

Gear Pump Units

1-1202-US

For single-line lubrication systems



MFE5-KW3-2



MFE5-BW3-2



MFE5-KW6



MFE5-BW7

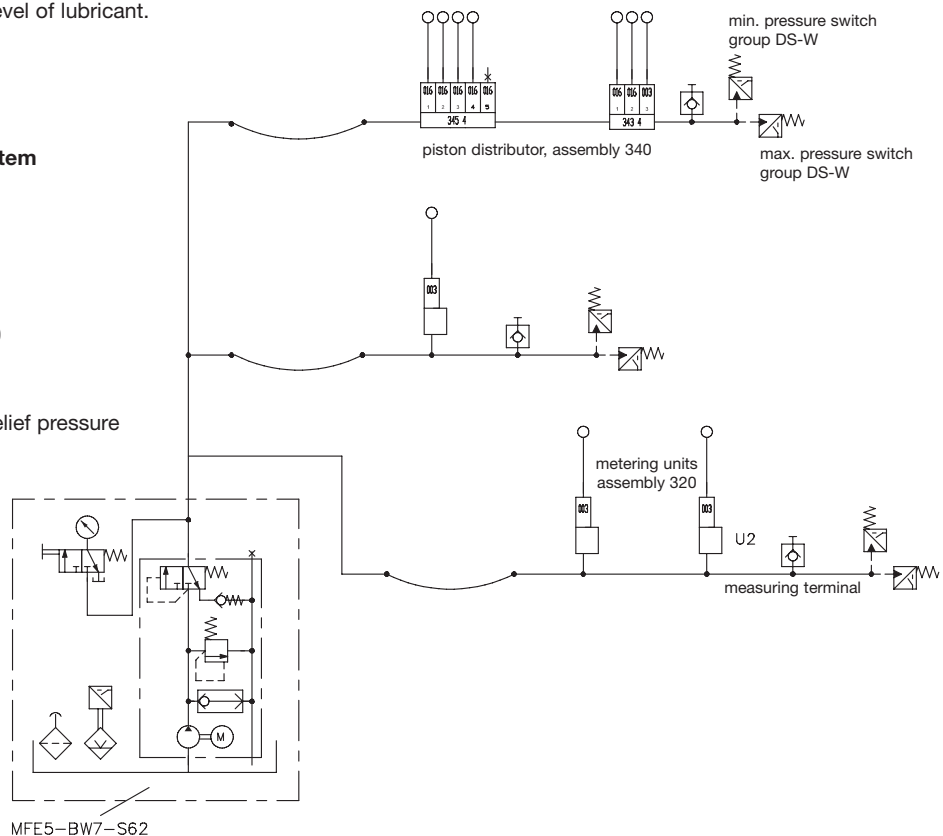
These units comprising the **MFE** Group are designed to supply the lubricant used in intermittently operated, single-line centralized lubrication systems. The basic setup includes a gear pump unit with motor, a 3- or 6-liter lubricant reservoir – optionally of metal or plastic – or a 15-liter metal reservoir and float switch to monitor the minimum permissible level of lubricant.

In addition to the basic models it is also possible for the units to be outfitted with add-ons. Special models for a wide variety of applications are listed in the overview table on page 8.

Example of a single-line central lubrication system for automobile makers

The system consists essentially of:

- a gear pump unit
- 6-liter metal reservoir
- piston distributors, assembly 340
- metering units, assembly 320
- pressure switches, group DS-W for max. pressure build-up and relief pressure



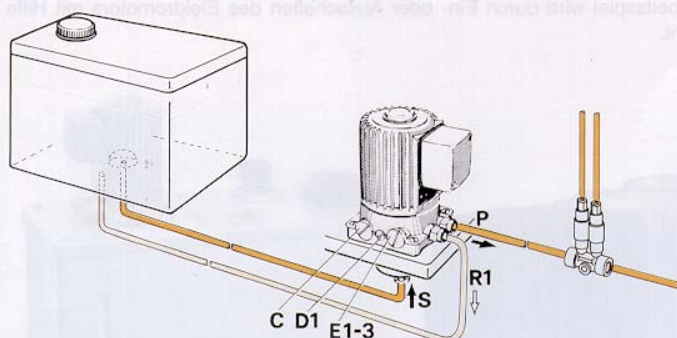
Model ME5**Gear pump unit
mounted separate from oil reservoir**

Fig. 1

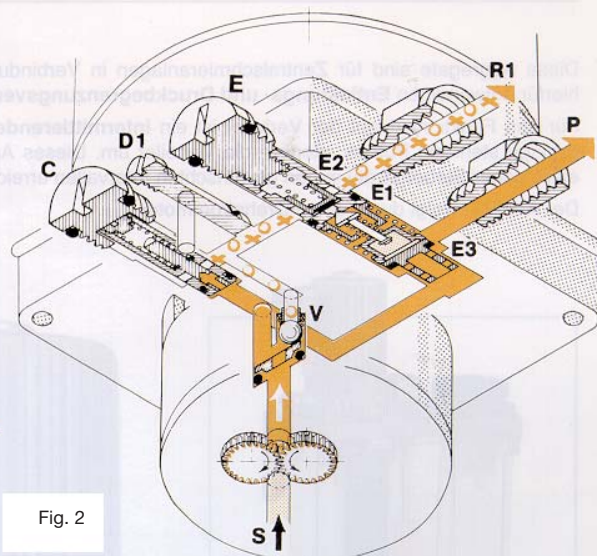


Fig. 2

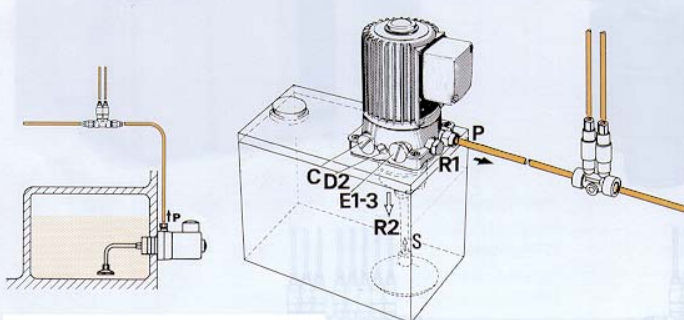
Model MFE5**Gear pump unit
for flange-mounting on oil reservoir**

Fig. 3

Fig. 4

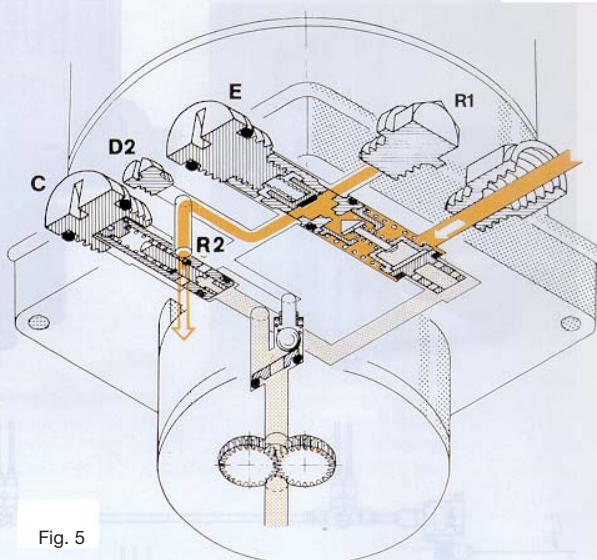
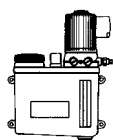


Fig. 5

Regarding Fig. 3:

A special sealed pump must be used for horizontal flange-mounting of the unit in a position **below the oil level**.



Gear pump unit model **MFE5**
complete with metal or plastic reservoir
(3, 6 and 15 liters) see pages 5-7.

| Order No. ¹⁾ | Model | Mounting position |
|-------------------------|-------------------------------------|-------------------|
| ME5 | mounted separate from oil reservoir | |
| MFE5 | for flanging to oil reservoir | |

¹⁾ Please quote voltage and frequency when ordering.

Notice!

All products from VOGEL may be used only for their intended purpose. If operating instructions are supplied together with the products, the provisions and information therein of specific relevance to the equipment must be observed as well.

In particular, we call your attention to the fact that hazardous materials of any kind, especially the materials classified as hazardous by EC Directive 67/548/EEC, Article 2, Par. 2, may only be filled into VOGEL centralized lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from VOGEL.

All products manufactured by VOGEL are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1013 mbars) by more than 0.5 bar at their maximum permissible temperature.

Explanation of hydraulic function

Both types have the same hydraulic function.

Oil is sucked in at **S** and flows under pressure through the duct in the direction **P**. The oil pressure closes valve **V** and opens valve **E3**, at the same time closing valve **E1** against spring tension. If air is entrained (due to low oil level in the reservoir), valve **V** remains open and diverts the air or, respectively, the air-oil mixture into the return duct (see bubble (o) marking in direction **R1**). Valve **C** allows oil under overpressure to flow out into the return duct (see cross (+) marking).

When the unit stops (interval time), spring-loaded valve **E1** opens and valve **E3** simultaneously closes. The system pressure at **P** can now be released through valve **E1** – with the exception of a small amount of residual pressure determined by valve **E2**. This pressure release is required for the piston distributors to function correctly.

The pressure relief process is shown in Fig. 5.

Explanation of the structural differences

In the case of model **ME5**, the long screw plug **D1** blocks flanged port **R2** of the return duct. The oil returning from valves **V**, **C** and **E1** flows via port **R1** through a tube to the separately mounted oil reservoir (see Fig. 1 and 2).

In the case of model **MFE5**, the short screw plug **D2** – unlike **D1** with model **ME5** – leaves flanged port **R2** open. A plug closes off external port **R1**. – Flanged port **R2** of the return duct drains directly into the reservoir without any connection threads (see Fig. 4 and 5).

MFE5 unit variants

| Order No. | Flow rate ³⁾ [l/min] | Max. back pressure ⁴⁾ [bars] | Design |
|-----------------|------------------------------------|--|---|
| MFE5 | 0.5 | 27 | basic version |
| MFE5-D | 0.5 | 27 | installed below oil level |
| MFE5-K | 0.5 | 16 | operation with capacitors |
| MFE5-S8 | 0.5 | 27 | basic version, FPM |
| MFE5-S9 | 0.5 | 16 | for oil as of 5 mm ² /s |
| MFE5-S29 | 0.5 | 27 | 50/95 weatherproofing (acc. DIN 50015) |
| MFE5-S40 | 0.5 | 27 | HAN6ES Harting connector |
| MFE5-S41 | 0.5 | 27 | UL-approved |
| MFE5-S43 | 0.5 | 27 | for oil as of 5 mm ² /s, UL |
| MFE5-S53 | 0.5 | 27 | FPM, for oil as of 5 mm ² /s |

Permissible operating viscosity . . . 20 bis 1000 mm²/s

Max. suction head 500 mm

Weight ≈ 3 kg

Three-phase motor

| | |
|---|------------------------------------|
| Voltage 230/400 V ⁵⁾ | Power consumption 0.29 A |
| Frequency 50 Hz | Rated power 0.07 kW |
| (Please specify different voltages or frequencies required when ordering) | Speed 2700 rpm |
| | Duty cycle 100% |
| | Type of enclosure IP 54 |

Running capacitors of Steinmetz circuit
at a frequency of 50/60 Hz: 230 V ... 8 µF, 115 V ... 30 µF

Special units are available on request for oils with operating viscosities outside the permissible values. Please inquire.

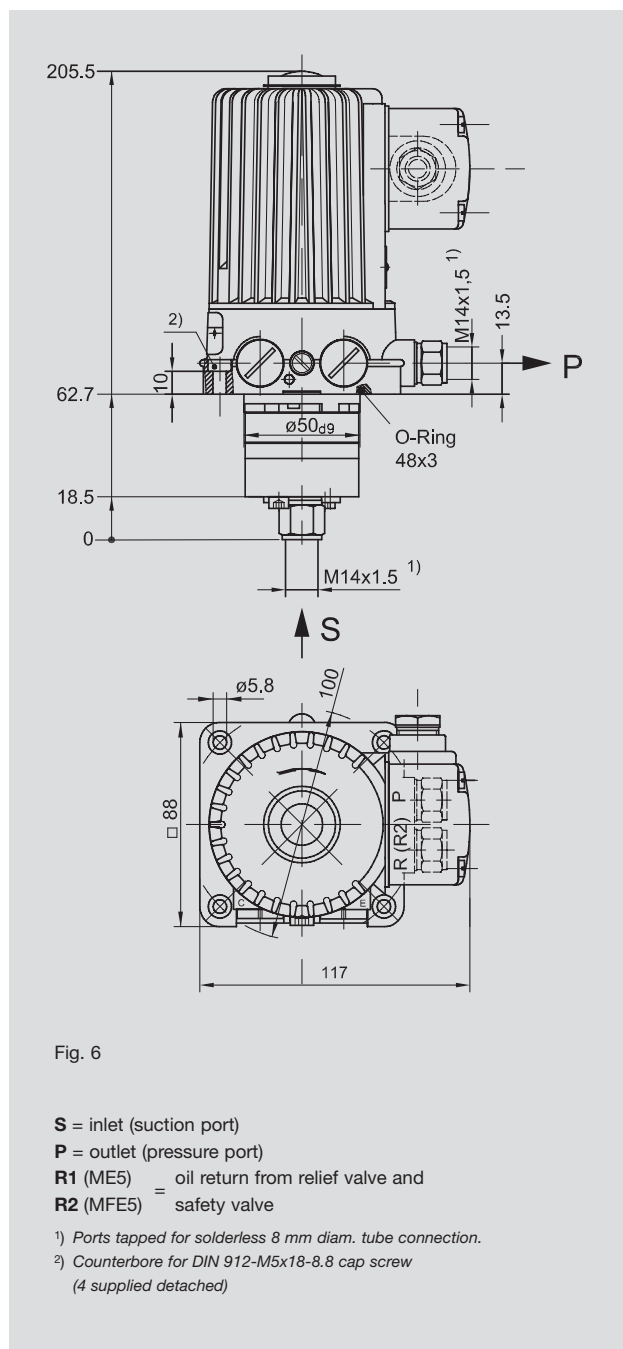


Fig. 6

³⁾ Flow rate based on an operating viscosity of 140 mm²/s at a back pressure of $p = 5$ bars.

⁴⁾ The max. back pressure is equivalent to the actual value of the built-in safety valve.

If the units are operated with a single-phase AC supply, only 60% of the indicated pressure is permissible, i.e. a 16-bar safety valve should be fitted to the system.

The appropriate capacitors for a frequency of 50 and 60 Hz are:

230 V ... 8 µF: order No. **179-340-007**

115 V ... 30 µF: order No. **179-340-060**

⁵⁾ See page 4: "Multivoltage motors".

Multivoltage motors for pump units (assembly M..)

Many export-oriented companies have to deal with voltages/frequencies that deviate from those in Germany. To make it easier for them to buy the most common pump units for centralized lubrication systems we have developed **3 multirange motors that cover a wide range of three-phase voltages and frequencies.**

Pump units with or without oil reservoirs are included, **provided the hydraulic power data listed in the leaflets are not exceeded** (limit values).

They are the following units:

**M2, MF2, MFE2, M5, MF5, MFE5,
FLM12-3, FLMF12-3, M202**

Limit values for

| | |
|---------------------------|--|
| 0,2 l-units (M..2-Group): | 27 bars – 2000 mm ² /s eff. |
| 0,5 l-units (M..5-Group): | 27 bars – 1000 mm ² /s eff. |
| 1,2 l-units FLM12-3: | 6 bars – 850 mm ² /s eff. |
| 2x0.2 l-units M202: | 12 bars – 850 mm ² /s eff. |

Our experience shows they can meet almost every need. That means simplified warehousing for our customers and shorter delivery times, since we always have these 3 types of motors in stock.

The rating plate on multirange motors is green

It shows the respective voltage ranges and rated speeds for 50 and 60 Hz separately as well as the permissible power consumption throughout the entire range.

No voltage tolerances ($\pm 5\%$) have to be allowed for with multirange motors conforming to EN 60 034, i.e. the indicated range limit values have to be taken as maximum or minimum limit values respectively.

Range I



100-130 V / 173-225 V, 50 Hz

120-156 V / 208-270 V, 60 Hz

order code: **199**

order code ISO-F: **19E**

Range II



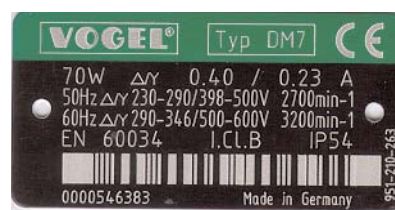
207-254 V / 360-440 V, 50 Hz

249-305 V / 432-528 V, 60 Hz

order code: **299**

order code ISO-F: **29E**

Range III



230-290 V / 398-500 V, 50 Hz

290-346 V / 500-600 V, 60 Hz

order code: **399**

order code ISO-F: **39E**

A tailor-made motor has to be used instead of a multirange motor in the following cases:

- when the desired operating voltage cannot be covered by one of the three voltage ranges,
- when the operating voltage, with the voltage tolerances to be expected, exceeds a defined voltage benchmark for the range,
- when CSA motors are involved,
- in the case of motors with double-star windings (YY),
- in the case of motors with PTC thermistor sensors,
- in the case of units (e.g. M1 or M201) outfitted with a 4-pole motor,
- for the M205 dual-circuit pump unit.

The rating plate on tailor-made motors is red

Example:



| Voltage | Order key |
|--|-----------|
| 230/400 V, 50 Hz | 140 |
| 230/400 V, 50 Hz, ISO-F | 143 |
| 230/400 V, 60 Hz | 640 |
| 230/400 V, 60 Hz, ISO-F | 621 |
| 240/415 V, 50 Hz | 150 |
| 240/415 V, 50 Hz, ISO-F | 152 |
| 240/415 V, 60 Hz | 650 |
| 240/415 V, 60 Hz, ISO-F | 586 |
| 255/440 V, 50 Hz | 165 |
| 255/440 V, 50 Hz, ISO-F | 181 |
| 255/440 V, 60 Hz | 665 |
| 255/440 V, 60 Hz, ISO-F | 831 |
| 265/460 V, 50 Hz | 175 |
| 265/460 V, 60 Hz | 675 |
| 265/460 V, 60 Hz, ISO-F | 674 |
| 265/460 V, 60 Hz, UL | 563 |
| 265/460 V, 60 Hz, CSA | 676 |
| 280/480 V, 60 Hz | 680 |
| 280/480 V, 60 Hz, ISO-F | 699 |
| 280/480 V, 60 Hz, UL | 562 |
| 280/480 V, 60 Hz, CSA | 681 |
| 280/480 V, 60 Hz, UL/CSA | 564 |
| 115 V, 50 Hz | 257 |
| 115 V, 60 Hz | 757 |
| 230 V, 50 Hz | 263 |
| 230 V, 60 Hz | 763 |
| 115 V, 50/60 Hz | 429 |
| 230 V, 50/60 Hz | 428 |
| 100-120 V, 50/60 Hz, 200-240 V, 50/60 Hz | 471 |
| 20-24 V DC, 20-24 V, 50/60 Hz | 472 |
| 12 V DC | 912 |
| 24 V DC | 924 |
| 48 V DC | 931 |

MFE5 gear pump unit with 3 or 6-liter metal reservoir



| Order No. | Flow rate [l/min] | Reservoir capacity [liters] | Reservoir material | Order No. without float switch |
|-------------------|----------------------|--------------------------------|--------------------|-----------------------------------|
| MFE5-BW3-2 | 0.5 | 3 | die-cast aluminum | MFE5-B3-2 |
| MFE5-BW7 | 0.5 | 6 | sheet steel | MFE5-B7 |

Port **P** tapped for solderless tube connection,
M14x1.5 for 8 mm diam. tube.
See page 3 for further technical details.

Technical data

Float switch for monitoring of critical oil level

| | |
|-------------------------|---------------------|
| Type of contact | 1 changeover |
| Max. switching voltage | 230 V AC / 230 V DC |
| Max. switching current | 1.0 A |
| Max. switching capacity | 60 VA / 40 W 1) |
| Type of enclosure | IP 65 |
| Temperature range | - 10 °C to + 80 °C |

1) Take appropriate measures to protect contacts when switching inductive loads.

Circuit diagram

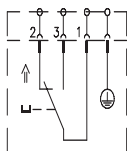
Float switch

Function:

Function:
When the oil drops to a minimum level, contact 1-2 opens and contact 1-3 closes.

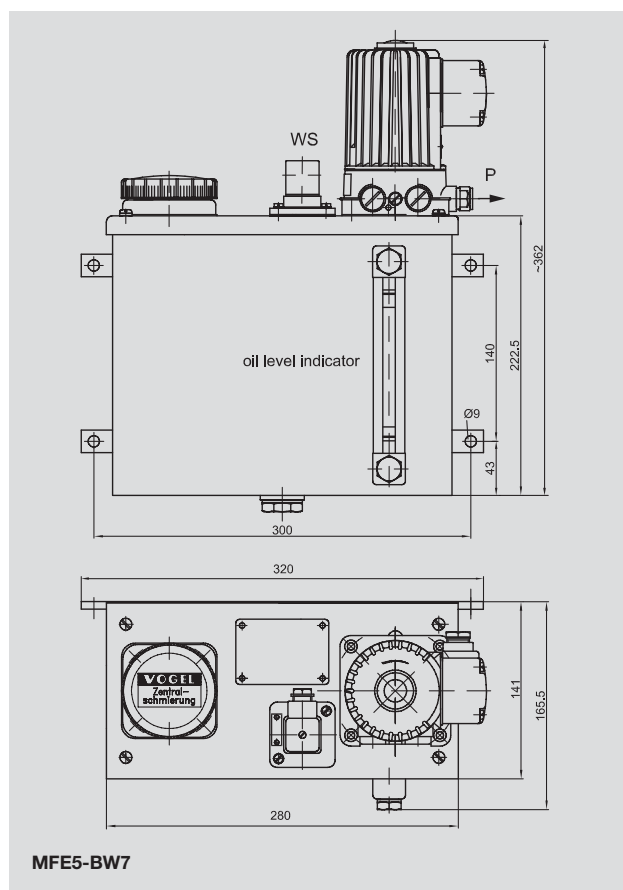
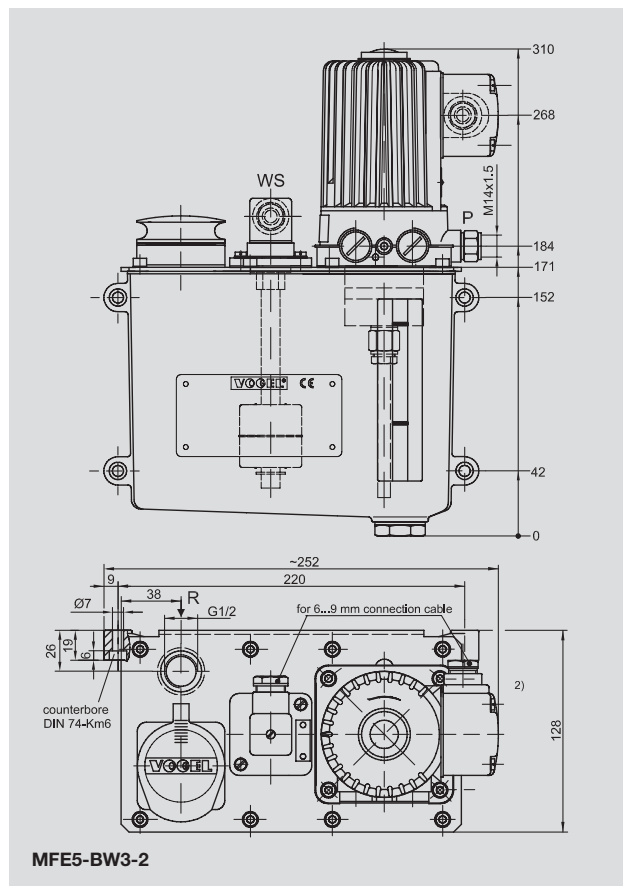
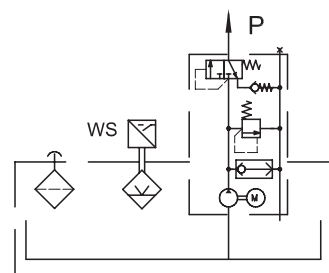
With plug-type connector to
DIN 43650-AM 3

Depicted: full reservoir



Hydraulic layout

MFE5-BW3-2 / MFE5-BW7
(units with WS float switch)



MFE5 gear pump unit with 3 or 6-liter plastic reservoir



| Order No. | Flow rate [l/min] | Reservoir capacity [liters] | Reservoir material | Order No. without float switch |
|-------------------|-------------------|-----------------------------|--------------------|--------------------------------|
| MFE5-KW3-2 | 0.5 | 3 | plastic | MFE5-K3-2 |
| MFE5-KW6 | 0.5 | 6 | plastic | MFE5-K6 |

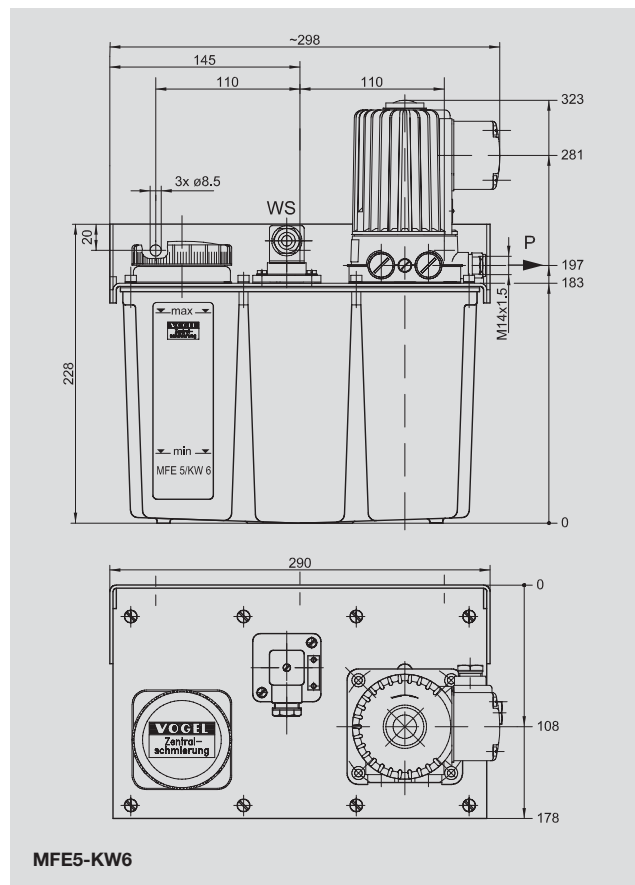
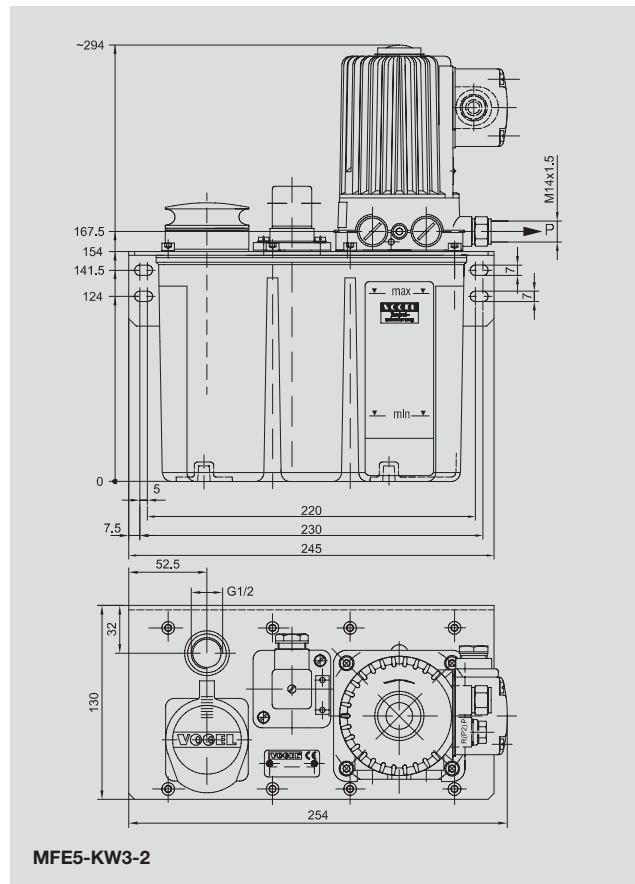
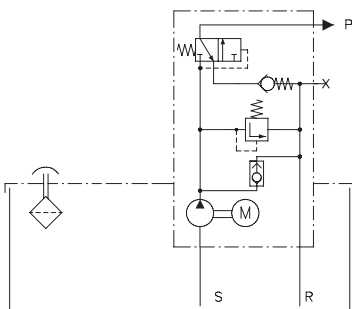
Port **P** tapped for solderless tube connection, M14x1.5 for 8 mm diam. tube.
See page 3 for further technical details.

See page 5 for technical data on the float switch.

Hydraulic layout

MFE5-K3-2 / MFE5-K6

(Units without float switch)



MFE5 gear pump unit with 15-liter sheet steel reservoir



| Order No. | Flow rate [l/min] | Reservoir capacity [liters] |
|------------------|----------------------|--------------------------------|
| MFE5-BW16 | 0,5 | 15 |

Port **P** tapped for solderless tube connection,
M14x1.5 for 8 mm diam. tube.
See page 3 for further technical details.

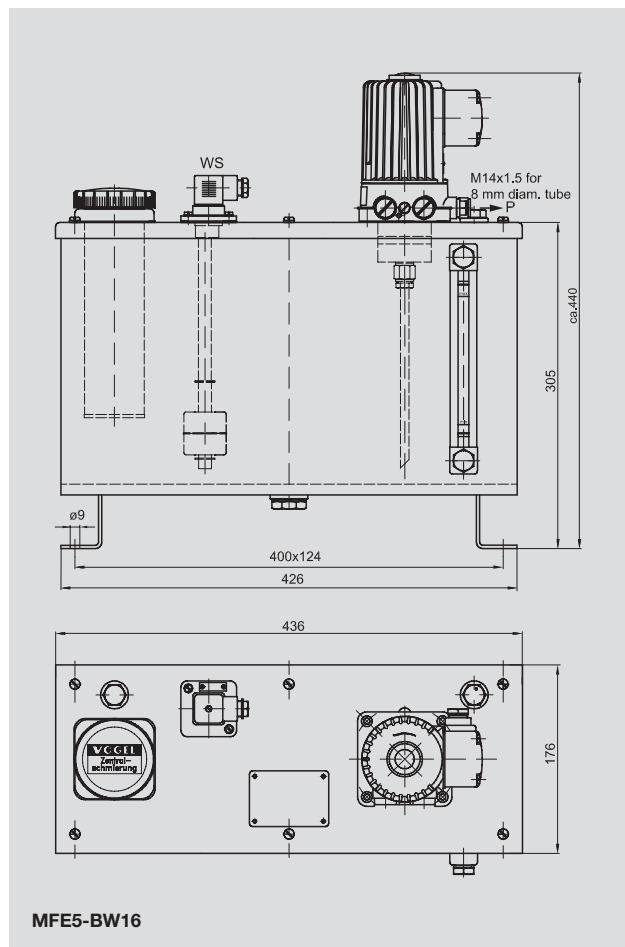
Technische Daten

Float switch

to monitor the critical level of oil with advance warning about 25 mm before the minimum oil level is reached.

| | |
|-------------------------|----------------------------|
| Type of contact | 2 NC types (reed contacts) |
| Max. switching voltage | 230 V AC / 230 V DC |
| Max. switching current | 0.8 A |
| Max. switching capacity | 60 VA / 30 W ¹⁾ |
| Type of enclosure | IP 65 |
| Temperature range | - 10 °C to + 80 °C |

¹⁾ Take appropriate measures to protect contacts when switching inductive loads.

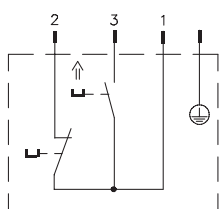


Circuit diagram

Float switch

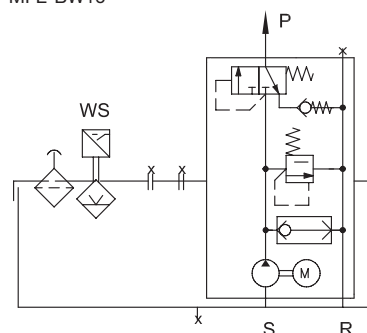
With plug-type connector to
DIN 43650-AM 3

Depicted: full reservoir

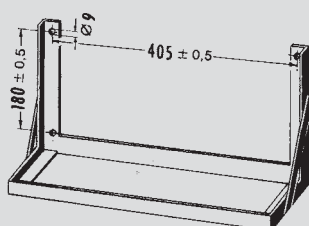


Function:
About 25 mm before the critical oil level is reached contact 1-3 closes.
When the critical oil level is reached contact 1-2 opens in addition.

Hydraulic layout MFE-BW16



Bracket for wall mounting, order No. 249-032.10



Overview table for gear pump units

| Order No. | Reservoir capacity [liters] | Reservoir material | Design features |
|-----------------------|-----------------------------|--------------------|--|
| MFE5-KW3 | 3 | Plastic | Basic version with WS32-2 float switch contact tube |
| MFE5-KW3-2-S4 | 3 | Plastic | Basic version with WS35-2 float switch |
| MFE5-KW3-S9 | 3 | Plastic | For oil as 5 mm ² /s at max. 16 bars |
| MFE5-KW3-2-S12 | 3 | Plastic | VW version with WS35-S14 float switch (2x NC contacts) |
| MFE5-KW3-S13 | 3 | Plastic | Unit for 50/95 weatherproofing, float switch WS32-2 |
| MFE5-KW3-S24 | 3 | Plastic | DaimlerChrysler version (Desina); WS35-S30 float switch; Motor with HAN6ES Harting connector |
| MFE5-BW3 | 3 | Metal | Basic version with WS32-2 float switch contact tube |
| MFE5-BW3-S14 | 3 | Metal | French Automotiv version (CNOMO); WS35 float switch contact tube; Stäubli filler coupling |
| MFE5-BW3-S22 | 3 | Metal | For oil as 5 mm ² /s at max. 16 bars |
| MFE5-BW3-S28 | 3 | Metal | VW-AG version, WS35-S14 float switch (2x NC contacts) |
| MFE5-BW3-K-S33 | 3 | Metal | Version for operation with capacitors at max. 16 bars |
| MFE5-BW3-S34 | 3 | Metal | Motor with UL approval |
| MFE5-BW3-S35 | 3 | Metal | Motor for 50/95 weatherproofing |
| MFE5-BW3-S37 | 3 | Metal | Basic version with WS35-3 float switch contact tube |
| MFE5-BW3-S41 | 3 | Metal | DaimlerChrysler version (Desina); WS35-S30 float switch; Motor with HAN6ES Harting connector |
| MFE5-KW6 | 6 | Plastic | Basic version with WS32-2 float switch |
| MFE5-KW6-S1 | 6 | Plastic | Basic version with WS35-2 float switch |
| MFE5-KW6-S8 | 6 | Plastic | FPM version, WS32-S8 float switch |
| MFE5-KW6-S24 | 6 | Plastic | Version for VW-AG with pressure gauge, protection valve, WS35-S7 float switch (2x NC contacts) |
| MFE5-KW6-S33 | 6 | Plastic | DaimlerChrysler version (Desina); motor with HAN6ES Harting connector; WS35-S30 float switch with M12x1 plug connector |
| MFE5-BW7 | 6 | Metal | Basic version with WS32-2 float switch |
| MFE5-BW7-CF | 6 | Metal | Basic version with WS35-2 float switch |
| MFE5-BW7-S8 | 6 | Metal | FPM version, WS32-S8 float switch |
| MFE5-BW7-S22 | 6 | Metal | Motor with UL approval |
| MFE5-BW7-S29 | 6 | Metal | French Automotiv version (CNOMO); WS35-2 float switch; Stäubli filler coupling |
| MFE5-BW7-S54 | 6 | Metal | Motor with enhanced 50/95 weatherproofing |
| MFE5-BW7-S62 | 6 | Metal | Version for VW-AG with pressure gauge, protection valve, WS35-S7 float switch (2x NC contacts) |
| MFE5-BW7-S98 | 6 | Metal | Version like MFE5-BW7-S62, but additionally with filler coupling |
| MFE5-BW7-S107 | 6 | Metal | DaimlerChrysler version (Desina); motor with HAN6ES Harting connector; WS35-S30 float switch with M12x1 plug connector |
| MFE5-BW7-V57-L | 6 | Metal | GM - OPEL version with 10 µm pressure filter, WS35-S30 float switch with M12x1 plug connector, EO2 screw unions |
| MFE5-BW15 | 15 | Metal | Basic version with WS32-2 float switch; wall-mounted reservoir |
| MFE5-BW16 | 15 | Metal | Basic version with WS32-2 float switch; foot-mounted reservoir |
| MFE5-BW15-S7 | 15 | Metal | Basic version with WS35-2 float switch; wall-mounted reservoir |
| MFE5-BW16-S3 | 15 | Metal | For oil as 5 mm ² /s at max. 16 bars; foot-mounted reservoir; FPM version, WS35-S8 float switch |
| MFE5-BW16-S5 | 15 | Metal | For oil as 5 mm ² /s at max. 16 bars; foot-mounted reservoir |
| MFE5-BW16-S46 | 15 | Metal | Version for VW-AG; foot-mounted reservoir; with WS35-S7 float switch (2x NC contacts); pressure gauge with protective valve |
| MFE5-BW16-S93 | 15 | Metal | DaimlerChrysler version (Desina); foot-mounted reservoir; motor with HAN6ES Harting connector; WS35-S30 float switch with M12x1 plug connector |
| MFE5-BW16-V57L | 15 | Metal | GM / OPEL version; foot-mounted reservoir; 10 µm pressure filter; WS35-S30 float switch with M12x1 plug connector, EO2 screw unions |



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