

Lubricant pump P300

AC versions with control PCB V10-V23 P300 with control board assembly instructions



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1. Overview, functional description

1 Pumps without follower plate

1 Reservoir

The lubricant is stored in the reservoir. Depending on the pump version there are different types of reservoirs and reservoir sizes.

1.1 Reservoir lid

Serves to fill the reservoir with suitable clean lubricant and as a protection against contamination of the lubricant.

1.2 Reservoir venting device

It provides air for the reservoir while the pump is operating and lubricant is supplied.

10 Stirring paddle

While the pump operates, the stirring paddle homogenises and smoothens the lubricant. The stirring paddle's lower vertical part pushes the lubricant towards the pump elements thus improving the suction behaviour of the pump.

Overview, functional description of pumps without follower plate



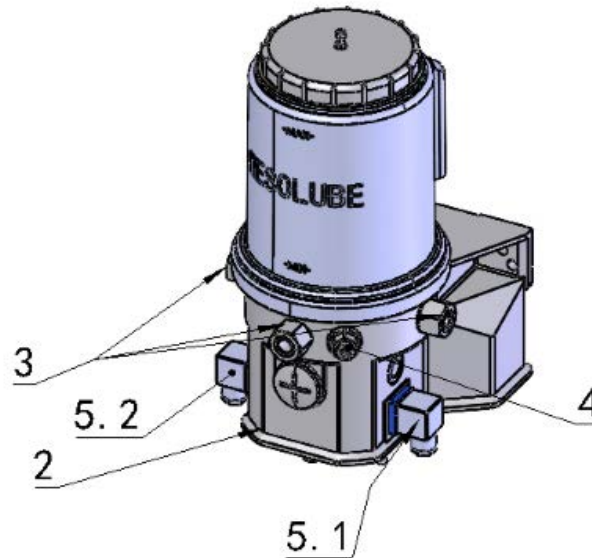
2 Pump housing

The pump housing accommodates the motor, the electrical connections, the filler fitting, the pump elements, the control PCB and, if need be, the intermittent low-level indication.

3 Pump elements

The pump can be equipped with up to 3 pump elements.

Overview, functional description of pumps without follower plate Fig. 2

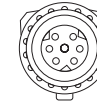


Types of connections

Square plug
DIN EN 175301-803



Bayonet plug
ISO 15170-1



9 Screw cap of control PCB

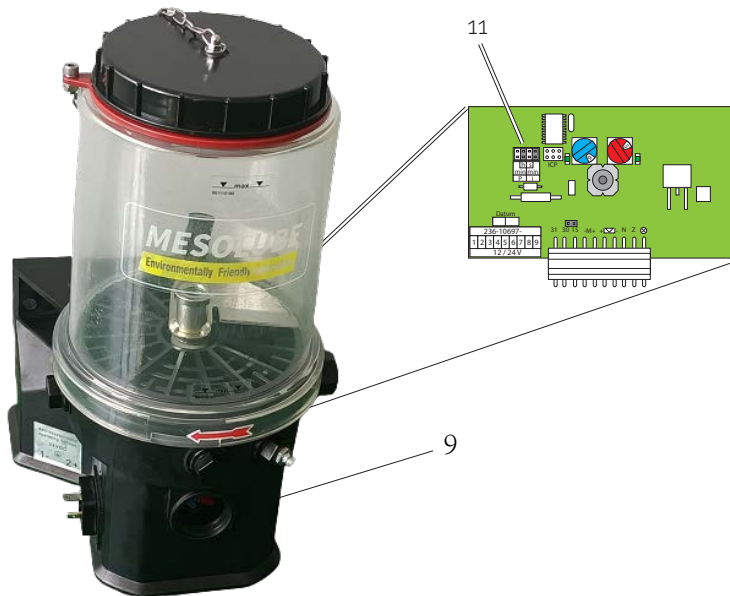
The screw cap (9) allows to see the operating or error states (LED displays on the control PCB).

Remove the screw cap (9) by turning it anti-clockwise to trigger an additional lubrication or to adjust lubrication and pause times on the control PCB. Then tighten the screw cap again by applying the stated tightening torque.

11 Control PCB

The control PCB is seated behind the screw cap. After removing the screw cap it is possible to adjust the lubrication time (jumper) and the pause time (blue rotary switch) or to trigger an additional lubrication (pushbutton). The control PCB is equipped with an EEPROM. Thus the PCB's data are protected against loss.

Overview, functional description of the control PCB Fig. 3



4. Technical data

4.1 General technical data

Operating pressure	max. 350 bar [5076 psi]	Rated voltage	110 - 260 VAC ($\pm 10\%$)
Number of pump elements	max. 3	Frequency	50-60 Hz ($\pm 5\%$) 1-phase
Direction of rotation	clockwise	Recommended back-up fuse	6,0 A slow-blow 110 - 260 V
sound pressure level	< 70 dB (A)	Switch-on current limitation	< 40 A peak (cold start @25 °C / 77 °F)
Nominal speed	20 rpm	Operating voltage of motor	24 V DC
Relative duty cycle ¹⁾	S3 25 ED 120 min	Output (signal)	floating
Ambient temperature ¹⁾	-25 °C to +70 °C [-13 °F to +158 °F]	Max. switching capacity	72 VA
Installation position ²⁾	vertical, i.e. reservoir at top.	Max. switching voltage	30 V DC
Protection type and class	see next page	Max. switching current	700 mA
		Current consumption	typically 1.78 A at 110 VAC up to 0.82 A at 260 VAC
		Weight of the empty pump	
Lubricants ³⁾	<ul style="list-style-type: none"> - Lubrication greases up to and including NLGI 2 - Lubrication oils of at least 40 mm²/s (cST) at ambient temperature - Chisel paste (see chapter Lubricants) 	02 litres, approx. 6.5 kg	[0.53 gal. approx. 14.3 lbs.]
		04 litres, approx. 9.0 kg	[1.06 gal. approx. 19.8 lbs.]
Filling	Depending on the specific pump type via: <ul style="list-style-type: none"> - Filler fitting - Reservoir lid (for reservoirs without follower plate) - Optional filling connection 	08 litres, approx. 10 kg	[2.11 gal. approx. 22.0 lbs.]
		11 litres, approx. 12 kg	[2.90 gal. approx. 26.5 lbs.]
		15 litres, approx. 14 kg	[3.96 gal. approx. 30.9 lbs.]

1) The lower limit of the ambient temperature presupposes the pumpability of the lubricant used at the respective actually existing temperature. The maximum admissible ambient temperature depends on the load and is mainly determined by the runtime and the operating pressure. The stated relative duty cycle refers to lubricants of NLGI 2, an ambient temperature of 60 °C [140 °F] and a medium back pressure of 160 bar on the pump element. In case of temperatures $\geq 60^\circ\text{C}$ and heavy load (higher pressure) the maximum duty cycle should be reduced. 3) Pumps with UL approval may only be operated up to a maximum permissible ambient temperature of +60 °C, regardless of the load.

2) Pumps with follower plate allow for a rotating installation as well, e. g. in wind turbine generators. Maximum speed and maximum distance to the rotation axis on request. For pumps without follower plate and expected inclined position (e.g. In case of construction or agricultural machinery) the following applies:

- The maximum filling must be reduced according to the expected inclined position (< MAX marking).

- The minimum filling must be increased as of an expected inclination of $> 30^\circ$ (> MIN marking), as otherwise a reduced lubricant volume in the suction area of the pump could result in a functional impairment.

3) Observe the limits stated in chapter Limits of use of the intermittent low-level indication.

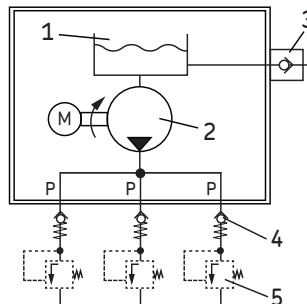
4.2 Protection types and classes

Degree of protection	IP6K9K
Types of protection	
Connection nominal voltage	Protection class 1
Connection of signal line	Protection class 3
- Square plug	SELV / PELV / FELV
- Bayonet plug	SELV / PELV



The specified degree of protection of the pump assumes that IP6K9K-capable connection sockets and corresponding cables are used. When using connection sockets and cables with a lower degree of protection, classification is made according to the lowest degree of protection. For the achievable degrees of protection when using the connection sockets and cables supplied by us, see chapter Spare parts.

4.3 Hydraulic connection diagram



- 1 = Reservoir
- 2 = Pump
- 3 = Filler fitting
- 4 = Check valve
- 5 = Pressure control valve
- P = Pressure line

4.4 Nominal output volumes



In case of pump elements 5, 6, 7 and R, the stated nominal outputs per stroke refer to NLGI 2 lubrication greases, for pump element L they refer to NLGI 0 lubrication greases, at an ambient temperature of + 20 °C [68 °F] and a back pressure of 100 bar [1450 psi] on the pump element. Deviating operating conditions or deviating pump configuration result in a changed motor speed and thus in a change of the output per time unit. If as a consequence of the changed motor speed the output per time unit needs to be adapted, this will be done by adapting the lubrication and pause time settings of the pump.

Pump element	L ⁴⁾	5	6	7	R	B	C ⁵⁾	Unit
Nominal output per stroke	0.03	0.10	0.16	0.22	0.04 / 0.18	0.10	0.24	cc
	[0.0018	[0,006]	[0.0097]	[0.0134]	[0.0024-0.019]	[0,006	[0.0146]	[cu. in.]

4.4.1 Influencing variables on the output volume

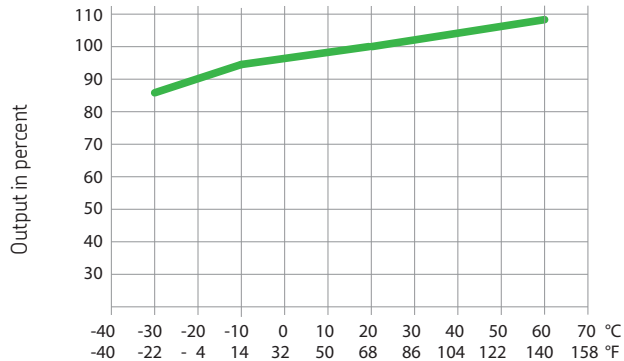
Influencing variables	Increasing the output	Reducing the output
Ambient temperature	> + 20 °C [68 °F]	< + 20 °C [68 °F]
Consistency class of the lubrication grease	< NLGI 2	N/A
Number of pump elements	N/A	> 1
Back pressure at the pump element	< 100 bar [1450 psi]	> 100 bar [1450 psi]

⁴⁾ Pump element L must not be used for pumps with follower plate. With the pump element L, lubricants according to the specifications mentioned in these instructions up to class < NLGI 2 can be pumped without restrictions. For lubricants of class NLGI 2, the suitability of pump element L for pumping from temperatures of -5 °C or lower must be checked in each individual case.

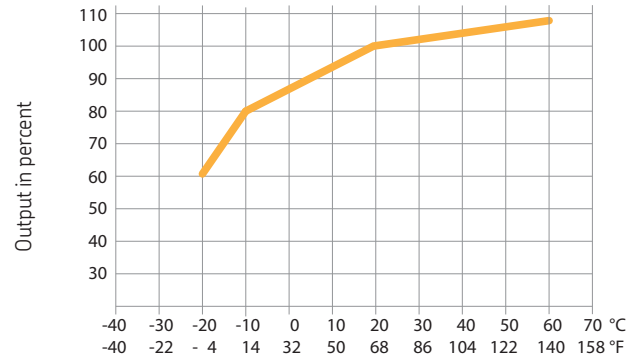
⁵⁾ Pump element C serves to supply exclusively chisel paste. When using chisel paste, observe the corresponding notes in the chapter Lubricants.

4.4.2 Output diagrams of typical NLGI 2 lubricants

Low temperature lubrication grease



High temperature lubrication grease



The output diagrams represent the average value of the different high- respectively low-temperature lubrication greases.

Calculation of the output using the example of a high-temperature lubrication grease

Nominal speed of the pump motor per minute x nominal output of pump element 7 per stroke x efficiency in percent at an assumed ambient temperature of -10 °C [14 °F] = $20\text{ rpm} \times 0.22\text{ cc}$ (0.0134) x 80 % = 3.5 cc/min [0.214 cu.in./min.].

4.5 Functioning principle of the intermittent low-level indication

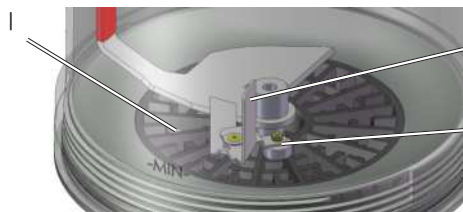
The intermittent low-level indication operates free of contact. Its main components are the following:

- o firmly positioned magnetic switch (I) inside of the reservoir bottom
- o flexible guide plate (II) connected to the stirring paddle with a magnet (III) and a control cam (IV)

If the reservoir is filled with a lubrication grease suitable for the intermittent low-level indication and the pump is operating, then the guide plate (II) is deflected by the resistance of the lubrication grease. As a consequence the magnet (III) connected to the guide plate (II) is moved on its inner circuit and cannot trigger a pulse at the magnetic switch (I) with its magnetic field. A control cam (IV) positively guides the magnet together with the pivoted guide plate towards the outside during each revolution. As soon as the guide plate leaves the control cam, the lubricant's resistance pushes the guide plate together with the magnet to the inside again.

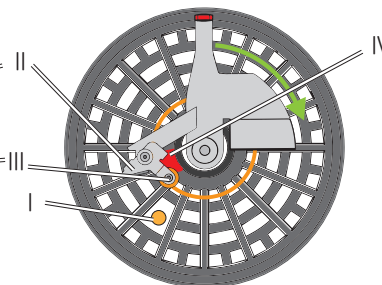
As soon as the lubricant inside the reservoir has fallen to that level that the lubricant's resistance is no more sufficient to further deflect the guide plate (II), the magnet (III) remains on the outer circuit and triggers a pulse each time it slides across the magnetic switch (I). If during an operating cycle the magnet (III) slides across the magnetic switch (I) six times, a low-level signal is sent by the control printed circuit board of the pump. For programming of the external control of the pump, see corresponding chapter in these instructions.

Perspective representation

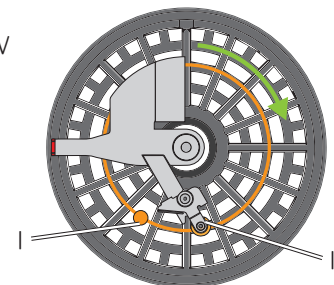


Schematic representation

Magnet on inner circuit



Magnet on outer circuit



4.7 Processing of the low-level signals in case of external controller and monitoring of the pump

The following statements apply to pumps with control printed circuit board type V and for pumps without printed circuit board with external controller and monitoring.

To avoid early low-level indication (e.g. caused by air inclusions or wave formation in the lubricant) in case of external controller or monitoring the following conditions have to be fulfilled by programming the external controller accordingly.

- After each operating cycle the pulses of the intermittent low-level indications have to be deleted.



Pulses must never be added up over several operating cycles. This may result in an early low-level indication.

Operating cycle \geq 32 seconds:

- Each operating cycle requires at least 6 signals by the magnetic switch .

Operating cycle \geq 24 seconds \leq 32 seconds:

- Each operating cycle requires at least 4 signals by the magnetic switch.

Operating cycle \leq 24 seconds:

- The number of required magnetic switch signals has to be adapted to the operating conditions to be expected.
To do so, contact our Customer Service.

4.7.1 Visualization of a low-level indication

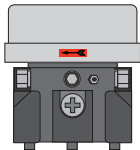

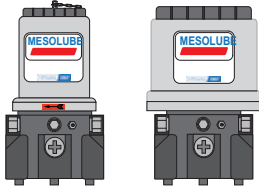


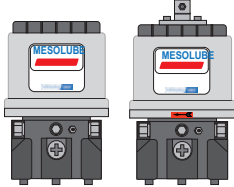
The low-level indication is evaluated externally as shown in the connection diagram.

4.7.2 Remaining run time of pump in case of a low-level indication

The owner has to ensure that the pump is stopped by the external control unit latest 4 minutes after a low-level-indication has been detected (4 pulses).

4.8 Reservoir variants

In the following you find the possible reservoir variants of the pumps described in these instructions (also see type identification code). For a better representation only the smallest possible reservoir size will be depicted always. In the figures the different reservoir variants may not always be distinguishable visually, as the differences are located in the interior construction (e.g. with and without low level indication).
(✓ = available reservoir sizes)

XNFL						XN / XL / XC ¹⁹⁾					XNBO / XLBO / XCBO					XNBA / XLBA / YLBA ²⁰⁾															
litre	2*	4	8	11	15	2	4*	8*	11*	15*	2	4*	8*	11*	15*	2	4*	8*	11*	15*											
gal.	00:53	01:06	02:11	2.9	3.96	00:53	01:06	02:11	2.9	3.96	00:53	01:06	02:11	2.9	3.96	00:53	01:06	02:11	2.9	3.96											
	✓					✓	✓	✓		✓	✓	✓	✓	✓	✓		✓														
																															
XBF / XPF ²¹⁾						YNBO / YLBO																									
litre	2	4*	8*	11*	15*	2	4*	8*	11*	15*																					
gal.	00:53	01:06	02:11	2.9	3.96	00:53	01:06	02:11	2.9	3.96																					
		✓	✓	✓	✓	✓	✓	✓		✓																					
																															

* These reservoir sizes require an adapter 226-14105-5, if a pressure control valve shall be mounted into the pump element.

¹⁹⁾ Reservoir XC is not available as 15-l version.

²⁰⁾ Reservoir YLBA is available as 8-l version only.

²¹⁾ Reservoir XPF is available as 8- and 15-l version only.

4.10 Lubricant requirement for priming of an empty pump

To prime an empty pump up to the MAX marking of the reservoir, the following lubricant quantities are required.

Nominal volume Litres / [gal.]		2 [0.53]	4 [1.06]	8 [2.11]	11 [2.90]	15 [3.96]
required lubricant quantity	litre	3.8 ± 0.25	5.8 ± 0.25	9.15 ± 0.25	12.1 ± 0.25	17.5 ± 0.25
	[gal.]	$[1 \pm 0.07]$	$[1.53 \pm 0.07]$	$[2.41 \pm 0.07]$	$[3.20 \pm 0.07]$	$[4.62 \pm 0.07]$



The deviation between the lubricant quantity required for priming and the nominal volume of the reservoir results from the filling of the pump housing up to the MIN marking of the reservoir.

4.12 Factory settings of the lubrication and pause times of pumps with control PCB V10-V23

Printed circuit board	Pause time / lubrication time	Time value	Rotary switch	Position	Printed circuit board	Pause time / lubrication time	Time value	Rotary switch	Position
V10/V20	Pause time	6 hrs	blue	6	V12/V22	Pause time	24 min	blue	6
	Lubrication time	6 min	red	3		Lubrication time	6 min	red	3
V11/V21	Pause time	6 hrs	blue	6	V13/V23	Pause time	24 min	blue	6
	Lubrication time	24 s	red	3		Lubrication time	24 s	red	3

4.13 Possible settings of the lubrication and pause times of pumps with control PCB V10-V23

Position of the rotary switch (blue)	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Pause time in minutes ⁹⁾	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
Pause time in hours ⁹⁾	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Position of the rotary switch (red)	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Lubrication time in seconds ⁹⁾	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
Lubrication time in minutes ⁹⁾	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30

⁹⁾ Time values for pause and lubrication times are factory-set via the rotary switches and jumpers on the control PCB. The positions of the jumpers must not be changed by the owner.



Reference to the "0" position of the rotary switches

Never turn the rotary switches in the "0" position. This position is intended exclusively for the owner's purposes. In the "0" position the pump operates with the factory settings and a fault is indicated by the control PCB's right LED.

4.14 Type identification code

The type identification code facilitates selection/ identification of important features of the product. For the type identification code of the respective product, see the type identification plate on the pump.

P	3	0	0	X	U	-	1	1	X	L	B	0	-	6	0	0	-	A	C	-	D	1	7	G	0	0	0	0	-	V	1	3	A	+	-	-	-	-	Example
	A			B	C		D			E				F				G			H	K	H	K	H	K	H	K		L		M					N	Category	
														1	2	3					X1	X2	X3	X4															Position

A Product designation¹⁰⁾
P300
B Corrosion protection classes¹⁰⁾
_ = C3 Term of protection ≥ 15 years ¹¹⁾
X = C5-M Term of protection ≥ 15 years ¹¹⁾
C Conformity¹⁰⁾
_ = CE/UKCA
U = CE/UKCA + UL/CSA approvals
D Reservoir sizes¹⁰⁾
2 = 2 l 00:53 gal.
4 = 4 l 01:06 gal.
8 = 8 l 02:11 gal.
11 = 11 l 2.90 gal.
15 = 15 l 3.96 gal.

¹⁰⁾ From these categories only one feature can be selected at a time.

¹¹⁾ The duration of the corrosion protection does not stand for the warranty period

C5-M versions cannot be combined with pump elements L, R, B and C.

¹²⁾ Reservoirs for oil cannot be combined with features B and C from category (F), nor with features A and S from category (M).

E Reservoir versions¹⁰⁾
XN = Lubrication grease without low-level indication
XL = Lubrication grease with intermittent low-level indication (NO)
XC = Lubrication grease with intermittent low-level indication (NC)
XNFL = Lubrication grease without low-level indication (flat reservoir)
XNBO = Lubrication grease without low-level indication with reservoir lid
XLBO = Lubrication grease with intermittent low-level indication (NO) and reservoir lid
XNBA = Lubrication grease without low-level indication with lockable reservoir lid
XLBA = Lubrication grease with intermittent low-level indication (NO) and lockable reservoir lid
XBF = Lubrication grease with follower plate, high- and low-level indication
XPF = Lubrication grease with follower plate, high- and low-level indication and pre-warning
XCBO = Lubrication grease with intermittent low-level indication (NC) and reservoir lid
YNBO ¹²⁾ = Lubrication oil without low-level indication with reservoir lid
YLBO ¹²⁾ = Lubrication oil with float magnetic switch, low-level indication and reservoir lid
YLBA ¹²⁾ = Lubrication oil with float magnetic switch, low-level indication and lockable reservoir lid

P	2	0	3	X	U	-	1	1	X	L	B	0	-	6	0	0	-	A	C	-	D	1	7	G	0	0	0	0	-	V	1	3	A	+	-	-	-	Example
A				B C		D		E			F			G		H K		H K		H K		H K		L		M		N			Category							
													1	2	3	X1				X2	X3	X4	Position															

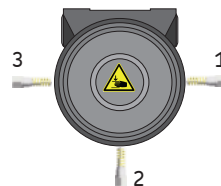
F | Pump elements¹³⁾

0	=	without pump element	Output volume of pump elements, see chapter Nominal output volume
L	=	Piston Ø 5 mm (0.20 in)	
5	=	Piston Ø 5 mm (0.20 in)	
6	=	Piston Ø 6 mm (0.23 in)	
7	=	Piston Ø 7 mm (0.28 in)	
R	=	Piston Ø 7 mm (0.28 in) adjustable output	
B	=	Piston Ø 7 mm (0.28 in) with bypass	
C	=	Piston Ø 7 mm (0.28 in) for chisel paste	
Thread: Connection M22x1.5 Outlet G1/4			

G | Rated voltage¹⁰⁾

AC	=	110-260 VAC
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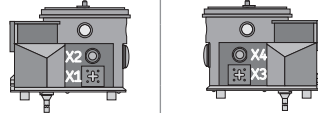
Positions of the pump elements in the type identification code



If only 2 pump elements are required, these should be positioned oppositely to one another (positions 1 and 3).

¹³⁾ From these categories there is always required a multiple selection with indication of the position.

P	2	0	3	X	U	-	1	1	X	L	B	0	-	6	0	0	-	A	C	-	D	1	7	G	0	0	0	0	-	V	1	3	A	+	-	-	-	Example
A				B C		D		E				F				G		H K		H K		H K		H K		L		M		N				Category				
												1	2	3					X1	X2	X3	X4					Position											

H Connections types on the pump ¹³⁾	Possible positions of the connection types on the pump						
	Left	Right side:	X1	X2	X3	X4	
0 = No connection to the pump			D	7	0	0	
D = Square plug for voltage supply			D	0	F	0	
7 = Bayonet plug 7/6 poles			D	0	G	0	
F = Square plug control PCB / Indication (without low-level indication)							
G = Square plug - magnetic switch / low-level indication	Example out of the above type identification code: X1 is the position of the square plug (D). X2 is the position of the bayonet plug (7).						
K Connection material ¹³⁾	Connection material suitable for connection type						
0 = Without connection material							
1 = Only connection socket (black)			D				
2 = Only connection socket (grey)			F	G			
A = Connection socket (black) with moulded cable 10 m [33 ft]			D				
B = Connection socket (grey) with moulded cable 10 m [33 ft]			F	G			
G = Bayonet socket 7/7-wire with cable 10 m [33 ft]			7				

Connection material is delivered loosely together with the pump

¹³⁾ From these categories there is always required a multiple selection with indication of the position.

P	2	0	3	X	U	-	1	1	X	L	B	0	-	6	0	0	-	A	C	-	D	1	7	G	0	0	0	0	-	V	1	3	A	+	-	-	-	Example
A				B C		D			E			F			G			H K		H K		H K		H K		L			M		N			Category				
												1	2	3							X1	X2	X3	X4							Position							

L | Control PCB and factory setting¹⁰⁾

V10	=	Terminals 15/30 bridged; pause time = 6 h lubrication time = 6 min
V11	=	Terminals 15/30 bridged; pause time = 6 h lubrication time = 24 sec
V12	=	Terminals 15/30 bridged; pause time = 24 min lubrication time = 6 min
V13	=	Terminals 15/30 bridged; pause time = 24 min lubrication time = 24 sec
V20	=	Pause time = 6 h lubrication time = 6 min
V21	=	Pause time = 6 h lubrication time = 24 sec
V22	=	Pause time = 24 min lubrication time = 24 sec
V23	=	Pause time = 24 min lubrication time = 24 sec

M | Lubrication greases¹⁰⁾

A ¹⁵⁾	=	Pump factory-filled with Fuchs Renocal FN 745
S ¹⁶⁾	=	Pump factory-filled with lubricant as specified by customer
Z	=	w/o lubrication grease

N | additional indications¹⁰⁾

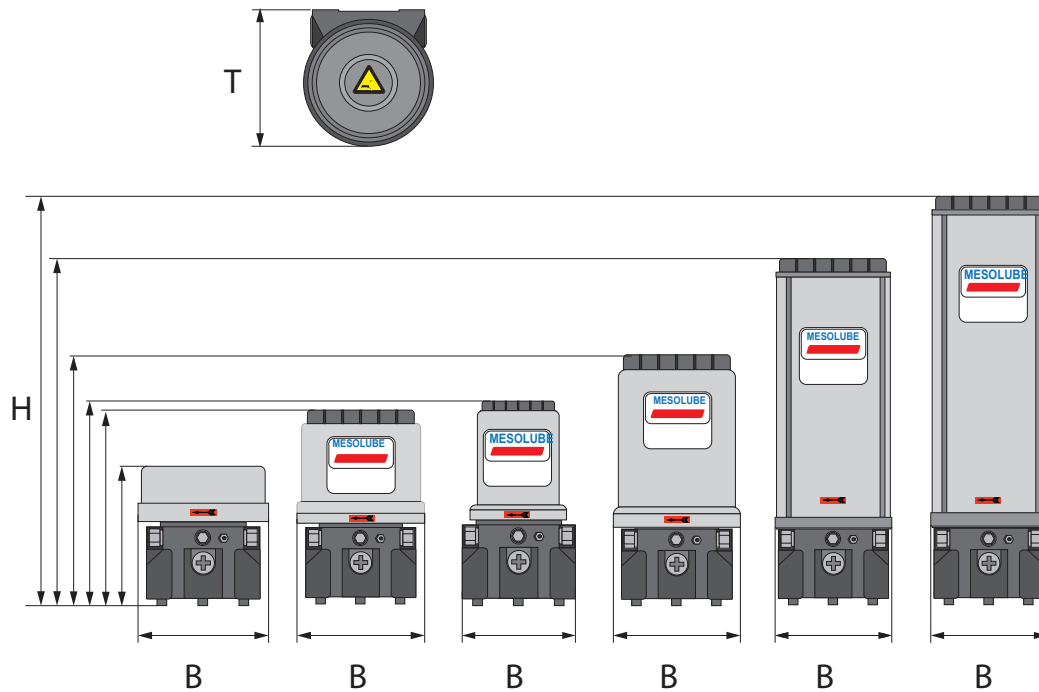
+ZUB	=	Accessories not specified by the type identification code
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Observe the note regarding "Terminals 15/30 bridged" in chapter "Changing the lubrication and pause times via jumper setting".

¹⁵⁾ Pumps are filled with the following grease quantities. Pump without follower plate; 2L reservoir approx. 750 g [27 fl.oz.] ≥ 4L reservoir approx. 1500 g [54 fl.oz.]; pump with follower plate: approx. 2250 g [81 fl.oz.].

¹⁶⁾ Observe the restrictions regarding CLP / GHS in chapter Safety instructions as well as the lubricant specifications indicated in chapter Technical Data.

Minimum assembly dimensions Fig. 6



6.3.2 Installation bores

NOTICE

Risk of damage to the superior machine and to the pump

Drill the mounting bores on non-load-bearing parts of the superior machine only. Fastening must not be done on two parts moving against one another (e. g. machine bed and machine assembly). When assembling pumps with 11l [2.9 gal.] or 15l [3.96 gal.] reservoirs the flatness of the upper and the lower mounting surfaces may deviate by a maximum of 1 mm [0.039 in.] from each other.

Fastening is done by means of:

2 resp. 3 screws	M8 (8.8)
2 resp. 3 hexagon nuts	M8 (8.8)
2 resp. 3 washers	8

Tightening torque = 18 Nm \pm 1.0 Nm
[13.27 ft.lb. \pm 0.74 ft.lb.]

Diameter of bores in the pump housing = \varnothing 9 mm [0.35 in.]

Pumps with 2 l [0.53 gal.] reservoir

Are fixed at the two lower fastening points (A) or (B) of the pump housing.

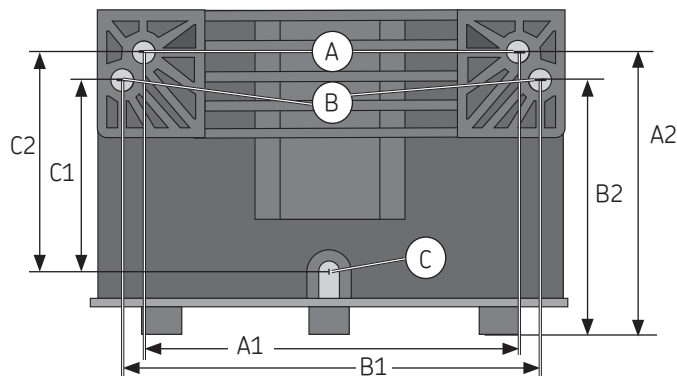
A1	=	162 mm	[6.38 in.]
B1	=	180 mm	[7.09 in.]
A2	=	124 mm	[4.88 in.]
B2	=	112 mm	[4.41 in.]

Pumps 2l Flat [0.53gal.], 4l [1.06gal.], 8 l [2.11 gal.], 11l [2.90 gal.] and 15l [3.96 gal.] reservoir

Are fixed at the three lower fastening points (A) or (B) and (C) of the pump housing.

C1	=	83 mm	[3.27 in.]
C2	=	95 mm	[3.74 in.]

Fastening points at the P203 pump housing Fig. 7



6.4 Electrical connection

WARNING



Electric shock

Make sure to disconnect the product from the power supply before carrying out any works on electrical components.

Carry out the electrical connection according to the connection type of the pump,

- Tailor the line for the power supply (5.1) according to the respective connection diagram in these instructions or use pre-fabricated cable (see type identification code)
- Insert bushing into corresponding plug and tighten respectively in case of square plugs tighten with its screw. Only be doing so the degree of protection can be complied with



Connect the line in such way that no mechanical forces are transferred to the product.



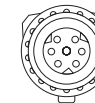
Electrical connection, Fig. 9

Types of connections

Square plug
DIN EN 175301-803



Bayonet plug
ISO 15170-1



6.5 Adjusting the output volume on the pump element R



The output of pump element R can be adjusted only while the pump is idle. Factory setting is full supply, i.e. The adjusting measure is $S = 29 \text{ mm}$ [1.14 in.].

To set the output volume proceed as follows:

- Loosen the counter nut (3.2)
- Adjust the output volume by screwing the spindle (3.3) to the indicated measure according to the table on the right

↺ = lower output volume

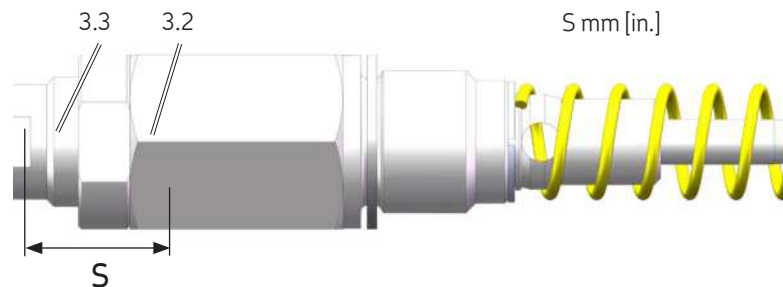
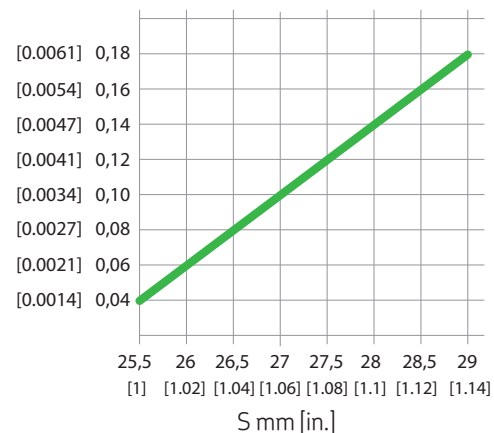
↻ = higher output volume

- After adjusting the output volume, retighten the counter nut (3.2)

Tightening torque = $20 \text{ Nm} \pm 2.0 \text{ Nm}$
[14.75 ft.lb. \pm 1.4 ft.lb.]

Adjusting the output volume on pump element R Fig. 11

Output
ccm/stroke
[fl.oz./ stroke]



6.6 Mount pressure control valve

Protect each pump element by means of a pressure control valve suitable for the planned maximum admissible operating pressure of the centralized lubrication system.



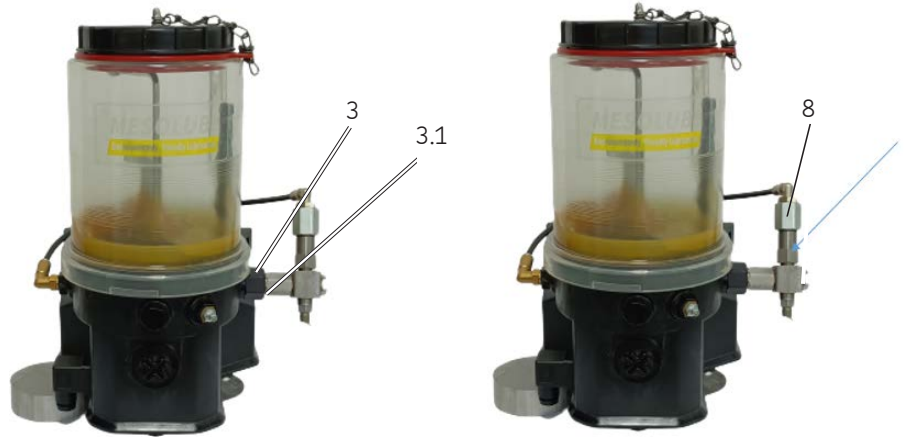
Observe the information given in chapter 4 regarding the adapter required for certain reservoir sizes.

To carry out the assembly proceed as follows:

- Remove the closure plug (3.1) from the pump element (3)
- Screw pressure control valve (8) into pump element (3)
- Repeat procedure for each pump element

Tightening torque = 6 Nm -0.5 Nm
[4.43 ft.lb. - 0.07 ft.lb.]

Mounting the pressure control valve Fig. 12



6.8 Filling with lubricant

6.8.1 Filling via the reservoir lid

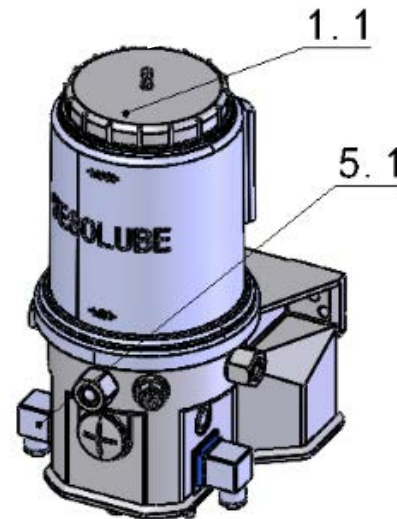
WARNING



Crushing hazard on the rotating stirring paddle. Filling via the reservoir lid is allowed only after disconnecting the pump from the power supply by removing it from the connection (5.1).

- Unscrew the reservoir lid (1.1) anti-clockwise from the reservoir. Deposit the reservoir lid at a clean place. The inside of the reservoir lid must not be contaminated. Remove possible contaminations
- Fill the reservoir from the top up to the MAX marking. Make sure to fill in the lubricant without air inclusions, if possible
- Reinstall the reservoir lid (1.1) clockwise

Filling via the reservoir lid Fig. 13



6.8.4 Priming of pumps with follower plate

In case of pumps without grease filling, before commissioning the space below the follower plate must be filled with grease. Any further fillings take place only via the filler fitting (4) or the optional filling connection on the pump



CAUTION

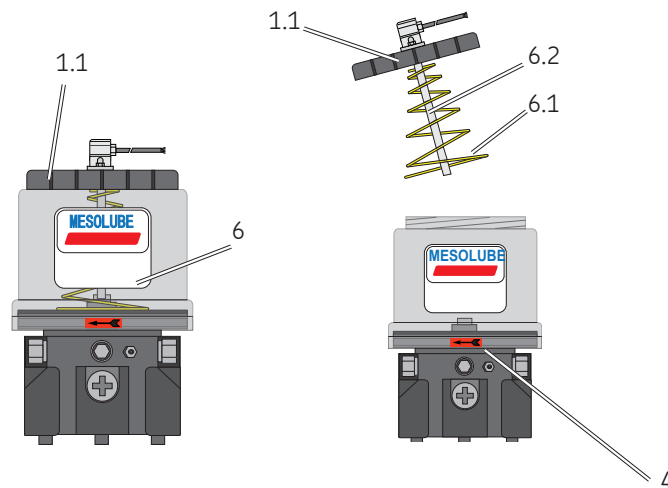


Spring force

Slowly loosen the reservoir lid holding it well. Wear safety goggles.

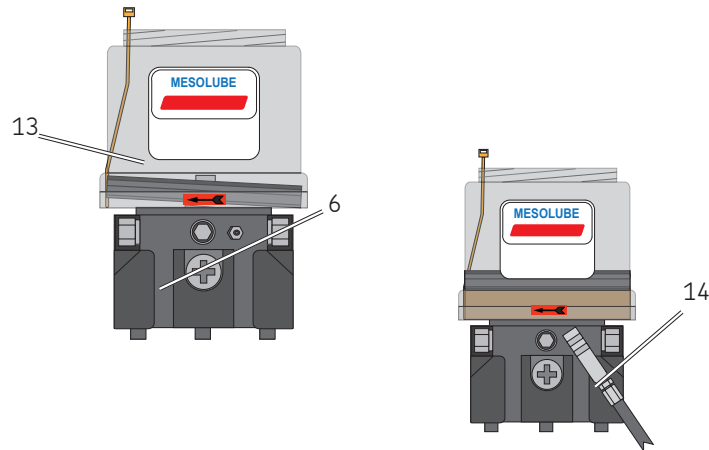
- Unscrew the reservoir lid (1.1) anti-clockwise from the reservoir
- Carefully loosen (6.1) the spring from the fixation at the follower plate (6)
- Carefully pull the contact rod (6.2) out of the follower plate (6)
- Remove the reservoir lid together with the spring and the contact rod

Priming of pumps with follower plate Fig. 16



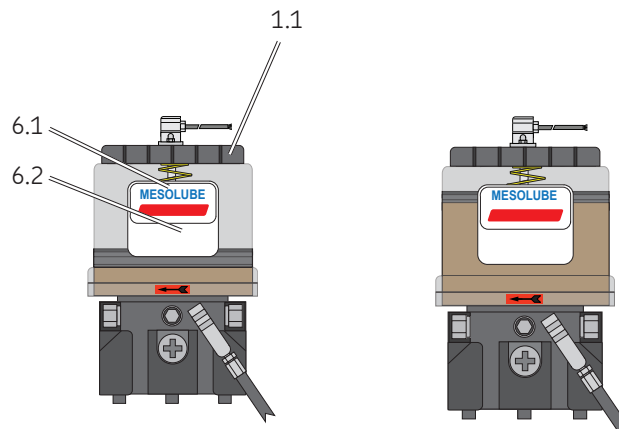
- Lightly oil the reservoir inside and the sealing lip of the follower plate
- Slightly tilt the follower plate (6) in the reservoir so that the side opposite of the filler fitting (4) is at the highest point.
- At this point pass a cable tie (13) into the area below the follower plate as shown
- Position the follower plate (6) horizontally again. When doing so ensure that the cable tie (13) creates an air gap.
- Position the filling connection (14) of the filler pump onto the filler fitting and fill the space below the follower plate with lubricant. Ensure that no air pockets remain below the follower plate and that no lubricant reaches the upper side of the follower plate.
- Remove the cable tie (13)

Priming of pumps with follower plate Fig. 17



- Reinstall the spring (6.1) and the contact rod (6.2).
- Close the reservoir lid (1.1) clockwise
- Fill the pump via the filler fitting up to the MAX marking.

Priming of pumps with follower plate Fig. 18



6.9 Setting of lubrication and pause times

Lubrication and pause times are set via the two rotary switches on the control PCB.

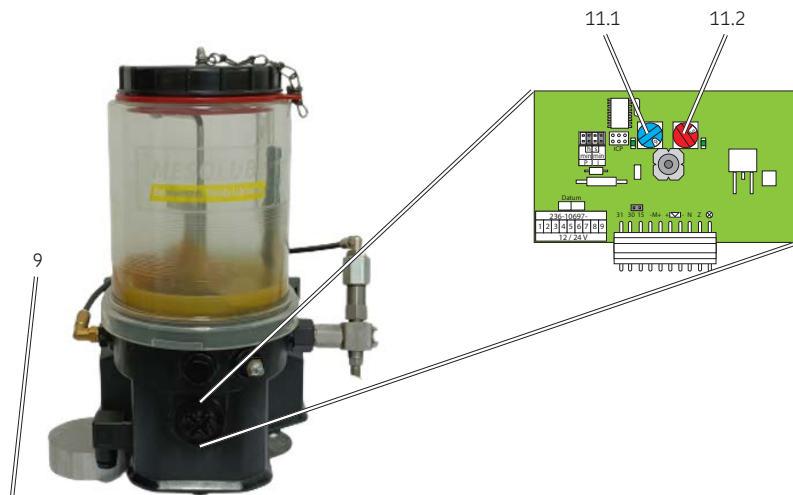
- Remove screw cap (9) including sealing ring
- Set the pause time by turning the left blue rotary switch (11.1)
- Set the lubrication time by turning the right red rotary switch (11.2)
- Mount screw cap (9) with gasket again

Tightening torque $2 \text{ Nm} \pm 0.2 \text{ Nm}$
[1.48 ft.lb. \pm 0.15 ft.lb.]



Do not turn the rotary switches in the "0" position. In the "0" position the pump operates with the factory settings and a fault is indicated by the control PCB's right LED.

Setting of lubrication and pause times Fig. 19

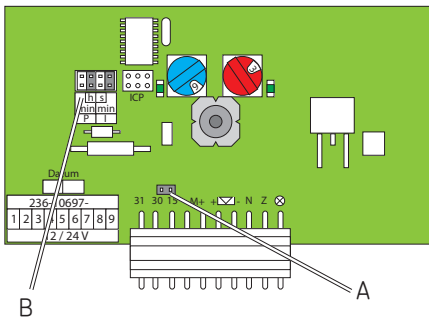















9

6.10 Changing the lubrication and pause times via jumper setting

NOTICE

Damage to the superior machine
 Jumper positions on the control PCB should never be changed. Changed jumper positions cannot be easily recognized by other persons and may therefore result in wrong settings of the lubrication and pause times.



Jumper position for bridge Terminals 15/30	Control PCB	Pause time		Lubrication time		Jumper position on the control PCB	
		4 - 60 min.	1 / 15 h	8-120 s	2-30 min		
A 	V 10						
not bridged	V 20		X		X	 B	
A 	V 11						
not bridged	V 21		X	X		 B	
A 	V 12						
not bridged	V 22	X			X	 B	
A 	V 13						
not bridged	V 23	X		X		 B	
		= Jumper positioned					
* If terminal 15 (machine contact/ drive switch) is bridged with terminal 30 (+) and if voltage is present at terminal 30, then the pump can work without the superior machine/ vehicle having to run. Without bridge the pump works only, if also the superior machine/ vehicle runs.							

6.11 Factory settings of the lubrication and pause times of pumps with control PCB V10-V23

Printed circuit board	Pause time/ lubrication time	Time value	Rotary switch	Position	Printed circuit board	Pause time/ lubrication time	Time value	Rotary switch	Position
V10/V20	Pause time	6 hrs	blue	6	V12/V22	Pause time	24 min	blue	6
	Lubrication time	6 min	red	3		Lubrication time	6 min	red	3
V11/V21	Pause time	6 hrs	blue	6	V13/V23	Pause time	24 min	blue	6
	Lubrication time	24 s	red	3		Lubrication time	24 s	red	3

6.12 Possible settings of the lubrication and pause times of pumps with control PCB V10-V23

Position of the rotary switch (blue)	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Pause time in minutes ⁹⁾	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
Pause time in hours ⁹⁾	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Position of the rotary switch (red)	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
Lubrication time in seconds ⁹⁾	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
Lubrication time in minutes ⁹⁾	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30

⁹⁾ Time values for pause and lubrication times are factory-set via the rotary switches and jumpers on the control PCB. The positions of the jumpers must not be changed by the owner.



Note regarding position "0" of the rotary switches

Never turn the rotary switches into position "0". This position is intended exclusively for the owner's purposes. In the "0" position the pump operates with the factory settings and a fault is indicated by the control PCB's right LED.

Acknowledge receipt of a fault indication

To acknowledge receipt of a fault indication proceed as follows:

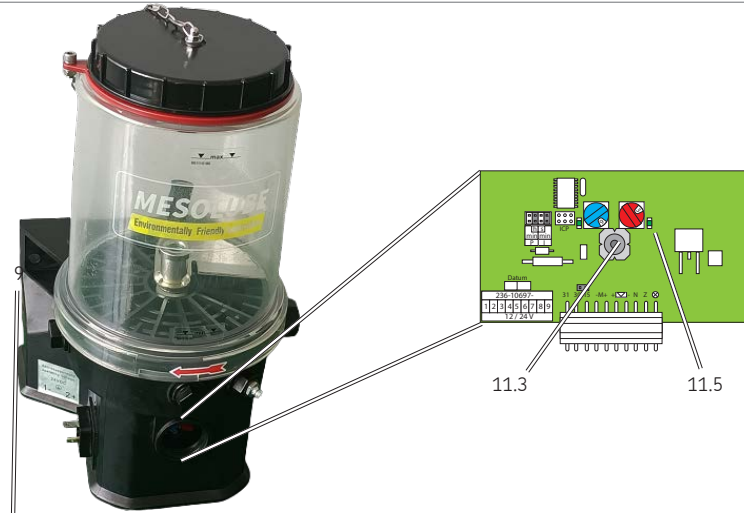
- Localize fault via flashing frequency and eliminate it
- Remove screw cap (9) including gasket
- Press pushbutton (11.3) on control PCB (< 1 seconds) to acknowledge receipt of a fault. The right LED (11.5) turns off
- Mount screw cap (9) and sealing ring again

Tightening torque $2 \text{ Nm} \pm 0.2 \text{ Nm}$
[$1.48 \text{ ft.lb.} \pm 0.15 \text{ ft.lb.}$]



A non-acknowledged fault remains stored even after switching off the machine contact/drive switch, i.e. when switching the pump on again, the LED (11.5) flashes according to the pending fault.

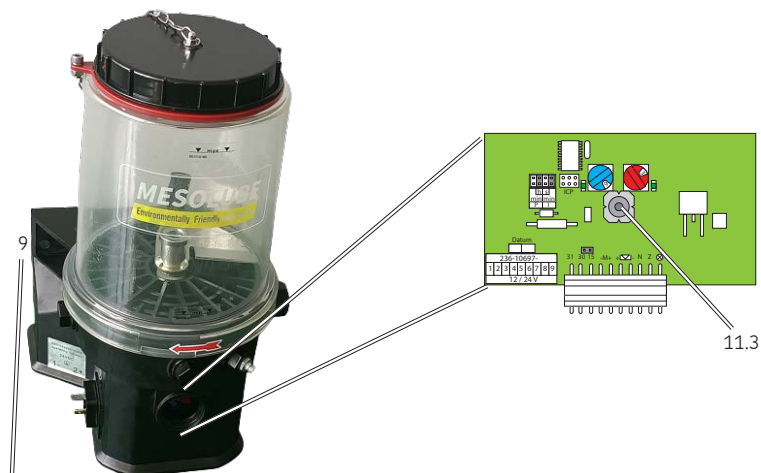
Acknowledging receipt of a fault



- To start the pump press the pushbutton (11.3) again (> 2 seconds). An additional lubrication will be carried out
- Mount screw cap (9) and gasket again

Tightening torque $2 \text{ Nm} \pm 0.2 \text{ Nm}$
[$1.48 \text{ ft.lb.} \pm 0.15 \text{ ft. lb.}$]

Acknowledging receipt of a fault indication Fig. 21



Triggering an additional lubrication cycle

To trigger an additional lubrication cycle proceed as follows:

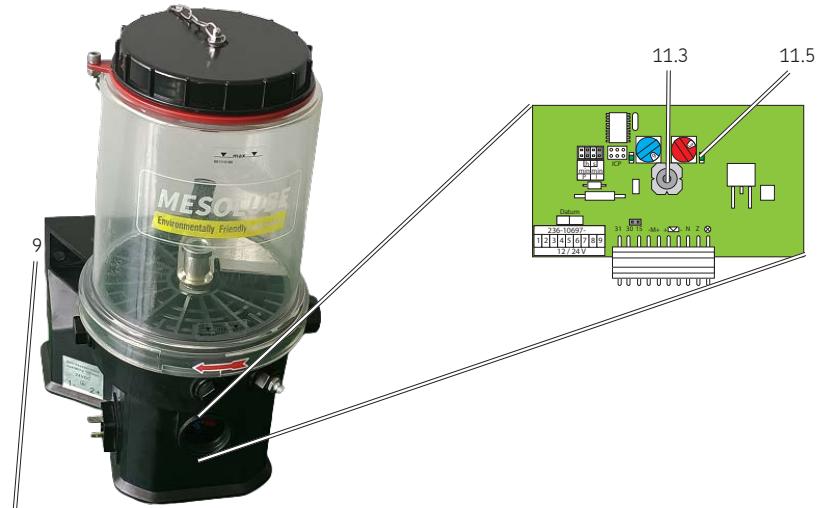
- Remove screw cap (9) including sealing ring
- Press the pushbutton (11.3) on the control pcb (> 2 seconds) to trigger an additional lubrication. The right LED (11.5) starts lighting and will continue lighting as long as the motor runs

The pump starts a lubrication cycle. The duration of the lubrication cycle corresponds to the value adjusted on the control PCB.

- Mount screw cap (9) and gasket again

Tightening torque 2 Nm \pm 0.2 Nm
[1.48 ft.lb. \pm 0.15 ft.lb.]

Setting of lubrication and pause times Fig. 22



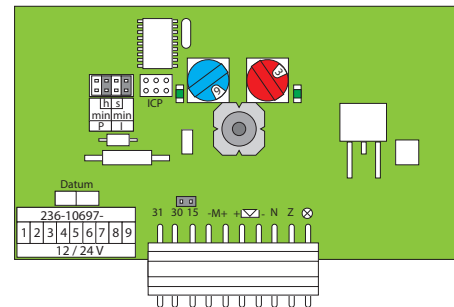
11.1 Display of the operating states and fault conditions by means of the control PCB's LEDs

Particular operating states and fault conditions are displayed via the control PCB's LEDs.

LED display	Possible cause			Remedy
Both LEDs off	A	F	G	Switch on operating voltage; change defective control PCB
Left LED is lit permanently	B			No fault, normal operating state (pause time)
Both LEDs are lit permanently	C			No fault, normal operating state (lubrication time)
Right LED flashes at an interval of four	D			Turn rotary switch out of position "0"
Right LED flashes at an interval of three	E			Replace control PCB

Possible cause

- A No (adequate) operating voltage (terminal 15)
- B Operating voltage (terminal 15) is present
- C Motor is running
- D Rotary switch in position "0"
- E Short circuit on pushbutton
- F Control PCB defective
- G Internal cable break



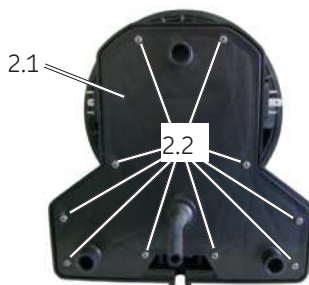
12.2 Replacement of the control PCB

The work should possibly be done at room temperature. At low temperatures the replacement may be subject to restrictions. To facilitate replacement of the control PCB the pump should be tilted into horizontal position.

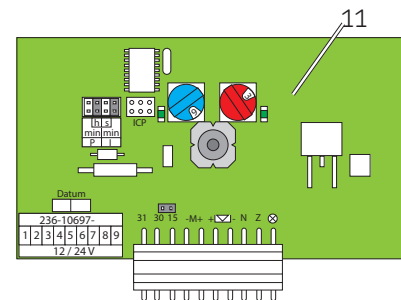
To replace the control PCB proceed as follows:

- Check the new control PCB for accordance with the documentation and the intended purpose
- Take protection measures against electrostatic discharge
- Unscrew the screws (2.2) from the housing cover (2.1)
- Remove housing cover (2.1)
- Remove plug (11.7) from control PCB and pull control PCB (11) out of the two lateral guide rails

Unscrew housing cover Fig. 24



Control PCB removed Fig. 26



Plug of the control PCB Fig. 25



Transparent reservoir

Designation	Qty.
2 l XNFL ^{B,C}	1
2 l XN ^{A,B,C}	1
2 l XL (with stirring paddle) ^{A,B,C}	1
2 l XN/YNBO ^{A,B,C,D,E}	1
2 l XLBO (without stirring paddle) ^{A,B,C,D,E} (Fig. similar 544-31940-1)	1
4 l XNBO/YNBO/XLBO/YLBO/XBF ^{A,B,C}	1
4 l XN/XL ^{A,B,C,F}	1
8 l XNBO/YNBO/XLBO/YLBO/XBF ^{A,B,C}	1
8 l XN/XL ^{A,B,C,F}	1

Delivery including: A = Lincoln/SKF Logo, B = Directional arrow, C = O-Ring, D = Reservoir lid, E = Warning label "Crushing hazard", F = Reservoir lid screwed to reservoir non detachably



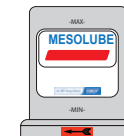
Other transparent reservoirs on request

Fig. 38

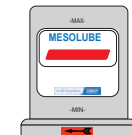
544-31997-1



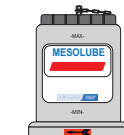
544-31996-1



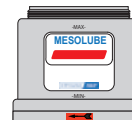
544-32028-1



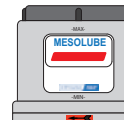
544-31940-1



544-31998-1



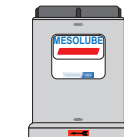
544-32695-1



544-31999-1



544-32696-1

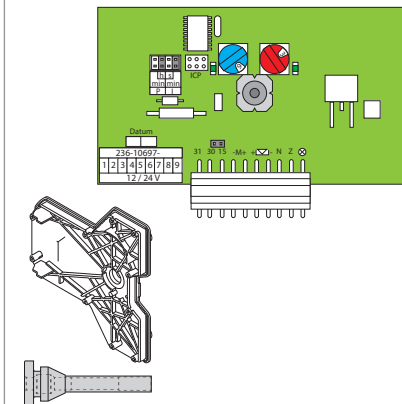


Replacement kit control PCB

Designation	Qty.
Replacement kit control PCB V1x P300	1
Replacement kit control PCB V2x P300	1

Delivering including housing cover, drain hose, and the corresponding number of screws required for installation

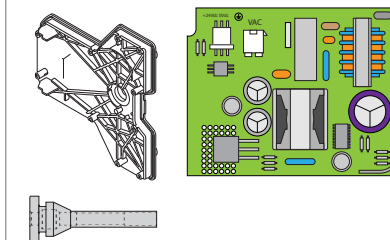
Fig. 39

**Replacement kit of power supply board**

Designation	Qty.
Replacement kit of power supply board	1

Delivering including housing cover, drain hose, and the corresponding number of screws required for installation

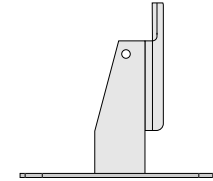
Fig. 40



Fixed paddle

Designation	Qty.	Part number
Fixed paddle 4 XNBO	1	444-70490-1
Fixed paddle 8 XNBO	1	444-70491-1

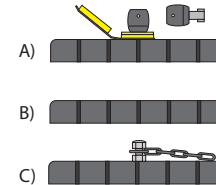
Fig. 41

**Reservoir lid**

Designation	Qty.	Part number
A) Reservoir lid 4/8l [1.06/2.11 gal.] XNBA/ XLBA	1	544-36963-1
B) Reservoir lid 4/8l [1.06/2.11 gal.]	1	544-31992-1
C) Reservoir lid 2l [0,53 gal] XNBO	1	544-85156-1

- A) Lockable reservoir lid; including 2 keys and warning label
 B) Including warning label
 C) Including chain

Fig. 42

**Screw cap**

Designation	Qty.	Part number
Screw cap at pump housing	1	544-32851-1

Fig. 43



Connection sockets and cable

Feature*	Designation	Qty.	Part number
1	Connection socket ^{H)} with gasket and screw	1	544-32850-1
2	Connection socket ^{K)} with gasket and screw	1	544-33843-1
A	Connection cable 10 m [33 ft.] with connection socket ^{H)}	1	664-36078-7
B	Connection cable 10 m [33 ft.] with connection socket ^{K)}	1	664-36078-9
G	Connection cable 10 m [33 ft.] with bayonet socket (7/7 poles)	1	664-34428-3

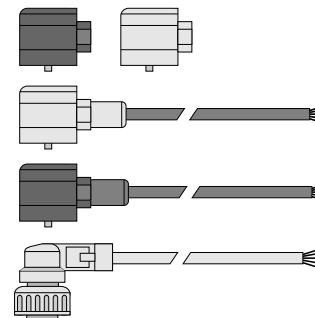
*Feature in type identification code (category K connection material)

H) = black

K) = grey

Feature*	Degree of protection (IEC 60529)
1	IP65
2	IP65
A	IP67
B	IP67
G	IP6K9K

Fig. 44



15. Electrical connections

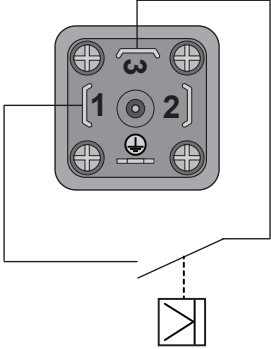
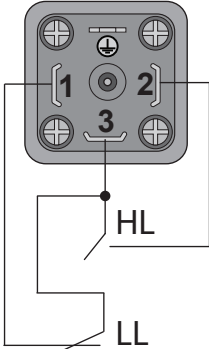
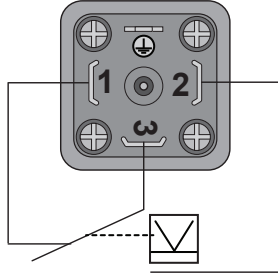
Cable colours following IEC 60757							
Abbreviation	Colour	Abbreviation	Colour	Abbreviation	Colour	Abbreviation	Colour
BK	black	GN	green	WH	white	PK	pink
BN	brown	YE	yellow	OG	orange	TQ	turquoise
BU	blue	RD	red	VT	violet	-----	-----



The assignment of the following electrical connection diagrams is done according to the respective referenced type identification code characteristics. For the complete type identification code of the P300 pumps, see instructions, chapter 4 Technical data.

15.3 Connection of signal line to reservoir lid

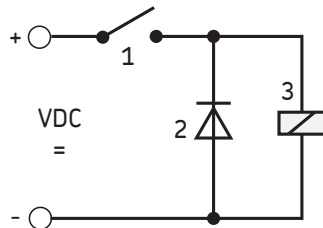
Connection diagram of the signal line with the square plug to reservoir lid Fig. 44

Connection diagram (lubrication grease) Magnetic switch Low-level indication		Connection diagram (lubrication grease) Magnetic switch high- and low-level indication		Connection diagram (lubricating oil) Float magnetic switch Low-level indication	
					
Depiction of unactuated condition					
Maximum switching capacity	21 VA	Maximum switching capacity	21 VA	Maximum switching capacity	60 VA
Maximum switching voltage	30 V DC	Maximum switching voltage	30 V DC	Maximum switching voltage	230V
Maximum switching current	700 mA	Maximum switching current	700 mA	Maximum switching current	1 A
HL = High level LL = Low level					

15.4 Recommended contact protection measure for switching inductive loads

Recommended contact protection measure for switching inductive loads Fig. 46

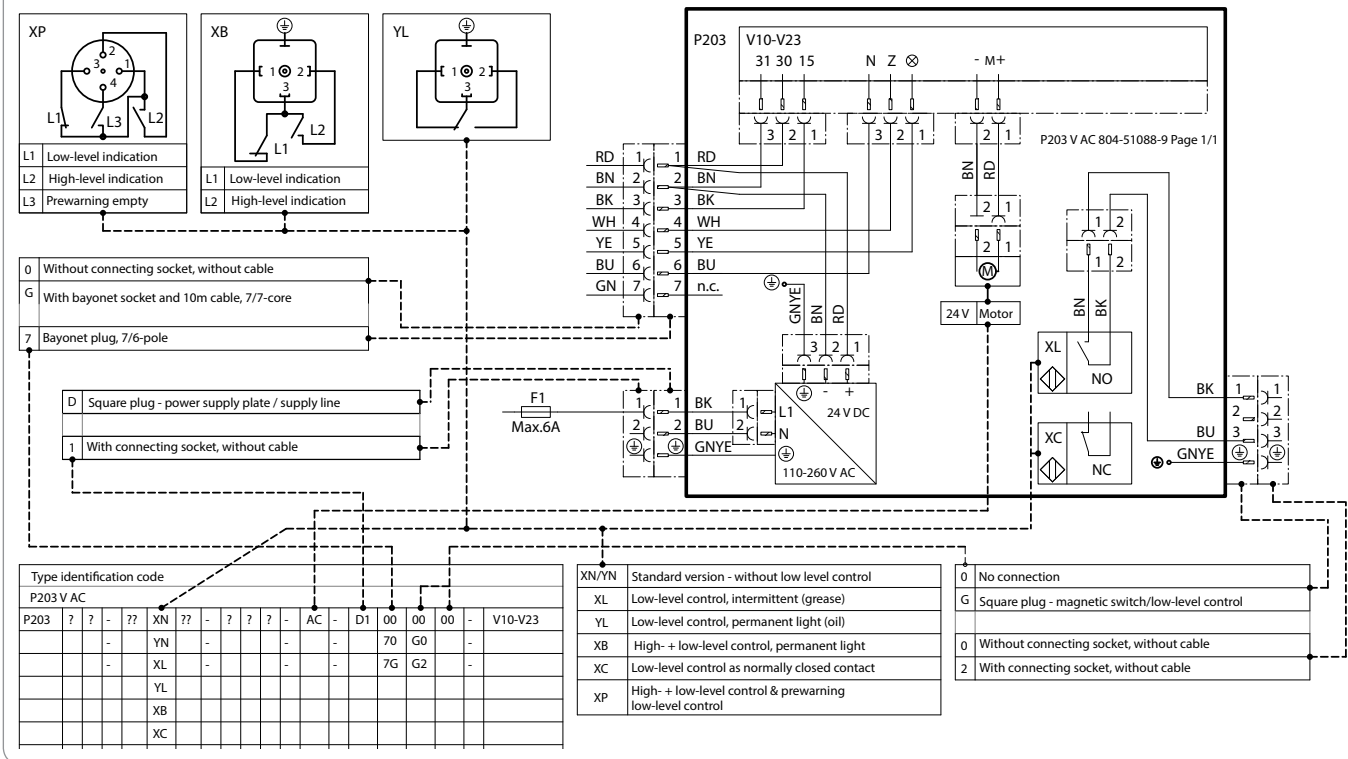
For protection of the relay contacts the following contact protection measure should be carried out by the operator.





- 1 Magnetic switch
- 2 Interference suppression diode
- 3 Load

15.5 Connection diagram P203 V AC with control PCB V

Connection diagram P300 V AC with control PCB V Fig. 47



15.6 Overview of cables and connection options

Pump						Cable			
External			Internally						
Plug	Colour	P.in	Colour	Function	Polarity	Part number	Length	Cross section	Degree of protection
 <p>Square plug</p>	RD	1	RD	+110 / 260 VAC	+110 / 260 VAC	664-36078-7	10 m	4 x AWG 18 4 x 0,82 mm ²	IP67
	BN	2	BN	GND	GND	664-36078-9	10 m		
	BK	3	BK						
	GN/YE	PE	GY/YE	PE	PE				
 <p>Bayonet plug, 7-pole</p>	RD	1	RD	+12/24 VDC	+12/24 VDC	664-34428-3	10 m	7 x 1,5 mm ²	IP6K9K
	BN	2	BN	GND	GND				
	BK	3	BK	Counter/Ignition	positive				
	WH	4	WH	Add Lub(Z)	positive (negative)*				
	YE	5	YE	NO	floating				
	BU	6	BU	C (max. 30V/4A)	floating				
	GN	7	GN	NC	floating				