

Grease Lubrication Pump FK

for use in progressive, single-line and dual-line centralized lubrication systems



Application

The FK pump unit is a multi-function piston pump whose modular structure makes it very versatile.

The FK pump unit can be used as a progressive, single-line or dual-line pump unit with or without integrated reversing valves. The modular structure of the pump also allows it to be retrofitted from one of the above-mentioned lubrication systems to another system without much effort or expense.

The pump, which was designed to handle demanding usage, is available with reservoir sizes of 15 kg, 30 kg and 60 kg.

Advantages

- compact, modular construction; especially well-suited for small to medium dual-line centralized lubrication systems
- Operating pressure up to 400 bar
- High operational reliability due to positively driven pump pistons
- Fill level monitoring (using ultrasonic sensor) with three adjustable switching points
- Easily serviceable due to quickly replaceable components (modules)
- Modular system, retrofitting to another system is possible
- Operating conditions from -25 °C to +60 °C
- Internal pressure-regulating valve with return of grease to the reservoir
- Option for attachments such as pressure gauge or filling coupling
- System requirements can be optimally met and the system pressure reduced by internally consolidating up to six pump elements
- Using multiple pump elements increases the redundancy factor (operational security)
- A new screw conveyor design permits the delivery of very highly viscous lubricants
- "All-in-one" solution with pressure-regulating valve, pressure-relief valve or changeover valve and pressure gauge
- Serves as a supply pump for single-line and dual-line centralized lubrication systems

Functional description

The FK pump unit is driven by an electric geared motor (1) that is radially flanged to the left side of the reservoir. A worm drive-shaft (2) flanged to the geared motor delivers the lubricant in the reservoir to the radial piston pump on the opposite side of the reservoir (3) and drives it as well. Piston stroke motions by the radial piston pump (3) are performed using a rotating eccentric shaft (4). Piston return (suction phase) is performed by positively driven pump pistons (5) that run in a plate cam (6).

Depending on the volume of lubricant required, the radial piston pump can be equipped with up to six pumping elements (7). Each pump element delivers the lubricant via its dedicated check valve (8) into a common downstream ring line (9).

This protects the radial piston pump from potential pressure peaks. The further course of the lubricant depends on the specific pump usage, whether it is used as a progressive, single-line or dual-line pump (see the following pump description for progressive, single-line or dual-line centralized lubrication systems).

FK4 pump unit for progressive centralized lubrication systems

-see FK4 connection drawing on page 4

Lubricant that comes from the ring line (9) is delivered to pump outlet "A/P". From there it is passed to the downstream progressive feeders.

The pump outlet "B/R" is closed on pump design FK4

FK1 pump unit for single-line centralized lubrication systems

-see FK1 connection drawing on page 4.

Lubricant that comes from the ring line (9) is delivered to the inlet of the 3/2 directional solenoid valve flanged to the pump (10). If the directional solenoid valve is actuated, the lubricant flows to pump outlet A/P.

After this, the lubricant is passed on through the main lubricant line to the downstream single-line distributors.

When a 3/2 directional solenoid valve is in a de-energized state, pressure relief of the main lubricant line returns to the lubricant reservoir (T).

FK3 pump unit for dual-line centralized lubrication systems without installed reversing valves

-see FK3 connection drawing on page 5

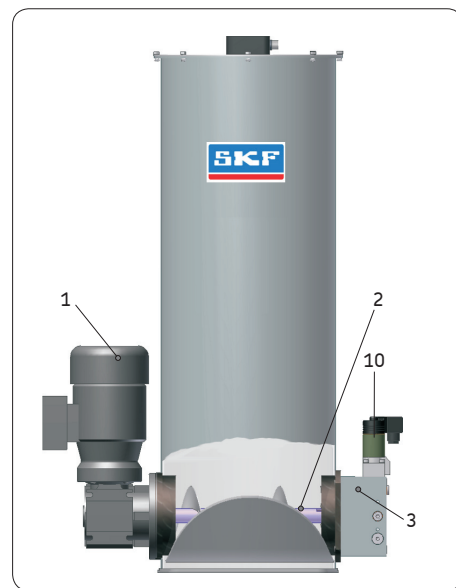
Lubricant that comes from the ring line (9) is delivered on to pump outlet "A/P". From there it is passed to the downstream external reversing valves.

The pump outlet "B/R" is open and serves to return the lubricant into the lubricant reservoir (T).

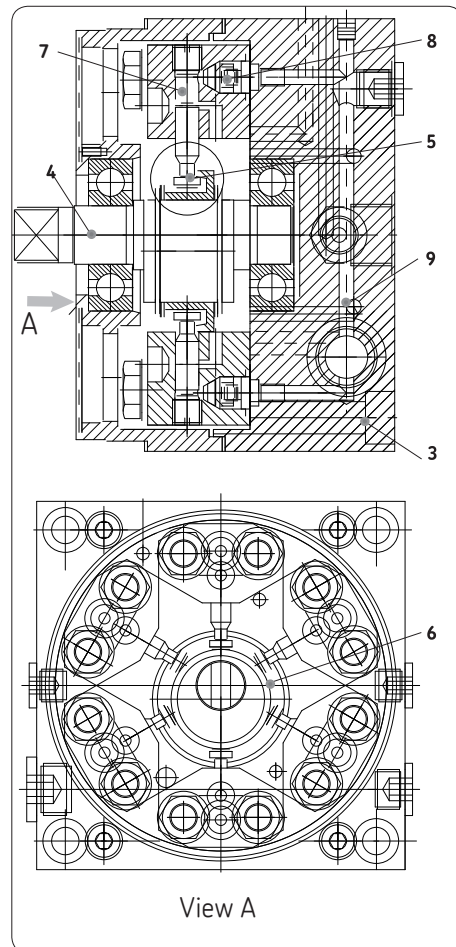
FK2 pump unit for dual-line centralized lubrication systems with integrated reversing valves

-see FK2 connection drawing on page 5

Lubricant that comes from the ring line (9) is delivered to the inlets of both 3/2 directional solenoid valves (10). If the 3/2 directional solenoid valve corresponding to connection A is actuated, the lubricant flows to outlet A. From there it is passed through the connected main lubricant line to the downstream dual-line distributors. At the same time, pressure in the second main lubricant line is relieved. This is performed via the second, unpressurized directional solenoid valve B and returns to the lubricant reservoir (T). When the required system pressure is reached, both directional solenoid valves switch over such that the main lubricant line that has been pressurized is relieved and the unpressurized main lubricant line is pressurized. In a de-energized state, both main lines are relieved.



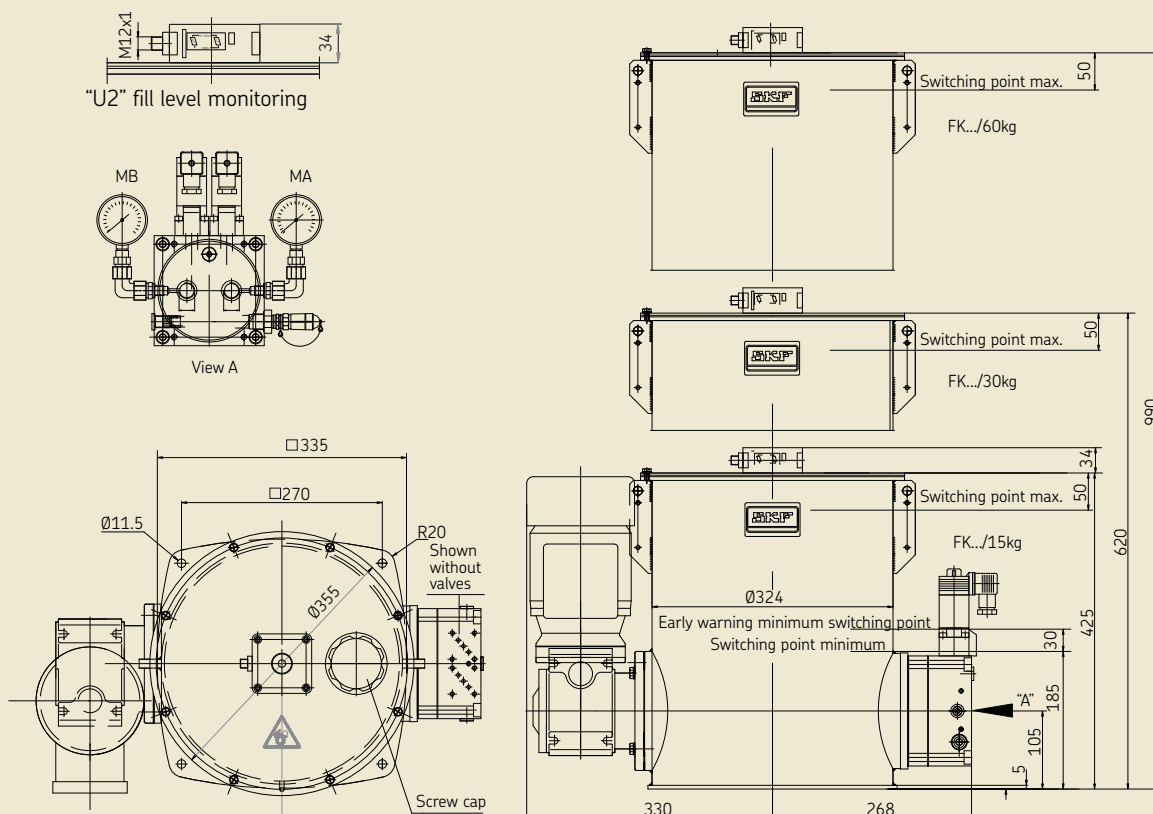
FK pump unit



FK pump cross-section

General technical data

Dimensions in mm



General parameters for FK

General information

Mounting position vertical
 Ambient and lubricant
 temperature range ... -25 °C to +60 °C

Reservoir for 15 kg, 30 kg or 60 kg

Number of
 pumping elements ... 1 to 6

Filling via filler socket G 1/2"

Dry weight

with reservoir capacity 15 kg approx. 46.2 kg
 with reservoir capacity.. 30 kg approx. 52.3 kg
 with reservoir capacity 60 kg approx. 64.0 kg

Gear

Type Screw drive, type **1M**
 Gear ratio 40:1

Motor

see rating plate
 Nominal speed 1500 RPM
 Rated voltage..... 230/400 VAC
 Frequency 50 Hz
 Nominal output..... 0.37 kW
 Rated current 1.09 A
 Protection class IP55-F

Pump

Type Radial piston pump

Operating pressure max. 400 bar

Delivery volume with: kg/hour

1 pump element 0.67
 2 pump elements .. 1.34
 3 pump elements .. 2.00
 4 pump elements .. 2.64
 5 pump elements .. 3.34
 6 pump elements .. 4.00

Lubricants

Mineral oils or environmentally compatible oils
 from ISO VG 46 to greases of NLGI Class 2
 (consultation required for synthetic oils)

Operating viscosity (Oil) $\geq 50 \text{ mm}^2/\text{s}$
 Worked penetration ... (grease) $> 220 \frac{1}{10} \text{ mm}$

Ultrasonic sensor

see Technical Data on pages 7

See important product usage information the
 on back cover.

Grease Lubrication Pump FK

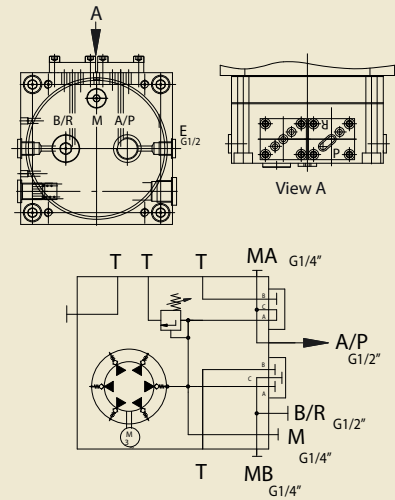
Pump unit for progressive
centralized lubrication systems,
Design FK4



Pump unit for single-line
centralized lubrication systems,
FK1 Design



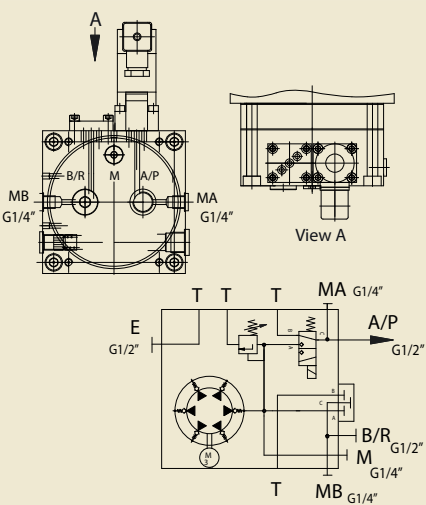
FK4 connection drawing



FK4 Characteristics

Pump outlet..... A/P
Pipe thread G1/2"

FK1 connection drawing



FK1 Characteristics

Pump outletA/P
Pipe thread G1/2"

Electrical

3/2 directional solenoid valve
Basic position de-energized closed
Manual actuation yes
Voltage 24 V DC
Rated current 0.67 A
Nominal output..... 20 W
ON-time 100% ON-time
(at max. +35°C)
Protection class IP 65
Electrical connection Plug
DIN 43650-AF3

Spare parts

Designation

Cable socket
with protection device, 3 m PUR cable and LED

Order no.

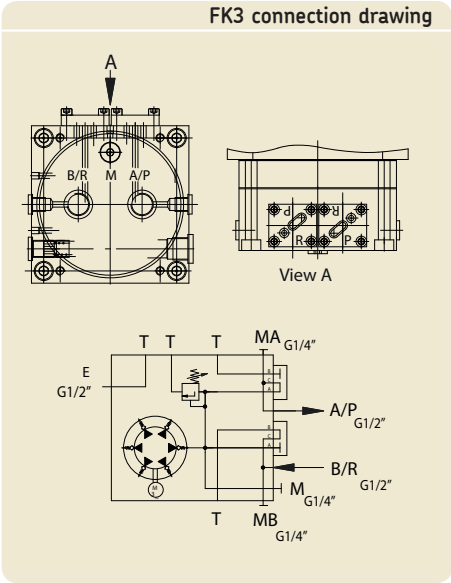
179-990-416

Note!

You can find additional cable sockets as well as technical data on the cable sockets in the leaflet "Electrical Plug-In Connections", leaflet no. 1-1730-EN.

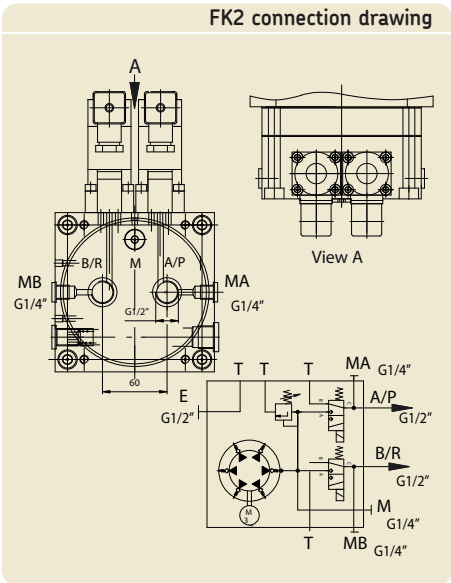
Grease Lubrication Pump FK

Pump unit for dual-line centralized lubrication systems without integrated changeover valves, Design FK3



FK3 Characteristics	
Pump outlet	A/P
Pipe thread	G 1/2"
Pump return.....	B/R
Pipe thread	G1/2"

Pump unit for dual-line centralized lubrication systems with integrated changeover valves, Design FK2

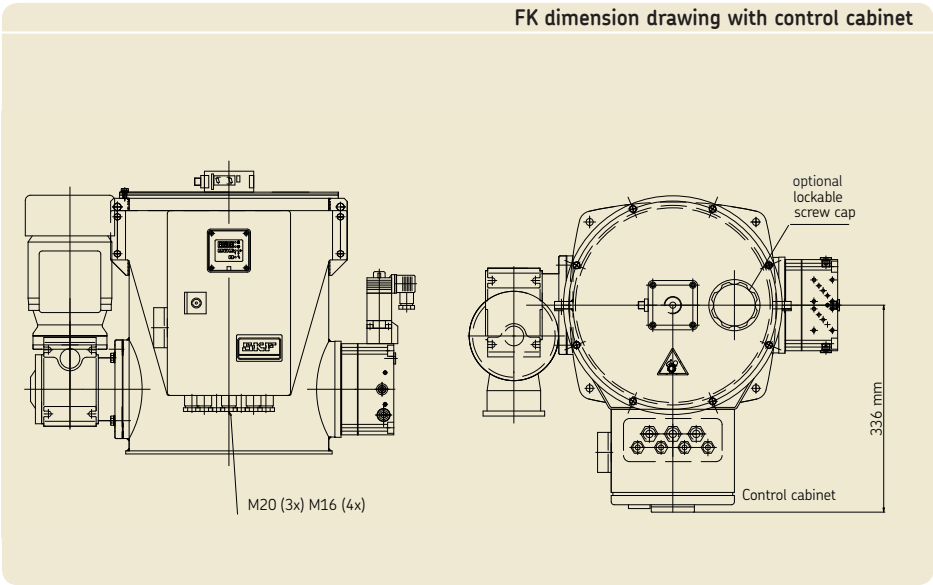


FK2 Characteristics	
Pump outlet/inlet A/P and B/R	
Pipe thread	G1/2"
Electrical	
3/2 directional solenoid valve	
Basic position	de-energized closed
Manual actuation.....	yes
Voltage	24 V DC
Rated current	0.67 A
Nominal output.....	20 W
ON-time	100% ED
	(at max. +35°C)
Protection class	IP 65
Electrical connection ...	Plug
	DIN 43650-AF3

Spare parts	
Designation	Order no.
Cable socket with protection device, 3 m PUR cable and LED	179-990-416
Note!	
You can find additional cable sockets as well as technical data on the cable sockets in the leaflet "Electrical Plug-In Connections", leaflet no. 1-1730.-EN	

Grease Lubrication Pump FK

Pump unit for centralized lubrication systems with integrated control cabinet
(Version key 4001)



Order number	
Description	Order no.
Electrical control cabinet	on request

The control cabinet consists of a SKF control unit, main switch, optionally with motor circuit breaker, power supply, coupling relay, control lamps, terminal clamps and fuses. A display with graphics capabilities for operating and monitoring equipment is also available. Switching from half-cycle to full-cycle (in dual-line centralized lubrication systems), configuration of monitoring and pause periods and the display of all notices and fault texts are also programmed.

Characteristics of FK with control cabinet	
Mounting position	vertical
Control unit	VOGEL
Ambient temperature	0 °C to +60 °C
Rated voltage	400 V3/N
	Three-phase; other Operating voltage on request
Frequency	50 - 60 Hz
Nominal output	0.85 kW
Protection class	IP 54
Connection type	Terminals

Attachment options

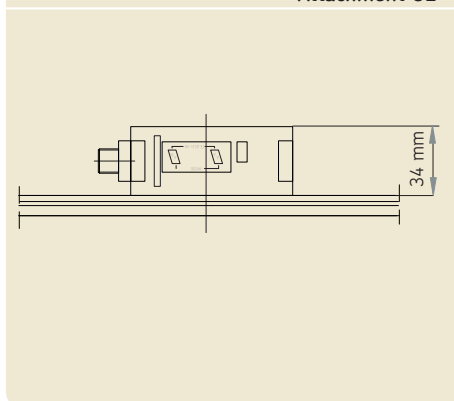
Lubricant level monitoring U2 Ultrasonic sensor with 2 switching points



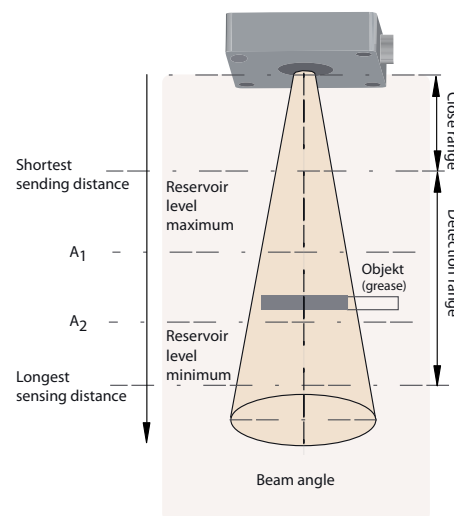
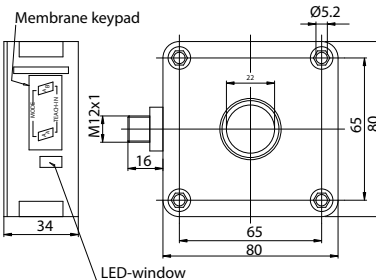
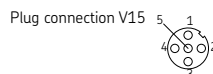
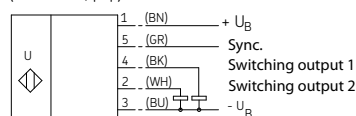
The ultrasonic sensor works with a piezoceramic element as a sonic transmitter and receiver. A decoupling layer made of a special material is used to decouple the ultrasound from the acoustically thinner air medium. The ultrasonic transducer is embedded water-tight in foam in the sensor's housing. The active area of the ultrasonic sensor is designated as the detection area and is limited by the shortest (A_1) and longest (A_2) 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 (A_2) and maximum (A_1) fill level.

Attachment U2



Standard symbol/connection:
(Version E6, pnp)



U2 Ultrasonic sensor characteristics

Type	Ultrasonic sensor (2 adjustable switching points, max., min.)
Standard target.....	100x100 mm
Sensing range.....	60 to 1000 mm
Adjustment range.....	90 to 1000 mm
Transducer frequency.....	approx. 175 kHz
Response delay.....	approx. 150 ms
Type of output.....	2 pnp switching outputs, choice of NO/NC types
Ambient temperature.....	-25 °C to +70 °C

Display/Control elements

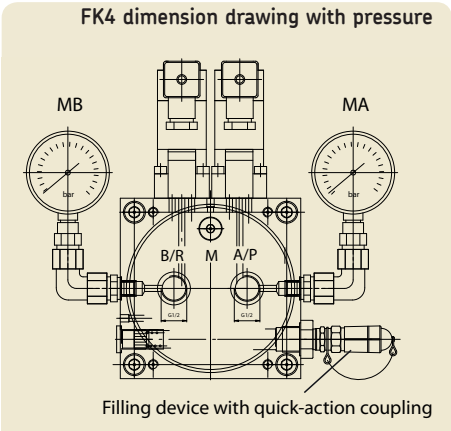
Yellow LED 1	constant: state of switching output 1 / flashing: teach-in function
Yellow LED 2	constant: state of switching output 2 / flashing: teach-in function
Red LED	normal operation: "Fault" / teach-in function: no object detected

Electrical data

Operating voltage	10 to 30 V DC, ripple 10% PP (peak-to-peak)
No-load current I_0	≤ 50 mA
Protection class	IP 65
Connection.....	V15 connector socket (M12x1), 5-pin

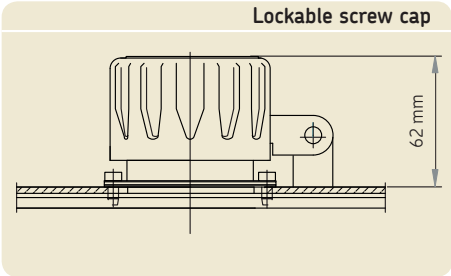
Accessories

Pump unit for dual-line centralized lubrication systems with pressure gauge



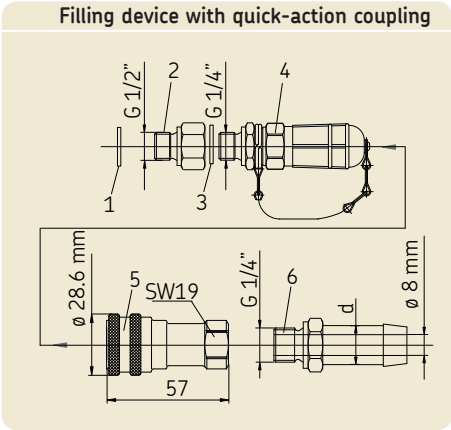
Pressure gauge, complete		
Item	Description	Order no.
1	Pressure gauge up to 400 bar (with screw unions)	24-1207-2230
2	Pressure gauge up to 600 bar (with screw unions)	24-1207-2226

Screw cap, lockable



Screw cap with gasket		
Item	Description	Order no.
1	Screw cap with gasket	24-0651-3490

Filling device with quick-action coupling



Filling device - quick-action coupling		
Item	Description	Order no.
1	Washer	DIN 7603-A21x26 CU
2	Adapter	401-016-132
3	Washer	DIN 7603-A14x18 CU
4	Filler socket	995-000-705
5	Coupling socket (for refill connection)	995-001-500
6	Hose fitting for connection to coupling socket	
	Diameter (d) 13	857-760-007
	(d) 16	857-870-002

Key to order codes

Design

Example:

FK 2 / 15 U2 1M 04 / 6 / 400 M2 3 / 0001 AF 07

Pump unit **FK**

Version

- 1** = Unit for single-line centralized lubrication systems
- 2** = Unit for dual-line centralized lubrication systems with changeover valves
- 3** = Unit for dual-line centralized lubrication systems without changeover valves
- 4** = Unit for progressive systems

Reservoir capacity

- 15** = 15 kg
- 30** = 30 kg
- 60** = 60 kg

Lubricant level monitoring

- X** = without Lubricant level monitoring
- U2** = Ultrasonic sensor with 2 switching points

Drive type **1M**

Gear ratio

- 04** = 40:1

Delivery volume

- | | |
|---|---|
| 1 = 0.67 kg/h (12.3 cm ³ /min.) | 2 = 1.34 kg/h (24.7 cm ³ /min.) |
| 3 = 2.00 kg/h (37.0 cm ³ /min.) | 4 = 2.64 kg/h (49.3 cm ³ /min.) |
| 5 = 3.34 kg/h (61.7 cm ³ /min.) | 6 = 4.00 kg/h (74.0 cm ³ /min.) |

Pressure-regulating valve, factory-set to

- 200** = 200 bar (for progressive, single-line and dual-line centralized lubrication systems)
- 300** = 300 bar (for progressive, single-line and dual-line centralized lubrication systems)
- 400** = 400 bar (for dual-line centralized lubrication systems)

Pressure gauge

/ = without pressure gauge

- MA** = 1x pressure gauge (for progressive, single-line and dual-line systems)
- M2** = 2x pressure gauge (MB + MA for dual-line systems)

Filler socket/Screw cap

- 0** = without Filler socket
- 1** = with filler socket
- 2** = without filler socket, with screw cap
- 3** = with filler socket and screw cap

Version key

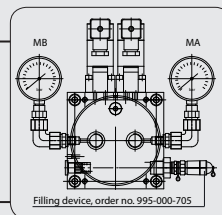
- 0001** = Basic design
- 4001** = Basic design with control cabinet and control unit (on request)

Motor data ¹⁾

AF = motor speed 1500 RPM, rated voltage 230/400 VAC, 50 Hz

Motor protection class

- 07** = IP 55 F



¹⁾ Other specifications available on request

Order example

For a pump unit of the FK series (**FK**) for dual-line systems with changeover valves (**2**), a 15 kg lubricant reservoir (**15**), ultrasonic lubricant level monitoring with two switching points (min. and max.) (**U2**), drive type M1 (**M1**), a 40:1 gear ratio (**04**), a delivery volume of 4 kg/h (**6**), a pressure-regulating valve set to 400 bar (**400**), pressure gauge for both outlet lines (MA + MB) (**M2**), filler socket and screw cap (**3**), basic design of pump unit (**0001**) with a 230/400 VAC drive motor (**AF**) with protection class IP 55 F (**07**),

the order number is: **FK 2 / 15 U2 1M 04 / 6 / 400 M2 3 / 0001 AF 07**

Order No. 1-3033-EN

Subject to change without notice! (07/2009)

Important product usage information

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 (1013 mbars) 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.

Brochure note

- | | |
|-------------|--|
| 1-0012-1-EN | DUOFLEX lubricant pumps for dual-line centralized lubrication systems |
| 1-3025-EN | FF Grease lubrication pump for a multi-line system with up to 12 outlets |
| 1-3026-EN | FB Grease lubrication pump for a multi-line system with up to 24 outlets |

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