FOREWORD

"DO IT RIGHT, THE FIRST TIME & EVERY TIME"

This publication is intended for use by trained technicians who can work on "SAME" Tractors to provide complete satisfaction to our valued customers.

It contains general information related to SAME Tractors and, in particular, highlights the inspection, overhauling and adjustment procedures as well as instructions for dismantling and reassembling operations.

The Workshop Service Manual provides a summary of various operations to mechanics, who have attended our service training programmes, to assist them in performing a precise and quality repair job on the SAME Tractor.

The contents of this Manual provide exhaustive information for experienced mechanics and is a refresher dossier on the sequence of the operations performed. It is, therefore, a good practice for every authorised dealer / authorised service center to have this publication, for a quick reference and for constantly improving the knowledge and skills of their personnel.

In accordance with our policy and commitment to the process of continuous improvement, the specifications, data and procedures mentioned in this Manual are subject to change. The holders of this Manual are, therefore, requested to constantly update the same with the periodic notifications on changes which are issued by us.

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GENERAL INFORMATION

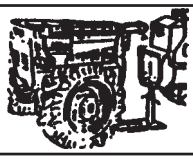
SPECIFICATION

Tractor

Model	SAME 393	SAME 453	SAME 503	SAME 603
Make	SAME	SAME	SAME	SAME
Type	Four Wheeled, two wheel drive unit construction General purpose Agricultural Tractor.			
Engine				
Make	SAME	SAME	SAME	SAME
Model	1000.3W			
Type	(Four stroke water cooled, Direct injection Diesel Engine)			
No. of Cylinders	Three			
Bore Diameter	105 mm			
Stroke	115.5 mm			
Capacity	3000 CC			
Compression Ratio	17:01			
Firing Order	1,3,2			
Horse Power	35HP/25.74kw at 2200 RPM	42HP/30.88Kw at 2200 RPM	50HP/36.76Kw at 2350 rpm	60HP/44.12Kw at 2350 rpm
Max. torque at rated speed Nm / RPM	141±8% at 1200 RPM	160±8% at 1400 RPM	181±8% at 1200 RPM	208±8% at 1200 RPM
Valves	Overhead Valve			
Valves Tip Clearance: Weight of Engine (Dry)	0.25 mm (cold) 320 Kg			
Fuel System				
Fuel Lift Pump	Diaphragm type			
Fuel Filter	MICO 0.5 Lit. Dual filter with replaceable paper element			
Filtering Capacity	1.5 to 2μ			
Fuel Injection Pump	MICO PFR 1K (F002 F20 008) Mono Cylinder			
No. of Pumps	Three			
Injectors	Multi Hole - MICO (F 002 C70 203)			
Injector Pressure	180 + 8 bar			
Engine Speed on No Load (Low Idle)	950±50	700±50	700±50	700±50
Injection Timing	16° BTDC			
Air Induction System				
Pre Cleaner	Centrifugal Pre-Cleaner with transparent dust collector			
Air Cleaner	Oil bath type			

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Splitting the Front Axle Assembly From the Tractor (02 - 1)

1. Keep the Tractor on a level ground and apply parking brake. Also wedge the Rear Wheels at both ends.
2. Remove the Weights and Front ballast frame (if Fitted).
3. Remove wiring connection of Head lamp, and Battery earth connection from the side panel end.
4. Remove Front Grill Assy. by unscrewing the screws by star screwdriver.
5. Disconnect the cable connection and remove the Battery.
6. Drain Water from the Radiator and no loss tank.
7. Jack the Tractor with the help of Tractor Splitting Kit at the bottom of the Engine (Special Tool No. G. ST.001.0) as shown in the Fig. 1

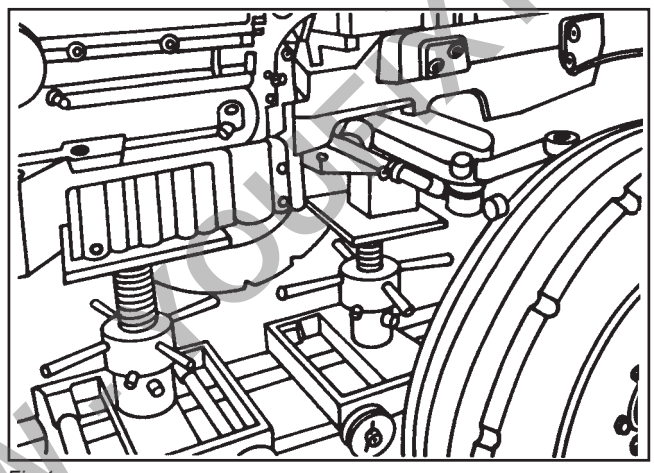


Fig.1

8. Remove the pre-Cleaner Assembly along with pipe and Silencer Assembly.
9. Remove the Top Bonnet Assembly along with side panels.
10. Remove the Water Hose connection and air induction hose connection.
11. Keep the Tractor front Wheel in straight direction.
12. Wedge the Centre Front Axle with Front Support from both ends.
13. Remove the Drag link connection at Steering box end.
14. Loosen 8 bolts connecting Front Engine Support and Engine Assembly.
15. Jack front Axle with Trolley Jack of Splitting Kit. (Refer Fig. 1)
16. Remove the Eight bolts and withdraw the front Axle Assy. completely along with Radiator, Front Support and Air Cleaner Assembly etc. (Refer Fig. 1)
17. Hold the Front Axle Assembly with the help of Special Horse holder.
18. Remove the trolley jack from Front Axle Assembly.

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FRONT AXLE

Make sure that the Stub Axle is not damaged and that the threading is in good condition. Replace if required.

Be sure no signs of oxidation are visible on the Stub Axle. Otherwise, remove with very fine abrasive paper.

Check the Stub Axle for either warp or damage. If present, replace the Stub Axle.

Carefully inspect the bearings making sure no grinding, scoring or marking are evident either on the rolling members or on the bearing races. Otherwise, replace the worn parts.

Check side axle upper and lower bushings A for wear (see figure 11), ascertaining that the reference notches are still present. Otherwise, replace.

Front Axle : Important torque tightening place / value

Description	No. or Qty.	Thread size in mm	Spanner size in mm	Torque value		
				Lb. ft.	Nm	Kgm
Center front axle to front axle	4	18 x 1.5	23 x 27	65.0	88	8.98
Front Bearing axle bracket to Front support (nut)	2	16 x 1.5	24	128.4	174	17.75
Rear Bearing axle bracket to Front support (nut)	2	18 x 1.5	27	135.8	270	18.77
Front support to Engine	8	18 x 2.5	27	198.8	240	27.5
Bolt spindle arm lever	2	12 x 1.5	18	65.0	88	8.98
Front wheel bolt	12	16 x 1.5	24	184.0	250	25.5

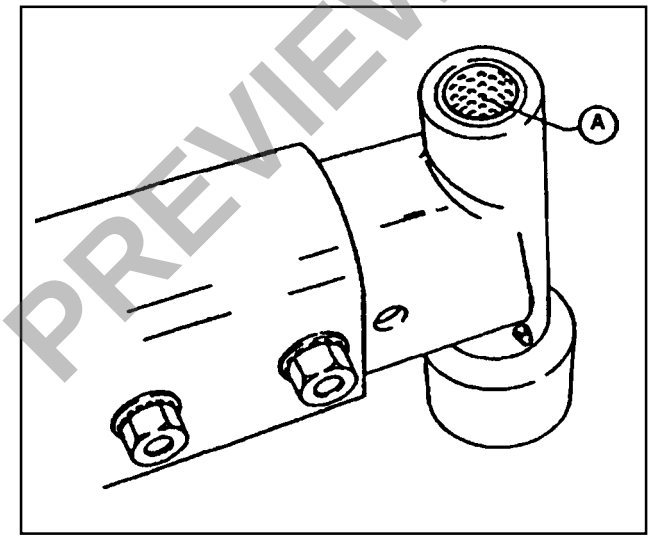


Fig. 11 - Wheel pivot bushings.
A - Bush with notches

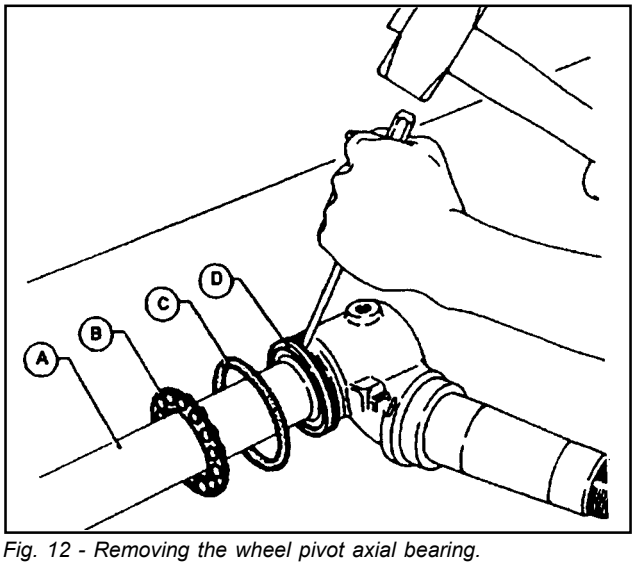


Fig. 12 - Removing the wheel pivot axial bearing.
A - Stub axle
B - Thrust bearing
C - 'O' - ring
D - Thrust bearing race

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ENGINE
TROUBLE SHOOTING

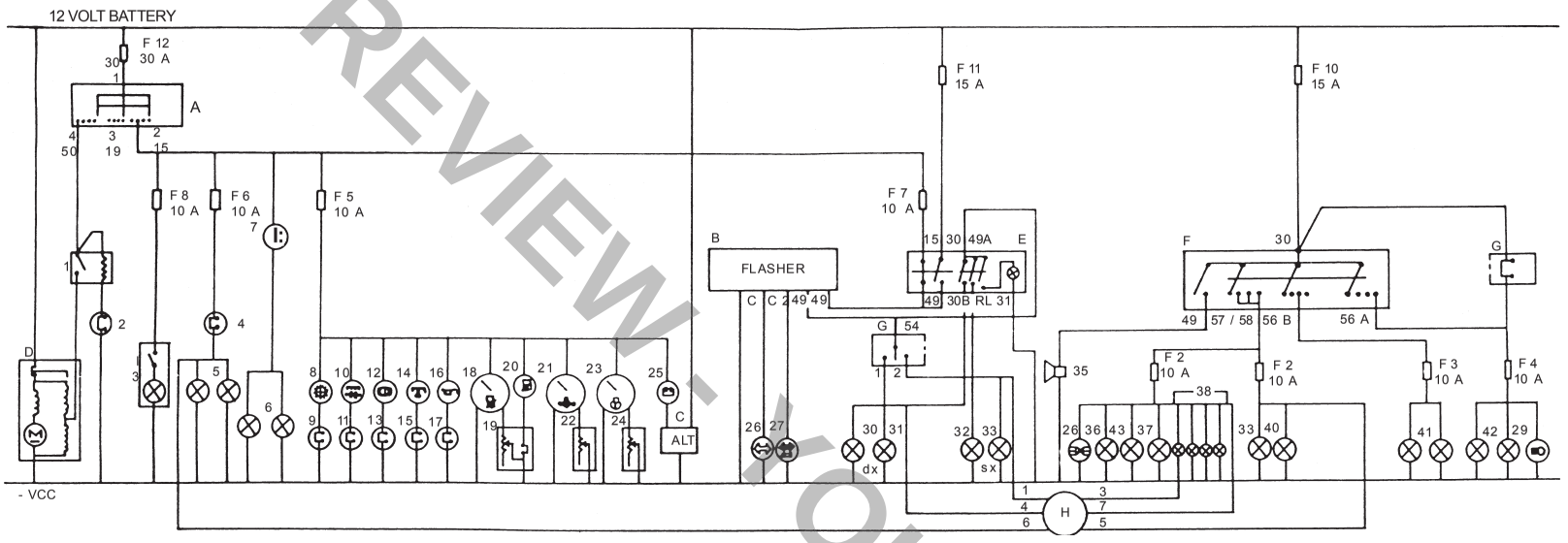
PROBLEMS	POSSIBLE CAUSES	
	CHECK BY THE USER	CHECKS BY THE WORKSHOP PERSONNEL
The Starter motor turns the Engine too slowly	1, 2, 3, 4	
The Engine does not start	5, 6, 7, 8, 9, 10, 12, 13, 15, 17	34, 35, 36, 37, 38, 42, 43, 44
The Engine is difficult to start	5, 7, 8, 9, 10, 11, 12, 13, 16, 17, 18, 19	34, 36, 37, 38, 40, 42, 43, 44
Engine not developing enough power	8, 9, 10, 11, 12, 13, 16, 17, 18, 19, 20, 21	34, 36, 37, 38, 39, 42, 43, 44
Misfire	8, 9, 10, 12, 13, 20, 22	34, 36, 37, 38, 39, 40, 41, 43
High fuel consumption	11, 13, 17, 18, 19, 21, 22	34, 36, 37, 38, 39, 40, 42, 43, 44
Black Exhaust smoke	11, 13, 17, 19, 21, 22	34, 36, 37, 38, 39, 40, 42, 43, 44
Blue or white exhaust smoke	4, 21, 23	36, 37, 38, 39, 42, 44, 45, 52, 58
The pressure of the lubricating oil is too low	4, 24, 25, 26	46, 47, 48, 50, 51, 59
The Engine knocks	9, 13, 17, 20, 22, 23	36, 37, 40, 42, 44, 46, 52, 53, 60
The Engine runs erratically	7, 8, 9, 10, 11, 12, 13, 16, 18, 20, 22, 23	34, 38, 40, 41, 44, 52, 60
Vibration	13, 20, 27, 28	34, 38, 39, 40, 41, 44, 52, 54
The pressure of the lubricating oil is too high	4, 25	49
The Engine temperature is too high	11, 13, 19, 27, 29, 30, 32	34, 36, 37, 39, 52, 55, 56, 57
Crankcase pressure	31	39, 42, 44, 45, 52,
Weak compression	11, 22	37, 39, 40, 42, 43, 44, 45, 53, 60
The Engine starts and stops	10, 11, 12	

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ELECTRICAL WIRING



1. Starting Relay (70 A)	18. Fuel Level Indicator	35. Horn
2. Ignition Switch	19. Fuel Level Sensor	36. LH Front Running Light
3. Rear Work Lamp	20. Fuel Reserve Pilot Lamp	37. RH Rear Running Light
4. Hydraulic Lights Stop Switch	21. Engine Oil Pressure Indicator	38. Light Instruments
5. Stop Lights	22. Engine Oil Pressure Sensor	39. RH Front Running Light
6. Reverse Lights	23. Water Temperature Indicator	40. LH Rear Running Light
7. Reverse Light Switch	24. Water Temperature Sensor	41. DX / SX Dim Head Light
8. Hydraulic Oil Filter Clogging Pilot Lamp	25. Alternator Pilot Lamp	42. DX / SX Bright Head Light
9. Hydraulic Oil Filter Clogging Switch	26. Turning Indicator Pilot Lamp	43. Light Plate
10. Hydraulic Oil Filter Clogging Pilot Lamp	27. Trailer Turning Indicator Pilot Lamp	A. Starting Switch
11. Rear P.T.O. Clutch Disengagement Pilot Lamp	28. Running Light Pilot Lamp	B. Flasher
12. Rear P.T.O. Clutch Disengagement Switch	29. Bright Light Pilot Lamp	C. Alternator
13. Emergency Brake Switch	30. RH Front Turning Indicator Light	D. Starter Motor
14. Rear P.T.O. Engagement Pilot Lamp	31. RH Rear Turning Indicator Light	E. Hazard Lights Switch
15. Rear P.T.O. Engagement Switch	32. LH Front Turning Indicator Light	F. Lights Command Switch
16. Engine Oil Pressure Pilot lamp Warning	33. LH Rear Turning Indicator Light	G. Direction Light Switch/High Beam Head Lights
17. Engine Oil Pressure Switch	34. Horn	H. Trailer Socket

Fig. 8 - Tractor harness (functional)

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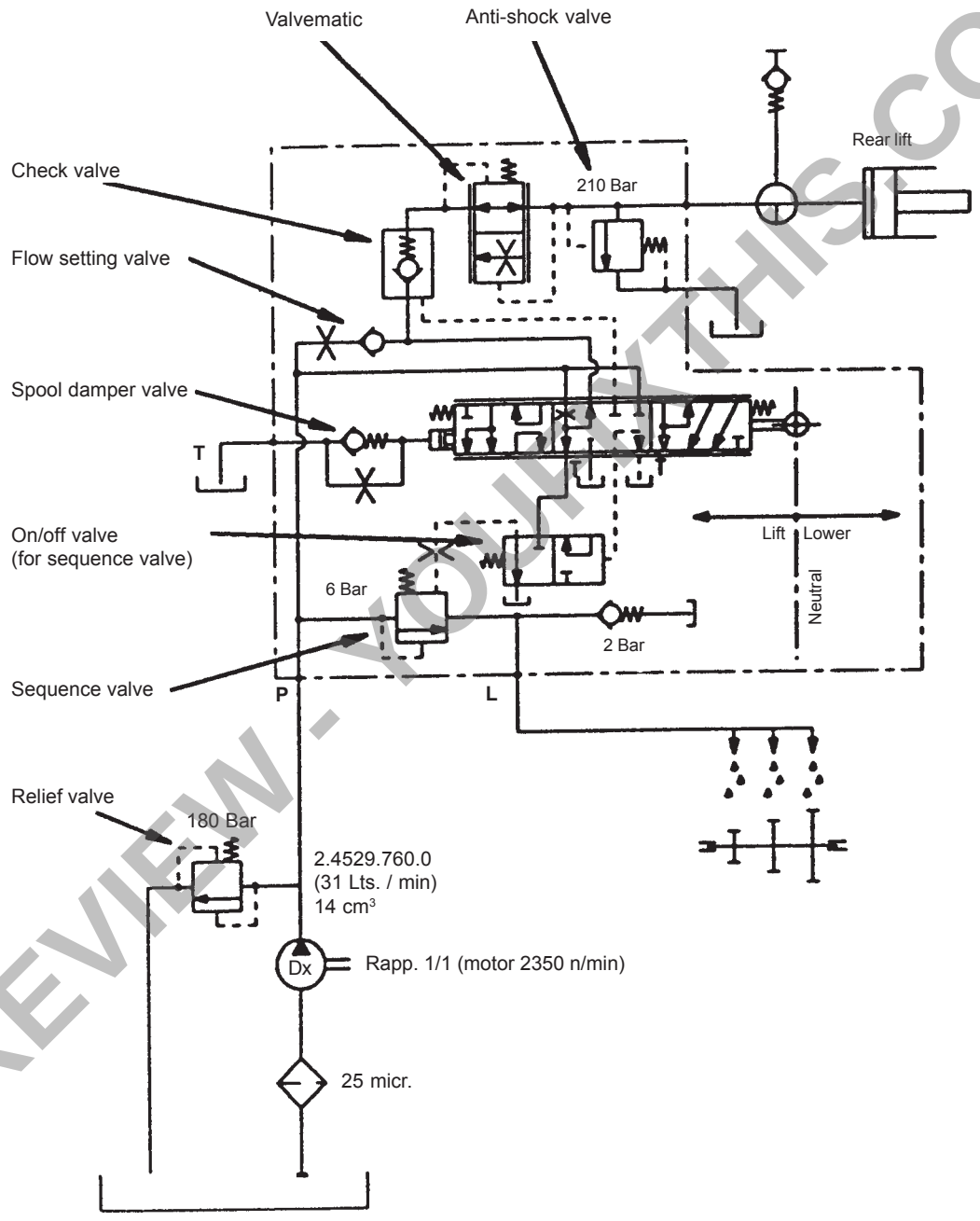


Fig. 2 - Hydraulic System diagram.

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FREE SERVICE SCHEDULE

Description	I Service 50 Hrs / 15 Days	II Service 350 Hrs / 4 Months	III Service 650 Hrs / 8 Months	IV Service 1000 Hrs / 1 Year
Wash & clean the Tractor	✓	✓	✓	✓
Clean Pre Cleaner Bowl	✓	✓	✓	✓
Change the Air Cleaner Oil	✓	✓	✓	✓
Change the Engine Oil	✓	✓	✓	✓
Replace the Engine Oil Filter	✓	✓	✓	✓
Grease Hydraulic Lift Links (*4 Points)*	✓	✓	✓	✓
Grease Front Axle Center Pin	✓	✓	✓	✓
Grease Front Stub Axle Pins RH / LH (*2 Points)*	✓	✓	✓	✓
Grease Rear Axle Shaft Bearings RH / LH (*4 Points)*	✓	✓	✓	✓
Check Gear Box Oil Level	✓	✓	✓	✓
Check Battery Electrolyte Level	✓	✓	✓	✓
Check for Oil / Fuel Leakage	✓	✓	✓	✓
Check Radiator Coolant Level	✓	✓	✓	✓
Clean Radiator Externally	✓	✓	✓	✓
Check Injectors & Calibrate, *if necessary*	....	....	✓	....
Adjust tappet Clearance	....	....	✓	....
Service Fuel Injection Pump & Calibrate, *if necessary*	....	....	....	....
Check Fan Belt Tension	✓	✓	✓	✓
Check Brake Fluid Level	✓	✓	✓	✓
Bleed Brake Circuit	✓	✓	✓	✓
Adjust Parking Brake	✓	✓	✓	✓
Adjust Clutch Pedal Travel (*Free Play)*	✓	✓	✓	✓
Adjust PTO Clutch lever free play	✓	✓	✓	✓
Clean Fuel Tank Neck Filter	✓	✓	✓	✓
Clean Fuel Tank Sediment Bowl	✓	✓	✓	✓
Replace PRIMARY Fuel Filter Element	....	✓	....	✓
Replace SECONDARY Fuel Filter Element	....	....	✓	....
Drain Fuel Filter Bowl	✓	✓	✓	✓
Bleed Fuel System	✓	✓	✓	✓
Adjust Toe-in	✓	✓	✓	✓
Check Tightness of all Hardwares	✓	✓	✓	✓
Check Front & Rear Tyre inflation Pressure	✓	✓	✓	✓
Check Engine Self Starter & Alternator	....	....	....	✓
Change Gear Box Oil and Hydraulic Suction Filter	....	....	....	✓
Change Steering Gear Box Oil	....	....	....	✓
Wash & Grease Hub Bearings	....	....	....	✓

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Say the year of Manufacture is Punched as 01 A 10 A

>> 01 Stands for year 2001
>> A Stands for Month January
} ***Refer Table - 1***

>> 10 Stands for date (i.e. 10th January)

>> A Stands for 'A' Shift

Following is the table for years & months : Table No. 1

Month of Manufacture	Year of Manufacture					
	2001	**2002**	**2003**	**2004**	**2005**	**2006**
January	01A	02A	03A	04A	05A	06A
February	01B	02B	03B	04B	05B	06B
March	01C	02C	03C	04C	05C	06C
April	01D	02D	03D	04D	05D	06D
May	01E	02E	03E	04E	05E	06E
June	01F	02F	03F	04F	05F	06F
July	01G	02G	03G	04G	05G	06G
August	01H	02H	03H	04H	05H	06H
September	01J	02J	03J	04J	05J	06J
October	01K	02K	03K	04K	05K	06K
November	01L	02L	03L	04L	05L	06L
December	01M	02M	03M	04M	05M	06M

TABLE No. 1

With the help of Table No. 1 the users can know the year of manufacture.

Similar logic can be applied for years beyond 2006 as shown in the above table.

For shift of the day it can A, B or C.

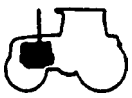
D - Chassis Serial Number (C - Fig. 1) is sequential number and it follows as : RPT 'XXXXX'

>> **RPT -** Stands for Ranipet Production Centre.
>> **'XXXXX' -** is Sequential Serial Number starting from 00001.

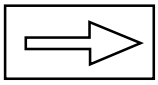
Chassis serial number is also punched on two more places as shown in figures on Page No. 13.
On the rear portion of the rear gear box (Fig - 3).
On the side of the front support (Fig - 4).

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TIGHTENING TORQUES



CAUTION :
Before tightening all screws should be de-greased, cleaned and lubricated with Engine oil.

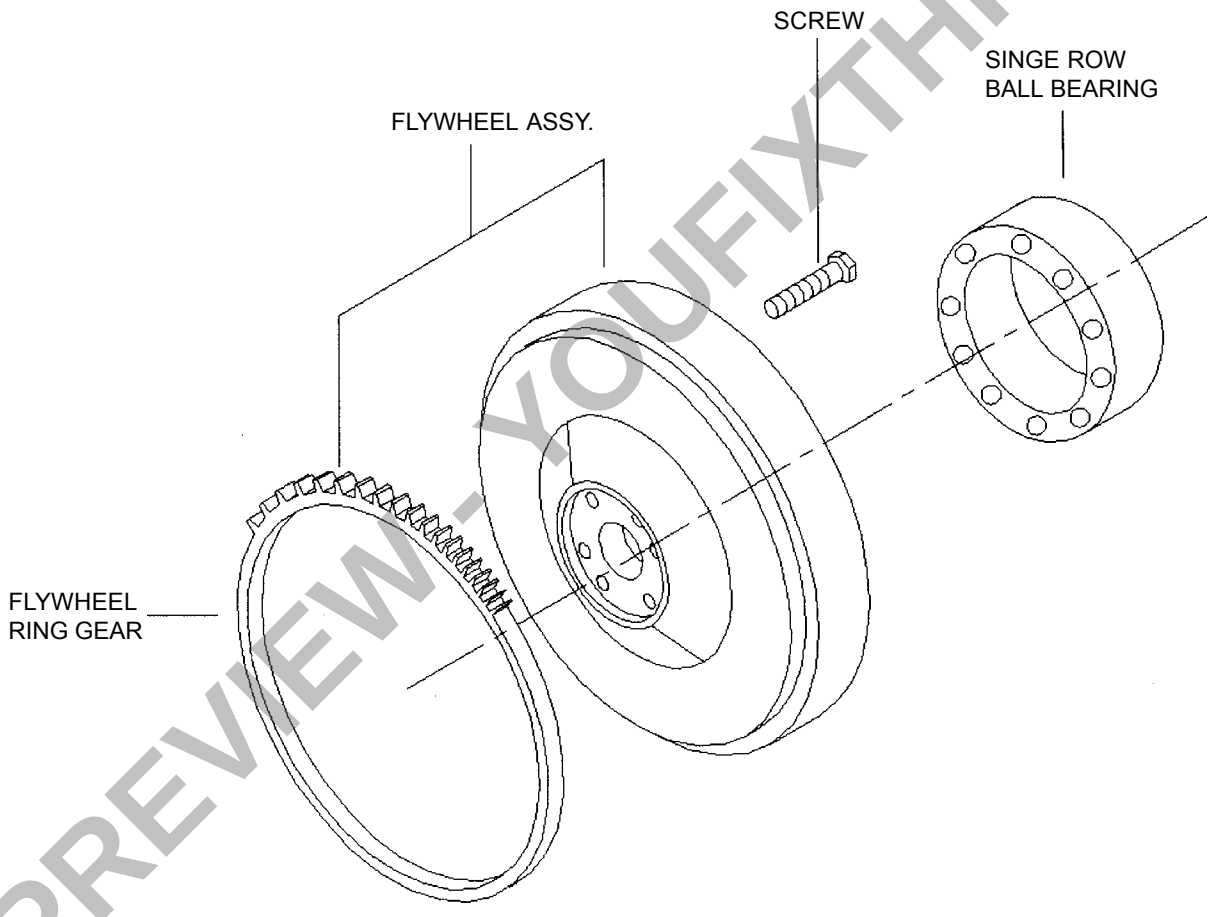
LOCATION	lb. ft.	Nm	Kgm
Flywheel mounting	79	108	11.0
Valve Rocker Arm Support	28	39	4.0
Fuel Injection Nozzle Retaining Fork	28	39	4.0
Fuel Injector Pressure pipe	17.7	24	2.5
Engine oil pump Mounting	29	39	4.0
Front Engine Timing Gear Cover	18	24.5	2.5
Rear Engine Oil Seal Retainer Plate	18	24.5	2.5
Oil Sump to Block	18	24.5	2.5
Valve cover	3.6	4.9	0.5
Pulley/Hub to Front of Crankshaft	245	333 to 353	34 to 36
Rear Engine Adaptor plate	86.4	118	12
Water Manifold to Heads	21.4	29	3.0
Water Pump to Block	36.1	49	5.0
Water Pump Flange Securing Screw	21.4	29	3.0
Thermostat Cap Screw	21.4	29	3.0

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ENGINE

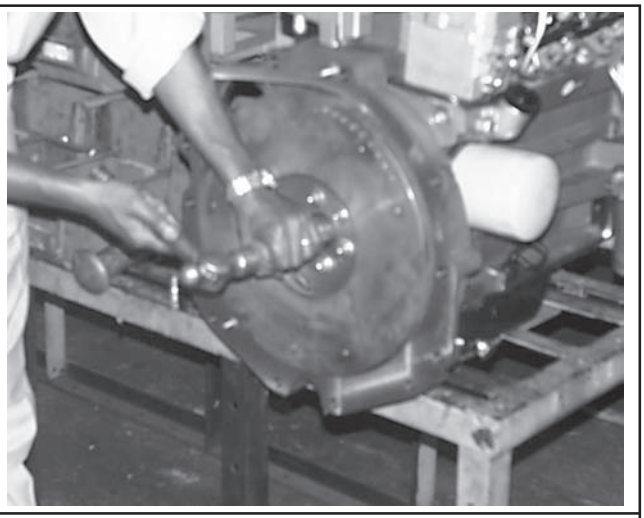
Fly Wheel

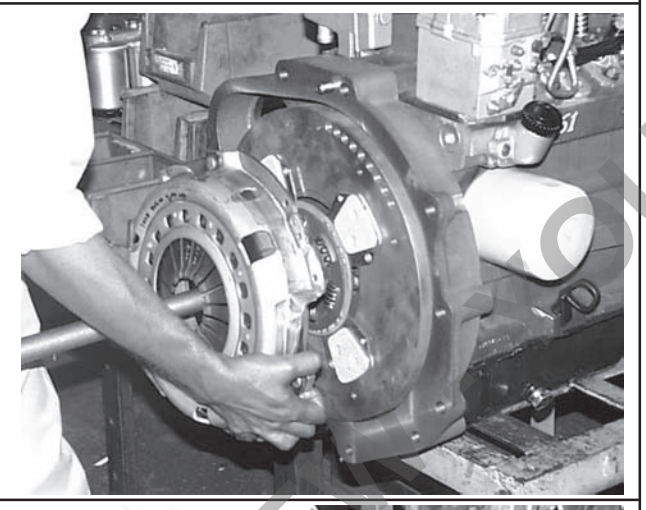


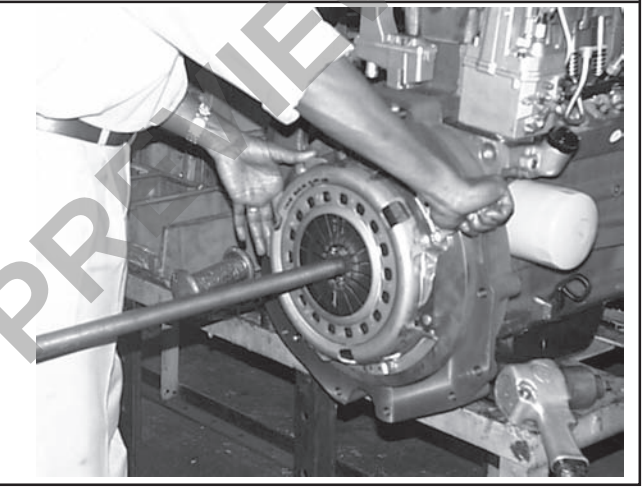
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SINGLE CLUTCH







- Press the Flywheel pilot bearing with help of special tool ATTR - 1209.
- Ensure the bearing on flywheel assembly and mounting threads are OK before assembling clutch.
- With the help of clutch centering tool (ATTR 1152), or with assembly clutch shafts locate the Main clutch disc (2) and Clutch assy. (1) on the Flywheel.
- While locating the Clutch disc ensure the face (identification mark on the disc retaining plate as “Flywheel side”) should face towards flywheel.
- Mount the clutch assembly with screws and tight the same with Criss cross method as shown in the figure.

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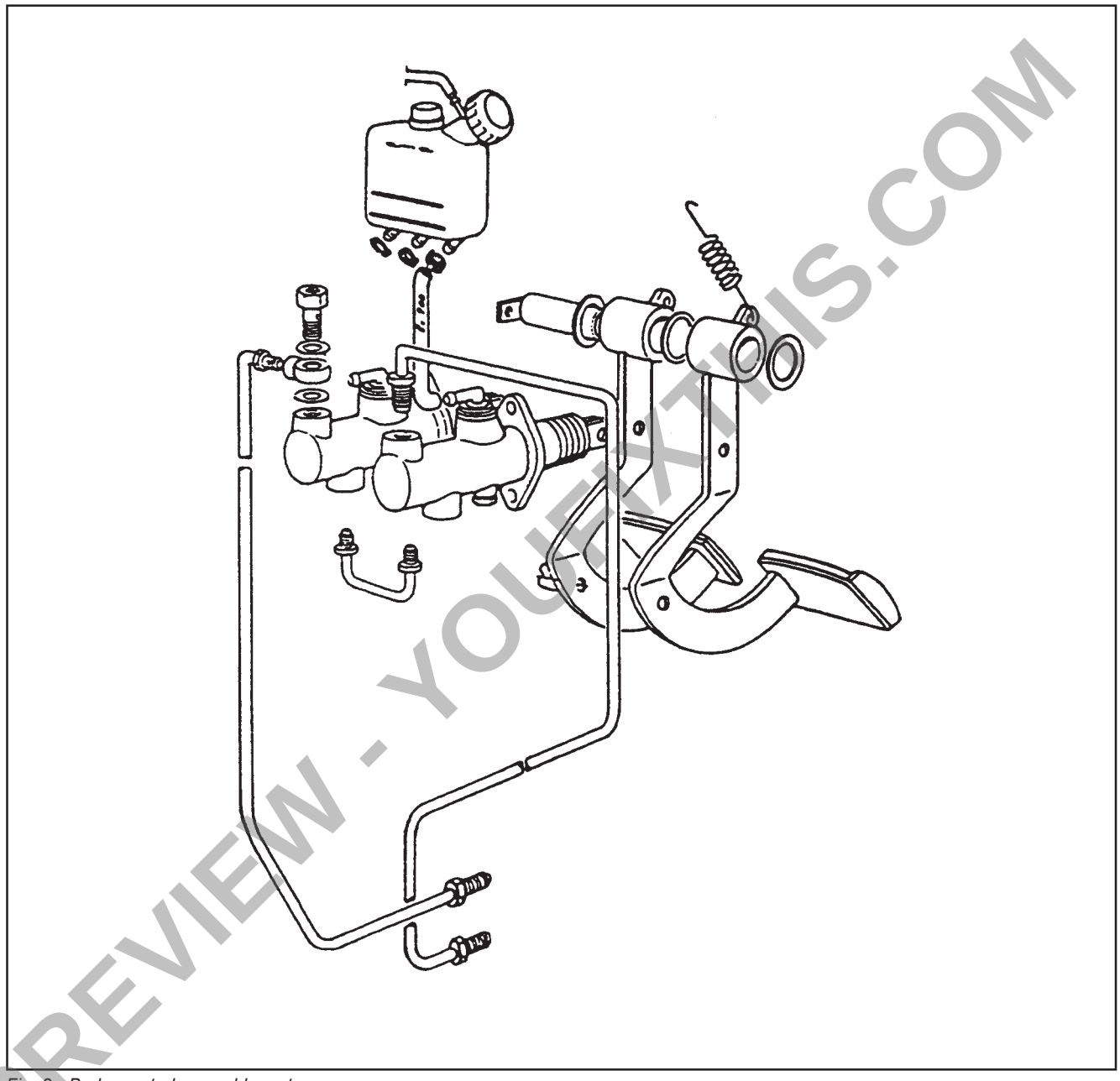


Fig. 2 - Brake control assembly parts.

Master cylinder

Disassembly and checking procedure

— Remove guard boot A, take snap ring B and withdraw rod C along with the support disc. Refer figure 3.

— Position the master cylinder in a vice provided with protective jaws. While partly pushing pistons into the pump, as shown in figure 5, loosen the piston retaining screws and then remove the pistons along with the spring.

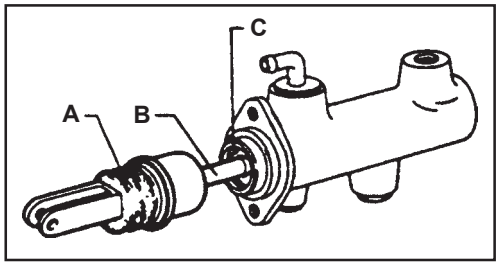


Fig. 3 - Brake pump control unit.

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Tap the end of gear shaft (1) with a soft faced hammer to force out the dish type expansion plug (6).

Slide the gear shaft (1) out of the levelling box (5) and remove the bearing (7).

Re-assembly is the reverse of the preceeding procedure. A new rivet (2) should be fitted and the gear box packed with recommended grease.

The adjustment range Min. length - 510 mm.
Max. length - 600 mm.

Stabilizer chains (Fig. 5)

It consists of turn-buckle, Chain links, Lock nut, Mounting bracket and Eye bolt. The mounting bracket is fitted to the bottom of the axle tube with the help of three bolts. One end of the chain assembly is fitted to the axle tube bracket by means of clevis pin and cotter and other end is fitted to lower link by means of eye bolt. The adjustment can be made with turn-buckle by loosening the lock nut.

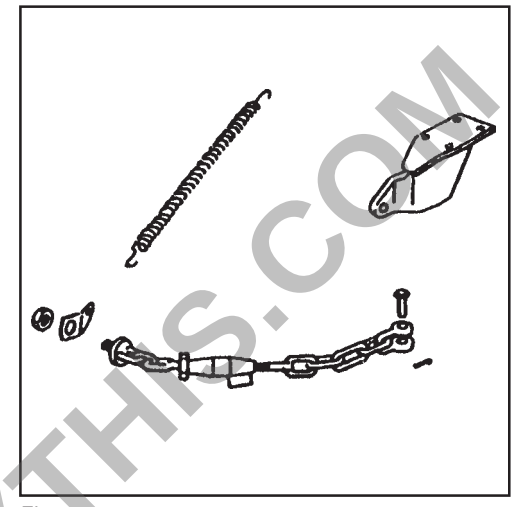


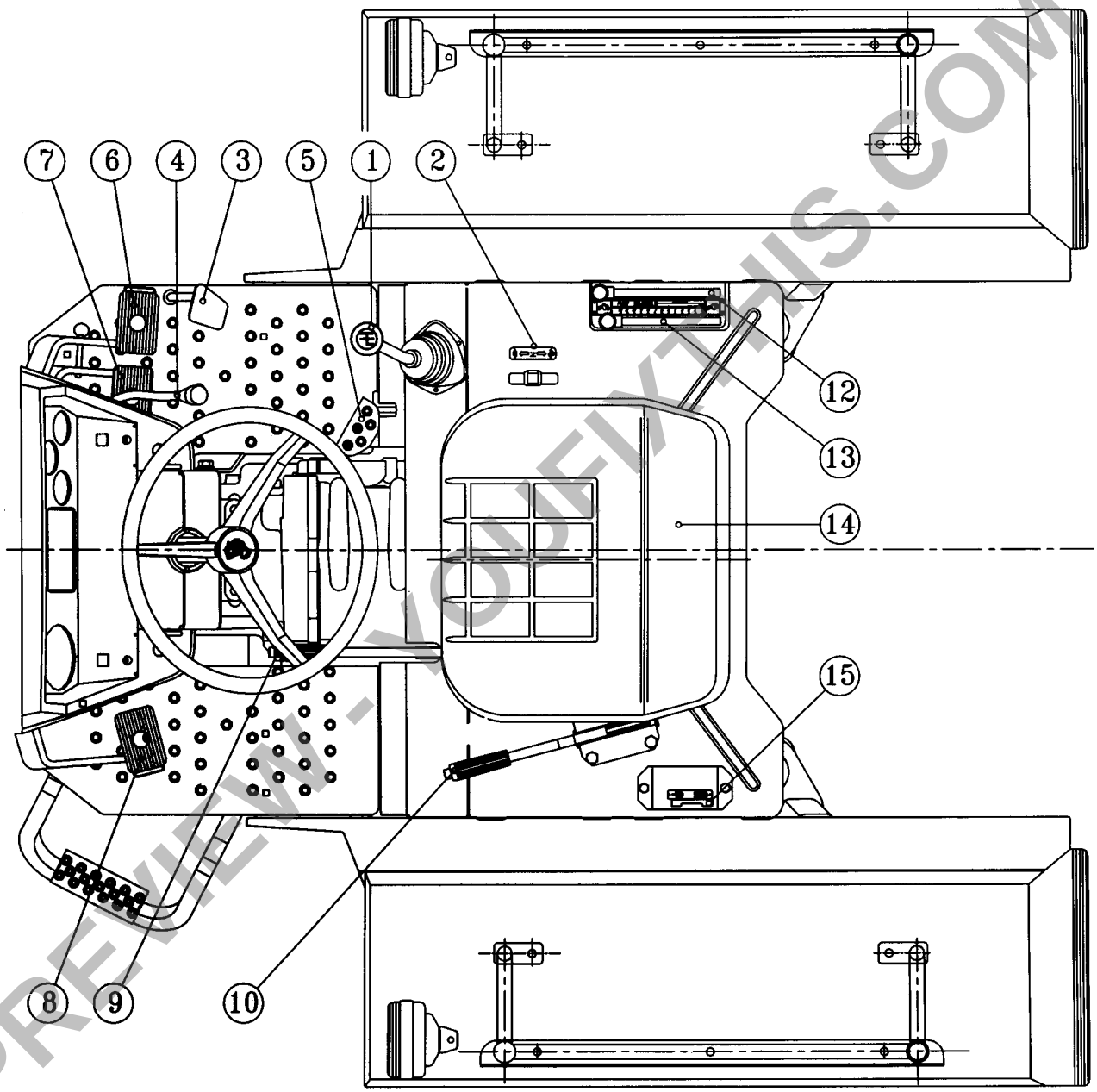
Fig. 5

WARNING: Always keep the length of the chain assembly equal on both sides, also lock the turn-buckle by locknut.

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Operator's compartment controls:



1 Gearshift control
2 Speed ranges control (Low/High)
3 Foot throttle control
4 Hand throttle control
5 Differential lock pedal
6 RH Brake pedal
7 LH Brake pedal
8 Clutch pedal
9 Hand brake
10 Clutch PTO control
11 Position control lever (Power lift)
12 Draft control lever (Power lift)
13 Seat
14 Ground PTO control
15 PTO Selecting lever

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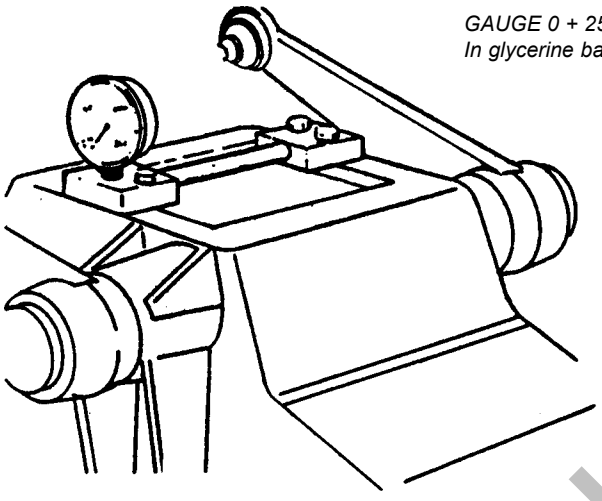
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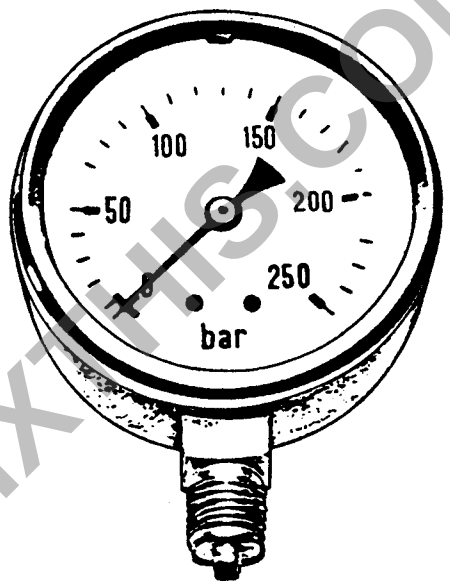
INSTRUMENTS, GAUGES AND SERVICE SPECIAL TOOLS

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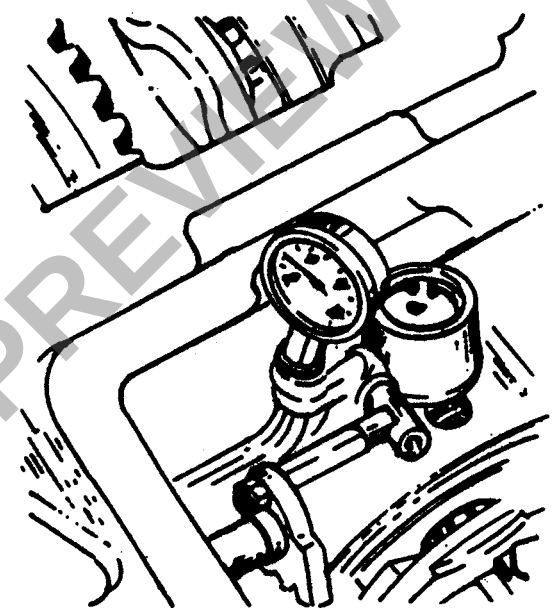
Pressure check

GAUGE 0 + 250 BAR
In glycerine bath



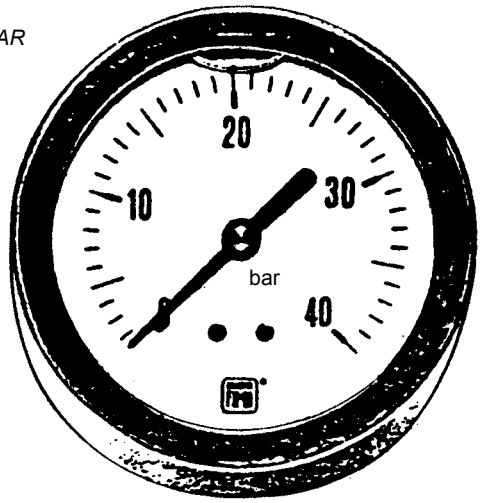


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Pressure check

GAUGE 0 + 40 BAR
In glycerine bath



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