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Operator's Manual

Electric Towing Truck

[Do not remove this manual from the truck]

CTX 40 / 70

Part No. 8087587 (Eng)
Book No. OM-847 (Rev 2.2)
Sep. 2016

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Record the following information pertaining to your truck.

Model No. _____

Serial No._____

Customer Truck Identification No. _____

Truck Weight, Empty _____

Truck Rated Capacity _____

Truck Gross Weight_____

Truck Gross Weight, Loaded w/ Rated Load_____

Special Equipment or Attachments _____

IMPORTANT

Do not expose this manual to hot water or steam.

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Foreword

This Operator's Manual should help you to make the best use of your CLARK Tow Tractor. Read through the instructions carefully and follow the given procedures strictly. Acquaint yourself with the controls and in particular observe all the safety regulations. Carry out all maintenance and care work at the recommended time intervals. CLARK Tow Tractors are characterized by their easy-maintenance design. You will therefore be able to carry out this work in a short time and without too much effort.

Regular maintenance and care of your Tow Tractor is recommended not just on economic grounds, but because a faulty Tow Tractor represents a source of potential danger.

In addition you should observe all Federal, State and Local regulations which provide inspections at set intervals of time.

For any checkup, repair, maintenance and all other work concerning your Tow Tractor, please contact your CLARK dealer. Here, specially trained service personnel will be glad to help you at any time. Should you desire to carry out maintenance, repair and all other work on your Tow Tractor yourself, you can of course obtain all required spare parts and all necessary materials from your CLARK dealer.

Please note: Only original CLARK spare parts guarantee the trouble free functioning and optimum economy of your Tow Tractor. Original CLARK spare parts are the best for your Tow Tractor. With their dimensional stability as well as their high material quality due to continuous and strict quality control, they correspond to those parts used in the series production of our Tow Tractors.

Finally we would like to draw your attention to the fact that any secondary damages due to improper handling, insufficient maintenance, wrong repairs or the use of other than original CLARK spare parts waive any liability by CLARK.

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Operator's Manual

You must be trained and authorized to operate a Tow Tractor.

YOU can prevent accidents

First: Learn safe operating rules and your company rules.

Next: Read your Operator's Manual. If you do not understand it, ask your supervisor for help.

Learn about the unit you operate.

Summary of Safe Operating Procedures

1. Do not operate this Tow Tractor unless you have been trained and authorized to do so. Read all warnings and instructions in the operator's manual of this truck.

2. Do not operate this Tow Tractor until you have checked it's condition. Give special attention to tires, horn, lights, battery, brakes, steering mechanism, and guards.

3. Operate tractor only from designated operating position. Never place any part of your body outside of the confines of the tractor. Do not cary passengers.

4. Make sure the tow coupling is secure.

5. Do not handle unstable or loosely stacked loads. Use special care when handling long, high or wide loads to avoid losing the load, striking bystanders, or tipping the tractor. Loads on trailers must be evenly distributed and secure.

6. Do not overload the tractor. Check the capacity plate for load weight. The safe capacity of a tractor-trailer is its stopping ability, not its potential towing ability.

7. Start, stop, travel, steer and brake smoothly. Slow down for turns and on uneven or slippery surfaces that could cause the tractor to slide or overturn. Violent application of brakes is dangerous and may cause "jack-knifing" the trailer.

8. When making a turn, allow for "corner-cutting" of the trailer.

9. When moving in reverse direction with a trailer, get assistance if vision is obstructed. Moving in reverse direction with more than one trailer is not recommended.

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10. Make sure correct tire pressures are maintained.

11. Before driving over a dockboard or bridge plate, make sure it is correctly secured. Drive carefully and slowly across the dockboard or bridge plate, and never exceed its rated capacity.

12. Do not run over objects on the traveled surface.

13. Use special care when operating on ramps - travel slowly, and do not angle or turn.

14. If a tractor must be parked on an incline, put chocks at the wheels.

15. Observe applicable traffic regulations and YEILD the right-of-way to pedestrians. Slow down and sound horn at cross aisles and wherever vision is obstructed.

16. Make a report of all accidents involving personnel, building structures and equipment to the correct authority.

17. Before getting off the tractor, neutralize the travel control and set the parking brake. When leaving the tractor unattended, turn the ignition switch Off.

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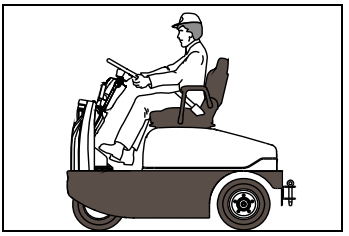
1. The Tow Tractor

Use in accordance with the regulations.



- Tow Tractors may only be used in accordance with the regulations, following these operating instructions.
- Tow Tractors are designed to tow loads.
- If a Tow Tractor is to be used for other purposes, permission must be obtained from CLARK, in writing, and if necessary from the supervisory authorities responsible, in order to prevent hazards from arising.

Stability

- CLARK Tow Tractors are stable in the working positions and when driving, if used with due care and attention and observing the maximum permissible loads.
- The trailing capacity of your CLARK Tow Tractors should never be surpassed. It would endanger its braking capacity.

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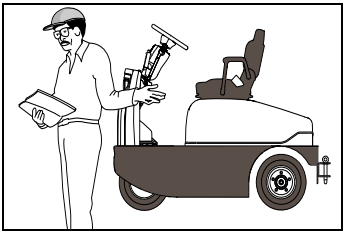
2. Inspection

Inspection prior to bringing into first use

- The Tow Tractor must be checked as to its functionality prior to putting it into operation. The working area to be used must be inspected as to its ground conditions (carrying capacity, flatness, sufficient width).



Regular and statutory inspections

- Tow Tractors must be regularly checked by trained and authorized service personnel. CLARK recommends an annual check-up based on an average operational performance.

Modification of the truck prohibited

- Unauthorized modification of the truck is not permitted, and, in case that a problem has occurred due to a modification without permission, the warranty service shall not be provided. For instance, the modifications which may void the warranty include those that may negatively affect the performance, durability and safety of the truck due to addition of unauthorized electrical devices (lamp, black box, electrical instrument, communication equipment, etc.), braking system, steering system, vision improvement system and detachable attachment device that were not mounted when the equipment was shipped out of the factory.

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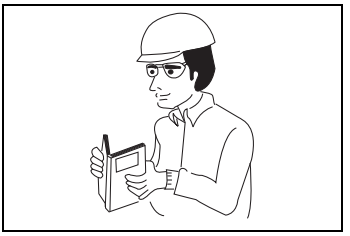
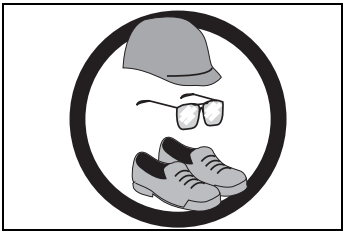
3. Operation

The driver



- Only trained and authorized personnel may be charged with driving a Tow Tractor. Please also observe all State and Federal laws and regulations.

- Please read this Operator's Manual and understand the contents carefully.



- We strongly recommend that you wear safety clothes suited for your work. Any wide or loose clothing must be avoided. Always wear a hard hat, safety shoes and, if required, safety glasses.

- Never drive your Tow Tractor with wet or oily hands or shoes. If you slip off the brake pedal or the wheel, serious accidents and personal injury may occur.

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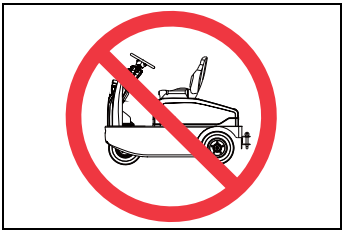
The working area

Operating aisles



- Never drive in areas which are closed to Tow Tractors, but only use aisles cleared for Tow Tractors operation. Traveling aisles and loading areas must be clearly identified and free of obstacles. Tow Tractors shall only be used on routes without sharp curves, excessive slopes and gades which are too narrow or too low. Watch the road surface - it must be sufficiently smooth and free of bumps. Please further observe all State and Federal regulations.

Hazard areas

- Tow Tractors which are to be used in flammable or explosive environments must be specially equipped for this purpose. The hazard areas must be identified accordingly.

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Getting ON/OFF the Equipment

- It is very dangerous to jump on or off the equipment.
- To get on or off the equipment, stop the equipment and use guide rail or steps to keep from losing your balance.
- The general rule is therefore that the operator shall always dismount when facing the truck.
- When getting on or off the equipment, do no grab the gear lever.
- Keep the guide rail or steps clean and well-maintained.

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When driving

Driving conduct

The operator shall comply with internal instructions on in-house traffic regulations and the relevant road traffic regulations on public roads. The speed of the Tow Tractor has to be adjusted to local conditions. For example, the operator shall drive slowly in bends, at and in narrow passageways or gates, when driving through swinging doors, at blind intersections or on uneven surfaces. He always shall keep a safe braking distance from vehicles or persons in front of him and he must always have his truck under control. Sudden stops, quick turns, overtaking at dangerous or blind intersections shall be avoided.

Tow Tractors shall not be put in motion when the operator is not assuming the proper operating position in the operator's seat.

Whilst driving, it is forbidden, amongst other things:

- To put arms or legs outside the truck
- For the operator to lean over the edge of the Tow Tractor
- To move from one truck to another or to fixed parts of a building.

The operator shall bring his truck to a standstill as soon as possible if the steering equipment is defective.

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Braking

The driving speed must be selected so that there is always an adequate braking distance in front of the truck. It should be noted in this respect that the pure braking distance increases at a higher rate of speed and that the drive wheels may spin or the truck may overturn in case of sudden braking.

Gradients

- Always reduce your speed and drive with special care on grades.
- Always keep the load fixed if you drive on grades.
- With restricted visibility always seek assistance when travelling on grades.
- Do not turn when going up or down a grade. Never drive diagonally across the grade. The truck can easily roll over in this case.
- Grades should always have a sufficiently rough surface. For smooth, and even travel avoid any load contact with the ground.
- Grades used by trucks shall not exceed the limits specified by the manufacturer.

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Climatic condition for Operation

- Maximum ambient temperature, short term(up to 1h) : +104 °F (+ 40 °C).
- Average ambient temperature for continuous duty : + 77 °F (+ 25 °C).
- Lowest ambient temperature : - 4 °F (- 25 °C) (in normal outdoor condition), +41 °F (+ 5 °C) (in normal indoor condition).
- Service altitude : up to 6560 ft (2000m) above sea level.
- Relative humidity : in the range 30 % to 95 % (non-condensing)

Tips for Operation according to the Weather

1) Hot Weather

– Driving in hot weather impairs driving ability and work efficiency. Take rest at regular intervals.

2) Cold Weather

– Remove the ice, snow or frost on the weather enclosure window before start operation. (If weather enclosure installed)
– Take utmost care when driving on icy surface.
– Do not step on slippery surface when getting in or out of the equipment.
– Use an ice removing device equipped with a handle and ladder to remove ice. snow or frost.
– Replace worn tire immediately. Especially, worn tires can cause serious accident on icy ground.
– Do not apply abrupt braking or starting on icy ground.

WARNING

Do not expose bare skin to the cold, metal surface of the equipment.

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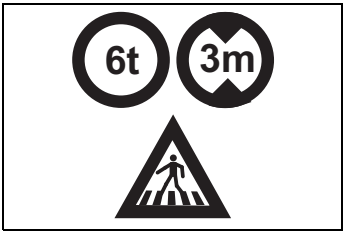
3) Rainy Weather

– If forklift truck is to be operated outdoors during rainy conditions, make sure cab is in place to prevent damage to electrical components

Behavior during operation

Traffic rules

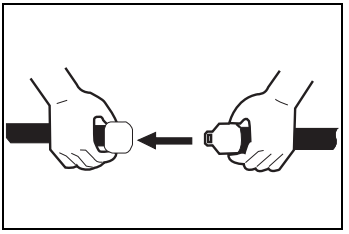
- Observe all safety regulations and all warning signs. Always behave as if traveling on public roads. Reduce the speed of your Tow Tractor and use the horn near corners, entrances, exits and near people.



Safety Belt (if installed)

(Only for use on models with weather enclosures.)

- Wear the safety belt below your waist and minimize the movement.



- Be sure to wear the safety belt before starting the equipment.

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When driving

- Avoid any abrupt starting, excessive traveling speeds and sudden directional changes.
- Select the driving speed so that sufficient stopping distance is always available. It must be remembered that the net stopping distance increases by approximately the square of the speed and that sharp braking of the Tow Tractor can cause the drive wheels to slip and the truck to tip over. Braking on curves further increases the danger of the Tow Tractor tipping due to the tilting moment which occurs.
- Reduce speed before curves and ramps, in narrow passageways, on wet roads and restricted visibility.
- Always look in the driving direction. No parts of the body should extend outside the truck.
- Always keep a sufficient distance from other vehicles so as to be able to stop in time in case of danger.

Safety of people

- Always make sure that there is nobody within the hazardous area of your Tow Tractor. Ask these people to leave the area immediately.

- Do not let other persons ride on the truck, on trailers.

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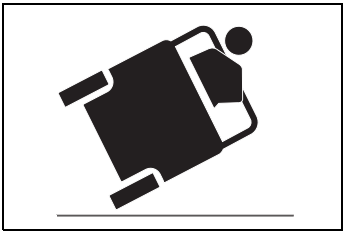
Tow Tractor tip over



Tow Tractors can be tipped over if not operated properly. Teach your operators that there are a number of things they must watch for that can cause a truck to tip over.

- Slow down before turning. Go into and out of turns slowly, using a slow rotation of the steering wheel.
- Do not move unstable loads.
- Do not turn on down- and up-slopes
- Drive careful and slowly at ramp edges or steps
- You may find that you have some long runs where you operate the truck empty, close to its top speed. Slow down before turning.

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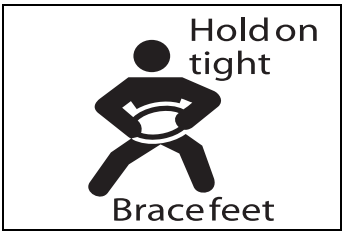
Safety Regulations

The operator must wear personal safety devices and follow the instructions for safety to prevent serious personal injury if the equipment overturns.

1. In the event your Tow Tractor is equipped with a weather enclosure, wear safety belt. Never jump off the equipment.

2. Hold the steering wheel firmly.
   Stiffen your legs to support yourself.



3. Lean against the opposite side wall, as shown in the figure.

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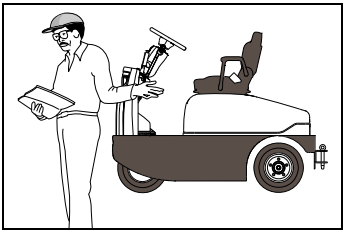
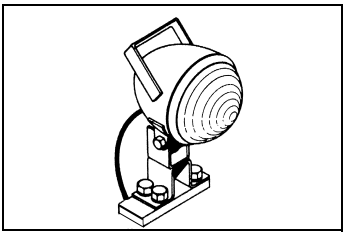
Troubleshooting

Daily inspection before operation



- Before starting to work check your Tow Tractor daily in accordance with the section "Daily Inspection". Always make sure that all safety systems are operating correctly. Never operate a truck which is damaged or not safe to operate. Check all warning and information decals. Any missing or damaged decals must be replaced immediately.

Illumination



- Tow Tractors used in poorly illuminated areas must be equipped with work lights.

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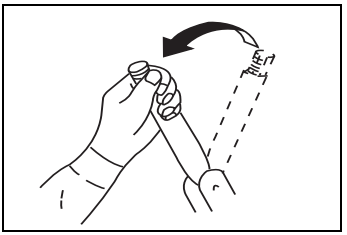
Leaving the tugger truck



- When leaving the Tow Tractor, shall be turned key off.
- Apply the parking brake, put the gear levers in the neutral position and secure your Tow Tractor against unauthorized use by third persons.
- Never park your Tow Tractor on grades. But if this is necessary always secure the truck with chocks.

Transport of towing tractors in elevators

- The transport of Tow Tractors in elevators is only permitted, if the elevator has a sufficient load capacity and is designed for this purpose.
- The tow tractor must be secured in a way that it cannot touch the elevator walls and may not move inadvertently.
- All persons travelling with the tow tractor must enter the elevator after the towing tractor and must leave before the tow tractor.

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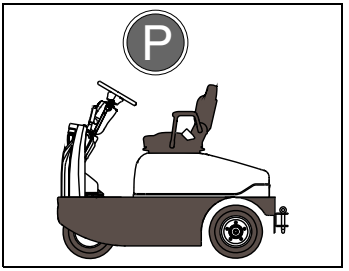
Additional regulations for special tasks

Tow Tractors used for the transport of persons

- The transport of persons by the Tow Tractor is only permissible, if the truck is equipped with appropriate seats and if the latter are designed for the transport of persons. Otherwise the transport of persons is prohibited.

Parking the Tow Tractor

- Park your Tow Tractor in authorized areas only. For this purpose:
  - apply the parking brake
  - put the directional control lever in neutral position
  - turn the key to "Off" position
  - remove the key.



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Trailer operation

- Trailors without a power-brake system may only be moved if the braking force of the Tow Tractor is sufficient for a safe stop. For the permissible trailer load please look to the truck plate.
- The tow tractor must be operated in such away that safe driving and braking of the towed vehicle is ensured for all driving movements.
- Please observe the information on the name plate of the trailer coupling.
- Trailer loads effect the braking force of your Tow Tractor; this particularly applies to traveling on grades.
- During the coupling process no persons are allowed between the trailer and the moving towing tractor.
- After each connection of trailers, the operator shall check before driving off :

  1.the trailer coupling is secured against becoming loose.

  2. the existing connections for brakes and lighting are connected.

  3.the existing brake power regulator has been adjusted to the actual hailing load
- Disconnected trailers shall be secured against unintentional movement (e.g. with blocks).
- If the Tow Tractor to be connected is operated from the outside, it shall be equipped for this purpose and the operator shall not step between the Tow Tractor and the trailer. If an assistant is used to connect trailers, the operator shall ensure that the person is not endangered during the coupling process.

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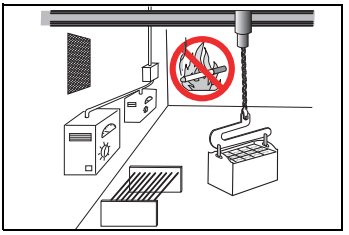
- When driving through narrow road sections, the dimensions of the trailer and the load must be observed. In the case of Tow Tractors with trailers, an adequate minimum distance to fixed components shall be ensured when turning and in curves.
- The admissible length of an Tow Tractor with trailers depends on the trailer or the truck and on the distance to be driven and shall be determined by means of a trial run, if necessary.
- The operators shall be informed of the admissible number of trailers and if necessary any speed reductions for individual stretches in the form of driving instructions. Adequate trial runs shall be made before commencing towing operations;
- Please observe all State, Federal and local laws and regulations.

Charging batteries of electric trucks



- The charging and maintenance of batteries may only be carried out in rooms particularly designed for this purpose by qualified personnel. In case of automatic charging devices the batteries may also be recharged by the operator. Please carefully read the operating instructions of the charger manufacturer.

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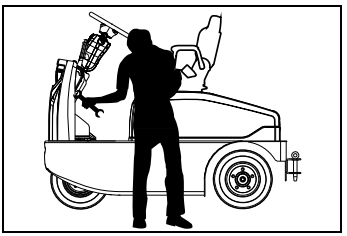
- Smoking and handling of open fires in charging stations is prohibited.

Repairs



- Safety equipment and switches may not be removed or made inefficient. Factory set adjustment values may not be changed.
- For any checkup, repair, maintenance and all other work concerning your Tow Tractor, please contact your CLARK dealer. Here, specially trained service personnel will be glad to help you at any time. Should you desire to carry out maintenance, repair and all other work on your Tow Tractor yourself, you can of course obtain all required spare parts and all necessary materials from your CLARK dealer. Please note: Only original CLARK spare parts guarantee the troublefree functioning and optimum economy of your Tow Tractor. Original CLARK spare parts are the best for your Tow Tractor. With their dimensional stability as well as their high material quality due to a continuous and strict quality control, they correspond to those parts used in the series production of our Tow Tractors.

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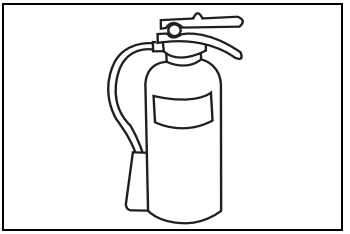
Fire Extinguisher



- Prepare a fire extinguisher at the designated place and learn how to use it to prepare for a fire accident.
- You must be well aware of the actions to take in a fire or other accident.
- Define the emergency contact and prepare communication means and contact information.

Waste Disposal

- Do not dump waste oil in sewer or river.
- Collect drain oil in an oil pan.
- Never spill waste oil on the ground.
- The waste materials from oil, filter or battery must be classified and kept at designated places and disposed of by an authorized disposal service provider or nearest A/S center

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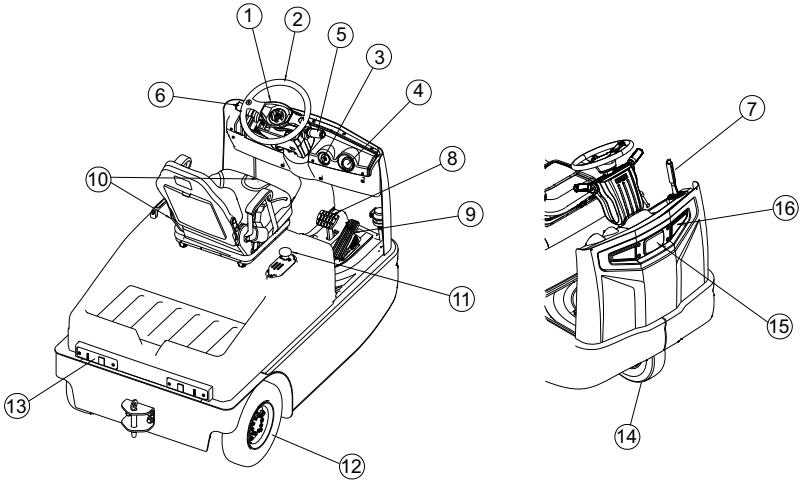
Know your Tow Tractor



Operator's Compartment and Controls

1. Horn button
2. Steering handwheel
3. Key switch
4. Smart display
5. Combination lever
6. Direction control lever
7. Parking brake lever
8. Brake pedal (pressing the pedal activates the brake)
9. Accelerator pedal (control of motor revolutions and thus the drive speed)
10. Seat adjustment lever
11. Emergency switch
12. Drive tire
13. Rear combination lamp
14. Steering tire
15. Head light
16. Turn signal lamp

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Dash display

LED function

The MDI-CAN has only a LED. This LED is red and lights and blinks when an alarm is present.

Display function

Hour meter

An alpha-numeric liquid crystal display is fitted in the centre of the unit that shows the Hours Worked. The display is backlit (the backlight is normally on).

Alarms

The same display can also indicate the Alarm state, showing a Code corresponding to the type of Alarm. To attract attention, the Red LED will start blinking when an Alarm is generated.

Software version

When the Key Switch is initially closed, the display shows the EPROM Version for a few seconds (EPXXX where XXX represents the version): MDI-CAN and then traction controller Eprom Version appears, each one for 2 seconds. Simultaneously the symbol of a Monkey Wrench appears.

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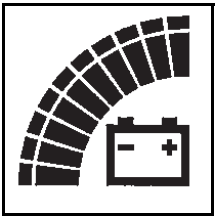
Battery State of Charge



The Battery's State of Charge indication is integrated in the LCD display; it is shown by ten notches. Each notch represents the 10% of the battery charge. As the battery becomes discharged, the notches turn off progressively, one after the other, in proportion to the value of the residual battery charge. This value, sent to the MDI-CAN by the controller via CAN-BUS, is displayed in the Tester Menu of the Zapi Console connected to the controller. When BATTERY LOW alarm appears on the controller, the battery symbol which is under the notches blinks.

Other information

Three symbols inform the operator as follows:

Turtle Symbol:

It is normally off; when it appears (fixed) it shows activation of the “turtle” mode of the truck, in which maximum speed and acceleration are reduced.

1. Turtle switch at steer column is activated and turtle symbol in display is own permanent. The driver see that turtle mode is activated.
2. The inching mode is activated by the switch in the steer column, and the turtle symbol flash every 500ms.
3. Turtle mode and Inching active by switches at steer column. Here should be also the turtle symbol flashing. The inching mode has higher priority than the Turtle mode, therefore flashing turtle symbol.

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Service Symbol:

It is normally off; when it appears (fixed) it shows the request of programmed maintenance or the Alarm state. In this case the relative code will be displayed. The information supplied by the MDI-CAN can be extremely useful. Failures can be quickly identified by the Operator or Service Technician thereby finding the fastest solution to the problem.

Hourglass Symbol:

It is normally off; it blinks when the Hour Meter is working.

NOTICE

When the Key Switch is closed, the MDI-CAN makes a general test lighting all the display liquid crystals, the led and the backlight.

In this paragraph and in the following paragraphs the display behavior if the ZAPI MDI-CAN adopts the standard protocol is described. The ZAPI MDI-CAN can also use a non standard protocol. The traction controller decides which of the two protocols use. If the non standard protocol is used, the traction controller decides how to manage icons, LED, backlight and which information write in the MDI-CAN memory.

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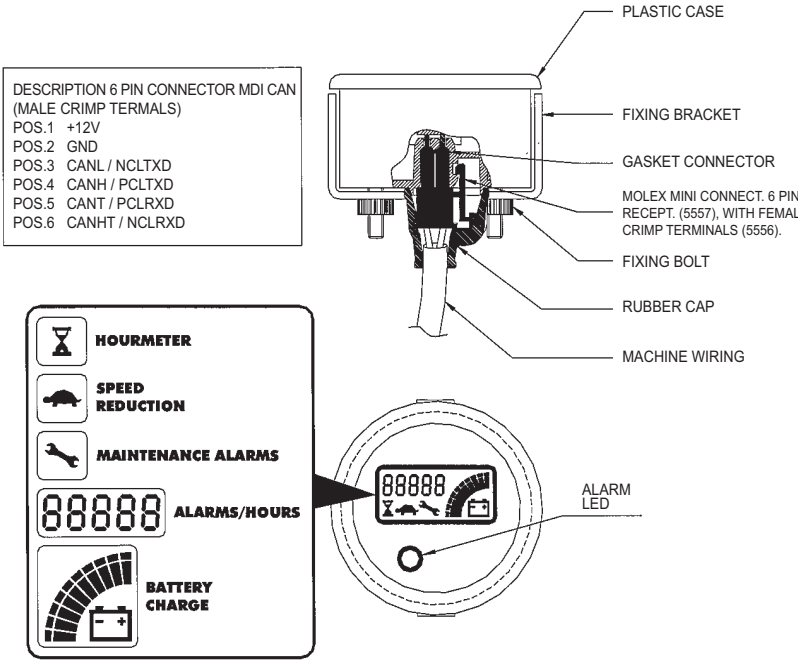
Installation

Connection scheme



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Connector description

CNA connector: Molex Minifit

- CANBUS communication version

A1	+12V	MDI CAN positive power supply
A2	GND	MDI CAN negative power supply
A3	CANL	CAN Low signal.
A4	CANH	CAN High signal.
A5	CANT	A 120 ohm CANBUS termination resistance is connected between this pin and CANL. To connect this pin to CNA#6 to insert the resistance.
A6	CANHT	Internally short circuited to CANH. To connect this pin to CNA#5 to insert the 120 ohm termination resistance.

- SERIAL communication version

A1	+12V	MDI CAN positive power supply
A2	GND	MDI CAN negative power supply
A3	NCLTXD	Serial Transmission negative.
A4	PCLTXD	Serial Transmission positive.
A5	PCLRXD	Serial Reception positive.
A6	NCLRXD	Serial Reception negative.

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Hour-meter Memory Service

The MDI-CAN indicator retains the Hour Meter value in its own memory (EEPROM). In this way it is possible to transfer the machine hour meter value into other controllers, if a replacement is required, without loss of the hour meter record for a particular machine.

This can achieved as follows:

- With the key Switch open, connect the ZAPI Console to controller.
- Close the key Switch. Set the function "LOAD HM FROM MDI" to ON. This can be found in the ADJUSTMENTS Menu. In some versions, this function may be called "AUX FUNCTION1".
- Open and close the key Switch.

The replacement controller will now receive and retain the machine hour meter value of the previous controller.

It has to be considered that:

- On default, the parameter "LOAD HM FROM MDI" is set to OFF. Therefore if this type of function is not activated as described above, the memory of the hour-meter will be lost at turn on.
- To avoid this situation, if the operator forgets to set parameter, the MDI-CAN signals the alarm "A98" for 1 minute (during this time traction is disabled).
  This alarm warns the operator of the imminent cancellation of the hour meter memory. After 1 minute, if the operator has not intervened, the hour meter of the MDI-CAN will be re-written, with the hour meter value of the new controller (Zero Hours if the controller is new).

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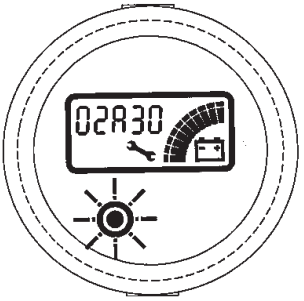
Alarms



The ZAPI MDI-CAN gives indication of the Alarms of the controllers to which it is connected via CAN-BUS, with a corresponding code.

When an Alarm is generated, the Red LED blinks to attract the attention of the operator. The symbol of Monkey Wrench also appears. The string shown on the display is XXAYY, where XX and AYY represent respectively the alarmed node and the alarm code. The alarm code meaning must be present in the controller user manual.

Decoding of the alarms displayed on the MDI-CAN

Using the indication given by the MDI-CAN and after reference to the following table, the operator can solve the problem, if the failure is not serious. It will also be necessary to refer to the paragraph describes the Alarms in the Service Manual of the relevant controller.

If the Alarm information suggests or indicates a serious problem, the operator will be able to give useful information to the Servicing Dealer, thereby reducing down time with relative costs savings.

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A00	NONE
A01	CHOPPER RUNNING
A02	NO COMMUNICATION
A03	UNKNOWN CHOPPER
A04	CONSOLE EEPROM
A05	SERIAL ERROR 2
A06	SERIAL ERROR 1
A07	CHOPPER NOT CONFIG
A08	WATCHDOG
A09	FIELD FF FAILURE
A10	EEPROM DATA KO
A11	EEPROM PAR KO
A12	EEPROM CONF KO
A13	EEPROM KO
A14	EEPROM OFFLINE
A15	LOGIC FAILURE 5
A16	LOGIC FAILURE 4
A17	LOGIC FAILURE 3
A18	LOGIC FAILURE 2
A19	LOGIC FAILURE 1
A20	FORW VMN LOW
A21	FORW VMN HIGH
A22	BACK VMN LOW
A23	BACK VMN HIGH
A24	LEFT VMN LOW
A25	LEFT VMN HIGH
A26	RIGHT VMN LOW
A27	RIGHT VMN HIGH
A28	PUMP VMN LOW
A29	PUMP VMN HIGH
A30	VMN LOW
A31	VMN HIGH

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A32	VMN NOT OK
A33	NO FULL COND
A34	RGT NO FULL COND
A35	LFT NO FULL COND
A36	PU NO FULL COND
A37	CONTACTOR CLOSED
A38	CONTACTOR OPEN
A39	BRAKE DON' T CLOSED
A40	BRAKE CONT OPEN
A41	DIR CONT CLOSED
A42	DIR CONT OPEN
A43	RIGHT CONT CLOSED
A44	RIGHT CONT OPEN
A45	LEFT CONT CLOSED
A46	LEFT CONT OPEN
A47	MAIN CONT CLOSED
A48	MAIN CONT OPEN
A49	I=0 EVER
A50	LEFT I=0 EVER
A51	RIGHT I=0 EVER
A52	PUMP I=0 EVER
A53	STBY I HIGH
A54	LEFT STBY I HIGH
A55	RGT STBY I HIGH
A56	PUMP STBY I HIGH
A57	HIGH FIELD CURR
A58	NO FIELD CURR
A59	HIGH BRAKING I
A60	CAPACITOR CHARGE
A61	HIGH TEMPERATURE
A62	TH PROTECTION

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A63	THERMIC LEVEL 2
A64	PUMP TEMPERATURE
A65	MOTOR TEMPERATURE
A66	BATTERY LOW
A67	BATTERY LEVEL 2
A68	BATTERY LEVEL 1
A69	CURRENT SENS KO
A70	POWER FAILURE 4
A71	POWER FAILURE 3
A72	POWER FAILURE 2
A73	POWER FAILURE 1
A74	DRIVER SHORTED
A75	CONTACTOR DRIVER
A76	COIL SHORTED
A77	COIL INTERRUPTED
A78	VACC NOT OK
A79	INCORRECT START
A80	FORW + BACK
A81	BAD STEER 0 SET
A82	ENCODER ERROR
A83	BAD ENCODER SIGN
A84	STEER SENS KO
A85	STEER HAZARD
A86	PEDAL WIRE KO
A87	PEDAL FAILURE
A88	TRACTION BRUSHES
A89	PUMP BRUSHES
A90	DRIVER 1 KO
A91	DRIVER 2 KO
A92	DRIVER 1 SIC KO
A93	DRIVER 2 SIC KO

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A94	INPUT ERROR 6
A95	INPUT ERROR 5
A96	INVERSION
A97	POSITION HANDLE
A98	INPUT ERROR 2
A99	INPUT ERROR 1

NOTICE

The 16A06 string corresponds to the NO COMMUNICATION alarm. It is the only MDI-CAN alarm and it indicates a problem in the communication with the traction controller. Check the connections between MDI-CAN and controller.

IMPORTANT

The alarms reported in the previous tables are referred to Zapi standard coding. Customized software or special products can have same changes in the alarms indications.

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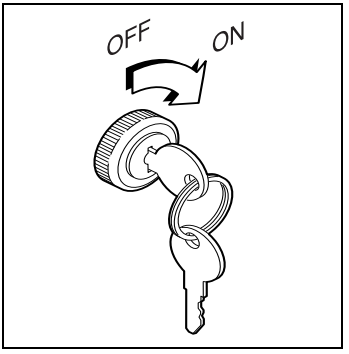
Key Switch

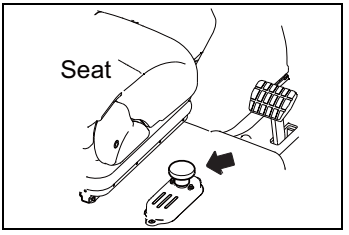
- Connects the battery with all truck operating systems (drive and steer electrical circuits) except the horn.
- Connects battery to the diagnostic display hour-meter and battery charge status.



The key switch must always be turned to the ON position to operate the truck. When the key is in the vertical OFF position, instruments, drive motor electrical circuits are disconnected (shut-off), and the key can be removed.

Emergency off switch

- When pressing the Emergency switch located to the right side of the operator's seat, the power supply will be cut off.
- The emergency OFF switch should only be used in dangerous situations and emergencies, so as not to damage the connector contacts.



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How to operate inching switch (Optional)

An option offered on the Tow Tractors is an Inching Switch. When activated the switches located at the left rear of the tractor can be used to jog the tractor forward or backward at a very low speed for enabling the coupling of the tractor to the trailer.

To Use:

- Inching enable switch "ON"

- Seat switch "Off" → Operator take off on the seat.

- Push inching switch (forward / backward).

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Seat switch

- The seat switch interrupts the driving current as soon as the driver's seat remains unloaded for about 2seconds.
- The driving current circuit is reconnected automatically when a load is applied to the driver's seat and the direction lever is set to the neutral position once and then back to forward / reverse position.

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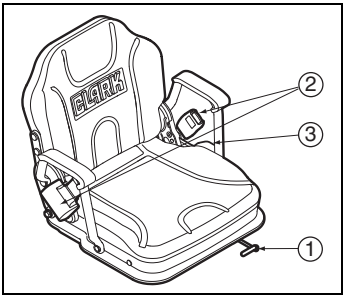
Seat adjustment



- The seat adjustment lever (1) is located under the seat. By pushing the lever to the side, the seat can be adjusted so that all controls may be comfortably reached. Once you have adjusted the seat to the desired position, release the lever.
- The back reclining adjustment lever(3) is located on the left side of seat cushion. Pull the lever up and adjust the back, release the lever.
- Be sure that the seat locking mechanism has engaged.
- Optional suspension seats can be adjusted for a comfortable ride.

Safety belt (applies only in the event your Tow Tractor is equipped with a weather enclosure)

- Seat belt (2) must be worn at all times.

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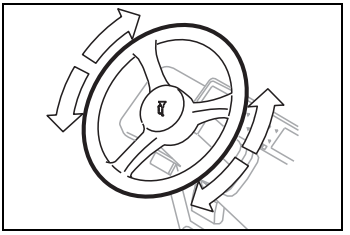
Adjusting the steering column

- The Tow Tractor is equipped with an adjustable steering column.
- Release the locking lever by rotating it C.C.W. After adjusting the steering column, it must be relocked in place securely.

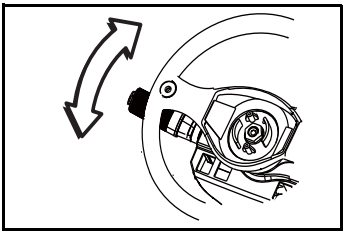
Steering system and horn

- The movements of the steering wheel are transferred to the steering axle mechanically.
- The horn button is located in the center hub of the steering wheel.



Direction Control Lever

- This lever is located adjacent to the steering column.
- For selection of the driving direction, the lever needs only to be pushed as far as the engaging point in the desired driving direction. When operating, observe the safety regulations described in Section 1.



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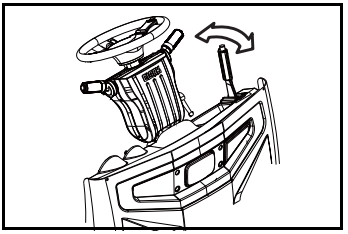
Parking brake

- The parking brake is released by pushing the button on top of the lever and then by moving the lever forwards.



Battery Specifications

The information on the battery specifications is printed on the label affixed to the battery.

See below for the specifications of the batteries for Tow Tractor models.

Model	Specification (standard)	Dimension (L x W x H)
CTX40	48V, 230AH	830 x 414 x 624
CTX70	48V, 300AH	830 x 414 x 624

Batteries with higher capacity or additional functions, other than those specified in the table above, are available. However, the outer dimensions must be observed. A different battery weight can affect the stability of the Tow Tractor. Therefore, use a battery whose weight falls within the allowable weight for the Tow Tractor.

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Battery Recharging

To charge the batteries, park the Tow Tractor safely in the designated place, and ensure that it is sufficiently ventilated in order to remove the hazardous gas generated during battery charging.

During battery charging, make sure to open the top cover of the battery to provide sufficient ventilation of the gas generated during charging. Never place any metal tools or parts upon the battery during charging, as a metal object could result in a short-circuit.

Before starting to recharge the battery, make sure to check the battery cables, connectors and the battery cells for defective parts. Never place electrically conductive parts on the battery cell connectors.

- First shut off the truck with the KEY switch
- Press the emergency stop button (for models equipped with the emergency stop button).
- Open the battery's top cover.
- Pull the battery connector out from the Tow Tractor connector.
- Connect the connector of the battery to the connector of the charger.
- Once charging is completed, disconnect the battery connector from that of the charger.
- Connect the battery connector to that of the Tow Tractor.
- Close the battery top cover and ensure that the battery cable will not be damaged.

The battery charger must be in compliance with the specifications provided by the manufacturer of the Tow Tractor or the battery. For further information on battery recharging, please refer to the technical documents provided by the supplier of the battery or charger.

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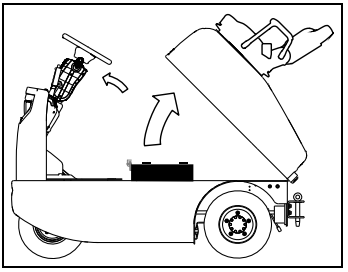
Battery Compartment Access

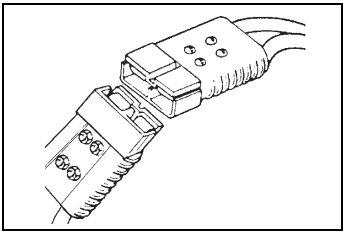


- The combination seat deck / battery compartment cover pivots upward to provide access to the battery compartment.
  The cover latch is located just above the floor board in the center of the cover.
  Release the compartment latch and lift the battery cover backwards. Gas springs are installed to hold the compartment in the raised position.

CAUTION

Make sure that the locking lever locks back into place properly when the cover is closed, and that the battery cables are not trapped.

Battery connector



- When inserting the battery connector, ensure that the battery cables remain free.

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Battery exchange

- In some applications it may be necessary to replace a discharged battery with a charged one and recharge the removed battery outside the truck at a designated place.
- The battery retainer should be checked after each battery change and adjusted if necessary. In order to avoid dangers from unforeseen movements, batteries in the Tow Tractor shall be secured as specified by CLARK.
- When removing and installing batteries, ensure that the battery cables are not damaged.
- Before exchanging the batteries, park the Tow Tractor safely in a designated area. How to park, refer to section “Parking”.
- Please adhere to the following procedure:

1. First shut off the truck with the KEY switch
2. Press the emergency stop button.
3. Open the battery's top cover.
4. Disconnect the battery from the truck by pulling the battery connector out from the Tow Tractor connector.

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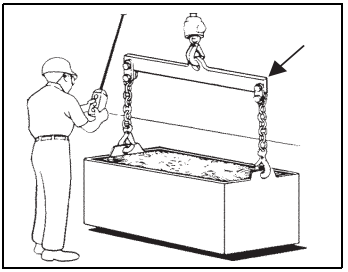
(Exchange with crane)



5. If the truck is fitted with a weather enclosure, remove the cover at the opening.
6. Remove the battery retainer.
7. In the event of a battery change with a hoisting gear, the lift should be vertical to ensure that the battery tray is not squeezed. Hooks shall be attached in such a way that they cannot fall on to the battery cells when the hoisting gear is slack. Make sure that the chains and safety hooks are checked and have sufficient load carrying capacity
8. When lifting the battery in and out, be careful not to damage the battery box by hitting the trucks chassis.
9. Place the battery carefully at the designated recharging place.
10. Remove the recharged battery and install in reverse order.
11. The Tow Tractor should only be restarted when the retainer, cables, connections, and covers have been returned to their normal operating condition.

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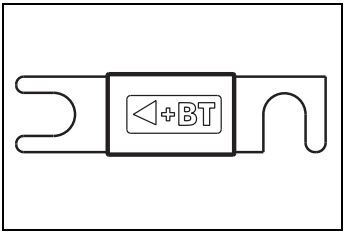
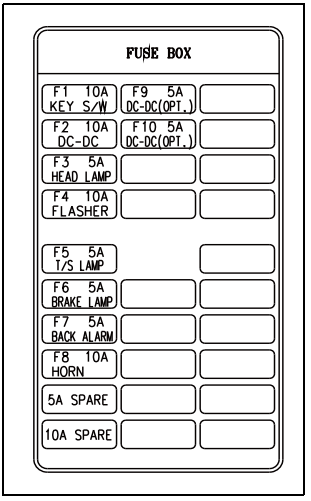
Fuses



- The main fuses are located on the control unit.
- Replace faulty fuses only with fuses of the same amperage.
- If a fuse blows frequently, there is a fault in the electrical system. To rectify the fault, contact your CLARK dealer.
  - Fuses are located under floor plate.
  - The fuse ratings are clearly visible on the fuses.

CTX40-70		
F1	Key switch	10 AMP
F2	DC-DC	10 AMP
F3	Head Lamp	5 AMP
F4	Flasher	10 AMP
F5	Turn Signal Lamp	5 AMP
F6	Brake Lamp	5 AMP
F7	Back Alarm	5 AMP
F8	Horn	10 AMP
F9	DC-DC (OPT)	5 AMP
F10	DC-DC (OPT)	5 AMP
Spare1		5 AMP
Spare2		10 AMP



IMPORTANT

Never replace a faulty fuse with one of a higher rating.
If a fuse persistently fails, there is a fault in the electrical system. You can contact your CLARK dealer with confidence to have the faults rectified.

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Truck with two-way radio or mobile phone

- For mobile phones and two way radios the usual regulations, as in the automotive sector, apply. High frequency transmission energy emitted by these and similar devices may cause malfunctions of the vehicle electronics.
- When installing such equipment, please contact your CLARK dealer for advice and assistance.

UL Classification Symbol

- Your truck meets the UL standard if the UL classification symbol is affixed (see fig.).

Warning decals

- Your truck is fitted with warning decals. Make sure that these decals are always clearly visible.
- Defective, missing or illegible decals must be replaced immediately.

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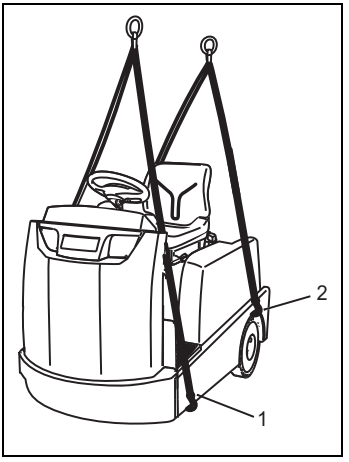
Truck Lifting by crane



Improper lifting by crane can result in accidents. The use of unsuitable lifting gear can cause the truck to crash when being lifted by crane.

- Prevent the truck from striking other objects when they are being raised, and avoid any uncontrolled movement. If necessary secure the truck with guide ropes.
- The truck should only be handled by people who are trained in using lifting slings and tools.
- Wear safety shoes when lifting the truck by crane.
- Do not stand under a swaying load.
- Do not walk into or stand in a hazardous area.
- Always use lifting gear with sufficient capacity (for truck weight see truck data plate).
- Always attach the crane slings to the prescribed strap points and prevent them from slipping.
- Use the lifting gear only in the prescribed load direction.
- Trucks with a weather enclosure must only be loaded by crane using a cross member.
- Crane slings should be fastened in such a way that they do not come into contact with any attachments when lifting.

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Lifting gear attachment points are provided on the chassis (1) and the trailer hitch (2) in case the truck is to be lifted or transported by crane.

- Park the truck securely.
- Secure the lifting gear to the attachment points (1) and (2).

Transportation

- When driving onto transport vehicles, care shall be taken to ensure that sufficient distance is maintained from edges and bridge plates, etc. Ramps with an adequate carrying capacity shall be used for driving onto a transport vehicle (e.g. flat bed loader).

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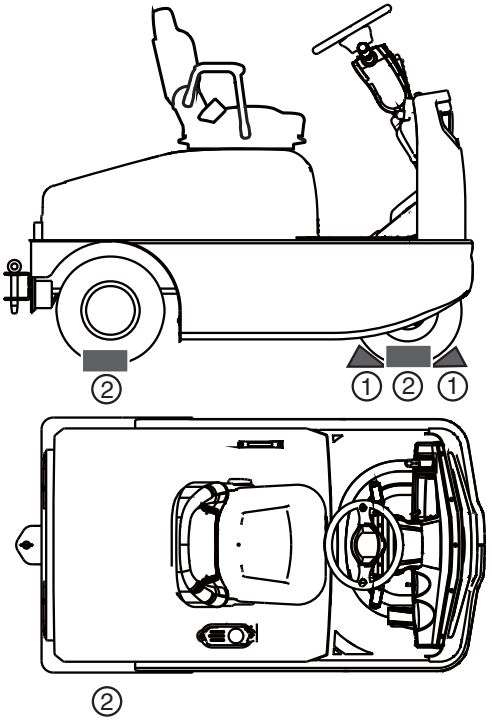
Transporting



Load the truck as follows if being transported in an enclosed trailer.

- Apply the parking brake.
- To fix lengthwise, install wooden props (1) at the front and rear on both sides of the front wheel.
- To fix sideways, install wooden props (2) at the sides of all three wheels.

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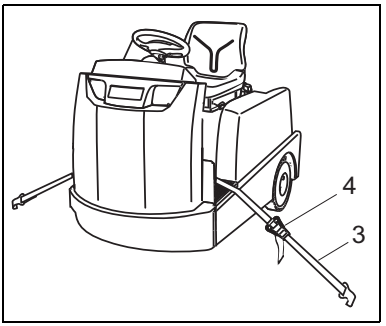
If transporting on an open trailer:

The truck must be securely fastened when transported on a trailer. The trailer must have fastening rings.

- To fasten the truck pull the tensioning belt (3) over the truck and attach it to the fastening rings.
- Tighten the tensioning belt with the tensioner (4).



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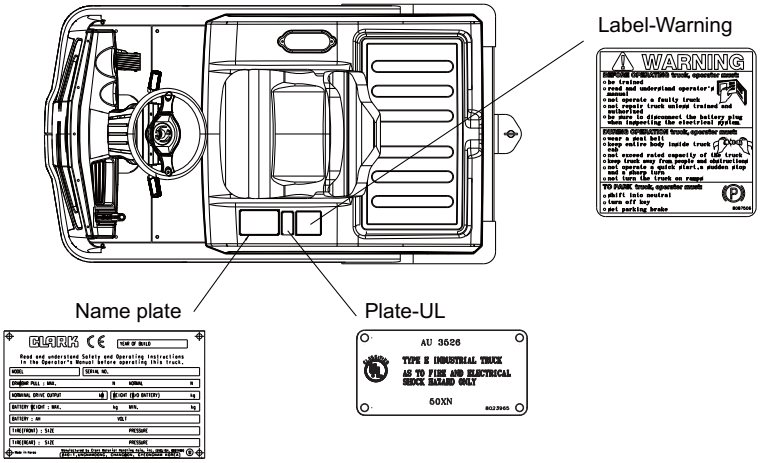
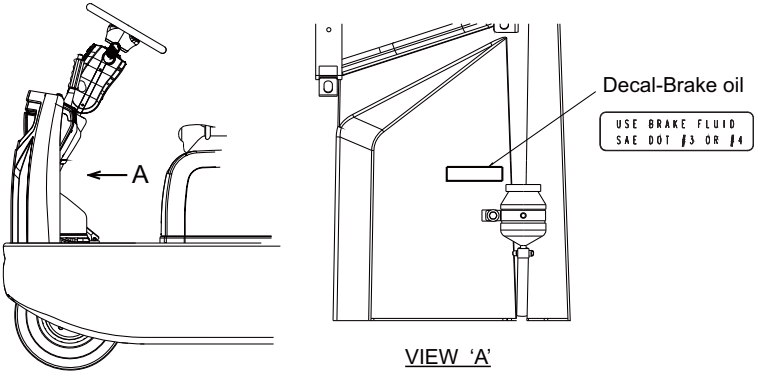
CTX 40 / 70





Attached Position of Safety Decals

CAUTION

Do not operate a truck with damaged or missing decals or data plates.
Replace them immediately.
Contact your local CLARK dealer to acquire new decals or data plates.

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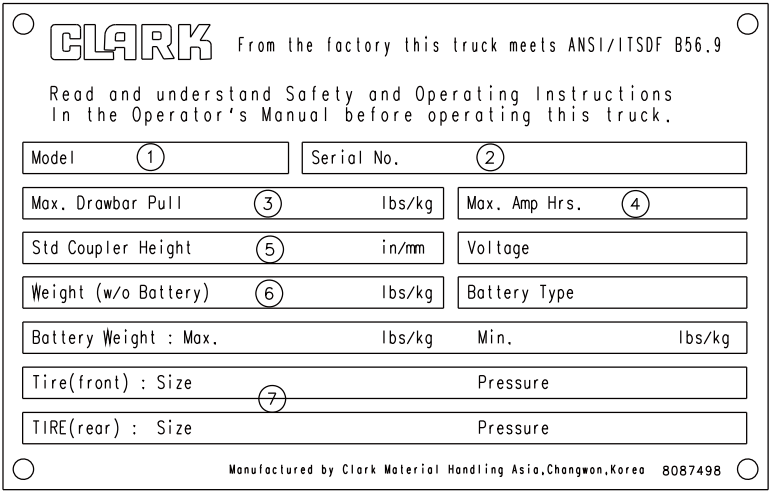
Name plate



What you should know about your truck :

1. The location of the model name.
2. The location of the serial number.
3. The location of the drawbar pull.
4. Maximum Ampere Hours
5. Standard Coupler Height
6. The truck weight whithout battery.
7. Which tire(size, pressure) to be used.

A damaged name/capacity plate must be replaced.

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Daily Inspection

- Always check that your Tow Tractor is operationally safe. Never drive a Tow Tractor you have not checked. Before starting work, you should convince yourself that the Tow Tractor is in an operationally safe state. Carry out this inspection by following the following list.

Daily inspection

	Page
Checking Tow Tractor for any signs of damage and dirt	3.2
Check tires	3.2
Check wheel nuts for tightness	3.2
Check the display unit are working properly	
Check horn is working properly	
Check service brake is working properly (pads are in good condition?)	3.3
Check parking brake is working properly and adjust if necessary	3.3
Check steering is working properly	
Check trailer coupling	
Check battery acid level and battery charge	
Check battery connectors are a tight fit	3.2
Check battery and wiring connectors are a tight fit	3.2
Check lighting (if any)	

Always check that your Tow Tractor is operationally safe. Never drive a Tow Tractor you have not checked.

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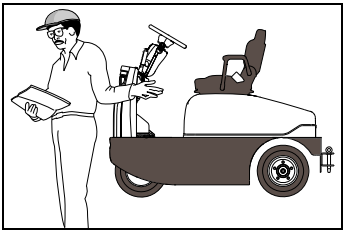
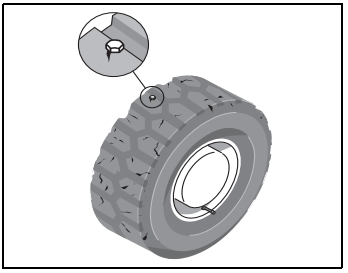
Visual inspection

Walk around your Tow Tractor and look for any obvious signs of damage, leaks and dirt.



- The degree to which cleaning is required depends on the operating environment of the Tow Tractor. For operation in areas with large amounts of dust or paper, thorough cleaning is required after each operating shift, or several times a day. The same applies to operation with cement and chemicals. See also section “4. Maintenance and Care”

Wheels and tires



- Check the :
  - State of the drive wheels, the steer wheels and all tires.
  - Tight of wheel nuts.
    See section "7. Technical Data" for tightening torques and tire pressure.

CAUTION

A wrong tire pressure influences the stability of the Tow Tractor. If you change a tire, always change both tires on the axle.

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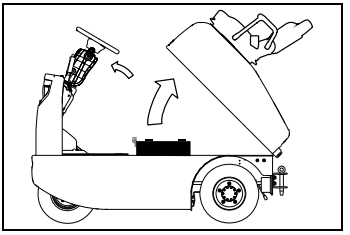
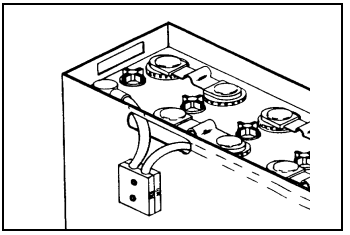
Lifting up the battery compartment



- Release the compartment lock and lift the battery cover up and backwards.
- Carry out the checks on the battery.

Checking the battery and cables



- Check for visible damage such as:
  - Loose connection cables
  - Broken battery connectors
  - Contamination and corrosion of the battery parts and electronics
  - Damaged cable insulation
  - Trapped cables.
- Clamps and cable shoes shall be kept clean and coated slightly with terminal grease.
- Have faults repaired immediately by a qualified and authorized person.
- Check for damage of cables and terminals every 500 working hours.

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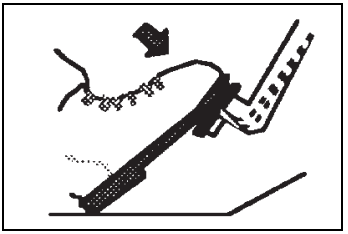
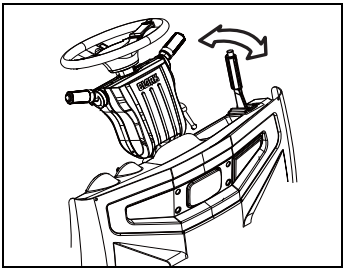
- If a Tow Tractor is operated with the old cables, the insulation of the cable may be hardened or cracked. In that case, the cables should be replaced with new cables having over 194°F (90°C) temperature rating.

Checking the service brake



- Depress the brake pedal with your foot to check that a firm resistance can be felt.
  The pedal must not feel spongy or give way. If it does, the Tow Tractor must not be used under any circumstances. Instead, you should arrange for the brake system to be serviced immediately.
- The pedal pad should also be replaced, if it no longer provides a good grip.

Checking the parking brake



- The brake is applied by moving the lever backwards and released by moving it forwards.
- The parking brake (hand brake) must hold your Tow Tractor on a 15% grade without load.

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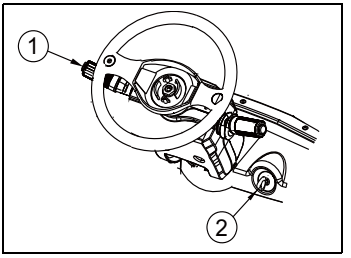
Starting the Truck

- Before you start the Tow Tractor, make sure that you have taken all the above-mentioned precautions and that the directional control (1) is in NEUTRAL. To start the Tow Tractor, turn the key switch (2) clockwise to the ON position.



Checking the traction cables

- Check for damage of cables and terminals at every scheduled PM(500 hrs)
- During inspection, check the following cable conditions
  - Terminals for loosing or corrosion
  - Insulation for hardening and cracking
  - Evidence of over heating
  - Worn or thin insulation
- Do not repair a cable by cutting out the damaged section and splicing.
- When required entire cable for traction motor should be replaced with new cables having over 194°F (90°C) temperature rating.

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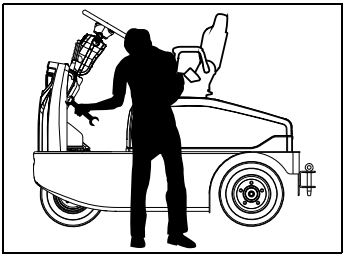
Operational safety of the Tow Tractor

- Do not start using any Tow Tractor, which is not in a safe operational state.
- Tow Tractors should only be repaired by competent and authorized persons.



Checklist after Equipment Deployment

Check followings after deploying the equipment;

- Check travel motor for proper functions
- Check the function of the battery charger
- Check various contacts for function and contact point condition
- Check braking distance and abnormal noise
- Check brake pedal force and clearance
- Check parking brake
- Check tire air pressure and tread wear
- Check battery fluid and terminals
- Check instrument gauges and warning lamps
- The speed can be set from 1.25 MPH (2km/h) to 5.6 MPH (9km/h) in 1km/h units.

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1) General

Persons to be appointed for maintenance and recurring inspections

Only qualified and authorised persons are allowed to carry out maintenance work. Periodic inspections shall be carried out by a technical expert. The aforesaid technical expert shall submit his expert opinion and evaluation only from the point of view of safety without being influenced by company and economic circumstances. He shall have sufficient knowledge and experience in order to be able to assess the status and condition of the truck and the effectiveness of the protective equipment in accordance with the latest state of the art and the basic principles for the inspection of trucks. Your CLARK dealer has trained staff available for maintenance and periodic inspections.

Intervals for maintenance work

The maintenance work shall be be carried out in intervals specified in Chapter 5.

Quality and quantity of the required oils and lubricants

Only the oils and lubricants stated in the operating instructions shall be used.

Spare parts

Only those spare parts shall be used which are specified by CLARK. If spare parts are used which have not been approved by CLARK, the risk of accidents can increase due to inadequate quality or an incorrect connection. If inadmissible spare parts are used, the user shall assume full and unlimited responsibility for any damage sustained.

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Servicing for which no special qualification is required

Simple servicing such as checking the oil level or checking the level of liquid in the battery may also be carried out by the operator.

Safety installations

All safety devices shall be re-installed after servicing and repairs and shall be checked for proper functioning.

Settings

If hydraulic and electric components are repaired or replaced, the equipment related settings shall be observed.

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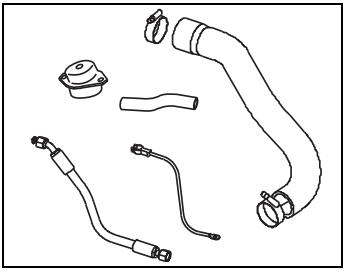
2) Safety tips

Hoses, cables and rubber parts



- Hydraulic lines must be depressurised.
- Hoses, cables and rubber parts succumb to a natural process of ageing, which is dependent on outside influences (e.g., temperature, environmental factors, etc.).
- At every maintenance, check all hoses, cables and rubber parts for damage and ageing.
- Replace all defective parts.

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Electronic system

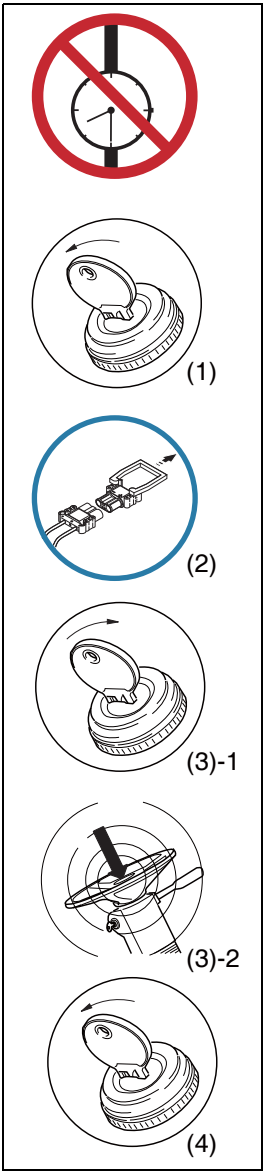
WARNING

Work on the electric equipment of truck shall only be carried out in a powerfree condition. Work on live components for functional testing, checks and adjustments shall only be carried out by instructed and authorized persons taking the appropriate precautionary measures. Before carrying out any maintenance work on electrical components, always disconnect the battery and take off watches, jewellery, rings or other metal objects.

High-performance, modern controls are equipped with capacitors. Residual voltage can still be present after the battery has been disconnected.

For this reason, undertake the following measures before servicing:

1. Switch off the ignition.
2. Disconnect the battery connector.
3. Switch ON the ignition and wait until the display lights go out. Activate the horn for approximately 5 seconds.
4. Switch OFF the ignition.



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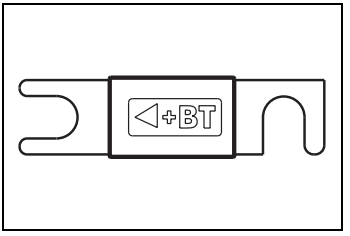
Before calling customer service at your CLARK dealer because of a performance drop or total failure of your truck, please check the following points :

1. Is the battery sufficiently charged?
2. Is the battery connector connected correctly and securely?
3. Are there any foreign particles in the operating panel?
4. Are all wires, cables and plug connections securely connected and damage free?

Are all fuses in working order?
(Check the fuse connections for corrosion).

Fuses

- The main fuses are located on the traction controller. The traction controller is installed under the hood of the truck.
- If you suspect a fuse has burnt out, this can best be checked using an ohm meter.



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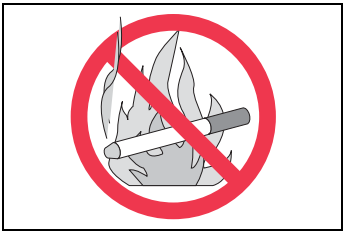
Electric-motors

General visual check

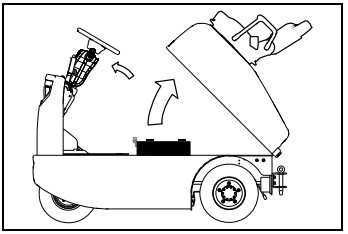
- Check for damage to terminal boards. Check for damage to encoder connector and temperature sensor connector.

Batteries - General information

Always observe the instructions provided by the battery and charger manufacturers.



1. Charging and maintenance operations are to be performed exclusively by qualified personnel working in well ventilated areas.
   Never smoke or use exposed light sources when working on the batteries, as the emerging gases and cause an explosion.
2. Never place electrically conductive parts on the battery cell connectors.



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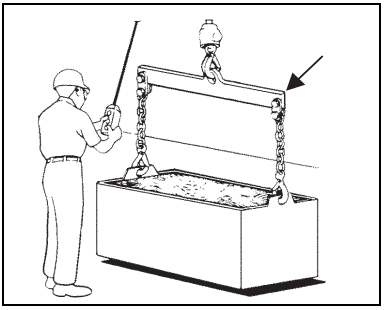
3. Always observe the following during both charging and the subsequent gas generation phase:
   - Battery cover open.
   - Battery plugs removed if the batteries are not equipped with a forced ventilation system (consult battery manual).
   - Remove all cover plates.
   - Check electrolyte level.
   - Switch off charger immediately when connection between charger and battery is interrupted.



4. Have damaged cells replaced.
5. Ensure that cables remain free and are not crimped
6. Always wash hands thoroughly after working with batteries (health and safety precaution).
7. For lifting out the batteries, a special device must be used (see figure).

- Make sure that the chains and safety hooks are checked and offer a sufficient load carrying capacity. Never use chains fixed to a centre ring. These chains will pull the compartment walls to the inside, thus damaging the battery cells.

8. The battery retainer shall be checked after each battery change and adjusted if needed. In order to avoid dangers from unforeseen movement, batteries in the truck shall be secured as specified by CLARK.

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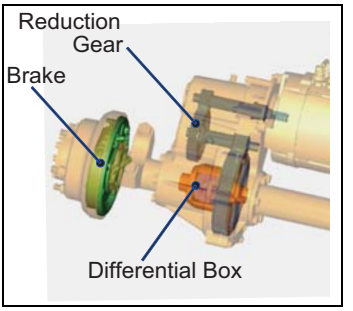
3) Maintenance

Checking the drive axle

1. Repair and replacement of parts



Inspect drive axle parts such as seals and washers for wear. If excessive wear or leakage is found, these parts need to be replaced.

Replace seriously worn parts even if they have not completely failed.

Steel parts such as shafts or gears cannot be repaired. If worn or damaged, they should be replaced.

Seals and washers need to be periodically replaced. Fasteners with auto-locking patches can be reused several times, but they should have a drop of heavy duty thread locker applied.

The repair of drive axel housing is limited to the removal of scratches of burrs on the machined surface, or replacement of damaged studs. Reuse and repair of worn parts should be avoided. Replacement with new parts is usually more cost effective and result in less machine downtime than risking replaced failure of a used part.

When parts replacement is needed, only genuine CLARK service parts should be used to maintain optimum performance and service life.

2. Maintenance period

Replacement period of wheel drive axle oil

2,000 hours with 1.8 Quarts (1.7liter) oil volume.

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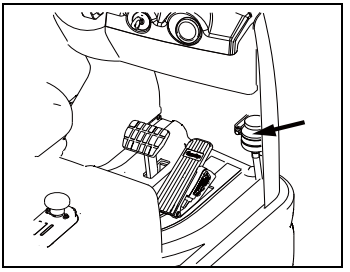
Greasing

- Grease your truck carefully in accordance with the greasing and lubrication schedule.
- Clean the grease nipples before greasing, and after lubricating. Remove any excess grease which has come out at the greasing points.

Checking the brake fluid level

- If the brake fluid level is too low, the brake system must be examined by an expert.
- Brake fluid absorbs moisture from the air (hygroscopic) and must therefore be changed every year.



Brakes

- In more demanding operating conditions, the brake linings may become worn more quickly. It may therefore be necessary to check the brake system between the intervals prescribed in the service schedule.
- New brake linings must get “worn in” and therefore do not have the optimum frictional force initially. The slightly diminished braking effect which results when the brakes are first applied can be overcome by applying the brake pedal harder.

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Disposing of lubricants, filters and batteries

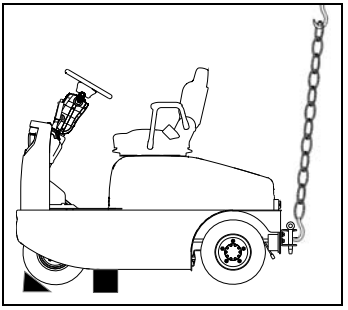
- Used parts and lubricants which arise during repair work must be stored safely until they can be disposed of in accordance with the regulations.
- In this respect, follow the regulations applicable in your country.

Changing the Wheels

1. Rear driving wheels

WARNING

To be able to disassemble the wheels previous experience is needed. If necessary, get in touch with a CLARK dealer.



1) Park the truck on a firm and level surface.
2) Turn the key switch to Off and disconnect the battery.
3) Place wedges behind the front wheels so as to avoid any truck movement.
4) Loosen the wheel nuts one or two turns, turning them counterclockwise.

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WARNING

Do not remove the nuts until the wheels are lifted off the ground.

5) Hold the truck by placing a wooden block under the rear part of the frame.
6) Remove the nuts completely and change the wheels.

WARNING

Be sure that the wooden blocks used to hold the truck are solid and in one only piece.

7) Install back the wheel nuts and snug them tight.
8) Take away the wooden blocks you had placed under the frame.
9) Lower the tractor slowly and take away the chocks from the front wheels.
10) Finish the wheel nut tightening, applying the specified torque.
11) After several hours of operation, tighten the nuts again.

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2. Front wheel

WARNING

To be able to disassemble the wheels you need previous experience. If needed, get in touch with a CLARK dealer.

1) Park the truck on a firm and levelled surface.
2) Turn the key switch to Off and disconnect the battery.
3) Apply the parking brake and place chocks at the rear wheels so as to avoid any truck movement.
4) Fasten the front of the truck with a lifting sling, assuring that the total lifting capacity of the tackle is at least 2/3 of the truck weight.
5) Loosen the wheel nuts slightly.

WARNING

Do not remove the nuts until the truck is lifted off the ground.

6) Lift the truck slowly with the tackle until the front wheel is suspended. Place wooden blocks at each front side of the frame.
7) Remove the nuts completely and change the wheels.

WARNING

Be sure that the wooden blocks used to hold the truck are solid and in one only piece.

8) Install the nuts again with the wheel mounted.
9) Take away the wooden blocks you had placed under the frame.

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10) After several hours of operation, tighten the nuts again.

CAUTION

When reinstalling the wheels, ensure correct seating of the valve stem. It must lock into the grooves of the wheel hub.
Tighten the wheel nuts evenly at the specified tightening torque. Check the tyre pressure.

NOTE

Wheel nuts need time to settle into their correct location while driving under load.
It is therefore essential to retighten the wheel bolts/nuts with the prescribed torque values after 50 operation hours on new machines and every wheel change.

4) Cleaning and Storage

Cleaning the truck

- Cleaning work may only be carried out in areas provided for this purpose. Ensure that pollution is avoided as much as possible.
- All areas which must be kept free of water, steam jet or cleaning agent, for functional or safety reasons, must be protected by covers or by taping them up. This applies, for example, for the electronic system.
- Electric and electronic components shall be cleaned with weak compressed air and metal free brushes.

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- Only brand name, stipulated cleaning agents may be used. Do not use gasoline or diesel under any circumstances.
- Once the truck has been cleaned, remove all covers and tape.
- Lubricate the truck in accordance with the lubrication plan.

WARNING

A braking test shall be carried out after the truck has been washed. If the brakes do not function properly from the operator's seat of the truck, the truck must be brought to a standstill by applying the parking brake.

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Lubrication and Maintenance Plan

Service to be done in accordance of list (1/2)			
Type of lubricant B Brake fluid G Multipurpose grease T Drive axle oil	Type of lubricant Item number in the drawing		**working hours**
Check the tightening torque of critical fastening elements			a
Carry out one equalization charge			a
Check drive axle oil level	1	T	a
Check that drive axle air breather ventilation is free	1		a
Grease steering gear	2	G	a
Check brake linings condition and wear	5		b
Check protection circuit (at least once a year, by an expert only)			c
Check insulation resistance (at least once a year, by an expert only)			c
Check layout of cables and connectors for corrosion			c
Replace drive axle oil	1	T	d
Check / lubricate steer axle wheel bearings	3	G	d
Replace brake fluid (min. every year)	4	B	c
Checking Contactor			a
Service brakes, braking performance			a
Parking brakes, braking performance			a
Brake system check damgaes on hoses, piping, linkage and cable looseness			c
Check rim and tyre condition (Damage, threat depth, screws and nuts, air pressure, abnomal noise)			a
Battery condition			a

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Lubrication and Maintenance Plan

Service to be done in accordance of list (2/2)			
Type of lubricant B Brake fluid G Multipurpose grease T Drive axle oil	Type of lubricant Item number in the drawing		**working hours**
Emergency shut off			a
Electrical wiring and fuses			a
Lightning system functionality and mounting			a
Instrumentation functionality			a
Check steer oil leackage			a
Steering wheel looseness and play, funtionality			a
Check damage on steer hoses			a
Check safety decals and plates			c

NOTES : **a)** Weekly by driver
b) 450~500 hours or every 6 months
c) 900~1000 hours or every 12 months
d) 2000 hours or every year

In heavy conditions the service intervals should be reduced

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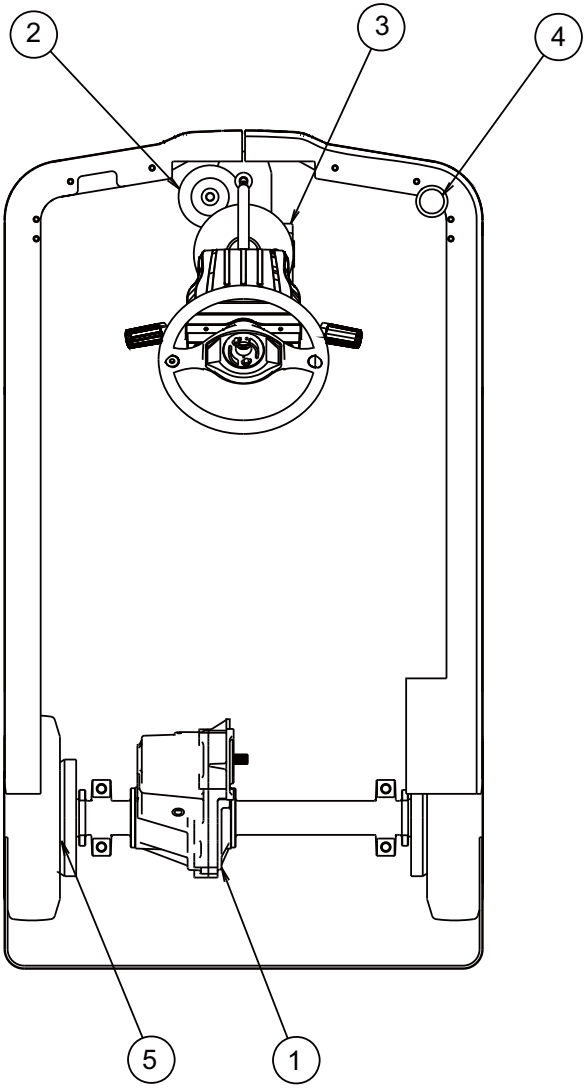

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Lubricant Recommendations

T Drive axle oil

CTX 40 / 70 :

- In accordance with specification SAE 80W90
  (CLARK #6094-10060)

G Multipurpose grease

In accordance with CLARK specification MS-9 or MS-107C

e.g.) BP	:	Multipurpose grease L2
MOBIL	:	Mobilgrease MP
DEFROL	:	M2F 2 EP 2
CHEVRON	:	Dura-Lit EP 2
FINA	:	Marson EPL2
SHELL	:	Alkvania grease EP2
GULF	:	Crow Grease EP 2

B Brake fluid

CTX 40 / 70 :

- In accordance with specification SAE J 1703 DOT 3 or 4
  (CLARK #8002222)

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Technical Data

Filling quantities

Drive axle ..... 1.8 Qts (2 liters)

Brake system .....1 Qt (1 liter)

Wheels and Tire

Steering tire

CTX 40/70..... 4.00 × 8 - 6PR 800kPa (116psi) (8bar)

Drive tires

CTX 40/70..... 4.00 × 8 - 6PR 800kPa (116psi) (8bar)

Fuses

Main fuses (Traction) - CTX 40 .....200 Amp

Main fuses (Traction) - CTX 70 .....250 Amp

Blade fuses - CTX 40/70 ..... 10 Amp

Blade fuses - CTX 40/70 ..... 5 Amp

Torques

Drive axle and frame..... 253 - 290 lbs·ft (343 - 392 N·m)

Wheel mounting nuts drive axle..... 114 - 133 lbs·ft (155 - 180 N·m)

Wheel mounting nuts steer axle ..... 114 - 133 lbs·ft (155 - 180 N·m)

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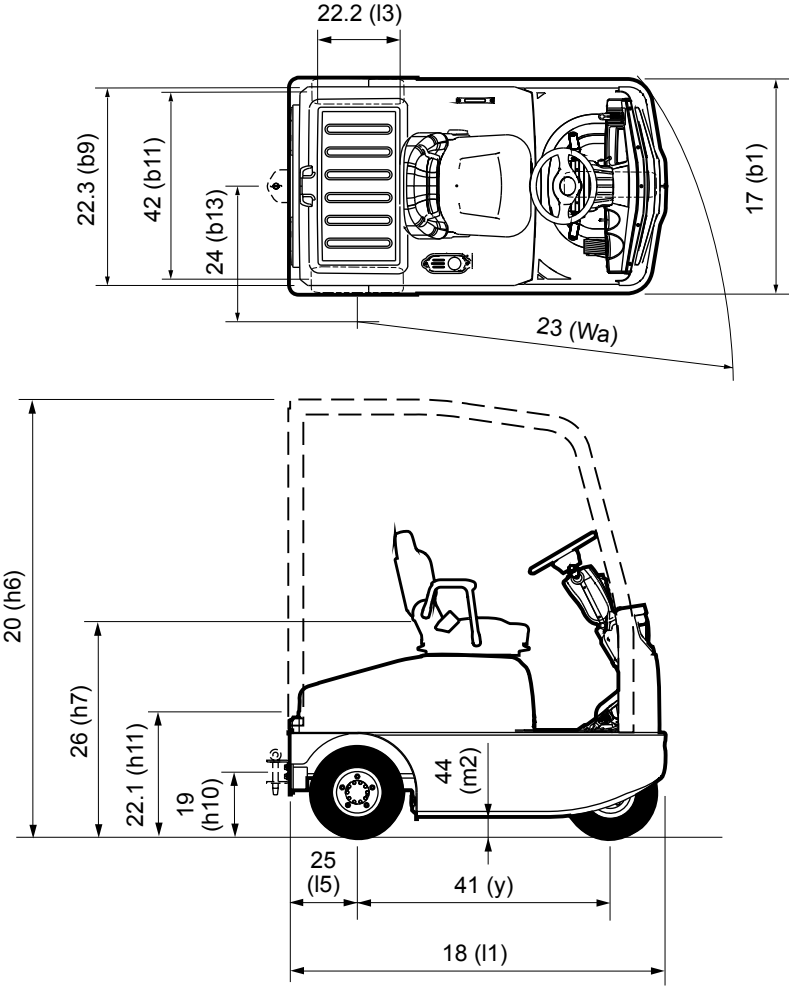
Dimensions (CTX40 / 70)



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Specification

General Information	1	Manufacture			CLARK	CLARK
	2	Model	Manufacture's Designation		CTX40	CTX70
	3	Rolling Load Capacity		lbs(kg)	8800(4000)	15400(7000)
	4					
	5	Power Unit			48 Volt	48 Volt
	6	Operator Type	Electric		Rider	Rider
	7	Tire Type			Solid Pneumatic	Solid Pneumatic
	8	Wheels (x=driven)	Front/Rear		1 / 2X	1 / 2X
Basic Dimensions	15	Overall Dimensions				
	17		Width Over Frame	b1 in(mm)	39.2(995)	39.2(995)
	18		Length w/Hitch, w/o Hitch	l1 in(mm)	72(1830),68(1730)	72(1830),68(1730)
	19		Coupling Height	h10 in(mm)	11.6(295)	11.6(295)
	20		Height, Weather Endosure	h6 in(mm)	80.1(2035)	80.1(2035)
	21	Step Height	Ground to Topof Step Plate	in(mm)	18.5(470)	18.5(470)
	22.1	Loading Height	Ground to Car go Area(unloaded)	h11 in(mm)	23.8(605)	23.8(605)
	22.2		Length of Loading surface	l3 in(mm)	16.5(420)	16.5(420)
	22.3		Width of Loading surface	b9 in(mm)	30.2(767)	30.2(767)
	23	Turning Radius	Turning Radius	Wa in(mm)	67(1700)	67(1700)
	24		Inside Turning Radius	b13 in(mm)	21.7(550)	21.7(550)
	25	Overhang		l5 in(mm)	12.2(310)	12.2(310)
	26	Seat Height	Ground to top of Seat Cushion	h7 in(mm)	36.2(920)	36.2(920)
	27					
Performance	28	Speeds	Travel Speed,Max w/Load	mph(kph)	5.6(9)	4.3(7)
	29		Travel Speed,Max w/oLoad	mph(kph)	8.1(13)	10.6(17)
	30					
	31					
	34	Service Weight		lbs(kg)	2006(910)	2315(1050)
Weights	35	Axle loading	Unload, Front/Rear	lbs(kg)	860(390)/1147(520)	948(430)/1367(620)
			Unloaded, Rear	lbs(kg)	1146(520)	1367(620)
Chassis	39	Tires	Number, Front/Rear		1/2	1/2
	40		Size, Front	in(mm)	4.00-8/6	4.00-8/6
			Size, Rear	in(mm)	4.00-8/6	4.00-8/6
	41	Wheel base		y in(mm)	45.6(1160)	45.6(1160)
	42	Track	Rear	b11 in(mm)	34.25(870)	34.25(870)
	43					
	44	Ground Clearance	At Center of Wheel base	m2 in(mm)	3.54(90)	3.54(90)
	45	Driver Motor Rating	S2-60m	HP(kW)	8(6.0)	8(6.0)
	46	Service Brake			Regen/Drum&Shoe	Regen/Drum&Shoe
Driver Line	48	Battery	Type		Lead-Acid	Lead-Acid
			Weight, Min	lbs(kg)	882(400)	1191(540)
			Drive Motor Control		AC inverter	AC inverter
			Max Capacity (6 hr rated)	kWh	14.0	14.0
	57	Towing Coupling Type			Pin Type	Pin Type
	58	Sound Level	ANSI B56.11.5	dB(A)	68.4	69.5

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Printed Date ; Feb. 2017