BOMAG

FAYAT GROUP

Service - Manual

BW 216 D-4 / BW 216 PD-4

S/N 101 583 23..... S/N 101 583 24



Single drum roller

Catalogue number.
008 911 83

03/2010

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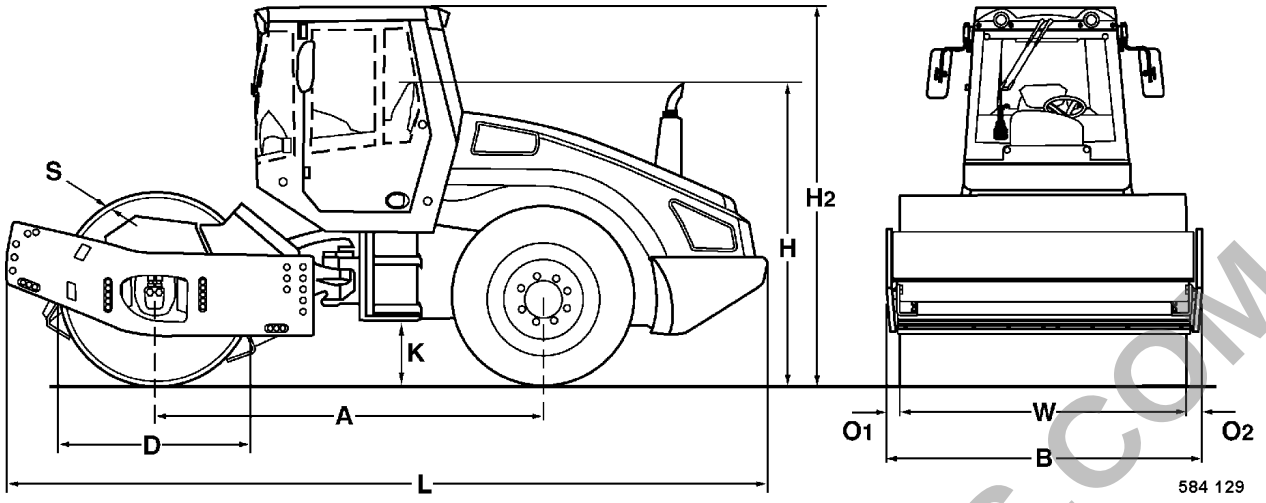


Fig. 13

Dimensions in mm	A	B	D	H	H2	K	L	O1	O2	S	W
BW 216 D-4	2960	2250	1500	2268	2972[1]	490	5808	60	60	35	2130
BW 216 PD-4	2960	2250	1500	2268	2972[2]	490	5808	60	60	25	2130

1 Depending on tire pressure
2 Depending on tire pressure

1		**BW 216 D-4**	**BW 216 PD-4**
Weights			
Operating weight (CECE) with ROPS and cabin	kg	15700	16200
Axle load, drum (CECE)	kg	10400	10900
Rear axle load (CECE)	kg	5300	5300
Static linear load	kg/cm	48.8	-
Travel characteristics			
Travel speed (1)	km/h	0 ... 4	0 ... 4
Travel speed (2)	km/h	0 ... 5	0 ... 5
Travel speed (3)	km/h	0 ... 7	0 ... 7
Travel speed (4)	km/h	0 ... 11	0 ... 11
Max. gradability (depending on soil)	%	45	48
Engine			
Engine manufacturer		Deutz	Deutz
Type		TCD 2013 L04 2V	TCD 2013 L04 2V
Cooling		Water	Water
Number of cylinders		4	4
Rated power DIN ISO 3046	kW	119	119
Rated speed	rpm	2200	2200
Fuel		Diesel	Diesel
Electrical equipment	V	12	12
Drive system		hydrostatic	hydrostatic
Driven axles		2	2

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3.1 General notes on maintenance

Maintenance work must only be carried out by qualified and appropriately trained personnel.

When performing maintenance work always comply with the appropriate safety regulations.

Thorough maintenance of the machine guarantees far longer safe functioning of the machine and prolongs the lifetime of important components. The effort needed for this work is only little compared with the problems that may arise when not observing this rule.

The terms right/left correspond with travel direction forward.

- Always clean machine and engine thoroughly before starting maintenance work.
- For maintenance work stand the machine on level ground.
- Perform maintenance work only with the motor switched off.
- Relieve hydraulic pressures before working on hydraulic lines.
- Before working on electric parts of the machine disconnect the battery and cover it with insulation material.
- When working in the area of the articulated joint attach the articulation lock (transport lock).

Environment

During maintenance work catch all oils and fuels and do not let them seep into the ground or into the sewage system. Dispose of oils, coolant and fuels environmentally.

Notes on the fuel system

The lifetime of the diesel engine depends to a great extent on the cleanliness of the fuel.

- Keep fuel free of contaminants and water, since this will damage the injection elements of the engine.
- Drums with inside zinc lining are not suitable to store fuel.
- The fuel drum must rest for a longer period of time before drawing off fuel.
- Do not let the hose stir up the slurry at the bottom of the drum.
- Do not draw off fuel from near the bottom of the drum.
- The rest in the drum is not suitable for the engine and should only be used for cleaning purposes.

Notes on the performance of the engine

On diesel engines both combustion air and fuel injection quantities are thoroughly adapted to each other and determine power, temperature level and exhaust gas quality of the engine.

If your engine has to work permanently in "thin air" (at higher altitudes) and under full load, you should consult the customer service of BOMAG or the customer service of the engine manufacturer.

Notes on the hydraulic system

During maintenance work on the hydraulic system cleanliness is of major importance. Make sure that no dirt or other contaminating substances can enter into the system. Small particles can produce flutes in valves, cause pumps to seize, clog nozzles and pilot bores, thereby making expensive repairs inevitable.

- If, during the daily inspection of the oil level the hydraulic oil level is found to have dropped, check all lines, hoses and components for leaks.
- Seal external leaks immediately. If necessary inform the responsible customer service.
- Do not store drums with hydraulic oil outdoors, or at least under a cover. Water can be drawn in through the bunghole when the weather changes.
- Always use the filling and filtering unit (BOMAG part-no. 007 610 01) to fill the hydraulic system. This unit is fitted with a fine filter to clean the hydraulic oil, thereby prolonging the lifetime of the filter.
- Clean fittings, filler covers and the area around such parts before disassembly to avoid entering of dirt.
- Do not leave the tank opening unnecessarily open, but cover it so that nothing can fall in.

Notes on the cooling system

For water-cooled engines the preparation and inspection of the coolant is of greatest importance, as otherwise the engine may be damaged by corrosion, cavitation and freezing.

The coolant is prepared by mixing a cooling system protection agent into the coolant.

The cooling system must be permanently monitored. Besides the inspection of the coolant level this includes also the inspection of the concentration of cooling system protection agent.

The concentration of cooling system protection agent can be checked by means of commercial testers (glycomat).

⚠ Danger

Health hazard!

The mixing of nitrite based anti-freeze agents with amine based agents results in the formation of health affecting nitrosamines.

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5.1 Special tools, tests and adjustments

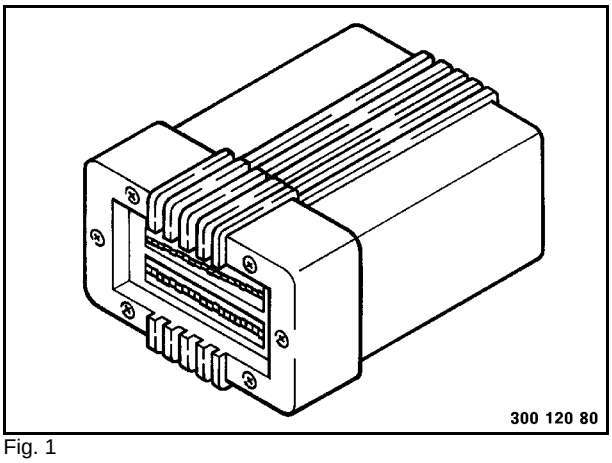


Fig. 1

1. Vibration reed frequency meter

   1000 - 4000 rpm

   17 - 67 Hz

   BOMAG part-no.: 300 120 80


Fig. 2

2. Sirometer (frequency meter)

   800 - 50.000 rpm

   14 - 750 Hz

   BOMAG part-no.: 059 710 02



Fig. 3

3. Anti-freeze tester, quick and accurate measuring, sturdy plastic housing, automatic temperature correction, no after-dripping, instructions for use on unit, reading down to -40 °C. Material: Plastic, Temperature range: down to -40 °C

   BOMAG part-no.: 050 100 75

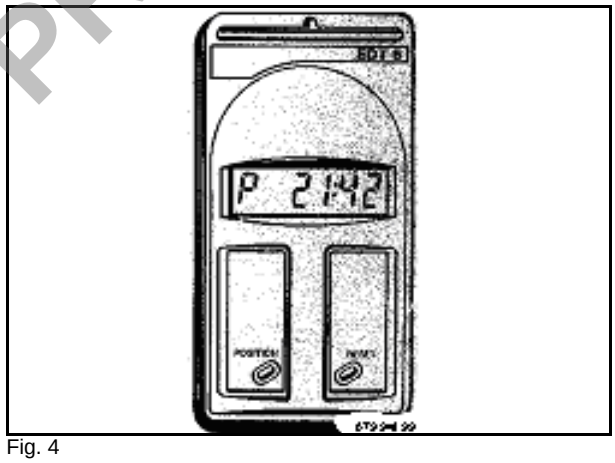


Fig. 4

4. Digital rpm-meter for petrol engines

   BOMAG part-no.: 079 948 99

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6.1 Special tools for flushing

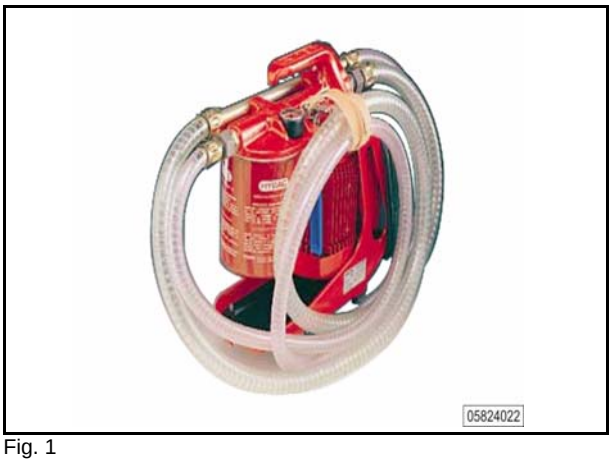


Fig. 1

1. Filling and filtering unit

   BOMAG part-no.: 058 240 22

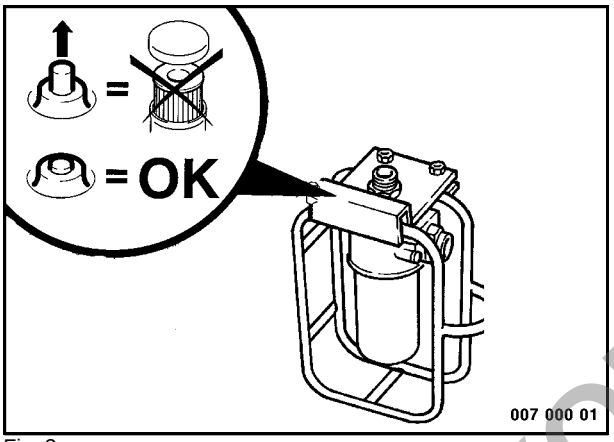


Fig. 2

2. Flushing filter (S connection)

   BOMAG part-no.: 007 000 01

3. Filter element 1µ

   BOMAG part-no.: 079 930 52

4. Flushing hose 20S - 25S (2 pieces)

   BOMAG part-no.: 055 509 19

5. Screw socket R1“ - 25S (2 pieces)

   BOMAG part-no.: 055 400 52

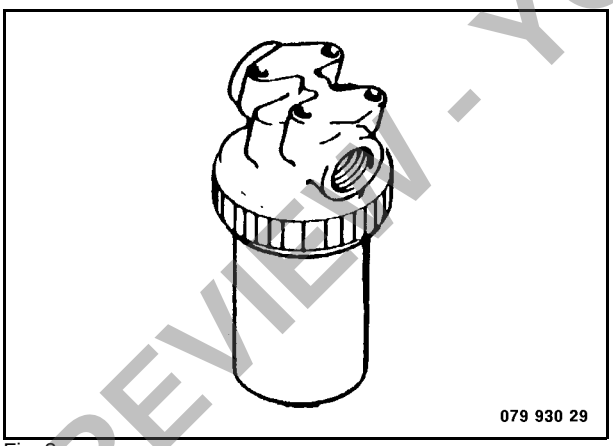


Fig. 3

6. Flushing filter (L connection)

   BOMAG part-no.: 079 390 29

7. Filter element

   BOMAG part-no.: 079 390 14

8. Flushing hose 15L (2 pieces)

   BOMAG part-no.: 055 510 09

9. Screw socket R3/4“ -- 15L (2 pieces)

   BOMAG part-no.: 055 400 89

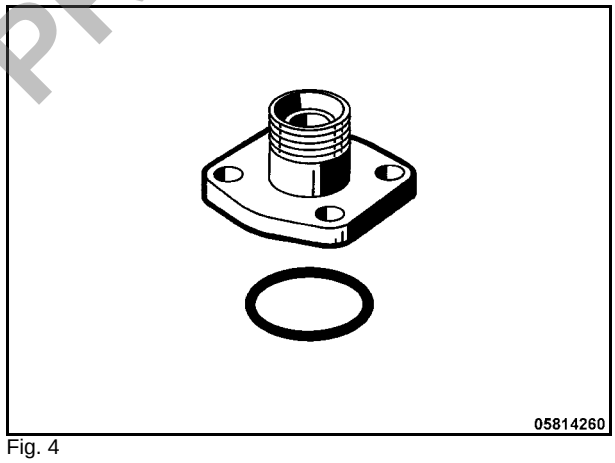


Fig. 4

10. SAE-flange 1“ - 20S

    BOMAG part-no.: 058 142 60

11. O-ring

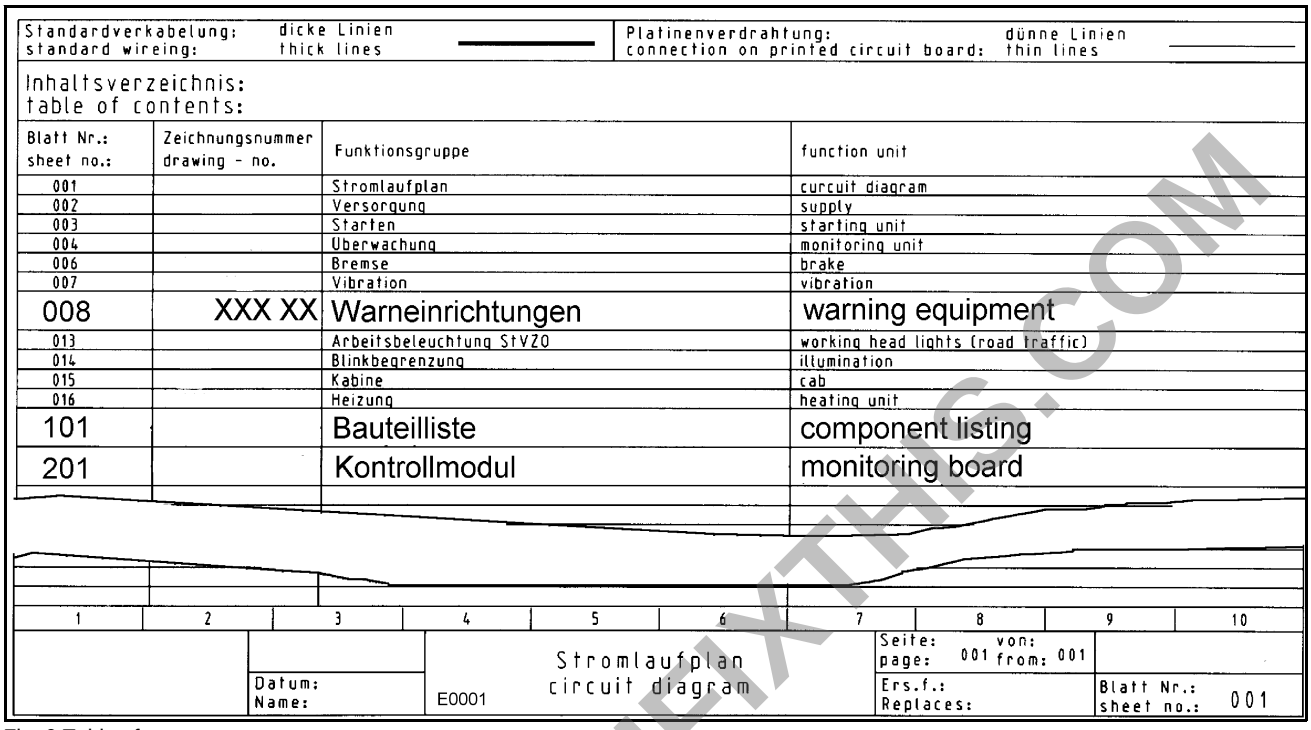
    BOMAG part-no. 062 203 30

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Table of contents (Fig. 6)

The table of contents lists all function groups.



Standardverkabelung: dicke Linien — standard wireing: thick lines

Platinenverdrahtung: dünne Linien — connection on printed circuit board: thin lines

Inhaltsverzeichnis:
table of contents:

Blatt Nr.: sheet no.:	Zeichnungsnummer drawing - no.	Funktionsgruppe	function unit
001		Stromlaufplan	curcuit diagram
002		Versorgung	supply
003		Starten	starting unit
004		Überwachung	monitoring unit
006		Bremse	brake
007		Vibration	vibration
008	XXX XX	Warneinrichtungen	warning equipment
013		Arbeitsbeleuchtung StVZO	working head lights (road traffic)
014		Blinkbegrenzung	illumination
015		Kabine	cab
016		Heizung	heating unit
101		Bauteilliste	component listing
201		Kontrollmodul	monitoring board

1 2 3 4 5 6 7 8 9 10

Datum: Name:

E0001 Stromlaufplan circuit diagram

Seite: page: von: 001 from: 001

Ers.f.: Replaces:

Blatt Nr.: sheet no.: 001

Fig. 6 Table of contents

Example:

Function group "Warning systems“, drawing number XXX XX can be found on page no. 8.

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8.1 Assembling the dust protection



Fig. 1

1. Unscrew the fastening screws for the control panel (Fig. 1).



Fig. 2

2. Lift the control panel up (Fig. 2) and.....



Fig. 3

3. ..... carefully pull the wiring loom out of the instrument carrier (Fig. 3).



Fig. 4

4. Pull the dust protection bag over the control panel (Fig. 4), ...

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9.1 EMR3 system components

Engine control unit

⚠ Caution

It is strictly prohibited to interchange control units from one production series or against another engine serial number. The warranty will in this case become null and void.

Sensors and actuators must not be connected to external power sources for testing, but must solely be operated in combination with the EMR3. Otherwise components may be permanently damaged.

Disconnecting the control unit plug connectors with the control unit switched on (i.e. with power supply to terminal 15), is not permitted. Correct procedure: Switch off the electric power supply (normally with the ignition switch), wait until the main relay has switched off (delayed by up to 15 s, listen for clicking sound), disconnect the plugs from the control unit.

The engine control unit is the central component of the EMR3-system. It has the function to assure optimal engine performance with the objectives

- good exhaust characteristic,
- low fuel consumption,
- smooth running of engine,
- long lifetime of engine,
- efficient service

. For this purpose the engine control unit runs a number of calculations using the detected measuring values and the parameters saved in the database, which for the basis for all functions provided. The most important functions include:

- exact control of injection process (among others the number, start and duration of injection processes),
- idle speed control,
- control of the exhaust gas recirculation quantity,
- optimization of smooth running (by means of correcting the injection quantity),
- engine monitoring,
- system diagnose.

Replacing the control unit

Each control unit is clearly designated to the engine, in accordance with the respective application. In case of a replacement the control unit therefore needs to be completed with the engine specific data set. When ordering a new control unit you must not only specify the part-number, but also the engine serial number (see sticker on EMR-control unit).

i Note

The Deutz part-number specified on the EMR-control unit is the part number without software specific for the engine. The correct part number can be found in the spare parts catalogue.

Replacing the EMR or DCR components

- On TCD-engines with Common Rail technology the system pressure is so high, that in case of leaks or repair all parts need to be replaced. When replacing sensors or other electric components, the new parts must be calibrated with the EMR control unit. This calibration must be performed with SERDIA (Level IIIa). (see also SERDIA manual).
- Any other EMR components (sensors etc) must under no circumstances be repaired, but must be replaced if they are defective.

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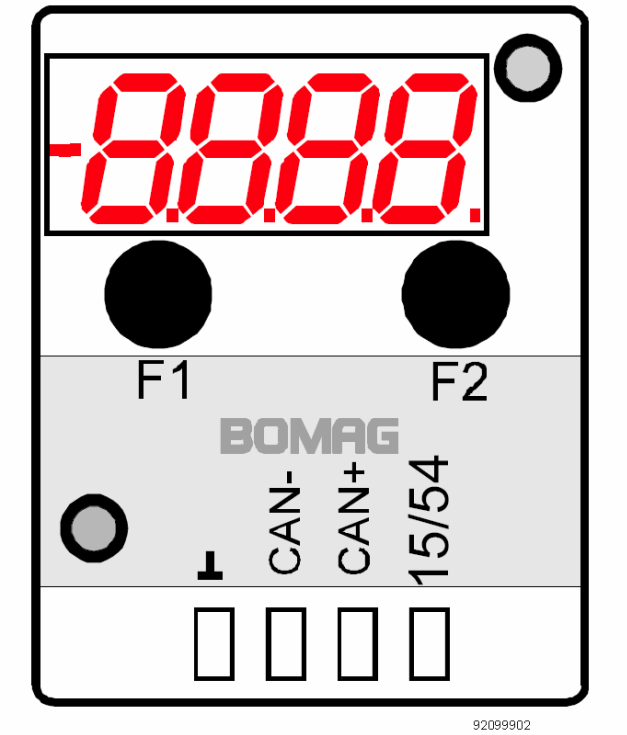


Bild 8

i Hinweis

The documentation "Service Training Electrics MESX" contains also the documentation BEM (BOMAG Evib-meter).

The BOP (BOMAG Operation Panel) is only installed in connection with BVC machines, BEM-machines are equipped wit display module. The display module is used for the output of fault codes and display values, as well as for the input of code numbers.

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11.1 Speedometer module

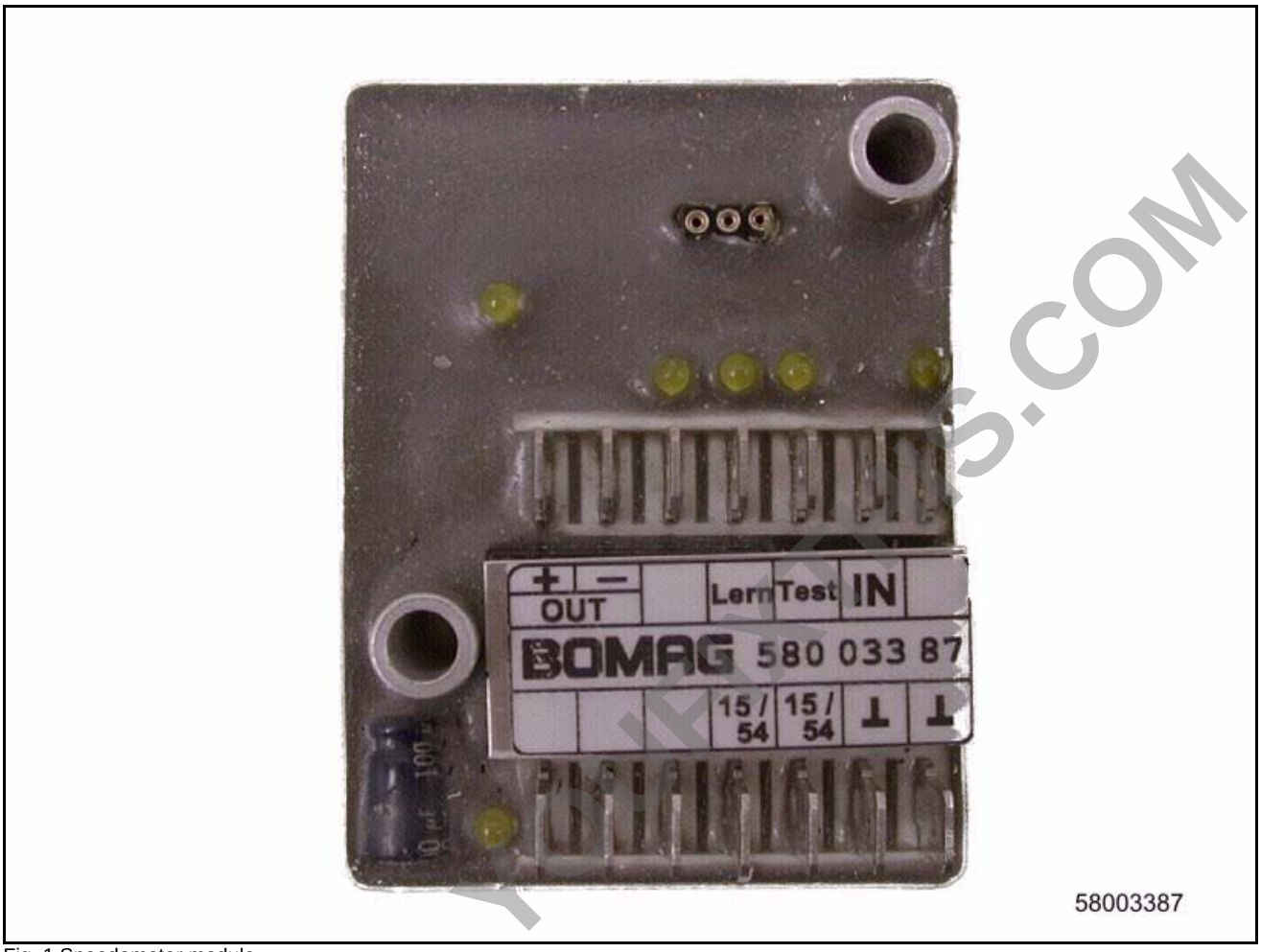


Fig. 1 Speedometer module

Description of function

With the programmable module BM UPM the software realizes a speedometer function. To ensure that the tachometer function is not only realized for one special roller, there is a possibility to adapt the module to any machine with the help of a self-teaching mode.

- Whenever the module is switched on the system runs a self-test by passing through the entire display range in both directions. The display self-test takes approx. 15 seconds.
- After this the module changes to measuring mode. The frequency of the travel pulses of the roller is detected and converted to a proportional output voltage that triggers the display.
- The output signal for the display is a PWM-signal.

Manual testing of the speedometer

When the module is in learning mode a manual display test can be performed via the input "Test". For this purpose the input "IN" must be energized with 12 Volt, whereupon the speedometer is constantly triggered with 3 Volt.

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BOMAG

Service Training



Single Drum Roller

BW 211 / 213 D- 4
BW 216 / 219 D-4

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13.2 Engine description TCD 2013, 4 and 6 cylinder

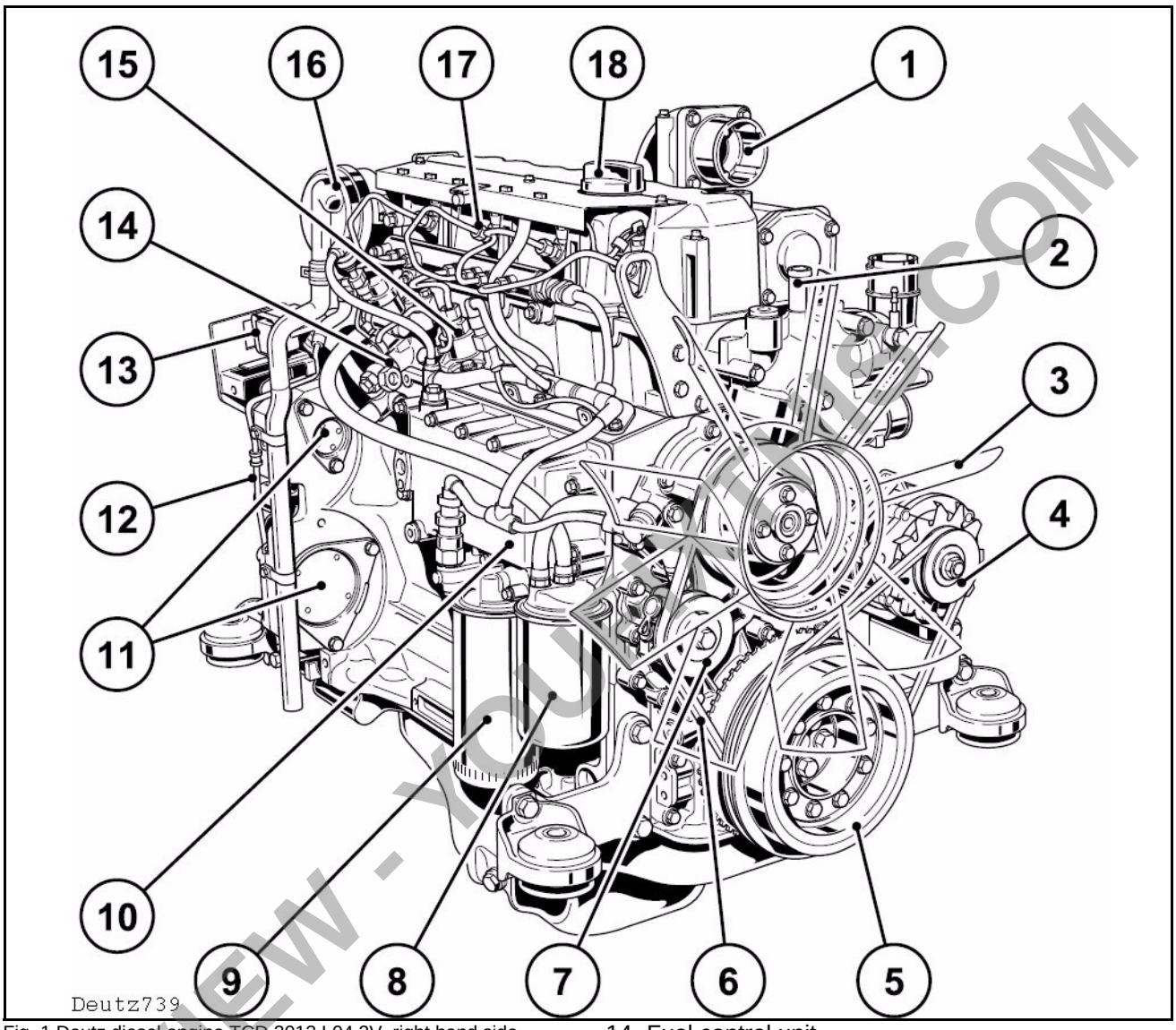


Fig. 1 Deutz diesel engine TCD 2013 L04 2V, right hand side

1 Combustion air inlet (possibility to install a heating flange, optionally)
2 Connection cabin heater ort compensation line
3 Fan
4 Generator
5 Belt pulley on crankshaft
6 V-belt
7 Fuel lift pump drive
8 Fuel filter
9 Replaceable lubrication oil filter
10 Lubrication oil cooler
11 Possible installation of hydraulic pump or compressor (optional)
12 Lubrication oil return line crankcase ventilation
13 Central plug (for engine control)
14 Fuel control unit
15 High pressure pump
16 Crankcase ventilation valve
17 Injector
18 Lubrication oil filling neck

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14.1 Physical basics

In order to understand the working principle of an air conditioning system one must first become familiar with the physical basics of such a system.

The four well known physical conditions of water apply also for the refrigerant in the air conditioning system.

1. gaseous (invisible)

2. vaporous

3. liquid

4. solid

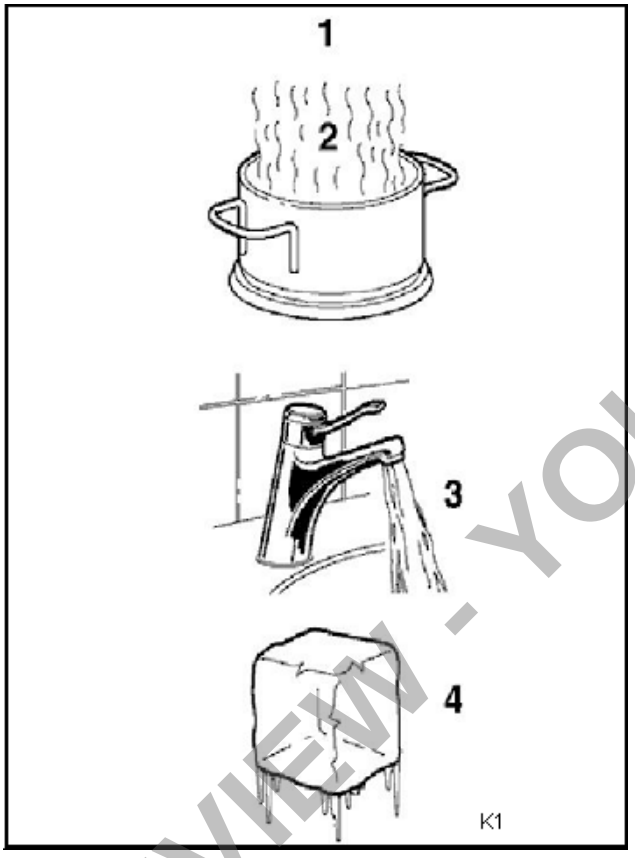


Fig. 1

If the water in a container is heated up (absorption of heat), the rising steam is visible. If the steam is heated up further, due to the absorption of heat, the visible steam will turn into invisible gas. This process is reversible. When withdrawing the heat contained in gaseous water, the gas will turn into steam, then into water and finally into ice.

A - heat absorption

B- Heat dissipation

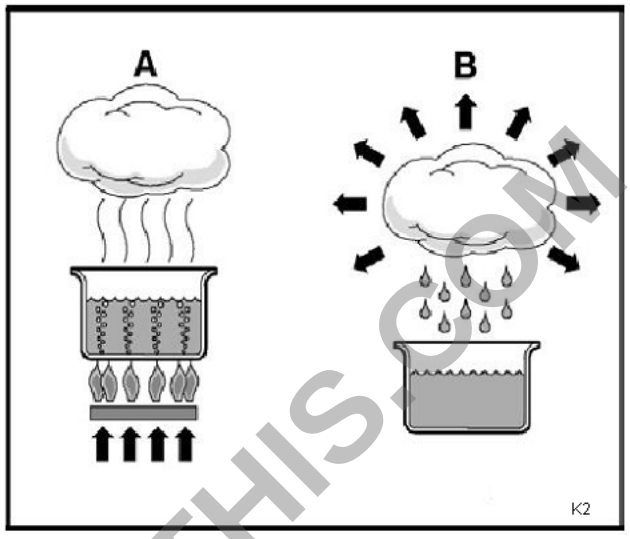


Fig. 2

Heat always flows from the warmer to the colder matter. Any matter consists of a mass of moving molecules. The rapidly moving molecules or a warmer matter dissipate part of their energy to the slower moving molecules with less heat. The movement of the molecules in the warmer matter becomes slower and the molecules in the cooler matter are accelerated. This process continued, until all molecules in the two matters move with identical speed. The matters have then reached an identical temperature and the transfer of heat stops.

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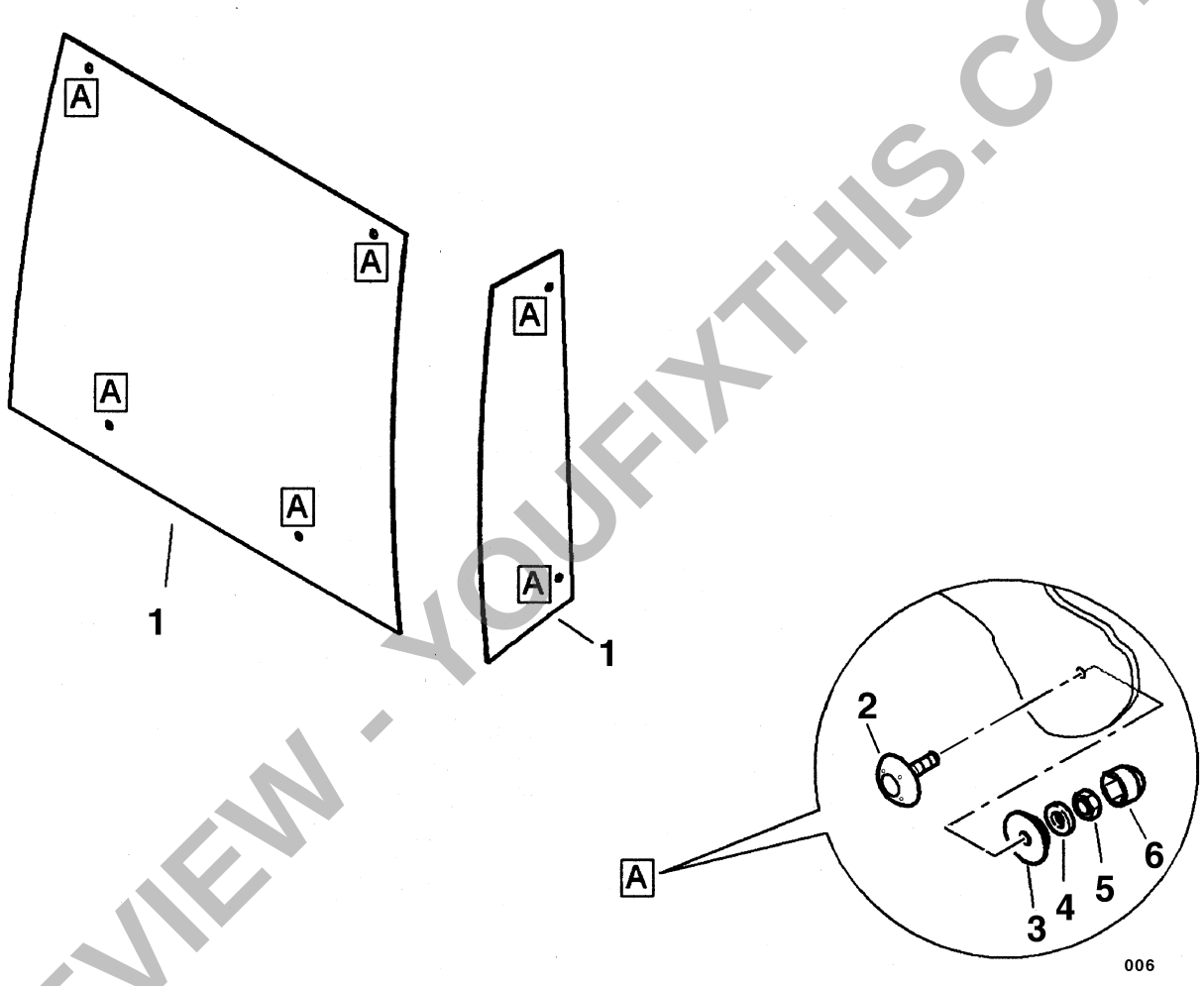


Fig. 1

1 Glass panes
2 Fastening element
3 Fixing washer and spacer
4 Washer
5 Hexagon nut, self locking
6 Protective cap

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16.1 Special tools, drum, single drum rollers

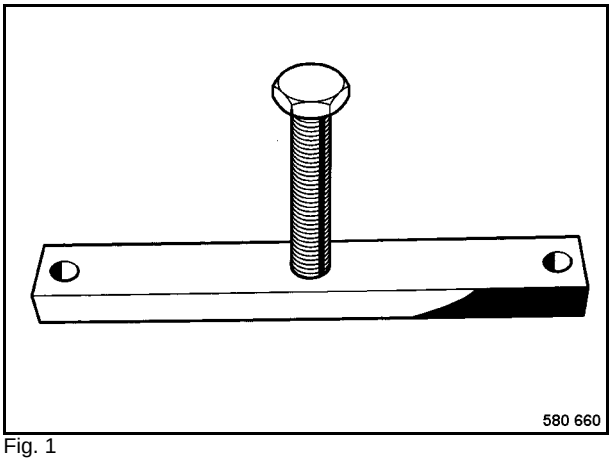


Fig. 1

1. Disassembly device for side plate

   BOMAG part-no.: 007 211 55

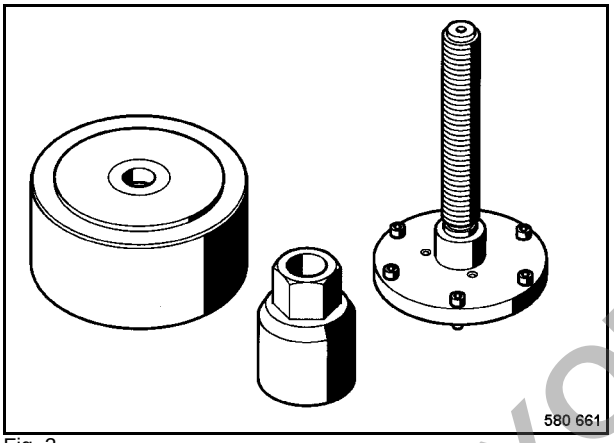


Fig. 2

2. Assembly device for side plate

   BOMAG part-no.: 971 079 21

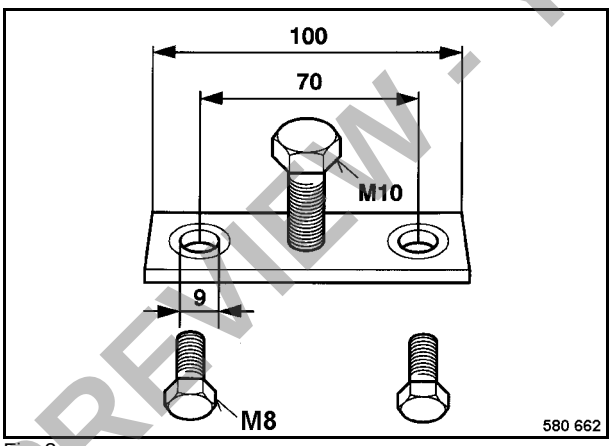


Fig. 3

3. Assembly device for coupling hub and flanged hub

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17.1 Special tools, oscillating articulated joint (BW177 to BW 216)

1. Pressing device for rocker bearings

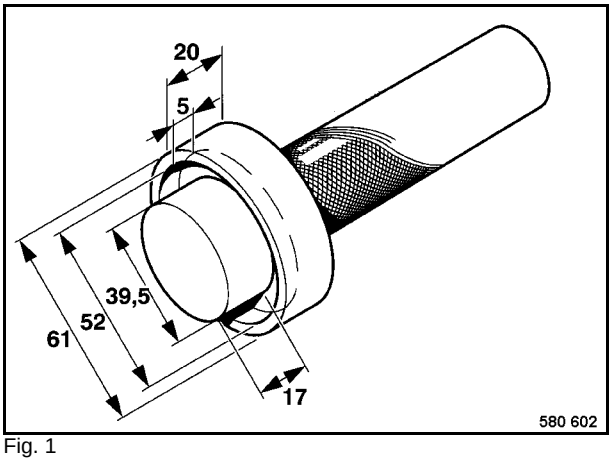


Fig. 1

2. Pressing bushing for outer rocker bearing race

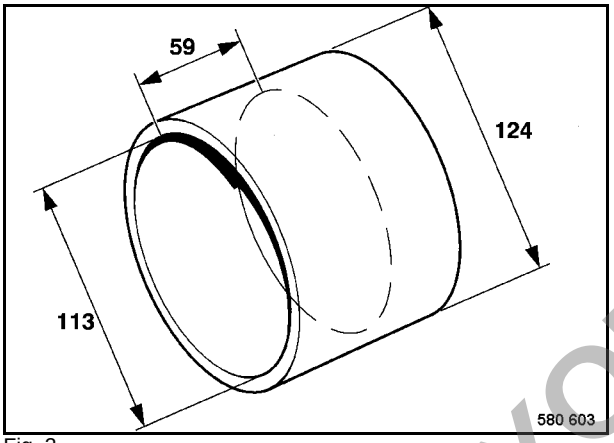


Fig. 2

3. Pressing bushing for inner rocker bearing race

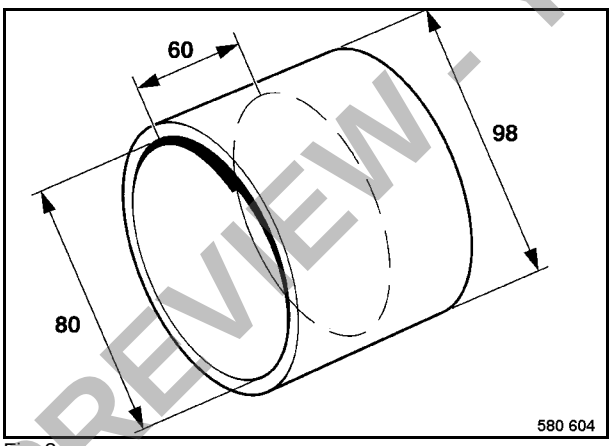


Fig. 3

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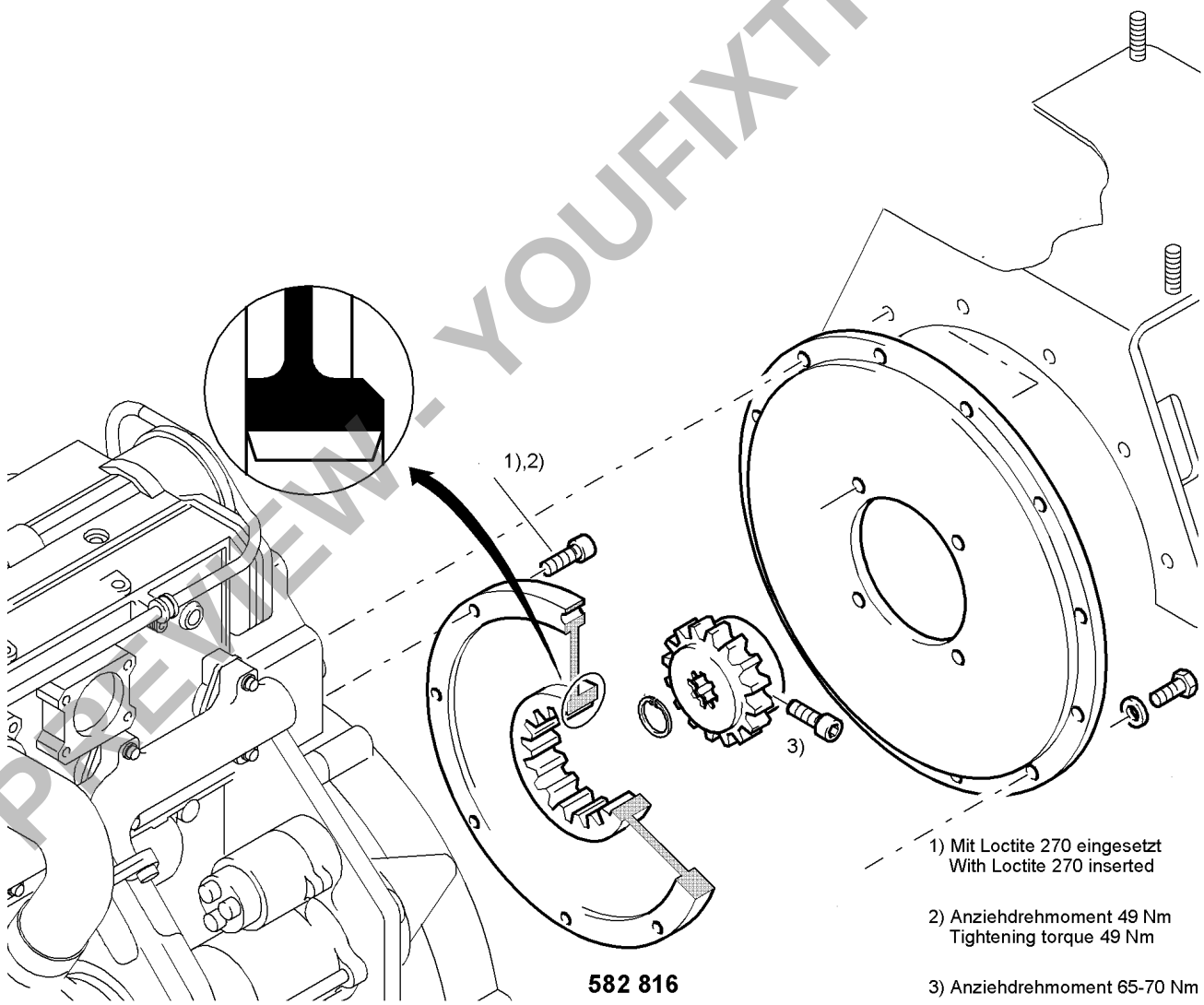


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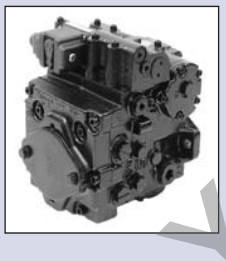
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Genuine Parts

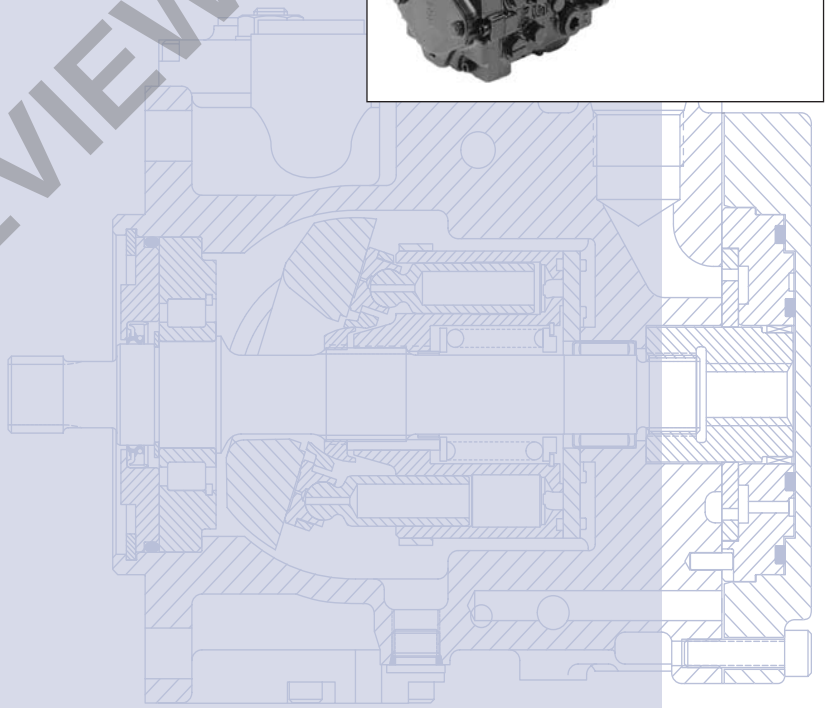
Series 42
Axial Piston Closed Circuit Pumps

Service Manual







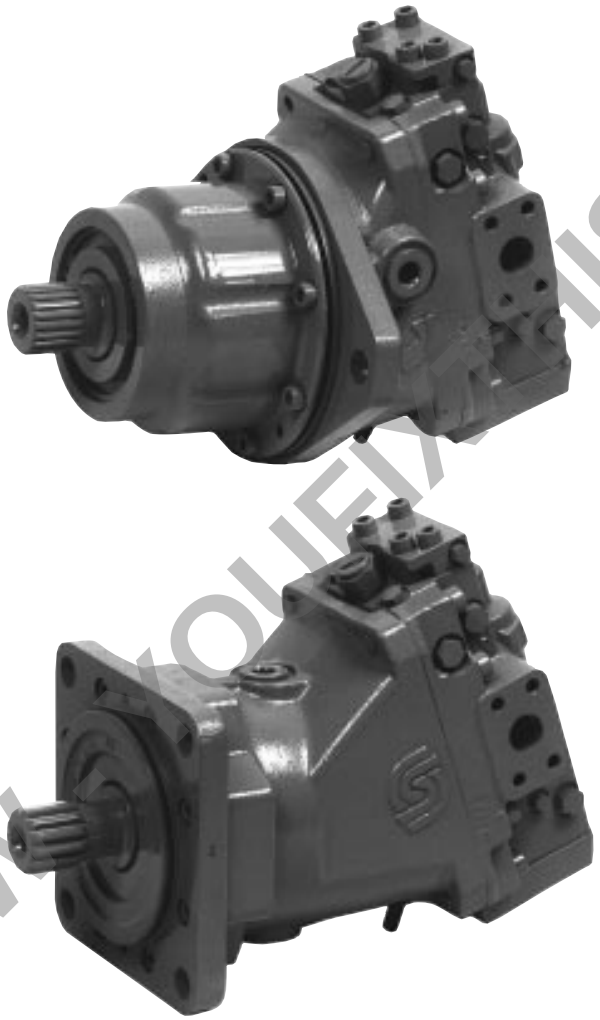


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SAUER SUNDSTRAND

Series 51



Bent Axis

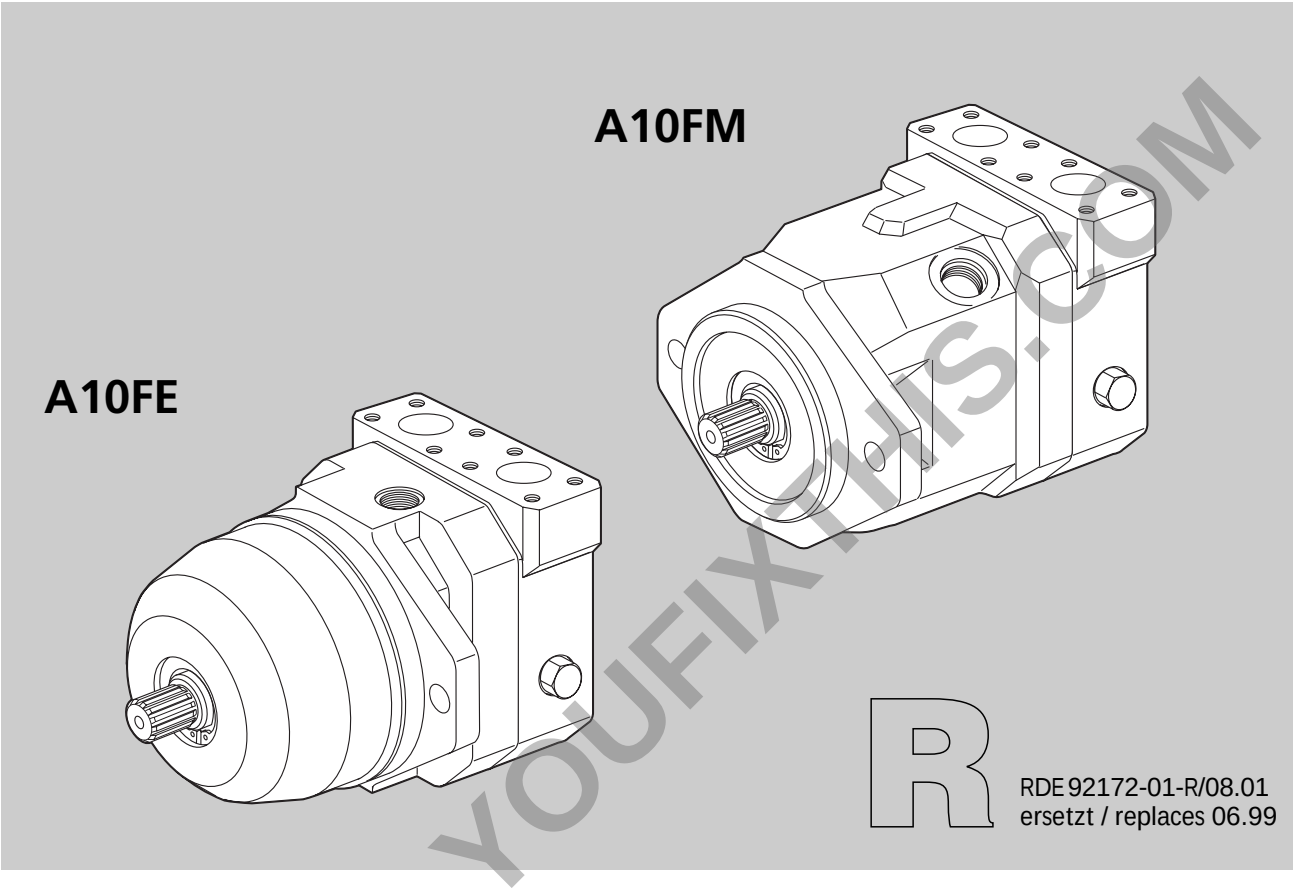
Variable Motors

Service Manual

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engineering
mannesmann
Rexroth



R

RDE 92172-01-R/08.01
ersetzt / replaces 06.99

Reparaturanleitung - A10FM 28 - 60 Baureihe 5
A10FE 28 - 60 Baureihe 5

Repair instructions - A10FM 28 - 60 Series 5
A10FE 28 - 60 Series 5

Brueninghaus
Hydromatik

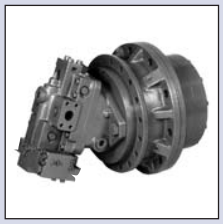
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SAUER DANFOSS

Series CR
Compact
Roller Drive

Service Manual and Repair Instruction



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Standardverkabelung: standard wireing:	dicke Linien thick lines	Platinenverdrahtung: connection on printed circuit board:	dünne Linien thin lines

Inhaltsverzeichnis: table of contents: BW 211-219 D-4 Tier III

Blatt Nr.: sheet no.:	Zeichnungsnummer drawing - no.	Funktionsgruppe	function unit
001	582 702 14	Stromlaufplan	Circuit Diagram
002	582 702 14	Versorgung, Starten, Hupe	supply, starting unit, signal horn
003	582 702 14	Motor Deutz EMR III	engine Deutz EMR III
004	582 702 14	Bremse, Rückfahrwarneinrichtung, Anzeige	brake, back up alarm, indicator
005	582 702 14	Fahrstufen, Sitzkontaktsch., Vibration	speed-ranges, seat-switch, vibr.
006	582 702 14	Anzeigen	indicators
007	582 702 14	Variocontrol, Messtechnik	Variocontrol, measurement equipm.
008	582 702 14	Bomag Compaction Management BCM	Bomag Compaction Management BCM
009	582 702 14	Diebstahlschutz System D-4, D-40, DHC-4, DH-40	anti - theft system
010	582 702 14	Beleuchtung und StvZO	illumination and StvZO
011	582 702 14	Kabinenausrüstung, Beleuchtung, Radio, Tachograph	cabin-equipment, headlights, radio, tachograph
012	582 702 14	Kabinenheizung, Klimaanlage, Zusatzheizung	cabin-heater, air conditioning, add. heater
101	582 702 14	Bauteilliste	component listing

1	2	3	4	5	6	7	8	9	10

	Gez.: 10.04.2006 Name: Vogt Gepr.: 10.04.2006 Name: Seis	Stromlaufplan circuit diagram	Seite: page: 001 von: from: 001 Ers.f.: Replaces:	582 702 14 Blatt Nr.: sheet no.: 001

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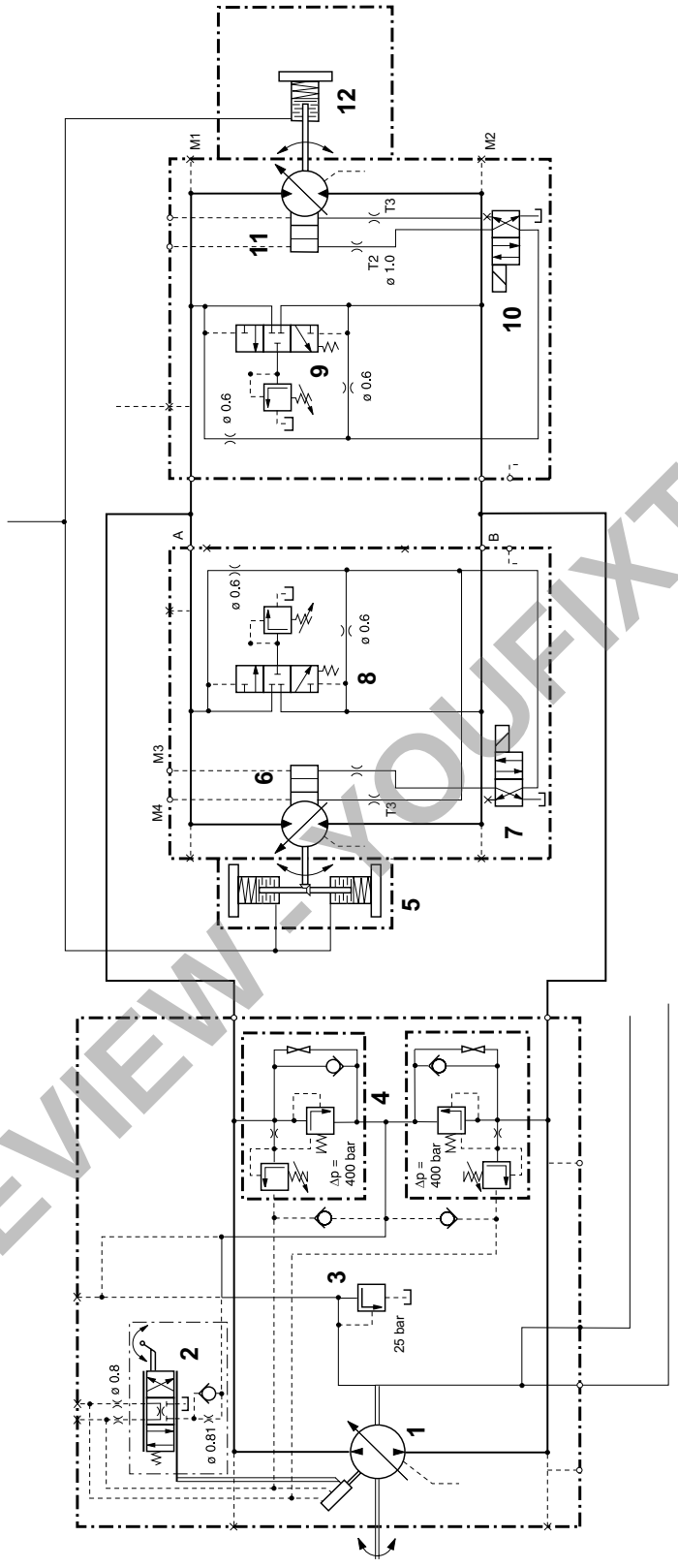


Fig. 2: Hydraulic diagram travel system BW 216 D-4

1	*Travel pump Sauer 90 R 075*	*5*	*Rear axle*	*9*	*Flushing valve (drum drive motor)*
2	*Servo control*	*6*	*Axle drive motor Sauer 51 D 110*	*10*	*Speed range valve (drum drive motor)*
3	*Charge pressure relief valve*	*7*	*Speed range valve*	*11*	*Drum drive motor (Sauer 51 C 110)*
4	*Multi function valve*	*8*	*Flushing valve*	*12*	*Reduction gear Sauer CR 31*

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