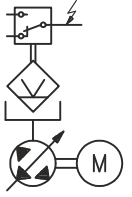




Illustration shows example

**Pump unit
GMA**



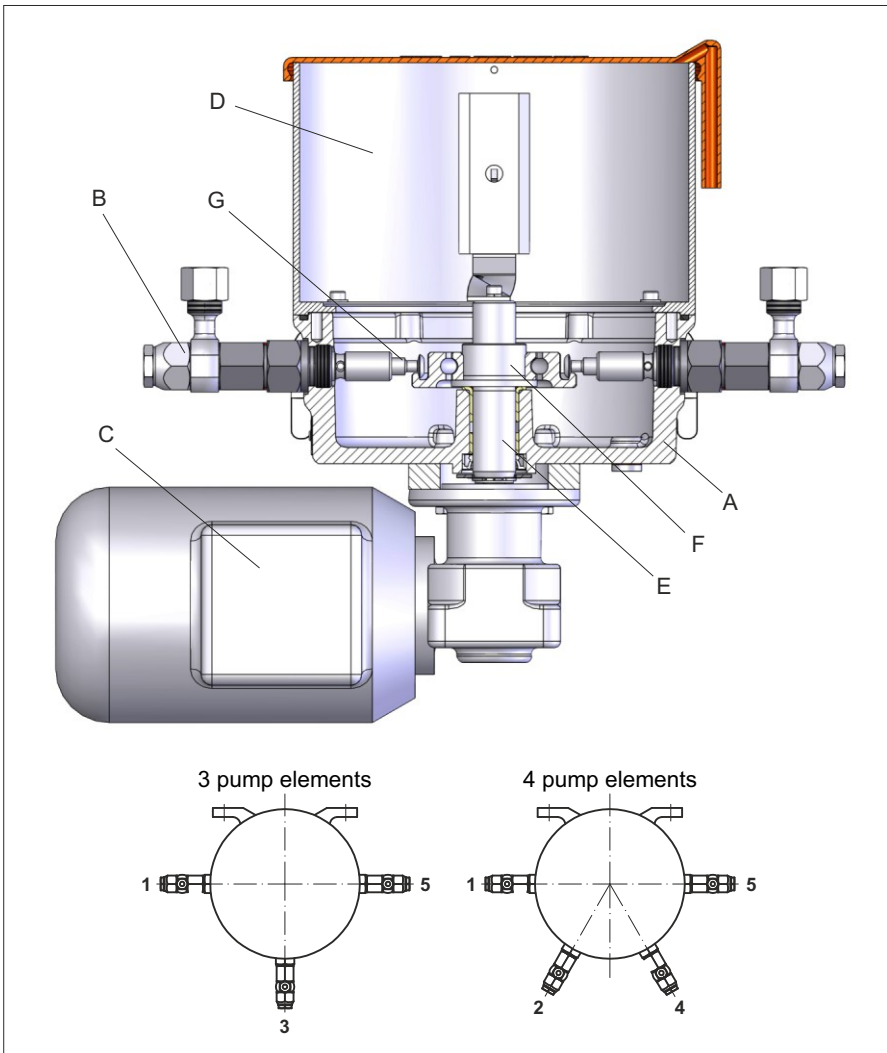
Application:

Pump unit in centralized lubrication systems

- adjustable delivery volumes
- with monitoring device
- with up to 4 pump elements
- usable for delivery of oil, semi-fluid grease or grease

- Subject to modifications -

Reservoir size Reservoir	2 or 4 l transparent	4 or 7 l stainless steel	5 or 10 l Polyester
<p>Pump unit GMA-B</p> <p>Drive by means of 24 V direct current motor</p>			
<p>Pump unit GMA-C</p> <p>Drive by means of three-phase current motor</p>			
<p>electrical level control (alternativ)</p>	<p>for grease NLGI-class 1 and 2 (intermittently signal) for oil (float switch)</p>	<p>for grease NLGI-class 1 and 2 (intermittently signal) for oil (float switch)</p>	<p>for grease NLGI-class 1 and 2 (static signal) for oil (float switch)</p>



Description:

Actuation:

The pump unit GMA is actuated by a three-phase A.C. motor or a D.C. motor (C), which is flanged to the pump casing (A) from the bottom.

Pump:

At the radial piston pump there are up to four pump elements (B) arranged radially around an eccentric (F), which is surrounded by a rolling bearing. On rotation of the actuator or the eccentric shaft (E) respectively the pump piston (G) of each pump element designs a suction or a delivery stroke per revolution and thus delivers the lubricant out of the reservoir (D) to the lubricating points. The delivery volume can be adjusted at each pump element individually. Depending on the operation (lubricant, lubricant supply etc.) the pump unit can be equipped with different pump elements, reservoir and monitoring units.

Operating instructions:

For the lubrication pumps only clean oil or grease from original containers may be used. If, before putting into operation, the lubricant is not filled through the filling nipple, the pump must be filled up to the vane with gear oil during initial filling to ensure good venting. The lubricant lines must be clean and free from obstructions. Do not connect them to the lubrication points before the lubricant emerging from the lines is free from air bubbles. Check all connections of the pressure lines for leakages.

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

Technical data general:

adm. delivery pressure: max. 250 bar
 Number of pump elements: 1 ... 3
 Installation at place 1, 3, 5
 Number of pump elements: 1 ... 4
 Installation at place 1, 2, 4, 5
 Delivery capacity per stroke and element
 in case of pump element $\varnothing 6$: 0,08 cm³
 in case of pump element $\varnothing 8$: 0,15 cm³
 Special pump element: 0,22 cm³
 (on request)
 Temperature range
 GMA-B: -20 ... +60 °C
 GMA-C: -20 ... +40 °C
 In case of low temperatures the grease penetration shall be regarded.
 Inserting position: vertically
 Material
 Housing: Aluminium
 Pump element: Steel, galvanized
 Gaskets: NBR
 Medium: Oil and grease up to NLGI-class 2
 (Mind the using conditions applicable to the reservoir and level monitoring utility!)

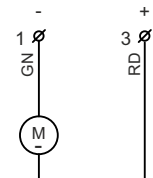
GMA-B:

Electrical data (motor):

Connecting voltage: 24 VDC
 Current: max. 2,5 A
 Number of rotations (depending on load)
 Connecting voltage 24 V
 when connected to 1 and 3: appr. 27 min⁻¹

(Depending on type, the direct current gear motor may be operated in pulse mode only.)

Connection scheme:

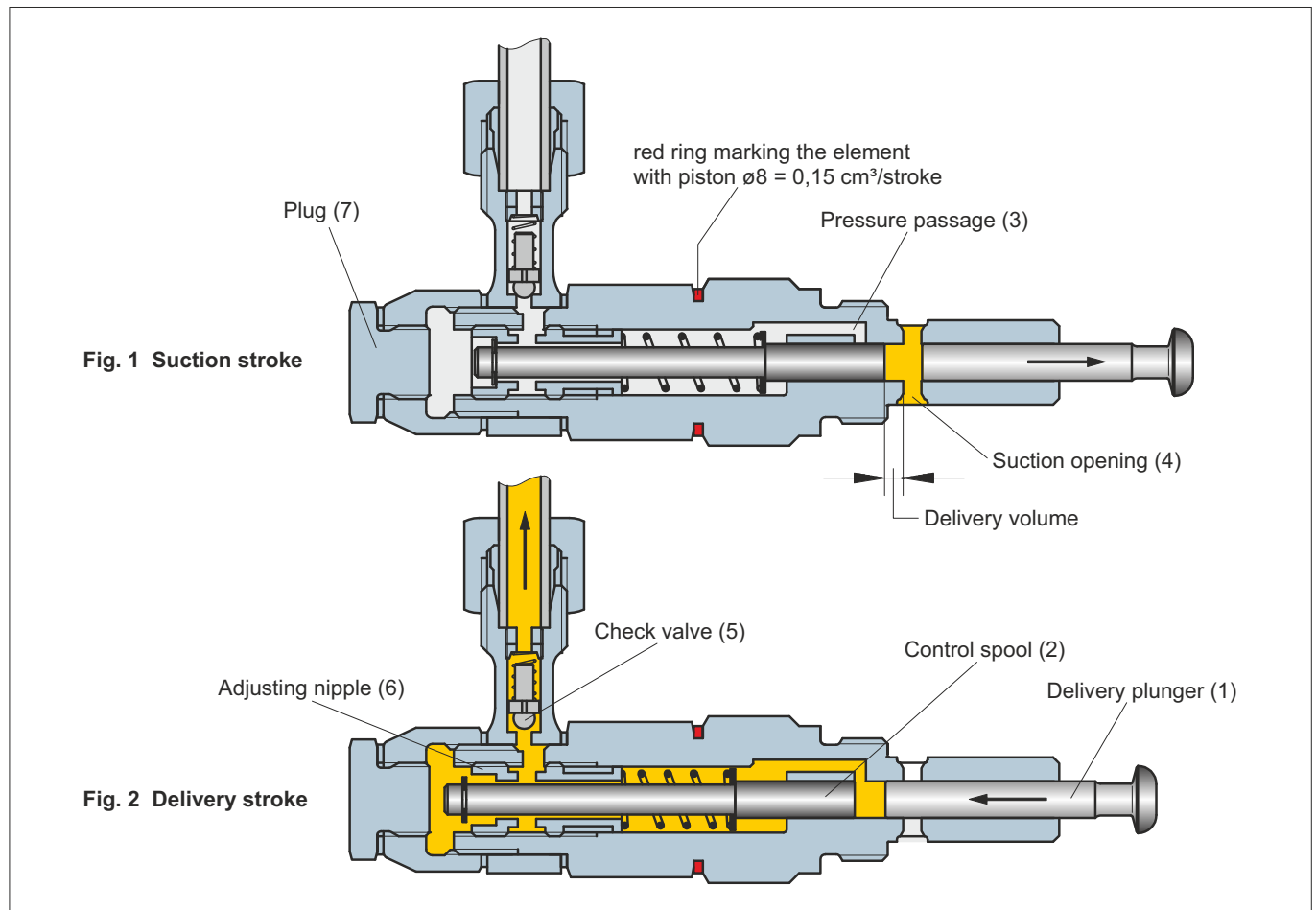


GMA-C:

Electrical data (motor):

Connecting voltage: 230/400 V (Δ/λ)
 Mains frequency: 50 Hz
 Protection class: DIN EN 60529 IP55
 Insulating category: F
 Special voltage upon request

Rotations at the pump shaft	Rated power	Rated current 230/400 V
① n = 1 min ⁻¹	45 W	0,31/0,18 A
④,5 n = 4,5 min ⁻¹	45 W	0,31/0,18 A
②5 n = 25 min ⁻¹	90 W	0,78/0,45 A



- Subject to modifications -

Operation of pump elements:

The suction stroke (fig. 1) is accomplished by the delivery piston (1) and the control piston (2). During that operation the delivery piston (1) is actuated by the eccentric shaft, and the control piston (2) by the spring. The control piston closes the pressure hole (3) and, depending on the set delivery capacity, remains at a certain position. With the delivery piston moving on, a vacuum will build up within the dosage area. After opening the suction hole (4) by the delivery piston, the lubricant starts to be sucked off the reservoir.

In case of pressure stroke (fig. 2) the delivery piston (1) moves to the left. As a result, the suction hole (4) will be closed with the lubricant available between the delivery and control pistons (2) being shifted until it clears the pressure hole (3) and the lubricant is delivered through the delivery piston up to the outlet. The pumps are supplied with their delivery capacities being set at maximum, i. e. at full stroke setting.

Delivery volume adjustment:

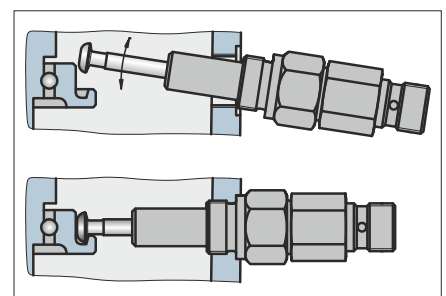
The **delivery volume** can be reduced to minimum of appr. 25% of the rated one. After having removed lock screw (7), the stroke is to be changed by means of the enclosed spanner through adjustment nipple (6). When turning the nipple to the right, delivery volume will decrease. At the adjustment nipple, there is a hexagon against which a spring loaded piston is pressing radially. Thus, any independent change of the delivery volume will be prevented. At the same time, the latching serves as a measure for setting the delivery volume. Six latches equal one rotation of the adjustment nipple and a reduction of the nominal delivery volume by appr. 33%. Precise setting to a specific delivery volume per stroke must ensue, based on volumetric measurements.

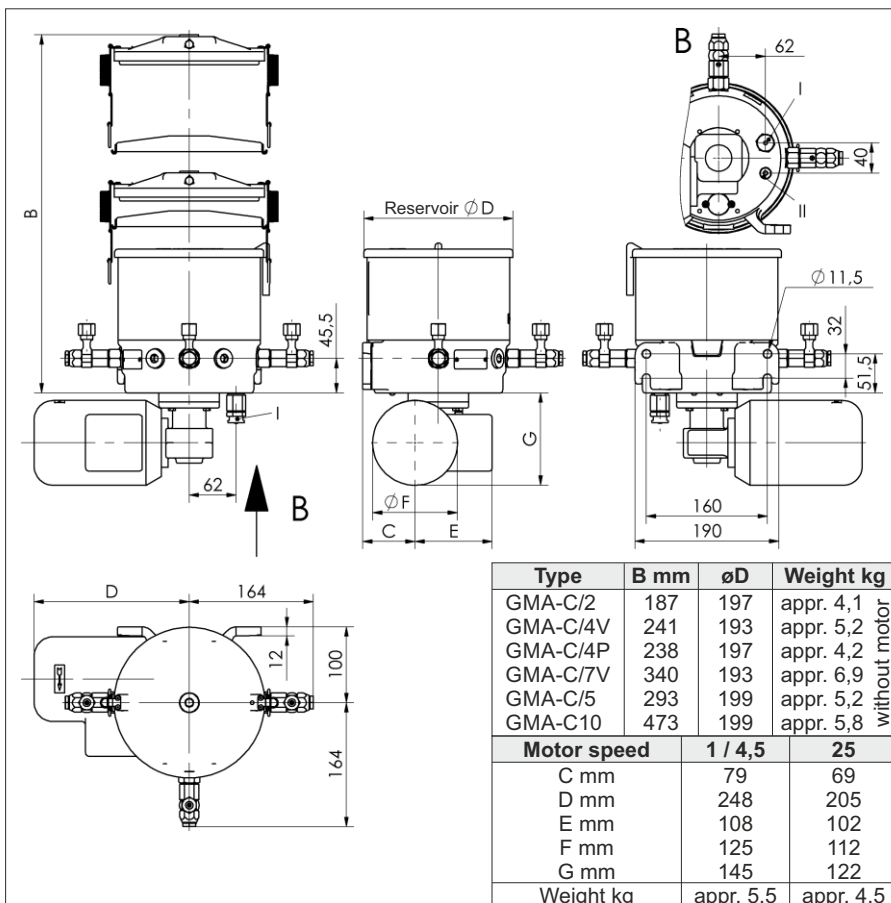
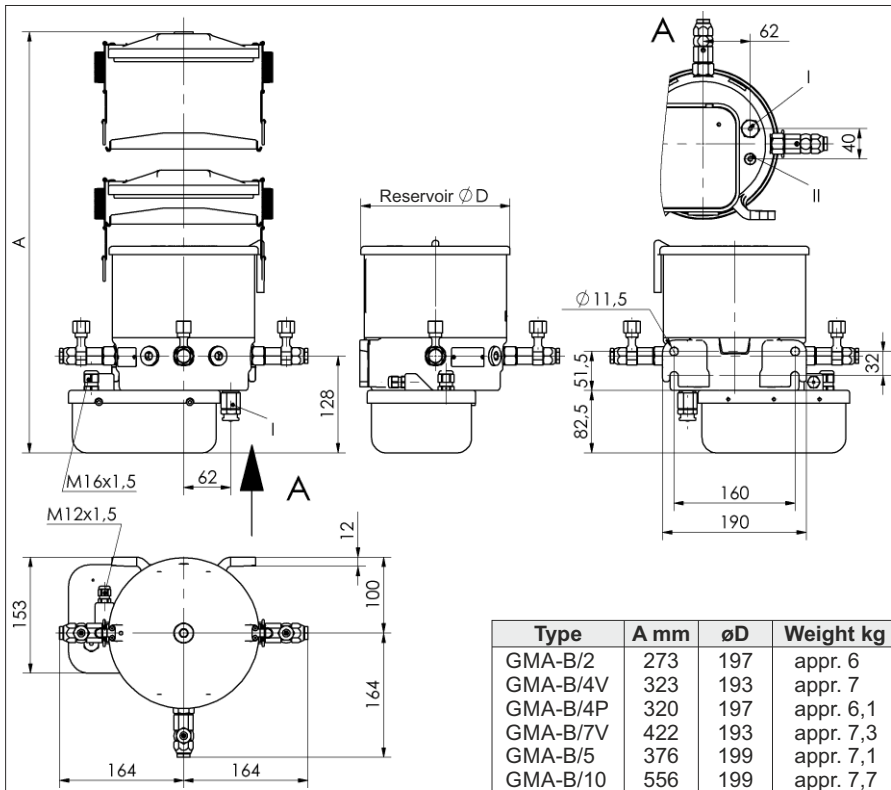
The element with a piston diameter of 8 mm = 0,15 cm³/stroke is marked with a red ring (see fig. 1).

Installation of pump elements:

If another pump element is to be installed in the lubrication pump subsequently, proceed as shown in the drawing on the right:

Insert pump element at an upwards inclination into the locating hole with the plunger pulled out about half way. To facilitate installation and putting into operation, fill the bore taking up the plunger with grease. Bring into horizontal position and screw in only after the plunger head abuts the pressure ring and engages in the groove of the pressure ring.





Reservoir / level monitoring:

Reservoir size	Level monitoring options
2 l (2)	Float: Min. level (F/0)
4 l (4P, 4V)	Proximity switch: Signal intermittently Min. level (C/0)
7 l (7V)	Float: Min. and max. level (F/0) Proximity switch: Signal intermittently Min. level (C1/0, C2/0)
5 l (5)	Float: Min. and max. level (F/0)
10 l (10)	Follow-up piston: Min. und max. level (F/K)

Level monitoring	suitable for delivery of
without level monitoring (0/0)	Oil as of 20 cP Grease up to NLGI-cl. 2
Float (F/0)	Oil as of 20 cP
Proximity switch (C1/0, C2/0)	Grease of NLGI-cl. 1 and 2
Follow-up piston (F/K)	Grease of NLGI-cl. 1 and 2

Reservoir size	Reservoir material
2 l (2)	Polyamide transparent
4 l (4P)	
4 l (4V)	stainless steel
7 l (7V)	
5 l (5)	Polyester fibreglass reinforced
10 l (10)	

When using a "K" sequence piston, the utilisable reservoir capacity decreases by approx. 2,5l.

Remark on the dimensional drawings:

- I = Filling connector (Connection thread G 3/8)
- II = Return connector G 1/8

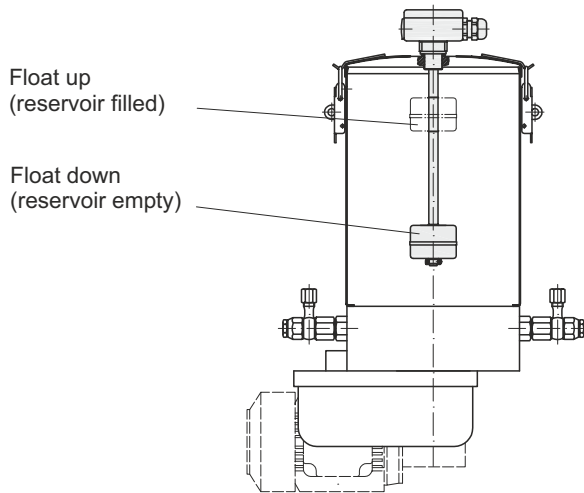
- Subject to modifications -



- Subject to modifications -

Oil-level monitoring

(F)/(O)



Electrical data level monitoring

(F)

Switching data:

Switching power: max. 40 W / 60 VA
 Switching voltage: max. 230 VUC
 Switching current: max. 0,5 A
 * In case of d.c. with inductive load a protective circuit shall be provided for.
 Protection class: DIN EN 60529 IP65
 Type of connection: Terminal box
 Cable gland: M16x1,5
 Wire cross section: 0,5 ... 1,5 mm²

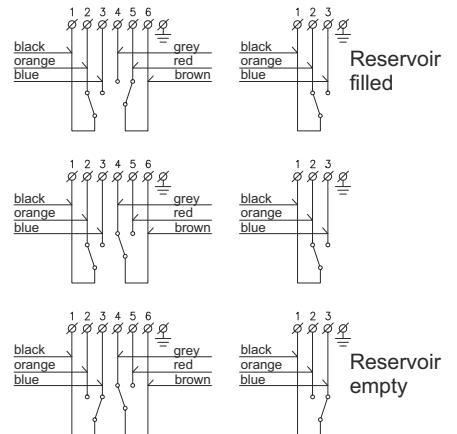
Connection diagram level monitoring

(F)

Reservoir size:

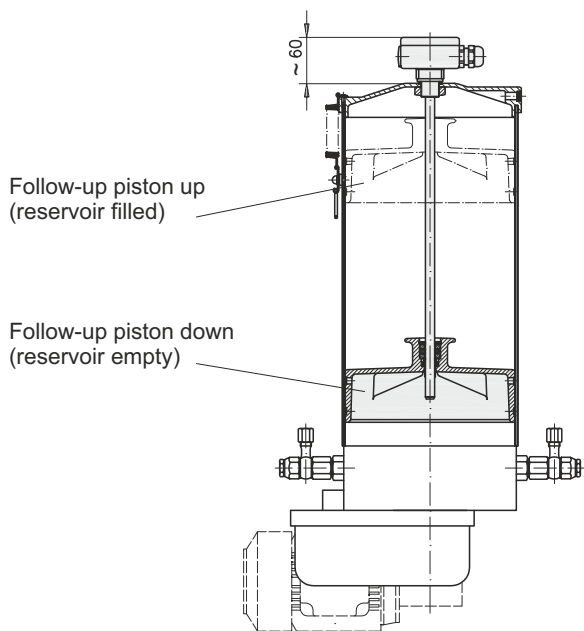
5l, 7l, 10l

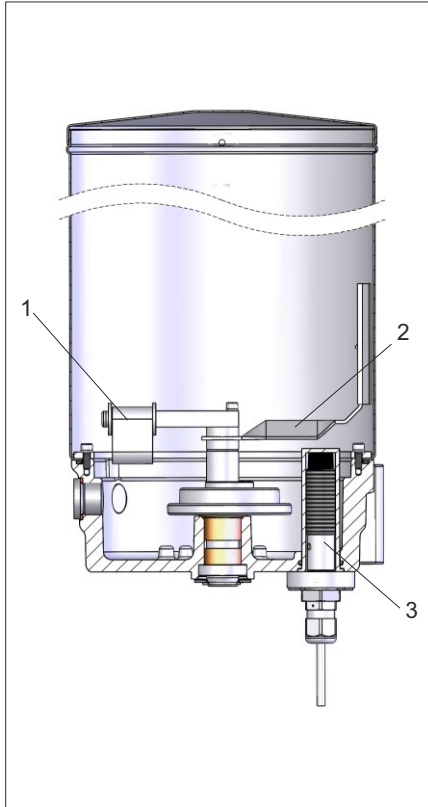
2l, 4l



Level monitoring for grease NLGI-class 1 and 2

(F)/(K)



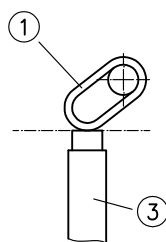
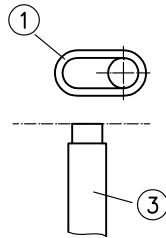
Grease-level monitoring via proximity switch (C1) (C2)


The grease inside the reservoir causes to lift up the actuating flap (1) upon rotation of the pump driving shaft. No signal will be given.

In case of an empty reservoir and a rotating pump driving shaft the actuating flap (1) will intermittently attenuate the proximity switch (3).

In case of full reservoir, the actuating flap, depending on grease penetration, may fall during standstill and attenuate the proximity switch (3).

Therefore, when evaluating the proximity switch signal, it should be ensured that the proximity switch signal is evaluated delayed (by approx. 10 s).


Electrical data level monitoring
by proximity switch with cable (C1)

by proximity switch with plug (C2)

Operating voltage:	10 ... 30 VDC
Residual ripple:	≤10%
Load current:	max. 200 mA
Inherent power consumption:	approx. 7,5 mA
Potential drop:	~0,8 V

The "empty" signal will be intermittently.

The function of monitoring "C" has been tested with mineral oil-based lubricants successfully. In case of special lubricants, suitability needs to be tested.

Type of connection:

(C1) GMA-B:	Terminal strip
GMA-C:	Cable 3 m
(C2) GMA-B:	(not possible)
GMA-C:	Male M12x1, 4-pin

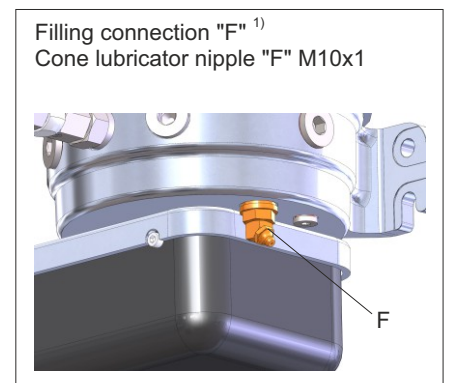
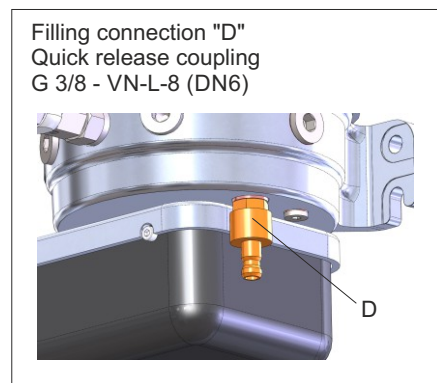
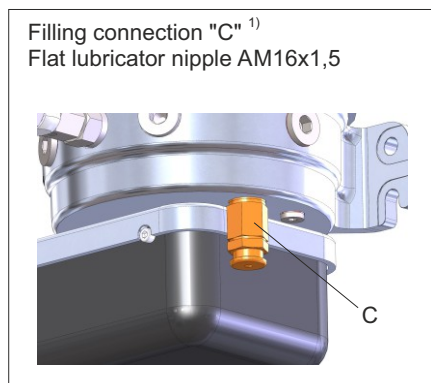
(for matching connecting cable see accessories)

Remark on functional principle:

- 1 Actuating flap
- 2 Agitator blade
- 3 Proximity switch

Filling connection:

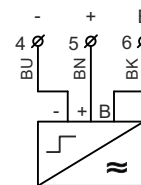
The filling connection is located under the pump housing.



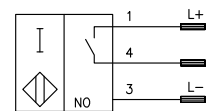
¹⁾ not suitable for oil

Connection scheme: Proximity switch

with cable (C1)



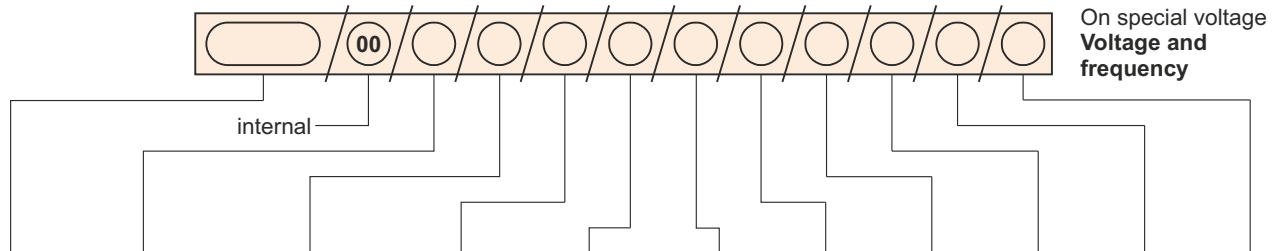
with plug (C2)



- Subject to modifications -



Order designation:



Drive	Reservoir size	Level monitoring	Follow-up piston	Filling connection	Pump element ^{3) 5)}					Number of revolution pump shaft ²⁾
					Place 1	Place 2	Place 3	Place 4	Place 5	
Direct current motor 24 V GMA-B01	2 l (Polyamide) (2)	without monitoring (0) For oil: Min. monitoring at reservoir (2) (4P) (4V) Min. and max. monitoring at reservoir (5) (7V) (10)	without (0)	without (0) Flat lubrication nipple ⁴⁾ AM16x1,5 DIN 3404 (C)	Pump element 6 with pipe connection					GMA-B: no sign
	4 l (Polyamide) (4P)			ø6 (66) ø6 (66) ø6 (66) ø6 (66) ø6 (66) ø8 (68) ø8 (68) ø8 (68) ø8 (68) ø8 (68) ø10 (610) ø10 (610) ø10 (610) ø10 (610) ø10 (610)						
	4 l (stainless steel) (4V)	without stirrer blade (F) with stirrer blade (F1)		Pump element 8 with pipe connection					GMA-C: 1 min ⁻¹ (1)	
	7 l (stainless steel) (7V)	For grease: Intermittent min. monitoring for all reservoirs (C1) (C2) ¹⁾		Nipple for snap (counterpart see accessories) (D)	ø6 (86) ø6 (86) ø6 (86) ø6 (86) ø6 (86) ø8 (88) ø8 (88) ø8 (88) ø8 (88) ø8 (88) ø10 (810) ø10 (810) ø10 (810) ø10 (810) ø10 (810)					
Three-phase current motor 400 V / 50 Hz or special voltage GMA-C01	5 l (Polyester) (5)	For grease: Min. / max. monitoring at reservoir (5) and (10)	with (K)	Cone lubrication nipple ⁴⁾ (F)	without pump element, place of installation closed (0) (0) (0) (0) (0)					4,5 min ⁻¹ (4,5)
	10 l (Polyester) (10)	with (F) without (0)			without pump element, place of installation not closed (open treaded bore) (L) (L) (L) (L) (L)					25 min ⁻¹ (25)

- Subject to modifications -

¹⁾ Level monitoring "C2" possible on GMA-C only
²⁾ For speed of GMA-B motor please see "technical data"
³⁾ Pump element with larger delivery volume on request: 0,22 cm³/stroke
 Order no. **110.990-65**
⁴⁾ Not suitable for oil
⁵⁾ When attaching pump elements at the locations 2 and 4, never mount another pump element at location 3, then.

Order example:

Pump unit GMA-C01 with reservoir size 2 l and level monitoring for oil, filling connection "D", pump element 8 with pipe connection ø8 at place 1 and pump element 6 with pipe connection ø8 at place 5, motor rotations 4,5.

Order designation:

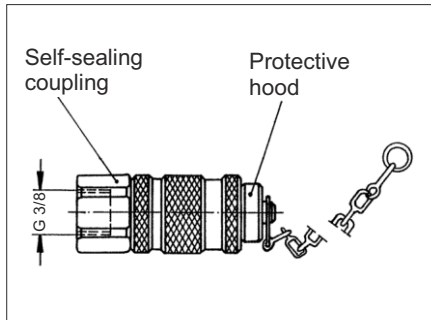
GMA-C01/00/2/F/0/D/88/0/0/0/68/4,5



**Accessories:
(please order separately)**

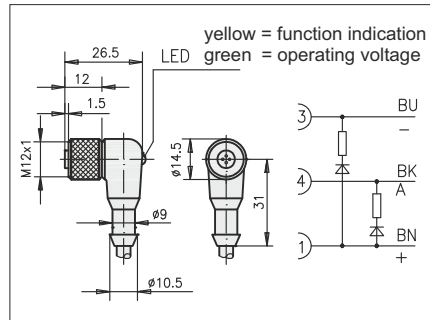
Counterpart to filling connection "D"

Order no. **110.135-65**



Connecting cable for level monitoring "C2" with LED, with cable 5 m / 90°

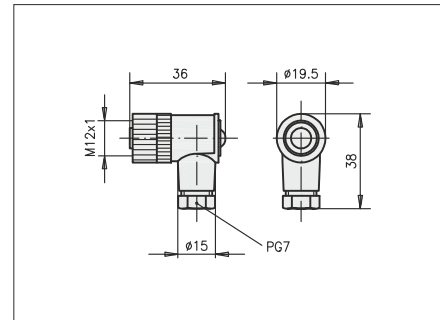
Order no. **913.404-19**



Cable cross section: 3x0,34 mm²
Operating voltage: 10 ... 30 VDC
Protection class: DIN EN 60529 IP68
Ambient temperature: -40 ... +90 °C

Cable socket for level monitoring "C2" without LED, packageable

Order no. **913.404-24**



Connecting type: Screws
Connecting cross section: 0,75 mm²
Cable cross section: max. 4 ... 6 mm
Cable gland: Pg7
Protection class: DIN EN 60529 IP67
Ambient temperature: -40 ... +85 °C

Function indication:

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

Technical documents also valid for this product:

B0301 EN Operating instructions GMA-B, -C
E0301 EN Spare parts GMA-B, -C



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