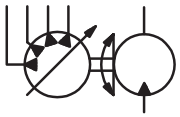
WOERNER
The Experts in Lubrication

**Piston pump**
**GMF-S01**



**This is a multi-line reciprocating pump for many applications, especially for mining industry**

- **The piston pump is driven by a hydraulic motor, alternatively by a geared motor**
- **All external parts are made of steel, the pump body is made of ductile iron**
- **Up to 24 adjustable pump elements**
- **Reciprocating pumps can be used with oil and grease**

**General description:**

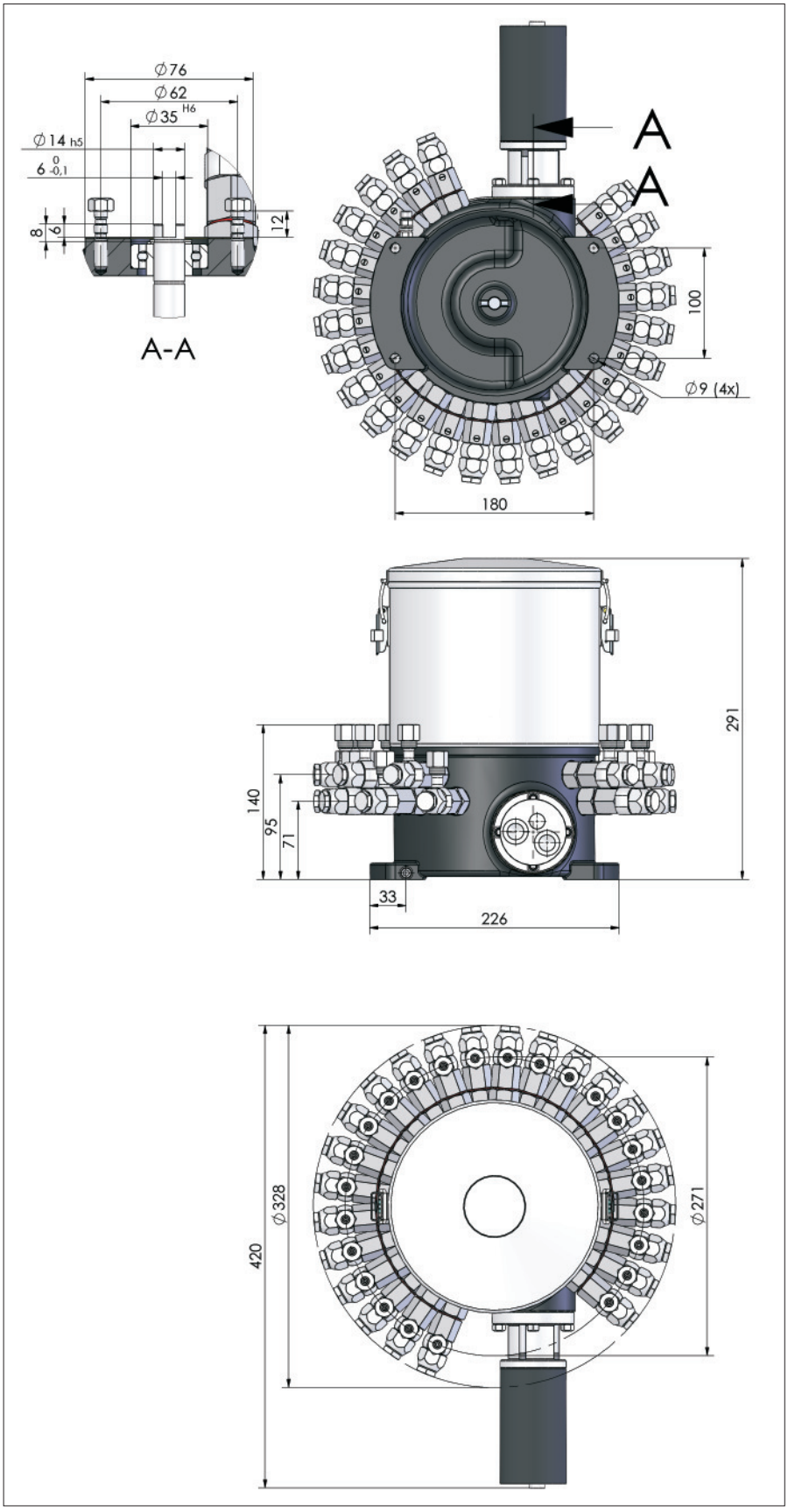
The reciprocating pump is capable of accommodating up to 24 pump elements. Delivery volume per element each is 0,08 or 0,15 cm³/stroke at maximum and are adjustable (0,22 cm³/stroke (not adjustable) on request). The reservoirs are made of stain-less steel material providing capacities between 2 and 25 litres.

- Subject to modifications -



EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de

**Data sheet** **P0836.03.15 EN**
Replaces P0781.08.14 EN




**General technical data:**

Admissible delivery pressure: 350 bar
The delivery pressure depends on the drive (pressure, volume flow), the reduction and the pump elements (number, size).

on request (pump elements "heavy series" e.g.) 400 bar

Number of pump elements: 1 ... 24

Delivery volume per stroke and element
in case of pump element 6: 0,08 cm³
in case of pump element 8: 0,15 cm³
special pump element (on request) 0,22 cm³

Stroke numbers of elements: 1 ... 25 $min^{-1}$
(=Rotation speed of pump shaft)
in case of deviation, please enquire.

Temperature range: -20 ... +80 °C
In the presence of low temperatures, grease penetration should be observed!

Medium: Oil and grease up to NLGI-class 3

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

Drive direction of rotation: as needed

Reciprocating pump installation position: vertical

Reservoir capacity: 2, 4, 7, 25 l

Material
Casing: Spheroidal graphite iron, painted
Pump element: Steel, galvanised
Reservoir 2 ... 25 l: Stainless steel

Gaskets: NBR

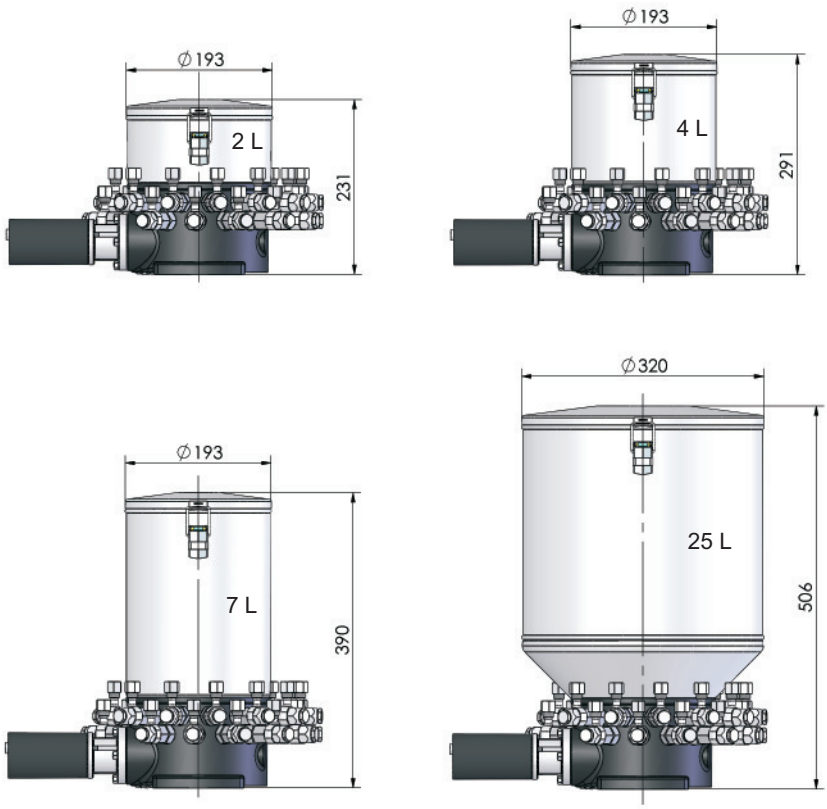
- Subject to modifications -

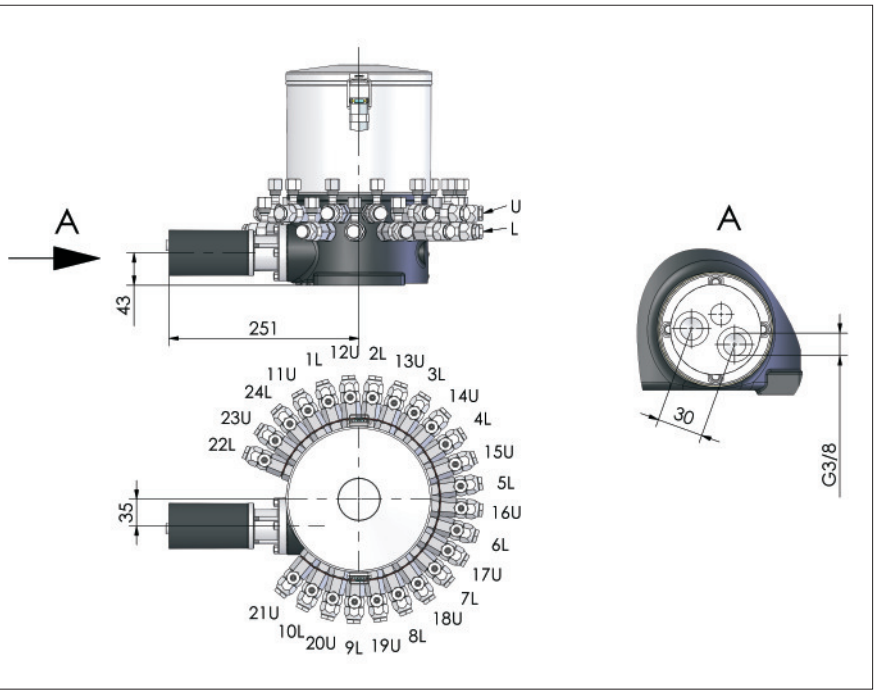


EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de

- Subject to modifications -

**Versions of reservoirs**




**Reservoir:**

Reservoirs with capacities ranging between 2 l and 25 l are available for delivery.

**Reservoir materials:**

| Capacity | Material | Weight |
|---|---|---|
| 2 l | stainless steel | 1,0 kg |
| 4 l | | 1,4 kg |
| 7 l | | 2,0 kg |
| 25 l | | 4,6 kg |

**Technical data for standard hydraulic motor:**

| | |
|---|---|
| Minimal hydraulic pressure: | ≥40 bar |
| Speed min.: | 50 $min^{-1}$ |
| Speed max.: | 1950 $min^{-1}$ |
| Speed at 1 l/min: | approx. 100 $min^{-1}$ |
| Pressure inclination max.: | 100 bar |
| Oil flow max.: | 16 l/min |

Drive volume flow depends on rotation speed of pump shaft for i = 66:1:

$$Q = 0{,}541 \times n_{GMF}$$

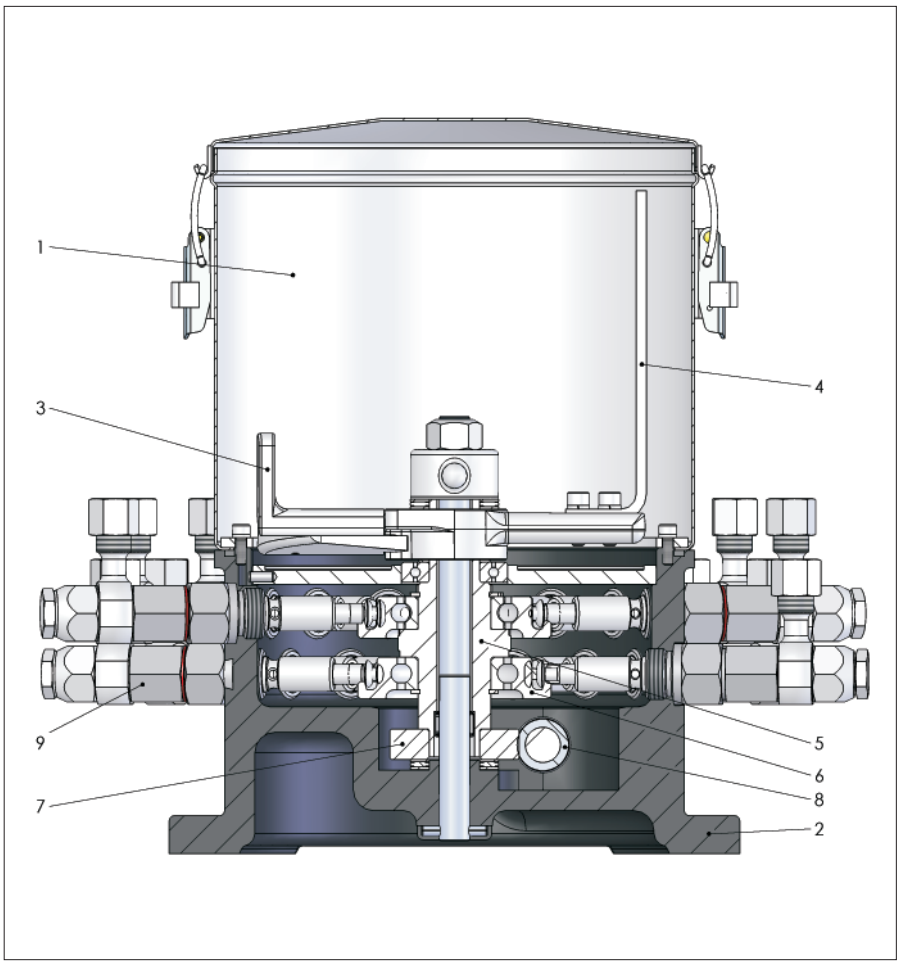
Q in l/min
$n_{GMF}$ in $min^{-1}$

Number of revolutions drive motor in relation to number of stroke of elements!

**Reduction:** 66:1
(Number of revolutions drive motor in relation to number of stroke of elements)



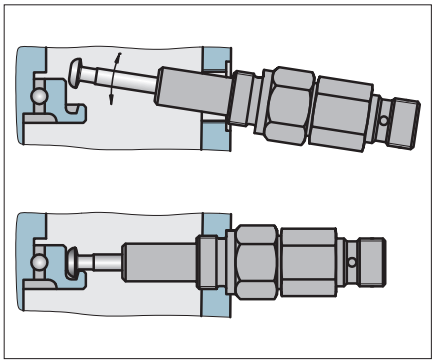
EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de




**Mode of operation:**

The reciprocating pump is composed of the following main parts:
The two parts 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.





**PMF pump elements assembly:**

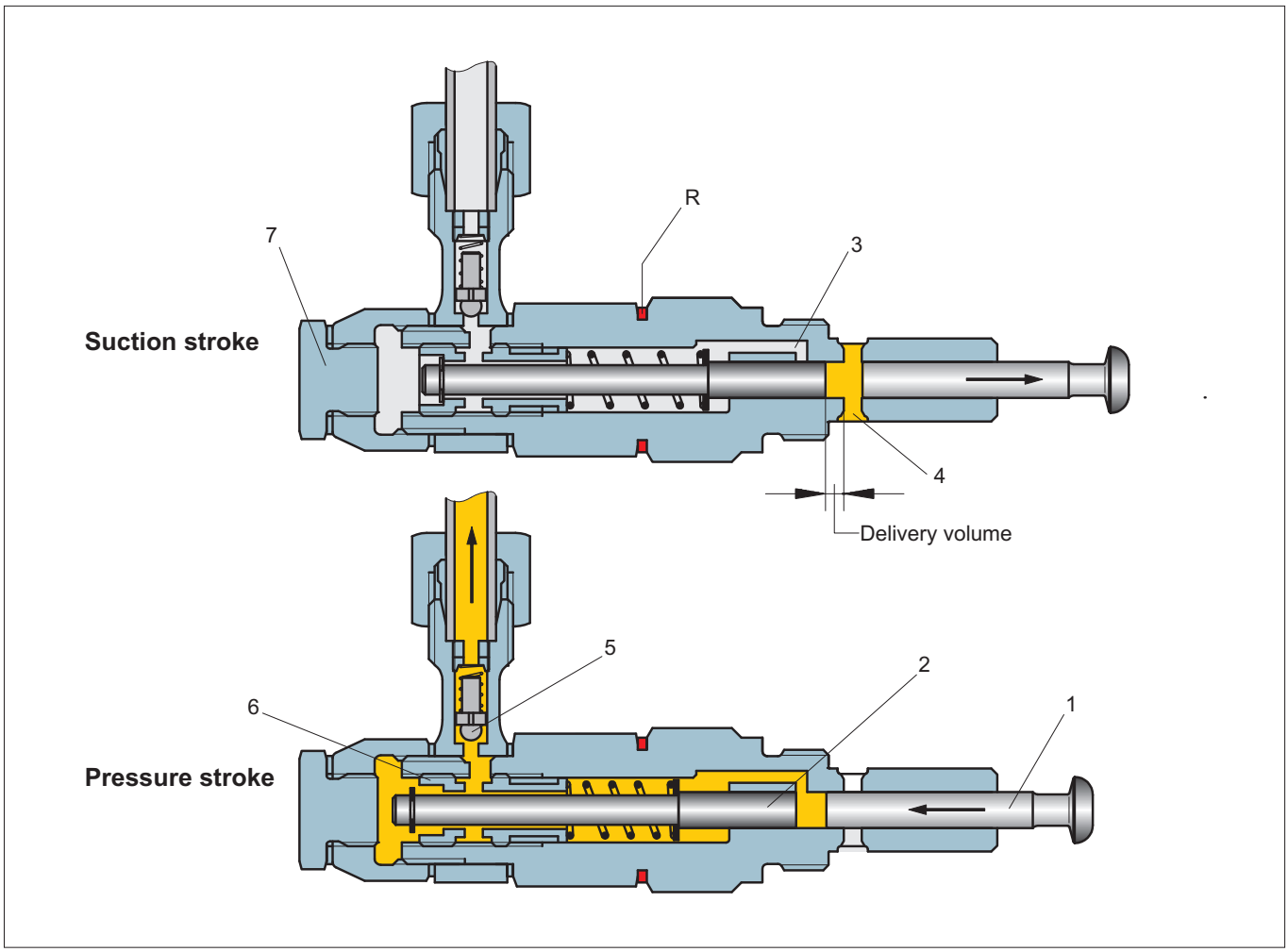
When fitting another pump element into the reciprocating pump, please proceed as shown in the sketch beside: With the delivery piston being approximately pulled out half, insert the pump element diagonally upward into the casing's reception hole. Insertion and operation will be easier when the hole that 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 connected with the lubrication points, unless lubricant comes out free of bubbles. All delivery pipe connections should be checked for leakage.



EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de






**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 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 nippe 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.

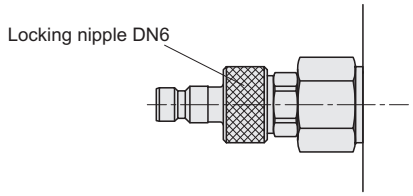
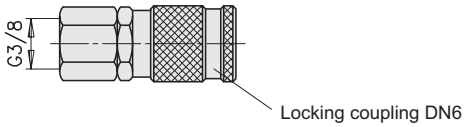
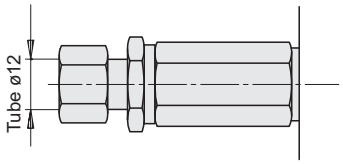
The element having a piston diameter of 8 mm = 0,15 cm³/stroke is marked with a red ring **"R"**.



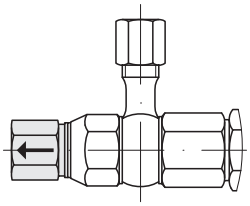
EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de

## Auxiliaries

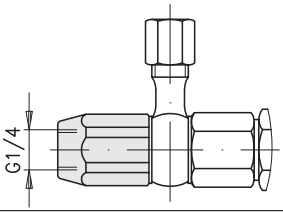
### Filling connector:

| Purchase-no. | Picture | Mounting place | Use |
|---|---|---|---|
| Filling connector "V" with dust cap 110.127-65K |  | Instead of a pump element | To filling the reservoir |
| Locking coupling with dust plug 110.135-65K |  | The locking coupling serves to establish a connection between the locking nipple and the hose | |
| Filling nipple "B" 110.550-66K |  | Instead of a pump element | |

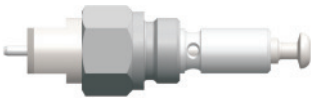
### Pressure control valve:

| Purchase-no. | Opening pressure | Picture | Mounting place | Use |
|---|---|---|---|---|
| 110.566-65 | 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 |
| 110.564-65 | 150 bar | | | |
| 110.560-65 | 400 bar | | | |
| 110.568-65 | preset as per customer's specification: from 50 ... 160 bar | | | |
| 110.562-65 | from 160 ... 250 bar | | | |

### Manometer connector:

| Purchase-no. | Picture | Mounting place | Use |
|---|---|---|---|
| 110.068-65K |  | 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 |

### Function indication:

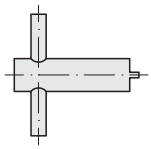
| Purchase-no. | Picture | Mounting place | Use |
|---|---|---|---|
| 752.528-69 |  | Instead of a pump element | Optical operating control<br><br>Function see data sheet P0809 |



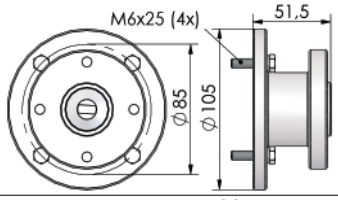
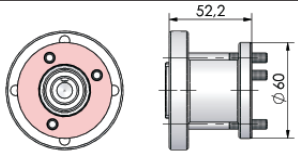
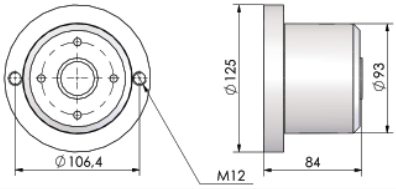


EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de

**Adjustment spanner:**

| Purchase-no. | Picture | 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) |

**Mounting accessories**

| Purchase-no. | Picture | Use |
|---|---|---|
| Attaching parts for three-phase motor 752.528-70 |  | Alternative mounting parts for drive |
| Attaching parts for hydr. motor ø45 752.528-67 |  | |
| Attaching parts for hydr. motor ø106,4 752.636-64 |  | |

**Purchase-designation:**

Piston pump **GMF-S01** ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○ ○

| Reservoir capacity (stainless steel) | Overall reduction | Type of drive | Element 6 [see 3)] with pipe connection | | | Element 8 [see 3)] with pipe connection | | | Filling connection | Lock screw Number | Level monitoring |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | ø6 | ø8 | ø10 | ø6 | ø8 | ø10 | | | |
| | | | | | | | | | see [1)] | see [2)] | |
| 2 l (2V)<br>4 l (4V)<br>7 l (7V)<br>25 l (25V)<br><br>for cartridge<br>4 l (4A)<br>withour reservoir<br>(0) | 7,66:1<br>(7,66)<br>12,7:1<br>(12,7)<br>25:1<br>(25)<br>50:1<br>(50)<br>66:1<br>(66) | Hydraulic motor<br>(L1)<br>without drive<br>(P) | Number (0)...(24) | Number (0)...(24) | Number (0)...(24) | Number (0)...(24) | Number (0)...(24) | Number (0)...(24) | without (0)<br>with (B)<br>with (V) | max. 24<br>(0) ... (24) | without level monitoring<br>(0) |

together 24 elements possible as maximum!

[1)] Instead of an element, a filling connector can be installed!
[2)] All element-free connections must be closed with lock screws!
[3)] Pump element with larger delivery volume on request:
0,22 cm³/stroke Order-no.: 110.990-65

**Purchase-example:**

Pump GMF-S01, reservoir 4 l, 14 elements 6 with pipe connector 8, 2 elements 8 with pipe connector 10, filling connector V, 7 lock screws.

**Purchase-designation:**

**GMF-S01 / 4V / 66 / L1 / 0 / 14 / 0 / 0 / 0 / 2 / V / 7 / 0**

- Subject to modifications -



EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de

## Important information about this data sheet



All the information in this data sheet has been examined for correctness with great care. Nevertheless, WOERNER cannot assume any liability for losses or damage resulting directly or indirectly from the application of the information contained in this data sheet.

All products from WOERNER may only be used as intended and corresponding to the information in this data sheet.
For products supplied with operating instructions, the additional directives and information contained in them are to be complied with.

Materials deviating from those mentioned in this data sheet and the technical documents which further apply may only be poured into and processed in the appliances and systems manufactured and supplied by WOERNER by following agreement with and written approval by WOERNER.
The safety and danger information stated in the safety data sheets of the substances used must be taken into account at all costs.

Transportation of gases, liquefied gases, gases under pressure, vapours and liquids, the vapour pressure of which is more than 0,5 bar above normal atmospheric pressure (1013 mbar) at the maximum admissible temperature, of easy inflammable or explosive media as well as transportation of foodstuffs is forbidden.



**Information on EU Directive 2002/95/EC (RoHS)**

With Directive 2002/95/EC of January 27, 2003, for the limitation of the use of certain hazardous substances in electrical and electronic devices (RoHS) material bans come into effect from July 2006 for electrical and electronic devices newly placed on the market for lead, cadmium, hexavalent chromium, mercury and brominated flame retardants.

In its controls and switching devices, WOERNER only uses materials which fulfil the criteria of EU Directive 2002/95/EC.

To the extent that hexavalent chromium has been used as corrosion protection in the parts which we produce ourselves, it has already been replaced by other environmentally tolerable protective measures.

The mechanical devices supplied by WOERNER are not affected by EU Directive 2002/95/EC.
But as WOERNER is conscious of its responsibility towards the environment, we shall also use materials fulfilling the requirements of the Directive for devices not covered by EU Directive 2002/95/EC as soon as they are generally available and their use is technically possible.

**Technical documents also valid for this product:**

**B0836 Operating instructions GMF-S01**



EUGEN WOERNER GmbH & Co. KG
Postfach 1661 DE-97866 Wertheim
Hafenstrasse 2 DE-97877 Wertheim
Tel. +49 9342 803-0 info@woerner.de
Fax +49 9342 803-202 www.woerner.de