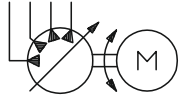




Illustration shows example

## Reciprocating pump PMF / GMF

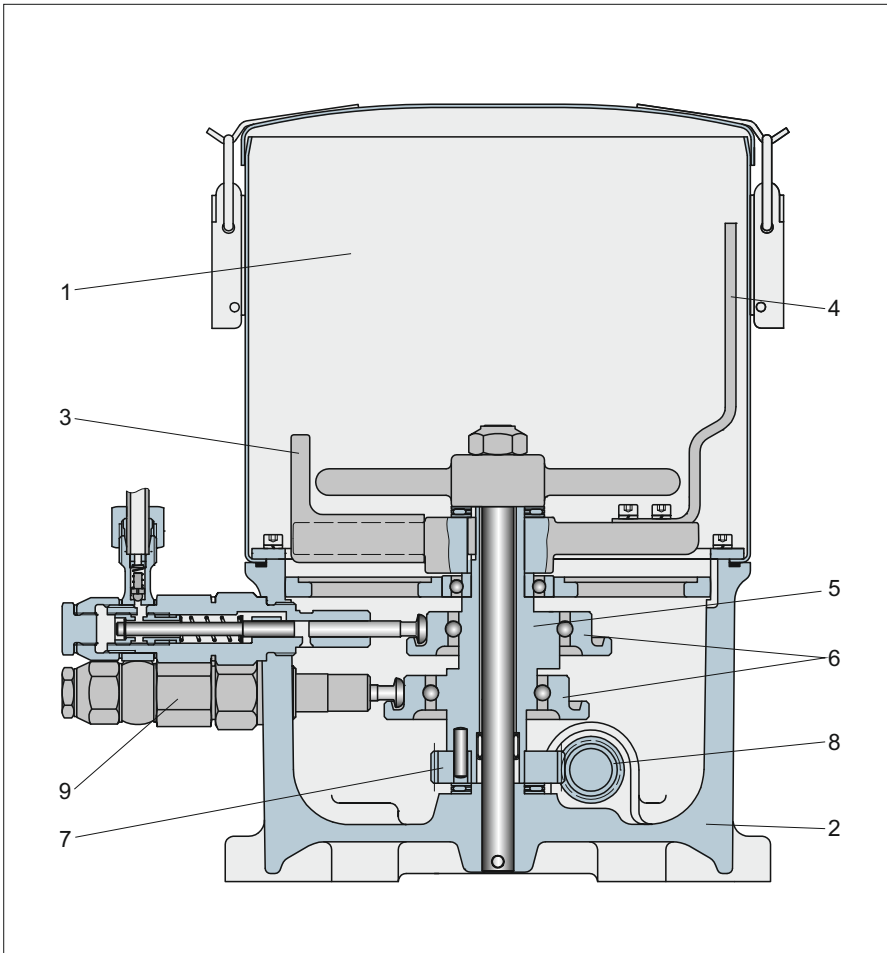


This is a multi-line reciprocating pump for many applications

- Being a universal type, our reciprocating pump is capable of meeting any challenge.
- The reciprocating pump can be fitted with various drives. Direction of rotation is as needed.
- Based on our long-standing experience, we can determine the appropriate type for every application.
- Reciprocating pumps can be used with oil and grease.
- ⚠ finishes for areas with a risk of explosion also possible.

### General description:

The reciprocating pump is capable of accommodating up to 24 pump elements. Delivery volume per element each is 0,08 or 0,15 cm<sup>3</sup>/stroke at maximum and can be regulated continuously (0,22 cm<sup>3</sup>/stroke on request). Maximum operating pressure amounts to 350 bar. The reservoirs are made of stainless steel or polyester material providing capacities between 2 and 30 litres. The reservoir content can be monitored electrically.



### Mode of operation:

The reciprocating pump is composed of the following main parts:

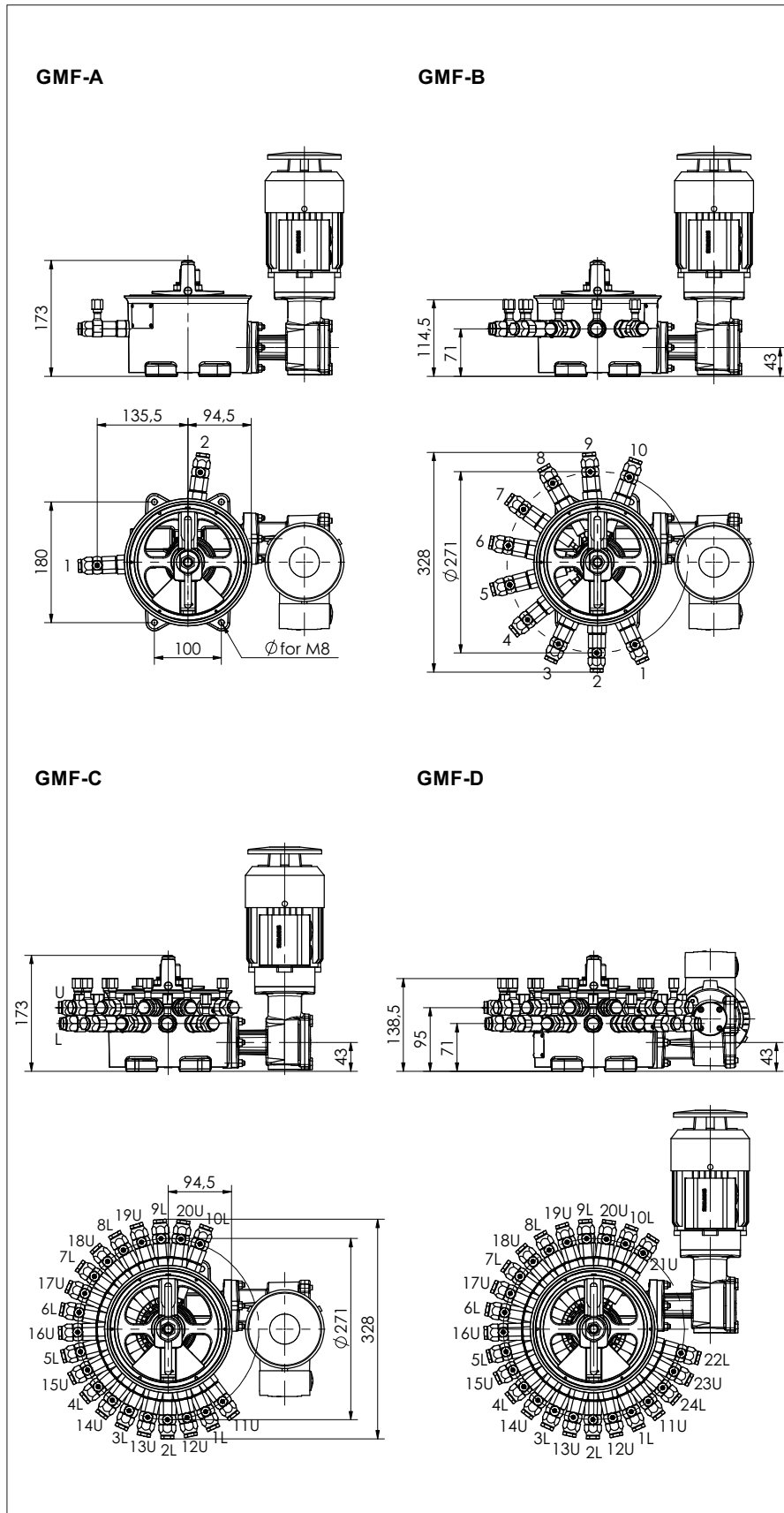
The pump casing **2**, the pump elements **9**, the inner and outer drives **7**, **8**, and the reservoir **1**. From the outer drive, the pump shaft **5** is driven via a worm gear **7**, **8**. With this pump shaft **5**, a pressure ring **6** runs around eccentrically, into which the pump elements **9** are hooked. Due to the eccentricity of pressure ring **6** to the pump shaft, every delivery piston will inevitably make a steady pressure and suction stroke with every turn of pump shaft **5**. Pump shaft **5** is connected with a stirring mechanism **3** that presses the lubricant to the intake holes of the pump elements **9** and cuts air bubbles up. In the level monitor fitted version, a follow-up piston for grease usage is provided for. This piston rests on the grease surface, thus enabling precise level monitoring. If there is no level monitoring provided for, a stripper **4** is installed.

Mode of operation and assembly of pump elements see data sheet P0386 and P0912.

- Subject to modifications -



- Subject to modifications -



### Type designation:

**Motor-driven** reciprocating pumps are type-designated by **GMF**.

The type designation of reciprocating pumps **without motor-drive** is **PMF**.

Depending on the number of pump element installation points, additional distinction is made as follows:

Number of mountable elements	Type
maximum 2	GMF-A PMF-A
maximum 10	GMF-B PMF-B
maximum 20	GMF-C PMF-C
maximum 24	GMF-D PMF-D

### General technical data:

Admissible delivery pressure: 350 bar  
on request (pump elements "heavy series" e. g.) 400 bar

Number of elements: 1 ... 24

Delivery volume per stroke and element  
in case of pump element 6: 0,08 cm<sup>3</sup>  
in case of pump element 8: 0,15 cm<sup>3</sup>  
special pump element (on request) 0,22 cm<sup>3</sup>

Stroke numbers of elements: 1 ... 25 min<sup>-1</sup>  
in case of deviation, please enquire.

Temperature range  
with electric motor: -20 ... +40 °C  
without electric motor: -20 ... +80 °C  
In the presence of low temperatures, grease penetration should be observed!

Medium: Oil and grease up to NLGI-class 3  
When choosing the reservoir and level monitoring, the medium should be taken into account.

The intended lubricant must be suitable for use with centralized lubrication equipment.

Drive direction of rotation: user-defined

Reciprocating pump installation position: vertical

Material  
Casing: Aluminium  
Pump element: Steel, galvanised  
Reservoir 2, 4, 7, 25 l: stainless steel  
Reservoir 5, 10, 30 l: Polyester  
Gaskets: NBR



stainless steel					Polyester				
stainless steel					Polyester, fibreglass reinforced				
Capacity l	øA mm	B mm	C mm	Weight kg	Capacity l	øA mm	B mm	C mm	Weight kg
2	193	111	231	1	5	199	221	341	1,5
4	193	171	291	1,4	10	199	401	521	1,8
7	193	269	390	2	30	331	482	602	4
25	320	386	506	4,6					

other reservoir versions available on request

### Reservoir:

Reservoirs with capacities ranging between 2 and 30 l are available for delivery. Every pump type any of the reservoirs depicted can be assigned to.

When choosing a reservoir, level monitoring and lubricant should be taken into consideration as well.

Reservoirs materials: see table on the left

### Reservoirs and level monitoring capability:

Capacity	Level monitoring	
2 l	impossible	
4 l	for oil:	Float switch min. level
7 l	for oil:	Float switch min. and max. level
25 l		
5 l	for oil:	Float switch min. and max. level
10 l		
30 l		

When a follow-up piston is used, the utilisable reservoir volume is reduced as follows

Reservoir capacity

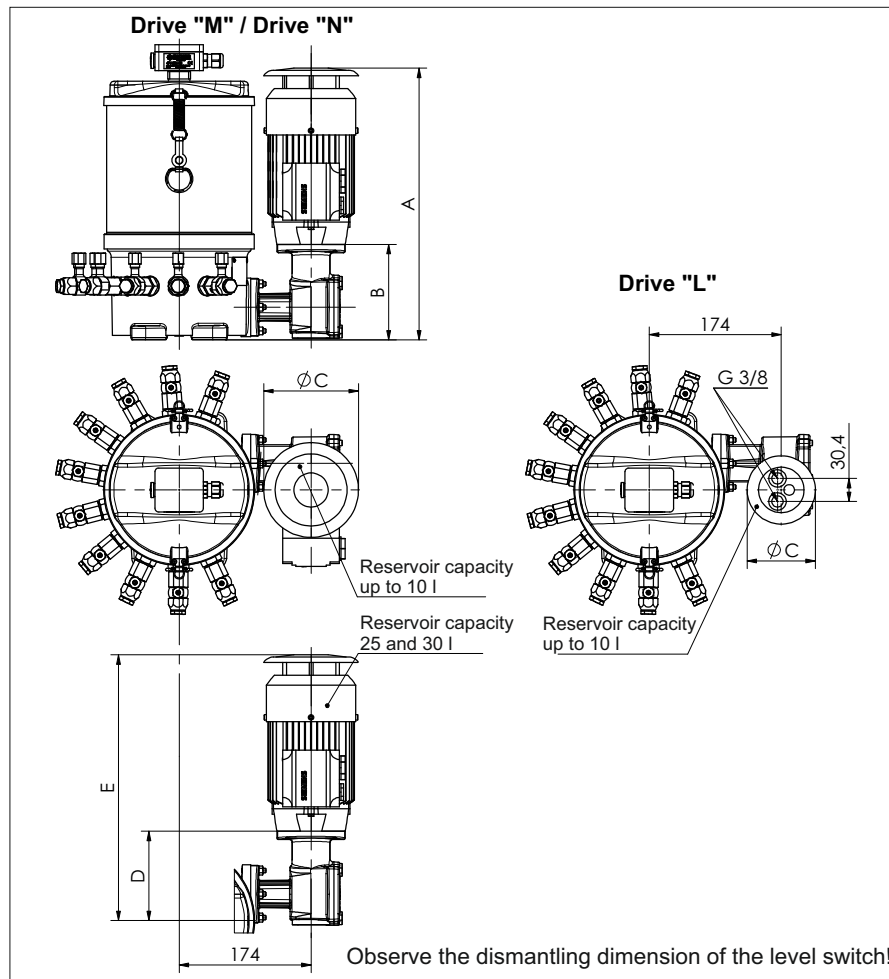
5 and 10 l: by approx. 2,5 l

Reservoir capacity 30 l: by approx. 6,0 l

For further information, see "level monitoring" description.



### Drive types:



- Subject to modifications -

	Dimensions				
	A mm	B mm	ØC mm	D mm	E mm
Drive "M"	358	126	125	118	351
Drive "N"	378	139	145	132	370
Drive "L"	258	118	90	118	254

Overall transmission	Delivery volume ** per element cm <sup>3</sup> /min		max. operating pressure bar			
	Element ø6	Element ø8	Drive "M"		Drive "N"	
	Element ø6	Element ø8	Element ø6	Element ø8	Element ø6	Element ø8
60 : 1	1,8	3,4	230	100	350	200
97 : 1	1,1	2,1	330	170		
160 : 1	0,7	1,3	350	270		
316 : 1	0,4	0,7		320		
625 : 1	0,2	0,3		350		
1250 : 1	0,1	0,2				
2500 : 1 *	0,05	0,1				

\* on request only

\*\* Benchmarks

**Drive "L":** with gear and hydraulic motor  
 Weight kg: 7,7 + reservoir weight + 0,25 x number of elements  
 Overall reduction same as with drives "M", "N"

#### Technical data motor:

When oil flow is 3,5 l/min  
 Power: 0,25 kW  
 Speed: 400 min<sup>-1</sup>  
 Speed: max. 1950 min<sup>-1</sup>  
 Pressure inclination: max. 100 bar  
 Oil flow: max. 16 l/min  
 mind permissible element stroke number!

### Drive "M"

#### Technical data motor:

Assembly group: BG63  
 Type: DIN EN 60034-7 IM 3611 (V18) with canopy  
 Flange: DIN EN 50347 FT 75 (C 90)

#### Electrical data motor:

Voltage  
 at 50 Hz D/Y: 220 ... 240/380 ... 420 V  
 at 60 Hz Y: 440 ... 480 V  
 Current  
 at 50 Hz D/Y: 1,07/0,62 A  
 at 60 Hz Y: 0,60 A  
 Power  
 at 50 Hz: 0,18 kW  
 at 60 Hz: 0,21 kW  
 Speed of rotation  
 at 50 Hz: 1385 min<sup>-1</sup>  
 at 60 Hz: 1685 min<sup>-1</sup>  
 Protection class: DIN EN 60529 IP55  
 Insulation class: F  
 Weight kg: 12,5 + reservoir weight + 0,25 x number of elements

Other motors on request.

### Drive "N"

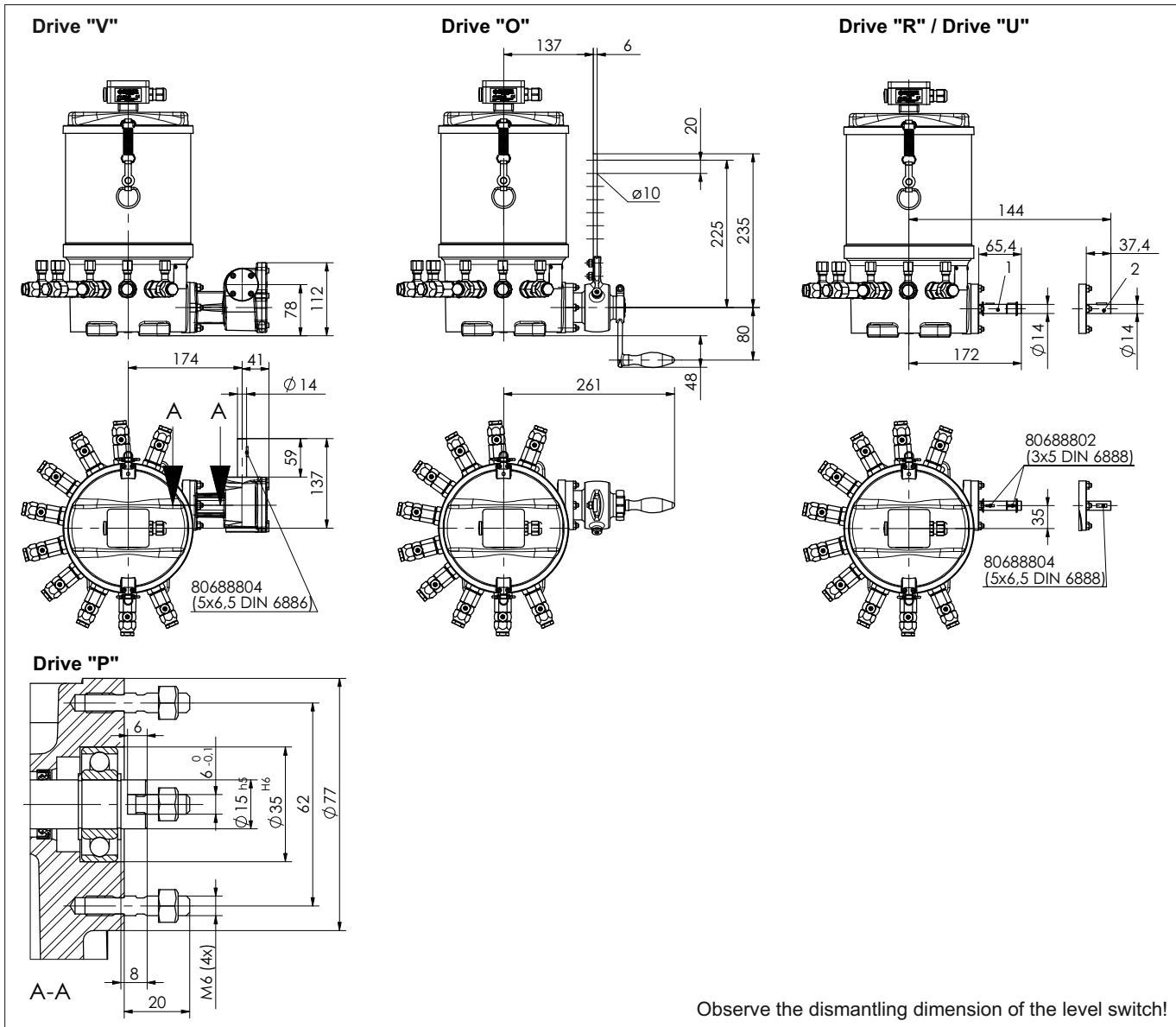
#### Technical data motor:

Assembly group: BG71  
 Type: DIN EN 60034-7 IM 3611 (V18) with canopy  
 Flange: DIN EN 50347 FT 85 (C 105)

#### Electrical data motor:

Voltage  
 at 50 Hz D/Y: 220 ... 240/380 ... 420 V  
 at 60 Hz Y: 440 ... 480 V  
 Current  
 at 50 Hz D/Y: 1,77/1,02 A  
 at 60 Hz Y: 1,04 A  
 Power  
 at 50 Hz: 0,37 kW  
 at 60 Hz: 0,43 kW  
 Speed of rotation  
 at 50 Hz: 1380 min<sup>-1</sup>  
 at 60 Hz: 1680 min<sup>-1</sup>  
 Protection class: DIN EN 60529 IP55  
 Insulation class: F  
 Weight kg: 14,9 + reservoir weight + 0,25 x number of elements

Other motors on request.



Observe the dismantling dimension of the level switch!

**Drive "V":** with gear  
 Weight kg: 6,4 + reservoir weight + 0,25 x number of elements

Transmissions:

97 : 1	160 : 1	316 : 1
625 : 1	1250 : 1	2500 : 1
3300 : 1	4356 : 1	

**Drive "O":** oscillating  
 Weight kg: 6,8 + reservoir weight + 0,25 x number of elements

Transmissions:

1,33 : 1	1,78 : 1	2,33 : 1
4,25 : 1	7,66 : 1	12,7 : 1
25 : 1	50 : 1	66 : 1

Formula for eccentric stroke calculation:

$$h = \frac{2 \times L \times \pi \times n_1 \times i}{n}$$

h = Eccentric stroke in mm  
 L = Swivel lever length in mm  
 n<sub>1</sub> = Stroke number of pump elements in min<sup>-1</sup>  
 i = Transmission  
 n = Speed of the driving shaft in min<sup>-1</sup>

**Drive "P":** without gear, for spare parts keeping  
 Weight kg: 5,1 + reservoir weight + 0,25 x number of elements

**Drive "R":** long driving shaft 1  
**Drive "U":** short driving shaft 2

Transmissions:

1,33 : 1	1,78 : 1	2,33 : 1
4,25 : 1	7,66 : 1	12,7 : 1
25 : 1	50 : 1	66 : 1

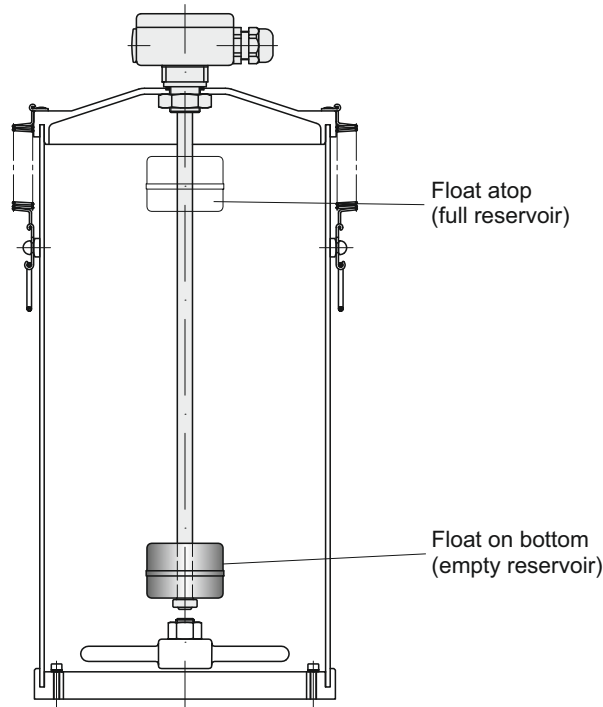
Weight kg: 5,2 + reservoir weight + 0,25 x number of elements

Gears ZAF following data sheet P0833 can be mounted on. Hence, pumps with the drives "M", "N" or "V" are generated.

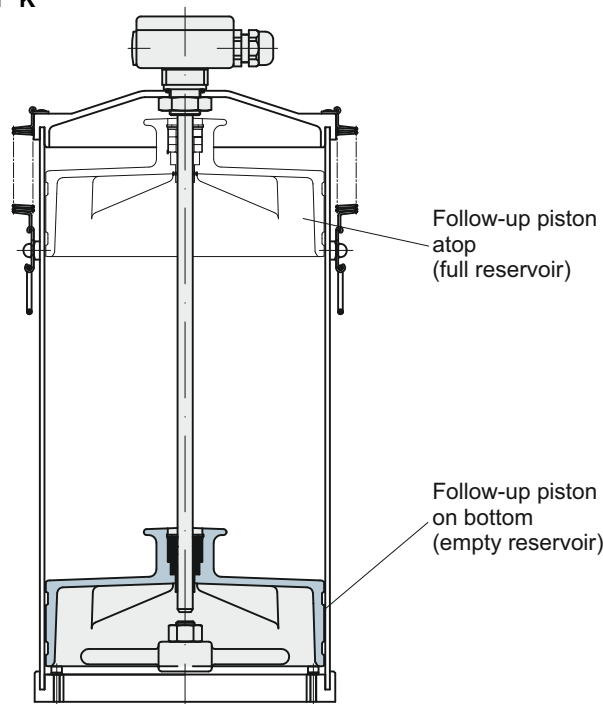
- Subject to modifications -



### Level monitoring via level switch "S"



### Level monitoring via level switch with follow-up piston "K"

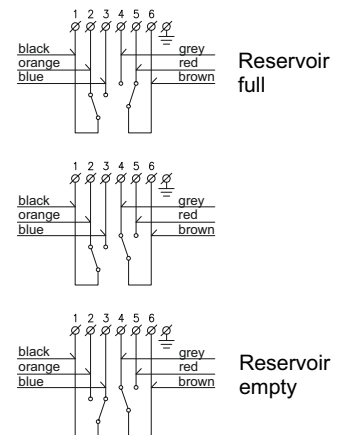


### Level monitoring:

#### Electrical data:

Switching power:	max. 40 W / 60 VA
Switching voltage:	max. 230 VUC
Switching current:	max. 0,5 A
In case of inductive and capacitive loads, protective switchings should be provided for. (Diode, RC-element, varistor)	
Protection class:	DIN EN 60529 IP65
Connection type:	Screw terminals
Cable gland:	M16x1,5
Conductor cross section:	0,5 ... 1,5 mm <sup>2</sup>
Weight:	0,15 ... 0,18 kg

#### Connection diagram:



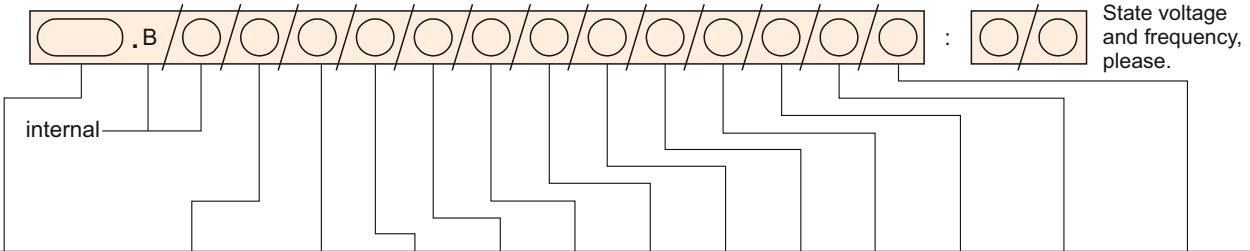
Level switches with follow-up pistons can be fitted into polyester-made reservoirs only.

Follow-up piston weight	
for reservoir:	5 and 10 l = 0,8 kg
for reservoir:	30 l = 2,7 kg

- Subject to modifications -



**Order designation:**



Type		Reservoir capacity		Overall reduction	Drive type	Element 6 <small>see 6+7)</small> with pipe connection			Element 8 <small>see 6+7)</small> with pipe connection			Filling connection	Lock screw Number	Level monitoring		
with motor	without motor	Poly-ester	stainless steel			ø6	ø8	ø10	ø6	ø8	ø10					
see <sup>1)</sup>						see <sup>2)</sup>	see <sup>2)</sup>	see <sup>2)</sup>	see <sup>2)</sup>	see <sup>2)</sup>	see <sup>2)</sup>	see <sup>3)</sup>	see <sup>4)</sup>	see <sup>5)</sup>		
<b>GMF-A</b> (2 point)	<b>PMF-A</b> (2 point)	5 l ⑤	2 l ②V	see table	V M N L O R U P	Number ① ÷ ②	Number ① ÷ ②	Number ① ÷ ②	Number ① ÷ ②	Number ① ÷ ②	Number ① ÷ ②	without ①	① ÷ ② max. 2	① without level monitoring		
together 2 elements possible at maximum!																
<b>GMF-B</b> (10 point)	<b>PMF-B</b> (10 point)		4 l ④V			10 l ⑩	Number ① ÷ ⑩	Number ① ÷ ⑩	Number ① ÷ ⑩	Number ① ÷ ⑩	Number ① ÷ ⑩	Number ① ÷ ⑩	Number ① ÷ ⑩	with B	① ÷ ⑩ max. 10	Grease K with level switch and follow-up piston
together 10 elements possible at maximum!																
<b>GMF-C</b> (20 point)	<b>PMF-C</b> (20 point)	7 l ⑦V	30 l ③①	Number ① ÷ ②①	Number ① ÷ ②①		Number ① ÷ ②①	Number ① ÷ ②①	Number ① ÷ ②①	Number ① ÷ ②①	Number ① ÷ ②①	with V	① ÷ ②① max. 20	Grease F with follow-up piston, without level switch		
together 20 elements possible at maximum!																
<b>GMF-D</b> (24 point)	<b>PMF-D</b> (24 point)	25 l ②⑤V		Number ① ÷ ②④	Number ① ÷ ②④	Number ① ÷ ②④	Number ① ÷ ②④	Number ① ÷ ②④	Number ① ÷ ②④	Number ① ÷ ②④		① ÷ ②④ max. 24	Oil S with level switch without follow-up piston			
together 24 elements possible at maximum!																

- <sup>1)</sup> Any GMF-A/B/C/D version possible in case of drive M, N or L only!
- <sup>2)</sup> When element installation in a certain position is required, please state such position when ordering!  
E. g. in case of 6 elements:  
"Installation into positions 1 ... 3 and 7 ... 9".
- <sup>3)</sup> Instead of an element, a filling connector can be installed!
- <sup>4)</sup> All element-free connections must be closed with lock screws!
- <sup>5)</sup> Level monitoring "K" and "F" possible in case of polyester reservoirs only!
- <sup>6)</sup> Pump element with larger delivery volume on request: 0,22 cm<sup>3</sup>/stroke
- <sup>7)</sup> Pump element with sieve 400 µm on request.

**Order example:**

Pump PMF-B, reservoir 10 l, overall reduction 1,33 (acc. to table), drive type U, 5 pieces of element 6 with pipe connector 8, 2 pieces of element 8 with pipe connector 6, filling connector V, 2 lock screws, level monitoring "S".

**Order designation:**

**PMF-B.B/00/10/1,33/U/0/5/0/2/0/0/V/2/S**

Overall reduction table	V	M	N	L	O	R	U	P	
			60				1,33		
			97				1,78		
			160				2,33		
			316				4,25		
			625				7,66		
			1250				12,7		
			2500				25		
		3300					50		
	4356					66			

- Subject to modifications -





## Additional equipment

### Filling connector:

Order no.	Depiction	Mounting place	Use
Locking nipple "V" with dust cap <b>110.127-65K</b>	<p>Locking nipple DN6</p>	Instead of a pump element.	For reservoir filling.
Locking coupling with dust plug <b>110.135-65K</b>	<p>G 3/8</p> <p>Locking coupling DN6</p>	The locking coupling serves to establish a connection between the locking nipple and the hose.	
Filling nipple "B" <b>110.550-66K</b>	<p>Pipe <math>\varnothing 12</math></p>	Instead of a pump element.	

### Pressure control valve:

Order no.	Opening pressure	Depiction	Mounting place	Use
<b>110.566-64</b>	70 bar		After removal of the locking screw at the pump element, the pressure control valve can be screwed in.	To limit max. operating pressure. The opening pressure is fixed and cannot be changed subsequently.
<b>110.569-64</b>	80 bar			
<b>110.565-64</b>	100 bar			
<b>110.564-64</b>	150 bar			
<b>110.563-64</b>	250 bar			
<b>110.570-64</b>	350 bar			
<b>110.560-64</b>	400 bar			
<b>110.568-65</b>	preset as per customer's specification: from 50 ... 160 bar			
<b>110.562-65</b>	from 160 ... 450 bar			

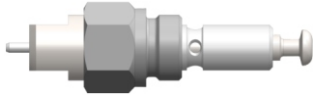
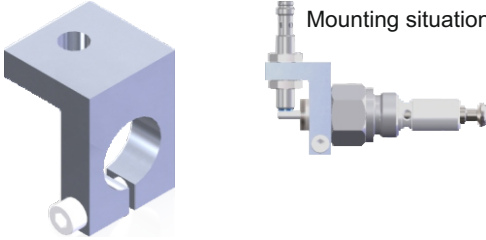
### Manometer connector:

Order no.	Depiction	Mounting place	Use
<b>110.068-65K</b>	<p>G 1/4"</p>	After removal of the locking cap at the pump element, the manometer connector can be screwed in.	To connect a manometer with G 1/4" male thread.

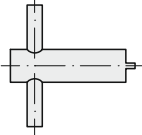
- Subject to modifications -



### Function indication:

Order no.	Depiction	Mounting place	Use
752.528-69		Instead of a pump element.	Optical operating control Function see data sheet P0809
Bracket for proximity switch 752.528-73 M8x1 752.528-74 M12x1	 Mounting situation	To the function indication.	Electrical operating control

### Adjustment spanner:

Order no.	Depiction	Use
110.004-65		After removal of the locking cap at the pump element, the delivery volume of the pump element can be adjusted by using the adjustment spanner (included in scope of delivery = i.e. 1 piece per pump each)

- Subject to modifications -

Technical documents also valid for this product:

- B0343 EN Operating instruction PMF / GMF
- E9501 EN List of spare parts PMF / GMF



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