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5.9 Change engine oil and oil filter cartridge

⚠ Caution

The oil change at 250 operating hours refers to the use of oils of quality class Cat DEO 10W-30 ECF-1 or API: CI-4/ECF1.

Refer also to the chapter 5.2, fuels and lubricants.

Drain the engine oil only when the engine is warm.

⚠ Danger

Danger of scalding!

When draining off hot oil.

By hot oil when unscrewing the engine oil filter.

Environment

Catch running out oil and dispose of environmentally together with the engine oil filter cartridge.

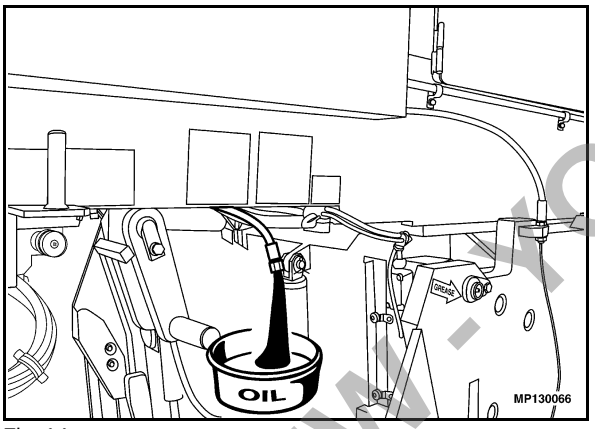


Fig. 14

- Unscrew the drain hose (Fig. 14) and catch running out oil.
- Reassemble the drain hose.

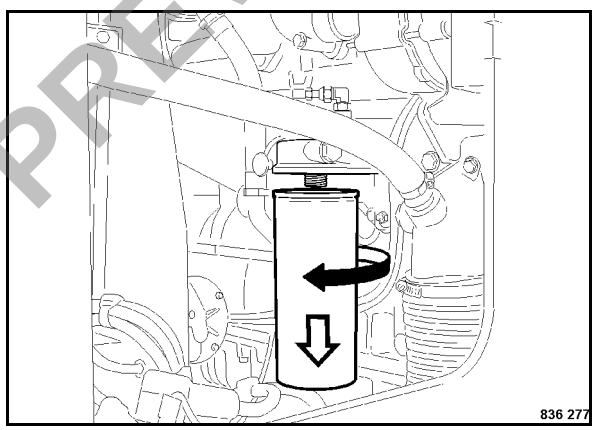


Fig. 15

- Unscrew the filter cartridge (Fig. 15) using an appropriate filter wrench.
- Clean the sealing face on the filter carrier from any dirt.
- Slightly oil the rubber seal on the new filter cartridges.

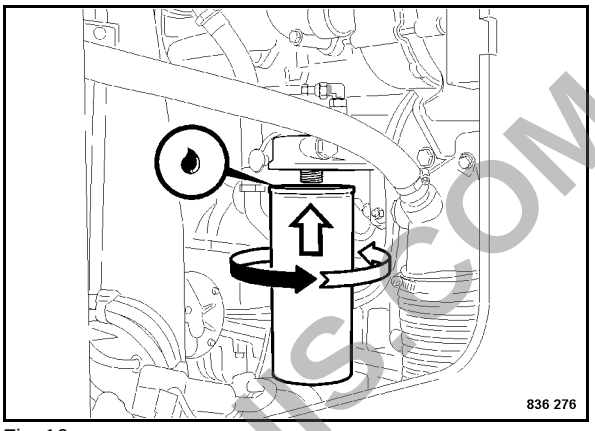


Fig. 16

- Turn the new filter cartridges (Fig. 16) on by hand, until the seal contacts.
- Tighten the filter element for another half turn.

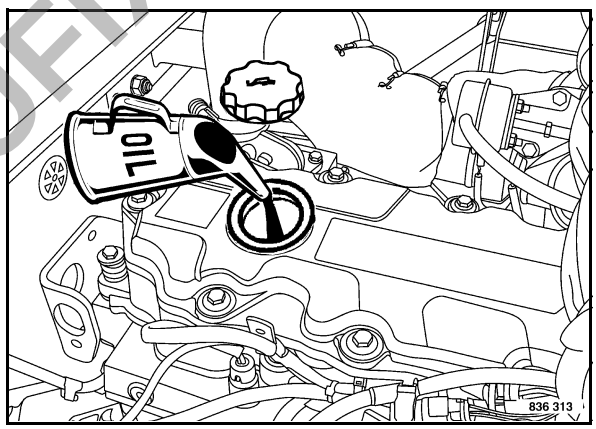


Fig. 17

- Fill in new engine oil (Fig. 17).

For quality and quantity of oil refer to the table of fuels and lubricants.

- Tighten the oil filler cap properly.

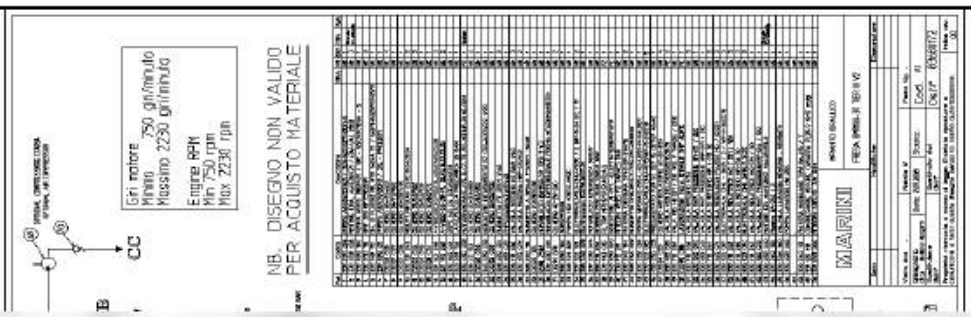
⚠ Caution

Before starting crank the engine with the starter motor until the oil pressure warning light goes out.

- After a short test run check the oil level on the dipstick, if necessary top up to the top dipstick mark.
- Check filter cartridge and drain plug for leaks after a short test run.
- Shut the engine down and wait for about 15 minutes, so that all oil can flow back into the oil sump.
- Check the oil level again , if necessary fill up to the Max.-mark.

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Industriegebiet Hellerwald
D-56154 Boppard

BM/30-2

CAT TIER3

ELECTRIC DRAWING

Drawing: DE013005
Created: 15. Dic. 2010
Last update: 07. Lug. 2011

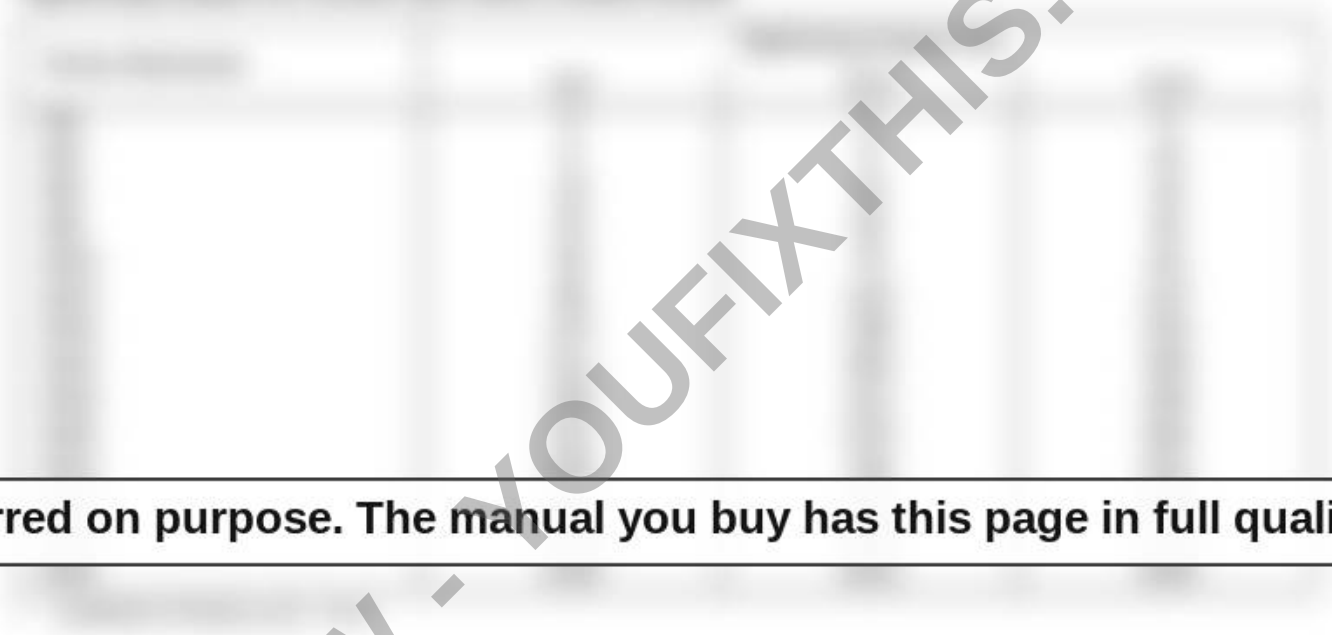
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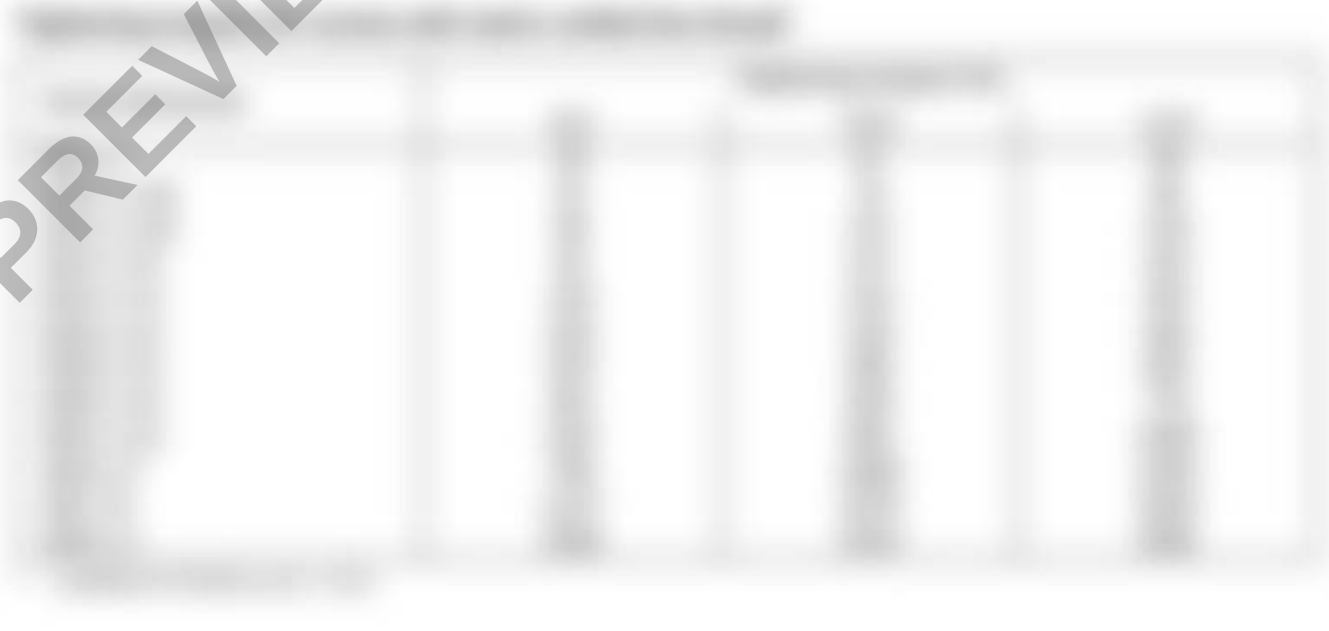
1.1

Design.: Luca Zuccarino date: 15. Dic. 2010 Resp. USER: ING. ZANIBONI	BOMAG FAYAT GROUP	BM/30-2	FRONT PAGE PRIMA PAGINA	D: DE013005	pag. 1

The values specified in the table apply for screws:

- black oiled
- with surface protection A4C
- with surface protection DACROMET





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5.7 Table of flashing codes

Flash-ing code	Description of flashing code	Effect on engine function			
		Misfire	weak power	reduced engine speed	Shut-down of engine
15	Short-circuit or interruption of electric circuit in injection pressure sensor*		X		
17	too high injection pressure* **				
18	Short-circuit or interruption of electric circuit in injection control valve				X
21	Sensor voltage supply higher or lower than normal*** ****		X		
24	Fault in oil pressure sensor*** ****				
25	Fault in intake manifold air pressure sensor*** *****				
26	Fault in ambient pressure sensor*** ****		X		
27	Fault in coolant temperature sensor*** ****		X	X	
28	Check the setting of the throttle control sen-sor***		X	X	
34	no speed signal**	X		X	X
35	Overspeed***				X
37	Fault in fuel pressure sensor*** ****		X	X	
38	Fault in intake manifold air pressure sensor*** ****				
39	Mechanical fault in injection pressure sensor**		X		
42	Check injection timing sensor* ***	X	X	X	
46	Engine oil pressure too low* **		X	X	X
51	Interruption of power supply from battery to control unit (ECM)* **	X	X		X
52	General module fault**	X	X	X	X
56	Program fault in engine control***		X	X	
59	Wrong engine software***	X	X	X	
61	Coolant temperature too high* **		X		X
62	Coolant level too low* **		X	X	X
63	Fuel pressure too low (filter clogged)* **		X	X	
64	Coolant temperature too high***		X		X
72	Fault on cylinder 1 or 2**	X	X		
73	Fault on cylinder 3 or 4**	X	X		
74	Fault on cylinder 5 or 6**	X	X		

* Shut down engine: Operate the engine carefully. Have the fault immediately corrected. Severe engine damage is possible.
** Inform the customer service of the engine manufacturer.
*** Problem must be examined as soon as possible.
**** This flashing code adversely affects the effect of the engine monitoring system
*****With this flashing code the system is only affected under certain ambient conditions, e.g. when starting the engine at low temperatures.

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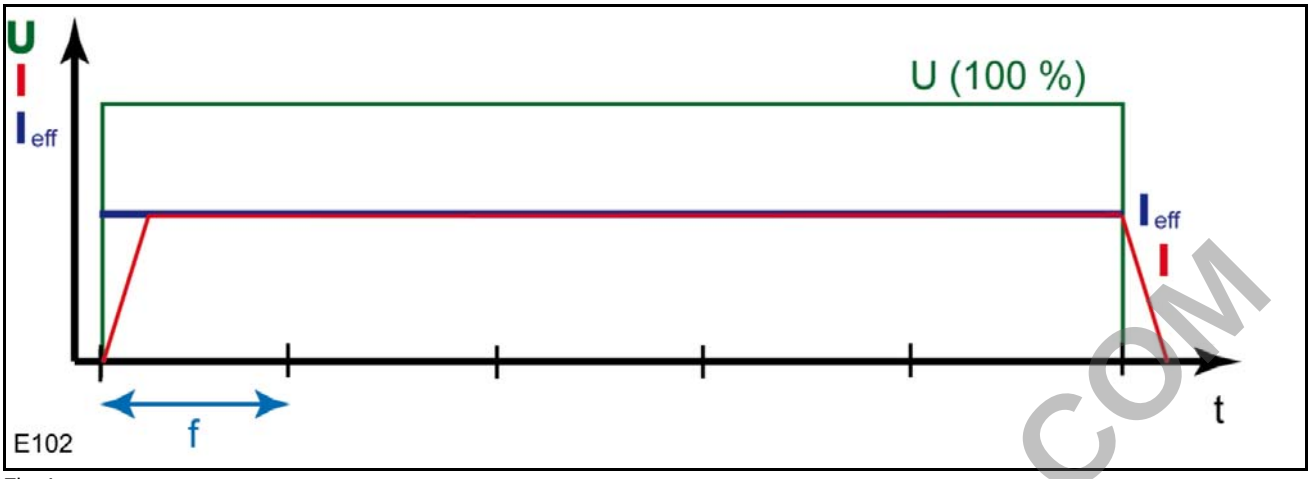


Fig. 1

(Fig. 1) Course of PWM-voltage U and coil current I at 100 % duty cycle The effective coil current Ieff is also 100 %.

What does Dither mean?

When a proportional hydraulic valve is triggered, its spool will not move immediately and at the beginning it will also not move proportionally to the coil current. Due to this "Slip-Stick effect" - a kine of "breakaway torque" - the valve right at the beginning requires a slightly higher current to be able to move the spool out of rest position. The same takes place with any other position change of the valve spool. Especially with very low actuating speeds this effect becomes apparent by jerky movements.

Engineering tackles this problem by subjecting the valve spool to an almost insignificant shuttle movement (the dither). The piston thereby permanently performs a shuttle movement and can therefore not "stick". Even very small position changes now take place without delay, just like a "flying start".

Advantage: The hydraulic cylinder actuated this way can be controlled with a much higher sensitivity.

Disadvantage: With dither the valves becomes noticeably warmer, because the valve spool is permanently in action.

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4.33 Multi-function display (MFD)

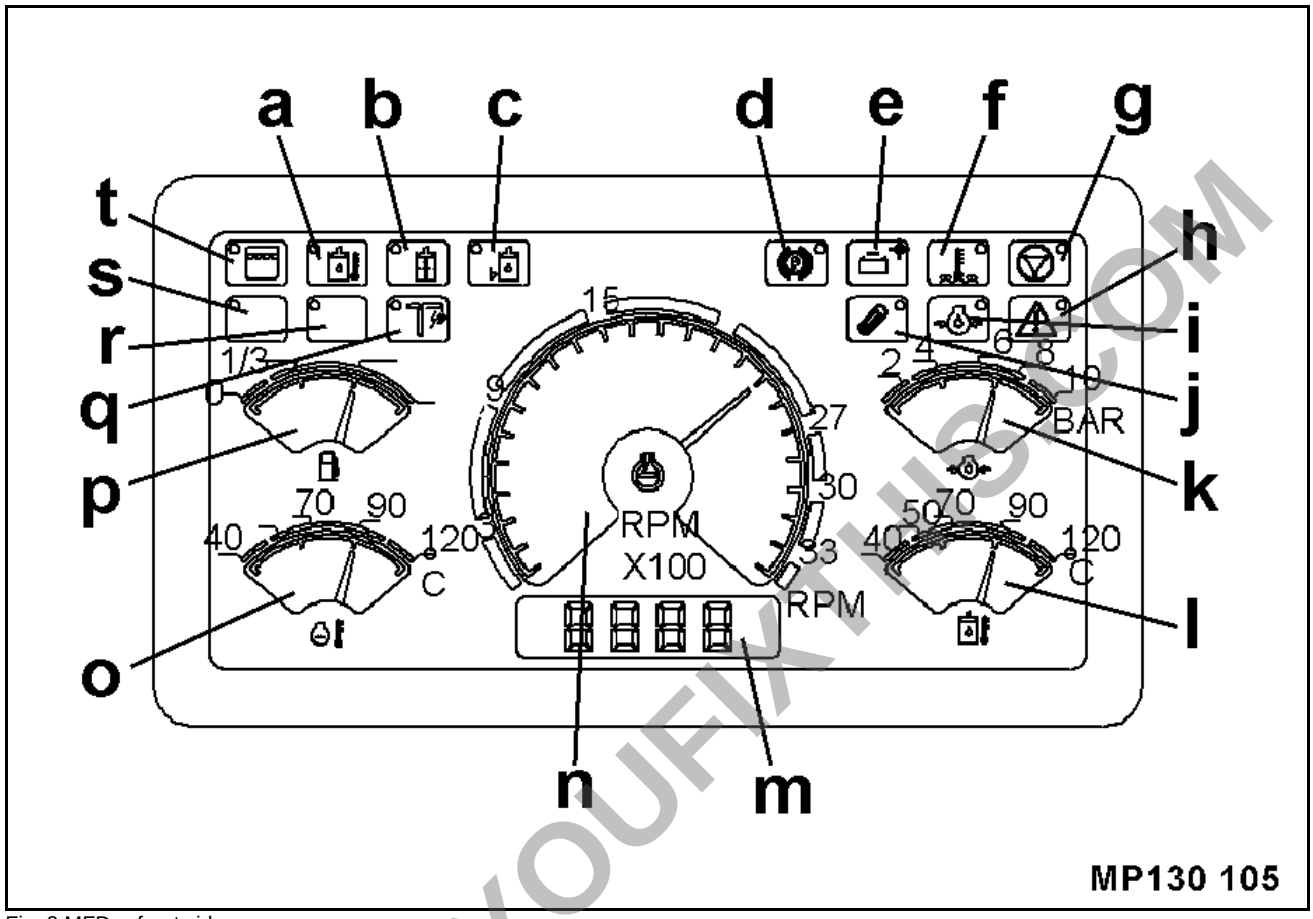


Fig. 9 MFD -- front side

Pos.	Designation
a	Display: Hydraulic oil temperature too high
b	Display: Hydraulic oil filter dirty
c	Display: Hydraulic oil level too low
d	Display: Parking brake closed
e	Display: Battery charge control
f	Warning: Motor temperature too high
g	Display: Emergency steering activated
h	not used
i	Warning: Engine oil pressure too low
j	Display: Combustion air filter dirty
k	Display: Engine oil pressure
l	Display: Hydraulic oil temperature
m	Display: Operating hours
n	Display: Engine speed
o	Display: Coolant temperature
p	Display: Fuel level
q	Display: Scrtaper opened
r	Display: Transport speed selected
s	Display: Working speed selected
t	not used

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4.51 Operating conditions for travel drive

Transport speed forward

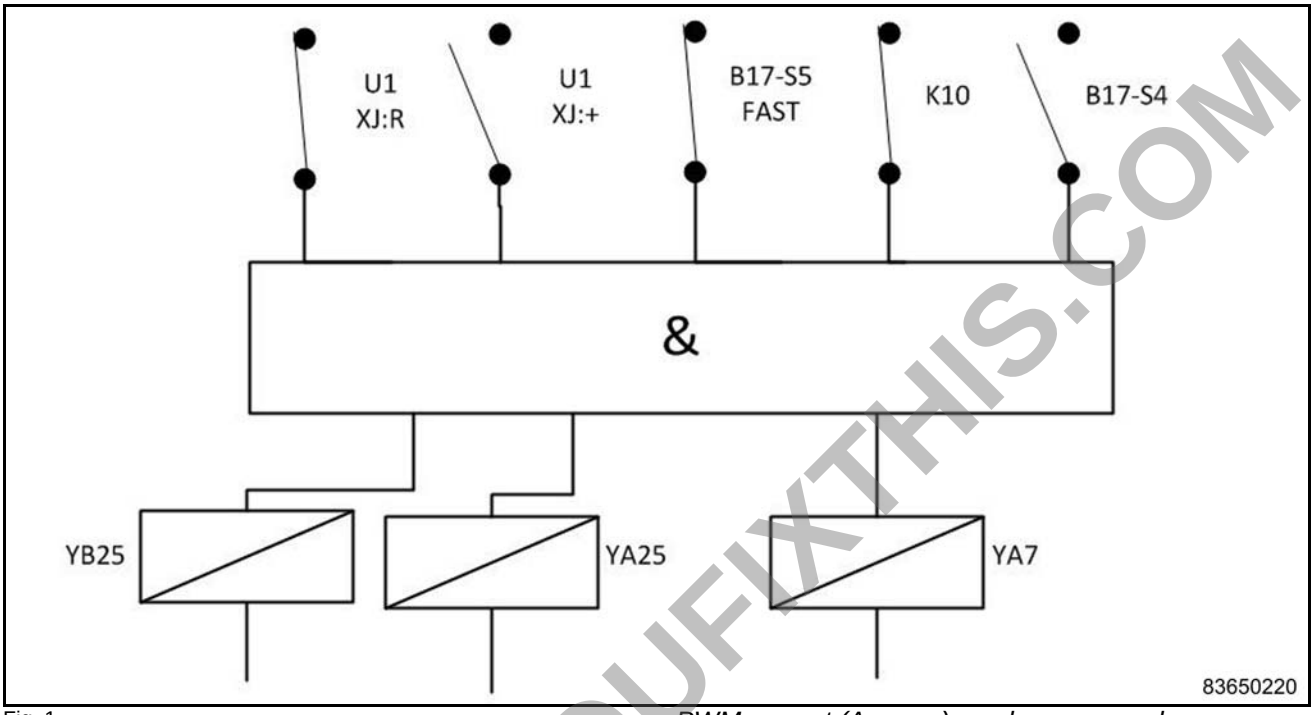


Fig. 1 *PWM current (Ampere) can be measured.*

i Note

The voltage (V) of the rectangular PWM signal cannot be measured.

U1/ XJ:R Joystick	U1/ XJ:+ Joystick	B17-S5 fast	K10	B17-S4	YA25 & YB25
1	0	1	1	0	1

Brake

U1/ XJ:R Joystick	U1/ XJ:+ Joystick	B17-S5 fast	K10	B17-S4	YA7
1	0	1	1	0	1

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5.2 Engine attachment parts

Left engine side

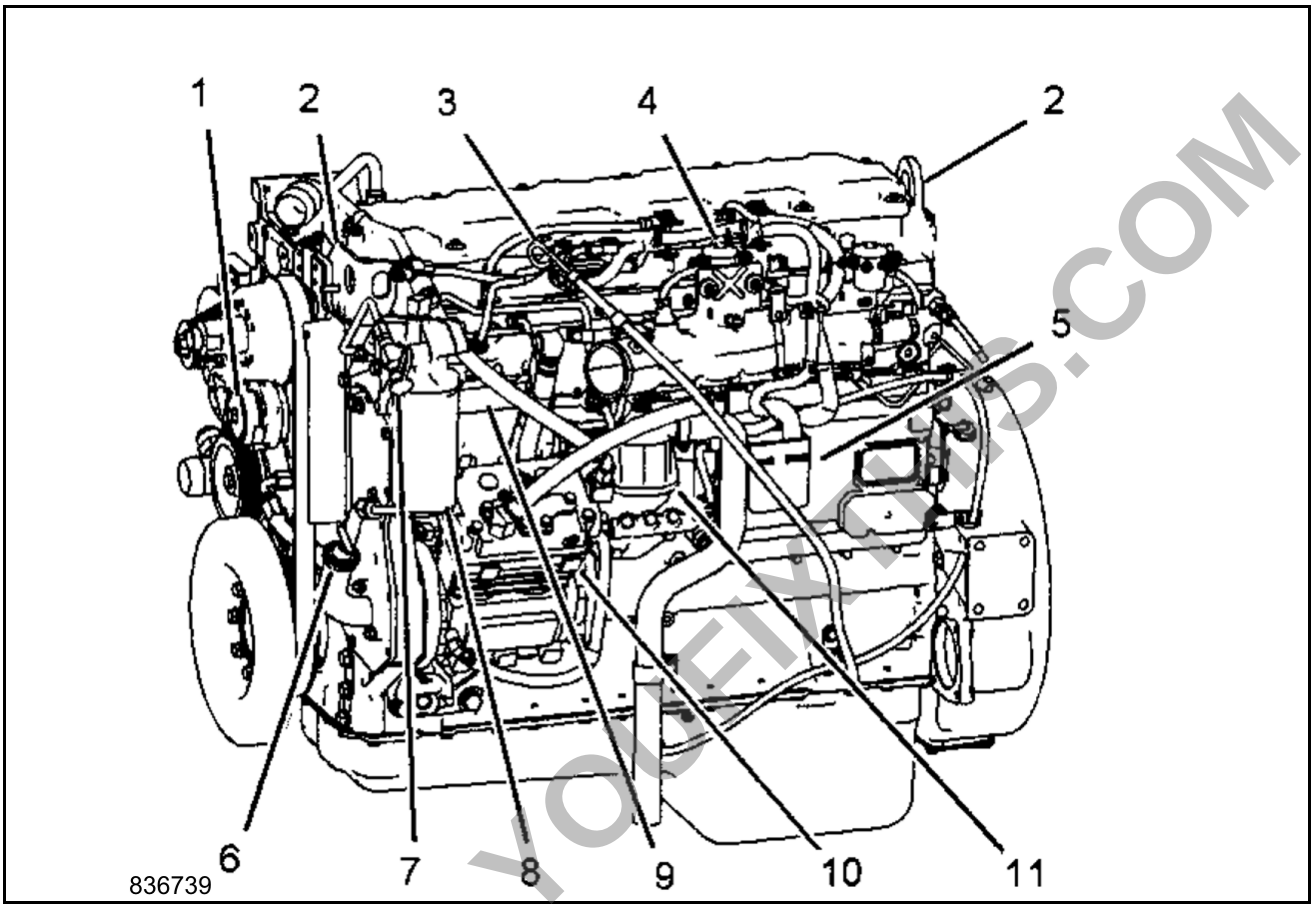


Fig. 3 Engine attachment parts, left

1	V-belt tensioner	7	Fuel injection pump
2	Lifting eyes	8	Fuel filter
3	Engine oil dipstick	9	Pump nozzles, hydraulic pump
4	Relay of the intake air pre-heating system	10	Air compressor
5	**J61Cat (page126)** engine control unit	11	Crankcase ventilation
6	Engine oil filler neck		

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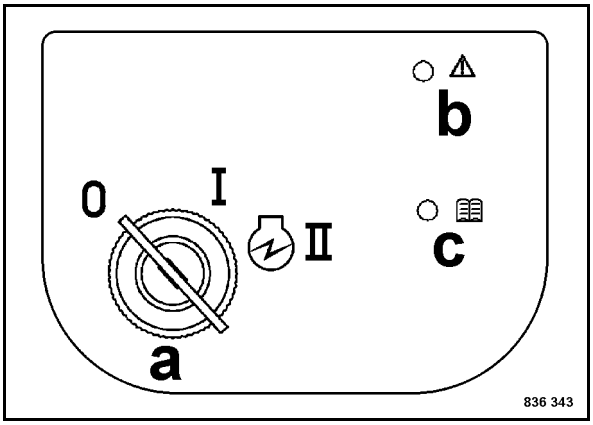


Fig. 6

- Switch the ignition switch a (Fig. 6) to position "0".
- Pull off the ignition key and attach a warning label to the control panel.

⚠ Danger

Life hazard!

Access the space under the machine only with engine and milling drum stopped.

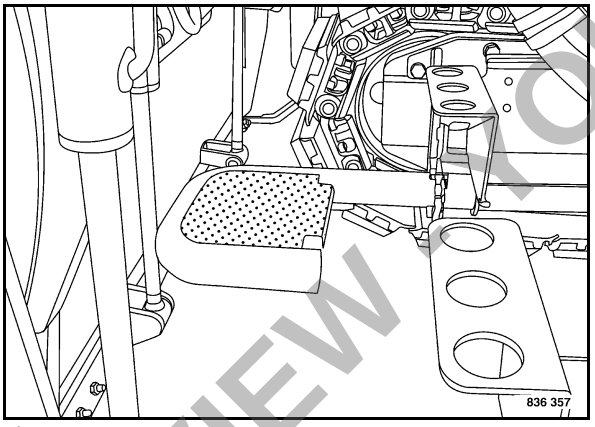


Fig. 7

- Fold out the seat (Fig. 7).

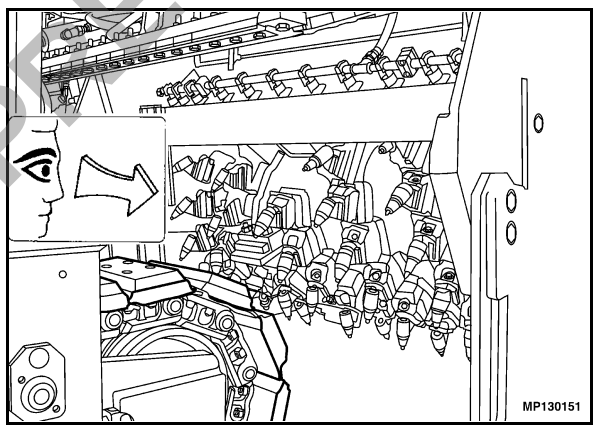


Fig. 8

- Turn the milling drum by hand and check condition and fastening of cutting tools and holders (Fig. 8). Round shank cutting tools must be free to turn in the sleeve.
- If necessary replace the cutting tools, see section "Maintenance as required".

⚠ Caution

Cutting tools with missing hard metal must be replaced immediately.

If cutting tools are not changed in time, milling drum or tool holders may suffer severe damage.

Check the cutting tools

- Rotate the drum by hand and check cutting tools and holders.
- Check whether the cutting tools rotate in their holders.

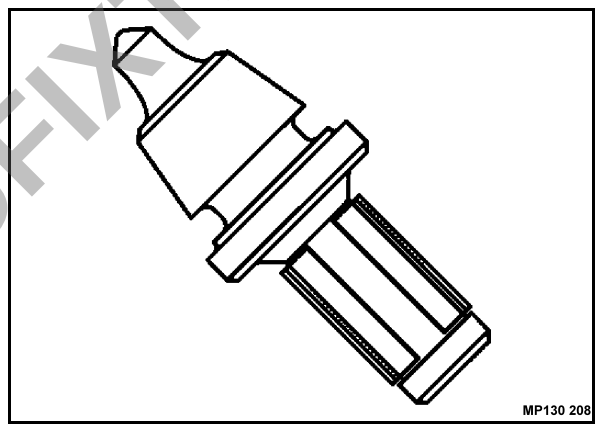


Fig. 9

Cutting tool in good condition (Fig. 9).

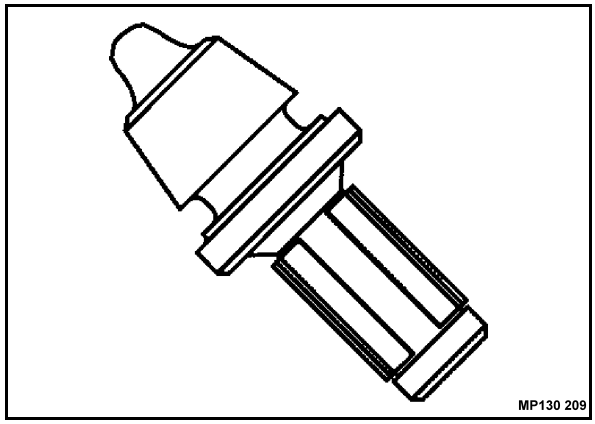


Fig. 10

Cutting tool with even wear (Fig. 10), must be replaced after short term use.

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Arrangement of valves

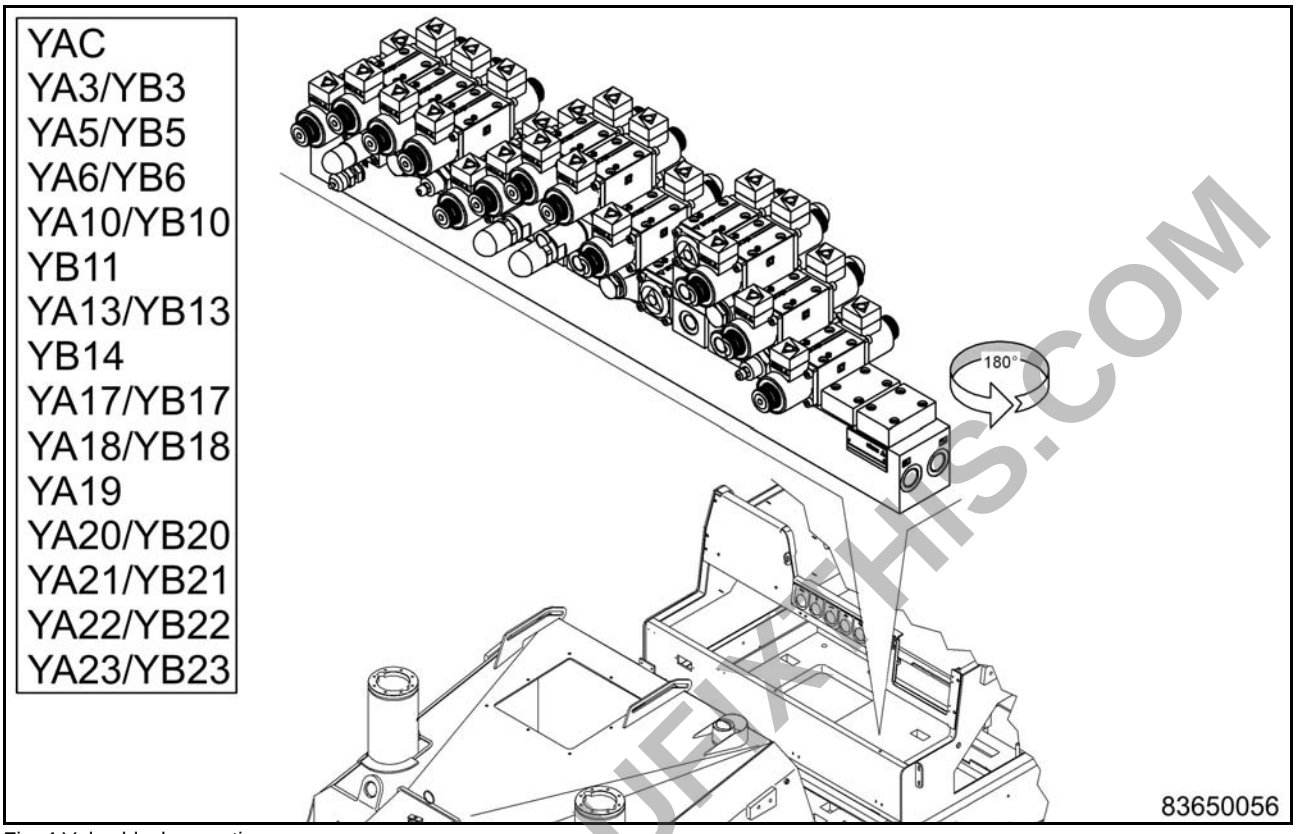


Fig. 4 Valve block operation



Fig. 5 Valves

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Side plates

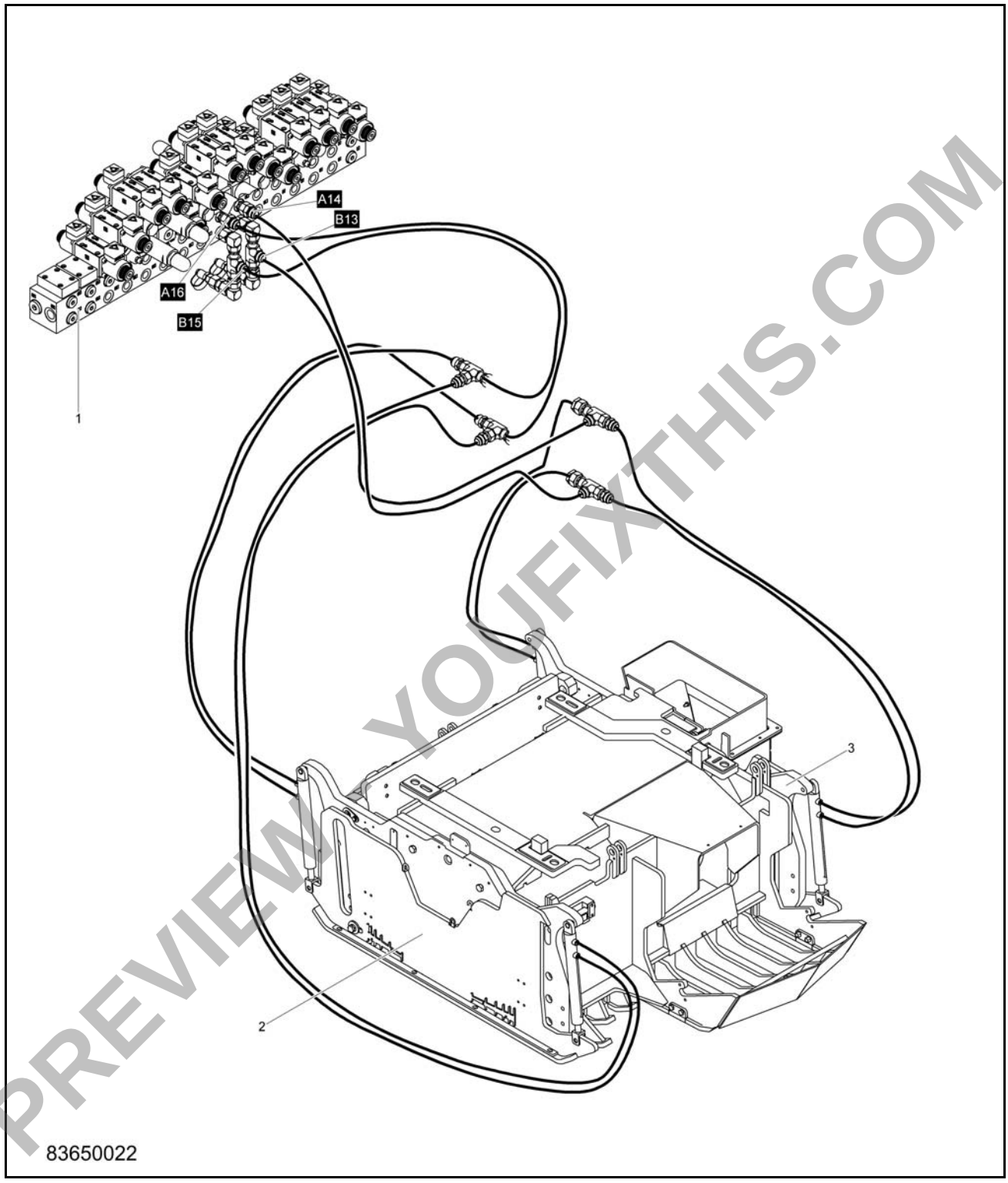


Fig. 55 Side plates - overview

The valve block (1) (Fig. 55) supplies the hydraulic cylinders for the side plates (2), (3) with hydraulic oil.

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T a b e l l e " mechanische Förderstrombegrenzung" (gültig für Anschlag Q_{min} und Q_{max})
L i s t mechanical flow limiter (both stopper max. and min. flow)

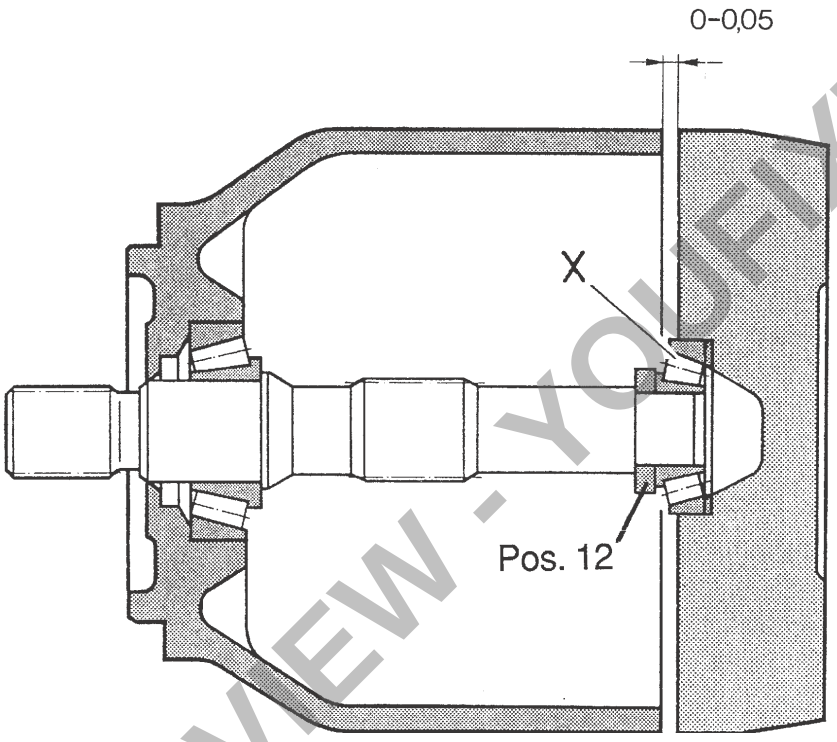
NG / *Size*	18	28	45	71	100*	140*
	1,09	1,58	3,23	4,69	6,16	7,06

Volumenänderung (in cm3) pro Gewindestiftumdrehung / *Differential volume (cm3) if you are rotating the threaded pin - each rotation.*

* mit vorhandenem einstellbaren Anschlag Q_{min} / *mech. stopper min. flow adjustable*

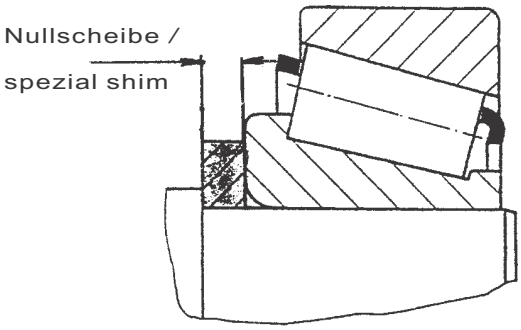
Montage - Abstimmung (Kegelrollenlager) / *taper roller bearing initial tension*

A10VSO Baureihe 31
A10VSO series 31



Hinweis zu den NG 18 und 28/
Note for size 18 and 28:

Die Ausmessung muß mit einer Nullscheibe -Pos. 12- (1,5 ± 0,01 breit) erfolgen, s. u. Einzelheit X. Diese Scheibe wird nach der Messung entnommen. Meßwert, Scheibenstärke der Nullscheibe und erforderliche Vorspannung ergibt die Stärke der Abstimmscheibe (Pos. 12).
The smal pump sizes have to be measured by using a spezial shim -Pos. 12- with its tolerance of 1,5 ± 0,01, see detail X. This shim will be disassembled after the measurement. Measurement, thickness of the spezial shim and necessary pretention all together makes the thickness of the adjustment shim (Pos. 12).



Einzelheit X/ *detail X*

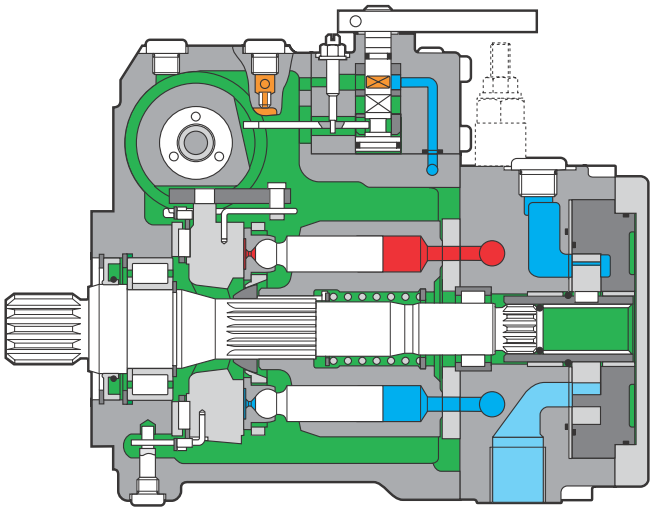
Abstimmung der Triebwerkslagerung
Die Vorspannung der Triebwerkslagerung muß im Gußgehäuse von 0 bis 0,05 mm durch Abschleifen der Abstimmscheibe Pos. 12 hergestellt werden.
Cast iron housing must have initial tension of the bearings : 0.....0,05 mm , grind Pos. 12 if necessary.

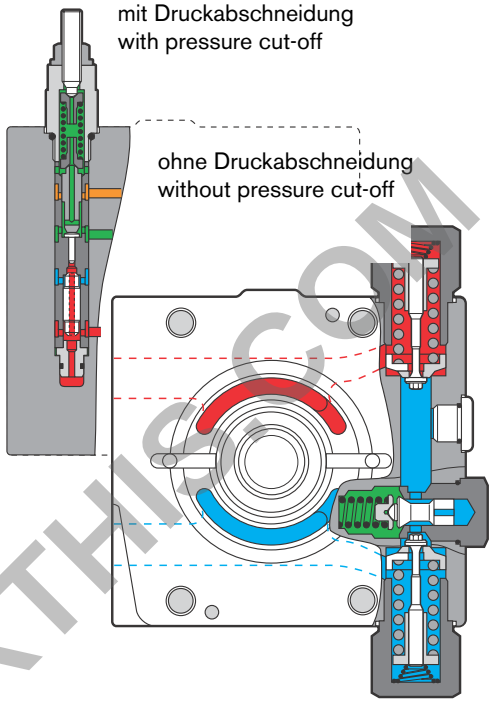
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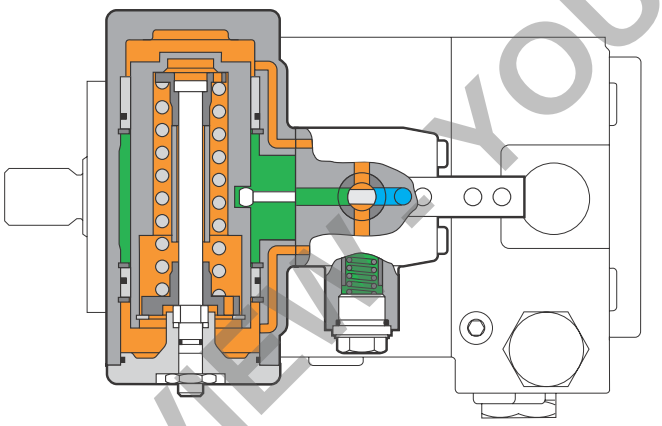
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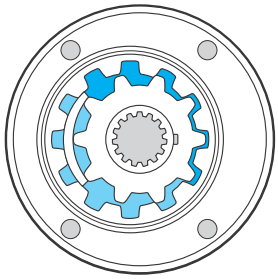
Schnittbild
Sectional view

HW

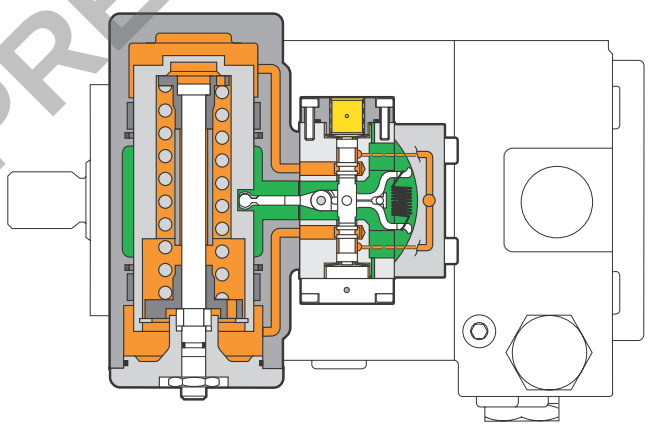




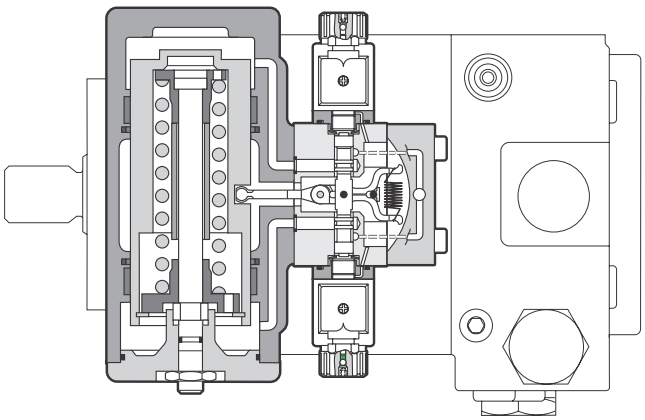




HDD



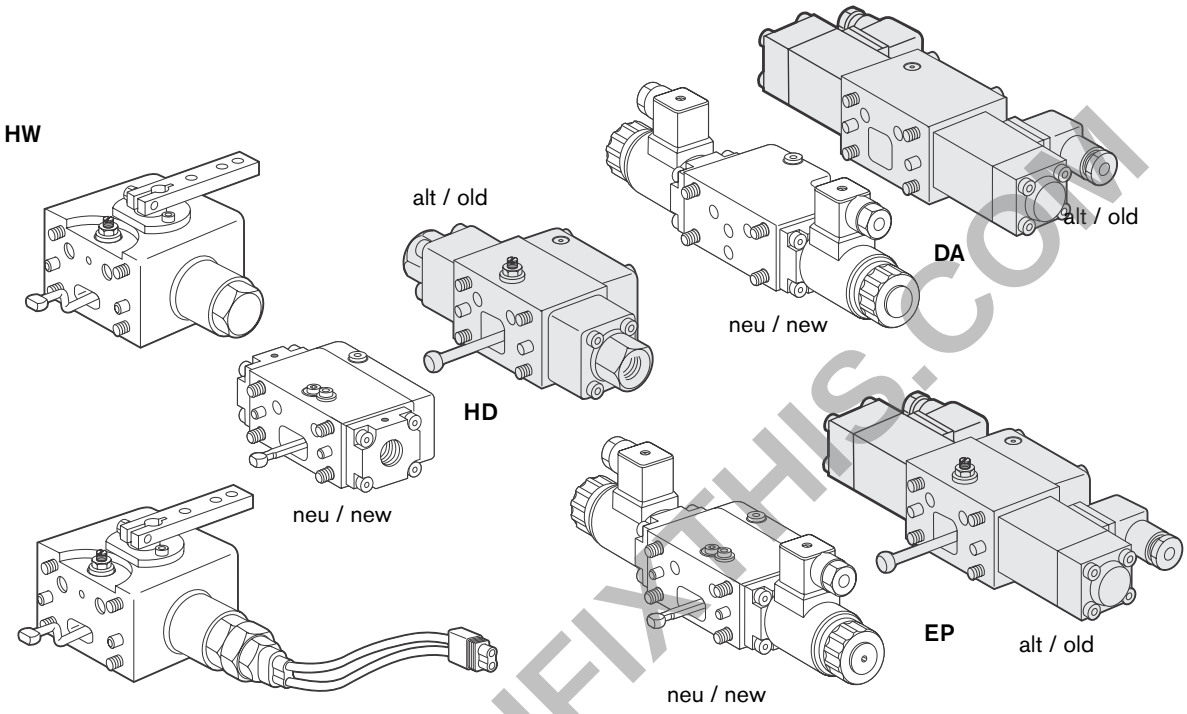
EPD



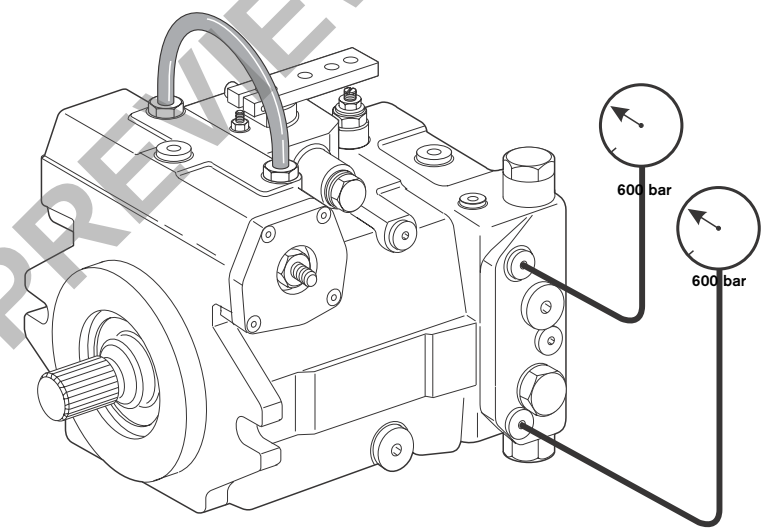
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Einstellhinweise - Mechanische "Nullage"
Adjustment instructions - Mechanical "zero position"



HW mit Nullagenschalter
HW with zero position switch



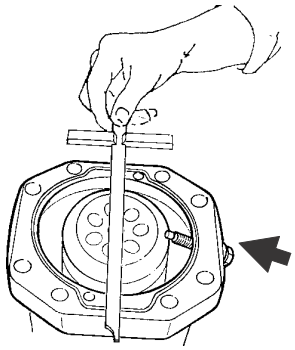
Achtung!
Sicherheitsbestimmungen beachten!
Mit Schlauch NW6 beide Stellkammern verbinden. Vermeidung von Restsignal aus hydraulischer Nullage.
Manometer an M_A und M_B anschließen.
Nullage so einstellen, daß bei blockiertem Antrieb beide Manometer auf gleichem Druckwert stehen.
Hinweis:
Totband der Nullage - vermitteln.

Attention!
Observe safety regulations!
Connect both control chambers with a nominal size 6 hose. Avoidance of residual signals from hydraulic zero position.
Connect pressure gauges to M_A and M_B. Adjust the zero position so that with at blocked drive both pressure gauges indicate the same pressure valve.
Note:
Ascertain the zero position dead band.

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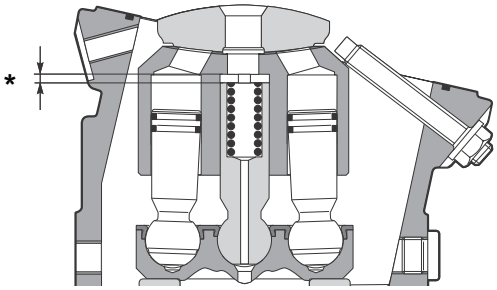
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Triebwerksabstimmung (siehe Serviceinfo)
Rotary group adjustment (see service information)



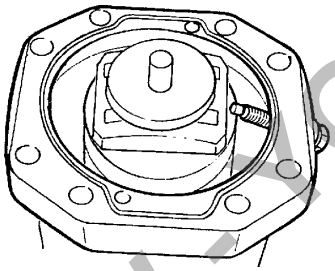
Mit Schraube Zylinderausschwenkung vermitteln.

Determine cylinder swivel range to max. angle with screw.



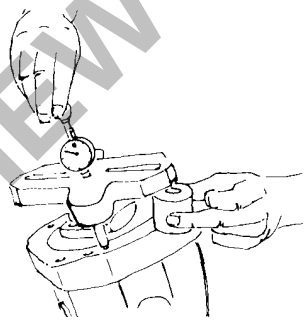
* Scheibe

* Disc



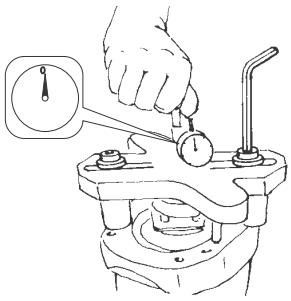
Zentrierscheibe aufsetzen.

Place centering disc.



Meßvorrichtung aufbauen.

Mount measuring device.



Maß X überprüfen.

Check dimension X.

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C.5 Füllmengen und Kontrollen

C.5 Filling and checks

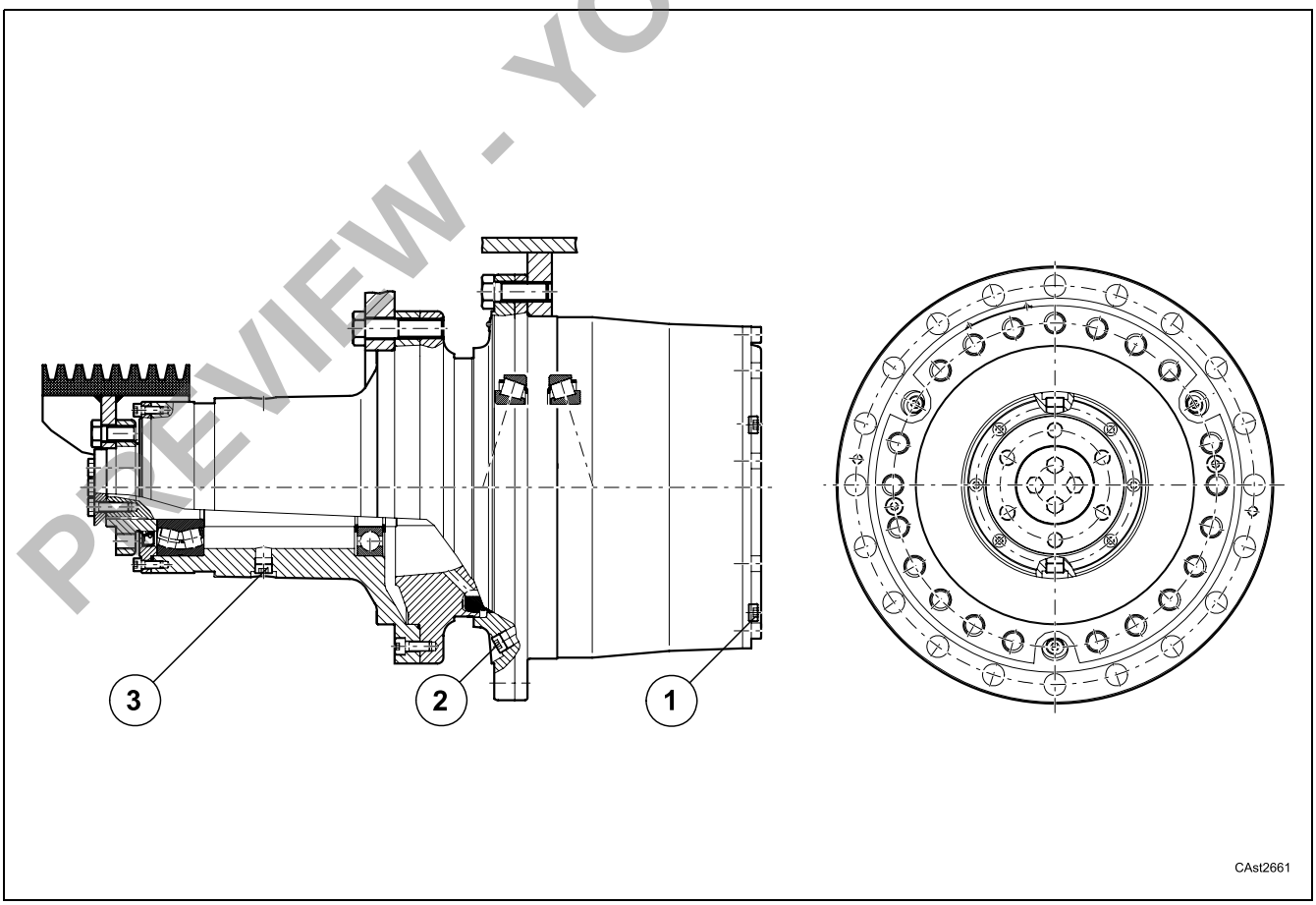
SCHMIERSTELLEN	POSITION / *POSITION*	*LUBRICATION POINTS*
Verschluss Öleinlass- Ablassniveau	**1**	*Oil fill/drain level check plug*
Öl Einlass Verschluss	**2**	*Oil fill plug*
Öl Ablass Verschluss	**3**	*Oil drain plug*

Periodische Kontrollen:

Der Schmiermittelstand des Fahrgetriebes muss genau auf Höhe des Kontrollverschlusses (**3**) stehen. Wenn dies nicht der Fall ist, ist Öl vom gleichen Typ nachzufüllen. Wenn ein Ölverlust oder ein anderer Schaden, der ein Absinken des Ölstandes verursacht, festgestellt wird, ist dieser sofort zu beheben, um mögliche Beschädigungen der mechanischen Teile zu verhindern.
Um das Öl ein- oder abzulassen:
- das Öl durch Verchluss (**1**) und (**2**) ablassen;
- das Öl durch Verschluss (**1**) füllen.

Routine checks:

*If the final drive lubricant should be flush with control plug (**3**). If not, make up level with the same oil.*
If leakage or any other factor determining fall in the oil level is found, then it is advisable to check immediately, in order to avoid damages to the mechanical parts.
Loosen and remove the drain plug for:
*- oil draining plug (**1**) und (**2**);*
*- oil filling plug (**1**).*



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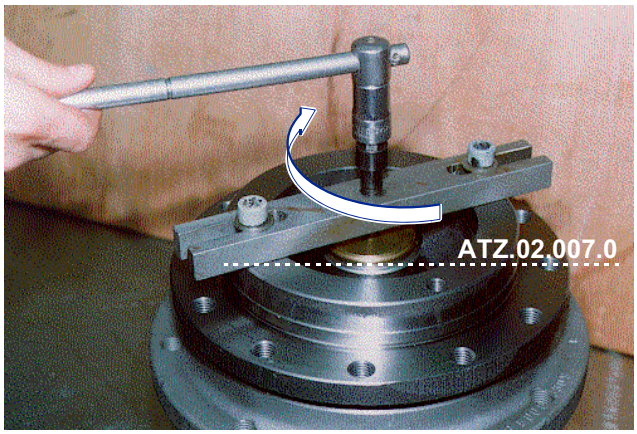
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19.6 Travel gear

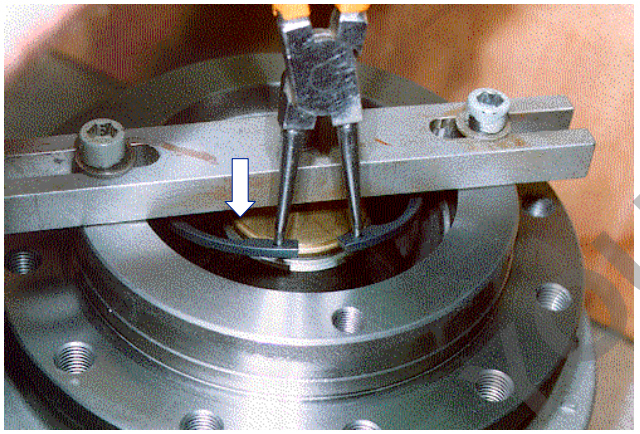
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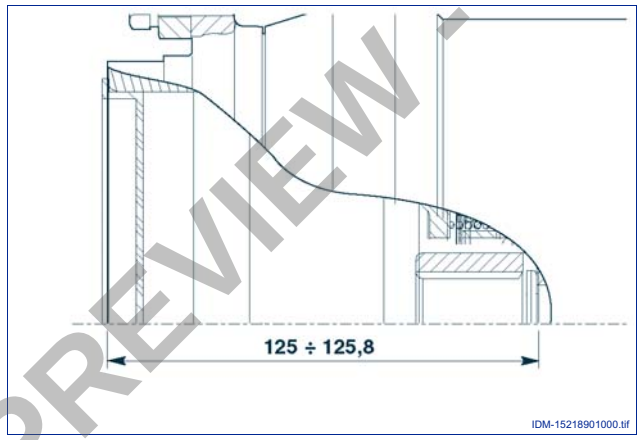
4.7. Fasi di rimontaggio



33. Posizionare l'attrezzatura (ATZ.02.007.0) sul mozzo flangiato (17) ed agire sulla vite fino a contrastare la forza delle molle (26).



34. Servendosi di pinze montare l'anello elastico (28) dalla propria sede nel mozzo flangiato (17).



Informazioni

Prima di montare il motore idraulico, verificare, con un calibro per interni, il corretto assemblaggio del riduttore controllando la quota assiale indicata nel disegno a fianco.

Al termine delle operazioni rimontare il motore idraulico, completo della sua guarnizione O-ring (29), fissandolo al riduttore con le 2 viti M12x35 (30), classe di resistenza 8.8, serrate ad una coppia di 86 Nm.

4.7. Reassembling Method

Place the equipment (ATZ.02.007.0) on the flanged hub (17) and turn the screw until it contrasts the force of the spring (26).

By using pliers insert the circlip (28) from its seat in the flanged hub (17).

Information

Before assembling the hydraulic motor, verify by a depth slide gauge the correct assembly of the unit checking the axial distance as shown in the scheme.

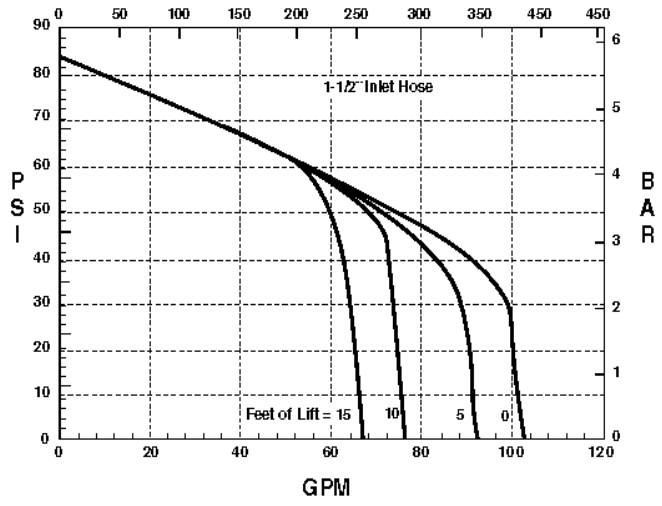
After having reassembled the gearbox, fit the hydraulic motor, being careful to include the O-ring (29), with nos. 2 screws M12x35 (30), grade 8.8, tightened at 86 Nm torque.

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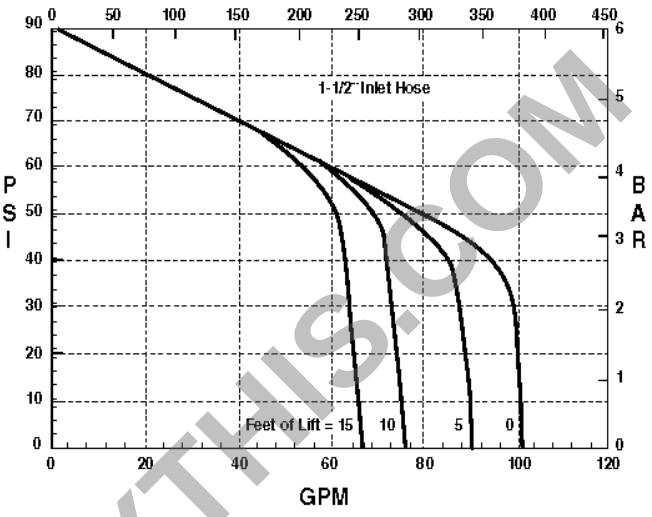
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Performance Graphs

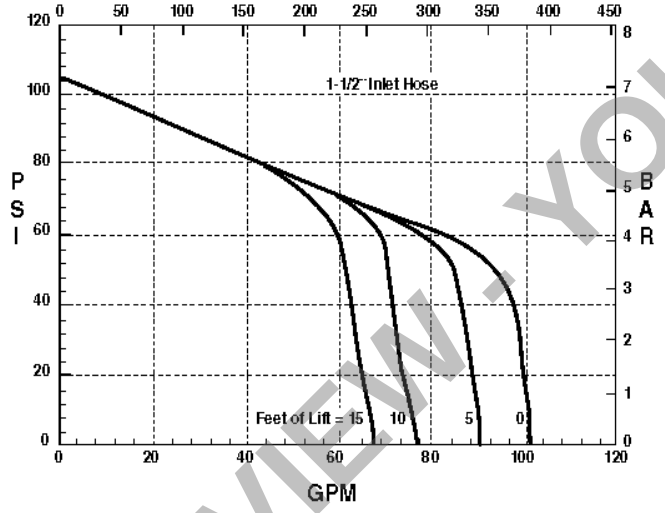
9303C-HM3C-SP Performance at 20 GPM



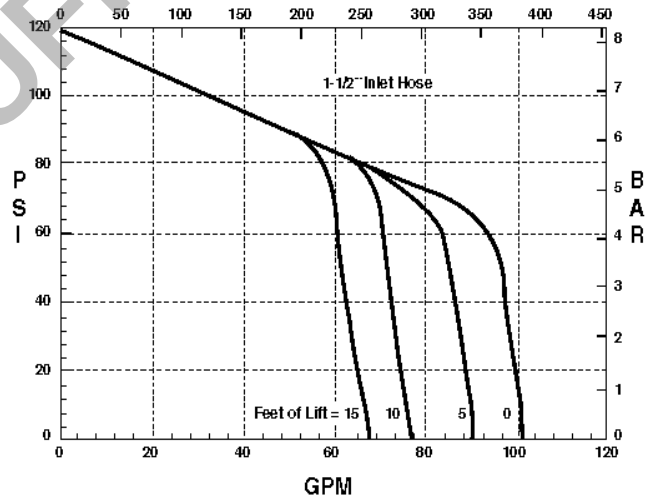
9303C-HM5C-SP Performance at 13 GPM



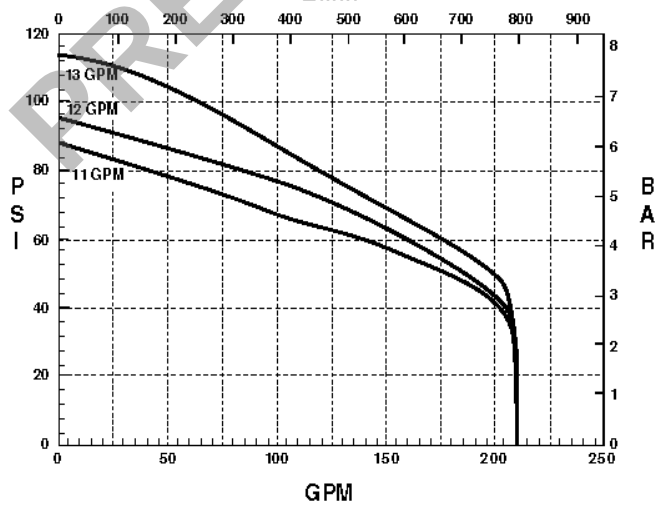
9303C-HM5C-SP Performance at 14 GPM



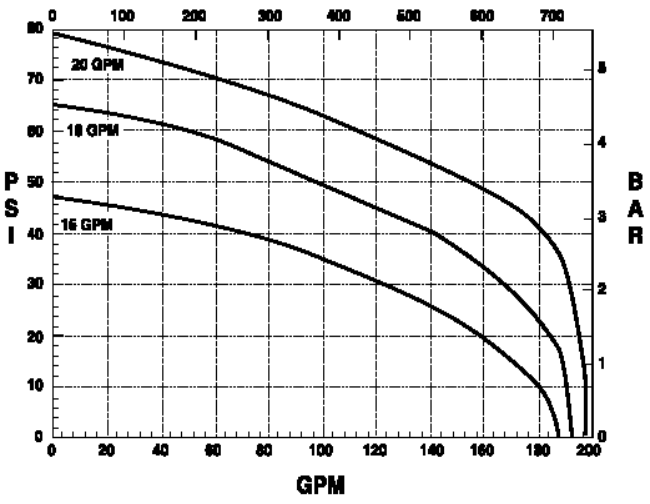
9303C-HM5C-SP Performance at 15 GPM



9304C-HM1C



9304C-HM3C



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2. Technische Daten

Zeichnung **0 593 955 -1/22 67 62**

$T_{ü\ max.}$ ca. **2860** Nm - erforderlicher Öldruck max. **40 bar**

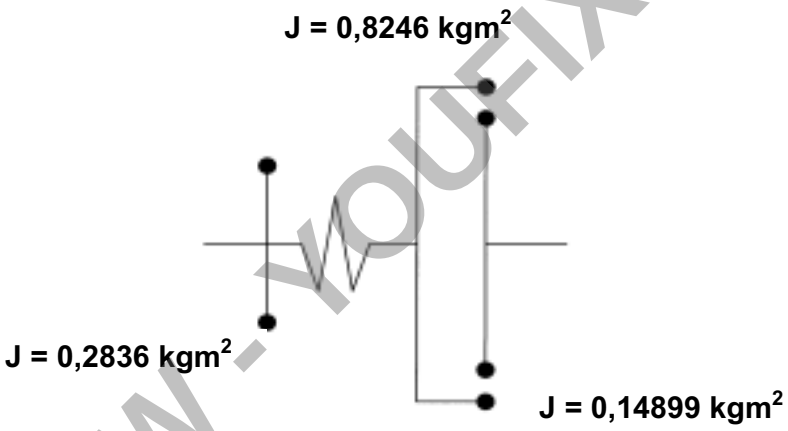
$T_{s\ max.}$ ca. **2175** Nm

max. Drehzahl **2200** min^{-1}

Gesamtlänge **ca. 485** mm - max. Durchmesser **553** mm

Gewicht ges.: **ca. 175** kg

Massenträgheitsmomente:



Schwingungsklausel

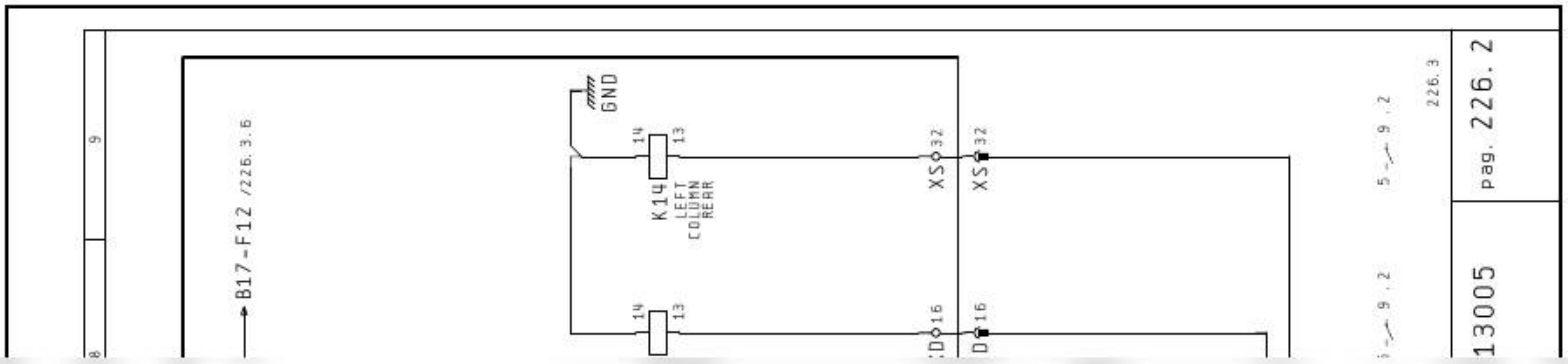
In Maschinen werden Schwingungen und Anregungen erzeugt, die sich ggf. auf unseren Liefergegenstand auswirken.

Da die dynamische Auslegung des gesamten Antriebsstranges, deren Teil unser Liefergegenstand ist, jedoch in Verantwortung des Maschinenherstellers liegt, empfehlen wir, den Antriebsstrang maschinendynamisch zu untersuchen und ggf. Schwingungsrechnungen und/oder -messungen durchzuführen.
Auf Anfrage unterstützen wir Sie gerne gegen separaten Auftrag.

Lediglich vorsorglich weisen wir darauf hin, daß wir für aus Schwingungen und Anregungen resultierende Schäden jeglicher Art keine Gewähr übernehmen, sofern die dynamischen Anforderungen an den Liefergegenstand vom Besteller nicht spezifiziert wurden. Insoweit verweisen wir auf Ziffer VI, 5 sowie Ziffer VI und VII unserer Allgemeinen Geschäftsbedingungen im weiteren.

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