

**FENDT**

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Werkstatthandbuch

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Workshopmanual

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Manuel d'atelier

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Manual de taller

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Manuale per l'officina

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Werkplaatshandboek

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*FENDT 900 Vario COM III*

X 990.005.057.012

**1**

**FENDT**

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<b>C</b>	Documents and Diagrams
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# 1005

Overall system/transmission

# FENDT 900 Vario - COM III

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## FENDT 900 Vario - COM III

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## **1005 Overall system/transmission**

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## A General

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# 1 Transmission control system functional sequence

## Transmission type ML 260

**M** – Marschall, designer of this development

**L** – Power distribution, mechanical and hydrostatic power transmission

**260** – Vario transmission size

### ML 260 transmission

The ML 260 is a continuously variable transmission for forward and reverse travel.

Power transmission can be hydrostatic or mechanical, or hydrostatic and mechanical.

Basically this means:

Slow forward travel = high hydrostatic transmission power/low mechanical transmission power

Fast forward travel = low hydrostatic transmission power/high mechanical transmission power

For a detailed explanation, see transmission function plan

### Hydrostatic power distribution

The ML transmission unit is flexibly mounted in the transmission housing. The transmission housing is also the oil reservoir for the hydrostatic drive.

Oil fill: Fendt Extra Trans 10W-40 or STOU oil, viscosity SAE 10W-40 or 15W-40

Initial fill: approx. 87 l

Refill: approx. 67 l, e.g. at oil change

Functional sequence, see transmission hydraulic circuit diagram

The servo pump draws in oil through the suction filter.

The temperature sensor (B009) monitors the temperature of the transmission oil.

Flow through the oil cooler is temperature-dependent.

This means that if the transmission oil is cold, little oil flows through the oil cooler, while most flows through the bypass valve. The bypass valve opens when the differential pressure exceeds approx. 3,5 bar. The transmission oil temperature is monitored by the temperature sensor.

The servo pump generates the system pressure for the ML control valves and enhanced control valves. The system pressure of approx. 25 bar is restricted by the pressure-limiting valve and restrictor orifice.

### The system uses three different pressures.

1. System pressure for ML transmission control, approx. 25 bar

2. Enhanced control pressure for the rear PTO clutch, rear PTO shaft control, differential lock and 4WD switchover. Enhanced control pressure approx. 18 bar

3. High pressure in ML transmission max. 550 bar + 15 bar

Pressure filter contamination is monitored by a pressure switch (S017) as a function of the transmission oil temperature. Filter contamination is not monitored if the transmission oil temperature is below 50°.

Two non-return valves (2V1 and 2V2) alternately feed cooled transmission oil into the high-pressure circuit.

Hot transmission oil is discharged from the high-pressure circuit via the purge valve (2V5).

The high-pressure circuit incorporates: a variable-displacement pump (2P1), two variable-displacement motors (2A1), two non-return valves (2V1 and 2V2), two servo-assisted high-pressure limiting valves (2V3 and 2V4), a purge valve (2V5), a clutch pressure-limiting valve (4V4), a turbo-clutch pressure-limiting valve (4V5) and a test connection (PH).

The variable-displacement cylinders (3A1 and 3A2) on the variable-displacement pump and motor are actuated by two 4/3-directional control valves (3V1 and 3V2).

The 4/3 directional control valves are mechanically actuated by the actuator shaft (3Z1).

The actuator shaft (3Z1) is rotated as required by the actuator unit (A009), thereby setting the correct quantity of oil to be supplied or consumed.

The variable-displacement pump (2P1) and the two variable-displacement motors (2A1) swivel correspondingly.

In the emergency mode switch position, the actuator shaft (3Z1) is actuated manually from the cab. see §2

In the emergency mode switch position, the transmission is automatically locked at approx. 30 km/h after the engine has been started.

If the clutch pedal, hand brake or neutral switch is operated, the high-pressure circuit is depressurised by the two high-pressure limiting valves (2V3 and 2V4).

The clutch function is controlled by pressure-limiting valve (4V4), the turbo-clutch function by pressure-limiting valve (4V5).

### Important note on filling the ML 260 transmission with oil:

During normal maintenance work, e.g. for a transmission oil change, the transmission oil should be added as in a normal change-gear transmission.

**If there is no oil in the high-pressure circuit, the transmission must be filled from an external pressurised filling unit.**

During filling, the transmission oil is additionally filtered through connection PU (measuring point M5).

**If the oil pressure filling is not performed, the variable-displacement pump (2P1) and variable-displacement motor (2A1) may become damaged as a result of dry running.**

### Electrical/electronic control

919 .. 0101-1000	925 .. 1001-	934 .. 0101-1000
919 .. 1001-	928 .. 0101-1000	934 .. 1001-
922 .. 0101-1000	928 .. 1001-	
922 .. 1001-	931 .. 0101-1000	
925 .. 0101-1000	931 .. 1001-	



The CAN bus is a data line and connects various components (also called users) with each other. If a large amount of data is transmitted, the voltage in the CAN bus (+ and - cables) rises.

In the Vario 900, data is transmitted via 4 CAN buses.

**G bus** - transmission bus

**K bus** - control bus

**V bus** - valve bus

**ISO bus** - For attaching ISO implements

The voltage can be checked at the CAN bus sockets (see Chapter 9000):

The actuator unit (A009) controls the actuator shaft, thereby changing the transmission ratio in the ML transmission.

The actuator unit (A009) comprises:

1. Drive for Emergency mode (required in case of failure of the electronic control system)
2. Clutch for the drive
3. Incremental encoder: a position sensor with digital resolution emitting 8000 pulses per revolution
4. Transmission  $i = 192:1$  (electric motor to actuator shaft)
5. 12 VDC electric motor, 0.4 to 7 amps, actuator unit (A009) no-load speed of 4500 rpm
6. Slip clutch 2.5 to 3.5 Nm, less than 5 Nm at key-operated actuator of emergency control.

Once the ignition is on, the actuator unit (A009) locates the reference point (approximate neutral point between forward and reverse travel)

When the engine has started, the actuator unit (A009) locates the reference point (precise neutral point between forward and reverse travel)

**Load limit control** (restricting the reduction in engine speed or adaptation to the engine speed)

Example: The engine speed is reduced when a load is applied. The electronics change the transmission ratio towards slow so that the engine speed is not reduced too much.

Load limit control is always enabled once the engine is started. However, the reduction in engine speed can be adjusted from 0 to 30% (see Operator's Manual)

**The default setting for load limit control is 14%**

**Load limit control functions:**

The electronics detect the setpoint engine speed from the position of the throttle pedal by means of the analogue position sensor (potentiometer) on the pedal.

**Control, setpoint transmission ratio has been reached.**

The tractor is placed under load and the engine speed drops.

The load limit control only ever changes the transmission ratio towards slow.

The load limit control is enabled at:

reduction in engine speed of over 180 rpm + set value.

Example:	
Engine speed according to throttle pedal position	2000 rpm
Load limit control setting 10% =	200 rpm
Calculation	
2000 rpm - 180 rpm - 200 rpm =	1620 rpm

This means that the load limit control changes the transmission ratio towards "Slow" from 1620 rpm. Theoretically, the load limit control adjusts the transmission ratio when under load, until ground speed reaches 0.

**NOTE:** Since the load limit control only changes the transmission ratio towards slow, it is beneficial to switch on cruise control.

If the engine speed rises again with cruise control switched on, the transmission ratio is restored to the maximum stored speed.

Control using the load limit control + cruise control can be dampened or accelerated using the accelerator ramp switch on the joystick.

## Sensors

**Engine Hall sensor (B010)** measures the engine speed. If the Hall sensor fails, it is only possible to continue in Emergency mode.

**The Hall sensor collecting shaft (B014) and bevel pinion (B015)** measure rotational speed and detects the direction of rotation.

**High-pressure sensor (B008)** transmits the current oil pressure in the high-pressure circuit to the electronic system.

**Clutch pedal sensor (B017)** electronically monitors clutch pedal travel. Before the clutch is engaged, the transmission ratio is reduced. Starting up in travel range I approx. 5 km/h, starting up in travel range II approx. 10 km/h.

<b>8</b>	<b>T000458</b>	919 .. 0101-1000	925 .. 1001-	934 .. 0101-1000
	Version 4	919 .. 1001-	928 .. 0101-1000	934 .. 1001-
	04-02-2010	922 .. 0101-1000	928 .. 1001-	
		922 .. 1001-	931 .. 0101-1000	
		925 .. 0101-1000	931 .. 1001-	

Travel range detection sensor (B016) electronically monitors range control travel.

**Temperature sensor (B009)** monitors the temperature of the transmission oil. Temperatures above 110°C are logged with a fault code.

**Rotary position sensor (B055)** electronically monitors the pedal travel of the foot throttle pedal.

**Solenoid valve, transmission neutral/turbo-clutch valve (Y004)** controls the turbo-clutch function. The high-pressure valves open depending on the engine speed.

**Speed governor solenoid valve (Y005)** cancels the speed restriction to approx. 30 km/h, when the electronics are operational. Speed governing is cancelled if  $800 \pm 50$  mA is applied to the solenoid.

**The filter contamination pressure switch (S017)** monitors clogging of the pressure filter on the ML transmission.

**Hand brake switch**, when the hand brake is applied, the two high-pressure valves open and the two F/R lamps flash.

The transmission is switched to neutral.

**The joystick** is in the multifunction armrest.

2 Transmission function diagram

- A Planetary carrier (drive from combustion engine)
- B Ring gear (drive to pump)
- C Planet gear
- D Sun gear (drive to collecting shaft)

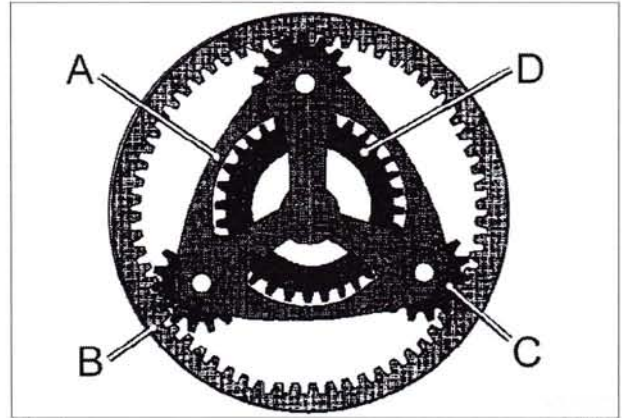


Fig. 1.

1001380

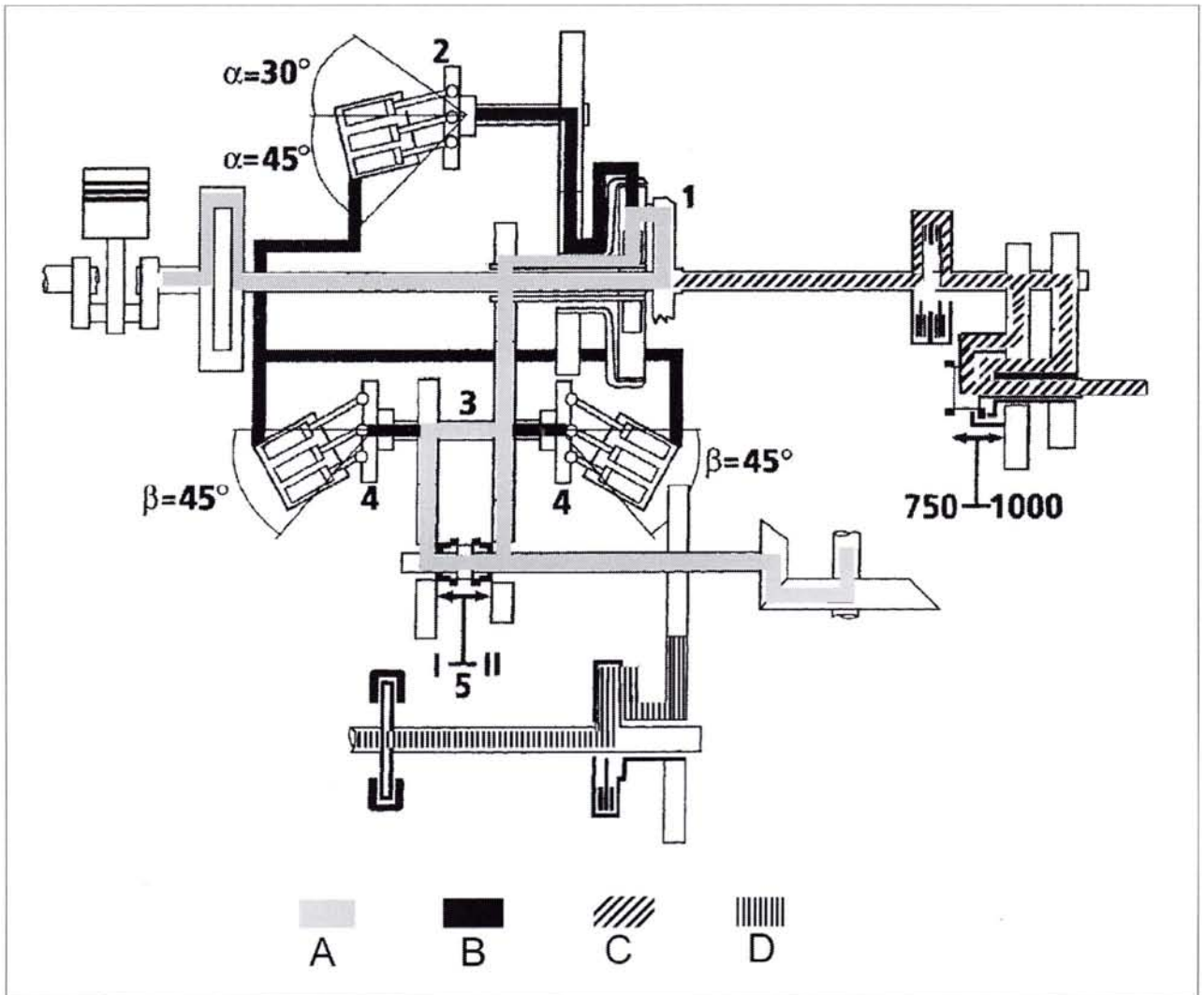


Fig. 2.

1001381

<b>A</b> Mechanical power flow	<b>1</b> Planetary gear
<b>B</b> Hydrostatic power flow	<b>2</b> Hydraulic pump
<b>C</b> PTO drive	<b>3</b> Collecting shaft
<b>D</b> 4WD	<b>4</b> Hydraulic motor
	<b>5</b> Range control



Active stationary

Engine running, tractor stationary

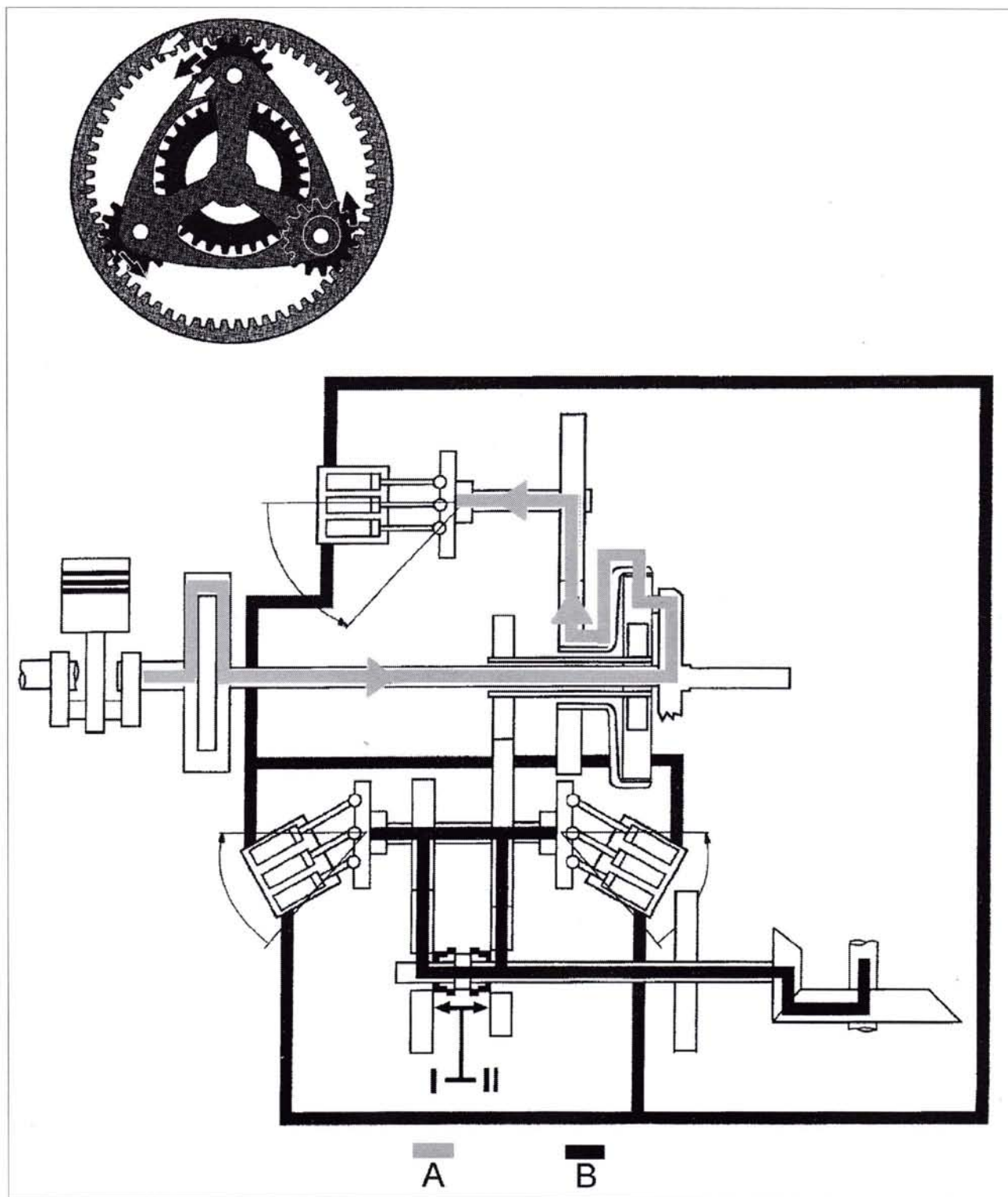


Fig. 3.

1001382

<p><b>A</b> Mechanical power flow</p>	<p><b>B</b> Hydrostatic power flow</p>
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919 .. 0101-1000  
 919 .. 1001-  
 922 .. 0101-1000  
 922 .. 1001-  
 925 .. 0101-1000

925 .. 1001-  
 928 .. 0101-1000  
 928 .. 1001-  
 931 .. 0101-1000  
 931 .. 1001-

934 .. 0101-1000  
 934 .. 1001-

**T000466**  
 Version 3  
 04-02-2010

Pulling away

99% hydrostatic power transmission

1% mechanical power transmission

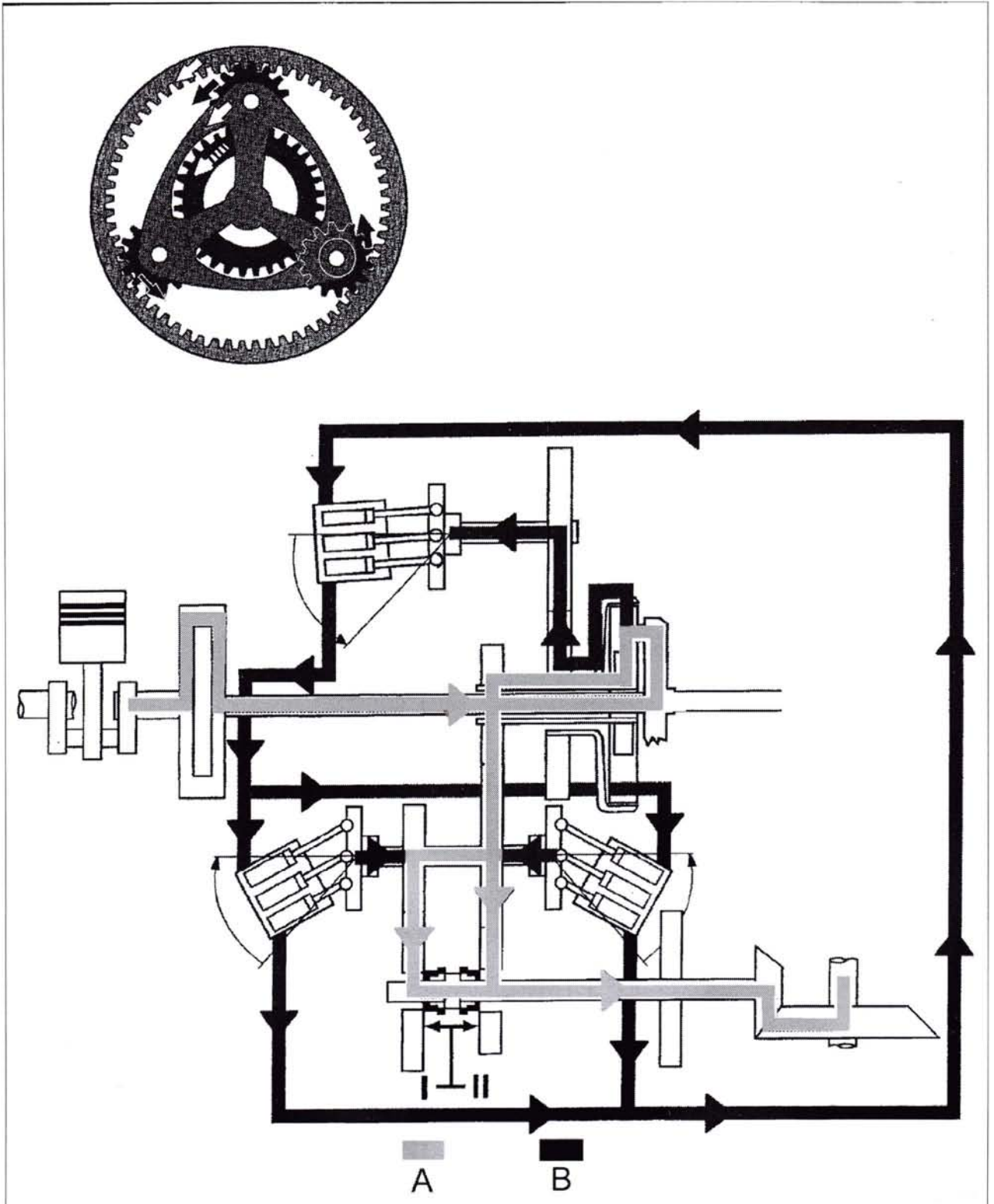


Fig. 4.

1001383

<b>A</b> Mechanical power flow	<b>B</b> Hydrostatic power flow
--------------------------------	---------------------------------

Driving, average speed  
 50% hydrostatic power transmission  
 50% mechanical power transmission

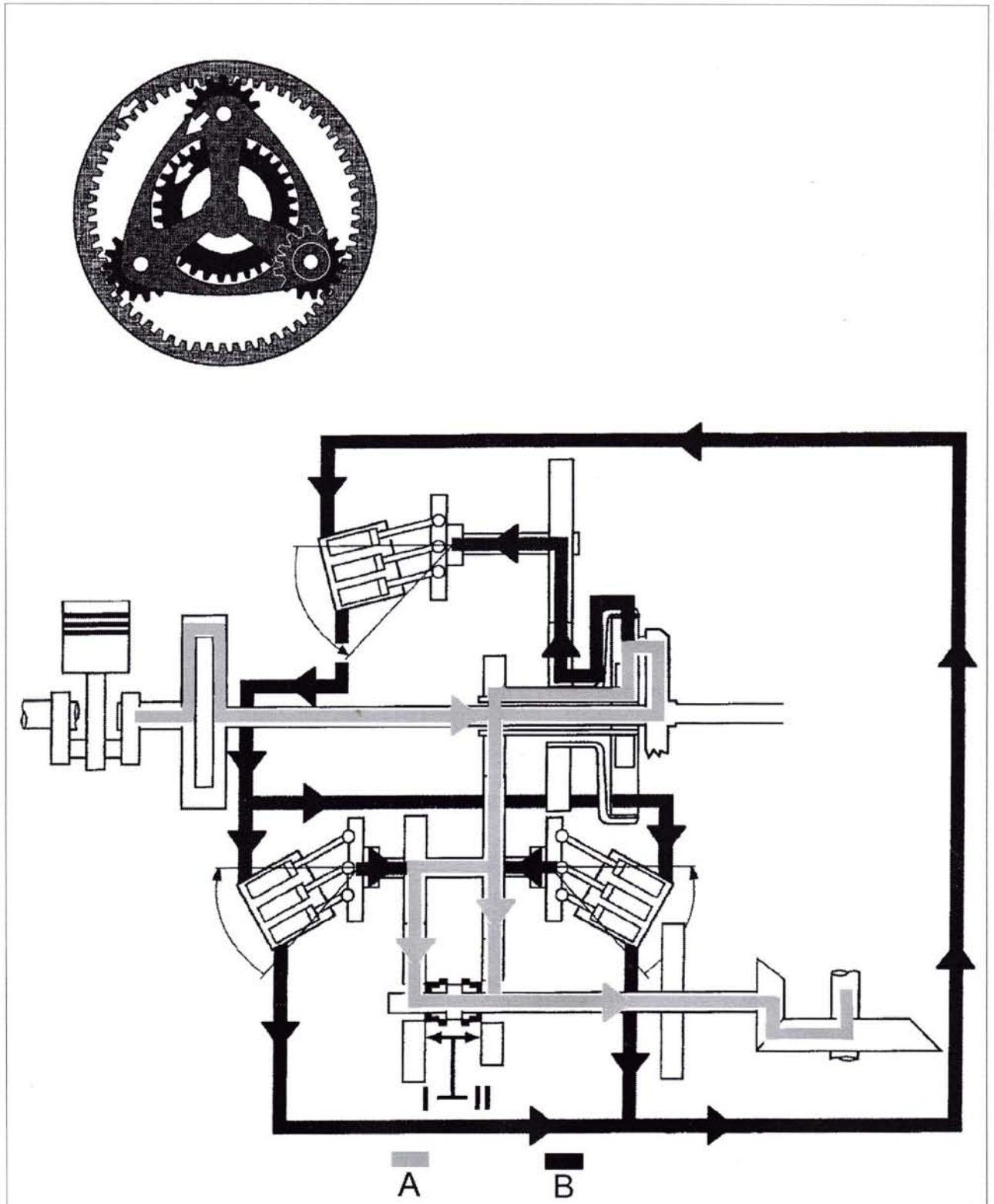


Fig. 5.

1001384

<p><b>A</b> Mechanical power flow</p>	<p><b>B</b> Hydrostatic power flow</p>
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919 .. 0101-1000  
 919 .. 1001-  
 922 .. 0101-1000  
 922 .. 1001-  
 925 .. 0101-1000

925 .. 1001-  
 928 .. 0101-1000  
 928 .. 1001-  
 931 .. 0101-1000  
 931 .. 1001-

934 .. 0101-1000  
 934 .. 1001-

**T000466**  
 Version 3  
 04-02-2010

Transport 40 km/h, 50 km/h or 60 km/h  
 approx. 100% mechanical power transmission

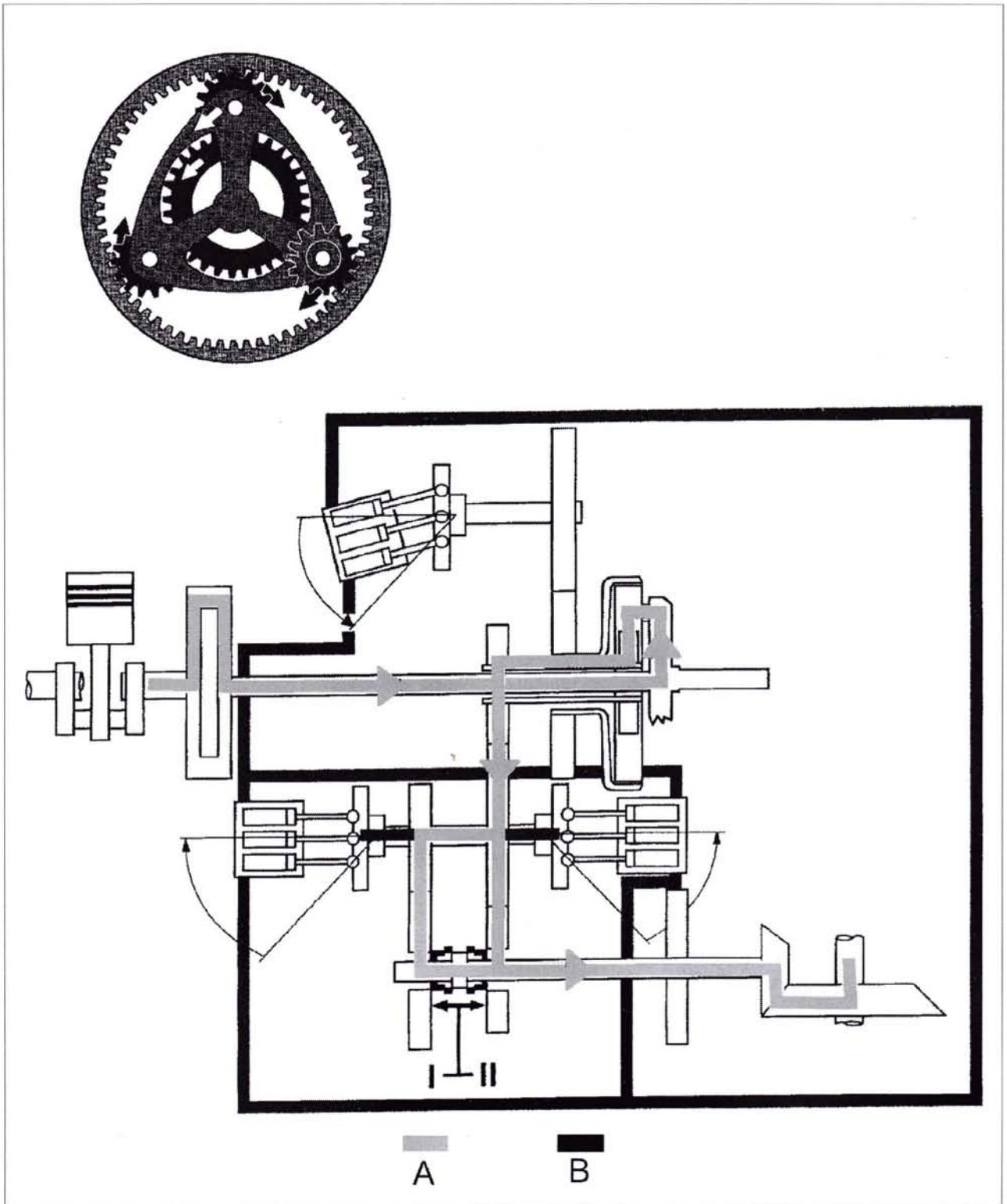


Fig. 6.

1001385

<b>A</b> Mechanical power flow	<b>B</b> Hydrostatic power flow
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Reversing

Average speed

100% hydrostatic power transmission

Ring gear rotates faster than the combustion engine

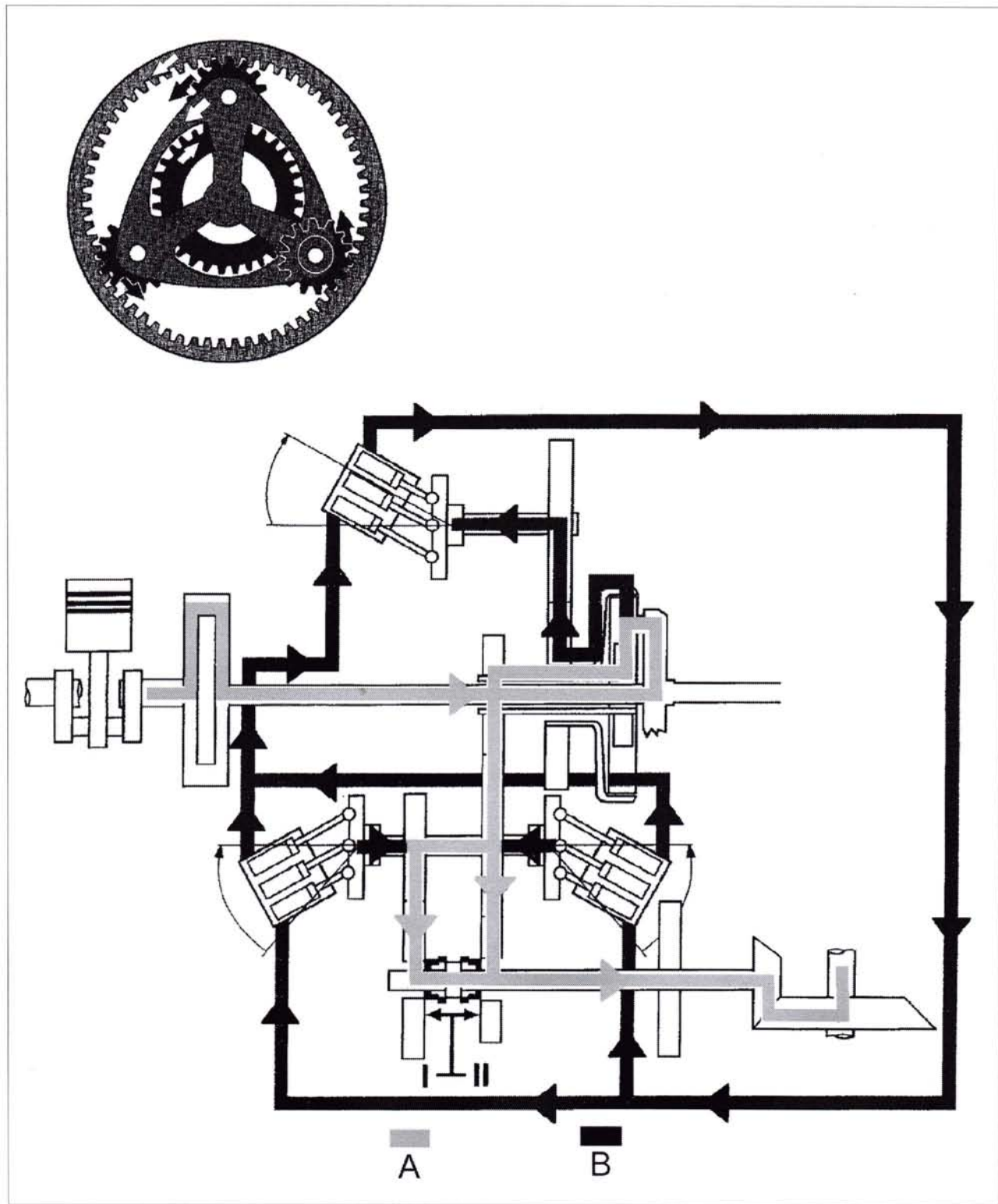


Fig. 7.

1001386

A Mechanical power flow	B Hydrostatic power flow
-------------------------	--------------------------

919 .. 0101-1000  
 919 .. 1001-  
 922 .. 0101-1000  
 922 .. 1001-  
 925 .. 0101-1000

925 .. 1001-  
 928 .. 0101-1000  
 928 .. 1001-  
 931 .. 0101-1000  
 931 .. 1001-

934 .. 0101-1000  
 934 .. 1001-

**T000466**  
 Version 3  
 04-02-2010



## C Documents and diagrams

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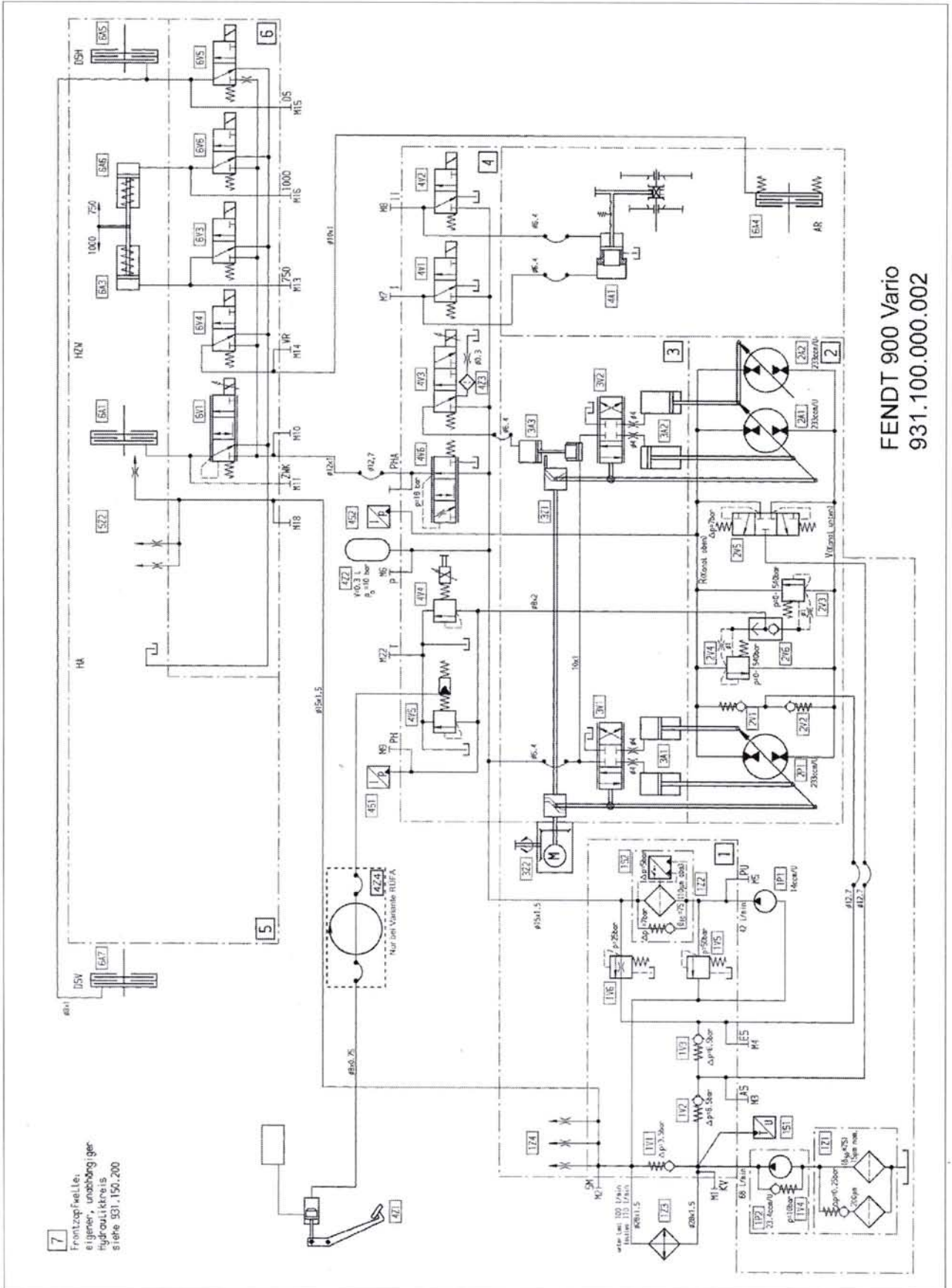
## 1 Transmission hydraulic system diagram - 931.100.000.002

Item	DIN	Designation	Item	DIN	Designation
<b>Switching circuits:</b>			<b>Valves:</b>		
1		Valve block, feed/lubrication	1V1		Radiator bypass valve
2		Main circuit	1V2		Pressure-limiting valve, discharge
3		Displacement	1V3		Pressure-limiting valve, feed
4		Valve block, enhanced hydraulics	1V4		Pressure-limiting valve, lubrication
5		Brake and rear axle	1V5		Pressure-limiting valve, servo pump
6		Valve block, rear axle	1V6		Pressure-limiting valve, servo circuit
7		Front PTO	2V1		Feed valve, forward
<b>Pumps:</b>			2V2		Feed valve, reverse
1P1		Servo pump	2V3		High-pressure limiting valve, forward
1P2		Lubrication pump	2V4		High-pressure limiting valve, reverse
2P1		Hydraulic pump	2V5		Purge valve
<b>Drives:</b>			2V6		Shuttle valve
2A1		Hydraulic motor	3V1		Hydraulic pump governor
2A2		Hydraulic motor	3V2		Hydraulic motor governor
3A1		Variable displacement cylinder, hydraulic pump	4V1	Y002	Solenoid valve, travel range 1
3A2		Variable displacement cylinder, hydraulic motor	4V2	Y003	Solenoid valve, travel range 2
3A3		Speed governor, emergency mode	4V3	Y005	Solenoid valve, speed governor
4A1		Range selector	4V4	Y004	Turbo clutch solenoid valve
6A1		Clutch, rear PTO	4V5		Pressure-limiting valve, clutch
6A3		Selector cylinder, PTO level 1 <sup>(1)</sup>	4V6		Pressure reducing valve, rear axle
6A4		4WD clutch	6V1	Y008	Solenoid valve, rear PTO
6A5		Differential lock, rear axle	6V3	Y026	Solenoid valve, PTO level 1 <sup>(1)</sup>
6A6		Selector cylinder, PTO level 2	6V4	Y009	4WD solenoid valve
6A7		Differential lock, front axle	6V5	Y010	Solenoid valve, differential lock
<b>Buzzers:</b>			6V6	Y027	Solenoid valve, PTO level 2
1S1	B009	Discharge temperature	<b>Measuring points:</b>		
1S2	S017	Transmission oil contamination switch	M1		Radiator feed
4S1	B008	Sensor, high-pressure 1	M2		Pressure lubrication
4S2	B039	Sensor, high-pressure 2	M3		Outlet pressure
<b>Other components:</b>			M4		Inlet pressure
1Z1		Suction filter with bypass	M5		Pressure, servo pump
1Z2		Pressure filter with bypass	M6		System pressure, transmission
1Z3		Transmission oil cooler	M7		Switching pressure, travel range 1
1Z4		Transmission lubrication	M8		Switching pressure, travel range 2
3Z1		Actuator shaft	M9		High-pressure
3Z2	A009	Actuator unit	M10		System pressure, rear axle
4Z1		Clutch pedal with sensor cylinder	M11		Pressure, PTO clutch
4Z2		Pressure accumulator	M13		Switching pressure, PTO level 1 <sup>(1)</sup>
4Z3		Strainer insert	M14		Pressure, 4WD clutch
4Z4		Rotary feedthrough RÜFA	M15		Pressure, differential lock

5Z2		Lubrication, rear PTO	M16		Switching pressure, PTO level 2
			M18		Lubrication pressure, rear axle
			M22		Clutch and turbo-clutch valve leakage

1. Depending on the version, level 1 operates at the following PTO speeds: 540/540 E or 1000 E (1000 E is available from chassis number 9XX/2X/3501 onwards on request).





FENDT 900 Vario  
 931.100.000.002

Fig. 1.

1001543

919 .. 0101-1000  
 919 .. 1001-  
 922 .. 0101-1000  
 922 .. 1001-  
 925 .. 0101-1000

925 .. 1001-  
 928 .. 0101-1000  
 928 .. 1001-  
 931 .. 0101-1000  
 931 .. 1001-

934 .. 0101-1000  
 934 .. 1001-

**T000467**  
 Version 4  
 15-12-2008





## E Measuring and testing

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1 Pressure measuring points on transmission and control hydraulics

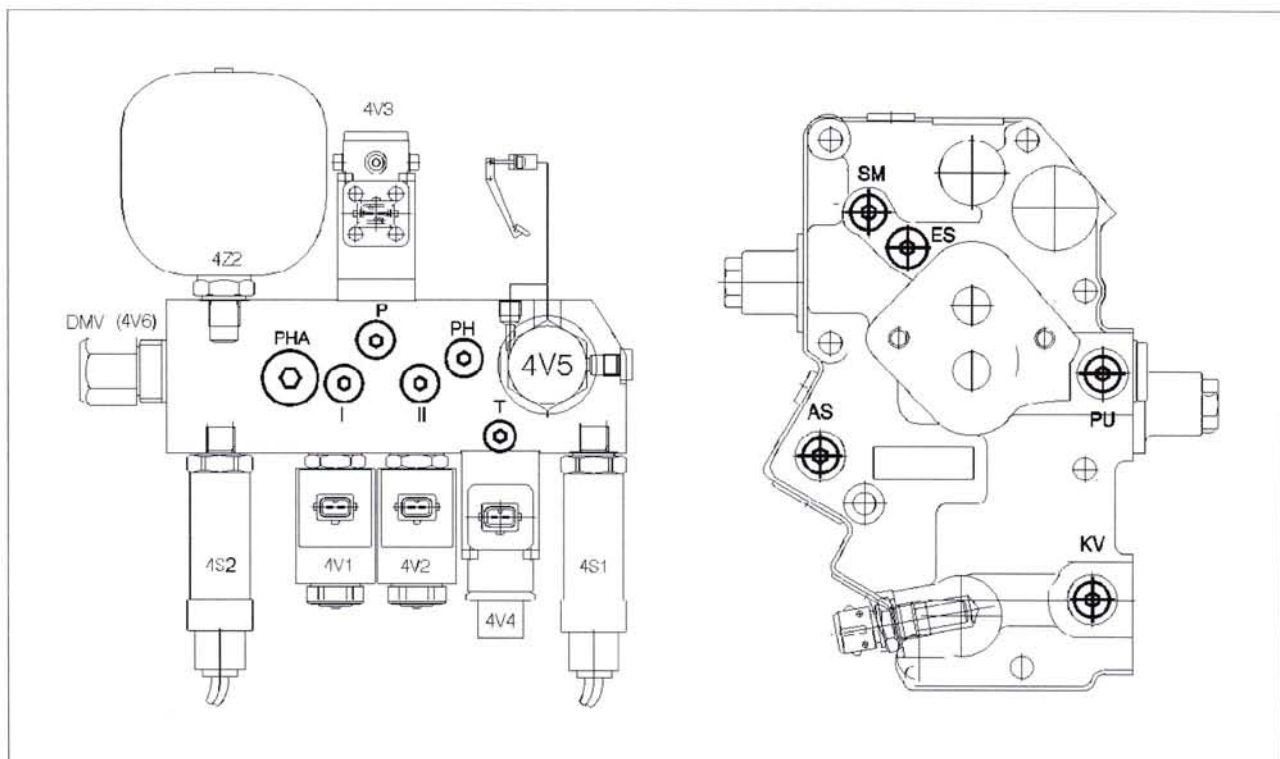


Fig. 1. 1001390

Mounted at rear on the rear axle housing

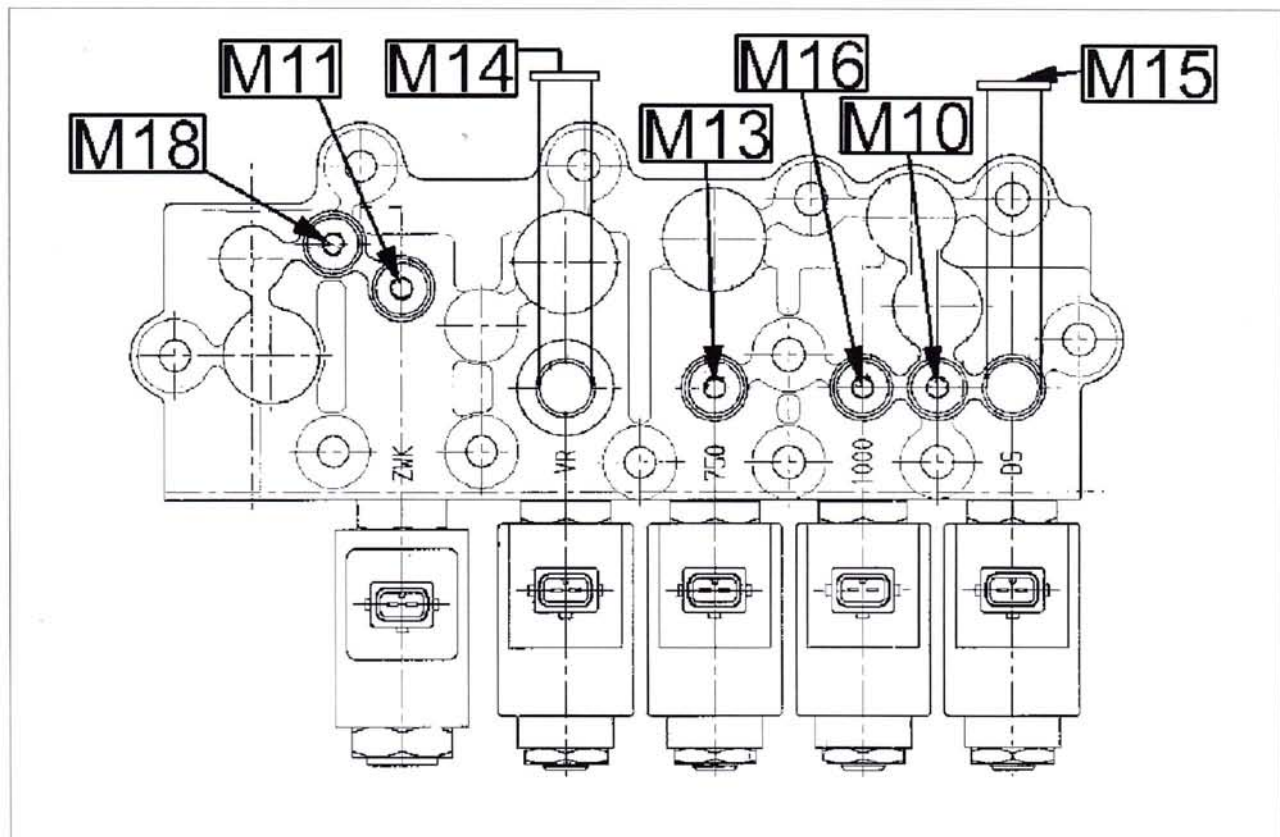


Fig. 2. 1001391

919 .. 0101-1000	925 .. 1001-	934 .. 0101-1000
919 .. 1001-	928 .. 0101-1000	934 .. 1001-
922 .. 0101-1000	928 .. 1001-	
922 .. 1001-	931 .. 0101-1000	
925 .. 0101-1000	931 .. 1001-	

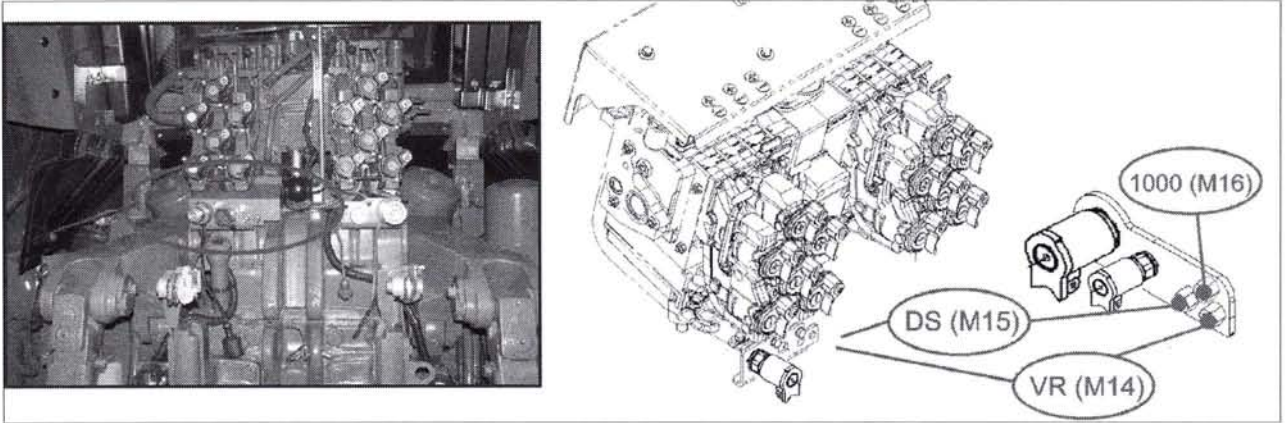


Fig. 3. I001587

- |     |                             |     |                              |
|-----|-----------------------------|-----|------------------------------|
| M14 | Pressure, 4WD clutch        | M16 | Switching pressure, PTO 1000 |
| M15 | Pressure, differential lock |     |                              |

**The measuring connections at the rear right and left of the cover plate on the rear axle housing may also be used for checking the rear PTO.**

**NOTE:** Measuring connection M16 is present from chassis number 9XX / 2X / 3501.

- 1 PTO clutch  
(Measuring connection M12 x 1.5)
- 2 Lubrication pressure, rear axle  
(Measuring connection M10 x 1)
- 3 PTO control 540/750  
(Measuring connection M10 x 1)

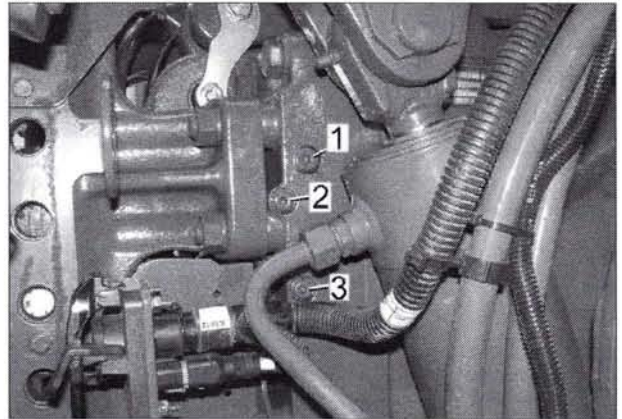


Fig. 4. I001405

- 4 PTO control 1000  
(Measuring connection M10 x 1)

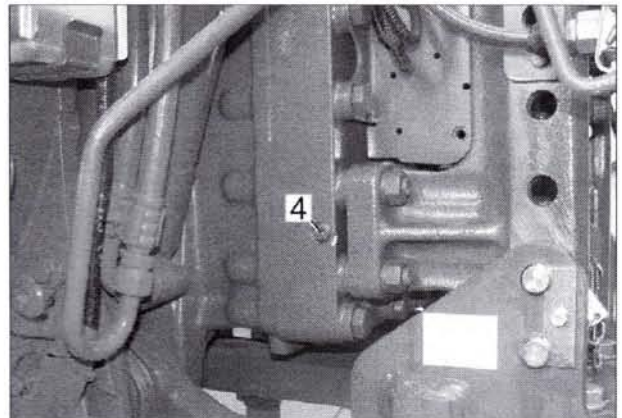


Fig. 5. I001406

Measuring point	Mark on the component	Designation	Measuring point	Mark on the component	Designation
M1	KV	Radiator feed	M10	PHA	System pressure, rear axle
M2	SM	Pressure lubrication	M11	PTO clutch	Pressure, PTO clutch
M3	AS	Outlet pressure	M13	750	Switching pressure, PTO 540E
M4	ES	Inlet pressure	M14	VR	Pressure, 4WD clutch



Measuring point	Mark on the component	Designation	Measuring point	Mark on the component	Designation
M5	PU	Pressure, servo pump	M15	DS	Pressure, differential lock
M6	P	System pressure, transmission	M16	1000	Switching pressure, PTO 1000
M7	I	Switching pressure, travel range I	M18		Lubrication pressure, rear axle
M8	II	Switching pressure, travel range II	M22		Clutch and turbo-clutch valve leakage
M9	PH	High-pressure			

M1 System pressure  
M2 Clutch pressure

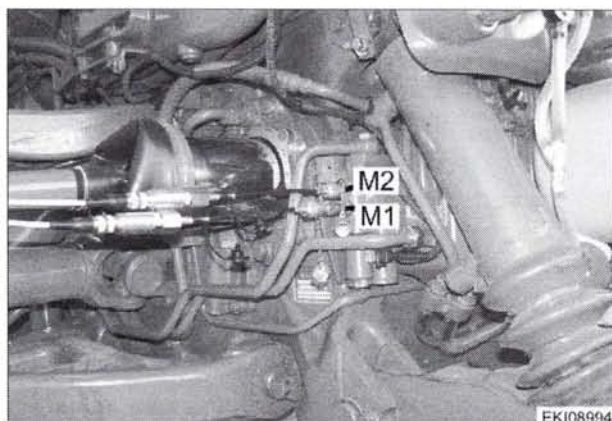


Fig. 6. Front PTO

EK108994  
1003549

## 2 Measuring transmission pressure

**In the event of complaints regarding Vario tractors that indicate malfunctions in the transmission or are generally captured under the heading "Power", proceed as follows.**

It must be determined whether the complaint is attributable to inadequate engine power or inadequate power from the drive train (transmission).

### 1. Low engine power

In the event of inadequate engine power, the power must be measured at the PTO via a reduction in engine speed from the rated speed to 1600 rpm, in increments of 50 rpm.

Engine brakes that allow computer-assisted evaluation are recommended. These enable power and torque curves to be calculated precisely.

### 2. Low drive train power (transmission)

For all complaints indicating that the possible cause is transmission-related, a hydraulic measurement must be carried out in the transmission before any repairs are attempted. The "Transmission pressure measurement (fax template)" test report must also be filled out. The procedures in this document are repeated as a check following the repair.

**High-pressure check is also possible via terminal A040 or A054.**



**DANGER: For all transmission pressure measurements, all 4 tractor wheels must be jacked up to prevent the risk of accident!**

### IMPORTANT:

- Engage 4WD
- Oil temperature in the transmission 35-45°C

## 3 Transmission pressure measurement (fax template)

<b>Workshop (Address):</b>	
<b>Workshop (Customer number):</b>	
<b>Chassis number:</b>	
<b>Operating hours:</b>	
<b>Complaint (if available: specify the fault code)</b>	
<b>Date, Signature</b>	

 **DANGER: For all transmission pressure measurements, all 4 tractor wheels must be jacked up to prevent the risk of accident!**

## I. Testing supply pressures

**NOTE:** Transmission oil temperature is 35-45°C for all pressure measurements

Measuring point	Engine speed	Setpoint value in bar	Actual value in bar
<b>PU</b> M5 Pressure, servo pump	800	25±2	
	1200	26±2	
	1600	27±2	
	2000	28±2	
<b>P</b> M6 System pressure, transmission	800	25±2	
	1200	25.5±2	
	1600	26±2	
	2000	27±2	
<b>ES</b> M4 Inlet pressure	800	16±2	
	1200	19±2	
	1600	21±2	
	2000	24.5±3	
<b>AS</b> M3 Outlet pressure	800	9±2	
	1200	11±2	
	1600	13±2	
	2000	16±2.5	
<b>SM</b> M2 Pressure lubrication	800	2±0.4	
	1200	3±0.5	
	1600	4.2±0.6	
	2000	5.5±0.8	

## II. High-pressure measurement

Measure the pressure driving forwards and in reverse.

 **DANGER: Perform each high-pressure measurement forwards or backwards for max. 5 seconds, to prevent oil heat-up!**

**Preparations:** travel range II, acceleration stage 4 or transmission in emergency mode (emergency operation from cab using auxiliary lever)

Measuring point	Engine speed	Setpoint value in bar	Actual value in bar
PH	1600	540±20	*

**NOTE:** Load PH high-pressure circuit for max. 5 seconds, performing the following measurements at the same time.

Measuring point	Engine speed	Setpoint value in bar	Actual value in bar
P	1600	26±2	
ES	1600	22±2	
AS	1600	15±2	
SM	1600	3.5±0.4	

**NOTE:** \*If high pressure PH is not reached, but pressures AS and ES are OK: Test clutch valve 4V4 and turbo-clutch valve 4V5 – see Chapter 1005 Reg. E.



4 Enhanced control pressure measurement: transmission (fax template)

<b>Workshop (Address):</b>	
<b>Workshop (Customer number):</b>	
<b>Chassis number:</b>	
<b>Operating hours:</b>	
<b>Complaint (if available: specify the fault code)</b>	
<b>Date, Signature</b>	

Check switch function pressures

Measuring point	Engine speed rpm	Setpoint value in bar	Actual value in bar
I and II Travel range control 1+2	1600	26±2	

Energise solenoid valves 1 (4V1) and 2 (4V2) alternately with 12 VDC.

Rear PTO, differential lock and 4WD coupling

**NOTE:** Allow engine to run at 1200 rpm. Check pressure at respective connection and M18 simultaneously.

Consumer switch position	Measuring point	Setpoint value in bar	Actual value in bar	Pressure lubrication M18 Setpoint value in bar	Pressure lubrication M18 Actual value in bar
Rear PTO - ON	<b>M11</b>	18+2.0		2.0±0.3	
Differential lock - ON	<b>M15</b>	18+2.0		2.0±0.3	
4WD ON/OFF	<b>M14</b>	18+2.0		2.1±0.3	
Rear PTO 540E - ON	<b>M13</b>	18+2.0		2.0±0.3	
Rear PTO 1000 - ON	<b>M16</b>	18+2.0		2.0±0.3	
Depress brake	<b>M10</b>	18+2.0		1.2±0.3	

The measuring connections at rear right and left on the cover plate may also be used for checking the rear PTO.

Front PTO

Measuring point	Setpoint value in bar	Actual value in bar
M1	16±2	
M2	16±2	

## 5 Inspecting the clutch or turbo-clutch pressure-limiting valve

### Turbo-clutch pressure-limiting valve 4V4/Y004

If the max. pressure is not reached during a high pressure measurement, the cause may originate from the drive train or may lie outside in the valve block. To decide if it is necessary to dismantle the drive train, one should first check the valve block (transmission control system) for leaks.

The turbo-clutch valve (4V4) controls the PH high-pressure in proportion to the engine speed up to 1250 rpm. This achieves the turbo-clutch function.

The turbo-clutch valve is fitted to the valve block, which also comprises the connection from the PH high-pressure circuit to the tank. If this connection is not closed, i.e. the turbo-clutch valve is not completely closed, high pressure build-up is not possible and the tractor does not achieve the maximum traction performance.

The turbo-clutch valve (4V4) closes the PH high-pressure circuit to the tank.

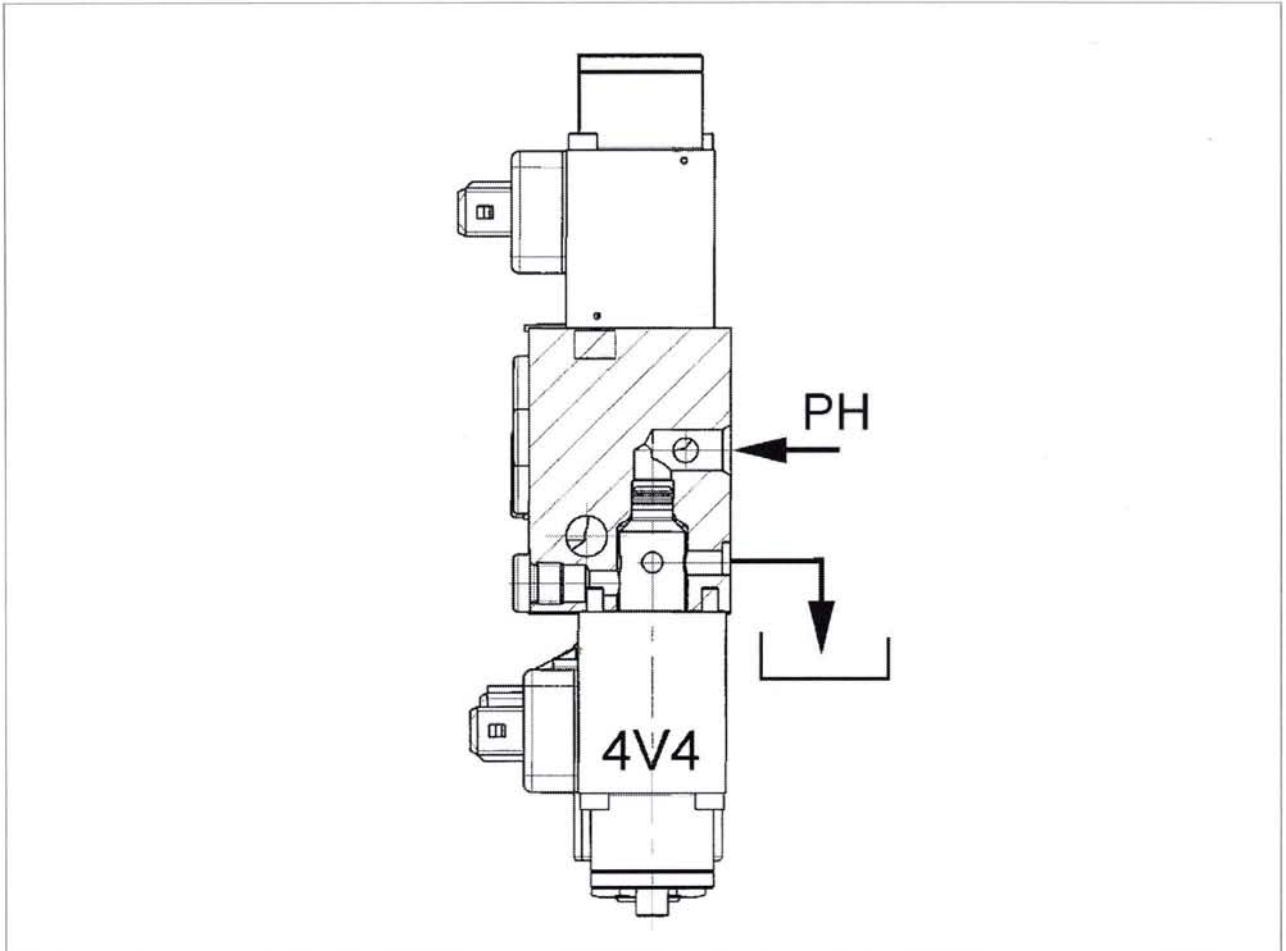


Fig. 7.

1002091

The turbo-clutch valve is controlled from the electronics box. The electrical current draw depends on the engine speed and is as follows:

Engine speed	Current draw	max. PH	Note
800 rpm	0 A	0 bar	Transmission neutral
800 rpm	0.34 A	78 bar	Transmission active
1200 rpm	1.02 A	105 bar	
from 1250 rpm	1.40 A	540 bar	

In order to carry out a leakage check it is possible to lock the turbo-clutch valve mechanically.

Screw in the hex. socket head screw



Fig. 8.

1002100

**Clutch pressure-limiting valve 4V5**

The clutch pressure-limiting valve is fitted to the valve block, which also comprises the connection from the PH high pressure to the tank.

The clutch valve also limits the PH high pressure to 550 bar ( $\pm 15$  bar).

The clutch valve closes the high-pressure circuit to the tank if the clutch pedal is not depressed.

When the clutch pedal is actuated, the clutch valve opens and the PH high pressure builds up via the connection to the tank.

There is then a reduction in high pressure (traction interruption) proportional to the travel of the clutch pedal (similar to mechanical drive clutch)

Clutch pedal completely pressed: PH high pressure = 0 bar

**The max. high pressure and the high pressure build-up depends on the functionality as well as the sealing of the clutch pressure-limiting valve (4V5)**

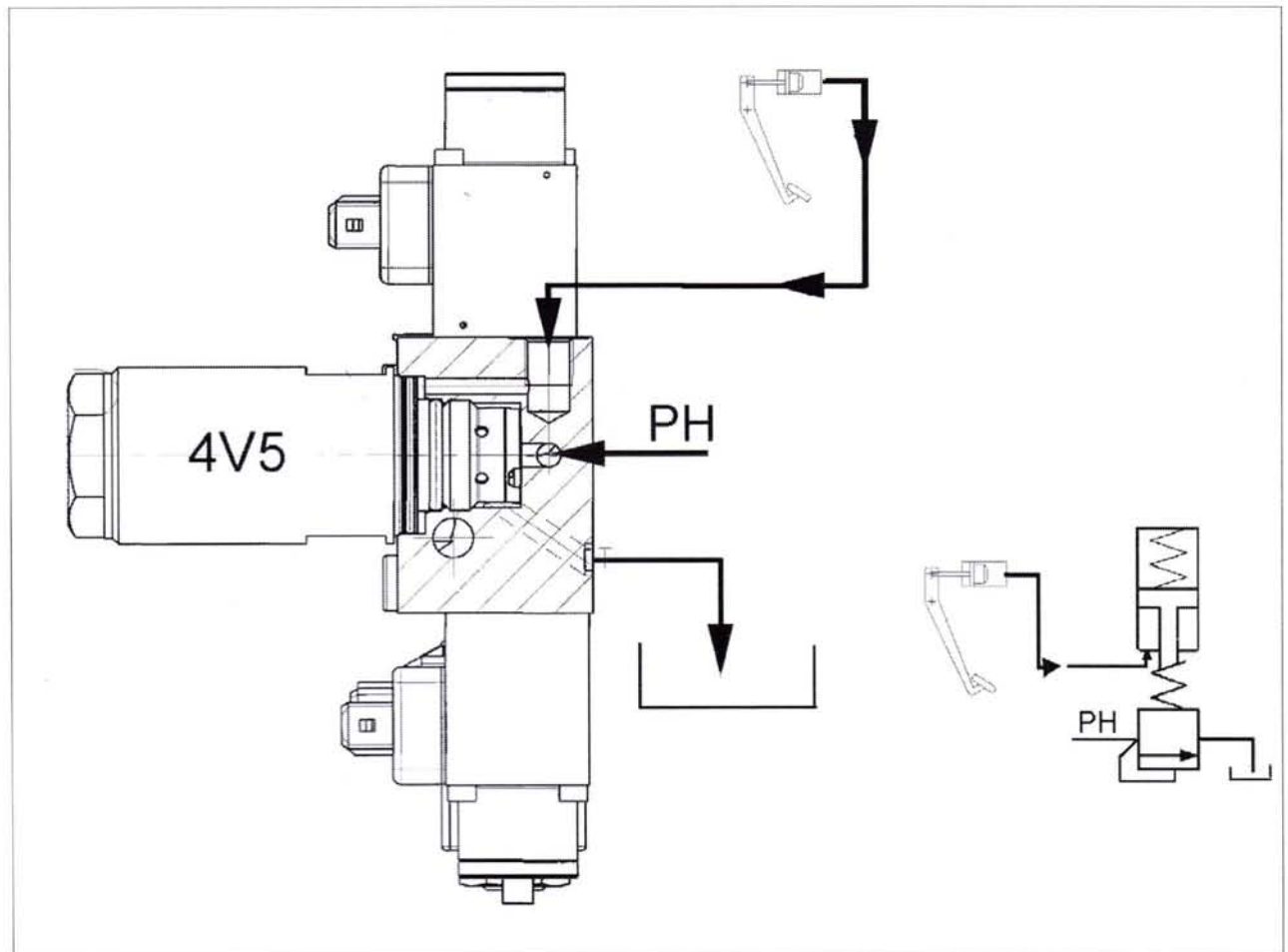


Fig. 9.

1002101

919 .. 0101-1000  
 919 .. 1001-  
 922 .. 0101-1000  
 922 .. 1001-  
 925 .. 0101-1000

925 .. 1001-  
 928 .. 0101-1000  
 928 .. 1001-  
 931 .. 0101-1000  
 931 .. 1001-

934 .. 0101-1000  
 934 .. 1001-

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Checking the high-pressure circuit in the valve block

**The following tasks must be carried out:**



**DANGER: Support the tractor safely on four support trestles (high pressure measurement)**

- Remove the right rear wheel as well as the cover panels
- Remove the screw plugs on the T connection
- Connect a pressure gauge with a rating higher than 550 bar to the PH measurement connection

#### Conducting the test

1. Start engine.
2. Apply the handbrake firmly and depress the footbrake
3. Engine speed greater than 1400 rpm (PVM activated signal)
4. Attach the auxiliary lever and drive the transmission against high pressure.

**NOTE:** Before checking the clutch valve (4V4) the clutch pedal must be calibrated.

see §11

#### Measurement (example)

PH	T connection	Possible cause of fault
250 bar	No oil is flowing from T	Drive train fault (check the high-pressure valves and purge valve and the screw connections in the pressure line); dismantle the drive train
250 bar	Oil is flowing from T	Turbo-clutch valve (4V4) or clutch valve (4V5) leaking

#### Checking the turbo-clutch valve (4V4)

Mechanically block the turbo-clutch valve (screw in the hex. socket head screw)

PH	T connection	Possible causes of the fault
250 bar	Oil is flowing from T	Clutch valve (4V5) leaking (replace)
550 bar	Oil is flowing from T	Electrical check of TK valve Y004

6 Enhanced control hydraulics valve block (rear axle)

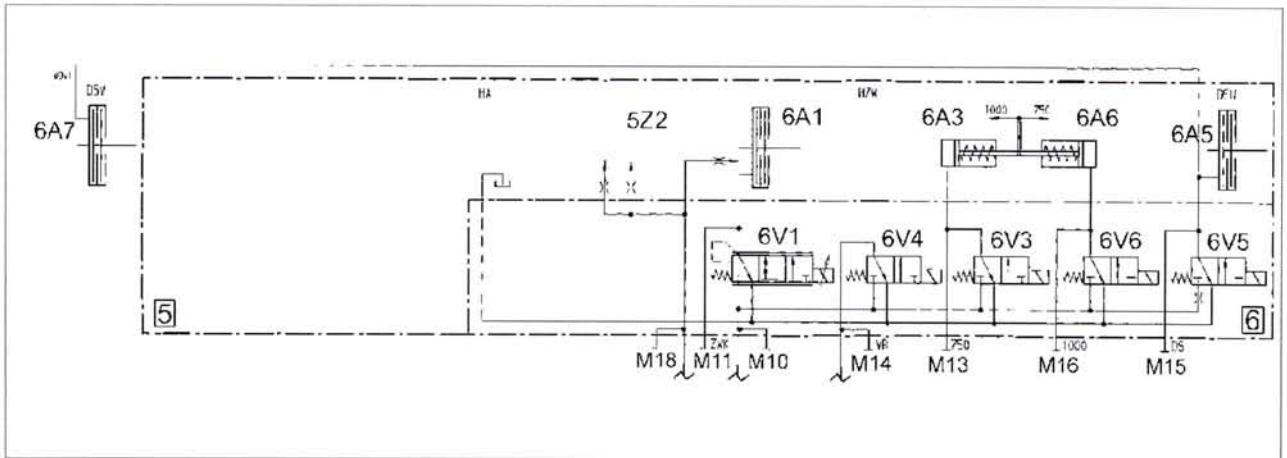


Fig. 10.

1001568

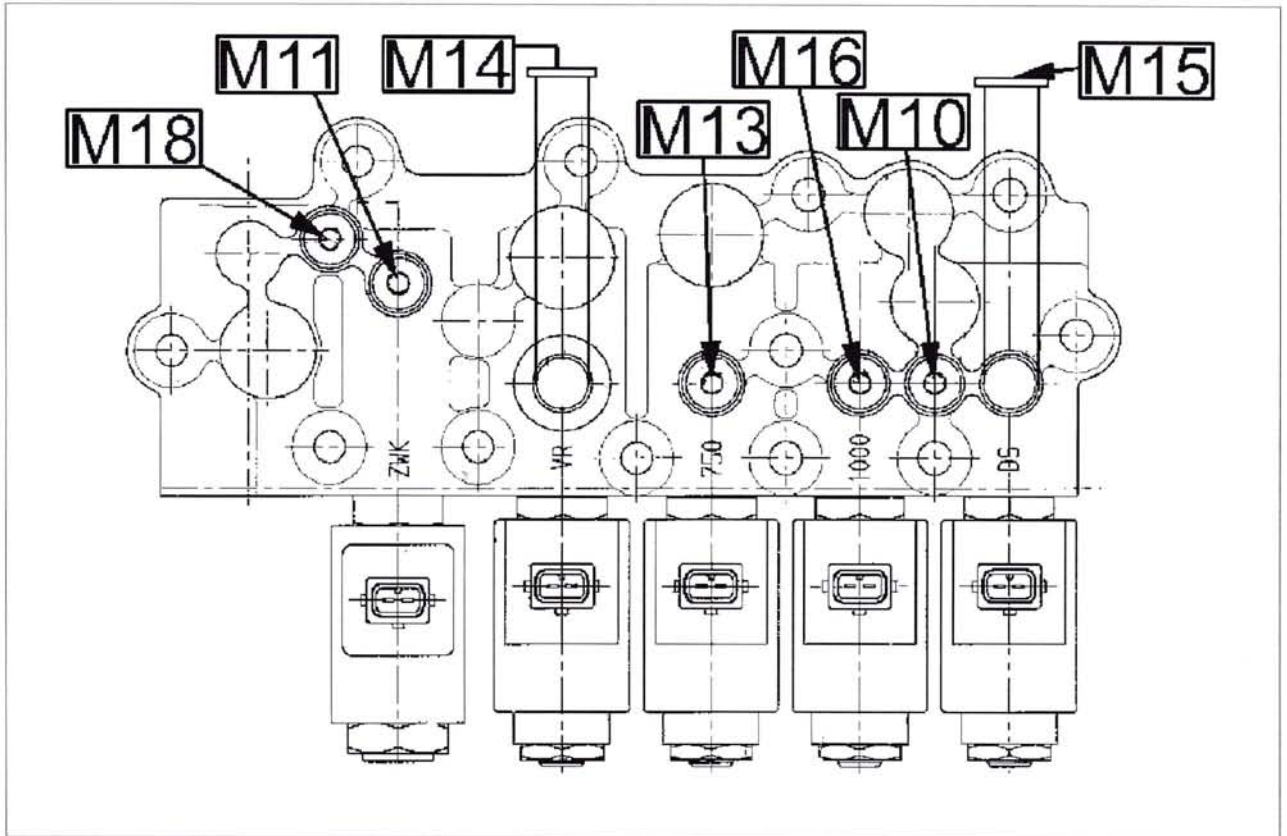


Fig. 11.

1001391

7 Valve block, inlet/lubrication

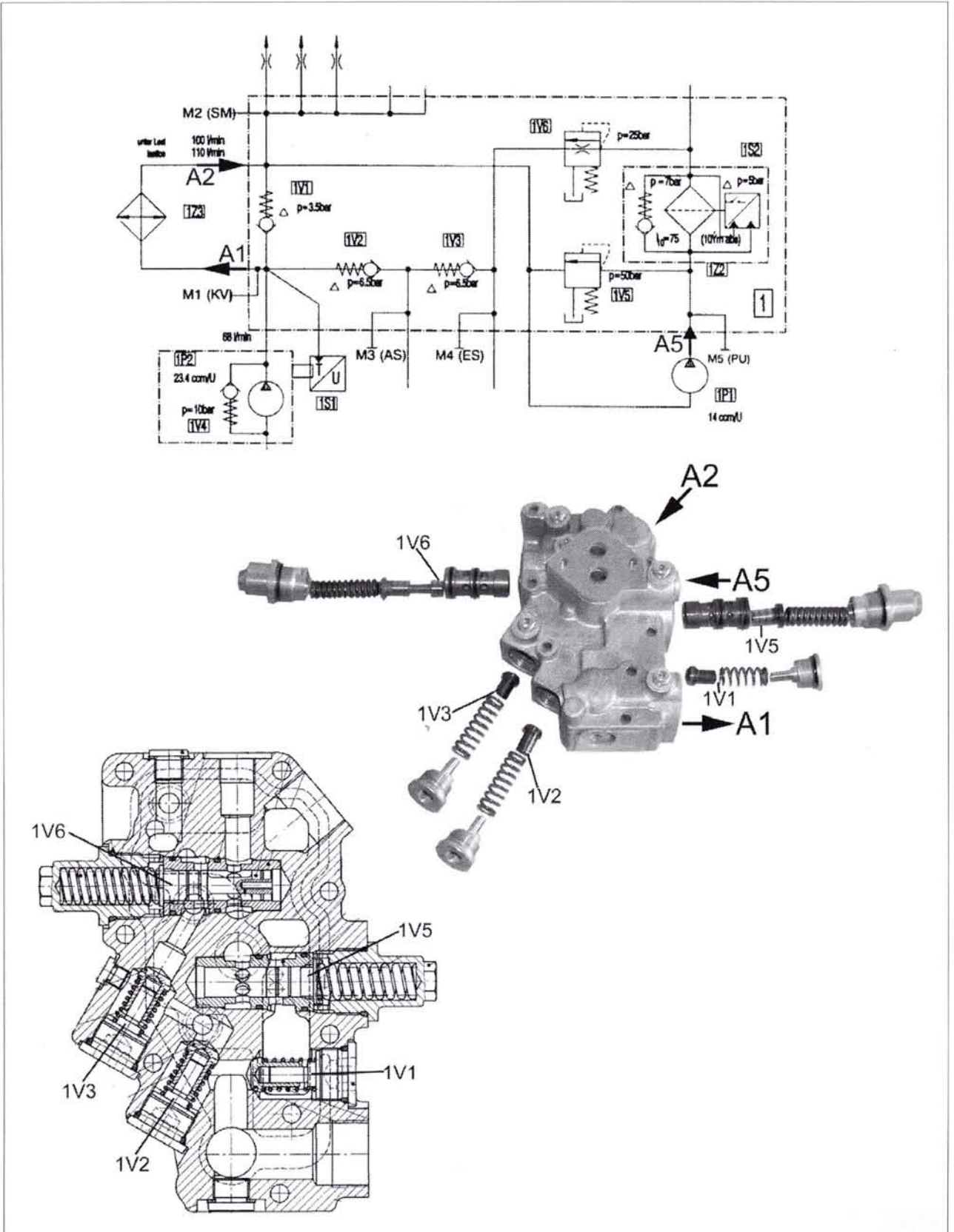


Fig. 12.

1001389

1V1	Radiator bypass valve (3.5 bar)	1V5	Pressure-limiting valve, servo-pump (50 bar)
1V2	Pressure-limiting valve, outlet (6.5 bar)	1V6	Pressure-limiting valve, servo-circuit (25 bar)
1V3	Pressure-limiting valve, inlet (6.5 bar)		