



Long
Operator's Manual
1100 Diesel
2 Wheel Drive

Operator's Manual

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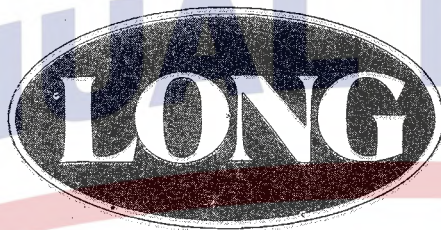
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LO-O-1100

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OPERATOR INSTRUCTIONS



1100 TRACTOR



LONG MFG. N.C. INC.

HOME OFFICE: TARBORO, N.C.
PLANTS: TARBORO, N.C. & DAVENPORT, IOWA
BRANCHES: CARROLLTON, TEXAS/MEMPHIS, TENN./TIFTON, GA.

FORM NO. 756038

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SAFETY PRECAUTIONS

In addition to endangering life and physical well-being, accidents can cause loss of money and man-hours. Most farm accidents can be avoided if all persons working with and around the equipment use common sense and observe basic safety rules.

1. Make sure that all drivers know how to operate the tractor properly and safely.
2. Allow only the operator on the tractor. Do not allow anyone else on the tractor. Keep children away at all times.
3. Prior to use, inspect all equipment to insure that it is in good condition. Do not operate equipment with damaged or missing parts.
4. Be sure all tractor controls are in neutral before starting the engine.
5. Keep hands and clothing away from moving parts.
6. Do not leave a running tractor unattended.
7. Prior to starting the tractor, blow the horn to warn all persons working near the tractor.
8. Always keep a firm grip on the steering wheel.
9. Do not exceed safe driving speeds.
10. Engage the clutch slowly, especially when driving up steep hills or out of ditches. There is always the possibility of the front end rising off the ground. Should this happen, disengage the clutch.
11. Always keep the tractor in gear when going down steep hills or grades.
12. Slow-moving vehicles on highways can be dangerous. Use a slow-moving vehicle sign in conjunction with flashing warning lights, headlights, and taillights.
13. Do not operate tractor engine in closed garage or shed.
14. Do not tie chains or ropes to axles or to other parts of the tractor chassis. Always hitch the load to the drawbar in the lowest possible position.
15. Always take up slack in chain or cable gradually.

16. Always wait until the tractor comes to a complete halt before dismounting.
17. Before dismounting the tractor, stop the PTO and lower all implements to the ground.
18. Always park the tractor with the brakes locked. Do not depend on the gears to hold the tractor in a parked position.
19. Do not make repairs or adjustments while the equipment is running.
20. Never stand between the tractor and the drawn implement, unless the transmission is in neutral and the brakes are locked.
21. Before servicing an implement, disengage the PTO.
22. Never refuel the tractor when the engine is hot or running.
23. Do not light matches or smoke while filling the fuel tank.
24. Before removing the radiator cap, relieve the pressure in the cooling system by carefully turning the cap to its first position.
25. Keep the brakes adjusted properly.
26. Disconnect the battery ground wire and the battery connector cable before making any adjustments on the engine or electrical systems.
27. Storage batteries give off highly explosive hydrogen gas when being charged. Keep away from sparks and flames.
28. If battery electrolyte contacts skin or clothing, wash immediately with water.
29. Escaping hydraulic oil can have extremely high pressure. A stream of it can easily penetrate the skin and cause blood poisoning. All connections must be tight and all lines and pipes must be in good condition. Be sure to relieve all hydraulic pressure before disconnecting any lines or pipes on the tractor hydraulic system. Keep all guards and shields in place.
30. Store lubricants away from other flammable materials.
31. Use a dry chemical or CO² extinguisher on fuel, oil or electrical fires.
32. When parts need replacing, use only parts approved by Long Mfg. N. C. Inc. Do not use substitute parts.

I. SPECIFICATIONS

ENGINE

Type designation	Z 7501 (Turbo-Charged)
Performance system	four-stroke
Injection system	direct
Number of cylinders	four
Cubic capacity	285 cu. in. (4.5621)
Bore/stroke	4.33 in. x 4.72 in. (110 mm, S = 120 mm)
Rated output	105 h.p. (SAE)
Working speed at rated output	2200 r.p.m.
Working speed at maximum torque	1500 r.p.m.
Compression ratio	17:1
Engine weight, dry	1113 lbs.
Cooling system	wet under forced circulation with thermostat incorporated
Clearance values (on cold engine):	
intake valves	.012±.002 in. (0.3±0.05 mm)
exhaust valves	.012±.002 in. (0.3±0.05 mm)
Firing order	1, 3, 4, 2
Injection pressure	2275±43 PSI (160±3 kg/sq.cm)

ENGINE EQUIPMENT

Fuel filter	twin-barrel FD10RP2.4 (with KN 100 valve) felt-and-paper insert
Oil pump	gear type
Oil filter	centrifugal, full-flow type
Turbo oil filter	Receplacable Element with by-pass
Air cleaner	VTCP 350, dry, stage 1 — multi- cyclone, stage 2 — paper cartridge
Injection pump	PP4M85P1A
Speed governor	RVIM225/1100, mechanical
Fuel supply pump	CD1M
Injector	VP81S453a 2555
Injector nozzle	DOP1508525
Electrical equipment rated voltage	12 V
Starter motor	4 h.p.
Alternator	14 V 35 A
Voltage regulator	14 V 35 A
Battery	two 6 volt in series

POWER TRANSMISSION

Clutch	friction type, single disc, dry
Gearbox	mechanical
Number of speeds forward/reverse	8/4
Number of speeds with torque converter applied forward/reverse	16/8

Engine run hourmeter with rev-counter

flexible shaft drive through gear train transmission receiving drive from fuel supply pump shaft

REAR AXLE

Driven axle

rear axle, through final drive and planetary reduction gears
locking devices provided

Differential mechanism

HYDRAULIC POWER LIFT AND IMPLEMENT LINKAGE SYSTEM

Mounted implement position control during operation

by means of three-point hitching system incorporating automatic draft control action, position control and pressure control system (optional)

Stroke/bore

S = 6.496 in. (S = 165 mm)

D = 3.740 in. (D = 95 mm)

Working pressure, maximum

160 kg/sq. cm 2275 PSI

Hydraulic pump delivery at 1800 r.p.m. pump speed

Q = 31 ± 3.1 l/min $8.2 \pm .8$ gpm

Implement mounting system

Cat. II three-point linkage

Implement hitching system

drawbar offering two positions

Lifting force at the ends of bottom links

3750 lbs. (1700 kg)

Permissible vertical load on hitching beam

1100 lbs. (500 kg)

Outer hydraulic system

supplies a single-action or a double-action cylinder (single). Provision is also made for supplying two double action cylinders.

TRACTIVE SYSTEM

Front suspension

swivel-mounted axle, 14°30'
maximum swing

Rear suspension

rigid

Front wheel toe-in

.157 ÷ .394 in. (4 ÷ 10 mm)

Front wheel tire size

11L x 15 6 ply

Front wheel rim size

8.00 x 15

Rear wheel tire size

18.4 x 34

— standard

Rear wheel rim size

W15—34

— standard

Steering

ball-and-screw, power assisted

BRAKES

Main brake

disc type, hydraulic control with pressure compensator, independent, acting on both rear wheels

Parking hand brake

disc type, lever controlled

OTHER CHASSIS DATA

Front wheel track	64.17 in. (1630 mm), 70.08 in. (1780 mm), 75.98 in. (1930 mm), 81.89 in. (2080 mm), 87.87 in. (2230 mm)
Rear wheel track — 18.4 x 34 (standard size)	59.06, 67.91 in. (1500, 1725 mm)
18.4 x 34 power adjustable	64-88 in. (1625-2235 mm) adjustable by steps, every 4 in. (100 mm)
Minimum turning radius with brakes applied	10 ft. 8 in. (3025 mm)
Draw-bar pull, with ballast weights fitted, on dry concrete road surface	8250 lbs. (3758 kg)

PERFORMANCE DATA

Maximum speeds of the tractor in individual gear position, when mounted on 18.4 x 34 size tires, with rated engine speed of 2200 r.p.m.

	(reduction unit applied)	(reduction unit disengaged)
1st gear	1.55 mph (2.48 km/h)	4.65 mph (7.27 km/h)
2nd gear	2.44 mph (3.92 km/h)	7.16 mph (11.46 km/h)
3rd gear	3.51 mph (5.60 km/h)	11.38 mph (18.21 km/h)
4th gear	5.54 mph (8.88 km/h)	16.20 mph (25.91 km/h)

Reverse speeds

1st gear	2.13 mph (3.41 km/h)
2nd gear	3.35 mph (5.37 km/h)
3rd gear	5.33 mph (8.54 km/h)
4th gear	7.59 mph (12.15 km/h)

With the torque converter engaged:

	(reduction unit applied)	(reduction unit disengaged)
1st gear	1.17 mph (1.86 km/h)	3.39 mph (5.43 km/h)
2nd gear	1.83 mph (2.93 km/h)	5.35 mph (8.56 km/h)
3rd gear	2.90 mph (4.66 km/h)	8.51 mph (13.61 km/h)
4th gear	4.15 mph (6.64 km/h)	12.11 mph (19.36 km/h)

Reverse speeds

1st gear	1.59 mph (2.54 km/h)
2nd gear	2.51 mph (4.01 km/h)
3rd gear	3.98 mph (6.37 km/h)
4th gear	5.67 mph (9.07 km/h)

VOLUME CAPACITY VALUES

Cooling system	19 qts. (18 l.)
Fuel tank	37 gal. (139 l.)
Engine oil sump	12 qts. (11.5 l.)
Oil quantity inside injection pump and speed governor	.39 qt. (0.32 l.)
Oil quantity inside gearbox and final drive	12 gal. (45 l.)
Oil quantity inside reduction gears	2x2.9 qts. (2x2.75 l.)
Oil quantity inside steering gear servo mechanism circulation system	7.4 qts. (7 l.)
Brake fuel quantity inside the hydraulic brake system	.5 qt. (0.45 l.)

MANUAL PREVIEW

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II. TRACTOR SERVICING

1. INITIAL TRACTOR STARTING

Prior to initial operation of the tractor, check the level of brake fluid and the functioning of the brakes, fill the cooling system and the fuel tank. Check the level of lubricating oil in the individual mechanisms. Fig. 2.

2. TRACTOR RUNNING-IN

Strictly observe these recommendations while running-in the tractor:

1. During the first 20 hours of engine run, apply loads only to one half of the engine output, and do not develop full speed. Use only implements which exert a partial load on the tractor.
2. Expose the engine to no more than $\frac{3}{4}$ of its output during the next 30 hours of run (50 hours altogether).

On completion of 50 hours of operation, contact your Long Dealer for the following service.

1. Change oil in the engine, clean the centrifugal oil filter impeller and replace turbo-charger oil filter element.
2. Clean oil filter in the hydraulic power lift circulation system and of the gearbox.
3. Clean the primary oil filter at the suction side of hydraulic pumps.
4. Tighten bolts securing the metal-and-rubber bushings that retain the operators platform to the tractor chassis.
5. Retorque cylinder head bolts to 160 ft. lbs.
6. Check the clearance between the brake and the torque booster drum.
7. Mail Warranty Continuation Card #1 to Long Mfg. N. C. Inc. Att: Director of Service.

On completion of 250 hours of operation, contact your Long Dealer for the following service.

1. Perform all functions included in the P IV inspection.
2. Clean the secondary oil filter of the hydraulic circulation system of the gearbox, and the primary oil filter at the suction side of the hydraulic pumps.

3. Change oil in final drive reduction gears.
4. Mail Warranty Continuation Card #2 to Long Mfg. N. C. Inc. Att: Director of Service.
5. Tighten the cylinder head nuts using 160 ft. lbs. torque. Adjust valve clearance values which should amount to .012 in. (0.3 mm) for intake and exhaust valves alike.
6. Do not make any use of independent brakes while running-in the tractor. Should one of the rear wheels slip, counteract immediately by engaging the differential mechanism interlocking device.

NOTE: Every day check the tightening of the rear wheel fixing nuts.

3. ROUTINE INSPECTION

Observe strictly the dates for the performance of routine inspections. This will help to extend the running time between the successive general repairs of the engine and of the tractor, while reducing the expenses involved. Perform all maintenance operations on the implements simultaneously with those effected on the tractor.

Routine inspection P-I, every 8–10 engine running hours (daily inspection)

1. Clean the tractor, inspect externally with particular attention to the tightness of all fittings and lines.
 2. Lubricate the tractor according to the lubrication chart.
 3. Check the quantity of fuel, of coolant inside the upper chamber of the radiator, and of the brake fluid; replenish if necessary.
 4. Check the tensioning of the bolts of the water pump, fan and alternator.
 5. Check tire pressure.
 6. Check the fixing of levers and drag links of the steering system.
 7. Check the functioning of electrical appliances (lights and horn).
 8. Check the readings of instruments on the control panel during the engine run.
 9. Check the brake performance.
 10. Clean the paper cartridge of the air cleaner every 10-50 hours of operation, depending on the dust content in the air.
 11. Clean the sediment trap bowl every 50 hours of engine time.
- Depending on the type of engine operation, proceed as follows:
12. Check the brake performance when driving the tractor.
 13. Check the hydraulic power lift performance prior to starting the hydraulic power lift operation.

Routine inspection P-II, every 100 engine running hours

1. Perform all functions included in the P-I routine inspection.
2. Lubricate the tractor according to the lubrication chart.
3. Clean the oil filters of the hydraulic power lift.
4. Check the condition of the storage battery pole posts, and the electrolyte level.
5. Check the tightening of bolts and nuts on the equipment and on the remaining parts of the engine.
6. Check the setting of the free travel of the clutch pedal.
7. Check the setting of the gearbox synchronizer brake.
8. Check the tightening of bolts on the front and rear wheel discs of bolts securing the rims of the rear wheels and ballast weights, and of the bolt unions on all outer elements.

Routine inspection P-III, every 150 engine running hours

1. Change engine oil, replace turbo-charge oil filter element and clean engine oil filters.

Routine inspection P-IV, every 200 engine running hours

1. Perform all functions included in the P-II routine inspection.
2. Lubricate the tractor according to the lubrication chart.
3. Clean the felt insert of the primary fuel filter. Clean the oil separator.
4. Check the front wheel toe-in.

Routine inspection P-V, every 400 engine running hours

1. Perform all functions included in the P-IV routine inspection, with the exception of item 4.
2. Lubricate the engine according to the lubrication chart.
3. Replace the paper cartridge of the air cleaner, and clean up the air cleaner oil reservoir.
4. Replace the felt insert and the paper insert in the fuel oil filter.
5. Adjust play in the front wheel bearings.
6. Check and adjust, if necessary, the play between the drum and the band of the torque converter brake.
7. Check the steering play.
8. Perform an inspection of the alternator and the starter motor.
9. Check the alignment of headlights.

Routine inspection P-VI, every 800 engine running hours

1. Perform all functions included in the P-V routine inspection.
2. Lubricate the tractor according to the lubrication chart.
3. Check engine compression.
4. Clean the secondary filter, the filler neck strainer and the magnetic plug of the hydraulic circulation system of the servo-mechanism.

4. WINTER OPERATION RECOMMENDATIONS

1. Use lubrication oil in accordance with the lubrication chart.
2. Keep batteries charged to capacity.
3. Proceed with the starting, with the engine clutch disengaged, as well as with disengaged hydraulic power lift pump, and with the P.T.O. shaft lever set in the neutral position (2).
4. Do not expose the engine to operational load, prior to its warming-up sufficiently.
5. Use antifreeze as coolant, adequate for your climate.
Reduce the intensity of cooling action of the engine, by applying the louver to cover the radiator.
6. Clean the fuel tank, remove all sediment and condensed water which is apt to cause air-locks inside the pipes, and the bursting of fuel pipes when freezing.

Prevent the condensation of water vapor inside the fuel tank, by keeping the fuel tank full.

III. TRACTOR OPERATION

1. SERVICE

Lubricating oil and grease used in the tractor should be kept free of dirt and dust.

Use separate containers for the storage and handling of the individual grades of lubricating oil.

Fill the fuel tank to the level reaching .75 in. (2 cm) below the filler hole. The filler cap of the fuel tank is provided with a vent hole. Watch at all times for this vent hole to be kept clear.

With the engine running, water keeps evaporating out of the cooling system. It is therefore necessary to check and fill up the water content inside the compensation reservoir several times a day, particularly on hot days. The brake fluid reservoir is fixed to the floor bracket, at the R.H. side of the tractor front. Maximum level of brake fluid inside the brake fluid reservoir must reach to .95 in. (24 mm), and minimum level — to 1.57 in. (40 mm) below the filler hole.

Use only the same grade of brake fluid to replenish.

When changing the brake fluid grade, flush the entire system with methylated alcohol.

Use oil grades specified in the lubrication chart for the lubrication of the individual mechanisms. When changing oil grade, flush the entire system thoroughly with oil grade as recommended by the lubrication chart specification.

2. SETTING THE TRACTOR FOR OPERATION

Check, prior to starting up the engine, the following:

- fuel tank full; if the fuel tank was empty with the engine out of operation for a longer time period, vent the fuel supply system,
- fuel shut off open,
- the tire pressure, correct,
- the oil reservoir, brake fluid, and the radiator full,
- check brake system.

3. TRACTOR OPERATION

3. 1. Engine starting

1. Check the levers for the gear changing, and of the auxiliary drive systems, in the neutral position.
2. Set the master switch (ignition) key in the position marked O.
3. Disengage the engine clutch, the P.T.O. shaft drive and the hydraulic pump.
4. Set the accelerator lever for the maximum fuel charge.
5. Depress clutch pedal fully.
6. Engage the starter motor.
The starter motor should not be kept energized for longer than 5 seconds at a time. If this fails, do not actuate the starter motor again before the elapse of 30 seconds.
7. Reduce engine rpm after engine starts.

3. 2. Tractor operation on the road

Check the following while driving the tractor:

1. Oil pressure indicator of the engine lubrication system; the oil pressure should be kept within the limits of 28.5-78.2 PSI (2-5.5 kg/sq. cm.)
2. The battery charging pilot light—colored red; if the lamp glows with the engine running, this indicates the alternator fails to charge the batteries.
3. The ammeter.
4. Water temperature indicator; the most suitable coolant temperature is to 176-203°F (80÷95°C) with the engine running. With the temperature dropping below that value, cover up the radiator by means of the louver.

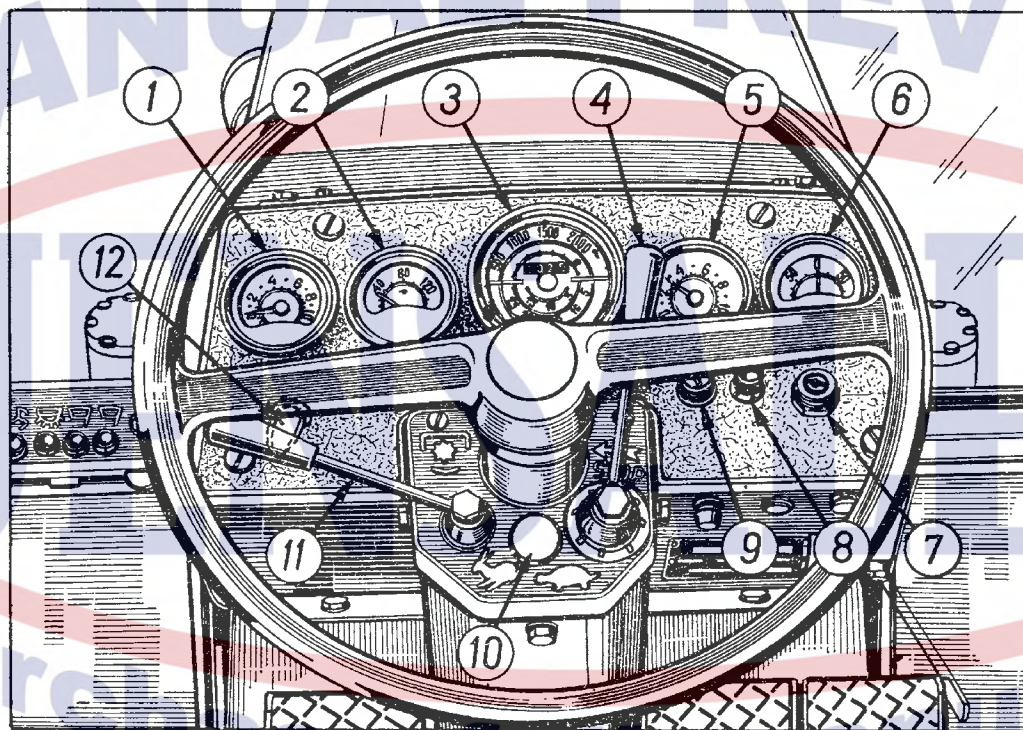


Fig. 3 — Instrument panel

1 — oil pressure indicator, 2 — water temperature indicator, 3 — hourmeter incorporating tachometer, 4 — lever for manual control of injection pump delivery charge, 6 — ammeter, 7 — master switch, 8 — instrument panel illumination switch, 9 — starter motor pushbutton, 10 — spot for the mounting of the torque booster, 11 — P.T.O. shaft clutch control lever, 12 — direction indicator switch.

The hourmeter indicates the number of hours of the engine run ($M_h = 1$ hour of engine run at 1800 r.p.m. working speed). The tachometer is provided with two calibration scales. The engine working speed M is read on one scale, the other reading the P.T.O. shaft working speed H .

The speedometer on the hourmeter is provided with a calibration scale featuring two ranges, the first one reading the riding speed in the 3rd gear position, the other one — riding speed in the 4th gear position.

3. 3. Brakes

The tractor is equipped with disc type brakes. The brakes are controlled by means of pedals provided for each of the wheels separately.

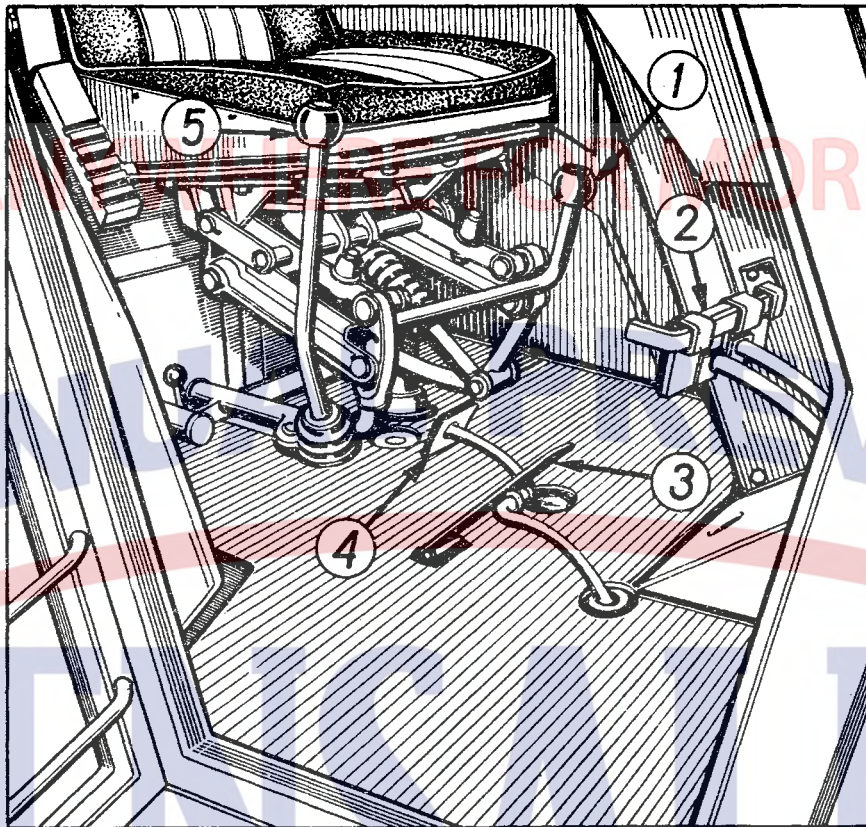


Fig. 4 — Control levers

1 — road reverse speed reduction unit control lever, 2 — foot brake pedal, 3 — pedal for the foot control of fuel batch volume, 4 — differential mechanism locking unit pedal, 5 — gear shifting lever.

The brake pedals should be coupled by means of a bolt. De-couple the brake pedals while performing field jobs, and while turning around, and apply brake on one of the rear wheels only, in order to reduce the turning radius. The hand brake is intended for protecting the tractor while parked. The hand brake is actuated by pulling the lever upwards.

Release the hand brake by pulling the lever gently upwards, while releasing the catch at the same time, and lowering the lever into its bottom position subsequently. Should one of the rear wheels slip while riding, engage the differential mechanism interlocking device. The interlocking system pedal is arranged at the R.H. side of the driver's seat.

NOTE: Do not engage the differential mechanism interlocking device while negotiating curves, nor with the rear wheel speeds differing substantially.

3. 4. P.T.O. shaft drive

The P.T.O. shaft can be employed for the drive of the machine coupled, both when in motion, and as a stationary unit.

The drive supplied to the machinery coupled can be either independent of the gear engaged, or dependent — supplied through the gearbox. The tractor can be moving while supplying drive, both in reduced and in normal gear positions. Drive as supplied by the P.T.O. shaft is shifted to dependent or independent, by means of the lever arranged at the R.H. side of the driver's seat, with the engine clutch completely disengaged. With the lever