CLAAS

A1
INJECTION SHEET CHECKING PROCEDURE

A2
DE 10 INJECTION

A3
DPS ENGINE

Technical support	**Chapter A**
Ares 507-607	**60 05 031 190 – 06.2005 publication**

Measurement and checking points

This sheet is intended to be duplicated and completed for each operation on the tractor. If you have to send it to the manufacturer's after sales service, it is essential to indicate:

Tractor type: .....

Serial n°: .....

Engine serial n°: .....

Total operating hours: .....

Date of operation: .....

Transmission type: .....

Checking operations

Concerns operations 2, 3, 4, 6, 7.

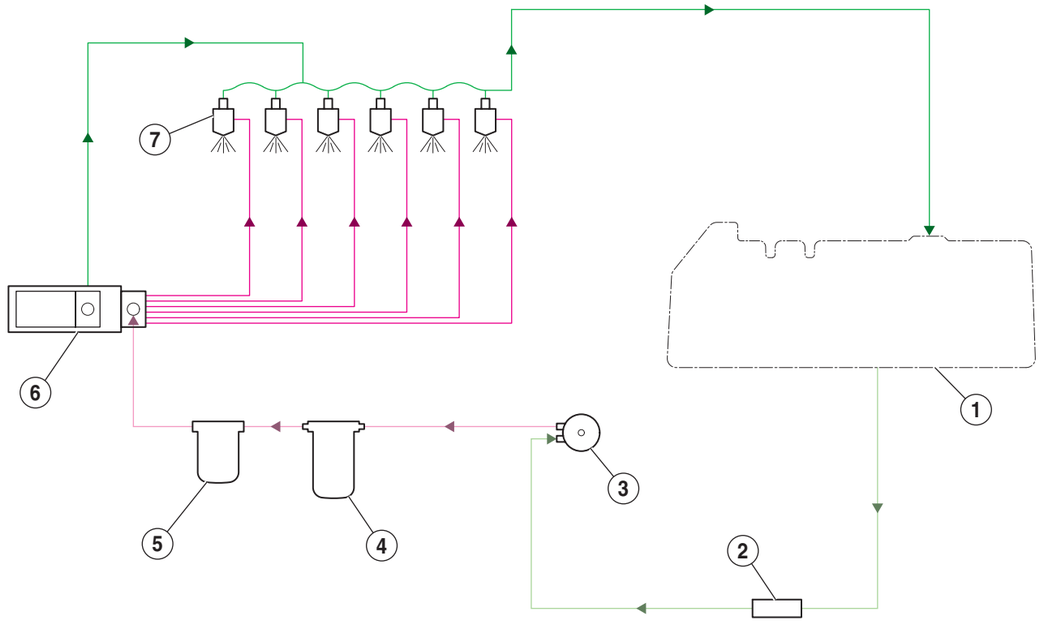
	Checking operation	Check
Engine	Oil level	
	Air filter	
	Diesel filter	
	Battery (volt)	
Transmission	Oil level	

Record of inspection results

	Start of test	End of test	Reference values (bar)
Hydraulic pressure 1			See appendix
Hydraulic pressure 2			
Hydraulic pressure 3			
Outside temperature			—
Transmission temperature			60°C → 65°C
Engine temperature			> 87°C
Diesel temperature			

FUEL INJECTION DATA SHEET

Ares 657 – H 8262
DPS 6068 TRT 71 engine
Nominal speed 2 200 rpm



- Supply system Suction
- Supply system Supply pump pressure
- Discharge line
- Return line

162msm01r

FUEL SUPPLY LINE DATA

1	Main fuel tank:	250 litres
2	Filter:	149 microns
3	Mechanical supply pumps.	
4	Fuel pre-filter:	10 microns
5	Filter:	2 microns
6	Stanadyne rotary injection pump type DE 10. Electronically controlled.	
7	Stanadyne staggered injection injectors 9.5 mm holder body (type 35107) Set pressure on injector: 250 bar.	

DYNAMIC TIMING

Electronic management.

TEST CONDITIONS

– Refer to inspection procedure.

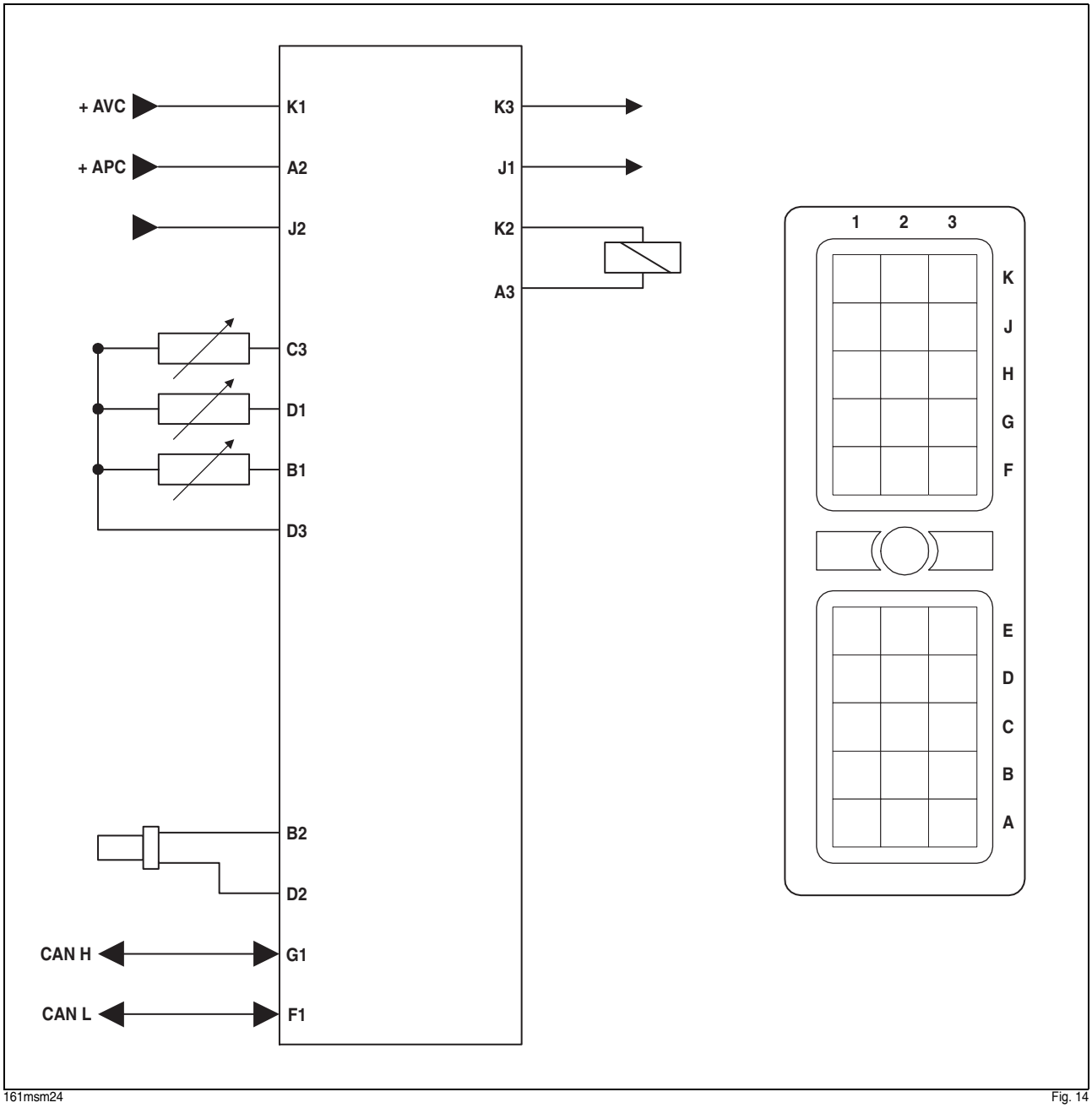
– Measure to be taken with visco-coupler **blocked.**

NOTE

– Reference values: measurements made on a tractor, closed central system with 100 l/min, fitted with pneumatic brakes and air conditioning, at an ambient temperature of 25 C with the viscous clutch **blocked.**

Description

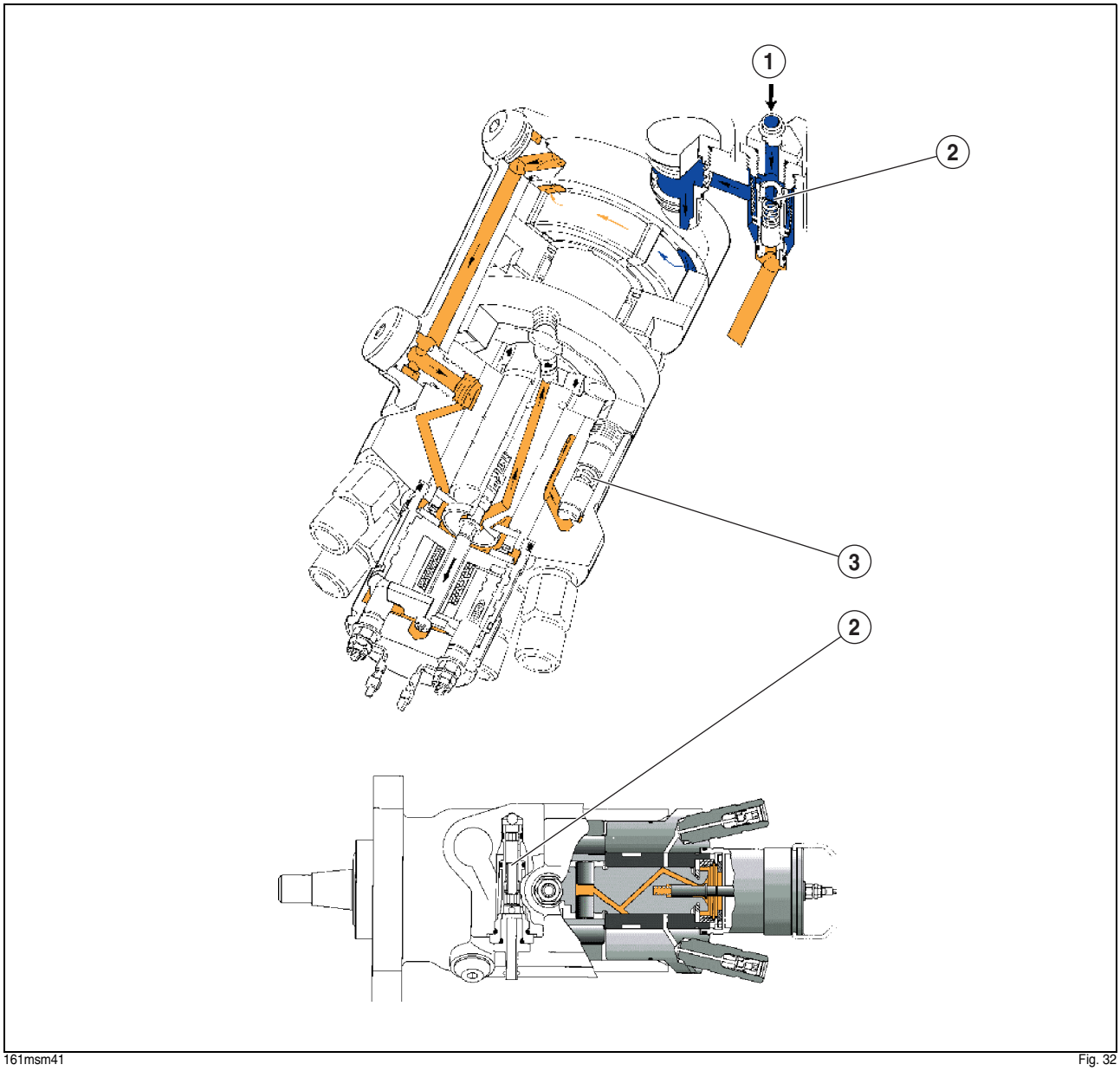
Engine computer inputs and outputs



161msm24 Fig. 14

Additional technical details

Fuel booster system



161msm41 Fig. 32

Nomenclature

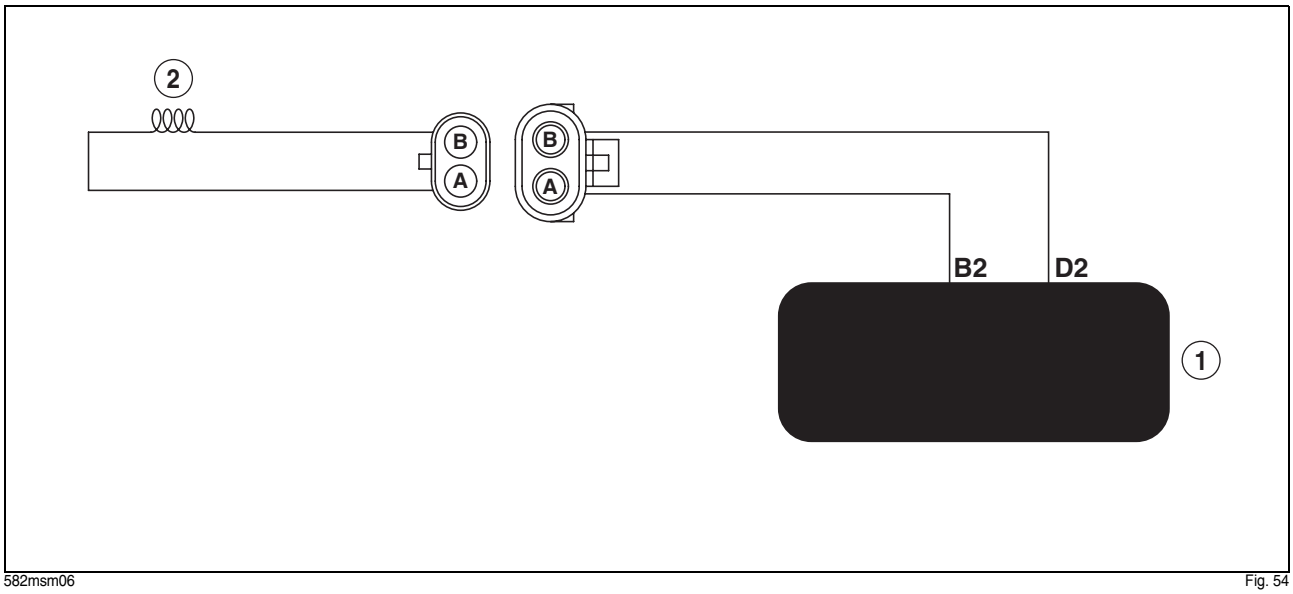
1 Fuel supply.
2 Transfer pressure regulator.
3 Charge accumulator.

Crankshaft position sensor

Measurement and checking points

Checking with Win Métadiag©

See chapter "G6".



582msm06 Fig. 54

Nomenclature

B2 Crankshaft position input.
D2 Sensor return.
1 Engine control unit.
2 Crankshaft position sensor.

Checking the resistance with a multimeter

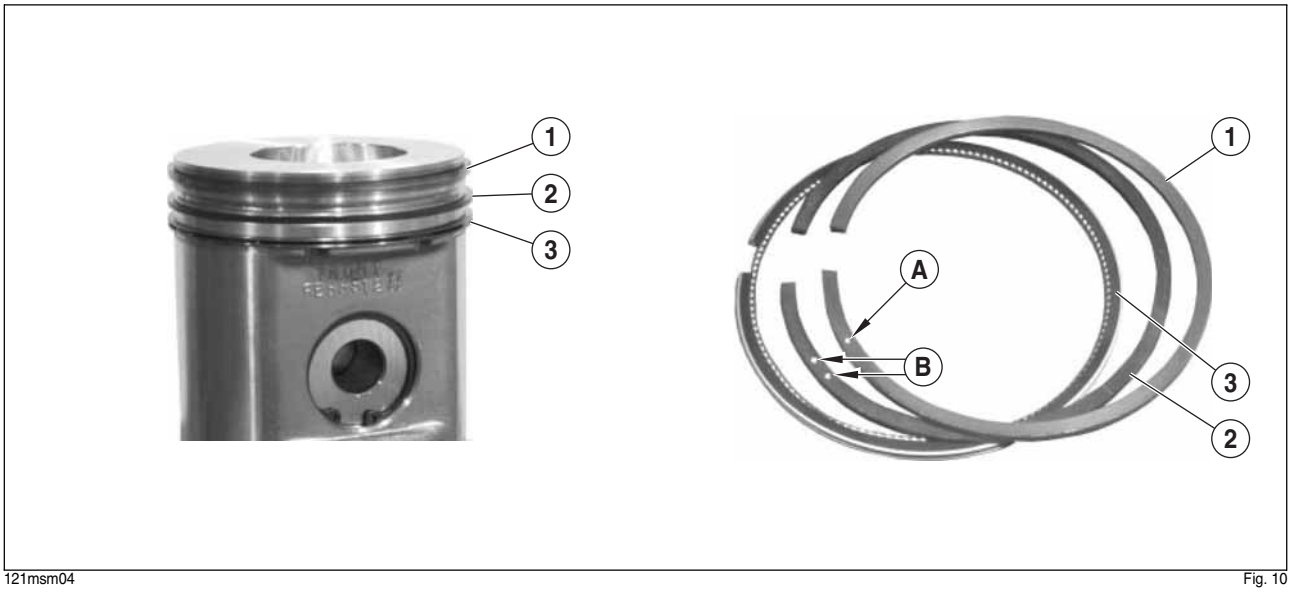
Remove the engine control unit connector then measure the resistance between points "B2" and "D2" using multimeter n° 60 05 005 744.

Resistance: 3 ± 0,3 kΩ.

The shim wheel is composed of 46 teeth uniformly spaced and of 2 missing teeth which determine the high neutral position.

Technology of moving parts

Rings



121msm04 Fig. 10

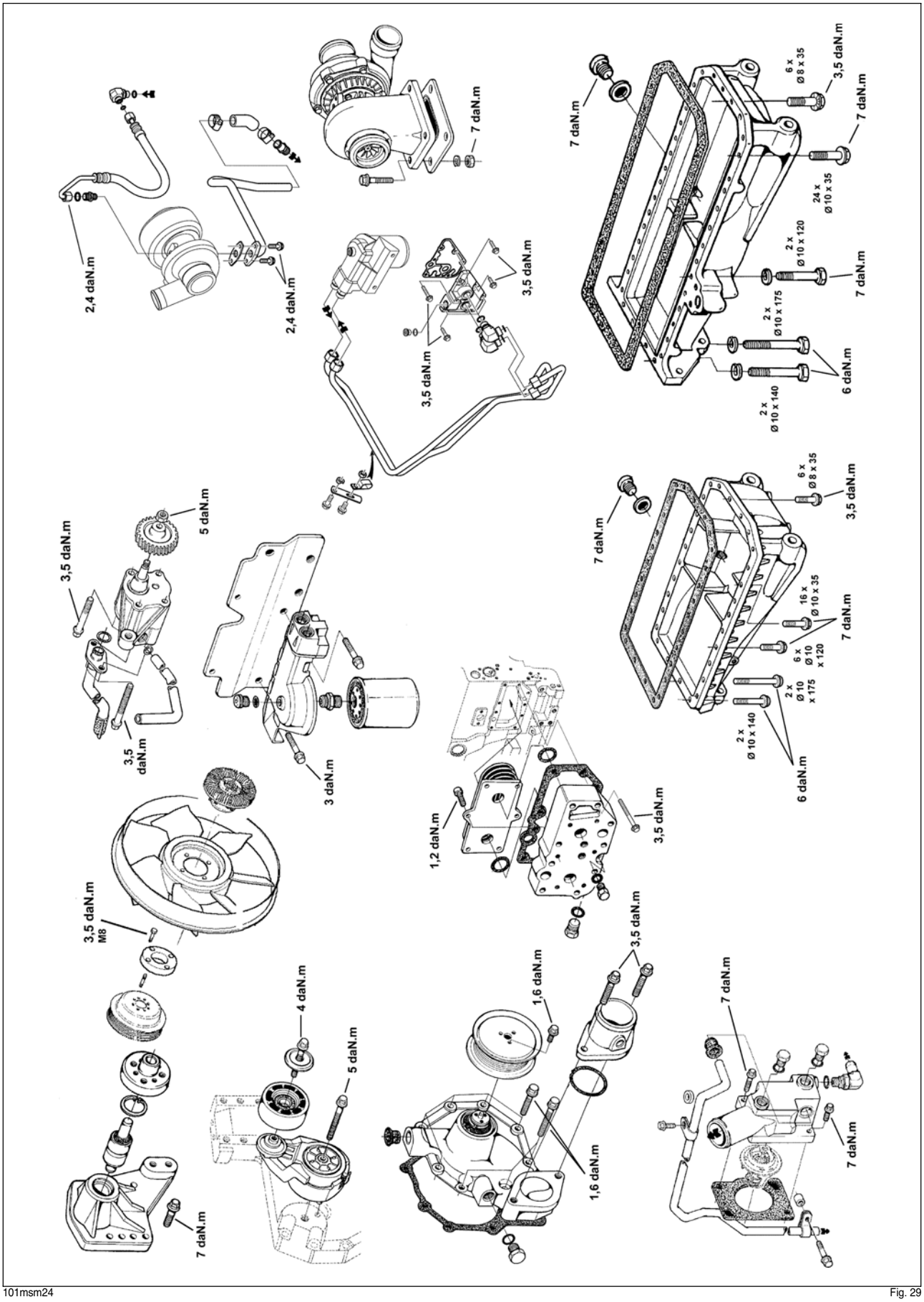
The top compression ring is as close as possible to the top of the piston to reduce waste space. This has necessitated the use of an insert that has better temperature resistance. An accumulation groove between the top compression ring and the compression ring gives the gases a greater expansion volume. The top compression ring thus remains in contact with its bearing surface, reducing the passage of gas to the lower part of the engine.

1. The top compression ring is trapezoid shaped with a contact face of the barrel type. It is marked with a dot (A).

2. The compression ring has a trapezoid cross-section, with a skewed contact face. It is marked with 2 points (B).

3. The oil control ring has a classical shape.

Tightening torques



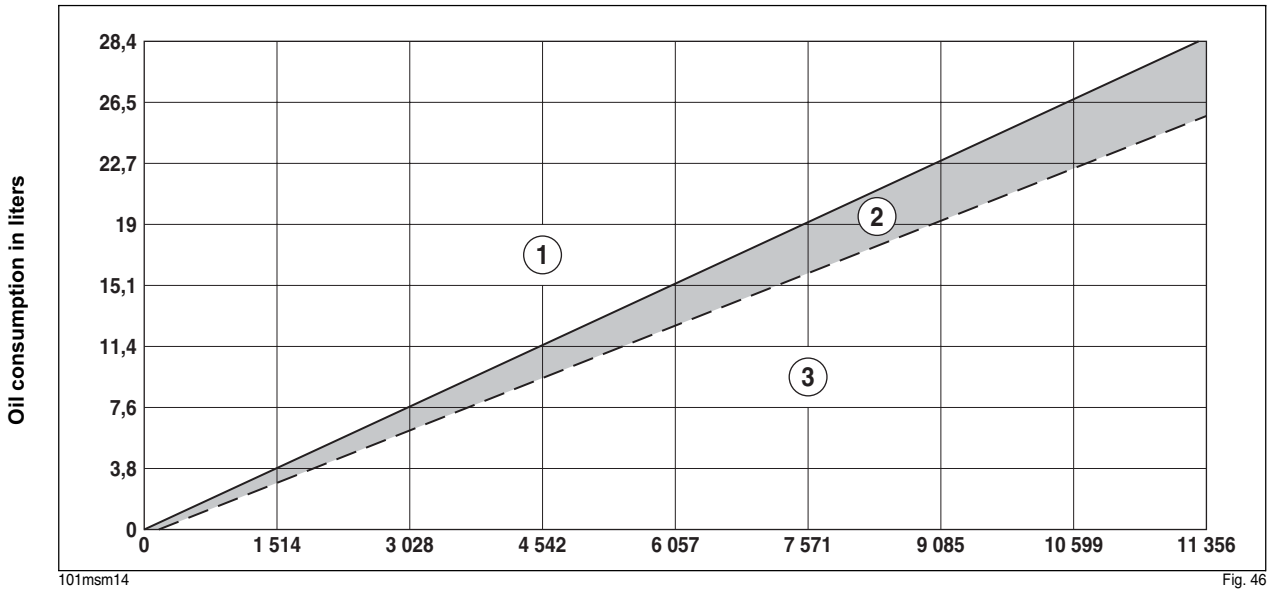
101msm24

Fig. 29

Check

Oil consumption

Table of acceptable oil consumption



101msm14 Fig. 46

Nomenclature

1 Excessive oil consumption.

2 Oil consumption remaining acceptable.

3 Oil consumption acceptable.

Complaints about oil consumption are usually expressed in the number of liters used daily. This information is not very specific. The following questions must be asked:

– How many hours in a day ?

– On the day in question, what was the engine operating load ?

A more satisfactory method for assessing oil consumption requires comparing the quantity of oil used and quantity of fuel burnt (see table). Long-term consumption (3 oil changes after engine running-in) must not exceed 0,95 l oil for 379 l fuel burnt.

Removal/refitting

Separate engine/gearbox

N.B.: Bleeding the air conditioning and coolant circuit is not requried for engine/gearbox separation.

– Untighten the 10 screws (1) and disconnect the two connectors behind the instrument panel upholstery, as well as the grounding wire (refer to chapter "H2"), (the air conditioning/heating block follows the engine upon separation).

Elements to remove to allow separation:

– Remove the left-hand side step and tank.

– Disconnect the harnesses and piping embarrassing discoupling.

– Fit the discoupling trolley.

N.B.: Adjust the various stops of the uncoupling assembly to separate properly the engine to facilitate the assembly recoupling.

– Untighten the screws (2) and (3).

– Separate the engine/gearbox assembly.

Removing the engine

– Perform preliminary operations and "engine/front axle separation".

– Remove all elements preventing engine removal.

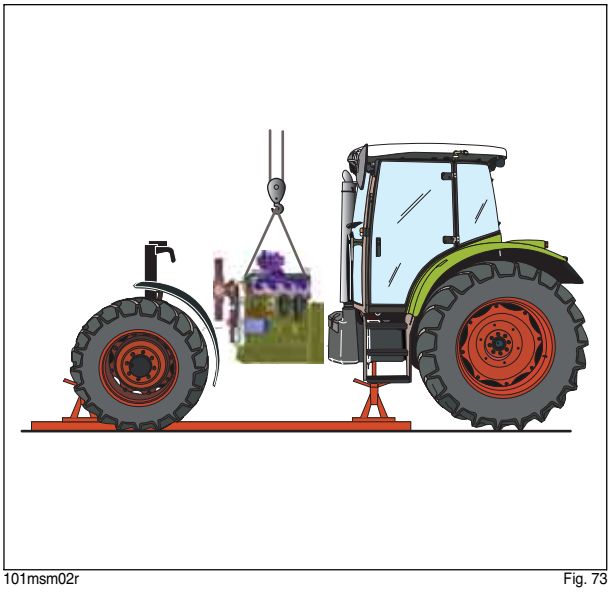
N.B.: Bleed the air conditioning.

– Position a prop under the transmission.

Note: To ensure safety, use a hoist adapted to the engine's weight: 600 kg.

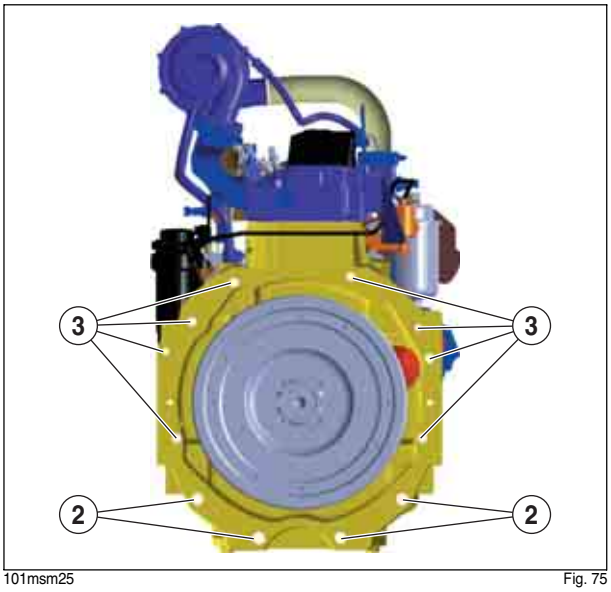
– Unscrew screws (2) and (3) and pull the engine out.

For refitting, perform the reverse sequence of operations while tightening screws (2) and (3) to their proper torque. Refer to the chapter "Tightening torques".



101msm02r Fig. 73

641msm19 Fig. 74



101msm25 Fig. 75

Removal/refitting

Reassembling pistons and connecting rods

N.B.: The pistons must be reassembled in the liners they were extracted from.

1. Smear the pistons and rings with clean engine oil. Fit the pistons into the liners using the ring compressor No. 77 01 388 111 (1).

N.B.: Check for each piston that the mark "FRONT" (A) on the upper face of the piston is turned towards the front of the cylinder block.

2. Push the piston into the liner until the upper ring is fully inside it.

Assembling the cap onto the connecting rod

1. Smear the half-bearings with clean engine oil, then assemble the cap onto the connecting rod with the pins (A) on the same side.

Important: Ensure that the cap is correctly aligned on the connecting rod with the junction surfaces perfectly coupled.

2. Dip the connecting rod bolts in clean engine oil and fit them.

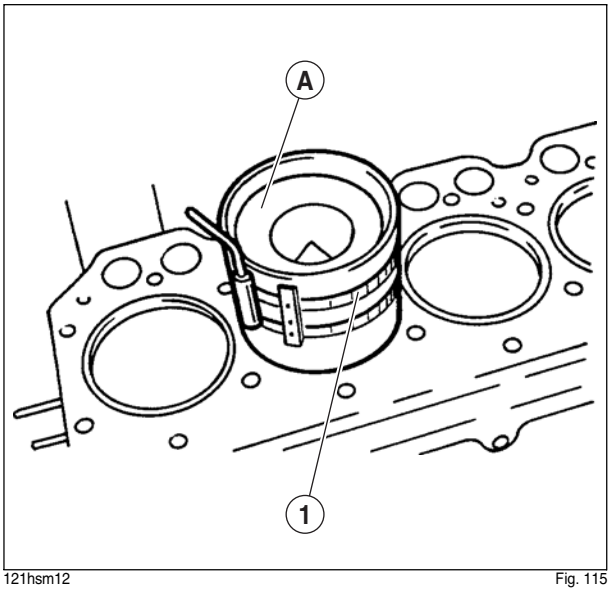
Important: Never use the connecting rod bolts more than once for the final assembly of the engine. When connecting rod bolts have been tightened at final torque, do not reuse them.

3. Tighten the bolts alternately at 5,8 daN.m, then turn each bolt at a 90-100 degree angle. Refer to the chapter "Tightening torques".

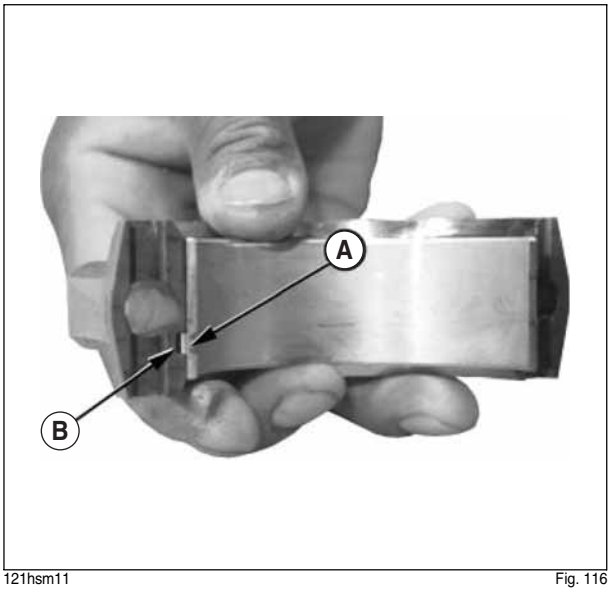
Tightening method

1. Position the wrench in parallel the engine axis (A).

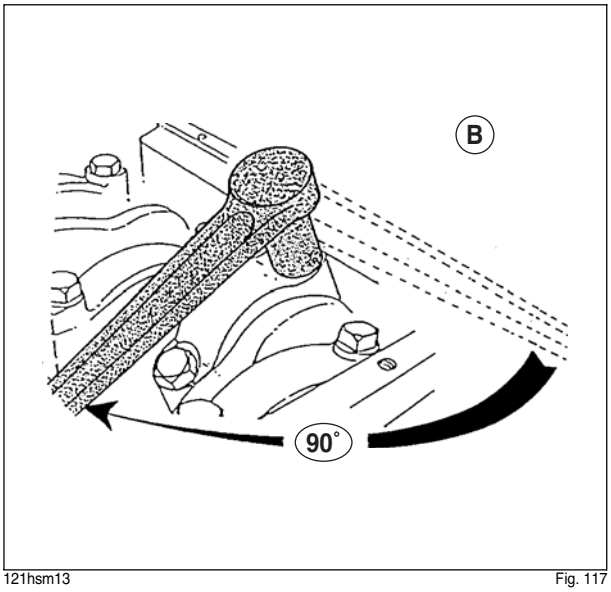
2. Tighten the bolt until the wrench is perpendicular to the engine axis (B).



121hsm12 Fig. 115



121hsm11 Fig. 116



121hsm13 Fig. 117

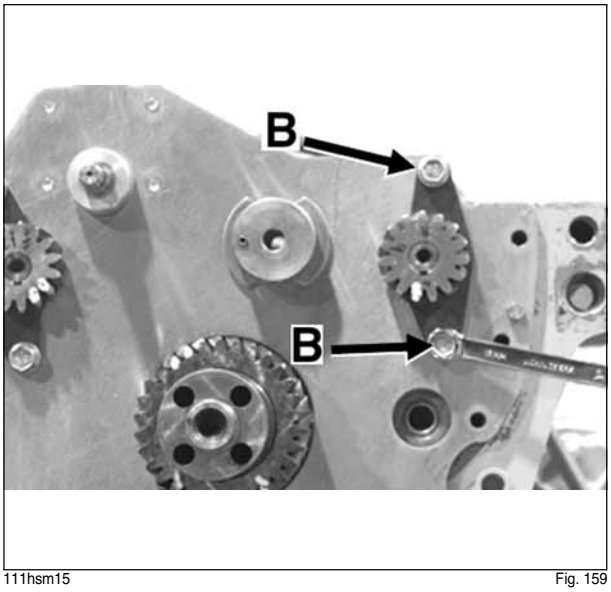
Reassembly of the balancer shafts

– Smear with clean engine oil the balancer shaft bushes in the cylinder block, as well as the shaft journals.

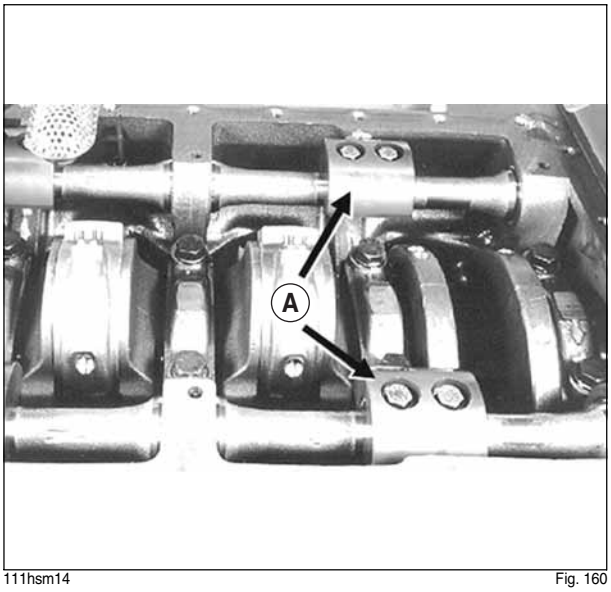
Important: Do not swap the shafts If the pinions are removed from the shafts on removal, and if they are swapped over, fit new bushes.

– Fit the balancer shafts and the stop plates, and tighten the bolts (B) to 4 daN.m (Fig. 159).

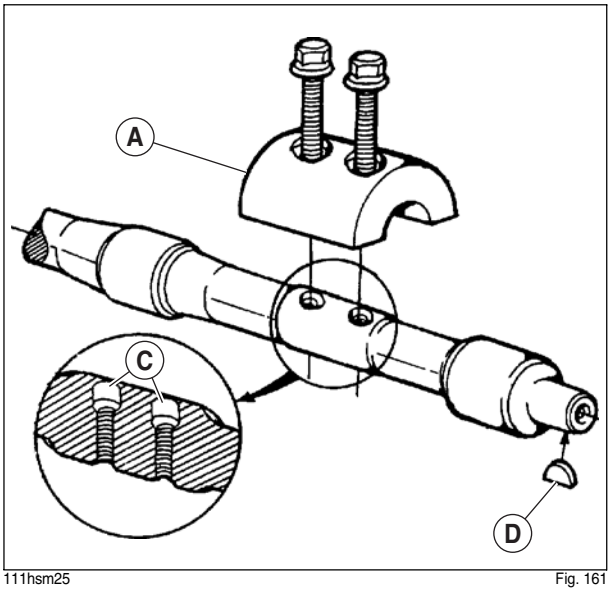
– Fit the counterweights (A) onto the balancer shafts on the bladed side (C). The counterweights must be opposed to the keys (D) (Fig. 160 and 161).



111hsm15 Fig. 159



111hsm14 Fig. 160

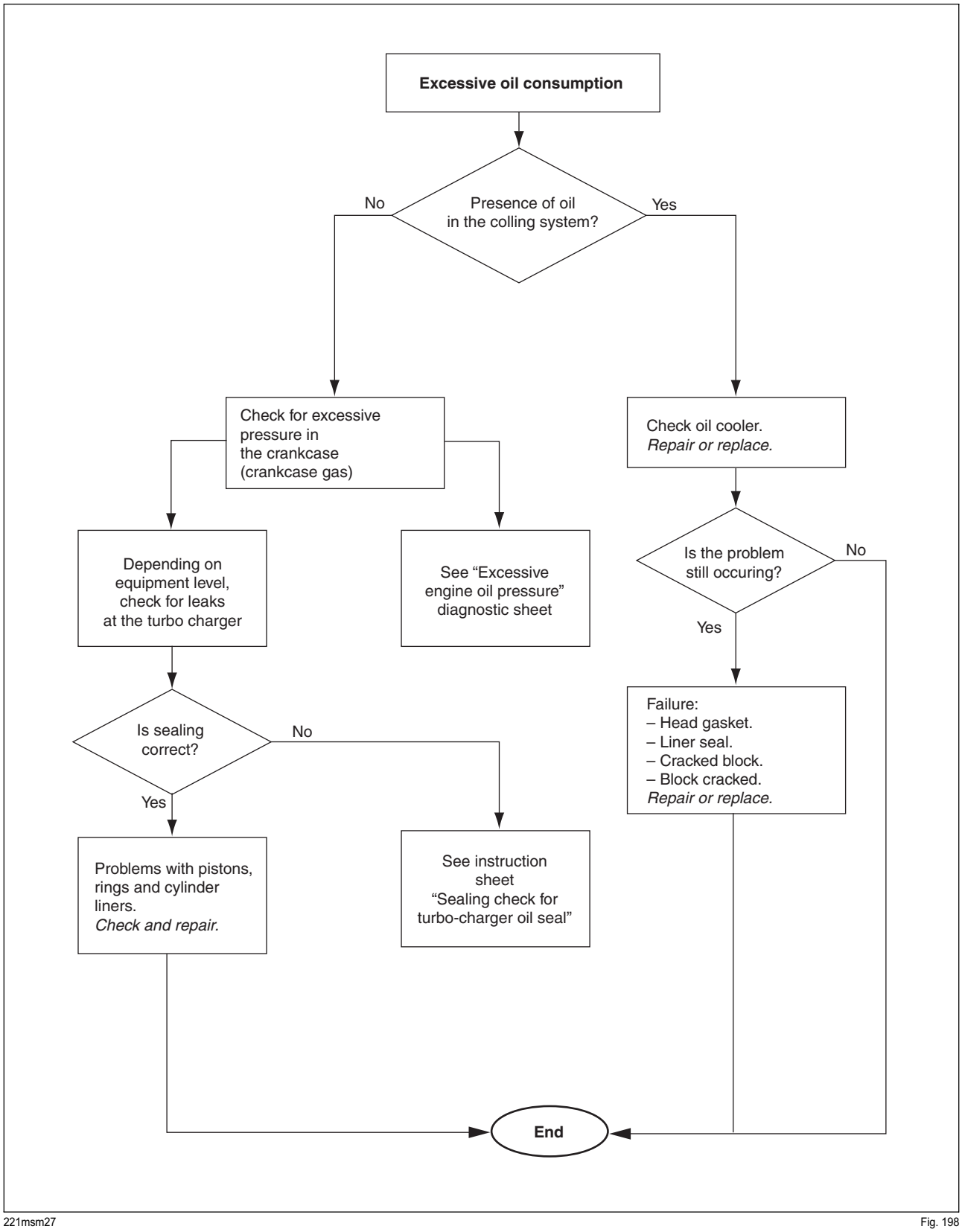


111hsm25 Fig. 161

Diagnostic Sheets

"Excessive oil consumption" sheet

Prior to this procedure, check the sealing on the outside pipes and the cap seals.

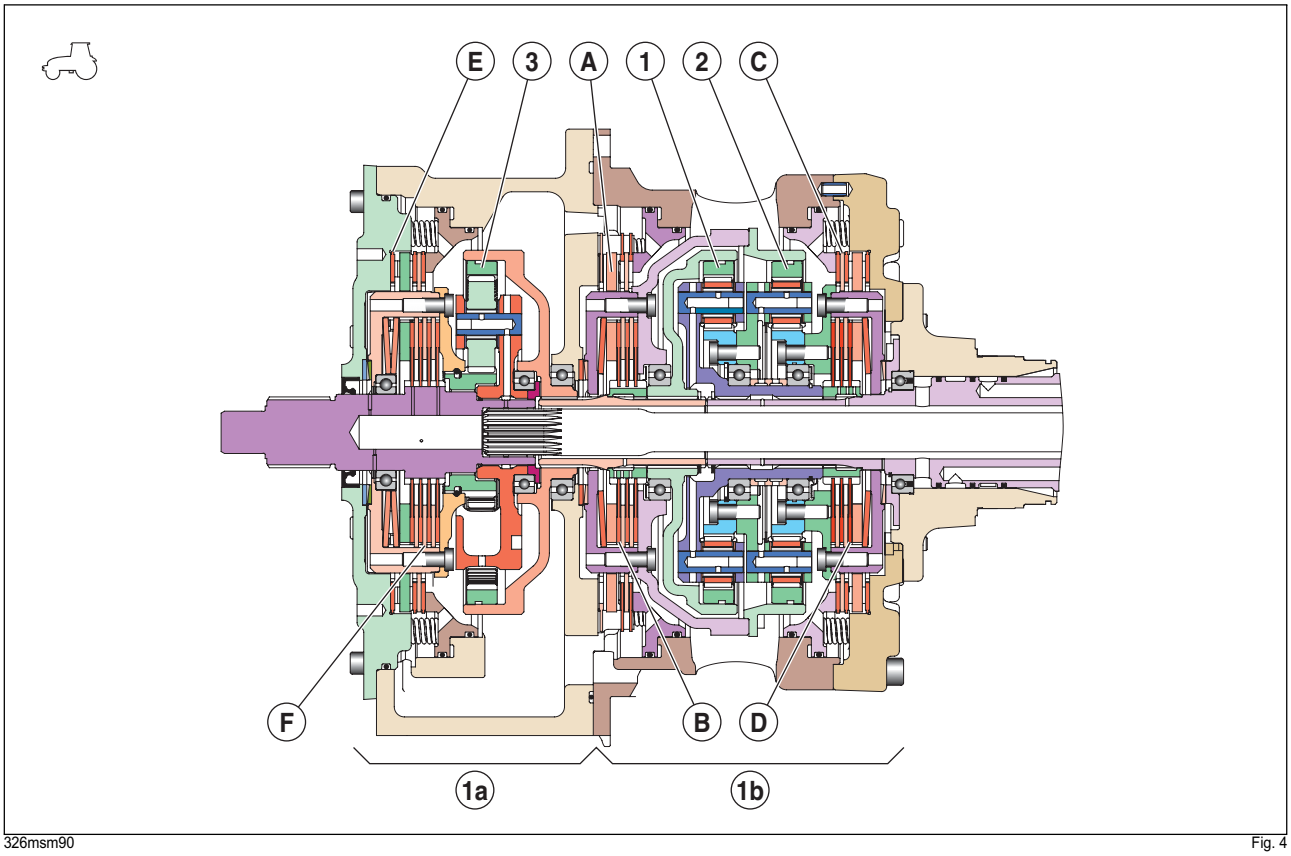


221msm27

Fig. 198

"Hexashift" module

Description



326msm90 Fig. 4

The "Hexashift" module is composed of:

– Speed increaser gearing (1a)

– Module 4 PS (1b).

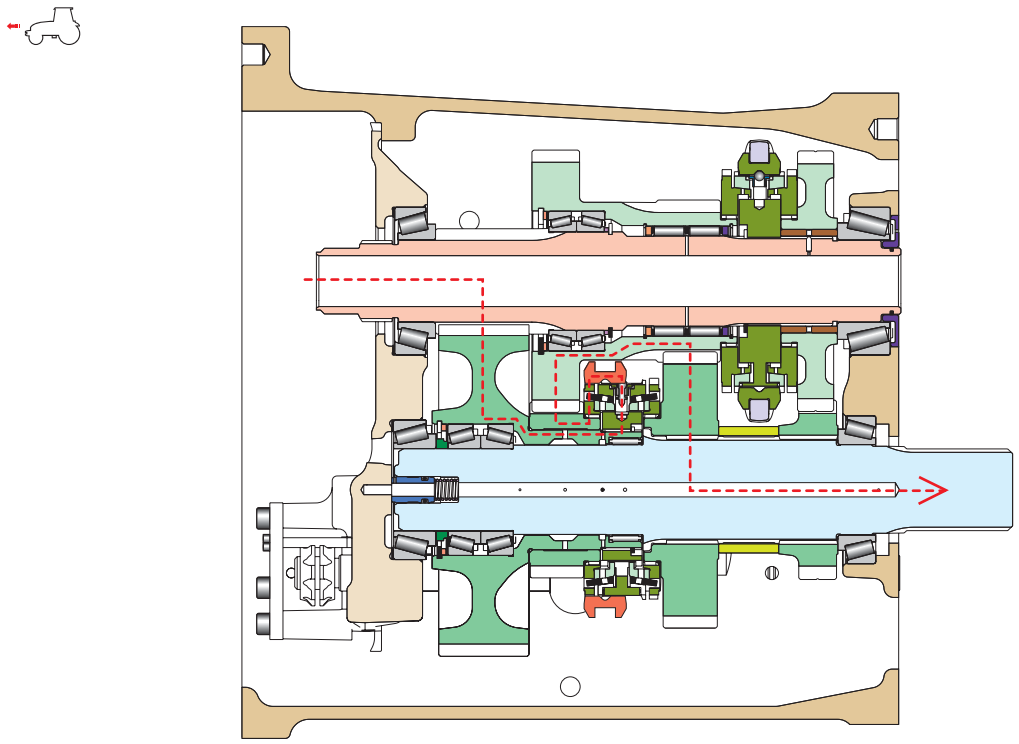
The multiplier (1a) is mainly composed of an epicyclic gear train (3) and a brake clutch (F/E).

The module 4 PS is mainly composed of 2 epicyclic trains 1 primary train (1), 1 secondary train (2) and 2 brake clutches (respectively (B/A) and (D/C)).

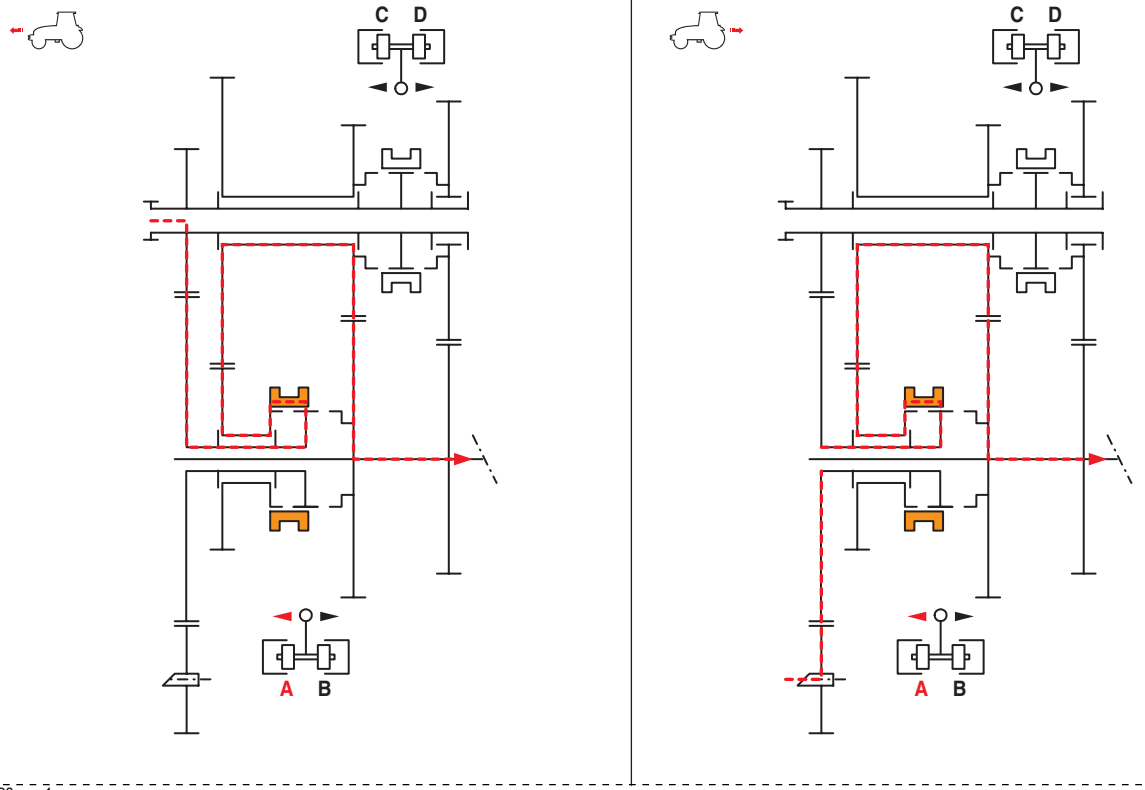
Robot-driven ranges module

Kinematics range "A"

The reduction ratio is 0,1.



326msm1n Fig. 28

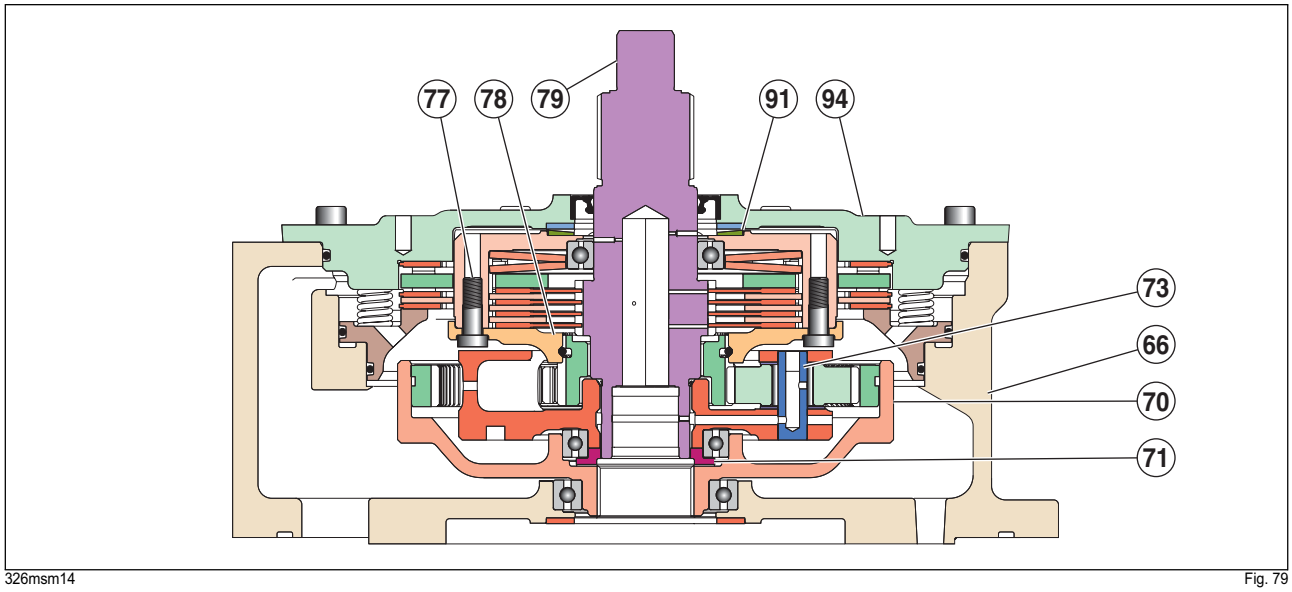


326msm1o Fig. 29

Characteristics GBA 25

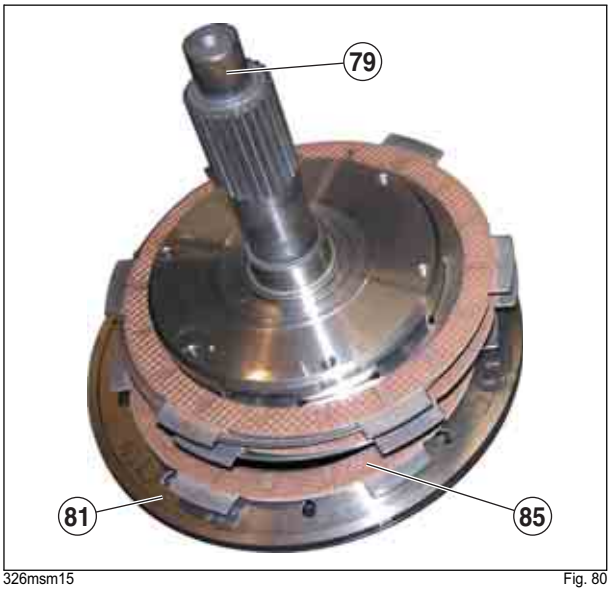
Transmission type		GTA 2522	GTA 2523
Speed increaser gearing			
Number of clutch discs "B"		4	
Number of brake discs "A"		3	
Number of satellites		3	
Module 4 PS			
Number of clutch discs "D"		3	
Number of brake discs "C"		3	
Number of satellites 1st epicyclic train gear		4	
Number of clutch discs "F"		3	
Number of brake discs "E"		3	
Number of satellites 2nd epicyclic train gear		4	
Shuttle reverser			
Number of rear clutch discs, diameter 172,5 mm		6	
Number of front clutch discs, diameter 172,5 mm		6	
Robot-driven ranges module			
Upper line			
Synchronizer		Single cone	
Ram control		Staged jack without spring device	
Lower line			
Synchronizer		Double cone	
Ram control device		Staged jack with spring device	
Range train "D"	40 km/h	46/38	47/37
	50 km/h	50/35	51/24
Crawler ranges module			
Number of satellites for slow		3	
Number of satellites for extra slow		5 + 3	

"Hexashift" module

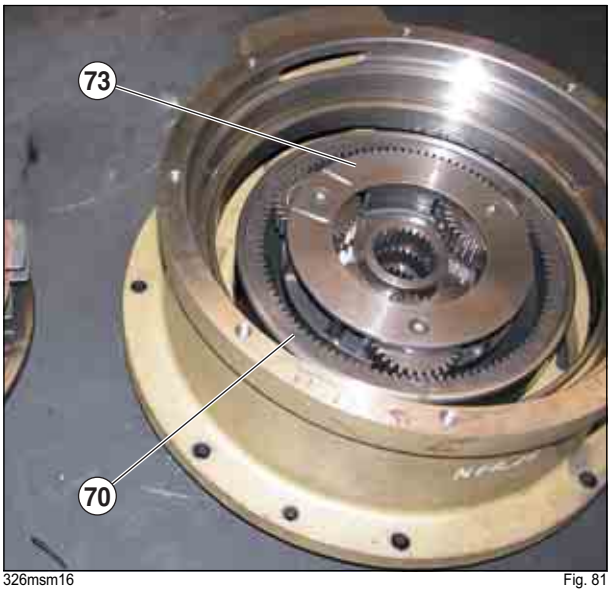


326msm14 Fig. 79

– Turn over the multiplier housing (66).
– Remove the cover (94) marking its position.
– Recover the friction washer (91).
– Pull on the shaft (79) to remove the clutch "E" and brake "F" assembly.
– Loosen the screws (77) of the cover (78) in order to completely remove the clutch "E" and the brake "F".
– Recover the final brake disc (85).
– Remove the piston (81) using a jet of compressed air.
– Remove the planet-carrier (73).
– Recover the bush (71).
– Remove the ring gear (70).



326msm15 Fig. 80



326msm16 Fig. 81

Robot-driven ranges module

Nomenclature

1 Cover.
2 Range "D" stop nut.
3 Range "C" stop nut.
4 Range "B" stop nut.
5 Range "A" stop nut.
6 Stop covers.
7 Stop screw.
8 Screws.
9 Prevention lock.
10 Cam followers.
11 Locating pin.
12 Locating pin.
13 Shims.
14 Bearing cup.
15 Bearing cone.
16 Reverse gear pinion.
17 Bearing cone.
18 Bearing cup.
19 Shims.
20 Bearing cup.
21 Bearing cone.
22 Upper shaft.
23 Retaining ring.
24 Washer.
25 Shims.
26 Bearing cup.
27 Bearing cone.
28 Bearing cone.
29 Bearing cup.
30 Washer.
31 Retaining ring.
32 Range "C" driving pinion and range "A" driven pinion.
33 Locking ring.
34 Washers.
35 Roller bearings.
36 Retaining ring.
37 Range "C" and "D" single cone synchroniser.
38 Bush.
39 Range "D" driving pinion.
40 Bearing cone.
41 Bearing cup.
42 Locking ring.
43 Sealing ring.
44 Retaining ring.
45 O-rings.
46 Cover.
47 O-ring.
48 Piston.
49 Retaining ring.
50 Guide rod.
51 O-ring.
52 Piston.
53 O-ring.
54 O-ring.
55 Fork for ranges "C" and "D".
56 Pin.
57 Plug.
58 Shims.
59 Lubrication tube.
60 O-ring.
61 Spring.
62 Bearing cup.
63 Bearing cone.
64 Retaining ring.
65 Washer.
66 Shims.
67 Shouldered bushing.
68 Bearing cup.
69 Bearing cone.
70 Bearing cone.
71 Bearing cup.
72 Range "A" and "B" driven pinion.
73 Range "A" driving pinion.
74 Needle bearing.
75 Lower shaft.
76 Range "A" and "B" double cone synchroniser.
77 Locking ring.
78 Range "A" and "C" driven pinion.
79 Spacer.
80 Range "D" driven pinion.
81 Bearing cone.
82 Bearing cup.
83 Guide rod.
84 Fork for ranges "A" and "B".
85 Locking ring.
86 Inner piston.
87 O-rings.
88 Retaining ring.
89 Spring.

Robot-driven ranges module

Adjusting the prevention lock

– Place the gearbox in neutral.

– Fully tension the lock (9).

– Apply Frenetanch (242) to the threaded section.

– Slacken the lock to allow the selection of only one gear.

– Leave the other control rod in neutral.

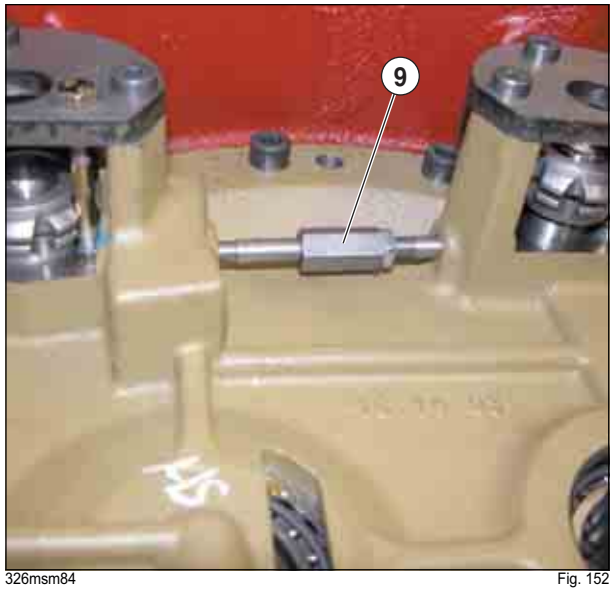
– Tension the lock with a functional minimum play.

– Tighten the lock-nut.

– Using a 22 long socket machined to an outside diameter of 28 mm:

– Fit the sensors and their plungers.

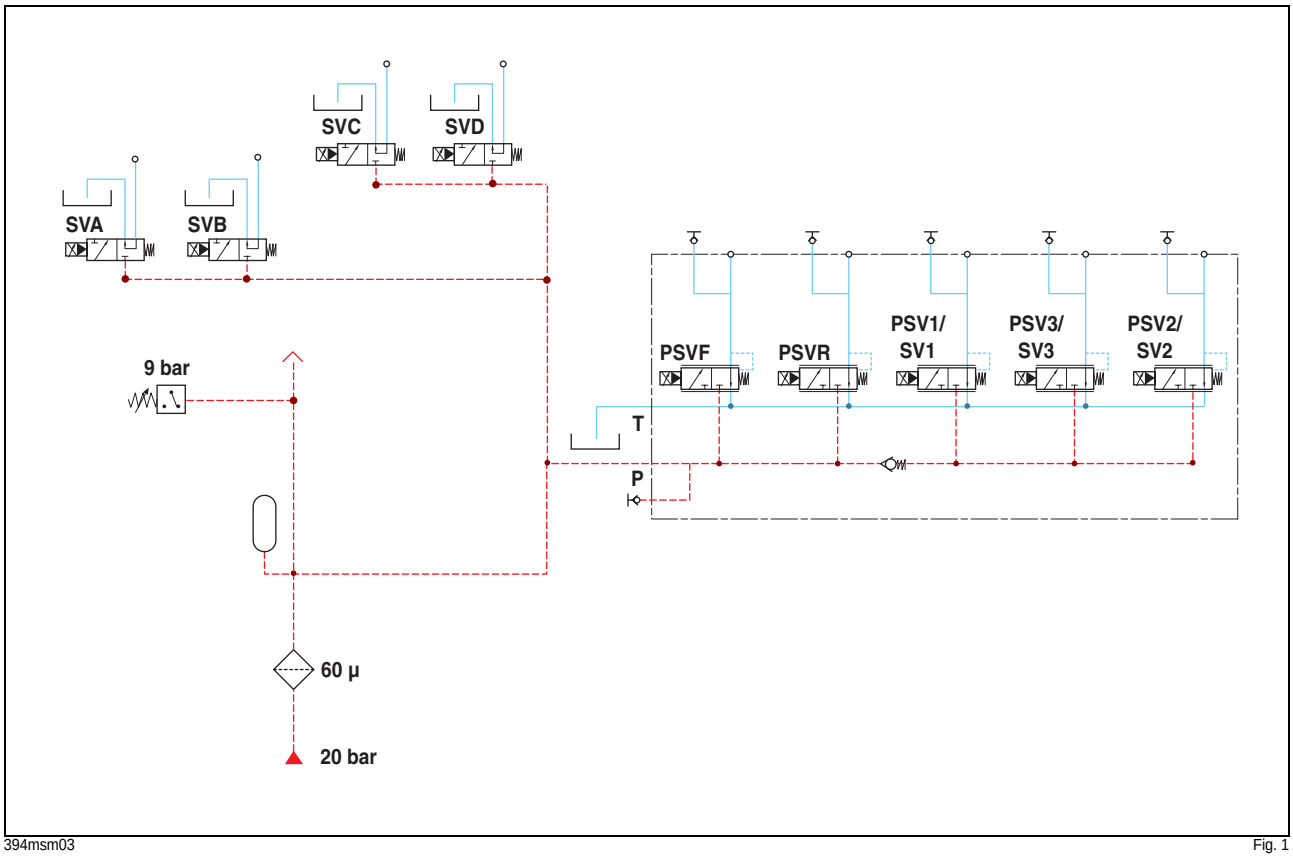
– Using the sensor control LEDs of control unit No. 60 05 006 155, check that 2 ranges cannot be selected at the same time.



326msm84 Fig. 152

Low pressure circuit 20 bar

Description



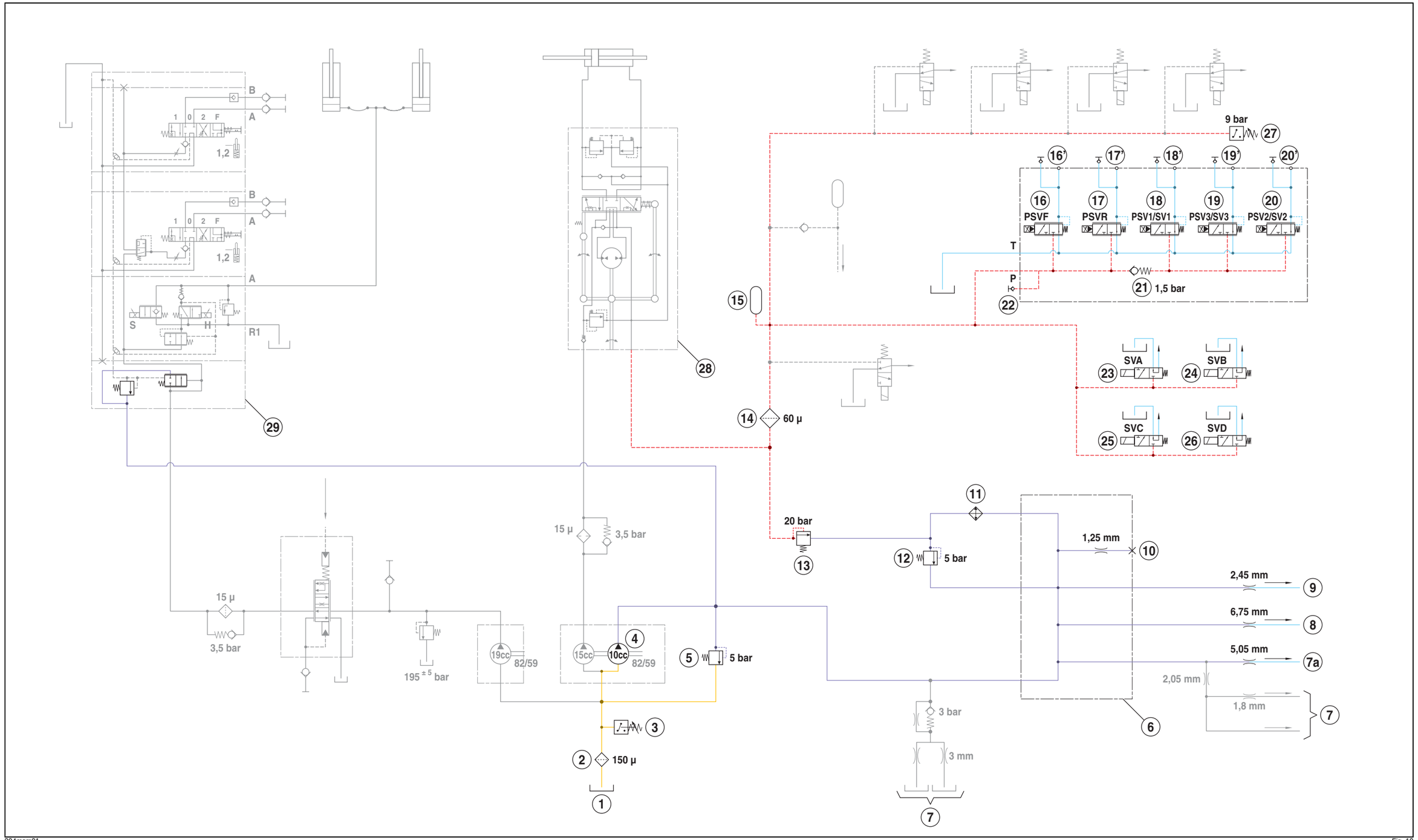
394msm03 Fig. 1

The low pressure circuit maintains a pressure of 20 bar. It allows notably to supply the:
– 3 "Hexashift" solenoid valves: PSV1, PSV2, PSV3* or SV1, SV2, SV3
– 2 proportional forward solenoid valves: PSVF, PSVR
– 4 "on/off" solenoid valves of robot-driven ranges: SVA, SVB, SVC, SVD.
The flow supply of the low pressure circuit depends on the high pressure hydraulic circuit fitted on the tractor.
A 60 micron filter protects the solenoid valves.
The accumulator fills the low pressure circuit upon major flow requirements at low engine speed.
Low pressure is monitored electronically by a 9 bar pressure contact.

** The proportional solenoid valves of the "Hexashift" PSV1, PSV2, PSV3 are now all or nothing solenoid valves from the Ares serial number A0301184 for Ares 607 and A0500884 for the Ares 507.*

Open center 60 l/min

Hydraulic diagram



394msm01

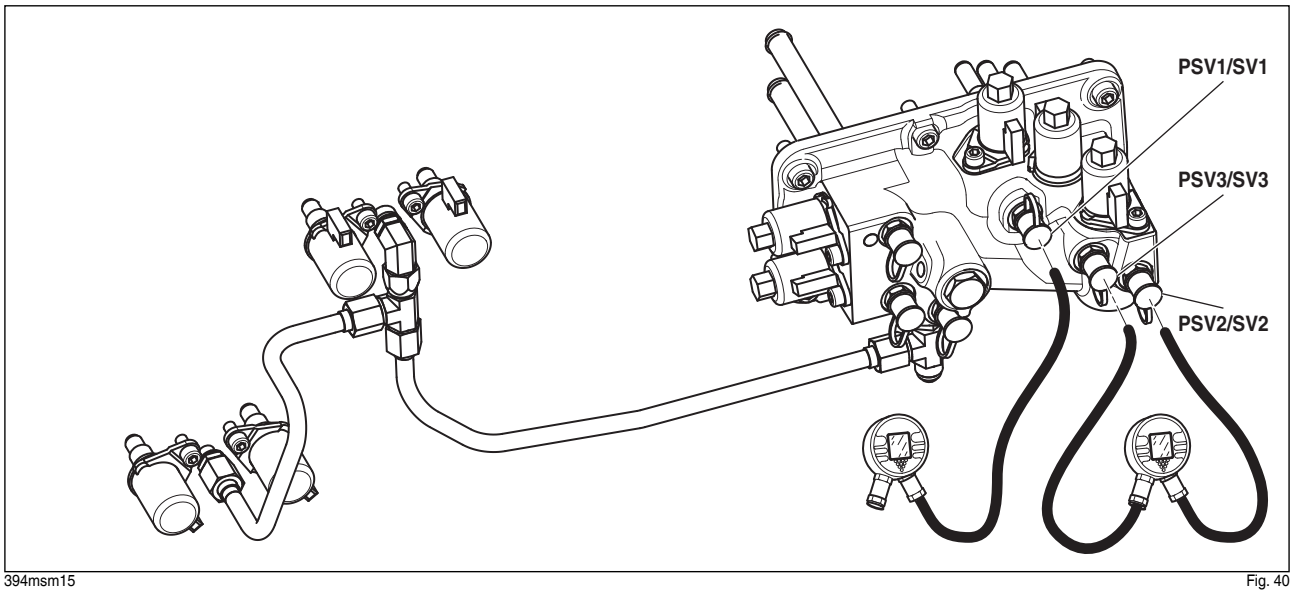
Fig. 19

Control unit GBA 25 measuring and checking points

Test conditions:
– Engine at nominal speed.
– Oil temperature 60 °C.

Checking the “Hexashift” module feed pressures

– Connect the tester n^{o} 60 0570 507 6 to the pressure connection “PSV1/SV1”, “PSV3/SV3” and “PSV2/SV2”.
– Engage the 6 gears in turn.
– The pressure should be 18,5 bar on the corresponding solenoid valves.



394msm15 Fig. 40

Test conditions Transmission oil temperature: 60 °C Engine running at 2 000 rpm	PSV1/SV1		PSV3/SV3		PSV2/SV2	
	Pressure in bar	Solenoid valve supply	Pressure in bar	Solenoid valve supply	Pressure in bar	Solenoid valve supply
First speed	18,5	0,8 A	0	0	18,5	0,9 A
Second speed	0	0	0	0	18,5	0,9 A
Third speed	18,5	0,8 A	0	0	0	0
Fourth speed	0	0	0	0	0	0
Fifth speed	18,5	0,8 A	18,5	0,8 A	0	0
Sixth speed	0	0	18,5	0,8 A	0	0

"Load sensing" 110 l/min measuring and checking points

Test conditions:

– Engine at nominal speed.

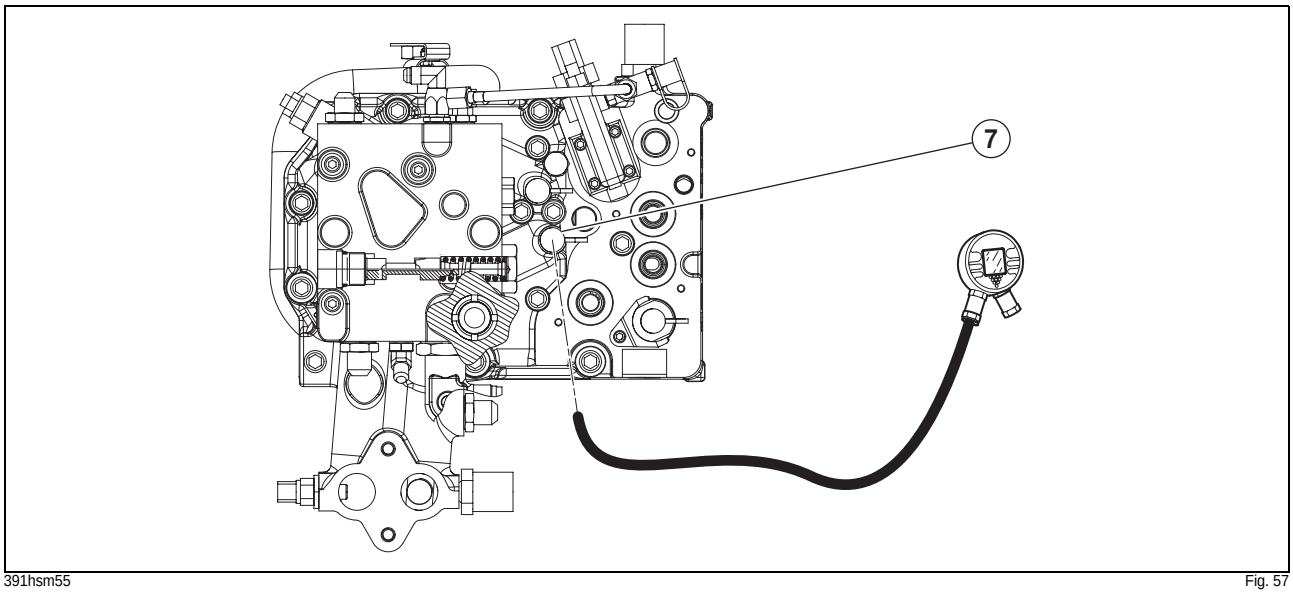
– Oil temperature 60°C.

Lubrication / boost pressure check

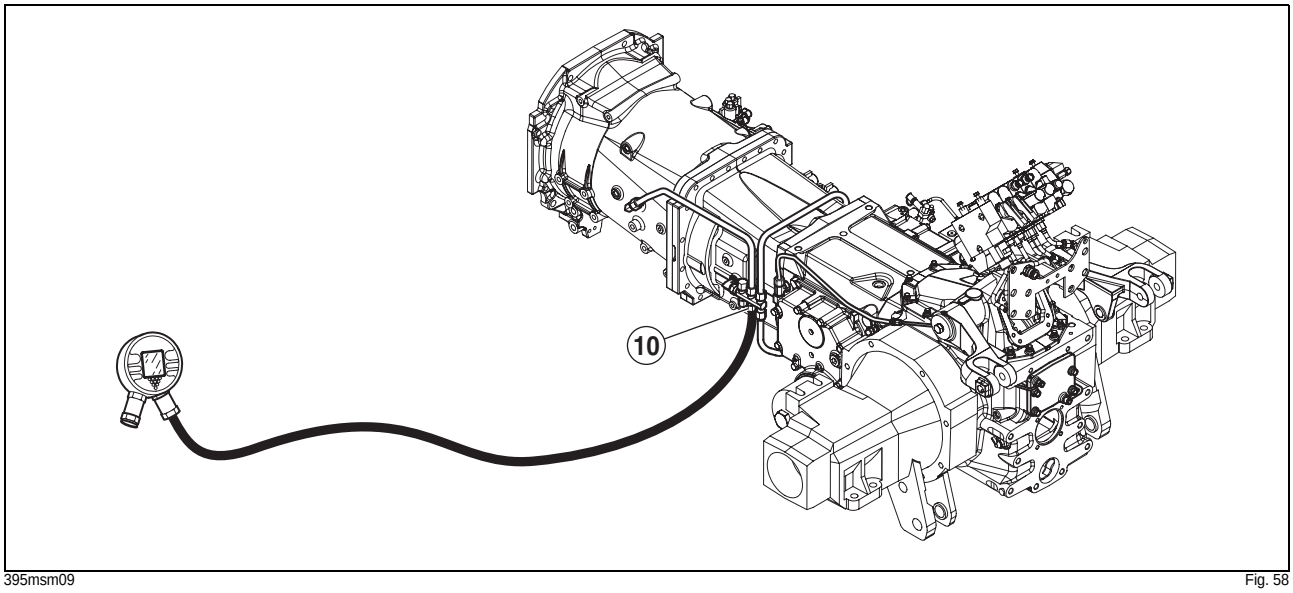
– Connect tester n° 60 05 705 076 to the pressure coupling (7) of the right-hand cover or to the coupling (10) of the lubrication tank.

– The pressure should be 6,3 ± 1 bar (5,5 ± 1 bar at 1 000 rpm) (Fig. 57).

– The pressure should be 3,5 bar (Fig. 58).



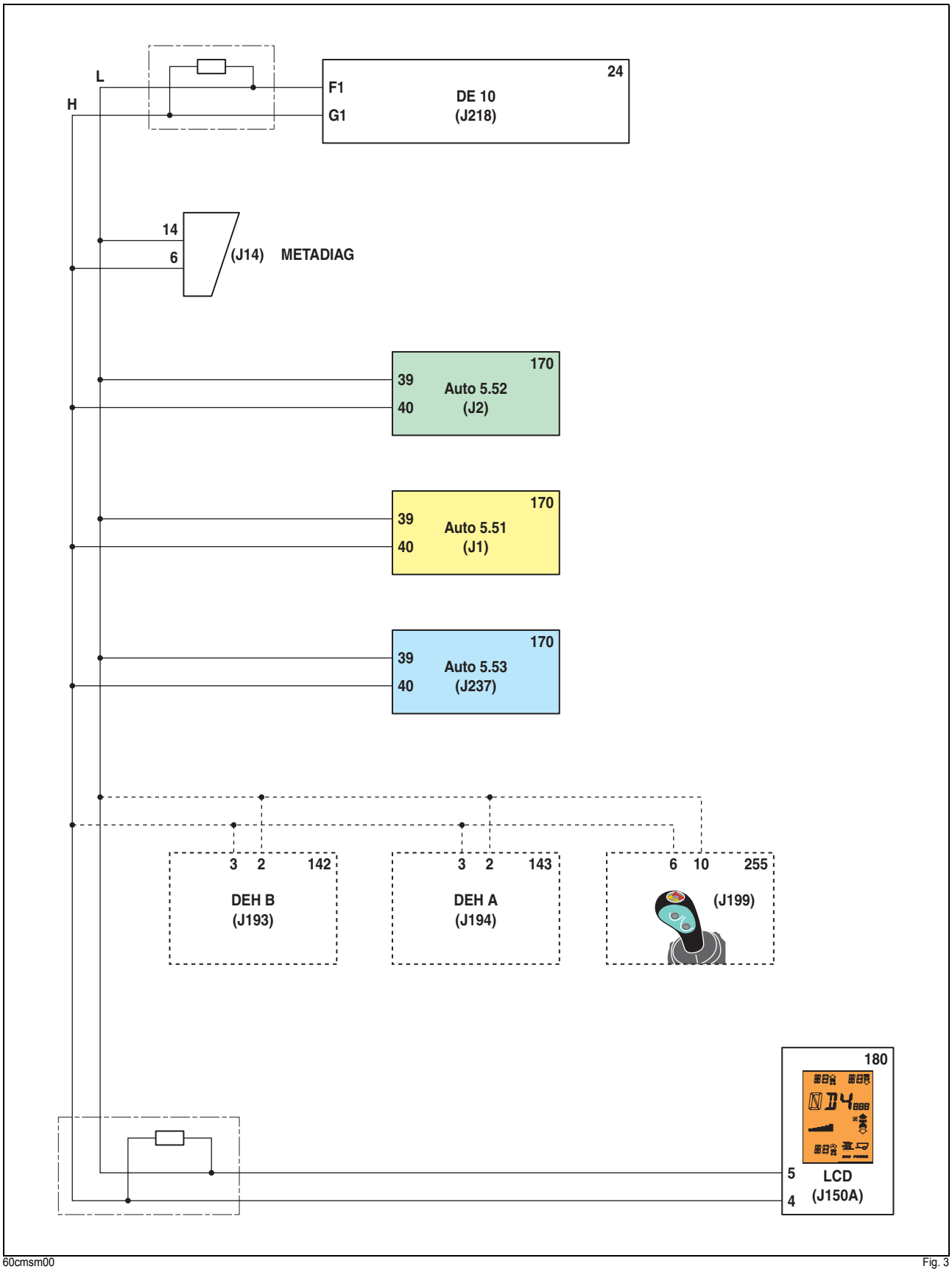
391hsm55 Fig. 57



395msm09 Fig. 58

Electronic transmission control

Communication network



60cmsm00

Fig. 3

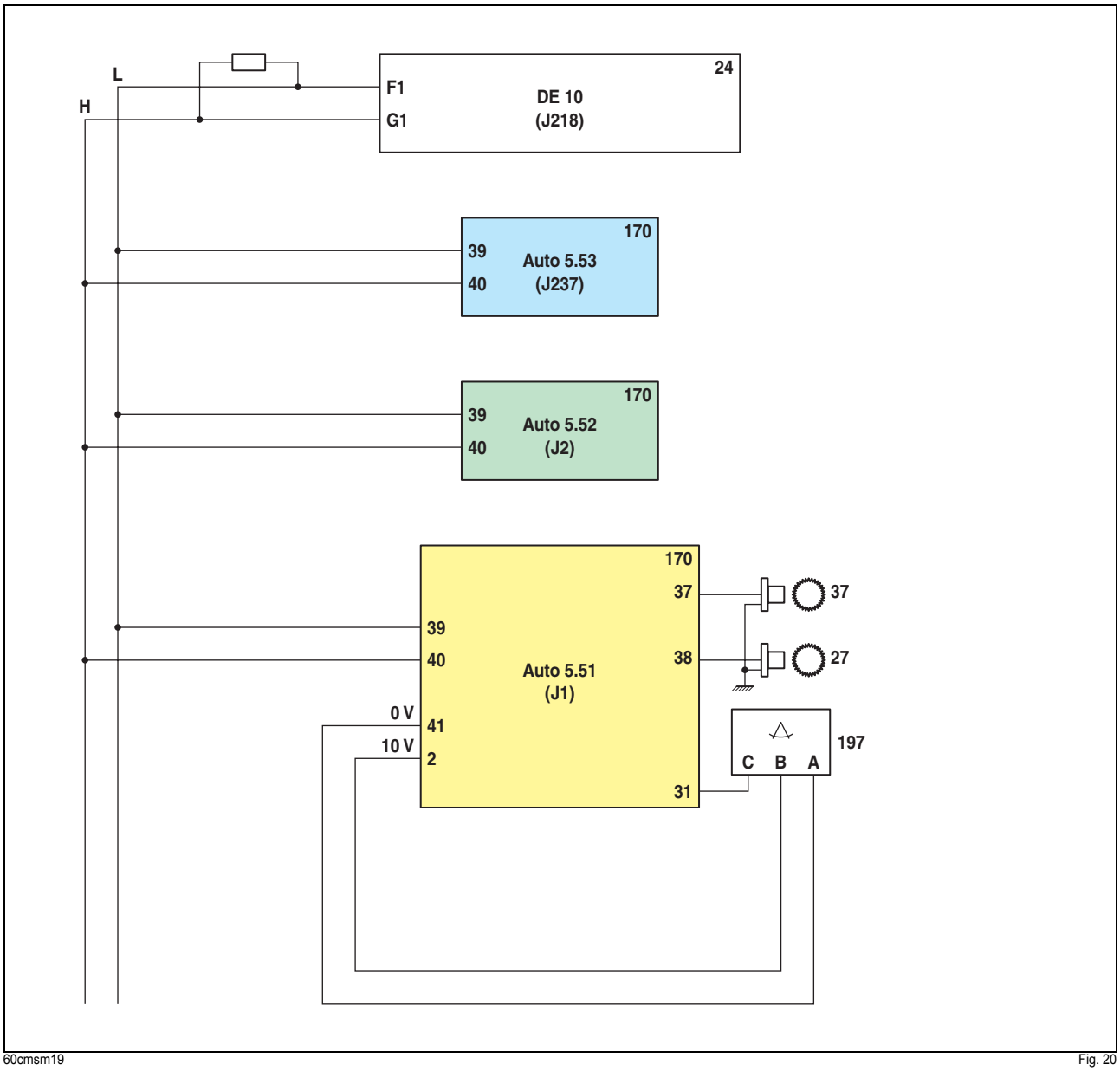
Gearbox electronic control

The management of the reverser under torque obligatorily requires the following functions:
– Power supply
– Gears and safety.

Pin	Function	State	Condition
Auto 5.53			
41	Temperature probe supply	0 V	Master switch on
21	Transmission temperature	0 V to 5 V	Master switch on
23	Driver seat contact	12 V	Driver sitting on the seat
27	Temperature indicator On	12 V	Temperature too high
Auto 5.52			
21	Transmission oil pressure	0 V	Pressure OK
13	Pressure indicator On	12 V	Pressure too low
Auto 5.51			
2	Sensor supply	10 V	Master switch on
41	Sensor supply	0 V	Master switch on
1	Power supply of forward proportional solenoid valves	12 V	Contact On, reverter in neutral, pedal not fully declutched
30	Pedal fully declutched	12 V	Contact On, reverter in neutral, pedal not fully declutched
20	Lever in reverse	12 V	Lever in reverse
16	Lever in forward	12 V	Lever in forward
19	Lever neutral	12 V	Lever neutral
35	Lever raised	12 V	Lever raised
37	Theoretical forward speed	Hz	Tractor in motion
38	Speed reverter output under torque	Hz	Tractor in motion
34	Clutch pedal position	0,5 V to 4,5 V	According to pedal position
26	Diagnostic indicator On	12 V	Gearbox fault
12	Horn On	12 V	Gearbox fault
3	Feedback from rear proportional solenoid valve	0 < ... < 0,8 A	Tractor in reverse
6	Supply of rear proportional solenoid valve	0 < ... < 0,8 A	Tractor in reverse
4	Feedback from forward proportional valve	0 < ... < 0,8 A	Tractor in forward
5	Supply of forward proportional solenoid valve	0 < ... < 0,8 A	Tractor in forward
Full Auto 5			
39	CAN communication	—	
40	CAN communication	—	

Gearbox electronic control

"Overdrive"



60cmsm19 Fig. 20

Nomenclature

24 Engine electronic central unit DE 10.
170 "Auto 5" electronic central unit.
197 Accelerator pedal sensor.

Electrical tests

"Auto-5" electronic unit

Voltage test (on connection concerned)

Test conditions:

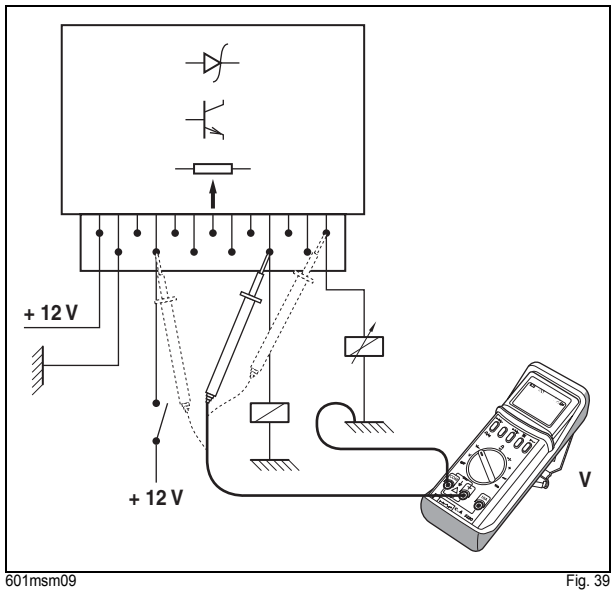
– Power on.

• Energise the input or output to be checked.

• Check the unit's input and output voltage depending on the relevant operating state.

• Connnect a multimeter n° 60 05 006 744 (voltmeter function) in parallel.

• Use tool n° 60 05 033 250 to connect to the connection concerned.



601msm09 Fig. 39

Frequency test (on connection concerned)

Test conditions:

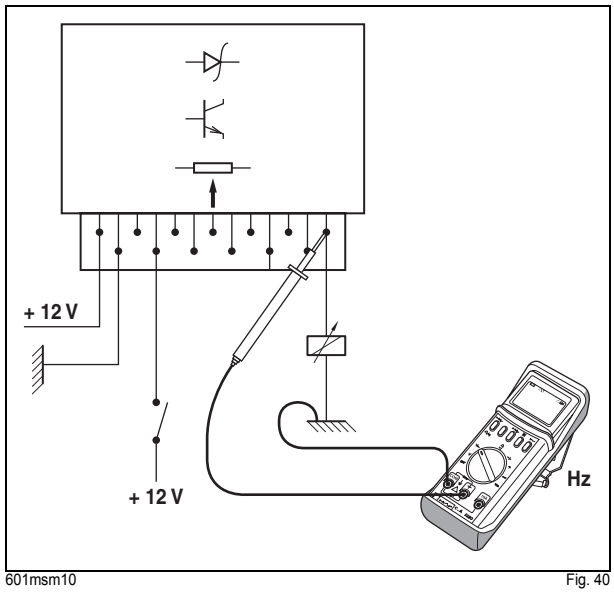
– Power on.

• Activate the input to be checked.

• Check the unit's input voltage against the relevant sensor state.

• Connect a multimeter n° 60 05 006 744 (frequency meter function) in parallel.

• Use tool n° 60 05 033 250 to connect to the connection concerned.



601msm10 Fig. 40

Current test (on connection concerned)

Test conditions:

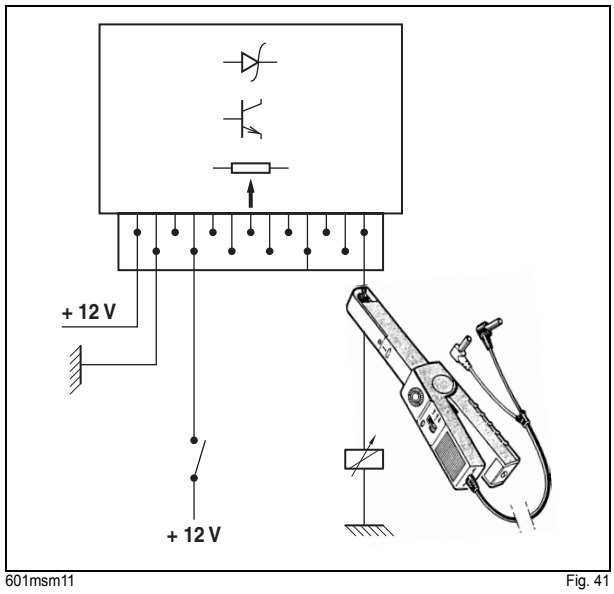
– Power on.

• Activate the output to be checked.

• Check the increase in the current supplied at the output from the unit.

• Connect a multimeter n° 60 05 006 744 (ammeter function) in series.

• Use tool n° 60 05 033 250 to connect to the connection concerned.



601msm11 Fig. 41

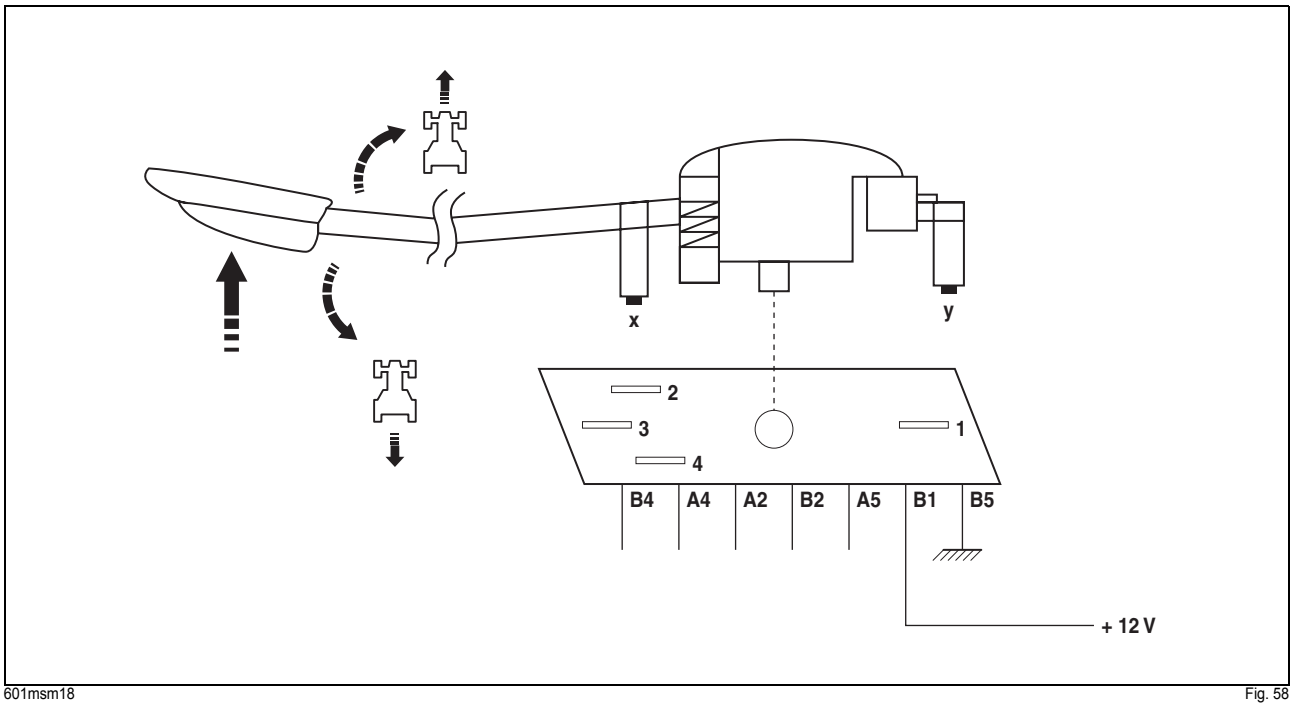
"Shuttle reverser" measurement and checking points

Checking the reverser selector (188)

See electrical tests, controller for details of the checking procedure.

– Two magnets (x) and (y) are located on the reverser selector on either side of the hinge with contacts on an electronic testing board.

– Voltages checked according to the following control logic.



601msm18 Fig. 58

Position	Ignition		B4 (solenoid valves)	A4 (rear)	A2 (front)	B2 (neutral)	A5 (rise)
	x	y					
Forwards	2	—	12 V	0 V	12 V	0 V	0 V
Neutral	3	1	0 V	0 V	0 V	12 V	0 V
Reverse	4	—	12 V	12 V	0 V	0 V	0 V
Rise	—	1 or—	12 V	0 V	0 V	12 V	12 V

Checking the "BOC" low clutch pedal switch

See electrical tests, supply circuit switch for details of test procedure.

– Pedal in high position, contact closed.

– Pedal in low position, contact open.

– Switch supplied at 12 volts by the controller.

Checking the theoretical speed and reverser output speed sensors (37) (27)

See electrical tests, variable reluctance induction sensors for details of test procedure.

Refer to "speed and security" function for test values.

"4-WHEEL DRIVE UNIT" MEASUREMENT AND CHECKING POINTS

"DIFFERENTIAL LOCK" MEASUREMENT AND CHECKING POINTS

"POWER TAKE-OFF" MEASUREMENT AND CHECKING POINTS

"BRAKING" MEASUREMENT AND CHECKING POINTS

Presentation of the rear axle

Foot brake

For transmissions GTA 2522 and GTA 2523 the surface of brake filling increases by 56%.

Brake discs	40 km/h	50 km/h
Internal diameter (mm)	274	243
External diameter (mm)	343	355
Surface area (cm²)	334	526

The tightness between the axle and the axle housing is now ensured by a shoulder and an o-ring.

343msmg1 Fig. 21

"HD" axle tube

Refitting the roller bearings and seals

– Clean the seal bearing faces. The seal bearing faces, the cups and cones should be free from burrs and impacts.

– Coat the outside diameter of the seal (9) with Loctite Oléoétanche (542).

N.B.: Fit the seals the right way round.

Without replacing the shaft (2)

Important: So that the seal lip does not contact on the same position of the shaft, fit the seal at 5 mm from the cup shoulder (Fig. 40).

When replacing the shaft (2)

– Position the seal at 4 mm from the cup shoulder (Fig. 40).

– Lubricate and fit the bearing cups.

– Fit the bush (5) on the face of the axle tube, set back 2,9 mm (Fig. 39).

– Using a suitable jig, fit the 3-lip seal (3) into the wheel shaft.

– Lubricate the shaft (2) and fit the wheel-side cone (4).

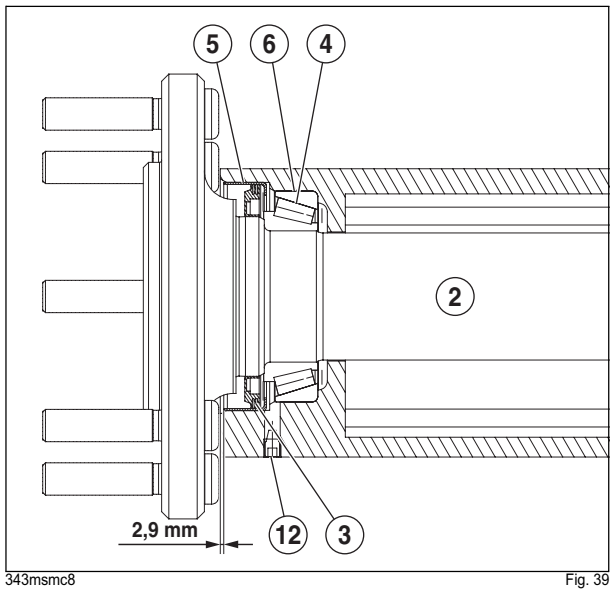
– Grease the cone and lips of the seal moderately.

– Protect the splines of the shaft (2) and insert it in the axle tube.

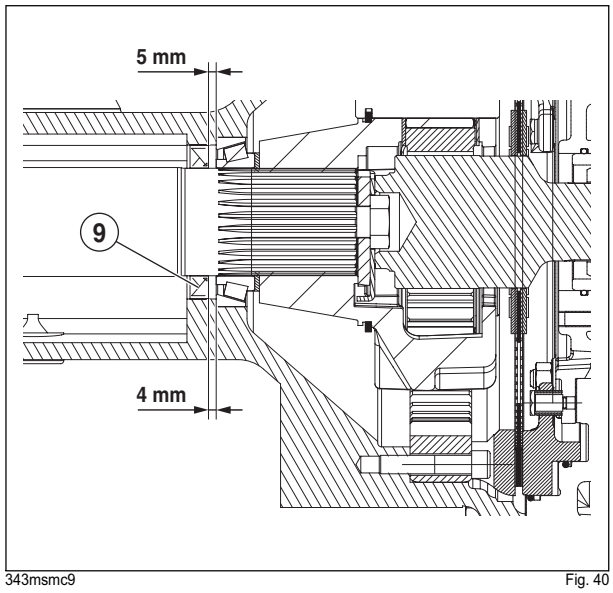
– Shim as described in the procedure below.

– Grease via the plug or the grease nipple (12).

– Refit the axle tube (see relevant paragraph).



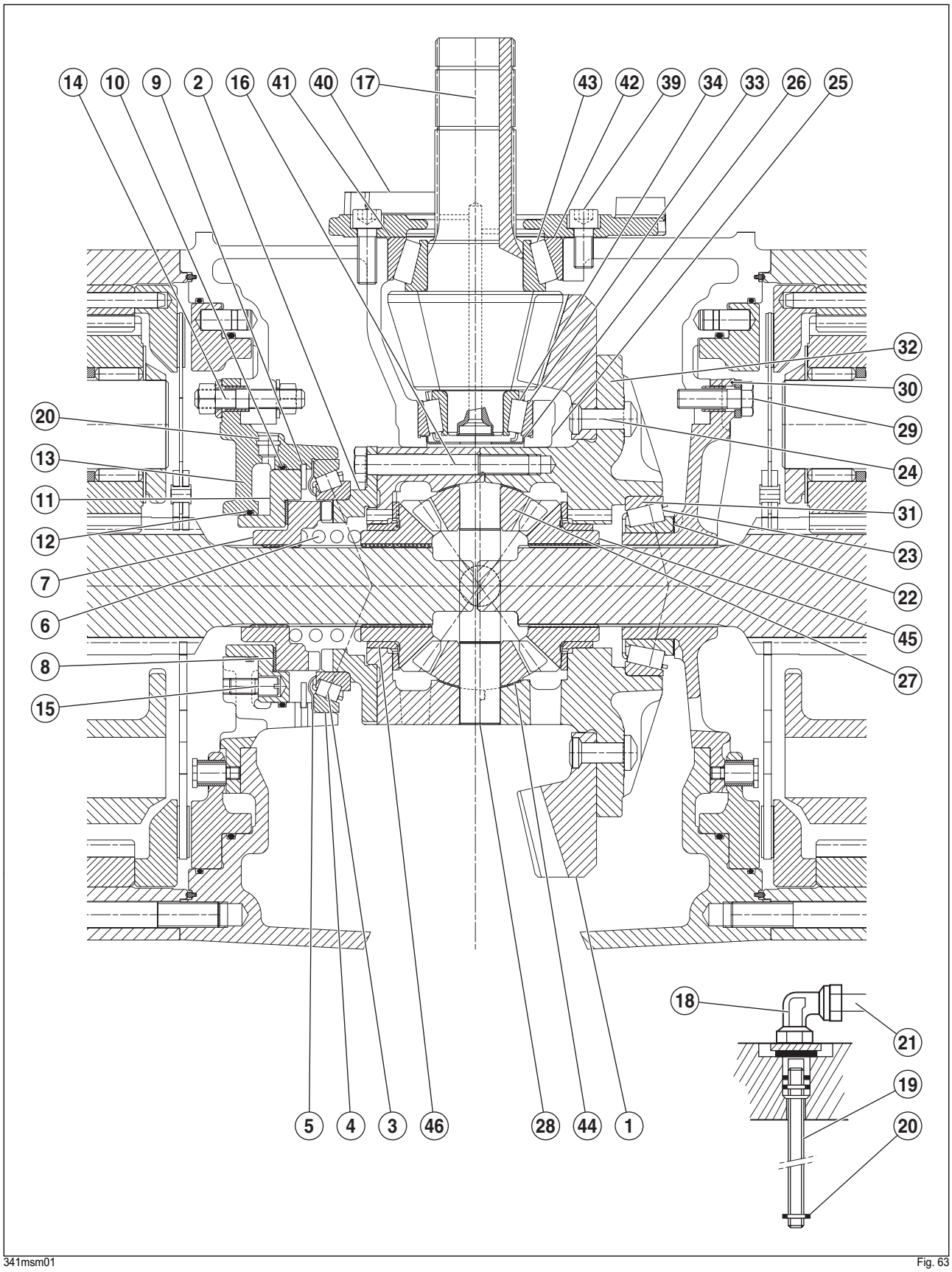
343msmc8 Fig. 39



343msmc9 Fig. 40

Crown wheel and pinion and differential

Sectional view



341msm01

Fig. 63

Crown wheel and pinion and differential

– Refit the spool valve support after having coated the sealing surface with Loctite Formajoint (510).

– Coat the threads of the 4 support attachment screws with Loctite Frenetanch (242).

– Tighten the support attachment screws to 5 to 7 daN.m.

– Refit the hydraulic covers previously removed (see chapter "E").

– Reconnect the PTO brake and lubrication supply hoses.

– Adjust the handbrake.

– Refit the cab (see chapter "H").

– Refit the hitch ladder.

– Adjust the power take-off controls (see relevant paragraph).

– Put the gear fork back in place.

– Glue with Loctite Frenbloc (270) and tighten screw (49).

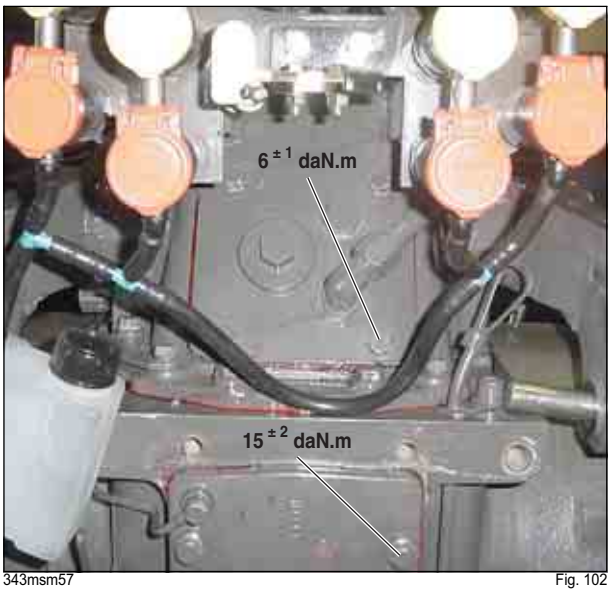
– Set the crawler speed control (see chapter "B").

– Bleed the brake circuit (see relevant paragraph).

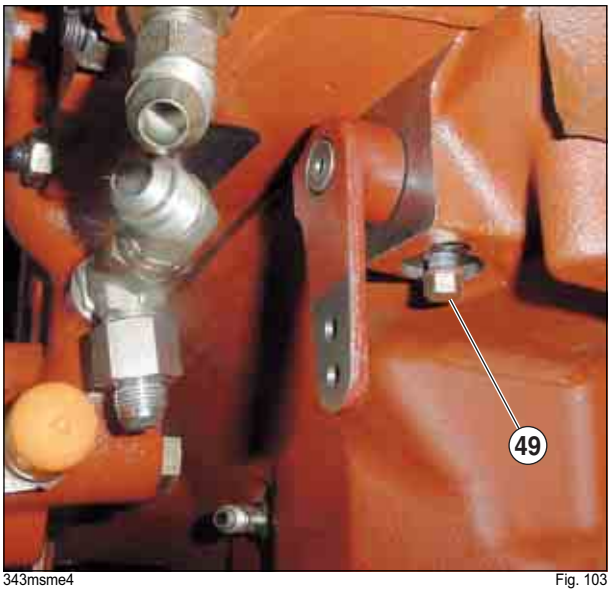
– Tighten the wheel nuts to 42 ± 2 daNm.

– Check the oil level of the casing.

– Test the tractor.



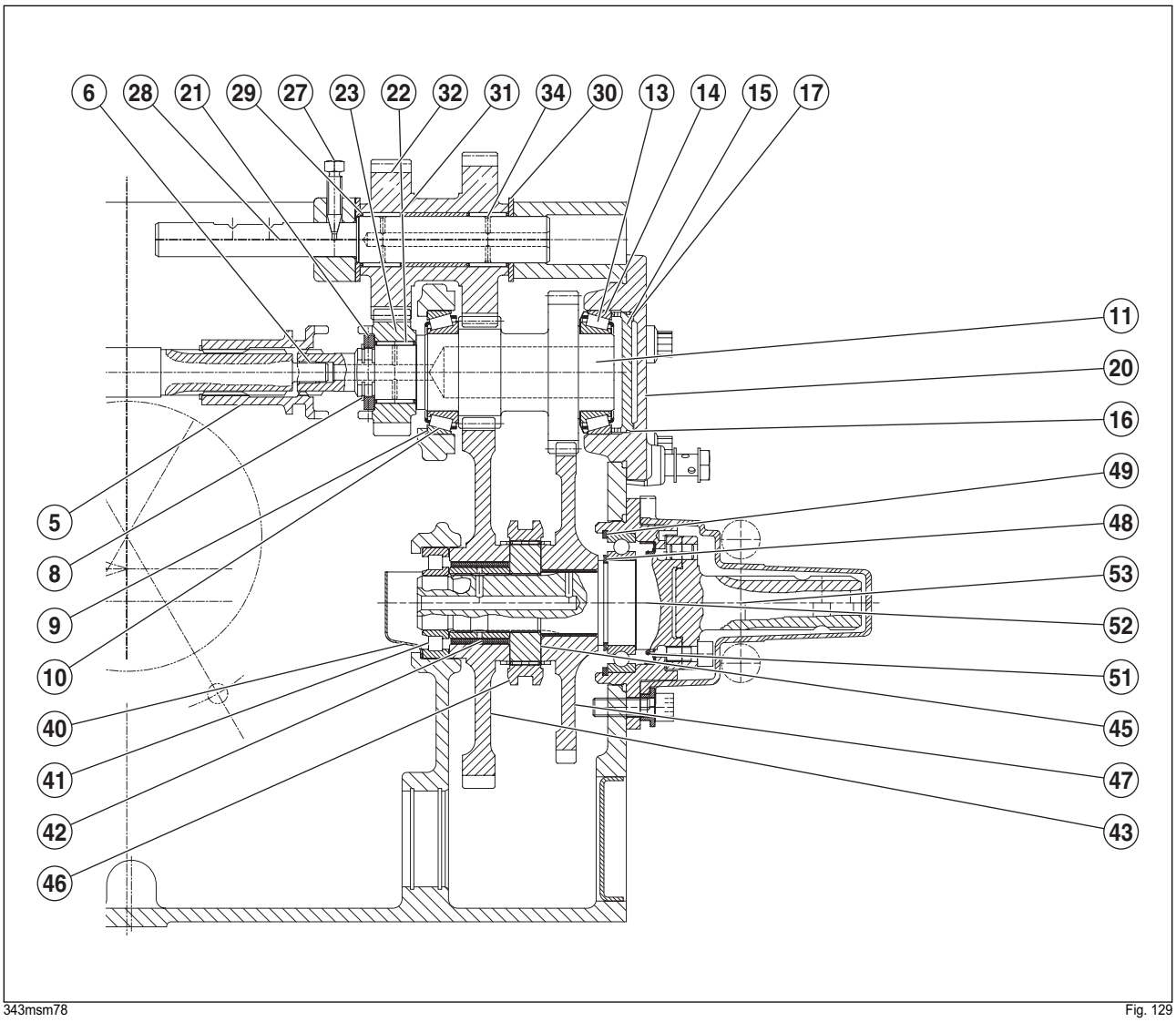
343msm57 Fig. 102



343msme4 Fig. 103

Rear power take-off upper shaft

Sectional view (540 and 1 000 rpm economy)



343msm78 Fig. 129

Nomenclature

1 Power take-off clutch.
2 Screws.
3 Power take-off shaft.
4 Circlip.
5 Sliding sleeve.
6 Bush.
7 Shaft.
8 Circlip.
9 Bearing cup.
10 Bearing cone.
11 18/28 sprocket pinion.
12 Deflector.
13 Bearing cone.
14 Bearing cup.
15 Piston.
16 O-ring.
17 Shim(s).
18 Washer.
19 Screws.
20 Cover.
21 Washer.
22 Needle bearing.
23 21 sprocket pinion.
24 Fork.
25 Nut.
26 Screws.
27 Lock screw.
28 Shaft.
29 Washer.
30 Washer.
31 Needle bearing.
32 28/31 sprocket pinion.
33 Spacer.
34 Needle bearing.
35 Plug.
36 Pin.
37 O-ring.
38 Lock screw.
39 Fork.
40 Deflector.
41 Bearing.
42 Bush.
43 66 sprocket pinion.
44 Pad.
45 Sliding gear hub.
46 Operating sleeve.
47 56 sprocket pinion.
48 Circlip.
49 Locking ring.
50 Bearing.
51 Seal.
52 Shaft.
53 Stub shaft.

– Unscrew the nut (33).

– Remove the shaft (27) and the pinion (29).

Fitting shims to the shaft (27)

– Put the pinion (29) and the shaft (27) in place in the box.

– Assemble without shim (30) in order to obtain some play (Fig. 163).

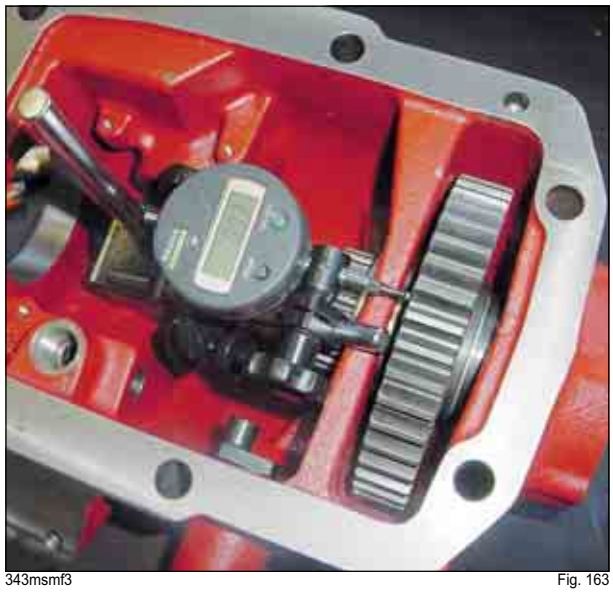
– Tighten nut (33) to 20 daN.m.

– Measure the backlash.

– Shim in order to obtain preload of 0,05 and a play of 0,10 mm.

343msmf2 Fig. 161

343msmf4 Fig. 162



343msmf3 Fig. 163

Transmission service brake 50 km/h

– Coat the brake discs with a suitable oil.

Note: Check that the disc slides freely on the planetary.

– Carry out the tightness test (see relevant paragraph).

– Refit the axle tubes (see relevant paragraph).

– Purge the main brake circuit and the trailer brake circuit (if assembled) (see relevant paragraph).

– Perform the hydraulic and braking road tests.

– Check the seals on the dismantled elements.

Sealing test

Important: When intervening on the brake piston and O-rings, it is highly recommended to check the sealing.

The elbow couplers (5) on the transmissions 50 km/h have throats. In the event of exchange of these elbow couplers, they must a replaced by couplers of the same diameter.

– Keep the piston in place with the locally made tool (Fig. 190 and 191).

– Fit an air inflation nozzle (C) to a JIC (1/2-100) coupling (A) to be screwed onto the bend (5). Connect to a conventional inflation handle fitted with its pressure gauge and place a presssure release valve n° 60 05 005 310 upstream.

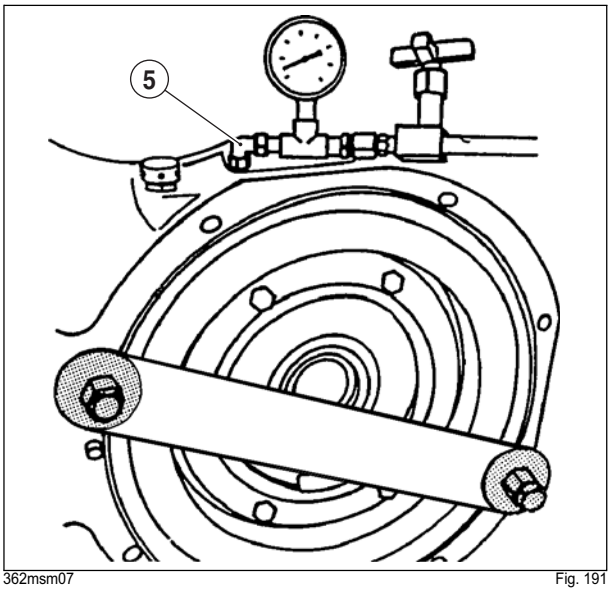
– Supply the circuit with 5-bar compressed air to ensure the proper operation of the piston.

– Reduce the pressure to 0,3 bar.

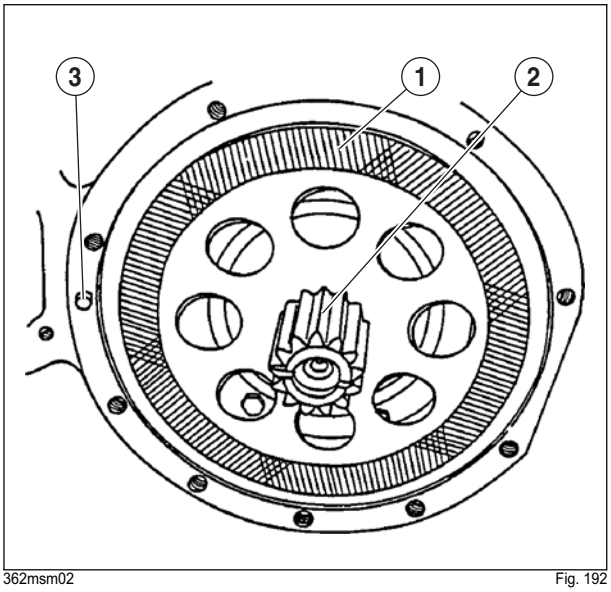
– Close the pressure regulator valve. For 1 minute, no pressure reduction should be noticed on the pressure gauge.

– Remove the pressure gauge. Remove the restraining tool.

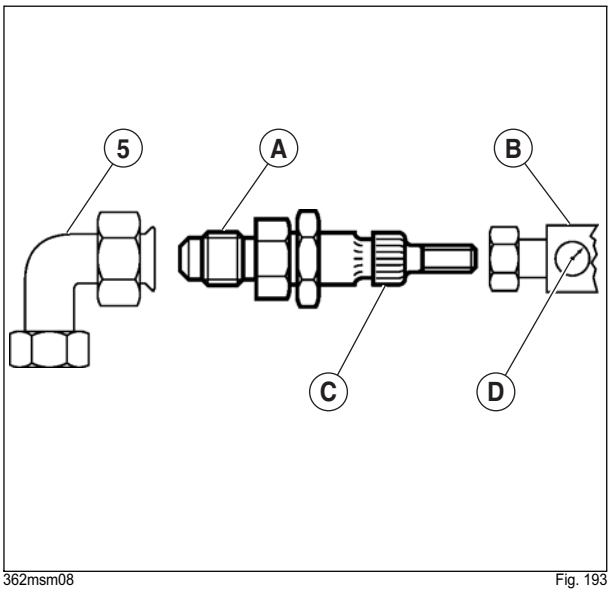
– Connect the brake hose.



362msm07 Fig. 191



362msm02 Fig. 192



362msm08 Fig. 193

Transmission hand brake 50 km/h

Technical specifications

GTA transmission	2522	2523
Brake types	Oil immersed disk brakes	
Diameter of friction discs	165 mm	
Number of discs	5	
Control	Mechanical	

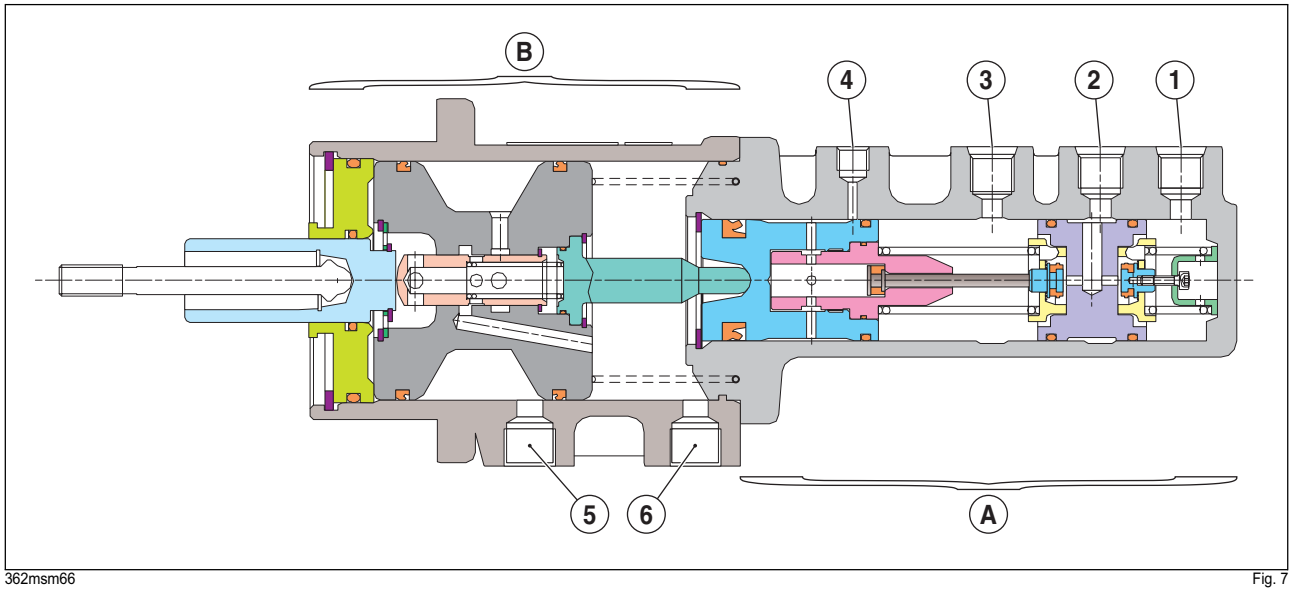
Exploded view

Nomenclature

1 Circlip.
2 Pinion.
3 Screws.
4 Locating pin.
5 Blanking plate.
6 Disc.
7 Backplate.
8 Mechanism assembly.
9 Disc.
10 Washer.
11 Circlip.
12 Spring.
13 Pin.
14 Seal.
15 Washer.
16 Circlip.
17 Screws.
18 Support plate.
19 Drive pinion.
20 Crown wheel.
21 Pin.
22 Pin.
23 Fork end.
24 Stud.
25 Pin.
26 Link.
27 Plate.
28 Nut.
29 Nut.
30 Plate.
31 Spring.
32 Link.
33 Screws.
34 Ball.
35 Circlip.
36 Cam.
37 Finger.

Braking 40 km/h

Brake valve "Iruna" plus "Booster"



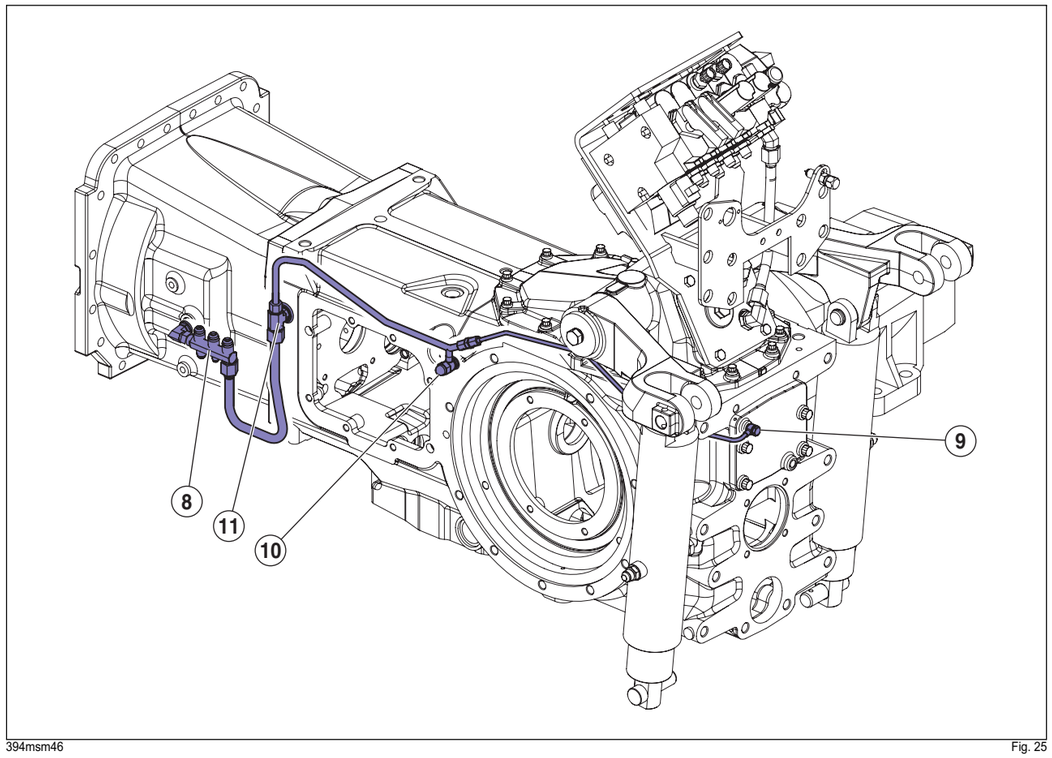
362msm66 Fig. 7

Nomenclature

1	Brake valve control.	**5**	20 bar supply.
2	Jar supply.	**6**	Return.
3	Brake controls.	**A**	Brake valve.
4	Balancing pipe.	**B**	Power brake system "booster".

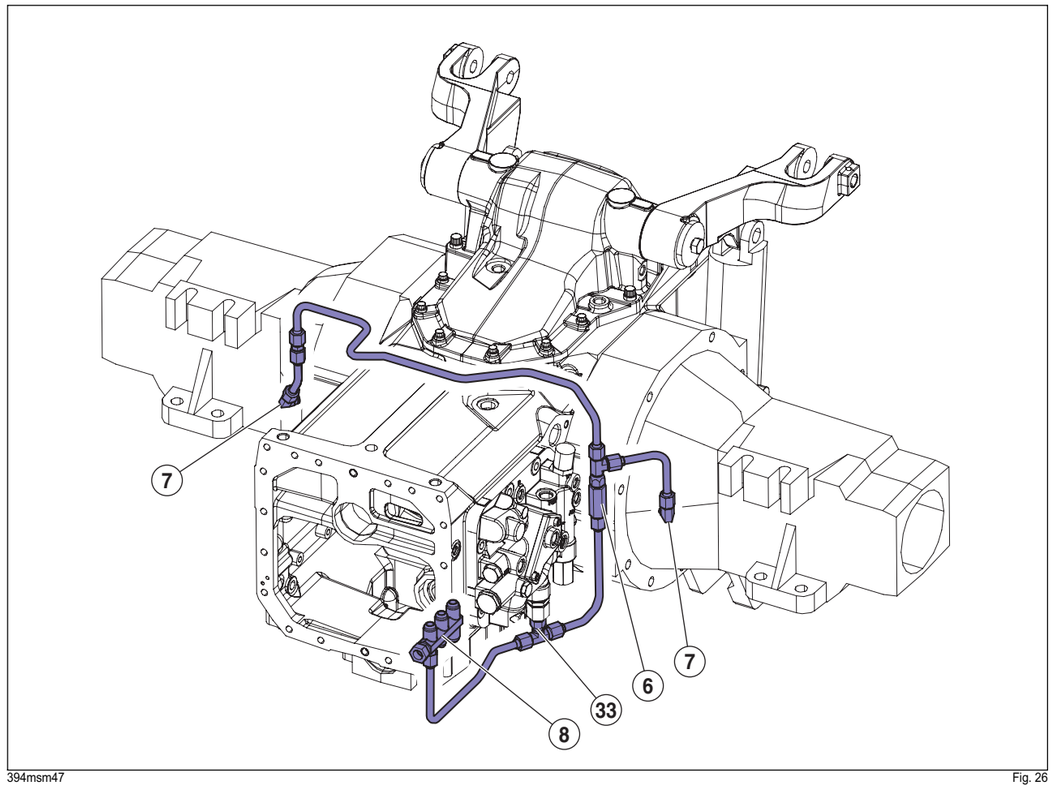
When the brake pedals are operated, the 20 bar pressure is added to the force applied by the foot to help move the master cylinder.

Lubrication of the power take-off, the gearbox lower line and the bevel gear



394msm46 Fig. 25

Brake lubrication



394msm47 Fig. 26

60 l/min open centre measurement and checking points

Test conditions:

– Engine at nominal speed.

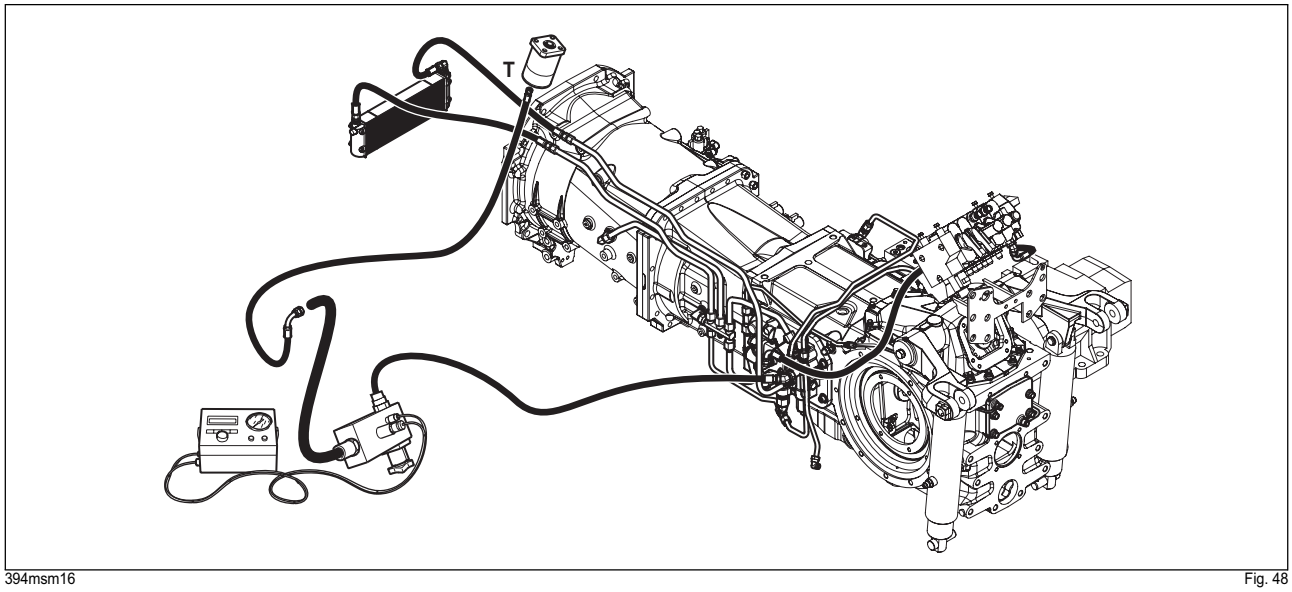
– Oil temperature 60°C.

– Without using actuators (steering, transmission, etc.).

Checking the flow coming from the steering box

– Connect tester n° 60 05 005 736 upstream of the distribution valve.

– Check the flow rate which should be 46 ± 5 l/min.

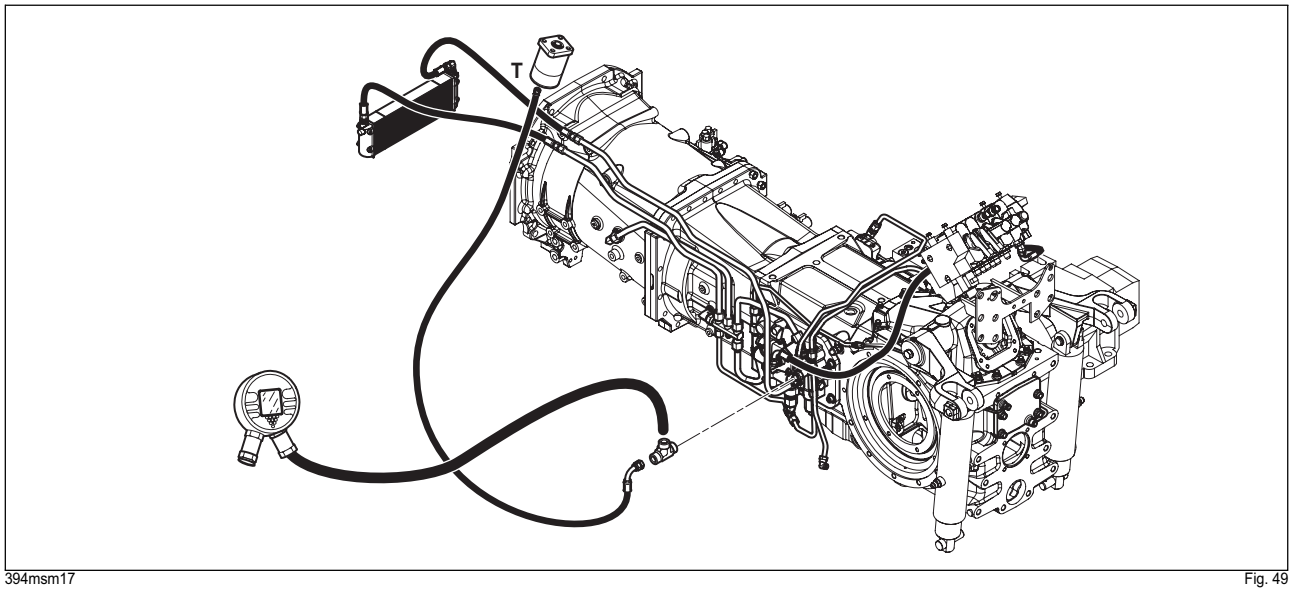


394msm16 Fig. 48

Checking the control pressure

– Connect tester 60 05 705 076 to the left-hand cover as illustrated below.

– The pressure should be 20 bar.



394msm17 Fig. 49

"Load sensing" 100 l/min "inspection results" sheet

This sheet may be copied and should be completed for each operation on the tractor. If it has to be returned to the manufacturer's after sales department; the following must be included:

Tractor type: .....

Serial n°: .....

Total operating hours: .....

Date of operation: .....

Checking the flow coming from the steering box

Test conditions Oil temperature 60°C	Flow in l/min	Measured value
Engine running at 2 200 rpm	46 ± 5	

Checking the control pressure

Test conditions Oil temperature 60°C	Pressure in bar	Measured value
Engine running at 2 200 rpm	20	

Cooler inlet flow rate check

Test conditions Oil temperature 80°C	Flow in l/min	Measured value
Engine running at 2 000 rpm	24 ± 2	

Cooler inlet presssure check

Test conditions Oil temperature 80°C	Pressure in bar	Measured value
Engine running at 2 000 rpm	6	

Checking the lubrication flow rate from the spool valves and the 10 cm³ pump

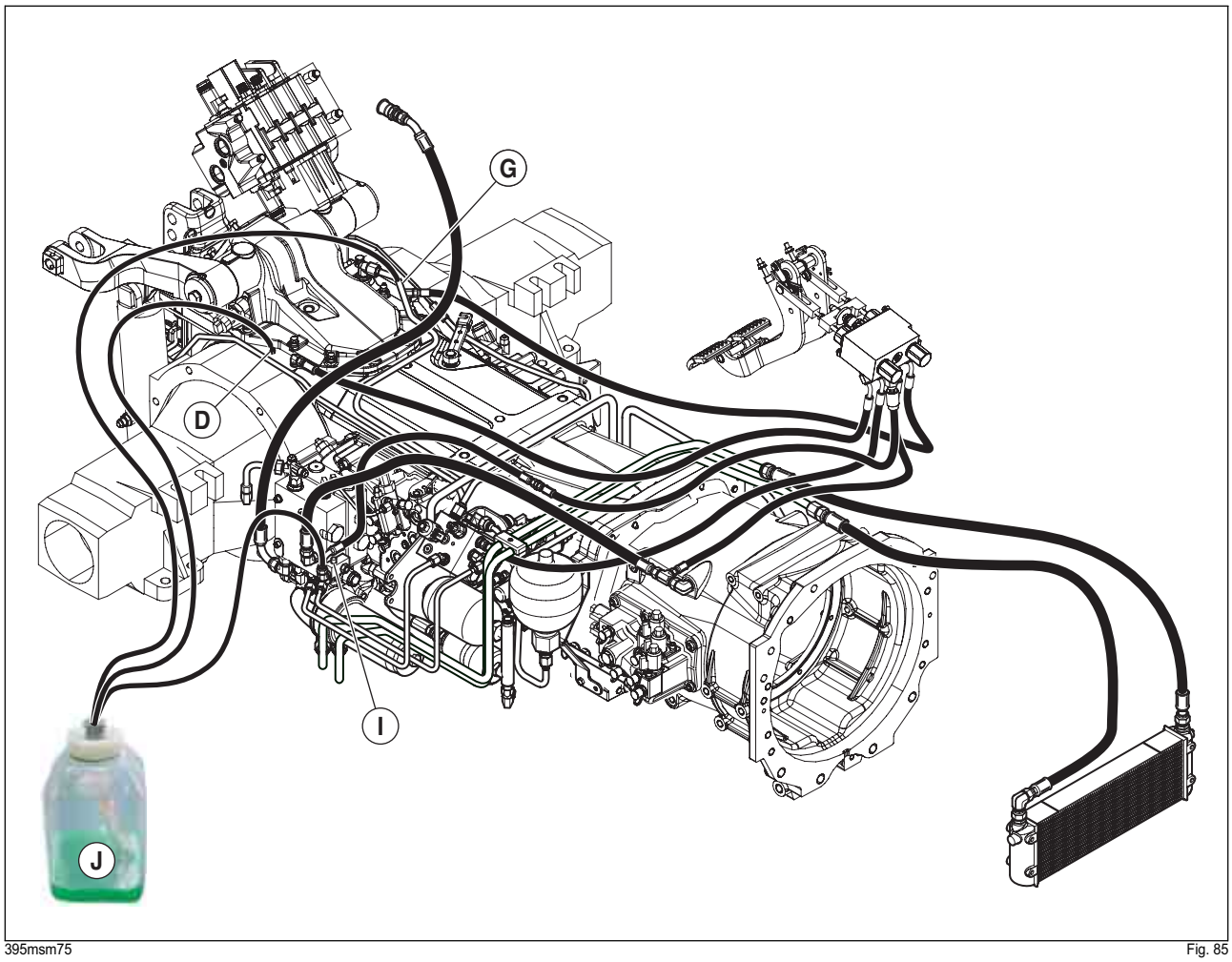
Test conditions Oil temperature 60°C	Flow in l/min	Measured value
Engine running at 2 000 rpm	30 ± 5	

Checking the rear axle lubrication pressure and flow rate

Test conditions Oil temperature 75°C	Pressure in bar	Measured value
Engine running at 2 200 rpm	3 to 4	
	Flow in l/min	**Measured value**
	35	

Transmission braking circuit (50 km/h version)

Purging the circuit



395msm75 Fig. 85

– Start the engine.

– Press on both brake pedals at the same time with moderate strength (30 daN).

– Unscrew the right brake purge screw (D), left brake purge screw (G), and the braking valve (I).

– Let the oil flow through a transparent tube until the air bubbles have disappeared.

– Close the purge valves and release the brake pedals.

– Check the firmness of the pedals.

Electronic rear axle control

Braking circuit solenoid valve control logic

Engine ignition phase

Pressure	Electrical state	Hydraulic state
All pressures	12 V	No inflation

Inflation phase after engine ignition

Pressure	Electrical state	Hydraulic state
< 90 bar	0 V	Inflation up to 105 bar
> 90 bar	12 V	No inflation

Engine running after inflation phase

Pressure	Electrical state	Hydraulic state
< 75 bar	0 V	Inflation up to 90 bar
> 90 bar	12 V	No inflation

"Power take-off" measurement and checking points

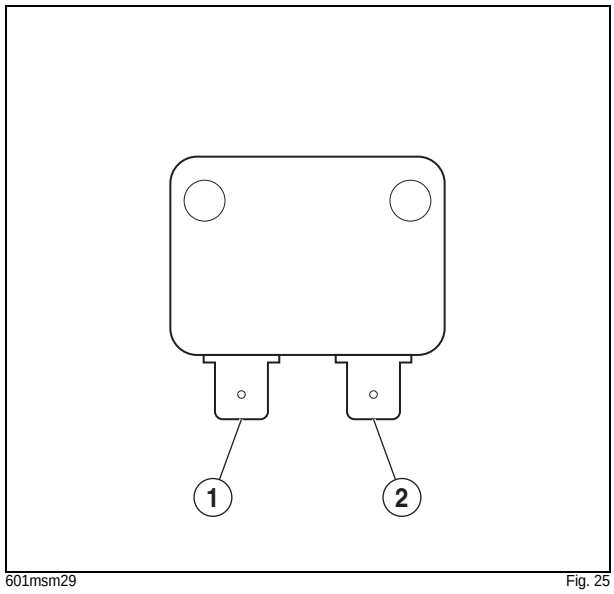
Checking the economical PTO selector switch (42)

See electrical tests, reed switch for details of checking procedure.

– Switch neutral, contact open between terminals "1" and "2".

– Switch actuated in the presence of a magnet on the economical speed selection lever, contact closed.

– Switch supplied at 12 V.



601msm29 Fig. 25

Checking the ground speed proportional PTO selector switch (41)

See electrical tests, supply circuit switch for details of test procedure.

• Switch at rest, proportional PTO disengaged:

– Contact open between terminals "a" and "a+".

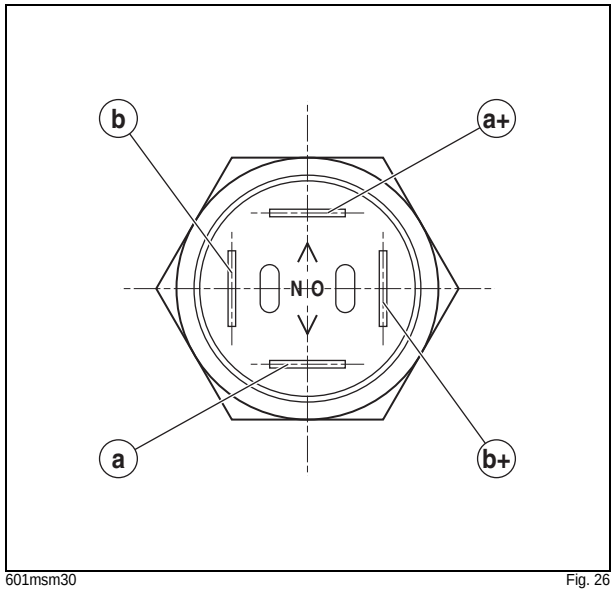
– Contact closed between terminals "b" and "b+".

• Switch actuated, proportional PTO engaged:

– Contact closed between terminals "a" and "a+".

– Contact open between terminals "b" and "b+".

• Switch supplied at 12 V.



601msm30 Fig. 26

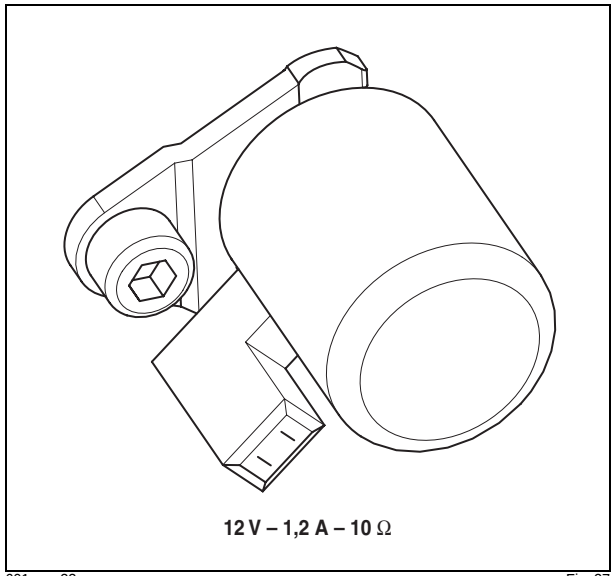
Checking the rear PTO solenoid valve (103)

See electrical tests, on/off solenoid valve for details of test procedure.

– Solenoid valve at rest (PTO disengaged).

– Solenoid valve powered (PTO engaged).

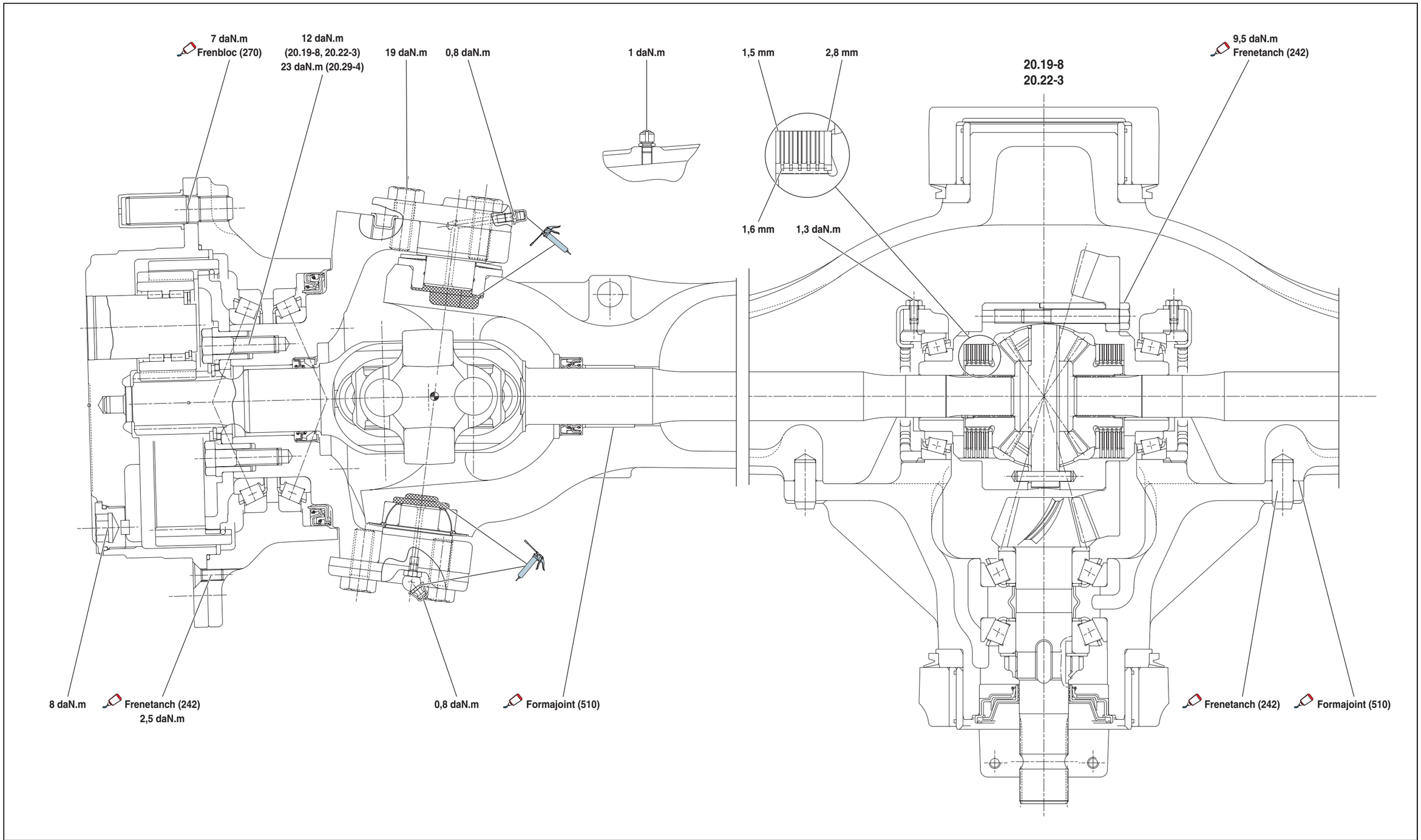
– Solenoid valve supplied at 12 V.



601msm33 Fig. 27

Main torques

Tightening torques and sealants



451msm07

Fig. 9

Bevel gear and differential

Removing the bevel gear and differential

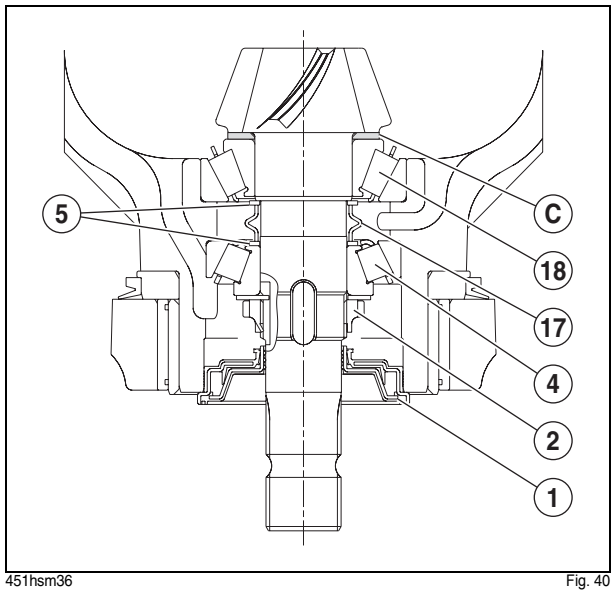
– Immobilise the tractor (see "Preliminary operations prior to working on the front axle").
– Remove the front axle.

N.B.: To remove the drive pinion and differential lock assembly, the universal shafts must be removed beforehand.

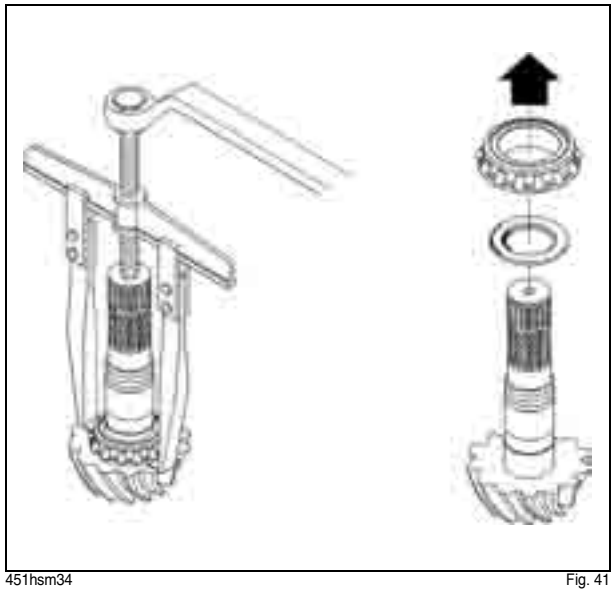
– Drain the differential by unscrewing the plug (19) (Fig. 42).
– Remove the bearing (12) by unscrewing the screw (13).
– Extract the bushes (9), (10), (7).
– Remove the sealing bush (1).
– Loosen the bevel pinion nut (2) using tool n° 60 05 006 536.
– Support then remove the cover (16) containing the drive pinion and differential.
– Remove the screws (34) and locking tabs (35) and (57).
– Mark the differential bearing flanges (22) in relation to the cover (16) to avoid reversing them on refitting.
– Unscrew the slotted nuts (36) with tool n° 60 05 006 534 and nut (56) with tool n° 60 05 006 581 (axle 20.29-4).
– Remove the screws (23).

Note: Do not reverse the bearings of the differential bearing blocks if they are not replaced.

– Put the cover fitted with the bevel pinion in a vice.
– Hold the drive pinion.
– Unscrew the nut (2) from the bevel pinion and extract it.
– Extract the inner bush from the bearing with an extractor.
– Extract the outer rings from the bevel pinion bearings (4) and (18).



451hsm36 Fig. 40


451hsm34 Fig. 41

– Remove the cover (35), the discs (33) and the backplates (34).

N.B.: According to the tractor reference, the hub (30), the cover (35), the Belleville washers (31), the discs (33) and the backplates (34) may differ.

– Separate the hub (30) from the housing (32).
– Remove the O-ring from the hub (30).
– Remove the Belleville washers.
– Remove the two rings (12) (Fig. 66).
– Extract the cone (19) using a press and an appropriate installation.

474msm07 Fig. 66

Refitting the clutch

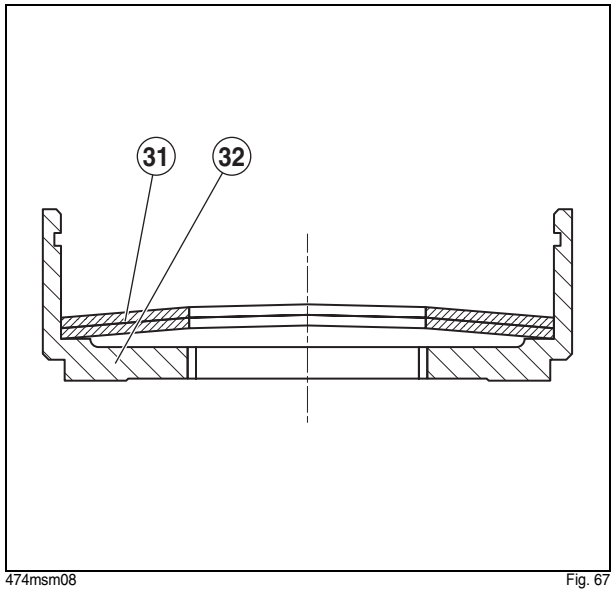
N.B.: All seals must be changed and lubricated on refitting.

N.B.: If the proportional power take-off gear (41) has been removed, tighten the screws to 11 daN.m with Loctite Frenetanch (242) (Fig. 59).

– Ensure that the duct of hub (30) is not blocked.
– Refit the Belleville washers (31) the the right direction (Fig. 67).
– Position the hub (30) in the clutch housing (32).
– Align the holes in the discs (33), the backplates (34) and the cover (35).

N.B.: To assist final fitting of the clutch, align the clutch housing on the disc, backplate, cover assembly (35) using 2 guide rods (A), without refitting the circlip (37) or the shims (36) and (9) (Fig. 68).

– Remove the bell pinion.

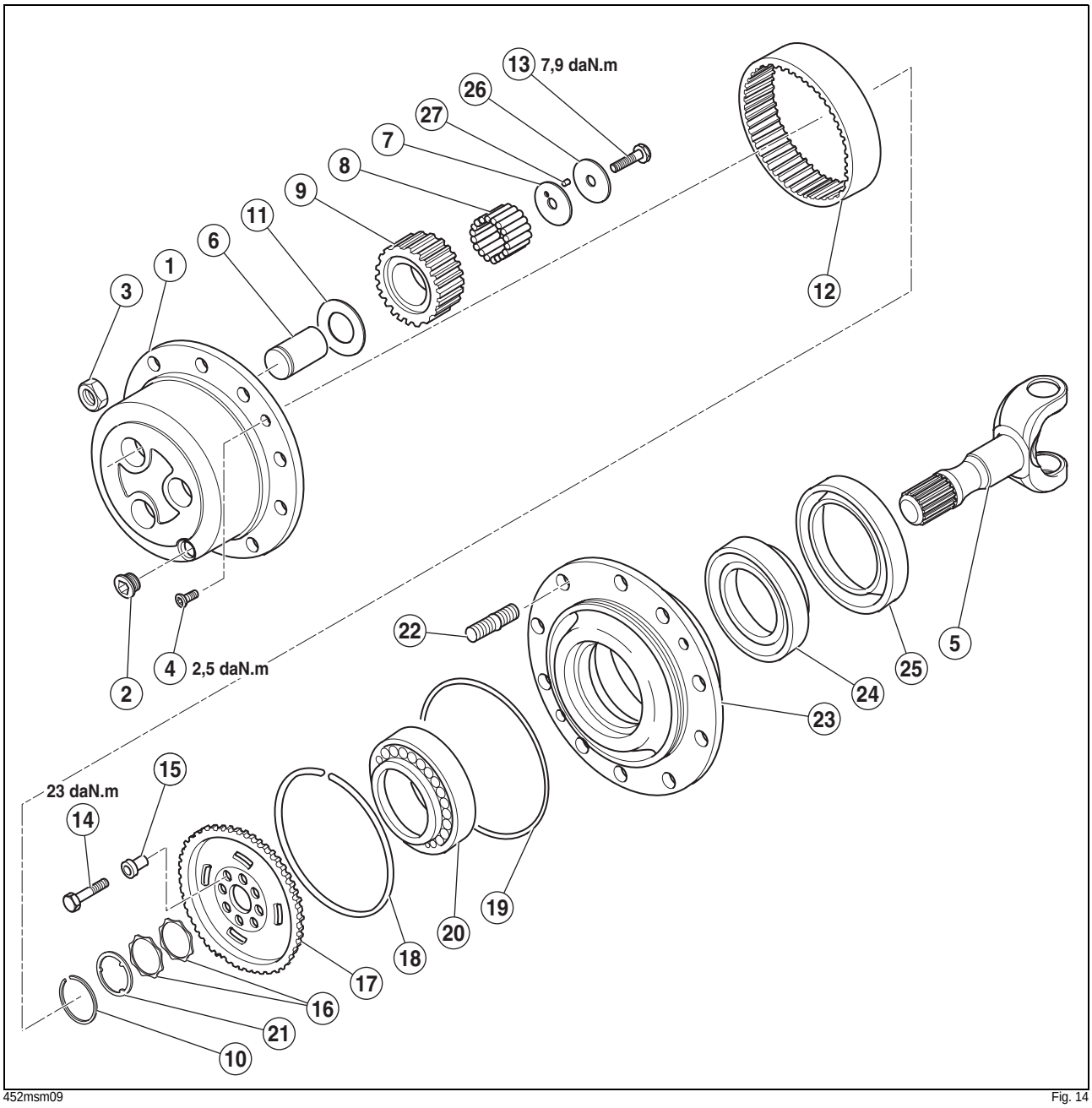


474msm08 Fig. 67

474msm09 Fig. 68

Epicyclic reduction gear and wheel hub

Exploded view



452msm09 Fig. 14

Nomenclature

1 Reduction gear cover.
2 Filling, dipstick and drain plug.
3 Wheel nut.
4 Screws.
5 Universal shaft.
6 Planet gear pins.
7 Washer.
8 Needles.
9 Planet gear pinion.
10 Circlip.
11 Spacer.
12 Crown wheel.
13 Screws.
14 Screws.
15 Bush.
16 Washer.
17 Sprocket.
18 Locking ring.
19 O-ring.
20 Tapered roller bearing.
21 Washer.
22 Stud.
23 Half-hub.
24 Tapered roller bearing.
25 Seal.
26 Washer*.
27 Locating pin*.

** Version 40 km/h only.*

Suspension cylinder and lower arm

Refitting the torsion bar

– Using a jack, lift the lower arm as high as possible (tractor in low position) (Fig. 50).
– Lubricate the splines of the front flange (108).
– Before refitting the torsion bar (118), check the stamp on the end (Fig. 51).

SX : Left-hand torsion bar.

DX : Right-hand torsion bar.

The arrow indicates the direction of torsion bar rotation on preloading.

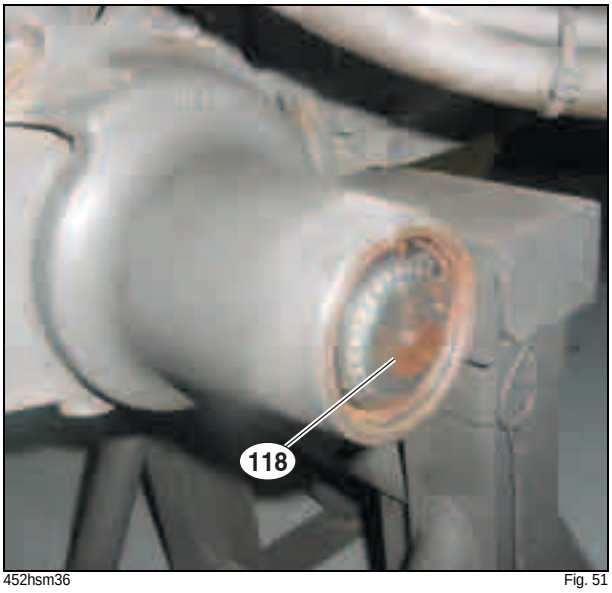
N.B.: The stamp should be located on the rear flange side (115).

– On the front flange side (108), introduce the torsion bar fitted with the circlip so that it is fully inserted in the flanges and flush up against the circlip.

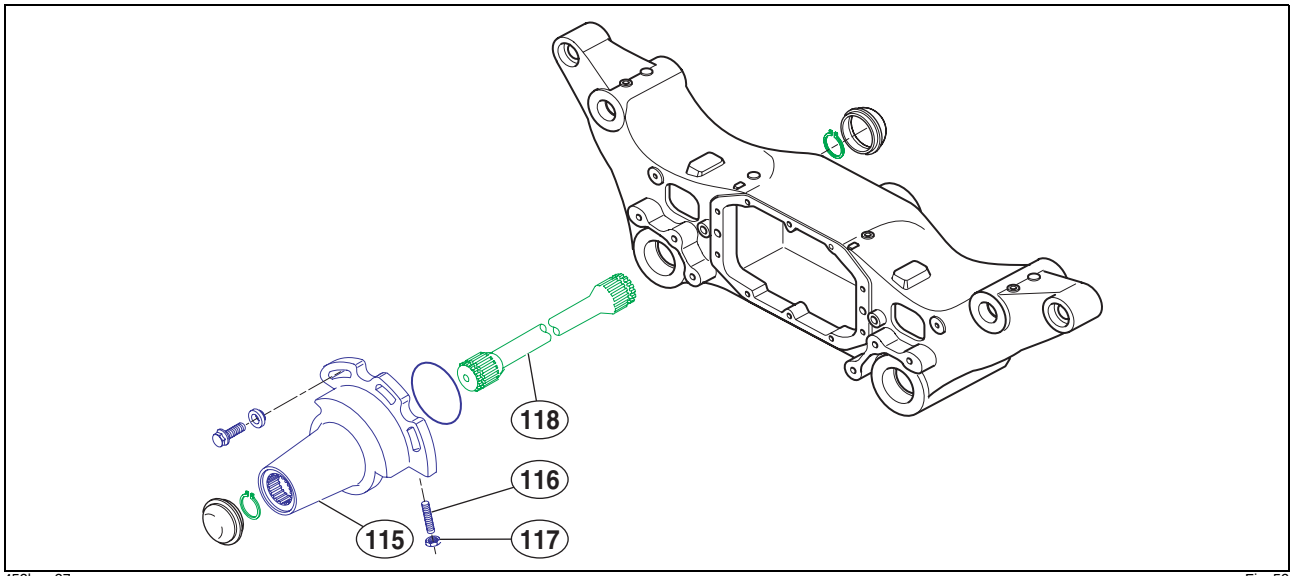
N.B.: Observe the marks made earlier.

– Position the rear flange (115) and insert the screws, without tightening, so that they are at the base of the slot on the left-hand side (looking at the flange face-on).

452hsm35 Fig. 50



452hsm36 Fig. 51



452hsm37 Fig. 52

Bevel gear and differential

Adjusting the pinion gear pre-load

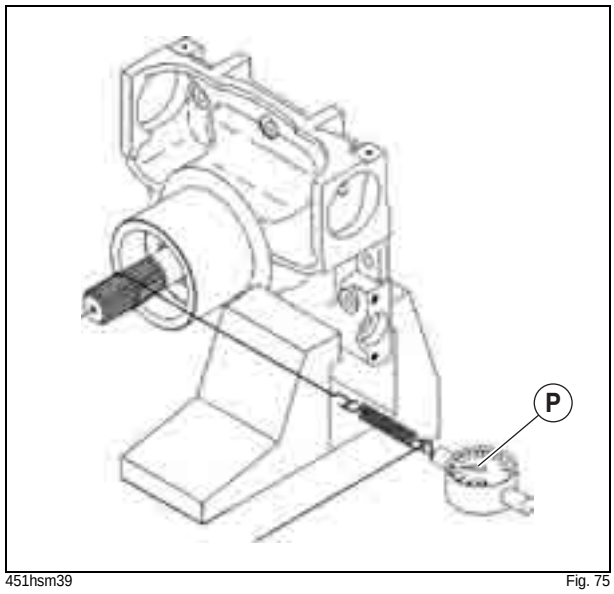
– Replace the washer (5) and the spacer (17).

N.B.: All preloads must be measured without the seal (1).

N.B.: This adjustment is only required on the pinion after fitting the 2 tapered bearings.

IMPORTANT: Do not tighten the nut in one go. Tap the ends of the pinion lightly with a hammer to seat the bearings correctly. A new spacer (17) must be fitted.

– The nut must be tightened gradually, without overtightening, using tool n° 60 05 006 536.
– Wrap the cord around the splined part of the gear (Fig. 75).
– Using spring balance n° 77 01 388 008, measure the force (P) required to drive the bevel pinion. It should be between 9,2 and 13,7 daN.
– Lock the nut by bending the lock washer.



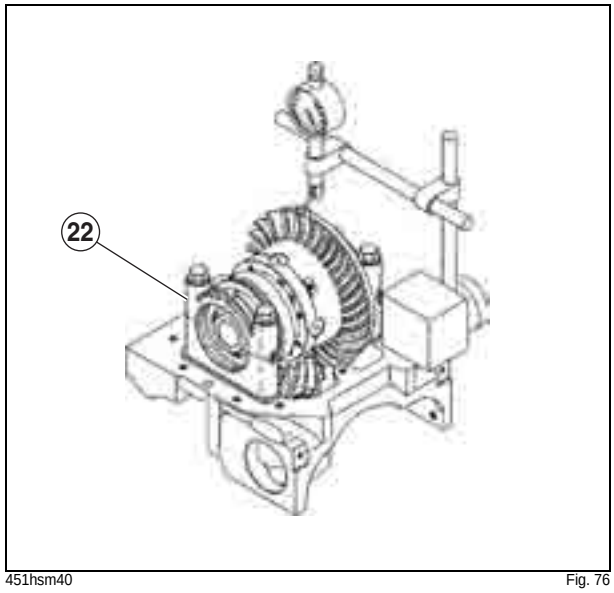
451hsm39 Fig. 75

Adjusting backlash

– Refit the differential housing.
– Refit the flanges (22).

N.B.: Change the O-ring (55) on the differential lock aperture of axle (20.29 – SI12/SI14).

– Check the meshing backlash which should be between 0,18 and 0,23 mm.
– Repeat several times by checking a number of teeth. If the values differ, place the probe on the tooth where the lowest value was recorded.
– Apply the same torque to the differential bearing nuts. Use tools n° 60 05 006 534 and n° 60 05 006 581 (axle 20.29 SI12/SI14).
– Place the dial gauge probe at 90° with the surface of a pinion tooth.



451hsm40 Fig. 76

Measurement and checking points

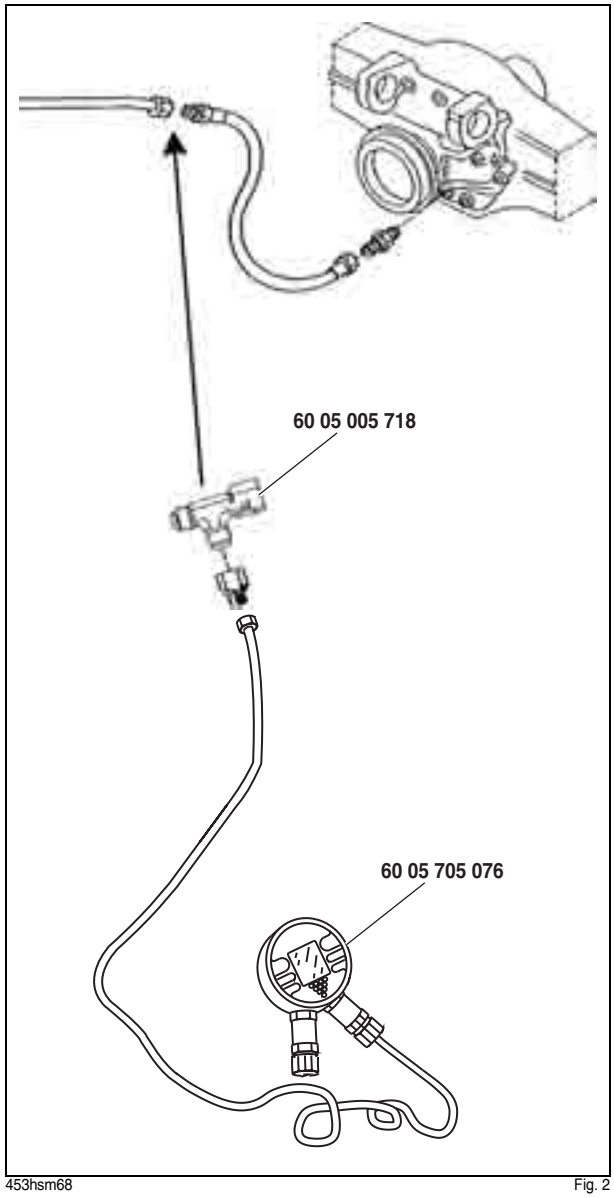
Test conditions.
– Transmission oil temperature: 60°C.
– Engine running at nominal speed.

Checking the differential lock circuit pressure (axle 20.29-4)

In case of a front differential lock malfunction, check the following items:

- The front differential control circuit pressure.
- Correct solenoid valve operation.

– Check that the engine control unit is working correctly with Win Métadiag©. If the ECU sends information but the solenoid valve is not powered, check the continuity of the solenoid valve supply circuit (see chapter "F").
– Set up pressure gauge n° 60 05 705 076 and adapter n° 60 05 005 718.
– Measure the pressure by activating the differential lock button. The pressure should be 20 bar. If it is not equal to 20 bar, check on the right-hand cover whether the supply to the other 20 bar circuits is correct.
– If hydraulic oil leaks from the front differential locking system it will flow directly into the differential housing. A leak on the circuit can only be detected therefore by checking that the differential housing level is not above the maximum level.



453hsm68 Fig. 2

Measurement and checking points

Test conditions.

– Engine idling.
– Transmission oil temperature: 60°C.

Checking the front axle engagement pressure

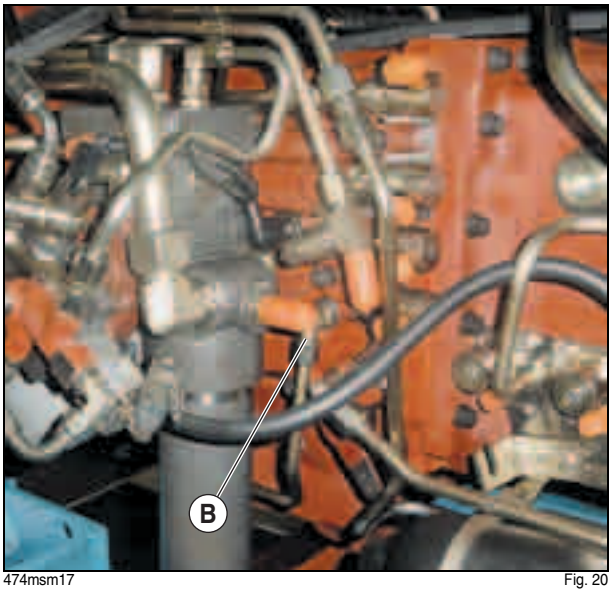
– Remove the 4-wheel drive housing supply pipe and fit a hydraulic hose in its place.
– Connect pressure gauge n° 60 05 705 076 to the hose.
– Measure the pressure which should be 0 bar when the front axle is engaged.
– Measure the pressure which should be 20 bar when the front axle is disengaged.

A Open centre hydraulic circuit.

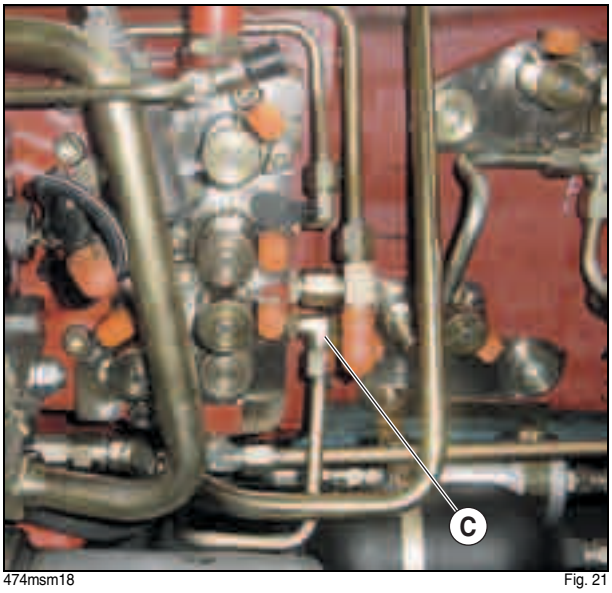
B Hydraulic circuit LS 100 l/min

C Hydraulic circuit LS 110 l/min

474msm16 Fig. 19



474msm17 Fig. 20



474msm18 Fig. 21

D3
ELECTRONIC COMPONENTS

RH COVER

LH COVER

CIRCUIT SELECTOR

HYDRAULIC MEASUREMENT AND CHECKING POINTS

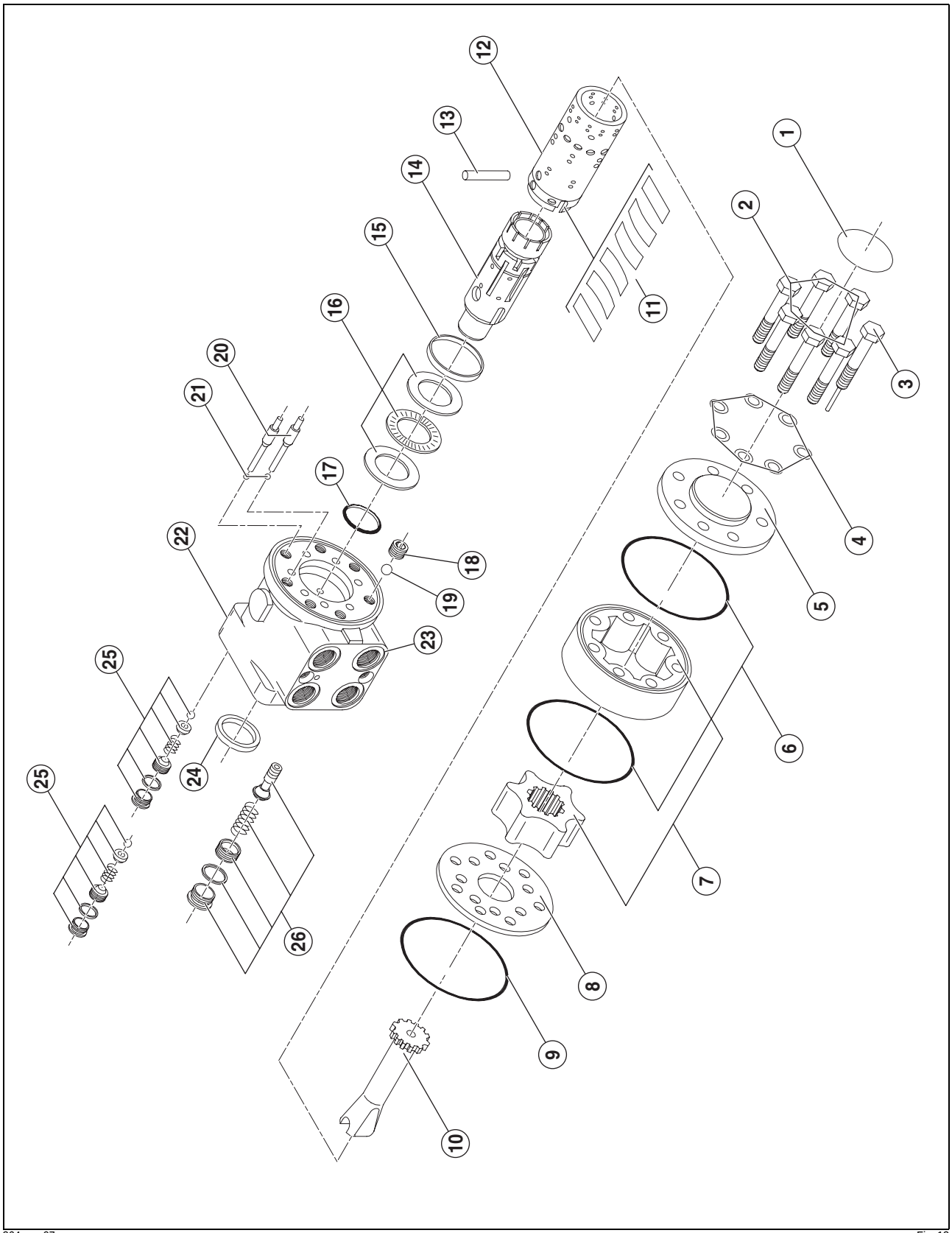
"HYDRAULIC INSPECTION RESULTS" SHEET

HYDRAULIC MEASUREMENT AND CHECKING POINTS

"HYDRAULIC INSPECTION RESULTS" SHEET

Steering unit

"OSPF 160 ON" unit (100 l/min "Load Sensing" circuit and centre open 60 l/min)

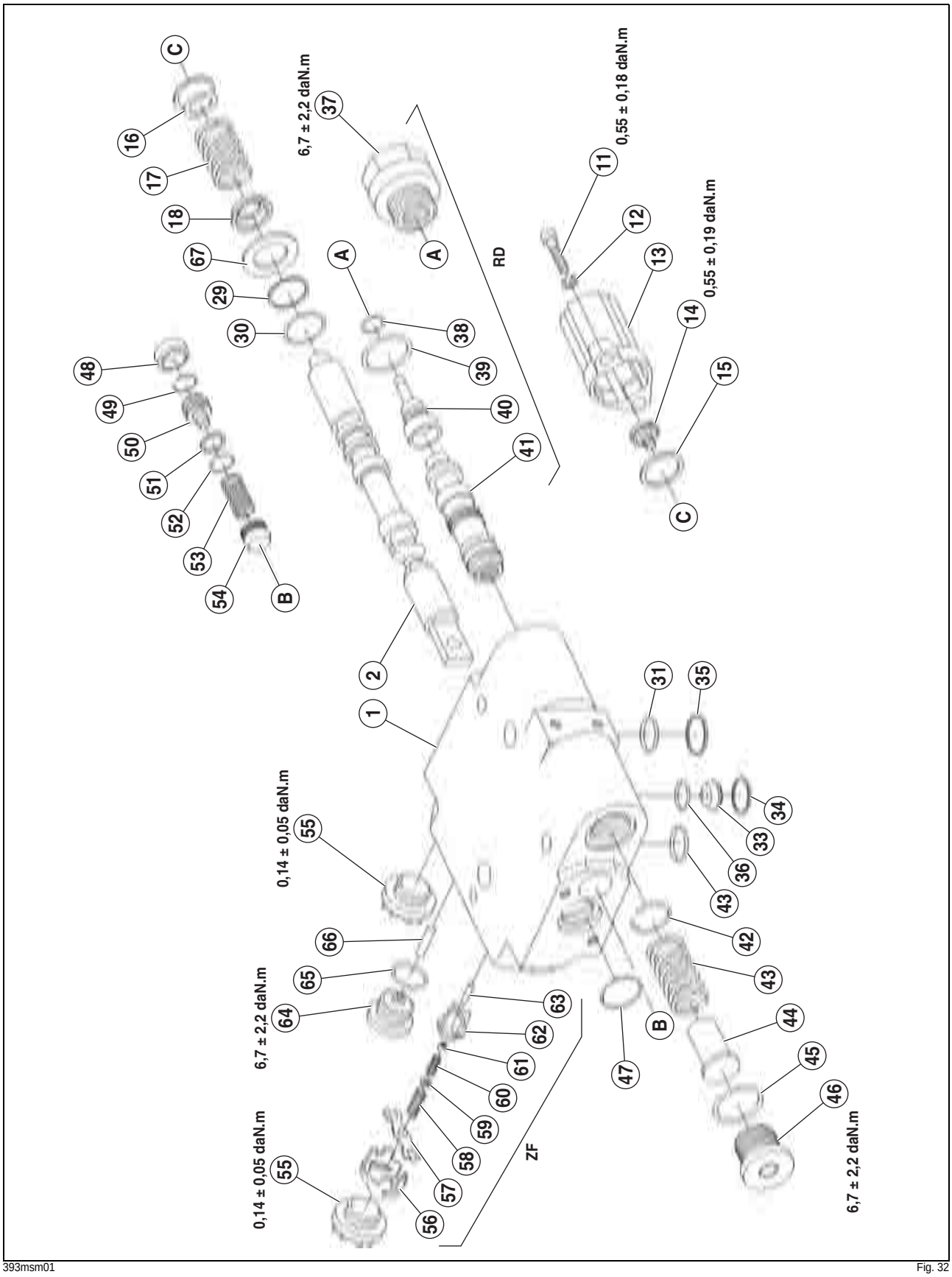


364msm07

Fig. 13

Auxiliary spool valve

3 position spool valve option "ZF" and flow regulator

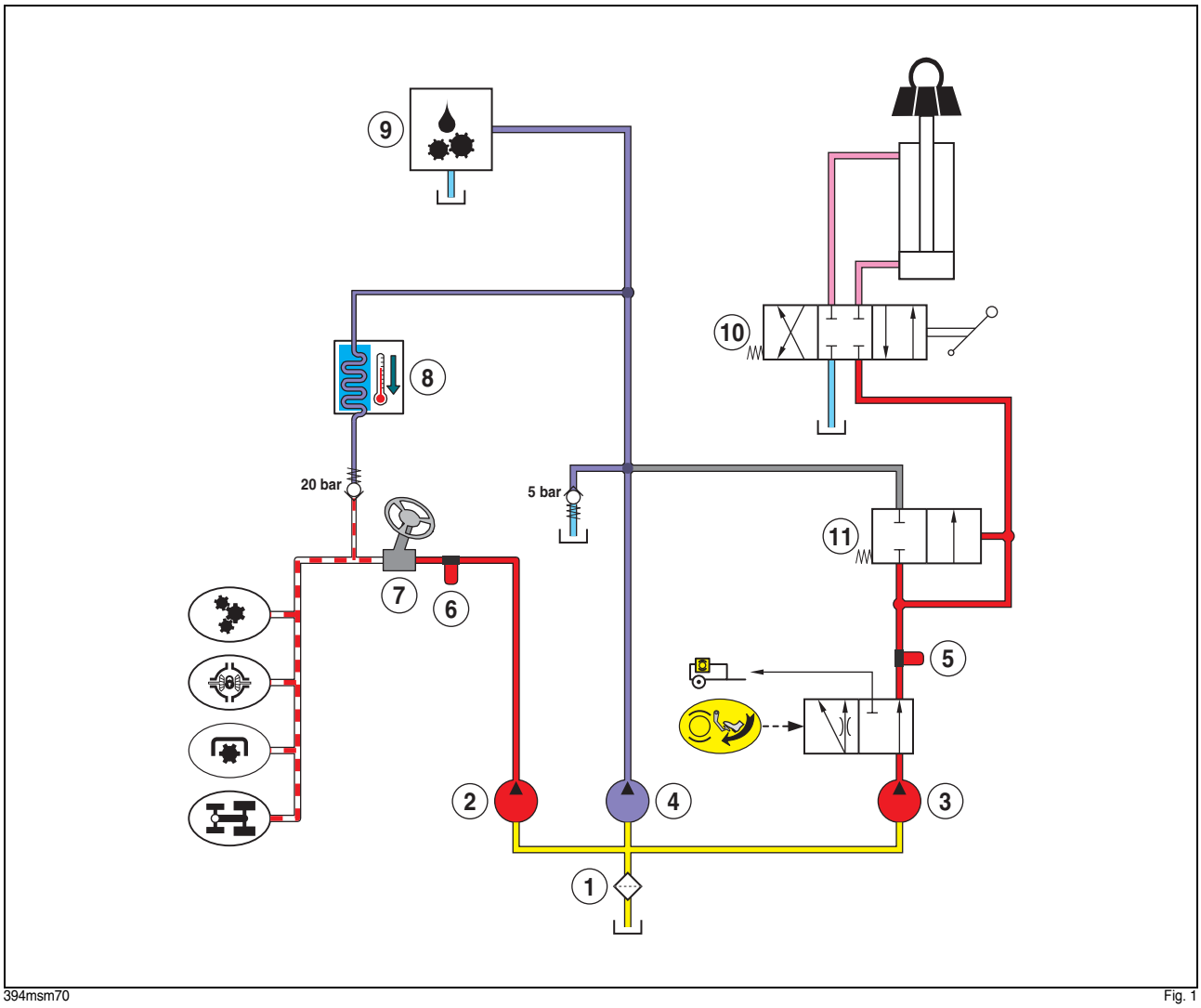


393msm01

Fig. 32

Description

Operation



394msm70 Fig. 1

Nomenclature

1 150 micron filter.
2 15 cm³ Pump.
3 19 cm³ Pump.
4 10 cm³ Pump.
5 15 micron filter.
6 15 micron filter.
7 Steering unit.
8 Oil cooler.
9 Transmission lubrication.
10 Spool valve unit.
11 Trailer brake valve.

This 60 l/min centre open circuit is characteristed by 3 hydraulic pumps.

A 19 cm³ pump supplies the braking valve followed by the auxiliary and linkage spool valves.

A 15 cm³ pump supplies first the steering unit, then the 20 bar services.

A 10 cm³ pump that continually lubricates the different transmission components.

Hydraulic measurement and checking points

Test conditions:

– Engine at nominal speed.

– Oil temperature at 60°C.

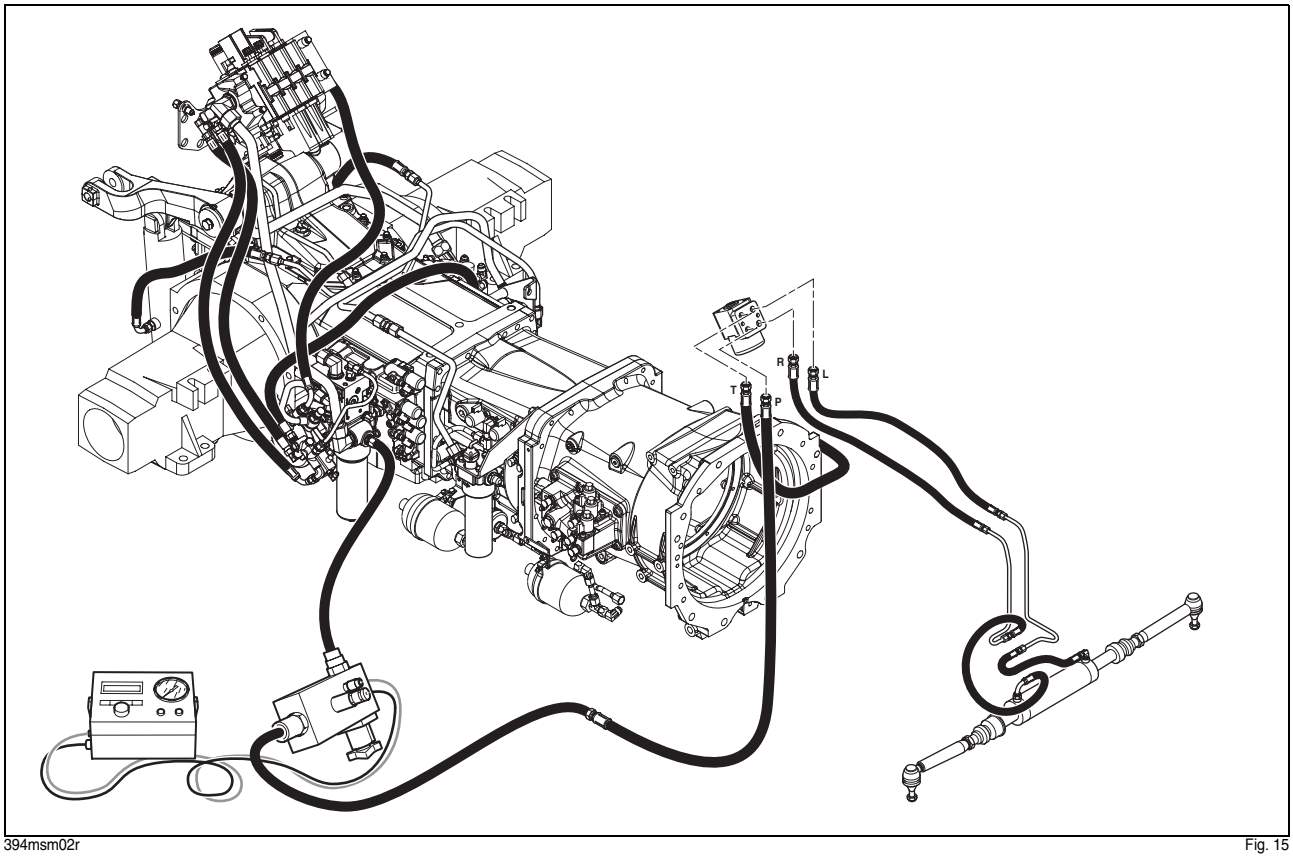
Steering pump check

– Connect the tester n° 60 05 005 736 to the steering filter outlet.

– Turn the wheels in one direction then in the other and measure the pressure when the wheels at at the end stops.

– The flow should be 45,8 l/min

– The pressure should be 175 bar when the wheels are at the end stops.



394msm02r Fig. 15

Description

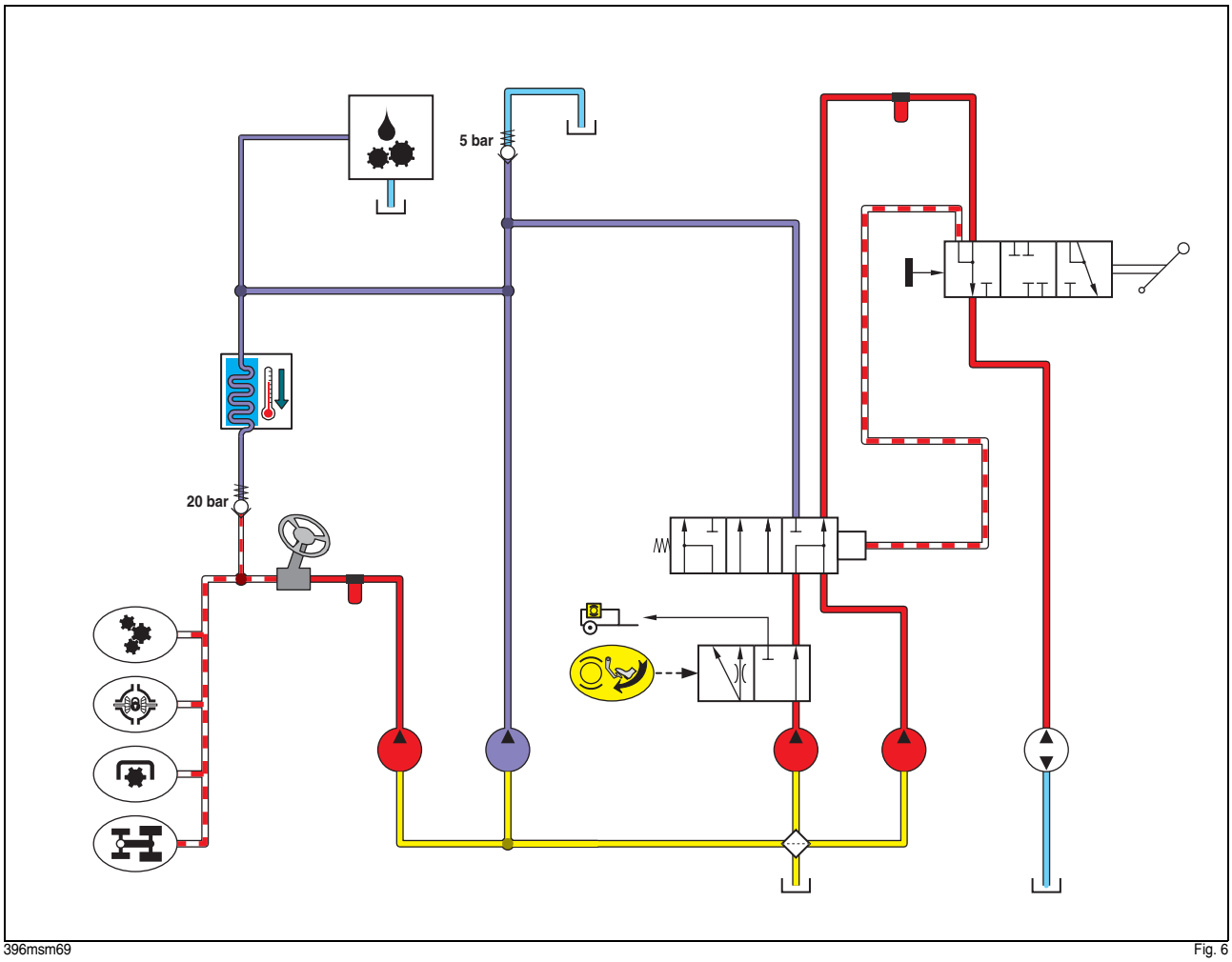
Engine running, flow demand above the capacity of the low rate pump

In this case, equality cannot be achieved between the low flow pump pressure and the LS pressure added to the stand-by pressure. The force of the spring pushes the balance, the slide moves into a position interrupting the backflow from the pumps to pump intake. The flow from the high flow pump will rejoin the operating system via non-return valve RV 2.

Low flow pump pressure = LS pressure + stand-by pressure.

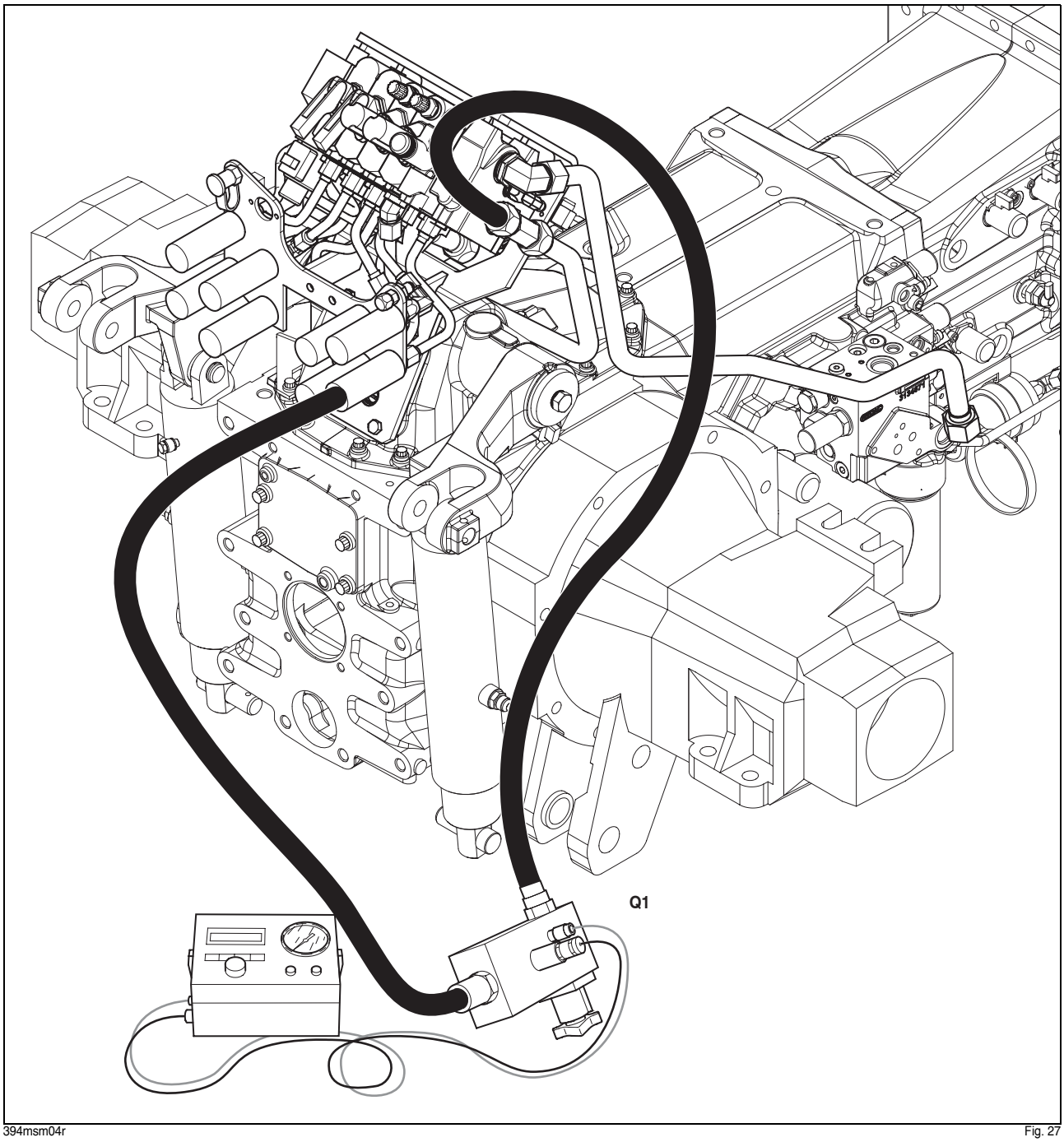
High rate pressure = LS pressure + stand-by pressure + RV 2 check valve ΔP.

RV 2 = approximately 5 barars.



396msm69 Fig. 6

Hydraulic measurement and checking points



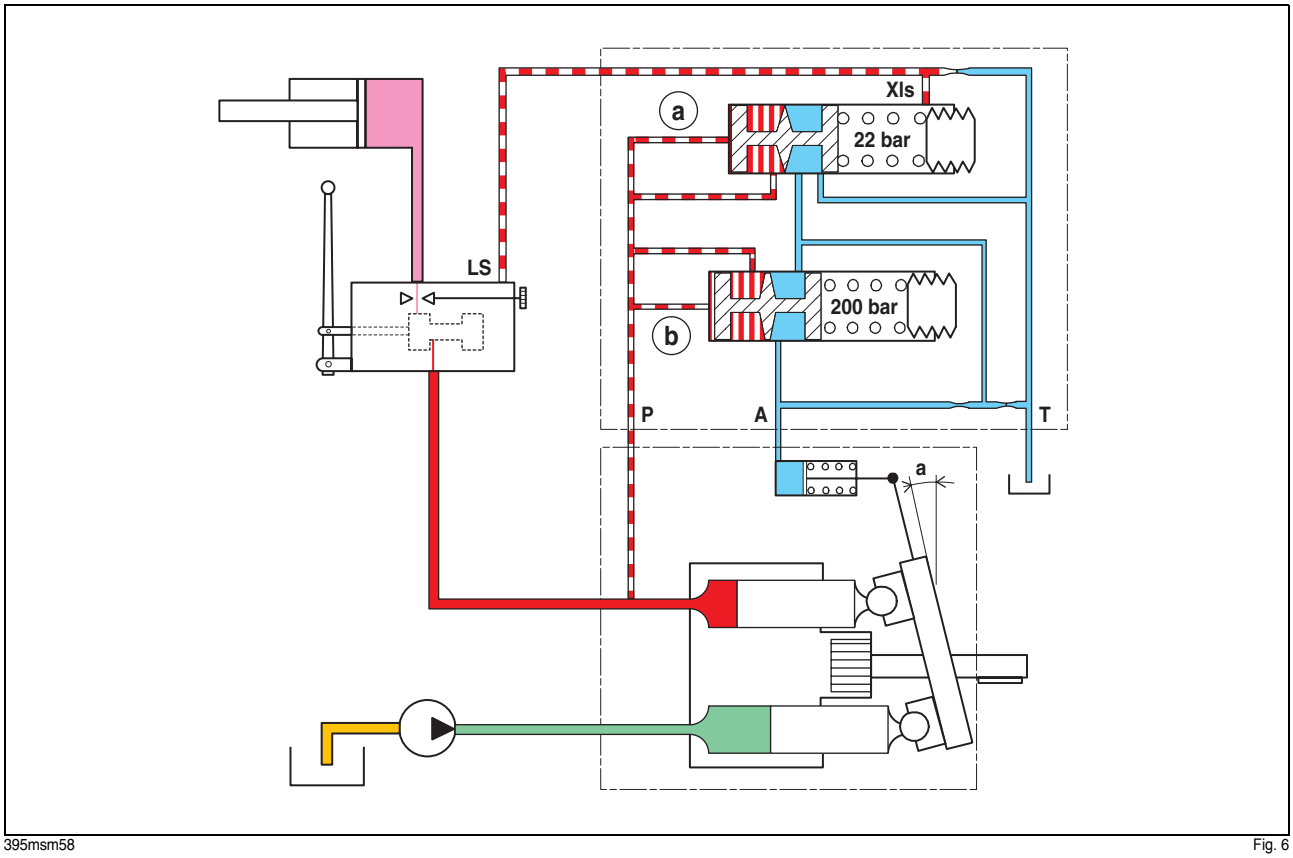
394msm04r

Fig. 27

Operation

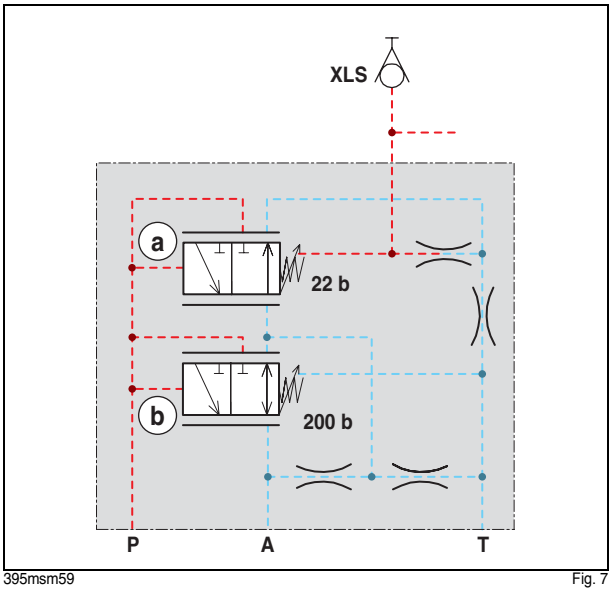
Pressure/flow regulation

With the engine stopped



395msm58 Fig. 6

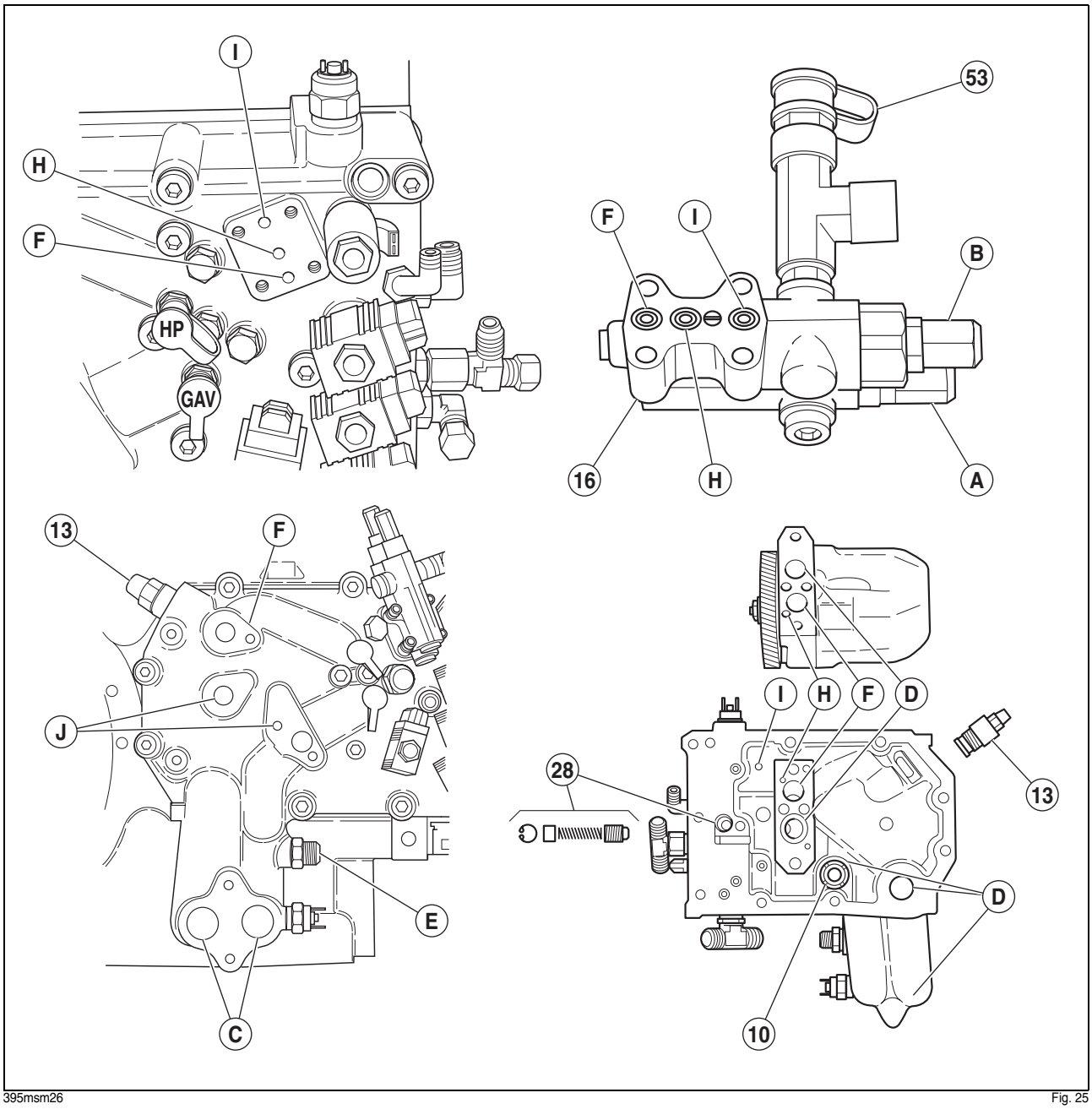
The pump, at rest, is at maximum displacement because of the action of the return spring.
The 2 valves, 200 and 22 bar, are also held at rest by springs.



395msm59 Fig. 7

RH cover

Identification of ports and lines



395msm26 Fig. 25

Nomenclature (Fig. 25)

A Adjustment screw, 22 bar.
B Adjustment screw, 200 bar.
C Main filter, 15 micron.
D Boost.
E Rear axle lubrication only.
F High pressure from variable displacement pump.
G High pressure outlet of variable displacement pump.
H To variable displacement pump control piston.
I Regulator return.
J Return from priority unit(s) (depending on version).
XLS LS signal (Load Sensing).

N.B.: Screws (A) and (B) are factory set. Do not change these settings.

Hydraulic measurement and checking points

• Connect tester n° 60 05 705 076 to each diagnostic socket located:

– On the pump regulator: Pressure Xls = P2

– On the right-hand cover: Pump pressure = P3.

Regulator position	Engine speed (rpm)	Q2 (l/min)	P2 (bar)	P3 (bar)
Maximum	2 200	100 ± 10	P2 =-P3 22 ± 1	130
Minimum		5 ± 1		

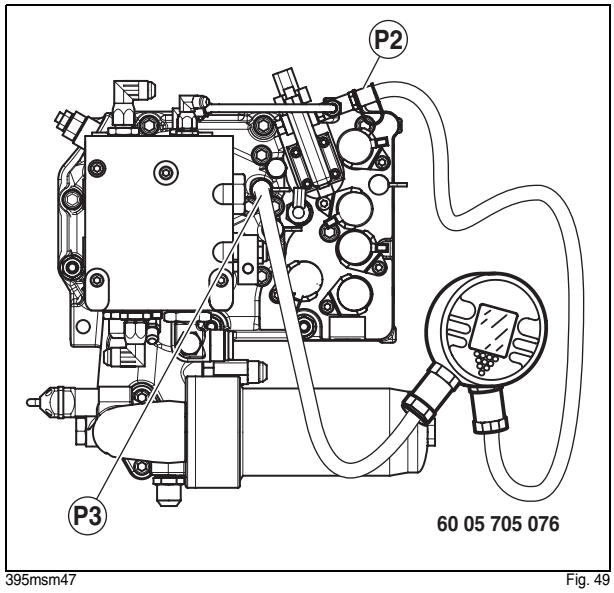
• Turn the control of the regulator concerned slowly to the minimum limit; (Q2) should gradually fall to a minimum flow rate of 5 ± 1 l/min

Trigger pressure check on the (KO) spool valve

– Connect tester n° 60 05 005 736 to a spool valve.

– Connect tester n° 60 05 705 076 to the pump regulator to read: Pressure Xls = P2.

– Run the engine at 1 000 rpm. Actuate the spool valve in the kick-out position, release the lever and gradually close the flowmeter valve until the lever returns to neutral. Read the trigger pressure: P2 = 160 to 185 bar.



395msm47 Fig. 49

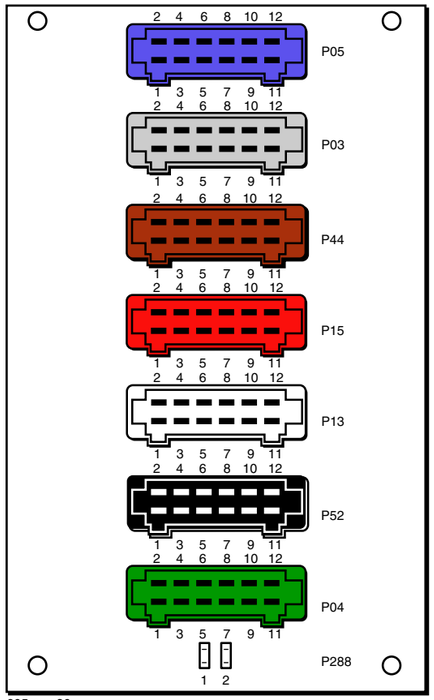
Conductor allocations

	Blue
1	+ AVC signalling control
2	D+ alternator
3	D+ instrument panel
4	Reverser engaged not in neutral
5	+APC transmission
6	Light relays controls
7	Start
8	Stop light output
9	Start-up controls
10	Stop light input
11	+ APC control panel
12	Hydraulic pressure warning light

	Grey
1	Parking position
2	+ AVC hazard warning light control
3	Front screen washer
4	+ AVC control panel
5	Windscr. wiper ctrl park. pos.
6	Flashing unit
7	+ P radio/cigar lighter
8	Power supply to indicator unit
9	+ APC rotating beacon control
10	Intermittent
11	+ APC hazard warning lights controls
12	+APC implement socket

	Brown
1	+ AVC engine calculator
2	+AVC REH
3	+ AVC socket 25 A
4	D+ REH
5	+ AVC socket 25 A
6	+ AVC suspended front axle
7	+ APC transmission controls
8	+ AVC transmission calculator
9	+ APC front PTO controls
10	+APC REH
11	+ APC engine calculator
12	+ APC transmission controls

	Red
1	Air conditioning relay controls (thermostat)
2	Air conditioning compressor (+)
3	Pressure switch
4	Not neutral
5	Non-neutral controls
6	—
7	+ APC reverser control ISC
8	+ AVC not switched
9	Recirculation (+)
10	Recirculation (-)
11	Recirculating controls
12	+ APC recirculation controls



605msm90

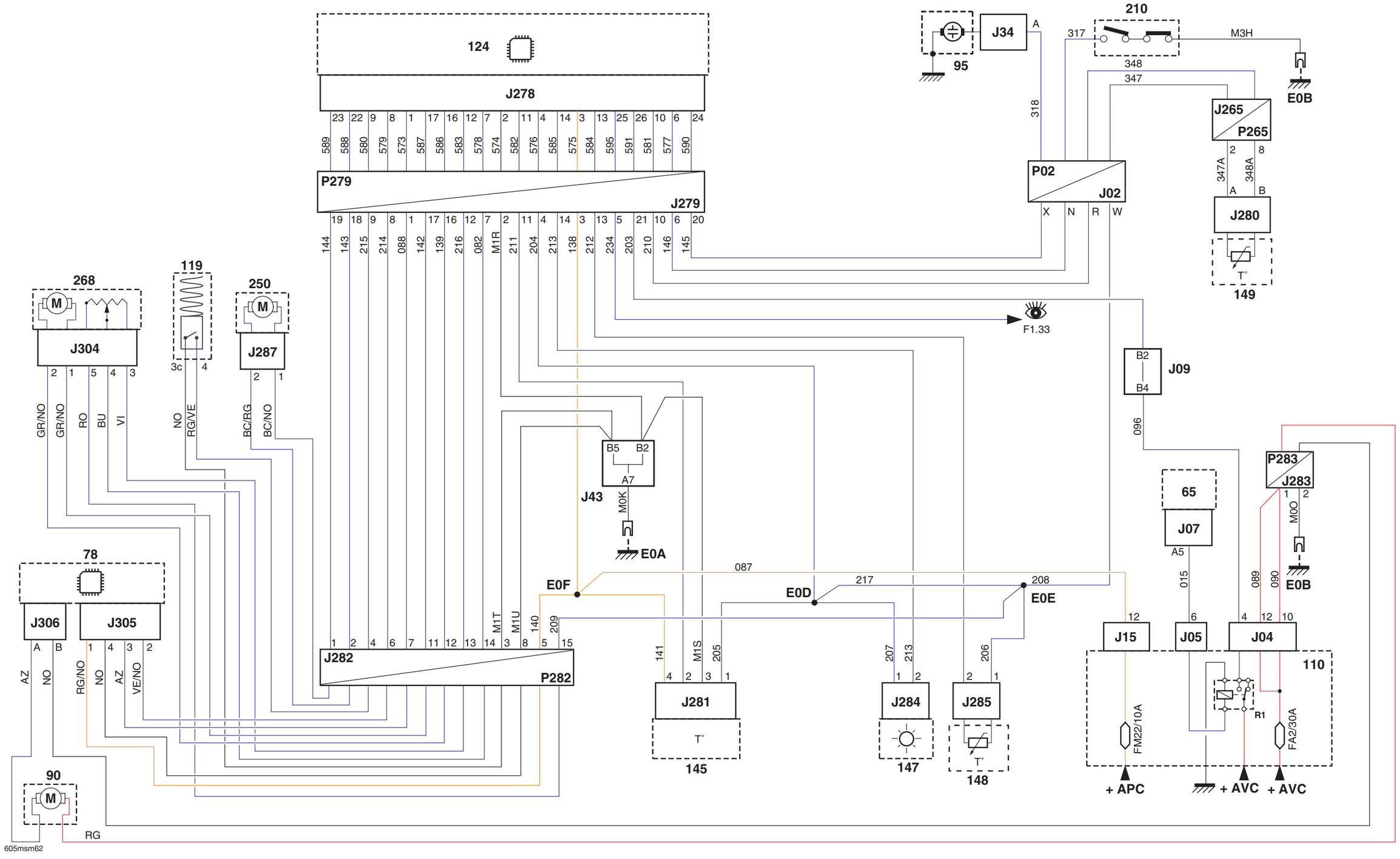
	White
1	Cuna braking solenoid valve
2	Hydraulic pressure
3	Cuna braking relay control
4	+AVC (constant source)
5	Outside rear work lights power supply
6	Safety solenoid valve
7	Outer work light relay control
8	+ AVC switched inside rear work lights
9	Outside rear work lights relay controls
10	Outside rear work lights power supply
11	+APC
12	Outside rear work lights relay controls

	Black
1	+ AVC ceiling light/radio/clock
2	+ P radio/clock/cigar-lighter
3	+ APC On-board computer
4	+ AVC accessories
5	Safety solenoid valve
6	Cab top mudguard lights
7	D+ on-board computer
8	+ AVC front work light
9	+ APC Electrohydraulic spool valve (DEH)
10	Outside front work light power supply
11	+ APC rear windscreen wiper control
12	Outside front work light relay control

	Green
1	+ P cigar-lighter
2	Earth
3	Left-hand lights
4	Left-hand lights
5	—
6	Right-hand lights
7	+ APC front windscreen wiper park position
8	Ventilation 3rd speed relay control
9	+ APC seat
10	Ventilation 3rd speed controls
11	+ APC windscreen wiper/washer control
12	+ APC ventilation

	P288
1	+ Interior front working lights
2	+ Side work lights

Instrument panel ventilation and climate control

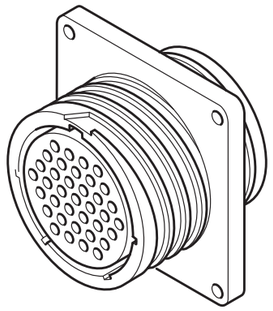


Electropilot - Front linkage

Ref	Item
110	Fuse box
141	Hydraulic spool valve control plate
142	RH electrohydraulic spool valve
143	LH electrohydraulic spool valve
144	Safety solenoid valve
168	External front linkage lift switch
169	External front linkage lower switch
255	Joystick - Solenoid pilot

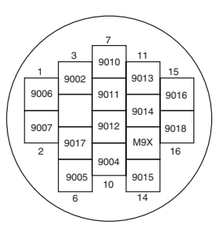
	Wire markers	2	J69	Ending	
27	952	0,6	CAN-Low	J252	2
28	956	0,6	CAN-High	J252	5
29	981	0,6	+APC RH and LH DEH	P42	12
31	980	0,6	Safety solenoid valve ctrl	P42	2
32	951	0,6	CAN-Low	J251	2
33	955	0,6	CAN-High	J251	5
37	M9U	0,6	DEH earth	**E6A**	
37	M9U*	1	DEH earth	**E9A**	

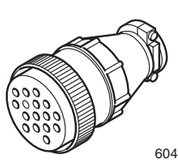
* TCE 15/25 control



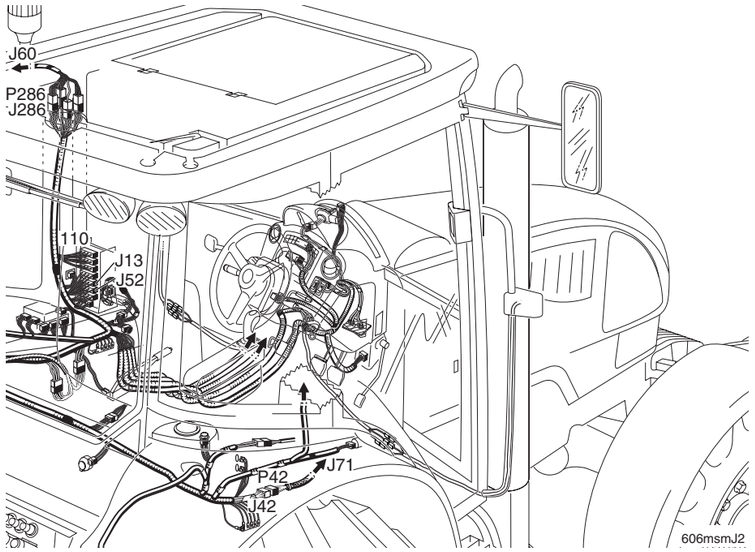
604msmY0

	Wire markers	2	J199	Ending	
1	9006	0,6	Potentiometer X	J198	9
2	9007	0,6	Potentiometer Y	J198	10
3	9002	0,6	+APC joystick	J198	3
5	9017	0,6	Safety solenoid valve (on)	J198	11
6	9005	0,6	CAN-High	P190	4
7	9010	0,6	Hydraul. motor ctrl (on)	J198	7
8	9011	0,6	Joystick on/off control	J198	5
9	9012	0,6	LED output on / off	J198	6
10	9004	0,6	CAN-Low	P190	1
11	9013	0,6	Raise extension command	J198	13
12	9014	0,6	Raise extension command	J198	16
13	M9X	0,6	Joystick earth	J198	19
14	9015	0,6	Relay output 1	J197	A1
15	9016	0,6	Relay output 2	J197	A5
16	9018	0,6	Hydraul. motor ctrl (off)	J198	8





604msmAJ



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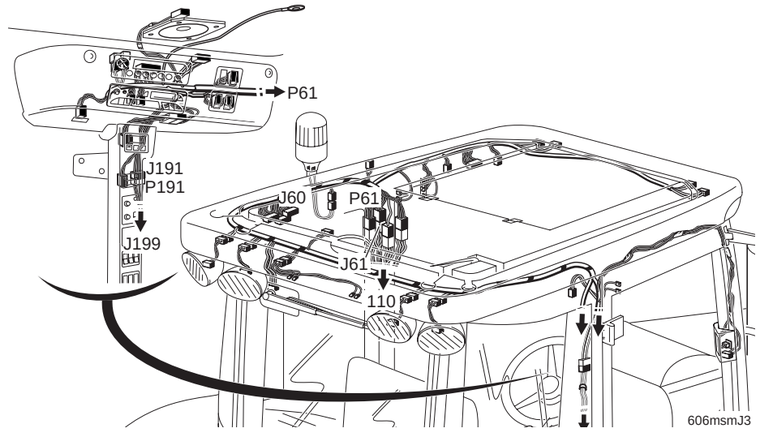

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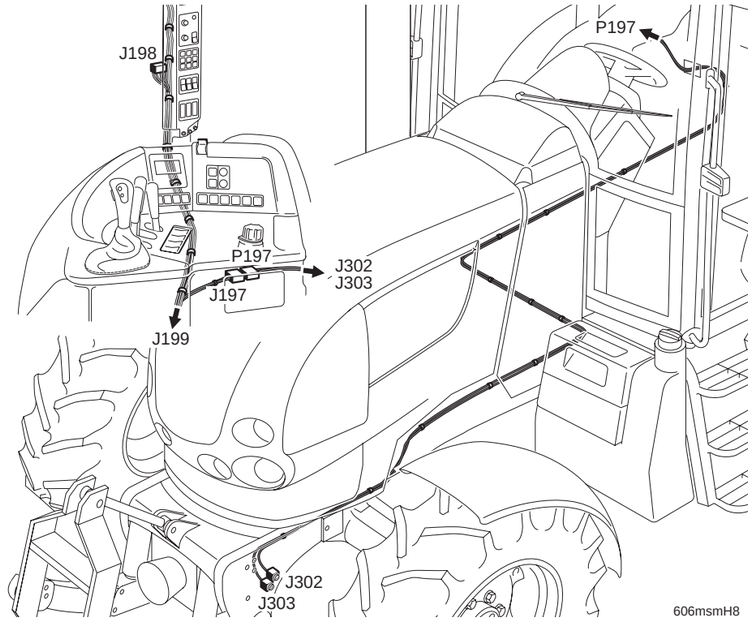

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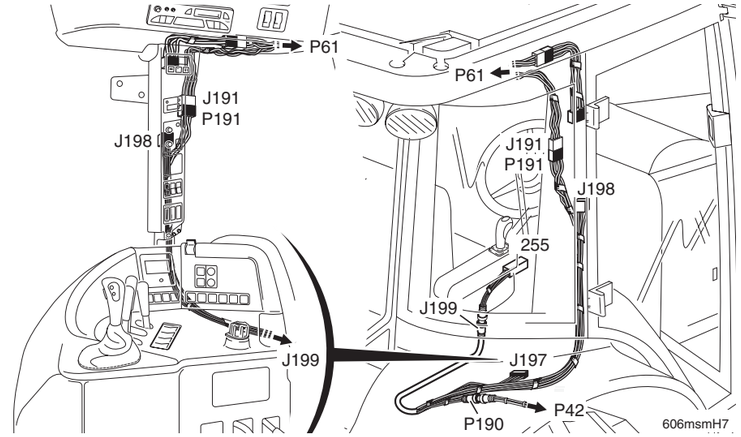

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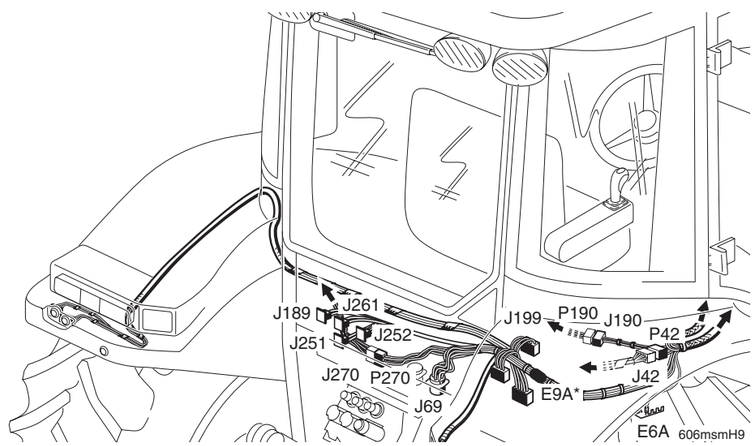
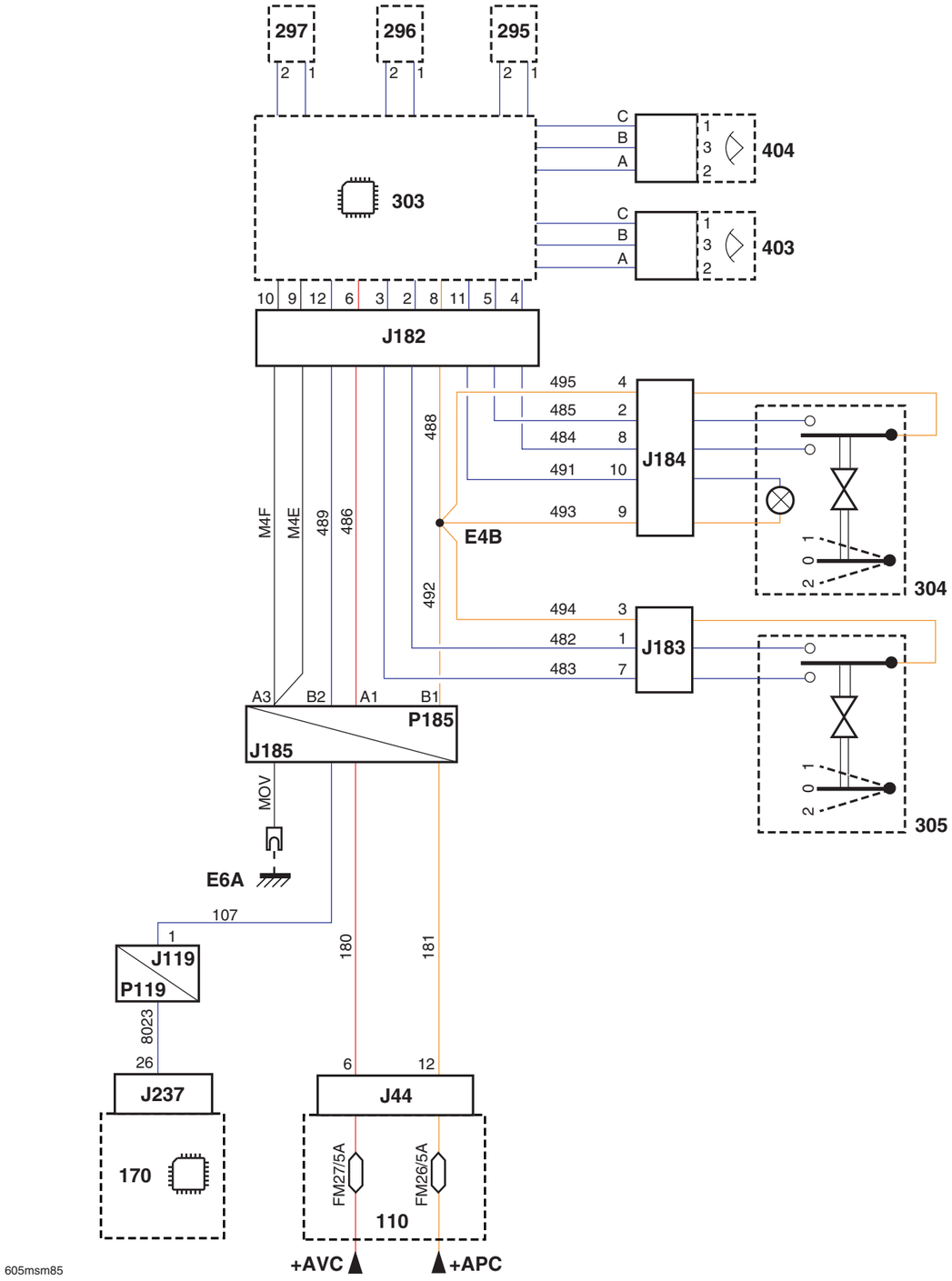


606msmH9

Suspended front axle

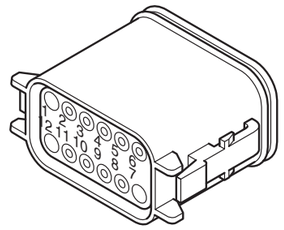


605msm85

Ref	Item
110	Fuse box
170	"Auto 5" electronic central unit
295	Control solenoid valve
296	RH cylinder solenoid valve
297	LH cylinder solenoid valve
303	Suspended front axle central electronic unit
304	Automatic/locking switch
305	Rise/lower switch
403	LH suspension sensor
404	RH suspension sensor

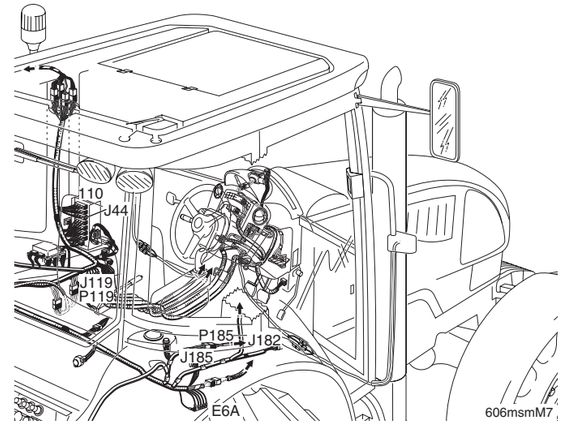
	Wire markers	2	J182	Ending	
2	482	1	Front axle lower ctrl	J183	1
3	483	1	Front axle rise ctrl	J183	7
4	484	1	Lock ctrl	J184	8
5	485	1	Automatic ctrl	J184	2
6	486	1	+ AVC suspended front axle	P185	A1
8	488	1	+ APC suspended front axle	**E4B**	
9	M4E	1	Front axle controller earth	P185	A3
10	M4F	1	Front axle controller earth	P185	A3
11	491	1	Front axle indicator light	J184	10
12	489	1	Speed information (14 km/h threshold)	P185	B2

1	2	3	4	5	6
	482	483	484	485	486
489	491	M4F	M4E	488	
12	11	10	9	8	7



604msmM5

	403/404
A	+APC
B	Signal
C	Earth



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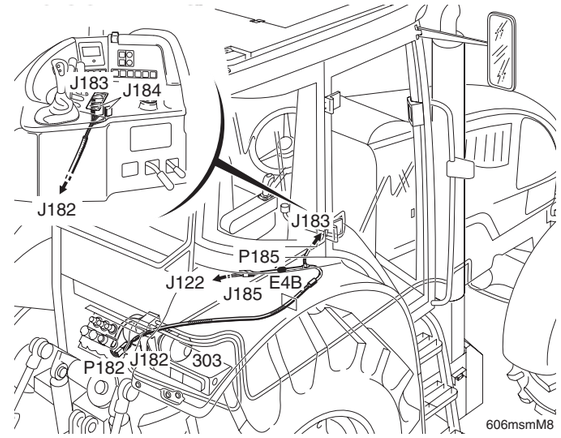

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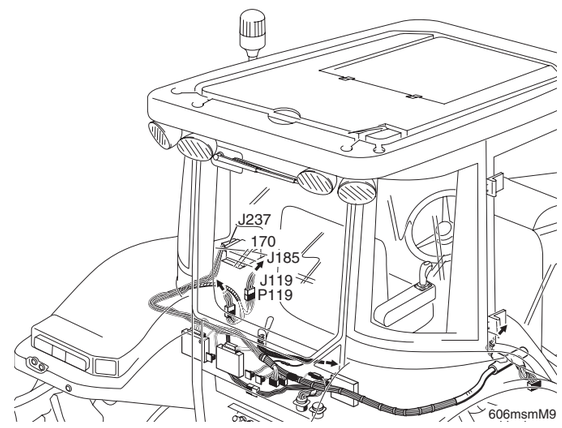
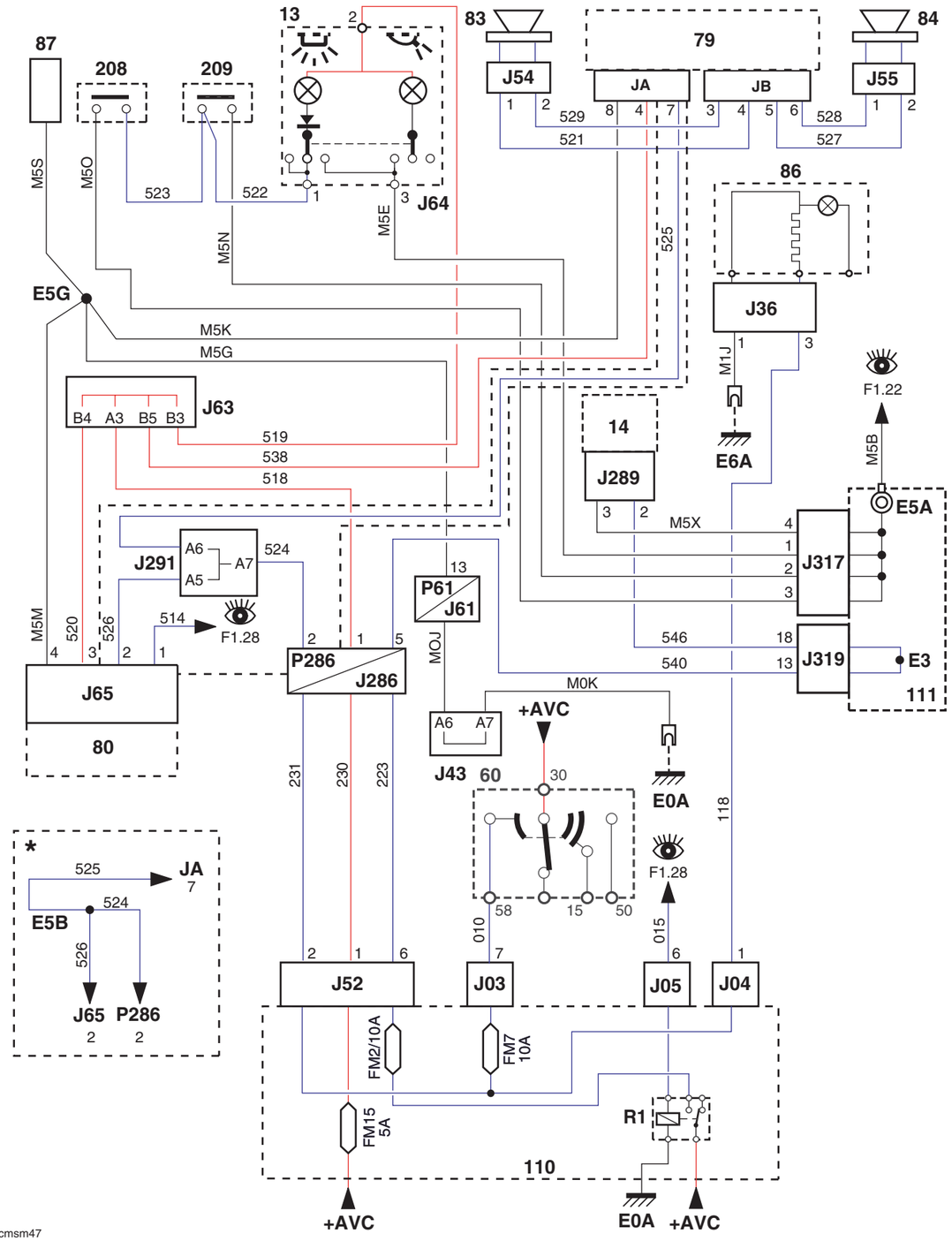


606msmM9

Cigarette lighter - Clock - Radio - Antenna - Cab light and spot

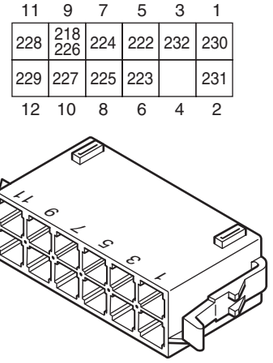


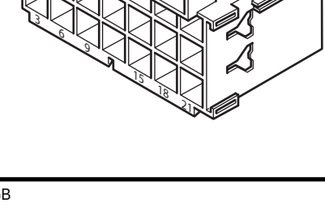
60cmsm47

* Version with manual air conditioning and without air conditioning with electric rearview mirror

Ref	Item
13	Roof lamp
14	Lighting spot
60	Key ingition switch
79	Car-radio
80	Clock
83	LH loudspeaker
84	RH loudspeaker
86	Cigarette lighter
87	Radio antenna
110	Fuse box
111	Cab top fuse box
208	RH door light switch
209	LH door light switch

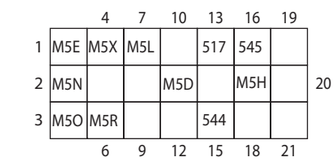
	Wire markers	2	J52	Ending	
1	230	0,5	+ AVC ceiling light and spot	J286	1
2	231	1	+ P cab top	J286	2
6	223	1	Side light indicator	J286	5

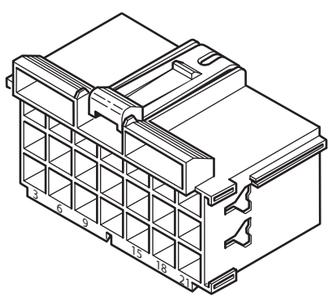




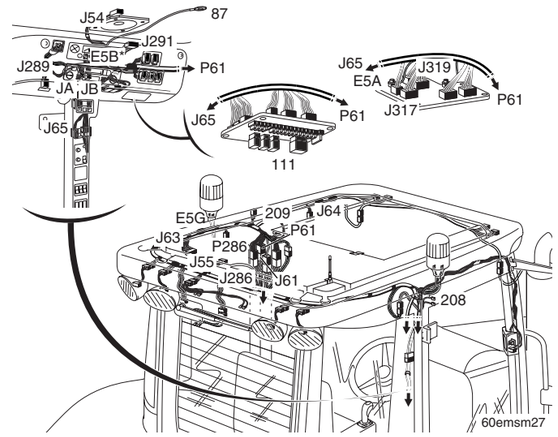
604msmC7

	Wire markers	2	J317	Ending	
1	M5E	0,5	Ceiling light earth	J64	3
2	M5N	0,5	LH door switch earth	**209**	
3	M5O	0,5	RH door switch earth	**208**	
4	M5X	0,5	Spotlight earth	J289	3

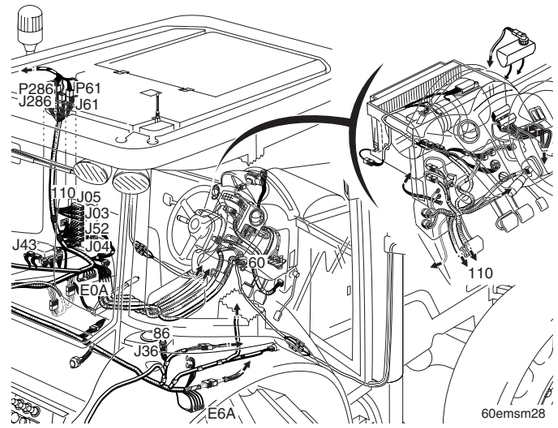




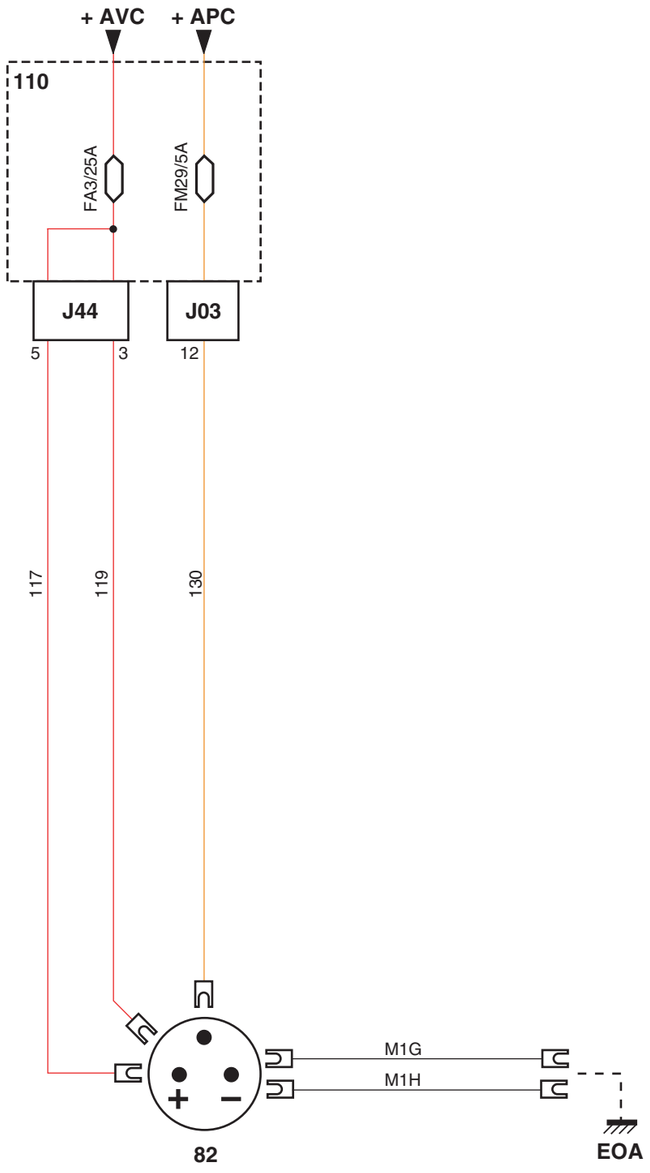
60bmsm19



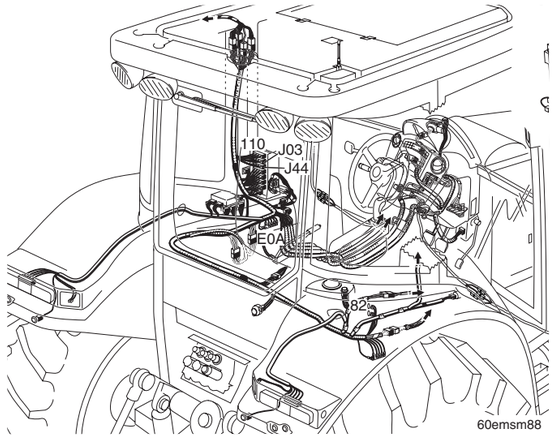
* Version with manual air conditioning and without air conditioning with electric rearview mirror



25 A power socket

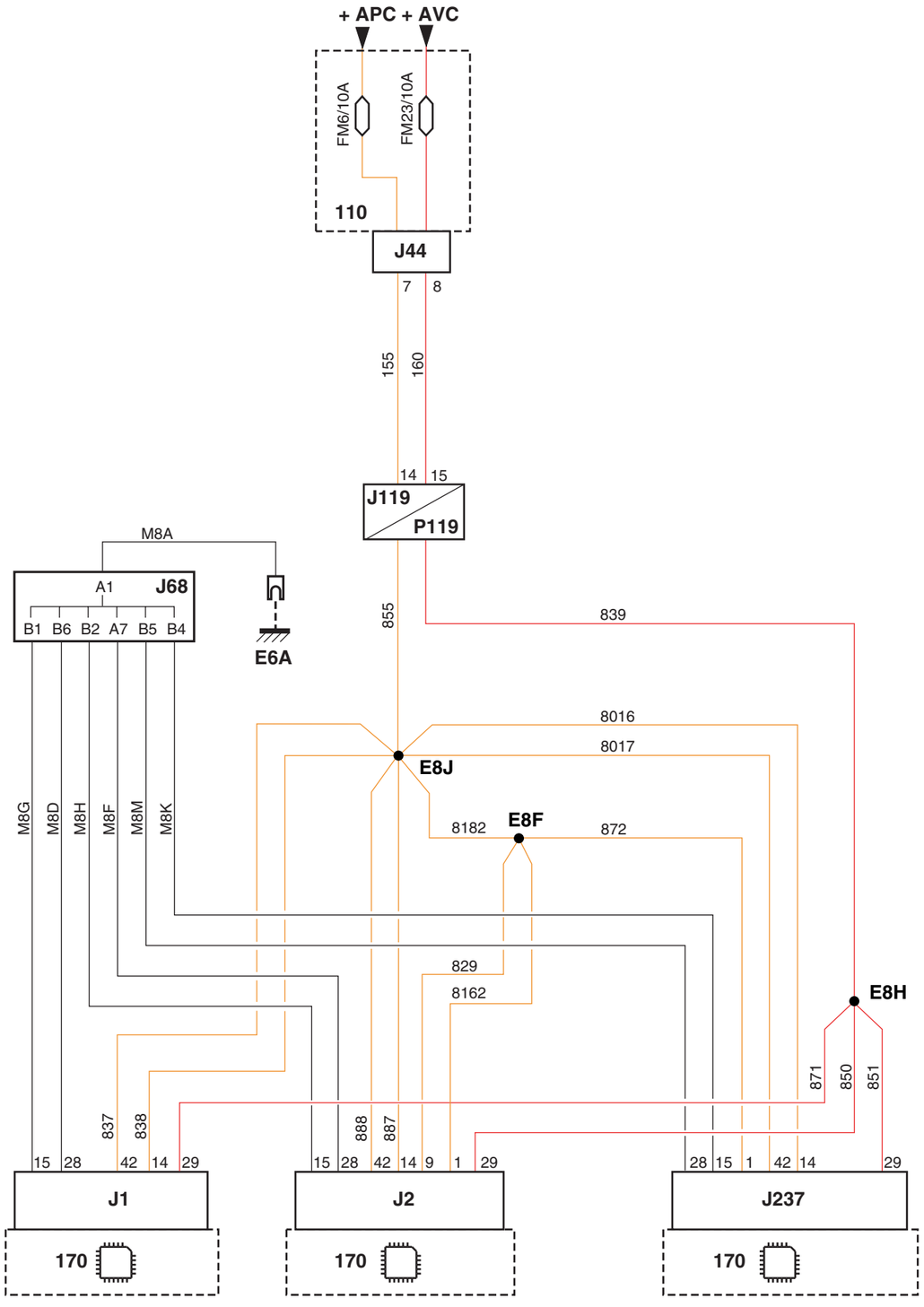


Ref	Item
82	25A power socket
110	Fuse box



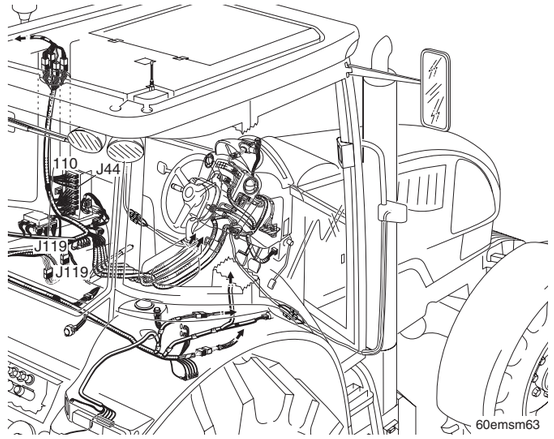
605msm66

Transmission calculator supply

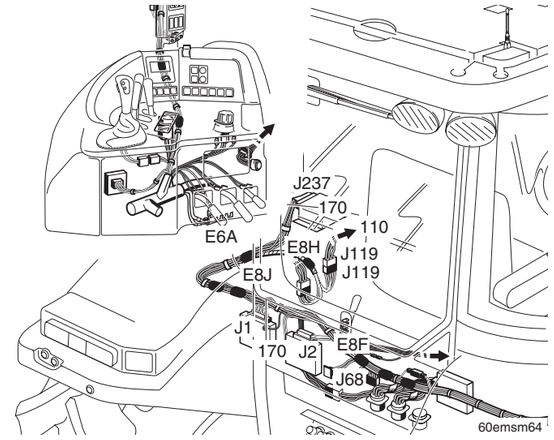


60cmsm62

Ref	Item
110	Fuse box
170	"Auto 5" electronic central unit



60emsm63



60emsm64

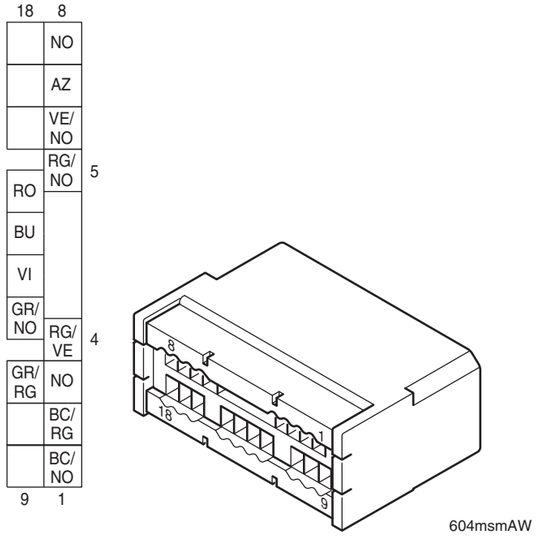
CONTENTS

Abbreviations

+APC ..... + After contact
+AVC (constant source) + Before contact
+ P ..... + Parking
4 WD ..... 4 wheel drive
AR ..... Reverse
AV ..... Forwards
CDE ..... Control
RH ..... Right
ECO ..... Economy
EV ..... Windscreen wiper
EXT ..... Exterior
LH ..... Left
GND ..... Ground
LS ..... Loudspeaker
INT ..... interior
SR ..... Shuttle reverser
LCD ..... liquid crystal display
LED ..... Indicator light
LV ..... Windscreen washer
ODB ..... On board computer
IP ..... Instrument panel
PTO ..... Power take-off (PTO)
POT ..... Potentiometer
REH ..... Electro-hydraulic lift
REF ..... Reference
TCE ..... Electronic Tracto-Control
IP ..... Instrument panel
TRANS ..... Transmission
ECU ..... Central electronic unit
W ..... Engine speed information

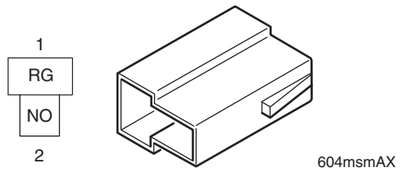
1c - Climate control harness

Wire markers	2	P282	Ending	
1	WH/BK	0,5	Recirculation control	J287	1
2	WH/RD	0,5	Recirculation control	J287	2
3	BK	0,5	Antifrost thermostat earth	**119**	3c
4	RD/GN	0,5	Defrosting thermostat	**119**	4
5	RD/BK	0,5	+ APC recirculation controls	J305	1
6	GN/BK	0,5	Power unit	J305	2
7	AZ	0,5	Ventilation speed 1	J305	3
8	BK	0,5	Control system earth	J305	4
▼	—	—	—		
11	GR/RD	0,5	Engine control	J304	1
12	GR/BK	0,5	Engine control	J304	2
13	VI	0,5	By-pass valve	J304	3
14	BL	0,5	Valve setpoint	J304	4
15	RD	0,5	Sensor REF	J304	5
▼	—	—	—		



604msmAW

Wire markers	2	P283	Ending	
1	RD	4	Ventilation control	**90**	
2	BK	4	Earth	J306	B



604msmAX

Wire markers	Colour
AZ	Azure
WH	White
BL	Blue
GR	Grey
BK	Black
RD	Red
RO	Pink
GN	Green
VI	Purple

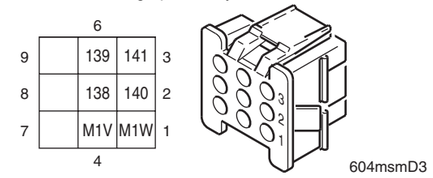
1d - Manual air conditioning or ventilation harness

Connectors	Designation
J112**	Air conditioning recirculation control
J287**	Recycling actuator
P17*/**	Instrument panel harness connection
P113**	Instrument panel harness connection

* Version without air conditioning ** Manual air conditioning version

Wire markers	2	J112	Ending	
1	M1W	0,6	Recirculation LED earth	J43	B7
2	140	1	+ APC recirculation controls	J15	12
3	141	1	Recirculation control	J15	11
4	M1V	0,6	Air conditioning LED earth	J43	B7
5	138	0,6	+ APC air conditioning control	**61**	
6	139	0,6	Air conditioning control	J113	2
▼	—	—	—		

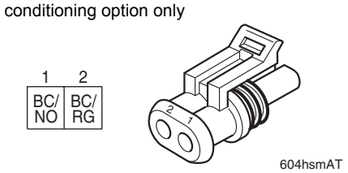
With manual air conditioning option only



604msmD3

Wire markers	2	J287	Ending	
1	WH	0,5	Recirculation control	P113	4
2	WH	0,5	Recirculation control	P113	3

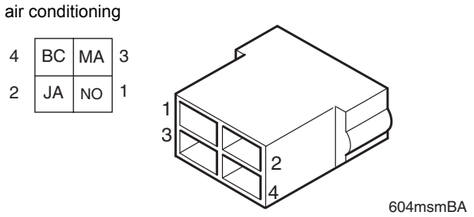
With manual air conditioning option only



604hsmAT

Wire markers	2	P17	Ending	
1	BK	3	Ventilation	**90**	
2	YL	1	Ventilation speed 1	**78**	
3	BR	2	Ventilation speed 2	**78**	
4	WH	3	Ventilation speed 3	**78**	

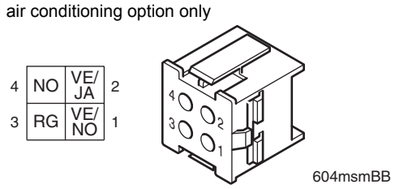
manual air conditioning



604msmBA

Wire markers	2	P113	Ending	
1	GN	0,6	Air conditioning pressure relay control	**119**	
2	VE/JA	0,6	Air conditioning control	**119**	
3	RD	1	Recirculation +	J287	2
4	BK	1	Recirculation -	J287	1

With manual air conditioning option only



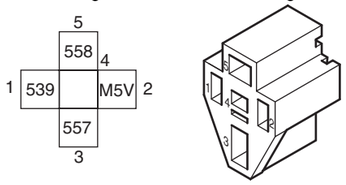
604msmBB

Wire markers	Colour
WH	White
YL	Yellow
BR	Brown
BK	Black
RD	Red
GN	Green

5a - Cab top harness

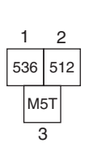
	Wire markers	2	J169	Ending	
1	539	0,5	Side light relay controls (on standby)	J291	B7
2	M5V	0,5	Side work light relay earth (on standby)	J60	A2
3	557	3	+ Side work lights (on standby)	P286	21
4	—	—	—		
5	558	3	+ Side work lights (on standby)	J292	2

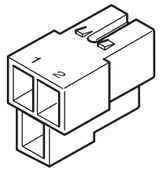
manual air conditioning - Without air conditioning



604msmP8

	Wire markers	2	J191	Ending	
1	536	1	Safety solenoid valve	P286	4
2	512	1	+ APC Electrohydraulic spool valve (DEH)	P286	8
3	M5T	1	DEH earth	J60	B5

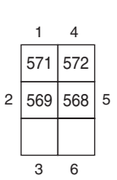


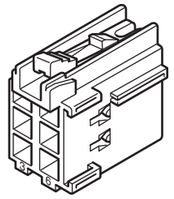


604msmP9

	Wire markers	2	J275	Ending	
1	571	0,6	CAN-Low	P137	6
2	569	0,5*	CAN-Low	J150A	5
3	—	—	—		
4	572	0,6	CAN-High	P137	3
5	568	0,6	CAN-High	J150A	4
6	—	—	—		

* Section = 0,6 for climate control version



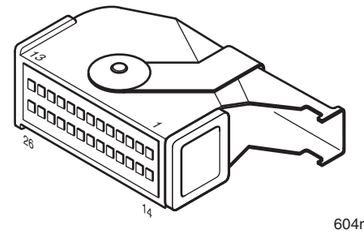


604msmR1

	Wire markers	2	J278	Ending	
1	573	0,6	Ventilation speed 1	P279	1
2	574	0,6	Earth	P279	2
3	575	0,6	+APC	P279	3
4	576	0,6	Sensor REF	P279	4
5	—	—	—		
6	577	0,6	Pressure switch	P279	6
7	578	0,6	Ventilation setpoint	P279	7
8	579	0,6	Power unit	P279	8
9	580	0,6	Defrosting thermostat	P279	9
10	581	0,6	Hood grille temperature sensor	P279	10
11	582	0,6	LH cover sensor	P279	11
12	583	0,6	By-pass valve	P279	12
13	584	0,6	Air-conditioning unit outlet temperature sensor	P279	13
14	585	0,6	Overhead instrument panel temperature sensor	P279	14
15	—	—	—		
16	586	0,6	Engine control	P279	16
17	587	0,6	Engine control	P279	17
▼	—	—	—		
22	588	0,6	Recirculation control	P279	18
23	589	0,6	Recirculation control	P279	19
24	590	0,6	Air conditioning compressor	P279	20
25	595	0,6	Line K	P279	5
26	591	0,6	Pilot	P279	21

With climate control option only

1	573	585	14
2	574		15
3	575	586	16
4	576	587	17
5			18
6	577		19
7	578		20
8	579		21
9	580	588	22
10	581	589	23
11	582	590	24
12	342C	595	25
13	583	591	26

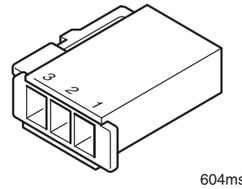


604msmR2

	Wire markers	2	J289	Ending	
1	—	—	—		
2	546	0,6	+ AVC spotlight	P61	5
3	M5X	0,5*	Spotlight earth	**E5A**	

* Section = 0,6 for climate control version

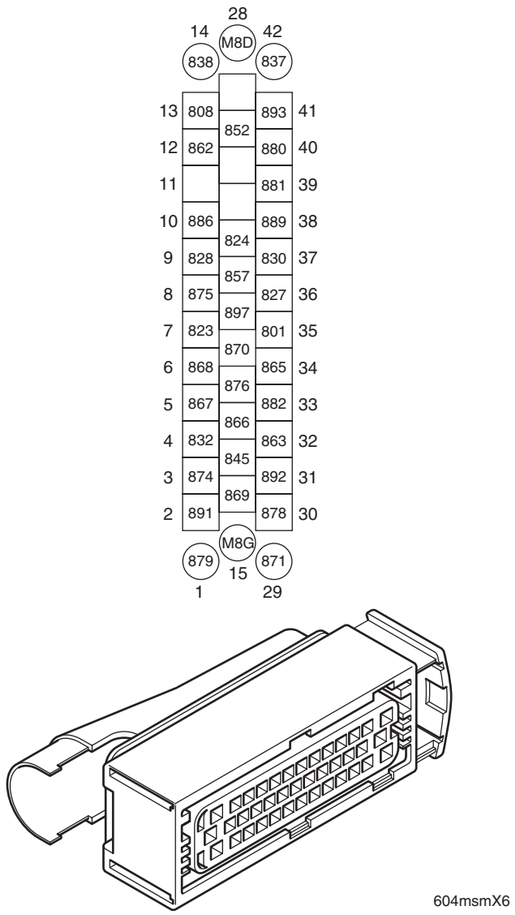
3	2	1
M5X	546	



604msmR3

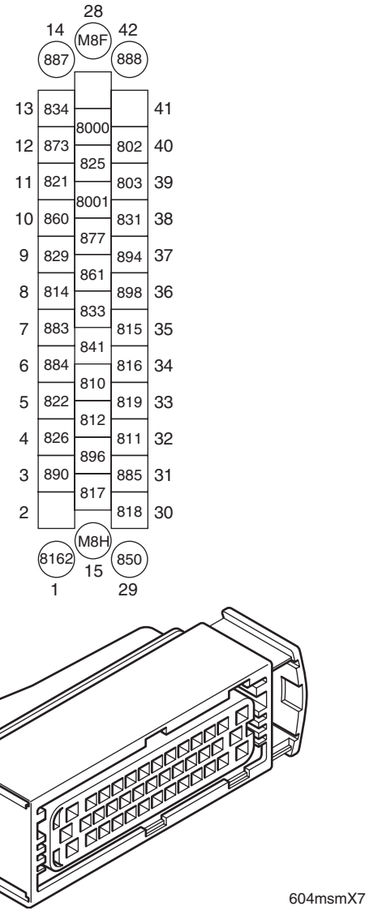
8a - Pneumatic brake transmission control harness - Hydraulic brake - Italy (Cuna)

	Wire markers	2	J1	Ending	
1	879	1	+APC solenoid valve supply	P119	12
2	891	0,6	Sensor voltage+	P119	6
3	874	0,75	Reverse drive solenoid valve return (PSVR)	P80	30
4	832	0,6	Forward drive solenoid valve return (PSVF)	J80	10
5	867	0,75	Forward drive solenoid valve (PSVF)	J80	26
6	868	0,75	Reverse solenoid valve (PSVR)	J80	27
7	823	0,75	Range solenoid valve A (SVA)	J80	5
8	875	0,75	Range solenoid valve B (SVB)	J80	23
9	828	0,6	PTO driver power supply	**53**	
10	886	0,75	Range solenoid valve D (SVD)	**E8B**	
11	—	—	—		
12	862	0,6	Buzzer	P20	21
13	808	0,6	Tractor speed	J300	1
14	838	1	+APC auto 5	J136	B6
15	M8G	1	"Auto 5"	J68	B1
16	869	0,75	Forward motion control	P20	8
17	845	0,6	Switch S1 end-of-travel	J80	2
18	866	0,75	Switch S3 end-of-travel	J80	16
19	876	0,6	Neutral control	P20	1
20	870	0,75	Reversing control	P20	7
21	897	0,6	Solenoid valve monitoring range D (SVD)	**E8B**	
22	857	0,75	Range solenoid valve C (SVC)	J80	24
23	824	0,75	Rear PTO solenoid valve	J80	8
▼	—	—	—		
26	852	0,6	Diagnostic indicator	P20	18
27	—	—	—		
28	M8D	1	"Auto 5" (1)	J68	B6
29	871	1	+AVC auto 5	J136	A2
30	878	0,6	+APC solenoid valve supply	P119	12
31	892	0,6	Accelerator POT	P20	17
32	863	0,75	Switch S2 end-of-travel	J80	13
33	882	0,75	Switch S4 end-of-travel	J80	17
34	865	0,75	Clutch cursor sensor	P20	10
35	801	0,6	Lever raised	P119	4
36	827	0,6	+ Rear PTO speed sensor	J80	14
37	830	0,6	+ Tractor speed sensor	J80	12
38	889	0,75	+ Module speed ISC	J80	29
39	881	0,6	CAN-Low (diagnostic)	J233	2
40	880	0,6	CAN-High (diagnostic)	J233	5
41	893	0,6	Sensor voltage-	P119	5
42	837	1	+APC auto 5	J136	B7



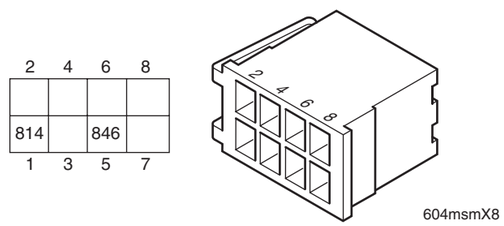
604msmX6

	Wire markers	2	J2	Ending	
1	8162	0,6	+APC	J67	B7
2	—	—	—		
3	890	0,75	Solenoid valve feedback (PSV1)	**Diode**	
4	826	0,75	Solenoid valve feedback (PSV2/3)	J80	22
5	822	0,75	(PSV3) solenoid valve	J80	21
6	884	0,75	(PSV2) solenoid valve	J80	37
7	883	0,6	Furrow control	J49	B4
8	814	0,6	4-wheel drive control	J45	1
9	829	1	+ APC driver	J67	A2
10	860	0,6	Crawler speed light	J150	12
11	821	0,75	Differential solenoid valve	J80	7
12	873	0,6	Rear PTO light	P20	15
13	834	0,6	Hydraulic pressure	P20	16
14	887	1	+APC auto 5 (2)	J136	A6
15	M8H	1	"Auto 5" (2)	J68	B2
16	817	0,6	Rear PTO stop (wing)	P20	6
17	896	0,6	PDF 1 000 rpm	**54**	
18	812	0,6	Range - control	J49	A4
19	810	0,6	LH stop	P20	13
20	841	0,6	Range change	J49	B2
21	833	0,6	Pressure switch (20 bar)	J80	3
22	861	0,6	Crawler speed	**47**	
23	877	0,75	(PSV1) solenoid valve	**Diode**	
24	8001	0,6	Differential indicator	J150	13
25	825	0,75	4-wheel drive solenoid valve	J80	6
26	8000	0,6	4 wheel drive light	J150	10
27	—	—	—		
28	M8F	1	"Auto 5" (2)	J68	A7
29	850	1	+AVC auto 5 (2)	J136	B3
30	818	0,6	Rear PTO clutch control	**53**	
31	885	0,6	Up position TCE	P20	4
32	811	0,6	Range + control	J49	A2
33	819	0,6	PTO Eco	**42**	
34	816	0,6	RH brake light	P20	12
35	815	0,6	Differential control	J46	1
36	898	0,75	Gearbox input speed sensor	J80	33
37	894	0,75	Pressure switch (5 bar)	J80	25
38	831	0,6	Engine speed	J80	11
39	803	0,6	CAN-Low	J307	2
40	802	0,6	CAN-High	J307	5
41	—	—	—		
42	888	1	+APC auto 5 (2)	J136	A5



604msmX7

	Wire markers	2	J45	Ending	
1	814	0,6	4-wheel drive control	J2	8
▼	—	—	—		
5	846	0,6	+APC 4-wheel drive control	J67	A3
▼	—	—	—		



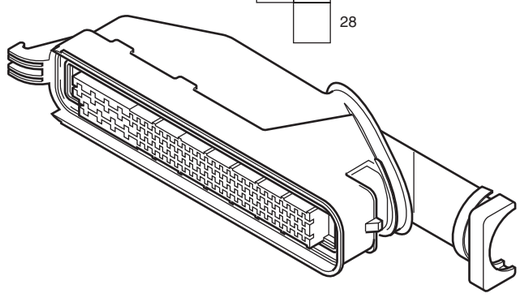
604msmX8

9/2a - TCE 15/25 Control harness

	Wire markers	2	J71	Ending	
1	—	—	—		
2	914	0,75	Down valve voltage+	J69	8
3	M9E	1*	TCE	**E9A**	
4	M9F	1*	TCE	**E9A**	
5	913	0,75	Up valve voltage-	J69	9
6	912	0,75	Down valve voltage-	J69	4
7	905	0,6	+ APC backligh	J70	A3
▼	—	—	—		
12	921	0,6	CAN-High return	P42	8
13	922	0,6	CAN-Low return	P42	7
14	—	—	—		
15	906	0,6	Rear position voltage+	J69	1
16	908	0,6	LH draft voltage+	J69	5
17	910	0,6	RH draft voltage+	J69	10
18	—	—	—		
19	933	0,6	Rear position voltage-	J69	3
20	934	0,6	LH rear draft voltage-	J69	7
21	935	0,6	RH rear draft voltage-	J69	12
22	—	—	—		
23	907	0,6	Rear position signal	J69	2
24	911	0,6	RH draft signal	J69	11
▼	—	—	—		
29	915	0,75	Up valve voltage+	J69	14
30	904	1,4	+AVC REH	J70	A1
31	932	1,4	+AVC REH	J70	B2
▼	—	—	—		
34	923	0,6	+APC REH	J70	B5
▼	—	—	—		
37	901	0,6	Rear lowering ext ctrl	J248	B6
38	900	0,6	Rear raising ext ctrl	J248	B1
39	—	—	—		
40	918	0,6	CAN-High network	P42	14
41	919	0,6	CAN-Low network	P42	13
42	920	0,6	REH up position	P42	15
▼	—	—	—		
47	902	1	+ APC (D+) alternator charge	P42	1
▼	—	—	—		
51	909	0,6	LH draft signal	J69	6
▼	—	—	—		

* Section = 1,4 for version with electrohydraulic spool valve (DEH)

27			55		
26			54		
25			53		
24	911		52		
23	907	909	51		
22			50		
21	935		49		
20	934		48		
19	933	902	47		
18			46		
17	910		45		
16	908		44		
15	906		43		
14		920	42		
13	922	919	41		
12	921	918	40		
11			39		
10		900	38		
9		901	37		
8			36		
7	905		35		
6	912	923	34		
5	913		33		
4	M9F		32		
3	M9E	932	31		
2	914	904	30		
1		915	29		
			28		

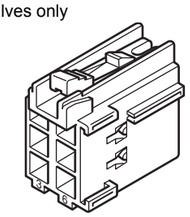


604msmAA

	Wire markers	2	J189	Ending	
1	950	0,6	CAN-Low	P270	1
2	9030	0,6	CAN-Low	P270	2
3	9032	0,6	CAN-Low	J261	1
4	948	0,6	CAN-High	P270	4
5	9031	0,6	CAN-High	P270	5
6	9033	0,6	CAN-High	J261	4

With electrohydraulic spool valves only

	1	4	
	950	948	
2	9030	9031	5
	9032	9033	
	3	6	

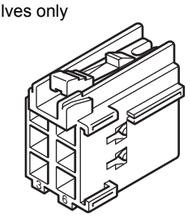


604msmF0

	Wire markers	2	J190	Ending	
1	953	0,6	CAN-Low	J252	3
▼	—	—	—		
4	957	0,6	CAN-High	J252	6
▼	—	—	—		

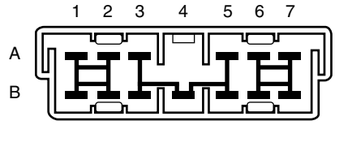
With electrohydraulic spool valves only

	1	4	
	953	957	
2			5
	3	6	



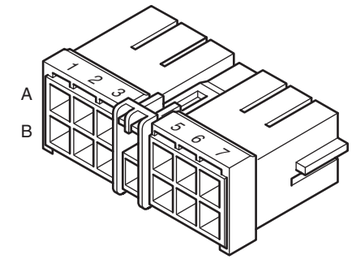
604msmG0

	Wire markers	2	J248	Ending	
A1	946	0,6	REH raise control	J40	A
A2	944	0,6	REH raise control	J26	A
A3	903	0,6	+APC REH	J70	B3
A4	—	—	—		
A5	941	0,6	+ REH raise control	J26	B
A6	943	0,6	REH lower control	J29	A
A7	947	0,6	REH lower control	J37	A
B1	900	0,6	Rear raising ext ctrl	J71	38
B2	—	—	—		
B3	942	0,6	+ REH lower control	J37	B
B4	939	0,6	+ REH lower control	J29	B
B5	940	0,6	+ REH raise control	J40	B
B6	901	0,6	Rear lowering ext ctrl	J71	37
B7	—	—	—		



604msmBJ

	1	2	3	4	5	6	7
A	946	944	903		941	943	947
B	900		942	939	940	901	

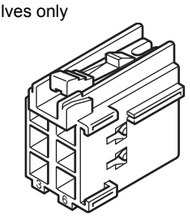


604msmAB

	Wire markers	2	J251	Ending	
1	954	0,6	CAN-Low	J261	3
2	951	0,6	CAN-Low	J69	32
3	9036	0,6	CAN-Low	J252	1
4	949	0,6	CAN-High	J261	6
5	955	0,6	CAN-High	J69	33
6	9037	0,6	CAN-High	J252	4

With electrohydraulic spool valves only

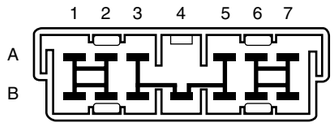
	1	4	
	954	949	
2	951	955	5
	9036	9037	
	3	6	



604msmJ0

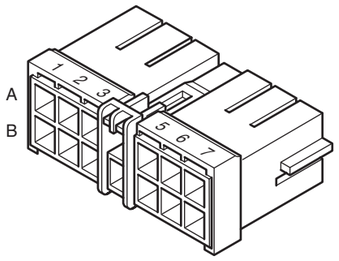
1a - Instrument panel harness

	Wire markers	2	J10	Ending	
A1	031	1,5	Flashing unit	J231	4
A2	032	1,5	Flashing light supply	J07	B2
▼	—	—	—		
A5	036	1	Front LH indicator	**5**	
A6	038	1,5	RH flashing lights	J07	B1
A7	039	1,5	RH flashing lights	J21	5
B1	033	1,5	Flashing light supply	J21	3
B2	—	—	—		
B3	035	1,5	LH flashing lights	J21	1
B4	034	1,5	LH flashing lights	J07	B4
B5	037	1,5	LH rear flashing light	J35	A1
B6	041	1,5	RH rear flashing light	J35	B4
B7	040	1	Front RH indicator	**4**	



604msmBJ

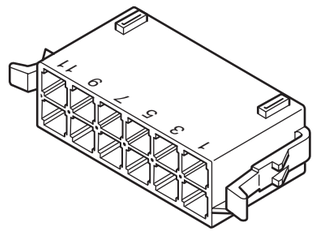
	1	2	3	4	5	6	7
A	031	032			036	038	039
B	033		035	034	037	041	040



604msmA7

	Wire markers	2	J13	Ending	
1	220	0,5	Braking solenoid valve - Italy	J119	9
2	125	0,5	Hydraulic pressure	J20	16
3	059	0,5	Handbrake	JX2	5
3	219	0,5	Handbrake	**204**	
4	—	—	—		
5	178	3	Outside rear work lights power supply	J286	13
6	106	1	Safety solenoid valve	J42	2
7	175	0,5	Outside RR work light ctrl	J286	15
8	176	3	+ AVC Rear work lights	J61	15
9	179	0,5	Rear work light ctrl	J286	19
10	094	1	Feu de travail aile arrière G	**161**	
10	095	1	Feu de travail aile arrière D	**160**	
11	196	0,75	+ APC LH PTO button	J123	A
12	177	0,5	Rear wing light control	J286	16

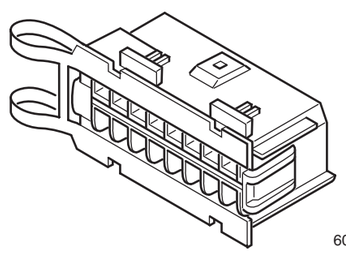
11	9	7	5	3	1
196	179	175	178	059 219	220
177	094 095	176	106		125
12	10	8	6	4	2



604msmA8

	Wire markers	2	J14	Ending	
▼	—	—	—		
5	M0D	1	Diagnostic plug	J43	A2
6	189	1	CAN-High	J266	4
7	084	1	Line K	J27	B6
▼	—	—	—		
14	188	1	CAN-Low	J266	1
15	085	1	Line L	J27	B1
16	076	1	+ AVC diagnostic socket	J03	4

1	2	3	4	5	6	7	8
				M0D	189	084	
					188	085	076
9	10	11	12	13	14	15	16

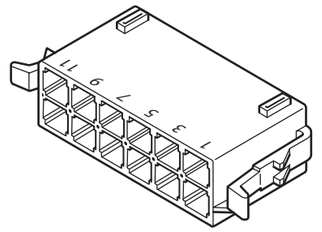


604msmA9

	Wire markers	2	J15	Ending	
▼	—	—	—		
4	157	1,5	Not neutral	J130	1
5	156	1,5	Reverser relay ctrl engaged	J59	B4
6	174	0,5	Inside rear work light control	J286	14
7	150	1,5	+APC neutral relay contact	J59	B1
▼	—	—	—		

Without air conditioning

11	9	7	5	3	1
		150	156		
			174	157	
12	10	8	6	4	2

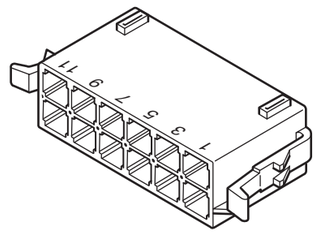


60bmsm06

	Wire markers	2	J15	Ending	
1	142	0,5	Air conditioning pressure relay control	J113	1
2	145	1	Air conditioning compressor	J02	X
3	146	1	Pressure switch	J02	N
4	157	1,5	Not neutral	J130	1
5	156	1,5	Reverser relay ctrl engaged	J59	B4
6	174	0,5	Inside rear work light control	J286	14
7	150	1,5	+APC neutral relay contact	J59	B1
8	—	—	—		
9	143	1	Recycling–	J113	4
10	144	1	Recycling+	J113	3
11	141	1	Recirculation control	J112	3
12	140	1	+ APC recirculation controls	J112	2

manual air conditioning

11	9	7	5	3	1
141	143	150	156	146	142
140	144		174	157	145
12	10	8	6	4	2

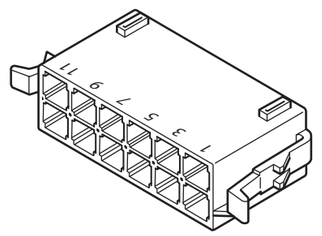


604msmB2

	Wire markers	2	J15	Ending	
1	—	—	—		
2	194	3	Long range light power supply	J286	20
3	192	0,5	Long-range light control	J286	18
4	157	1,5	Not neutral	J130	1
5	156	1,5	Reverser relay ctrl engaged	J59	B4
6	174	0,5	Inside rear work light control	J286	14
7	150	1,5	+APC neutral relay contact	J59	B1
▼	—	—	—		
12	087	2	+ APC ventilation	**E0F**	

Climate control

11	9	7	5	3	1
		150	156	192	
087			174	157	194
12	10	8	6	4	2



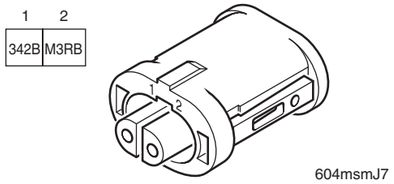
60bmsm07

3/1b - 4 cylinder radiator cowling harness

Connectors	Designation
J273	RH work light
J274	LH work light
J280*	Hood temperature sensor
P265	Engine front harness connection

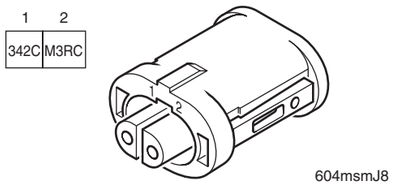
* Climate control version

	Wire markers	2	J273	Ending	
1	342B	1	RH work light	**E3G**	
2	M3RB	1	RH work light earth	**E3H**	



604msmJ7

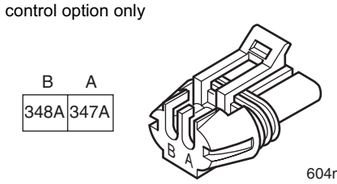
	Wire markers	2	J274	Ending	
1	342C	1	LH work light	**E3G**	
2	M3RC	1	LH work light earth	**E3H**	



604msmJ8

With climate control option only

	Wire markers	2	J280	Ending	
A	347A	1	Hood temperature sensor	P265	2
B	348A	1	Hood temperature sensor	P265	8

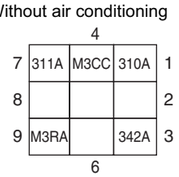


604msmJ9

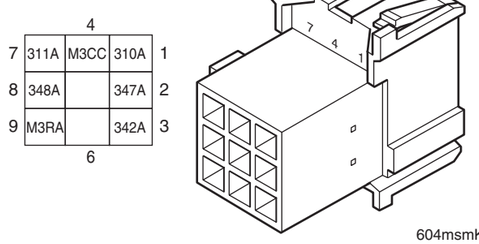
manual air conditioning - Without air conditioning

	Wire markers	2	P265	Ending	
1	310A	2	Headlights	**E3A**	
2	347A*	1	Hood temperature sensor	J280	A
3	342A	2	Working lights	**E3G**	
4	M3CC	2	Work light earth	**E3C**	
▼	—	—	—		
7	311A	2	Dipped headlights	**E3B**	
8	348A*	1	Hood temperature sensor	J280	B
9	M3RA	2	Work light earth	**E3H**	

* Climate control version



Climate control

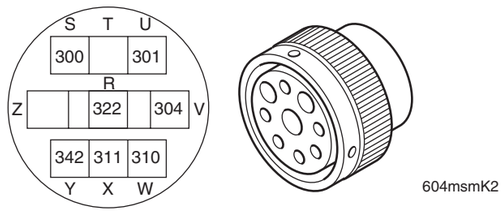


604msmK1

3/2a - 6 cylinder engine front harness

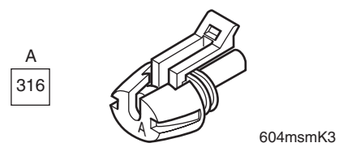
Connectors	Designation
J01	Instrument panel harness connection
J16	Preheating harness connection
J22	Windscreen washer pump
J31	Engine water temperature
J34	Compressor
J51	Front power take-off
J200	Rear windscreen washer pump
J209	Air temperature
J210	Engine water temperature
J212	Engine speed
J213	Injection pump
J218	Injection pump
J226	Fuel temperature
J243	Controller Area Network (CAN)
J244	Controller Area Network (CAN)
J265	Radiator cowling harness connection
P02	Instrument panel harness connection

	Wire markers	2	J01	Ending	
R	322	10	+ AVC general	**E3D**	
S	300	7	+ AVC general	**E3D**	
T	—	—	—		
U	301	7	+ AVC general	**E3D**	
V	304	3	Starter solenoid	**32**	
W	310	2	Dipped headlights	J265	1
X	311	2	Headlights	J265	7
Y	342	2	Grille work lights control	J265	3
Z	—	—	—		



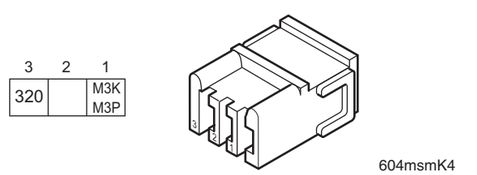
604msmK2

	Wire markers	2	J16	Ending	
A	316	1	Preheating ctrl	J218	K3



604msmK3

	Wire markers	2	J22	Ending	
1	M3K	1	Windscreen washer pump	**E0B**	
1	M3P	1	Rear screen washer	J200	1
2	—	—	—		
3	320	1	Windscreen washer pump	P02	H

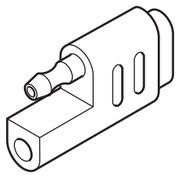


604msmK4

7/1 - Closed centre circuit transmission harness - 110 litres - Pneumatic brake - Hydraulic brake - Italy (Cuna)

1	Wire markers	2	J82	Ending	
1	712	0,75	+ Tractor speed	P80	12
2	M7N	0,75	Tractor speed	**E7C**	

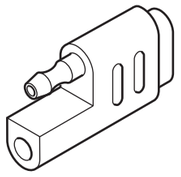
1	2
712	M7N



604msmU3

1	Wire markers	2	J83	Ending	
1	711	0,75	+ Engine speed sensor	P80	11
2	M7O	0,75	Engine speed	**E7C**	

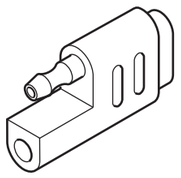
1	2
711	M7O



604msmU4

1	Wire markers	2	J84	Ending	
1	714	0,75	+ Rear PTO speed	P80	14
2	M7P	0,75	Rear PTO speed	**E7C**	

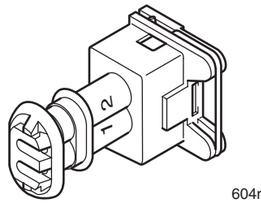
1	2
714	M7P



604msmU5

1	Wire markers	2	J85	Ending	
1	709	0,75	Solenoid valve brake PdF rear	P80	9
2	M7C	0,75	Solenoid valve brake PdF rear	**E7A**	

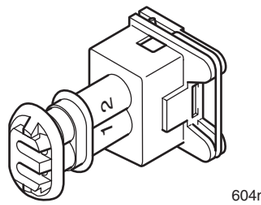
1	2
709	M7C



604msmU6

1	Wire markers	2	J86	Ending	
1	708	0,75	Rear PTO solenoid valve	P80	8
2	M7J	0,75	Rear PTO solenoid valve	**E7A**	

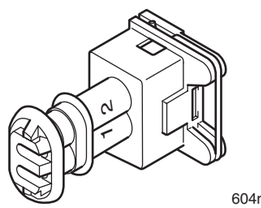
1	2
708	M7J



604msmU7

1	Wire markers	2	J87	Ending	
1	704	0,75	Oil filter	P80	4
2	M7F	0,75	Oil filter blocked	**E7A**	

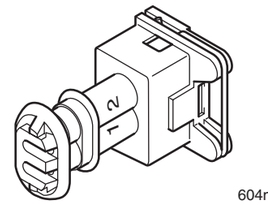
1	2
704	M7F



604msmU8

1	Wire markers	2	J88	Ending	
1	707	0,75	Differential solenoid valve	P80	7
2	M7G	0,75	Differential solenoid valve	**E7A**	

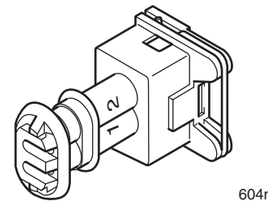
1	2
707	M7G



604msmU9

1	Wire markers	2	J89	Ending	
1	706	0,75	4 WD solenoid valve	P80	6
2	M7H	0,75	4 WD solenoid valve	**E7A**	

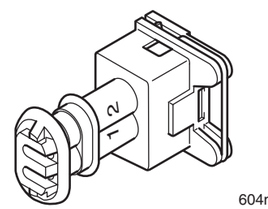
1	2
706	M7H



604msmV1

1	Wire markers	2	J90	Ending	
1	705	0,75	Range solenoid valve A (SVA)	P80	5
2	M7I	0,75	Range solenoid valve A (SVA)	**E7A**	

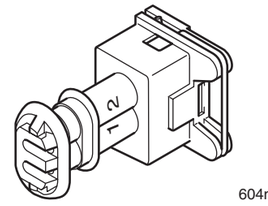
1	2
705	M7I



604msmV2

1	Wire markers	2	J91	Ending	
1	719	0,75	– Transmission temperature	P80	19
2	720	0,75	+ Transmission temperature	P80	20

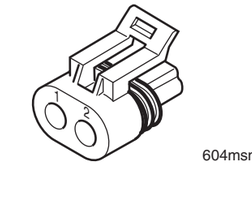
1	2
719	720



604msmV3

1	Wire markers	2	J92	Ending	
1	721	0,75	(PSV3) solenoid valve	P80	21
2	717	0,75	Solenoid valve feedback (PSV3)	**E7E**	

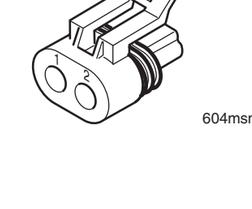
1	2
721	717



604msmV4

1	Wire markers	2	J116	Ending	
1	726	0,75	Forward drive solenoid valve (PSVF)	P80	26
2	710	0,75	Forward drive solenoid valve return (PSVF)	P80	10

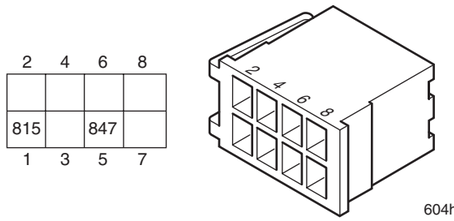
1	3
726	710



604msmV5

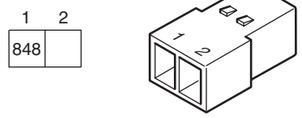
8a - Pneumatic brake transmission control harness - Hydraulic brake - Italy (Cuna) - 50 km/h

	Wire markers	2	J46	Ending	
1	815	0,6	Differential control	J2	35
▼	—	—	—		
5	847	0,6	+APC differential control	**E8G**	
▼	—	—	—		



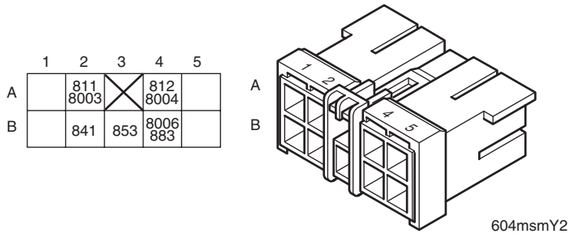
604hsmX9

	Wire markers	2	J47	Ending	
1	848	1	+APC clutch control	**E8G**	
2	—	—	—		



604msmY1

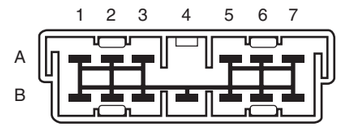
	Wire markers	2	J49	Ending	
A1	—	—	—		
A2	811	0,6	Range + control	J2	32
A2	8003	0,6	Range + control	**220A**	
A3	—	—	—		
A4	812	0,6	Range - control	J2	18
A4	8004	0,6	Range - control	**220B**	
A5	—	—	—		
B1	—	—	—		
B2	841	0,6	Range change	J2	20
B3	853	0,6	+APC +/- range control	**E8G**	
B4	8006	0,6	Furrow control	**220C**	
B4	883	0,6	Furrow control	J2	7
B5	—	—	—		



604msmY2

	Wire markers	2	J68	Ending	
A1	M8A	2	Transmission control earth	**E6A**	
A2	M8B	0,6	Indicator light display earth	J195	9
A3	M8Q**	1	Air brake solenoid valve	J80	35
A3	M8R*	0,6	ISO unit	J207	2
A4	—	—	—		
A5	M8C	0,6	LCD display	J137	1
A6	M8E***	1,4	Solenoid valve earth	J80	31
A7	M8F	1	Earth "Auto 5"	J2	28
A7	M8T	0,6	Resisitance earth	J300	3
B1	M8G	1	Earth "Auto 5"	J1	15
B2	M8H	1	Earth "Auto 5" (2)	J2	15
B3	M8J	1	Earth "Auto 5" (1/2)	**184**	
B4	M8K	1	Earth "Auto 5" (3)	J237	15
B5	M8M	1	Earth "Auto 5" (3)	J237	28
B6	M8D	1	Earth "Auto 5" (1)	J1	28
B7	M8L	0,75	GND frequency earth	J80	15

* Version with ISO socket
** Version with pneumatic braking and 50 km/h
*** Section = 1,5 for hydraulic version Italy



604msmBK

Without ISO socket

	1	2	3	4	5	6	7
A	M8A	M8B		X	M8C	M8E	M8F M8T
B	M8G	M8H	M8J	M8K	M8M	M8D	M8L

With ISO socket - Hydraulic brake (Italy)

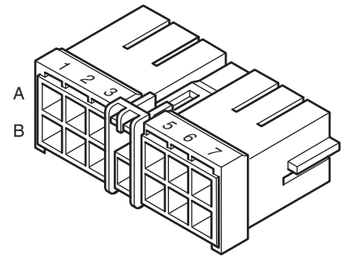
	1	2	3	4	5	6	7
A	M8A	M8B	M8R	X	M8C	M8E	M8F M8T
B	M8G	M8H	M8J	M8K	M8M	M8D	M8L

Without ISO socket - Pneumatic brake - 50 km/h

	1	2	3	4	5	6	7
A	M8A	M8B	M8Q	X	M8C	M8E	M8F M8T
B	M8G	M8H	M8J	M8K	M8M	M8D	M8L

With ISO socket - Pneumatic brake - 50 km/h

	1	2	3	4	5	6	7
A	M8A	M8B	M8Q M8R	X	M8C	M8E	M8F M8T
B	M8G	M8H	M8J	M8K	M8M	M8D	M8L



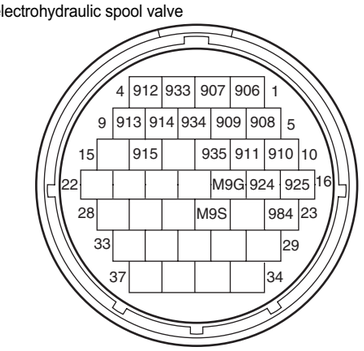
604msmY4

9/2a - TCE 15/25 control harness

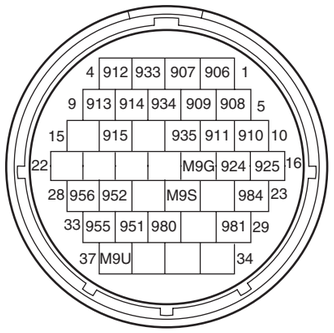
	Wire markers	2	J69	Ending	
1	906	0,6	Rear position voltage+	J71	15
2	907	0,6	Rear position signal	J71	23
3	933	0,6	Rear position voltage-	J71	19
4	912	0,75	Down valve voltage-	J71	6
5	908	0,6	LH draft voltage+	J71	16
6	909	0,6	LH draft signal	J71	51
7	934	0,6	LH rear draft voltage-	J71	20
8	914	0,75	Down valve voltage+	J71	2
9	913	0,75	Up valve voltage-	J71	5
10	910	0,6	RH draft voltage+	J71	17
11	911	0,6	RH draft signal	J71	24
12	935	0,6	RH rear draft voltage-	J71	21
13	—	—	—		
14	915	0,75	Up valve voltage+	J71	29
15	—	—	—		
16	925	0,6	+APC radar (RH+ relayed)	J70	A5
17	924	0,6	Radar signal	P42	6
18	M9G	0,6	Radar	**E9A**	
▼	—	—	—		
23	984	0,75	Fuel level	P42	10
24	—	—	—		
25	M9S	0,75	Fuel gauge	P42	11
26	—	—	—		
27	952*	0,6	CAN-Low	J252	2
28	956*	0,6	CAN-High	J252	5
29	981*	1	+ APC Electrohydraulic spool valve (DEH)	P42	12
30	—	—	—		
31	980*	1	Safety solenoid valve	P42	2
32	951*	0,6	CAN-Low	J251	2
33	955*	0,6	CAN-High	J251	5
▼	—	—	—		
37	M9U*	1	DEH earth	**E9A**	

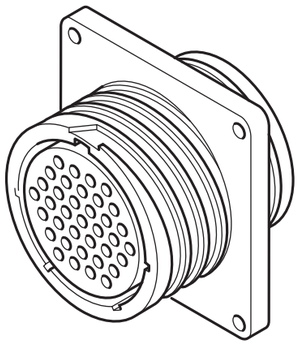
* Version with DEH

Without electrohydraulic spool valve



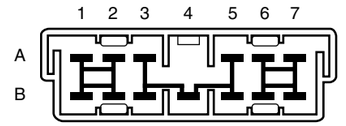
With electrohydraulic spool valve





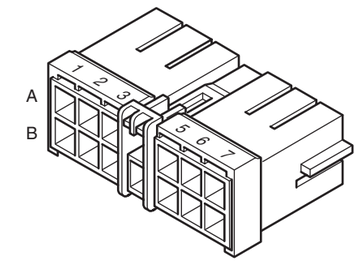
604msmY0

	Wire markers	2	J70	Ending	
A1	904	1,4	+AVC REH	J71	30
A2	—	—	—		
A3	905	0,6	+ APC backligh	J71	7
A4	—	—	—		
A5	925	0,6	+APC radar (RH+ relayed)	J69	16
▼	—	—	—		
B1	917	2	+AVC REH	P42	9
B2	932	1,4	+AVC REH	J71	31
B3	903	0,6	+APC REH	J248	A3
B4	916	0,6	+APC REH	P42	3
B5	923	0,6	+APC REH	J71	34
▼	—	—	—		



604msmBJ

	1	2	3	4	5	6	7
A	904		905	X	925		
B	917	932	903	916	923		



604msmZ0

CHECKS AND ADJUSTMENTS

G3 – TCE 15/25 ELECTRONIC LIFT

DESCRIPTION

CHECKS AND ADJUSTMENTS

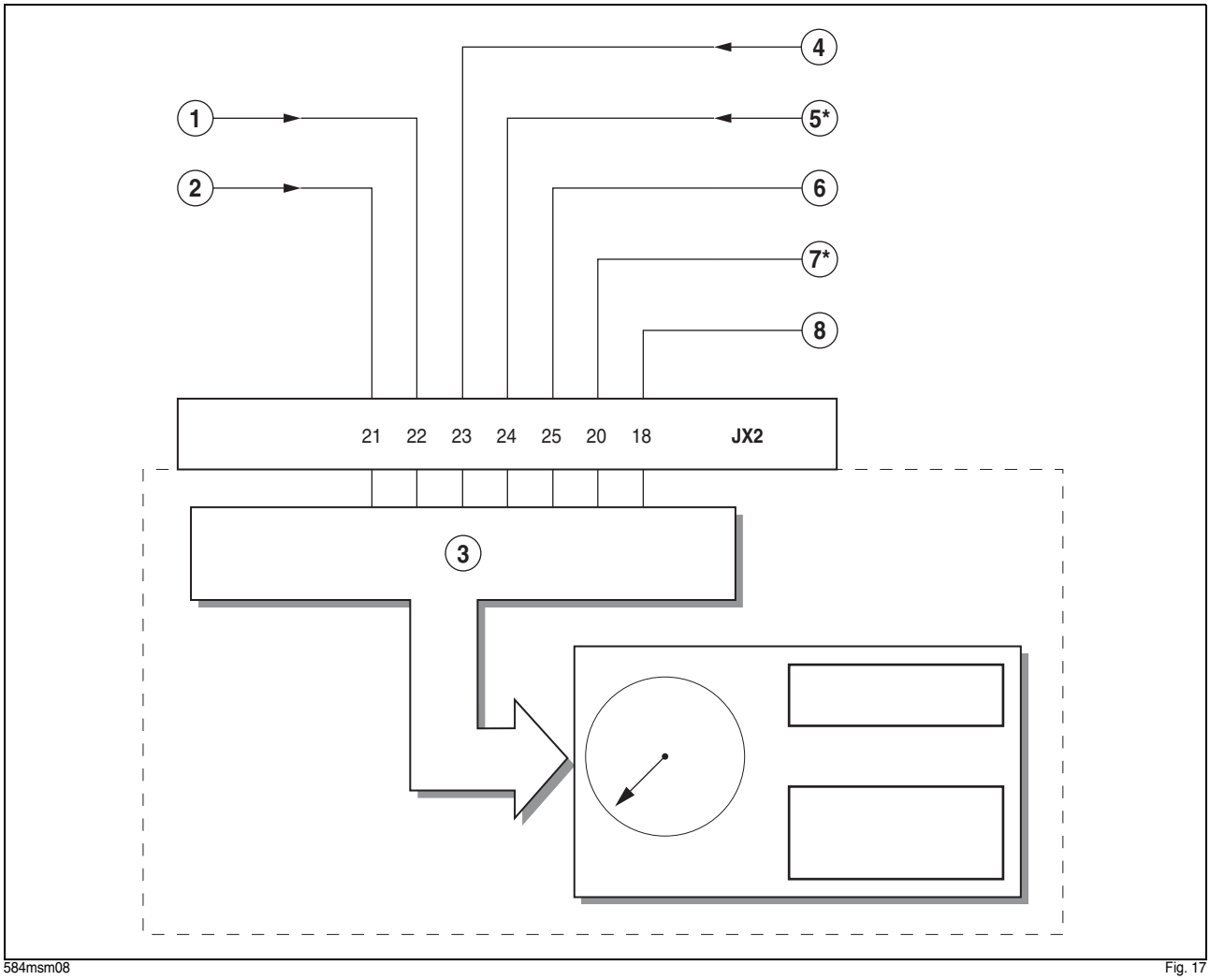
G4 – INFOTRAC AND ISO SOCKET

PRESENTATION OF THE "INFOTRAC"

Characteristics

Input/output by function

Input/output by function (rev counter, various speeds and hour counter)



584msm08 Fig. 17

Nomenclature

1 Rear power take-off speed.
2 Alternator signal (engine speed).
3 Dashboard electronic control unit.
4 Theoretical speed sensor signal.
5 Actual speed radar signal*.
6 Speed calibration control.
7 Front PTO signal*.
8 Display selection control.

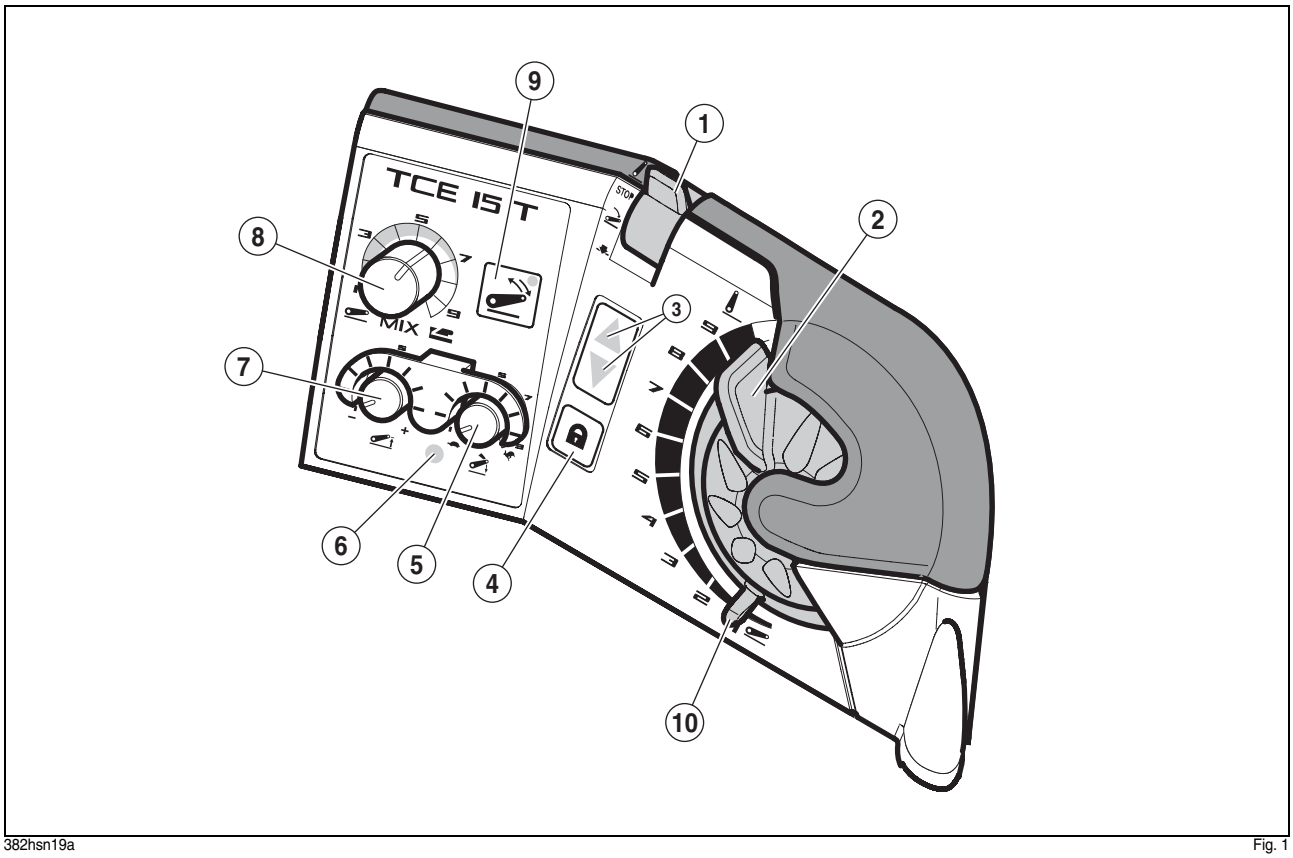
Nature of signal or electrical level

1, 2, 4, 5*: AC signal measured on frequency indicator.
6, 8: Earth contact.
7*: 12 V DC voltage if front PTO control engaged.

** Option depending on model.*

Description

TCE 15 T



382hsn19a Fig. 1

Nomenclature

1 5-position mode switch (transport, high position, stop, working position and dropping).

2 Position adjustment control (work depth adjustment).

3 Lift movement indicator lights (up / down).

4 Transport lock button.

5 Button to adjust rate of descent.

6 Safety warning light. This light will be lit or start flashing if the safety function or alarm is activated on the TCE unit. It can be activated in three different ways.
– Light flashing slowly or quickly: Operating fault. The flashing rate defines the nature of the fault. The lift can still be used (Win Métadiag© is required to determine the origin of the fault).
– Light on steady: System in safety mode. To reset the unit, carry out the lift setup procedure.

7 Button to adjust top limit.

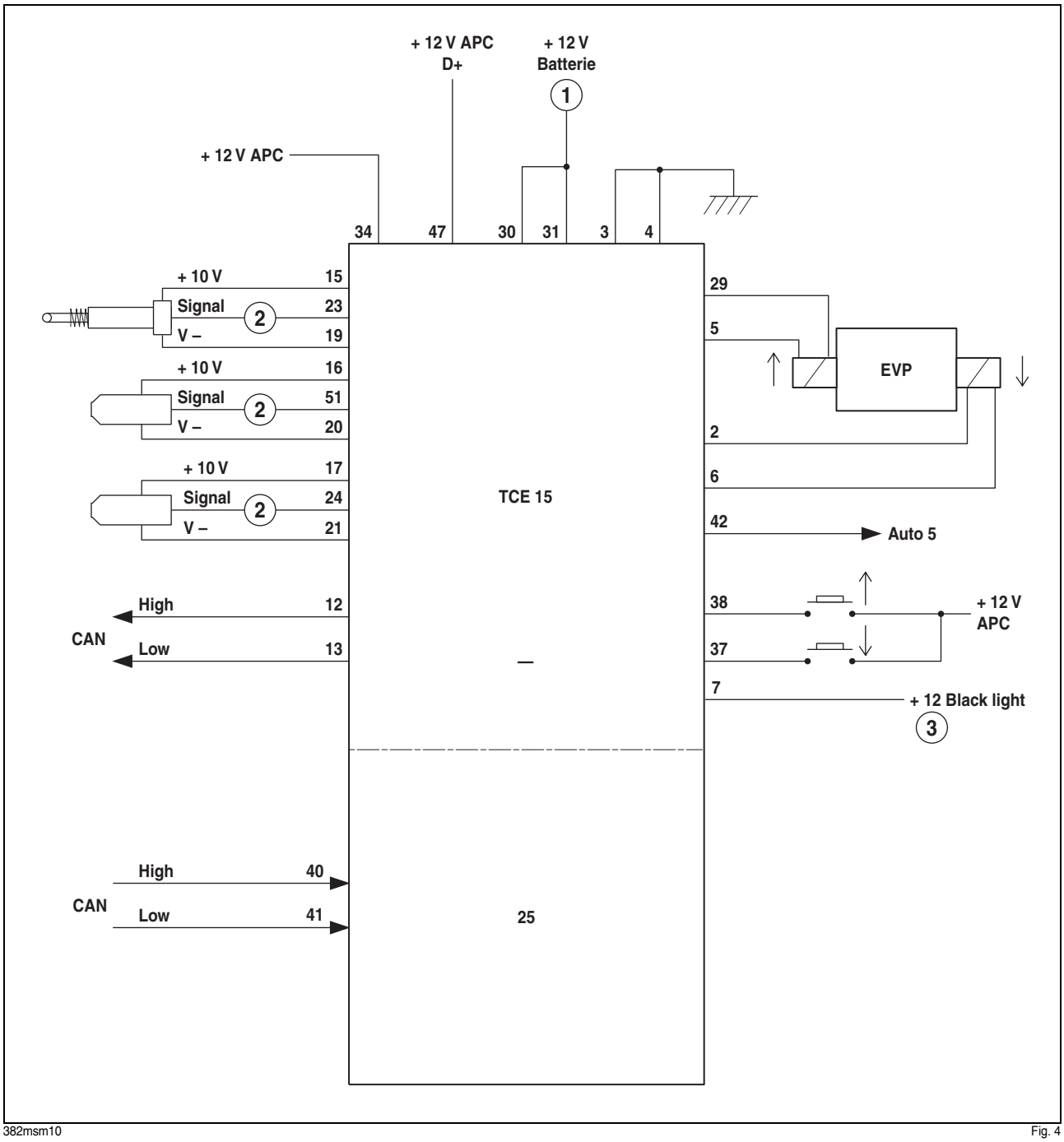
8 Keys to adjust sensitivity of draft/ position control.

9 Damping mode key for transport.

10 Mechanical stop identifying the "low limit" position.

Description

ECU inputs and outputs



382msm10 Fig. 4

Nomenclature

1 Battery.
2 Signal.
3 Black light.

Presentation of the ISO socket

ISO unit

Its purpose is to make the signals received for an implement usable.

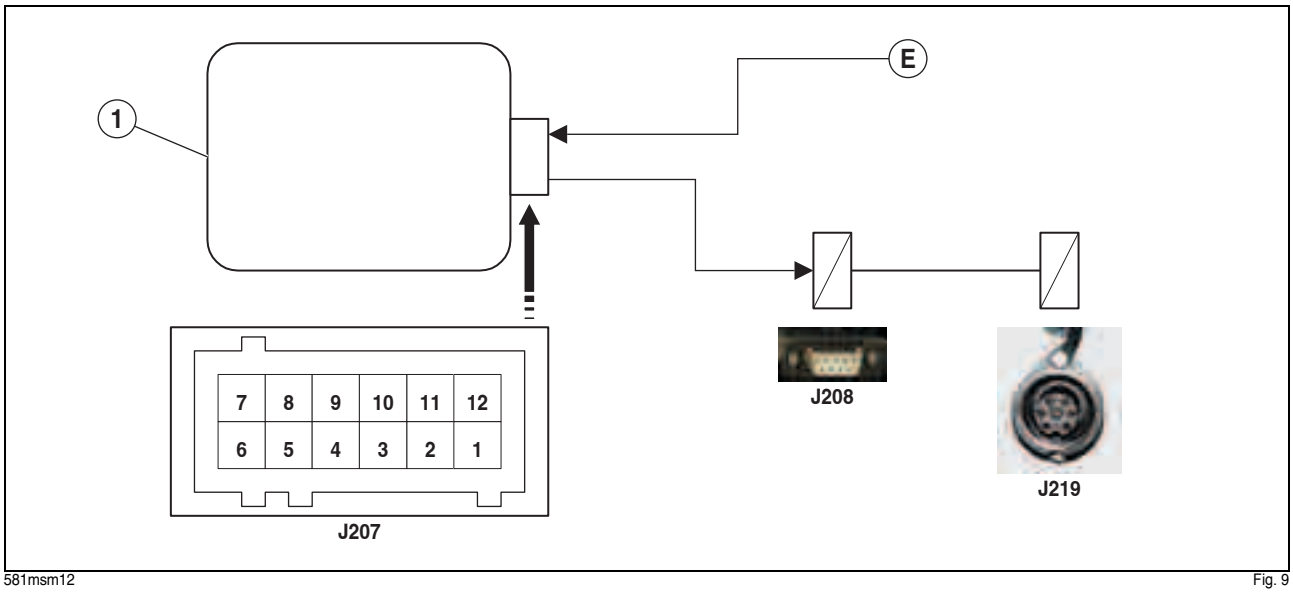
– Change the unit in the event of a fault.

The ISO unit (1) is located on the rear panel.

A single connector receives the inputs and outputs (Fig. 9). For more information, refer to the connector channel table (see chapter "G5").

581msm05 Fig. 8

Harness schematic



581msm12 Fig. 9

Nomenclature

1 ISO unit.

E Inputs.

Description

The Electropilot system operates via a CAN bus.

Note: a CAN bus consists of 2 wires that carry information in binary form .

The information does not have a precise destination but is preceded by an identifier. Information is made available to all units present on the bus. From the moment that an identifier is relevant to a unit, the latter will process the message that accompanies this identifier .

These 2 wires are twisted ("twisted pair") to imprive interference resistance.

The CAN bus links the joystick, the two electrohydraulic spool valves, as well as the "Auto 5" transmission unit.
Électropilot can only be activated with the engine running. This "engine running" signal is provided by the transmission unit (Auto 5).
When the system is active, the safety spool valve is powered. Control of this solenoid is provided by the joystick and amplified within the settings console.
If the joystick is moved forwards, this sends a certain identifier onto the bus accompanied by a flow order (this will depend on the position of the joystick and the setting of potentiometer "A" on the console).
This identifier will only be of interest to spool valve "A" which will position the spool to obtain the required flow.

"Inspection results" sheet

This sheet is intended to be duplicated and completed for each operation on the tractor. If you have to send it to the manufacturer's after sales service, it is essential to indicate:

Tractor type.....

The serial number.....

Total operating hours.....

Date of operation .....

Checking the safety solenoid valve

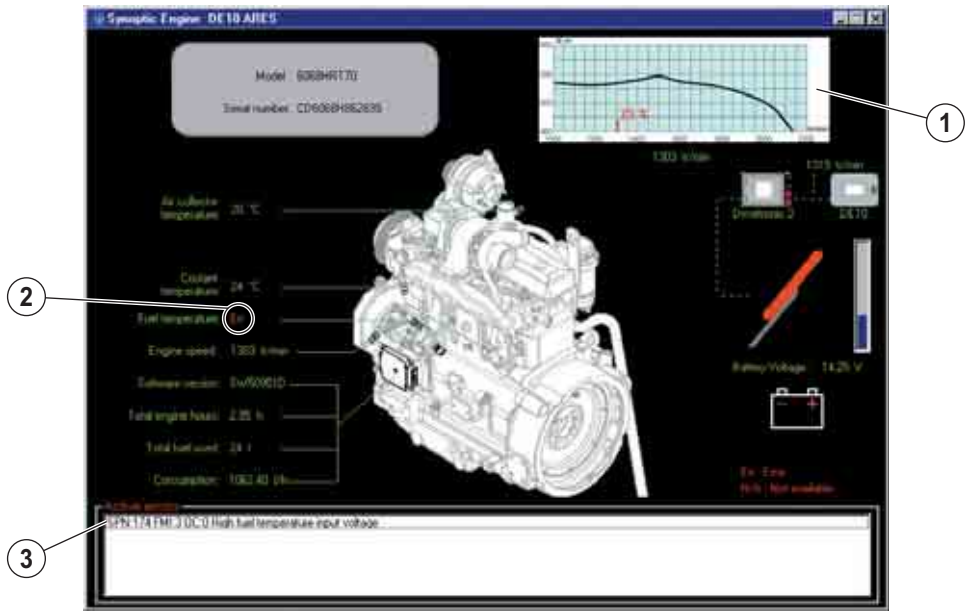
Test conditions with power on	Nominal voltage (volt)	Measured voltage
Control in neutral	0	
Control activated	12	
Test condition with power off	**Nominal resistance (Ohm)**	**Measured resistance**
Control activated	5,3	

Checking the control pressure

Test conditions Oil temperature at 60°C Engine at nominal speed	Nominal pressure (bar)	Recorded pressure
Control activated	22,5 ± 1,5	

Engine application

Engine overview



586hsm60 Fig. 21

Nomenclature

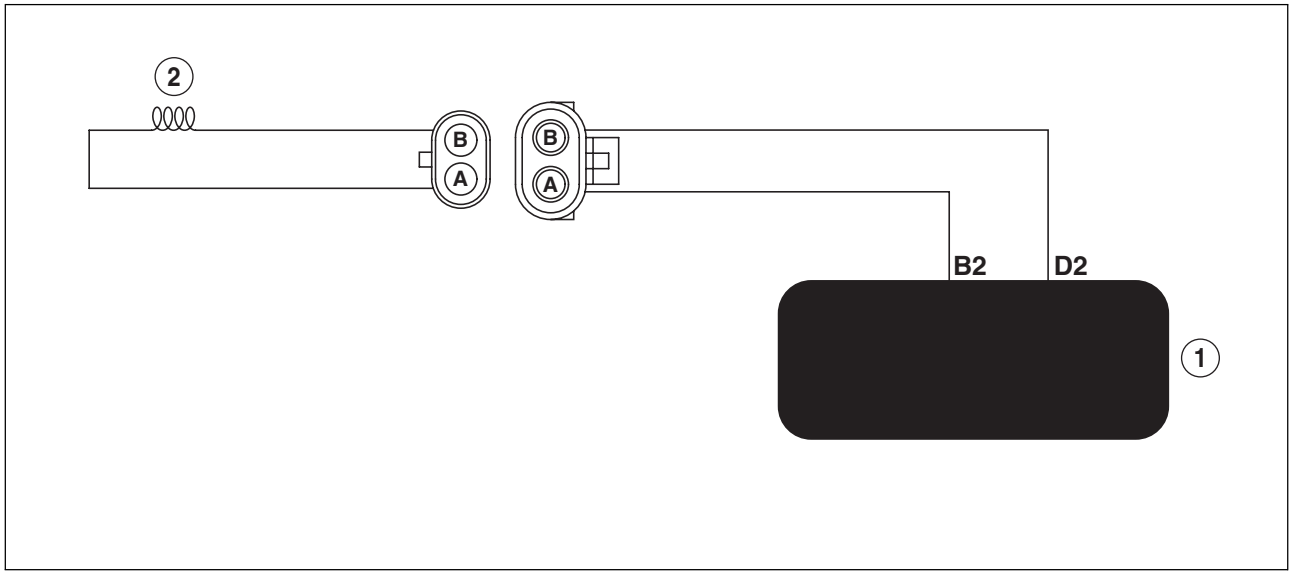
1 Percentage of engine charge at a given speed.

2 Indicates an error on the fuel temperature function.

3 Error code relating to point (2). Double-click it to access the corresponding sheet.

Engine application

Anomaly code SPN 190 FMI 16
Moderate engine overspeed



582msm06 Fig. 33

Nomenclature

B2 Crankshaft position sensor input.
D2 Crankshaft position sensor return.
1 Engine control unit.
2 Fuel temperature sensor.

Code SPN 190 FMI 16 is declared if

The engine control unit detects that the engine speed exceeds 3 000 rpm

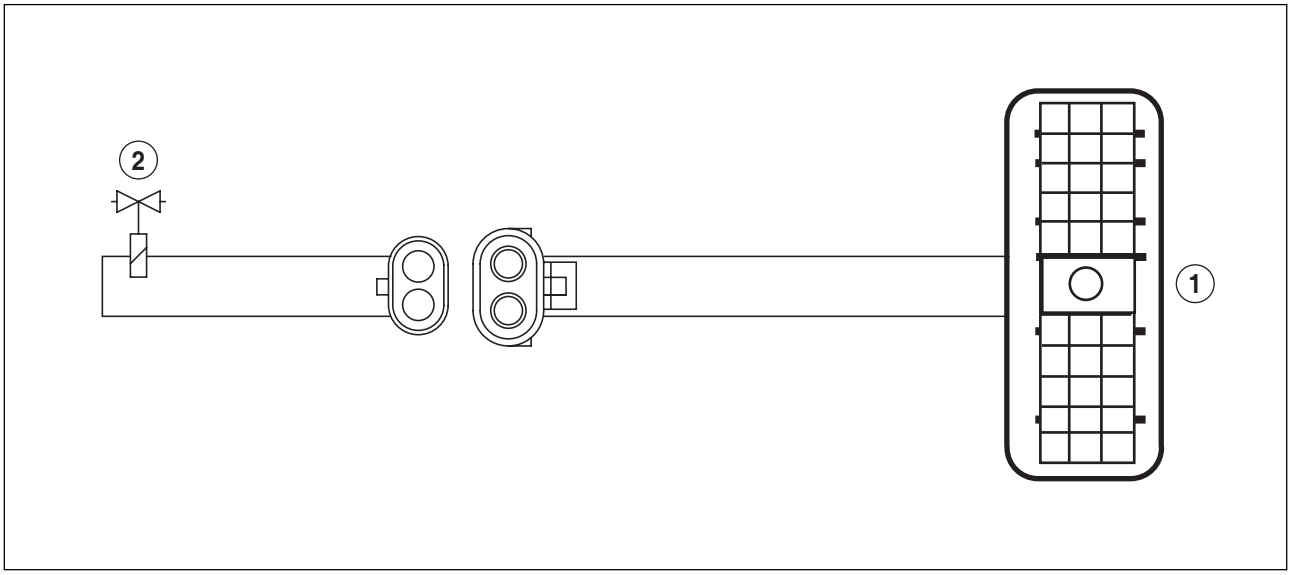
This is what happens if the SPN 190 FMI 16 code is in force

The engine control unit cuts off the fuel feed until the engine runs at less than 2 800 rpm

1. The electronic management system may be affected Using Win Métadiag©, watch whether other codes appear and look at their diagnostic procedure.
2. In the absence of other memorised or active codes, clear the SPN 190 FMI 16 code and monitor the codes to see if they are repeated.

Engine application

Anomaly code SPN 1076 FMI 10
Pump solenoid valve circuit intermittently short-circuited



582msm20 Fig. 11

Nomenclature

1 Engine control unit.
2 Pump solenoid valve.
A3 Pump solenoid valve return.
K2 Pump solenoid valve feed.

Code SPN 1076 FMI 10 is declared if

The pump solenoid valve circuit is short-circuited at the supply.

This is what happens if the SPN 1076 FMI 10 code is in force

The control unit immediately reduces the engine power to 50 % of its maximum power.

1. Check the connection Carry out a preliminary inspection of the UCE unit connector, the pump connector and any other connector. Find any dirty, worn or badly positioned terminals.	**No defective connection** Go to 2. **Defective connection(s)** Repair the defective connection(s).
2. Check the engine control unit **1** Master switch off. **2** Disconnect the pump solenoid valve and engine control unit connectors. **3** Measure with the multimeter the resistance between the terminal K2 of the front wiring assembly: – A good earth. – All the other terminals of the control unit connector.	**Record of less than 20 000 ohms** Go to 3. **Record of less than 20 000 ohms** Pump solenoid valve feed wire short-circuited.
3. Check the pump solenoid valve return circuit **1** Master switch off. **2** Disconnect the pump solenoid valve and engine control unit connectors. **3** Measure with the multimeter the resistance between the terminal A3 on the front wire assembly side and: – A good earth. – All the other terminals of the control unit connector.	**Record of less than 20 000 ohms** Go to 4. **Record of less than 20 000 ohms** Pump solenoid valve return wire short-circuited.

Engine application

– Check the unit and click OK.

If the unit does not match, connect the required unit and click "Retry".

586msm31 Fig. 52

– Otherwise click "Cancel" and repeat the Internet downloading procedure, checking the information entered on the site.

Service brake cut-out relay solenoid valve (centre open at rest)

Error codes	Object	Cause	Audio warning:	"ISC" reset requested
337	Inconsistency between the selected gear and the measured ratio.	Check: Engine speed data. The shuttle reverser output speed sensor. For a possible seizure of the forward/reverse or "Hexashift solenoid valves (PSV1, PSV2, PSV3). For a possible mechanical problem on the forward/reverse or "Hexashift" clutches (slippage).	Yes	Yes
341	Short circuit at 12 volts of the power take-off solenoid valve.	Check: For a possible 12 V short circuit on the solenoid valve power supply harness. The "Auto 5" unit with tool n° 60 05 033 249 and replace if necessary.	No	No
342	Short circuit on power take-off solenoid valve earth.	Check: For a possible open circuit in the solenoid valve supply harness. For a possible short circuit to earth on the solenoid valve. The "Auto 5" unit with tool n° 60 05 033 249 and replace if necessary.		
343	Power take-off solenoid valve circuit open.	Check: For a possible open circuit in the solenoid valve supply harness. The resistance of the solenoid valve winding. The "Auto 5" unit with tool n° 60 05 033 249 and replace if necessary.		
344	Drop in engine speed (during power take-off start-up).	Check: Possible mechanical problem with the power take-off. Possible problem with the tool driven by the power take-off.		
345	Button active but power take-off off (e.g.: after engine stall).	Check: The harnesses and their connections. Power take-off solenoid valve. Power take-off engine speed sensors. Possible mechanical problem with the power take-off. The "Auto 5" unit with tool n° 60 05 033 249 and replace if necessary.		

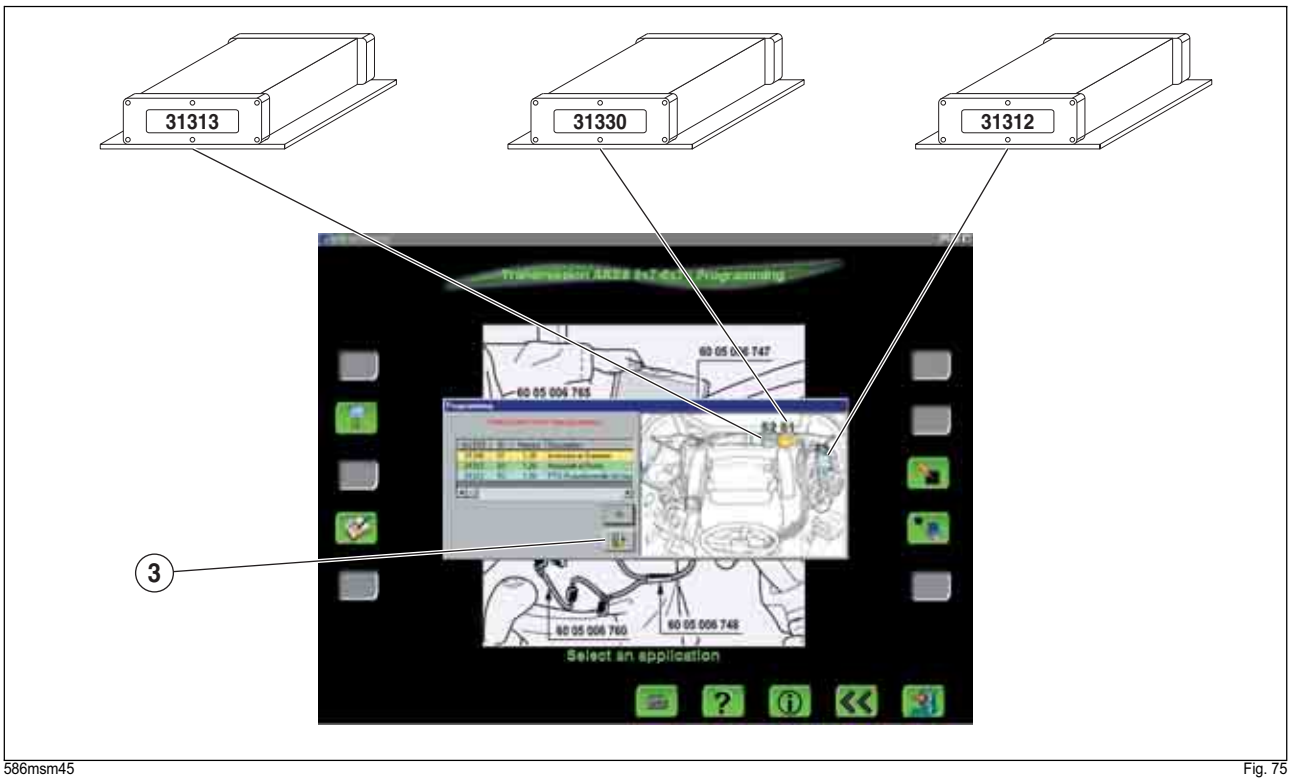
Service brake cut-out relay solenoid valve (centre open at rest)

After programming each function in its slot, run the programming procedure again.

– Answer "Yes" to the question "Have you exchanged one or more units?".

– Check that the functions and versions are correct.

– Exit the application by clicking the icon (3).



586msm45 Fig. 75

N.B.: During the programming procedure, code 400 (see list of error codes) is displayed on the screen.

Dashboard application

Overview

586hsm50 Fig. 98

Nomenclature

1 Built-in test. Illustrated indicator lamps lit simultaneously or successively.

2 Software version.

CLAAS

H1
CAB LIFTING AND GLASS BONDING

H2
MANUAL HEATING/AIR CONDITIONING

H3
REGULATED HEATING AND A/C

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Removing the cab

Operation n° 12

– Identify and disconnect the spool valve control junctions.

– Open junction (K) (Fig. 16).

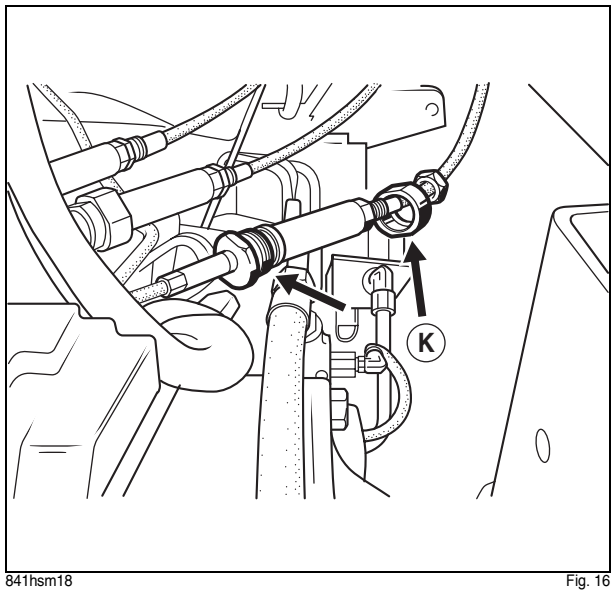
– Unscrew locknuts (L) (Fig. 17).

– Unscrew nut (M) towards the control lever (Fig. 17).

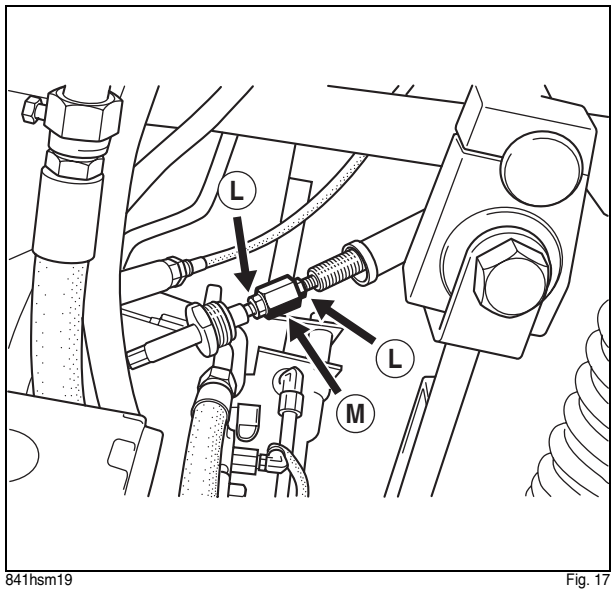
Operation n° 13

– Disconnect the handbrake cable (N) (Fig. 18). Refer to chapter "C4" for the setting procedure.

– Disconnect the crawler range control cable.



841hsm18 Fig. 16



841hsm19 Fig. 17

841msm30 Fig. 18

Removal/refitting of glazing

– As soon as the perimeter of the windscreen frame is covered: With the help of another person and observing rules of safety (gloves, goggles and stepladder on each side of the engine), bond the windscreen to the cab starting at the top

Take care on passing the worklight protectors.

– Align the windscreen vertically and horizontally with the lower windows.

– Apply the necessary pressure to flatten the seal around the entire perimeter.

– Strap the windscreen against the cab.

N.B.: Do not fasten too tightly.

– Stick masking tape at the lower window joints.

– Coat the joint grooves with sealant and smooth off the excess with a spreader.

– Refit the removed components.

Tractor standing time after bonding:

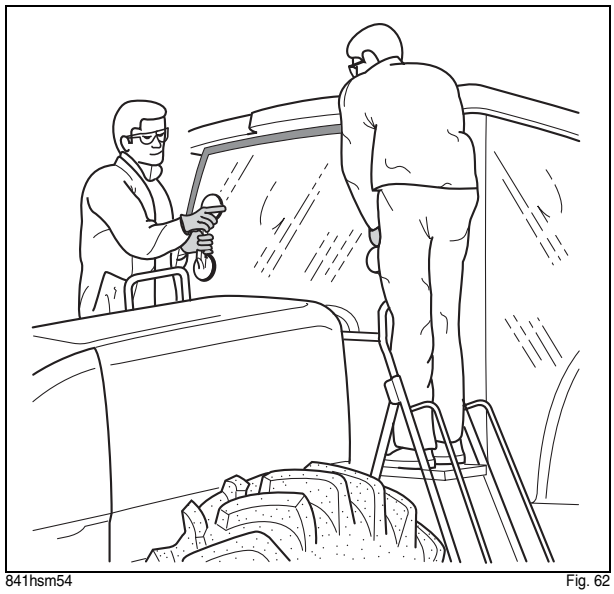
30 minutes at an outdoor temperature of 20°C.

If the temperature is very low:

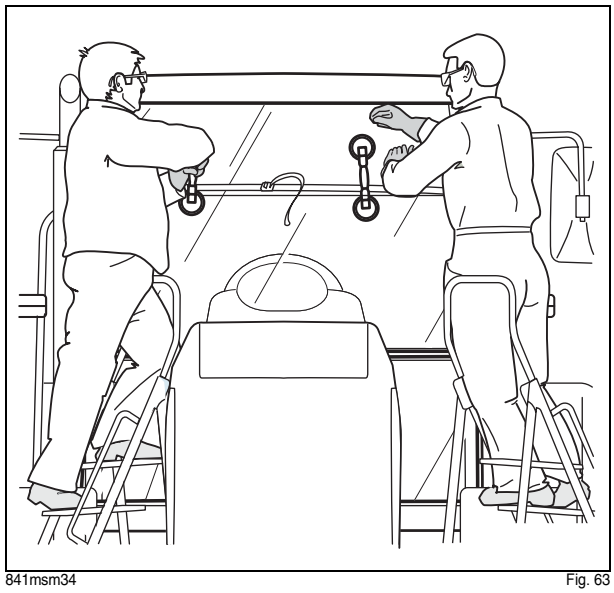
– Start the engine and set the cab heating to the deicing position.

– If necessary, hear the perimeter of the windscreen with a hot air blower.

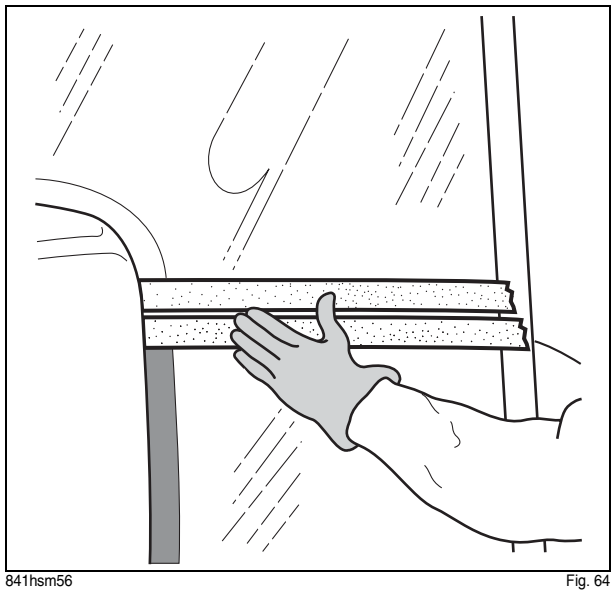
– In all cases, refer to the drying indicator which must not be tacky.



841hsm54 Fig. 62



841msm34 Fig. 63



841hsm56 Fig. 64