

Multiline pump unit

# Product series FF

for oil, fluid grease and grease,  
for SKF MultiFlex and SKF ProFlex centralized lubrication systems

Design 1M, dual-stage



Design 2M, single-stage



The multiline pump unit of the FF series is suitable for small and medium-sized systems due to its flow rate and reservoir capacity. The lubricant can be fed to the lube points directly or via a progressive feeder.

The multiline pump unit of the FF series is a very sturdy and vibration-resistant multiline pump, designed for oils and for very stiff greases, harsh operating conditions and, if necessary, continuous operation.

## Designs

- as grease or oil lubrication pumps
- with 4 kg or 10 kg grease reservoir
- with or without fill level control
- high permissible operating pressure, up to 350 bar
- with three-phase motors in 230/400 V, 290/500 V and 400/690 V designs
- with up to 12 individually adjustable pump elements/outlets with various delivery volumes and tube connections
- with up to 7 cm<sup>3</sup>/min lubricant per outlet
- optional with pressure control valve integrated into the pump element

## Applications

- Automotive industry
- Construction materials machinery
- Annealing machines
- Tunnel driving machinery, mining
- Paper and boxing machinery
- Steel and heavy industry
- Conveying systems
- Wind energy systems



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 **CAUTION**

The important information on product usage located on the back cover applies to all systems described in this brochure.

# FF multiline pump unit

## Pump operation

The pump is operated (→ Fig. 1) by a worm drive (2) consisting of a worm and related worm gear. The worm gear drives the eccentric drive shaft (6) with the fitted agitator (4). The agitator (4) pushes the lubricant through the strainer into the pump's inlet chamber.

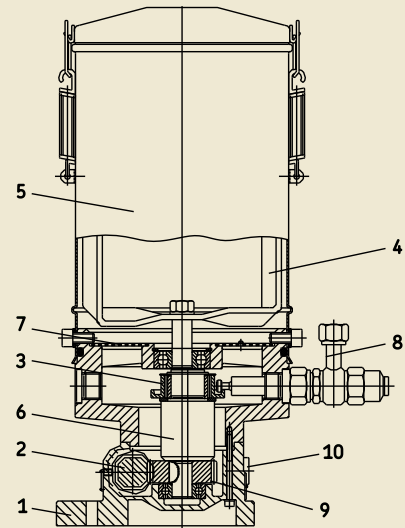
The eccentric drive shaft (6) has a needle-bearing guide ring (3) to receive the delivery piston heads of the pump elements (8). The eccentric movement of the guide ring (3) forcibly moves the suspended delivery pistons into the guide ring.

Sectional view of FF pump

Fig. 1

### Components

- 1 Housing with mounting flange
- 2 Drive shaft with worm
- 3 Guide ring
- 4 Agitator
- 5 Grease reservoir
- 6 Eccentric drive shaft
- 7 Strainer
- 8 Pump element
- 9 Worm gear
- 10 Filler socket (G 3/8")



## Pump element operation

The delivery piston is forcibly actuated as described in "Pump operation". In the suction stroke position (→ Fig. 2), the cross hole of the delivery piston (3) is closed. At the start of the pressure stroke, the delivery piston (1) closes the suction hole. The suctioned lubricant in chamber A is pressed against the spring-loaded control piston (3). The cross hole in the control piston (3) is opened. The lubricant reaches chamber B under pressure through the cross and longitudinal hole of the control piston (3), where it flows through the ring duct and the check valve (5) to the outlet. After the pressure stroke is complete, the suction stroke of the delivery piston (1) begins.

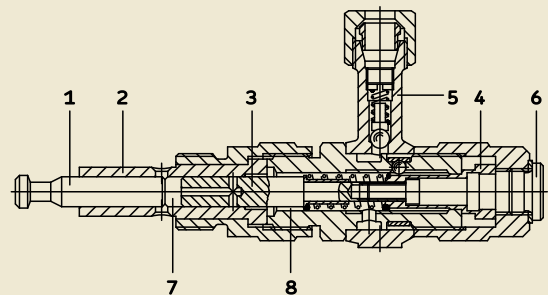
Moving the delivery piston (1) also brings the control piston (3) back to its normal position using spring tension. The suction stroke movement of the delivery piston (1) generates negative pressure in chamber A. When the suction hole opens, the existing negative pressure draws the lubricant into chamber A. The pump element is now prepared for the next lubrication process.

Sectional view of pump elements

Fig. 2

### Components

- 1 Delivery piston
- 2 Cylinder
- 3 Spring-loaded control piston
- 4 Adjustment cap
- 5 Ring piece with check valve
- 6 Screw plug
- 7 Chamber A
- 8 Chamber B



# FF multiline pump unit

## General notes

The order of pump elements is factory-set for pump designs 1M and 2M. The order begins with the smallest pump elements. The order is shown in the following pump illustrations. The order of the pump elements can be modified at additional charge.

The lubricants to be used must conform with the requirements of the machines being lubricated and be suitable for use in centralized lubrication systems.

## Delivery volume adjustment on pump element

The delivery volume of the pump element is determined by the control piston stroke (→ Fig. 2 and Fig. 3). The screw plug (6) must be removed in order to adjust the delivery volume. The adjustment cap (4) can then be turned.

The following apply to adjustment:

**Clockwise rotation** – decreased delivery volume.

**Counterclockwise rotation** – increased delivery volume.

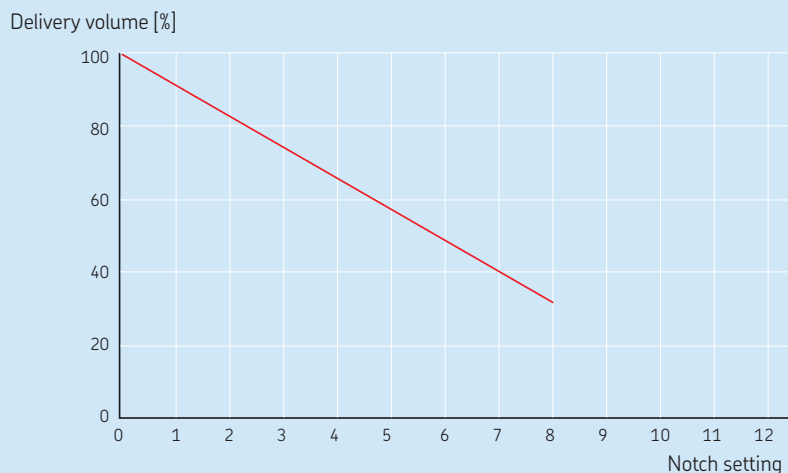
### Note!

Unless otherwise requested, pump is configured for full stroke on delivery.

We recommend that the delivery volume not be reduced below  $\frac{1}{3}$  of the maximum to achieve the product's operating specifications. This corresponds to clockwise rotation of the adjustment cap (Fig. 2, position 4) by eight notches.

Fig. 3

Delivery volume as a function of notch setting on pump element for piston diameters of 6 mm, 8 mm and 10 mm



## Pressure regulating valves for pump elements

Pump elements can be equipped with pressure regulating valves (→ Accessories). This involves replacing the screw plug (6) with the pressure regulating valve (→ Fig. 2).

If necessary, grease/oil recirculation can be provided from the pressure regulating valve to the pump housing. This does, however, require a different pressure regulating valve with a G 1/4" outlet and a M20x1.5 threaded socket. The threaded socket needs to be placed into an available mounting space (1 to 12) for pump elements and connected with the pressure regulating valve using tubing. Pressure regulating valves for line installation can also be ordered as accessories.

## Design note

The FF multiline pump is equipped standard with a motor protection enclosure of protection class IP 55. The FF multiline pump is available in a-n Ex design (ATEX) on request.

There are also different fill level switches for different applications and lubricants. We recommend the U2 ultrasonic design with two switching points as the standard fill level switch.

When the FF pump is used as an oil lubrication pump, the reservoir can be equipped with a fill level monitor (fill level switch "W"). Additionally, a special filling device with optical fill level display (fill level control "S") can be installed.

The FF multiline lubrication pump is available in the following special designs:

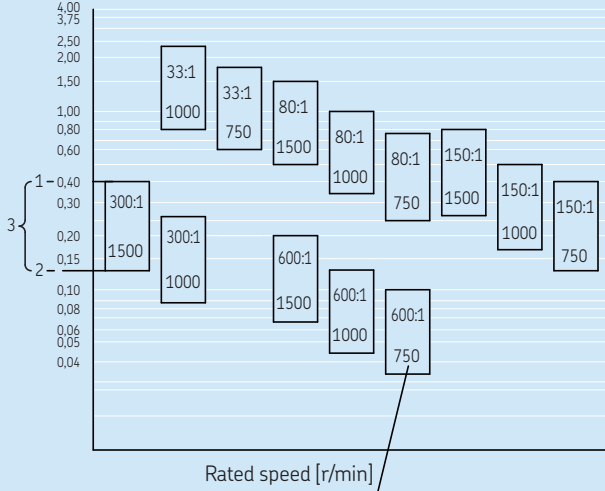
- ATEX design
- pre-set delivery volumes
- pre-installed pressure regulating valves
- drive motor with custom voltage, custom frequency and custom protection type-custom varnish

# FF multiline pump unit

## Delivery volume of pump element with 6 mm, 8 mm and 10 mm piston diameter

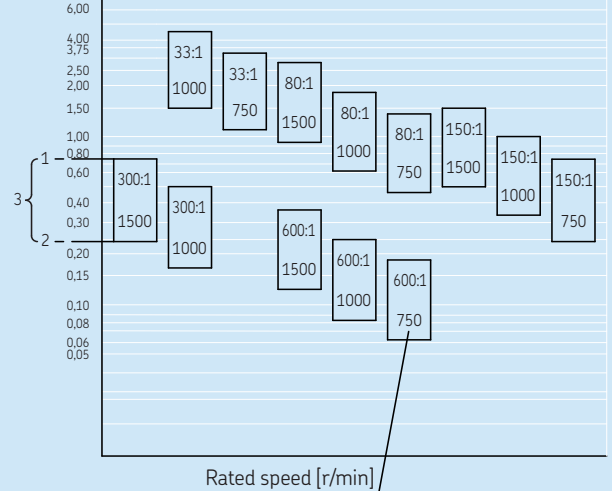
**Delivery volume as a function of 6 mm piston diameter**

Volumetric flow per pump element [cm<sup>3</sup>/min]



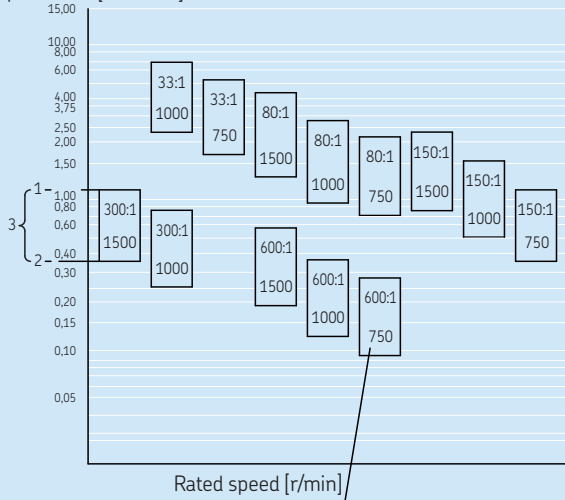
**Delivery volume as a function of 8 mm piston diameter**

Volumetric flow per pump element [cm<sup>3</sup>/min]



**Delivery volume as a function of 10 mm piston diameter**

Volumetric flow per pump element [cm<sup>3</sup>/min]



### Legend

- 1 = maximum delivery volume at constant speed (100%)
- 2 = minimum delivery volume at constant speed (33%)
- 3 = adjustable delivery volume range

### Note!

The delivery volumes shown are based on the motors' rated speeds. At reduced speeds (→ rating plate), the values are lowered accordingly.

# FF multiline pump unit

## Design 1M, dual-stage

Design 1M, dual-stage



Motor data design 1M

Rated speed [min <sup>-1</sup> ]	Frequency [Hz]	Rated power [kW]	Rated voltage [V]	Rated current [A]	Order code
1 000	50	0,09	230/400	0,80/0,46	<b>AG</b>
			290/500	0,64/0,37	<b>AL</b>
			400/690	0,46/0,26	<b>AP</b>
1 500	50	0,18	230/400	1,13/0,65	<b>AF</b>
			290/500	0,90/0,52	<b>AK</b>
			400/690	0,65/1,07	<b>AO</b>



### Note!

This data refers to three-phase motors from VEM. There may be differences with motors from other manufacturers.

### Technical data

#### General

Mounting position . . . . . vertical  
 Temperature range . . . . . -15 °C to +40 °C <sup>1)</sup>  
 Reservoir . . . . . 4 or 10 kg  
 Number of pump elements . . . . . 1 to 12  
 Filling . . . . . via filler socket G 3/8"  
 Dry weight . . . . . FF 04 approx. 15 kg;  
 FF 10 approx. 20,5 kg

#### Gearbox

Type. . . . . Screw drive 1M, dual-stage  
 Gear ratios . . . . . 80:1; 150:1; 300:1; 600:1

#### Motor

→ "motor data" table and rating plate

#### Pump

Type. . . . . Multi-piston pump  
 with 1 to 12 outlets

#### Operating pressure for pump elements

Piston-Ø 6 . . . . . max. 350 bar  
 Piston-Ø 8 . . . . . max. 200 bar  
 Piston-Ø 10 . . . . . max. 125 bar

#### Lubricants

Mineral oils or environmentally compatible oils from ISO VG 46 to greases of NLGI Grade 3 (consultation required for synthetic oils)

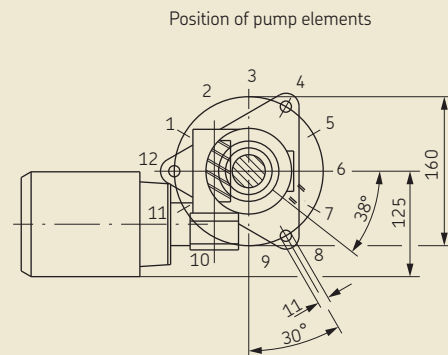
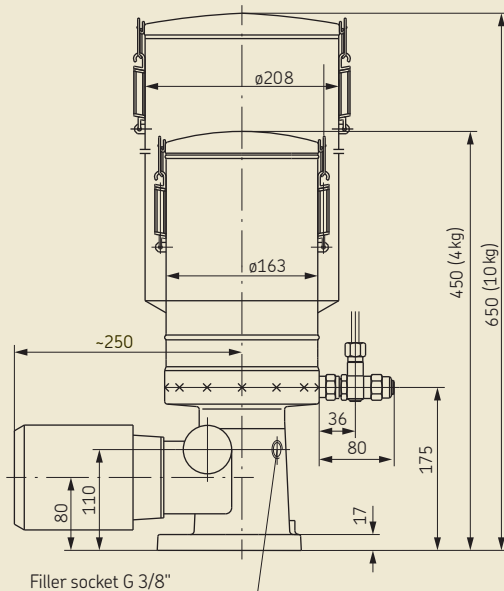
Operating viscosity (Oil) . . . . . ≥ 50 mm<sup>2</sup>/s  
 Worked penetration (Grease) . . . . . > 220 1/10 mm

#### Delivery volume of pump elements

Piston-Ø 6 . . . . . 0,027 to 0,080 cm<sup>3</sup>/stroke  
 Piston-Ø 8 . . . . . 0,050 to 0,150 cm<sup>3</sup>/stroke  
 Piston-Ø 10 . . . . . 0,077 to 0,230 cm<sup>3</sup>/stroke

<sup>1)</sup> At higher ambient temperatures, note that there is reduction in (motor) performance of approx. 1% per Kelvin.

Design 1M, dual-stage



# FF multiline pump unit

## Design 2M, single-stage



**Motor data design 2M**

Rated speed [min <sup>-1</sup> ]	Frequency [Hz]	Rated power [kW]	Rated voltage [V]	Rated current [A]	Order code
750	50	0,12	230/400	1,27/0,73	<b>AH</b>
			290/500	0,34/0,58	<b>AM</b>
			400/690	0,73/1,26	<b>AQ</b>
1 000	50	0,25	230/400	1,91/1,10	<b>AG</b>
			290/500	0,51/0,88	<b>AL</b>
			400/690	0,10/0,17	<b>AP</b>

**Note!** This data refers to three-phase motors from VEM. There may be differences with motors from other manufacturers.

**Technical data**

**General**  
 Mounting position . . . . . vertical  
 Temperature range . . . . . -15 °C to +40 °C<sup>1)</sup>  
 Reservoir . . . . . 4 or 10 kg  
 Number of pump elements . . . . . 1 to 12  
 Filling . . . . . via filler socket G 3/8"  
 Dry weight . . . . . FF 04 approx. 15 kg;  
 FF 10 approx. 20,5 kg

**Gearbox**  
 Type. . . . . Screw drive 2M, single-stage  
 Gear ratio . . . . . 33:1 general

**Motor**  
 → "motor data" table and rating plate

**Pump**  
 Type. . . . . Multi-piston pump with 1 to 12 outlets

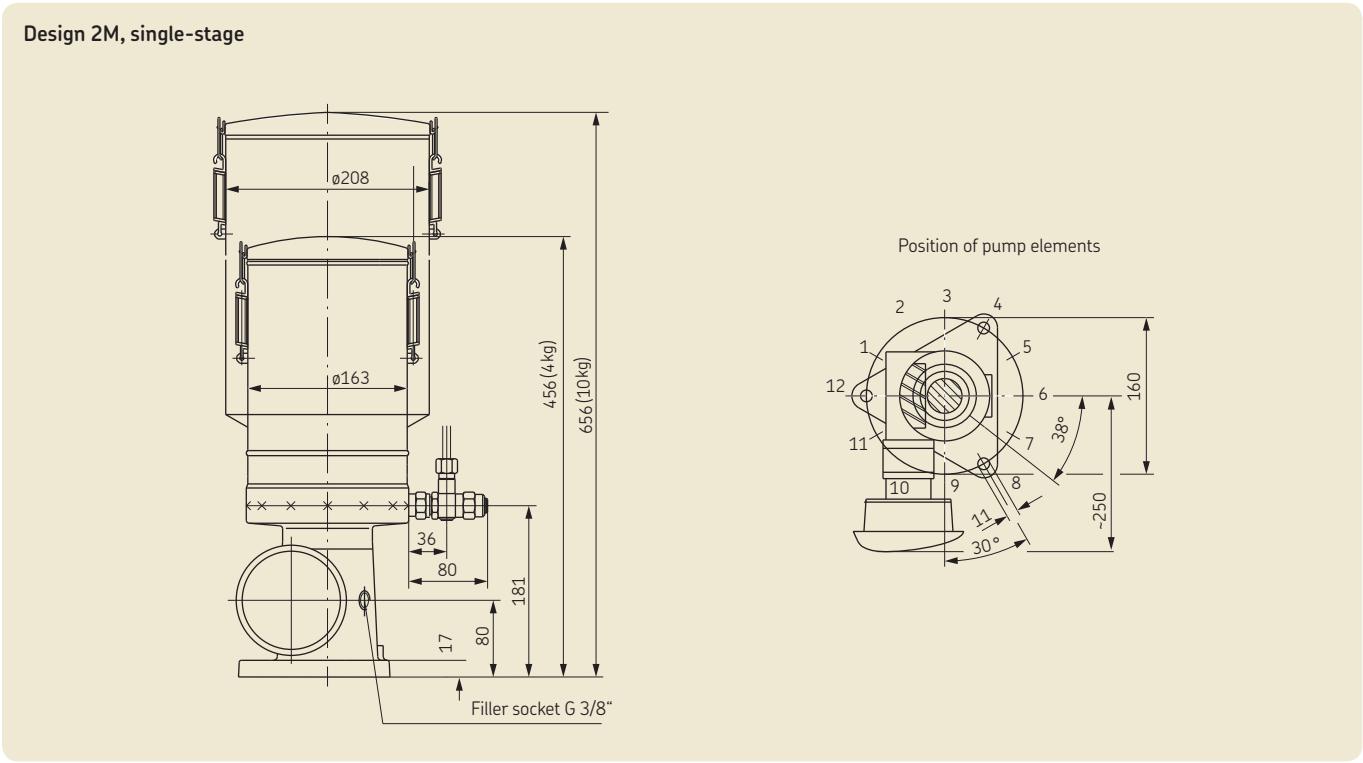
Operating pressure for pump elements  
 Piston-Ø 6 . . . . . max. 350 bar  
 Piston-Ø 8 . . . . . max. 200 bar  
 Piston-Ø 10. . . . . max. 125 bar

**Lubricants**  
 Mineral oils or environmentally compatible oils from ISO VG 46 to greases of NLGI Grade 3 (consultation required for synthetic oils)

Operating viscosity (Oil) . . . . . ≥ 50 mm<sup>2</sup>/s  
 Worked penetration (Grease) . . . . . > 220 1/10 mm

**Delivery volume of pump elements**  
 Piston-Ø 6 . . . . . 0,027 to 0,080 cm<sup>3</sup>/stroke  
 Piston-Ø 8 . . . . . 0,050 to 0,150 cm<sup>3</sup>/stroke  
 Piston-Ø 10. . . . . 0,077 to 0,230 cm<sup>3</sup>/stroke

<sup>1)</sup> At higher ambient temperatures, note that there is reduction in (motor) performance of approx. 1% per Kelvin.



1-3025-EN · PUB L5/P2 14129 EN

# Fill level control, optical

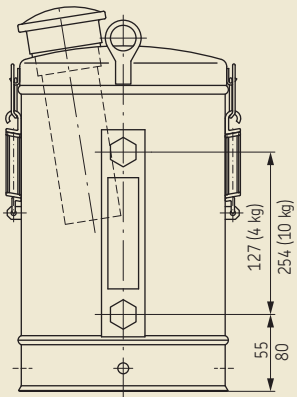
## Fill level control S (Oil)

### Technical data

#### General

Lubricant . . . . . Oil  
 Design . . . . . For oil lubrication pumps;  
 with sight glass and  
 filler socket with strainer

### Fill level control S



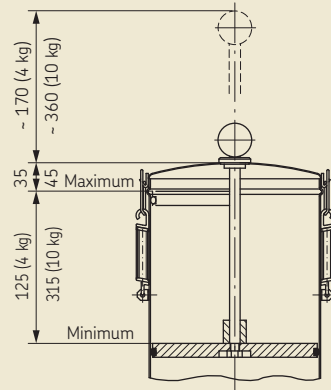
## Fill level control G (Grease)

### Technical data

#### General

Lubricant . . . . . Grease  
 Design . . . . . Optical fill level control  
 (dip stick)

### Fill level control G



# Fill level switches for oil

## Fill level switch W

### Technical data

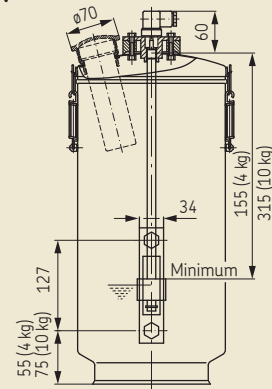
#### General

Design . . . . . Reed contact for  
 monitoring minimum level

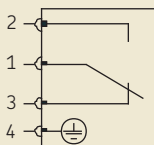
Form of contact . . . . . Changeover  
 Switching capacity . . . . . 15 W/VA  
 Switching voltage, max. . . . . 240 V AC/ 120 V DC  
 Switched current, max. . . . . 1 A  
 Connection diagram . . . . . Plug EN 175301-803  
 (DIN 43650)

Protection class . . . . . IP 65

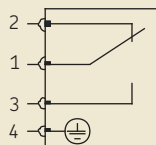
### Fill level switch W



### Connector pin assignment fill level switch W



Switch position  
at minimum



Switch position  
above minimum

### Connector pin assignment

PIN	Description
1	+ Supply voltage
2	Signal output "above minimum"
3	Signal output "minimum"
4	PE Protective earth



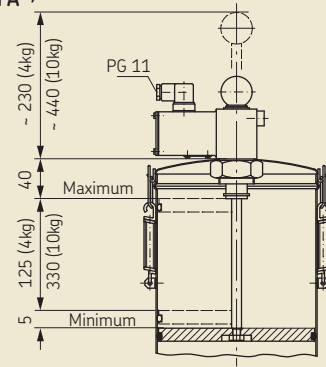
# Fill level switches for grease

## Fill level switch A

### Technical data

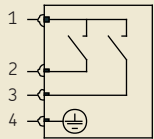
<b>General</b>	
Design	Microswitch with three switching points (maximum, minimum prewarning, minimum) and dip stick
Switching voltage, max.	250 V AC/30 V DC
Switched current, max.	15 AAC / 10 A DC
Connection diagram	Plug EN 175301-803 (DIN 43650)
Protection class	IP 65
Lubricants	Grease of NLGI Grade 2

### Fill level switch A<sup>1)</sup>

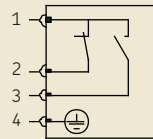


<sup>1)</sup> Special design with cable brake protection available on request

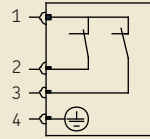
### Connector pin assignment fill level switch A



Switch position at maximum



Switch position between minimum and maximum



Switch position at minimum

### Connector pin assignment

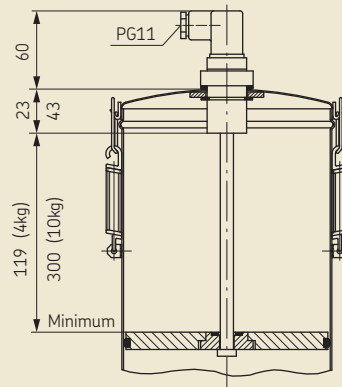
PIN	Description
1	+ Supply voltage
2	Signal output "above minimum"
3	Signal output "minimum"
4	PE Protective earth

## Fill level switch E

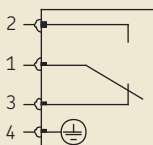
### Technical data

<b>General</b>	
Design	Reed contact for monitoring minimum level
Form of contact	Changeover
Switching capacity, max.	60 W/VA
Switching voltage, max.	230 V DC/AC
Switched current, max.	1 A
Connection diagram	Plug EN 175301-803 (DIN 43650)
Protection class	IP 65
Lubricants	Grease of NLGI Grade 2

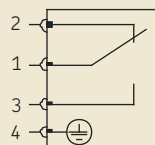
### Fill level switch E



### Connector pin assignment fill level switch E



Switch position at minimum



Switch position above minimum

### Connector pin assignment

PIN	Description
1	+ Supply voltage
2	Signal output "above minimum"
3	Signal output "minimum"
4	PE Protective earth

# Fill level switches for grease

## Fill level switch F

### Technical data

#### General

Design . . . . . Reed contact for monitoring minimum and maximum level

Form of contact . . . . . NO-contact/NC contact

Switching capacity, max. . . . . 60 W/VA

Switching voltage, max. . . . . 230 V DC/AC

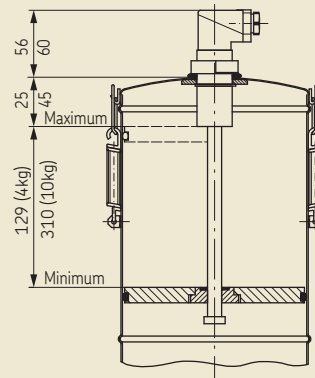
Switched current, max. . . . . 1 A

Connection diagram . . . . . Plug EN 175301-803 (DIN 43650)

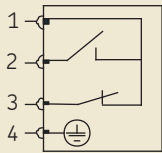
Protection class . . . . . IP 65

Lubricants. . . . . Grease of NLGI Grade 2

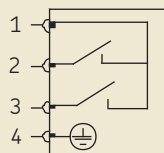
### Fill level switch F



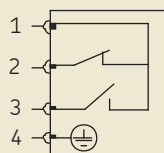
### Connector pin assignment fill level switch F



Switch position at minimum



Switch position between minimum and maximum



Switch position at maximum

### Connector pin assignment

PIN	Description
1	+ Supply voltage
2	Signal output "maximum"
3	Signal output "minimum"
4	PE Protective earth

## Fill level switch H

### Technical data

#### General

Design . . . . . Reed contact with three switching points (maximum, minimum pre-warning, minimum)

Form of contact:

1. Max. fill level . . . . . NO-contact

2. Fill level pre-warning . . . . . NO-contact

3. Min. fill level . . . . . Changeover

Switching capacity, max. . . . . 60 W/VA

Switching voltage, max. . . . . 10-30 V DC/AC

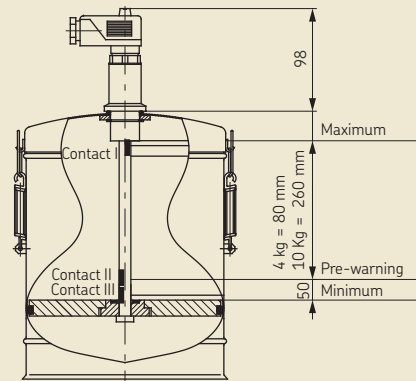
Switched current, max. . . . . 1 A

Connection diagram . . . . . Plug EN 175301-803 (DIN 43650)

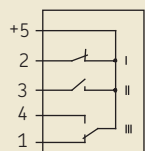
Protection class . . . . . IP 65

Lubricants. . . . . Grease of NLGI Grade 2

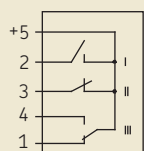
### Fill level switch H



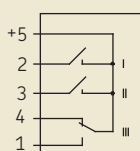
### Connector pin assignment fill level switch H



Switch position at maximum



Switch position at pre-warning



Switch position at minimum

### Connector pin assignment

PIN	Description
1	Standard output
2	Signal output "maximum"
3	Signal output "pre-warning"
4	Signal output "minimum"
5	+ Supply voltage

# Fill level monitoring for oil and grease

## U2 Ultrasonic sensor with 2 switching points

U2 Ultrasonic sensor



The ultrasonic sensor works with a piezoceramic element as a sonic transmitter and receiver. A decoupling layer is used to decouple the ultrasound from the acoustically thinner air medium. The ultrasonic transducer is embedded water-tight in foam in the sensor's housing. The active area of the ultrasonic sensor is designated as the detection area and is limited by the shortest (**A1**) and longest (**A2**) sensing distance. Its values depend on the size of the transducer. The transducer transmits a sonic pulse packet and converts the echo pulse back into voltage.

The integrated controller uses the echo time and speed of sound to calculate the distance between the minimum (**A2**) and maximum (**A1**) fill level.

### Technical data

#### General

Design . . . . . Ultrasonic sensor with two adjustable switching points (maximum, minimum)  
 Form of contact . . . . . pnp, choice of NO-contact/NC contact  
 Ambient temperature . . . . . -25 °C to +70 °C

#### Indicator

Yellow LED 1 . . . . . constant: state of switching output 1 / flashing: teach-in function  
 Yellow LED 2 . . . . . constant: state of switching output 2 / flashing: teach-in function  
 Red LED. . . . . normal operation: "fault"/ no lubricant detected

#### Electrical data

Operating voltage . . . . . 10 to 30 V DC, ripple 10%  
 No-load current  $I_0$  . . . . .  $\leq 50$  mA  
 Protection class . . . . . IP 65  
 Connection . . . . . connector socket V15 (12Mx1), 5-pin

### Note!

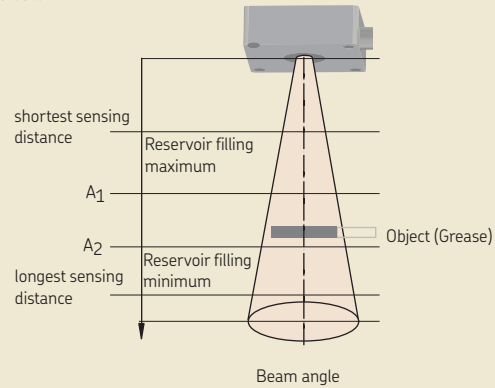
The factory-set values can be changed by the customer at any time (teach-in).

Contact box is not part of the shipment.  
 Available for separate order.

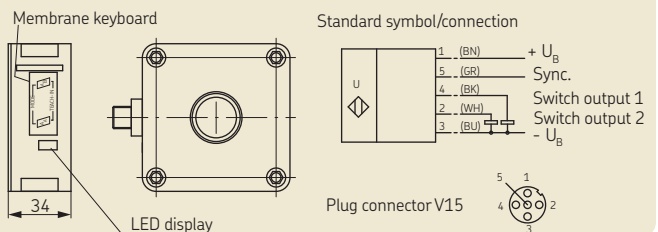
### Contact box

Description	Order No.
Contact box (not part of the shipment)	24-1882-2076

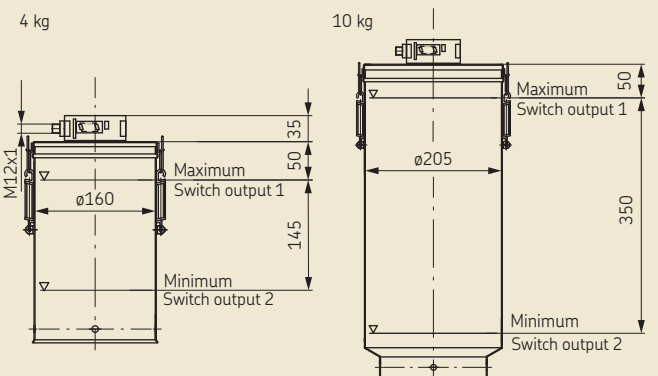
### Function



### U2 Ultrasonic sensor



### Reservoir with U2 Ultrasonic sensor



# FF multiline pump unit

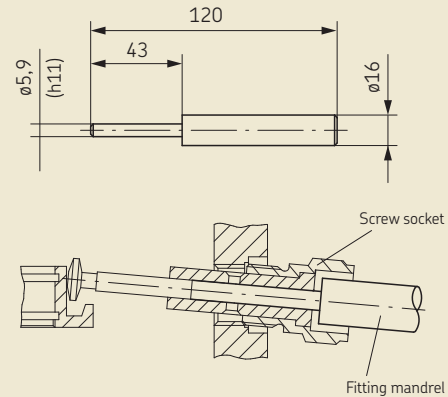
## Accessories

### Accessory Fitting mandrel

**Fitting mandrel**  
for installing a pump element

Description	Order No.
Fitting mandrel	<b>44-1827-2010</b>

### Fitting mandrel

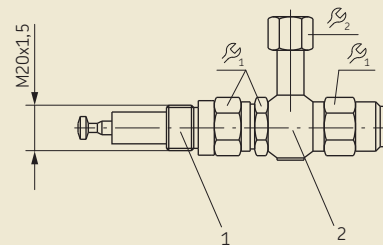


### Accessory Pump element

**Pump element with ring piece**  
for installing a pump element

Description	∅ [mm]	Weight [g/each]	⌀ <sub>1</sub>	⌀ <sub>2</sub>	Order No.
Pump element (Pos. 1)	6	260	24	–	<b>24-1557-3680</b>
	8	260	24	–	<b>24-1557-3681</b>
	10	280	24	–	<b>24-1557-3683</b>
Ring piece (Pos.2)	6	100	–	14	<b>24-2255-2003</b>
	8	80	–	17	<b>24-2255-2004</b>
	10	100	–	19	<b>24-2255-2005</b>

### Pump element

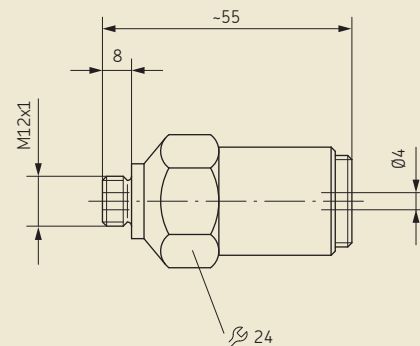


### Accessory Pressure regulating valve

**Pressure regulating valves for grease**  
for insertion into pump elements

Set pressure [bar]	Weight [g/each]	Order No.
50	130	<b>24-2103-2273</b>
100	130	<b>24-2103-2344</b>
125	130	<b>24-2103-2345</b>
150	130	<b>24-2103-2342</b>
175	130	<b>24-2103-2272</b>
200	130	<b>24-2103-2346</b>
350	130	<b>24-2103-2271</b>

### Pressure regulating valve

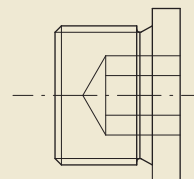


### Accessory Screw plug

**Screw plug**  
for closing unused pump outlets

Design	Weight [g/each]	Order No.
M20x1,5	37	<b>95-1520-0908</b>

### Screw plug



# FF multiline pump unit

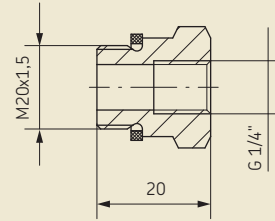
## Accessories

### Accessory Threaded socket

**Threaded socket for grease recirculation**  
in place of a pump element to recirculate grease into pump housing

Design	Order No.
Steel, galvanized surface, with copper (Cu) washer	<b>24-1755-2003</b>

### Threaded socket

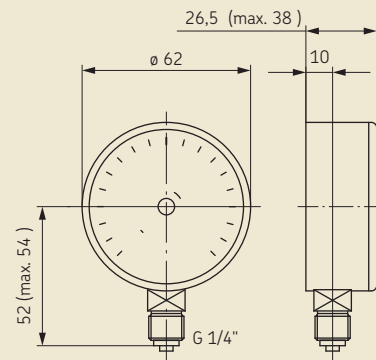


### Accessory Pressure gauge

Indicating range	Order No.
0 to 250 bar (0 to 3600 psi)	<b>169-125-000</b>
0 to 400 bar	<b>169-140-001</b>
Washer <sup>1)</sup>	<b>248-610.02</b>

<sup>1)</sup> Washer must be ordered separately for each pressure gauge.

### Pressure gauge



### Accessory Pressure gauge screw

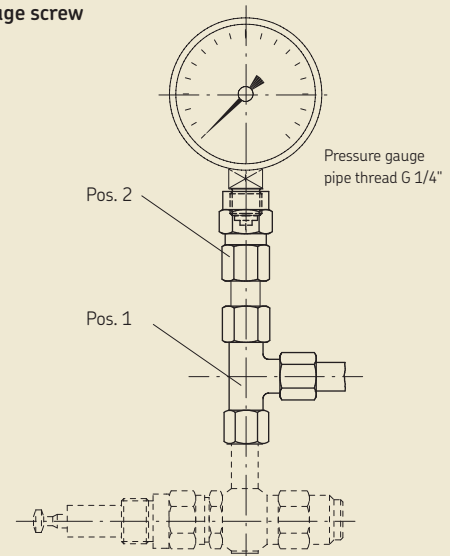
**Position 1:** elbow fitting, directionally adjustable, according to DIN 2353

Tube external diameter	Thread	Order No.
6 mm	M 12x1,5	<b>443-406-061</b>
8 mm	M 14x1,5	<b>443-408-081</b>
10 mm	M 16x1,5	<b>443-410-101</b>

**Position 2:** Pressure gauge screw

Tube external diameter	Thread	Order No.
6 mm	M 12x1,5	<b>443-406-061</b>
8 mm	M 14x1,5	<b>443-408-081</b>
10 mm	M 16x1,5	<b>443-410-101</b>

### Pressure gauge screw



# FF multiline pump unit

## Accessories

### Accessory Topping-up pump

#### Manual topping-up pump

Description	Order No.
with gear, for 25 kg drum	<b>169-000-042</b>
for 50 kg drum	<b>169-000-054</b>
without running gear for 25 kg drum	<b>169-000-342</b>
corresponding filler socket	<b>995-000-705</b>

The delivery rate of all desings is ~40 cm<sup>3</sup>/stroke.

### Topping-up pump <sup>1)</sup>



<sup>1)</sup> A generic pump is depicted; the actual pumps may differ in appearance.

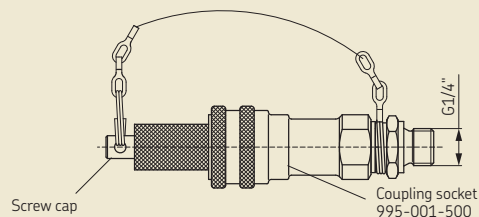
### Accessory Coupling socket

#### Coupling socket with cap

for installation on a topping-up pump

Description	Order No.
Coupling socket with cap	<b>995-001-509</b>

### Coupling socket with cap



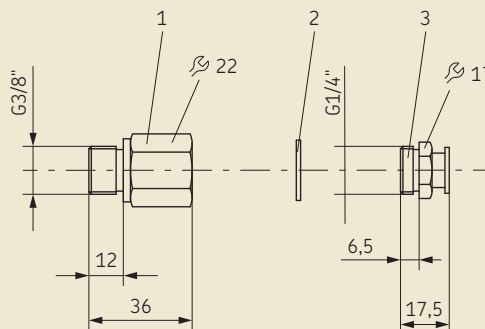
### Accessory Lubricant nipple

#### Reduction fitting with flat-type lubricant nipple

for connecting a manual grease press

Pos.	Description	Order No.
1	Reduction fitting RI 3/8x1/4 VZK E0	<b>96-3120-0058</b>
2	Washer A 17x21 DIN 7603 CU	<b>DIN 7603-A17x21 CU</b>
3	Flat-type lubricant nipple AG 1/4-16 DIN 3404	<b>96-0002-0053</b>

### Filling device with lubricant nipple



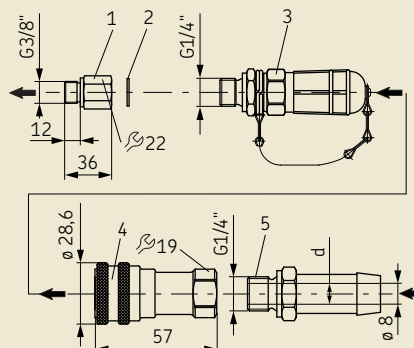
### Accessory Quick-action coupling

#### Quick-action coupling

for connecting an automatic filling device

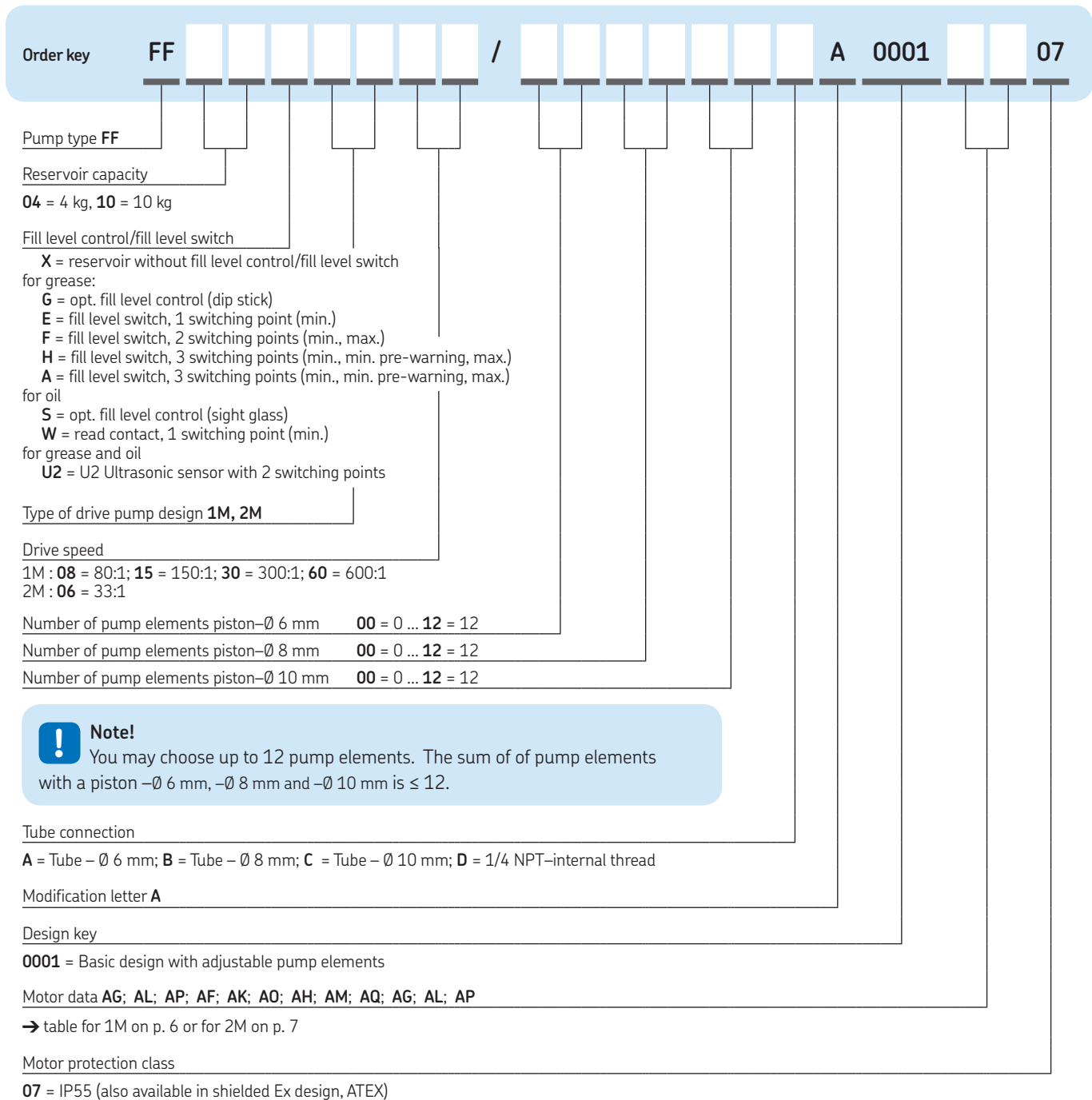
Pos.	Description	Order No.
1	Reduction fitting RI 3/8x1/4 VZK E0	<b>96-3120-0058</b>
2	Washer A 17x21 DIN 7603 CU	<b>DIN 7603-A17x21 CU</b>
3	Filler socket	<b>995-000-705</b>
4	Coupling socket (for refill connection)	<b>995-001-500</b>
5	Hose fitting for connection to coupling socket Diameter (d) 13 mm	<b>857-760-007</b>
	Diameter (d) 16 mm	<b>857-870-002</b>

### Filling device with quick-action coupling



# FF multiline pump unit

## Order key



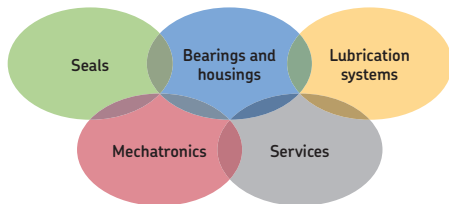
### Note!

You may choose up to 12 pump elements. The sum of of pump elements with a piston –∅ 6 mm, –∅ 8 mm and –∅ 10 mm is ≤ 12.

### Order example:

**FF04U22M06/080400BA0001AG07**

- Pump type FF
- 4 kg-reservoir
- U2 ultrasonic fill level switch
- Drive type 2M
- Drive speed 06 (33:1)
- 8 pump elements with ∅ 6 mm
- 4 pump elements with ∅ 8 mm
- 0 pump elements with ∅ 10 mm
- tube connection B with ∅ 8mm
- Modification letter A
- Basic design with adjustable pump elements
- Motor values (2M) of 1 000 r/min, 50 Hz, 0,25 kW, 230/400 V AC, 1,91/1,10 A
- Protection class IP55



### The Power of Knowledge Engineering

Combining products, people, and application-specific knowledge, SKF delivers innovative solutions to equipment manufacturers and production facilities in every major industry worldwide. Having expertise in multiple competence areas supports SKF Life Cycle Management, a proven approach to improving equipment reliability, optimizing operational and energy efficiency and reducing total cost of ownership.

These competence areas include bearings and units, seals, lubrication systems, mechatronics, and a wide range of services, from 3-D computer modelling to cloud-based condition monitoring and asset management services.

SKF's global footprint provides SKF customers with uniform quality standards and worldwide product availability. Our local presence provides direct access to the experience, knowledge and ingenuity of SKF people.

#### **!** Important information on product usage

All products from SKF may be used only for their intended purpose as described in this brochure and in any instructions. If operating instructions are supplied with the products, they must be read and followed.

Not all lubricants are suitable for use in centralized lubrication systems. SKF does offer an inspection service to test customer supplied lubricant to determine if it can be used in a centralized system. SKF lubrication systems or their components are not approved for use with gases, liquefied gases, pressurized gases in solution and fluids with a vapor pressure exceeding normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.

Hazardous materials of any kind, especially the materials classified as hazardous by European Community Directive EC 67/548/EEC, Article 2, Par. 2, may only be used to fill SKF centralized lubrication systems and components and delivered and/or distributed with the same after consulting with and receiving written approval from SKF.

#### Additional brochures for further information:

- 1-0103-EN *Fittings and accessories*
- 1-0107-6-EN *Accessories for progressive systems*
- 1-3016-EN *Sectional feeder VP*
- 1-3017-EN *Block feeder VPB*
- 1-3026-EN *FB multiline pump unit*
- 1-3030-EN *Piston pump unit KFG*
- 1-9201-EN *Transport of lubricants in centralized lubrication systems*

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