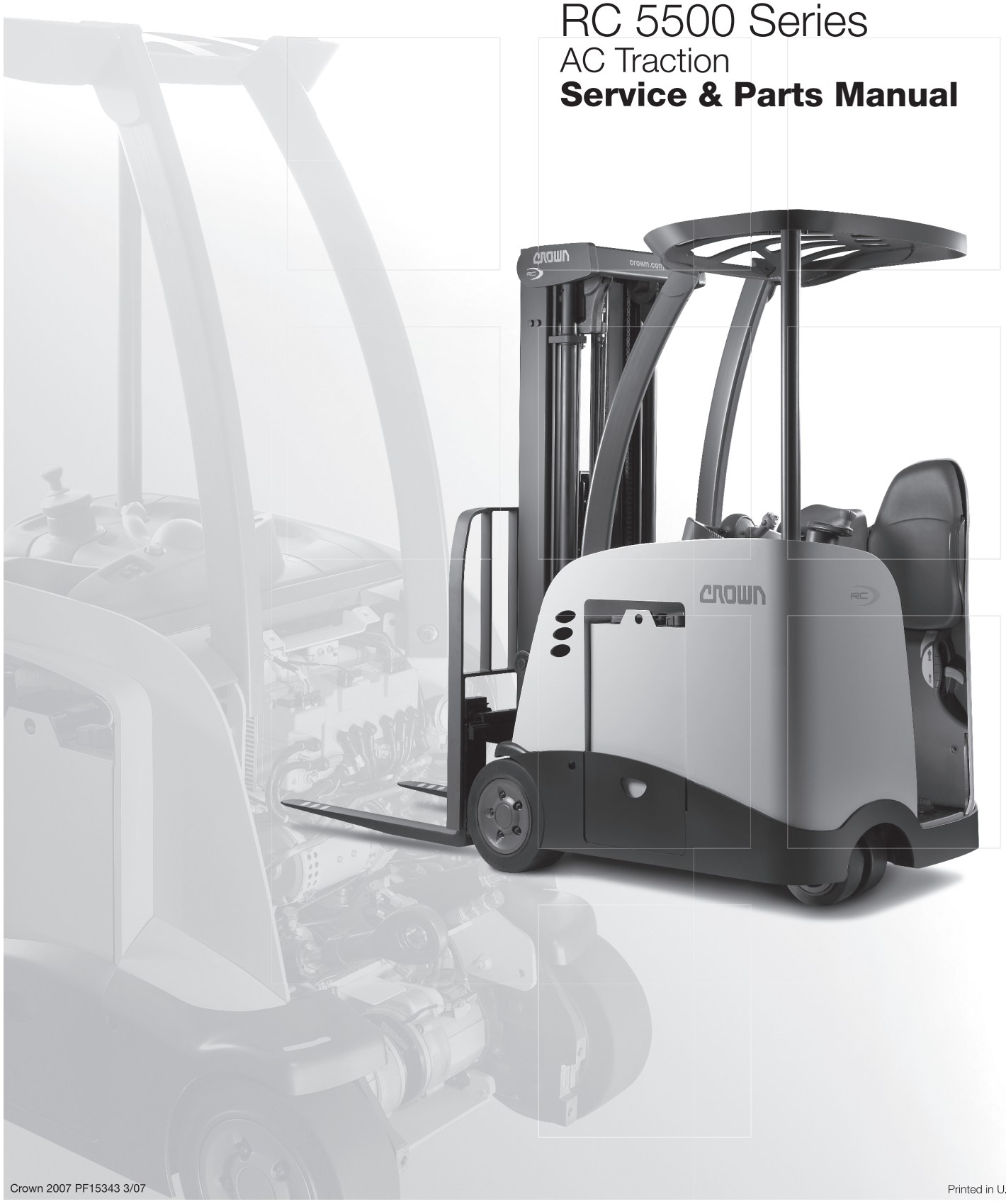
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Model No. _____

Serial No. _____

# RC 5500 Series
## AC Traction
## **Service & Parts Manual**




Crown 2007 PF15343 3/07

Printed in U.S.A.

https://truckmanualshub.com/

**New Bremen, Ohio 45869 USA**
Phone 419/629-2311
crown.com

## How to Order Service Parts

To obtain fast, efficient service when ordering repair parts for your Crown Material Handling Equipment, please follow this simple procedure:

1. Address all orders to your local Crown dealer.
2. Specify model and serial number of truck, which is shown on the serial number plate.
3. List the quantity needed.
4. List the part number and description, as shown in this Service Manual.
5. Show billing and shipping address.
6. Suggest fastest routing.

*Your authorized Crown dealer stocks a large number of standard service parts. In addition, he has a factory - trained Service Department to serve you.*

## Our Local Crown Dealer Is

**NAME** _____

**ADDRESS** _____

**CITY** _____

**STATE** _____ **ZIP** _____

**TELEPHONE** _____

The information in this manual is the latest available at the time of printing for the unit with which it was shipped. Should there be any variation due to vendor changes or special options on your unit, contact your Crown dealer or Crown at the above address.

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# General Maintenance Instructions

**WARNING**

*TO PREVENT SERIOUS RISK OF INJURY TO YOURSELF AND OTHERS OBSERVE THE FOLLOWING SAFETY INSTRUCTIONS*

Power industrial trucks may become hazardous if adequate maintenance is neglected. Therefore, adequate maintenance facilities, trained personnel and procedures should be provided.

Maintenance and inspection shall be performed in conformance with the following practices:

1. A scheduled planned maintenance, lubrication, and inspection system should be followed.
2. Only qualified and authorized personnel shall be permitted to maintain, repair, adjust and inspect truck.
3. Before leaving the truck—
   - Stop truck.
   - Fully lower the load engaging means.
   - Place directional controls in neutral.
   - Apply the parking brake.
   - Turn off power (power disconnect).
   - Remove key.
   - Block the wheels if truck is on an incline.
4. Before working on truck—
   - Raise drive wheel free of floor or disconnect power sources.
   - Use chocks or other positive positioning devices.
   - Block load engaging means, inter masts, or chassis before working under them.
   - Operation to check performance of truck or attachments shall be conducted in an authorized safe clearance area.
5. Before starting to operate truck—
   - Be in operating position.
   - Apply brake.
   - Place directional control in neutral.
   - Before operating truck, check functions of lift systems, directional control, speed control, steering, warning devices, brakes and any attachments if any used.
6. Avoid fire hazards and have fire protection equipment present. Do not use an open flame to check level, or for leakage of electrolyte and fluids or oil. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.
7. Keep shop well ventilated, clean and dry.
8. Brakes, steering mechanisms, control mechanisms, lift overload devices, guards, and safety devices shall be inspected regularly and maintained in a safe operating condition.
   - All guards must be installed to factory configuration and condition before operating truck. Do not operate truck if any guards or fasteners are damaged, improperly installed or missing.
9. Capacity, operation and maintenance instruction plates or decals shall be maintained in legible condition.
10. All parts of lift mechanisms shall be inspected to maintain them in safe operating condition.
11. All hydraulic systems shall be regularly inspected and maintained in conformance with good practice. Cylinders, valves, and other similar parts shall be checked to assure that “drift” has not developed to the extent that it would create a hazard.
12. Batteries, motors, controllers, limit switches, protective devices, electrical conductors, and connections shall be maintained in conformance with good practice. Special attention shall be paid to the condition of electrical insulation.
13. Trucks shall be kept in a clean condition to minimize fire hazards and facilitate detection of loose or defective parts.

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14. Modifications and additions which affect capacity and safe truck operation shall not be performed by the customer or user without manufacturers prior written approval. Capacity, operation and maintenance plates or decals shall be changed accordingly.

    – Adding electrical devices (radio, terminal, lights, etc.) or changing existing components or wiring can affect truck operation and could cause an accident. Contact authorized Crown personnel before adding to or changing the electrical system in any way.

    – For EE rated trucks, adding electrical devices could cause a fire or explosion, as well as void the EE rating. Written approval must be obtained from Crown prior to adding electrical device(s). Prior to use, inspection of installed device(s) must be performed by an appropriate nationally recognized testing laboratory (i.e. Underwriters Laboratories Inc) or the Authority Having Jurisdiction (see NFPA 505).

15. Care shall be taken to assure that all replacement parts are interchangeable with the original parts and of equal quality to that provided in the original equipment.

16. Be sure that any equipment added to the truck (terminal, fan, clipboard, etc.) is positioned so that it does not block your vision or interfere with safe and efficient operation of the truck.

For further information pertaining to operating and maintenance procedures:

- All trucks except Series B and Tow Tractors, refer to current ASME B56.1.
- Series B trucks, refer to current ASME B56.10.
- Tow Tractors, refer to current ASME B56.9.

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# Control of Hazardous Energy

## Lockout/Tagout

In the interest of safety and to ensure compliance with OSHA Regulations, (Standards - 29 CFR), control of hazardous energy (lockout/tagout) - 1910.147, Crown has developed guidelines for proper energy control when performing service and maintenance on the truck. Before performing any service or maintenance, review appropriate sections in this service manual for additional procedures to be followed.

In addition, Crown recommends that all mechanics wear appropriate protective items, such as safety glasses, work gloves, and steel-toed shoes, whenever performing service or maintenance work on Crown equipment.

## Battery

### Safety Rules

- Wear protective clothing, such as, rubber apron, gloves, boots and full-face shield when performing any maintenance on batteries. Do not allow electrolyte to come in contact with eyes, skin, clothing or floor. If electrolyte comes in contact with eyes, flush immediately and thoroughly with clean water. Obtain medical attention immediately. Should electrolyte be spilled on skin, rinse promptly with clean water and wash with soap. A baking soda solution (one pound to one gallon of water) will neutralize acid spilled on clothing, floor or any other surface. Apply solution until bubbling stops and rinse with clean water.
- Keep vent plugs firmly in place at all times except when adding water or taking hydrometer readings.
- Do not bring any type of flame, spark, etc., near the battery. Gas formed while the battery is charging, is highly explosive. This gas remains in the cells long after charging has stopped.
- Do not lay metallic or conductive objects on battery. Arcing will result.
- Do not allow dirt, cleaning solution or other foreign material to enter cells. Impurities in electrolyte has a neutralizing effect reducing available charge.
- If battery repair is planned, follow the battery manufacturer's instructions concerning repair practices and procedures.

### Battery Care

**CAUTION**

*Only qualified and experienced personnel should perform maintenance and repair on batteries.*

- Make certain the charger being used matches the voltage and amperage of the truck battery. This voltage is listed on the truck serial plate.
- Before disconnecting or connecting batteries to a charger, make sure charger is "OFF". If an attempt is made to do this while charger is "ON", serious injury to you, the battery and charger could result.
- Never use a match or lighter. Battery fumes are explosive.
- Make certain battery used meets weight, size and voltage requirements of truck (refer to serial plate). NEVER operate truck with an undersized battery.

### Charging

**CAUTION**

*Never smoke or bring flame near the battery. Gas formed during charging is highly explosive and can cause serious injury.*

Consult the charger manufacturer's manual covering your charger for hints on operation and maintenance.

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### Battery Removal

**CAUTION**

*When removing the battery, move truck to area intended for battery care. Floor must be level. Turn key switch or toggle switch to "OFF" position and remove key. Disconnect battery and lockout or tagout truck as described in Lockout - Tagout in this section. Never move battery partially from truck without roller stand in place. Lower load engaging means completely. If battery is removed with load engaging means raised, use hoist attached to mast to provide tip over protection. Do not allow any metallic object to come in contact with the top of the battery cells. This may cause a short circuit when removing, transporting the battery. Use an insulator (such as plywood) to cover the top of the battery before and during removal.*

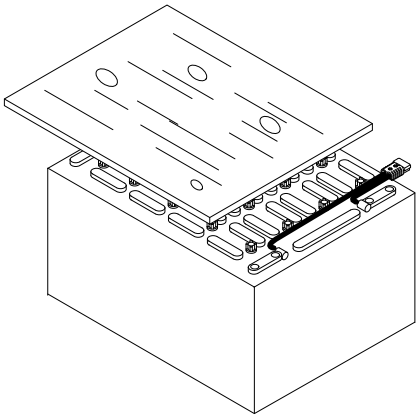


Figure 8251

### Battery Installation

**CAUTION**

*When installing the battery, move truck to area intended for battery care. Floor must be level. Turn key switch or toggle switch to "OFF" position and remove key. Lockout or tagout truck as described in Lockout - Tagout in this section. If battery was removed with load engaging means raised, use hoist attached to mast to provide tip over protection. Do not allow any metallic object to come in contact with the top of the battery cells. This may cause a short circuit when transporting or installing the battery. Use an insulator (such as plywood) to cover the top of the battery before and during installation.*

**CAUTION**

*Make certain same battery or battery of equal weight is loaded into truck for truck stability. See nameplate for minimum battery weight.*

### Lockout - Tagout

Always turn key switch to "OFF", remove key and apply tag to multi-function control handle Item 1 and/or steering tiller Item 2 with cable tie warning others truck is being serviced.

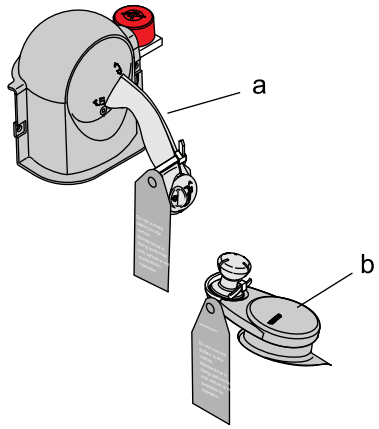



Figure 16925-01

a Multi-function Control Handle

b Steering Tiller

When maintenance is to be performed and the battery will be left in the truck, remove the main power fuses and install a commercially available lockout device on the battery connector.

When maintenance is performed and the battery is removed from the truck, remove main power fuses, install a lockout device on the trucks battery connector if possible, or if possible install a tag with a cable tie on the trucks battery connector so it cannot be removed easily warning that the truck is not available for operation.



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## Brake Release Instructions

RC 5500 series trucks ship with spring applied/electrically released brakes. Power must be applied to the brake circuit to release brakes for towing/unloading.

Equipment required: Crown wire harness part number 139956-001 or equivalent.

### WARNING

*Extreme care must be taken when using this method to release the brakes. With brakes released on uneven surfaces, vehicle will roll.*

#### No battery installed method

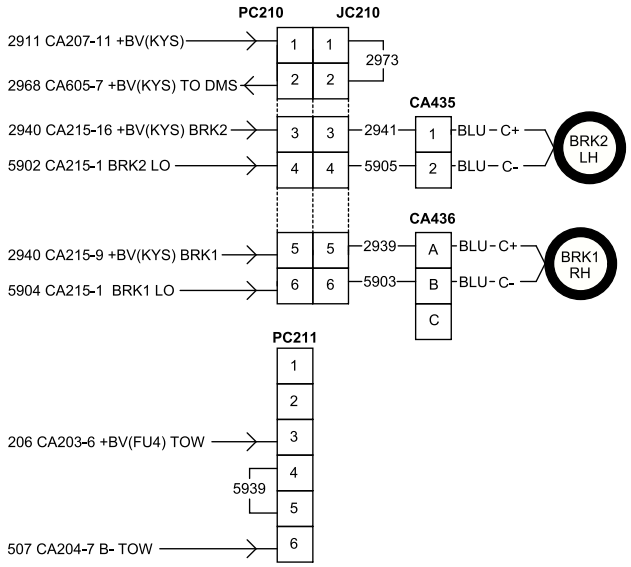
1. Open vehicle "desktop" cover and disconnect harness connector CA210 (near power fuses).
2. Plug harness (139956-001) into harness plug JC210.
3. Apply 18-24 volts (DC) to harness to release brakes.
4. Once vehicle has been moved, remove power to harness and reconnect CA210.

### CAUTION

*Do not apply more than 28 volts (DC) to brake release harness. Brake coil damage will occur.*

#### Battery installed method

1. With battery unplugged from vehicle, unplug harness connector CA210 (located under desktop cover).
2. Plug JC210 into PC211 (located in same area) on vehicle.
3. Plug battery into vehicle battery connector to release brakes.
4. Once vehicle has been moved, disconnect battery and reconnect CA210.




**Tow Condition Note:**
**-** Disconnect PC210 From JC210
- Connect PC211 Into JC210

Figure 16926

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## Capacitance

Due to capacitance voltage present in the traction motor controller and lift motor controller, whenever performing maintenance which may permit contact with the bus bars and associated power cables, discharge the capacitors.

- Move truck to a secure non-traffic maintenance area with a level floor.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Disconnecting the battery will discharge the capacitors. Once the dash display flashes, the capacitors are discharged. Two alternative methods of discharging these capacitors are to disconnect the battery and hold the key switch in the "start" position for 10 seconds or disconnect the battery and connect a 200 ohm, 2 watt resistor between the positive and negative terminals on the controller.
- Turn key switch to "OFF", remove key.

Truck Modules

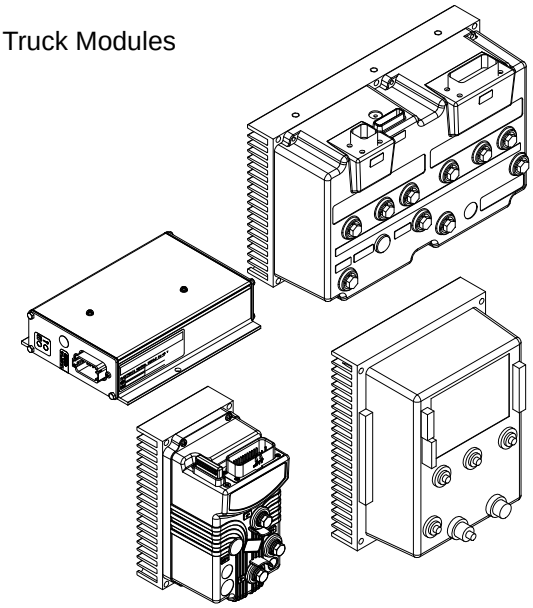


Figure 16927

## Hydraulic

**WARNING**

*AVOID HIGH PRESSURE FLUIDS – Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.*
*Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.*

When maintenance is to be performed on the hydraulic system, make certain the hydraulic system is not under pressure by:

- Move truck to a secure non-traffic maintenance area with a level floor.
- No load on forks.
- Completely lower load engaging means (mast) or, if required for maintenance, block mast sections at the appropriate height as described in Mast of this section.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Depressurize hydraulic reservoir by momentarily opening cap on reservoir before disconnecting any hydraulic lines or components.
- Operate hydraulic levers to remove any hydraulic pressure that may be present.


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## Towing Truck

Refer to the following guidelines when towing the truck:

### Towing by Pulling in Power Unit First Direction

**WARNING**

- *Towed truck must always maintain three contact points with floor and/or towing device.*
- *Do not make sharp turns when lifting/towing truck.*
- *Towed vehicle forks should be empty and no more than 305 mm (12.0 in) off floor. If possible, tilt forks back and center sideshifter.*
- *Extreme care must be taken when using this method to release the brakes. With brakes released on uneven surfaces, vehicle will roll.*
- *Provide a safe distance for truck to coast to stop.*
- *Excessive acceleration by towing vehicle, or drag caused by towed vehicle (i.e., brake drag, drive unit drag, wheel drag, etc.) will greatly increase requirements to pull or push a vehicle.*

Preparing Truck For Towing:

- Power must be applied to the brake circuit to release brakes for towing. Refer to Brake Release Instructions in this section.
- Turn power OFF.

**WARNING**

*Truck will be difficult to steer. Use extreme caution.*

- Driver will be required to steer truck, as there is no power assist from hydraulics. Truck will coast to stop.

Towing Device Requirements:

- Towing device/vehicle must have pulling/braking capacity greater than 3600 kg (8000 lb).
- Brakes on towed truck will not operate.

**WARNING**

*Towing mechanism attachment must not intrude more than 40 mm (1.6 in) into floorboard cavity. Failure to observe this WARNING could result in damage to floorboard components.*

- When attaching towing device to lift truck to be towed, a slotted hole has been provided on rear bottom side of power unit. Firmly attach tow device in this area. Fasten so as not to loosen or disengage during towing.

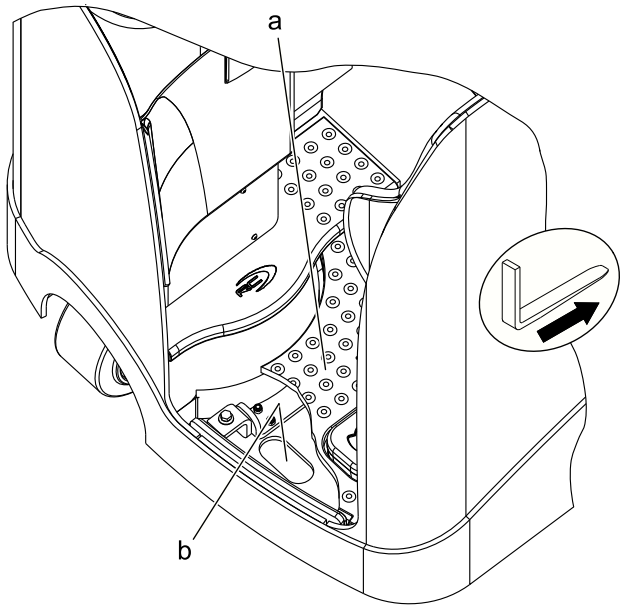



Figure 18645

a Floorboard (cutout to show slotted hole)

b Slotted Hole

Towing Guidelines:

- Maximum travel speed while towing truck is 3.2 kph (2 mph).

**WARNING**

*Truck will be difficult to steer. Use extreme caution.*

- Driver will be required to steer truck, as there is no power assist from hydraulics.
- Truck will coast to stop.
- Operator actions: see WARNINGS above.

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## Towing by Pulling in the Forks First Direction

**WARNING**

*Towing by pulling in the forks first direction is not recommended.*

## Towing by Lifting Truck and Pulling in Power Unit First Direction

**WARNING**

- *Do not lift towed truck higher than 51 mm (2.0 in) off floor.*
- *Towed truck must always maintain three contact points with floor and/or towing device.*
- *Do not make sharp turns when lifting/towing truck.*
- *Towed vehicle forks should be empty and no more than 305 mm (12.0 in) off floor. If possible, tilt forks back and center sideshifter.*
- *Extreme care must be taken when using this method to release the brakes. With brakes released on uneven surfaces, vehicle will roll.*

Preparing Truck For Towing:

- Power must be applied to the brake circuit to release brakes for towing. Refer to Brake Release Instructions in this section.
- Turn power OFF.

Towing Device Requirements:

- Towing device must have lifting capacity of 2268 kg (5000 lb) at load position at slot opening in bottom of power unit.
- Towing device must have pulling/pushing/braking capacity greater than 3600 kg (8000 lb).
- Ensure that a stem or ball capable of stated pulling/pushing/braking capacity, and of such a design as to prevent disengagement during towing operation, is used.
- When attaching towing device to lift truck to be towed, engage in slot located in rear, lower portion of power unit skirt.

Towing Guidelines:

- Maximum travel speed while towing truck is 3.2 kph (2 mph).

**WARNING**

*Truck will be difficult to steer. Use extreme caution.*

- No operator should be on lifted and towed truck.
- Operator actions: see WARNINGS above.

## Towing by Lifting Truck and Pulling in the Forks First Direction

**WARNING**

*Towing by lifting truck and pulling in the forks first direction is not recommended.*



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## Lifting and Blocking

- Move truck to a secure non-traffic maintenance area with a level floor.
- No load on forks.
- Lockout or tagout truck as described in Lockout - Tagout in this section.

**Side**

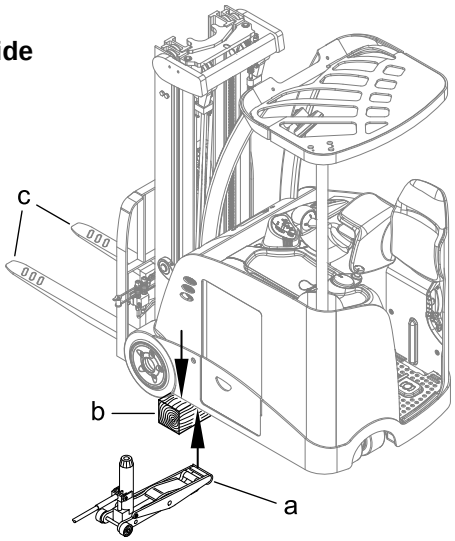



Figure 16928-01

a Use Serated Pads on Jack and Position Jack 75 mm (3.0 in) Inward on a Flat Surface

b Hardwood Block One Side of Truck Only to Height as Required – Not to Exceed 162 mm (8.0 in)

c Do Not Raise Forks More than 380 mm (15 in) from Floor

**WARNING**

*Truck stability decreases dramatically if truck skirt is raised more than 140 mm (5.5 in) or 15°. Attach sling and overhead lifting device to all cross members of the mast to prevent truck from tipping over when raising one side of the truck.*

**NOTES:**

- Hydraulic Jack Capacity: 3620 kg (8000 lb)
  - Crown Part Number: 122599
  - Collapsed Height Minimum: 60 mm (2.25 in)
  - Raised Height Maximum: 400 mm (16 in)

**Steer Wheel**

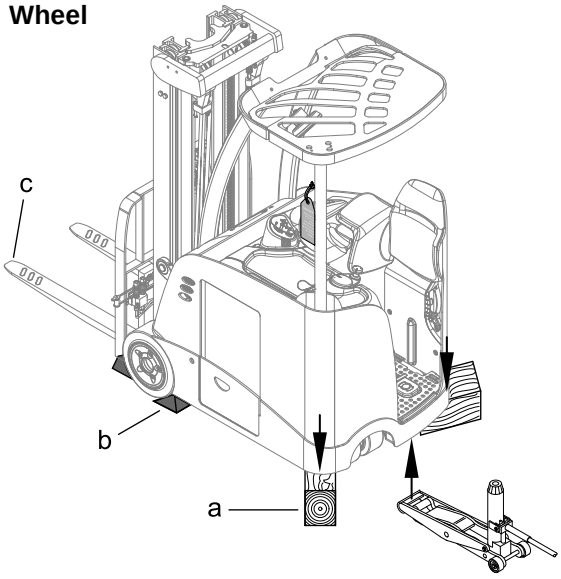



Figure 16929-01

a Use Hardwood Blocks to Set Height as Required – Not to Exceed 162 mm (8.0 in)

b Wheel Chock Both Drive Wheels

c Do Not Raise Forks More than 380 mm (15 in) from Floor

**NOTE**

*Position hardwood blocks as shown when lifting and blocking the truck.*

## Mast

### Blocking Masts

Use 100 x 100 mm (4 x 4 in) or bigger hardwood blocks of appropriate length for supporting mast channels. Block both mast rails of each stage to maintain stability.

Remove any carriage mounted accessory (i.e., carton clamp, etc.) except sideshifters before blocking masts. These accessories add significant weight to the mast.

- Move truck to a secure non-traffic maintenance area with a level floor.
- Chock wheels (refer to Lifting and Blocking in this section).
- Connect battery.
- Raise forks and position blocks under second stage mast as shown.
- Using a clamp or ratchet tie down, secure blocks to mast channel as shown.
- Lower mast and position appropriate length blocks under third stage mast as shown.
- Lower mast and position appropriate length block under fourth stage mast (or inner) on quad mast as shown.
- Using a clamp or ratchet tie down, secure blocks to mast channel or second stage block as shown.
- Lower fork carriage until carriage rests on stops or place blocks under carriage and lower until weight rests on blocks.
- Lockout or tagout truck as described in Lockout - Tagout in this section.

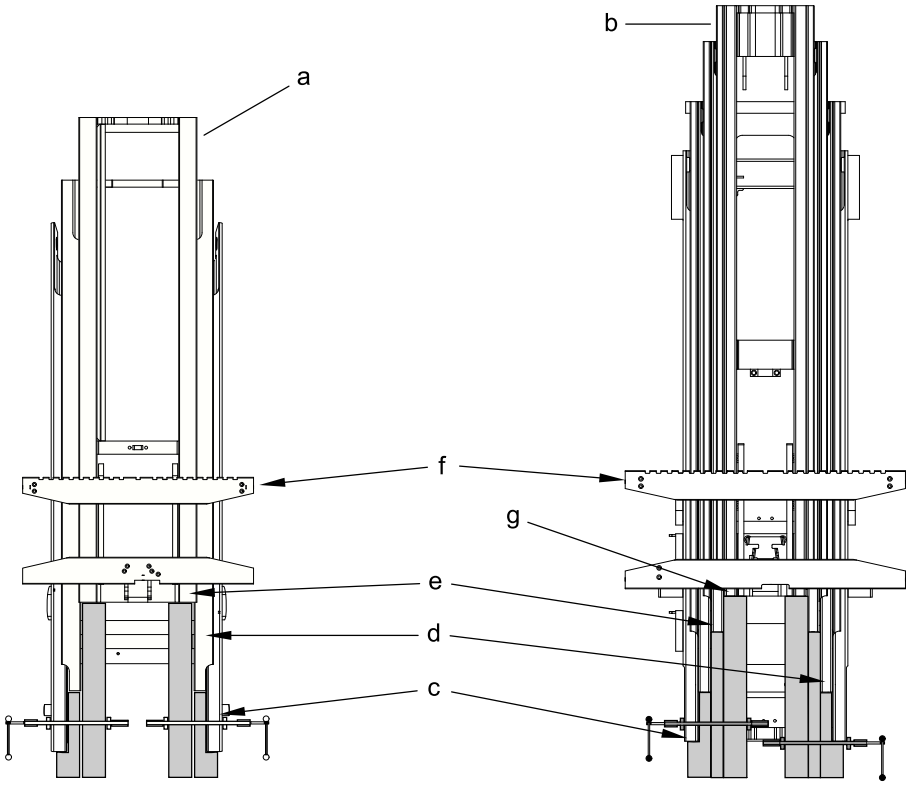



Figure 16930-01

a TT Mast
b Quad Mast
c Second Stage Mast
d First Stage Mast (Mainframe or Outer Mast)
e Third Stage Mast
f Fork Carriage (Shown Raised Slightly for Clarity)
g Fourth Stage Mast (or Inner)


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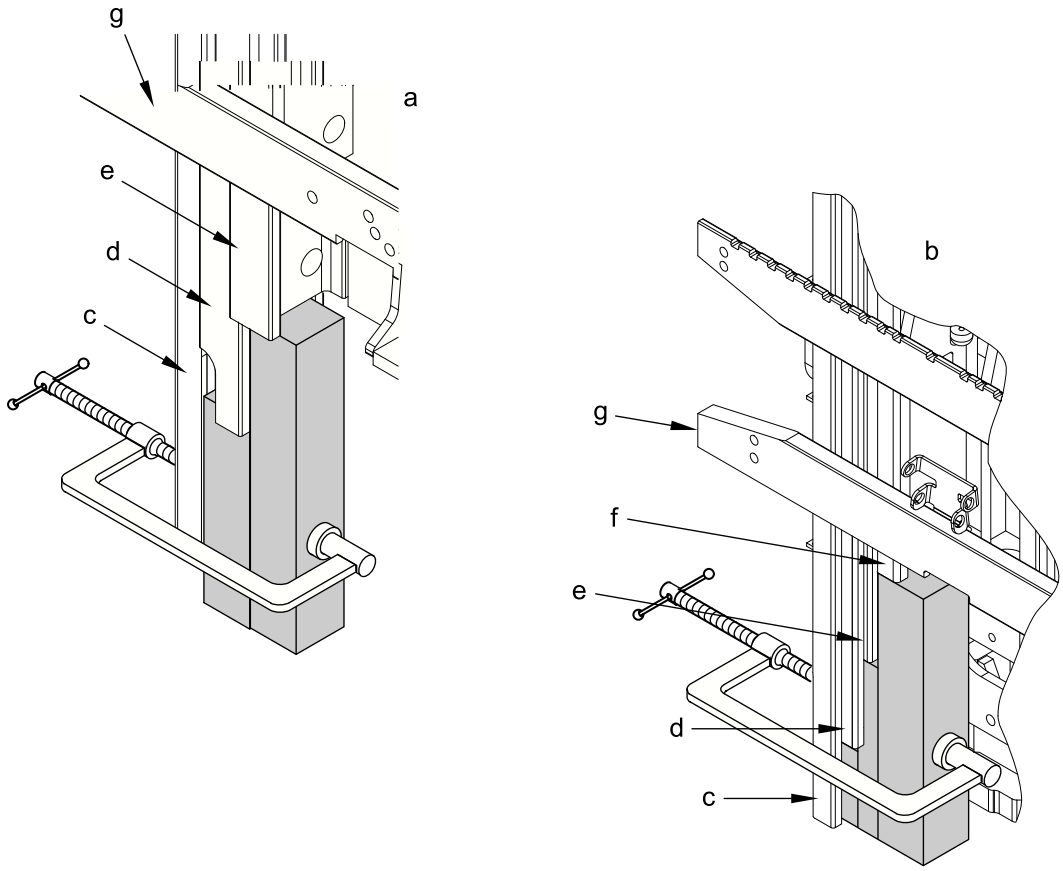



Figure 16931-01

a TT Mast
b Quad Mast
c First Stage (Mainframe or Outer Mast)
d Second Stage
e Third Stage
f Fourth Stage (or Inner Mast)
g Fork Carriage

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## Disconnecting Tilt Cylinder

**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.*

When the tilt cylinders are disconnected from the hydraulic system or from the mounting brackets, the mast must be secured to keep the mast from pivoting toward, or away from the truck.

- Move truck to a secure non-traffic maintenance area with a level floor.
- Lower load engaging means (mast) completely. No load on forks.
- Lockout or tagout truck as described in Lockout - Tagout in this section.
- Chock wheels (refer to Lifting and Blocking in this section).
- Attach a sling and lifting device to all mast top cross braces so movement will be minimal when tilt cylinders are disconnected.

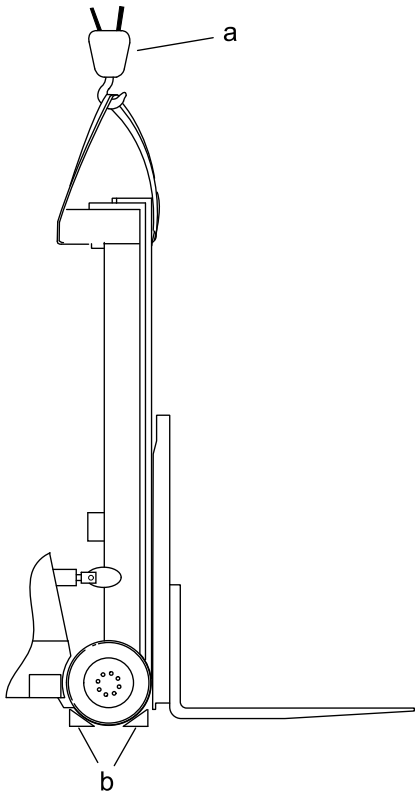



Figure 16932-01

a Attach Lifting Device to All Top Cross Braces and Center to Maintain Balance

b Wheel Chocks



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## Removing Mast

1. Move truck to a secure non-traffic maintenance area with a level floor.
2. Lockout or tagout truck as described in Lockout - Tagout in this section.
3. Remove battery.
4. Remove forks.
5. Operate all hydraulic levers to remove any hydraulic pressure in the system.
6. Disconnect lift cylinder hydraulic lines, accessory cables and accessory hydraulic lines between power unit and mast if present. Use container to catch hydraulic oil.
7. Disconnect wiring between mast and power unit.
8. Support mast as described in Disconnecting Tilt Cylinders in this section.
9. Chain mast sections together at the upper cross-braces. Chain fork carriage to lower mast cross-brace. This will keep carriage and mast sections from moving when the mast is laid down.
10. Remove retaining rings connecting tilt cylinders to the mast.
11. Remove pivot block mounting bolts. If pivot blocks are to be removed, note number and location of shims between pivot blocks and mast.
12. Move mast away from truck and lay mast on level floor with the truck side of the mast on the floor.

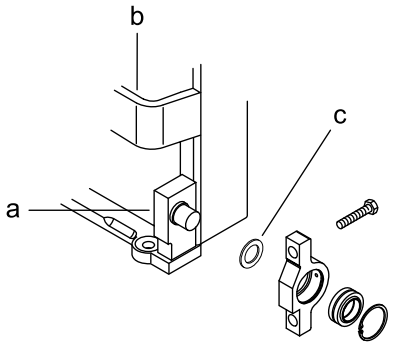



Figure 16934-01

a Power Unit
b Mast
c Shim

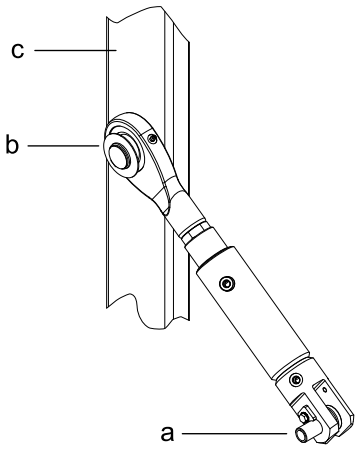



Figure 16933-01

a Mounts to Truck Frame
b Remove Retaining Ring
c Part of Mainframe

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## Notes:

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# Cleaning of Material Handling Equipment

## Cleaning Methods

The preferred method of cleaning built up dirt and dust from electric material handling equipment is dry pressured air. For localized degreasing, use of an appropriate solvent is recommended.

If these methods are not effective and power washing is the only alternative, extreme care must be exercised. Electrical components including connectors, terminal boards and wiring can be permanently damaged from water and/or cleaning solvents. Mineral and chemical residue left on or in components (i.e., circuit boards, contactors, encoders, switches, potentiometers, etc.) after washing is a proponent of oxidation and corrosion.

Functional integrity of contaminated components may be questionable. Nuisance fault logging, intermittent operation or immediate failure could be the resultant of power washing. For these reasons all electronic components including motors must be protected. Component removal is the best method to eliminate the risk of damage.

Power washing will also remove and/or destroy lubricants in or on the surface of shafts, unsealed bearings, hinges, exposed gears, bushings, chains, linkages, etc. These Items must also be protected or properly lubricated after cleaning.

Consideration must also be given to metal surfaces. The cleaning process can strip away paint and protective coatings applied to components (i.e., hydraulic lines, terminal strips, linkages) for freezer/corrosion environment. Paint and/or protective coating must be reapplied to these areas to reduce the chance of oxidation and corrosion.

Before installing removed components, lubricating or returning the equipment to service it must be free of solvent residue and thoroughly dry.

**Crown Cleaning Products Chart**

| Cleaner Type | Part Number | Package Quanity |
|---|---|---|
| Degreaser & Cleaner | 363105-001<br>363105-012 | 20 oz. Can<br>(12) 20 oz. Cans |
| All Purpose Cleaner | 363114-001<br>363114-012 | 20 oz. Can<br>(12) 20 oz. Cans |
| Glass Cleaner | 363101-001<br>363101-012 | 20 oz. Can<br>(12) 20 oz. Cans |
| Waterless Hand Cleaner | 363111-001<br>363111-012 | 15 oz. Tube<br>(12) 15 oz. Tubes |
| Pumiced & Smooth Hand Cleaner | 363112-001<br>363112-004 | 1 Gallon Jug<br>(4) 1 Gallon Jugs |
| Wall Mounted Deluxe Soap Dispenser | 363122 | Used with 363112-001 |
| Tough On Grease | 063009-005 | 1 Gallon Jug |

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## Notes:

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# 1 INTRODUCTION

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## Notes:

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## Introduction

This manual is intended for the service technician who is seeking information about maintenance and service replacement parts. It contains a section on troubleshooting which will enable a qualified technician to locate and solve problems which may occur.

## Operation Instructions

This manual does not contain operator instructions. Operator Instructions in tag or booklet form are sent with each truck. Additional copies can be ordered if required. These booklets are for you and your personnel to insure years of safe, trouble-free operation of your Crown Lift Truck. For standup rider counterbalance operator instructions, refer to Crown publication, "Operator Manual RC 5500 Series".

## Operater Training

Crown produces a complete series of operator training programs available through your local Crown dealer. A complete listing of these and other available programs can also be found under "Training" on www.crown.com.

## Service Training

Complete Service Training is available for the lift truck technician covering all Crown Lift Trucks, module systems, wire guidance, hydraulic and electrical systems. To obtain more information concerning service training, contact your Crown Dealer or under "Training" on www.crown.com.

## Replacement Parts

When ordering replacement parts from this manual, always specify, along with part number, model and serial number of the truck. This information will further enable us to give correct, fast and efficient service.

For current part number of service manuals, operator manuals, operator training programs, truck capacities and technical specifications, contact your local dealer or at www.crown.com.

This manual is arranged according to major sections which covers maintenance and replacement parts. The sectional descriptions are as follows:

| Maintenance | | Replacement Parts | |
|---|---|---|---|
| Section | Description | Section | Description |
| M1 | Lubrication and Adjustment | 1 | Power Unit Parts |
| M2 | Hydraulic | 2 | Hydraulic Parts |
| M3 | Drive Unit | 3 | Drive Unit Parts |
| M4 | Electrical | 4 | Electrical Parts |
| M5 | Brake | 5 | Brake Parts |
| M6 | Steering | 6 | Steering Parts |
| M7 | Lifting Mechanism | 7 | Lifting Mechanism Parts |
| M8 | Cylinders | 8 | Cylinder Parts |
| M9 | Platform | 9 | Platform Parts |
| M10 | Glossary | 10 | Labels and Decals |

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The data plate for the RC 5500 series truck is located on the battery compartment wall and includes a model number and truck data number. From these two numbers, you can identify the truck model, series, series updates, determine relative size and performance, capacity and specific truck data. The following pages explain the model & truck data numbering system.

The example of the model number shown (RC 5530 -30) is a RC 5500 series. It has an AC traction motor with a 462 mm (18.19 in) battery compartment. It also has DC hydraulics and has a capacity of 1360 kg (3000 lbs).

*Actual rated capacity may vary, depending on special equipment or modifications. Consult capacity plate located on the overhead guard.

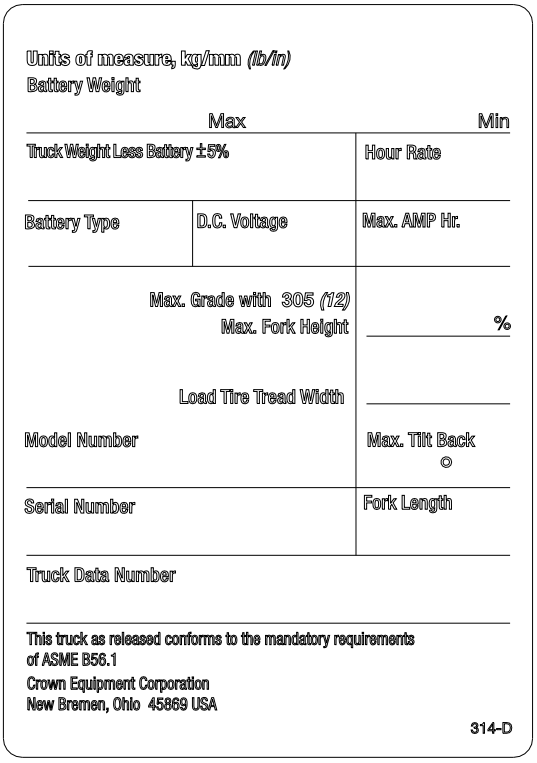



Figure 14936

**MODEL NUMBER EXAMPLE**

**Series Update**
Significant change(s) to the product that would not merit a new series number (generation).
5 = AC traction as standard (only) offering.

**Hydraulics System**
0 = DC Hydraulics
5 = AC Hydraulics

***Capacity**
30 = 1360 kg (3000 lbs)
35 = 1590 kg (3500 lbs)
40 = 1815 kg (4000 lbs)
1.5 = 1500 kg (3307 lbs)
1.6 = 1600 kg (3527 lbs)
1.8 = 1800 kg (3968 lbs)

**Image Generator**
RC - Rider Counterbalance

**RC5530 -30**

**Series**
Major technical and design changes making the product a new and improved generation.

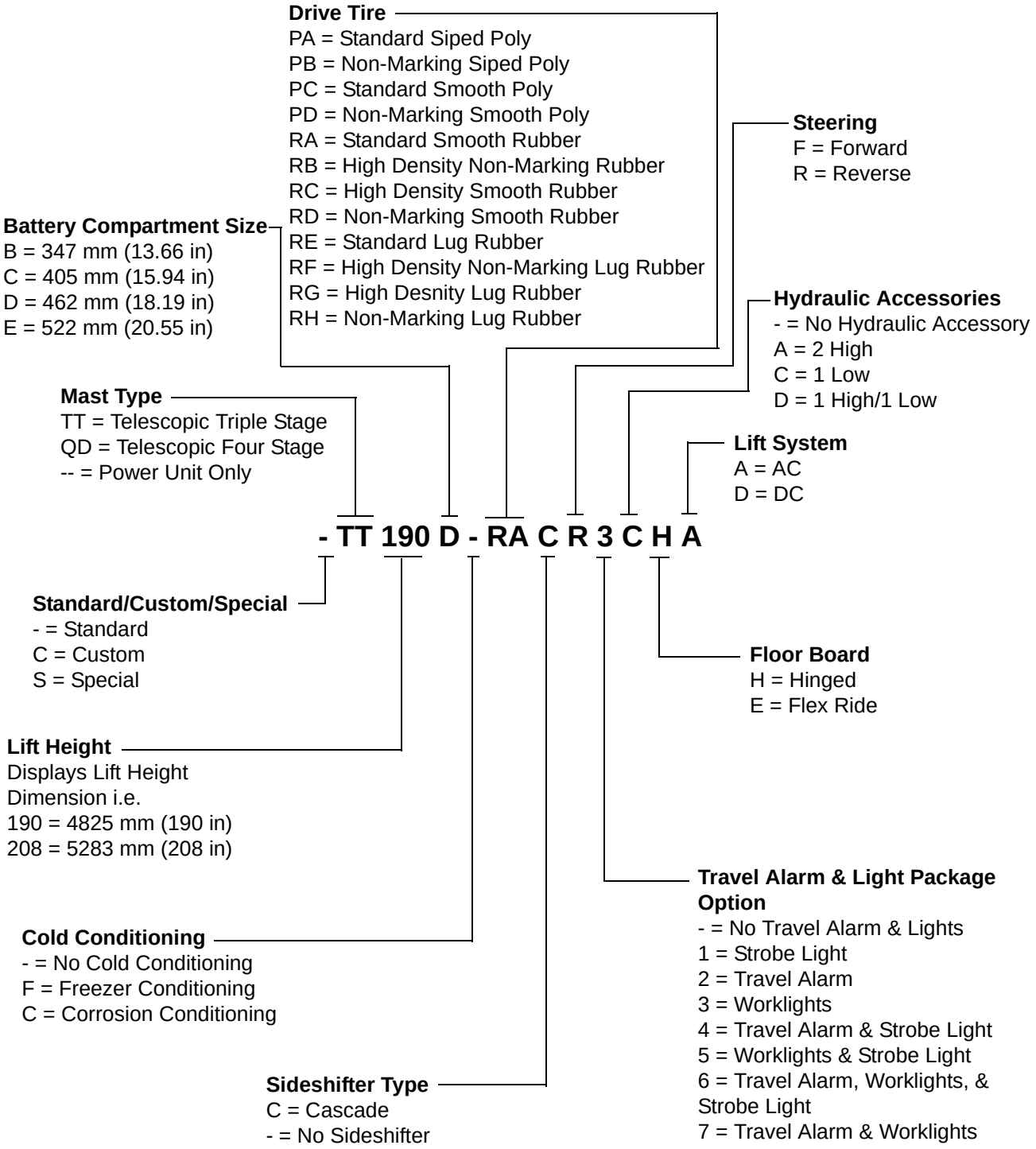
**Base or Custom**
C = Custom (fleet) truck
No letter = Base truck

**Relative Size or Performance**
1 = 347 mm (13.66 in) battery compartment
2 = 405 mm (15.94 in) battery compartment
3 = 462 mm (18.19 in) battery compartment
4 = 522 mm (20.55 in) battery compartment

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Truck data numbers provides you and your Crown dealer with a wealth of information to insure the selection of proper parts for your Crown truck. You may simply provide this number to your Crown dealer, or use the following breakdown if selecting your own part numbers or service information from this manual.



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## Notes:

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# *LUBRICATION & ADJUSTMENT*

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## Notes:

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## Lubrication and Adjustment

To obtain maximum life of any industrial equipment, a well planned maintenance program (PM), performed by qualified technical personnel should be followed. In conjunction with, and an integral part of, any planned maintenance program should be daily operator input. Operator involvement can greatly reduce truck down time, assist in determining planned maintenance (PM) schedules and ultimately save money. For these reasons, Crown recommends a checklist similar to the Operators Daily Checklist shown below.

Before performing maintenance to any unit, it should be taken to an area set aside for maintenance or a section where there is adequate space to perform required work. This is a must to insure the safety of others and to insure that proper maintenance is performed to the unit.

If desired, padded packs of this checklist (OF-3772) are available through your Crown dealer.

CROWN

Operators
Daily Checklist

Model _____ Serial No. _____ Week beginning _____ 20____

Shift No. _____

Truck No. _____

This check must be made by the truck operator daily at the start of the shift. Certain items listed are not included on some models. Check all items applicable to unit noted above.

Check (✓) appropriate box [OK] OK [ ] Needs repair or adjustments (give details in comments section)

| | | MONDAY | TUESDAY | WEDNESDAY | THURSDAY | FRIDAY | SATURDAY | SUNDAY |
|---|---|---|---|---|---|---|---|---|
| VISUAL CHECKS | **DAMAGE** bent, dented or broken parts | OK | OK | OK | OK | OK | OK | OK |
| | **LEAKS** drive unit, brakes, hydraulics | OK | OK | OK | OK | OK | OK | OK |
| | **TIRES & WHEELS** drive wheels, load wheels, casters | OK | OK | OK | OK | OK | OK | OK |
| | **FORKS** in place, properly secured | OK | OK | OK | OK | OK | OK | OK |
| | **CHAINS, CABLES & HOSES** in place | OK | OK | OK | OK | OK | OK | OK |
| | **HOUR METER** operating | OK | OK | OK | OK | OK | OK | OK |
| | **BATTERY** water level, vent caps in place, cleanliness | OK | OK | OK | OK | OK | OK | OK |
| | **BATTERY CONNECTOR** cracked, burnt, tight fitting | OK | OK | OK | OK | OK | OK | OK |
| | **GUARDS** overhead, load backrest, battery retainer | OK | OK | OK | OK | OK | OK | OK |
| | **SAFETY DEVICES** flashing lights, indicator lights, safety shield operator harness, warning labels, etc. in condition as equipped | OK | OK | OK | OK | OK | OK | OK |
| | **HORN** sounds | OK | OK | OK | OK | OK | OK | OK |
| OPERATIONAL CHECKS | **STEERING** no binding, no excessive play | OK | OK | OK | OK | OK | OK | OK |
| | **TRAVEL CONTROLS** all speed ranges, forward & reverse, no unusual noise | OK | OK | OK | OK | OK | OK | OK |
| | **HYDRAULIC CONTROLS** raise & lower, tilt forward & rearward reach in & out, sideshift right & left, etc., no unusual noise | OK | OK | OK | OK | OK | OK | OK |
| | **BRAKES** stop truck within required distance, work smoothly, brake override functions | OK | OK | OK | OK | OK | OK | OK |
| | **PARKING BRAKE** seat, hand, foot | OK | OK | OK | OK | OK | OK | OK |
| | **BATTERY CHARGE** discharge meter in full green or 75% charge after raising forks | OK | OK | OK | OK | OK | OK | OK |
| | **POWER DISCONNECT** cuts off all electric power | OK | OK | OK | OK | OK | OK | OK |
| | **ATTACHMENTS** function properly, no unusual noise | OK | OK | OK | OK | OK | OK | OK |
| | **LIMIT SWITCHES** travel limit, lift limit, tilt limit, etc. | OK | OK | OK | OK | OK | OK | OK |
| | **HOUR METER READING** | | | | | | | |
| | **OPERATOR'S INITIALS** | | | | | | | |
| | **SUPERVISOR'S OK** | | | | | | | |

- If the truck is found to be in need of repair or in any way unsafe, or contributes to an unsafe condition, the matter shall be reported immediately to the designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

If during operation, the truck becomes unsafe in any way, the matter shall be reported immediately to the designated authority, and the truck shall not be operated until it has been restored to safe operating condition.

Do not make repairs or adjustments unless specifically authorized to do so.

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Figure 14990

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The following is a list of lubricants and maintenance products recommended when doing Planned Maintenance on Crown Lift Trucks.

**Lubrication Identification Chart**

| Type of Lubricant | | Part Number | Package Quantity |
|---|---|---|---|
| A | Gear Lube 75W-90 (Synthetic) | 363514-001<br>363514-002<br>063002-044 | 1 Quart<br>12 Quart/Case<br>5 Gallon |
| B | Grease (Multi-Purpose) | 063002-034<br>063002-045 | 14 oz Cartridge<br>(40) 14 oz Cartridges |
| BB(1) | Grease (Low Temperature) | 063002-017<br>063002-046 | 14 oz Cartridge<br>(40) 14 oz Cartridges |
| BBB | Food Grade Grease (Multi-Purpose) | 363002-001<br>363002-030 | 14 oz Cartridge<br>(30) 14 oz Cartridges |
| C | Oil (SAE 40) | | |
| D | Hydraulic Oil | 363504-101<br>363504-106 | 1 Gallon<br>(6) 1 Gallon |
| DD(1) | Hydraulic Oil (Low Temp) | 363505-101<br>363505-106 | 1 Gallon<br>(6) 1 Gallon |
| DDD | Hydraulic Oil - DTE24 | 063001-021 | 1 Gallon |
| E | Channel Grease | 063002-024<br>063002-022 | 14.5 oz Cartridge<br>35 lb Pail |
| F | Gear Grease | 063002-024<br>063002-022 | 14.5 oz Cartridge<br>35 lb Pail |
| G | Chain & Cable Lube | 363107-001<br>363107-012 | 15 oz Can<br>(12) 15 oz Cans |
| | Premium Chain & Cable Lube | 363115-001<br>363115-012 | 12 oz Can<br>(12) 12 oz Cans |
| H | Final Finish - Rubber & Vinyl Dressing | 363129-001<br>363129-012 | 11 oz Can<br>(12) 11 oz Cans |
| I | Grease (Lift Pump Coupling) | 063002-039<br>127801S | 1 lb Jar<br>1 oz Jar |
| J | Brake Fluid - Dot 5 | 063004-002<br>063004-003 | 12 oz<br>1 Gallon |
| K | Grease (Wheel Bearing) | 063002-034<br>063002-045 | 14 oz Cartridge<br>(40) 14 oz Cartridges |
| L | Metal Assembly Spray | 063002-021 | 16 oz Spray |
| M | Silicon Grease (Clear) | 063002-020 | 5.3 oz Tube |

(1) Trucks operated in below freezing temperatures must use Low Temp Hydraulic Oil & Grease.

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| Lubrication Identification Chart | | | |
|---|---|---|---|
| Type of Lubricant | | Part Number | Package Quantity |
| N | Brake & Parts Cleaner | 363102-001<br>363102-012 | 14 oz Can<br>(12) 14 oz Cans |
| | Low VOC Brake & Parts Cleaner | 363103-001<br>363103-012 | 14 oz Can<br>(12) 14 oz Cans |
| | Non-Flammable Brake & Parts Cleaner | 363116-001<br>363116-012 | 19 oz Can<br>(12) 19 oz Cans |
| O | Penetrating Lubricant | 363104-001<br>363104-012 | 20 oz Can<br>(12) 20 oz Cans |
| P | Premium Formula Multi-Purpose Grease | 363108-001<br>363108-012 | 11 oz Can<br>(12) 11 oz Cans |
| Q | White Lithium Grease | 363110-001<br>363110-012 | 11 oz Can<br>(12) 11 oz Cans |
| R | Choke & Carburetor Cleaner | 363109-001<br>363109-012 | 15 oz Can<br>(12) 16 oz Cans |
| S | Contact Cleaner - Non-Flammable | 363106-001<br>363106-012 | 10 oz Can<br>(12) 10 oz Cans |
| | Contact Cleaner | 363128-001<br>363128-012 | 11 oz Can<br>(12) 11 oz Cans |
| T | Electrical Connector Oxidation & Corrosion Inhibitor | 127189-001 | 30 cc |
| U | Battery Cleaner | 363124-001<br>363124-012 | 18 oz Can<br>(12) 18 oz Cans |
| V | Battery Protector | 363125-001<br>363125-012 | 15 oz Can<br>(12) 15 oz Cans |
| W | Food Grade Machine Lubricant | 363127-001<br>363127-012 | 12 oz Can<br>(12) 12 oz Cans |
| X | Food Grade Silicone Spray | 363126-001<br>363126-012 | 11 oz Can<br>(12) 11 oz Cans |

| Alternate Lubricants & Fluids Chart | | | |
|---|---|---|---|
| Type of Lubricant | | Product Name | Manufacturer / Distributor |
| A | Gear Lube 75W-90 (Typical) | Mobilube1 SHC 75W-90* API GL-4<br>Dubois EG 0-75 & 90* | Mobil<br>Dubois Chemical |
| B | Grease (Multi-Purpose) | Mobilgrease XHP 222 Special<br>Union Unoba EP No 2<br>Retinax A(1)<br>LM Grease<br>Unirex EP-2 | Mobil<br>Union 76 Co.<br>Shell<br>Burmah Castrol<br>Exxon |
| BB | Grease (Low Temp) (2) | Lubriplate<br>Alvania RA(1)<br>Helveum O(1) | Fiske Bros Refining Co.<br>Shell<br>Burmah Castrol |
| BBB | Food Grade Grease (Multi-Purpose) | Petro Canada Purity FG | Petro Canada |
| C | Oil (SAE 40) | | |
| D | Hydraulic Oil | Crown | Crown |
| DD | Hydraulic Oil (Low Temp) (2) | Crown | Crown |
| DDD | Hydraulic Oil - DTE24 (3) | Mobil DTE 24 | Mobil |
| E | Channel Grease | Factran #2 | Standard Oil Co. |
| F | Gear, Channel & Shaft Grease | Molykote BR-2 Plus | Dow Corning |
| G | Chain & Cable Lube | Crown | Crown |
| | Premium Chain & Cable Lube | Crown | Crown |
| H | Final Finish - Rubber & Vinyl Dressing | Crown | Crown |
| I | Grease (Lift Pump Coupling) | Nyogel 774F-MS | NYE Lubricants |
| J | Brake Fluid - Dot 5 | Q2-1141 Silicon Brake Fluid | Dow Corning |
| K | Grease (Wheel Bearing) | Mobilgrease XHP 222 Special<br>Unirex EP-2<br>Lubriplate No. 1242(1) | Mobil<br>Exxon<br>Fiske Bros. Refining Co. |
| L | Metal Assembly Spray | Dow Corning | Dow Corning |
| M | Silicon Grease (Clear) | Dow Corning 111 Compound | Dow Corning |
| N | Brake & Parts Cleaner | Crown | Crown |
| | Low VOC Brake & Parts Cleaner | Crown | Crown |
| | Non-Flammable Brake & Parts Cleaner | Crown | Crown |

(1) Denotes allowable substitutes, contact factory if unavailable.
(2) Trucks operated in below freezing temperatures must use Low Temp Hydraulic Oil & Grease.
(3) Premium antiwear hydraulic oil used in blending with low temp oil.

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| Alternate Lubricants & Fluids Chart | | | |
|---|---|---|---|
| Type of Lubricant | | Product Name | Manufacturer / Distributor |
| O | Penetrating Lubricant | Crown | Crown |
| P | Premium Formula Multi-Purpose Grease | Crown | Crown |
| Q | White Lithium Grease | Crown | Crown |
| R | Choke & Carburetor Cleaner | Crown | Crown |
| S | Contact Cleaner | Crown | Crown |
| T | Electrical Connector Oxidation & Corrosion Inhibitor | Nye Grease | NYE Lubricants |
| U | Battery Cleaner | Crown | Crown |
| V | Battery Protector | Crown | Crown |
| W | Food Grade Machinery Lubricant | Crown | Crown |
| X | Food Grade Silicone Spray | Crown | Crown |

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## Notes:

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# Lubrication and Adjustment

## Component Accessibility

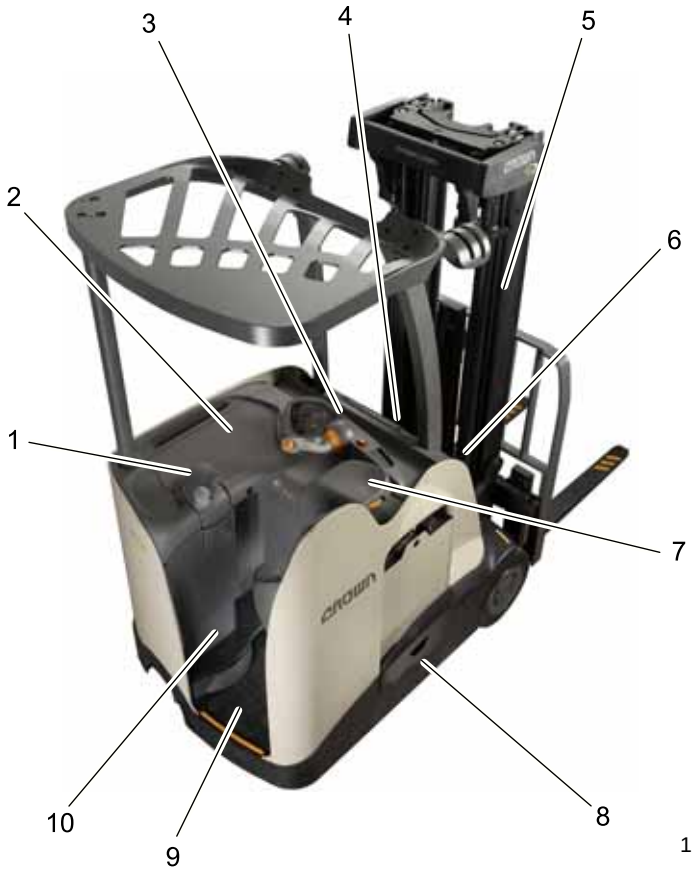
For regular maintenance, access to various truck components is accomplished by removing various covers/ doors. The following is a general explanation of which cover, door, etc. that must be removed to allow for the most efficient access when performing service and/or maintenance to components. Refer to the figures in this section as an aid in locating parts that require attention.

**CAUTION**

*Disconnect the battery and chock all wheels before proceeding.*

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1 Tiller Support
2 Desktop
3 Display Panel Cover
4 Front Cover
5 Mast
6 Manifold Cover
7 Armrest
8 Battery Retainer
9 Floorboard
10 Steer Axle Cover

Figure 16020

Remove tiller support to access:

- Steering control unit

Remove one screw then lift up desktop to access:

- Contactor panel (distribution panel, fuses, contactors)
- Steering control unit

When removing display panel cover, first remove key from switch then remove cover to access:

- Access 1
- Multi-task handle assembly
- Key switch
- Indicator panel lights and switches
- Access 7

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Remove front cover to access:

- Access 2
- Hydraulic components (lift motor, lift pump filter)
- Access 3
- Tilt cylinders
- Horn
- Battery retainer switches
- TPA (tilt position assist)
- Hydraulic reservoir

Remove manifold cover to access:

- Manifold block and solenoid valves

The mast also has several components to access:

- Chains
- Column rollers
- Chain adjust
- Accessory guide
- Pulleys

Loosen each battery retainer screw then lift and remove battery retainers to access:

- Battery rollers (battery removed)
- Battery retainer switches (left and right)
- Battery and connectors

Remove armrest cover to access:

- Armrest assembly

Remove floorboard to access:

- Brake switch (BRKS)
- Entry bar assembly and switches
- Switches (DMS1, DMS2 and DMS3)
- Brake pedal hall sensor (RPS1)

Remove steer axle cover plate to access:

- Axle assembly
- Steer motor

Remove floor suspension cover to access

- Suspension springs, linkage and damper

## Lubrication

The following information provides guidelines for proper lubrication intervals called out in the lubrication chart. However, some operating conditions will require more frequent checks and lubrication than listed. For example, truck applications which operate in extreme moisture or dust environments will require schedule modification in each particular application.

Use high grade lubricants and fluids. Sources of these lubricants may originate from almost any oil company; those listed on page MA-1960-500 are typical and any lubricant with equal specifications may be used.

On trucks equipped to operate in below freezing temperatures, low temperature hydraulic oil must be used. All screws, washers, nuts, roll pins, retaining rings, brake linkage, etc. need to be coated with a rust preventive (078882) to protect against corrosion. Lubrication intervals must be changed to a frequency that will minimize corrosion and wear on moving shafts and parts.

The truck has seven zerk fittings for lubrication purposes (nine zerks with sideshifter). Refer to the following information for specifications, locations, etc.

**NOTE**

*Use Planned Maintenance Inspection Report (PF15345) for RC 5500 trucks as required to record and assure maintenance checks.*

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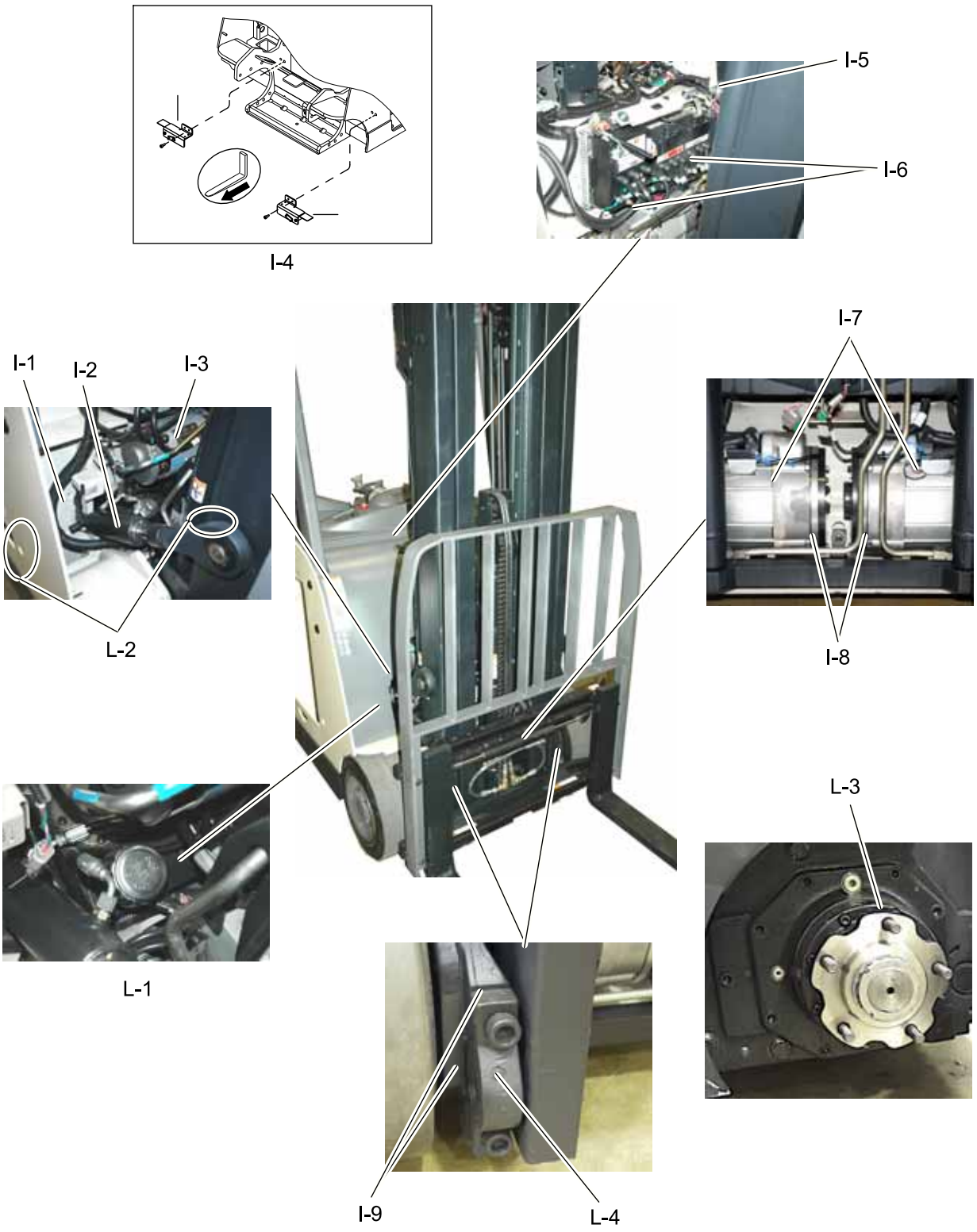



Figure 15977

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| Inspection Chart 1 | | | |
|---|---|---|---|
| Index | Component | 60 Days 250 Hours | 12 Months 2000 Hours |
| I-1 | Power Unit Wall Around Tilt Mounting Hardware (crack-free) | | Check |
| I-2 | Tilt Cylinders, Pivot Points and Mounting Hardware | Check | |
| I-3 | Pump Motor Brushes and Armature Condition | Check | |
| I-4 | Battery Retainer Switches Operation | N/A | |
| I-5 | Horn Operation | N/A | |
| I-6 | Power Cable and Connections | Check | |
| I-7 | Traction Motors | Check | |
| I-8 | Parking Brake Operation | N/A | |
| I-9 | Mast Mounting Hardware and Pivot Points | Check | |

Refer to appropriate section of Service and Parts Manual for additional information concerning inspection and/or adjustment.

| Lubrication Chart 1 | | | | | |
|---|---|---|---|---|---|
| Index | Component | Lube Type | Quantity | 60 Days 250 Hours | 12 Months 2000 Hours |
| L-1 | Hydraulic Reservoir<br>Oil<br>10 Micron<br>Suction Strainer<br>Cap Ventilating Element | D | 16.6 Litre (4.4 Gal)<br>1<br>1<br>1 | Check<br>1st Change<br><br>1st Change | Change<br>Change<br>Clean<br>Change |
| L-2 | Tilt Cylinder Zerks | B | As Req. | Check | |
| L-3 | Drive Unit | A | 1 Litre (1 Qt) | Check | Change |
| L-4 | Mast Pivot Zerks | B | As Req. | Check | |

See Chart 1 and 2 for Lube Type designation explanation (MA-1960-500).

Lubrication intervals must be changed to a frequency that will minimize corrosion and wear on moving parts for trucks operated in environments with excessive dust and moisture, freezer/corrosion applications, etc.

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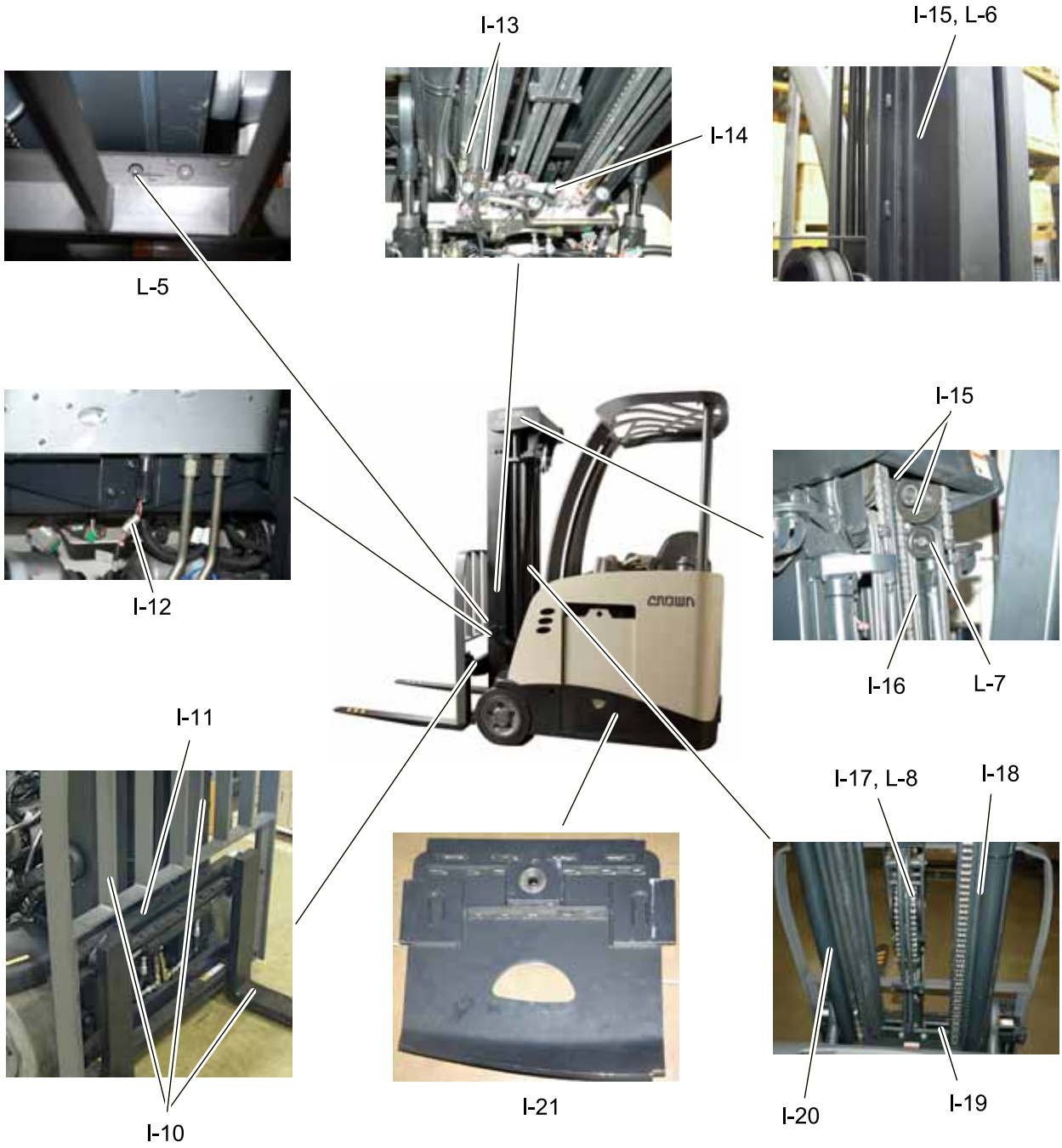



Figure 15978

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| Inspection Chart 2 | | | |
|---|---|---|---|
| Index | Component | 60 Days 250 Hours | 12 Months 2000 Hours |
| I-10 | Forks, Carriage, Load Backrest and Attachments | Check | |
| I-11 | Sideshifter (Slides, Cylinders, Mounting, etc.) | Check | |
| I-12 | Load Sense Switch | Check | |
| I-13 | Hydraulic Line, Hose Fittings and Connections | Check | |
| I-14 | Solenoid Valves | Check | |
| I-15 | Column Rollers/Channels | Check | |
| I-16 | Hose Take Up Cables | Check | |
| I-17 | Lift Chain | Check | |
| I-18 | Cylinder Guides, Slides and Stops | Check | |
| I-19 | Carriage Cylinder and Mounting Hardware | Check | |
| I-20 | Mast Cylinder(s) | Check | |
| I-21 | Battery Retainers | Check | |

Refer to appropriate section of Service and Parts Manual for additional information concerning inspection and/or adjustment.

| Lubrication Chart 2 | | | | | |
|---|---|---|---|---|---|
| Index | Component | Lube Type | Quantity | 60 Days 250 Hours | 12 Months 2000 Hours |
| L-5 | Sideshifter Zerks | B | As Req. | Check | |
| L-6 | Mast Channels and Rollers | E | As Req. | Check | |
| L-7 | Hoses, Cables and Pulleys | H | As Req. | Check | |
| L-8 | Lift Chain | G | As Req. | Check | |

See Chart 1 and 2 for Lube Type designation explanation (MA-1960-500).

Lubrication intervals must be changed to a frequency that will minimize corrosion and wear on moving parts for trucks operated in environments with excessive dust and moisture, freezer/corrosion applications, etc.

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Figure 15979

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| Inspection Chart 3 | | | |
|---|---|---|---|
| Index | Component | 60 Days 250 Hours | 12 Months 2000 Hours |
| I-22 | Presence Pedal | N/A | |
| I-23 | Pads | Check | |
| I-24 | Suspension Lever | Check | |
| I-25 | Overhead Guard and Mounting Hardware | Check | |
| I-26 | 3rd Post Assembly and Mounting Hardware | Check | |
| I-27 | Labels/Decals | Check | |
| I-28 | Armrest | Check | |
| I-29 | Worklights | Check | |
| I-30 | Battery and Connectors | Check | |
| I-31 | Drive Tires and Lug Nuts | Check | |

Refer to appropriate section of Service and Parts Manual for additional information concerning inspection and/or adjustment.

| Lubrication Chart 3 | | | | | |
|---|---|---|---|---|---|
| Index | Component | Lube Type | Quantity | 60 Days 250 Hours | 12 Months 2000 Hours |
| L-9 | Armrest Sliding Surfaces | M | As Req. | Check | |
| L-10 | Battery Rollers | B | As Req. | Check | |

See Chart 1 and 2 for Lube Type designation explanation (MA-1960-500).

Lubrication intervals must be changed to a frequency that will minimize corrosion and wear on moving parts for trucks operated in environments with excessive dust and moisture, freezer/corrosion applications, etc.

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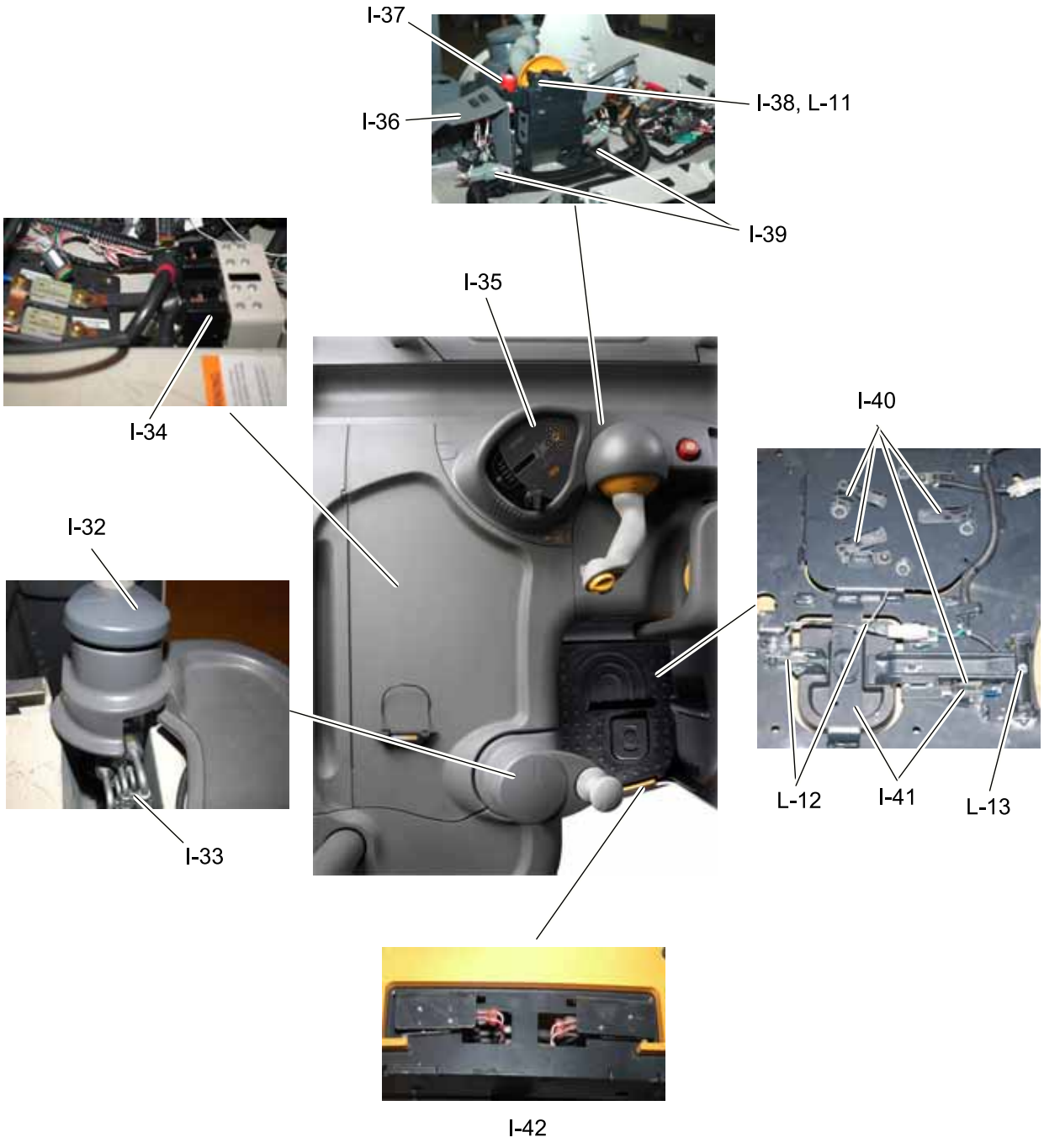



Figure 15980

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| Inspection Chart 4 | | | |
|---|---|---|---|
| Index | Component | 60 Days 250 Hours | 12 Months 2000 Hours |
| I-32 | Steering Tiller Operation | N/A | |
| I-33 | Steering Control Unit | Check | |
| I-34 | Contactor Panel and Tips | Check | |
| I-35 | Access 1 | Check | |
| I-36 | Switch Panel (Override, Fan, Light, Dome Light) (1) | Check | |
| I-37 | Emergency Disconnect (EDS) | Check | |
| I-38 | Multi-Task Handle Switches and Linkage | Check | |
| I-39 | Electrical Connections | Check | |
| I-40 | Floorboard Switches and Springs | Check | |
| I-41 | Brake Pedal and Switch | Check | |
| I-42 | Entry Bar and Switches | Check | |

(1) Optional componentry.

Refer to appropriate section of Service and Parts Manual for additional information concerning inspection and/or adjustment.

| Lubrication Chart 4 | | | | | |
|---|---|---|---|---|---|
| Index | Component | Lube Type | Quantity | 60 Days 250 Hours | 12 Months 2000 Hours |
| L-11 | Multi-Task Handle Ramp and Plunger | M | As Req. | Check | |
| L-12 | Brake Linkage and Pins | B | As Req. | Check | |
| L-13 | Brake Pedal Zerk | B | As Req. | Check | |

See Chart 1 and 2 for Lube Type designation explanation (MA-1960-500).

Lubrication intervals must be changed to a frequency that will minimize corrosion and wear on moving parts for trucks operated in environments with excessive dust and moisture, freezer/corrosion applications, etc.

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## Notes:

https://truckmanualshub.com/


# Componentry

## Access 1

**Display Control Module (DCM)**

**Location:** console (left of multi-task handle).

**Purpose:** park brake control and displays pertinent truck information to operator or service technician.

**Data:** information received from truck control modules and sensors.

**Adjustment:** none required.

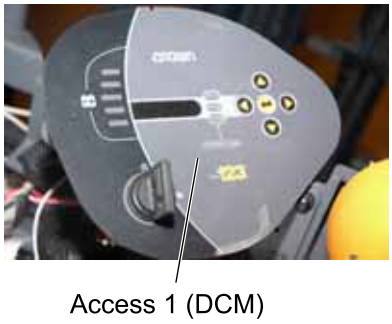



Figure 15867

## Access 2

**Hydraulic Control Module (HCM)**

**Location:** top of front wall.

**Purpose:** AC/DC pump motor (M3) control.

**Data:** information received from truck control modules and sensors.

**Adjustment:** none required.




Figure 15862

## Access 3

**Traction Control Module (TCM)**

**Location:** top of front wall.

**Purpose:** traction motors (M1 & M2) control.

**Data:** information received from truck control modules and sensors.

**Adjustment:** none required.

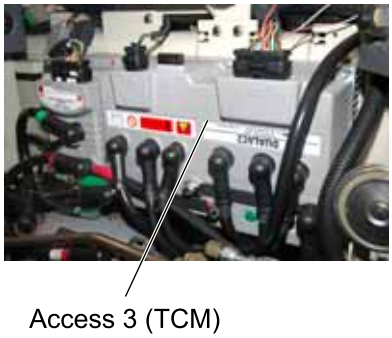



Figure 15950

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## Access 7

**Accessory Control Module (ACM)**

**Location:** top of power unit, below multifunction control handle.

**Purpose:** controls solenoid valve actuations.

**Data:** information received from truck accesses, multitask handle and sensors.

**Adjustment:** none required.




Figure 15861

## ALM1

**Status Alarm**

**Location:** distribution panel.

**Purpose:** audible warning when operator does incorrect sequence (SRO). Also sounded when foot on entry bar.

**Data:** controlled by Access 1.

**Adjustment:** none required.

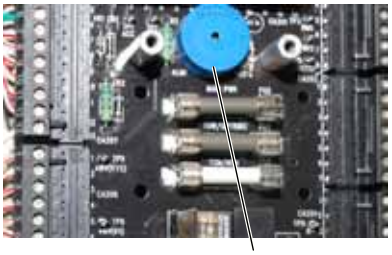



Figure 16196

## ALM2

**Travel Alarm**

**Location:** chassis, above oil filter (left side).

**Purpose:** audible warning when truck is traveling forward and/or reverse direction.

**Data:** controlled by Access 2.

**Adjustment:** none required.




Figure 15900

## BRESL, BRESR

**Battery Restraint Switches**

**Location:** cubbies on left/right sides.

**Purpose:** monitor switch for control system. Informs control system when battery restraints are in place.

**Data:** wired normally open - held closed when battery door is in place.

**Adjustment:** none required.

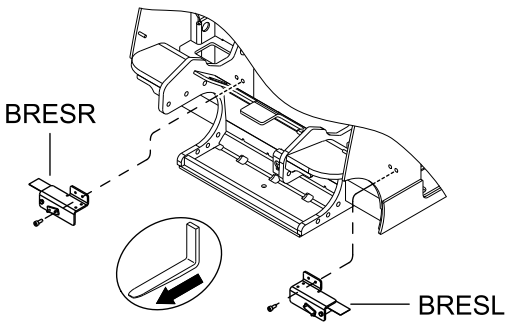



Figure 15866

https://truckmanualshub.com/


## BRKS

**Brake Switch**

**Location:** brake pedal mounting bracket on left side.

**Purpose:** mechanical redundancy of RPS1.

**Data:** wired normally closed, open when operator depresses pedal.

**Adjustment:** refer to maintenance section.

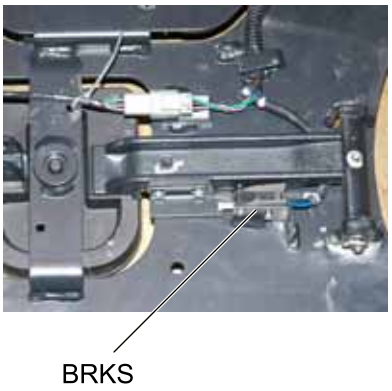



Figure 15863

## BRK1

**Brake Right Hand**

**Location:** bottom center of truck front.

**Purpose:** park brake, provide 2/3 total braking force.

**Data:** 18VDC nominal operating voltage.

**Adjustment:** none required.

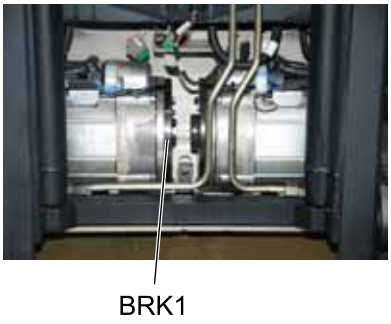



Figure 15864

## BRK2

**Brake Left Hand**

**Location:** bottom center of truck front.

**Purpose:** park brake, provide 1/3 total braking force.

**Data:** 18VDC nominal operating voltage.

**Adjustment:** none required.

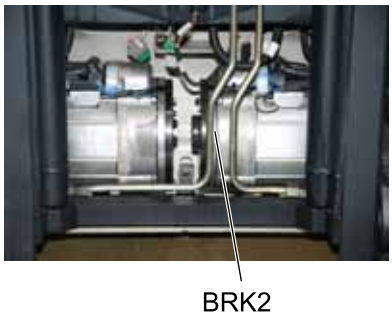



Figure 15865

https://truckmanualshub.com/



## CBVE

**Counterbalance Valve Extend**

**Location:** mast manifold.

**Purpose:** provide control of overrunning load for tilt function.

**Data:** pressure setting pre-set by vendor.

**Adjustment:** none required.

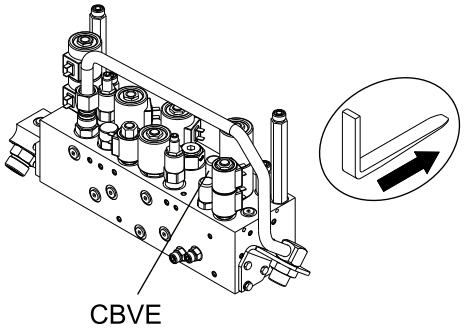



Figure 16046

## CBVR

**Counterbalance Valve Retract**

**Location:** mast manifold.

**Purpose:** provide control of overrunning load for tilt function.

**Data:** pressure setting pre-set by vendor.

**Adjustment:** none required.

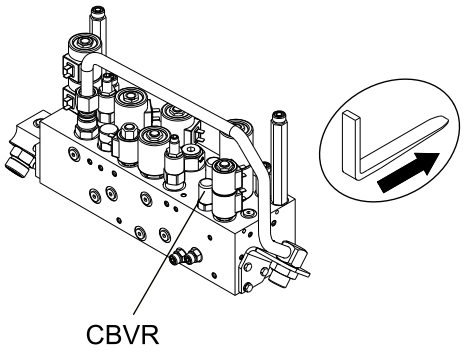



Figure 16047

https://truckmanualshub.com/


## CVR

**Check Valve Lower**

**Location:** mast manifold.

**Purpose:** prevents mast from drifting down (loaded/ unloaded).

**Data:** allows hydraulic flow in only one direction.

**Adjustment:** none required.

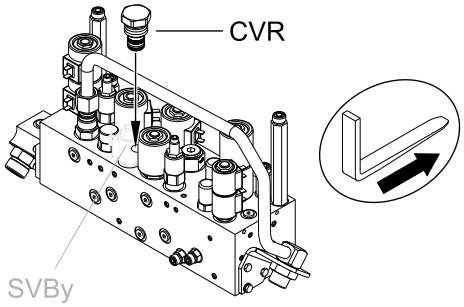



Figure 16048

## DLS

**Dome Light Switch**

**Location:** console.

**Purpose:** turn on/off dome light.

**Data:** toggle switch wired normally open.

**Adjustment:** none required.

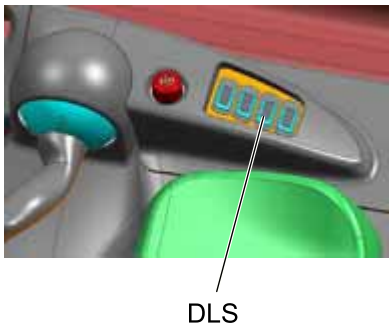



Figure 15933

## DMS1, DMS2, DMS3

**Foot Presence Switches**

**Location:** right side of floorboard.

**Purpose:** indicates right foot presence.

**Data:** wire normally open - held open when nothing on pedal.

**Adjustment:** none required.




Figure 15884

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## ECR1

**LH Traction Motor Encoder**

**Location:** inside left hand traction motor.

**Purpose:** provides speed and direction information to Access 3 module.

**Data:** 11.3VDC, 64 pulses per revolution.

**Adjustment:** none required.

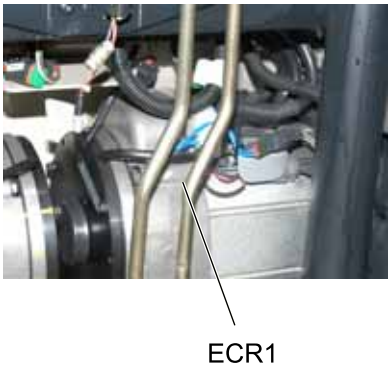



Figure 15885

## ECR2

**RH Traction Motor Encoder**

**Location:** inside right hand traction motor.

**Purpose:** provides speed and direction information to Access 3 module.

**Data:** 11.3VDC, 48 pulses per revolution.

**Adjustment:** none required.




Figure 15886

## ECR3

**Steering Command Encoder**

**Location:** steer tiller.

**Purpose:** provide command to Access 7 for steering.

**Data:** 5VDC, 64 pulses per revolution.

**Adjustment:** none required.

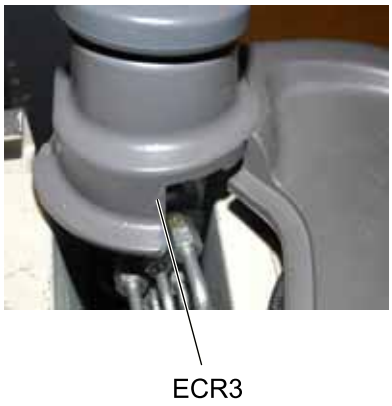



Figure 15887

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## ECR4

**AC/DC Pump Motor Encoder**

**Location:** inside AC/DC pump motor.

**Purpose:** sense AC/DC pump motor speed.

**Data:** 11.3VDC, 64 pulses per revolution.

**Adjustment:** none required.




Figure 15888

## EDS

**Emergency Disconnect Switch**

**Location:** right side of multi-task handle casting.

**Purpose:** allows disconnection of power in emergency situation. Resets the emergency disconnect contactor, removing power from power/control circuitry.

**Data:** wired normally closed until operator depresses button, then momentarily opens.

**Adjustment:** none required.




Figure 15890

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## ENLS, ENSR

**Entry Bar Switches**

**Location:** left/right sides of entry bar.

**Purpose:** signals Access 3 to remove power from traction circuit when operator's foot is resting on power unit skirt along operator compartment.

**Data:** wired normally closed. Operator standing on skirt actuates switch.

**Adjustment:** none required.

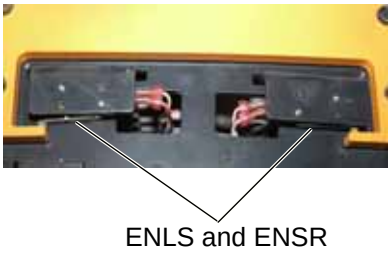



Figure 15891

## FNS

**Fan Switch**

**Location:** console.

**Purpose:** allows operator to turn on/off operator fan and select low/high speed.

**Data:** Off/high speed/low speed.

**Adjustment:** none required.

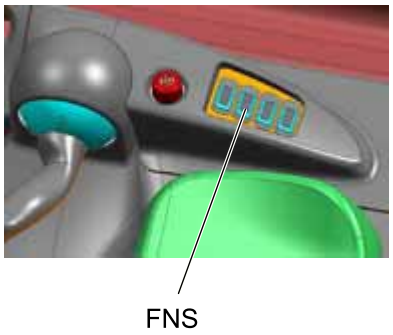



Figure 15934

## FAN1

**Operator Fan**

**Location:** work assist post/A pillar.

**Purpose:** operator comfort.

**Data:** 24VDC high speed, 12 volt DC low speed, 1 amp current draw.

**Adjustment:** none required.




Figure 15892

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## FAN2

**Controller Fan**

**Location:** near bottom side of left A pillar, beside Access 3 (TCM).

**Purpose:** cooling of Access 2 and 3.

**Data:** 36VDC, 420 mA running current, 3500 rpm and 235 cfm.

**Adjustment:** none required.




Figure 15893

## FS

**Forward Travel Switch**

**Location:** multi-task handle.

**Purpose:** informs control system forward travel is being requested by the operator.

**Data:** Optic switch output 0 volts when forward direction is selected. Output 5 volts when in neutral or reverse travel selected.

**Adjustment:** none required.

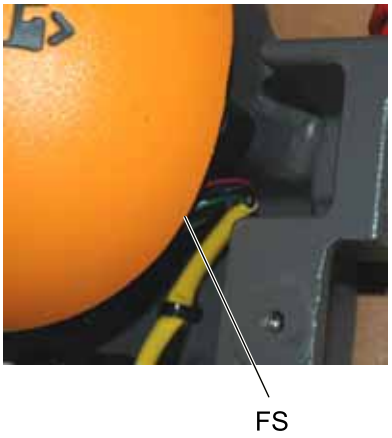



Figure 15894

## FU1

**Traction Fuse**

**Location:** fuse panel.

**Purpose:** protect traction motor and associated power circuitry from overcurrent.

**Data:** 500A.

**Adjustment:** none required.

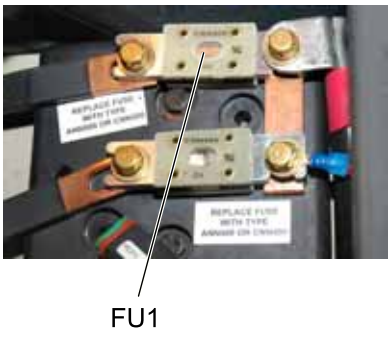



Figure 15895

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## FU2

**Hydraulics Fuse**

**Location:** fuse panel.

**Purpose:** protect hydraulic control circuitry from overcurrent.

**Data:** 400A.

**Adjustment:** none required.

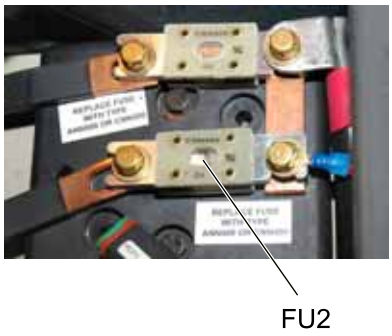



Figure 15896

## FU3

**Main Power**

**Location:** distribution panel.

**Purpose:** protect control circuitry from overcurrent.

**Data:** 15A current.

**Adjustment:** none required.

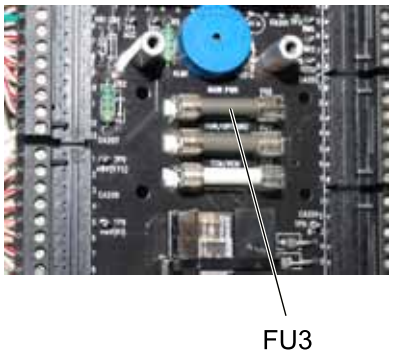



Figure 15897

## FU4

**Options/Tow**

**Location:** distribution panel.

**Purpose:** protect optional/tow accessories and associated wiring from overcurrent.

**Data:** 15A current.

**Adjustment:** none required.

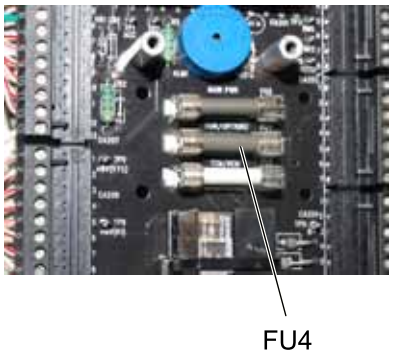



Figure 15898

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## FU5

**TCM**

**Location:** distribution panel.

**Purpose:** protect Access 2/Access 3 logic circuitry and associated wiring from overcurrent.

**Data:** 5A current.

**Adjustment:** none required.

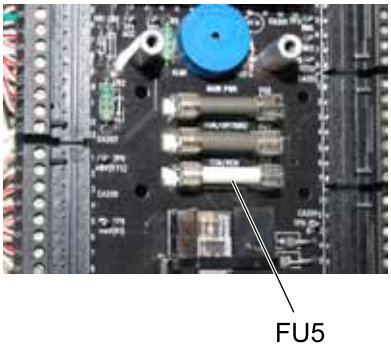



Figure 16049

## FU13/FU14

**Freezer/Corrosion**

**Location:** freeze/corrosion distribution panel.

**Purpose:** protect freezer condition components and wiring from overcurrent.

**Data:** 15A current.

**Adjustment:** none required.

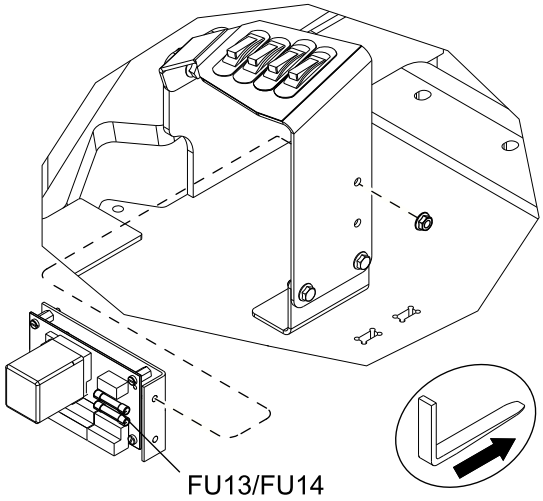



Figure 15899

## HGTS1

**Height Switch 1**

**Location:** mast at staging.

**Purpose:** provides speed limit input when forks are above free lift, provides lift/tilt interlock and reduces braking deceleration when forks are above free lift.

**Data:** wired normally closed - held closed when mast is below staging. 36VDC.

**Adjustment:** none required.




Figure 15901

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## HGTS2

**Height Switch 2**

**Location:** mast at variable heights below staging.

**Purpose:** provides lift/tilt interlock at specified heights and specified degrees of tilt for trucks with 10° forward tilt for Quad/TT.

**Data:** wire normally closed. Closed when fork carriage reaches specified heights. 36VDC.

**Adjustment:** none required.

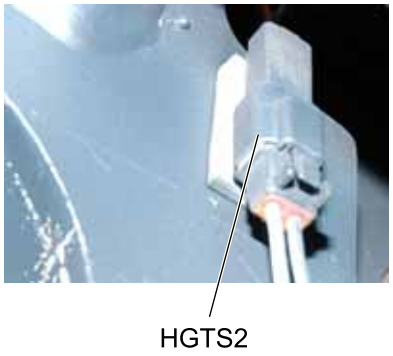



Figure 15902

## HGTS3

**Height Switch 3**

**Location:** mast at variable heights above staging.

**Purpose:** provides lift/tilt interlock at specified heights and specified degrees of tilt for trucks with 10° forward tilt for Quad/TT.

**Data:** wire normally closed. Closed when fork carriage reaches specified heights. 36VDC.

**Adjustment:** none required.

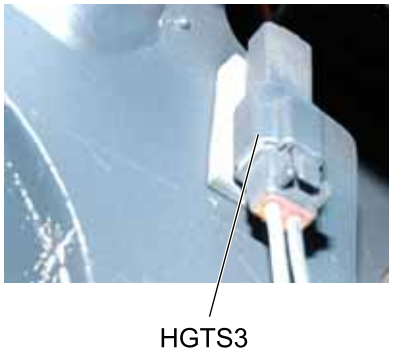



Figure 16240

## HGTS4

**Height Switch 4**

**Location:** mast at variable heights above staging.

**Purpose:** provides lift/tilt interlock at specified heights and specified degrees of tilt for trucks with 10° forward tilt for TT.

**Data:** wire normally closed. Closed when fork carriage reaches specified heights. 36VDC.

**Adjustment:** none required.

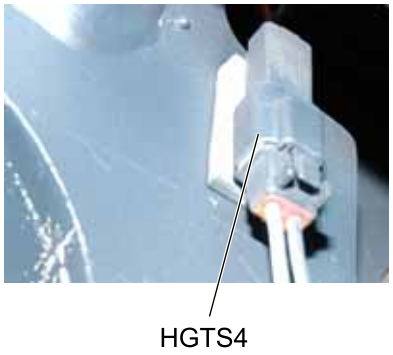



Figure 16241



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## HN1

**Horn**

**Location:** bracket by left A pillar.

**Purpose:** provide operator controlled audible warning.

**Data:** 36VDC, 0.4 amp.

**Adjustment:** none required.




Figure 15903

## HNS

**Horn Switch**

**Location:** multi-task handle.

**Purpose:** allow operator to sound horn.

**Data:** wired normally open until operator depresses horn button located on multifunction handle.

**Adjustment:** none required.

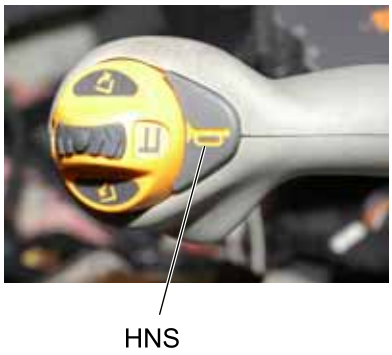



Figure 15904

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## K1

**Power Up Relay**

**Location:** distribution panel.

**Purpose:** provides power up, power down sequence interlock.

**Data:** 36VDC coil energized upon keyswitch test position closure.

**Adjustment:** none required.

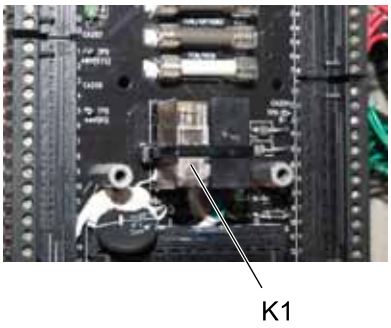



Figure 15906

## K2

**Options**

**Location:** distribution panel.

**Purpose:** provides power for optional electrical equipment eg. Lights, fan etc.

**Data:** 36VDC coil energized upon keyswitch test position.

**Adjustment:** none required.

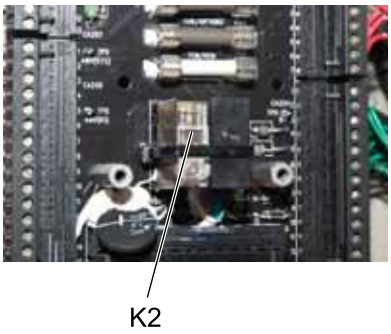



Figure 15907

## KYS

**Key Switch**

**Location:** Access 1 bracket.

**Purpose:** allows operator to power truck up and shut truck down by providing battery power to controllers and power up circuitry.

**Data:** key operated selector switch. Energizes K1 w/test position and maintains K1 with run position.

**Adjustment:** none required.




Figure 15908



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## L

**Line Contactor**

**Location:** horizontal on contactor panel.

**Purpose:** switch power to Access 3 power circuitry.

**Data:** 36VDC.

**Adjustment:** none required.




Figure 15909

## LCV

**Compensated Flow Regulator Lower**

**Location:** mast manifold.

**Purpose:** limit maximum lowering speed of mast regardless of hydraulic system pressure.

**Data:** flow setting pre-set by vendor.

**Adjustment:** none required.

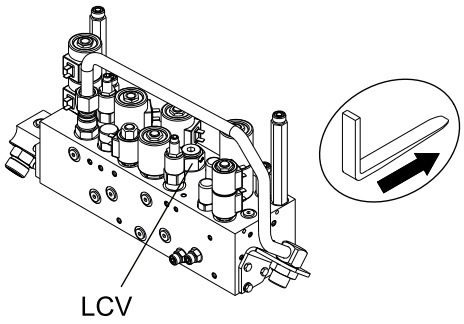



Figure 15905

## LGT1, LGT2

**Work Lights**

**Location:** overhead guard or mast.

**Purpose:** provide lighted work area outside operator compartment.

**Data:** 36VDC.

**Adjustment:** none required.

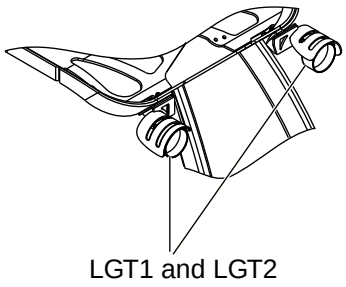



Figure 15910

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## LGTS1

**Light Switch 1**

**Location:** console.

**Purpose:** allows operator to turn on/off work assist lights.

**Data:** wired normally open - operator toggles switch to close the contacts and turn on work lights. 36VDC.

**Adjustment:** none required.

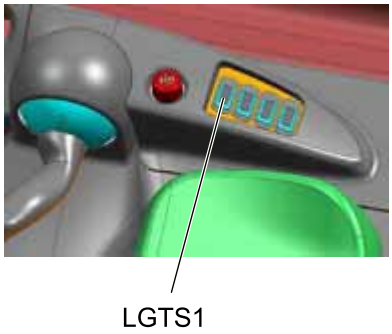



Figure 15913

## LGT3

**Strobe Light**

**Location:** overhead guard.

**Purpose:** provide visual warning of lift truck presence.

**Data:** 36VDC.

**Adjustment:** none required.

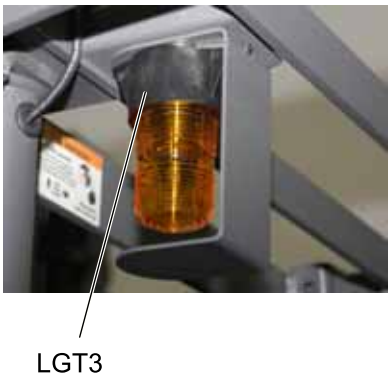



Figure 15914

## LGT4

**Dome Light**

**Location:** work assist.

**Purpose:** provide lighted work area inside operator compartment.

**Data:** 12.8VDC, 1.44 amp use 20 ohm resistor in series with light.

**Adjustment:** none required.

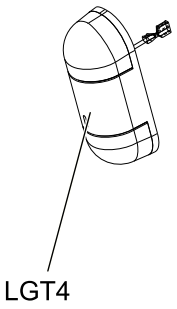



Figure 15915



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## M1

**RH Traction Motor**

**Location:** right hand front bottom corner of power unit.

**Purpose:** provides driving force for traction/regen braking.

**Data:** Access 3 provides speed control via operator input.

**Adjustment:** none required.




Figure 15916

## M2

**LH Traction Motor**

**Location:** left hand front bottom corner of power unit.

**Purpose:** provides driving force for traction/regen braking.

**Data:** Access 3 provides speed control via operator input.

**Adjustment:** none required.

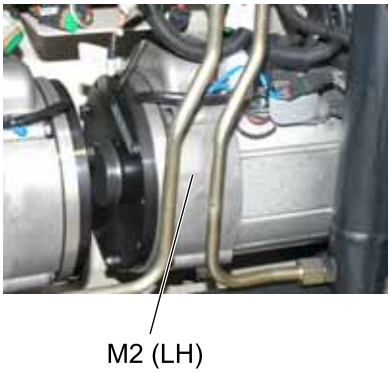



Figure 15917

## M3

**AC/DC Pump Motor**

**Location:** front wall of power unit.

**Purpose:** provide driving force for hydraulic pump supplying hydraulic oil flow for lift and accessory functions. provides hydraulic pressure for steering/hydraulic functions.

**Data:** Access 2 provides speed control via operator input.

**Adjustment:** none required.

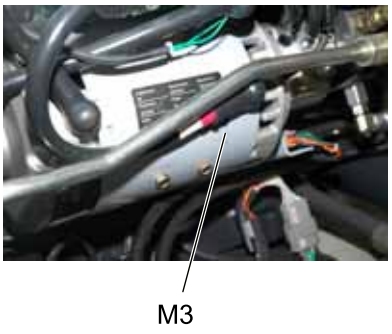



Figure 15918

https://truckmanualshub.com/



## ORS

**Override (Lift Cutout) Switch**

**Location:** console.

**Purpose:** allows operator to override height encoder/ limit switch and continue raising.

**Data:** momentary contact wired normally open - operator toggles switch to close the contacts and provide override function.

**Adjustment:** none required.

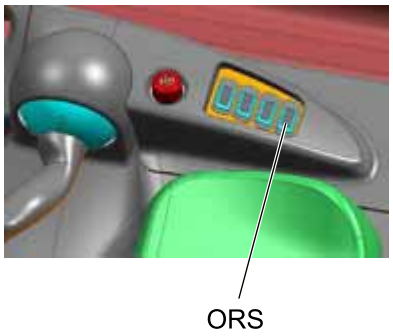



Figure 15919

## PCA

**Pressure Compensator Valve**

**Location:** mast manifold.

**Purpose:** provides priority and compensated flow control for tilt and accessory functions.

**Data:** not applicable.

**Adjustment:** none required.

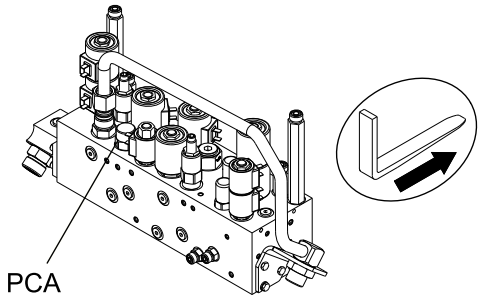



Figure 15940

## POT1

**Accelerator Potentiometer**

**Location:** multi-task handle.

**Purpose:** provides input to controller for speed.

**Data:** 1.7 K ohm.

**Adjustment:** refer to maintenance section.

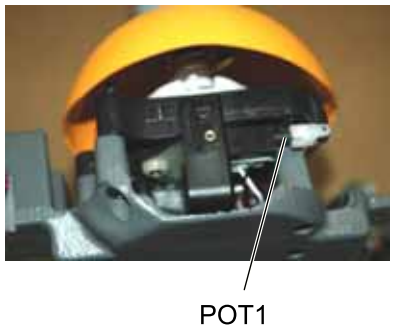



Figure 15920



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## POT2

**Lift/Lower Request Potentiometer**

**Location:** multi-task handle.

**Purpose:** provide lift request input to controller.

**Data:** 1.7 K ohm.

**Adjustment:** refer to maintenance section.

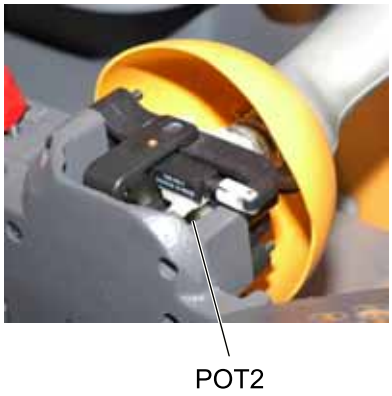



Figure 15921

## POT3

**Accessory Request Potentiometer**

**Location:** multi-task handle.

**Purpose:** provide accessory functions request input to controller.

**Data:** 1.7 K ohm.

**Adjustment:** refer to maintenance section.




Figure 15922

## POT4

**Steer Potentiometer**

**Location:** right of steer tiller.

**Purpose:** provides input to Access 3 for steering feedback.

**Data:** 5 K ohm.

**Adjustment:** refer to maintenance section.




Figure 15923

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## P

**Pump Contactor**

**Location:** horizontal on contactor panel.

**Purpose:** switch power to Access 2. On/off controlled by Access 2 via operator input.

**Data:** 36VDC.

**Adjustment:** none required.




Figure 15924

## PT1

**Load Sense**

**Location:** bottom side of mast mounted manifold.

**Purpose:** provides approximate weight measurement information on forks for data capacity monitor.

**Data:** bi-directional differential pressure transducer.

**Adjustment:** none required.

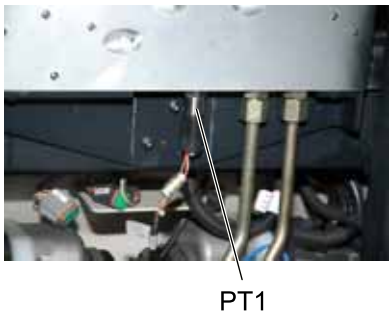



Figure 15925

## PRVA

**Clamp Pressure**

**Location:** mast.

**Purpose:** replaces RVA valve when truck equipped with pressure regulator option.

**Data:** 24VDC maximum.

**Adjustment:** none required.

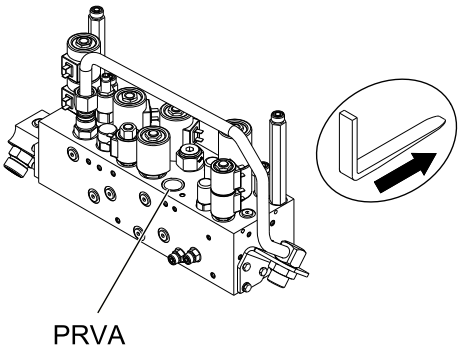



Figure 15927



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## RPS1

**Rotational Position Sensor 1**

**Location:** bottom side of floorboard.

**Purpose:** provides input to the Access 3 for braking command.

**Data:** 0.5 - 4.5VDC.

**Adjustment:** none required.

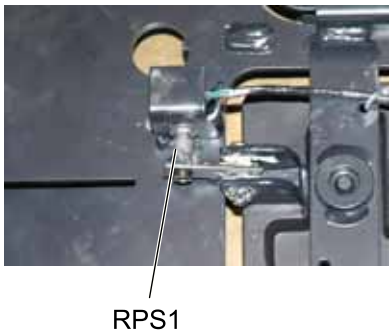



Figure 15929

## RPS2

**Rotational Position Sensor 2**

**Location:** right hand side of tilt cylinder.

**Purpose:** provides input to Access 7 for tilt cylinder position.

**Data:** 0.5 - 4.5VDC.

**Adjustment:** none required.

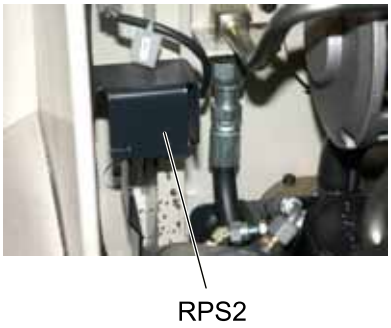



Figure 15930

## RS

**Reverse Switch**

**Location:** multi-task handle.

**Purpose:** informs control system reverse travel being requested by operator.

**Data:** optic switch output 0 volt when reverse travel direction selected. Output 5 volt when in neutral or forward travel selected.

**Adjustment:** none required.

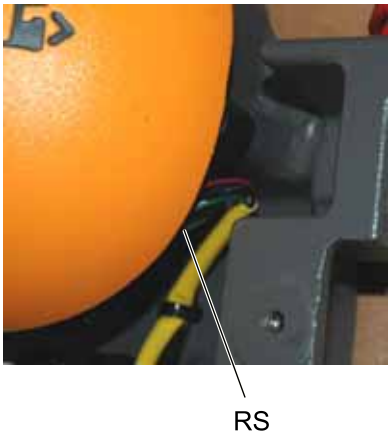



Figure 15931

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## RVA

**Relief Valve Accessory**

**Location:** mast manifold.

**Purpose:** limit maximum tilt and accessory pressure (independent from raise).

**Data:** adjusted to 17237 Kpa (2500 psi) at vendor.

**Adjustment:** none required.

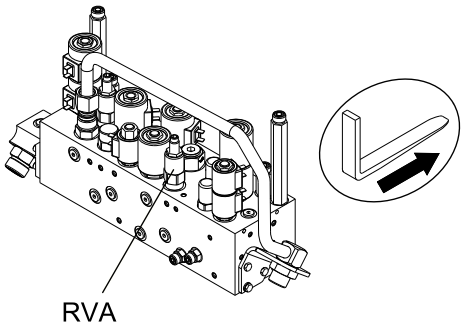



Figure 15941

## RVM

**Relief Valve Mast**

**Location:** mast manifold.

**Purpose:** limit maximum lift pressure for raise.

**Data:** adjusted to 23442 Kpa (3400 psi) at vendor.

**Adjustment:** none required.

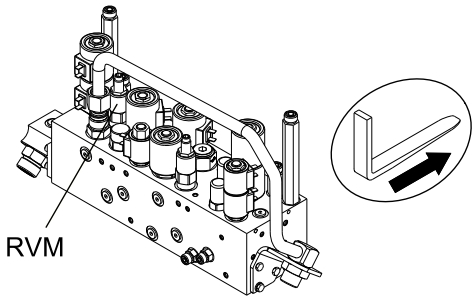



Figure 15944

## SSS

**Sequence Select Switch**

**Location:** right side of multi-task handle casting.

**Purpose:** allows 4th and 5th function selection.

**Data:** printed circuit board mounted push button.

**Adjustment:** none required.

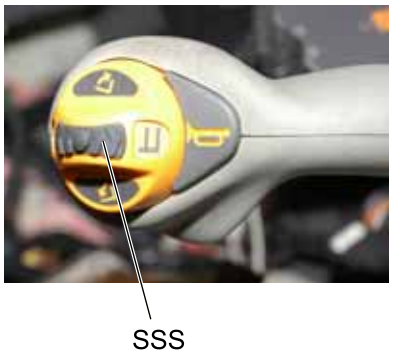



Figure 15937



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## SPL

**Load Lowering Proportional Valve**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow path for the lower function.

**Data:** coil energized by Access 7 when lower function selected via POT2. Coil resistance 28.8 ohm. Coil voltage 24VDC regardless of battery voltage.

**Adjustment:** none required.

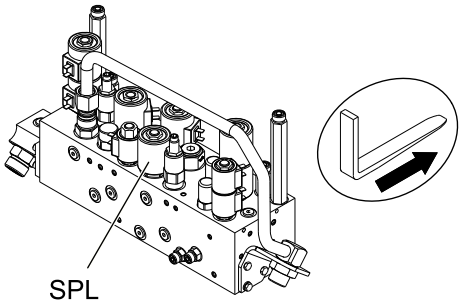



Figure 15938

## SPA

**Auxiliary Proportional Valve**

**Location:** mast manifold.

**Purpose:** sets hydraulic fluid flow for tilt and accessory function.

**Data:** coil energized by Access 7 when accessory function selected via POT3, SSS or TDS. Coil resistance 28.8 ohm. Coil voltage 24 volt DC regardless of battery voltage.

**Adjustment:** none required.

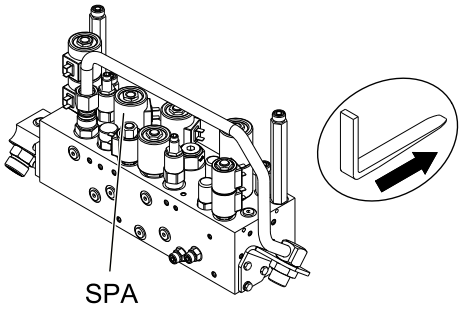



Figure 15939

## SVTE

**Tilt Extend**

**Location:** mast manifold.

**Purpose:** tilt retract.

**Data:** 24 nominal operating voltage.

**Adjustment:** none required.

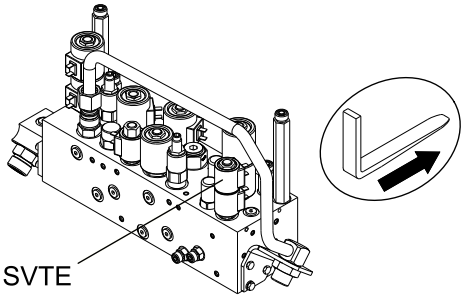



Figure 16053

https://truckmanualshub.com/



## SVTR

**Tilt Retract**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow for tilt function.

**Data:** 24 nominal operating voltage.

**Adjustment:** none required.

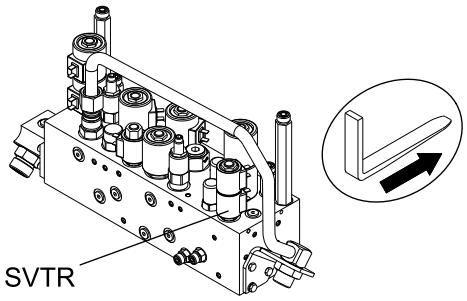



Figure 16054

## SVT

**Tilt Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow direction for tilt function.

**Data:** coil energized by Access 7 when tilt function is selected via TBS or TDS. Coil resistance 39.3 ohms. Coil voltage 24VDC regardelss of battery voltage.

**Adjustment:** none required.

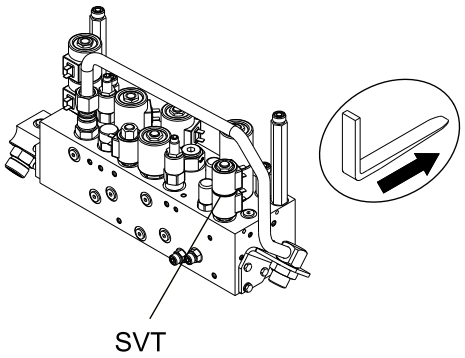



Figure 15946

## SVH

**Hoist Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow path for raise/lower function.

**Data:** coil energized by Access 7 when raise function selected via POT2. Coil resistance 28.8 ohm. Coil voltage 24VDC regardless of battery voltage.

**Adjustment:** none required.

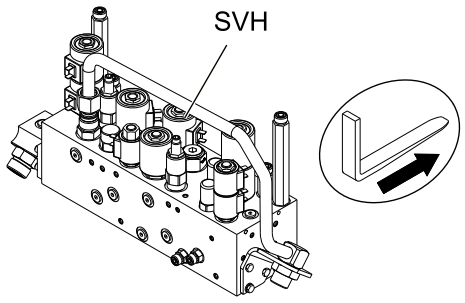



Figure 15936



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## SVBy

**Bypass Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow path to reservoir for excess oil generated while steering.

**Data:** 24VDC.

**Adjustment:** none required.

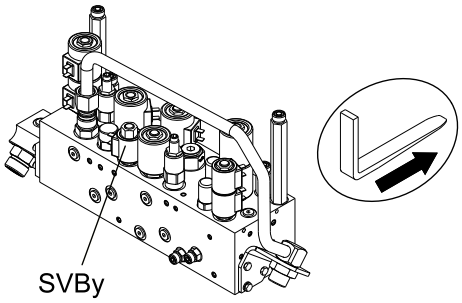



Figure 15942

## SVA1A

**First Accessory Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow direction for first accessory function - right.

**Data:** coil energized by Access 7 when first accessory function selected via POT3. Coil resistance 28.8 ohm for HI flow and 39.3 ohm for LO flow. Coil voltage 24VDC regardless of battery voltage.

**Adjustment:** none required.

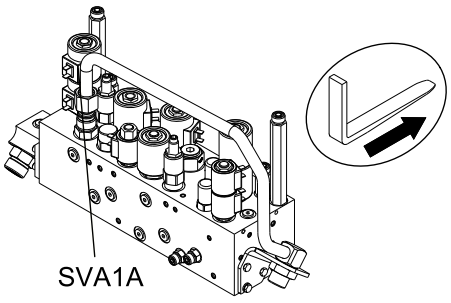



Figure 15943

## SVA1B

**First Accessory Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow direction for first accessory function.

**Data:** coil energized by Access 7 when first accessory function selected via POT3. Coil resistance 28.8 ohm for HI flow and 39.3 ohm for LO flow. Coil voltage 24VDC regardless of battery voltage.

**Adjustment:** none required.

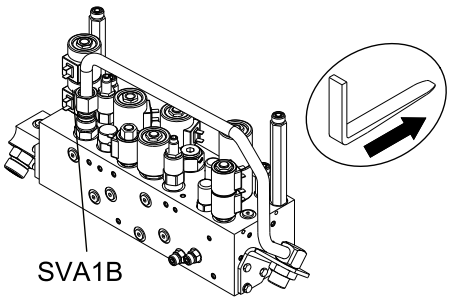



Figure 16055

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## SVA2A

**Second Accessory Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow path for second accessory function.

**Data:** coil energized by Access 7 when second accessory function selected via POT3 and pressing SSS at the same time. Coil resistance 28.8 ohm. Coil voltage 24VDC regardless of battery voltage.

**Adjustment:** none required.

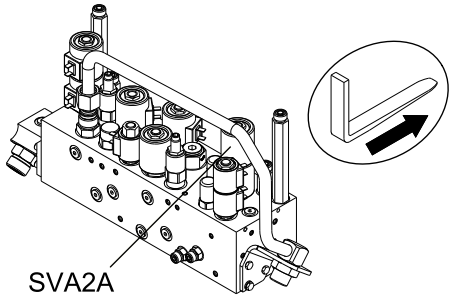



Figure 15945

## SVA2B

**Second Accessory Solenoid**

**Location:** mast manifold.

**Purpose:** provide hydraulic flow path for second accessory function.

**Data:** coil energized by Access 7 when second accessory function selected via POT3 and pressing SSS at the same time. Coil resistance 28.8 ohm. Coil voltage 24VDC regardless of battery voltage.

**Adjustment:** none required.

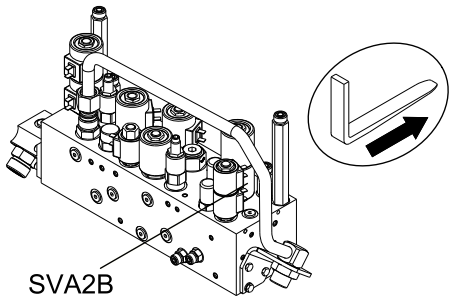



Figure 16056

## SVA3

**5th Function**

**Location:** part of attachment.

**Purpose:** 5th function.

**Data:** none required.

**Adjustment:** none required.

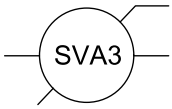



Figure 15947

## TBS

**Tilt Back Switch**

**Location:** multi-task handle.

**Purpose:** allows operator to select tilt back function of hydraulic system.

**Data:** printed circuit board mounted push button switch wired normally open.

**Adjustment:** none required.

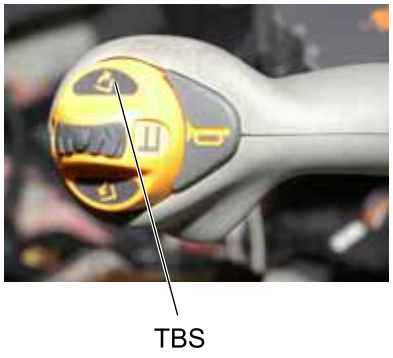



Figure 15948



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## TDS

**Tilt Down Switch**

**Location:** multi-task handle.

**Purpose:** allows operator to select tilt down function of hydraulic system.

**Data:** printed circuit board mounted push button switch wired normally open.

**Adjustment:** none required.

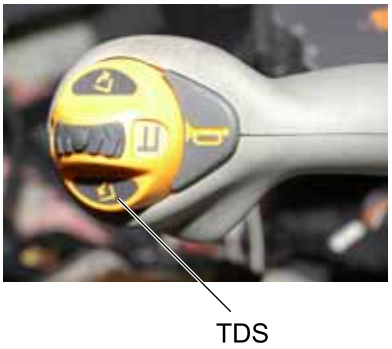



Figure 15949

## TR1

**K1 inrush**

**Location:** distribution panel.

**Purpose:** reduce inrush Access 2/Access 3 power up.

**Data:** not applicable.

**Adjustment:** none required.

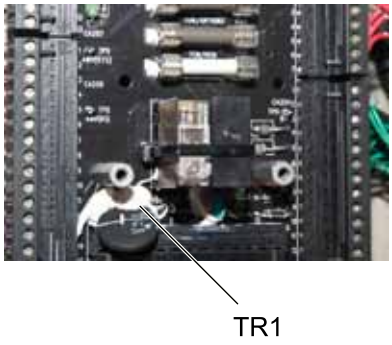



Figure 15951

## TR2

**KYS inrush**

**Location:** distribution panel.

**Purpose:** reduce inrush of Access 1 power up.

**Data:** not applicable.

**Adjustment:** none required.

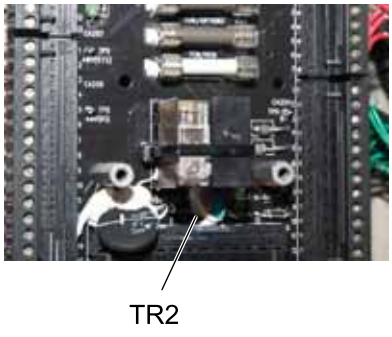



Figure 15952

https://truckmanualshub.com/



## TS1

**RH Traction Motor Thermal**

**Location:** inside right hand traction motor.

**Purpose:** sense temperature of right hand traction motor.

**Data:** temperature compensated diode.

**Adjustment:** none required.




Figure 15953

## TS2

**LH Traction Motor Thermal**

**Location:** inside left hand traction motor.

**Purpose:** sense temperature of left hand traction motor.

**Data:** temperature compensated diode.

**Adjustment:** none required.

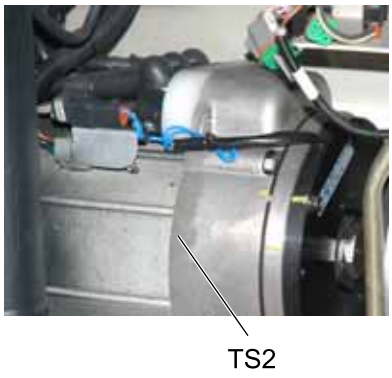



Figure 15954

## TS3

**Pump Motor Thermal**

**Location:** inside pump motor.

**Purpose:** sense temperature of pump motor.

**Data:** temperature compensated diode.

**Adjustment:** none required.




Figure 15955



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# Metric Torque Values

All Crown trucks are manufactured with class 8.8 or better screws and bolts. The information contained in this section will aid you when replacing any screws and bolts that are necessary when performing maintenance on your lift truck.

## Grade

| Grade Marking (on Head) | Specification | Material | Bolt and Screw Size (mm) |
|---|---|---|---|
|   | Class 5.8 | Low Carbon Steel | M5 through M36 |
|   | Class 8.8 | Medium Carbon Steel Quenched and Tempered | M5 through M36 |
|   | Class 10.9 | Medium Carbon Alloy Steel Quenched and Tempered | M5 through M36 |
| **NOTE:** Even though a bolt head is unmarked, Crown uses nothing less than class 8.8 in all of its bolted assemblies. Instances do occur when class 8.8 bolts are manufactured unmarked. When a fastener is replaced that is unmarked, replace the fastener with a class 8.8. | | | |

Figure 15048

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| Torque Chart - Metric Hex Head Cap Screws and Nuts | | | |
|---|---|---|---|
| Thread Diameter & Pitch | Tightening Torque Nm (ft lb) | | |
| | Class 8.8 | Class 10.9 | Class 12.9 |
| M5 x 0.80 | 5 - 8 (4 - 6) | 7 - 8 (5 - 6) | 8 - 10 (6 - 7) |
| M6 x 1.00 | 8 - 10 (6 - 7) | 12 - 14 (9 - 10) | 15 - 16 (11 - 12) |
| M8 x 1.25 | 20 - 25 (15 - 18) | 28 - 31 (21 - 23) | 34 - 37 (25 - 27) |
| M10 x 1.50 | 39 - 43 (29 - 32) | 56 - 61 (41 - 45) | 68 - 75 (50 - 54) |
| M12 x 1.75 | 71 - 76 (52 - 56) | 100 - 107 (73 - 79) | 119 - 127 (88 - 94) |
| M14 x 2.00 | 113 - 122 (83 - 90) | 159 - 171 (117 - 126) | 190 - 205 (140 - 151) |
| M16 x 2.00 | 175 - 190 (129 - 140) | 247 - 267 (182 - 197) | 296 - 320 (218 - 236) |
| M20 x 2.50 | 340 357 (251 - 271) | 479 - 518 (353 - 382) | 574 - 621 (423 - 458) |
| M24 x 3.00 | 587 - 635 (433 - 468) | 824 - 892 (608 - 658) | 990 - 1071 (730 - 790) |
| M30 x 3.50 | 1175 - 1274 (867 - 940) | 1654 - 1792 (1220 - 1322) | 1985 - 2150 (1464 - 1586) |
| **Note:** Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page. | | | |

| Torque Chart - Metric Hex Socket Countersink Head Screws | | | |
|---|---|---|---|
| Thread Diameter & Pitch | Tightening Torque Nm (ft lb) | | |
| | Class 8.8 | Class 10.9 | Class 12.9 |
| M5 x 0.80 | 4 - 7 (3 - 5) | 5 - 8 (4 - 6) | 7 - 10 (5 - 7) |
| M6 x 1.00 | 7 - 10 (5 - 7) | 9 - 12 (7 - 9) | 11 - 14 (8 - 10) |
| M8 x 1.25 | 16 - 19 (12 - 14) | 23 - 26 (17 - 19) | 27 - 30 (20 - 22) |
| M10 x 1.50 | 31 - 34 (23 - 25) | 45 - 49 (33 - 36) | 54 - 58 (40 - 43) |
| M12 x 1.75 | 56 - 60 (41 - 44) | 79 - 84 (58 - 62) | 94 - 102 (69 - 75) |
| M14 x 2.00 | | | |
| M16 x 2.00 | 124 - 146 (99 - 108) | 190 - 206 (140 - 152) | 228 - 247 (168 - 182) |
| M20 x 2.50 | 259 - 281 (191 - 207) | 363 - 395 (268 - 291) | 437 - 473 (322 - 349) |
| M24 x 3.00 | 416 - 451 (307 - 333) | 586 - 635 (432 - 468) | 702 - 762 (518 - 562) |
| M30 x 3.50 | | | |
| **Note:** Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page. | | | |

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| Torque Chart - Metric Socket Head Cap Screws | | | |
|---|---|---|---|
| Thread Diameter & Pitch | Tightening Torque Nm (ft lb) | | |
| | Class 8.8 | Class 10.9 | Class 12.9 |
| M5 x 0.80 | 5 - 8 (4 - 6) | 7 - 9 (5 - 7) | 8 - 11 (6 - 8) |
| M6 x 1.00 | 9 - 12 (7 - 9) | 12 - 15 (9 - 11) | 15 - 18 (11 - 13) |
| M8 x 1.25 | 22 - 24 (16 - 18) | 30 - 33 (22 - 24) | 35 - 38 (26 - 28) |
| M10 x 1.50 | 42 - 45 (31 - 33) | 58 - 64 (43 - 47) | 71 - 76 (52 - 56) |
| M12 x 1.75 | 72 - 77 (53 - 57) | 102 - 110 (75 - 81) | 122 - 132 (90 - 97) |
| M14 x 2.00 | 115 - 125 (85 - 92) | 161 - 175 (119 - 129) | 194 - 210 (143 - 155) |
| M16 x 2.00 | 179 - 194 (132 - 143) | 251 - 273 (185 - 201) | 301 - 327 (222 - 241) |
| M20 x 2.50 | 348 - 377 (257 - 278) | 489 - 530 (361 - 391) | 588 - 637 (434 - 470) |
| M24 x 3.00 | 601 - 651 (443 - 480) | 846 - 915 (624 - 675) | 1014 - 1098 (748 - 810) |
| M30 x 3.50 | 1196 - 1296 (882 - 956) | 1681 - 1822 (1240 - 1344) | 2017 - 2187 (1488 - 1613) |
| **Note:** Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page. | | | |

| Torque Chart - Metric Flanged Hex Head Cap Screws and Nuts | | | |
|---|---|---|---|
| Thread Diameter & Pitch | Tightening Torque Nm (ft lb) | | |
| | Class 8.8 | Class 10.9 | Class 12.9 |
| M5 x 0.80 | | 8 - 11 (6 - 8) | 9 - 12 (7 - 9) |
| M6 x 1.00 | | 14 - 16 (10 - 12) | 16 - 19 (12 - 14) |
| M8 x 1.25 | | 31 - 34 (23 - 25) | 38 - 41 (28 - 30) |
| M10 x 1.50 | | 62 - 68 (46 - 50) | 75 - 81 (55 - 60) |
| M12 x 1.75 | | 108 - 117 (80 - 86) | 130 - 141 (96 - 104) |
| M14 x 2.00 | | 174 - 187 (128 - 138) | 209 - 225 (154 - 166) |
| M16 x 2.00 | | 273 - 294 (201 - 217) | 327 - 354 (241 - 2610 |
| M20 x 2.50 | | | |
| **Note:** Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page. | | | |

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## Notes:

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# Torque Values

All Crown Trucks are manufactured with Grade 5 or better screws and bolts. The information contained in this section will aid you when replacing any screws and bolts that are necessary when performing maintenance on your lift truck.

## Grade

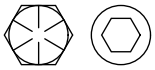
| Grade Marking (on Head) | Specification | Material | Bolt and Screw Size (Inches) |
|---|---|---|---|
|  | SAE - Grade 2 | Low Carbon Steel | 1/4 thru 1-1/2 |
|  | SAE - Grade 5 | Medium Carbon Steel, Quenched and Tempered | 1/4 thru 1-1/2 |
|  | SAE - Grade 8 | Medium Carbon Alloy Steel, Quenched and Tempered | 1/4 thru 1-1/2 |
| **NOTE:** Even though a bolt head is unmarked, Crown uses nothing less than Grade 5 in all of its bolted assemblies. Instances do occur when Grade 5 bolts are manufactured unmarked. When a fastener is replaced that is unmarked, replace the fastener with a Grade 5. | | | |

Figure 14916

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| Torque Chart | | | | | | |
|---|---|---|---|---|---|---|
| Bolt Diameter | Grade 5 | | | Grade 8 | | |
| | Dry Torque Requirement | | | Dry Torque Requirement | | |
| in | ft lb | kgm | Nm | ft lb | kgm | Nm |
| 1/4 | 9 ± 3 | 1.2 ± .4 | 12 ± 4 | 13 ± 4 | 1.8 ± .5 | 17.5 ± 5.5 |
| 5/16 | 18 ± 5 | 2.5 ± .7 | 24.5 ± 7 | 25 ± 5 | 3.5 ± .7 | 34 ± 7 |
| 3/8 | 32 ± 5 | 4.4 ± .7 | 43.5 ± 7 | 48 ± 10 | 6.6 ± 1.3 | 65 ± 13.5 |
| 7/16 | 50 ± 10 | 6.9 ± 1.4 | 67.5 ± 13.5 | 75 ± 10 | 10.4 ± 1.4 | 102 ± 13.5 |
| 1/2 | 75 ± 10 | 10.4 ± 1.4 | 101.5 ± 13.5 | 112 ± 15 | 15.5 ± 2.0 | 152 ± 20.5 |
| 9/16 | 110 ± 15 | 15.2 ± 2.0 | 149 ± 20.5 | 163 ± 20 | 22.5 ± 3.0 | 221 ± 27 |
| 5/8 | 150 ± 20 | 20.7 ± 2.8 | 203.5 ± 27 | 225 ± 30 | 31.1 ± 4.1 | 305 ± 41 |
| 3/4 | 265 ± 35 | 36.6 ± 4.8 | 359 ± 47.5 | 400 ± 50 | 55.2 ± 6.9 | 542 ± 68 |
| 7/8 | 420 ± 60 | 58.1 ± 8.3 | 569 ± 81 | 640 ± 80 | 88.3 ± 11.0 | 868 ± 108 |
| 1 | 640 ± 80 | 88.5 ± 11.1 | 868 ± 109 | 960 ± 115 | 132.5 ± 15.9 | 1300 ± 156 |
| 1 1/8 | 800 ± 100 | 110.6 ± 13.8 | 1085 ± 136 | | | |
| 1 1/4 | 1000 ± 120 | 138 ± 16.6 | 1356 ± 163 | | | |
| 1 3/8 | 1200 ± 150 | 166 ± 20.7 | 1630 ± 203 | | | |
| 1 1/2 | 1500 ± 200 | 207 ± 27.7 | 2034 ± 271 | | | |
| Mounting bolt torque requirements involving hydraulic valves. | | | | | | |
| | | | | | | |
| 5/16 | 13 ± 2 | 1.8 ± .3 | 17.5 ± 2.5 | | | |
| 3/8 | 24 ± 2 | 3.3 ± .3 | 32.5 ± 2.5 | | | |
| 7/16 | 39 ± 2 | 5.4 ± .3 | 53 ± 2.5 | | | |
| **NOTE:** Torque values called out in the maintenance section of this manual will take precedence over torque values found on this page. | | | | | | |

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# HYDRAULIC

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## Notes:

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# General Information

The hydraulic system in your truck is powered by a gear type pump driven by either a DC motor or a three phase AC motor. The pump, P1, supplies oil flow for steering, lift and accessory functions.

Maximum pressure is limited by an adjustable relief valve, RVM. The setting for RVM is noted on the hydraulic schematics. Refer to the service manual index for pump, valve and manifold information.

**WARNING**

*AVOID HIGH PRESSURE FLUIDS-Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.*
*Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.*

## Hydraulic Lines and Fittings

- Blow air through all hose and lines to remove loose particles before installing. Any rubber hose with wire braid inner construction and any steel tube lines which have been collapsed or kinked are permanently damaged and must be replaced even if the damage is not externally visible.
- Flexible hose must be replaced if it collapses in normal operating position.
- All hoses and lines are to be clear of any surface or edge which will cause damaging wear and cuts, or on which they can become caught.
- All connections are to be leak free.

## Reservoir

With all cylinders in the retracted position and after all air has been bled from the hydraulic system, fill reservoir so that the oil level is to the "FULL" mark on dipstick. The dipstick is located with the breather assembly in reservoir. The capacity of the hydraulic reservoir at this level should be approximately 16.6 liters (4.4 gallons).

The hydraulic system is very susceptible to dirt and contamination that could, over time, create hydraulic malfunctions. Therefore, before adding oil to truck, filter oil with a 10 micron filter or with a 100 mesh strainer. This is especially important when oil source is a 55 gallon drum.

## Filter

Every 12 months or 2000 hours:

- Clean suction strainer (100 mesh strainer).
- Replace breather cap (includes 10 micron element).
- Replace return filter (10 micron element).

When replacing return filter, do not tighten filter with the use of a wrench. A wrench should only be used for filter removal.

To install filter, apply a film of hydraulic oil to the seal and hand tighten until seal contacts filter head. Then tighten ½ revolution. Check for leaks.

## Drift Test

All drift test should be conducted with a capacity load (refer to serial plate for the rated capacity of your truck). The material used for the test load must be evenly stacked within the limits of a four foot square pallet and must be secured to the fork carriage with forks spread to their maximum width.

**NOTE**

*Lift measurement is to be taken from the tip of the fork to the floor.*

**CAUTION**

*Never stand or work under a suspended load.*

## Lift Drift Test

Place maximum load (refer to serial plate for rated capacity of your truck) on forks at rated load center, and mast tilted back. Elevate the test load above staging height. Shut off truck. After five minutes, measure the distance the forks have drifted. Load drift downward may not exceed 64 mm (2.5 in) over a five minute period.

## Tilt Drift Test

Cycle tilt forward and back several times before testing. Place maximum load at rated load center and elevate load above staged height. With the mast at vertical (0 in), the mast and carriage may not drift more than 19.05 mm (0.75 in) during a five minute period, measured at the tilt cylinder rod.

## Steering Slip

With truck keyed up, stand or place weight on the pedals and turn the tiller into the stop and hold it against the stop with 128.8-162.7 Nm (95-120 ft lb) steer force. Check steer tiller speed for CW and CCW directions, movement is not to exceed 10 rpm on trucks equipped with standard oil and 20 rpm on trucks equipped with freezer oil. If the movement exceeds these ratings, a need for corrective action as indicated.

## Freezer Preparation

Crown trucks may require a mixture of low temperature hydraulic oil, Crown P/N 363505-101 (3.78 liters [1 gal]), blended 50% with standard hydraulic oil, Crown P/N 363504-101 (3.78 liters [1 gal]) when used in a freezer or cooler. High concentrations of low temperature oil is too thin for most cold storage operations and therefore could shorten the life of the pump and cylinder packings if used in higher ambient temperatures.

**NOTE**

*Trucks equipped with velocity fuses may experience staging issues if an insufficient mix of low temperature oil has been used.*

For truck applications operating continually in temperatures at or above 4.4° C (40° F), use 100% standard hydraulic oil (363504-101) (1). Refer to Figure 16063.

For truck applications operating continually in temperatures in a cool environment with freezer use, a 50/50 blend of low temperature (363505-101) and standard hydraulic oil (363504-101) (2) should be used.

The proper mixture of freezer hydraulic oil will ensure the best and most efficient operation of your Crown equipment.

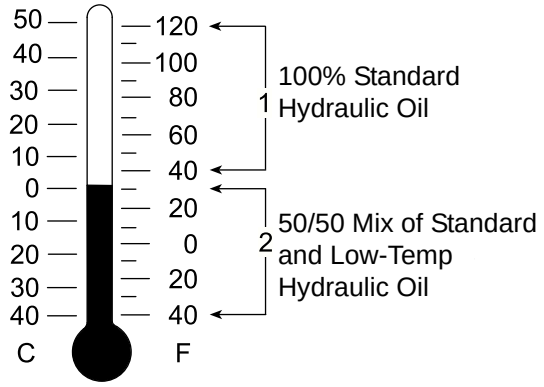



Figure 22422

## Circuit Operation

The following information contains brief descriptions of the hydraulic circuits for the various hydraulic functions. Figure 14161 is a reference schematic for these descriptions and may vary for that which is applicable to your truck. Refer to hydraulic schematic in the HYD section of this manual for the schematic of your unit.

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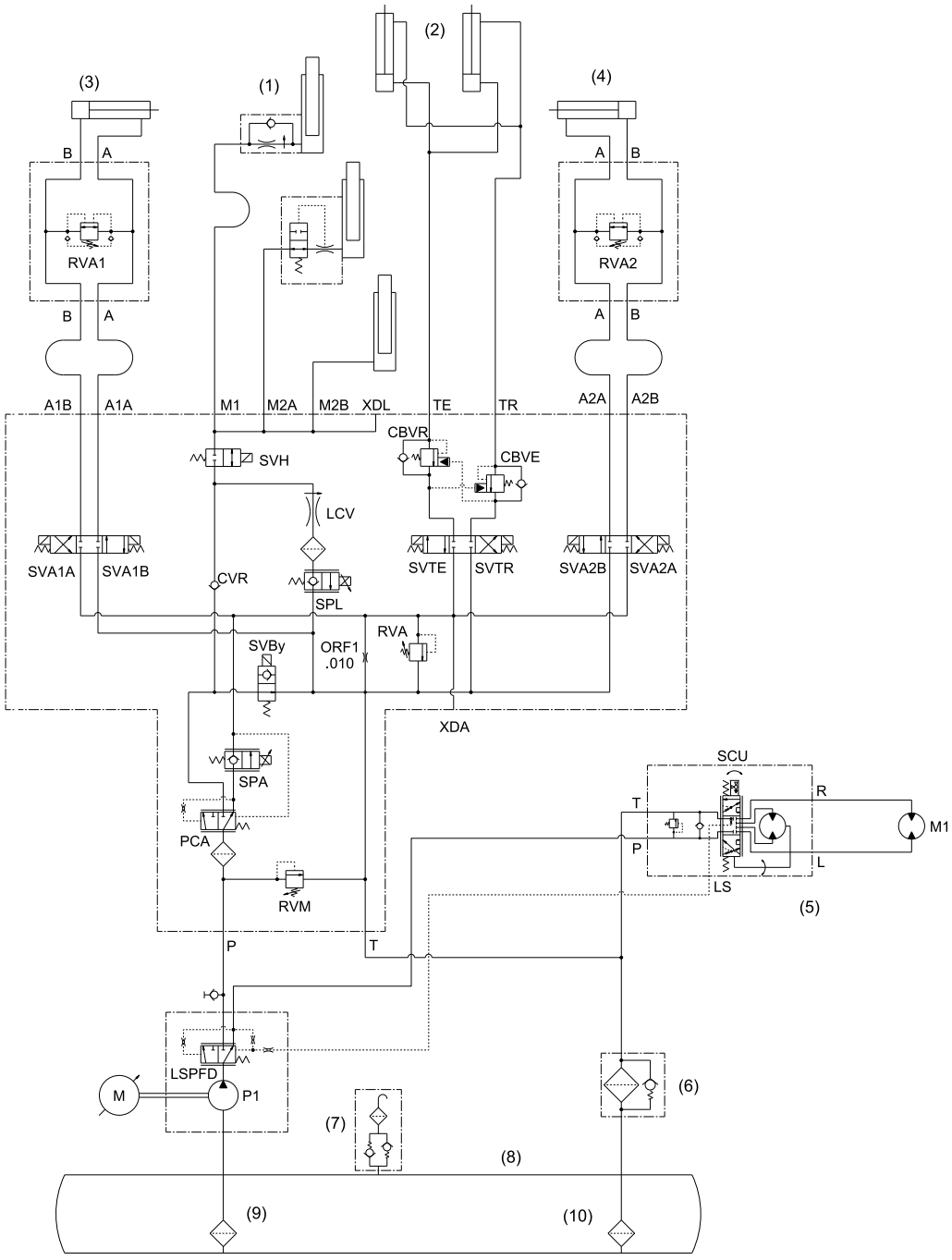



Figure 14161

| | | | |
|---|---|---|---|
| 1 | Lift | 6 | Return Filter |
| 2 | Tilt | 7 | Breather |
| 3 | Accessory 1 | 8 | Reservoir |
| 4 | Accessory 2 | 9 | Suction Strainer |
| 5 | Steering | 10 | De-aeration Screen |

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# Hydraulic Circuits

## Steering Circuit

The steering system is "on demand" hydraulic steering.

The hydraulic components in the steering circuit are shown in Figure 15856.

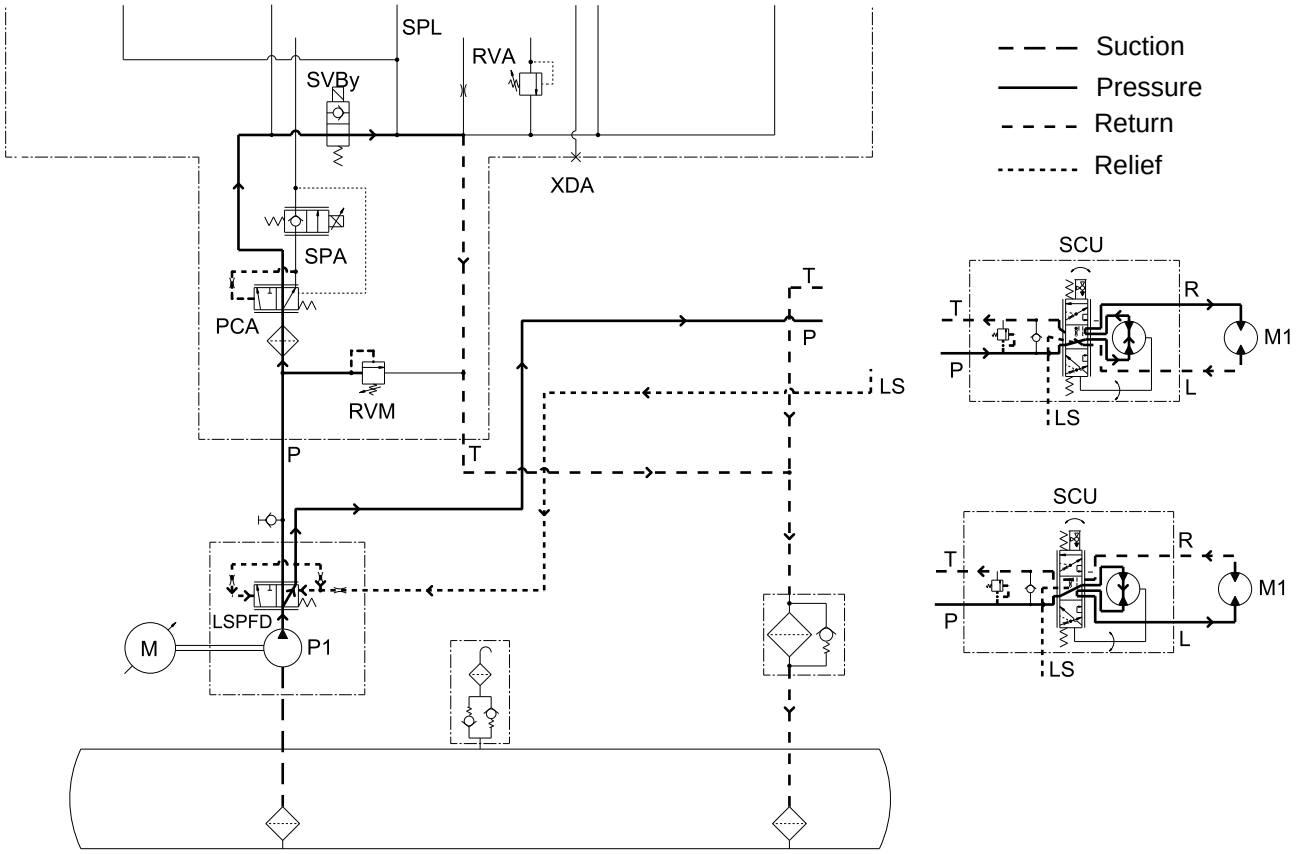



Figure 15856

When the steering tiller is rotated one direction or the other the pump motor will be turned on and will provide oil flow to both the Main Manifold and the SCU. The SCU will direct oil flow (provided by P1) from port P to the hydraulic steering motor. A small portion of the oil supplied to port P is sent back to P1 through a Load Sense hose. Oil flow through the steering motor causes the steering motor output shaft to rotate. The steer wheel assembly, which is mechanically linked to the steering motor output shaft, will be turned by the motor output shaft rotation. Oil flow leaving the steering motor will flow back through the SCU, exit at port T and return to the reservoir. A fixed relief valve internal to the SCU will open at 11032 kPa (1600 psi) to protect the steering circuit.

Excess oil flow generated by steering will enter the main manifold at Port P. This oil flow will initially pass through the envelope on the right side of PCA and be stopped by the check portion of SPA, which is de-energized. This will cause pressure to build up in the pilot passage on the left side of PCA, forcing that valve spool to shift against the spring on the right side of PCA as the oil pressure overcomes the spring pressure. This allows the excess oil flow to pass through PCA and SVBy and back to the reservoir.

When the steering tiller is released, springs internal to the SCU will cause that valve to return to the neutral position. This action will connect an orifice in the SCU between the LS hose and the reservoir. This connection will relieve pressure in the LS hose to the reservoir.

When pressure in the Load Sense hose is relieved (through the SCU) to the reservoir, the pressure differential across the LSPFD spool inside P1 will cause the spool to shift against the spring. This action is what will position the LSPFD spool so that it can provide more oil flow to the Main Manifold and less to the SCU during times when another hydraulic function is being used during steering operation.

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## Hoist

The next hydraulic cycle is the Hoist function, more commonly known as Raise & Lower.

## Lift Circuit

Refer to figure 15857. Lifting the multitask handle will change the voltage across POT 2, the Raise/Lower potentiometer, creating a Raise command input to the truck's electronic control system. The system will energize the coils of SVH and SVBy and the pump motor. SVH will shift and allow oil flow after PCA and CVR to flow out of the manifold to the lift cylinders. SVBy will shift and prevent oil flow after PCA from flowing back to the reservoir.

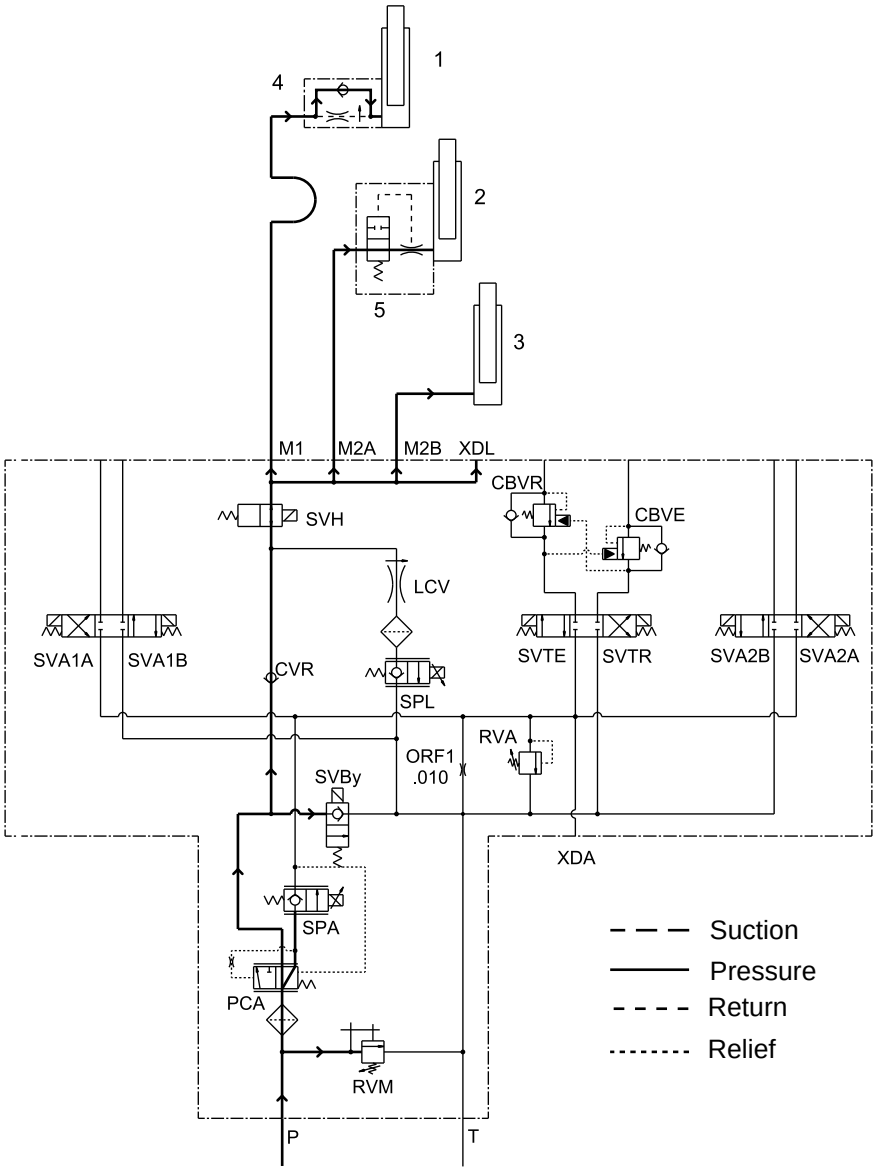



Figure 15857-01

1 Carriage Cylinder
2 Left Mast Cylinder
3 Right Mast Cylinder
4 Flow Control Valve
5 Velocity Fuse

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Pump motor speed will be in proportion to the raise command. The pump motor contains an internal sensor bearing, allowing closed loop speed control of the pump motor. This simply means that if the multitask handle is lifted slightly, SVH and SVBy will shift fully, but the pump motor will run at a low rpm, and P1 will deliver a low volume of oil flow to the carriage and mast cylinders. As the multitask handle is raised more, pump motor speed will increase, increasing the volume of oil flow supplied to the cylinders.

## Lower Circuit

Refer to Figure 15858. Pressing down on the multitask handle will change the voltage across POT 2 creating a Lower command input to the truck's electronic control system. The system will energize the coil of SVH and proportionally drive (energize) the coil SPL which sets the lowering speed.

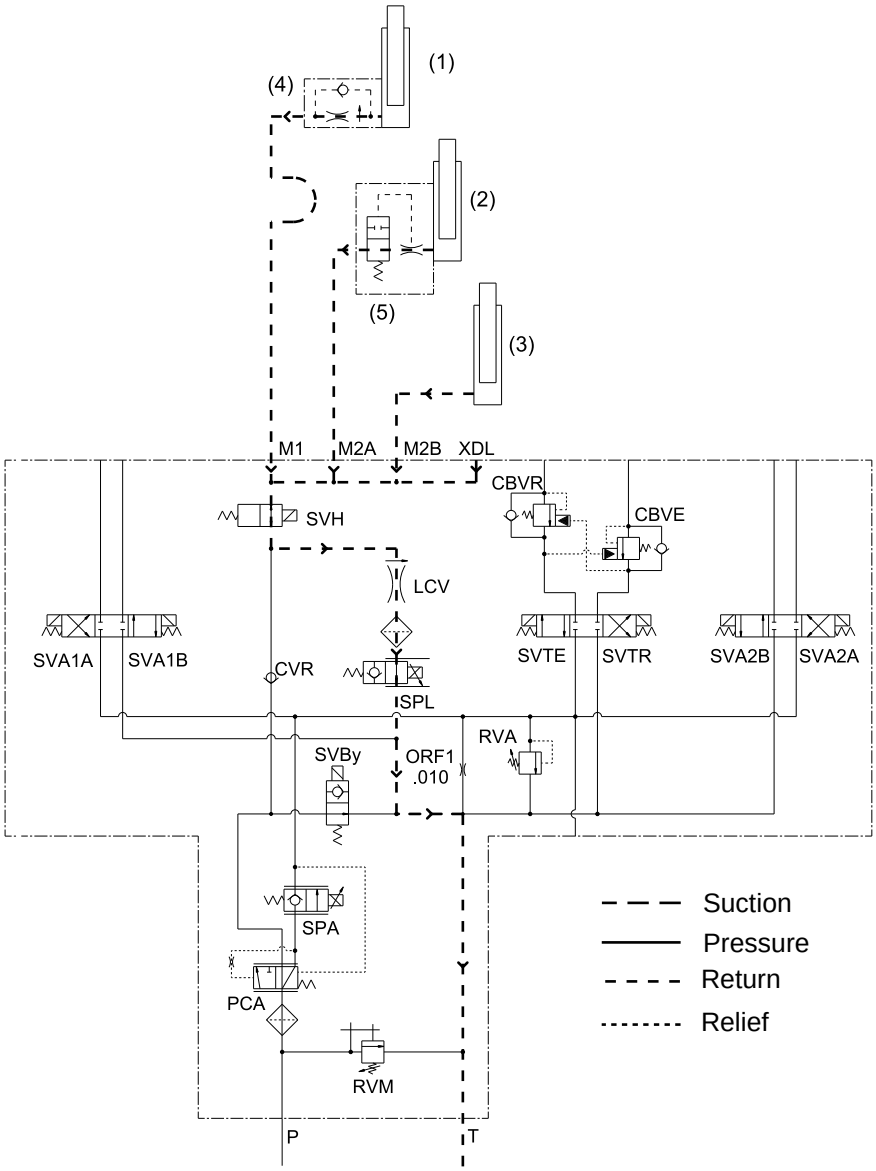



Figure 15858

1 Carriage Cylinder
2 Left Mast Cylinder
3 Right Mast Cylinder
4 Flow Control Valve
5 Velocity Fuse

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As hydraulic fluid leaves the cylinders, it passes through the flow control valve of the carriage cylinder and the velocity fuse of the mast cylinder. Neither of these components restrict or inhibit the flow of hydraulic fluid during normal hydraulic system operation. The function of these two components is to prevent the mast from making to quick of a decent in the event of a plumbing failure. The hydraulic fluid flows through the SVH and into the LCV. The maximum lowering speed is limited by the pressure compensated flow regulator, LCV. Hydraulic fluid passes through the SPL and back to the reservoir.

## Tilt and Accessory Flow

Refer to Figure 15994. Any accessory command will energize the pump motor and proportionally energize the coil of SPA. SPA spool will shift and allow oil flow after PCA to SVA1 (and SVA2 if the truck is so equipped), SVT, RVA, and ORF1. Oil flow after SPA will also be directed into a pilot passage on the spring side of PCA, causing a change in the pressure differential across PCA. That change in pressure differential will cause PCA to shift and deliver the required amount of oil flow to satisfy the accessory demand. Using this pressure differential, PCA will provide consistent accessory speed regardless of the load. Any excess flow after PCA not used in accessory operation will be sent back to the reservoir by SVB.

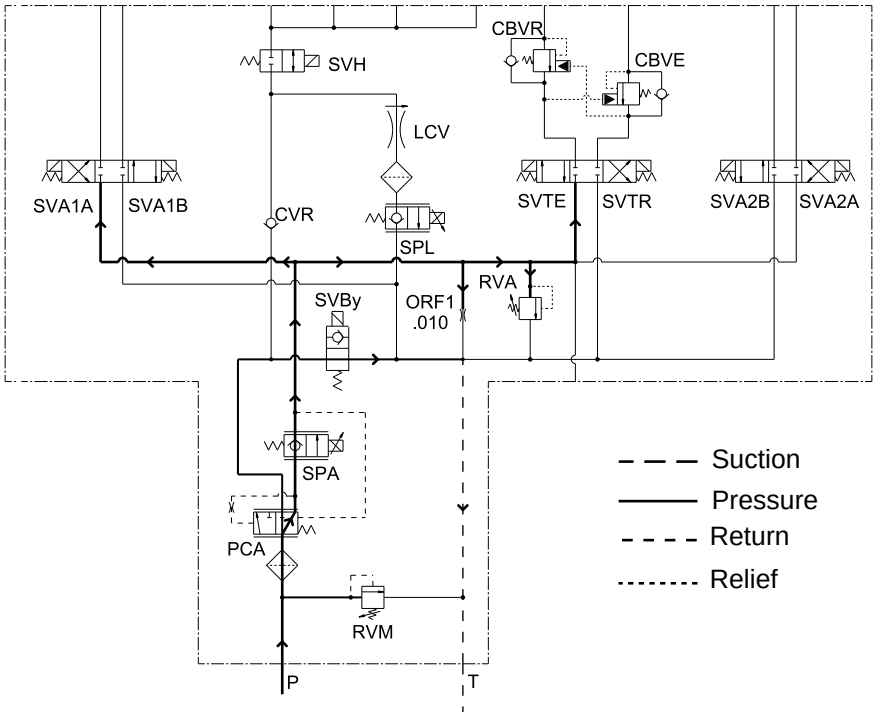



Figure 15994

When the accessory command is released, SPA will de-energize and return to its closed position. The function of ORF1 is to allow the pressure trapped in the accessory circuit to bleed off, allowing PCA to operate at the lowest possible pressure drop when an accessory is not being operated.

RVA is set to protect the accessory circuit by going into relief at 17237 kPa (2500 psi).

## Tilt

SVT, the solenoid valve for tilt is a three position valve with two coils. A Tilt Command will energize one of the two coils, depending on which direction of Tilt was selected.

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## Tilt Down Circuit

Pressing on the bottom part of the multitask handle thumb ball closes TDS, (Tilt Down Switch). Refer to Figure 15982. When Tilt Down is selected, SVTE will energize and shift fully. SPA will be ramped open to the point required for tilt speed, and the pump motor will be ramped up to the rpm required for tilt speed.

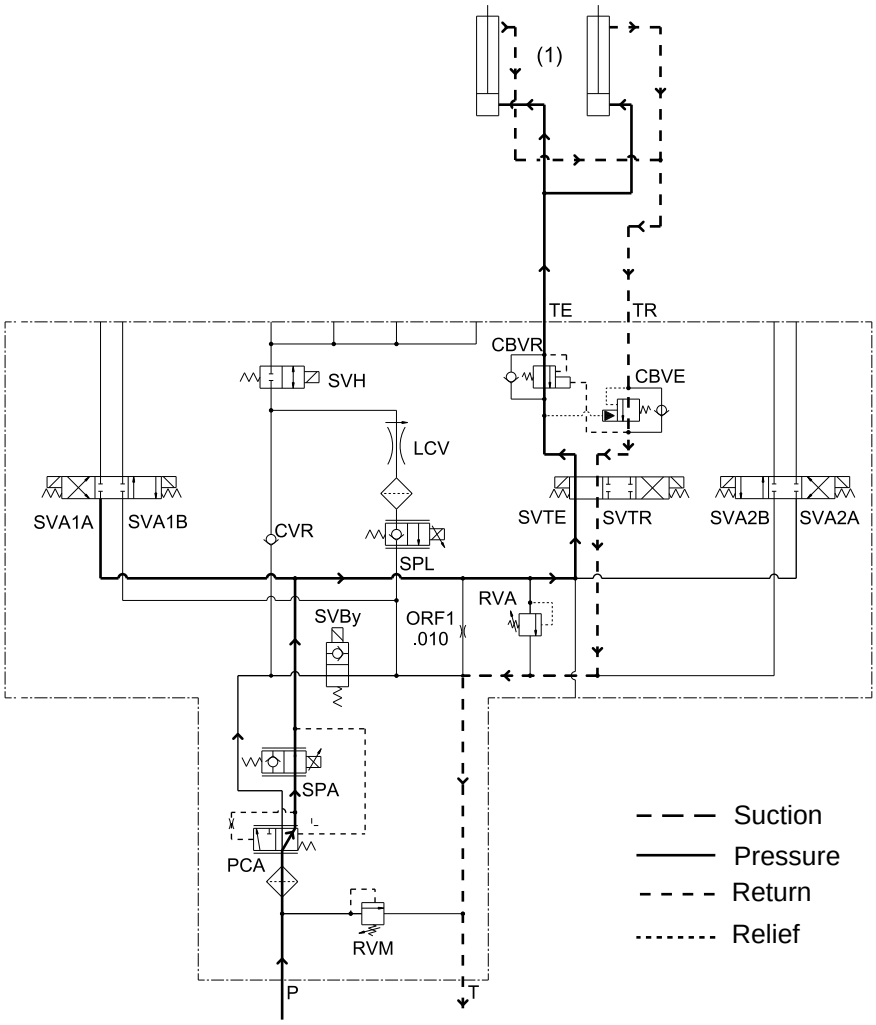



Figure 15982

1 Tilt Cylinders

The oil flow supplied by P1 will flow across SVTE and up to CBVR. In order for a double acting circuit such as Tilt to operate correctly, there needs to be a path to allow oil in the other side of the circuit to move.

CBVE and CBVR are "load holding" counter balance valves which allow oil flow in the Tilt circuit but control overrunning load conditions and drift. This simply means the CBVE and CBVR use pressure differentials to make sure Tilt doesn't move any further or faster than what is commanded regardless of the load on the forks.

Each counterbalance valve contains a check portion and a load holding or blocking portion. The valve will allow "free flow" when the direction of oil flow is such that it is able to move the check portion of the valve. If oil is "free flowing" through the check portion of CBVR, the load holding portion of CBVE will act as a blocking valve. This blocking portion of the valve needs to be opened far enough to allow the tilt function to operate in response to demand without overrunning that demand.

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Refer to Figure 15982. Oil flow after CBVR will leave the main manifold at port TE and flow into the back of the double-acting piston type Tilt cylinders. That oil flow will exert pressure on the piston and rod assemblies inside of the tilt cylinders. This will cause the pistons to exert pressure on oil contained in the front of the tilt cylinders. That oil will be forced out the front of the tilt cylinders, into port TR of the main manifold, across SVTE and back to the reservoir. This entire action allows the cylinder rods to "extend" out of the cylinder housings, causing the mast to tilt down or away from the power unit.

## Tilt Back Circuit

Pressing on the upper part of the multi-task handle thumb ball closes TBS (Tilt Back Switch). Refer to Figure 15859. When Tilt Back is selected SVTR will energize and shift fully. SPA will be ramped open to the point required for tilt speed, and the pump motor will be ramped up to the rpm required for tilt speed. Supply oil after SPA will flow through the check portion of CBVE, out port TR and into the front of the tilt cylinders. Some of that oil flow will be applied as pilot pressure to the blocking portion of CBVR.

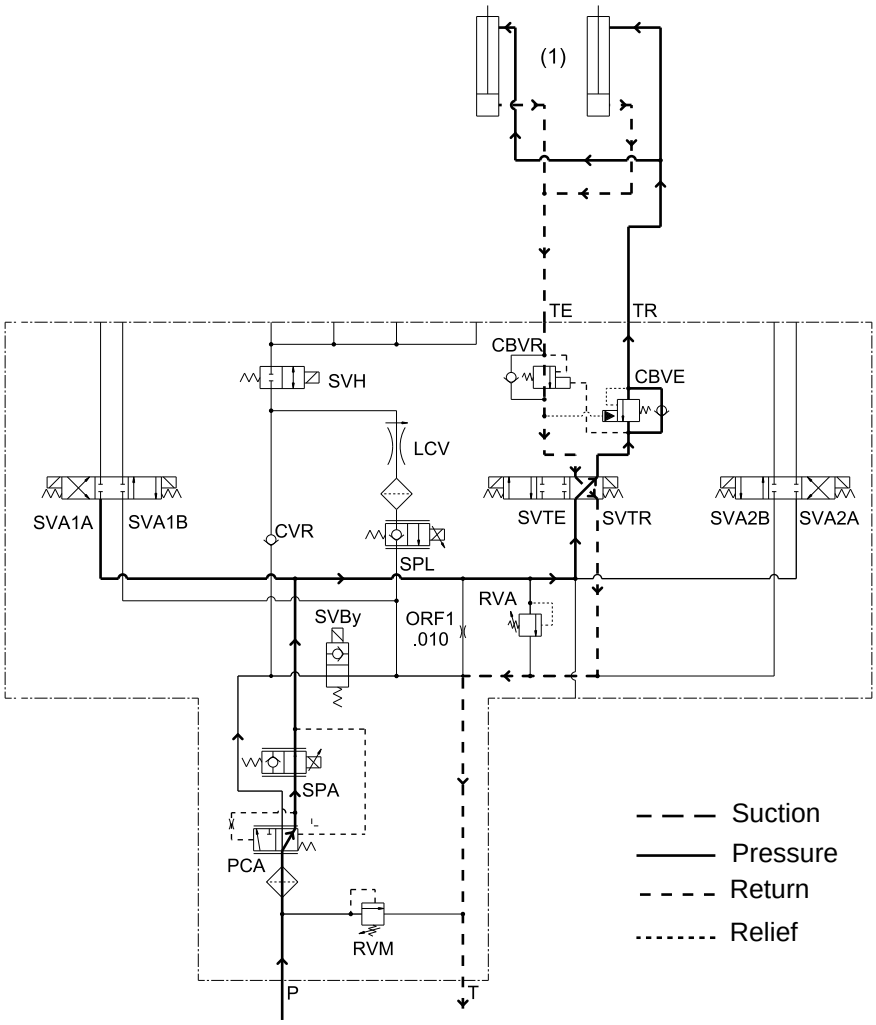



Figure 15859

Oil in front of the pistons inside the Tilt cylinders will be pushed out and into port TE. Some of this oil flow will be applied as relief pressure to the blocking portion of CBVR. Both supply and return oil flow will force the blocking portion of CBVR to open, allowing the oil entering port TE to flow through SVTR and back to the reservoir. This will cause the piston and rod assemblies to "retract" into the cylinders causing the mast to tilt back or towards the power unit. When the Tilt Back command is removed, (TBS opened) SPA and the pump motor are ramped closed/off and SVTR is de-energized.

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## Tilt Position Assist

The truck will also be equipped with a feature called Tilt Position Assist which allows an operator to return the forks to a level position after tilting either down or back. After initial calibration, this feature is used by pressing and holding the switch on the left hand side of the multi-task handle and then pressing and holding either TDS or TBS (it doesn't matter which). The truck's control system will tilt the mast and automatically stop when fork position reaches the calibrated level position.

## Sideshift - Left Circuit

In addition to Hoist and Tilt, it can be equipped with optional or accessory hydraulic functions. SVA1A/ SVA1B is the solenoid valve that will direct oil flow to the Third hydraulic function (first accessory). SVA1A/ SVA1B can be either a low flow or high flow valve.

On trucks equipped with an accessory attachment such as Sideshift, rolling the multi-task handle thumb ball to the operator's left will change the voltage across POT 3. This action creates a Sideshift left command input to the truck's electronic control system.

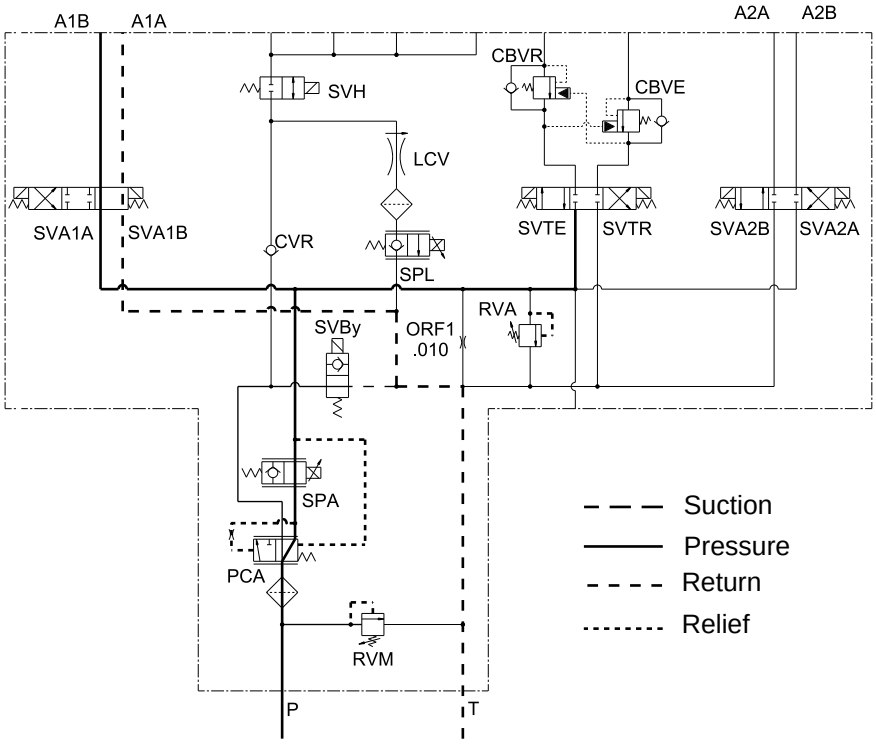



Figure 15983

Refer to Figure 15983. When SS left is selected SVA1B will energize and shift fully. SPA will ramp open and the pump motor speed will ramp up in proportion to the voltage change across POT 3. Supply oil after SPA will flow through SVA1B, out port A1B and into the right side of the double acting sideshift cylinder, forcing the carriage to move to the left.

Oil in the left hand side of the SS cylinder will be pushed out of the cylinder, into Port A1A of the main manifold, through SVA1B, and out Port T to the reservoir.

When the SS left command is removed, (POT 3 in neutral position) SPA and the pump motor are ramped closed/off and SVA1B is de-energized.

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## Sideshift - Right Circuit

Refer to Figure 15993. When SS right is selected SVA1A will energize and shift fully. SPA will ramp open and the pump motor speed will ramp up in proportion to the voltage change across POT 3. Supply oil after SPA will flow through SVA1A, out port A1A and into the left side of the double acting sideshift cylinder, forcing the carriage to move to the right.

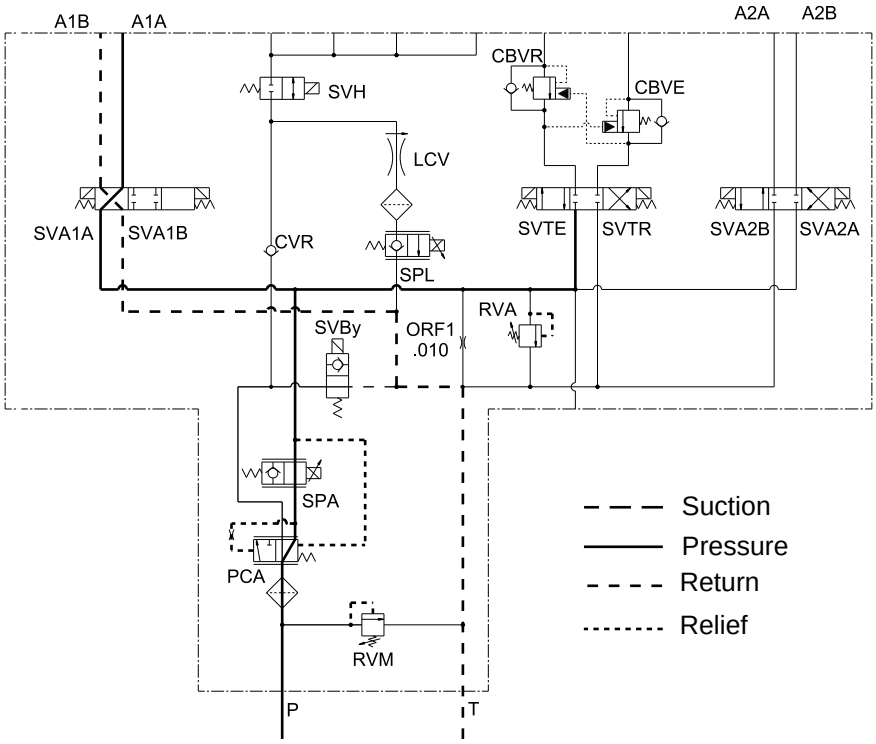



Figure 15993

Oil in the right hand side of the SS cylinder will be pushed out of the cylinder, into Port A1B of the main manifold, through SVA1A, and out Port T to the reservoir.

When the SS right command is removed, (POT 3 in neutral position) SPA and the pump motor are ramped closed/off and SVA1A is de-energized.

## Fourth Hydraulic Function (Second Accessory)

The truck can also be equipped with a Fourth hydraulic function (second accessory). Refer to Figure 15855. SVA2A/SVA2B is the solenoid valve that will direct oil flow to that function. SVA2A/SVA2B is a high flow valve.

Operating the Fourth hydraulic function is accomplished by pressing and holding the switch on the left hand side of the multitask handle and then rolling the thumb ball to the left or right. Either SVA2A or SVA2B will energize and shift while SPA and the pump motor operate in proportion to POT 3 voltage.

## Fifth Hydraulic Function (Third Accessory)

The truck can also be equipped with an optional Fifth hydraulic function (third accessory). Oil flow for this Fifth function is routed through SVA2A/SVA2B and directed to that function by a solenoid controlled valve mounted on the actual attachment. When equipped with a Fifth hydraulic function, the switch on the left hand side of the multitask handle (normally used for TPA and second accessory) is pressed (and held) and the thumb ball is rolled up or down (actuating TBS or TDS). This means TPA will not be available on a truck equipped for five hydraulic functions (Hoist, Tilt, and three accessories).

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## Notes:

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# Accessory Clamp Set-Up

## Attachment Setup - General

Hydraulics for optional attachments, such as carton clamps, are controlled by the mast manifold through a crossover relief manifold assembly mounted on the carriage. The crossover relief manifold has an adjustable relief valve to regulate maximum pressure to the attachment.

PRVA replaces RVA on the mast manifold when the truck is equipped with the pressure regulator option. This option allows multiple pressures to be set for the attachment by setting the pressure regulator (PRVA) tag pressures to desired levels through the Service Menu.

**WARNING**

*AVOID HIGH PRESSURE FLUIDS-Escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.*
*Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.*

## Attachment Setup - Clamp

1. Set the carriage mounted crossover relief valve to the maximum rated pressure of the attachment.
   – If equipped with Electronic Pressure Regulator, locate the accessory pressure regulator valve (PRVA) on the mast manifold. PRVA replaces RVA when the truck is equipped with pressure regulator option. To disable the pressure regulator option, remove the coil from PRVA, while leaving the wires connected. Failure to leave the wires connected will cause a fault. Refer to Figure 15927.

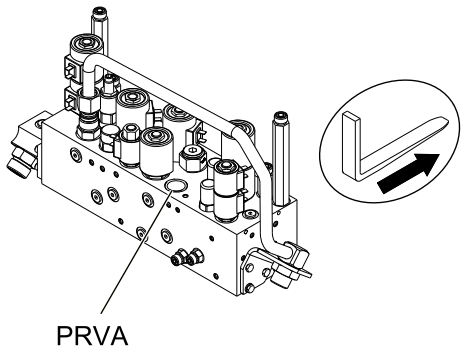



Figure 15927

   – Use Service Menu, F12, to set Accessory 1, Hi Flow, to three gpm. **F12 must be set to "Hi Flow" to enable F13 Accessory 2.** Refer to Figure 19637. For more information on Service Menus, refer to Electrical, Access 123…System.

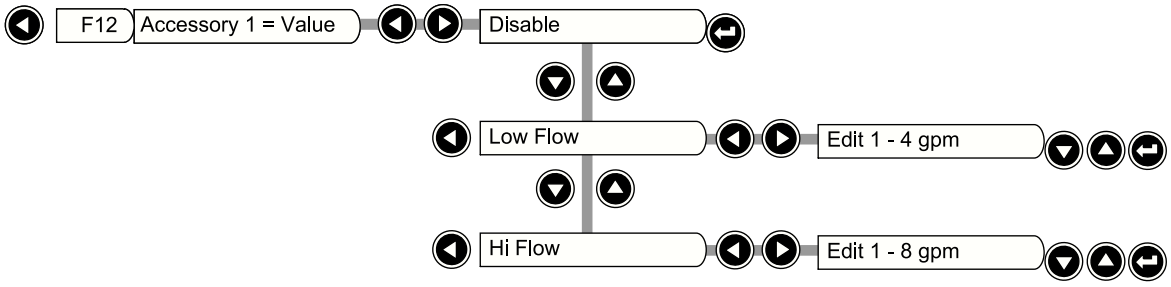



Figure 19637

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– Use Service Menu, F13, to set Accessory 2 flow for the attachment. Set flow to match the attachment manufacturer's nominal recommended flow. For example, if the attachment manufacturer recommends 5 - 8 gpm, start at 5 gpm. Refer to Figure 19638.

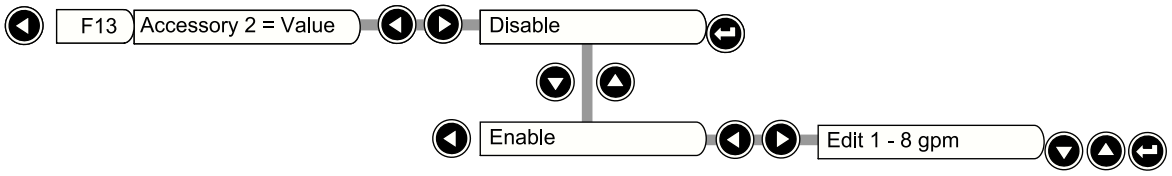



Figure 19638

– Use a piece of cardboard or paper to check for hydraulic leaks. Disconnect hydraulic plumbing to attachment. Cap hoses with a plastic plug to avoid oil leakage and contamination. Catch any oil that may be spilled.

– Connect a pressure gauge to the two ports (a) of the carriage mounted crossover relief manifold used for the attachment. Refer to Figure 19639.

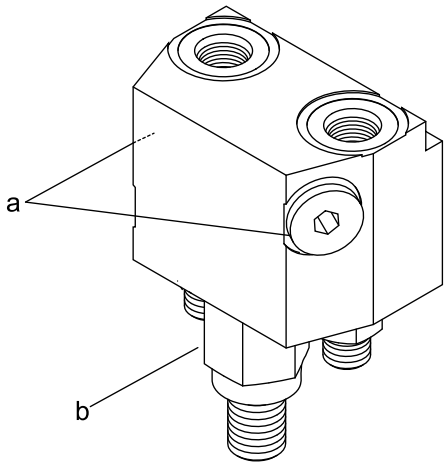



Figure 19639

– Observe and record the pressure on each gauge while operating the attachment in the direction of release.

– Calculate the crossover relief valve setting by subtracting the lower pressure from the higher pressure.

– Adjust the crossover relief valve until the attachment maximum rated pressure is obtained.

2. Re-connect hydraulic plumbing to attachment as disconnected above.

3. If equipped with electronic pressure regulator, assemble the coil back into PRVA.

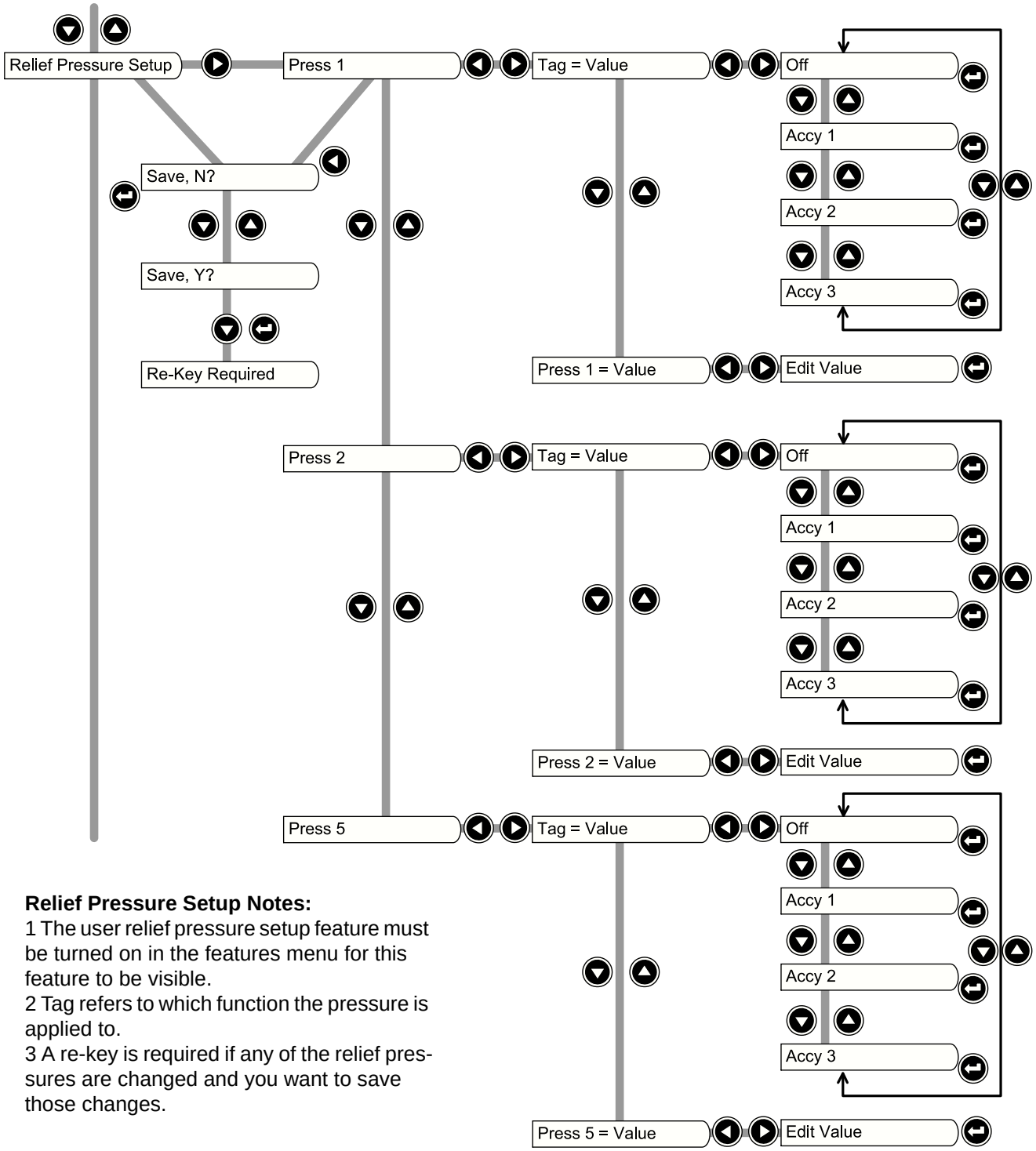
4. Use a piece of cardboard or paper to check for hydraulic leaks.

5. If the attachment is equipped with a relief valve, set it to approximately 100 psi less than the attachment's rated pressure. The attachment should have a gauge port for this purpose. For example, if the attachment is rated to 2200 psi, set the attachment relief valve to 2100 psi.

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6. Use the Operator Menu to set pressure regulator tag pressures to the desired levels. This menu is only available when F20 and F21 are enabled. Refer to Figure 15414.
7. Verify force output of clamp during operation.
8. If faster clamp operation is desired, note time (seconds) to cycle clamp. Increase F13 setting in 1 GPM increments. If time does not decrease, relief pressures have been reached. Reduce flow to previous setting.




**Relief Pressure Setup Notes:**
1 The user relief pressure setup feature must be turned on in the features menu for this feature to be visible.
2 Tag refers to which function the pressure is applied to.
3 A re-key is required if any of the relief pressures are changed and you want to save those changes.

Figure 15414

https://truckmanualshub.com/

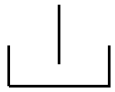


## Notes:

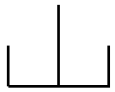
https://truckmanualshub.com/



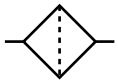
# Hydraulic Schematic Symbols



VENTED RESERVOIR
with lines above fluid level



VENTED RESERVOIR
with lines below fluid level



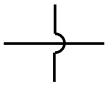
FILTER or STRAINER



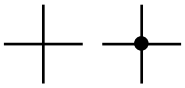
HYDRAULIC LINE
with full flow (plumbing - may be tubing, hose, or flow passage in manifold



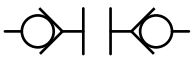
PILOT or DRAIN LINE
limited flow



LINES CROSSING



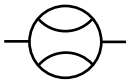
LINES CONNECTED



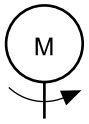
QUICK DISCONNECT
(disconnected)



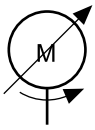
PLUGGED PORT
(test port)



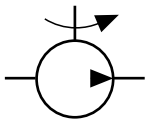
FLOW METER



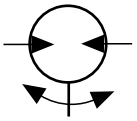

ELECTRIC MOTOR
unidirectional single speed



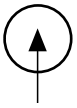

ELECTRIC MOTOR
unidirectional variable speed



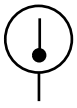
HYDRAULIC PUMP
fixed displacement unidirectional



HYDRAULIC MOTOR
bi-directional



GAUGE
pressure



GAUGE
temperature



ACCUMULATOR
gas charged diaphragm type

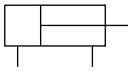
Figure 3559-03

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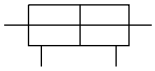




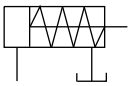
PRESSURE SWITCH



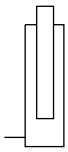
CYLINDER
double acting unequal area



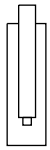
CYLINDER
double acting equal area
(steer) (double end)



CYLINDER
single acting spring returned
(rod end vented)



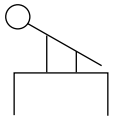
CYLINDER
single acting ram type



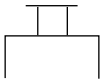
CYLINDER
single acting with cushion



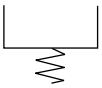
COMPONENT ENCLOSURE
manifold block



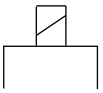
ACTUATOR MANUAL LEVER



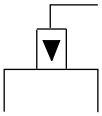
ACTUATOR MANUAL



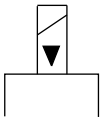
SPRING
(bias to normal
de-energized position)



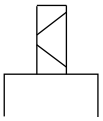
SOLENOID
single coil or winding



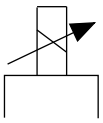
HYDRAULIC PILOT
OPERATED



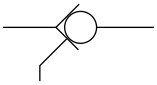
SOLENOID
pilot operated



SOLENOID DUAL



SOLENOID PROPORTIONAL



VALVE PILOT CHECK
(pilot to open)

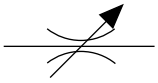
Figure 3560-03

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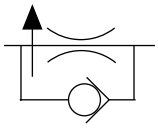
ORIFICE THROTTLE
fixed



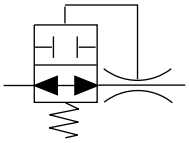
ORIFICE THROTTLE
adjustable



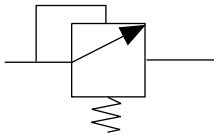
FLOW CONTROL
PRESSURE COMPENSATED
fixed



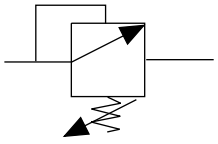
FLOW CONTROL
PRESSURE COMPENSATED
fixed with reverse flow bypass



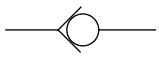
FUSE VELOCITY



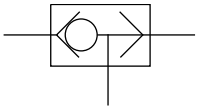
VALVE RELIEF
fixed setting



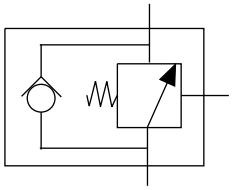
VALVE RELIEF
adjustable



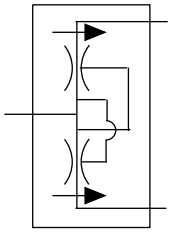
VALVE CHECK



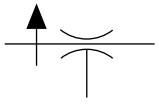
VALVE SHUTTLE



VALVE
SINGLE COUNTERBALANCE
in manifold



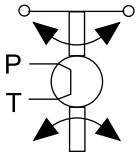
FLOW DIVIDER/COMBINER



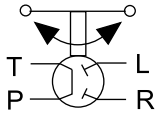
BYPASS FLOW CONTROL
regulated flow
pressure compensated



VALVE MANUAL SHUTOFF




TORQUE GENERATOR

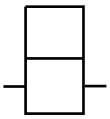



STEER UNIT
hydrostatic

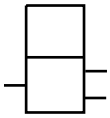
Figure 3561-03

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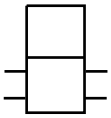




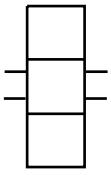
VALVE
2 way 2 position



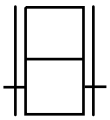
VALVE
3 way 2 position



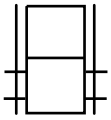
VALVE
4 way 2 position



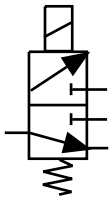
VALVE
4 way 3 position



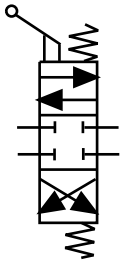
VALVE
2 way infinite positions



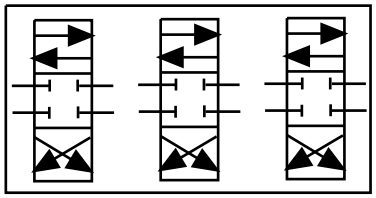
VALVE
4 way infinite positions



VALVE
3 way 2 position
spring bias, solenoid control



VALVE
4 way 3 position
dual spring centered,
manual lever control



NOTE: The type of valve depends on the number of spools found in the component enclosure (Triple spool valve shown)

Figure 3562-03

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# Pump Maintenance

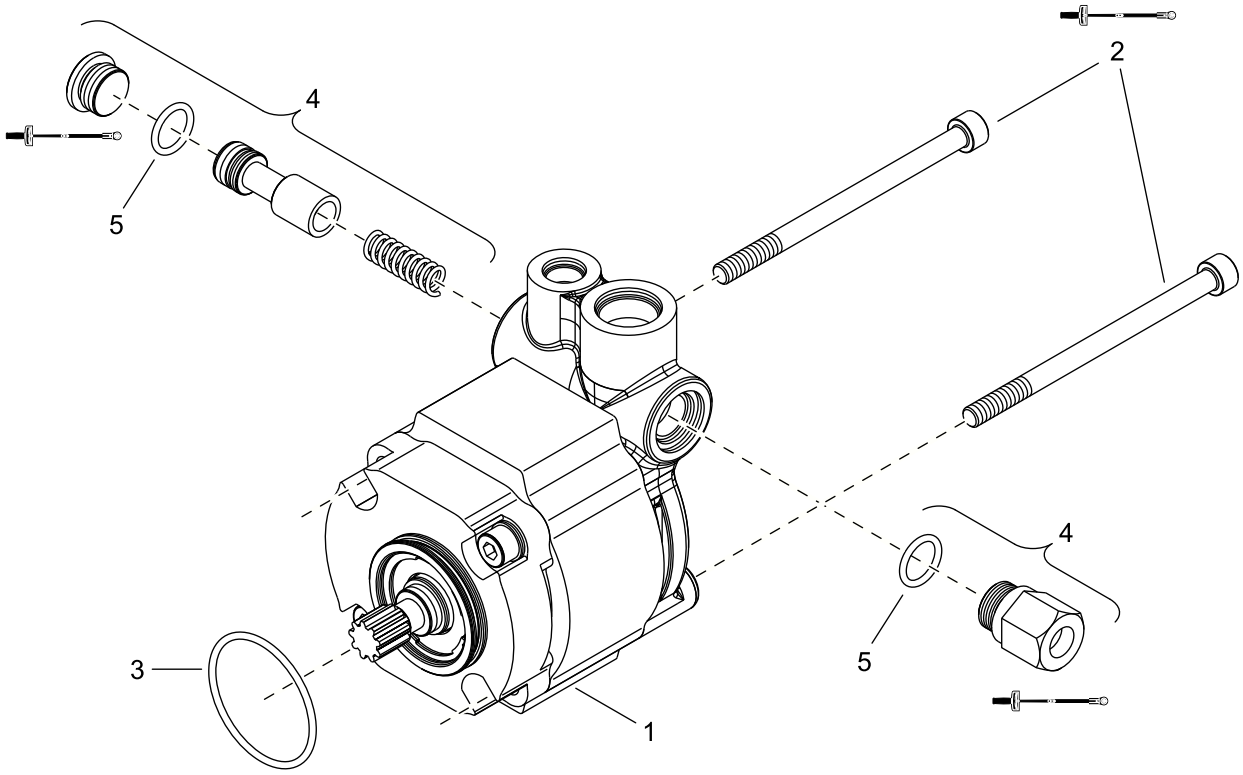



Figure 16083

## General

Before beginning to disassemble the pump, make sure you have a clean, dust-free location, using clean tools and equipment. Dirt or grit will damage the highly polished machined surfaces and will result in leakage or premature failure of the pump.

## Pump Disassembly

1. Remove bolts which hold the pump to the lift motor.
2. Remove the lift pump from motor.
3. Carefully remove the O-ring seal (index 3).
4. Remove the Priority Valve (index 4) and remove O-rings (Item 5).

## Parts Inspection

Wash all metal parts thoroughly with a good cleaning fluid. Inspect, in the order disassembled, for wear and damage.

## Body

Examine the body and make sure there is no visible damage to the body.

## Priority Valve

Check for damage to the valve components and the condition of the O-rings.

## Pump Reassembly

1. Make sure that all pump components are perfectly clean and lubricated with hydraulic oil to be used in the pump, prior to assembly.
2. Place the O-rings (index 5) onto the Plug end and the Port end of the Priority Valve and assemble remaining components in order they were removed. Torque at 50-60 Nm (36.9-44.3 ft lbs).
3. Lubricate the O-ring (index 3) and seat it at the front of the lift pump. Apply grease (063002-038) to splined shaft and attach the pump to the motor.
4. Insert the bolts into the pump body and hand tighten into tapped holes in the mounting flange of the motor. Torque at 27 Nm (37 ft lbs).

## Start Up Procedure

This procedure will cover the steps to be taken when first starting a pump on a vehicle that has had any of the following operations performed:

1. The pump has been replaced or an existing pump has been removed and reinstalled.
2. The pump suction line has been replaced or the pump suction line has been removed and reinstalled.
3. The reservoir has been drained and refilled.
4. Any other operation that may cause the pump to lose its prime.

**WARNING**

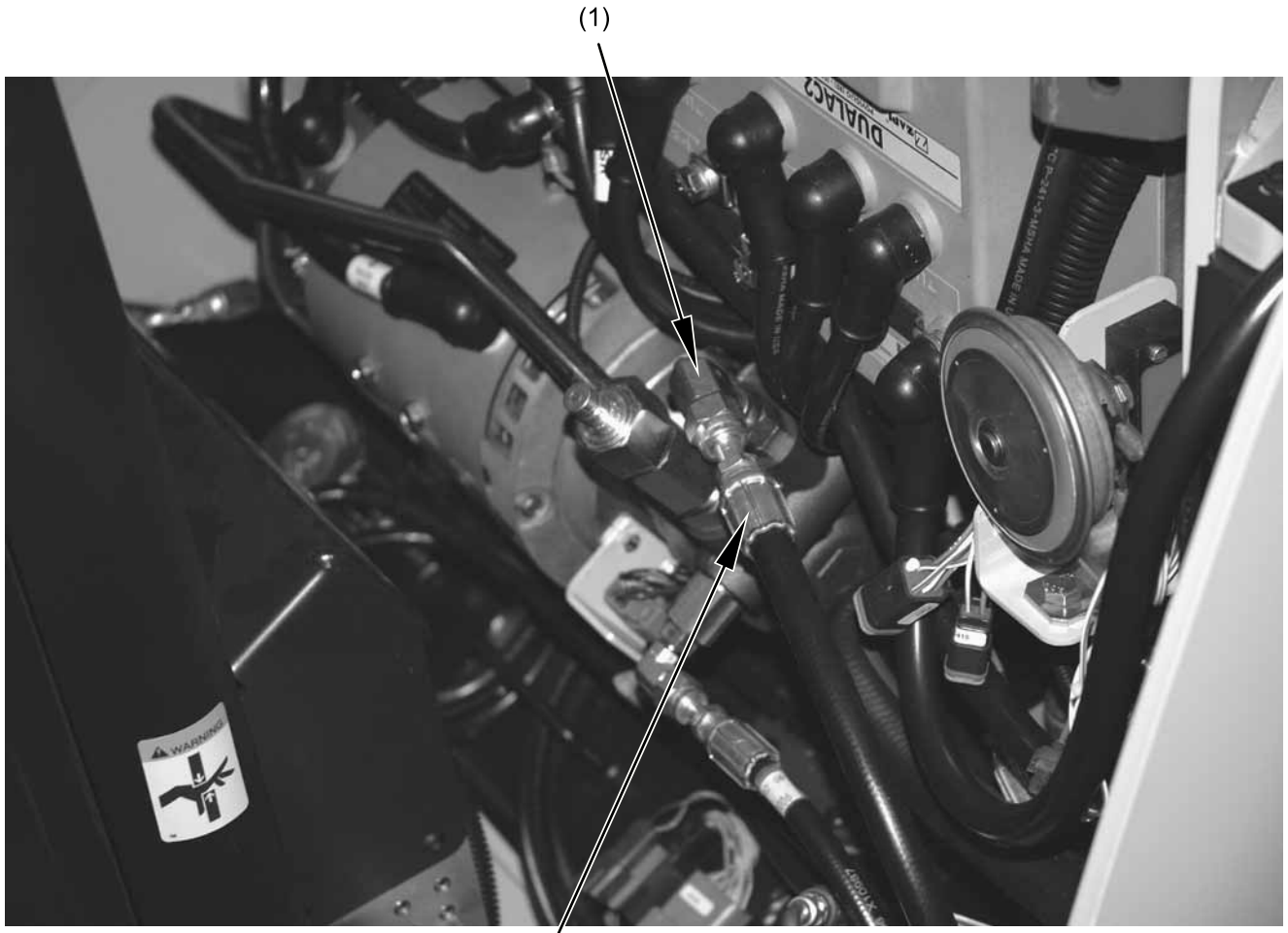
*Before proceeding, Review the Control of Hazardous Energy, Lockout/Tagout and Hydraulic Sections of this manual.*

Follow these steps when starting the pump. Refer to figure 16082 for pump connection points.

1. Disconnect the battery.
2. Remove the steer pressure hose from the pump and plug using 064335-006.
3. Connect an extra hose (064322-003) to the pump steer pressure port. Direct the other end of the hose into a container that will catch the oil during the startup procedure. Note: Either secure the hose to the container or have someone hold the hose directing it into the container in a safe manner. Oil coming from the hose will be at a velocity high enough to cause the hose to move if not secured or held. There may also be significant splashing of oil so it is recommended that the container be covered.
4. Connect the battery.
5. Power up the truck.
6. Move the lift lever to the maximum lift speed position for 2 seconds then return to neutral. Look for oil at the pump steer pressure port. Repeat this procedure until oil comes from the steer pressure port. If flow can not be established after 7 attempts, check for the following:
   - Proper oil level in reservoir.
   - Suction line is connected and clamped.
   - Suction line is obstructed. This includes the suction strainer and the suction hose.
   - Steer pressure hose is loose at the pump.
7. When flow has been established at the steer pressure port, remove the extra hose from the pump steer pressure port, remove the plug from the steer pressure hose, reconnect the steer pressure hose to the pump and torque to 24.5-27.1 Nm (18-20 ft lb).
8. Exercise steering and mast functions. Check for proper oil level. Adjust as required.

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(1) Steer Pressure Port Adapter
(2) Steer Pressure Hose

Figure 16082

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## Notes:

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# 4 DRIVE UNIT

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## Notes:

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## Drive Unit

This truck has independent drive units coupled to each drive wheel. Each unit is totally enclosed and oil filled to give maximum lubrication to both bearings and gears.

**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. Control of Hazardous Energy section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to performing drive unit maintenance as outlined in this section.*

## Inspect Drive Unit

Before attempting to replace the drive tire or remove the drive unit, complete a visual/physical inspection of the following:

- Inspect drive unit for leaks.
- Check fill plug, drain plug, breather plug and level check plug for leaks.
- Check drive unit for proper oil level.
- Check drive tires for cuts, gouges and excessive wear.
- Physically check torque values on drive tire fasteners.

## Drive Unit Lubrication

The drive unit has a capacity of approximately 800 ml (0.85 quart) of 75W-90 synthetic gear oil. Refer to Lubrication & Adjustment for lubricant information.

Remove the drain plug (3) to completely drain the unit. To fill, remove fill plug (1) and add gear oil until present at the level check plug (2). Refer to Figure 16097-05.

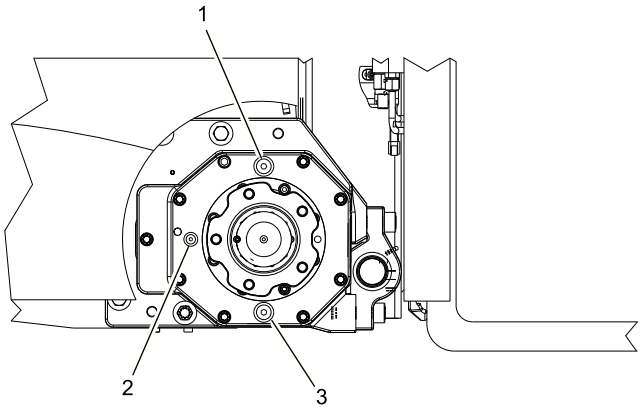



Figure 16097-05

1 Torque 53.3 - 58.7 Nm (12.5 - 16.5 ft lb)
2 Torque 17.6 - 20.4 Nm (13 - 15 ft lb)
3 Torque 53.3 - 58.7 Nm (12.5 - 16.5 ft lb)

## Drive Tire Replacement

When replacing the drive tire, make sure the composition and size are such that maneuverability, capacity and braking are maintained. The drive tire is a "press-on" type; press the existing tire off the hub and press on the replacement tire. Do not press hub through old tire directly into new tire in one operation. This method is more likely to cause hub misalignment resulting in premature tire failure. Place new tire on a flat, level steel plate. This will insure an even distribution of force and pressure when the hub is pressed into the replacement tire. Apply a light film of oil to the hub before pressing in replacement tire. The outside of hub must be pressed flush with the outside edge of tire. It is recommended that both drive tires be replaced at the same time to maintain equal tire circumference.

**CAUTION**

*Refer to Control of Hazardous Energy Lockout/Tagout section for lifting and blocking instructions.*

1. Move the truck to a service area with a level floor. Lower the forks, and chock steer tire.
2. Lift and block truck so drive tires just clear the floor.
3. Remove the five lug nuts and drive tire from the drive unit.
4. Press existing tire off the hub.
5. Inspect the hub for any damage and replace as needed.
6. Remove any paint that may be present on tapered lug seats or on inner hub face that contacts truck axle.
7. Verify replacement drive tire being installed is of the correct composition and size. The incorrect type of tire can affect maneuverability and braking requirements of the truck. Refer to Drive Unit Parts for tire part number selection.
8. Press replacement tire onto hub. The outside of hub must be pressed flush with the outside edge of tire.
9. Apply anti-seize to lug nut stud and lug nut threads. For anti-seize part number, refer to One Source Catalog.
10. Install the tire on the truck and tighten lug nuts by hand.
11. Torque the lug nuts in sequence per Figure 16098-02.

- First torque sequence value 27 - 54 Nm (20 - 40 ft lb) to seat nuts.
- Second torque sequence value 81 - 102 Nm (60 - 75 ft lb).
- Third torque sequence value 135 - 146 Nm (100 - 108 ft lb).

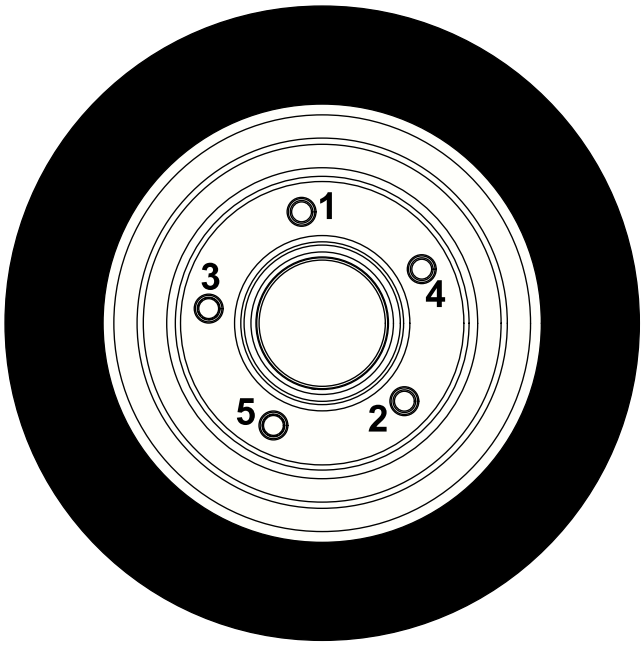



Figure 16098-02

12. Raise the truck, remove blocking material from under truck and lower to floor.
13. Verify truck is operational.


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# Traction Motor

**NOTE**

*If truck is equipped with DC traction motors, traction motor removal is not necessary for replacement of motor brushes as access holes located in the front of the power unit permit brush replacement while traction motors are still mounted to drive unit.*

## Traction Motor Removal

1. Chock steer wheel and disconnect the battery. Refer to Control of Hazardous Energy section.
2. Remove front power unit cover.
3. Remove the mast. Refer to Removing Mast procedures in the Control of Hazardous Energy section of the service manual.
4. Remove the drive unit assembly. Refer to Drive Unit Removal procedures in this section of the manual.
5. Disconnect brake connector and disassemble brake from traction motor. See "Parking Brake Removal" procedures in the Brake section of this service manual.
6. Support the weight of the motor while removing the four motor mounting bolts.

**CAUTION**

*Traction motor is heavy, approximately 35 kg (75 lb).*

7. Remove the motor.

## Traction Motor Installation

1. Clean the mount plate motor pilot bore with parts cleaner. Ensure both surfaces are free of dirt and oil.
2. Assemble the four motor mounting bolts, with washers, into the motor end housing.
3. Assemble traction motor to the pilot bore taking care that the motor shaft pinion is guided smoothly into the mating gear mesh.
   - The terminal block on the motor is to be positioned upward relative to the truck.
   - Ensure the motor is mounted squarely onto the mount plate with no shavings or debris between the two faces.
   - Do not draw motor onto pilot using fasteners. This may result in binding or shaft misalignment.
4. Align and assemble bolts into the mount plate and torque the bolts using the sequence shown in Figure 20860. Torque bolts to 31.3 - 36.7 Nm (23 - 27 ft lb).

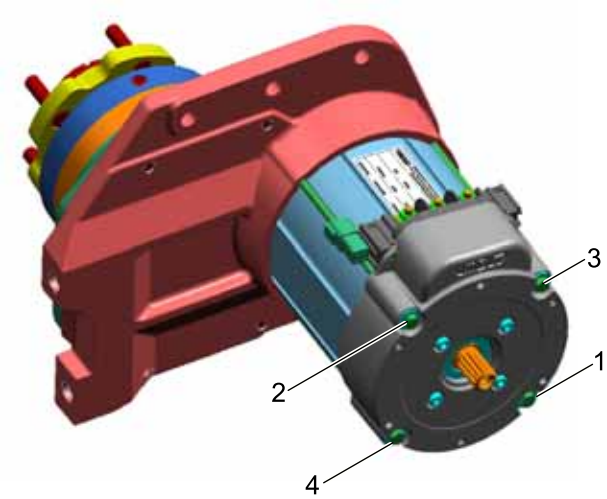



Figure 20860

5. Assemble brake to motor. Refer to Brake chapter.
6. Install the drive unit assembly. Refer to "Drive Unit Installation" procedures (follows).
7. Install the mast (reverse mast removal steps). Refer to the parts pages for screw/bolt torque specifications.
8. Install power unit cover.
9. Connect battery and remove wheel chocks.
10. Verify proper truck operation.

## Drive Unit Removal

**WARNING**

*Make sure lifting device is sufficiently rated to lift truck. Keep all hands, feet etc. away from unit being raised. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*

1. Disconnect the battery and chock drive tires. Refer to Control of Hazardous Energy chapter.
2. Remove front power unit cover.
3. Remove the mast. Refer to "Removing Mast" procedures in the Control of Hazardous Energy section of the service manual.
4. Block the power unit so drive tires are just off the floor.
5. Disconnect all electrical connections to the traction motor and brake.
6. Remove the drive tire and string guard (if equipped). Refer to Drive Tire Replacement in this section.
7. Support the weight of the drive unit while removing the eight screws that secure the drive unit to the chassis.

**CAUTION**

*Drive unit is heavy, approximately 57 kg (125 lb), excluding motor, brake, gear lube and tire/hub assembly.*

8. Remove the drive unit and take to a clean area as needed for repair.

## Drive Unit Installation

1. Install the drive unit to the chassis using the eight screws.
2. Torque the screws to 339 Nm (250 ft lb).
3. Install the drive tire. Refer to Drive Tire Replacement in this section for proper procedures and torque specifications.
4. Reconnect all electrical connections to the motor and brake. Torque traction motor power cable terminal nuts to 23 - 24 Nm (17.0 - 17.7 ft lb).
5. Install the string guard (if equipped) and drive tire. Refer to Drive Tire Replacement for proper procedures and lug nut torque specifications.
6. Remove the power unit blocking.
7. Chock the drive tires.
8. Install the mast (reverse mast removal steps). Refer to parts pages for screw/bolt torque specifications.
9. Replace the front power unit cover.
10. Connect the battery and remove the chocks.

Verify proper truck operation.

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## Drive Unit Sub-Assembly Removal

**CAUTION**

*Be sure the battery is disconnected before performing any maintenance operations.*

**WARNING**

*Make sure the lifting device is sufficiently rated to lift truck. Keep all hands, feet etc. away from unit being raised. Never work under or around a truck that is not properly secured.*

1. Use a suitable lifting device to raise the truck and block securely. Refer to Control of Hazardous Energy Lockout/Tagout section for lifting and blocking instructions.
2. Disconnect the battery.
3. Release the brakes. See Control of Hazardous Energy.
4. Remove the drive tire and string guard (if equipped).
5. Refer to Figure 16177-01. Remove the drain plug (2) and allow the hydraulic gear oil to drain into a container.
6. Remove the nine socket head cap screws (1) from the drive unit sub-assembly.

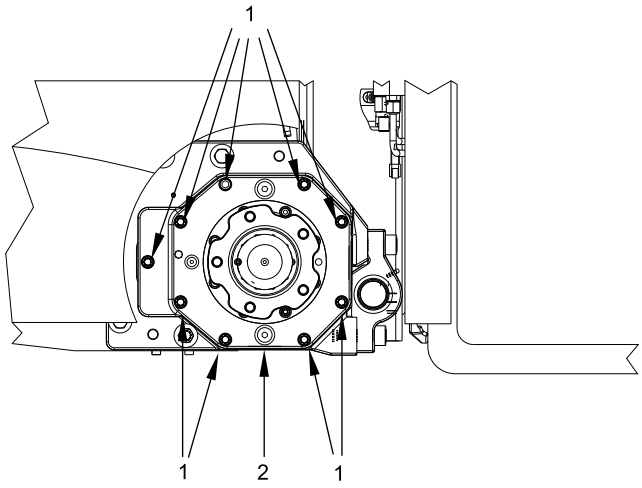



Figure 16177-01

1 M12 Socket Head Cap Screw
2 Drain Plug

7. Refer to Figure 15454-02. Carefully remove the drive unit sub-assembly by placing a pry-bar between the tabs of the bearing holder (21) and the mount plate (30) to break the seal of the gasket eliminator. Remove the drive unit sub-assembly by pulling it horizontally away from the truck not allowing the sub-assembly to drop and damage the meshing teeth of the gear assembly (25). Be careful not to gouge or score the mounting surfaces.

(a) Torque 522 - 562 Nm (385 - 415 ft lb)
(b) Torque 11.6 - 13.2 Nm (103 - 117 in lb)
(c) Torque 32 - 38 Nm (24 - 28 ft lb)
(d) Torque 53.3 - 58.7 Nm (12.5 - 16.5 ft lb)
(e) Torque 17.6 - 20.4 Nm (13 - 15 ft lb)
(f) Torque 71 - 79 Nm (52 - 58 ft lb)

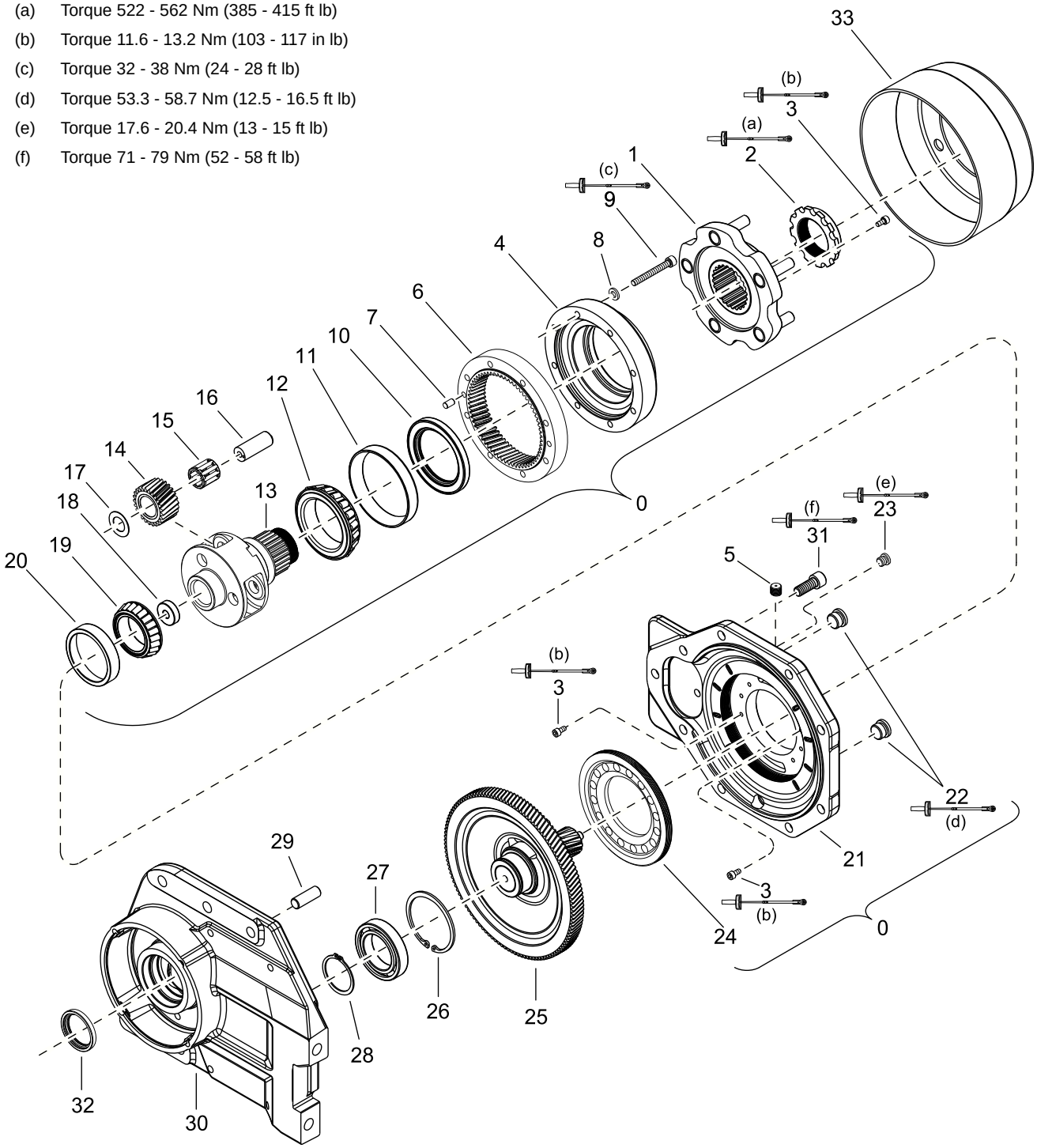



Figure 15454-03

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8. Remove the sealant residue from the surface of the bearing holder (21) and the mounting plate (30) with parts cleaner. Place a shop rag over the exposed gears to prevent contamination.
9. With the sub-assembly removed, visually inspect the components. Wheel hub assembly should rotate freely. If the sub-assembly does not move freely or is damaged, replace the sub-assembly.
10. Inspect the gear assembly (25) for damage or excessive wear. Replace as needed.
11. Rotate the gear to align the internal retaining ring (26) with the gear assembly slot. Reaching through the slot with retaining ring pliers, compress the retaining ring from the ring groove and remove the gear assembly.
12. Inspect the bearing (27) for damage. Replace as needed.
13. With the gear assembly removed and the mounting plate (30) free of sealant residue, inspect the surface and dress down any gouges or score marks with an emery cloth. Cover exposed gears to prevent contamination.

## Drive Unit Gear Assembly Replacement/Installation

1. Refer to Figure 20858. Lay the large internal retaining ring (1) over male bearing seat on bottomside of the gear assembly (2). Press the ball bearing (3) onto the bearing seat. Assure that the bearing is pressed on squarely and is completely seated, and that the retainer ring spins freely, not pinched between bearing and gear assembly shoulder.
2. Install the small external retainer ring (4) into gear assembly ring groove, captivating the bearing to the gear assembly.
3. Install the gear assembly with captive bearing (1-4) into the appropriate RH or LH mount plate bearing bore using slight pressure from a tool such as a small rubber mallet.

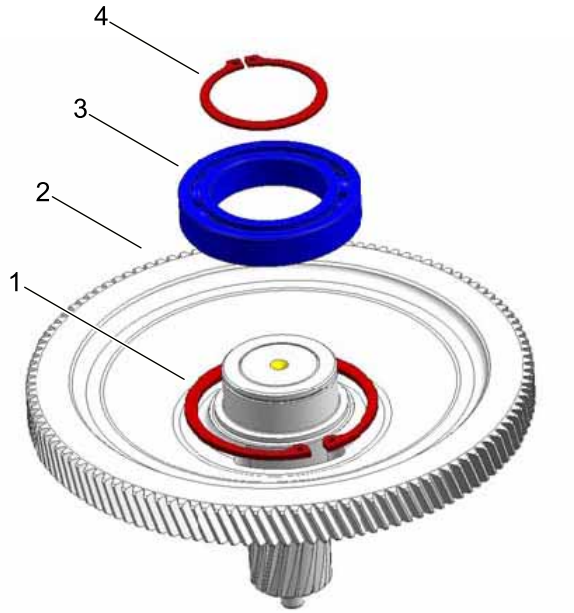



Figure 20858

4. Refer to Figure 20859. Rotate the gear to align the captive internal retaining ring with gear assembly slot. Reaching through slot (1) with retaining ring pliers, snap the ring into the groove, securing the gear assembly to the mount plate.

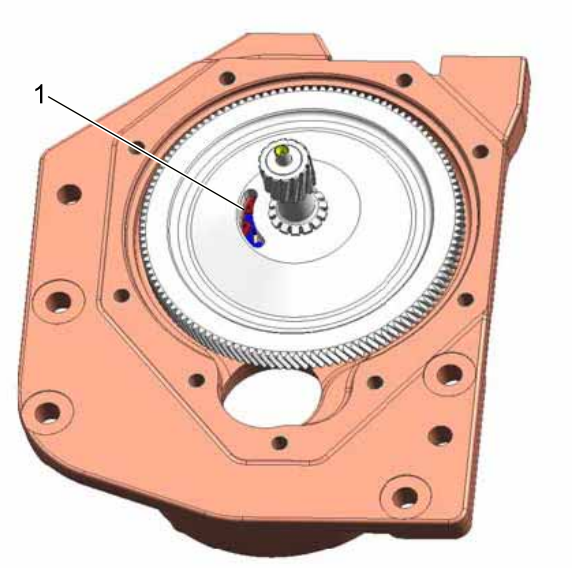



Figure 20859

5. Clean the mount plate and mating bearing surfaces with parts cleaner. Assure both surfaces to be free of dirt and oil.
6. Apply primer N (spray or brush) to the bearing holder surface and allow the solvent to evaporate completely - approximately one or two minutes. Spraying only one surface with Primer N will delay activating the gasket eliminator until the two joint surfaces are assembled, thus allowing for additional assembly time and flexibility. Refer to the Drive Unit parts page for primer and gasket eliminator part numbers.
7. Refer to Figure 16178-01. Apply gasket eliminator, 061004-030 (50 ml) to the mount plate surface in a continuous bead (10), distributed around all bolt holes. Once applied, the bead or pattern should not be disturbed until assembly to assure proper seal.

**NOTE**

*Immediate assembly not required as long as sealant has not been activated by the primer; however avoid assembly delays longer than 45 minutes.*

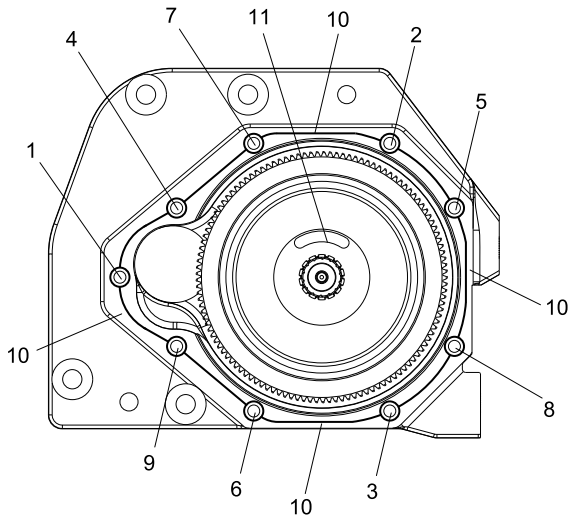



Figure 16178-01

10 Gasket Eliminator

11 Gear Assembly Slot

8. Guide sun pinion into the planet idler so gears mesh as gearbox subassembly is moved into place. Assemble mating gearbox assembly squarely (without lateral movement) to assure an even spread of the sealant across the interface.
9. Assemble with the nine socket head cap screws (31). Refer to Figure 15454-02.
   - Apply primer T (spray or brush) to both fastener and hole threads, and allow solvent to evaporate completely - approximately one or two minutes. Apply thread locking adhesive onto fastener threads as well as down the sides of the female threads. Refer to Drive Unit parts page for primer and thread locking adhesive part numbers.
   - Install the fasteners and torque in specified cross-torque pattern as shown in Figure 16178-01. Torque screws to 75 ± 4 Nm (55 ± 3 ft lb).
10. Allow sufficient cure time with parts undisturbed - approximately 4 hours.
11. Fill drive unit with synthetic 75W/90 gear oil, 363514-001. Refer to Drive Unit Lubrication in this chapter.
12. Install the drive tire. Refer to Drive Tire Replacement in this chapter.
13. Connect all electrical connections to drive motor.
14. Raise the truck and remove the blocking material from under the truck and lower to the floor.
15. Connect the battery.
16. Verify truck is operational.

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# ELECTRICAL

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## Notes:

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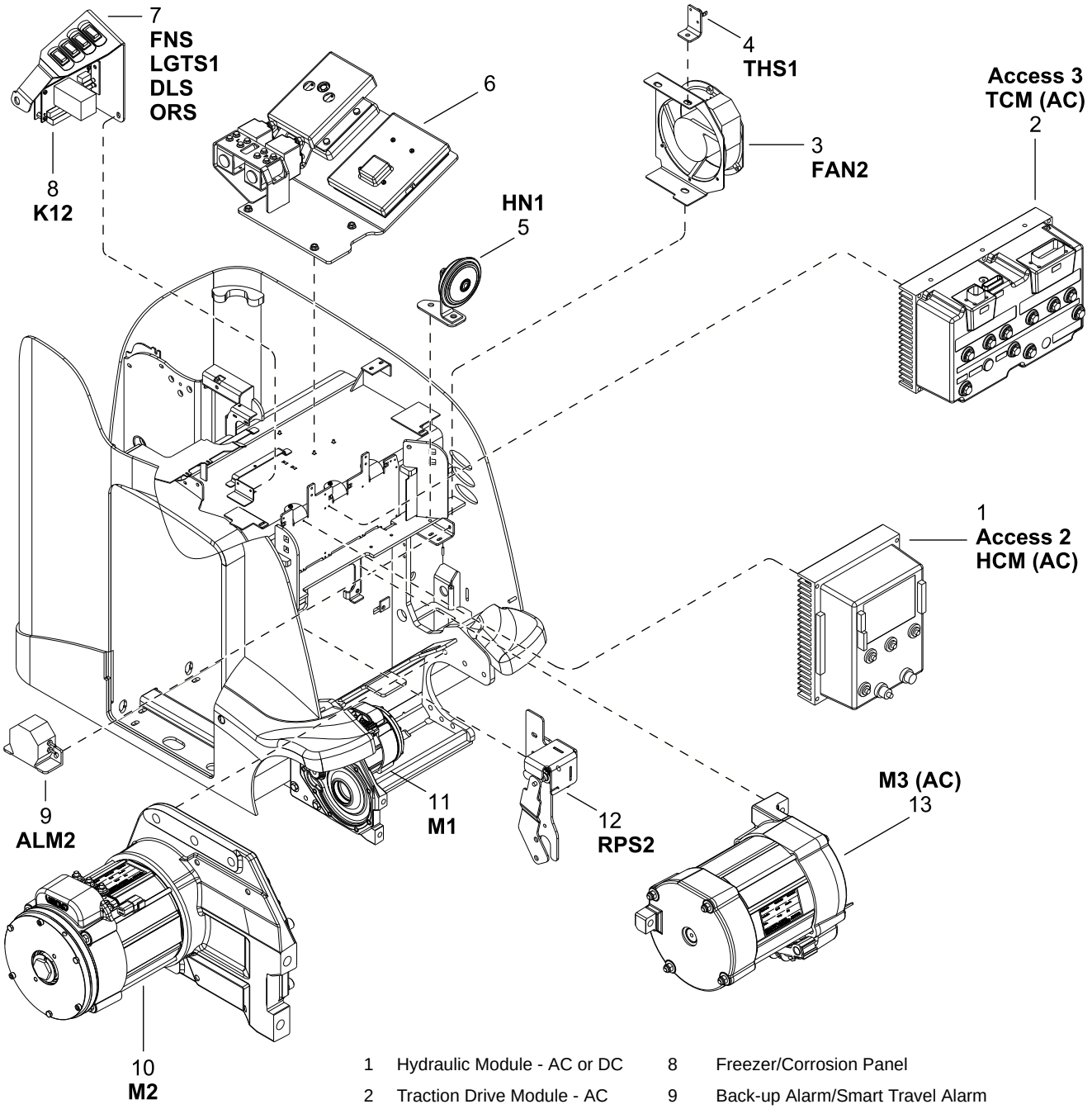


# Electrical

The electrical system is powered by a 36 volt battery. To provide battery power for the electrical controls of the truck, the battery retainers must be in position, the battery connector on the right side of the truck must be engaged, operator in position in the operator compartment and the keyswitch cycled from "off" to "start" to "on." The controls are now ready for operation.

Smooth and effortless traction speed control is made possible through the use of the multi-task control handle, traction drive module (Access 3) and AC traction motor. By moving the multi-task control handle forward (away from operator) or reverse (toward operator), infinite speed control is possible in relation to control lever movement, from creep speed to maximum speed.

Lift, lower, steering, tilt and tilt position assist/measurement, horn, sideshift and an accessory function are controlled via the multi-task control handle, hydraulic control module (AC or DC), pump motor (AC or DC) and, when applicable, accessory control module (Access 7). Solenoids provide the lockout means to permit the function desired only to operate.

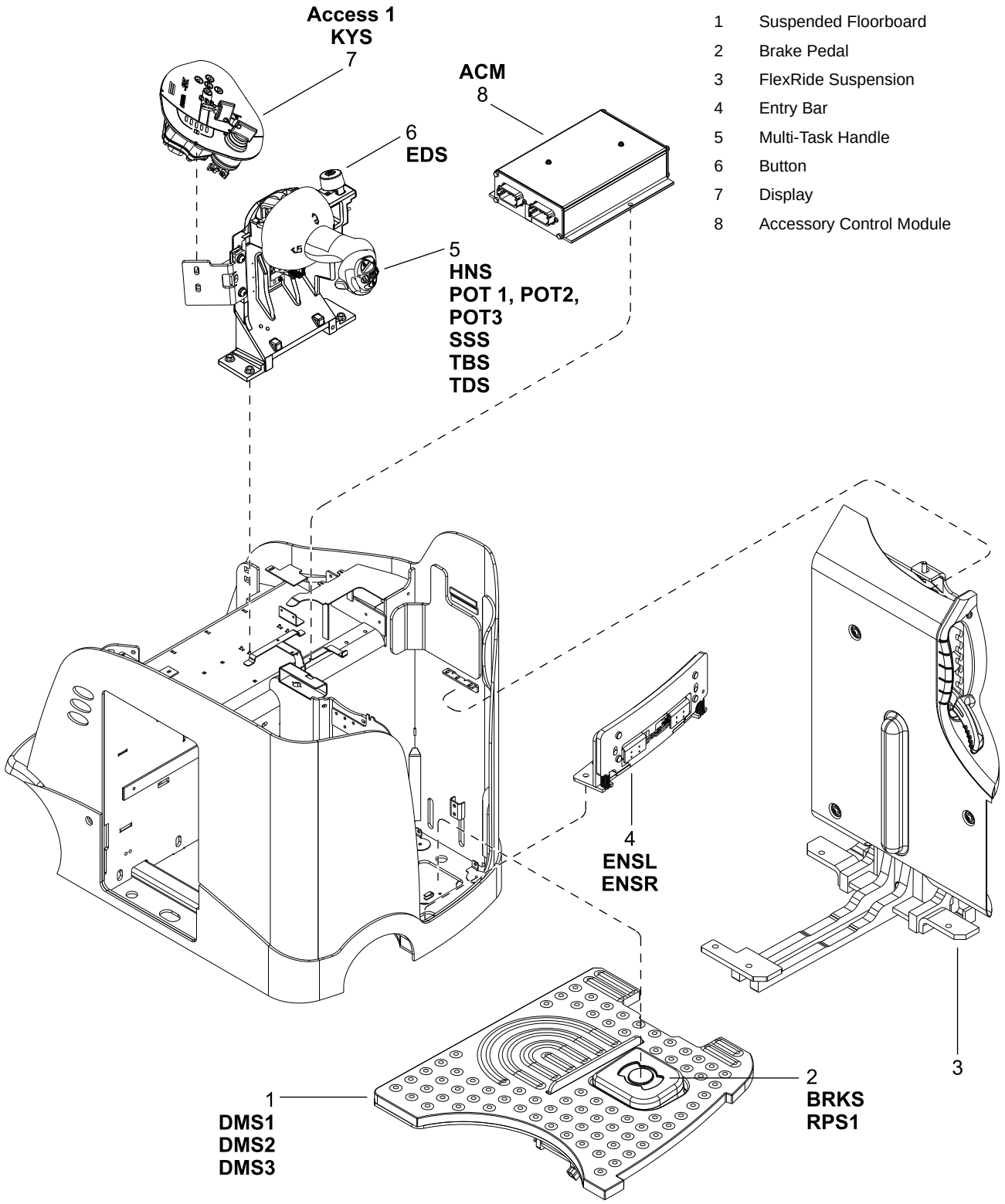



| | | | |
|---|---|---|---|
| 1 | Hydraulic Module - AC or DC | 8 | Freezer/Corrosion Panel |
| 2 | Traction Drive Module - AC | 9 | Back-up Alarm/Smart Travel Alarm |
| 3 | Axial Fan 48V | 10 | LH Traction Motor |
| 4 | Thermostat | 11 | RH Traction Motor |
| 5 | Horn | 12 | Tilt Limit Switch |
| 6 | Contactor Panel | 13 | Pump Motor - AC or DC |
| 7 | Switches | | |

Figure 16062

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1 Suspended Floorboard
2 Brake Pedal
3 FlexRide Suspension
4 Entry Bar
5 Multi-Task Handle
6 Button
7 Display
8 Accessory Control Module

Figure 16195

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## Notes:

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# Electrical System

The following is an explanation of terms and symbols which are standard on Crown wiring diagrams.

## Wiring Color Codes

Wires are limited to the colors shown in the chart below. The color of the wire is based on the function of the circuit in which it is used. Each wire is assigned a three or four digit number. The first one or two numbers identify the color of the lead. The last two numerals number the lead from one thru ninety-nine. Exceptions to this can be component leads supplied by vendors. Each wire is identified by a number on a wiring pictorial (refer to section DIA).

**Wiring Color Codes Chart**

| Number | Color | Function |
|---|---|---|
| 0** | Black | Traction Inputs/Outputs |
| 1** | Brown | Analog Inputs |
| 2** | Red | Battery Positive |
| 3** | Orange | Non-Battery Positive |
| 4** | Yellow | Status Inputs/Outputs |
| 5** | Green | Battery Negative |
| 6** | Blue | Isolated Negative |
| 7** | Violet | Load Position Inputs/Outputs |
| 8** | Gray | Indicators and Warning Devices |
| 9** | White | Miscellaneous |
| 29** | Red Stripe/White | Positive that has gone thru a switch |
| 59** | Green Stripe/White | Negative that has gone thru a switch or resistor |

## Power Cables

Except WP trucks, power cables are designated using one of the following abbreviations, followed by a dash number.

**Power Cables Abbreviations Chart**

| Abbreviation | Part Numbers |
|---|---|
| PC#1 | 084571 |
| PC#2 | 084570 |
| PC#4 | 084569 |
| PC#6 | 084568 |
| PC#10 | 090963 |
| PC#1/0 | 084572 |
| PC#2/0 | 084573 |
| PC#3/0 | 086749 |

An example of such a cable is PC # 1/0 - 10. The part number for this cable is 084572-010.

| Component Abbreviations and Designators | |
|---|---|
| **Components** | |
| 1AD | 1A Bypass Driver |
| ALM | Alarm |
| ATD | Anti Tie Down Module |
| BATT | Battery |
| BDI | Battery Disch. Interrupt |
| BRK | Brake |
| CA | Connector Assembly |
| CAP | Capacitor |
| DB | Diode Block |
| DFR | Defrost |
| DMC | Dual Motor Card |
| DR | Driver Module |
| ECN | Encoder |
| FAN | Fan |
| FIL | Filter |
| FLS | Flasher |
| FU | Fuse |
| HF | Hash Filter |
| HN | Horn |
| HR | Heater |
| HSC | High Speed Card |
| JC | Fixed Part of Ca |
| LGT | Light |
| M | Motor |
| MCR | Motor Control |
| PC | Movable Part of Ca |
| PCVA | "Pressure Compensated Valve, Acc." |
| PCVH | "Pressure Compensated Valve, Hoist" |
| PMTD | Pulse Monitor Trip Driver |
| POT | Potentiometer |
| PS | Power Supply |
| PS | Pressure Switch |

| Component Abbreviations and Designators | |
|---|---|
| REC | Rectifier |
| RES | Resistor |
| SB | Suppressor Block |
| SSC | Safety Switch Card |
| SV | Hydraulic Solenoid |
| SVA | Solenoid Valve - Accessory |
| SVL | Solenoid Valve - Lower |
| SVP | Solenoid Valve - Pilot |
| SVR | Solenoid Valve - Reach |
| SVS | Solenoid Valve - Sideshift |
| SVT | Solenoid Valve - Tilt |
| TB | Terminal Board |
| TD | Time Delay |
| TDR | Time Delay Relay |
| TMM | Truck Management Module |
| TP | Test Point |
| TT | Hour Meter (Truck Time) |
| V | Discharge or Volt Meter |
| XC | Socket for PC Board |
| **Contactor and Relays** | |
| A | Speed Contactor |
| B | Speed Contactor |
| C | Speed Contactor |
| D | Dual Contactor |
| ED | Emerg. Disc. Contactor |
| F | Forward Contactor |
| FA | Forward Contactor A |
| FB | Forward Contactor B |
| FW | Field Weakening |
| K | Relay |
| P | Pump Contactor |
| R | Reverse Contactor |
| RA | Reverse Contactor A |
| RB | Reverse Contactor B |

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| Component Abbreviations and Designators | |
|---|---|
| RGB | Regen. Braking Contactor |
| S | Power Steering Contactor |
| 1A | Bypass Contactor |
| **Switches** | |
| 1AS | Traction Bypass Switch |
| ACC | Accessory Switch |
| ACS | Accelerator Switch |
| AHS | Aux. Height Switch |
| AS | Switch For A Contactor |
| AxA | Aux. Sw. on A Contactor |
| AxB | Aux. Sw. on B Contactor |
| AxC | Aux. Sw. on C Contactor |
| AxF | Aux. Sw. on Fwd. Contactor |
| AxR | Aux. Sw. on Rev. Contactor |
| AXS | Aux. Function Switch |
| BFS | Brake Fluid Switch |
| BLS | Battery Latched Switch |
| BMS | Brake Monitor Switch |
| BPS | Brake Pressure Switch |
| BRES | Battery Restraint Switch |
| BRS | Brake Switch |
| BS | Switch For B Contactor |
| CHS | Chain Switch |
| CHSL | Chain Switch Left |
| CHSR | Chain Switch Right |
| CLS | Clamp Switch |
| CS | Switch For C Contactor |
| CTS | Cable Tension Switch |
| DIS | Direction Switch |
| DMS | Dead Man Switch |
| DMSL | Dead Man Switch Left |
| DMSR | Dead Man Switch Right |
| DPS | Display Switch |
| DRS | Door Switch |

| Component Abbreviations and Designators | |
|---|---|
| DTS | Drive Tow Switch |
| ECS | Elevation Control Switch |
| EDS | Emergency Disconnect Switch |
| EIS | Extend In Switch |
| EMS | Emergency Switch |
| ENS | Entry Switch |
| EOS | Extend Out Switch |
| ERLS | Emergency Raise/Lower Switch |
| ERS | Erase Switch |
| EXS | Extend Switch |
| FHS | Fork Home Switch |
| FKS | Fork Switch |
| FLMCS | Forward Left Motor Cover Sw |
| FLS | Fork Left Switch/Free Lift Switch |
| FNS | Fan Switch |
| FRMCS | Forward Right Motor Cover Sw |
| FRS | Fork Right Switch |
| FS | Forward Switch |
| FTS | Foot Guard Switch |
| GCSL | Gate Closed Switch Left |
| GCSR | Gate Closed Switch Right |
| GOSL | Gate Open Switch Left |
| GOSR | Gate Open Switch Right |
| GTS | Gate Switch |
| GUS | Guidance Switch |
| HCS | Height Cable Switch |
| HGTS | Height Switch |
| HNS | Horn Switch |
| HSS | High Speed Switch |
| HTS | Heater Switch |
| HTSXX | Height Switch (XX  Inches) |
| KORS | Key Override Switch |
| KYS | Key Switch |
| LCS | Lower Cutout Switch |

| Component Abbreviations and Designators | |
|---|---|
| LGS | Light Switch |
| LMS | Limit Switch |
| LOS | Lower Switch |
| LTS | Loadtray Switch |
| MFS | Multi-funciton Switch |
| MVS | Multi-voltage Switch |
| NUS | Null Switch |
| ORS | Override Switch |
| PLS | Pivot Left Switch |
| PORS | Presence Overide Switch |
| PRS | Pivot Right Switch |
| PS | Pressure Switch |
| PTS | Pivot Switch |
| PUS | Pump Switch |
| QPS | Quick Pick Switch |
| RAS | Raise Switch |
| RES | Reach Extended Switch |
| RGS | Rail Guide Switch |
| RGSL | Rail Guidance Switch Left |
| RGSR | Rail Guidance Switch Right |
| RIS | Reach In Switch |
| RLMCS | Rear Left Motor Cover Switch |
| ROS | Reach Out Switch |
| RRMCS | Rear Right Motor Cover Switch |
| RS | Reverse Switch |
| RSS | Sheet Retainer Switch |
| SAS | Safety Switch |
| SCS | Sideshift Center Switch |
| SES | Seat Switch |
| SLS | Sideshift Left Switch |
| SQS | Sequence Switch |
| SRS | Sideshift Right Switch |
| SSS | Sideshift Switch |
| STS | Power Steer Switch |

| Component Abbreviations and Designators | |
|---|---|
| SWH | Operator Activated Switch |
| TBS | Tilt Back Switch |
| TDS | Tilt Down Switch |
| TES | Test Switch |
| THS | Thermal Switch |
| TLS | Traverse Left Switch |
| TLT | Tilt Switch |
| TRS | Traverse Right Switch |
| TUS | Tilt Up Switch |
| TVS | Traverse Switch |
| ZSS | Zone Select Switch |
| **Terms** | |
| ASM | Assembly |
| CTRL | Control |
| CTRLR | Controller |
| DESIG LIST | Designation List |
| DIST PNL | Distribution Panel |
| DSPL | Display |
| F / C | Freezer Conditioning |
| HCM | Hydraulic Control Module |
| HDL | Handle |
| HYD | Hydraulic |
| OHG | Overhead Guard |
| PCB | Printed Circuit Board |
| PICT | Pictorial |
| PKT | Packet |
| PL | Platform |
| PWR | Power |
| PWR SPLY | Power Supply |
| SCHEM | Schematic |
| TCM | Traction Control Module |
| TMM | Truck Management Module |
| TRAC | Traction |

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## Switches

Switch symbols convey:

1. Type of switch.
2. Number of terminals.
3. Momentary or maintained contact.
4. How the switch is held and wired.
5. How the switch is activated.
6. Application.

### Type of Switch

- With common



Figure 8115-01

or

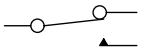


Figure 8116-01

- Without common



Figure 8117-01

or

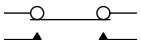


Figure 8118-01

### Number of Terminals

- All terminals are shown even if not wired.

### Momentary or Maintained Contact

- Momentary contact is a shaded triangle.



Figure 8119-01

or



Figure 8120-01

- Maintained is an open circle (an open circle also denotes the common terminal).



Figure 8115-01

or



Figure 8117-01

### How the Switch is Held and Wired

To determine how the switch is held and wired, look closely at the contact symbols. An open circle denotes a maintained contact so therefore it is the normally closed terminal. A shaded triangle denotes a momentary contact, therefore it is the normally open terminal.

Switches having more than one maintained contact do not have a normally open or normally closed terminal, although they may have a common. Symbols for these switches include the markings present on the actual switch.

Example:

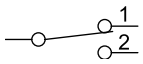
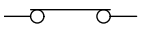



Figure 8121-01

| Examples (All Momentary) | | |
|---|---|---|
| | With Common (Transfer) | Without Common (Double Break) |
| Wired normally open, held open |  Figure 8119-01 |  Figure 8120-01 |
| Wired normally open, held closed |  Figure 8122 |  Figure 8123 |
| Wired normally closed, held open |  Figure 8115-01 |  Figure 8117-01 |
| Wired normally closed, held closed |  Figure 8124 |  Figure 8125 |

**How the Switch is Activated**

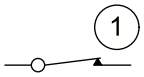
If it is necesary to include how the switch is mechanically actuated, a note will be added to the drawing (example: operator, lever or truck actuated, etc.)

**Application**

Switch application is conveyed through the abbreviation (example: HTS = Height Switch 120 in., DTS = Drive/Tow Switch).

Notes:

- In a schematic, the condition of a circuit is defined using a  note (example: vehicle shown fully lowered with no operator on vehicle).
- Positive action switches are marked with the following symbol:




8126-02

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**Switch Symbols** (Mechanically activated switches)

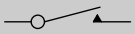
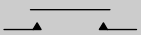
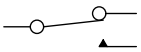
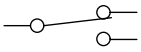
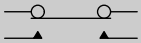
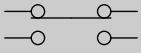
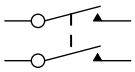
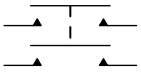
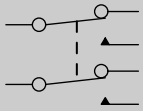
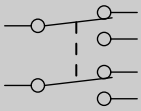
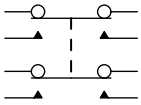
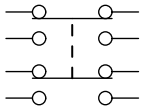
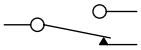
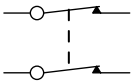
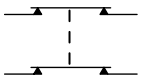
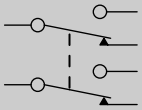
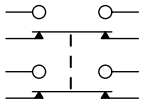
| Actuation | Description | No. of Terminals | Momentary | | Fully Maintained | |
|---|---|---|---|---|---|---|
| | | | w/common | w/o common | w/common | w/o common |
| NO | SPST | 2 |  |  | | |
| | SPDT | 3 |  | |  | |
| | SPDT | 4 | |  | |  |
| | DPDT | 4 |  |  | | |
| | DPDT | 6 |  | |  | |
| | DPDT | 8 | |  | |  |
| NOHC | SPST | 2 |  |  | | |
| | SPDT | 3 |  | | | |
| | SPDT | 4 | |  | | |
| | DPDT | 4 |  |  | | |
| | DPDT | 6 |  | | | |
| | DPDT | 8 | |  | | |

Figure 8100-01

**Switch Symbols** (Mechanically activated switches) **Continued**

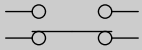
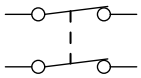
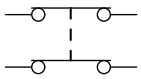
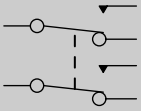
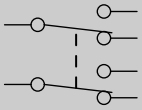
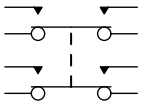
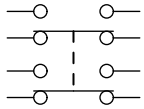
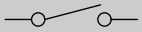
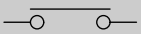
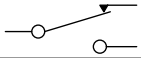
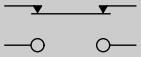
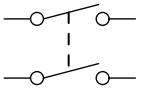
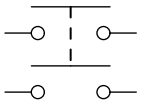
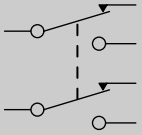
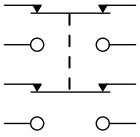
| Actuation | Description | No. of Terminals | Momentary | | Fully Maintained | |
|---|---|---|---|---|---|---|
| | | | w/common | w/o common | w/common | w/o common |
| NC | SPST | 2 |  |  | | |
| | SPDT | 3 |  | |  | |
| | SPDT | 4 | |  | |  |
| | DPST | 4 |  |  | | |
| | DPDT | 6 |  | |  | |
| | DPDT | 8 | |  | |  |
| NCHO | SPST | 2 |  |  | | |
| | SPDT | 3 |  | | | |
| | SPDT | 4 | |  | | |
| | DPST | 4 |  |  | | |
| | DPDT | 6 |  | | | |
| | DPDT | 8 | |  | | |

Figure 8101-02

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**Specialty Switches**

Pressure Switch

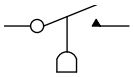


Figure 8127

Reed Switch

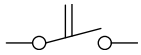


Figure 8128

Temperature Switch

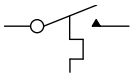


Figure 8129

Brake Fluid Switch

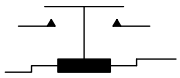


Figure 8130

Three Position Key Switch

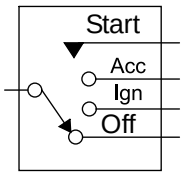



Figure 8131-01

### Other Electrical Symbols

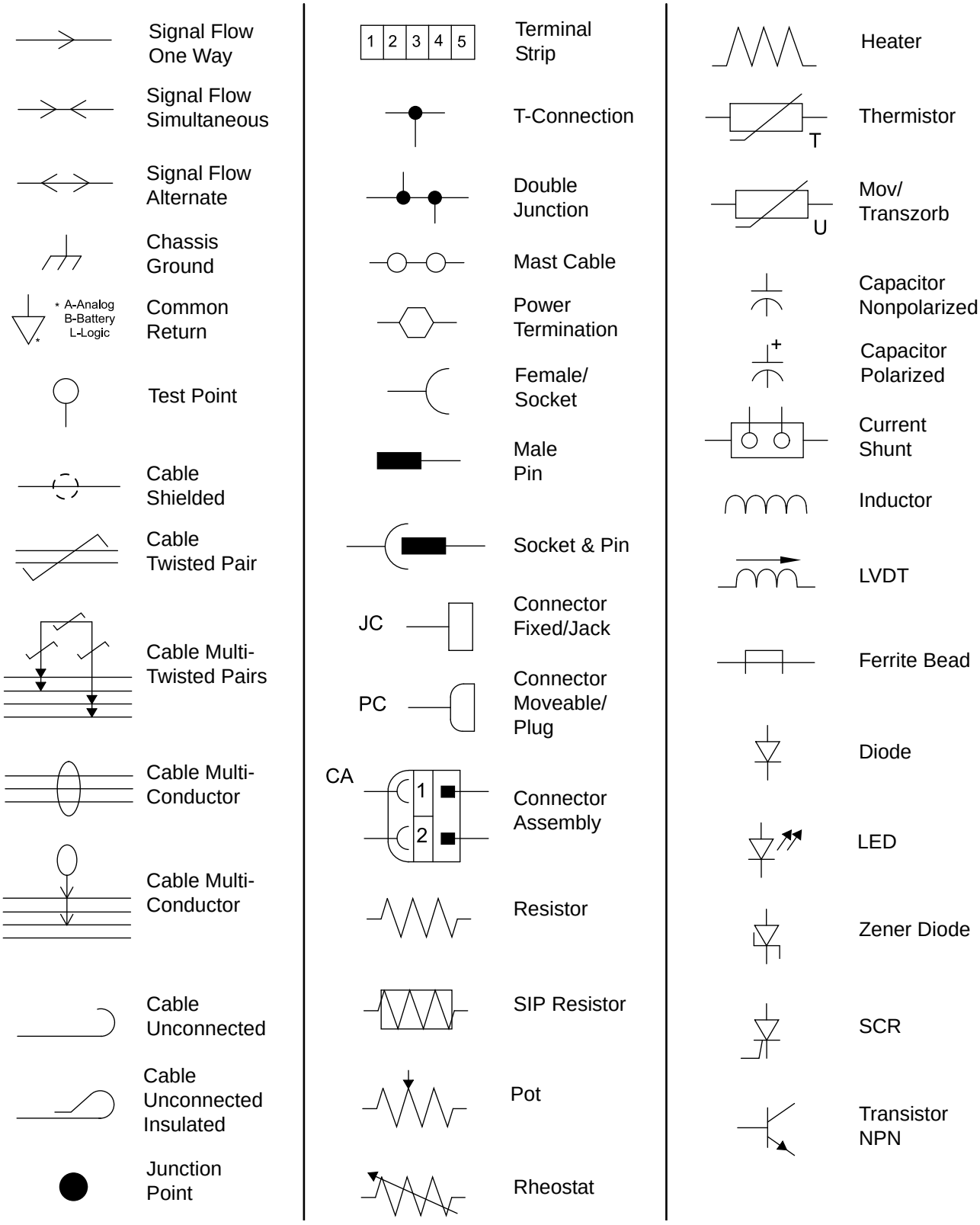



Figure 8132-02

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**Other Electrical Symbols**

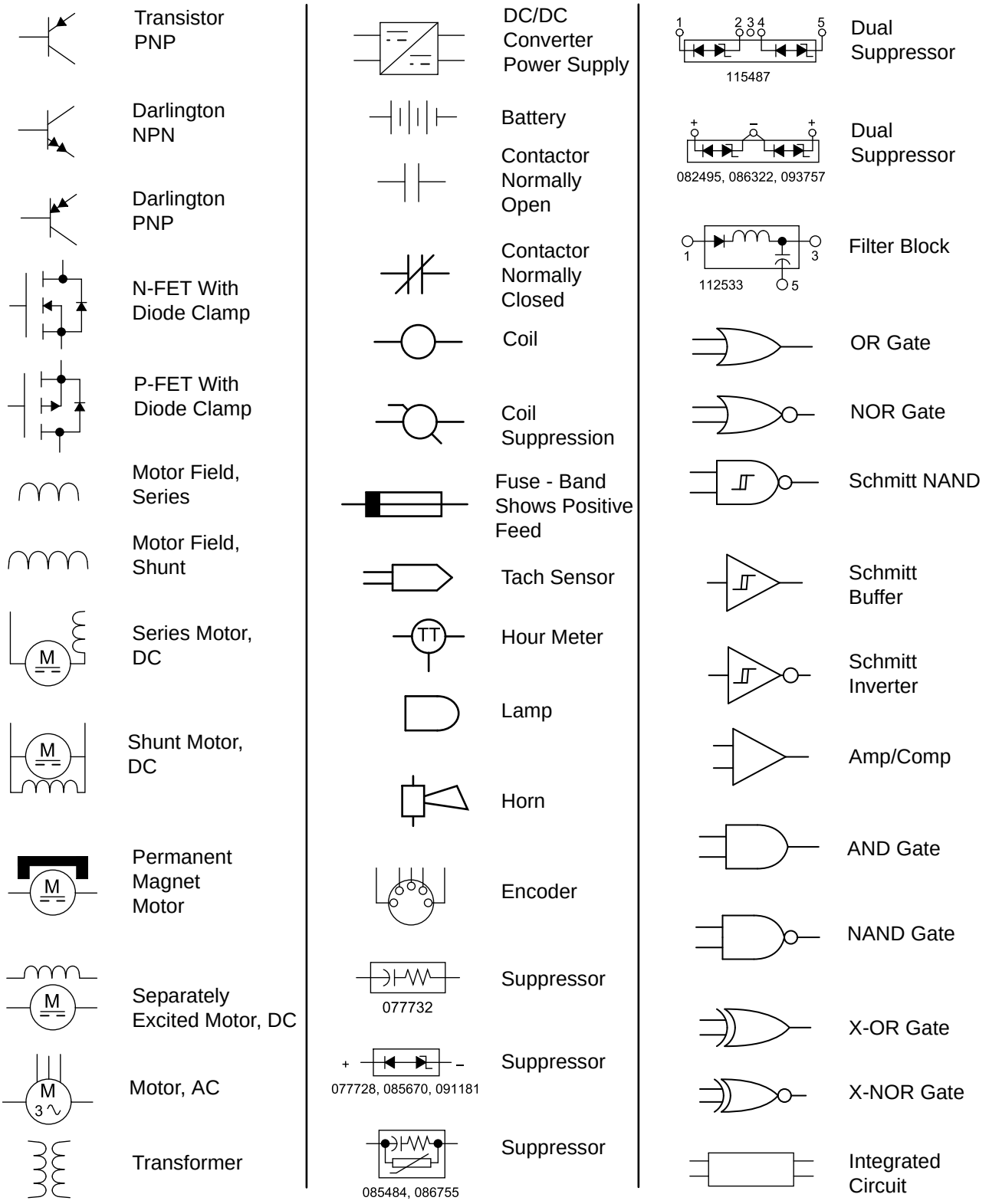



Figure 8133-02

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## Notes:

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# ACCESS 123...System

ACCESS 1

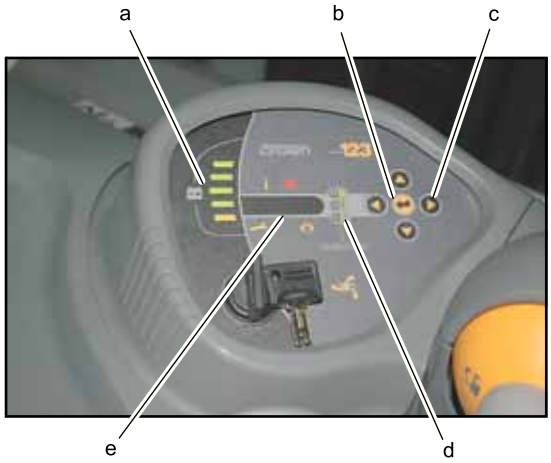



Figure 15470-01

a Battery Discharge Indicator

b Enter or Return Key - used to navigate in and out of menus and accept inputs

c Navigation Keys - up, down, left and right arrows; used to scroll through menus

d Performance Level Indicators

e Display Screen

## ACCESS 1 Display

ACCESS 1 display messages and menus can be accessed from three levels of authorization:

1. Operator Level
2. Service Level - Level 2 (Full Truck Operation)
3. Service Level - Level 3 (No Truck Operation)

Typical navigation button usage: up and down arrows will scroll through menu choices, right arrow will enter a menu and left arrow will exit the current menu. The enter/return button is used to select a function or choice.

## Operator Level

The operator level is accessed by turning the key switch ON. The operator may choose from the following menus (provided a higher priority message is not active and the necessary features menus are enabled):

- Message (for example Bdi = 70%)
- Pressure (option - the truck must be equipped with PVAR and F20 Pressure Regulator feature menu must be enabled)
- Hour
- Events
- Service
- Performance
- Setup Relief Pressures (F20 Pressure Regulator and F21 User Pressure feature menus must be enabled)

The following messages will be displayed in order of priority (if enabled), regardless of operator selection:

1. PM Due
2. User Code
3. Event Code
4. Return throttle to neutral
5. User selected message

If any message is more than eight characters it will be scrolled across the display from right to left.

After power up, the display will always show RC 5500 regardless of which menu was selected prior to powering down the truck. To change the message displayed after power up, enter the Message Mode and select one of the other choices. A more detailed Message Mode explanation follows.

## Message Mode

To enter the Message Mode, power up truck. With a Message (for example Bdi = 70%) present on the display, press the right arrow to enter this menu. Press the up/down arrows to scroll through the menus:

- Timer
- Trip
- Bdi
- Hours
- Odometer

**Note:** Message Mode is controlled by the Features menu (F22). F22 allows the message mode to be limited to one of the menus listed above or allows all the messages to be viewed. For more information, refer to feature menu F22 Message Mode explanation later in this section.

After truck power up, RC 5500 will be the message displayed until a different message mode menu is selected.

### Timer - Message Mode

This menu allows the operator to display a stopwatch. To select this message, power up the truck. Press the right arrow, use up/down arrows to display Timer. Press the right arrow to enter the Timer menu. Use the up/down arrows to scroll through choices:

- Stop
- Start
- Reset

#### Timer - Start

Press the enter/return button. The display will exit the Message Mode and display;

Stopwatch (00:00:00), which will be incrementing.

#### Timer - Stop

Use the up/down arrows to display Stopwatch. Press the right arrow to enter the Message Mode. Use the up/down arrows to display Timer. Press the right arrow to enter the Timer menu. Use the up/down arrows to display Stop, press the enter/return button. The display will exit the Message Mode and show the Stopwatch stopped, with whatever amount time accumulated (example, 01:01:32).

#### Timer - Reset

Use the up/down arrows to display the Stopwatch. Press the right arrow to enter the Message Mode. Use the up/down arrows to display Timer. Press the right arrow to enter Timer menu. Use the up/down arrows to display Reset. Press the enter/return button. The display will exit the Message Mode. The Stopwatch will be zeroed, and not counting (00:00:00).

### Trip - Message Mode

This menu allows the operator to display the distance traveled in either direction since the last reset, in feet. To select this message, power up the truck. Press the right arrow to enter the Message Mode. Use the up/down arrows to scroll to Trip. Press the enter/return button and the display will exit the Message Mode. The display will show xxxx ft.

#### Trip - Reset

Press the right arrow to enter Message Mode. Use the up/down arrows to display Trip. Press the right arrow to display Reset. Press the enter/return button. The display will exit Message Mode and display distance traveled reset (xxxx ft).

### Bdi - Message Mode

This menu allows the operator to display the battery percent of remaining charge. To select this message, power up the truck. Press the right arrow to enter the Message Mode. Use the up/down arrows to scroll to Bdi. Press the enter/return button. The display will exit the Message Mode and show (Bdi = XX%).

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### Hours - Message Mode

This menu allows the operator to display accumulated hours. To select this message, power up the truck. Press the right arrow. Use the up/down arrows, scroll to Hours. Press the enter/return button. The display will exit the Message Mode and show (H1 or H2 = XX). H1 or H2 hours can be shown depending on which hour meter is selected in Features menu F25 Hour Meter. For information on the difference between H1 and H2 meters, refer to “Hour” (follows after “Odometer - Message Mode”).

### Odometer - Message Mode

Press the right arrow. Use the up/down arrows to scroll to Odometer. Press the enter/return button. The display will exit the Message Mode and show the distance the truck has traveled, in miles (mi=XX).

## Hour

This menu allows the operator to view one of nine different hour meter readings.

- H1 (key switch on, operator in compartment)
- H2 (key switch on, operator in compartment plus programmable timeout which will increment for the timeout period after operator has left the compartment)
- H3 (odometer)
- H4 (ACCESS 3 (TCM) on time)
- H5 (ACCESS 2 (HCM) on time)
- H6 (ACCESS 1 (DCM) value)
- H7 (ACCESS 2 (HCM) value)
- H8 (ACCESS 3 (TCM) value)
- H9 (ACCESS 7 (ACM) value)

To enter this menu, power up the truck. Press the down arrow to display Hour. Press the right arrow, H1 will be displayed. Use the up/down arrows to view different hour meter readings. To stop the message from scrolling press the right arrow at the desired hour meter. To exit Hour menu press the left arrow until Hour is displayed.

## Pressure

On trucks that are equipped with an accessory with a pressure regulator (like a carton clamp), this menu allows the operator to set the pressure for the attachment. To view/use this menu, the truck must be equipped with PVAR and features menus F20 Pressure Regulator must be enabled.

## Events

This menu allows the operator to view stored event codes (up to 16). To enter this menu, power up the truck. Press the down arrow until Events is displayed. Press the right arrow, Last will briefly be displayed. The last event code stored will then be displayed (EV=XXX). Use the up/down arrows to scroll through stored event codes (Last to Last-15). Press the left arrow button to return to the main menu at Events.

**Note:** Event codes can not be cleared from the Operator level menu.

## Service

This menu enters maintenance Levels 2, Level 3 and Bleed Quick Disconnect. A password is required to enter maintenance levels 2 and 3. Contact your local Crown dealer to obtain this password.

### Level 2

To enter Level 2, power up the truck. Press the down arrow until Service is displayed. Press the right arrow, Level 2 will be displayed. Press the right arrow and four blank boxes will be displayed. Use the up/down arrows to enter the first digit of the password. Press the right arrow to move to the next digit, continue until the final digit is entered. Press the enter/return button to accept the password.

After the password is accepted, the following menus can be displayed:

- Analyzer (A1, A2 and A3 submenus)
- Calibration
- Features
- Hour
- Events
- Performance
- Utilities

An explanation of these menus is located after the menu charts in this section of the service manual.

### Level 3

The truck is not operational in Level 3. To enter this level, power up the truck. Step off the floor pedals, allow the truck to time out (L and P contactors to de-energize) and press the down arrow until Service is displayed. Press the right arrow and Level 2 will be displayed. Press the down arrow and Level 3 will be displayed. Enter the password using the same password and procedures as entered in Level 2. After the password is accepted, the following menus can be displayed:

- Analyzer (A1, A2 and A4 submenus)
- Features
- Hour
- Events
- Performance
- Utilities

An explanation of these menus is located after the menu charts in this section of the service manual.

Once you are in Level 3 you can step on the floor pedals. The L contactor will not energize and you will not have forward or reverse travel.

**Note:** Once maintenance Levels 2 or 3 are entered the truck must be turned OFF then back ON to exit the Service menu.

### Bleed Quick Disconnect

Bleeding the quick disconnect circuit minimizes the force needed to connect/disconnect attachment hoses to/from the quick disconnect fittings. This menu allows the operator to easily bleed the pressure from the quick disconnect circuit. To enter this menu, power up the truck while standing on the floorboard (L and P contactors must be energized). Press the down arrow until Service is displayed. Press the right arrow and Level 2 will be displayed. Press the down arrow and Bleed Quick Disconnect will be displayed. Press the enter arrow. Pressing the enter arrow signals the ACCESS modules to energize the accessory solenoid valve(s) opening a path for pressurized oil to return to the reservoir. This only takes a brief moment. The display message will then change to "Re-key Required". The key switch must then be turned OFF then ON to resume normal truck operation.

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## Performance

You must be OFF the floor pedals and allow the truck to time out (L and P contactors must be de-energized) to gain access to Performance menu. If Features menu F10 User Performance is enabled and the operator is off the floor pedals, this menu allows the operator to choose one of three performance modes to operate the truck.

- P1 (maximum achievable performance level)
- P2 (reduced performance from maximum, similar to previous model)
- P3 (used where operational conditions require lowest truck performance)

To enter Performance menu, power up the truck. Step off the floor pedals and allow the truck to time out (L and P contactors to de-energize). Use the up/down arrows to scroll to Performance. Press the right arrow P1, P2 or P3 will be displayed. Use the up/down arrows to display a different performance level. Once the desired level is displayed, press the enter/return button to select. Press the left arrow button to return to the main menu at Performance.

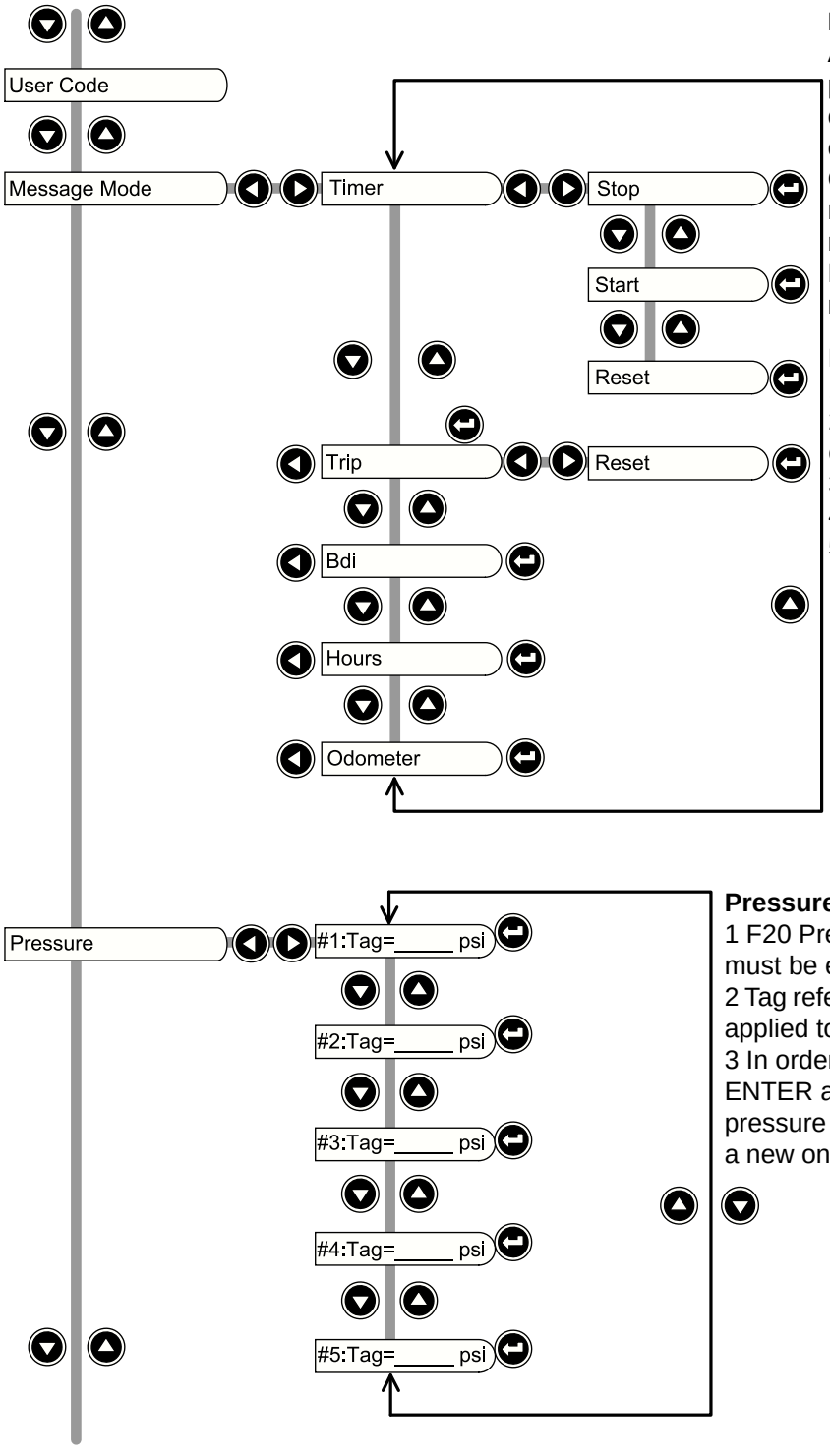
## Relief Pressure Setup

To access this menu, features menus F20 Pressure Regulator and F21 User Pressure must be enabled and the truck must be equipped with PVAR.

To enter Relief Pressure Setup menu, power up the truck. Use the up/down arrows to scroll to Relief Pressure Setup. Refer to section "Hydraulic, Accessory Clamp Set-Up" in this service manual for procedures to set pressures.

### Operator Menus

From page -009




**Message Mode Menus**
Allows the operator to select what is displayed in message mode if no higher priority items are active. Also allows the operator to control the trip meter and timer. Only the appropriate menus will be made visible based on the features menu F22 Message Mode setting. RC 5500 is displayed until item from menu is chosen.

**Message Mode Priority**
1 PM Due (if H10 PM Timer is enabled
2 User code (if F11 User Codes is enabled)
3 Return throttle to neutral
4 Event code
5 Default message

**Pressure Notes:**
1 F20 Pressure Regulator features menu must be enabled for this menu to be visible.
2 Tag refers to which function the pressure is applied to.
3 In order to select the pressure to use, the ENTER arrow must be pressed. Once a pressure is selected, it will remain active until a new one is selected.

To page -007

Figure 15411-01



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**Operator Menus**

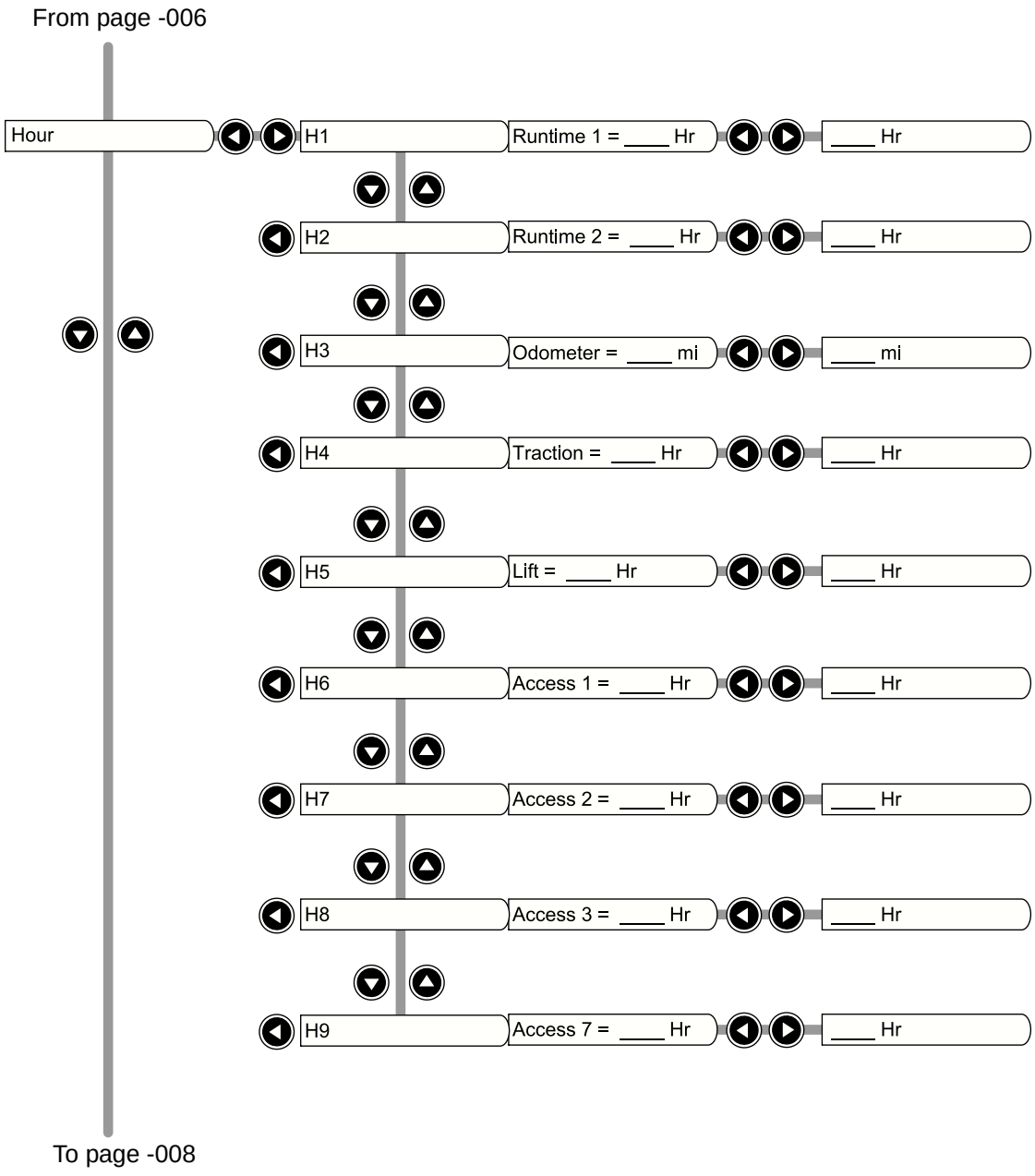
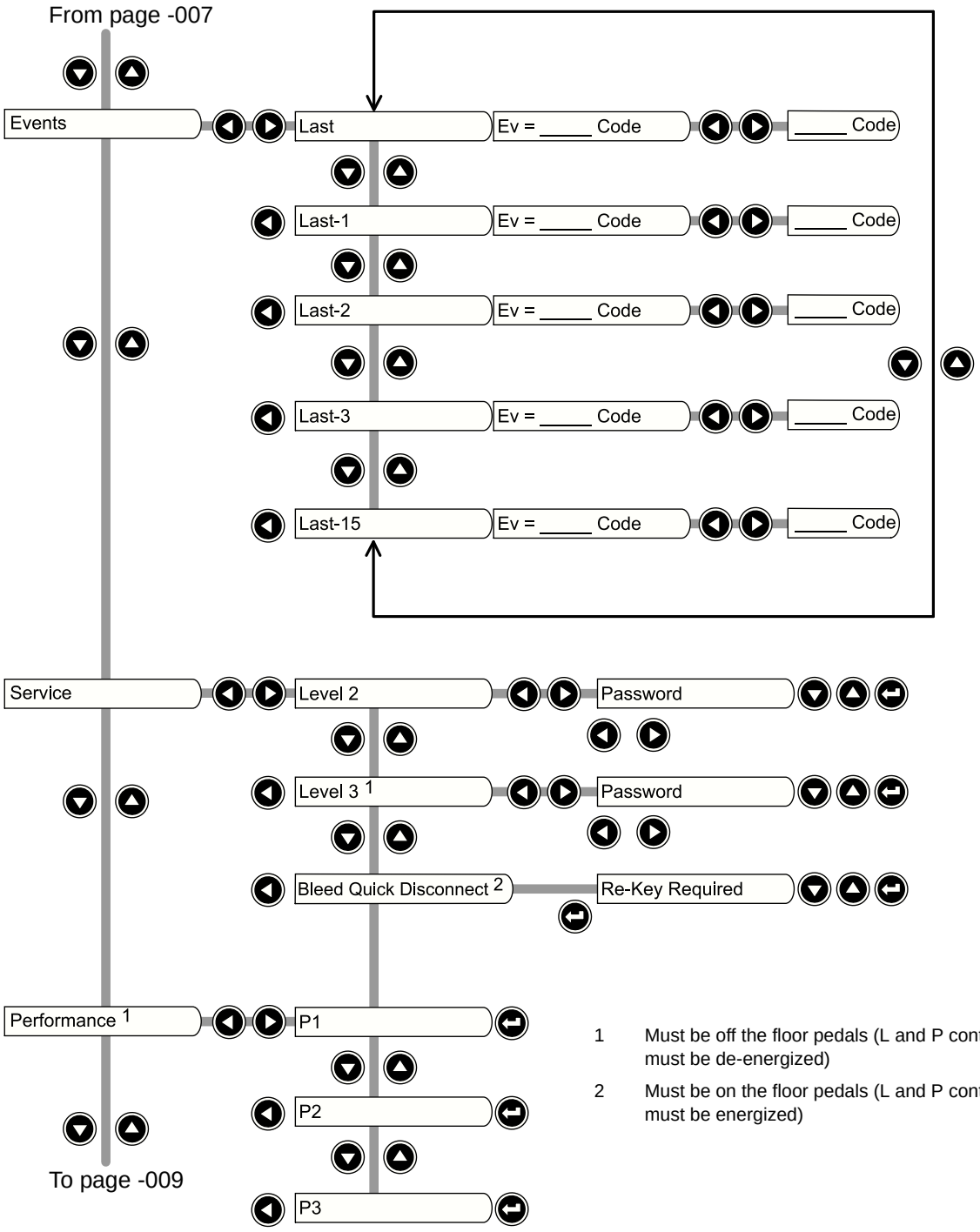



Figure 15412-01

### Operator Menus




1 Must be off the floor pedals (L and P contactors must be de-energized)

2 Must be on the floor pedals (L and P contactors must be energized)

Figure 15413-01

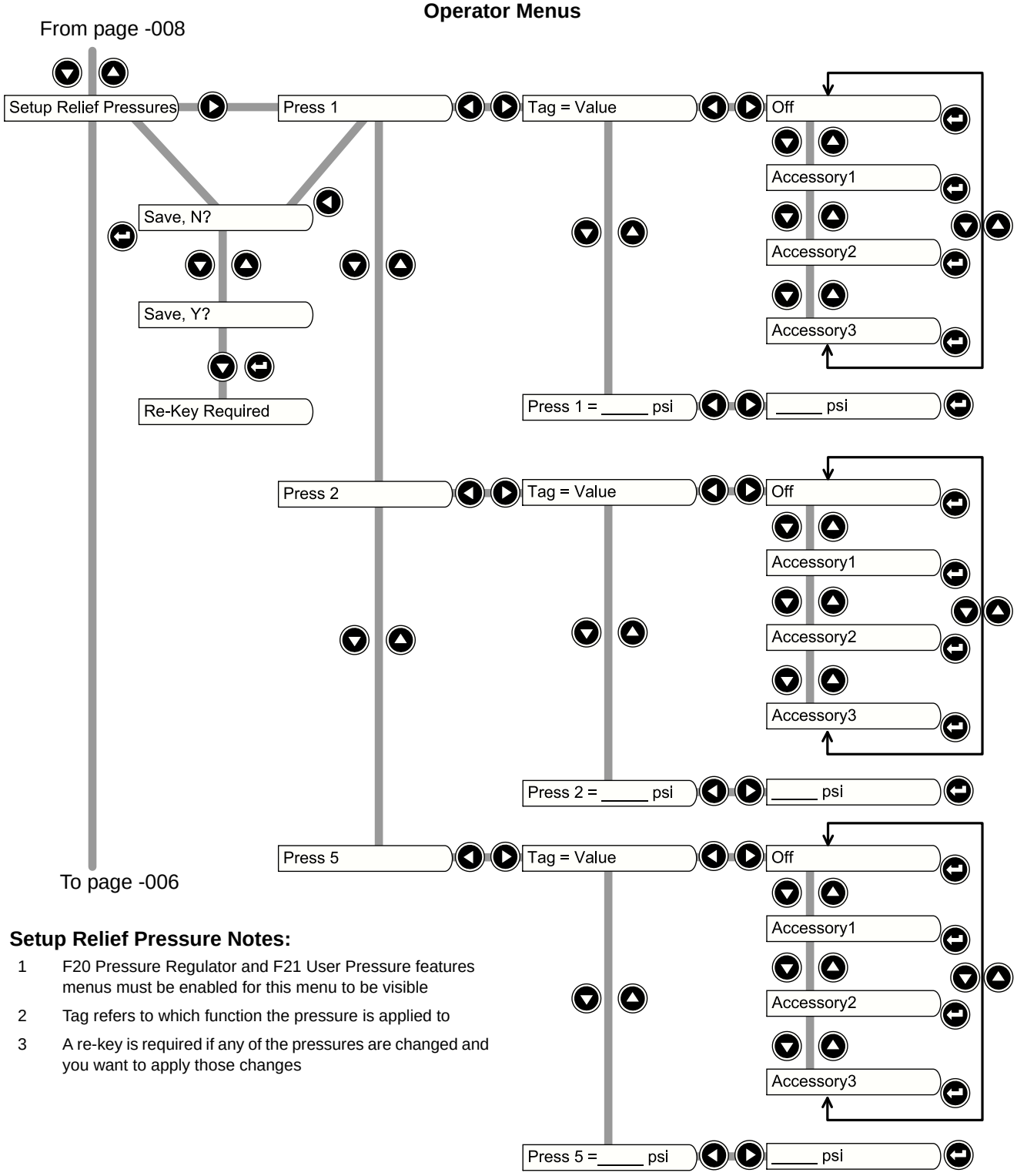


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## Operator Menus




### Setup Relief Pressure Notes:

1. F20 Pressure Regulator and F21 User Pressure features menus must be enabled for this menu to be visible
2. Tag refers to which function the pressure is applied to
3. A re-key is required if any of the pressures are changed and you want to apply those changes

Figure 15414-01

### Service Menu

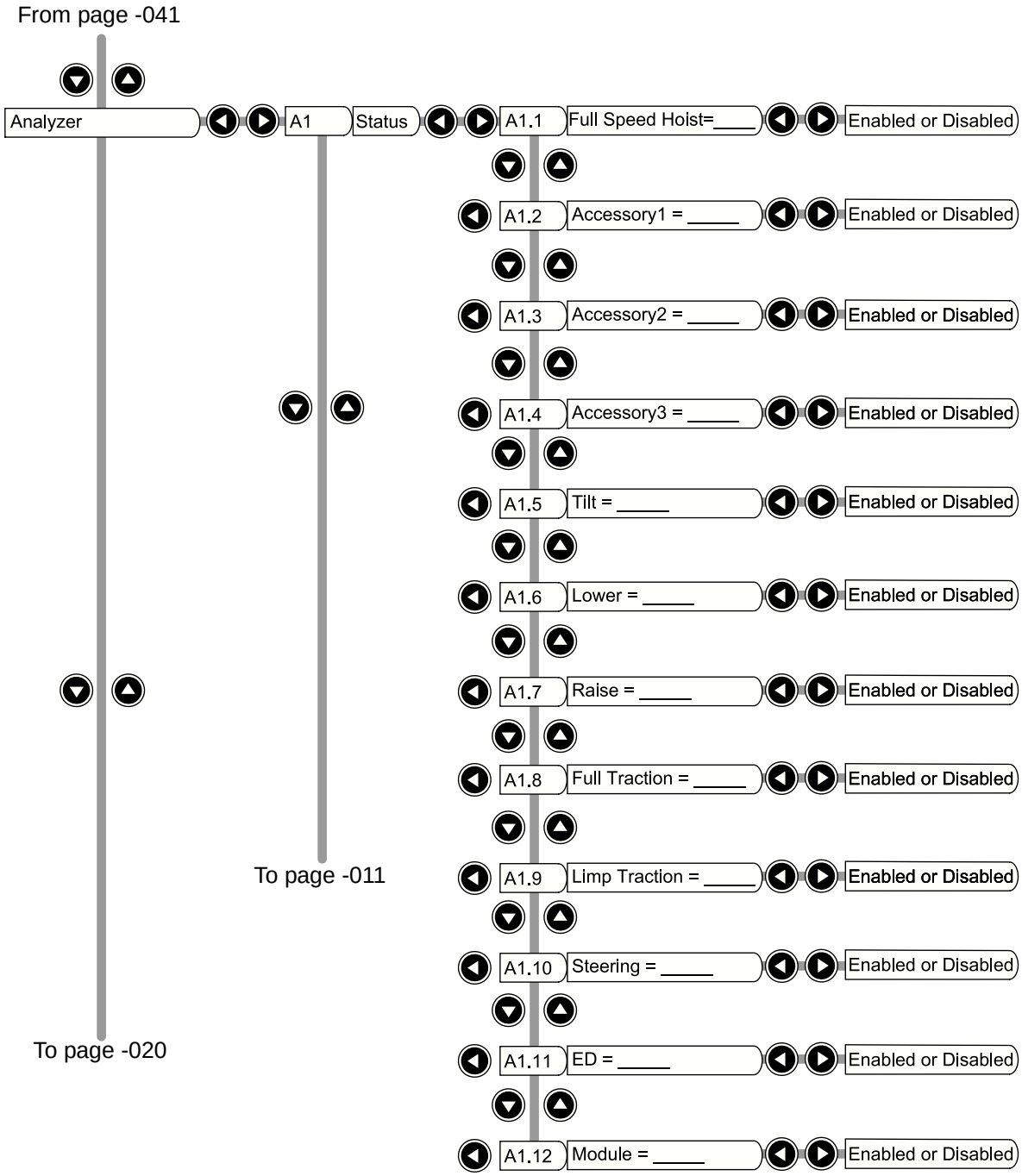



Figure 15415-01

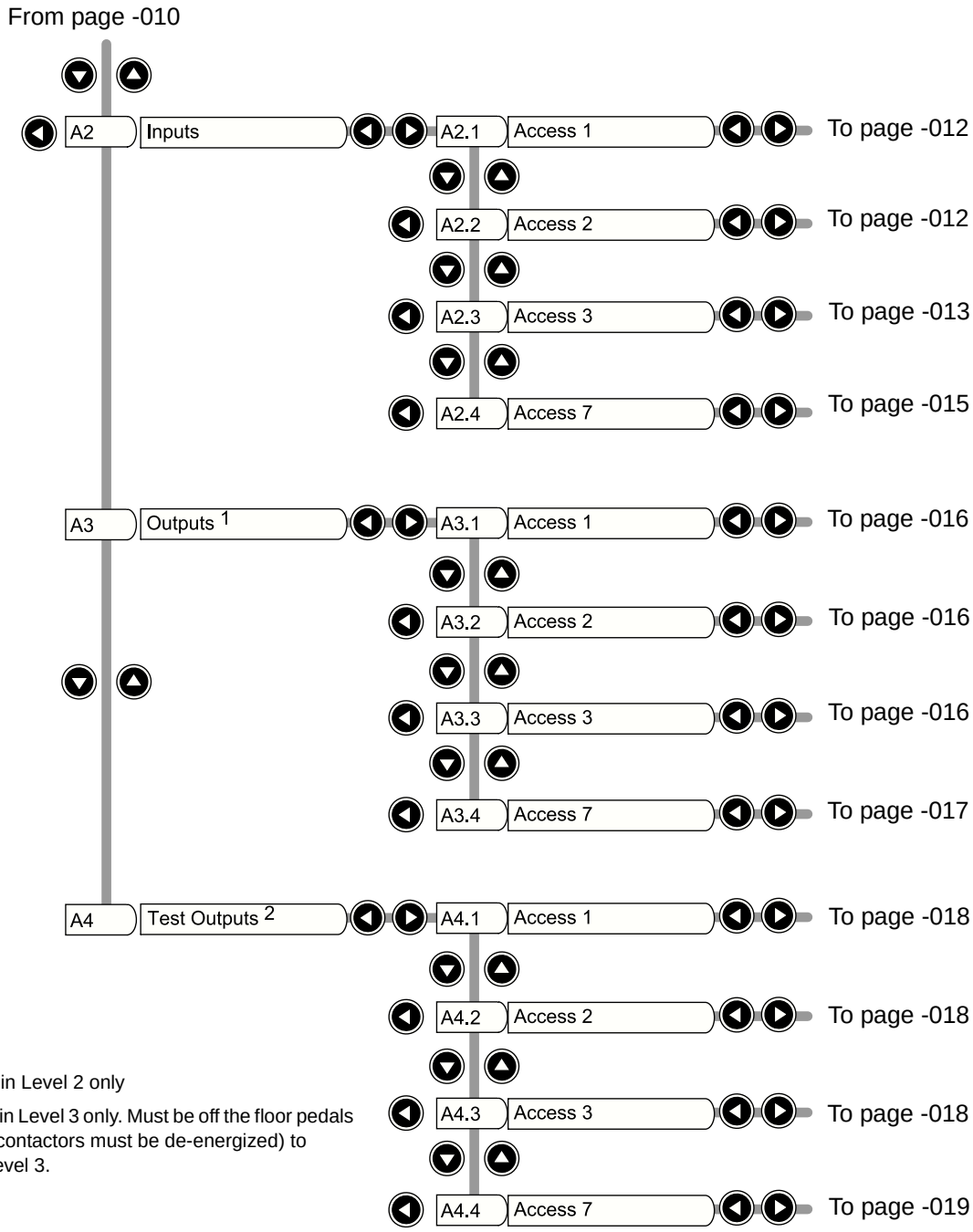


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**Service Menu**




1 Available in Level 2 only

2 Available in Level 3 only. Must be off the floor pedals (L and P contactors must be de-energized) to access Level 3.

Figure 15416-01

### Service Menu

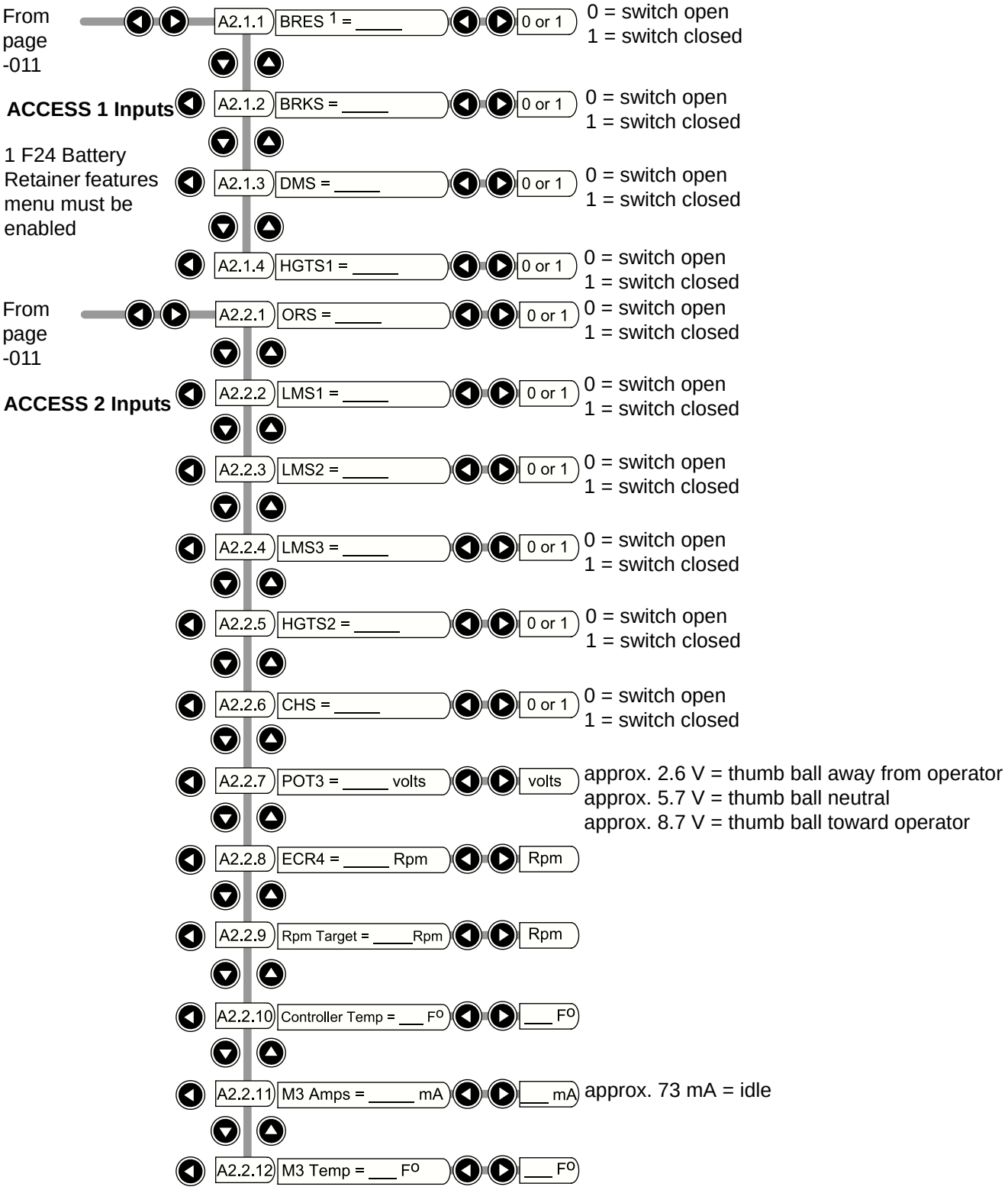



Figure 15418-01



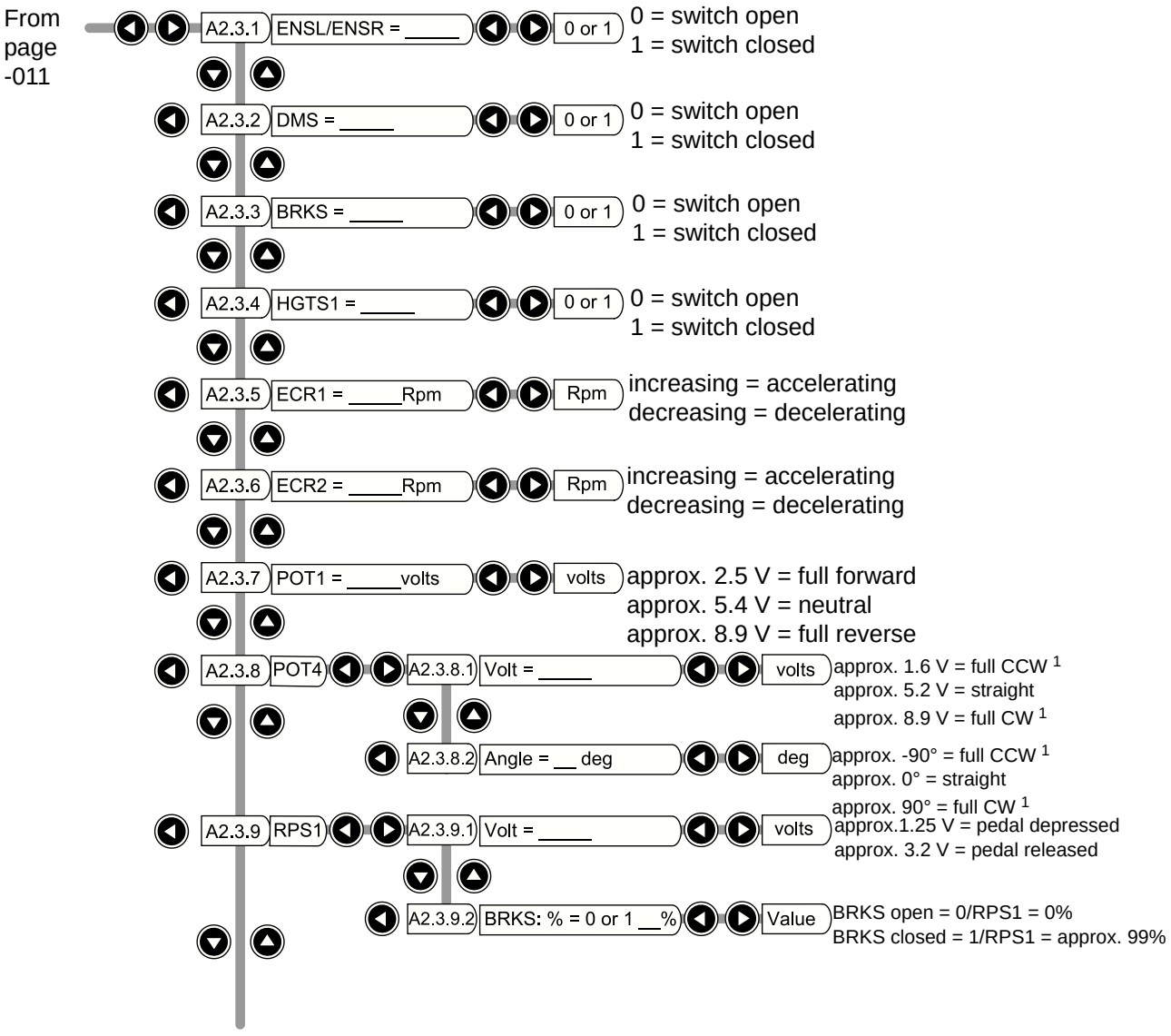
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**Service Menu**

**ACCESS 3 Inputs**




1 CW and CCW are from the steer tire perspective not from the steer tiller (trucks can be equipped with forward or reverse steering)

Figure 15419-01

**Service Menu**

**ACCESS 3 Inputs (Cont'd)**

From page -013

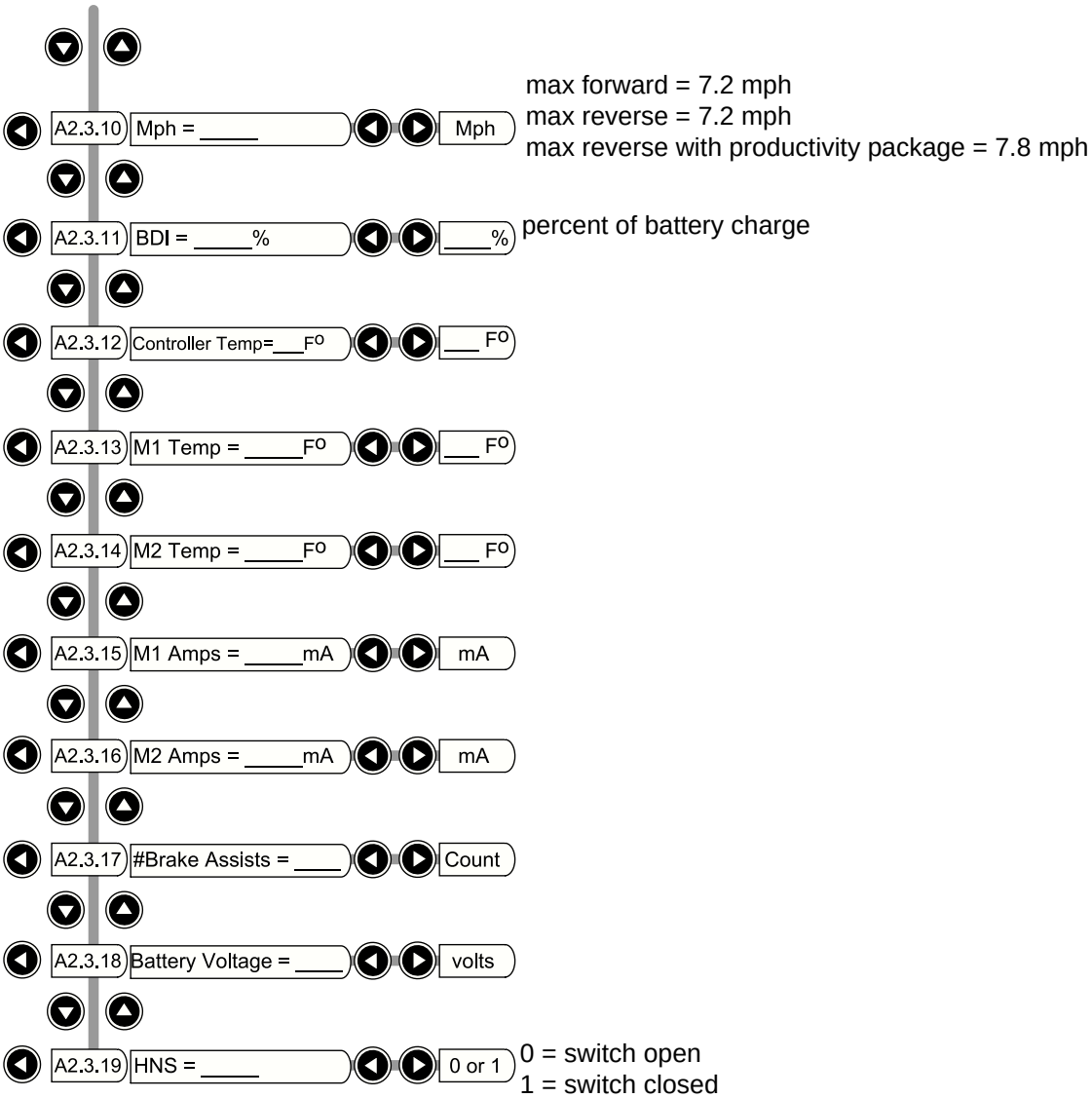



Figure 15420-01



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**Service Menu**

**ACCESS 7 Inputs**

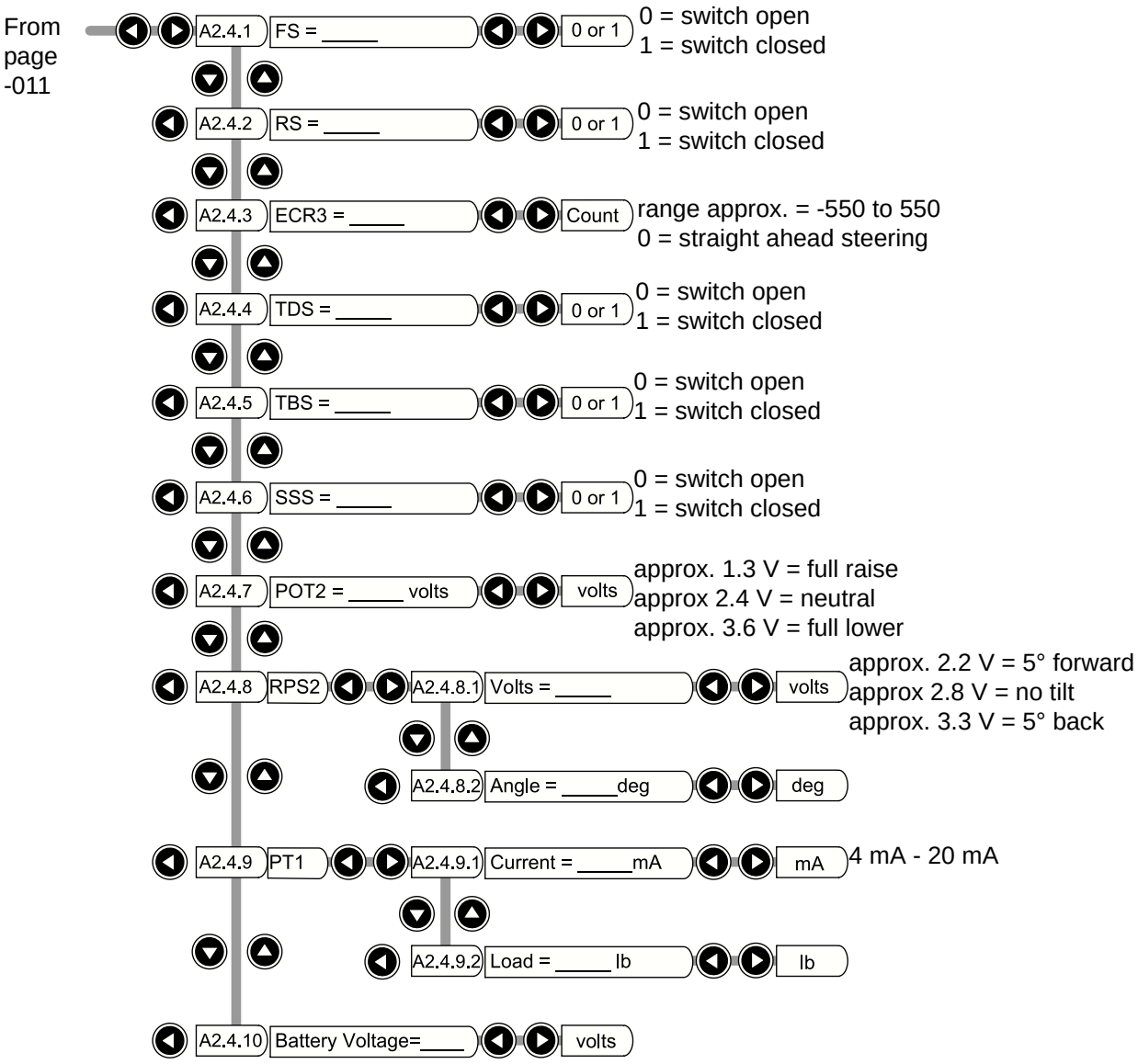



Figure 15421-01

**Service Menu**

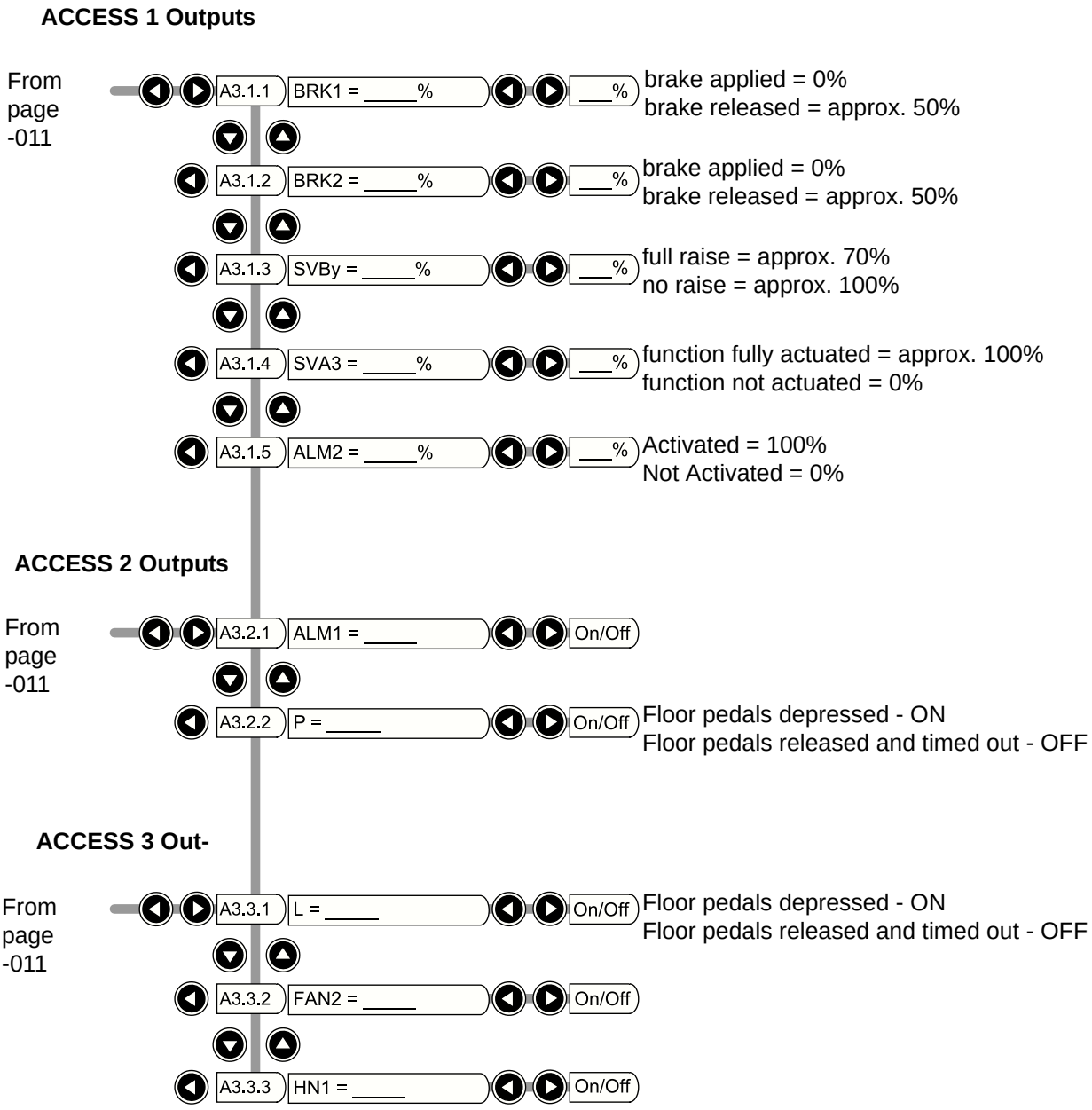



Figure 15422-01



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**Service Menu**

**ACCESS 7 Outputs**

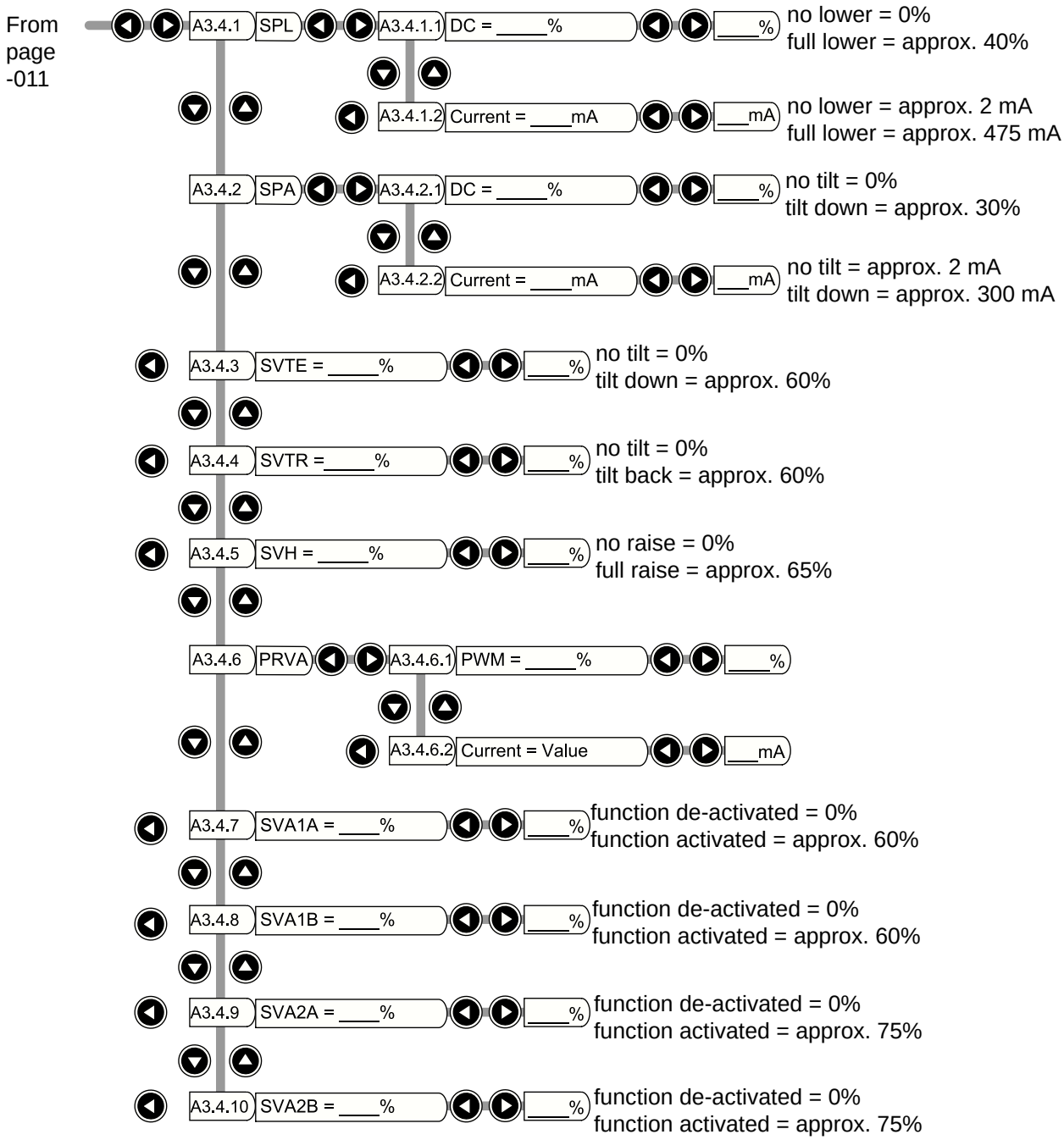
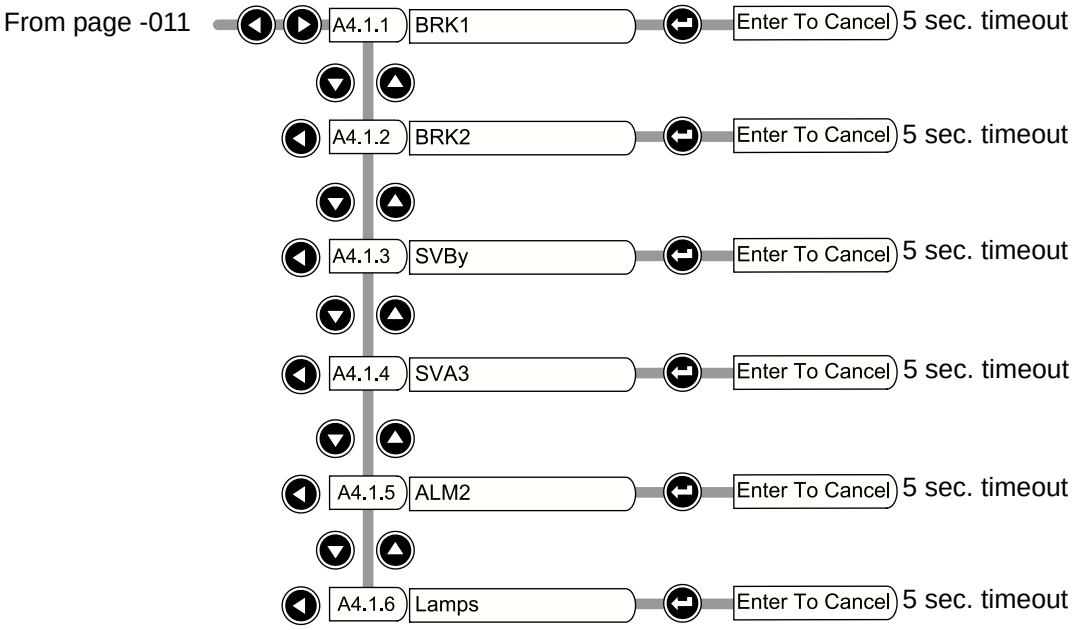


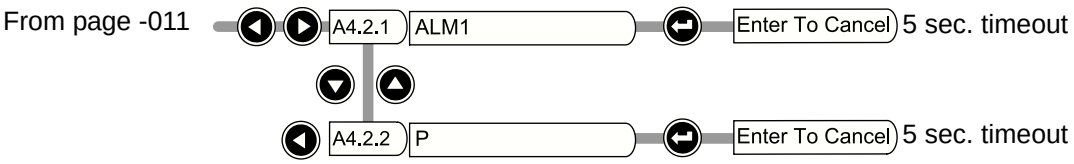

Figure 15423-01

### Service Menu

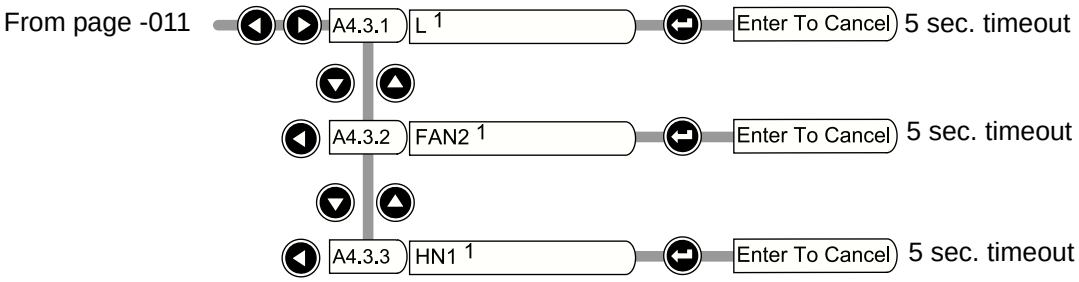
**ACCESS 1 Test Outputs**




**ACCESS 2 Test Outputs**




**ACCESS 3 Test Outputs**




1 Floor pedal must be depressed (DMS must be closed)

Figure 15424-02



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**Service Menu**

**ACCESS 7 Test Outputs**

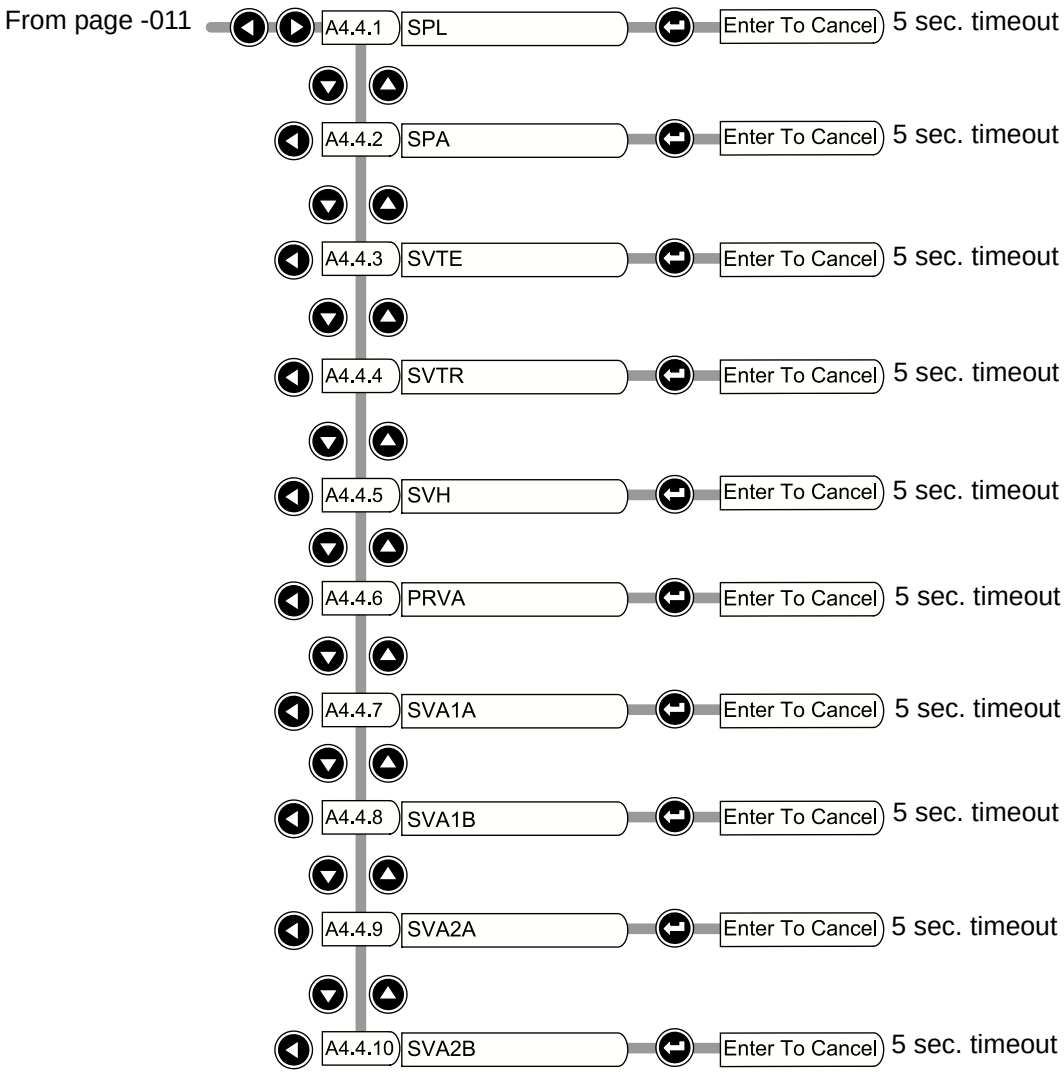
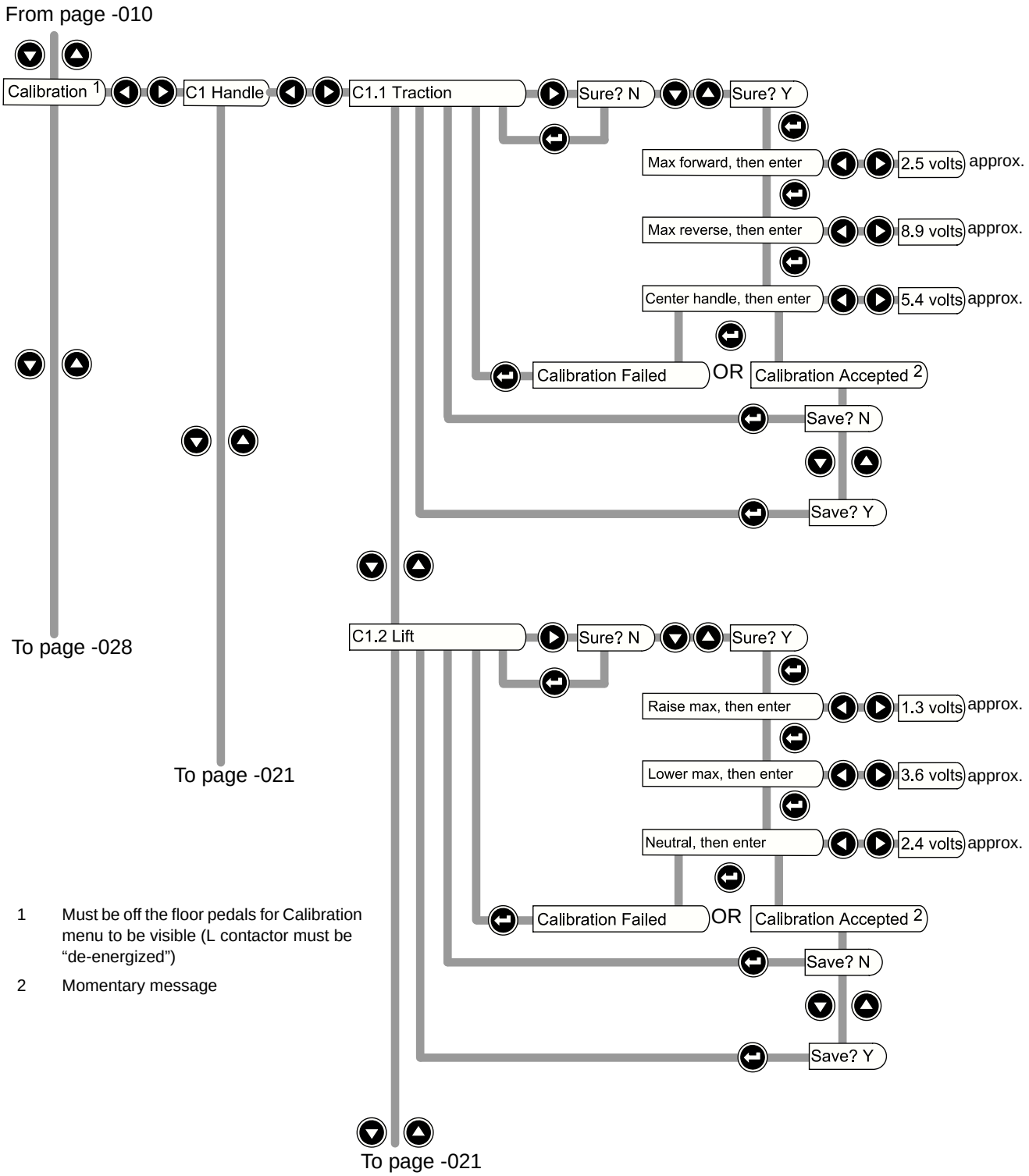



Figure 15425-01

### Service Menu




1 Must be off the floor pedals for Calibration menu to be visible (L contactor must be "de-energized")

2 Momentary message

Figure 15439-02

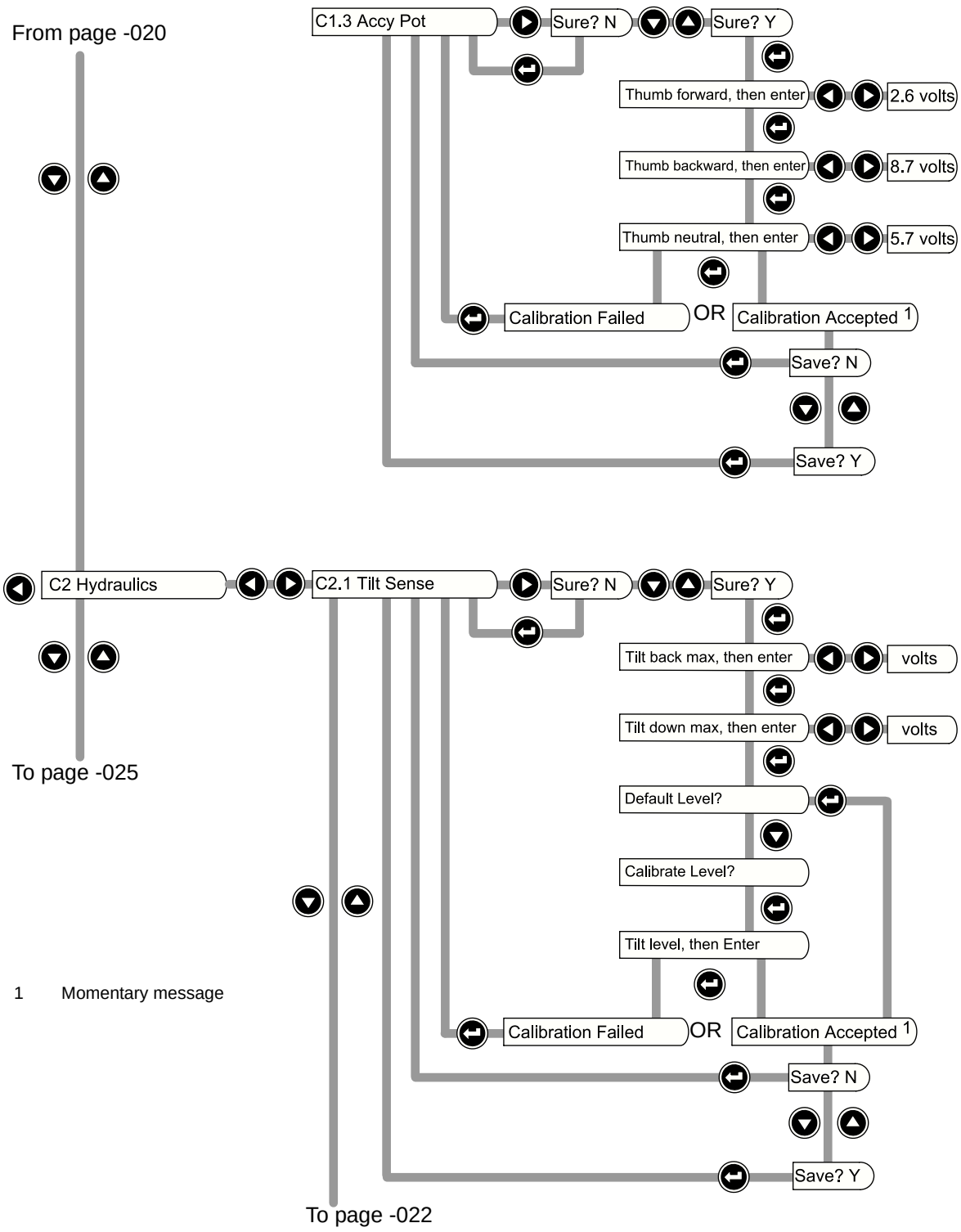


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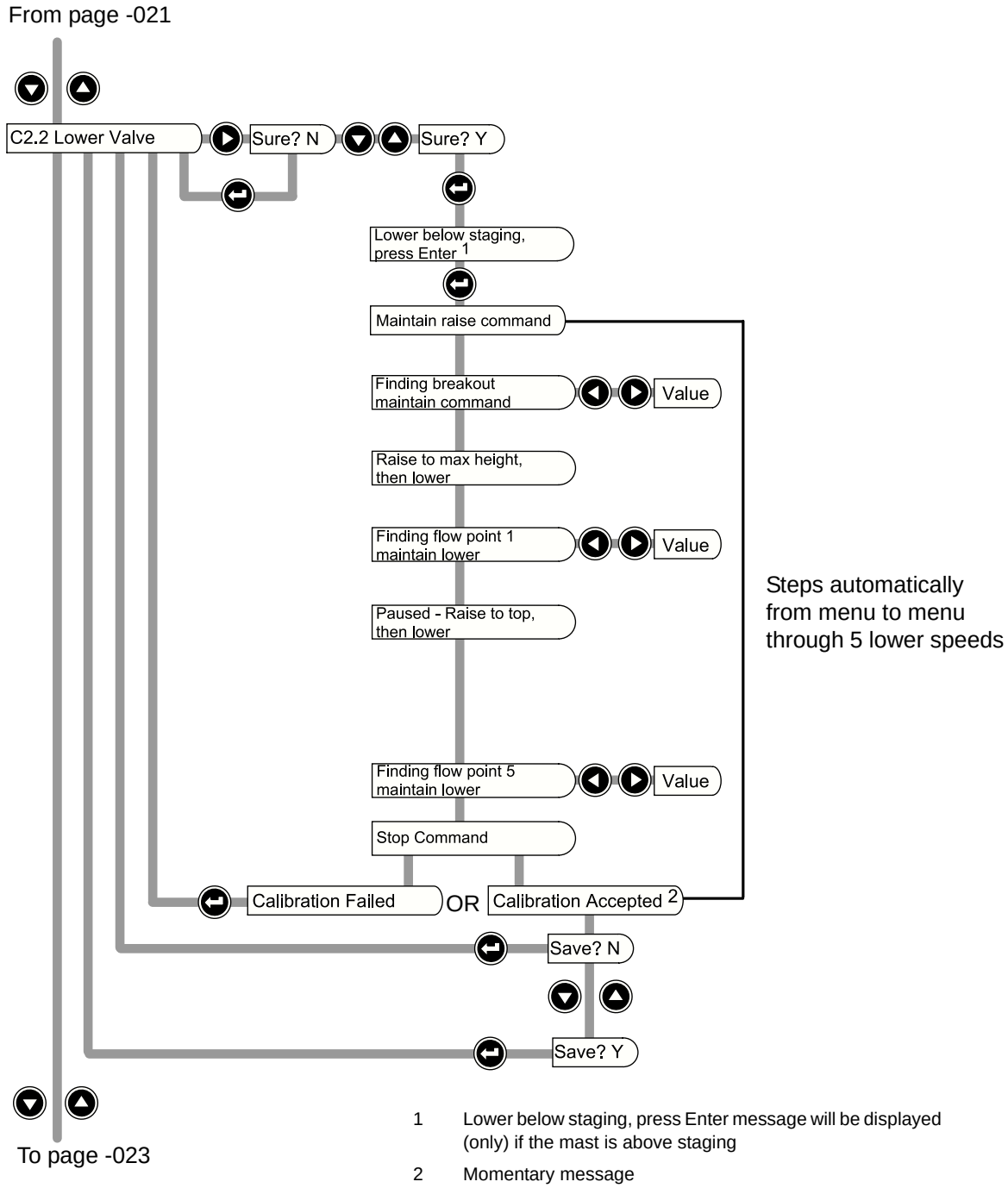
**Service Menu**




1 Momentary message

Figure 15440-01

### Service Menu




1 Lower below staging, press Enter message will be displayed (only) if the mast is above staging

2 Momentary message

Figure 15442-01

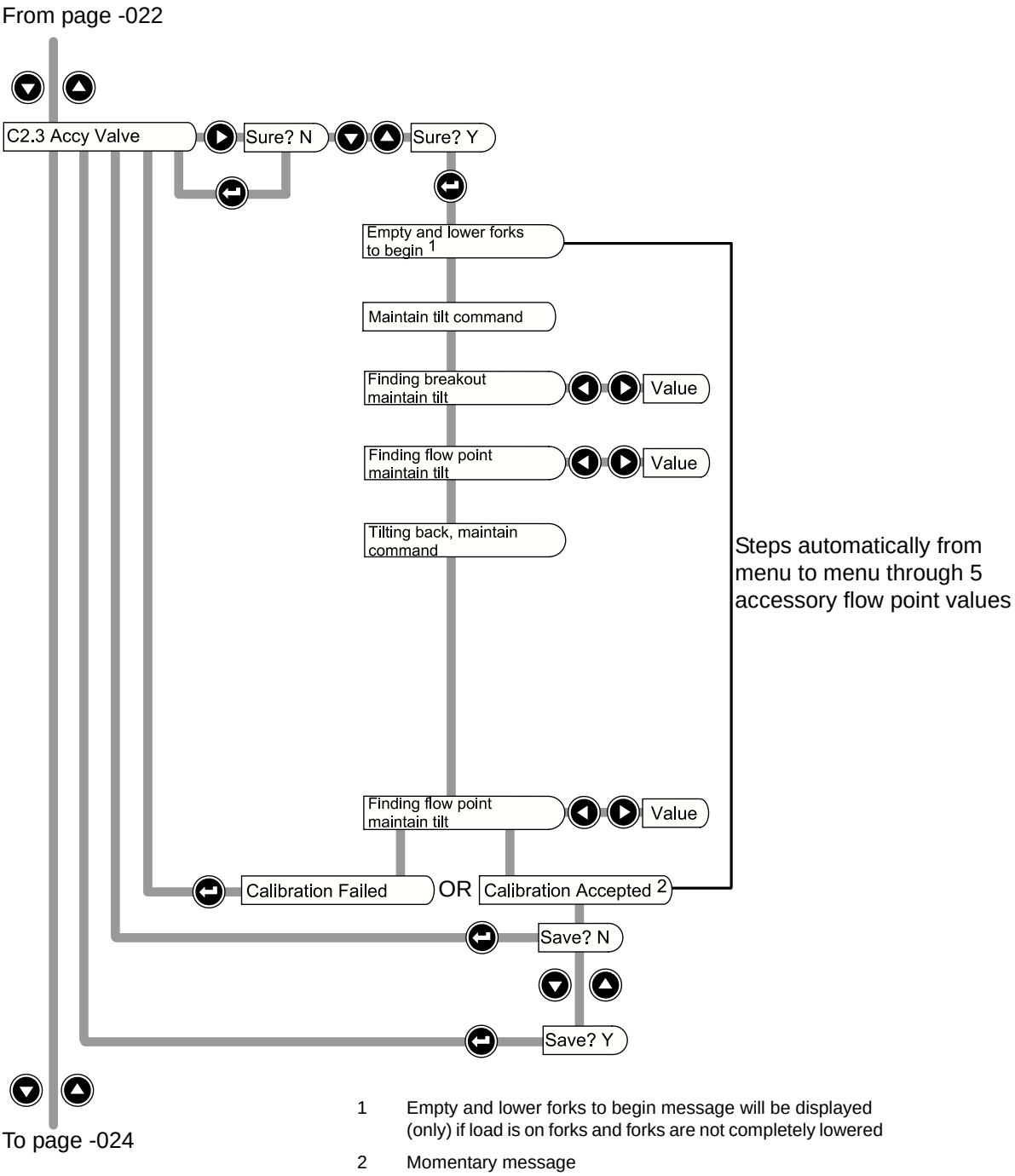


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**Service Menu**

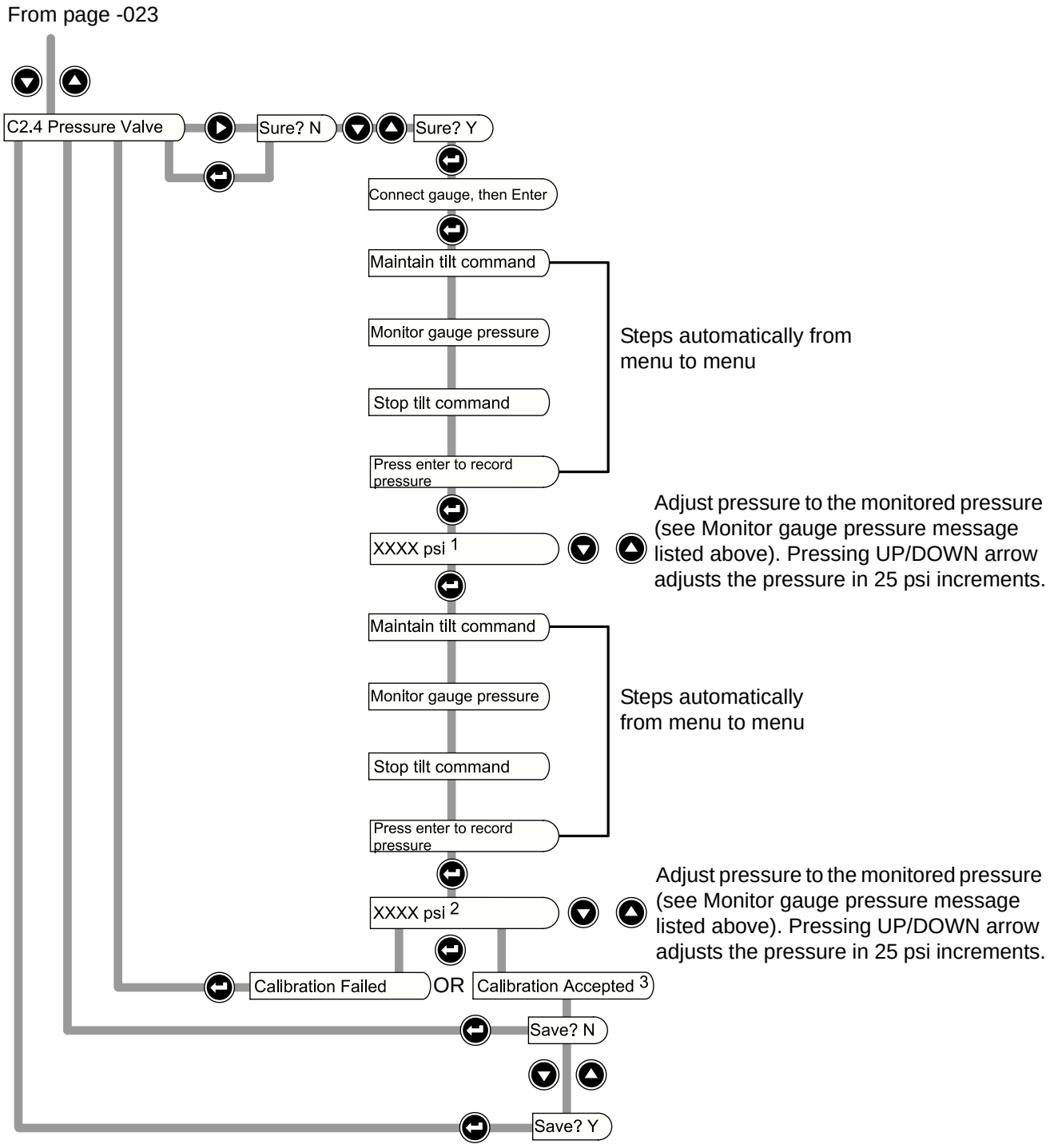



1 Empty and lower forks to begin message will be displayed (only) if load is on forks and forks are not completely lowered

2 Momentary message

Figure 15443-01

### Service Menu




1 High pressure setting

2 Low pressure setting

3 Momentary message

Figure 15444-01

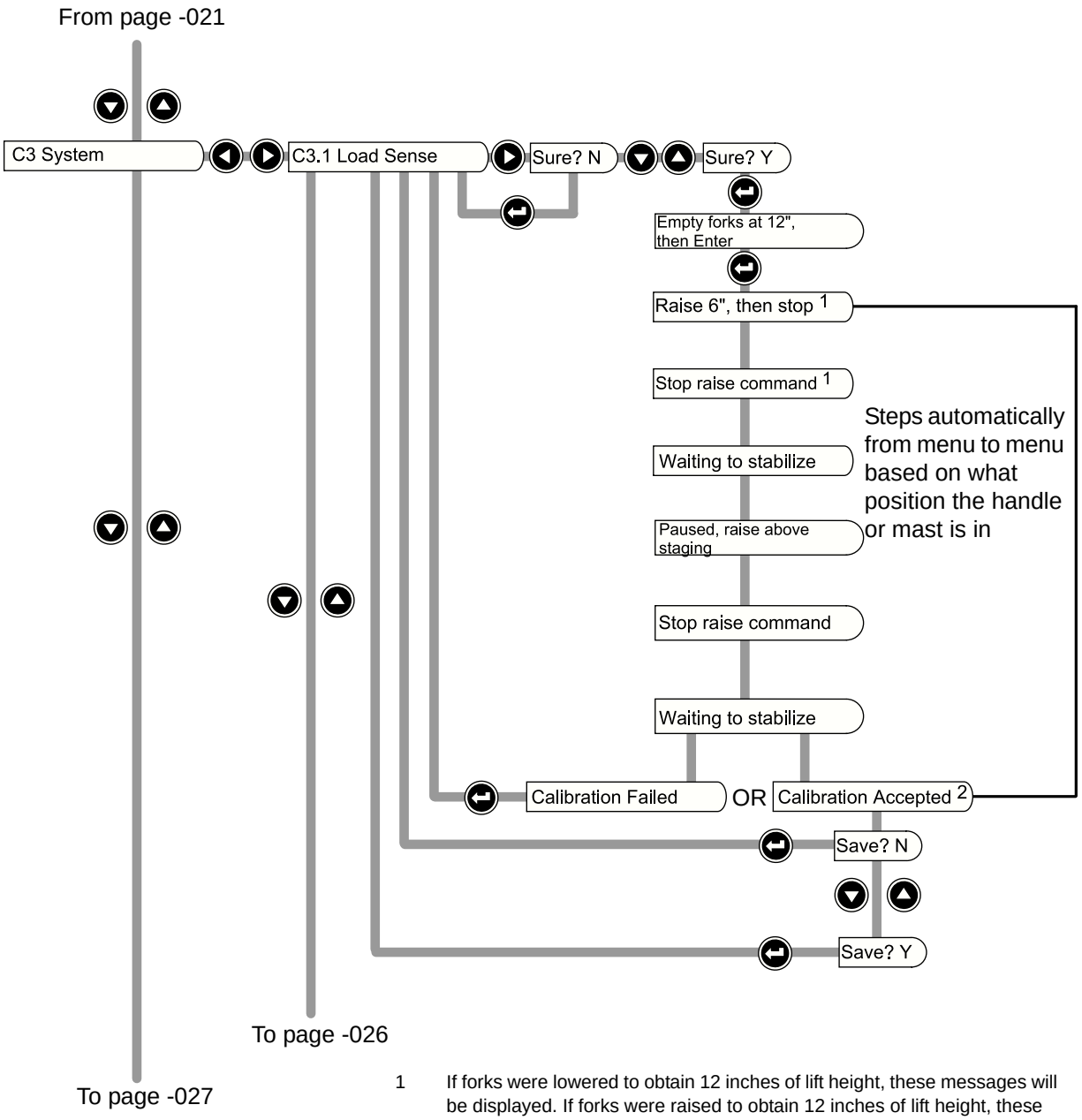


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**Service Menu**

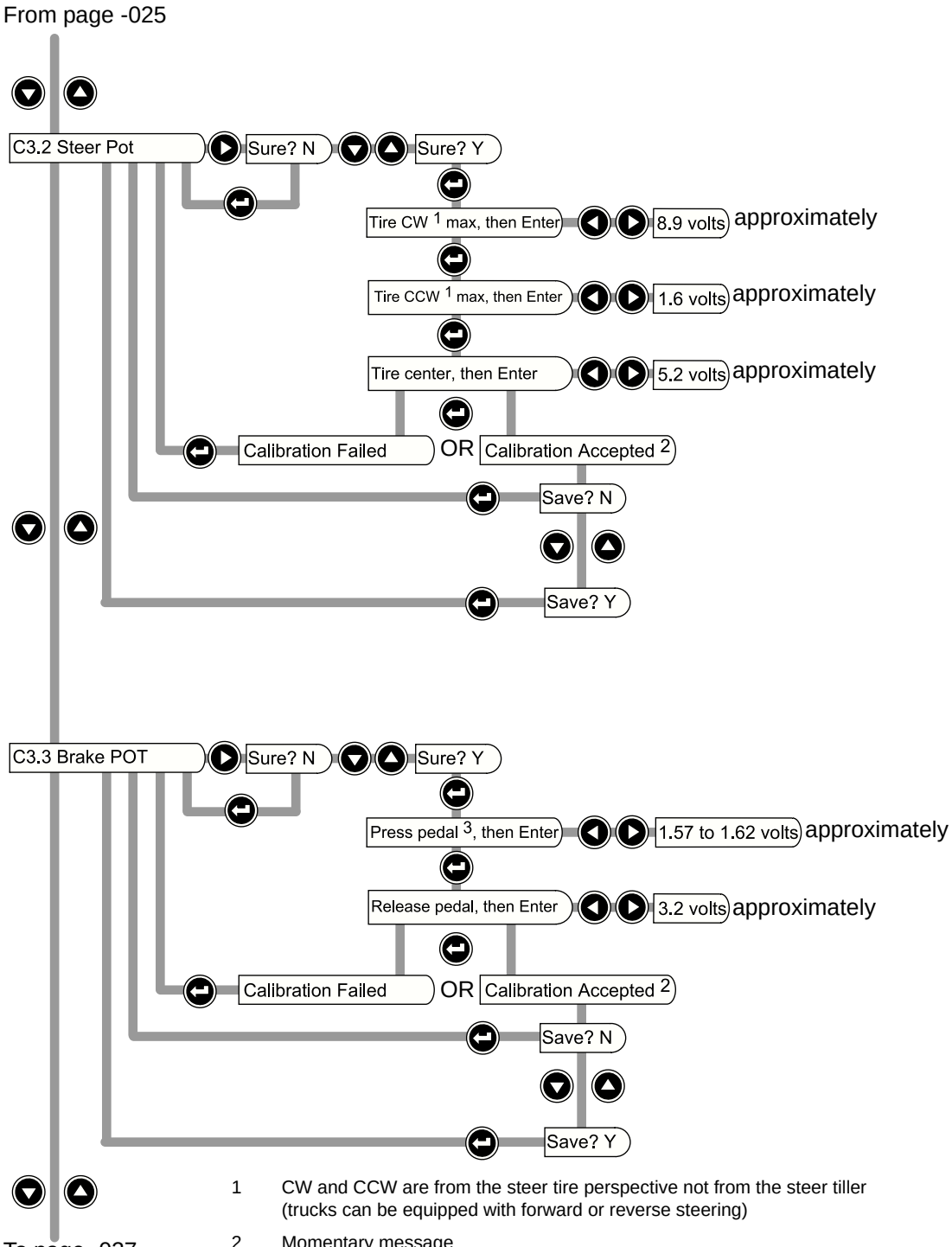



1 If forks were lowered to obtain 12 inches of lift height, these messages will be displayed. If forks were raised to obtain 12 inches of lift height, these messages will not appear.

2 Momentary message

Figure 15445-01

### Service Menu




1 CW and CCW are from the steer tire perspective not from the steer tiller (trucks can be equipped with forward or reverse steering)

2 Momentary message

3 Press pedal to mechanical stops. Display will show approximately 1.32 V. Then raise pedal for an additional 0.25 to 0.30 V.

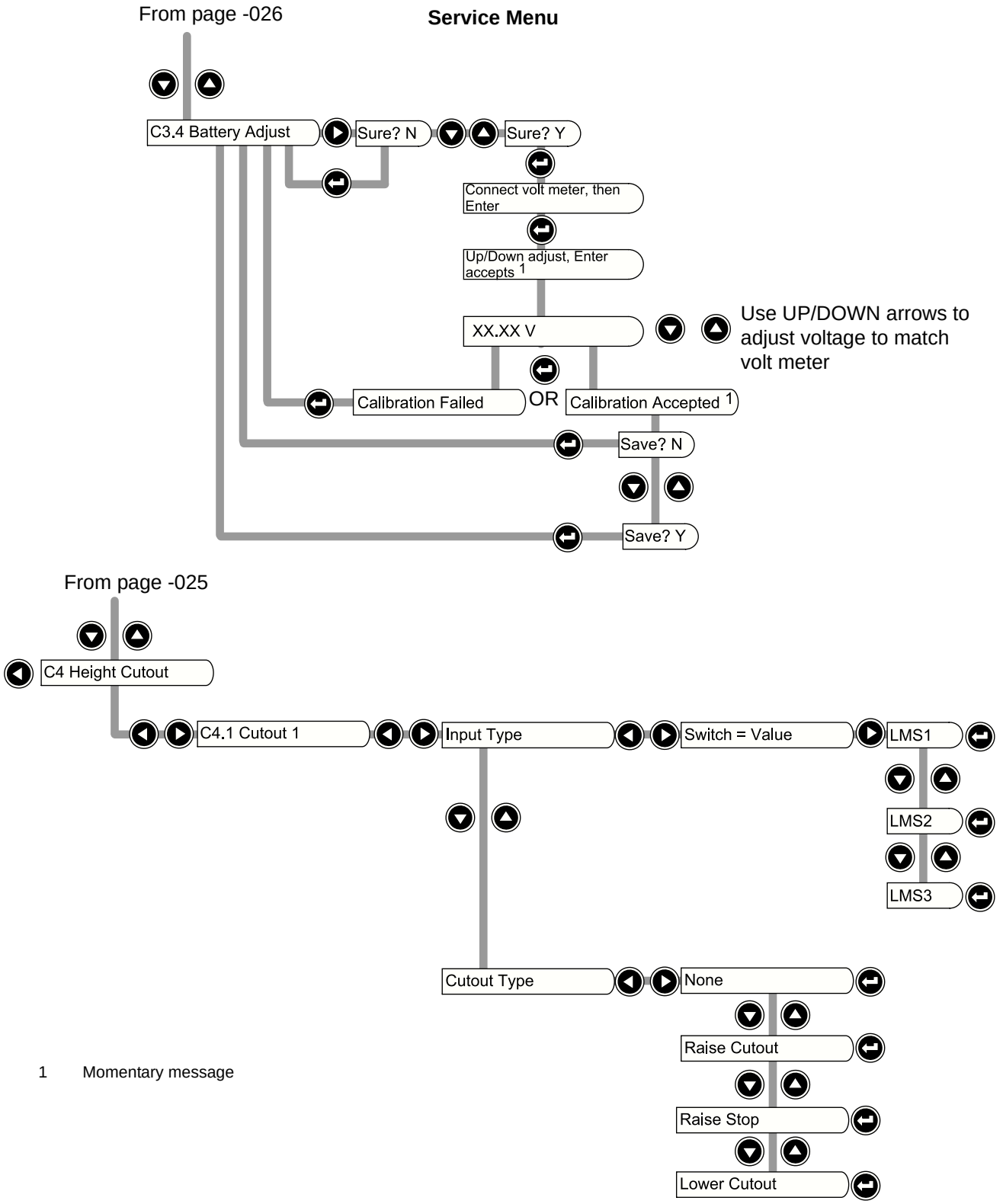
Figure 15446-02



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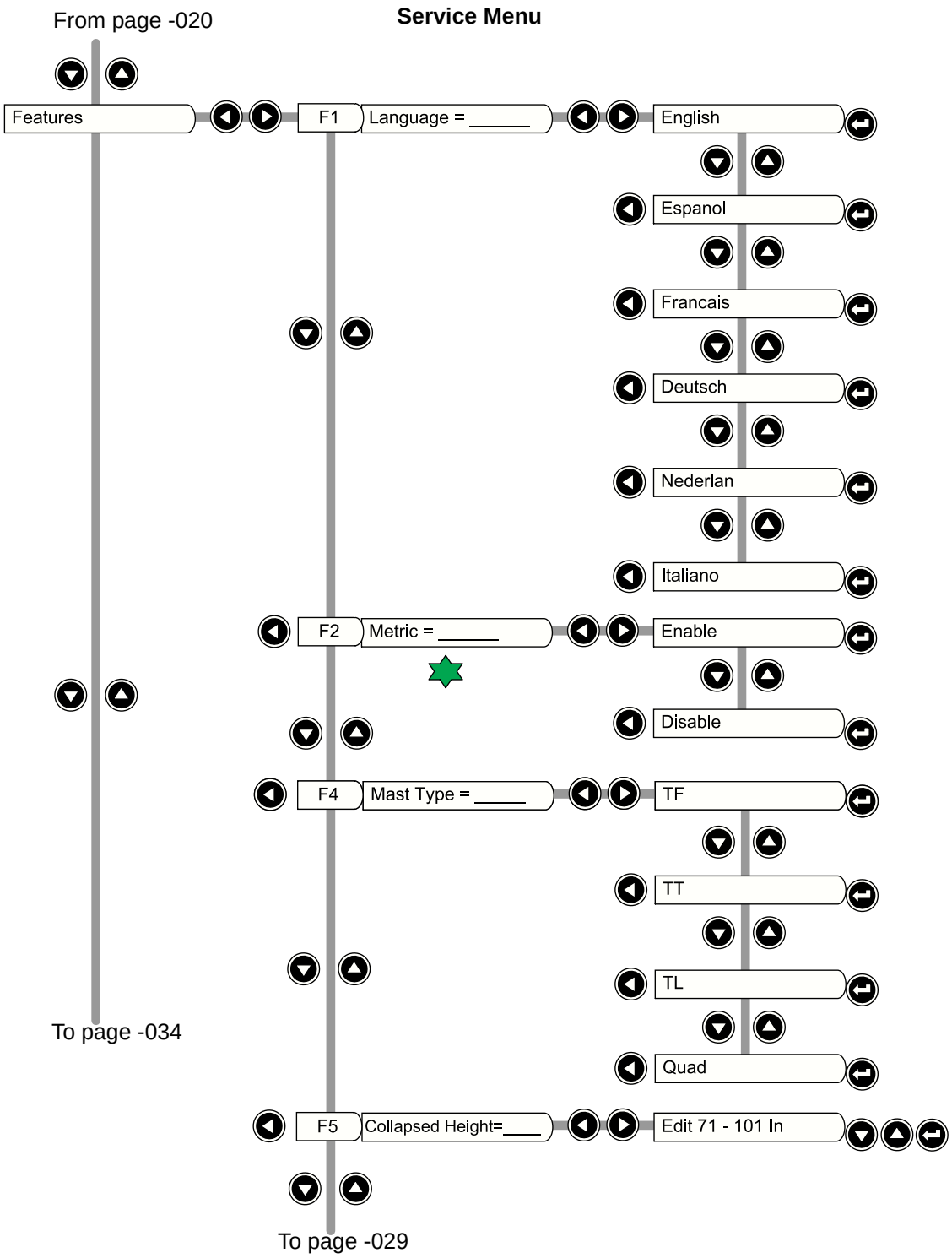
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1 Momentary message

Figure 15447-01




Will be implemented in later software revision, invisible until then.

Figure 15426-01



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**Service Menu**

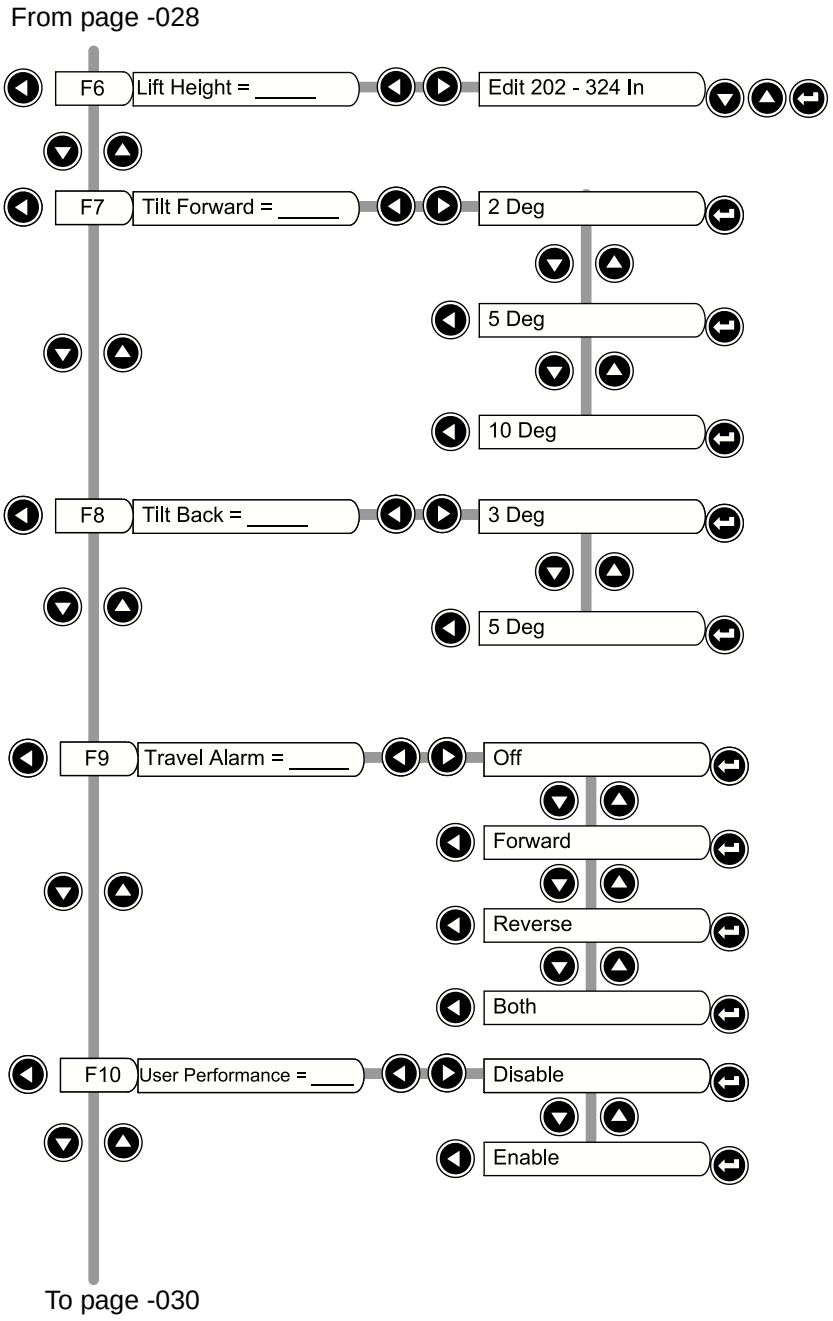
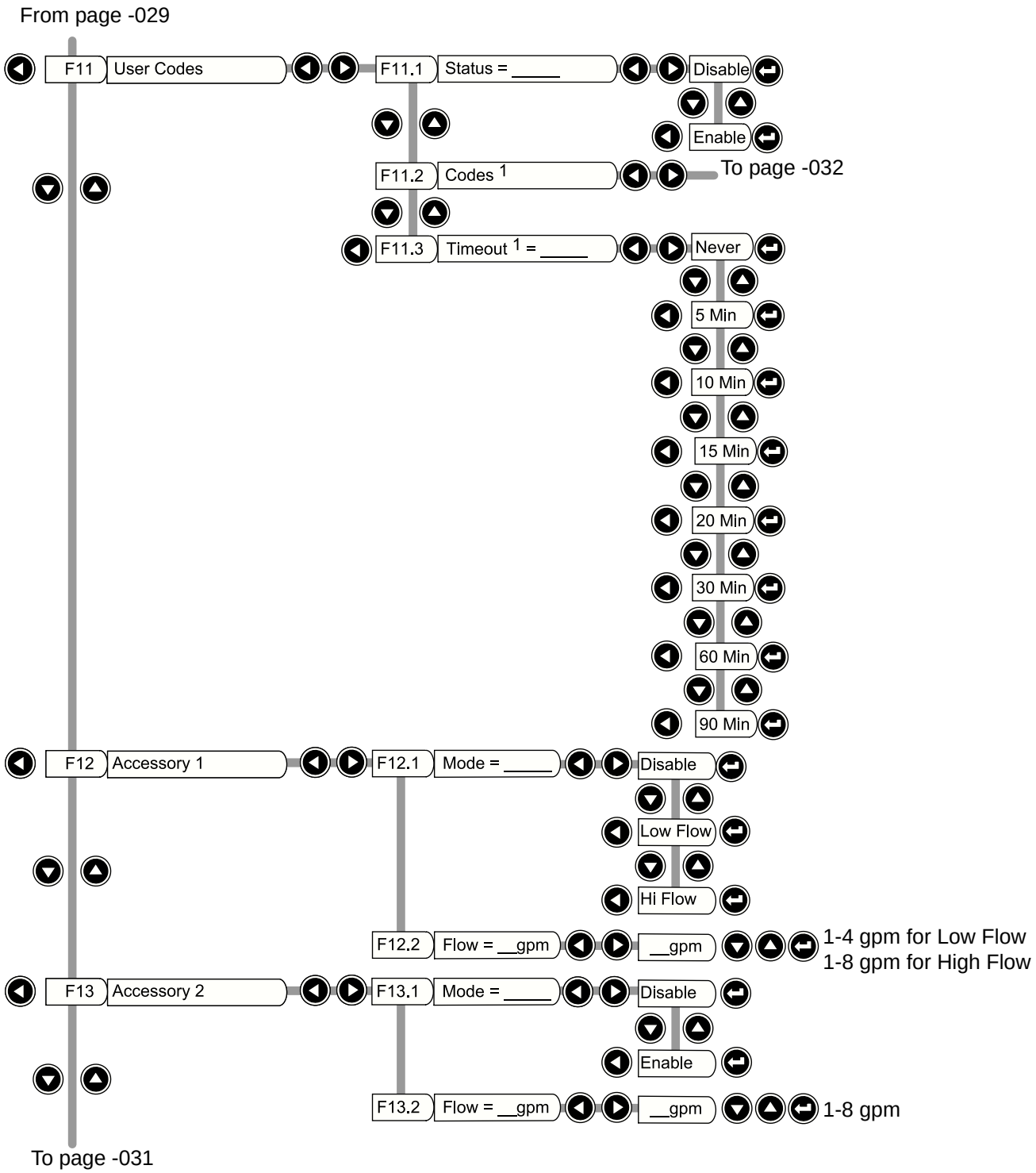



Figure 15427-01

### Service Menu




1 F11.1 Status menu must be *Enabled* for F11.2 Codes and F11.3 Timeout menus to be visible

Figure 15428-01



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**Service Menu**

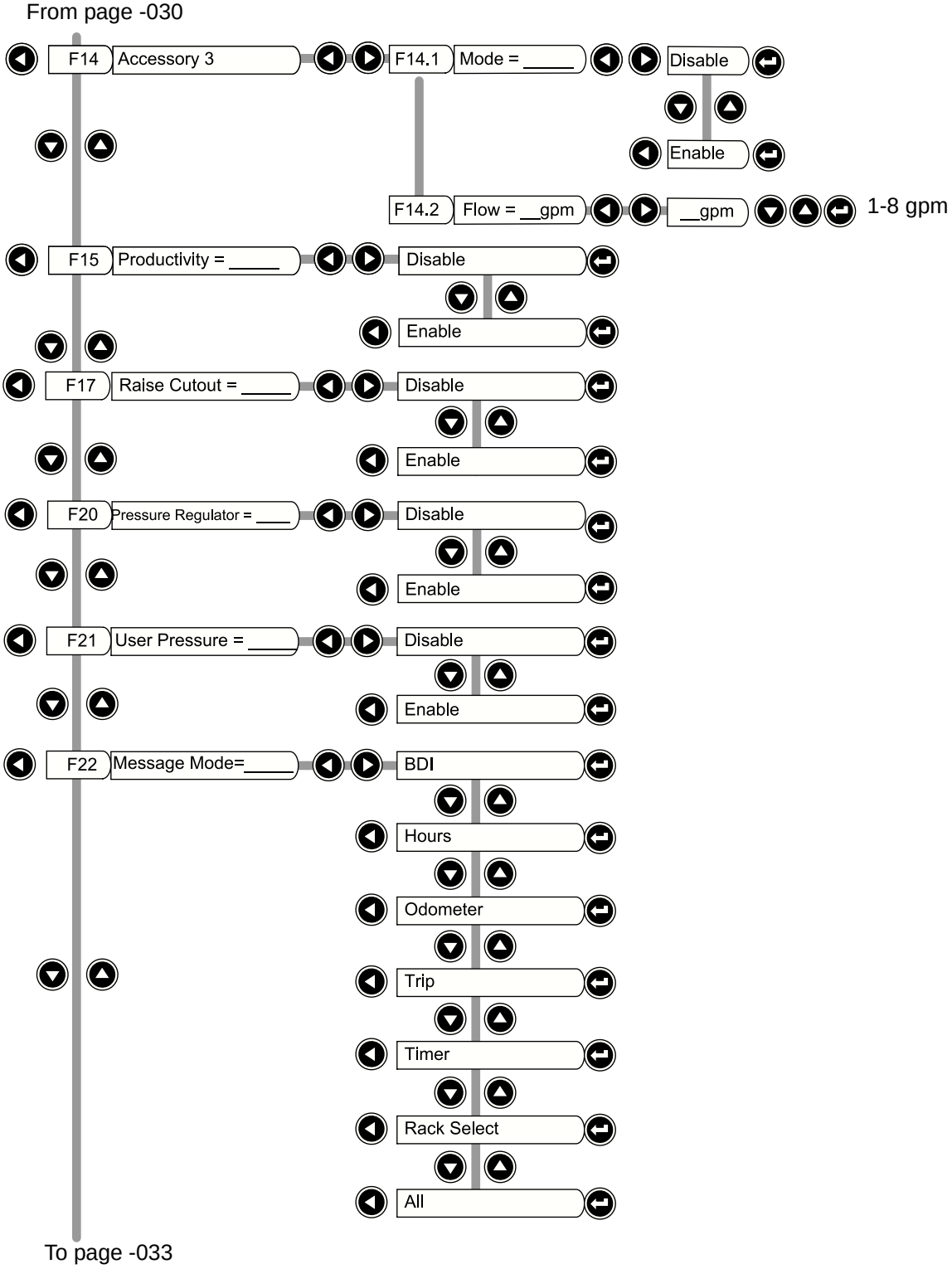



Figure 15429-01

**Service Menu**

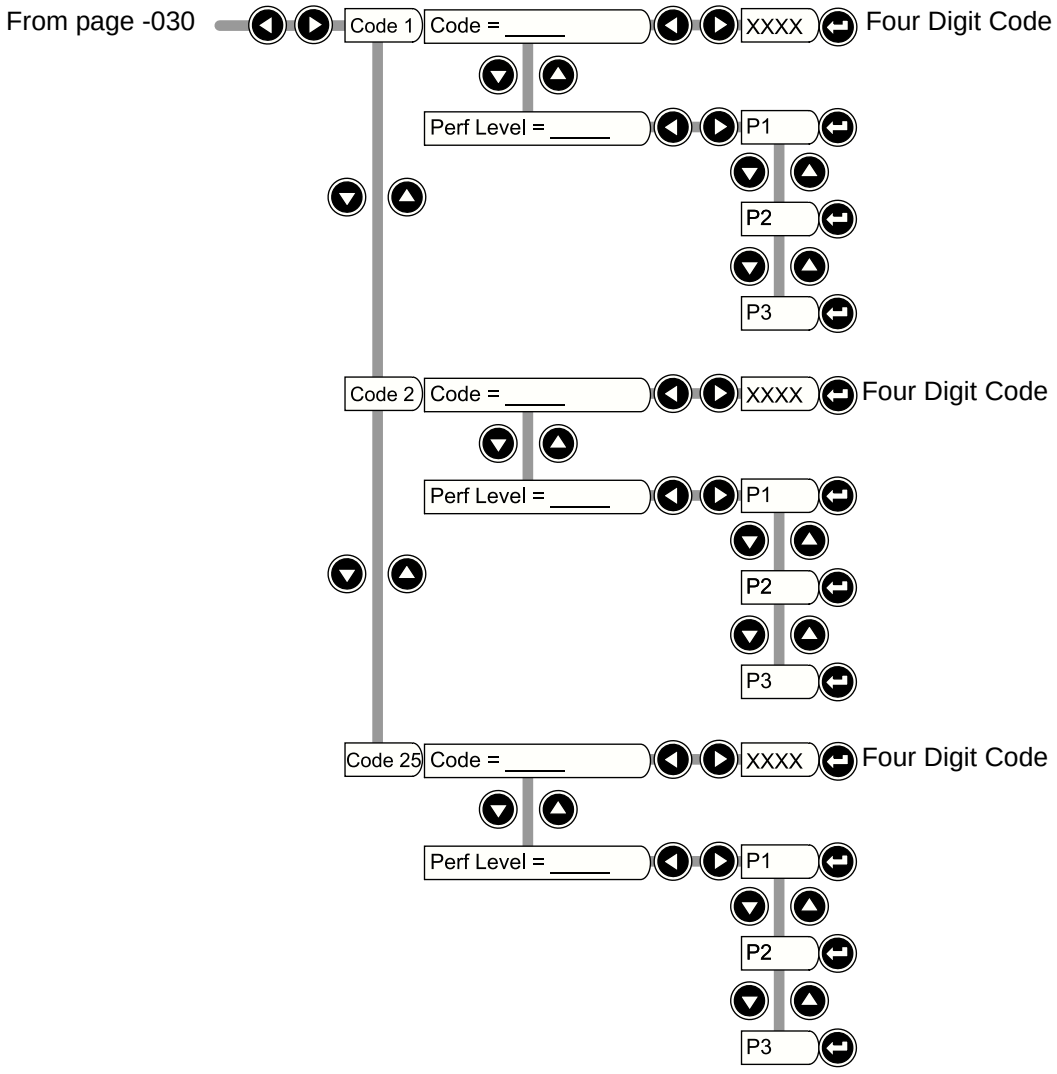



Figure 15430-01



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**Service Menu**

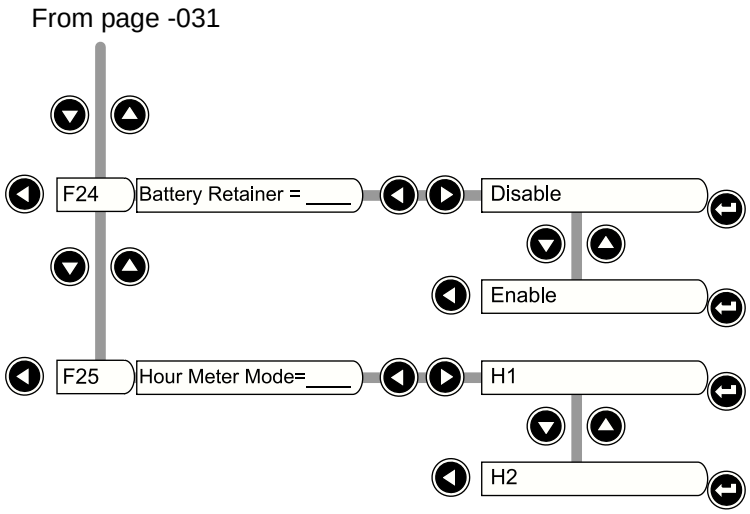
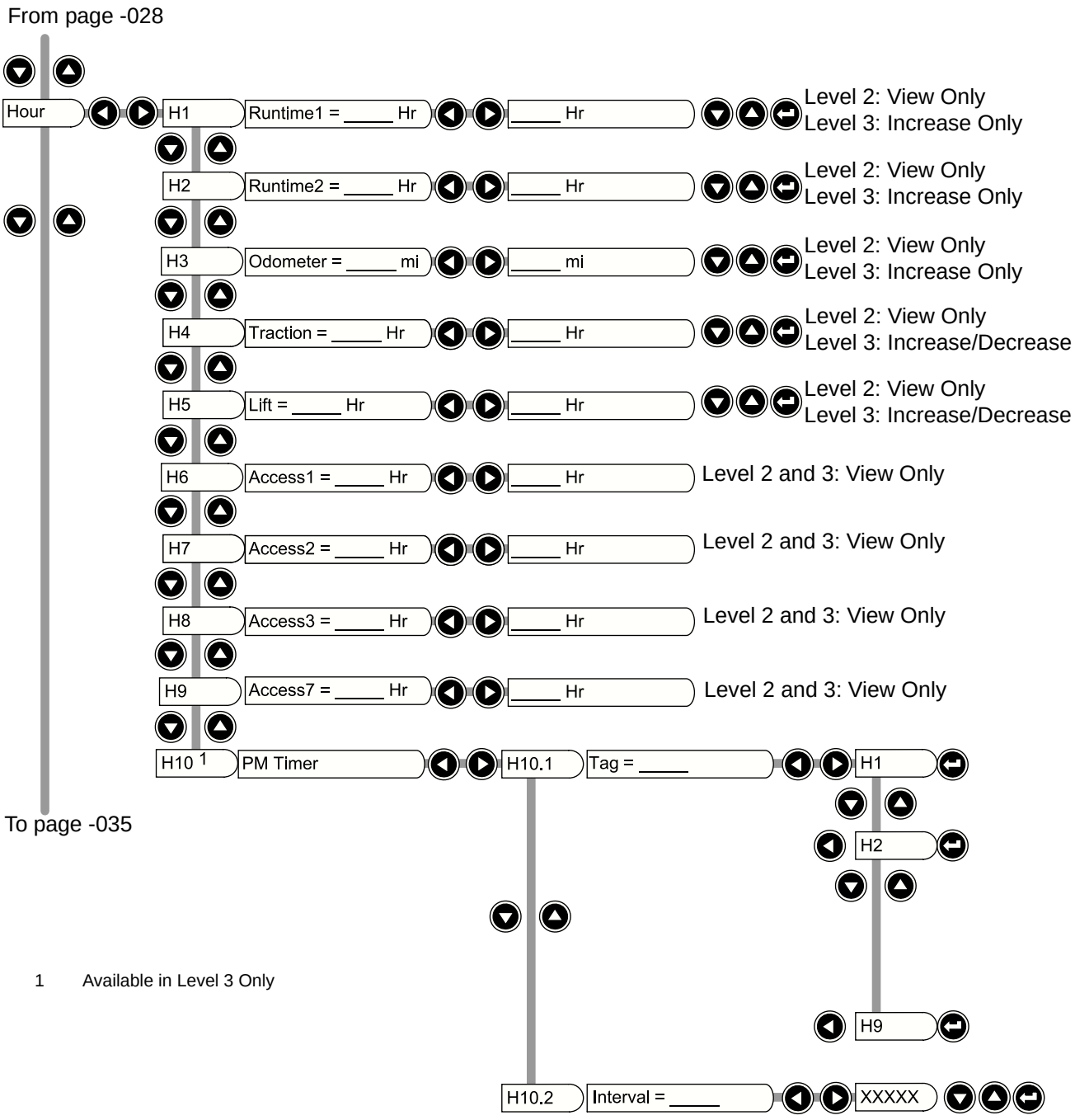



Figure 15433-01

### Service Menu




1 Available in Level 3 Only

Figure 15450-01



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## Service Menu

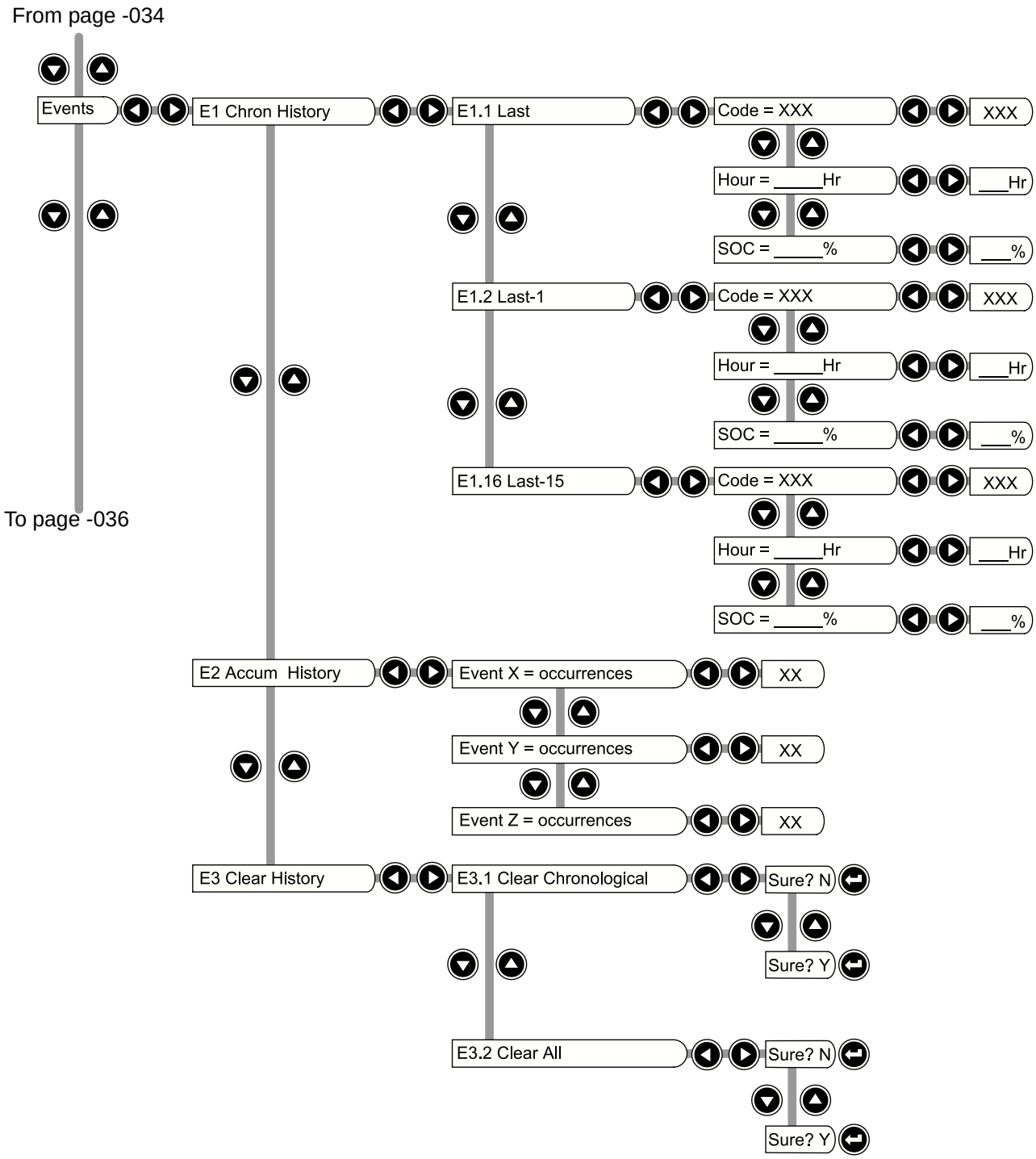
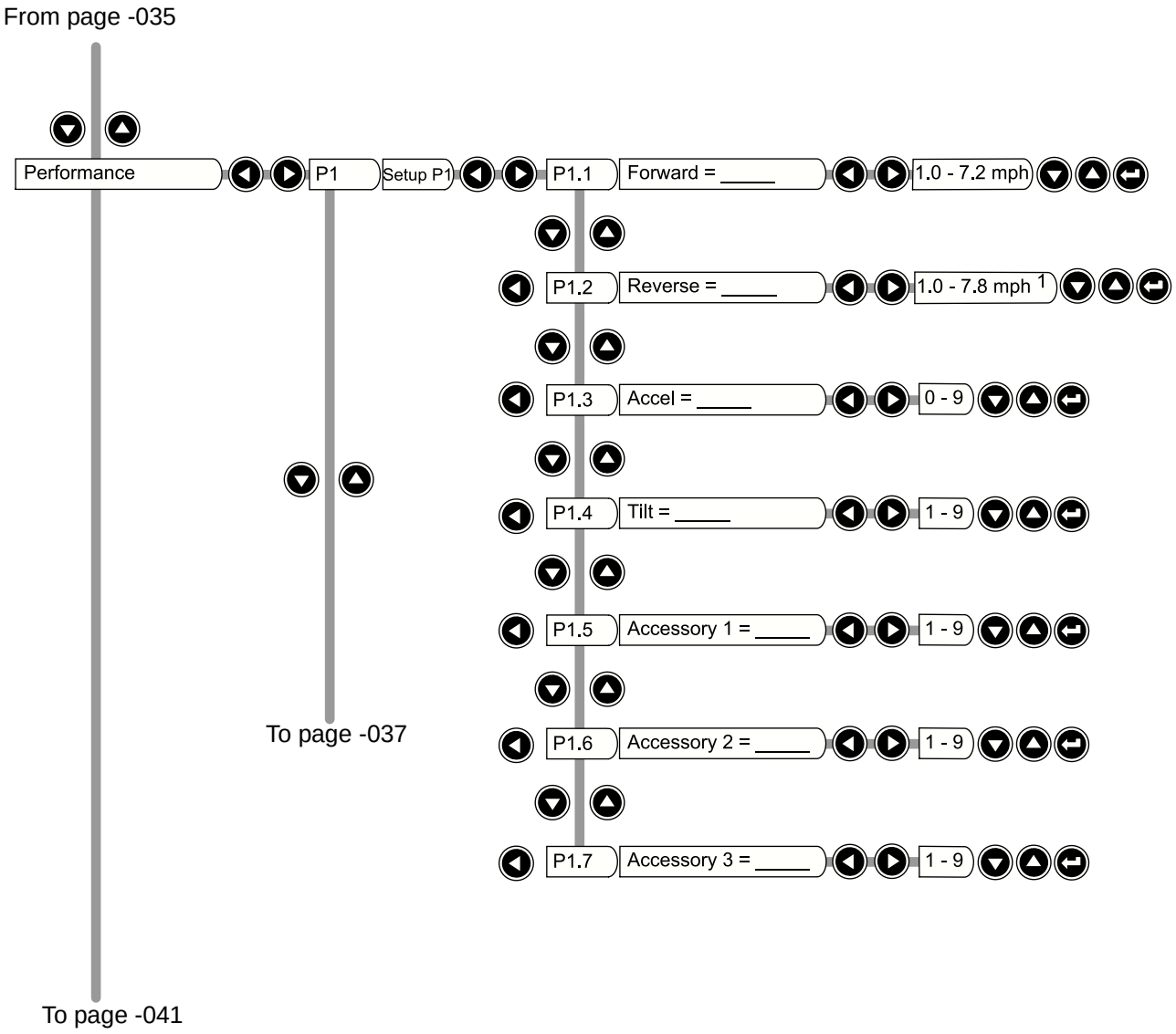



Figure 15451-01

### Service Menu




1 Maximum standard reverse travel speed is 7.2 mph.
Maximum reverse travel speed for trucks with productivity package is 7.8 mph.

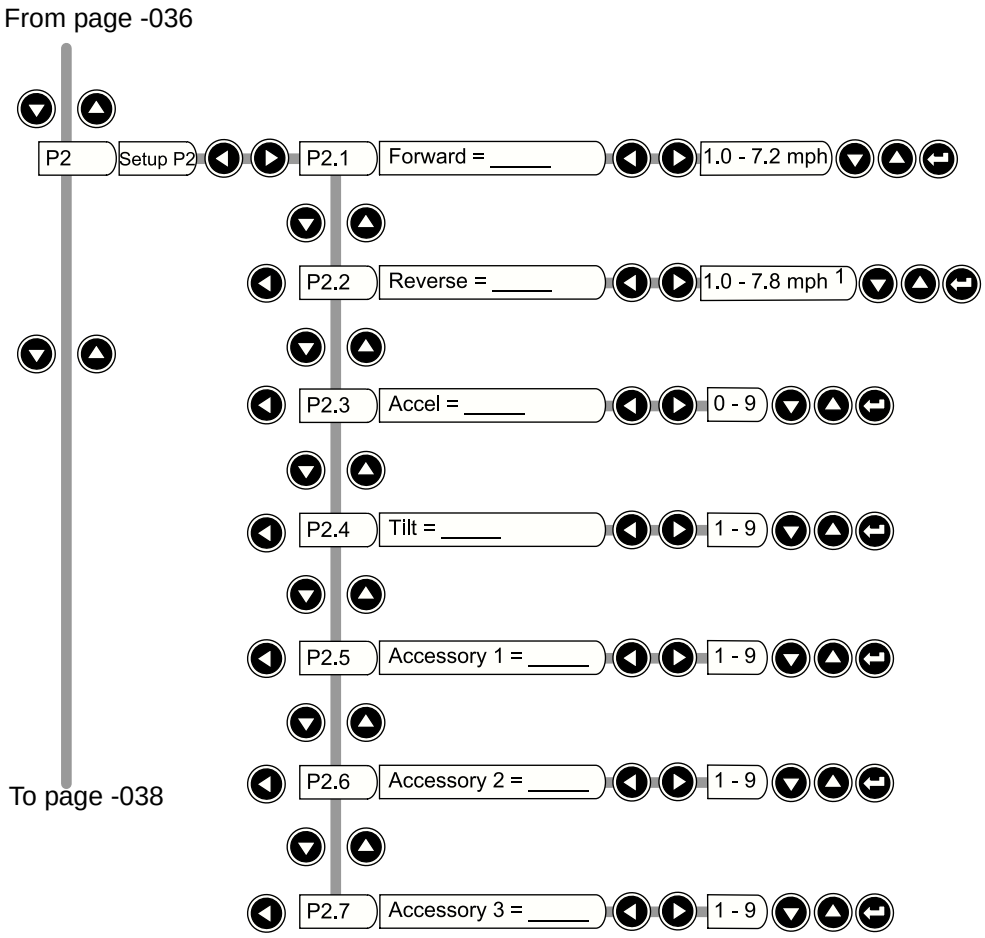
Figure 15434-01


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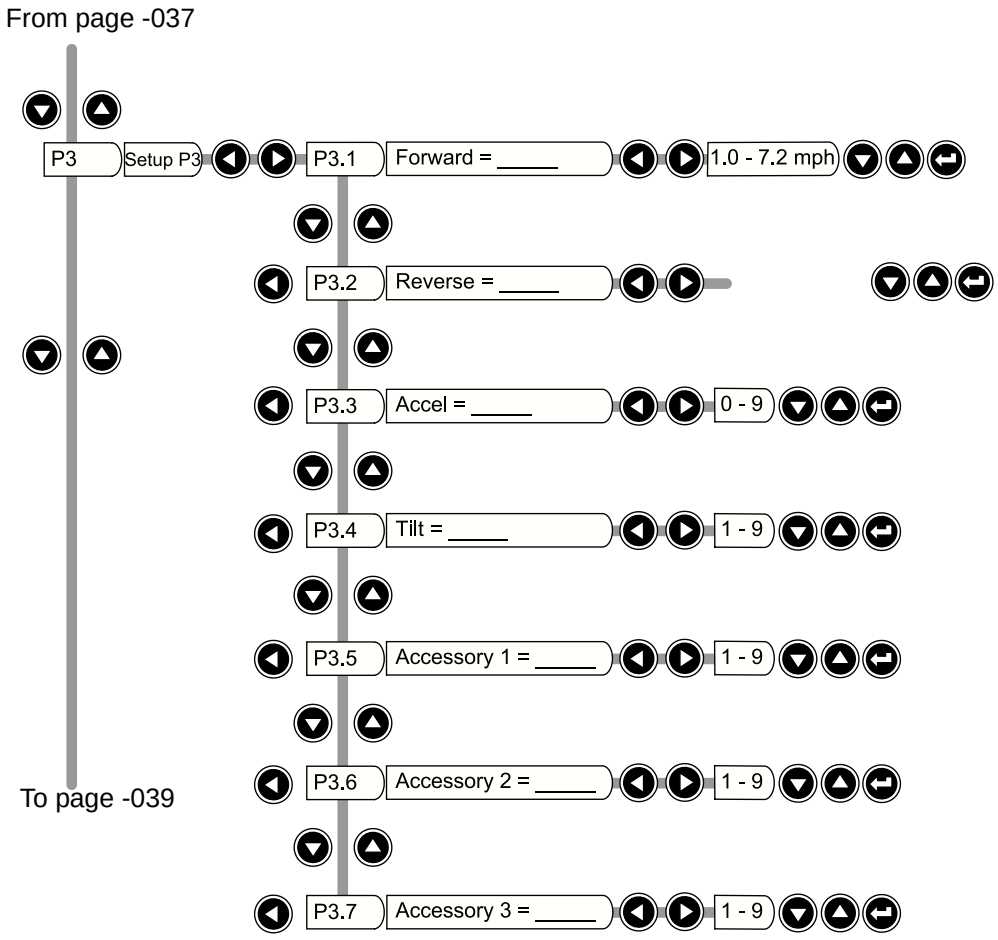
**Service Menu**




1 Maximum standard reverse travel speed is 7.2 mph.
Maximum reverse travel speed for trucks with productivity package is 7.8 mph.

Figure 15435-01

**Service Menu**




1 Maximum standard reverse travel speed is 7.2 mph.
Maximum reverse travel speed for trucks with productivity package is 7.8 mph.

Figure 15436-01


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**Service Menu**

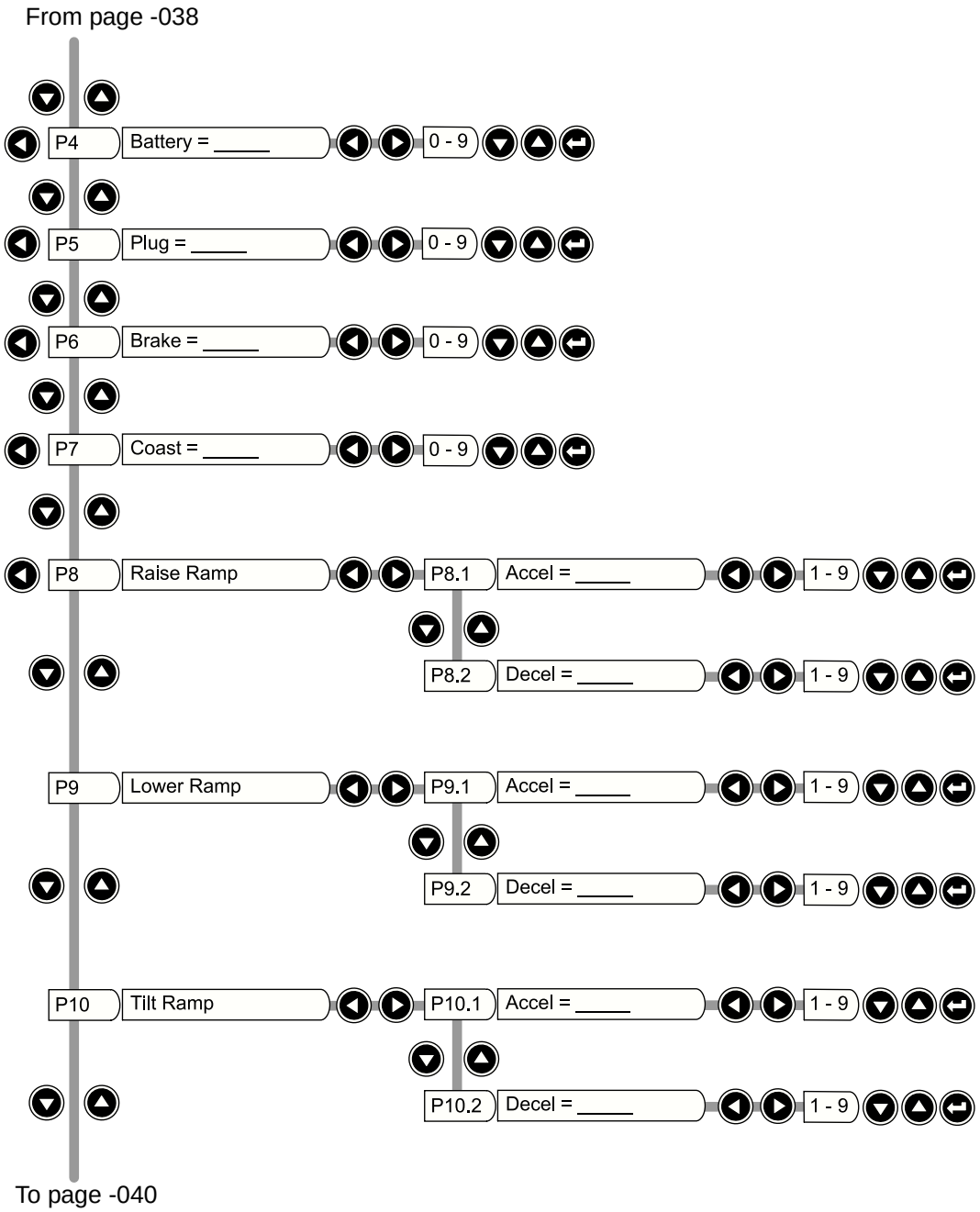
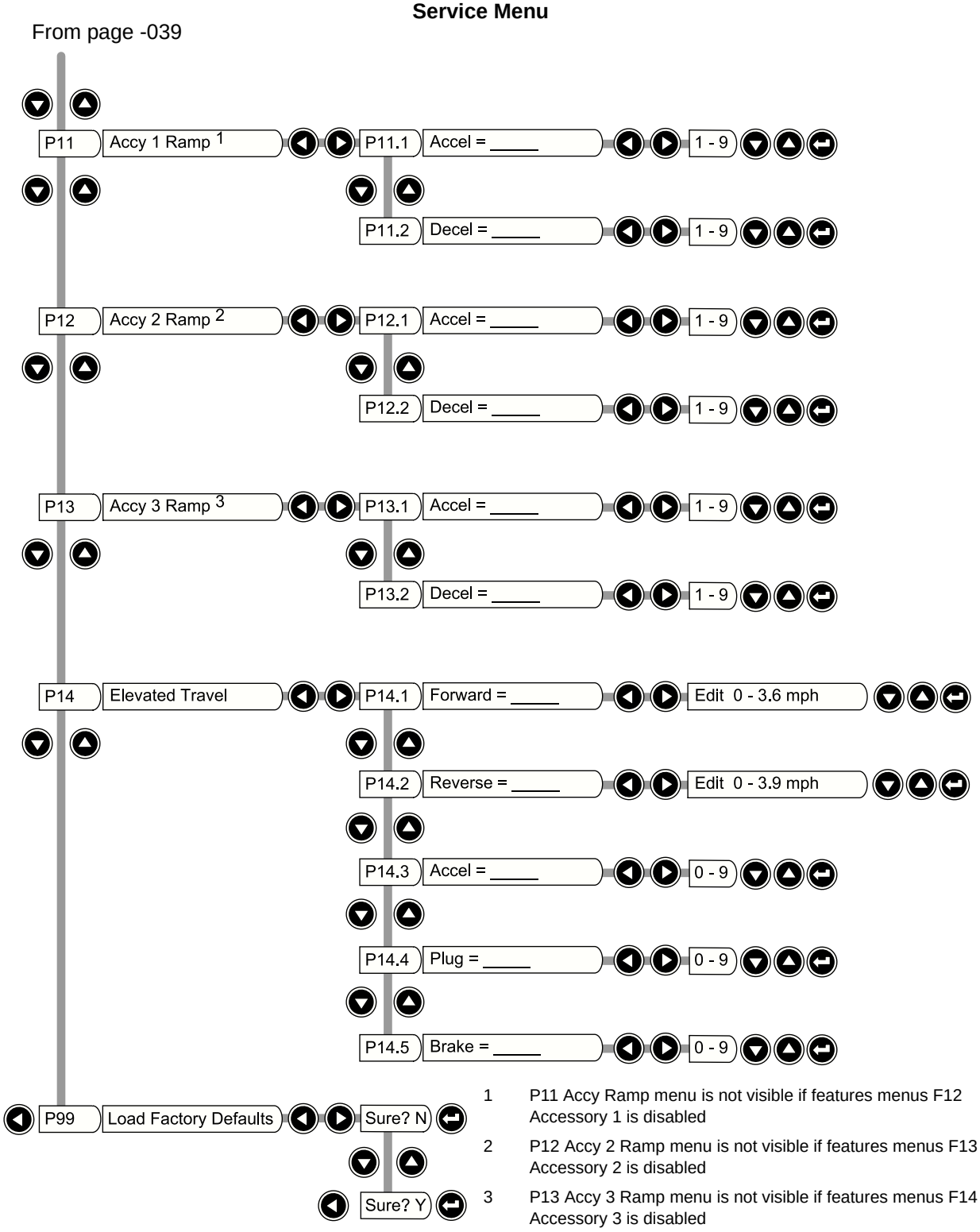



Figure 15437-02

### Service Menu




1 P11 Accy Ramp menu is not visible if features menus F12 Accessory 1 is disabled

2 P12 Accy 2 Ramp menu is not visible if features menus F13 Accessory 2 is disabled

3 P13 Accy 3 Ramp menu is not visible if features menus F14 Accessory 3 is disabled

Figure 15438-01

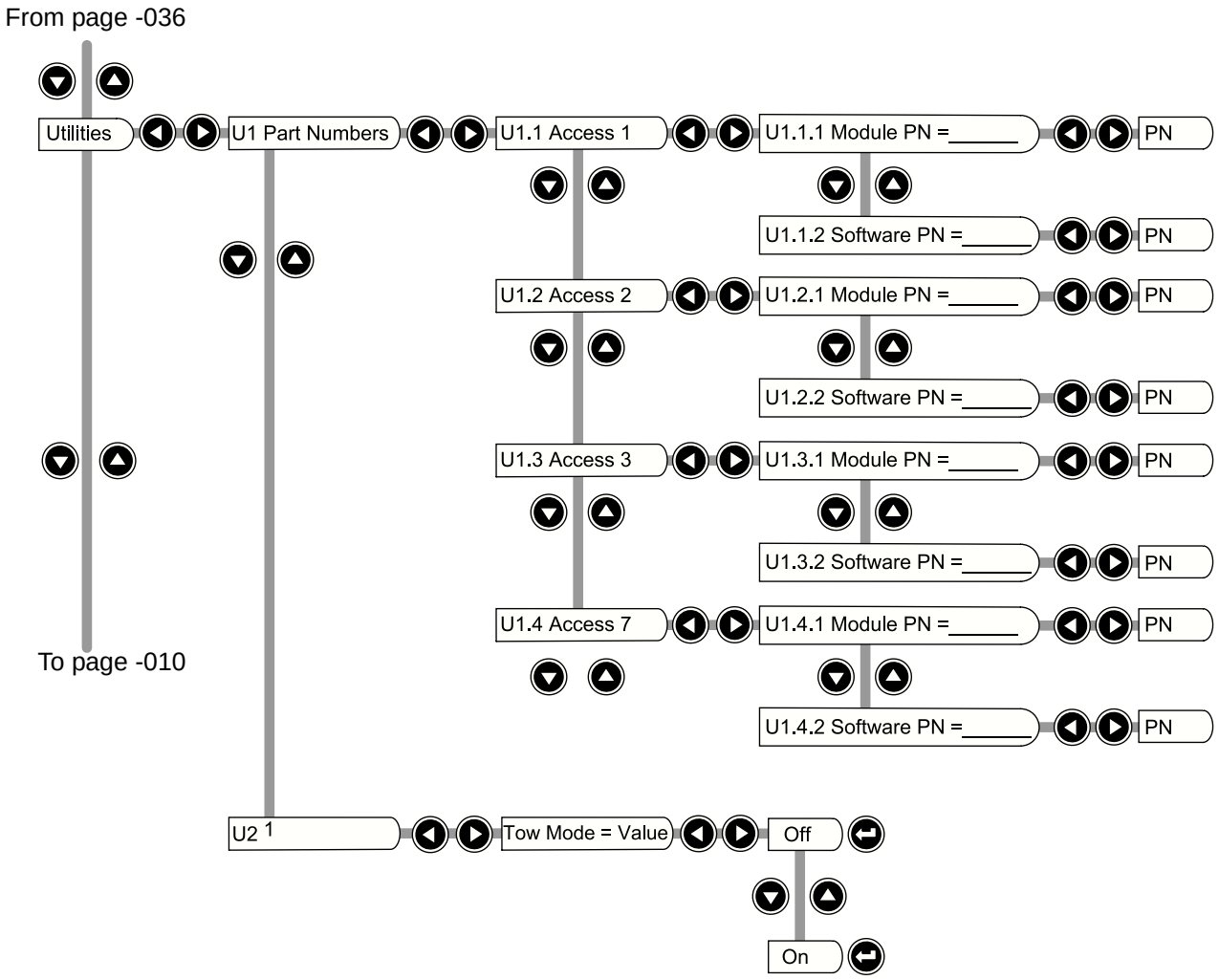


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**Service Menu**




1 Level 3 only. To deactivate Tow Mode, turn the keyswitch OFF and then ON.

Figure 15453-02

## Analyzer

The Analyzer menu is a troubleshooting tool that allows the technician to check the status of various circuits, check component inputs and outputs and test/drive component outputs.

The Analyzer submenus are:

- A1 Status
- A2 Inputs
- A3 Outputs (Level 2 Only)
- A4 Test Outputs (Level 3 Only)

**NOTE**

*The floor pedals must be depressed (L and P contactors must be energized) to use the Analyzer menus.*

### Analyzer Access

1. Power up the truck. From Service Level 2 or Level 3, press the right arrow to enter the Service submenus.
2. Use the up and down arrows to navigate to the Analyzer menu.
3. Press the right arrow to enter the Analyzer menu. Use the up and down arrows to scroll through the submenus.

### A1 Status

A1 Status allows technicians to view the status of monitored truck systems. This information can be used to troubleshoot service conditions by identifying common circuits for enabled or disabled functions. The A1 Status menu includes multiple submenus.

- For all A1 Status submenus, the display will scroll right to left indicating the function is either Enabled or Disabled.
- To stop the display from scrolling, press the right arrow and the display will show Enabled or Disabled only.
- If you press the right arrow to display Enabled or Disabled only, then press the left arrow and then the down arrow to scroll to the next submenu.
- If you don't press the left arrow and just allow the text to scroll, then press the down arrow to scroll to the next submenu.

**A1.1 Full Speed Hoist;** The display will show enabled or disabled. Enabled indicates full speed hoist is allowed. Disabled indicates full speed hoist is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.2 submenu to continue.

**A1.2 Accessory 1;** The display will show enabled or disabled. Enabled indicates hydraulic accessory 1 function is allowed. Disabled indicates hydraulic accessory 1 function is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.4 submenu to continue.

**A1.4 Accessory 3;** The display will show enabled or disabled. Enabled indicates hydraulic accessory 3 function is allowed. Disabled indicates hydraulic accessory 3 function is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.5 submenu to continue.

**A1.5 Tilt;** The display will show enabled or disabled. Enabled indicates tilt is allowed. Disabled indicates tilt is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.6 submenu to continue.

**A1.6 Lower;** The display will show enabled or disabled. Enabled indicates lower is allowed. Disabled indicates lower is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.7 submenu to continue.

**A1.7 Raise;** The display will show enabled or disabled. Enabled indicates raise is allowed. Disabled indicates raise is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.8 submenu to continue.

**A1.8 Full Traction;** The display will show enabled or disabled. Enabled indicates full speed traction is allowed. Disabled indicates full speed traction is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.9 submenu to continue.

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**A1.9 Limp Traction;** The display will show enabled or disabled. Enabled indicates limp traction is allowed. Disabled indicates limp traction is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.10 submenu to continue.

### NOTE

*When a truck has a service condition, limp travel allows the truck to be moved to a maintenance area at a reduced travel speed. Travel is not permitted with some service conditions and in these cases, limp travel will be disabled.*

**A1.10 Steering;** The display will show enabled or disabled. Enabled indicates steering is allowed. Disabled indicates steering is not allowed. This could be due to a system fault. Navigate to "A1 Status" or A1.11 submenu to continue.

**A1.11 ED;** The display will show enabled or disabled. Enabled indicates the emergency disconnect circuit is functional. Disabled indicates the emergency disconnect circuit is not functional. This could be due to a system fault. Navigate to "A1 Status" or A1.12 submenu to continue.

**A1.12 Module;** The ACCESS 123® modules are all connected and communicate with each other. The display will show enabled or disabled. Enabled indicates all modules are functioning properly and communicating. Disabled indicates one or more modules are not functioning properly and communicating. This could be due to a system fault.

Press the left arrow to return to A1 Status submenu. Press the down arrow to scroll to A2 Inputs.

## A2 Inputs

The RC 5500 truck has up to four ACCESS 123 modules. Each module receives input signals from electrical components like switches, sensors, potentiometers and encoders. A2 Inputs allows the technician to check to see if these signals are received by the module. The A2 Input submenus are sorted by ACCESS 123 module.

### NOTE

*If the truck is not equipped with a component specified in the following menus and/or the proper features menu enabled, the menu will not be available for display.*

Press the right arrow to enter the submenus. Use the up and down arrows to navigate to the desired submenu.

**A2.1 ACCESS 1;** View inputs monitored by ACCESS 1 display module. Press the right arrow to enter the submenus.

**A2.1.1 BRES;** (optional battery retainer switches input) to view inputs, features submenu F24 Battery Retainer must be enabled. To check input, press the right arrow and remove and install battery retainer. Battery retainer in place = 1; switch closed. Battery retainer not in place = 0; switch open. Press the left arrow to return to A2.1.1 BRES submenu then down arrow to continue.

**A2.1.2 BRKS;** (brake switch input) to check input press the right arrow and depress and release the brake pedal. Brake pedal depressed = 0; switch open. Brake pedal released = 1; switch closed. Press the left arrow to return to A2.1.2 BRKS submenu then down arrow to continue.

**A2.1.3 DMS;** (foot presence pedal switches; DMS1, DMS2, and DMS3 input,) to check input, press the right arrow and depress and release the floorboard. Floorboard depressed = 1; switch closed. Floorboard released = 0; switch open. Press the left arrow to return to A2.1.3 DMS submenu then down arrow to continue.

**A2.1.4 HGST1;** (height switch 1 input) to check input press the right arrow and raise and lower the mast above and below staging. Mast below staging = 0; switch open. Mast above staging = 1; switch closed.

Press the left arrow to return to A2.1.4 HGST1 submenu. Press the left arrow again to return to A2.1 ACCESS 1 submenu and then down arrow to scroll to A2.2 ACCESS 2 submenu.

**A2.2 ACCESS 2;** View inputs monitored by ACCESS 2 Hydraulic Control module. Press the right arrow to enter the submenus.

**A2.2.1 ORS;** (optional lift cutout override switch input) features menu F17 Raise Cutout must be enabled to view this menu. To check input, press the right arrow and actuate the switch. The display should indicate 0 when the switch is open and 1 when closed. Press the left arrow to return to A2.2.1 ORS submenu then down arrow to continue.

**A2.2.2 LMS1;** (optional lift/lower cutout switch input) features menu F17 Raise Cutout must be enabled to view this menu. To check input, press the right arrow and raise/lower mast to the height needed to activate/deactivate switch. The switch location (height) varies with customer specifications. The display should indicate 0 when the switch is open and 1 when closed. Press the left arrow to return to A2.2.2 LMS1 submenu then down arrow to continue.

**A2.2.3 LMS2;** (optional lift/lower cutout switch input) features menu F17 Raise Cutout must be enabled to view this menu. To check input, press the right arrow and raise/lower mast to the height needed to activate/ deactivate switch. Switch location (height) varies with customer specifications. The display should indicate 0 when the switch is open and 1 when closed. Press the left arrow to return to A2.2.3 LMS2 submenu then down arrow to continue.

**A2.2.4 LMS3;** (optional lift/lower cutout switch input) features menu F17 Raise Cutout must be enabled to view this menu. To check input, press the right arrow and raise/lower mast to the height needed to activate/ deactivate switch. Switch location (height) varies with customer specifications. The display should indicate 0 when the switch is open and 1 when closed. Press the left arrow to return to A2.2.4 LMS3 submenu then down arrow to continue.

**A2.2.5 HGTS2;** (optional lift/tilt interlock switch input on TT and Quad mast with 10 deg. tilt) to check input, press right arrow and raise/lower mast to height needed to activate/deactivate switch. Display should indicate 0 when the switch is open and 1 when closed. Press the left arrow to return to A2.2.5 HGTS2 submenu then down arrow to continue.

**A2.2.6 CHS;** (optional drop limit hydraulic pressure switch input equipped on trucks with quad mast) this switch opens disabling lower should the hydraulic pressure drop in the lower circuit due to the forks lowering onto the racks. To check input, press the right arrow. Display should indicate 0 when the switch is open and 1 when closed. Press the left arrow to return to A2.2.6 CHS submenu then down arrow to continue.

**A2.2.7 POT3;** (accessory request potentiometer input) to check input, press the right arrow. Multi-task thumb ball rotated away from operator - approximately 2.6 volts. Multi-task thumb ball not rotated - approximately 5.7 volts. Multi-task thumb ball rotated toward operator - approximately 8.7 volts. Press the left arrow to return to A2.2.7 POT3 submenu then down arrow to continue.

**A2.2.8 ECR4;** (pump motor encoder input) press enter arrow. Displays pump motor RPM (max 1600 RPM for the AC pump motor and 2465 RPM for the DC pump motor). To check input, press the right arrow. The numbers should increase when increasing hydraulic function speed (like lift) and decrease when decreasing hydraulic function speed. The numbers should increase and decrease smoothly and not "jump" in large increments. If they "jump", the encoder probably needs to be replaced. Press the left arrow to return to A2.2.8 ECR4 submenu then down arrow to continue.

**A2.2.9 RPM Target;** press enter arrow. Displays pump motor target RPM. To check input, press the right arrow. Press the left arrow to return to A2.2.9 RPM Target submenu then down arrow to continue.

**A2.2.10 Controller Temp;** Press the right arrow to view ACCESS 2 module temperature. Press the left arrow to return to A2.2.10 Controller Temp submenu then down arrow to continue.

**A2.2.11 M3 Amps;** Press the right arrow to view pump motor current. Idle - approx. 70 amps. Press the left arrow to return to A2.2.11 M3 Amps submenu then down arrow to continue.

**A2.2.12 M3 Temp;** Press the right arrow to view pump motor temperature.

Press the left arrow to return to A2.2.12 M3 Temp submenu. Press the left arrow again to return to A2.2 ACCESS 2 submenu and then down arrow to scroll to A2.3 ACCESS 3 submenu.

**A2.3 ACCESS 3;** View inputs monitored by ACCESS 3 traction control module. Press the right arrow to enter the submenus.

**A2.3.1 ENSL/ENSR;** (entry bar switches input) to check input press the right arrow and depress and release the entry bar. Entry bar depressed = 0; switches open. Entry bar not depressed = 1; switches closed. Press the left arrow to return to A2.3.1 ENSL/ENSR submenu then down arrow to continue.

**A2.3.2 DMS;** (foot presence pedal switches, DMS1, DMS2 and DMS3 input) to check input press the right arrow and depress and release the floorboard. Floorboard depressed = 1; switch closed. Floorboard release = 0; switch open. Press left arrow to return to A2.3.2 DMS submenu then down arrow to continue.

**A2.3.3 BRKS;** (brake switch input) to check input press the right arrow and depress and release the brake pedal. Brake pedal depressed = 0; switch open. Brake pedal not depressed = 1; switch closed. Press left arrow to return to A2.3.2 BRKS submenu then down arrow to continue.

**A2.3.4 HGTS1;** (height switch 1 input) to check input, press the right arrow and raise/lower mast to above and below staging. Display should indicate 0 when the mast is below staging (switch is open) and when the mast is above staging the display shows 1 (switch is closed). Press the left arrow to return to A2.3.4 HGST1 submenu then down arrow to continue.

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**A2.3.5 ECR1;** (left traction encoder input) inputs traction speed and direction and is displayed in RPMs. Press the right arrow. The RPMs should increase when accelerating and decrease when decelerating. The numbers should be positive in the forward direction and negative in the reverse direction. The numbers should increase and decrease smoothly and not "jump" in large increments. If they "jump", the encoder probably needs to be replaced. Press the left arrow to return to A2.3.5 ECR1 submenu then down arrow to continue.

**A2.3.6 ECR2;** (right traction encoder input) inputs traction speed and direction and is displayed in RPMs. Press the right arrow. The RPMs should increase when accelerating and decrease when decelerating. The numbers should be positive in the forward direction and negative in the reverse direction. The numbers should increase and decrease smoothly and not "jump" in large increments. If they "jump", the encoder probably needs to be replaced. Press the left arrow to return to A2.3.6 ECR2 submenu then down arrow to continue.

**A2.3.7 POT1;** (accelerator potentiometer input) to check input, press the right arrow and move multi-task handle. Full forward - approximately 2.5 volts. Neutral - approximately 5.4 volts. Full reverse - approximately 8.9 volts. Press the left arrow to return to A2.3.7 POT1 submenu then down arrow to continue.

**A2.3.8 POT4;** (steer potentiometer input) to check inputs, press the right arrow.

**A2.3.8.1 Volt;** to check POT4 input, press right arrow and rotate the steer tiller. Full CCW rotation of steer tire - approximately 1.6 volts. Straight ahead direction - approximately 5.2 volts. Full CW rotation of steer tire- approximately 8.9 volts. Press the left arrow to return to A2.3.8.1 POT4 submenu and then down arrow to continue.

## NOTE

*CW and CCW are from the steer tire perspective not from the steer tiller (trucks can be equipped with forward or reverse steering).*

**A2.3.8.2 Angle;** to check POT4 input, press the right arrow and rotate the steer tiller. Full CCW rotation = -90 degrees. Straight ahead direction = 0 degrees. Full CW rotation = 90 degrees. Press the left arrow twice to return to A2.3.8 POT4 submenu then down arrow to continue.

**A2.3.9 RPS1;** (brake pedal sensor input) to check inputs, press the right arrow.

**A2.3.9.1 Volt;** to check RPS1 input, press the right arrow and depress and release brake pedal. Fully depressed pedal - approximately 1.25 volts. Pedal released - approximately 3.2 volts. Press the left arrow to return to A2.3.9.1 Volt submenu then down arrow to continue.

**A2.3.9.2 BRKS:** %; to check the percent of RPS1 input with BRKS closed and open, press the right arrow and depress and release brake pedal. Fully depressed pedal BRKS: % 0 = approximately 0%. Pedal released BRKS: % 1 = approximately 99%. Press left arrow twice to return to A2.3.9 RPS1 submenu then down arrow to continue.

**A2.3.10 MPH;** Press the right arrow and travel. Displays travel speed in mph. Maximum travel speed below staging and no load is: forward - 7.2 mph, reverse - 7.2 mph standard speed, reverse with productivity package - 7.8 mph. Press the left arrow to return to A2.3.10 MPH then down arrow to continue.

**A2.3.11 BDI;** Press the right arrow to view percent of battery charge. Press the left arrow to return to A2.3.11 BDI then down arrow to continue.

**A2.3.12 Controller Temp;** Press the right arrow to view ACCESS 3 module temperature. Press the left arrow to return to A2.3.12 Controller Temp and then down arrow to continue.

**A2.3.13 M1 Temp;** Press the right arrow to view right traction motor temperature. Press the left arrow to return to A2.3.13 M1 Temp then down arrow to continue.

**A2.3.14 M2 Temp;** Press the right arrow to view right traction motor temperature. Press the left arrow to return to A2.3.14 M2 Temp then down arrow to continue.

**A2.3.15 M1 Amps;** Press the right arrow to view right traction motor current. Press the left arrow to return to A2.3.15 M1 Amps then down arrow to continue.

**A2.3.16 M2 Amps;** Press the right arrow to view right traction motor current. Press the left arrow to return to A2.3.16 M2 Amps then down arrow to continue.

**A2.3.17 # Brake Assists;** Press the right arrow to view the number of times the traction motor brakes assisted in slowing/stopping the truck. Press the left arrow to return to A2.3.17 # Brake Assists then down arrow to continue.

**A2.3.18 Battery Voltage;** Press the right arrow to view battery volts. Press the left arrow to return to A2.3.18 Battery Voltage then down arrow to continue.

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**A2.3.19 HNS;** (horn switch input) to check input press the right arrow and depress the horn switch. Horn switch depressed = 1; switch closed. Horn switch released = 0; switch open.

Press the left arrow to return to A2.3.19 HNS submenu. Press the left arrow again to return to A2.3 ACCESS 3 submenu then down arrow to scroll to A2.4 ACCESS 7 submenu.

**A2.4 ACCESS 7;** View inputs monitored by ACCESS 7 accessory control module. Press the right arrow to enter the submenus.

**A2.4.1 FS;** (forward switch input) to check input press the right arrow, move the multi-task handle to forward travel position and then allow handle to return to home/neutral position. Forward travel position = 1; switch closed. Home/neutral position = 0; switch open. Press the left arrow to return to A2.4.1 FS submenu then down arrow to continue.

**A2.4.2 RS;** (reverse switch input) to check input press the right arrow, move the multi-task handle to reverse travel position and then allow handle to return to home/neutral position. Reverse travel position = 1; switch closed. Home/neutral position = 0; switch open. Press the left arrow to return to A2.4.2 RS submenu then down arrow to continue.

**A2.4.3 ECR3;** (steer command encoder input) inputs steer command speed and direction and is displayed in counts. Range is approx 550 to -550. Zero should be displayed in straight ahead direction of travel. The numbers should increase and decrease smoothly and not "jump" in large increments. If they "jump", the encoder probably needs to be replaced. Press the left arrow to return to A2.4.3 ECR3 submenu then down arrow to continue.

**A2.4.4 TDS;** (tilt down switch input) to check input, press the right arrow. Select tilt down and then allow thumb ball to return to home position. Tilt down selected = 1; switch closed. Home position = 0; switch open. Press the left arrow to return to A2.4.4 TDS submenu then down arrow to continue.

**A2.4.5 TBS;** (tilt back switch input) to check input, press the right arrow. Select tilt back and then allow thumb ball to return to home position. Tilt back selected = 1; switch closed. Home position = 0; switch open. Press the left arrow to return to A2.4.5 TBS submenu then down arrow to continue.

**A2.4.6 SSS;** (1st and 2nd accessory sequence select switch input) to check input, press the right arrow. Press the button located on the back of the multi- task handle. Switch depressed = 1; switch closed. Switch not depressed = 0; switch open. Press the left arrow to return to A2.4.6 SSS submenu then down arrow to continue.

**A2.4.7 POT2;** (lift/lower request potentiometer input) to check input, press the right arrow and move the multi-task handle. Full raise - approximately 1.3 volts. Neutral - approximately 2.4 volts. Full lower - approximately 3.6 volts. Press the left arrow to return to A2.4.7 POT2 submenu and then down arrow to continue.

**A2.4.8 RPS2;** (tilt sensor input) to check inputs, press the right arrow.

**A2.4.8.1 Volt;** to check RPS2 input, press the right arrow and tilt forks. Press the left arrow to return to A2.4.8.1 Volt submenu then down arrow to continue.

**A2.4.8.2 Angle;** to check RPS2 input, press the right arrow and tilt forks. Degree of tilt is displayed.

## NOTE

*For the maximum degree of allowable tilt, refer to the tilt cylinder part number stamped on the end of the tilt cylinder (see Figure 15595-01).*

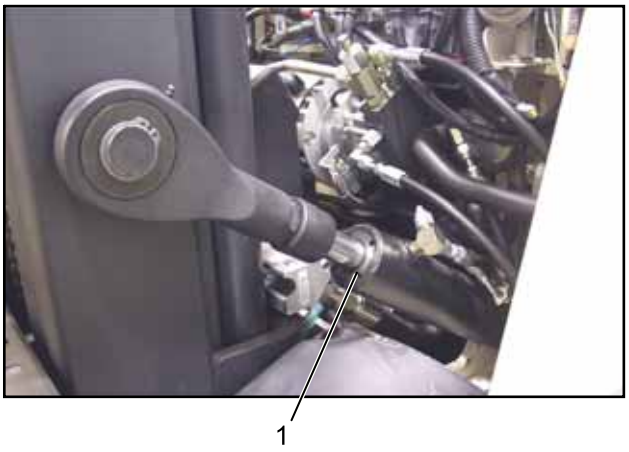



Figure 15595-01

1 The Tilt Cylinder part number is stamped on the end of the cylinder



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*The tilt cylinder part number includes a dash number. Degree of tilt is indicated by the dash number. See the example in Figure 15596.*

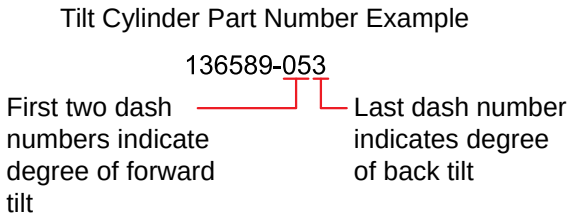



Figure 15596

*In the example shown in Figure 15596, forward tilt is 5 degrees and back tilt is 3 degrees.*

**A2.4.9 PT1;** (optional load sensor input) to check input, press the right arrow.

**A2.4.9.2 Current;** to check input, press the right arrow Input will be displayed in milliamps. Press the left arrow to return to A2.4.9.2 Current submenu then down arrow to continue.

**A2.4.9.3 Load;** to check input, lift a known weight with a 610 mm (24 in) load center and press the right arrow. The load weight is displayed. Press the left arrow twice to return to A2.4.9 PT1 submenu then down arrow to continue.

**A2.4.10 Battery Voltage:** Press the right arrow to view battery volts. Press the left arrow to return to A2.4.10 Battery Voltage submenu. Press the left arrow to return to A2.4 ACCESS 7 submenu. Press the left arrow to return to A2 Inputs submenu. Press the down arrow to scroll to A3 Outputs submenu.

## A3 Outputs

### NOTE

*The ACCESS 123 modules pulse voltage to components, so the voltage to the components is rapidly turned ON and OFF. The percent shown in the following menus is the amount of ON time (called duty cycle or pulse width modulation). To determine output voltage, multiply battery voltage by percent shown on display and divide by 100.*

The RC 5500 truck has up to four ACCESS 123 modules. Each module sends output signals to electrical components like solenoid valve coils, contactor coils, alarms and brake coils. A3 Outputs allows you to check to see if the modules are outputting the proper signal.

The A3 Output submenus are sorted by ACCESS 123 module.

If the truck is not equipped with a component specified in the following menus and/or the proper features menu enabled, the menu will not be available for display.

A3 is available in Level 2 service mode only. It is NOT available in Level 3. Press the right arrow to enter the submenus. Use the up and down arrows to navigate to the desired submenu.

**A3.1 ACCESS 1;** View outputs by ACCESS 1 display module. Press the right arrow to enter the submenus.

**A3.1.1 BRK1;** (right brake coil output) to view output, press the right arrow. Depress and release the brake pedal. Pedal released (brake applied) = 0% (coil is de-energized). Pedal depressed (brake released) = approximately 50% (coil is energized). Press the left arrow to return to A3.1.1 BRK1 submenu then down arrow to continue.

**A3.1.2 BRK2;** (left brake coil output) to view output, press the right arrow. Depress and release the brake pedal. Pedal released (brake applied) = 0% (coil is de-energized). Pedal depressed (brake released) = approximately 50% (coil is energized). Press the left arrow to return to A3.1.2 BRK2 submenu then down arrow to continue.

**A3.1.3 SVBy;** (bypass solenoid valve coil output) to view output, press the right arrow. Raise forks (full speed) and then stop raising. Full speed raise - approximately 70%. No raise - approximately 100%. Press the left arrow to return to A3.1.3 BRK2 submenu then down arrow to continue.

**A3.1.4 SVA3;** (optional 3rd accessory solenoid valve coil output) to view output, press the right arrow. Activate and de-activate accessory. Accessory activated - approximately 100% (coil is energized). No raise - approximately 0% (coil is de-energized). Press the left arrow to return to A3.1.4 SVA3 submenu then down arrow to continue.

**A3.1.5 ALM2;** (travel alarm output) depending on how features menu F9 Travel Alarm is set, ALM2 may sound when traveling in reverse, forward or both directions. To view output, press the right arrow and sound the alarm. Alarm activated - approximately 100%. Alarm not activated - 0%. Press the left arrow twice to return to A3.1 ACCESS 1 Outputs submenu then down arrow to continue.

**A3.2 ACCESS 2;** View outputs by ACCESS 2 hydraulic module. Press the right arrow to enter the submenus.

**A3.2.1 ALM1;** (incorrect operator sequence alarm output) to view output, press the right arrow and sound alarm. Alarm activated - On. Alarm not activated - Off. Press the left arrow to return to A3.2.1 ALM1 submenu then down arrow to continue.

**A3.2.2 P;** (pump contactor coil output). To view output, press the right arrow. Floor pedals depressed - ON. Floor pedals released and timed out - OFF. Press the left arrow twice to return to A3.2 ACCESS 2 submenu and then down arrow to continue.

**A3.3 ACCESS 3;** View outputs by ACCESS 3 traction module. Press the right arrow to enter the submenus.

**A3.3.1 L;** (line contactor coil output). To view output, press the right arrow. Floor pedals depressed - ON. Floor pedals released and timed out - OFF. Press the left arrow to return to A3.3.1 L submenu then down arrow to continue.

**A3.3.2 FAN2;** (power unit fan output). To view output, press the right arrow. Fan "running" - ON, fan not "running" - OFF. Press left arrow to return to A3.3.2 FAN2 submenu then down arrow to continue.

**A3.3.3 HN1;** (horn output). To view output, press the right arrow and sound horn. Horn activated - ON. Horn not activated - OFF. Press the left arrow twice to return to A3.3 ACCESS 3 submenu then down arrow to continue.

**A3.4 ACCESS 7;** View outputs by ACCESS 7 accessory module. Press the right arrow to enter the submenus.

**A3.4.1 SPL;** (lower proportional valve coil output) to view output to SPL coil, press the right arrow.

**A3.4.1.1 DC;** to view output, press the right arrow. Select full lower and then release the multi-task handle. Full lower - approximately 40%, no lower - 0%. Press the left arrow to return to A3.4.1.1 DC submenu then down arrow to continue.

**NOTE**

*DC = duty cycle*

**A3.4.1.2 Current;** to view output, press the right arrow. Select full lower and then release the multi-task handle. Full lower - approximately 475 mA, no lower - approximately 2 mA. Press the left arrow twice to return to A3.4.1 SPL submenu then down arrow to continue.

**A3.4.2 SPA;** (accessory proportional valve coil output) to view output to coil, press the right arrow.

**A3.4.2.1 DC;** to view output, press the right arrow. Select tilt down and then release thumb ball. Tilt down - approximately 30%, no tilt - 0%. Press the left arrow to return to A3.4.2.1 DC submenu then down arrow to continue.

**A3.4.2.2 Current;** to view output, press the right arrow. Select tilt down and then release thumb ball. Tilt down - approximately 300 mA, no tilt - 2 mA. Press the left arrow twice to return to A3.4.2 SPA submenu then down arrow to continue.

**A3.4.3 SVTE;** (solenoid valve tilt extend output) to view output, press the right arrow and activate/de-activate function. Tilt down - approximately 60%. No tilt - approximately 0%. Press the left arrow to return to A3.4.3 SVTE submenu then down arrow to continue.

**A3.4.4 SVTR;** (solenoid valve tilt retract output) to view output, press the right arrow and activate/de-activate function. Tilt back - approximately 60%. No tilt - approximately 0%. Press the left arrow to return to A3.4.4 SVTR submenu then down arrow to continue.

**A3.4.5 SVH;** (solenoid valve hoist coil output) to view output, press the right arrow and select raise. Raise - approximately 65%. No raise - approximately 0%. Press the left arrow to return to A3.4.5 SVH submenu then down arrow to continue.

**A3.4.6 PRVA;** (optional proportional accessory relief valve coil output) to view output to PRVA coil, press the right arrow.

**A3.4.6.1 PWM;** View percent of pulse width modulation (duty cycle). Press the right arrow and actuate accessory function that requires pressure setting. Press the left arrow to return to A3.4.6.1 PWM and then the down arrow to continue.

**A3.4.6.2 Current;** to view output, press the right arrow and actuate accessory function that requires pressure setting. Press the left arrow to return to A3.4.6.2 current and then the down arrow to continue.


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**A3.4.7 SVA1A;** (1st accessory solenoid valve A coil output) to view output, press the right arrow and activate/de-activate function. Coil energized - approximately 60%. Coil not energized - 0%. Press the left arrow to return to A3.4.7 SVA1A submenu then down arrow to continue.

**A3.4.8 SVA1B;** (1st accessory solenoid valve B coil output) to view output, press the right arrow and activate/de-activate function. Coil energized - approximately 60%. Coil not energized - 0%. Press the left arrow to return to A3.4.8 SVA1B submenu then down arrow to continue.

**A3.4.9 SVA2A;** (1st accessory solenoid valve A coil output) to view output, press the right arrow and activate/de-activate function. Coil energized - approximately 75%. Coil not energized - 0%. Press the left arrow to return to A3.4.9 SVA2A submenu then down arrow to continue.

**A3.4.10 SVA2B;** (1st accessory solenoid valve B coil output) to view output, press the right arrow and activate/de-activate function. Coil energized - approximately 75%. Coil not energized - 0%. Press the left arrow to return to A3.4.10 SVA2B submenu. Press left arrow to return to A3.4 ACCESS 7 submenu. Press left arrow to return to A3 Outputs submenu. Press down arrow to continue.

## A4 Test Outputs

When troubleshooting, A4 Test Outputs can be used to check to see if the ACCESS 123 module output voltage is being supplied to the components without operating the truck. The A4 Output submenus are sorted by ACCESS 123 module.

A4 is available in Level 3 service mode only. It's not available in Level 2. For more information and to access Level 3, refer to "Level 3" near the beginning of this section. Press the right arrow to enter the submenus. Use the up and down arrows to navigate to the desired submenu.

### NOTE

*During a test, all test output submenus will display a message "Enter to Cancel". To cancel the test, you can either push the enter arrow or wait approximately 5 seconds and the test will time out.*

**A4.1 ACCESS 1;** To test outputs by ACCESS 1 display module. Press the right arrow to enter the submenus.

**A4.1.1 BRK1;** (right brake coil) connect the DVOM across the brake coil. Press the right arrow and then press enter arrow to test. DVOM should display approximately 15 volts. Press the down arrow to continue.

**A4.1.2 BRK2;** (left brake coil) connect the DVOM across brake coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 15 volts. Press the down arrow to continue.

**A4.1.3 SVBy;** (bypass solenoid valve coil) connect the DVOM across coil. Press the right arrow and then press enter arrow to test. DVOM should display approximately 21 volts. Press the down arrow to continue.

**A4.1.4 SVA3;** (optional 3rd accessory solenoid valve coil) connect the DVOM across coil. Press right arrow and then press enter arrow to test. Press the down arrow to continue.

**A4.1.5 ALM2;** (incorrect operator sequence alarm output) press the right arrow and then press enter arrow to test. Alarm should sound. Press the down arrow to continue.

Press the left arrow to return to A4.1 ACCESS 1 then down to continue.

**A4.1.6 Lamps;** (ACCESS 1 lamps) press the right arrow and then press enter arrow to test. The lamps should light.

**A4.2 ACCESS 2;** To test outputs by ACCESS 2 hydraulic module. Press the right arrow to enter the submenus.

**A4.2.1 ALM1;** (travel alarm output) press the right arrow and then press the enter arrow to test. Alarm should sound. Press the down arrow to continue.

**A4.2.3 P;** (pump contactor coil) connect the DVOM across coil. Press the right arrow and then press enter arrow to test. The DVOM should display approximately 35 volts.

Press the left arrow to return to A4.2 ACCESS 2 then down to continue.

**A4.3 ACCESS 3;** To test outputs by ACCESS 3 traction module. Press the right arrow to enter the submenus.

### NOTE

*When testing A4.3.1 L and A4.3.2 FAN2 outputs, the floorboard must be depressed (DMS1, DMS2 and/or DMS3 must be closed).*

**A4.3.1 L;** (line contactor) connect the DVOM across coil. Press the right arrow and then press the enter ar-

row to test. The DVOM should display approximately 24 volts. Press the down arrow to continue.

**A4.3.2 FAN2;** (power unit fan). Press the right arrow and then press enter arrow to test. The fan should operate. Press the down arrow to continue.

**A4.3.3 HN1;** (horn) press right arrow and then press enter arrow to test. The horn should sound.

Press the left arrow to return to A4.3 ACCESS 3 then down to continue.

**A4.4 ACCESS 7;** To test outputs by ACCESS 7 accessory module. Press the right arrow to enter the submenus.

**A4.4.1 SPL;** (lower proportional valve coil) connect the DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 7 volts. Press the down arrow to continue.

**A4.4.2 SPA;** (accessory proportional valve coil) connect DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 7 volts. Press the down arrow to continue.

**A4.4.3 SVTE;** (solenoid valve tilt extend coil) connect DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 21 volts. Press the down arrow to continue.

**A4.4.4 SVTR;** (solenoid valve tilt retract coil) connect DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 21 volts. Press the down arrow to continue.

**A4.4.5 SVH;** (solenoid valve hoist coil) connect DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 7.5 volts. Press the down arrow to continue.

**A4.4.6 PRVA;** (optional proportional accessory relief valve coil) connect the DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately battery volts. Press the down arrow to continue.

**A4.4.7 SVA1A;** (optional 1st accessory solenoid valve A coil) connect the DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 30 volts. Press the down arrow to continue.

**A4.4.8 SVA1B;** (optional 1st accessory solenoid valve B coil) connect the DVOM across coil. Press the right arrow and then press the enter arrow to test. The DVOM should display approximately 30 volts. Press the down arrow to continue.

**A4.4.9 SVA2A;** (optional 2nd accessory solenoid valve A coil) connect DVOM across coil. Press right arrow and then press enter arrow to test. The DVOM should display approximately 30 volts. Press the down arrow to continue.

**A4.4.10 SVA2B;** (optional 2nd accessory solenoid valve B coil) connect the DVOM across coil. Press the right arrow and then press enter arrow to test. The DVOM should display approximately 30 volts.

Press the left arrow to until you scroll back to Analyzer menu. Then press the down to continue.

## Calibration

If the calibration procedures are not performed correctly, unsatisfactory truck performance or logged events may result.

### When to Calibrate

- When ACCESS 1, 2, 3, or 7 is replaced, full truck calibration is required.
- When any potentiometer, encoder, or component used to mount or position a potentiometer or encoder is replaced.

**NOTE**

*During most calibrations, you can press the right arrow to view the component input or output value. You can use this as a troubleshooting tool if there are problems with the calibration process by comparing values with a known working truck.*

### Calibration Error Message

The message "Calibration Failed" may be displayed if required calibration criteria are not met. This message may result from improper sequencing of switches to component issues. If this message is displayed during calibration, press the enter arrow to repeat calibration procedures.


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**Accessing the Calibration Menu**

1. Power up the truck without stepping on floor pedals.
2. Navigate to Service menu, select Level 2 and enter the password (calibration menu is not available in Level 3).
3. After entering the password, press the down arrow to navigate to Calibration menu.
4. Step on the floor pedals.

## NOTE

*You must be off the floor pedals and allow the truck to time out (L & P contactors de-energized) to gain access to the Calibration menu. Once in the Calibration menu, you can step on the pedals. However, L will not energize, and you will not have forward or reverse travel.*

5. Press the right arrow to access the first calibration menu.

**C1 Handles;** C1 Handles allows the truck to learn the parameters of the potentiometers (POT1, POT2 and POT3) in the multi-task handle.

1. Press the right arrow to continue.

**C1.1 Traction;** This calibration allows the truck to learn the parameters of the traction potentiometer (POT1) in the multi-task handle.

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press the enter arrow to continue. The following message will be displayed:
   **Max Forward, then Enter**
3. Move and hold the multi-task handle to max forward position. Press the enter arrow. The following message will be displayed:
   **Max Reverse, then Enter**
4. Move and hold the multi-task handle to max reverse position. Press the enter arrow. The following message will be displayed:
   **Center Handle, then Enter**
5. Return the multi-task handle to neutral position. Press the enter arrow. The display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
6. Press the up/down arrow to toggle to "Y" then press enter arrow to save calibration.

**C1.2 Lift;** this calibration allows the truck to learn the parameters of the lift/lower potentiometer (POT2) in the multi-task handle.

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press enter arrow to continue. The following message will be displayed:
   **Raise Max, press Enter**
3. Move and hold the multi-task handle to max raise position. Press the enter arrow. The following message will be displayed:
   **Lower Max, press Enter**
4. Move and hold the multi-task handle to max lower position. Press the enter arrow. The following message will be displayed:
   **Neutral, press Enter**
5. Return the multi-task handle to neutral position. Press the enter arrow. The display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
6. Press the up/down arrow to toggle to "Y" then press enter arrow to save calibration.

**C1.3 Accy Pot;** this calibration allows the truck to learn the parameters of the accessory potentiometer (POT3) operated by the thumb ball in the multi-task handle.

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press enter arrow to continue. The following message will be displayed:
   **Thumb forward, then Enter**
3. Completely roll the thumb ball away from you. Press the enter arrow. The following message will be displayed:
   **Thumb backward, then Enter**
4. Completely roll the thumb ball toward you. Press the enter arrow. The following message will be displayed:
   **Thumb neutral, then Enter**

5. Return the thumb ball to neutral position. Press the enter arrow. The display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
6. Press the up/down arrow to toggle to "Y" then press the enter arrow to save calibration.
7. Press the left arrow to return to C1 Handles menu.
8. Press the up/down arrow to navigate to the C2 Hydraulics menu.

**C2 Hydraulics;** these calibrations allow the truck to learn the parameters of the tilt position sensor (RPS2) and the hydraulic proportional valves (SPL, SPA and PRVA) power requirements.

1. Press the right arrow to continue.

**C2.1 Tilt Sense;** this calibration allows the truck to learn the parameters of the tilt sensor (RPS2).

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press enter arrow to continue. The following message will be displayed:
   **Tilt back max, then Enter**
3. Tilt the mast completely backward. Press the enter arrow. The following message will be displayed:
   **Tilt down max, then Enter**
4. Tilt the mast completely forward. Press the enter arrow. The following message will be displayed:
   **Default Level?**
5. This menu allows you to set the tilt position assist level at the factory default position (forks level). Press the enter arrow to accept the default position.
   OR
   Press the down arrow to scroll to the next menu option:
   **Calibrate level**
   This allows you to select the tilt angle for tilt position assist.
6. Press the enter arrow. The following message will be displayed:
   **Tilt level, then Enter**
7. Tilt the mast to the level you wish to set the tilt position assist to, then press the enter arrow. The display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
8. Press up/down arrow to toggle to "Y" then press enter arrow to save calibration.

**C2.2 Lower Valve;** this calibration allows the truck to learn the parameters of SPL solenoid proportional lower valve power requirements.

### NOTE

*The truck uses the free lift switch (HGST1) to detect mast movement and the lift height entered in features menu F6 to calculate lower speeds. If the truck can not raise to its maximum lift height because it is too tall for the building, change the F6 Features menu to match the maximum height the truck can obtain. Then only raise to this height during this calibration.*

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press enter arrow to continue.
   The following message will be displayed if the mast is above staging:
   **Lower below staging, press Enter**
3. Lower the mast below staging. The following message will be displayed:
   **Maintain raise command**

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4. Move and hold the multi-task handle to raise position. The mast will raise until the free lift switch (HGST1) changes state. Then the mast will lower slightly changing the state of the switch again. Then the mast will raise slowly stopping just as the free lift switch changes state and the following message will be displayed.
   **Finding breakout maintain command**
   When this message appears, the ACCESS 123 system is pulsing the SPL valve coil to find out when the valve will open far enough to start porting oil and begin lowering the mast. As soon as the free lift switch changes state, the system will know the breakout value and the following message will be displayed:
   **Raise to max height, then lower**
   When this message appears, raise to maximum lift height then lower. The following message will be displayed:
   **Finding flow point 1 maintain lower**
   When this message appears, the ACCESS 123 system is pulsing the SPL valve coil to find out when the valve will open far enough to allow enough oil flow to achieve speed 1. The system uses the lift height entered in F6 features menu and the free lift switch to calculate lower speeds. During this lower calibration, when the mast gets below free lift, the message will change to:
   **Paused - Raise to top, then lower**
   Raise the mast to maximum lift height then lower. Calibration will resume.
   The last two messages will repeat until the five lower speed values are found and then the message will change to:
   **Stop command**
   When calibration is complete, the display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**

5. Press the up/down arrow to toggle to "Y" then press the enter arrow to save calibration.

**C2.3 Accy Valve;** this calibration allows the truck to learn the parameters of SPA solenoid proportional accessory valve power requirements.

1. Press the right arrow. The display will ask:
   **Sure? N**

2. Press the up/down arrow to toggle to "Y" then press the enter arrow to continue.
   **Empty and lower forks to begin**

3. Remove the load (if necessary) and fully lower forks. The following message will be displayed:
   **Maintain tilt command**

4. Push and hold either tilt arrow. The following message will be displayed:
   **Finding Breakout maintain tilt**
   When this message appears, the ACCESS 123 system is pulsing the SPA valve coil to find out when the valve will open far enough to start porting oil. Once this value is found, the following message will be displayed:
   **Finding flow point maintain tilt**
   When this message appears, the ACCESS 123 system is pulsing the SPA valve coil to find out when the valve will open far enough to allow enough oil flow to achieve the first accessory flow point. Once this value is found, the menu will automatically advance to the next flow point.
   This calibration will find 5 accessory flow point values. When the mast tilts forward completely during this calibration, the message will change to:
   **Tilting back, maintain command**
   Maintain the tilt command. The mast will tilt back and the system will resume calibration.
   When calibration is complete, the display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**

5. Press the up/down arrow to toggle to "Y" then press enter arrow to save calibration.

**C2.4 Pressure Valve;** this calibration allows the truck to learn the parameters of the proportional accessory relief valve (PRVA) power requirements.

## NOTE

*C2.4 Pressure Valve calibration is necessary when the truck is equipped with PRVA. PRVA replaces RVA when the truck is equipped with pressure regulator option.*

1. Press the right arrow. The display will ask:
   **Sure? N**

2. Press the up/down arrow to toggle to "Y" then press the enter arrow to continue.
   **Connect gauge, then Enter**

3. Connect the hydraulic pressure gauge to the quick disconnect port located on the steering priority valve which is attached to the end of the hydraulic pump. Refer to Figure 22581 below.

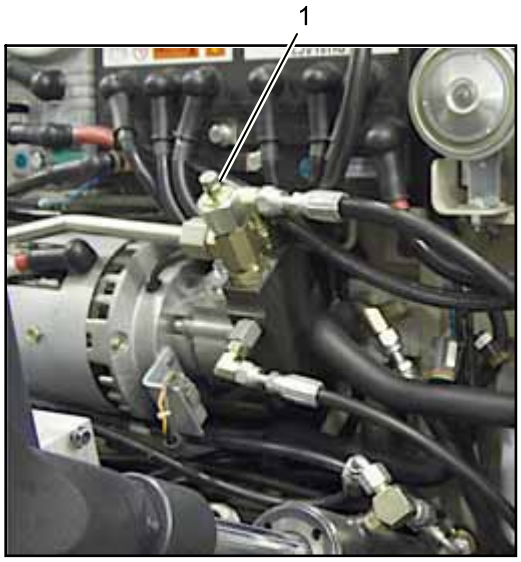



Figure 22581

1 Quick Disconnect Port

4. After connecting the gauge, press the enter arrow. The following message will be displayed:
   **Maintain tilt command**
5. Push and hold either tilt arrow. The following message will be displayed:
   **Monitor gauge pressure**
6. Note the pressure reading (you'll need to enter this value later). After a few seconds the following message will be displayed:
   **Stop tilt command**
7. Stop tilt command. The following message will be displayed:
   **Press enter to record pressure**
8. Press the enter arrow. The current pressure value of the ACCESS 123 program will be displayed.
   **XXXX psi**
9. Press the up/down arrow to adjust value to the recorded pressure in step 6. Pressing the up/down arrow adjusts the value in 25 psi increments. When finished, press the enter arrow to continue.
   The system will perform the same calibration twice. The first time high hydraulic pressure will be registered in the hydraulic gauge, and the second time low pressure will be registered. Both pressures must be entered. After entering the pressure for the second time, the display will briefly show:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
10. Press the up/down arrow to toggle to "Y" then press the enter arrow to save calibration.
11. Press the left arrow to return to C2 Hydraulics menu.
12. Press the up/down arrow to navigate to C3 System menu.
13. Remove the hydraulic gauge from quick disconnect port.

**C3 System;** these calibrations allow the truck to learn the parameters of the optional load sensor (PT1), steer potentiometer (POT4), brake pedal sensor (RPS1), and adjust battery voltage.

1. Press the right arrow to continue.

**C3.1 Load Sense;** this calibration allows the truck to learn the parameters of optional load sensor (PT1).

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press the enter arrow to continue. The display message will change to:
   **Empty forks at 12", then Enter**
3. Remove the load (if necessary) and raise/lower forks so they are approximately 12 inches from floor (you need not measure the height). If you lowered the forks to obtain 12 inches of lift height, the message will change to:
   **Raise 6" then stop**
4. Raise forks approximately 6 inches then stop. The message will change to:
   **Stop raise command**

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5. If you raised the forks to obtain approximately 12 inches of lift height the last two messages will not appear.

## NOTE

*Raise allows the sensor to be more accurate than when lower is the last function used because raise is always used to pick up a load. So if you calibrate right after raising, then you will calibrate out the seal friction from raise.*

The message will then change to:
**Waiting to stabilize**
For a few moments calibration procedures are stopped so the load can stop any slight movement and the hydraulic pressure can stabilize. This permits an accurate reading. The message will then change to:
**Paused, raise above staging**

6. Raise the mast above staging. The following message will be displayed:
   **Stop raise command**
7. Stop raising. The following message will be displayed:
   **Waiting to stabilize**
   For a few moments calibration procedures are stopped so the load can stop any slight movement and the hydraulic pressure can stabilize. This permits an accurate reading. The message will then change to:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
8. Press up/down arrow to toggle to "Y" then press the enter arrow to save calibration.

**C3.2 Steer Pot;** this calibration allows the truck to learn the parameters of the steering potentiometer (POT4).

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press enter arrow to continue. The display message will change to:
   **Tire CW max, then Enter**

## NOTE

*CW and CCW are from the steer tire perspective not from the steer tiller (trucks can be equipped with forward or reverse steering).Turning the wrong way will cause an event to occur and calibration failure.*

3. Turn the steer tiller so the steer tire rotates clockwise until it reaches the mechanical stops. Then press the enter arrow. The display message will change to:
   **Tire CCW max, then Enter**
4. Turn the steer tiller so the steer tire rotates counterclockwise until it reaches the mechanical stops. Then press the enter arrow. The display message will change to:
   **Tire center, then Enter**
5. Turn the steer tiller so the steer tire is in the straight ahead position. Then press the enter arrow. The display message will change to:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
6. Press the up/down arrow to toggle to "Y" then press the enter arrow to save calibration.

**C3.3 Brake Pedal;** this calibration allows the truck to learn the parameters of the brake pedal sensor (RPS1).

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press enter arrow to continue. The display message will change to:
   **Press pedal, then Enter**
3. Depress the brake pedal until it reaches the mechanical stops.
4. Press the right arrow and monitor RPS1 voltage with the pedal fully depressed.
5. Add 0.25 to 0.30 volts to the fully depressed pedal voltage. For example, if the voltage displayed is 1.32 V add 0.25 and 0.30 V to 1.32 V for a total of 1.57 to 1.62 V.
6. Allow the pedal to rise so the voltage displayed equals the amount calculated in step 5.

## NOTE

*Raising the brake pedal for an additional 0.25 to 0.30 volts during this calibration prevents undesired brake commands when traveling over bumps such as rough floors or dock plates.*

7. Press the enter arrow. The display message will change to:
   **Release pedal, then Enter**

8. Release the brake pedal and allow it to return to the neutral position, Then press the enter arrow. The display message will change to:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
9. Press the up/down arrow to toggle to "Y" then press enter arrow to save calibration.

**C3.4 Battery Adjust;** this calibration allows the truck to learn the actual battery voltage.

1. Press the right arrow. The display will ask:
   **Sure? N**
2. Press the up/down arrow to toggle to "Y" then press the enter arrow to continue. The display message will change to:
   **Connect volt meter, then Enter**
3. Connect a volt meter to the battery then press the enter. The display message will momentarily change to:
   **up/down adjust, Enter accepts**
   The display message will then change to the previous voltage setting:
   **XX.XX V**
4. Use the up/down arrows to adjust the voltage shown on the display to match the voltage displayed on the volt meter. Then press the enter arrow to continue. The display message will change to:
   **Calibration Accepted**
   The display will ask:
   **Save? N**
5. Press the up/down arrow to toggle to "Y" then press the enter arrow to save calibration.
6. Press the left arrow to return to C3 System menu.
7. Press the up/down arrow to navigate to the C4 System menu.

**C4 Height Cutout;** this calibration programs a raise or lower cutout.

Press the right arrow to continue.

**C4.1 Cutout 1;** this calibration programs the raise or lower cutout.

**NOTE**

*Currently, one programmed raise or lower cutout is available. Future software updates may permit additional cutouts.*

Press the right arrow to continue.

**Input Type;** Since one cutout currently is available an input type doesn't need to be selected. The factory setting is LMS1 and is the only current choice available.

Press the down arrow to continue.

**Cutout Type;** Press the right arrow to select the appropriate cutout type. Use the up and down arrows to scroll to type, then press the enter arrow to select type. Cutout types are:

- **None - No cutout.**
- **Raise Cutout;** This cutout will cause the mast to stop during raise when the mast reaches the cutout. To raise the mast beyond the cutout, the operator must press and hold the optional override switch before raise is selected again.
- **Raise Stop;** This type of cutout will cause the mast to stop during raise when the mast reaches the cutout. The mast cannot be raised above a Raise Stop.
- **Lower Cutout;** This cutout will cause the mast to stop during lower when the mast reaches the cutout. To lower the mast below the cutout, the operator must press and hold the optional override switch before lower is selected again.

## Features

Incorrectly setting Features submenus may cause an Event Code to be logged and/or incorrect truck operation.

First, power-up truck, navigate to Service menu, select Level 2 or 3, and enter the password. After entering the password, use the down arrow to navigate to the FEATURES menu.

Next, by pressing the right arrow you should see the first features submenu.

**NOTE**

*If the message being displayed is too large for the ACCESS 1 text window, the message will scroll from right to left so the entire message can be read.*

If changes have been made in the sub menus, pressing the left arrow at the first level menu will prompt "Save? N" in the settings. Use the up and down arrows to select Save? Y then press enter/return to save settings.


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**F4 Mast Type** = ___; Used during calibration of the solenoid proportional lower valve (SPL) to determine lowering speed. The mast type is included in the data number shown on the data plate. Press the right arrow, and use the up and down arrows to select the correct mast type. The four options are TT, TL, TF and Quad. Next, press enter/return to accept input. Menu will return to F4. Press the down arrow to continue.

**F5 Collapsed Height** = ___; Used during calibration of the solenoid proportional lower valve (SPL) to determine lowering speed. To determine the collapsed height of the truck, completely lower forks and measure the height of the mast from floor to top of mast.

Press the right arrow and then change the value one digit at a time (from left to right) using the up, down and right arrow keys. Then press enter/return to accept input. Menu will return to F5. Press the down arrow to continue.

**F6 Lift Height** = ___; The lift height value is also used during calibration of the solenoid proportional lower valve (SPL) to determine lowering speed. The lift height is included in the data number shown on the data plate. Press the right arrow and then change the value one digit at a time (from left to right) using the up, down and right arrow keys. Press enter/return to accept input and menu will return to F6. Press the down arrow to continue.

**F7 Tilt Forward** = ___; Specifies the maximum degree of forward tilt. The accessory control module (ACCESS 7) slows tilt slightly before the tilt cylinder mechanical stops are contacted providing a cushion effect. ACCESS 7 uses the value in this menu to determine when to begin tilt slow down.

## NOTE

*The tilt position sensor has two functions: provide feedback for the Tilt Position Assist (TPA) feature and monitor the degree of tilt and send this information to the ACCESS 7, so tilt slows at the proper time.*

The Tilt Position Assist (TPA) option allows operators to tilt the forks to a programmed tilt position (such as tilting the forks level).

To use this option: with the thumb ball in neutral, press and hold the switch on the back of the multi-task handle. Then actuate tilt forward or back. The forks will go to the programmed tilt position.

On trucks with a third accessory, the switch on the back of the multi-task handle is used to enable the fifth function. Therefore, TPA is not available on trucks with a third accessory.

## NOTE

*For the maximum degree of tilt, refer to the tilt cylinder part number stamped on the end of the tilt cylinder.*

The tilt cylinder part number includes a dash number. Degree of tilt is indicated by the dash number.

Press the right arrow and use the up and down arrows to select the correct value. The values are 2, 5 or 10 degrees. Then press enter/return and menu will return to F7. Press the down arrow to continue.

**F8 Tilt Back** = ___; Specifies the maximum degree of forward tilt. The accessory control module (ACCESS 7) slows tilt slightly before the tilt cylinder mechanical stops are contacted providing a cushion effect. ACCESS 7 uses the value in this menu to determine when to begin tilt slow down.

## NOTE

*The maximum degree of back tilt is also included on the data plate.*

Press the right arrow and use the up and down arrows to select a value. The values are 3 or 5 degrees. Then press enter/return and menu will return to F8. Press the down arrow to continue.

**F9 Travel Alarm** = ___; Changes the travel alarm setting. Press the right arrow and use the up and down arrows to select a setting. The four options are off, forward, reverse and both. Then press enter/return to accept input. Menu will return to F9. Press the down arrow to continue.

**F10 User Performance** = ___; Determines whether the operator has the ability to select different truck performance levels. If enabled, any operator can select any performance levels (P1, P2 and P3), regardless of F11 setting, can be selected in the Level 1 Operator mode.

If disabled the performance level will default to P1 or to the level assigned to the user code in F11, if F11 is enabled. Press the right arrow, use the up and down arrows to change. Then press enter/return to accept input and menu will return to F10. Press the down arrow to continue.

**F11 User Codes** = ____; Allows you to enter up to 25 user codes. Each user code is assigned to one of the three performance levels (P1, P2 and P3) based on the operator's experience or skill level. Press the right arrow to enter the following submenus (F11.1, F11.2 and F11.3):

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**F11.1 Status** = ____; Allows you to enable or disable the user code feature, press the right arrow. Use the up and down arrows to enable/disable. Then press enter/return to accept input and menu will return to F11.1. Press the down arrow to continue.

## NOTE

*F11.2 Codes submenus will not appear if F11.1 is set to disable.*

**F11.2 Codes** = ____; Allows the addition of user codes. After pressing the right arrow, "Code 1" will be displayed. To create a code number (code numbers must contain four digits), press the right arrow again and use the up and down arrows to change the digit and the right arrow key to move to the next digit.

Once the desired "Code" is entered, press the enter/return button to accept the code number. Then press the up or down arrow to assign a performance level to the code. The Perf Level = menu shown should appear.

Press the right arrow and use the up and down arrows to select the desired performance level (P1, P2 and P3) for user code 1. When finished press enter/return. Use the down arrow to add more codes (up to 25). When no more codes are needed, use the left arrow to return to F11.2. Press the down arrow to continue.

**F11.3 Timeout** = ____; Sets the code timer. This is the number of "unattended" minutes that will elapse before the truck will have to be turned OFF, restarted and a user code entered. This feature can be used to help prevent untrained or inexperienced operators from attempting to operate the truck if the "logged on" operator steps away from the truck without keying it OFF.

Press the right arrow and use the up and down arrows to set the truck to a timeout value. The timeout values are 5, 10, 15, 20, 30, 60 or 90 minutes.

Press enter/return to return to F11.3. Then press left arrow to return to F11. Press the down arrow to continue.

**F12 Accessory 1** = ____; Sets the volume of hydraulic oil flow supplied to the first accessory.

## NOTE

*Accessory 1 is the next hydraulic function after lift and tilt.*

Press the right arrow to enter the following submenus (F12.1 and F12.2).

**F12.1 Mode** = ____; Press the right arrow, and use the up and down arrows to select low or high flow. Then press enter/return to accept input and menu will return to F12.1.

## NOTE

*Hydraulic accessories require low or high volume of oil flow to function. Solenoid valves, SVA1A through SVA2B open to permit flow to and from the accessory. Two different size valves, either low or high flow, are available for SVA1 or SVA2. If you select the wrong valve (low or high) in the features submenu, an event code will occur because the hydraulic control module will sense an incorrect SVA1 or SVA2 coil resistant value.*

The first accessory can be low or high flow. The data number on the data plate includes high/low flow accessory information. Press the down arrow to continue.

**F12.2 Flow** = ____; Press the right arrow, and use the up and down arrows to select 3.8 through 15.1 lpm (1 through 4 gpm) for low flow accessories or 3.8 through 30.3 lpm (1 through 8 gpm) for high flow accessories.

Press enter/return to accept input and return to F12.2. Press the left arrow to return to F12.

## NOTE

*If you select the wrong volume of flow (lpm or gpm) in the features submenu, the hydraulic accessory will not function to manufacturer specifications. The manufacturer attachment information provides the volume of oil flow needed for the attachment. Press the down arrow to continue.*

**F13 Accessory 2** = ____; Sets the volume of hydraulic oil flow supplied to the second accessory. Press the right arrow to enter the following submenus (F13.1 and F13.2).

## NOTE

*The second and third accessory must be high flow.*

**F13.1 Mode** = ____; Since the second function must be high flow, these choices are enable or disable.

Press the right arrow, and use the up and down arrows to enable or disable this feature. Press enter/return to accept input return to F13.1. Press the down arrow to continue.



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### NOTE

*F13.2 menu will not appear if F13.1 is set to disable.*

**F13.2 Flow** = ____; Press the right arrow and use the up and down arrows to select 3.8 through 30.3 lpm (1 through 8 gpm). Press enter/ return to return to F13.1. Press the left arrow to accept input and return to F13. Press the down arrow to continue.

**F14 Accessory 3** = ____; Sets the volume of hydraulic oil flow supplied to the third accessory.

### NOTE

*If F13 is set to disable, F1 will not appear.*

Press the right arrow to enter the following submenus (F14.1 and F14.2).

### NOTE

*The second and third accessory must be high flow.*

**F14.1 Mode** = ____; Since the second function must be high flow, these choices are enable or disable.

Press the right arrow and use the up and down arrows to enable or disable this feature. Press enter/return to accept input and return to F14.1. Press down arrow to continue.

### NOTE

*F14.2 menu will not appear if F14.1 is set to disable.*

**F14.2 Flow** = ____; Press the right arrow and use the up and down arrows to select 3.8 through 30.3 lpm (1 through 8 gpm). Press enter/return to accept input and return to F14.2. Press the left arrow to return to F14. Press the down arrow to continue.

**F15 Productivity** = ____; When enabled, this feature permits increased travel speeds when the load is less than 455 kg (1000 lb). For this feature to function, the truck must be equipped with a load sensor.

Press the right arrow and use the up and down arrows to enable or disable this feature. Press enter/return to accept input and return to F15. Press the down arrow to continue.

**F17 Raise Cutout** = ___; In this feature, truck must be equipped with mast limit switches. If this feature is enabled and the truck is equipped with mast limit switches, raise will cutout at the predetermined height of a mast limit switch.

Press the right arrow and use the up and down arrows to enable or disable this feature. Press enter/return to accept input and return to F17. Press the down arrow to continue.

**F20 Pressure Regulator** = ___; This feature must be enabled on trucks including an accessory with a pressure regulator (like a carton clamp), so the proportional accessory relief valve (PVAR) can be calibrated. Press the right arrow and use the up and down arrows to enable or disable feature. Press enter/return to accept input and return to F20.

### NOTE

*Trucks equipped with the electronic pressure regulator option have a proportional accessory relief valve (PVAR) included in the hydraulic manifold instead of an accessory relief valve RVA. PRVA allows multiple relief settings for attachments.*

Press the down arrow to continue.

**F22 Message Mode** = ___; This feature changes information displayed during operation. Different messages may be displayed in the Level 1 Message Mode, which allows you to select the message(s) that will be displayed while in Level 1 Message Mode.

Select from: Bdi (battery percent of charge), Hours (hour meter reading), Odometer (total distance truck has traveled in miles), Trip (total distance truck has traveled since last reset), Timer (stopwatch) or All (allows operator to determine message using display buttons).

Press the right arrow and use the up and down arrows to select a message. After selecting message, press enter/return to accept input and return to F22. Press the down arrow to continue.

**F24 Battery Retainer** = ___; If battery retainers are not in place on trucks equipped with optional battery restraint switches and this feature is enabled, then travel and hydraulic functions will not be permitted.

Press the right arrow and use the up and down arrows to enable or disable this feature. Press enter/return to accept input and return to F24. Press the down arrow to continue.

**F25 Hour Meter** = ___; Changes the hour meter that will be displayed during operation. H1 records the presence pedal switch ON time. H2 also records the presence pedal switch ON time plus the timeout period that the truck is left unattended before the display shuts down.

Press the right arrow and then use the up and down arrows to change between H1 and H2. Press the enter/ return button to accept input and return to F25.

## Hours

- In service Level 2 or Level 3, hour meters can be viewed.
- In service Level 3, H1 Runtime1 hour meter, H2 Runtime2 hour meter, and H3 Odometer can be increased (not decreased).
- In service Level 3, H4 Traction and H5 Lift hour meters can be increased or decreased.
- In level 3 (only) the PM timer can be set.
- Access module hours can't be modified. If a module is replaced with a used module, the display will automatically show the time for the replacement module.

### Hour Access

From service Level 2 or Level 3, navigate to Hour menu using the up/down arrows. Press the right arrow to access the Hour submenus. Use the up and down arrows to navigate through the submenus, press the right arrow to enter a submenu.

**H1 Truck Runtime1 = ___ Hr;** The H1 hour meter runs when the key switch is ON and the floorboard is depressed. To modify, in Level 3 only, press the right arrow and use the up/down arrows to increase the value. Press enter to set meter value. Press down arrow to continue.

**H2 Truck Runtime2 = ___ Hr;** The H2 hour meter runs when the key switch is ON and the floorboard is depressed. H2 incorporates a programmable timeout which will continue to increment for the timeout period after the operator has stepped off the floor pedal. To modify, in Level 3 only, press the right arrow and use the up/down arrows to increase the value. Press enter to set meter value. Press down to continue.

**H3 Odometer = ___ mi;** View total accumulated truck travel distance. To modify, in Level 3 only, press the right arrow and use the up/down arrows to increase the value. Press enter to set meter value. Press down arrow to continue.

**H4 Traction = ___ Hr;** View total accumulated traction hours. To modify, in Level 3 only, press the right arrow and use the up/down arrows to increase/decrease the value. Press enter to set meter value. Press down arrow to continue.

**H5 Lift = ___ Hr;** View total accumulated lift hours. To modify, in Level 3 only, press the right arrow and use the up/down arrows to increase/decrease the value. Press the enter arrow to set meter value. Press the down arrow to continue.

**H6 ACCESS1 = ___ Hr;** View total accumulated ACCESS 1 hours. The hours can not be modified. Press the down arrow to continue.

**H7 ACCESS2 = ___ Hr;** View total accumulated ACCESS 2 hours. The hours can not be modified. Press the down arrow to continue.

**H8 ACCESS3 = ___ Hr;** View total accumulated ACCESS 3 hours. The hours can not be modified. Press the down arrow to continue.

**H9 ACCESS7 = ___ Hr;** View total accumulated ACCESS 7 hours. The hours can not be modified. Press the down arrow to continue.

**H10 PM Timer = ___;** The PM Timer allows you to program a PM reminder for the operator. By selecting the hour meter (tag) and the hour interval, you choose which hour meter you want monitored for a PM and the number of hours logged before a PM is due. When the PM timer counts down or decreases to zero, "PM Due" will be shown on the display after power up self test is complete.

This menu item is only available in service Level 3. Press the right arrow to enter values. Use the up/down arrows to scroll through submenus.

**H10.1 Tag = ___;** The tag setting assigns the hour meter that will be monitored for planned maintenance intervals. It can be tied to any of the hour meters, H1 through H9. Press the right arrow. Use the up/down arrows to scroll to desired meter. Press the enter arrow to select meter.

**H10.2 Interval = ___;** This setting indicates number of hours logged before a PM is due. Press the right arrow. Use the up/down arrows to change the value. The value can be set from one hour to 99999 hours.

## Events

The Events Menu allows access to view logged event codes on ACCESS 1. For event code descriptions and troubleshooting steps, refer to the Event Codes section of this service manual.

Power up the truck. Navigate to the Service Menu and enter Level 2. Scroll to Events.

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**E1 Chron History** - Press the right arrow to view a chronological listing of the last 16 events beginning with the most recent event logged. Use the up and down arrows to scroll through the events. Use the right arrow for more information about each event.

**E1.1 Last;** Press the right arrow to view the event code "Code = ___". Press the down arrow to view the hour meter reading "Hour = ___ Hr" when the event was logged. Press the down arrow again to view the battery state of charge, "SOC = ___ %" when the event was logged. Press the left arrow to return to E1.1 then press the down arrow to continue.

**E1.2 Last -1 through E1.16 Last -15;** The remaining event codes follow the same pattern as E1.1. Follow the instructions given in E1.1 to view the event code, the hour meter reading and the state of battery charge when the event occurred. Press the left arrow to return to E1. Press the down to continue.

**E2 Accum History;** Press the right arrow to view the number of times a specific event has occurred. Use the up and down arrows to scroll through the events. Press the left arrow to return to E2. Press the down to continue.

**E3 Clear History;** Clear History permits two ways of clearing event codes; Clear Chronological and Clear All. Press the right arrow.

**E3.1 Clear Chronological;** This menu permits clearing Chronological History (E1) which still allows access to Accumulated History (E2) of events. Press the right arrow to clear chronological event code log history. Use the up and down arrows to select "Sure? Y" and press enter to clear. Menu will return to E3.1 Clear Chronological. Press the down arrow to continue.

**E3.2 Clear All;** This menu permits clearing both Chronological (E1) and Accumulated (E2) History. Press the right arrow to clear all stored event history. Use the up and down arrows to select "Sure? Y" and press enter to clear. Menu will return to E3.2 Clear All. Press the left arrow twice to return to Events.

## Performance

P1, P2, and P3 are the three performance levels that may be selected when in level 1 as long as F10 User Performance is enabled. If User Performance is disabled, the operator will then be locked in at the P1 settings. The other option is enabling the F11 User Codes option which allows any one of the three performance levels to be assigned to the 25 different user codes. Any setting under the three performance levels can be higher, lower or the same as the setting under any other performance.

If changes have been made in the sub menus, pressing the left arrow at the first level menu will prompt "Save? N" in the settings. Use the up and down arrows to select "Save? Y" then press enter/return to save settings.

Within the P1, P2 and P3 menus you can adjust the following parameters.

**P1.1 Forward** = ___ mph; Maximum forward (forks first) traction speed. Press the right arrow and use up/down arrows to select desired speed. Range is from 1.0 to 7.2 mph. Factory setting is 7.2 for P1; 6.2 for P2 and 6.0 for P3. Press the enter/return to accept input. The menu will return to P1.1. Press the down arrow to continue.

**P1.2 Rev** = ___ mph; Maximum reverse (power unit first) traction speed. Press the right arrow and use the up/down arrows to select desired speed. Range is 1.0 to 7.2 mph for standard trucks, and 1.0 to 7.8 mph for trucks equipped with the productivity package. Factory setting is 7.8 for P1; 7.2 for P2 and 6.0 for P3. Press the enter/return button to accept input. The menu will return to P1.2. Press the down arrow to continue.

**P1.3 Accel** = ___; Acceleration rate (time for truck to go from stop to top speed). Press the right arrow and use the up/down arrows to select desired acceleration rate. Range is 1 for the longest acceleration time to 9 for the shortest acceleration time. Factory setting is 7 for P1; 6 for P2 and 5 for P3. Press the enter/return button to accept input. The menu will return to P1.3. Press the down arrow to continue.

**P1.4 Tilt** = ___; Allows overall tilt speed adjustment. Press the right arrow and use the up/down arrows to select desired speed. Range is 1 (slowest) to 9 (fastest). Factory setting is 9 for P1, P2 and P3. Press the enter/return button to accept input. The menu will return to P1.4. Press the down arrow to continue.

### NOTE

*Depending on the trucks configuration the following accessory speed settings may or may not be shown. Reference F12, F13 and F14 in the Features menu.*

**P1.5 Accessory 1** = ___; Allows accessory 1 overall speed adjustment. Press the right arrow and use the up/down arrows to select desired speed. Range is 1 (slowest) to 9 (fastest). Factory setting is 9 for P1; 7 for P2 and 5 for P3. Press the enter/return button to accept input. The menu will return to P1.5. Press the down arrow to continue.

**P1.6 Accessory 2** = __; Allows accessory 2 overall speed adjustment. Press the right arrow and use the up/down arrows to select desired speed. Range is 1 (slowest) to 9 (fastest). Factory settings are 9 for P1; 7 for P2 and 5 for P3. Press the enter/return button to accept input. The menu will return to P1.6. Press the down arrow to continue.

**P1.7 Accessory 3** = __; Allows accessory 3 overall speed adjustment. Press the right arrow and use the up/down arrows to select desired speed. Range is 1 (slowest) to 9 (fastest). Factory settings are 9 for P1; 7 for P2 and 5 for P3. Press the enter/return button to accept input. The menu will return to P1.7. Press the down arrow to continue.

Press the left arrow to return to P1 Setup P1. Press the down arrow to go to P2/P3, or the left arrow to exit to the main menu.

**P2 and P3**

Performance levels P2 and P3 have the same parameters and adjustability as just described in the P1 information. However, the Crown standard values will vary between levels.

### NOTE

*With the parameters of P1, P2, and P3 set at the Crown standard settings, P1 will be the fastest; P2 will operate similar to the RC 3000 and P3 will be the slowest.*

After setting the performance levels for P1, P2, and P3, press the down arrow to navigate to P4.

**P4 Battery** = ___; Provides adjustability for the battery's state of charge which is monitored through the ACCESS 123 system. Changing this setting will affect the battery discharge level at which lift lockout will occur.

### NOTE

*Decreasing the P4 setting reduces the required volts per cell level allowing the battery to go into deeper discharge prior to lift lockout. Increasing the P4 setting will increase the volts per cell monitor level disabling the lift function earlier in the discharge cycle.*

### ⚠ CAUTION

*Adjusting the P4 setting to a level permitting battery discharge that is too deep may cause truck to register a low battery fault and could potentially damage electrical components.*

Press the right arrow and use the up/down arrows to select desired setting. A setting of 1 will take the battery to its deepest discharge. A setting of 9 will decrease the level of discharge. Factory setting is 3. Press the enter/return button to accept input. The menu will return to P1.4. Press the down arrow to continue.

**P5 Plug** = ___; Allows adjustment of the plugging effort in relation to the travel handle position. The longest plugging distance will occur with the handle near the neutral position and P5 setting of 1. The shortest plugging distance is achieved when the handle is fully applied in one direction or the other, and a P5 setting of 9.

To modify, press the right arrow and use the up/down arrows to select desired setting. Range is 1 to 9. Factory setting is 7. Press the enter/return button to accept input. The menu will return to P5. Press the down arrow to continue.

**P6 Brake** = ___; Adjusts the motor braking effort. Press the right arrow and use the up/down arrows to select desired setting. Range is 1 for the least motor braking effort to 9 for the maximum motor braking effort. This setting works in conjunction with the brake pedal position sensor to establish the amount of braking. Factory setting is 7. Press the enter/return button to accept input. The menu will return to P6. Press the down arrow to continue.

**P7 Coast** = ___; Controls the amount of regenerative braking current applied to the drive motor when the operator returns the multi-task handle to neutral while the truck is moving. The higher the setting, the lower the amount of regenerative braking current applied to the drive motor, resulting in the longest coasting distance. The lower the setting, the higher the amount of regenerative braking current applied to the drive motor, the shorter the coasting distance.

Press the right arrow and use the up/down arrows to select desired setting. Range is from 1 to 9. Factory setting is 9. Press the enter/return button to accept input. The menu will return to P7. Press the down arrow to continue.

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**P8 Raise Ramp** = __; Adjusts how reactive the raise function is to the inputs received from the multi-task handle. Press the right arrow, which gives you access to the two options shown below. Use the up/down arrows to select either accel or decel. Accel stands for acceleration - how quickly raise reacts when giving the raise command. Decel stands for deceleration - how quickly raise reacts when stopping the raise command. Factory setting is 9 for P8.1 (Raise Accel) and 7 for P8.2 (Raise Decel).

Press the right arrow and use the up/down arrows to select desired setting. Range is 1 for the least reactive to 9 for the most reactive. Press the enter/return button to accept input. The menu will return to P8. Press the down arrow to continue.

**P9 Lower Ramp** = __; Adjusts how reactive the lower function is to the inputs received from the multi-task handle. Press the right arrow, which gives you access to the two options shown below. Use the up/down arrows to select either accel or decel. Accel stands for acceleration - how quickly lower reacts when giving the lower command. Decel stands for deceleration - how quickly lower reacts when stopping the lower command. Factory setting is 7 for P9.1 (Lower Accel) and 9 for P9.2 (Lower Decel).

Press the right arrow and use the up/down arrows to select desired setting. Range is 1 for the least reactive to 9 for the most reactive. Press the enter/return button to accept input. The menu will return to P9. Press the down arrow to continue.

**P10 Tilt Ramp** = __; Adjusts how reactive the tilt function is to the inputs received from the TBS/TDS. Press the right arrow, which gives you access to two options, accel or decel.

Use the up/down arrows to select either accel or decel. Accel stands for acceleration - how quickly tilt reacts when giving the tilt command. Decel stands for deceleration - how quickly tilt reacts when stopping the tilt command. Factory setting is 6 for P10.1 (Accel) and 9 for P10.2 (Decel).

Press the right arrow and use the up/down arrows to select desired setting. Range is 1 for the least reactive to 9 for the most reactive. Press the enter/return button to accept input. The menu will return to P10. Press the down arrow to continue.

**P11 Accy 1 Ramp** = __; Adjusts how reactive the accessory 1 function is to the input received from the multi-task handle. Press the right arrow, which gives you access to two options, accel or decel.

Use the up/down arrows to select either accel or decel. Accel stands for acceleration - how quickly the accessory reacts when giving the accessory command. Decel stands for deceleration - how quickly the accessory reacts when stopping the accessory command. Factory setting is 6 for P11.1 (Accel) and 9 for P11.2 (Decel).

Press the right arrow and use the up/down arrows to select desired setting. Range is 1 for the least reactive to 9 for the most reactive. Press the enter/return button to accept input. The menu will return to P11 Accy 1 Ramp. Press the down arrow to continue.

Use the same procedures to adjust the next two settings as just used for Accy Ramp 1. These settings adjust how reactive the accessory 2 and 3 function is to the inputs received from the multi-task handle, and is set up the same way.

**P12 Accy 2 Ramp** = __; Factory setting is 6 for P12.1 (Accel) and 9 for P12.2 (Decel).

**P13 Accy 3 Ramp** = __; Factory setting is 6 for P13.1 (Accel) and 9 for P13.2 (Decel).

When finished, press the down arrow to continue.

**P14 Elevated Travel** =___; Adjust the performance of the following functions when the mast is above staging. Press the right arrow to enter the following submenus (F14.1, F14.2, F14.3, F14.4 and F14.5):

**P14.1 Forward** = ___mph; Maximum forward (forks first) traction speed above free lift. Press the right arrow and use the up/down arrows to select desired speed. Range is 0 mph to 3.6 mph. Factory setting is 3.6 mph. Press the enter/return button to accept input. The menu will return to P14.1. Press the down arrow to continue.

**P14.2 Reverse** = ___ mph; Maximum reverse (power unit first) traction speed above free lift. Press the right arrow and use the up/down arrows to select desired speed. Range is 0 mph to 3.9 mph. Factory setting is 3.9 mph. Press the enter/return button to accept input. The menu will return to P14.2. Press the down arrow to continue.

**P14.3 Accel** = ___; Acceleration rate (time for truck to go from stop to top speed) above freelift. Press the right arrow and use the up/down arrows to select desired acceleration rate. Range is 1 for the longest acceleration time to 9 for the shortest acceleration time. Factory setting is 5. Press the enter/return button to accept. The menu will return to P14.3. Press the down arrow to continue.

**P14.4 Plug** = ___; Allows adjustment of the plugging effort above free lift in relation to the travel handle position. The longest plugging distance will occur with the handle near the neutral position and a setting of 1. The shortest plugging distance is achieved when the handle is fully applied in one direction or the other, with a setting of 9. Factory setting is 5. Press the right arrow and use the up/down arrows to select desired setting. Press the enter/return button to accept input. The menu will return to P14.4. Press the down arrow button to continue.

**P14.5 Brake** = ___; Adjusts the motor braking effort above free lift. Press the right arrow and use the up/down arrows to select desired setting. The range is 1 for the least motor braking effort to 9 for the maximum motor braking effort, in relationship to the brake pedal position. Factory setting is 5. Press the enter/return button to accept input. The menu will return to P14.5. Press the down arrow to continue.

**P99 Load factory defaults** - Loads factory settings for all Performance menu levels. Press the right arrow to select this feature. Use up/down arrows to select "Sure? Y" to accept factory settings. Press the enter/return button to accept. Display returns to P99, press the left arrow to exit to main menu. This procedure can be done at any time while in the performance menu.

## Utilities

The Utilities menu allows you to view module and software part numbers and activate the tow mode. Part numbers are available in service Level 2 and Level 3. Tow mode is only available in Level 3.

Power up the truck. Navigate to the Service Menu and enter Level 3. Scroll to Utilities and press the right arrow.

**U1 Part Numbers;** For access to module and software part numbers, press the right arrow. Use the up and down arrows to scroll through the submenus.

### NOTE

*The software part number includes two dash numbers. The last dash number denotes the software version. For example, if ACCESS 1 software part number is 122729-001-02, the part number ends with a dash 02 indicating the software version is 2.*

**U1.1 ACCESS 1;** Press the right arrow to view ACCESS 1 part number. Press the down arrow to view software part number. Press the left arrow to return to U1.1 then press the down arrow to continue.

**U1.2 ACCESS 2;** Press the right arrow to view ACCESS 2 part number. Press the down arrow to view software part number. Press the left arrow to return to U1.2 then press the down arrow to continue.

**U1.3 ACCESS 3;** Press the right arrow to view ACCESS 3 part number. Press the down arrow to view software part number. Press the left arrow to return to U1.3 then press the down arrow to continue.

**U1.4 ACCESS 7;** Press the right arrow to view ACCESS 7 part number. Press the down arrow to view software part number. Press the left arrow to return to U1.4 then press the left arrow again to return to U1 Part Numbers. Press the down arrow to continue.

**U2 Tow Mode;** (Level 3 Only) this menu allows activation of tow mode. With tow mode active, the parking brakes will release. Before making tow mode active, be sure to read and follow the procedures in the "Control of Hazardous Energy" section in this service manual.

### NOTE

*For tow mode to be active, the floor pedals must be depressed.*

1. To activate tow mode, press the right arrow.
2. The following message will be displayed.
   **Tow Mode = Off**
3. Press the right arrow and use the up/down arrow to change OFF to ON.
4. Press enter to activate tow mode.
5. To de-activate Tow Mode, turn the key switch OFF then ON.

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# Control Modules

## Traction Drive Module

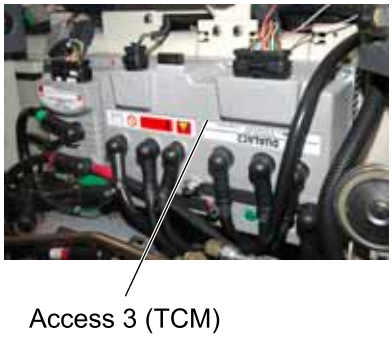



Figure 15950

## Basics of System Operation

The AC traction drive module (Access 3) applies a variable frequency current and pulse width modulated three phase AC voltage to the motor stator to generate a rotating magnetic field. The rotating magnetic field induces an opposing magnetic field in the rotor which causes the rotor to turn. Using this technology eliminates the need for motor brushes as well as forward and reversing contactors and the associated maintenance. The traction drive module contains the power circuitry for converting the DC input to three phase AC output and controls the Pulse Width Modulation (PWM) of the voltage and the frequency of the resultant current waveform. The resulting output is shown (single phase shown).

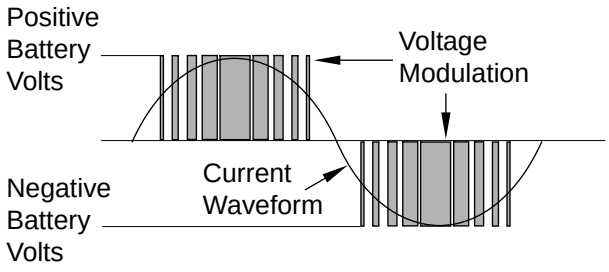



Figure 9892-01

Each phase of the output is 120 degrees out of phase as shown.

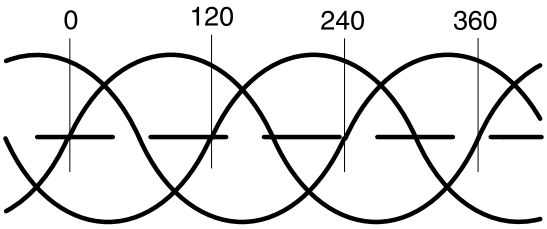



Figure 9893

Each phase is applied to separate windings in the motor stator, resulting in the rotating magnetic field which causes rotation of the rotor. Access 3 manages the speed regulation and various system inputs and outputs.

Inherent to the design of AC motors is generated voltage when using motor braking. Without the need for additional contactors or resistance, this voltage is applied to the battery to extend the usable charge available.

Motor torque is variable making closed loop speed regulation possible. This will maintain vehicle speed, within the limits of the motor and drive system, as determined by the speed request. A speed sensor bearing in the motor provides the feedback signal to the traction drive module for control of the AC power converter. Speed feedback is also provided to Access 3 for speed regulation.

## Control Circuit Operation

The control circuitry of the Access 3 module is software driven with the parameters set for the system by the Features and Performance menus.

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## Power Circuit Operation

The traction control module provides signals to the inputs of the power transistors to switch battery voltage on and off to provide a pulse width modulated voltage output and consequently the sinusoidal current waveform. The identical inputs occur on the U, V and W inputs 120 degrees out of sequence for the three phase output required. The upper bank of transistors produces the positive pulses and the lower bank of transistors produce the negative pulses.

ACCESS 3 Traction Control Module

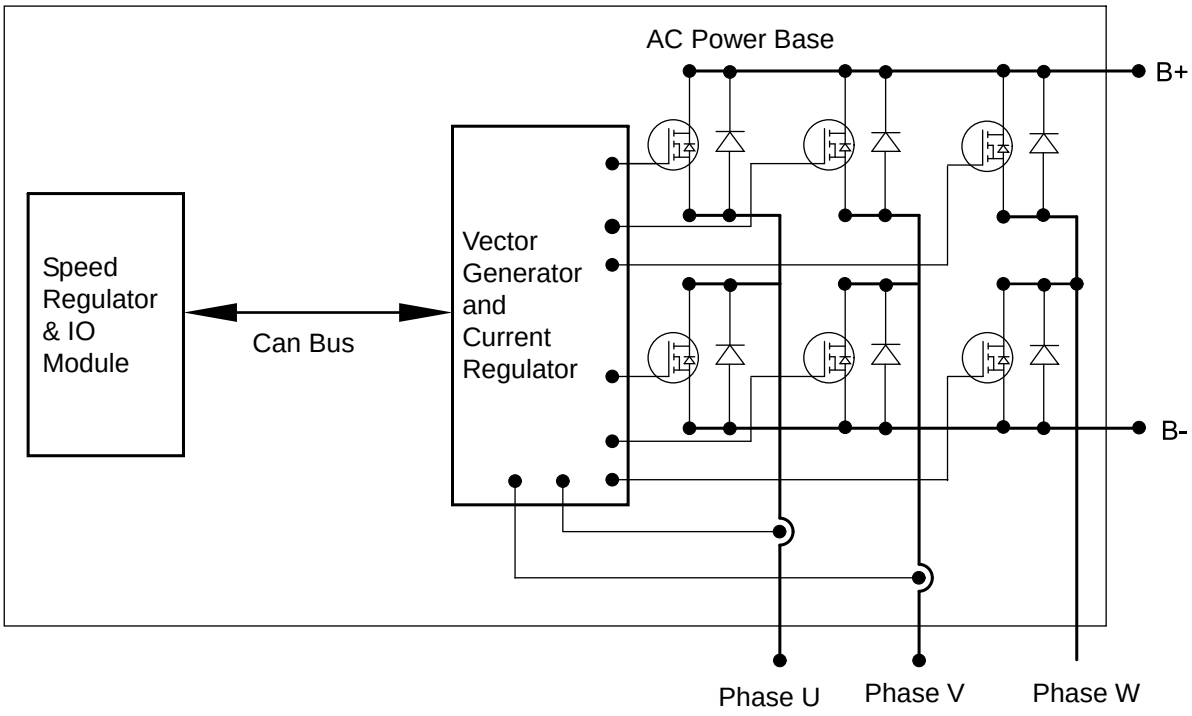



Figure 14996

When the motor is acting as a generator, the diodes in parallel with the transistors convert the three phase AC current to DC current that returns energy to the battery.

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## Hydraulic Control Module - AC/DC




Figure 15862

## Basics of System Operation

The hydraulic control module (Access 2) regulates the AC/DC pump motor (M3), whose function is to:

1. Act as the driving force for the hydraulic pump.
2. Supply hydraulic oil flow for lift and accessory functions.
3. Provide hydraulic pressure for steering/hydraulic functions.

Access 2 module provides speed control via operator input.

## Accessory Control Module

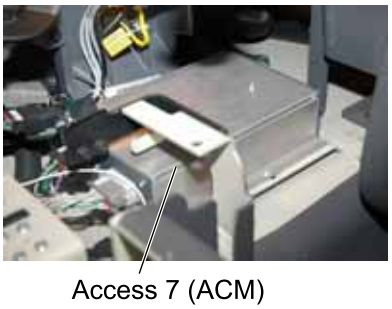



Figure 15861

## Basics of System Operation

The main function of the accessory control module (Access 7) is to control solenoid valve actuations, which include the following:

1. Load Lowering Proportional Valve (SPL)
2. Auxiliary Proportional Valve (SPA)
3. Tilt Extend (SVTE)
4. Tilt Retract (SVTR)
5. Tilt Solenoid (SVT)
6. Hoist Solenoid (SVH)
7. First Accessory Solenoid (SVA1A)
8. First Accessory Solenoid (SVA1B)
9. Second Accessory Solenoid (SVA2A)
10. Second Accessory Solenoid (SVA2B)
11. Clamp Pressure (PRVA)

The coil is energized by Access 7 when the appropriate function is selected, prompting the corresponding action to take place.

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## Notes:

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# Contactor

**110613-005 Contactor (36/48 Volt)**

**110613-007 Contactor (36 Volt)**

The purpose of these instructions is to instruct the technician on proper care and maintenance to obtain satisfactory service from these devices. Crown has tested and applied these contactors according to the requirements of our vehicle. No modifications or changes should be made in the layout, physical arrangement or electrical connections without permission from Crown.

**CAUTION**

*Before any inspection, adjustments, servicing, parts replacement or any other act is performed requiring physical contact with the electrical working components or wiring of these contactors, disconnect battery, raise drive wheels clear of floor and place blocks under truck frame.*

### Inspection

The following information is intended to assist during periods of normal maintenance and to provide checks for maintaining adjustments. As these devices are tested and adjusted at the factory, they should not normally require further adjustments. However, if factory adjustments are tampered with or otherwise changed, the checks contained in the following information may be made.

### Contacts

- In normal operation, contacts will become blackened, discolored, and roughened. This will not interfere with proper operation and cleaning is not necessary.
- Contacts should be replaced before the silver contact facing is completely eroded through to the backing material. The silver contact facing may transfer to either the moving or stationary contact and cause buildup on one contact. This can be expected under certain conditions and does not require contact dressing or filing.
- It is recommended that contacts always be replaced in pairs.

### Coil

- Remove all electrical connections to coil.
- Contactor 110613-005, resistance reading of coil to be between 70 - 78 ohms. Contactor 110613-007, resistance reading of coil to be between 39 - 49 ohms.
- If reading does not fall within these limits, replace.

### Component Replacement

Refer to Figure 5674-01 and parts breakdown in the Service And Parts manual.

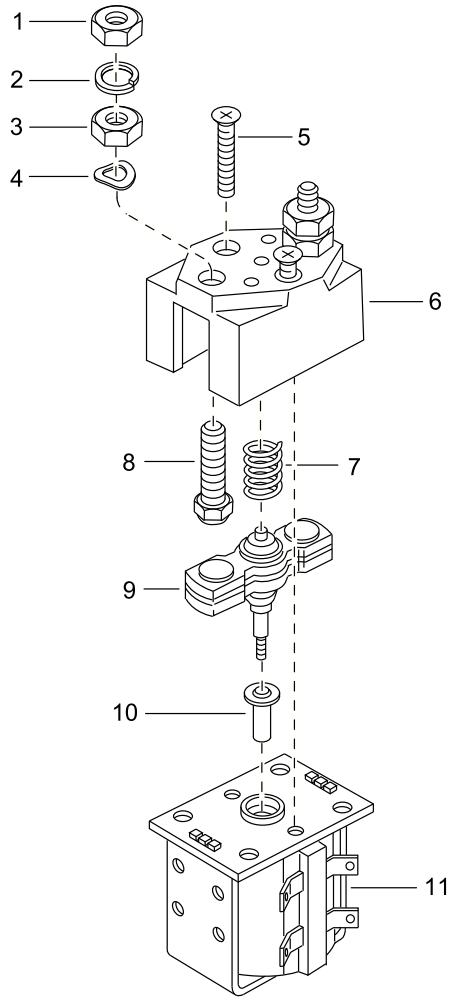



Figure 5674-01

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### Contact Replacement

1. Remove electrical connections to contacts (coils do not have to be disconnected for this procedure).
2. Remove two screws (Index 5) from top of contacts and lift contact assembly from truck.
3. Disassemble and replace contacts.
4. Install contact assembly on coils and fasten securely with two screws (Index 5).
5. Connect cables.

### Coil Replacement

1. Disconnect all electrical wiring.
2. Remove the four contactor mounting screws and remove contactor from truck.
3. Remove two screws (Index 5) and separate contact assembly from coil assembly.
4. Select replacement coil and transfer plunger (Index 9) from coil being replaced to replacement coil.
5. Reassemble contact assembly to coil assembly and secure with two screws (Index 5).
6. Mount contactor on truck and reconnect all electrical wiring.

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## Battery

The care and maintenance of the battery is very important to obtain efficient truck operation and maximum battery life.

**CAUTION**

*Gases produced by a battery can be explosive. Do not smoke, use an open flame, create an arc or sparks in the vicinity of the battery. Ventilate an enclosed area well when charging.*
*Batteries contain sulfuric acid which may cause severe burns. Avoid contact with eyes, skin or clothing. In case of contact, flush immediately and thoroughly with clean water. Obtain medical attention when eyes are affected. A baking soda solution (one pound to one gallon of water) applied to spilled acid until bubbling stops, neutralizes the acid for safe handling and disposal.*

Leakage voltage from battery terminals to battery case can cause misleading trouble symptoms with the truck electrical system. Since components of the truck electrical system are insulated from truck frame, leakage voltage will not normally affect truck operation unless a short circuit or breakdown of circuit wire insulation to truck frame occurs.

A voltage check from battery connector terminal to battery case should indicate near zero volts. Typically the sum of the voltages at both terminals will equal battery volts. This leakage will discharge the battery. As battery cleanliness deteriorates, the usable charge of the battery decreases due to this self discharge.

Although a leakage voltage reading of zero volts may not be possible, a cleaner battery will have more usable charge for truck operation and not affect operation of electronic devices on the unit.

## Safety Rules

Wear protective clothing such as, rubber apron, gloves, boots and goggles when performing any maintenance on batteries. Do not allow electrolyte to come in contact with eyes, skin, clothing or floor. If electrolyte comes in contact with eyes, flush immediately and thoroughly clean with water. Obtain medical attention immediately. Should electrolyte be spilled on skin, rinse promptly with clean water and wash with soap and water. A baking soda solution (one pound to one gallon of water) will neutralize acid spilled on clothing, floor or any other surface. Apply solution until bubbling stops and rinse with clean water.

- Keep vent plugs firmly in place at all times except when adding water or taking hydrometer readings.
- Do not bring any type of flame, spark, etc., near the battery. Gas formed while the battery is charging, is highly explosive. This gas remains in the cells long after charging has stopped.
- Do not lay metallic or conductive objects on battery. Arcing will result.
- Do not allow dirt, cleaning solution or other foreign material to enter cells. Impurities in electrolyte has a neutralizing effect reducing available charge.
- If battery repair is planned, follow the battery manufacturer's instructions concerning repair practices and procedures.

## Checking

Battery electrolyte level should be checked before each charge of the battery. The level should be maintained at 13 mm (0.5 in) above plates or just below lower lip of the filler hole at all times. If low, add distilled water or approved local supply (consult battery manufacturer) at the end of a charge cycle. Do not overfill. For maximum battery life, specific gravity readings should be taken daily on a pilot cell and recorded. A different pilot cell should be selected on a monthly basis with readings taken on all cells at semi annual or annual intervals. Do not take specific gravity readings immediately after adding water. Water and electrolyte must be thoroughly mixed by charging before a reliable reading can be taken. Normal full charged specific gravity should be between 1.265 and 1.285.

## Battery Care

Your Crown truck is powered by an electrical storage battery. Here are a few suggestions which will help you give the battery proper care.

- The battery on your Stand-up Rider is located in front of the operator's compartment.
- Charge the battery only in areas designated for that use.
- Make certain the charger being used matches the voltage and amperage of the truck battery. This voltage is listed on the truck serial plate.
- Before disconnecting or connecting batteries to a charger, make sure the charger is "OFF". If an attempt is made to do this while the charger is "ON", serious injury to you, the battery and the charger could result.
- Before charging, make sure the battery cells contain the correct amount of water. Charging batteries with a low water level might result in damage to the cells. When checking water levels, never use any type of open flame, battery fumes are explosive.
- Before connecting the battery cable to the trucks receptacle, make sure the key switch is off and controls are in the off position. The battery cable must be fully connected before the truck is used. If the plug is not making good contact, heat will weld the two parts of the battery connector together, making it difficult to remove and necessary to replace.
- Battery terminals should be checked and cleaned of corrosion regularly. Good battery terminal contact is essential not only for operation, but also for proper charging of the battery.
- The charging requirements will vary depending on the use of the truck. The battery should be given an equalizing charge on a weekly basis. This charge should normally be an additional three hours at the finish rate.
- Refer to charger manufacturer's manual for specific charging procedures.
- Make certain battery used meets weight and size requirements of truck (refer to serial plate). NEVER operate truck with an undersized battery.

## Charging

Charging requirements will vary depending on use of truck. A battery with a specific gravity of 1.160 should be recharged. In some applications more than one battery is required to provide ample power to the unit during the service period.

**CAUTION**

*Never smoke or bring open flame near the battery. Gas formed during charging is highly explosive and can cause serious injury.*

Consult the charger manufacturer's manual covering your charger for hints on operation and maintenance. Some of the basic rules are as follows:

**Placing battery on charge:**

- Park truck at charging station with forks lowered and key removed.
- Make certain charger control is in off position.
- Connect battery to charger and make certain connectors are mated completely.
- Set timer for specified time. Set for normal (Daily Charge, except one night a week when the equalize [Weekend] Charge should be used).
- Check ammeter to make certain it shows charge.

**Removing battery from charge:**

- Make certain charger is turned off.
- Unplug the connector, using both hands with a straight pulling motion.
- Hang up the charger cable to prevent damage to the cable. (Broken connectors can cause poor connections and connector failures.)
- Make daily battery checks, add distilled water as needed.
- Connect battery to truck. Make certain connections are mated completely.

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## Battery Cleaning

Always keep vent plugs tightly in place when cleaning battery. When properly watered and charged, the battery will remain clean and dry. All that is necessary is to brush or blow off any dust or dirt that may accumulate on them. However, if electrolyte is spilled or overflows from a cell, it should be neutralized with a solution of baking soda and water (one pound to one gallon of water). To do this, remove battery from truck and clean with the solution of baking soda and water, brushing the soda solution beneath the connectors and removing grime from the covers. Then rinse the battery with cool water from a low pressure supply to remove the soda and loosen dirt. If batteries stay wet consistently, they may be either overcharged or over filled. This condition should be investigated and corrected.

## Troubleshooting

Records of battery specific gravity readings, charger used, truck used, etc. can be a most effective troubleshooting aid. Contact your dealer for charts specifically for this purpose.

Voltage readings of each cell taken at the normal charger finish rate also indicate battery condition. New batteries will have cell voltages from 2.55 volts to 2.65 volts. Older batteries may however range from 2.45 volts to 2.55 volts. These readings still indicate a battery in good condition.

A variation of .20 volts may be normal if certain cells are exposed to higher temperatures during discharge. Voltage differences that cannot be attributed to battery age or operating conditions indicate a weak cell(s) and maintenance is required.

**CAUTION**

*Only qualified and experienced personnel should perform maintenance and repair on batteries.*

## Battery Removal

**CAUTION**

*Don't allow any metallic objects to come in contact with the top of the battery cells. This may cause a short circuit when removing, installing or transporting the battery. Use an insulator (such as plywood) to cover the top of the battery before and during removal and installation.*

1. Turn key switch off.
2. Disconnect battery.

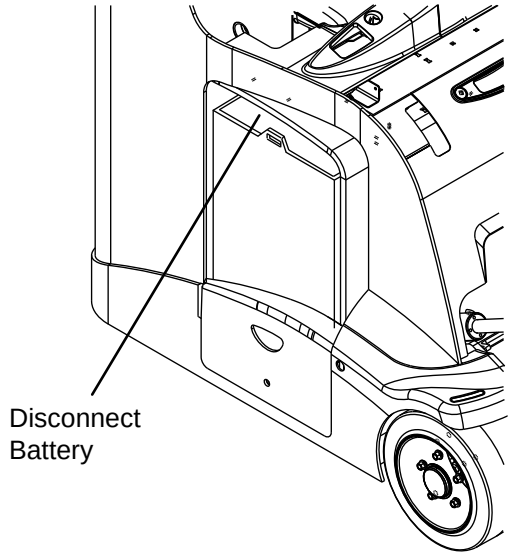



Figure 16003

3. Remove battery retainer (one side only).

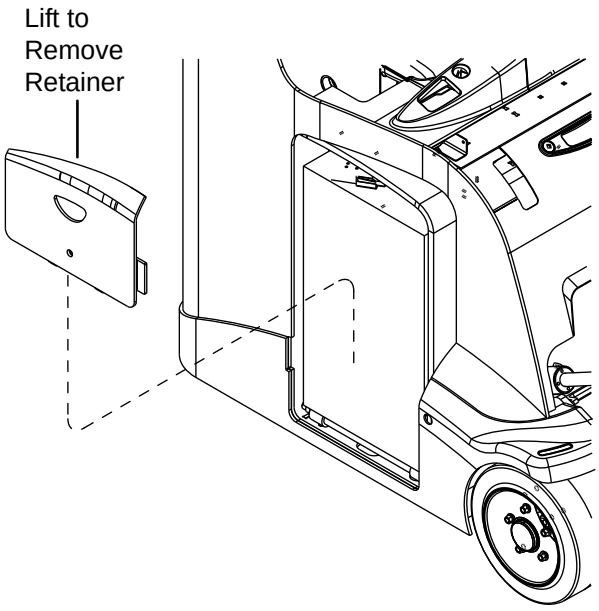



Figure 16004

4. Position battery roller stand next to truck. Align stand with battery. Battery roller stand should be the same height as the truck's battery compartment rollers and as long as or longer than battery.

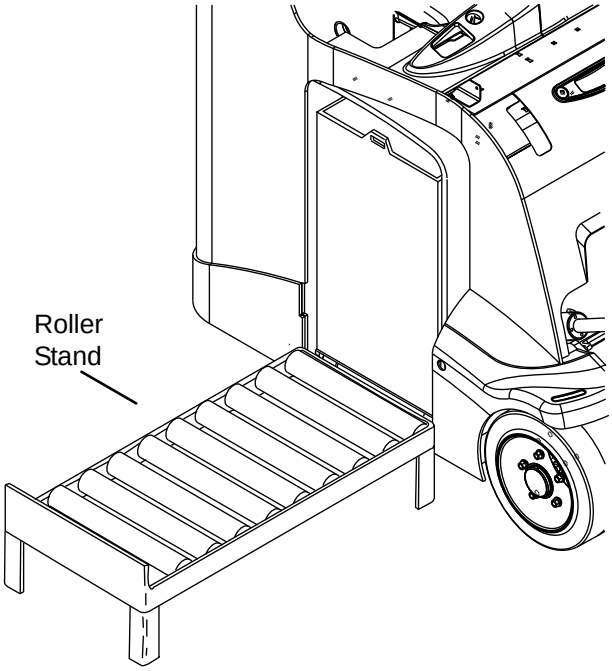



Figure 16005

5. Roll battery onto stand. Using approved spreader bar, lift and move battery to charging area.

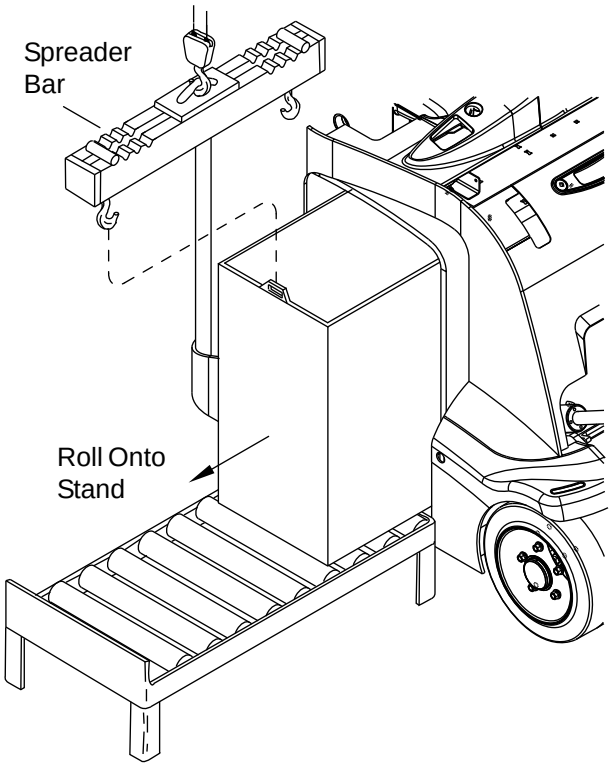



Figure 16006

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## Battery Installation

**CAUTION**

*Don't allow any metallic objects to come in contact with the top of the battery cells. This may cause a short circuit when removing, installing or transporting the battery. Use an insulator (such as plywood) to cover the top of the battery before and during removal and installation.*

1. Check to be sure key switch is turned off.
2. Remove battery retainer (one side only).

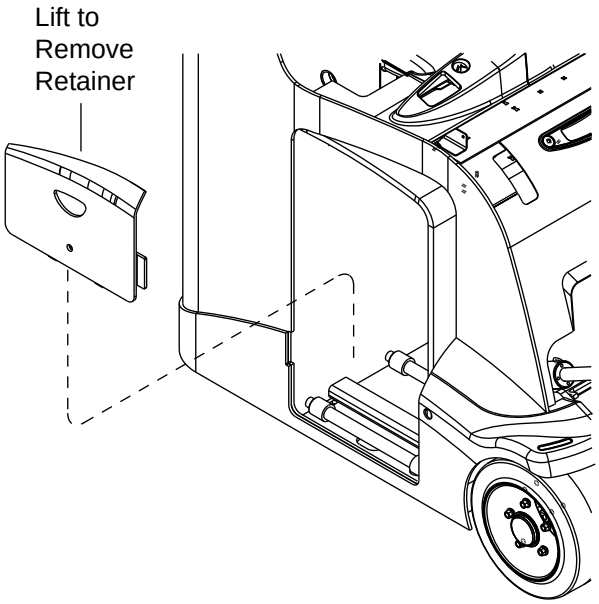



Figure 16007

3. Position battery roller stand next to truck. Align stand with battery compartment. Battery roller stand should be the same height as the truck's battery compartment rollers and as long as or longer than battery.

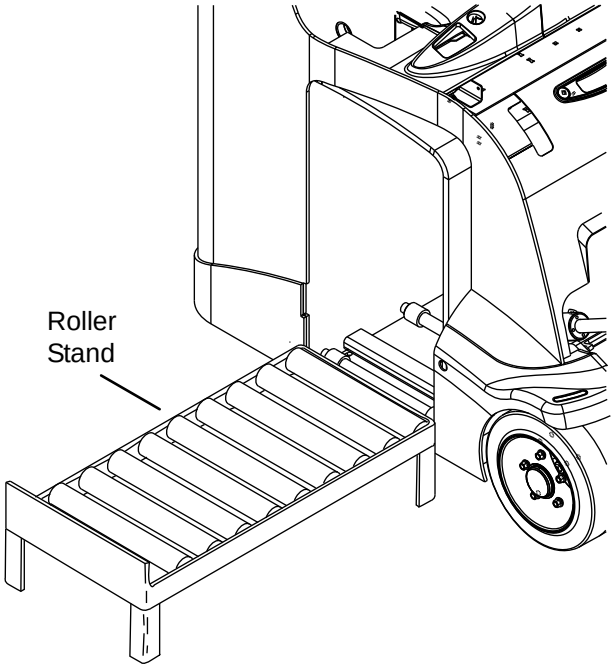



Figure 16008

4. Using approved spreader bar, move battery onto roller stand and push battery compartment.

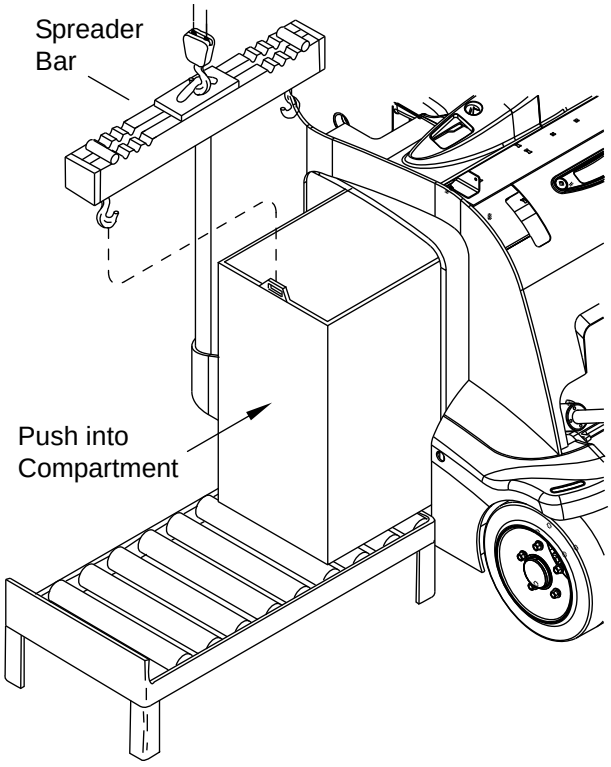



Figure 16009

5. Remove roller stand and install battery retainer.

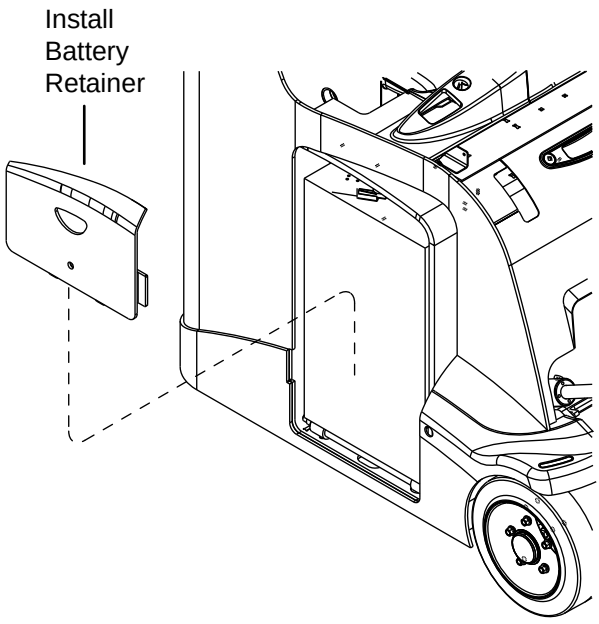



Figure 16010

6. Connect battery.

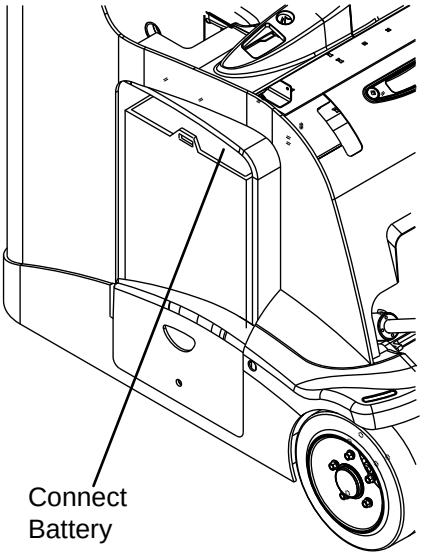



Figure 16011

7. Turn key switch on and check truck operation.

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## Motors

This truck is equipped with a left and a right AC motor that provide traction, and a DC motor that powers the hydraulic pump. The traction motors have ECR1/ECR2 sensors to monitor speed and position. The ECR1 is internal in the right hand motor, the ECR2 in the left. The standard hydraulic pump motor is DC, with AC being optional. Pump motor has ECR4 to monitor pump direction and speed. This is internal to the motor.

Refer to Section M6.2 for information regarding the steer motor.

**Chart 1 - Motor Information**

| Motor Function | Traction | Traction - EE | Hydraulic | Hydraulic | Hydraulic - EE |
|---|---|---|---|---|---|
| **Part Number** | 021084 | 021184 | 021122 | 021099 | 021185 |
| **Motor Type** | AC Induction | AC Induction | AC Induction | DC | AC Induction |
| **Voltage** | 36 | 36 | 36 | 36 | 36 |
| **Rated Output kW (HP)** | 4.8 (6.43) | N/A | 7.9 (10.59) | 7.9 (10.59) | 7.9 (10.59) |
| **RPM** | 1690 | 1690 | 1600 | 2465 | 1600 |
| **Direction of Rotation** | Bi-Directional | Bi-Directional | CCW | CCW | CCW |
| **Motor Diameter mm (in)** | 190.5 (7.5) | 190.5 (7.5) | 190.5 (7.5) | 170.18 (6.7) | 190.5 (7.5) |
| **Number of Brushes** | N/A | N/A | N/A | 4 | N/A |
| **Internal Sensors** | ECR1/ECR2 | ECR1/ECR2 | ECR4 | ECR4 | ECR4 |

Check motor for shorts between terminals and motor frame by use of an ohmmeter on a high resistance scale such as R x 10,000. If a reading of less than 50,000 ohms is observed, the source of trouble should be repaired before unit is placed into operation to prevent further damage.

## Pump Motor and Brush Inspection

1. Disconnect battery.
2. Remove the hydraulic unit mounting bolts and tilt unit just enough to access top of motor. Remove headband and commutator end head.
3. Clean brush band area and remove brush band.
4. Clean dirt and carbon dust from winding and brush holder with low pressure air. Use a clean, dry cloth to clean commutator. (Do not use emery cloth.)
5. Brushes should be replaced when they reach a length of 10 mm (0.375 in) or will reach that length before the next scheduled inspection.
6. Check brush springs to see they maintain tension against the commutator equally on all brushes.

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## Notes:

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# Event Codes

ACCESS 123® Module Listing:

ACCESS 1: Display Control Module (DCM)

ACCESS 2: Hydraulic Control Module (HCM)

ACCESS 3: Traction Control Module (TCM)

ACCESS 7: Accessory Control Module (ACM)

**CAUTION**

*After replacing an ACCESS 123 module or updating software, verify that the performance and features settings are correct. Recalibrate as needed (refer to "Calibration" in ACCESS 123…System" section of the service manual).*

**Some Troubleshooting Basics**

Statistically the majority of malfunctions occur in or at output devices, such as relay tips, contactors and motors. The next components to test are connectors, wiring and input devices such as switches, potentiometers or encoders. When measuring the voltage and resistance of these components, use a digital volt ohm meter (DVOM). The last component to suspect is the ACCESS 123 control module. In all instances, you should begin your troubleshooting procedure at the driven (output) device, proceed to input devices, then, and only then, move on to the ACCESS 123 control module to which these devices attach. Be sure to reconnect all components previously disconnected after completing the event code steps.

**WARNING**

*Never key ON truck with any control connectors disconnected. In addition, never remove or connect any control connectors while the truck is keyed ON.*

**When a Malfunction Occurs**

- From ACCESS 1, navigate to the Service menu, select Level 2 and enter the password.
- Navigate to the events menu and access the event code(s).

**NOTE**

*Your monitoring system can be accessed at three levels of authorization:*
*Level 1: Operator Mode*
*Level 2: Field Service Mode (Full Truck Operation)*
*Level 3: Analyzer/Test Mode (No Truck Operation)*

This section deals with Level 2 and Level 3. For information on Level 1 see the Operators Manual. Refer to ACCESS 123..System for menu navigation charts and menu explanations.

**Software**

Software updates can sometimes eliminate events so you should periodically check to be sure the truck has the latest software. To ensure the software is the latest version, enter Level 2 from ACCESS 1 and scroll to the Utilities Menu. Call your local Crown dealer for software updates.

**No Event Code?**

When the truck malfunctions and no event code is displayed it usually means the malfunction is not electrical.

If the truck powers up but a code is not displayed, the malfunction is probably mechanical or hydraulic rather than electrical. Information regarding mechanical and hydraulic troubleshooting is located in this Manual.

**To Locate Malfunctioning Components**

Component and Wiring Location Maps are provided at strategic locations to help you quickly determine the physical location of items in question.

All components are clearly marked at the connection points.

## Capacitance

**CAUTION**

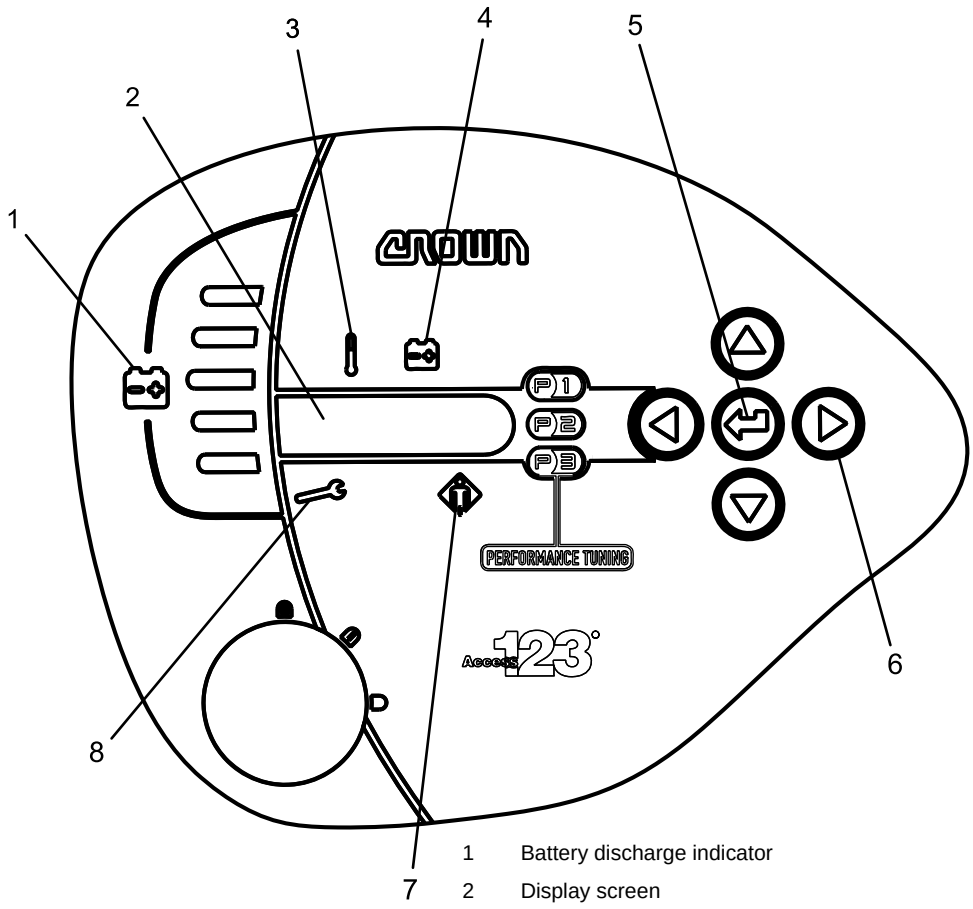
*Due to capacitance voltage present in the ACCESS 3 traction control module and ACCESS 2 hydraulic control module, whenever performing maintenance which may permit contact with the bus bars and associated power cables, discharge the capacitors.*

- *Move truck to a secure non-traffic maintenance area with a level floor.*
- *Lockout and tagout truck as described in Lockout - Tagout in this section.*
- *Disconnecting the battery will discharge the capacitors. Once the dash display flashes, the capacitors are discharged. Two alternative methods of discharging these capacitors are to disconnect the battery and hold the key switch in the "start" position for 10 seconds or disconnect the battery and connect a 200 ohm, 2 watt resistor between the positive and negative terminals on the controller.*
- *Turn key switch to OFF, remove key.*

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### ACCESS 1 Display Control Module (DCM)




1 Battery discharge indicator
2 Display screen
3 Motor temperature indicator (viewable during initial key ON, self test and indicator functioning)
4 Battery retainer switch indicator (viewable during initial key ON, self test and indicator functioning)
5 Enter or return key used to navigate in and out of menus, drive test outputs and select/input settings
6 Navigation keys (up, down, left and right arrow) used to scroll through menus
7 Operator improper sequence error indicator (viewable during initial key ON, self test and indicator functioning)
8 Service required indicator (viewable during initial key ON, self test and indicator functioning)

Figure 15761-01

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## Event Code 100

**ACCESS 1 brake off test issue.**

**Step 1:** Re-key truck.

- If: Event returns.
  - Then follow event codes 102 and 103 to verify brake circuit.
- If: OK.
  - Then replace ACCESS 1.

## Event Code 101

**ACCESS 1 did not pass self test.**

**Step 1:** Check voltage at ACCESS 1 CA215-17 (+) and CA215-4 (-).

- If: 35 to 38 Vdc.
  - Then re-key truck, replace ACCESS 1 if event returns.
- If: Less than 35 Vdc.
  - Then issue exists in power-up circuit. Repair as necessary.

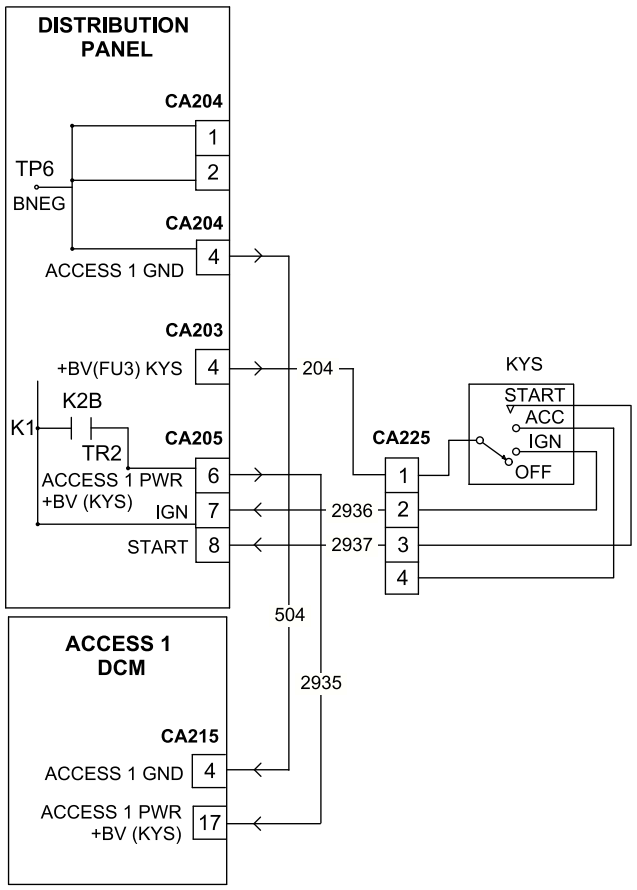



Figure 15770-02


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## Event Code 102

**Left hand brake coil (BRK2) shorted.**

**Step 1:** Disconnect CA435, connect DVOM and check resistance of brake coil.

- If: Less than 6.0 ohms.
  - Then replace BRK2 coil.
- If: Greater than 6.0 ohms.
  - Proceed to step 2.

**Step 2:** Connect DVOM to CA435-1 and CA435-2. Enter Level 3, navigate to Analyzer menu A4.1.2 BRK2. Press enter on the display and record DVOM reading.

- If: Approximately 15 volts.
  - Then replace BRK2 coil.
- If: Less than approximately 15 volts.
  - Proceed to step 3.

**Step 3:** Connect DVOM to CA215-16 and CA215-1. Enter Level 3, navigate to Analyzer menu A4.1.2 BRK2. Press enter on the display and record DVOM reading.

- If: Approximately 15 volts.
  - Then check wiring and connections between CA215 and BRK2.
- If: Less than approximately 15 volts.
  - Then replace ACCESS 1.

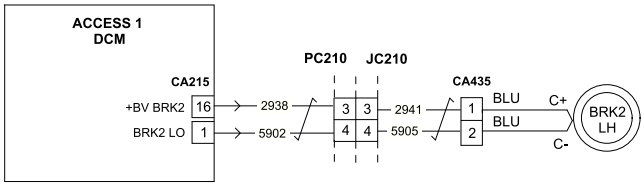



Figure 15773

## Event Code 103

**Right hand brake coil (BRK1) shorted.**

**Step 1:** Disconnect CA436, connect DVOM and check resistance of brake coil.

- If: Less than 6.0 ohms.
  - Then replace BRK1 coil.
- If: Greater than 6.0 ohms.
  - Proceed to step 2.

**Step 2:** Connect DVOM to CA436-A and CA436-B. Enter Level 3, navigate to Analyzer menu A4.1.1 BRK1. Press enter on the display and record DVOM reading.

- If: Approximately 15 volts.
  - Then replace BRK1 coil.
- If: Less than approximately 15 volts.
  - Proceed to step 3.

**Step 3:** Connect DVOM to CA215-9 and CA215-2. Enter Level 3, navigate to Analyzer menu A4.1.1 BRK1. Press enter on the display and record DVOM reading.

- If: Approximately 15 volts.
  - Then check wiring and connections between CA215 and BRK2.
- If: Less than approximately 15 volts.
  - Then replace ACCESS 1.

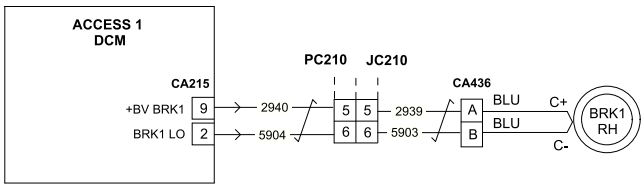



Figure 15775

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## Event Code 104

**ACCESS 1 brake test issue.**

**Step 1:** Verify connections and wiring at brakes, CA435, CA436, CA210 and CA215, at ACCESS 1.

- If: Connections correct.
  - Then re-key truck.
- If: Event clears.
  - Then monitor truck.
- If: Event returns.
  - Then replace ACCESS 1.

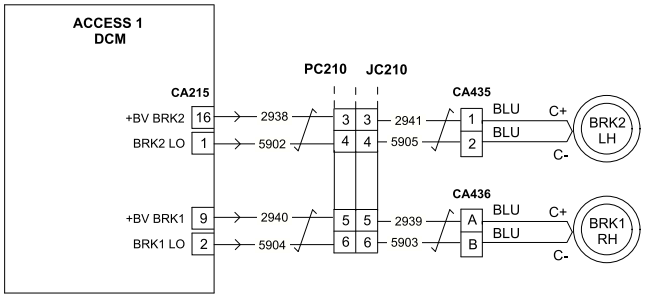



Figure 15776

## Event Code 105

**Left hand brake coil (BRK2) open.**

**Step 1:** Disconnect CA435, connect DVOM and check resistance of brake coil.

- If: Greater than 6.0 ohms.
  - Then replace BRK2 coil.
- If: 6.0 ohms or less.
  - Proceed to step 2.

**Step 2:** Disconnect CA215 and check continuity of wiring between CA215 and CA435.

- If: No continuity.
  - Repair/replace wiring or connections.
- If: Continuity.
  - Proceed to step 3.

**Step 3:** Connect DVOM to CA215-16 and CA215-1. Enter Level 3, navigate to Analyzer menu A4.1.2. Press enter on the display and record DVOM reading.

- If: Approximately 15 volts.
  - Check for loose connections, power up truck and monitor operation.
- If: Less than approximately 15 volts.
  - Replace ACCESS 1.

***Note:*** *This code is only generated at power up, when traction is requested or when the brake is applied to park the truck.*

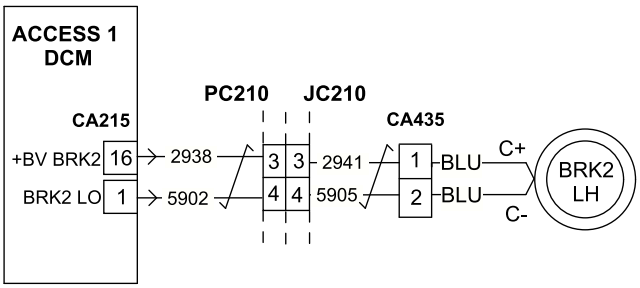



Figure 16343-01


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# Event Code 106

**Right hand brake coil (BRK1) open.**

**Step 1:** Disconnect CA436, connect DVOM and check resistance of brake coil.

- If: Greater than 6.0 ohms.
  - Then replace BRK2 coil.
- If: 6.0 ohms or less.
  - Proceed to step 2.

**Step 2:** Disconnect CA215 and check continuity of wiring between CA215 and CA436.

- If: No continuity.
  - Repair/replace wiring or connections.
- If: Continuity.
  - Proceed to step 3.

**Step 3:** Connect DVOM to CA215-9 and CA215-2. Enter Level 3, navigate to Analyzer menu A4.1.1. Press enter on the display and record DVOM reading.

- If: Approximately 15 volts.
  - Check for loose connections, power up truck and monitor operation.
- If: Less than approximately 15 volts.
  - Replace ACCESS 1.

***Note:*** *This code is only generated at power up, when traction is requested or when the brake is applied to park the truck.*

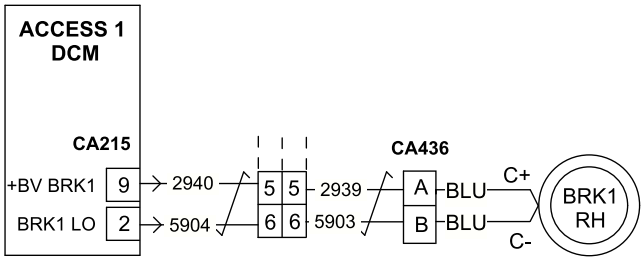



Figure 16344-01

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# Event Code 107

**SVA3 solenoid coil shorted.**

This code only applies to trucks with a 3rd hydraulic accessory.

**Step 1:** Disconnect leads from SVA3, connect DVOM across coil and check resistance.

- If: Approximately 0 ohm.
  - Then coil shorted, replaced coil.
- If: Resistance is OK.
  - Then proceed to Step 2.

**Step 2:** Disconnect CA205 and CA215. Check for continuity of wires between connectors.

- If: No continuity.
  - Then repair/replace wiring.
- If: Continuity.
  - Then proceed to Step 3.

**Step 3:** Connect DVOM to CA205-12 and +BV.

- If: 0 V
  - Then repair/replace distribution panel or wiring.
- If: Battery volts
  - Then proceed to Step 4.

**Step 4:** Connect DVOM to CA215-23 and CA205-12. Enter Level 3, navigate to Analyzer menu A4.1.4 SVA3. Press enter on the display and record DVOM reading.

- If: Approximately 30 V.
  - Check for loose connections, power up truck and monitor operation.
- If: Less than approximately 30 V
  - Replace ACCESS 1.

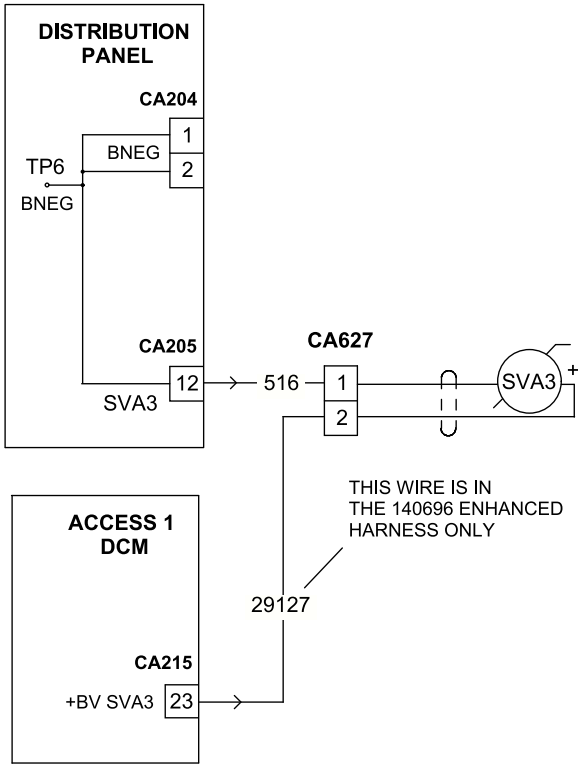



Figure 15777-01


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# Event Code 108

**ACCESS 3 loses power.**

ACCESS 7 is still powered. A single flashing BDI LED is displayed if present at start up.

**Step 1:** Check voltage at CA403-3 (+) and BNEG.

- If: Less than 35 Vdc.
  - Then check wiring and fuse, FU5, from KYS to FU5 to CA403-3 and repair.
- If: Between 35 to 38 Vdc.
  - Then check ACCESS 3 CAN wiring CA401-1 and CA401-6 and repair. Refer to Event Code 300 for additional information.

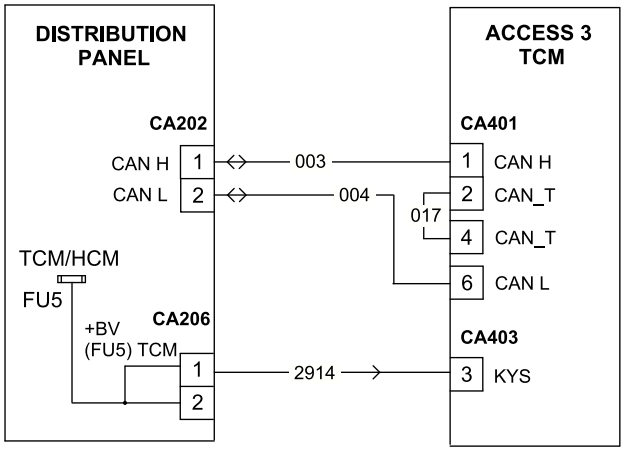



Figure 15778

# Event Code 109

**ACCESS 7 Lost CAN Communication.**

**Step 1:** Verify K1 is energized and ACCESS 2, 3 and 7 are powered up.(-).

- If: K1, ACCESS 2, 3 or 7 are not powered.
  - Then repair wiring as necessary.
- If: K1, ACCESS 2, 3 and 7 are powered.
  - Then proceed to Step 2.

**Step 2:** Check resistance at CAN wiring CA231-1 (high) and CA231-12 (low).

- If: 60 ohm.
  - Then CAN communication line is good, proceed to Step 3.
- If: Approximately 120 ohm.
  - Then connection between ACCESS 7 and ACCESS 1, 2 and 3 has been interrupted. Repair wiring as necessary.

**Step 3:** Check resistance from CAN wiring CA231-1 (high) to BNEG.

- If: Shorted to BNEG.
  - Then repair CAN wiring as necessary.
- If: Not shorted to BNEG.
  - Then proceed to Step 4.

**Step 4:** Check resistance from CAN wiring CA231-1 (high) and CA231-12 (low) to +BV.

- If: Shorted to +BV.
  - Then repair CAN wiring as necessary.
- If: Not shorted to +BV.
  - Replace ACCESS 7.

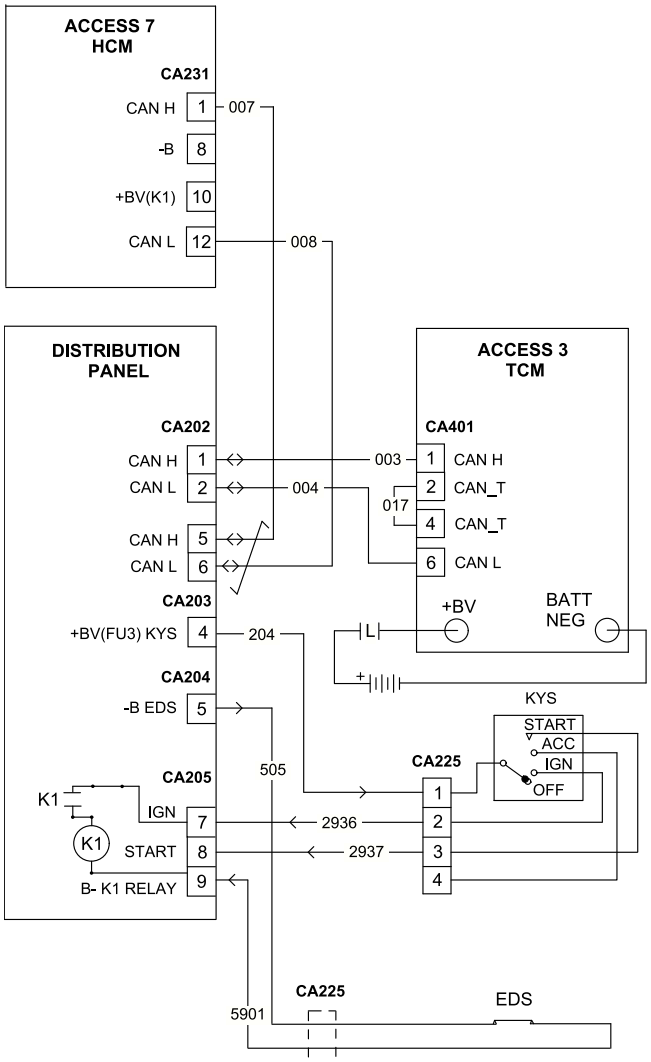



Figure 15779-01



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# Event Code 110

**ACCESS 1 Communication issue.**

**Step 1:** Check voltage at ACCESS 1 CA215-17 (+) and CA215-4 (-) and at CA403-3 (+) and BNEG.

- If: 35 to 38 Vdc.
  - Then follow Event 300 procedures.
- If: Less than 35 Vdc.
  - Then follow Event 303 procedures.

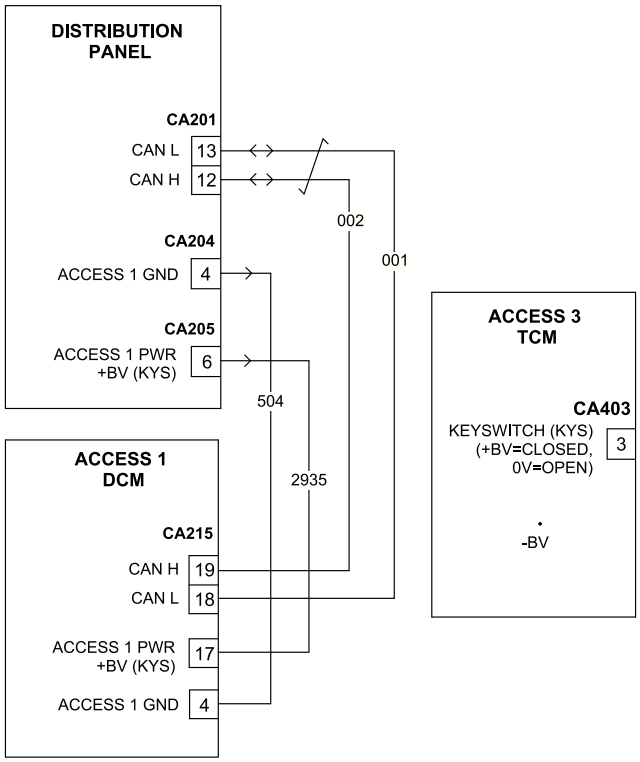



Figure 15783-01

# Event Code 111

**Brake switch mismatch.**

ACCESS 3 brake switch (BRKS) input is different than ACCESS 1 brake switch (BRKS) input.

**Step 1:** Enter Level 2, navigate to Analyzer menu A2.1.2 BRKS. Depress brake pedal. Display should show "1" when the brake pedal is depressed (switch closed) and "0" when the pedal is released (switch open).

- If: Correct.
  - Then proceed to step 3.
- If: Not correct.
  - Then proceed to step 2.

**Step 2:** Connect DVOM to CA215-14 and BNEG (TP6). Depress brake pedal. DVOM should display battery volts when the brake pedal is depressed (switch closed) and 0 volts when the pedal is released (switch open).

- If: Correct.
  - Then replace ACCESS 1.
- If: Not correct.
  - Then check wiring and connections between CA201-9 and CA215-14. Repair/replace as needed. If OK, proceed to step 5.

**Step 3:** Enter Level 2, navigate to Analyzer menu A2.3.3 BRKS. Depress brake pedal. Display should show "1" when the brake pedal is depressed (switch closed) and "0" when the pedal is released (switch open).

- If: Correct.
  - Check for loose connections, power up truck and monitor operation.
- If: Not correct.
  - Then proceed to step 4.

**Step 4:** Connect DVOM to CA403-9 and BNEG (TP6). Depress brake pedal. DVOM should display battery volts when the brake pedal is depressed (switch closed) and 0 volts when the pedal is released (switch open).

- If: Correct.
  - Then replace ACCESS 3.
- If: Not correct.
  - Then check wiring and connections between CA201-6 and CA403-9. Repair/replace as needed. If OK, proceed to step 5.

**Step 5:** Check voltage between CA201-9 and TP6 (BNEG) and between CA201-6 and TP6 (BNEG).

- If: Both checks are battery volts.
  - Check for loose connections, power up truck and monitor operation.
- If: Either check is less than battery volts.
  - Then replace distribution panel.

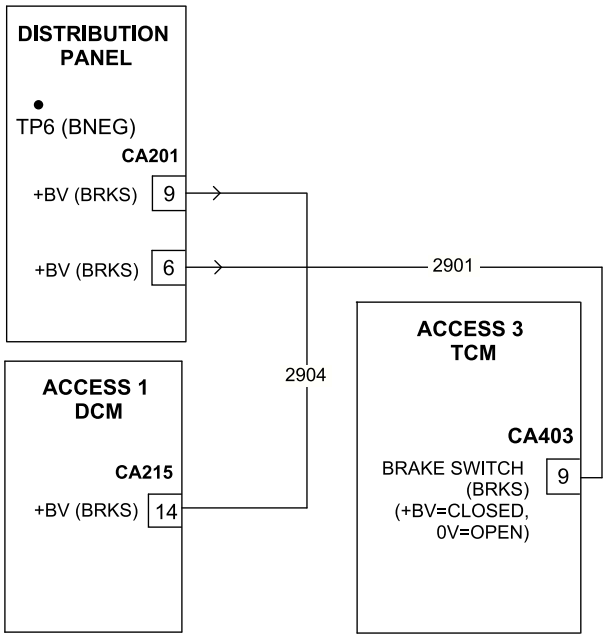



Figure 15784-01

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# Event Code 112

**Staging switch mismatch.**

ACCESS 3 height switch (HGTS1) input different than ACCESS 1 height switch (HGTS1) input.

**Step 1:** Enter the Analyzer menu A2.1.4 then A2.3.4 and record the reading of each with key on, operator on presence switch and mast below staging height.

- If: A2.3.4 reads “1” while A2.1.4 reads “0”.
  - Then proceed to Step 2.
- If: A2.1.4 reads “1” while A2.3.4 reads “0”.
  - Then proceed to Step 3.

**Step 2:** Check voltage between ACCESS 3 CA403-10 (+) and TP6 (-) on the distribution panel with key on, operator on presence switch and mast below staging height.

- If: Battery volts.
  - Then replace ACCESS 3.
- If: Battery volts.
  - Then check wiring and connections between CA201-8 on distribution panel and CA408-10 on ACCESS 3. Repair/replace as needed. If OK, proceed to Step 4.

**Step 3:** Check voltage between CA215-15 (+) on ACCESS 1 and TP6 (-) on the distribution panel with key on, operator on presence switch and mast below staging height.

- If: Battery volts.
  - Then replace ACCESS 1.
- If: Less than battery volts.
  - Then check wiring and connections between CA201-11 on the distribution panel and CA215-15 on ACCESS 1. Repair/replace as necessary. If OK, proceed to Step 4.

**Step 4:** Check voltage between CA201-8 and TP6 (-) and between CA201-11 and TP6 (-) on the distribution panel with key on, operator on presence switch and mast below staging height.

- If: Both checks are battery volts.
  - Then re-key and monitor truck.
- If: Either check is less than battery volts.
  - Then replace distribution panel.

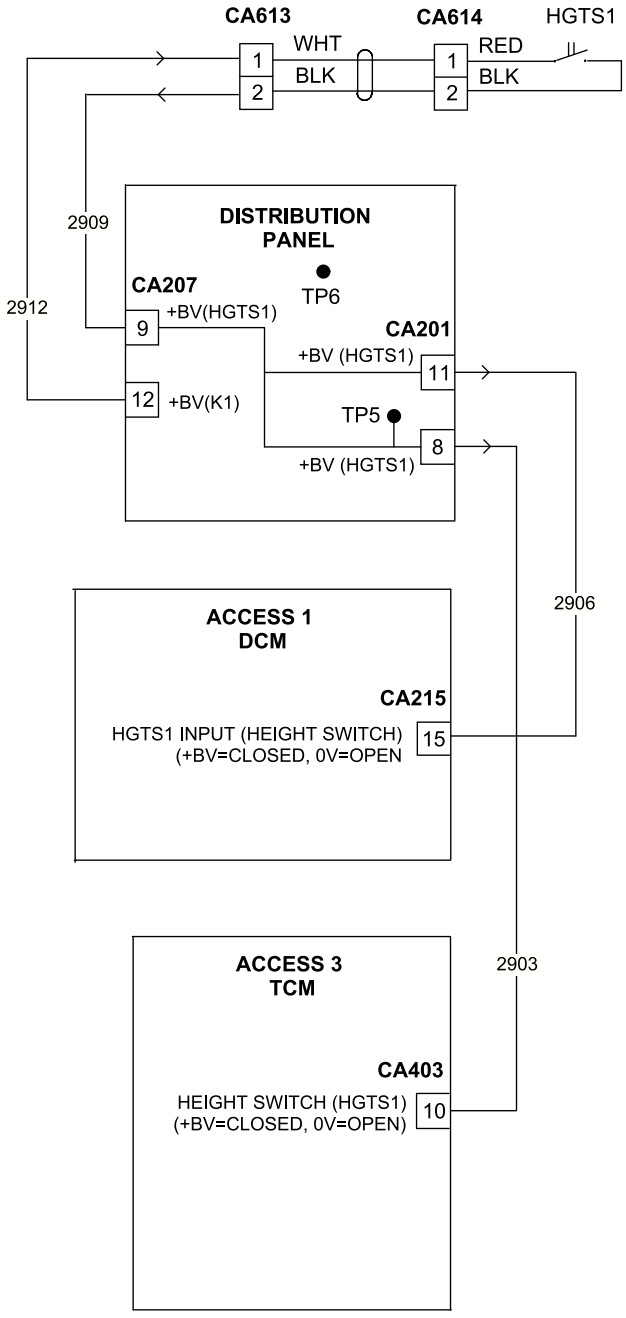



Figure 15785-01

https://truckmanualshub.com/

# Event Code 113

**Foot Presence Switch mismatch.**

ACCESS 3 foot presence switch (DMS1, DMS2 and DMS3) input is different than ACCESS 1 foot presence switch (DMS1, DMS2 and DMS3) input.

**Step 1:** Enter Level 2, navigate to Analyzer menu A2.1.3 DMS. Depress floorboard. Display should show "1" when the floorboard is depressed (switch closed) and "0" when the floorboard is released (switch open).

- If: Correct.
  - Then proceed to step 3.
- If: Not correct.
  - Then proceed to step 2.

**Step 2:** Connect DVOM to CA215-8 and BNEG (TP6). Depress brake pedal. DVOM should display battery volts when the brake pedal is depressed (switch closed) and 0 volts when the pedal is released (switch open).

- If: Correct.
  - Then replace ACCESS 1.
- If: Not correct.
  - Then check wiring and connections between CA201-10 and CA215-8. Repair/replace as needed. If OK, proceed to step 5.

**Step 3:** Enter Level 2, navigate to Analyzer menu A2.3.3 BRKS. Depress brake pedal. Display should show "1" when the brake pedal is depressed (switch closed) and "0" when the pedal is released (switch open).

- If: Correct.
  - Check for loose connections, power up truck and monitor operation.
- If: Not correct.
  - Then proceed to step 4.

**Step 4:** Connect DVOM to CA403-5 and BNEG (TP6). Depress brake pedal. DVOM should display battery volts when the brake pedal is depressed (switch closed) and 0 volts when the pedal is released (switch open).

- If: Correct.
  - Then replace ACCESS 3.
- If: Not correct.
  - Then check wiring and connections between CA201-7 and CA403-5. Repair/replace as needed. If OK, proceed to step 5.

**Step 5:** Check voltage between CA201-7 and TP6 (BNEG) and between CA201-10 and TP6 (BNEG).

- If: Both checks are battery volts.
  - Check for loose connections, power up truck and monitor operation.
- If: Either check is less than battery volts.
  - Then replace distribution panel.

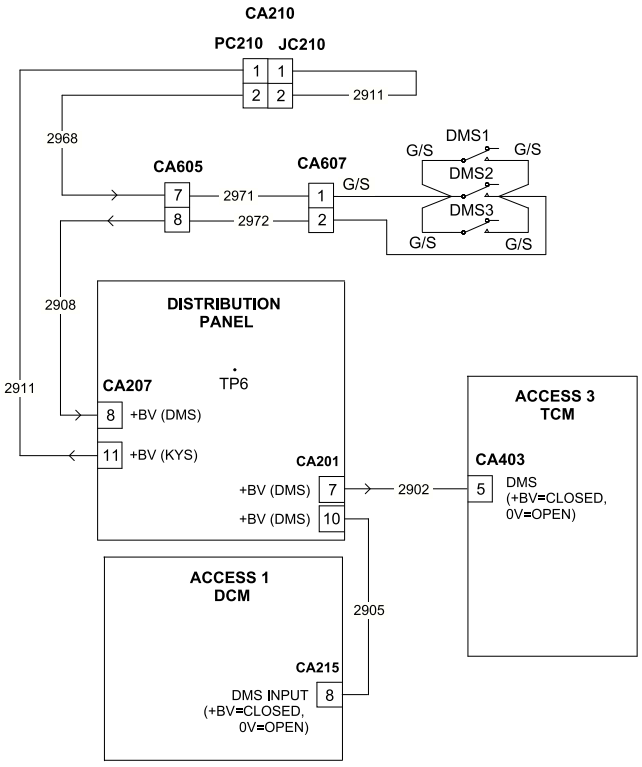



Figure 15786

https://truckmanualshub.com/



# Event Code 114

**SVBY Solenoid coil shorted.**

Short circuit condition of the SVBY load or ACCESS 1 driver.

**Step 1:** Disconnect wires to SVBY coil. Key up truck and attempt to raise.

- If: 114 code is no longer present.
  - Then SVBY coil is shorted, replace. Resistance should measure approximately 29 ohms.
- If: 114 code is present.
  - Then proceed to Step 2.

**Step 2:** Disconnect CA215-22. Key up truck and attempt to raise.

- If: 114 code is not present.
  - Then repair wiring between CA215-22 and SVBY coil.
- If: 114 code is present.
  - Then replace ACCESS 1.

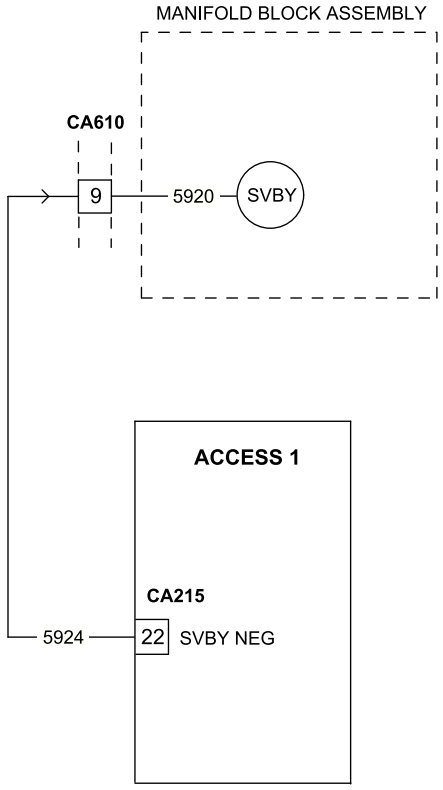



Figure 16345

# Event Code 199

**Software Incompatible between ACCESS 1 and ACCESS 3.**

**Step 1:** Enter the Utilities menu U1.1.2 and U1.3.2 and record the software part numbers. Re-key truck.

- If: Event continues after re-key.
  - Then contact Crown Service for software updates.

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# Event Code 200

**Loss of CAN Communication from ACCESS 2 to ACCESS 1 Display.**

**Step 1:** Check +BV and BNEG power connections to ACCESS 2.

- If: OK.
  - Then proceed to Step 2.

**Step 2:** Check CAN communication path. With key off check resistance across pins CA202-3 and CA202-4 on the Distribution Panel. Correct measurement is 60 ohm. Across pins CA201-12 and CA201-13 is 60 ohm.

- If: 60 Ohm.
  - Then CAN communication line is correct. Proceed to Step 4.
- If: Approximately 120 ohm.
  - Proceed to Step 3.

**Step 3:** Connection between ACCESS 2 and ACCESS 1 has been interrupted. Check for loose connection at CA405-18 and CA405-19 on ACCESS 2 (DC) or CA406-1 and CA406-3 (AC) module or CA215-18 and CA215-19 on ACCESS 1.

- If: Connection loose.
  - Repair/replace connection.
- If: Connections OK.
  - Proceed to Step 4.

**Step 4:** Disconnect CA215 from ACCESS 1. Measure resistance across pins CA215-18 and CA215-19 (CAN low and CAN high). The correct measurement is approximately 120 ohm.

- If: Less or greater than 120 ohm.
  - Replace ACCESS 1.
- If: Approximately 120 ohm.
  - Proceed to Step 5.

**Step 5:** Disconnect CA405 on ACCESS 2 and measure across pins 18 and 19 (On AC Models, disconnect CA406 on ACCESS 2 and measure resistance across pins 3 and 1). The correct measurement is approximately 120 ohm.

- If: Resistance is less than or greater than 120 ohm.
  - Replace ACCESS 2.
- If: Resistance measures approximately 120 ohm.
  - Then proceed to Step 6.

**Step 6:** Check CAN low line for continuity from CA405 pin 19 (CA406 pin 1 for AC lift models) to CA215 pin 19.

- If: High resistance or open connection is measured.
  - Then a short or open circuit has occurred. Trace wiring and repair/replace as necessary.

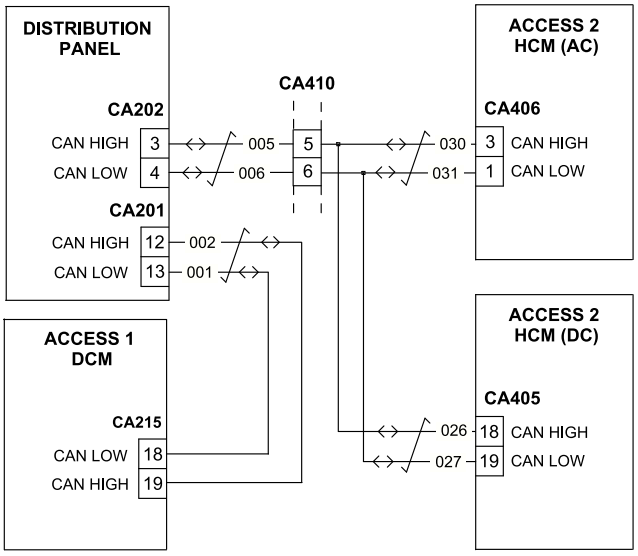



Figure 15981


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# Event Code 201

**ACCESS 2 Logic Issue.**

An under voltage or over voltage condition has occurred in ACCESS 2.

**Step 1:** Check for shorted or loose power connections at battery and ACCESS 2. An issue in the BNEG circuit is more likely to cause this code then +BV. Repair/replace as necessary.

**Step 2:** Check for battery volts between +BV and BNEG power connections at ACCESS 2.

- If: Battery volts correct.
  - Then perform C3.4 battery adjust calibration.
- If: Less than battery volts.
  - Then proceed to Step 3.

**Step 3:** Verify that pump contactor is closed.

***Note:*** *DMS1, 2, or 3 must be closed (floorboard must be depressed).*

- If: Pump contactor closed.
  - Then check FU2 pump fuse and pump contactor tip condition. Repair/replace as necessary.
- If: Pump contactor open.
  - Then proceed to Step 4.

**Step 4:** Verify proper voltage at contactor coil. Pump contactor coil voltage should be 36 Vdc at pull in and 24 Vdc after approximately one second.

- If: Coil voltage is correct.
  - Then replace pump contactor.
- If: Voltage is out of range.
  - Then proceed to Step 5.

**Step 5:** With key on and truck powered on, check for battery volts +BV at TP8. Use TP6 Battery negative as reference.

- If: Battery volts correct.
  - Then proceed to Step 6.
- If: Less than battery volts.
  - Then check for battery volts +BV at FU5, Keyswitch (KYS) and K1 relay tips. Repair/replace component as necessary.

**Step 6:** Check for battery volts +BV at CA405-33 (DC) or CA409-1 (AC).

- If: Battery volts correct.
  - Then replace ACCESS 2.
- If: Less than battery volts.
  - Then check wiring for open circuit between CA206-2 on distribution panel and CA405-33 (DC) or CA409-1 (AC).

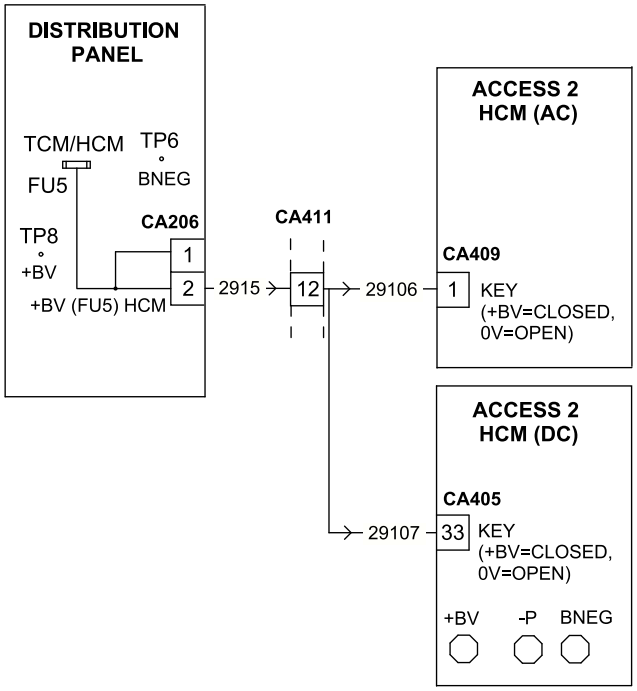



Figure 15984-02

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## Event Code 202

**Motor voltage output Low (AC Hydraulic units only).**

**Step 1:** Check voltage at hydraulic motor power cable connections, with keyswitch ON and P contactor pulled in. Use BNEG on ACCESS 2 as reference.

- If: Less than 15 Vdc.
  - Then proceed to Step 2.
- If: Greater than 20 Vdc.
  - Then proceed to Step 3.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 2:** Verify BNEG is present at ACCESS 2 power connection by moving positive meter lead to +BV at battery.

- If: 35 to 38 Vdc.
  - Then proceed to Step 3.
- If: 0 Vdc.
  - Then issue exists in BNEG power circuit. Repair as necessary.

**Step 3:** Check voltage at hydraulic motor output (U, V & W) on ACCESS 2 with key on. Use BNEG on ACCESS 2 as reference.

- If: Less than 15 Vdc.
  - Then follow Event 201 procedures.
- If: Greater than 20 Vdc.
  - Then replace ACCESS 2.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 4:** Verify power cables are connected correctly between motor and ACCESS 2 module.

- If: Cables connected correctly.
  - Then proceed to Step 5.
- If: Cables incorrectly connected.
  - Then repair/replace as necessary.

**Step 5:** Check for open hydraulic motor. Remove power cables from motor, measure and record resistance across each of the following phases (U to V), (U to W), (V to W).

- If: Open.
  - Then replace motor.
- If: Greater than 1 ohm resistance.
  - Then replace the motor.
- If: Less than 1 ohm resistance.
  - Then replace ACCESS 2.

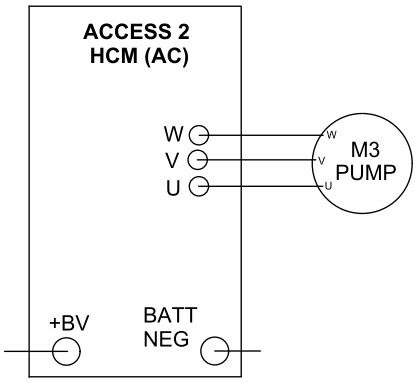



Figure 15995

## Event Code 202

**Hydraulic motor voltage output low (DC Hydraulic units only).**

**Step 1:** If problem occurs at start up, P contactor will not close. Remove A or D cable to motor and verify continuity through motor, good connection to BV+, and greater than 10,000 ohms to truck chassis.

If problem occurs after P contactor closes, proceed to Step 4.

- If: Continuity incorrect.
  - Repair/replace wiring, connections or motor.
- If: Continuity correct.
  - Then proceed to Step 2.


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**Step 2:** Check P contactor wiring connections and measure voltage across coil.

- If: 0 Vdc.
  - Then proceed to Step 3.
- If: 35-38 Vdc.
  - Then replace P contactor.

**Step 3:** Check voltage across CA405-26 and CA405-27 on ACCESS 2.

- If: 0 Vdc.
  - Then replace ACCESS 2.
- If: 35-38 Vdc.
  - Then repair/replace wiring or connections from ACCESS 2 to P coil.

**Step 4:** Check voltage at hydraulic motor power cable connections, with key switch ON and P contactor pulled in. Use BNEG on ACCESS 2 as reference.

- If: Less than 35 Vdc.
  - Then proceed to Step 5.
- If: Greater than 35 Vdc.
  - Then proceed to Step 6.

**Step 5:** Verify BNEG is present at ACCESS 2 power connection by moving positive meter lead to (B+) at battery.

- If: 0 Vdc.
  - Then issue exists in BNEG power circuit. Repair as necessary
- If: 35 to 38 Vdc.
  - Then proceed to Step 6.

**Step 6:** Check voltage at hydraulic motor output (+BV) and (-P) on ACCESS 2 with key on, and P contactor pulled in.

- If: Less than 15 Vdc.
  - Then follow Event 201 procedures.
- If: Greater than 20 Vdc.
  - Then replace ACCESS 2.
- If: 15 to 20 Vdc.
  - Then proceed to Step 7.

**Step 7:** Verify power cables are connected correctly between motor and ACCESS 2.

- If: Cables connected correctly.
  - Then proceed to Step 8.
- If: Cables incorrectly connected.
  - Then repair/replace as necessary.

**Step 8:** Check for open hydraulic motor. Remove power cables from motor, measure and record resistance from A to D motor studs.

- If: Greater than 1 ohm resistance or open.
  - Then check brushes, replace motor.
- If: Less than 1 ohm resistance.
  - Then replace ACCESS 2.

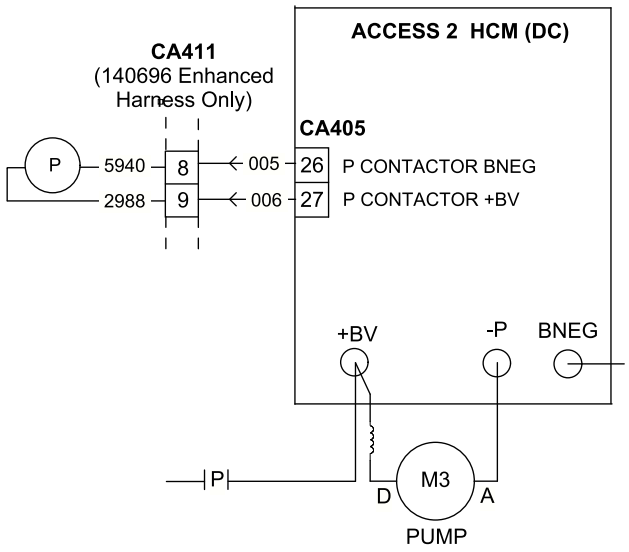



Figure 15996-02

https://truckmanualshub.com/

# Event Code 203

**High voltage on motor terminal outputs (DC Hydraulic units only).**

Problem is with motor connections, motor power circuit or controller. Check Event 201 procedures.

**Step 1:** Check voltage at hydraulic motor power cable connections, with Key on. Use BNEG on ACCESS 2 as reference.

- If: Less than 15 Vdc.
  - Then proceed to Step 2.
- If: Greater than 20 Vdc.
  - Then proceed to Step 3.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 2:** Verify BNEG is present at ACCESS 2 power connection by moving positive meter lead to +BV at battery.

- If: 35 to 38 Vdc.
  - Then proceed to Step 3.
- If: 0 Vdc.
  - Then issue exists in BNEG power circuit.

**Step 3:** Check voltage at traction motor output +BV and P- ACCESS 2 with key on and full speed lift engaged.

- If: Less than 35 Vdc.
  - Then proceed to Step 4.
- If: Greater than 35 Vdc.
  - Then replace ACCESS 2.

**Step 4:** Verify power cables are connected correctly between motor(s) and ACCESS 3.

- If: Cables connected correctly.
  - Then proceed to Step 5.
- If: Cables connected incorrectly.
  - Then repair/replace as necessary.

**Step 6:** Check for open hydraulic motor winding. Remove power cables from hydraulic motor. Measure resistance across A to D cable studs.

- If: Greater than 1 ohm or open.
  - Then check brushes. Replace motor as necessary.
- If: Less than 1 ohm.
  - Then replace ACCESS 2.

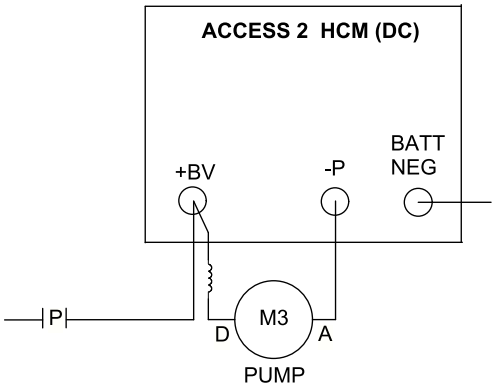



Figure 15996-01


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# Event Code 203

**High voltage on hydraulic terminal outputs (AC Hydraulic units only).**

**Step 1:** Check voltage at each hydraulic motor power cable connection, with Key on. Use BNEG on ACCESS 2 as reference.

- If: Less than 15 Vdc.
  - Then proceed to Step 2.
- If: Greater than 20 Vdc.
  - Then proceed to Step 3.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 2:** Verify BNEG is present at ACCESS 2 power connection by moving positive meter lead to +BV at battery.

- If: 35 to 38 Vdc.
  - Then proceed to Step 3.
- If: 0 Vdc.
  - Then issue exists in BNEG power circuit.

**Step 3:** Check voltage at hydraulic motor output (U, V & W) on ACCESS 2 with key on. Use BNEG on ACCESS 2 as reference.

- If: Less than 15 Vdc.
  - Then follow Event 201 procedures.
- If: Greater than 20 Vdc.
  - Then replace ACCESS 2.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 4:** Verify power cables are connected correctly between motor and ACCESS 2.

- If: Cables connected correctly.
  - Then proceed to Step 5.
- If: Cables connected incorrectly.
  - Then repair/replace as necessary.

**Step 5:** Check for open hydraulic motor. Remove power cables. Measure and record resistance across each of the following phases (U to V), (U to W), (V to W).

- If: Greater than 1 ohm or open.
  - Then replace motor.
- If: Less than 1 ohm resistance.
  - Then replace ACCESS 2.

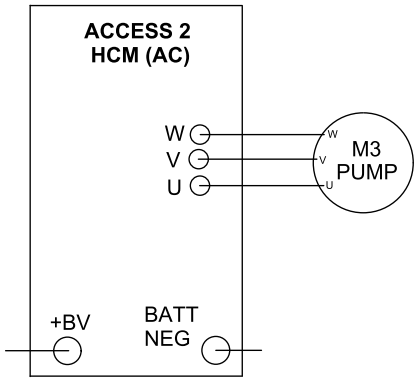



Figure 15995

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# Event Code 204

**Hydraulic motor current Low while motor is running (DC or AC Hydraulic models).**

**Step 1:** Verify hydraulic motor cables are connected to proper terminals at ACCESS 2 and motor.

- If: Connections not correct.
  - Connect properly.
- If: Connections correct.
  - Then proceed to Step 2.

**Step 2:** Check for loose coil connections at P contactor, CA411-8 and CA411-9, and at ACCESS 2 (AC) connector CA409-2 and CA409-8 and at ACCESS 2 (DC) connector CA405-26, CA405-27.

- If: Correct.
  - Then replace ACCESS 2.
- If: Not correct.
  - Then repair as necessary.

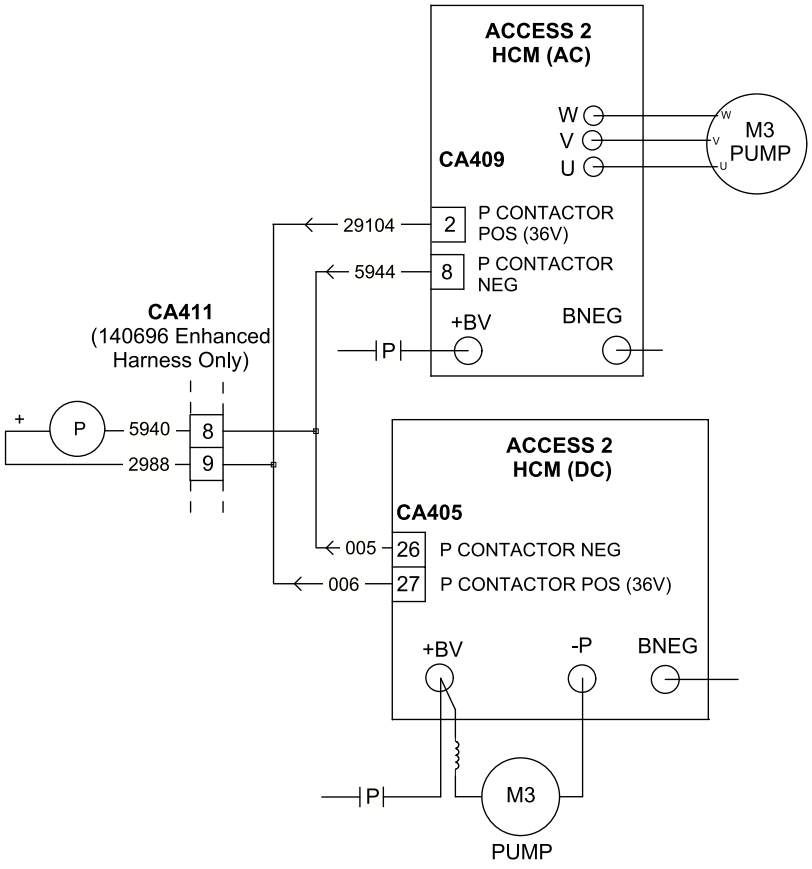



Figure 15997-01


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# Event Code 205

**ACCESS 2 detecting incorrect current in feedback circuit at standby (AC or DC Hydraulic models).**

**Step 1:** Verify hydraulic motor cables are connected to proper terminals at ACCESS 2 and motor.

- If: Connections not correct.
  - Connect properly.
- If: Connections correct.
  - Then proceed to Step 2.

**Step 2:** Check for open hydraulic motor. Remove power cables from hydraulic motor. Measure and record resistance across each of the following phases (U to V), (U to W), (V to W) - AC or (A to D) - DC.

- If: Open or greater than 1 ohm.
  - Then replace motor/brushes DC.
- If: Less than 1 ohm resistance.
  - Then replace ACCESS 2.

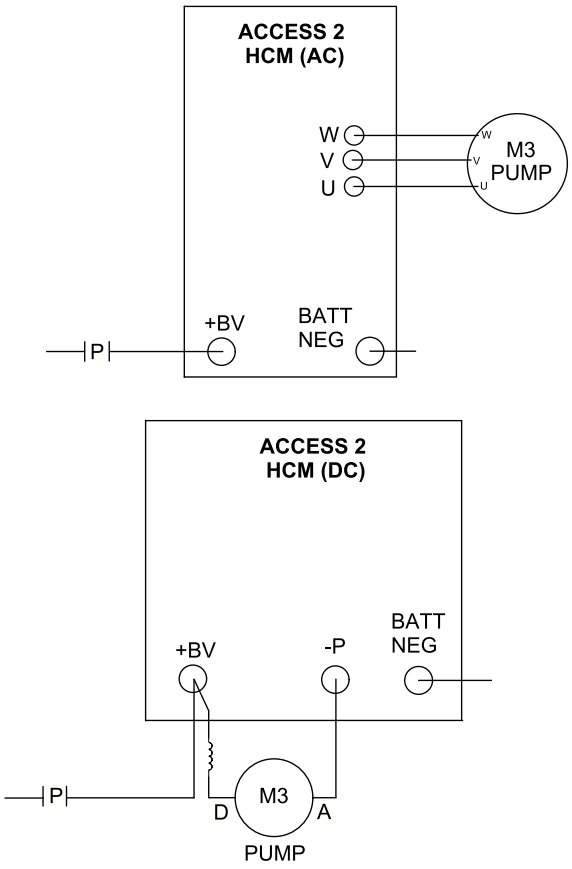



Figure 15998-01

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# Event Code 206

**ACCESS 2 detects pump contactor coil driver shorted (AC or DC Hydraulic models).**

**Step 1:** Verify the pump contactor coil is getting the proper voltage. With key on and operator present, place meter leads on wires at pump contactor coil.

- If: 17 to 22 Vdc, after contactor pulls in.
  - Then inspect contactor to make sure tips are in good condition and the contactor tips move without binding, repair/replace as necessary.

***Note:*** *Pump contactor coil resistance is 50 ohm.*

- If: Less than 17 Vdc.
  - Then proceed to Step 2.

**Step 2:** Verify pump contactor coil output between CA409-2 (+) and CA409-8 (-) (AC Hyd models) or CA405-27 (+) and CA405-26 (-) (DC Hyd models) at ACCESS 2.

- If: 17 to 22 Vdc.
  - Then issue exists in wiring between CA409 (AC Hyd models), CA405 (DC Hyd models), CA210 and pump contactor coil. Repair/replace as necessary.
- If: Less than 17 Vdc.
  - Then proceed to Step 3.

**Step 3:** Verify ACCESS 2 is getting proper key switch input voltage between CA409-1 (+) and BNEG (AC) or CA405-33 (+) and BNEG (DC).

- If: 33 to 35 Vdc.
  - Then replace ACCESS 2.
- If: Less than 33 Vdc.
  - Then issue exists in power up circuit. Check for open in circuit between KYS, K1, FU5 and CA409-1(AC) or CA405-33 (DC).


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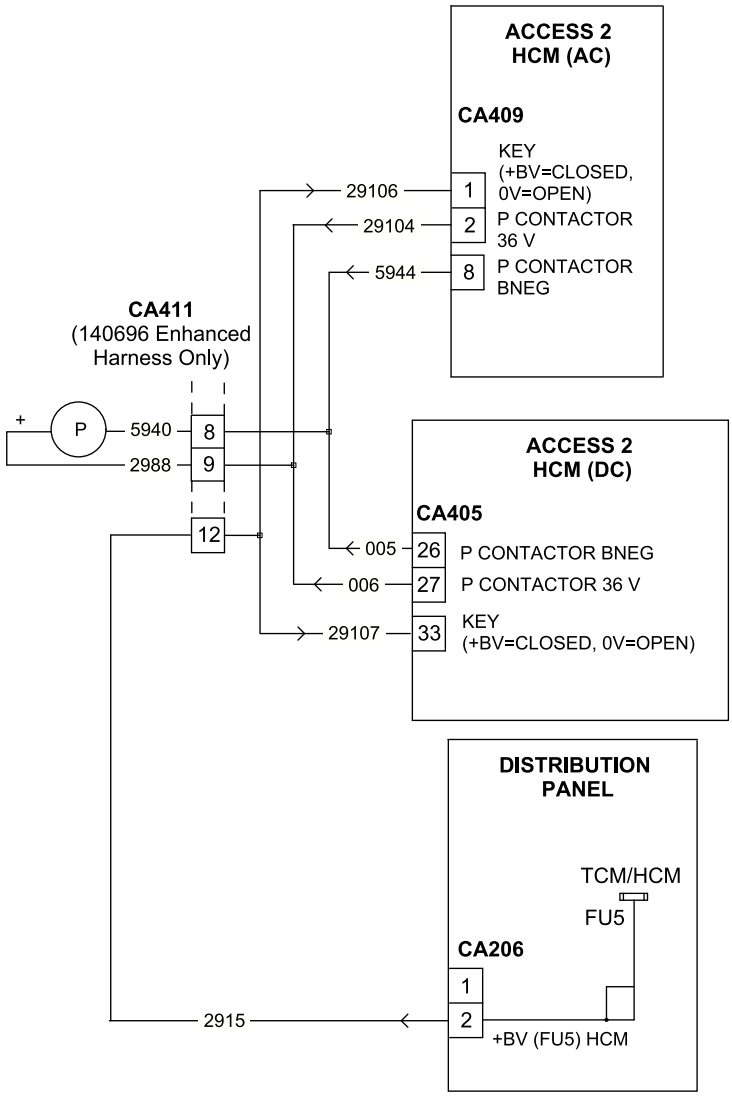



Figure 15999-02

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# Event Code 207

**Pump Contactor Driver Open (AC or DC Hydraulic models).**

**Step 1:** Measure voltage across P contactor coil while using Analyzer menu A4.2.2, to energize P Contactor coil.

- If: 33-35 Vdc.
  - Then replace P contactor.
- If: Less than 33 Vdc.
  - Proceed to Step 2.

**Step 2:** Check continuity of wiring from ACCESS 2, CA409-2(+) and CA409-8 (-) (AC Hyd models) or CA405-27 (+) and CA405-26 (-) (DC Hyd models).

- If: No continuity.
  - Repair/replace wiring or connections.
- If: Continuity OK.
  - Then replace ACCESS 2.

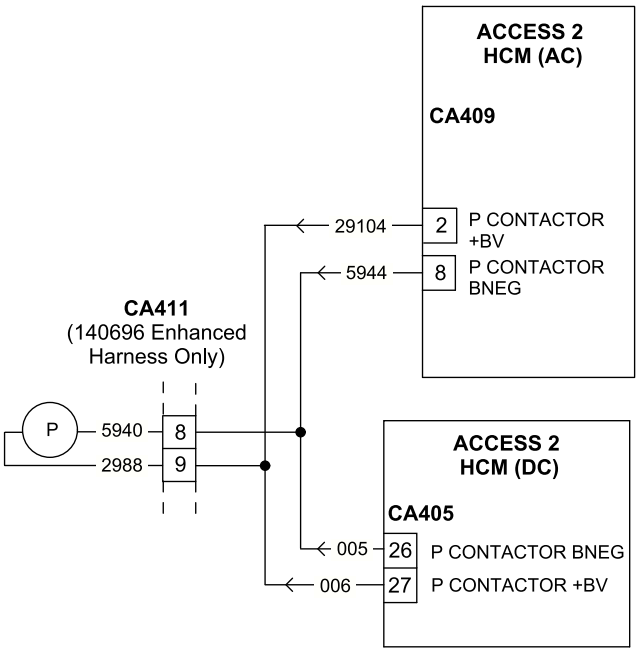



Figure 16000-01


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# Event Code 208

**Pump Contactor Coil Circuit Shorted (AC or DC Hydraulic models).**

**Step 1:** Verify the pump contactor coil is getting the proper voltage. With key on and operator present, place meter leads on wires at pump contactor coil.

- If: 17 to 22 Vdc, after contactor pulls in.
  - Then inspect contactor to make sure tips are in good condition and the contactor tips move without binding, repair/replace as necessary.

***Note:*** *Pump contactor coil resistance is approximately 50 ohm.*

- If: Less than 17 Vdc.
  - Then proceed to Step 2.

**Step 2:** Verify pump contactor coil output between CA409-2 (+) and CA409-8 (-) (AC Hyd models) or CA405-27 (+) and CA405-26 (-) (DC Hyd models) at ACCESS 2.

- If: 17 to 22 Vdc.
  - Then issue exists in wiring between CA409, CA405 and pump contactor coil. Repair/replace as necessary.
- If: Less than 17 Vdc.
  - Then proceed to Step 3.

**Step 3:** Verify ACCESS 2 is getting proper key switch input voltage between CA409-1 (+) and BNEG (AC) or CA405-33 (+) and BNEG (DC).

- If: 33 to 35 Vdc.
  - Then replace ACCESS 2.
- If: Less than 33 Vdc.
  - Then issue exists in power up circuit. Check for open in circuit between KYS, K1, FU5 and CA409-1(AC) or CA405-33) (DC).

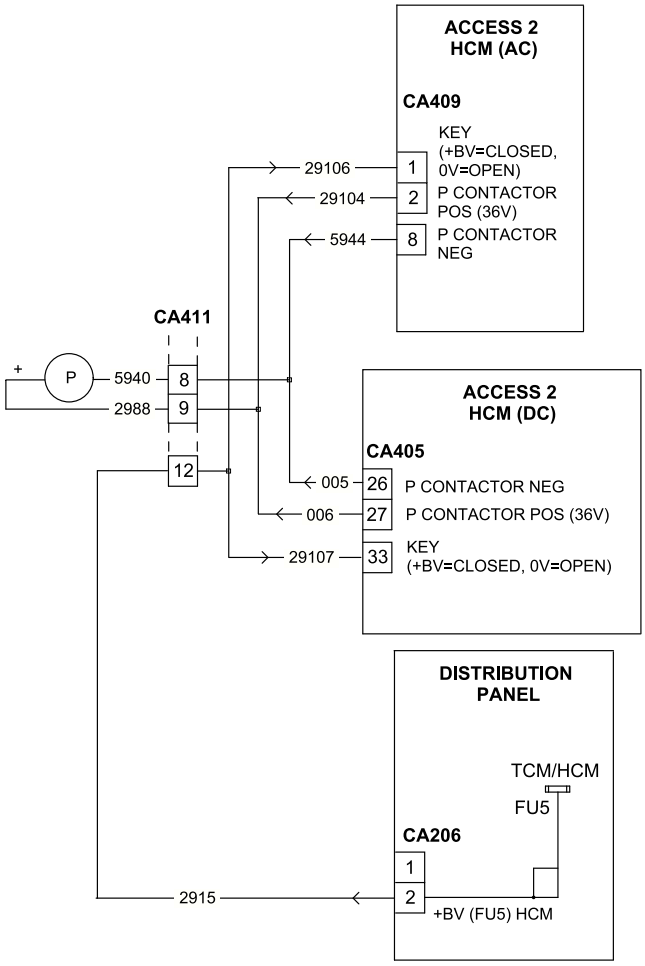



Figure 15999-01

## Event Code 209

**Incorrect battery voltage detected at ACCESS 2 (DC Hydraulic models only).**

**Step 1:** Verify correct battery is installed and charged.

- If: Correct battery installed and charge correct.
  - Then proceed to Step 2.

**Step 2:** Verify voltage powering ACCESS 2 logic is +BV. Check voltage at CA405-33 (+) and BNEG.

- If: Voltage is same as (+BV) cable.
  - Then proceed to Step 3.
- If: Voltage not same.
  - Then repair wiring to CA405-33.

**Step 3:** Perform C3.4 battery adjust calibration.

- If: Event clears.
  - Then return truck to service.
- If: Event does not clear.
  - Then replace ACCESS 2.

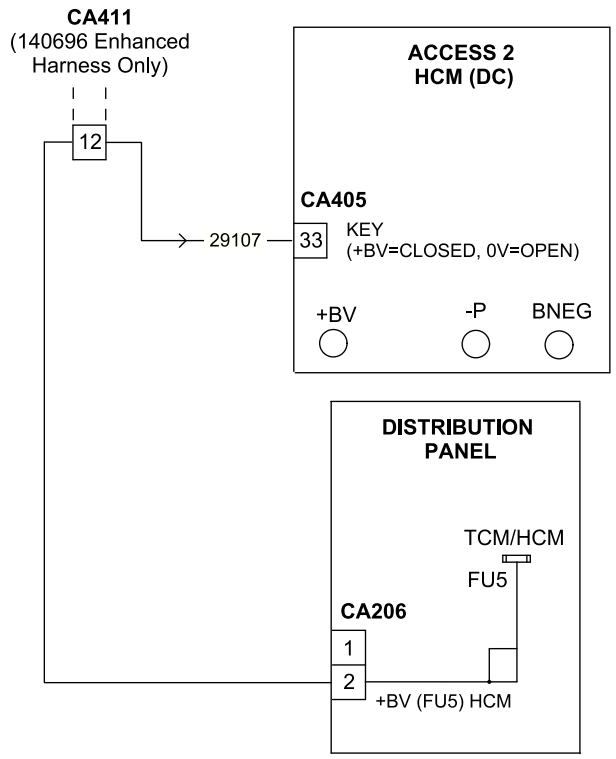



Figure 16001

## Event Code 212

**ACCESS 2 detects incorrect POT3 Accessory Potentiometer Input (AC Hydraulic models only).**

**Step 1:** Use Analyzer A2.2.7 and record input voltage range while accessory function (SS) is operated. Verify a consistent voltage change during rotation of control.

- If: Within range.
  - Then replace ACCESS 2.
- If: Not within range.
  - Then measure voltage at CA408-3 (-) and CA408-1 (+), replace pot and/or repair wiring.

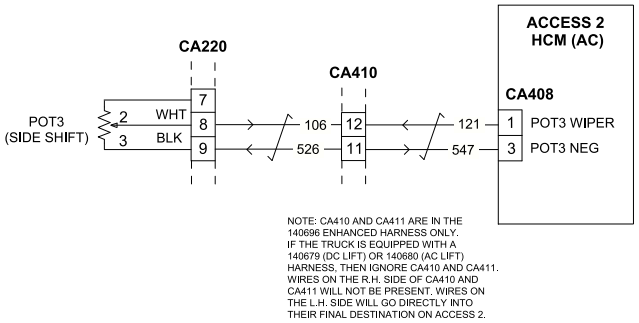



Figure 16002



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# Event Code 213

**ACCESS 2 lost CAN communication.**

**Step 1:** Verify +BV at CA231-7 and CA231-10 with negative reference at CA231-8 BNEG cable.

- If: Correct.
  - Then proceed to Step 2.
- If: Not correct.
  - Then verify KYS, K1 & FU5 operation and repair.

**Step 2:** Check CAN communication path. With key off check line resistance from CA202-3 to CA202-4 on the Distribution Panel. Correct measurement across pins 3 and 4 is 60 ohm. Across pins CA201-12 and CA201-13 is 60 ohm.

- If: 60 ohm.
  - Then CAN communication line is correct, proceed to Step 3.
- If: Approximately 120 ohm.
  - Then the CAN connection between ACCESS 2 and ACCESS 1 has been interrupted. Check for loose connection at CA405-18 and CA405-19 on ACCESS 2 (DC) or CA406-1 and CA406-3 (AC) module or CA215-18 and CA215-19 on ACCESS 1.
- If: Connections correct.
  - Then proceed to Step 3.

**Step 3:** Disconnect CA215 from ACCESS 1 Display. On the ACCESS 1 Display measure resistance across pins 18 and 19 (CAN low and CAN high). Correct measurement is approximately 120 ohm.

- If: 120 ohm.
  - Then disconnect CA405 on ACCESS 2 (DC) and measure across pins 18 and 19. (On AC Models, disconnect CA406 on ACCESS 2 and measure resistance across pins 3 and 1). The correct measurement is approximately 120 ohm.
- If: Resistance is less than or greater than 120 ohms on either ACCESS 1 or ACCESS 2.
  - Then the issue is internal to ACCESS 2. Replace ACCESS 2.
- If: The resistance measures approx 120 ohms on both ACCESS 1 and ACCESS 2.
  - Then proceed to Step 4.

**Step 4:** Disconnect CAN line at ACCESS 2. Check CAN low line for continuity from CA405-19 (DC) or CA406-1 (AC) to CA215-18.

- If: High resistance or open connection is measured.
  - Then a short or open circuit has occurred. Trace wiring and repair/replace as necessary.
- If: Low line is correct.
  - Then proceed to Step 5.

**Step 5:** Check CAN high line for continuity from CA405-18 (DC) or CA406-3 (AC) to CA215-19.

- If: High resistance or open connection is measured.
  - Then a short or open circuit has occurred. Trace wiring and repair/replace as necessary.
- If: Low line is correct.
  - Then replace ACCESS 2.

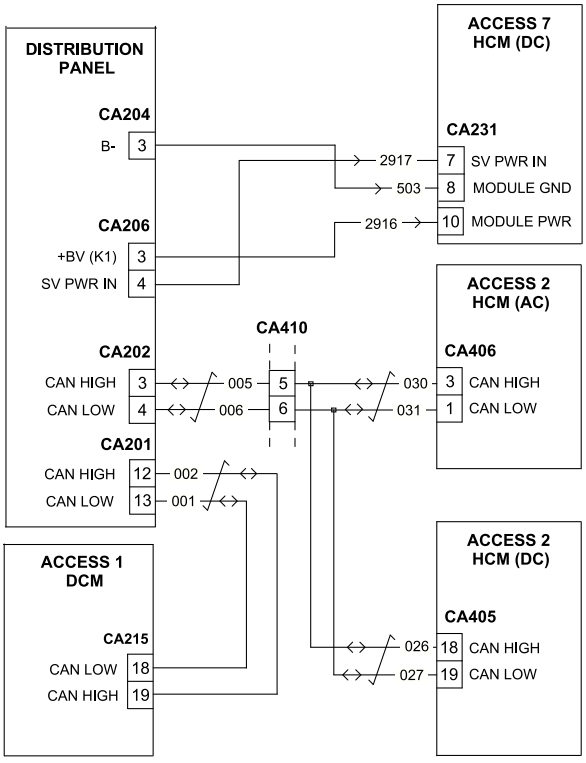



Figure 16012

https://truckmanualshub.com/

## Event Code 214

**Load Sense Transducer PT1 Output Out of Range (DC Hydraulic models).**

**Step 1:** Power down and disconnect battery. Reconnect battery and power up.

- If: Code continues.
  - Then replace PT1.
- If: Code still continues.
  - Then replace ACCESS 7.

## Event Code 215

**ACCESS 2 Travel Alarm (ALM2) Output Driver (DC Hydraulic models).**

**Step 1:** From ACCESS 1, proceed to Level 3, Analyzer menu A4.2.1 and with DVOM across ALM1, test drive output from Access 2.

- If: 33-35 Vdc and alarm sounds.
  - Then output driver is correct, check ALM1 wiring for shorts.
- If: Less than 33-55 Vdc.
  - Then output driver is not working. Proceed to Step 2.

**Step 2:** Verify Travel alarm (ALM2) is enabled. Navigate to F9 Features menu to check.

- If: Travel alarm is turned on.
  - Then replace ACCESS 2.
- If: Travel alarm is turned off.
  - Then turn on travel alarm.

## Event Code 216

**ACCESS 2 Travel Alarm (ALM2) Output Driver Shorted (DC Hydraulic models).**

**Step 1:** Verify Travel Alarm (ALM2) is enabled. Navigate to F9 Features menu to check. From ACCESS 1, proceed to Level 3, Analyzer menu A4.2.1 and with DVOM across ALM2, test drive output from ACCESS 2.

- If: 33-35 Vdc.
  - Then output driver is OK. Reset code and monitor for reoccurrence.
- If: Less than 33-35 Vdc.
  - Then output driver is not working, proceed to Step 2.

**Step 2:** Check for short from negative wire of ALM2 to BNEG by checking voltage from +BV to ALM2 negative wire.

- If: 33-35 Vdc.
  - Then negative wire is shorted to BNEG, trace wire to CA405-28 and repair wiring.
- If: Less than 5 Vdc.
  - Then proceed to Step 3.

**Step 3:** Disconnect wires and check ALM2 for internal short using ohmmeter, should read 35 to 45 ohm.

- If: Less than 35 ohm.
  - Then replace ALM2.
- If: 35-45 ohm.
  - Then replace ACCESS 2.

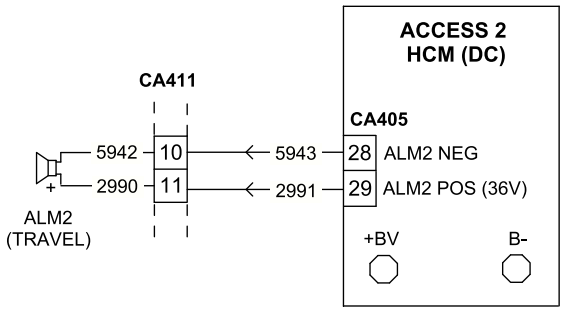



Figure 16017


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# Event Code 217

**ACCESS 2 Travel Alarm (ALM2) Reads Short across Output (DC Hydraulic models).**

**Step 1:** From ACCESS 1, Level 3, Analyzer menu A4.2.1 and with DVOM across ALM2, test drive output from ACCESS 2.

- If: 33-35 Vdc.
  - Then output driver is ok, reset code and monitor for reoccurrence.
- If: Less than 33-35 Vdc.
  - Then output driver is not working or is sensing a short circuit; proceed to Step 2.

**Step 2:** Check for short from negative wire of ALM2 to +BV by checking voltage from BNEG to ALM2 positive wire.

- If: 33-35 Vdc.
  - Then negative wire is shorted to +BV, trace wire to CA405-28 and repair wiring.
- If: Less than 5 Vdc.
  - Then proceed to Step 3.

**Step 3:** Disconnect wires and check ALM2 for internal short using ohmmeter, should read 35 to 45 ohm.

- If: Less than 35 ohm.
  - Then replace ALM2.
- If: 35-45 ohm.
  - Then replace ACCESS 2.

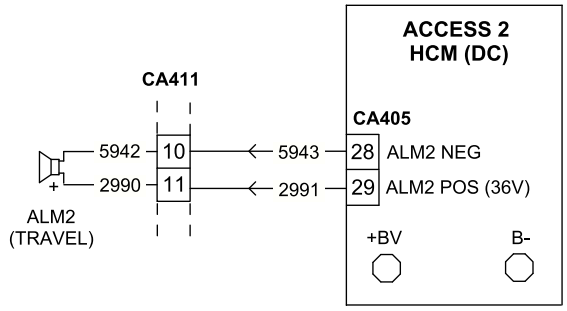



Figure 16017

https://truckmanualshub.com/

# Event Code 218

**ECR4 (Hyd Sensor bearing) Feedback Issue.**

Hydraulic motor encoder feedback does not match ACCESS 2 output.

**Step 1:** From ACCESS 1, Level 2, proceed to Service Analyzer menu A2.2.8 and A2.2.9 and monitor ECR4 and RPM Target inputs while operating lift. Range is 800 to 3200 RPM.

- If: Inputs within range.
  - Then replace ACCESS 2.
- If: Inputs do not follow changes in motor speed during operation.
  - Then proceed to Step 2.

**Step 2:** Use DVOM to check from positive (CA420-3) and negative (CA420-6) at Hydraulic motor. Power supply should be approximately 11.3 Vdc.

- If: OK.
  - Then proceed to Step 3.

**Step 3:** Use DVOM to check from positive (CA405-1) and negative (CA405-2) at ACCESS 2. Power supply should be approximately 11.3 Vdc.

- If: OK
  - Then repair/replace wiring/connection between CA405 and CA420.
- If: Less than 11.3 Vdc.
  - Then replace ACCESS 2.

**Step 4:** Check ECR4 wiring for proper continuity from ACCESS 2 to pump connector CA405-13 (Ch A) to CA420-5 and CA405-14 (Ch B) to CA420-4. Verify wiring not shorted.

- If: Wiring not OK.
  - Then repair/replace wiring or connections.
- If: Wiring checks OK.
  - Then replace sensor bearing (ECR4).

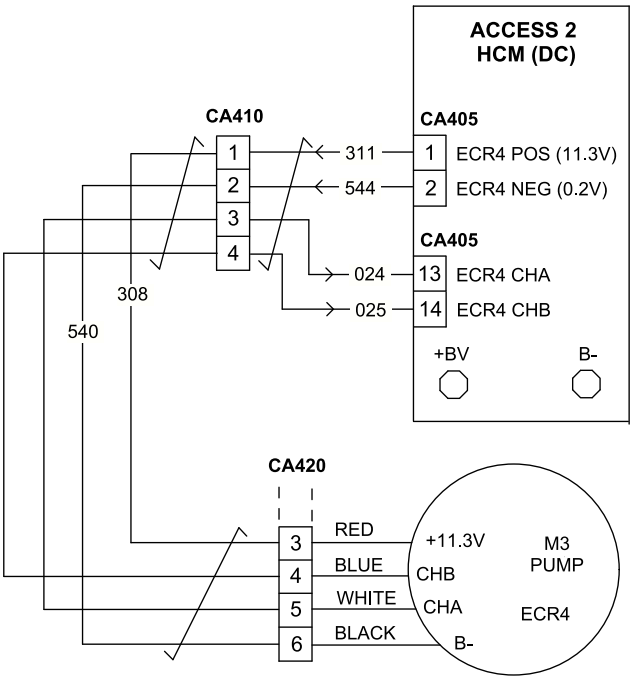



Figure 16018


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## Event Code 219

**ACCESS 2 detects U, V & W voltage feedback circuit out of range (AC Hydraulic Models).**

***Note:*** *If event 222 flashes briefly after start up then changes to event 219, check for open in the P contactor power circuit.*

**Step 1:** Check U, V, & W motor cables for shorts and verify connections are correct and secure.

- If: Cables correct.
  - Then proceed to Step 2.
- If: Cables are not correct, repair as necessary.

**Step 2:** Verify P contactor contacts are closed and operates correctly.

- If: P contactor works correctly.
  - Then proceed to Step 3.
- If: P contactor does not work correctly.
  - Then follow Event Code 222 instructions.

**Step 3:** Inspect P contactor tips and measure voltage drop across tips.

- If: More than 0.5 Vdc.
  - Then replace P contactor tips.
- If: Less than 0.5 Vdc.
  - Then replace ACCESS 2.

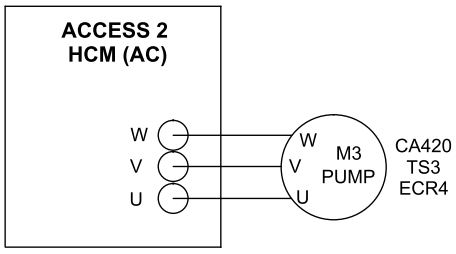



Figure 16019

## Event Code 220

**ACCESS 2 overload protection circuit (AC Hydraulic models).**

Verify motor turns freely.

**Step 1:** Check power cable connections at ACCESS 2, motor power cables for short to each other and that motor power cables are connected to the correct terminals on hydraulic motor and ACCESS 2.

- If: Cable connections tight, cables are not shorted together and are on proper terminals.
  - Then proceed to Step 2.

**Step 2:** Disconnect U, V, and W cables at hydraulic motor. Verify low resistance from U to V, V to W and U to W cable lugs.

- If: Motor checks OK.
  - Then replace ACCESS 2.
- If: Motor windings are bad.
  - Then replace hydraulic motor.

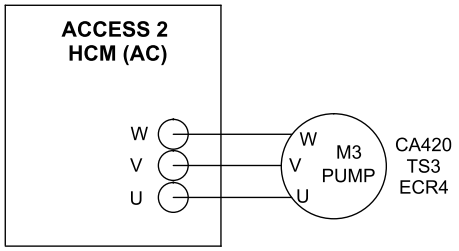



Figure 16019

## Event Code 221

**P Contactor Shorted (AC Hydraulic models).**

**Step 1:** With Key off, measure voltage at +BV on ACCESS 2 while referencing BNEG cable for negative.

- If: +BV has greater than 5 Vdc.
  - Then proceed to Step 2.
- If: +BV is 0 Vdc.
  - Then replace ACCESS 2.

**Step 2:** Remove power cable to P contactor.

- If: Voltage drops to 0 Vdc.
  - Then replace P contactor.
- If: Voltage does not drop.
  - Then replace ACCESS 2.

## Event Code 222

**Voltage not present at ACCESS 2 +BV terminal after power up sequence.**

***Note:*** *If event 222 flashes briefly after start up then changes to event 219, the event is caused by an open in the P (pump) contactor power circuit.*

**Step 1:** Verify P (pump) contactor is closed. Key must be on and operator standing on the floorboard (presence switch closed).

- If: P contactor closed.
  - Then proceed to Step 2.
- If: P contactor open.
  - Then follow Event 221 procedures.

**Step 2:** Check voltage between +BV and BNEG power cable connections on ACCESS 2.

- If: 35 to 38 Vdc.
  - Then replace ACCESS 2.
- If: Less than 35 Vdc.
  - Then follow Event 201 procedures.

## Event Code 223

**ACCESS 2 capacitor not charging after power up sequence (AC Hydraulic models only).**

Power capacitor charge does not increase when key is turned on and operator present (DMS closed).

**Step 1:** Check voltage between +BV and BNEG power connections at ACCESS 2, with key on and operator present.

- If: 35 to 38 Vdc.
  - Then replace ACCESS 2.
- If: Less than 35 Vdc.
  - Then follow Event 201 procedures.


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# Event Code 224

**ECR4 (Pump motor encoder) feedback lost (AC Hydraulic models only).**

***Note:*** *This event code is only monitored while hydraulic motor is running.*

**Step 1:** Re-key truck and verify if event code still present.

- If: Event code 218 is present.
  - Proceed to Step 2.
- If: No codes present.
  - Monitor truck operation for reoccurrence of code.

**Step 2:** Check wiring from CA407 pins 1, 2, 3 and 5 through CA410 to CA420 pins 3, 4, 5 and 6.

- If: No wiring issues exist.
  - Then issue exists in ECR4. Replace sensor bearing (ECR4).

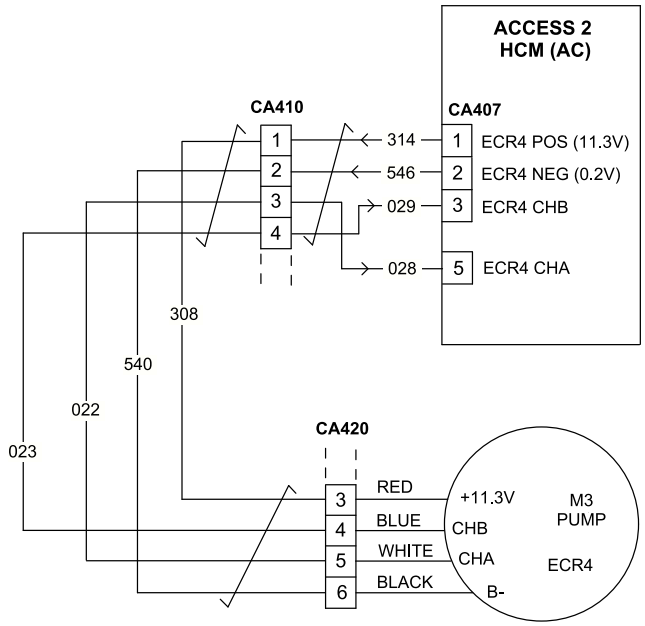



Figure 16377

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# Event Code 300

**Loss of CAN communication from ACCESS 3 to ACCESS 1.**

This is an ACCESS 3 check (watchdog) event. It can occur during key up initialization, during standby (line contactor open) or during operation of the vehicle.

**Step 1:** Check for loose power cable connections on ACCESS 3. If connections are tight, proceed to Step 2.

**Step 2:** Check CAN communication path. With key off, check resistance across CA201 pins 12 and 13, which are located on the distribution panel. Correct measurement across pins 12 and 13 is 60 ohm.

- If: 60 ohm.
  - Then CAN communication line is good. Proceed to Step 4.
- If: Approximately 120 ohm.
  - Then proceed to Step 3.

**Step 3:** Connection between ACCESS 1 and ACCESS 3 has been interrupted. Check for loose connection at CA401 pins 1 and 6 on ACCESS 3 or CA215 pins 18 & 19 on back of ACCESS 1.

- If: Connections are loose.
  - Then tighten, re-key truck and monitor operation.
- If: Connections correct.
  - Then proceed to Step 4.

**Step 4:** Disconnect CA215 from ACCESS 1. On the ACCESS 1 measure resistance across CA215 pins 18 & 19 (CAN low and CAN high). The correct measurement is approximately 120 ohm.

- If: 118 to 122 ohm.
  - Then proceed to Step 4.
- If: Resistance out of range.
  - Then replace ACCESS 1.

**Step 4:** Disconnect CA401 on ACCESS 3. Place a jumper between CA401-2 and CA401-4 on ACCESS 3. Measure the resistance across CA401 pins 6 and 1.

- If: 118 to 122 ohm.
  - Then proceed to Step 5.
- If: Resistance out of range.
  - Replace ACCESS 3.

**Step 5:** Check CAN Low line for continuity from CA401 pin 6 harness connection to CA215 pin 18 harness connection. Check CAN High line for continuity from CA401 pin 1 to CA215 pin 19.

- If: High resistance or open circuit is detected.
  - Then open or short circuit has occurred. Trace wiring and repair/replace as necessary.

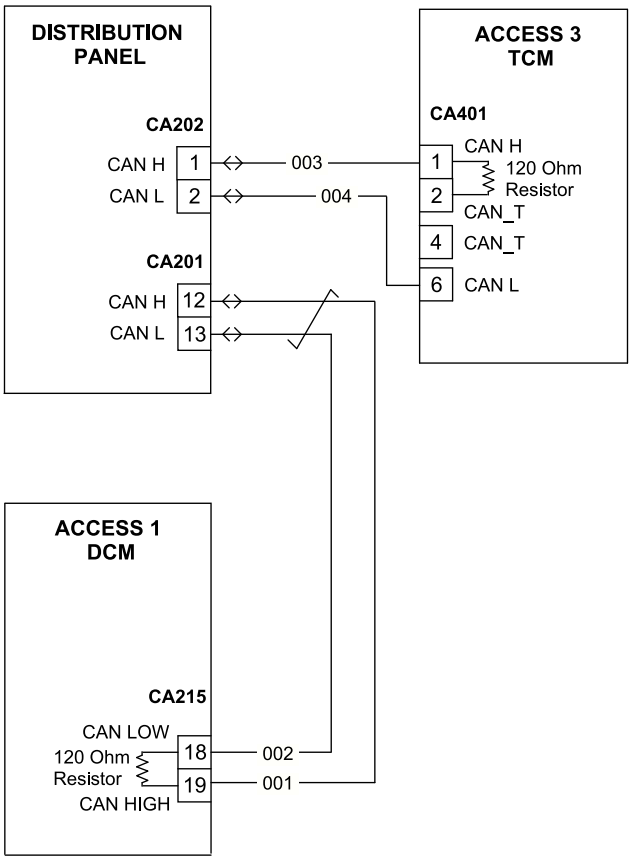



Figure 15742-01


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# Event Code 301

**ACCESS 3 protection circuit overload.**

**Step 1:** Block vehicle with drive wheels off of floor. (Refer to Control of Hazardous Energy Section in Crown Service and Parts Manual for proper blocking procedures).

**Step 2:** Release brakes using Brake Release procedure in Control of Hazardous Energy Section of Crown Service and Parts Manual.

**Step 3:** Turn drive tires manually to verify the traction motors are not locked.

- If: Motors do not turn freely.
  - Then check for possible problems internal to motor or drive unit.
- If: Motors turn freely.
  - Then proceed to Step 4.

**Step 4:** Check for loose power cable connections, motor power cables shorted to each other and motor power cables are connected to correct terminals on both traction motors and at ACCESS 3.

- If: Cable connections are not correct.
  - Then correct, re-key and monitor truck operation.
- If: Cable connections tight, not shorted and properly located.
  - Then proceed to Step 5.

**Step 5:** Check cables and motors for shorts to frame or each other.

- If: Cables or motor are not shorted.
  - Then proceed to Step 6.
- If: Cables or motor are shorted.
  - Then repair/replace cable/motor as necessary.

**Step 6:** Remove U, V and W connections at drive motors one at a time. Check continuity of each motor cable from the ACCESS 3 to the motors.

- If: Continuity incorrect.
  - Then repair/replace as necessary.
- If: Continuity correct.
  - Then replace ACCESS 3.

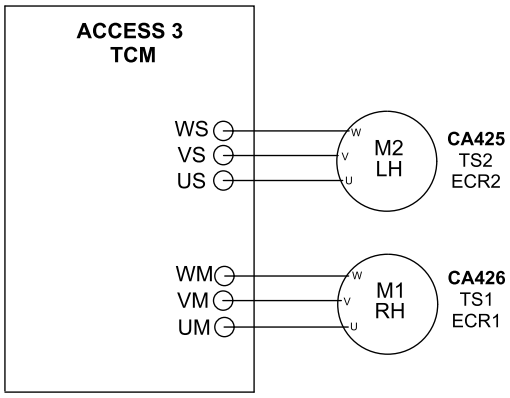



Figure 15743

# Event Code 302

**ACCESS 3 detects U, V and W voltage feedback circuit out of range.**

***Note:*** *If event 307 flashes briefly after start up then changes to event 302, event is caused by an open in the line contactor power circuit.*

**Step 1:** Verify line contactor is closed. Key must be on and operator standing on the floorboard (presence switches DMS closed).

- If: Line contactor closed.
  - Then proceed to Step 2.
- If: Line contactor open.
  - Then follow Event 311 procedures.

**Step 2:** Check voltage between +BV and BNEG power cables connections on ACCESS 3.

- If: 35 to 38 Vdc.
  - Then proceed to Step 3.
- If: Less than 35 Vdc.
  - Then follow Event 303 procedures.

**Step 3:** Verify motor power cables are connected to the proper terminals at both drive motors and ACCESS 3.

- If: Cables properly connected.
  - Then replace ACCESS 3.

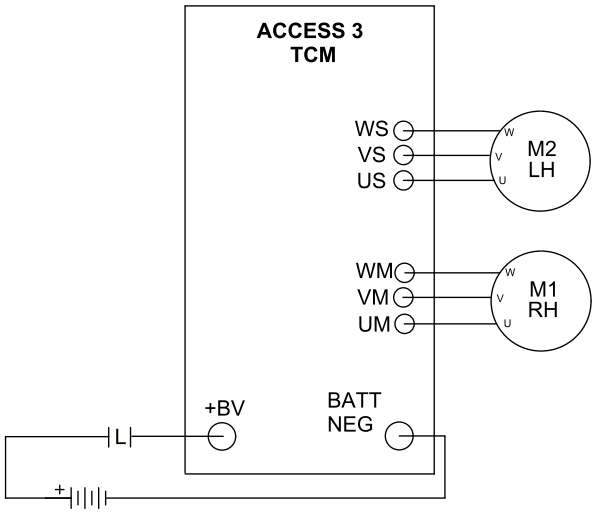



Figure 15749-01


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# Event Code 303

**ACCESS 3 Voltage out of range.**

An under or over voltage condition has been detected by ACCESS 3.

**Step 1:** Unplug battery, measure and record voltage between +BV and BNEG of battery connector. Plug in battery and key up truck. Proceed to Calibration menu (C3.4) and adjust as near as possible to recorded truck voltage. Re-key the truck.

- If: Event clears.
  - Then return truck to service.
- If: Event does not clear.
  - Then proceed to Step 2.

**Step 2:** Check voltage between +BV and BNEG power connections at ACCESS 3, with key on and operator present.

***Note:*** *Voltage at these terminals will be:*

*1. The same as recorded in Step 1, if the key input is present at CA403-3 and the line contactor is closed.*

*2. Approximately two Vdc less than the voltage recorded in Step 1, if the line contactor power circuit is open and the key input is present at CA403-3.*

*3. Steadily dropping toward 0 Vdc, if the key input is not present at CA403-3. It takes approximately 10 minutes for the voltage to drop to 0 Vdc.*

- If: 35 to 38 Vdc.
  - Then replace ACCESS 3.
- If: 32 to 34 Vdc.
  - Then check (FU1), line contactor tip condition and power cable connections between battery connector and ACCESS 3. Repair/replace as necessary.
- If: Voltage is slowly decreasing.
  - Then proceed to Step 4.
- If: 0 Vdc.
  - Then proceed to Step 3.

**Step 3:** Verify BNEG is present at ACCESS 3 power connection by moving positive meter lead to +BV at battery.

- If: 35 to 38 Vdc.
  - Then proceed to step 4.
- If: 0 Vdc.
  - Then issue exists in BNEG power circuit.

**Step 4:** Check key switch input voltage (+) at ACCESS 3 (CA403-3). Use BNEG power connection on ACCESS 3 as reference.

- If: 35 to 38 Vdc.
  - Then replace ACCESS 3.
- If: Less than 35 Vdc.
  - Then proceed to Step 5.

**Step 5:** Verify the proper battery is installed and charged.

- If: Improper battery/low battery charge.
  - Then replace battery/charge battery.
- If: Proper battery is installed and charged.
  - Then issue exists in key circuit. Check for open circuit between FU3, Key, K1 relay tips, FU5 and CA403-3.

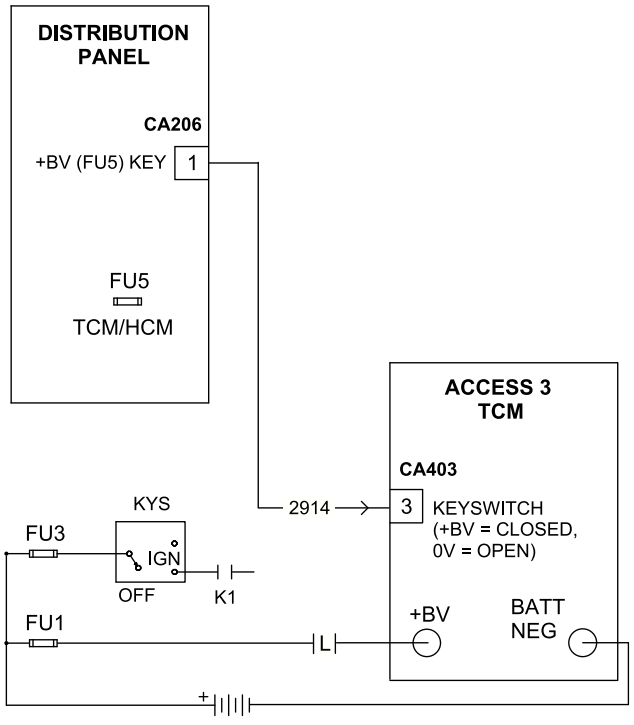



Figure 15750

https://truckmanualshub.com/

## Event Code 304

**Low voltage on motor terminal outputs.**

**Step 1:** Check voltage at each traction motor power cable connection, with Key on. Use BNEG on ACCESS 3 as reference.

- If: Less than 15 Vdc.
  - Then proceed to Step 2.
- If: Greater than 20 Vdc.
  - Then proceed to Step 3.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 2:** Verify BNEG is present at ACCESS 3 power connection by moving positive meter lead to +BV at battery.

- If: 35 to 38 Vdc.
  - Then proceed to Step 3.
- If: 0 Vdc.
  - Then issue exists in BNEG power circuit.

**Step 3:** Check voltage with at each traction motor output (U, V & W) on ACCESS 3 with key on. Use BNEG on ACCESS 3 as reference.

- If: Less than 15 Vdc.
  - Then follow Event 303 procedures.
- If: Greater than 20 Vdc.
  - Then replace ACCESS 3.
- If: 15 to 20 Vdc.
  - Then proceed to Step 4.

**Step 4:** Verify power cables are connected correctly between motor(s) and ACCESS 3.

- If: Cables connected correctly.
  - Then proceed to Step 5.
- If: Cables incorrectly connected.
  - Then repair/replace as necessary.

**Step 5:** Check for open traction motor(s). Remove power cables from traction motor. Measure and record resistance across each of the following phases (U to V), (U to W), (V to W).

- If: Any phase is open.
  - Then replace motor.
- If: Any phase is greater than 1 ohm resistance.
  - Then replace the motor.
- If: All phases less than 1 ohm resistance.
  - Then replace ACCESS 3.

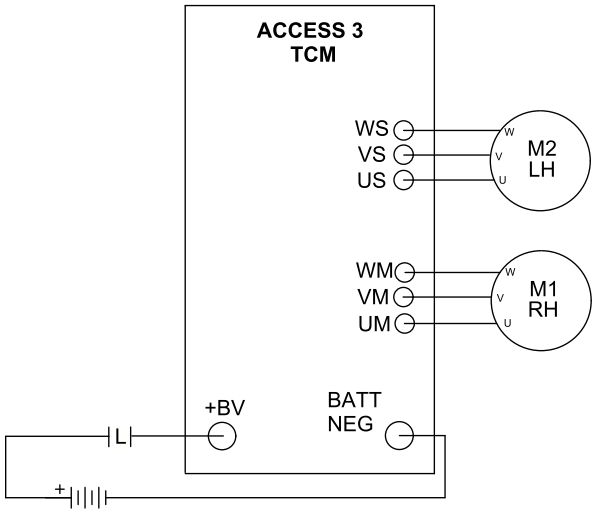



Figure 15749-01

## Event Code 305

**High voltage on motor terminal outputs.**

***Note:*** *A common symptom for this event is the traction fuse FU1 blowing during plugging.*

**Step 1:** Follow Event 304 procedure.


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## Event Code 306

**Voltage present at ACCESS 3 +BV terminal prior to power up sequence.**

**Step 1:** Check line contactor tips.

- If: Tips welded.
  - Then repair/replace as necessary.
- If: Tips OK.
  - Then proceed to Step 2.

**Step 2:** Check voltage between +BV and BNEG of ACCESS 3, with key off and battery unplugged.

- If: Voltage steadily dropping toward 0 Vdc or at 0 Vdc.

***Note:*** *Voltage will take approximately 10 minutes to reach 0 Vdc from 38 Vdc.*

  - Then replace ACCESS 3.
- If: 35 to 38 Vdc.
  - Then short exists between battery and ACCESS 3. Repair/replace as necessary.

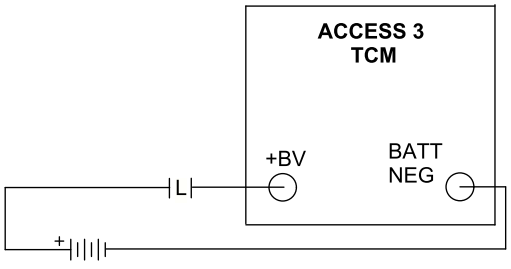



Figure 15752

## Event Code 307

**Voltage not present at ACCESS 3 +BV terminal after power up sequence.**

***Note:*** *If Event 307 flashes briefly after start up then changes to Event 302, event is caused by an open in the line contactor power circuit.*

**Step 1:** Verify line contactor is closed. Key must be on and operator present.

- If: Line contactor closed.
  - Then proceed to Step 2.
- If: Line contactor open.
  - Then follow event 311 procedures.

**Step 2:** Check voltage between +BV and BNEG power cable connections on ACCESS 3.

- If: 35 to 38 Vdc.
  - Then replace ACCESS 3.
- If: Less than 35 volts.
  - Then follow Event 303 procedures.

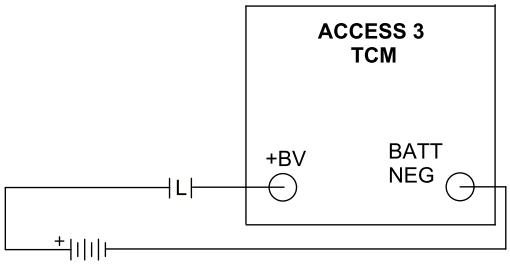



Figure 15752

https://truckmanualshub.com/

## Event Code 308

**ACCESS 3 detecting incorrect voltage in current sensor feedback circuit.**

**Step 1:** Verify traction motor cables are connected to proper terminals at ACCESS 3 and motors.

- If: Connections correct.
  - Then proceed to Step 2.

**Step 2:** Check for open traction motor. Remove power cables from each traction motor. Measure and record resistance across each of the following phases (U to V), (U to W), (V to W).

- If: Any phase is open.
  - Then replace motor.
- If: Any phase is greater than 1 ohm resistance.
  - Then replace the motor.
- If: All phases are less than 1 ohm resistance.
  - Then replace ACCESS 3.

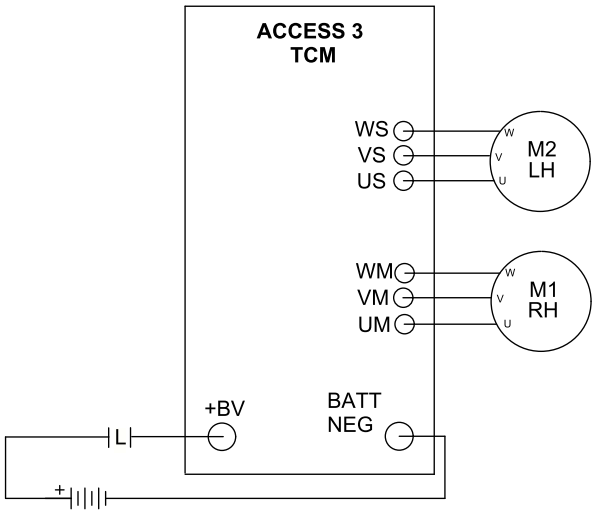



Figure 15749-01

## Event Code 309

**ACCESS 3 capacitor not charging after power up sequence.**

Power capacitor charge does not increase when key is turned on and operator present (DMS closed).

**Step 1:** Check voltage between +BV and BNEG power connections at ACCESS 3, with key on and operator present.

- If: 35 to 38 Vdc.
  - Then replace ACCESS 3.
- If: Less than 35 Vdc.
  - Then follow event 303 procedures.

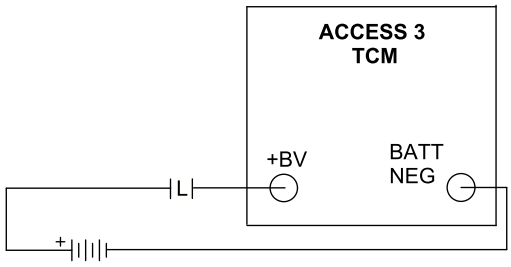



Figure 15752

## Event Code 310

**Access CAN Communication Out of Range.**

**Step 1:** Follow Event 300 procedures.


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# Event Code 311-313

Event Codes 311, 313: Line contactor coil shorted.

Event Code 312: Line contactor driver open.

**Step 1:** Disconnect CA403 at ACCESS 3 and check resistance between pin 26 and 27 on wire harness side. Correct resistance is 70 to 78 ohm.

- If: Resistance is in range.
  - Then replace ACCESS 3.
- If: Resistance out of range.
  - Then proceed to Step 2.

**Step 2:** Disconnect line contactor coil wires and measure resistance across the coil. Correct resistance is 70 to 78 ohm.

- If: Resistance out of range.
  - Then replace coil.
- If: Resistance is in range.
  - Then issue exists between CA403-26 and 27 and the coil. Verify wiring and repair/replace as necessary.

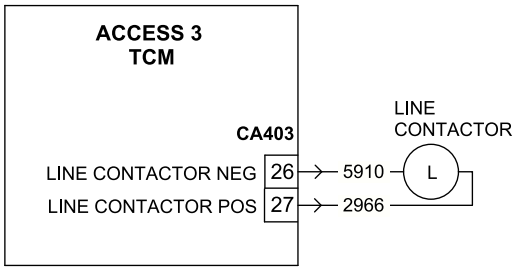



Figure 15626

https://truckmanualshub.com/

# Event Code 314

**ECR1 or ECR2 Traction Encoder issue.**

**Step 1:** Verify which motor circuit the problem is in (RH or LH). With drive wheels elevated and steer wheels straight, proceed to Analyzer menu A2.3.5 ECR1 (RH motor) and A2.3.6 ECR2 (LH motor) to read motor RPM. Select travel.

- If: Motor RPM reads 0 on either motor.
  - Then the issue lies within corresponding circuit RH or LH. Once determined whether issue is in RH or LH circuit, proceed with Step 2.
- If: Motor RPM reads 0 on both motors.
  - Then proceed with Step 2.

**Step 2:** Verify connections are secure at CA403 pins 1,2,13 and 14 for ECR1 and pins 11, 12, 22 and 23 for ECR2. Also, verify connections CA426 and CA425 on traction motors. Also, verify continuity from CA403 pin connections to CA426 and CA425. Repair/replace as necessary.

- If: Correct.
  - Then proceed to Step 3.

**Step 3:** The 12 volt (11.3 actual) supply for the motor encoder is within ACCESS 3.

- If: 11 to 12 volts present.
  - Then proceed to Step 4.
- If: 12 volts not present.
  - Then replace ACCESS 3.

**Step 4:** Disconnect CA426 and CA425 encoder connections one at time. Check to see if either the correct motor speed returns or for 12 volts at CA403-1 and 2 and CA403-11 and 12 accordingly.

***Note:*** *ECR1 or ECR2 shorted could affect the 12 volt supply from ACCESS 3 and make it appear there is no 12 volt supply.*

- If: Speed or 12 volts at CA403-1 or 2 returns.
  - Then replace appropriate sensor bearing or (ECR1 or ECR2) motor.

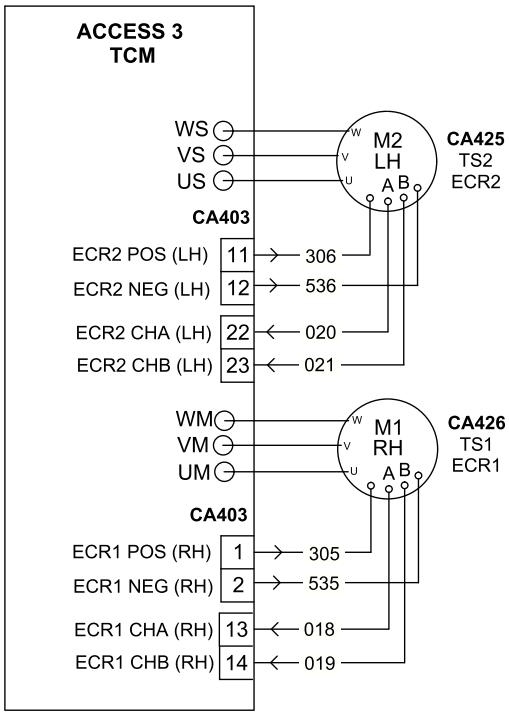



Figure 15627


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## Event Code 315

**Incorrect battery voltage detected at ACCESS 3.**

**Step 1:** Verify correct battery is installed and charged.

- If: Correct battery installed and charge correct.
  - Then proceed to Step 2.

**Step 2:** Unplug battery, measure and record voltage between +BV and BNEG of battery connector. Plug in battery and key up truck. Proceed to Calibration menu (C3.4) and adjust to the recorded voltage reading. Re-key the truck.

- If: Event clears.
  - Then return truck to service.
- If: Event does not clear.
  - Then replace ACCESS 3.

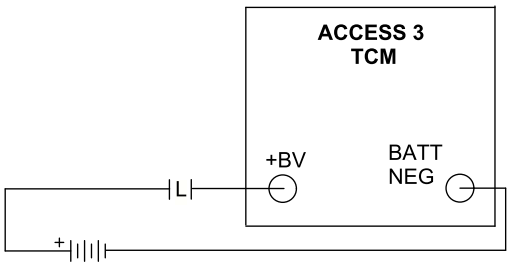



Figure 15752

## Event Code 316

**ACCESS 3 detects Internal Communication out of range.**

**Step 1:** Follow Event Code 300 procedures.

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# Event Code 318

**Steering potentiometer POT4 out of range.**

**Step 1:** Verify steering potentiometer angle using Analyzer A2.3.8.2. Should read approximately 0 Degrees steer wheels straight ahead, +90 degrees full right and -90 degrees full left.

- If: Reading correct.
  - Then calibrate steer potentiometer and monitor.
- If: Reading incorrect.
  - Then proceed to Step 2.

**Step 2:** Check steering potentiometer wiper voltage using Analyzer A2.3.8.1. Voltage is approximately 5.2 Vdc wheels straight ahead, 1.6 Vdc wheels full left and 8.9 Vdc wheels full right.

- If: Voltage within range.
  - Then proceed to Step 3.
- If: Voltage out of range.
  - Then proceed to step 4.

**Step 3:** Check steering potentiometer voltage at ACCESS 3 connector CA403-17. Use TP6 battery negative as reference. Voltage is approximately 5.2 Vdc wheels straight ahead, 1.6 Vdc wheels full left and 8.9 Vdc wheels full right.

- If: Voltage within range.
  - Then replace ACCESS 3.
- If: Voltage out of range.
  - Then issue exists in wiring or connection between CA403-17 and CA601-C. Repair/replace as necessary.

**Step 4:** Check voltage between CA601-A (+) and CA601-B (-) at POT1. Should be between 11.0 to 11.3 Vdc.

- If: Voltage within range.
  - Then replace steering potentiometer (POT1).
- If: Voltage out of range.
  - Then proceed to Step 5.

**Step 5:** Check voltage supply to steering potentiometer between CA403-16 (+) and CA403-15 (-). Should read 11.0 to 11.3 Vdc.

- If: Voltage within range.
  - Then check wiring and connections between CA403 and CA601. Repair/replace as necessary.
- If: Voltage out of range.
  - Then replace ACCESS 3.

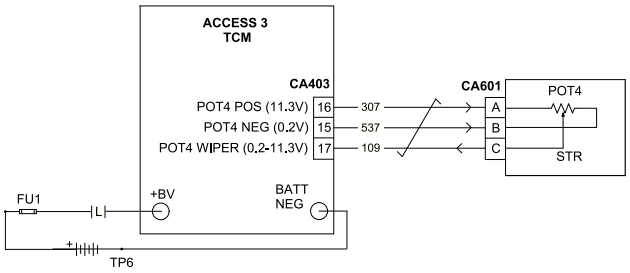



Figure 15765


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# Event Code 319

**ACCESS 3 detected the brake switch (BRKS) opening or closing outside the 5-50% brake application range of the brake sensor (RPS1).**

**Step 1:** Verify brake switch operation in Analyzer menu A2.3.9.2 is between 18% and 35% when BRKS changes from 0 to 1 as brake pedal is slowly released brake pedal and from 1 to 0 as pedal is slowly depressed.

- If: BRKS changes outside range.
  - Then adjust BRKS to actuate at approximately 22 to 27%. Recalibrate brake pedal (RPS1) after brake switch adjustment.
- If: BRKS remains at 0 at 1 regardless of pedal position.
  - Then check condition of BRKS and BRKS circuit for open or short.
- If: BRKS changes state inconsistently.
  - Then replace BRKS.
- If: RPS1 does not change state or is erratic.
  - Then proceed to Step 2.

**Step 2:** Verify linkage and wiring to RPS1 is correct.

- If: Linkage is binding or loose.
  - Then repair linkage as needed.
- If: Linkage is correct
  - Then proceed to Step 3.

**Step 3:** Check RPS1 wiring.

- If: RPS1 wiring is not secure.
  - Then repair wiring as needed.
- If: RPS1 wiring is secure.
  - Then proceed to Step 4.

**Step 4:** Verify RPS1 5 V power supply (CA606-1 and -3).

- If: Power supply is available to RPS1.
  - Then proceed to Step 6.
- If: Power supply is not available to RPS1.
  - Then proceed to Step 5.

**Step 5:** Check wiring and voltage from ACCESS 3 (CA403-19 and -33).

- If: Power supply is not available from ACCESS 3.
  - Then replace ACCESS 3.
- If: Power supply is available from ACCESS 3.
  - Then repair wiring from ACCESS 3 (CA403-19 and -33) to RPS1 (CA606-1 and -3).

**Step 6:** Check RPS1 output voltage, verify RPS1 output ranges from 0.5 to 4.5 Vdc at CA606-3 and -2.

- If: RPS1 output does not range consistently between approximately 0.5 to 4.5 Vdc.
  - Then replace RPS1.
- If: RPS1 output ranges consistently between approximately 0.5 to 4.5 Vdc.
  - Then replace ACCESS 3.
- If: RPS1 wiring input to ACCESS 3 is not correct.
  - Then repair wiring to ACCESS 3 as needed.

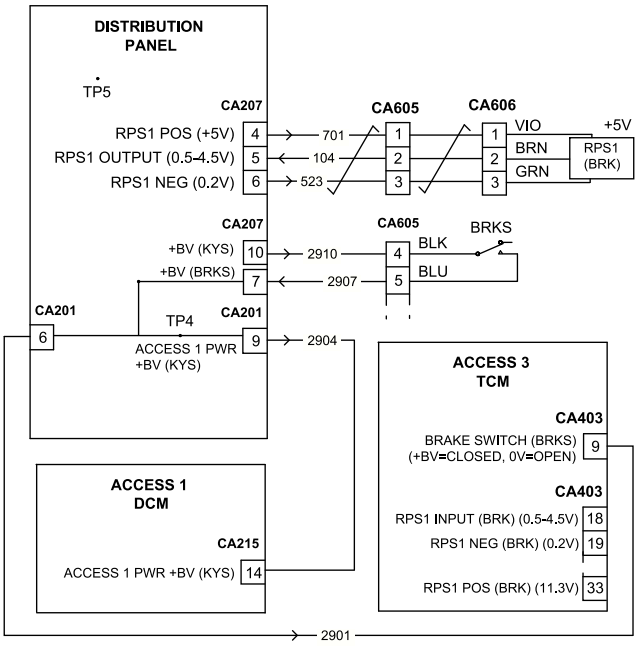



Figure 15766-01

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# Event Code 399

**Software Incompatible between ACCESS 1 and ACCESS 3.**

**Step 1:** Enter the Utilities menu U1.3.2 and U1.1.2 and record the software part numbers.

- If: Event continues after re key.
  - Then contact Crown Service for software updates.


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# Event Code 700

**ACCESS 7 Memory Hardware Failure.**

Microcontroller internal to ACCESS 7 has experienced a failure in reading or writing to ACCESS 7 internal memory.

**Step 1:** Power down truck, then power-up.

- If: Issue continues.
  - Then replace ACCESS 7.

# Event Code 701

**Proportional Solenoid (SPA) Open Coil Circuit.**

This fault is logged if an open circuit exists between SPA coil and driver CA230-2.

**Step 1:** Drive SPA coil through Analyzer menu A4.4.2 in display and measure voltage across SPA with wiring connected. Normal A4 test output voltage at coil is approximately 7 Vdc. Coil resistance is approximately 29 ohms.

- If: 7 Vdc.
  - Then SPA is open, replace SPA.
- If: 0 Vdc.
  - Then a positive or negative is missing; go to Step 2.

**Step 2:** Drive SPA through Analyzer menu A4.4.2 in display and measure voltage from +BV to SPA negative with wiring connected.

- If: 0 Vdc.
  - Then negative is missing; proceed to Step 3.
- If: +BV.
  - Then positive is missing; proceed to Step 4.

**Step 3:** Drive SPA through Analyzer menu A4.4.2 in display and measure voltage between CA230-2 (-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-2 to SPA.
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SPA through Analyzer menu A4.4.2 in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 7 Vdc.
  - Then wiring is open from CA230-12 and SPA (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

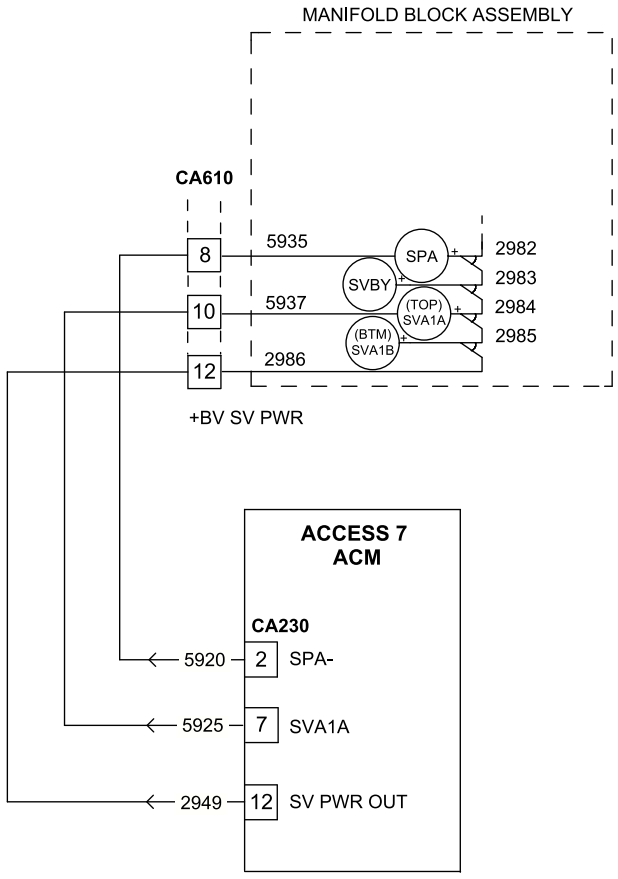



Figure 16036

https://truckmanualshub.com/

# Event Code 702

**SPL Solenoid Open Coil Circuit.**

Event logged if an open circuit exists between SPL and driver CA230-1.

**Step 1:** Drive SPL coil through Analyzer menu A4.4.1 in display and measure voltage across SPL with wiring connected. Normal A4 test output voltage at coil is approximately 23 Vdc. Coil resistance is approximately 29 ohm.

- If: 7 Vdc.
  - Then SPL is open; replace SPL.
- If: 0 Vdc.
  - Then a positive or negative is missing; proceed to Step 2.

**Step 2:** Drive SPL through Analyzer menu A4.4.1 in display and measure voltage from +BV to SPL negative with wiring connected.

- If: 0 Vdc.
  - Then negative is missing; proceed to Step 3.
- If: +BV.
  - Then positive is missing; proceed to Step 4.

**Step 3:** Drive SPL through Analyzer menu A4.4.1 in display and measure voltage between CA230-1(-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-1 to SPL.
- If: 0 Vdc.
  - Then open is internal to Access, replace ACCESS 7.

**Step 4:** Drive SPA through Analyzer menu A4.4.1 in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 7 Vdc.
  - Then wiring is open from CA230-12 and SPA (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

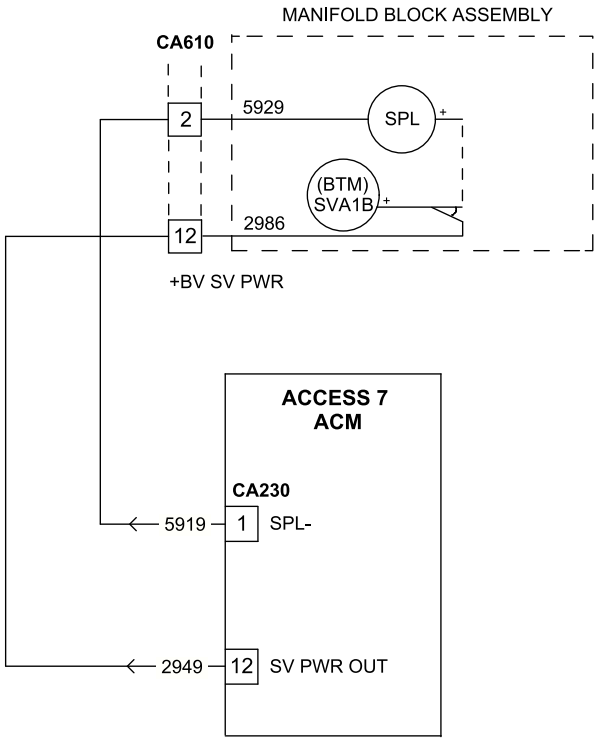



Figure 16037


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# Event Code 703

**SVA2A Solenoid Coil Circuit Open.**

Event logged if an open circuit exists between SVA2A and driver CA230-9.

***Note:***

**Step 1:** Drive SVA2A through Analyzer menu A4.4.9 in display and measure voltage across SVA2A with wiring connected. Normal A4 test output voltage at coil is approximately 30 Vdc. Coil resistance is approximately 39 ohms.

- If: 30 Vdc
  - Then SVA2A is open, replace SVA2A.
- If: 0 Vdc.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive SVA2A through Analyzer menu A4.4.9 in display and measure voltage from +BV to SVA2A negative with wiring connected.

- If: 0 Vdc.
  - Then negative is missing, proceed to Step 3.
- If: +BV.
  - Then positive is missing, proceed to Step 4.

**Step 3:** Drive SVA2A through analyzer mode in display and measure voltage between CA230-9 (-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-9 to SVA2A (-).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SVA2A through analyzer mode in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 30 Vdc.
  - Then wiring is open from CA230-12 and SVA2A (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

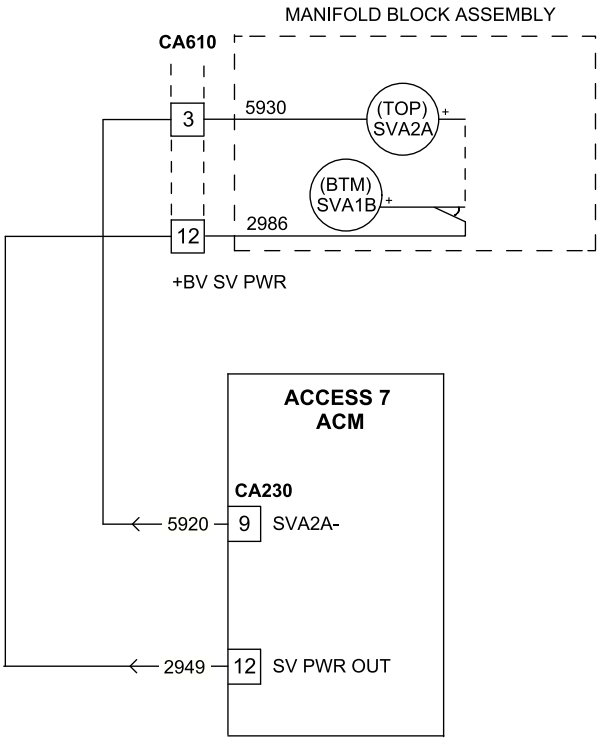



Figure 16038

## Event Code 704

**SVA1B Solenoid Coil Open.**

**Step 1:** Drive SVA1B through analyzer menu A4.4.8 and measure voltage across SVA1B with wiring connected. Normal A4 test output voltage at coil is approximately 30 Vdc. Coil resistance is approximately 39 ohms.

- If: 30 Vdc.
  - Then SVA1B is open, replace SVA1B.
- If: 0 Vdc.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive SVA1B through analyzer menu in display and measure voltage from +BV to SVA1B negative with wiring in tact.

- If: 0 Vdc.
  - Then negative is missing; proceed to Step 3.
- If: +BV.
  - Then positive is missing; proceed to Step 4.

**Step 3:** Drive SVA1B through analyzer menu in display and measure voltage between CA230-7 (-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-7 to SVA1B (-).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SVA1B through analyzer menu in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 30 Vdc.
  - Then wiring is open from CA230-12 and SVA1B (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

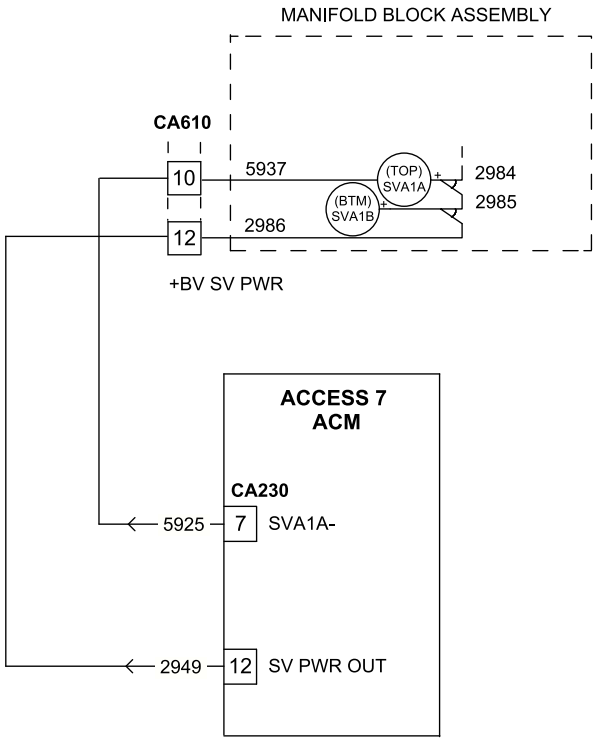



Figure 16039



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# Event Code 705

**SVA1A Solenoid Coil Circuit Open.**

Event logged if an open circuit exists between SVA1A and driver CA230-8.

**Step 1:** Drive SVA1A through Analyzer menu A4.4.7 in display and measure voltage across SVA1A with wiring connected. Normal A4 test output voltage at coil is approximately 30 Vdc. Coil resistance is approximately 39 ohms.

- If: 30 Vdc.
  - Then SVA1A is open, replace SVA1A.
- If: 0 Vdc.
  - Then a positive or negative is missing; proceed to Step 2.

**Step 2:** Drive SVA1A through Analyzer menu A4.4.7 in display and measure voltage from +BV to SVA1A negative with wiring connected.

- If: 0 Vdc.
  - Then negative is missing; proceed to Step 3.
- If: +BV.
  - Then positive is missing, proceed to Step 4.

**Step 3:** Drive SVA1A through Analyzer menu A4.4.7 in display and measure voltage between CA230-8 (-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-7 to SVA1A (-).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SVA1A through Analyzer menu A4.4.7 in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 30 Vdc.
  - Then wiring is open from CA230-12 and SVA1A (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

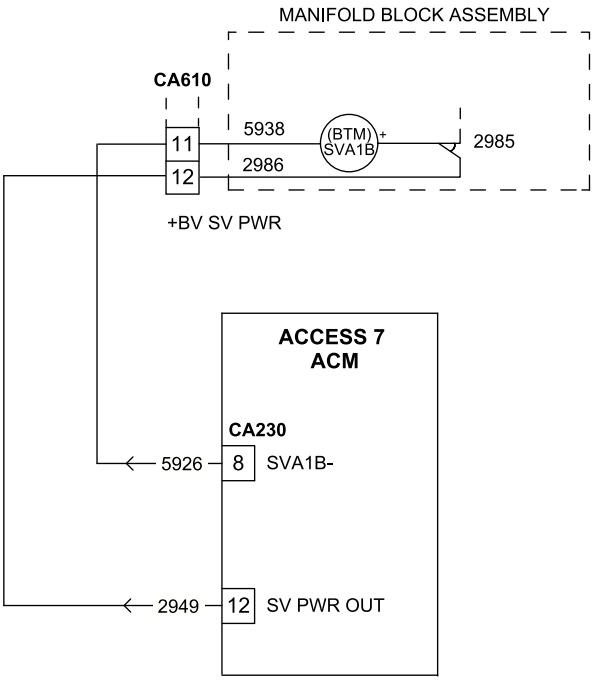



Figure 16040

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# Event Code 706

**SVTR Solenoid Coil Open Circuit.**

Event logged if an open circuit exists between SVTR and driver CA230-4.

**Step 1:** Drive SVTR through Analyzer menu A4.4.4 in display and measure voltage across SVTR coil with wiring connected. Normal A4 test output voltage at coil is approximately 21 Vdc. Coil resistance is approximately 39 ohms.

- If: 21 Vdc
  - Then SVTR is open, replace SVTR.
- If: 0 Vdc.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive SVTR through Analyzer menu A4.4.4 in display and measure voltage from +BV to SVTR (-) with wiring connected.

- If: 0 Vdc.
  - Then negative is missing, proceed to step 3.
- If: +BV.
  - Then positive is missing, proceed to step 4.

**Step 3:** Drive SVTR through Analyzer menu A4.4.4 in display and measure voltage between CA230-4(-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-4 to SVTR.
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SVTR through Analyzer menu A4.4.4 in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 21 Vdc.
  - Then wiring is open from CA230-12 and SPA (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

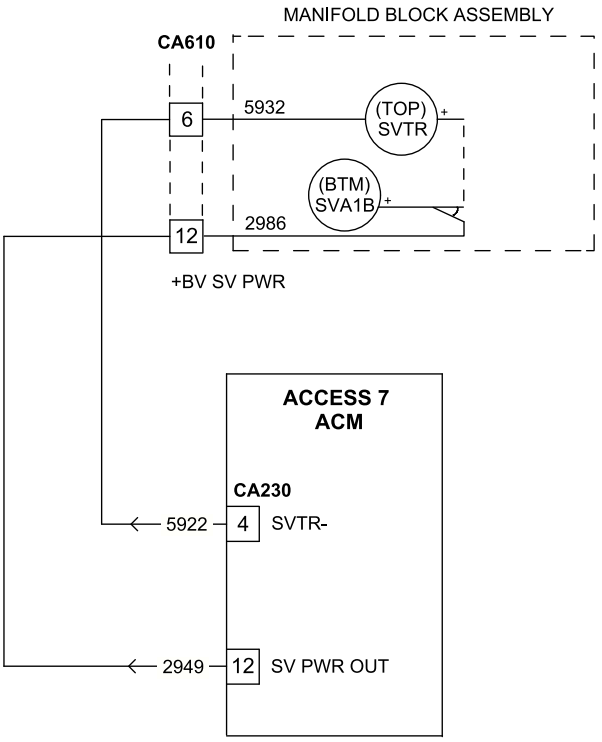



Figure 16041-01


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# Event Code 707

**SVTE Solenoid Coil Open Circuit.**

Event logged if an open circuit exists between SVTE and driver CA230-3.

**Step 1:** Drive SVTE through analyzer mode in display A4.4.3 and measure voltage across SVTE coil with wiring connected. Normal A4 test output voltage at coil is approximately 21 Vdc. Coil resistance is approximately 39 ohms.

- If: 21 Vdc.
  - Then SVTE is open, replace SVTE.
- If: 0 Vdc.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive SVTE through Analyzer menu A4.4.3 in display and measure voltage from +BV to SVTE(-) with wiring connected.

- If: 0 Vdc.
  - Then negative is missing; proceed to Step 3.
- If: +BV.
  - Then positive is missing; proceed to Step 4.

**Step 3:** Drive SVTE through Analyzer menu A4.4.3 in display and measure voltage between CA230-3(-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-3 to SVTE.
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SVTE through Analyzer menu A4.4.3 in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 21 Vdc.
  - Then wiring is open from CA230-12 and SVTE (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

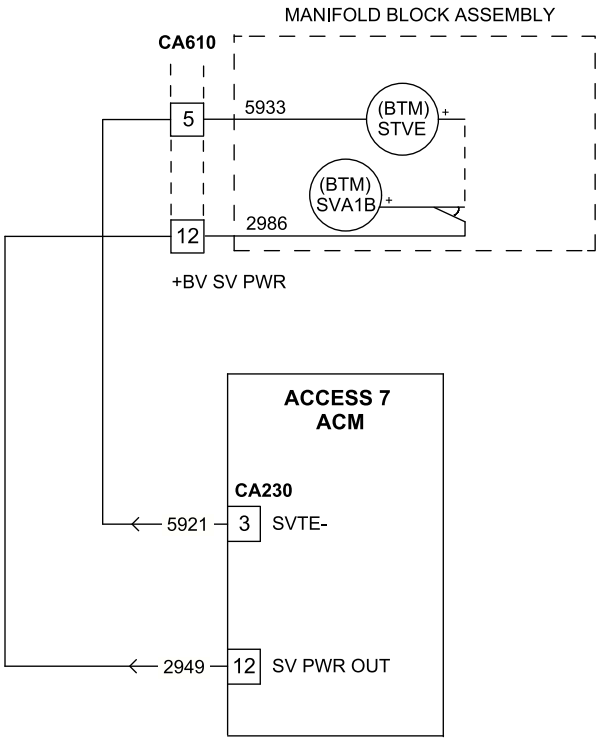



Figure 16042-01

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# Event Code 708

**PRVA Solenoid Coil Circuit Open.**

Event logged if an open circuit exists between PRVA and driver CA230-6.

**Step 1:** Drive PRVA through Analyzer menu A4.4.6 in display and measure voltage across PRVA with wiring connected.

- If: 33-35 Vdc
  - Then PRVA is open, replace PRVA.
- If: 0 Vdc.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive PRVA through Analyzer menu A4.4.6 in display and measure voltage from BNEG to PRVA negative with wiring connected.

- If: 0 Vdc.
  - Then negative is missing, proceed to Step 3.
- If: 33-35 Vdc.
  - Then positive is missing, proceed to Step 4.

**Step 3:** Drive PRVA through Analyzer menu A4.4.6 in display and measure voltage between CA230-6 (-) and +BV with wiring connected.

- If: 33-35 Vdc.
  - Then wiring is open from CA230-6 to PRVA (-).
- If: 0 Vdc.
  - Then open is internal to Access, replace ACCESS 7.

**Step 4:** Drive PRVA through Analyzer menu A4.4.6 in display. Measure voltage between CA231-10 (+) and BNEG.

- If: 33-35 Vdc.
  - Then wiring is open from CA231-10 and PRVA (+).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

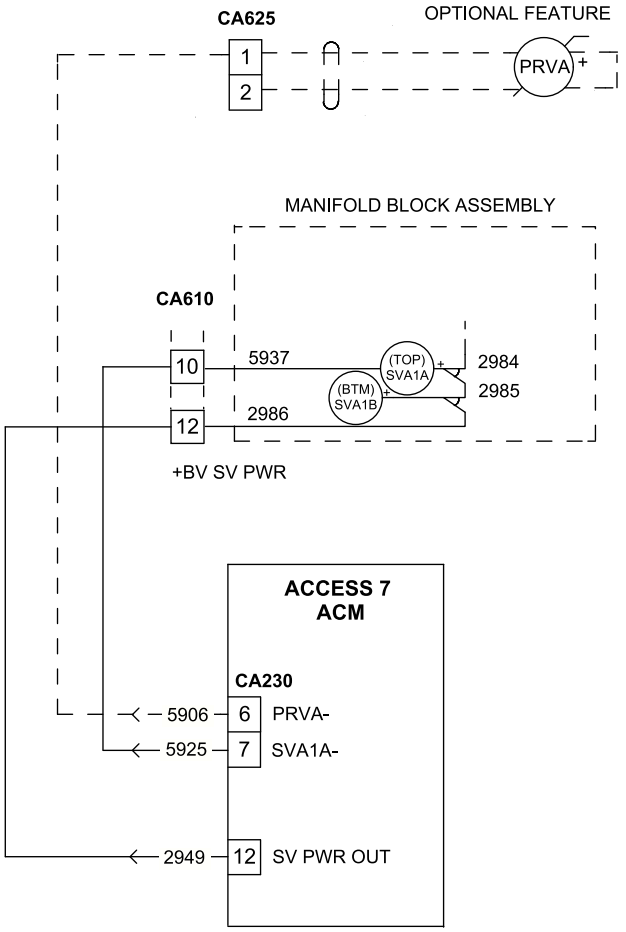



Figure 16043


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# Event Code 709

**SVH Solenoid Coil Open Circuit.**

Event logged if an open circuit exists between SVH and driver CA230-5.

***Note:***

**Step 1:** Drive SVH through Analyzer menu A4.4.5 in display and measure voltage across SVH with wiring connected. Normal A4 test output voltage at coil is approximately 7.5 Vdc. Coil resistance is approximately 29 ohms.

- If: 7.5 Vdc.
  - Then SVH is open, replace SVH.
- If: 0 Vdc.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive SVH through Analyzer menu A4.4.5 in display and measure voltage from +BV to SVH negative with wiring connected.

- If: 0 Vdc.
  - Then negative is missing, proceed to Step 3.
- If: +BV.
  - Then positive is missing; proceed to step 4.

**Step 3:** Drive SVH through Analyzer menu A4.4.5 in display and measure voltage between CA230-5 (-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-5 to SVH (-).
- If: 0 Vdc.
  - Then open is internal, replace ACCESS 7.

**Step 4:** Drive SVH through Analyzer menu A4.4.5 in display. Measure voltage between CA230-12 (+) and BNEG.

- If: 7.5 Vdc.
  - Then wiring is open from CA230-12 and SVH (+).
- If: 0 Vdc.
  - Then open is internal to Access, replace ACCESS 7.

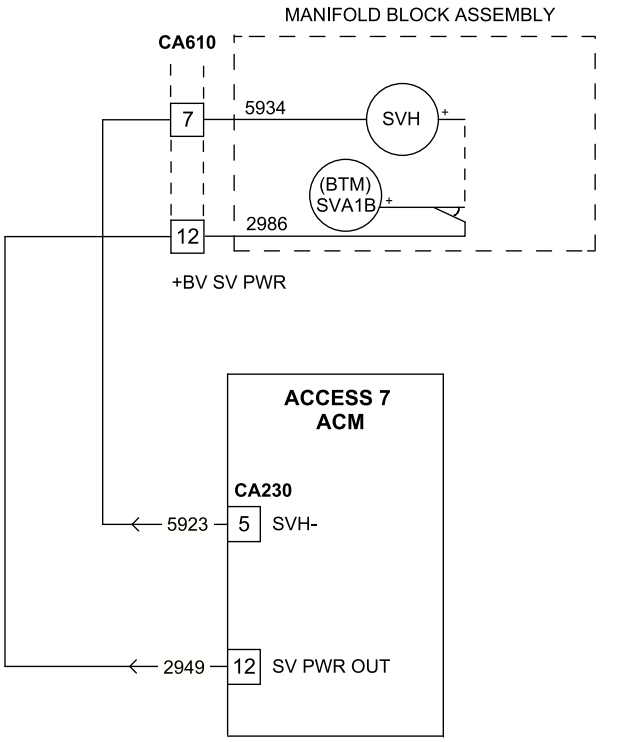



Figure 16044

https://truckmanualshub.com/

# Event Code 710

**Steer Encoder Supply Voltage Out of Range.**

This diagnostic is monitoring the steer encoder (ECR3) / FS,RS output voltage to ensure it is within the range of 4.75 V to 5.5 V at all times. If the voltage goes above or outside this range, then the event is logged.

***Note:*** *The steer encoder and FS/RS share power supply.*

**Step 1:** Measure voltage across steer encoder positive and negative. CA602-1+ and CA602-4. Should measure 4.75-5.5 Vdc.

- If: Outside range.
  - Then proceed to Step 2.
- If: Within range.
  - Then replace ACCESS 7.

**Step 2:** Check voltage at CA231-6 and CA231-9 (ACCESS 7).

- If: Within range.
  - Then fix wiring problem between CA602 and CA231.
- If: Outside range.
  - Then proceed to Step 3.

**Step 3:** Disconnect CA221-3 and CA221-4 to FS/RS and recheck voltage at CA231-6+ and CA231-9 (ACCESS 7).

- If: Within range.
  - Then short is in the FS/RS circuit.
- If: Outside range.
  - Then replace ACCESS 7.

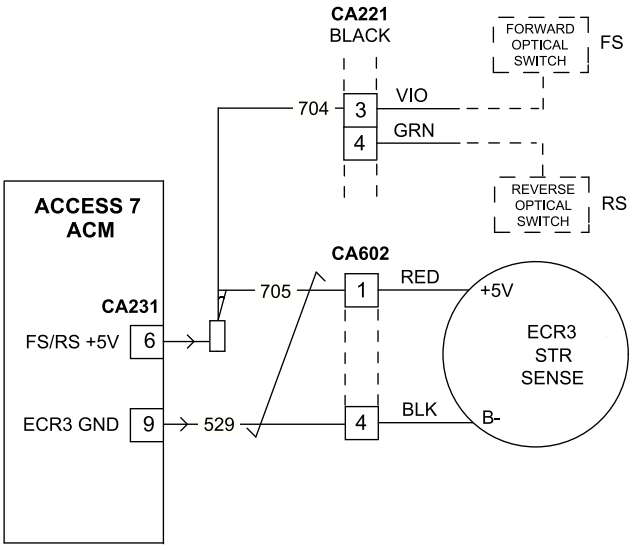



Figure 16045


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# Event Code 711

**ACCESS 7 Module Internal Shutdown.**

An interrupt internal to ACCESS 7 has toggled unexpectedly. This event is logged as an attempt to prevent undesired action.

**Step 1:** Key down truck, then key-up.

- If: Code continues.
  - Then replace ACCESS 7.

# Event Code 712

**Load Sensor (PT1) Outside Range.**

The pressure transducer input (PT1), CA232-2 is reading out of range from the expected values.

**Step 1:** Check Load Sensor counts using Analyzer menu A2.4.9.1 while lifting load. Transducer range is between 4-20mA. (20mA = shorted, 4mA = open).

- If: Less than 4 mA.
  - Then check wire continuity from CA232-2 to CA612-1 and from CA232-3 (+) to CA612-2.
- If: Wiring does not have continuity.
  - Then repair wiring to PT1.
- If: Wiring continuity correct.
  - Then replace PT1.
- If: Greater than 20 mA.
  - Then proceed to Step 2.
- If: PT1 within 4-20 mA range.
  - Then replace ACCESS 7.

**Step 2:** Check voltage across PT1 wires at CA612-2 (+) and CA612-1 (-).

- If: 14 to 16 Vdc.
  - Then replace ACCESS 7.
- If: Less than 14 Vdc.
  - Then proceed to Step 3.

**Step 3:** Check voltage between CA612-2 (+) and BNEG.

- If: Between 14-16 Vdc.
  - Then wiring from CA232-2 to CA612-1 is open. Repair as necessary.
- If: Less than 14 Vdc.
  - Then proceed to Step 4.

**Step 4:** Check voltage between CA612-1 (-) and +BV.

- If: +BV.
  - Then wiring between CA232-3 to CA612-2 is open, repair as necessary.
- If: 0 Vdc.
  - Then replace ACCESS 7.

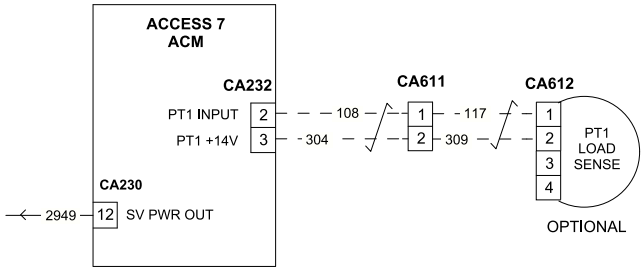



Figure 16064

https://truckmanualshub.com/

## Event Code 713

**Excessive Current SPL Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-1.

**Step 1:** Remove wire from CA230-1. Key on truck and attempt to lower, monitor event code.

- If: Event 713 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 29 ohms. Reinstall wire and proceed to Step 2.
- If: Event 713 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key-on truck and attempt to lower, monitor event code.

- If: Event 713 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 713 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 29 ohms.

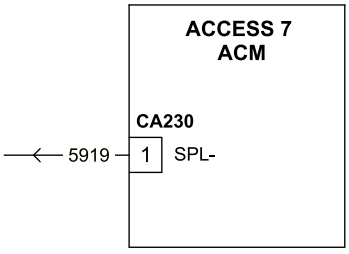



Figure 16065

## Event Code 714

**Excessive Current SPA Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-2.

**Step 1:** Remove wire from CA230-2. Key on truck and attempt to tilt, monitor event code.

- If: Event 714 is not the last event.
  - Then short is in the solenoid or wiring. Coil resistance should be approximately 29 ohms. Reinstall wire and proceed to Step 2.
- If: Event 714 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to tilt, monitor event code.

- If: Event 714 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 714 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 29 ohms.

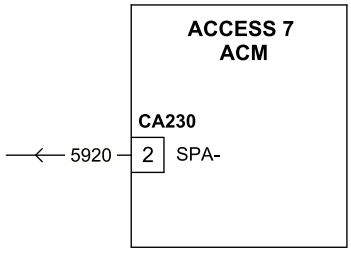



Figure 16066


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## Event Code 715

**Excessive Current SVTR Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-4.

**Step 1:** Remove wire from CA230-4. Key on truck and attempt to tilt, monitor event code.

- If: Event 715 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 39 ohms. Reinstall wire and proceed to Step 2.
- If: Event 715 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to tilt, monitor event code.

- If: Event 715 is still the last event.
  - Then short exists in wiring, check for short between negative and positive wire.
- If: Event 715 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 39 ohms.

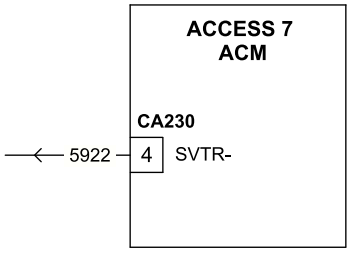



Figure 16067

## Event Code 716

**Excessive Current SVTE Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-3.

**Step 1:** Remove wire from CA230-3. Key on truck and attempt to tilt, monitor event code.

- If: Event 716 is not the last event.
  - Then short is in the solenoid or wiring. Coil resistance should be approximately 39 ohms. Reinstall wire and proceed to Step 2.
- If: Event 716 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to tilt, monitor event code.

- If: Event 716 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 716 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 39 ohms.

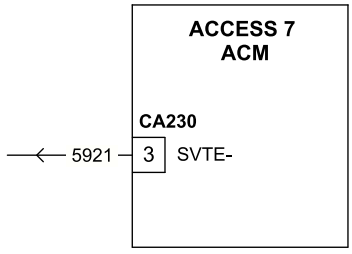



Figure 16068

https://truckmanualshub.com/

## Event Code 717

**Excessive Current SVA1A Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-7.

**Step 1:** Remove wire from CA230-7. Key on truck and attempt to SS right, monitor event code.

- If: Event 717 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 39 ohms. Reinstall wire and proceed to Step 2.
- If: Event 717 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to SS, monitor event code.

- If: Event 717 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 717 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 39 ohms.

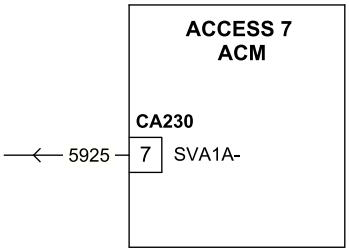



Figure 16069

## Event Code 718

**Excessive Current SVA1B Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-8.

**Step 1:** Remove wire from CA230-8. Key on truck and attempt to SS left, monitor event code.

- If: Event 718 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 39 ohms. Reinstall wire and proceed to Step 2.
- If: Event 718 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to SS, monitor event code.

- If: Event 718 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 718 is not the last event code.
  - Then short exists in solenoid. Coil resistance should be approximately 39 ohms. Replace the solenoid.

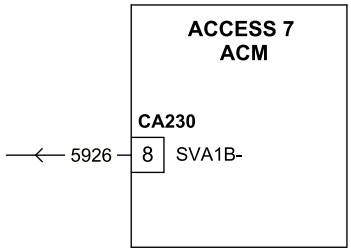



Figure 16070


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## Event Code 719

**Excessive Current SVA2A Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-9.

**Step 1:** Remove wire from CA230-9. Key on truck and attempt to use accessory 2, monitor event code.

- If: Event 719 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 39 ohms. Reinstall wire and proceed to Step 2.
- If: Event 719 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to use accessory 2, monitor event code.

- If: Event 719 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 719 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 39 ohms.

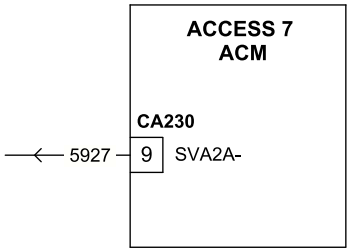



Figure 16071

## Event Code 720

**Excessive Current SVH Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-5.

**Step 1:** Remove wire from CA230-5. Key on truck and attempt to raise, monitor event code.

- If: Event 720 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 39 ohms. Reinstall wire and proceed to Step 2.
- If: Event 720 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to raise, monitor event code.

- If: Event 720 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 720 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 39 ohms.

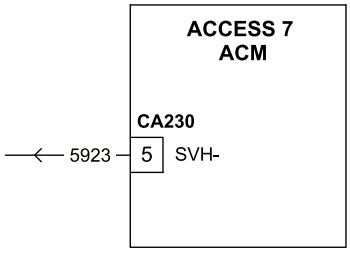



Figure 16072

https://truckmanualshub.com/

# Event Code 721

**Excessive Current PRVA Solenoid Coil Circuit.**

Event logged if excessive current flows through driver CA230-6.

**Step 1:** Remove wire from CA230-6. Key on truck and attempt to use pressure regulator, monitor event code.

- If: Event 721 is not the last event.
  - Then short is in the wiring or solenoid. Reinstall wire and proceed to Step 2.
- If: Event 721 is still the last event
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to use pressure regulator, monitor event code.

- If: Event 721 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 721 is not the last event code.
  - Then short exists in solenoid, replace solenoid.

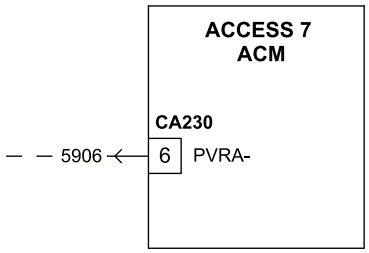



Figure 16073


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# Event Code 722

**CAN Communication between ACCESS 7 and ACCESS 2 Time Out.**

Lost CAN communication between ACCESS 7 and ACCESS 2.

**Step 1:** Check for other event codes and troubleshoot them first.

- If: No other event codes.
  - Then proceed to Step 2.

**Step 2:** Verify ACCESS 2 remains powered at time of code. Check voltage from CA405-33 (+) and BNEG. (CA409-1 (+) and BNEG on AC hydraulic models).

- If: Not powered.
  - Then repair power supply wiring.
- If: ACCESS 2 remains powered.
  - Then proceed to Step 3.

**Step 3:** Key OFF truck and check CAN high and low lines with DVOM for proper resistance at harness. Connect leads to CA405-18 and CA405-19 (DC) or CA406-3 and CA406-1 (AC), should be approximately 60 ohm.

- If: 0 ohm.
  - Then a short exists between CAN high and CAN low. Check wiring and repair.
- If: Greater than 60 ohm.
  - Then check wiring for open or bad connection. If OK, then replace ACCESS 2.
- If: 60 ohm.
  - Then CAN line is correct, replace ACCESS 2 if code continues.

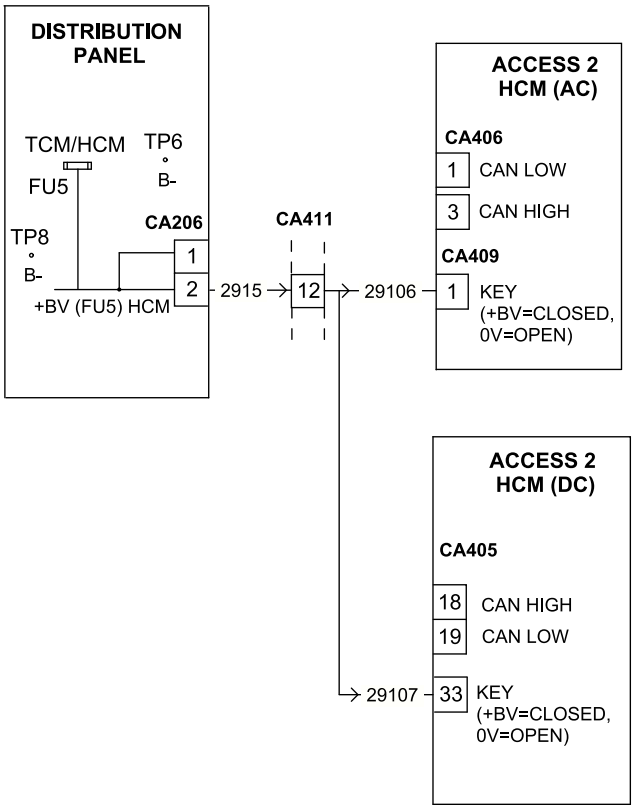



Figure 16078

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# Event Code 723

**CAN Communication Time Out between ACCESS 7 and ACCESS 3.**

Lost CAN communication between ACCESS 7 and ACCESS 3.

**Step 1:** Check for other event codes and investigate them first.

- If: No other event codes.
  - Then proceed to Step 2.

**Step 2:** Verify ACCESS 3 remains powered at time of code.

- If: ACCESS 3 not powered.
  - Then trace/repair power supply wiring to CA403-3(+) and BNEG.
- If: ACCESS 3 remains powered.
  - Then proceed to step 3.

**Step 3:** Key OFF truck and check CAN high and low lines with DVOM for proper resistance at harness CA401-1 and CA401-6, should be approximately 60 ohm.

- If: 0 ohm.
  - Then a short exists between CAN high and CAN low. Check wiring and repair.
- If: 60 ohm.
  - Then CAN line is correct, replace ACCESS 3 if code continues.
- If: Greater than 60 ohm.
  - Then check wiring for open or bad connection. If OK, replace ACCESS 3.

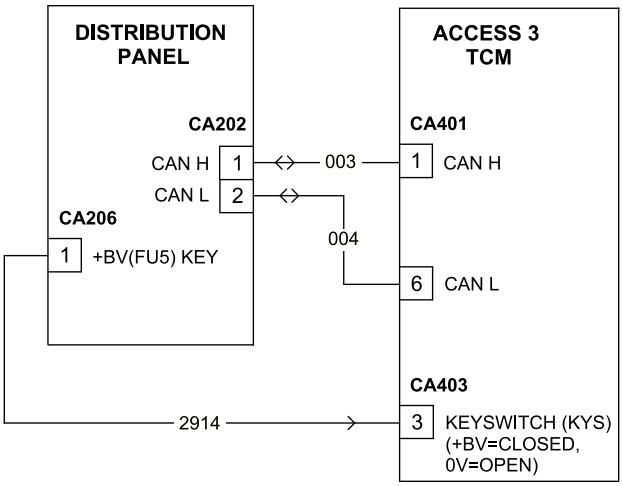



Figure 16079


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# Event Code 724

**CAN Communication Time Out ACCESS 7 and ACCESS 1.**

Lost CAN communication between ACCESS 7 and ACCESS 1.

**Step 1:** Check for other event codes and investigate them first.

- If: No other event codes.
  - Then proceed to step 2.

**Step 2:** Verify ACCESS 1 remains powered at time of code.

- If: ACCESS 1 not powered.
  - Then trace/repair power supply wiring to CA215-17 (+) and CA215-4 (-).
- If: ACCESS 1 remains powered.
  - Then proceed to Step 3.

**Step 3:** Key OFF truck and check CAN high and low lines with DVOM for proper resistance at harness CA401-1 and CA401-6, should be approximately 60 ohm.

- If: 0 ohm.
  - Then a short exists between CAN high and CAN low. Check wiring and repair.
- If: 60 ohm.
  - Then CAN line is OK, replace ACCESS 1 if code continues.
- If: Greater than 60 ohm.
  - Then check wiring for an open or bad connection. If OK, then replace ACCESS 1.

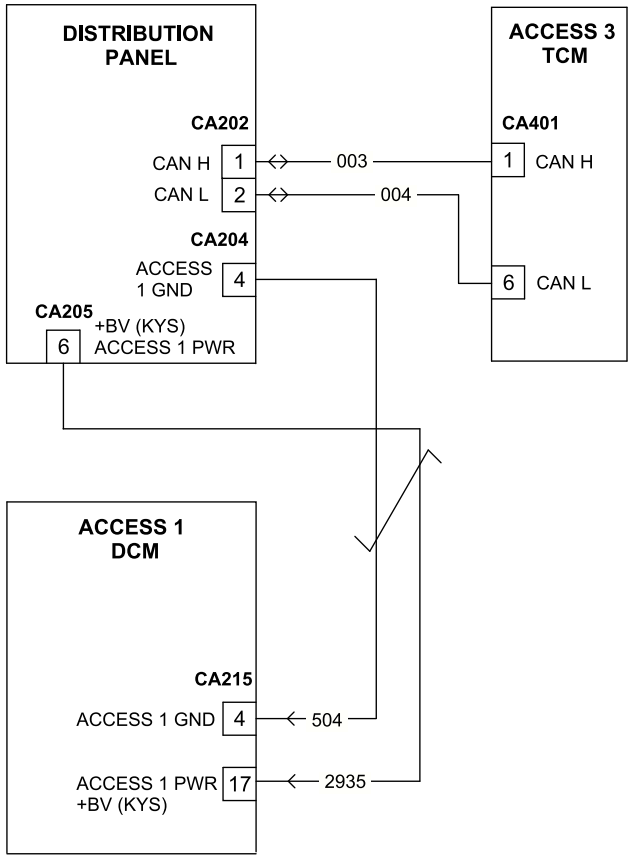



Figure 16080

https://truckmanualshub.com/

# Event Code 726

**CAN Communication Time Out between ACCESS 7 and ACCESS 2 or ACCESS 3.**

Lost CAN communication (SDO) between ACCESS 7 and either ACCESS 2 or ACCESS 3.

**Step 1:** Check for other event codes and investigate them first.

- If: No other event codes.
  - Then proceed to Step 2.

**Step 2:** Verify ACCESS 2 and 3 remain powered at time of code.

- If: Not powered.
  - Then trace/repair power supply wiring to CA215-17 (+) and CA215-4 (-).
- If: ACCESS 2 & 3 remain powered.
  - Then proceed to Step 3.

**Step 3:** Key OFF truck and check CAN high and low lines with DVOM for proper resistance at harness CA401-1 and CA401-6, should be approximately 60 ohm.

- If: 0 ohm.
  - Then a short exists between CAN high and CAN low. Check wiring and repair.
- If: 60 ohm.
  - Then CAN line is correct. Replace ACCESS 3 if code continues.
- If: Greater than 60 ohm.
  - Then check wiring for open or bad connection. If OK then replace ACCESS 3.

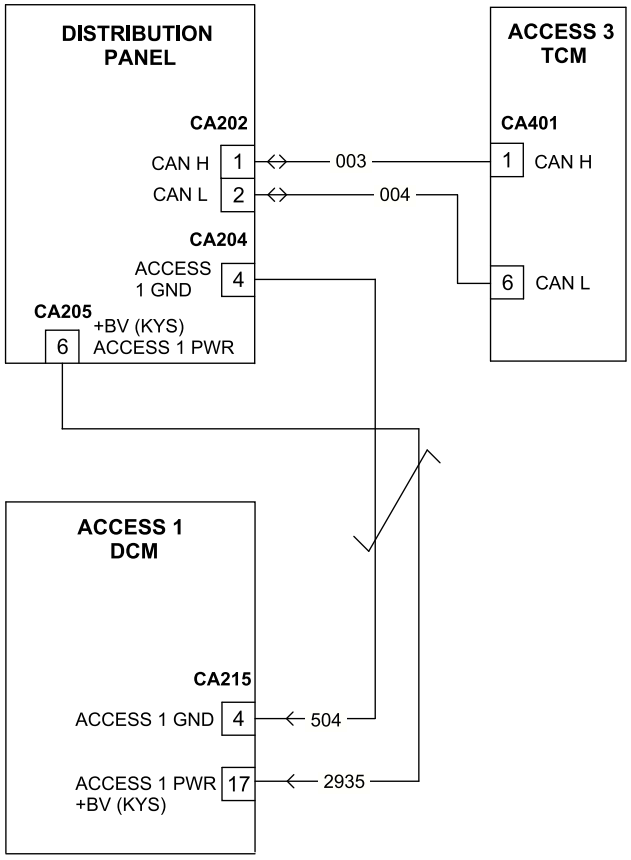



Figure 16080

# Event Code 727

**ACCESS 7 Software Issue.**

**Step 1:** Key down truck, then key-up.

- If: Event code continues.
  - Then load current software into ACCESS 7.
- If: Event code continues.
  - Then replace ACCESS 7.


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# Event Code 728

**ECR5 Height ENCODER.**

The optional Height Encoder input has changed without a raise or lower command.

**Step 1:** Using Analyzer A2.1.5, monitor count value while lifting and lowering mast above staging.

- If: Count not consistent with lift operation.
  - Then proceed to Step 2.
- If: Count follows lift operation.
  - Then replace ACCESS 1.

**Step 2:** Verify mechanical operation of ECR5 is correct.

- If: Mechanical operation not correct.
  - Then repair ECR5.
- If: OK.
  - Then proceed to Step 3.

**Step 3:** Check power supply to encoder at CA622-1 (+) and CA622-4 (-). Should be approximately 5 Vdc.

- If: Power supply is not 5 Vdc.
  - Then proceed to Step 4.
- If: Power supply is 5 Vdc.
  - Then proceed to Step 5.

**Step 4:** Check voltage across pins CA215-10 and CA215-12 of ACCESS 1.

- If: 5 Vdc.
  - Then repair/replace wiring or connection between CA215-10 and CA622-1 or between CA215-12 and CA622-4.
- If: Not 5 Vdc.
  - Then replace ACCESS 1.

**Step 5:** Check continuity from CHA and CHB wires (CA622-2 & -3) to ACCESS 1 (CA215-11 and CA215-5).

- If: No continuity.
  - Then repair wiring or connections.
- If: Continuity.
  - Then replace ECR5.

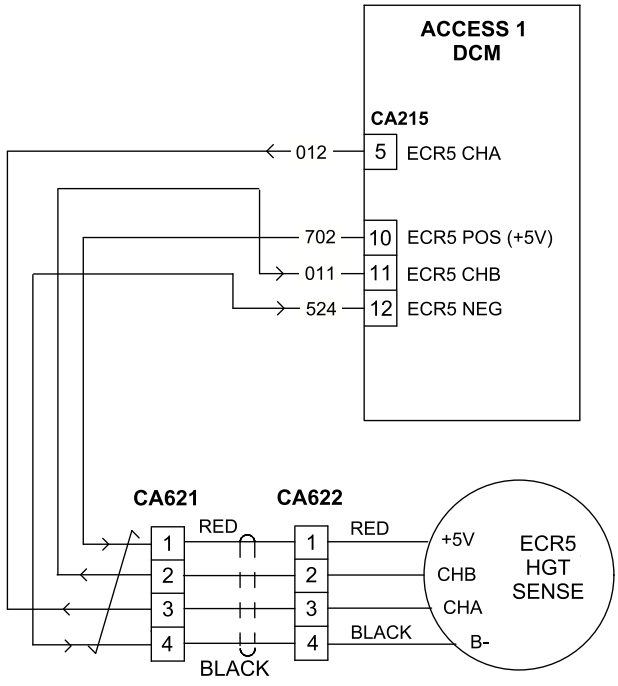



Figure 16081

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# Event Code 729

**ECR5 Height Encoder not counting.**

ACCESS 1 does not receive ECR5 (optional height encoder) counts when mast is being raised above staging.

**Step 1:** Using Analyzer A2.1.5, monitor count value while lifting and lowering mast above staging.

- If: Count not consistent with lift operation.
  - Then proceed to Step 2.
- If: Count follows lift operation.
  - Then replace ACCESS 1.

**Step 2:** Verify mechanical operation of ECR5 is correct.

- If: Mechanical operation not correct.
  - Then repair ECR5.
- If: Correct.
  - Then proceed to Step 3.

**Step 3:** Check power supply to encoder at CA622-1 (+) and CA622-4 (-). Should be approximately 5 Vdc.

- If: Power supply is not 5 Vdc.
  - Then proceed to Step 4.
- If: Power supply is 5 Vdc.
  - Then proceed to Step 5.

**Step 4:** Check voltage across pins CA215-10 and CA215-12 of ACCESS 1.

- If: 5 Vdc.
  - Then repair/replace wiring or connection between CA215-10 and CA622-1 or between CA215-12 and CA622-4.
- If: Not 5 Vdc.
  - Then replace ACCESS 1.

**Step 5:** Check continuity from CHA and CHB wires (CA622-2 & -3) to ACCESS 1 (CA215-11 and CA215-5).

- If: No continuity.
  - Then repair wiring.
- If: Wiring is correct.
  - Then proceed to Step 6.

**Step 6:** Replace ECR5.

- If: Known working encoder does not solve code and wiring is OK.
  - Then replace ACCESS 7.

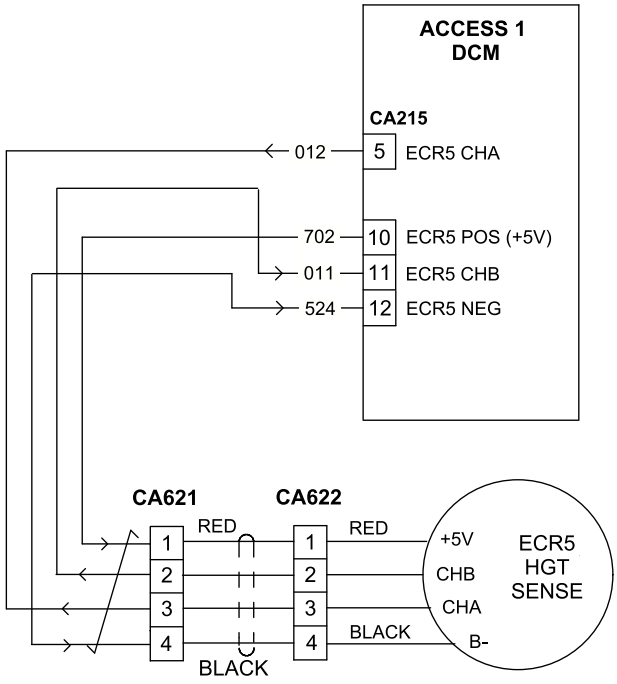



Figure 16081


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# Event Code 730

**ECR5 Height ENCODER Input Reversed.**

Event logged if the height encoder inputs A and B indicate that the mast is raising/lowering opposite of the command given.

**Step 1:** Verify A and B channels are wired correctly from CA622-2 to CA215-11 and CA622-3 to CA215-5.

- If: Wired incorrectly.
  - Then reverse wiring.
- If: Wired correctly.
  - Proceed to Step 2.

**Step 2:** Verify ECR5 is powered at CA622-1 and CA622-4, should be approximately 5 Vdc.

- If: ECR5 is not powered.
  - Then check wiring to ACCESS 1 and repair.
- If: ECR 5 is powered.
  - Then proceed to Step 3.

**Step 3:** Verify POT2 is wired with proper polarity from CA232-8 and 232-9 to CA220-4 and CA220-6 and POT2.

- If: Wiring is incorrect.
  - Then repair wiring.
- If: Wiring is correct.
  - Then proceed to Step 4.

**Step 4:** Using Analyzer A2.1.5, and ECR5 removed, rotate encoder manually and monitor count value.

- If: Count is consistent with rotation.
  - Then replace ACCESS 1.
- If: Count is not consistent with rotation.
  - Then replace ECR5.

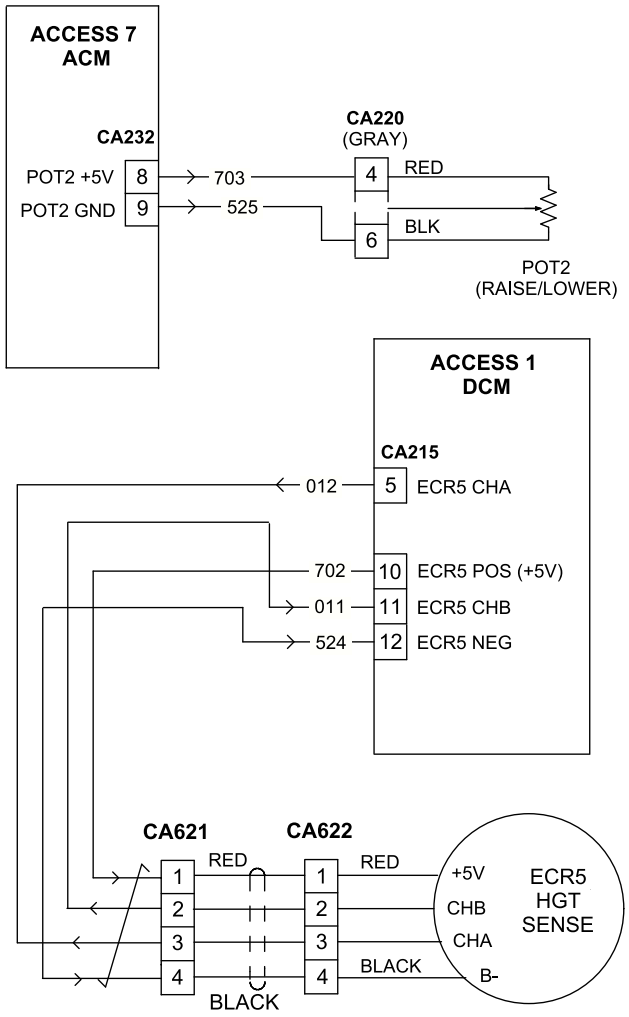



Figure 16086-01

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## Event Code 731

**TILT Not Moving When Commanded.**

Tilt has been commanded, the pump has been turned on and the appropriate solenoids have been energized. The mast may in fact even be tilting. However, ACCESS 7 has seen no movement (tilt). In this case the tilt sensor is in range but stuck or slipping.

This event may occur above staging due to slower pump speed. In this case, check pump operation first - refer to Step 5.

**Step 1:** Use Analyzer mode A2.4.8.1 and A2.4.8.2 to verify input during tilt operation.

- If: Input is incorrect.
  - Then proceed to Step 2.
- If: Input is correct.
  - Then replace ACCESS 7.

**Step 2:** Verify mechanical operation of RPS2, including shaft set screw is tight.

- If: Mechanical operation correct.
  - Then proceed to Step 3.
- If: Mechanical operation not correct.
  - Then repair RPS2.

**Step 3:** Verify RPS2 power supply, approximately 5 Vdc at CA421-1 and CA421-3.

- If: Power supply is not correct.
  - Then proceed to Step 4.
- If: Power supply is correct.
  - Then replace ACCESS 7.

**Step 4:** Verify power supply at ACCESS 7, CA232-4 (+) and CA232-12 (-).

- If: Power supply is incorrect at ACCESS 7.
  - Then replace ACCESS 7.
- If: Power supply is correct at ACCESS 7.
  - Then repair wiring from ACCESS 7 to RPS2. CA232-4 and CA232-12 to CA421-1 and CA421-3.

**Step 5:** Check hydraulic pressure at test port (quick disconnect fitting in front of pump).

- If: Pressure is low.
  - Then replace pump.
- If: Pressure is OK.
  - Then proceed with Step 1.

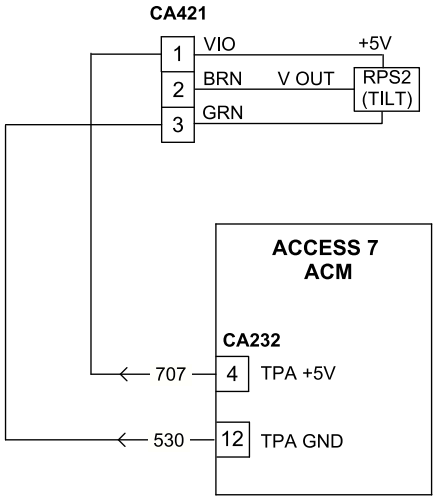



Figure 16087

## Event Code 732

**ACCESS 1 / ACCESS 7 CAN Receiving Issue.**

ACCESS 1 is receiving CAN packets too fast.

**Step 1:** Verify correct Accesses are on truck.

- If: New Accesses have recently been installed.
  - Then check for software compatibility.

**Step 2:** Determine if event code is being logged during different truck functions.

- If: Event code is logged during a function.
  - Then check load and suppression.
- If: Event code is logged when truck is idle.
  - Then key OFF truck, disconnect strobe or other accessories and key ON truck.
- If: Event code clears.
  - Then replace strobe or accessory.
- If: Event code continues.
  - Then follow event code 724 to check CAN Communication lines.


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# Event Code 733

**ACCESS 7 CAN Communication Issue with ACCESS 1.**

ACCESS 1 Passive Issue.

**Step 1:** Key ON truck, verify status of ACCESS 7 status light and 36 Vdc from CA231-7 (+) to CA231-8 (-).

- If: 36 Vdc and event code continues.
  - Then check wiring for proper connections from CA231-1 to CA215-19 and CA231-12 to CA215-18. If wiring is OK, proceed to Step 2.
- If: 0 Vdc.
  - Then Check FU3, KYS, K1 and associated wiring to ACCESS 7. If components and wiring are OK, replace ACCESS 7.

**Step 2:** Determine if event code is being logged during different truck functions.

- If: Event is logged during a function.
  - Then check load and suppression.
- If: Event is logged when truck is idle.
  - Then proceed to Step 3.

**Step 3:** Key OFF truck, disconnect strobe and electrical accessories and Key ON truck.

- If: Event code clears.
  - Then replace strobe or accessory.
- If: Event Code continues.
  - Then proceed with Steps 4 and 5.

**Step 4:** Check CAN communication lines. Key OFF truck, with a DVOM check resistance between CAN high and CAN low at CA202-5 and CA202-6 on distribution panel, should be 60 ohm.

- If: 0 ohm.
  - Then short exists in CAN wiring, repair as necessary.
- If: Greater than 60 ohm.
  - Then proceed to Step 5.

**Step 5:** Remove CA231 and check resistance from CA231-1 and CA231-12 on ACCESS 7.

- If: Greater than 120 ohm.
  - Then replace ACCESS 7.
- If: 120 ohm.
  - Proceed to Step 6.

**Step 6:** Check for CAN line short to battery positive, battery negative, or truck frame. Key OFF truck, disconnect battery. With a DVOM check resistance at power unit from CAN low to battery negative buss bar, TP8 on distribution panel and truck frame. Resistance should be greater than 10k ohm. Repair wiring as necessary.

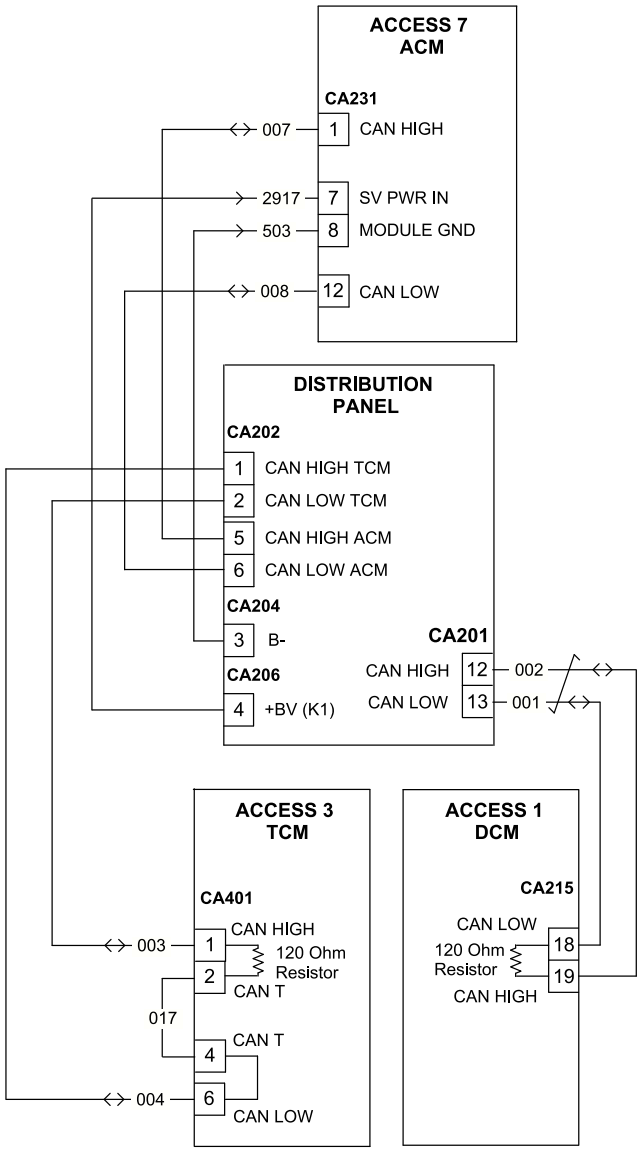



Figure 16088-01

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## Event Code 734

**ACCESS 7 CAN Communication Issue with ACCESS 1.**

ACCESS 1 Event Control Issue.

Follow event code 733 troubleshooting procedure.

## Event Code 735

**ACCESS 7 CAN Communication Line Open.**

ACCESS 1 CAN off line.

Follow event code 733 troubleshooting procedure.


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# Event Code 736

**ACCESS 1 / ACCESS 7 CAN Communication Issue.**

ACCESS 1 receiving duplicate ID.

**Step 1:** Key ON truck, verify status of ACCESS 7 status light and 36 Vdc from CA231-7 (+) to CA231-8 (-).

- If: 36 Vdc and event code persists.
  - Then check wiring for proper connections from CA231-1 to CA215-19 and CA231-12 to CA215-18. If wiring is OK, proceed to Step 2.
- If: 0 Vdc.
  - Then check FU3, KYS, K1 and associated wiring to ACCESS 7. If wiring and components are OK, replace ACCESS 7.

**Step 2:** Determine if event code is being logged during different truck functions.

- If: Event is logged during a function.
  - Then check load and suppression.
- If: Event is logged when truck is idle.
  - Then proceed to Step 3.

**Step 3:** Key OFF truck, disconnect strobe and electrical accessories and Key ON truck.

- If: Event code clears.
  - Then replace strobe or accessory.
- If: Event code persists.
  - Then proceed with Steps 4 and 5.

**Step 4:** Check CAN communication lines. Key OFF truck, with a DVOM check resistance between CAN high and CAN low at CA202-5 and CA202-6 on distribution panel, should be 60 ohm.

- If: 0 ohm.
  - Then short exists in CAN wiring, repair as necessary.
- If: Greater than 60 ohm.
  - Then proceed to Step 5.

**Step 5:** Remove CA231 and check resistance from CA231-1 and CA231-12 on ACCESS 7.

- If: Greater than 120 ohm.
  - Then replace ACCESS 7.
- If: 120 ohm.
  - Proceed to Step 6.

**Step 6:** Check for CAN line short to battery positive, battery negative, or truck frame. Key OFF truck, disconnect battery. With a DVOM check resistance at power unit from CAN low to battery negative buss bar, TP8 on distribution panel and truck frame. Resistance should be greater than 10k ohm. Repair wiring as necessary.

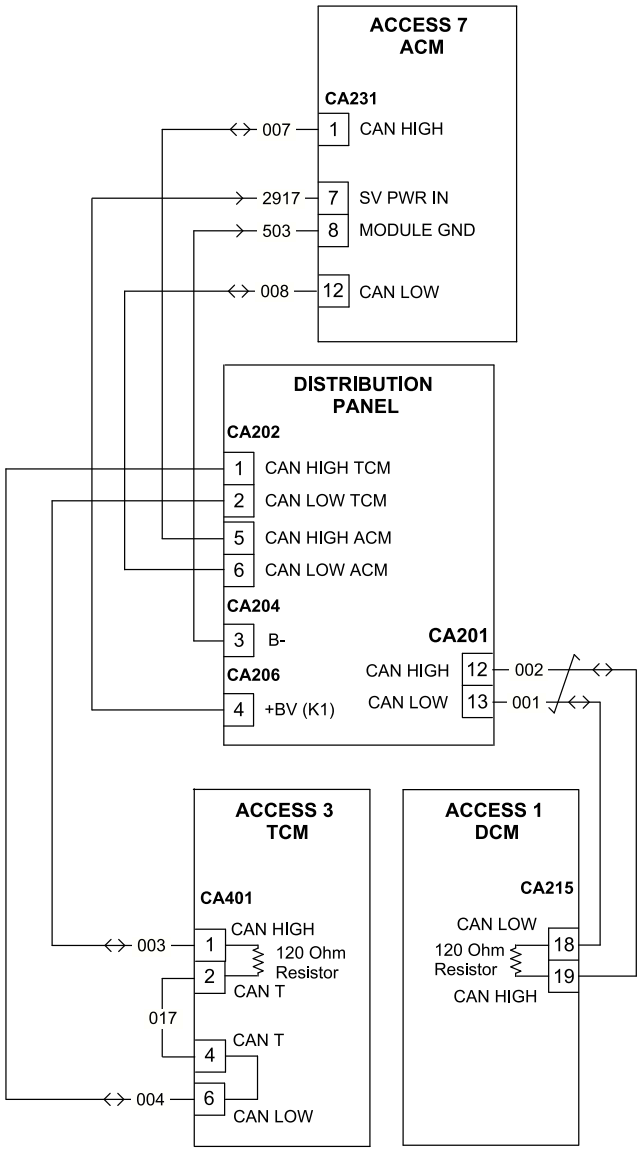



Figure 16088-01

## Event Code 737

**ACCESS 1/ACCESS 7 CAN Communication Issue.**

ACCESS 1 receiving short packets.

Follow procedure for event code 736.

## Event Code 738

**ACCESS 1 / ACCESS 7 CAN Communication Error.**

ACCESS 1 receiving long packets.

Follow procedure for event code 736.

## Event Code 739

**Tilt Position Sensor (RPS2) Outside Calibrated Range.**

ACCESS 7 has detected the RPS2 sensor to be out of range from the calibrated values.

***Note:*** *A 739 event code will be logged when calibrating tilt (RPS2) if HGTS1 is open (mast up).*

**Step 1:** Use Analyzer mode A2.4.8.1 and A2.4.8.2 in display to verify input during tilt operation.

- If: Value is not between 0.5 and 4.5 Vdc or inconsistent with commands.
  - Then proceed to Step 2.
- If: Value is within range.
  - Then replace ACCESS 7.

**Step 2:** Verify mechanical operation of RPS2, including set screw is tight on shaft.

- If: Mechanical issue.
  - Then repair and recalibrate RPS2.
- If: Correct.
  - Then recalibrate RPS2. If issue remains then proceed to Step 3.

**Step 3:** Check power supply voltage to RPS2 between CA421-1 (+) and CA421-3 (-). Should be approximately 5 Vdc.

- If: Correct.
  - Then proceed to Step 4.
- If: Incorrect.
  - Proceed to Step 5.

**Step 4:** Check RPS2 input wiring to ACCESS 7, CA232-1 to RPS2 CA421-2 for continuity.

- If: No continuity.
  - Then repair wiring.
- If: Wiring has continuity.
  - Then replace RPS2.

**Step 5:** Check voltage at CA232-4 (+) and CA232-12 (-). Should be approximately 5 Vdc.

- If: Correct.
  - Then a wiring problem exists between ACCESS 7 and RPS2. Repair as necessary.
- If: Incorrect.
  - Then replace ACCESS 7.

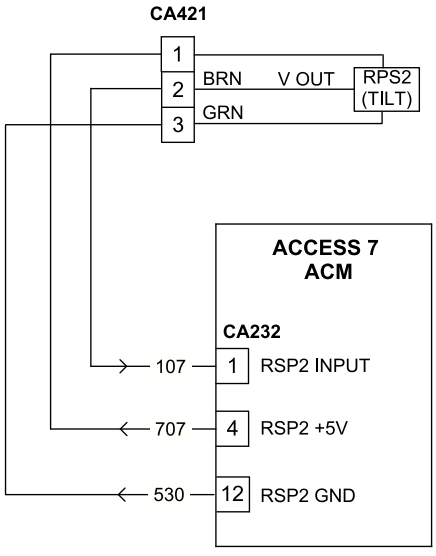



Figure 16089-01


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# Event Code 740

**Accessory Potentiometer POT3 Outside Calibrated Range.**

The POT3 input value is out of range from the calibrated values.

***Note:*** *ECR4 and POT3 share power supply from ACCESS 2.*

***Note:*** *If code is intermittent, then recalibrate POT3 (C1.3 calibration menu) thumb ball held firmly against stops.*

**Step 1:** Use Analyzer menu A2.2.7 in display to verify input while actuating accessory hydraulic function.

- If: Value is not between 2 and 11 Vdc or inconsistent with commands.
  - Then proceed to Step 2.
- If: Value is consistent with command and within range.
  - Then replace ACCESS 2.

**Step 2:** Verify mechanical operation of POT3.

- If: Mechanical issue.
  - Then repair and recalibrate POT3.
- If: POT3 mechanical operation is correct.
  - Then recalibrate POT3 accessory potentiometer. If issue remains, then proceed to Step 3.

**Step 3:** Check power supply voltage to POT3 between CA220-7 (+) and CA220-9 (-). Should be approximately 12 Vdc.

- If: Power supply voltage correct.
  - Then proceed to Step 4.
- If: Power supply voltage incorrect.
  - Then proceed to Step 5.

**Step 4:** Check wiper circuit input at ACCESS 2. Connect leads to CA410-12(+) to CA220-8 (-) and check continuity.

- If: No continuity.
  - Then repair wiring.
- If: Wiring has continuity.
  - Then replace POT3.

**Step 5:** Check voltage across pins CA408-1 and CA408-3 (AC) or CA405-15 and CA405-16 (DC).

- If: Approximately 12 Vdc.
  - Then repair/replace wiring or connection between CA220 and CA405 (DC) or CA408 (AC).
- If: Not approximately 12 Vdc.
  - Then replace ACCESS 2.

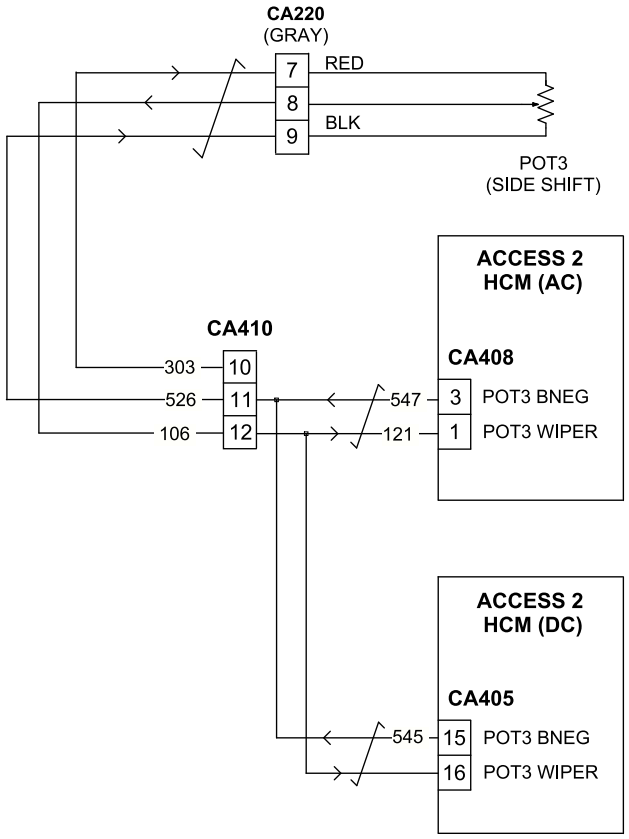



Figure 16090-01

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## Event Code 741

**Accessory Potentiometer POT3 Outside Calibrated Range.**

The POT3 input has gone to a value that is out of range from the calibrated values (above).

Follow procedures for event code 740.

## Event Code 742

**Lift/Lower Potentiometer POT2 Outside Calibrated range.**

The POT2 input has gone to a value that is out of range from the calibrated values (below).

***Note:*** *If code is intermittent, then recalibrate POT2 with multi-task handle held firmly against upper and lower stops.*

**Step 1:** Use Analyzer menu A2.4.7 to check input to ACCESS 7 while lifting and lowering.

- If: Range is approximately 1.3 to 3.6 volts and consistent with commands.
  - Then replace ACCESS 7.
- If: Range is not approximately 1.3 to 3.6 volts or inconsistent with commands.
  - Then proceed to step 2.

**Step 2:** Verify mechanical operation of POT2.

- If: Mechanical issue.
  - Then repair/replace POT2.
- If: POT2 mechanical operation is OK.
  - Then recalibrate POT2 and if issue remains proceed to step 3.

**Step 3:** Check power supply voltage to POT2. Connect leads across pins CA220-4 and CA220-6.

- If: Approximately 5 V.
  - Then proceed to Step 4.
- If: Not approximately 5 V.
  - Then proceed to Step 5.

**Step 4:** Check wiper circuit continuity. Connect leads across pins CA220-5 and CA232-7.

- If: No continuity.
  - Repair/replace wiring or connection.
- If: Continuity.
  - Then replace POT2.

**Step 5:** Check power supply voltage from ACCESS 7. Connect leads across pins CA232-8 and CA232-9.

- If: Approximately 5 V.
  - Then repair/replace wiring or connection from CA232 to CA220.
- If: Not approximately 5 V.
  - Then replace ACCESS 7.

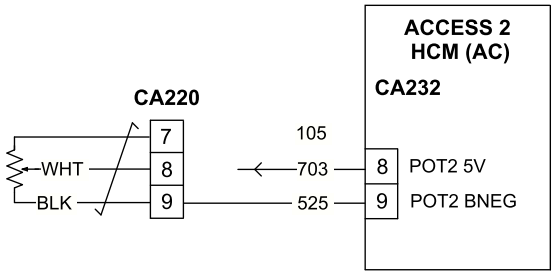



Figure 22801

## Event Code 743

**Lift Potentiometer POT2 Outside Calibrated Range.**

The POT2 input has gone to a value that is out of range from the calibrated values (above).

Follow procedures for event code 742.

## Event Code 744

**ACCESS 7 Software Watchdog Monitor.**

Software watchdog issue during self test.

**Step 1:** Re-key truck.

- If: Event code reoccurs.
  - Then replace ACCESS 7.


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## Notes:

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# Event Code 745

**Steering Feedback (POT4) Sensor Issue.**

The system has detected the steer feedback pot (POT4) movement of 20 degrees without any input from the steer tiller encoder (ECR3) if this event is logged, a re-key will only log a 318 code.

***Note:*** *This event can be caused if the 12 Vdc supply in ACCESS 3 gets shorted to BNEG in the accelerator pot circuit. This issue can occur along with an event code 318.*

**Step 1:** Using Analyzer menu, compare ECR3 input at A2.4.3 to POT4 input at A2.3.8 and verify both inputs are consistent when tiller is moved.

- If: Inconsistency is in ECR3 circuit.
  - Then proceed to Step 2.
- If: Inconsistency is in POT4 circuit.
  - Then proceed to Step 4.

**Step 2:** Check 5 Vdc power supply between CA602-1(+) and CA602-4(-).

- If: Power supply is 5 Vdc.
  - Then proceed to Step 3.
- If: Power supply is not 5 Vdc.
  - Then trace/repair wiring from ACCESS 7, check for short to +5 V or BNEG.

**Step 3:** Check continuity from Channel A (CA602-3) and Channel B (CA602-2) to ACCESS 7 (CA231-5 and CA231-4) respectively.

- If: No continuity.
  - Then check replace connections or wiring.
- If: Continuity checks correct.
  - Then replace ECR3.

**Step 4:** Check for 11.3 Vdc to POT4 between CA601-A and CA601-B.

- If: Power supply is approximately 11.3 Vdc.
  - Then proceed to Step 5.
- If: Power supply is not 11.3 Vdc.
  - Then trace/repair wiring, check for short to +BV or BNEG.

**Step 5:** Check wiper wiring between CA403-17 and CA601-C.

- If: Wiring is correct.
  - Then replace POT4.
- If: Wiring is not correct.
  - Then trace/repair wiring, check for short to +BV or BNEG.


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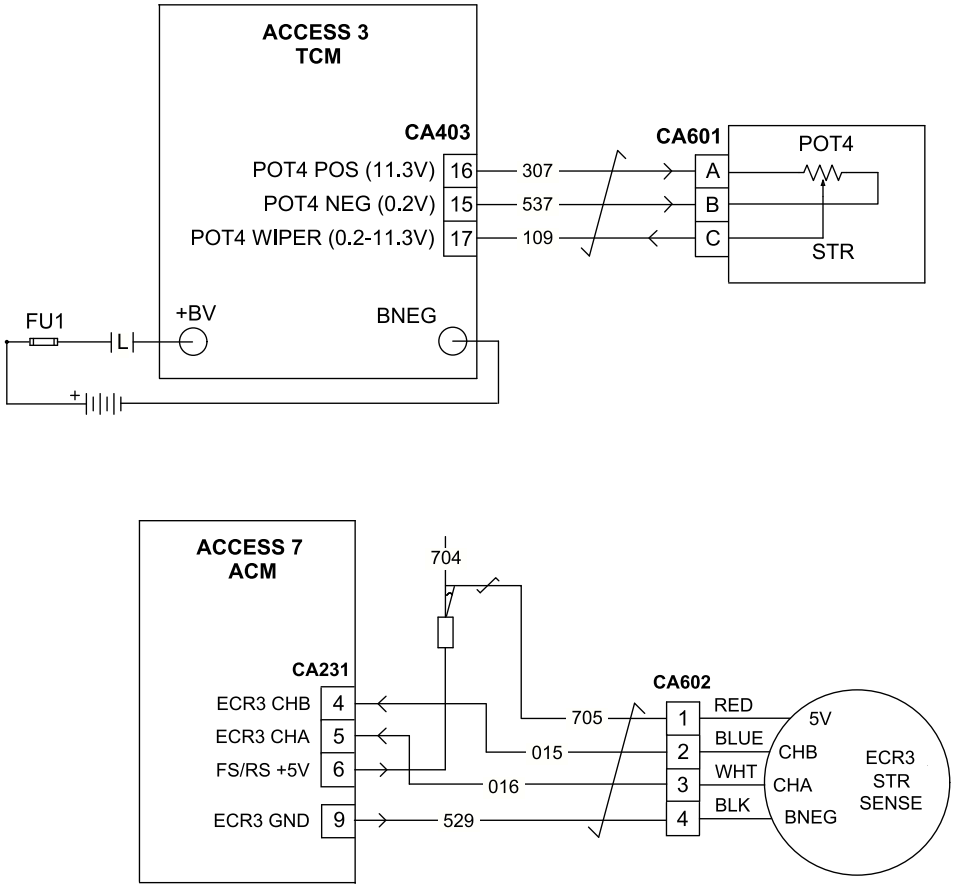



Figure 16378-01

# Event Code 746

**Excessive Current SVA2B Solenoid Coil Circuit.**

This code is logged if excessive current flows through driver CA230-10.

**Step 1:** Remove wire from CA230-10. Key ON truck and attempt to use accessory 2, monitor event code.

- If: Event 746 is not the last event.
  - Then short is in the wiring or solenoid. Coil resistance should be approximately 39 ohms. Reinstall wire. Proceed to Step 2.
- If: Event 746 is still the last event.
  - Then replace ACCESS 7.

**Step 2:** Remove positive wire from solenoid. Key on truck and attempt to use accessory 2. Monitor event code.

- If: Event 746 is still the last event.
  - Then short exists in wiring, check for shorts between negative and positive wire.
- If: Event 746 is not the last event code.
  - Then short exists in solenoid, replace solenoid. Coil resistance should be approximately 39 ohms.

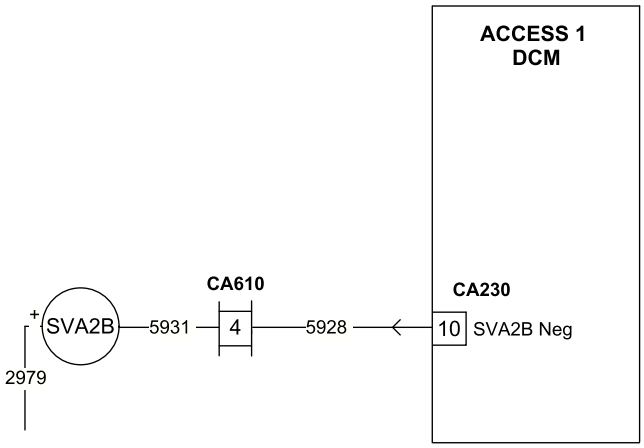



Figure 22809


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# Event Code 747

**SVA2B Solenoid Coil Open Circuit.**

This code is logged if an open circuit exists between SVA2B and driver CA230-10.

**Step 1:** Drive SVA2B through Analyzer menu A4.4.10 in display and measure voltage across SVA2B with wiring connected.

- If: 30 Vdc.
  - Then SVA2B is open, replace SVA2B. Coil resistance should be approximately 39 ohms.
- If: 0 V.
  - Then a positive or negative is missing, proceed to Step 2.

**Step 2:** Drive SVA2B through Analyzer menu A4.4.10 in display and measure voltage from +BV to SVAB2 negative with wiring connected.

- If: 0 V.
  - Then negative is missing. Proceed to Step 3.
- If: +BV.
  - Then positive is missing. Proceed to Step 4.

**Step 3:** Drive SVA2B through Analyzer menu A4.4.10 in display and measure voltage between CA230-10 (-) and +BV with wiring connected.

- If: +BV.
  - Then wiring is open from CA230-10 to SVA2B.
- If: 0 Vdc.
  - Then open is internal to Access, replace ACCESS 7.

**Step 4:** Drive SVA2B through Analyzer menu A4.4.10 in display and Measure voltage between CA230-12 (+) and BNEG.

- If: 30 Vdc.
  - Then wiring is open from CA230-12 and SVA2B (+).
- If: 0 Vdc.
  - Then open is internal to Access, replace ACCESS 7.

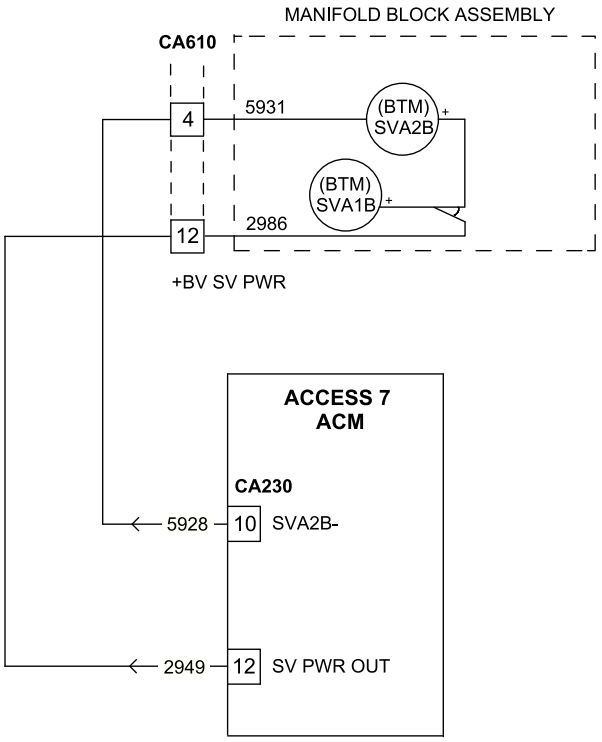



Figure 16092-01

# Event Code 748

**ACCESS 1 Communication Start Up Issue with ACCESS 7.**

This is a CAN issue that can occur at start-up when ACCESS 7 goes out and gets hardware/software part numbers of all Accesses.

**Step 1:** Check that ACCESS 1 power is +BV and stable at time of fault. Check CAN wiring integrity.

- If: Prevalent/permanent and only fault.
  - Then replace ACCESS 1.

***Note:*** *If 748 in combination with 749 or 750 or 751 replace ACCESS 7.*

## Event Code 749

**ACCESS 3 (Master) Startup Miscommunication.**

This event code occurs at startup when the ACCESS 7 retrieves identification.

**Step 1:** Verify input voltage to ACCESS 3 during event at +BV and BNEG.

- If: 35-38 Vdc and stable during event.
  - Then proceed to Step 2.

**Step 2:** Check CAN wiring by following event code 733.

- If: CAN wiring is bad.
  - Then repair CAN network.
- If: CAN wiring is correct.
  - Then proceed to Step 3.

**Step 3:** Check for additional event codes.

- If: Only Event code 749 occurs.
  - Then replace ACCESS 3.
- If: Event code 749 occurs with 748, 750 or 751 codes.
  - Then replace ACCESS 7.

## Event Code 750

**ACCESS 3 (Slave) Startup Miscommunication.**

This event code occurs at startup when the ACCESS 7 retrieves identification.

**Step 1:** Verify input voltage to ACCESS 3 during event at +BV and BNEG.

- If: 35-38 Vdc and stable during event.
  - Then proceed to Step 2.
- If: Not 35-38 Vdc and stable.
  - Then repair power circuit to ACCESS 2.

**Step 2:** Check CAN wiring by following event code 733.

- If: CAN wiring is bad.
  - Then repair CAN network.
- If: CAN wiring is correct.
  - Then proceed to Step 3.

**Step 3:** Check for additional event codes.

- If: Only Event code 750 occurs.
  - Then replace ACCESS 3.
- If: Event code 750 occurs with 748, 749 or 751 codes.
  - Then replace ACCESS 7.


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## Event Code 751

**ACCESS 2 Startup Miscommunication.**

This event code occurs at startup when the ACCESS 7 retrieves Access identification.

**Step 1:** Measure input voltage to ACCESS 2 during event at +BV and BNEG.

- If: 35-38 Vdc and stable during event.
  - Then proceed to Step 2.
- If: Not 35-38 Vdc and stable.
  - Then repair power circuit to ACCESS 2.

**Step 2:** Check CAN wiring by following event code 733.

- If: CAN wiring is bad.
  - Then repair CAN network.
- If: CAN wiring is correct.
  - Then proceed to Step 3.

**Step 3:** Check for additional event codes.

- If: Only event code 751 occurs.
  - Then replace ACCESS 2.
- If: Event code 751 occurs with 748, 749 or 750 codes.
  - Then replace ACCESS 7.

## Event Code 752

**ACCESS 1 Software not compatible with ACCESS 7 Software.**

Software not compatible with ACCESS 7 software.

**Step 1:** Enter the Utilities menu U1.1.2 and U1.4.2 and record software part numbers. Contact Crown for software updates.

## Event Code 753

**ACCESS 3 Master Software not compatible with ACCESS 7 Software.**

ACCESS 3 master software not compatible with ACCESS 7 software.

**Step 1:** Enter the Utilities menu U1.3.2 and U1.4.2 and record software part numbers. Contact Crown for software updates.

## Event Code 754

**ACCESS 3 Slave Software not compatible with ACCESS 7 Software.**

ACCESS 3 Slave software not compatible with ACCESS 7 software.

**Step 1:** Enter the Utilities menu U1.3.2 and U1.4.2 and record software part numbers. Contact Crown for software updates.

## Event Code 755

**ACCESS 2 Software not compatible with ACCESS 7 Software.**

ACCESS 2 software not compatible with ACCESS 7 software.

**Step 1:** Enter the Utilities menu U1.2.2 and U1.4.2 and record software part numbers. Contact Crown for software updates.

## Event Code 799

**ACCESS 7 Internal Fault.**

ACCESS 7 has logged an event indicating an internal problem exists.

**Step 1:** Key down truck, then key-up.

- If: Code continues.
  - Then load current software in ACCESS 7.
- If: Code continues.
  - Then replace ACCESS 7.

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# BRAKE

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## Notes:

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# Brake

## Service Brake

Truck braking is accomplished by using the traction motors for slowing and stopping the truck.

Truck braking is available three different ways:

1. Plugging by reverse of accelerator control handle using motor torque.
2. Service brake by lifting brake pedal to apply dynamic motor torque.
3. Parking brake, which uses an electrically released, spring applied mechanical brake when truck is-keyed OFF.

When the operator leaves the truck ON, the parking brake is applied at the opening of the ED contactor (approximately five seconds after leaving operator compartment). While ED is engaged, the traction controller powers the motors for *position hold* feature. The parking brake is also applied when the truck is keyed OFF.

The electric parking brakes are mounted on the traction motors. There are no adjustments to this brake.

## Plugging Distance

Truck warm up consists of six trips over the test course, alternating direction (forks last/forks first). Truck is accelerated from a dead stop at the maximum rate, and then plugged to a stop at the maximum rate at the 12.2 m (40.0 ft) location on the test course.

**NOTE**

*Ensure test course is 12.2 m (40.0 ft) in length on a level, smooth, dry concrete surface. No load is present on forks.*

Determine the plugging distance through test course as follows:

1. Ensure travel direction is forks first.
2. Align drive tire contact point with the start of test course.
3. Accelerate to maximum speed.
4. Perform a maximum plug at the 12.2 m (40.0 ft) location and record the distance to stop the truck. Stopping distance should be within the approximate range listed in the following chart.

**Chart 1 - Plugging Distance**

| Model | Distance | |
|---|---|---|
| | meters | feet |
| RC5510-30, RC5510-1.5 | 2.77 | 9.1 |
| RC5520-30, RC5520-1.5 | 2.99 | 9.8 |
| RC5530-30, RC5530-1.5 | 2.99 | 9.8 |
| RC5530-35, RC5530-1.6 | 3.05 | 10.0 |
| RC5540-40, RC5540-1.8 | 3.14 | 10.3 |

5. To adjust plugging, use ACCESS 1 and access P5 Performance menu in level 2. Adjust the effort to a higher or lower setting. The higher the setting, the shorter the distance; the lower the setting, the longer the distance.

## Service Brake

### Stopping Distance

1. Ensure travel direction is forks first.
2. Travel at maximum acceleration from 0 to 12.2 m (0 to 40.0 ft).
3. Release brake pedal.
4. The truck should stop within the approximate distance given in the following chart:

**NOTE**

*Ensure test course is 12.2 m (40.0 ft) in length on a level, smooth, dry concrete surface. No load is present on forks.*

**Chart 2 - Stopping Distance**

| Model | Distance | |
|---|---|---|
| | meters | feet |
| RC5510-30, RC5510-1.5 | 2.87 | 9.4 |
| RC5520-30, RC5510-1.5 | 2.87 | 9.4 |
| RC5530-30, RC5510-1.5 | 2.90 | 9.5 |
| RC5530-35, RC5510-1.6 | 2.83 | 9.3 |
| RC5540-40, RC5510-1.8 | 2.80 | 9.2 |

5. To adjust braking, use ACCESS 1 and access P6 Performance menu in level 2. Adjust the brake effort to a higher or lower setting. The higher the setting, the shorter the distance; the lower the setting, the longer the distance.

## Parking Brake Check

**NOTE**

*The parking brake is factory set and non-serviceable in the field. If parking brake does not hold satisfactorily, replace brake.*

**CAUTION**

Parking brake operation should not be tested under extreme dynamic (high speed) conditions. Excessive brake wear can occur.

1. Operate truck in forks first direction at approximately 1.6 kph (1 mph).
2. Depress power disconnect button. Truck operations will stop and truck should come to an aggressive stop.

**NOTE**

*The parking brake is factory set and non-serviceable in the field. If parking brake does not hold satisfactorily, replace brake.*

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## Electric Parking Brake Release Procedures

The following is a list of procedures for towing a disabled truck. Depending upon the distance the truck may have to be towed one procedure may be more appropriate of an option than some of the other procedures. Choose the procedure that best fits the situation.

**WARNING**

*Extreme care must be taken when using any of the following procedures to release the parking brake. The truck's parking brakes will not be functional and the brake pedal in the operator compartment will not apply the parking brakes in all of the listed procedures. The parking brake will only be able to be applied when the truck is returned to normal parking brake configuration. During any procedure, lockout and tagout the truck as described in Control Of Hazardous Energy (Lockout/ Tagout in the Service And Parts Manual.*
*When towing the truck, make sure all operators are informed of the truck's lack of braking.*
*Once the truck is in an area intended for maintenance, chock wheels or make sure truck is secure to prevent it from moving while the brakes are released.*
*If truck is not returned to normal braking configuration after towing, then the truck should remain locked out and tagged accordingly.*

## Releasing Parking Brake Using Operator Display

**NOTE**

*Battery must be present in truck for this procedure.*

- This procedure is for moving the truck a short distance as this procedure allows for the truck to only be moved for intervals of five minutes at one time then the brake is applied.

Key truck ON and navigate to the Service menu level 3, Utilities menu level U2 (Tow-Mode). At this level a password is required to enter this mode.

- All traction is inhibited and steer pump will be active if operator is present.
- Message on ACCESS 1 will read: *TOW? Y 5 Minutes BRAKE RELEASED*. Press enter key to release parking brakes.
- If additional time is needed to tow the truck the five minute period can be restarted following the above procedures.

To apply the parking brakes while in Tow-Mode the action can be cancelled by pressing the down arrow key and then answering *TOW? N* or keying truck OFF will apply the parking brakes.

- When in Tow-Mode, if the operator is not present (not standing on the presence pedal) and either drive wheel moves an audible alarm will sound.
- Once the truck is in an area intended for maintenance and re-apply the parking brakes by using ACCESS 1 or by keying truck OFF to return to normal braking configuration. If truck is not returned to normal braking configuration after towing, then the truck should remain locked out and tagged accordingly.

## Releasing Parking Brake Using Truck Battery

**NOTE**

*Battery must be present in truck for this procedure.*

- Key truck OFF, disconnect battery and open the main desk top cover.
- Disconnect connector CA210 (labeled *Drive*) located underneath the main desk top on top of the counterweight.
- Connect Plug PC211 (labeled *TOW*) to JC 210. Lower the desk top cover.
- Connect battery.
- Once the truck is in an area intended for maintenance raise desk top and disconnect JC210 from PC211 and reconnect JC210 and PC210 to return truck to normal braking configuration. Close desk top.
- If truck is not returned to normal braking configuration after towing, then the truck should remain locked out and tagged accordingly.

## Releasing Parking Brake Using External Power Source

- Key truck OFF, disconnect battery and open the main desk top cover.
- Disconnect connector CA210 (labeled *Drive*) located underneath the main desk top on top of the counterweight.
- Pull plug JC210 and the harness into the operator compartment.
- Using brake release harness (139956-002), connect an external power source to the female connector. The parking brakes will release.

**NOTE**

*The external power source should only supply the voltage that is stated on the wire harness (139956-002).*

- Once the truck is in an area intended for maintenance disconnect the external power source, raise desk top and reconnect JC210 and PC210 connectors to normal braking configuration and lower desk top.
- If truck is not returned to normal braking configuration after towing, then the truck should remain locked out and tagged accordingly.

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## Brake Switch Adjustment (BRKS)

1. Key truck OFF, disconnect battery and chock wheels.
2. Remove or tilt floorboard assembly up to gain access to the brake pedal switch (BRKS).
3. Press brake pedal (2) down until it is contact with poly stop. Refer to Figure 16028-01.

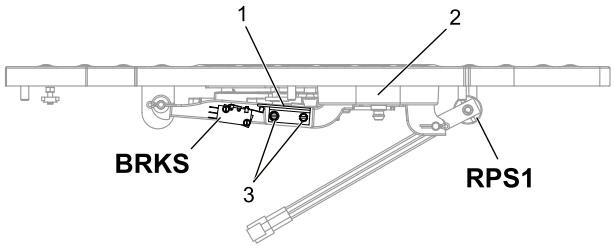



Figure 16028-01

1 Adjuster Bracket
2 Brake Pedal Fully Depressed Contacting Poly Stop
3 Screws

4. With the brake pedal against the poly stop, loosen the adjustment bracket screws (3) and rotate the adjustment bracket (1) down until the switch reaches its maximum travel position. Refer to Figure 16029-01.

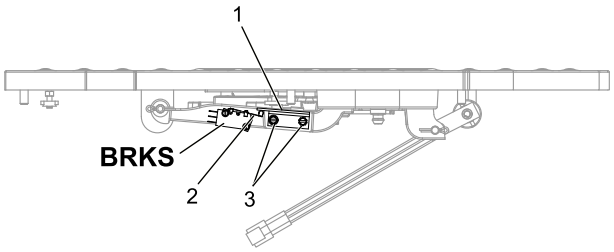



Figure 16029-01

1 Rotate Adjuster Bracket Down
2 Switch at Maximum Travel Position
3 Tighten Screws after Adjustment is Complete

5. Tighten the adjustment bracket screws (3).
6. Verify the BRKS switch makes and breaks within the first 20 to 30 percent travel of the brake pedal from the fully depressed position. The parking brakes nominally are set at 30 percent of pedal travel. Refer to A2.3.9.2 in Service menu to review setting.

## Parking Brake Removal

**WARNING**

*Wear appropriate protective items, such as safety glasses, whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*

**CAUTION**

*In this section you will be required to block the mast. Control Of Hazardous Energy Lockout/Tagout provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast blocking, as outlined in this section.*

1. Move truck to an area set aside for maintenance.
2. Raise mast high enough to gain access to the parking brake mounted on the end of the drive unit. Refer to Control Of Hazardous Energy Lockout/Tagout, Blocking Mast and Lifting Mechanism of the Service and Parts Manual for correct mast blocking procedures.
3. Securely block the mast, key truck OFF, and disconnect battery.

**NOTE**

*LH Brake = P/N 136830 (4 internal springs)*
*RH Brake = P/N 136802 (8 internal springs)*

4. Disconnect either CA435 (LH brake) or CA436 (RH brake).

5. Insert three screws, 060062-012 to hold brake assembly together. Refer to Figure 16938-01.

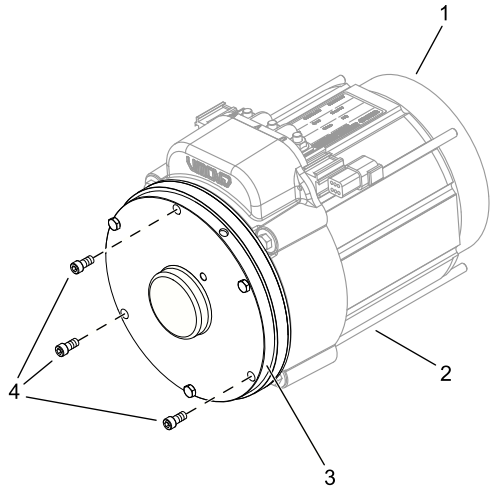



Figure 16938-01

1 Mounts to Drive Unit
2 LH Traction Motor
3 Parking Brake
4 Screws

6. Remove screws that attach brake assembly to traction motor. Refer to Figure 16939-01.

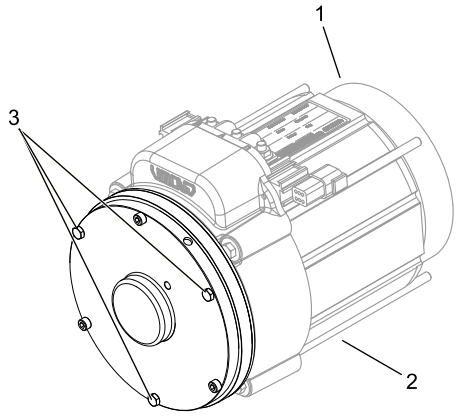



Figure 16939-01

1 Mounts to Drive Unit
2 LH Traction Motor
3 Mounting Screws

7. Remove brake assembly from truck. Refer to Figure 16940-01.
8. Inspect brake hub. Refer to Figure 16940-01.

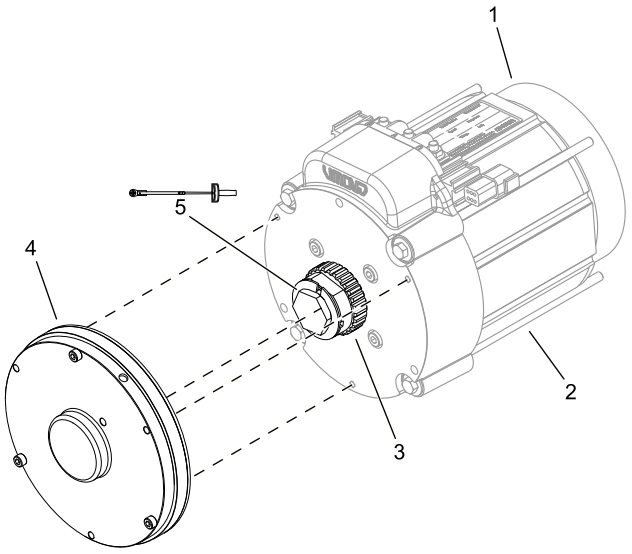



Figure 16940-01

1 Mounts to Drive Unit
2 LH Traction Motor
3 Brake Hub
4 Brake Assembly
5 Screw - Torque 68 ± 6.8 Nm (50.0 ± 5.0 ft lb)

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9. Install replacement brake assembly, keeping brake hub in position. Refer to Figure 16941-01.
10. Brake electrical leads should be pointing upwards.
11. Secure brake assembly using screws removed in step 6 and torque to 9.5 ± 1.0 Nm (7.0 ± 1.0 ft lb). Refer to Figure 16941-01.

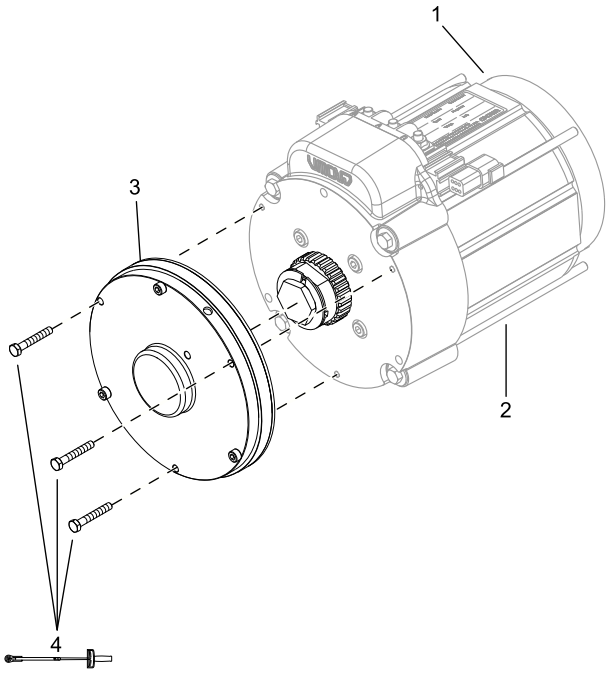



Figure 16941-01

1 Mounts to Drive Unit
2 LH Traction Motor
3 Brake Assembly
4 Screws - Torque 9.5 ± 1.0 Nm (7.0 ± 1.0 ft lb)

12. Remove three screws installed in step 5.
13. Repeat the above steps for remaining parking brake assembly.
14. Connect battery, key truck ON and raise mast to allow removal of blocking material.
15. Lower mast and verify parking brake operation.

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## Notes:

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# STEERING

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## Notes:

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## Steering

Your truck is equipped with a hydraulic steering systems. A hydrostatic steering control unit, located in the power unit, is coupled via hydraulic hoses to the steering motor, mounted on the axle housing, used to actuate the steering.

## Hydrostatic Steering Unit

The hydrostatic steering unit (open center non-reaction) mounts in the power unit below the steering tiller. The non-reaction unit maintains the steered position when the operator releases the steering tiller. Cylinder ports are blocked in the neutral valve position. The operator must steer the drive wheel back to the straight ahead position.

The steering unit meters a proportional amount of oil to the steering motor when the tiller is rotated. This pressurized oil is supplied by P1 pump, and is supplied to the appropriate side of the steering motor by the direction of rotation of the steering control unit via the steering tiller. When the steering tiller rotation is stopped, the steer motor ports are blocked to hold the steering in that position. In the event the pump flow is stopped, the steer unit can be manually rotated to "pump" flow to the appropriate motor port by turning the steering tiller in the desired direction, thus allowing emergency steering.

Steer circuit relief pressure is non-adjustable and preset 11,031 kPa (1600 psi).

## Forward and Reverse Steering

Steering on your truck can be changed from forward steering the reverse steering by reversing the hydraulic lines at the steer motor. Care should be exercised when maintenance is performed on the steering system to return the truck to the proper steering mode upon completion.

**NOTE**

*Prior to disassembly the service technician should determine the steer direction of the truck, upon completion of the maintenance, steer direction should be checked to insure that it is set for the desired direction and functioning properly.*

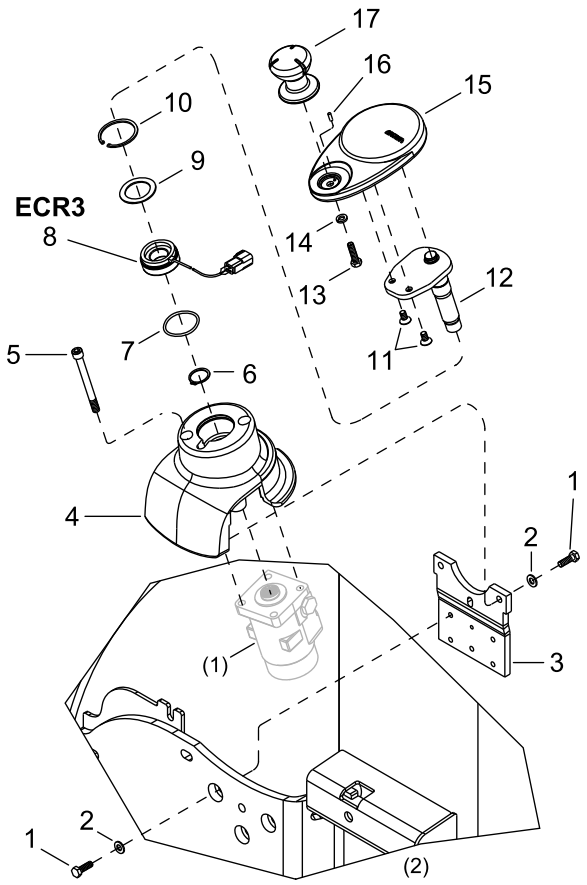
## Steer Tire

When replacing the steer tire, make sure the composition and size are such that maneuverability, stability and braking requirements are maintained. Both steer tires should be replaced at the same time to maintain equal tire circumference.

The steer tire is a "press-on" type; press the old tire off the hub and press new tire on. The outside of the hub should be flush with the outside edge of tire.

## Steer Command Assembly

Refer to the following procedures and Figure 16181 to assemble the Steer Command Assembly.




(1) Steer Control Unit

(2) Part of Top of Truck Frame

Figure 16181

1. Slide retaining ring (index 10) onto tiller mount (index 12).
2. Slide flatwasher (index 9), ball bearing sensor (Index 8) and O-ring (index 7) onto tiller mount. Slide retaining ring (index 6) on tiller mount and snap into place.
3. Assemble steer control unit to tiller support using two screws (index 5). Snap retaining ring (index 10) into place. Slide tiller mount (index 12) into steer control unit.
4. Assemble steer knob (index 17) to tiller using one roll pin (index 16), one lockwasher (index 14) and one screw (index 13).
5. Assemble mounting plate (index 3) to tiller support (index 4) using three flatwashers (index 2) and three screws (index 1).
6. Assemble tiller mount to tiller (index 15) using two screws (index 11).
7. Assemble steer control unit, tiller support and mounting plate to truck frame using three flatwashers (index 2) and three screws (index 1).

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## Housing to Yoke Assembly

1. Prior to assembly, pack tapered roller bearings cones with grease.

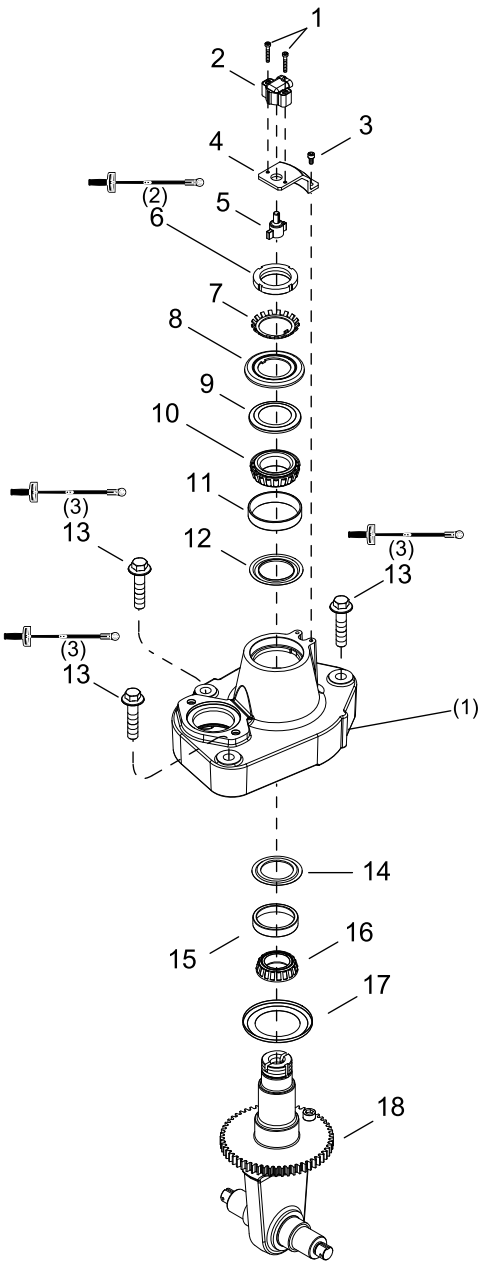



Figure 16217-01

(1) Mounts to Truck Frame

(2) Refer to Housing to Yoke Assembly for Torque Values

(3) 339 Nm (250 ft lb)

2. Install metallic grease seals (index 12 and 14) with cupped side facing outward and press bearing cups (index 11 and 15) into housing ensuring they are fully seated. Refer to Figure 16217-01.
3. Apply a light coating of lubricant to yoke shaft bearing diameters. Install the lower bearing metallic grease seal (index 17) with cupped side facing outwards towards shaft end and press lower bearing cone (index 16) onto yoke shaft ensuring it is fully seated.
4. Fill lower bearing cup and metallic seal with grease. Install yoke shaft with lower bearing cone into housing from bottom.
5. Fill upper bearing cup and metallic seal with grease. Install bearing cone (index 10), upper metallic seal (index 9), top cap (index 8), tabbed washer (index 7), and locknut (index 6) on to yoke shaft.
6. Torque locknut to 170 Nm (125 ft lb) while rotating or oscillating the yoke shaft assembly in both directions a minimum of three times. Then loosen the locknut until free. Retighten the locknut to 34 Nm (25 ft lb) of torque. If a slot in the locknut and a tab on the washer are not aligned, further tighten the locknut until the next slot and tab are aligned. Bend tab to engage the slot in the locknut.

## Steer Motor to Axle Housing Assembly

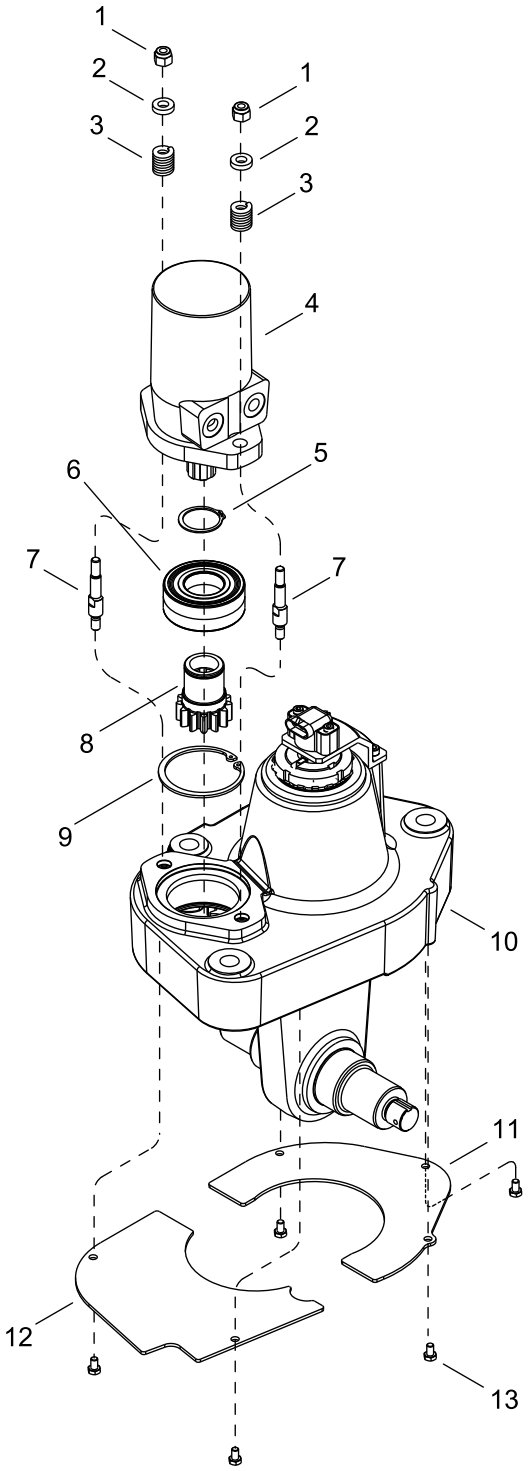



Figure 16180

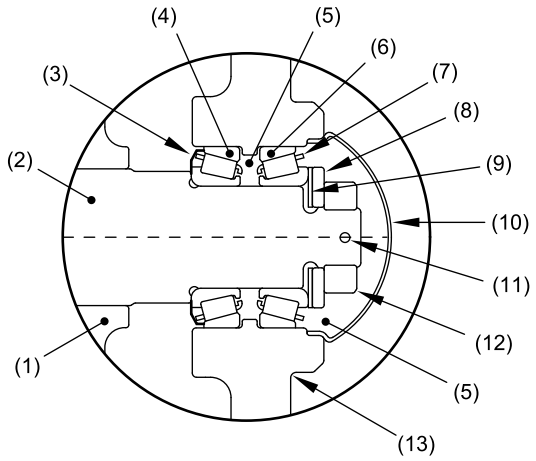
1. Press double row bearing (index 6) on shaft portion of gear pinion (index 8). Ensure bearing is seated on shoulder and install snap ring (index 5). Refer to Figure 16180.
2. Lubricate pinion bearing bore lightly and install pinion and bearing sub-assembly into housing. Secure with snap ring (index 9). Check gear mesh for proper operation.
3. Lubricate faces of gears with grease.
4. Apply thread locking adhesive to threads on end of threaded shaft (index 7) with larger diameter and thread into counter bored holes of housing on each side of pinion. Torque to 24 Nm (18 ft lb).
5. Lightly grease motor face and pilot. Apply spline grease (063002-038) to spline on motor shaft. Install hydraulic motor (index 4) over threaded shafts with the ports outward to longest side of the housing.
6. Place a compression spring (index 3) and flatwasher (index 2) on each side and secure with locknuts torque to 24 Nm (18 ft lb).
7. Place front covers (index 11) on bottom of housing and secure with three hex bolts (index 13).
8. Slide rear cover (index 12) between front cover and housing and secure with two hex bolts (index 13).
9. Torque hex bolts to 9 Nm (6.5 ft lb).

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## Wheel Assemblies to Steer Axle (Metallic Shield)

1. Prior to assembly, pack tapered roller bearings cones with grease.



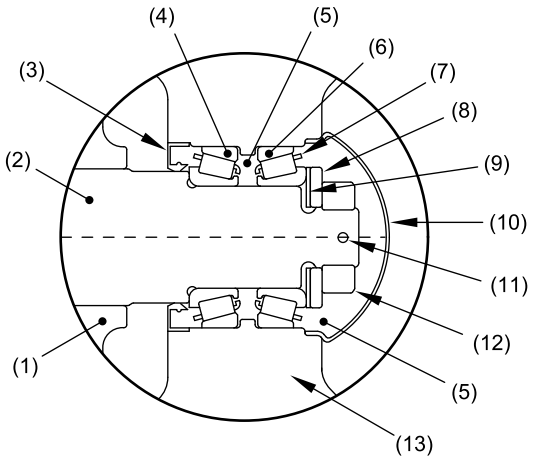

| | | | |
|---|---|---|---|
| (1) | Yoke Shaft | (7) | Bearing Assembly |
| (2) | Steer Axle | (8) | Tabbed Washer |
| (3) | Outer Ring Metallic Seal | (9) | Flatwasher |
| (4) | 1st Bearing Cup | (10) | Grease Cap |
| (5) | Bearing/Hub Cavity | (11) | Cotter Pin |
| (6) | 2nd Bearing Cup | (12) | Special Nut |
| | | (13) | Wheel Assembly |

Figure 16182

2. Apply a light coating of lubricant to the steer axle bearing diameters. Install outer ring metallic grease seal on the axle with the cupped side facing out and bearing cone onto the steer axle with its rollers facing out, 1st bearing cup area. Refer to Figure 16182.
3. Press bearing cups into wheel hubs ensuring they are fully seated. Install wheel assembly over the steer axle. Pack grease into hub cavity.
4. Install bearing cone into the 2nd bearing cup. Add flatwasher, tabbed washer and special nut.
5. Torque special nut to 170 Nm (125 ft lb) while rotating or oscillating the wheels a minimum of three turns in each directions while torquing. Then loosen the adjusting nut until free. Retighten the nuts to 34 Nm (25 ft lb) of torque. If slot in the nut and cross hole in the axle are not aligned, further tighten the nut until the next slot and cross hole are aligned, insert the cotter pin and bend.
6. Fill half of the grease cap cavity with grease.
7. Install grease cap.
8. Repeat for opposite side.

## Wheel Assemblies to Steel Axle (Oil Seal)

1. Prior to assembly, pack tapered roller bearings cones with grease.




| | | | |
|---|---|---|---|
| (1) | Yoke Shaft | (7) | Bearing Assembly |
| (2) | Steer Axle | (8) | Tabbed Washer |
| (3) | Oil Seal | (9) | Flatwasher |
| (4) | 1st Bearing Cup | (10) | Grease Cap |
| (5) | Bearing/Hub Cavity | (11) | Cotter Pin |
| (6) | 2nd Bearing Cup | (12) | Special Nut |
| | | (13) | Wheel Assembly |

Figure 16183

2. On the steel axle apply a light coating of lubricant to the bearing diameters and the sealing surface for the oil seal. Refer to Figure 16183.
3. Press bearing cups into wheel hubs ensuring they are fully seated. Place the 1st bearing cone into the first bear cup with its rollers facing out towards the 1st bearing cup. Install oil seal into the counter bore of the wheel hub until seated with the lip seal side facing out. Install wheel assembly over the steer axle. Pack grease into hub cavity.
4. Install bearing cone into the 2nd bearing cup. Add flatwasher, tabbed washer and special nut.
5. Torque the special nut to 170 Nm (125 ft lb) while rotating or oscillating the wheels a minimum of three turns in each directions while torquing. Then loosen the adjusting nut until free. Retighten the nuts to 34 Nm (25 ft lb) of torque. If the slot in the nut and cross hole in the axle are not aligned, further tighten the nut until the next slot and cross hole are aligned. Insert cotter pin and bend.
6. Fill half of the grease cap cavity with grease.
7. Install the grease cap.

Repeat for opposite side.

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# Hydraulic Steer Motor

## Disassembly

Cleanliness is extremely important when repairing hydraulic motors. Work in a clean area. Before disconnecting hydraulic lines, clean port area of motor. Before disassembly, drain oil from motor. Then plug ports and thoroughly clean exterior of motor. Check output shaft, remove any burrs, nicks, or sharp edges.

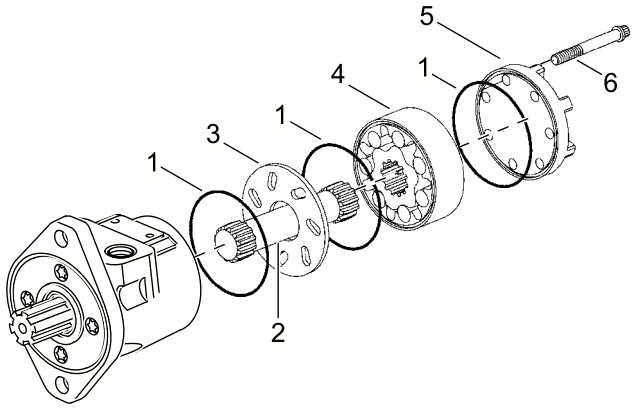



Figure 21925

1 Seal
2 Drive
3 Spacer Plate
4 Geroler
5 End Cap
6 Cap Screw

Tools Required:

- Torque wrench, 34 Nm (25 ft lb) capacity
- Ratchet wrench
- 5/16 in - 12 point heavy duty socket, 56 Nm (41.3 ft lb) capacity
- 5/16 in - 6 point/torx (E10) heavy duty socket, 56 Nm (41.3 ft lb) capacity
- Small flat blade screwdriver
- 3/16 in hex key
- Rubber hammer

1. Using protective material on vise jaws, clamp motor in a vise so shaft is vertical and end cap is on top. Clamp on mounting flange, using just enough clamping force to securely hold motor.
2. Remove screws (6) from end cap (5) and disassemble motor as shown in Figure 21925. Do not disassemble geroler (4).
3. Refer to Figure 21926. Unclamp motor and remove output shaft (3), thrust needle bearing (2) and thrust bearing race (1).

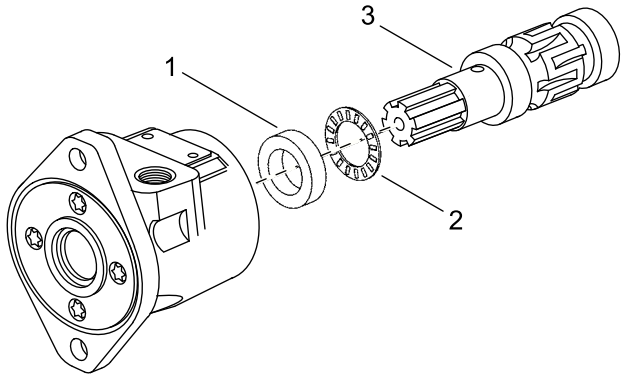



Figure 21926

1 Thrust Bearing Race
2 Thrust Needle Bearing
3 Output Shaft

4. Clamp motor in vise so mounting flange is on top. Clamp across port area. Do not clamp on motor housing. Use just enough clamping force to hold motor securely.
5. Remove screws securing mounting flange to motor housing.

**CAUTION**

*Thread locking adhesive was applied to screws during assembly. Do not exceed 56 Nm (41.3 ft lb) of removal torque.*

Refer to Figure 21927. Since thread locking adhesive was applied to screws, heat may have to be applied to motor housing to loosen screws. Use propane torch and apply just enough heat to remove screws (1). Do not overheat motor housing or mounting flange.

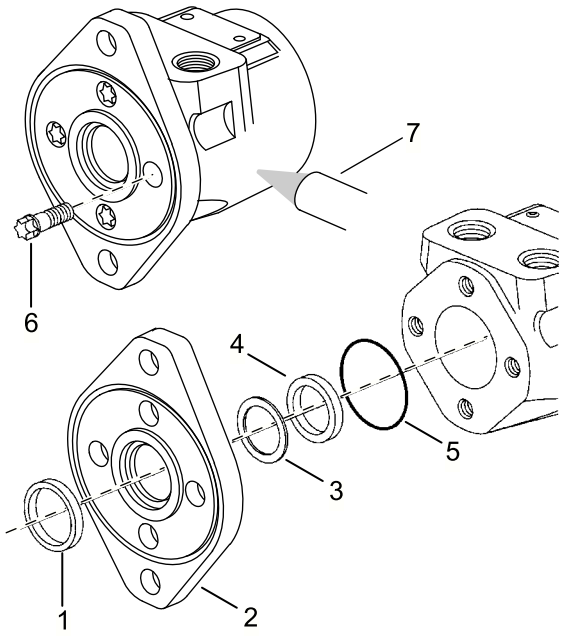



Figure 21927

1 Exclusion Seal
2 Mounting Flange
3 Back-Up Ring
4 Pressure Seal
5 Seal
6 Cap Screw
7 Heat with a propane torch

6. Remove mounting flange (2) from motor housing.
7. Carefully remove exclusion seal (1), pressure seal (4) and backup ring (3) from mounting flange (2). A seal removal tool may be fabricated by bending and rounding the end of a small flat blade screwdriver, refer to Figure 21928. Be careful to not damage the mounting flange shaft bore.

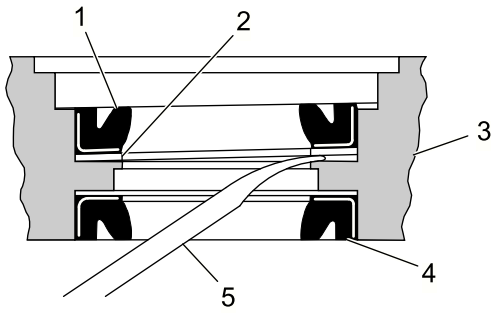



Figure 21928

1 Pressure Seal
2 Back-Up Ring
3 Mounting Flange
4 Exclusion Seal
5 Seal Removal Tool

## Steer Motor Assembly

Check all mating surfaces. Replace any parts with scratches or burrs that could cause leakage. Wash all metal parts in clean solvent. Blow dry with low pressure air. Do not wipe parts dry with paper towels or cloth. Lint in a hydraulic system will cause damage. Check spline and chamfered area of output shaft; remove any nicks, burrs, or sharp edges that could damage shaft seals during assembly.

**NOTE**

*Always use new seals when assembling hydraulic motors. Lubricate new seals with clean petroleum jelly. Also, lubricate machined surfaces and bearings with clean hydraulic fluid.*

1. Remove all thread locking adhesive from mounting flange screws and their threaded holes. Threads must be clean and dry before applying new thread locking adhesive.
2. Refer to Figure 21926. Lubricate and install output shaft (3), thrust needle bearing (2) and bearing race (1) into housing. Do not allow oil to enter cap screw threaded holes.
3. Refer to Figure 21927 for correct seal orientation. Lubricate exclusion seal (1) and install in mounting flange (2).

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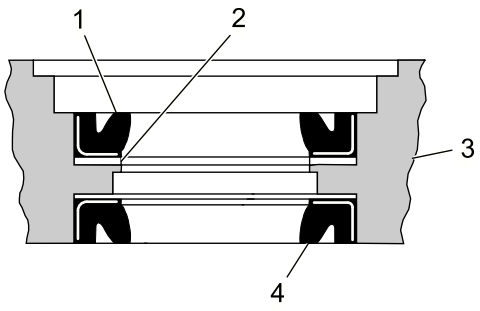



Figure 21929

1 Pressure Seal
2 Back-Up Ring
3 Mounting Flange
4 Exclusion Seal

4. Refer to Figure 21929. Lubricate and install backup ring (2) and pressure seal (1). Be sure exclusion seal (4) and pressure seal (1) are undamaged and properly seated.
5. Apply thread locking adhesive (061004-019) to mounting flange cap screw threaded holes in motor housing.

**NOTE**

*Thread locking adhesive must cure completely before motor is put into service. Using primer reduces curing time. For curing time, refer to thread locking adhesive manufacturer instructions.*

6. Install a protective sleeve over output shaft. Lubricate inner edges of exclusion and pressure seals. Lubricate and install the 49 mm (1 15/16 in) diameter o-ring seal on mounting flange. Slide mounting flange over shaft.
7. Remove protective sleeve and install the four cap screws. Torque cap screws, in a crisscross pattern, to 28 Nm (20.7 ft lb). Be sure output shaft remains in housing.
8. Securely clamp motor in vise so output shaft is vertical and down. Clamp on mounting flange.
9. Pour clean hydraulic fluid into motor to provide start-up lubrication.
10. Lubricate and install one of the three largest diameter seals in motor housing groove.
11. Install drive. If splined ends of drive are different lengths, install longer end into shaft.

## Motor Timing

12. Refer to Figure 21930. Align shaft timing dot (3) with any bolt hole (5). Bolt hole will be used for timing reference.

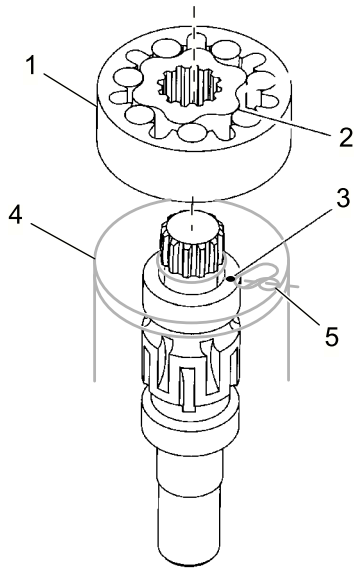



Figure 21930

1 Geroler
2 Star Point
3 Timing Dot
4 Spacer Plate
5 Threaded Hole for Timing Dot Reference

13. Install spacer plate (4), and note position of threaded hole in housing (aligned with timing dot on shaft). Be sure slots in spacer plate provide passage for hydraulic fluid as well as cap screws. If spacer plate is improperly installed (wrong-side-up), the motor will not operate.
14. Lightly stretch, lubricate and install the second of three large diameter seals in geroler (1).
15. Install geroler (1).
16. Align any star point (2) with threaded hole (noted for location of timing dot).
17. Rotate the geroler (1) to align the screw holes.
18. Lubricate and install the last of the three large diameter seals in end cap groove.
19. Install end cap and secure with cap screws. Torque cap screws, in a crisscross pattern, to 34 Nm (25 ft lb).

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## Notes:

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# LIFTING MECHANISM

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## Notes:

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# Mast

**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.*

Your truck has been built with either a TT or Quad mast, depending on your particular application.

## Torque Requirements

The four M20 screws that secure the mast pivot block to the power unit must be torqued 550 to 600 Nm (405 to 440 ft lb).

## Fork Adjustments

- With the forks completely lowered and level, adjust so that the top surface of the fork tip is a maximum of 12.7 mm (0.5 in) from the floor.
- Maximum fork height is to be within ± 12.7 mm (±0.5 in) of the fork height specified on the truck data plate.

## Mast Flaking

It is not uncommon for a new mast to appear as if it is flaking or peeling. This appearance is an indication that the rollers are seating to the mast channel and is considered normal. Eventually, this condition will disappear. The grease applied to the channel will retain these particles.

## TT (Triple Telescopic Full Free Lift) Mast

The TT is a three stage mast assembly providing a high lift height while maintaining a low collapsed height. The TT incorporates two mast cylinders and a carriage cylinder. The fork carriage assembly ascends completely to the top of the mast as the single center cylinder is completely extended. As the carriage reaches the top of the mast, it contacts a pair of stops. At this time the two mast cylinders begins to extended and the Intermediate and inner stage masts begin to ascend. A pair of lift chains are attached to the bottom of the inner mast and to the top of the main frame. These lift chains are routed through pulley assemblies mounted in the top of the intermediate mast.

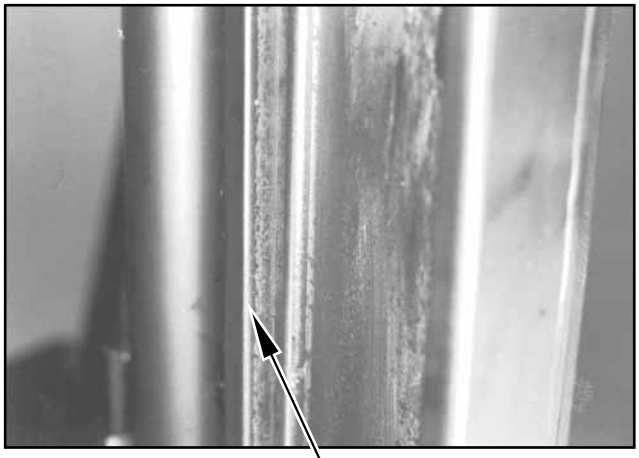
The carriage cylinder is mounted to the inner mast with mounting hardware at the base and to the center crossbrace. Lift chains are routed from the back of the cylinder through a yoke assembly to the back of the carriage assembly.

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## Mast Testing (Assembled)

With the mast assembled, there are some tests that can be made to verify that column rollers are riding correctly.

- Inspect each channel on outer mast for roller tracking path. The only area that should show wear is the flange of the channel where the roller rides. The channel should not show signs of any cutting or grooving. If grooving or cutting is evident, it will normally take place at the side of the roller, 10 mm (0.375 in) from the channel flange. If this type of wear is evident, a shim will have to be removed. Full surface scuffing is also a sign that too many shims are installed.



Channel Should Only Show Wear Here

Figure 16947

- Once an adjustment has been made by removing or adding shims, a recheck of the mast channel will be required. To see the new wear pattern, clean the channel with solvent that will remove the lubricant and wipe with a cloth. Spray the channel with a thin coat of paint. This will allow a visible indication of where the rollers are riding. Repeat as required.
- Once the mast meets requirements, lubricate mast with grease. When the mast is raised near full extension, it should not lean right or left; instead it should appear even and straight. If leaning condition exists, it is a sign that the shimming is too loose or unbalanced and will need to be adjusted, or lift chains require adjustments.

## Mast Inspection

- Verify lift chains are of equal tension by raising the fork carriage approximately 75 mm (3.0 in) off of ground.
- Verify lift chains are properly lubricated. Refer to Lifting Mechanism, Lift Chains for chain lubrication and inspection procedures.
- Extend mast to its full lift height and verify mast and carriage extend fully without binding and mast does not skew.
- Inspect mast rails for lubrication. Lubricate as needed. Refer to Lubrication and Adjustment for lubrication types and recommended intervals.
- Verify hydraulic hoses travel evenly in hose guides.
- Verify hoses are not twisted or kinked.
- Check for hose connection leaks and tighten loose fittings.
- Lower mast and inspect wear blocks at top of outer, intermediate and inner stage masts for wear and lubrication. Shim and or replace as needed.
- Inspect all column rollers for flat spots and look for broken or missing shims. Replace as needed.

**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.*


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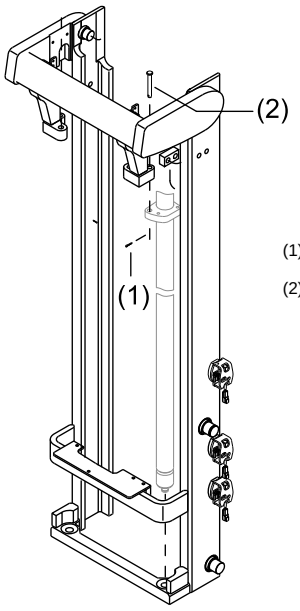
## Mast Disassembly

**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.*

The following steps cover the disassembly of the TT mast.

1. Remove load backrest. Raise carriage and remove forks. Lower mast cylinders completely.
2. Disconnect and remove battery.
3. Cycle sideshift and accessory levers a few times to assure hydraulic pressure is relieved from system.




(1) Cotter Pins
(2) Pins

Figure 16948

4. Connect a lifting device to the carriage and raise carriage assembly to get slack in the lift chains and any accessory hydraulic hoses. Disconnect chains and any hydraulic lines from back of the carriage.
5. Remove yoke assemblies form the top of the carriage cylinder.
6. Lower carriage completely and connect a lifting device to the top crossbrace of the inner mast. Raise mast until the carriage can be pulled forward and out of the mast.
7. Disconnect hydraulic line at the bottom of the carriage cylinder. Remove the two screws securing the bottom of the carriage cylinder to the inner mast.
8. While stabilizing the carriage cylinder, remove the U-bolt assembly that connects the carriage cylinder to the middle crossbrace. Move the carriage cylinder to a clean work area if carriage cylinder disassembly is required.
9. Remove stop bolt on the inner mast. Remove accessory hose guide if so equipped, at the bottom of inner mast.

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10. Disconnect lift chains from the inner mast.
11. With the lifting device connected to the top of the inner mast, raise until it can be pulled from the intermediate mast. Remove column rollers and shims, making sure of the number and position of all shims for reference at reassembly. Lay the inner mast aside and proceed to the top of intermediate mast.
12. Remove column rollers from top of the intermediate mast. Record the number and position of all shims.
13. Attach a lifting device to top of intermediate mast and raise high enough to allow the hydraulic hoses and lift chains to be pulled clear of rollers in top of intermediate mast.
14. Lower intermediate mast completely and remove retaining rings that secure the mast cylinder to the top of the intermediate mast. Remove both internal stops near the top of outer mast. The intermediate mast will have to be raised nearly to its maximum in order to gain access to the internal stops through web of the intermediate mast.
15. After removing the internal stops, continue to raise the intermediate mast until it can be pulled from the top of the outer mast. Remove column rollers from bottom of the intermediate mast and the top of the outer mast. Record the number and position of all shims for reference at reassembly.
16. Disconnect hydraulic lines at the base of the two mast cylinders. Support cylinders and remove the pins (index 1) and cotter pins (index 2) that connect at the top of the outer mast. Refer to Figure 16948. Move cylinders to a clean work area if further disassembly is required.

## Removal From Power Unit

If the amount of overhead room will not allow the masts to be raised enough for removal, the mast assembly will need to be unbolted from the power unit and laid down.

1. Remove load backrest and forks. Lower mast cylinders completely.
2. Disconnect and remove battery.
3. Cycle lift, sideshift and accessory levers a few times to assure hydraulic pressure is relieved from system.
4. Disconnect cables and hydraulic lines from power unit to mast assembly. Use container to catch hydraulic oil.
5. Remove height switch. Disconnect wire cable at power unit and pull out into mast area.
6. Connect a hoist to the top cross brace of the outer mast. Remove retaining ring holding each tilt cylinder to mast.
7. Raise and block power unit so that drive wheels are off of ground 6 to 12 mm (0.25 to 0.50 in). Remove drive wheels and then remove pivot blocks and mast from power unit.
8. Lay mast on floor on its back side (side that normally faces the operator).
9. Refer to Disassembly Procedure in this section if further disassembly is required.

**NOTE**

*With the mast assembly laid down, the cylinder and mast assemblies must be removed by making all hook-ups with hoist as near the center of the assembly as possible to maintain balance.*

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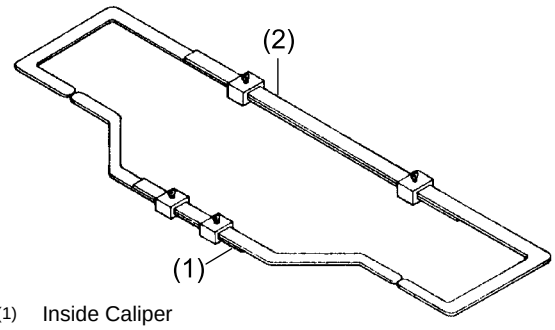
## Mast Reassembly

1. Clean column roller studs at the top of the outer mast. If any paint or rust is evident on the studs, remove with emery cloth and grease with multi-purpose grease, Crown No. 063002-024.
2. Place two 0.76 mm (0.030 in) shims, Crown No. 060030-085, on each of the four studs and install column rollers. Two studs at the top of the outer mast and two studs at the bottom of the intermediate mast.
3. Use inside caliper and measure between the two rollers on the outer mast. Refer to Figure 16949.

**NOTE**

*The column roller studs are canted, measure at narrowest part of rollers.*

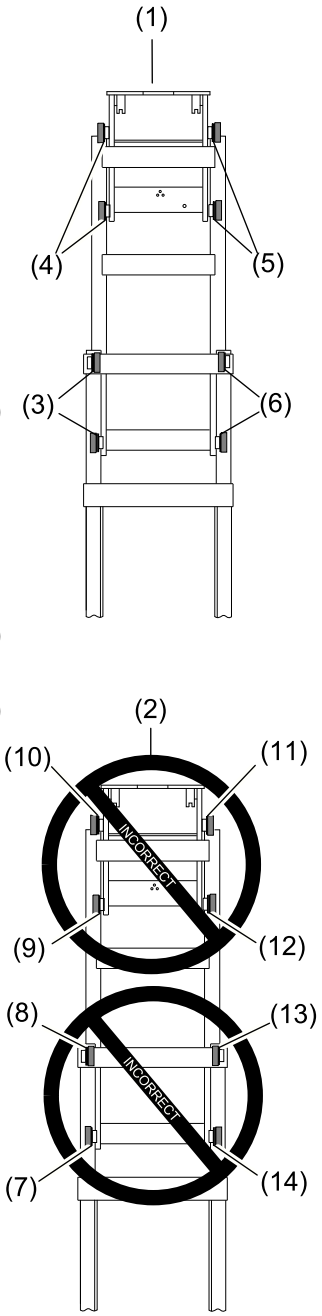
4. Measure the outside of the intermediate mast, along the area where the outer mast column rollers will travel, with the outside caliper. Refer to Figure 16949.




(1) Inside Caliper
(2) Outside Caliper

Figure 16949

5. After finding the widest contact point, lock the thumb screws and place the inside calipers and outside calipers together and determine the amount of shimming to be added to (or removed from) the column rollers. When shimming column rollers, try to balance out the number of shims on each side. Example: Two shims on right side and two shims on left side on column roller studs. If an odd number of shims are required, refer to Figure 16950.




(1) **Correct**
(3) 2 Shims (Mast)
(4) 1 Shim (Carriage)
(5) 2 Shims (Carriage)
(6) 1 Shim (Mast)
(2) **Incorrect**
(7) 1 Shim (Mast)
(8) 2 Shims (Mast)
(9) 1 Shim (Carriage)
(10) 2 Shims (Carriage)
(11) 1 Shim (Carriage)
(12) 2 Shims (Carriage)
(13) 1 Shim (Mast)
(14) 2 Shims (Mast)

Figure 16950

6. Follow the above procedure for measuring the intermediate mast lower column rollers and the inside of the outer mast channels at the rollers contact point. After measurements have been taken, shim as required.

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7. Connect a lifting device to the intermediate mast. Raise the intermediate mast until it engages the outer mast at the top. Lower intermediate mast into the outer mast and check running clearance.

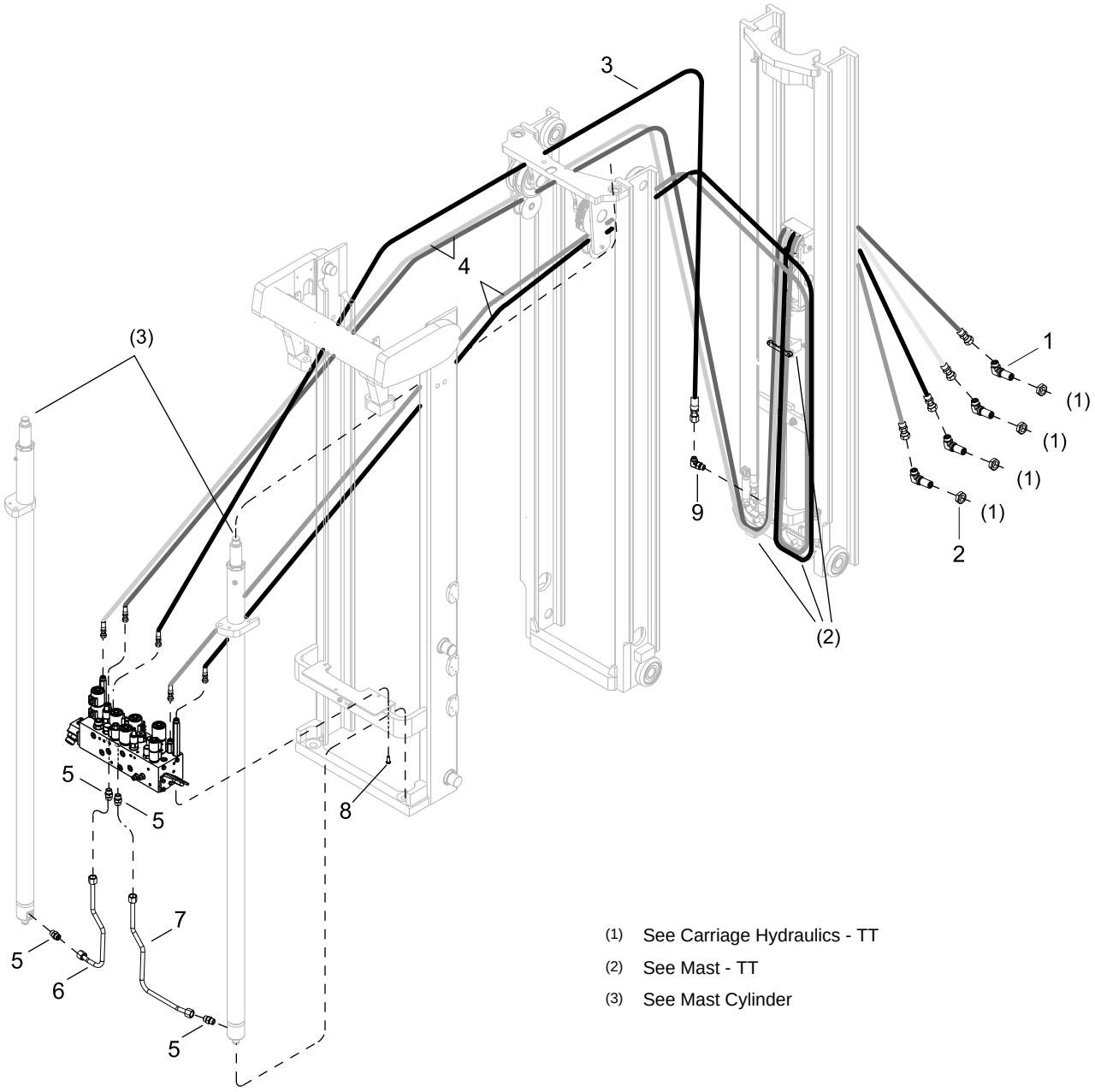
**NOTE**

*When the column rollers are properly adjusted, they should leave a slight paint scrape on the inside rails of the outer mast and the outside rails of the intermediate mast.*

8. Apply a small amount of multi-purpose grease to the contact areas of the mast.
9. Install right and left mast cylinders. Secure mast cylinders to the top of the outer mast near the chain anchors using pins (index 3) and cotter pins (index 4). Refer to Figure 16948. Install internal stops at top of outer mast.
10. Attach the mast cylinder rods to the top of the intermediate mast with retaining rings (index 62). Refer to Figure 16948. Install chain rollers into top of intermediate mast.
11. Install inner mast in same manner as intermediate mast. Use hardwood blocks and block each mast section 300 to 380 mm (12 to 15 in) apart. Connect lift chains to top of outer mast, route through top of intermediate mast and connect to bottom of inner mast.
12. Route hydraulic hoses through pulley at top of intermediate mast and connect hoses to connectors on the manifold block mounted to the bottom of the outer mast.

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(1) See Carriage Hydraulics - TT

(2) See Mast - TT

(3) See Mast Cylinder

Figure 15580

13. Install stop bolt to the bottom of inner stage. This stop must be installed to the opposite side of mast from lift hoses to prevent hose damage when the mast is extended completely.
14. Install carriage cylinder into the inner mast using U-bolt and two screws.
15. Install yoke assembly to the carriage cylinder and connect chains and hydraulic lines to back of carriage.

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**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.*

**CAUTION**

*Be sure all stops and safety devices are in place before cycling mast to check for proper operation.*

## Quad (Four Stage) Mast

The quad is a four stage mast assembly providing a high lift height while maintaining a low collapsed height. The quad incorporates two mast cylinders and one carriage cylinder. The fork carriage assembly ascends completely to the top of the mast as the carriage cylinder is completely extended. As the carriage reaches the top of the mast, it contacts a pair of stops. At this time the two mast cylinders begin to extend and the inner, 3rd and 2nd stage masts begin to ascend. A pair of lift chains are attached to the bottom of the inner stage and to the top of the 2nd stage mast. Another pair of lift chains are attached to the bottom of the 3rd stage and to the top of the outer mast. These lift chains are routed through pulley assemblies mounted in the top of the 2nd and 3rd stage masts.

The carriage cylinder is mounted to the inner stage mast with mounting hardware at the base and to the center crossbrace on the inner mast. Lift chains are routed from the back of the cylinder through a yoke assembly to the back of the carriage assembly.

Two tilt cylinders are used for all tilt operations and are attached to the power unit and outer mast.

## Mast Flaking

It is not uncommon for a new mast to appear as if it is flaking or peeling. This appearance is an indication that the rollers are seating to the mast channel and is considered normal. Eventually, this condition will disappear. The grease applied to the channel will retain these particles. If flaking continues, column rollers should be checked to see if they need to be reshimmed.

## Mast Testing (Assembled)

With the mast assembled, there are some tests that can be made to verify that column rollers are riding correctly.

- Inspect each channel on outer mast for roller tracking path. The only area that should show wear is the flange of the channel where the roller rides, refer to Figure 16947. The channel should not show signs of any cutting or grooving. If grooving or cutting is evident, it will normally take place at the side of the roller, 10 mm (0.375 in) from the channel flange. If this type of wear is evident, a shim will have to be removed. Full surface scuffing is also a sign that too many shims are installed.
- Roller tracking is different on 2nd, 3rd and inner mast of quad mast. Rollers are mounted parallel to web and rubbing on small raised portion of web is normal.




Figure 16947


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- Once an adjustment has been made by removing or adding shims, a recheck of the mast channel will be required. To see the new wear pattern, clean the channel with a solvent that will remove the lubricant and wipe with a cloth. Spray the channel with a thin coat of paint. This will allow a visible indication of where the rollers are riding. Repeat as required.

## Mast Inspection

**WARNING**

*Wear appropriate items, such as safety glasses and steel-toed shoes whenever performing maintenance work. Do not place fingers, hands or arms through mast or position them at pinch points.*
*In this section you may be required to lift and block the truck and mast or raise and lower different components for removal and installation. Make sure lifting device and sling are sufficiently rated to withstand the weight being lifted. Never work under or around a truck that is not properly secured. Refer to truck Data Plate for truck weight information.*
*It will be necessary to disconnect and remove the battery from the truck, disconnect tilt cylinders from the mast, disconnect electrical connections and hydraulic lines. "Control of Hazardous Energy" section provides information for performing the above procedures along with some additional information on other procedures dealing with truck maintenance. This section should be read and reviewed prior to mast removal, installation and maintenance as outlined in this section.*

- Verify lift chains are of equal tension by raising the fork carriage approximately 75 mm (3.0 in) off of ground.
- Verify lift chains are properly lubricated. Refer to Lifting Mechanism, Lift Chains for chain lubrication and inspection procedures.
- Extend mast to its full lift height and verify mast and carriage extend fully without binding and mast does not skew.
- Inspect mast rails for lubrication. Lubricate as needed. Refer to Lubrication and Adjustment for lubrication types and recommended intervals.
- Verify hydraulic hoses travel evenly in hose guides.
- Verify hoses are not twisted or kinked.
- Check for hose connection leaks and tighten loose fittings.
- Lower mast and inspect wear blocks at top of outer, 2nd and 3rd stage masts for wear and lubrication. Shim and or replace as needed.
- Inspect all column rollers for flat spots and look for broken or missing shims. Replace as needed.

## Mast Removal

- Move truck to an area set aside for lift truck maintenance that has access to an overhead lifting device sufficiently rated to lift the mast assembly.
- Lower mast completely and remove load backrest.
- Raise carriage and remove forks.
- Lower mast completely.
- Connect a lifting device to carriage and raise carriage to get slack in lift chains and any accessory hoses. Disconnect lift chains and hydraulic hoses/lines from back of carriage. Cap all hydraulic hose/line connections.
- Disconnect hydraulic hose from truck to mast. Cap all hydraulic hose lines.
- Attach lifting device to top of the mast assembly and take slack out of lift chain attached to mast.
- Disconnect tilt cylinders from mast.
- Disconnect mast lower mounting bracket.
- Remove mast assembly from truck.
- Reverse the above procedures for installing the mast assembly on the truck.

## Carriage Removal

- Raise mast high enough to place two 100 x 100 x 510 mm (4 x 4 x 20 in) hardwood blocks under the inner mast.
- Attach an overhead lifting device to the carriage and raise it slightly to get slack in carriage lift chains.
- Disconnect carriage lift chains.
- Disconnect hydraulic hoses/lines from carriage. Cap all hydraulic hose/lines.
- Remove inner mast stops located at bottom of inner mast.
- Using overhead lifting device lower carriage and remove through bottom of inner mast.
- Reverse the above steps to install the carriage.

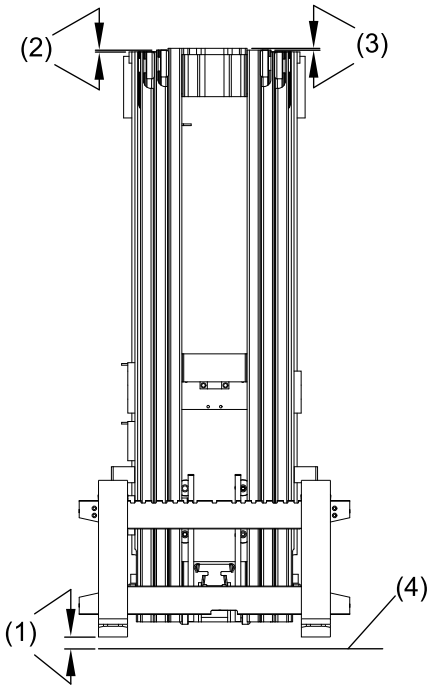
## Carriage Inspection

- Inspect column rollers for excessive wear or damage. Replace rollers with visible flat spots or cracks.
- Inspect load roller bearings by turning rollers on their shafts. Rollers with roughness or noticeable restrictions to turning should be replaced.
- Inspect all carriage weldments for cracks. Replace carriage if cracks are visible.
- Inspect chain anchors for wear or damage. Replace as needed.
- Inspect side thrust rollers and adjustment.

## Lift Chain Tension

Lift chains for the quad mast have been pre-stretched to help reduce the amount of chain stretch which will help reduce the amount of adjustments needed. The following is a guideline to use when verifying lift chain adjustment on quad mast trucks. Lift chains should be inspected every 250 hours or 60 days.

- Completely lower mast.
- Raise fork heel 25 mm (1.0 in) off of floor. Refer to Figure 16951.




Outer and 2nd Stage Mast Should be Level

(1) 25 mm (1.0 in)

(2) 2 - 3 mm (0.079 - 0.12 in) Above Outer and 2nd Stage Mast

(3) 2 - 3 mm (0.079 - 0.12 in) Above 3rd Stage Mast

(4) Floor

Figure 16951

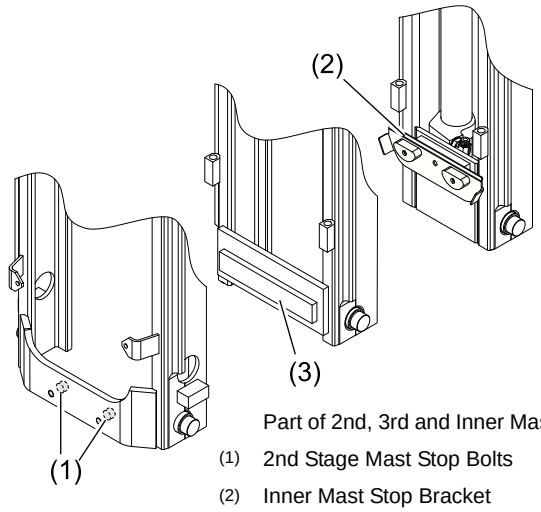

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- The top of the outer and 2nd stage masts should be even with each other.
- The 3rd stage mast should be about 2 to 3 mm (0.079 to 0.12 in) above the outer and 2nd stage masts.
- The inner stage mast should be about 2 to 3 mm (0.079 to 0.12 in) above the 3rd stage mast.
- Any variation in these measurements indicates the lift chain tensions are incorrect and need to be adjusted to achieve the above measurements.

Another indication the mast lift chains need adjustment is if the masts are resting on the mast stop bolts at the bottom of the 2nd stage, a stop bar welded to the bottom of the 3rd stage mast and/or the bracket mounted to the bottom of the inner mast. If any of the stages are resting on these locations then the lift chains need to be adjusted to the above listed dimensions. Refer to Figure 16952.




Part of 2nd, 3rd and Inner Masts

(1) 2nd Stage Mast Stop Bolts
(2) Inner Mast Stop Bracket
(3) 3rd Stage Mast Stop Bar

Figure 16952

Always replace lift chains in pairs whenever replacement is indicated.

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## Notes:

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# Lift Chains

Lift chains are highly important components on fork lift trucks. The chain system on your mast was designed for efficient, reliable transmission of lifting force from hydraulic cylinder(s) to the mast, platform (if present) and forks. Safe, uninterrupted use of your lift truck depends on the proper care and maintenance of the lift chains.

Most complaints of unsatisfactory chain performance can be traced directly to inadequate maintenance. Highly stressed precision chains require periodic maintenance to deliver maximum service life.

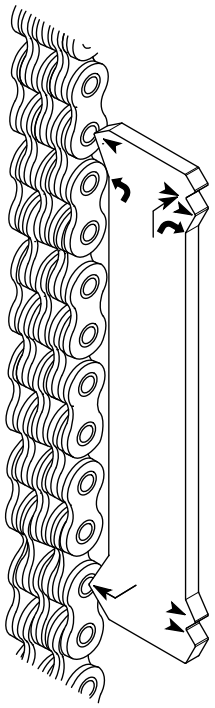
## Inspection

After every 100 hours of truck operation, lift chains should be inspected and lubricated. When used in an extremely corrosive environment, inspect chains every 50 working hours. During inspection, check for the following:

### Wear

As the chain flexes on and off pulleys, the joints gradually wear.

The "stretch" a chain develops during usage is due to material being worn off of pin outside diameter and pin hole inside diameter on the inside plates.

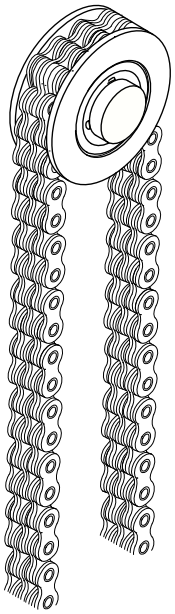


Roller and Leaf
Chain Wear Scale

Figure 16844

Chain wear can be measured by using a 106440 wear scale or a steel tape (Refer to Figure 16844). When chains have elongated 3%, as represented on scale "A" (19 mm [0.75 in] or 25 mm [1.0 in] pitch chain) or scale "B" (16 mm [0.625 in] pitch chain) of the wear scale, they should be discarded. On chain with 19 mm (0.75 in) between pins, for example, 305 mm (12.0 in) of chain contains 16 pitches or links. When 16 pitches measure 314 mm (12.375 in) the chain should be replaced. On chain with 16 mm (0.625 in) between pins, 20 pitches or links equal 318 mm (12.5 in). When 20 pitches measure 327 mm (12.875 in) the chain should be replaced. Crown currently uses 16 mm (0.625 in) pitch (20 links in 318 mm [12.5 in]), 19 mm (0.75 in) pitch (16 links in 305 mm [12.0 in]) and 25 mm (1.0 in) pitch (12 links in 305 mm [12.0 in]) chain. When checking chain wear, be sure to measure a segment of chain that operates over a pulley. Do not repair chain(s) by cutting out the worn section and splicing in a new piece. If part of a chain is worn, replace lift chain(s). If truck has a matched set of lift chains replace both chains at same time.

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With Forks Lowered
Check Either Front
or Rear Pulley for
Chain Wear

Figure 16845

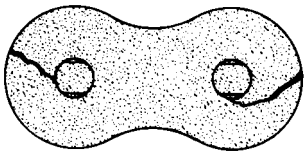
## Rust and Corrosion

Chains used on lift trucks are highly stressed precision components. It is very important that "as-manufactured" ultimate strength and fatigue strength be maintained throughout the chain service life.

Corrosion will cause a major reduction in the load-carrying capacity of lift chain or roller chain because corrosion causes side plate cracking.

It is extremely important to protect lift chains from corrosion, whether in service or in storage. The initial factory lubrication on chains is an excellent rust and corrosion inhibitor. Factory lube is applied in a hot dip tank to insure complete penetration into the joint. Do not steam clean or degrease new chains. After the chain has been placed in service, factory lube must be supplemented by a maintenance lubrication program.

Refer to applicable lubrication and adjustment section for your particular truck series and/or the lubrication information later in this section.



Corroded Chain
(with Stress-Corrosion Cracks)

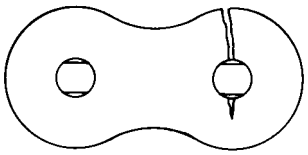
Figure 16846

Heavy motor oil serves both as a joint lubricant and corrosion inhibitor. During inspection, carefully examine external chain surfaces for the presence of an oily film. Under certain operating or environmental conditions it may be necessary to oil chains more frequently than 100 hour intervals. In all cases, the external surface of the chain must be protected with a film of oil.

Corroded chains should be inspected for cracked plates. Outside plates are particularly susceptible to stress corrosion cracking. If chains are heavily rusted or corroded they should be removed from the mast for a thorough inspection for cracked plates. If plates are cracked, both chains on the truck must be replaced. Oil chains when they are reinstalled on the mast.

## Cracked Plates

The most common cause of plate cracking is fatigue failure. Fatigue is a phenomenon that affects most metals and many plastics. After many repeated heavy loads the plates may crack and the chains will eventually break.



Fatigue Cracks

Figure 16847

Fatigue cracks are almost always found through the pin holes perpendicular to the pitch line. (Refer to Figure 16847) Contrast this failure mode to the random failures caused by stress-corrosion cracking. (Refer to Figure 16846) If any fatigue cracks are discovered during planned maintenance (PM) inspections, both lift chains should be replaced. Many apparently sound plates will be on the verge of cracking, making chain failure very likely.

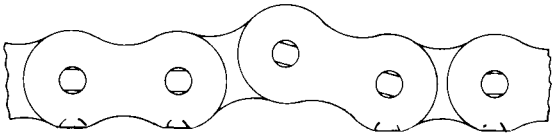

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## Tight Joints

All joints in lift chain should flex freely. Tight joints resist flexure, increase internal friction, thus increasing chain tension required to lift a given load. Increased tension accelerates wear and fatigue problems. Refer to Figure 16848.



Tight Joints

Figure 16848

Tight joints in lift chains can be caused by:

1. Bent pins or plates,
2. Rusty joints,
3. Peened plate edges.

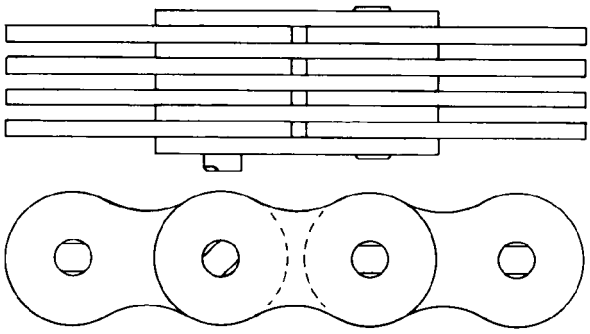
Oil rusty chains and replace chains that appear bent or peened. Peening of plate edges may be caused by worn pulleys, unusually heavy loads, or chain sliding past a guide or obstruction in the mast.

## Protruding or Turned Pins

Heavily loaded chains operating with little lube generate tremendous friction between pin and plates (pin and bushing in roller chain). In extreme cases, the frictional torque in the joint can actually turn pins in the press-fit outside plates.

If chain is allowed to operate in this condition, the pins slowly work out of the chain, causing chain failure. Turned pins can be quickly spotted because the flats on the "V" heads are no longer in line. Refer to Figure 16849, pin has turned 45 degrees. Chains with turned or protruding pins should be replaced immediately.

Never attempt to repair the chain by driving pins back into the chain.



Protruding & Turned Pin

Figure 16849

## Chain Side Wear

A continuous wear pattern on pin heads and outside plates indicates misalignment. Misalignment can be caused by two different factors: unequal chain tension or nonalignment between pulleys and chain anchors.

- **Unequal Chain Tension** - When a lift chain is installed or adjusted, care should be taken to "load" the chains evenly. When changing fork heel height or platform height for example, the chain anchors should be loosened until both forks come in contact with the floor. At this point both chains should display the same tension or slack. The chain anchor nuts should be tightened an equal number of revolutions on both chain anchors to put equal tension on chains. When the desired height setting is achieved the locking nut should be tightened to secure setting.
- **Non Alignment of Lifting Components** - Non alignment of the pulley and chain due to incorrect shimming of the mast or bent or damaged mast or cylinder components can also contribute to chain side wear. A check for this condition is to place the truck on a level area in your maintenance area. After supporting the fork carriage, disconnect each end of the lift chain at the chain anchor and visually inspect its alignment with the anchor slots.

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## Lift Chain Lubrication

The most important consideration in field maintenance of lift chains is LUBRICATION. Hard working, heavily loaded chains cannot be expected to give satisfactory wear life without scheduled periodic lubrication. Like all bearing surfaces, the precision-manufactured, hardened-steel, joint-wearing surfaces require a film of oil between mating parts to prevent rapid wear.

Maintaining an oil film on all chain surfaces will:

- Minimize joint wear (chain stretch).
- Prevent corrosion.
- Reduce the possibility of pin turning.
- Minimize tight joints in roller chain.
- Promote smooth, quiet chain action.
- Lower chain tension by reducing internal friction in the chain system.

Heavy motor oil is an excellent chain lubricant-even used motor oil is adequate to lubricate exposed lift chains.

Laboratory wear tests show SAE 40 oil to have greater ability to prevent wear than SAE 10 oil. Also, SAE 40 oil is superior to hydraulic fluid or automatic transmission fluid. Generally, the heaviest (highest viscosity) oil that will penetrate the joint works best.

Laboratory wear testing shows dry film lubes to be less effective in preventing joint wear than fluid petroleum based products.

Some aerosol spray lubes, such as Crown part number 063001-009, are effective, more convenient and less messy than applying motor oils.

Whatever method is used, the oil must penetrate the chain joint to prevent wear. Applying oil to external surfaces will prevent rust, but oil must flow into the live bearing surfaces for maximum wear life. (Refer to Figure 16850).

Apply oil to chains with a narrow paint brush. A plastic liquid detergent bottle makes a handy lube applicator. Flood the chain with oil over its entire length every lube-inspection period.

Frequency of lubrication will vary with operating conditions and environment. The best estimate of lube period is 100 hours actual operating truck time. Trucks parked outdoors, used in freezers or trucks in extremely severe service, may require more frequent lubrication to maintain an oil film on all chain surfaces.

In dusty operating conditions, lubed chains will gather dust. Even under these conditions wear life will be greatly improved by periodic lubrication. Joints may acquire a "paste" made up of oil and dirt, but joint wear will still be much less than if the chain is allowed to run dry with metal-to-metal contact between pins and plates.

At 100 hour intervals, clean chains to remove accumulation of dirt-and lubricate immediately. (Do not steam clean chains.)

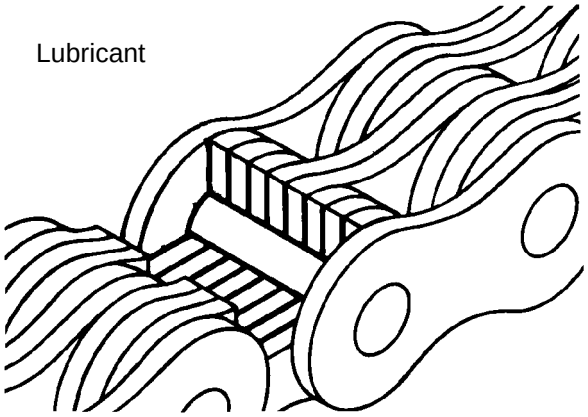



Figure 16850

## Lift Chain Replacement

The first step in chain replacement is to find the chain part number in your service manual parts list.

An important factor in ordering replacement chain from the truck manufacturer is that special chains may be specified for your truck with certified minimum ultimate strength.

If the unit is equipped with two strands, replace chains as a pair. It will be virtually impossible to maintain uniform loading between the strands if a new chain is put into service opposite an old chain. The joints in the old chain will have worn through the hardest layer of the case-hardened pin. Therefore, the wear rate on the old chain will be greater than that on the new chain, greatly complicating the problem of maintaining equal chain tension.

The new chain will wear more slowly, causing it to bear the major portion of the load, resulting in premature wear and fatigue failure.


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Never steam clean or degrease new chains. The manufacturer's grease is effective in reducing wear and corrosion. If the original factory lube is dried out or wiped off, soak the new chain in heavy engine oil for at least 0.5 hour prior to installing on truck.

After the existing chains have been removed from the mast, very carefully inspect chain anchors and sheaves. Broken, cracked, or worn anchors must be replaced. Replace worn sheaves, and check sheave bearings for wear. Do not paint the replacement chain before or after it has been installed. Paint will help prevent corrosion, but will prevent oil from reaching the pin surface for good joint lubrication.

Install the new chains, using new anchor pins. Existing pins may contain invisible fatigue cracks that could lead to pin failure. After chains have been connected to the anchors, adjust chain tension to obtain proper fork or platform height.

Correct chain installation and mast adjustment will increase chain service life.

## Chain Anchors and Pulleys

An inspection of the chain system should include a close examination of chain anchors, anchor tension devices and pulleys.

Check chain anchors for wear, breakage, and radial misalignment. Anchors with worn or broken fingers should be replaced. Anchors should be adjusted to eliminate twisting or other misalignment in the chain. When chain is misaligned, the load is not distributed uniformly between the plates-prolonged operation will result in premature fatigue failure.

Pulleys with badly worn flanges and outside diameter should be replaced. Heavy flange wear indicates chain misalignment. Investigate cause by checking chain tension and mast shimming.

## Leaf Chain Disconnect

To minimize the risk of damaging (cracking, etc.) the chain, refer to the following when disconnecting leaf chain.

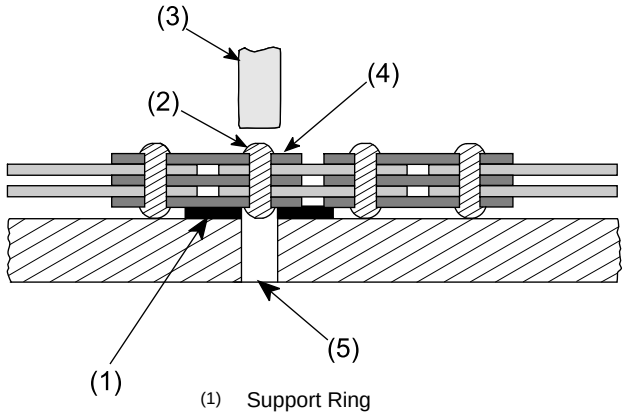
Tools Required:

1. A sturdy work surface with an opening slightly greater than the pin diameter, and should be thick enough to allow the pin to extend beneath the work surface as it is driven through the bottom pin link plate.
2. A support ring (flatwasher) with an inside diameter slightly greater than the pin diameter and a height equal to the head height of the pin.
3. Grinding wheel.
4. Pin punch with a diameter slightly less than the pin diameter, hammer or pressing equipment.

## Disconnect Procedures:

(Refer to Figure 16851)

1. Grind the top head of the pin flush with the pin link plate. Be careful not to grind or damage the pin link plate.
2. Position the support ring over opening of the work surface. The support ring serves to support the bottom pin link plate and avoids damage to chain components while driving the pin through the chain.
3. Stand the chain on its side and seat pin in the support ring.
4. Remove the pin from the chain through the top pin link plate.




(1) Support Ring
(2) Grind Pin Flush with Link Plate
(3) Grinding Wheel
(4) Pin Link Plate
(5) Work Surface Knock Out Aperture

Figure 16851

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## Notes:

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# Fork Inspection

**WARNING**

The following causes of fork failure may mean loss of equipment, damaged materials, bodily injury or loss of life. Make an inspection and measurement of the forks at each planned maintenance interval to check for wear, overload, fatigue, bends, etc. Refer to “Lubrication and Adjustment” chapter.

**WARNING**

- *Use the proper fork for how it was designed to be used.*
- *Avoid using fork extensions.*
- *Do not modify forks.*
- *Only qualified personnel should make repairs.*
- *Visually inspect forks each work day.*

## Abrasion

Abrasion gradually reduces the thickness of the fork. Be sure the fork thickness is within specifications. Do not allow forks to rub the floor during normal operation. If forks rub floor, check lift chain adjustment. Fork wear at the heel must not exceed 10 percent of the original thickness. At this point forks are adequate for approximately 80 percent of rated capacity. Refer to Chart 2. Use fork wear calipers, part no. 107330, or a measuring instrument such as a vernier or good 160 mm (6.0 in) scale. For allowable fork wear thickness, refer to Chart 1.

**Allowable Wear Thickness Chart 1**

| Standard Fork Thickness | | Allowable 10% Wear Fork Thickness | |
|---|---|---|---|
| mm | in | mm | in |
| 31.5 | 1.25 | 28.5 | 1.12 |
| 38.0 | 1.50 | 35.0 | 1.38 |
| 44.5 | 1.75 | 39.5 | 1.56 |
| 51.0 | 2.00 | 46.0 | 1.81 |
| 57.0 | 2.25 | 51.0 | 2.00 |
| 63.5 | 2.50 | 57.0 | 2.25 |

If using the fork wear calipers, refer to the following:

Refer to Figure 16854-01. The fork wear calipers have two measuring points or jaws. The inside jaws (2) measure 10% less than the outside jaws (1).

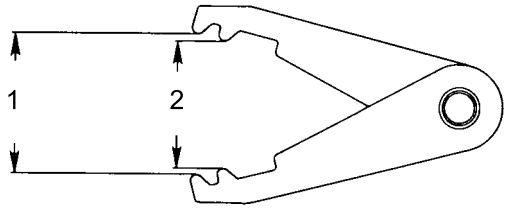



Figure 16854-01

1 Outside Jaws 100% (Fork Shank)

2 Inside Jaws 90% (Fork Blade)

Refer to Figure 16855-01. To set the outside jaws, measure the thickness of the middle of the shank (this point receives almost no wear). Set the calipers to the “feel” of the shank by lightly tapping on them with a metal object.

**NOTE**

*Care should be taken when using the calipers to hold them square across the shank or an incorrect reading will result.*

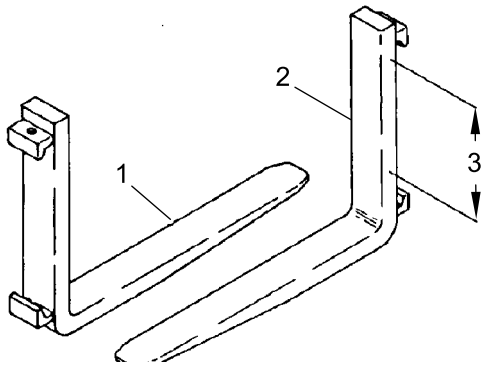



Figure 16855-01

1 Fork Blade
2 Fork Shank
3 Measure Here to Set Outside Jaws

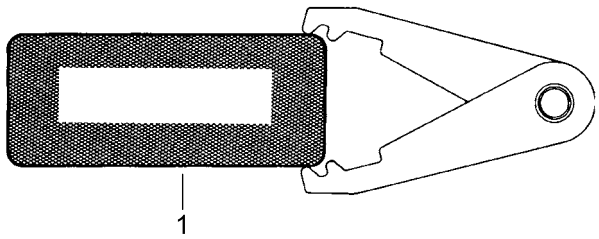



Figure 16856-01

1 Fork Shank Cross Section

Once the outside jaws are set, check to see if the inside jaws of the calipers pass over the flanks of the fork blade at any point between the end of the taper and the heel of the fork blade. After checking the blade, re-check the caliper setting by measuring the shank again making sure the setting was not inadvertently changed.

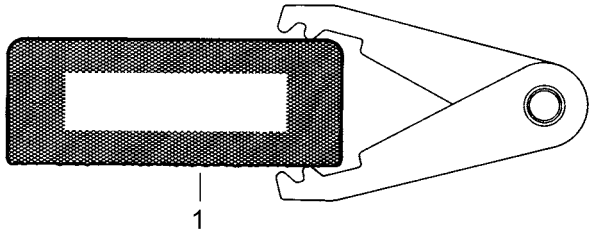



Figure 16857-01

1 Fork Blade Cross Section


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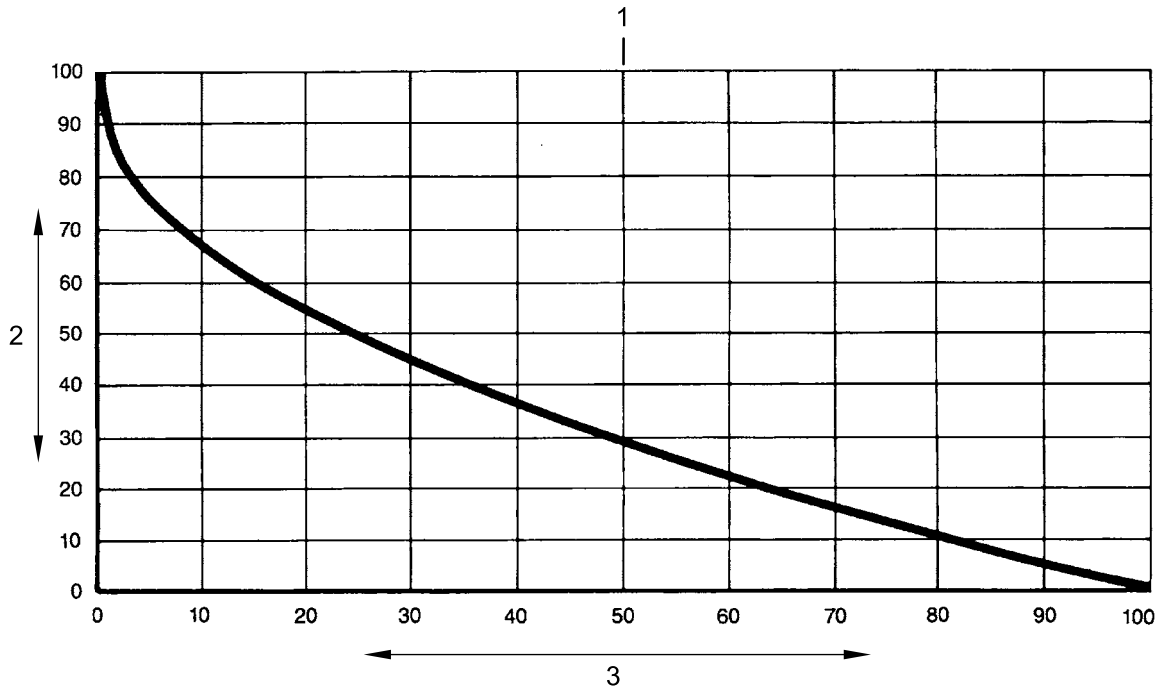



Figure 16858-01

1 Chart 2 - Wear vs. Capacity

2 Percentage Reduction in Fork Blade Thickness

3 Percentage Remaining of Specified Fork Capacity

## Overloading

Know the capacity of the forks and truck. Fork capacity and load center is stamped on the fork. Refer to Figure 16859-01. Overloading can cause permanent deformation or serious fatigue conditions.

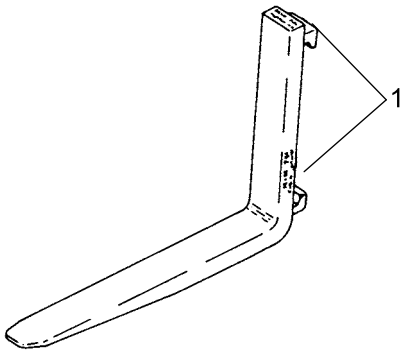



Figure 16859-01

1 Location of Capacity and Load Center Rating

## Fatigue

A fatigue crack will normally start in the heel area of the fork. Cracks can usually be detected in the early stages by inspection of the heel area. Check for cracks that transverse the fork in an area up to 130 mm (5.0 in) either side of the outer heel radius. These cracks are a sign that the area has weakened and the fork needs to be replaced. Make a visual inspection for cracks each work day. If a more accurate inspection is necessary, use dye penetrants or magnaflux fork.

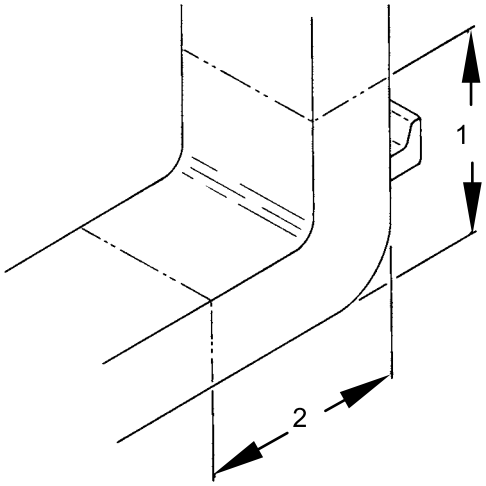



Figure 16860-01

1 130 mm (5.0 in)

2 130 mm (5.0 in)

## Bent or Twisted Forks

Overloading, glancing blows against solid objects or picking up loads unevenly can bend or twist a fork, making fork replacement necessary. The maximum allowable difference in fork tip elevation from one fork to another is 3% of the fork length.

The angle between the top of the fork (blade) to the back surface of the vertical leg (shank) shall be less than 93°. Any angle greater will require fork repair or replacement. The fork manufacturer or service technician with the expertise of equal competence are the only parties that should attempt to make such repairs.

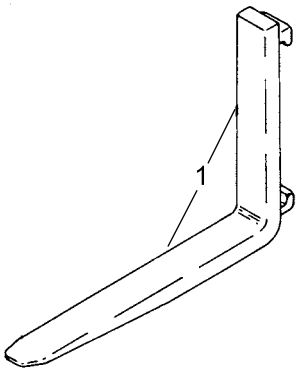



Figure 16861-01

1 93° Maximum

Use a carpenter's square to check the fork. Refer to Figure 16862-01. Hold the square against the shank staying above the radius of the heel as shown. Measure the distance closest to the radius of the heel of the fork blade and square (2). Add 31.8 mm (1.25 in) to this measurement and record. If the distance between the end of the square and blade (3) is greater than this calculation, replace blade (fork is deformed more than 93°).

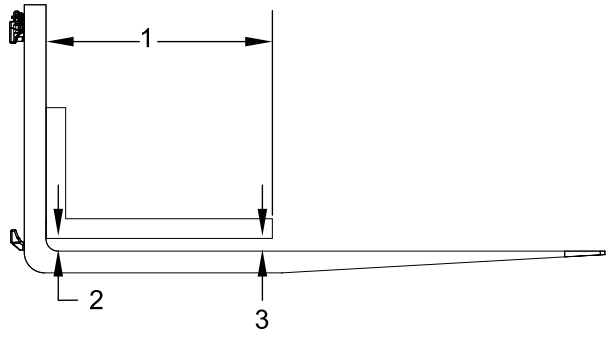



Figure 16862-01

1 609 mm (2.0 ft)

2 "x"

3 "x" + 31.8 mm (1.25 in)


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## Hanger

Check for cracks or damage to the fork pins and the area of fork attachment. Check carriage for excessive wear or cracks. Repair or replace parts if necessary.

Check condition of fork locking pin, spring, cam, etc. for proper operation (if forks are so equipped).

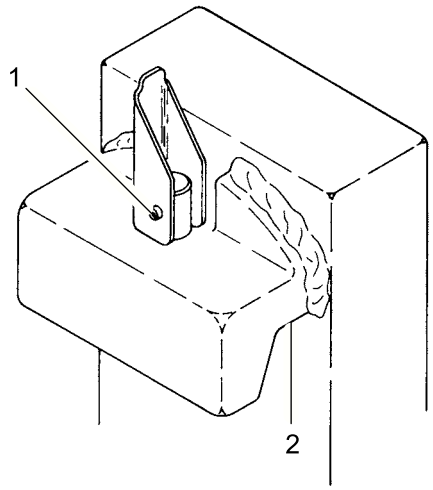



Figure 16863

1 Check Locking Pin, Spring, etc.

2 Check for Cracks Under Hanger

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# CYLINDERS

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## Notes:

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# Cylinders

**WARNING**

*Avoid high pressure fluids - escaping fluids under pressure can penetrate the skin, causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately from a specialist who has experience with this type of injury.*

Great care and cleanliness should be exercised in the disassembly and assembly of any hydraulic cylinders.

1. Wipe all surfaces clean of dirt and oil before disassembly.
2. Care should be taken when removing the ram from the cylinder to prevent damage to the packing on the piston end.
3. After cylinder components are disassembled and seals, o-rings and wipers are removed, thoroughly wash all metallic parts in solvent and blow dry with compressed air.
4. Carefully inspect the ram assembly and cylinder bore. Replace if scored, grooved, pitted or worn. Minor damage to the cylinder bore can be removed with the use of a cylindrical honing tool.
5. Place washed components in a clean container until reassembly. Whenever new packings are required, new wiper rings should also be installed.

## Mast Cylinder

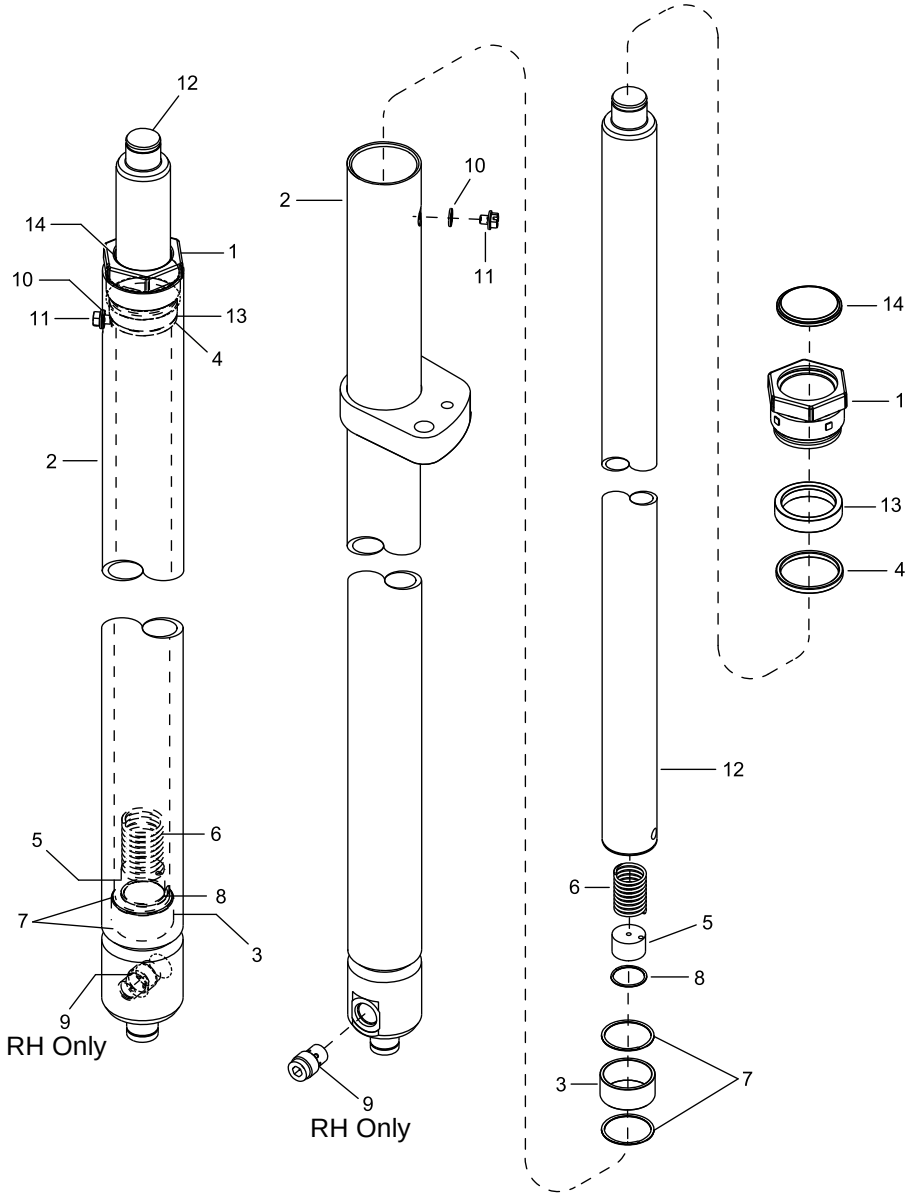



Figure 15293

The mast cylinder is secured to the outer mast. The mast cylinder is a single acting ram type cylinder. Extreme care should be taken when performing any type of repair. In the event of excessive oil leakage around the rod end of the cylinder or its inability to lift the load, the cylinder will have to be removed from the truck and repaired.

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## Mast Cylinder Inspection

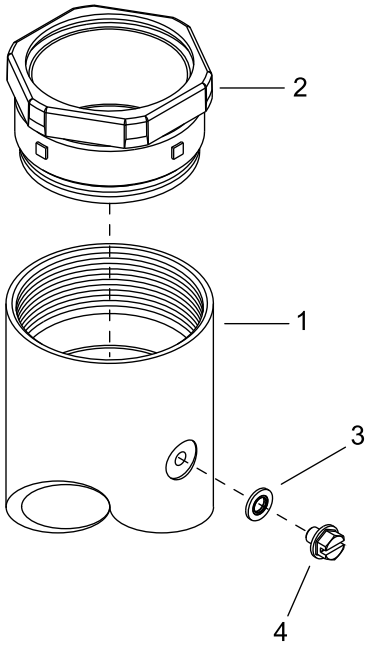
(Refer to Figure 15293)

1. Before disconnecting battery and initial cylinder repair, a careful inspection should be made of the cylinder assembly throughout a complete lift and lower sequence.
2. Check ram (12) for any signs of nicks, scratches, surface imperfections, etc. that allow abnormal leakage, improper cylinder operation, or create seal damage.
3. Check wiper ring (14) and complete cap area for component wear and/or leakage that is abnormal.

As the cylinder assembly is repaired be aware of component part condition and not only replace a worn or damaged part, but correct or replace a part that may be causing other premature wear.

## Mast Cylinder Disassembly

1. Turn the cap counterclockwise and unscrew it from the cylinder tube. Refer to Figure 15962.




1 Cylinder Tube
2 Cap
3 O-Ring
4 Bleed Screw

Figure 15962

2. Remove the cap and carefully extract the ram assembly from the cylinder bore, never allowing the ram to come in contact with any sharp edges.

## Mast Cylinder Repair

**WARNING**

*Avoid high pressure fluids - escaping fluids under pressure can penetrate the skin, causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately from a specialist who has experience with this type of injury.*

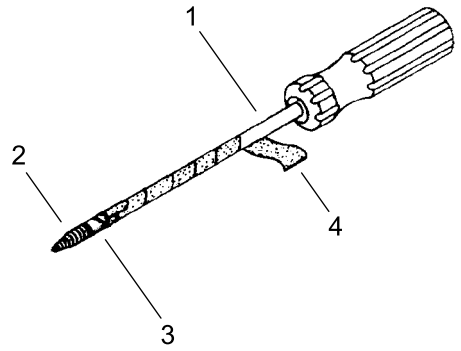
When an excessive amount of hydraulic oil is evident on the top of the cylinder where the ram exits from the cap, the rod packing is probably bad and should be replaced. The replacement of the packing can be accomplished without removing the ram assembly from the cylinder tube or truck.

1. Make sure all hydraulic pressure has been removed from the mast cylinders.
2. Carefully remove hydraulic fittings from lift cylinder rams. Attempt to absorb any hydraulic oil draining from lines during this procedure.
3. Remove cylinder cap by turning it in a counterclockwise direction.

**NOTE**

*Seals used in the cylinders are made of an extremely durable, hard polyurethane material which can be deformed temporarily to allow for installation without permanent damage.*

4. The packing is located below the cap and remains in the cylinder bore after the cap is removed. A pair of special tools can be used to facilitate packing removal (refer to Figure 15963).




1 Screwdriver 152 mm (6 in) Shaft Length (Min.) 4 mm (0.156 in) Shaft Diameter (Max.)
2 No. 8 Metal Screw Headless (4 mm Self-Tapping)
3 Weld (Grind Off Excess) to a Max. Dia. of 4 mm (0.156 in)
4 Tape

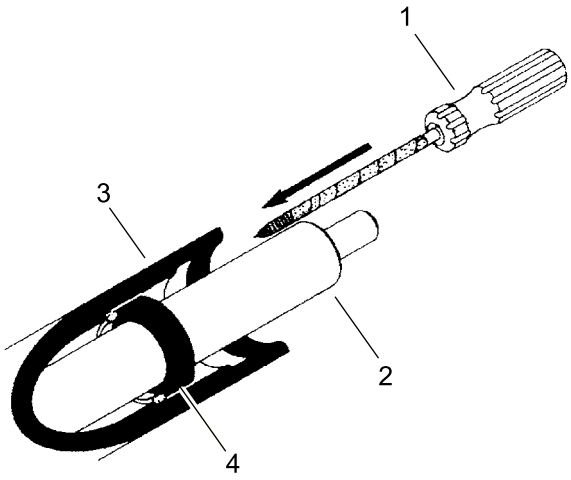
Figure 15963

To make these tools, weld or braze a headless 4.0 mm self-tapping (No. 8 metal) screw to the end of a screwdriver. The screwdriver must have at least 150 mm (6.0 in) of shank length with no larger than 4.0 mm (0.156 in) shank diameter. After attaching the screw to the screwdriver, grind off excess weld to a diameter of 4.0 mm (0.156 in). Wrap the shank with electrical tape from the tip of the screw to the screwdriver handle. This will prevent scratching of the cylinder bore or the ram.

**NOTE**

*Extreme care should be taken to prevent damage to cylinder wall and ram assembly.*

5. Insert the tools between the ram and the cylinder walls, 180° apart, and screw into the face of the packing (refer to Figure 15964).




1 Seal Pulling Tool
2 Ram
3 Cylinder Tube
4 Seal

Figure 15964

6. After the threads are sufficiently secured into the packing, evenly pull on the screwdriver handles until the packing is removed.

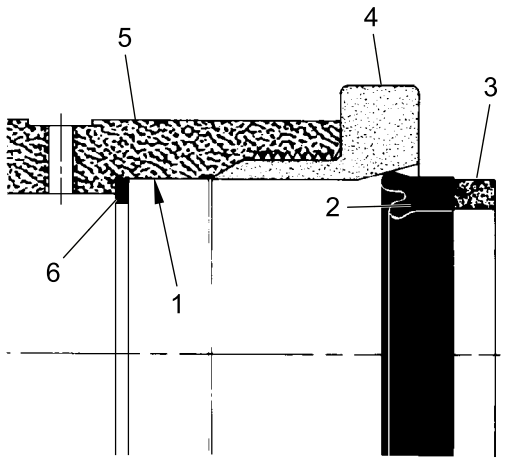
**CAUTION**

*Close inspection of seal seating critical areas should be made before the new seal is installed.*

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Refer to Figure 15970. Seal failure may not have been caused by a worn seal, but rather by burrs, nicks and dirt located on the seal seating area, causing the seal to deform and lose its sealing ability.




1 Critical Seal Seating Area
2 Seal
3 Forging Tool
4 Sleeve
5 Cylinder Tube
6 Collar

Figure 15970

7. At this time, the wiper ring should also be removed since packings and wiper rings should always be replaced in pairs. Thoroughly clean the area where the seals seat. Any burrs, dirt or seal debris must be removed before installing new seals.
8. Tools used to install hydraulic seals should be of soft metal or suitable plastic, free of burrs and sharp edges. Screwdrivers and other similar tools should not be used as they may damage the sealing edges.
9. The area in contact with the seal should be free of burrs, sharp edges and nicks.
10. If necessary to force seal over sharp edges, slots or undercuts, protective devices should be used.
11. Light lubrication should be applied to the seal and installation groove prior to installation. The same oil that will be used later in the cylinder should be applied.

## Mast Cylinder Reassembly

**CAUTION**

*Care should be taken when inserting the cylinder cap to prevent threads and sharp edges from damaging new seals and packings. Packings can also be damaged by forcing air past seals.*

When repacking the mast cylinder, carefully bring oil back into the system while the bleed screw is fully open to allow air to burp.

After packings and seals are in place and the ram assembly has been installed, reattach the cap.

## Mast Cylinder Bleeding and Flushing Procedures

**WARNING**

*Avoid high pressure fluids - escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.*

Mast hydraulic circuits need to be flushed after repair of mast cylinders and bled of all air. Before flushing and bleeding of system inspect all hydraulic connections and verify that all filters are installed and hydraulic fluid levels are adequate for test. Hydraulic system must be pressurized during the flushing and bleeding procedures.

**CAUTION**

*Do not attempt to bleed a line by cracking an o-ring face seal fitting. This will result in damaging the o-ring which then must be replaced to prevent hydraulic fluid leakage.*

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### Mast Cylinder Bleeding

1. Elevate carriage to approximately 1220 mm (48.0 in).
2. Slowly open each cylinder's bleed screws and bleed air from cylinders until a solid stream of hydraulic fluid flows out of the cylinders.
3. Tighten bleed screw.

### Mast Cylinder Flushing

1. After bleeding cylinders, actuate control valve to raise carriage through free and stage lift and stop to hold in position.
2. With carriage raised, examine cylinders for any leaks.
3. Actuate control valve to lower carriage through stage and free lift to examine operation and staging.
4. Raise and lower carriage rapidly for a minimum of 10 cycles to flush system.

**CAUTION**

*Never stand or work under a suspended load.*

Fully extend the mast with maximum rated load. The load may not drift down more than 50 mm (2.0 in) within five minutes.

Occasionally, a slight creep of the fork assembly may occur due to internal cylinder seal leakage, but it can also be caused by leakage in the check valves, control valve, etc. To seat these valves properly when this occurs, raise and lower the forks to flush out any foreign material from the valve seat.

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## Carriage Cylinder

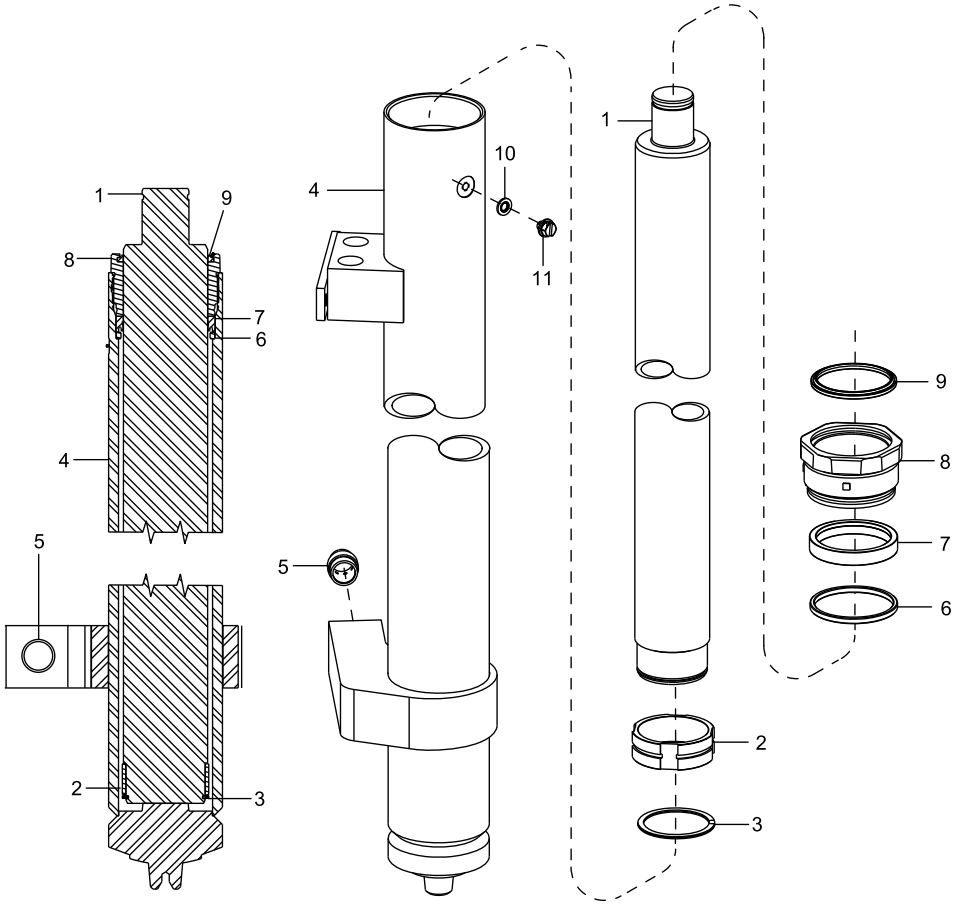



Figure 15296

The carriage cylinder is located at the base of the inner mast, and is a single acting ram type cylinder. Extreme care should be taken when performing any type of repair. In the event of excessive oil leakage around the cap end of the cylinder or its inability to lift the load, the cylinder will have to be removed from the truck and repaired.

### Inspection

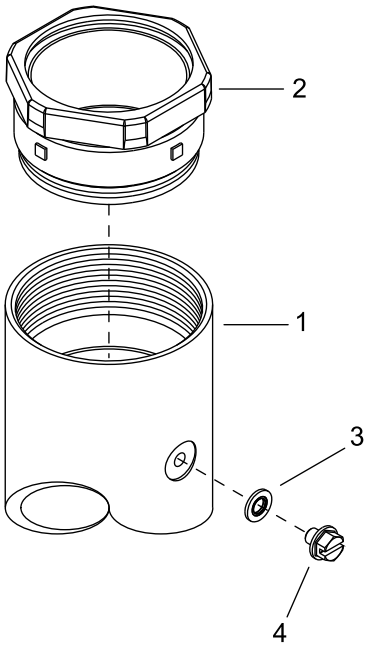
(Refer to Figure 15296)

1. Before disconnecting battery and initial cylinder repair, a careful inspection should be made of the cylinder assembly throughout a complete lift and lower sequence.
2. Check roller bar or yoke area for signs of abnormal wear, damage, etc.
3. Check ram (1) for any signs of nicks, scratches, surface imperfections, etc. that allow abnormal leakage, improper cylinder operation, or create seal damage.
4. Check wiper ring (9) and complete cap area for component wear and/or leakage that is abnormal.

As the cylinder assembly is repaired be aware of component part condition and not only replace a worn or damaged part, but correct or replace a part that may be causing other premature wear.

### Carriage Cylinder Disassembly

1. Turn the cap counterclockwise and unscrew it from the cylinder tube. Refer to Figure 15962.




1 Cylinder Tube
2 Cap
3 O-Ring
4 Bleed Screw

Figure 15962

2. Remove the cap and carefully extract the ram assembly from the cylinder bore, never allowing the ram to come in contact with any sharp edges.

### Carriage Cylinder Repair

**WARNING**

*Avoid high pressure fluids - escaping fluids under pressure can penetrate the skin, causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately from a specialist who has experience with this type of injury.*

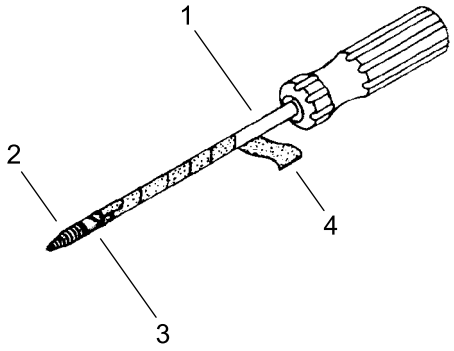
When an excessive amount of hydraulic oil is evident on the top of the cylinder where the ram exits from the cap, the rod packing is probably bad and should be replaced. The replacement of the packing can be accomplished without removing the ram assembly from the cylinder tube or truck.

1. Make sure all hydraulic pressure has been removed from the carriage cylinders.
2. Carefully remove hydraulic fittings from carriage cylinder ram. Attempt to absorb any hydraulic oil draining from lines during this procedure.
3. Remove cylinder cap by turning it in a counterclockwise direction.

**NOTE**

*Seals used in the cylinders are made of an extremely durable, hard polyurethane material which can be deformed temporarily to allow for installation without permanent damage.*

4. The packing is located below the cap and remains in the cylinder bore after the cap is removed. A pair of special tools can be used to facilitate packing removal (refer to Figure 15963).




1 Screwdriver 152 mm (6 in) Shaft Length (Min.) 4 mm (0.156 in) Shaft Diameter (Max.)
2 No. 8 Metal Screw Headless (4 mm Self-Tapping)
3 Weld (Grind Off Excess) to a Max. Dia. of 4 mm (0.156 in)
4 Tape

Figure 15963


Crown 2007 PF15682-8 Rev. 6/08

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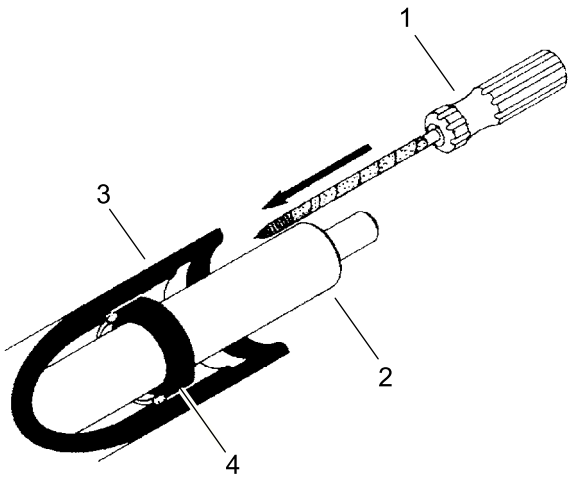


To make these tools, weld or braze a headless 4.0 mm self-tapping (No. 8 metal) screw to the end of a screwdriver. The screwdriver must have at least 150 mm (6.0 in) of shank length with no larger than 4.0 mm (0.156 in) shank diameter. After attaching the screw to the screwdriver, grind off excess weld to a diameter of 4.0 mm (0.156 in). Wrap the shank with electrical tape from the tip of the screw to the screwdriver handle. This will prevent scratching of the cylinder bore or the ram.

**NOTE**

*Extreme care should be taken to prevent damage to cylinder wall and ram assembly.*

5. Insert the tools between the ram and the cylinder walls, 180° apart, and screw into the face of the packing (refer to Figure 15964).




1 Seal Pulling Tool
2 Ram
3 Cylinder Tube
4 Seal

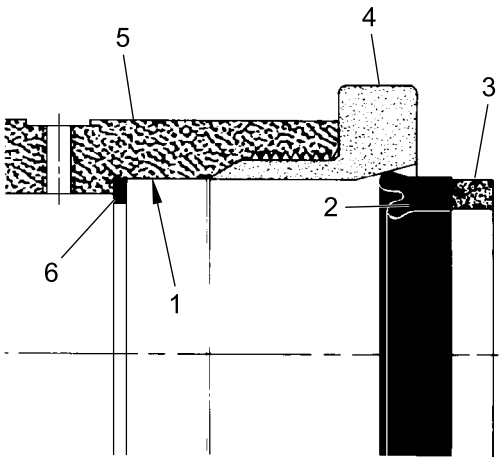
Figure 15964

6. After the threads are sufficiently secured into the packing, evenly pull on the screwdriver handles until the packing is removed.

**CAUTION**

*Close inspection of seal seating critical areas should be made before the new seal is installed.*

Refer to Figure 15970. Your seal failure may not have been caused by a worn seal, but rather by burrs, nicks and dirt located on the seal seating area, causing the seal to deform and lose its sealing ability.




1 Critical Seal Seating Area
2 Seal
3 Forging Tool
4 Sleeve
5 Cylinder Tube
6 Collar

Figure 15970

7. At this time, the wiper ring should also be removed since packings and wiper rings should always be replaced in pairs. Thoroughly clean the area where the seals seat. Any burrs, dirt or seal debris must be removed before installing new seals.
8. Tools used to install hydraulic seals should be of soft metal or suitable plastic, free of burrs and sharp edges. Screwdrivers and other similar tools should not be used as they may damage the sealing edges.
9. The area in contact with the seal should be free of burrs, sharp edges and nicks.
10. If necessary to force seal over sharp edges, slots or undercuts, protective devices should be used.
11. Light lubrication should be applied to the seal and installation groove prior to installation. The same oil that will be used later in the cylinder should be applied.

### Carriage Cylinder Reassembly

**CAUTION**

*Care should be taken when inserting the cylinder cap, to prevent threads and sharp edges from damaging new seals and packings. Packings can also be damaged by forcing air past seals.*

When repacking the carriage cylinder, carefully bring oil back into the system while the bleed screw is fully open to allow air to burp.

After packings and seals are in place and the ram assembly has been installed, reattach the cap.

### Carriage Cylinder Bleeding and Flushing Procedures

**WARNING**

*Avoid high pressure fluids - escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.*

Carriage hydraulic circuits need to be flushed after repair of carriage cylinders and bled of all air. Before flushing and bleeding of system inspect all hydraulic connections and verify that all filters are installed and hydraulic fluid levels are adequate for test. Hydraulic system must be pressurized during the flushing and bleeding procedures.

**CAUTION**

*Do not attempt to bleed a line by cracking a seal fitting. This will result in damaging the seal which then must be replaced to prevent hydraulic fluid leakage.*

### Carriage Cylinder Bleeding

1. Slowly elevate the empty carriage to approximately 1220 mm (48.0 in).
2. Slowly open each cylinder's bleed screws and bleed air from cylinders until a solid stream of hydraulic fluid flows out of the cylinders.
3. Tighten bleed screw.

### Carriage Cylinder Flushing

1. Slowly elevate the empty carriage to approximately 1220 mm (48.0 in).
   After bleeding cylinders, actuate control valve to raise carriage through free and stage lift and stop to hold in position.
2. With carriage raised, examine cylinders for any leaks.
3. Actuate control valve to lower carriage through stage and free lift to examine operation and staging.
4. Raise and lower carriage rapidly for a minimum of 10 cycles to flush system.

**CAUTION**

*Never stand or work under a suspended load.*

Fully extend the mast with maximum rated load. The load may not drift down more than 50 mm (2.0 in) within five minutes.

Occasionally, a slight creep of the fork assembly may occur due to internal cylinder seal leakage, but it can also be caused by leakage in the check valves, control valve, etc. To seat these valves properly when this occurs, raise and lower the forks to flush out any foreign material from the valve seat.

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# Tilt Cylinder

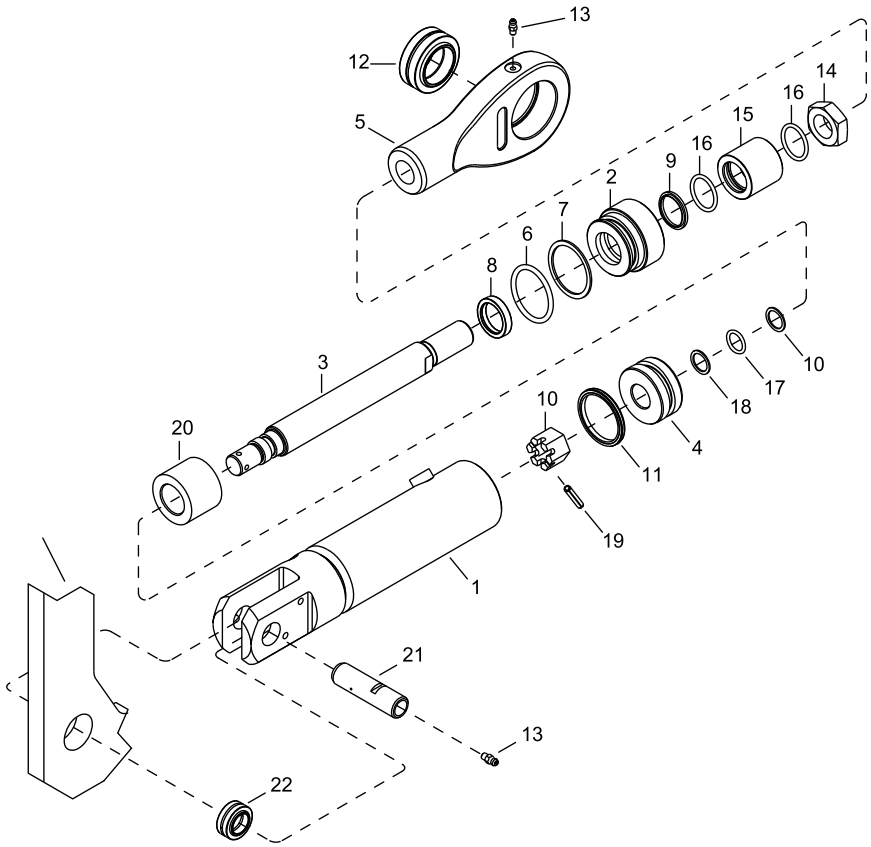



Figure 15301

The tilt cylinder is mounted at the base of the front frame. This tilt cylinder is a double acting piston type cylinder. Extreme care should be taken when performing any type of repair. In the event of excessive oil leakage around the rod end of the cylinder or its inability to tilt the load, the cylinder will have to be removed from the truck and repaired.

As the cylinder assembly is repaired be aware of component part condition and not only replace a worn or damaged part, but correct or replace a part that may be causing other premature wear.

## Tilt Cylinder Inspection

(Refer to Figure 15301)

1. Before disconnecting battery and initial cylinder repair, a careful inspection should be made of the cylinder assembly throughout a complete tilting sequence.
2. Check piston rod (3) for any signs of nicks, scratches, surface imperfections, etc. that allow abnormal leakage, improper cylinder operation, or create seal damage.
3. Check wiper ring (9) and complete cap area for component wear and/or leakage that is abnormal.

### Tilt Cylinder Disassembly

(Refer to Figure 15301)

Before proceeding with disassembly, thoroughly clean the outside of the cylinder to remove all grease and dirt build-up.

1. Place the cylinder in a vise. Care should be taken to avoid over-tightening, as the tube assembly (1) may be easily damaged. The use of an adjustable spanner wrench, similar to the one shown in Figure 15966, is required for disassembly. A face spanner wrench with 4.75 mm (0.187 in) pins and a spread of at least 66.7 mm (2.625 in) is sufficient.

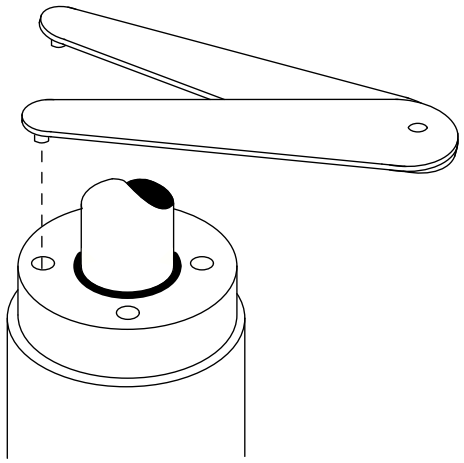


Figure 15966

2. Using a scraper or similar tool, remove any material, burrs, etc. from the edge of the cylinder. If burrs, etc. are not removed, piston removal may be difficult.
3. Using spanner wrench, remove the rod guide (2), o-ring (6), back-up ring (7), packing rod (8) and wiper ring (9).
4. Next, carefully remove the roll pin (19), nut (10), piston seal (11), piston (4), back-up rings (18), o-ring (17) and spacer (20) out of the end of the tube assembly.
5. Inspect the tube assembly for any signs of scoring. If scoring is evident, the tube assembly must be replaced. The tube assembly should be honed to remove any remaining burrs.

### Rod Disassembly

1. Remove cotter pin and then use wrench flats on rod to remove castle nut.
2. Slide all components off the end of the rod.
3. Inspect the rod for scoring or damaged material. If damages or scoring is evident, the rod must be replaced.

### Tilt Cylinder Repair

**CAUTION**

*Never use a screwdriver to remove seals, as irreparable damage and leakage may occur.*

1. With the use of a small hooked tool, carefully pull the seals from their mounting grooves.
2. After all the seals have been removed, inspect the contact surface of the piston for scoring. If slight scoring is evident, sand with a fine emery paper until all high surfaces have been removed. Heavily scored components must be replaced.

**NOTE**

*When cleaning the piston, be sure to clean seal seating areas. Protect eyes and face when using compressed air.*

3. When all parts have been disassembled and inspected, wash all cylinder components in a good grade solvent and dry with air pressure.
4. After all parts have been thoroughly cleaned, place in a dirt free area until ready for reassembly.

### Tilt Cylinder and Rod Reassembly

1. Apply a coating of hydraulic oil (Crown No. 063001-001) to all seals before they are assembled.
2. Install all seals by hand.
3. After the seals have been installed, install piston and fasten hex jam nut; be sure piston is seated properly against the rod shoulder.

**CAUTION**

*Care should be taken when inserting the rod guide to prevent sharp edges from damaging the new seals and packings.*

4. After installing the rod assembly into the tube assembly, carefully assemble the rod guide into the tube.

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## Tilt Cylinder Adjustment

1. Turn rod end on piston rod until the end of the rod end is 24.5 mm (0.96 in) from the shoulder on the piston rod. Hex jam nut is to be against the end of the rod end (refer to Figure 15967). Repeat procedure for the other tilt cylinder.

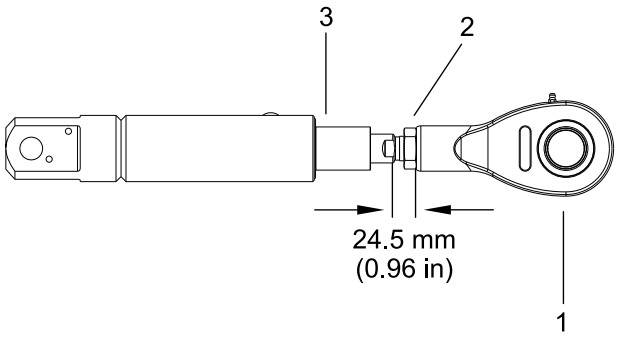



Figure 15967

1 Rod End
2 Hex Jam Nut
3 Spacer

2. Connect both tilt cylinders to the mast with appropriate hardware. The date code on the rod end is to face the mast channel and the large flat washer is to be on the outboard side.
3. The truck must be empty and located on a surface plate to make the following adjustments to the tilt cylinder rod end.
4. Extend cylinders to full forward position. Refer to Chart 1 - Degree of Tilt to determine correct degree of forward tilt.

| Chart 1 - Degree of Tilt | | |
|---|---|---|
| **Tilt Cylinder Assembly** | **Forward Tilt** | **Backward Tilt** |
| 136589-053 | 5° | 3° |
| 136589-055 | 5° | 5° |
| 136589-103 | 10° | 3° |
| 136589-105 | 10° | 5° |

5. Loosen the hex jam nut to allow the piston rod to be rotated using a 27 mm open end wrench on the flats provided. Adjust the piston rods so that both cylinders bottom out at the same time when the mast is tilted forward.
6. Use an inclinometer to check the tilt of the mast on the first stage. If the measured degree is not within the ± 0.25° tolerance, rotate the piston rods until the desired degree of tilt is within tolerance. (The mast may need tilted back to allow clearance for the wrench to turn the cylinder shaft.)
7. Once all adjustments are complete, tighten the hex jam nut up against the end of the rod end and torque hex jam nut to 339 ± 27 Nm (250 ± 20 ft lb).
8. Tilt mast to back until one of the tilt cylinder spacers is snug and cannot be rotated freely. Do not tilt back any further than this.
9. Use an inclinometer to check the tilt of the mast. If the measured degree is not within the +0/-0.5° tolerance add retaining rings (Crown Part No. 060009-168) between the spacer and the cylinder until desired degree of tilt is achieved. There may now be a gap between the other spacer and cylinder. Measure the gap, and then tilt the mast forward. Add retaining rings between the spacer and cylinder so the gap is less than 1.59 mm (0.0625 in).

## Tilt Cylinder Shimming

1. Tilt mast back to its maximum position.
2. Refer to Figure 19830. On the side of the truck with the tilt position assist assembly, measure the gap (1) between the end cap (2) and the drive axle mounting plate (3).

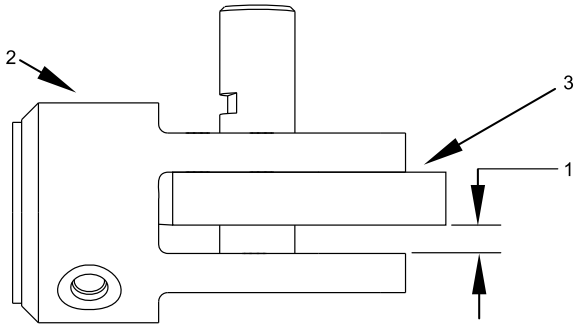



Figure 19830

3. Use the Tilt Cylinder Spacing chart to determine the type and quantity of spacers needed for the measured gap.

| Tilt Cylinder Spacing | | | |
|---|---|---|---|
| Measured Gap | | Quantity of Spacers | |
| mm | in | 141414-001 | 141414-002 |
| 8.45 - 8.1 | 0.33 - 0.32 | 1 | 3 |
| 8.0 - 7.2 | 0.31 - 0.29 | 1 | 2 |
| 7.1 - 6.3 | 0.28 - 0.25 | 1 | 1 |
| 6.2 - 5.4 | 0.24 - 0.21 | 1 | 0 |

**Tilt Cylinder Spacing Chart**

4. Refer to Figure 19831. Place required spacers (1) between the end cap (2) and drive axle mounting plate (3) on the inside of the drive axle mounting plate (3).

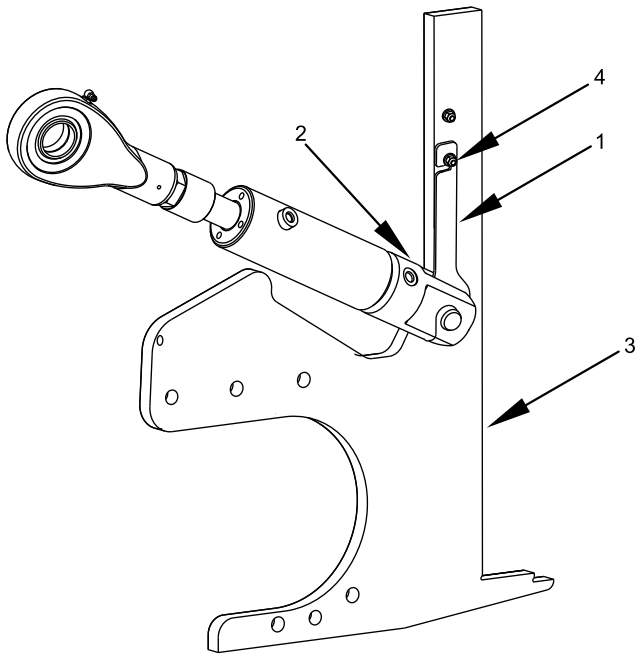



Figure 19831

### NOTE

*Always install the thinner spacer 141414-002 closest to the drive axle plate.*

5. Loosen the lower bolt and nut (4) holding the tilt position assist assembly and slide spacers behind the nut. Retighten nut and torque to 12 Nm (9 ft lb).

## Tilt Cylinder Bleeding and Flushing Procedures

### WARNING

*Avoid high pressure fluids - escaping fluid under pressure can penetrate the skin causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered as a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately by a specialist who has had experience with this type of injury.*

Tilt hydraulic circuits need to be flushed after repair of tilt cylinders and bled of all air. Before flushing and bleeding of system inspect all hydraulic connections and verify that all filters are installed and hydraulic fluid levels are adequate for test. Hydraulic system must be pressurized during the flushing and bleeding procedures.

### CAUTION

*Do not attempt to bleed a line by cracking an o-ring face seal fitting. This will result in damaging the o-ring which then must be replaced to prevent hydraulic fluid leakage.*

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## Tilt Cylinder Bleeding and Flushing

1. Turn truck on and raise the carriage approximately 305 mm (12.0 in).
2. Tilt the mast completely forward, then back.
3. Repeat this complete cycle, totally forward and then completely back, a minimum of 10 times.
4. If it is suspected that any air is still in the system, repeat the process.

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## Notes:

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## Sideshifter Cylinder

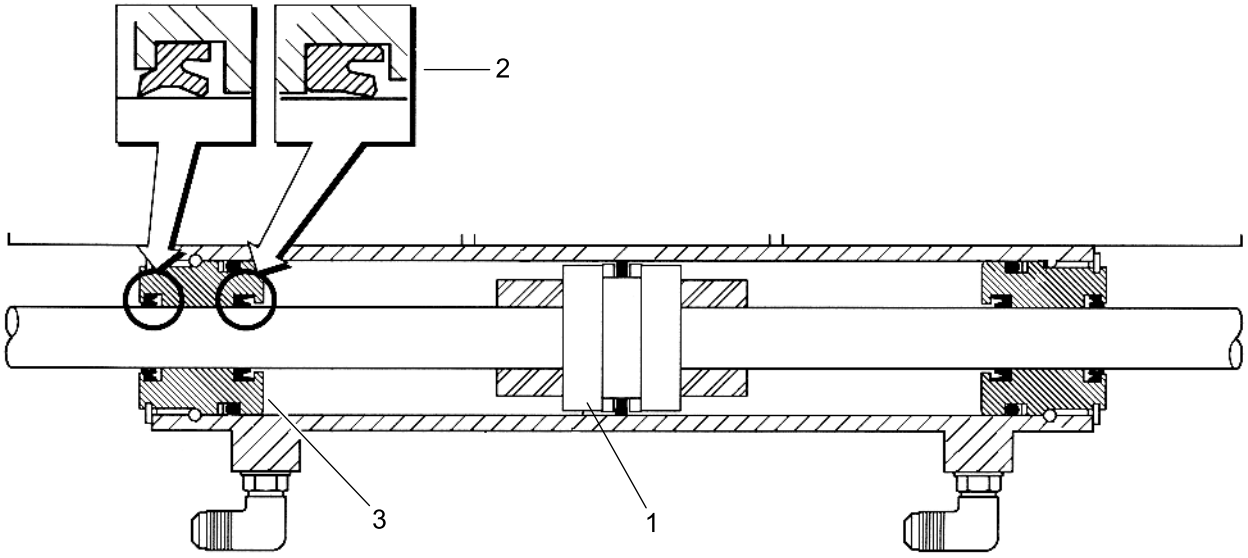
The sideshifter cylinder is located at the base of the load backrest and sits between the forks. Extreme care should be taken when performing any type of repair. In the event of excessive oil leakage around the rod end of the cylinder or its inability to lift the load, the cylinder will have to be removed from the truck and repaired.

## Sideshifter Cylinder Inspection

**NOTE**

*Minor nicks will not bypass oil under pressure. If unable to remove nicks with an emery cloth, the part should be replaced.*

1. Inspect all components for nicks or burrs and remove them with 400-grit emery cloth.
2. The outside of the shell should be checked for deformities that weaken the shell's performance when under pressure. Replace if necessary.




1 Piston
2 U-Cup Seals
3 Retainer

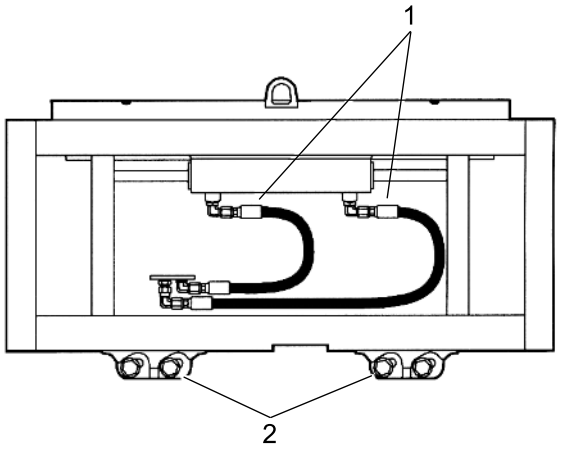
Figure 16061

## Sideshifter Cylinder Removal

**WARNING**

*Relieve hydraulic pressure before removing hoses or hydraulic components. Make sure the truck is turned off and move the auxiliary control handle several times in both directions.*

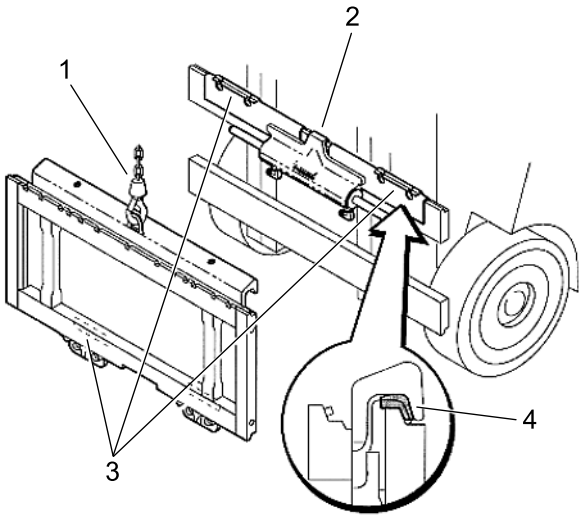
1. Disconnect hoses beneath the cylinder.
2. Remove the lower mounting hooks, as shown in Figure 15965.




1 Hoses
2 Lower Mounting Hooks

Figure 15965

3. Attach an overhead hoist to the top of the sideshifter carriage and remove the carriage from the truck (the cylinder assembly/anchor bracket will remain on the truck carriage).
4. Carefully remove the cylinder assembly/anchor bracket from the truck carriage.
5. Inspect the sideshifter bearings for wear and replace if necessary.




1 Overhead Hoist
2 Cylinder Assembly/Anchor Bracket
3 Sideshifter Bearings
4 Upper Bearings

Figure 15968

For reassembly, the above steps should be reversed, with the following exceptions:

1. Thoroughly clean the upper hook and lower bearing pocket to remove built-up dirt and grease.
2. Prior to reassembly, carefully inspect and clean all parts.
3. Inspect the anchor bracket cutouts and locate the upper bearings.
4. Install the lower mounting hooks and adjust as needed.
5. Ensure proper lubrication of sideshifter bearings.

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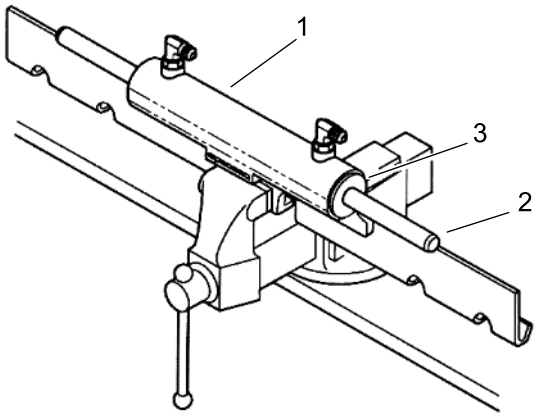


## Sideshifter Cylinder Disassembly

**CAUTION**

*Do not clamp over the cylinder shell.*

1. Clamp the cylinder assembly in a soft-jawed vise, as shown in Figure 15969.
2. Carefully center the cylinder rod and remove the spiral snap rings from the retainers.




1 Cylinder Assembly
2 Cylinder Rod
3 Spiral Snap Rings

Figure 15969

**NOTE**

*Extreme care should be taken to prevent damage to cylinder wall and ram assembly.*

3. Ease the retainers into the shell approximately 50.0 mm (2.0 in). Pry one end of each retaining ring up and remove it from the groove, as shown in Figure 15971.

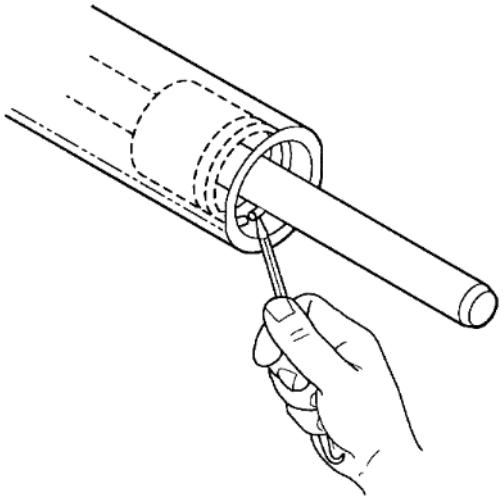
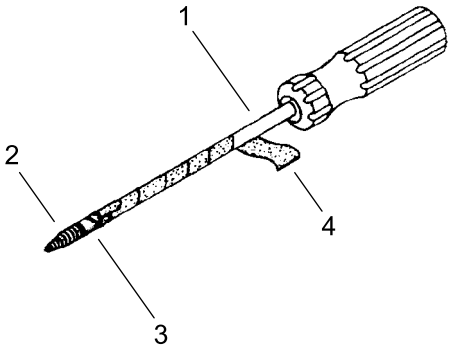


Figure 15971

A pair of special tools can be used to facilitate packing removal (Refer to Figure 15963).




1 Screwdriver
152.0 mm (6.0 in) Shaft Length (Min.)
4.0 mm (0.156 in) Shaft Diameter (Max.)
2 No. 8 Metal Screw Headless (4.0 mm Self-Tapping)
3 Weld (Grind Off Excess) to a Max. Dia. of 4.0 mm (0.156 in)
4 Tape

Figure 15963

To make these tools, weld or braze a headless 4.0 mm self-tapping (No. 8 metal) screw to the end of a screwdriver. The screwdriver must have at least 150.0 mm (6.0 in) of shank length with no larger than 4.0 mm (0.156 in) shank diameter. After attaching the screw to the screwdriver, grind off excess weld to a diameter of 4.0 mm (0.156 in). Wrap the shank with electrical tape from the tip of the screw to the screwdriver handle.

**CAUTION**

*Do not scratch or nick the cylinder bore or seal grooves.*

4. Carefully remove the rod assembly from the cylinder.
5. Place the rod assembly in a soft-jawed vise or between two blocks of wood to facilitate seal removal. Pry the seals up and cut to remove (Refer to Figure 16059).

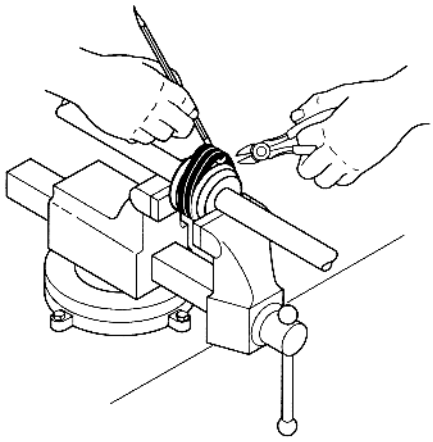
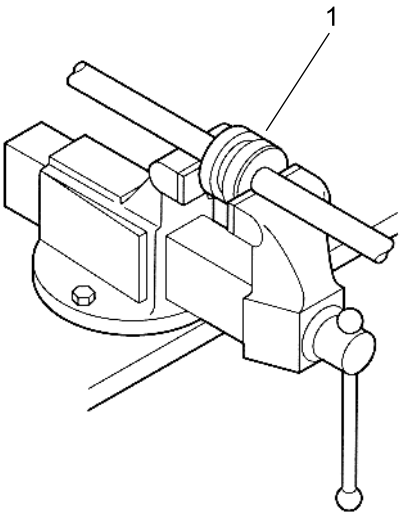


Figure 16059

## Sideshifter Cylinder Reassembly

1. To allow the seals to slide easily over the piston/retainer chamfer, polish it carefully with an emery cloth.




1 Piston/Retainer Chamfer

Figure 16060

2. Thoroughly wash all components with cleaning solvent and lubricate new seals and rings with petroleum jelly.
3. Ensure the u-cup seals are installed correctly; if placed backward, they will not work properly. For proper seal direction, refer to Figure 16061.
4. When installing new seals, hook one side of each one in the groove and push it over the piston or retainer.
5. Apply a layer of petroleum jelly to the inside of the cylinder shell, piston seals and retainers.
6. Insert the rod assembly into the cylinder shell. Use a rubber mallet to tap the rod end if resistance occurs.
7. Carefully drive the retainers into the shell far enough to facilitate installation of retaining rings.
8. Pull the rod out on one side to full extension; this will allow the retainer to be in position for installing the spiral snap ring. Repeat this process on the other end.

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# PLATFORM

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## Notes:

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# Sideshifter

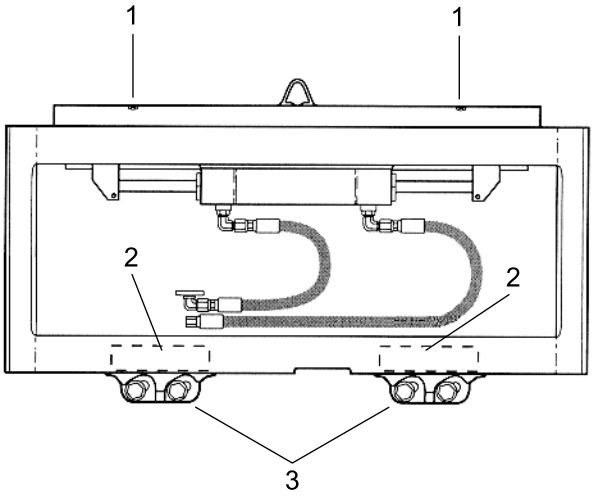
## Sideshifter Inspection

**WARNING**

*After servicing, test sideshifter through 5 complete cycles, first empty, then with a load to ensure proper operation.*

Safe and efficient truck operation is dependent on periodic inspections. When making a routine inspection of the sideshifter, check for the following:

1. Check sideshifter for loose or missing bolts, damaged hoses, hydraulic leaks and worn or missing fork stops.
2. Carefully inspect lower hooks for signs of wear and for proper clearance. Adjust if necessary (see Sideshifter Installation). Tighten lower hook cap screws to 165 Nm (1460 in lb).
3. Tighten backrest cap screws to 195 Nm (1726 in lb).
4. Apply general-purpose lithium-based chassis grease to sideshifter upper and lower bearings to ensure sufficient movement.




(1) Upper Bearing Grease Fittings
(2) Lower Bearing Grease Areas
(3) Lower Mounting Hooks

Figure 16206

5. Inspect upper and lower bearings for signs of wear. Replace the entire bearing set if any bearing is less than 2.5 mm (0.098 in) in thickness due to wear.
6. Inspect forks for damage.

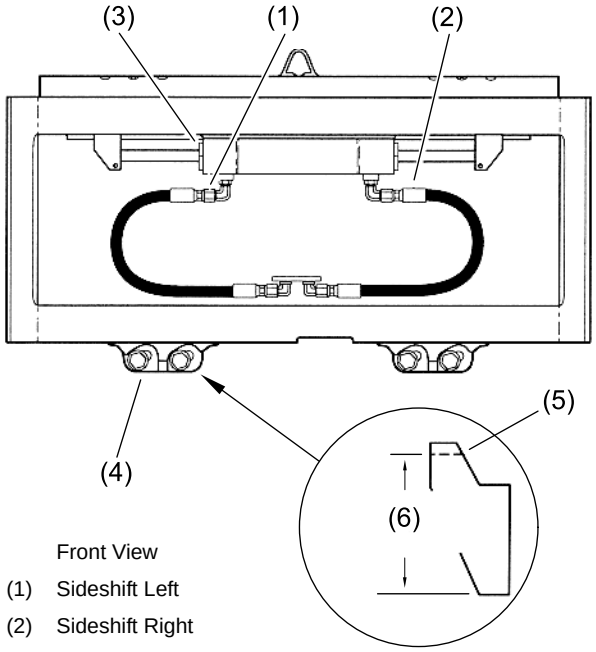
## Sideshifter Removal

1. Carefully remove forks from the sideshifter.
2. Remove the backrest from the sideshifter. For reassembly, tighten the cap screws to 195 Nm (1726 in lb).

**WARNING**

*Avoid high pressure fluids - escaping fluids under pressure can penetrate the skin, causing serious injury. Relieve pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand. Any fluid injected into the skin under high pressure should be considered a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately from a specialist who has experience with this type of injury.*

3. Make sure all hydraulic pressure has been removed from the attachment hydraulic system, and disconnect the hoses from the cylinder. Tagout hoses for reassembly.
4. If servicing the hydraulic cylinder, loosen the seal carriers before removing the sideshifter. For reassembly, tighten seal carriers to 165 Nm (1460 in lb).
5. Remove the lower mounting hooks and inspect for wear. Replace if past wear limit mark (refer to Figure 16964).




Front View

(1) Sideshift Left
(2) Sideshift Right
(3) Seal Carriers
(4) Lower Mounting Hooks
(5) Wear Limit Mark
(6) Minimum 45 mm (1.81 in)

Figure 16964


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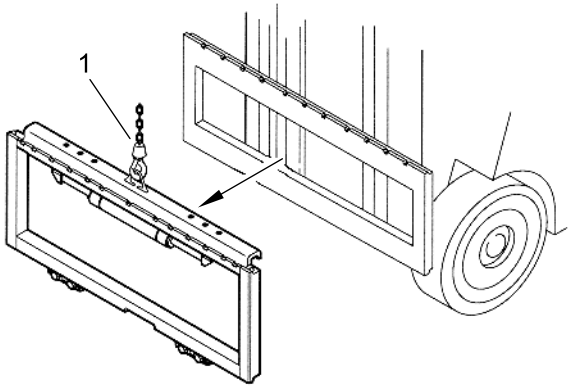
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**WARNING**

*Make sure overhead hoist has a rated capacity of at least 450 kg (1000 lb).*

6. Attach overhead hoist to the top of the sideshifter and lift slowly away from the truck carriage, refer to Figure 16208.




1 450 kg (1000 lb) Capacity Overhead Hoist

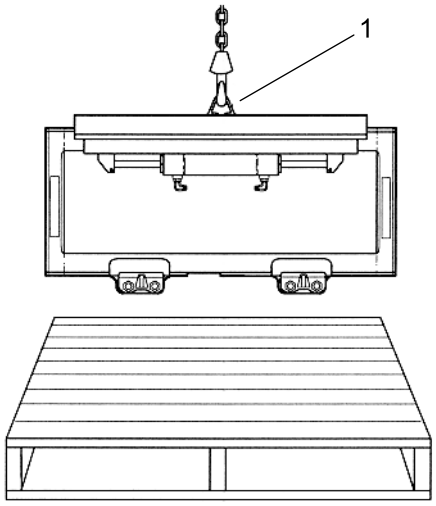
Figure 16208

## Sideshifter Installation

**WARNING**

*Make sure overhead hoist has a rated capacity of at least 450 kg (1000 lb).*

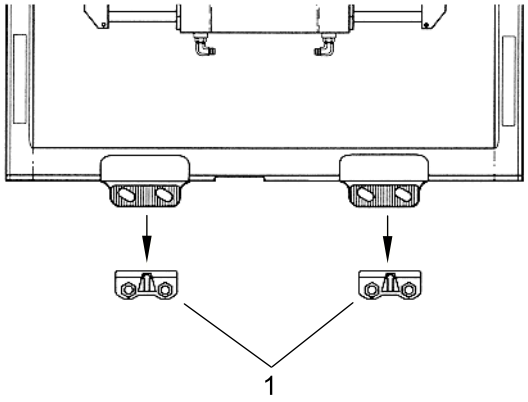
1. Attach overhead hoist to the lifting eye of the sideshifter, refer to Figure 16209.




1 Lifting Eye

Figure 16209

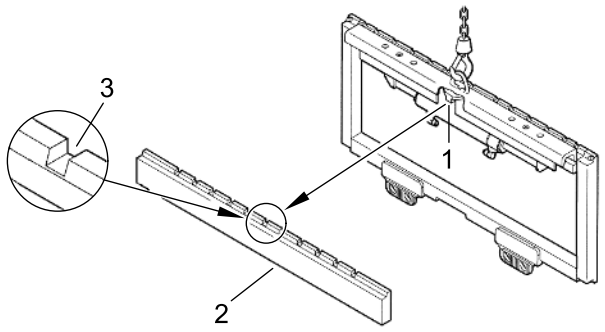
2. Remove bolt-on lower hooks, refer to Figure 16210.




1 Lower Hooks

Figure 16210

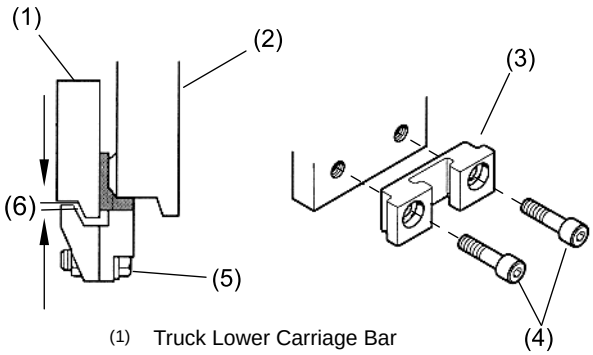
3. Carefully mount sideshifter on truck carriage. Make sure to engage the locator tab on the sideshifter with the center notch on the truck's upper carriage bar. Refer to Figure 16211.




1 Locator Tab
2 Truck Upper Carriage Bar
3 Center Notch

Figure 16211

4. Install lower hooks. Adjust as shown in Figure 16965 to ensure proper operation. Torque nuts and cap screws to 165 Nm (1460 in lb).




(1) Truck Lower Carriage Bar
(2) Sideshifter
(3) Lower Hook
(4) Cap Screws
(5) Nut
(6) Clearance: 0.8 mm (0.031 in) Minimum
1.6 mm (0.063 in) Maximum

Figure 16965

5. Flush supply hoses thoroughly and install them.
6. Install forks (refer to Figure 16213).

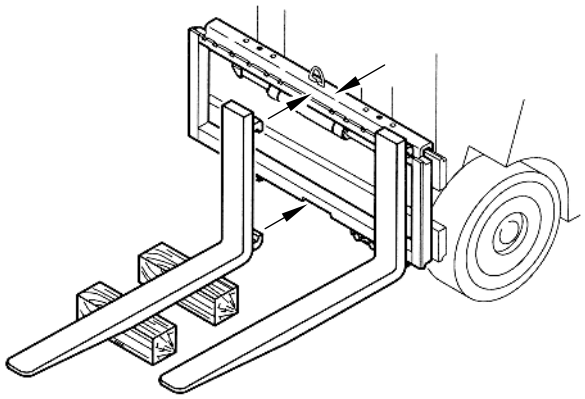
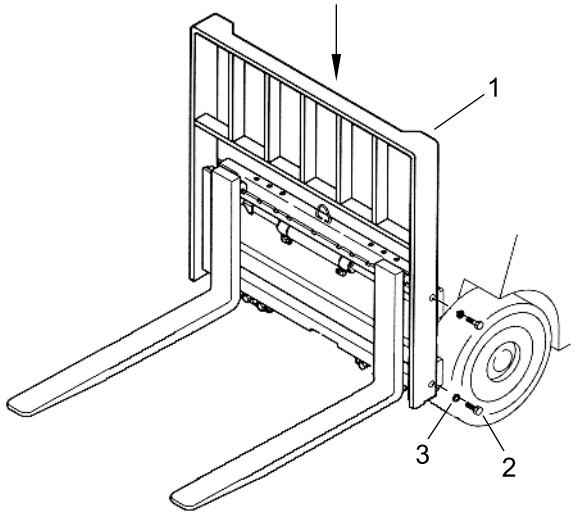


Figure 16213

7. Install backrest, refer to Figure 16214. Tighten screws to 196 Nm (1726 in lb).




1 Backrest
2 Cap Screw
3 Lockwasher

Figure 16214

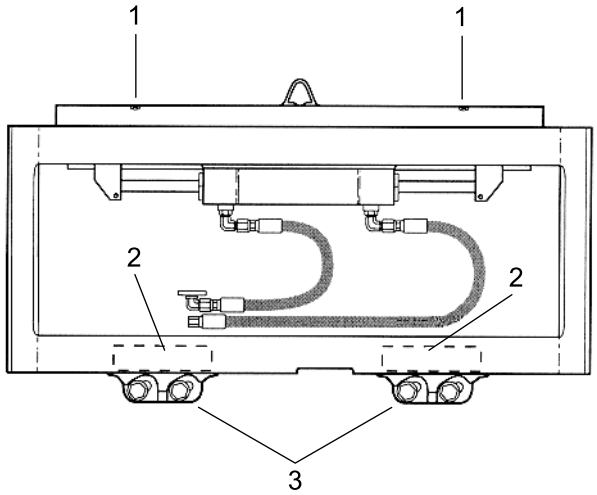
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**NOTE**

*During installation, no lubrication is required for upper bearings.*

8. Lubricate lower bearings using general-purpose, lithium-based chassis grease. Refer to Figure 16206.




(1) Upper Bearing Grease Fittings
(2) Lower Bearing Grease Areas
(3) Lower Mounting Hooks

Figure 16206

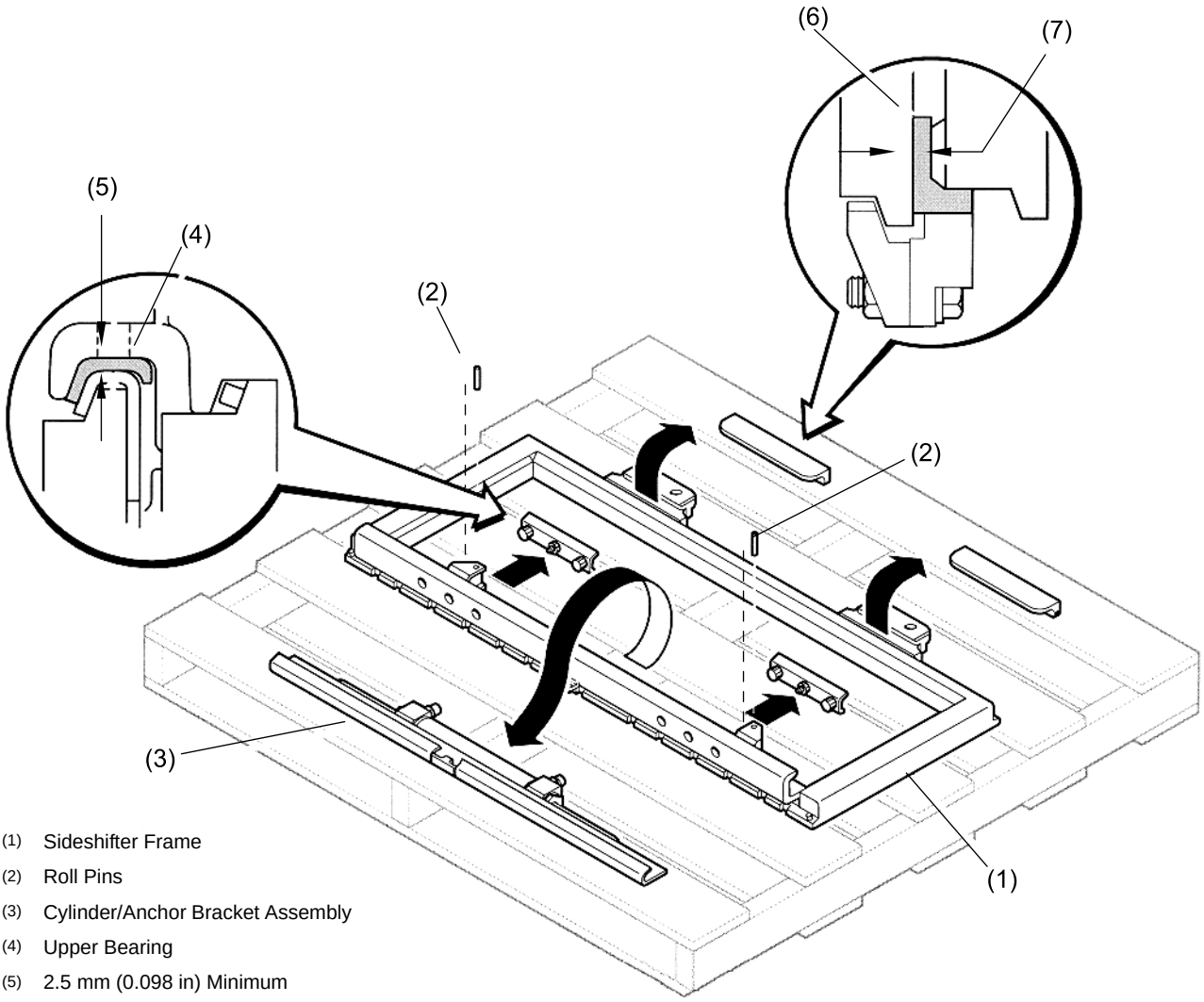
# Bearings

## Bearing Lubrication

Lubricate both the upper and lower sideshifter bearings with chassis grease every 300 hours or 4 weeks of operation, whichever occurs first. If operating in contaminated environments, lubricate every week or as required.

## Bearing Service

1. Carefully remove the sideshifter from the truck as described in Sideshifter Removal and lay flat on a pallet or workbench for servicing.
2. Remove roll pins and the cylinder/anchor bracket assembly from the frame, as shown in Figure 16215.




(1) Sideshifter Frame
(2) Roll Pins
(3) Cylinder/Anchor Bracket Assembly
(4) Upper Bearing
(5) 2.5 mm (0.098 in) Minimum
(6) Lower Bearing
(7) 2.5 mm (0.098 in) Minimum

Figure 16966

### NOTE

*Use a wood block or plastic hammer to seat new upper bearings into frame. Upper bearings must be fully seated into upper frame for ample lower hook clearance.*

3. Remove the upper bearings by prying them carefully out of the frame. If any bearing is worn to less than 2.5 mm (0.098 in) thickness, replace all upper bearings. Refer to Figure 16966.
4. Remove the lower bearings by wedging them from the lower hook mounts. If any bearing is worn to less than 2.5 mm (0.098 in) thickness, replace all lower bearings. Refer to Figure 16966.

### NOTE

*Make sure all items are cleaned thoroughly and free of any dirt, nicks, or scratches prior to reassembly.*

5. For reassembly, reverse the above procedures.

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## Troubleshooting

If the attachment will not sideshift, or sideshifts slowly, there are six potential problems that could be affecting its performance:

1. Insufficient upper bearing lubrication or worn/damaged bearings (see Bearings).
2. Hydraulic pressure/flow from lift truck is inadequate or excessive.
3. Signs of external leaking.
4. Lower mounting hook clearance is inaccurate (see Sideshifter Installation).
5. Cylinder seals are worn/defective (see Sideshifter Cylinder).
6. Cylinder fittings or flow restrictors are plugged, not installed properly, or are the wrong type (see Sideshifter Cylinder).

If problems persist, try the following procedures:

## Supply Circuit Test

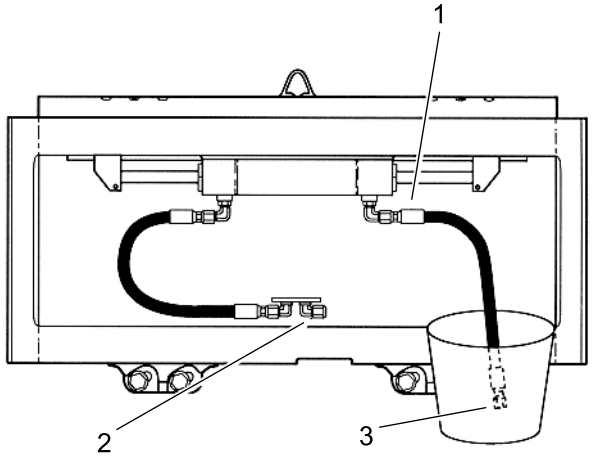
1. Check the supplied pressure at the carriage hose terminals. Recommended pressure is 2300 psi (160 bar), not to exceed 3500 psi (245 bar).
2. Check the flow volume at the carriage hose terminal. Recommended flow is 7.5 l/min (2 gpm), not to exceed 12 l/min (3 gpm), or drop below 4 l/min (1 gpm).
3. Sideshift completely to the left and hold the lever in the "sideshift left" position for a few seconds. Release the lever and inspect fittings, hoses and cylinder rod ends for external leaks.

## Sideshift Circuit Test

**WARNING**

*Avoid high pressure fluids - escaping fluids under pressure can penetrate the skin, causing serious injury. Relieve pressure before disconnecting hydraulic lines. Turn the truck off and move the truck auxiliary control handle multiple times in both directions. Tighten all connections before applying pressure. Keep hands and body away from pin holes which eject fluids under high pressure. Use a piece of cardboard or paper to search for leaks. Do not use your hand.*
*Any fluid injected into the skin under high pressure should be considered a serious medical emergency despite an initial normal appearance of the skin. There is a delayed onset of pain, and serious tissue damage may occur. Medical attention should be sought immediately from a specialist who has experience with this type of injury.*

1. Sideshift all the way to the left. Turn the truck off and relieve pressure from the attachment system. Disconnect the "sideshift right" supply hose from the truck hose terminal and direct hose end to drain bucket. Cap the supply fitting.




1 Sideshift Right Supply Hose
2 Supply Fitting Cap
3 Hose End

Figure 16216

2. Start the truck and actuate the "sideshift left" lever for 5 seconds. If there is substantial hydraulic flow out of the drain hose, the sideshift cylinder is defective and must be replaced. See Sideshifter Cylinder for cylinder replacement procedures. If there is no hydraulic flow, check for plugged flow restrictor washers and fittings, making sure they are also installed correctly. If there are still no signs of hydraulic flow, the problem is not hydraulic.

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# GLOSSARY

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## Notes:

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Components have been listed in chart form to assist the service technician in locating these components on the Electrical Diagrams and Parts Breakdown forms. The chart is in columns: **Component**; **Location**; **Function**; **Diagram**; **Parts Breakdown**. The **Component** column contains the abbreviation of the component as it appears on the Diagrams in the Maintenance Section. The **Location** column gives the general location on the truck such as on platform or in power unit. The **Function** column then explains the function or circuit of that device. The **Diagram** column gives the page number of the diagram on which the component can be found. The callout in parenthesis following the page number corresponds to the grid callouts on that diagram, locating that component. The **Parts Breakdown** column includes the parts breakdown page number on which the component is located along with the index number, in parenthesis, if applicable.

| ***AUDIBLE INDICATORS*** | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| ALM1 | Distribution Panel | Status Alarm | DIA-1055-004 (B-2) | 04.0-1055-005 (40) |
| ALM2 | Power Unit - Chassis | Travel Alarm | DIA-1055-009 (B-4)<br>DIA-1055-010 (B-4) | |
| HN1 | Power Unit Front - LH | Truck Horn | DIA-1055-008 (B-4) | 04.0-1055-005 (44) |
| ***BATTERY*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| Battery | Power Unit Battery Compartment | Power Supply | DIA-1055-016 (A-1)<br>DIA-1055-017 (A-1) | 01.2-1055-001 |
| ***CONNECTIONS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| CA201 | Distribution Panel | Access 1 and 3 I/O | DIA-1055-004 (B-2)<br>DIA-1055-018 (B-1) | 04.8-1055-001 |
| CA202 | Distribution Panel | CAN Communication | DIA-1055-004 (B-2) | 04.8-1055-001 |
| CA203 | Distribution Panel | BV (FU3) | DIA-1055-004 (B-2) | 04.8-1055-001 |
| CA204 | Distribution Panel | B-, Accessory | DIA-1055-004 (B-3) | 04.8-1055-001 |
| CA205 | Distribution Panel | Truck I/O, KYS | DIA-1055-004 (B-4) | 04.8-1055-001 |
| CA206 | Distribution Panel | Sensor I/O | DIA-1055-004 (B-3) | 04.8-1055-001 |
| CA207 | Distribution Panel | Truck I/O | DIA-1055-004 (B-2) | 04.8-1055-001 |
| CA210 | Bottom Center Power Unit Front | BRK1, BRK2 | DIA-1055-011 (C-3) | 04.8-1055-001 |
| CA211 | Near Contactor Panel | Drive/Tow | DIA-1055-011 (B-4) | 04.8-1055-001 |
| CA212 | Overhead Guard | LGT3 (Strobe) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA215 | Access 1 | Display | DIA-1055-005 | 04.8-1055-001 |
| CA220 | Below Multi-Task Handle | POT1, POT2, POT3, HNS | DIA-1055-006 (B-1) | 04.6-1055-001 (7)<br>04.8-1055-001 |
| CA221 | Below Multi-Task Handle | Optical Switch Board, FS, RS, TDS, TBS, SSS, ORS | DIA-1055-006 (B-3)<br>DIA-1055-018 (A-4, B-4) | 04.6-1055-001 (5)<br>04.8-1055-001 |
| CA225 | Access 1 | Key Switch | DIA-1055-012 (B-1)<br>DIA-1055-018 (B-2) | 04.8-1055-001 |

| CONNECTIONS (Continued) | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| CA230 | Access 7 | Solenoid Valves | DIA-1055-007 (B-3)<br>DIA-1055-018 (B-3) | 04.8-1055-001 |
| CA231 | Access 7 | BV, B-, CAN Communication, Multi-Task Handle | DIA-1055-007 (B-2) | 04.8-1055-001 |
| CA232 | Access 7 | Multi-Task Handle, Load Sense | DIA-1055-007 (B-2) | 04.8-1055-001 |
| CA401 | Access 3 | CAN Communication | DIA-1055-008 (B-1) | 04.8-1055-001 |
| CA402 | Access 3 | CAN Communication | DIA-1055-008 (B-1)<br>DIA-1055-018 (C-2) | 04.8-1055-001 |
| CA403 | Access 3 | Traction Control I/O | DIA-1055-008 (C-1, C-2, C-3, C-4) | 04.8-1055-001 |
| CA405 | Access 2 (AC)<br>Access 2 (DC) | N/A<br>Hydraulics/Main Plug | DIA-1055-009 (C-1)<br>DIA-1055-010 (C-2, C-3, C-4) | 04.8-1055-001 |
| CA406 | Access 2 (AC) | CAN Communication/ Access 2 | DIA-1055-009 (C-2) | 04.8-1055-001 |
| CA407 | Access 2 (AC) | Encoder I/O | DIA-1055-009 (C-2) | 04.8-1055-001 |
| CA408 | Access 2 (AC) | Switch/Pot Input/Truck Input | DIA-1055-009 (C-3) | 04.8-1055-001 |
| CA409 | Access 2 (AC) | Sensor I/O, P Output | DIA-1055-009 (C-4) | 04.8-1055-001 |
| CA410 | Near Access 2 (AC)<br>Near Access 2 (DC) | CAN Communication/ Access 2/Encoder I/O, Switch/Pot Input/Truck I<br>Hydraulics/Main Plug | DIA-1055-009 (B-2)<br>DIA-1055-010 (B-2) | 04.8-1055-001 |
| CA411 | Near Access 2 (AC)<br>Near Access 2 (DC) | Switch/Pot Input/Truck Input, Sensor I/O, P Output, Hydraulics/Main Plug | DIA-1055-009 (B-3, B-4)<br>DIA-1055-010 (B-3, B-4) | 04.8-1055-001 |
| CA415 | Power Unit Top | Work Light | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA416 | Power Unit Top | Dome Light | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA417 | Power Unit Top | Operator Fan | DIA-1055-012 (B-4) | 04.8-1055-001 |
| CA418 | Power Unit Top | Accessory Cable | DIA-1055-012 (B-4) | 04.8-1055-001 |
| CA420 | Pump Motor (M3) | ECR4, TS3 | DIA-1055-011 (B-1) | 04.8-1055-001 |
| CA421 | Hydraulics | Tilt RPS2 | DIA-1055-014 (B-1) | 04.8-1055-001 |
| CA425 | Traction Motor M2 LH | ECR2, TS2 | DIA-1055-011 (B-2) | 04.8-1055-001 |
| CA426 | Traction Motor M1 RH | ECR1, TS1 | DIA-1055-011 (B-2) | 04.8-1055-001 |
| CA428 | Bottom Power Unit Front Left (Cubbie) | BRESL | DIA-1055-011 (C-3) | 04.8-1055-001 |

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***CONNECTIONS (Continued)***

| | Location | Function | Diagram | Parts Breakdown |
|---|---|---|---|---|
| CA429 | Bottom Power Unit Front Right (Cubbie) | BRESR | DIA-1055-011 (C-3) | 04.8-1055-001 |
| CA435 | Front Power Unit Bottom Center - Left | Park Brake BRK2 | DIA-1055-011 (B-3) | 04.8-1055-001 |
| CA436 | Front Power Unit Bottom Center - Right | Park Brake BRK1 | DIA-1055-011 (B-4) | 04.8-1055-001 |
| CA601 | Floorboard/Steer Motor | STR/POT4 | DIA-1055-013 (B-1, C-1) | 04.8-1055-001 |
| CA602 | Counterweight/Steer Tiller | ECR3 | DIA-1055-013 (B-2) | 04.8-1055-001 |
| CA605 | Floorboard | RPS1, BRKS, DMS1, DMS2, DMS3 | DIA-1055-013 (B-3) | 01.0-1055-102 (21)<br>01.0-1055-152 (21)<br>04.8-1055-001 |
| CA606 | Floorboard | RPS1 | DIA-1055-013 (C-3) | 04.8-1055-001 |
| CA607 | Floorboard | DMS1, DMS2, DMS3 | DIA-1055-013 (C-3) | 04.8-1055-001 |
| CA608 | Floorboard | ENSL, ENSR | DIA-1055-013 (B-4) | 04.8-1055-001 |
| CA610 | Manifold | Solenoid Valves | DIA-1055-014 (B-1, B-2) | 04.8-1055-001 |
| CA611 | Hydraulics | PT1 (Load Sense) | DIA-1055-014 (B-2) | 04.8-1055-001 |
| CA612 | Bottom Manifold | PT1 (Load Sense) | DIA-1055-014 (B-2) | 04.8-1055-001 |
| CA613 | Hydraulics | HGTS1 | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA614 | Mast | HGTS1 | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA617 | Hydraulics | HGTS2, HGTS3, HGTS4 | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA618 | Mast | HGTS2, HGTS3, HGTS4 | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA621 | Hydraulics | ECR5 Height Sense | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA622 | Hydraulics | ECR5 Height Sense | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA625 | Near Hydraulic Reservoir | PRVA Pressure Regulator | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA627 | Hydraulics | SVA3 Accessory 3 | DIA-1055-014 (B-3) | 04.8-1055-001 |
| CA629 | Near Hydraulic Reservoir | LMS1 (Lower), LMS2, (Height), LMS3, (Height2), CHS (Chain Slack) | DIA-1055-014 (B-4) | 04.8-1055-001 |
| CA807 | F/C Distribution Panel | RES1, RES2, RES3, RES4, THS1, THS2 | DIA-1055-015 (B-1, B-2) | 04.8-1055-001 |
| CA808 | F/C Distribution Panel | BV, B-, +BV (K24) | DIA-1055-015 (A-1) | 04.8-1055-001 |
| CA814 | F/C Distribution Panel | RES2, RES3, RES4, RES5, RES6, RES7 | DIA-1055-015 (B-1, B-2) | 04.8-1055-001 |

| ***CONNECTIONS (Continued)*** | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| CA816 | Overhead Guard/Work Assist | LGT1 (LH) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA817 | Overhead Guard/Work Assist | LGT1 (LH) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA818 | Overhead Guard/Work Assist | LGT2 (RH) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA819 | Overhead Guard/Work Assist | LGT2 (RH) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA820 | Overhead Guard | LGT3 (Strobe) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA821 | Overhead Guard | LGT3 (Strobe) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA822 | Overhead Guard | LGT4 (Dome) | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA824 | FAN1 | Diode Assembly | DIA-1055-012 (B-4) | 04.8-1055-001 |
| CA825 | FAN1 | Diode Assembly | DIA-1055-012 (B-4) | 04.8-1055-001 |
| CA826 | FAN1 | Diode Assembly | DIA-1055-012 (B-4) | 04.8-1055-001 |
| CA827 | FAN1 | Diode Assembly | DIA-1055-012 (B-3) | 04.8-1055-001 |
| CA828 | FAN1 | Low Speed | DIA-1055-012 (C-3) | 04.8-1055-001 |
| CA829 | FAN1 | High Speed | DIA-1055-012 (C-4) | 04.8-1055-001 |
| ***CONTACTORS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| L | Contactor Panel | Switch Power to Access 3 | DIA-1055-008 (B-4)<br>DIA-1055-016 (B-1)<br>DIA-1055-017 (B-1) | 04.1-1055-001 (9)<br>04.1-1055-050 (2)<br>04.4-1145-001 |
| P | Contactor Panel | Switch Power to Access 2 | DIA-1055-009 (B-3)<br>DIA-1055-010 (B-3)<br>DIA-1055-016 (B-1)<br>DIA-1055-017 (B-1) | 04.1-1055-001 (9)<br>04.1-1055-050 (2)<br>04.4-1145-001 |
| ***ENCODERS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| ECR1 | Traction Motor M1-AC<br>Traction Motor M1-EE | Speed/Direction to Access 3 | DIA-1055-011 (C-2) | 03.1-1055-001 (5)<br>03.1-1055-050 (6) |
| ECR2 | Traction Motor M2-AC<br>Traction Motor M2-EE | Speed/Direction to Access 3 | DIA-1055-011 (C-2) | 03.1-1055-001 (5)<br>03.1-1055-050 (6) |
| ECR3 | Steer Tiller | Steering Command to Access 7 | DIA-1055-013 (B-2) | 06.0-1055-001 (8) |
| ECR4 | Pump Motor | Motor Speed Sensor | DIA-1055-011 (C-1) | 02.2-1055-001 (4)<br>02.2-1055-050 (3)<br>02.2-1055-100 (4) |

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| *FUSES* | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| FU1 | Contactor Panel<br>Contactor Panel - EE | Traction | DIA-1055-016 (C-1)<br>DIA-1055-017 (C-1) | 04.1-1055-001 (10)<br>04.2-1055-052 (43) |
| FU2 | Contactor Panel<br>Contactor Panel - EE | Hydraulics | DIA-1055-016 (C-1)<br>DIA-1055-017 (C-1) | 04.1-1055-001 (11)<br>04.2-1055-052 (41) |
| FU3 | Distribution Panel<br>Distribution Panel - EE | Main Power | DIA-1055-004 (B-2) | 04.3-1055-001 (5)<br>04.3-1055-100 (5) |
| FU4 | Distribution Panel<br>Distribution Panel - EE | Options/Tow | DIA-1055-004 (B-3) | 04.3-1055-001 (5)<br>04.3-1055-100 (5) |
| FU5 | Distribution Panel - EE | Access2 and 3 | DIA-1055-004 (B-3)<br>DIA-1055-015 (A-3) | 04.3-1055-100 (4) |
| FU13 | F/C Distribution Panel | Freezer/Corrosion | DIA-1055-015 (B-1)<br>DIA-1055-015 (A-3) | 04.3-1055-050 (2) |
| FU14 | F/C Distribution Panel | Freezer/Corrosion | DIA-1055-015 (B-2)<br>DIA-1055-015 (A-3) | 04.3-1055-050 (2) |
| *LIGHTS* | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| LGT1 | Overhead Guard<br>TT Mast<br>Quad Mast | Left Work Light | DIA-1055-012 (C-3) | 04.9-1055-050 (8)<br>04.9-1055-100 (8)<br>04.9-1055-125 (10) |
| LGT2 | Overhead Guard<br>TT Mast<br>Quad Mast | Right Work Light | DIA-1055-012 (C-3) | 04.9-1055-050 (8)<br>04.9-1055-100 (8)<br>04.9-1055-125 (10) |
| LGT3 | Overhead Guard | Strobe Light | DIA-1055-012 (C-3) | 04.9-1055-001 (7) |
| LGT4 | Work Assist | Dome Light | DIA-1055-012 (C-3) | 10.0-1055-050 (1) |
| *MISCELLANEOUS* | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| BRK1 | Traction Motor M1 RH | Park Brake (2/3 of Force) | DIA-1055-011 (C-3) | 05.3-1055-001 (2) |
| BRK2 | Traction Motor M2 LH | Park Brake (1/3 of Force) | DIA-1055-011 (C-3) | 05.3-1055-001 (1) |
| FAN1 | OHG/Work Assist | Operator Fan | DIA-1055-012 (C-3) | 10.0-1055-050 (17) |
| FAN2 | Power Unit Left | Access 2 and 3 Cooling | DIA-1055-008 (B-4) | 04.0-1055-005 (49) |
| PT1 | Manifold Bottom | Load Sense (Forks) | DIA-1055-014 (C-2) | |
| RPS1 | Floorboard | Input to Access 3 - Braking | DIA-1055-013 (C-3) | 01.0-1055-102 (48)<br>01.0-1055-152 (48) |
| RPS2 | Front Power Unit (near tilt cylinder) | Input to Access 7 - Tilt Cylinder Position | DIA-1055-014 (B-1) | 04.8-1055-100 (10) |
| TR1 | Distribution Panel | Start Position Inrush - Access 2 and 3 | DIA-1055-004 (B-3) | |
| TR2 | Distribution Panel | IGN Position Inrush - Access 1 | DIA-1055-004 (B-3) | |

| *MISCELLANEOUS (Continued)* | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| TS1 | Traction Motor M1 RH | Motor Temperature Sensor | DIA-1055-011 (C-2) | |
| TS2 | Traction Motor M2 LH | Motor Temperature Sensor | DIA-1055-011 (C-2) | |
| TS3 | Pump Motor (M3) | Motor Temperature Sensor | DIA-1055-011 (C-1) | |
| ***MOTORS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| RH Traction (M1) | Power Unit - Right Hand | Travel/Regen Braking | DIA-1055-011 (C-2)<br>DIA-1055-016 (B-3)<br>DIA-1055-017 (B-3) | 03.1-1055-001<br>03.1-1055-050<br>04.0-1055-005<br>05.3-1055-001 |
| LH Traction (M2) | Power Unit - Left Hand | Travel/Regen Braking | DIA-1055-011 (C-2)<br>DIA-1055-016 (B-3)<br>DIA-1055-017 (B-3) | 03.1-1055-001<br>03.1-1055-050<br>04.0-1055-005<br>05.3-1055-001 |
| Pump (M3) | Power Unit | Lift | DIA-1055-011 (C-1)<br>DIA-1055-016 (B-3)<br>DIA-1055-017 (B-3) | 02.1-1055-001 (1)<br>02.2-1055-001<br>02.2-1055-050<br>02.2-1055-100<br>04.0-1055-007 |
| Steering | Floorboard | Power Steering | DIA-1055-013 (B-2, C-2) | 06.0-1055-050<br>06.2-1452-001 |
| ***POTENTIOMETERS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| POT1 | Multi-Task Handle | Traction | DIA-1055-006 (B-1)<br>DIA-1055-015 (C-1) | 04.6-1055-001 (2) |
| POT2 | Multi-Task Handle | Raise/Lower | DIA-1055-006 (B-2)<br>DIA-1055-015 (C-2) | 04.6-1055-001 (4) |
| POT3 | Multi-Task Handle | Side Shift | DIA-1055-006 (B-2)<br>DIA-1055-015 (C-2) | 04.6-1055-001 (15) |
| POT4 | Steer Motor | Access 3 Input - Steering Feedback | DIA-1055-013 (B-2, C-2) | 06.0-1055-050 (5) |
| ***RELAYS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| K1 | Distribution Panel<br>Distribution Panel - EE | Power Up/Down | DIA-1055-004 (B-3) | 04.3-1055-001 (6)<br>04.3-1055-100 (3) |
| K2 | Distribution Panel<br>Distribution Panel - EE | Option Power | DIA-1055-004 (B-3) | 04.3-1055-001 (7)<br>04.3-1055-100 (2) |
| K11 | Power Unit Top | THS 1 & 2 Power | DIA-1055-015 (B-2, B-4) | 04.3-1055-050 (3) |
| K12 | Power Unit Top | RES 1,2 3, 4, 5, 6 & 7 Power | DIA-1055-015 (B-2, B-4) | 04.3-1055-050 (4)<br>04.0-1055-001 |

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| ***RESISTORS*** | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| RES1 | Multi-Task Handle | Freezer/Corrosion | DIA-1055-015 (B-1, B-3) | 04.6-1055-003 (41) |
| RES2 | Multi-Task Handle | Freezer/Corrosion | DIA-1055-015 (C-1, B-3) | 04.6-1055-003 (55) |
| RES3 | Multi-Task Handle | Freezer/Corrosion | DIA-1055-015 (C-2, B-3) | 04.6-1055-003 (55) |
| RES4 | Multi-Task Handle | Freezer/Corrosion | DIA-1055-015 (C-2, B-3) | 04.6-1055-003 (55) |
| RES5 | Multi-Task Handle | Freezer/Corrosion/POT 1 | DIA-1055-015 (C-1, B-3) | |
| RES6 | Multi-Task Handle | Freezer/Corrosion/POT 2 | DIA-1055-015 (C-2, B-3) | |
| RES7 | Multi-Task Handle | Freezer/Corrosion/POT 3 | DIA-1055-015 (C-2, B-3) | |
| RES8 | Between CA416 and CA822 | LGT4 (Dome) | DIA-1055-012 (B-3) | |
| ***SOLENOID VALVES*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| CBVE | Manifold | Counterbalance Extend | HYD-1055-001 | 02.4-1055-052 (27)<br>02.4-1055-152 (27) |
| CBVR | Manifold | Counterbalance Retract | HYD-1055-001 | 02.4-1055-052 (28)<br>02.4-1055-152 (28) |
| CVR | Manifold | Check Lower | HYD-1055-001 | 02.4-1055-052 (23)<br>02.4-1055-152 (23) |
| LCV | Manifold | Compensated Flow Regulator Lower | HYD-1055-001 | 02.4-1055-052 (25)<br>02.4-1055-152 (25) |
| PCA | Manifold | Pressure Compensator | HYD-1055-001 | 02.4-1055-052 (31)<br>02.4-1055-152 (32) |
| PRVA | Mast | Clamp Pressure Regulator | DIA-1055-014 (C-3)<br>HYD-1055-001 | |
| RVA | Manifold | Relief Valve Accessory | HYD-1055-001 | 02.4-1055-052 (29)<br>02.4-1055-152 (30) |
| RVM | Manifold | Relief Valve Mast | HYD-1055-001 | 02.4-1055-052 (21)<br>02.4-1055-152 (21) |
| SPA | Manifold | Auxiliary | DIA-1055-014 (C-2)<br>HYD-1055-001 | 02.4-1055-052 (22)<br>02.4-1055-152 (22) |
| SPL | Manifold | Load Lowering | DIA-1055-014 (C-1)<br>HYD-1055-001 | 02.4-1055-052 (26)<br>02.4-1055-152 (26) |
| SVA1 (SVA1A/ SVA1B) | Manifold | First Accessory | DIA-1055-014 (C-2)<br>HYD-1055-001 | 02.4-1055-052 (20)<br>02.4-1055-152 (20) |

| ***SOLENOID VALVES (Continued)*** | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| SVA2 (SVA2A/ SVA2B) | Manifold | Second Accessory | DIA-1055-014 (C-2) | 02.4-1055-152 (20) |
| SVBy | Manifold | Bypass | DIA-1055-014 (B-2) | 02.4-1055-052 (30)<br>02.4-1055-152 (31) |
| SVH | Manifold | Raise/Lower | DIA-1055-014 (B-2) | 02.4-1055-052 (24)<br>02.4-1055-152 (24) |
| SVT (SVTR/ SVTE) | Manifold | Tilt Retract/Extend | DIA-1055-014 (B-1, B-2) | 02.4-1055-052 (20)<br>02.4-1055-152 (29) |
| ***SUPPRESSOR BLOCKS*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| SVA3 | Attachment | Fifth Function | DIA-1055-014 (C-3) | |
| ***SWITCHES*** | | | | |
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| BRESR | Battery Retainer | Battery Restraint | DIA-1055-011 (C-3) | 01.2-1055-001 (3)<br>04.8-1055-025 |
| BRESL | Battery Retainer | Battery Restraint | DIA-1055-011 (C-3) | 01.2-1055-001 (3)<br>04.8-1055-025 |
| BRKS | Floorboard | RPS1 | DIA-1055-013 (B-3) | 01.0-1055-102 (21)<br>01.0-1055-152 (21) |
| DLS | Power Unit Top | Dome Light On/Off | DIA-1055-012 (B-2) | 04.0-1055-001 (11) |
| DMS1, DMS2 and DMS3 | Floorboard | Foot Presence | DIA-1055-013 (C-3) | 01.0-1055-102 (30)<br>01.0-1055-152 (30) |
| EDS | Power Unit Top | Emergency Disconnect Removes Power to Truck | DIA-1055-012 (B-1) | 04.6-1055-003 (37) |
| ENSL | Entry Bar | Entry Switch Left | DIA-1055-013 (B-3) | 01.0-1055-200 (6) |
| ENSR | Entry Bar | Entry Switch Right | DIA-1055-013 (B-4) | 01.0-1055-200 (6) |
| FNS | Power Unit Top | Operator Fan On/Off | DIA-1055-012 (B-2) | 04.0-1055-001 (11) |
| FS | Multi-Task Handle | Forward Travel | DIA-1055-006 (C-3)<br>DIA-1055-018 (C-4) | 04.6-1055-001 (5) |
| HGTS1 | Mast - TT<br>Mast - Quad | Free Lift Switch | DIA-1055-014 (C-2) | 07.2-1055-003 (41)<br>07.24-1055-102 (37) |
| HGTS2 | Mast - TT<br>Mast - Quad | Lift Switch W/10$^{o}$ Forward Tilt | DIA-1055-014 (C-3) | 07.2-1055-001 (23)<br>07.24-1055-100 (22) |

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| *SWITCHES (Continued)* | | | | |
|---|---|---|---|---|
| | **Location** | **Function** | **Diagram** | **Parts Breakdown** |
| HGTS3 | Mast - TT<br>Mast - Quad | Lift Switch W/10º Forward Tilt | DIA-1055-014 (C-3) | 07.2-1055-001 (23)<br>07.24-1055-100 (22) |
| HGTS4 | Mast - TT | Lift Switch W/10º Forward Tilt | DIA-1055-014 (C-3) | 07.2-1055-001 (23) |
| HNS | Multi-Task Handle | Horn | DIA-1055-006 (B-2) | 04.6-1055-001 (7) |
| KYS | Display | Power Up/Down | DIA-1055-012 (B-1)<br>DIA-1055-018 (B-1) | 04.8-1055-250 (3)<br>04.8-1055-250 (4) |
| LGTS1 | Power Unit Top | Work Lights On/Off | DIA-1055-012 (B-2) | 04.0-1055-001 (11) |
| ORS | Power Unit Top | Override Switch | DIA-1055-012 (B-2) | 04.0-1055-001 (11) |
| RS | Multi-Task Handle | Reverse Travel | DIA-1055-006 (C-3)<br>DIA-1055-018 (C-4) | 04.6-1055-001 (5) |
| SSS | Multi-Task Handle | Sequence Select | DIA-1055-006 (B-3)<br>DIA-1055-018 (B-4) | 04.6-1055-001 (7) |
| TBS | Multi-Task Handle | Tilt Back | DIA-1055-006 (B-3)<br>DIA-1055-018 (B-4) | 04.6-1055-001 (7) |
| TDS | Multi-Task Handle | Tilt Down | DIA-1055-006 (B-3)<br>DIA-1055-018 (B-4) | 04.6-1055-001 (7) |
| THS1 | Near HN1 - Power Unit Front Wall | F/C Thermostat | DIA-1055-015 (B-2)<br>DIA-1055-015 (B-3) | 04.0-1055-005 (57) |
| THS2 | Near EDS - Power Unit Top | F/C Thermostat | DIA-1055-015 (B-2)<br>DIA-1055-015 (B-4) | 04.6-1055-003 (43) |

| *SYSTEM/MODULES* | | | |
|---|---|---|---|
| | **Location** | **Diagram** | **Parts Breakdown** |
| Access 1 - Display Control Module | Power Unit Top Center | DIA-1055-005 (C-1, C-2, C-3) | 04.8-1055-250 (1) |
| Access 2 - Hydraulic Control Module AC | Power Unit Front Wall | DIA-1055-016 (B-2)<br>DIA-1055-009 (C-1, C-2, C-3, C-4) | 04.0-1055-001 (2) |
| Access 2 (HCM) DC | | DIA-1055-017 (B-2)<br>DIA-1055-010 (C-1, C-2, C-3, C-4) | |
| Access 3 - Traction Control Module | Power Unit Front Wall | DIA-1055-016 (B-2)<br>DIA-1055-017 (B-2)<br>DIA-1055-008 (C-1, C-2, C-3, C-4) | 04.0-1055-001 (3) |
| Access 7 - Accessory Control Module | Power Unit Front Wall | DIA-1055-007 (B-1, B-2, B-3)<br>DIA-1055-018 (B-3) | 04.0-1055-003 (21) |

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## Notes:

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# WIRING DIAGRAMS

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## Notes:

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# Introduction to Diagram Usage

## Schematic

- Power up diagram. Illustrates the circuitry involved in getting the truck system to an operating mode (e.g. interlock switches, relays, SCR systems etc.).
- Circuitry which stands alone and is separate from truck operation is shown in block form with the pictorials detailing the circuitry (e.g. light package, displays, wire guidance, freezer condition).

## Pictorials

- Terminal board and connector numbering on the pictorials are in two classes; power unit and platform. Power unit TB's and CA's are even 100's (200, 400, 600 etc.) and platform TB's and CA's are odd 100's (100, 300, 500 etc.). On manup trucks (SP, TS, TSP etc.), odd and even 100's will be present on the wiring diagrams. Man-down trucks, which don't have a platform (stand-up rider, pallet etc.), only even 100's will be present.
- Wiring starts at a central location (e.g. distribution board) and wiring connection points are numbered with the lowest number odd or even. The next wiring connection point from the distribution board are then numbered with the next group of 100's and so on for each connection point removed from the central location.
- Terminal board and connector numbering is sequential on each consecutive page. In this way a wiring address giving a connector number or terminal board number will indicate which direction to look in the diagrams for the other end of the wire. When wiring goes to a component and not a terminal board or connector, a reference terminal board is used and is shown with a dashed line box with the reference terminal board number in parenthesis. This terminal board will not appear on the truck and only present as a wiring directory.
- Input/Output arrows may appear at terminal boards and connectors. These indicate whether what the wire is carrying is incoming or outgoing. This is helpful when tracing the origin of the signal or voltage.
- The truck has been sectioned with one page covering each section. When options affect the wiring in a section, an additional page is added which duplicates wiring that is identical and adds the option wiring. In this way only one page of the truck section is required for the applicable truck configuration.
- Wiring that is identified by color rather than number will typically be a cable or wires with vendor componentry.
- Page titles, listed at the beginning of the electrical diagrams, indicate the subsystem or section of truck wiring that is covered by each page.

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## Notes:

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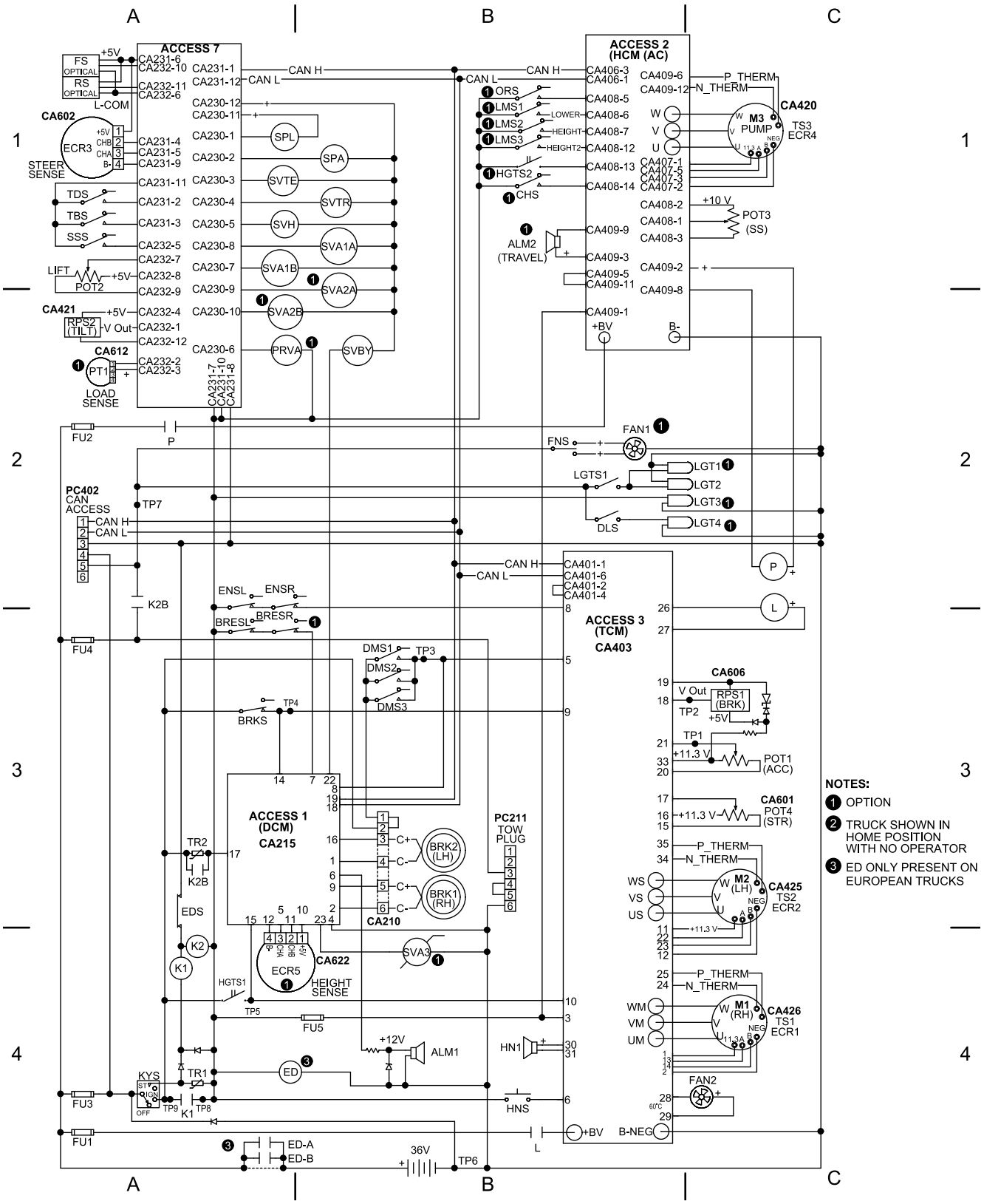


This electrical diagram index lists wiring diagrams with the area or component(s) of the truck covered by each diagram. Exceptions indicated are listed below.


| Title | Page Number | Revision |
|---|---|---|
| Schematic – With AC Lift | DIA–1055–002 | 02 - 4/09 |
| Schematic – With DC LIft | DIA–1055–003 | 02 - 4/09 |
| Distribution Panel | DIA–1055–004 | 02 - 4/09 |
| Display Module (Access 1) | DIA–1055–005 | |
| Multi-Task Handle | DIA–1055–006 | |
| Accessory Control Module | DIA–1055–007 | 01 - 7/08 |
| Traction Control Module | DIA–1055–008 | 02 - 4/09 |
| Hydraulic Control Module – AC Lift | DIA–1055–009 | 01 - 4/09 |
| Hydraulic Control Module – DC Lift | DIA–1055–010 | |
| Motors And Brakes | DIA–1055–011 | 01 - 12/09 |
| Console And Overhead Guard | DIA–1055–012 | 01 - 7/08 |
| Floorboard | DIA–1055–013 | |
| Hydraulics, Height And Load Sense | DIA–1055–014 | 01 - 7/08 |
| Freezer Condition | DIA–1055–015 | |
| Power Cable – AC Lift (ANSI Trucks) | DIA–1055–016 | 02 - 4/09 |
| Power Cable – AC Lift w/Rapid Charge | DIA–1055–017 | 02 - 4/09 |
| Power Cable – AC Lift (Euro Trucks) | DIA–1055–018 | 02 - 4/09 |
| Power Cable – DC Lift (ANSI Trucks) | DIA–1055–019 | 02 - 4/09 |
| Power Cable – DC Lift w/Rapid Charge | DIA–1055–020 | 02 - 4/09 |
| Power Cable – DC Lift (Euro Trucks) | DIA–1055–021 | 02 - 4/09 |
| InfoLink | DIA–1055–022 | 02 - 4/09 |
| Wire Harnesses | DIA–1055–023 | 02 - 7/08 |

# WIRING DIAGRAMS

## Electrical Schematic - AC Lift



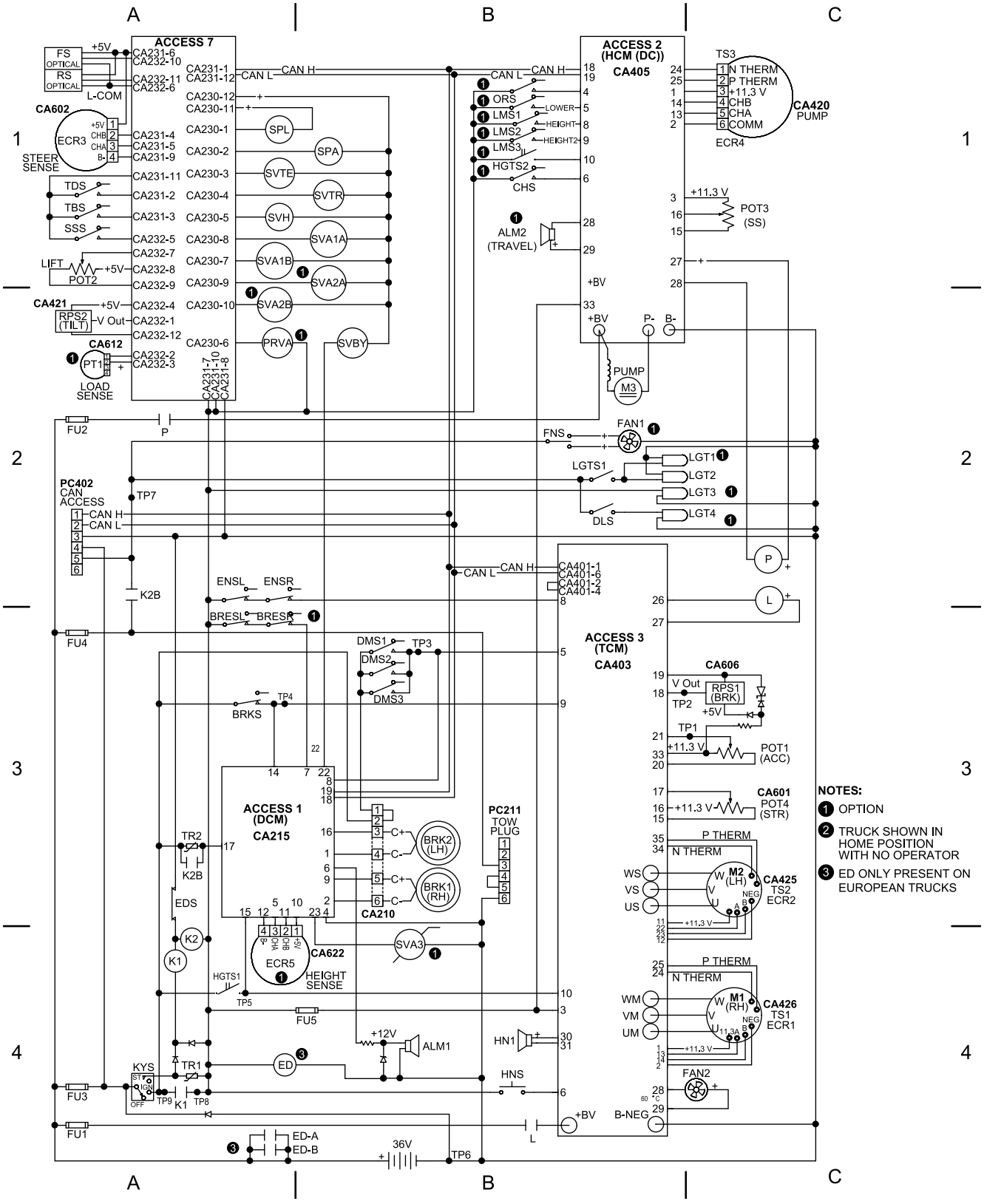

138542 C



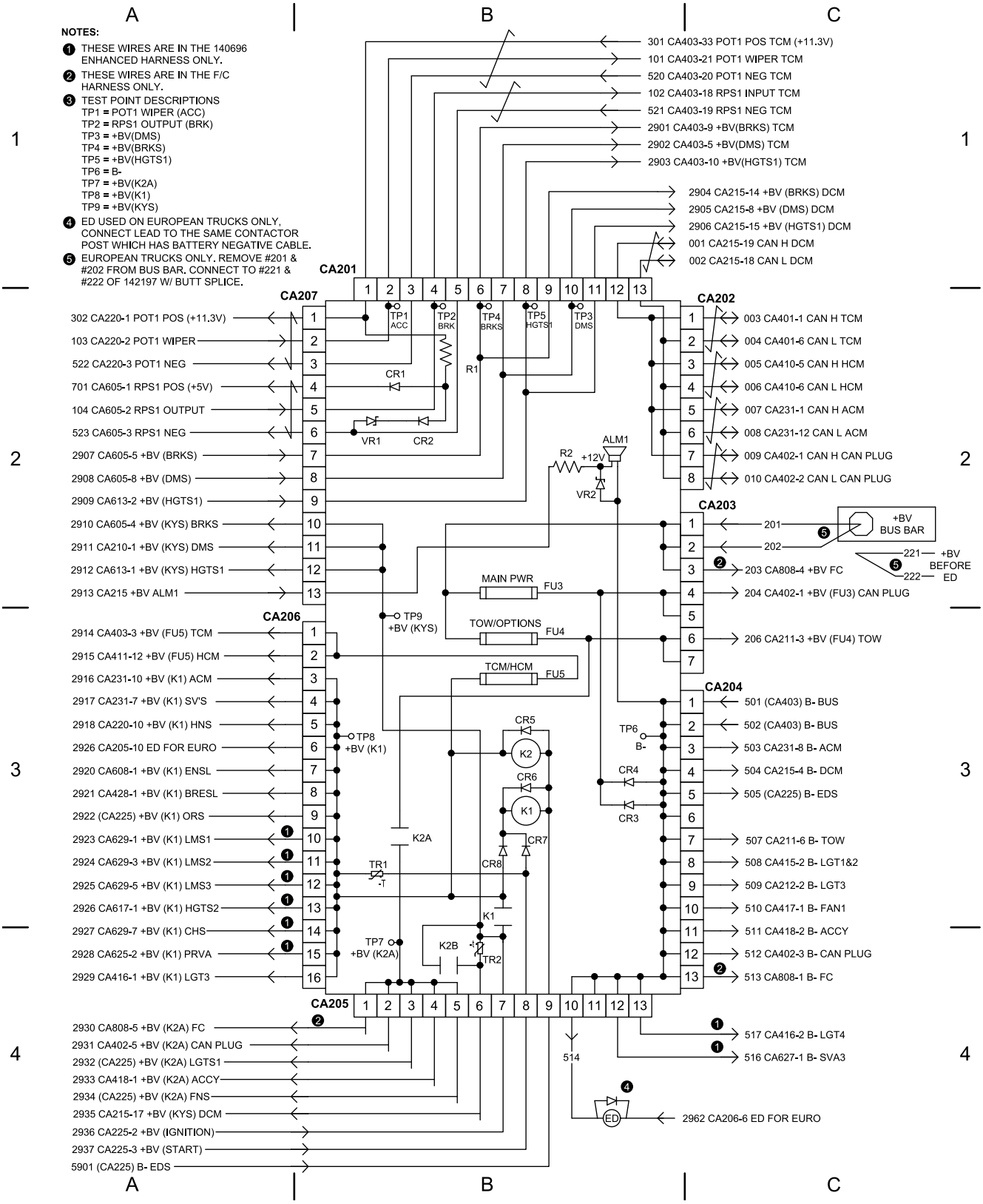
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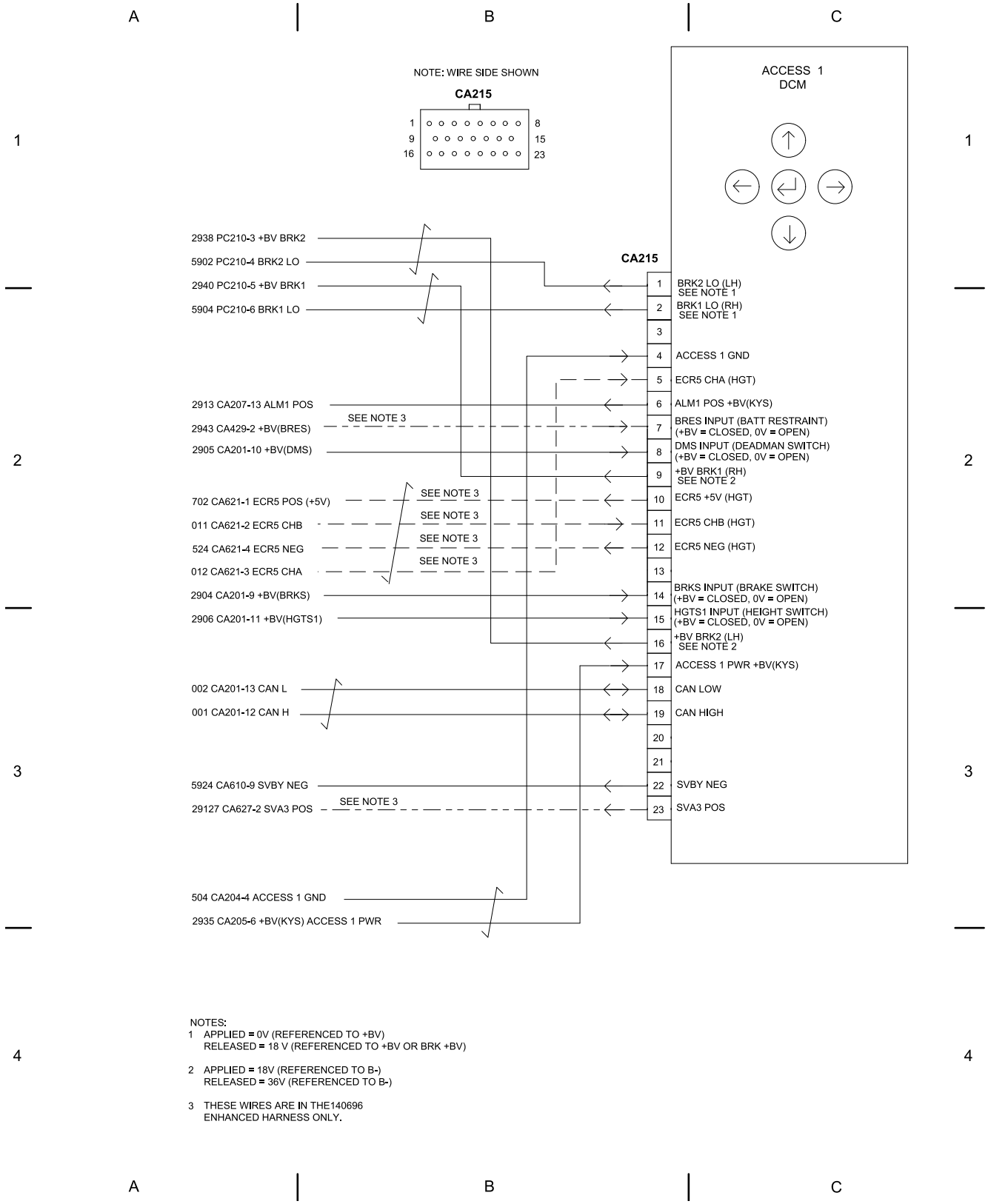

138541 C


NOTES:
1 THESE WIRES ARE IN THE 140696 ENHANCED HARNESS ONLY.
2 THESE WIRES ARE IN THE F/C HARNESS ONLY.
3 TEST POINT DESCRIPTIONS
TP1 = POT1 WIPER (ACC)
TP2 = RPS1 OUTPUT (BRK)
TP3 = +BV(DMS)
TP4 = +BV(BRKS)
TP5 = +BV(HGTS1)
TP6 = B-
TP7 = +BV(K2A)
TP8 = +BV(K1)
TP9 = +BV(KYS)
4 ED USED ON EUROPEAN TRUCKS ONLY, CONNECT LEAD TO THE SAME CONTACTOR POST WHICH HAS BATTERY NEGATIVE CABLE.
5 EUROPEAN TRUCKS ONLY. REMOVE #201 & #202 FROM BUS BAR. CONNECT TO #221 & #222 OF 142197 W/ BUTT SPLICE.
301 CA403-33 POT1 POS TCM (+11.3V)
101 CA403-21 POT1 WIPER TCM
520 CA403-20 POT1 NEG TCM
102 CA403-18 RPS1 INPUT TCM
521 CA403-19 RPS1 NEG TCM
2901 CA403-9 +BV(BRKS) TCM
2902 CA403-5 +BV(DMS) TCM
2903 CA403-10 +BV(HGTS1) TCM
2904 CA215-14 +BV (BRKS) DCM
2905 CA215-8 +BV (DMS) DCM
2906 CA215-15 +BV (HGTS1) DCM
001 CA215-19 CAN H DCM
002 CA215-18 CAN L DCM
CA201
CA207
302 CA220-1 POT1 POS (+11.3V)
103 CA220-2 POT1 WIPER
522 CA220-3 POT1 NEG
701 CA605-1 RPS1 POS (+5V)
104 CA605-2 RPS1 OUTPUT
523 CA605-3 RPS1 NEG
2907 CA605-5 +BV (BRKS)
2908 CA605-8 +BV (DMS)
2909 CA613-2 +BV (HGTS1)
2910 CA605-4 +BV (KYS) BRKS
2911 CA210-1 +BV (KYS) DMS
2912 CA613-1 +BV (KYS) HGTS1
2913 CA215 +BV ALM1
TP1 ACC
TP2 BRK
TP4 BRKS
TP5 HGTS1
TP3 DMS
CR1
R1
VR1
CR2
ALM1
R2
+12V
VR2
CA202
003 CA401-1 CAN H TCM
004 CA401-6 CAN L TCM
005 CA410-5 CAN H HCM
006 CA410-6 CAN L HCM
007 CA231-1 CAN H ACM
008 CA231-12 CAN L ACM
009 CA402-1 CAN H CAN PLUG
010 CA402-2 CAN L CAN PLUG
CA203
201
202
203 CA808-4 +BV FC
204 CA402-1 +BV (FU3) CAN PLUG
206 CA211-3 +BV (FU4) TOW
+BV BUS BAR
221 +BV BEFORE ED
222
MAIN PWR
FU3
TOW/OPTIONS
FU4
TCM/HCM
FU5
CA206
2914 CA403-3 +BV (FU5) TCM
2915 CA411-12 +BV (FU5) HCM
2916 CA231-10 +BV (K1) ACM
2917 CA231-7 +BV (K1) SV'S
2918 CA220-10 +BV (K1) HNS
2926 CA205-10 ED FOR EURO
2920 CA608-1 +BV (K1) ENSL
2921 CA428-1 +BV (K1) BRESL
2922 (CA225) +BV (K1) ORS
2923 CA629-1 +BV (K1) LMS1
2924 CA629-3 +BV (K1) LMS2
2925 CA629-5 +BV (K1) LMS3
2926 CA617-1 +BV (K1) HGTS2
2927 CA629-7 +BV (K1) CHS
2928 CA625-2 +BV (K1) PRVA
2929 CA416-1 +BV (K1) LGT3
TP9 +BV (KYS)
TP8 +BV (K1)
TP7 +BV (K2A)
CR5
K2
CR6
K1
CR7
CR8
K2A
TR1
K1
K2B
TR2
TP6 B-
CR4
CR3
CA204
501 (CA403) B- BUS
502 (CA403) B- BUS
503 CA231-8 B- ACM
504 CA215-4 B- DCM
505 (CA225) B- EDS
507 CA211-6 B- TOW
508 CA415-2 B- LGT1&2
509 CA212-2 B- LGT3
510 CA417-1 B- FAN1
511 CA418-2 B- ACCY
512 CA402-3 B- CAN PLUG
513 CA808-1 B- FC
CA205
2930 CA808-5 +BV (K2A) FC
2931 CA402-5 +BV (K2A) CAN PLUG
2932 (CA225) +BV (K2A) LGTS1
2933 CA418-1 +BV (K2A) ACCY
2934 (CA225) +BV (K2A) FNS
2935 CA215-17 +BV (KYS) DCM
2936 CA225-2 +BV (IGNITION)
2937 CA225-3 +BV (START)
5901 (CA225) B- EDS
514
517 CA416-2 B- LGT4
516 CA627-1 B- SVA3
ED
2962 CA206-6 ED FOR EURO

138543 F

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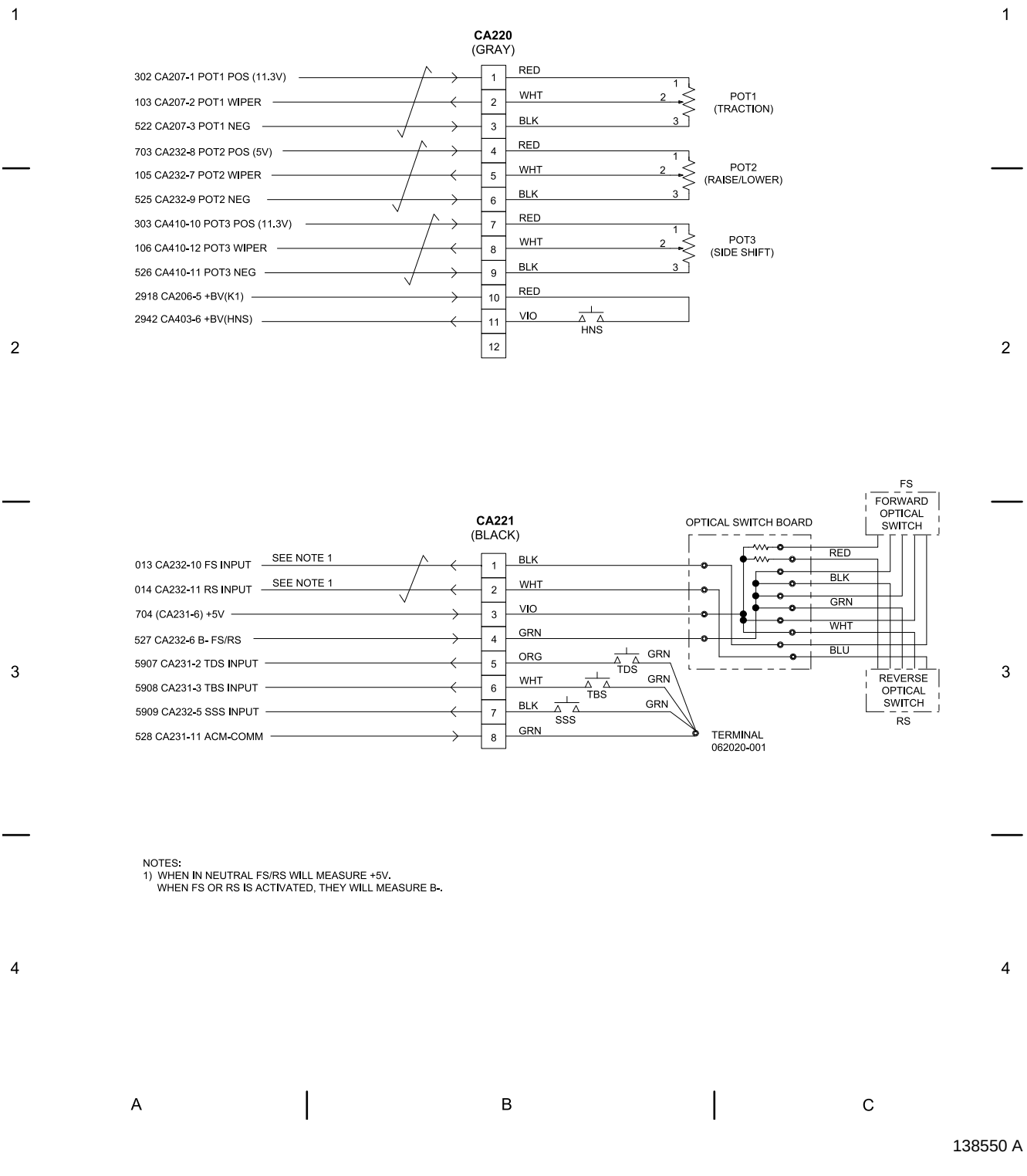



NOTES:
1 APPLIED = 0V (REFERENCED TO +BV)
RELEASED = 18 V (REFERENCED TO +BV OR BRK +BV)

2 APPLIED = 18V (REFERENCED TO B-)
RELEASED = 36V (REFERENCED TO B-)

3 THESE WIRES ARE IN THE140696 ENHANCED HARNESS ONLY.

138544 A

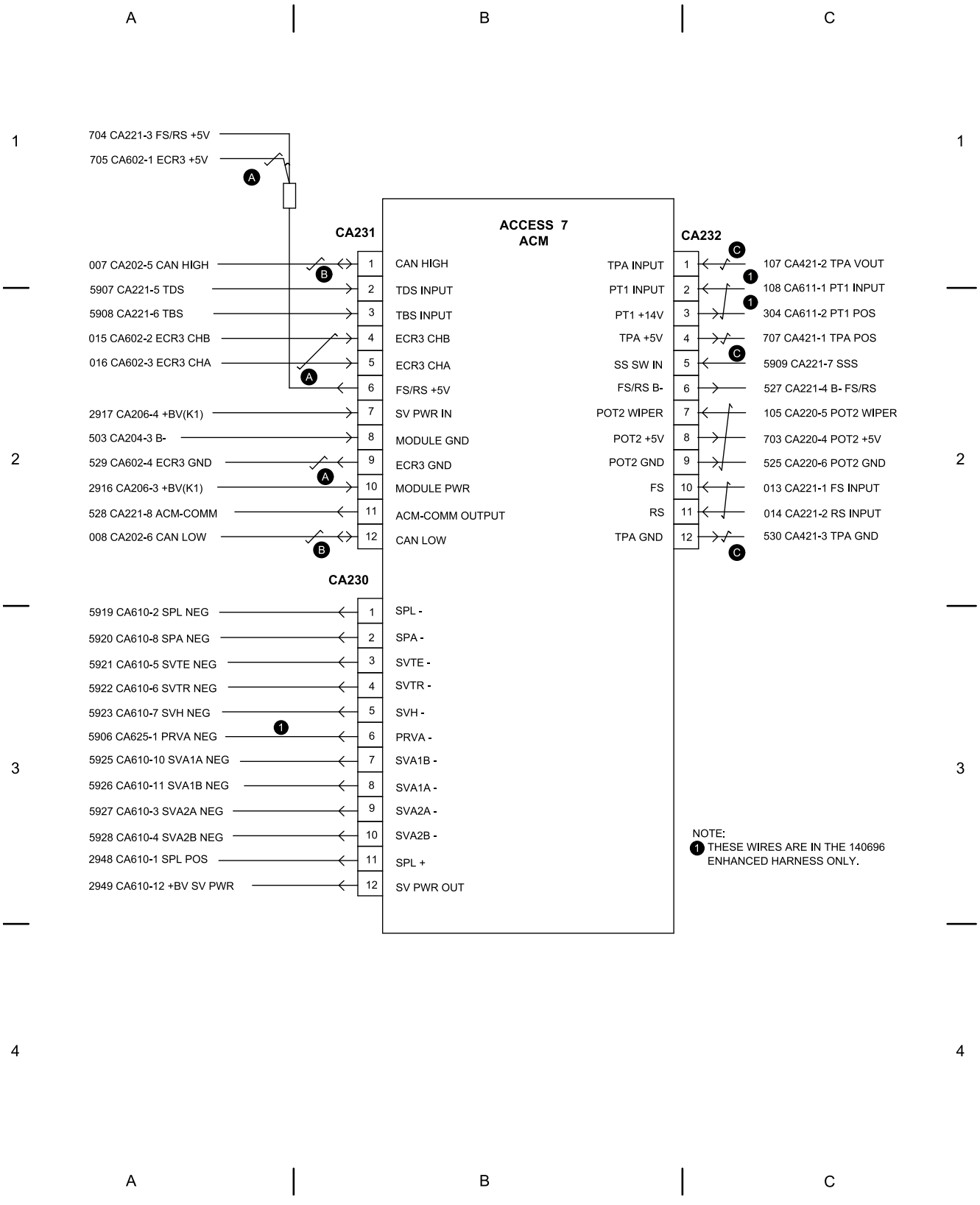



NOTES:
1) WHEN IN NEUTRAL FS/RS WILL MEASURE +5V.
   WHEN FS OR RS IS ACTIVATED, THEY WILL MEASURE B-.

138550 A

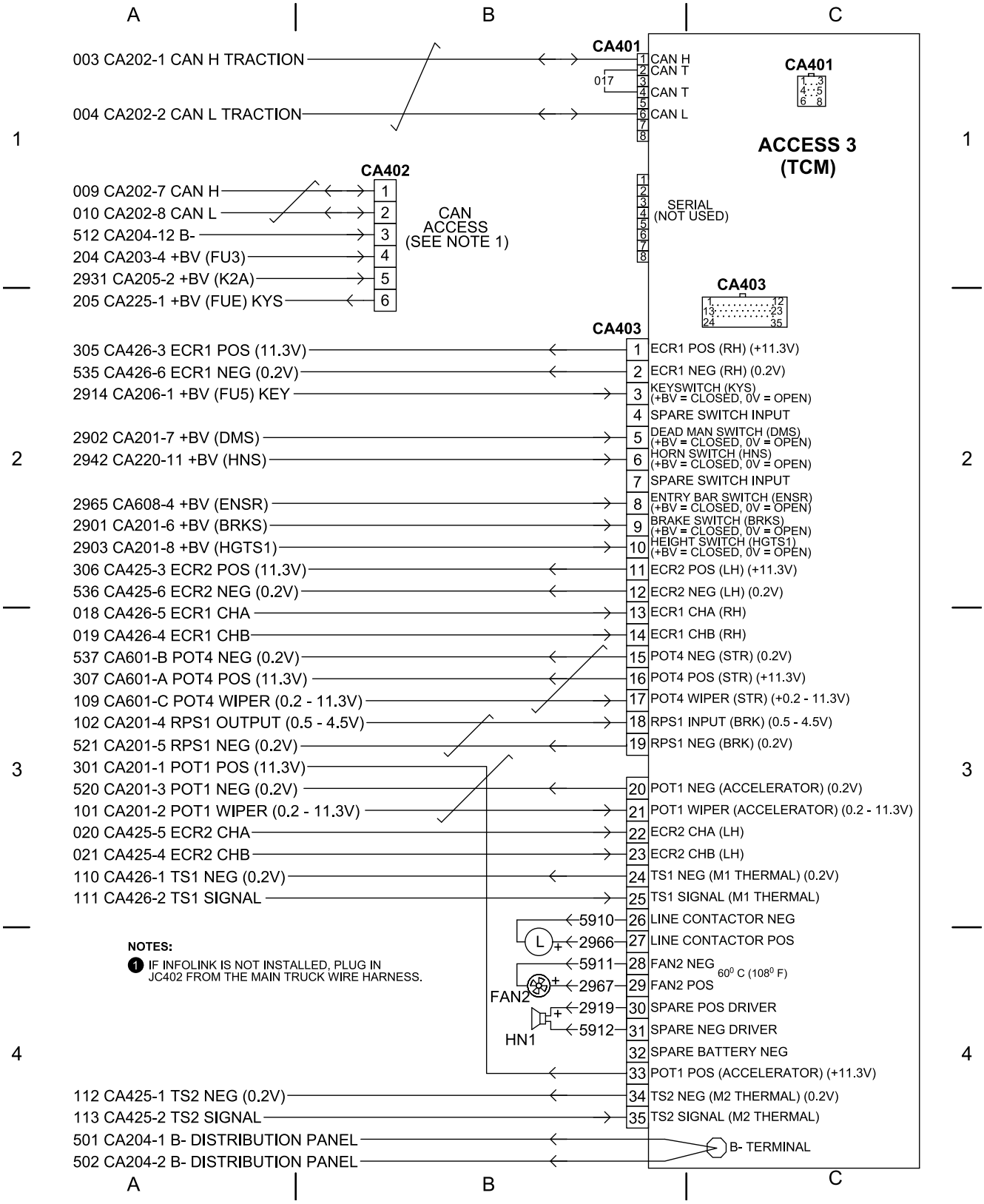
https://truckmanualshub.com/






138551 B

https://truckmanualshub.com/

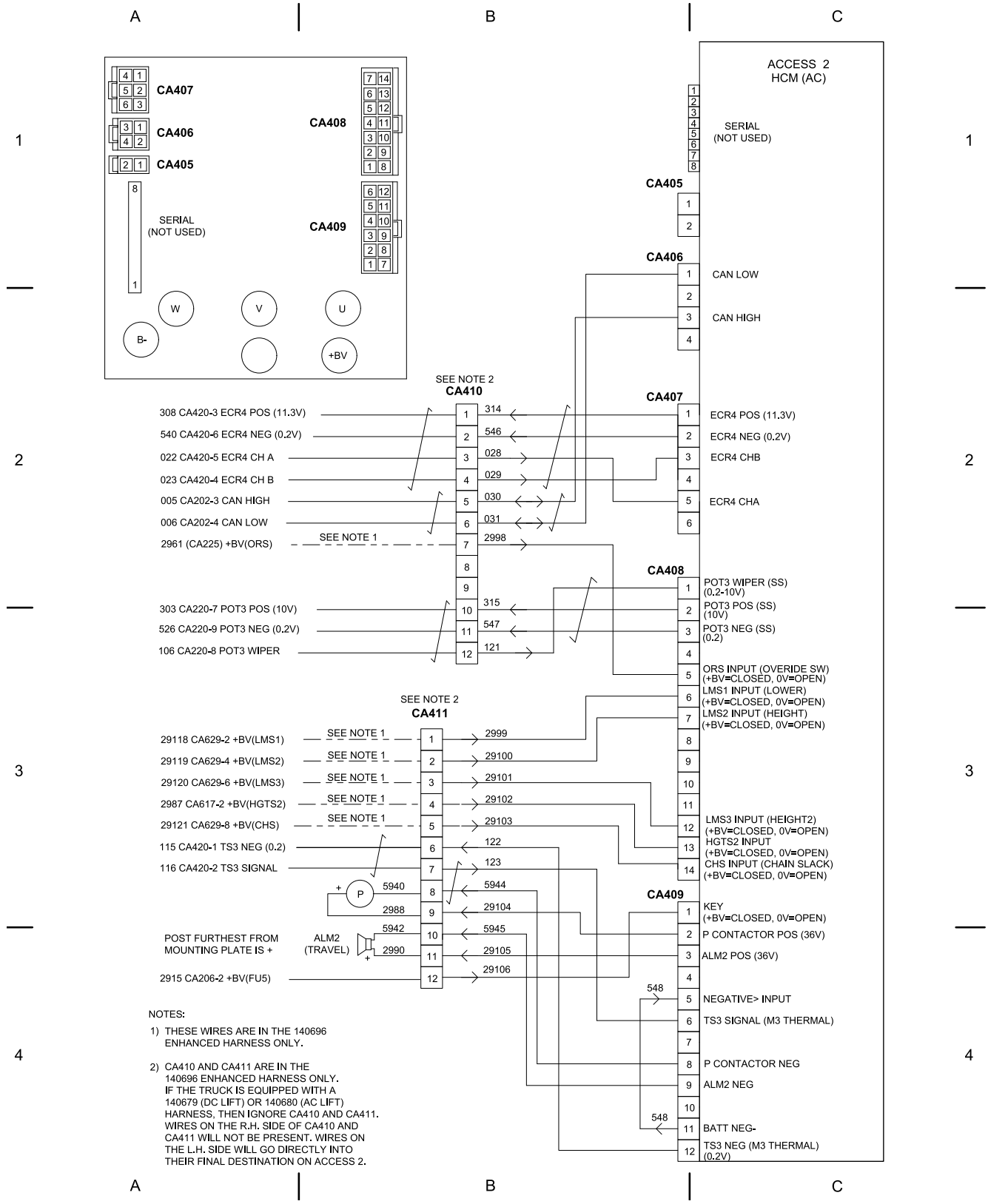



138545 D


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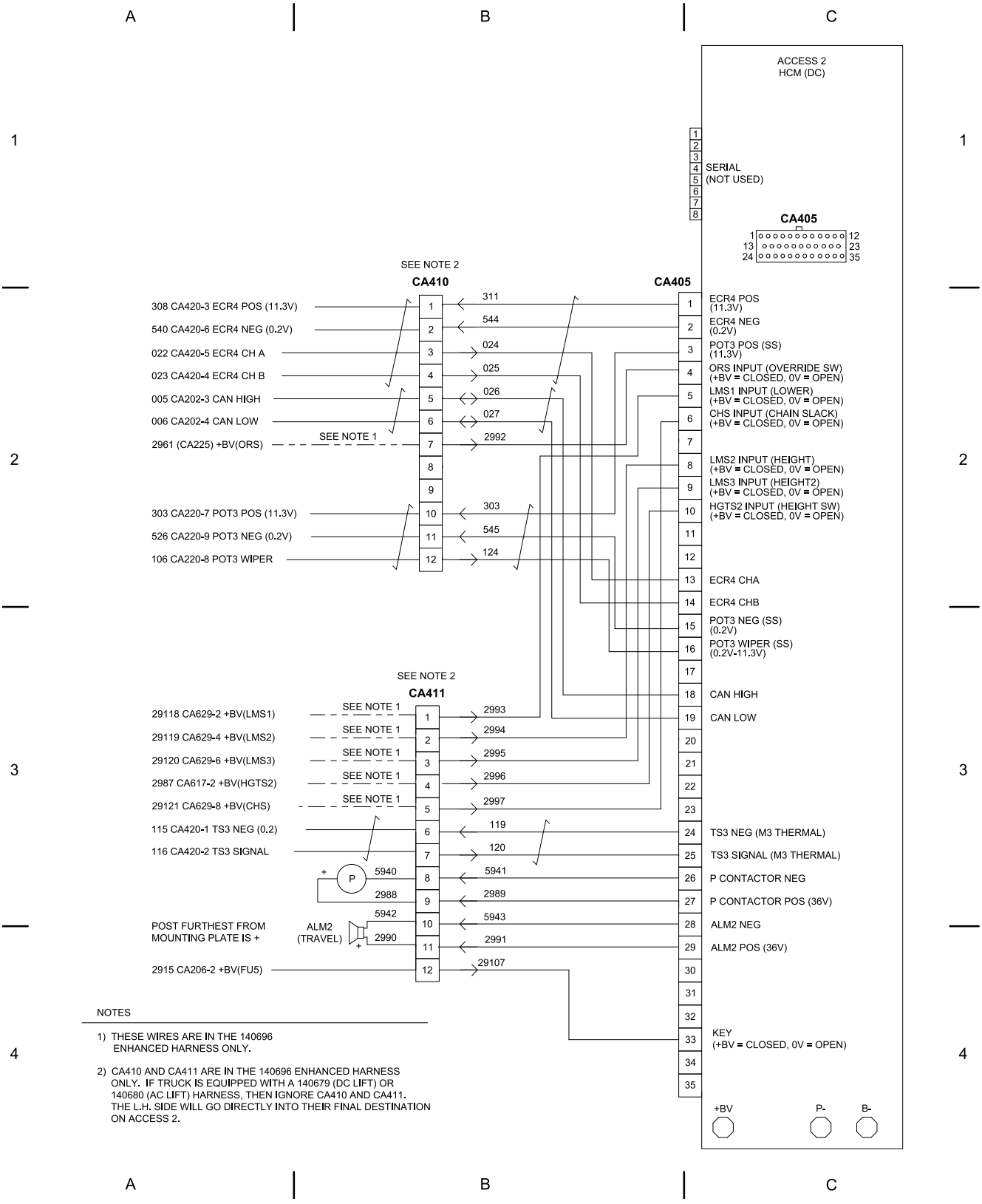



NOTES:

1) THESE WIRES ARE IN THE 140696 ENHANCED HARNESS ONLY.

2) CA410 AND CA411 ARE IN THE 140696 ENHANCED HARNESS ONLY. IF THE TRUCK IS EQUIPPED WITH A 140679 (DC LIFT) OR 140680 (AC LIFT) HARNESS, THEN IGNORE CA410 AND CA411. WIRES ON THE R.H. SIDE OF CA410 AND CA411 WILL NOT BE PRESENT. WIRES ON THE L.H. SIDE WILL GO DIRECTLY INTO THEIR FINAL DESTINATION ON ACCESS 2.

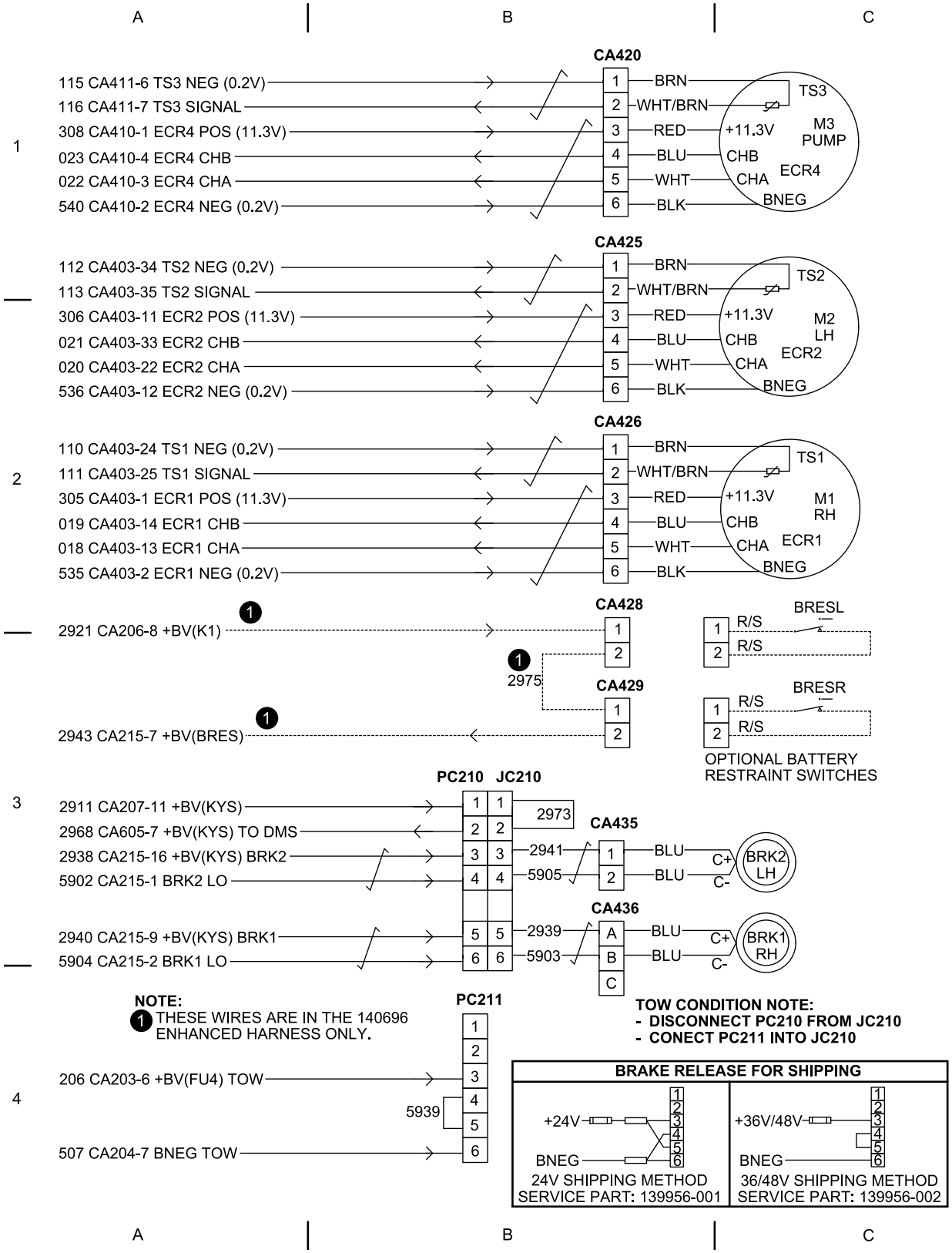
138548 A


ACCESS 2
HCM (DC)
SERIAL
(NOT USED)
CA405
SEE NOTE 2
CA410
CA405
308 CA420-3 ECR4 POS (11.3V)
540 CA420-6 ECR4 NEG (0.2V)
022 CA420-5 ECR4 CH A
023 CA420-4 ECR4 CH B
005 CA202-3 CAN HIGH
006 CA202-4 CAN LOW
2961 (CA225) +BV(ORS)
SEE NOTE 1
303 CA220-7 POT3 POS (11.3V)
526 CA220-9 POT3 NEG (0.2V)
106 CA220-8 POT3 WIPER
311
544
024
025
026
027
2992
303
545
124
ECR4 POS (11.3V)
ECR4 NEG (0.2V)
POT3 POS (SS) (11.3V)
ORS INPUT (OVERRIDE SW) (+BV = CLOSED, 0V = OPEN)
LMS1 INPUT (LOWER) (+BV = CLOSED, 0V = OPEN)
CHS INPUT (CHAIN SLACK) (+BV = CLOSED, 0V = OPEN)
LMS2 INPUT (HEIGHT) (+BV = CLOSED, 0V = OPEN)
LMS3 INPUT (HEIGHT2) (+BV = CLOSED, 0V = OPEN)
HGTS2 INPUT (HEIGHT SW) (+BV = CLOSED, 0V = OPEN)
ECR4 CHA
ECR4 CHB
POT3 NEG (SS) (0.2V)
POT3 WIPER (SS) (0.2V-11.3V)
SEE NOTE 2
CA411
29118 CA629-2 +BV(LMS1)
29119 CA629-4 +BV(LMS2)
29120 CA629-6 +BV(LMS3)
2987 CA617-2 +BV(HGTS2)
29121 CA629-8 +BV(CHS)
115 CA420-1 TS3 NEG (0.2)
116 CA420-2 TS3 SIGNAL
2915 CA206-2 +BV(FU5)
2993
2994
2995
2996
2997
119
120
5940
2988
5941
2989
5942
2990
5943
2991
29107
P
ALM2 (TRAVEL)
POST FURTHEST FROM MOUNTING PLATE IS +
CAN HIGH
CAN LOW
TS3 NEG (M3 THERMAL)
TS3 SIGNAL (M3 THERMAL)
P CONTACTOR NEG
P CONTACTOR POS (36V)
ALM2 NEG
ALM2 POS (36V)
KEY (+BV = CLOSED, 0V = OPEN)
+BV
P-
B-
NOTES
1) THESE WIRES ARE IN THE 140696 ENHANCED HARNESS ONLY.
2) CA410 AND CA411 ARE IN THE 140696 ENHANCED HARNESS ONLY. IF TRUCK IS EQUIPPED WITH A 140679 (DC LIFT) OR 140680 (AC LIFT) HARNESS, THEN IGNORE CA410 AND CA411. THE L.H. SIDE WILL GO DIRECTLY INTO THEIR FINAL DESTINATION ON ACCESS 2.

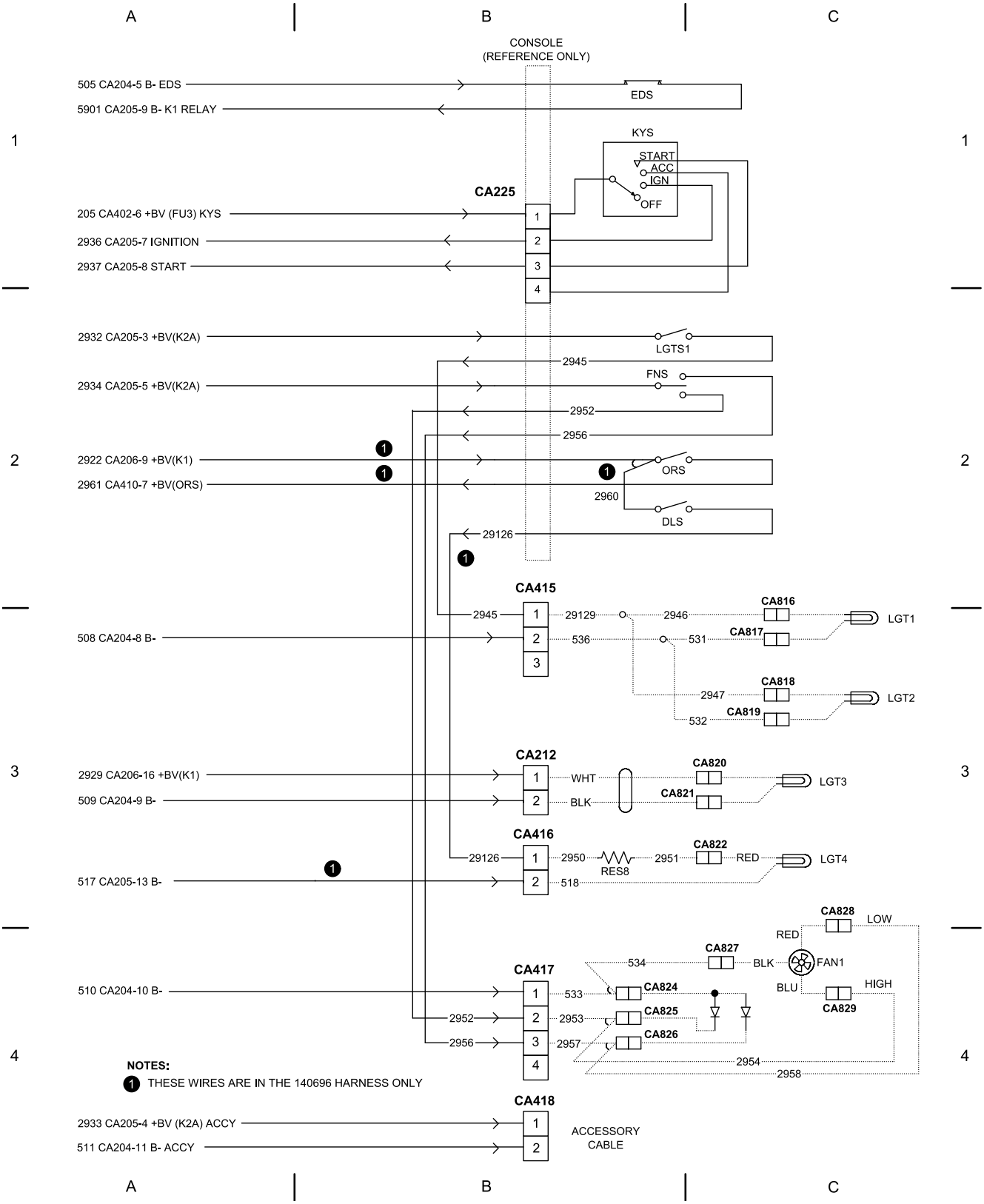
138547 A

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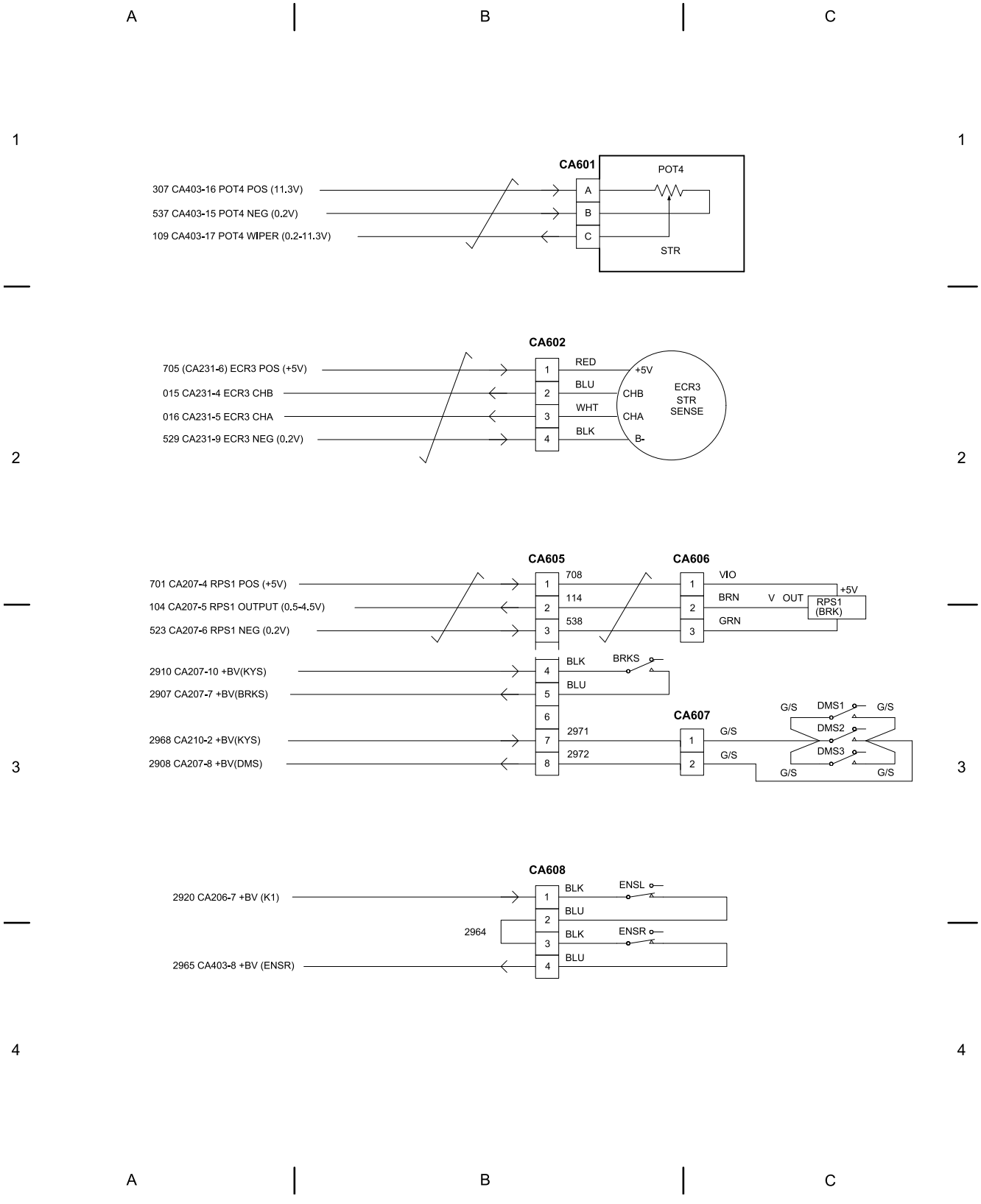

138546 B


A
B
C
CONSOLE
(REFERENCE ONLY)
505 CA204-5 B- EDS
EDS
5901 CA205-9 B- K1 RELAY
KYS
START
ACC
IGN
OFF
CA225
205 CA402-6 +BV (FU3) KYS
2936 CA205-7 IGNITION
2937 CA205-8 START
2932 CA205-3 +BV(K2A)
LGTS1
2945
2934 CA205-5 +BV(K2A)
FNS
2952
2956
2922 CA206-9 +BV(K1)
2961 CA410-7 +BV(ORS)
ORS
2960
DLS
29126
CA415
2945
29129
2946
CA816
LGT1
508 CA204-8 B-
536
531
CA817
CA818
2947
LGT2
532
CA819
CA212
2929 CA206-16 +BV(K1)
509 CA204-9 B-
WHT
BLK
CA820
CA821
LGT3
CA416
29126
2950
RES8
2951
CA822
RED
LGT4
517 CA205-13 B-
518
CA828
LOW
RED
CA827
534
BLK
FAN1
CA417
510 CA204-10 B-
533
CA824
BLU
HIGH
CA825
2953
CA829
2952
2956
CA826
2957
2954
2958
NOTES:
1 THESE WIRES ARE IN THE 140696 HARNESS ONLY
CA418
2933 CA205-4 +BV (K2A) ACCY
511 CA204-11 B- ACCY
ACCESSORY
CABLE
1
2
3
4

138553 C

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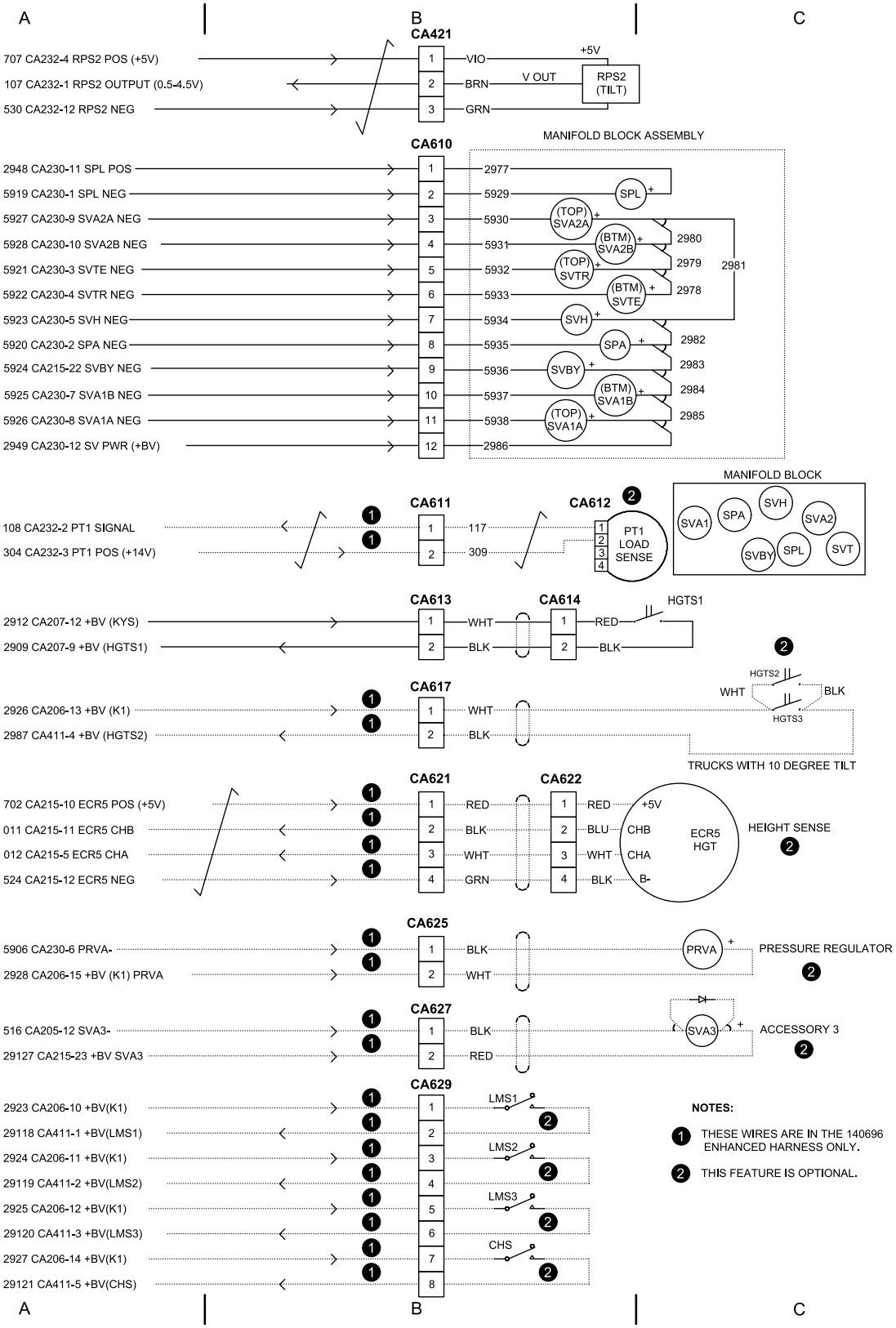





138549 A

# WIRING DIAGRAMS

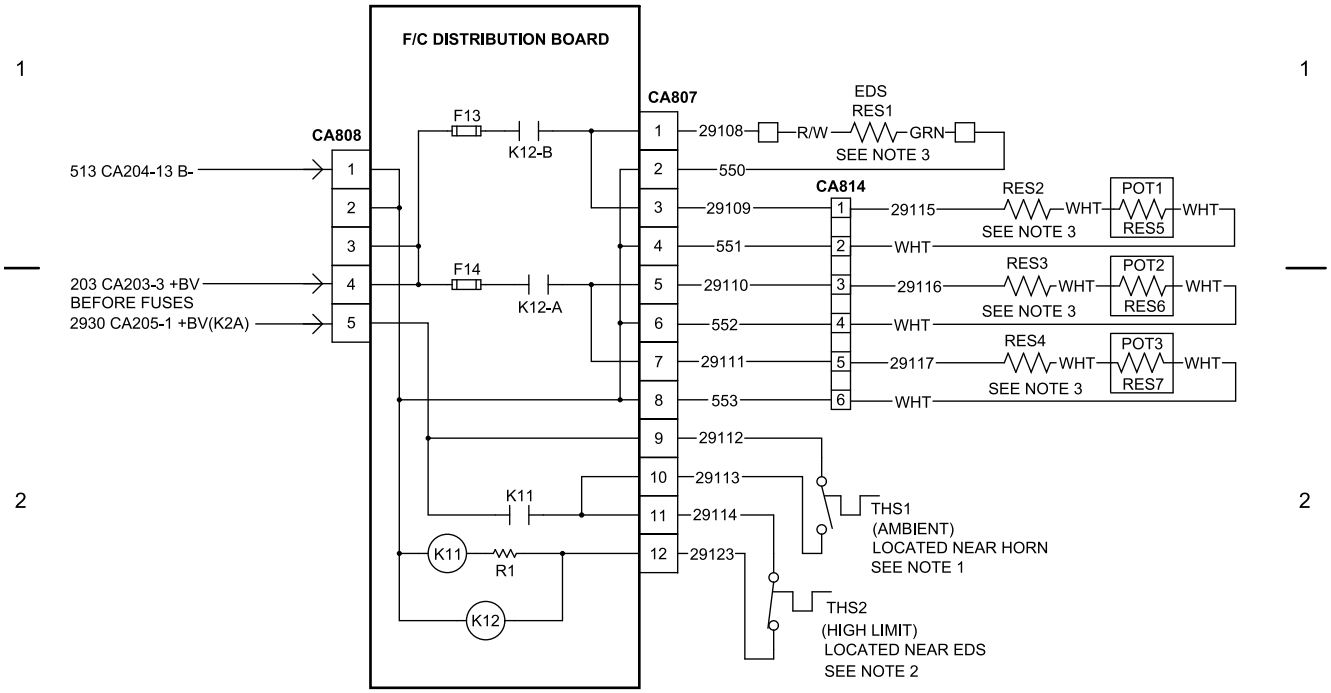
## Hydraulics, Height & Load Sense

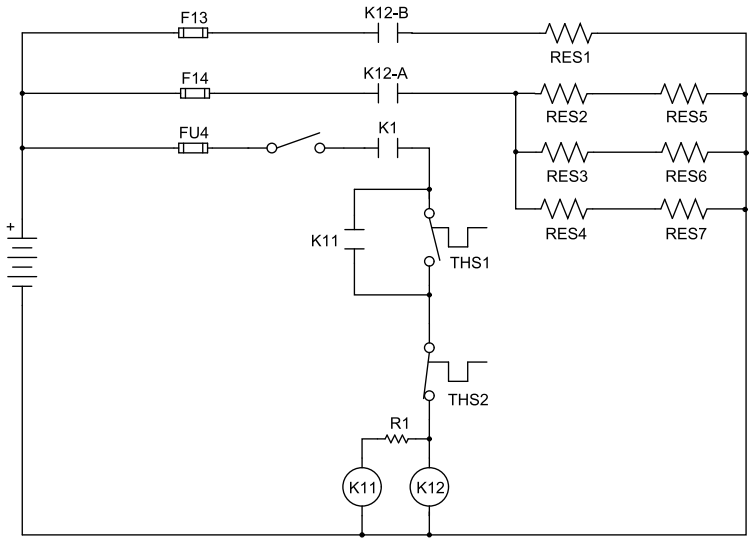



138552 C

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**NOTES:**

1) THS1 SHOWN AT AMBIENT OF 70° F
   < 40° F = CLOSED
   > 55° F = OPEN

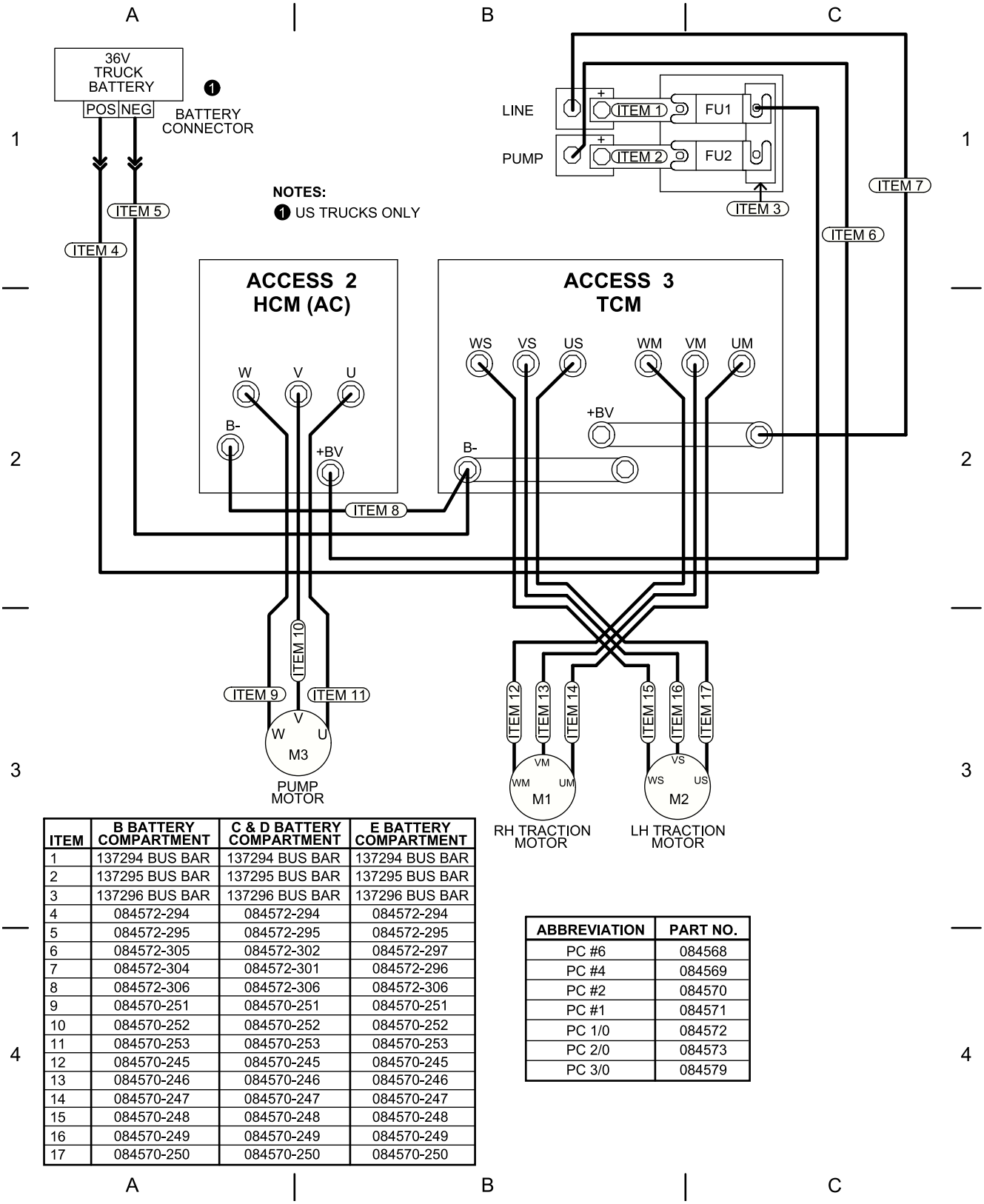
2) THS2 SHOWN AT AMBIENT OF 70° F
   < 100° F = CLOSED
   > 130° F = OPEN

3) RESISTOR VALUES
   RES1 70 OHM 25W
   RES2 140 OHM 10W
   RES3 140 OHM 10W
   RES4 140 OHM 10W
   RES5 40 OHM
   RES6 40 OHM
   RES7 40 OHM

138554 A

# WIRING DIAGRAMS

## Power Cables - AC Lift (ANSI Trucks)




| ITEM | B BATTERY COMPARTMENT | C & D BATTERY COMPARTMENT | E BATTERY COMPARTMENT |
|---|---|---|---|
| 1 | 137294 BUS BAR | 137294 BUS BAR | 137294 BUS BAR |
| 2 | 137295 BUS BAR | 137295 BUS BAR | 137295 BUS BAR |
| 3 | 137296 BUS BAR | 137296 BUS BAR | 137296 BUS BAR |
| 4 | 084572-294 | 084572-294 | 084572-294 |
| 5 | 084572-295 | 084572-295 | 084572-295 |
| 6 | 084572-305 | 084572-302 | 084572-297 |
| 7 | 084572-304 | 084572-301 | 084572-296 |
| 8 | 084572-306 | 084572-306 | 084572-306 |
| 9 | 084570-251 | 084570-251 | 084570-251 |
| 10 | 084570-252 | 084570-252 | 084570-252 |
| 11 | 084570-253 | 084570-253 | 084570-253 |
| 12 | 084570-245 | 084570-245 | 084570-245 |
| 13 | 084570-246 | 084570-246 | 084570-246 |
| 14 | 084570-247 | 084570-247 | 084570-247 |
| 15 | 084570-248 | 084570-248 | 084570-248 |
| 16 | 084570-249 | 084570-249 | 084570-249 |
| 17 | 084570-250 | 084570-250 | 084570-250 |

| ABBREVIATION | PART NO. |
|---|---|
| PC #6 | 084568 |
| PC #4 | 084569 |
| PC #2 | 084570 |
| PC #1 | 084571 |
| PC 1/0 | 084572 |
| PC 2/0 | 084573 |
| PC 3/0 | 084579 |

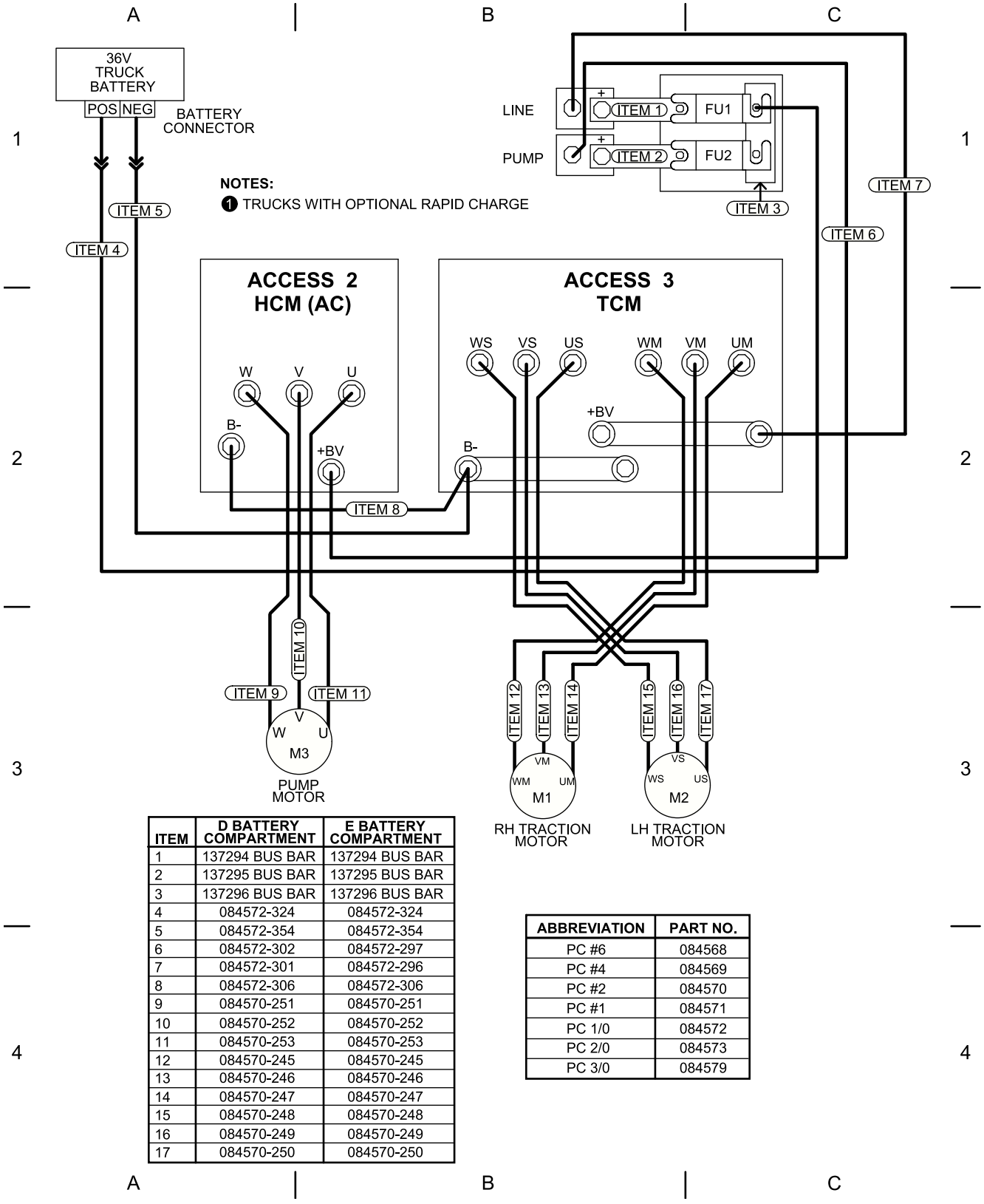
138556 D sh 1



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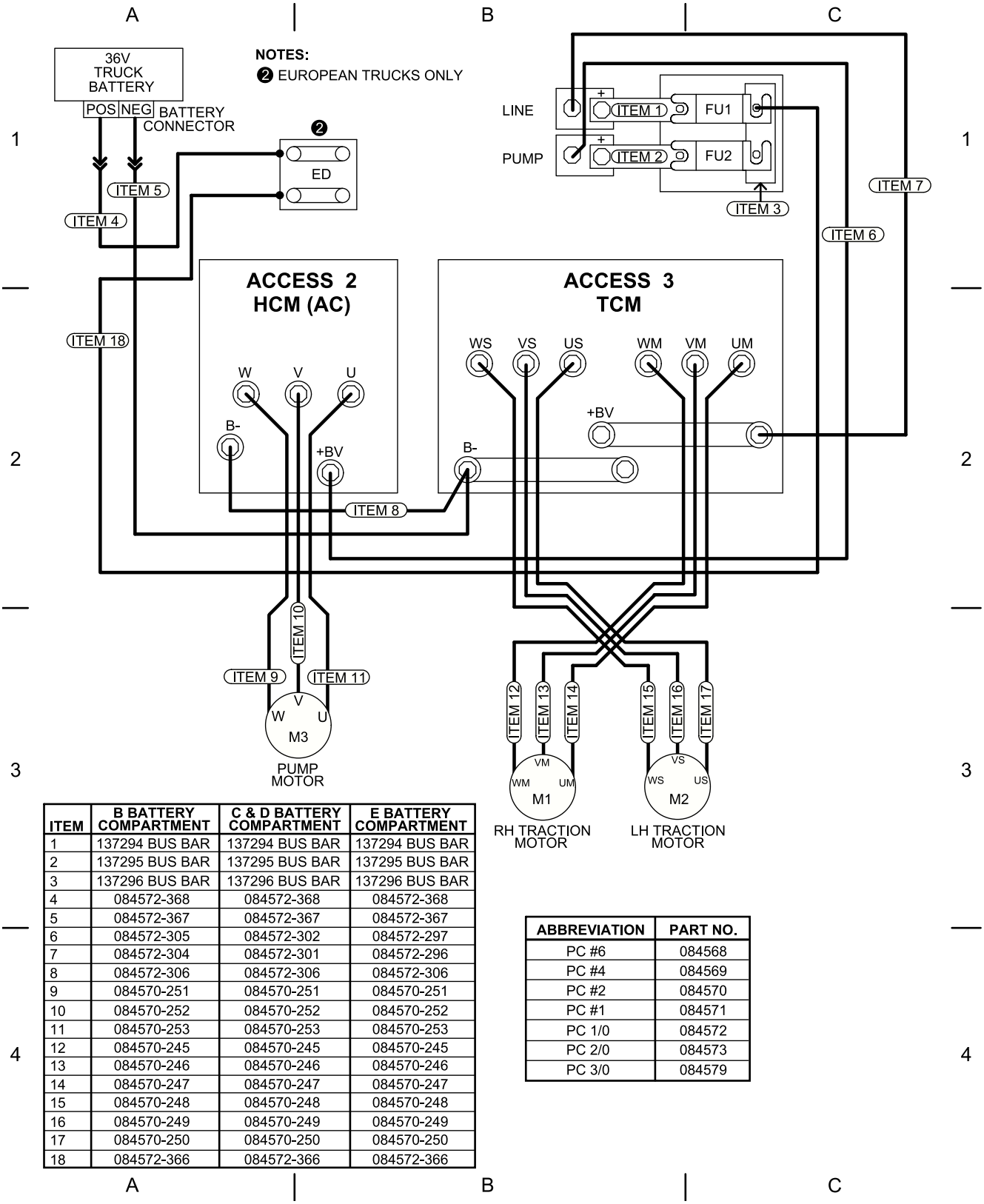

| ITEM | D BATTERY COMPARTMENT | E BATTERY COMPARTMENT |
|---|---|---|
| 1 | 137294 BUS BAR | 137294 BUS BAR |
| 2 | 137295 BUS BAR | 137295 BUS BAR |
| 3 | 137296 BUS BAR | 137296 BUS BAR |
| 4 | 084572-324 | 084572-324 |
| 5 | 084572-354 | 084572-354 |
| 6 | 084572-302 | 084572-297 |
| 7 | 084572-301 | 084572-296 |
| 8 | 084572-306 | 084572-306 |
| 9 | 084570-251 | 084570-251 |
| 10 | 084570-252 | 084570-252 |
| 11 | 084570-253 | 084570-253 |
| 12 | 084570-245 | 084570-245 |
| 13 | 084570-246 | 084570-246 |
| 14 | 084570-247 | 084570-247 |
| 15 | 084570-248 | 084570-248 |
| 16 | 084570-249 | 084570-249 |
| 17 | 084570-250 | 084570-250 |

| ABBREVIATION | PART NO. |
|---|---|
| PC #6 | 084568 |
| PC #4 | 084569 |
| PC #2 | 084570 |
| PC #1 | 084571 |
| PC 1/0 | 084572 |
| PC 2/0 | 084573 |
| PC 3/0 | 084579 |

138556 D sh 3

# WIRING DIAGRAMS

## Power Cable - AC Lift (Euro Trucks)



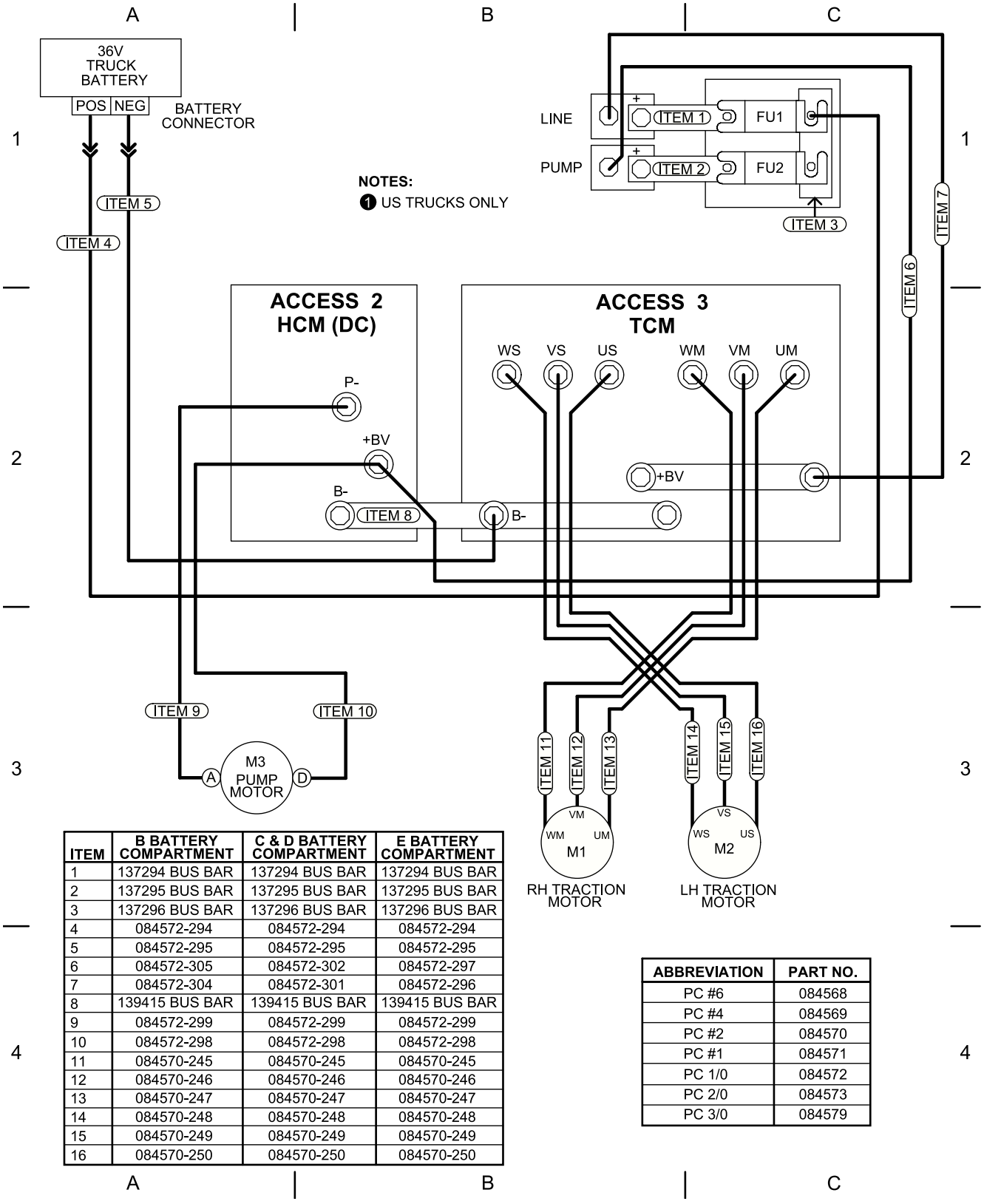

| ITEM | B BATTERY COMPARTMENT | C & D BATTERY COMPARTMENT | E BATTERY COMPARTMENT |
|---|---|---|---|
| 1 | 137294 BUS BAR | 137294 BUS BAR | 137294 BUS BAR |
| 2 | 137295 BUS BAR | 137295 BUS BAR | 137295 BUS BAR |
| 3 | 137296 BUS BAR | 137296 BUS BAR | 137296 BUS BAR |
| 4 | 084572-368 | 084572-368 | 084572-368 |
| 5 | 084572-367 | 084572-367 | 084572-367 |
| 6 | 084572-305 | 084572-302 | 084572-297 |
| 7 | 084572-304 | 084572-301 | 084572-296 |
| 8 | 084572-306 | 084572-306 | 084572-306 |
| 9 | 084570-251 | 084570-251 | 084570-251 |
| 10 | 084570-252 | 084570-252 | 084570-252 |
| 11 | 084570-253 | 084570-253 | 084570-253 |
| 12 | 084570-245 | 084570-245 | 084570-245 |
| 13 | 084570-246 | 084570-246 | 084570-246 |
| 14 | 084570-247 | 084570-247 | 084570-247 |
| 15 | 084570-248 | 084570-248 | 084570-248 |
| 16 | 084570-249 | 084570-249 | 084570-249 |
| 17 | 084570-250 | 084570-250 | 084570-250 |
| 18 | 084572-366 | 084572-366 | 084572-366 |

| ABBREVIATION | PART NO. |
|---|---|
| PC #6 | 084568 |
| PC #4 | 084569 |
| PC #2 | 084570 |
| PC #1 | 084571 |
| PC 1/0 | 084572 |
| PC 2/0 | 084573 |
| PC 3/0 | 084579 |

138556 D sh 2

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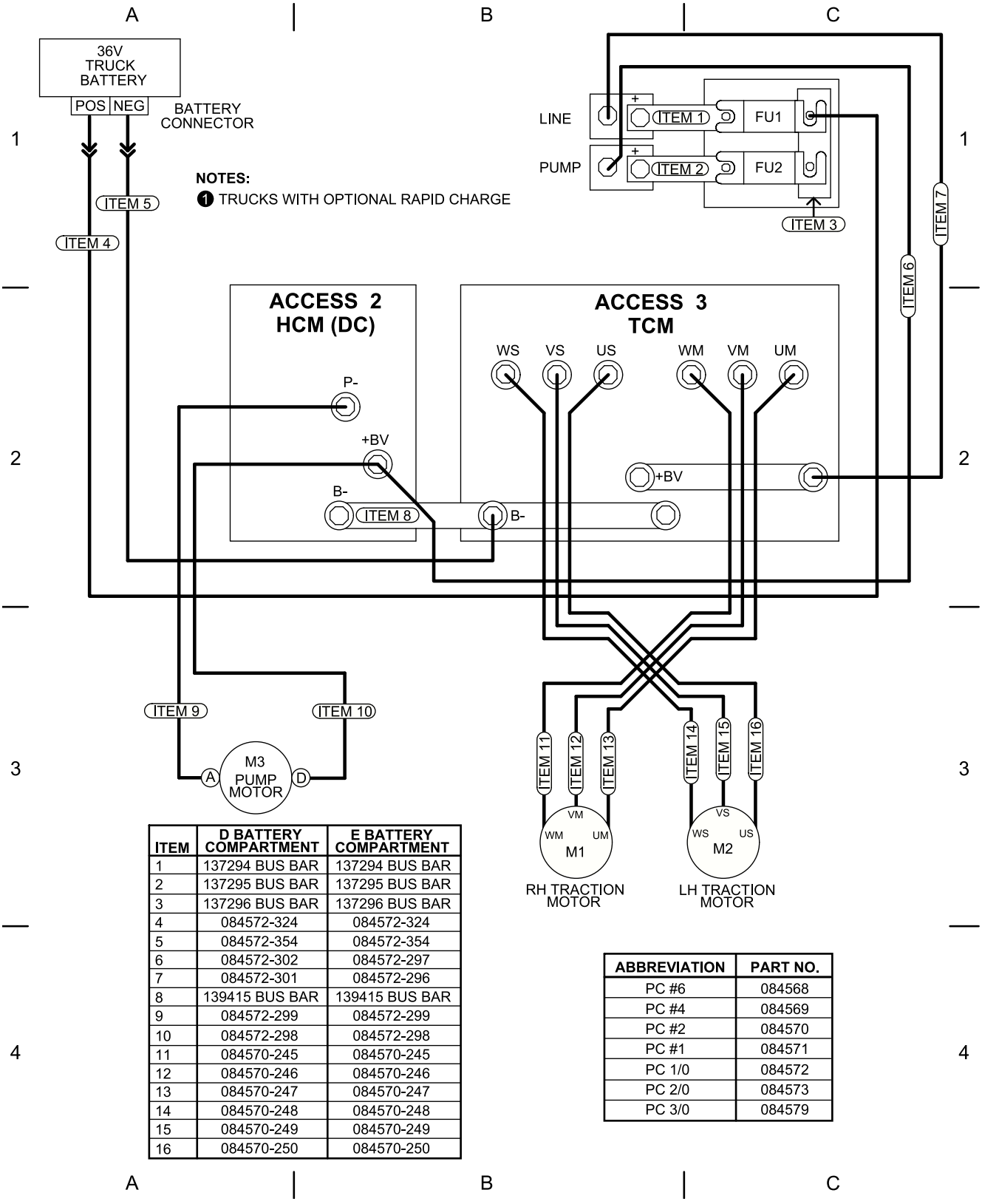

| ITEM | B BATTERY COMPARTMENT | C & D BATTERY COMPARTMENT | E BATTERY COMPARTMENT |
|---|---|---|---|
| 1 | 137294 BUS BAR | 137294 BUS BAR | 137294 BUS BAR |
| 2 | 137295 BUS BAR | 137295 BUS BAR | 137295 BUS BAR |
| 3 | 137296 BUS BAR | 137296 BUS BAR | 137296 BUS BAR |
| 4 | 084572-294 | 084572-294 | 084572-294 |
| 5 | 084572-295 | 084572-295 | 084572-295 |
| 6 | 084572-305 | 084572-302 | 084572-297 |
| 7 | 084572-304 | 084572-301 | 084572-296 |
| 8 | 139415 BUS BAR | 139415 BUS BAR | 139415 BUS BAR |
| 9 | 084572-299 | 084572-299 | 084572-299 |
| 10 | 084572-298 | 084572-298 | 084572-298 |
| 11 | 084570-245 | 084570-245 | 084570-245 |
| 12 | 084570-246 | 084570-246 | 084570-246 |
| 13 | 084570-247 | 084570-247 | 084570-247 |
| 14 | 084570-248 | 084570-248 | 084570-248 |
| 15 | 084570-249 | 084570-249 | 084570-249 |
| 16 | 084570-250 | 084570-250 | 084570-250 |

| ABBREVIATION | PART NO. |
|---|---|
| PC #6 | 084568 |
| PC #4 | 084569 |
| PC #2 | 084570 |
| PC #1 | 084571 |
| PC 1/0 | 084572 |
| PC 2/0 | 084573 |
| PC 3/0 | 084579 |

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# WIRING DIAGRAMS

## Power Cable - DC Lift w/Rapid Charge




| ITEM | D BATTERY COMPARTMENT | E BATTERY COMPARTMENT |
|---|---|---|
| 1 | 137294 BUS BAR | 137294 BUS BAR |
| 2 | 137295 BUS BAR | 137295 BUS BAR |
| 3 | 137296 BUS BAR | 137296 BUS BAR |
| 4 | 084572-324 | 084572-324 |
| 5 | 084572-354 | 084572-354 |
| 6 | 084572-302 | 084572-297 |
| 7 | 084572-301 | 084572-296 |
| 8 | 139415 BUS BAR | 139415 BUS BAR |
| 9 | 084572-299 | 084572-299 |
| 10 | 084572-298 | 084572-298 |
| 11 | 084570-245 | 084570-245 |
| 12 | 084570-246 | 084570-246 |
| 13 | 084570-247 | 084570-247 |
| 14 | 084570-248 | 084570-248 |
| 15 | 084570-249 | 084570-249 |
| 16 | 084570-250 | 084570-250 |

| ABBREVIATION | PART NO. |
|---|---|
| PC #6 | 084568 |
| PC #4 | 084569 |
| PC #2 | 084570 |
| PC #1 | 084571 |
| PC 1/0 | 084572 |
| PC 2/0 | 084573 |
| PC 3/0 | 084579 |

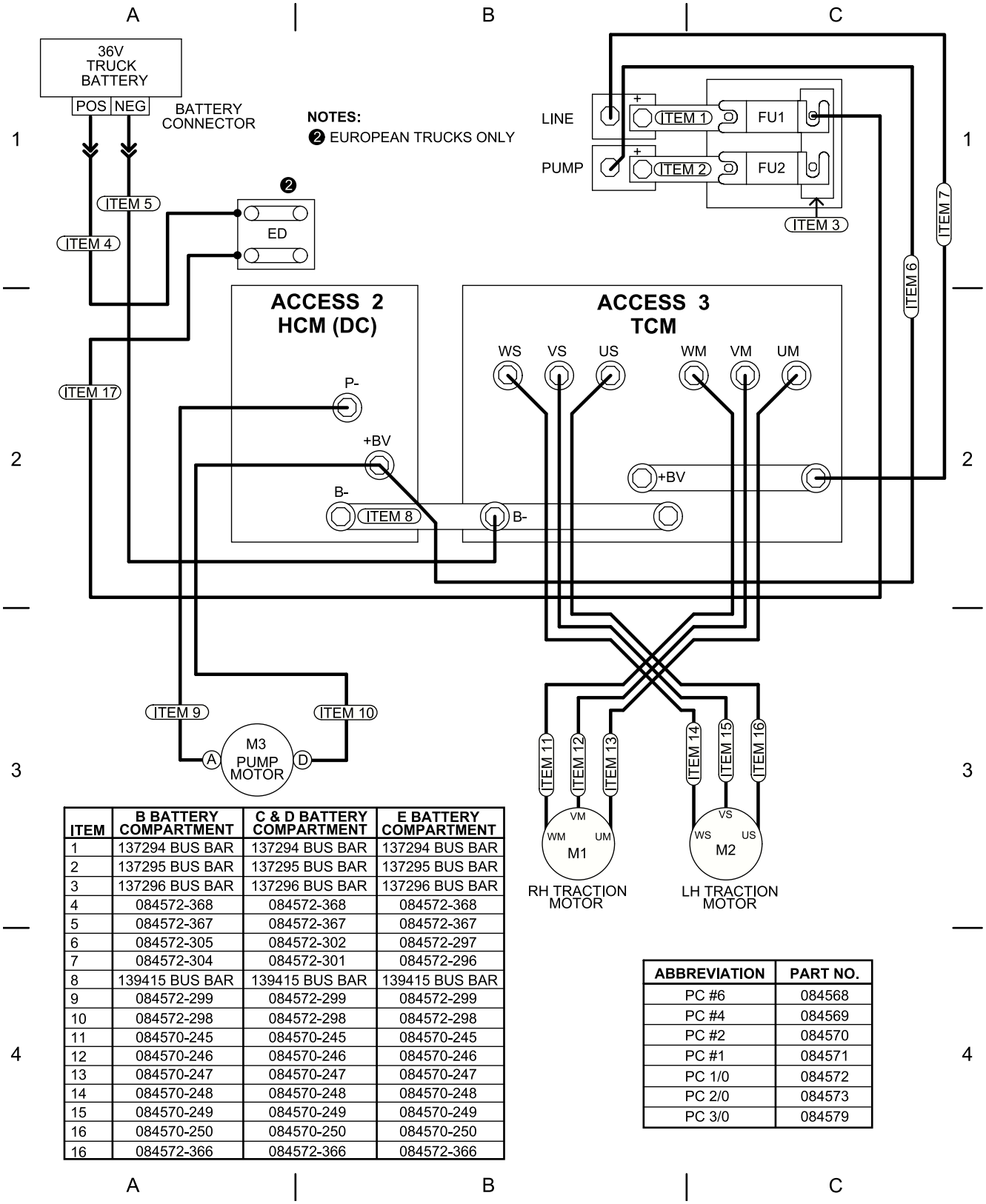
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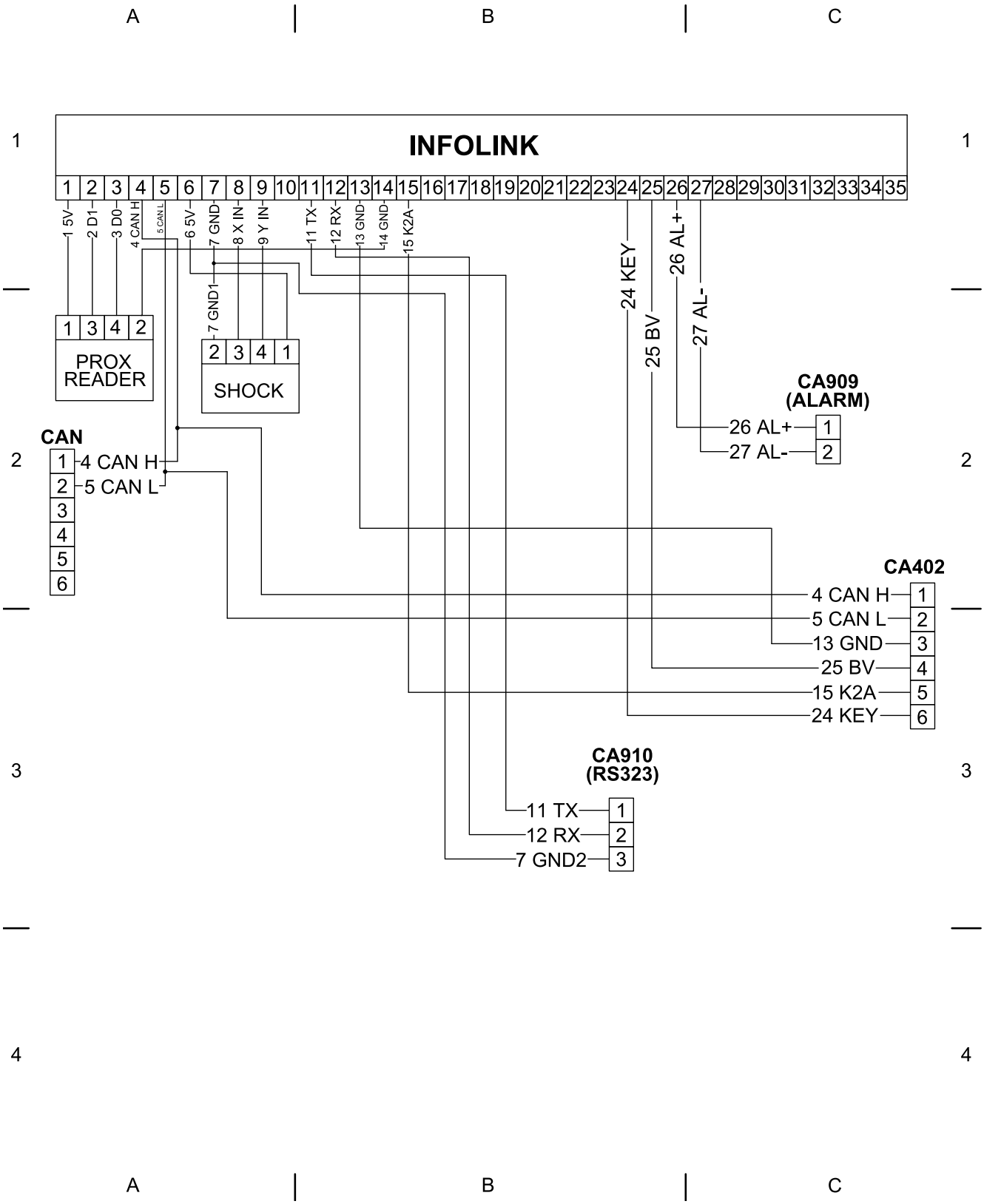

| ITEM | B BATTERY COMPARTMENT | C & D BATTERY COMPARTMENT | E BATTERY COMPARTMENT |
|---|---|---|---|
| 1 | 137294 BUS BAR | 137294 BUS BAR | 137294 BUS BAR |
| 2 | 137295 BUS BAR | 137295 BUS BAR | 137295 BUS BAR |
| 3 | 137296 BUS BAR | 137296 BUS BAR | 137296 BUS BAR |
| 4 | 084572-368 | 084572-368 | 084572-368 |
| 5 | 084572-367 | 084572-367 | 084572-367 |
| 6 | 084572-305 | 084572-302 | 084572-297 |
| 7 | 084572-304 | 084572-301 | 084572-296 |
| 8 | 139415 BUS BAR | 139415 BUS BAR | 139415 BUS BAR |
| 9 | 084572-299 | 084572-299 | 084572-299 |
| 10 | 084572-298 | 084572-298 | 084572-298 |
| 11 | 084570-245 | 084570-245 | 084570-245 |
| 12 | 084570-246 | 084570-246 | 084570-246 |
| 13 | 084570-247 | 084570-247 | 084570-247 |
| 14 | 084570-248 | 084570-248 | 084570-248 |
| 15 | 084570-249 | 084570-249 | 084570-249 |
| 16 | 084570-250 | 084570-250 | 084570-250 |
| 16 | 084572-366 | 084572-366 | 084572-366 |

| ABBREVIATION | PART NO. |
|---|---|
| PC #6 | 084568 |
| PC #4 | 084569 |
| PC #2 | 084570 |
| PC #1 | 084571 |
| PC 1/0 | 084572 |
| PC 2/0 | 084573 |
| PC 3/0 | 084579 |

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# WIRING DIAGRAMS

## InfoLink






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| Harness Components Connected By: | | |
|---|---|---|
| 127272-002 | * | HGTS1 Harness: JC613, PC614 Trucks W/Collapsed Height Of 1805 mm (71 in) |
| 127272-003 | * | HGTS1 Harness: JC613, PC614 Trucks W/Collapsed Height Of 2110 mm (83 in) |
| 127272-004 | * | HGTS1 Harness: JC613, PC614 Trucks W/Collapsed Height Of 2260 mm (89 in) |
| 127272-005 | * | HGTS1 Harness: JC613, PC614 Trucks W/Collapsed Height Of 2415 mm (95 in) |
| 127272-011 | * | HGTS1 Harness: JC613, PC614 Trucks W/Collapsed Height Of 2565 mm (101 in) |
| 140696 | * | Main Wire Harness: (Enhanced) PC201, PC202, PC203, PC204, PC205, PC206, PC207, PC210, JC210, PC211, PC212, PC215, PC220, PC221, PC225, PC230, PC231, PC232, PC401, PC402, PC403, PC410, PC411, PC415, PC416, PC417, PC 418, PC420, PC421, PC425, PC426, PC428, PC429, PC435, PC436, PC601, PC602, PC605, PC608, JC610, JC611, PC613, PC617, PC621, PC625, PC627, PC629, +BV, B-, HN1, FAN2, EDS, L Contactor, P Contactor<br>Travel Alarm, LGTS1, FNS, ORS, DLS |
| 140679 | * | Main Wire Harness (DC Lift) PC201, PC202, PC203, PC204, PC205, PC206, PC207, PC210, JC210, PC211, PC212, PC215, PC220, PC221, PC225, PC230, PC231, PC232, PC401, PC402, PC403, PC405, PC415, PC417, PC 418, PC420, PC421, PC425, PC426, PC435, PC436, PC601, PC602, PC605, PC608, JC610, JC613, PC621, +BV, B-, HN1, FAN2, EDS, L Contactor, P Contactor<br>Travel Alarm, LGTS1, FNS |
| 140680 | * | Main Wire Harness (AC Lift) PC201, PC202, PC203, PC204, PC205, PC206, PC207, PC210, JC210, PC211, PC212, PC215, PC220, PC221, PC225, PC230, PC231, PC232, PC401, PC402, PC403, PC405, PC406, PC407, PC408, PC409, PC415, PC417, PC 418, PC420, PC421, PC425, PC426, PC435, PC436, PC601, PC602, PC605, PC608, JC610, JC613, PC621, +BV, B-, HN1, FAN2, EDS, L Contactor, P Contactor<br>Travel Alarm, LGTS1, FNS |
| 137254 | | Manifold Harness: PC610, SPL, SVA2A, SVA2B, SFTR, SVTE, SVH, SPA, SVBY, SVA1A, SVA1B |
| 140969 | | Floorboard Harness: JC605, PC606, PC607, Brake Switch (BRKS) |
| 137257 | * | DC Hydraulics Harness: PC405, JC410, JC411 |
| 140042 | | Entry Bar Switch Assembly: JC608, ENSL, ENSR |
| 137504 | * | AC Hydraulics Harness: PC406, PC407, PC408, PC409, JC410, JC411 |
| 137505 | * | Battery Restraint Harness: BRESL or BRESR |
| 140965 | * | Overhead Guard Light Harness: JC415, LGT1, LGT2 |
| 138642 | * | Load Sense Harness: PC611, PC612 (PT1) |
| 140968 | * | Fan Harness: JC417, Operator Fan (Includes Diode Assembly) |
| 138644 | * | Freezer/Corrosion Harness: PC807, PC808, PC814, +BV, -BV, RES1(EDS), High Limit Thermostat (THS2), Ambient Thermostat (THS1) |
| 140967-001 | * | Mast Work Light Harness: JC415 W/Mast Collapsed Height of 1805mm (71in) |
| 140967-003 | * | Mast Work Light Harness: JC415 W/Mast Collapsed Height of 2110mm (83in) |

| Harness Components Connected By: | | |
|---|---|---|
| 140967-004 | * | Mast Work Light Harness: JC415 W/Mast Collapsed Height of 2260mm (89in) |
| 140967-005 | * | Mast Work Light Harness: JC415 W/Mast Collapsed Height of 2415mm (95in) |
| 140967-006 | * | Mast Work Light Harness: JC415 W/Mast Collapsed Height of 2565mm (101in) |
| 140514 | * | Height Switch 2 Harness (10 Degree Tilt): JC617, HGTS2 |
| 140972-001 | * | Accessory 3 Harness: JC627, SVA3 W/Mast Collapsed height of 1805mm (71in) |
| 140972-003 | * | Accessory 3 Harness: JC627, SVA3 W/Mast Collapsed height of 2110mm (83in) |
| 140972-004 | * | Accessory 3 Harness: JC627, SVA3 W/Mast Collapsed height of 2260mm (89in) |
| 140972-005 | * | Accessory 3 Harness: JC627, SVA3 W/Mast Collapsed height of 2415mm (95in) |
| 140972-006 | * | Accessory 3 Harness: JC627, SVA3 W/Mast Collapsed height of 2565mm (101in) |
| 140973 | * | Pressure Regulator Harness: JC625, PRVA |
| 141638 | | InfoLink Harness: JC221, JC225, JC230, JC402, PC221, PC225, PC230, BRKS, DMS |
| 139870 | | Dome Light Harness: JC416 |
| 141637 | | Auto PWR Down Harness, JC225, PC225 |
| 140966 | | Strobe Harness, JC212 |
| 140290-001 | * | InfoLink Harness |
| 142197 | * | ED Contactor (Euro Trucks Only) |
| 143320 | * | DC Lift Harness w/Constant Power, PC201, PC202, PC203, PC204, PC205, PC206, PC207, PC210, JC210, PC211, PC215, PC220, PC221, PC225, PC230, PC231, PC401, PC402, JC402, PC403, PC405, PC420, PC421, PC415, PC417, PC418, PC426, PC436, PC601, PC602, JC610, PC613, Console Switches, Line Contactor, Strobe, HGTS1, Entry Bar, Floorboard, Manifold, LH ECR, LH BRK, HN, FAN2, Travel Alarm |
| 143321 | * | AC Lift Harness w/Constant Power, PC201, PC202, PC203, PC204, PC205, PC206, PC207, PC210, PC211, JC210, PC212, PC215, PC220, PC221, PC225, PC230, PC231, PC232, PC401, PC402, JC402, PC403, PC406, PC407, PC408, PC409, PC415, PC417, PC418, PC420, PC421, PC425, PC426, PC435, PC436, PC601, PC602, PC605, PC608, JC610, PC613, Console Switches, FAN2, Travel Alarm, Horn, Line Contactor, Pump Contactor |
| 143524 | * | Enhanced Harness w/Constant Power, PC201, PC202, PC203, PC204, PC205, PC206, PC207, PC210, JC210, PC211, PC215, PC220, PC221, PC225, PC230, PC231, PC233, PC401, JC402, PC403, PC410, PC411, PC415, PC416, PC417, PC418, PC420, PC421, PC425, PC426, PC429, PC435, PC436, PC601, PC602, PC605, PC608, PC610, PC611, PC613, PC617, PC625, PC627, PC629, Line Contactor, Pump Contactor, Console Switches, Battery Restraint Switches, Horn, FAN2, Travel Alarm |
| * Wire harness selection depends on truck configuration | | |


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# HYDRAULIC SCHEMATIC

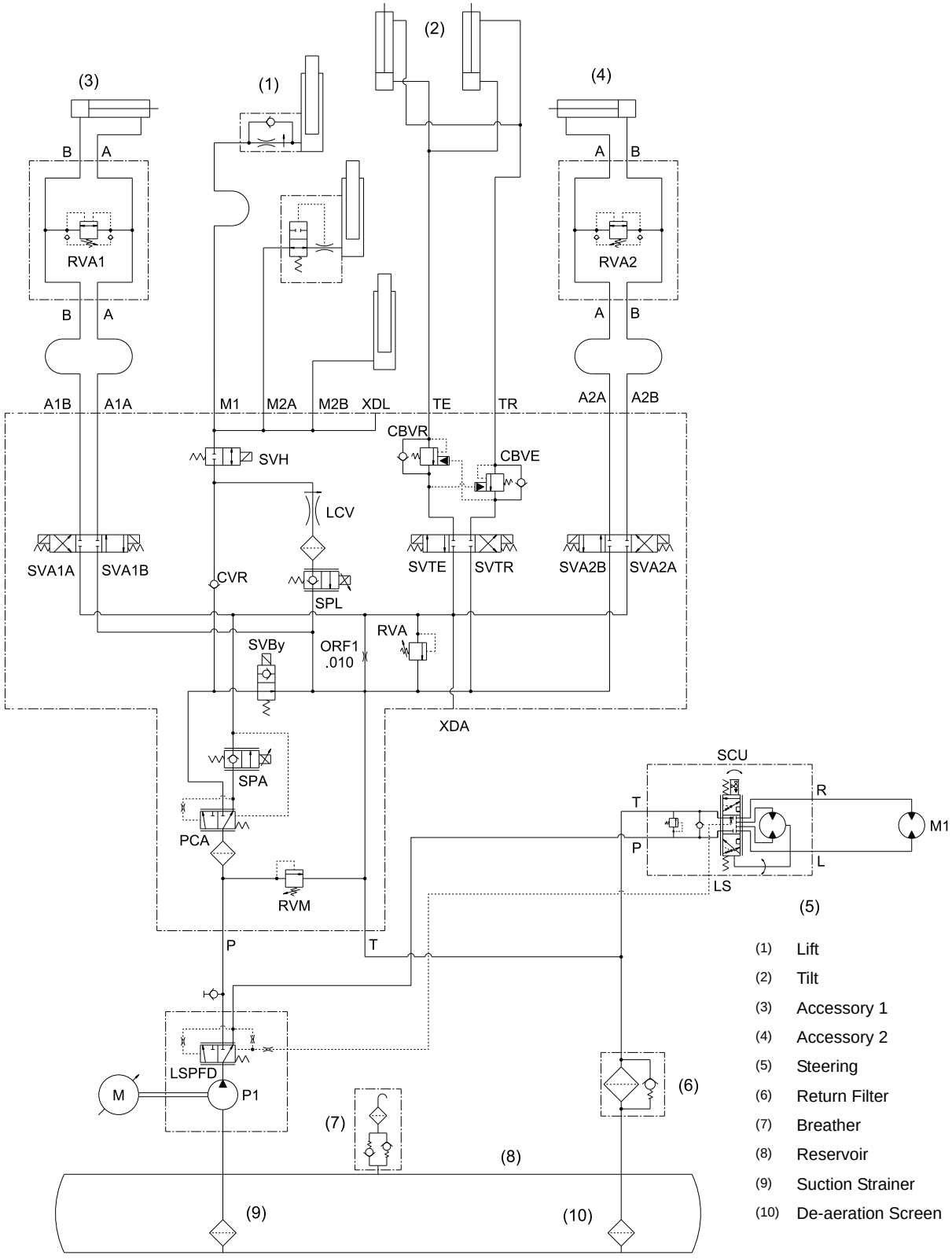
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## Notes:

https://truckmanualshub.com/






(1) Lift
(2) Tilt
(3) Accessory 1
(4) Accessory 2
(5) Steering
(6) Return Filter
(7) Breather
(8) Reservoir
(9) Suction Strainer
(10) De-aeration Screen

Figure 14161

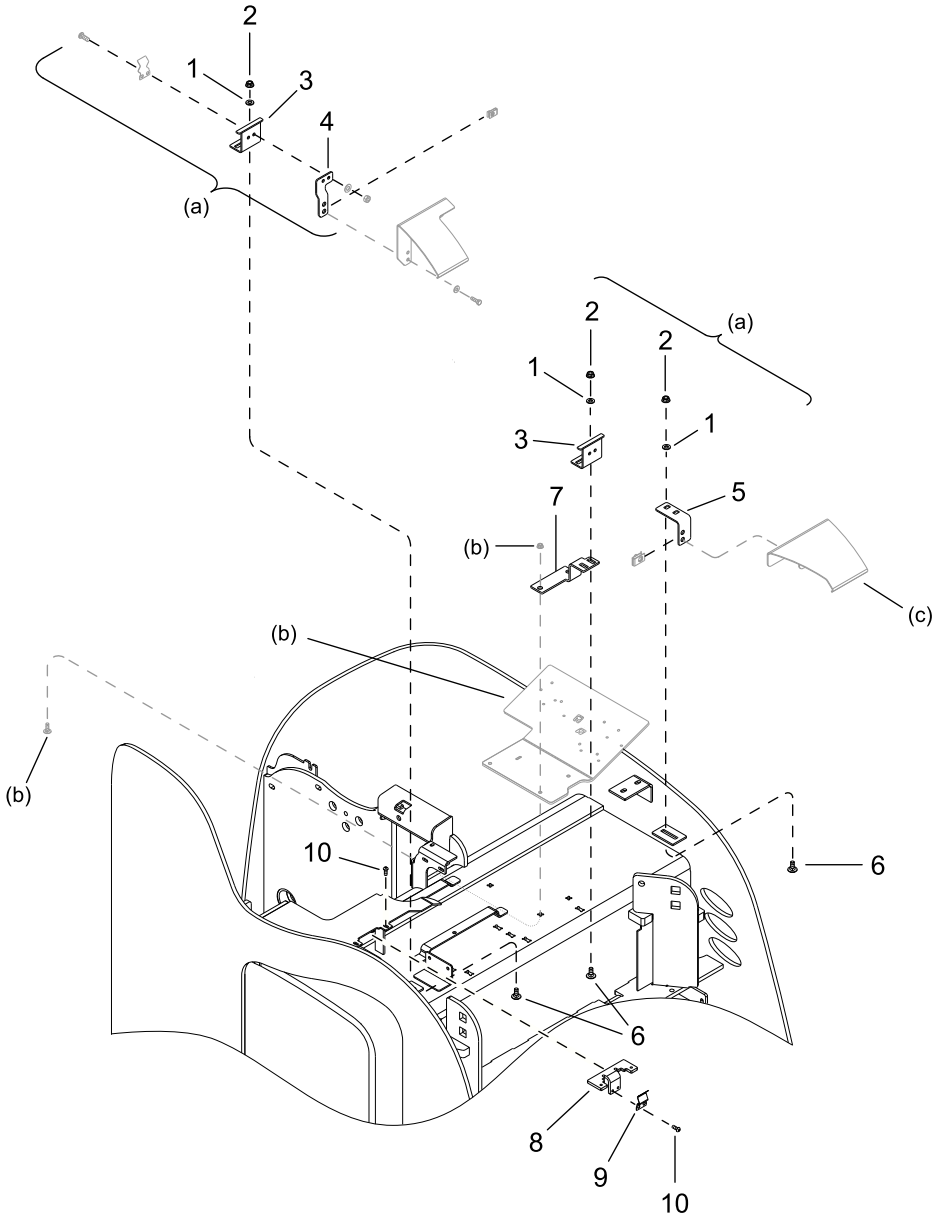
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## Notes:

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# POWER UNIT PARTS




(a) "B" Battery Compartment

(b) See Contactor Panel

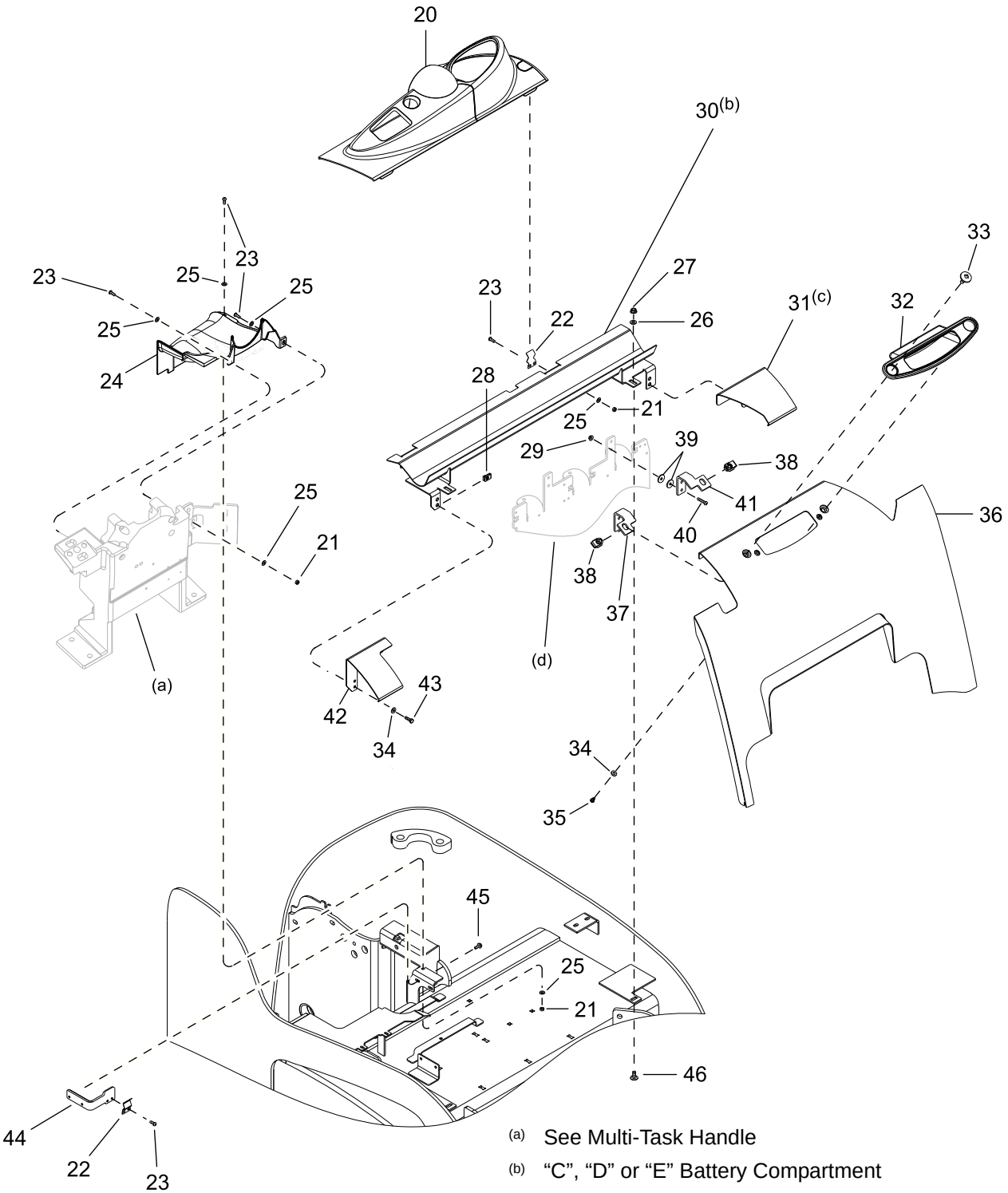
(c) Shown With Work Assist

Figure 15456-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060030-017 | Flatwasher with "B" Battery Compartment | 6 |
| 2 | 060059-001 | Nut with "B" Battery Compartment | 6 |
| 3 | 138876-001 | Bracket with "B" Battery Compartment | 2 |
| 4 | 141037 | Mounting Bracket with "B" Battery Compartment | 1 |
| 5 | 141024 | Mounting Bracket with "B" Battery Compartment | 1 |
| 6 | 060063-048 | Screw with "B" Battery Compartment | 6 |
| 7 | 138875 | Bracket with "B" Battery Compartment | 1 |
| 8 | 140578 | Bracket | 1 |
| 9 | 135912 | Clip | 1 |
| 10 | 060062-027 | Screw | 4 |




(a) See Multi-Task Handle

(b) "C", "D" or "E" Battery Compartment

(c) Shown With Work Assist

(d) See Electrical Components

Figure 15392-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 20 | (1) | Cover | 1 |
| 21 | 060059-050 | Nut | 6 |
| 22 | 135912 | Clip | 3 |
| 23 | 060062-027 | Screw | 9 |
| 24 | 135084 | Cover | 1 |
| 25 | 060063-204 | Flatwasher | 9 |
| 26 | 060030-017 | Flatwasher | 2 |
| 27 | 060059-001 | Nut | 2 |
| 28 | 060102-002 | U-Nut | 4 |
| 29 | 060059-027 | Nut | 4 |
| 30 | 141036-003 | Tray with “C” Battery Compartment | 1 |
| | 141036-004 | Tray with “D” Battery Compartment | 1 |
| | 141036-005 | Tray with “E” Battery Compartment | 1 |
| 31 | 140432 | Cover LH without Work Assist | 1 |
| | 140433 | Cover LH with Work Assist | 1 |
| | 141651 | Cover LH with Infolink | 1 |
| 32 | 140043 | Handle Assembly | 1 |
| 33 | 115453 | Screw Latch | 2 |
| 34 | 060030-132 | Flatwasher | 6 |
| 35 | 060062-004 | Screw | 2 |
| 36 | 136025 | Front Cover without Edison Quick Charge, Standard | 1 |
| | 139675 | Front Cover with Edison Quick Charge, Optional | 1 |
| 37 | 140997 | Bracket RH | 1 |
| 38 | 060031-030 | Speed Nut | 2 |
| 39 | 060030-123 | Flatwasher | AR |
| 40 | 060062-041 | Screw | 4 |
| 41 | 140998 | Bracket LH | 1 |
| 42 | 140431 | Cover RH | 1 |
| 43 | 060062-006 | Screw | 4 |
| 44 | 140559 | Bracket | 1 |
| 45 | 060062-040 | Bolt | 2 |
| 46 | 060063-048 | Screw | 2 |

(1) See Chart 1

| Chart 1 - Cover | | |
|---|---|---|
| Battery Compartment Size | Index 20 - Cover | InfoLink Antenna Cut-Out |
| B | 135957-002 | No |
| B | 135957-012 | Yes |
| C | 135957-003 | No |
| C | 135957-013 | Yes |
| D | 135957-004 | No |
| D | 135957-014 | Yes |
| E | 135957-005 | No |
| E | 135957-015 | Yes |

**Always Specify Model, Data & Serial Number**

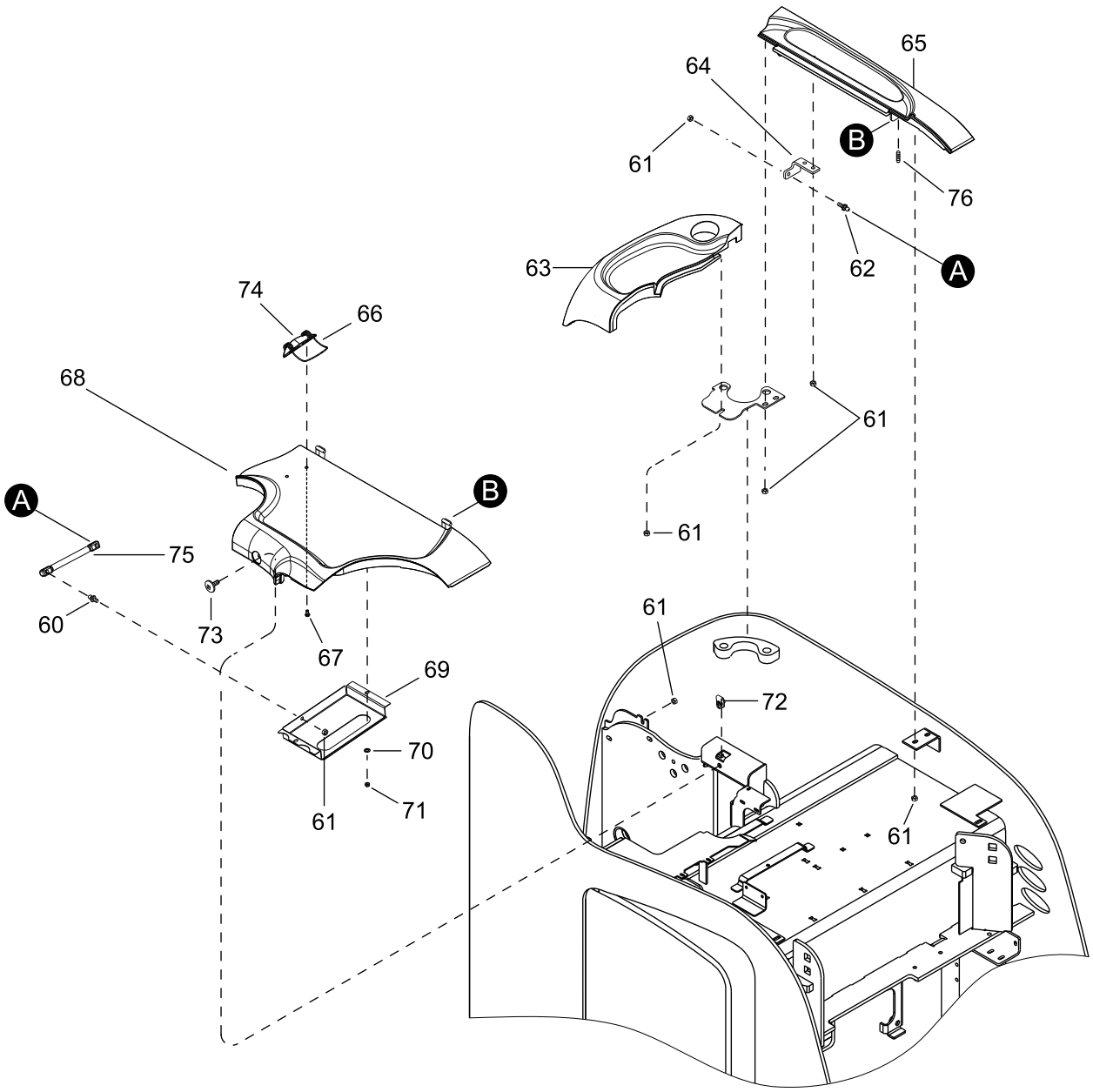



Figure 19218

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 60 | 139388 | Stud Ball | 1 |
| 61 | 060059-001 | Nut | 9 |
| 62 | 139388 | Stud Ball | 1 |
| 63 | 135081-002 | Desktop LH | 1 |
| 64 | 139887 | Mount Damper | 1 |
| 65 | 135083 | Side Tray | 1 |
| 66 | 814594 | Spring with Desktop Clip Pad | 1 |
| 67 | 060062-003 | Screw with Desktop Clip Pad | 2 |
| 68 | 135080-001 | Desktop without Desktop Clip Pad | 1 |
| | 135080-002 | Desktop with Desktop Clip Pad | 1 |
| 69 | 138632 | Bracket Case (Manual) | 1 |
| 70 | 060030-204 | Flatwasher | 2 |
| 71 | 060059-050 | Nut | 2 |
| 72 | 060031-030 | Speed Nut | 1 |
| 73 | 115453 | Screw Latch | 1 |
| 74 | 816658 | Housing with Desktop Clip Pad | 1 |
| 75 | 140024 | Gas Spring | 1 |
| 76 | 060015-132 | Screw | 2 |

(a) Optional
(b) Refer to Floorboard
(c) Rotated 180º

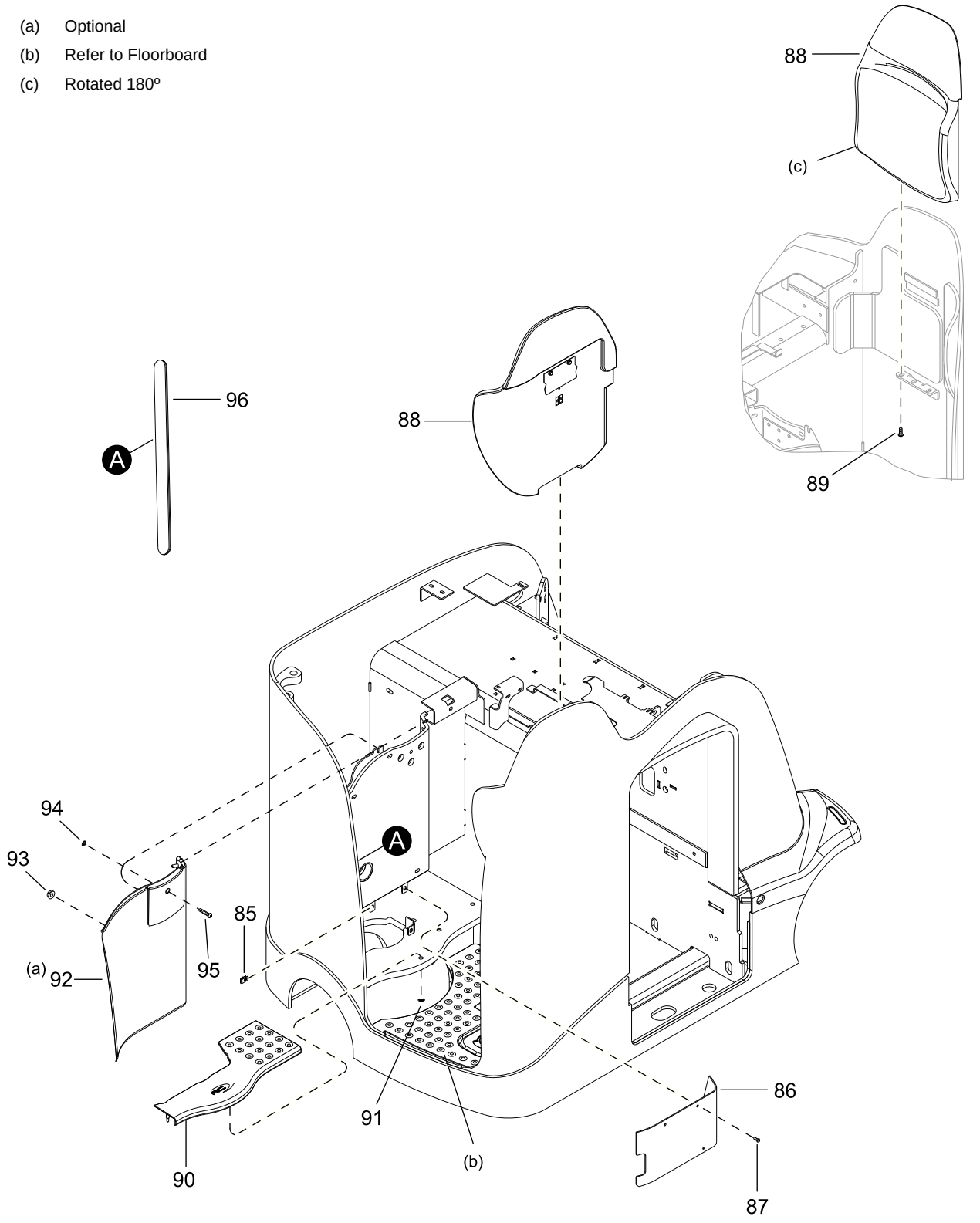



Figure 15405-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 85 | 060102-002 | U-Nut | 3 |
| 86 | 140453 | Cover | 1 |
| 87 | 060062-027 | Screw | 3 |
| 88 | 135095 | Back Pad | 1 |
| 89 | 060063-050 | Screw | 2 |
| 90 | 135089 | Step Mat | 1 |
| 91 | 060031-031 | Speed Nut | 4 |
| 92 | 135088 | Knee Pad - Optional | 1 |
| 93 | 060059-028 | Nut | 6 |
| 94 | 060143-001 | Retaining Washer | 1 |
| 95 | 060062-041 | Screw | 1 |
| 96 | 137320-002 | Knee Pad - Standard | 1 |
| | 138329-002 | Adhesive | AR |

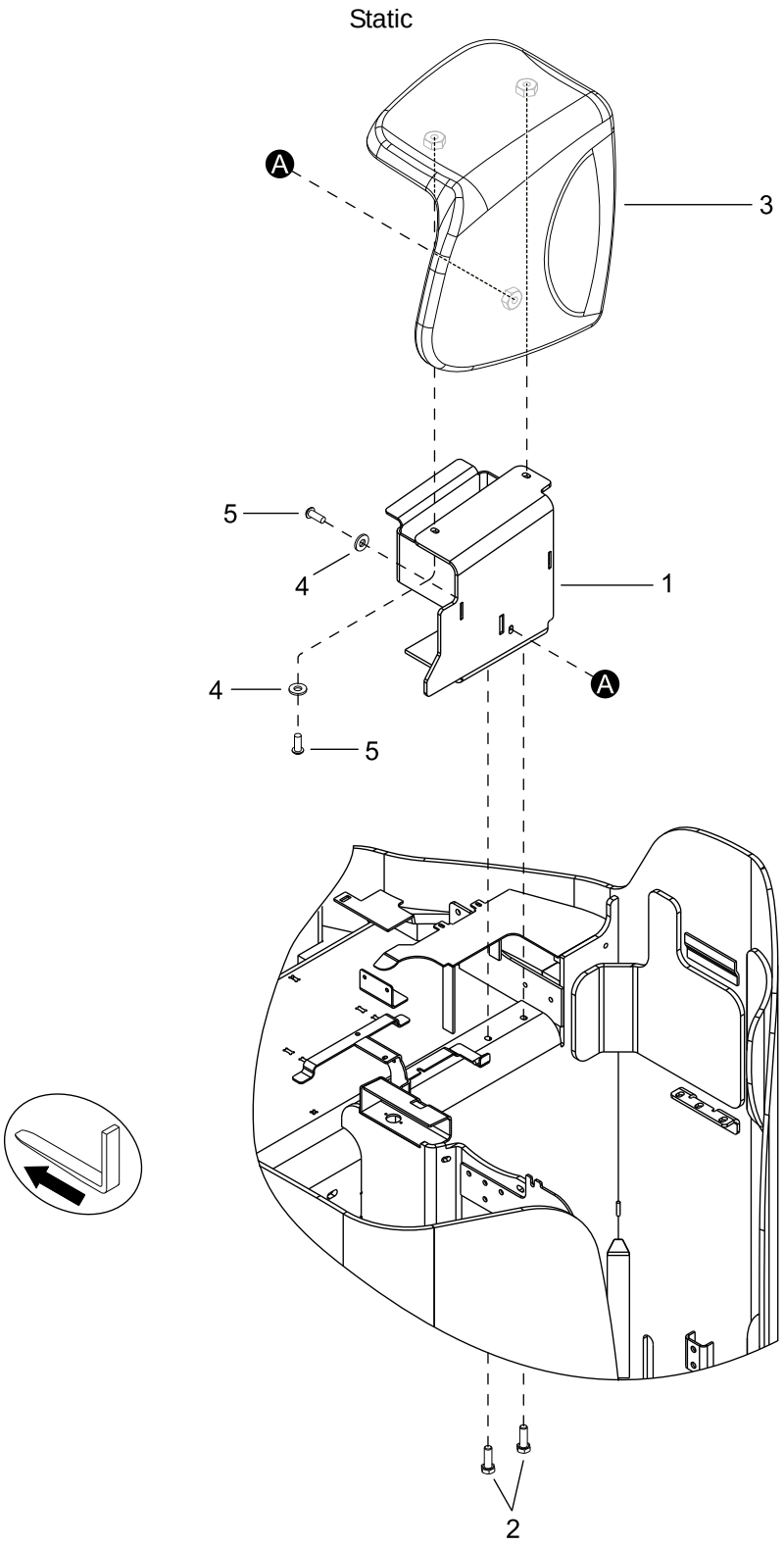



Figure 16306

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 140599 | Armrest Support | 1 |
| 2 | 060075-041 | Screw | 2 |
| 3 | 135093 | Arm Pad | 1 |
| 4 | 060030-012 | Flatwasher | 3 |
| 5 | 060062-027 | Screw | 3 |

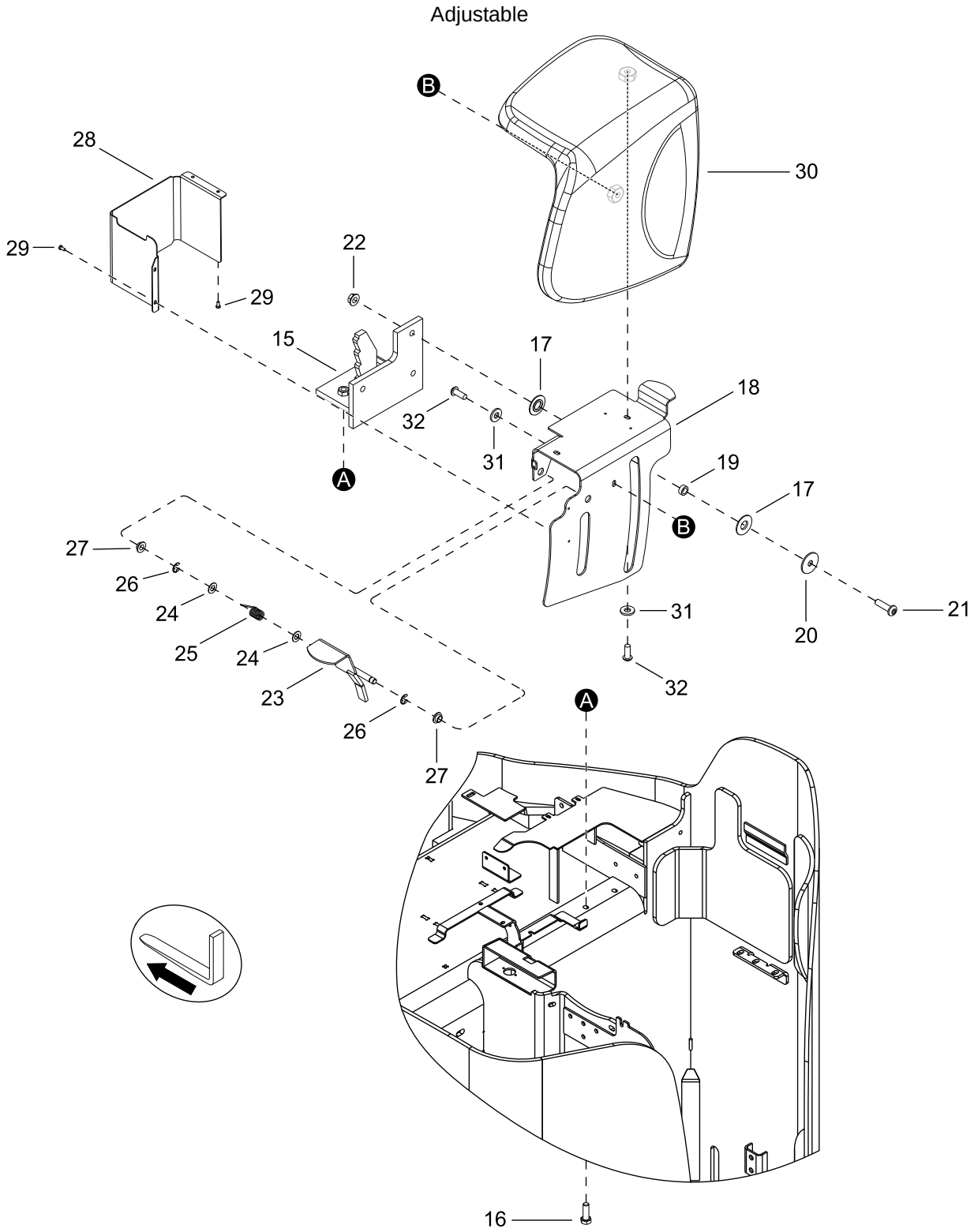



Figure 16307

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 15 | 136787 | Mounting | 1 |
| 16 | 060075-041 | Screw | 2 |
| 17 | 137978 | Slide Bushing | 6 |
| 18 | 141081 | Slide Bracket | 1 |
| 19 | 103418-048 | Spacer | 3 |
| 20 | 060030-080 | Flatwasher | 3 |
| 21 | 060075-008 | Screw | 3 |
| 22 | 060059-029 | Nut | 3 |
| 23 | 136791 | Release | 1 |
| 24 | 060030-248 | Flatwasher | 2 |
| 25 | 141082 | Spring | 1 |
| 26 | 060009-133 | Retaining Ring | 2 |
| 27 | 137977 | Flanged Bushing | 2 |
| 28 | 137082 | Metal Shroud | 1 |
| 29 | 060065-007 | Screw | 4 |
| 30 | 135093 | Arm Pad | 1 |
| 31 | 060030-012 | Flatwasher | 3 |
| 32 | 060062-027 | Screw | 3 |

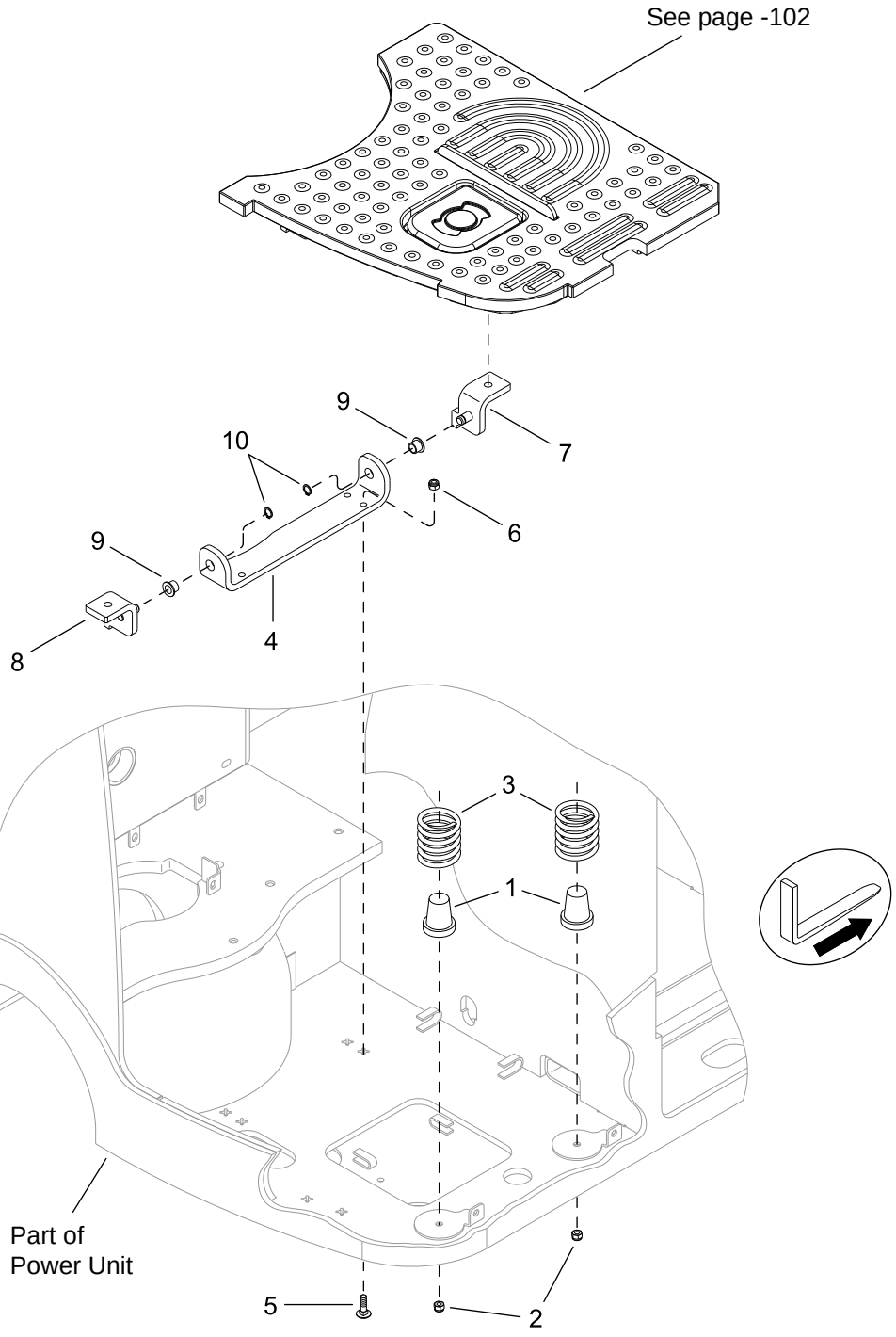



Figure 15458

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 137616 | Rubber Stopper | 2 |
| 2 | 060059-020 | Nut | 2 |
| 3 | 137617 | Spring | 2 |
| 4 | 137624 | Center Hinged Floorboard Bracket | 1 |
| 5 | 060063-041 | Screw | 4 |
| 6 | 060059-020 | Nut | 4 |
| 7 | 137619 | Front Bracket | 1 |
| 8 | 137623 | Rear Bracket | 1 |
| 9 | 065042-003 | Bushing | 2 |
| 10 | 060009-003 | Retaining Ring | 2 |

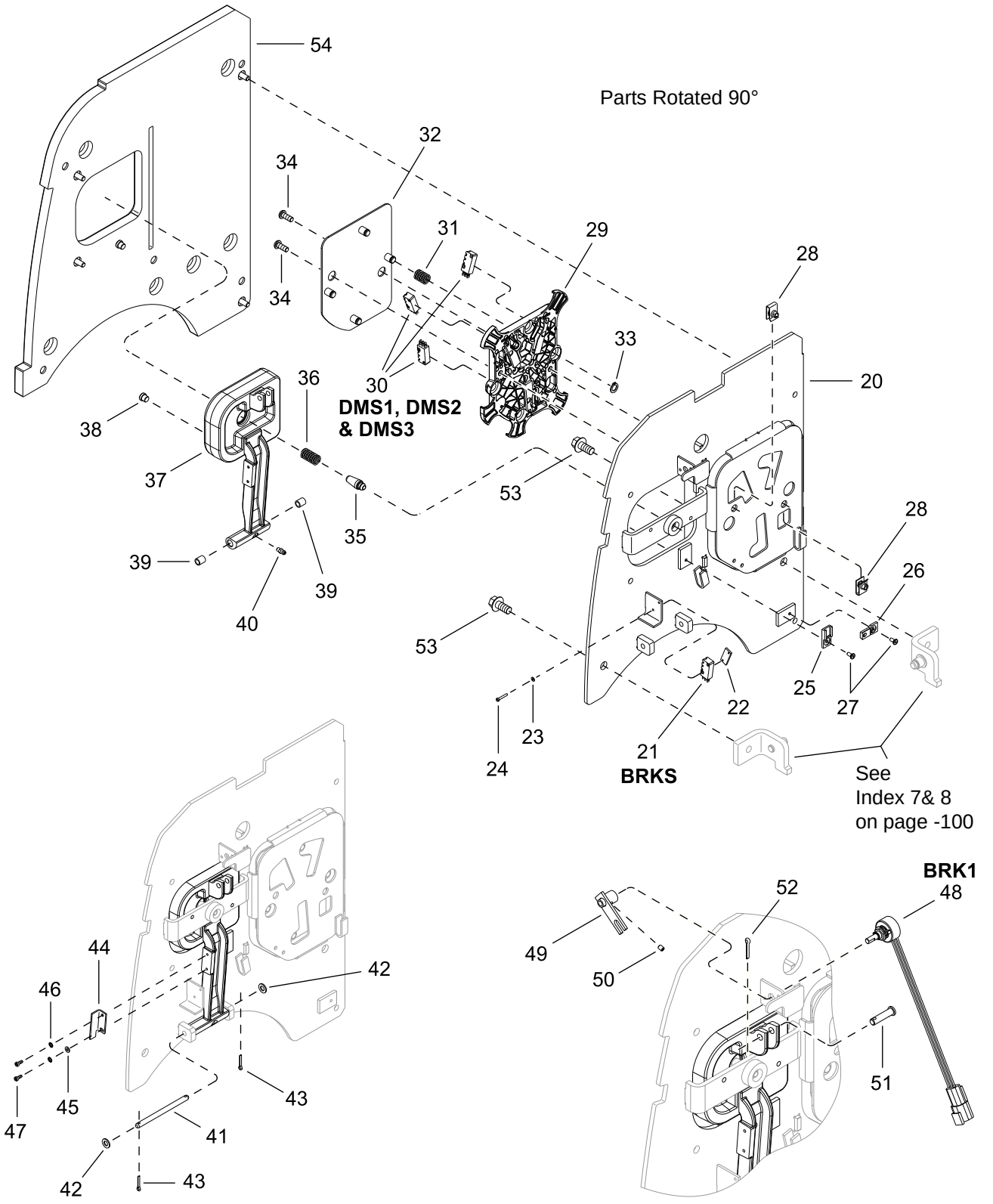



Figure 15459

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 20 | 134065 | Floorboard | 1 |
| 21 | 062752-005 | Switch V7 | 1 |
| 22 | 133389 | Retainer | 1 |
| 23 | 060005-050 | Lockwasher | 2 |
| 24 | 060064-002 | Screw | 2 |
| 25 | 062749-001 | Attachment Clip | 1 |
| 26 | 062749-002 | Attachment Clip | 1 |
| 27 | 060061-032 | Screw | 2 |
| 28 | 060102-007 | U-Nut | 2 |
| 29 | 133682 | Pedal Baseplate | 1 |
| 30 | 132721 | Foot Presence Switch Assembly | 1 |
| | 062752-002 | .Switch | 3 |
| | 062755-001 | .Connector | 1 |
| | 062798-002 | .Connector Insert | 1 |
| | 062007-092 | .Terminal | 2 |
| | 062007-102 | .Terminal | 4 |
| 31 | 133485 | Spring | 4 |
| 32 | 133684 | Plate | 1 |
| 33 | 060009-159 | Retaining Ring | 4 |
| 34 | 060063-015 | Screw | 2 |
| 35 | 123482 | Poly Stop | 1 |
| 36 | 122834 | Spring | 1 |
| 37 | 135815 | Brake Pedal | 1 |
| 38 | 123724 | Poly Slide | 1 |
| 39 | 065038-009 | Bearing | 2 |
| 40 | 064332-001 | Lube Fitting | 1 |
| 41 | 135895 | Pivot Pin | 1 |
| 42 | 060030-265 | Flatwasher | 2 |
| 43 | 060038-017 | Cotter Pin | 2 |
| 44 | 138312 | Adjuster Bracket | 1 |
| 45 | 060030-045 | Flatwasher | 1 |
| 46 | 060005-033 | Lockwasher | 2 |
| 47 | 060065-004 | Screw | 2 |
| 48 | 140759 | Rotary Sensor Assembly | 1 |
| 49 | 136806 | Actuator | 1 |
| 50 | 060061-025 | Screw | 1 |
| 51 | 103160 | Clevis Pin | 1 |
| 52 | 060038-017 | Cotter Pin | 1 |
| 53 | 060115-016 | Screw | 2 |
| 54 | 136970-001 | Foamed Mat | 1 |
| | 135097-002 | Rubber Mat (Freezer/Corrosion) | 1 |

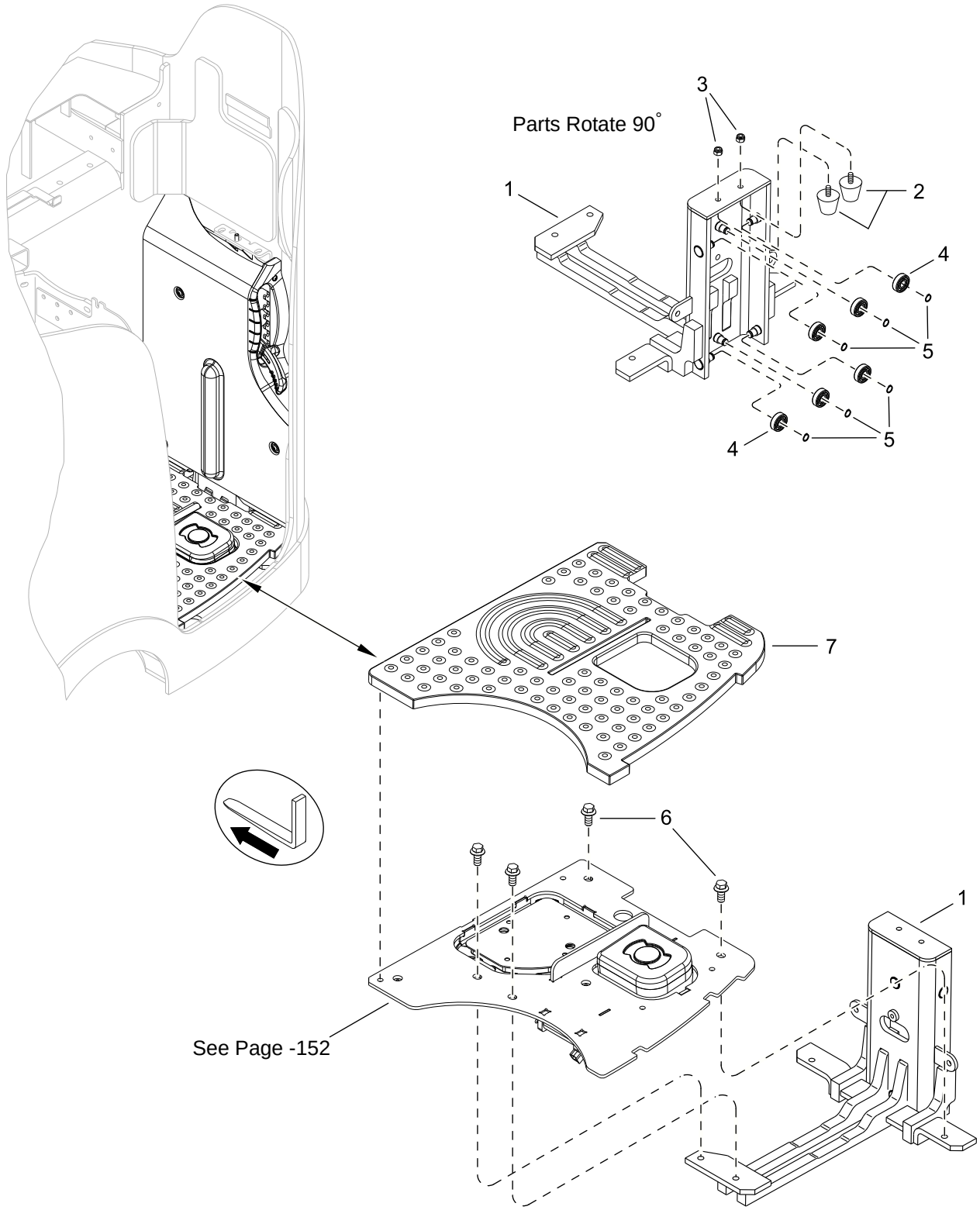



Figure 15525

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 140722 | Carriage | 1 |
| 2 | 138354 | Bumper | 2 |
| | 138689* | Bumper (Freezer/Corrosion) | 2 |
| 3 | 060059-020 | Nut | 2 |
| 4 | 065081-015 | Ball Bearing | 6 |
| 5 | 060009-186 | Retaining Ring | 6 |
| 6 | 060115-016 | Screw | 4 |
| 7 | 136968 | Foamed Mat | 1 |
| | 135097-001* | Rubber Mat (Freezer/Corrosion) | 1 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

# POWER UNIT PARTS

## FlexRide Suspension

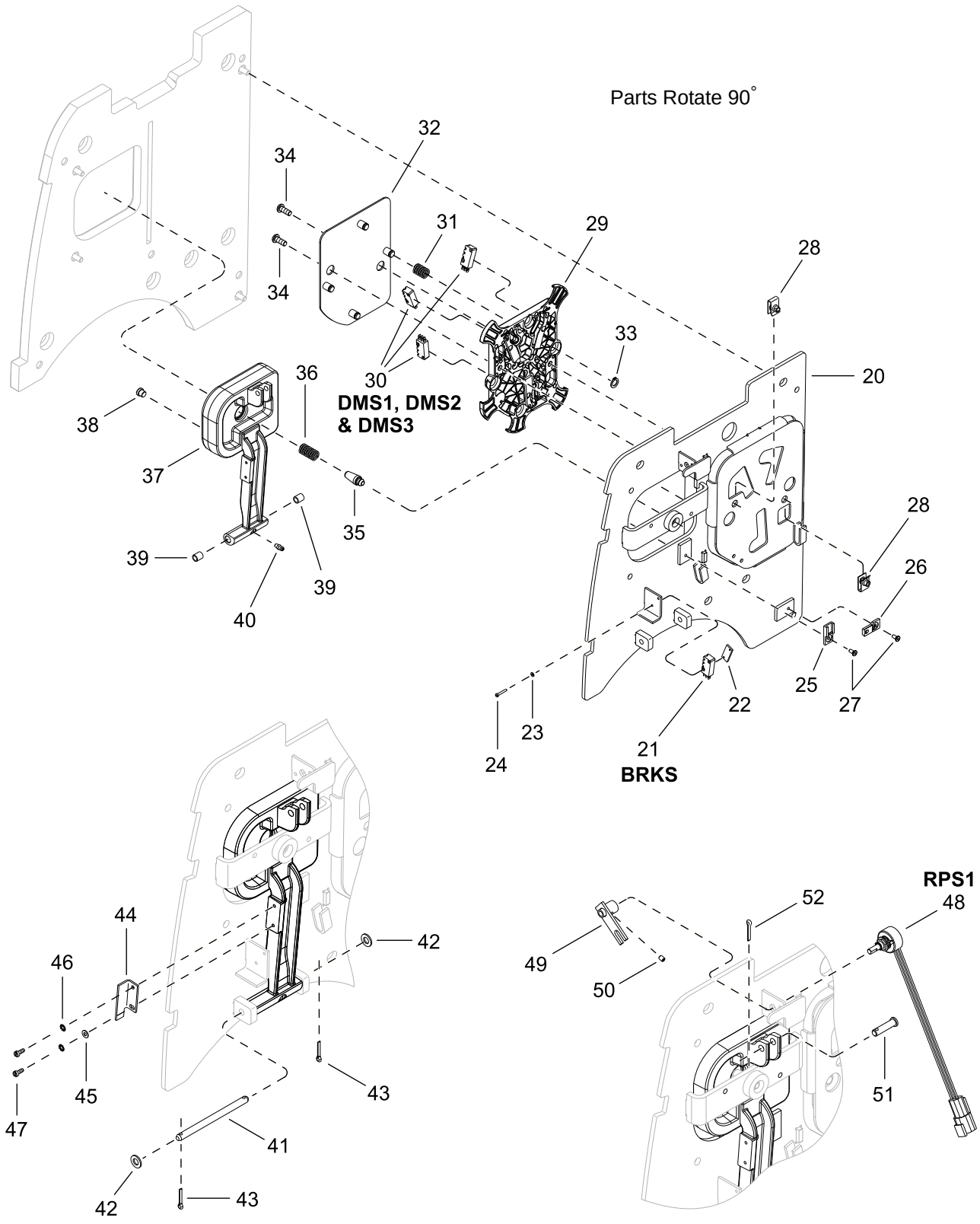



Figure 15526-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 20 | 140715 | Floorboard | 1 |
| 21 | 140040 | Switch Assembly (Includes Leads) | 1 |
| 22 | 133389 | Retainer | 1 |
| 23 | 060005-050 | Lockwasher | 2 |
| 24 | 060064-002 | Screw | 2 |
| 25 | 062749-001 | Attachment Clip | 1 |
| 26 | 062749-002 | Attachment Clip | 1 |
| 27 | 060061-032 | Screw | 2 |
| 28 | 060102-007 | U-Nut | 2 |
| 29 | 133682 | Pedal Baseplate | 1 |
| 30 | 132721 | Foot Presence Switch Assembly | 1 |
| | 062752-002 | Switch | 3 |
| | 062755-001 | Connector | 1 |
| | 062798-002 | Connector Insert | 1 |
| | 062007-092 | Terminal | 2 |
| | 062007-102 | Terminal | 4 |
| 31 | 133485 | Spring | 4 |
| 32 | 133684 | Plate | 1 |
| 33 | 060009-159 | Retaining Ring | 4 |
| 34 | 060063-015 | Screw | 2 |
| 35 | 123482 | Poly Stop | 1 |
| 36 | 122834 | Spring | 1 |
| 37 | 135815 | Brake Pedal | 1 |
| 38 | 123724 | Poly Slide | 1 |
| 39 | 065038-009 | Bearing | 2 |
| 40 | 064332-001 | Lube Fitting | 1 |
| 41 | 135895 | Pivot Pin | 1 |
| 42 | 060030-265 | Flatwasher | 2 |
| 43 | 060038-017 | Cotter Pin | 2 |
| 44 | 138312 | Adjuster Bracket | 1 |
| 45 | 060030-045 | Flatwasher | 1 |
| 46 | 060005-033 | Lockwasher | 2 |
| 47 | 060065-004 | Screw | 2 |
| 48 | 140759 | Rotary Sensor Assembly | 1 |
| 49 | 136806 | Actuator | 1 |
| 50 | 060061-025 | Screw | 1 |
| 51 | 103160 | Clevis Pin | 1 |
| 52 | 060038-017 | Cotter Pin | 1 |

# POWER UNIT PARTS

## FlexRide Suspension

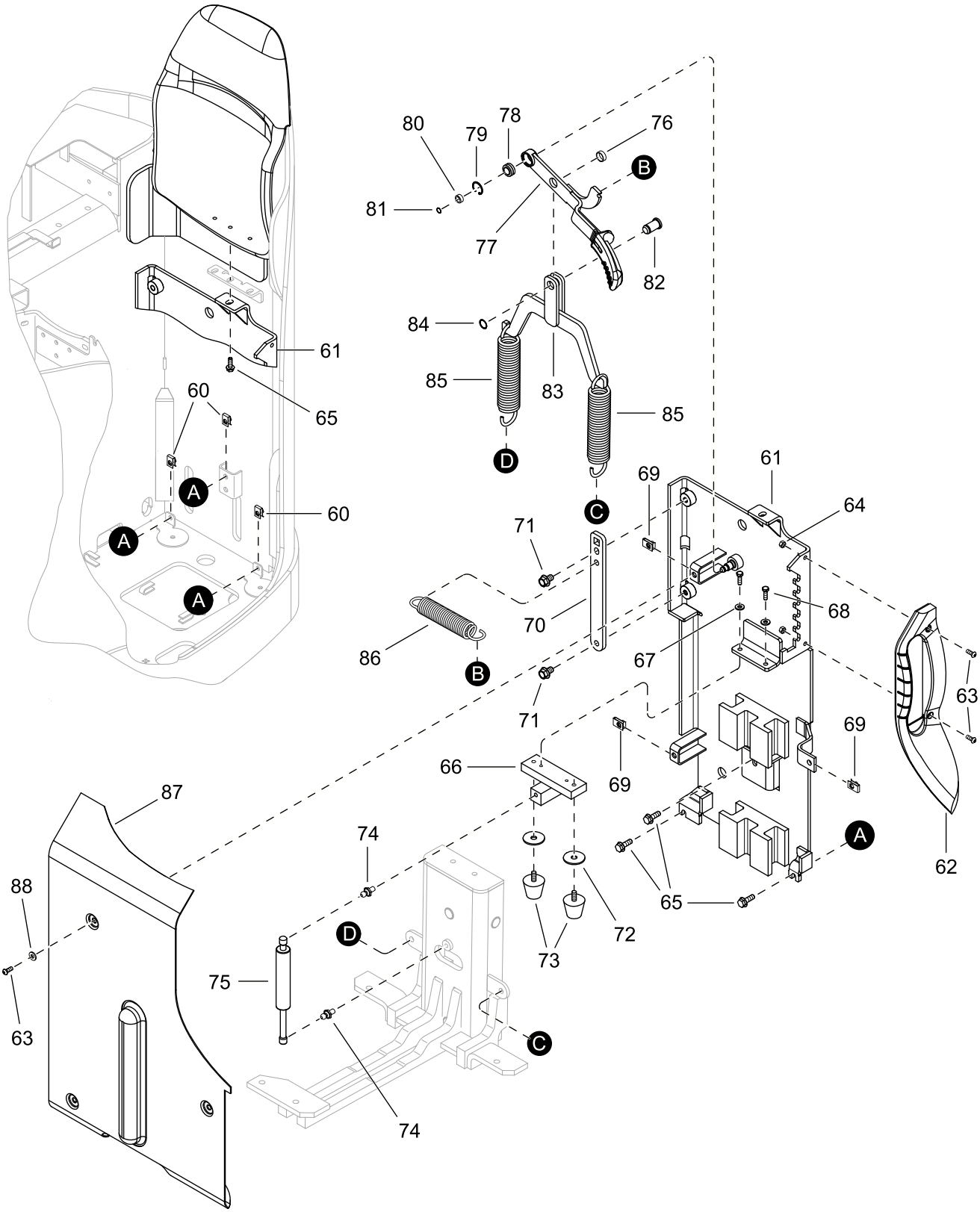



Figure 15527-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 60 | 060102-007 | U-Nut | 3 |
| 61 | 140716 | Track | 1 |
| 62 | 138439 | Pocket | 1 |
| 63 | 060062-066 | Screw | 5 |
| 64 | 060059-037 | Nut | 2 |
| 65 | 060063-042 | Screw | 4 |
| 66 | 140726 | Top Stop | 1 |
| 67 | 060030-012 | Flatwasher | 2 |
| 68 | 060062-006 | Screw | 2 |
| 69 | 060102-002 | U-Nut | 3 |
| 70 | 139473 | Tensioning Lever | 1 |
| 71 | 060075-043 | Screw | 2 |
| 72 | 060030-080 | Flatwasher | 2 |
| 73 | 138354 | Bumper | 2 |
| | 138689* | Bumper (Freezer/Corrosion) | 2 |
| 74 | 139388 | Ball Stud | 2 |
| 75 | 138336 | Hydraulic Damper | 1 |
| 76 | 065007-011 | Bearing | 1 |
| 77 | 138440 | Lever Arm Handle | 1 |
| 78 | 065012-006 | Bushing | 1 |
| 79 | 060009-108 | Retaining Ring | 1 |
| 80 | 139440 | Spacer | 1 |
| 81 | 060009-184 | Retaining Ring | 1 |
| 82 | 138452 | Stud | 1 |
| 83 | 139471 | Yoke | 1 |
| 84 | 060009-185 | Retaining Ring | 1 |
| 85 | 138337 | Extension Spring | 2 |
| 86 | 139430 | Helper Spring | 1 |
| 87 | 140728 | Cover | 1 |
| 88 | 060030-012 | Flatwasher | 3 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

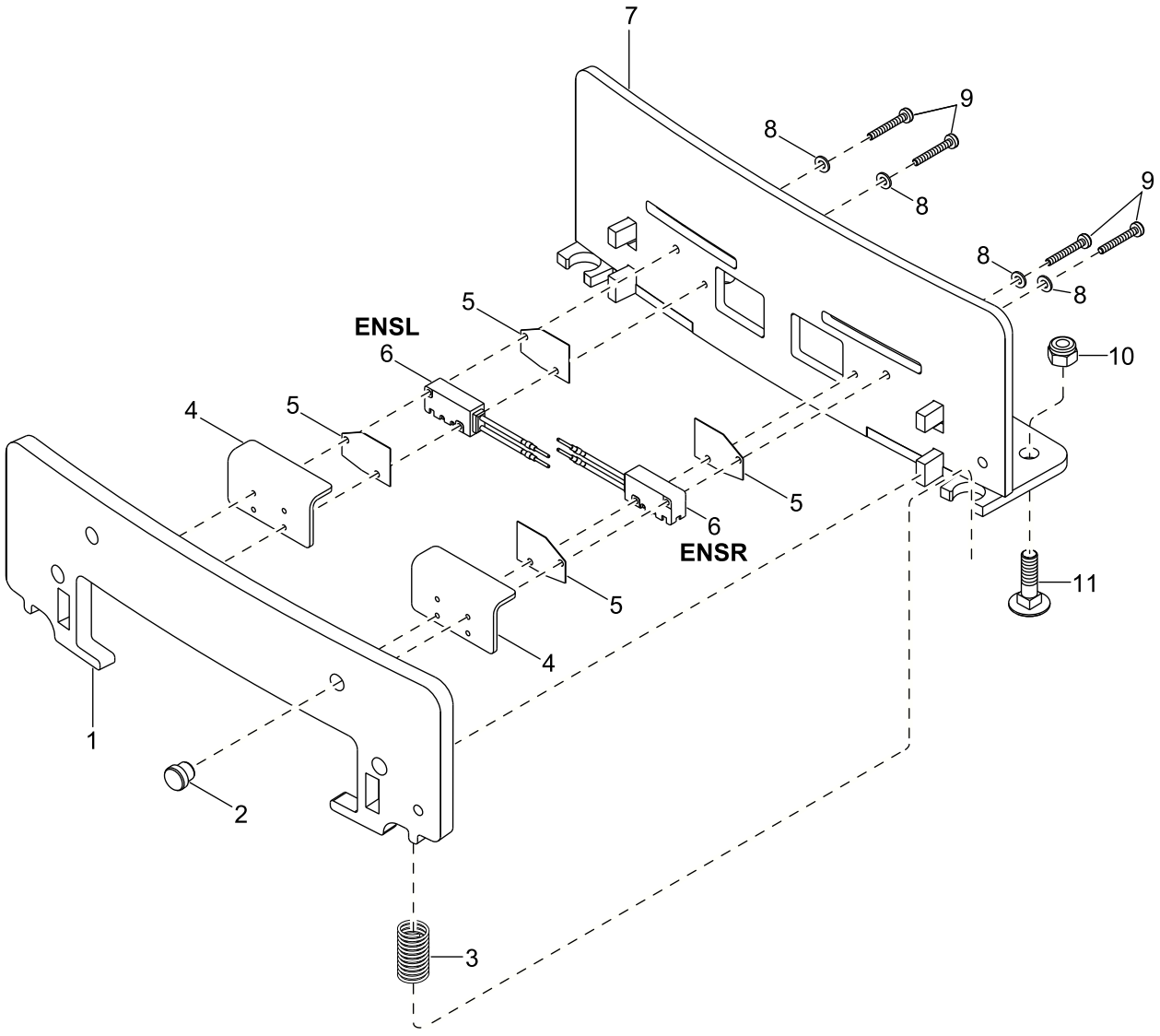



Figure 21018

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 146050 | Entry Bar | 1 |
| 2 | 123724 | Poly Slide | 4 |
| 3 | 102545 | Spring | 2 |
| 4 | 134789 | Switch Cover | 2 |
| 5 | 093603 | Insulator Switch | 4 |
| 6 | 140042 | Switch Assembly | 1 |
| 7 | 146051 | Entry Bar | 1 |
| 8 | 060030-236 | Flatwasher | 4 |
| 9 | 060064-017 | Screw | 4 |
| 10 | 060059-020 | Nut | 4 |
| 11 | 060063-041 | Screw | 4 |

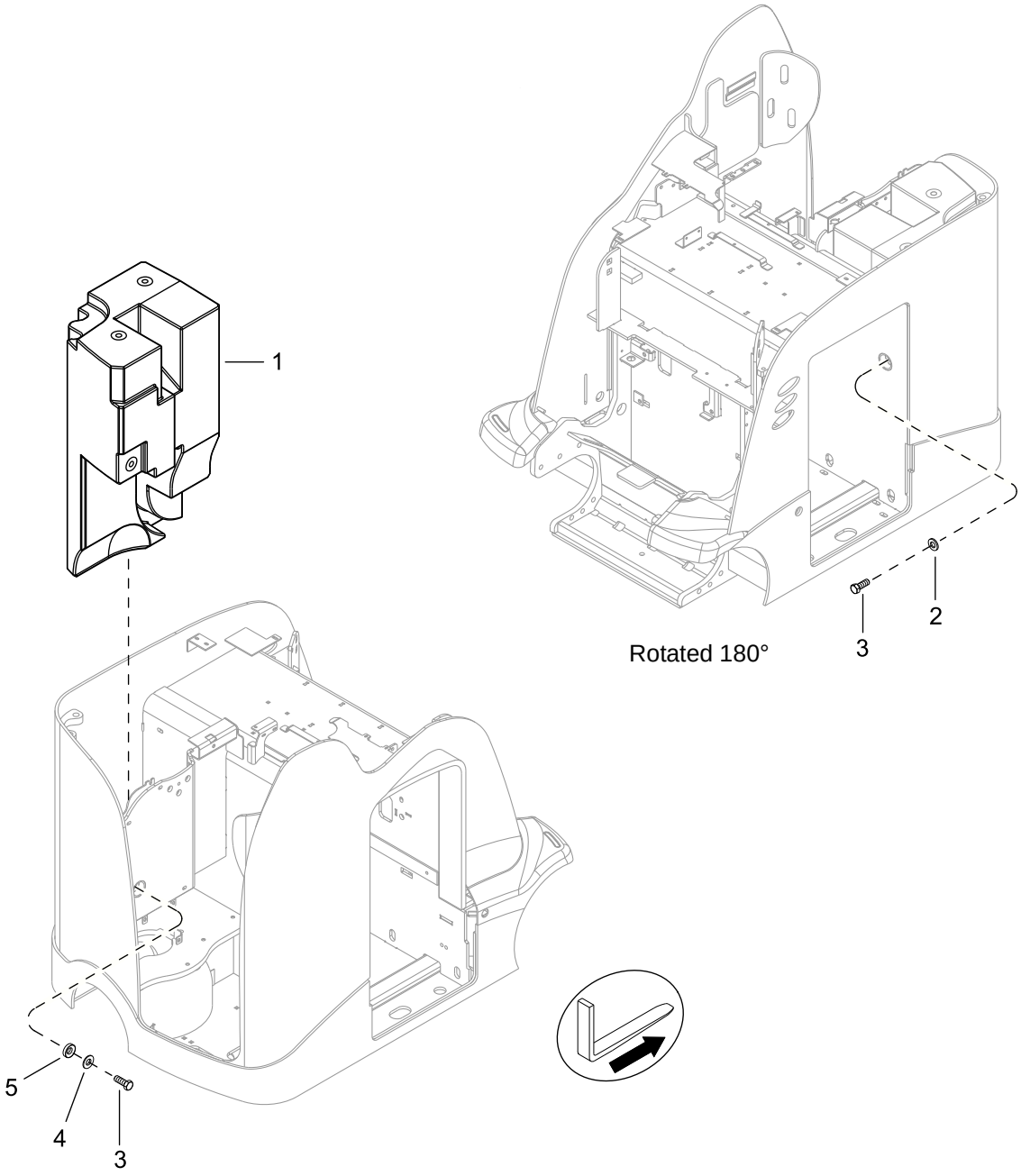



Figure 15326

https://truckmanualshub.com/



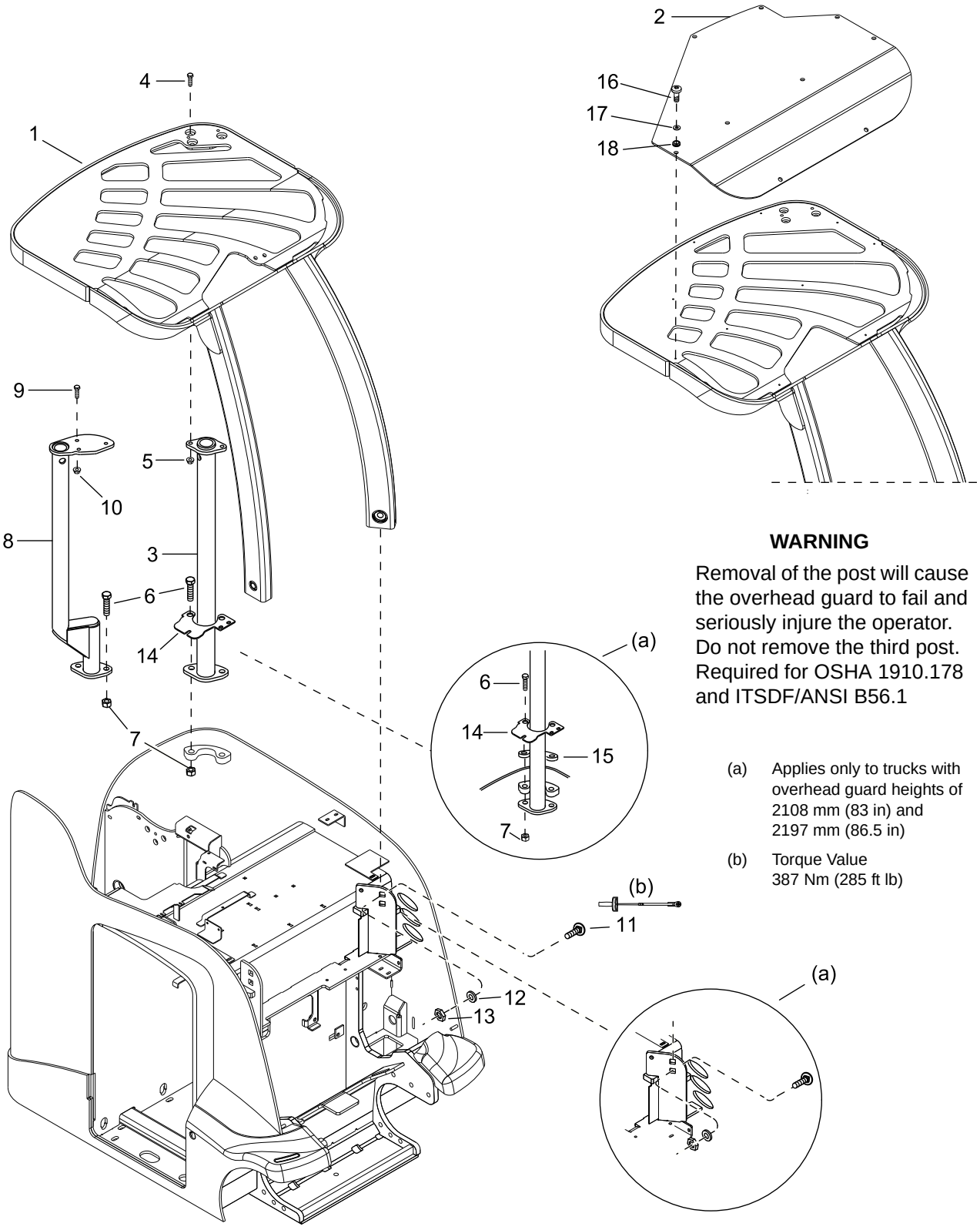
| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | (1) | Counterweight | 1 |
| 2 | 060030-341 | Flatwasher | 1 |
| 3 | 060023-007 | Screw | 2 |
| 4 | 060128-002 | Spherical Washer | 1 |
| 5 | 060128-001 | Spherical Washer | 1 |

(1) See Chart 1

**Chart 1 - Counterweight**

| *Battery Compartment Size | Truck Capacity(2) | | Index 1 - Counterweight |
|---|---|---|---|
| | kg | lb | |
| B | 1360.8 | 3000 | 134533 |
| C | 1360.8 | 3000 | 134533 |
| D | 1360.8 | 3000 | 134532 |
| | 1587.6 | 3500 | 134533 |
| E | 1814.4 | 4000 | 134533 |

(2) Refer to Capacity Plate.




**WARNING**

Removal of the post will cause the overhead guard to fail and seriously injure the operator. Do not remove the third post. Required for OSHA 1910.178 and ITSDF/ANSI B56.1

(a) Applies only to trucks with overhead guard heights of 2108 mm (83 in) and 2197 mm (86.5 in)

(b) Torque Value 387 Nm (285 ft lb)

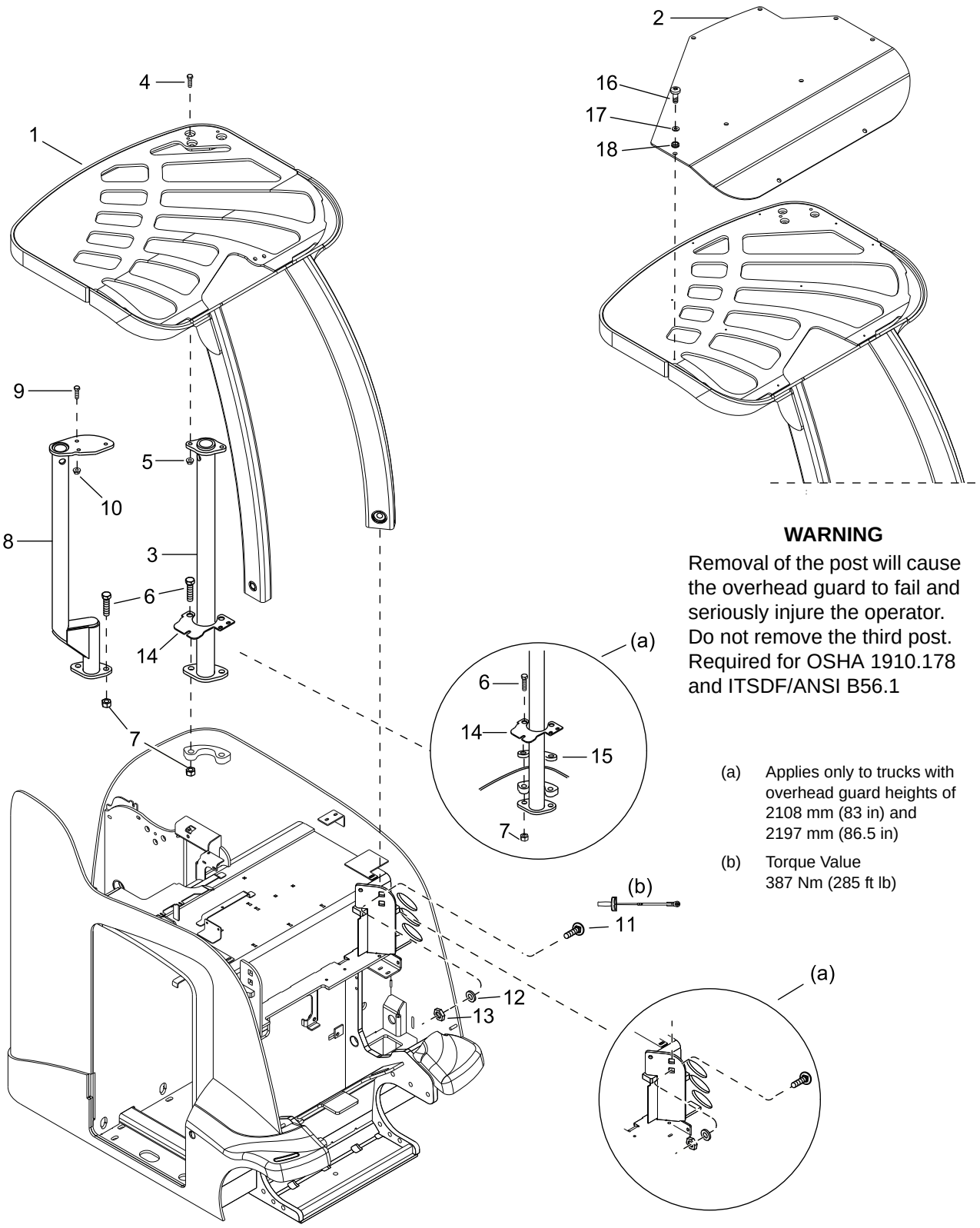
Figure 18332

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | (1) | Overhead Guard | 1 |
| 2 | (1) | Overhead Guard Shield | 1 |
| 3 | (2) | 3rd Post Assembly | 1 |
| 4 | 060115-024 | Screw | 2 |
| 5 | 060059-010 | Nut | 2 |
| 6 | 060023-004 | Screw | 2 |
| 7 | 060021-061 | Nut | 2 |
| 8 | (2) | Drive Thru 3rd Post Assembly | 1 |
| 9 | 060115-024 | Screw | 3 |
| 10 | 060059-010 | Nut | 3 |
| 11 | 060023-032 | Screw | 2 |
| 12 | 060134-001 | Flatwasher | 2 |
| 13 | 060021-061 | Nut | 2 |
| 14 | 140536 | Bracket | 1 |
| 15 | 141292 | Spacer | 1 |
| 16 | 060062-037 | Screw | 8 |
| 17 | 060030-012 | Flatwasher | 8 |
| 18 | 065004-017 | Grommet | 8 |

(1) See Chart 1
(2) See Chart 2




**WARNING**

Removal of the post will cause the overhead guard to fail and seriously injure the operator. Do not remove the third post. Required for OSHA 1910.178 and ITSDF/ANSI B56.1

(a) Applies only to trucks with overhead guard heights of 2108 mm (83 in) and 2197 mm (86.5 in)

(b) Torque Value 387 Nm (285 ft lb)

Figure 18332

https://truckmanualshub.com/



| Chart 1 - Overhead Guard | | | | | |
|---|---|---|---|---|---|
| Overhead Guard Height | | Index 1 - Overhead Guard Without Cover | | | |
| | | *Battery Compartment Size | | | |
| mm | in | B | C | D | E |
| 2108, 2146 | 83, 84.5 | 142193-002 | 142193-003 | 142193-004 | 142193-005 |
| 2197, 2235 | 86.5, 88 | 142194-002 | 142194-003 | 142194-004 | 142194-005 |

| Overhead Guard Height | | Index 1 - Overhead Guard With Mesh Cover | | | |
|---|---|---|---|---|---|
| | | *Battery Compartment Size | | | |
| mm | in | B | C | D | E |
| 2108, 2146 | 83, 84.5 | 139749-002 | 139749-003 | 139749-004 | 139749-005 |
| 2197, 2235 | 86.5, 88 | 139749-006 | 139749-007 | 139749-008 | 139749-009 |

| Overhead Guard Height | | Index 1 - Overhead Guard With Expanded Metal Cover | | | |
|---|---|---|---|---|---|
| | | *Battery Compartment Size | | | |
| mm | in | B | C | D | E |
| 2108, 2146 | 83, 84.5 | 139751-002 | 139751-003 | 139751-004 | 139751-005 |
| 2197, 2235 | 86.5, 88 | 139751-006 | 139751-007 | 139751-008 | 139751-009 |

| Overhead Guard Height | | Index 1 - Overhead Guard With Plexiglass Cover | | | |
|---|---|---|---|---|---|
| | | *Battery Compartment Size | | | |
| mm | in | B | C | D | E |
| 2108, 2146 | 83, 84.5 | 139961-002 | 139961-003 | 139961-004 | 139961-005 |
| 2197, 2235 | 86.5, 88 | 139961-006 | 139961-007 | 139961-008 | 139961-009 |

| Overhead Guard Height | | Index 2 - Overhead Guard Shield | | | |
|---|---|---|---|---|---|
| | | *Battery Compartment Size | | | |
| mm | in | B | C | D | E |
| 2108, 2146 | 83, 84.5 | 139960-002 | 139960-003 | 139960-004 | 139960-005 |
| 2197, 2235 | 86.5, 88 | 139960-012 | 139960-002 | 139960-003 | 139960-004 |

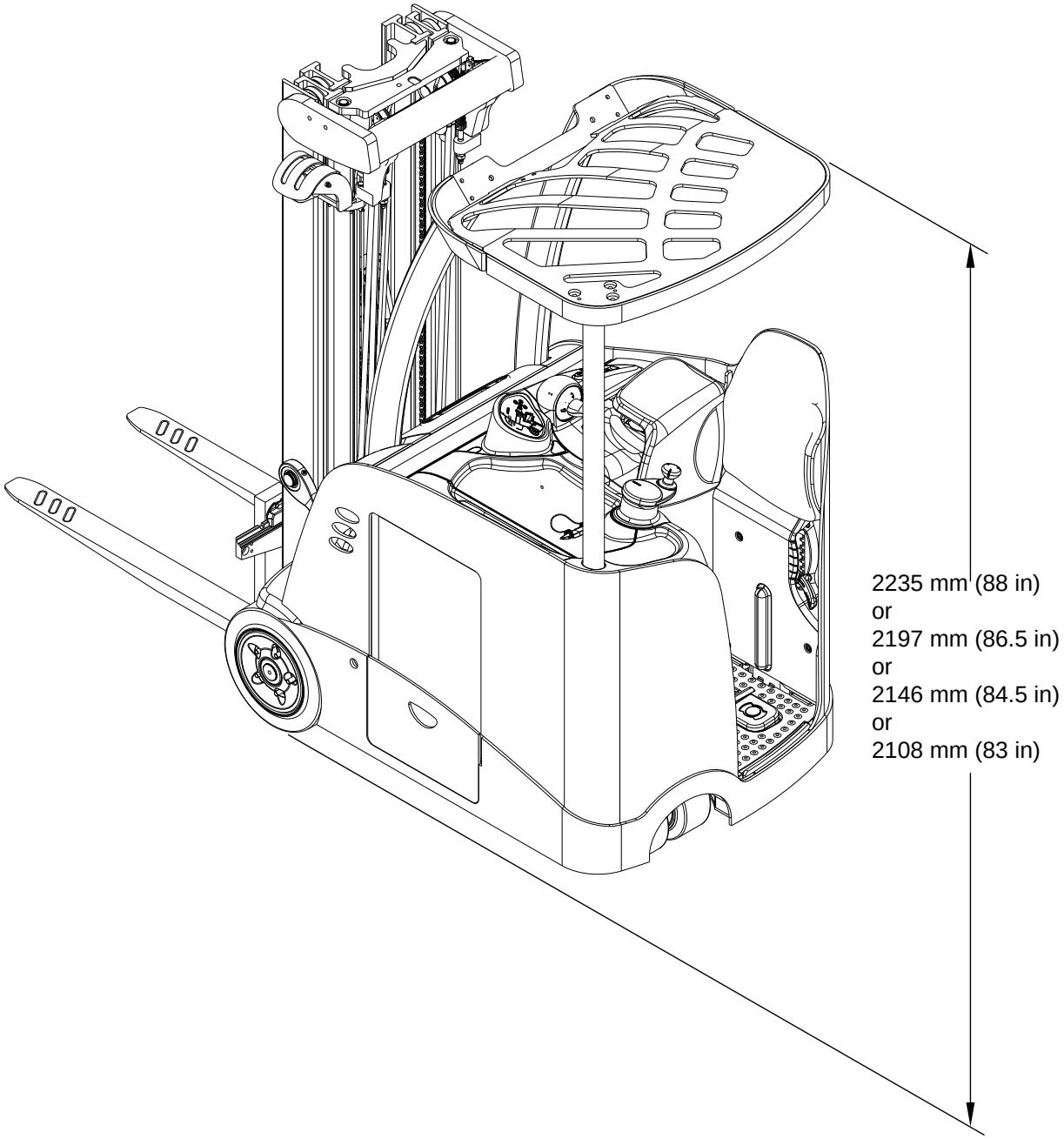



Figure 18333

https://truckmanualshub.com/



| Chart 2 - Standard 3rd Post Assemblies | | | |
|---|---|---|---|
| Overhead Guard Height | | *Battery Compartment Size | Index 3 - 3rd Post Assembly |
| mm | in | | |
| 2108 | 83 | B, C, D or E | 142275-006 |
| 2146 | 84.5 | B, C, D or E | 142275-002 |
| 2197 | 86.5 | B, C, D or E | 142275-005 |
| 2235 | 88 | B, C, D or E | 142275-001 |

| Drive Thru 3rd Post Assemblies | | | |
|---|---|---|---|
| Overhead Guard Height | | *Battery Compartment Size | Index 8 - 3rd Post Assembly |
| mm | in | | |
| 2146 | 84.5 | B, C, D or E | 142842-002 |
| 2197 | 86.5 | C, D or E | 142842-005 |
| 2235 | 88 | B, C, D or E | 142842-001 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

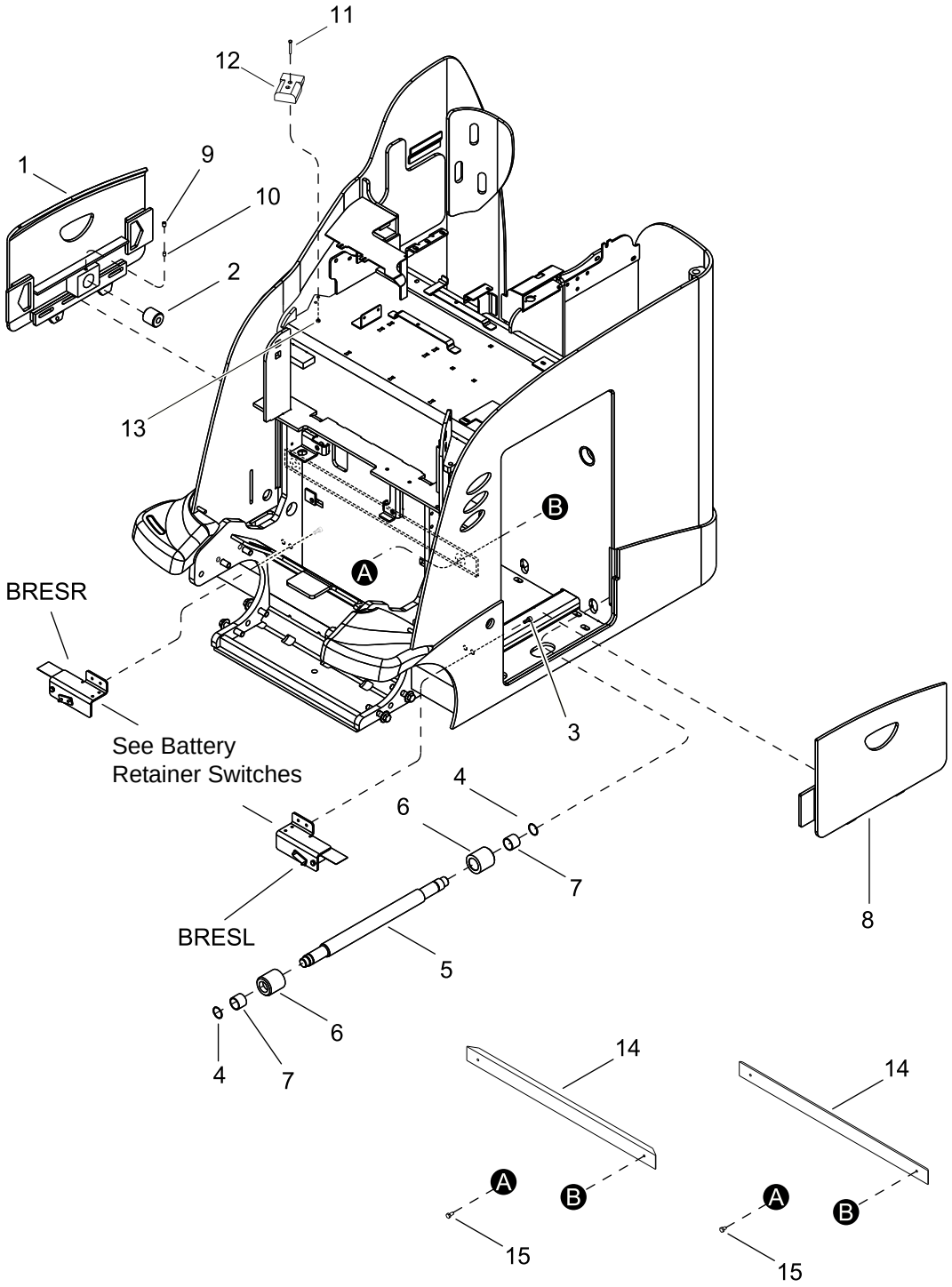



Figure 15325-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 136004-002* | Right Retainer Assembly "B" Battery Box | 1 |
| | 136004-003* | Right Retainer Assembly "C" Battery Box | 1 |
| | 136004-004* | Right Retainer Assembly "D" Battery Box | 1 |
| | 136004-005* | Right Retainer Assembly "E" Battery Box | 1 |
| 2 | 128613-001 | Battery Screw | 1 |
| 3 | 060061-019 | Screw | 4 |
| 4 | 060009-129 | Retaining Ring | 8 |
| 5 | 136013-002* | Roller Shaft "B" Battery Box | 4 |
| | 136013-003* | Roller Shaft "C" Battery Box | 4 |
| | 136013-004* | Roller Shaft "D" Battery Box | 4 |
| | 136013-005* | Roller Shaft "E" Battery Box | 4 |
| 6 | 136012 | Roller | 8 |
| 7 | 065007-101 | Metric Bushing | 8 |
| 8 | 138758-002* | Left Retainer Assembly "B" Battery Box | 1 |
| | 138758-003* | Left Retainer Assembly "C" Battery Box | 1 |
| | 138758-004* | Left Retainer Assembly "D" Battery Box | 1 |
| | 138758-005* | Left Retainer Assembly "E" Battery Box | 1 |
| 9 | 119218 | Block | 1 |
| 10 | 060063-013 | Set Screw | 1 |
| 11 | 060062-009 | Screw | 2 |
| 12 | 078723-001 | Connector SB350 Gray | 1 |
| | 078723-003 | Connector SB350 Red | 1 |
| | 078723-006 | Connector SB350 Blue | 1 |
| | 078723-009 | Connector SB350 Yellow | 1 |
| | 078723-011 | Connector SB350 Green | 1 |
| 13 | 060059-037 | Nut | 2 |
| 14 | 138903* | Battery Spacer "E" Battery Box (1) | 1 |
| | 138910* | Battery Spacer "E" Battery Box (2) | 1 |
| 15 | 060063-083 | Screw "E" Battery Box (1) | 2 |
| | 060063-006 | Screw "E" Battery Box (2) | 2 |

(1) Used with trucks with battery code 1

(2) Used with trucks with battery code 2

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

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## Notes:

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# HYDRAULIC PARTS

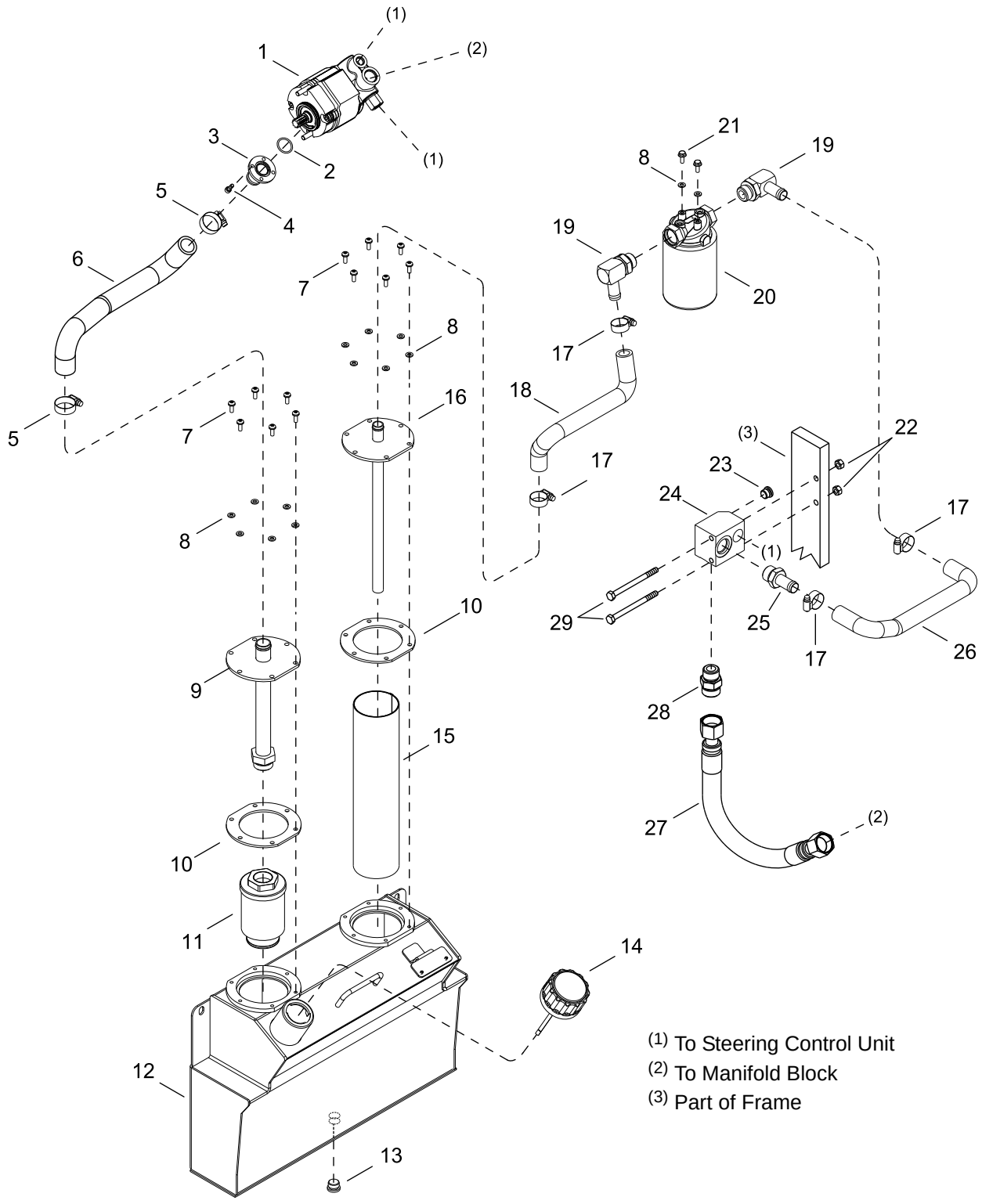
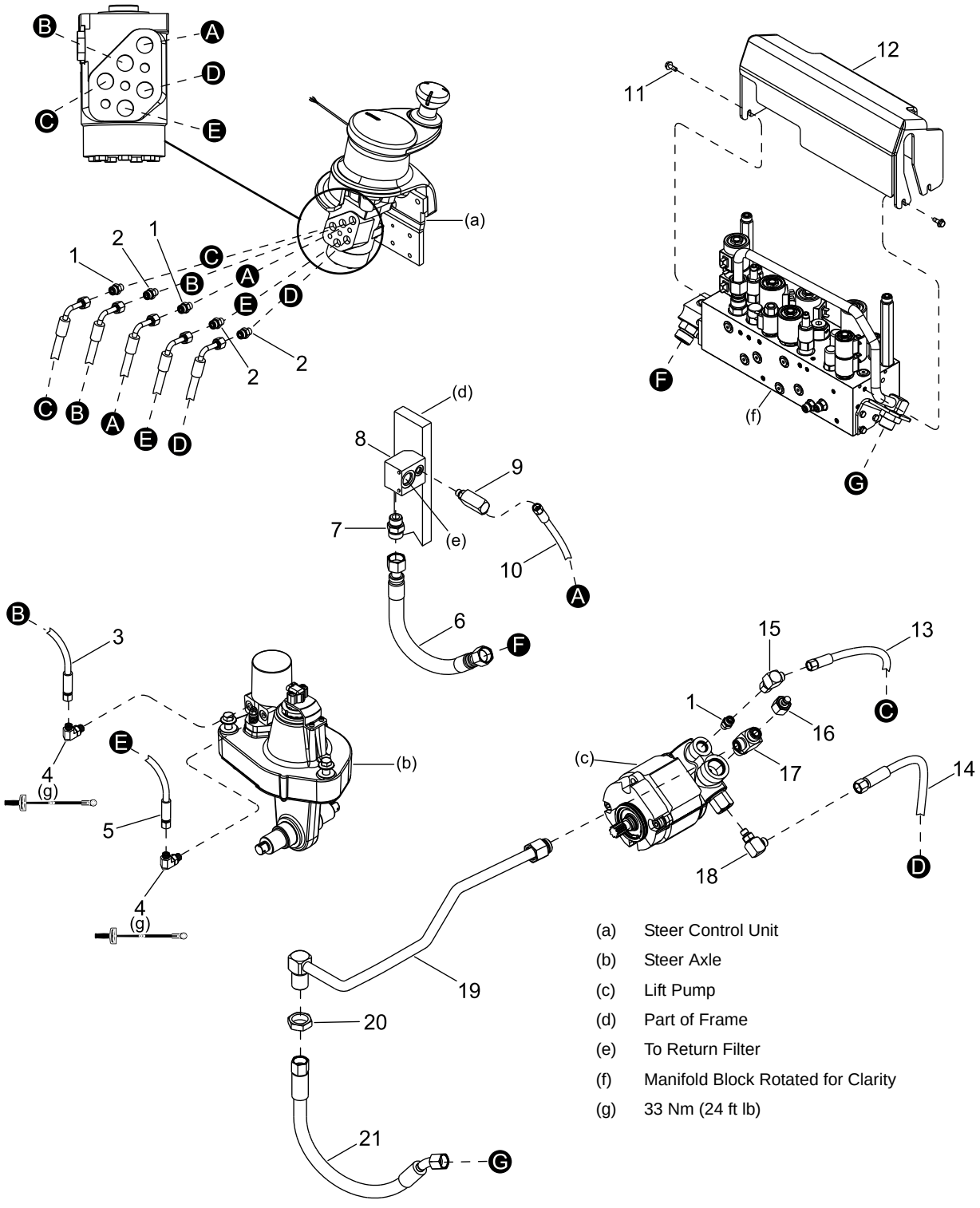



Figure 15509

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 133903-001 | Pump W/Priority Valve DC Trucks 11cc | 1 |
| | 133903-002 | Pump W/Priority Valve AC Trucks 13cc | 1 |
| 2 | 064260-002 | O-Ring | 1 |
| 3 | 130743 | Inlet Flange | 1 |
| 4 | 060062-034 | Screw | 4 |
| 5 | 061022-001 | Clamp | 2 |
| 6 | 136841 | Hose | 1 |
| 7 | 060129-002 | Screw | 12 |
| 8 | 060131-004 | Washer | 14 |
| 9 | 134147 | Suction Manifold | 1 |
| 10 | 793754 | Gasket | 2 |
| 11 | 130887 | Strainer | 1 |
| 12 | 137658 | Reservoir | 1 |
| 13 | 064091-001 | Plug | 1 |
| 14 | 140577 | Breather Cap | 1 |
| 15 | 135000 | Screen | 1 |
| 16 | 134148 | Return Manifold | 1 |
| 17 | 061022-010 | Clamp | 4 |
| 18 | 136840 | Hose | 1 |
| 19 | 064143-009 | Nipple | 2 |
| 20 | 141132 | Filter Assembly | 1 |
| | 141133 | Filter Element | 1 |
| 21 | 060062-040 | Screw | 2 |
| 22 | 060059-001 | Nut | 2 |
| 23 | 064091-002 | Plug w/O-Ring | 1 |
| 24 | 136683 | Manifold Block | 1 |
| 25 | 064083-009 | Insert | 1 |
| 26 | 136839 | Hose | 1 |
| 27 | 064420-001 | Hose | 1 |
| 28 | 064279-012 | ORFS-ORB Adapter | 1 |
| 29 | 060063-068 | Screw | 2 |




(a) Steer Control Unit
(b) Steer Axle
(c) Lift Pump
(d) Part of Frame
(e) To Return Filter
(f) Manifold Block Rotated for Clarity
(g) 33 Nm (24 ft lb)

Figure 15569-02

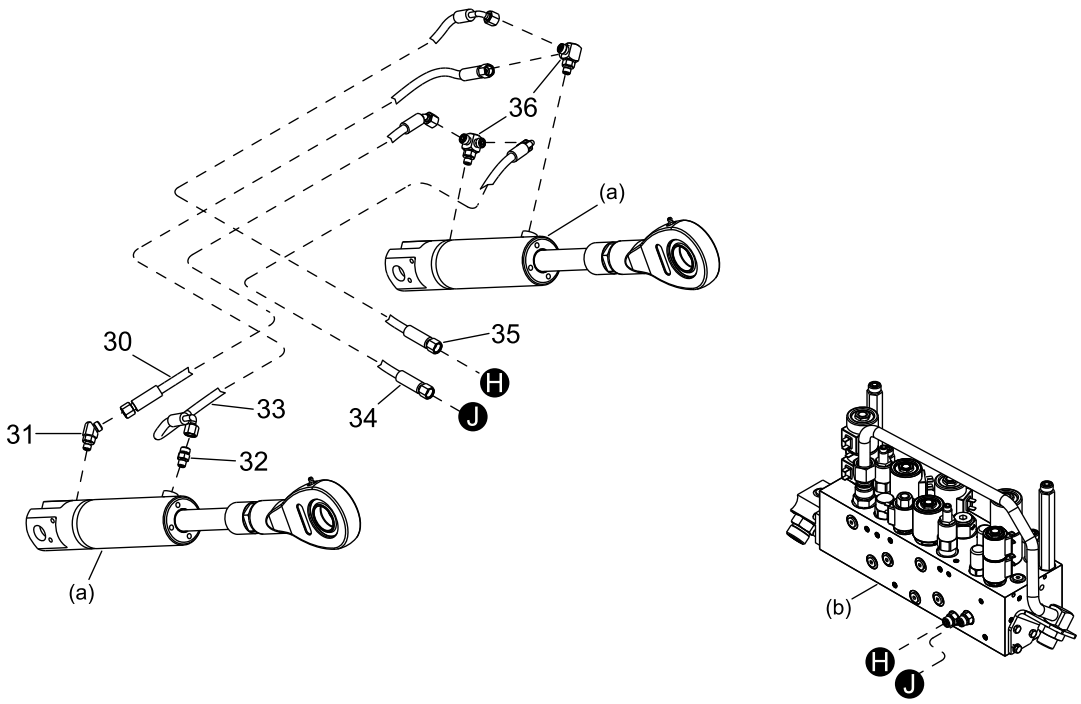
https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 064279-010 | Adapter | 3 |
| 2 | 064279-005 | Adapter | 5 |
| 3 | 064343-010 | Hose | 1 |
| 4 | 064280-016 | 90° Adapter | 2 |
| 5 | 064343-008 | Hose | 1 |
| 6 | 064420-001 | Hose | 1 |
| 7 | 064279-012 | Adapter | 1 |
| 8 | 136683 | Power Unit Return Manifold | 1 |
| 9 | 064327-006 | Elbow | 1 |
| 10 | 064298-021(1) | Hose | 1 |
| | 064298-022(2) | Hose | 1 |
| 11 | 060062-040 | Screw | 4 |
| 12 | 136479 | Manifold Cover | 1 |
| 13 | 064298-023(1) | Hose | 1 |
| | 064298-024(2) | Hose | 1 |
| 14 | 064343-006(2) | Hose | 1 |
| | 064343-007(1) | Hose | 1 |
| 15 | 064296-006 | 90° Swivel Elbow | 1 |
| 16 | 064397 | Diagnostic Connector | 1 |
| 17 | 064319-010 | Run Tee | 1 |
| 18 | 064280-004 | 90° Adapter | 1 |
| 19 | 136850 | Tube | 1 |
| 20 | 064325-010 | Bulkhead Nut | 1 |
| 21 | 064514-001 | Hose | 1 |

(1) Used on trucks with “B” and “C” battery box

(2) Used on trucks with “D” and “E” battery box




(a) Tilt Cylinder

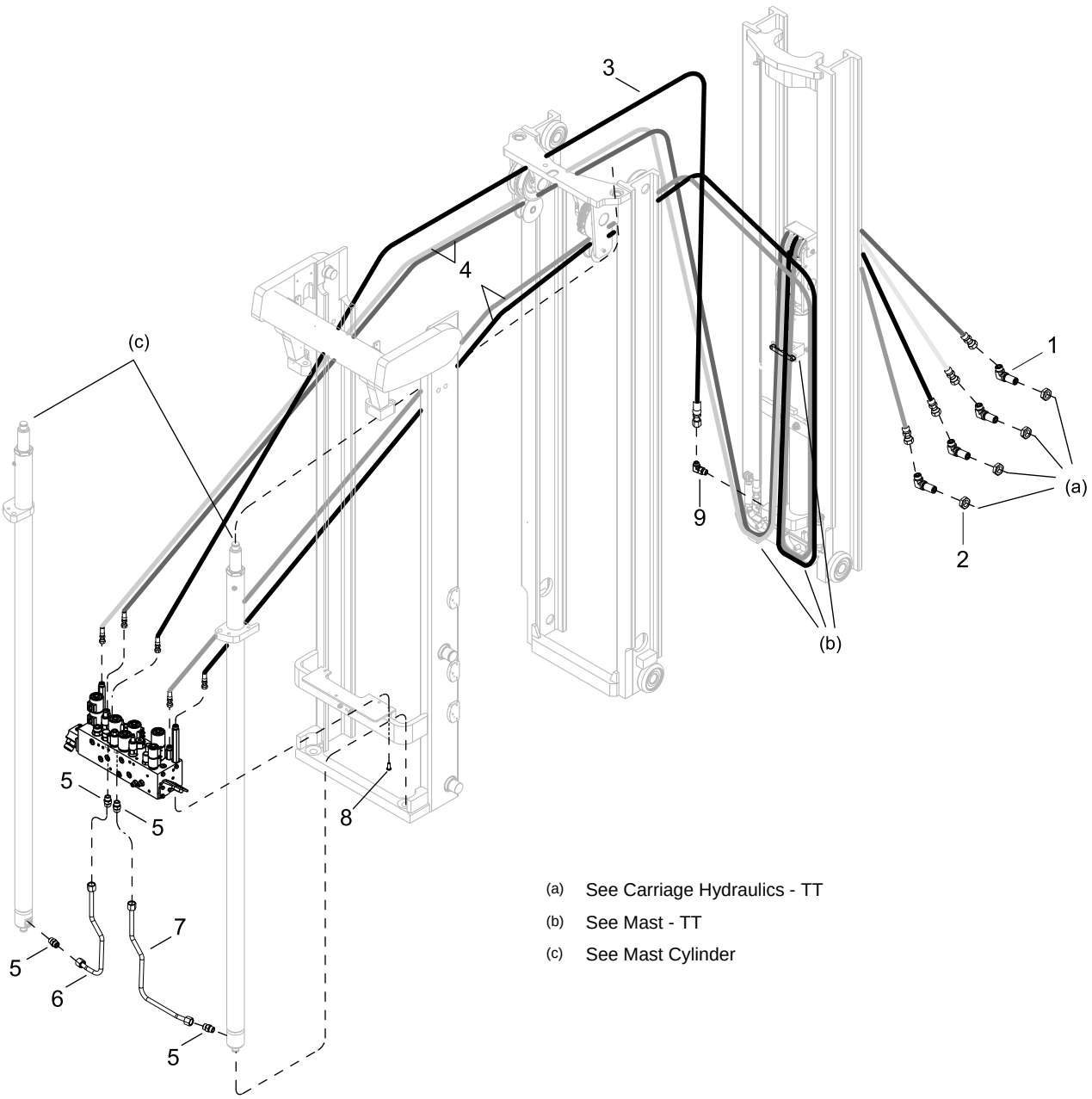
(b) Manifold Block Rotated for Clarity

Figure 15570-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 064351-002 | Hose | 1 |
| 31 | 064281-005 | 45° Adapter | 1 |
| 32 | 064279-004 | Adapter | 1 |
| 33 | 064343-009 | Hose | 1 |
| 34 | 064343-014 | Hose | 1 |
| 35 | 064343-013 | Hose | 1 |
| 36 | 064404 | Tee | 2 |




(a) See Carriage Hydraulics - TT

(b) See Mast - TT

(c) See Mast Cylinder

Figure 15580-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 064326-006 | Bulkhead Fitting | 4 |
| 2 | 064325-006 | Bulkhead Nut | 4 |
| 3 | 064372-xxx* | Hose (1) | 1 |
| 4 | 064362-xxx* | Hose 1 Accessory (1) | 2 |
| | 064362-xxx* | Hose 2 Accessory (1) | 4 |
| 5 | 064279-008 | Adapter | 4 |
| 6 | 064365-004 | Hose | 1 |
| 7 | 136566 | Tube | 1 |
| 8 | 060063-015 | Screw | 3 |
| 9 | 064280-001 | 90° Adapter | 1 |

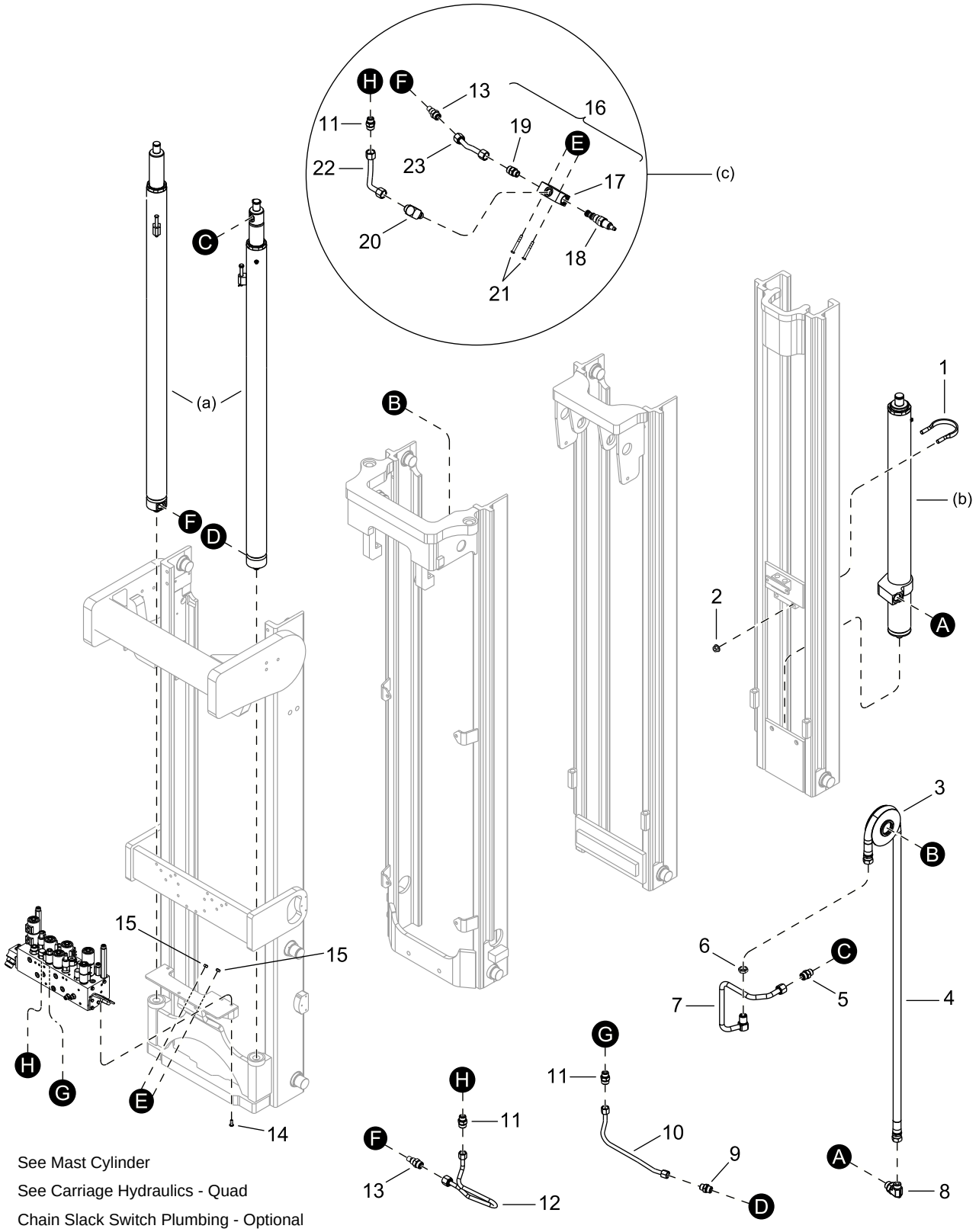
(1) See Hose Chart

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

| Hose Chart | | | |
|---|---|---|---|
| Lift Height | | Index 3 Hose | Index 4 Hose |
| mm | in | | |
| 3911 | 154 | 064372-047 | 064362-024 |
| 4826 | 190 | 064372-049 | 064362-026 |
| 5283 | 208 | 064372-050 | 064362-027 |
| 5740 | 226 | 064372-051 | 064362-028 |
| 6197 | 244 | 064372-052 | 064362-029 |

# HYDRAULIC PARTS

## Mast Plumbing - Quad




(a) See Mast Cylinder

(b) See Carriage Hydraulics - Quad

(c) Chain Slack Switch Plumbing - Optional

Figure 15582-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 131786 | U-Bolt | 1 |
| 2 | 060059-010 | Nut | 2 |
| 3 | 131666-001 | Pulley | 1 |
| 4 | * | Hose See Chart | 1 |
| 5 | 064279-001 | Adapter | 1 |
| | 064019-045 | O-Ring | 1 |
| | 064019-102 | O-Ring | 1 |
| 6 | 064325-010 | Bulkhead Nut | 1 |
| 7 | 132177 | Tube | 1 |
| 8 | 064280-013 | 90° Adapter | 1 |
| | 064019-075 | O-Ring | 1 |
| | 064019-102 | O-Ring | 1 |
| 9 | 064279-009 | Adapter | 1 |
| | 064019-045 | O-Ring | 1 |
| | 064019-100 | O-Ring | 1 |
| 10 | 139662 | Tube | 1 |
| 11 | 064279-008 | Adapter | 2 |
| | 064019-030 | O-Ring | 2 |
| | 064019-100 | O-Ring | 2 |
| | 064279-008 | Adapter (1) | 1 |
| | 064019-030 | O-Ring | 1 |
| | 064019-100 | O-Ring | 1 |
| 12 | 143289 | Tube | 1 |
| 13 | 141841-001 | Velocity Fuse | 1 |
| | 141841-001 | Velocity Fuse (1) | 1 |
| | 064019-045 | O-Ring | 1 |
| | 064019-102 | O-Ring | 1 |
| 14 | 060063-015 | Screw | 3 |
| 15 | 060059-001 | Nut (1) | 2 |
| 16 | 139660-001 | Manifold Assembly (1) | 1 |
| 17 | 139661 | Manifold Block (1) | 1 |
| 18 | 132550 | Drop Limit Valve (1) | 1 |
| 19 | 064279-009 | Adapter (1) | 1 |
| | 064019-045 | O-Ring | 1 |
| | 064019-100 | O-Ring | 1 |
| 20 | 064280-009 | 90° Adapter (1) | 1 |
| | 064019-045 | O-Ring | 1 |
| | 064019-100 | O-Ring | 1 |
| 21 | 060063-018 | Screw (1) | 2 |
| 22 | 141835 | Tube (1) | 1 |
| 23 | 141836 | Tube (1) | 1 |

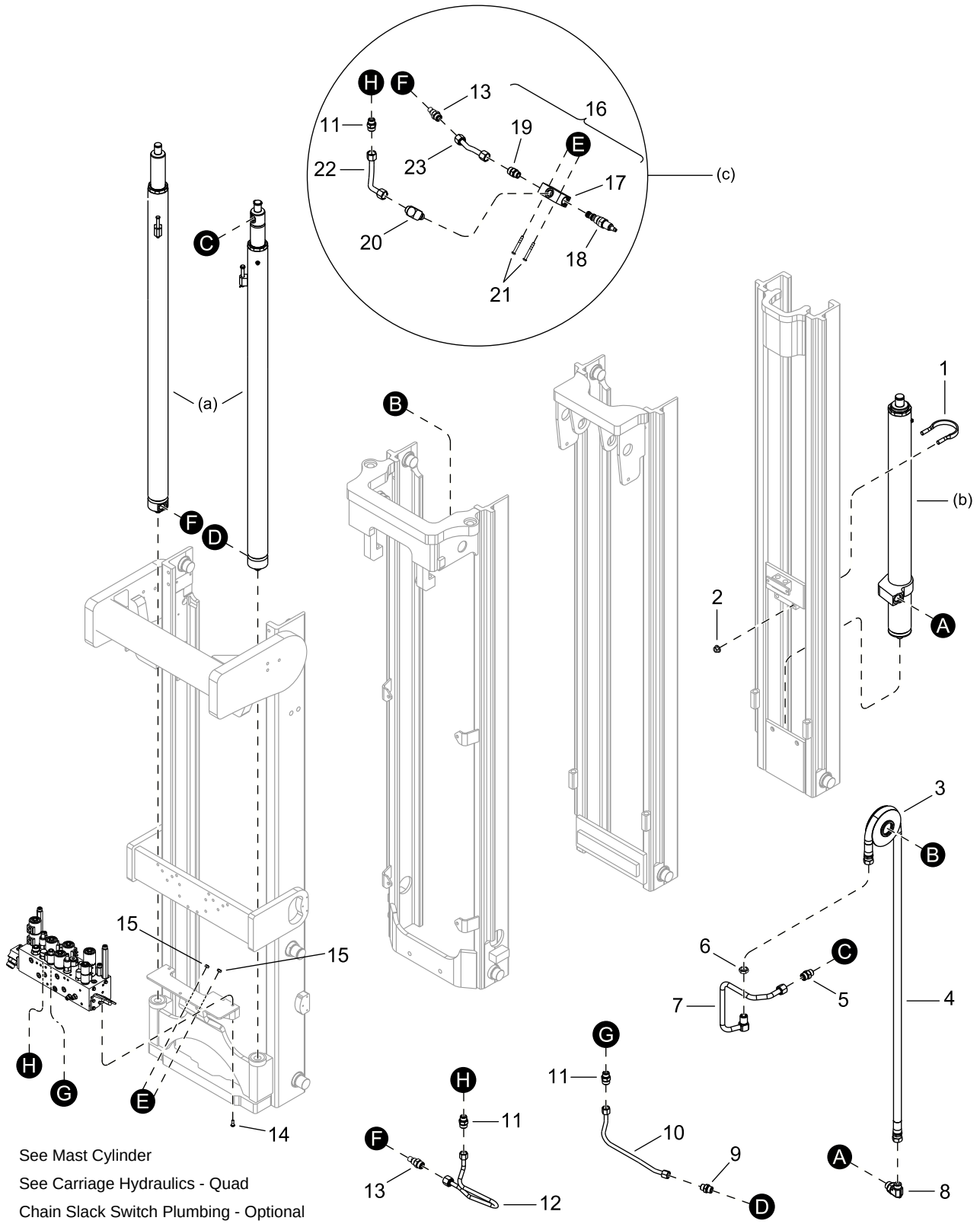
(1) Chain Slack Option

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

# HYDRAULIC PARTS

## Mast Plumbing - Quad




(a) See Mast Cylinder

(b) See Carriage Hydraulics - Quad

(c) Chain Slack Switch Plumbing - Optional

Figure 15582-01

https://truckmanualshub.com/



| Chart 1 - Hose | | |
|---|---|---|
| Lift Height* | | Index 4 Hose |
| mm | in | |
| 6096 | 240 | 064359-203 |
| 6248 | 246 | 064359-211 |
| 6553 | 258 | 064359-218 |
| 6705 | 264 | 064359-226 |
| 7010 | 276 | 064359-233 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

# HYDRAULIC PARTS

## Mast Plumbing - Quad

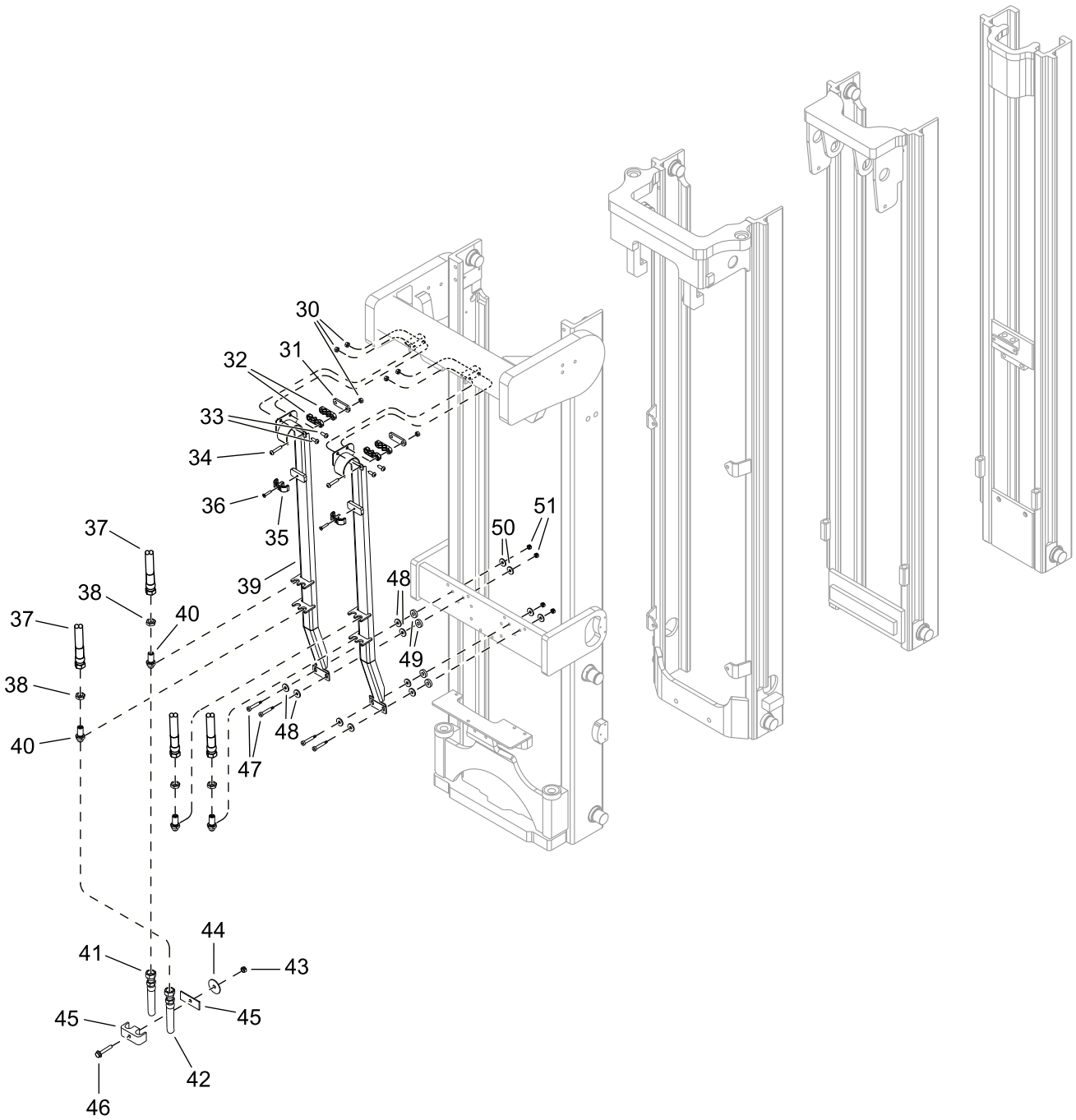



Figure 15583-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 060059-020 | Nut | 4 |
| 31 | 131705 | Guide | 1 |
| 32 | 131704 | Clamp Insert | 2 |
| 33 | 060063-015 | Screw | 2 |
| 34 | 060063-023 | Screw | 4 |
| 35 | 123281 | Clamp | 1 |
| 36 | 060062-022 | Screw | 1 |
| 37 | * (1) | Hose | 2 |
| 38 | 064325-006 | Bulkhead Nut | 2 |
| 39 | * (1) | Accessory Bracket | 1 |
| 40 | 064355-006 | Straight Bulkhead | 2 |
| | 064019-101 | O-Ring | 2 |
| 41 | 064362-040 | Hose | 1 |
| 42 | 064362-039 | Hose | 1 |
| 43 | 060059-037 | Nut | 1 |
| 44 | 060030-141 | Flatwasher | 1 |
| 45 | 124481-003 | Hose Clamp | 1 |
| 46 | 060062-031 | Screw | 1 |
| 47 | 060120-003 | Screw | 2 |
| 48 | 060030-294 | Flatwasher | 4 |
| 49 | 060030-375 | Flatwasher | 2 |
| 50 | 060030-285 | Flatwasher | 2 |
| 51 | 060059-011 | Nut | 2 |

(1) See Chart 2 - Hose and Accessory

**Chart 2 - Hose and Accessory**

| Lift Height* | | Index 37 Hose | Index 39 Accessory Bracket | Index 68 Accessory Channel |
|---|---|---|---|---|
| mm | in | | | |
| 6096 | 240 | 064360-203 | 131811-203 | 131808-203 |
| 6248 | 246 | 064360-211 | 131811-211 | 131808-211 |
| 6553 | 258 | 064360-218 | 131811-218 | 131808-218 |
| 6705 | 264 | 064360-226 | 131811-226 | 131808-226 |
| 7010 | 276 | 064360-233 | 131811-233 | 131808-233 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

# HYDRAULIC PARTS

## Mast Plumbing - Quad

(a) Top of 3rd Stage Mast
(b) Carriage Cylinder Yoke
(c) To Power Unit Hydraulics
(d) Mounted to Outer Mast
(e) Mounted to 2nd Stage Mast
(f) Around Bracket Mounted to Inner Mast
(g) To Attachments

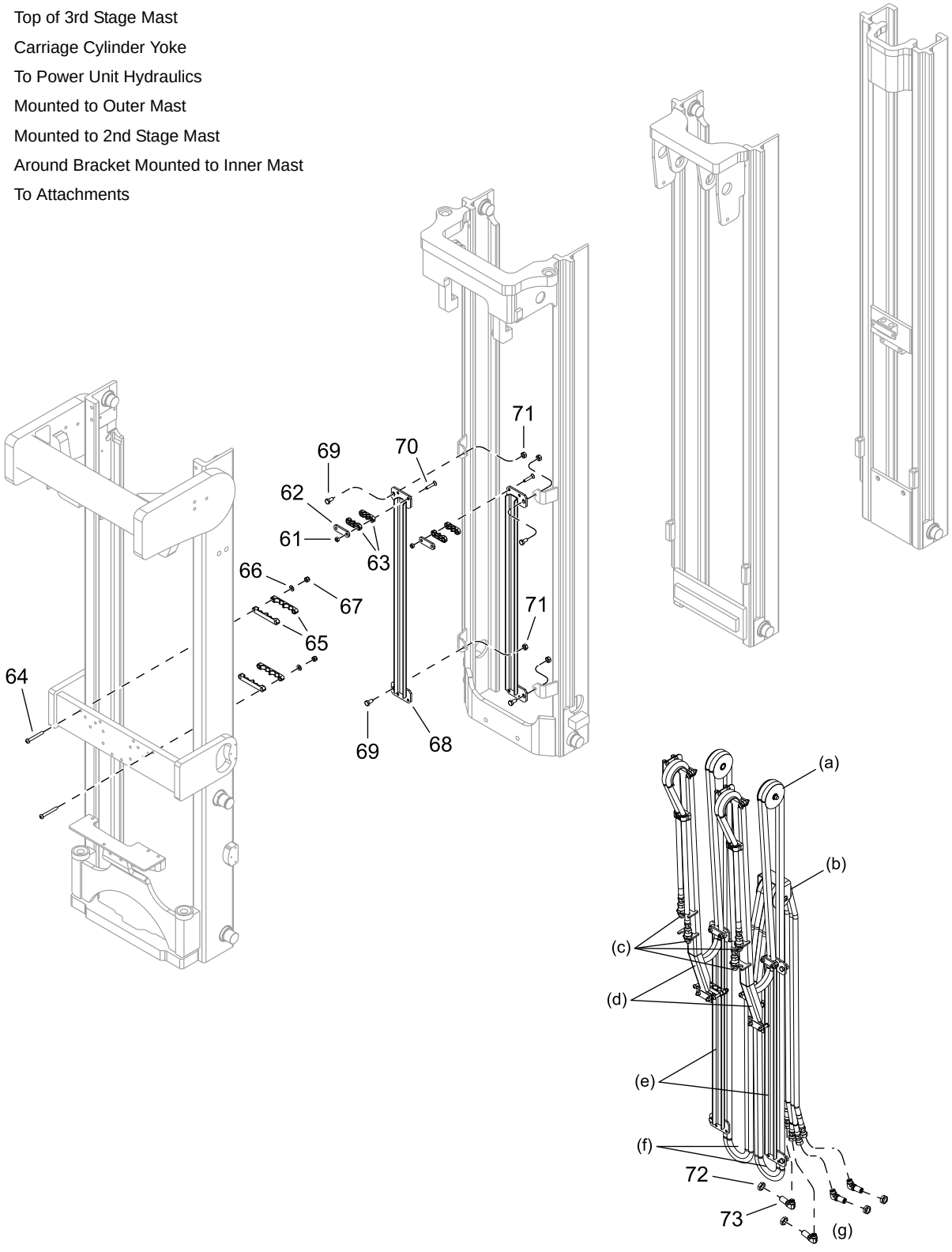


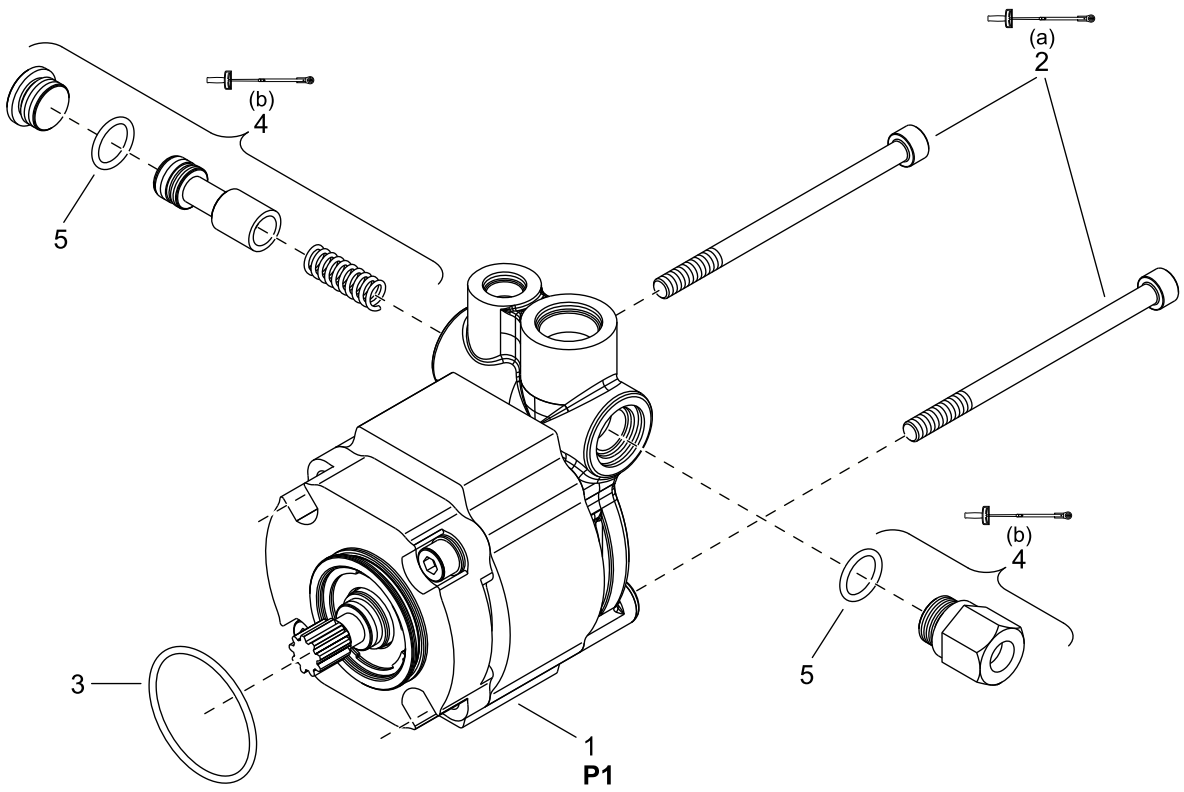

Figure 20096

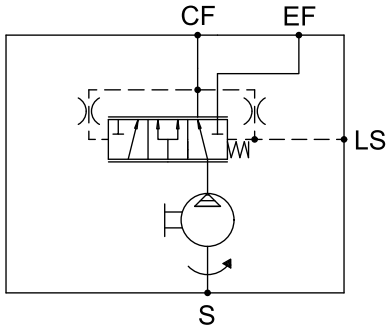
https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 61 | 060059-020 | Nut | 2 |
| 62 | 131705 | Guide | 1 |
| 63 | 131704 | Clamp Insert | 2 |
| 64 | 060063-018 | Screw | 2 |
| 65 | 131659 | Hose Guide | 2 |
| 66 | 060030-017 | Flatwasher | 2 |
| 67 | 060059-020 | Nut | 2 |
| 68 | * (1) | Accessory Channel | 1 |
| 69 | 060075-013 | Screw | 2 |
| 70 | 060063-027 | Screw | 2 |
| 71 | 060059-069 | Nut | 2 |
| 72 | 064325-006 | Bulkhead Nut | 2 |
| 73 | 064326-006 | Bulkhead Fitting | 2 |
| | 064019-101 | O-Ring | 2 |

(1) See Chart 2 - Hose and Accessory




(a) Torque 27 Nm (37 ft lb)

(b) Torque 50-60 Nm (36.9-44.3 ft lb)

Figure 14354-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 133903-001 | Internal Gear Pump (DC) (1) | 1 |
| | 133903-002 | Internal Gear Pump (AC) (2) | 1 |
| 2 | 060063-069 | Screw | 2 |
| 3 | 064260-004 | O-Ring | 1 |
| 4 | 140287 | Priority Valve Kit | 1 |
| 5 | 064260-005 | O-Ring | 2 |
| | 063002-040 | Spline Grease | AR |

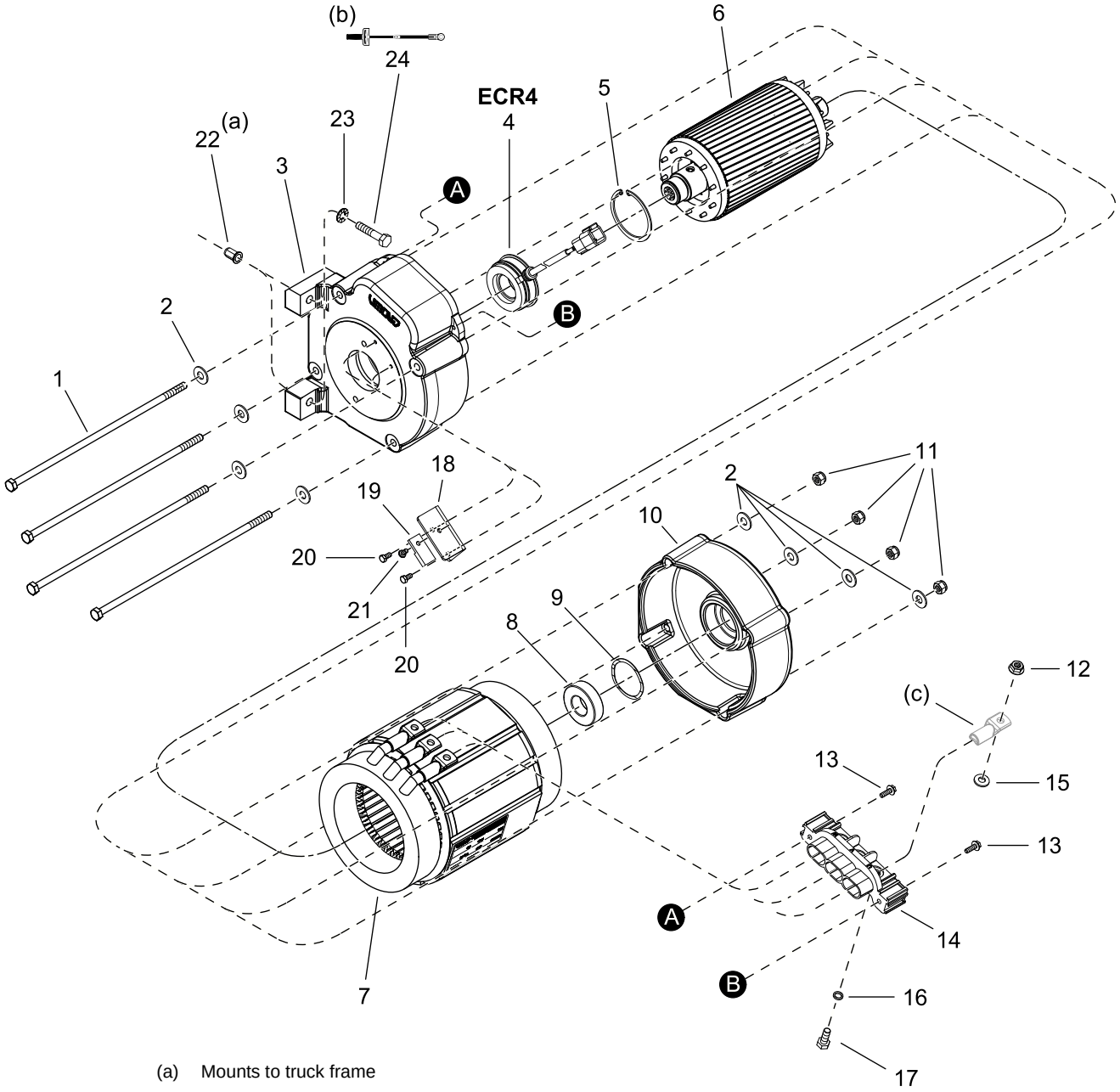
(1) RC 5500 and RR/RD 5700 trucks

(2) RC 5500 trucks only

**Always Specify Model, Data & Serial Number**

# HYDRAULIC PARTS

## Pump Motor - AC




(a) Mounts to truck frame

(b) See Pump Motor Service for torque values

(c) Power Terminal

Figure 14360-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 021122 | 36 V AC Pump Motor | 1 |
| 1 | 021079-006 | Bolt | 4 |
| 2 | 060030-336 | Flatwasher | 8 |
| 3 | 021124 | Drive End | 1 |
| 4 | 020985-004 | Sensor | 1 |
| 5 | 060009-144 | Retaining Ring | 1 |
| 6 | 021146 | Rotor | 1 |
| 7 | 021113-001 | Stator Assembly | 1 |
| 8 | 065081-051 | Bearing | 1 |
| 9 | 060046-016 | Washer | 1 |
| 10 | 021126 | End Head | 1 |
| 11 | 060059-020 | Nut | 4 |
| 12 | 060059-028 | Nut | 3 |
| 13 | 060061-013 | Screw | 2 |
| 14 | 021150 | Terminal Block | 1 |
| 15 | 060125-001 | Spring Disc | 3 |
| 16 | 020959 | Spacer | 3 |
| 17 | 060063-011 | Screw | 3 |
| 18 | 139548 | Bracket | 1 |
| 19 | 062749-001 | Clip | 1 |
| 20 | 060061-006 | Screw | 2 |
| 21 | 060061-032 | Screw | 1 |
| 22 | 060103-005 | Threaded Insert | 3 |
| 23 | 060089-002 | Washer | 3 |
| 24 | 060075-047 | Screw | 3 |

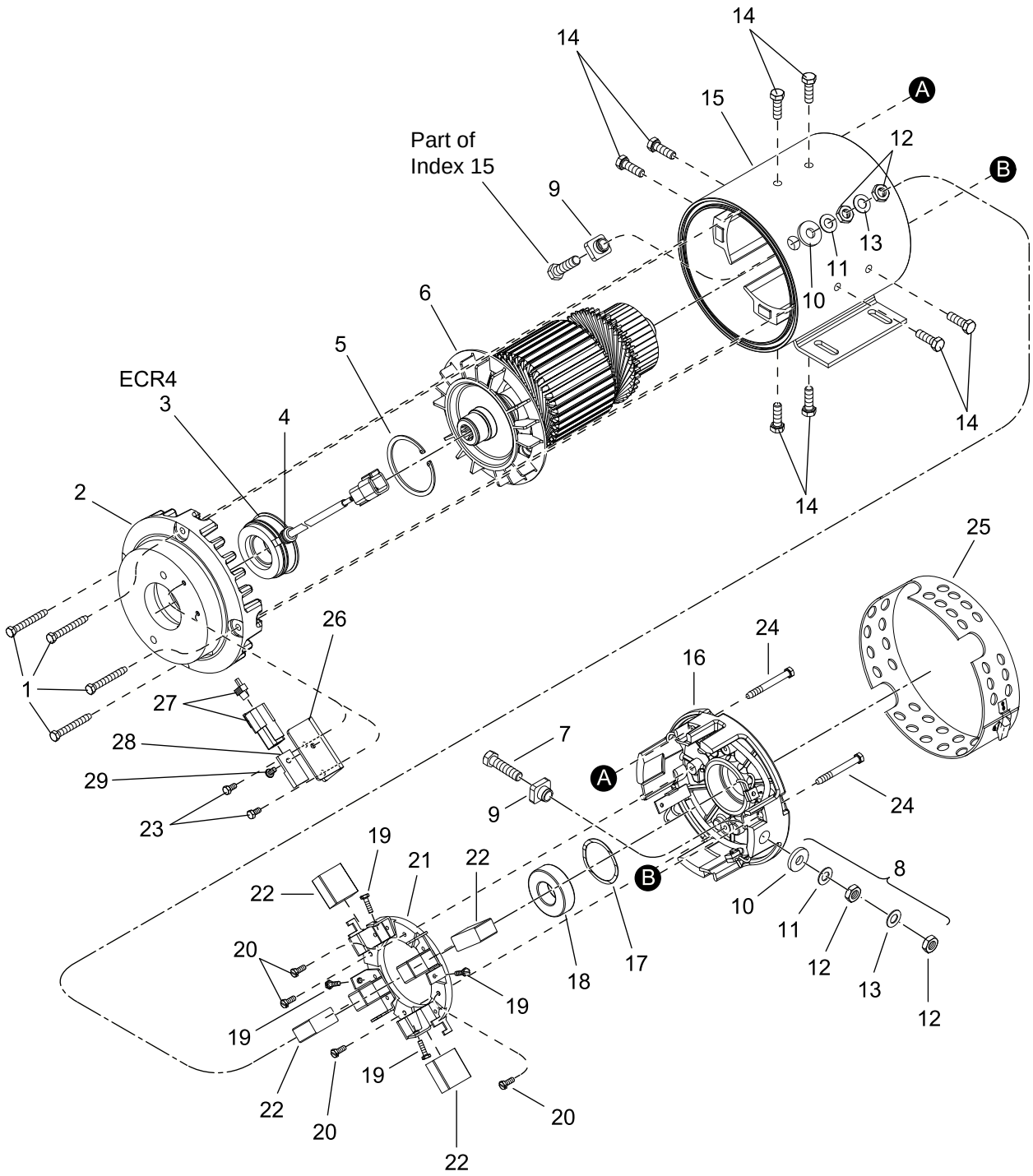


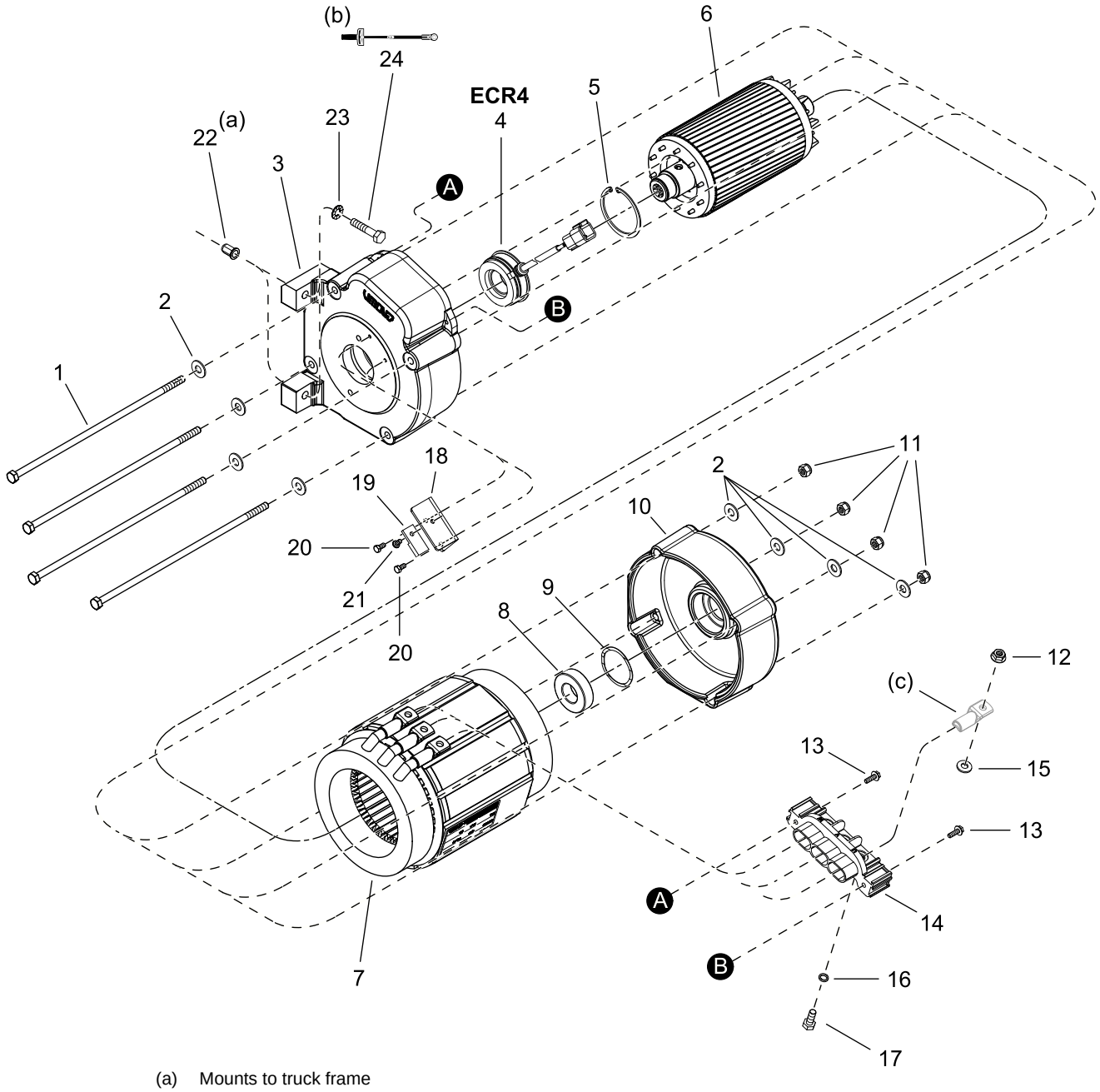

Figure 14369-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 021099 | 36 V DC Pump Motor | 1 |
| 1 | 060078-006 | Screw | 4 |
| 2 | 021098 | Drive End | 1 |
| 3 | 020985-003 | Sensor | 3 |
| 4 | 073805-003 | Grommet | 1 |
| 5 | 060009-144 | Retaining Ring | 1 |
| 6 | 020135 | Armature Assembly | 1 |
| 7 | 020024 | Terminal And Lead Assembly | 1 |
| 8 | 113653 | Terminal Stud Kit | 1 |
| 9 | 020025-001 | Insulator Terminal | 2 |
| 10 | 020026 | Insulating Washer | 2 |
| 11 | 060030-248 | Flatwasher | 2 |
| 12 | 060021-053 | Nut | 4 |
| 13 | 060005-054 | Lockwasher | 2 |
| 14 | 060078-003 | Screw | 8 |
| 15 | 021127 | Frame And Field Assembly | 1 |
| 16 | 020081 | End Head | 1 |
| 17 | 060046-016 | Washer | 1 |
| 18 | 065081-051 | Bearing | 1 |
| 19 | 060078-011 | Screw | 4 |
| 20 | 060032-033 | Screw | 4 |
| 21 | 020018 | Brush Box | 1 |
| 22 | 020020-003 | Brush 16 x 32 | 4 |
| | 113652 | Brush Kit Contains Four Brushes | 1 |
| 23 | 060061-006 | Screw | 2 |
| 24 | 060078-004 | Screw | 2 |
| 25 | 020427-001 | Headband | 1 |
| 26 | 139584 | Bracket | 1 |
| 27 | 062756-004 | Connector | 1 |
| | 062798-007 | Connector Insert | 1 |
| | 062754-002 | Plug Seal | 2 |
| 28 | 062749-001 | Clip | 1 |
| 29 | 060061-032 | Screw | 1 |

**Always Specify Model, Data & Serial Number**




(a) Mounts to truck frame

(b) See Pump Motor Service for torque values

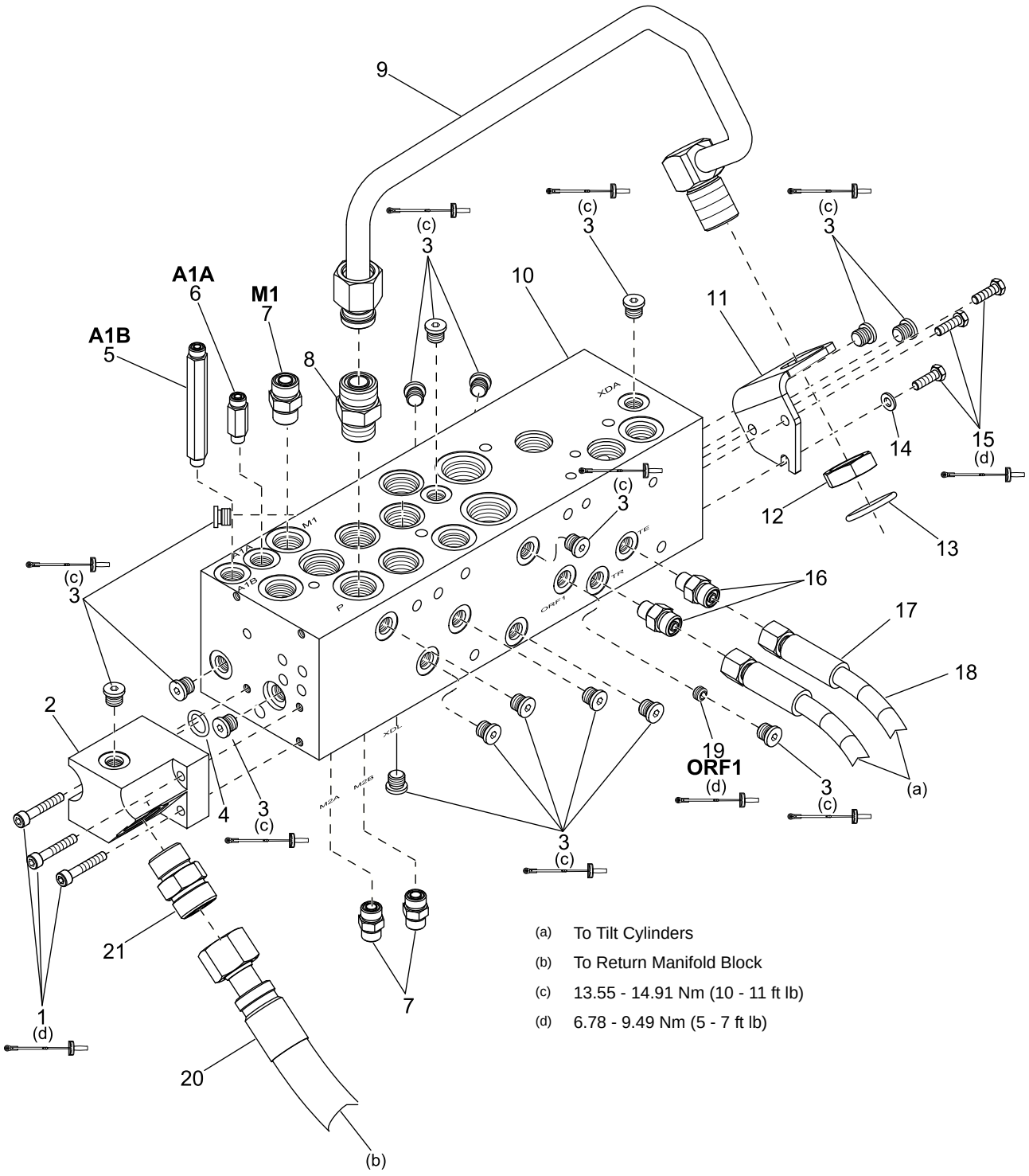
(c) Power Terminal

Figure 14360-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 021185 | 36 V AC Pump Motor | 1 |
| 1 | 021079-006 | Bolt | 4 |
| 2 | 060030-336 | Flatwasher | 8 |
| 3 | 021180 | Drive End | 1 |
| 4 | 020985-004 | Sensor | 1 |
| 5 | 060009-144 | Retaining Ring | 1 |
| 6 | 021146 | Rotor | 1 |
| 7 | 021113-002 | Stator Assembly | 1 |
| 8 | 065081-051 | Bearing | 1 |
| 9 | 060046-016 | Washer | 1 |
| 10 | 021182 | End Head | 1 |
| 11 | 060059-020 | Nut | 4 |
| 12 | 060059-028 | Nut | 3 |
| 13 | 060061-013 | Screw | 2 |
| 14 | 021150 | Terminal Block | 1 |
| 15 | 060125-001 | Spring Disc | 3 |
| 16 | 020959 | Spacer | 3 |
| 17 | 060063-011 | Screw | 3 |
| 18 | 139548 | Bracket | 1 |
| 19 | 062749-001 | Clip | 1 |
| 20 | 060061-006 | Screw | 2 |
| 21 | 060061-032 | Screw | 1 |
| 22 | 060103-005 | Threaded Insert | 3 |
| 23 | 060089-002 | Washer | 3 |
| 24 | 060075-047 | Screw | 3 |




(a) To Tilt Cylinders

(b) To Return Manifold Block

(c) 13.55 - 14.91 Nm (10 - 11 ft lb)

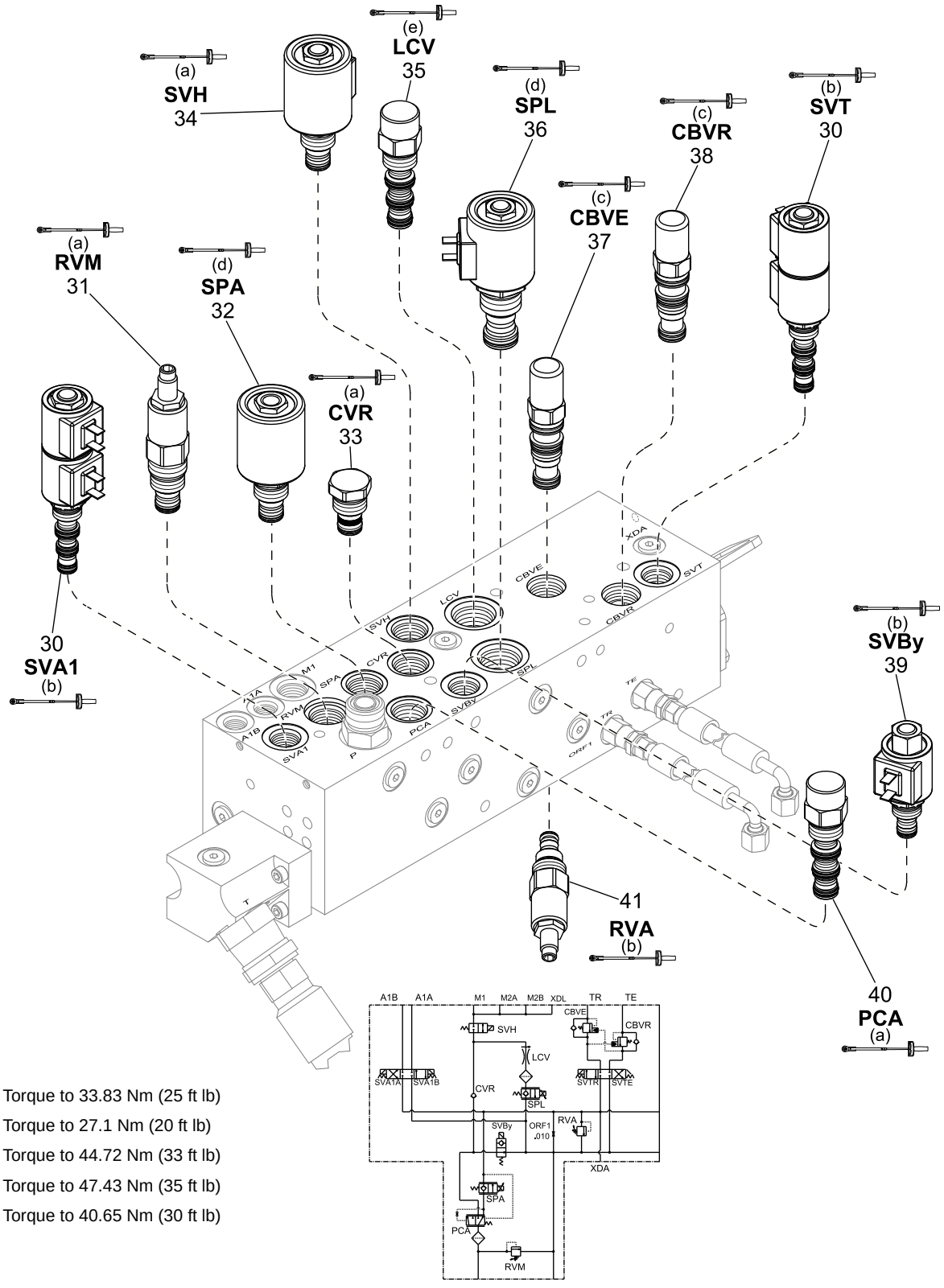
(d) 6.78 - 9.49 Nm (5 - 7 ft lb)

Figure 20547

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 145785-001 | Valve Assembly TT Mast | 1 |
| 0 | 145785-002 | Valve Assembly Quad Mast | 1 |
| 1 | 060062-018 | Screw | 3 |
| 2 | 136681 | Manifold Return | 1 |
| 3 | 064091-006 | Plug | 17 |
| 4 | 064019-004 | O-Ring | 1 |
| 5 | 064396-009 | Adapter | 1 |
| 6 | 064396-007 | Adapter | 1 |
| 7 | 064279-008 | Adapter | 3 |
| 8 | 064279-001 | Adapter | 1 |
| 9 | 136848 | Tube Assembly | 1 |
| 10 | 145786 | Manifold Assembly 1LF | 1 |
| 11 | 137083-002 | Bracket | 1 |
| 12 | 064325-010 | Bulkhead Nut | 1 |
| 13 | 064019-102 | O-Ring | 1 |
| 14 | 060131-004 | Metric Washer | 1 |
| 15 | 060062-006 | Screw | 3 |
| 16 | 064279-004 | Adapter | 2 |
| 17 | 064343-014 | Hose Assembly | 1 |
| 18 | 064343-013 | Hose Assembly | 1 |
| 19 | 123270-006 | Orifice | 1 |
| 20 | 064420-001 | Hose Assembly | 1 |
| 21 | 064279-012 | Adapter | 1 |




(a) Torque to 33.83 Nm (25 ft lb)

(b) Torque to 27.1 Nm (20 ft lb)

(c) Torque to 44.72 Nm (33 ft lb)

(d) Torque to 47.43 Nm (35 ft lb)

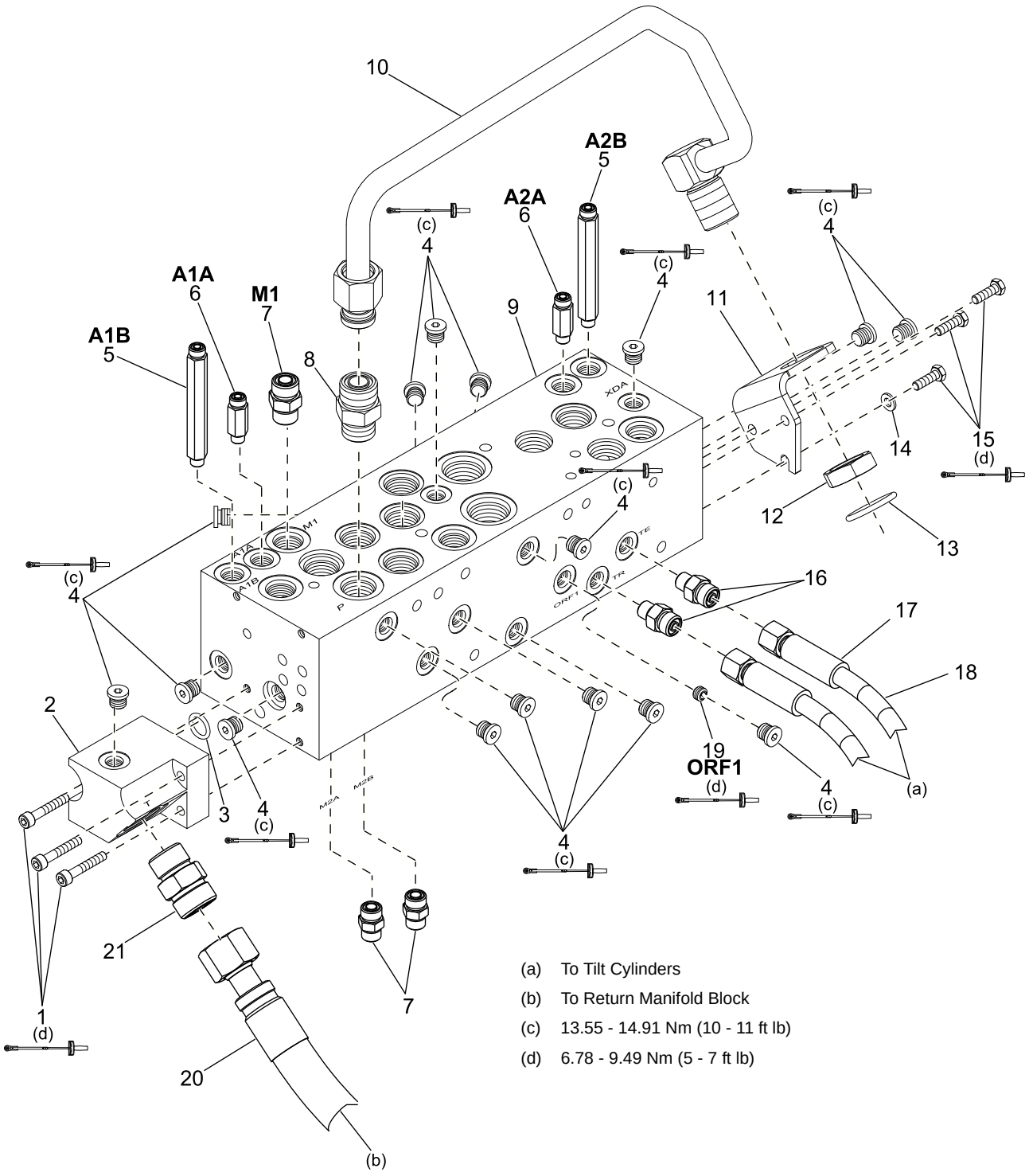
(e) Torque to 40.65 Nm (30 ft lb)

Figure 20548

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 137525-001 | Solenoid Valve | 2 |
| | 104164-002 | Coil | 2 |
| | 123977 | Seal Kit (1 Kit Per Valve) | 1 |
| 31 | 117913-004 | Relief Valve | 1 |
| | 111790-020 | Seal Kit | 1 |
| 32 | 135724-002 | Proportional Solenoid Valve | 1 |
| | 104164-005 | Coil | 1 |
| | 111790-020 | Seal Kit | 1 |
| 33 | 117380-002 | Check Valve | 1 |
| | 111790-020 | Seal Kit | 1 |
| 34 | 137527-002 | Solenoid Valve | 1 |
| | 104164-005 | Coil | 1 |
| | 111790-030 | Seal Kit | 1 |
| 35 | 141027-001 | Load Lowering Valve TT Mast | 1 |
| | 142202-001 | Load Lowering Valve Quad Mast | 1 |
| | 139702-002 | Seal Kit | 1 |
| 36 | 137528-002 | Proportional Solenoid Valve | 1 |
| | 104164-005 | Coil | 1 |
| | 111790-023 | Seal Kit | 1 |
| 37 | 137519-001 | Counterbalance Valve | 1 |
| | 111791 | Seal Kit | 1 |
| 38 | 137519-002 | Counterbalance Valve | 1 |
| | 111791 | Seal Kit | 1 |
| 39 | 117377-003 | Solenoid Valve | 1 |
| | 104164-002 | Coil | 1 |
| 40 | 137521-001 | Pressure Compensator Valve | 1 |
| | 111790-029 | Seal Kit | 1 |
| 41 | 117913-004 | Relief Valve | 1 |
| | 111790-020 | Seal Kit | 1 |




(a) To Tilt Cylinders

(b) To Return Manifold Block

(c) 13.55 - 14.91 Nm (10 - 11 ft lb)

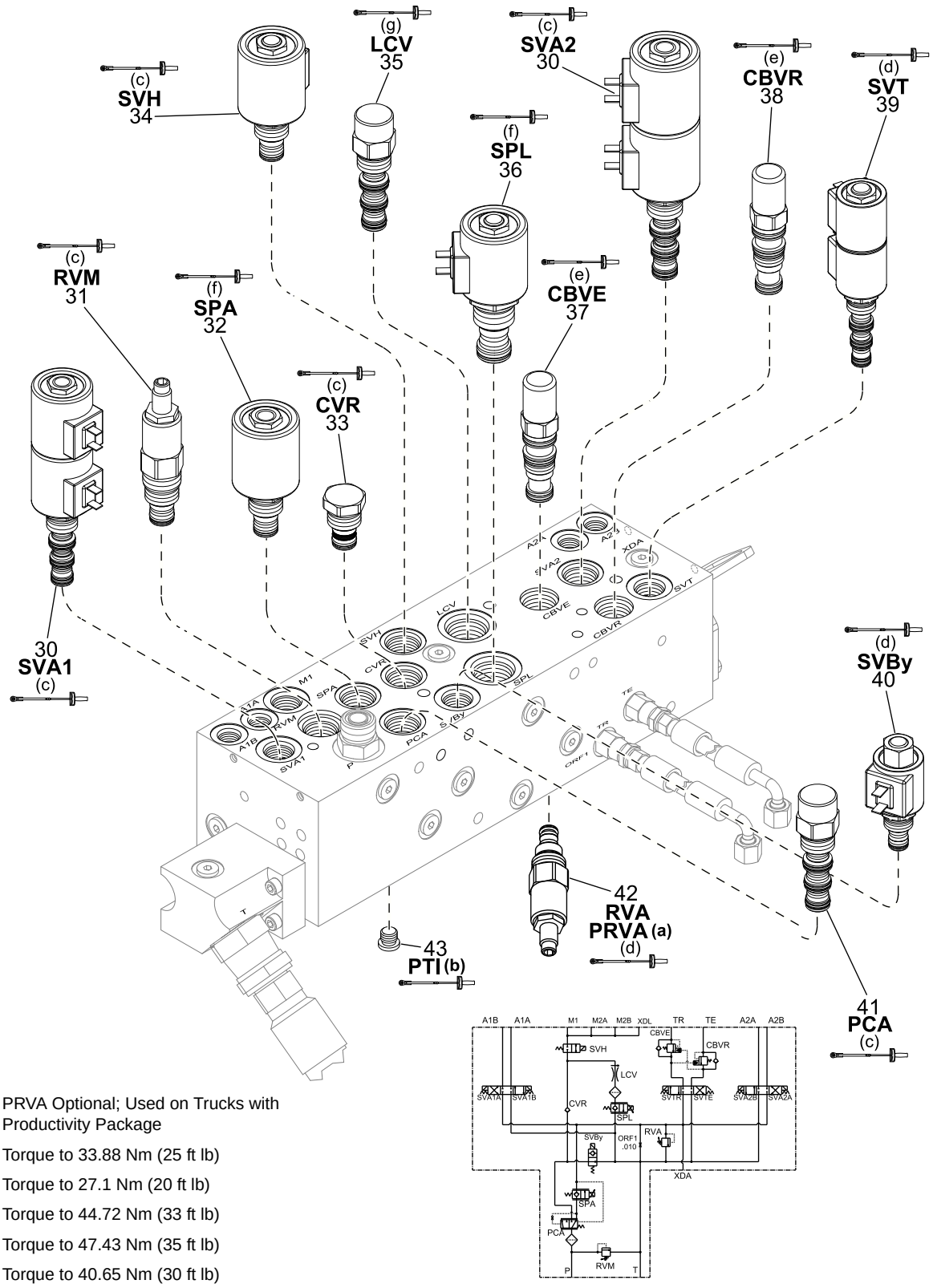
(d) 6.78 - 9.49 Nm (5 - 7 ft lb)

Figure 20549

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 145788-001 | Valve Assembly TT Mast | 1 |
| 0 | 145788-002 | Valve Assembly Quad Mast | 1 |
| 1 | 060062-018 | Screw | 3 |
| 2 | 136681 | Manifold Return | 1 |
| 3 | 064019-004 | O-Ring | 1 |
| 4 | 064091-006 | Plug With O-Ring | 16 |
| 5 | 064396-009 | Adapter | 2 |
| | 064279-010 | Adapter | 2 |
| 6 | 064396-007 | Adapter | 2 |
| 7 | 064279-008 | Adapter | 3 |
| 8 | 064279-001 | Adapter | 1 |
| 9 | 145789 | Manifold Assembly 2HF | 1 |
| 10 | 136848 | Tube Assembly | 1 |
| 11 | 137083-002 | Bracket | 1 |
| 12 | 064325-010 | Bulkhead Nut | 1 |
| 13 | 064019-102 | O-Ring | 1 |
| 14 | 060131-004 | Metric Washer | 1 |
| 15 | 060062-006 | Screw | 3 |
| 16 | 064279-004 | Adapter | 2 |
| 17 | 064343-014 | Hose Assembly | 1 |
| 18 | 064343-013 | Hose Assembly | 1 |
| 19 | 123270-006 | Orifice | 1 |
| 20 | 064420-001 | Hose Assembly | 1 |
| 21 | 064279-012 | Adapter | 1 |




(a) PRVA Optional; Used on Trucks with Productivity Package

(b) Torque to 33.88 Nm (25 ft lb)

(c) Torque to 27.1 Nm (20 ft lb)

(d) Torque to 44.72 Nm (33 ft lb)

(e) Torque to 47.43 Nm (35 ft lb)

(f) Torque to 40.65 Nm (30 ft lb)

Figure 20550

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 137526-001 | Solenoid Valve | 2 |
| | 104164-005 | Coil | 2 |
| | 111790-007 | Seal Kit | 1 |
| 31 | 117913-004 | Relief Valve | 1 |
| | 111790-020 | Seal Kit | 1 |
| 32 | 135724-002 | Proportional Solenoid Valve | 1 |
| | 104164-005 | Coil | 1 |
| | 111790-020 | Seal Kit | 1 |
| 33 | 117380-002 | Check Valve | 1 |
| | 111790-020 | Seal Kit | 1 |
| 34 | 137527-002 | Solenoid Valve | 1 |
| | 104164-005 | Coil | 1 |
| | 111790-030 | Seal Kit | 1 |
| 35 | 141027-001 | Load Lowering Valve TT Mast | 1 |
| | 142202-001 | Load Lowering Valve Quad Mast | 1 |
| | 139702-002 | Seal Kit | 1 |
| 36 | 137528-002 | Proportional Solenoid Valve | 1 |
| | 104164-005 | Coil | 1 |
| | 111790-023 | Seal Kit | 1 |
| 37 | 137519-001 | Counterbalance Valve | 1 |
| | 111791 | Seal Kit | 1 |
| 38 | 137519-002 | Counterbalance Valve | 1 |
| | 111791 | Seal Kit | 1 |
| 39 | 137525-001 | Solenoid Valve | 1 |
| | 104164-002 | Coil | 1 |
| | 123977 | Seal Kit | 1 |
| 40 | 117377-003 | Solenoid Valve | 1 |
| | 104164-002 | Coil | 1 |
| | 111790-016 | Seal Kit | 1 |
| 41 | 137521-001 | Pressure Compensator Valve | 1 |
| | 111790-029 | Seal Kit | 1 |
| 42 | 137523-002 | Relief Valve | 1 |
| | 141052-001 | Relief Valve - Optional | 1 |
| | 111790-001 | Seal Kit | 1 |
| 43 | 064091-006 | Plug | 1 |
| | 137638-001 | Pressure Transducer - Optional | 1 |

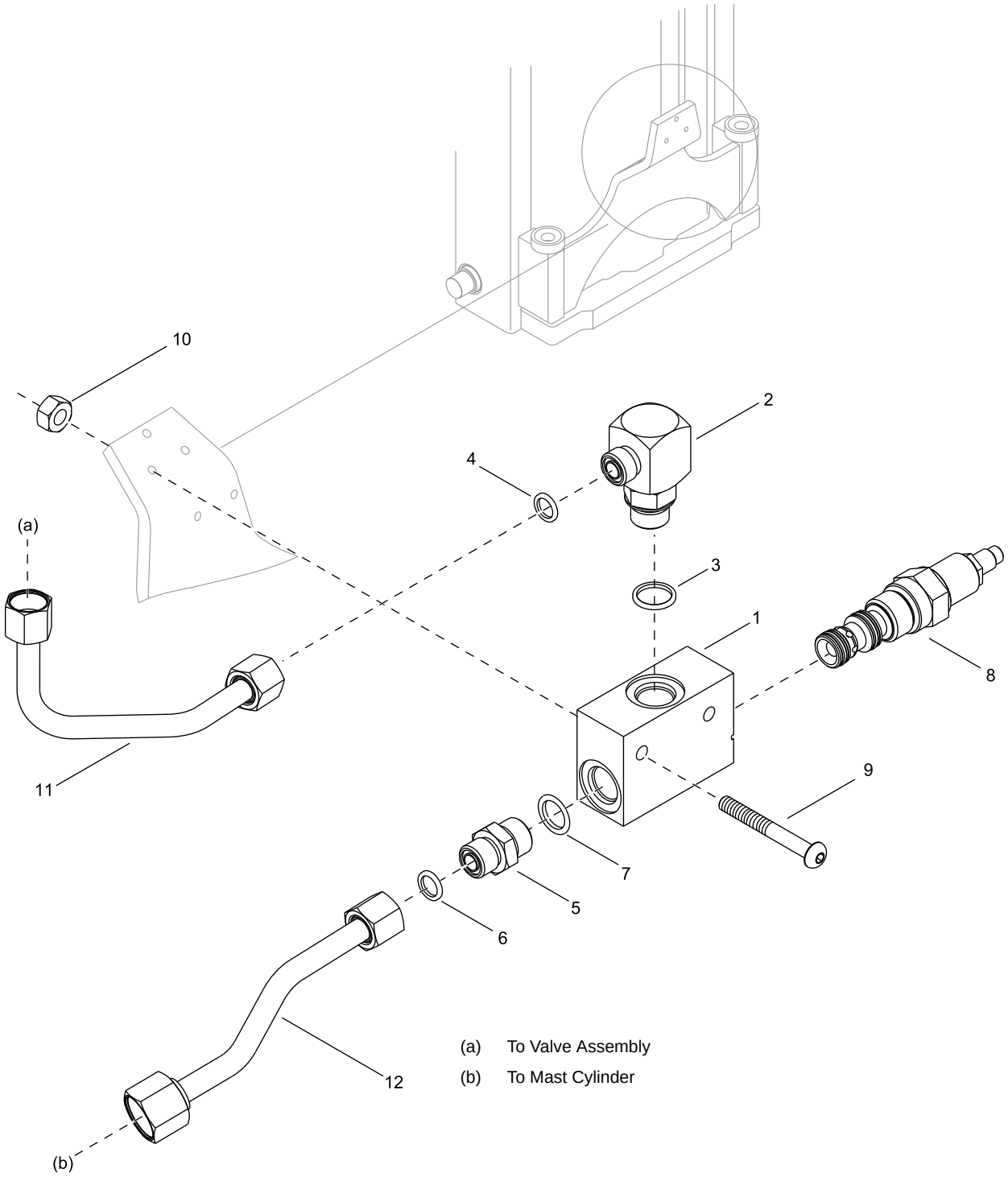



Figure 19561

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 139660-001 | Manifold Assembly | 1 |
| 1 | 139661 | Manifold Block | 1 |
| 2 | 064280-009 | ORFS ORB 90° Adapter | 1 |
| 3 | 064019-045 | O-Ring | 1 |
| 4 | 064019-100 | O-Ring | 1 |
| 5 | 064279-009 | ORFS ORB Adapter | 1 |
| 6 | 064019-100 | O-Ring | 1 |
| 7 | 064019-045 | O-Ring | 1 |
| 8 | 132550 | Drop Limit Valve | 1 |
| 9 | 060063-018 | Screw | 2 |
| 10 | 060059-001 | Nut | 2 |
| 11 | 141835 | Tube Assembly | 1 |
| 12 | 141836 | Tube Assembly | 1 |

| Model | Function |
|---|---|
| RC 3000 | Carriage Hydraulics |
| RC 5500 | Carriage Hydraulics |
| SC 4000 | Carriage Hydraulics |
| SC 4500 | Carriage Hydraulics |
| FC 4000 | Carriage Hydraulics |

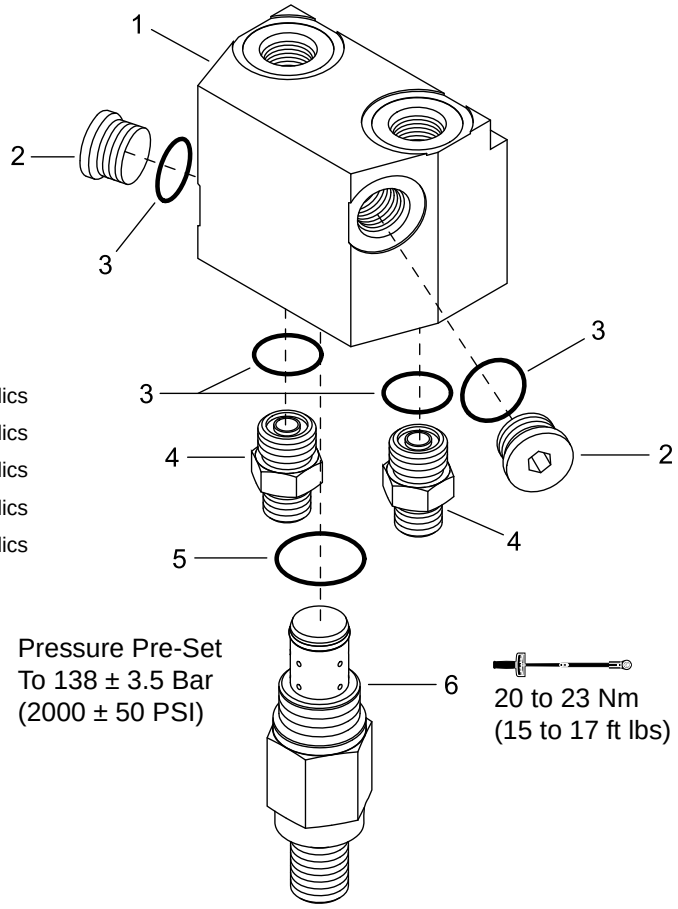



Figure 15738

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 124821* | Crossover Relief Manifold Assembly | 1 |
| 1 | 124822 | Manifold Block | 1 |
| 2 | 064091-002 | Plug | 2 |
| 3 | 064019-029 | O-Ring | 4 |
| 4 | 064279-010 | Adapter | 2 |
| 5 | 064019-045 | O-Ring | 1 |
| 6 | 126233 | Relief Valve | 1 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

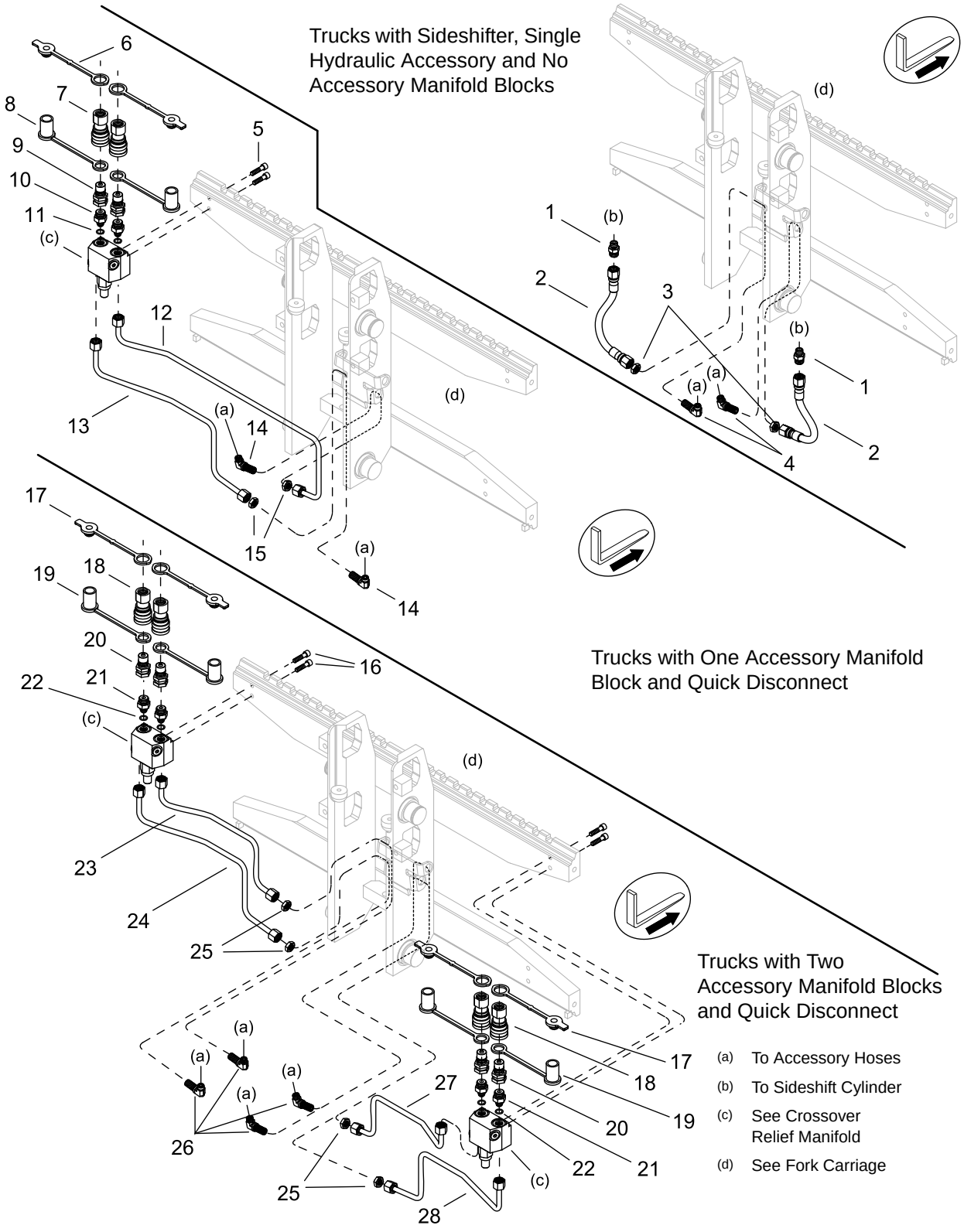



Figure 15634-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 064280-006 | Adapter | 2 |
| 2 | 064337-003 | Hose | 2 |
| 3 | 064325-006 | Nut | 2 |
| 4 | 064326-006 | Bulkhead Fittings | 2 |
| 5 | 060016-088 | Screw | 2 |
| 6 | 064232-001 | Dust Plug (1) | 2 |
| 7 | 064334-003 | Female Coupler (1) | 2 |
| 8 | 064231-001 | Dust Cap (1) | 2 |
| 9 | 064333-003 | Nipple (1) | 2 |
| 10 | 064004-004 | Connector | 2 |
| 11 | 064019-029 | O-Ring | 2 |
| 12 | 132487* | Tube Assembly (2) | 1 |
| | 134189* | Tube Assembly (3) | 1 |
| 13 | 132490* | Tube Assembly (2) | 1 |
| | 134192* | Tube Assembly (3) | 1 |
| 14 | 064326-006 | Bulkhead Fittings | 2 |
| 15 | 064325-006 | Nut | 2 |
| 16 | 060016-088 | Screw | 4 |
| 17 | 064232-001 | Dust Plug (1) | 4 |
| 18 | 064334-003 | Female Coupler (1) | 4 |
| 19 | 064231-001 | Dust Cap (1) | 4 |
| 20 | 064333-003 | Nipple (1) | 4 |
| 21 | 064004-004 | Connector | 4 |
| 22 | 064019-029 | O-Ring | 4 |
| 23 | 132491* | Tube Assembly (2) | 1 |
| | 134193* | Tube Assembly (3) | 1 |
| 24 | 132490* | Tube Assembly (2) | 1 |
| | 134192* | Tube Assembly (3) | 1 |
| 25 | 064325-006 | Nut | 4 |
| 26 | 064326-006 | Bulkhead Fittings | 4 |
| 27 | 132489* | Tube Assembly (2) | 1 |
| | 139876* | Tube Assembly (3) | 1 |
| 28 | 132488* | Tube Assembly (2) | 1 |
| | 139875* | Tube Assembly (3) | 1 |

(1) Quick Disconnect Parts

(2) Items for 965 mm (38 in) Carriage

(3) Items for 880 mm (34.5 in) Carriage

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

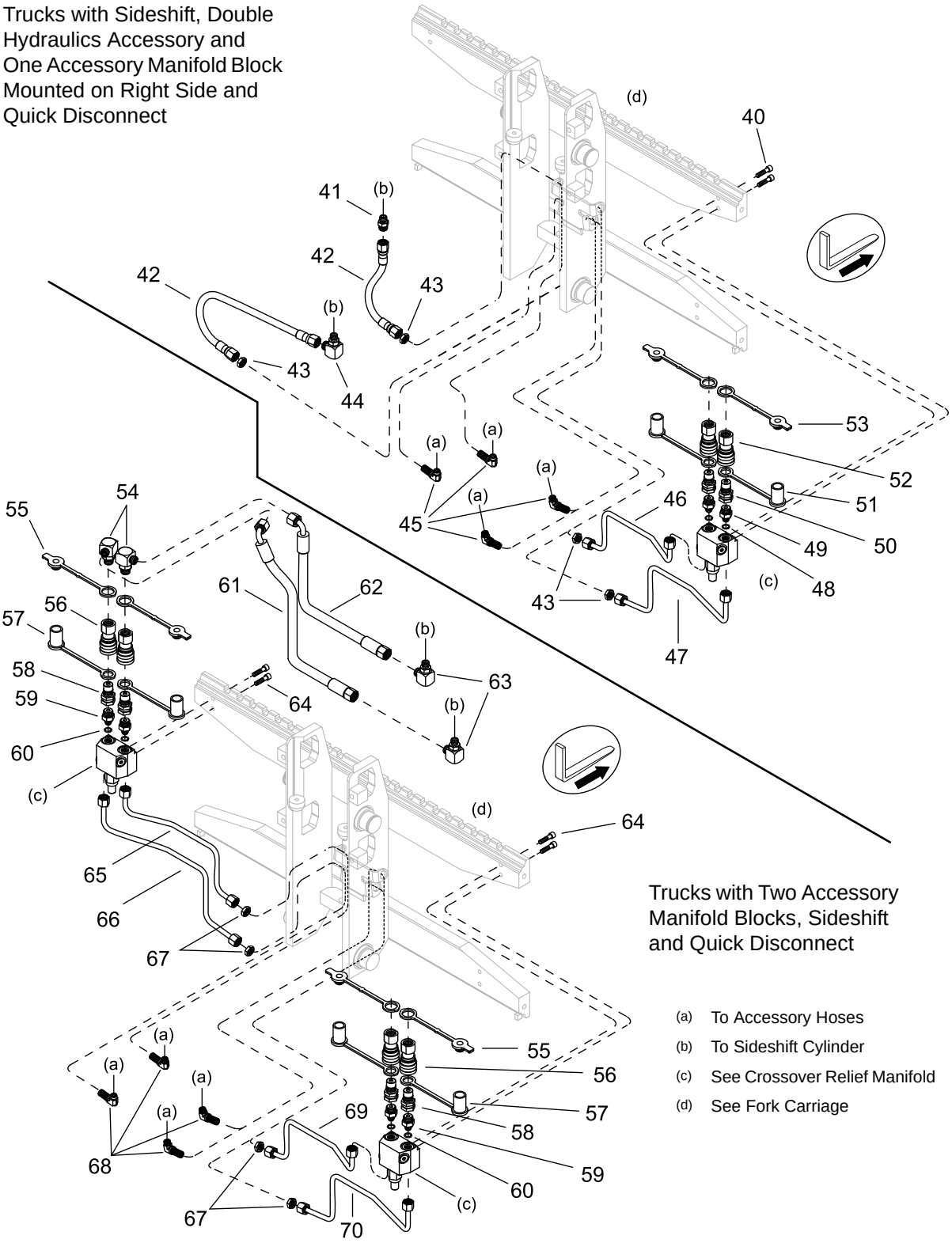



Figure 15640-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 40 | 060016-088 | Screw | 2 |
| 41 | 064280-006 | Adapter | 1 |
| 42 | 064337-003 | Hose | 2 |
| 43 | 064325-006 | Nut | 4 |
| 44 | 064280-006 | Adapter | 1 |
| 45 | 064326-006 | Bulkhead Fittings | 4 |
| 46 | 132489* | Tube Assembly (965 mm (38.0 in) Carriage) | 1 |
| | 139876* | Tube Assembly (880 mm (34.5 in) Carriage) | 1 |
| 47 | 132488* | Tube Assembly (965 mm (38.0 in) Carriage) | 1 |
| | 139875* | Tube Assembly (880 mm (34.5 in) Carriage) | 1 |
| 48 | 064019-029 | O-Ring | 2 |
| 49 | 064004-004 | Connector | 2 |
| 50 | 064333-003 | Nipple (1) | 2 |
| 51 | 064231-001 | Dust Cap (1) | 2 |
| 52 | 064334-003 | Female Coupler (1) | 2 |
| 53 | 064232-001 | Dust Plug (1) | 2 |
| 54 | 064280-002 | Adapter | 2 |
| 55 | 064232-001 | Dust Plug (1) | 4 |
| 56 | 064334-003 | Female Coupler (1) | 4 |
| 57 | 064231-001 | Dust Cap (1) | 4 |
| 58 | 064333-003 | Nipple | 4 |
| 59 | 064004-004 | Connector | 4 |
| 60 | 064019-029 | O-Ring | 4 |
| 61 | 064308-002 | Hose Assembly | 1 |
| 62 | 064308-003* | Hose Assembly TT Mast | 1 |
| | 064308-004* | Hose Assembly Quad Mast | 1 |
| | 061003-005 | Cable Tie | 1 |
| 63 | 064280-006 | Adapter | 2 |
| 64 | 060016-088 | Screw | 4 |
| 65 | 132491* | Tube Assembly (965 mm (38.0 in) Carriage) | 1 |
| | 134193* | Tube Assembly (880 mm (34.5 in) Carriage) | 1 |
| 66 | 132490* | Tube Assembly (965 mm (38.0 in) Carriage) | 1 |
| | 134192* | Tube Assembly (880 mm (34.5 in) Carriage) | 1 |
| 67 | 064325-006 | Nut | 4 |
| 68 | 064326-006 | Bulkhead Fittings | 4 |
| 69 | 132489* | Tube Assembly (965 mm (38.0 in) Carriage) | 1 |
| | 139876* | Tube Assembly (880 mm (34.5 in) Carriage) | 1 |
| 70 | 132488* | Tube Assembly (965 mm (38.0 in) Carriage) | 1 |
| | 139875* | Tube Assembly (880 mm (34.5 in) Carriage) | 1 |

(1) Quick Disconnect Parts

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

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## Notes:

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# DRIVE UNIT PARTS

https://truckmanualshub.com/

# DRIVE UNIT PARTS

## Drive Unit

(a) Torque 522 - 562 Nm (385 - 415 ft lb)
(b) Torque 11.6 - 13.2 Nm (103 - 117 in lb)
(c) Torque 32 - 38 Nm (24 - 28 ft lb)
(d) Torque 53.3 - 58.7 Nm (12.5 - 16.5 ft lb)
(e) Torque 17.6 - 20.4 Nm (13 - 15 ft lb)
(f) Torque 71 - 79 Nm (52 - 58 ft lb)

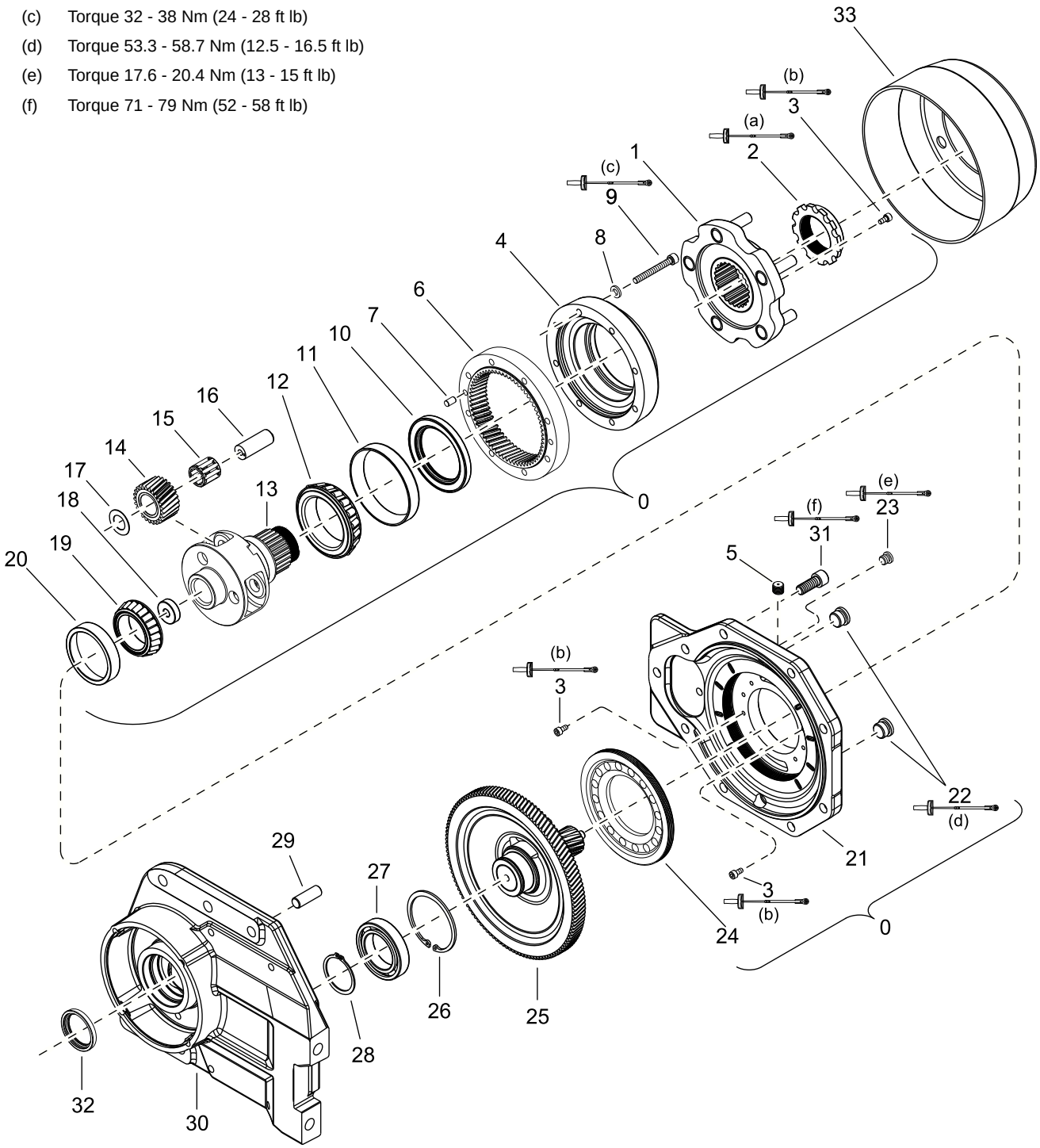



Figure 15454-03

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 141436 | LH Drive Unit Sub-Assembly Kit | 1 |
| | 141396 | RH Drive Unit Sub-Assembly Kit | 1 |
| 1 | 132320 | Wheel Hub Assembly | 1 |
| 2 | 140705 | Locking Nut | 1 |
| 3 | 060062-025 | Screw | 4 |
| | 061004-002 | Thread Locking Adhesive Primer | AR |
| | 061004-006 | Thread Locking Adhesive Blue | AR |
| 4 | 146857 | Housing (1) | 1 |
| 5 | 064020-010 | Pipe Plug | 1 |
| | 061004-016 | Thread Locking Adhesive Primer | AR |
| | 061004-005 | Thread Locking Adhesive Thread Sealant | AR |
| 6 | 138930 | Ring Gear (2) | 1 |
| 7 | 061011-014 | Dowel Pin | 2 |
| 8 | 060030-365 | Flatwasher | 8 |
| 9 | 060063-078 | Screw | 8 |
| | 061004-002 | Thread Locking Adhesive | AR |
| | 061004-006 | Thread Locking Adhesive | AR |
| 10 | 064138-019 | Oil Seal | 1 |
| 11 | 077014 | Bearing Cup | 1 |
| 12 | 077015 | Bearing Cone | 1 |
| 13 | 147105 | Carrier Shaft | 1 |
| 14 | 138929 | Planet Idler | 3 |
| 15 | 065180 | Needle Bearing | 3 |
| 16 | 147345 | Planetary Shaft | 3 |
| 17 | 132447 | Shim | 6 |
| 18 | 065081-012 | Ball Bearing | 1 |
| 19 | 065019 | Bearing Cone | 1 |
| 20 | 065018 | Bearing Cup | 1 |
| 21 | 146727-002 | Holder Bearing LH (1) | 1 |
| | 146727-001 | Holder Bearing RH (1) | 1 |
| 22 | 064091-001 | Hex Plug with O-Ring | 2 |
| 23 | 064091-006 | Hex Plug with O-Ring | 1 |
| 24 | 144486 | Adjusting Plate | 1 |
| 25 | 147068 | Gear Assembly | 1 |
| 26 | 060009-180 | Retaining Ring | 1 |
| 27 | 065081-078 | Ball Bearing | 1 |
| 28 | 060009-085 | Retaining Ring | 1 |
| 29 | 140080 | Dowel Pin | 2 |
| 30 | 147070 | Mount Plate LH (1) | 1 |
| | 147069 | Mount Plate RH (1) | 1 |
| | 147072 | Mount Plate LH EE (1) | 1 |
| | 147071 | Mount Plate RH EE (1) | 1 |
| 31 | 060115-022 | Screw | 9 |
| | 061004-002 | Thread Locking Adhesive Primer | AR |
| | 061004-006 | Thread Locking Adhesive Blue | AR |
| 32 | 064138-022 | Oil Seal | 1 |
| 33 | 146686 | Guard String | 1 |

(1) Refer to Drive Unit Maintenance to apply primer 061004-016 and gasket eliminator 061004-030.

(2) Refer to Drive Unit Maintenance to apply primer 061004-016 and gasket eliminator 061004-015.

**Always Specify Model, Data & Serial Number**

(a) Power Terminal
(b) Torque 9 - 13 Nm (6.6 - 9.6 ft lb)
(c) Torque 32 - 36 Nm (23.6 - 26.5 ft lb)
(d) Torque 23 - 24 Nm (16.9 - 17.7 ft lb)

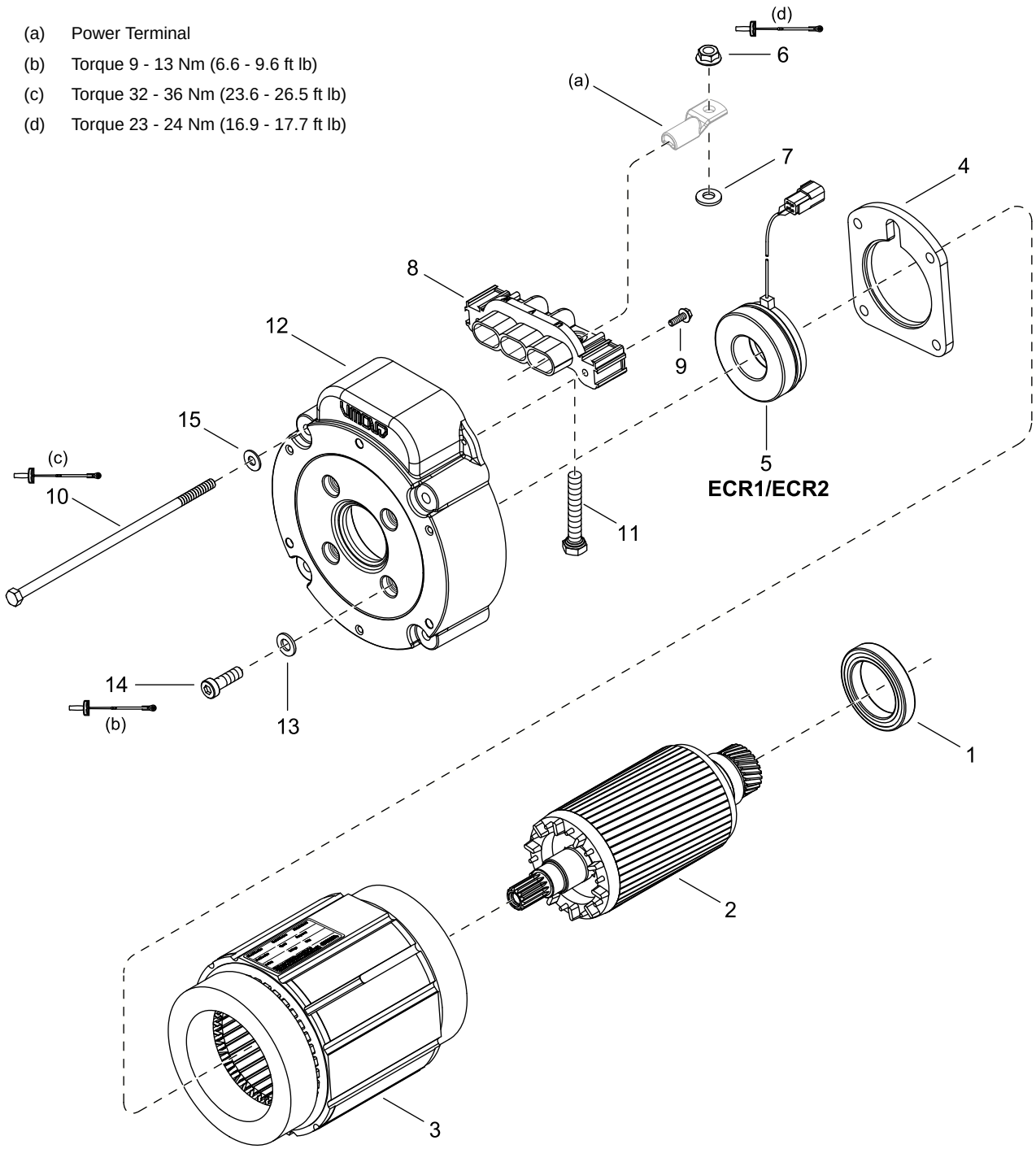



Figure 15403-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 021084 | 36V AC Traction Motor Assembly (1) | 1 |
| 1 | 065081-076 | Bearing Ball | 1 |
| 2 | 021085 | Rotor | 1 |
| 3 | 021069-002 | Stator | 1 |
| 4 | 021078 | Retainer Bearing | 1 |
| 5 | 146080-004 | Bearing Ball Sensor | 1 |
| 6 | 060059-028 | Nut | 3 |
| 7 | 060125-001 | Spring Disc | 3 |
| 8 | 021150 | Terminal Block | 1 |
| 9 | 060061-013 | Screw | 2 |
| 10 | 021079-003 | Bolt | 4 |
| 11 | 021212-002 | Screw | 3 |
| 12 | 021082 | Brake End Head | 1 |
| 13 | 060030-265 | Flatwasher | 4 |
| 14 | 060063-097 | Screw | 4 |
| 15 | 060030-336 | Flatwasher | 4 |

(1) Quantities shown for one motor.

(a) Power Terminal
(b) Torque 9 - 13 Nm (6.6 - 9.6 ft lb)
(c) Torque 32 - 36 Nm (23.6 - 26.5 ft lb)
(d) Torque 23 - 24 Nm (16.9 - 17.7 ft lb)

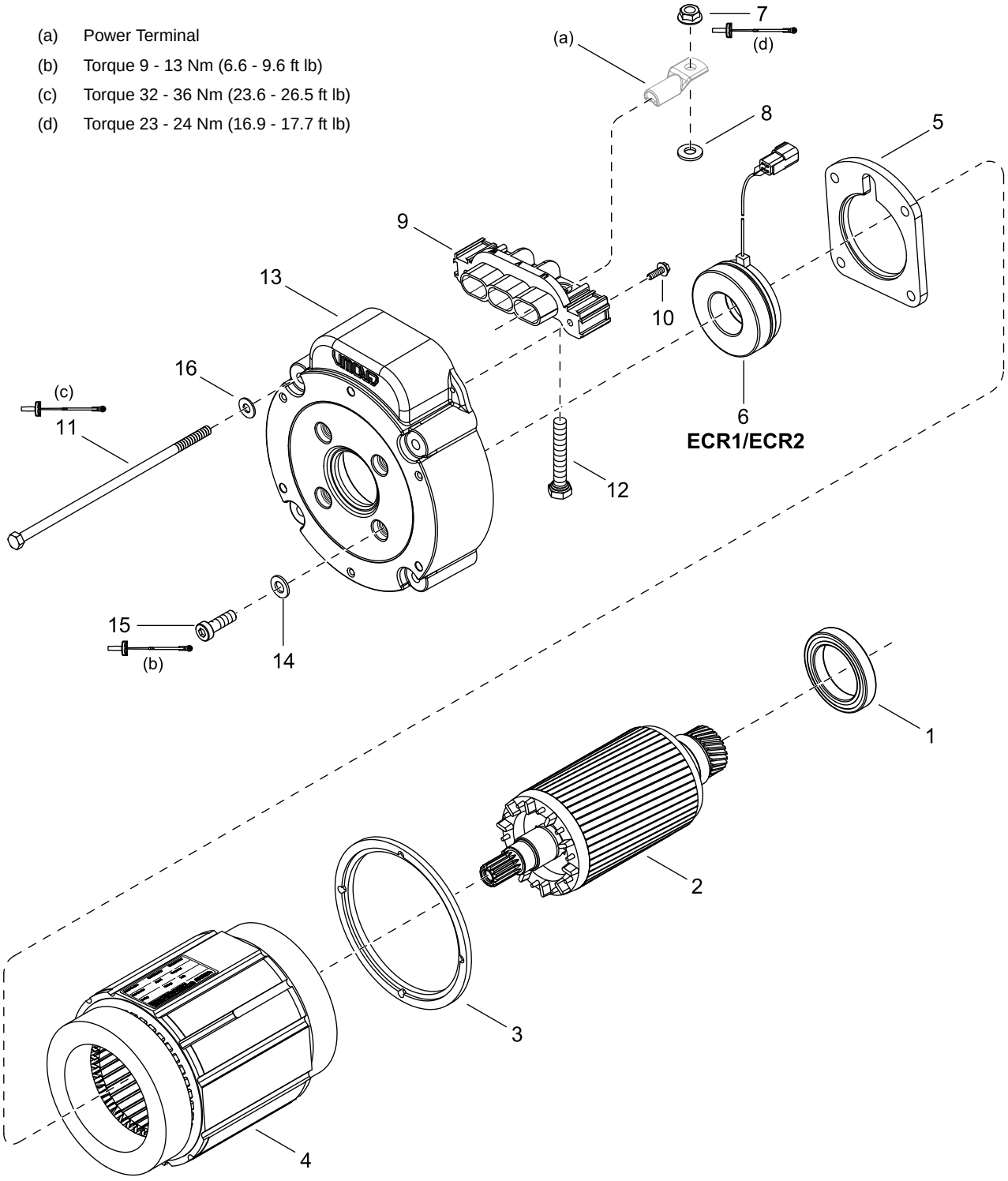



Figure 15407-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 021184 | 36V AC Traction Motor Assembly - EE (1) | 1 |
| 1 | 065081-076 | Bearing Ball | 1 |
| 2 | 021085 | Rotor | 1 |
| 3 | 021177 | Ring Adapter | 1 |
| 4 | 021069-002 | Stator | 1 |
| 5 | 021078 | Retainer Bearing | 1 |
| 6 | 146080-004 | Bearing Ball Sensor | 1 |
| 7 | 060059-028 | Nut | 3 |
| 8 | 060125-001 | Spring Disc | 3 |
| 9 | 021150 | Terminal Block | 1 |
| | 065031-001 | Sealant (2) | AR |
| 10 | 060061-013 | Screw | 2 |
| 11 | 021079-003 | Bolt | 4 |
| 12 | 021212-001 | Screw | 3 |
| 13 | 021151 | Brake End Head | 1 |
| 14 | 060030-265 | Flatwasher | 4 |
| 15 | 060063-097 | Screw | 4 |
| 16 | 060030-336 | Flatwasher | 4 |

(1) Quantities shown for one motor.

(2) Use to seal up area around the Terminal Block (around leads and against Stator).

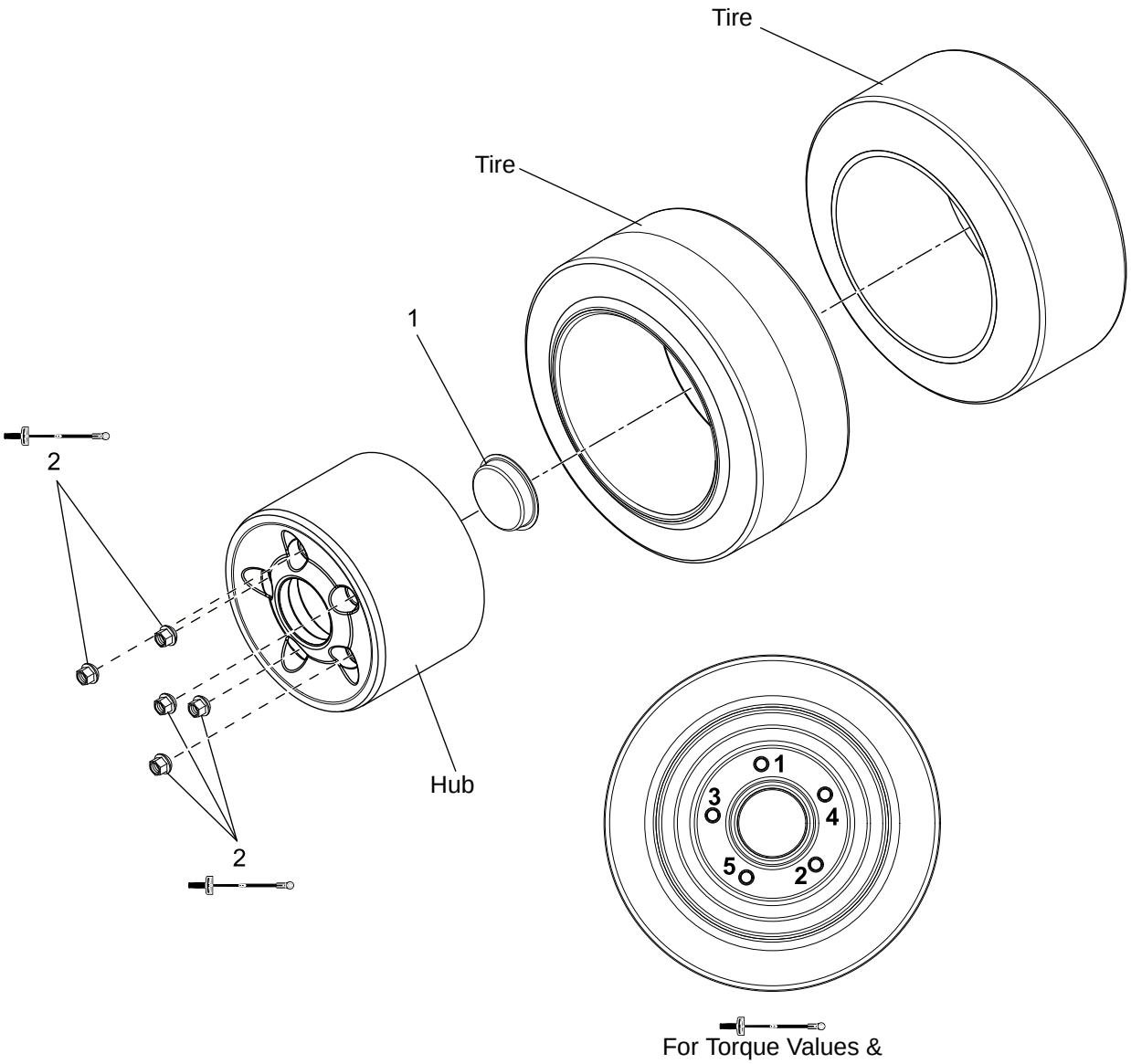



Figure 14315

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 140594 | Cap | 2 |
| 2 | 060105-001 | Nut | 10 |

**Chart 1 Drive Tire Assembly**

| Tire | Hub | Tire Size | Composition / Color | Tread | Tire Capacity |
|---|---|---|---|---|---|
| 139567-344-01 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Poly/Black | Smooth | 1360-1815 kg (3000-4000 lbs) |
| 139567-344-03 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Poly/Black | Siped | 1360-1815 kg (3000-4000 lbs) |
| 139567-354-01 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Poly/Cream | Smooth | 1360-1815 kg (3000-4000 lbs) |
| 135906-301-41 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Black | Smooth | 1360 kg (3000 lbs) |
| 135906-311-41 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Gray | Smooth | 1360 kg (3000 lbs) |
| 135906-301-42 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Black | Lugged | 1360 kg (3000 lbs) |
| 135906-311-42 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Gray | Lugged | 1360 kg (3000 lbs) |
| 135906-305-41 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Black | Smooth | 1590-1815 kg (3500-4000 lbs) |
| 135906-315-41 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Cream | Smooth | 1590-1815 kg (3500-4000 lbs) |
| 135906-305-42 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Black | Lugged | 1590-1815 kg (3500-4000 lbs) |
| 135906-315-42 | 140692 | 406 x 178 x 267 mm (16 x 7 x 10.5 in) | Rubber/Cream | Lugged | 1590-1815 kg (3500-4000 lbs) |

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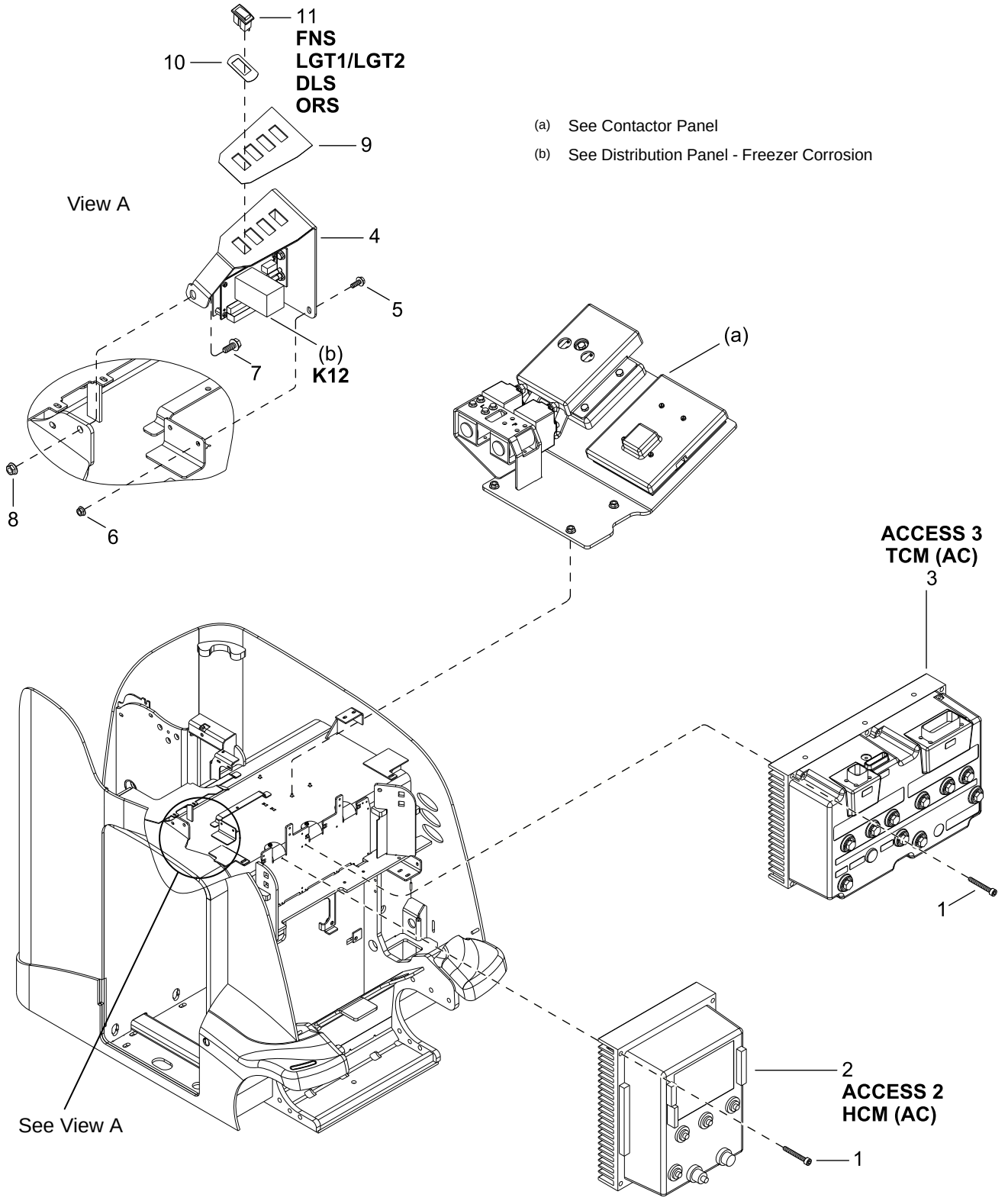


## Notes:

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CROWN

# ELECTRICAL PARTS




(a) See Contactor Panel

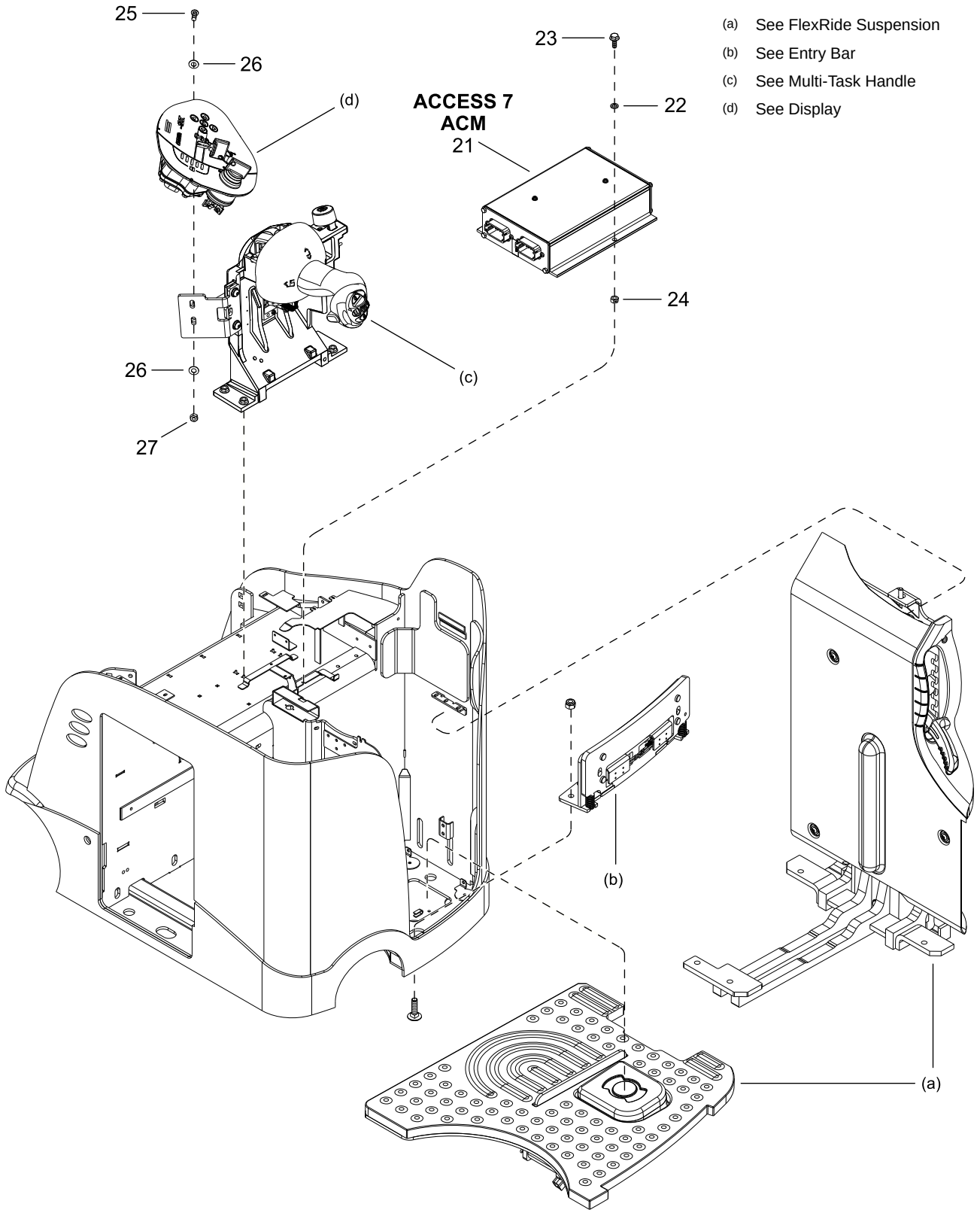
(b) See Distribution Panel - Freezer Corrosion

Figure 15724-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060062-009 | Screw | 10 |
| 2 | 135807-100-0R-S | Hydraulic Module - AC | 1 |
| | 135806-100-0R-S | Hydraulic Module - DC | 1 |
| 3 | 132939-107-0R-S | Traction Drive Programmed Module - AC | 1 |
| 4 | 137080 | Switch Bracket | 1 |
| | 141096 | Switch Bracket Key Override | 1 |
| 5 | 060062-016 | Screw | 2 |
| 6 | 060059-027 | Nut | 2 |
| 7 | 060063-042 | Screw | 1 |
| 8 | 060059-028 | Nut | 1 |
| 9 | 138868-001 | Switch Plate Cover | 1 |
| | 138868-002 | Switch Plate Cover | 1 |
| | 138868-003 | Switch Plate Cover | 1 |
| | 138868-004 | Switch Plate Cover | 1 |
| 10 | 138906-001 | Switch Label - Fan | 1 |
| | 138906-002 | Switch Label - Work Light | 1 |
| | 138906-003 | Switch Label - Dome Light | 1 |
| | 138906-004 | Switch Label - Override | 1 |
| 11 | 062595-001 | Switch Panel - On/Off | 1 |
| | 062595-002 | Switch Panel - On/Off | 2 |
| | 062595-003 | Switch Panel - On/Off | 1 |



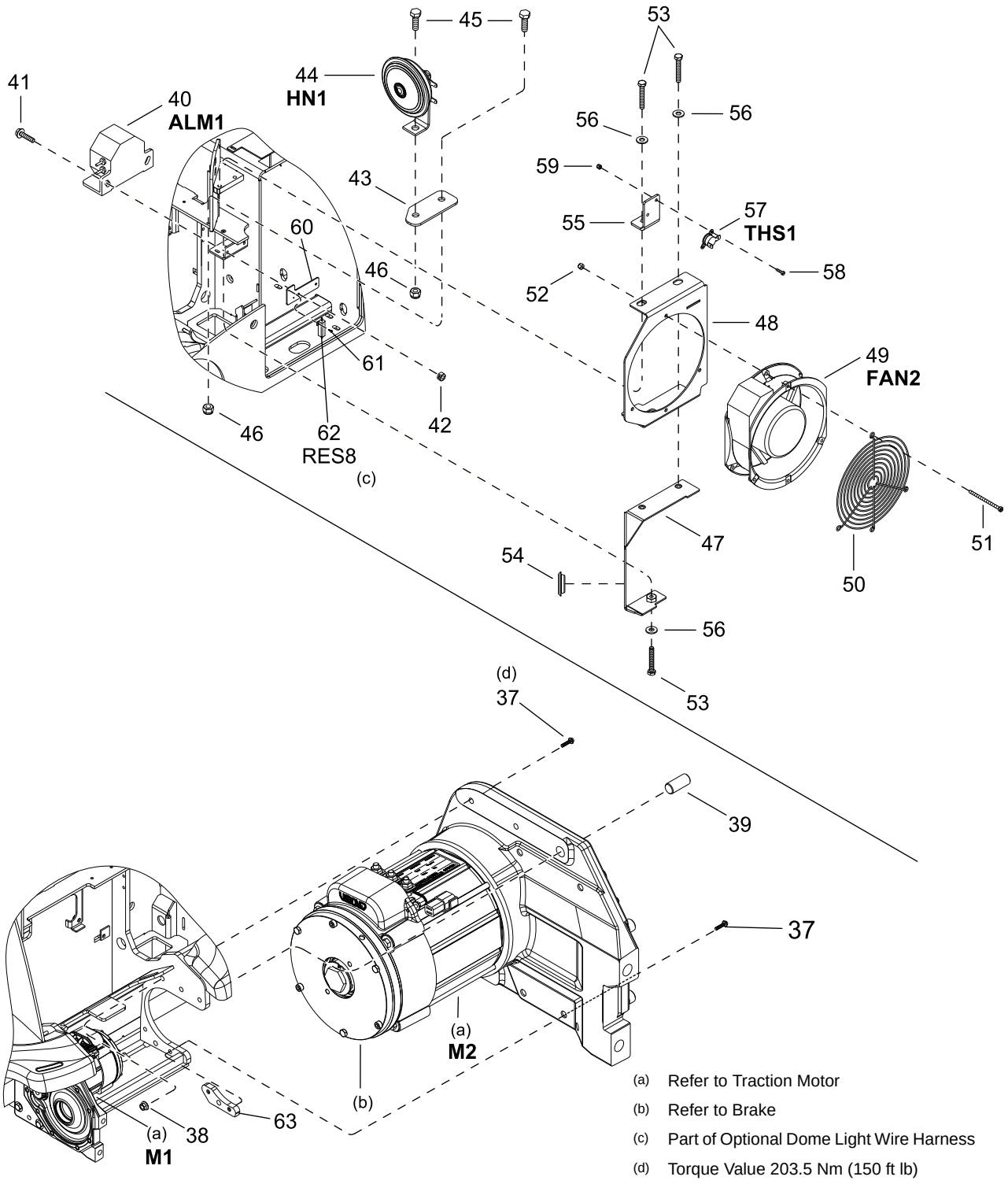

(a) See FlexRide Suspension
(b) See Entry Bar
(c) See Multi-Task Handle
(d) See Display

Figure 15725-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 21 | 140055-001-0R-S | ACCESS 7 | 1 |
| 22 | 060030-274 | Flatwasher | 2 |
| 23 | 060062-040 | Screw | 2 |
| 24 | 060059-037 | Nut | 2 |
| 25 | 060062-027 | Screw | 2 |
| 26 | 060030-204 | Flatwasher | 4 |
| 27 | 060059-050 | Nut | 2 |




(a) Refer to Traction Motor

(b) Refer to Brake

(c) Part of Optional Dome Light Wire Harness

(d) Torque Value 203.5 Nm (150 ft lb)

Figure 15737-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 37 | 060117-021 | Screw | 8 |
| 38 | 060059-055 | Nut | 2 |
| 39 | 140080 | Dowel Pin | 4 |
| 40 | 115565 | Back-up Alarm | 1 |
| | 129615 | Smart Travel Alarm | 1 |
| 41 | 060062-015 | Screw | 2 |
| 42 | 060059-027 | Nut | 2 |
| 43 | 140537 | Horn Mount Plate | 1 |
| 44 | 132198-001 | Horn | 1 |
| 45 | 060063-004 | Screw | 2 |
| 46 | 060059-020 | Nut | 2 |
| 47 | 135971 | Fan Duct | 1 |
| 48 | 135970 | Plate Duct | 1 |
| 49 | 126489 | Axial Fan 48V | 1 |
| 50 | 128458 | Fan Guard | 1 |
| 51 | 060065-009 | Screw | 4 |
| 52 | 060059-036 | Nut | 4 |
| 53 | 060062-020 | Screw | 3 |
| 54 | 107716-003 | Plug | 1 |
| 55 | 139559 | Thermostat Mount (1) | 1 |
| | 078882 | Tectyl (1) | AR |
| | 065005-003 | Gasket Sealer (1) | AR |
| 56 | 060030-132 | Flatwasher (1) | 3 |
| 57 | 088941 | Thermostat (1) | 1 |
| 58 | 060064-015 | Screw (1) | 2 |
| 59 | 060059-014 | Nut (1) | 2 |
| 60 | 142271 | Resistor Bracket (2) | 1 |
| 61 | 060064-015 | Screw (2) | 2 |
| 62 | 110761-023 | Resistor part of Dome Light Wire Harness (2) | 1 |
| 63 | 135103 | Left Hand Top Plate | 1 |
| | 135104 | Right Hand Top Plate | 1 |

(1) Freezer/Corrosion

(2) Only on Trucks with Optional Dome Light

(a) Refer to Pump Motor - AC

(b) Refer to Pump Motor - DC

(c) Refer to Pump Motor Service for Torque Values

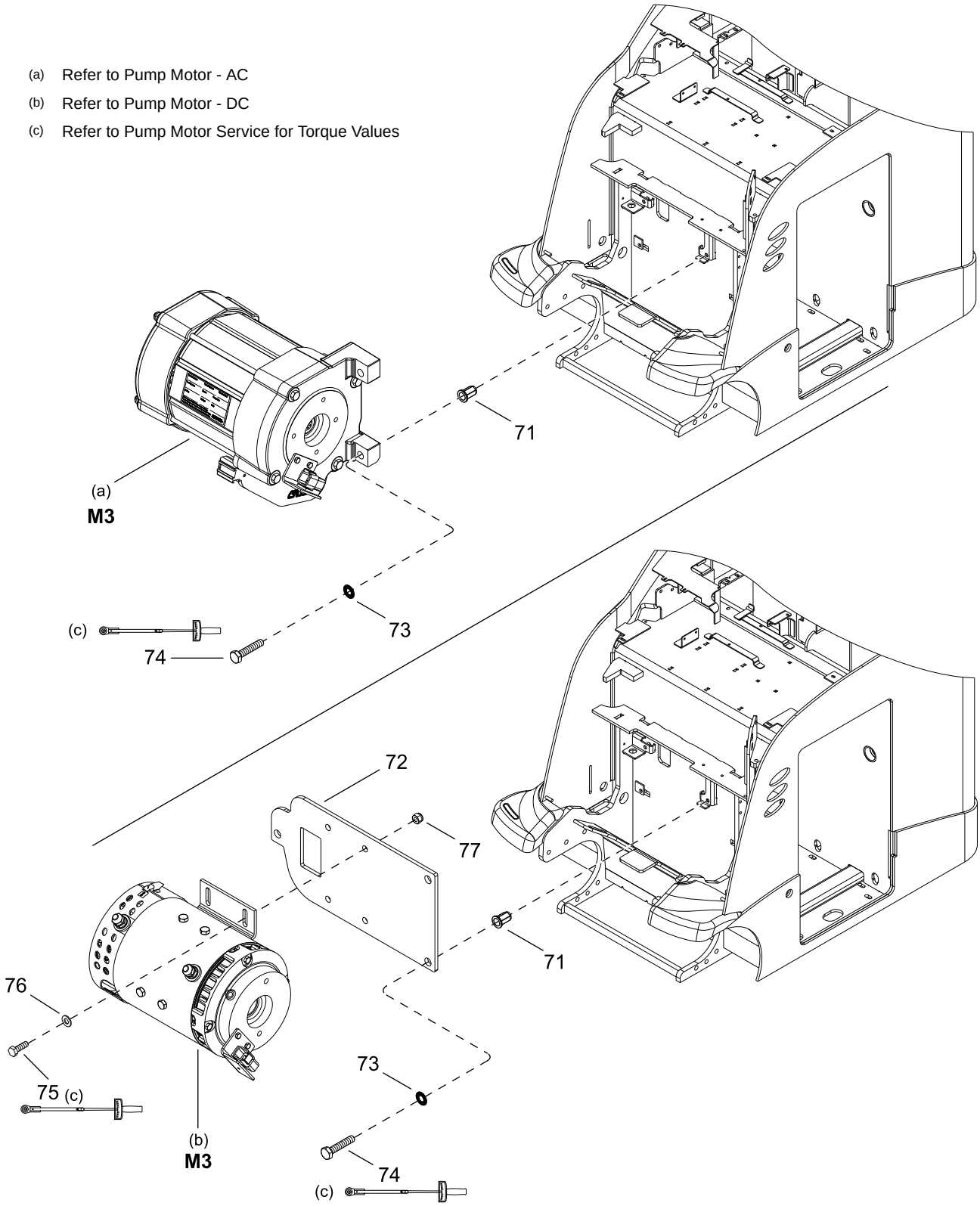



Figure 15911-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 71 | 060103-005 | Insert | 3 |
| 72 | 135752 | Mounting Plate - DC Motor | 1 |
| 73 | 060089-002 | Wedge Washer | 3 |
| 74 | 060075-007 | Screw | 3 |
| 75 | 060063-004 | Screw | 4 |
| 76 | 060030-017 | Flatwasher | 4 |
| 77 | 060059-020 | Nut | 4 |

# ELECTRICAL PARTS

## Contactor Panel

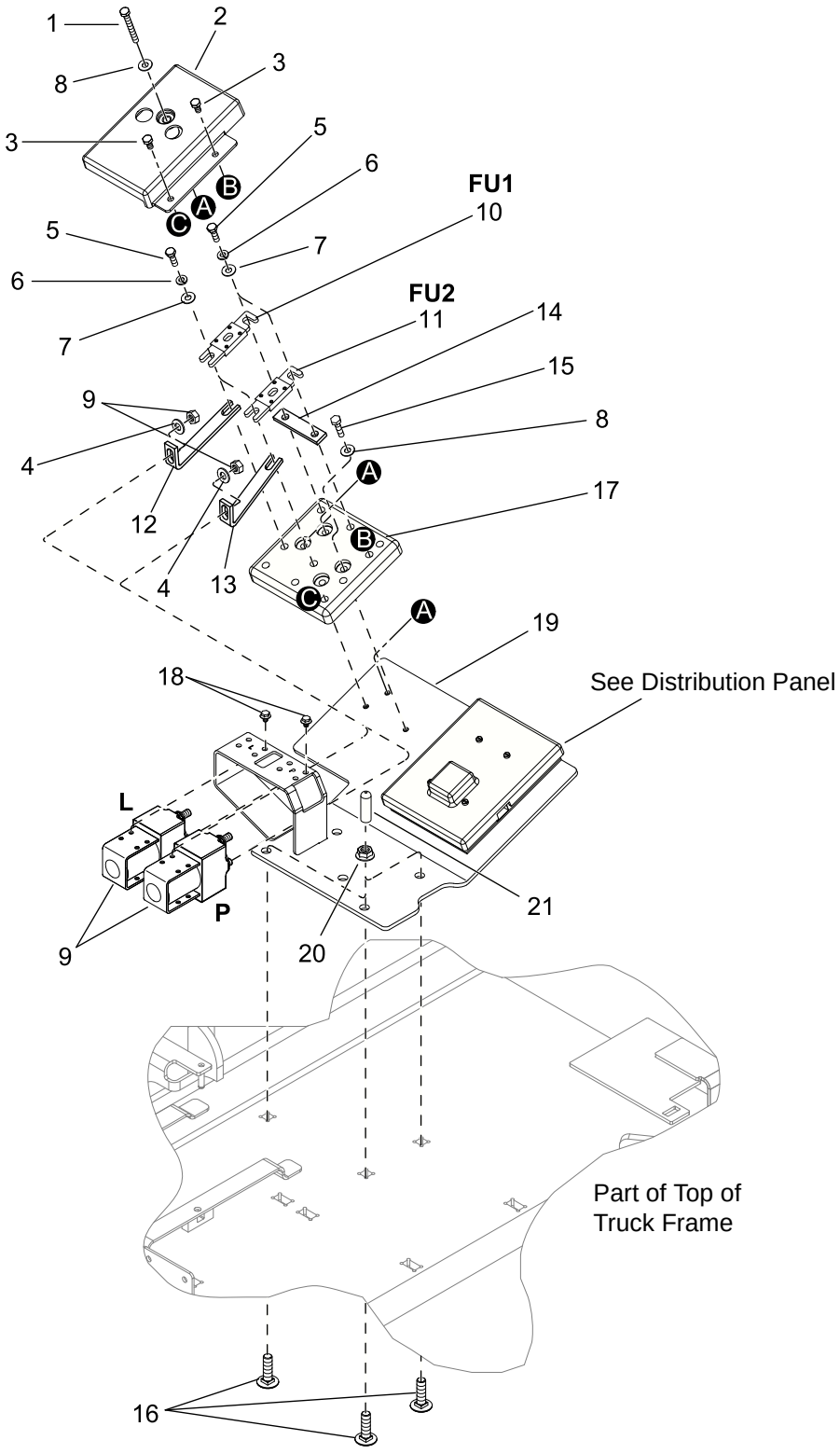



Figure 14169



Crown 2006 PF15354-1 Rev. 8/07

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060062-046 | Screw | 1 |
| 2 | 137517 | Cover | 1 |
| 3 | 060062-004 | Screw | 2 |
| 4 | 060030-196 | Flatwasher | 2 |
| 5 | 060062-008 | Screw | 4 |
| 6 | 060005-026 | Lockwasher | 4 |
| 7 | 060030-060 | Flatwasher | 4 |
| 8 | 060030-012 | Flatwasher | 3 |
| 9 | 110613-007 | Contactor | 2 |
| | 125588-001 | Insulator Boot | 2 |
| 10 | 132083-003 | Fuse | 1 |
| | 113729-021 | Label | 1 |
| 11 | 132083-002 | Fuse | 1 |
| | 113729-023 | Label | 1 |
| 12 | 137294 | Bus Bar | 1 |
| 13 | 137295 | Bus Bar | 1 |
| 14 | 137296 | Bus Bar | 1 |
| 15 | 060062-045 | Screw | 2 |
| 16 | 060062-052 | Carriage Screw | 3 |
| 17 | 138519 | Fuse Panel | 1 |
| 18 | 060061-016 | Screw | 8 |
| 19 | 140992 | Contactor Panel | 1 |
| 20 | 060059-027 | Hex Nut | 3 |
| 21 | 061101-007 | Cap Fitting | 2 |

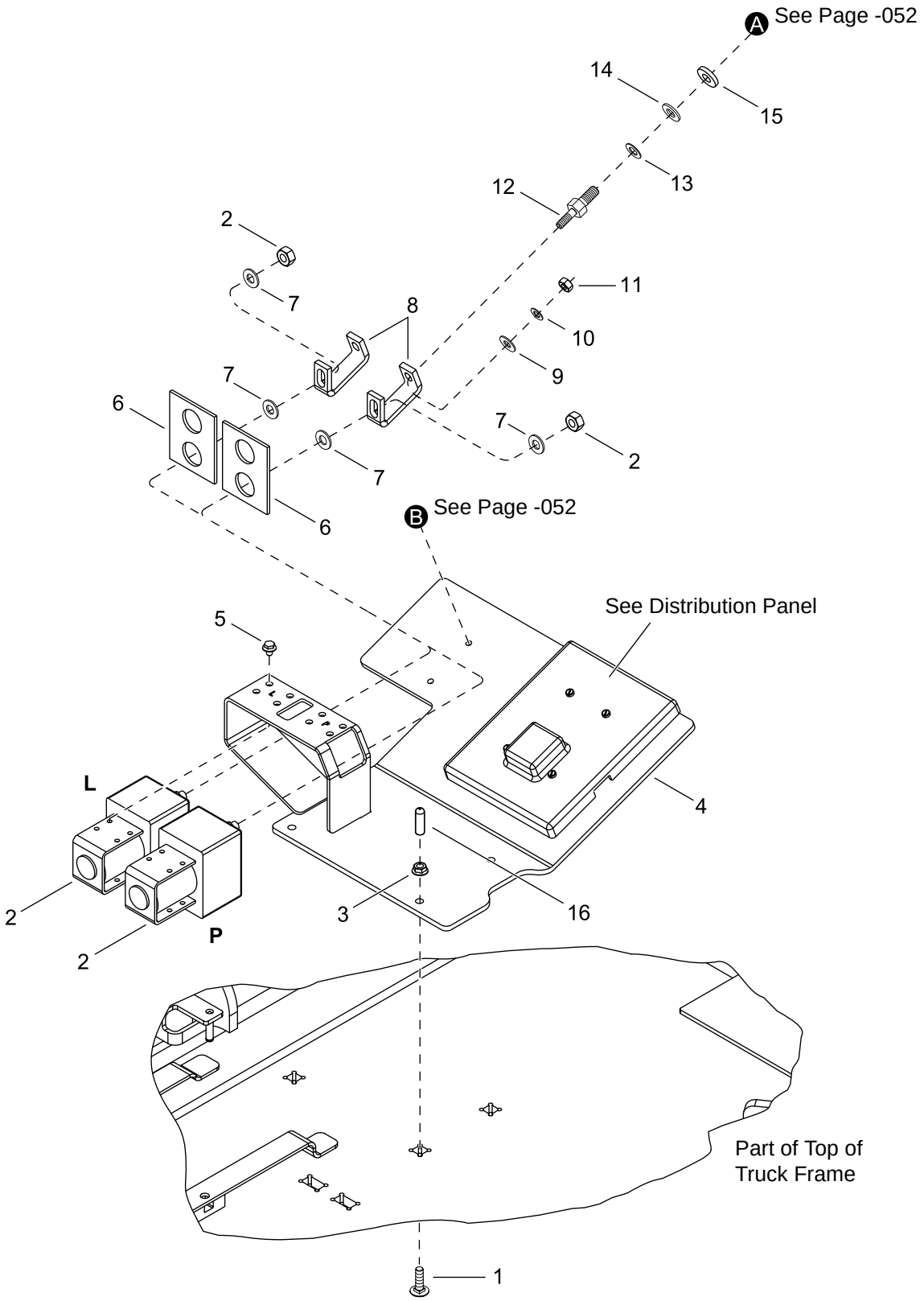



Figure 15457

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060062-052 | Screw | 3 |
| 2 | 118280-005 | Contactor | 2 |
| 3 | 060059-027 | Nut | 3 |
| 4 | 139858 | Contactor Panel | 1 |
| 5 | 060061-016 | Screw | 8 |
| 6 | 133619 | Insulator | 2 |
| 7 | 060030-196 | Flatwasher | 4 |
| 8 | 139857 | Bus Bar | 2 |
| 9 | 060030-060 | Flatwasher | 2 |
| 10 | 060005-022 | Lockwasher | 2 |
| 11 | 060059-005 | Nut | 2 |
| 12 | 141065 | Stud | 2 |
| 13 | 060005-020 | Lockwasher | 2 |
| 14 | 060030-017 | Flatwasher | 2 |
| 15 | 119323 | Insulator | 2 |
| 16 | 061101-007 | Cap Fitting | 2 |

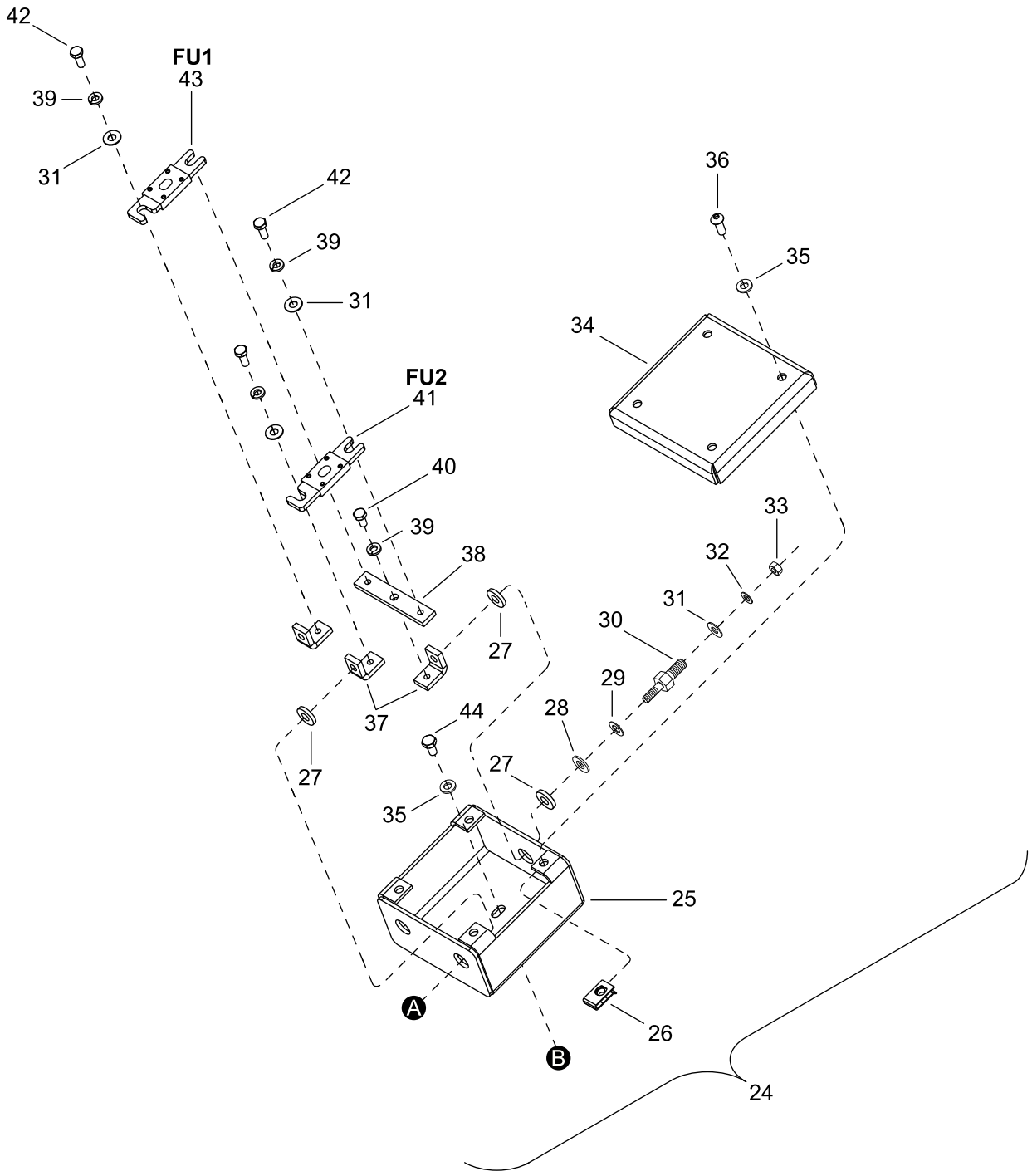
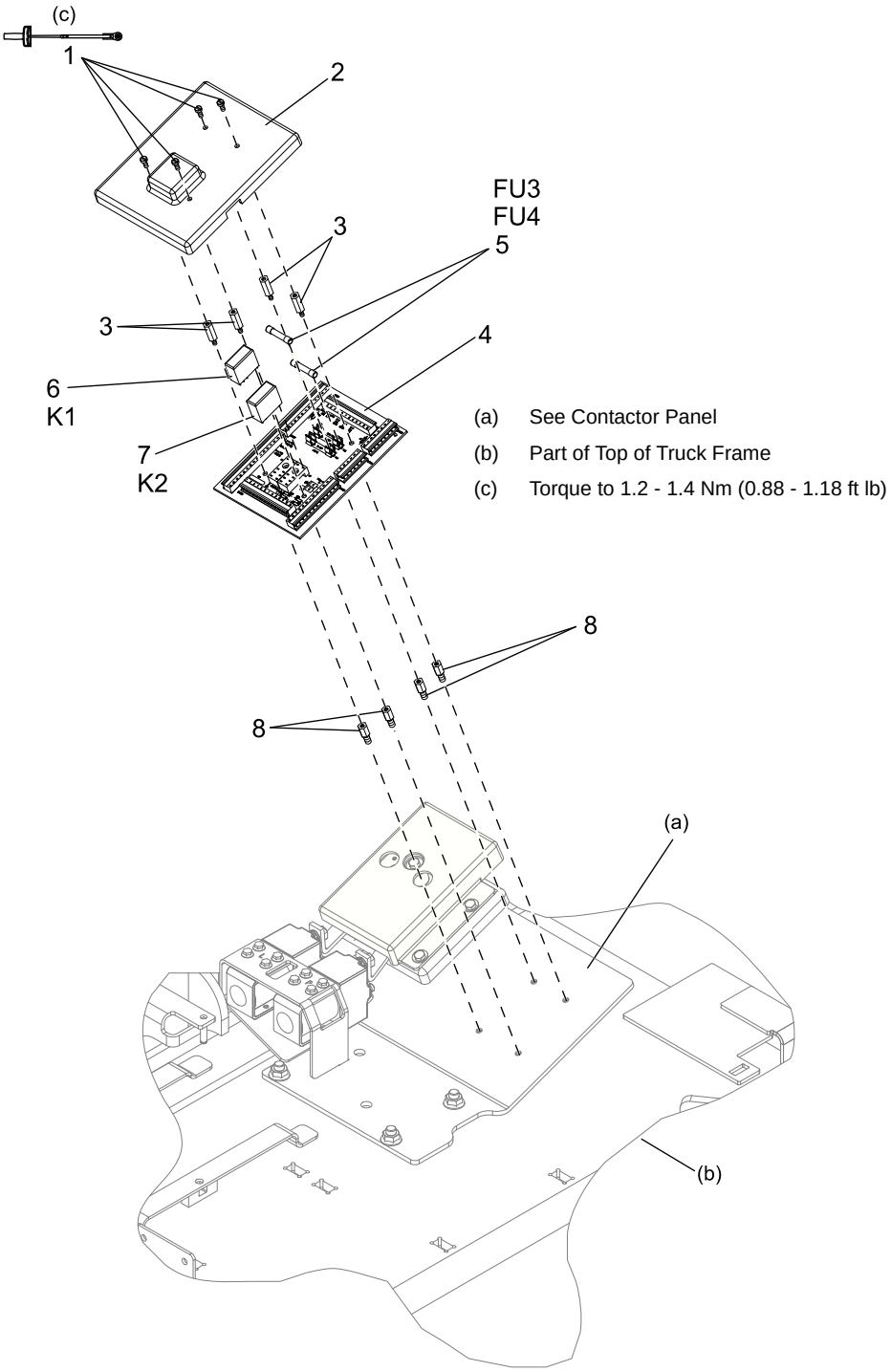



Figure 15466

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 24 | 139854 | Fuse Box Assembly - EE | 1 |
| 25 | 139861 | Fuse Box - EE | 1 |
| 26 | 060102-002 | U-Nut | 4 |
| 27 | 119323 | Insulator | 4 |
| 28 | 060030-017 | Flatwasher | 1 |
| 29 | 060005-020 | Lockwasher | 1 |
| 30 | 141065 | Stud | 1 |
| 31 | 060030-060 | Flatwasher | 5 |
| 32 | 060005-022 | Lockwasher | 1 |
| 33 | 060059-005 | Nut | 1 |
| 34 | 139860 | Fuse Box Cover - EE | 1 |
| 35 | 060131-004 | Flatwasher | 6 |
| 36 | 060062-027 | Screw | 4 |
| 37 | 139855 | Bus Bar | 3 |
| 38 | 139856 | Bus Bar | 1 |
| 39 | 060005-026 | Lockwasher | 5 |
| 40 | 060062-062 | Screw | 1 |
| 41 | 132083-002 | Fuse | 1 |
| 42 | 060062-039 | Screw | 4 |
| 43 | 132083-003 | Fuse | 1 |
| 44 | 060062-003 | Screw | 2 |




(a) See Contactor Panel
(b) Part of Top of Truck Frame
(c) Torque to 1.2 - 1.4 Nm (0.88 - 1.18 ft lb)

Figure 14190-01

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060065-007 | Screw | 4 |
| 2 | 124994 | Cover | 1 |
| | 146987 | Foam Tape | 1 |
| 3 | 124960-002 | Spacer | 4 |
| 4 | 138379 | Distribution Panel | 1 |
| 5 | 094362-002 | Fuse | 2 |
| 6 | 062640-002 | Relay | 1 |
| 7 | 062711-001 | Relay | 1 |
| 8 | 124960-011 | Spacer | 4 |

**Always Specify Model, Data & Serial Number**

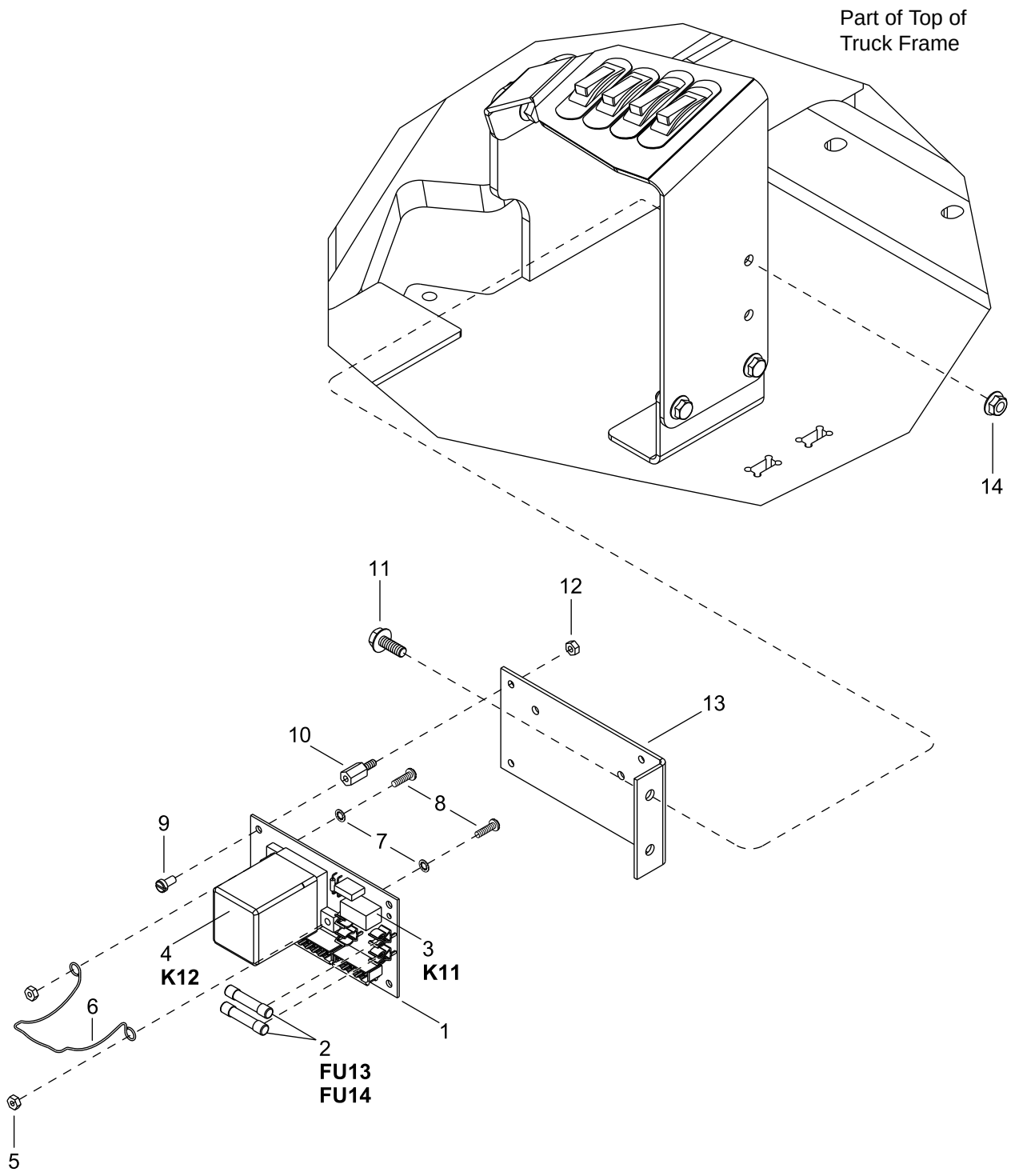
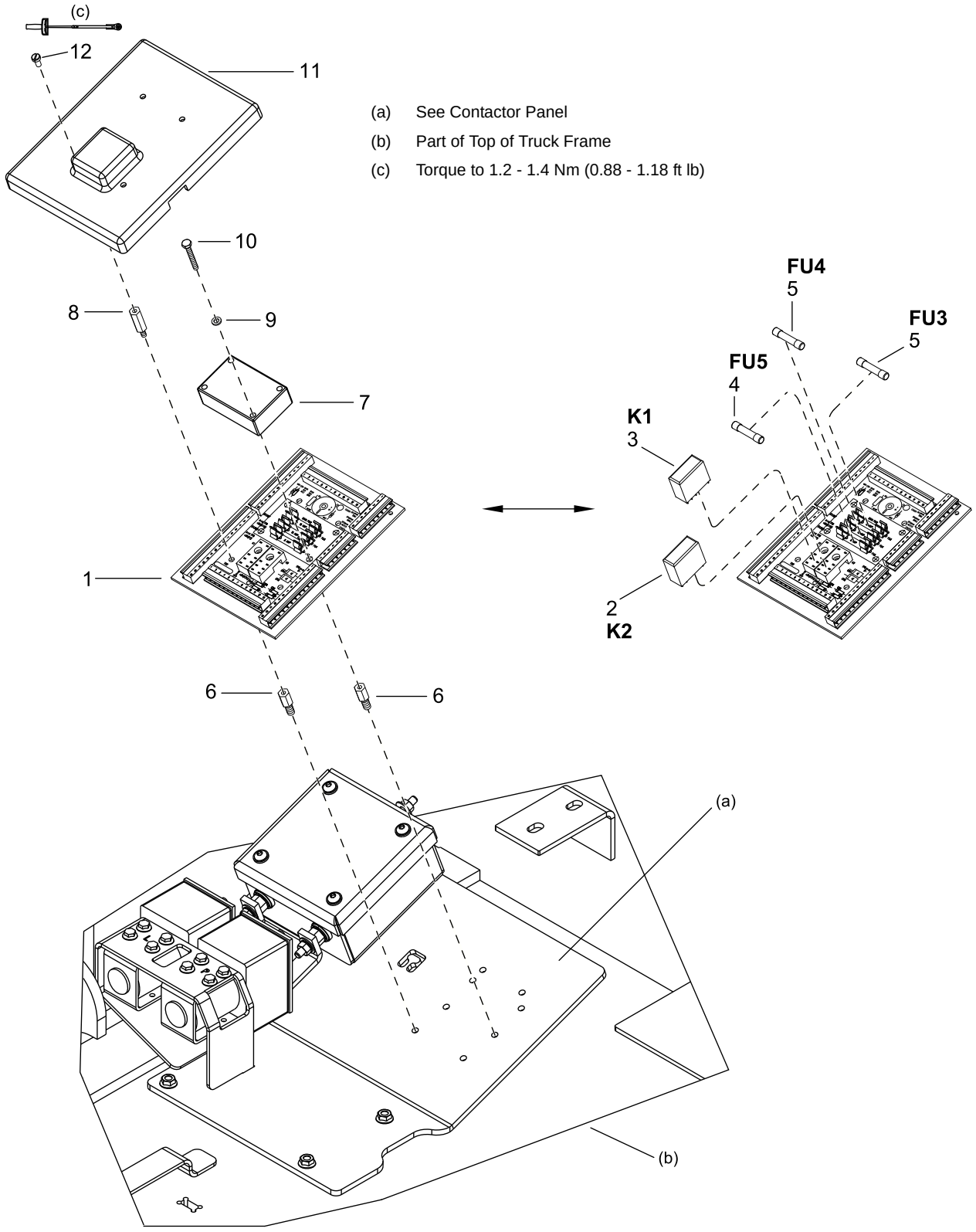



Figure 15475

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 123903-001 | Freezer/Corrosion PCB Panel Assembly | 1 |
| 1 | 123903-001 | Panel | 1 |
| 2 | 094362-002 | Fuse | 2 |
| 3 | 062496-003 | Relay | 1 |
| 4 | 062337-006 | Relay | 1 |
| 5 | 060021-003 | Nut | 2 |
| 6 | 062339 | Relay Hold Down Spring | 1 |
| 7 | 060005-048 | Lockwasher | 2 |
| 8 | 060012-064 | Screw | 2 |
| 9 | 060065-007 | Screw | 4 |
| 10 | 124960-001 | Spacer | 4 |
| 11 | 060062-016 | Screw | 2 |
| 12 | 060059-033 | Nut | 4 |
| 13 | 127418 | Support Bracket | 1 |
| 14 | 060059-027 | Nut | 2 |




(a) See Contactor Panel

(b) Part of Top of Truck Frame

(c) Torque to 1.2 - 1.4 Nm (0.88 - 1.18 ft lb)

Figure 15511-01

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 138379 | Distribution Panel Assembly | 1 |
| 2 | 062711-001 | Relay | 1 |
| 3 | 062640-002 | Relay | 1 |
| | 061003-005 | Cable Tie | 1 |
| 4 | 094362-006 | Fuse | 1 |
| 5 | 094362-002 | Fuse | 2 |
| 6 | 124960-011 | Spacer | 8 |
| 7 | 140458 | Fuse Enclosure | 1 |
| 8 | 124960-002 | Spacer | 4 |
| 9 | 060005-004 | Lockwasher | 4 |
| 10 | 060065-021 | Screw | 4 |
| 11 | 124994 | Distribution Panel Cover | 1 |
| | 146987 | Foam Tape | 1 |
| 12 | 060065-007 | Screw | 4 |

| Model | Function |
|---|---|
| SC 4500 | L |
| RC 5500 | L & P |

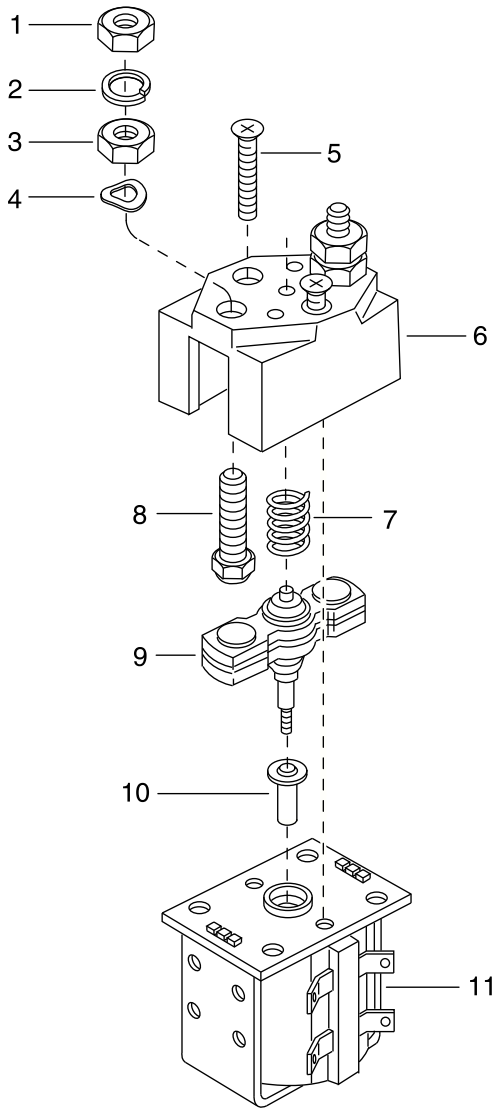



Figure 5674-01



Crown 2006 PF15155-1 Rev. 11/06

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 110613-007 | Contactor Assembly | 1 |
| 1 | 060059-001 | Nut | 2 |
| 2 | 060005-031 | Lockwasher | 2 |
| 3 | 060059-004 | Jam Nut | 2 |
| 4 | 060005-020 | Lockwasher | 2 |
| 5 | 107351 | Screw | 2 |
| 6 | 114436 | Cover | 1 |
| 7 | 140407 | Return Spring | 1 |
| 8 | 113368 | Fixed Contact, Includes Index 1 thru 4 | 2 |
| 9 | 117158 | Moving Contact | 1 |
| 10 | 123601 | Bushing Kit | 1 |
| 11 | 118934 | Coil & Frame | 1 |
| | 117162 | Contact Repair Kit, Includes Index 1, 2, 3, 4, 8, 9, & 10 | 1 |

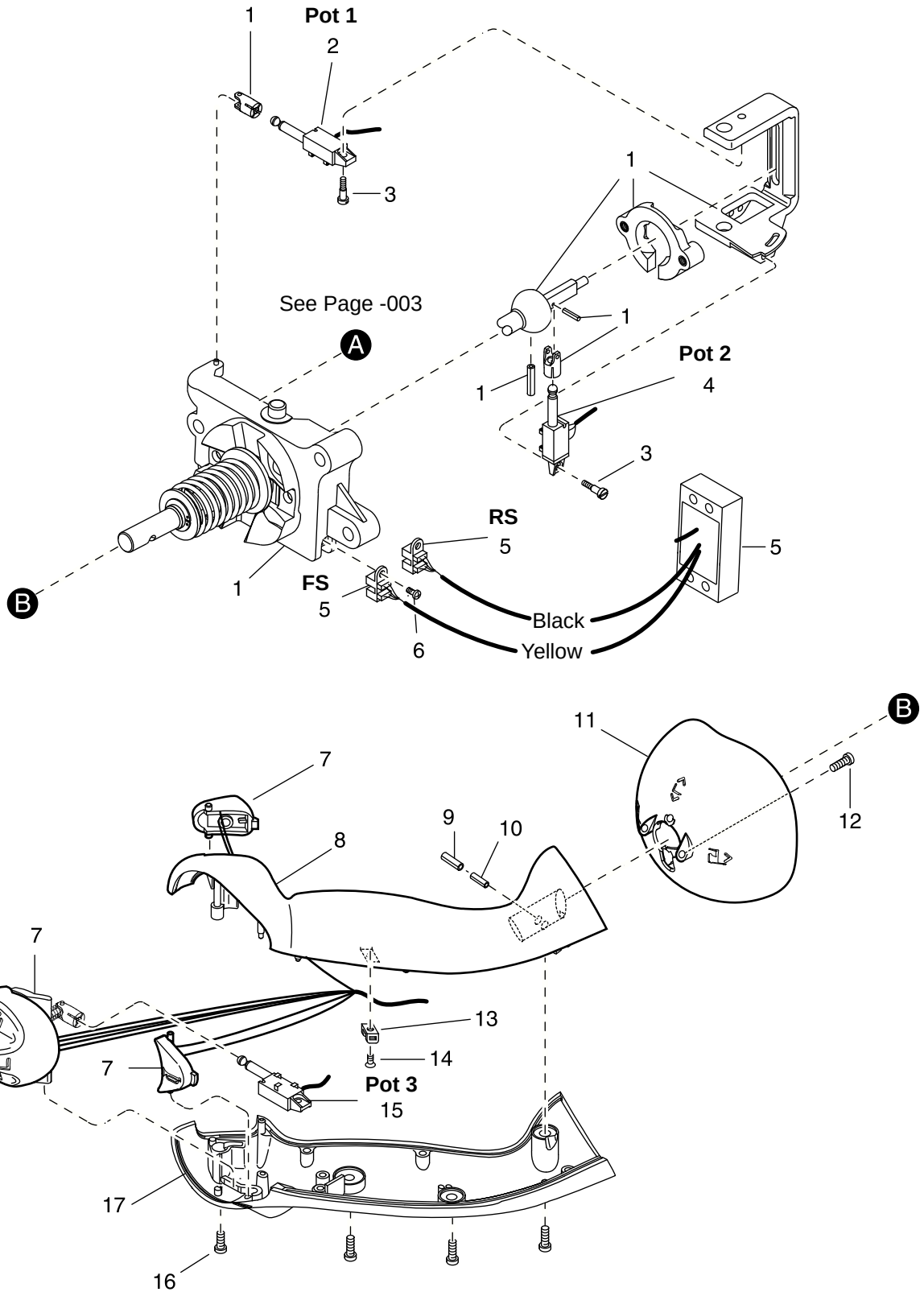
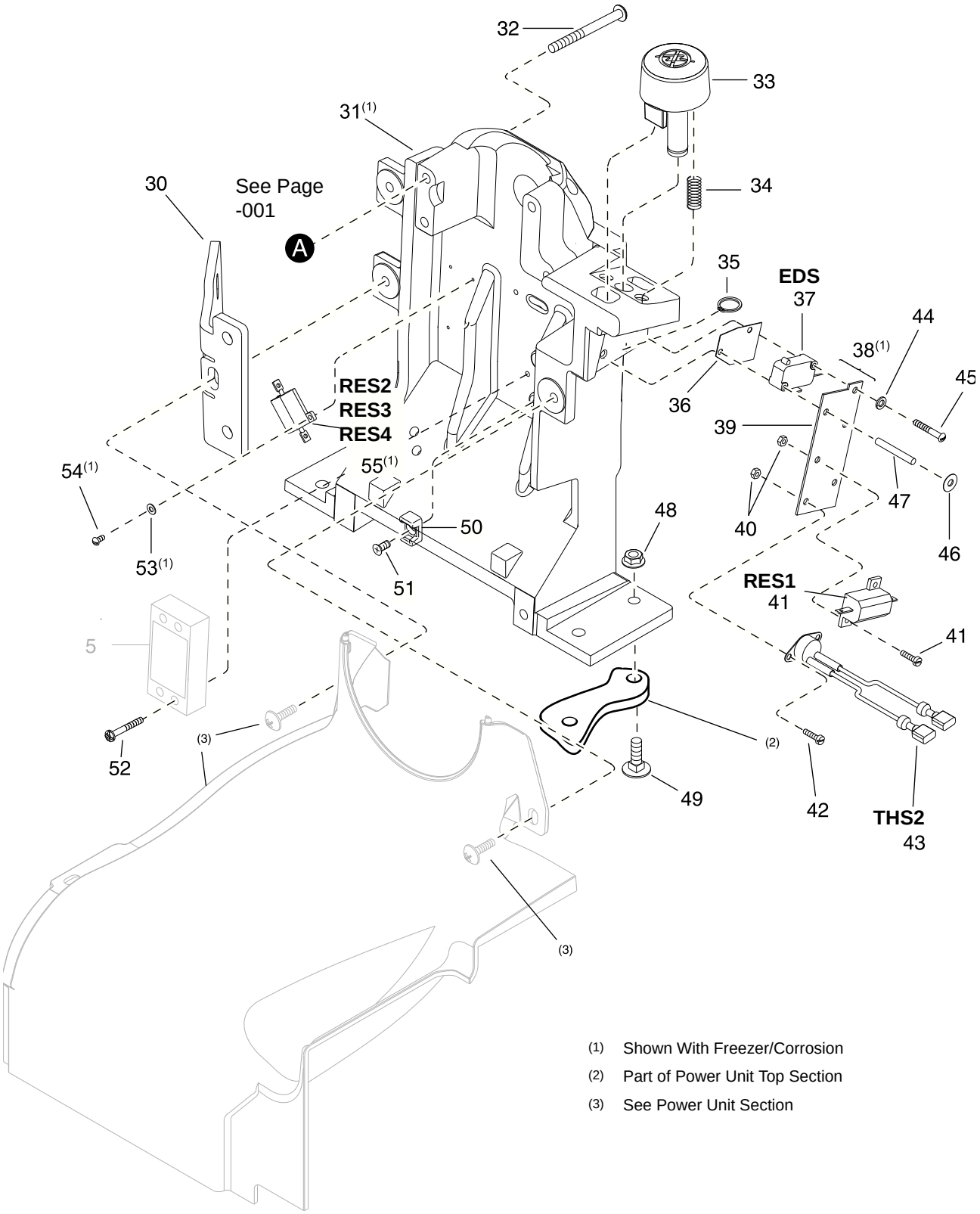



Figure 15514

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 140750-001 | Support Assembly (Includes Index 1-17) | 1 |
| | 140750-002 | Support Assembly (Freezer/Corrosion) (Includes Index 1-17) | 1 |
| 1 | 122322 | Multi Task Handle Base Assembly | 1 |
| 2 | 140745-001 | Traction Command Potentiometer | 1 |
| | 140745-002 | Traction Command Potentiometer (Freezer/Corrosion) | 1 |
| 3 | 060045-030 | Screw | 2 |
| 4 | 140743-001 | R/L Command Potentiometer | 1 |
| | 140743-002 | R/L Command Potentiometer (Freezer/Corrosion) | 1 |
| 5 | 140747 | Optical Switch | 1 |
| | 062756-007 | Connector JC221 | 1 |
| | 062798-009 | Connector Insert | 1 |
| 6 | 060011-026 | Screw | 2 |
| 7 | 140738 | Harness Handle With Thumbwheel | 1 |
| | 062756-006 | Connector JC220 | 1 |
| | 062798-011 | Connector Insert | 1 |
| | 061003-002 | Cable Tie | 4 |
| 8 | 126690 | Upper Handle | 1 |
| 9 | 060000-117 | Pin Roll | 1 |
| 10 | 060000-118 | Pin Roll | 1 |
| 11 | 123673-001 | Dust Cover | 1 |
| 12 | 060032-057 | Screw | 3 |
| 13 | 122255 | Tie Mount | 1 |
| 14 | 060012-075 | Screw | 1 |
| 15 | 140741-001 | Side Shift Command Potentiometer | 1 |
| | 140741-002 | Side Shift Command Potentiometer (Freezer/Corrosion) | 1 |
| 16 | 060013-039 | Screw | 4 |
| 17 | 126691 | Lower Handle | 1 |




(1) Shown With Freezer/Corrosion

(2) Part of Power Unit Top Section

(3) See Power Unit Section

Figure 15510

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 141008 | Display Bracket | 1 |
| 31 | 140985-001 | Support | 1 |
| | 140985-002 | Support (Freezer/Corrosion) | 1 |
| | 061003-004 | Cable Tie | 2 |
| 32 | 060014-086 | Screw | 4 |
| 33 | 123747 | Button Assembly | 1 |
| 34 | 094606 | Compression Spring | 2 |
| 35 | 060009-002 | Retaining Ring | 1 |
| 36 | 093603 | Switch Insulator | 1 |
| 37 | 062753 | Positive Break Switch | 1 |
| 38 | 138769 | Support Heater Assembly (Freezer/Corrosion) | 1 |
| 39 | 137665 | Bracket | 1 |
| 40 | 060059-066 | Nut | 4 |
| 41 | 119274-003 | Resistor | 1 |
| 42 | 060064-001 | Screw | 4 |
| 43 | 062783-002 | Thermostat | 1 |
| 44 | 060005-049 | Lockwasher | 1 |
| 45 | 060011-021 | Screw | 1 |
| 46 | 060031-017 | Speed Nut | 1 |
| 47 | 060077-008 | Pin | 1 |
| 48 | 060059-027 | Nut | 4 |
| 49 | 060062-052 | Screw | 4 |
| 51 | 060012-075 | Screw | 2 |
| 50 | 122255 | Tie Mount | 2 |
| | 061003-002 | Cable Tie | 2 |
| 52 | 060012-070 | Screw | 2 |
| 53 | 060005-001 | Lockwasher (Freezer/Corrosion) | 6 |
| 54 | 060010-003 | Screw (Freezer/Corrosion) | 6 |
| 55 | 062033-054 | Resistor (Freezer/Corrosion) | 3 |
| | 062756-004 | Connector JC814 (Freezer/Corrosion) | 1 |
| | 062798-007 | Connector Insert | 1 |

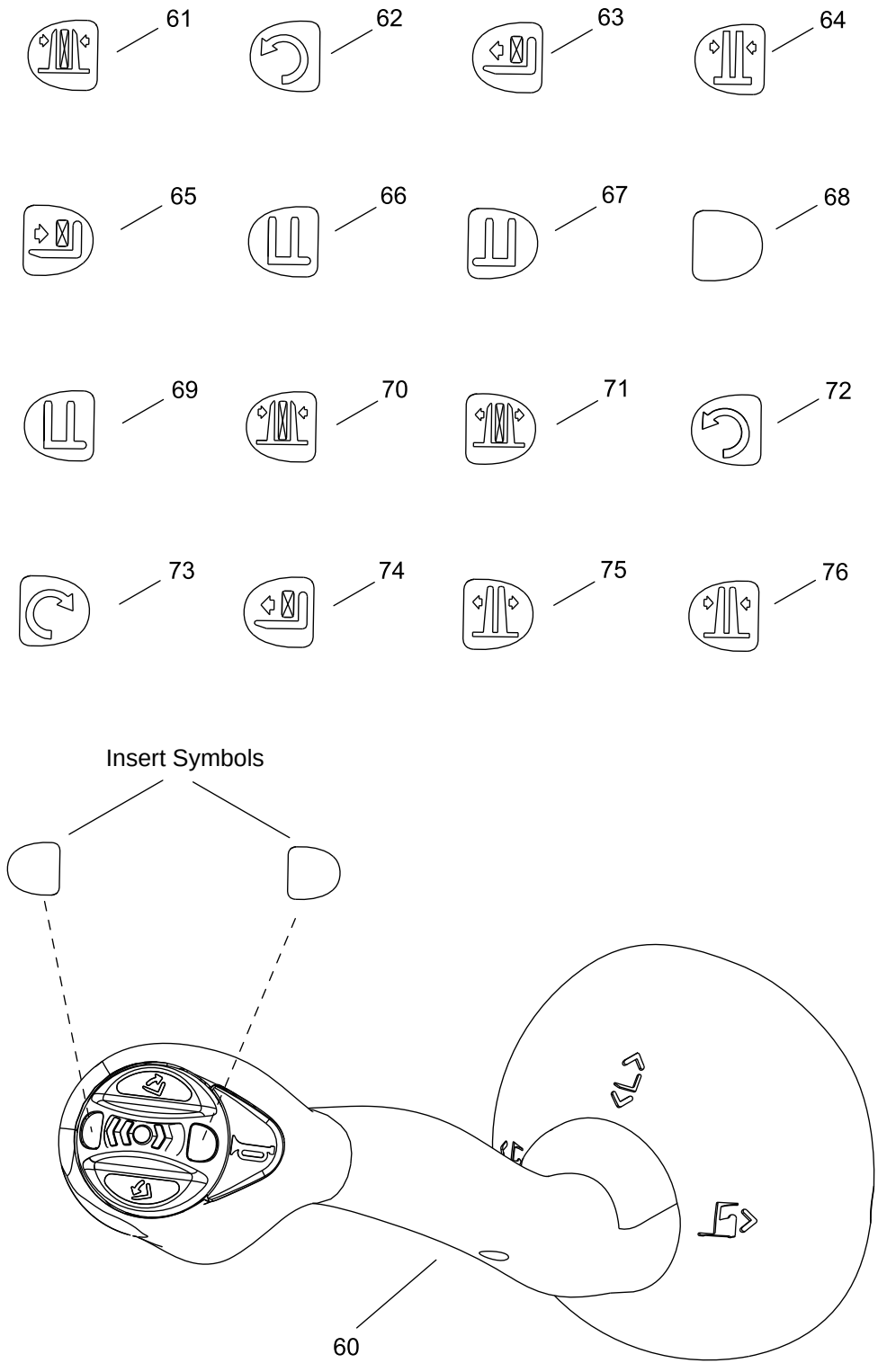



Figure 15788

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 60 | 140750-001* | Support Assembly | 1 |
| | 140750-002* | Support Assembly (Freezer/Corrosion) | 1 |
| 61 | 137671-001* | MFC Insert - Clamp | 1 |
| 62 | 137671-002* | MFC Insert - Rotate | 1 |
| 63 | 137671-003* | MFC Insert - Push/Pull | 1 |
| 64 | 137671-004* | MFC Insert - Fork Spreader | 1 |
| 65 | 137671-005* | MFC Insert - Push/Pull | 1 |
| 66 | 137671-006* | MFC Insert - Side Shift Left | 1 |
| 67 | 137671-007* | MFC Insert - Side Shift Right | 1 |
| 68 | 137671-008* | MFC Insert - Plain | 2 |
| 69 | 137671-009* | MFC Insert - Side Shift Left | 1 |
| 70 | 137671-010* | MFC Insert - Clamp | 1 |
| 71 | 137671-011* | MFC Insert - Clamp | 1 |
| 72 | 137671-012* | MFC Insert - Rotate | 1 |
| 73 | 137671-013* | MFC Insert - Rotate | 1 |
| 74 | 137671-014* | MFC Insert - Push/Pull | 1 |
| 75 | 137671-015* | MFC Insert - Fork Spreader | 1 |
| 76 | 137671-016* | MFC Insert - Fork Spreader | 1 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

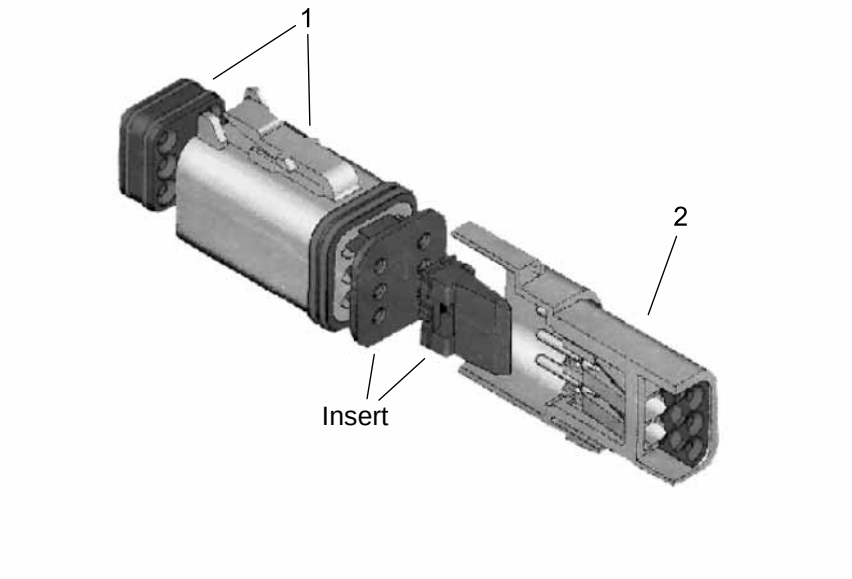



Figure 15471

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**INDEX PART NUMBER PART NAME NUMBER REQUIRED**

| Connector Part Number Chart | | | | | | |
|---|---|---|---|---|---|---|
| Index | Connector | Designation | # of Terminals | Terminal | Insert | Seal Plug |
| 1(1)(2)(3) | 062701-004(4) | PC210 | 6 | 062704-004 | 062703-008 | - |
| (1)(2)(3) | 062701-004(4) | PC211 | 4 | 062704-004 | 062703-008 | 062754-001 |
| (1)(2)(3) | 062701-001(4) | PC212 | 2 | 062704-004 | 062703-002 | - |
| (1)(2)(3) | 062755-006(4) | PC220 | 12 | 092797-004 | 062798-012 | 062754-001 |
| (1)(2)(3) | 062755-007(4) | PC221 | 8 | 062797-004 | 062798-010 | - |
| (1)(2)(3) | 062701-003(4) | PC225 | 4 | 062704-004 | 062703-006 | 062754-001 |
| (1)(2)(3) | 062701-006(4) | PC230 | 12 | 062704-004 | 062703-012 | - |
| (1)(2)(3) | 062701-010(4) | PC231 | 12 | 062704-004 | 062703-012 | - |
| (1)(2)(3) | 062701-006(4) | PC232 | 12 | 062704-004 | 062703-012 | - |
| (1)(2)(3) | 062701-004(4) | PC402 | 6 | 062704-004 | 062703-008 | 062754-001 |
| (1) | 062701-006(4) | PC410 | 12 | 062704-004 | 062703-012 | 062754-001 |
| (1) | 062701-010(4) | PC411 | 12 | 062704-004 | 062703-012 | - |
| (1)(2)(3) | 062701-002(4) | PC415 | 3 | 062704-004 | 062703-004 | 062754-001 |
| (1) | 062755-001(4) | PC416 | 2 | 062797-004 | 062798-002 | - |
| (1)(2)(3) | 062701-003(4) | PC417 | 3 | 062704-004 | 062703-006 | 062754-001 |
| (1)(2)(3) | 062701-001(4) | PC418 | 2 | 062704-004 | 062703-002 | - |
| (1)(2)(3) | 062755-004(4) | PC420 | 6 | 062797-012 | 062798-008 | - |
| (1)(2)(3) | 062755-002(4) | PC421 | 3 | 062797-004 | 062798-004 | - |
| (1)(2)(3) | 062755-004(4) | PC425 | 6 | 062797-012 | 062798-008 | - |
| (1)(2)(3) | 062755-004(4) | PC426 | 6 | 062797-012 | 062798-008 | - |
| (1) | 062701-001(4) | PC428 | 2 | 062704-004 | 062703-002 | - |
| (1) | 062701-001(4) | PC429 | 2 | 062704-004 | 062703-002 | - |
| (1)(2)(3) | 062701-001(4) | PC435 | 2 | 062704-004 | 062703-002 | - |
| (1)(2)(3) | 062701-002(4) | PC436 | 3 | 062704-004 | 062703-004 | 062754-001 |

(1) Used on 140696 Enhanced All Options Harness.
(2) Used on 140679 DC Lift Harness.
(3) Used on 140680 AC Lift Harness.

**Always Specify Model, Data & Serial Number**

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(4) Uses 062737-002 Crimping Tool and 062706 Extraction Tool.

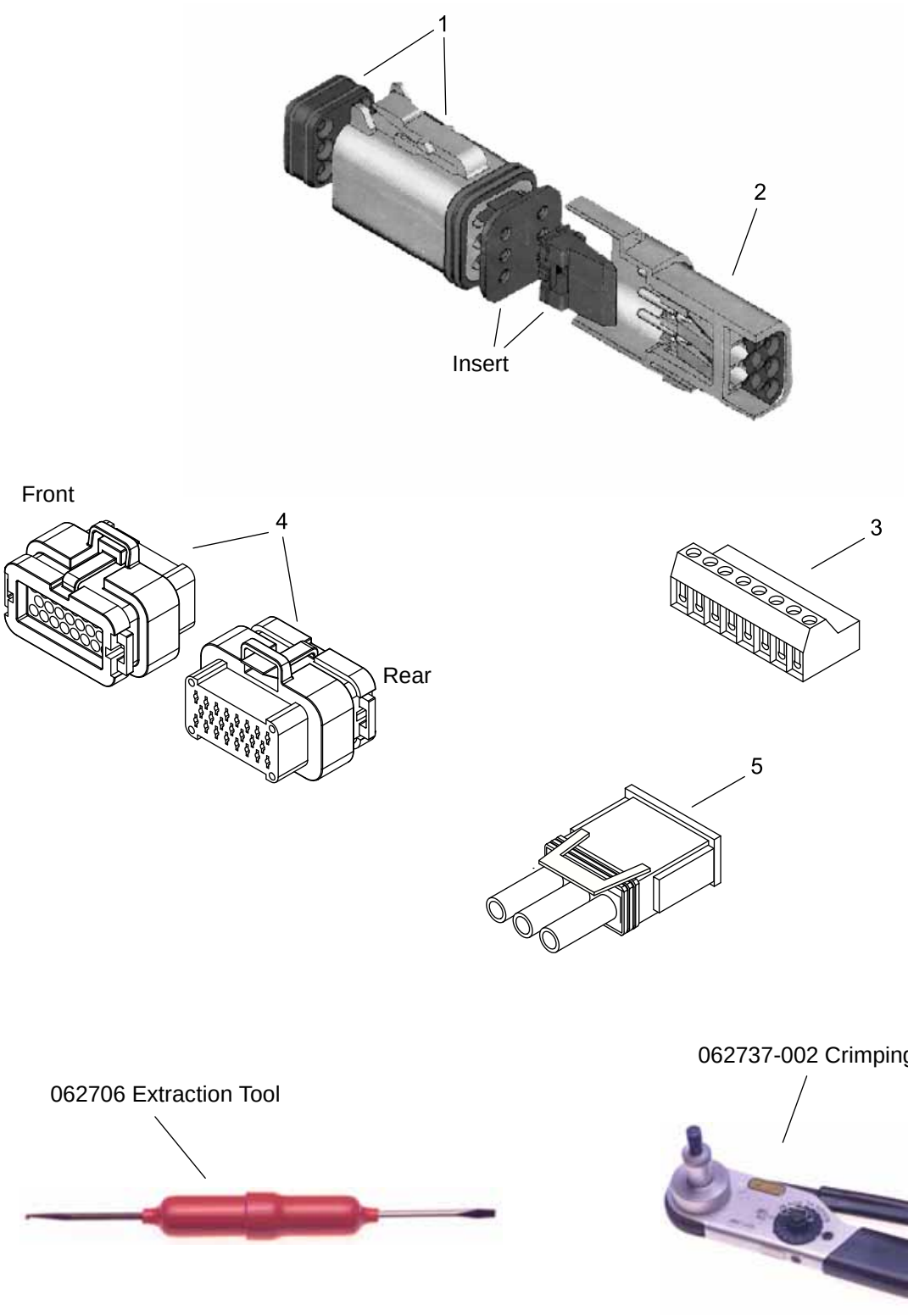



Figure 15471

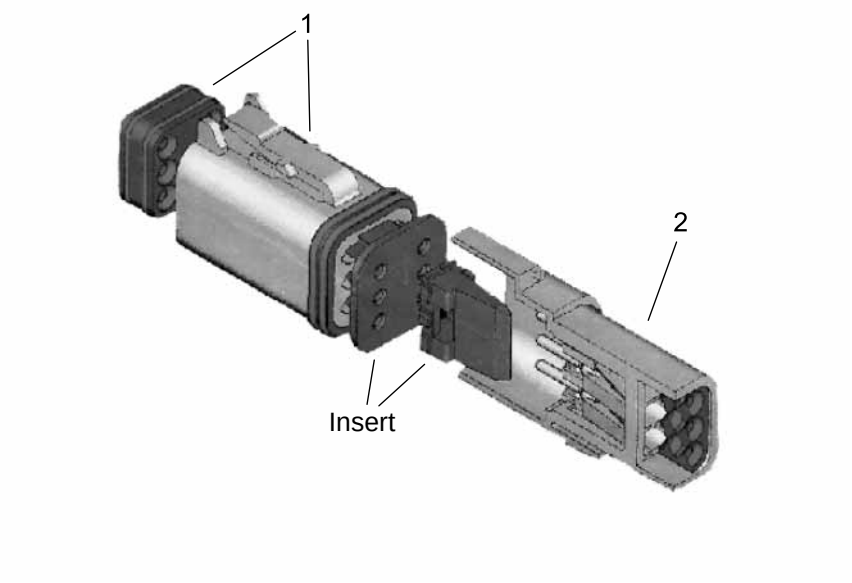
https://truckmanualshub.com/



| Connector Part Number Chart Continued | | | | | | |
|---|---|---|---|---|---|---|
| Index | Connector | Designation | # of Terminals | Terminal | Insert | Seal Plug |
| 1(1)(2)(3 | 062755-003(4) | PC602 | 4 | 062797-004 | 062798-006 | - |
| (1)(2)(3) | 062701-005(4) | PC605 | 8 | 062704-004 | 062703-010 | 062754-001 |
| (1)(2)(3) | 062701-003(4) | PC606 | 3 | 062704-004 | 062798-004 | - |
| (1)(2)(3) | 062701-003(4) | PC608 | 4 | 062704-004 | 062703-006 | - |
| (1) | 062702-001(4) | PC611 | 2 | 062704-004 | 062703-001 | |
| | 062701-003(4) | PC612 | 2 | 062704-008 | 062703-006 | 062754-001 |
| (1)(2)(3) | 062701-001(4) | PC613 | 2 | 062704-004 | 062703-002 | - |
| | 062701-001(4) | PC614 | 2 | 062704-004 | 062703-002 | - |
| (1) | 062701-001(4) | PC617 | 2 | 062704-004 | 062703-002 | - |
| (1) | 062701-003(4) | PC621 | 4 | 062704-004 | 062703-006 | - |
| | 062755-003(4) | PC622 | 4 | 062797-012 | 062798-006 | - |
| (1) | 062755-001(4) | PC625 | 2 | 062797-004 | 062798-002 | - |
| (1) | 062755-001(4) | PC627 | 2 | 062797-004 | 062798-002 | - |
| (1) | 062701-005(4) | PC629 | 8 | 062704-004 | 062703-010 | - |
| 2(1)(2)(3) | 062702-004(4) | JC210 | 6 | 062704-003 | 062703-007 | - |
| (1) | 062702-006(4) | JC410 | 10 | 062704-003 | 062703-011 | - |
| (1) | 062702-010(4) | JC411 | 12 | 062704-003 | 062703-011 | - |
| (1)(2)(3) | 062702-002(4) | JC415 | 2 | 062704-003 | 062703-003 | - |
| (1) | 062702-001(4) | JC416 | 2 | 0622797-003 | 062703-001 | |
| (1)(2)(3) | 062702-003(4) | JC417 | 3 | 062704-003 | 062703-005 | - |
| (1)(2)(3) | 062702-005(4) | JC605 | 7 | 062704-003 | 062703-009 | - |
| (1)(2)(3) | 062756-001(4) | JC607 | 2 | 062797-003 | 062798-001 | - |

(1) Used on 140696 Enhanced All Options Harness.
(2) Used on 140679 DC Lift Harness.
(3) Used on 140680 AC Lift Harness.
(4) Uses 062737-002 Crimping Tool and 062706 Extraction Tool.

**Always Specify Model, Data & Serial Number**



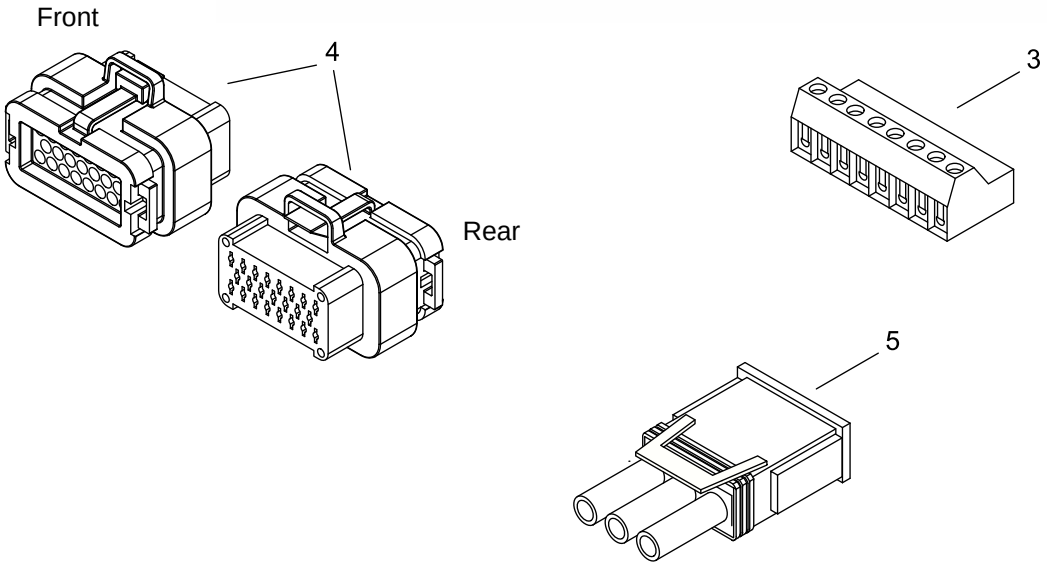







Figure 15471

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| Connector Part Number Chart Continued | | | | | | |
|---|---|---|---|---|---|---|
| Index | Connector | Designation | # of Terminals | Terminal | Insert | Seal Plug |
| 2(1)(2)(3) | 062702-003(4) | JC608 | 2 | 062704-003 | 062703-005 | - |
| (1)(2)(3) | 062702-006(4) | JC610 | 12 | 062704-003 | 062703-011 | - |
| (1) | 062702-001(4) | JC611 | 2 | 062704-003 | 062703-001 | - |
| (1)(2)(3) | 062702-001(4) | JC613 | 2 | 062704-003 | 062703-001 | - |
| (1) | 062702-003(4) | JC621 | 4 | 062704-003 | 062703-005 | - |
| | 062702-001(4) | JC642 | 2 | 062704-003 | 062703-001 | - |
| 3(1)(2)(3) | 062717-005 | PC201 | 13 | - | - | - |
| (1)(2)(3) | 062717-003 | PC202 | 8 | - | - | - |
| (1)(2)(3) | 062717-006 | PC203 | 7 | - | - | - |
| (1)(2)(3) | 062717-005 | PC204 | 13 | - | - | - |
| (1)(2)(3) | 062717-007 | PC205 | 13 | - | - | - |
| (1)(2)(3) | 062717-001 | PC206 | 16 | - | - | - |
| (1)(2)(3) | 062717-007 | PC207 | 13 | - | - | - |
| 4(1)(2)(3) | 062720-001 | PC215 | 23 | 062721-002 | - | 062822-001 |
| (1)(2)(3) | 062720-003 | PC401 | 4 | 062721-001 | - | 062822-001 |
| (1)(2)(3) | 062720-002 | PC403 | 31 | 062721-001 | - | 062822-001 |
| (1)(2)(3) | 062720-002 | PC405 | 16 | 062721-001 | - | 062822-001 |
| (3) | 116851-008 | PC406 | 4 | 116858 | - | - |
| (3) | 116851-003 | PC407 | 6 | 116858 | - | - |
| (3) | 116851-009 | PC408 | 14 | 116858 | - | - |
| (3) | 116851-006 | PC409 | 12 | 116858 | - | - |
| 5(1)(2)(3) | 062728-001 | PC601 | 3 | 062729-003 | - | - |

(1) Used on 140696 Enhanced All Options Harness.
(2) Used on 140679 DC Lift Harness.
(3) Used on 140680 AC Lift Harness.

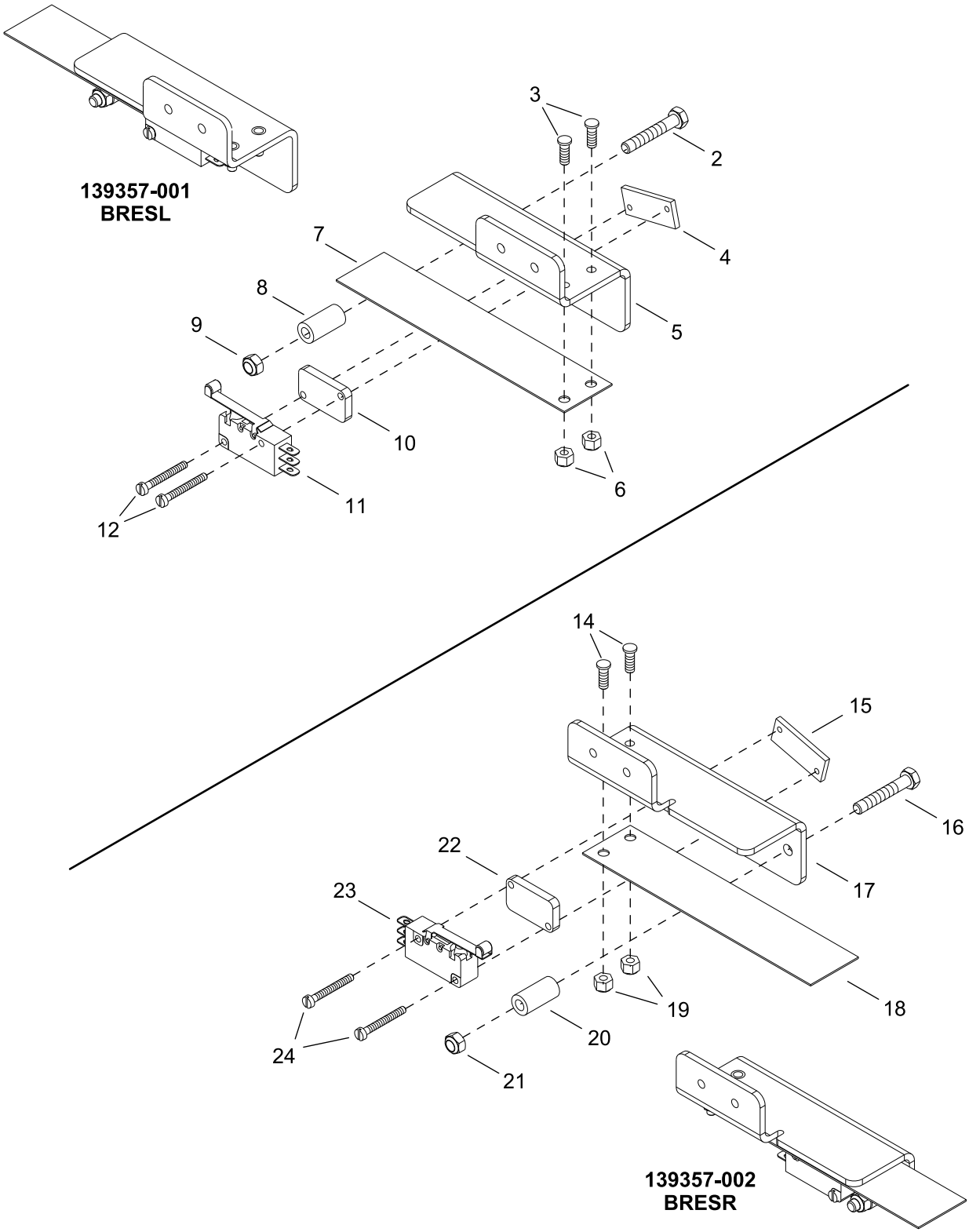



Figure 15460

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 139357-001 | Battery Gate Switch Assembly - LH | 1 |
| 2 | 060061-001 | Screw | 1 |
| 3 | 060113-004 | Self-Clinching Stud | 2 |
| 4 | 133389 | Retainer | 1 |
| 5 | 137351 | Switch Bracket - LH | 1 |
| 6 | 060059-036 | Nut | 2 |
| 7 | 130464 | Flat Spring | 1 |
| 8 | 062488-004 | Spacer | 1 |
| 9 | 060059-019 | Nut | 1 |
| 10 | 126046 | Spacer | 1 |
| 11 | 062752-005 | Switch | 1 |
| 12 | 060064-011 | Screw | 2 |
| 13 | 139357-002 | Battery Gate Switch Assembly - RH | 1 |
| 14 | 060113-004 | Self-Clinching Stud | 2 |
| 15 | 133389 | Retainer | 1 |
| 16 | 060061-001 | Screw | 1 |
| 17 | 137352 | Switch Bracket - RH | 1 |
| 18 | 130464 | Flat Spring | 1 |
| 19 | 060059-036 | Nut | 2 |
| 20 | 062488-004 | Spacer | 1 |
| 21 | 060059-019 | Nut | 1 |
| 22 | 126046 | Spacer | 1 |
| 23 | 062752-005 | Switch | 1 |
| 24 | 060064-011 | Screw | 2 |

# ELECTRICAL PARTS

## Tilt Limit Switch

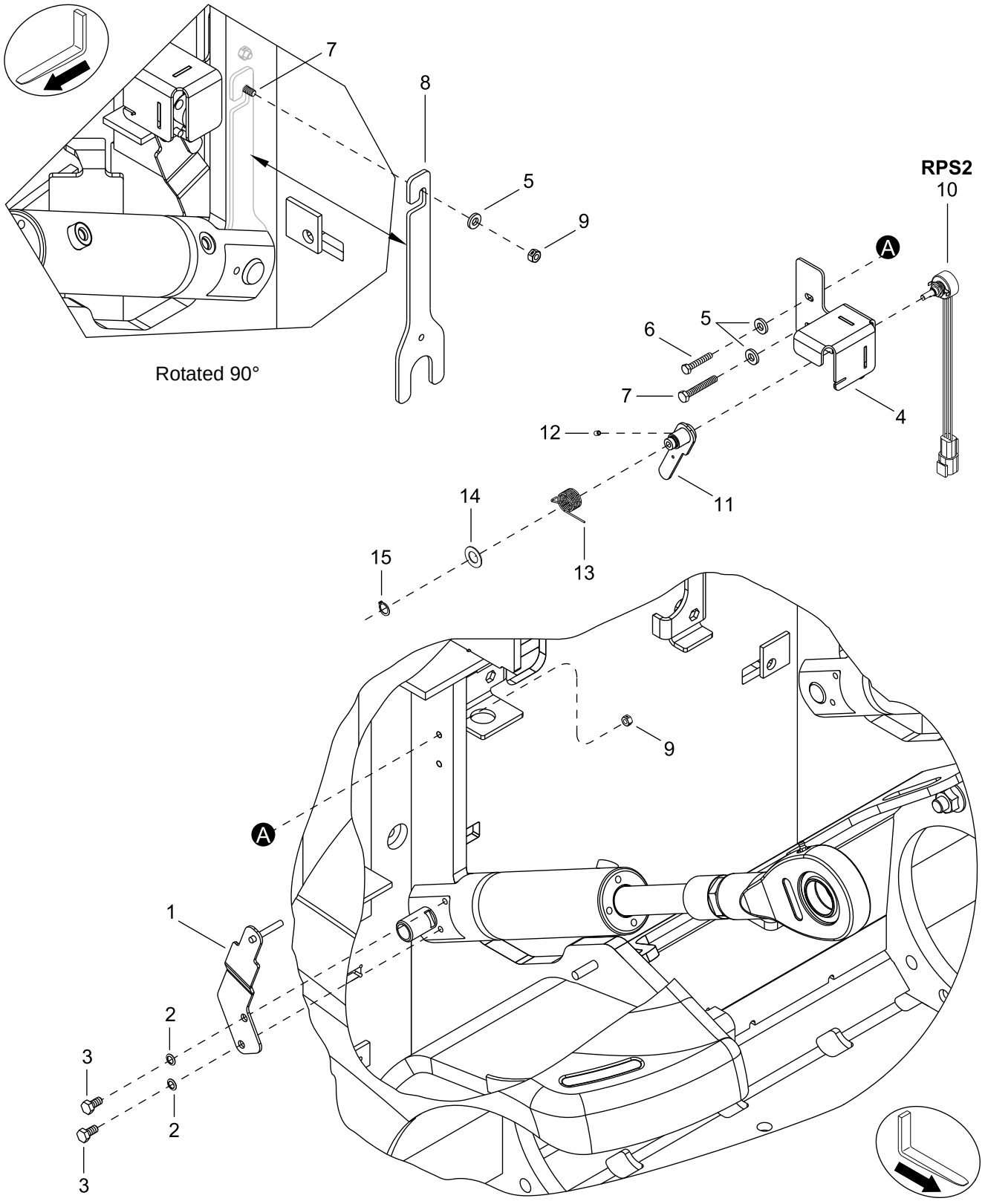
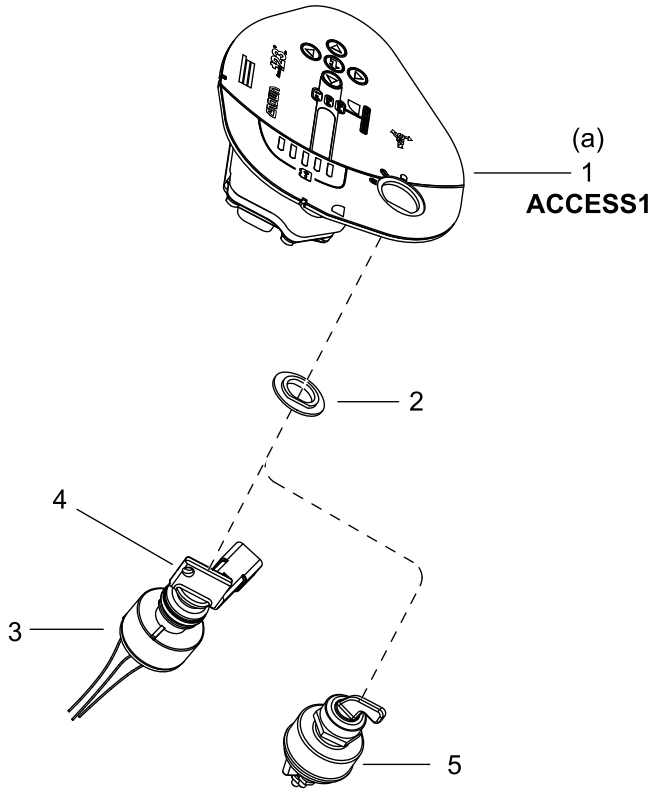



Figure 15581

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 139402 | Arm | 1 |
| 2 | 060134-002 | Washer | 2 |
| 3 | 060063-006 | Screw | 2 |
| 4 | 141001 | Bracket | 1 |
| 5 | 060030-092 | Flatwasher | 3 |
| 6 | 060062-007 | Screw | 1 |
| 7 | 060062-020 | Screw | 1 |
| 8 | 141414-001 | Spacer | AR |
| | 141414-002 | Spacer | AR |
| 9 | 060059-011 | Nut | 2 |
| 10 | 140759 | Rotary Sensor | 1 |
| 11 | 137024 | Arm | 1 |
| 12 | 060061-025 | Screw | 1 |
| 13 | 139412 | Torsion Spring | 1 |
| 14 | 060030-156 | Flatwasher | 1 |
| 15 | 060009-003 | Retaining Ring | 1 |




(a) See Electrical Components - Power Unit for Mounting Hardware

Figure 15958-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 139631-001-0S | Access 1 (Display Module) - Standard | 1 |
| 2 | 119240 | Insert | 1 |
| 3 | 146500 | Key Switch Assembly | 1 |
| 4 | 107739 | Key and Ring Assembly (Includes 2 Keys) | 1 |
| | 107151-002 | Key | 1 |
| 5 | 146057 | Keyless Key Switch Assembly | 1 |

**Always Specify Model, Data & Serial Number**

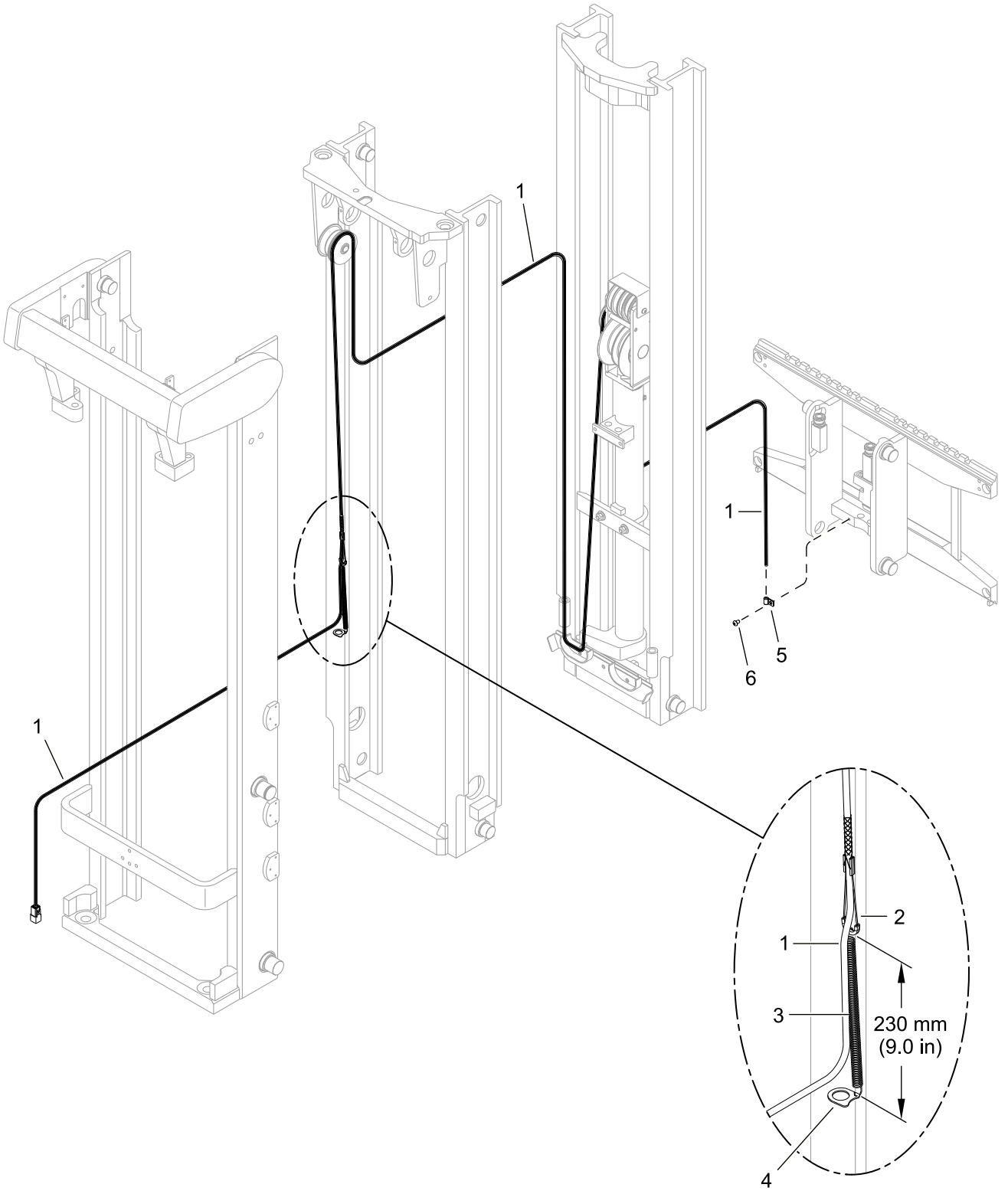



Figure 15767

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | *(1) | Control Cable | 1 |
| 2 | 107204 | Cable Grip | 1 |
| 3 | 089544 | Extension Spring | 1 |
| 4 | 136571 | Anchor | 1 |
| 5 | 061002-026 | Clamp | 1 |
| 6 | 060063-030 | Screw | 1 |

(1) See Chart 1

**Chart 1 – Control Cable Index 1**

| Lift Height* | | Length Required | | Part Number |
|---|---|---|---|---|
| mm | (in) | mm | (in) | |
| 3911 | (154) | 6845 | (270) | 140972-001 |
| 4826 | (190) | 7760 | (306) | 140972-003 |
| 5283 | (208) | 8210 | (323) | 140972-004 |
| 5740 | (226) | 8675 | (342) | 140972-005 |
| 6197 | (244) | 9125 | (359) | 140972-006 |

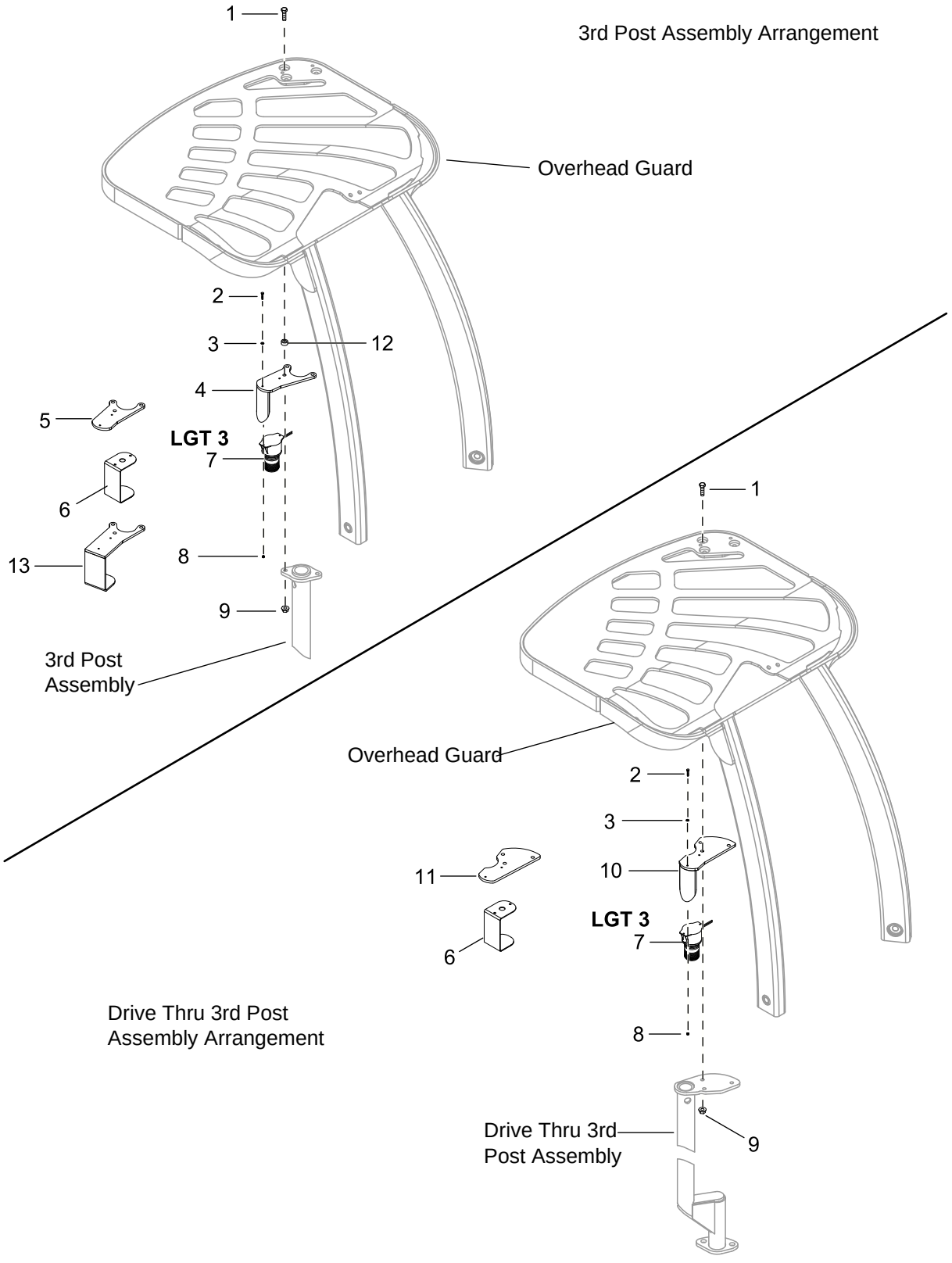



Figure 15572-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060115-027 | Screw | 3 |
| 2 | 060061-004 | Screw | 2 |
| 3 | 060030-044 | Flatwasher | 2 |
| 4 | 138650 | Mount (Without Drive Thru 3rd Post Assembly) | 1 |
| 5 | 141355 | Strobe Guard (Full Shield Option) | 1 |
| 6 | 138854 | Shield (Full Shield Option) | 1 |
| 7 | 127651-001 | Strobe Light Amber (1) | 1 |
| | 127651-002 | Strobe Light Red (1) | 1 |
| | 127651-003 | Strobe Light Blue (1) | 1 |
| | 138445-001 | Amber Flashing Light Assembly | 1 |
| | 138445-002 | Red Flashing Light Assembly | 1 |
| | 138445-003 | Blue Flashing Light Assembly | 1 |
| 8 | 060059-019 | Nut | 2 |
| 9 | 060059-010 | Nut | 3 |
| 10 | 139701 | Guard (With Drive Thru 3rd Post Assembly) | 1 |
| 11 | 139700 | Drive Thru Strobe Mount Plate (Full Shield Option) | 1 |
| 12 | 138794 | Spacer | 1 |
| 13 | 141604 | Strobe Guard (2) | 1 |

(1) See Strobe Light

(2) Trucks with Cage over Strobe/Flashing Light

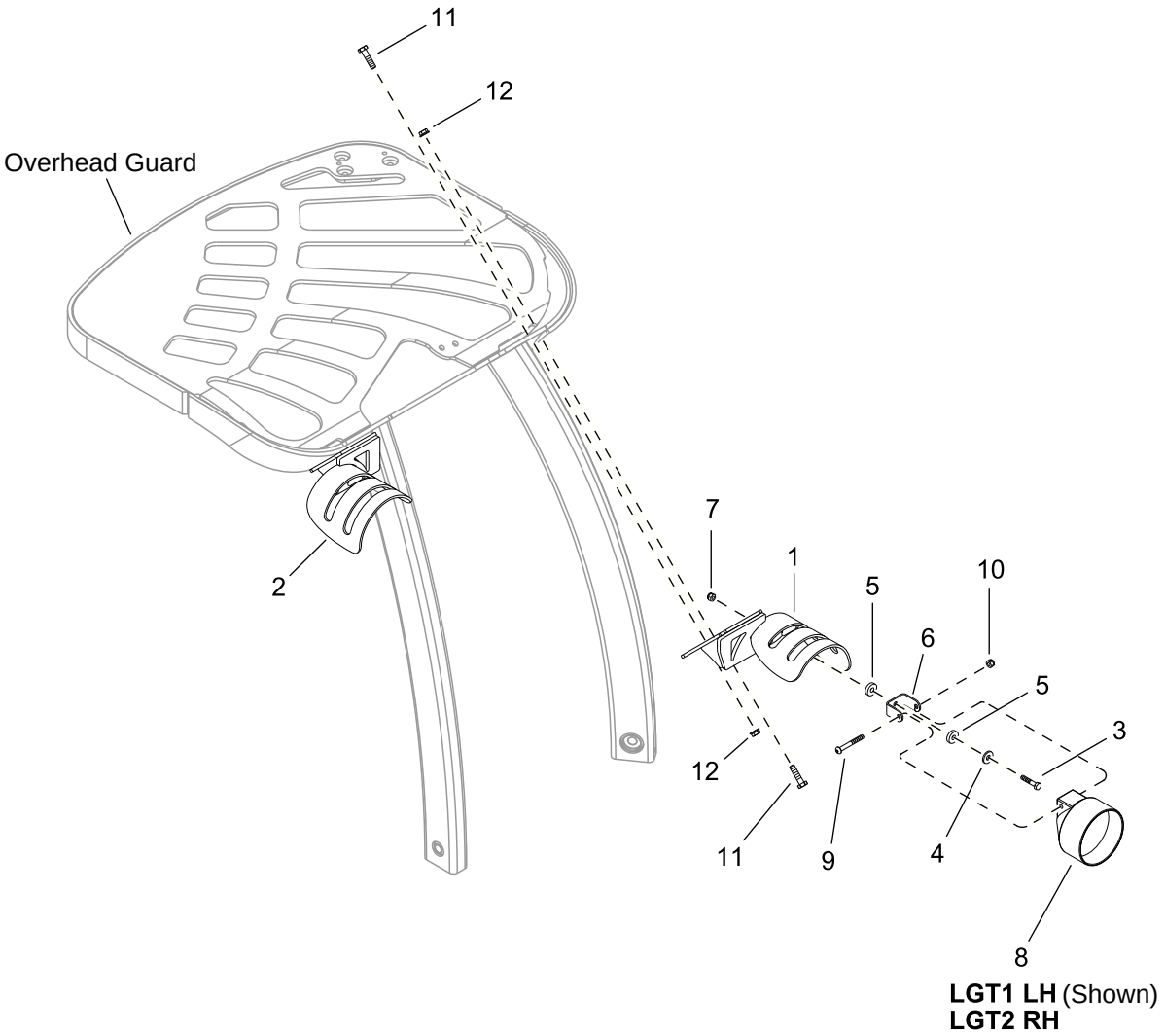



Figure 15631

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 139997 | LH Light Mount | 1 |
| | 142930 | LH Light Mount (1) | 1 |
| 2 | 140000 | RH Light Mount | 1 |
| 3 | 060063-002 | Screw | 2 |
| 4 | 060030-119 | Flatwasher | 2 |
| 5 | 107726 | Spacer | 4 |
| 6 | 139359 | Bracket | 2 |
| 7 | 060059-020 | Nut | 2 |
| 8 | 104296-004 | Spotlight 36 V | 2 |
| | 145982-003(2) | LED Spotlight 12 - 48 V | 2 |
| | 146957 | LED Bulb | 1 |
| 9 | 060063-018 | Screw | 2 |
| 10 | 060059-020 | Nut | 2 |
| 11 | 060075-002 | Screw | 4 |
| 12 | 060059-069 | Nut | 4 |

(1) TT Mast with 5285 mm (208 in) Lift Height or Greater and Quad Mast with 6248 mm (246 in) Lift Height or Greater

(2) Optional

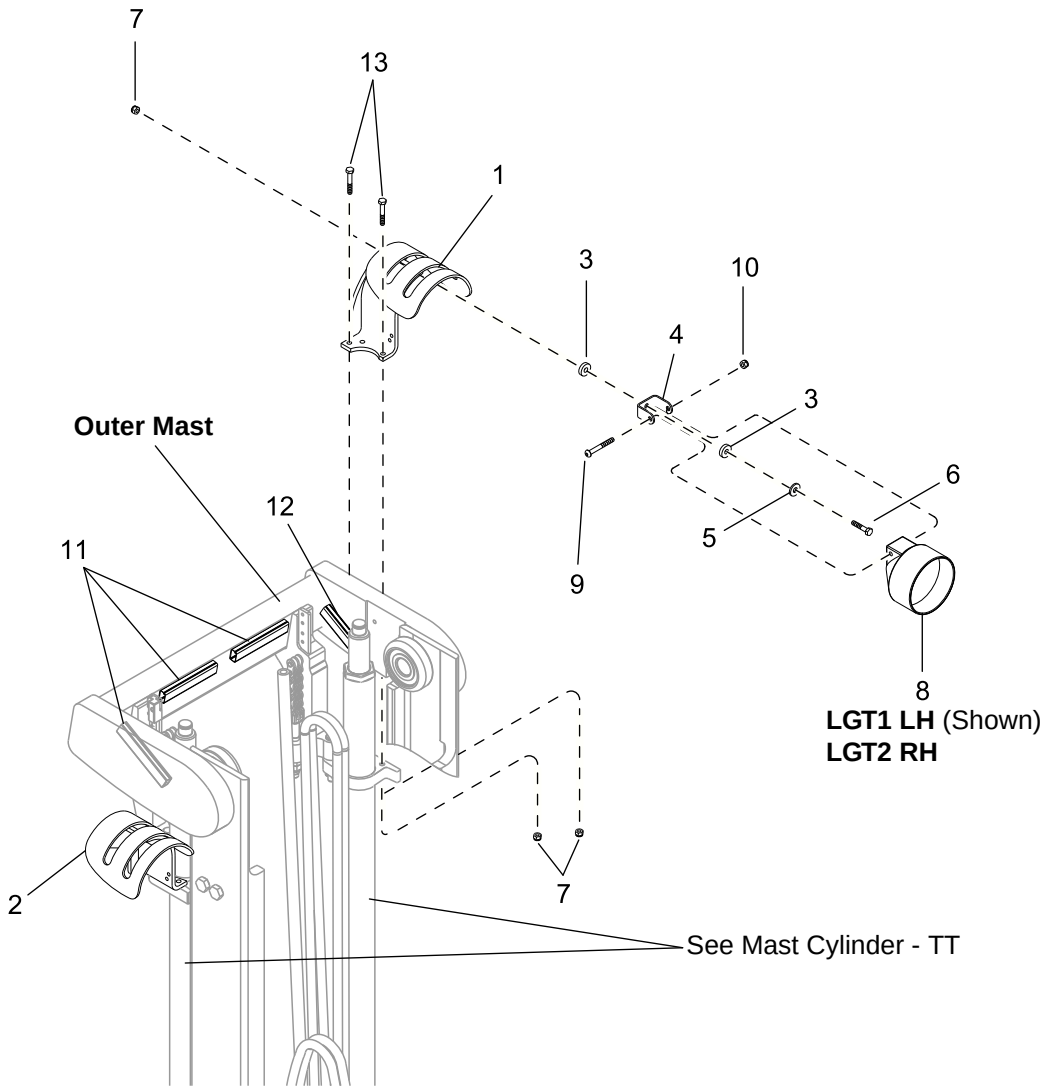



Figure 15633

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 139612-002 | Mast Light Mount LH | 1 |
| 2 | 139612-001 | Mast Light Mount RH | 1 |
| 3 | 107726 | Spacer | 4 |
| 4 | 139359 | Bracket | 2 |
| 5 | 060030-119 | Flatwasher | 2 |
| 6 | 060063-005 | Screw | 2 |
| 7 | 060059-020 | Nut | 6 |
| 8 | 104296-004 | Spotlight 36 V | 2 |
| | 145982-003(1) | LED Spotlight 12 - 48 V | 2 |
| | 146957 | LED Bulb | 1 |
| 9 | 060063-018 | Screw | 2 |
| 10 | 060059-020 | Nut | 2 |
| 11 | 125018-005 | Cable Duct | 3 |
| 12 | 125018-008 | Cable Duct | 1 |
| 13 | 060063-007 | Screw | 4 |

(1) Optional

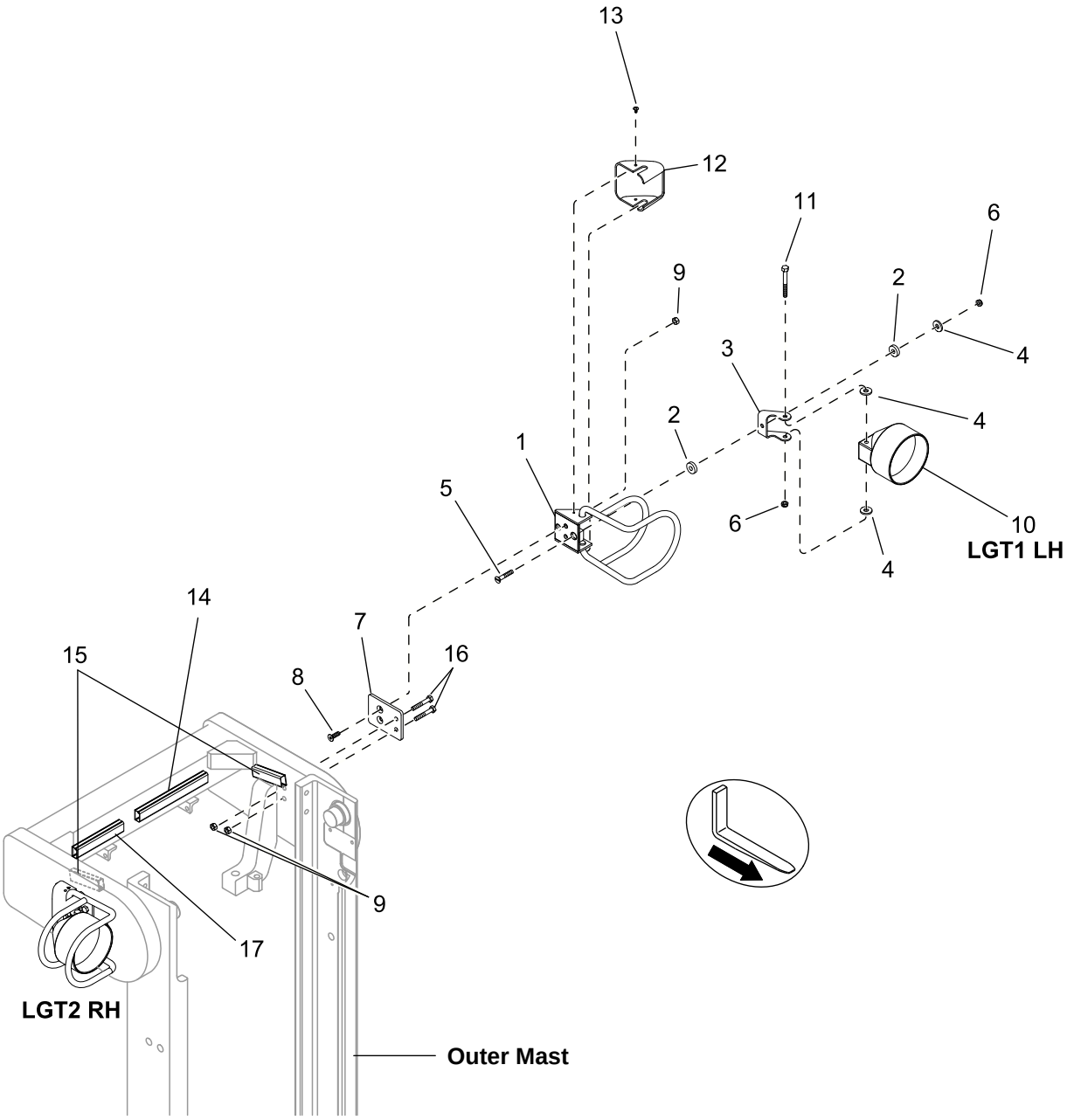



Figure 15641-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 112372 | Light Bracket | 2 |
| 2 | 107726 | Spacer | 4 |
| 3 | 112926 | Bracket | 2 |
| 4 | 060030-119 | Flatwasher | 6 |
| 5 | 060016-033 | Screw | 2 |
| 6 | 060042-010 | Nut | 4 |
| 7 | 134215 | Plate | 2 |
| 8 | 060063-036 | Screw | 4 |
| 9 | 060059-001 | Nut | 8 |
| 10 | 104296-002 | Spotlight 36 V | 2 |
| | 145982-003(1) | LED Spotlight | 2 |
| | 146957 | LED Bulb | 1 |
| 11 | 060016-009 | Screw | 2 |
| 12 | 112772 | Cover Light Bracket | 2 |
| 13 | 060014-049 | Screw | 4 |
| 14 | 125018-012 | Cable Duct 203 mm (8.0 in) | 1 |
| 15 | 125018-008 | Cable Duct 89 mm (3.5 in) | 2 |
| 16 | 060063-007 | Screw | 4 |
| 17 | 125018-005 | Cable Duct 140 mm (5.5 in) | 1 |

(1) Optional

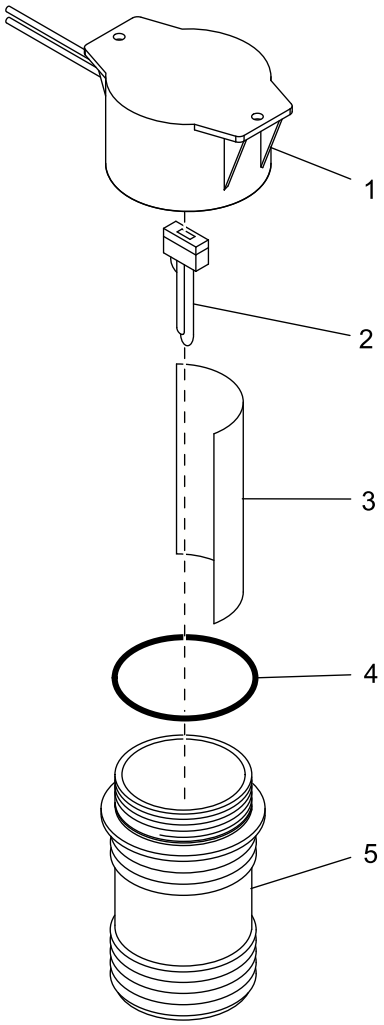



Figure 8336-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 127651-001 | Strobe Light Amber | 1 |
| 0 | 127651-002 | Strobe Light Red | 1 |
| 0 | 127651-003 | Strobe Light Blue (Does Not Include Index 3) | 1 |
| 1 | * | Power Supply | 1 |
| 2 | 113615 | Strobe Lamp | 1 |
| 3 | 113620 | Blackout Lens | 1 |
| 4 | 113614 | O-Ring | 1 |
| 5 | 113611 | Amber Lens | 1 |
| | 113612 | Blue Lens | 1 |
| | 113613 | Red Lens | 1 |

* Strobe Light Replacement is More Economical

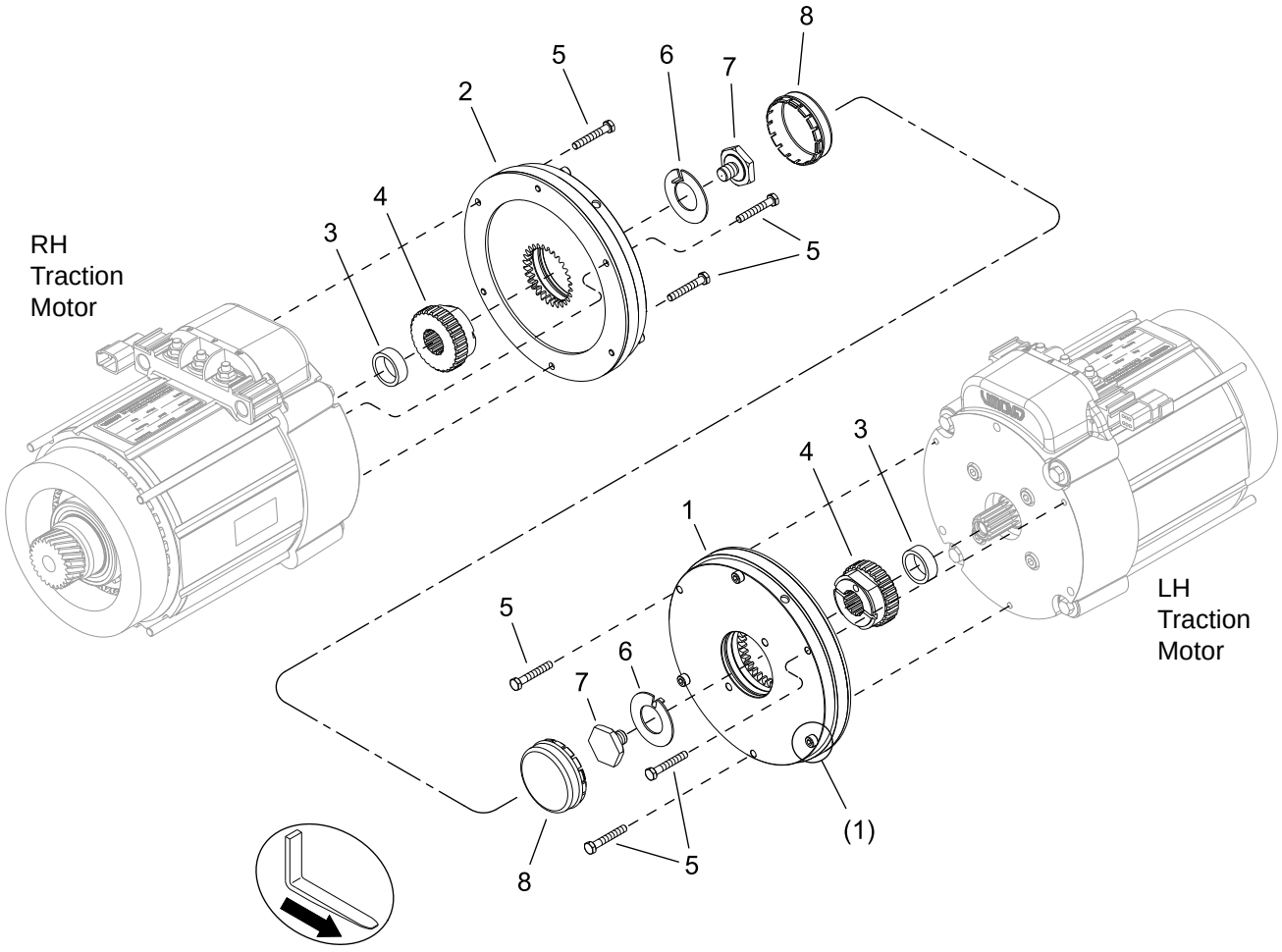
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## Notes:

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# BRAKE PARTS




(1) Remove Screws (3 Places) After Assembly

Figure 15327

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 136830 | LH Brake Assembly | 1 |
| 2 | 136802 | RH Brake Assembly | 1 |
| 3 | 077233-013 | Spacer | 2 |
| 4 | 113919 | Brake Hub | 2 |
| 5 | 060062-014 | Screw | 6 |
| 6 | 139558 | Lockwasher | 2 |
| 7 | 112156 | Bolt | 2 |
| 8 | 139556 | Dust Cap | 2 |

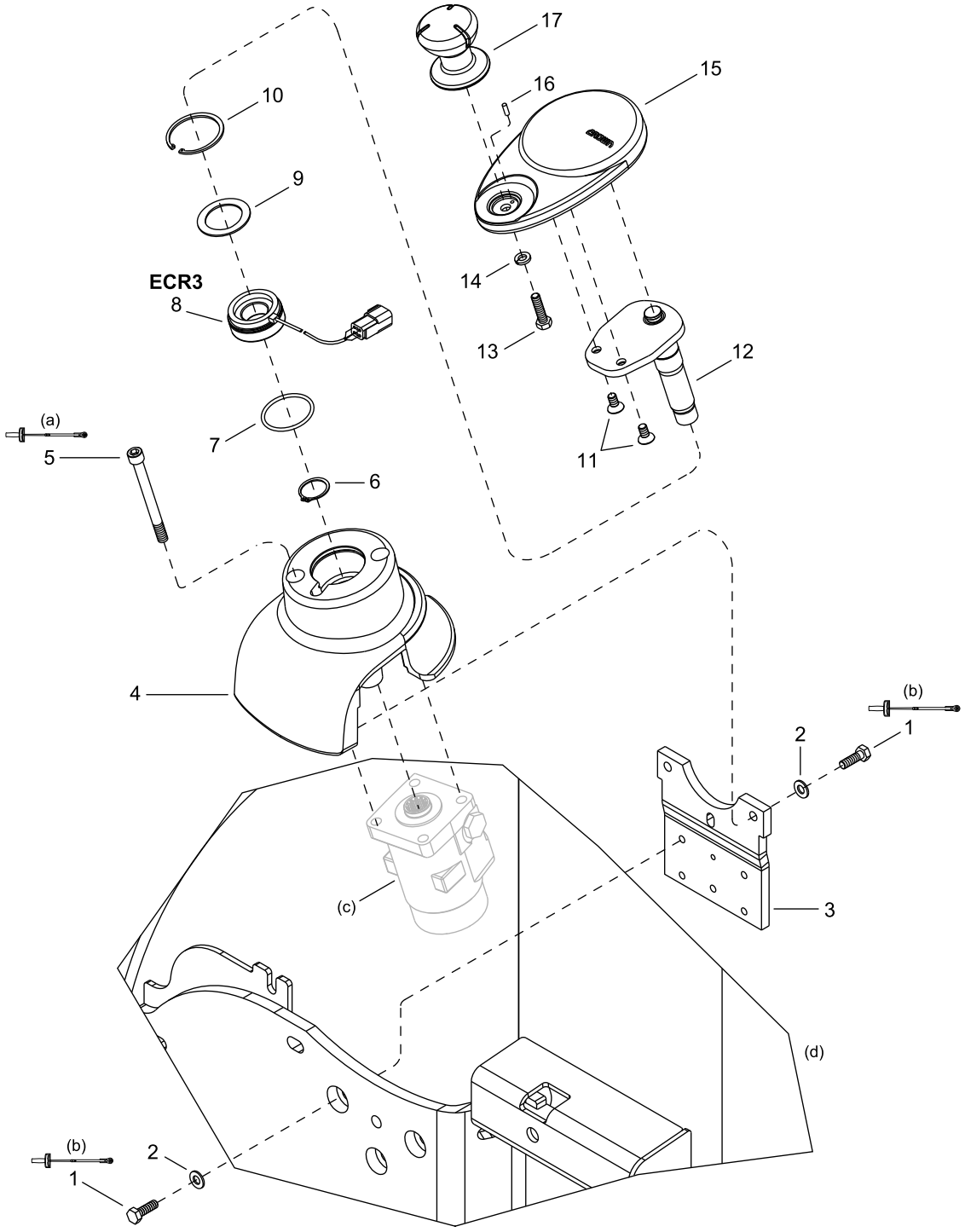
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## Notes:

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# STEERING PARTS




(a) Torque value 52.9 Nm (39.0 ft lb)

(b) Torque value 22.5 Nm (16.6 ft lb)

(c) Steer Control Unit

(d) Part of Top of Truck Frame

Figure 15513-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060063-060 | Screw | 6 |
| | 061004-006 | Thread Locking Adhesive | AR |
| 2 | 060030-017 | Flatwasher | 6 |
| 3 | 135969 | Mount Plate | 1 |
| 4 | 144659 | Tiller Support | 1 |
| 5 | 060017-119 | Screw | 2 |
| | 061004-006 | Thread Locking Adhesive | AR |
| 6 | 060009-036 | Retaining Ring | 1 |
| 7 | 064019-006 | O-Ring | 1 |
| 8 | 065179-005 | Ball Bearing Sensor | 1 |
| 9 | 060030-057 | Flatwasher | 1 |
| 10 | 060009-039 | Retaining Ring | 1 |
| 11 | 060016-091 | Screw | 2 |
| 12 | 135943 | Tiller Mount | 1 |
| 13 | 060016-019 | Screw (Used with 123674 Tiller) | 1 |
| | 060016-070 | Screw (Used with 137669 Short Tiller) | 1 |
| 14 | 060005-008 | Lockwasher | 1 |
| 15 | 123674 | Tiller | 1 |
| | 137669 | Short Tiller (Optional) | 1 |
| 16 | 060000-002 | Roll Pin | 1 |
| 17 | 123678 | Steer Knob Assembly | 1 |

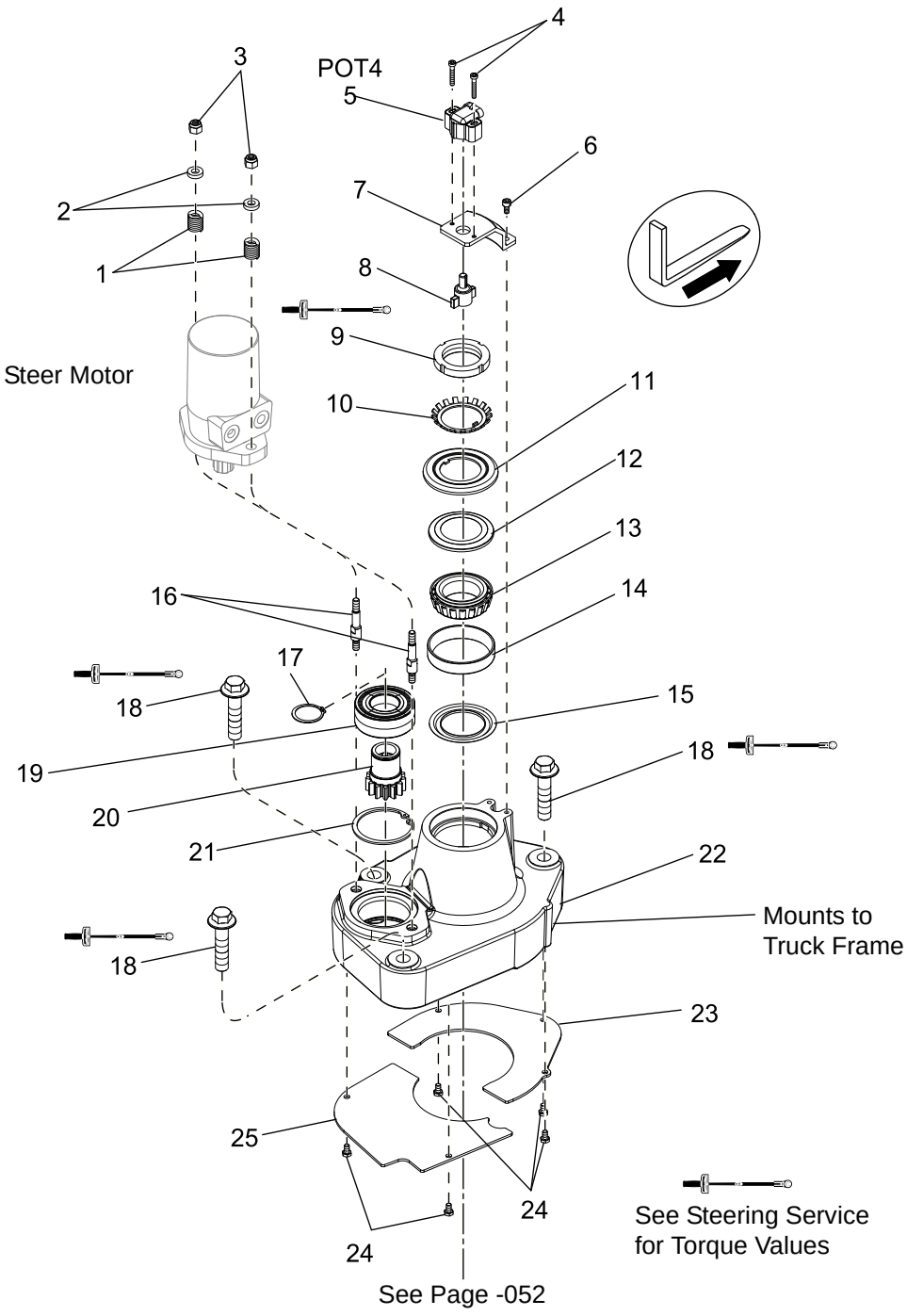



Figure 14326

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 121837 | Compression Spring | 2 |
| 2 | 060030-288 | Flatwasher | 2 |
| 3 | 060042-020 | Self Locking Nut | 2 |
| 4 | 060061-014 | Screw | 2 |
| 5 | 062709 | Potentiometer | 1 |
| 6 | 060062-025 | Screw | 2 |
| 7 | 124873 | Bracket | 1 |
| 8 | 124502 | Sensor Shaft | 1 |
| 9 | 060043-009 | Locknut | 1 |
| 10 | 060044-010 | Lockwasher | 1 |
| 11 | 124513 | Top Cap | 1 |
| 12 | 065129-007 | Metallic Seal | 1 |
| 13 | 065108 | Bearing Cone | 1 |
| 14 | 065107 | Bearing Cup | 1 |
| 15 | 065154-001 | Metallic Seal | 1 |
| 16 | 128134 | Threaded Shaft | 2 |
| 17 | 060009-018 | Retaining Ring | 1 |
| 18 | 060117-021 | Bolt | 3 |
| 19 | 065089-005 | Double Row Bearing | 1 |
| 20 | 138792 | Pinion Gear | 1 |
| 21 | 060009-053 | Retaining Ring | 1 |
| 22 | 146939 | Steer Axle Mounting | 1 |
| 23 | 138328 | Front Cover | 1 |
| 24 | 060062-004 | Screw | 5 |
| 25 | 138327 | Rear Cover | 1 |

# STEERING PARTS

## Steer Axle

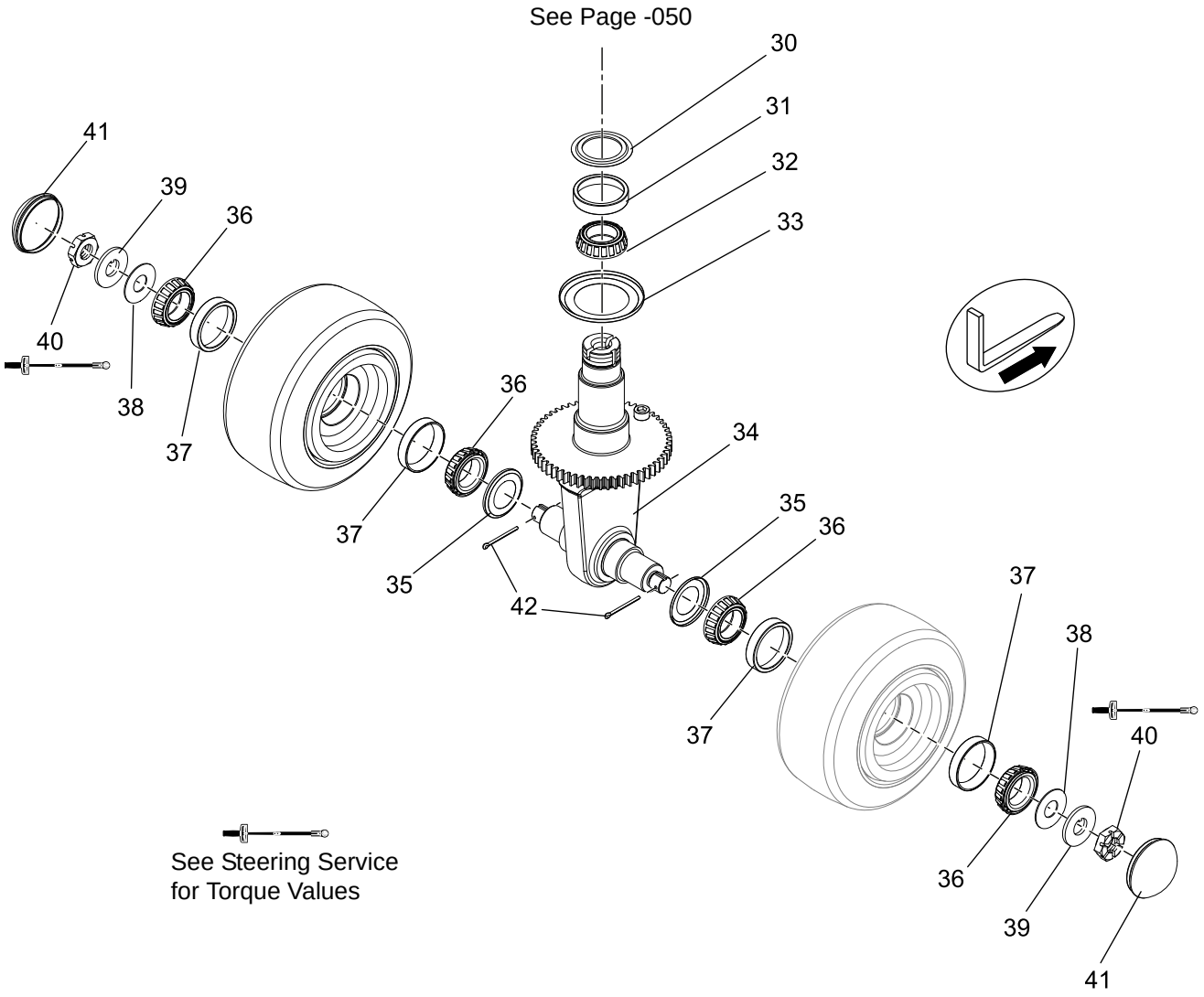



Figure 14327

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 065154-002 | Metallic Seal | 1 |
| 31 | 065145 | Bearing Cup | 1 |
| 32 | 065146 | Bearing Cone | 1 |
| 33 | 065129-006 | Metallic Seal | 1 |
| 34 | 138335 | Yoke Shaft | 1 |
| 35 | 065129-005 | Metallic Seal | 2 |
| | 064138-021 | Oil Seal (Freezer/Corrosion) | 2 |
| 36 | 065148 | Bearing Cone | 4 |
| 37 | 065147 | Bearing Cup | 4 |
| 38 | 060030-328 | Flatwasher | 2 |
| 39 | 060051-004 | Tabbed Washer | 2 |
| 40 | 124761 | Nut | 2 |
| 41 | 103777-002 | Grease Cap | 2 |
| 42 | 060038-001 | Cotter Pin | 2 |

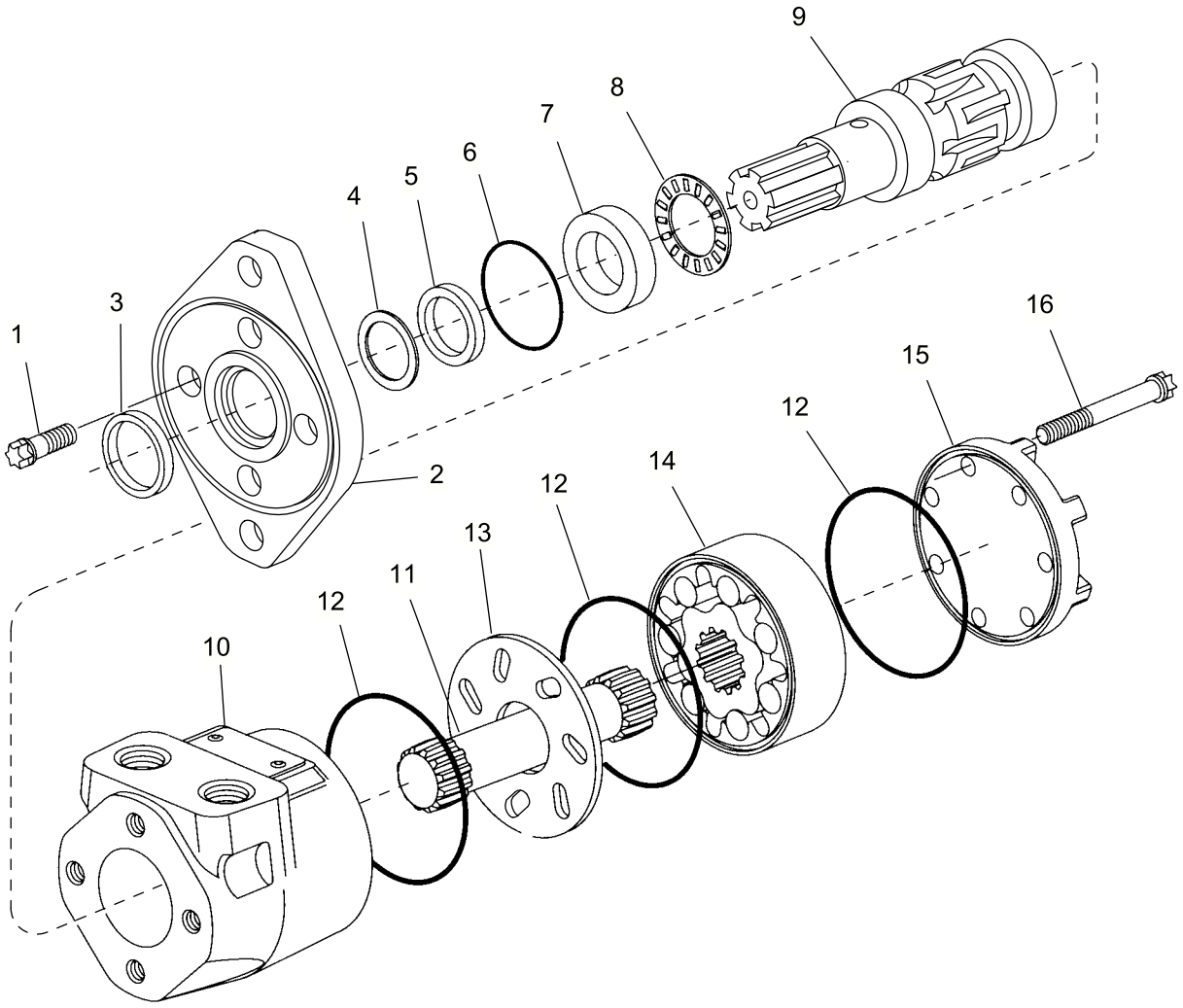



Figure 5836S-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 121659 | Steer Motor Assembly | 1 |
| 1 | 125175 | Screw | 4 |
| 2 | 125176 | Flange | 1 |
| 3 | 125177 | Exclusion Seal | 1 |
| 4 | 125178 | Backup Washer | 1 |
| 5 | 125179 | Pressure Seal | 1 |
| 6 | 125180 | Seal | 1 |
| 7 | 125181 | Thrust Bearing Race | 1 |
| 8 | 125182 | Thrust Needle Bearing | 1 |
| 9 | 125183 | Output Shaft | 1 |
| 10 | 125184 | Output Shaft | 1 |
| 11 | 125185 | Drive | 1 |
| 12 | 125186 | Seal | 3 |
| 13 | 125187 | Spacer Plate | 1 |
| 14 | | Geroler (Not Serviceable) | 1 |
| 15 | 125189 | End Cap | 1 |
| 16 | 125190 | Screw | 7 |
| | 125191 | Seal Kit Includes 3, 4, 5, 6 and 12 | 1 |

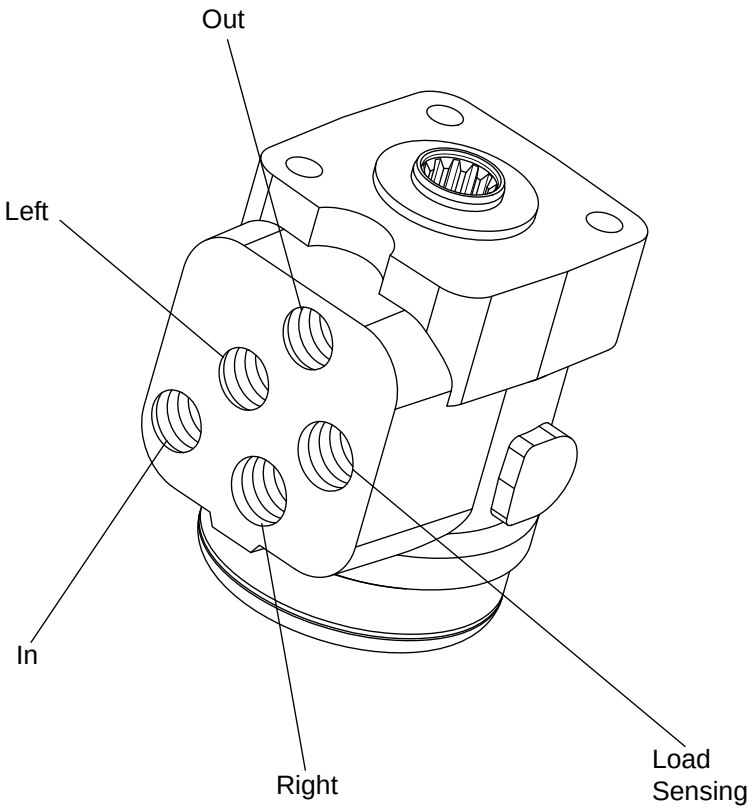
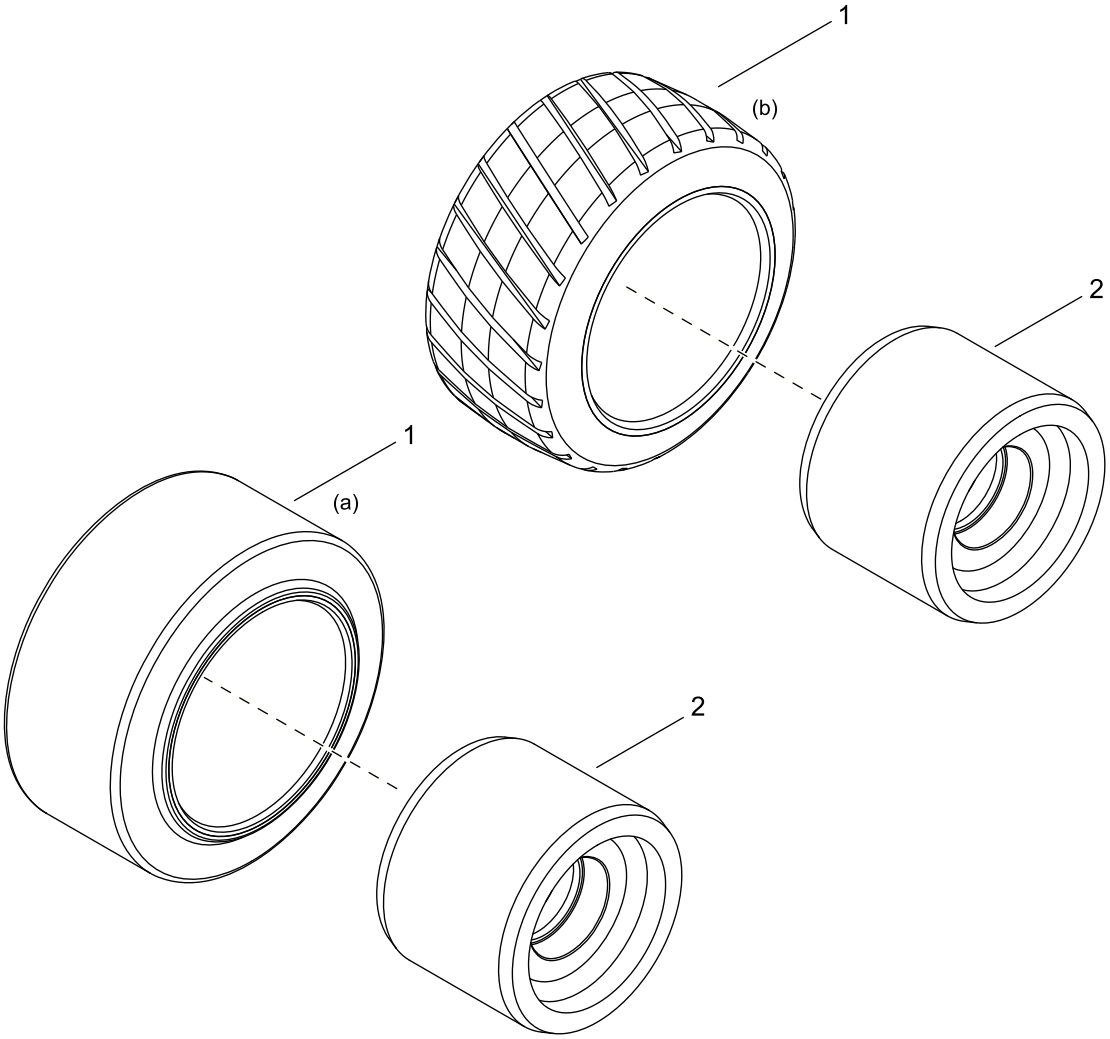



Figure 14356

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 131246 | Steer Control Unit | 1 |




(a) Smooth Tread Tire

(b) Siped Tread Tire

Figure 14316-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | | Tire Refer to Chart | 2 |
| 2 | 134825 | Hub | 2 |

| Index 1 - Steer Tire<br>254 x 12 x 165 mm (10 x 5 x 6.5 in) | | | | |
|---|---|---|---|---|
| Tire | Tread Design | Composition | Color | Truck Capacity |
| 135907-301-41 | Smooth | SRP Rubber | Black | 1360 kg (3000 lb) |
| 135907-311-41 | Smooth | SRP Rubber | Gray Non-Marking | 1360 kg (3000 lb) |
| 135907-301-42 | Siped | SRP Rubber | Black | 1360 kg (3000 lb) |
| 135907-311-42 | Siped | SRP Rubber | Gray Non-Marking | 1360 kg (3000 lb) |
| | | | | |
| 135907-305-41 | Smooth | Heavy Load Rubber | Black | 1590 - 1815 kg (3500 - 4000 lb) |
| 135907-315-41 | Smooth | Heavy Load Rubber | White Non-Marking | 1590 - 1815 kg (3500 - 4000 lb) |
| 135907-305-42 | Siped | Heavy Load Rubber | Black | 1590 - 1815 kg (3500 - 4000 lb) |
| 135907-315-42 | Siped | Heavy Load Rubber | White Non-Marking | 1590 - 1815 kg (3500 - 4000 lb) |
| | | | | |
| 107933-344-01 | Smooth | Poly | Black | 1360 - 1815 kg (3000 - 4000 lb) |
| 107933-344-03 | 22° Router Siped | Poly | Black | 1360 - 1815 kg (3000 - 4000 lb) |
| 107933-354-01 | Smooth | Poly | Cream | 1360 - 1815 kg (3000 - 4000 lb) |

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## Notes:

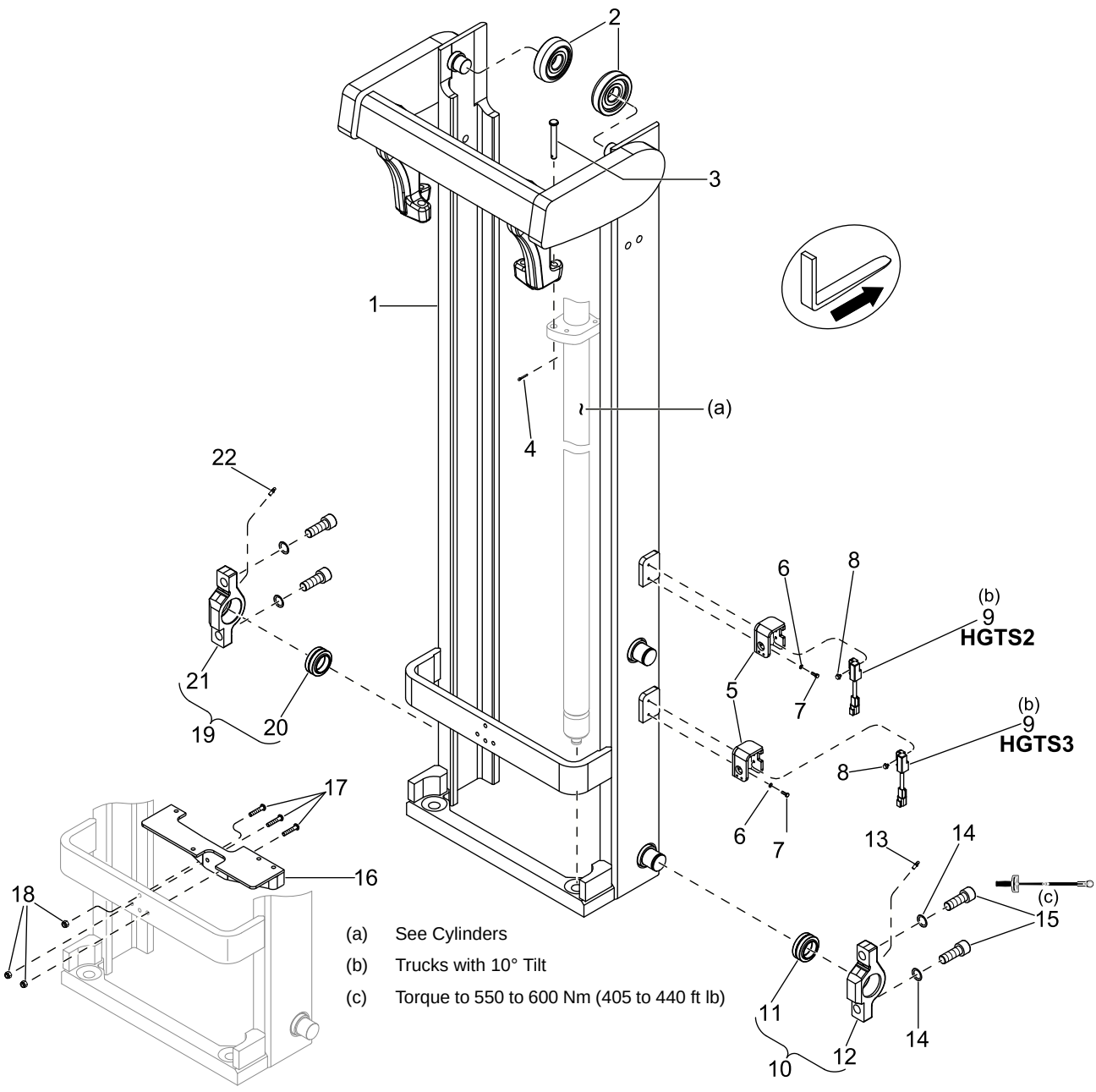
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# LIFTING MECHANISM PARTS

https://truckmanualshub.com/



**Outer Mast**




(a) See Cylinders

(b) Trucks with 10° Tilt

(c) Torque to 550 to 600 Nm (405 to 440 ft lb)

Figure 15575-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | * | Outer Mast (See Chart) | 1 |
| 2 | 074668-001 | Column Roller | 2 |
| 3 | 060121-001 | Clevis Pin | 2 |
| 4 | 060038-017 | Cotter Pin | 2 |
| 5 | 142014 | Switch Mount (1) | 3 |
| 6 | 060030-217 | Flatwasher (1) | 4 |
| 7 | 060061-005 | Screw (1) | 4 |
| 8 | 060061-016 | Screw (1) | 2 |
| 9 | 062874 | Proximity Sensor (1) | 2 |
| 10 | 134266 | Mast Pivot Assembly RH | 1 |
| 11 | 065012-009 | Bushing | 1 |
| 12 | 134101 | Mast Pivot RH | 1 |
| 13 | 054011-006 | Grease Fitting | 1 |
| 14 | 060134-001 | Flatwasher | 4 |
| 15 | 060099-011 | Screw | 4 |
| 16 | 145684 | Valve Mount | 1 |
| 17 | 060063-023 | Screw | 3 |
| 18 | 060059-001 | Nut | 3 |
| 19 | 134814 | Mast Pivot Assembly LH | 1 |
| 20 | 065012-009 | Bushing | 1 |
| 21 | 134813 | Mast Pivot LH | 1 |
| 22 | 054011-006 | Grease Fitting | 1 |

(1) Used With 10° Forward Tilt

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

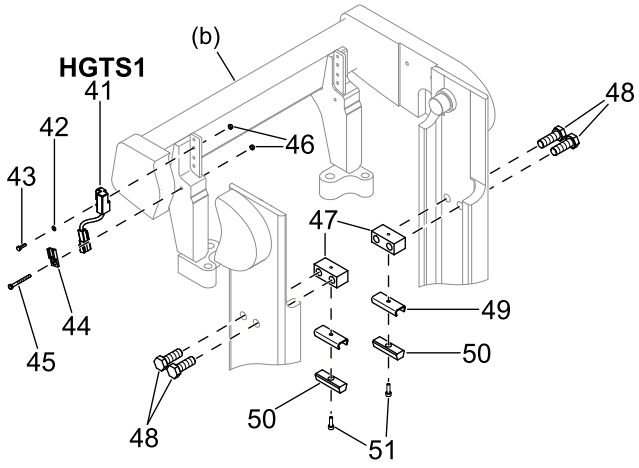
**Chart - Outer Mast**

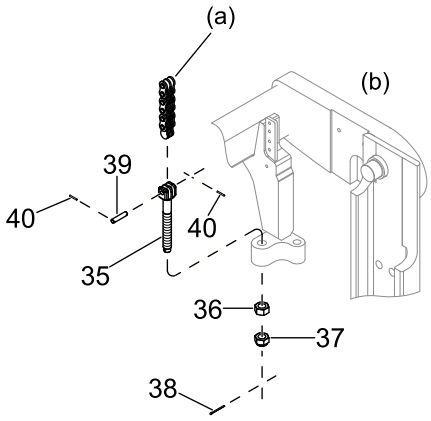
| Lift Height | | Index 1 Part Number | |
|---|---|---|---|
| mm | in | Without Tilt | With 10° Forward Tilt |
| 3911 | 154 | 136490-180 | 136490-180-10 |
| 4825 | 190 | 136490-211 | 136490-211-10 |
| 5285 | 208 | 136490-226 | 136490-226-10 |
| 5740 | 226 | 136490-241 | 136490-241-10 |
| 6197 | 244 | 136490-256 | 136490-256-10 |

**Always Specify Model, Data & Serial Number**

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**Outer Mast**

(a) See Lift Chain - TT
(b) Rotated 90°
(c) See Cylinder Parts

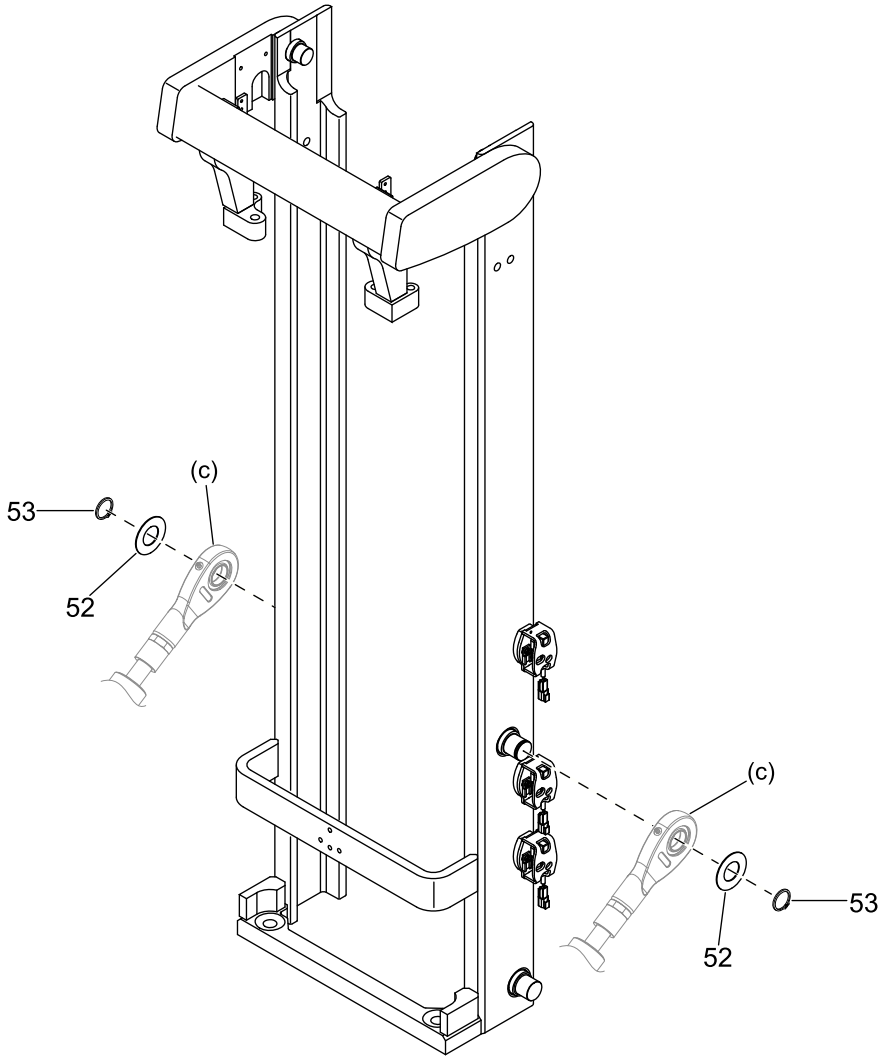



Figure 15576-02

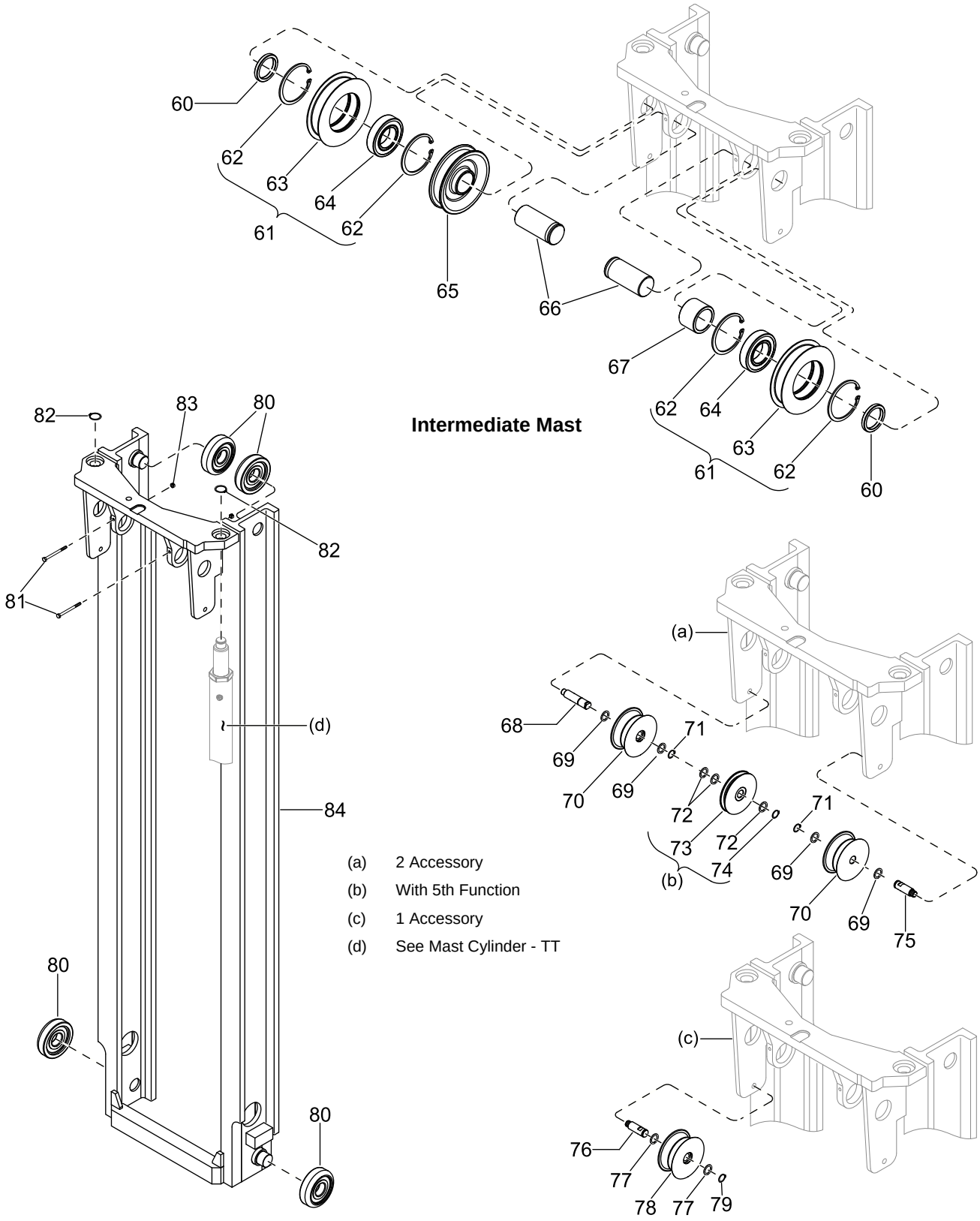
https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 35 | 131854-150 | Chain Anchor | 2 |
| 36 | 060059-022 | Nut | 2 |
| 37 | 060059-025 | Nut | 2 |
| 38 | 060038-003 | Cotter Pin | 2 |
| 39 | 042906 | Pin | 2 |
| 40 | 060000-055 | Roll Pin | 4 |
| 41 | 062874 | Proximity Sensor | 1 |
| 42 | 060030-217 | Flatwasher | 1 |
| 43 | 060061-010 | Screw | 1 |
| 44 | 062749-001 | Attachment Clip | 1 |
| 45 | 060061-033 | Screw | 1 |
| 46 | 060059-019 | Nut | 2 |
| 47 | 129252 | Stop Block | 2 |
| 48 | 060117-005 | Screw | 4 |
| 49 | 107563-001 | Bracket | 2 |
| 50 | 092747-001 | Poly Stop | 2 |
| 51 | 060062-005 | Screw | 2 |
| 52 | 060030-369 | Flatwasher | 2 |
| 53 | 060009-130 | Retaining Ring | 2 |

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(a) 2 Accessory
(b) With 5th Function
(c) 1 Accessory
(d) See Mast Cylinder - TT

Figure 15577-02

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 60 | 136569-002 | Spacer | 2 |
| 61 | 131667-001 | Pulley Assembly | 2 |
| 62 | 060009-062 | Retaining Ring | 2 |
| 63 | 131668-001 | Pulley | 1 |
| 64 | 065081-045 | Bearing | 1 |
| 65 | 136568-001 | Pulley | 1 |
| 66 | 136576 | Pulley Shaft | 2 |
| 67 | 136569-001 | Spacer | 1 |
| 68 | 131665 | Pulley Shaft (1) | 1 |
| | 136572 | Pulley Shaft (2) | 1 |
| 69 | 060030-067 | Flatwasher (1) | 4 |
| 70 | 131671-001 | Hose Pulley (1) | 2 |
| 71 | 060009-005 | Retaining Ring (1) | 2 |
| 72 | 060030-067 | Flatwasher (2) | 3 |
| 73 | 136574-003 | Wire Pulley (2) | 1 |
| 74 | 060009-005 | Retaining Ring (2) | 1 |
| 75 | 131665 | Pulley Shaft (1) | 1 |
| 76 | 131665 | Pulley Shaft (3) | 1 |
| 77 | 060030-067 | Flatwasher (3) | 2 |
| 78 | 131671-001 | Hose Pulley (3) | 1 |
| 79 | 060009-005 | Retaining Ring (3) | 1 |
| 80 | 074668-001 | Column Roller | 4 |
| 81 | 060062-055 | Screw | 2 |
| 82 | 060009-036 | Retaining Ring | 2 |
| 83 | 060059-037 | Nut | 2 |
| 84 | 136502-180* | Intermediate Mast - 3911 mm (154 in) Lift Height | 1 |
| | 136502-211* | Intermediate Mast - 4825 mm (190 in) Lift Height | 1 |
| | 136502-226* | Intermediate Mast - 5285 mm (208 in) Lift Height | 1 |
| | 136502-241* | Intermediate Mast - 5740 mm (226 in) Lift Height | 1 |
| | 136502-256* | Intermediate Mast - 6197 mm (244 in) Lift Height | 1 |

(1) 2 Accessory

(2) Used with 5th Function

(3) 1 Accessory

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

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### Inner Mast

(a) See Lift Chain - TT
(b) See Yoke - TT
(c) See Carriage Cylinder - TT

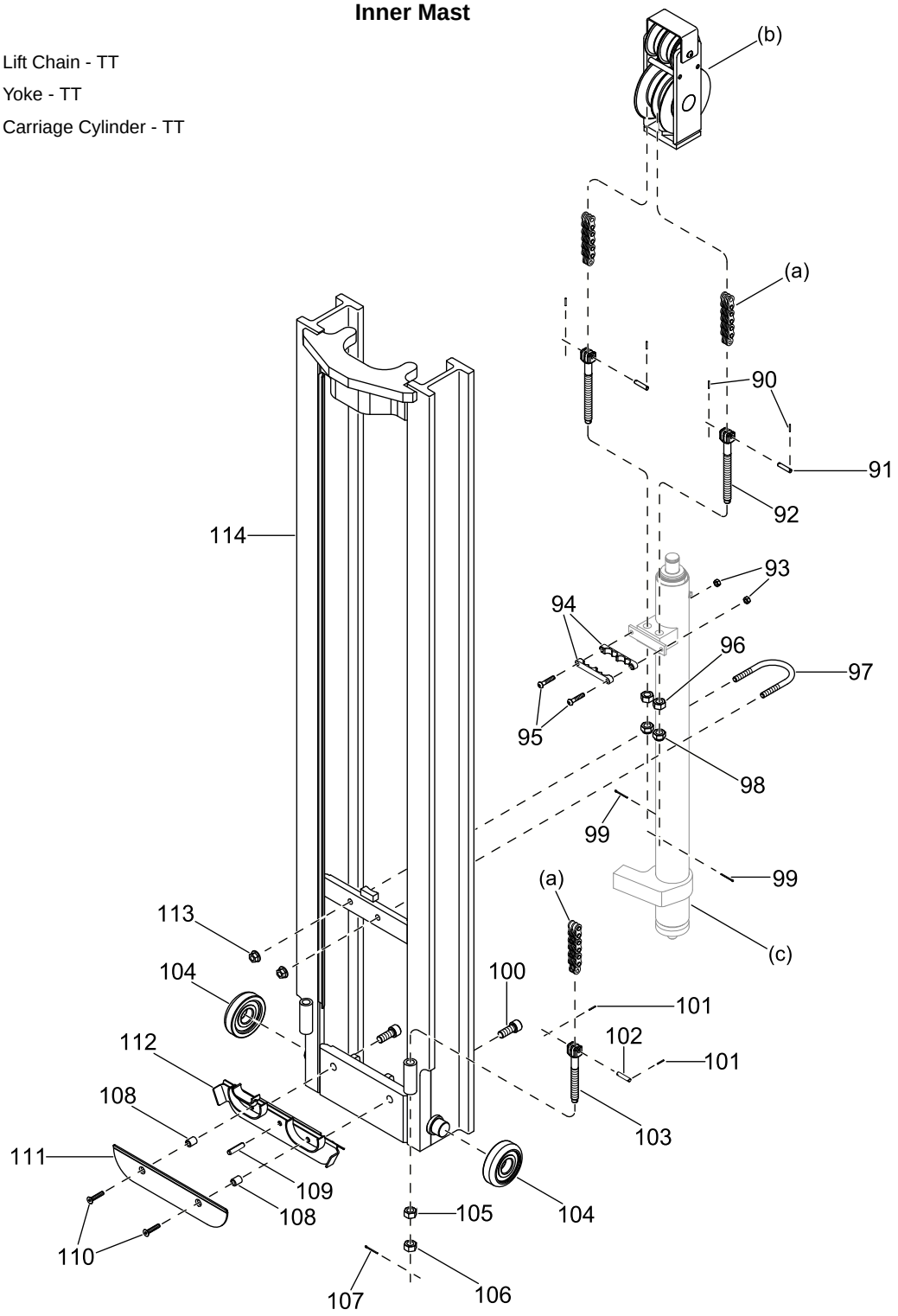



Figure 15578-02

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 90 | 060000-055 | Roll Pin | 2 |
| 91 | 042906 | Pin | 1 |
| 92 | 131854-190 | Chain Anchor | 2 |
| 93 | 060059-001 | Nut | 2 |
| 94 | 131659 | Hose Guide | 2 |
| 95 | 060023-023 | Screw | 2 |
| 96 | 060059-022 | Nut | 2 |
| 97 | 136565 | U-Bolt | 1 |
| 98 | 060059-025 | Nut | 2 |
| 99 | 060038-003 | Cotter Pin | 2 |
| 100 | 060117-012 | Screw | 2 |
| 101 | 060000-055 | Roll Pin | 2 |
| 102 | 042906 | Pin | 1 |
| 103 | 131854-150 | Chain Anchor | 2 |
| 104 | 074668-001 | Column Roller | 2 |
| 105 | 060059-022 | Nut | 2 |
| 106 | 060059-025 | Nut | 2 |
| 107 | 060038-003 | Cotter Pin | 2 |
| 108 | 116991 | Spacer | 2 |
| 109 | 050000-039 | Roll Pin | 1 |
| 110 | 060063-027 | Screw | 2 |
| 111 | 136559 | Cover | 1 |
| 112 | 136554-100 | Accessory Guide | 1 |
| | 136554-105 | Accessory Guide (1) | 1 |
| 113 | 060059-010 | Nut | 2 |
| 114 | 136511-180* | Inner Mast - 3911 mm (154 in) Lift Height | 1 |
| | 136511-211* | Inner Mast - 4825 mm (190 in) Lift Height | 1 |
| | 136511-226* | Inner Mast - 5285 mm (208 in) Lift Height | 1 |
| | 136511-241* | Inner Mast - 5740 mm (226 in) Lift Height | 1 |
| | 136511-256* | Inner Mast - 6197 mm (244 in) Lift Height | 1 |

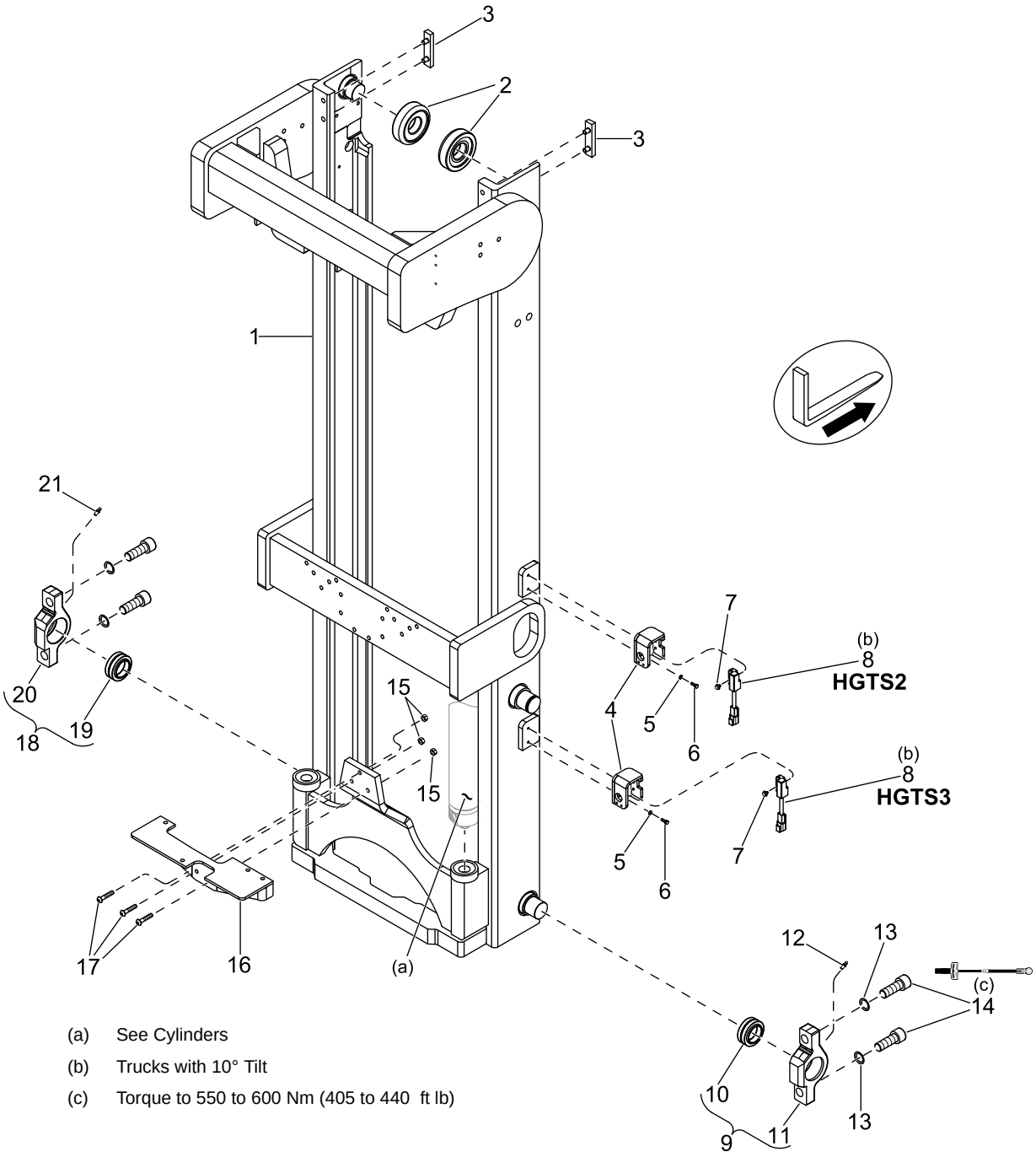
(1) Used with 5th Function

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

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(a) See Cylinders

(b) Trucks with 10° Tilt

(c) Torque to 550 to 600 Nm (405 to 440 ft lb)

Figure 15635-03

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | * | Outer Mast (See Chart 1) | 1 |
| 2 | 131787-095 | Column Roller | 2 |
| 3 | 131664-001 | Wear Block | 2 |
| 4 | 142014 | Switch Mount (1) | 2 |
| 5 | 060030-217 | Flatwasher (1) | 4 |
| 6 | 060061-005 | Screw (1) | 4 |
| | 061003-004 | Cable Tie | 2 |
| 7 | 060061-016 | Screw (1) | 2 |
| 8 | 062874 | Proximity Sensor (1) | 2 |
| 9 | 134266 | Mast Pivot Assembly RH | 1 |
| 10 | 065012-009 | Bushing | 1 |
| 11 | 134101 | Mast Pivot RH | 1 |
| 12 | 054011-006 | Grease Fitting | 1 |
| 13 | 060134-001 | Flatwasher | 4 |
| 14 | 060099-011 | Screw | 4 |
| 15 | 060059-001 | Nut | 3 |
| 16 | 145684 | Valve Mount | 1 |
| 17 | 060063-023 | Screw | 3 |
| 18 | 134814 | Mast Pivot Assembly LH | 1 |
| 19 | 065012-009 | Bushing | 1 |
| 20 | 134813 | Mast Pivot LH | 1 |
| 21 | 054011-006 | Grease Fitting | 1 |

(1) Used With 10° Forward Tilt

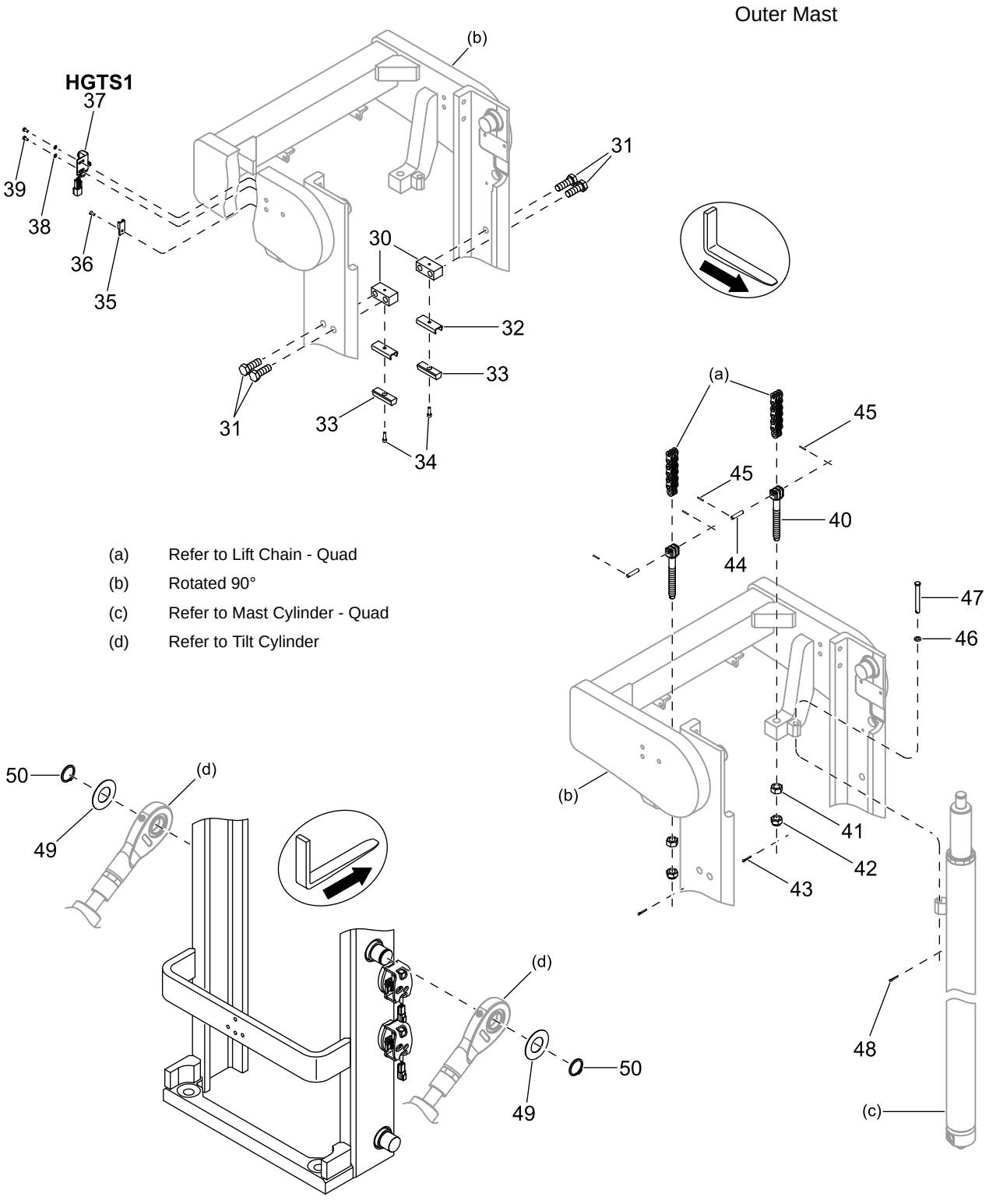
***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 1 - Outer Mast**

| Lift Height | | Index 1 Part Number | |
|---|---|---|---|
| mm | in | Without Tilt | With 10° Forward Tilt |
| 6096 | 240 | 139656-203 | 139656-203-10 |
| 6248 | 246 | 139656-211 | 139656-211-10 |
| 6553 | 258 | 139656-218 | 139656-218-10 |
| 6705 | 264 | 139656-226 | 139656-226-10 |
| 7010 | 276 | 139656-233 | 139656-233-10 |

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(a) Refer to Lift Chain - Quad
(b) Rotated 90°
(c) Refer to Mast Cylinder - Quad
(d) Refer to Tilt Cylinder

Figure 15636-02

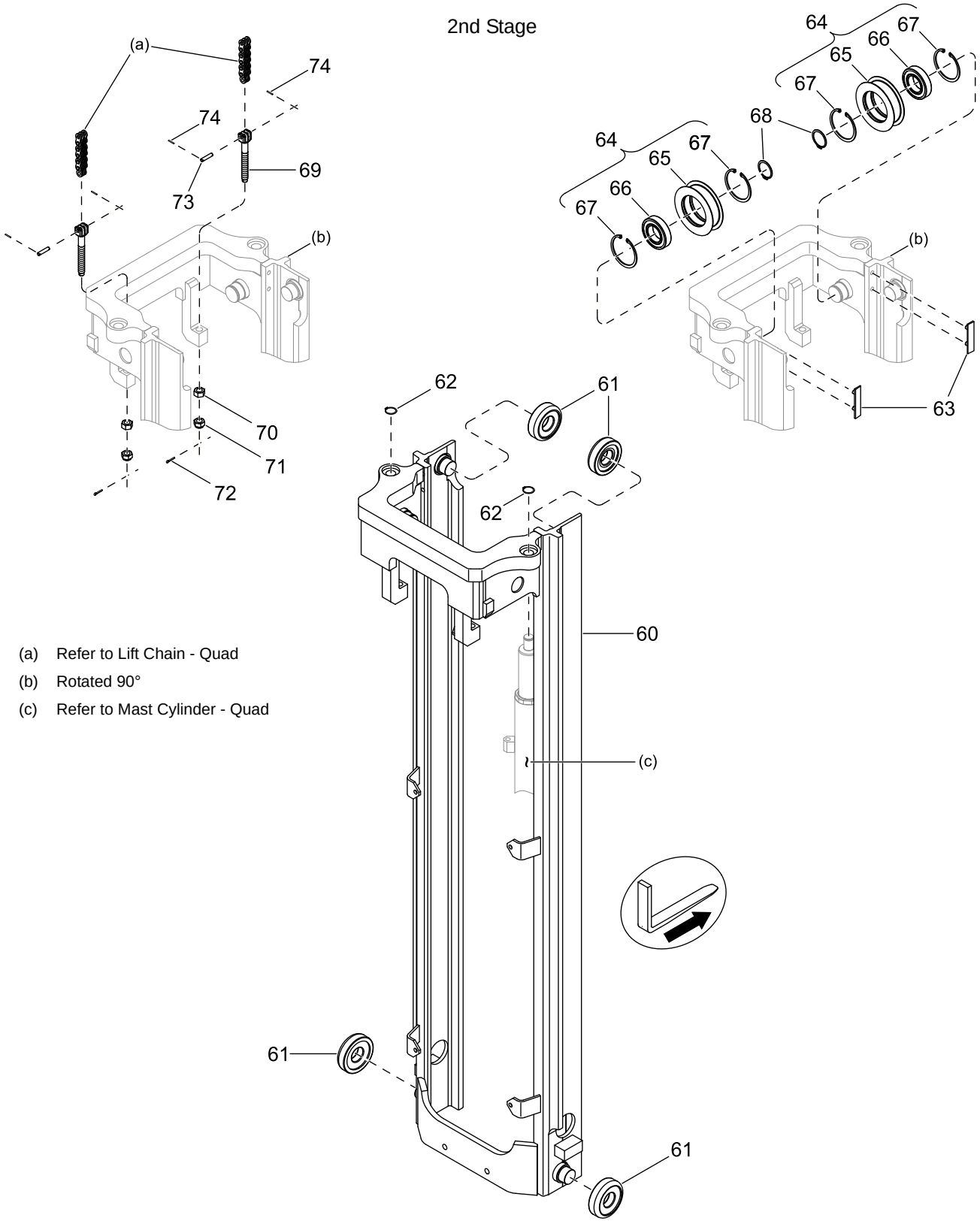
https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 129252 | Stop Block | 2 |
| 31 | 060117-005 | Screw | 4 |
| 32 | 107563-001 | Bracket | 2 |
| 33 | 092747-001 | Poly Stop | 2 |
| 34 | 060062-005 | Screw | 2 |
| 35 | 062749-001 | Attachment Clip | 1 |
| 36 | 060061-008 | Screw | 1 |
| 37 | 127311 | Lead & Switch Assembly | 1 |
| 38 | 060030-217 | Flatwasher | 2 |
| 39 | 060061-006 | Screw | 2 |
| | 061004-019 | Thread Locking Adhesive | AR |
| 40 | 131855-155 | Chain Anchor | 2 |
| 41 | 060059-022 | Nut | 2 |
| 42 | 060059-025 | Nut | 2 |
| 43 | 060038-003 | Cotter Pin | 2 |
| 44 | 042906 | Pin | 2 |
| 45 | 060000-055 | Roll Pin | 4 |
| 46 | 060030-191 | Flatwasher | 2 |
| 47 | 076470-025 | Clevis Pin | 2 |
| 48 | 060038-017 | Cotter Pin | 2 |
| 49 | 060030-369 | Flatwasher | 2 |
| 50 | 060009-130 | Retaining Ring | 2 |

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(a) Refer to Lift Chain - Quad

(b) Rotated 90°

(c) Refer to Mast Cylinder - Quad

Figure 15637-02

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 60 | * | 2nd Stage Mast (See Chart 2) | 1 |
| 61 | 131787-095 | Column Roller 95.76 mm (3.77 in) | AR |
| | 131787-100 | Column Roller 101.42 mm (3.99 in) | AR |
| 62 | 060009-036 | Retaining Ring | 2 |
| 63 | 131663 | Wear Block | 2 |
| 64 | 131667-002 | Pulley Assembly | 2 |
| 65 | 131668-002 | Pulley | 1 |
| 66 | 065081-045 | Bearing | 1 |
| 67 | 060009-062 | Retaining Ring | 2 |
| 68 | 060009-043 | Retaining Ring | 2 |
| 69 | 131854-150 | Chain Anchor | 2 |
| 70 | 060059-022 | Nut | 2 |
| 71 | 060059-025 | Nut | 2 |
| 72 | 060038-003 | Cotter Pin | 2 |
| 73 | 042906 | Pin | 2 |
| 74 | 060000-055 | Roll Pin | 4 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 2 - 2nd Stage Mast**

| Lift Height | | Index 60 Part Number |
|---|---|---|
| mm | in | |
| 6096 | 240 | 131606-203 |
| 6248 | 246 | 131606-211 |
| 6553 | 258 | 131606-218 |
| 6705 | 264 | 131606-226 |
| 7010 | 276 | 131606-233 |

**Always Specify Model, Data & Serial Number**

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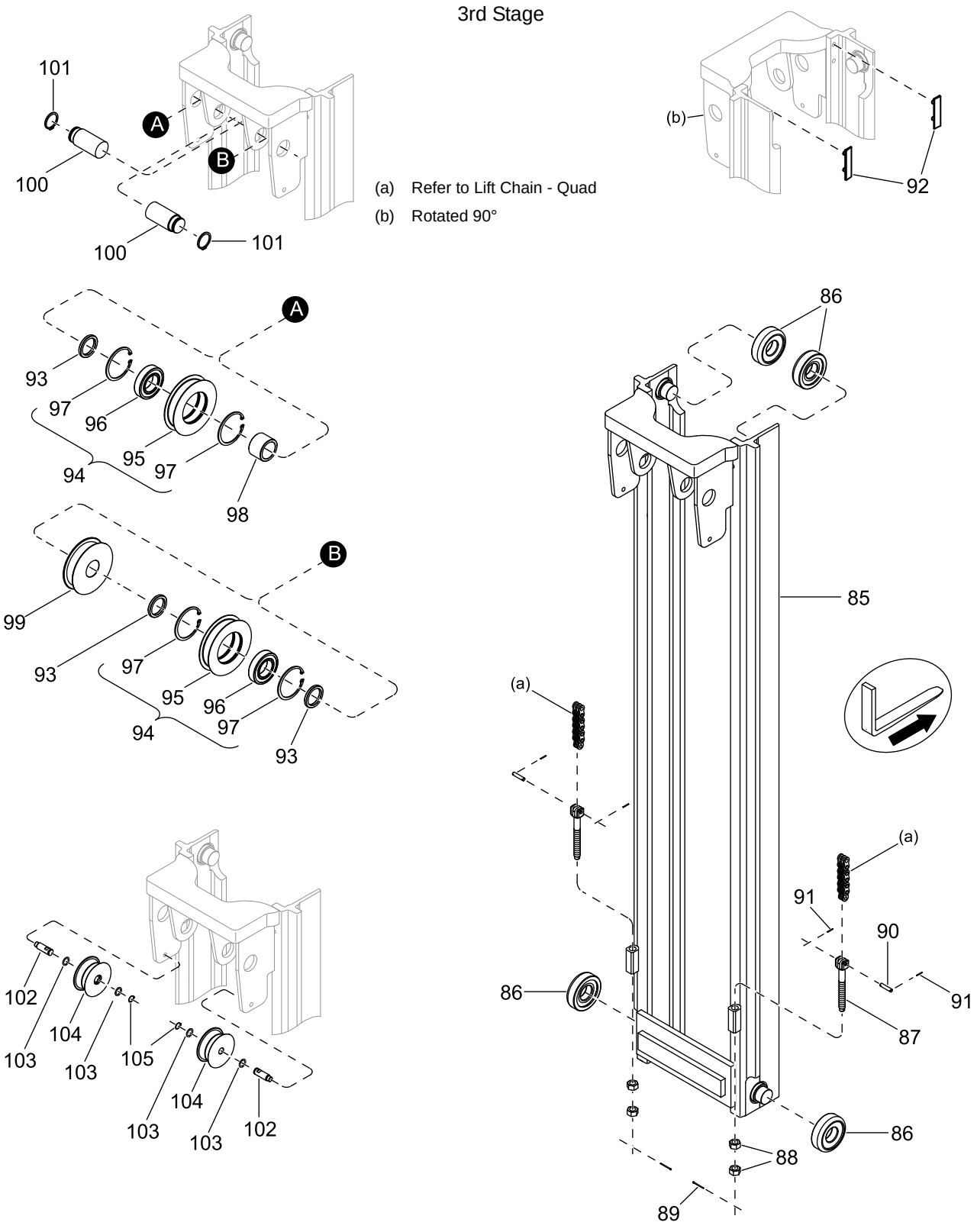



Figure 15638-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 85 | * | 3rd Stage Mast (See Chart 3) | 1 |
| 86 | 131787-095 | Column Roller | 4 |
| 87 | 131855-155 | Chain Anchor | 2 |
| 88 | 060059-022 | Nut | 4 |
| 89 | 060038-003 | Cotter Pin | 2 |
| 90 | 042906 | Pin | 2 |
| 91 | 060000-055 | Roll Pin | 4 |
| 92 | 131663 | Wear Block | 2 |
| 93 | 136569-002 | Spacer | 3 |
| 94 | 131667-001 | Pulley Assembly | 2 |
| 95 | 131668-001 | Pulley | 1 |
| 96 | 065081-045 | Bearing | 1 |
| 97 | 060009-062 | Retaining Ring | 2 |
| 98 | 136569-001 | Spacer | 1 |
| 99 | 136568-001 | Hose Pulley | 1 |
| 100 | 131670 | Pulley Shaft | 2 |
| 101 | 060009-130 | Retaining Ring | 2 |
| 102 | 131665 | Pulley Shaft(1) | 1 |
| | 131665 | Pulley Shaft(2) | 2 |
| 103 | 060030-067 | Flatwasher(1) | 2 |
| | 060030-067 | Flatwasher(2) | 4 |
| 104 | 131671-001 | Hose Pulley(1) | 1 |
| | 131671-001 | Hose Pulley(2) | 2 |
| 105 | 060009-005 | Retaining Ring(1) | 1 |
| | 060009-005 | Retaining Ring(2) | 2 |

(1) 1 Accessory

(2) 2 Accessory

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 3 - 3rd Stage Mast**

| Lift Height | | Index 85 Part Number |
|---|---|---|
| mm | in | |
| 6096 | 240 | 131635-203 |
| 6248 | 246 | 131635-211 |
| 6553 | 258 | 131635-218 |
| 6705 | 264 | 131635-226 |
| 7010 | 276 | 131635-233 |

**Always Specify Model, Data & Serial Number**

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Inner

(a) Refer to Lift Chain - Quad
(b) Refer to Yoke - Quad
(c) Refer to Carriage Cylinder - Quad

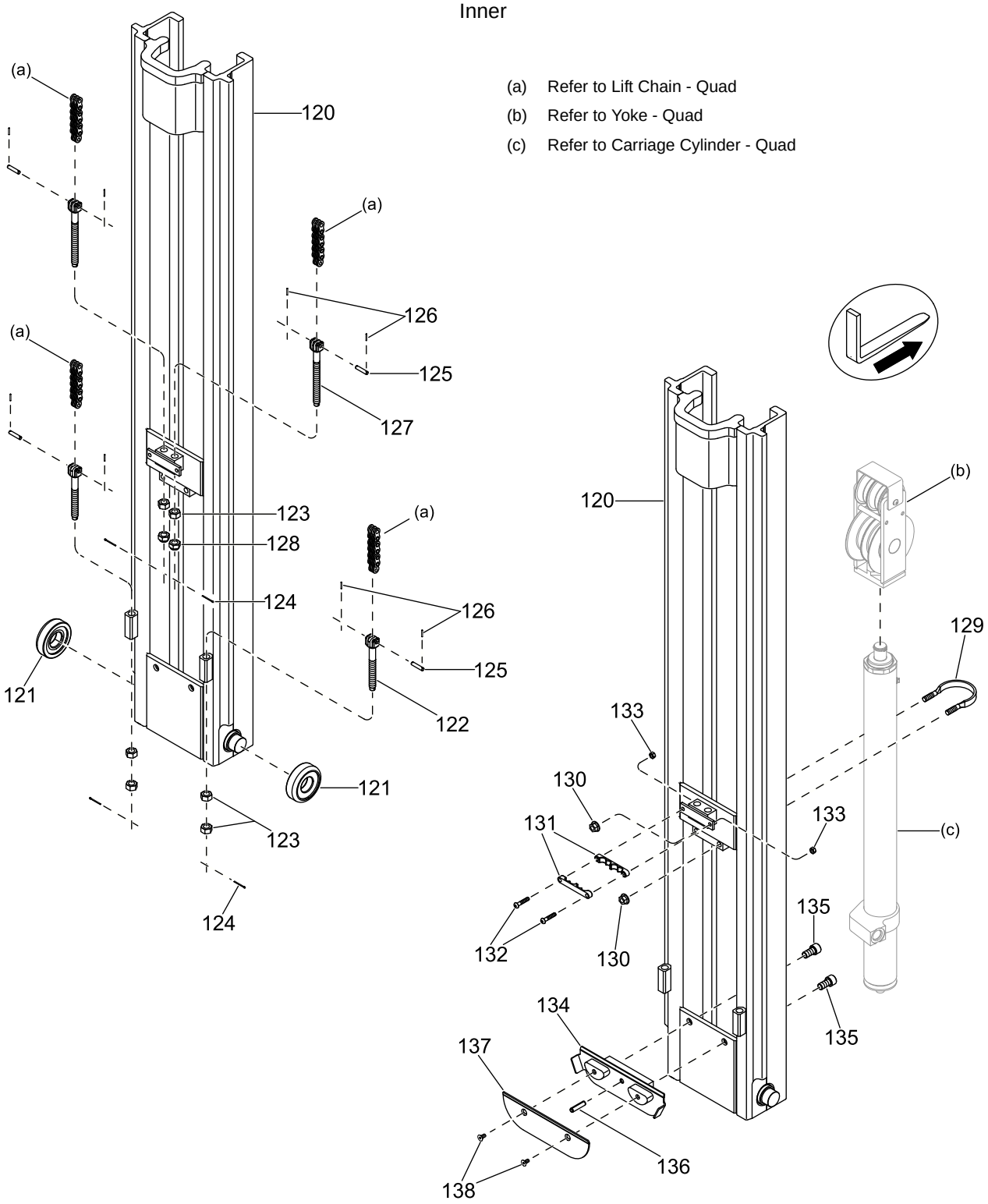



Figure 15639-02

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 120 | * | Inner Mast (See Chart 4) | 1 |
| 121 | 131787-095 | Column Roller | 2 |
| 122 | 131854-100 | Chain Anchor | 2 |
| 123 | 060059-022 | Nut | 6 |
| 124 | 060038-003 | Cotter Pin | 4 |
| 125 | 042906 | Pin | 4 |
| 126 | 060000-055 | Roll Pin | 8 |
| 127 | 131854-190 | Chain Anchor | 2 |
| 128 | 060059-025 | Nut | 2 |
| 129 | 131786 | U-Bolt | 1 |
| 130 | 060059-010 | Nut | 2 |
| 131 | 131659 | Hose Guide | 2 |
| 132 | 060063-023 | Screw | 2 |
| 133 | 060059-001 | Nut | 2 |
| 134 | 131805 | Accessory Guide | 1 |
| 135 | 060117-003 | Screw | 2 |
| 136 | 050000-039 | Roll Pin | 1 |
| 137 | 132086 | Cover | 1 |
| 138 | 060063-029 | Screw | 2 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 4 - Inner Mast**

| Lift Height | | Index 120 Part Number |
|---|---|---|
| mm | in | |
| 6096 | 240 | 131646-203 |
| 6248 | 246 | 131646-211 |
| 6553 | 258 | 131646-218 |
| 6705 | 264 | 131646-226 |
| 7010 | 276 | 131646-233 |

**Always Specify Model, Data & Serial Number**

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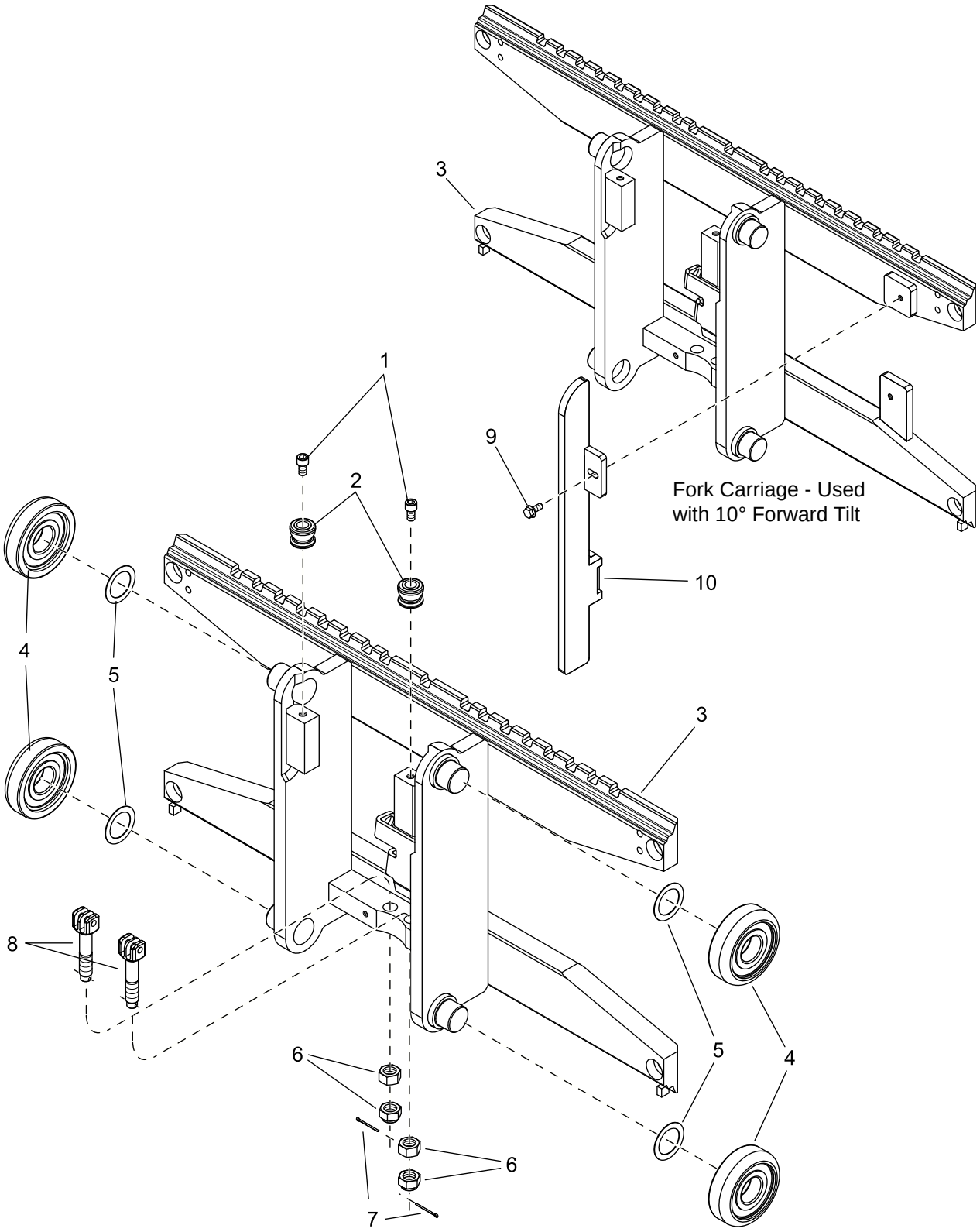



Figure 14313-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 060017-050 | Screw | 2 |
| | 061004-026 | Thread Locking Adhesive Blue | 1 |
| 2 | 124018 | Bumper | 2 |
| 3 | 136538-034 | Fork Carriage 875 mm (34.5 in) (Shown) | 1 |
| | 136538-038 | Fork Carriage 965 mm (38 in) | 1 |
| | 136538-038-10 | Fork Carriage 965 mm (38 in) (1) | 1 |
| 4 | 074668-001 | Column Roller | 4 |
| 5 | 060030-085 | Flatwasher | AR |
| 6 | 060059-022 | Nut | 4 |
| | 061004-019 | Thread Locking Adhesive Red | 1 |
| 7 | 060038-003 | Cotter Pin | 2 |
| 8 | 131854-100 | Chain Anchor | 2 |
| 9 | 060063-050 | Screw (1) | 2 |
| 10 | 142017 | Guide Bar (1) | 1 |

(1) Used With 10° Forward Tilt.

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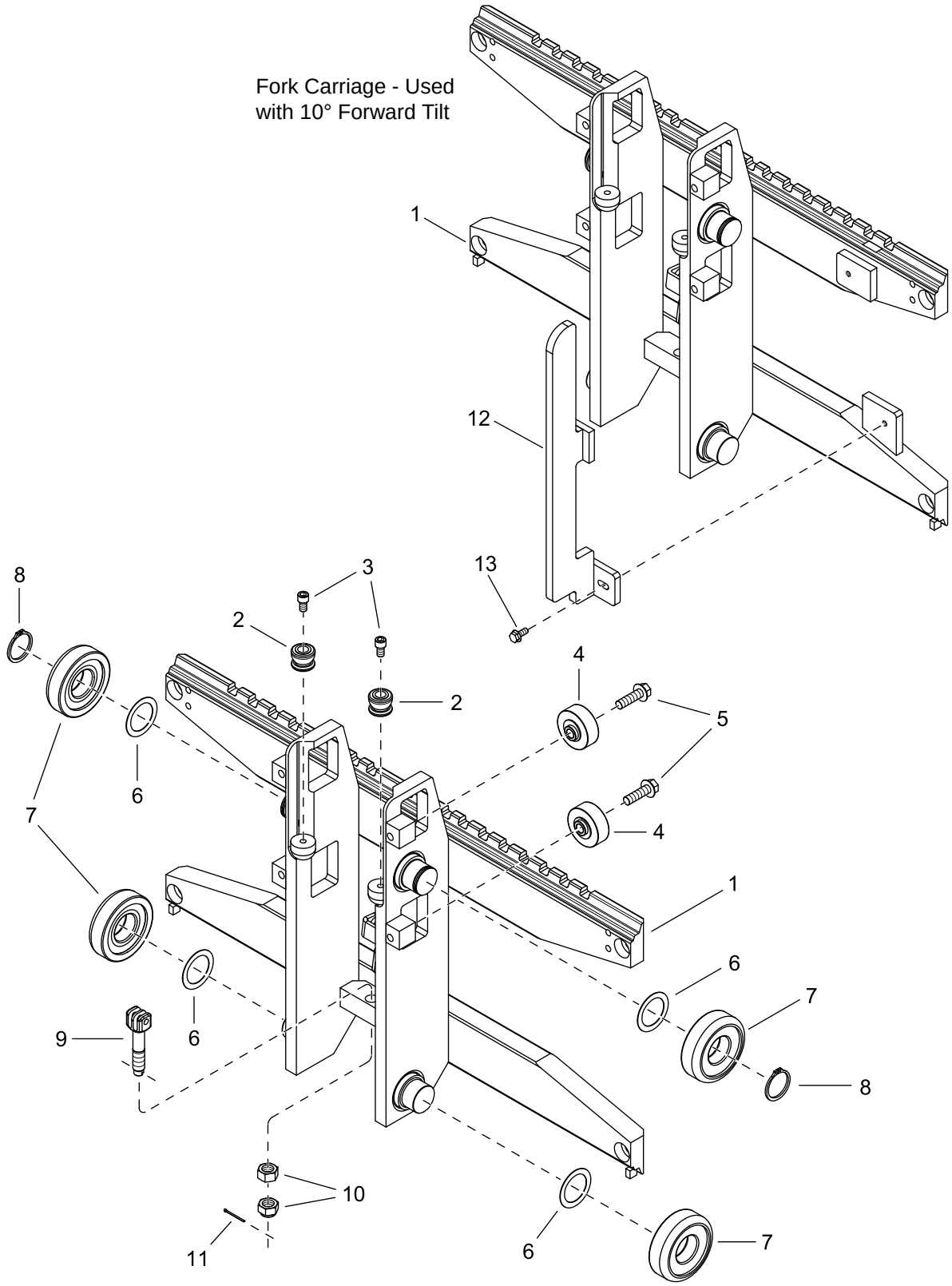



Figure 15298-01

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 139874-034 | Fork Carriage 875 mm (34.5 in) | 1 |
| | 139874-038 | Fork Carriage 965 mm (38 in) | 1 |
| | 139874-038-10 | Fork Carriage 965 mm (38 in) (1) | 1 |
| 2 | 124018 | Bumper | 2 |
| 3 | 060017-050 | Screw | 2 |
| | 061004-026 | Thread Locking Adhesive Blue | 1 |
| 4 | 065177 | Eccentric Bearing | 4 |
| 5 | 060115-003 | Screw M12 | 4 |
| 6 | 060030-231 | Flatwasher | AR |
| 7 | 131787-095 | Column Roller | 4 |
| 8 | 060009-130 | Retaining Ring | 2 |
| 9 | 131854-100 | Chain Anchor | 2 |
| 10 | 060059-022 | Nut | 4 |
| | 061004-019 | Thread Locking Adhesive Red | 1 |
| 11 | 060038-003 | Cotter Pin | 2 |
| 12 | 142022 | Guide Bar (1) | 1 |
| 13 | 060063-050 | Screw (1) | 2 |

(1) Used With 10° Forward Tilt.

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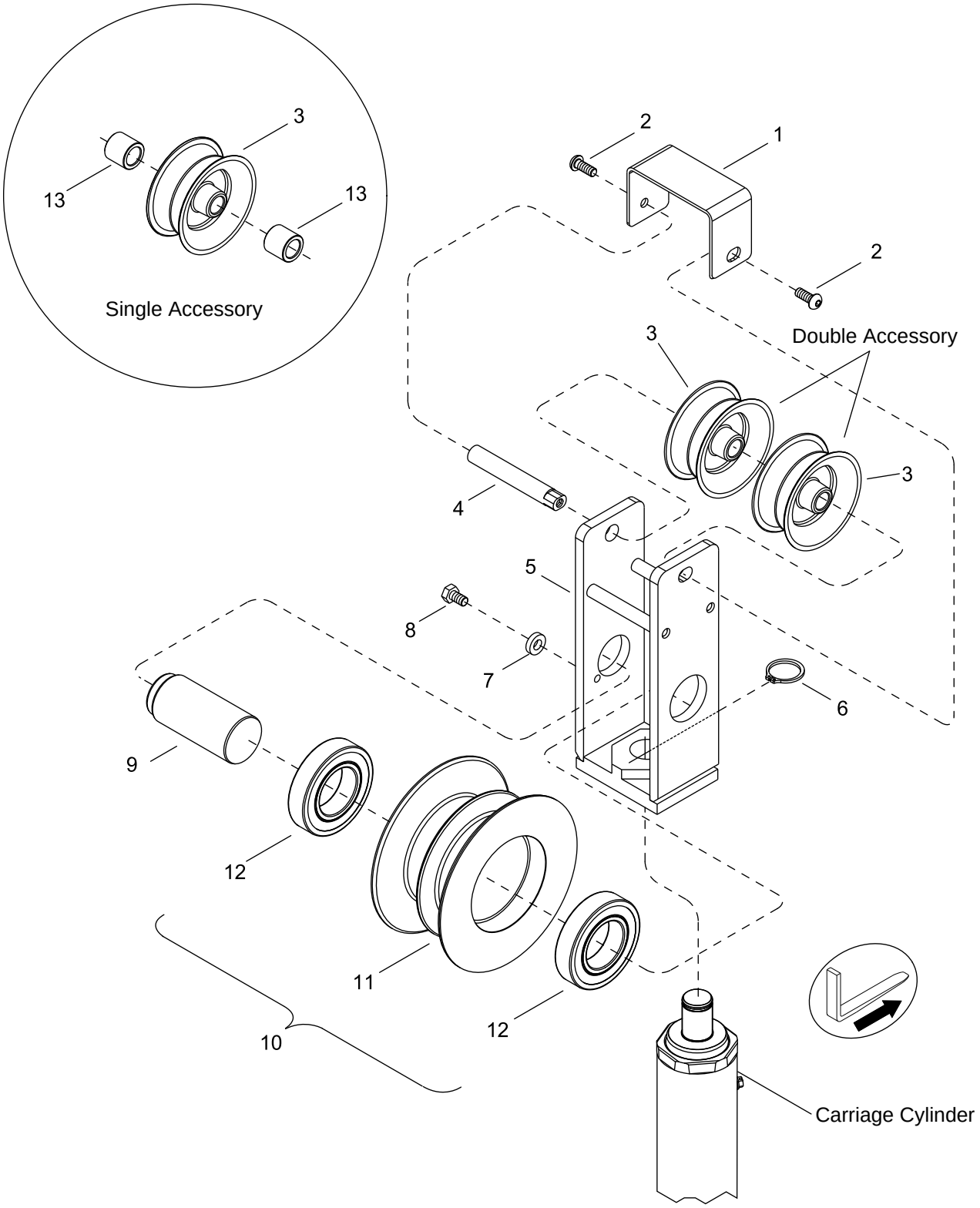



Figure 15306

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 131804* | Cover(1) | 1 |
| 2 | 060063-015* | Screw(1) | 2 |
| 3 | 131671-001* | Hose Pulley(1) (3) | 2 |
| | 131671-001* | Hose Pulley(1) (2) | 1 |
| 4 | 131803* | Shaft(1) | 1 |
| 5 | 136560 | Yoke | 1 |
| 6 | 060009-105* | Retaining Ring | 1 |
| 7 | 060030-288 | Flatwasher | 1 |
| 8 | 060063-008 | Screw | 1 |
| | 061004-019 | Thread Locking Adhesive | 1 |
| 9 | 131677 | Shaft | 1 |
| 10 | 136562 | Pulley Assembly | 1 |
| 11 | 136563 | Pulley | 1 |
| 12 | 065081-045 | Bearing | 2 |
| 13 | 138363-001 | Spacer(2) | 2 |

(1) Used with Accessory Hoses Only.

(2) Single Accessory Only.

(3) Double Accessory Only.

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

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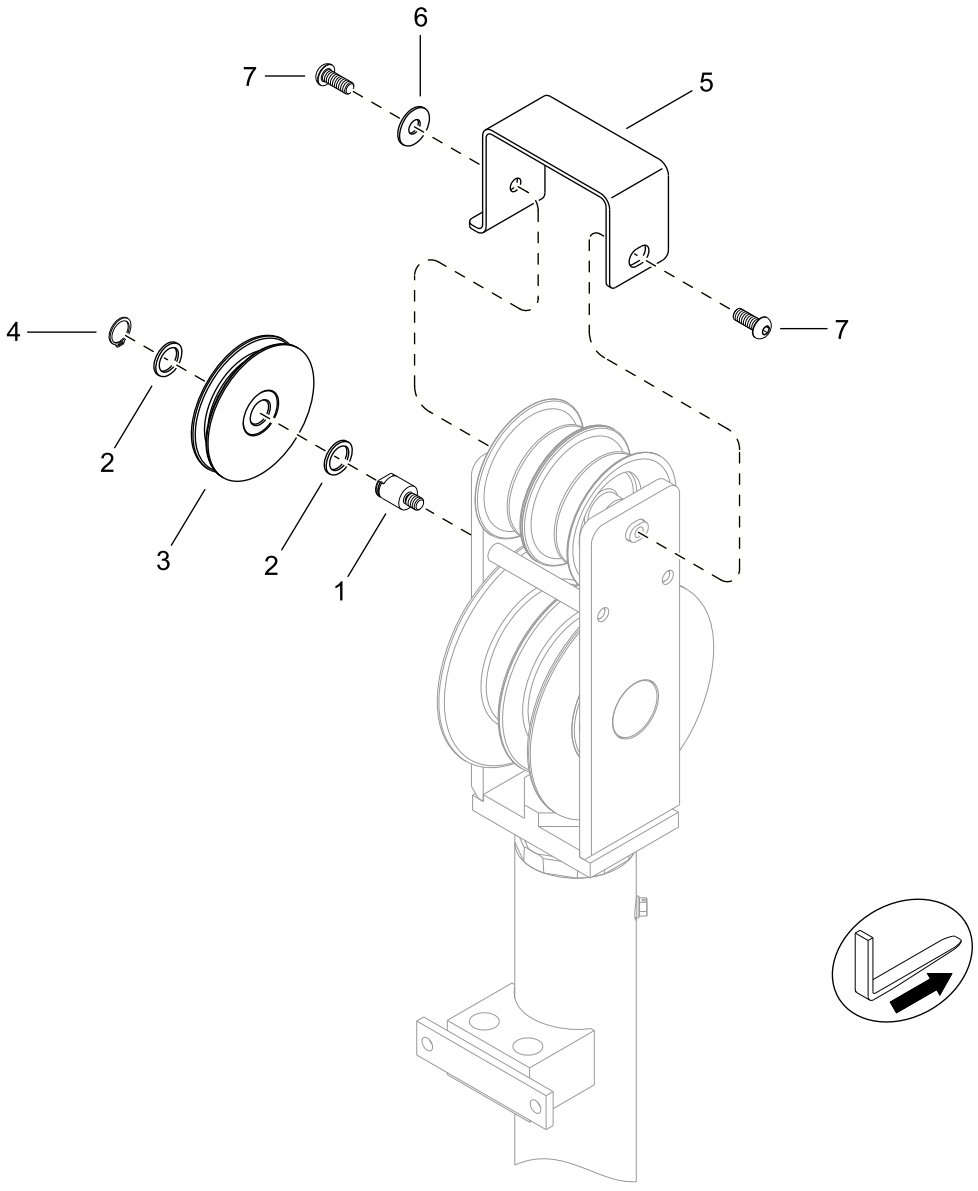



Figure 15787

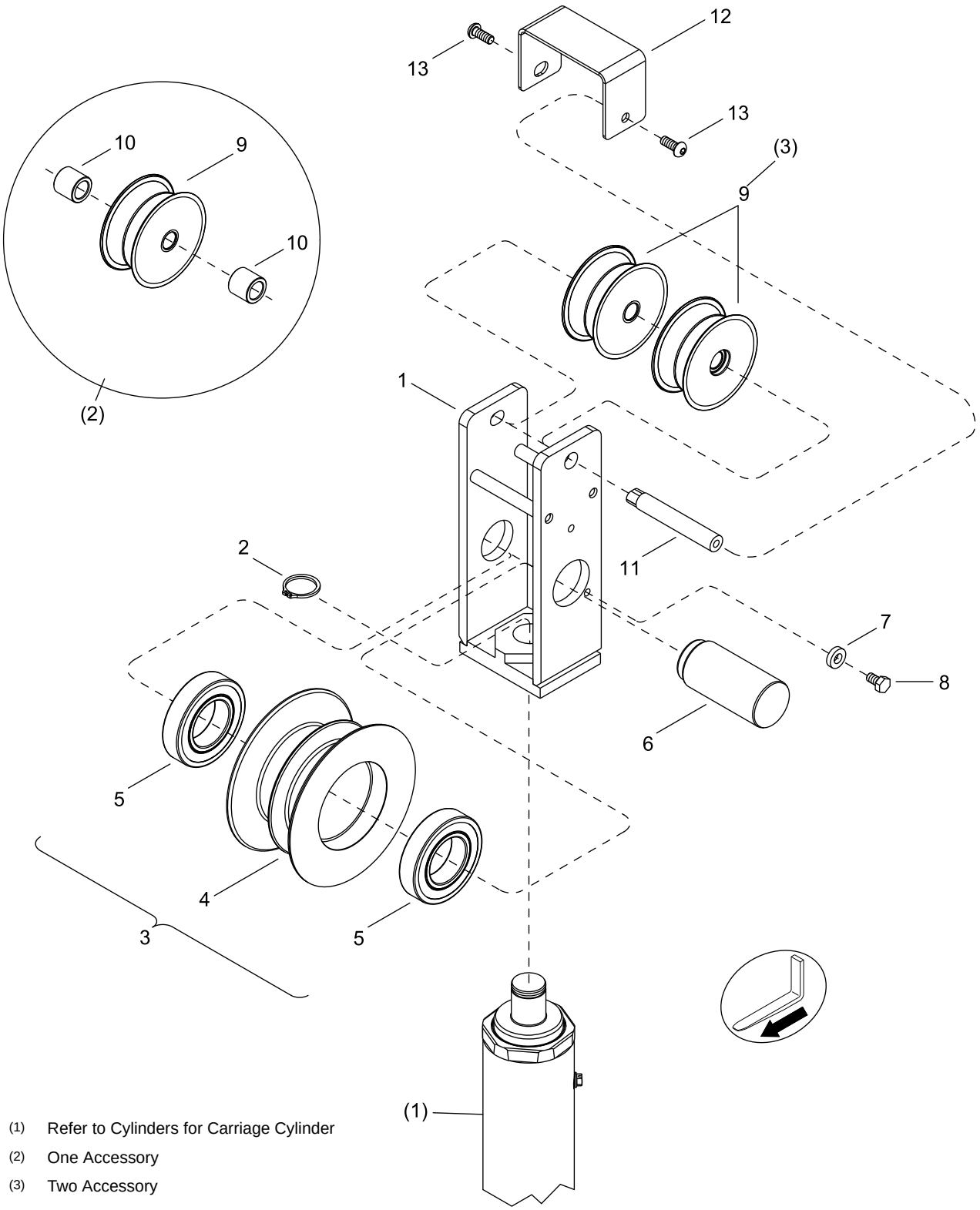
https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 136573 | Pulley Shaft | 1 |
| 2 | 060030-067 | Flatwasher | 2 |
| 3 | 136574-003 | Wire Pulley | 1 |
| 4 | 060009-005 | Retaining Ring | 1 |
| 5 | 136575 | Cover | 1 |
| 6 | 060030-061 | Flatwasher | 1 |
| 7 | 060063-015 | Screw | 2 |

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(1) Refer to Cylinders for Carriage Cylinder

(2) One Accessory

(3) Two Accessory

Figure 17260

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 136560 | Yoke | 1 |
| 2 | 060009 | Retaining Ring | 1 |
| 3 | 136562 | Pulley Assembly | 1 |
| 4 | 136563 | Pulley | 1 |
| 5 | 065081-045 | Bearing | 2 |
| 6 | 131677 | Shaft | 1 |
| 7 | 060030-288 | Flatwasher | 1 |
| 8 | 060063-008 | Screw | 1 |
| | 061004-019 | Thread Locking Adhesive | 1 |
| 9 | 131671-001 | Hose Pulley (1) (2) | 1 |
| | 131671-001 | Hose Pulley (1) (3) | 2 |
| 10 | 138363-001 | Spacer (1) (2) | 2 |
| 11 | 131803 | Shaft (1) | 1 |
| 12 | 131804 | Cover (1) | 1 |
| 13 | 060063-015 | Screw (1) | 2 |

(1) Used with Accessory Hoses only
(2) One Accessory only
(3) Two Accessory only

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

https://truckmanualshub.com/



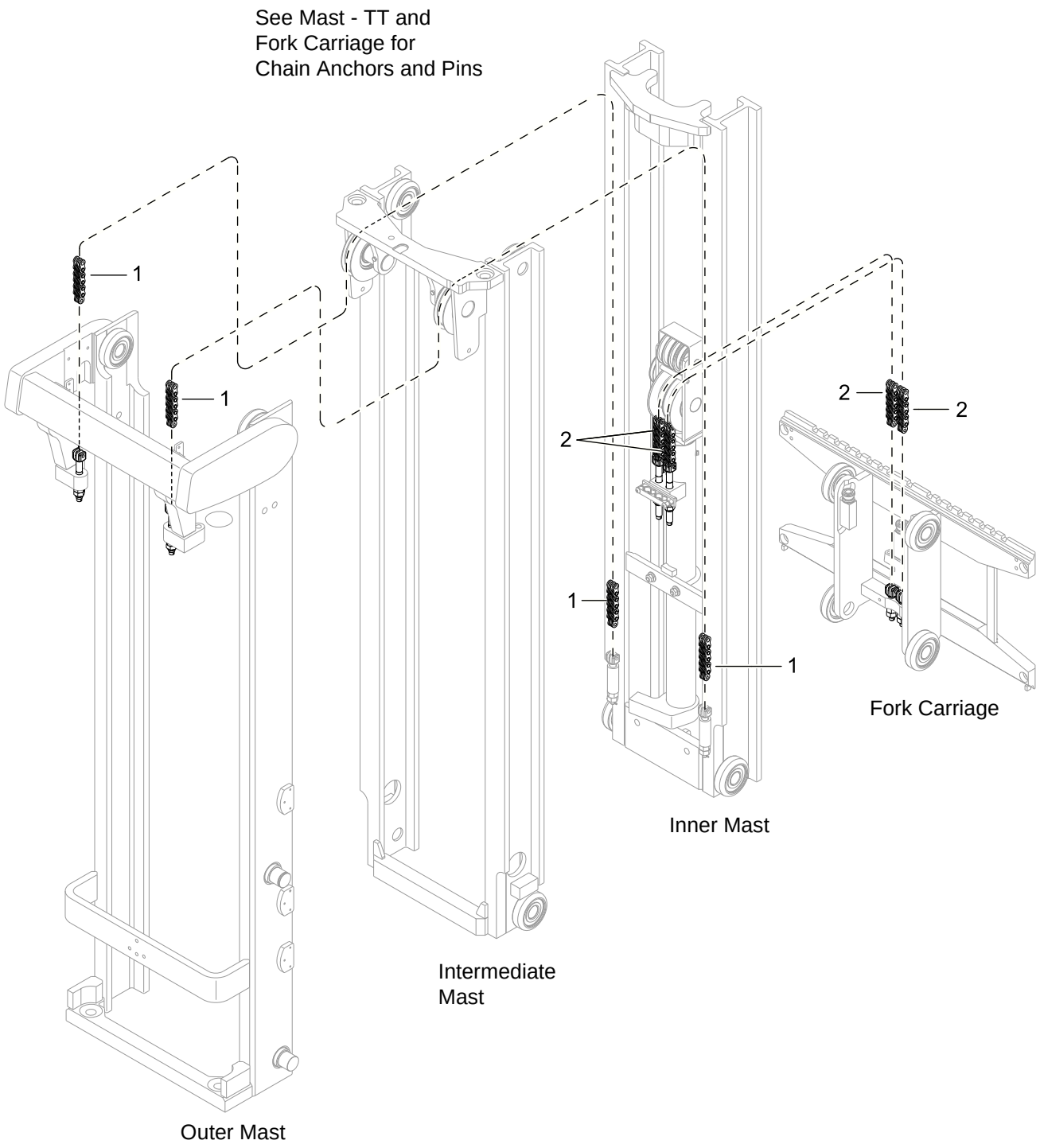



Figure 15739

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | *(1) | Mast Chain | 2 |
| 2 | *(2) | Carriage Chain | 2 |

(1) See Chart 1

(2) See Chart 2

**Chart 1 – Mast Chain Index 1**

| Lift Height* | | Length Required | | Links | Part Number | Minimum Order Required (ft) | |
|---|---|---|---|---|---|---|---|
| mm | (in) | mm | (in) | | | Each | Per Truck |
| 3911 | (154) | 1696 | (66.75) | 89 | 073991-067 | 6 | 12 |
| 4826 | (190) | 2000 | (78.75) | 105 | 073991-067 | 7 | 14 |
| 5283 | (208) | 2153 | (84.75) | 113 | 073991-067 | 8 | 16 |
| 5740 | (226) | 2305 | (90.75) | 121 | 073991-067 | 8 | 16 |
| 6197 | (244) | 2458 | (96.75) | 129 | 073991-067 | 9 | 18 |

**Chart 2 – Carriage Chain Index 2**

| Lift Height* | | Length Required | | Links | Part Number | Minimum Order Required (ft) | |
|---|---|---|---|---|---|---|---|
| mm | (in) | mm | (in) | | | Each | Per Truck |
| 3911 | (154) | 1162 | (45.75) | 61 | 073991-067 | 4 | 8 |
| 4826 | (190) | 1315 | (51.75) | 69 | 073991-067 | 5 | 10 |
| 5283 | (208) | 1391 | (54.75) | 73 | 073991-067 | 5 | 10 |
| 5740 | (226) | 1469 | (57.75) | 77 | 073991-067 | 5 | 10 |
| 6197 | (244) | 1543 | (60.75) | 81 | 073991-067 | 6 | 12 |

When ordering chain, order the number of inches of 073991-067 for your particular truck. The appropriate minimum order quantity is listed in the charts. Cut chain to length requried for your truck. **Repalce both chains at the same time.**

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

https://truckmanualshub.com/



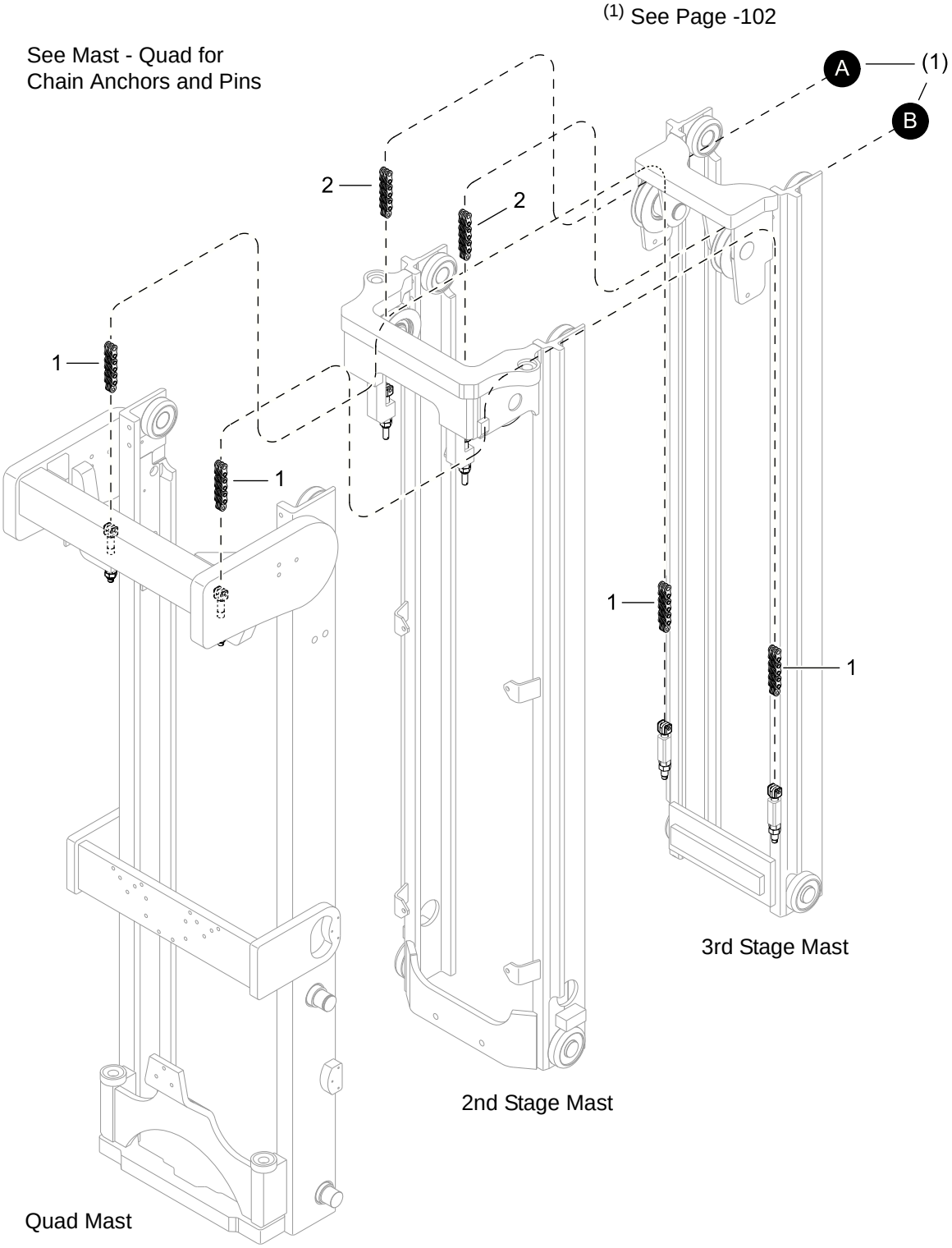



Figure 15740

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | *(3) | Mast Chain | 2 |
| 2 | *(4) | Mast Chain | 2 |

(3) See Chart 1

(4) See Chart 2

**Chart 1 – Mast Chain Index 1 (Outer Mast to 3rd Stage Mast)**

| Lift Height* | | Length Required | | Links | Part Number | Minimum Order Required (ft) | |
|---|---|---|---|---|---|---|---|
| mm | (in) | mm | (in) | | | Each | Per Truck |
| 6096 | (240) | 1848 | (72.75) | 97 | 042907-019 | 7 | 14 |
| 6248 | (246) | 1924 | (75.75) | 101 | 042907-019 | 7 | 14 |
| 6553 | (258) | 2000 | (78.75) | 105 | 042907-019 | 7 | 14 |
| 6705 | (264) | 2077 | (81.75) | 109 | 042907-019 | 7 | 14 |
| 7010 | (276) | 2153 | (84.75) | 113 | 042907-019 | 8 | 16 |

**Chart 2 – Mast Chain Index 2 (2nd Stage Mast to Inner Mast)**

| Lift Height* | | Length Required | | Links | Part Number | Minimum Order Required (ft) | |
|---|---|---|---|---|---|---|---|
| mm | (in) | mm | (in) | | | Each | Per Truck |
| 6096 | (240) | 1848 | (72.75) | 97 | 073991-067 | 7 | 14 |
| 6248 | (246) | 1924 | (75.75) | 101 | 073991-067 | 7 | 14 |
| 6553 | (258) | 2000 | (78.75) | 105 | 073991-067 | 7 | 14 |
| 6705 | (264) | 2077 | (81.75) | 109 | 073991-067 | 7 | 14 |
| 7010 | (276) | 2153 | (84.75) | 113 | 073991-067 | 8 | 16 |

When ordering chain, order the number of inches of 042907-019 or 073991-067 for your particular truck. The appropriate minimum order quantity is listed in the charts. Cut chain to length required for your truck. **Replace both chains at the same time.**

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

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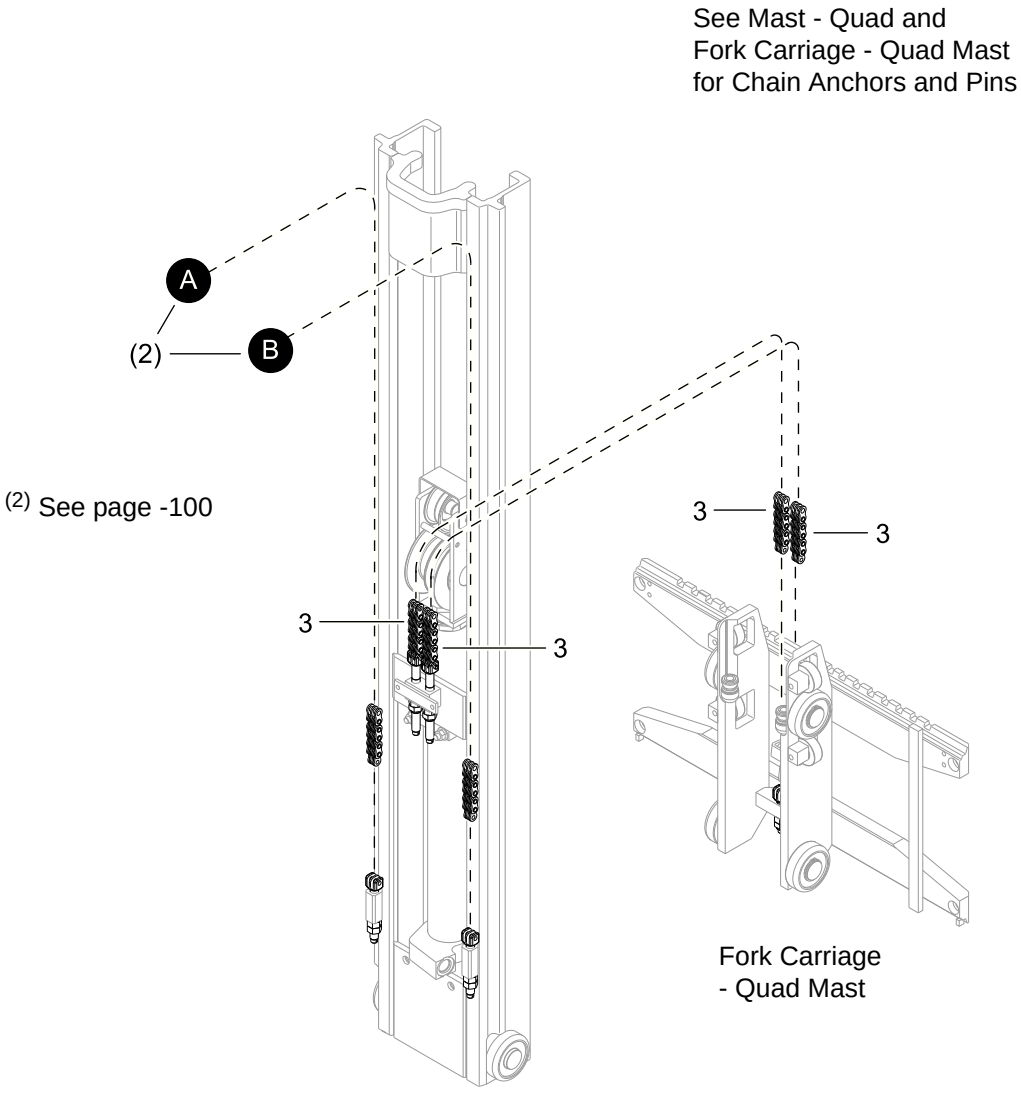



Figure 15741

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 3 | *(5) | Carriage Chain | 2 |

(5) See Chart 3

**Chart 3 – Carriage Chain Index 3**

| Lift Height* | | Length Required | | Links | Part Number | Minimum Order Required (ft) | |
|---|---|---|---|---|---|---|---|
| mm | (in) | mm | (in) | | | Each | Per Truck |
| 6096 | (240) | 1353 | (53.25) | 71 | 073991-067 | 5 | 10 |
| 6248 | (246) | 1429 | (56.25) | 75 | 073991-067 | 5 | 10 |
| 6553 | (258) | 1505 | (59.25) | 79 | 073991-067 | 5 | 10 |
| 6705 | (264) | 1581 | (62.25) | 83 | 073991-067 | 6 | 12 |
| 7010 | (276) | 1657 | (65.25) | 87 | 073991-067 | 6 | 12 |

When ordering chain, order the number of inches of 073991-067 for your particular truck. The appropriate minimum order quantity is listed in the chart. Cut chain to length required for your truck. **Replace both chains at the same time.**

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

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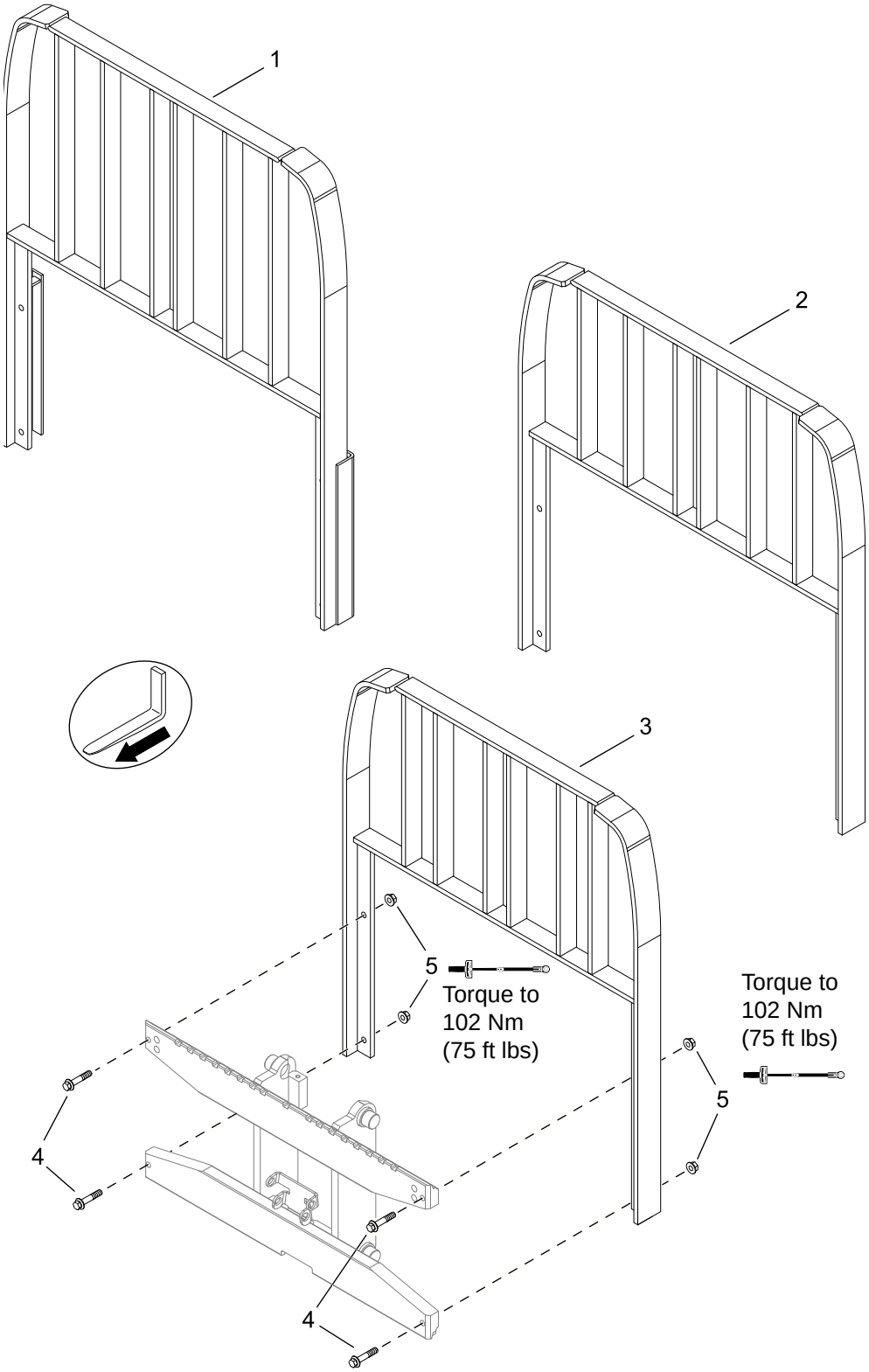



Figure 14310

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 137329-001 | Slip-On Load Backrest 915 x 1220 mm (36 x 48 in) | 1 |
| | 137329-002 | Slip-On Load Backrest 990 x 1220 mm (39 x 48 in) | 1 |
| 2 | 138366-002 | Load Backrest 915 x 915 mm (36 x 36 in) | 1 |
| | 138366-003 | Load Backrest 915 x 1065 mm (36 x 42 in) | 1 |
| | 138366-004 | Load Backrest 915 x 1220 mm (36 x 48 in) | 1 |
| 3 | 138382-002 | Load Backrest 990 x 915 mm (39 x 36 in) | 1 |
| | 138382-003 | Load Backrest 990 x 1065 mm (39 x 42 in) | 1 |
| | 138382-004 | Load Backrest 990 x 1220 mm (39 x 48 in) | 1 |
| 4 | 060115-025 | Screw With Sideshifter | 4 |
| | 060115-027 | Screw Without Sideshifter | 4 |
| 5 | 060059-010 | Nut | 4 |

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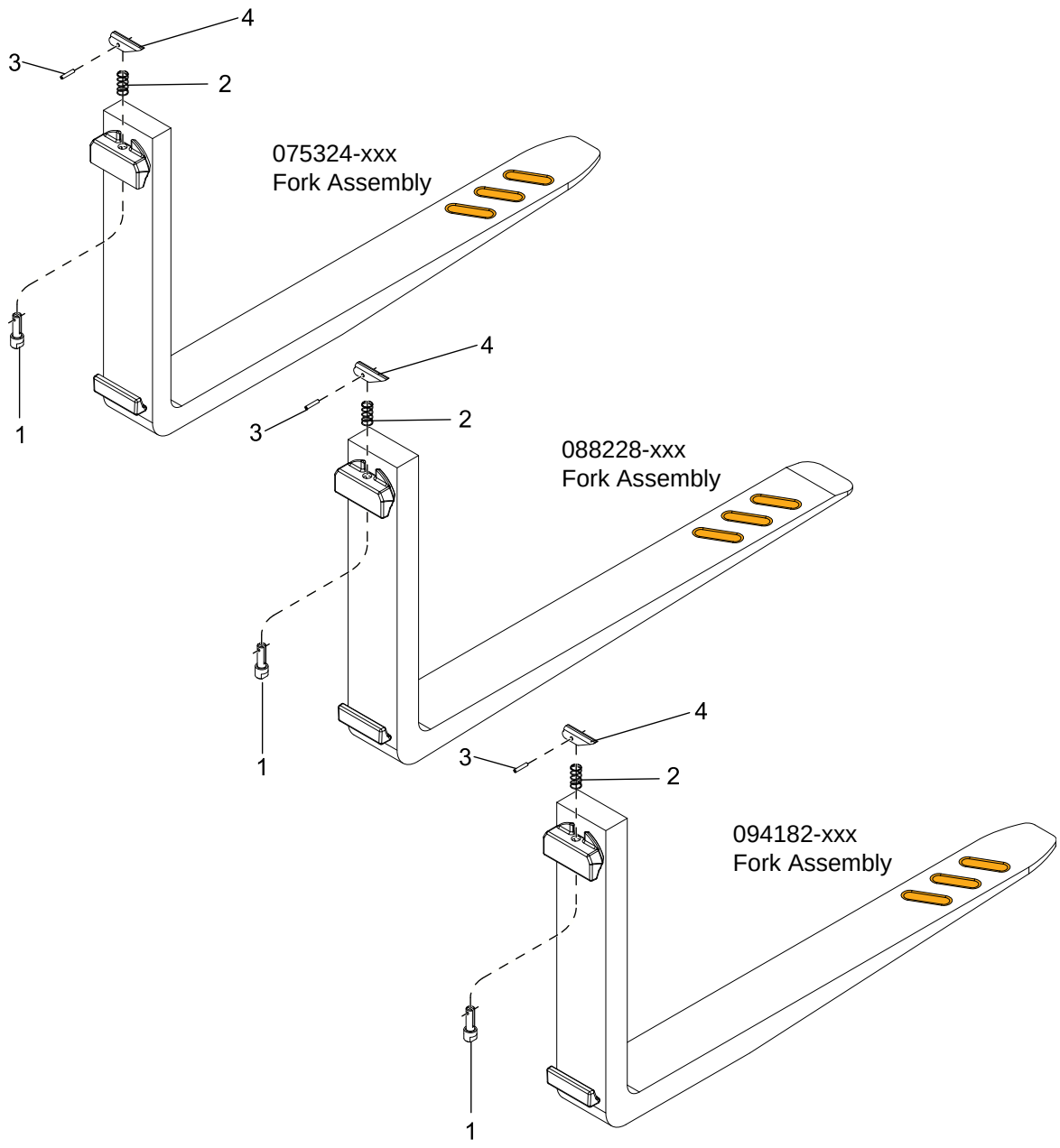



Figure 14309

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 103442 | Pin Assembly | 1 |
| | 103443 | Pin | 1 |
| 2 | 104329 | Spring | 1 |
| 3 | 060000-061 | Roll Pin | 1 |
| 4 | 075248 | Handle | 1 |

Fork Assemblies noted in Charts include Index 1 through 4

**Always Specify Model, Data & Serial Number**

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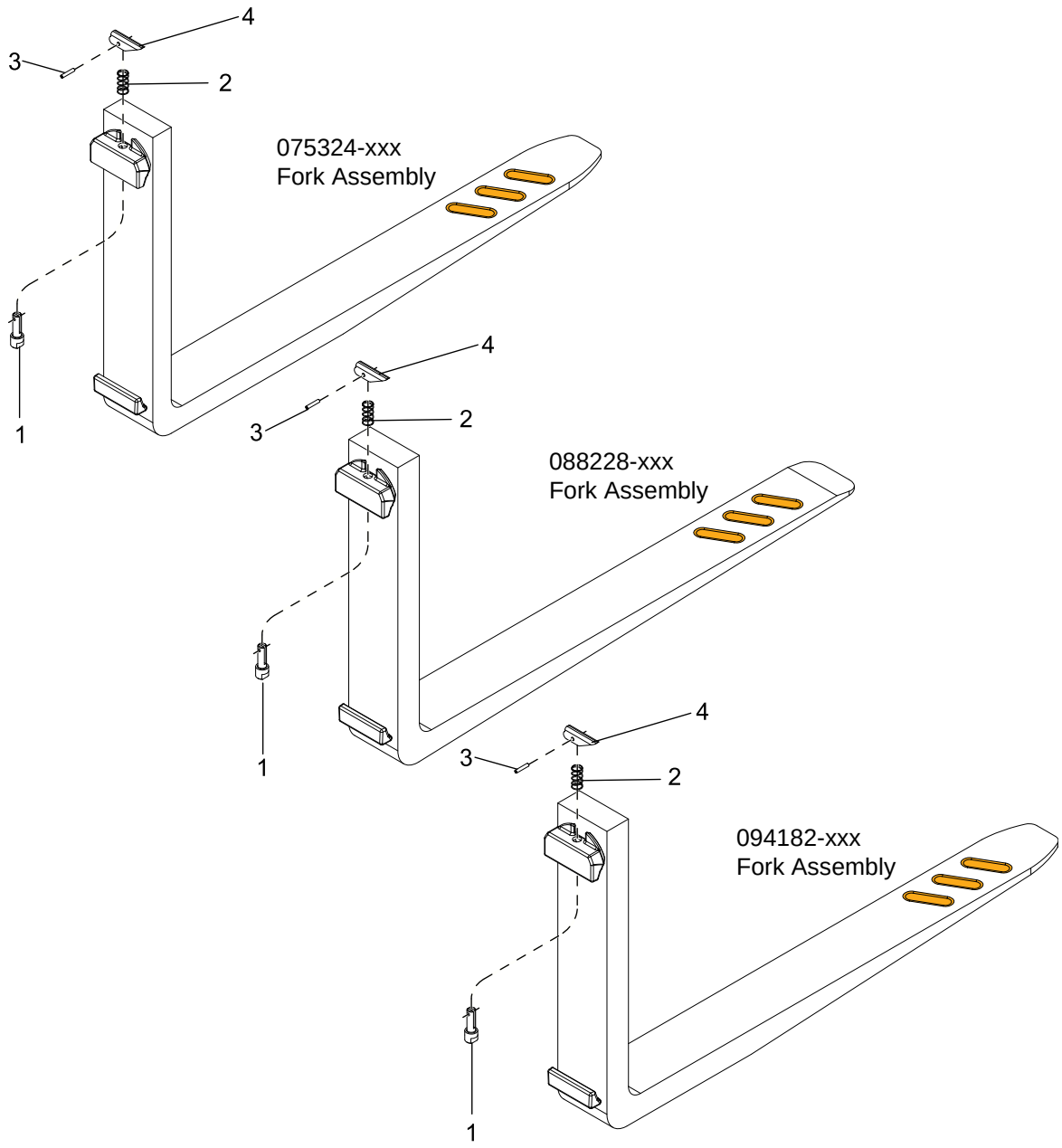



Figure 14309

https://truckmanualshub.com/


| Model, Fork Designation Chart | | | | |
|---|---|---|---|---|
| Series | Capacity | Fork Assembly Base Part Number | | |
| | | 075324-xxx | 094182-xxx | Polished Fork Full Taper 088228-xxx |
| W | 1815 kg (4000 lbs) | | X | |
| WB | 455 - 1360 kg (1000 - 3000 lbs)<br>1815 kg (4000 lbs) | X | X | |
| WR | 910 - 1360 kg (2000 - 3000 lbs) | X | | |
| RC<br>RC 3000<br>RC 5500 | 1360 kg (3000 lbs)<br>1585 - 1815 kg (3500 - 4000 lbs) | X | X | X<br>X |
| SC<br>SC 4000, 4500 | 1360 kg (3000 lbs)<br>1585 - 1815 kg (3500 - 4000 lbs) | X | X | X<br>X |
| RR 3000, 3500<br>RR 5000, 5200<br>RR 5700 | 1585 - 2040 kg (3500 - 4500 lbs) | | X | X |
| RS 3000, 3500 | 1815 kg (4000 lbs) | | X | X |
| RD 3000, 3500<br>RD 5000, 5200<br>RR 5700 | 1360 kg (3000 lbs) | X | X | X |
| SH | 1815 kg (4000 lbs) | | X | X |
| SHR | 1130 - 1360 kg (2500 - 3000 lbs)<br>1585 kg (3500 lbs) | X | X | X<br>X |

| Fork Length Chart | | | | |
|---|---|---|---|---|
| Fork Length | | Fork Assembly Part Number | | |
| mm | in | 075324-xxx | 094182-xxx | Polished Fork Full Taper 088228-xxx |
| 760 | 30 | -001 | -001 | -001 |
| 915 | 36 | -002 | -002 | -002 |
| 990 | 39 | -006 | -006 | -006 |
| 1065 | 42 | -003 | -003 | -003 |
| 1145 | 45 | -005 | -005 | -005 |
| 1220 | 48 | -004 | -004 | -004 |
| Following Part Numbers Not Used on RR, RS, & RD Series Trucks | | | | |
| 1370 | 54 | -007 | -007 | -007 |
| 1525 | 60 | -008 | -008 | -008 |

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## Notes:

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# CYLINDER PARTS

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# CYLINDER PARTS

## Mast Cylinder - TT

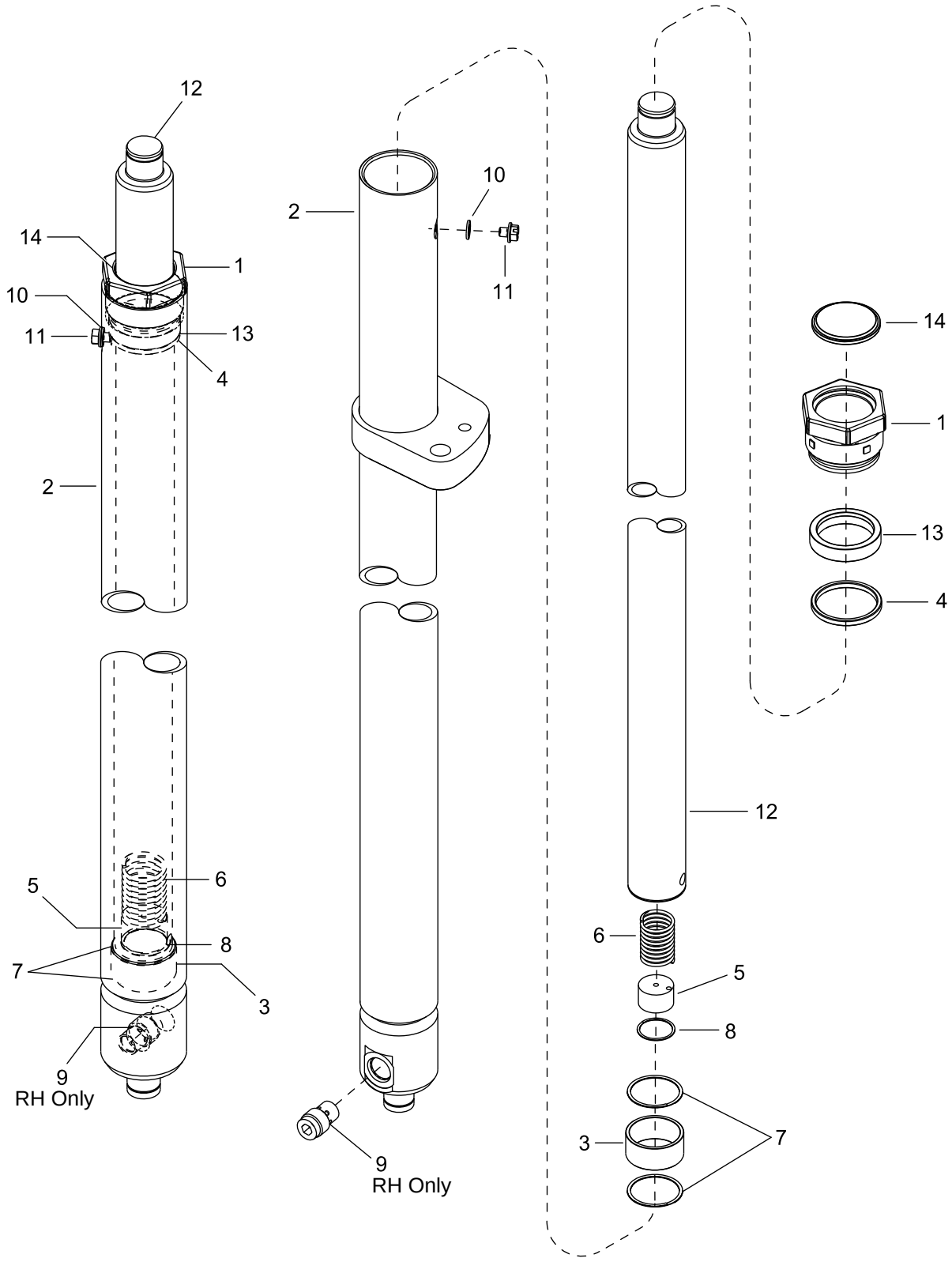



Figure 15293

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | *(1) | RH Mast Cylinder Assembly TT | 1 |
| | *(1) | LH Mast Cylinder Assembly TT | 1 |
| 1 | 136535 | Cylinder Cap | 1 |
| 2 | *(1) | RH Mast Cylinder | 1 |
| | *(1) | LH Mast Cylinder | 1 |
| 3 | 124201-001 | Bushing | 1 |
| 4 | 081161-023 | Collar | 1 |
| 5 | 124179 | Shutoff Piston | 1 |
| 6 | 091428 | Compression Spring | 1 |
| 7 | 060009-163 | Retaining Ring | 2 |
| 8 | 060009-167 | Retaining Ring | 1 |
| 9 | 124251-001 | Velocity Fuse (RH Only) | 1 |
| 10 | 074240 | Seal | 1 |
| 11 | 060015-078 | Screw | 1 |
| 12 | *(1) | Ram | 1 |
| 13 | 064132-048 | Packing Rod | 1 |
| 14 | 064135-018 | Wiper Ring | 1 |

(1) See Chart 1

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 1 – Mast Cylinder Parts**

| Lift Height | | Index 0 Mast Cylinder Assembly | | Index 2 Mast Cylinder | | Index 12 Ram |
|---|---|---|---|---|---|---|
| mm | (in) | RH | LH | RH | LH | |
| 3911 | (154) | 136530-180 | 136536-180 | 136531-180 | 136537-180 | 136534-180 |
| 4826 | (190) | 136530-211 | 136536-211 | 136531-211 | 136537-211 | 136534-211 |
| 5283 | (208) | 136530-226 | 136536-226 | 136531-226 | 136537-226 | 136534-226 |
| 5740 | (226) | 136530-241 | 136536-241 | 136531-241 | 136537-241 | 136534-241 |
| 6197 | (244) | 136530-256 | 136536-256 | 136531-256 | 136537-256 | 136534-256 |

**Always Specify Model, Data & Serial Number**

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# CYLINDER PARTS

## Carriage Cylinder - TT

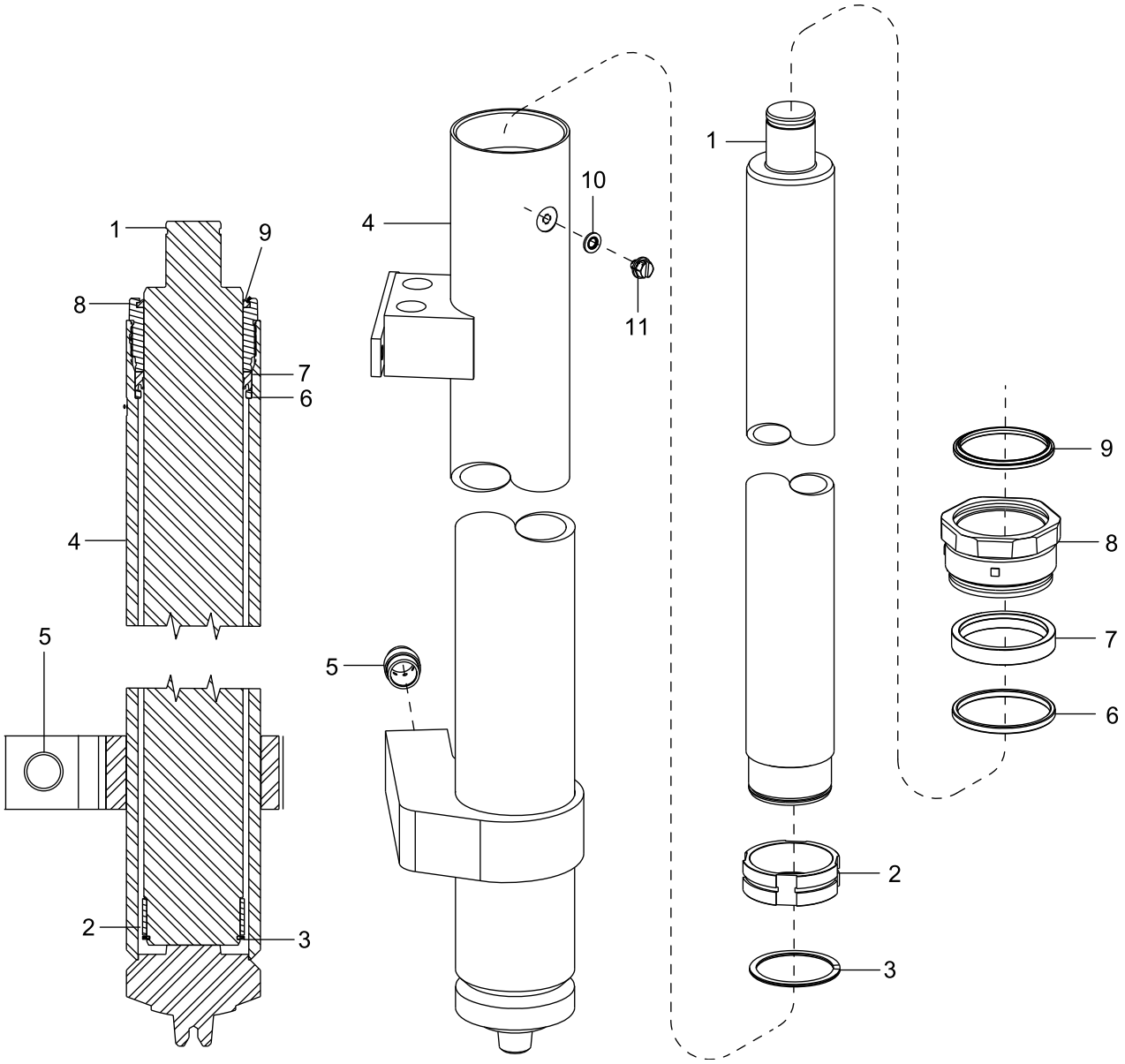



Figure 15296

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | *(1) | Carriage Cylinder Assembly TT | 1 |
| 1 | *(1) | Ram | 1 |
| 2 | 082232-003 | Bushing | 1 |
| 3 | 060009-087 | Retaining Ring | 1 |
| 4 | *(1) | Cylinder | 1 |
| 5 | 127190-001 | Flow Control Valve | 1 |
| 6 | 081161-024 | Collar | 1 |
| 7 | 064132-049 | Packing Rod | 1 |
| 8 | 136528 | Cylinder Cap | 1 |
| 9 | 064135-004 | Wiper Ring | 1 |
| 10 | 074240 | Seal | 1 |
| 11 | 060015-078 | Screw | 1 |
| | 126127 | Seal Kit (Includes Index 7, 9, 10 & 11) | 1 |

(1) See Chart 1

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 1 – Carriage Cylinder Parts**

| Lift Height | | Index 0 Cylinder Assembly | Index 1 Ram | Index 4 Cylinder |
|---|---|---|---|---|
| mm | in | | | |
| 3911 | 154 | 136521-180 | 136527-180 | 136522-180 |
| 4826 | 190 | 136521-211 | 136527-211 | 136522-211 |
| 5283 | 208 | 136521-226 | 136527-226 | 136522-226 |
| 5740 | 226 | 136521-241 | 136527-241 | 136522-241 |
| 6197 | 244 | 136521-256 | 136527-256 | 136522-256 |

**Always Specify Model, Data & Serial Number**

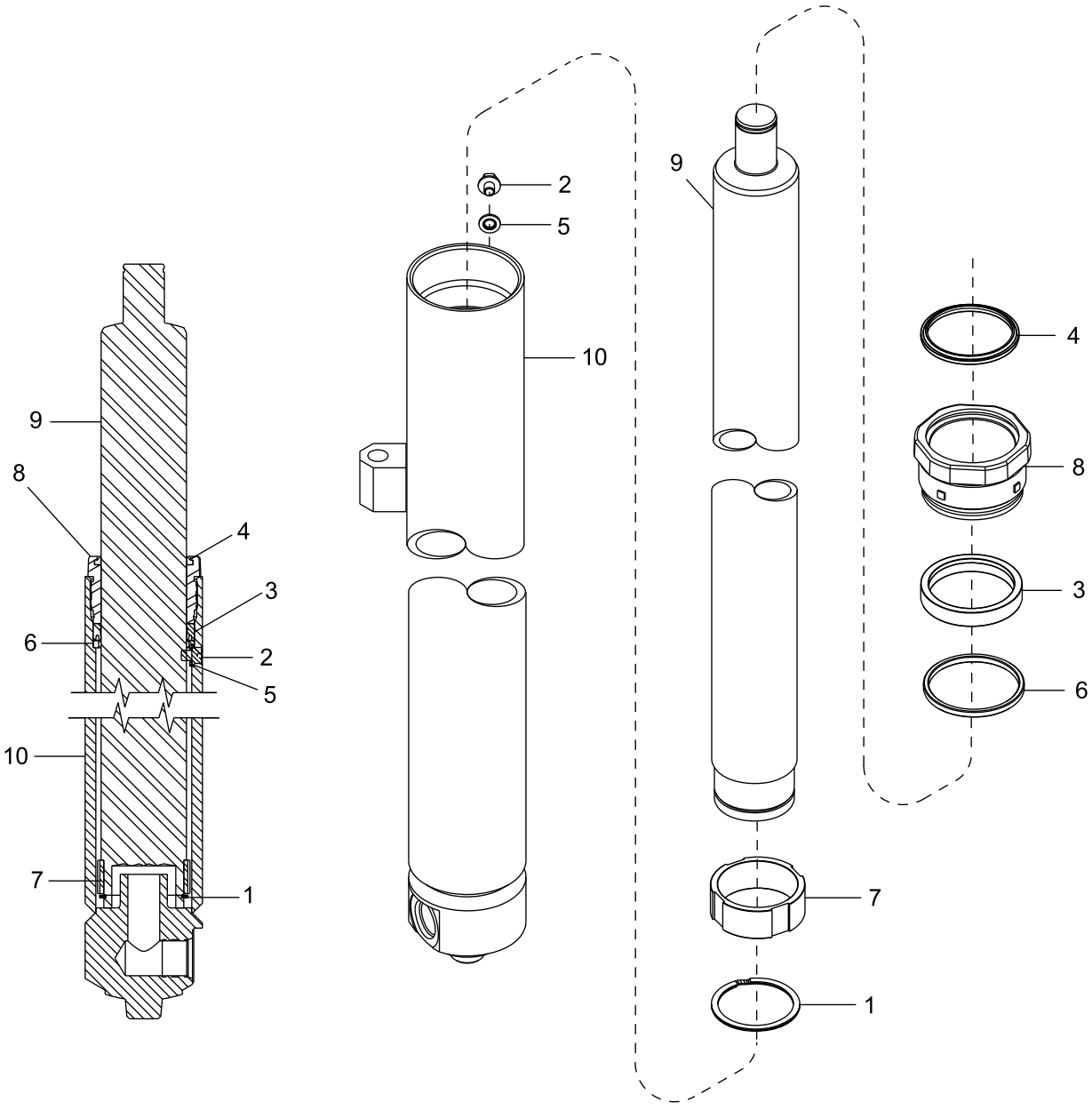



Figure 15297

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | *(1) | Mast Cylinder Assembly Quad | 1 |
| 1 | 060009-067 | Retaining Ring | 1 |
| 2 | 060015-078 | Screw | 1 |
| 3 | 064132-027 | Packing Rod | 1 |
| 4 | 064135-008 | Wiper Ring | 1 |
| 5 | 074240 | Seal | 1 |
| 6 | 081161-015 | Collar | 1 |
| 7 | 128185-002 | Bushing | 1 |
| 8 | 129267 | Cap | 1 |
| 9 | *(1) | Ram | 1 |
| 10 | *(1) | Cylinder | 1 |

(1) See Chart 1

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 1 – Quad Mast Cylinder**

| Lift Height | | Index 0 Mast Cylinder Assembly | | Index 9 Ram | | Index 10 Cylinder | |
|---|---|---|---|---|---|---|---|
| mm | (in) | RH | LH | RH | LH | RH | LH |
| 6096 | (240) | 139877-203 | 139879-203 | 131796-203 | 131792-203 | 139878-203 | 139880-203 |
| 6248 | (246) | 139877-211 | 139879-211 | 131796-211 | 131792-211 | 139878-211 | 139880-211 |
| 6553 | (258) | 139877-218 | 139879-218 | 131796-218 | 131792-218 | 139878-218 | 139880-218 |
| 6705 | (264) | 139877-226 | 139879-226 | 131796-226 | 131792-226 | 139878-226 | 139880-226 |
| 7010 | (276) | 139877-233 | 139879-233 | 131796-233 | 131792-233 | 139878-233 | 139880-233 |

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# CYLINDER PARTS

## Carriage Cylinder - Quad

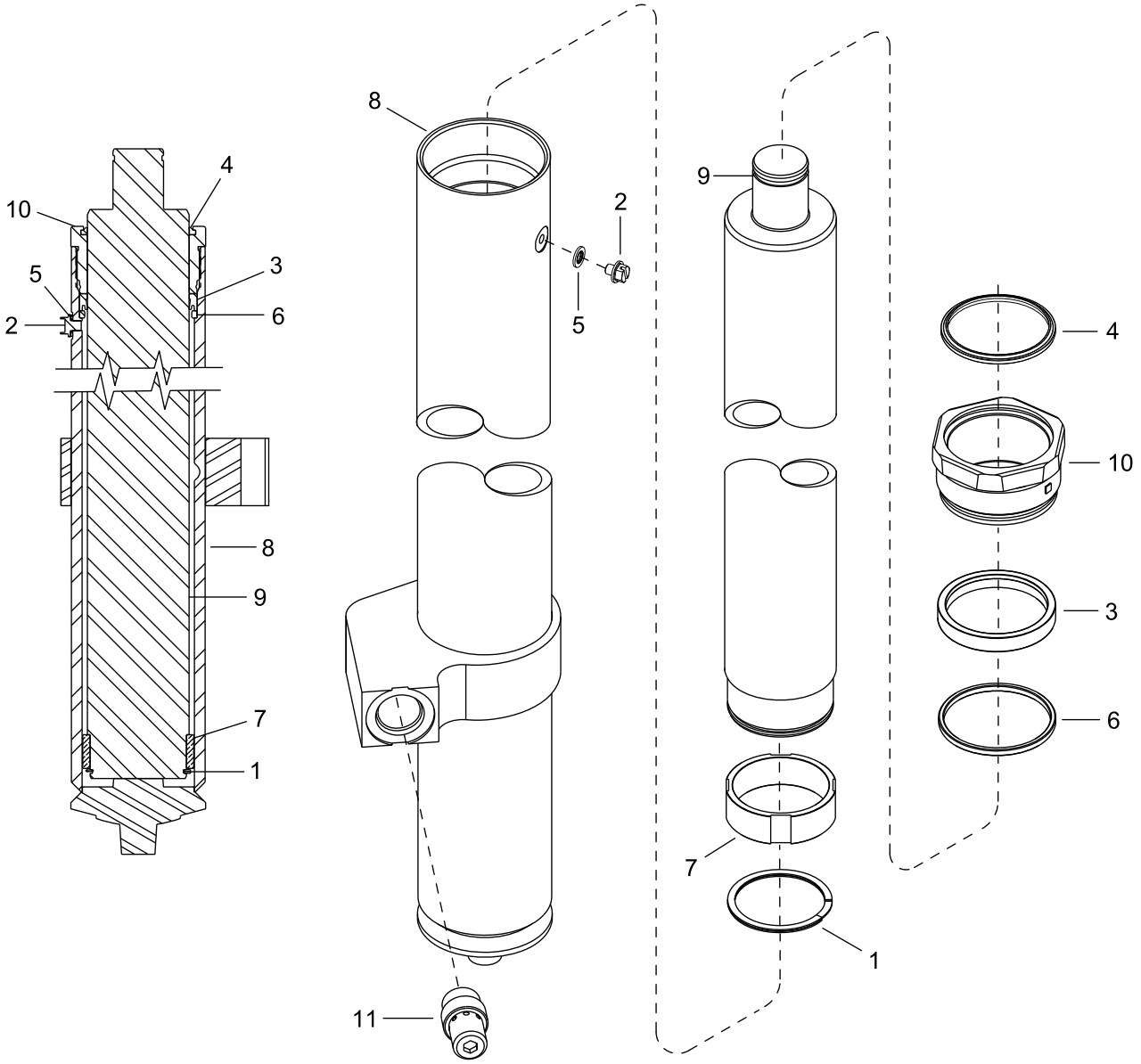



Figure 15300



Crown 2006 PF15592-1 Rev. 10/09

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | *(1) | Carriage Cylinder Assembly Quad | 1 |
| 1 | 060009-049 | Retaining Ring | 1 |
| 2 | 060015-078 | Screw | 1 |
| 3 | 064132-054 | Packing Rod | 1 |
| 4 | 064135-006 | Ring | 1 |
| 5 | 074240 | Seal | 1 |
| 6 | 081161-025 | Collar | 1 |
| 7 | 128185-035 | Bushing | 1 |
| 8 | *(1) | Cylinder | 1 |
| 9 | *(1) | Ram | 1 |
| 10 | 131844 | Cap | 1 |
| 11 | 131983-035 | Control Flow Valve | 1 |
| | 132630 | Seal Kit (Includes Index 2, 3, 4 & 5) | 1 |
| | 091240-020 | Poly Pak Packing Tool | 1 |

(1) See Chart 1

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 1 - Quad Carriage Cylinder**

| Lift Height | | Index 0 Carriage Cylinder Assembly | Index 8 Cylinder | Index 9 Ram |
|---|---|---|---|---|
| mm | in | | | |
| 4978 | 196 | 139872-196 | 131839-196 | 139873-196 |
| 6096 | 240 | 139872-203 | 131839-203 | 139873-203 |
| 6248 | 246 | 139872-211 | 131839-211 | 139873-211 |
| 6553 | 258 | 139872-218 | 131839-218 | 139873-218 |
| 6705 | 264 | 139872-226 | 131839-226 | 139873-226 |
| 7010 | 276 | 139872-233 | 131839-233 | 139873-233 |

**Always Specify Model, Data & Serial Number**

# CYLINDER PARTS

## Tilt Cylinder

(a) Part of Power Unit
(b) F Extended
(c) B Retracted

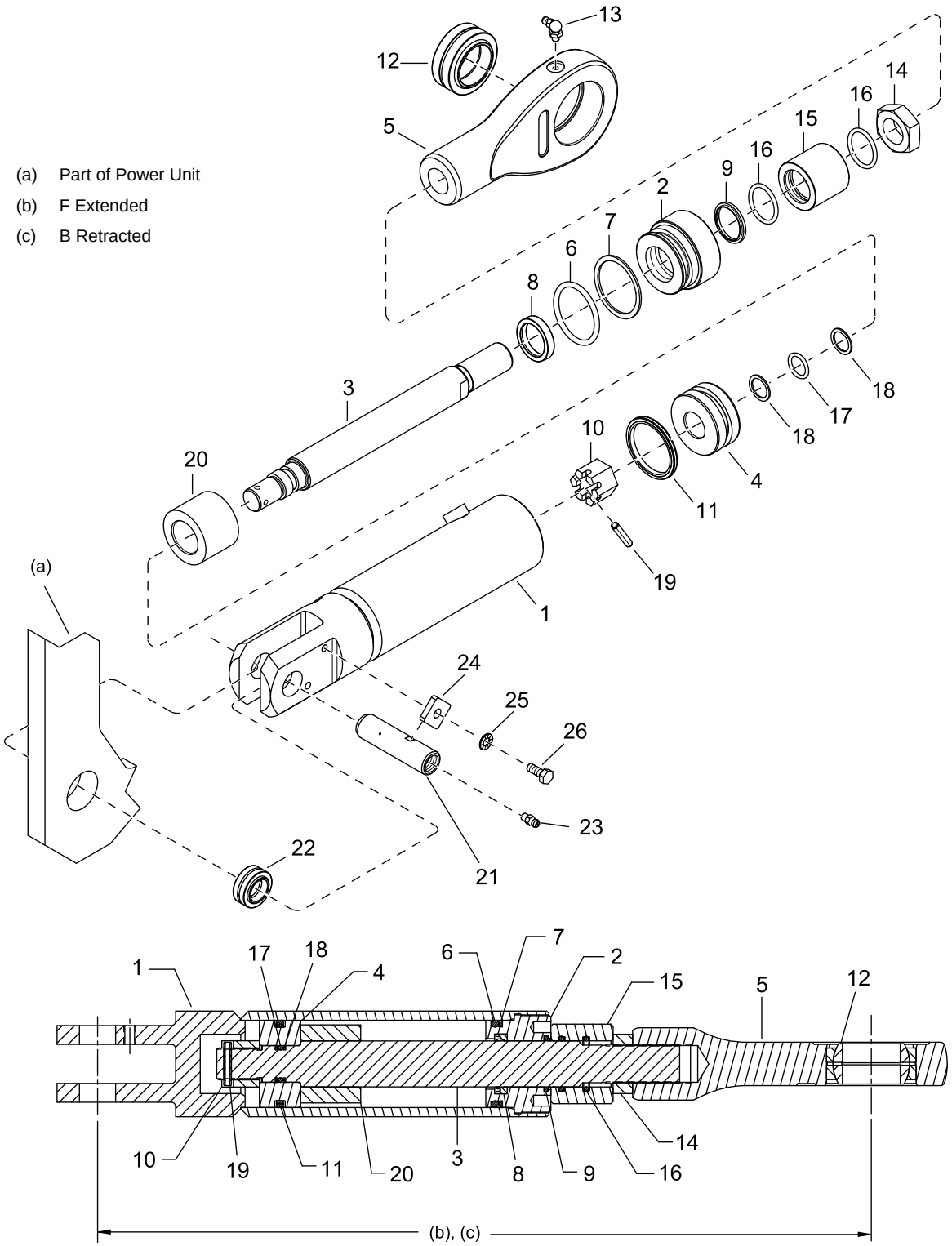



Figure 15301-02

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | *(1) | Tilt Cylinder Assembly (2) | 1 |
| 1 | 136590 | Cylinder | 1 |
| 2 | 136595-001 | Rod Guide | 1 |
| 3 | 136593 | Piston Rod | 1 |
| 4 | 136594 | Piston | 1 |
| 5 | 136597 | End Rod | 1 |
| 6 | 064019-113 | O-Ring | 1 |
| 7 | 064074-043 | Back-Up Ring | 1 |
| 8 | 064132-045 | Packing Rod | 1 |
| 9 | 064135-014 | Wiper Ring | 1 |
| 10 | 060059-059 | Nut | 1 |
| 11 | 064216-014 | Piston Seal | 1 |
| 12 | 065012-009 | Ball Bushing | 1 |
| 13 | 064332-002 | Lub Fitting | 1 |
| 14 | 060059-054 | Nut | 1 |
| 15 | *(1) | Spacer | 1 |
| 16 | 064019-084 | O-Ring | 2 |
| 17 | 064019-022 | O-Ring | 1 |
| 18 | 064074-001 | Back-Up Ring | 2 |
| 19 | 060106-005 | Roll Pin | 1 |
| 20 | *(1) | Spacer | 1 |
| 21 | 133986 | Pin | 1 |
| 22 | 065012-007 | Bushing | 1 |
| 23 | 064332-001 | Lub Fitting | 1 |
| 24 | 129481 | Block | 2 |
| | 129481 | Block (3) | 1 |
| 25 | 060089-005 | Wedge Washer | 2 |
| | 060089-005 | Wedge Washer (3) | 1 |
| 26 | 060063-011 | Bolt | 2 |
| | 060063-011 | Bolt (3) | 1 |
| | 140091 | Seal Kit (Includes Index 6-9, 11, 16-19) | 1 |

(1) See Chart 1 for TT Mast or Chart 2 for Quad Mast.

(2) Quantities listed are for one Tilt Cylinder Assembly.

(3) Trucks with Tilt Limit Switch Option

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Always Specify Model, Data & Serial Number**

# CYLINDER PARTS
## Tilt Cylinder

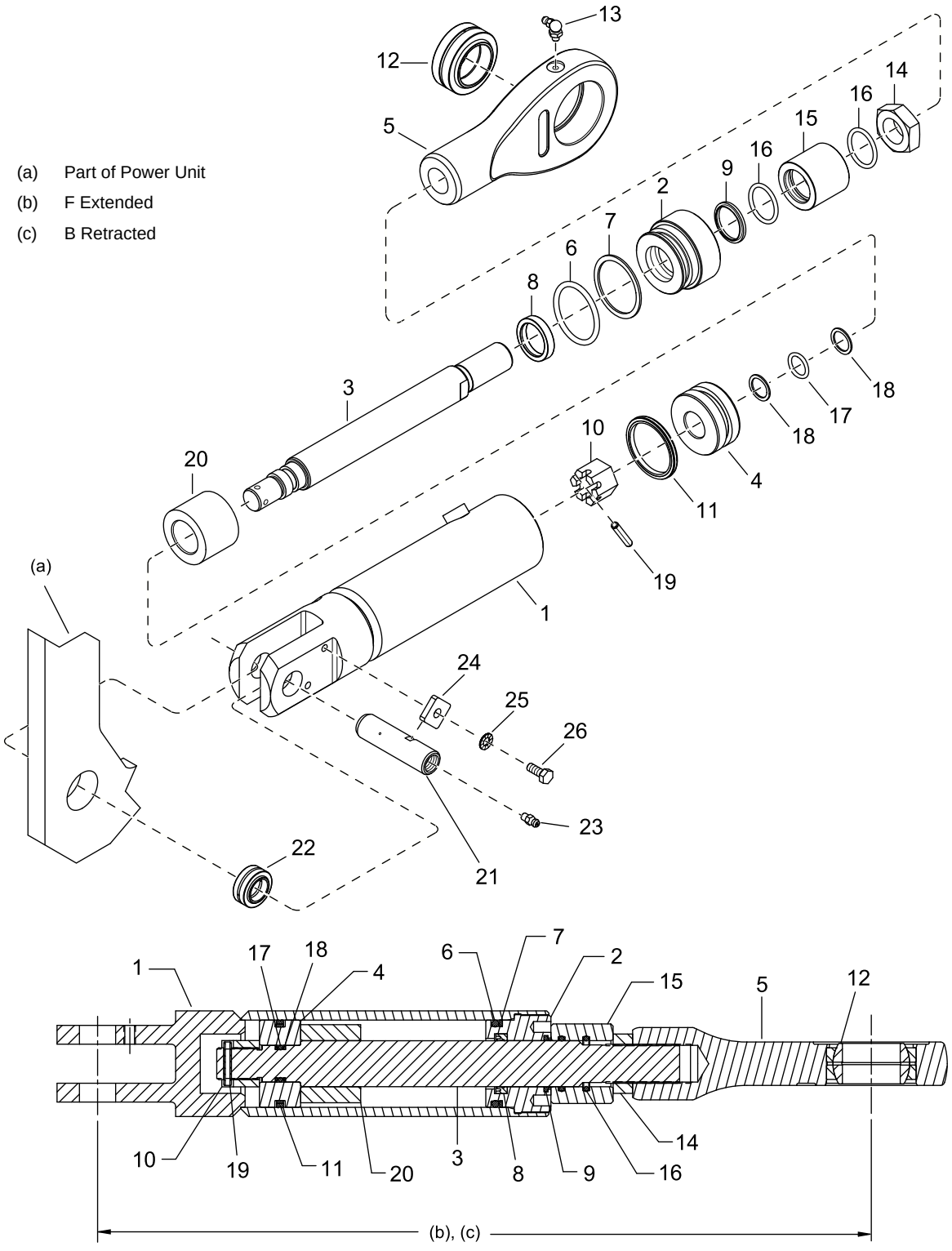



Figure 15301-02

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**INDEX PART NUMBER PART NAME NUMBER REQUIRED**

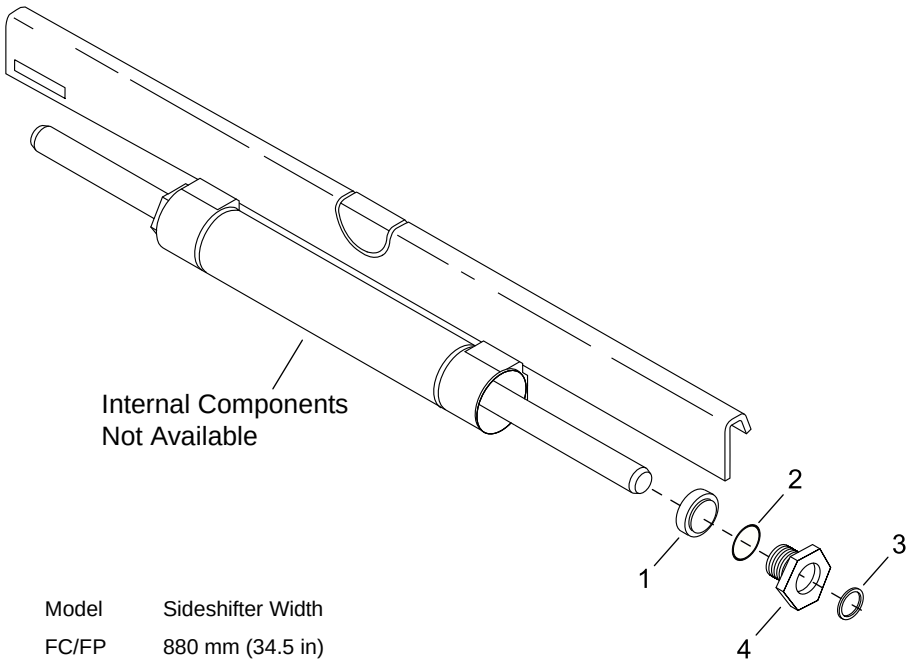
| Chart 1 – TT Mast Tilt Cylinder | | | | | | | |
|---|---|---|---|---|---|---|---|
| Forward Tilt Limit | Backward Tilt Limit | Lift Height mm (in) | Index 0 Tilt Cylinder Assembly | Index 15 Spacer | Index 20 Spacer | Extended Length “F” mm (in) | Retracted Length “B” mm (in) |
| 5° | 3° | 3911.6 (154) | 136589-053 | 138441-002 | 075684-051 | 621.4 (24.5) | 552.5 (21.8) |
| 5° | 5° | Greater than 3911.6 (154) | 136589-055 | 138441-001 | 075684-051 | 621.4 (24.5) | 534.9 (21) |
| 10° | 3° | 3911.6 (154) | 136589-103 | 138441-002 | None used | 662.9 (26.1) | 552.5 (21.8) |
| 10° | 5° | Greater than 3911.6 (154) | 136589-105 | 138441-001 | None used | 662.9 (26.1) | 534.9 (21) |

| Chart 2 – Quad Mast Tilt Cylinder | | | | | | | |
|---|---|---|---|---|---|---|---|
| Forward Tilt Limit | Backward Tilt Limit | Lift Height | Index 0 Tilt Cylinder Assembly | Index 15 Spacer | Index 20 Spacer | Extended Length “F” mm (in) | Retracted Length “B” mm (in) |
| 5° | 3° | All | 136589-053 | 138441-002 | 075684-051 | 621.4 (24.5) | 552.5 (21.8) |
| 10° | 3° | All | 136589-103 | 138441-002 | None used | 662.9 (26.1) | 552.5 (21.8) |

**Always Specify Model, Data & Serial Number**

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# CYLINDER PARTS
## Sideshifter Cylinder




| Model | Sideshifter Width |
|---|---|
| FC/FP | 880 mm (34.5 in) |
| FC/FP | 1120 mm (44.0 in) |
| FC 4000 | 965 mm (38.0 in) |
| FC 4000 | 1120 mm (44.0 in) |
| FC 4500 | 880 mm (34.5 in) |
| FC 4500 | 965 mm (38.0 in) |
| FC 4500 | 1120 mm (44.0 in) |
| RC 3000 | 880 mm (34.5 in) |
| RC 5500 | 880 mm (34.5 in) |
| RC 5500 | 965 mm (38.0 in) |
| SC | 880 mm (34.5 in) |
| SC 4000 | 880 mm (34.5 in) |
| SC 4200 | 965 mm (38.0 in) |
| SC 4500 | 880 mm (34.5 in) |

Figure 17319

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 126841-001 (1) | Sideshift Cylinder 880 and 965 mm (34.5 and 38 in) | 1 |
| | 126841-002 (2) | Sideshift Cylinder 1120 mm (44 in) | 1 |
| | 126841-003 (3) | Sideshift Cylinder 965 mm (38 in) | 1 |
| | 126841-004 (4) | Sideshift Cylinder 1120 mm (44 in) | 1 |
| 1 | 116865 | Rod Seal | 2 |
| 2 | | O-Ring 70 Duro | 2 |
| 3 | 116860 | Rod Wiper Seal | 2 |
| 4 | 126902 | Carrier Retainer Seal | 2 |
| | 126903 | Seal Kit | 1 |

(1) For 126466-001 880 and 965 mm (34.5 and 38 in) sideshifter assembly
(2) For 126466-002 1120 mm (44 in) sideshifter assembly
(3) For 136579-004 965 mm (38 in) sideshifter assembly
(4) For 136579-005 1120 mm (44 in) sideshifter assembly

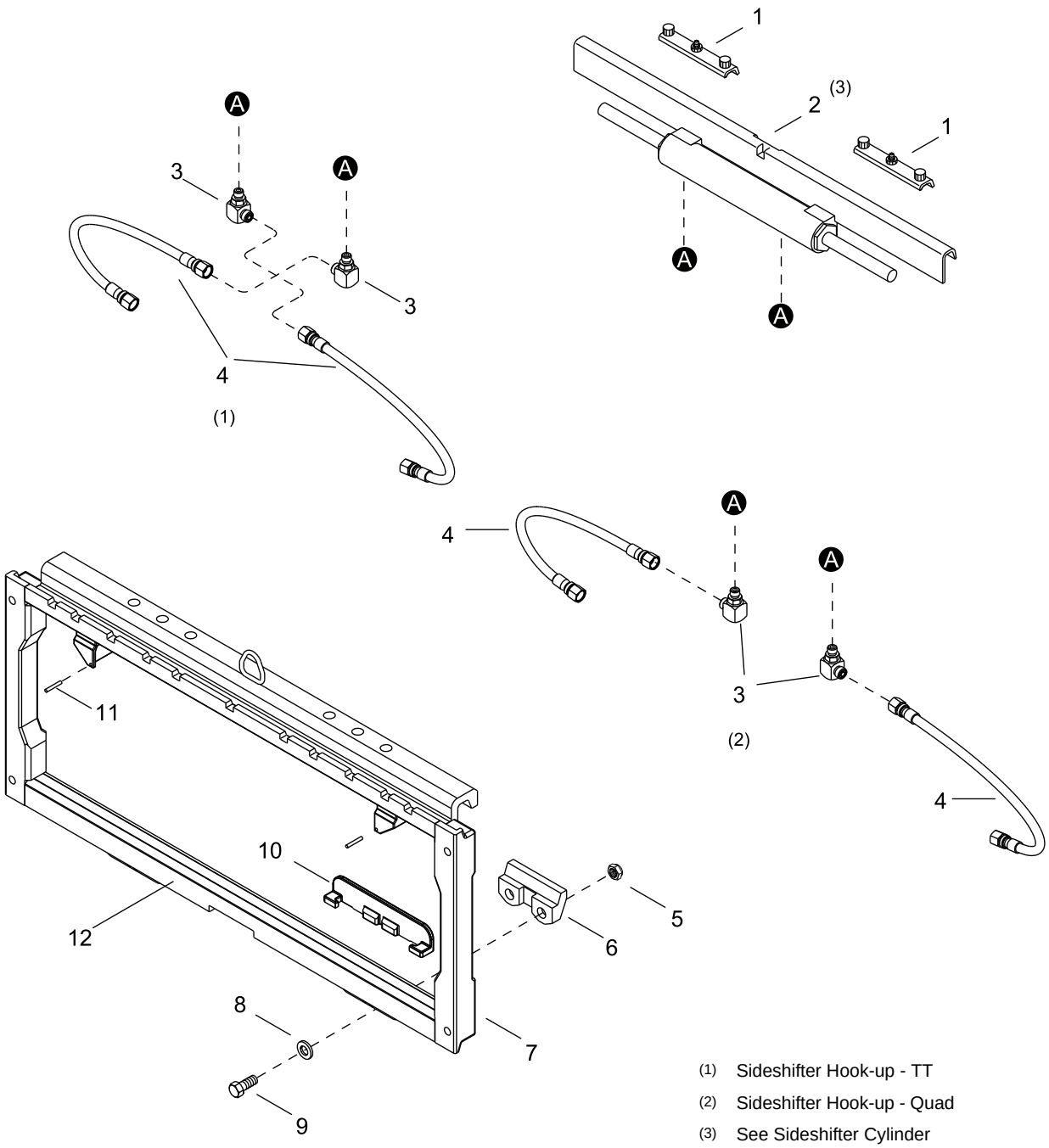
https://truckmanualshub.com/



## Notes:

https://truckmanualshub.com/

# PLATFORM PARTS




(1) Sideshifter Hook-up - TT

(2) Sideshifter Hook-up - Quad

(3) See Sideshifter Cylinder

Figure 15642

https://truckmanualshub.com/



| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 0 | 136579-001* | Sideshifter 880 mm (34.5 in) | 1 |
| | 136579-002* | Sideshifter 965 mm (38.0 in) | 1 |
| 1 | 131989 | Upper Bearing | 2 |
| 2 | 126841-001 | Sideshifter Cylinder | 1 |
| 3 | 064280-006 | 90° Adapter | 2 |
| 4 | 064337-003 | Hose Assembly | 2 |
| 5 | 094004 | Nut | 4 |
| 6 | 126843 | Lower Hook | 2 |
| 7 | 126844 | Fork Stop | 1 |
| 8 | 116876 | Flatwasher | 4 |
| 9 | 060020-019 | Capscrew | 4 |
| 10 | 131990 | Lower Bearing | 2 |
| 11 | 060000-020 | Roll Pin | 2 |
| 12 | | Faceplate (1) | 1 |

(1) Not serviceable, replace Sideshifter when Faceplate is needed.

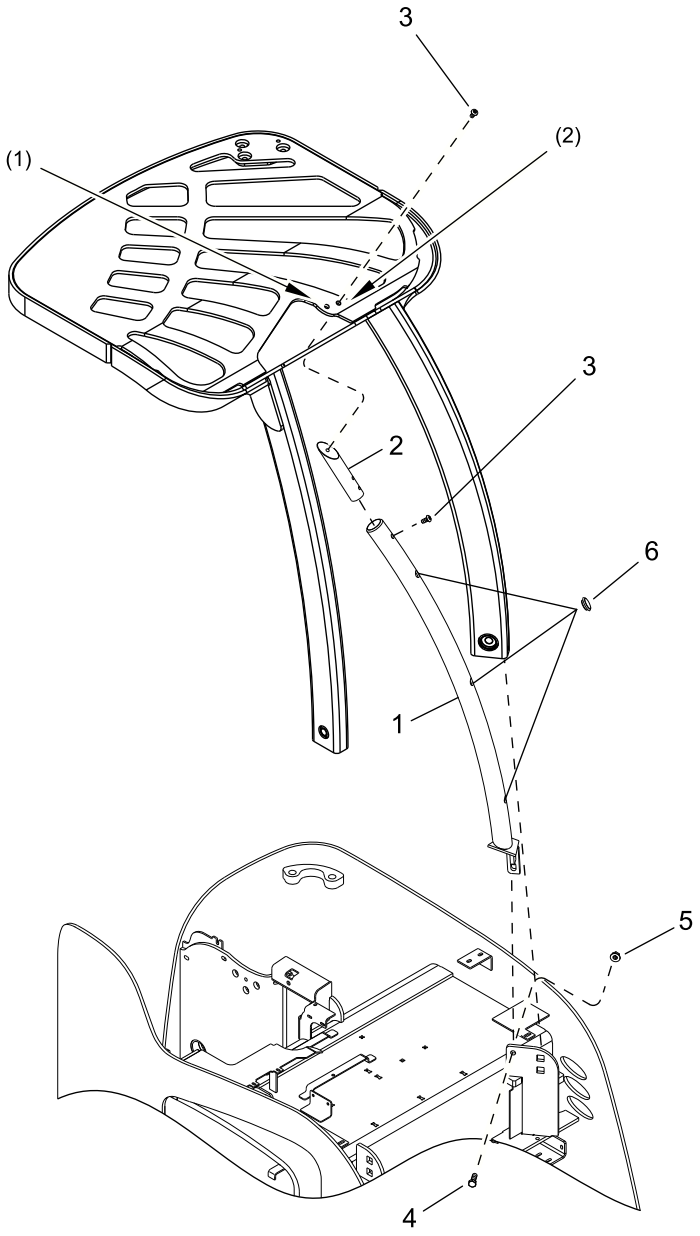
https://truckmanualshub.com/



## Notes:

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# LABELS AND DECALS




(1) Mounting Hole for Trucks with 2235 mm (88.0 in) Overhead Guard

(2) Mounting Hole for Trucks with 2146 mm (84.5 in) Overhead Guard

Figure 15729

https://truckmanualshub.com/


| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 141076-001 | Work Assist Tube Assembly With 2146 mm (84.5 in) Overhead Guard | 1 |
| | 141076-002 | Work Assist Tube Assembly With 2235 mm (88 in) Overhead Guard | 1 |
| 2 | 141063 | Adjustment Bar | 1 |
| 3 | 060075-040 | Screw | 2 |
| 4 | 060115-010 | Screw | 1 |
| 5 | 060059-010 | Nut | 1 |
| 6 | 107716-002 | Plug | AR |
| | 065004-050 | Grommet | AR |

**Always Specify Model, Data & Serial Number**

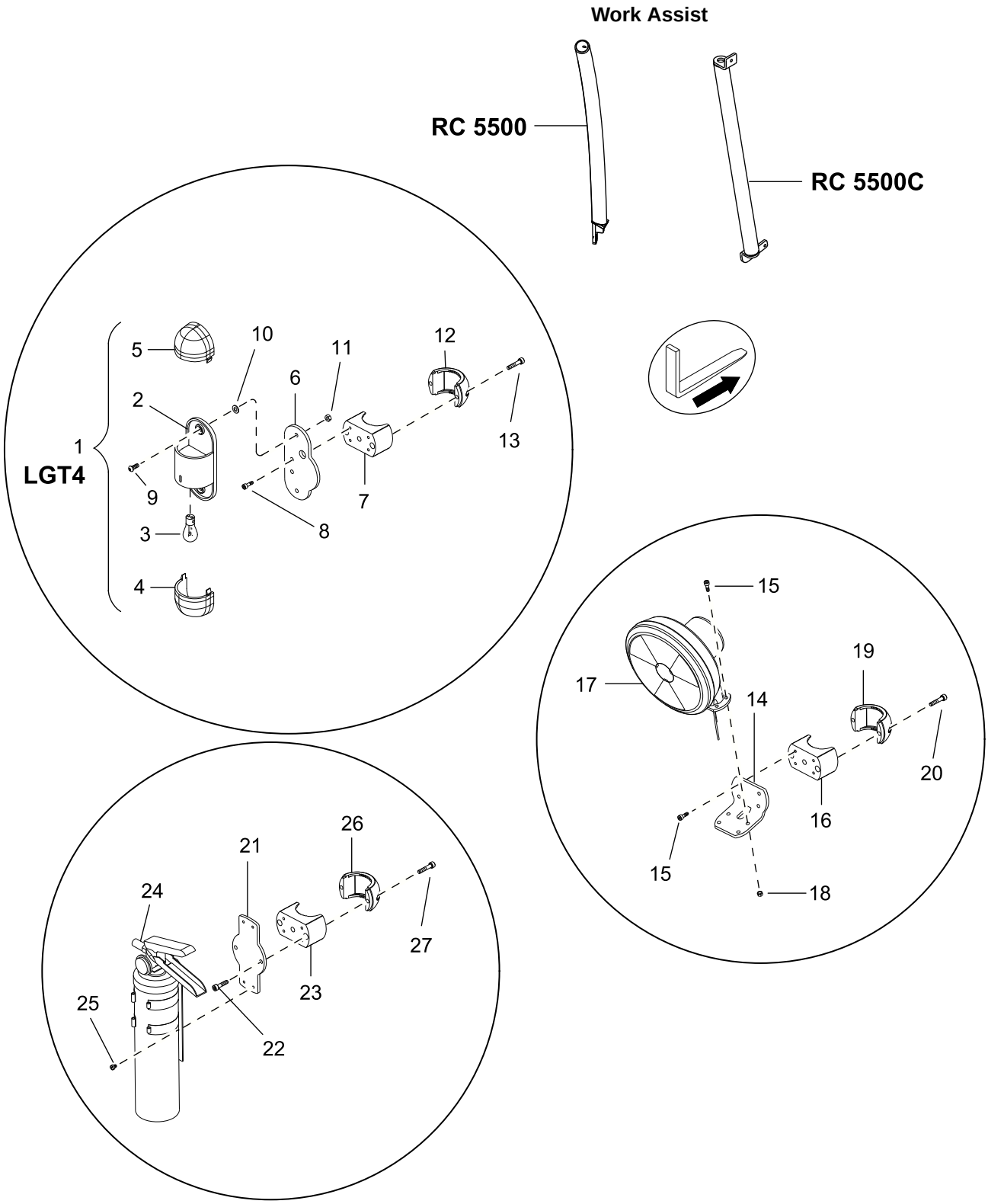



Figure 15731

https://truckmanualshub.com/


| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 123683 | Light | 1 |
| 2 | 123782 | Housing | 1 |
| 3 | 116364 | Bulb | 1 |
| 4 | 123781 | Clear Lens | 1 |
| 5 | 123783 | Black Lens | 1 |
| 6 | 139555 | Plate | 1 |
| 7 | 128362 | Upper Clamp | 1 |
| 8 | 060061-038 | Screw | 2 |
| 9 | 060062-027 | Screw | 2 |
| 10 | 060030-010 | Flatwasher | 2 |
| 11 | 060059-034 | Nut | 2 |
| 12 | 127697 | Lower Clamp | 1 |
| 13 | 060062-060 | Screw | 2 |
| 14 | 129286 | Fan Bracket | 1 |
| 15 | 060061-038 | Screw | 8 |
| 16 | 128362 | Upper Clamp | 1 |
| 17 | 127259-005 | 36 Volt Fan Without Switch (Shown) | 1 |
| | 137289 | Fan EE | 1 |
| 18 | 060059-064 | Nut | 4 |
| 19 | 127697 | Lower Clamp | 1 |
| 20 | 060062-060 | Screw | 2 |
| 21 | 129287 | Fire Extinguisher Bracket | 1 |
| 22 | 060062-013 | Screw | 2 |
| 23 | 128362 | Upper Clamp | 2 |
| 24 | 079528 | Fire Extinguisher | 1 |
| 25 | 060061-021 | Screw | 4 |
| 26 | 127697 | Lower Clamp | 2 |
| 27 | 060062-060 | Screw | 2 |

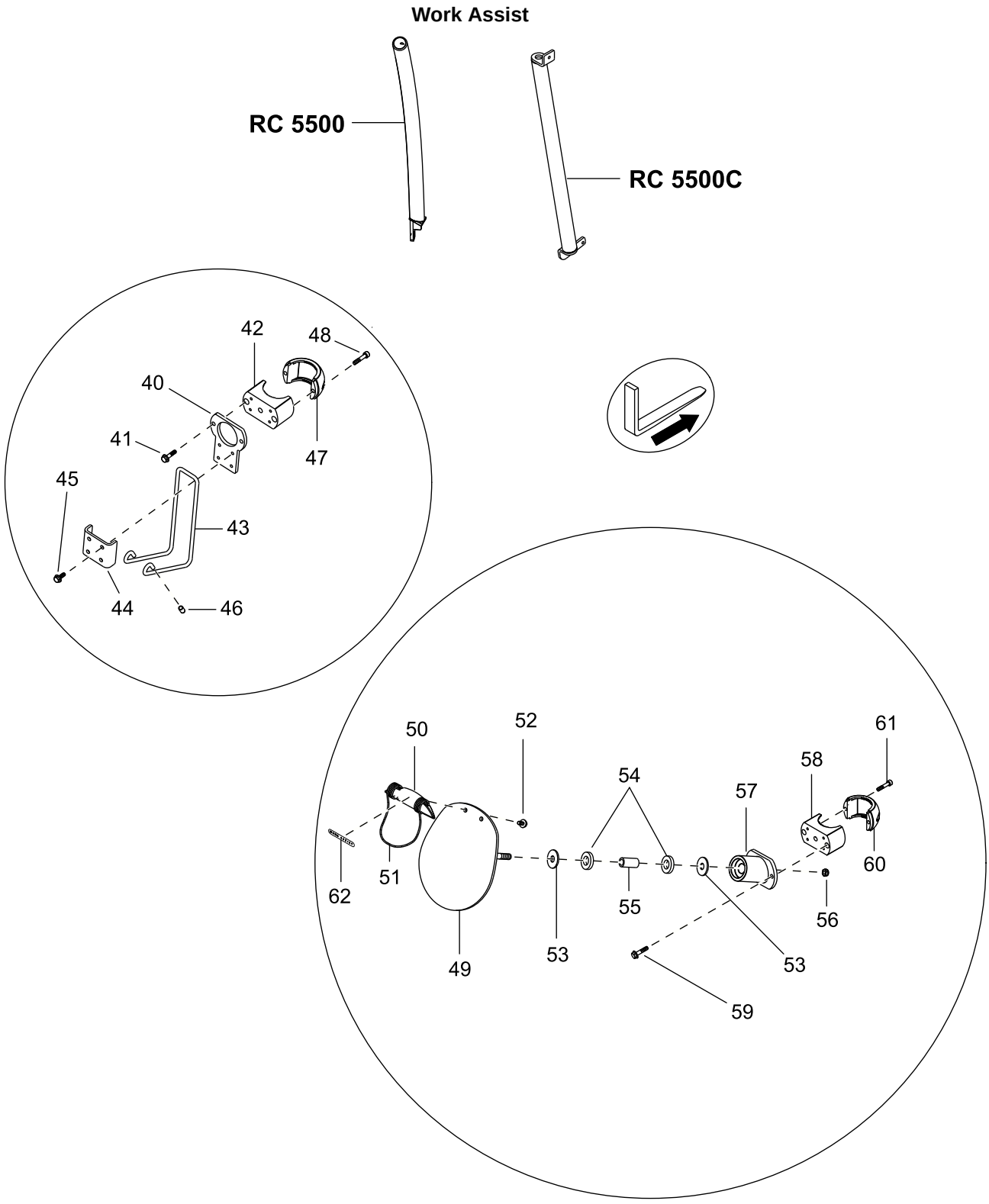



Figure 18437

https://truckmanualshub.com/


| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 40 | 130050-002 | Mounting Plate | 1 |
| 41 | 060062-038 | Screw | 1 |
| 42 | 128362 | Upper Clamp | 1 |
| 43 | 130071 | Wire Holder | 1 |
| 44 | 130060 | Clamp Bracket | 1 |
| 45 | 060062-040 | Screw | 4 |
| 46 | 130125 | Cap | 2 |
| 47 | 127697 | Lower Clamp | 1 |
| 48 | 060062-060 | Screw | 2 |
| 49 | 130008 | Clip Pad | 1 |
| 50 | 816658 | Housing | 1 |
| 51 | 814594 | Spring | 1 |
| 52 | 060062-003 | Screw | 2 |
| 53 | 060030-078 | Flatwasher | 2 |
| 54 | 130064 | Bushing | 2 |
| 55 | 090670-008 | Spacer | 1 |
| | 063002-020 | Lubricant | AR |
| 56 | 050008-034 | Nut | 1 |
| 57 | 131403 | Clip Pad Bracket | 1 |
| 58 | 128362 | Upper Clamp | 1 |
| 59 | 060062-038 | Screw | 2 |
| 60 | 127697 | Lower Clamp | 1 |
| 61 | 060062-060 | Screw | 2 |
| 62 | 069788 | Work Assist Label | 1 |

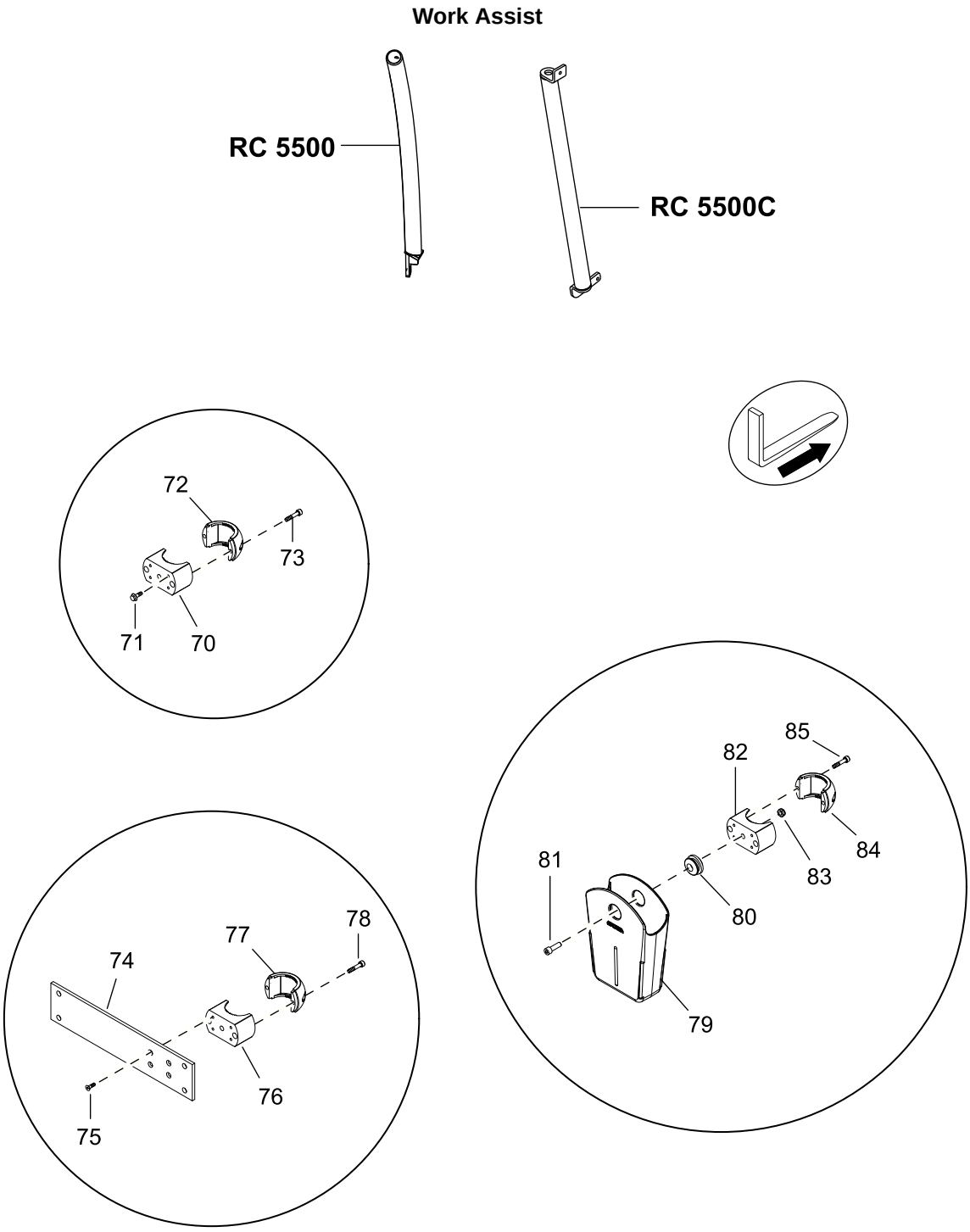
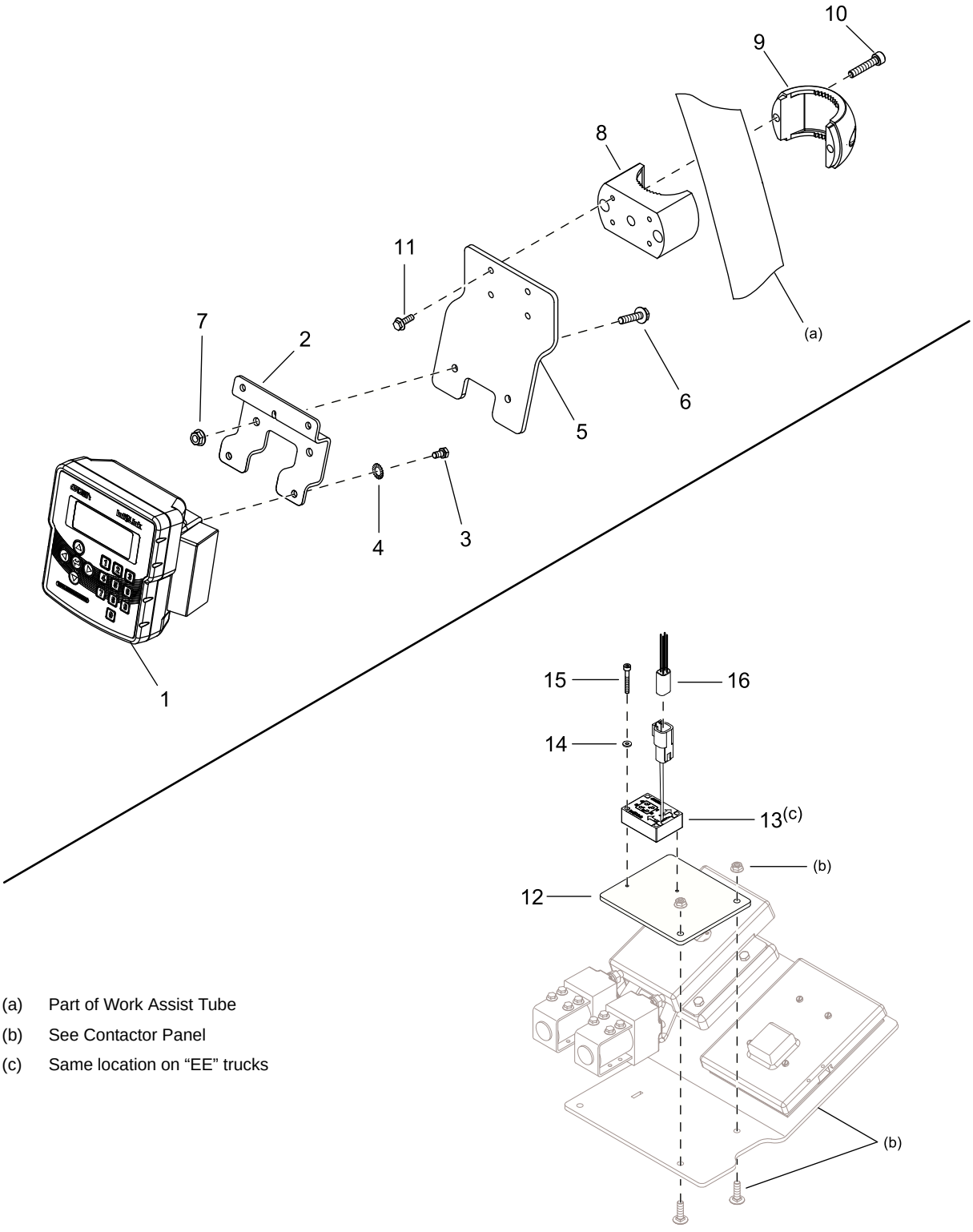



Figure 15736

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 70 | 128362 | Upper Clamp | 1 |
| 71 | 060061-022 | Screw | 4 |
| 72 | 127697 | Lower Clamp | 1 |
| 73 | 060062-060 | Screw | 2 |
| 74 | 131365 | Accessory Mounting Plate | 1 |
| 75 | 050003-014 | Screw | 4 |
| 76 | 128362 | Upper Clamp | 1 |
| 77 | 127697 | Lower Clamp | 1 |
| 78 | 060062-060 | Screw | 2 |
| 79 | 125502 | Storage Pocket | 1 |
| 80 | 125503-002 | Pocket Mount | 1 |
| 81 | 060016-069 | Screw | 1 |
| 82 | 128362 | Upper Clamp | 1 |
| 83 | 060042-010 | Nut | 1 |
| 84 | 127697 | Lower Clamp | 1 |
| 85 | 060062-060 | Screw | 2 |




(a) Part of Work Assist Tube

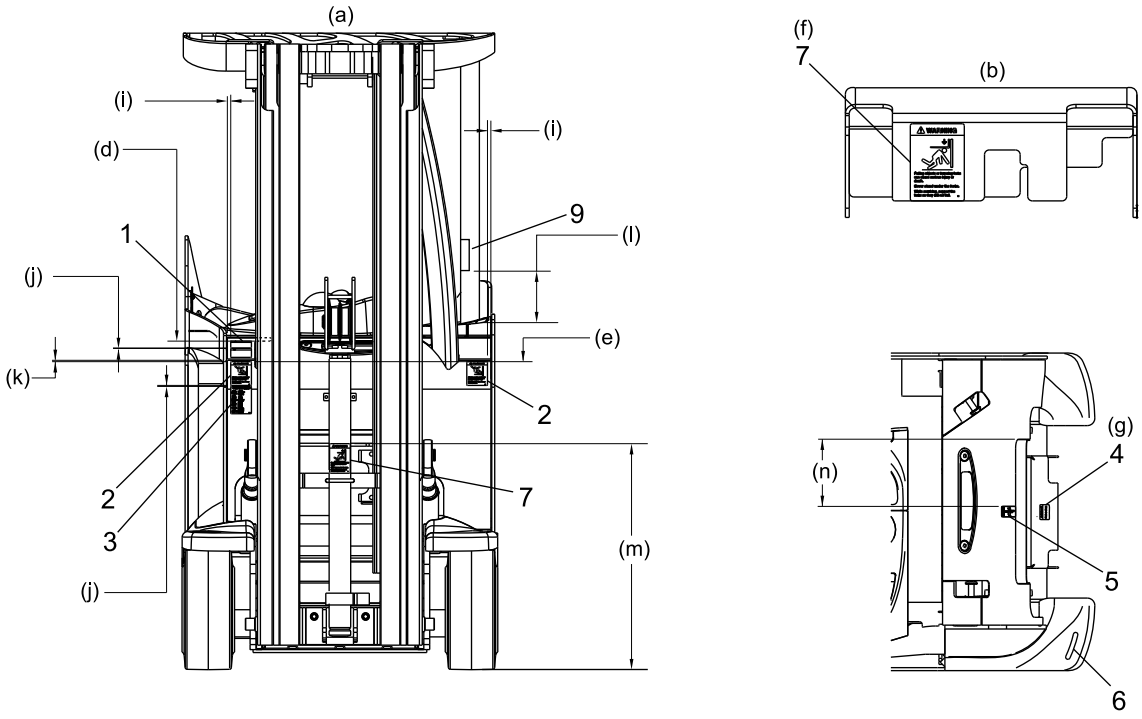
(b) See Contactor Panel

(c) Same location on “EE” trucks

Figure 22582

https://truckmanualshub.com/


| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 147253-001 | InfoLink Module w/Proximity Reader | 1 |
| | 062872 | Proximity Reader | 1 |
| | 340064 | Proximity Reader Cover | 1 |
| | 147253-002 | InfoLink Module w/o Proximity Reader | 1 |
| 2 | 139899 | Bracket | 1 |
| 3 | 060061-006 | Screw | 4 |
| 4 | 060005-005 | Lockwasher | 4 |
| 5 | 140245 | Bracket 15° | 1 |
| 6 | 060062-040 | Bolt | 2 |
| 7 | 060059-027 | Nut | 2 |
| 8 | 127697 | Lower Clamp | 1 |
| 9 | 128362 | Upper Clamp | 1 |
| 10 | 060062-060 | Screw | 2 |
| 11 | 060061-022 | Bolt | 4 |
| 12 | 141645 | Mounting Plate | 1 |
| 13 | 140382 | Impact Sensor Module | 1 |
| 14 | 060030-326 | Flatwasher | 2 |
| 15 | 060065-025 | Screw | 2 |
| 16 | 140557 | Impact Sensor Extension Harness | 1 |




(a) Front Cover
(b) Front of Manifold Cover
(c) Fan Duct
(d) Align with Edge Behind Pillar
(e) Align with Similar Label
(f) Centered
(g) Centered on Cover
(h) Align with Edge of Weldment
(i) 11.5 mm (0.45 in)
(j) 3.2 mm (0.13 in)
(k) 6 mm (0.24 in) From Edge
(l) 150 mm (5.91 in) From Edge
(m) 765 mm (30.12 in)
(n) 226 mm (8.9 in)
(o) 68.1 mm (2.68 in)

Figure 15759-01

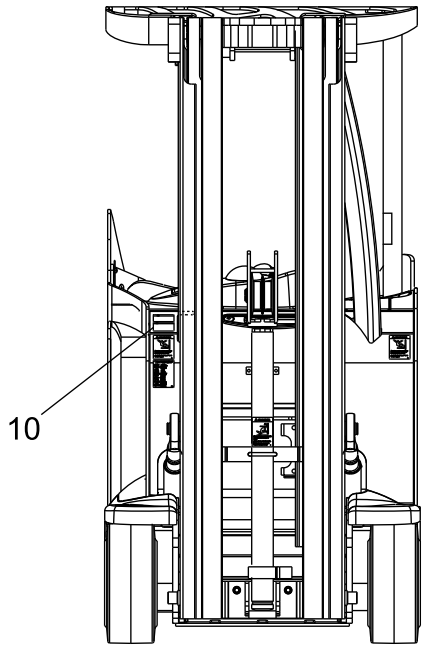
https://truckmanualshub.com/

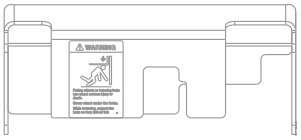

| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 1 | 069091 | Unsupported Load Warning | 1 |
| | 869091- (1) | Unsupported Load Warning | 1 |
| 2 | 069009 | Stand-On Warning | 1 |
| | 869009- (1) | Stand-On Warning | 1 |
| 3 | 069320-001 | Patent Label | 1 |
| 4 | 069611 | Not A Step Warning | 1 |
| | 869611- (1) | Not A Step Warning | 1 |
| 5 | 069006 | Hands Off Warning | 1 |
| | 869006- (1) | Hands Off Warning | 1 |
| 6 | 069624 | Flash Orange | 1 |
| 7 | 069010 | Stand Under Warning | 2 |
| | 869010- (1) | Stand Under Warning | 2 |
| 8 | 069699 | Cleanout Label | 1 |
| 9 | 069766 | Protect Yourself Warning | 1 |
| | 869766 (1) | Protect Yourself Warning | 1 |
| | 142297 | Warning Labels Kit (Includes Index 1, 2, 4, 5, 7, 9, 10, 21, 22, 31, 32, 44, 45, 60, 61 & PF16923 | 1 |
| | 142298 | Labels & Decals Kit (Includes Index 1, 2, 4, 5, 7, 9, 10, 15, 16, 20, 21, 31, 32, 34, 42, 45, 60, 61 & PF16923 | 1 |

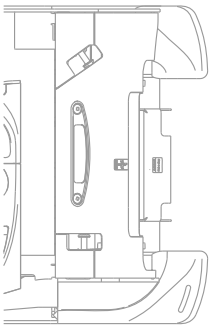
(1) Choice of dash number depends on Language. When ordering, refer to chart below and complete the part number with the correct dash number.

| Dash Number | Language |
|---|---|
| 001 | German |
| 002 | French |
| 003 | Spanish |
| 004 | Dutch |
| 005 | Italian |
| 006 | English |

**Always Specify Model, Data & Serial Number**





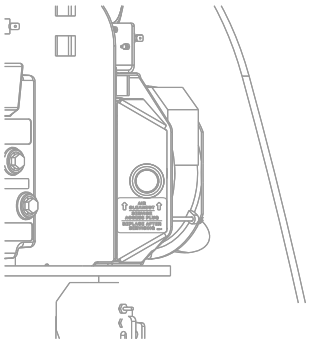


Figure 21064

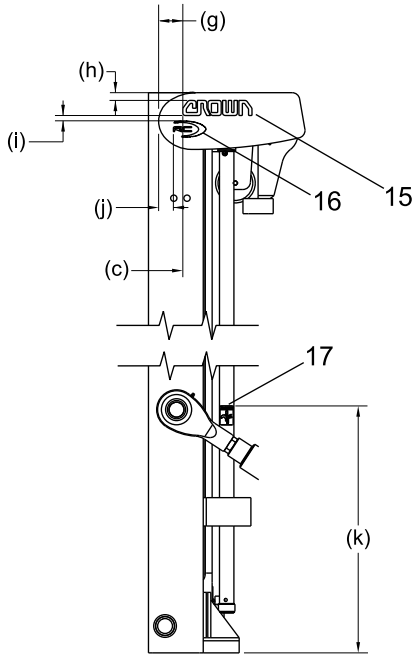
https://truckmanualshub.com/

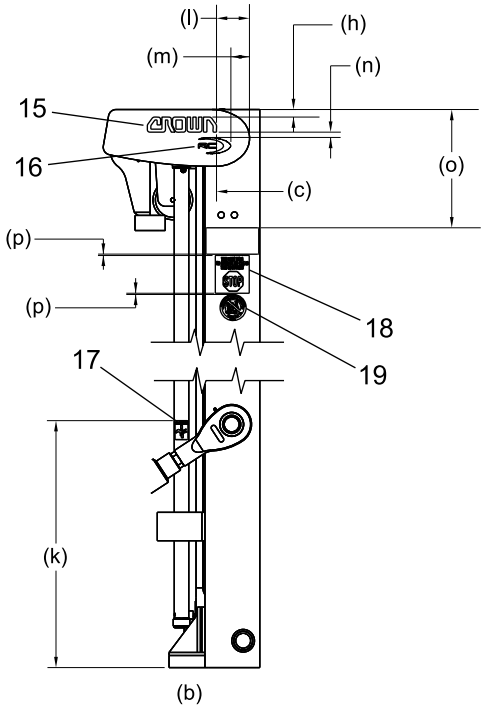

| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 10 | * | Battery Size Warning (See Chart 1) | 1 |

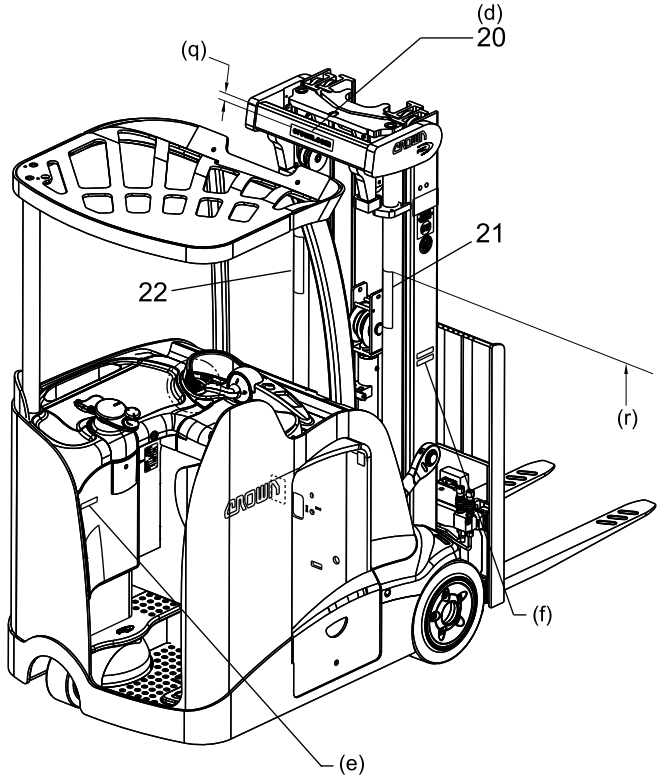
***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 1 - Item 10 - Battery Size Warning**

| Size | Code | Language | Part Number | Size | Code | Language | Part Number |
|---|---|---|---|---|---|---|---|
| B | 4 | English | 069112-116 | E | 2 | Spanish | 069112-121-03 |
| B | 4 | French | 069112-116-02 | E | 5 | English | 069112-122 |
| B | 4 | Spanish | 069112-116-03 | E | 5 | French | 069112-122-02 |
| C | 4 | English | 069112-117 | E | 5 | Spanish | 069112-122-03 |
| C | 4 | French | 069112-117-02 | B | 3 | English | 069112-123 |
| C | 4 | Spanish | 069112-117-03 | B | 3 | French | 069112-123-02 |
| D | 4 | English | 069112-118 | B | 3 | Spanish | 069112-123-03 |
| D | 4 | French | 069112-118-02 | C | 3 | English | 069112-124 |
| D | 4 | Spanish | 069112-118-03 | C | 3 | French | 069112-124-02 |
| E | 4 | English | 069112-119 | C | 3 | Spanish | 069112-124-03 |
| E | 4 | French | 069112-119-02 | D | 3 | English | 069112-125 |
| E | 4 | Spanish | 069112-119-03 | D | 3 | French | 069112-125-02 |
| E | 1 | English | 069112-120 | D | 3 | Spanish | 069112-125-03 |
| E | 1 | French | 069112-120-02 | E | 3 | English | 069112-126 |
| E | 1 | Spanish | 069112-120-03 | E | 3 | French | 069112-126-02 |
| E | 2 | English | 069112-121 | E | 3 | Spanish | 069112-126-03 |
| E | 2 | French | 069112-121-02 | | | | |




(a) Left Side Mast
(b) Right Side Mast
(c) Align
(d) Centered
(e) Serial Number Stamped in Power Unit
(f) Serial Number & Date Stamped in Mast
(g) 64 mm (2.52 in)
(h) 20 mm (0.79 in)
(i) 14 mm (0.55 in)
(j) 39 mm (1.54 in)
(k) 653 mm (25.71 in)
(l) 87 mm (3.43 in)
(m) 49 mm (1.93 in)
(n) 14 mm (0.55 in)
(o) 313 mm (12.31 in)
(p) 3.2 mm (0.13 in)
(q) 30 mm (1.18 in)
(r) 2 x 1524 mm (60.0 in) From Floor

Figure 15760-01

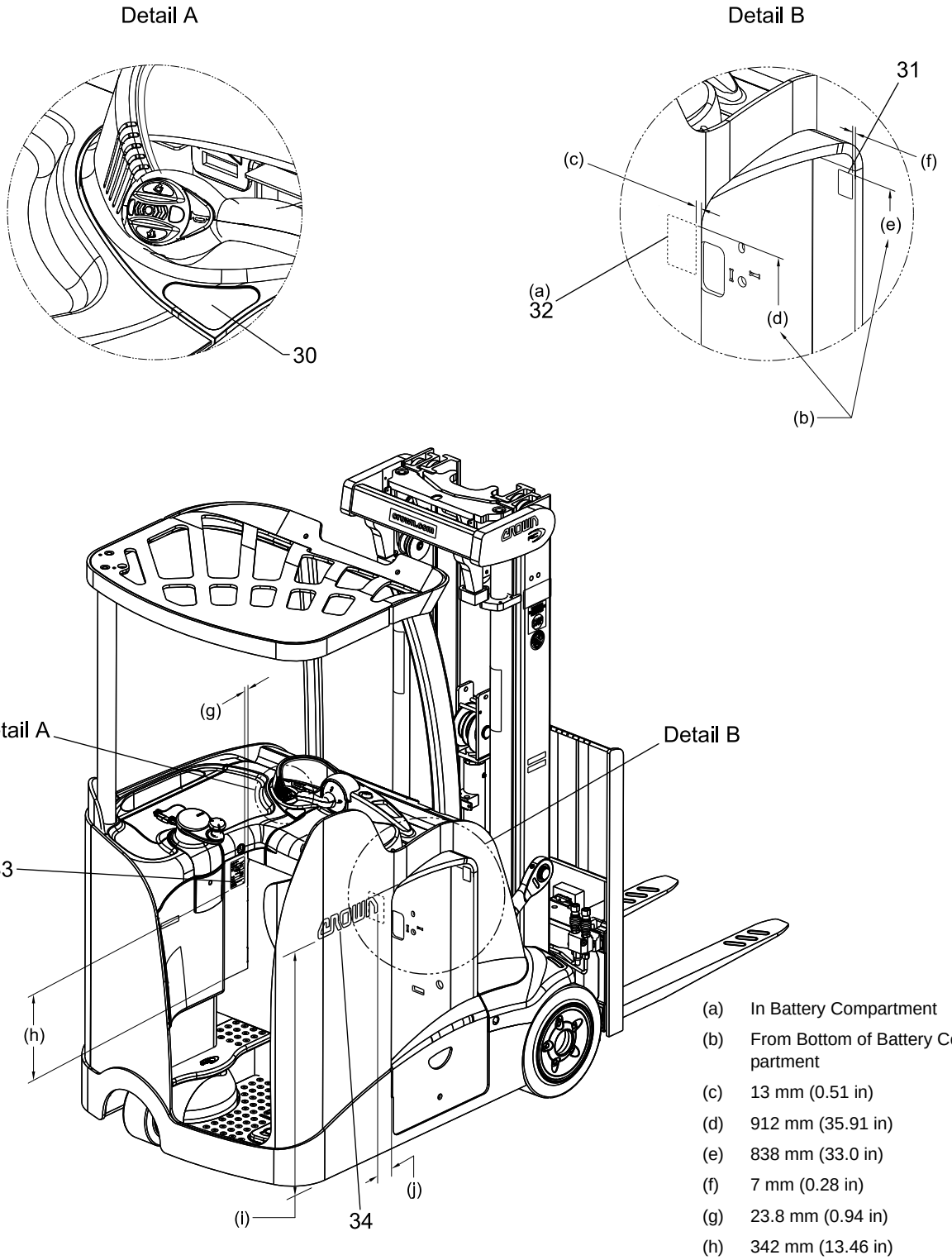
https://truckmanualshub.com/


| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 15 | 106158-022 | Crown Heavy Decal | 2 |
| 16 | 069372-016 | Momentum RC Decal | 2 |
| 17 | 069006 | Hands Off Warning | 2 |
| | 869006- (1) | Hands Off Warning | 2 |
| 18 | 069598 | Under 18 Stop Label | 1 |
| 19 | 069599 | Under 18 Law Label | 1 |
| 20 | 069374-001 | Crown.com Decal | 1 |
| 21 | 069627 | Operator Warning | 1 |
| | 069627-102 | Operator Warning (French ANSI) | 1 |
| | 069627-103 | Operator Warning (Spanish ANSI) | 1 |
| | 869627- (1) | Operator Warning | 1 |
| 22 | 069655 | Operator Warning | 1 |
| | 069655-102 | Operator Warning (French ANSI) | 1 |
| | 069655-103 | Operator Warning (Spanish ANSI) | 1 |
| | 869655- (1) | Operator Warning | 1 |

(1) Choice of dash number depends on Language. When ordering, refer to chart below and complete the part number with the correct dash number.

| Dash Number | Language |
|---|---|
| 001 | German |
| 002 | French |
| 003 | Spanish |
| 004 | Dutch |
| 005 | Italian |
| 006 | English |

**Always Specify Model, Data & Serial Number**




(a) In Battery Compartment
(b) From Bottom of Battery Compartment
(c) 13 mm (0.51 in)
(d) 912 mm (35.91 in)
(e) 838 mm (33.0 in)
(f) 7 mm (0.28 in)
(g) 23.8 mm (0.94 in)
(h) 342 mm (13.46 in)
(i) 879 mm (34.61 in)
(j) 72 mm (2.83 in)

Figure 15762-01

https://truckmanualshub.com/

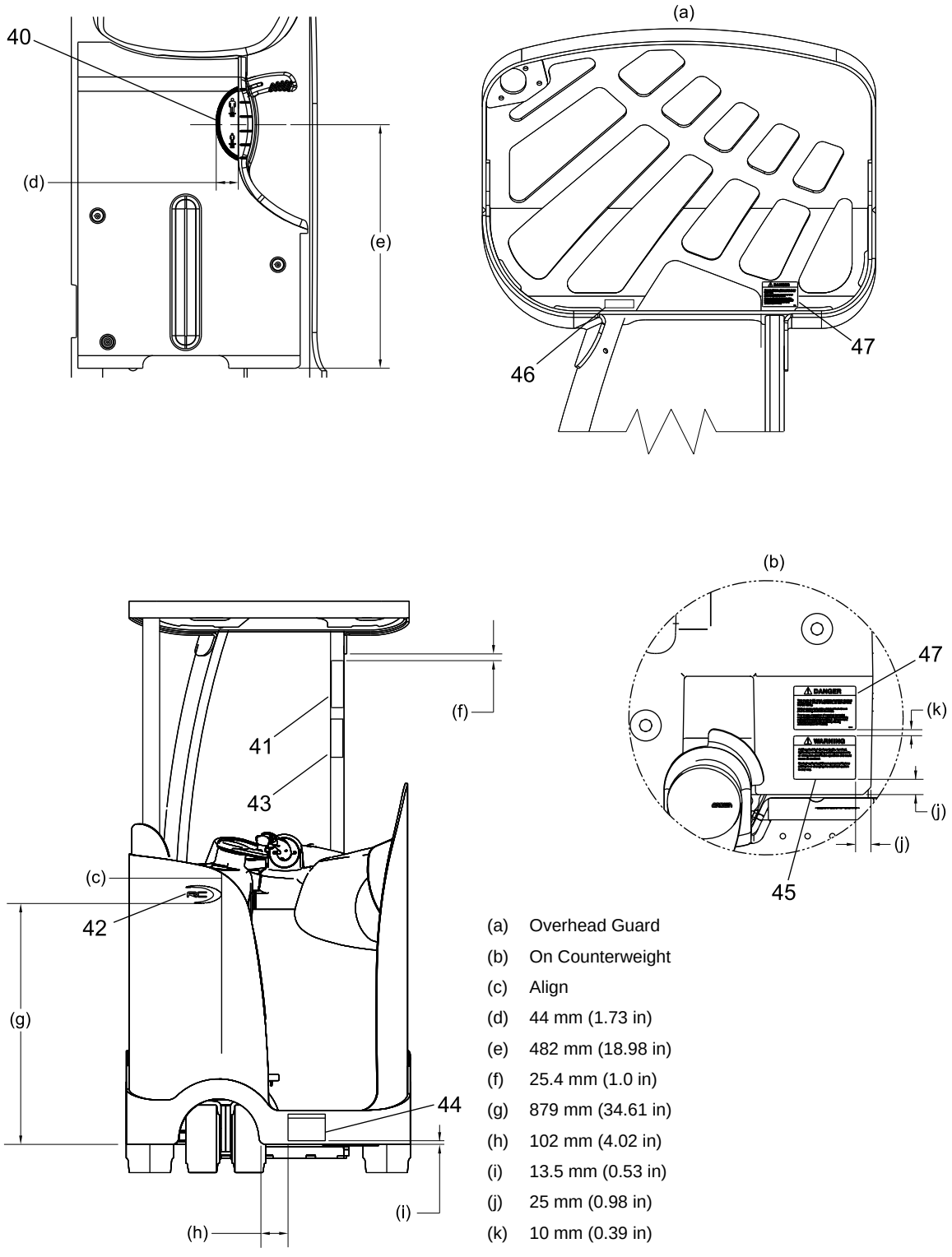

| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 30 | 069651 | TPA Label | 1 |
| | 069652 | Fifth Function Adjustment Label | 1 |
| | 069690 | Fifth Function Slipsheet Label | 1 |
| | 069691 | Fifth Function Swing Frame Label | 1 |
| 31 | 069047 | Charger Hook-Up Caution | 1 |
| | 869047- (1) | Charger Hook-Up Caution | 1 |
| 32 | 069107 | Battery Danger | 1 |
| | 869107- (1) | Battery Danger | 1 |
| 33 | | Data Plate (2) | 1 |
| 34 | 106158-001 | Crown Heavy Decal | 1 |

(1) Choice of dash number depends on Language. When ordering, refer to chart below and complete the part number with the correct dash number.

(2) Contact Factory

| Dash Number | Language |
|---|---|
| 001 | German |
| 002 | French |
| 003 | Spanish |
| 004 | Dutch |
| 005 | Italian |
| 006 | English |

**Always Specify Model, Data & Serial Number**




(a) Overhead Guard
(b) On Counterweight
(c) Align
(d) 44 mm (1.73 in)
(e) 482 mm (18.98 in)
(f) 25.4 mm (1.0 in)
(g) 879 mm (34.61 in)
(h) 102 mm (4.02 in)
(i) 13.5 mm (0.53 in)
(j) 25 mm (0.98 in)
(k) 10 mm (0.39 in)

Figure 15763-01

https://truckmanualshub.com/

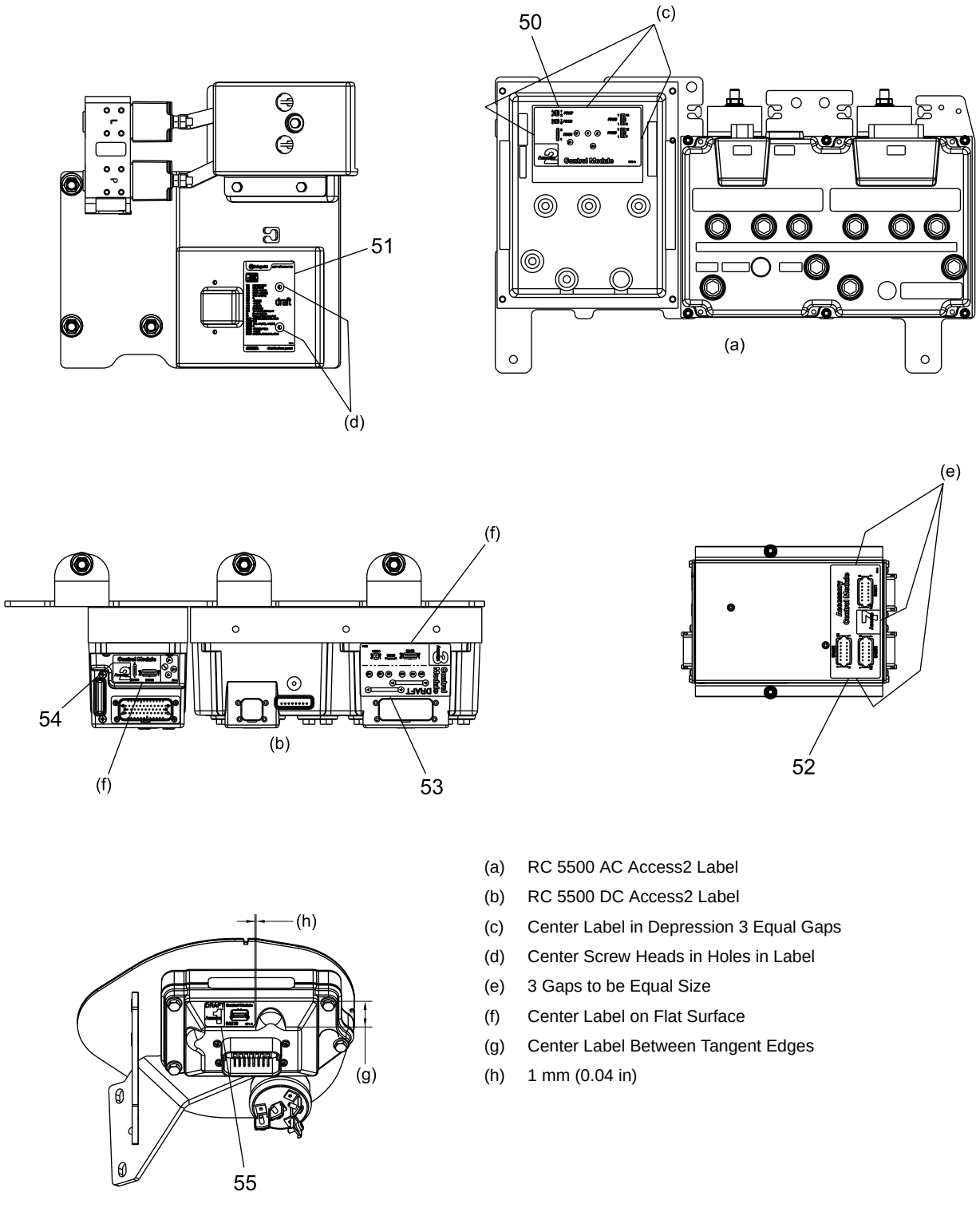


| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 40 | 068788 | FlexRide Suspension | 1 |
| 41 | | Capacity Plate (2) | 1 |
| 42 | 069372-015 | Momentum RC Decal | 1 |
| 43 | | Capacity Plate (2) | 1 |
| 44 | 069650 | Brakes Applied Caution | 1 |
| 45 | 069012 | Electrical Addition Warning | 1 |
| | 869012- (1) | Electrical Addition Warning | 1 |
| 46 | 069111 | UL Label | 1 |
| 47 | 069841 | Electrical Addition Danger Label | 2 |

(1) Choice of dash number depends on Language. When ordering, refer to chart below and complete the part number with the correct dash number.

(2) Contact Factory

| Dash Number | Language |
|---|---|
| 001 | German |
| 002 | French |
| 003 | Spanish |
| 004 | Dutch |
| 005 | Italian |
| 006 | English |




(a) RC 5500 AC Access2 Label
(b) RC 5500 DC Access2 Label
(c) Center Label in Depression 3 Equal Gaps
(d) Center Screw Heads in Holes in Label
(e) 3 Gaps to be Equal Size
(f) Center Label on Flat Surface
(g) Center Label Between Tangent Edges
(h) 1 mm (0.04 in)

Figure 15768-01

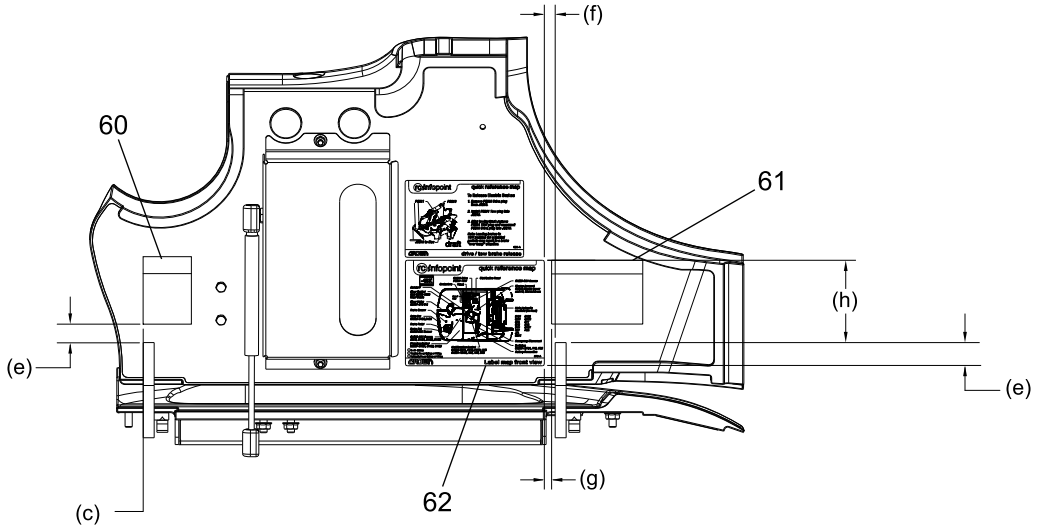

Crown 2007 PF15668-11 Rev. 12/08

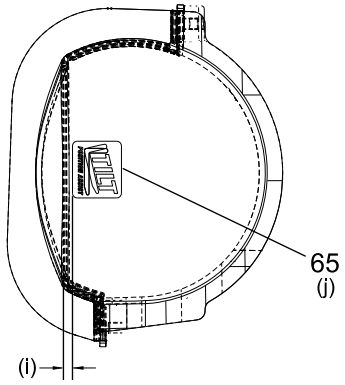
https://truckmanualshub.com/

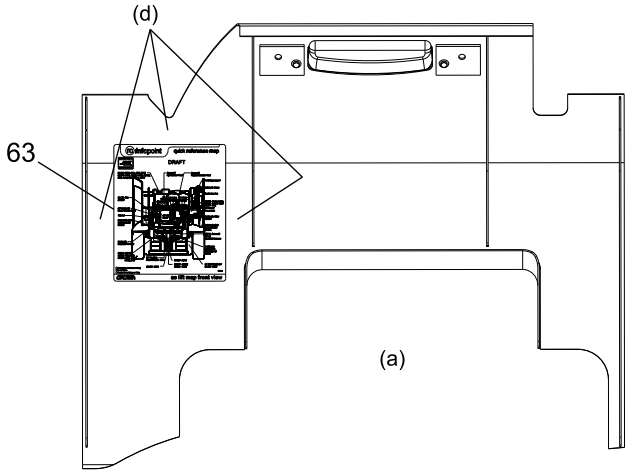

| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 50 | 069672 (1) | Access 2 Label | 1 |
| 51 | 069675 | Distribution Label | 1 |
| 52 | 069674 | Access 7 Label | 1 |
| 53 | 069623 | Access 3 Label | 1 |
| 54 | 069673 (2) | Access 2 Label | 1 |
| 55 | 069671 | Access 1 Label | 1 |

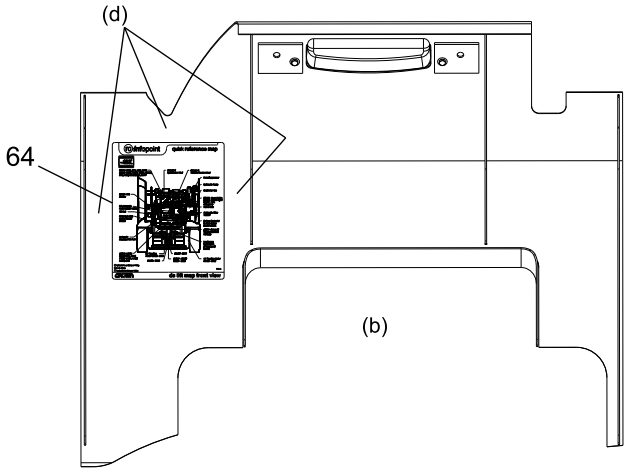
(1) AC Lift
(2) DC Lift

**Always Specify Model, Data & Serial Number**




(a) AC Lift Map Label RC 5500 Front Cover
(b) DC Lift Map Label RC 5500 Front Cover
(c) Align
(d) Gaps to be Equal Size
(e) Centered Between Right and Left Sides of Housing
(f) 25.4 mm (1.0 in)
(g) 12 mm (0.47 in)
(h) 8 mm (0.31 in)
(i) 90 mm (3.54 in)
(j) 4.8 mm (0.19 in)

Figure 15769-01

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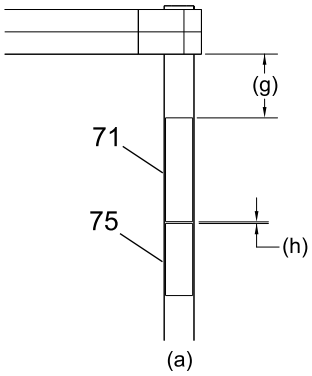

| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 60 | 069744 | 3rd Post Warning | 1 |
| | 069744-102 | 3rd Post Warning | 1 |
| | 069744-103 | 3rd Post Warning | 1 |
| | 869744 (1) | 3rd Post Warning | 1 |
| 61 | 069710 | Tow Plug Warning | 1 |
| 62 | 069676 | Power Unit/Drive Label | 1 |
| | 069676-001 | Power Unit/Drive Label | 1 |
| | 069676-002 | Power Unit/Drive Label | 1 |
| | 869676 (1) | Power Unit/Drive Label | 1 |
| 63 | 069677 (2) | Front View Map Label | 1 |
| | 869677 (1) (2) | Front View Map Label | 1 |
| 64 | 069700 (3) | Front View Map Label | 1 |
| | 869700 (1) (3) | Front View Map Label | 1 |
| 65 | 069863 | Tilt Position Assist Label | 1 |

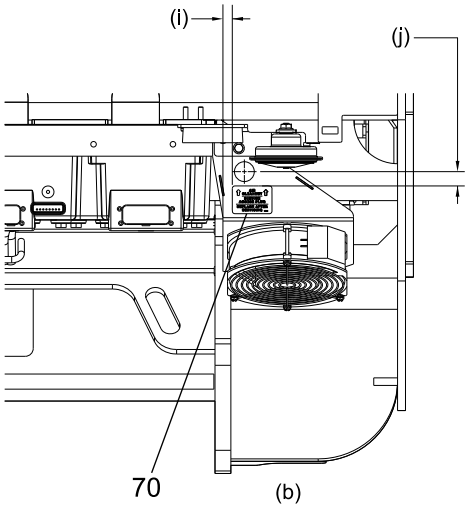
(1) Choice of dash number depends on Language. When ordering, refer to chart below and complete the part number with the correct dash number.

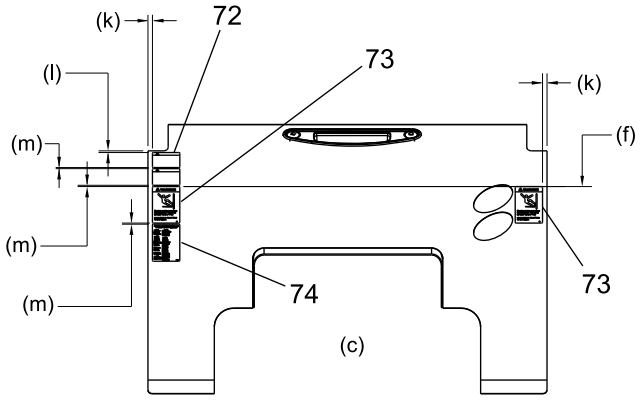
(2) AC Lift

(3) DC Lift

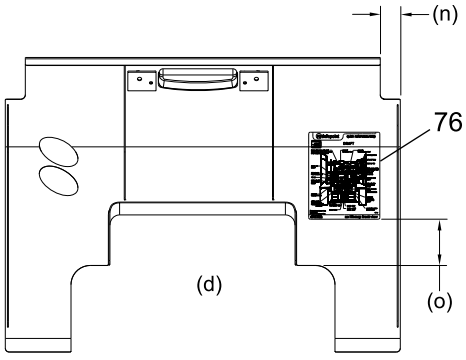
| Dash Number | Language |
|---|---|
| 001 | German |
| 002 | French |
| 003 | Spanish |
| 004 | Dutch |
| 005 | Italian |
| 006 | English |




(a) RC 5500C Over Head Guard RH Pillar
(b) RC 5500C Fan Duct
(c) RC 5500C Front Cover
(d) DC Lift Map Label RC 5500C Front Cover
(e) AC Lift Map Label RC 5500C Front Cover
(f) Align With Similar Label
(g) 108.5 mm (4.27 in)
(h) 3 mm (0.12 in)
(i) 12 mm (0.47 in)
(j) 18 mm (0.77 in)
(k) 11.5 mm (0.45 in)
(l) 6 mm (0.24 in)
(m) 3.2 mm (0.13 in)
(n) 45 mm (1.77 in)
(o) 120 mm (4.72 in)



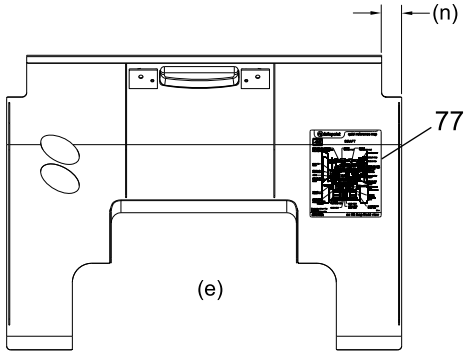




Figure 15774-01

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 70 | 069699 | Cleanout Label | 1 |
| 71 | | Capacity Plate (2) | 1 |
| | 869571- (1) | Protect Yourself Warning | 1 |
| 72 | 069091 | Unsupported Load Warning | 1 |
| | 869091- (1) | Unsupported Load Warning | 1 |
| 73 | 069009 | Stand On Warning | 1 |
| | 869009- (1) | Stand On Warning | 1 |
| 74 | 069320-001 | Patent Label | 1 |
| 75 | | Capacity Plate (2) | 1 |
| 76 | 069677 (4) | Front View Map Label | 1 |
| 77 | 069700 (3) | Front View Map Label | 1 |

(1) Choice of dash number depends on Language. When ordering, refer to chart below and complete the part number with the correct dash number.

(2) Contact Factory

(3) AC Lift

(4) DC Lift

| Dash Number | Language |
|---|---|
| 001 | German |
| 002 | French |
| 003 | Spanish |
| 004 | Dutch |
| 005 | Italian |
| 006 | English |

**Always Specify Model, Data & Serial Number**

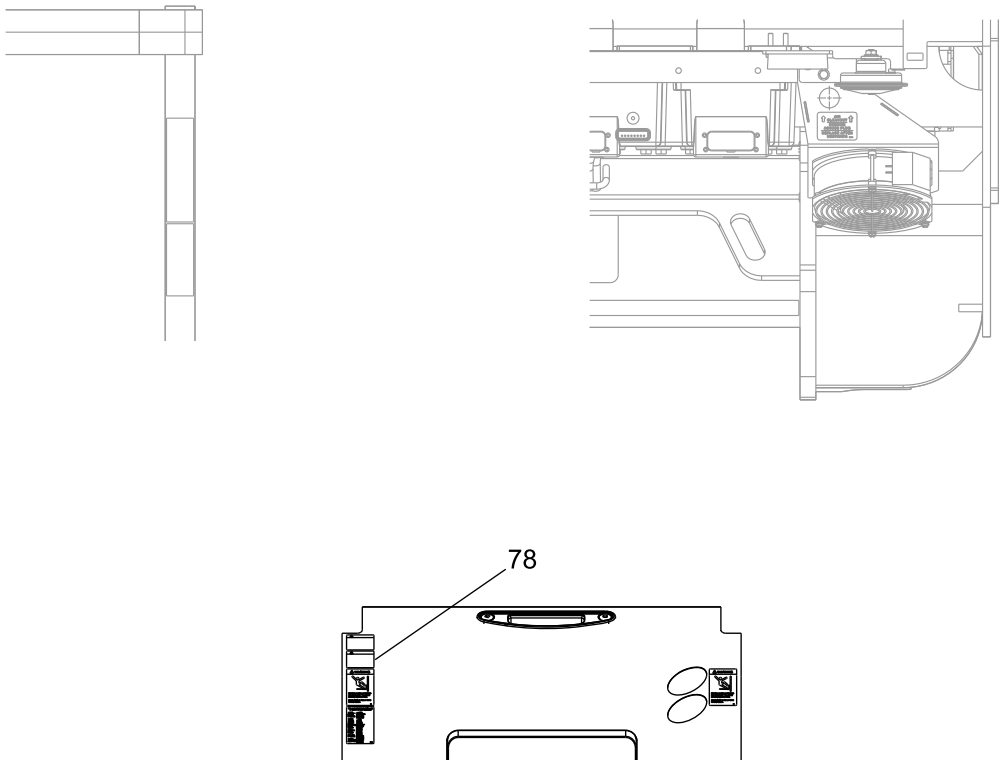



Figure 21069

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| INDEX | PART NUMBER | PART NAME | NUMBER REQUIRED |
|---|---|---|---|
| 78 | * | Battery Warning Size (See Chart 2) | 1 |

***** To select appropriate part number, use the data number to determine truck features. Refer to Introduction.

**Chart 2 - Item 78 - Battery Size Warning**

| Size | Code | Language | Part Number | | Size | Code | Language | Part Number |
|---|---|---|---|---|---|---|---|---|
| B | 4 | English | 069112-116 | | E | 2 | Spanish | 069112-121-03 |
| B | 4 | French | 069112-116-02 | | E | 5 | English | 069112-122 |
| B | 4 | Spanish | 069112-116-03 | | E | 5 | French | 069112-122-02 |
| C | 4 | English | 069112-117 | | E | 5 | Spanish | 069112-122-03 |
| C | 4 | French | 069112-117-02 | | B | 3 | English | 069112-123 |
| C | 4 | Spanish | 069112-117-03 | | B | 3 | French | 069112-123-02 |
| D | 4 | English | 069112-118 | | B | 3 | Spanish | 069112-123-03 |
| D | 4 | French | 069112-118-02 | | C | 3 | English | 069112-124 |
| D | 4 | Spanish | 069112-118-03 | | C | 3 | French | 069112-124-02 |
| E | 4 | English | 069112-119 | | C | 3 | Spanish | 069112-124-03 |
| E | 4 | French | 069112-119-02 | | D | 3 | English | 069112-125 |
| E | 4 | Spanish | 069112-119-03 | | D | 3 | French | 069112-125-02 |
| E | 1 | English | 069112-120 | | D | 3 | Spanish | 069112-125-03 |
| E | 1 | French | 069112-120-02 | | E | 3 | English | 069112-126 |
| E | 1 | Spanish | 069112-120-03 | | E | 3 | French | 069112-126-02 |
| E | 2 | English | 069112-121 | | E | 3 | Spanish | 069112-126-03 |
| E | 2 | French | 069112-121-02 | | | | | |

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## Notes:

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# RC 5500 AC Series

# PF15343-00C

# REV. A

mfg 20091221

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