

FARMTRAC

TRAKTÖRLERİ TÜRKİYE

Kullanım Kılavuzu

Farmtrac 675/675DT



 **Perkins**

BOSCH 



 **CARRARO**

Özkaplan Otomotiv

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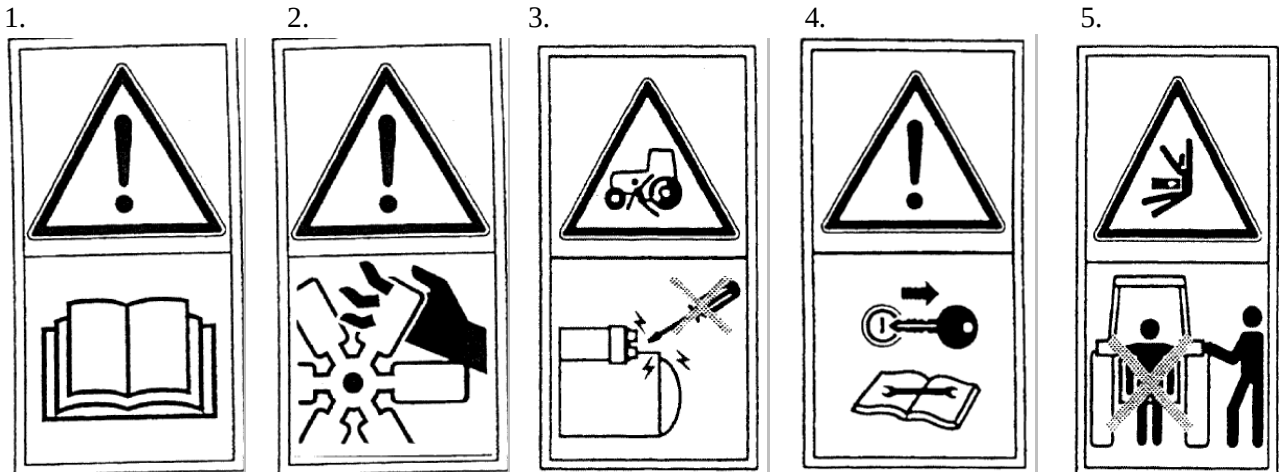
INTRODUCTION



This symbol warn of necessity of particularly careful due to possible risk for people and tractor damage.

Read this Manual carefully and familiarize yourself with all the controls before attempting to operate the tractor and observe the included rules.

Safety symbols



Ad. 1 – Read the operator's manual carefully.

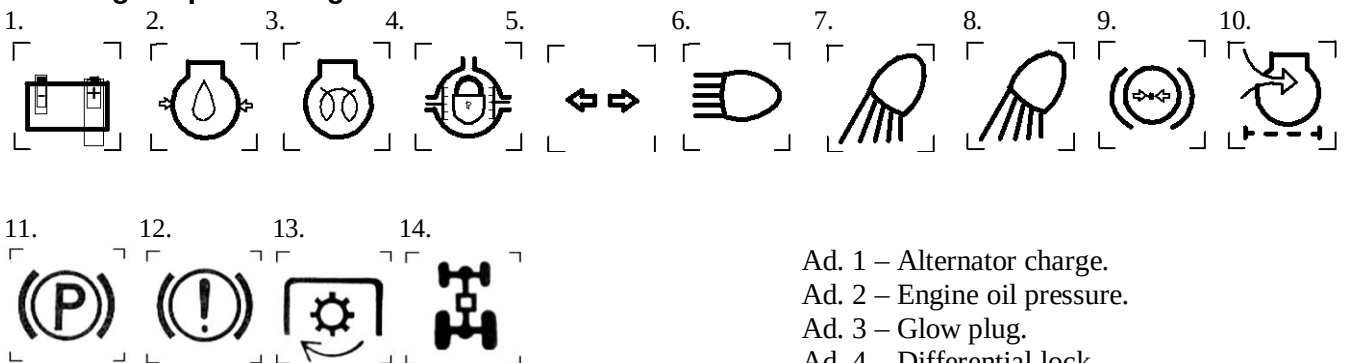
Ad. 2 – Keep your hands away from moving parts..

Ad. 3 – Always start the engine from the operator's seat.

Ad. 4 – Stop the engine and remove the key before you start maintenance or repair operations.

Ad. 5 – Keep away from the three-point linkage.

Warning lamps marking



Ad. 1 – Alternator charge.

Ad. 2 – Engine oil pressure.

Ad. 3 – Glow plug.

Ad. 4 – Differential lock.

Ad. 5 – Turn indicators.

Ad. 6 – Headlight main beam.

Ad. 7 – Work lamp front.

Ad. 8 – Work lamp rear.

Ad. 9 – Air pressure drop.

Ad. 10 – Air cleaner choked.

Ad. 11 – Parking brake.

Ad. 12 – Braking system failure.

Ad. 13 – PTO (power take-off)

Ad. 14 – 4WD (four wheel drive)



Fig. 1.0. Universal tractor FARMTRAC 675 DT.

Thank you for purchasing new Farmtrac tractor.

This Manual has been prepared to assist you in the correct procedure for running-in, driving and operating your new tractor and to assist you in the correct method of maintenance to keep it in peak condition.

Farmtrac series of tractors have been designed and build to give maximum performance, economy and ease of operation under a wide variety of operating conditions.

Prior to delivery, your tractor was carefully inspected, both at the factory and by your Authorized Dealer to ensure that it reaches you in optimum condition. To maintain this condition and ensure trouble-free operation, it is important that the routine services, as specified in this manual, are carried out at the recommended intervals.

The vehicle reference serial number should always be quoted to the Dealer whenever tractor requires service.

Read this manual carefully and keep it at a convenient place for future reference. This manual must be considered as an integral part of your tractor. If at any time you require service or advice concerning your tractor, do not hesitate to contact your Authorized Dealer.

He has trained personnel, genuine parts and the necessary equipment to carry out all your service requirements.

When replacement parts are required, it is important that only genuine or approved service parts be used. Extensive damage may occur as a result of fitment of parts of inferior quality.

All data given in this book is subject to production variations. Dimension and weights are approximate only and the illustrations do not necessarily show tractors in standard condition. Some of the equipment / accessories described in the text may also not be fitted on your tractor. For exact information about any particular tractor, please consult your Authorized Dealer.

1. GENERAL INFORMATION

1.1. Identification data.

- Tractor identification data is located on tractor identification plate, located on the right hand side on wall of Cabin under the engine bonnet and affixed with rivets, (Fig. 1a).
The plate contains tractor serial number, engine serial number and year of manufacture, etc.
- The chassis (tractor) serial number is punctured on the clutch housing at the R.H. side of the tractor (Fig. 1b).
- The engine serial number - punctured on the cylinder block at the R.H. side of tractor, beside FIP (Fig. 1c).
- Cabin identification data - on identification plate on L.H. side front central cross bar of cabin frame (inside cabin, Fig. 1d).

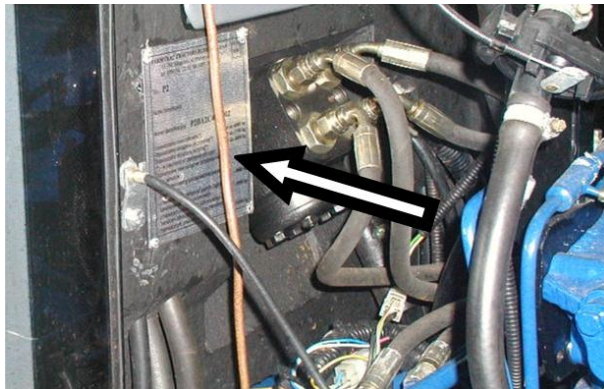


Fig. 1a



Fig. 1b



Fig. 1c



Fig. 1d

1.2. Safety precautions.

A careful operator is the best operator. Most accidents can be avoided by observing certain precautions to prevent the possibility of injury or damage. The following precautions should be taken to help prevent accidents. Read these carefully before operating your new Farmtrac tractor.



Important !

1. Read this Manual carefully and familiarize yourself with all the controls before attempting to operate the tractor. Working with unfamiliar equipment or lack of operating knowledge may lead to accidents.
2. Do not permit any one to ride on the tractor with the operator.
3. Use the foot steps and assist handles when getting on or off the tractor. It is recommended that you face the tractor when mounting or dismounting. Keep steps and platform clear of mud and debris.
4. Replace any warning sign on the tractor that becomes damaged or is painted over. Replace all missing, illegible or damaged safety decals.

Operating the tractor

1. Never start the engine while standing beside the tractor. Always sit on the tractor seat. Fasten seat belt and ensure that the Cab/ Roll Over Protective Structure (ROPS) (if fitted) is in place before starting the engine.
2. Apply the parking brake, place the PTO selection lever in the "Neutral" position, external hydraulics control lever in the "Neutral" position, the lift control levers in the down position and the transmission in neutral before starting the tractor.
3. Do not bypass the safety starter switch. Consult your Dealer if your safety start control is not operating correctly.
4. Stop the engine, bring PTO selection lever in neutral position and apply the parking brake.
5. Do not engage the parking brake while the tractor is in motion.
6. Never get off the tractor while it is in motion.
7. Never park the tractor on a steep incline.
8. To provide maximum lateral stability, add liquid ballast to tyres and cast iron wheel weights and set front and rear wheels to maximum tread width commensurate with the operation being performed.
9. Do not tie ropes, chains, or cables to the axle or other parts of the chassis. Always hitch the load to the tractor's drawbar in the lowest possible position, except when pulling implements are specifically designed and properly attached to the three point hitch.
10. If the front tends to rise with heavy implements at the rear, install front end wafer weights.
11. Ensure that an implement coupled to the three-point linkage does not collide any part of the cab (applicable to tractors fitted with cab).
12. Never leave equipment in raised position.
13. If the engine or power steering ceases operating, stop the tractor immediately.
14. Always engage Position Control when attaching equipment, transporting equipment and when no equipment is attached. Be sure hydraulic couplers are properly mounted and will disconnect safely in case of accidental detachment of the implement.
15. Ensure any attached equipment or accessories are correctly installed, are approved for use with the tractor, do not overload the tractor and are operated and maintained in accordance with the instructions issued by the equipment or accessory manufacturer.
16. Remember that your tractor, if abused or incorrectly used, can be dangerous and become a hazard both to the operator and to bystanders. Do not overload or operate with attached equipment which is unsafe, not designed for the particular task or is poorly maintained.

WARNING: Hearing protection must be worn when operating this tractor if a safety cab is not fitted.



Driving the tractor

1. Before you start driving always blow the horn to warn the people operating the machine attached to your tractor, bystanders and especially children.
2. Always drive the tractor with care and at speeds compatible with safety, especially when operating over rough ground, crossing ditches or slopes, or when turning, to avoid overturning the tractor.
3. Never allow the tractor to over-run when going downhill, particularly with trailed equipment attached. Keep the tractor in the same gear when going downhill as used when going uphill. Do not coast or free-wheel down hills. Use extreme caution while operating on steep slopes and use a low gear to maintain control with minimum braking.
4. Keep the brake pedals latched together at all times unless independent braking is required. This may be used to assist turning when traveling very slowly and on headlands.
5. Reduce speed before turning or applying the brakes. Brake both the wheels simultaneously when making an emergency stop.
6. Do not engage the differential lock when turning the tractor. When engaged, the lock will prevent the tractor taking the turn and may result in overturning of the tractor.

7. If the tractor drive wheels are stuck, shift to reverse gear and back out, to prevent from lifting the front wheels off the ground and possibly rolling the tractor over backwards.
8. Slow moving vehicles on highways are dangerous. Use a slow moving (SMV) sign in conjunction with headlights, tail lights and flashing warning lights.
9. Use extreme caution and avoid hard application of the tractor brakes when towing heavy loads. Any towed vehicle whose total weight exceeds that of the tractor must be equipped with pneumatic brakes for safe operations.
10. Watch where you are going especially at row ends, on roads, around trees and any low hanging obstacle.
11. Dip the tractor lights when meeting a vehicle at night. Ensure the lights are adjusted to avoid blinding the driver of an oncoming vehicle.
12. Always check overhead clearance, especially when working in confined spaces.
13. Engage the clutch slowly when driving out of a ditch, gully or up a steep hillside. Disengage the clutch promptly if the front wheels rise off the ground.
14. Whenever possible avoid driving the tractor across slopes. Preferably drive up and down sloping fields. If it is necessary to work across slopes, proceed as follows:
 - use the widest wheel track setting compatible with the implement being used,
 - always turn uphill at the end of each run,
 - raise the implement to the height sufficient for making a turn only, or raise the implement using Position Control,
 - ensure that the rear tyre pressures are equal,
 - reduce the speed to a minimum on headlands,
 - when using a reversible plough, start at the top of the slope to reduce the tractor inclination angle by making the top wheels run in the furrow.

Operating the PTO

1. Ensure the PTO guard is always installed and replace the PTO shaft cap when the PTO is not being used.
2. Disengage the independent PTO clutch prior the selection of PTO. Before stopping the engine, bring the PTO selection lever in neutral position and wait for the PTO shaft to stop turning before getting off the tractor to connect or disconnect PTO driven equipment.
3. Apply the parking brake and block the rear wheels, front and rear, when operating stationary PTO driven equipment.
4. To avoid injury, never clean, unclog, adjust or service PTO driven equipment while PTO is engaged.
5. Never wear loose clothing when operating the PTO or when near equipment that is rotating.
6. Before operating implements, study the implement manufacturer's handbook. Certain implements require special operating techniques.

Servicing the tractor

1. Keep the tractor and equipment, particularly brakes and steering, maintained in a reliable and satisfactory condition to ensure your safety and comply with legal requirements.
2. Stop the engine and disconnect battery terminals before performing any service on the tractor.
3. To prevent fire or explosion, keep open flames away from the battery. To prevent sparks which could cause explosion, use jumper cables according to instructions.
4. The fuel oil in the injection system and fluid in the hydraulic system are under high pressure and can penetrate the skin. Unqualified and unauthorized persons should not remove or attempt to adjust a pump, injector, nozzle or any other part of the fuel injection system. This also may be unlawful under certain circumstances. Failure to follow these instructions can result in serious injury.
5. Do not use your hand to check for leaks. Use a piece of cardboard or paper to search for leaks.
6. Stop the engine and relieve pressure before connecting or disconnecting hydraulic or fuel lines.
7. Tighten all connections before starting the engine or pressurizing lines.
8. If fluid is injected into the skin, obtain medical attention immediately.

9. The cooling system is operated under pressure which is controlled by the radiator cap. It is dangerous to remove the cap while the system is hot. Allow the engine to cool, then turn the cap slowly to the first stop and allow the pressure to escape before removing the cap entirely.
10. Continuous long term contact with used engine oil may cause skin cancer. Avoid prolonged contact with used engine oil. Wash skin promptly with soap and water.
11. Do not run the tractor engine in a closed building without adequate ventilation as exhaust fumes may suffocate you.
12. Do not modify, or alter, or permit anyone else to modify, or alter the tractor, or any of its components, or any tractor function without first consulting your Authorized Dealer.
13. Tractor wheels are heavy. Handle them with care and ensure that, when stored, they cannot topple and cause injury.
14. Discard the used lubricating oils and filter canisters in accordance with local regulations.

1.3. Fire precautions.

1. Under no circumstances should gasoline, alcohol or blended fuels be added to fuel oil. These combinations can create an increased fire or explosive hazard. In a closed container, such as a fuel tank, these blends are more explosive than pure gasoline. **Do not use these blends.**
2. Never remove the fuel cap or refuel with the engine running or hot.
3. Do not smoke or allow an open flame near the fuel tank or while re-fuelling the tractor. Wait for the engine to cool before re-fuelling.
4. Maintain control on the fuel filler pipe nozzle when filling the tank.
5. Do not fill the fuel tank to its capacity. Allow room for expansion.
6. Wipe up spilled fuel immediately.
7. Always tighten the fuel tank cap securely.
8. If the original fuel tank cap is lost, replace it with an approved cap. A non-approved cap may not be safe.
9. Keep equipment clean and properly maintained.
10. Do not drive equipment near open fires.
11. Should the fuel catch fire, extinguish fire covering it tightly with asbestos blanket, canvas sheet or rags, or else by pouring sand or soil over the fire. Never use water to extinguish burning fuel or lubricants as this makes the fire to spread even faster. A fire extinguisher should be carried with the tractor.
12. Precautions should be taken to ensure that stored fuel is kept free of dirt, water, etc.
13. Fuel should be stored in black iron tanks, not galvanized tanks, as the galvanized coating will react with the fuel and form compounds that will contaminate the injection pump and injectors.
14. Bulk storage tanks should be installed away from direct sunlight and angled slightly so that the outlet pipe is at the higher end. In this way sediment in the tank will settle away from the outlet pipe.
15. To facilitate moisture and sediment removal, a drain plug should be provided at the lowest point (at the opposite end to the outlet pipe). If there is no filter on the outlet pipe, then a funnel with a fine mesh screen should be used when filling the tractor fuel tank.
16. Fuel purchases should be arranged so that summer grade fuels are not held over and used in winter and vice-versa.

WARNING:



The fuel oil in the injecting system is pressurized and can penetrate human skin with fatal results. Adjustment of fuel injection equipment should not be carried out by unqualified persons.

Safety frame or roll bar (where fitted)

Your tractor is equipped with a CAB/ROPS which must be maintained in a serviceable condition. Be careful when driving through doorways or working in confined spaces with low headroom.

Do not:

- I) Modify, drill, weld or alter the CAB/ROPS in any way. Doing so could render you liable to legal prosecution in some counties.
- II) Attempt to straighten or weld any part of the CAB/ROPS or retaining brackets which have suffered damage. By doing so you may weaken the structure and endanger your safety.
- III) Secure any parts on the CAB/ROPS or attach it with other than special high tensile bolts and nuts specified.
- IV) Attach chains or ropes to the CAB/ROPS for pulling purposes.
- V) Take unnecessary risks even though your CAB/ROPS affords you the maximum protection possible.

NOTE: If there is a risk from falling objects at your work environment, a Falling Objects Protective Structure (FOPS) must be installed on your tractor.

1.4. Warranty.

FARMTRAC TRACTORS EUROPE, when selling tractors to its Authorized Dealers, gives a warranty which, subject to certain conditions guarantees that tractors are free from defects in material and workmanship.

Each FARMTRAC TRACTORS EUROPE Authorized Dealer is required to give a similar warranty for the benefit of the first retail purchaser of a new tractor supplied by FARMTRAC TRACTORS EUROPE.

Under the terms of warranty the purchaser is entitled to a specified, service inspections and repairs including parts replacement, if the manufacturer is responsible for the defect.

NOTE:	FARMTRAC TRACTORS EUROPE will not accept responsibility for any claim resulting from the fitment of non-approved parts or attachments, or unauthorized modification or alteration.
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NOTE:	Repairs of parts protected with seals can be carried out by an Authorized Dealer only. Arbitrary removal or breaking of the seal may lead to warranty invalidation.
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1.5. Tractor delivery to purchaser.

The Dealer is required to carry out certain activities when supplying a new Farmtrac tractor.

This consists of a full pre-delivery inspection to ensure that the tractor supplied is ready for immediate use and full instructions in the basic principles of operation and maintenance of the tractor. These instructions will cover instruments and controls, routine maintenance and safety precautions. All persons who will be concerned with the operation and maintenance of the machine should be present for these instructions.

The following check list items should be covered by the Dealer during the tractor handing over:

- all safety points and decals on the tractor and in the Operator's Manual,
- location and significance of tractor and engine serial numbers,
- use of all instruments and controls,
- running in procedure,
- engine starting and stopping procedure, when hot and cold,
- driving the tractor, starting and stopping,
- gear selection for the particular operation to be performed,
- towing of the tractor,
- use and adjustment of clutches,
- brakes, latched and unlatched, method of adjustment,

- differential lock, its engagement, disengagement and adjustment,
- use of power take-off,
- how to use the hydraulic lift system, attach/detach implements and use of stabilizers.
- use of external hydraulics,
- four-wheel drive, its engagement and disengagement,
- the method of making the wheel track adjustments, front wheel alignment and use of correct tyre pressure,
- cooling system, frost precautions and fan belt adjustment.
- maintenance of the engine air cleaner,
- fuel system and how to remove the air,
- electrical system maintenance,
- bolts and nuts fastening,
- grease points,
- oil changes and location of drain plugs, filler plugs and dipsticks,
- filter replacement and cleaning,
- transport and storage of fuel,
- warranty entitlement and the services due during the warranty period.

Pre-delivery inspection

The following items must be checked, and where necessary, corrected by the Dealer before delivery:

1. Verify serial numbers of the tractor and engine.
2. Assemble parts removed for transport.
3. Check the tractor against its specification.
4. Examine the condition of factory seals.
5. Remove water and impurities from water trap and bleed the fuel system.
6. Check the liquid level in the cooling system and in screen washer system.
7. Check the oil level in all system.
8. Check the battery electrolyte level and electrolyte concentration.
9. Lubricate all grease points, if necessary.
10. Check for tightness and locking all external nuts, bolts, screw, plugs, connections, and clamping bands (special attention should be paid to air intake and cooling system hose and pipe connections).
11. Ensure that pipes, hoses and wiring are not fouling exhaust system or sharp edges.
12. Check the fan and air compressor (if fitted) V-belt tension.
13. Check clutch pedal free travel.
14. Check tyre pressure.
15. Check front wheel alignment and hub bearings for play.
16. Check the safety start switch function.
17. Check the headlight setting.
18. Road test the tractor checking all instruments, controls and services for correct function.
19. After road test, check for leaks.

2. TECHNICAL SPECIFICATION.

Specification / Tractor model	FT 675 DT	FT 675
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2.1. Engine.

Engine model	PERKINS 1104D-44T 3061/2200
Engine type	four stroke, water-cooled, turbocharged, direct injection diesel
Number of cylinders	4, vertical, in-line
Firing order	1 – 3 – 4 - 2
Bore / stroke	105 / 127 [mm]
Capacity	4400 [cm ³]
Compression ratio	18.2 :1 ± 5%
Engine rated power	55,5 / 75,5 [kW / HP]
Engine rated speed	2200
Maximum engine torque	307 [Nm] at 1400 rpm
Low idle speed, rpm	800 ÷ 1000 [rpm]
Valve clearances (on cold engine)	
• inlet valve	0,20 [mm]
• exhaust valve	0,45 [mm]
Valve timing:	
• inlet valve opens	17° BTDC
• inlet valve closes	48° ABDC
• exhaust valve opens	59° BBDC
• exhaust valve closes	75° ATDC

Fuel System

Fuel Injection pump type, make	Rotary type 1532 -2644C312, -2644C339
Governor type, make	Mechanical, DELPHI
Max. no load speed	2350 ± 50 rpm
Injector	
• type	Delphi 2645K025
• injector nozzle type	LJBX 6923602,
• injection pressure	18,4±0,4 MPa
Fuel Feed pump	Electric
Fuel filter	Two stage type , placed between Fuel Feed pump and F.I.P.
Recommended fuel:	Diesel fuel
• summer	B per PN-EN590:2002
• interim period	D per PN-EN590:2002
• winter	F per PN-EN590:2002
Fuel tank capacity	98 [dm ³]

Lubrication System

Type	Full flow, force feed and splash
Pump type	Eccentric
Oil pressure at engine rated speed and oil temp of 110°C	0.30 MPa
Oil filter type	Spin on, throw away type
Lubricating system capacity	9 dm ³
Recommended oil	- TEXACO URSA SUPER TD 15W-40 - STATOIL EuroWay 15W-40 - STATOIL TurboMaxWay 15W-40

Cooling System

Type	Pressurised recirculation, by pass with radiator, fan, thermostat
Cooling system capacity, litres	17 dm ³
Fan	10 blades, diameter 457 mm
Fan / alternator belt deflection, mm	13 ÷ 19 mm
Recommended coolant	see coolant specification

Air cleaner

Type	dry type, two-stage, in front of radiator
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2.2. Electrical System.

Type	single line, 12V with negative to earth
Alternator	Denso A115 - 12V/65A
Battery	6 SK 120,12V,120 Ah
Starter motor	Denso P95 - 12V/3 kW
Starting aid	glow plug
Electrical socket	Seven pin socket, 12N

2.3. Transmission.**Clutch.**

Type	friction type, dry, two-disc clutch with independent control of PTO clutch
Clutch plate diameter:	
• transmission	310 mm
• PTO	310 mm
Pedal free travel (Transmission clutch)	25 ÷ 35 mm
Actuation	Transmission clutch – foot pedal, PTO clutch – hydraulic

Gearbox with range lever

Type	CARRARO mechanical, with constant mesh gears
Number of gears in gearbox	4 + 4R
Number of reduction gears	3
Total number of forward/reverse gears	12 F; 12 R
Gearbox control	manual by means of three levers
Oil capacity	See rear axle

Rear Axle

Type	Carraro 506 UP HCR bevel tooth crown wheel and pinion
Final drive gear ratio	3,166 : 1
Differential – satellites No.	4
– differential lock	mechanical, foot operated
Final reduction gears - type	epicyclical
- gear ratio	6,857 : 1
Recommended oil	TEXACO Super Universal Tractor Oil 15W-30
Oil capacity:	
gear box, rear axle, hydraulic system	38,0 dm ³
Other	- safety start - differential lock

Ratios and tractor ground speeds

Table 1.

Gear range	Gear	Total ratio		Theoretical tractor ground speeds in km/h at engine rated speed for specified tyre size / effective rolling circuit											
		For-ward	Back-ward	18,4-30 / 4522		16,9-30 / 4365		16,9-28 / 4280		16,9R30 / 4317		18,4-R30 / 4537		270/95R38 / 4457	
				For-ward	Back-ward	For-ward	Back-ward	For-ward	Back-ward	For-ward	Back-ward	For-ward	Back-ward	For-ward	Back-ward
L	1L	403,06	474,19	1,51	1,44	1,43	1,21	1,40	1,19	1,41	1,20	1,40	1,19	1,46	1,24
	2L	276,22	324,97	2,21	2,10	2,09	1,77	2,05	1,74	2,06	1,75	2,05	1,74	2,13	1,81
	3L	190,98	224,68	3,20	3,04	3,02	2,56	2,96	2,51	2,98	2,54	2,96	2,51	3,08	2,62
	4L	131,91	155,19	4,63	4,40	4,37	3,71	4,28	3,64	4,32	3,67	4,28	3,64	4,46	3,79
M	1M	160,31	188,60	3,81	3,62	3,59	3,05	3,52	3,00	3,55	3,02	3,52	3,00	3,67	3,12
	2M	109,86	129,25	5,55	5,28	5,24	4,46	5,14	4,37	5,19	4,41	5,14	4,37	5,36	4,55
	3M	75,96	89,36	8,03	7,64	7,58	6,45	7,44	6,32	7,50	6,38	7,44	6,32	7,75	6,58
	4M	52,46	61,72	11,63	11,06	10,98	9,33	10,77	9,15	10,86	9,23	10,77	9,15	11,21	9,53
H	1H	59,71	70,25	10,22	9,72	9,65	8,20	9,46	8,04	9,54	8,11	9,46	8,04	9,85	8,37
	2H	40,92	48,14	14,91	14,18	14,08	11,97	13,81	11,74	13,93	11,84	13,81	11,74	14,38	12,22
	3H	28,29	33,28	21,57	20,52	20,37	17,31	19,97	16,98	20,14	17,12	19,97	16,98	20,80	17,68
	4H	19,54	22,99	31,23	29,70	29,48	25,06	28,91	24,57	29,16	24,79	28,91	24,57	30,11	25,59

Front axle

Type	CARRARO 20.11, crown wheel and pinion	-
Final drive gear ratio	2,3 : 1	-
Differential		-
- differential lock	automatic	
Final reduction gears		-
- type	epicyclical	
- gear ratio	6 : 1	
- oil capacity	2 x 1 dm ³	
Axle housing oil capacity	4 dm ³	-
Recommended oil	TEXACO Geartex EP-C 80W-90	-

Power Take-Off - PTO

Type	independent and ground mechanical
PTO clutch control	Type 1 per PN-86/R-36101 - 6 (ISO 500)
PTO shaft end	695 mm
Height above ground	540 rpm at 1938 rpm
Independent PTO shaft speed	1000 rpm at 1962 rpm
Engine – PTO ratio	at 540 rpm. - 0,278
Rotation	at 1000 rpm - 0,509 rightwards, from tractor end

Ground PTO shaft revolutions No. for specified tyre size used

		Tyre size					
		16.9-28	16.9-30	16.9 R 30	18.4-30	18.4 R 30	270/95 R 38
Ground PTO shaft rotations for 1 km distance	540	2,8278	2,7525	2,8035	2,6180	2,6676	2,7155
	1000	5,1729	5,0352	5,1285	4,7891	4,8798	4,9674

Ground PTO shaft rotations [rpm] on each gear at engine speed 2200 rpm*

Reductor gear ratio	PTO ratio	Gear box ratio (gear)			
		1	2	3	4
L	540	66,06	96,39	139,41	201,85
	1000	120,84	176,33	255,03	369,24
M	540	166,09	242,36	350,53	507,51
	1000	303,83	443,35	641,23	928,38
H	540	445,90	650,65	941,05	1362,47
	1000	815,68	1190,23	1721,47	2492,37

* –backward speed is 85% of forward speed

2.4. Hydraulic lift system.

Type	piston type with position & draft control
Cylinder bore	110/102
Hydraulic pump type	gear
Hydraulic pump capacity- at 2200 rpm	34 dm ³ / min
Nominal Pressure	17 - 19 MPa
Number of quick couplings for external hydraulics	4
Quick couplings type	ISO 12.5
Oil filter	on the suction side of the pump
External hydraulics	control of two double acting or four single acting ram cylinders
Temporary oil rate flow taken from transmission	7 l

2.5. Three-point linkage.

Type	lever type, accordant to PN-88/R-36110
Category	2 per ISO 730-1:1994
Lifting capacity at the ends of lower links in horizontal position	2400 kg

2.6. Coupling devices.

Drawbar. - Type - Pin diameter - Ground clearance - Max. vertical static load	fork type accordant to PN-82/R-36107 33 mm 465 mm 5 kN at 400 mm from PTO shaft end
Upper transportation hitch. - Pin hole diameter - Ground clearance	33 mm 905 mm

2.7. Steering system.

Type	hydrostatic
Oil capacity	3 l
Recommended oil	Hipol ATF-2D
Steering wheel diameter	380 mm
Number of steering wheel revolutions from lock to lock	3,5

2.8. Wheels & axles.

Front axle type • type Spindles • type	rigid, swivel pin mounted, driven -	rigid, swivel pin mounted, not driven rigid, extendable, wheel track adjustable
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Rear wheels: Rim size • Tire size - standard • Wheel track • Recommended inflation pressures: - at field - at road transport	W 16L x 30 18,4 - 30 (8 PR) 1395; 1508; 1592; 1702; 1795; 1908 mm 100÷110 kPa 170 kPa	W 15L x 30 16,9 - 30 (8 PR) 1395; 1508; 1592; 1702; 1795; 1908 100÷110 kPa 170 kPa
Front wheels: • Toe-in • Rim size • Tire size - standard * • Wheel track • Recommended inflation pressures: - without front weights - with front weights - with front loader, speed up to 10 km/h	0 ÷ 5 mm W 10x24 11,2 R24 1460; 1560; 1660; 1760; 1860 100÷110 kPa 120÷140 kPa 240 kPa	0 ÷ 13 mm 5,50 F x 16 7.50 - 16 1385; 1485; 1585; 1685; 1785; 1885 180 kPa 200÷220 kPa 350 kPa

2.9. Braking system.

Service brake:	
• Type	wet, disc type
• Control	mechanical, foot control, with possibility of left & right wheel independent braking
• Acting on	rear axle 2 wheels
Emergency brake:	function fulfilled by parking and service brake
Parking brake	
• Type	wet, disc type
• Control	mechanical, hand lever operated
• Acting on	rear axle wheels
• Trailer air braking system.	over-pressured, single-line or triple-line type
- Air reservoir capacity	15 dm ³
Standard air pressure	
- in single line system	058÷0,63 MPa
- in triple-line system	0,65÷0,81 MPa
Pressure drop at warning lamp on	0,4 ± 0,04 MPa

2.10. Tractor weight.

Weight of tractor in running order, kg	3585 kg	3308 kg
Weight distribution on axle, kg:		
• front	1470 kg	1204 kg
• rear	2115 kg	2104 kg
Maximum permissible tractor weight kg	6000 kg	
Weight distribution on axle kg:		
• front	1650 kg	1500 kg
• rear	4350 kg	4500 kg
Maximum mass of the trailer kg:		
• Unbraked trailer towable mass	1500 kg	
• Unbraked agricultural implement	3000 kg	
• Inertia braked towable mass	5000 kg	
• Independently braked towable mass	5000 kg	
• Towable mass fitted with air braking	12500 kg	
Ballast weights		
• Front axle	$6 \times 22 + 1 \times 40 = 172 \text{ kg}$	
• Rear axle	$2 \times 39 + 4 \times 32 = 206 \text{ kg}$	

2.11. Tractor dimensions.

Overall length, mm	3725÷4190 mm	3710÷4185 mm
Overall width, mm	1939÷2375 mm	1950÷2350 mm
Overall height, mm	2490÷2505 mm	
Wheelbase, mm	2314 mm	2413mm
Ground clearance, mm	390÷405 mm	
Minimum turning circle without independent braking, mm:	With wheel track: front – 1560; rear – 1508	
• to the left front drive engaged front drive disengaged	10100 mm 9350 mm	7710 mm
• to the right front drive engaged front drive disengaged	9900 mm 9150 mm	7600 mm

3. INSTRUMENT PANEL & CONTROL DEVICES

3.1. Instrument Panel.

The following text describes the various gauges, switches, warning lights and control levers situated on the instrument panel, or close to it (Fig 3.1).

Coolant temperature gauge (1)

The gauge indicates the temperature of the engine coolant. If the pointer enters the red zone of the gauge while the engine is running, stop the engine and investigate the cause.

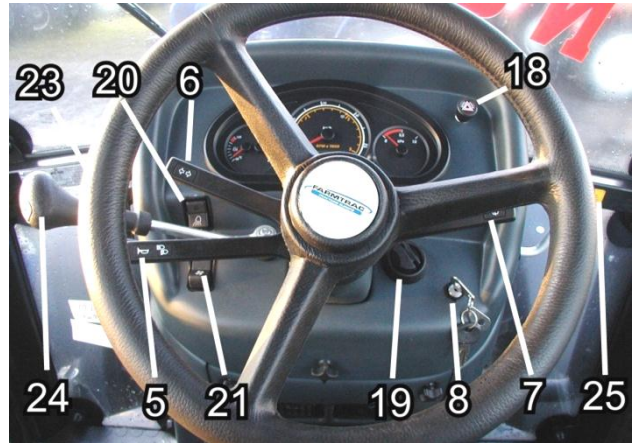


Fig. 3.1 Instrument panel, see description below.

Tachometer and hour meter (2)

Tachometer shows the engine speed in hundreds of revolutions per minute (rpm). The hour meter shows the total number of hours of operation, and register one mth during one hour of engine operation by engine speed of 1600 rpm.

Fuel gauge (3)

The fuel gauge indicates the fuel level in the tank. Operates with the key-start switch turned to position 2.

Air pressure gauge (4)

The air pressure gauge, shows the air pressure in the air system.

Direction indicator switch (5)

Operates as follow:

- Lever center – OFF,
- Lever upwards – R.H. direction indicator operates,
- Lever downwards – L.H. direction indicator operates.

Light and horn switch (6)

The lever has four positions:

- Pos. 1 – upwards – OFF,
- Pos. 2 – center side – side & tail lights and dipped beam ON,
- Pos. 3 – downwards side, tail lights and main beam ON,
- Pos. 4 – backward – horn is actuated in any position of lever.

Windscreen wiper and washer switch (7) (ref. Cab version)

The lever has three positions:

- Lever upwards – OFF,
- Lever downwards – windscreen wiper ON,
- Lever backward – windscreen washer is actuated.

Key-start switch (8)

Positions of the key:

- Pos. 1 – OFF,
- Pos. 2 – (key turned clockwise 30°) – electrical accessories ON,
- Pos. 3 – (key turned clockwise 60°) – flame plug is energized for cold weather starting, (spring turns the key automatically to pos. 2),
- Pos. 4 – (key turned clockwise 90°) – starting motor operates, (spring turns the key automatically to pos. 2).

Alternator charge warning light (9) – red

This charge warning light illuminates when the starter switch key is in pos. 2.

The light should extinguish after the engine starts and rotates 700 rpm. If the warning lamp illuminates when the engine is running, over 750 rpm, stop the engine and identify the cause of the problem.

Engine oil pressure warning light (10) – red

This warning light illuminates when the starter switch key is in pos. 2. It should extinguish when the engine starts and should remain extinguished with the engine running at all its speeds. If the light illuminates when the engine is running, stop the engine immediately and investigate the reason of pressure drop.

Flame plug warning light (11) – yellow

This warning light illuminates when the starter switch key is in pos. 3. Extinguishes after flame plug switching off. If the light does not come on, identify the cause of the problem.

Differential lock warning light (12) – yellow

This warning light illuminates when the differential lock is engaged.

Flashing indicator warning light (13) – green

This warning light flashes irrespective of whether the L.H. or R.H. indicator is selected.

Main beam warning light (14) – blue

This warning light illuminates when the headlights are switched to main beam.

Work lamps warning light

Front (15) and rear (16) lamps.

Air pressure drop warning light (17) – red

This warning light illuminates when the air pressure in the trailer air braking system drops below 0,4. In such case, further towing of a trailer is not permitted.

Hazard warning lights switch (18)

All direction indicators will be flashing simultaneously. The hazard warning lights operate independently of starter switch key position.

Cab heater control knob (19)

This knob controls the valve through which the coolant from the engine cooling system is flowing. When the knob is pushed in, the valve is closed.

Light main switch (20)

This switch is used to switch on/off the tractor lighting system. When pushed in, the tractor marker lights illuminate.

Blower switch (21)

Is used to switch on/off the front blower, controlling the air blow into the cab.

Dipped (lower) beam warning light (22) – green

This warning light illuminates when the headlights are switched to dipped (lower) beam.

Steering wheel adjustment lever (23)

The lever is used to adjust the steering wheel tilt and is always in the permanent lock position. To change the steering wheel tilt, move the wheel lock lever downwards and set the steering wheel to the desired position. Then move the lock lever backwards to lock the steering wheel.

Shuttle lever (24 – described in chapter 3.2)**Hand throttle (25)**

This lever is used to selected engine speed. Pull the lever backwards to progressively increase the engine speed. Push the throttle lever forwards to decrease the engine speed.

NOTE:	When traveling on the road, the foot throttle should be used, and the hand throttle lever should be brought to the closed position.
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Dry air cleaner contamination warning light (26) – yellow

This warning light illuminates in case of dry air cleaner excessive contamination.

PTO 1000 rpm warning light (27) – yellow

This warning light illuminates when the PTO 1000 rpm is set ON.

Front drive engagement warning light (28) – yellow

This warning light illuminates when front drive is engaged.

Parking brake engagement warning light (29) – red

This warning light illuminates when parking brake is engaged.

3.2. Control levers and pedals (Fig. 3.2).**Clutch pedal (3)**

Operation of the foot throttle overrides the hand throttle (25 fig. 3.1) setting when increasing the engine speed. When the foot throttle is released, the engine returns to the speed set by the hand throttle. When foot throttle is used the hand throttle should be brought to the closed position.

Service brake pedals (2, 3)

The service brake system is mechanically actuated. The two brake pedals can either be used independently (to aid turning in confined spaces) or locked together using latch to provide a master pedal for normal braking. For independent braking, disengage the latch (4). Then the inner pedal (2) actuates the brake of rear L.H. wheel and the outer pedal (3) – the brake of rear R.H. wheel.

Clutch pedal (5)

When this pedal is fully pressed, the drive to the wheels will be disengaged. Always depress the clutch pedal to engage or disengage a gear ratio. Clutch pedal must be depressed fully every time any of the three gear levers (main, range or shuttle) is operated.

PTO clutch lever (6) of engine speed PTO

This is used to engage or disengage the drive to the engine speed PTO. When in its bottom position, the drive to the PTO is connected. To disengage the drive to PTO, pull the lever up, and to engage, press the button on the top of the lever and bring the lever down.

PTO selector lever (7)

This lever has three positions as shown on the decal situated by the lever:

- upper position – engine speed PTO engaged,
- centre position – neutral,
- bottom position – ground speed PTO engaged.

When moving the lever to the upper position, always disengage the PTO clutch by means of a lever (6).

NOTE:	1. Keep the PTO clutch always in engaged condition (i.e. ratchet type operating lever in fully down position) irrespective of whether the PTO is in use or not. 2. Depress the transmission clutch for shifting the PTO selector lever from neutral to ground speed PTO and vice-versa.
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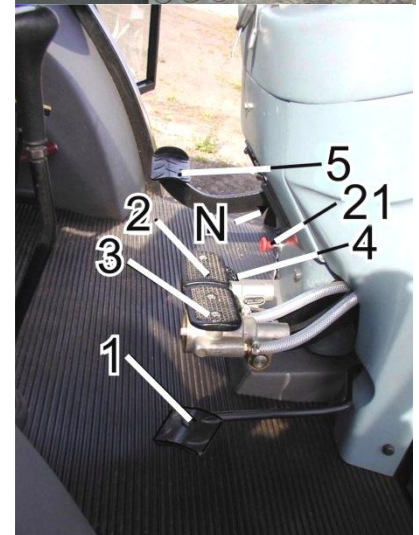
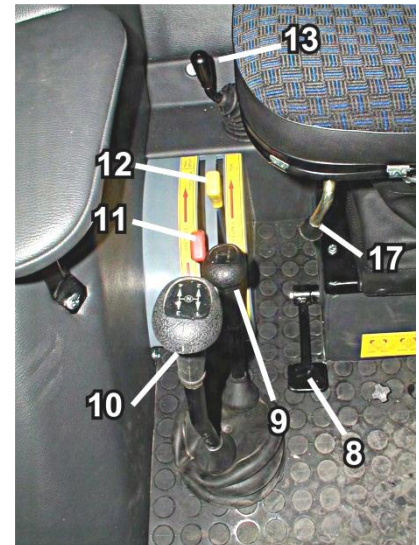
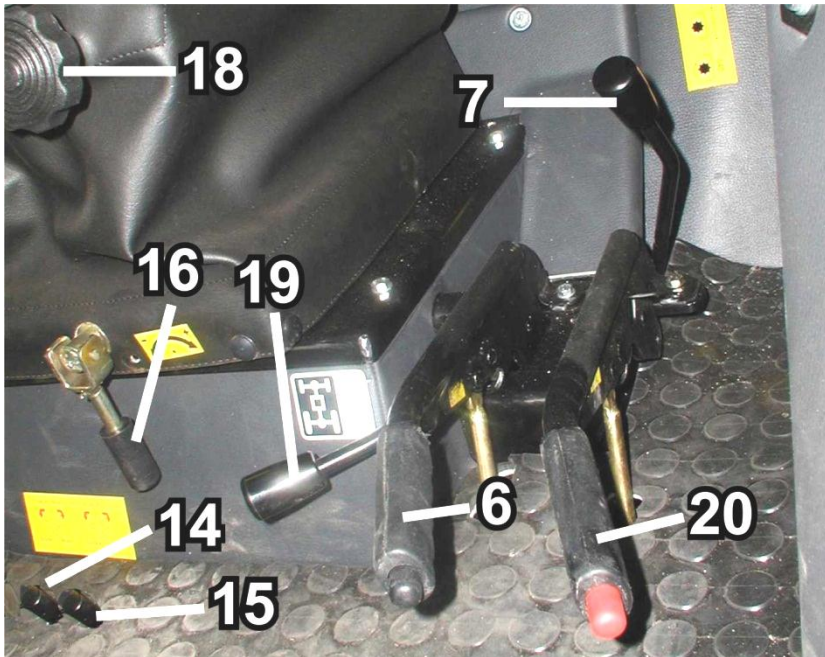


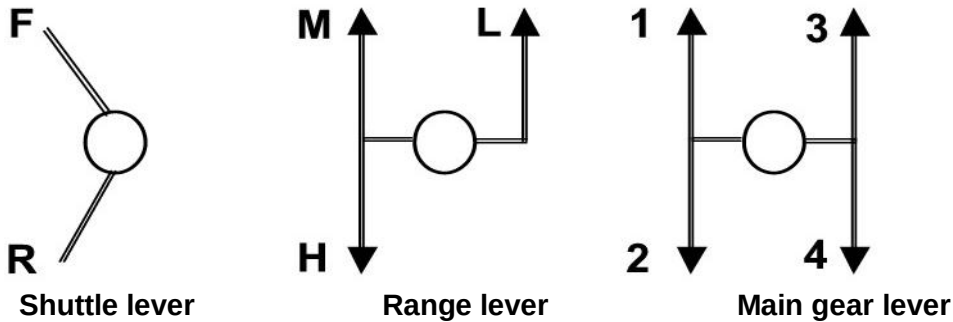
Fig. 3.2 Control levers and pedals, N – air vents.

Differential lock pedal (8)

The differential lock mechanically locks the rear half axles together so that both wheels pull together. The differential lock warning light illuminates when differential lock is engaged.

Range lever (9)

The range lever is used to select high (H) medium (M) or low (L) gear train. The shift pattern is placed on the top of the lever knob. Select the range according to the load and speed requirement. When shifting, the clutch pedal must be pressed.

Position of gear selection levers.**Shuttle lever (24-Fig. 3.1)**

The shift pattern is given on the top of the lever knob. The lever has three positions:

- F - Forwards,
- Centre - Neutral,
- R - Rearwards.

WARNING:

1. The shuttle control is linked to the safety start switch. Set the shuttle lever in the centre position before operating the starter switch key.
2. There is a lock provided between the shuttle lever and the clutch mechanism. Whenever the shuttle lever is operated always stop the tractor and depress the clutch pedal, otherwise the shuttle control mechanism may get damaged.

Main gear lever (10)

The main gear lever is used to select the gearbox ratio and has four positions. The shift pattern is placed on the top of the lever knob. All gearbox ratios are of synchromesh type and enable shifting of gear while in motion. When shifting, the clutch pedal must be depressed.

Hydraulic lift control levers (11,12)

These levers are used to control the action of the tractor three-point linkage. External lever (yellow knob) is the – Position Control lever and the internal (red knob)– Draft Control lever. For detailed operating instructions, see section – “OPERATION”

External hydraulics control lever (13)

For detailed operating instructions, see section 4.5.2.

Sensitivity Control knob (14)

The Sensitivity Control knob, when rotated regulates the hydraulic oil flow to give smoother response to the draft signals while using the soil engaging implements. For details, see section D.

Flow Control knob (15)

This is used to control the rate of drop of the lower links. For operating instructions, see section D.

Operator's seat adjustment levers (16, 17, 18)

For details, see further in this section.

Front drive engagement lever (19)

This is used to engage the front drive and has two positions:

- with the lever in bottom position the front drive is engaged.
- with the lever in upper position the front drive is disengaged.

NOTE:

The front drive should only be used when operating in field conditions. Do not operate the tractor in four wheel drive on the road (with the exception of uphill driving) as this may lead to premature wear of front tyres and excessive fuel consumption.

Parking brake lever (20)

Parking brake is used to lock the tractor rear wheels for parking and/or stationary operation. To engage the parking brake, latch the service brakes together and press them down. Then pull the hand lever up.

To release the parking brake, press the service brake pedals down, then press the button on the end of the lever and push the lever down.

Compressor engage lever

Compressor is fitted with clutch. To disengage clutch operate lever on compressor back side (2-fig. 5.13.2) downwards.

PTO 1000 rpm engagement lever

In case of need of operation with PTO high rotation (1000 rpm) implements, shift forward the lever placed above PTO shaft end (10 - Fig. 4.6.2).

**WARNING:**

Shift the PTO 1000 rpm lever only at PTO clutch (6) disengaged and PTO lever at neutral position (7)

3.3. Tractor cab (Fig. 3.3)

The safety type cab protects the operator against adverse weather conditions and serious injuries in case of the tractor overturning. The cab has two doors which can be blocked in open position.

Ventilation of the cab interior is possible through deflectable side and rear windows, roof hatch and forced air circulation.

The window panes are made of a safety type glass. The R.H. side door is opened by means of key. To open, insert the key, turn it through 90°, remove the key and press the button. The other door is locked by means of latch located at the bottom of the lock.

To open the roof hatch (12):

- press the button on the hatch handle (13),
- push the hatch upwards.

The opening angle of the hatch is maintained automatically due to the action of two damper. In emergency, when leaving the cab through the door is impossible, the hatch can be used as emergency exit. To open it fully, push sharply on the handle to disengage the dampers from their sockets.

Standard equipment of the cab comprises:

- air filter (4),
- wipers of windscreen (3) and rear window (15)),
- windscreen washer,
- adjustable side mirrors (2),
- Internal lamp (9),
- sun visor (10),
- heating system (heated air is directed through the deflectable vents (N) or to the windscreen and/or to the operator's legs),
- ventilation (blow of fresh air through vents (11),
- front and rear work lamps (1 - 2 pcs. at the front and 2 pcs. at the rear of the cab roof).

Upon request, radio and loudspeakers (16) can be fitted.

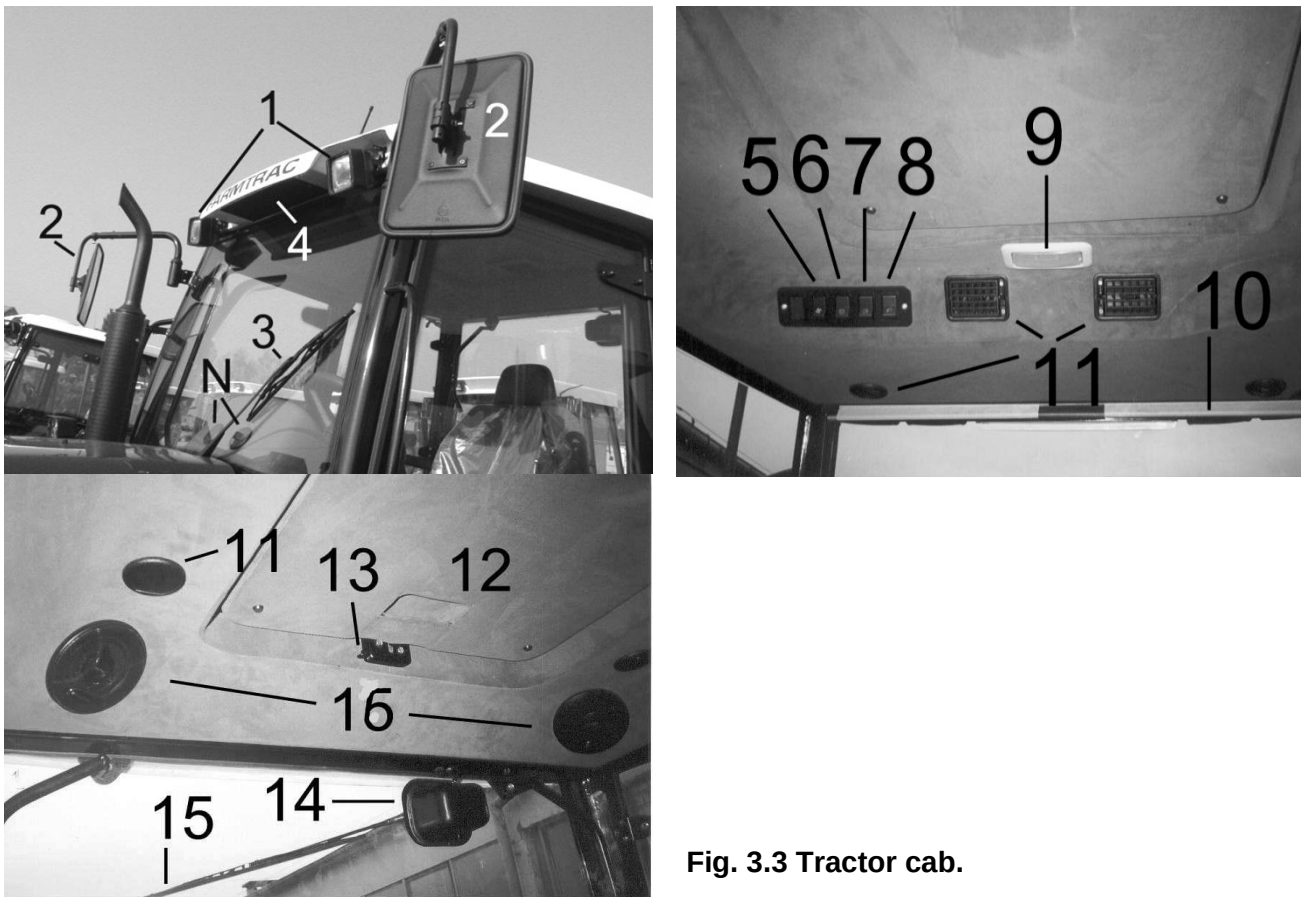


Fig. 3.3 Tractor cab.

Switches in the cab roof

- blower switch (5) – this used to switch on/off the fresh air blow into the cab through the vents in the cab roof (11),
- rear window wiper switch (6),
- rear work lamps switch (7),
- front work lamps switch (8).

3.4. Operator's seat adjustments (Fig. 3.2)

The operator's seat can be adjusted as follows:

- for its distance from the steering wheel (17),
- for height (18),
- for its suspension stiffness (16).

To adjust its distance from the steering wheel, disengage the rack from the rail by means of lever 17, slide the seat forwards or backwards to the desired position, and then release the lever to lock the seat in position.

To adjust the seat for height ($\pm 35\text{mm}$), turn the knob 18 clockwise or counter clockwise, thus lifting or lowering the seat.

To adjust the seat for the suspension stiffness, to comply with the operator's weight (within the range of 60 to 120 kg), turn the articulated knob to obtain the desired seat stiffness.

The seat belt should be secured to the holes situated at both seat sides.

4. OPERATION.

4.1. Tractor running in.

Your new tractor will provide long and dependable service if given proper care during the first 50 hours running in period and if serviced at the recommended intervals. Therefore, the following precaution should be taken during the running-in period:

- after reaching the operating temperatures, engage the tractor in work which will load the engine as near as possible to full load conditions,
- avoid prolonged operation without a load on engine,
- avoid overloading of the engine. Operating in too high gear under heavy load may cause excessive engine overloading. Overloading occurs when the engine will not respond to a throttle increase,
- to ensure proper clutch life, during the first 15 hours of operation keep careful watch on the clutch pedal free travel. If its decrease is found, adjust it immediately,
- frequently and regularly check the tightness of all external bolts, nuts. This is especially true of wheel retaining bolts/nuts,
- check the instruments frequently and keep the radiator and various oil reservoirs filled to the recommended levels.

After first 50 hours of operation, i.e. when the running in period is completed, first technical inspection should be carried out according to the list given in the Periodic Maintenance Chart – see Table 4, Section 5.1.

4.2. Starting and stopping the engine.

Before starting

Prior to daily start-up of the tractor, carry out the Daily Maintenance as described in Periodic Maintenance Chart (every 10 hours of operation) and particularly:

- make sure all safety shields are in place and secured properly,
- check coolant and engine oil levels and replenish as necessary,
- check the tension of belts and adjust as required,
- ensure the grill and the radiator are clear of debris to provide adequate engine cooling,
- switch on the earth switch (Fig. 4.2.),
- check operation of clutch, brake and throttle controls. All controls must operate freely and be adjusted correctly,
- carry out general inspection of tyres, tyre pressure and wheel nuts/bolts tightness. Observe for external signs of leakage and correct before operating the tractor,
- ensure that there is sufficient fuel in the tank and the fuel tap is open.
- check operation of lights and warning flashers. If tractor is to be driven on public roads, ensure the mirrors and slow moving vehicle emblem are in place,
- make sure the brake pedals are latched together and apply the parking brake
- make sure the main gear lever and range lever are in neutral position,
- set the hydraulic lift levers in “DOWN-LOWERING” position and the PTO selector lever is in neutral position

NOTE:	Tractor is fitted with safety switch device. Only the range lever centre position enables engine starting. In any other range lever position the safety start switch automatically disconnects the starter motor.
--------------	---

NOTE:	The control levers of upper and lower couplers of the external hydraulics, when moved to operating position, will be kept there by the lock. To release the lever, move it by hand to the neutral position.
--------------	---

WARNING: Do not leave this lever in operating position, front or reverse, if not needed, otherwise the hydraulic pump may get damaged.



WARNING: Start the tractor only from the operator's seat



Starting the engine

Normal starting procedure (at the ambient temperatures above 5°C)

To start the engine, proceed as follows:

- set the hand throttle lever to half-open position,
- turn the starter switch key (10 – Fig. 3.1.) fully to the START position to engage the starter motor,
- release the key the moment the engine starts, allowing it to return to the AUXILIARY position,
- release the clutch pedal slowly and adjust the engine speed control to get an even idle speed.

NOTE:	Do not crank the motor for more than 5 seconds. Allow the starter to cool (at least 30 seconds) between intervals of cranking.
--------------	--

Cold weather starting procedure (at ambient temperatures below 5°C)

In such case the flame plug must be used.

- set the hand throttle lever to fully open position,
- prior to cranking the engine, turn the key to the HEAT position, and hold it there for 20 to 30 seconds. Then turn the key clockwise to the START position. When the engine starts, return the key again to the HEAT position, and hold it there till the engine operates evenly,
- when the engine starts release the key, allowing it to return to the "AUXILIARY" position.

If the engine fails to start after several attempts, bleed the fuel system as described in Section 5.3.2. and check the operation of glow plug.

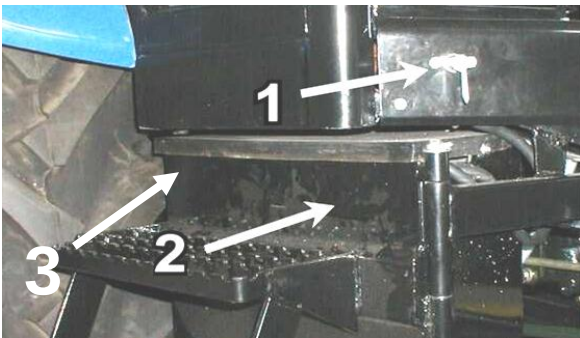


Fig. 4.2 Earth switch and battery

1- Earth switch. 2- Battery.

3-Battery access bolt.

Stopping the engine

Stopping the engine immediately after it has been working under load can result in overheating and quick wear of the engine components.

NOTE:	If the engine has been operating at high rpm and/or high loads, run the engine at low idle for at least three minutes to reduce and stabilize internal engine temperature before stopping the engine.
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Avoiding hot engine shutdowns will maximize turbocharger shaft and bearing life.

4.3. Driving the tractor.

After starting the engine:

- depress the clutch pedal, then select the desired speed range, gear and direction gear,
- release the parking brake lever,
- increase the engine speed slowly and simultaneously release the clutch pedal slowly,
- release the clutch pedal fully and slowly operate the throttle until desired engine speed is reached.

Selecting the correct gear

Select the gear which will give the best fuel consumption without overloading the engine or transmission. Also remember that ground conditions in the same field may vary almost every few meters, therefore select the gear in which the engine will operate satisfactorily at about three-quarters of its maximum power.

Never work the tractor by slipping and re-engaging the clutch and at all times avoid riding the clutch pedal which can cause overheating, and will lead to clutch failure.

WARNING: 	1. Avoid pressing the clutch pedal all the time. 2. Do not move the gear lever, the range selector lever, unless the clutch pedal is pressed, when the tractor is moving. 3. Never move down on slopes with the tractor in gear and the clutch disengaged. 4. For road work, take hand throttle to minimum position and use the foot throttle only. 5. When tractor is towed, the engine must run (due to hydrostatic steering system) and the gear lever place in neutral position.
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Recommendations aimed at tractor operating efficiency and fuel saving.

1. Match the attached implement size so that the engine could operate at over 75% of its power.
2. Avoid unnecessary tractor idling and reduce the time spent on headland turns and travels to the field.
3. Use correct tyre pressure for a given work.
4. Use the ballast weights reasonably.
5. Match the trailer load capacity correctly and utilize it to the highest extent possible.
6. For field transport make use of single axle trailer preferably.
7. Make use of Draft Control for controlling the working depth of mounted soil engaging implement to the highest extent
8. Look after the efficiency of the fuel system and carry out the maintenance and adjustments as stated in this book.
9. Use recommended fuels and lubricants only.

Towing

Before towing the tractor, move the PTO lever, the range selector lever and the main gear lever into neutral. The tractor must be towed at safe speed using a rigid drawbar.

WARNING: 	When the engine is stopped the hydraulic power assistance to the steering does not operate. The tractor can then be steered manually. In this situation the tractor must moved slowly with extreme caution.
--	--

Braking system

WARNING: 	1. Before driving on the road, always latch the brake pedals together. 2. Independent braking may only be used to assist turning on headlands of a tractor with mounted implements. 3. When the tractor is operated for stationary work, even if only for short periods always engage the parking brake
--	---

When attaching a trailer, or trailed machines to the tractor, ensure that the trailer air braking system is connected.

To connect the trailer braking system to the tractor braking system, proceed as follows:

- engage the parking brake (this will cause the air pressure in the hose drop down to the atmospheric pressure,
- couple the trailer and tractor air couplers,
- release the parking brake.

WARNING: Never start towing of a trailer with the air pressure gauge pointer in red zone. Allow time for the compressor to fill the air reservoir. Insufficient air pressure in the system is then also indicated by air pressure drop warning light which illuminates red.



Front drive axle

The drive to the front wheels is transmitted from the drop box by the drive shaft, crown wheel and pinion and differential mechanism to the front axle final reduction units. As a standard equipment the "limited slip" type of differential is fitted (self-locking).

WARNING: Operation in four wheel drive is intended for field work only. Do not use the tractor in four wheel drive on roads or dry land.



Rear differential lock

If during the field work one of the rear wheels starts to slip (there is a small difference in rotational speed) engage the differential lock by pressing the differential lock pedal down firmly,

In case one of the wheels is slipping significantly (there is considerable difference in rotational speed) proceed as follows:

- fully depress the clutch pedal,
- engage the differential lock by pressing its pedal down,
- release the clutch pedal slowly, while maintaining foot pressure on the differential lock pedal.

To disengage the differential lock release the pedal. If the lock fails to disengage, steer slightly to either left or right or depress for a moment one of the brake pedals (independent).

WARNING: 1. Do not attempt to engage the differential lock with one wheel spinning fast and the other stopped.
2. Do not attempt to turn with the differential lock engaged.



4.4 Power take-off (PTO).

Power take-off shaft is placed in the rear axle housing and it's end rotates to the right (from rear of the tractor), diameter 35 mm with 6 splines as per PN-77/R-36101 standard with ring groove for safety attachment of the driven implement telescopic-articulated shaft.

PTO shaft is covered with the PTO guard (4 - Fig.4.6.2) and secured with a PTO cup (3 -Fig.4.6.2) (when PTO is not operated)

NOTE: 1. After attaching mounted implement carefully raise and lower it using Position Control lever. Check clearance and the drive shaft slide range/articulation.
2. When attaching trailed implements ensure the drawbar is correctly set.
3. Check all four wheels when carrying out stationary PTO work.

WARNING:

Before operating the tractor with PTO driven implements, familiarize yourself with the safety precautions given below and strictly observe them:

1. Before connecting, disconnecting, cleaning or adjusting the PTO driven implements, disengage the PTO drive, stop the engine, remove the key, apply the hand brake and make sure that the PTO drive line has stopped.
2. Do not operate the PTO driven implements without the master shield fitted.
3. Make certain the implement drive shaft is securely locked on the tractor PTO shaft before starting the engine.
4. After locking the drive shaft on the tractor PTO shaft, attach the drive shaft guard safety chains to the master shields.
5. Fit the removable cap when the PTO drive line is not in use.

Operating the PTO

To obtain 540 rpm at the PTO:

- set the engine speed to 2110 rpm,
- pull the PTO clutch lever 6 (Fig. 3.2) upwards,
- bring the PTO selector lever 7 (Fig. 3.2) to engaged position by pulling it up,
- release the PTO clutch lever by pressing the knob at the top of the lever, and then release it.

NOTE:

Bring the PTO clutch lever to disengaged position (pulled up) while shifting the PTO selector lever to engaged or neutral position.

The drive is transmitted from the tractor PTO shaft to the implement by a telescopic-articulated shaft with guard. This guard ensures safe operation of the drive shaft only if a master shield both on the tractor and on the implement are fitted. The tractor is fitted with PTO guard 4 (Fig. 4.6.2).

When connecting the drive shaft to the tractor and to the implement, this should be carried out strictly in accordance with the drive shaft or implement manufacturer operating instructions.

If PTO driven implements is attached to the drawbar, then the drawbar should be set to the position which ensures that the horizontal distance between the end of the PTO shaft and the pin hole in the end of the drawbar is at least 400 mm.

To engage PTO drive move the PTO clutch lever (6 – Fig. 3.2). On lower position the PTO is engaged. Pulling the lever upwards the PTO drive is disengaged. To engage again release the lever pulling the knob on its end.

To engage the ground speed PTO:

- Press the transmission clutch pedal fully,
- move the PTO selector lever down to the ground speed PTO operation,
- select the ground speed of the tractor by selecting the appropriate transmission gear ratio and release the clutch pedal,
- using the throttle, control the tractor speed.

NOTE:

Press the clutch pedal fully for shifting the PTO selector lever from neutral to ground speed operation and vice-versa.

WARNING:

To avoid inadvertent movement of the implement, keep the PTO selector lever in neutral after each use.

**WARNING:**

Keep the PTO shaft in engage position (PTO clutch lever fully lowered) irrespective of the PTO selector lever.
Before select PTO speed pull the PTO clutch lever fully.

To select PTO speed move the PTO selector lever (7– Fig. 3.2). There are three positions as shown on sticker beside the lever:

- | | | |
|-----------------------------|---|--------------------|
| 1 - independent PTO engaged | - | Independent |
| 2 - neutral | - | N |
| 3 - ground PTO engaged | - | Ground |

Shifting the lever to engage position pull the PTO clutch lever fully(6– Fig. 3.2).

When shifting the lever to the ground PTO engaged, there is obtained PTO speed depending on tractor speed. Tables with ground PTO speed are in chapter 2.3.

Independent PTO drive means that the PTO shaft rotates proportionally to engine rotation. There is possibility to select two speeds: 540 rpm and 1000 rpm (by engine rated rotation speed).

If required to drive implements of higher PTO speed (1000 rpm), select forward position of the lever (10 - Fig. 4.6.2) placed above PTO shaft end. When 1000 rpm PTO is engaged the yellow indication light illuminates on the pulpit (27- Fig.3.1).

**WARNING:**

When 1000 rpm PTO is engaged don't use implements adapted to low PTP rotation to avoid damage of the implement and danger

4.5. Tractor hydraulic system.

Your tractor is equipped with a hydraulic system providing accurate and sensitive control over a wide range of operating conditions.

This system provides the following functions:

Draft Control – is most suitable for mounted soil engaging implements. Changes in the working depth or soil resistance cause the draft loading on the implement to increase or decrease. This change in draft loading is sensed through the top link of the three-point linkage and the hydraulic system responds by raising or lowering the implement to restore the draft loading. In this way a uniform draft load is maintained on the implement.

Position Control – provides accurate and sensitive control of implements such as sprayers, rakes, mowers etc., that operate above the ground. Position control would not normally be used with soil engaging implements unless it is essential to maintain a constant position of the equipment regardless of the draft load.

Sensitivity Control – provides smoother response to draft signals while using soil engaging implements.

Flow Control – is provided to control the rate of drop of the lower links and for locking of the lower links in raised (transport) position.

External hydraulics control – is provided to control the external equipment that requires hydraulic power for its operation, such as trailer tipping, loader operation, hydraulic motor drive, etc.

4.5.1. Hydraulic lift system.

Control levers (Fig. 3.2)

- Draft Control lever 12 (next to the seat) – yellow knob, is used to adjust the draft i.e. working depth,
- Position Control lever 11 (next to the mudguard) – red knob, is used to adjust the position/height of the implement and lets you lift or lower the implement,
- Sensitivity Control knob 14,

- Flow Control knob 15.

The Position and Draft Control levers are used in conjunction to raise or lower the three-point linkage (and implement) to the required height and adjust the working depth.

In order to operate the three-point linkage, the external hydraulics control lever must be kept in neutral position.

WARNING: 	1. Do not transport or attach implement when the hydraulic system is in Draft Control. Use Position Control for these operations only. 2. Always lower the implement to the ground before stopping the engine.
--	---

Draft control operation

Move the Draft Control lever in the sector to find the point near the centre where the lift links neither raise nor lower. This is the neutral point.

Lower the implement into work using the Draft Control lever. Push the lever forwards to increase the draft loading. Pull rearwards to reduce the draft loading. In most circumstances the forwards movement of the Draft Control lever will increase implement depth and rearwards movement will reduce the depth.

Once set, the tractor hydraulic system will automatically adjust the implement depth to maintain an even pull on the tractor and so reduce wheel slip to a minimum.

When lowering the implement into work, push the draft control lever down to the bottom of the quadrant to ensure positive engagement of the implement in the ground, then immediately raise the draft control lever until the required implement depth is achieved.

NOTE:	When operating in Draft Control, the Position Control lever should normally be at the bottom of the sector gear. However, the Position Control lever may be used in conjunction with Draft Control to limit the maximum depth of correction with achievement of more even depth of cultivation in fields with widely varying soil conditions.
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When grading and back-filling with light equipment, such as rear blade, it may be desirable to prevent the blade from “diving”. This is accomplished by using the Position Control lever in conjunction with the Draft Control lever. See “Draft Control operation with Position Control” on this page.

Position control operation

Set the required implement height/depth using the Position Control lever. Pull the lever back to raise the implement, push forward to lower. The implement height/depth is relative to the position of the lever in the quadrant.

NOTE:	1. When operating in Position Control the Draft Control lever should be pushed down to the bottom of the quadrant. 2. When transporting equipment on the three-point linkage use the Flow Control knob to lock the position of raised implement. This will prevent accidental movement of the control lever which could result the equipment to lower
--------------	--

Draft control operation with position control

Position Control may be used together with the draft control as follows:

Set the Position Control lever at the maximum desired implement depth. The hydraulic system will not lower the implement below this depth. This will also prevent “diving” which may be encountered with light equipment, such as a rear blade, when grading or back-filling. Adjust the Draft Control lever for the maximum required draft load (pull).

The hydraulic lift system will now provide normal draft response within the range set by the position control. This adjustment provides a more uniform depth while maintaining an even pull in widely varying soil conditions.

Flow and sensitivity control (fig. 3.2)

Your tractor is equipped with hydraulic Flow and Sensitivity Control mechanism., operated by two knobs provided on the platform area. The Sensitivity Control knob 14 when rotated regulates the hydraulic oil flow to give smoother response to draft signals while using soil engaging implements. When setting the Draft Control lever, the Sensitivity Control knob 14 should be opened by rotating it in clockwise direction. In case any vibrations are experienced on the mounted implement, gradually rotate the knob anti-clockwise until the vibrations are arrested.

The Flow Control knob 15 is provided to control the rate of drop of the lower links by regulating the flow of hydraulic oil. When the knob is fully tightened by rotating it in clockwise direction to an extreme, the lower links can be locked in the raised position and will not lower even if Draft or Position levers are lowered. While transporting attachments, this locking system should be used. The rate of flow of oil is infinitely variable between the extreme positions of the knob.

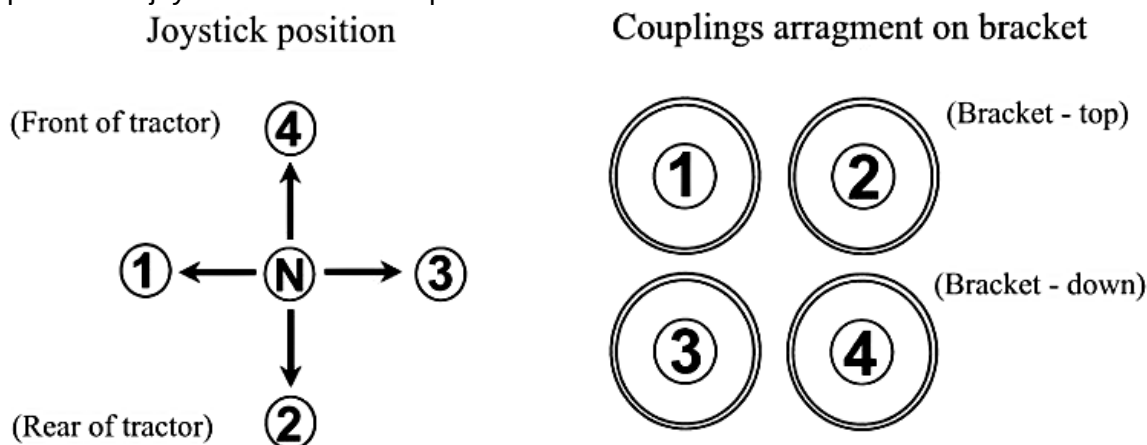
4.5.2. External hydraulics control.

The spool valve(s) controls the oil flow to the hydraulic equipment found on farm machinery, namely: single- and double-acting ram cylinders and hydraulic motors.

NOTE:	It is important that the components are identified correctly before the machine or implement is attached to or operated by the tractor, otherwise damage to the system may result.
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The spool valve(s) is located under the cab platform are connected by the piping to quick-release couplers at the rear of the tractor

The external hydraulic control is fitted with double spool valve with four quick-release couplers. It is controlled with a joystick with four positions corresponding to the quick-release couplers, as shown below. Depending on joystick position the pressure appears on relevant coupler (for example: at position "1" the oil is fed to coupler 1 and oil return on coupler 2 and vice-versa; at joystick position "4" the oil is fed to coupler 4 and oil return on coupler 3 and vice-versa. Centre position of joystick is the neutral position.



Position 1 of joystick has a lock that holds it in position. To release, the lever must be manually displaced. In any other position, the lever when released, automatically returns to the neutral position.

WARNING: Do not leave the joystick in its front lock position unless needed, to avoid hydraulic pump damage.



WARNING: Leaking fluid under pressure can penetrate the skin causing serious injury. Avoid the hazard by relieving pressure before disconnecting hydraulic lines. Tighten all connections before applying pressure. Search for leaks with a piece of cardboard. Protect hands and body from high pressure fluids. If an accident occurs, see a doctor immediately or gangrene may result.



To operate a spool control valve, connect the remote cylinder feed hose to the lift coupler by inserting the hose in the coupling after removing the dust cap. Ensure that the hose is properly seated. The return hose from the double-acting cylinder must also be connected to the drop coupler.

A second remote cylinder can be connected (on tractor where twin spool valve is installed) after connection to the second set of couplers.

WARNING: Before connecting or disconnecting hydraulic hoses at the remote couplers, stop the engine and relieve the pressure in the circuit by moving the joystick fully forward, fully rearward, side ways and then to neutral position.



NOTE: Before connecting remote cylinder hoses, thoroughly clean the connections to prevent oil contamination. Remote cylinders are operated by oil drawn from the tractor transmission system. Therefore, always check and replenish the transmission system oil after remote cylinder equipment has been connected and cycled a few times

If hoses are accidentally disconnected from the tractor during use, clean tip and coupler receptacles. Hoses can be reinstalled as previously described with minimal loss of oil.

WARNING: Make sure that the amount of oil in the gearbox does not fall below the minimum level. Take special care when cleaning the hydraulic unit on the implement/equipment so as not pollute the oil in the transmission housing.



4.6. Equipment attaching on three-point linkage.

The tractor hydraulic lift system with three-point linkage (see Fig. 4.6.1) facilitates control of implements and machines from operator's place.

The three-point linkage consists of following elements:

1. Top link (1) it is fitted with locking sleeve and lever to adjust the length of the link. It can be attached to one of three openings in top link rocker (2). When transporting the tractor, hook the link over the lug.
2. Lower links (6 and 7).
3. Lift rods, right (5) and left (4) attached lower links with lift arms. Both lift rods length is adjusted by means of rotary handles. To turn the handle pull it upwards to unlock.
4. Stabilizer bars protect implements of excessive lateral movement. The external bars are adjustable with means of a sleeve nut (8) locking with check nut (9).
5. Quick couplers (3) of lower links and top link are designed to attach implements to three point linkage.
6. Multi-hole drawbar (10).

Attaching implement to the three-point linkage

- shift the upper transport hitch to top position (1 - Fig. 4.6.2),
- remove the upper transport hitch (1 - Fig. 4.6),
- remove the drawbar (7 - Fig. 4.6.2) after putting out pins (9 - Fig. 4.6.2),
- move back the tractor to the implement aligning the ends of lower links (3 - Fig. 4.6.1) with the implement hitch pins,
- using the Position Control lever (11 - Fig. 3.2.), raise or lower the linkage until the left hand lower link ball end is in line with the left hand hitch pin of the implement,
- apply the parking brake,
- put ball joint sleeves on implement hitch pins to attach the implement to tractor lower links,
- position the end of the left lever link over the implement hitch pin and secure with a linch pin,
- as required adjust the height of the right hand lower link with the leveling lever (12 - Fig. 4.6.1) control and attach to the implement hitch pin,
- adjust the lift rods to their normal operating length, until the implement is level (in perpendicular plane),
- depending on the implement, attach the top link (2 - Fig. 4.6.1) to a selected hole of the lift rocker and then to the implement cross shaft adjusting its length as necessary,
 - lower hole – light implements – Hydraulic system is more sensitive to load changes
 - upper hole – heavy implements – Hydraulic system is less sensitive to load changes
- adjust the stabilizer bars for side swing (Fig. 4.6.1),
To lengthen or shorten the stabilizers use tube nut (8,9 - Fig. 4.6.1) with handle.
After setting length of both stabilizers secure the nut with lock nut (11 - Fig. 4.6.1).

Make sure the stabilizers have the same length.

In transport position stabilizers length should be set as they not to be strained.

When operating with plough implement the length of stabilizers should be set such as side mowing did not exceed 125 mm at end of each lower link.

NOTE:	When attaching mounted or semi mounted equipment to the three-point linkage, or when coupling trailed equipment to the drawbar, ensure that there is adequate clearance between the implement and the tractor. The clearance in the raised position should be checked by raising the implement carefully in Position Control. Check the swing clearance by performing a series of left and right hand turns with the tractor and implement combination.
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WARNING: 	Do not transport or attach the implement when the hydraulic system is in Draft Control. Always use Position Control for these operations.
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Detaching the implement

- select level and firm ground to detach the implement and lower the implement to the ground,
- apply the parking brake and stop the engine,
- ensure all hydraulic pressure is relieved,
- turn the levelling lever control to level the implement with the ground, if needed,
- support the implement so that it will not tip or fall when detached from the tractor,
- detach the top link and lower links from the implement frame.

Attaching the implement to the three-point hitch equipped with hook type ends

- fit the balls with guide cones to the implement cross shaft and hitch pins and secure with linch pins,
- back the tractor to the implement and raise the lower links using Position Control so that the hook ends engage in the link balls and snap into connection. The stabilizer bars maintain a proper distance between the lower links,
- lift the latch on the top link hook and lower the top link so that the hook end engage in the ball and snap into connection.

To detach, reverse the procedure of attaching.

Apart from the three-point hitch (Fig D8), the machines and implements can be attached to:

- upper transport hitch (for 2-axle trailers),
- linkage drawbar,
- lower transport hitch (for single-axle trailer),
- multi-hole drawbar.

Upper transport hitch – is used for hitching a two-axle trailers. This hitch must be detached when attaching implements to the three-point hitch.

Linkage drawbar – is used for hitching trailed machines and implements. The distance of its hitch points to the PTO shaft end is 400 mm, thus enabling attachment of PTO driven machines and implements. The height of the drawbar hitch point can be changed by inverting the drawbar or by repositioning the clevis.

Lower transport hitch – is used for hitching single-axle trailer.

WARNING: Never tow implements attaching to the hydraulic lift rocker

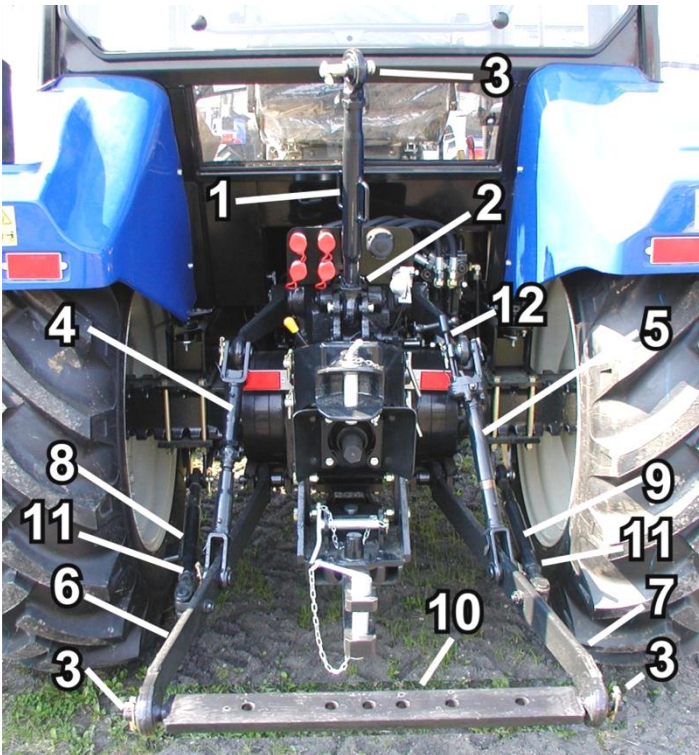


Fig. 4.6.1. Three-point linkage

1- Top link, 2- Top link rocker, 3- Ball joint, 4- L.H. lift rod, 5- R. H. lift rod, 6- L.H. lower link, 7- R.H lower link, 8,9- External stabilizer tube nuts, 10- Multi-hole drawbar, 11- External stabilizer lock nuts, 12- R. H. lift rod adjustment handle.

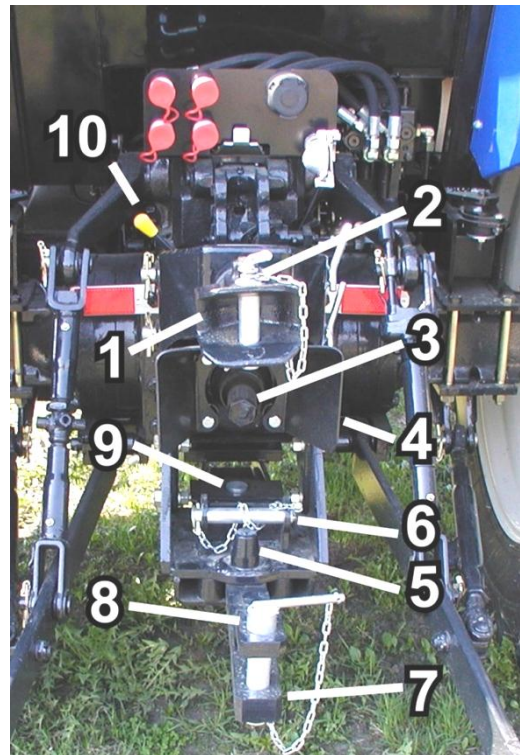


Fig. 4.6.2. Hitches

1- Upper hitch, 2- Upper hitch pin, 3- PTO shaft cup, 4- PTO shaft guard, 5- Lower transportation hitch, 6- Lower hitch lock, 7- Tractor drawbar, 8- drawbar pin, 9- Drawbar attaching pin, 10- PTO 1000 rpm engagement lever.

4.7. Attaching trailed machines and implements.

Apart from the three-point hitch (Fig 4.6.1), the machines and implements can be attached to:

- upper transport hitch,
- tractor drawbar,
- lower transportation hitch,
- multi-hole drawbar.

Upper transport hitch (Fig 1 - 4.6.2), – is used for hitching a two-axle trailers. This hitch must be detached when attaching implements to the three-point hitch.

Tractor drawbar (7 - Fig. 4.6.2) – is used for hitching trailed machines and implements. The distance of its hitch points to the PTO shaft end is 400 mm, thus enabling attachment of PTO driven machines and implements. The height of the drawbar hitch point can be changed by inverting the drawbar or by repositioning the clevis.

Lower transportation hitch (5 - Fig. 4.6.2) – is used for hitching single-axle trailer.

4.8. Tractor weighing.

For maximum performance in heavy draft conditions weight should be added to the tractor in the form cast iron weights. Front-end ballast may be required for stability and steering control when weight is transferred from the front to the rear wheels as the implement is raised by the tractor three-point linkage.

Weighing limitations

Additional weights can be applied:

- to front weight carrier - 6 wafer weights of 22 kg each ($6 \times 22 = 132$ kg), central tow hook of 40 kg can be dismantled in case of front axle unload need – installation of front loader.
- to rear wheels – 2 rear wheel weights of 39 kg each and 4 additional weights of 32 kg each ($2 \times 39 + 4 \times 32 = 206$ kg).

	WARNING: Take special care when carry and assembly rear wheel weights and front weight carrier, due to it's high weight – should be done by two persons.
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5. MAINTENANCE AND ADJUSTMENT

5.1. Periodic maintenance chart.

Table 4

Hours of operation	Service requirements	Check	Clean	Lubricate	Change	Adjust Replenish	Drain Remove
Every 10 Hours	Engine oil level	X				X	
	Dry air cleaner dust collector						X
	Radiator coolant level	X				X	
	Radiator matrix and oil cooler		X				
	Water in air reservoir (if fitted)						X
	Air compressor V-belt (during first 30 hours)	X				X	
	Dry air cleaner outer element		X				
First 50 hours	Engine oil and oil filter	A	A		A		A
	Fuel filter(s)	A	A				
	Radiator coolant level	A				A	
	Low idle engine speed	A				A	
	Dry air cleaner outer element		A				
	Air compressor (if fitted) and fan V-belts tension)	A				A	
	Clutch pedal free travel	A				A	
	Transmission and rear axle oil level	A				A	
	Hydraulic oil filters				A		
	Front drive axle oil including final reduction units				A		
	Front drive axle oil breather		A				
	Braking system (including foot brake valve)	A				A	
	Tightness of trailer air braking system (if fitted)	A				A	
	Operation of electrical equipment	A				A	
	Battery electrolyte level and concentration	A				A	
	Lubrication acc. to the Grease Points Chart.			A			
	Leakage of oil and coolant (after road test)	A				A	
	Tightness of external threaded connections (wheels, manifolds, cab, ballast weights, 3-point linkage etc.)	A				A	
	Condition of tyres and pressures	A				A	
Every 50 Hours	Fuel filter(s)	X	X				X
	Battery electrolyte level and concentration					X	
	Condition of tyres and pressures	X				X	

Hours of operation	Service requirements	Check	Clean	Lubricate	Change	Adjust Replenish	Drain Remove
Every 150 Hours	Dry air cleaner outer element Oil level in hydrostatic steering oil reservoir Transmission and rear axle oil level Front drive axle oil including final reduction units Air compressor (if fitted) and fan V-belts tension Lubrication acc. to the Grease Points Chart. Clutch pedal free travel Tightness of external threaded connections (wheels, manifolds, cab, ballast weights, 3-point linkage etc.) Cabin air cleaner element	X X X X X X X	X X X	 X 	 	 X X X X X X	
Every 300 Hours	Hydraulic oil filter Oil level in hydrostatic steering oil reservoir Braking system adjustment V-belts tension Tightness of trailer air braking system (if fitted) Tightness of external threaded connections (manifolds, cab, 3-point linkage)	 A A A A			A A	 A A A A	
Every 600 Hours	Dry air cleaner outer element Engine oil and oil filter Fuel filter element Radiator coolant Fuel system breathing Hydrostatic steering oil and oil filter Front wheels toe in Condition of all lines (fuel, hydraulic, electric) and tightness Starter motor pinion	 A A A	 A		X A X X X	 X X X A A	
Every 1200 Hours or every year	Transmission and rear axle oil level Front drive axle oil including final reduction units Fuel tank and air reservoir (if fitted) Cooling system Alternator brushes	 X	 A X		X X A		 X

NOTE

Carry out maintenance every specified number of operation hours

- it means, that carrying out maintenance after 300 hours of operation, also should be carried out maintenance after 10 and 50 hours of operation etc.
- **A – maintenance to be carry out by Authorized Service Shop**

5.2. Lubrication.

5.2.1. Oils.

Following lubricating grades of oil are applicable in Farmtrac tractors:

Table 5

Oil kind	Recommended oil grade	Application	Oil level
Engine oil	TEXACO Super Universal Tractor Oil 15W-30	Oil sump	Between marks on dipstick
Transmission oil	TEXACO Super Universal Tractor Oil 15W-30	Rear axle Transmission Hydraulic lift Reduction gears	Between marks on dipstick in rear axle for all systems
	TEXACO Geartex EP-C 80W-90	Front axle Front reduction gears	To reduction gear hole lower edge
Hydraulic oil	Hipol ATF-2D	Steering system	To hole lower edge

5.2.2. Greases.

In the FARMTRAC tractor grease is applied by hand or using grease gun in grease fittings. Greasing points are shown in Table No. 6.

NOTE: Clean the grease gun and grease point nipple, before and after lubrication.

Table 6

Grease point	Greasing method	Number of grease points	Lubricate every hours of operation
Front wheel hubs	by hand	1x2	150
Rear wheel hubs	grease gun	1x2	150
Front axle king pins	grease gun	1x2	150
Front axle pivot pin	grease gun	2	150
Clutch pedal pivot	grease gun	1	150
Brake pedal pivot	grease gun	2	150
Brake & clutch pedal pivot (Cab)	grease gun	2	150
Three-point linkage: threading elements	by hand		150

5.2.3 . Reservoir filling.

Keep oil and grease in tight and clean containers.

Table 7

Liquid kind	Application	Capacity in liters
Engine oil	Oil sump	9
Transmission oil	Transmission, Rear axle, Hydraulic lift	38
	Front axle	4
	Front axle reduction units	2x1
Hydraulic oil	Steering system oil container	3,5
Coolant	Cooling system	17
Diesel fuel	Fuel tank	98
Wind screen spray	Wind screen spray container	1,5

Clean control & filler plugs and area around before oil / coolant level check. Check and replace, if necessary, plug seals.

Fill fuel tank using thick strainer funnel with relevant fuel according to ambient temperature.

Fill radiator with antifreeze coolant available on the market.

5.3. Engine.

5.3.1. Engine lubrication system.

Engine oil and filter change

Check the engine oil level every 10 hours of operation, or daily. Before checking the oil level, stop the engine and wait for a short period to allow the oil to drain back into the sump (tractor must be on level ground). Check the oil level by means of the dipstick (1-Fig. 5.3.2). If necessary, remove the filler plug and top up with fresh oil to the upper mark on the dipstick. Do not overfill.

Change the engine oil and oil filter as specified in table 4.

To change the oil, proceed as follows:

Warm the engine to operating temperature. Stop the engine, remove the drain plugs on oil sump both sides (6-Fig. 5.3.2 and 3-Fig. 5.3.3), and collect the oil in a suitable container. Unscrew and discard the oil filter (4-Fig. 5.3.2),. Clean the area around the filter. Smear clean engine oil around the rubber seal of a new filter and install on the tractor. Screw up until the faces just meet, then tighten a further 3/4 of a turn. Do not over tighten.

Replace the drain plug, remove the filler plug, and refill the engine with clean oil. Replace the filler plug.

Run the engine for a minute or so, to circulate the oil, then stop the engine. Wait for a short period to allow the oil to drain back to sump, then check the oil level by means of the dipstick.

Add clean oil, as necessary, until the oil reaches the upper mark on the dipstick.

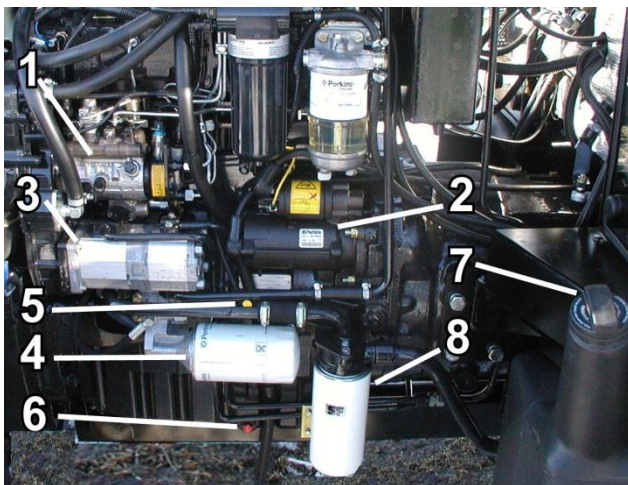


Fig. 5.3.2. Engine L.H. side. 1- Injection pump. 2- Starter motor. 3- Hydraulic pump. 4- Engine oil filter. 5- Dipstick. 6- Drain plug on engine L.H. side. 7- Fuel filler cup, 8- Hydraulic oil filter.

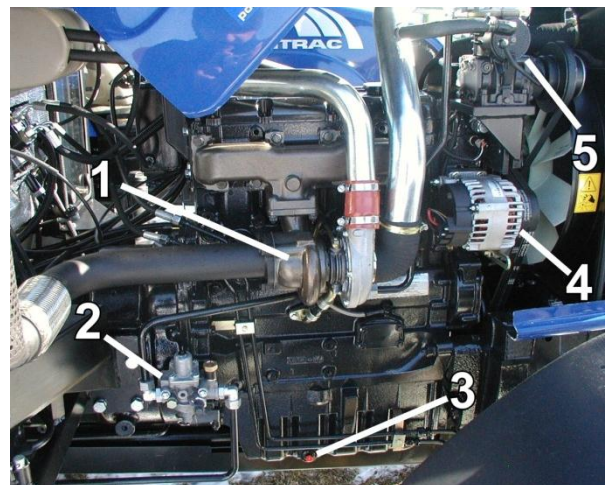


Fig. 5.3.3. Engine L.H. side. 1- Turbo charger. 2- Pressure regulator. 3- Drain plug on engine R.H. side. 4- Alternator. 5- Air compressor.

WARNING: Don't mix different kinds of engine oil.



5.3.2. Fuel system.

Keep fuel system clean. It is recommended to clean fuel tank once a year. Fill the tank with clean diesel fuel. Don't empty fuel tank completely.

Fuel filter maintenance

Remove water and impurities from filter every 50 hours of operation (2-Fig. 5.3.4).

To remove water and impurities from the fuel filter, loosen the drain plugs (3 - Fig. 5.3.4) at the bottom of the fuel filter to allow the water/fuel to drain into a suitable container. Additionally tractor is fitted with fuel separator (7-Fig. 5.3.4). Drain the separator when water and impurities accumulates inside by loosening the drain plugs (3 - Fig. 5.3.4).

Every 600 hours of operation change the element of the fuel filter (2-Fig. 5.3.4).

To replace the fuel filter canister:

- thoroughly clean the outside surface of the fuel filter assembly,
- loosen the drain nut at the bottom of the filter and allow the water/fuel to drain into a suitable container,
- use a strap wrench or similar tool to loosen the filter canister and remove the canister,
- lubricate lightly the two top seals 2 and 3 of the new canister with clean fuel. Fit the new canister to the filter head and tighten, by hand only,
- eliminate the air from the fuel filter, see "Bleeding the fuel system" in this section.

Bleeding the fuel system

If air enters the fuel system, it must be removed before the engine can be started.

Air can enter in to the system if:

- the fuel tank is drained during normal operation,
- the low-pressure fuel pipes are disconnected,
- a part of the low-pressure fuel system leaks during engine operation.

There is generally no need to bleed tractor fuel system as the electrical fuel lift pump can solve the problem.

If it is however required to vent the fuel system, loose fuel injectors nuts and operate the starter motor until fuel is forced out from the pipes, then tighten the union nuts. When fuel free of air bubbles flows out tighten the ends and clean up of fuel.

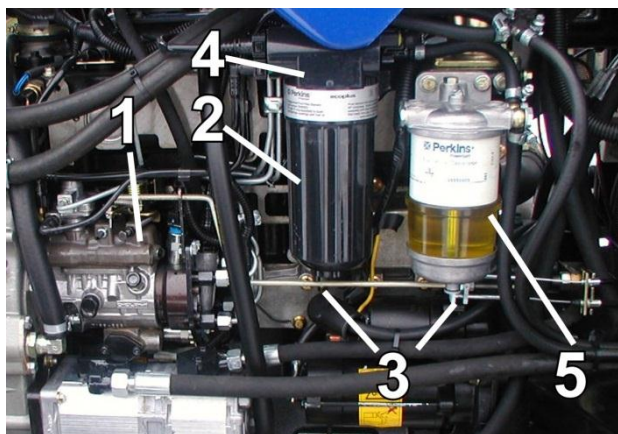


Fig. 5.3.4. Fuel system. 1-Fuel injection pump. 2- Fuel Filter. 3- Drain plug. 4- Electrical fuel feed pump. 5- Water Separator.

5.3.3. Dry air cleaner.

Dry air cleaner maintenance.

Remove any accumulated dust from the dry air cleaner dust collector every 10 hours of operation, or daily in extremely dusty conditions (Fig. 5.3.6);

Clean the outer element every 50 hours of operation, or whenever the air cleaner warning light on the instrument panel comes on.

To clean the outer element:

- remove the Cleaner cover (4 - Fig. 5.3.6) by releasing 3 latches (2 - Fig. 5.3.6) and carefully slide the element (6 - Fig. 5.3.6) out the filter housing,
- clean the element by hand. Do not beat the element against a hard surface as the element may be damaged or distorted,

- alternatively, compressed air not exceeding 2 kg/cm² may be used. Insert the air line nozzle inside the element and blow the dust from the inside to the outside. Keep the nozzle at a safe distance from the element. Blow loose particles from the outside of the element by holding the nozzle at least 150 mm from the element,
- clean the inside of the air cleaner housing with a damp lint-free cloth,
- reinstall the outer element ensuring that the rubber sealing ring on the end is secure.

Every 600 hours of operation replace the outer element

Replace the inner element every three changes of outer element.

NOTE: Never attempt to clean the inner element. It must be replaced.

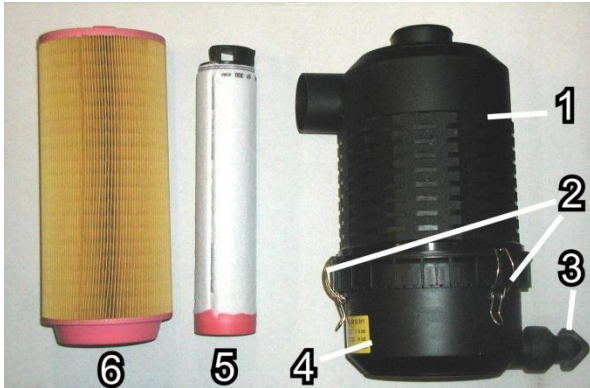


Fig. 5.3.6. Dry air cleaner. 1-Filter housing. 2- Latches. 3- Dust collector . 4- Cover. 5- Inner element. 6- Outer element.

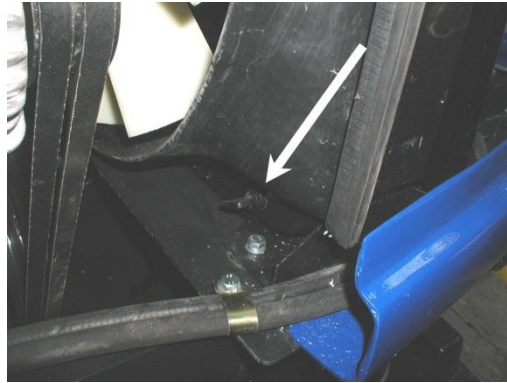


Fig. 5.3.7. Radiator drain tap.

5.3.4. Cooling system.

Check the radiator coolant level every 10 hours of operation, or daily.

With the engine cold, remove the radiator filler cap and check that the coolant level is with the bottom of the filler neck. Top up, as necessary.

Clean the radiator matrix and oil cooler every 10 hours of operation, or daily. by blowing compressed air from the rear of the radiator.

Every year or every 1200 hours of operation clean cooling system and change coolant.

In order to drain and refill the cooling system, precede as follows:

- ensure that the tractor is on level ground,
- remove the radiator filler cap,
- open the tap (Fig. 5.3.7) at the bottom of the radiator in order to drain the radiator,
- close the drain taps,
- refill the system with a relevant fresh coolant to the correct level,
- operate the engine and then recheck the coolant level and top up as necessary.

5.3.5. Engine cylinder head.

Valve clearance adjustment.

Check the valve clearances every 1200 hours of operation and after each cylinder head removal.

To check/adjust the valve clearances, proceed as follows:

- remove the cylinder head cover,
- the clearances are checked between the top of the valve stem and rocker lever by means of feeler gauge. The correct clearances on cold engine are:
 - inlet valve: 0,20 mm
 - exhaust valve: 0,45 mm
- The sequence of valves from No. 1 cylinder is shown in the table below:

Cylinder and valve number	1		2		3		4	
	1	2	3	4	5	6	7	8
Valve I = Inlet E = Exhaust	I	E	I	E	I	E	I	E

NOTE: No. 1 cylinder is at the front of engine.

- if adjustment is needed:
 - loosen the lock nut and adjust the clearance by turning the adjusting screw on the valve rocker,
 - retighten the lock nut while keeping the adjusting screw in position,
 - recheck the valve clearance,
- to check/adjust the clearance of No. 1 cylinder valves rotate the crankshaft in the normal direction until the inlet valve 7 of No. 4 cylinder has just opened and the exhaust valve 8 of the same cylinder has closed completely,
- set the valves 3 and 4 of No. 2 cylinder as indicated above for No. 4 cylinder. Then check/adjust the clearances of the valves 5 and 6 of No. 3 cylinder,
- set the valve 1 and 2 of No. 1 cylinder as indicated above for No. 4 cylinder. Then check/adjust the valves 7 and 8 of No. 4 cylinder.
- set the valves 5 and 6 of No. 3 cylinder. Then check/adjust the valve 3 and 4 of No. 2 cylinder.

5.4. Electrical system.

The electrical system is connected to battery after earth switch is switched on (1-Fig. 4.2).

WARNING:



To avoid damage to the alternator charging system, observe following service precautions:

- NEVER make or break any of the charging circuit connections, including the battery, when the engine is running.
- Washing tractor, be careful and don't let water enter into the alternator and starter motor.
- NEVER short any of the charging components to earth.
- ALWAYS disconnect the battery earth terminal when installing or removing the alternator.
- DO NOT use a slave battery of higher than 12 volts nominal voltage.
- ALWAYS disconnect the battery earth cable when charging the battery in the tractor using a battery charger.
- ALWAYS observe correct polarity when installing a battery or using a slave battery to jump-start the engine.
- ALWAYS disconnect the battery earth cable before carrying out arc welding on the tractor or on any implement attached to the tractor.

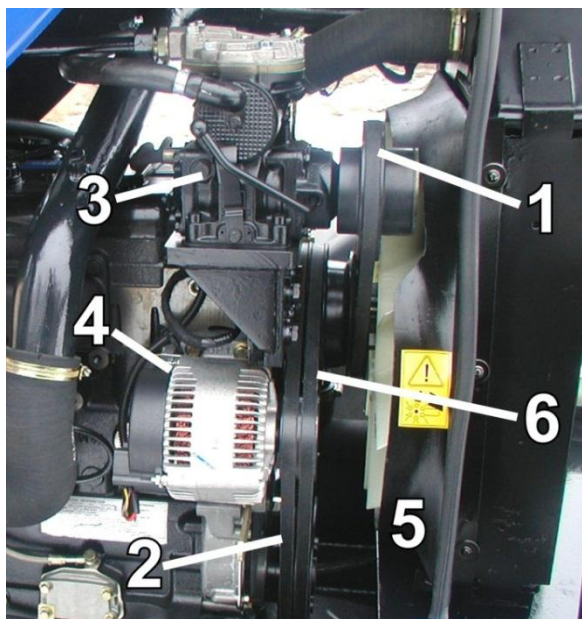


Fig. 5.4. V-belts.

1-Compressor V-belt. 2 - Alternator V-belt. 3 - Compressor. 4 - Alternator. 5 - Fan protection cover.. 6- Fan V-belt.

5.4.1 Alternator maintenance.

Check the fan/alternator V-belt tension every 150 hours of operation. (Fig. 5.4).

The correct belt deflection is 8 mm, with the belt depressed (with a force of about 25N).

If adjustment is required:

- loosen the pivot fasteners of the alternator and the adjustment link fasteners,
- change the position of the alternator to give the correct tension. Tighten the pivot fasteners of the alternator and the adjustment link fasteners (to 22 Nm),
- check the belt tension again to ensure that it is still correct. If a new belt is fitted, the belt tension must be checked again after the first 20 hours of operation.

5.4.2. Starter motor maintenance.

Push clutch pedal during engine starting to reduce starter motor load.

If the starter motor fails, have it repaired at specialized service.

WARNING:



Don't start the starter motor when engine is on which may cause the motor damage. Don't crank the engine longer than 5 second and next crank can be made after 30 seconds.

5.4.3. Battery maintenance.

The battery (2-Fig.4.2) is mounted on the R.H. side under the cab step. To gain access to the battery, remove the nut (3-Fig. 5.4.2) securing the shelf and deflect the shelf with the battery.

Check the electrolyte level every 50 hours of operation. The electrolyte level in each cell should be 10 ÷ 15 mm above the top of separator plates and can be measured with glass tube. If necessary, replenish each cell with distilled water to the required level.

When conventional battery is fitted, periodic inspection of electrolyte level and concentration is required.

At regular intervals, clean the battery terminals and cable ends, then smear them with petroleum jelly. Keep the battery top clean.

To ensure proper battery performance, check also at regular intervals the electrolyte concentration so that the battery charge level could be defined.

If the battery is found discharged to 50 %, or more, it should be recharged until a signs of full battery charge are evident (intensive gas emission) and the electrolyte concentration.

NOTE:

In some territories maintenance free batteries are fitted on tractors. Follow the manufacturer's maintenance instructions.

WARNING:

1. During servicing be utmost careful when in contact with sulphuric acid (pour acid into water) to prevent contamination of the body, clothing or other objects. If such contamination occurs, immediately flush the contaminated spot with water liberally and neutralize with 2,5% solution of borax and water. The electrolyte should be prepared using protective clothing and glasses.
2. Do not approach the battery with an open fire and avoid situations leading to short-circuit or "flashing" as explosion is likely to occur.

5.4.4. Spot lights adjustment.

Regarding the safety of road traffic the front headlights adjustment should be executed in authorized service depot.

5.4.5. Bulb and fuse - replacement.

Be sure of correct power of installed bulb. Disconnect the main earth switch before bulb change.

NOTE:

Do not replace blown fuse with another of a different capacity

The fuses are placed in a box located under the instrument panel. Remove the plastic cover to gain access to the fuses.

Fuses location in fuse box is specified in table No. 8 .Table No. 9 describes bulbs specification.

Table 8

Fuse location in fuse box											
12	11	10	9	8	7	6	5	4	3	2	1
13		14		15		16					

Fuse No.	Electric circuit	Capacity
1	Headlights (main beam)	15A
2	Headlights (dipped beam)	15A
3	Marker lights	15A
4	Fuel supply control device Glow plugs relay	10A
5	Front air blower	10A
6	Indicator lights	10A
7	Stop lights, gauges and warning lamps	10A
8	Horn, windscreen wiper and washer	10A
9	Blower (in the roof), rear window wiper, illumination of switches, 7 pin socket	10A
10	Work lamps	25A
11	Work lamps	25A
12	Relays of main and dipped beam	25 A
13	Flame / Glow* plug	25 A
14	Hazard warning lights, cab lighting, radio	15 A
15	Work lamps	25A
16	Work lamps	25A

* 70 A capacity fuse is located in separate box .

Table 9

Application	Bulb indication	Nos. per tractor
Headlights (main and dipped beam)	H4 12V 60/55 W	2
Front and rear work lamps	H3 12V 55W	8
Front marker lights	12V 5W	2
Rear marker lights and stop lights	12V 5/21W	2
Flashing indicators (front and rear)	12V 21W	4
Number plate illumination	12V 5W	1
Cab lighting	12V C5W	1
Illumination of instrument panel gauges and indicator lights	12V 1,2 WBC	14

5.5. Hydrostatic steering system.

Hydrostatic steering system has an independent circuit with its own oil reservoir (Fig. 5.5.1). There is an oil filter in the reservoir. Replace the filter element every 600 hours of operation.

To replace the filter, drain the oil from the reservoir, remove the reservoir cover (2), remove the filter element and install a new one.

Drain the oil by plug (6) located at the bottom of the reservoir - after unscrewing drain plug unscrew also the filler plug with vent (5). The reservoir cover is removed by unscrewing screws (4) located on the top of the reservoir. The filter is removed by unscrewing the screw (7).

After replacing the filter, follow the assembly steps and fill the system with fresh oil

Free play in the system is measured on the circumference of the steering wheel when the front wheels are set to ride forward and should not exceed 5° with the engine running.

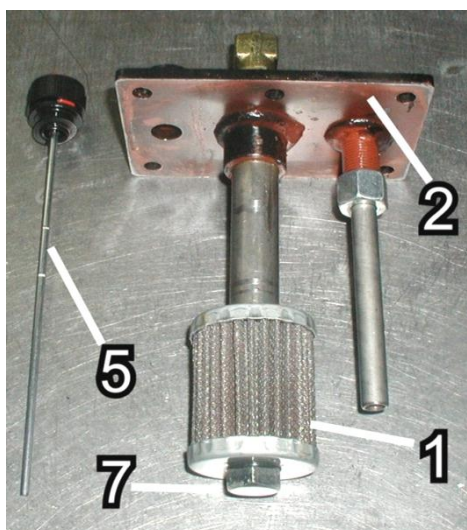
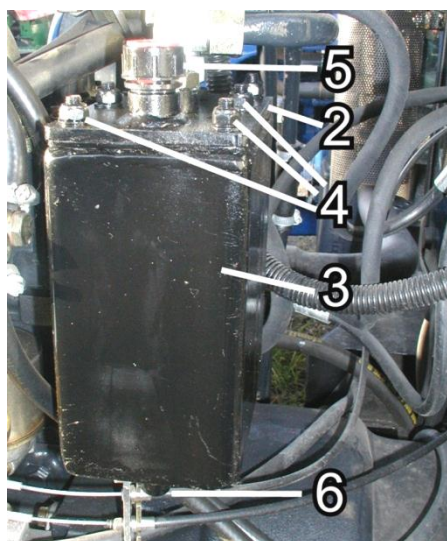


Fig. 5.5.1. Hydrostatic steering oil reservoir:

1 - Filter element. 2 - Oil reservoir cover. 3 - Oil reservoir housing. 4 - Cover securing bolt. 5 - Filler plug with oil level dipstick. 6 - Drain plug. 7 - Filter securing nut.

5.6. Front axle.

5.6.1. Non-driven front axle

Grease points

Every 150 hours of operation grease front axle pivot pins (Fig. 5.6.1), stub axles and front wheel hubs (Fig. 5.6.2) grease points.

Front wheel bearings adjustment

Inspect the front wheel bearings clearance every 600 hours of operation at raised axle and freely rotating wheel.

If there is found excessive axial clearance at the wheel, adjust it as follows:

unscrew the hub cup;

- Remove the castellated nut securing pin;
- Rotate the wheel by hand and tighten the castellated nut to the beginning of the wheel braking;
- Turn back the nut to nearest groove enabling to secure with locking pin;
- Put the pin (wheel should rotate freely in bearings showing no clearance);
- Fill the bearing with grease;
- Screw the hub cup.

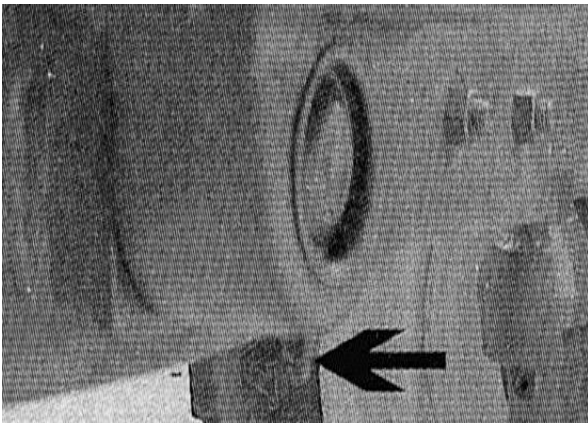


Fig. 5.6.1. Front axle pivot pin (2 grease points).

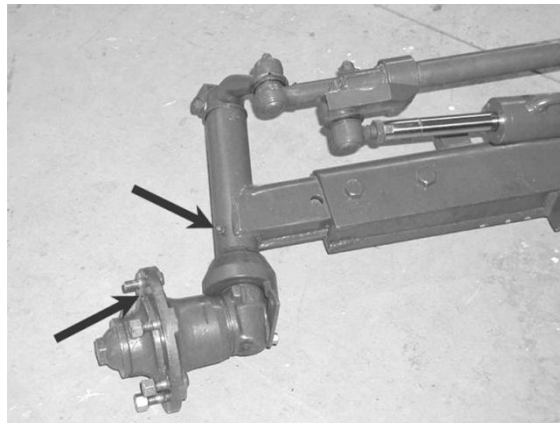


Fig. 5.6.2 Stub axles (2 grease points) and front wheel hubs (2 grease points).

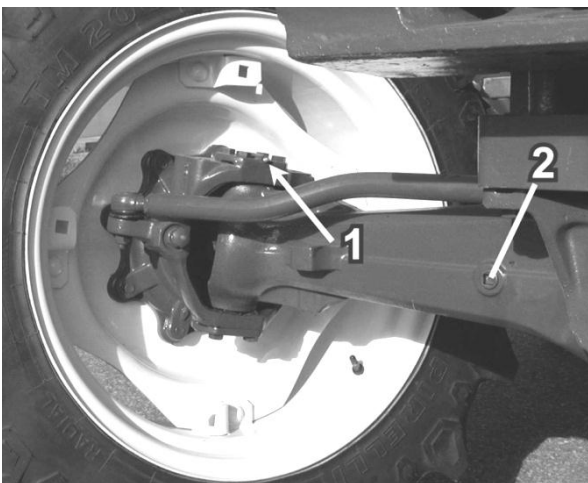


Fig. 5.6.3. Front drive axle.
1 - King pin grease points (2 pcs. on each side of tractor – at the top and at the bottom). 2 - Filler / level plug.

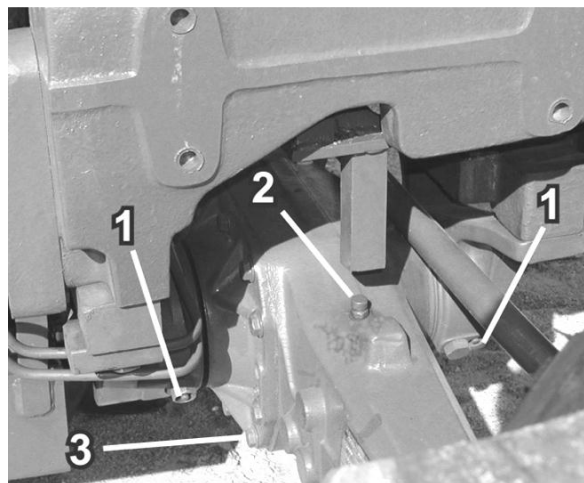


Fig. 5.6.4. Front drive axle. 1 - Pivot pin grease points (2 pcs.). 2 - Breather. 3 - Drain plug.

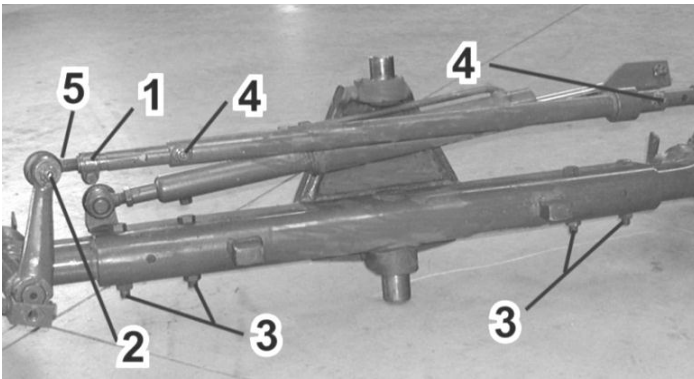


Fig. 5.6.5. Front non-driven axle

1- Track rod ball joint clamp. 2- Ball joint bolt
3- Track adjustment bolts. 4- Center sleeve retaining bolts.
5- Track rod ball joint.

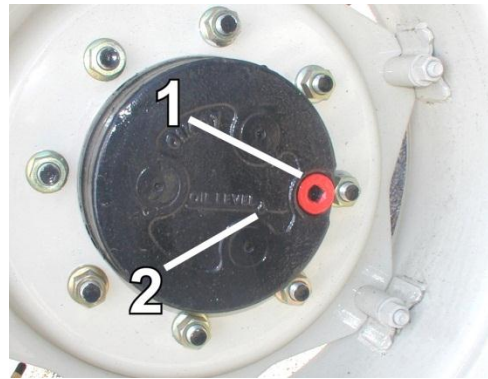


Fig. 5.6.6. Epicyclical reduction unit of front drive axle.

1- Filler / level plug,
2- Oil level line in wheel hub.

5.6.2. Front drive axle

Lubrication

Every 150 hours of operation grease front axle pivot pins (1-Fig. 5.6.4) and kingpins (1-Fig. 5.6.4) grease points.

Check the oil level in the front axle housing (2-Fig. 5.6.3) and clean the breather (2-Fig. 5.6.4) of the front axle every 150 hours of operation.

To check, remove the filler / level plug (2-Fig. 5.6.3). The oil should reach the edge of level hole.

To clean the oil breather, remove it, clean in fuel oil and allow it to dry. Tighten it to a torque of 10 Nm.

Replace the oil in the front drive axle housing every 600 hours of operation plug (2-Fig. 5.6.3) short after tractor stop. The drain plug (3-Fig. 5.6.4) is located at front of the front axle housing.

Check the oil level in the epicyclical reduction units of front drive axle every 150 hours of operation.

To check, set the wheel hub with the filler/level, drain plug 1-Fig. 5.6.6) in horizontal position as indicated by the line (2-Fig. 5.6.6) and remove the plug. The oil level should reach the hole level.

Replace the oil in the front final drive housing every 600 hours of operation or once a year, whichever occurs first.

To replace, proceed as follows (Fig. 5.6.6):

- set the plug in its upper position and then loosen it to release possible internal pressure,
- set the plug in its lowest position and remove it,
- after draining the oil, set the plug in horizontal position as indicated by the line and fill the system with a fresh oil of recommended grade up to the level of the plug hole. For capacity, see Table 7.
- fit the plug and tighten to a torque of 80 Nm.

Grease every 150 hours of operation propeller shaft ends.

To gain access to the grease points of the drive shaft, remove the drive shaft guard.

Fig. 5.6.7. Propeller shaft – 2 grease points



5.7. Wheels.

5.7.1. Front wheel track adjustment.

Non driven front axle

Front extension axles enable to set front wheel track in range of 1230 ÷ 1930 mm.

To adjust the front wheel track, proceed as follows:

- apply the parking brake,
- chock the rear wheels and raise the front of the tractor so that wheels are clear of the ground,
- unscrew the nuts and remove the bolts 1 (Fig. 5.7.1) securing the left and right hand axle arms to the axle beam,
- unscrew the nuts and remove the bolts 4 (Fig. 5.6.5) retaining the track rod center sleeve from either side,
- reset the left and right hand axle arms passing the securing bolts through the axle beam and the axle arms as indicated in Fig. 5.7.1 and in the track setting table,
- refit and tighten the retaining bolts 4 (Fig. 5.6.5),
- tighten the axle arm securing bolts to 160Nm,
- check the toe-in and adjust, if necessary.

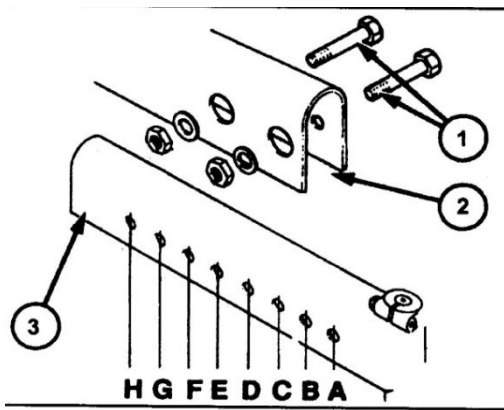


Fig. 5.7.1. Front wheel track adjustment – possible positions of axle arm.

1 - Securing bolts. 2 - Axle beam.

3 - Axle arm. A÷H – adjusting openings.

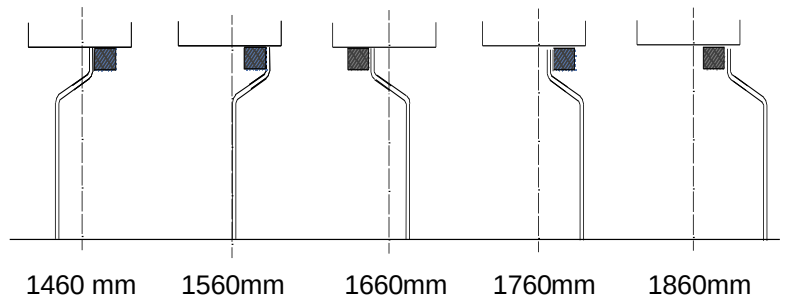


Fig. 5.7.2. Front drive axle wheel track

Front drive axle

The different track widths are obtained by altering the position of the rim in relation to the disc and/or of the disc in relation to the reduction unit flange as well as by reversing the wheels and interchanging them.

NOTE: If the wheels are reversed, they must be transferred to the opposite side of the tractor so as to maintain the correct tyre tread direction.

NOTE: After wheel tracks change check the front wheel nuts tightening and adjust front wheel toe-in.

When refitting or adjusting front wheel, tighten the nuts/bolts progressively to the following torque:

- rim to disc – **144 Nm**,
- disc to axle hub – **300 ÷ 360 Nm**.

5.7.2. Front wheels toe-in.

Toe-in measurement and adjustment .

Check and adjust the front wheel toe-in every 600 hours of operation and after every change in the track setting and when excessive tyre wear is noticed.

To adjust non-driven front axle

To adjust non-driven axle toe-in (Fig. 5.6.5 and Fig. 5.7.3) :

- remove the R.H. side track rod end 5 from the steering arm and loosen the clamp bolt 1,
- screw in or out the track rod ball joint as desired,
- re-fix the tie rod in the steering arm,
- recheck the toe-in and repeat the procedure, if required,
- tighten the track rod ball joint to 160 Nm,
- tighten the tie rod clamp

Measure distance between points on rims at front (before axle) - dimension "A", and then at the back (after axle) after rotate the wheels about half a turn, 180° (Fig. 5.7.3) ;

From the result, subtract the result of measurement "A" before axle. The difference should be $0 \div 13$

To adjust front drive axle toe-in:

- dismount the track rod,
- loosen the lock nut of track rod at each track rod end,
- shorten or lengthen the track rod by track rod ends rotating. Adjustment must be made equally to both track rod ends,
- refit the track rod to the front axle and tighten the lock nuts, to the torque of 140 Nm,
- recheck the toe-in and adjust, if necessary.

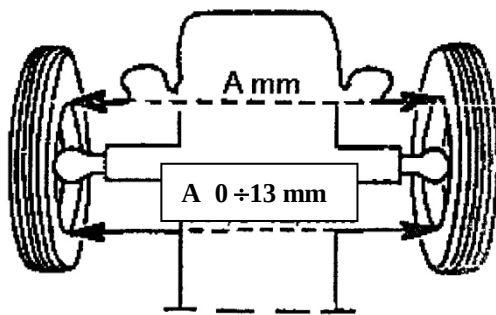


Fig. 5.7.3. Non-driven axle toe-in adjustment

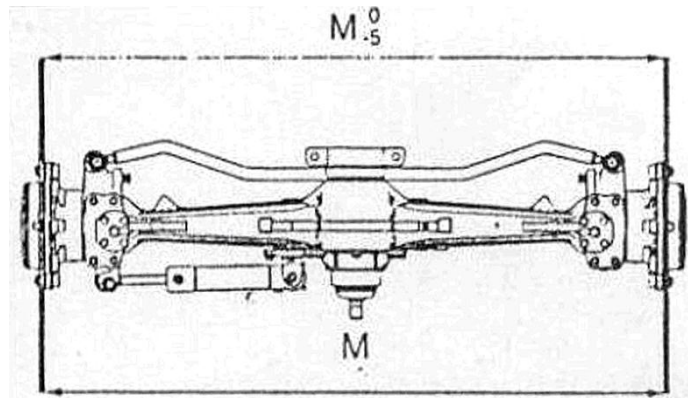


Fig. 5.7.4. Front drive axle toe-in adjustment

5.7.3. Rear wheel track adjustment.

Rear wheel track adjustment is effected by changing the position of the wheel rim in relation to the disc and/or of the disc in relation to the axle hub as well as by reversing the wheels and interchanging them. There are six possible settings (Fig. 5.7.5).

NOTE: If the wheels are reversed, they must be transferred to the opposite sides of the tractor so as to maintain the correct direction of the tyre tread.

When refitting or adjusting a wheel, tighten the nuts/bolts progressively to the following torque:

- rim to disc – **244 Nm**,
- disc to axle hub – **300 ÷ 360 Nm**.



WARNING: Recheck after driving the tractor 200 m and then twice at 10 hour interval. If heavy work is involved, check twice at 2 hour interval until torque is held according to the values as given above.

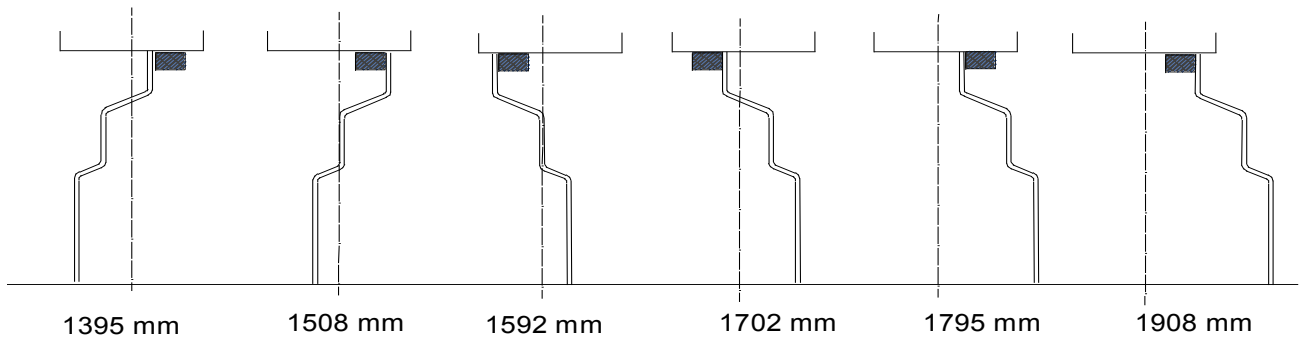


Fig. 5.7.5 Rear wheel track

5.7.4. Tyres use & maintenance.

Check tyre inflation pressure every 10 hours of operation or daily before starting work.

WARNING: These rules, if followed carefully, will ensure maximum tyre life:



- Apply recommended tyre pressures, check that the tyre pressures are correct for the particular operation to be performed. In certain conditions the pressures may be lowered, particularly where the loads are light or the soil is very humid, resulting in the tyre tread failing to self-clean. If the tyre pressures are reduced, have someone observe the tractor. Do not exceed 20 km/h on the road, if the tyre pressures have been lowered for ploughing.
- Keep oil grease and strong alkaline or acid fertilizers away from the tyres to prevent deterioration of the rubber.
- re-vulcanized any small sidewall, or thread splits or cuts, as soon after they occur as possible. This extends the life of the tyre.
- Tyre inflation pressure at one axle wheels must be equal.

5.7.5. Wheel bearings greasing.

Every 150 hours of operation grease rear wheel bearing (Fig. 5.7.6) .



Fig. 5.7.6. Rear wheel bearing grease point.



Fig. 5.7.7. Front wheel bearing grease point (non-drive axle).

Grease front non-drive axle wheel bearings every 600 hours of operation (Fig. 5.7.7).

5.8. Clutch.

Every 150 hours of operation grease:

a) with grease,

- clutch linkage pedal pivot (1-Fig. 5.8.1),
- reverse pivot shaft (Fig. 5.8.2),
- reverse pivot sleeves (Fig. 5.8.3) – upper sleeve is accessible after opened tractor bonnet and lower sleeve is accessible after removed steering column LHS cover

b) with grease-maintaining agent - clutch linkage attachment pivot in clutch pedal lever fork.

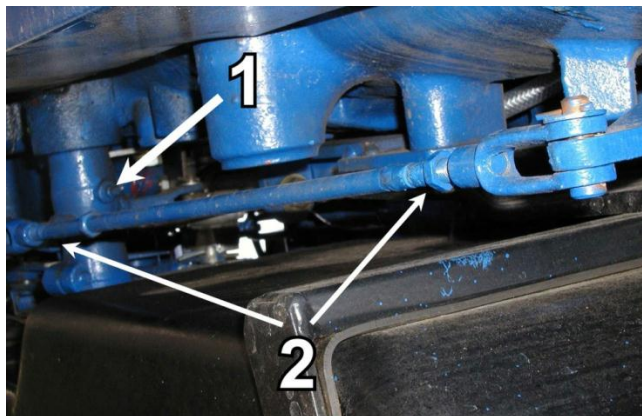


Fig. 5.8.1. Free travel adjustment of transmission clutch pedal. 1 – Lock nut. 2 – Clutch linkage pivot grease point.



Fig. 5.8.2. Grease point of shuttle control shaft.

Check and adjust, if necessary, the free travel of transmission clutch pedal (Fig. 5.8.1), every 150 hours of operation.

- loosen the locknut and remove the split pin and clevis pin,
- turn the clevis to lengthen or shorten the operation rod, as required,
- secure the clevis pin with a new split pin and tighten the locknut.

With correct lever setting, clutch pedal free travel is 25÷35 mm.

Check and adjust, if necessary, the free travel of PTO clutch control lever every 150 hours of operation. Check more frequently if in heavy work involved.

It should be 25 – 35 mm at clutch lever end.

If adjustment is required (Fig. 5.8.4):

- loosen the locknut 2 and rotate the linkage rod 3 to lengthen or shorten it,
- after achieving the required free travel, tighten the locknut 2.

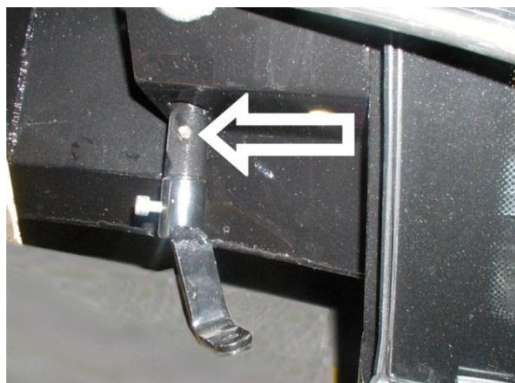


Fig. 5.8.3. Reverse pivot sleeves grease point.

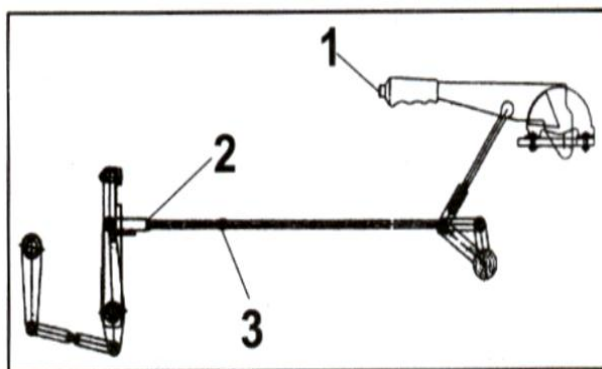


Fig. 5.8.4. PTO clutch lever adjustment. 1 – PTO clutch lever. 2 – Locknut. 3 – Linkage rod.

NOTE: Adjust the transmission clutch pedal free travel before adjusting the PTO clutch. Keep the PTO clutch always in engaged condition, that is lever in down position irrespective of whether the PTO is in use or not.

5.9. Transmission & rear axle maintenance.

Every 150 hours of operation check and replenish if necessary transmission & rear axle oil with oil dipstick (6-Fig. 5.13.2). When controlling oil level, park tractor on level ground.

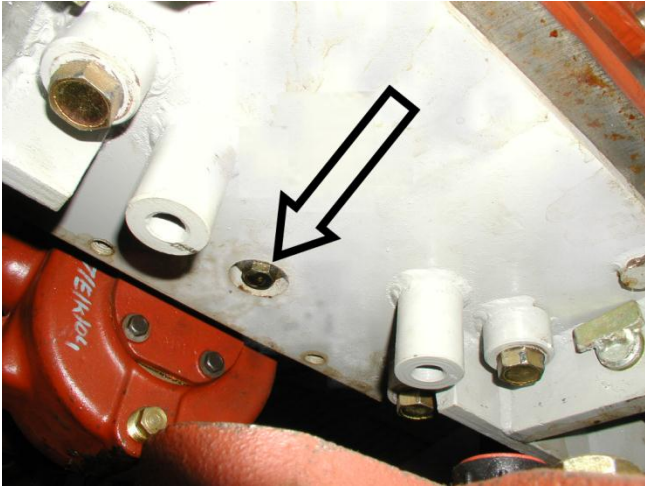


Fig. 5.9.1. Rear axle / transmission oil drain plug

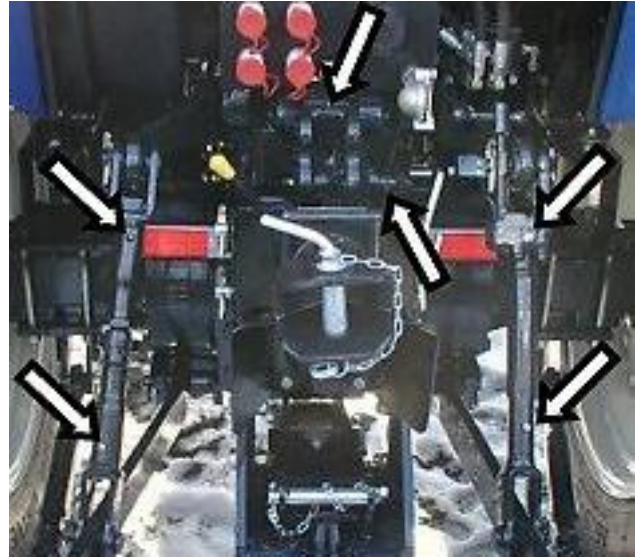


Fig. 5.9.2. 3-point linkage grease points

Replace hydraulic oil filter (8- Fig. 5.3.1) every 300 hours of operation. Transmission & rear axle oil should be replaced every 1200 hours of operation or once a year short time after stopping the engine. To drain the oil remove drain plug at the bottom of rear axle (Fig. 5.9.1) and wait for a moment to allow the oil to drain to a suitable container, replace plugs after oil has completely drained. Refill the rear axle with clean oil through the filler plug at R.H. side of rear axle centre housing (7-Fig. 5.13.2). After refilling, oil should reach level between top and bottom mark on the dipstick.

WARNING: Don't mix different kinds of engine oil.



5.10. Three-point linkage.

Grease every 150 hours of operation, lift rods greasing fittings as shown on Fig. 5.9.2. Threading joints grease every 300 hours of operation.

5.11. Cab and operator's seat.

Clean the cab air filter every 150 hours of operation. Clean every 10 hours or daily if operated in heavy dust conditions.

To remove and clean the air filter, proceed as follows (4-Fig. 3.4):

- unscrew two bolts securing the grille to the roof,
- pull the filter out,

- clean the filter element by blowing on the filter element with compressed air at a pressure not exceeding 0,7 MPa and keeping the nozzle at a reasonable distance from the element. The air stream should be directed opposite to this of air flow in normal operation,
- before refitting the filter element, wipe out its compartment with a damp cloth to remove the remaining dust particles,
- refit the filter element correctly to ensure proper air flow and tightness,
- refit the filter guard.

If the filter element is moist and the above cleaning procedure gives no satisfactory results, wash it in warm (about 30° C) solution of water and non-foaming detergent for automatic washing machine. Soak the element in solution for about 10 minutes and then agitate the element in solution to help remove the dirt. Ensure the element is rinsed thoroughly in clean water, then shake off water and allow 12 hours for the filter to dry. After drying inspect the element for holes or tears by looking through it towards a bright light and particularly check for damaged gasket.

Do not wash the filter element more than 10 times.

Do not direct the water jet onto the cab air filter, when washing the tractor.

Grease elements of operator's seat suspension; every 300 hours of operation.

5.12. Braking system.

Grease the brake pedal pivot every 150 hours of operation (Fig. 5.12).



Rys. 5.12. Brake pedal pivot pin grease point.

5.12.1. Service break adjustment.

Check the brakes operation every day.

Pedal correct free travel should be 20 - 25 mm.

If the free travel is out of the limits, as given above, or the braking performance of wheels is uneven, adjust the brakes as follows:

- chock the front wheels and raise the rear wheels just clear of the ground,
- release the parking brake,
- unlatch the brake pedals,
- remove the instrument panel shroud,
- turn the adjusting nut until the respective brake starts to operate,
- adjust the length of operating cable so that there is a free travel at the pedal of 20 to 25 mm,
- if the cable adjustment range does not permit obtaining correct adjustment, adjust the length of operating rods of the system
- repeat the procedure for the other brake,
- road test the tractor with the brakes latched and check the brakes for pulling to one side. Any tendency to pulling to one side should be counteracted by increasing the pedal free travel on the side to which the tractor pulls.

5.12.2. Parking brake.

Parking brake adjustment should follow the service brake adjustment.

If correctly adjusted, the parking brake should act securely, when the ratchet pawl is snapped in the third to fifth recess on the rack, counting from the lowest position.

Adjust the parking brake as follows:

- latch the brake pedals,
- place the parking brake lever in its lowest position,
- slacken the pull rod locknut, each side,
- shorten the pull rods by turning the adjusting nuts as far as possible and without interfering the free travel of the brake pedals,
- retighten the lock nuts,
- check the brake for correct adjustment. After engaging the parking brake, the air pressure at the air coupler should drop to atmospheric pressure,
- road test the tractor with the brakes latched and check the parking brake for pulling to one side.

Lock the brake pedals together and road test to ensure that the brakes are balanced and will stop the tractor in a straight line. If the tractor pulls to one side, adjust until the brakes are correctly balanced.

5.13. Air braking system.

Tractor air braking system is used for actuating the trailer air brakes and for tyre inflating. Tractor system is adapted to control trailer with single or double-line trailer air braking system. It is fitted with trailer control valve. The system contains of Air compressor (1-Fig. 5.13.2), Pressure regulating valve (Fig. 5.13.4), Air reservoir (3-Fig. 5.13.1), coupling for connection to trailer air braking system (3 - Fig. 5.13.3).

Air braking system is shown at Fig. 5.13.1.

- | | | |
|---|-----------------|---|
|  | WARNING: | 1. Never start towing of a trailer with the air pressure gauge showing pressure below $0,4 \pm 0,04$ MPa. |
| | | 2. Stop towing of a trailer with air braking system if the air pressure warning light illuminates. |

Air compressor

The energy (compressed air) source for trailer air braking system is a piston one cylinder compressor Ø65 mm bore and 76 cm³ displacement operate on 800 to 3000 rpm and obtain a capacity of max 85 l/min.

The air compressor is equipped with a special type of valves enabling the pressure to be self-stabilized. This means that the pressure in the air reservoir is maintained constant due to the compressor delivery stopping at a definite pressure.

The compressor maintains a pressure ranging between 1.1 and 1.4 MPa in the system, from the compressor to the pressure regulating valve.

The air compressor is driven by V-belt from the engine crankshaft pulley, operating on 800 to 3000 rpm and obtain a capacity of max 85 l/min.

There is provided a clutch on the air compressor to save energy when drive without trailer.

To disengaging the drive move the lever at the rear of the compressor (2-Fig. 5.13.2).

The compressor is pressure lubricated with the engine oil from the engine lubrication system.

The lamp on instrument panel (17-Fig. 3.1) illuminates when air pressure inside the trailer air braking system falls below $0,4 \pm 0,04$ MPa and the pressure gauge (4-Fig. 3.1) informs about the current in the air container.

Avoid to contact the V-belt to oil and grease.

Renew the belt if it is worn. If contaminated with oil or grease, wash it using water and soap.

Check the air compressor V-belt tension every 150 hours of operation.

New belt will “bed in” and may require adjustment after ten hours service. Check the tension of a new belt every 10 hours or daily within first 30 hours of operation.
The correct belt deflection is 8 mm.

If adjustment is required:

- loosen the bolts securing the air compressor bracket to the engine block,
- move the air compressor bracket up, until correct V-belt tension is achieved,
- tighten the bolts securing the bracket and re-check the tension.

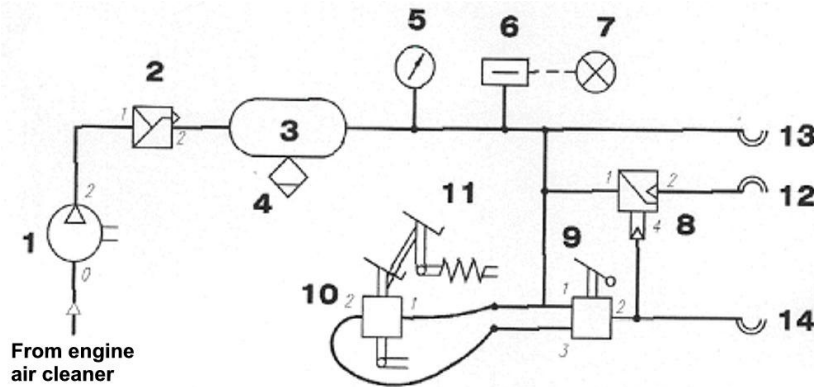


Fig. 5.13.1 Diagram of double line air system.

- 1 - Air compressor.
- 2 - Pressure regulating valve.
- 3 - Air reservoir. 4 - Drain valve.
- 5 - Air pressure gauge. 6 - Air pressure sensor. 7 - Air pressure drop warning light. 8 - Trailer braking valve. 9 - Parking brake valve. 10 - Trailer braking control valve. 11 - Equalizing valve.
- 12 - Coupling valve.
- 13 - Coupling valve red.
- 14 - Coupling valve yellow.

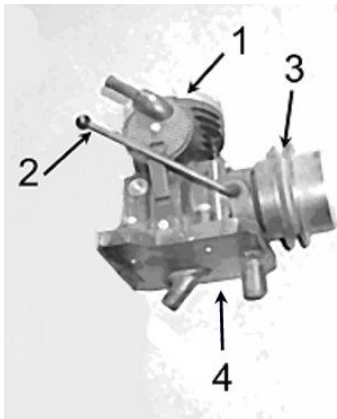


Fig. 5.13.2 Air compressor
1-Compressor, 2- Engage lever, 3-Compressor V-belt pulley, 4-Compressor bracket.

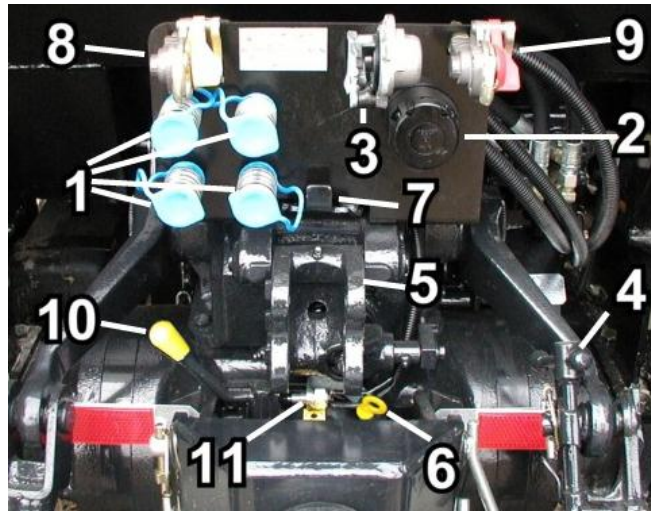


Fig. 5.13.3 Rear of the tractor

- 1- Quick couplers (see description in 4.5.2).
- 2- Seven pin socket.
- 3- Coupler of single line trailer air braking system.
- 5- Hydraulic lift rocker.
- 6- Transmission oil level dipstick, 7-Transmission oil filler plug, 8- Supply socket. 9 - Control socket. 10- PTO 1000 engage sensor, 11- PTO 1000 selector lever.



Fig. 5.13.4. Air Pressure regulating valve. 5-Air regulating valve. 7- Safety valve. 8-Tyre inflating valve.

Air reservoir

The capacity of the air reservoir is 15 liters. The air reservoir ensures the compressed air supply to the trailer air braking system. It prevents rapid pressure drop in the system when the trailer air brakes are used frequently.

After 1200 hours of operation or after two years of operation, and then every 1000 hours or once a year clean the reservoir thoroughly with detergents and blow through with hot air.

At every tractor inspection ensure that the air compressor is firmly secured.

A defective reservoir (cracks, indents, etc.) should be replaced by a new one immediately.

Any kind of the air reservoir repair is not permitted

Drain water from the air reservoir every 10 hours of operation or daily by pushing drain valve at bottom of the reservoir.

Pressure regulating valve with safety valve

The pressure is compressed to the air container through the valve. The valve reduces the air pressure maintained by the compressor to $p_e=0,8^{+0,02}$ and $\Delta p_e=0,06^{+0,04}$ MPa. The pressure regulating valve is fitted with a tyre inflating valve and a safety valve which limits the maximum air pressure inside the tractor pneumatic installation for braking the trailers (Fig. 5.13.4).

To inflate the tractor or trailer tyres, first reduce pressure in air system to 0,3 MPa (stop the engine and drop air by the drain valve from the air reservoir) and connect the valve to the wheel inflation valve with a rubber hose and with the engine running, inflate tyres to the prescribed pressure. The valve is located on front lower edge of cab on tractor R.H. side (beside main earth switch). No periodical servicing of this pressure regulating valve is necessary. Inspections and adjustments can be made by a specialized service only.

Equalizing device

The equalizing device (which is at the same time the foot of R.H. side brake pedal) is used for leveling the R.H. and L.H. pedal plates of the main brake (two pedals latched together).

Neither servicing nor adjustment of this device is necessary.

Trailer braking control valve

The foot brake valve (which is at the same time the foot of R.H. side pedal) is used to operate the trailer brakes.

The trailer braking force is proportional to the pressure exerted on the brake pedal. Pressing on the pedal causes the compressed air supply to the trailer to be progressively cut off and thus braking the trailer. The air escapes through the valve.

Adjust the foot brake valve every 250 hours of operation by setting correct length of the valve linkages.

The adjustment of the foot brake valve must always follow the adjustment of tractor brakes.

Parking brake valve

The valve is connected by pull rod with the parking brake lever. When engaging the parking brake, the hand brake valve is operated (a hissing sound of the air escaping from the valve should be heard). If the hand brake valve is out of operation (no hissing sound) shorten the pull rod which connects the valve with the parking brake lever.

Coupling valve

The pneumatic system of the tractor and trailer can be coupled by means of this valve which is standard design.

Connecting the trailer and tractor air braking system

As a standard, tractor is fitted with single line air braking system with one (white) air braking coupling.

In option the tractor is fitted with double line air braking system with three couplings (Fig. 5.13.3):

white – to couple single line trailer air braking system,

red – to supply triple line trailer air braking system,

yellow – to control triple line trailer air braking system.

All couplings are fitted with automatic valves to cut off tractor air braking system after disconnected of trailer coupling. The couplings are accordant to ISO standard.

To couple the trailer and tractor air braking system, equalize air pressure in tractor system with ambient pressure (by engaging the parking brake) and after connecting hose couplers release the parking brake. Tractor and trailer braking should be at the same time. Couple also trailer electrical system to the tractor seven pin socket (2 - Fig. 5.13.3).

5.14. Hydraulic lift.

Hydraulic lift is supplied with oil from tractor transmission system.

Grease lift rocker solid grease.

Bleeding Hydraulic lift system:

- check transmission system oil level before bleeding, replenish if required,
- start the engine, move slowly distributor lever from “raising” to “lowering” position – without loading three point linkage,
- don't load hydraulic lift with implements for several minutes.

6. ENGINE FAULT FINDING CHART

The following are suggestions listed for your convenience. You can make simple adjustments on you tractor that will improve its operation and save your time.

If any trouble is experienced, make sure of the cause before attempting to make any adjustments. Always make one adjustment at a time, and if the adjustment made does not improve the problem, return to the original setting before proceeding to the next adjustment.

FAULT	Possible cause	
	To be rectified by user	To be rectified by your Dealer
Low cranking speed	1,2,3,4	
The engine will not start	5,6,7,8,9,10,12,14,15,17	13,34,35,36,37,38,40,42,43,44
Difficult starting	5,7,8,9,10,11,12,14,15,16,17,19	13,34,36,37,38,40,42,43,44
Lack of power	8,9,10,11,12,16,17,18,10,20,21	13,34,36,37,38,39,42,43,44
Misfiring	8,9,10,12,15,2,22	13,34,36,37,38,39,40,41,43
Excessive fuel consumption	11,15,17,18,19,21,22	13,34,36,37,38,39,40,42,43,44
Black exhaust	11, 15,17,19,21,22	13,34,36,37,38,39,40,42,43,44
Blue or white exhaust	4,15,21,23	36,37,38,39,42,44,45,52,58
Low oil pressure	4,24,25,26	46,47,48,50,51,59
The engine knocking	9,15,17,20,22,23	13,36,37,40,42,44,46,52,53,60
ERRATIC RUNNING	7,8,9,10,11,12,15,16,18,20,22,23	13,34,38,40,41,44,52,60,
Vibration	18,20,27,28	13,34,38,39,40,41,44,52,54
High oil pressure	4,25	49
Overheating	11,15,19,27,29,30	13,34,36,37,39,52,55,56,57
Excessive crankcase pressure	31,33	39,42,44,45,52
Poor compression	11,22	37,39,40,42,43,44,45,53,60
The engine starts and stops	10,11,12	

KEY TO FAULT FINDING CHART:

- | | |
|--|---|
| 1 - Battery capacity low. | 31 - Choked breather pipe. |
| 2 - Bad electrical connections. | 32 - Insufficient coolant in system. |
| 3 - Faulty starter motor | 33 - Vacuum pipe leaks or faulty exhauster. |
| 4 - Incorrect grade of lubricating oil. | 34 - Faulty fuel injection pump. |
| 5 - Low cranking speed. | 35 - Broken fuel injection pump drive. |
| 6 - Fuel tank empty. | 36 - Incorrect timing of fuel injection pump. |
| 7 - Faulty stop control operation. | 37 - Incorrect valve timing. |
| 8 - Blocked fuel feed pipe. | 38 - Poor compression. |
| 9 - Faulty fuel lift pump. | 39 - Cylinder head gasket leaking. |
| 10 - Choked fuel filter. | 40 - Sticking valves. |
| 11 - Restriction in air cleaner. | 41 - Incorrect high-pressure pipes. |
| 12 - Air in fuel system. | 42 - Worn cylinder bores. |
| 13 - Faulty injectors or incorrect type. | 43 - Pitted valves and seats. |
| 14 - Cold start system used incorrectly. | 44 - Broken, worn or sticking piston rings. |
| 15 - Faulty cold start system. | 45 - Valve stems and/or guides worn. |
| 16 - Blocked fuel tank vent. | 46 - Worn or damaged crankshaft bearings. |

- | | |
|--|--|
| 17 -Incorrect type or grade of fuel. | 47 - Lubricating oil pump worn. |
| 18 -Restricted movement of engine speed control. | 48 - Relief valve sticking open. |
| 19 -Restriction in exhaust pipe. | 49 - Relief valve sticking closed. |
| 20 -Overheating. | 50 - Relief valve spring broken. |
| 21 -Too low engine temperature. | 51 - Fault in suction pipe of lubricating oil pump. |
| 22 -Incorrect valve tip clearances. | 52 - Piston seizure/ pick up. |
| 23 -Incorrect grade of oil in wet type air cleaner, if fitted. | 53 - Incorrect piston height. |
| 24 -Insufficient oil in sump. | 54 - Incorrectly aligned flywheel housing or flywheel. |
| 25 -Inaccurate gauge. | 55 - Faulty thermostat or of an incorrect type. |
| 26 -Choked oil filter. | 56 - Restriction in water jacket. |
| 27 -Damaged fan. | 57 - Faulty water pump. |
| 28 -Faulty engine mounting or flywheel housing. | 58 - Damaged valve stem oil deflectors, if fitted. |
| 29 -Excess of oil in sump. | 59 - Blocked sump strainer. |
| 30 -Chocked radiator. | 60 - Broken valve spring. |

7. TRACTOR STORAGE

If your tractor is to be out of service of any length of time, certain precautionary measures must be taken to safeguard it.

It is recommended, if the standstill period is not very long, to run the engine every 7 days until the operating temperature of the engine is reached (green scale in the water temperature gauge).

If the tractor is to be out of service for an extended period of time the following precautionary measures should be taken:

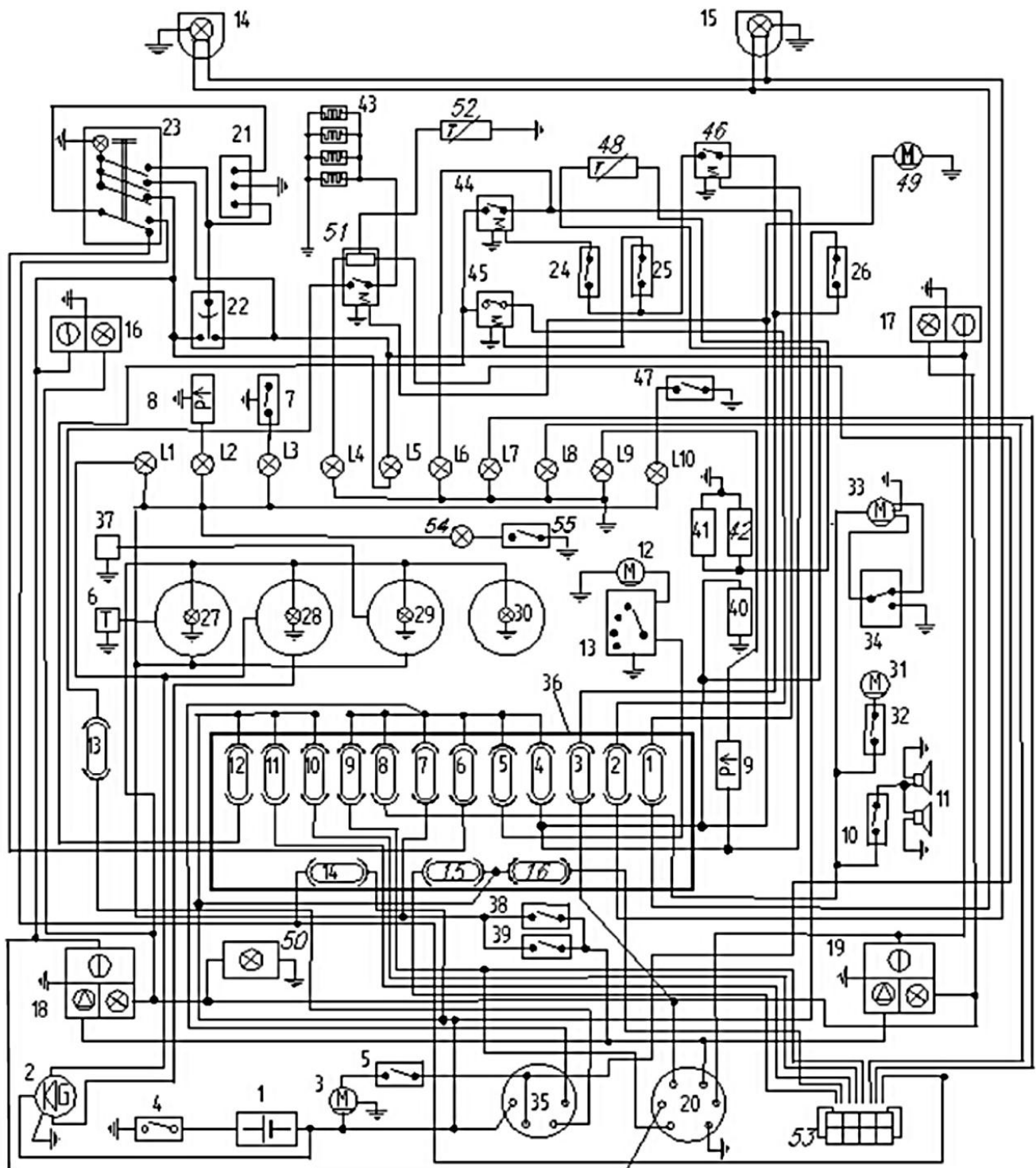
- clean the tractor,
- drain the engine and transmission oil and refill with fresh oil,
- drain the fuel tank and pour approximately 10 litres of special calibrating fuel into the tank. Run the engine for at least 10 minutes to ensure complete distribution of the calibration fuel throughout injection system. See the next item before running the engine,
- check the radiator coolant level. If the coolant is within 200 hours of the next change, renew the coolant. Run the engine for one hour to disperse the inhibitor throughout the cooling system,
- lubricate all grease fittings,
- rise the lift linkage hydraulically and support the lift arms in the fully raised position,
- lightly coat all exposed hydraulic piston rods with petroleum jelly, e.g. power steering cylinder rams, spool valves, etc.,
- remove the battery and store in a warm, dry atmosphere. Recharge periodically,
- raise the tractor and place supports under the axles to take the weight off the tires,
- block the clutch pedal in the fully depressed position,
- cover the exhaust pipes opening

PREPARING THE TRACTOR FOR USE AFTER STORAGE

- inflate the tires to the correct pressure,
- refill the fuel tank,
- check the radiator coolant level,
- check all oil levels,
- install a fully charged battery,
- remove the exhaust pipe covering,
- start the engine and check that all instruments and controls are functioning correctly,
- drive the tractor without a load to ensure that it is operating satisfactorily

8. WIRING DIAGRAMS

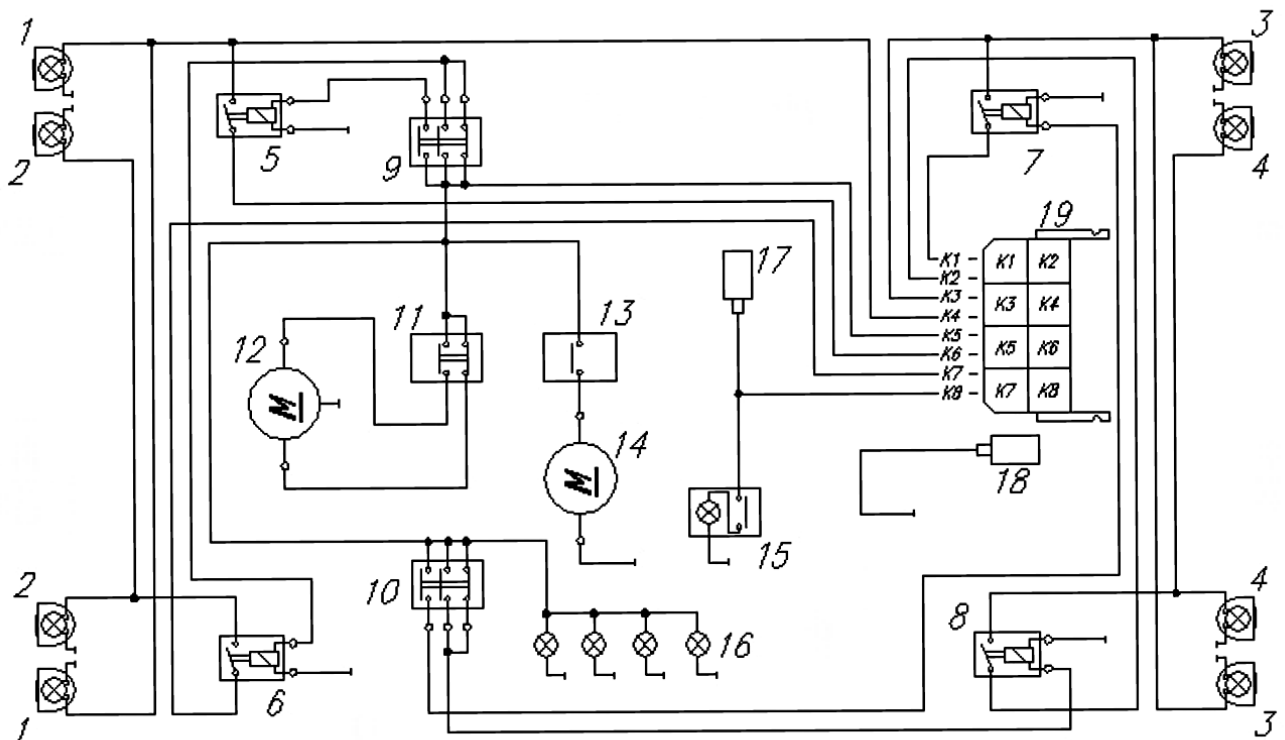
FT 675 WIRING DIAGRAM (without cab)



KEY TO FT675 WIRING DIAGRAMS

- | | |
|--|---|
| 1. Battery. | 31. Windscreen washer motor. |
| 2. Alternator. | 32. Windscreen washer switch. |
| 3. Starter motor. | 33. Windscreen wiper motor. |
| 4. Earth switch. | 34. Windscreen wiper switch. |
| 5. Safety start switch. | 35. Master switch. |
| 6. Coolant temperature sender unit. | 36. Fuse box. |
| 7. Differential lock engaged sender unit. | 37. Fuel level sender unit. |
| 8. Engine oil pressure drop sender unit. | 38. Stop light sender unit, L.H. |
| 9. Air pressure drop sender unit. | 39. Stop light sender unit, R.H. |
| 10. Horn switch. | 40. Fuel stop control switch (applicable to FT675 only). |
| 11. Horn. | 41. Starting aid sender unit (applicable to FT675 only). |
| 12. Motor of front blower. | 42. Six-pin connector (for connecting the cab wiring system). |
| 13. Front blower switch. | 43. Flame plug. |
| 14. Headlight assy., L.H. | 44. Main beam switch over. |
| 15. Headlight assy., R.H. | 45. Dipped beam switch over. |
| 16. Front lights (side marker light + flashing indicator), L.H. | 46. Thermostat (applicable to FT675 only). |
| 17. Front lights (side marker light + flashing indicator), R.H. | 47. Air cleaner restriction sender unit. |
| 18. Rear lights (tail light + flashing indicator + stop light), L.H. | 48. Cold start sensor. |
| 19. Rear lights (tail light + flashing indicator + stop light), R.H. | 49. Fuel pump. |
| 20. Seven-pin socket. | 50. Pulpit light. |
| 21. Flasher unit. | 51. Glow plug relay. |
| 22. Flashing indicator switch. | 52. Glow plug relay sensor. |
| 23. Hazard warning lights switch. | 53. PTO 1000 rpm engage warning light. |
| 24. Main beam switch. | 54. PTO 1000 rpm engage sensor. |
| 25. Dipped beam switch. | |
| 26. Marker lights (side and tail) switch. | L 1 - Battery charge warning light. |
| 27. Coolant temperature gauge. | L 2 - Engine oil pressure warning light. |
| 28. Tachometer and hour counter with illumination. | L 3 - Differential lock engaged warning light. |
| 29. Fuel gauge with illumination. | L 4 - Flame plug warning light. |
| 30. Air pressure gauge illumination. | L 5 - Flashing indicator warning light. |
| | L 6 - Main beam warning light. |
| | L 7 - Front work lamps indicator light. |
| | L 8 - Rear work lamps indicator light. |
| | L 9 - Air pressure drop warning light. |
| | L10 - Air cleaner warning light. |

CAB WIRING DIAGRAM



KEY TO CAB WIRING DIAGRAM:

- | | |
|---------------------------------------|--|
| 1 - Front work lamps. | 9 - Cab lighting lamp. |
| 2 - Rear work lamps. | 10 - Illumination lamps of switches. |
| 3 - Front work lamps switch. | 11 - Rear window wiper switch. |
| 4 - Relay of front work lamps switch. | 12 - Rear window wiper motor. |
| 5 - Rear work lamps switch. | 13 - Blower switch. |
| 6 - Relay of rear work lamps switch. | 14 - Blower motor. |
| 7 - Radio power supply. | 15 - Six-pin connector (to tractor wiring system). |
| 8 - Cab lighting switch. | |