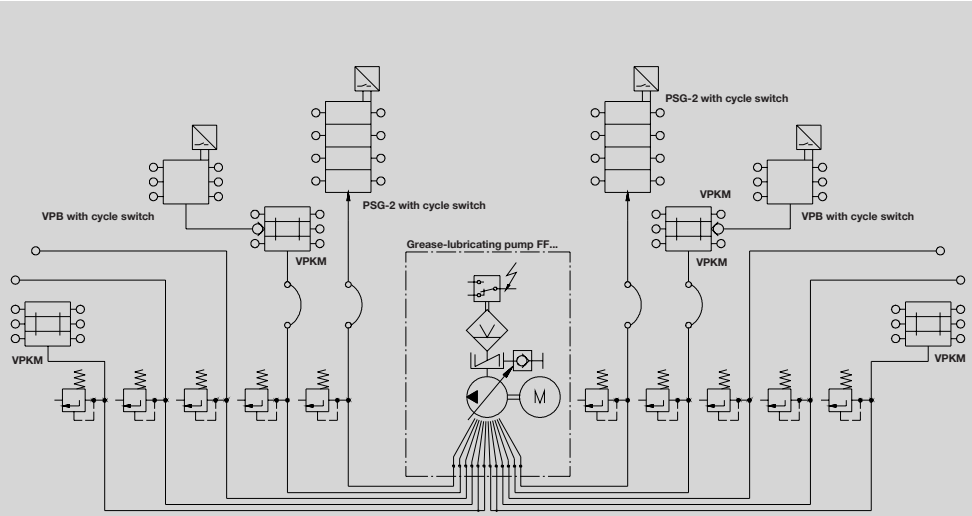
Grease-lubricating pump FF...

DSK 2-008-00-US (05.05)

electrically operated, for small and medium-sized multiple-line and progressive systems



FF

Specification

- **VOGEL** Grease-lubricating pumps FF... are available with different three-phase motors, with 4 or 10 kg grease containers as well as with or without filling level control
- High operational pressure (up to 350 bar) possible
- Up to 12 individually adjustable pump elements (= outlets) with various delivery volumes and pipe connections Centralized lubrication system with direct lubrication position connection
- Max. 10 cm^3 lubricant per minute and outlet Supply by progressive distributors
- Various delivery plungers (6 mm, 8 mm and 10 mm Ø) for various delivery amounts and operational pressures (350 bar, 200 bar and 125 bar)
- Pressure control valve (accessory) mounted on the pump element (protects the grease-lubricating pump against unpermitted pressure buildup)
- Screwed sealing plugs for unused integral thread
- **VOGEL** Grease-lubricating pumps FF... can also be used as an oil pump

VOGEL® Centralized Lubrication

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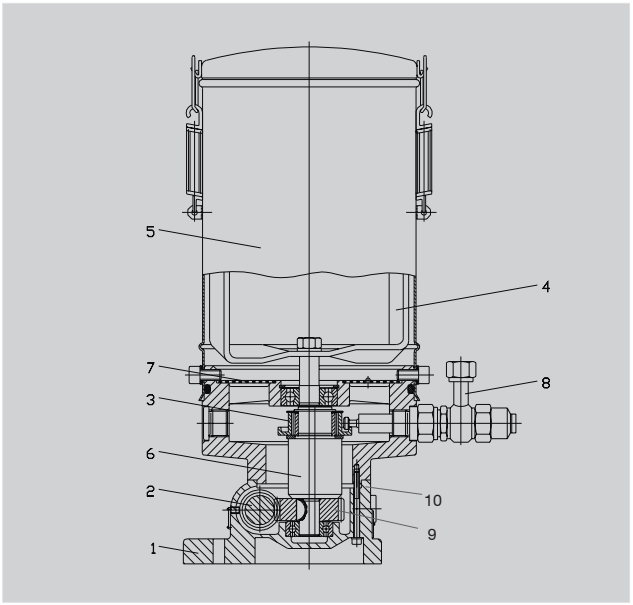
General

The grease-lubricating pump of the FF... series is suitable for small and medium-sized systems because of its flow rate and tank capacity.

The lubricant can be fed to the lubrication points directly or via a distributor (progressive distributor).



Pump construction

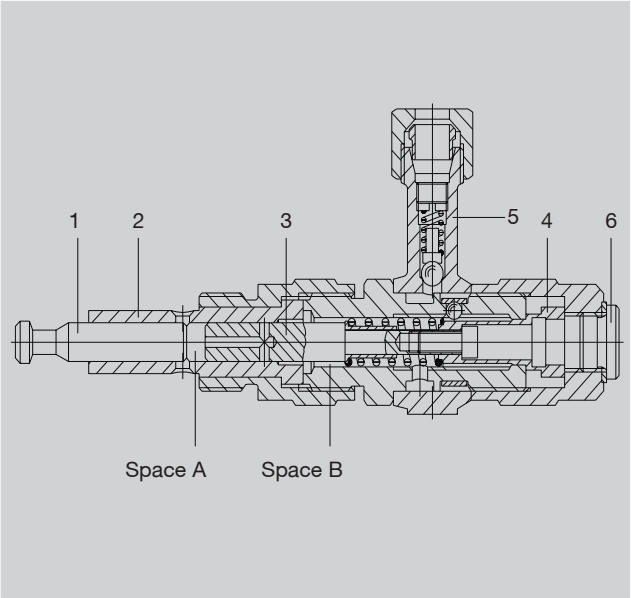
Position	Description
1	Housing with clamping collar
2	Motor shaft with screw
3	Guide ring
4	Agitator blade
5	Grease container
6	Eccentric motor shaft
7	Strainer
8	Pump element
9	Worm gear
10	Filler neck (G 3/8)

Pump operation

The pump is operated by a worm gear transmission **(5)** consisting of a worm and the respective worm gear. The worm gear drives the eccentric motor shaft **(6)** with the fitted agitator blade **(4)**. The agitator blade **(4)** pushes the lubricant through the strainer into the pump's inlet chamber.

The eccentric motor shaft **(6)** has a needle-bearing guide ring **(3)** to receive the delivery piston heads of the pump elements **(8)**.

The suspended delivery pistons (into the guide ring) are forcibly moved by the eccentric movement of the guide ring **(3)**.



Pump element construction with delivery volume adjustment

Position	Description
1	Delivery piston
2	Cylinder
3	Spring-loaded control piston
4	Adjustment cap
5	Ring-segment with non-return valve
6	Screwed sealing plug

Pump element operation

The delivery piston is forcibly activated as described in “Pump operation”.

In the intake stroke position (as diagrammed) the cross hole of the control piston **(3)** is closed.

At the beginning of the pressure stroke, the delivery piston **(1)** closes the suction hole. The suctioned lubricant in space A is pressed against the spring-loaded control piston **(3)**. The cross hole in the control piston **(3)** is opened.

The lubricant reaches space B under pressure over the lengthwise and cross hole of the control piston **(3)** and from there, over the ring canal and the non-return valve **(5)** to the outlet.

After the resulting pressure stroke, the intake stroke of the delivery piston **(1)** begins.

By moving the delivery piston **(1)**, the control piston **(3)** is also brought into its starting position by the spring tension.

A vacuum is created in space A resulting from the intake stroke movement of the delivery piston **(1)**. By opening the suction hole, the lubricant reaches space A through the existing vacuum.

The pump element is prepared for the next lubrication step.

Delivery volume adjustment on the pump element

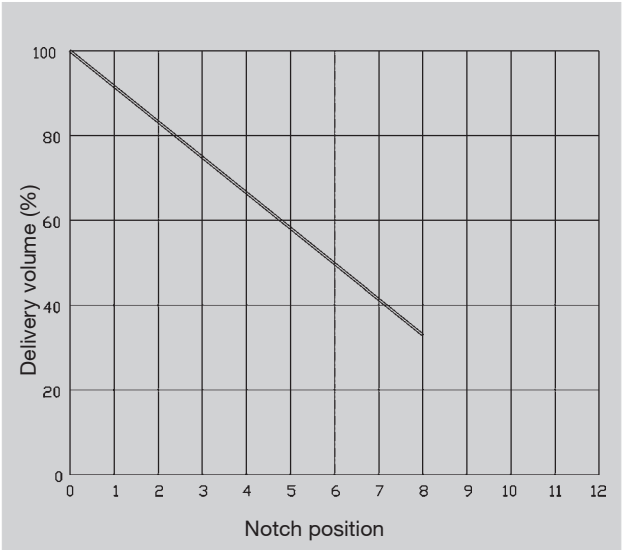
The delivery volume of the pump element is determined by the stroke of the control piston. The screwed sealing plug (**6**) has to be removed when adjusting the delivery volume. Afterwards, the adjustment cap (**4**) can be turned.

The following setting apply:

- Turning to the right will result in decreased delivery volume
- Turning to the left will result in increased delivery volume

Note!
The delivery volume of the pump element must be reduced to 1/3 of the maximum delivery volume. This corresponds to turning the adjustment cap (**4**) by eight notches.

Delivery volume depending on the notch position on the pump element for piston diameters of 6 mm, 8 mm and 10 mm.



Lubricating pump FF ... 1M/2M

Characteristics

General

Mounting position ..... vertical ambient
Ambient and lubricant temperature range ..... -15 °C to + 40 °C [1])
Reservoir ..... for ca. 4 or 10 kg
Amount of pump elements ..... 1 to 12
Filling ..... via filler neck G 3/8
Empty weight ..... FF 04 ca. 15 kg
..... FF 10 ca. 20.5 kg

Gearbox

Type ..... worm gear
1 M ..... two-stage
2 M ..... one-stage
Translations
1 M 80:1; 150:1; 300:1; 600:1
2 M 33:1

Motor

see Table page 6 and 8 as well as type plate.

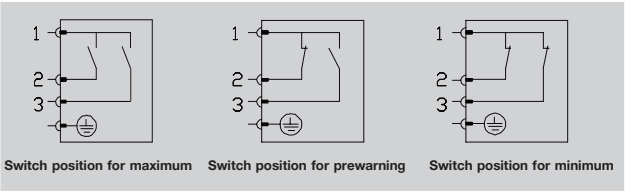
Pump
Type ..... multi-piston pump with 1 to 12 outlets
Working pressure for pump elements with piston diameter of
6 mm ..... max. 350 bar
8 mm ..... max. 200 bar
10 mm ..... max. 125 bar
Lubricants ..... Mineral oil or environmentally compatible oil starting with ISO VG 46 to the grease type NLGI Class 3 (please contact regarding synthetic oil types)
Operating viscosity (oil) ..... ≥ 50 mm^2/s
Worked penetration (grease) ..... > 220 1/10 mm

Delivery volume of the pump elements
Piston Ø 6 ..... 0.027 to 0.08 cm^3/stroke
Piston Ø 8 ..... 0.05 to 0.15 cm^3/stroke
Piston Ø 10 ..... 0.077 to 0.23 cm^3/stroke

1) With higher ambient temperature, note that there will be a reduction in (motor) performance of ca. 1 % per Kelvin.

Level switch specifications

Level indicator A

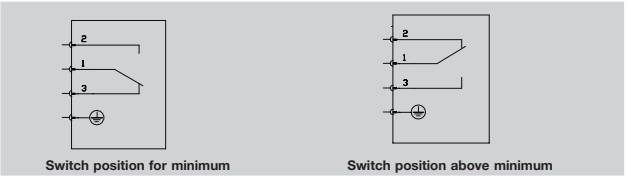


Delivery is also possible with modified contact functions

Specification Microswitch; .... dip stick
Switched current max. ..... 15 A for AC (with inductive load 0.25 A for DC)
Switching voltage max. ..... 250 V DC - 380 V AC

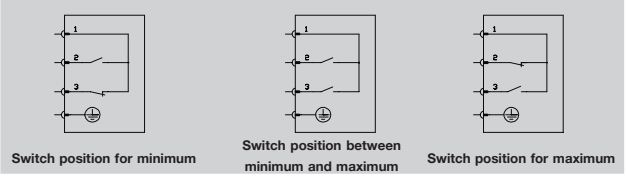
Switch specification .. 3 switching points (closer)
1. max. filling level ..... (contact 1+2 open; contact 1+3 open)
2. Filling level prewarning .(contact 1+2 closed; contact 1+3 open)
3. min. filling level ..... (contact 1+2 closed; contact 1+3 closed)
Connection via connector ..... connector DIN 43 650
Type of protection ..... IP 54
opt. Filling level display .....via dip stick (grease overflow plate)

Level indicator E



Specification ..... reed contact
Switch specification ..... 1 switching point: min. (changeover switch)
Switching capacity max. ..... 60 W/VA
Switching voltage max. ..... 230 V AC/DC
Connection via connector ..... connector DIN 43 650
Type of protection connector/plug socket ..... IP 65

Level indicator F

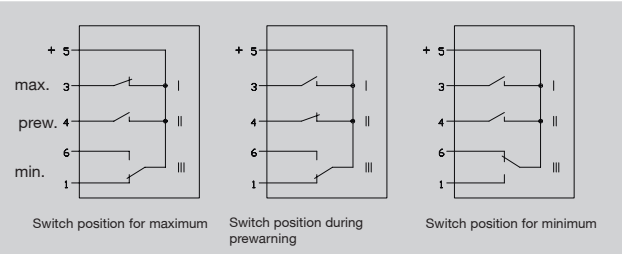


Specification ..... reed contact
Switch specification ..... 2 switching points (min. - max.)
Switched current max. ..... 1 A for AC/DC
Switching voltage max. ..... 42 V AC/DC
Connection via connector ..... connector DIN 43 650
Type of protection connector/plug socket ..... IP 65

Level indicator G

Specification ..... optical filling level control (dip stick)

Level indicator H



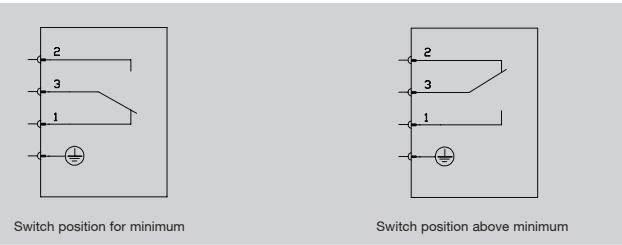
Specification ..... reed contact
Switching capacity max. ..... 60 W/VA
Switching voltage max. ..... 10 -30 V AC/DC

Switch specification ..... 3 switching points
1. max. filling level ..... (closer)
2. filling level prewarning ..... (closer)
3. min. filling level ..... (changeover switch)
Connection via connector ..... connector DIN 43 651
Type of protection connector/plug socket ..... IP 65

Level indicator S

Specification ..... for oil; with visual control (sight glass; filler neck with strainer on the cover)

Level indicator W

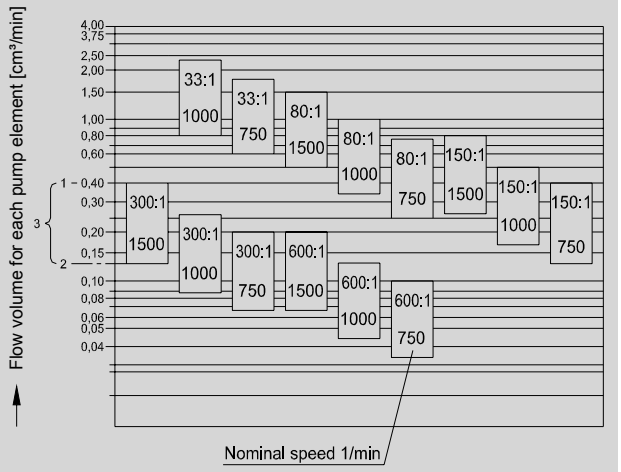


Specification: ..... for oil; with level switch reed contact
Switching capacity max. 10 W/40VA
Switching voltage max. ..... 250 V AC/DC
Switch specification ..... 1 switching point
min. filling level ..... (changeover switch) with filler neck (strainer) on the cover
Connection via connector ..... connector DIN 43 650
Type of protection connector/plug socket ..... IP 65

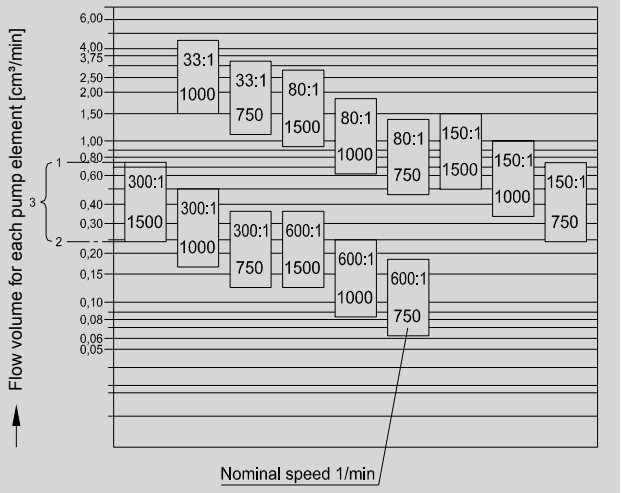
Delivery volume of the pump element with piston diameters 6, 8 and 10 mm

Delivery volume for each pump element depending on the rotational speed of the motor shaft.

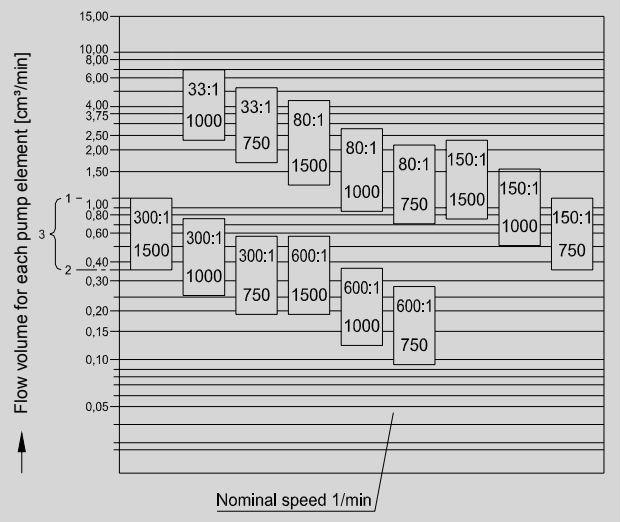
Piston diameter 6 mm



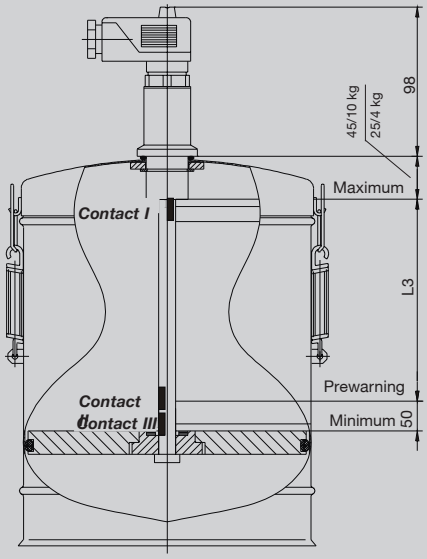
Piston diameter 8 mm



Piston diameter 10 mm

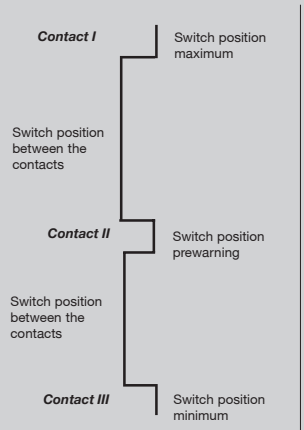


Grease-lubricating pump FF..1M...illustration

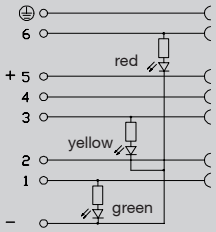


Reservoir	L3
[kg]	[mm]
4	80
10	260

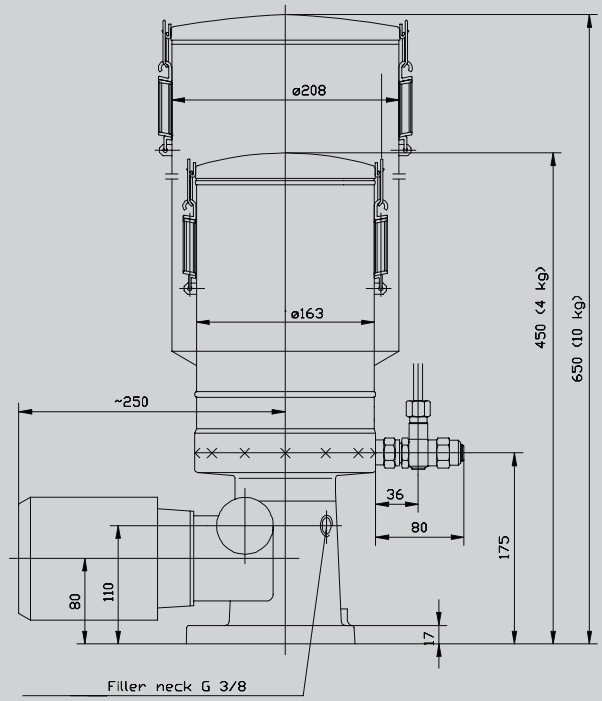
Reservoir model with level switch "H"

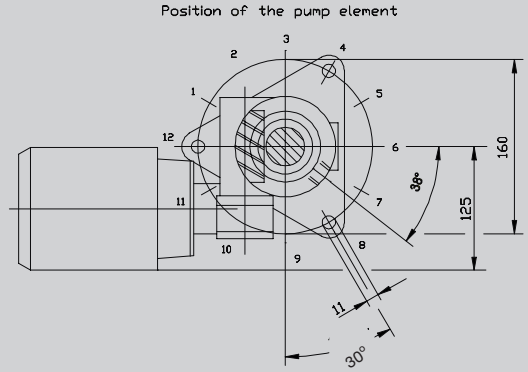


Switching scheme contacts



incl. cable plug with 3 LED
(yellow/green/red)
24-1882-2060





Norminal speed [min^{-1}]	Frequecy [Hz]	Norminal power [kW]	Norminal voltage [V]	Norminal current [A]	Order-No
1000	50	0.09	230/ 400	0.80 / 0.46	AG
1000	50	0.09	290 / 500	0.64 / 0.37	AL
1000	50	0.09	400 / 690	0.46 / 0.26	AP
1500	50	0.18	230 / 400	1.13 / 0.65	AF
1500	50	0.18	290 / 500	0.90 / 0.52	AK
1500	50	0.18	400 / 690	0.65 / 1.07	AO

Note!

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

Oil level monitoring

When using the FF pump as an oil lubrication pump, the reservoir can be equipped with an oil level monitor (level switch “W”). This may have either one (basic design “Contact min.”, two or three switching points. The specification of the oil level monitor is made to customer specifications corresponding to receipt of order. Additionally, a special filling device and an optical filling level display can be installed.

Ordering example for grease-lubricating pump FF..1M...

Ordering example: **FF 04 X 1M 08 / 08 04 00 A A 0001 AF 07**

Type

Tank capacity

04 = 4 kg; **10** = 10 kg

Level switch

X = reservoir without level switch

A = level switch; microswitch; dip stick

E = level switch; 1 switching point (min. changeover switch)

F = level switch; reed contact; 2 switching points

G = opt. filling level control (dip stick)

H = level switch; reed contact, 3 switching points

1. max. filling level (closer)
2. filling level prewarning (closer)
3. min. filling level (changeover switch)

S = for oil; with visual control (sight glass)

W = for oil; reed contact; 1 switching point min.; changeover switch

Type of drive

Delivery index

08 = 80:1; **15** = 150:1; **30** = 300:1; **60** = 600:1

Drive position (see ill.)

Amount of pump elements piston-∅ 6 mm

Amount of pump elements piston-∅ 8 mm

$\sum \leqq 12$

Amount of pump elements piston-∅ 10 mm

Pipe connection

A-pipe-∅ 6 mm; **B**-pipe-∅ 8 mm; **C**-pipe-∅ 10 mm; **D**-1/4 NPT-internal thread

A= modification letter

Model identification number

0001 = Basic model with adjustable pump elements

Nominal speed, frequency, nominal power, nominal voltage and nominal current (-see Table page 6)

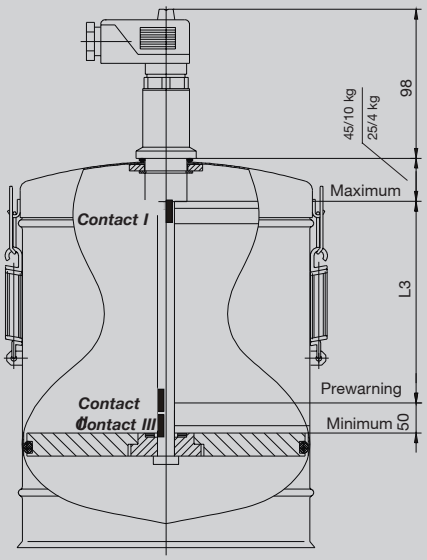
Type of protection (motor)

07 = IP55; **13** = EEx eIIT3 IP55; **34** = EEx dIICT4 IP55

Ordering example

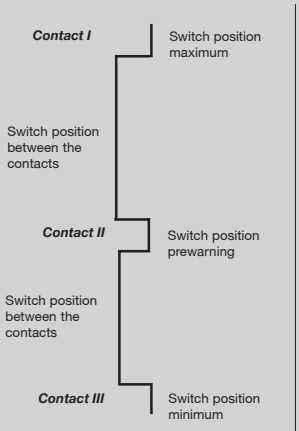
for a pump unit type FF with 4 kg-reservoir, without level switch, motor with drive levels, delivery index 08 (80:1), 8 pump elements with Ø 6 mm, 4 pump elements with Ø 8 mm, 0 pump elements with Ø 10 mm, pipe connection Ø 6 mm, modification letter A, basic design with adjustable pump elements, motor value of 1500 min^{-1}, 230/400 V AC, 1.13/0.65 A, type of protection IP55.
FF04X1M08/080400AA0001AF07

Grease-lubricating pump FF..2M...illustration

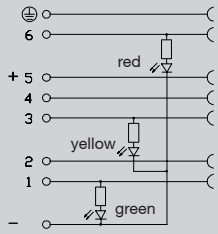


Reservoir [kg]	L3 [mm]
4	80
10	260

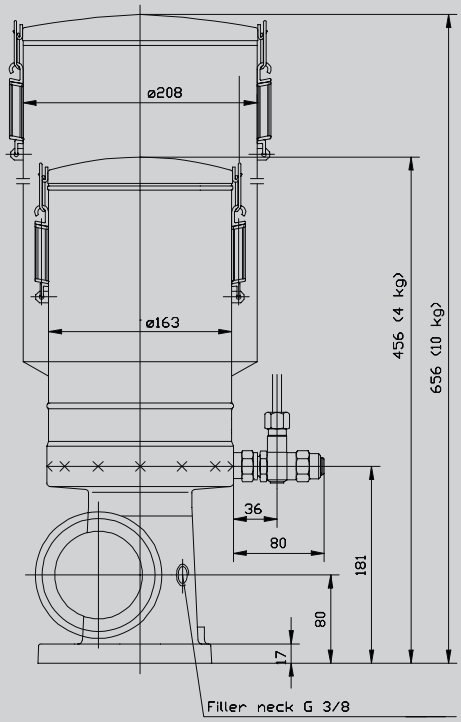
Reservoir model with level switch "H"

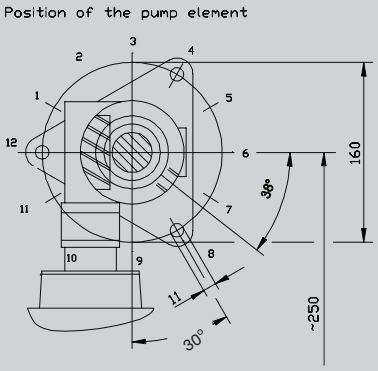


Switching scheme contacts



incl. cable plug with 3 LED (yellow/green/red)
24-1882-2060





Norminal speed [min^{-1}]	Frequecy [Hz]	Norminal power [kW]	Norminal voltage [V]	Norminal current [A]	Order-No
750	50	0.12	230 / 400	1.27 / 0.73	AH
750	50	0.12	290 / 500	0.34 / 0.58	AM
750	50	0.12	400 / 690	0.73 / 1.26	AQ
1000	50	0.25	230 / 400	1.91 / 1.10	AG
1000	50	0.25	290 / 500	0.51 / 0.88	AL
1000	50	0.25	400 / 690	0.10 / 0.17	AP

Note!

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

Oil level monitoring

When using the FF pump as an oil lubrication pump, the reservoir can be equipped with an oil level monitor (level switch “W”). This may have either one (basic design “Contact min.”), two or three switching points. The specification of the oil level monitor is made to customer-specifications corresponding to receipt of order. Additionally, a special filling device and an optical filling level display can be installed.

Ordering example for grease-lubricating pump FF..2M...

Ordering example: **FF 04 X 2M 06 /08 04 00 A A 0001 AG 07**

Type

Tank capacity
04 = 4 kg; **10** = 10 kg

Level switch
X = reservoir without level switch
A = level switch; microswitch; dip stick
E = level switch; 1 switching point (min. changeover switch)
F = level switch; reed contact; 2 switching points
G = opt. filling level control (dip stick)
H = level switch; reed contact, 3 switching points
1. max. filling level (closer)
2. filling level prewarning (closer)
3. min. filling level (changeover switch)
S = for oil; with visual control (sight glass)
W = for oil; reed contact; 1 switching point min.; changeover switch

Type of drive

Delivery index
06 = 33:1

Drive position (see ill.)

Amount of pump elements piston-Ø 6 mm
Amount of pump elements piston-Ø 8 mm $\sum \leqq 12$
Amount of pump elements piston-Ø 10 mm

Pipe connection
A-pipe-Ø 6 mm; **B**-pipe-Ø 8 mm; **C**-pipe-Ø 10 mm; **D**-1/4 NPT-internal thread

A= modification letter

Model identification number
0001 = Basic model with adjustable pump elements

Nominal speed, frequency, nominal power, nominal voltage and nominal current (-see Table page 8)

Type of protection (motor)
07 = IP55; **13** = EEx eIIT3 IP55; **34** = EEx dIICT4 IP55

Ordering example

for a pump unit type FF with 4 kg-reservoir, without level switch, motor with drive levels, delivery index 06 (33:1), 8 pump elements with Ø 6 mm, 4 pump elements with Ø 8 mm, 0 pump elements with Ø 10 mm, pipe connection Ø 6 mm, modification letter A, basic design with adjustable pump elements, motor value of 1000 min^{1}, 230/400 V AC, 1.91/1,10 A, type of protection IP55.
FF04X2M06/080400AA0001AG07

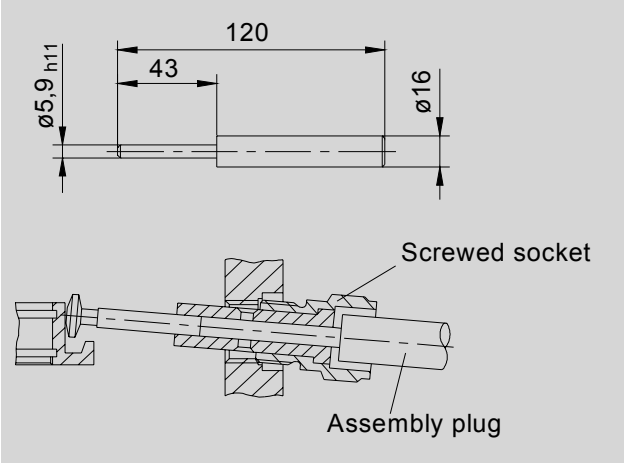
Accessories

(separately ordered)

Assembly plug

(for installing a pump element)

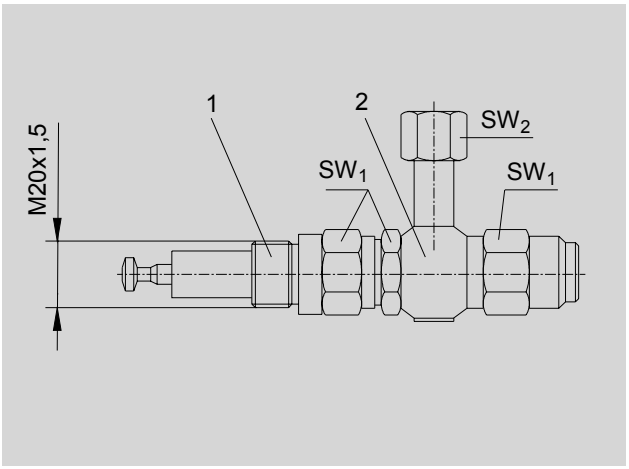
Order no.	**44-1827-2010**



Pump element with ring-segment

(for later installation or replacement)

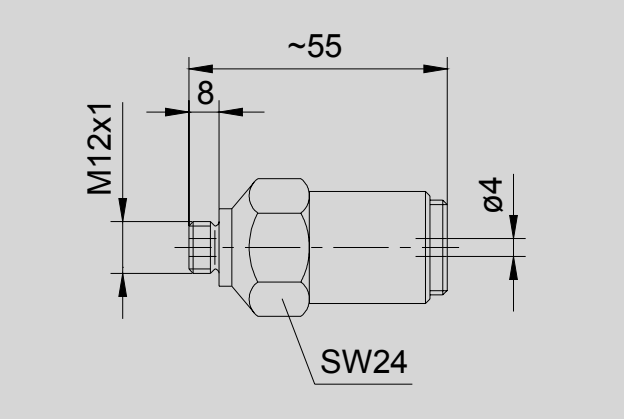
Application	**SW_1** [mm]	**SW_2** [mm]	**Weight** [kg/St]	**Order no.**
Pump element (Pos.1)				
Piston diameter 6 mm	24	-	0,259	**24-1557-3680**
Piston diameter 8 mm	24	-	0,264	**24-1557-3681**
Piston diameter 10 mm	24	-	0,275	**24-1557-3683**
Ring segment (Pos.2)				
Pipe diameter 6 mm	-	14	0,101	**24-2255-2003**
Pipe diameter 8 mm	-	17	0,076	**24-2255-2004**
Pipe diameter 10 mm	-	19	0,100	**24-2255-2005**



Pressure control valve

(to insert into the pump element)

Set pressure [bar]	**Weight** [kg/St]	**Order no.**
50	0,13	**24-2103-2273**
100	0,13	**24-2103-2344**
150	0,13	**24-2103-2342**
175	0,13	**24-2103-2272**
350	0,13	**24-2103-2271**



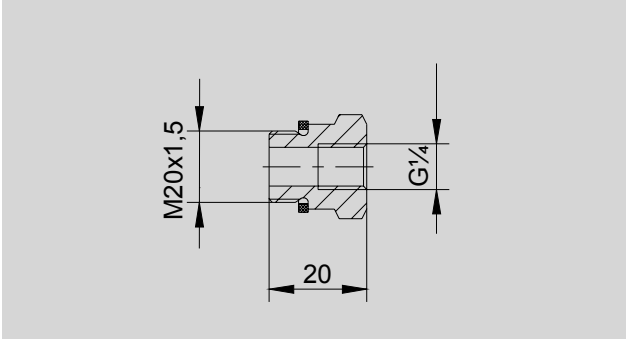
Accessories

(separately ordered)

Screwed socket for grease recirculation

(at the position of a pump element)

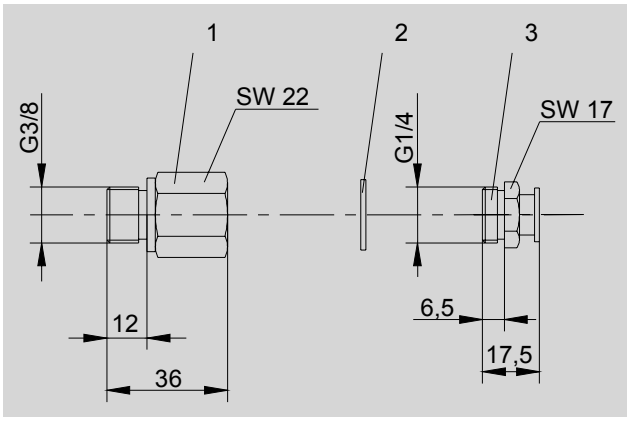
Description	Order no..
Steel, galvanized surface; with Cu-seal	**24-1755-2003**



Filling equipment - Reducing spout with lubricating nipple

(for connecting a manual grease press)

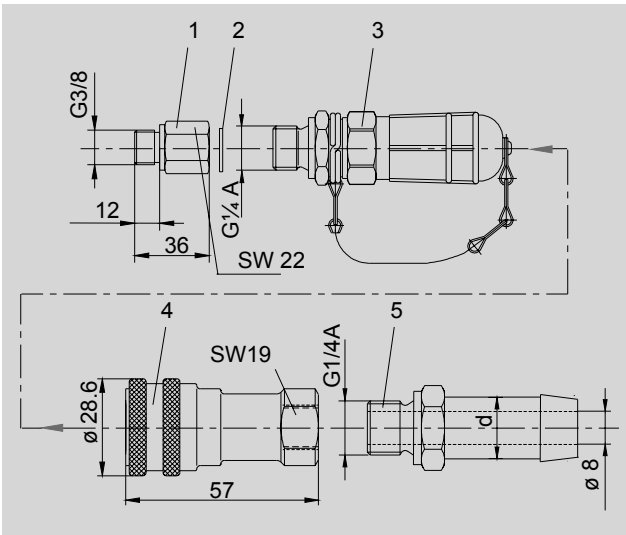
Pos.	Description	Order no.
1	**Reducing fitting** RI 3/8x1/4 VZK EO	**96-3120-0058**
2	**Sealing** A 17x21 DIN 7603 CU	**95-1721-7603**
3	**Lubricating nipple** AG 1/4-16 DIN 3404	**96-0002-0053**



Filling equipment - rapid action hose coupling

(for connecting automatic filling equipment)

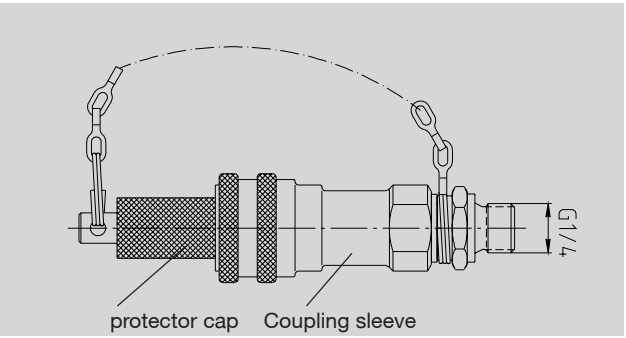
Pos.	Description	Order no.
1	**Reducing fitting** RI 3/8x1/4 VZK EO	**96-3120-0058**
2	**Sealing** A 17x21 DIN 7603 CU	**95-1721-7603**
3	**Filler socket**	**995-000-705**
4	**Coupling sleeve** for filling connection)	**995-001-500**
5	**Hose fitting** for connection on coupling sleeve Diameter (d) 13	**857-760-007**
	(d) 16	**857-870-002**



Filling equipment - Coupling sleeve with protector cap

(for closing coupling sleeve)

Description	Order no.
Coupling sleeve with protector cap	**995-001-509**



Publication notes

Operating manual	
for grease-lubricating pump FF...	DSB 2-010-00-US
Replacement parts lists	
for grease-lubricating pump FF...	DSE 2-008-00-US
Leaflet for grease pump	1-0107-3-US
Leaflet for progressive distributor VPKM	1-0107-1-US
Leaflet for progressive distributor VPBM	1-0107-1-US
Leaflet for progressive distributor VPG	1-0107-1-US
Leaflet for segment distributor PSG 2	1-3013-US
Leaflet for segment distributor PSG 3	1-3014-US

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