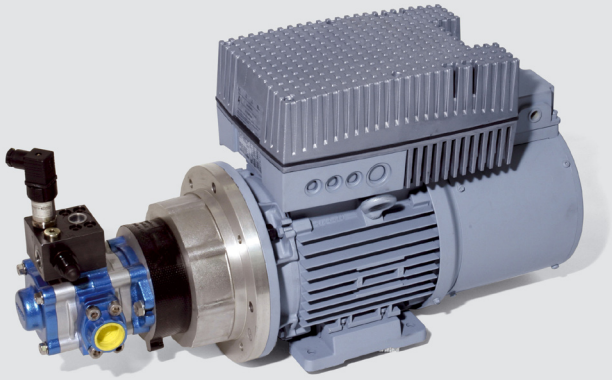
Voith Turbo

VOITH

Medium pressure internal gear pump IPME for cooling and lubricating applications



Features

- Voith Superlip principle with additional axial compensation
- Pressure medium viscosity range from 1 to 300 mm²/s (cSt)
- High efficiency levels
- Very low flow and pressure pulsation
- Low noise levels
- Compact design
- Multiple pumps possible
- Suitable for variable-speed drives (variable volume flow, pressure control)
- Delivery flow up to 260 l/min at 125 bar

H hydraulic

Table of contents

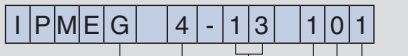
Characteristic data

Standard Type Size	Displacement volume*	Revolution speed		Delivered flow**		Continuous pressure		Weight
		(p_{max}) min	max	n = 1450 1/min	n = n_{max}	<10cSt	⩾10cSt	
	cm^3/U	1/min	1/min	l/min	l/min	bar	bar	kg
IPME 4	13	400	3600	19,1	47,4	100	125	5,5
IPME 5	25	400	3000	36,6	75,7	100	125	9,8
IPME 6	50	400	2600	73,0	130,9	100	125	16,5

* Due to manufacturing tolerances the displacement volume can be lower around 1,5%

** Delivered flow without consideration of the volumetric efficiency

Design options



Shaft extension
1 = key

Fastening flange
0 = SAE 2 hole
4 = ISO 2 hole

Direction of rotation (view of pump shaft)
1 = right
6 = left

Displacement volume

Size

Shaft seal
without designation = Varilip (standard)
G = mechanical seal

Technical data

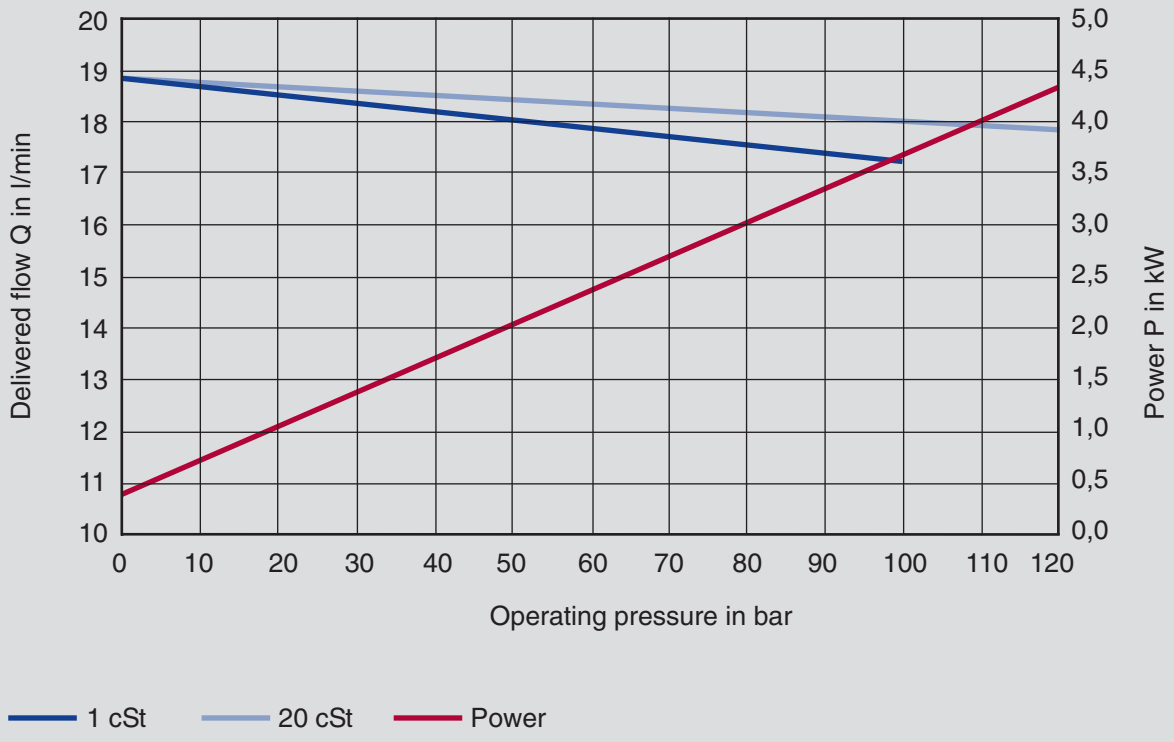
General		
Type of construction		internal gear pump without filler element with radial gap compensation (Voith Superlip principle)
Fastening possibilities		ISO or SAE 2 hole flange with key shaft
Direction of rotation		right or left rotation
Drive power		see the following data sheets
Shaft load		for radial and/or axial load of the drive shaft please consult us
Installation position		any position
Flow medium		coolants and lubricants (emulsions and oils), cutting oil, special fluids on request
Ambient temperature	°C	-10 to +60
Contamination level		max. admissible contamination level of the pressurized fluid 40 mg/l and particle size < 30 µm. This corresponds to NAS 1638 class 11 with steel and class 12 with aluminum.
Hydraulic characteristics		
Input pressure	bar	0,8 to 3,0 bar (abs.) max. 6,0 bar (abs.) with mechanical seal
Continuous pressure	bar	see table characteristic data
Flow medium temperature	°C	0 to +80
Viscosity range	mm^2/s	1 to 300; admissible start up viscosity: 2000

Operational characteristics IPME 4 standard design

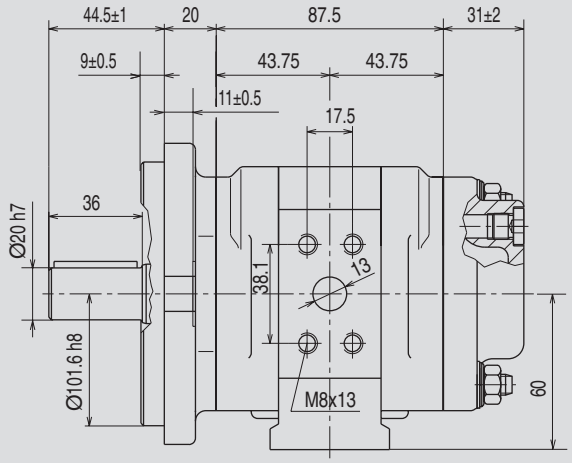
Operational characteristics 50 Hz, n = 1450 1/min													
Pressure	bar	10	20	30	40	50	60	70	80	90	100	110	120
Delivered flow Flow medium viscosity 1 cSt	l/min	18,9	18,7	18,5	18,3	18,1	18,0	17,8	17,6	17,4	17,2	-	-
Delivered flow Flow medium viscosity 20 cSt	l/min	19,0	18,9	18,8	18,7	18,6	18,5	18,4	18,3	18,2	18,1	18,0	17,9
Power requirement	kW	0,5	0,9	1,2	1,5	1,9	2,2	2,5	2,9	3,2	3,5	3,9	4,2

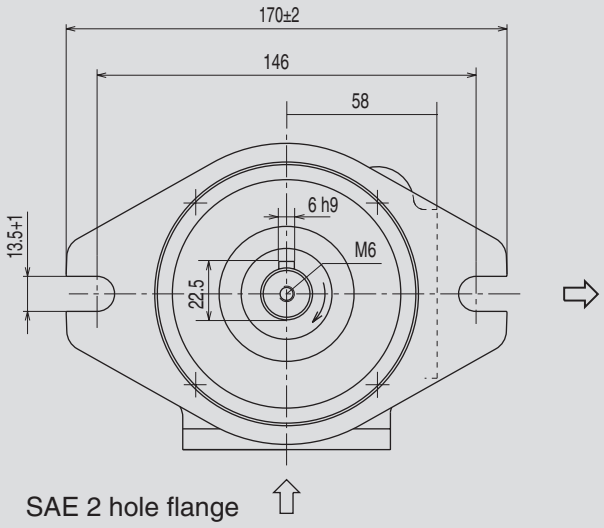
Operational characteristics for other frequency / number of revolutions on request

IPME 4-13, Delivered flow and power requirement at 1450 1/min

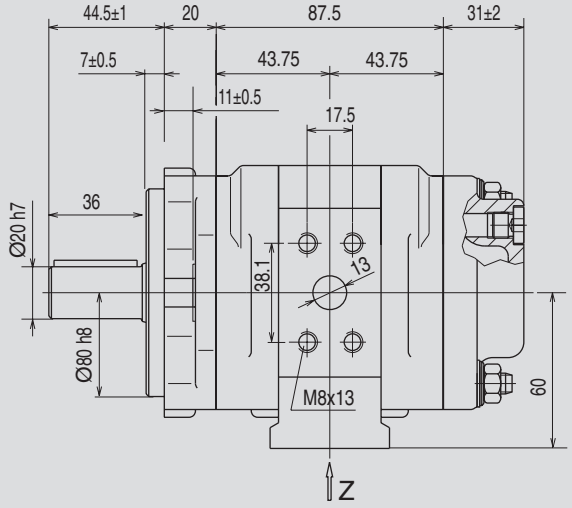


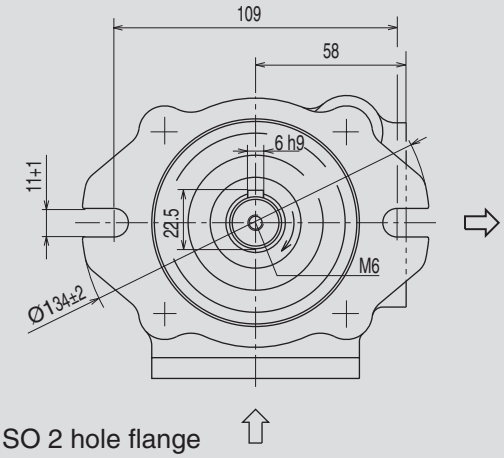
Dimensional drawing IPME 4 standard design





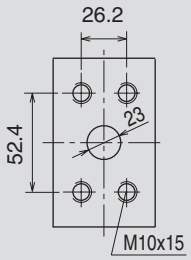
SAE 2 hole flange





ISO 2 hole flange

View Z



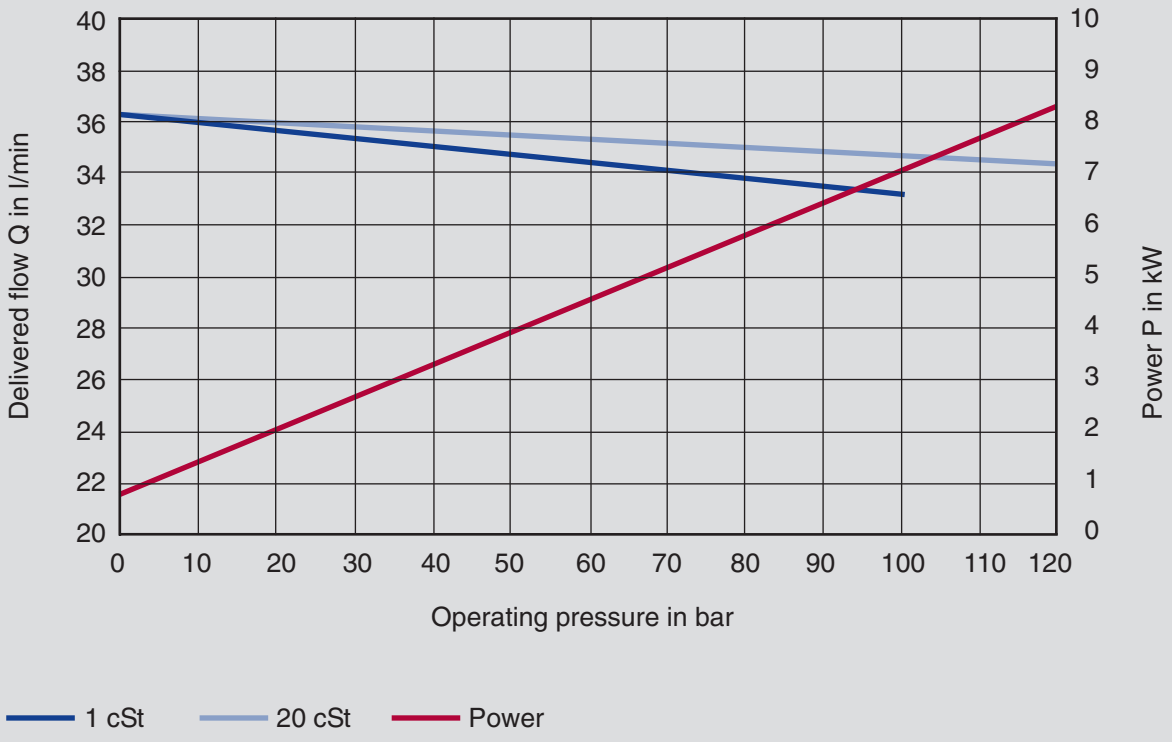
SAE flange in standard design
G 1“ for suction connection
G ½“ for pressure connection
please order separetelly

Operational characteristics IPME 5 standard design

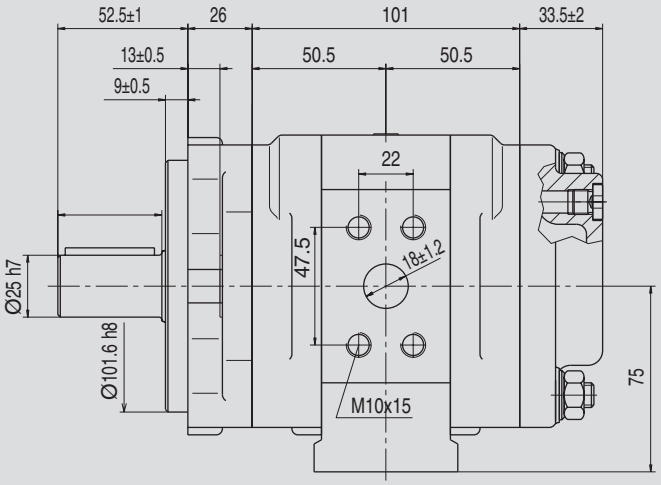
Operational characteristics 50 Hz, n = 1450 1/min													
Pressure	bar	10	20	30	40	50	60	70	80	90	100	110	120
Delivered flow Flow medium viscosity 1 cSt	l/min	36,2	35,9	35,5	35,2	34,8	34,4	34,1	33,7	33,3	33,0	-	-
Delivered flow Flow medium viscosity 20 cSt	l/min	36,4	36,2	36,0	35,9	35,7	35,5	35,3	35,1	34,9	34,7	34,5	34,4
Power requirement	kW	1,2	1,8	2,4	3,1	3,7	4,4	5,0	5,6	6,3	6,9	7,6	8,2

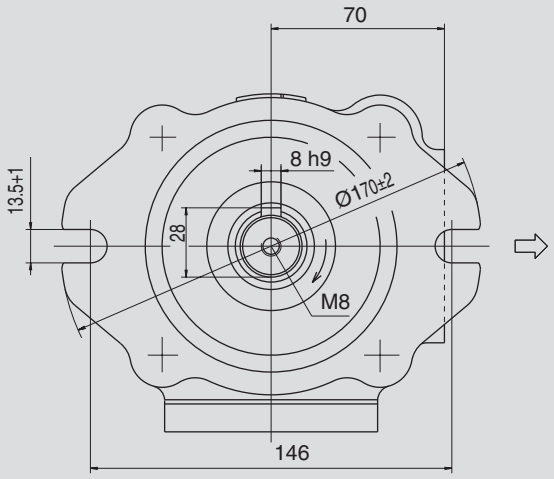
Operational characteristics for other frequency / number of revolutions on request

IPME 5-25, Delivered flow and power requirement at 1450 1/min

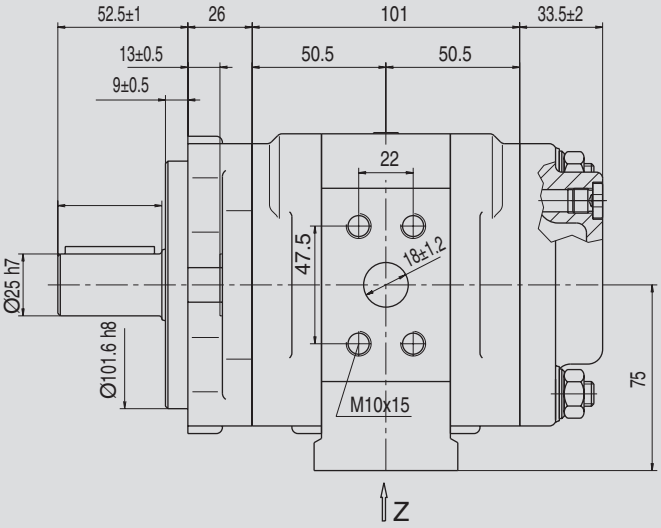


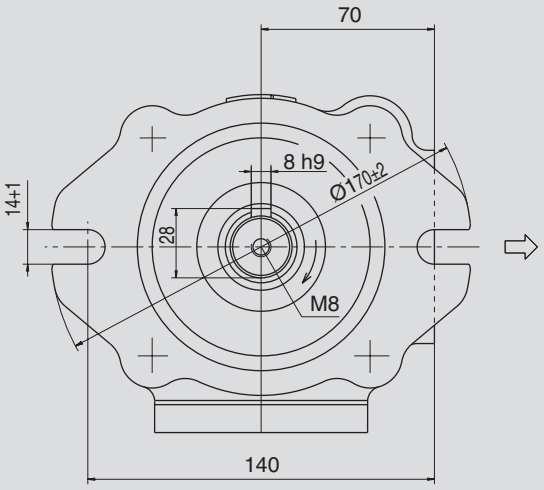
Dimensional drawing IPME 5 standard design





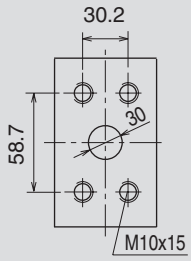
SAE 2 hole flange ⇧





ISO 2 hole flange ⇧

View Z



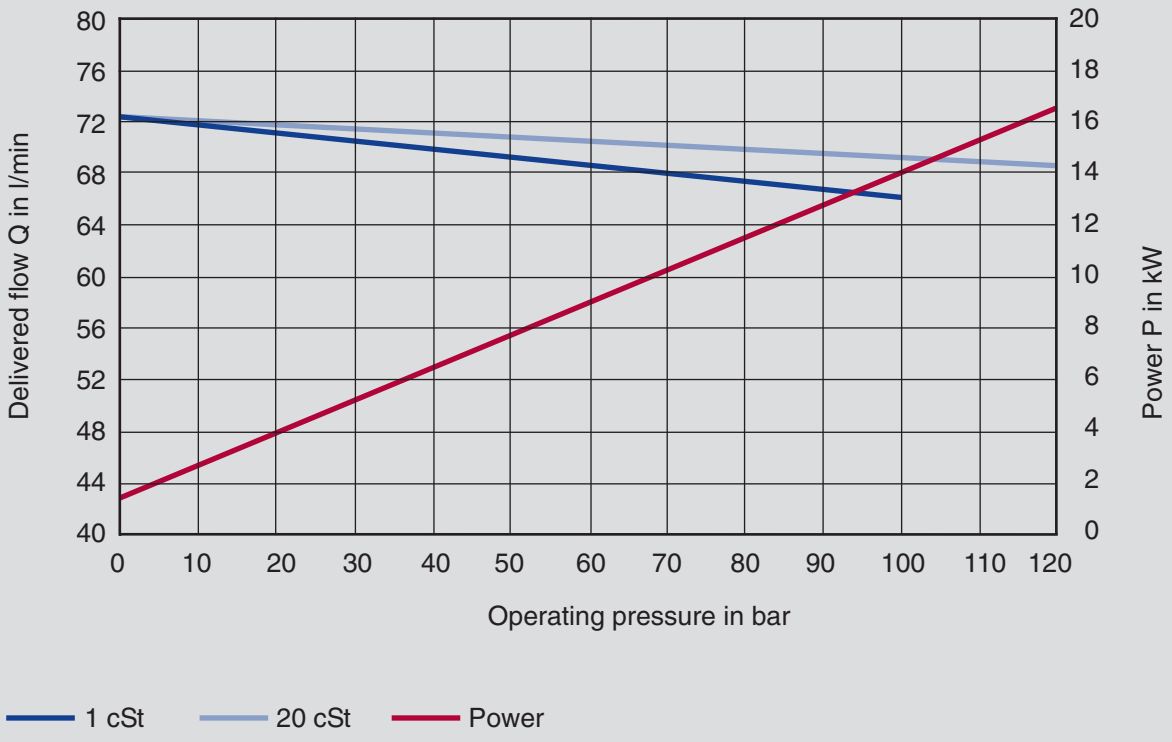
SAE flange in standard design
G 1¼“ for suction connection
G ¾“ for pressure connection
please order separetelly

Operational characteristics IPME 6 standard design

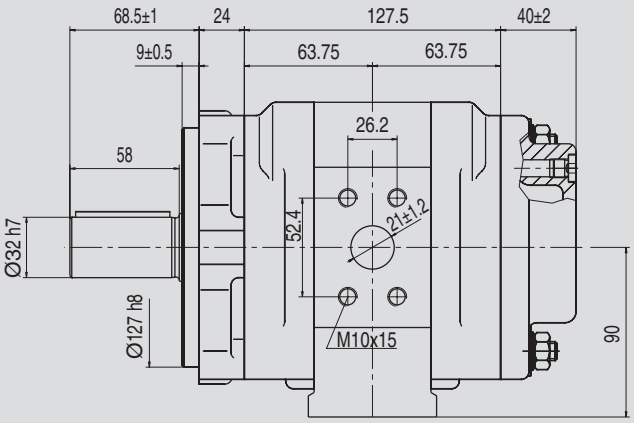
Operational characteristics 50 Hz, n = 1450 1/min													
Pressure	bar	10	20	30	40	50	60	70	80	90	100	110	120
Delivered flow Flow medium viscosity 1 cSt	l/min	72,3	71,6	70,8	70,1	69,4	68,7	67,8	67,2	66,5	65,8	-	-
Delivered flow Flow medium viscosity 20 cSt	l/min	72,6	72,3	71,9	71,6	71,2	70,8	70,5	70,1	69,7	69,4	69,0	68,7
Power requirement	kW	2,1	3,4	4,7	5,9	7,2	8,5	9,8	11,1	12,4	13,6	14,9	16,4

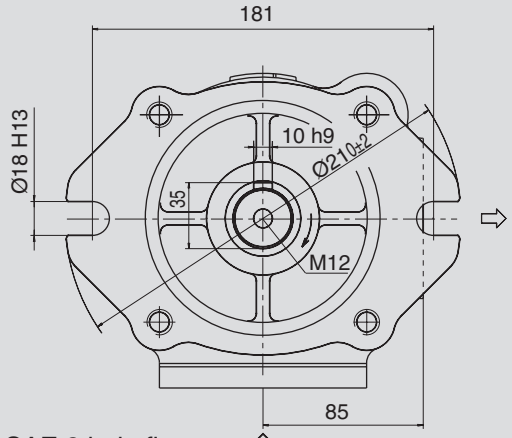
Operational characteristics for other frequency / number of revolutions on request

IPME 6-50, Delivered flow and power requirement at 1450 1/min

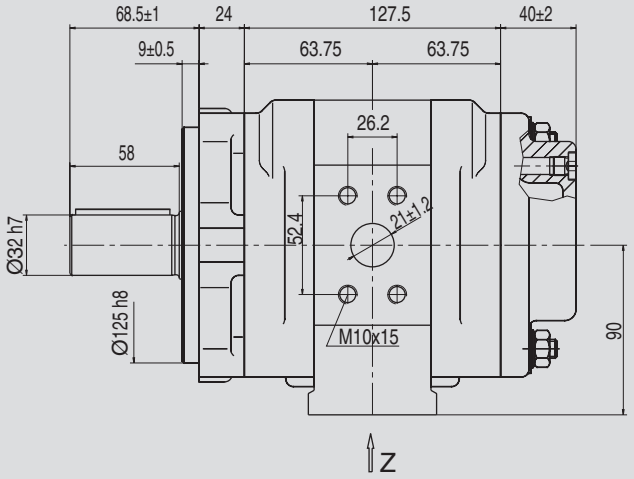


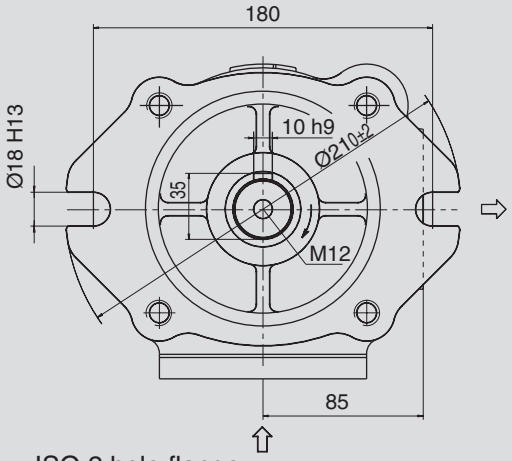
Dimensional drawing IPME 6 standard design





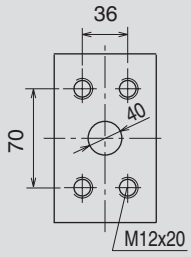
SAE 2 hole flange ⇧





ISO 2 hole flange ⇧

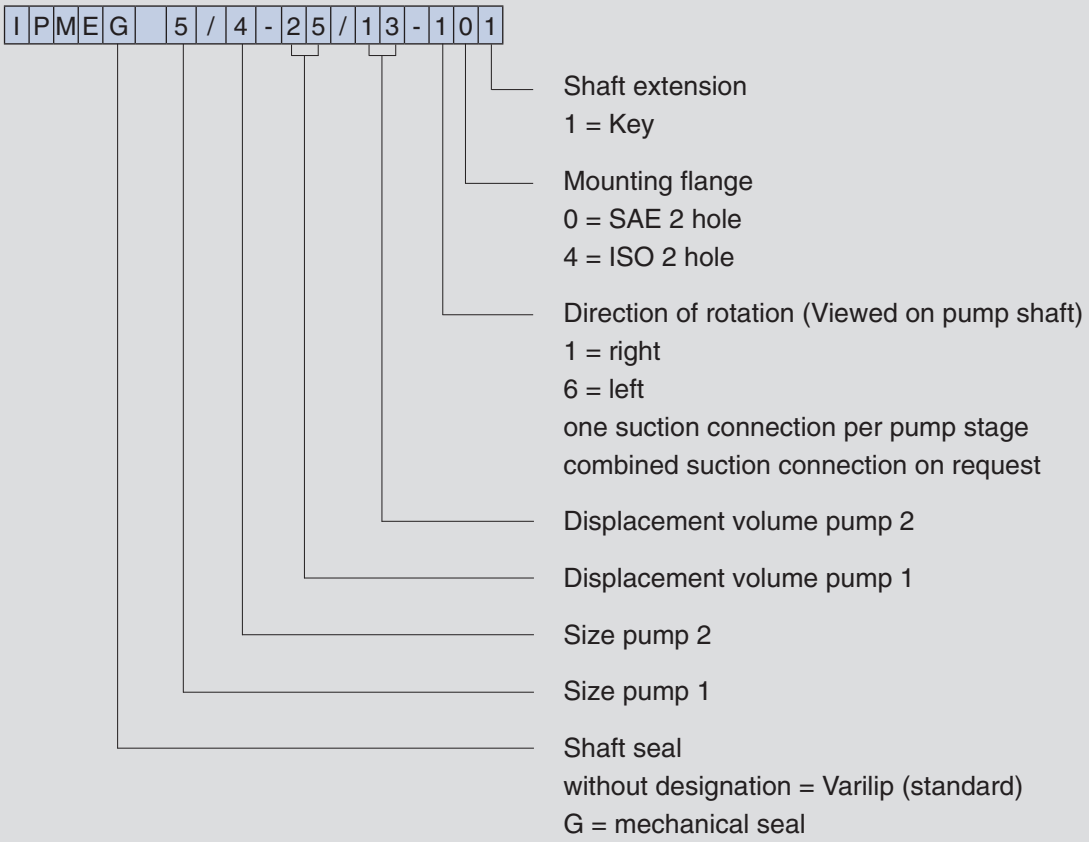
View Z



SAE flange in standard design
G 1½“ for suction connection
G 1“ for pressure connection
please order separetelly

Multiple combinations for greater displacement volumes

Example

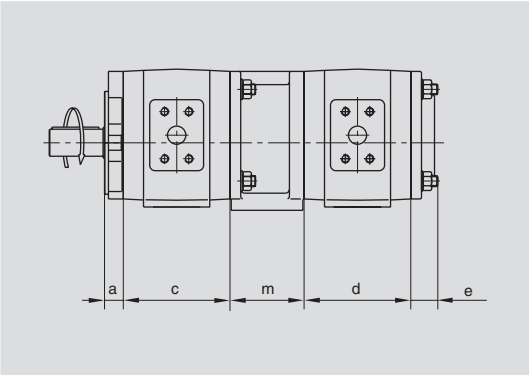


Possible pump combinations

Pump 1 \ Pump 2	IPME 4-13	IPME 5-25	IPME 6-50
IPME 4-13	IPME 4/4-13/13	-	-
IPME 5-25	IPME 5/4-25/13	IPME 5/5-25/25	-
IPME 6-50	IPME 6/4-50/13	IPME 6/5-50/25	IPME 6/6-50/50

Requiered intermediate housing				
IPME 4-13		225	-	-
IPME 5-25		226	227	-
IPME 6-50		228	229	230

Dimensions for calculating total length of pump combinations



Flange thickness “a” primary pump
Length of housing “c”primary pump
Length dimension “m / o” intermediate housing
Length of pump housing “d” B-stage
End cover “e” of the B-stage

Detail dimensions see single pump

The example shows a combination of two pumps.
Combination of three pumps on request.

	a	c	m	d	e
IPME 4/4-13/13	20	87,5	48	87,5	31
IPME 5/4-25/13	26	101	54	87,5	31
IPME 5/5-25/25	26	101	62	101	33,5
IPME 6/4-50/13	24	127,5	63	87,5	31
IPME 6/5-50/25	24	127,5	66	101	33,5
IPME 6/6-50/50	24	127,5	67	127,5	40

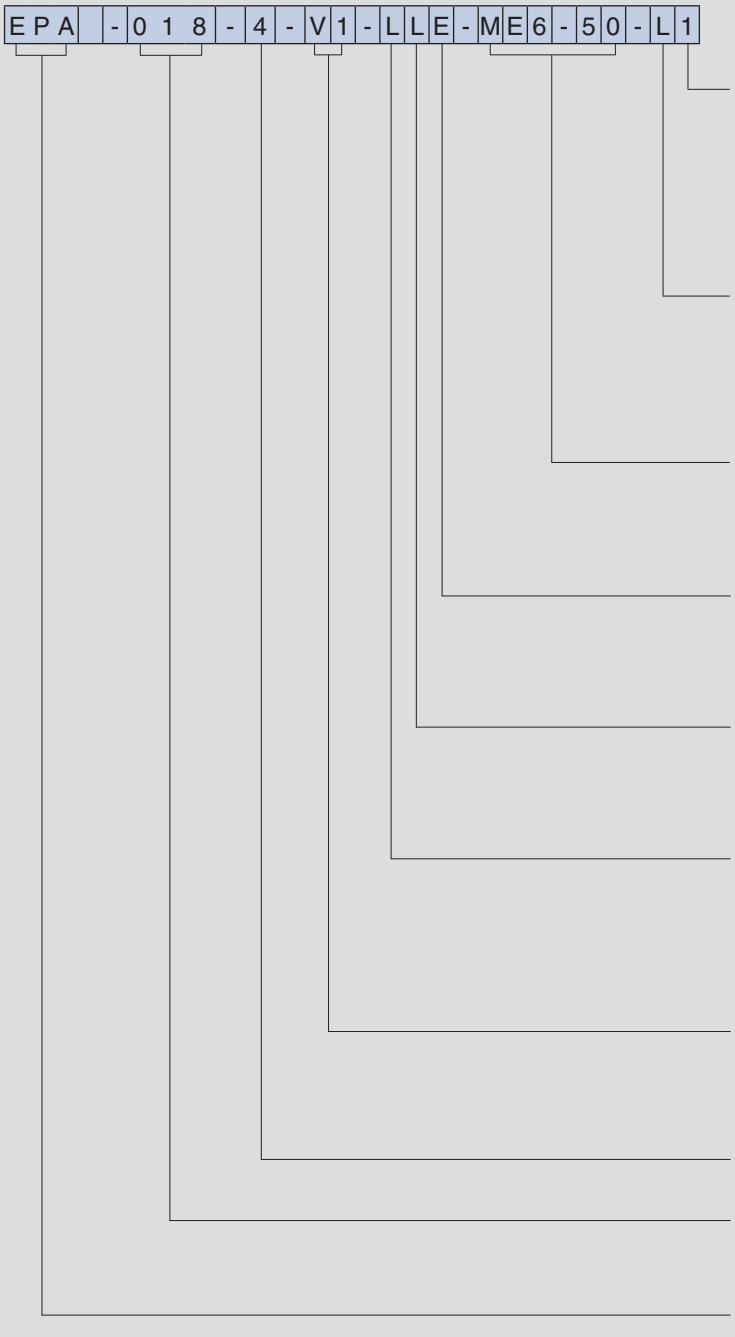
EPA – electric motor pump set

Parameter of the normated motors DIN 42677 at 50 Hz, 1450 min^{-1}

Size	Power	Voith Code	Pump type	Total delivered flow at continuous pressure		Continuous pressure max.	
				<10 cSt	⩾10 cSt	1 cSt	20 cSt
	kW			l/min	l/min	bar	bar
90 S	1,1	1,1	IPME 4	18,6	18,9	25	
90 L	1,5	1,5	IPME 4	18,3	18,7	40	
100 L	2,2	2,2	IPME 4	18,0	18,5	60	
100 L	3,0	3,0	IPME 4	17,6	18,3	80	
			IPME 5	35,2	34,8	50	
112 M	4,0	4,0	IPME 4	17,2	18,0	100	110
			IPME 5	34,6	35,6	55	
			IPME 5/4	53,7	54,7	30	
132 S	5,5	5,5	IPME 4		17,9		120
			IPME 5	33,7	35,1	80	
			IPME 5/4	52,8	54,3	50	
132 M	7,5	7,5	IPME 5	33,0	34,5	100	110
			IPME 5/4	51,8	53,7	70	
			IPME 6	69,2	71,0	55	
			IPME 6/4	88,4	90,3	40	
			IPME 6/5	88,4	90,3	40	
160 M	11	011	IPME 5		34,4		120
			IPME 5/4	50,2	52,8	100	110
			IPME 6	67,2	70,1	80	
			IPME 6/4	86,6	89,3	60	
			IPME 6/5	86,6	89,3	60	
			IPME 6/6	140,7	143,3	35	
160 L	15	015	IPME 5/4		52,3		120
			IPME 6	65,8	69,0	100	110
			IPME 6/4	84,2	88,2	85	
			IPME 6/5	102,0	105,0	70	
			IPME 6/6	139,0	142,6	50	
180M	18,5	018	IPME 6		68,7		120
			IPME 6/4	82,9	87,2	100	105
			IPME 6/5	100,0	105,0	85	
			IPME 6/6	139,0	142,6	65	
180 L	22	022	IPME 6/4		86,6		120
			IPME 6/5	100,0	105,0	85	
			IPME 6/6	134,4	140,2	80	
200 L	30	030	IPME 6/5		103,0		120
			IPME 6/6	131,5	138,0	100	110
225 S			IPME 6/6		137,3		120

Other power, frequency and number of revolutions on request

Type code EPA



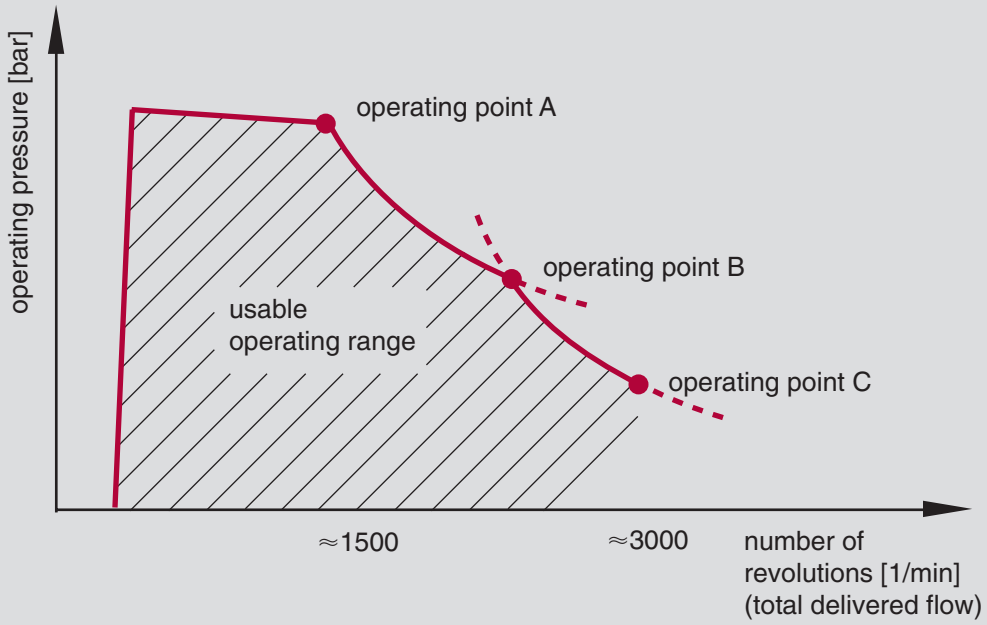
EPA(F) – Electric motor pump set with variable flow

With the help of an additional frequency converter the described electric motor pump units can be operated at variable speed and thus variable delivery. It is possible to use the entire operating range of the electric motor under the motor control given deliveries and/or operating pressures without valve technology.
Two modes of operation are possible:

1. Flow control
The necessary cooling agent quantities are given by machine control. The operating pressure places itself according to the resistances (piping etc.) in the system and dependent on the available torque according to the motor characteristic. Individual pressure phases and maximum pressure must be secured separately with pressure control valves.

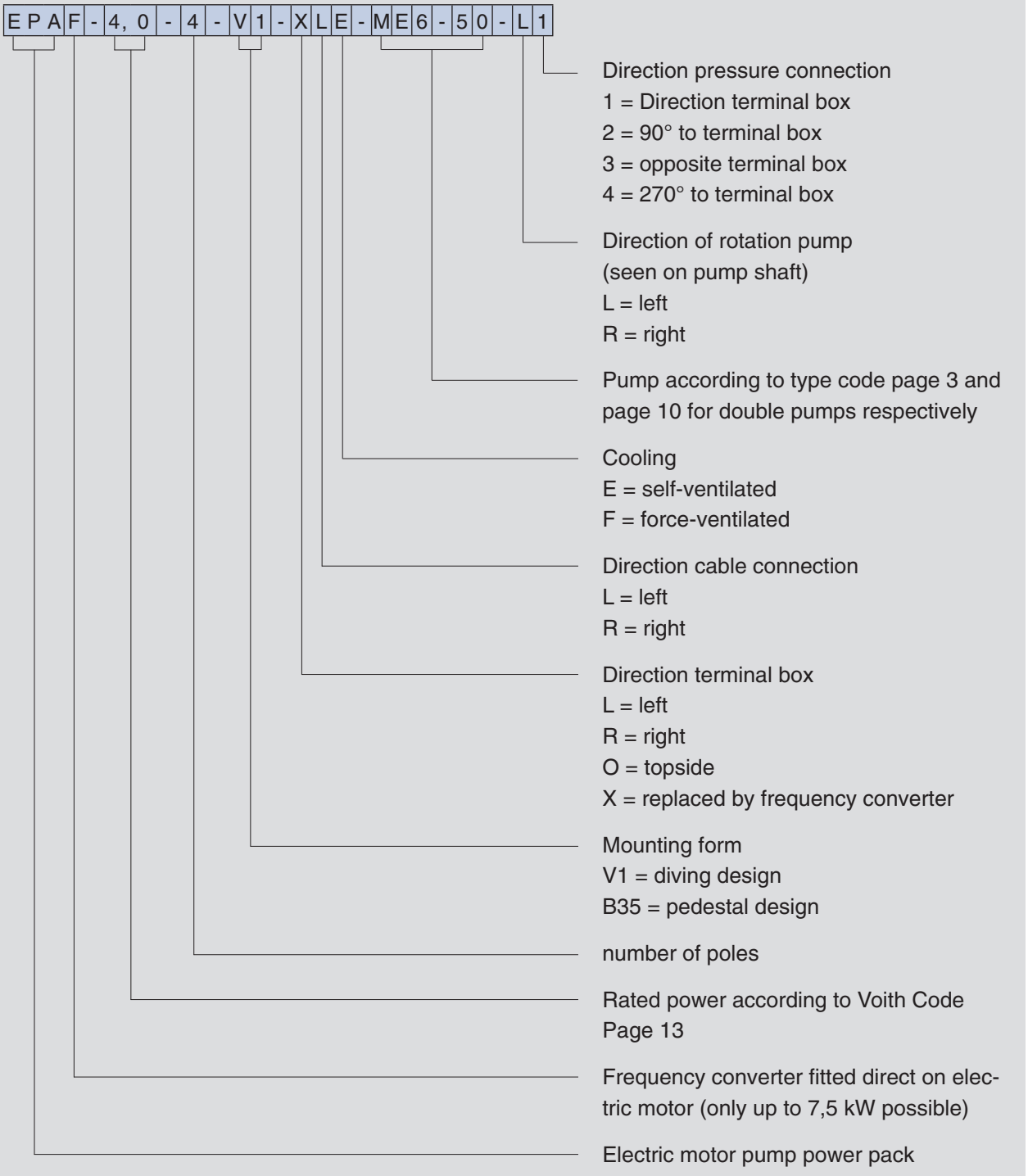
2. Pressure control
The necessary cooling agent pressures are given by machine control. The motor speed is reduced according to the motor characteristic, and/or regulated by frequency changer so that the pressure is held. Pressure control valves for individual pressure phases are not required, a maximum pressure protection is only needed.

Selection diagram for electric motor characteristic curve



Reference values for the operating points A, B and C see tables on the pages 17 to 20.

Type code EPAF



Standard value EPA(F)

EPA-XXX-4-V1-XLE-ME4-13-L1								
IPME 4-13, Vg=13 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 3000 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
1,5	1380	1311	36	16	24	25	11	38
2,2	1410	1340	57	16	38	25	17	37
3,0	1410	1340	82	16	55	24	24	36
4,0	1420	1349	113	16	76	23	34	35
5,5	1430	1359	*158	15	107	22	48	33

EPA-XXX-4-V1-XLE-ME5-25-L1								
IPME 5-25, Vg=25 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 3000 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
3,0	1410	1340	37	32	25	48	11	72
4,0	1420	1349	53	32	36	48	16	71
5,5	1430	1359	77	32	52	46	23	70
7,5	1430	1359	109	31	74	45	33	68
11,0	1465	1392	*161	30	112	43	50	64

*Attention: Please be aware of the admissible continuous pump pressure!

Standard value EPA(F)

EPA-XXX-4-V1-XLE-ME5/4-25/13-L1								
IPME 5/4-25/13, Vg=38 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 3000 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
4,0	1420	1349	31	50	21	74	9	111
5,5	1430	1359	46	49	31	73	14	109
7,5	1430	1359	67	48	46	71	20	107
11,0	1465	1392	102	48	71	69	31	104
15,0	1465	1392	143*	46	99	66	44	99

EPA-XXX-4-V1-XLE-ME6-50-L1								
IPME 6-50, Vg=50 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 2600 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
5,5	1430	1359	32	66	22	98	13	127
7,5	1430	1359	48	66	33	97	19	126
11,0	1465	1392	74	66	52	95	31	123
15,0	1465	1392	106	65	74	93	43	121
18,5	1470	1397	133*	64	93	91	55	118

*Attention: Please be aware of the admissible continuous pump pressure!

Standard value EPA(F)

EPA-XXX-4-V1-XLE-ME6/5-50/13-L1								
IPME 6/5-50/13, Vg=63 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 2600 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
7,5	1430	1359	36	84	24	123	14	161
11	1465	1392	56	85	39	122	23	159
15	1465	1392	81	84	57	120	34	157
18,5	1470	1397	103	83	72	119	42	155
22,0	1470	1397	124*	82	87	118	51	153

EPA-XXX-4-V1-XLE-ME6/5-50/25-L1								
IPME 6/5-50/25, Vg=75 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 2600 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
11,0	1465	1392	46	102	32	147	19	191
15,0	1465	1392	66	101	46	145	27	189
18,5	1470	1397	84	101	59	144	35	188
22,0	1470	1397	103	100	72	143	42	186
30,0	1470	1397	144*	98	101	140	60	182

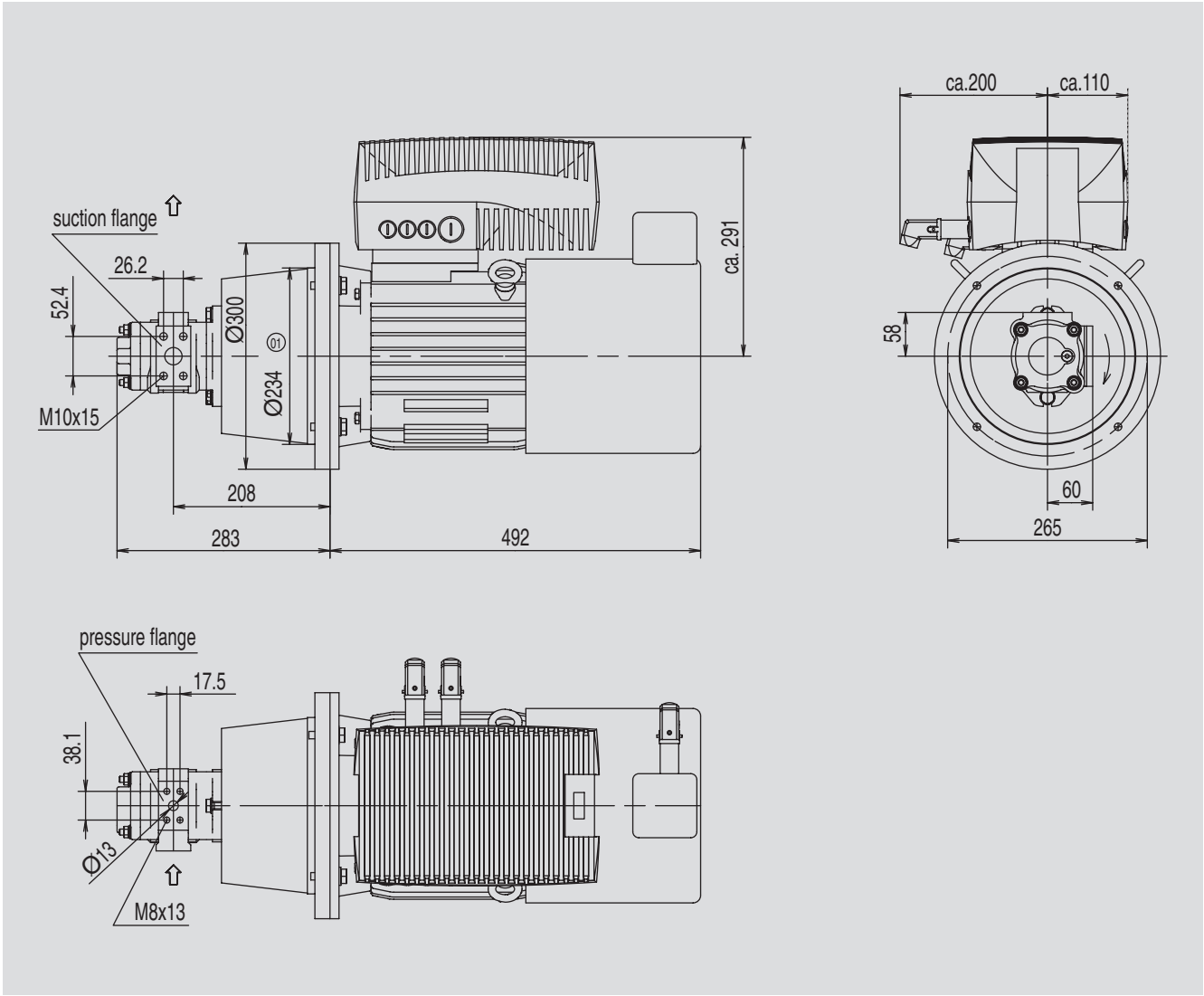
*Attention: Please be aware of the admissible continuous pump pressure!

Standard value EPA(F)

EPA-XXX-4-V1-XLE-ME6/6-50/50-L1								
IPME 6/6-50/50, Vg=100 cm³								
	nominal electric motor speed	voltage factor 0,95	operating point A		operating point B n = ca. 2000 1/min		operating point C n = ca. 2600 1/min	
			p	Q	p	Q	p	Q
kW	1/min	1/min	bar	l/min	bar	l/min	bar	l/min
11,0	1430	1359	32	134	22	198	13	257
15,0	1465	1392	47	137	33	197	19	256
18,5	1465	1392	61	136	42	196	25	255
22,0	1470	1397	74	136	52	195	31	253
30,0	1470	1397	105	135	73	193	43	251
37,0	1470	1397	133*	133	93	191	55	248

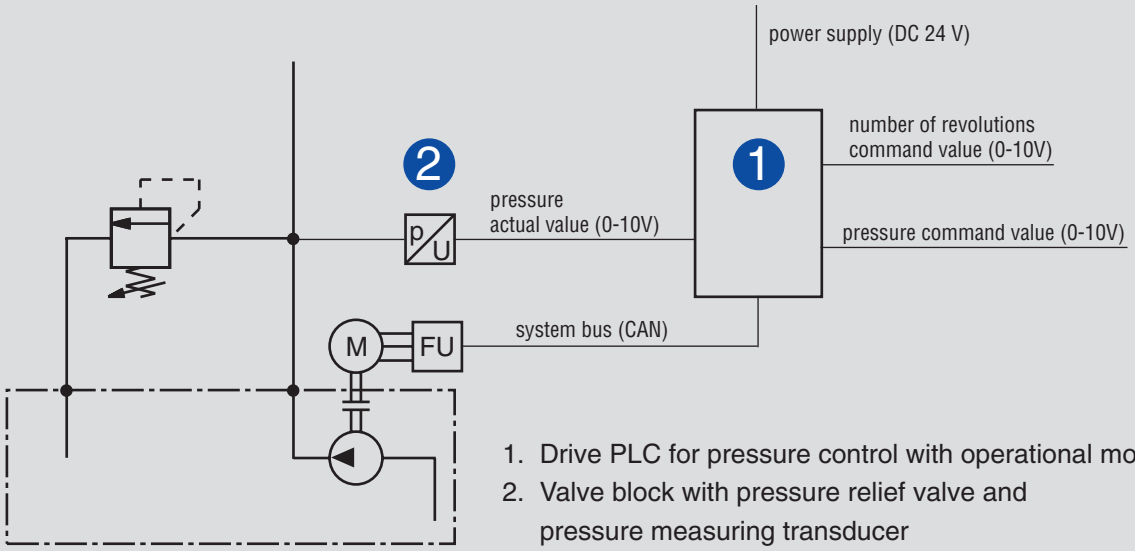
*Attention: Please be aware of the admissible continuous pump pressure!

Design example EPAF 5,5-4-V1-XLF-ME4-13-L1



The direct construction of the frequency static frequency convertor on the electric motor is possible for electric motors from 1,1 kW to 7,5 kW. For this and higher power also separate frequency static frequency convertor for control cabinet installation are available.

Components for pressure control



1. Drive PLC for pressure control with operational module
2. Valve block with pressure relief valve and pressure measuring transducer

Pressure control valves for cooling and lubricating applications

Pipe connection	- see separate data sheet
Flange design for direct mounting on the pump	- see separate data sheet

Voith Turbo H + L Hydraulic GmbH & Co. KG
Schuckertstraße 15
71277 Rutesheim, Germany
Tel. +49 (0)7152/992-3
Fax +49 (0)7152/992-400
sales-rut@voith.com
www.voithturbo.com

VOITH

Engineered reliability.

VTHL IP101 en, MBi, 11/07. Dimensions and illustrations without obligation. Subject to modifcations.