956 & 1056

Workshop Manual



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BASIC SYSTEM COMPONENTS
Electrical System

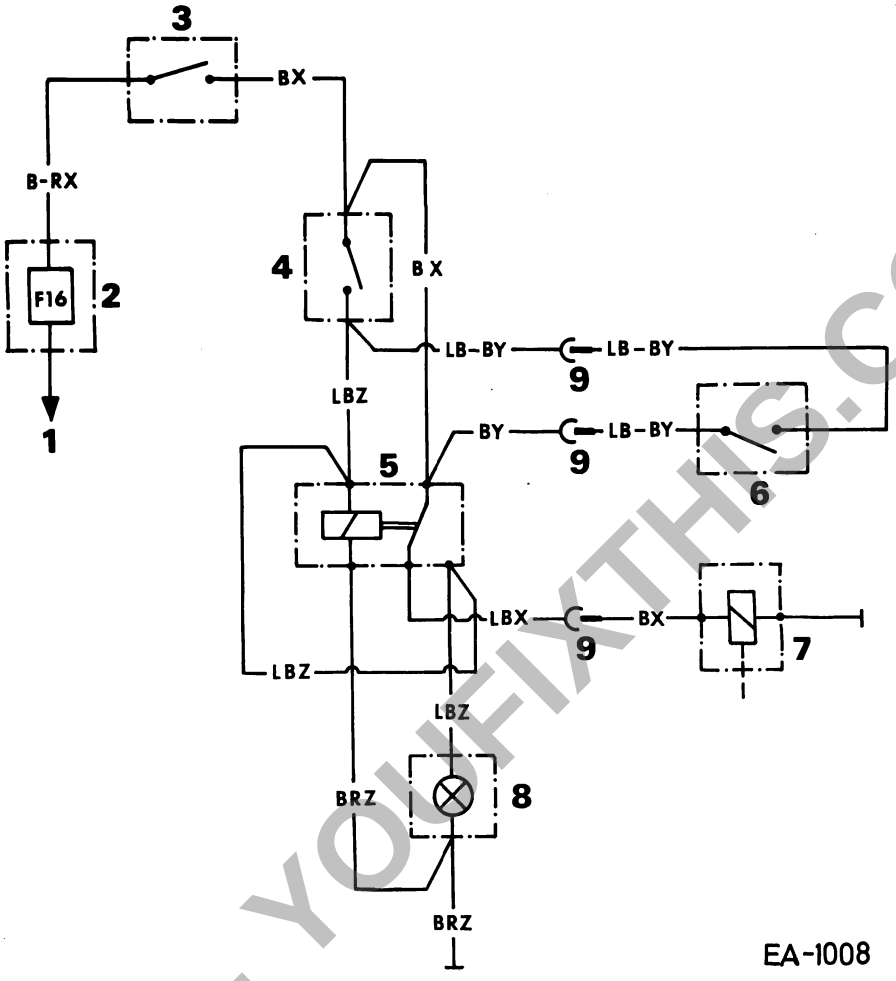


Figure 49 A.C. Wiring Diagram

1 – POWER SUPPLY FROM FAN SWITCH
2 – FUSE 10 A
3 – THERMOSTAT TEMPERATURE CONTROL
4 – LOW PRESSURE SWITCH*
(OPENED BY PRESSURE)
5 – LATCHING RELAY
6 – HIGH PRESSURE SWITCH*
(CLOSED BY PRESSURE)
7 – COMPRESSOR CLUTCH RELAY
8 – WARNING LIGHT
9 – LINE CONNECTOR

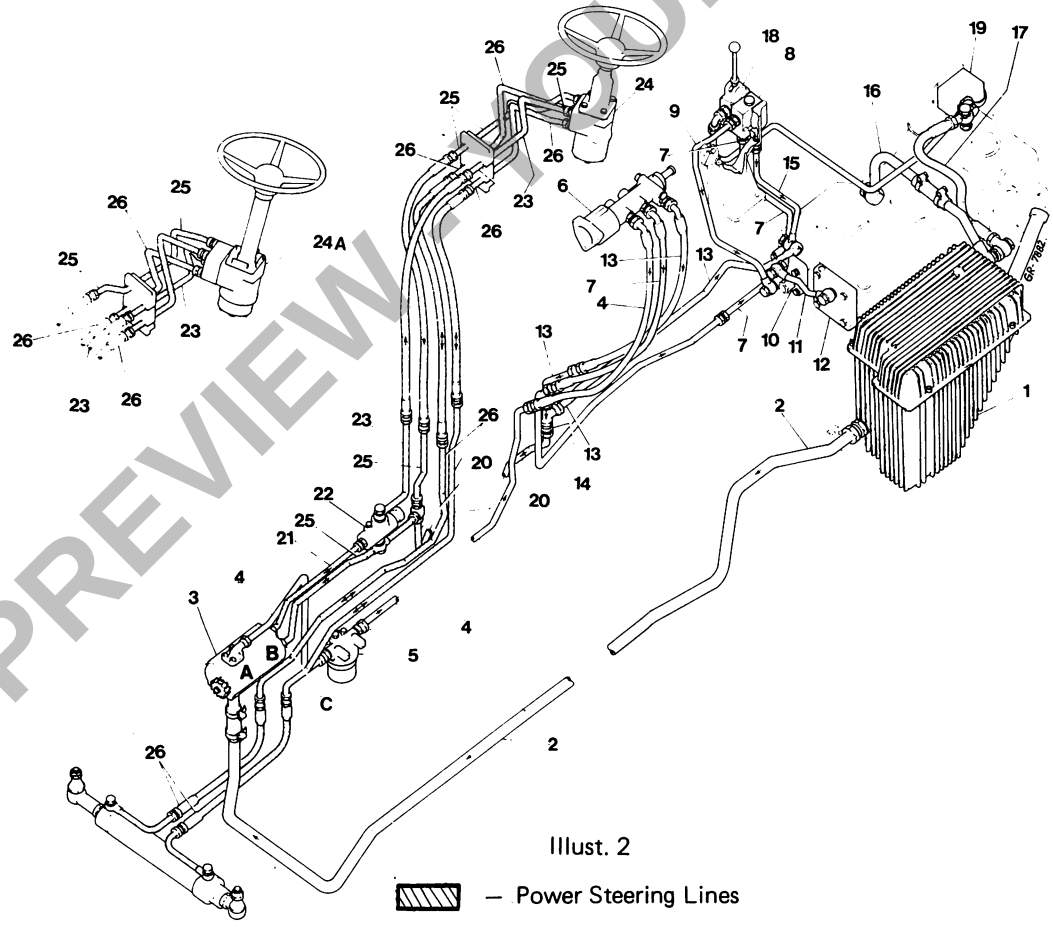
* FAILURE CONTROL SYSTEM

COLOUR CODE		NO.	CROSS-SECTION mm²	
			DIN 72 551	NF 32-700
B	BLACK	Z	0.75	0.6
DB	DARK-BLUE	Y	1.0	1.0
LB	LIGHT BLUE	X	1.5	1.4
BR	BROWN	W	2.5	3.0
LG	LIGHT GREEN	V	4.0	5.0
DG	DARK GREEN	U	6.0	7.0
P	PINK	T	10.0	10.0
V	VIOLET	S	16.0	16.0
R	RED	R	25.0	25.0
G	GRAY (SLATE)	Q	35.0	40.0
W	WHITE	P	50.0	50.0
Y	YELLOW	O	70.0	70.0
O	ORANGE	N	95.0	95.0

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Hydraulic System

1 – Oil cooling reservoir
2 – Suction line
3 – Hydraulic pump, dual element gear type
A – Hydraulic lift element
B – Power steering element
C – Back pressure check valve (0.6 – 2.5 bar)
4 – Pressure line
5 – Pressure oil filter
6 – Brake booster, when actuated, 1.5 l/min. are diverted from oil delivery of element (A) to booster cylinder. Return flow through (13)
7 – Pressure line (on tractors without auxiliary control valves, to draft control valve)
8 – Mounting block
9 – Pressure line
10 – Draft control valve
11 – Pressure line
12 – Cylinder head
13 – Return line
14 – Check valve (FWD only)
15 – Return line
16 – Overflow line
17 – Venting line
18 – Auxiliary control valve
19 – Quick disconnect coupling
20 – Suction line for manual steering (FWD only)
21 – Pressure line
22 – Flow divider, constant delivery to steering control valve:
"ZF" Standard = 12 l/min
"ZF" FWD = 18 l/min
"DANFOSS" Standard = 12 l/min
"DANFOSS" FWD = 14 l/min
24 – Steering control valve "ZF"
24 A – Steering control valve "DANFOSS"
25 – Return line
26 – Steering cylinder lines



Illust. 2

▨ – Power Steering Lines

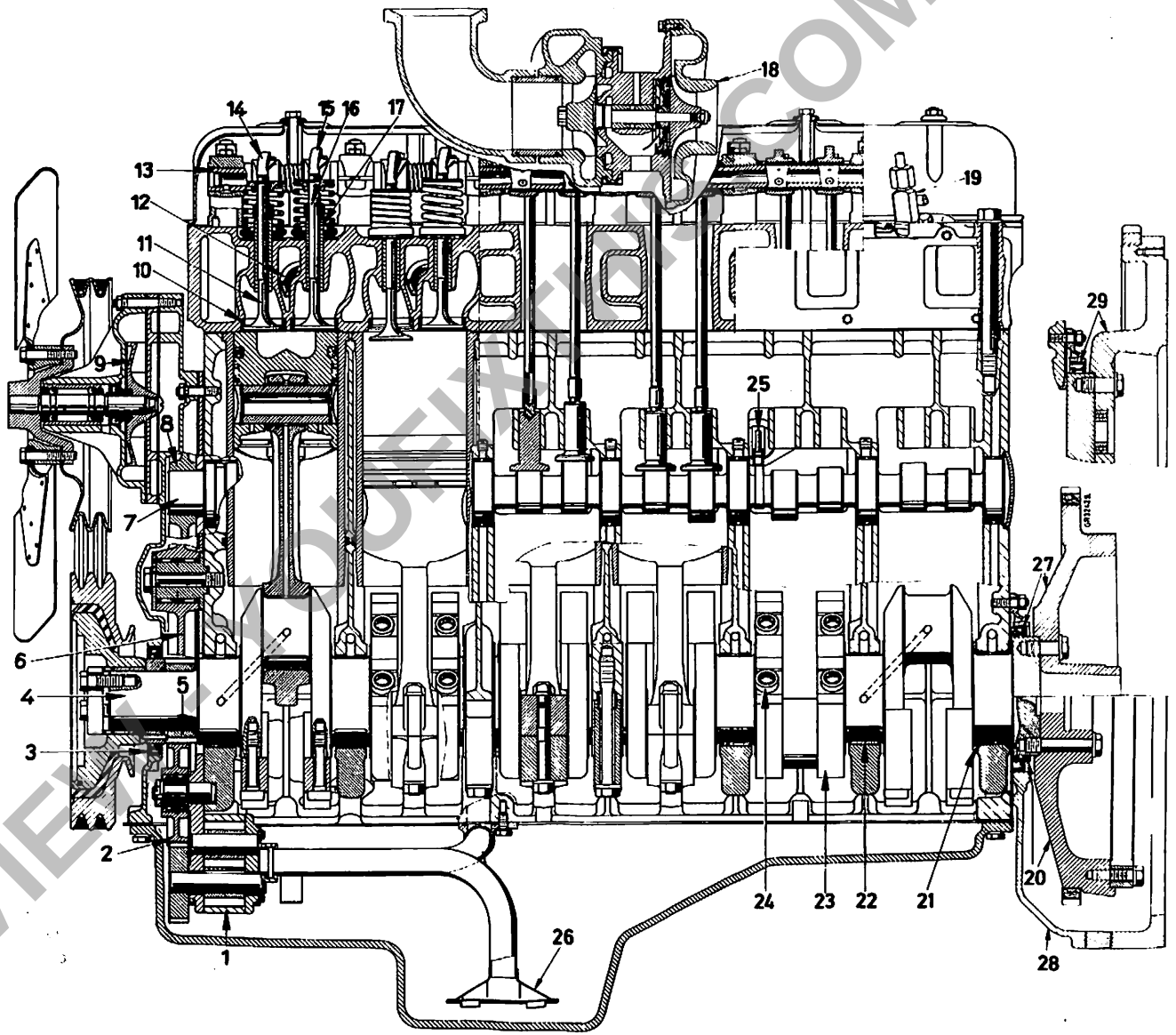
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Longitudinal Section of Engine

1 – Oil pump
2 – Idler gear (Oil pump)
3 – Crankshaft oil seal, front
4 – Crankshaft
5 – Crankshaft pinion
6 – Idler gear
7 – Camshaft
8 – Camshaft gear
9 – Water pump
10 – Valve seat insert
11 – Exhaust valve
12 – Coolant jet for injection nozzle
13 – Valve lever shaft
14 – Exhaust valve lever
15 – Intake valve lever
16 – Intake valve
17 – Valve stem guide
18 – Turbocharger
19 – Injection nozzle holder
20 – Flywheel and crankshaft oil seal, torque converter version
21 – Main bearing, rear
22 – Main bearing
23 – Balance weight
24 – Balance weight bolts
25 – Fuel feed pump drive
26 – Oil suction screen
27 – Flywheel and crankshaft oil seal, early torque converter version
28 – Flywheel housing
29 – Flywheel and crankshaft oil seal, dry type disk clutch version



Illust. 3
Typical DT-358 engine

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Special Nut and Bolt Torque Data

	daNm			Lbf-ft		
	1st step	2nd step	final step	1st step	2nd step	final step
* Balance weight necked-down bolts (obsolete)	3	–	5.5 ÷ 6.0	21.7	–	40 ÷ 43.5
* Balance weight pitch diameter bolts	6	–	10.0 ÷ 10.5	44	–	72.3 ÷ 76
* Main bearing cap necked down bolts (obsolete) 10.9	4	8	10.5 ÷ 11.5	29	58	76 ÷ 83
* Main bearing cap necked down bolts (obsolete) 12.9	4	8	13 ÷ 14	29	58	94 ÷ 101
* Main bearing cap pitch diameter bolts 12.9	4	8	19 ÷ 20	29	58	137.5 ÷ 145
* Main bearing cap pitch diameter bolts 10.9	4	8	14 ÷ 15	29	58	101 ÷ 109
* Connecting rod nuts "Angle" tightening procedure, refer to Illust. 144						
* Annular spring tightener element or clamping ring	3	6	6 ÷ 6.5	21.7	43.5	43.5 ÷ 47
* Capscrew-clamping ring front pto	1.5	2.7	3.0	10.8	19.5	22
** Idler gear necked down bolt (obsolete)	–	–	9 ÷ 9.5	–	–	65 ÷ 69
** Idler gear pitch diameter bolt	–	–	10 ÷ 10.5	–	–	72 ÷ 76
* Flywheel bolts	4	8	14 ÷ 15	30	60	103 ÷ 110
Bolts, seal ring retainer, rear	1.5	–	1.8 ÷ 2	10.8	–	13 ÷ 14.5
* Cylinder-head nuts (obsolete)	4	8	11.5 ÷ 12.5	29	58	83 ÷ 90
* Cylinder-head studs (obsolete)	–	–	5 ÷ 6	–	–	36 ÷ 44
* Cylinder-head cap screws with round washer (obsolete)	4	8	11 ÷ 12	29	58	80 ÷ 87
* Cylinder-head cap screws with collar	4	8	14 ÷ 15	29	58	101 ÷ 109
Valve lever bracket studs	–	–	3.5 ÷ 4	–	–	25 ÷ 29
* Valve lever bracket stud nuts	–	–	6 ÷ 7	–	–	44 ÷ 51
Valve lever bracket clamping screw	–	–	1 ÷ 1.2	–	–	7 ÷ 8.6
Side cover screws	–	–	1.6 ÷ 1.8	–	–	12 ÷ 13
Oil pressure gauge			max. 1			max. 7.2
Temperature sender unit			max. 2			max. 14.5
Exhaust manifold stud nuts	–	–	3.5 ÷ 4.0	–	–	26 ÷ 30
Nozzle holder stud)	–	–	1.3 ÷ 1.8	–	–	9.4 ÷ 13
Nozzle holder stud nuts) flange mounted	0.5	–	1 ÷ 1.2	3.6	–	7.2 ÷ 8.7
Nozzle union nut) nozzle holder	–	–	6 ÷ 8	–	–	44 ÷ 58
* Bolt) crab mounted	–	–	2.3 ÷ 2.7	–	–	16.6 ÷ 19.5
Nozzle union nut) nozzle holder	–	–	5 ÷ 7	–	–	36.2 ÷ 50.7
Nozzle holder leak oil connection hollow screw	–	–	0.2 ÷ 0.8	–	–	1.5 ÷ 5.8
Injection line union nuts	–	–	2 ÷ 2.5	–	–	15 ÷ 18
Valve cover adapter stud	–	–	1.6 ÷ 1.8	–	–	11.6 ÷ 13
Valve cover stud nut	–	–	0.5 ÷ 0.7	–	–	3.6 ÷ 5
Valve cover screws (sheet metal)	–	–	0.5 ÷ 0.7	–	–	3.6 ÷ 5
Valve cover screws (gray iron)	–	–	1.5 ÷ 1.7	–	–	11 ÷ 12.3
Oil pan drain plug (when asbesto-filled packing ring is used)	–	–	5 ÷ 6	–	–	36 ÷ 43
Oil pan drain plug (when copper ring is used)	–	–	13.8 ÷ 15	–	–	100 ÷ 118
Plug with socket head (oil gallery-crankcase)	–	–	max. 1.2	–	–	max. 8.7
Injection pump gear bolt (3 radial lines)	1.5	–	2.2 ÷ 2.5	11	–	16 ÷ 18
Injection pump gear bolt (6 radial lines)	1.5	–	2.5 ÷ 2.8	11	–	19 ÷ 21
Injection pump cover bolt (tighten crosswise)	0.4	–	0.8 ÷ 1	3	–	5.8 ÷ 7.2
Injection pump flange nut	1.5	–	2.2 ÷ 2.5	11	–	16 ÷ 18
Injection pump plunger end plug (AF 17)	–	–	4.5 ÷ 5.5	–	–	33 ÷ 40
Injection pump plunger end plug (AF 12)	–	–	1.4 ÷ 2.0	–	–	10 ÷ 15
Injection pump drive shaft nut M 12 (AF 19)	–	–	6 ÷ 7	–	–	44 ÷ 50
Injection pump drive shaft nut M 14 (AF 22)	–	–	8.5 ÷ 10	–	–	63 ÷ 72
Hollow screws	–	–	2 ÷ 2.5	–	–	15 ÷ 18
Bolts, sheet metal oil pan	–	–	1.2 ÷ 1.4	–	–	8.7 ÷ 10
Engine breather screw	–	–	0.8 ÷ 1.0	–	–	5.8 ÷ 7.2
Valve set screw clamping torque	–	–	1.7 ÷ 4.5	–	–	12.3 ÷ 32.6
Exhaust manifold, coolant filter mounting stud	–	–	3.5 ÷ 4.0	–	–	26 ÷ 29
VE Injection pump support angle mounting bolt M 6	–	–	0.7 ÷ 0.9	–	–	5.2 ÷ 6.6

* Oiled

** Use liquid locking compound while mounting

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Probable Cause	Remedy

Engine Fails to Turn

1. Batteries too low to turn engine	Charge batteries or install new ones.
2. Starting switch inoperative	Inspect for faulty cables and terminals. Replace starting switch if necessary.
3. Cranking motor inoperative	Refer to Service Manual "Electrical Equipment".
4. Engine oil too heavy	Use correct grade of lubricating oil.
5. Internal seizure	Hand crank the engine. If the engine does not turn easily, seizure due to internal damage; including gear train, pistons, sleeves, connecting rods or main bearings, is indicated.
6. Hydrostatic lock	Remove all the injection nozzles and crank the engine. Check for fuel or coolant in the cylinder.

Engine Does Not Develop Full Power

1. Low or no fuel pressure	
a. Insufficient fuel	Check fuel tank.
b. Fuel oil filter clogged	Disassemble and clean each unit.
c. Fuel filter gaskets defective (air being drawn into fuel)	Replace gaskets.
d. Moisture in fuel tank	Drain entire system including water trap and filter. Refill with clean fuel, and vent the air from the system.
2. Poor fuel	Use good grade of fuel.
3. Air cleaner clogged	Remove and service air cleaner as described in operator's manual.
4. Injection pump not properly timed to the engine	Check timing. (Refer to Section "INJECTION PUMP.")
5. Injection pump not operating properly	Remove injection pump and test it. Refer to Service Manual "Fuel System and Turbocharger" for test specifications.
6. One or more fuel injection nozzles not operating properly	Replace the injection nozzles.
7. Loose or broken fuel lines or fittings between injection pump and injection nozzles	Tighten or repair.
8. Loose or broken connections or leaking gaskets at intake manifold or exhaust manifold	Tighten or repair.
9. Improper valve settings	Reset as necessary. If out of adjustment an excessive amount, check for bent push rods.
10. If equipped with ether priming system with butterfly valve, check the valve position	Correct.
11. *Lack of compression*	Refer to "Poor Compression".

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High Fuel Pressure

1. Clogged fuel return line or elbow	Remove and clean.

Engine Runs Unevenly and Vibrates

1. Valve and spring assembly inoperative	Repair or install parts needed.

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SPECIFICATIONS

Engine	*Number of Cylinders*	*Bore mm (inch)*	*Stroke mm (inch)*	*Piston Displacement cm^3 (cu. inch)*
D-155	3	98.4 (3.875)	111.1 (4.375)	2536 (155)
D-179			128.5 (5.06)	2934 (179)
D-206			111.1 (4.375)	3382 (206)
D-239			128.5 (5.06)	3911 (239)
DT-239				
D-246	4	100.0 (3.937)	128.5 (5.06)	4034 (246)
D-268			139.7 (5.5)	4389 (268)
D-310			111.1 (4.375)	5073 (310)
D-358	6	98.4 (3.875)	128.5 (5.06)	5867 (358)
DT-358				
DT-402		100.0 (3.937)	139.7 (5.5)	6587 (402)

Type 4—Cycle—Diesel—Engines

Direction of rotation, facing flywheel L. H.

Compression ratio 16 : 1 (except D-268 and DT-402 15:1)

Compression at starting speed, MPa (PSI) 2.2—2.4 (313—341)

Firing order

3 Cyl.	1—3—2
4 Cyl.	1—3—4—2
6 Cyl.	1—5—3—6—2—4

Valve clearance, engine hot, mm (inch) 0.30 (.012)

Lubricating System

Min. oil pressure at main oil gallery and 90 – 100 °C oil temperature

	OLD	NEW
at rated speed MPa (PSI)	0.25 (36)	0.30 (44)
at low idle speed MPa (PSI) *)		0.09 (13)

*) observe oil pressure warning light.

Oil consumption at rated speed and full load, less than 1.5 g/kWh (overhauled engine).

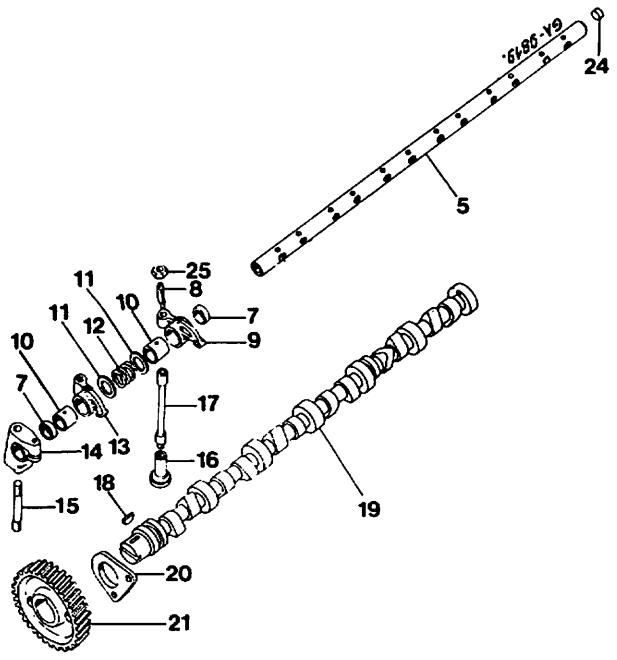
Cooling System

Most favourable operating temperature 90° – 95 °C (194° – 203 °F)

Air System

Max. permissible restriction before servicing the air cleaner 635 mm (25 inch) of water

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Illust. 5

General

The valve lever assembly receives its lubrication through the hollow valve lever shaft. Oil holes are provided in the valve lever shaft (5) Illust. 5 to lubricate individual valve levers.

An oil port is provided in the shaft which must line up with the respective oil-way in the bracket. The mark (3) Illust. 8 must be in line with the clamping slot of the front bracket. Replaceable oil plugs (24) Illust. 5 are used to close up both ends of the shaft.

Valve levers for intake and exhaust valves differ in length but are provided with the same replaceable bushings which must be reamed to size after installation.

Replacement levers are supplied with bushings in place.

Specifications

(refer to Illust. 5)

Valve Lever and Shaft

Valve lever shaft diameter, mm (inch) 21.56-21.59 (0.849-0.850)

Valve lever clearance on shaft, mm (inch) 0.023-0.064 (0.0009-0.0025)

Valve lever bushing reamed to size (inner diameter), mm (inch) 21.62-21.64 (0.851-0.852)

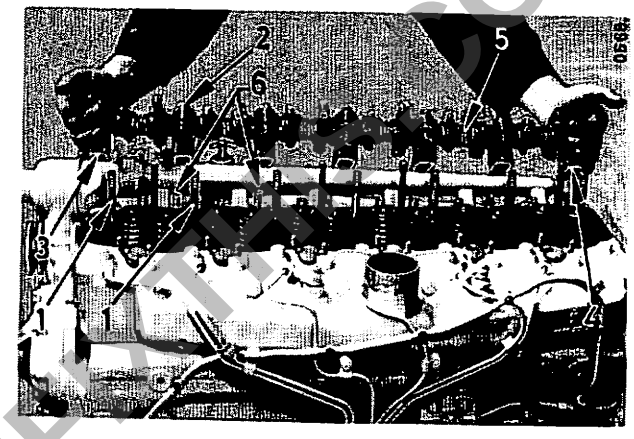
Valve Lever Springs

Free length, mm (inch) 37.7 (1.48)
Test length, mm (inch) 25.0 (1.00)
Test load, N (lbf) 29 (6.6)

Removal and Disassembly

Thoroughly clean the engine externally.

Remove valve housing cover.



Illust. 6

1 – Studs
2 – Clamping bolts
3 – Valve lever shaft bracket, front
4 – Valve lever shaft bracket, rear
5 – Pressure spring
6 – Valve push rod

Remove nuts from studs (1) Illust. 6 and lift the complete valve lever assembly clear of the cylinder head. Loosen clamping bolts (2) and press in brackets slightly towards the center, taking care that they do not slide off the shaft, resulting in levers and springs etc. being scattered all over the floor. Slide all parts off the shaft and place them on a table in removal order to facilitate correct reassembly.

Cleaning, Inspection, and Repair

Clean all parts in kerosene or Diesel fuel and blow dry with compressed air. Be sure all oil passages are free from sludge and sediment.

Check valve lever shaft, lever bushings, thrust washers, and spacer rings. Check bushings and valve lever shaft for scoring and out-of-round wear and replace, if necessary. Use a suitable drift punch and press plate and drive bushings out of valve levers.

Install new bushings. The new bushing must be flush with the two side faces (5) Illust. 7. Use a 3 mm = 1/8" drill to open the oil passage (4) in the bushing and remove chips and burrs. Ream the bushing to size, see "Specifications".

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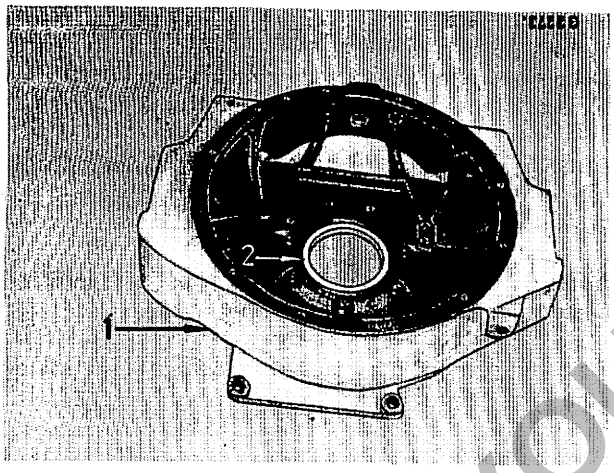
If the sealing face is undamaged use special tool (3) Illust. 97 to install the oil seal. To offset the oil seal as shown in section "B" Illust. 96 place the thinner ring (4) Illust. 97 on the tool and press the oil seal in. For offsetting as shown in section "C" place the thicker ring (5) on the tool (3) and press the oil seal in.

Note: When offsetting always use a new seal.

Install the seal with its open side toward the engine.

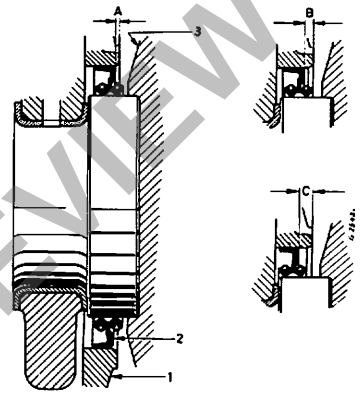
Keep the outer case of the seal dry when the seal is pressed in.

When in place the seal must be at right angles to the crankshaft otherwise oil leakage may develop.



Illust. 98

1 – Flywheel housing, displaced design
2 – Oil seal, outer DIA 130 mm (5.118 inch)



Illust. 99
Oil seal installed in flywheel housing

A – First location = 1.5 mm (.059 in.)
B – Second location = 3.5 mm (.138 in.)
C – Third location = 5.5 mm (.217 in.)

1 – Flywheel housing present design
2 – Double lip oil seal, outer DIA 140 mm (5.512 in.)
3 – Flywheel

Installation tools, and offsetting stages of the oil seal (2) Illust. 98 are the same as for the oil seal shown in Illust. 96.

When renewing the seal be certain its main lip is toward the engine, i. e. the dust lip must be installed toward the flywheel.

For installation and offsetting the oil seal (2) Illust. 99 use the respective tool and spacer rings available for this purpose.

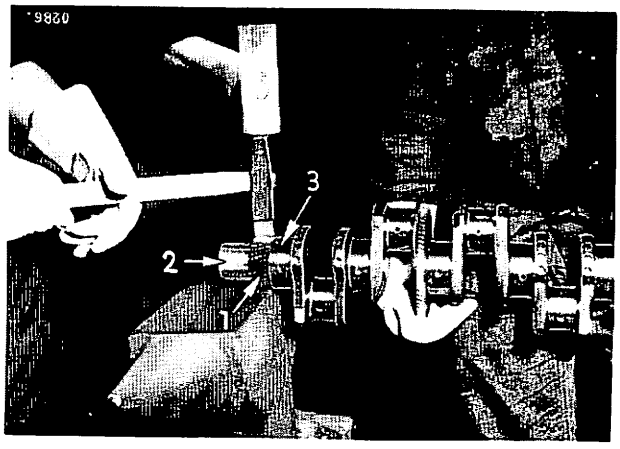
Install the seal with its open side toward the engine.

Keep the outer case of the seal dry when the seal is pressed in.

Crankshaft Pinion

Check crankshaft pinion for wear and chipping. If damaged replace the pinion as follows:

Remove spacer ring (12) Illust. 83 and O-ring (11) from crankshaft front end.



Illust. 100

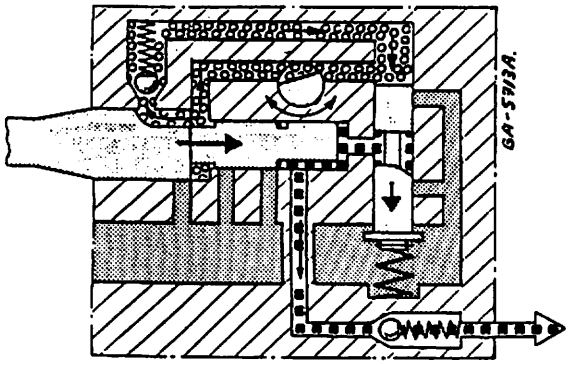
1 – Crankshaft pinion
2 – Finished surface
3 – Main bearing journal

Place the crankshaft pinion on an anvil and holdt it in position, Illust. 100. The bearing journal (3) must not touch the anvil edge.

Slide a metal sleeve over the finished surface (2) to protect it from damage. Wrap a rag around the chisel to catch any possible chippings.

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Fuel Delivery

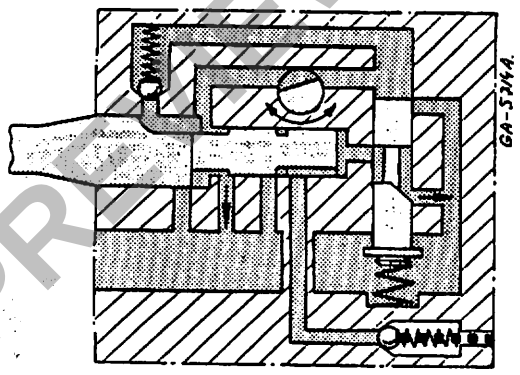


Illust. 4

a) On the injection stroke, fuel in the injection circuit (27) Illust. 3 is pressurized and directed by the distributing groove through the various outlet ports to the individual delivery valves (9).

b) Fuel in the governing circuit (26) is also pressurized and directed via throttle (4) and check valve (19) behind the control plunger (16) and forces the latter against control plunger spring (21). See also Illust. 4.

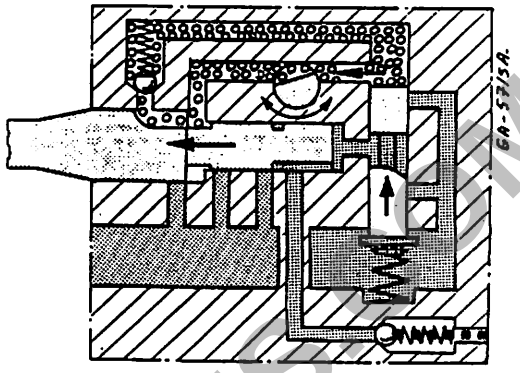
End of Fuel Delivery



Illust. 5

The end of fuel delivery is reached as soon as helix (28) Illust. 3 of the control plunger clears the spill port (18). See also Illust. 5.

Return Stroke

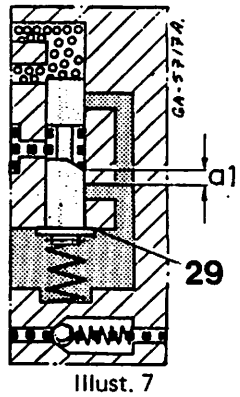


Illust. 6
Distributor plunger in TDC

On the plunger return stroke check valve (19) Illust. 3 and delivery valve (9) are closed.

Control plunger spring (21) forces control plunger (16) against its mechanical stop (29) displacing governor circuit fuel via throttle (4). See also Illust. 6.

Max. Torque



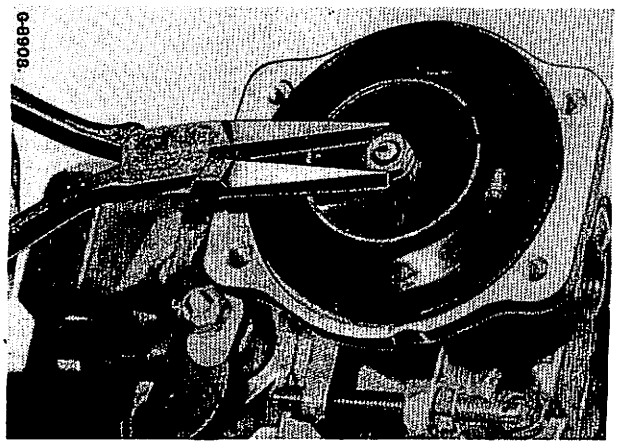
Illust. 7

a1 – Control plunger travel at max. torque
29 – Mechanical stop

At maximum torque the control plunger is using its full stroke (a1) Illust. 7 returning to its mechanical stop (29) every time.

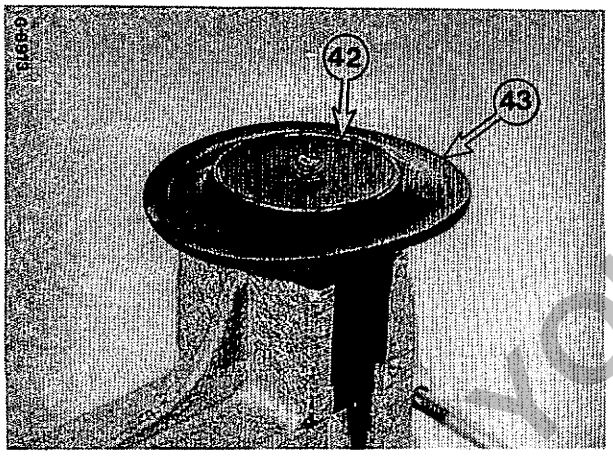
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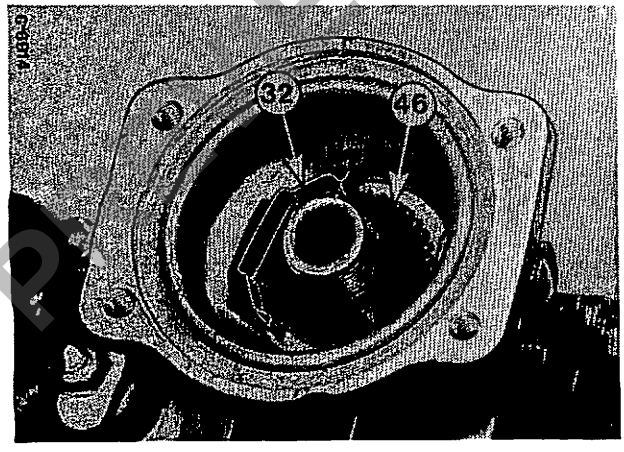
Illust. 77

Remove the diaphragm with control shaft (41), Illust. 77.



Illust. 78

Clamp the control shaft (41) in a vise equipped with hard rubber jaws.

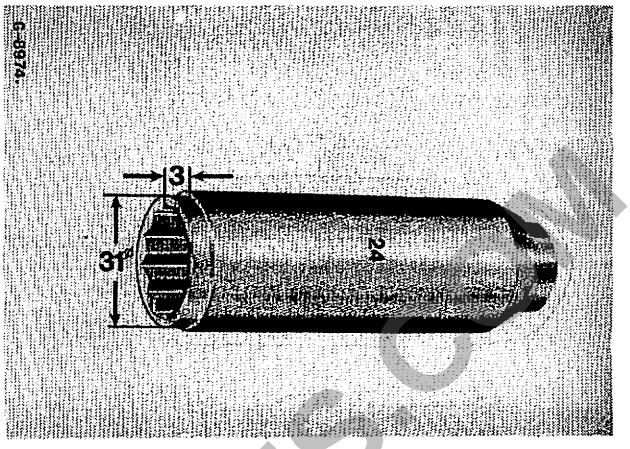


Illust. 79

Remove nut (45), lock washer (44), retainer washer (42) and diaphragm (43) Illust. 78.

Remove ... ...et nut (46) Illust. 79.

Loosen hexagon nut (33). To do so modify a 24 mm socket as shown in Illust. 80.



Illust. 80

Screw out pilot sleeve (31).

Remove lock spring (32) and nut (33) from the pilot sleeve.

Remove breather screw (60).

Using the screw driver bit KDEP 1090 loosen the threaded tension washer (35).

Do not remove this washer now.
Remove the aneroid housing from the pump housing.
Lift control lever (56) out of the pump housing.
Remove tension washer (35).
Using puller tool KDEP 1104 remove bushing (37).
Remove gasket (38).

If necessary remove throttle lever and shut-off lever assembly.

Back-off full load adjusting screw (88).

Inspection

Inspect the diaphragm for any sign of wear, fatigue and/or leaks.

Inspect pilot sleeve and all moving parts for wear.

Replace worn parts with new ones.

Replace O-rings and gaskets with new ones.

Reassembly and Adjustment

Install the aneroid housing temporarily.

With the cross hole side (arrow Illust. 81) ahead screw pilot sleeve (31) into the housing until dimension (B) = 7 to 8 mm is obtained Illust. 82.

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Engine: D–179 *Application: 454 HS, 464 HS/GD, 240A HS/TC, 2400A HS, 2454 HS, 3400A HS/GD (U.S.), 4500B TC, 506*

Injection Pump: EP/VA3/100H 1200 CR 61 (3 144 403 R91)

Pump speed		1/2 engine speed
Engine speed:		
low idle	1/min	700 – 800
high idle	1/min	2710
rated load	1/min	2400
minimum overload	1/min	1600
Rated power at rated load speed	kW	39
Max. torque at minimum overload speed	daNm	18.5
Torque rise	%	
Static timing – engine	degrees BTDC	14
Start to advance – engine speed	1/min	650
Total advance – engine	degrees BTDC	27.9
Pump advance at minimum overload speed	mm	3.1
Full pump advance at rated load speed	mm	6.3
Charging pump pressure at:		
low idle	kPa	248
minimum overload speed	kPa	448
rated load speed	kPa	675
Max. permissible vacuum at inlet side of pump	kPa	– 20
Fuel rator specifications:		
Fuel consumption at:		
rated load speed	kg/h	9.7
time	s/l	314
100/min below rated speed	kg/h	9.3
time	s/l	328
minimum overload speed	kg/h	6.9
time	s/l	440
Turbocharger, boost pressure at rated speed	kPa	

Engine power, fuel consumption and charging pump pressure ± 3 %

(NEZG 2835)

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Flow Bench Test Specifications

Engine: *D–239* *Rated Speed: 2400 RPM* *Application:* *674 G.D., 574 H.S., 2500 A H.S., 3500 A G.D., 3500 A H.S. (U.S.), 250 A H.S./T.C., 2574 H.S.*				
Injection Pump	IHC–No.		Bosch–No.	
	3 144 496 R91		EP/VA4/100H 1200 CR 12-12	
Correction of Control Specifications acc. to "Bosch" Test Instruction VDT–WPP 161/4 or Pre-Adjusting Dimensions see "Bosch" Repair Manual VDT–WIP 161/4				
Plunger Lift to Port Closure	0.5 ± 0.02 (± 0.04) mm			
Static Timing	Alignment of the Pointer at 1 mm Plunger Stroke (ref. to Outlet 'A')			
1. Control Specifications	RPM		Delivery Difference cu.cm./1000 Strokes	
1.1 Injection Advance	800	2.9 – 3.9 mm		
1.2 Charging Pump Pressure	800	0.49 – 5.4 MPa (71–78 PSI)		
1.3 Full Load Delivery	800	68 – 69 cu.cm./1000 Strokes	2.5	
1.4 Idler-Governor Run-Out	350	13 – 19 "	3	
1.5 Start	100	min. 85 "	Opening P. 20 MPa (2840 PSI)	
1.6 End-Governor Run-Out	1250	31 – 39 "		
2. Check Data and in Brackets (Re-check Data)				
2.1 Injection Advance	RPM	250–400 (220–430)	800	1000-1150 (970-1180)
	mm	Begin	(2.6–4.2)	End (4.7–5.4)
2.2 Charging Pump Pressure	RPM	200	800	1200
	MPa	0.17-0.22 (0.15-0.24)	(0.47–0.56)	0.63-0.68 (0.61-0.70)
	PSI	24.6-32 (21.7-34.8)	(68–81)	91-98.6 (88-101.5)
2.3 Feed Quantity				
Speed Lever End Position	Feed Lever Full	RPM	cu.cm/1000 Strokes	Overflow Quantity cu.cm/10 sec.
		1270 – 1320 (1255 – 1335)	10	
		1250	(30–40)	
		1180	70–73 (69.5–73.5)	
		800	67.5–69.5	55–100 (40–110)
		500	68.5–72.5 (67.5–73.5)	
	Stop	1200	0	
Idling Position	Full	550 – 600 (530 – 620)	0	
		350	(11 – 21)	
	Start	100	min. 85	Opening P. 20 MPa
		220 (200)	min. 85	
		340 (360)	max. 60	

1: Shim Thickness under advance piston spring 1.8 mm
2: Pre-load length of governor spring 24.6 mm

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Fuel Rator Test Specifications

Engine: D–358 *Application: 1046*

Injection Pump "Bosch" EP/VA6/100H 1050 CR 81 (3 144 077 R91)

Pump speed	1/2 engine speed
Low idle speed – engine	650 – 750
High idle speed – engine	max. 2320
Rated load speed – engine	2100
Minimum overload speed – engine	1600
Max. torque daNm (ft.lbs) at 1600 engine rpm	35.47 (257)
Rated kW (HP) at engine rated load speed	71.2 (95.5)

Timing Advance

Static timing – engine, degrees BTDC	16
Total advance – engine, degrees BTDC	28
Start to advance – engine rpm	800
Pump advance at minimum overload engine speed (travel of advance piston) mm (inch)	4.2 (.165)
Full pump advance (travel of advance piston) mm (inch)	5.4 (.213)
Plunger lift to port closure mm (inch)	0.3 ± 0.02 (.012 ± .0008)

Charging Pump Pressure, at:

Low idle, MPa (PSI)	0.37 – 0.42 (53 – 60)
Minimum overload speed, MPa (PSI)	0.55 – 0.62 (79 – 89)
Rated load speed, MPa (PSI)	0.63 – 0.70 (90 – 100)
Max. permissible vacuum at inlet side of pump kPa (PSI)	20 (2.9)

Fuel Rator Specifications

Maximum fuel at rated load speed kg/h (lbs/hr)	18.78 (41.4)
Minimum time sec/1000 ccm (sec/qt) *	161 (152)
Fuel at 2000 rpm engine speed kg/h (lbs/hr)	16.78 (37.0)
Minimum time sec/1000 ccm (sec/qt) *	180 (170)
Fuel at minimum overload speed kg/h (lbs/hr)	14.42 (31.8)
Minimum time sec/1000 ccm (sec/qt) *	208 (197)
Fuel temperature at overflow line °C (°F)	49 – 54 (120 – 130)

* US qt

Engine power, fuel consumption and charging pump pressure ± 3 %

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Flow Bench Test Specifications

Engine:	*D–358*		*Rated Speed: 3000 RPM*	
Application:	*1) 1630A/1730A/1830A (xxx–)*			
	2) T.O.E./ACCO 1820, Series 200 Atkinson			
Injection Pump	IHC–No.		Bosch–No.	
	1) 3 218 230 R91		EP/VA6/100H 1500 CR 189	
	2) 3 144 048 R91		EP/VA6/100H 1500 CR 19-4	
Correction of Control Specifications acc. to "Bosch" Test Instruction VDT–WPP 161/4 or Pre-Adjusting Dimensions see "Bosch" Repair Manual VDT–WIP 161/4				
Plunger Lift to Port Closure	0.4 ± 0.02 (± 0.04) mm			
Static Timing	Alignment of the Pointer at 1 mm Plunger Stroke (ref. to Outlet 'A')			
1. Control Specifications	RPM		Delivery Difference cu.cm./1000 Strokes	
1.1 Injection Advance	1000	4.7-5.7 mm		
1.2 Charging Pump Pressure	1000	0.59-0.64 MPa (84-91 PSI)		
1.3 Full Load Delivery	800	71 -72 cu.cm. / 1000 Strokes	2.5	
1.4 Idler-Governor Run-Out	250	22 -28 "	3	
1.5 Start	100	min. 70 "	Opening P. 20 MPa (2840 PSI)	
1.6 End-Governor Run-Out	1600	25 -33 "		
2. Check Data and in Brackets (Re-check Data)				
2.1 Injection Advance	RPM	220-370 (190-400)	1000	1300-1450(1270-1480)
	mm	Begin	(4.4-6)	End (6.9-7.6)
2.2 Charging Pump Pressure	RPM	200	1000	1500
	MPa	0.2-0.25 (0.18-0.27)	(0.57-0.66)	0.74-0.79(0.72-0.81)
	PSI	28-36 (26-38)	(81-94)	105-112 (102-115)
2.3 Feed Quantity				
Speed Lever End-Position	Feed Lever Full	RPM	cu.cm./1000 Strokes	Overflow Quantity cu.cm./10 sec.
		1620-1670 / (1605-1685)	10	
		1600	(24-34)	
		1400	71.5-74.5 (71-75)	
		1200	75-77 (74.5-77.5)	55-100 (40-110)
		800	(70.5-72.5)	
		500	63.5-67.5(62.5-68.5)	
	Stop	1500	0	
Idling Position	Full	370-420 / (350-440)	0	
		250	(20-30)	
	Start	100	min. 70	Opening Pressure 20 MPa
		220 (200)	min. 70	
		340 (360)	max. 60	

1: Shim thickness under advance piston spring 2.0 mm
2: Pre-load length of governor spring 24.6 mm

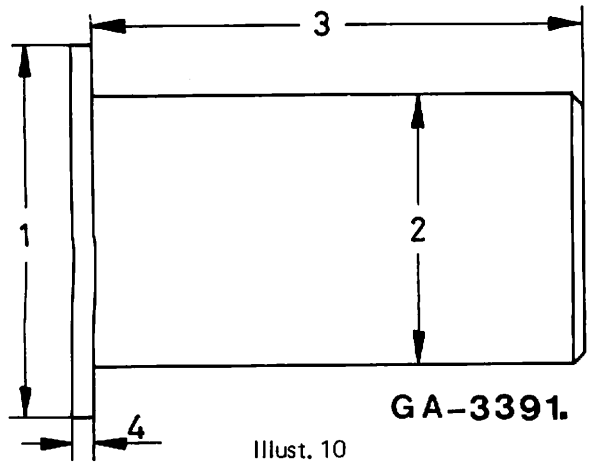
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Unsolder the coil connections. Unscrew the fixing screws and separate pole shoes and coil.

Fit the new field coils over the pole shoes and place them in position inside the yoke.

Locate the pole shoes by lightly tightening the fixing screws.

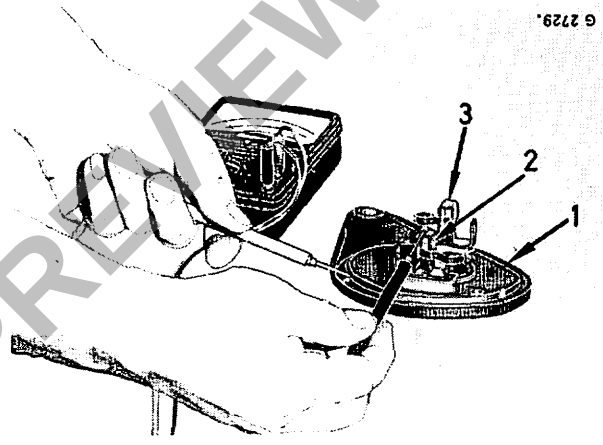


Illust. 10
Shaft for pole shoe mounting

1– Outer yoke diameter
2– Armature diameter +0.35–0.40 mm =.014–.016"
3– Yoke length
4– 5 mm = 3/16"

For proper alignment, slide the shaft Illust. 10 into the yoke. Tighten the pole shoe screws fully and lock them by caulking.

Replace the insulation piece between field coil connection and yoke, the re-solder the connection.



Illust. 11
Testing brush guide insulation

1 – Commutator end bracket
2 – Insulated brush guide
3 – Earthed brush guide

Test the insulation of brush guide (2) Illust. 11 by means of an ohmmeter.

An "infinite" ohm reading indicates the insulation is in order.

Note: For this test, the end bracket must be free of brush dust and dry.

Replace the end bracket, if insulation is poor.

Polarizing the Generator

The Bosch DC generator has sufficient remanent magnetism and therfore needs no polarizing on new or replacement unit. However, if the unit has been disassembled and field coils are tested or replaced, polarize the generator as follows:

Install the generator and connect cables in accordance with the wiring diagram.

With V-belt off, bridge regulator terminals B+ and D+ with a jumper lead for one second.

The momentary surge through the generator will run the generator as a motor and polarize it.

Warning: Do not run the overhauled generator without polarizing it or the regulator will be damaged.

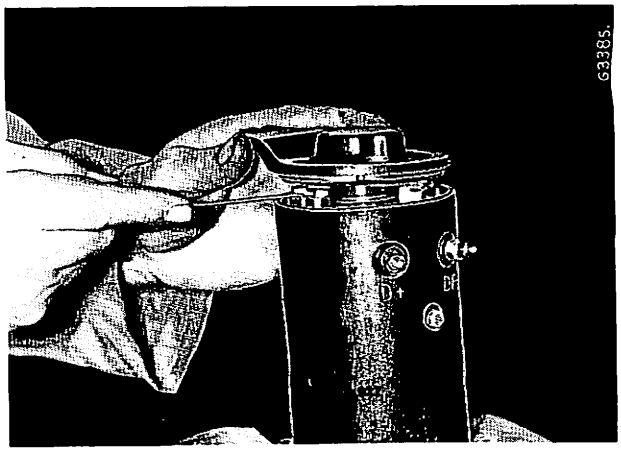
Assembly

Assembling the generator is a reversal of the dissasembling procedure.

The following points must be observed.

Observe strict cleanliness.

Be sure the locating tangs of the yoke engage in the recesses of both end brackets.



Illust. 11a
11 amps Generator
Installing commutator end bracket

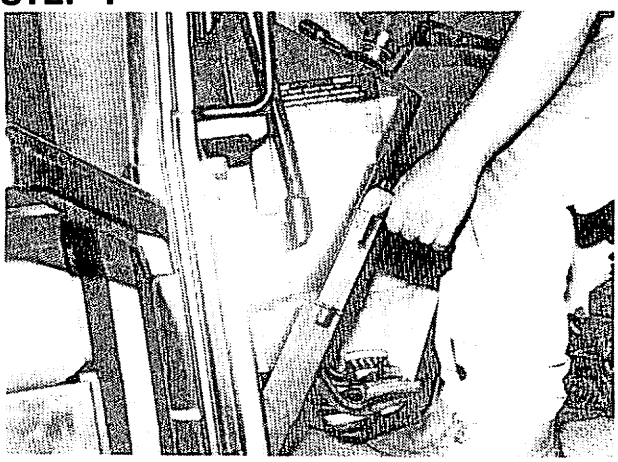
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STEERING CYLINDER
Removal and Disassembly

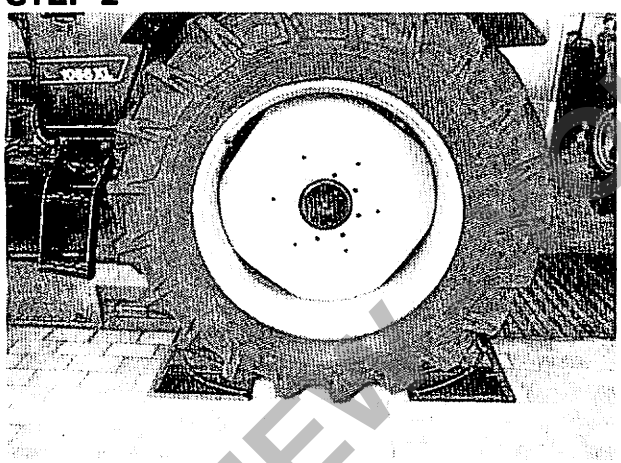
NOTE: *Some photographs show the axle removed from the tractor. It is not necessary to remove the axle to service the steering cylinder.*

STEP 1



Apply the parking brake.

STEP 2



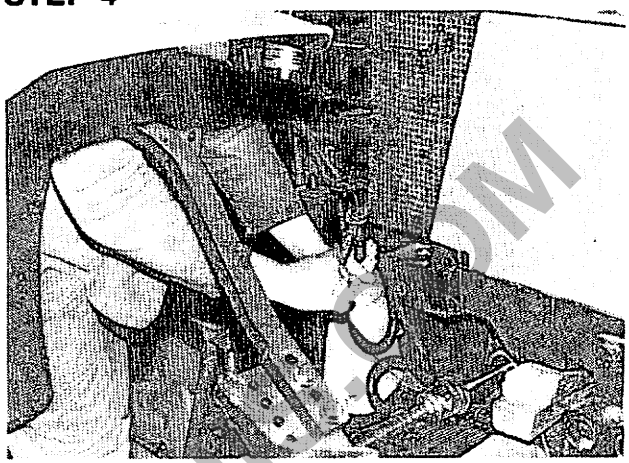
Put blocks in front of and behind the rear wheels.

STEP 3



Disconnect the steering hoses, one hose at the top coupling and the other hose at the bottom.

STEP 4



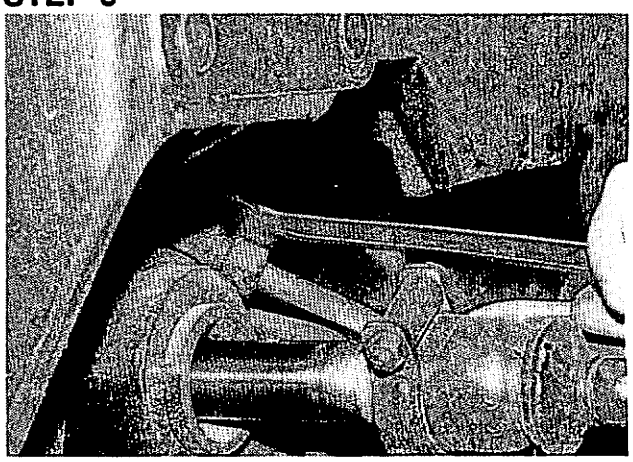
Short circuit the hoses to prevent the ingress of dirt and loss of oil.

STEP 5



Remove the steering pipe clamp.

STEP 6



Remove the right side steering line and cap the port.

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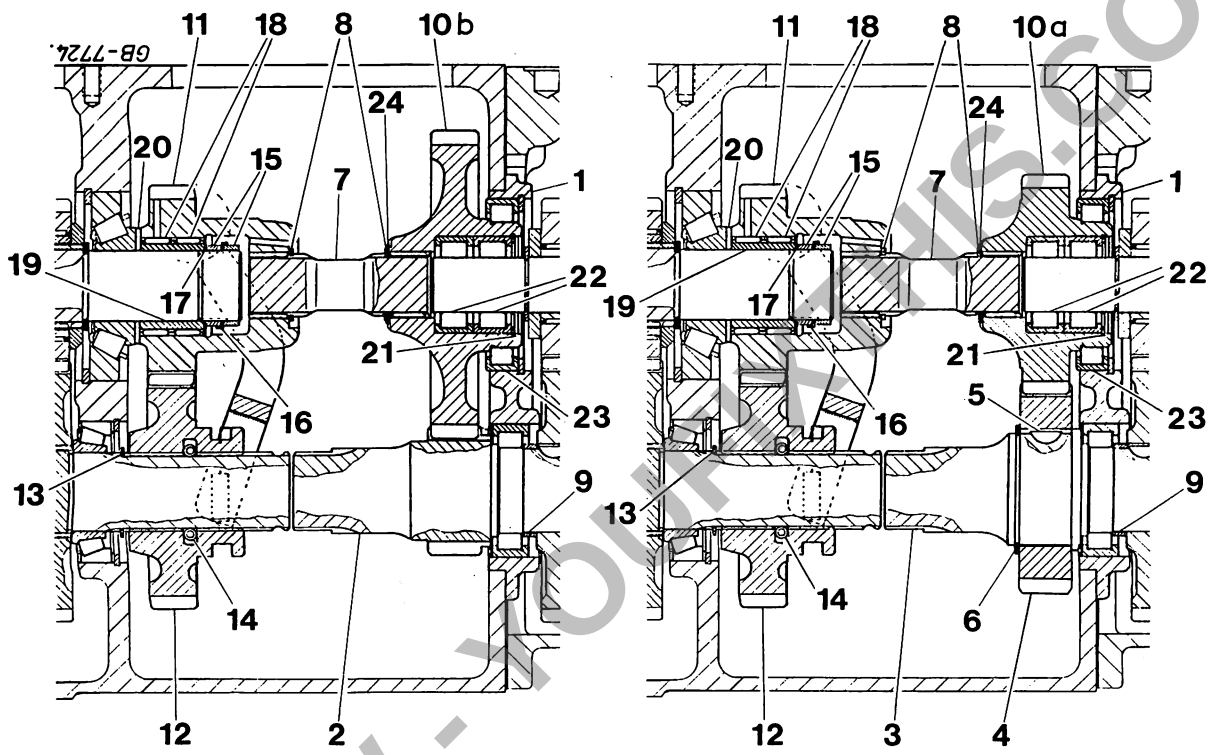
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SPEED REDUCER (NON SYNCHRONISED)

GENERAL

If equipped with speed reducer, some transmission shafts and their bearings are different from the other transmission versions.

When replacing parts therefore take particular care to observe details given in the parts catalogue.



Illust. 100

70% Reduction

20% Reduction 955/1055 (-C2726) G

The Legend of Illustrations in this section shows above reference numbers in brackets () for easy reference.

1-Bearing support cover
2-Countershaft (70% reduction)
3-Countershaft (20% reduction) with 4, 5 and 6
4-Gear, 34 teeth
5-Woodruff-key
6-Circlip
7-Idler shaft
8-Circlips
9-Spacer
10a-Gear, 35 teeth (20% reduction)
10b-Gear, 51 teeth (70% reduction)
11-Countershaft gear, 32 teeth
12-Countershaft gear, 38 teeth
13-Circlip
14-Locking spring
15-Locking and adjusting nuts
16-Lock washer
17-Washer
18-Needle bearing
19-Bushing
20-Thrust washer
21-Circlip
22-Roller bearings
23-Roller bearings
24-Shim

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Section
6635

MECHANICAL FRONT DRIVE, TRANSFER GEARBOX

"B" Family Tractors
743, 745, 844, 845, 743XL, 745XL, 844XL, 845XL and 856XL

"C" Family Tractors
956, 1056, 956XL and 1056XL

IMPORTANT: *Transfer Gearboxes referred to in this section were made using the metric system. All measurements and checks must be made with metric tools to make sure of an accurate reading when inspecting parts.*

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J I Case
A Tenneco Company

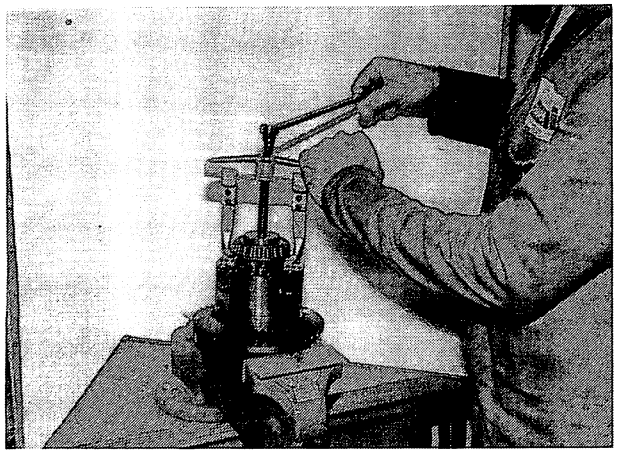
TENNECO

Don 8-57320

Printed in England
November 1987

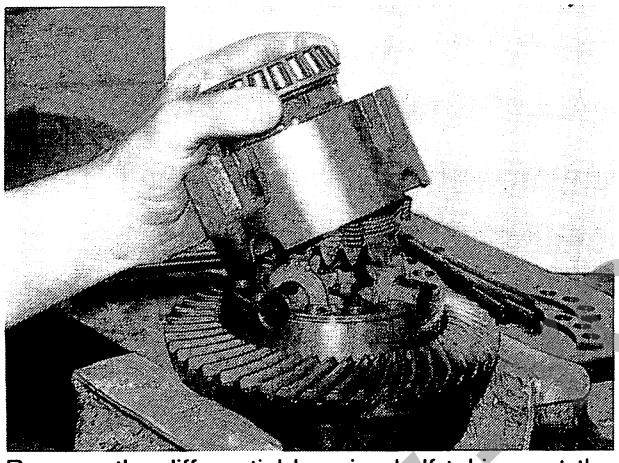
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STEP 16



Remove the roller bearing from the small end.

STEP 17



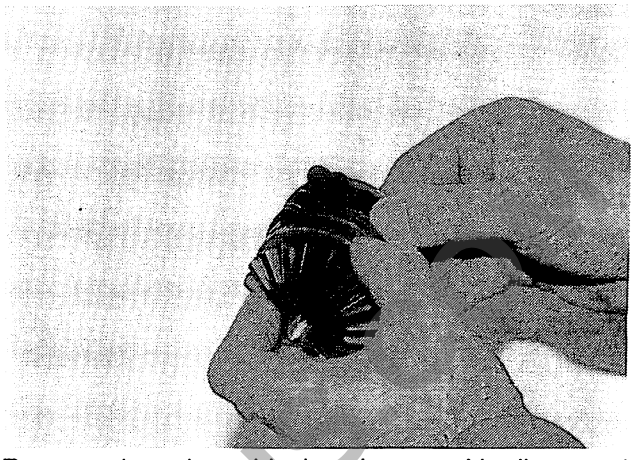
Remove the differential housing half taking out the side bevel gear, discs and end plate.

STEP 18



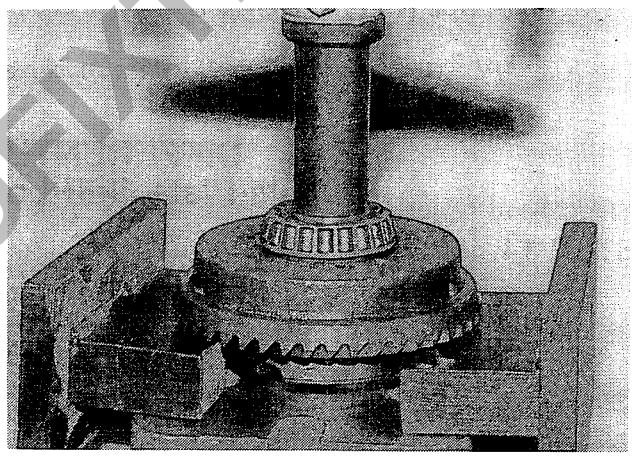
Remove the planetary pinions, thrust washers and spider shafts.

STEP 19



Remove the other side bevel gear with discs and end plate.

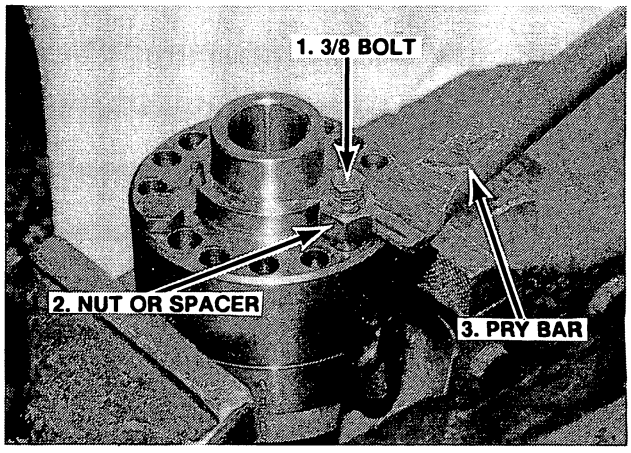
STEP 20



Use a press to remove the bevel gear and bearing.

NOTE: *The bearing at the bevel gear side will be damaged if removed. Bearing removal is only necessary when the bevel gear is replaced. Install a new bearing if the bevel gear is replaced.*

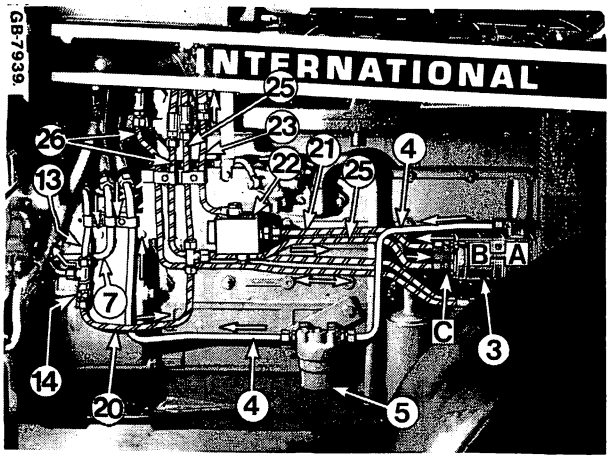
STEP 21



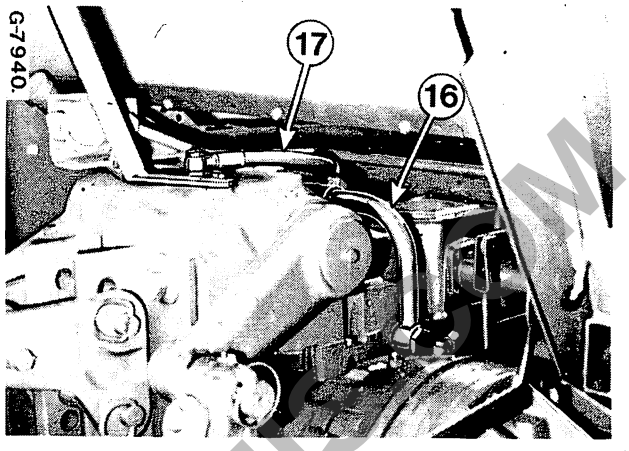
Remove the roll pins if necessary.

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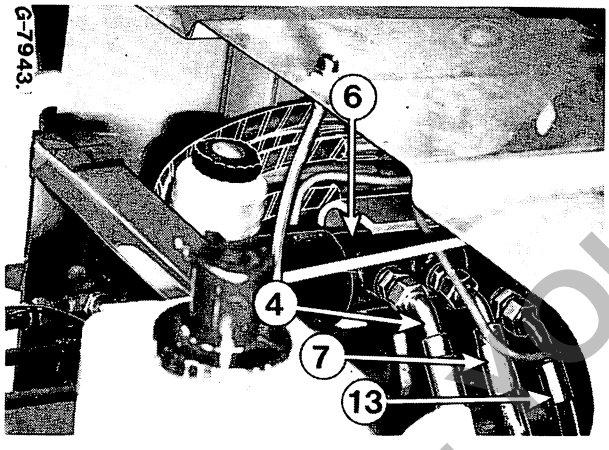
Hydraulic System



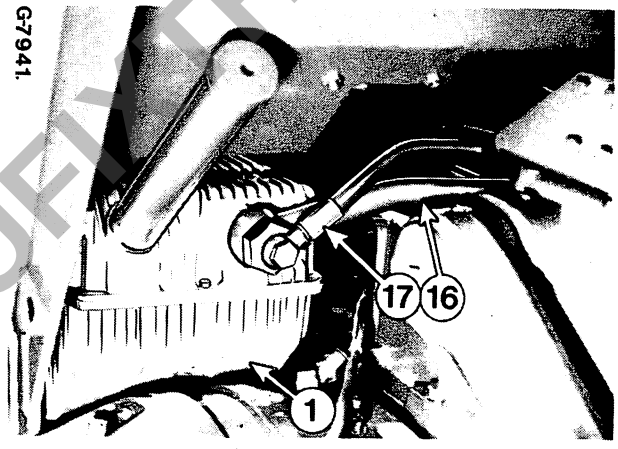
Illust. 2a



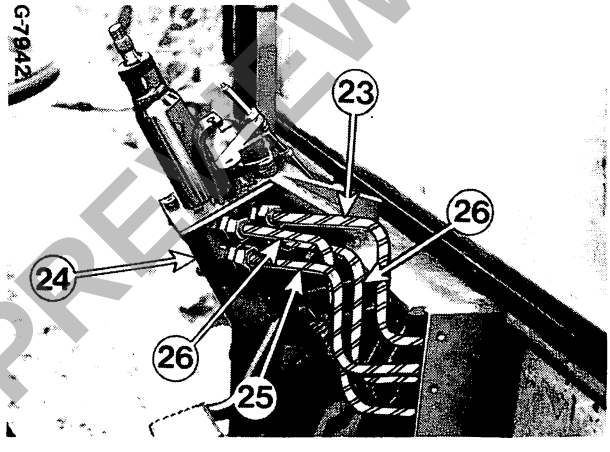
Illust. 2d



Illust. 2b



Illust. 2e



Illust. 2c

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Use only genuine replacement parts with the

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in order that the machine may be maintained in first class operating condition. The use of any part other than the genuine engineered CASE IH part releases the Company from any guarantee.

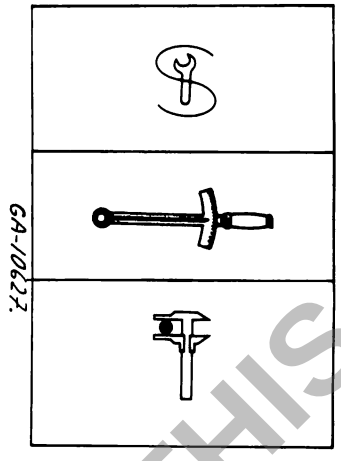
General

This manual covers such repairs and adjusting procedures influenced by the Control Center (Cab).

Repairs are grouped in relation to cab position, refer to General Service Guide, Illust. 4 – 6.

Symbols

The following symbols may appear on assembly drawings:



= Use special tool

= Special torque

= Check/Adjust

Tractor Models

For simplification of reference tractor models are combined in "Families" as follows:

743 – 745 – 844 XL	=	"B–Fam."
955 – 1055 XL	=	"C–Fam."
1255 – 1455 XL	=	"D–Fam."

SI Measurements

A standard of measurement known as International System of Units (SI) has been adopted for world-wide use. These units are used throughout this manual.

SI Unit		*English Equivalent*
mm	– milimeter	0.039 inches
cm	– centimeter	0.39 inches
m	– meter	3.28 feet
cm^3	– cubic centimeter	0.06 cubic inches
m^3	– cubic meter	35.31 cubic feet
l	– liter	1.057 quarts
kg	– kilogram	2.205 pounds weight
kPa	– kilopascal	0.145 psi
MPa	– Megapascal	145 psi
N	– Newton	0.225 pounds force
daN	– dekanewton	2.25 pounds force
Nm	– Newton meter	0.738 foot pounds force
daNm	– dekanewton meter	7.38 foot pounds force
°C	– degrees-Celsius	°Fahrenheit = 1.8 x °C + 32
kW	– kilowatt	1.34 horsepower
l/min	– liter/minute	0.219 gallons per minute
km/h	– kilometer/hour	0.621 miles per hour
1/min		rpm

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FLOOR MATS AND SEALS "D–FAM."

Illust. 75

1 – Floor mat
2/3– Insulating plates, self – sealing
4 – Floor mat lining
5 – Seat carrier mat
6 – Insulating plate
7 – Covering, rear wall
8* – Seal
9 – Insualting plate, steering carrier
11 – Grommet, differential lock
12* – Sealing frame
13 – Boot, speed - and range shifting
14 – Grommet, lowering control
15 – Grommet, hand brake
16 – Grommet, Pto shifting
17 – Insulating frame
18 – Plastic cap
19 – Insulating plate
F – Moisture drain holes DO NOT cement.
G – Inner cementing

Note: If cementing (G) has been removed, re-cement with black silicon.

*) prior to installation, lubricate lightly.

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