

UD and UC Gear pump unit

for SKF CircOil or hydraulic lubrication systems



General Information

The UC and UD gear pump units are vertically or horizontally arranged units that are used in hydraulic or circulating-oil lubrication systems. All off-the-shelf lubricants and hydraulic oils in the viscosity range of between 20 and 800 mm²/s are conveyed.

Advantages

UC and UD type gear pump units :

- Highly robust
- Virtually wear- and maintenance-free operation
- Well-scalable delivery rate range
- The pressure port for the UC pumps is located above the reservoir cover
- Optional pressure regulating valves can be installed without any additional pipework
- The pressure regulating valves installed in series 3 are easily accessible due to their mounting position above the reservoir cover.
- Vibration proof model available optionally for instance for the naval industry

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Application

The gear pump units are manufactured in 3 assemblies: Series 1 is approved for very high viscosities up to 1.000 mm²/s. They are characterized by their simple and small design, and are accordingly inexpensive. They are particularly suited for small hydraulic and lubrication systems that require volumetric flows between 0.06 l/min and 3 l/min and operating pressures between 25 bar and 60 bar. Series 2 and series 3 meet high requirements in terms of volumetric flow, operating pressure and efficiency. While Series 2 has been designed for volumetric flows of between 1 l/min and 10.8 l/min, series 3 covers the range between 3.8 l/min and 36 l/min. Within the series, the permissible operating pressure is greater as the nominal volumetric flow gets smaller. Due to the overlapping volumetric flow ranges, it is possible, for instance, to convey 9 l/min using a series 2 pump in the low-pressure range, whereas a corresponding series 3 pump can

achieve this volumetric flow in the high-pressure range for the same efficiency. The respective ranges of each series are shown in a simple form in Fig. 1. There are no restrictions with regard to the mounting position of all the units. When UC units are to be mounted lower than the maximum liquid level (oil reservoir), additional sealing of the flange face is required, which must be provided by the customer (refer to version key shown on pump unit).

Note

Please do not hesitate to contact our engineers for any questions relating to special designs (such as designs with increased flow pressure), ATEX guidelines, foreign regulations, or protection class or rated voltage.

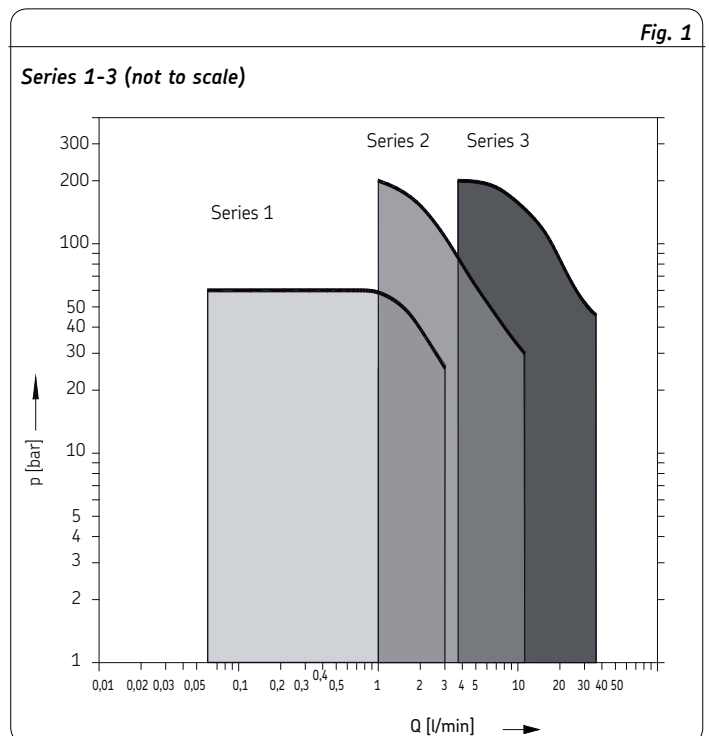
Design and mode of operation

The gear pump units consist of motor, coupling, flange and gear pump. Electronic motors of performance class 0.18 kW are exclusively used for series 1. The flange size is 116x116 mm for vertical pump units (UC) and 80x120 mm for horizontal pump units (UD).

In series 2, different motor classes are used (0.18; 0.37; 0.55 and 0.75 kW). By combination with gear pump units of different sizes (1.2 cm³/U to 8 cm³/U), a wide spectrum of volumetric flow and operating pressure is achieved. This means that this series begins with a pump for 1 l/min at 200 bar and extends to a pump for 10.8 l/min at 30 bar. The flange size is 150x150 mm for vertical pump units (UC) and 120x150 mm for horizontal pump units (UD).

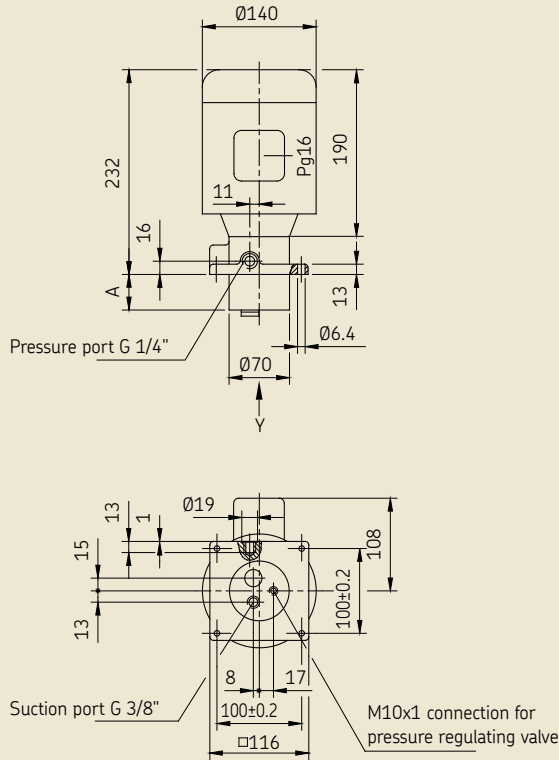
In series 3, electronic motors which provide up to a nominal output of between 0.75 and 4 kW are used. The gear pumps have a pump constant of between 4.5 cm³/U and 26 cm³/U. Series 3 begins with a pump of 3.8 l/min at 200 bar and extends to the biggest pump, which delivers 36 l/min at 45 bar.

The flange size is 205x205 mm for vertical pump units (UC) and 180x220 mm for horizontal pump units (UD).

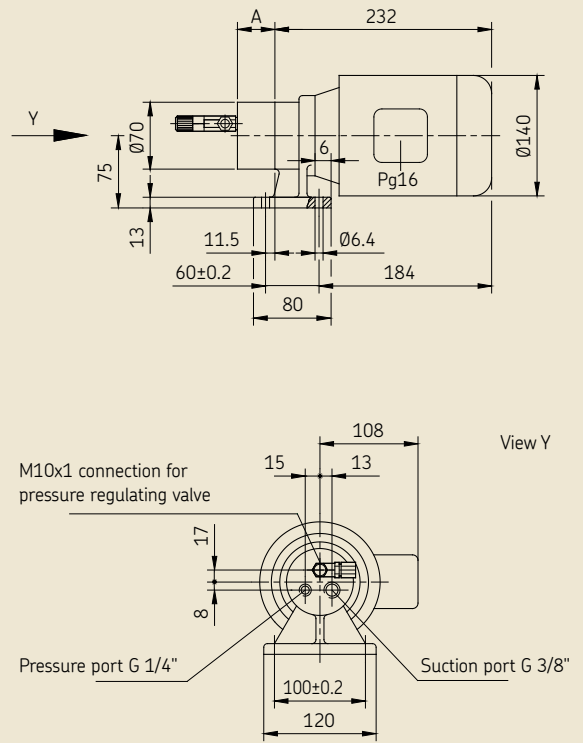


Series 1: Q_{nominal} up to 3 l/min

UC gear pump unit, Series 1



UD gear pump unit, Series 1



Technical Data

Nominal volumetric flow $q=0$ [l/min]	Operating pressure P_{max} [bar]	Dim. A [mm]	UC Weight [kg]	UD Weight [kg]
0.06	60	37	7.9	6.5
0.12				
0.18				
0.25				
0.50				
0.75				
1.00	50	40	8	6.6
1.50				
2.00				
2.5	35	47	8.3	6.9
3.00				
	30	47	8.4	7.0
	25	51	8.5	7.1
			8.6	7.2

Note
Dimensions for the motor may vary, depending on the motor manufacturer. There may be dimensional deviations, in particular with regard to explosion protection.

See important product usage information on the back cover.

Series 1: Q_{nominal} up to 3 l/min

Technical Data

Units

Mounting position: discretionary (where UC units are installed lower than the maximum oil level, the customer must seal flange/machine)

Ambient temperature: - 15 to + 40 °C (At higher ambient temperatures, note that there is a reduction in performance of approx. 1% per Kelvin)

Pump

Nominal volumetric flow: see page 5

Type: gear pump

Design:

B 1 standard gasket FPMB

3018 Pump with standard sealing for outlet under lubricant level (only for UC)

Operating pressure:

Inlet max. 2 bar (overpressure)

Outlet p_{max} see page 4

Lubricant mineral oils, synthetic and environmentally friendly oils with an operating viscosity between 20 and 1.000 mm²/s

Suction height max. 700 mm (for max. tube Ø)

Motor

Rated power: 0.18 kW

Rated current at 400 V 0.65 A

Frequency 50 Hz 1)

Type: IM V18/B14
(motor can be shifted by 90°)

Size: 63 C 90

Type of voltage: 3-phase AC voltage

Rated speed 1.500 min⁻¹

Voltage tolerance: ± 10 %

Rated current see rating plate (motor)

Protection class: IP 55

Temperature class: F

1) The motors are suited for a frequency of 50 or 60 Hz. For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20 % (compared to the table specifications, basis 50 Hz).

Accessories

Designation

Order no.

Suction port:

GE screw connection	G 3/8" - Ø 12	412-403W
GE screw connection	G 3/8" - Ø 12	412-433W
Sealing ring	G 3/8"	DIN7603-A17x21-Cu

Pressure port:

GE screw connection	G 1/4" - Ø 6	406-413W
GE screw connection	G 1/4" - Ø 8	408-403W
GE screw connection	G 1/4" - Ø 10	410-403W
GE screw connection	G 1/4" - Ø 12	412-423W
Sealing ring	G 1/4"	DIN7603-A14x18-Cu
Fastening screw	M6x20 DIN 912	DIN912-M6x20-8.8
Sealing ring for pressure regulating valve	A10x13.5	95-1021-7603

Order references Series 1: Q_{nominal} up to 3 l/min

Explanation of order codes

Example: UC 0.06 / 60 AF 07 B1

Gear pump unit	
Vertical	UC
Horizontal	UD

Design key	
Standard gasket FPM	B1
Tech. data, see page 4	B 3018

Protection class	Order description
IP55	07

Nominal volumetric flow $p=0$ [l/min]	Continuous volumetric flow $p=p_{\text{max}}$ [l/min]	Operating pressure [bar]
0.06	0.048	60
0.12	0.096	
0.18	0.144	
0.25	0.20	
0.50	0.40	
0.75	0.60	
1.00	0.80	
1.50	1.35	50
2.00	1.80	35
2.50	1.90	30
3.00	2.40	25

Motor output data ¹⁾		
Rated speed ¹⁾ [rpm]	Rated voltage [V]	Order code
1.500	230 / 400	AF
	290 / 500	AK
	400 / 690	A0

¹⁾ This motor data refers to three-phase motors from VEM. There may be differences with motors from other manufacturers. Other specifications available on request.

Note: The required pressure regulating valve is **not** included. Please order separately, see page 14.

Order example:

A gear pump unit of the UC series (**UC**) with a nominal volumetric flow of 0.06 l/min (**0.06**), an operating pressure of 60 bar (**60**), a rated speed of 1500 min⁻¹ (rated power 0.18 kW, rated current 0.65 A, frequency 50 Hz) for a rated voltage of 230/400 V (**AF**) in protection class IP55 (**07**) and version key B1 (**B1**) results in the following order number: **UC 0.06 /60 AF 07 B1**

Series 2: Q_{nominal} up to 10.8 l/min

Technical Data

Units

Mounting position: discretionary (where UC units are installed lower than the maximum oil level, the customer must seal flange/machine)

Ambient temperature: - 15 to + 40 °C (At higher ambient temperatures, note that there is a reduction in performance of approx. 1% per Kelvin)

Pump

Nominal volumetric flow: . . see page 8

Type: gear pump

Design:

B 1 standard gasket FPMB

3018. pump with standard sealing for outlet under lubricant level (only for UC)

Operating pressure:

Inlet max. 2 bar (overpressure)

Outlet p_{max} see page 6

Lubricant mineral oils, synthetic and environmentally friendly oils with an operating viscosity between 20 and 1.000 mm²/s

Suction height max. 1.200 mm (for max. tube Ø)

Rated motor power ¹⁾	0.18 [kW]	0.37 / 0.55 / 0.75 [kW]
Type	IM V18 or IMB14 Motor can be shifted by 90°	IM V18 or IMB14
Size	63C120	80C120
Type of voltage	3-phase AC voltage	
Frequency ²⁾	50 Hz	
Voltage, rated speed	see table page 8	
Rated current	see rating plate (motor)	
Protection class	see table	
Temperature class	F	

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

2) The motors are suited for a frequency of 50 or 60 Hz. For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20 % (compared to the table specifications, basis 50 Hz).

Note

Dimensions for the motor may vary, depending on the motor manufacturer. There may be dimensional deviations, in particular with regard to ex-protection.

Accessories

Designation

Order no.

Suction port:

GE screw connection	G 1/2" - Ø 18	96-0218-0058
Sealing ring	G 1/2"	DIN7603-A21x26-Cu

Pressure port:

GE screw connection	G 1/2" - Ø 12	412-453W
GE screw connection	G 1/2" - Ø 15	96-0215-0058
GE screw connection	G 1/2" - Ø 18	96-0218-0058
GE screw connection	G 3/8" - Ø 12	412-403W
GE screw connection	G 3/8" - Ø 15	415-433W
GE screw connection	G 3/8" - Ø 18	96-0220-0058
Fastening screw	M8x16 DIN 912	DIN912-M6x16-8.8
Fastening screw	M8x30 DIN 912	DIN912-M8x30-8.8

Screw plug for unused pressure port:

Screw plug	G 1/2"	95-0012-0908
Sealing ring		DIN7603-A21x26-Cu
Screw plug	G 3/8"	95-0038-0908
Sealing ring		DIN7603-A17x21-Cu

Order reference

Series 2: Q_{nominal} up to 10.8 l/min**Example: UC 1 / 140 A AG 07 B1**

Gear pump unit	
Vertical	UC
Horizontal	UD

Design key	
Standard gasket FPM	B1
Techn. data, see page 7	B 3018

Protection class	Order description
IP55	07

Series 2	A
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Motor output data ¹⁾		
Rated speed ¹⁾ [rpm]	Rated voltage [V]	Order code
1000	230 / 400	AG
	290 / 500 400 / 690	AL
		AP
1500	230 / 400	AF
	290 / 500 400 / 690	AK
		AO

Nominal volumetric flow ²⁾ $Q_{p=0}$ [l/min]	Operating pressure [bar]	Rated speed [rpm]	Rated power [kW]	Rated current at 400 V [A]
1.0	140	1000	0.37	1.22
	200		0.55	1.73
1.6	45	1.500	0.18	0.65
	180		0.75	2.10
2.3	30		0.18	0.65
	100		0.55	1.6
	130		0.75	2.10
3.5	20		0.18	0.65
	65		0.55	1.6
	90		0.75	2.10
4.8	15		0.18	0.65
	45		0.55	1.6
	65	0.75	2.10	
7	10	0.18	0.65	
	30	0.55	1.6	
	45	0.75	2.10	
9	8	0.18	0.65	
	25	0.55	1.6	
	35	0.75	2.10	
10.8	7	0.18	0.65	
	20	0.55	1.6	
	30	0.75	2.10	

¹⁾ This motor data refers to three-phase motors from VEM. There may be differences with motors from other manufacturers.

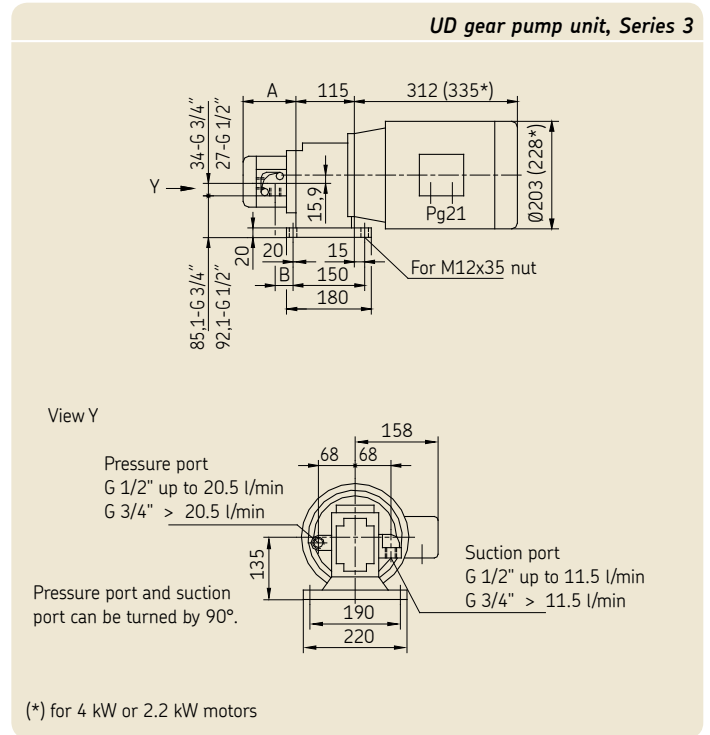
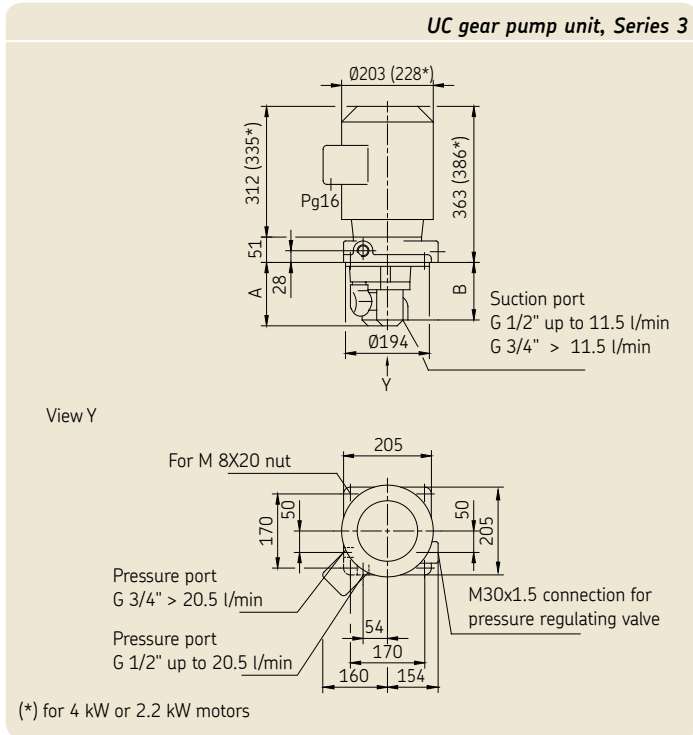
²⁾ A by 30% decreased volumetric flow must be expected for a service viscosity < 100 mm²/s and max. operating pressure.

Note: The required pressure regulating valve is **not** included. Please order separately, see page 14/15.

Order example

A gear pump unit of the UC series (UC) with a nominal volumetric flow of 1l/min (1), an operating pressure of 140 bar (140), of series 2 (A), a rated speed of 1.000 min⁻¹ (rated power 0.37 kW, rated current 1.22A, frequency of 50 Hz) for a rated voltage of 230/400 V (AG) in protection class IP55 (07) and a version key B1 (B1) results in the following order number: **UC 1 / 140 A AG 07 B1**

Series 3: Q_{nominal} up to 36 l/min



UC/UD technical data. Series 3

Nominal volumetric flow $q_{p=0}$ [l/min]	Operating pressure P_{max} [bar]	Flange	UC			UD		
			Dim. A [mm]	Dim. B [mm]	Weight [kg]	Dim. A [mm]	Dim. B [mm]	Weight [kg]
3.8	80	90C200	153	123.8	15.5	88	20.3	14.5
	120				16.5			15.5
	160				18.5			17.5
	200				20			19
6.0	75	90C200	153	123.8	16.5	88	20.3	15.5
	100				18.5			17.5
	150	100C200			20			19
	200				26			25
8.5	50	90C200	153	123.8	16.5	88	20.3	15.5
	70				18.5			17.5
	100	100C200			20			19
	140				26			25
	180				31			30
11.5	40	90C200	153	123.8	17	88	20.3	16
	50				19			18
	80	110C200			20.5			19.5
	100				26.5			25.5
	140				31.5			30.5

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Series 3: Q_{nominal} up to 36 l/min

Continued from page 9

UC/UD technical data, Series 3

Nominal volumetric flow $q_{p=0}$ [l/min]	Operating-pressure P_{max} [bar]	Flange	UC			UD		
			Dim. A [mm]	Dim. B [mm]	Weight [kg]	Dim. A [mm]	Dim. B [mm]	Weight [kg]
13.7	20	90C200	169	149.3	16	104	28.3	15
	35				17			16
	40	110C200			19			16.8
	70	112C200			20.5			19.5
15.0	30	90C200	169	149.3	17	104	28.3	16
	40				19			18
	60	100C200			20.5			19.5
	80	112C200			26.5			25.5
	110	112C200			31.5			30.5
20.5	20	90C200	169	149.3	17	104	28.3	16
	30				19			18
	40	100C200			20.5			19.5
	60	112C200			26.5			25.5
	80	112C200			31.5			30.5
26	17	90C200	179	155.3	17.5	114	34.3	16.5
	22				19.5			18.5
	35	100C200			21			20
	45	112C200			27			26
	60	112C200			32			31
30	15	90C200	183	157.3	17.5	118	36.55	16.5
	20				19.5			18.5
	30	100C200			21			20
	40	112C200			27			26
	50	112C200			32			31
36	12	90C200	183	157.3	17.7	118	36.55	16.7
	17				19.7			18.7
	25	100C200			21.2			20.2
	25	112C200			27.2			26.2
	45	112C200			32.2			31.2

Series 3: Q_{nominal} up to 36 l/min

Technical Data

Units

Mounting position: discretionary (where UC units are installed lower than the maximum oil level, the customer must seal flange/machine)

Ambient temperature: - 15 to + 40 °C (At higher ambient temperatures, note that there is a reduction in performance of approx. 1% per Kelvin)

Pump

Nominal volumetric flow: pages 9 and 10

Type: gear pump

Design:

B 1 standard gasket FPMB

3018. pump with standard sealing for outlet under lubricant level (only for UC)

Operating pressure:

Inlet max. 2 bar (overpressure)

Outlet p_{max} see pages 9 and 10

Lubricant mineral oils, synthetic and environmentally friendly oils with an operating viscosity between 20 and 1.000 mm²/s

Suction height max. 1.200 mm (for max. tube \emptyset)

Motor

Nominal output page 12

Type: V18/B14 (motor can be shifted by 90°)

Type of voltage: 3-phase AC voltage

Rated speed 1.500 min⁻¹

Voltage tolerance: $\pm 10\%$

Rated current see rating plate (motor)

Frequency 50 Hz ¹⁾

Protection class: IP 55

Temperature class: F

1) The motors are suited for a frequency of 50 or 60 Hz. For connection with a frequency of 60 Hz, the speed and the volumetric flow are increased by 20 % (compared to the table specifications, basis 50 Hz).

Order references Series 3: Q_{nominal} up to 36 l/min

Example: UC 3.8 / 80 B AG 07 B1

Gear pump unit	
Vertical	UC
Horizontal	UD

Series 3	B
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Design key	
Standard gasket FPM	B1
Techn. data, see page 11	B 3018
Protection class	
IP55	Order description
	07

Motor output data ²⁾		
Rated speed ¹⁾ [rpm]	Rated voltage [V]	Order code
1.000	230 / 400	AG
	290 / 500 / 400 / 690	AL AP
	230 / 400	AF
1.500	290 / 500 / 400 / 690	AK AO

Nominal volumetric flow ²⁾ p=0 [l/min]	Operating pressure [bar]	Rated speed ¹⁾ [rpm]	Rated power ¹⁾ [kW]	Rated current at 400V [A]
3.8	80	1000	0.75	2.43
	120		1.1	3.15
	160		1.5	3.40
	200		2.2	5.35
6.0	75	1500	1.1	2.62
	100		1.5	3.40
	150		2.2	5.15
	200		3	6.70
8.5	50		1.1	2.62
	70		1.5	3.40
	100		2.2	5.15
	140		3	6.70
11.5	180	4	8.80	
	40	1.1	2.62	
	50	1.5	3.40	
	80	2.2	5.15	
13.7	100	3	6.70	
	140	4	8.80	
	20	1000	0.75	2.43
	35		1.1	3.15
40	1.5		3.40	
70	2.2		5.35	
15.0	30	1500	1.1	2.62
	40		1.5	3.40
	60		2.2	5.15
	80		3	6.70
20.5	110		4	8.80
	20		1.1	2.62
	30		1.5	3.40
	40		2.2	5.15
	60	3	6.70	
	80	4	8.80	

Continued on next page

Order reference

Series 3: Q_{nominal} up to 36 l/min

Individual parameters, series 3, continued from page 12

Example: UC 3.8 / 80 B AG 07 B1

Nominal volumetric flow ²⁾ $q=0$ [l/min]	Operating pressure [bar]	Rated speed ¹⁾ [rpm]	Rated power ¹⁾ [kW]	Rated current at 400V [A]
26.0	17	1.500	1.1	2.62
	22		1.5	3.40
	35		2.2	5.15
	45		3	6.70
	60		4	8.80
30	15		1.1	2.62
	20		1.5	3.40
	30		2.2	5.15
	40		3	6.70
	50		4	8.80
36	12		1.1	2.62
	17		1.5	3.40
	25		2.2	5.15
	35		3	6.70
	45		4	8.80

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

2) Other specifications available on request.

Note: The required pressure regulating valve is **not** included. Please order separately, see page 14/15.

Order example:

A gear pump unit of the UC series (**UC**) with a nominal volumetric flow of 3.8 l/min (**3.8**), an operating pressure of 80 bar (**80**), of the series up to 36 l/min (**B**), a rated speed of 1.000 min⁻¹, a rated power of 0.75 kW, a rated current of 2.43 A, frequency of 50 Hz, a rated current of 400 V (**AG**) in protection class IP55 (**07**) and version key B1 (**B1**) results in the following order number: **UC 3.8 / 80 B AG 07 B1**

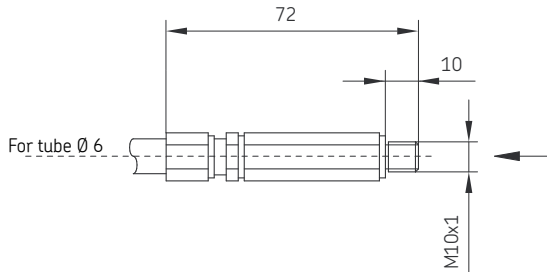
Accessories (ordered separately)

Designation	Dimension	Size [l/min]	Order No.
Suction port:			
GE screw connection	G 1/2" - Ø 22	UC/UD: 6; 8; 11.5	96-0223-0058
GE screw connection	G 3/4" - Ø 28	UC/UD: 13.7 to 36	96-0229-0058
Pressure port:			
GE screw connection	G 1/2" - Ø 12	UD: 6 to 20.5	412-453W
GE screw connection	G 1/2" - Ø 15	UC: 3.8 to 36	96-0215-0058
GE screw connection	G 1/2" - Ø 18		96-0218-0058
GE screw connection	G 3/4" - Ø 12	UD: 26; 30; 36	412-463W
GE screw connection	G 3/4" - Ø 15		96-0246-0058
GE screw connection	G 3/4" - Ø 18		412-413W
GE screw connection	G 3/4" - Ø 22		96-0222-0058
Fastening screw	M 10 x 30 DIN 912		95-1030-0912
Fastening screw	M 12 x 35 DIN 912		DIN912-M12x35-8.8
Screw plug for unused pressure port			
Screw plug	G 1/2"		95-0012-0908
Sealing ring			DIN7603-A21x26-Cu
Screw plug	G 3/4"		95-0034-0908
Sealing ring			DIN7603-A27x32-Cu

Accessories

Pressure regulating valves (ordered separately)

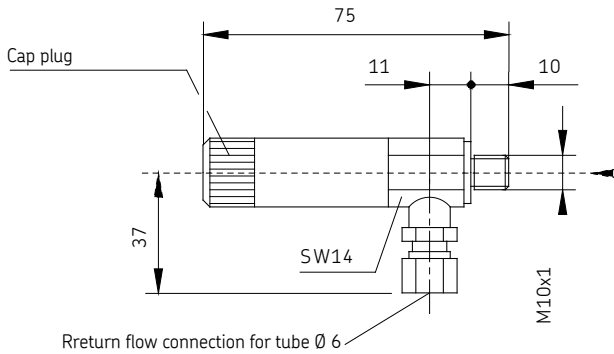
Series 1, fixed setting



Pressure regulating valve, Series 1, fixed setting

Application	Cracking pressure	Order no.
UC/UD	10 bar	24-2103-2382
	15 bar	24-2103-2383
	25 bar	24-2103-2384
	30 bar	24-2103-2384
	35 bar	24-2103-2385
	50 bar	24-2103-2386
	60 bar	24-2103-2401
Sealing ring		95-1021-7603

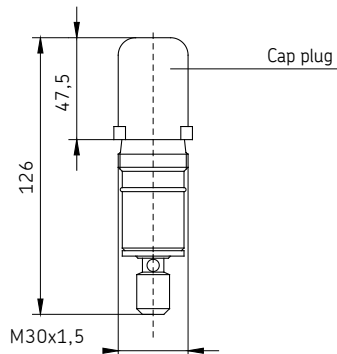
Series 1, adjustable



Pressure regulating valve, Series 1, adjustable

Application	Operating pressure	Order no.
UC/UD	0 - 20 bar	24-2103-2121
	20 - 60 bar	24-2103-2122

Series 2 and 3, adjustable

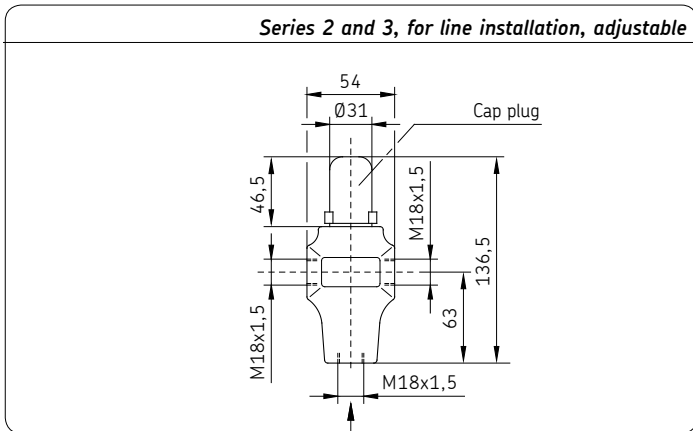


Pressure regulating valve, Series 2 and 3, adjustable

Application	Operating pressure	Order no.
UC	3 - 10 bar	24-2103-3076
	10 - 15 bar	24-2103-3077
	15 - 50 bar	24-2103-3078
	40 - 100 bar	24-2103-3079
	70 - 180 bar	24-2103-3080
	100 - 250 bar	24-2103-3081

Accessories

Pressure regulating valves, sealing sets (ordered separately)



Pressure regulating valve, Series 2 and 3, for line installation

Application	Operating pressure	Order no.
UC	3 - 10 bar	24-2103-3088
	10 - 15 bar	24-2103-3089
	15 - 50 bar	24-2103-3090
	40 - 100 bar	24-2103-3091
	70 - 180 bar	24-2103-3092
	100 - 250 bar	24-2103-3093
Screw unions	Dimension	Order no.
GE screw connection	M 18 x 1.5 (Ø 12)	412-433
GE screw connection	M 18 x 1.5 (Ø 15)	96-0315-0058
Sealing ring	A 18 x 22	DIN7603-A18x22-Cu
Screw	M 18 x 1.5	95-1518-0908

Caution

When the pressure regulating valve is used for line installation, to avoid injuries caused by accident the pump-side mounting hole (M30x1.5) must be closed with a plug, order number 24-1821-2060.

Maintenance

Under normal operating conditions, gear pump units do not require special maintenance.

However, observe the following points when mounting or re mounting the units

- Observe the arrow indicator on the unit and connect the motor according to the values on the rating plate
- Dust deposits on the motor will impair cooling
- The air inlet at the fan blade may not be covered

FPM pump gasket sets

Series	Type	Size	Order No.
1	UC/UD	0.06 ... 3 l/min	24-0404-2615
	UC/UD	1.5; 2.0; 2.5 and 3 l/min	24-0404-2299 ¹⁾
2	UC	1 ... 10.8 l/min	24-0404-2334
	UD	1 ... 10.8 l/min	24-0404-2337
3	UC	3.8 ... 11.5 l/min	24-0404-2320
	UC	13.7 ... 20.5 l/min	24-0404-2321
	UC	26 ... 36 l/min	24-0404-2322
	UD	3.8 ... 11.5 l/min	24-0404-2328
	UD	13.7 ... 20.5 l/min	24-0404-2329
	UD	26 ... 36 l/min	24-0404-2330

¹⁾ Only applicable to pumps with keys 2847 B to 2850 B

Order No. 1-3019-EN

Subject to change without notice! (10/2018)

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.

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