

## Multi-line pumps

# Product series RA

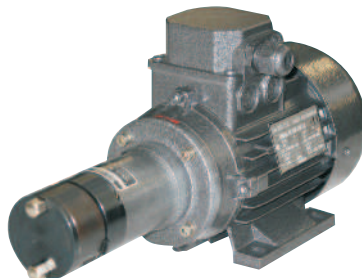
For oil and grease

For use in SKF MultiFlex multi-line lubrication systems

RA 1UA ....



RA 1M ....



RAB 07 ....



The SKF MultiFlex multi-line pump is a positive-displacement pump with multiple utilizable outlets. The displacement is continuously variable.

### Special characteristics

The SKF MultiFlex multi-line pump is constructed as a radial piston pump in a modular design. Up to five pump elements, each with one, two, or four outlets, can be “combined” so that the number of outlets can be adapted to current requirements in the best possible way.

This simple stacking design also allows for subsequent expansion or reduction of the number of pump outlets.

The displacement of a pump element's outlets is continuously variable (stepless adjustment) from outside.

Continuous variability and an extended speed range result in an extremely broad spectrum of delivery rates. This makes the pump highly attractive as a feed pump in circulating lubrication systems with low circulation rates (up to 30 cm<sup>3</sup>/min per outlet) or as a multi-circuit pump to supply multiple independent lubrication zones.

The pump can be driven in either direction of rotation as desired.

Its operating pressure is max. 63 bar, with up to 100 bar for short periods. The design of the RA/RAB multi-line pump permits it to pump both mineral-based and synthetic-based oils and greases.

# Contents

<b>Special characteristics</b> . . . . .	<b>1</b>
<b>Mode of operation</b> . . . . .	<b>3</b>
<b>Design</b> . . . . .	<b>3</b>
<b>Displacement</b> . . . . .	<b>4</b>
<b>MultiFlex designs</b>	
Rotary drive, coaxial . . . . .	5
Rotary drive with coaxial gear . . . . .	6
Rotary drive with bevel gear . . . . .	7
Electric motor drive, coaxial . . . . .	8
Electric motor drive with coaxial gear . . . . .	9
Electric motor drive with bevel gear . . . . .	10
Rotary drive with bevel gear and reservoir . . . . .	11
Electric motor drive with coaxial gear and reservoir . . . . .	12
Electric motor drive with bevel gear and reservoir . . . . .	14
Electric motor drive with 3, 7, or 15 liter reservoir . . . . .	16
<b>Fill level switch</b> . . . . .	<b>18</b>
<b>Accessories</b> . . . . .	<b>19</b>
<b>Spare parts</b> . . . . .	<b>20</b>

## Design

In its basic design, the SKF MultiFlex multi-line pump is comprised of a drive, spacer ring with lubricant inlet, at least one pump element, and a cap.

The pump element shown in **Figure 1** in its pressure phase is comprised of the pump ring (1), the pump shaft (2) with the two radial pump pistons (3), and the track ring with elliptical inner contour (4) which is permanently joined to the adjusting plate (5). The pump ring (1) houses the suction grooves and the pressure bores. The pump shaft, which also acts as the drive shaft for the next pump element via the embedded coupling, is designed as a rotary valve. The two pump pistons are pressed against the inner side of the track ring by the spring (6).

## Mode of operation

### Suction phase

As the pump shaft turns, the two pump pistons move apart due to the spring loading, until the outer dead center (following a track ring) is reached. Until the outer dead center is reached, the control bore in the pump shaft connects the space between the two pump pistons with a lubricant inlet in the spacer ring.

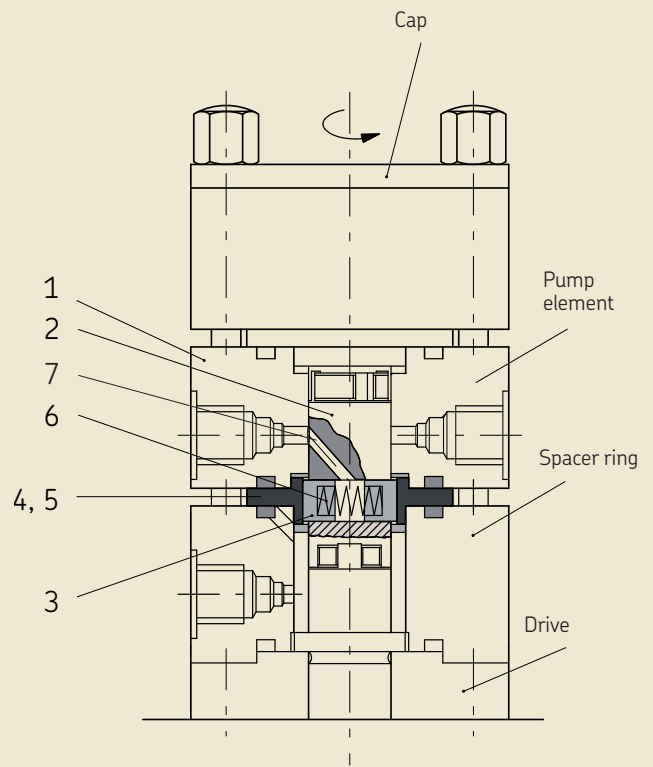
### Pressure phase

Due to the elliptically shaped track ring, the pump pistons move together against the spring force as the pump shaft continues to turn, until the inner dead center is reached. Until this is reached, the control bore in the pump shaft connects the space between the two pump pistons with a lubricant outlet in the pump ring.

The displacement can be varied continuously (steplessly) with the adjusting plate using the phase control method, meaning that the track ring position is changed relative to the position of the control bore in the pump shaft. The stroke of the two pistons remains the same in every phase variation; it is fully effective or only partially effective, depending on the setting. This means that a part of the stroke volume is fed back in the outlet bolt, which reduces the effective displacement.

Fig. 1

Pump element in the pressure phase



### CAUTION

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

# Displacement

The displacement of the RA multi-line pump series for oils and greases (reference viscosity 140 mm<sup>2</sup>/s) as a function of drive speed and step-down ratio is shown in **Diagram 1**.

**Diagram 2** illustrates the achievable continuous operating pressure as a function of operating viscosity and piston stroke rate.

$$\text{Piston stroke rate } z = \frac{\text{Drive speed } [\eta]}{\text{Step-down ratio } [l]}$$

The maximum achievable operating pressure varies according to the operating viscosity of the lubricating medium and the given piston stroke rate.

Restrictions apply to the permitted operating viscosity at piston stroke rates > 50 rpm.

The individual pump elements can be set to no less than 1/3 capacity.

Setting 0 = 1/3 capacity

Diagram 1

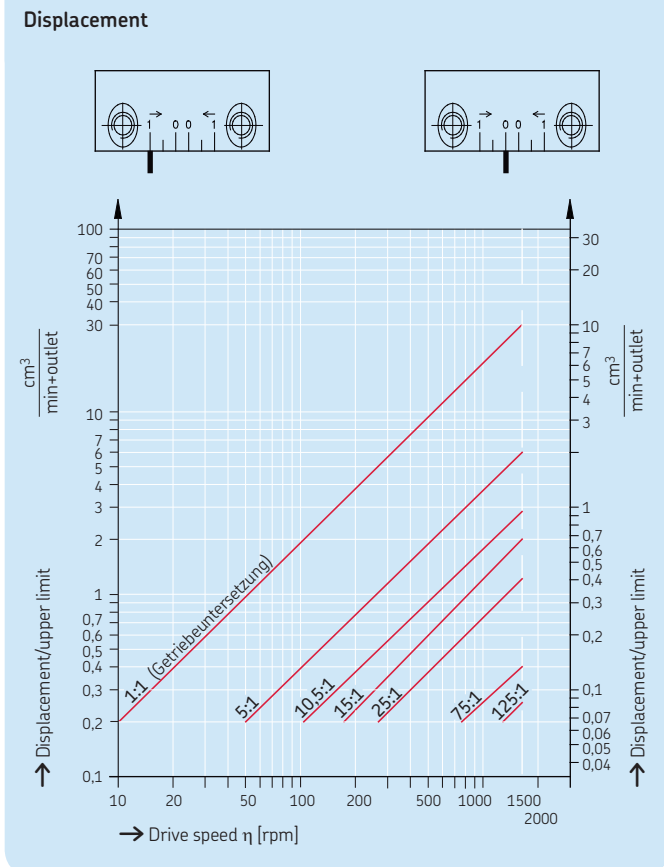
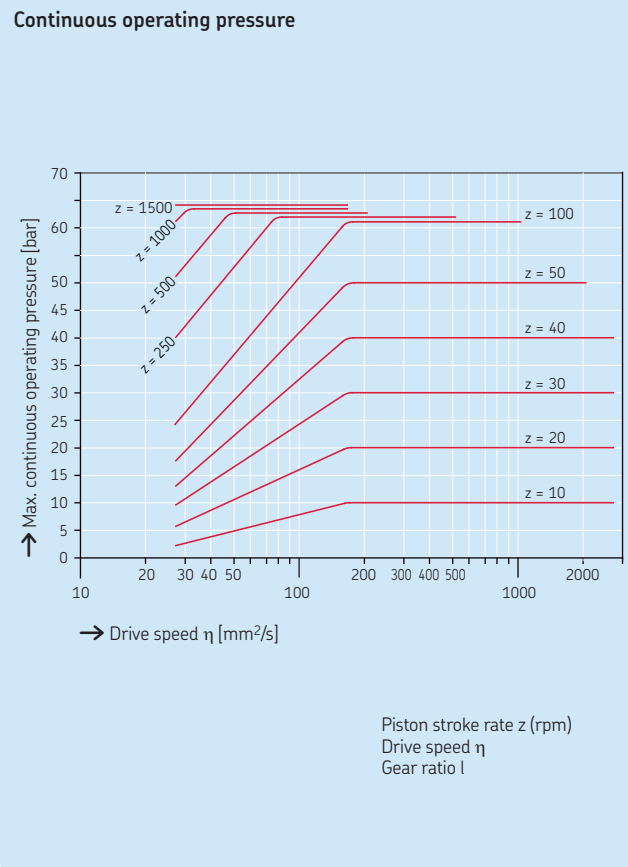
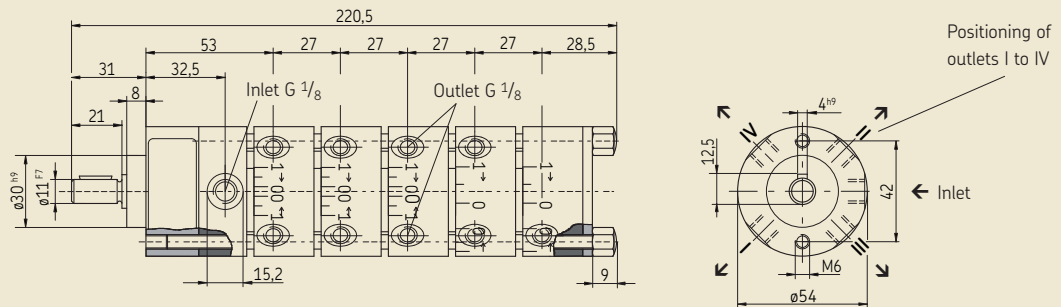


Diagram 2



# Rotary drive, coaxial

Fig. 2



## Technical data

### General

Mounting position ..... Any  
Ambient temperature ..... -15 to +80°C

### Pump

Type ..... Radial piston pump  
Operating pressure ..... 63 bar<sup>1)</sup>  
Short-term pressure ..... 100 bar  
Number of combinable pump elements ..... Max. 5  
Outlets per pump element ..... 1, 2 or 4  
Displacement variability per pump element ..... Continuously variable  
Displacement per outlet and revolution of the pump shaft ..... Max. 0.02 cm<sup>3</sup>  
Drive speed ..... 10 to 1500 rpm  
Direction of rotation ..... Clockwise or counterclockwise<sup>2)</sup>

Lubricant ..... Mineral oils<sup>3)</sup>  
Temperature range ..... -15 to +80°C  
Operating viscosity ..... 25 to 2500 mm<sup>2</sup>/s  
Suction height ..... 500 mm  
Intake tube inside diameter ..... ≥ 4 mm

Weight with pump element	1	2	3	4	5
	2.74 kg	1.59 kg	1.97 kg	2.36 kg	2.74 kg

<sup>1)</sup> Max. operating pressure – see page 4, diagram 2.  
<sup>2)</sup> Standard: clockwise.  
<sup>3)</sup> For synthetic lubricants on request.

### Note

Accessories and spare parts – see pages 19–20.

## Explanation or order codes

**RA 1UA 00/4421 R 0001**

**Type** —————  
Radial piston pump RA

**Drive** —————  
1UA = rotary, coaxial

**Step-down ratio** —————  
00 = 1:1

**Number of outlet ports per pump element** —————  
1 = 1 outlet 2 = 2 outlets 4 = 4 outlets  
1 to 5 pump elements (counted from drive)

**Direction of rotation** —————  
R = Standard: clockwise  
L = counterclockwise

**Design key** —————  
0001

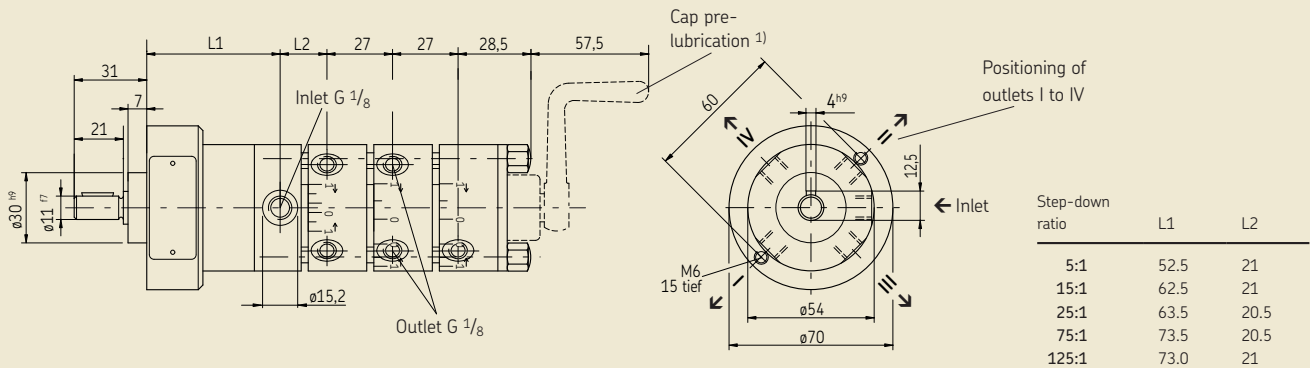
## Order example

SKF MultiFlex multi-line pump consisting of a radial piston pump (RA), rotary drive, coaxial (1UA), step-down ratio 1:1 (00), with 4 pump elements, with a total of 11 outlets, consisting of: pump element 1 with 4 outlets, pump element 2 with 4 outlets, pump element 3 with 2 outlets and pump element 4 with 1 outlet (4421), direction of rotation clockwise (R) and design key (0001),

Order No. RA 1UA 00 / 4421 R 0001

# Rotary drive with coaxial gear

Fig. 3



<sup>1)</sup> Hand crank is included in scope of delivery and comes with the pump on delivery.

## Technical data

### General

Mounting position ..... Any  
Ambient temperature ..... -15 to +80°C

### Pump

Type ..... Radial piston pump  
Operating pressure ..... 63 bar<sup>1)</sup>  
Short-term pressure ..... 100 bar  
Number of combinable pump elements ..... Max. 5  
Outlets per pump element ..... 1, 2 or 4  
Displacement variability per pump element ..... Continuously variable  
Displacement per outlet and revolution of the pump shaft ..... Max. 0.02 cm<sup>3</sup>  
Drive speed ..... Up to 3600 rpm  
Direction of rotation ..... Clockwise or counterclockwise<sup>2)</sup>

Lubricant ..... Mineral oils<sup>3)</sup>  
Temperature range ..... -15 to +80°C  
Operating viscosity ..... 25 to 2500 mm<sup>2</sup>/s  
Suction height ..... 500 mm  
Intake tube inside diameter ..... ≥ 4 mm

### Gearbox

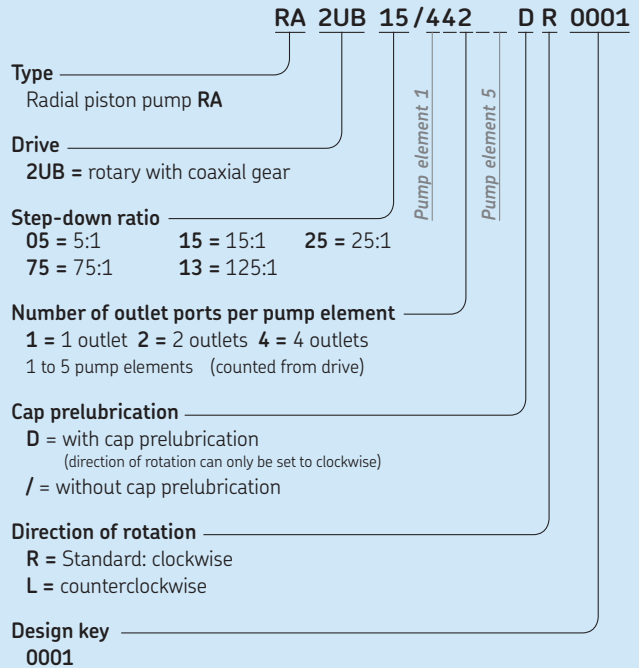
Step-down ratio ..... 5:1, 15:1, 25:1, 75:1, 125:1

**Weight with pump element**

1	2.24 kg <sup>3)</sup>
2	2.63 kg <sup>3)</sup>
3	3.01 kg <sup>3)</sup>
4	3.40 kg <sup>3)</sup>
5	3.78 kg <sup>3)</sup>

<sup>1)</sup> Max. operating pressure – see page 4, diagram 2.  
<sup>2)</sup> For synthetic lubricants on request.  
<sup>3)</sup> Weight is increased by 100 g with cap pre-lubrication.

## Explanation of order codes



## Order example

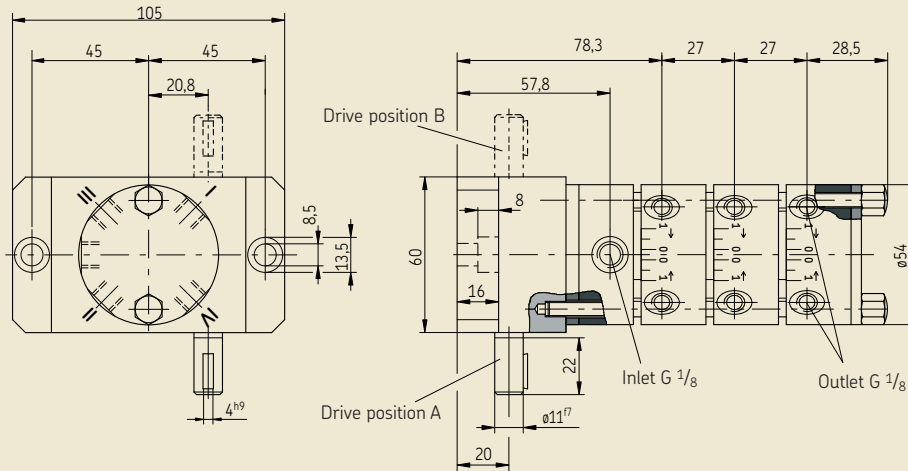
SKF MultiFlex multi-line pump, consisting of a radial piston pump (RA), rotary drive with coaxial gear (2UB), step-down ratio 15:1 (15), with 3 pump elements, with a total of 10 outlets, consisting of: pump element No. 1 with 4 outlets, pump element No. 2 with 4 outlets and pump element No. 3 with 2 outlets (442) cap pre-lubrication (D), direction of rotation clockwise (R) and design key (0001),

**Order No. RA 2UB 15 / 442 D R 0001**

**Note**  
For accessories and spare parts – see pages 19–20.

# Rotary drive with bevel gear

Fig. 4



## Technical data

### General

Mounting position ..... Any  
Ambient temperature ..... -15 to +80°C

### Pump

Type ..... Radial piston pump  
Operating pressure ..... 63 bar<sup>1)</sup>  
Short-term pressure ..... 100 bar  
Number of combinable pump elements ..... Max. 5  
Outlets per pump element ..... 1, 2 or 4  
Displacement variability per pump element ..... Continuously variable  
Displacement per outlet and revolution of the pump shaft ..... Max. 0.02 cm<sup>3</sup>  
Drive speed ..... 10 to 1500 rpm  
Direction of rotation ..... Clockwise or counterclockwise<sup>2)</sup>

Lubricant ..... Mineral oils<sup>3)</sup>  
Temperature range ..... -15 to +80°C  
Operating viscosity ..... 25 to 2500 mm<sup>2</sup>/s  
Suction height ..... 500 mm  
Intake tube inside diameter ..... ≥ 4 mm

### Gearbox

Drive position ..... A or B

<b>Weight with pump element</b>	1	.....	1.69 kg
	2	.....	2.07 kg
	3	.....	2.46 kg
	4	.....	2.84 kg
	5	.....	3.23 kg

<sup>1)</sup> Max. operating pressure– see page 4, diagram 2.  
<sup>2)</sup> Standard: clockwise.  
<sup>3)</sup> Synthetic lubricants can be provided on request.

## Note

For accessories and spare parts – see pages 19–20.

## Explanation of order codes

**RA 3UA 01 A 4 2 4 4 1 R 0001**

**Type** ..... Radial piston pump **RA**

**Drive** ..... **3UA** = rotary with bevel gear

**Step-down ratio** ..... **01** = 10.5:1

**Drive position** ..... **A** or **B**

**Number of outlet ports per pump element** ..... **1** = 1 outlet **2** = 2 outlets **4** = 4 outlets  
1 to 5 pump elements (counted from drive)

**Direction of rotation** ..... **R** = Standard: clockwise  
**L** = counterclockwise

**Design key** ..... **0001**

## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (**RA**), rotary drive with bevel gear (**3UA**), step-down ratio 10.5:1 (**01**), drive position a (**A**), with 5 pump elements, with a total of 15 outlets, consisting of: pump element 1 with 4 outlets, pump element 2 with 2 outlets, pump element 3 with 4 outlets, pump element 4 with 4 outlets and pump element 5 with 1 outlet (**42441**), direction of rotation clockwise (**R**) and design key (**0001**),

**Order No. RA 3UA 01 A 42441 R 0001**

# Electric motor drive, coaxial

## Technical data

### General

Mounting position . . . . . Any  
Ambient temperature . . . . . -15 to +80°C

### Pump

Type . . . . . Radial piston pump  
Operating pressure . . . . . 63 bar<sup>1)</sup>  
Short-term pressure . . . . . 100 bar  
Number of combinable pump elements . . . . . Max. 5  
Outlets per pump element . . . . . 1, 2 or 4  
Displacement variability per pump element . . . . . Continuously variable  
Displacement per outlet and motor speed of 1360 rpm . . . . . Approx. 27.2 cm<sup>3</sup>/min

Lubricant . . . . . Mineral oils<sup>2)</sup>  
Temperature range . . . . . -15 to +80°C  
Operating viscosity . . . . . 25 to 2500 mm<sup>2</sup>/s  
Suction height . . . . . 500 mm  
Intake tube inside diameter . . . . . ≥ 4 mm

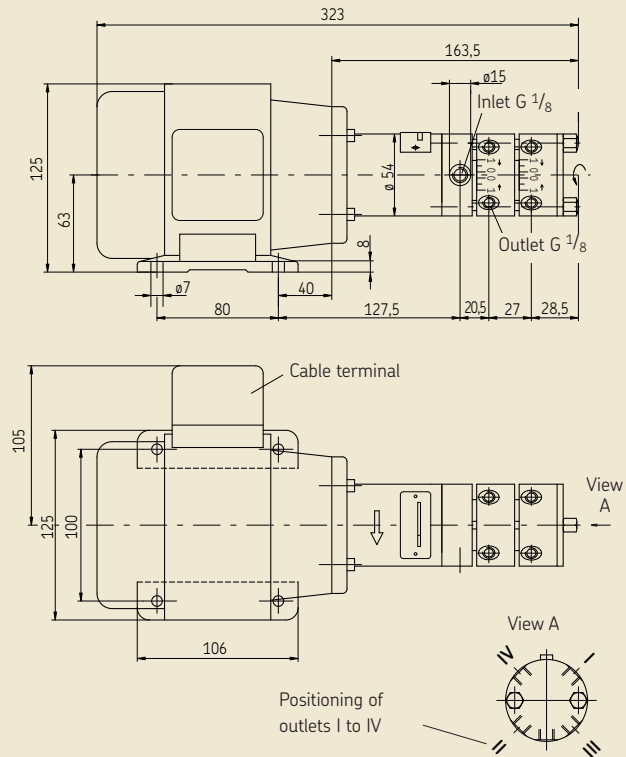
### Motor

Type/size . . . . . IM B34/63 C 90  
Type of voltage . . . . . 3-phase AC voltage  
Weight . . . . . 5.2 kg

Weight with pump element	1	2	3	4	5
	7.05 kg	7.44 kg	7.82 kg	8.21 kg	8.59 kg

<sup>1)</sup> Max. operating pressure – see page 4, diagram 2.  
<sup>2)</sup> Synthetic lubricants can be provided on request.

Fig. 5



## Explanation of order codes

**RA 1M 00/44421 R 0001 AF 07**

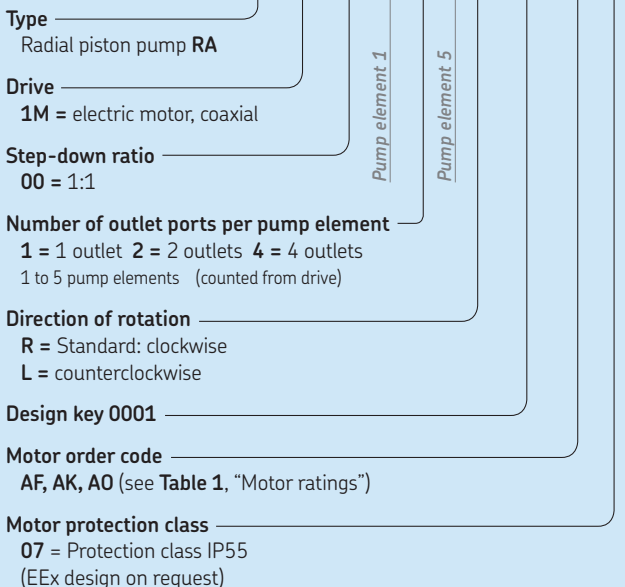


Table 1

Rated speed [rpm]	Frequency [Hz]	Rated output [kW]	Rated voltage [V]	Rated current [A]	Order code
1500	50	0.18	230/400	1.13/0.65	<b>AF</b>
1500	50	0.18	290/500	0.90/0.52	<b>AK</b>
1500	50	0.18	400/690	0.65/0.38	<b>AO</b>

## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (RA), electric motor drive, coaxial (1M), step-down ratio 1:1 (00), with 5 pump elements, with a total of 15 outlets, consisting of: pump element No. 1, No. 2 and No. 3 with 4 outlets each, pump element No. 4 with 2 outlets and pump element No. 5 with 1 outlet (44421), direction of rotation clockwise (R) and design key (0001), motor values of 1500 rpm, 230/400 V AC, 1.13/0.65 A (AF), with protection class IP55 (07)  
**Order No. RA 1M 00 / 44421 R 0001 AF 07**

## Note

The motor specifications refer to three-phase motors from VEM. There may be differences with motors from other manufacturers. For accessories and spare parts – see pages 19–20.



# Electric motor drive with coaxial gear

## Technical data

### See page 8

Displacement per outlet and motor speed of 1360 rpm ..... See **Table 2**

### Gearbox

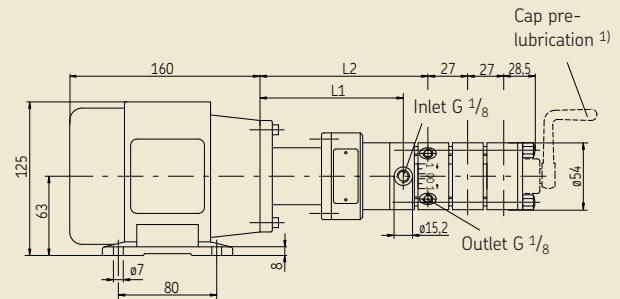
Step-down ratio ..... 5:1; 15:1; 25:1;  
75:1; 125:1

### Weight with pump element

1	8.34 kg <sup>1)</sup>
2	8.73 kg <sup>1)</sup>
3	9.11 kg <sup>1)</sup>
4	9.50 kg <sup>1)</sup>
5	9.88 kg <sup>1)</sup>

<sup>1)</sup> Weight is increased by 100 g with cap prelubrication.

Fig. 6



<sup>1)</sup> Hand crank is included in scope of delivery and comes with the pump on delivery.

Table 2

Step-down ratio	Length L1 [mm]	Length L2 [mm]	Displacement [cm <sup>3</sup> /min]	Pressure max. [bar]
5:1	110,5	131,5	Approx. 1.8 to approx. 5.44	63
15:1	120,5	141,5	Approx. 0.6 to approx. 1.81	63
25:1	120,5	141,5	Approx. 0.36 to approx. 1.09	50
75:1	131	152	Approx. 0.12 to approx. 0.36	20
125:1	131	152	Approx. 0.07 to approx. 0.21	10

## Explanation of order codes

**RA 2M 15/421 D R 0001 AF 07**

### Type

Radial piston pump **RA**

### Drive

**2M** = Electric motor with coaxial gear

### Step-down ratio

**05** = 5:1, **15** = 15:1, **25** = 25:1,  
**75** = 75:1, **13** = 125:1

### Number of outlet ports per pump element

**1** = 1 outlet **2** = 2 outlets **4** = 4 outlets  
1 to 5 pump elements (counted from drive)

### Cap prelubrication

**D** = with cap prelubrication  
(direction of rotation can only be set to clockwise)  
/ = without cap prelubrication

### Direction of rotation

**R** = Standard: clockwise  
**L** = counterclockwise

### Design key 0001

### Motor order code

**AF, AK, AO** (see Table 1, "Motor ratings")

### Motor protection class

**07** = Protection class IP55  
(Ex design on request)

## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (**RA**), electric motor drive with coaxial gear (**2M**), step-down ratio 15:1 (**15**), with 3 pump elements, with a total of 7 outlets, consisting of: pump element No. 1 with 4 outlets, pump element No. 2 with 2 outlets and pump element No. 3 with 1 outlet, (**421**), cap prelubrication (**D**), default direction of rotation clockwise (**R**), design key (**0001**), motor values of 1500 rpm, 230/400 V AC, 1.13/0.65 A, (**AF**), with protection class IP55 (**07**),

**Order No. RA 2M 15/421 DR 0001 AF 07**

## Note

The motor specifications refer to three-phase motors from VEM. There may be differences with motors from other manufacturers. For accessories and spare parts – see pages 19–20.

# Electric motor drive with bevel gear

## Technical data

### General

Mounting position ..... Any  
Ambient temperature ..... -15 to +80°C

### Pump

Type ..... Radial piston pump  
Operating pressure ..... 63 bar<sup>1)</sup>  
Short-term pressure ..... 100 bar  
Number of combinable pump elements ..... Max. 5  
Outlets per pump element ..... 1, 2 or 4  
Displacement variability per pump element ..... Continuously variable  
Displacement per outlet and motor speed of 1360 rpm ..... Approx. 2.59 cm<sup>3</sup>/min

Lubricant ..... Mineral oils<sup>2)</sup>  
Temperature range ..... -15 to +80°C  
Operating viscosity ..... 25 to 2500 mm<sup>2</sup>/s  
Suction height ..... 500 mm  
Intake tube inside diameter ..... ≥ 4 mm

### Motor

Type/size ..... IM B34/63 C 90  
Type of voltage ..... 3-phase AC voltage

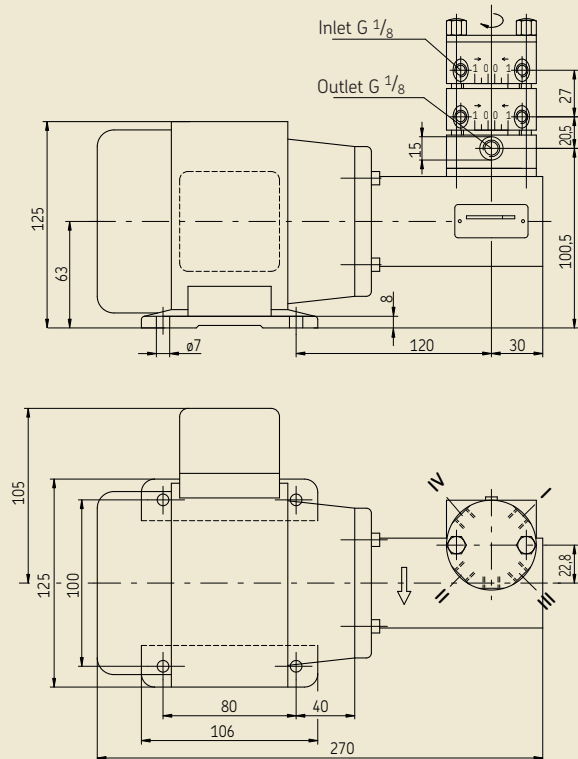
**Weight with pump element**

1	6.90 kg
2	7.28 kg
3	7.67 kg
4	8.05 kg
5	8.44 kg

<sup>1)</sup> Max. operating pressure— see page 4, diagram 2.

<sup>2)</sup> Synthetic lubricants can be provided on request.

Fig. 7



## Explanation of order codes

**RA 3M 01/44421 / 0001 AF 07**

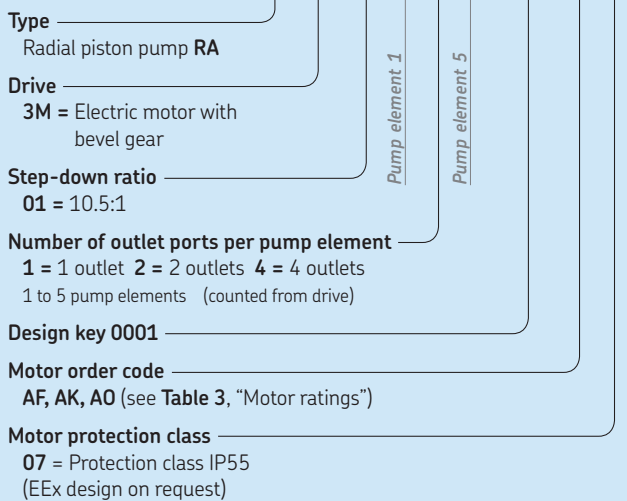


Table 3

Rated speed [rpm]	Frequency [Hz]	Rated output [kW]	Rated voltage [V]	Rated current [A]	Order code
1500	50	0.18	230/400	1.13/0.65	<b>AF</b>
1500	50	0.18	290/500	0.90/0.52	<b>AK</b>
1500	50	0.18	400/690	0.65/0.38	<b>AO</b>

## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (**RA**), electric motor drive with bevel gear (**3M**), step-down ratio 10.5:1 (**01**), with 5 pump elements, with a total of 15 outlets, consisting of:

- pump element No. 1 with 4 outlets,
- pump element No. 2 with 4 outlets,
- pump element No. 3 with 4 outlets,
- pump element No. 4 with 2 outlets and
- pump element No. 5 with 1 outlet (**44421**)

design key (**0001**), motor values of 1500 rpm, 230/400 V AC, 1.13/0.65 A (**AF**), with protection class IP 55 (**07**)

**Order No. RA 3M 01 / 44421 / 0001 AF 07**

**Note**  
The motor specifications refer to three-phase motors from VEM. There may be differences with motors from other manufacturers. For accessories and spare parts – see pages 19–20.

# Rotary drive with bevel gear and reservoir

## Technical data

### General

Reservoir capacity	2 or 4.5 kg
Mounting position	Vertical
Ambient temperature	-15 to +80°C
Filling	From above (through reservoir cover) or via filler socket
Fill level control	With or without fill level switch

### Pump

Type	Radial piston pump
Operating pressure	63 bar <sup>1)</sup>
Short-term pressure	100 bar
Number of combinable pump elements	Max. 3
Outlets per pump element	1, 2 or 4
Displacement variability per pump element	Continuously variable
Displacement per outlet and revolution of the pump shaft	Approx. 0.02 cm <sup>3</sup> /min
Drive speed	100 to 1500 rpm
Direction of rotation	Drive position A, counterclockwise; drive position B, clockwise
Lubricant	Greases based on mineral oil <sup>2)</sup>
Temperature range	-15 to +80°C
Penetration as per NLGI	≤ 2

### Gearbox

Step-down ratio	10.5:1
Drive position	A or B

### Weight for 4.5 kg reservoir

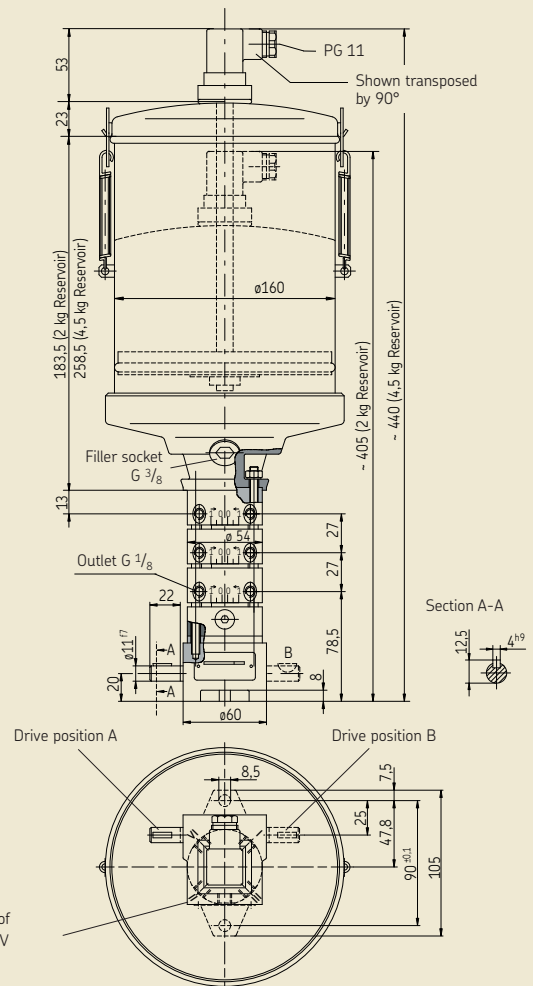
with pump element	1	6.11 kg <sup>3)</sup>
	2	6.50 kg <sup>3)</sup>
	3	6.88 kg <sup>3)</sup>

<sup>1)</sup> Max. operating pressure – see page 4, diagram 2.

<sup>2)</sup> Synthetic lubricants can be provided on request.

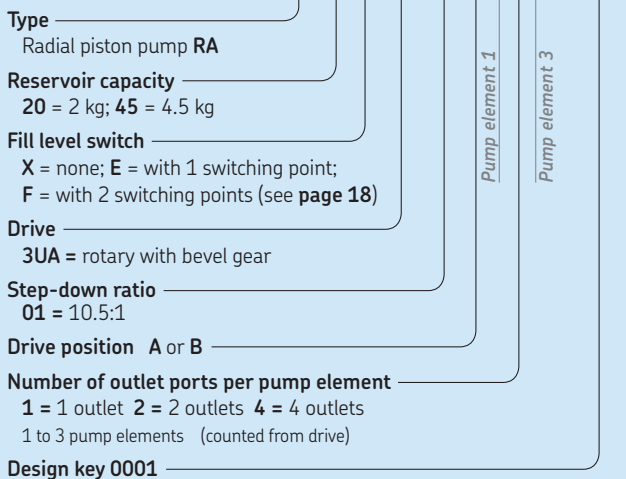
<sup>3)</sup> Weight is reduced by 300 g with a 2 kg reservoir.

Fig. 8



## Explanation of order codes

RA 20 F 3UA 01 B 4 4 2 / 0001



## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (RA), 2 kg reservoir (20), with fill level switch (F), rotary drive with bevel gear (3UA), step-down ratio 10.5:1 (01), drive position B (B), with 3 pump elements, with a total of 10 outlets, consisting of: pump element No. 1 with 4 outlets, pump element No. 2 with 4 outlets and pump element No. 3 with 2 outlets, (442), design key (0001),

Order No. RA 20 F 3UA 01 B 4 4 2 / 0001.

**Note**  
For fill level switch, accessories and spare parts – see pages 18–20.

# Electric motor drive with coaxial gear and reservoir

## Technical data

### General

Reservoir capacity	2 or 4.5 kg
Mounting position	Vertical
Ambient temperature	-15 to +60°C
Filling	From above (through reservoir cover) or via filler socket
Fill level control	With or without fill level switch

### Pump

Type	Radial piston pump
Operating pressure	63 bar <sup>1)</sup>
Short-term pressure	100 bar
Number of combinable pump elements	Max. 3
Outlets per pump element	1, 2 or 4
Displacement variability per pump element	Continuously variable
Displacement per outlet at motor speed of 1360 rpm	See <b>Table 5</b>

Lubricant	Greases based on mineral oil <sup>2)</sup>
Temperature range	-15 to +80°C
Penetration as per NLGI	≤ 2

### Motor

Type/size	IM B34/63 C 90
Type of voltage	3-phase AC voltage

### Gearbox

Step-down ratio	5:1; 15:1; 25:1; 75:1; 125:1
-----------------	---------------------------------

### Weight for 4.5 kg reservoir

with pump element	1	12.77 kg <sup>3)</sup>
	2	13.15 kg <sup>3)</sup>
	3	13.54 kg <sup>3)</sup>

<sup>1)</sup> Max. operating pressure – see page 4, diagram 2.

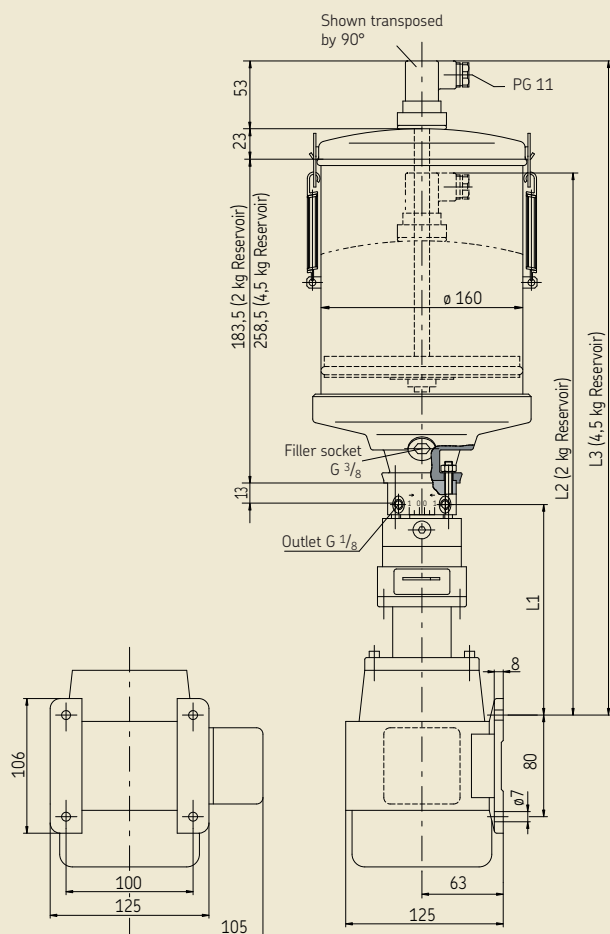
<sup>2)</sup> Synthetic lubricants can be provided on request.

<sup>3)</sup> Weight is reduced by 300 g with a 2 kg reservoir.

**Table 4**

Rated speed [rpm]	Frequency [Hz]	Rated output [kW]	Rated voltage [V]	Rated current [A]	Order code
1500	50	0.18	230/400	1.13/0.65	<b>AF</b>
1500	50	0.18	290/500	0.90/0.52	<b>AK</b>
1500	50	0.18	400/690	0.65/0.38	<b>AO</b>

**Fig. 9**



**Table 5**

Step-down ratio	Length L1 [mm]	Length L2 [mm]	Length L3 [mm]	Displacement [cm <sup>3</sup> /min]
5:1	171.5	444	519	Approx. 1.63 to 4.89
15:1	181.5	454	529	Approx. 0.54 to 1.62
25:1	181.5	454	529	Approx. 0.32 to 0.97
75:1	192	464.5	539.5	Approx. 0.10 to 0.32
125:1	192	464.5	539.5	Approx. 0.06 to 0.19

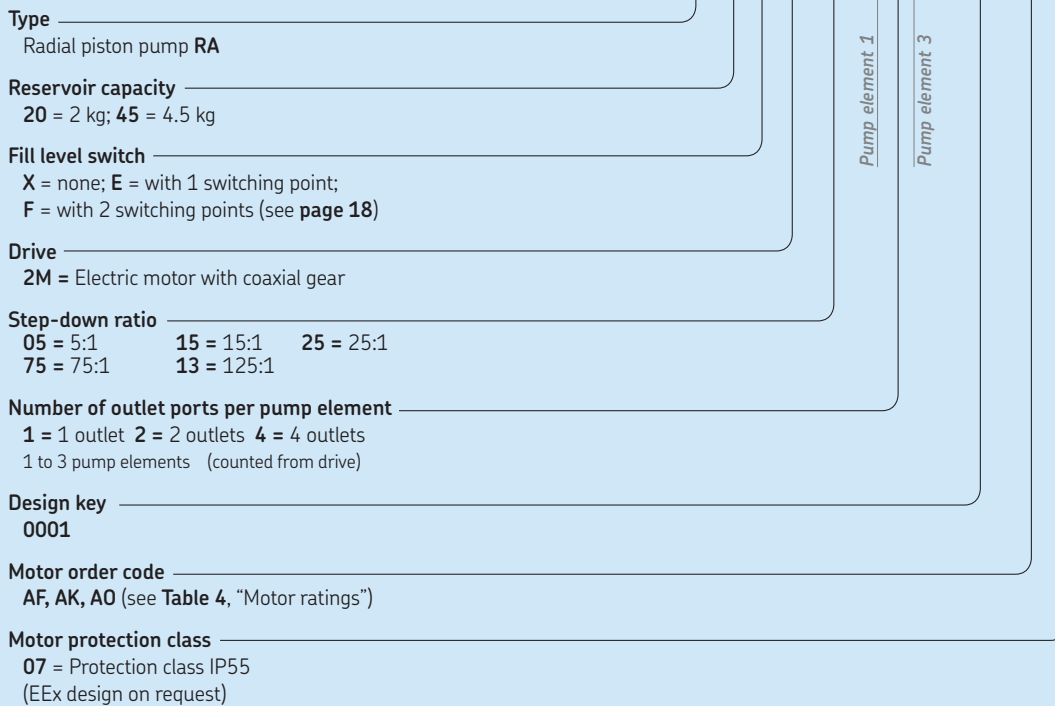
### Note

The motor specifications refer to three-phase motors from VEM. There may be differences with motors from other manufacturers. For fill level switch, accessories and spare parts – see pages 18–20.

# Electric motor drive with coaxial gear and reservoir

## Explanation of order codes

**RA 20 F 2M 05 / 4 4 2 / 0001 AF 07**



## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (**RA**), 2 kg reservoir (**20**), with fill level switch (**F**), electric motor drive with coaxial gear (**2M**), step-down ratio 5:1 (**05**), with 3 pump elements, with a total of 10 outlets, consisting of:  
 pump element No. 1 with 4 outlets,  
 pump element No. 2 with 4 outlets and  
 pump element No. 3 with 2 outlets, (**442**),  
 design key (**0001**), motor values of 1500 rpm, 230/400 V AC, 1.13/0.65 A (**AF**), with protection class IP 55 (**07**)

**Order No. RA 20 F 2M 05 / 442 / 0001 AF 07**

# Electric motor drive with bevel gear and reservoir

## Technical data

### General

Reservoir capacity	2 or 4.5 kg
Mounting position	Vertical
Ambient temperature	-15 to +60°C
Filling	From above (through reservoir cover) or via filler socket
Fill level control	With or without fill level switch

### Pump

Type	Radial piston pump
Operating pressure	63 bar <sup>1)</sup>
Short-term pressure	100 bar
Number of combinable pump elements	Max. 3
Outlets per pump element	1, 2 or 4
Displacement variability per pump element	Continuously variable
Displacement per outlet at motor speed of 1360 rpm	Approx. 2.33 cm <sup>3</sup> /min

Lubricant	Greases based on mineral oil <sup>2)</sup>
Temperature range	-15 to +80°C
Penetration as per NLGI	≤ 2

### Motor

Type/size	IM B34/63 C 90
Type of voltage	3-phase AC voltage

### Gearbox

Step-down ratio	10.5:1
-----------------	--------

### Weight for 4.5 kg reservoir with pump element

1	11.37 kg <sup>3)</sup>
2	11.76 kg <sup>3)</sup>
3	12.14 kg <sup>3)</sup>

<sup>1)</sup> Max. operating pressure – see page 4, diagram 2.

<sup>2)</sup> Synthetic lubricants can be provided on request.

<sup>3)</sup> Weight is reduced by 300 g with a 2 kg reservoir.

Fig. 10

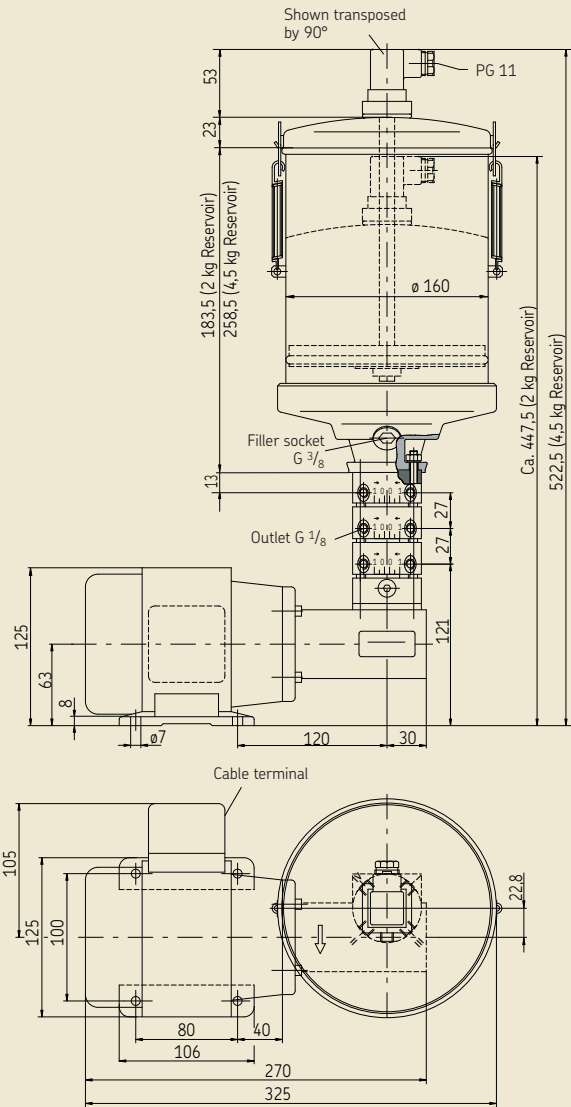


Table 6

Rated speed [rpm]	Frequency [Hz]	Rated output [kW]	Rated voltage [V]	Rated current [A]	Order code
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	0.65/0.38	AO

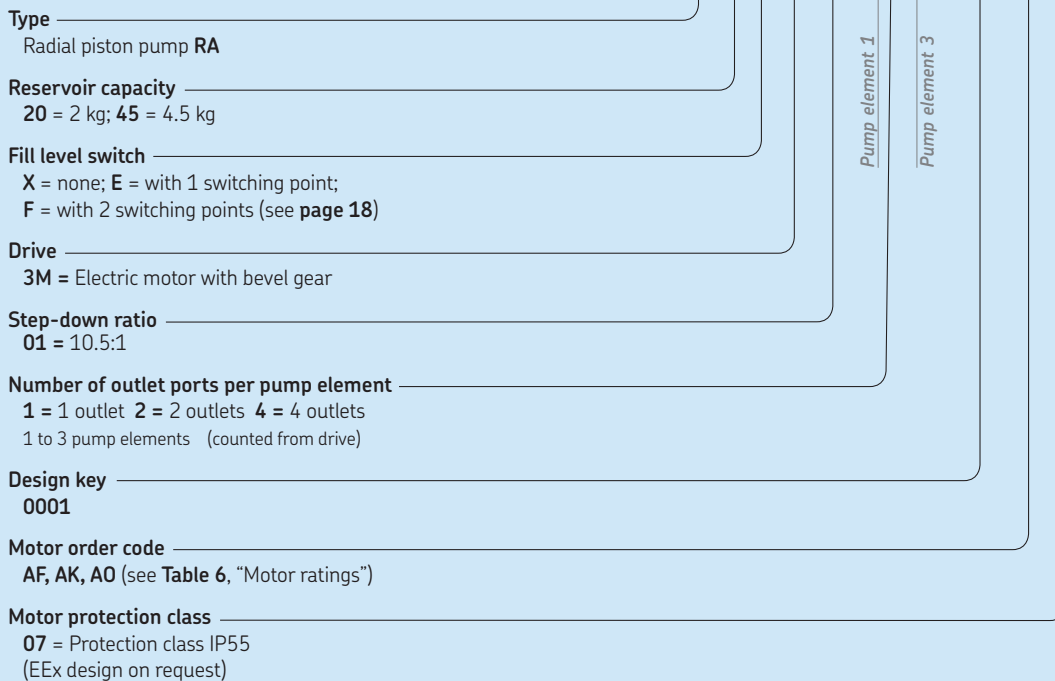
### Note

The motor specifications refer to three-phase motors from VEM. There may be differences with motors from other manufacturers. For fill level switch, accessories and spare parts – see pages 18–20.

# Electric motor drive with bevel gear and reservoir

## Explanation of order codes

**RA 20 F 3M 01 / 124 / 0001 AF 07**



## Order example

SKF MultiFlex multi-line pump, consisting of a radial piston pump (**RA**), 2 kg reservoir (**20**), with fill level switch (**F**), electric motor drive with bevel gear (**3M**), step-down ratio 10.5:1 (**01**), with 3 pump elements, with a total of 7 outlets, consisting of:  
 pump element No. 1 with 1 outlet,  
 pump element No. 2 with 2 outlets and  
 pump element No. 3 with 4 outlets, (**124**),  
 design key (**0001**), motor values of 1500 rpm, 230/400 V AC, 1.13/0.65 A (**AF**), with protection class IP 55 (**07**)

**Order No. RA 20 F 3M 01 / 124 / 0001 AF 07**

# Electric motor drive with 3, 7, or 15 liter reservoir

## Technical data

### General

Mounting position . . . . . Horizontal  
 Ambient temperature . . . . . -15 to +60 °C  
 Filling . . . . . Via filler cap  
 Fill level control . . . . . With or without fill level switch

### Pump

Type . . . . . Radial piston pump  
 Operating pressure . . . . . See **Table 8**  
 Short-term pressure . . . . . 100 bar  
 Number of combinable pump elements . . . . . Max. 5  
 Outlets per pump element . . . . . 1, 2 or 4  
 Displacement variability per pump element . . . . . Continuously variable  
 Displacement per outlet at motor speed of 1360 rpm . . . . . See **Table 7**

Lubricant . . . . . mineral oil<sup>1)</sup>  
 Temperature range . . . . . -15 to +80 °C  
 Operating viscosity . . . . . 25 to 2500 mm<sup>2</sup>/s

### Motor

Type/size . . . . . IM B34/63 C 90  
 Type of voltage . . . . . 3-phase AC voltage

### Gearbox

Step-down ratio . . . . . 1:1; 5:1; 10.5:1; 15:1; 25:1; 75:1; 125:1

### Reservoir

Capacity . . . . . 3, 7 or 15 liters  
 Design for 3 and 7 liters . . . . . Polyamide, transparent  
 Design for 15 liters . . . . . Aluminum

<sup>1)</sup> Synthetic lubricants can be provided on request.

**Table 7**

Rated speed [rpm]	Frequency [Hz]	Rated output [kW]	Rated voltage [V]	Rated current [A]	Order code
1500	50	0.18	230/400	1.13/0.65	<b>AF</b>
1500	50	0.18	290/500	0.90/0.52	<b>AK</b>
1500	50	0.18	400/690	0.65/0.38	<b>AO</b>

### Note

The motor specifications refer to three-phase motors from VEM. There may be differences with motors from other manufacturers. For fill level switch, accessories and spare parts – see **pages 18–20**.

### Order example

SKF MULTIFLEX multi-line pump consisting of a radial piston pump RA installed on a reservoir (**RAB**), 7 liter reservoir (**07**), with fill level switch (**V**), electric motor drive, coaxial (**1M**), without step-down ratio 0:0 (**00**), pump mounted on the right side of reservoir (**/**), with 5 pump elements, with a total of 13 outlets, consisting of:  
 pump element 1 with 2 outlets,  
 pump element 2 with 1 outlet,  
 pump element 3 with 4 outlets  
 pump element 4 with 2 outlets and  
 pump element 5 with 4 outlets (**21424**),  
 without cap prelubrication (**/**), design key (**0001**),  
 motor values of 1500 rpm, 230/400 V AC, 1.13/0.65 A (**AF**),  
 with protection class IP 55 (**07**)

**Order No. RAB 07 V 1M 00 / 21424 / 0001 AF 07**

## Explanation of order codes

### Type

Radial piston pump **RA** installed on reservoir

### Reservoir capacity

**03** = 3 liters; **07** = 7 liters; **15-2** = 15 liters

### Fill level switch

**X** = none; **V** = with fill level switch for min. (reed contact) (see **page 18**)

### Drive type

**1M** = Electric motor, coaxial; **2M** = Electric motor with coaxial gear; **3M** = Electric motor with bevel gear

### Step-down ratio

**00** = 1:1 (1M); **01** = 10.5:1 (3M); **05** = 5:1 (2M); **15** = 15:1 (2M);  
**25** = 25:1 (2M); **75** = 75:1 (2M); **13** = 125:1 (2M)

### Attachment location

**A** = on right side of reservoir (3M pump pointing upwards), **/** = on right side of reservoir (1M, 3M)

### Number of outlet ports per pump element

**1** = 1 outlet **2** = 2 outlets **4** = 4 outlets  
 1 to 5 pump elements (counted from drive)

### Cap prelubrication

**DR** = with cap prelubrication, direction of rotation can only be set to clockwise (2M); **/** = none (1M, 2M)

### Design key 0001

### Motor order code

**AF, AK, AO** (see **Table 7**, "Motor ratings")

### Motor protection class

**07** = Protection class IP55 (Ex design on request)

**RAB 07 V 1M 00 / 21424 / 0001 AF 07**

Pump element 1

Pump element 5



# Electric motor drive with 3, 7, or 15 liter reservoir

Fig. 11

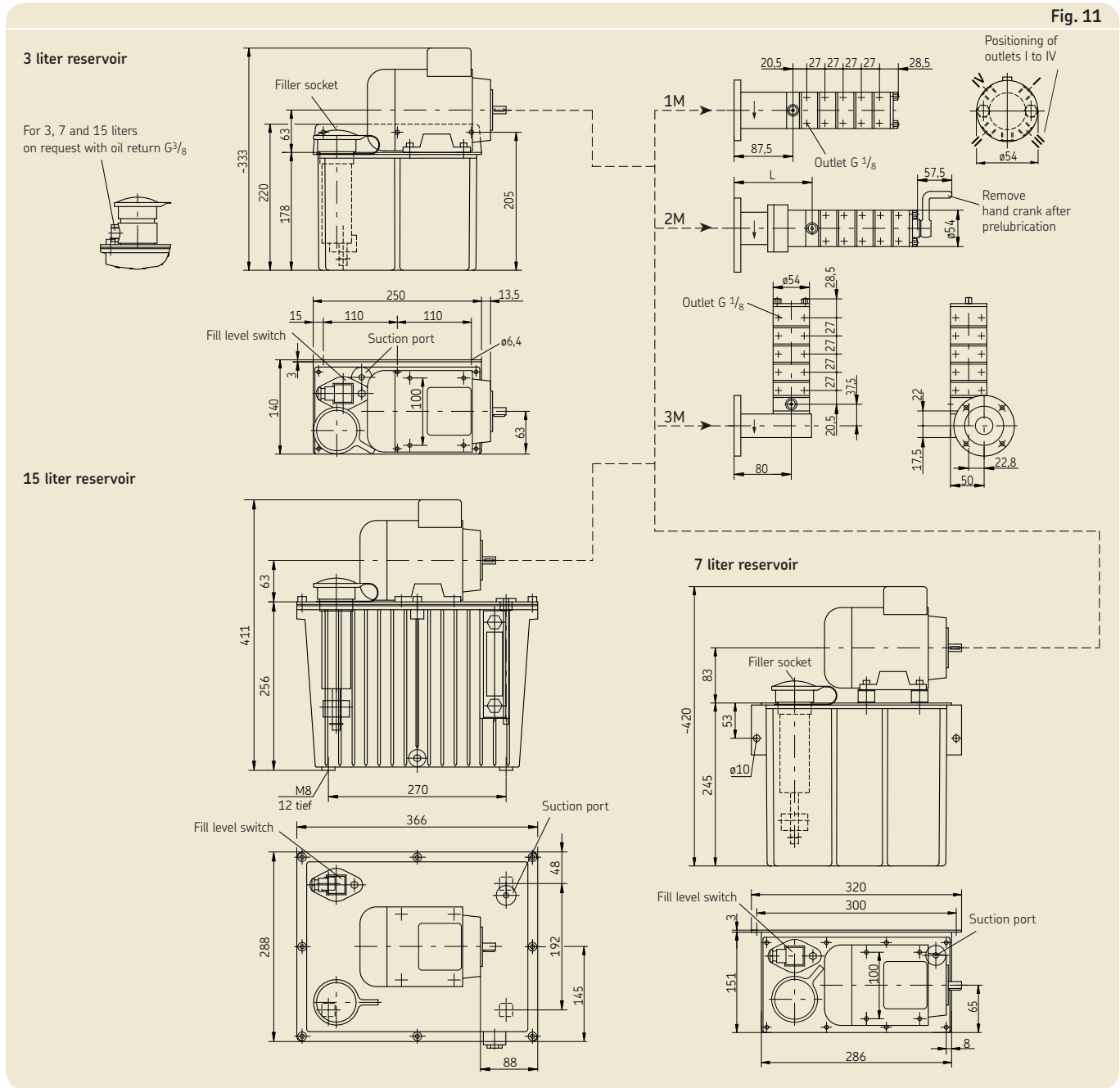


Table 8

Step-down ratio	Length L [mm]	Displacement per outlet [cm <sup>3</sup> /min.]	Max. operating pressure [bar]
1:1	87.5	Approx. 27.2	63
10.5:1	–	Approx. 2.59	63
5:1	110.5	Approx. 5.44	63
15:1	120.5	Approx. 1.81	63
25:1	120.5	Approx. 1.09	50
75:1	131	Approx. 0.36	20
125:1	131	Approx. 0.22	10

Table 9

### Weights

3 liter reservoir . . . . .	1.7 kg	Fill level switch . . . . .	0.135 kg
7 liter reservoir . . . . .	2.76 kg	Motor . . . . .	5.2 kg
15 liter reservoir . . . . .	8 kg	per pump element . . . . .	0.385 kg
		Cap prelubrication . . . . .	0.1 kg

### Pump design

Drive type 1M . . . . .	1.48 kg
Drive type 2M . . . . .	2.76 kg
Drive type 3M . . . . .	1.33 kg

# Fill level switch for grease

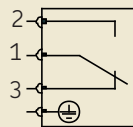
## Technical data

### Fill level switch E

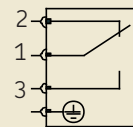
Design .....	Reed contact
Switch design .....	1 switching point min. (changeover)
Switching capacity, max. ....	60 W/VA
Switching voltage, max. ....	230 V AC/DC
Connector plug .....	DIN EN 175301-803-A
Protection class of plug/socket .....	IP 65

Fig. 12

### Wiring diagram for fill level switch E



Contact position  
min. fill level



Contact position  
above min. fill level

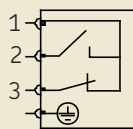
## Technical data

### Fill level switch F

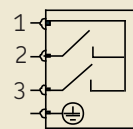
Design .....	Reed contact
Switch design .....	2 switching points (min. - max.)
Switch current, max. ....	1 A with AC/DC <sup>1)</sup>
Switching voltage, max. ....	42 V AC/DC
Connector plug .....	DIN EN 175301-803-A
Protection class of plug/socket .....	IP 65

Fig. 13

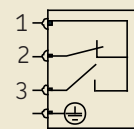
### Wiring diagram for fill level switch F



Contact position  
min. fill level



Contact position  
between  
min. and max. fill level



Contact position  
max. fill level

<sup>1)</sup> Provide spark quenching if there is inductive load.

# Fill level switch for oil

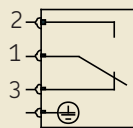
## Technical data

### Fill level switch V

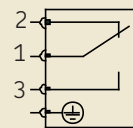
Design .....	Min. monitoring
Contact voltage .....	10 - 42 V AC/DC
Rated contact current .....	1 A
Load contact .....	Changeover <sup>1)</sup> (reed contact)
Connector plug .....	DIN EN 175301-803-A
Protection class of plug/socket .....	IP 65

Fig. 14

### Wiring diagram for fill level switch V



Contact position  
max. fill level



Contact position  
above max. fill level

<sup>1)</sup> Other specification available on request.

# Accessories

## Accessories (ordered separately)

Designation	for pipe ø	Thread	Order No.
Union nut	4	R 1/8	44-0709-2040
	6	R 1/8	44-0709-2041
Double tapered ring	4		44-0405-2002
	6		406-001
Straight connector	4	R 1/8 tap.	404-403W
	6	R 1/8 tap.	406-423W
	8	R 1/8 tap.	408-423W
Banjo fitting	4	R 1/8	96-7004-0058
	6	R 1/8	96-7006-0058
	8	R 1/8	96-7008-0058
GE screw union with check valve	4	R 1/8 tap.	24-2103-2933
	6	R 1/8 tap.	24-2103-2927
Banjo fitting with check valve	4	R 1/8 tap.	24-2106-2016
	6	R 1/8 tap.	24-2106-2017
Banjo fitting <sup>1)</sup>	6	R 1/8	24-2106-2390
Pressure regulating valve <sup>2)</sup>		R 1/8	24-2103-3680
Pressure regulating valve <sup>3)</sup>	6	R 1/8 tap.	24-2103-3681

<sup>1)</sup> With additional connection thread for directly screwing pressure regulating valves.

<sup>2)</sup> Up to 90 bar, without pipe connection for RA pumps operated for short periods.

<sup>3)</sup> Up to 60 bar, with pipe connection for continuous duty.

## SKF plug connector with cylindrical internal thread

Designation	for pipe ø	Thread	Order No.
Adapter	4	G 1/8	404-040-VS
	6	G 1/8	456-004-VS
Banjo fitting	4	G 1/8	504-108-VS
	6	G 1/8	506-108-VS
Elbow	4	G 1/8 tap.	514-018-VS
	6	G 1/8 tap.	506-511-VS

### Note

For further detailed information about SKF plug connectors and related tools, see our brochure on connector systems, brochure **No. 1-0103-EN**.

# Spare parts

## Spare parts (ordered separately)

For rotary drive,  
coaxial, with coaxial and bevel gear

Electric motor drive, coaxial

Description	Order No.
<b>Rotary drive</b>	
Coaxial 1:1	24-0701-3000
Coaxial 5:1	24-0701-3070
Coaxial 5:1 with prelubrication	24-0701-3080
Coaxial 15:1	24-0701-3071
Coaxial 15:1 with prelubrication	24-0701-3081
Coaxial 25:1	24-0701-3072
Coaxial 25:1 with prelubrication	24-0701-3082
Coaxial 75:1	24-0701-3073
Coaxial 75:1 with prelubrication	24-0701-3083
Coaxial 125:1	24-0701-3074
Coaxial 125:1 with prelubrication	24-0701-3084
<b>Bevel gear</b>	
Drive position A (10.5:1)	24-0701-3001
Drive position B (10.5:1)	24-0701-3002
Spacer ring (only at 1:1)	24-1721-2000
<b>Pump element</b>	
With 1 outlet	24-1557-3520
With 2 outlets	24-1557-3521
With 4 outlets	24-1557-3522
<b>Stud bolt for step-down ratios 1:1, 10.5:1, 15:1, 25:1 and 75:1<sup>1)</sup></b>	
For 1 pump element	44-0717-2060
For 2 pump elements	44-0717-2061
For 3 pump elements	44-0717-2062
For 4 pump elements	44-0717-2063
For 5 pump elements	44-0717-2064
<b>Stud bolt for step-down ratios 5:1 and 125:1<sup>1)</sup></b>	
For 1 pump element	44-0717-2069
For 2 pump elements	44-0717-2070
For 3 pump elements	44-0717-2071
For 4 pump elements	44-0717-2072
For 5 pump elements	44-0717-2073
Washer <sup>1)</sup>	DIN125-B6.4-ST
Nut <sup>1)</sup>	DIN934-M6-8
Cap	44-0413-2610
Cap nut <sup>1)</sup>	95-0006-0917
Hand crank	24-0801-2070

<sup>1)</sup> Two required per pump.

## Spare parts (ordered separately)

For electric motor drive with  
coaxial and bevel gear and  
coaxial and bevel gear with reservoir

Description	Order No.
<b>Electric motor</b>	
Order code AF <sup>1)</sup>	84-1700-4790
Order code AK <sup>1)</sup>	84-1700-4808
Order code AO <sup>1)</sup>	84-1700-4786
Cheese-head screw <sup>2)</sup>	DIN 912-M5×16-8.8
<b>2 kg reservoir</b>	
Without fill level switch	24-0254-2312
With fill level switch E	24-0254-2334
With fill level switch F	24-0254-2330
<b>4.5 kg reservoir</b>	
Without fill level switch	24-0254-2310
With fill level switch E	24-0254-2335
With fill level switch F	24-0254-2331
<b>Rotary drive with bevel gear and reservoir</b>	
Bevel gear (10.5:1)	24-0701-3003
Spacer ring (only at 1:1)	24-1721-2001
<b>Pump element</b>	
With 1 outlet	24-1557-3520
With 2 outlets	24-1557-3521
With 4 outlets	24-1557-3522
<b>Stud bolt<sup>3)</sup></b>	
For 1 pump element	44-0717-2070
For 2 pump elements	44-0717-2071
For 3 pump elements	44-0717-2072
Washer <sup>3)</sup>	DIN125-B6.4-ST
Nut <sup>3)</sup>	DIN934-M6-8

<sup>1)</sup> Protection class IP 55

<sup>2)</sup> Four required per pump.

<sup>3)</sup> Two required per pump.



---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

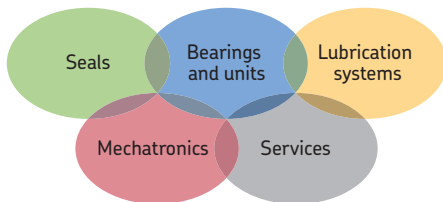
---

---

---

---





### The Power of Knowledge Engineering

Drawing on five areas of competence and application-specific expertise amassed over more than 100 years, SKF brings innovative solutions to OEMs and production facilities in every major industry world-wide. These five competence areas include bearings and units, seals, lubrication systems, mechatronics (combining mechanics and electronics into intelligent systems), and a wide range of services, from 3-D computer modelling to advanced condition monitoring and reliability and asset management systems. A global presence provides SKF customers uniform quality standards and worldwide product availability.

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

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

Not all lubricants can be fed using centralized lubrication systems. SKF can, on request, inspect the feedability of the lubricant selected by the user in centralized lubrication systems. Lubrication systems and their components manufactured by SKF are not approved for use in conjunction with gases, liquefied gases, pressurized gases in solution, vapors or such fluids whose vapor pressure exceeds normal atmospheric pressure (1 013 mbar) by more than 0,5 bar at their maximum permissible temperature.

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, Para. 2, may only be filled into SKF centralized lubrication systems and components and delivered and/or distributed with the same after consultation with and written approval from SKF.

#### Further brochures

- |                  |   |
|------------------|---|
| <i>1-0103-EN</i> | <i>Fittings and Accessories</i>                                   |
| <i>1-9201-EN</i> | <i>Transport of Lubricants in Centralized Lubrication Systems</i> |

#### SKF Lubrication Systems Germany GmbH

Hockenheim Plant  
2. Industriestrasse 4  
68766 Hockenheim  
Germany

Tel. +49 (0)6205 27-0  
Fax +49 (0)6205 27-100

This brochure was presented to you by:

© SKF is a registered trademark of the SKF Group.

© SKF Group 2014

The contents of this publication are the copyright of the publisher and may not be reproduced (even extracts) unless prior written permission is granted. Every care has been taken to ensure the accuracy of the information contained in this publication but no liability can be accepted for any loss or damage whether direct, indirect or consequential arising out of the use of the information contained herein.

PUB LS/P2 11103 EN · July 2014 · 1-3000-EN

