WORKSHOP MANUAL

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RUBIN 120
RUBIN 135
RUBIN 150

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SECTION 10

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SAFETY NOTES

To ensure that machines entrusted to Authorised Service Centres for repair or overhaul continue to function correctly, it is very important that all repair work is carried out in the prescribed manner.

The procedures for checks and repairs indicated in this manual are safe and effective.

Some of the operations described require the use of special tools and equipment: these tools have been designed for a specific purpose and may ordered directly from the Manufacturers.

DO NOT USE MAKESHIFT TOOLS; not only is there is risk of personal injury, but such tools are rarely suited to the purpose for which they are used.

To prevent injury to operators, the symbols ⚠ and ⚠ are used in this manual to indicate the safety precautions required. The warnings accompanying these symbols must always be adhered to carefully.

In potentially hazardous situations, always give priority to personal safety and take the necessary actions to eliminate the danger.

GENERAL SAFETY RULES

1 - Even if you have a thorough knowledge of the machine as regards its components, operation and controls, always take particular care when carrying out the following operations. Remember that the machine you are working on is in need of repair or overhaul and consequently may not always behave as expected.

2 - Before starting work, clean the machine thoroughly to remove all mud, dust and road dirt.
Also clean the cab to remove all traces of oil, snow and ice from the access steps and grab rails.

3 - When climbing up to or down from the cab, always ensure you maintain three points of contact at a time (foot or handholds) in order to keep your balance and prevent accidental falls.

4 - Always take special care when carrying out fault diagnosis operations; these operations often require two persons, who must never stand in front of the wheels when the engine is running.

5 - When carrying out checks and repairs, wear close-fitting clothing, safety goggles and protective gloves that are suitable for the task (cleaning, draining fluids, repairs).
When working near moving parts, long hair should be gathered up and secured safely under a cap to prevent the risk of entanglement and sever injury.

6 - Do not allow anyone who is not directly involved in the work to come near the machine; ensure that they remain at a safe distance.

7 - Keep well clear of moving parts; when the engine is running, some moving parts are not easily visible and therefore present a risk of entanglement, even if protected by safety guards.

8 - Ensure that the area is well ventilated before starting the engine in order to avoid the formation of dangerous concentrations of toxic gases; always connect suitable fume extraction equipment to the exhaust pipe.

9 - Under no circumstances start the engine with the safety guards removed; all repair and adjustment operations must be carried out with the engine stopped.

10 - Do not top up fuel, oil or coolant levels when the engine is running.

11 - Never smoke and ensure there are no naked flames nearby when topping up fuel or oil.
Always remove the battery from the machine before recharging.

12 - Before checking or removing the battery, stop the engine and remove the key from the starter switch.

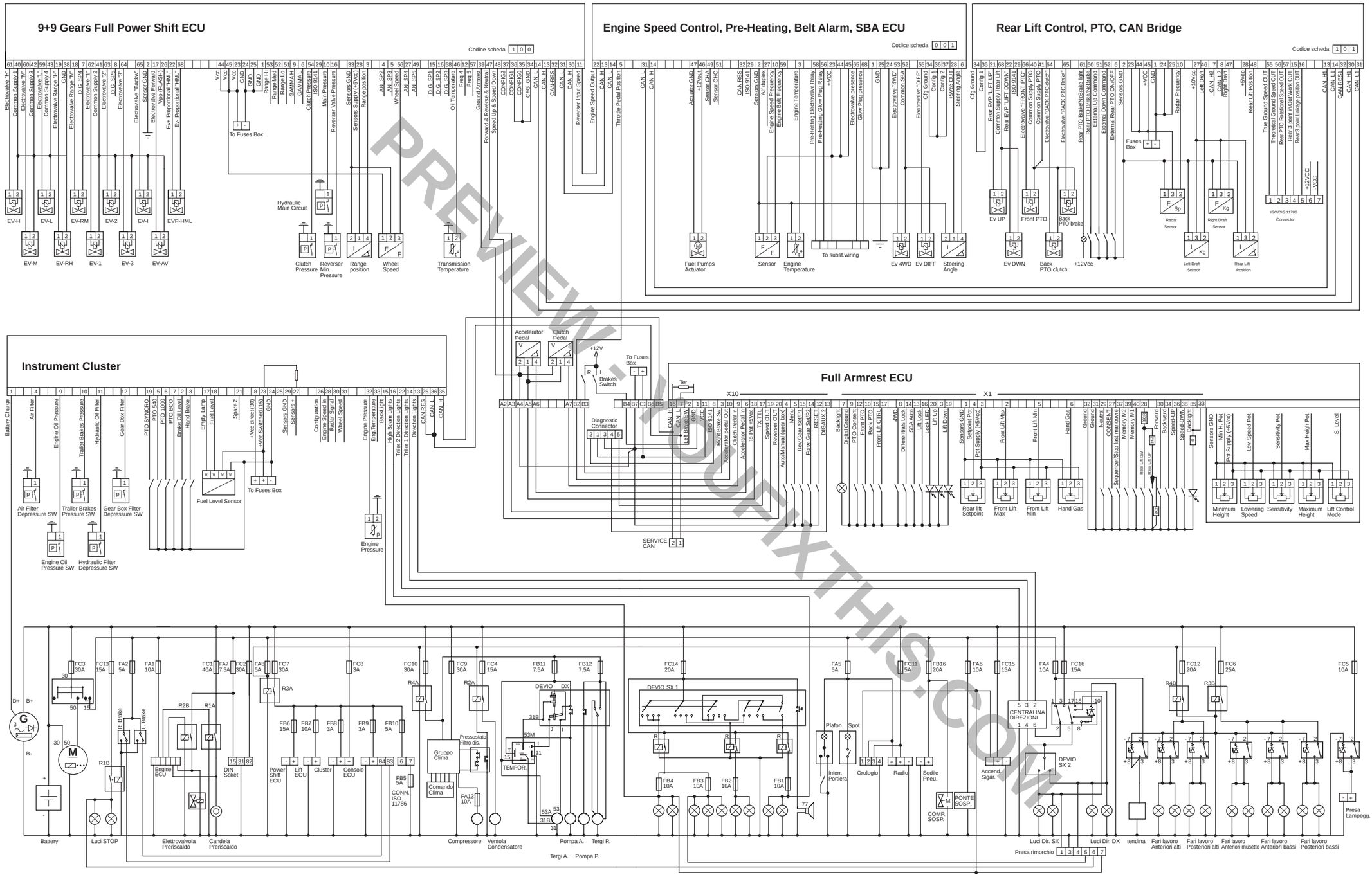
13 - Remove the battery and recharge in a well-ventilated area where the temperature exceeds 0°C.

14 - When checking or recharging the battery, do not smoke or allow naked flames in the vicinity as the hydrogen gas given off by the battery is highly explosive.

15 - The liquid (electrolyte) contained in the battery is very harmful if it comes into contact with the skin and the eyes; for this reason, always wear gloves and safety goggles with side shields when checking or topping up the battery.
Should any electrolyte accidentally come into contact with your skin, wash the affected parts immediately with copious amounts of water. If electrolyte comes into contact with your clothing, this should be removed as soon as possible.

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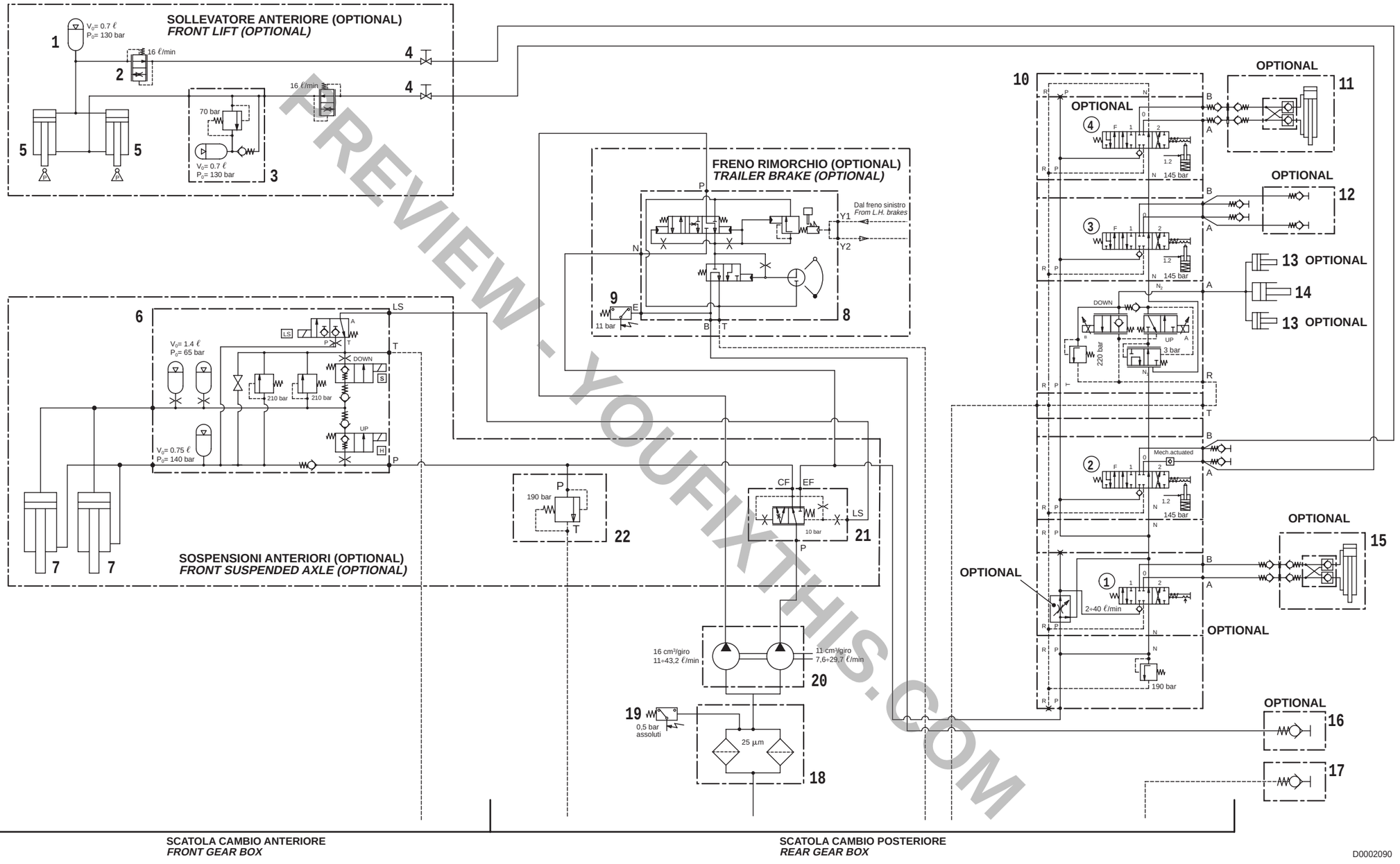
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OPEN CENTRE HYDRAULIC DIAGRAM (1/3)

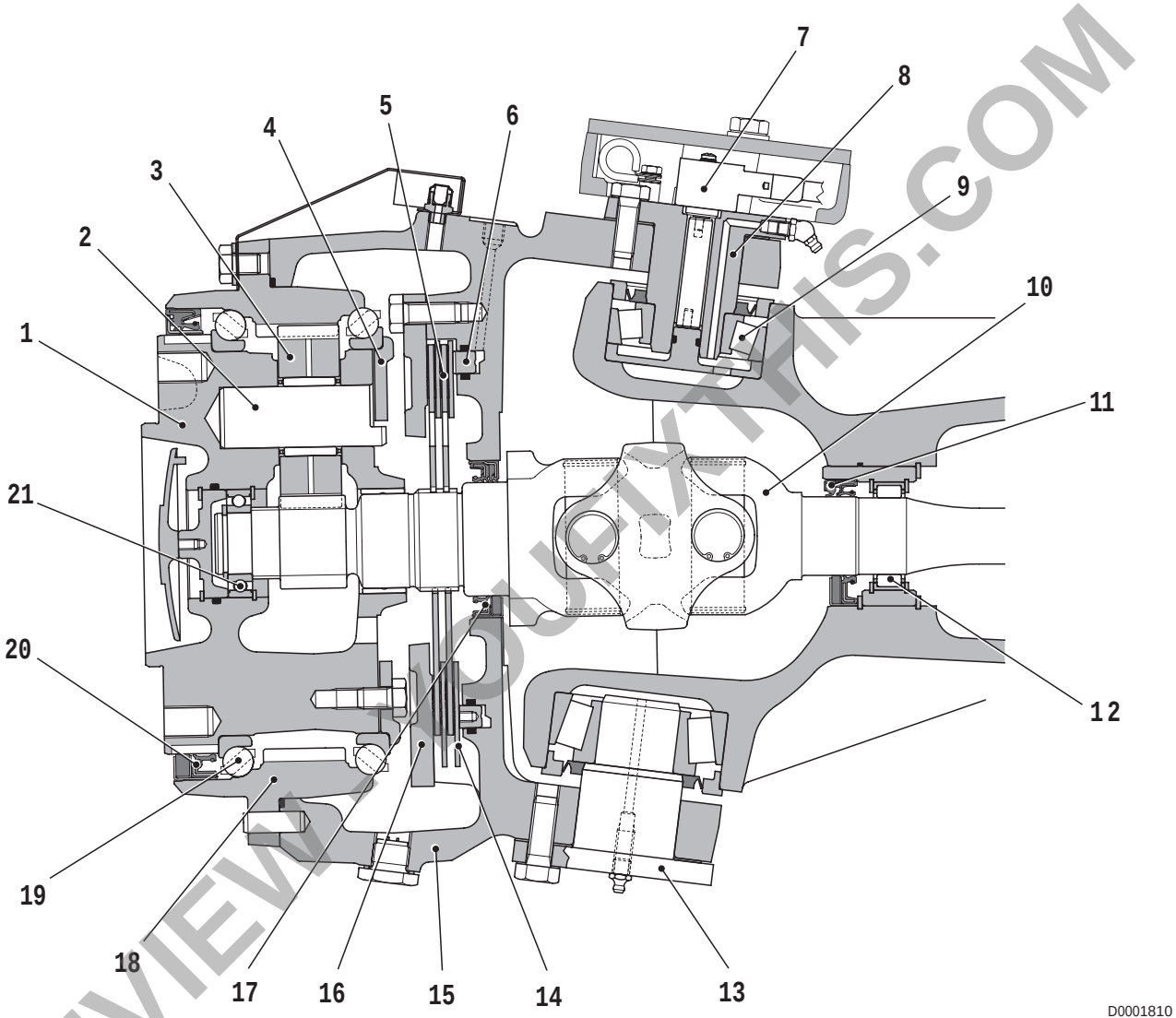


1 - Accumulatore
2 - Regolatore di flusso
3 - Dispositivo ammortizzatore
4 - Rubinetti esclusione sollevatore anteriore
5 - Cilindri sollevatore anteriore
6 - Gruppo distributore sospensione anteriore
7 - Cilindri sospensione assale anteriore
8 - Valvola di frenatura rimorchio
9 - Pressostato NC
10 - Distributore servizi ausiliari
11 - Cilindro tirante idraulico
12 - Innesti rapidi anteriori
13 - Cilindri ausiliari sollevatore
14 - Cilindro sollevatore
15 - Cilindro 3° punto idraulico
16 - Innesto rapido freno rimorchio
17 - Innesto rapido scarico libero
18 - Gruppo filtri
19 - Sensore di intasamento filtro
20 - Pompa doppia
21 - Valvola prioritaria
22 - Valvola di massima

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FRONT AXLE

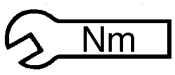
1. HUB CARRIER AND FINAL REDUCTION UNIT



1. Planet carrier
2. Pin
3. Planet pinion
4. Flange
5. Brake disc
6. Brake piston
7. Steering sensor
8. Upper kingpin
9. Taper roller bearing
10. Half-shaft
11. Oil seal
12. Roller cage
13. Lower kingpin
14. Plain disc
15. Hub carrier
16. Oil seal
17. Flange
18. Ring gear
19. Ball cage
20. Oil seal
21. Bearing
22. Roller cage

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STANDARD TIGHTENING TORQUES FOR NUTS AND BOLTS



⚠ The tightening torques for certain specific components and special tightening methods are indicated in the relative assembly paragraphs.

★ The tightening torques indicated below refer to bolts and nuts assembled without lubrication and, where applicable, with anaerobic threadlocking compound.
The values apply to tightening on steel or cast iron components; for soft materials such as aluminium, copper, plastic, sheet metal or panels, the indicated tightening torques must be reduced by 50%.

BOLT SIZE		BOLT CLASS					
		8.8		10.9		12.9	
		Nm	lb.ft.	Nm	lb.ft.	Nm	lb.ft.
COARSE THREAD	M6x1	8.0 – 8.8	5.9 – 6.5	11.8 – 13.0	8.7 – 9.6	13.8 – 15.2	10.2 – 11.2
	M8x1.25	19.4 – 21.4	14.3 – 15.8	28.5 – 31.5	21.0 – 23.2	33.3 – 36.9	24.5 – 27.2
	M10x1.5	38.4 – 42.4	28.3 – 31.2	56.4 – 62.4	41.6 – 46.0	67.4 – 74.4	49.7 – 54.8
	M12x1.75	66.5 – 73.5	49.0 – 54.2	96.9 – 107	71.4 – 78.9	115 – 128	84.8 – 94.3
	M14x2	106 – 117	78.1 – 86.2	156 – 172	115.0 – 126.8	184 – 204	135.6 – 150.3
	M16x2	164 – 182	120.9 – 134.1	241 – 267	117.6 – 196.8	282 – 312	207.8 – 229.9
	M18x2.5	228 – 252	168.0 – 185.7	334 – 370	246.2 – 272.7	391 – 432	288.2 – 318.4
	M20x2.5	321 – 355	236.6 – 261.6	472 – 522	347.9 – 384.7	553 – 611	407.6 – 450.3
	M22x2.5	441 – 487	325.0 – 358.9	647 – 715	476.8 – 527.0	751 – 830	553.5 – 611.7
	M24x3	553 – 611	407.6 – 450.3	812 – 898	598.4 – 661.8	950 – 1050	700.2 – 773.9
	M27x3	816 – 902	601.4 – 664.8	1198 – 1324	882.9 – 975.8	1419 – 1569	1045.8 – 1156.4
FINE THREAD	M8x1	20.8 – 23.0	15.3 – 17.0	30.6 – 33.8	22.6 – 24.9	35.8 – 39.6	26.4 – 29.2
	M10x1.25	40.6 – 44.8	29.9 – 33.0	59.7 – 65.9	44.0 – 48.6	71.2 – 78.6	52.5 – 57.9
	M12x1.25	72.2 – 79.8	53.2 – 58.8	106 – 118	78.1 – 87.0	126 – 140	92.9 – 103.2
	M12x1.5	69.4 – 76.7	51.1 – 56.5	102 – 112	75.2 – 82.5	121 – 134	89.2 – 98.8
	M14x1.5	114 – 126	84.0 – 92.9	168 – 186	123.8 – 137.1	199 – 220	146.7 – 162.1
	M16x1.5	175 – 194	129 – 143	257 – 285	189.4 – 210.0	301 – 333	221.8 – 245.4
	M18x1.5	256 – 282	188.7 – 207.8	375 – 415	276.4 – 305.9	439 – 485	323.5 – 357.4
	M20x1.5	355 – 393	261.6 – 289.6	523 – 578	385.5 – 426.0	611 – 676	450.3 – 498.2
	M22x1.5	482 – 532	355.2 – 392.1	708 – 782	521.8 – 576.3	821 – 908	605.1 – 669.2
	M24x2	602 – 666	443.7 – 490.8	884 – 978	651.5 – 720.8	1035 – 1143	762.8 – 842.4

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LIST OF ENGINE ECU ALARM CODES

N°	Tester Message	Cause of fault - Remedy	Control unit action
1	OVERSPEED	• **Engine speed >3200 rpm** Restart the engine	Actuator control removed
2	ACTUATOR OPEN	• **Actuator not connected** • **Wiring fault** Check Pin [46], Pin [47]	Actuator not controlled
3	ACTUATOR SHOR.CIRC	• **Actuator faulty** • **Wiring fault** check Pin [46], Pin [47]	Actuator control removed
4	RPM Sen.n.c.	• **Pickup not connected** Check Pin [10]	Actuator control removed
5	RPM Sen.inter.	• **Pickup faulty** • **Poor contact** Check Pin [10]	Actuator control removed
6	Acc.Ped.sh.cir.	• **Short circuit of pedal potentiometer** • **Wiring fault** Check Pin [5]	When the CAN is not active, engine remains at idle speed; otherwise no effect ✻
7	Acc.Ped.n.c.	• **Pedal potentiometer not connected** • **Wiring fault** Check Pin [5]	When the CAN is not active, engine remains at idle speed; otherwise no effect ✻
8	Glowp.Rel. n.c.	• **Glowplug relay faulty (located in fuse holder)** • **No connection between the control unit (Pin [56]) and the relay**	Preheating inhibited
9	Glowplug n.c.	• **Glowplug not connected** • **No connection between the relay and glowplug** Check Pin [56] Pin [68]	Preheating inhibited ✻
10	Glowp.Rel. Faul.	• **Glowplug relay faulty** • **Wiring fault** • **No power to glowplug** Check fuse • **Shortcircuit of glowplug** Check Pin [56] Pin [68]	Preheating inhibited ✻
11	Preh.Rel.n.c.	• **Preheating solenoid relay faulty (located in fuseholder)** • **No connection between control unit (Pin [58]) and relay**	Preheating inhibited
12	Preh.Sol. n.c.	• **Preheating solenoid not connected** • **Wiring fault** Check Pin [58], Pin [65]	Preheating inhibited ✻
13	Prh.Sol.Re.C.fau	• **Preheating solenoid relay faulty** • **Wiring fault** • **No power to solenoid** Check fuse • **Short circuit of solenoid** Check Pin [58], Pin [65]	Preheating inhibited ✻

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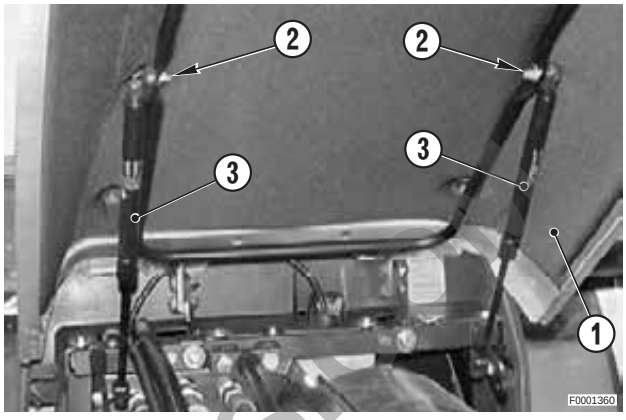
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REMOVAL AND ADJUSTMENT OF ENGINE HOOD, SIDE PANELS AND GRILLE

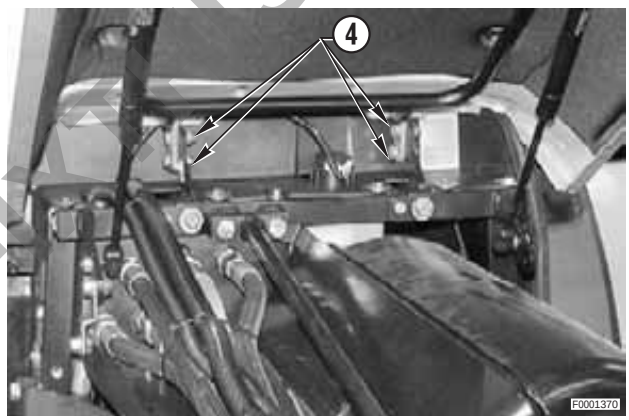
1. Removal of the upper hood

1 - Open the hood (1).

2 - While supporting the hood in the raised position, remove the pin screws (2) and detach the hood from the gas springs (3).



3 - Loosen and remove the hinge retaining screws (4) and remove the hood.



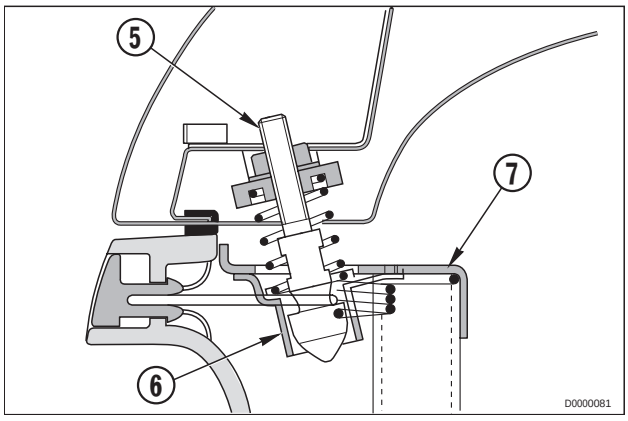
1.1 Refitting the engine hood

- Refit the hood following the removal operations in reverse order.

1.2 Adjustment of the hood catch.

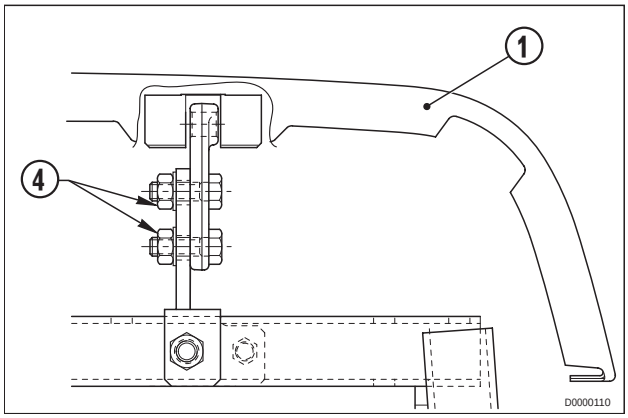
★ To adjust the catch, the front grille must be fitted and the gas springs disconnected.

1 - Close the hood and check that the striker (5) engages the centre of bush (6) in the front frame (7).



2 - If the striker (5) does not enter the bush (6) centrally, loosen nuts 4, move the hood and then re-tighten nuts (4).

Nm Nuts: 14.5 –16 Nm (10.7 – 11.8 lb.ft.)

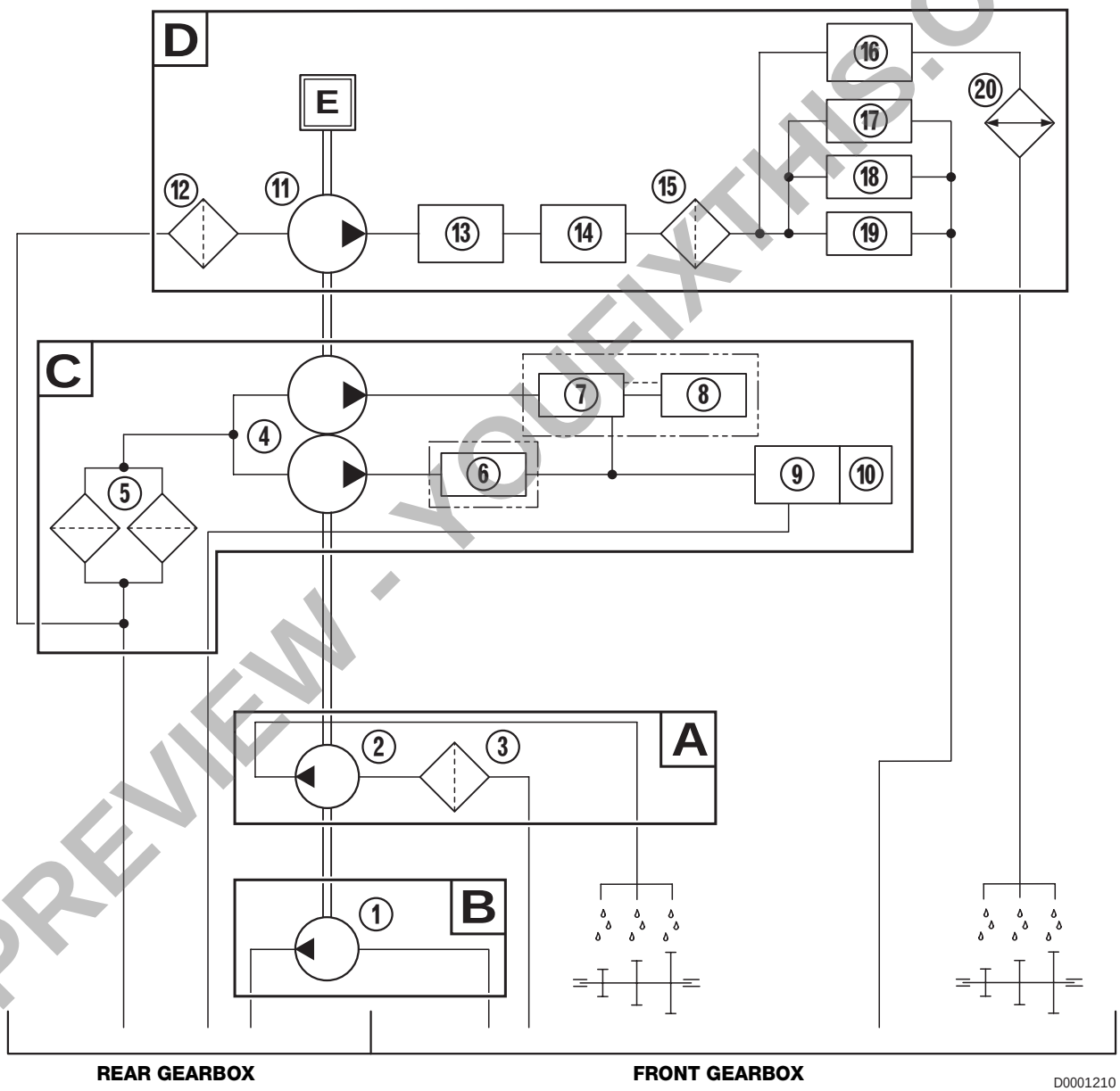


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OPEN CENTER (OC) HYDRAULIC SYSTEM

1. COMPONENTS

A Secondary shaft lubrication circuit
B Oil level maintenance circuit
C Auxiliary services circuit
D Steering and Power Shift control circuit



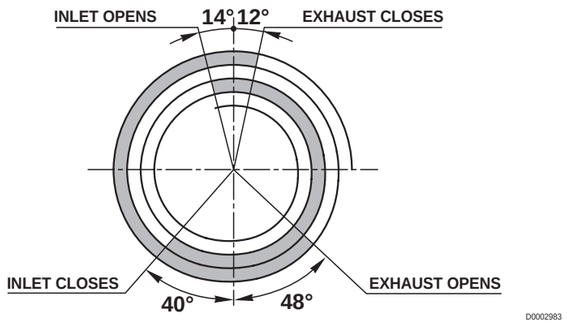
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ENGINE TECHNICAL DATA

TRACTOR MODEL		RUBIN		
		120	135	150
ENGINE	TYPE	1000.6 WT	1000.6 WT	1000.6 WTI
Configuration and type		4-stroke diesel, in-line, liquid-cooled		
Cylinders	N°	6	6	6
Valves per cylinder	N°	1 inlet / 1 exhaust		
Aspiration		Turbo	Turbo	Turbo and Intercooler
Boost pressure (2100 rpm)	bar (psi)	1.3 (18.8)	1.4 (20.3)	1.6 (23.2) (before intercooler) 1.5 (21.7) (after intercooler)
Bore	mm (in.)	105 (4.137)	105 (4.137)	105 (4.137)
Stroke	mm (in.)	115.5 (4.551)	115.5 (4.551)	115.5 (4.551)
Stroke-bore ratio		1.1	1.1	1.1
Total displacement	cm³ (ℓ)	6000 (6)	6000 (6)	6000 (6)
Cylinder swept volume	cm³ (ℓ)	1000 (1)	1000 (1)	1000 (1)
Compression ratio		16:1	16:1	16:1
Inlet valve opens / closes		14° ppms / 40° dpmi	14° ppms / 40° dpmi	14° ppms / 40° dpmi
Exhaust valve opens / closes		48° ppmi / 12° dpms	48° ppmi / 12° dpms	48° ppmi / 12° dpms
Maximum power	kW / rpm	88/2350	99/2350	110/2350
Power at max. rpm	kW / rpm	69/2500	85/2500	105/2500
Maximum torque	Nm / rpm	483/1400	566/1500	609/1450
Minimum specific fuel consumption	g/kWh / rpm	216/1700	214/1700	212/1700
Specific fuel consumption / max. power	g/kWh / rpm	236/2350	228/2350	223/2350
Idle speed	rpm	650 - 700	650 - 700	650 - 700
Maximum permitted engine speed	rpm	2520 - 2550	2520 - 2550	2520 - 2550
Firing order		1-5-3-6-2-4		
Direction of rotation		Counter-clockwise (viewed from flywheel end)		
Fuel injection system		Direct injection - BOSCH unit injection pumps type PFR 1K		
Injector type and configuration		4-hole Minisac		
Engine governor		Electronic		
Injection pressure	bar (psi)	700 (10152)	700 (10152)	700 (10152)
Static advance		13° ppms	13° ppms	16° ppms
Lubrication		Forced with gear pump		
Cold-starting system		Glowplug thermostarter		
Starter motor		12 V - 3 kW	12 V - 3 kW	12 V - 3 kW
Alternator		12 V - 150 A	12 V - 150 A	12 V - 150 A

VALVE TIMING DIAGRAM



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C	A	L	I	B	R	A	T	I	O	N	C	L	U	T	C
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
T	r	a	c	t	o	r		P	l	a	n	e			
			7	0		T	O	i	l		7	8			
	R	a	n	g	e		L	e	n	t	a				
B	r	e	a	k		O	F	F							
C	h	o	o	s	e		C	l	u	t	c	h			
h	.	c	a	l	i	b	r			x	x	x	x	x	x
>	1	|	C	l	u	t	c	h	1	^	.	x	x	x	%
	2	|	C	l	u	t	c	h	2	^	.	x	x	x	%
	3	|	C	l	u	t	c	h	3	^	.	x	x	x	%
	C	l	u	t	c	h	M	.					b	a	r
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
[	A	]	C	h	o	i	x	[	D	]	+	[	C	]	
[	B	]	S	t	o	r	e								
[	E	]	E	x	i	t									

1.2 Clutch calibration

From this menu you can perform the automatic or manual calibration of the gearbox clutches.

The information displayed is as follows:

- Operating hours since last calibration (n°).
- Calibration coefficient of 1st speed clutch %.
- Calibration coefficient of 2nd speed clutch %.
- Calibration coefficient of 3rd speed clutch %.
- Corrective parameter for M clutch (main) (bar). (This parameter may also have a negative value).

NOTES.1 - The calibration coefficients for the 1-2-3 speed clutches are percentage values calculated automatically by the ECU which modify:

1 - The filling end pressure.

2 - The filling time.

3 - The modulation start pressure.

4 - The modulation end pressure.

2 - If the ECU has never performed the automatic calibration procedure for all the clutches, it will signal an error code for each clutch that has not been calibrated (See paragraph «ALARM CODES»).

3 - The clutches that have been previously calibrated are indicated by the black background of the box containing the clutch identification number.

C	A	L	I	B	R	A	T	I	O	N	C	L	U	T	C
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
T	r	a	c	t	o	r		P	l	a	n	e			
			7	0		T	O	i	l		7	8			
	R	a	n	g	e		L	e	n	t	a				
B	r	e	a	k		O	F	F							
C	h	o	o	s	e		C	l	u	t	c	h			
h	.	c	a	l	i	b	r								
>	1	|	C	l	u	t	c	h	1	^	.	0	9	5	%
	2	|	C	l	u	t	c	h	2	^	.	1	0	0	%
	3	|	C	l	u	t	c	h	3	^	.	0	8	7	%
	C	l	u	t	c	h	M	.	+	0	.	3	b	a	r
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
[	A	]	C	h	o	i	x	[	D	]	+	[	C	]	
[	B	]	S	t	o	r	e								
[	E	]	E	x	i	t									

In order to carry out the calibration procedure, the following conditions must be satisfied:

1 - Engine running at idle speed.

2 - Drive the tractor over a flat section of road, preferably on asphalt or concrete.

3 - The tractor must be free of all implements or ballast.

4 - The tyres must be inflated to the optimum pressures.

5 - None of the hydraulic systems must be activated (SBA, 4WD, Lift, PTO, Steering).

6 - The gearbox oil temperature must be within the range of 70°C (158°F) to 78°C (172.4°F).

7 - Low range engaged.

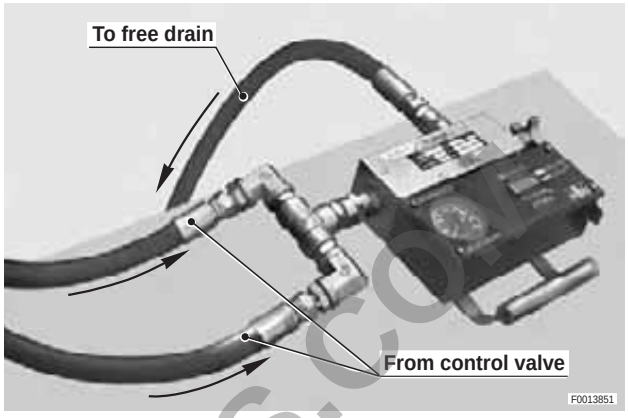
8 - Brakes off.

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TESTING THE AUXILIARY SERVICES PUMP

★ Test conditions:
- Engine: at normal operating temperature
- Hydraulic oil: 60 - 70 °C (140 - 158 °F)
- Handbrake on
- Gearbox in neutral



1. Connection of the flow meter (LS version)

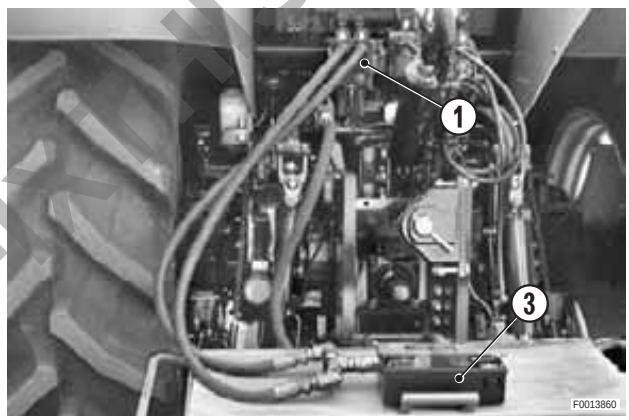
1 - Connect the flow meter delivery pipes (2) to two yellow couplers on the auxiliary service control valve block (1).

2 - Connect the flow meter drain pipe (5) to the free drain (4).

2. Connection of the flow meter (OC version)

1 - Connect the flow meter delivery pipe (2) to a red coupler on the auxiliary service control valve block (1).

2 - Connect the flow meter drain pipe to the free drain (4).



3. Measuring the flow rate

1 - Start the engine and bring it up to a speed of 1000 rpm.

2 - Operate the levers of the control valves that are connected to the flow meter.

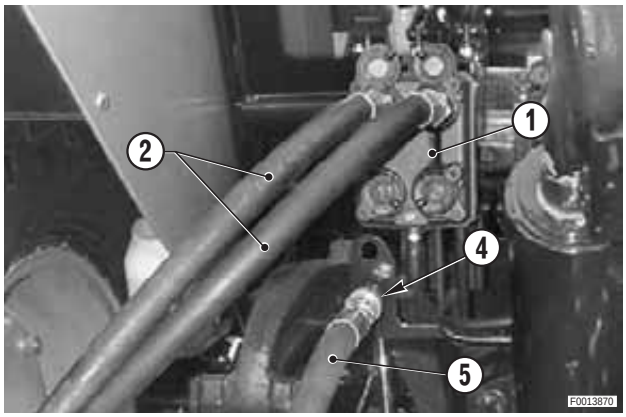
3 - Adjust the delivery pressure to 50 bar (725 psi) and check the pump flow rate.

4 - Release the levers and repeat the operation a number of times.

5 - Repeat steps 2, 3 and 4 with a delivery pressure of 100 bar (1450.3 psi) and 150 bar (2175.5 psi).

6 - Bring the engine speed up to 2350 rpm and repeat steps 2, 3, 4 and 5 in this condition.

7 - Check the readings against the values given in the tables below.



OC CIRCUIT

Pressure bar (psi)	Flow rate at 1000 rpm ℓ/min (US.gpm)	Flow rate at 2350 rpm ℓ/min (US.gpm)
50 (725)	29,5 (7.79)	69,5 (18.36)
100 (1450.3)	28,0 (7.39)	68,5 (18.09)
150 (2175.5)	27,5 (7.26)	66,5 (17.57)

LS CIRCUIT

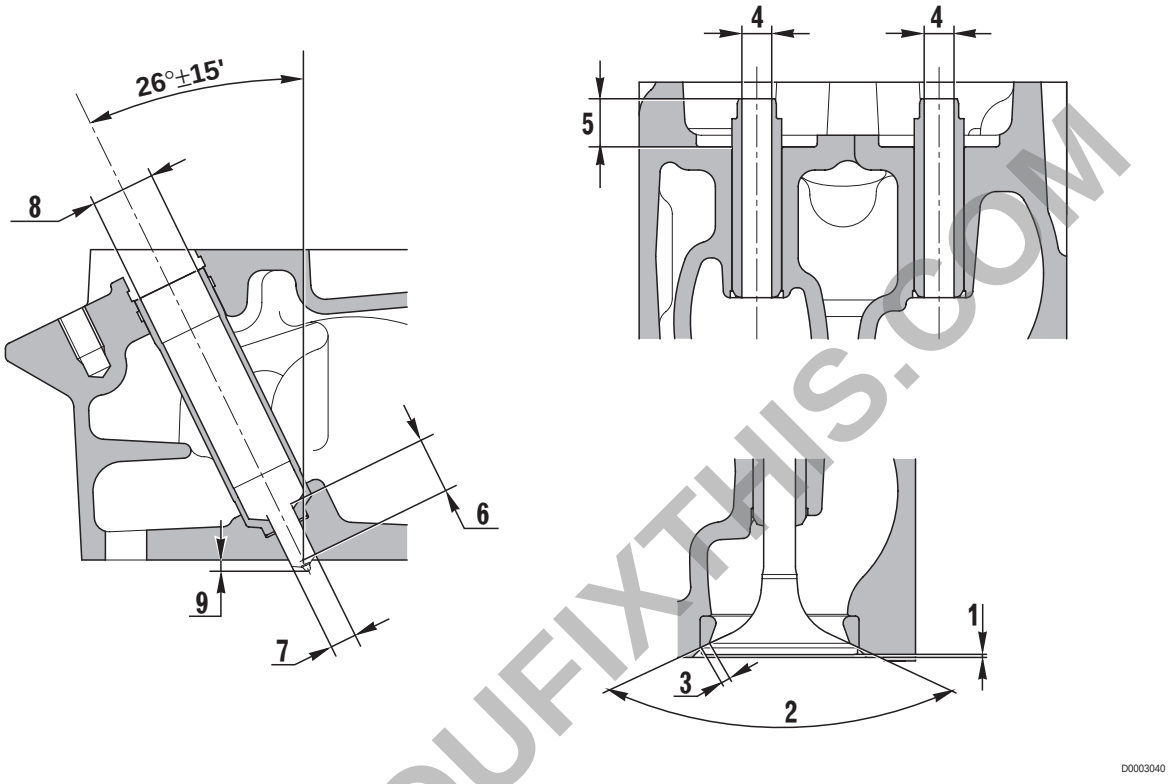
Pressure bar (psi)	Flow rate at 1000 rpm ℓ/min (US.gpm)	Flow rate at 2350 rpm ℓ/min (US.gpm)
50 (725)	43,0 (11.36)	107,0 (28.27)
100 (1450.3)	41,0 (10.83)	104,5 (27.61)
150 (2175.5)	38,0 (10.04)	101,9 (26.92)

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TECHNICAL DATA AND DIMENSIONS

CYLINDER HEADS - VALVE GUIDES - VALVE SEATS



Unit of measurement: mm (in.)

Pos.	Dimensions		Normal measurement	Tolerance limit	NOTES
1	Valves stand-in	Inlet	1.00 (0.040)	0.90 – 1.50 (0.035 – 0.060)	
		Exhaust	0.80 (0.031)	0.70 – 1.30 (0.027 – 0.051)	
2	Valve seat angle	Inlet	120°	–	
		Exhaust	90°	–	
3	Contact band (valve to seat)	Inlet	2.10 (0.083)		
		Exhaust	2.21 (0.087)		
4	Inside diameter of valve guide		9.025 (0.364) 9.040 (0.356)		Renew when the clearance between the guide and the valve exceeds 0.1 mm (0.004 in.).
5	Protrusion of valve guide above spring seat	Inlet	14.7 – 14.3 (0.579 – 0.563)		
		Exhaust			
6	Length of injector nozzle holder		17.27 – 17.1 (0.680 – 0.673)		
7	Injector nozzle holder bore		9.5 – 9.6 (0.374 – 0.378)	–	
8	Copper bushing bore		21.7 – 21.8 (0.855 – 0.859)	–	
9	Injector protrusion		3.4 – 3.81 (0.134 – 0.150)	–	

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MAINTENANCE OF THE AIR CONDITIONING SYSTEM

The checks and servicing operations required for the air conditioning system are as follows:

1 - Checking the tension of the compressor drive belt.

2 - Discharging, flushing and recharging of the system using a dedicated service machine and R134a refrigerant.

3 - Removal and renewal of the compressor.

4 - Inspection and renewal of the magnetic clutch pulley.

5 - Removal of the condenser cooling fans.

6 - Removal and renewal of the receiver-drier.

7 - Removal and renewal of the condenser.

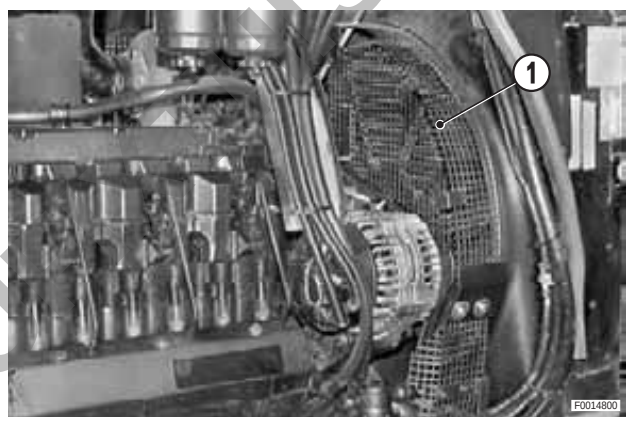
8 - Removal of the evaporator and the electronic temperature sensor.
(For details, see «REMOVAL OF THE AIR CONDITIONING EVAPORATOR»).

ADJUSTING THE TENSION OF THE COMPRESSOR DRIVEBELT

★ Before adjusting the tension, carefully examine the drivebelt for signs of wear.
The belt must be renewed immediately if any cracks, fraying or cuts rare found.

⚠ If a new belt is fitted, adjust the tension again after approx. 50 operating hours.

1 - Remove the grille (1).



2 - Loosen the screw (2) and nut (3) securing the compressor (4).

3 - Loosen nut (5) and screw in screw (6) to obtain a deflection of 10–15 mm (0.4 –0.6 in.) when a load of 10 kg (22 lb.) is applied at the mid-point of either of the two runs.

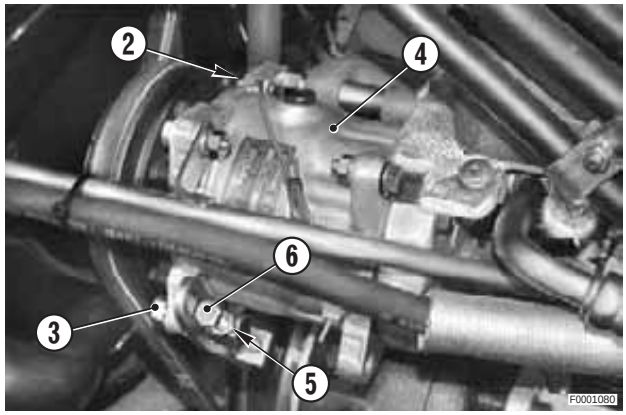
★ In the case of a new belt the deflection should be 7–9 mm (0.276 –0.355 in.).

4 - Secure screw (6) with locknut (5).

5 - Fix the compressor (4) and re-check the tension.

6 - Refit grille (1).

⚠ After fitting a new drivebelt, re-check the tension after 50 operating hours.



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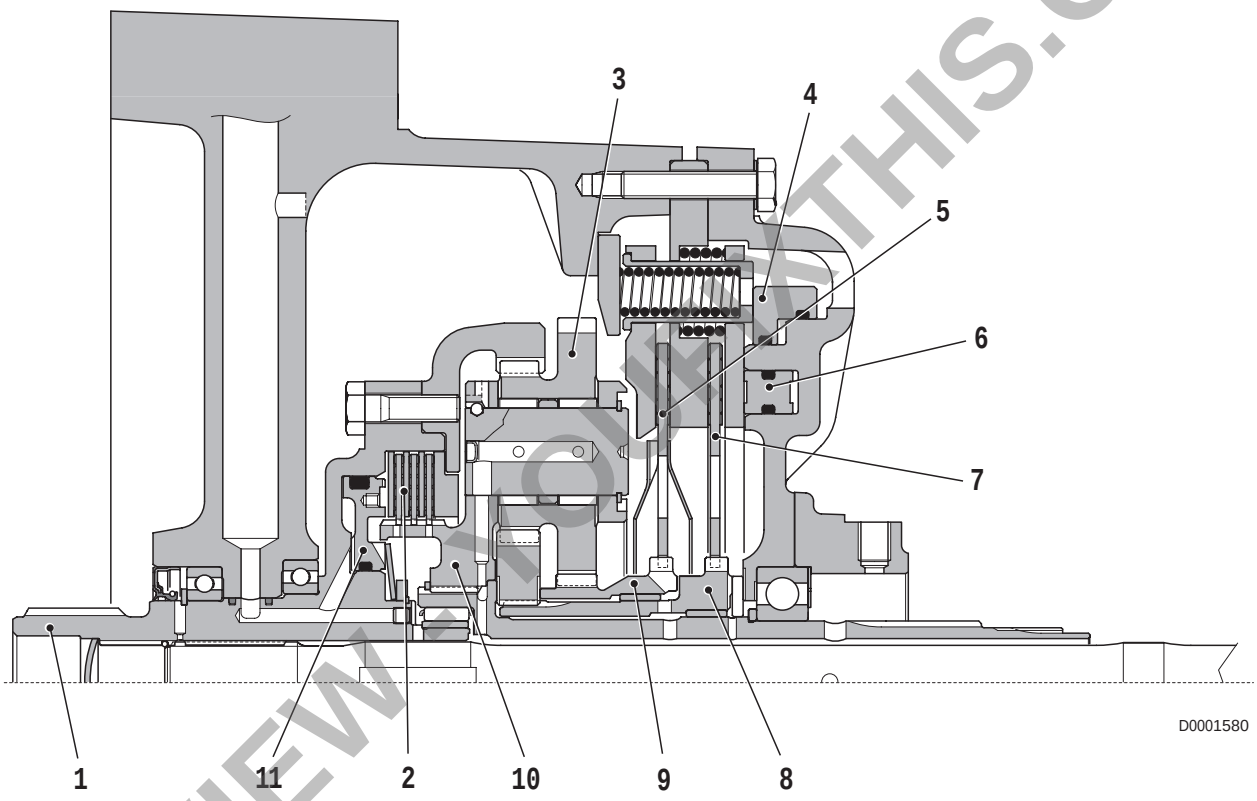
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1. H-M-L UNIT

DESCRIPTION

The H-M-L unit is comprised of a wet multiplate clutch that controls engagement of the H speeds and two single-plate clutches that control engagement of the M and L speeds.

The M and L speeds are obtained through a double-ratio epicyclic reduction unit, while the H speed is obtained through a direct connection between the driven shaft and the driving shaft.



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COMPONENTS

1 - Drive shaft
2 - H speed engagement clutch
3 - Planet pinion
4 - M speed engagement piston
5 - M speed engagement clutch
6 - L speed engagement piston
7 - L speed engagement clutch
8 - L speed sun gear
9 - M speed sun gear
10 - Driven shaft
11 - H speed engagement piston

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E	v		P	r	o	p	o	r	t	i	o	n	a	l	
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
1	/	+	C	u	r	r	e	n	t						
2	/	–	C	u	r	r	e	n	t						
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
I	(	E	v	P	)					x	x	x	x	m	A
P	W	M	%										x	x	x
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
=	=	=	=	=	=	=	=	=	=	=	=	=	=	=	=
[	E	]	E	x	i	t									

2.3 Ev Proportional

From this menu you can test the operation of the proportional solenoid valve that modulates the gear engagement pressure.

- **1/ + Current**: By pressing [1] on the ART® you increase the current drawn by the solenoid.
- **2/ - Current**: By pressing [2] on the ART® you decrease the current drawn by the solenoid.
- **I (EvP.)**: Current draw of the solenoid (mA)
- **PWM %**: Percentage of P.W.M.

Press [E] to exit.

L	o	w		V	o	l	t	a	g	e					

E	v	P		C	o	n	n	e	c	t					

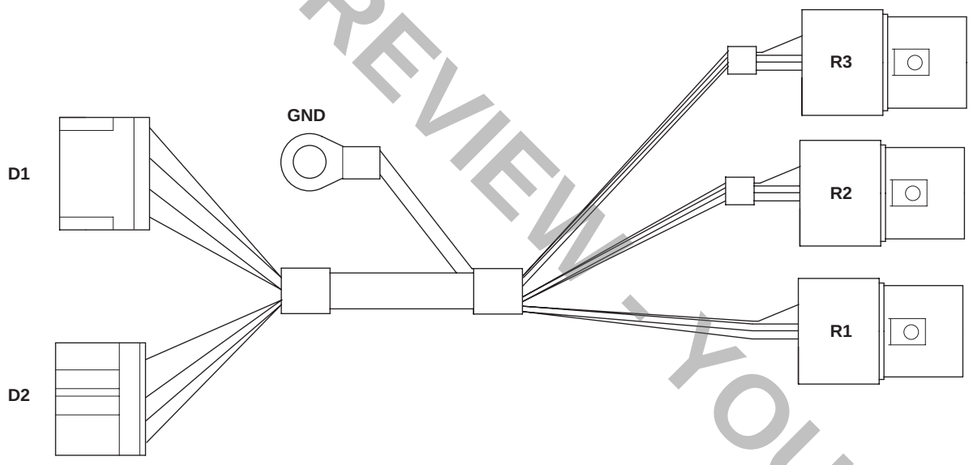
The ECU automatically performs tests on the supply voltage and the current draw of the solenoid.

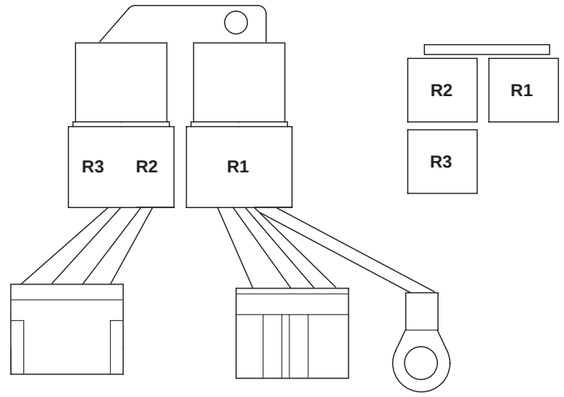
If the battery voltage is less than 12V or if the current drawn by the solenoid is less than 200 mA, the messages on the left will be displayed.

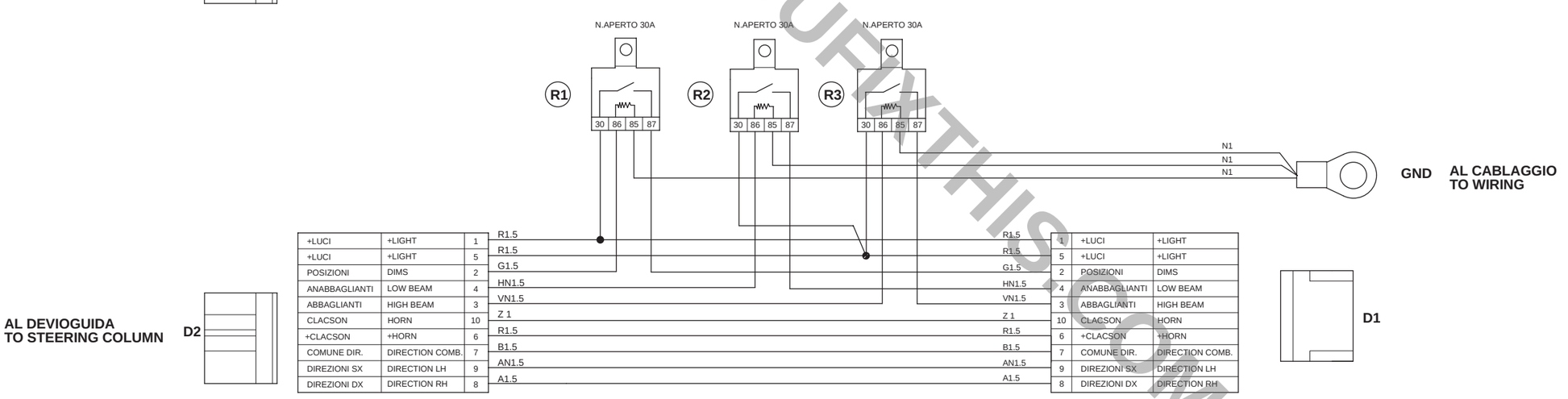
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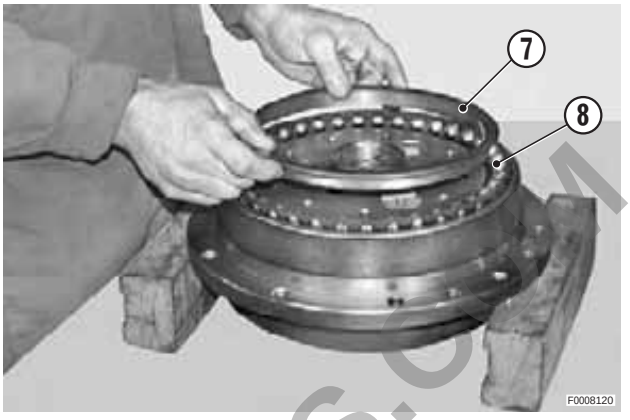
+LUCI	+LIGHT	1
+LUCI	+LIGHT	5
POSIZIONI	DIMS	2
ANABBAGLIANTI	LOW BEAM	4
ABBAGLIANTI	HIGH BEAM	3
CLACSON	HORN	10
+CLACSON	+HORN	6
COMUNE DIR.	DIRECTION COMB.	7
DIREZIONI SX	DIRECTION LH	9
DIREZIONI DX	DIRECTION RH	8

1	+LUCI	+LIGHT
5	+LUCI	+LIGHT
2	POSIZIONI	DIMS
4	ANABBAGLIANTI	LOW BEAM
3	ABBAGLIANTI	HIGH BEAM
10	CLACSON	HORN
6	+CLACSON	+HORN
7	COMUNE DIR.	DIRECTION COMB.
9	DIREZIONI SX	DIRECTION LH
8	DIREZIONI DX	DIRECTION RH

0.011.8747.4
WIRING WITH 3 RELAYS FOR STEERING COLUMN LIGHTS SWITCH

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6 - Remove inner thrust plate (7) and ball cage (8).

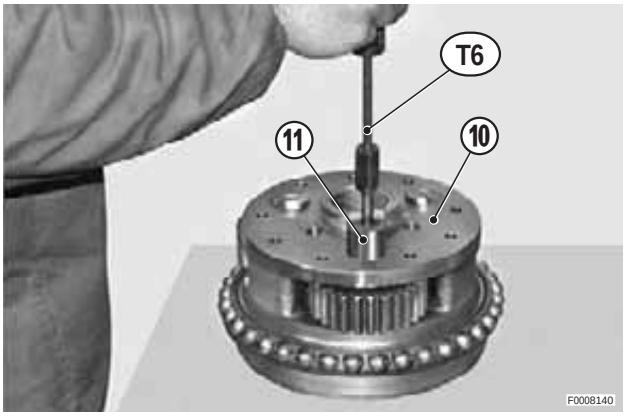


7 - Lift up the annulus (9) and place it to one side..

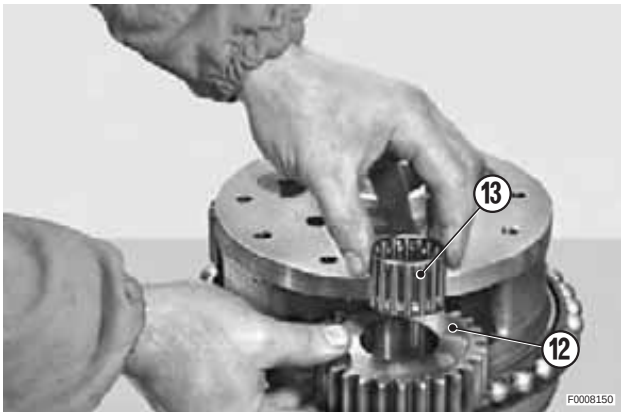


8 - Withdraw the planet pins (1) from the planet carrier (10).

★ If necessary, use slide hammer puller slide hammer puller **T6** (code 5.9030.618.4/10) screwed into the central hole.



9 - Withdraw the planet pinions (12) and the relative roller cages (13).

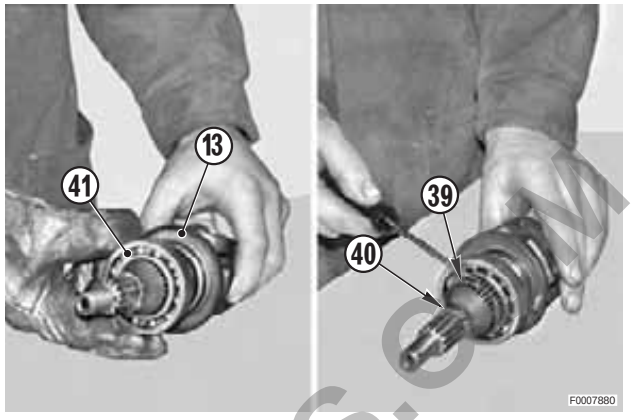


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3 - Heat bearing (41) and fit to shaft (13) driving it up against the shoulder.

4 - Fit circlip (39).

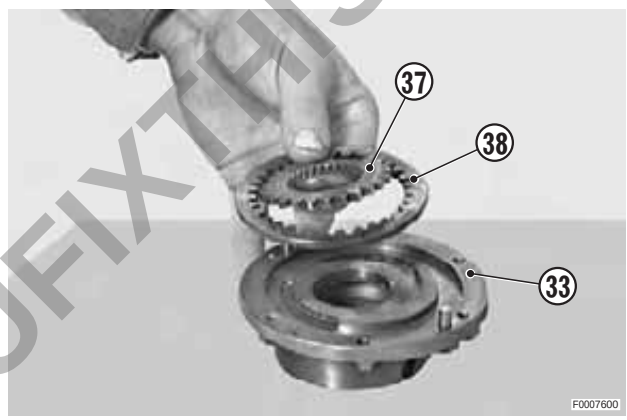
5 - **Only if removed.** Fit circlip (40).



5. Assembly of the pump unit

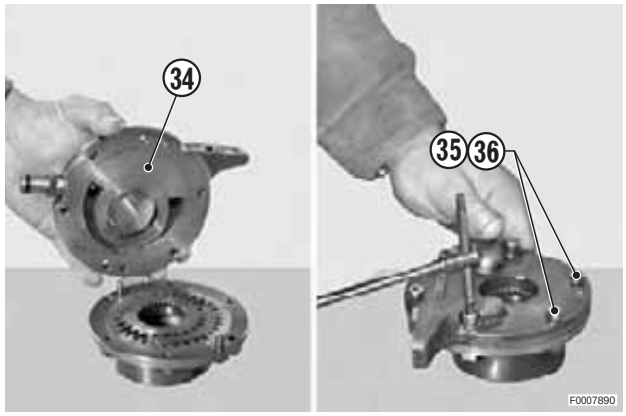
1 - Lubricate gears (37) and (38) and locate them in the pump housing (33).

Gears: Gearbox oil

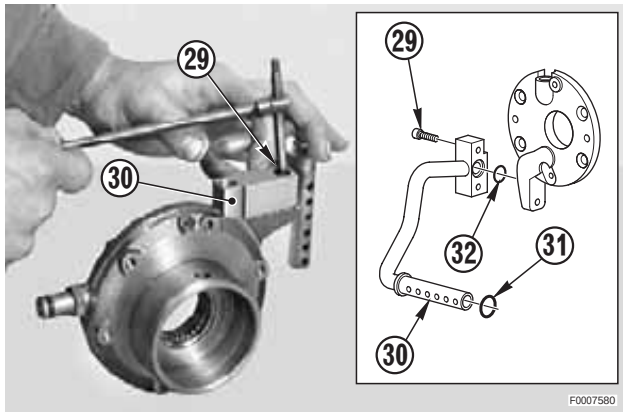


2 - Locate the pump cover (34) aligning the positioning marks made during the dismantling procedure.

3 - Fix the cover in position with bolts (35) and washers (36).

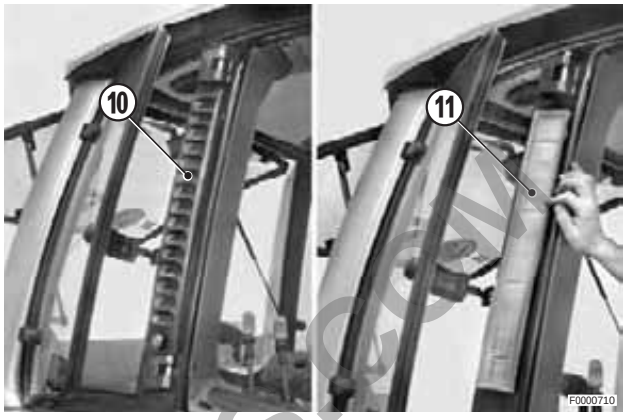


4 - Locate O-ring (31) in the flange and fit the suction pipe (30). Secure with bolts (29).



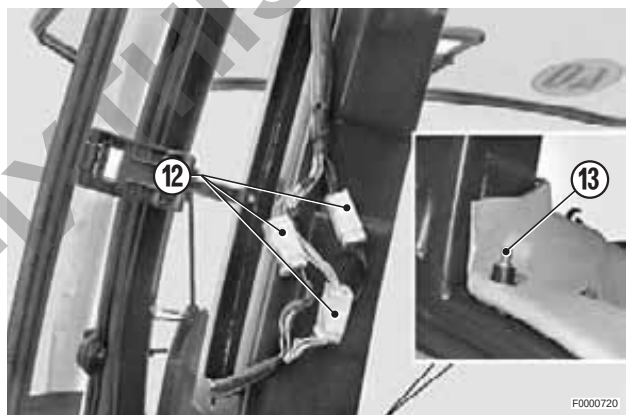
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8 - Remove the grille (10) and filter (11) from the right-hand cab pillar.

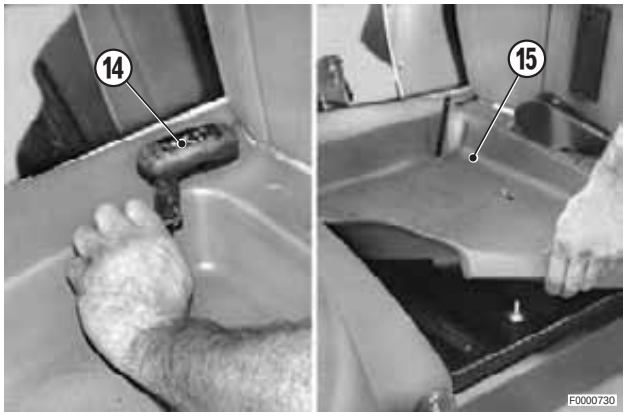


9 - Mark and disconnect the connectors (12) of the cab roof wiring.

10 - Disconnect the gas spring of the right-hand door and remove the mounting pin (13).

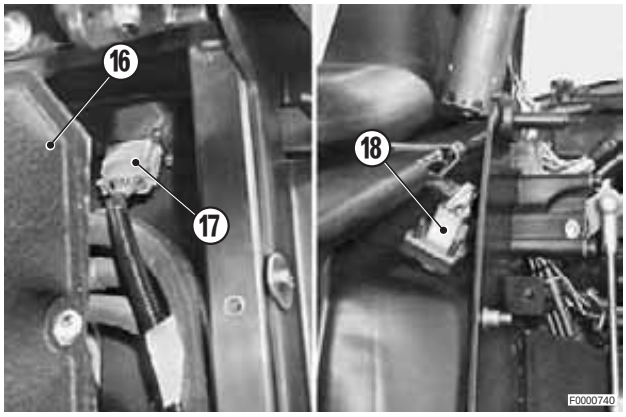


11 - Remove the knob (14) of the PTO speed selector lever and remove the rear floor mat (15).



12 - **For suspended front axle versions only.**
Remove the front insulation panel (16) and unplug connector (17) of the front axle control unit.

12a - Remove the bulkhead connector (18).



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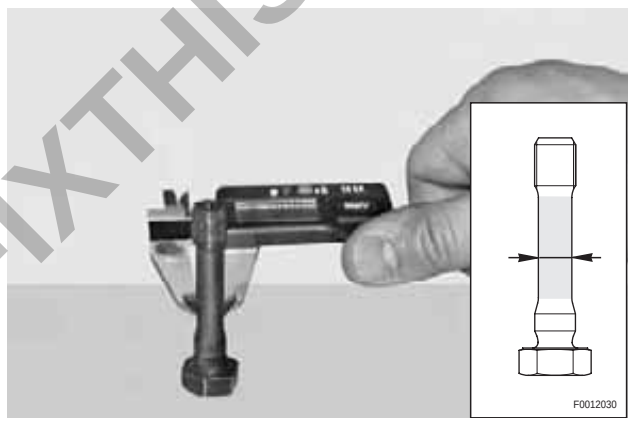
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4 - Using a dial gauge, measure the outside diameters of the gudgeon pins; if the diameter of a gudgeon pin is not within the tolerance limits specified in «TECHNICAL DATA AND DIMENSIONS», renew the gudgeon pin.



4. INSPECTION OF THE BIG-END CAP BOLTS

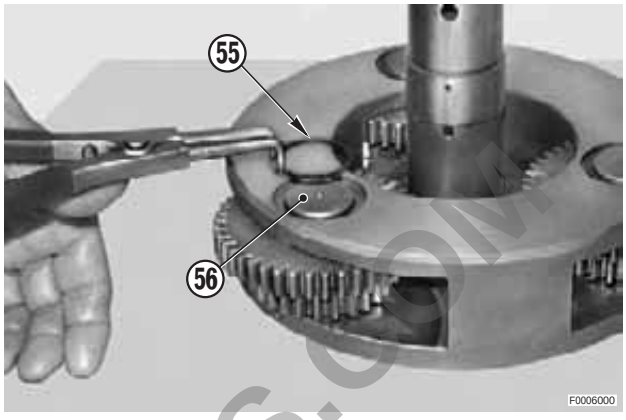
1 - Using a dial gauge or micrometer, measure the diameter of the bolts along the central reduced diameter section; the difference between the maximum and minimum dia-meter gives an indication of the stress to which the bolt has been subjected during previous tightenings.
If the difference between the minimum and maximum diameter exceeds that indicated in the table «TECHNICAL DATA AND DIMENSIONS», renew the bolts



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8 - Secure pins (56) in position with circlips (55).



4. Assembly of the H speed clutch

1 - Fit O-rings (53) and (54) to piston (52).

O-rings: Grease

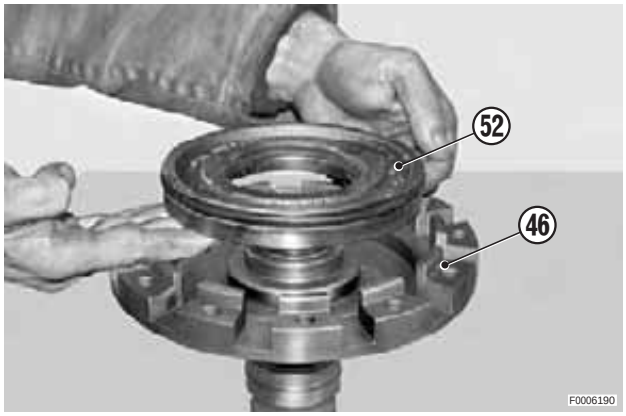


2 - Fit the complete piston (52) in the cylinder (46).

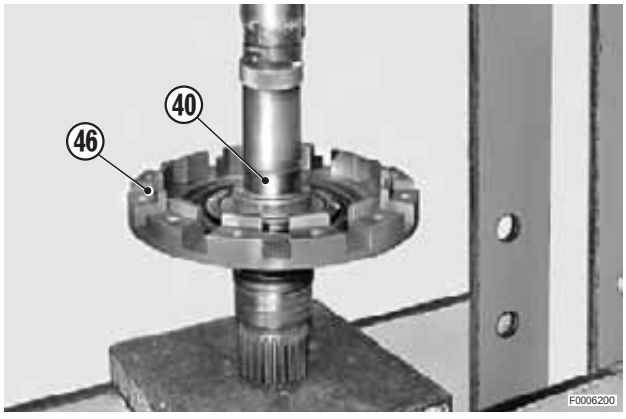
★ Lubricate the surfaces of the piston chamber.

Surfaces: gearbox oil

★ To insert the piston, keep it level while tapping evenly around the circumference with a soft mallet.

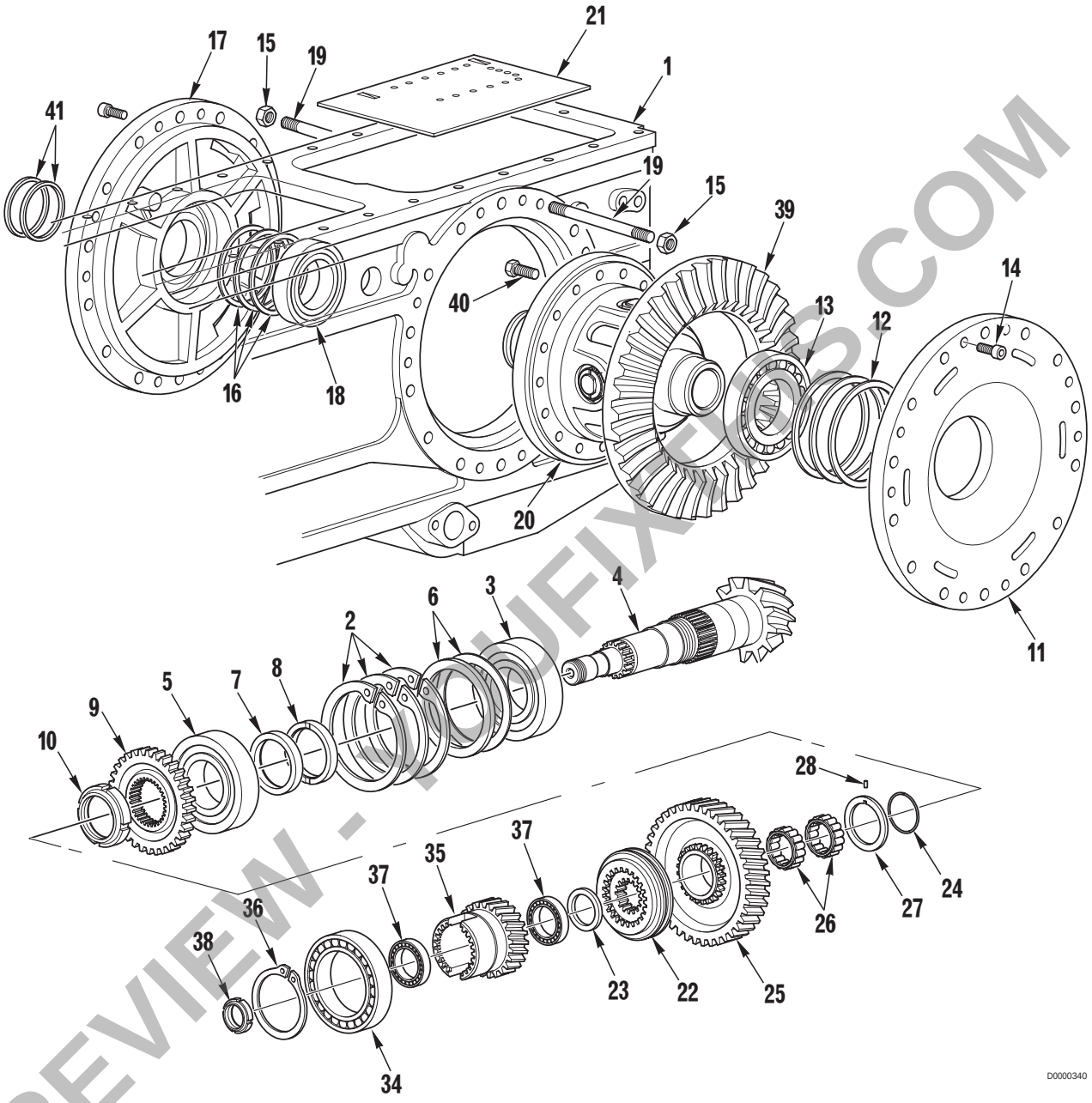


3 - Using a press and a drive, fit the inner race of the roller cage (40).

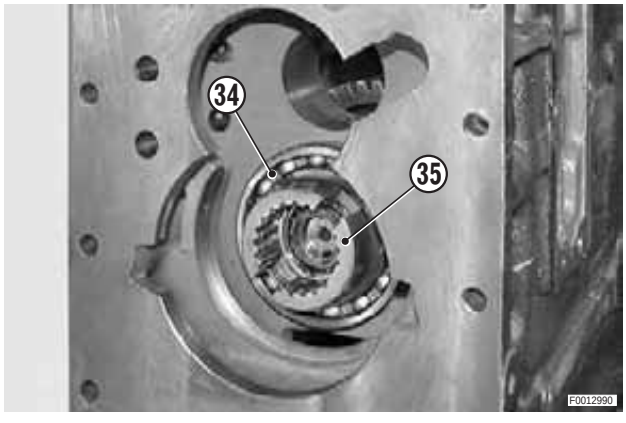


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8. REMOVAL OF THE BEVEL PINION



1 - Remove gear (35) complete with bearing (34).
★ If necessary, use a soft drift and a mallet.



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