



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.

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 cm³/stroke at maximum and can be regulated continuously. Maximum operating pressure amounts to 350 bar. The reservoirs are made of steel sheet or transparent polyester material providing capacities between 2 and 30 litres. The reservoir content can be monitored electrically.

Reciprocating pump PMF/GMF 110.000

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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. For pump elements description, see: pump elements mode of operation, please. 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.



PMF pump elements assembly:

When fitting another pump element into the reciprocating pump, please proceed as shown in the sketch beside: With the delivery piston being approximately pulled out half, insert the pump element diagonally upward into the casing's reception hole. Insertion and operation will be easier when the hole that serves to accommodate the delivery piston is filled with grease. Do not put the pump element into horizontal position and screw in, unless the delivery piston's head touches the pressure ring and ratches into the latter's groove.

When demounting, pull the pump element cautiously out of the casing such that the delivery piston will remain within the pump element.

Notes to operation:

Reciprocating pumps must be operated with clean oil or grease from original drums only. If, upon start-up, filling is not made via the filling nipple, the pump, in case of initial filling, has to be filled with gear oil up to the stirrer wing's level. This way, proper deaeration is ensured. The lubricant leads must be cleaned and have no obstructions. They shall not be con-nected with the lubrication points, unless lubricant comes out free of bubbles. All delivery pipe connections should be checked for leakage.





Pump elements mode of operation:

Suction stroke is accomplished by delivery piston 1 and control piston 2. In this process, delivery piston 1 is actuated by the eccentric shaft, whilst the spring actuates control piston 2. The control piston closes pressure hole 3 and is kept in a certain position as determined by the preset delivery volume. The delivery piston moves on, causing a vacuum to be built up in the proportioning space. When the delivery piston has opened suction hole 4, lubricant starts to be sucked from the reservoir.

In case of **pressure stroke**, delivery piston 1 moves to the left. In this motion, suction hole 4 is closed and control piston 2 displaced by virtue of the lubricant being available in between the delivery and control pistons until it releases pressure hole **3** and the lubricant is delivered through the delivery piston to the outlet. The pump elements are delivered with maximum delivery volume, i.e. they are set to full stroke.

The **delivery volume** can be adjusted stageless. To this effect, after having removed lock screw **7** above the adjustable nipple **6**, the stroke is changed by using the spanner enclosed. When turning the nipple to the right, delivery volume will be reduced. At the adjustable nipple, there is a hexagon, against which a spring-loaded piston is pressing radially. Thus, any independent alteration of the delivery volume is prevented. At the same time, the locking serves as a measure for setting the delivery volume. Six lockings equal one turn of the

adjustable nipple with the delivery stroke being changed by 1 mm. An overall stroke of 3 mm corresponds to 18 lockings. The delivery volume should not fall short of 25 % of the maximum volume, i.e. a reduction from full stroke by 14 lockings.

The element having a piston diameter of 8 mm = 0,15 cm³/stroke is marked with a red ring **"R"**.

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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	Туре
at maximum 2	GMF-A PMF-A
at maximum 10	GMF-B PMF-B
at maximum 20	GMF-C PMF-C
at maximum 24	GMF-D PMF-D

General technical data:

Admissible delivery pressure: 350 bar
Number of elements: 1 24
Delivery volume per stroke and element in case of pump element 6: 0,08 cm ³ in case of pump element 8: 0,15 cm ³
Stroke numbers of elements: 125 min ⁻¹ 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 tempera- tures, grease penetration should be observed!
Medium: Oil and grease
When choosing the reservoir and level monitoring, the medium should be taken into account
Drive direction of rotation: as needed
Reciprocating pump installation position: vertical
Material: Casing: Aluminium Pump element: Steel, galvanised Reservoir 2, 4, 7, 25l: Steel, galvanised Reservoir 5, 10, 30l: Polyester Gaskets: NBR

- Änderungen vorbehalten -

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Reservoir:

Reservoirs with capacities ranging between 2I and 30I 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.

Reservoir materials:

Capacity	Material	Weight
21		1,0 kg
4	Steel,	1,4 kg
71	galvanised	2,0 kg
25		4,6 kg
51	Polyester,	1,5 kg
10 I	fibreglass	1,8 kg
301	reinforced	4,0 kg

Reservoirs and level monitoring capability:

Capacity	Level monitoring			
21		impossible		
4	for oil:	Float switch min. level		
71	for oil:	Float switch		
25 I		min. and max. level		
51	for oil:	Float switch		
10 I	for grease:	min. and max. level		
30 I		min. and max. level		

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

Reservoir capacity 51 and 101

by approx. 2,51

Reservoir capacity 301 by approx. 6,01

For further information, see "level monitoring" description

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Drive types:



Drive "M": Drive "N":	with gear and motor BG63 with gear and motor BG71
Weight [kg]:	10,7 + reservoir weight+ 0,25 x number of elements

The gears are filled with 80 cm³ ISO VG 220 gear oil. After 3000 hours of operation, checking is required.

Motor electrical data:

Mains voltage:	230/400V
Frequency: Special voltage and freque	50 Hz ency possible
Synchronous speed:	1500 min ⁻¹
Power: Drive "M": Drive "N":	0,18 kW 0,37 kW
Protection system:	IP55
Thermal category:	F

Overall	Delive per elemer	ry flow max. operating pressure [bar] (with 20 elements ins it [cm³/min] Drive "M" Drive "N"		max. operating pressure [bar Drive "M"		ments installed)
l'ansimission	Element Ø6	Element Ø8	Element Ø6	Element Ø8	Element Ø6	Element Ø8
60 : 1	1,82	3,4	230	100		200
97 : 1	1,12	2,1	330	170		
160 : 1	0,67	1,28		270		
316 : 1	0,34	0,64		320	350	250
625 : 1	0,17	0,32	350			350
1250 : 1	0,087	0,163		350		
2500 : 1 *	0,0435	0,0815				
* on request of	only					

Drive "L":	with gear and hydraulic motor				
Weight [kg]:	7,7 - 0,25	+ reserv 5 x numb	voir v ber c	veight of elem	+ nents
Overall redu "M", "N"	iction	same	as	with	drives

Motor technical data:

When oil flow is 3,5 l/min	
Power:	0,25 kW
Speed:	400 min ⁻¹
Speed max.:	1950 min ⁻¹
Pressure inclination max.	.: 100 bar
Oil flow max.: mind permissible number!	16 l/min element stroke
The georgers filled with 9	

The gears are filled with 80 cm³ ISO VG 220 gear oil. After 3000 hours of operation, checking is required.

- Änderungen vorbehalten -

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drives "M", "N" or "V" are generated.

n = Speed of the driving shaft

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Level monitoring:

Electrical data:	
Switching power at max .:	40 W / 60 VA
Switching voltage at max.:	230 VUC
Switching current at max.: In case of inductive loads, protective switc provided for (diode varistor)	0,5 A and capacitive chings should be e, RC-element,
Protection system:	IP 65
Connection type:	Screw terminals
Cable gland:	PG11
Conductor cross secton:	0,51,5 mm²
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:	5a.101=0,8kg
for reservoir:	301=2,7 kg

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Auxiliaries

Filling connector:



Pressure control valve:

Purchase-no.	Opening pressure [bar]	Depiction	Mounting place	Use
110.566-65	70 bar	I		
110.564-65	150 bar		After removal of the	
110.560-65	400 bar		locking screw at the	To limit max.
	preset as per customer's specification:		pressure control valve can be screwed in.	oporating pressure.
110.568-65	from 50 to 160	I		
110.562-65	from 160 to 250			

Manometer connector:

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

Adjustment spanner:

Purchase-no.	Depiction	Use
110.004-45		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)

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Purchase-designation: Reciprocating pump												State voltage and frequency, please.			
	Ту	ре	Reservoir capacity []]		Overall	Drive	Element 6 with pipe connection		E with p	Element 8 with pipe connection		Filling	Lock screw	Level	
	with motor	without motor	Polyester	Steel	tion	type	Ø 6	Ø8	Ø 10	Ø 6	Ø8	Ø 10	connection	Number	monitoring
	see 1)						see 2)	see 2)	see 2)	see 2)	see 2)	see 2)	see 3	see 4)	see 5)
	GMF-A (2 places)	PMF-A (2 places)		2		V M	Number	Number	Number	Number	Number	Number	without	(0) ÷ (2) at max. 2	0 without level monitoring
	GMF-B (10 places)	PMF-B (10 places)	(5)	4	see	N L	Number	Number	Number (0)÷(10)	Number	Number	Number (0)÷(10)	with	0 ÷ 10 at max. 10	Grease K with level switch and follow-up
	GMF-C (20 places)	PMF-C (20 places)	10	7	table	O K R	Number	Number (0÷20)	Number (0)÷20	Number	Number	Number	B	0 ÷ 20 at max. 20	Grease F with follow- up piston,
	GMF-D (24 places)	PMF-D (24 places)	30	25		(U) (P)	toge Number (0)÷(24)	Number 0÷24	Number 0÷24	possible Number (0)÷(24) possible	at maxim Number (0)÷24 at maxim	um! Number 0÷24 um!	with V	0 ÷ 24) at max. 24	without level switch Oil (S) with level switch without follow-up piston

1) Any GMF-A/B/C/D version possible in case of drive M, N or L only!

- 2) When element installation in a certain position is required, please state such position when ordering! For instance: In case of 6 elements: "Installation into positions $1\div3$ and $7\div9$ ".
- 3) Instead of an element, a filling connector can be installed!
- 4) All element-free connections must be closed with lock screws!
 5) Level monitoring "K" and "F" possible in case of polyester reservoirs only!

	V	М	Ν	L	0	Κ	R	U	Ρ	
Overall reduction table			60		1,33					
				1,78						
	1	60			2,33					
	3	316			4,25					
	6	625			7,66					
	12	250			12,7					
	25	500			25					
	3300				50					
	4356				66					

Purchase-example:

Pump PMF-B, reservoir 10l, 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, 3 lock screws, level monitoring "S".

Purchase-designation: PMF-B/10/1,33/U/0/5/0/2/0/0/V/2/S

- Änderungen vorbehalten -