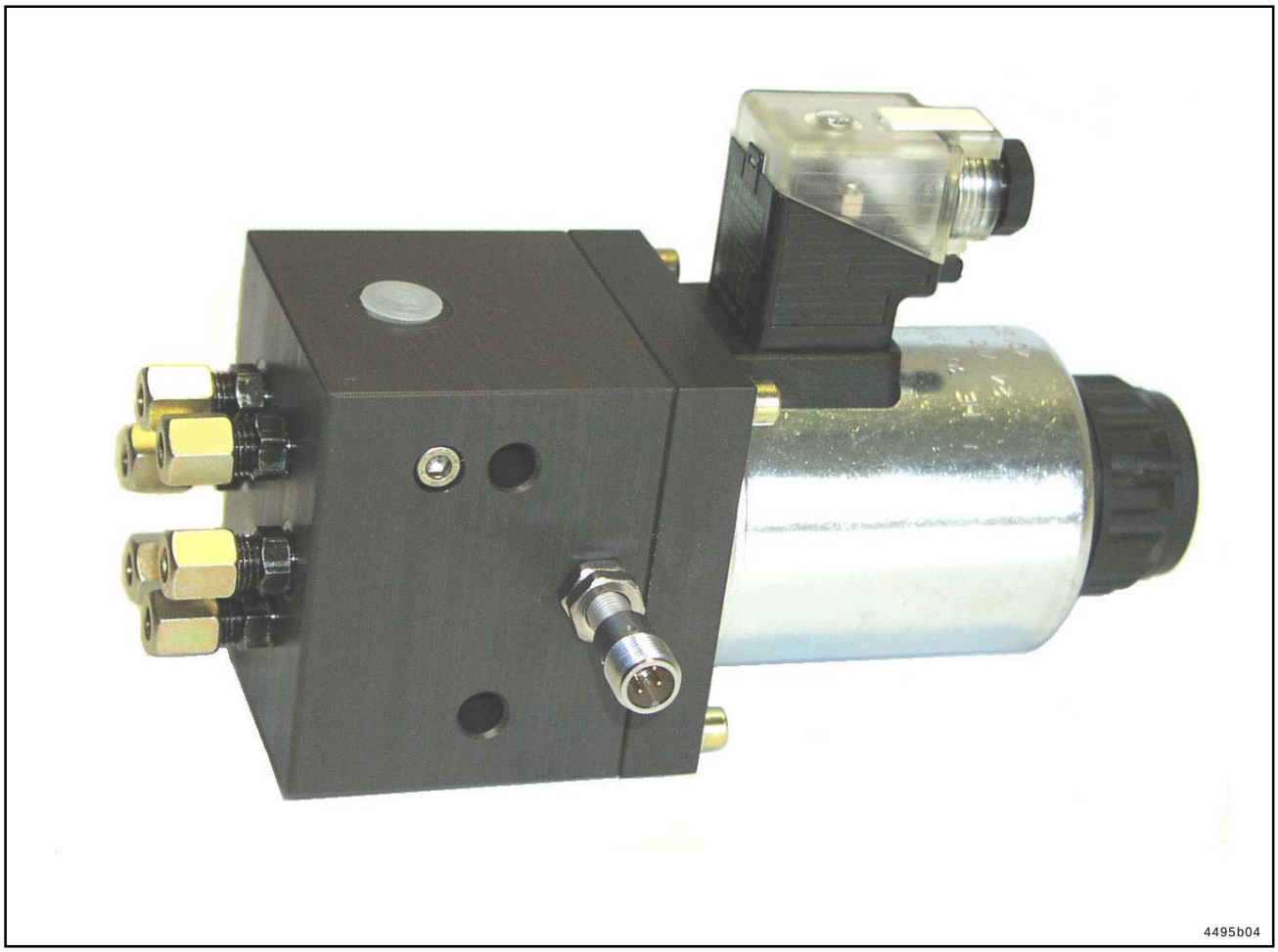
2.1A-88002-C06

Magnetic Pump PMA - 2



2.1A-88002-C06

Table of Contents

Safety Instructions

Appropriate Use

- The PMA-2 magnetic pump is exclusively designed for use in centralized oil lubrication systems.
- The limiting values specified in the Technical Data, particularly in the maximum operating pressure and the maximum frequency, must on no account be exceeded.
- Any other use is not in accordance with the specified instructions.
- The manufacturer is not liable for damages resulting from improper use.

Maintenance and Repairs

- Before any maintenance or repair on the magnetic pump is done, the User Manual and the Safety Instructions must be read.
- The User Manual must be available on the site where the pump is in operation.
- Alteration or modifications of the magnetic pump are only allowed if approved by the manufacturer.
- For repairs use only original Lincoln spare parts.
- If other spare parts are used, the manufacturer may be released from its liability for the resulting consequences.

Operation of the Magnetic Pump

- The magnetic pump should only be used if it is in good technical condition.
- Defects and faults which may impair its operation and safety must be remedied immediately.
- The reservoir must be refilled in due time with clean oil.
- Should you need more information than is given in this User Manual, please contact our company (see address below).

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Fields of Application

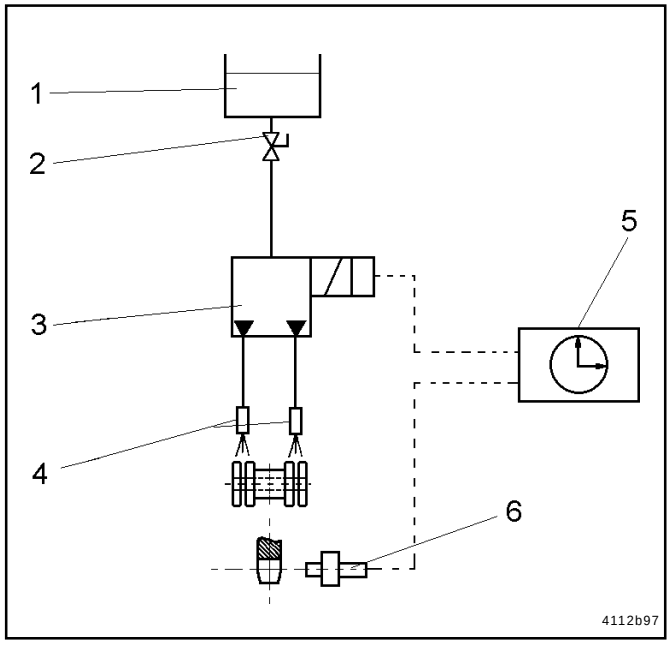


Fig. 1 - Magnetic pump for chain lubrication via spray nozzle

1 - Oil reservoir
2 - Shut-off valve
3 - Magnetic pump
4 - Spray nozzles
5 - Control unit
6 - Proximity switch on drive wheel

- The magnetic pump is designed to be used as an oil supply pump, preferably in chain lubrication systems.
- It can be used in a centralized lubrication system either
  - as a **splash lubrication device** for the accurate lubrication of chain studs and rollers, if used in connection with nozzles,
    or
  - as a **drop lubrication or brush lubrication device**, if used with progressive divider valves.
- Due to the high pulse frequency the pump is also suitable for high-speed chains.
- the pump is driven by an electromagnet (2, fig. 2).
- The movement of the drive pinion (teeth or chain) is sensored by the proximity switch (7, fig. 1) which, in this way, controls the electromagnet for splash lubrication.

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Structure

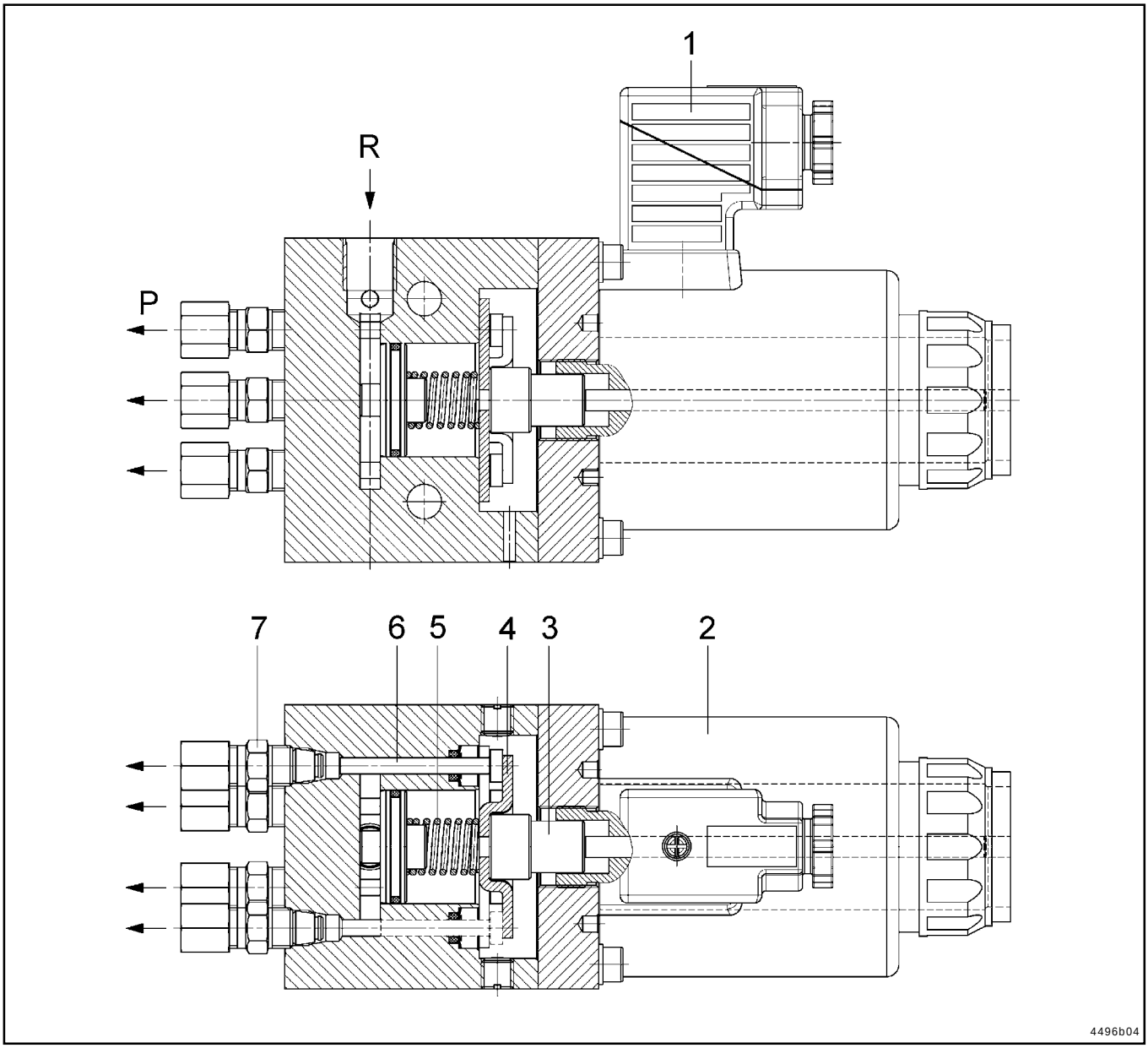


Fig. 2 Sectional drawing of the PMA-2

R - Oil from the reservoir
P - Pressure connection
1 - Plug (with rectifier for AC version)
2 - Electric solenoid
3 - Tappet
4 - Piston support
5 - Compression spring
6 - Piston
7 - Check valve

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Operation

- The armature of the electric solenoid (2, Fig. 2) receives an electrical pulse (energizing) from the proximity switch (6, Fig. 1). It contacts the piston support (4, Fig. 2) via a tappet (3). The piston support causes the pistons (6) to move.
- The pistons eject a dosed quantity of oil to the pressure connection (P). The return stroke of the pump pistons and that of the armature are spring activated. During the return stroke the pistons suck fresh oil from the storage chamber. The pump is ready for the next lubrication pulse.
- A proximity switch (optional version) monitors the operation of the pump.

Erection and Installation

Specifications of the installation site

- even, solid and vibration-free installation surface
- protected from dust and dirt
- safe from atmospheric influences

- Installation position: horizontal, venting screw to the left or to the right
- Oil supply: free oil supply from the reservoir

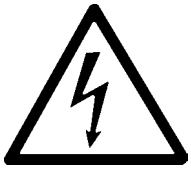
CAUTION

Tightening torque of the fastening screws 15 Nm 10%

Max. length of tube line to the nozzles:

Output 60 mm³: steel tube 6 m
plastic tube 3 m
Output 30 mm³: steel tube 3 m
plastic tube 1.5 m

Electrical connection



Before connecting the device, disconnect the system from the power supply.

The installation and connection of electric devices must be carried out only by qualified electrician personnel! Observe the relevant rules of technology and the respective work protection legislation (directives, standards).

Electric connection of the electrical solenoid
- in accordance with the electrical wiring diagram and the switching diagram

Electric connection of the proximity switch
- in accordance with the electrical wiring diagram and the switching diagram

Operating Instructions

Start-up

Connection of the tube lines and filling of the pump

* connect the pressure line(s) and the filling line to the corresponding connections on the pump.

CAUTION

Take care that no dirt or other foreign particles enter the pump housing.

* Clean the tube lines before connecting them.
* Avoid contamination of the environment.
* Fill the reservoir with clean oil.
* Open the shut-off valve in the oil supply line to the pump.

Venting
* Unscrew the venting screw (E, Fig. 11) until oil emerges. Then re-tighten the venting screw.
* Let the pump run until all connected nozzles operate properly.

Maintenance and Repair

Before undertaking any repair on the pump:

* **Disconnect the system from the power supply and make sure that it cannot be restarted inadvertently**
* **Close the shut-off valve in the oil supply line**
* **Reduce the pump and system pressure to zero. Danger due to splashing oil.**

- **Repair work may be carried out only by qualified personnel using original Lincoln spare parts.**

- Provided that the pump dispenses only clean oil, it does not need any particular maintenance.
- The piston of each pump element lies directly in the oil being dispensed and is therefore lubricated automatically.

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

- The pistons are subject to natural wear, which depends on the cycle time and pressure setting.
- After any replacement or repair the tube lines and the pump must be vented again.

Troubleshooting

NOTE: The following items only describe faults occuring at the pump itself. Faults due to an electric failure or system malfunction must be looked up in the system description.

• **Fault: Pump does not supply**	
• **Cause:**	• **Remedy:**
• Electric solenoid defective	* Check the supply voltage, replace the defective electrical solenoid.
• **Fault: Pump does not supply, solenoid receives pulses**	
• **Cause:**	• **Abhilfe:**
• No oil in the system	* Check the oil supply to the pump. Refill the reservoir.
• Piston damaged	* Replace complete pump element
• Suction borehole clogged	* Remove pump element, clean it and check for foreign particles
• Air in the system	* Vent the pump and the tube lines (see „Start-up“)

- Any repairs which are beyond the knowledge of the user’s personnel must be carried out by Lincoln experts. For this purpose, return the defective pup to the repair department of the Walldorf works or call for a specialist who will carry out the repair on site.

Service address: LINCOLN GmbH & Co. KG
Abt. Kundendienst
Postfach 1263
D-69183 Walldorf

Technical Data

Pump

Number of outlets:	1 - 6 *Note: If progressive metering devices are installed downstream of the pump, do not use more than 2 outlets.*
Lubricant output per stroke and outlet:	60 mm³ or 30 mm³
Dispensed lubricants:	Oils on mineral oil or synthetic basis, purity: 30 µm
Viscosity:	30 to 800 mm²/s (at operating temperature)
Operating temperature:	- 15° C to 50° C (higher on request)
Installation position:	preferably horizontal
Suction connection:	G 1/4"i
Pressure connection:	for tube Ø 6 mm
Pressure:	max. 50 bar (depending on the number of outlets)
Solenoid:	Single-stroke control solenoid
Type of protection:	IP 65
Insulation class:	B
Cyclic duration factor (ED):	40 % ED
Supply voltage:	24 VDC / 230 VAC / 120 VAC
Solenoid voltage:	24 VDC / 196 VDC / 105 VDC
Current consumption:	4.4A / 0.66 A / 1.11 A
Rectifier for AC voltage:	in the connection plug

Switch times for maximum pluse frequency

If shortest pulse times shall be achieved, the following switch times must be observed:

1. for connecting voltage 24VDC

Voltage on: 0.1 s
Voltage off: 0.15 s

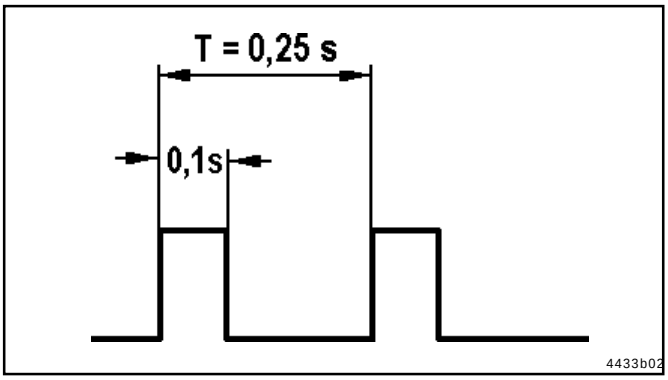


Fig. 3: Switch times for maximum pulse frequency at 24VDC

f_{max} = 1/T = 4 Hz (for permanent operation)
f_{max} = 1/T = 5 Hz (for interval operation, 5 min on, 5 min off)

2. for connecting voltages 120VAC/230VAC

Voltage on: 0.1 s
Voltage off: 0.2 s

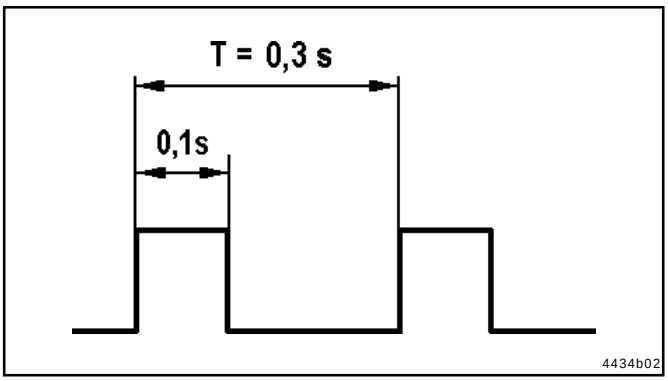


Fig. 4: Switching times for maximum pulse frequency at 230 VAC

f_{max} = 1/T = 3,33 Hz

Note:
The indicated pulse frequencies were achieved at ambient temperature of 25°C with oil OPTIMOL VISCOGEN KL 09.

Electric equipment

Connecting plug for 24VDC part no. 236-13868-1
self-connecting, terminal screws
3-pole, contact arrangement acc. to DIN 43650-A ; M16 x 1.5
Type of protection: IP 65; holding capacity 100 W(VA)

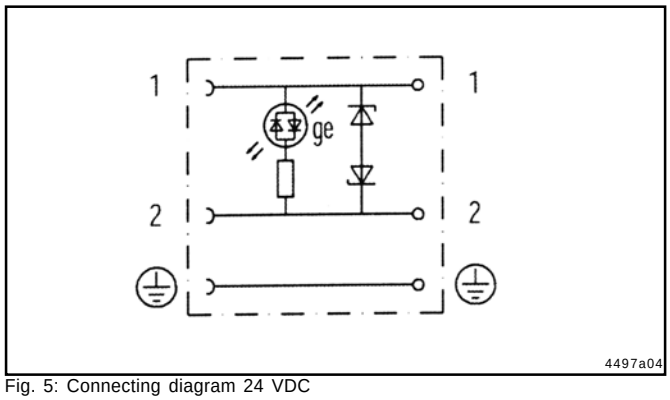


Fig. 5: Connecting diagram 24 VDC

Connecting plug for 120 VAC and 230VAC:
Part no. 236-13868-3
With bridge rectifier and LED display
Contact arrangement acc. to DIN 43650-A, M 16 x 1.5
Operating voltage: 1.5 A
Holding capacity: 345 W (VA)
Type of protection: IP 65

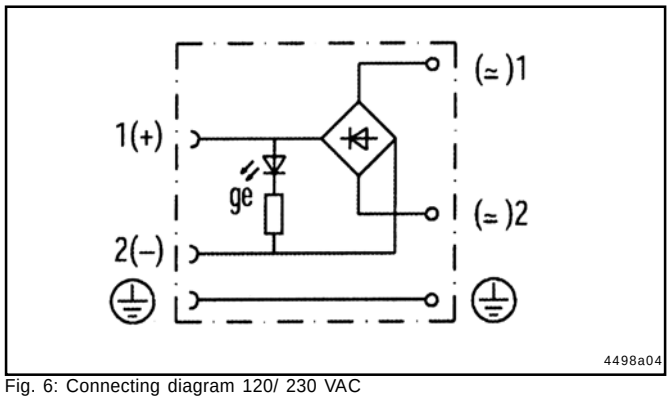


Fig. 6: Connecting diagram 120/ 230 VAC

Proximity switch, Part no. 234-13195-8:
Three-core, NO-contact, PNP, appliance inlet with LED
Operating distance: 2 mm
Operating voltage: 10 ....30 VDC
Operating current: 150 mA
Operating frequency: 1000 Hz
Voltage drop: 3 V
Type of protection: IP 67

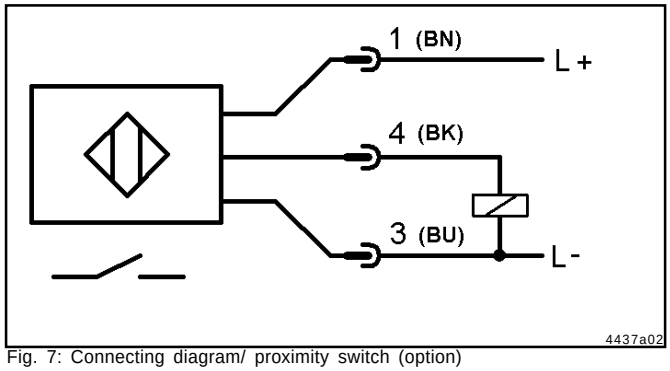


Fig. 7: Connecting diagram/ proximity switch (option)

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Float magnetic switch:
(Part no. 444-24283-1):
Switching capacity: max. 60VA
Switching voltage: max. 230V
Switching current: 1 A
The maximum switching capacities refer to pure resistive loads. In case of deviating loads, contact protective measures are necessary.

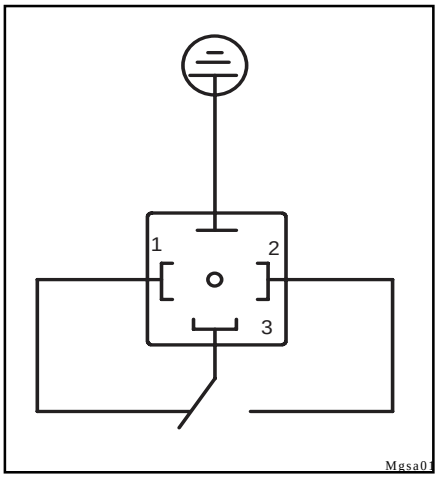


Fig. 8 - Connecting diagram/ float magnetic switch

Contact Protection Measures

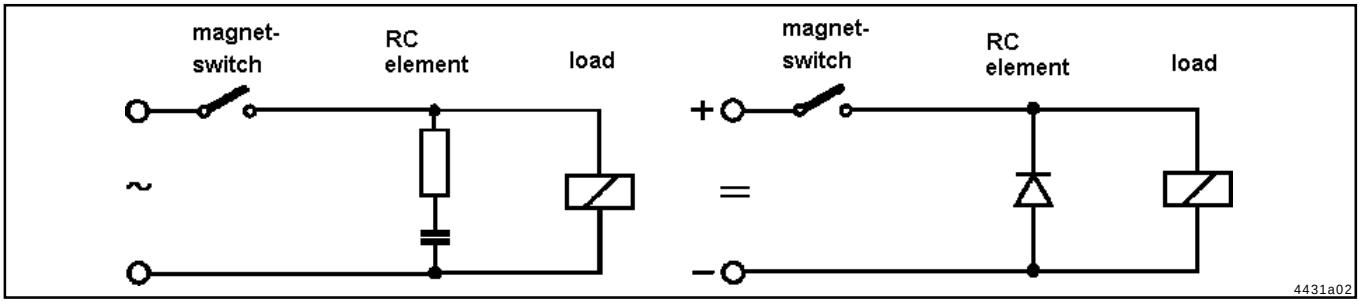


Fig. 9: Contact protection measures

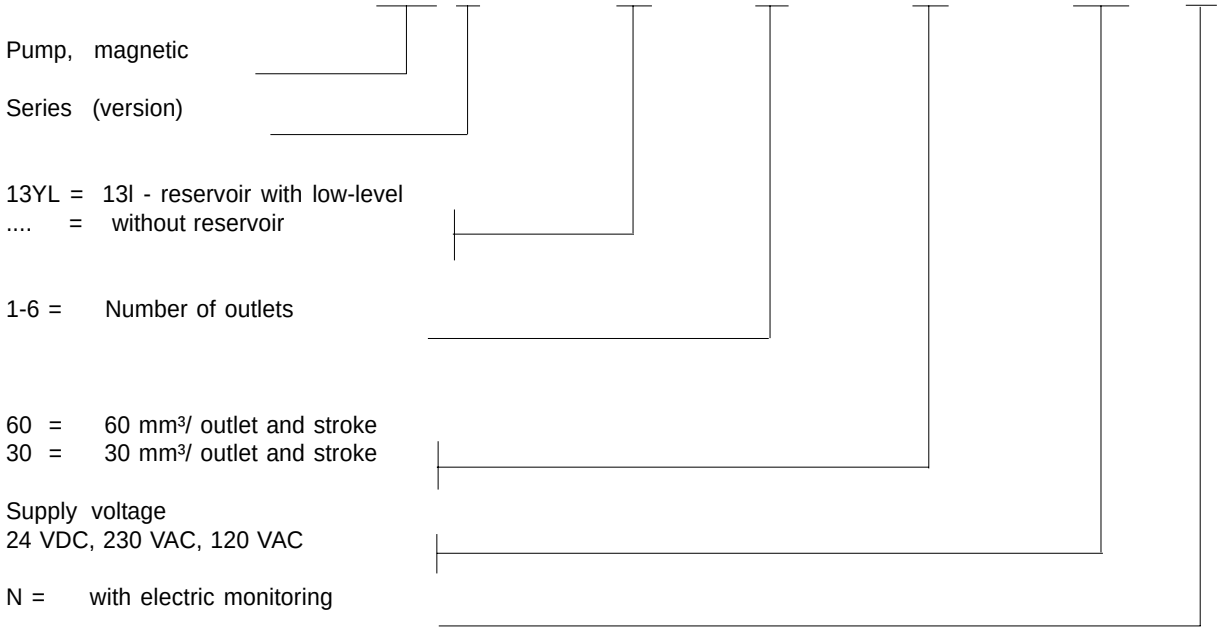
LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Identification Code

The different models of the magnetic pump can be ordered in accordance with the following type code:

Ordering examples:

PMA	2	-	13YL	2	-	60	-	230AC	-	N
PMA	2	-	.....	6	-	30	-	24DC		



LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Dimensions

Magnetic Pump PMA - 2

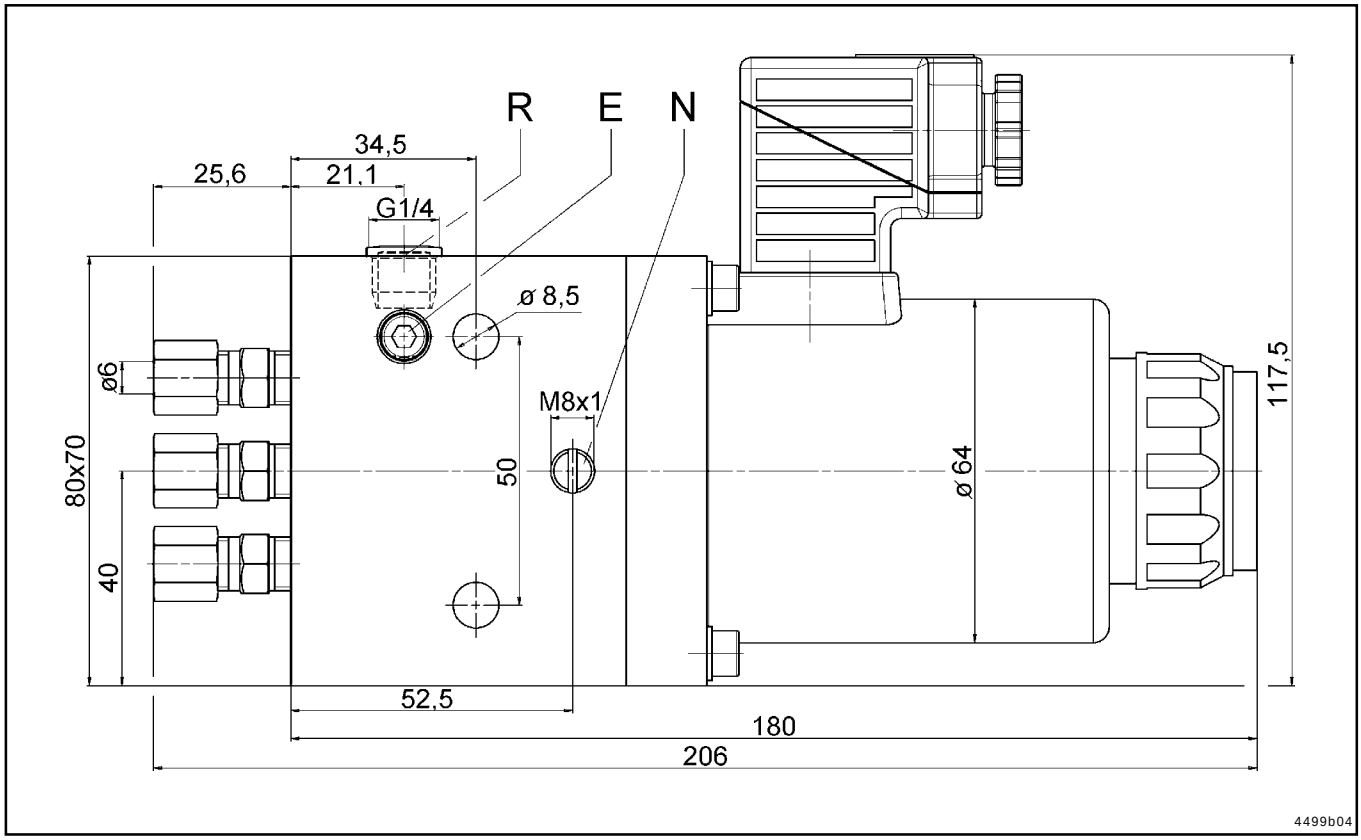


Fig. 10 - Dimensions of pump PMA - 2

R = Oil supply from reservoir
E = Venting
N = Connection for proximity switch (option)

E and N are available on both sides of the pump body. Closure screw N can be removed on the rear side if fixed on an even surface.

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Accessories

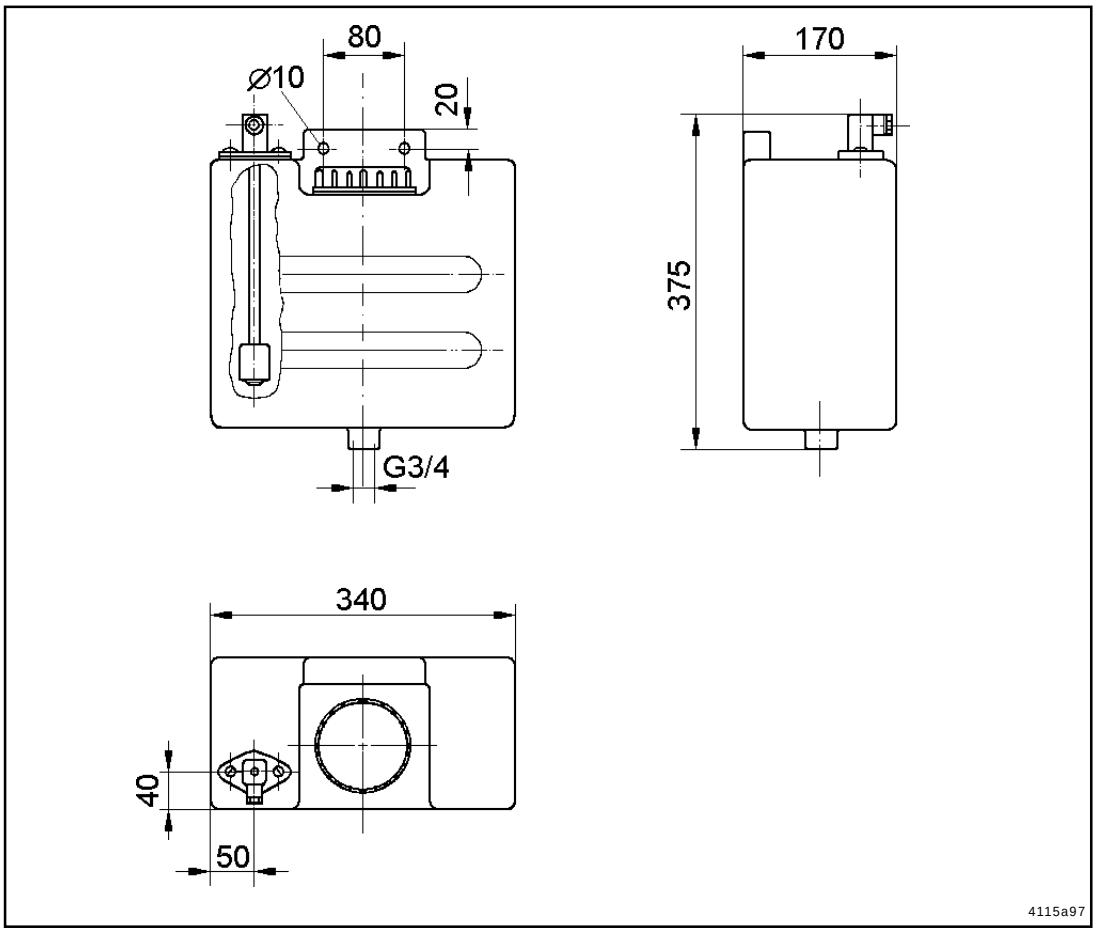


Fig. 11 - Reservoir 13 l, Part no. 651-28691-1 with electric low-level control (float magnetic switch)

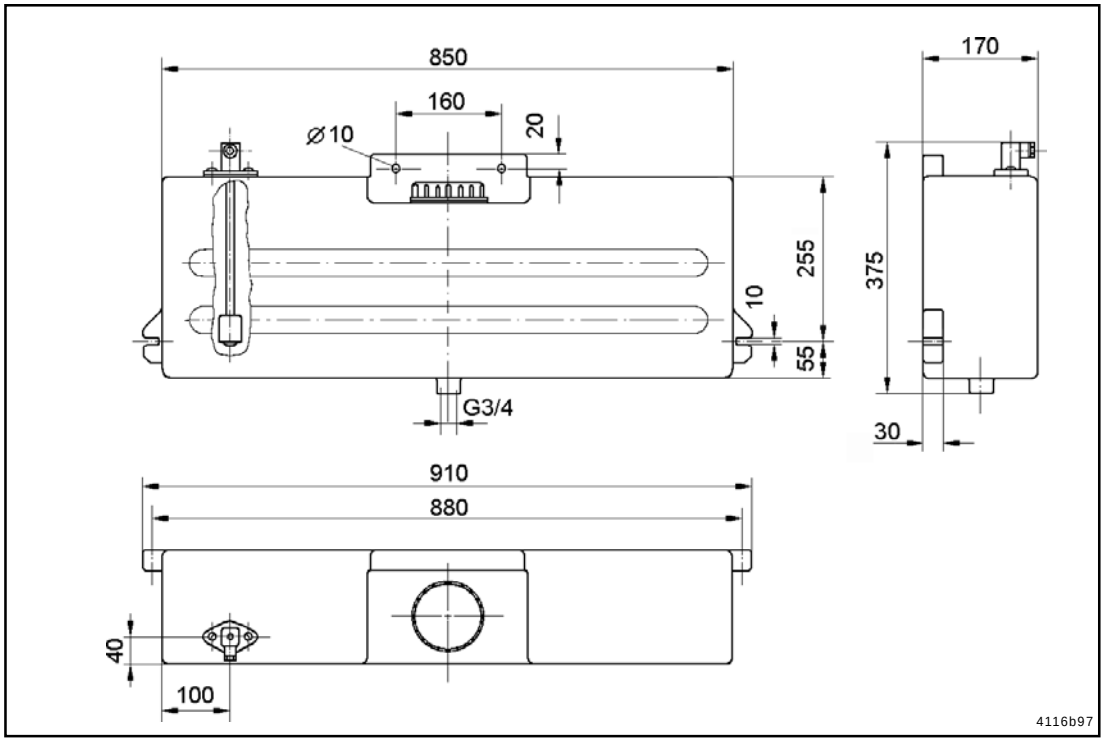
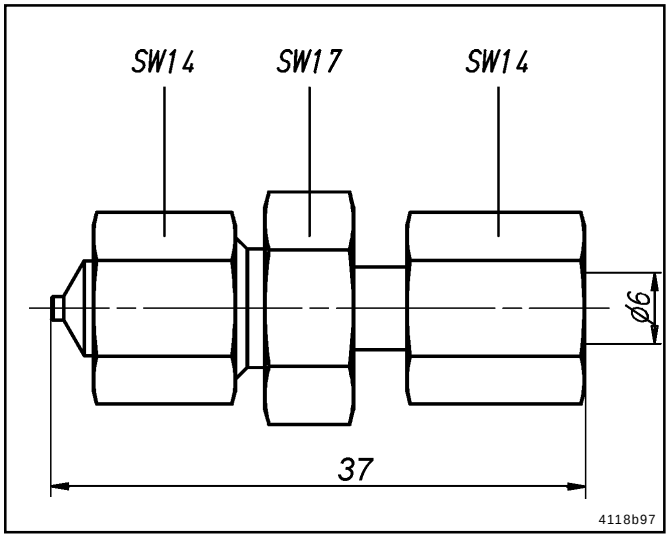


Fig. 12 - Reservoir 36 l, Part no. 651-28685-1 with electric low-level control (float magnetic switch)

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Accessories

Oil squirt nozzle SZDY-03, Part no. 615-28660-3



Opening pressure: approx. 2.5 bar
Connection: for tube lines ø 6mm

Fig. 13 - Squirt nozzle 615-28660-3

Double nozzles

Oil squirt nozzle, double, DSZDY-01 part no. 615-29209-1

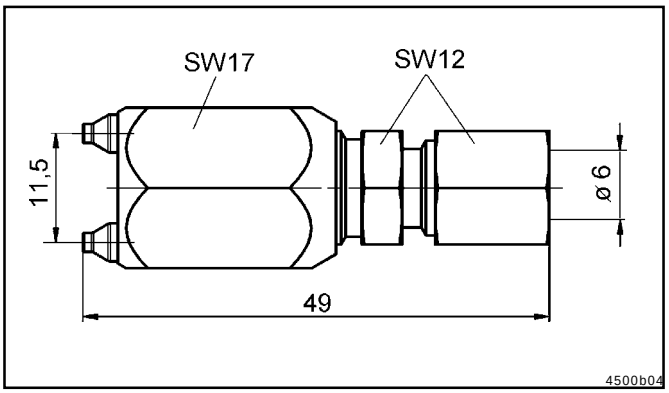


Fig. 14 Oil squirt nozzle, double

Note:

- *Use double nozzles for squirting from top to bottom only*
- *Horizontal application only after prior consultation*
- *Distance to the chain: 20 - 50 mm (at an operation viscosity of 800 cSt.)*
- *Bigger distances possible in case of lower viscosities*

Oil squirt nozzle, double, 90°, part no. 615-29301-1

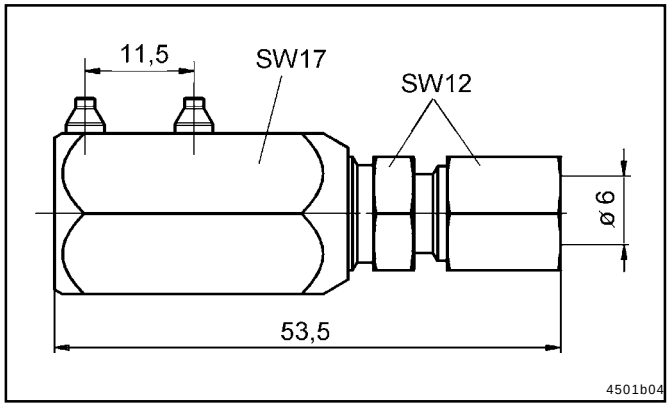


Fig. 15 Oil squirt nozzle, double 90°

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Components of the Magnetic Pump PMA - 2

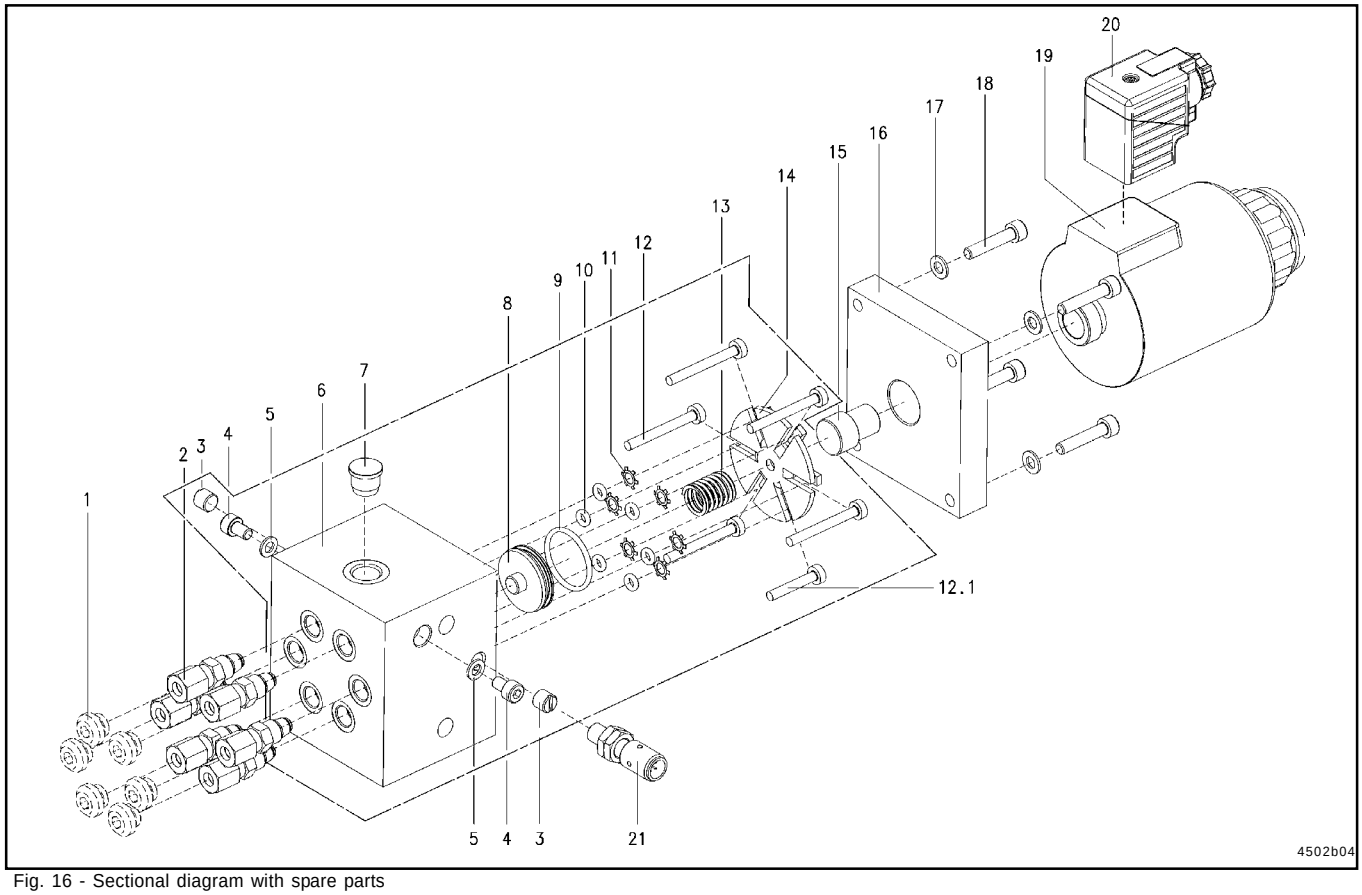


Fig. 16 - Sectional diagram with spare parts

Item	Designation	Quantity	Part-no.
1	Hex. socket head closure screw M10 x 1	0-5	303-17499-3
2	Check valve	1-6	504-32694-1
3	Closure plug M 8 x 1	2	*
4	Hex. socket head screw M 5 x 8C	2	*
5	Copper washer Cu 5 x 9 x 1	2	*
6	Pump housing	1	*
7	Protective plug	1	*
8	Sealing piston D 28	1	*
9	O-Ring 24 x 2	1	*
10	O-Ring 4 x 2	6	*
11	Self-lock ring ZJ 10	6	*
12	Piston D4	1-6	*
12.1	Dummy piston	0-5	*
13	Compression spring	1	*
14	Piston support	1	*
15	Tappet 60 mm³	1	451-70426-1
	Tappet 30 mm³	1	451-70425-1
16	Connection plate for solenoid	1	451-70427-1
17	Washer D 5,3C	4	209-13077-3
18	Hex. socket head screw M 5 x 25C	4	201-12017-8
19	Solenoid 40 % ED, 24 VDC	1	235-13171-4
	Solenoid 40 % ED, 105 VDC	1	235-13171-5
	Solenoid 40 % ED, 196 VDC	1	235-13171-3
20	Plug for solenoid 24 VDC	1	236-13868-1
	Plug for solenoid 105 VDC and 196 VDC	1	236-13868-3
21	Proximity switch 10-30 VDC M 8 x 1	1	234-13195-8
*	included in spare parts assy (see next page)		

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Spare part assy for housing consisting of items 3, 4, 6 - 15

Designation	Part no.
Housing assy for PMA2-...-1	551-32568-1
Housing assy for PMA2-...-2	551-32569-1
Housing assy for PMA2-...-3	551-32570-1
Housing assy for PMA2-...-4	551-32571-1
Housing assy for PMA2-...-5	551-32572-1
Housing assy for PMA2-...-6	551-32573-1

Arrangement of outlets

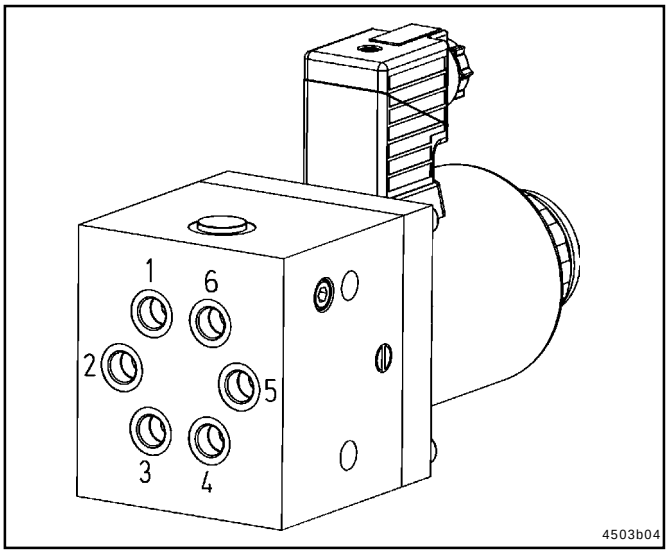


Fig. 17 Arrangement of outlets

Number of outlets	Installation position
6	1 - 6
5	2 - 6
4	1, 3, 4, 6
3	1, 3, 5
2	2, 5
1	3

Installation of the proximity switch

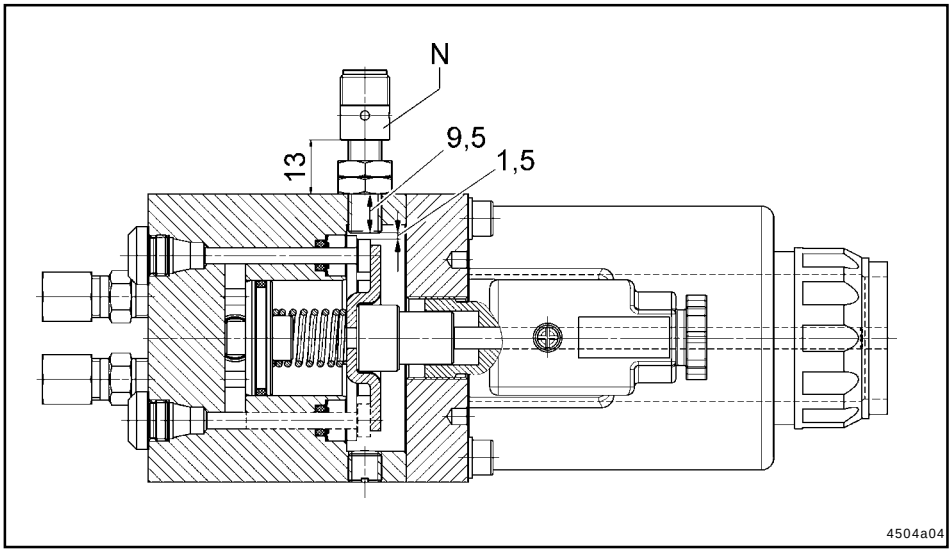


Fig. 18 Installation of the proximity switch

N = proximity switch, part no. 234-13159-8
Tightening torque: 7 NM +10% SW 13

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259

Manufacturer's declaration of conformity as defined by the EC machinery directive 98/37/EC, Annex II B

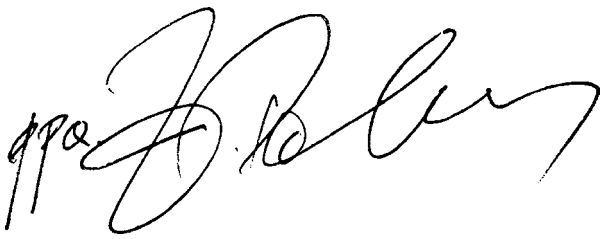
Herewith we declare that the supplied model of the

Magnetic Pump PMA ...

is intended to be incorporated into machinery covered by this directive and must not be put into service until the machinery into which it is to be incorporated has been declared in conformity with the provisions of the above mentioned directive including all modifications of this directive valid at the time of the declaration.

Applied harmonized standards in particular:

EN 292-1	Safety of machinery part 1 Basic terminology, methodology
EN 292-2	Safety of machinery part 2 Technical principles and specifications
EN 809	Pumps and pump units for liquids, Safety requirements
EN 60204-1	Safety of machinery Electrical equipment of machinery Part 1: General requirements



Walldorf, May, 2004 , Dr. Ing. Z. Paluncic

LINCOLN GmbH & Co. KG • Postfach 1263 • D-69183 Walldorf • Tel +49 (6227) 33-0 • Fax +49 (6227) 33-259