

DIRECTOR GENERAL BORDER ROADS

GENERAL MAINTENANCE INSTRUCTION NO 219 **OF MINI TVRR ED-30**

Introduction

1. Mini Tandem Vibratory Road Roller make Escorts Model ED-30 having hydrostatic drive on both drums and high strength main frame/chassis front and rear roller assembly, with single amplitude and dual vibratory system, hydraulic transmission and steering mechanism, pressurized water sprinkling system with tank of 200 Ltrs capacity having operator weight of 2975 Kg. The eqpt is powered by KOEL HA-394 air cooled 3 cylinder engine (as per DIN-6271 IFN) developing 47 HP @ 2300 RPM, with 12 V starting system and cold starting device. As with all technical equipment, the machine needs care and servicing. The extent and the frequency of the servicing work depends mainly on the frequently different operating and working conditions. Under difficult working conditions, the machine will require servicing at more frequent intervals, than those specified for normal use. The servicing intervals are laid down according to the reading on the operating hour meter ,whereby additional servicing work must be carried out during running-in according to the running-in regulation. The work required to safeguard and maintain the operational safety, must be carried out as listed below.

Running-in, servicing frequencies and servicing work for the diesel engine must be carried out in accordance with the servicing manual of the engine manufacturer. This will enable to carry out a number of simple maintenance tasks. This GMI covers the periodical maintenance and lubrication of various components of Mini TVRR ED-30. The regular servicing and preventive maintenance are essential for optimal usages of Eqpt to achieve maximum life for planning and timely repair to arrest defect from developing in to major one, where minimising the down time and production losses.

AIM:-

This instruction issued as guide lines for scheduled preventive maintenance, lubrication of Mini TVRR ED-30 manufactured by Escorts construction equipment Ltd for regular attention to keep the Eqpt in good mechanical condition and it must be strictly followed.

Action by

(a) **User Unit** :

To carry out periodic inspection and monitor regular/periodical maintenance as laid down in this instruction and record the tasks done in the logbook.

(b) **Field Wksp (GREF)**

(i) To carry out and monitor, maintenance schedule and oil changes as per periodical maintenance laid down in the maintenance instructions and to check the record of maintenance including lubrication.

(ii) To advise the user unit in respect of any lapses noticed

(c) **Mobile maintenance team** :

To ensure that proper maintenance is carried out and report accordingly to Task Force Commander and OC Fd Wksp for necessary action

Details: The details of maintenance and lubrication with their periodicity are as under :-

- (a) Periodical maintenance schedule - Appx 'A'
- (b) Driving instructions & cautions - Appx 'B'
- (c) Recommended lub oils, grease and coolant - Appx 'C'
- (d) Tech specifications - Appx 'D'

5. Please ack receipt.

(Hari Prakash)
SE (E&M) FS
Dir (Tech)
for Dir Gen Border Roads

Distribution

Normal

Servicing every 10 operating hours (also observe the engine operating manual)

1. Maintenance point on diesel engine for oil change

Running-in, servicing frequencies and servicing work for the diesel engine must be carried out in accordance with the servicing manual of the engine manufacturer.

- A oil filter
- B oil stick
- C oil drain screw

2. Inspection and clean the dry air filter

Inspection of the serviceability of air filter cartridge must be carried out before work starts.

- Run diesel engine briefly at maximum speed.

Provided the warning lamp (203) does not light up the air filter cartridge is fully operational. If the warning lamp is alight, the air filter cartridge must be replace.

Replacing the air filter cartridge

- Unscrew the hexagon nut A.
- Remove the housing B and clean.
- Remove fouled air filter cartridge C.
- Clean the inside of the filter housing.
- Insert new air filter cartridge.
- Reassemble in the reverse order.

3. Check oil level in the hydraulic oil tank

- Check only when the engine is cold.
- Unscrew the ventilation filter A.
- Correct oil level: Between min and max marking on dipstick at screwed-in ventilation filter. Do not exceed this level!.
- Where there is a lack of oil, top up suitable oil.
- With a considerable loss of oil, find and rectify the cause.

4. Other inspection and servicing work.

Check indicator lamp.

! Only to be carried out with the engine at a stands till!

- Turn key switch (305) to position 1.
- Charge current warning lamp (201) alight.
- Engine oil pressure gauge (314) working.
- Apply parking brake (302) and indicator (303) should alight.
- Check function of the horn (405).
- Check function of warning flasher (301).
- Check function of headlamps(304).

5. **Check function of parking brake and emergency stop**

! The transmission must be actuated for this servicing work. Ensure that nobody is within the danger zone of the machine. Observe the safety regulation.

- Apply parking brake (302)
- Briefly push the drive lever (404) forwards.

The parking brake is functional, provided the transmission is blocked. If the machine moves off despite the parking brake! Request the assistance of customer services for work on the parking brake!

Servicing every 250 operating hours (also observe the engine operating manual). Carry out all servicing work specified under 10 operating hours. In addition:

1. **Lubrication pivoted steering and pivoted bearing**

! Work with in the endangered area of the pivoted steering may only be carried out with the engine at a stand still and the electric system switched off! In addition of the safety strut must be inserted!

- Grease lubrication nipple A (3X)

2. **Lubricate the steering cylinder bolts**

! Work with in the endangered area of the pivoted steering may only be carried out with the engine at a stand still and the electrical system switched off! In addition of the safety strut must be inserted!

- Grease lubrication nipple A.

3 **Check scrapers**

Check that the scrapers have proper contact with the roller drum. Readjust where necessary.

- Release clamp bolts (5x).
- Re-insert scrapper B.
- Retighten fastening screws A.

Check the condition of the scrapers. Replace worn scrapers.

Servicing every 500 operating hours (also observe the engine operating manual). Carry out all servicing work specified under 10 and 250 operating hours. In addition.

1. **Replace filter insert of drive and vibration drive**

Danger of scalding resp. burning !

- Unscrew cup housing.
- Pull filter insert from the filter head and replace with a new one.
- Clean any fouling away from inside the cup housing then scew back into the filter head and tighten.

2. Check air filter control lamp

- Disconnect cable plug from vacuum switch on air filter, and bridge both contacts in the plug.
- The warning flasher (202) must light up. If the indicator lamp does not light up, find the cause (e.g. faulty lamp, defective cable) and rectify fault immediately.

Servicing every 2000 operating hours, at least once annually (also observe the engine operating manual). Carry out all servicing work specified under 10,250, and 500 operating hours. In addition:

General: After an extended standstill (e.g. during the winter), carry out the following servicing work prior to resume (e.g. in the spring). Condensate and deposits of dirt can affect the function of the engine and the hydraulic power plant.

1. Change the hydraulic oil

Danger of scaling rps. Burning! For cleaning do not use any cotton waste! Collect used oil in a container and insure environmentally safe disposal! Do not allow to seep into the ground.

- Remove ventilation filter A and clean.
- Unscrew oil drain plug B and drain off used oil.
- Remove cleaning cover C and check for deposits of dirt in the tank. If these are present, thoroughly clean the tank.
- Fit new seal to cover and attach.
- Screw in and tighten the oil drain plug.
- Fill with specified type of oil through filler opening D.
- Correct oil level: Between min and max marking on dipstick at screwed-in ventilation filter. Do not exceed this level!
- Start the engine, actuate the drive lever (404) at low speed until the transmission engages. Similarly actuate the steering. The pipes and hose lines will be filled with oil and vented.
- Check oil level with the engine at a standstill, possibly top up.
- Check hydraulic system for leaks.

Avoid consequential damage! Following damage to the hydraulic system, in which foreign bodies have entered the oil circuit, the complete hydraulic system must be cleaned. This work may only be carried out by trained personnel! Request assistance from customer services! Afterwards, replace all the intake, return or pressure filter in the hydraulic system after 50 and 125 operating hours.

2. Clean the water sprinkling system

The following procedure applies for both water tanks.

- Remove drain plug beneath the water tank and drain off remaining water.
- Unscrew closure caps A on the spray pipes B.
- Thoroughly clean water tank with high pressure cleaner (where available) or with a jet of water.
- Clean spray pipes, hose lines and spray pipe nozzles.

Reassemble in the reverse order. Clean water filter and spray nozzles as specified.

DRIVING INSTRUCTION & CAUTION MINI TVRR ED-30

01. Before you drive ensure that your Eqpt is in a road worthy condition.
02. Watch the gauges on instrument panel every now and then while driving.
03. Drive in the appropriate speed in the individual gear.
04. Before commencing the drive ensure that the head lights, signal lights & brake lights clean and functioning properly.
05. If you find any thing wrong or unsafe get it replaced/repared before commencing the work .
06. Fill up diesel tank at the end of each working day to reduced water condensation in the tank.
07. Check engine oil and oil filter element, if found dirty clean it and refill with recommended oil.
08. Check and clean air cleaner-primary element, if restriction indicator shown red band.
09. Check steering gear box for oil leak & level, top up if necessary.
10. Check battery terminal, Apply petroleum jelly.
11. Check fan belt tension at regular intervals and adjust as needed.

Lubricants details

Viscosity- Temperature range

The viscosity of lube oil changes with the temperature at the place of use is decisive for the choice of the viscosity (SAE category).

Engine oil The oil quality must comply with the API classification	Quality CD/SE CD/SF CE/SF CE/SG	Viscosity	
Hydraulic oil The viscosity is specified according to DNI51519(VG: viscosity grade)	HLP-D	VG 22 VG 32 VG 46 VG 68 VG 100	Conditions Arctic Winter Summer Tropical Extremely hot
Vibration oil Only special Hamm oil is permissible Order No.01238051			
Grease Lithium saponified multi-purpose grease waterproof, with high-pressure additives Temperature range-25°C (-13°F to 248°F)			

RECOMMENDED LUBRICANTS MINI TVRR ED-30

	SPECIFICATION	IOC	CASTROL	SHELL	KIRLOSKAR	ELF OIL
ENGINE OIL	API CD/SE	15W/40 OR 20W/40	15W/40 OR 20W/40	15W/40 OR 20W/40	K-OIL	
HYD. OIL	DIN515224/2	SERVO HYDAX 68		Shell Tellus T 68		ELFONA DS 68
DRUM VIBRATOR UNIT	API, GL 4 MIL L 2105	SERVO HP 85W 90	85W 90	SHELL SPIRAX HD 85W/90		
GREASE	LITHIUM SOAP BASE WITH AP ADDITIVE	EP 2	EP 2	EP 2	EP 2	

Appendix 'D'

TECHNICAL SPECIFICATION OF MINI TVRR-30

Sr No	DATA	Units	HA294	HA394	HA494	HA694
01	Cubic Capacity	CC	1884	2826	3768	5652
02	Working Cycle	-	Four stroke diesel cycle			
03	Combustion System		Direct Injection			
04	Cooling system		Air Cooled			
05	No of Cylinders		2	3	4	6
06	Bore	mm	100	100	100	100
07	Stroke	mm	120	120	120	120
08	Direction of rotation		Counter Clockwise (Looking at flywheel end)			
09	Compression ratio	Kg/cm2	17:1	17:1	17:1	17:1
10	Compression pressure	Kg/cm2	24-28			
11	Max firing pressure		(min. acceptable 20)			
12	Min Operating speed	RPM	8.05			
13	Max Operating speed	RPM	1500	1500	1500	1500
14	Low Idling Speed	RPM	2500	2800	2800	2800
15	Bumping Clearance		1.0 to 1.2			
16	Valve Clearance Cold for					
	Inlet	mm	0.15			
	Exhaust	mm	0.15			
17	Valve Timing					
	Inlet opens before TDC	Degree	26	32	32	32
	Inlet closed after BDC	Degree	67	60	60	60
	Exhaust opens before BDC	Degree	73	70	70	70
	Exhaust closed after TDC	Degree	30	32	32	32
18	Firing order		1-2	1-2-3	1-3-4-2	1-5-3-6-2-4
19	Overall dimensions (Bare engine)					
	Total Length	mm	678	808	938	1277
	Total Width	mm	704	704	704	704
	Total Height	mm	872	868	868	922
	Height below Crank shaft center line	mm	301	297	297	300
20	Total Weight without flywheel	Kg	243	300	338	430
	Weight of Std flywheel	Kg	41	41	39	39
	Weight of flywheel for Genset application	Kg	83	83	47	47