

FARMTRAC

TRAKTÖRLERİ TÜRKİYE

Kullanım Kılavuzu

Farmtrac 6060DT/6075DT



Özkaplan Otomotiv

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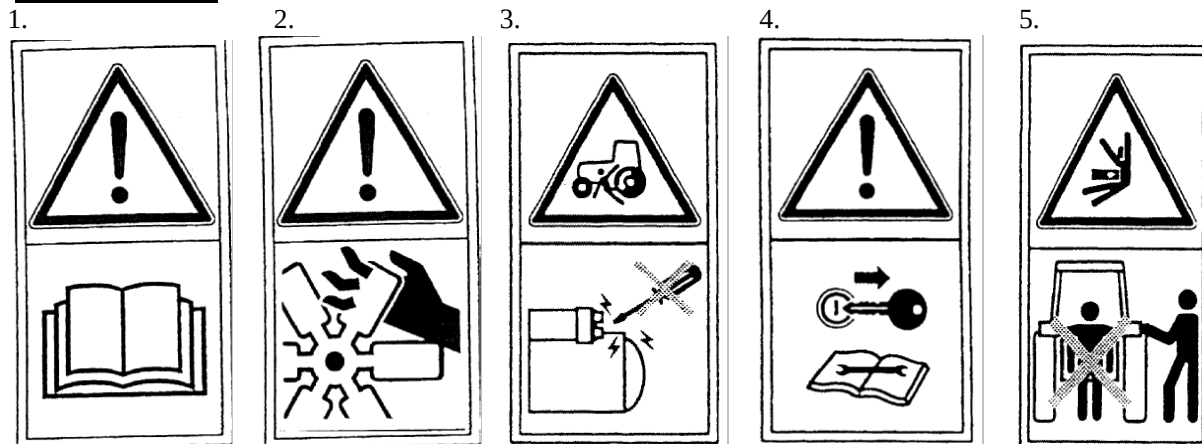
INTRODUCTION



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.

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, on the right mudguard, riveted from inside (Fig. 1a), The plate contains tractor serial number, engine serial number, certificate number, etc.
- The chassis (tractor) serial number is punctured on the right reduction gear housing (Fig. 1b).
- The engine serial and certificate number - punctured on the cylinder block under starter motor (Fig. 1c) - and on identification plate stuck on valve cover (Fig. 1c).
- Protection frame identification data - on identification plate on right pillar outside (Fig. 1f).

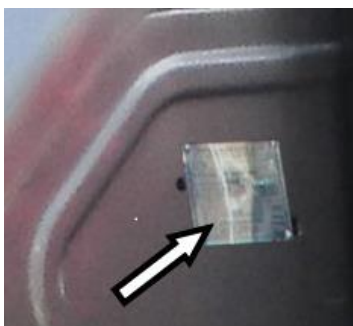


Fig. 1a

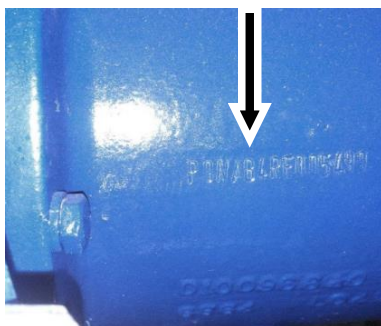


Fig. 1b

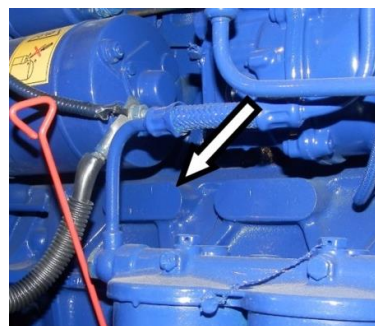


Fig. 1c



Fig. 1d

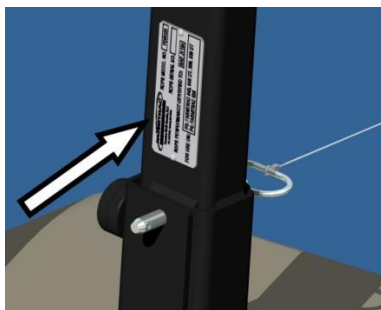


Fig. 1f

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. Use fuel oil with a minimum cetane rating of 40. At very low ambient temperatures and/or at high altitudes, a fuel with a higher cetane rating is required.
13. Fuel oil with a sulphur content above 1.3 % is not recommended.
14. Precautions should be taken to ensure that stored fuel is kept free of dirt, water, etc.
15. 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.
16. 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.
17. 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.
18. 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 you 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 6075 DT	FT 6060 DT
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2.1. Engine.

Engine model	AE4.286E-3A	AE4.286H-3A
Engine type	four stroke, water-cooled, direct injection diesel, turbocharged	
Number of cylinders	4, vertical, in-line	
Firing order	1 - 3 - 4 - 2	
Bore / stroke	111,76 / 106,68 [mm]	
Capacity	3146 [cm ³]	
Compression ratio	18,0:1 ± 5 %	
Engine rated power	54,4 kW	44,1 kW
Engine rated speed	2200 [rpm]	2000 [rpm]
Maximum engine torque	295 [Nm] at 1300 - 1400 rpm	250 [Nm] at 1300 - 1400 rpm
Low idle speed, rpm	700 ÷ 800 [rpm]	

Fuel System.

Fuel Injection pump type, make	BOSH
Max. no load speed	2500-2550 rpm
Injector type	BOSH
Fuel filter type, location, make	Two stage type
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	59 [dm ³]

Lubrication System.

Type	Full flow, force feed and splash
Oil filter type	Spin on, throw away type
Lubricating system capacity	8.0 dm ³
Recommended oil	API CJ-4

Cooling System.

Type	Pressurised recirculation, by pass with radiator, fan, thermostat
Cooling system capacity, litres	11,5 dm ³
Fan	6 blades, diameter 400 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	triple line, 12V with negative to earth
Alternator	12V/55A
Battery	12V,90Ah
Starter motor	12V/3,2 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	280 mm
• PTO	216 mm
Pedal free travel (Transmission clutch)	32 ÷ 38 mm
Actuation	Transmission clutch – foot pedal, PTO clutch – hand lever

Gearbox with range lever.

Type	mechanical, with constant mesh gears
Number of gears	4 + 1R
Number of reduction unit gears	2
Total number of forward/reverse gears	8 F; 2 R
Gearbox control	manual by means of two levers
Oil capacity	See rear axle

Rear Axle.

Type	bevel tooth crown wheel and pinion
Final drive gear ratio	6,16 : 1
Differential – satellites No.	4
– differential lock	mechanical, foot operated
Final reduction gears - type	epicyclic
- gear ratio	6,16 : 1
Recommended oil	TEXACO Super Uniwersal Tractor Oil 15W-30
Oil capacity :	
- gear box	12,5 dm ³
- rear axle hydraulic system	26,0 dm ³
Other	- differential lock - safety start

Front axle.

Type	crown wheel and pinion
Final drive gear ratio	1,8125 : 1
Recommended oil	80W-90

Transmission ratios

Table 1.

Gear range	Gear	Total ratio	
		FT 6075 DT	FT 6060 DT
L	1L	198,71	177,81
	2L	147,17	131,69
	3L	83,85	75,03
	4L	61,61	55,13
H	1H	55,61	49,76
	2H	41,19	36,86
	3H	23,47	21,00
	4H	17,24	15,43
L	RL	173,34	155,11
H	RH	48,52	43,41

Power Take-Off - PTO.

Type	independent
PTO clutch control	mechanical
PTO shaft end	Type 1 per PN-86/R-36101 - 6 (ISO 500)
Independent PTO shaft speed	540 rpm at 1810r./min
Engine – PTO ratio	$i_{WOM} = 0,278$
Rotation	rightwards, from tractor end

2.4. Hydraulic lift system.

Type	piston type with position & draft control
Cylinder bore	76,2
Hydraulic pump type	gear
Hydraulic pump capacity- at 2200 rpm	44 dm ³ / min
Nominal Pressure	19 MPa
Number of quick couplings for external hydraulics	2 (4 option)
Quick couplings type	ISO
Oil filter	on the suction side of the pump
External hydraulics	control of two double acting ram cylinders

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	1500 kg

2.6. Coupling devices.

Drawbar. - Type - Pin diameter - Max. vertical static load	double-position fork type accordant to PN-82/R-36107 32 mm 8 kN at 350 mm from PTO 5 kN at 400 mm from PTO
Upper transportation hitch. - Type - Pin hole diameter - Max. vertical static load	single-position fork type accordant to PN-87/R-36113 32 mm 2 kN

2.7. Steering system.

Type	hydrostatic
Ilość oleju	3,5 l
Recommended oil	Hipol ATF-2D
Steering wheel diameter	350 mm
Number of steering wheel revolutions from lock to lock	2,25

2.8. Wheels & axles.

Front axle type type	rigid, swivel pin mounted, driven
Rear wheels: - Rim size - Tire size - standard - Wheel track - Recommended inflation pressures: - at field - at road transport	W 15 x 28 14,9 - 28 1320 – 1930 mm 120 kPa 140 kPa
Front wheels: - Rim size - Tire size - standard * - Recommended inflation pressures: - at field - at road transport	W 8 x 20 9,5 R 20 100÷110 kPa 120÷140 kPa

2.9. Braking system.

Service brake: - Type - Control - Acting on	wet, disc type mechanical, foot control, with possibility of left & right wheel independent braking rear axle 2 wheels
Emergency brake:	function fulfilled by parking and service brake
Parking brake - Type - Control - Acting on	wet, disc type mechanical, hand lever operated rear axle wheels
Trailer air braking system. - Compressor type - Air reservoir capacity - Standard air pressure - Pressure drop at warning lamp on	overpressured, single-line or triple-line type FOS Łódź - 601.10.911 15 dm ³ 058÷0,63 MPa 0,4 ± 0,04 MPa

2.10. Tractor weight.

Weight of tractor in running order, kg	3144 – 3272
Weight distribution on axle, kg:	
• front	1356 – 1518
• rear	1754 – 1788
Maximum permissible weight of tractor, kg	5000
Weight distribution on axle kg:	
• Front (20 - 50%)	1000 – 2500
• Rear (50 - 80%)	2500 – 4000
	2500
	4000
Maximum mass of the trailer kg:	
• Unbraked trailer towable mass	1500
• Unbraked agricultural implement	3000
• Independently braked towable mass	5000
• Inertia braked towable mass	5000
• Towable mass fitted with air braking	12500
Ballast weights	
• Front axle	$4 \times 22 + 1 \times 40 = 128 \text{ kg}$
• Rear axle	$2 \times 35 + 4 \times 32 = 198 \text{ kg}$

2.11. Tractor dimensions.

Overall length, mm	3595 – 3924
Overall width, mm	1370 – 2418
Overall height, mm	2434 – 2438
Wheelbase, mm	2250
Ground clearance, mm	301 – 332
Minimum turning circle without independent braking, mm:	
• to the left / to the right	
front drive engaged	6010
front drive disengaged	5960

3. INSTRUMENT PANEL & CONTROL DEVICES

3.1. Instrument Panel.



Fig. 3.1. Instrument panel, see description below.

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

Tachometer and hour meter (1)

Tachometer shows the engine speed in hundreds of revolutions per minute (rpm).

Coolant temperature gauge (2)

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.

Fuel gauge (3)

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

Engine oil pressure gauge (4)

Operates with the key-start switch turned to position 2.

Alternator charge warning gauge (5)

Operates with the key-start switch turned to position 2.

Direction indicator warning light (6) – green

This warning light flashes showing which indicator is selected.

Trailer 1 direction indicator warning light (7) – green

This warning light illuminates when the starter switch key is in pos. 2. Operates only if the trailer is connected to the tractor.

Main beam warning light (8) – blue

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

Trailer 2 direction indicator warning light (9) – green

This warning light illuminates when the starter switch key is in pos. 2. Operates only if the trailer is connected to the tractor.

Battery charge warning light (10) – 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.

Parking Brake (11) – Red

This warning light illuminates when Parking Brake is engaged.

Tachometer and hour meter (12)

Tachometer shows the engine speed in hundreds of revolutions per minute (rpm). The hour meter shows the total number of hours of operation, and one hour of engine operation by engine speed of 1400 rpm.

Four wheel drive indicator light (13) – green

Four wheel indicator light illuminates if the four wheel drive is engaged.

Glow plug warning light (14) – yellow

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

Water in Fuel warning light (15) – yellow

This warning light illuminates in case of water in Fuel.

Air filter clogged indicator light (16) – yellow

This warning light illuminates if the air pressure drop when passing through the filter is too high. It is necessary to check the engine air filter and replace the filter cartridges if necessary.

Engine oil pressure warning light (17) – 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 and check the reason of pressure drop.

Hazard warning lights switch (18)

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

Direction indicator switch (19)

Operates as follow:

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

Hand throttle (21)

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.

Horn switch (22)

To actuate horn, push the button. Operates with the key-start switch turned to position 2.

Light switch (23)

The switch has four positions:

- Pos. 1 – switch turned R.H.S. – OFF,
- Pos. 2 – switch turned clockwise – panel and side & tail lights ON,
- Pos. 3 – switch turned clockwise – dipped beam ON,
- Pos. 4 – switch turned L.H.S. – main beam ON,

12V supply plug socket (24)**Key-start switch (25)**

Positions of the key:

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

Engine stop control (26)

Pull the knob fully out to cut off fuel supply to injectors and stop the engine. Push the knob fully back in before restarting the engine.

Air pressure gauge (27)

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

Air pressure drop warning light (28) – red

This warning light illuminates when the air pressure in the trailer air braking system drops below 0,5 MPa. In such case, further towing of a trailer is not permitted.

3.2. Control levers and pedals.

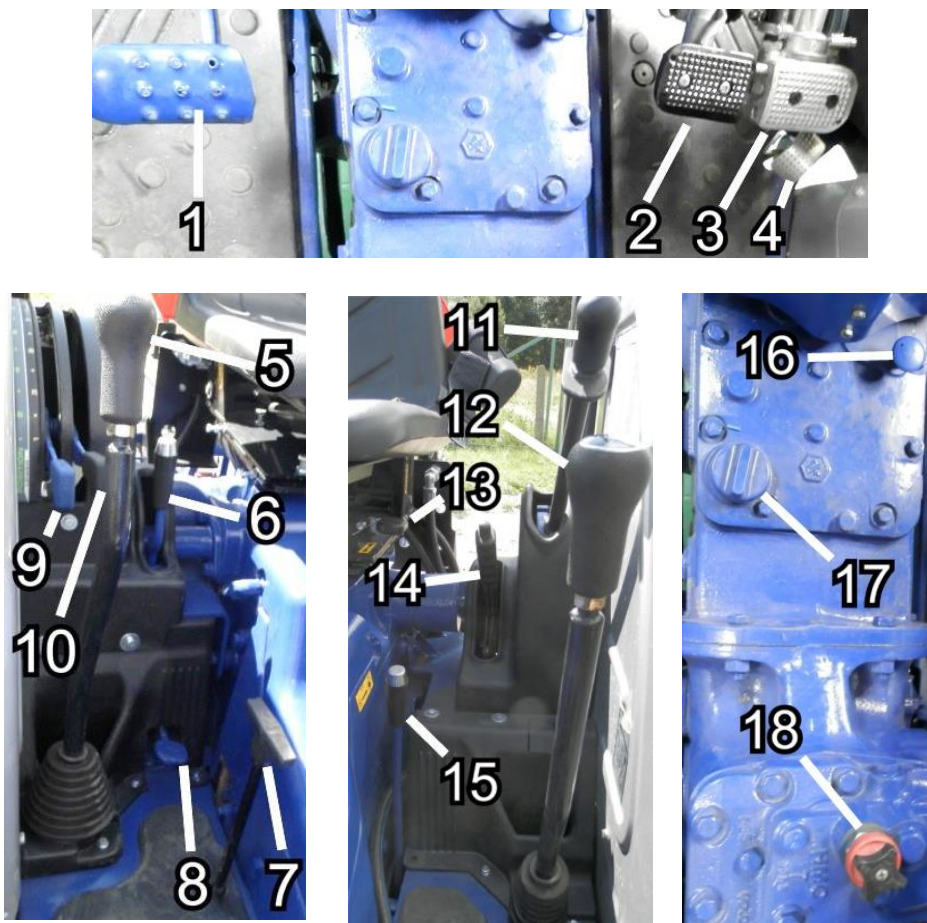


Fig. 3.2 Control levers and pedals see description below.

Clutch pedal (3)

When this pedal is pressed half way the drive between engine and transmission will be disengaged. Press clutch pedal fully to engage or disengage the PTO output shaft. Always press the clutch pedal to engage or disengage a gear ratio or when operating PTO.

Service brake pedals left (2) and right (3)

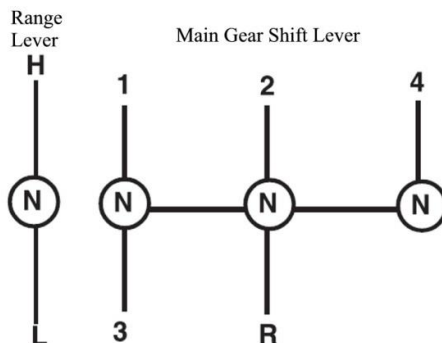
The service brake system is mechanically actuated. The two brake pedals can either be used independently (to aid turning in confined spaces) or locked together using latch to provide a master pedal for normal braking. For independent braking, disengage the latch. Then the left pedal actuates the brake of rear L.H. wheel and the right pedal– the brake of rear R.H. wheel. When driving on public road both brake pedals must be locked together.

Foot Throttle (4)

Operation of the foot throttle overrides the hand throttle setting (21 - fig. 3.1) 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.

Main gear shift lever (5)

The main gearshift lever is used to select any of four forward or one reverse gear ratio. See figure below for the gear shift positions.

**External hydraulics control lever (6)**

For detailed operating instructions, see section 4.5.2.

Front drive engagement lever (7)

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

upwards – disengaged downwards – engaged

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.
Push clutch pedal when operating front drive engagement lever.

Differential lock pedal (8)

The differential lock mechanically locks the rear wheels together to avoid slip of one wheel. Hold down the differential lock pedal until the lock is felt to engage. The lock will automatically disengage when traction at rear wheels equalizes.

Hydraulic lift control levers (9, 10)

These levers are used to control the action of the tractor three-point linkage. External lever (close to mudguard) is the Position Control lever (9) and the internal (closer to operator's seat) is the Draft Control lever (10). For detailed operating instructions, see section 4.5 – Hydraulic system.

PTO clutch lever (11)

Tractors are fitted with double-disc clutch in which PTO output shaft is actuated with a lever. To engage PTO output shaft, pull the clutch lever lock upward and shift the lever forward. To disengage pull lever backwards.

Range lever (12)

The range lever is used to select high (H) or low (L) gear range.. Select the range according to the load and speed requirement. See figure below for the gear shift positions.

Operator's seat adjusting lock lever (13)

Pull the lever to adjust operator's seat distance from the steering wheel.

Parking brake lever (14)

Parking brake is used to lock the tractor rear wheels for parking and/or stationary operation. To engage the parking brake, press brake pedals down (4 & 5) and pull the hand lever up. To release parking brake press button at the end of parking brake lever and move the lever down.

WARNING:

The range lever is linked to the safety start switch. Set the range lever in the center position before operating the starter switch key.

PTO selector lever (15)

This lever has three positions:

- forward position – engine speed PTO engaged,
- centre position – neutral,
- backward position – ground speed PTO engaged.

When moving the lever to the relevant position, always disengage the PTO clutch with lever 11.

NOTE:

Keep the PTO clutch always in engaged condition irrespective of whether the PTO is in use or not

Gear box oil level dipstick (16)**Gear box oil filler plug (17)****Flow control valve knob (18)**

When operating in draft control, the lever is used to adjust sensitivity of automatic depth control system and when operating in position control to set the rate of raise the lower links.

Compressor engage lever

Compressor is fitted with clutch. To disengage clutch operate lever on compressor back side downwards.

3.3. Operator's seat adjustments.

The operator's seat can be adjusted as follows:

- for its distance from the steering wheel
- for height
- for its suspension stiffness

To adjust its distance from the steering wheel, disengage the rack from the rail by means of lever 13, 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 turn the knob clockwise or counterclockwise, 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 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, located on tractor right side above battery box,
- 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 center position enables engine starting. In any other range lever position the safety start switch automatically disconnects the starter motor.
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NOTE:	The control lever of the external hydraulics, when moved forwards, will be kept there by the lock. To release the lever, move it by hand to the neutral position. In any other position, when released, the lever automatically returns to the neutral position
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	WARNING: Do not leave this lever in front position, if not needed, otherwise the hydraulic pump may get damaged.
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	WARNING: Start the tractor only from the operator's seat
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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 (25 – 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 40 seconds. Allow the starter to cool (at least 30 seconds) between intervals of cranking.
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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.

4.3. Driving the tractor.

After starting the engine:

- press 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.

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 move 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 (when PTO is not operated) (5 -Fig.4.6.2)

- | | |
|--------------|---|
| NOTE: | <ol style="list-style-type: none"> 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:
 | <p>Before operating the tractor with PTO driven implements, familiarize yourself with the safety precautions given below and strictly observe them:</p> <ol style="list-style-type: none"> 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

Tractors are fitted with double-disc clutch in which PTO output shaft is actuated with a lever. To engage PTO output shaft, pull the clutch lever (11 - Fig. 3.2) lock upward and shift the lever forward. To disengage pull lever backwards.

To select PTO drive move the PTO selector lever (15 – Fig. 3.2). There are three positions:

- forward position – engine speed PTO engaged,
- centre position – neutral,
- backward position – ground speed PTO engaged.

Before shifting the lever to engage position set the PTO clutch lever 11 (Fig 3.2) to disengaged position.

When shifting the lever to the ground PTO engaged, there is obtained PTO speed depending on tractor speed.

Independent PTO drive means that the PTO shaft rotates proportionally to engine rotation.

To obtain 540 rpm at the PTO set the engine speed to 1810 rpm

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

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.

4.4.1. Use of Multi Speed PTO & Reverse PTO:

Start the engine, set PTO drive selector to ground speed - backward position, keep the transmission gear levers in neutral position and move the PTO lever to backward position.

You can use the Multi Speed PTO feature in three ways:

A) Getting Multi Speed PTO feature when your tractor is in Stationary Condition:

- Keep your Hi-Low lever in Neutral Position
- Disengage PTO Clutch Lever
- Select the Main gear lever in any one gear position (1st to 4th).
- Engage PTO Clutch and the PTO will start rotating as per the selection of the gear.
- You can further change the PTO RPM in a particular gear selection by changing the engine RPM also.

B) Getting Multi Speed PTO feature when your tractor is in Moving Condition

- Keep your Hi or Low lever in engage Position (as per need)
- Disengage PTO Clutch Lever
- Select the Main gear lever in any one gear position (1st to 4th).
- Engage PTO Clutch and the PTO will start rotating as per the selection of the gear.
- You can further change the PTO RPM in a particular gear selection by changing the engine RPM also.

C) Getting Reverse PTO feature:

- Keep your Hi or Low lever in Neutral Position
- Disengage PTO Clutch Lever
- Select the Main gear lever in Reverse gear position.
- Engage PTO Clutch and the PTO will start rotating in the reverse direction.
- You can further change the PTO RPM by changing the engine RPM also.

With this, you can fully utilize the Multi Speed PTO benefits as per your application/ operating needs.

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.

WARNING:



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

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.

Two distinct systems are incorporated

1. Upper Link Draft Control.
2. Position Control.

The type of control selected will depend on the type of implement in use and the operating conditions.

Draft Control is most suitable for mounted implements operating in the ground. 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. The system responds to both upper link compression and tension loads and is, thus, described as a double-acting system.

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 ground engaging equipment unless it is essential to maintain a constant depth regardless of the draft load.

4.5.1. Hydraulic lift system.

The tractor has a dual lever system, i.e., separate levers for Draft and Position Control functions (Figure. 3.2):

- Draft Control lever (10 - Fig. 3.2) (next to the seat) is used to adjust the draft i.e. working depth
- Position Control lever (9 - Fig. 3.2) (next to the mudguard) is used to adjust the position/height of the implement and lets you lift or lower the implement

Draft Control Operation

Move the Draft Control Lever in the quadrant 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 forward to increase the draft loading. Pull rearwards to reduce the draft loading. In most circumstances, forward movement of the Draft Control Lever will increase implement depth and rearward 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.

When the required implement working depth has been established, set the adjustable stop adjacent to the Draft Control Lever to locate the position for repeated use. The Draft Control Lever may be eased sideways to bypass the adjustable stop, if required.

A pressure sensitive feathering valve, installed within the hydraulic system, automatically regulates the hydraulic oil flow to give smoother response to draft signals when using soil engaging implements. In addition, some models have a manually operated flow control valve fitted to regulate the rate of correction of the hydraulic system.

Tilt the Flow Control Valve knob, (18 - Fig. 3.2), rearward for the maximum rate of correction and forward for the minimum correction rate. The rate of oil flow (correction) of the hydraulic system is infinitely variable between these two points.

Pull the Draft Control Lever to the top of the quadrant to override the Flow Control Valve and raise the implement quickly.

**NOTE :**

When operating in Draft Control, the Position Control Lever, (Figure. 3.2) should normally be at the bottom of the quadrant. However, the Position Control Lever may be used in conjunction with Draft Control to limit the maximum depth of correction to achieve a more even depth of cultivation in fields with widely varying soil conditions.

When grading and backfilling with light equipment, such as a 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.

**WARNING:**

Do not transport or attach equipment when the hydraulic system is in Draft Control. Use Position Control for these operations. Always lower hydraulic equipment to the ground before stopping the tractor.

Position Control Operation

Set the required implement height/depth using the Position Control Lever (Figure. 3.2). Pull the Lever back to raise the implement height/depth using the Position Control Lever. Pull the Lever back to raise the implement, push forward to lower. Implement height/ depth is relative to the position of the Lever in the quadrant.

**NOTE:**

When operating in Position Control the Draft Control Lever should be pushed down to the bottom of the quadrant

When the required implement working height/depth has been established, set the adjustable stop adjacent to the Position Control Lever to locate the position for repeated use. The Lever may be eased sideways when it is required to by pass the adjustable stop.

The adjustable stop is reversible after loosening the central clamp screw so that it may also be used when operating in Draft Control.

When operating in Position Control it is of no advantage to restrict the oil flow in the hydraulic system. However, the manual flow control valve (where fitted) may be used to reduce the rate of lift of the three-point linkage, if required. To reduce the rate of lift, tilt the Flow Control Valve lever / knob, (18 - Fig. 3.2)., forward. Tilt the Rocker rearward to increase the rate of lift.

**NOTE:**

When transporting equipment on the three-point linkage set the adjustable stop to maintain the Position Control Lever in the raised position. This will prevent accidental movement of the Lever which could result in attached equipment lowering and becoming damaged or damaging the road surface.

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 backfilling.

Adjust the Draft Control Lever for the maximum required draft load (pull).

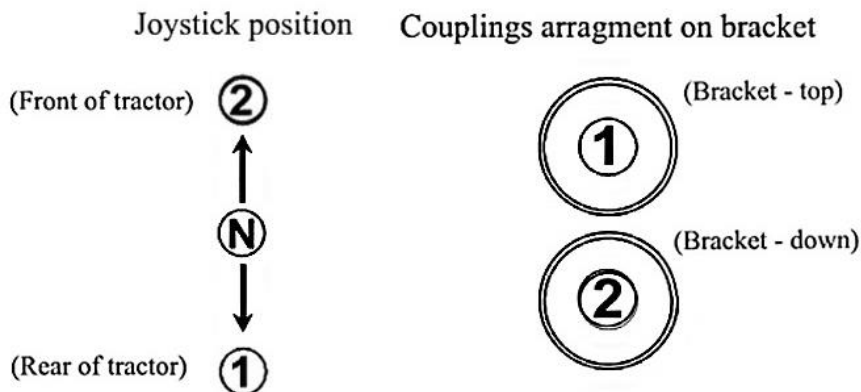
The hydraulic lift system will now provide normal draft response within the range set by the Position Control. This adjustment provides a more uniform depth while maintaining an even pull in widely varying soil conditions.

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 checked 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 external hydraulic system quick-release couplers are located at rear end of tractor (1- Fig. 5.13.5) Hydraulic control is fitted with single spool valve with two quick-release couplers It is controlled with a lever (6-Fig. 3.2) with two positions corresponding to the quick-release couplers, as shown below. Depending on joystick position the pressure appears on relevant coupler Centre position of joystick is the neutral position.



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.
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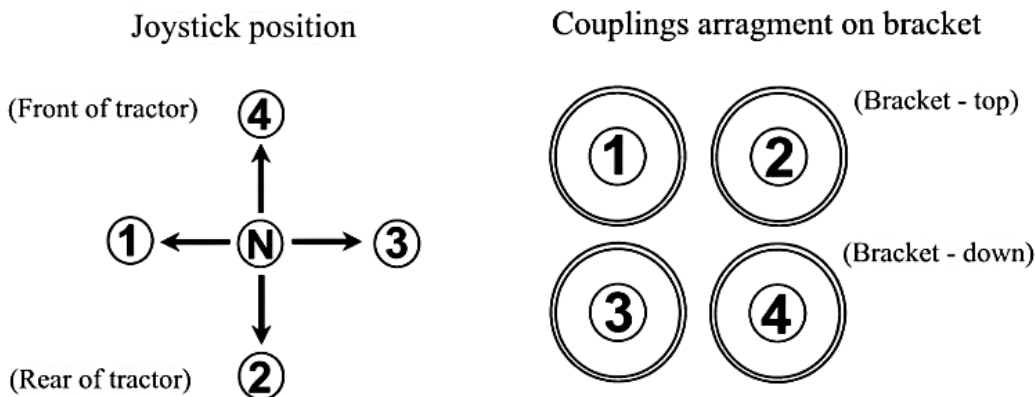
NOTE:	Before connecting remote cylinder hoses, thoroughly clean the connections to prevent oil contamination. Remote cylinders are operated by oil drawn from the tractor transmission system. Therefore, always check and replenish the transmission system oil after remote cylinder equipment has been connected and cycled a few times
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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 oil level in the gearbox is not 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.
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In option he external hydraulic control is fitted with double spool valve with four quick-release couplers

It is controlled with a lever (6-Fig. 3.2) 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 4 of joystick has a lock that holds it in position. To release, the lever must be manually moved. 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.

4.6. Equipment attaching on three-point linkage.

The tractor lift hydraulic 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 (2) it is fitted with locking sleeve and handle (3), to adjust the length of the link. It can be attached to one of two openings in top link rocker (4). When transporting the tractor, hook the link over the lug (5).
2. Lower links (8 and 9).
3. Lift rods, left (6) and right (12) attached lower links with lift arms. The right hand lift rod length is adjusted by means of handle with screw.
4. Stabilizer bars (7 and 10) protect implements of excessive lateral movement. The bars are length adjustable.

Attaching/detaching the implements

Before attaching the implement to the tractor:

- ensure the stabilizer bars are adjusted to level the implement,
- remove the upper transport hitch (1 - Fig. 4.6.2),
- remove the drawbar (6 - Fig. 4.6.2), if close mounted implement is being attached after putting out the pin (8 - Fig. 4.6.2).

	WARNING: Do not transport or attach the implement when the hydraulic system is in Draft Control. Always use Position Control for these operations.
---	---

Attaching implement to the three-point linkage

- move back the tractor to the implement aligning the ends of lower links (8, 9 - Fig. 4.6.1) with the implement hitch pins,
- using the Lift Control levers (9, 10 - 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 and stop the engine,
- position the end of the left hand lever link over the implement hitch pin and secure with a linchpin,
- as required adjust the height of the right hand lower link (12 - Fig. 4.6.1) with the leveling handle (11 - Fig. 4.6.1) and attach to the implement hitch pin,
- attach the top link (2 - Fig. 4.6.1) to a selected connection of the lift rocker and then to the implement cross shaft adjusting its length as necessary,
- adjust the lift rods to their normal operating length, until the implement is level (in perpendicular plane),
- adjust the top link to its normal operating length, until the implement is level (in longitudinal plane),
- adjust the stabilizer bars for side swing,

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.
--

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 leveling 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.

WARNING: Never tow implements attaching to the hydraulic lift rocker

4.7. Attaching trailed machines and implements.

Apart from the three-point hitch (Fig 4.6.2), the machines and implements can be attached to:

- upper transportation hitch (for 2-axle trailers),
- tractor drawbar,
- multi-hole drawbar.

Upper transportation hitch (1 - Fig. 4.6.2) – is used for hitching a two-axle trailers. Secure the hitch attaching pin with a cotter. This hitch must be detached when attaching implements to the three-point hitch. To disconnect the hitch move out pin (3 - Fig. 4.6.2)

NOTE: This hitch must be detached when attaching implements to the three-point hitch.
--

Tractor drawbar (6 - Fig. 4.6.2) – is used for hitching trailed machines and implements. There are two positions of drawbar (extended and folded). When extended, the distance from drawbar pin axis to PTO shaft end is 400 mm and permissible vertical load on drawbar is 5 kN. In folded position the distance is 350 mm and permissible vertical load is 8 kN (Fig. 4.7). This position enable to attach PTO driven machines and implements base on single axle trailer.

Multi-hole drawbar – is used only for hitching light weight agricultural implements.

NOTE: When towing, ensure setting multi-hole drawbar below tractor rear axle, to maintain tractor stability. It is not allowed to attach implements which can raise multi-hole drawbar during operation.

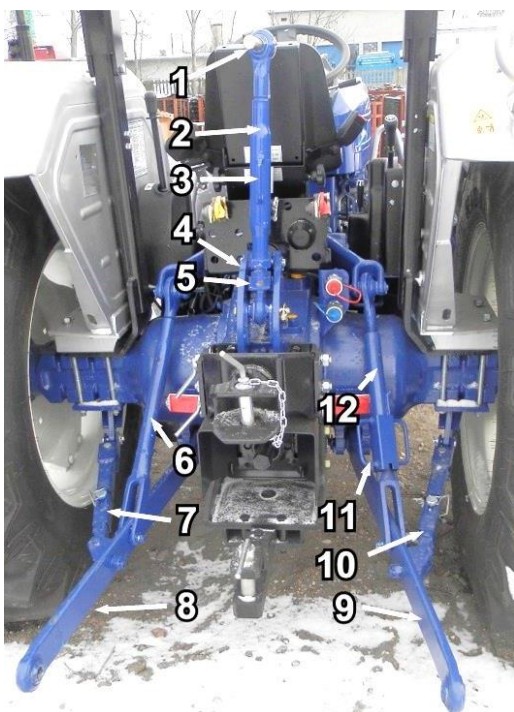


Fig. 4.6.1. Three-point linkage

1- Ball joint, 2- Top link, 3- Locking handle, 4- Top link rocker, 5- Top link lug, 6- L.H. lift rod, 7- L.H. stabilizer, 8- L.H. lift link, 9- R.H. lift link, 10- R.H. stabilizer, 11- R. H. lift rod adjustment handle, 12- R.H. lift rod.

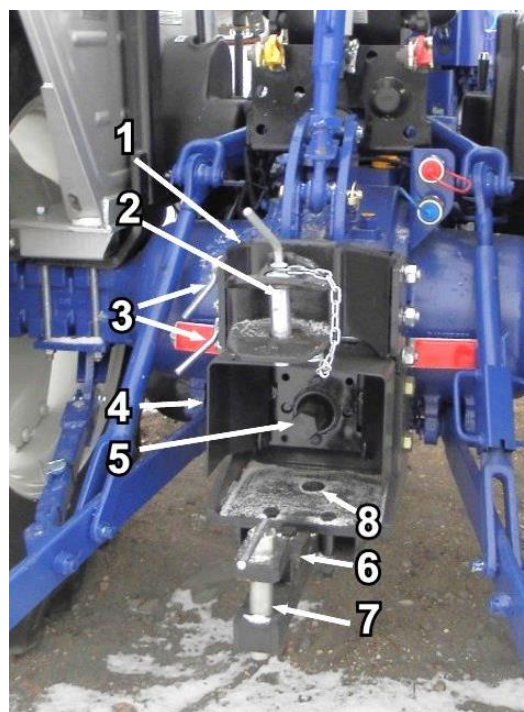


Fig. 4.6.2. Hitches

1- Upper transportation hitch, 2- Hitch pin, 3- Transportation hitch attachment pins, 4- PTO master shield, 5- PTO shaft cup, 6- Tractor drawbar pin, 7- Tractor drawbar, 8- Tractor drawbar attachment pin.

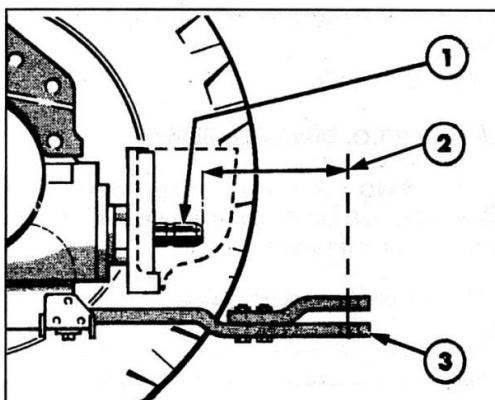


Fig. 4.7. Tractor drawbar load.

1- PTO shaft, 2 – Distance from PTO shaft end to drawbar pin axis, 3 - Tractor drawbar

4.8. Tractor weighing.

For maximum performance in heavy draft conditions weight should be added to the tractor in the form of liquid ballast, cast iron weights or a combination of both.

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 - 4 wafer weights of 22 kg each and central tow hook of 40 kg
($4 \times 22 \text{ kg} + 40 \text{ kg} = 128 \text{ kg}$),
- to rear wheels – 2 rear wheel weights of 35 kg each and 4 additional weights of 32 kg each
($2 \times 35 \text{ kg} + 4 \times 32 \text{ kg} = 198 \text{ kg}$).

	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.
---	---

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	
Every 50 Hours	Dry air cleaner outer element		X				
	Fuel filter(s)						X
	Transmission and rear axle oil level	X				X	
	Battery electrolyte level and concentration	X				X	
	Lubrication acc. to the Grease Points Chart.			X			
	Clutch pedal and PTO clutch lever free travel	X				X	
Every 300 Hours	Tightness of external threaded connections (wheels, manifolds, cab, ballast weights, 3-point linkage etc.)	X				X	
	Condition of tyres and pressures	X				X	
	Engine oil and oil filter				X		X
	Transmission oil level	X				X	
	Front drive axle oil including final reduction units	X				X	
	Hydraulic oil filter				X		
Every 600 Hours	Braking system adjustment	X				X	
	Air compressor (if fitted) and fan V-belts tension	X				X	
	Tightness of trailer air braking system (if fitted)	X				X	
	Tightness of external threaded connections (manifolds, cab, 3-point linkage)	X				X	
	Hydrostatic steering oil and oil filter	X				X	
	Dry air cleaner outer element		X				
Every 900 Hours	Dry air cleaner outer element				X		
	Fuel preliminary filter				X		
	Valve clearances	X				X	
	Hydrostatic steering oil and oil filter				X		
Every 900 Hours	Starter motor pinion	X	X				
	Primary fuel filter element				X		
	Injector maintenance	X	X		X		
	Fuel system breathing					X	
	Hydrostatic steering oil and oil filter				X		
	Rear axle oil level				X		
Every 900 Hours	Front drive axle oil level (including final reduction units)				X		
	Fuel tank and air reservoir (if fitted)		X				
	Transmission and rear axle oil				X		

	Alternator brushes				X		
See text	Cooling system				X		X
See text	General maintenance						

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.

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	API CJ-4	Oil sump	Between marks on dipstick
Transmission oil	TEXACO „SUTO“ 15W-30	Rear axle Transmission Hydraulic lift Reduction gears	Between marks on dipstick in rear axle for all systems
Hydraulic oil	Hipol ATF-2D	Steering system	To reduction gear 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
Rear wheel hubs	grease gun	1x2	50
Front axle king pins	grease gun	1x2	50
Front axle pivot pin	grease gun	2	50
Clutch pedal pivot	grease gun	1	50
Brake pedal pivot	grease gun	2	50
Brake & clutch pedal pivot (Cab)	grease gun	2	50
Brake actuator mechanism	grease gun	2	50
Three-point linkage: lift rods, linkages	grease gun	2	50
Three-point linkage: threading elements	by hand		50

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	8
Transmission oil	Transmission	11,5
	Rear axle, Hydraulic lift	23,3
	Front axle	4
	Front axle reduction units	0,8 x 2
Hydrostatic system oil	Steering system	2,5
Coolant	Cooling system	11,5
Diesel fuel	Fuel tank	59

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.

Liquid top levels are shown in table No. 7.

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 (12- 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 plug (3- Fig. 5.3.1), and collect the oil in a suitable container. Unscrew and discard the oil filter (2-Fig. 5.3.1),. 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 overtighten.

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.

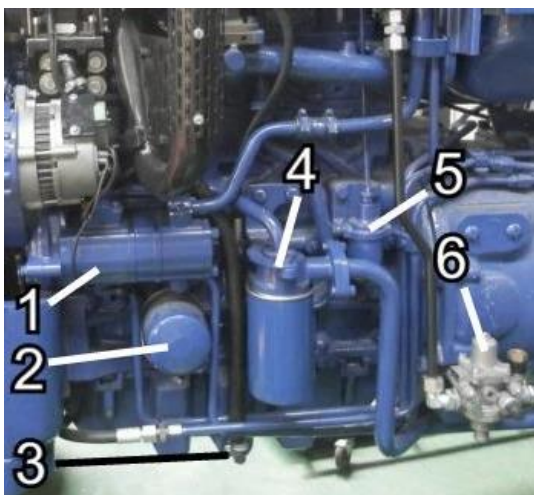


Fig. 5.3.1. Engine L.H. side.

1- Hydraulic oil pump, 2- Engine oil filter, 3- Drain plug, 4- Hydraulic oil filter, 5-Turbocharger oil filter, 6- Air Pressure regulating valve.



Fig. 5.3.2. Engine R.H. side..

7- Hydrostatic oil container filler plug, 8- Minimum oil level indication, 9- Engine oil filler cap, 10- Coolant leveling container, 11- Coolant filler plug, 12- Dipstick, 13- Engine bonnet lock lever.



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



Fig. 5.3.3. Fuel system.

1- Fuel tank, 2- Fuel cut-off valve, 3- Water separator, 4- Separator drain plug, 5- Fuel filter vent plugs 6- Primary fuel filter, 7- Secondary fuel filter, 8- Fuel filter drain plugs, 9- Injection pump, 10- Hand priming pump, 11- Starter motor.

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 filters (preliminary and primary) every 50 hours of operation. (Fig. 5.3.3)

To remove water and impurities from the preliminary and primary fuel filters 1, 2 (Fig. 5.3.3) : loosen the drain plugs 10 (Fig. 5.3.3) at the bottom of the filters and allow the water/fuel to drain into a suitable container.

Every 600 hours of operation change the felt element of the preliminary fuel filter. 2 (Fig. 5.3.3).
Every 900 hours of operation change the felt element of secondary fuel filter 1 (Fig. 5.3.3).
In order to replace a filter element unscrew bolt at filter top cover, remove used filter element and put new clean element.

Water separator

The tractor is fitted with separator (3-Fig. 5.3.3) to separate water and initial removal of fuel impurities. The separator should be cleaned whenever there is water in it (the red ring reaches the red line on the separator housing) or other impurities. In order to remove them, unscrew the drain plug (4-Fig. 5.3.3) and drain water or/and fuel with dirt.

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.

In order to eliminate air from the fuel system, proceed as follows:

- loosen the bleeding screw at preliminary filter cover top (5-Fig. 5.3.3),
- unscrew hand primer plunger (10-Fig. 5.3.3),
- loosen the banjo bolt at the fuel inlet pipe to the injection pump and operate the hand primer until fuel, free of air, comes from the banjo bolt. Tighten the banjo bolt,
- loosen the union nut at the fuelled starting aid (glow plug) and operate the hand primer until fuel, free of air, comes from the connection. Tighten the union nut at the starting aid,
- loosen the high-pressure pipe union nut at two of the injectors ,
- set the throttle fully open and operate the starter motor until fuel is forced out from the pipes, then tighten the union nuts,
- operate the engine at low idle speed for minimum of two minutes immediately after air has been removed from the system. This will ensure that the system is free of air.

Start the engine and check to ensure there are no fuel leaks.

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:

- Stop engine before air cleaner servicing. Do not operate engine without filter elements.
- Remove the retaining wing nut and carefully slide the element 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,
- reinstall the outer element ensuring that the rubber sealing ring on the end is secure.

Filter elements replacement:

- Replace primary filter after 3 cleanings or 600 hours of operation.
- Ensure dust ejector valve is in place & intact.
- Safety filter to be replaced at 3rd replacement of primary filter.
- Do not wash the primary filter & safety filter ever.
- Ensure gasket washer is installed correctly before fastening wing nut.

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

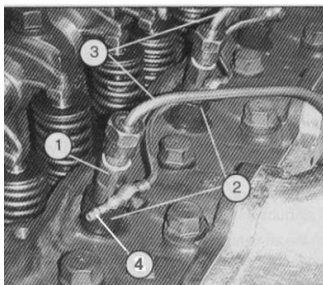


Fig. 5.3.5. Fuel injector

- 1- Injector body.
- 2- Securing bolts.
- 3- High pressure pipe.
- 4- Overflow pipe.

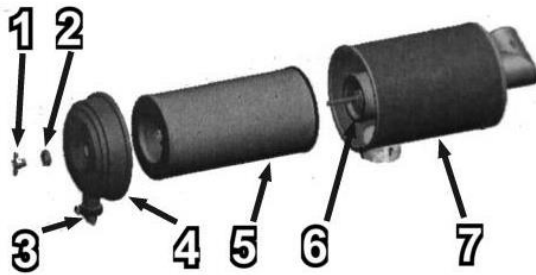


Fig. 5.3.6. Dry air cleaner.

- 1- Wing nut, 2- Gasket washer, 3- Dust ejector valve, 4- Service cover, 5- Primary filter - Inner (safety) element, 6- Safety filter - Outer element, 7- Filter housing.



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.



WARNING

If the cooling system is filled with water during winter period, be sure to drain water from the system after operation.
Frozen water can destroy engine.

5.3.5. Engine cylinder head.

Valve clearance adjustment (Fig. 5.3.9a).

Check/adjust the valve clearances every 600 hours of operation and after each cylinder head removal.

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

- remove the cylinder head cover,
- remove the plug 1 (Fig. 5.3.9b),
- set the piston of No. 1 cylinder in TDC position after compression stroke (both valves must be closed) – the arrow on the guard should align with “0” timing mark on the flywheel (Fig. 5.3.9b),
- the correct clearances on cold engine are as follows:
 - inlet valve: 0,3 mm,
 - exhaust valve: 0,4mm,
- the clearance should be measured with a feeler gauge inserting it between the top of the valve stem and rocker lever
- the sequence of valves from No. 1 cylinder is shown in the table below:

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

- if adjustment is needed:
 - adjust the clearance by turning the adjusting screw on the valve rocker,
 - recheck the valve clearance.
- with the piston of No.1 cylinder in TDC position check and adjust the following valves: No.1 – inlet, No.2 – exhaust, No.4 – exhaust, No.5 – inlet,
- rotate the engine one complete revolution until No.1 cylinder is on TDC of exhaust stroke and then check and adjust the valves: No.3 – inlet and No.6 – exhaust, etc.
- refit the rocker cover using a new gasket and the plug in the flywheel access hole.

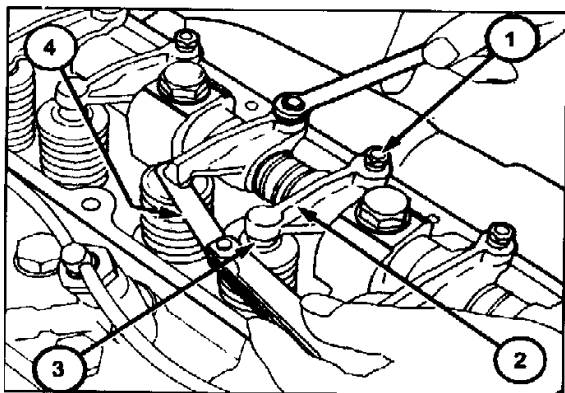


Fig. 5.3.9a Valve clearance adjustment.
1-Rocker arm screw. 2- Rocker arm.
3-Valve stem. 4-Filer gauge.

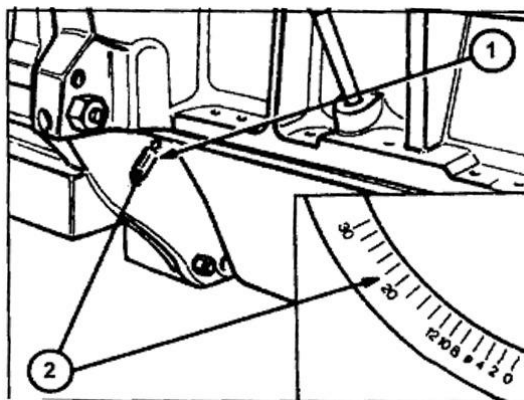


Fig. 5.3.9b. Timing setting.
1 - Plug. 2 - Scale.

5.4. Electrical system.

The electrical system is connected to battery after earth switch is on which is located on tractor right side above battery box.

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.

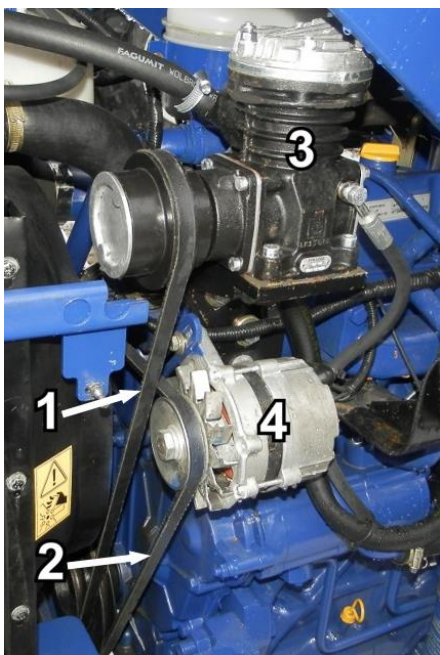


Fig. 5.4.1. V-belts.

1-Compressor V-belt. 2 - Fan/alternator V-belt. 3 - Compressor. 4 - Alternator

5.4.1 Alternator maintenance.

Check the fan/alternator V-belt tension every 300 hours of operation. (Fig. 5.4.1).

The correct belt deflection is 13 ÷ 19 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,
- 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.

Change the alternator brushes and clean the brush box every 1200 hours of operation.

It is recommended that only an Authorized Dealer carry out this service.

5.4.2. Starter motor maintenance.

Check and clean the starter motor pinion every 600 hours of operation.

To check and clean:

- disconnect the cable from the battery earth terminal, from the starter motor and solenoid,
- extract the three securing bolts and remove the starter motor,
- examine the starter pinion for clutch dust contamination and, if necessary, clean with a solution of 75% paraffin (kerosene) and 25% lubricating oil.

5.4.3. Battery maintenance.

The battery is mounted on tractor R.H. side (1- Fig. 5.4.3) in metal box. To gain access to the battery, remove the nut (2-Fig. 5.4.3) behind the box.

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.
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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.
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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
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The fuses are placed in a box located under engine bonnet 4 (Fig. 5.5.1). To gain access to fuses remove plastic cover. Fuse layout is shown on Fig. 5.4.2.

Table No. 9 describes bulbs specification.

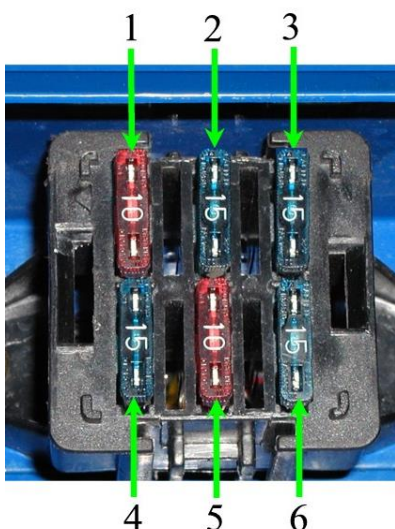


Fig. 5.4.2. Location of fuses in fuse box

1 – Marker lights, 2- Headlight main beam,
3 - Headlight dipped beam, 4 – Warning lights, Work
lamps, 5 – Horn, 6 – Stop lights, indicator lights.

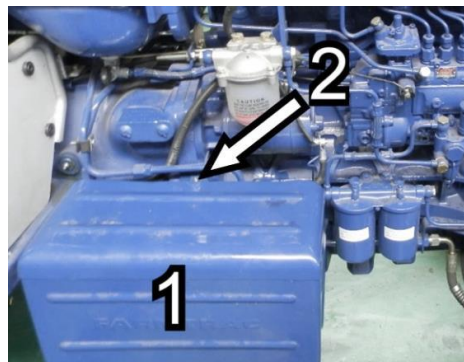


Fig. 5.4.3. Battery.

1- battery box, 2- battery box cover mounting
bolt.

Table 9

Application	Bulb indication	Nos. per tractor
Headlights (dipped beam)	H7 12V 55 W	2
Headlights (main beam)	H7 12V 55 W	2
Rear work lamp	H3 12V 55W	1
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

5.5. Hydrostatic steering system.

Hydrostatic steering system has an independent oil system with its own oil reservoir with filter (Fig. 5.5.1). Check the hydrostatic steering oil and possibly replenish to above minimum level every 300 hours of operation.



Fig. 5.5.1. Hydrostatic steering oil reservoir:

1 - Oil reservoir.
2 - Filler plug.
3 - Minimum level indication.
4 - Fuse box.

5.6. Front axle.

Front drive axle grease as shown below.

Every 50 hours of operation grease propeller shaft grease points.

Check the oil level in the front final drive housing and clean the breather 5 (Fig. 5.6.1) of the final drive housing every 300 hours of operation.

To check, remove the filler / level plug 2 (Fig. 5.6.1). The oil should reach the edge of level hole. If leakage or any other factor determining fall in the oil level is found, then check it immediately to avoid damage to the mechanical parts.

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

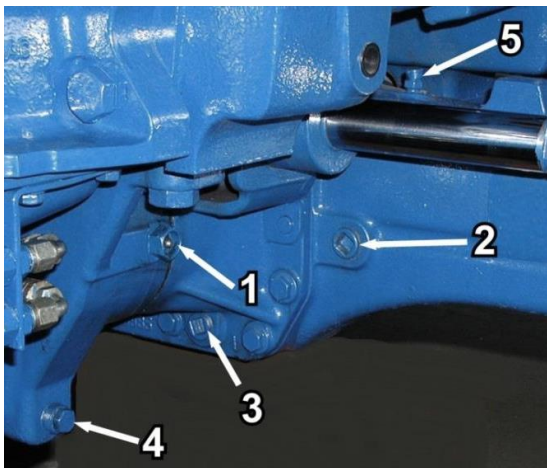


Fig. 5.6.1. Front drive axle.
1 - Trunion pin grease. 2 - Filler / level plug. 3 – Drain plug. 4 – Front reduction gear drain plug, 5 – Breather plug.



Fig. 5.6.2. Epicyclic reduction unit of front drive axle.
1 - Filler/level/drain plug. 2 - King pin grease points (2 pcs. on each side of tractor – at the top and at the bottom).

Check the oil level in the epicyclic reduction units of front drive axle every 300 hours of operation

5.7. Wheels.

5.7.1. Front wheel track adjustment.

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.
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Following wheel tracks of Front drive axle are available: 1430; 1520; 1560; 1655 mm.

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

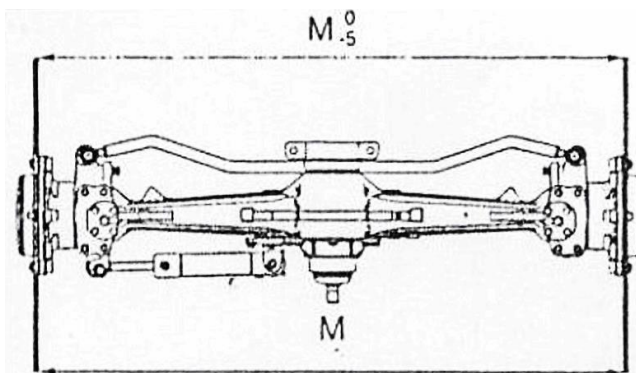


Fig. 5.7.1. Front drive axle toe-in adjustment

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. 5.7.3).

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 – **176 Nm**,
- disc to axle hub – **270 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.

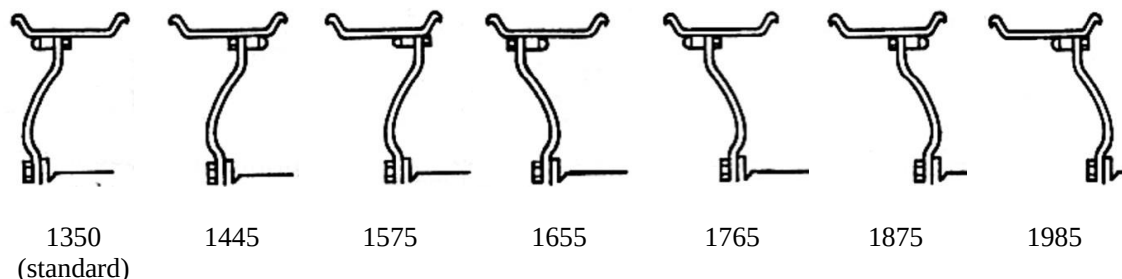


Fig. 5.7.3 Rear wheel track

5.7.4. Tyres use & maintenance.

Ciśnienie w ogumieniu należy sprawdzać co 10 mtg lub w danym dniu przed rozpoczęciem pracy
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.

5.8. Clutch.

Every 50 hours of operation grease:

a) with grease,

- clutch linkage pedal pivot (1-Fig. 5.8.1),
- clutch pedal pivot

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

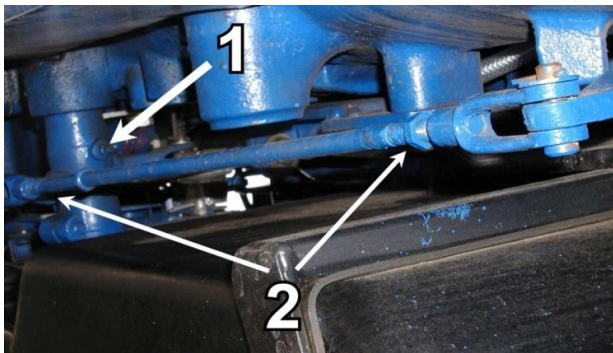


Fig. 5.8.1. Free travel adjustment of transmission clutch pedal. 1 – Clutch linkage pivot grease point. 2 – Lock nut.

Check and adjust, if necessary, the free travel of transmission clutch pedal every 50 hours of operation.

To adjust (Fig. 5.8.1):

- loosen the locknut 1 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 32÷38 mm.

5.9. Transmission & rear axle maintenance.

Every 50 hours of operation check and replenish if necessary transmission & rear axle oil. When controlling oil level, park tractor on level ground.



Fig. 5.9.1. Rear axle oil drain plug.

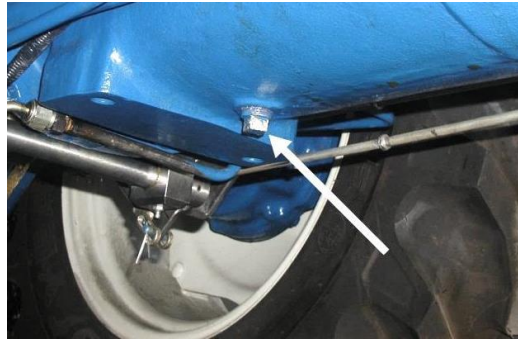


Fig. 5.9.2. Transmission oil drain plug.



Fig. 5.9.3. Hydraulic oil filter.

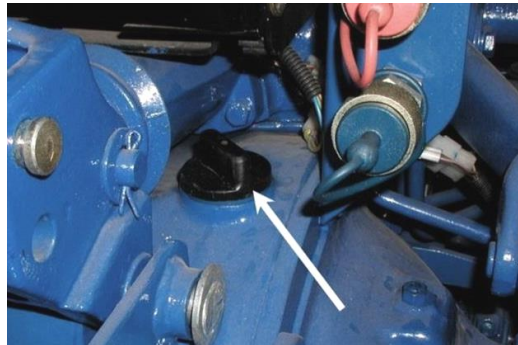


Fig. 5.9.4. Rear axle oil filler plug.



Fig. 5.9.5. Rear axle oil level control plug.

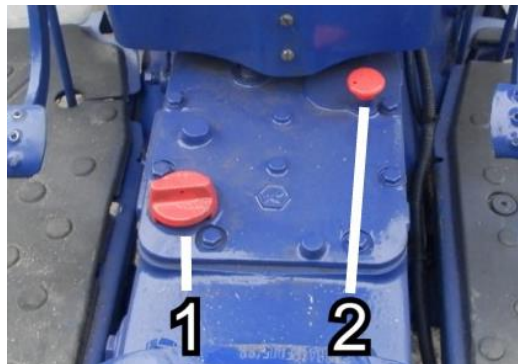


Fig. 5.9.6. Transmission oil filler plug (1) and dipstick (2).

Replace hydraulic oil filter (Fig. 5.9.3) 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 bottom of transmission (Fig. 5.9.2), 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 (Fig. 5.9.4). Before refilling, unscrew and remove rear axle oil level control plug at R.H. side of rear axle center housing (Fig. 5.9.5), oil should reach control plug level.

To refill transmission oil, remove filler (1) and dipstick (2) plugs and refill oil by hole (1) (Fig. 5.9.6). After refilling, check oil level, by means of the dipstick. Then start the engine for a minute or so, stop the engine and check oil level again, top-up to dipstick upper mark if required. When replacing transmission oil, the oil filter (Fig. 5.9.3) should also be replaced.



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

Every 150 hours of operation grease front drive axle propeller shaft grease point.



Fig. 5.7.9. Propeller shaft of front drive axle – grease point.

5.10. Three-point linkage.

Grease every 50 hours of operation L.H. rod, R.H. rod adjustment leveling box, lift rods greasing fittings as shown on Fig. 5.10.

Threading joints grease every 300 hours of operation.



Fig. 5.10 Three-point linkage greasing fittings.

5.11. Operator's seat.

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

5.12. Braking system.

5.12.1. Service break adjustment.

Check the brakes and adjust as necessary every 300 hours of operation, or more frequently, if operated in heavy conditions.

Grease the brake system actuation mechanism every 300 hours of operation (Fig. 5.12.1). Pedal correct free travel should be 25 - 32 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 below :

- 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 25-32 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 break adjustment.

Parking brake adjustment should follow the foot 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.



Fig. 5.12.1 Brake system actuation mechanism grease fitting.



Fig. 5.12.2 Brake pivot grease fitting.

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 (Fig. 5.13.2), Pressure regulating valve (Fig. 5.13.3), Air reservoir (Fig. 5.13.1), coupling for connection to trailer air braking system (3 - Fig. 5.13.4).

Air braking system is shown at Fig. 5.13.

	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.

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

The lamp on instrument panel illuminates when air pressure inside the trailer air braking system falls below $0,4 \pm 0,04$ MPa and the pressure gauge 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 50 hours of operation (with Radiator fan V-belt).

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 13 – 19 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.

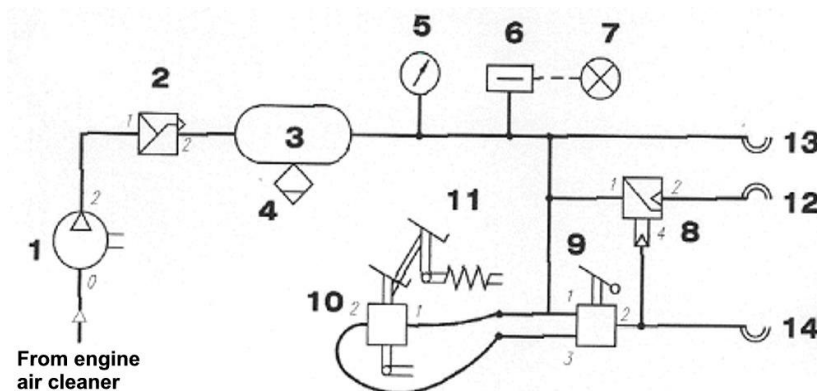


Fig. 5.13.1. Diagram of air system. 1 - Air compressor. 2 - Pressure regulating valve. 3 - Air reservoir. 4 - Drain valve. 5 - Air pressure gauge. 6 - Air pressure sensor. 7 - Air pressure drop warning light. 8 - Trailer braking valve. 9 - Parking brake valve. 10 - Trailer braking control valve. 11 - Equalizing valve. 12 - Coupling valve. 13 - Coupling valve red. 14 - Coupling valve yellow.

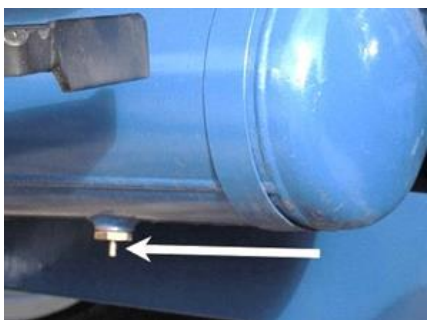


Fig. 5.13.2 Air reservoir with Drain valve.

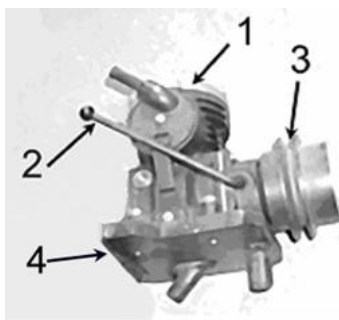


Fig. 5.13.3 Air compressor
1-Compressor, 2- Engage lever,
3-Compressor V-belt pulley,
4-Compressor bracket.



Fig. 5.13.4. Air Pressure
regulating valve. 1-Air
regulating valve. 2-Safety valve.
3-Tyre inflating valve

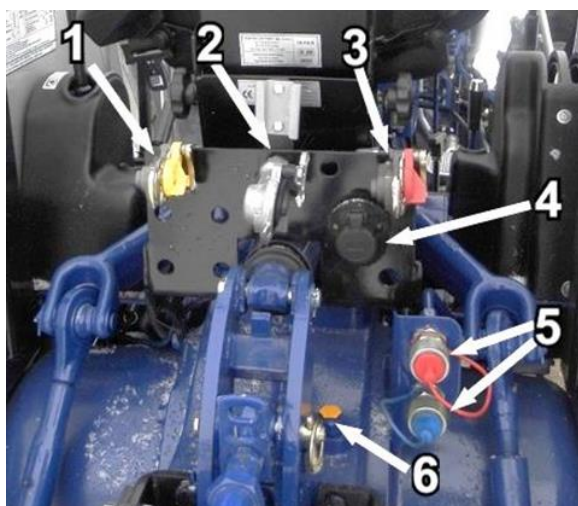


Fig 5.13.5 Rear of the tractor.

1- Coupler of control triple line trailer air braking system, 2- Coupler of single line trailer air braking system, 3- Coupler of supply triple line trailer air braking system, 4- Seven pin socket Hydraulic lift rocker, 5- Quick couplers, 6 – Rear axle oil filler.

Air reservoir

The capacity of the air reservoir is 15 litres. 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 (Fig. 5.13.2).

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.

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 (3 - Fig. 5.13.4.) with a rubber hose and with the engine running, inflate tyres to the prescribed pressure.

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

The tractor is fitted with three couplings (1, 2, 3 - Fig. 5.13.5):

black – 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 (4 - Fig. 5.13.5).

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.