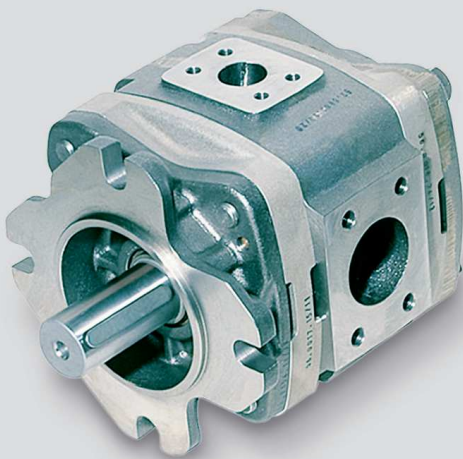
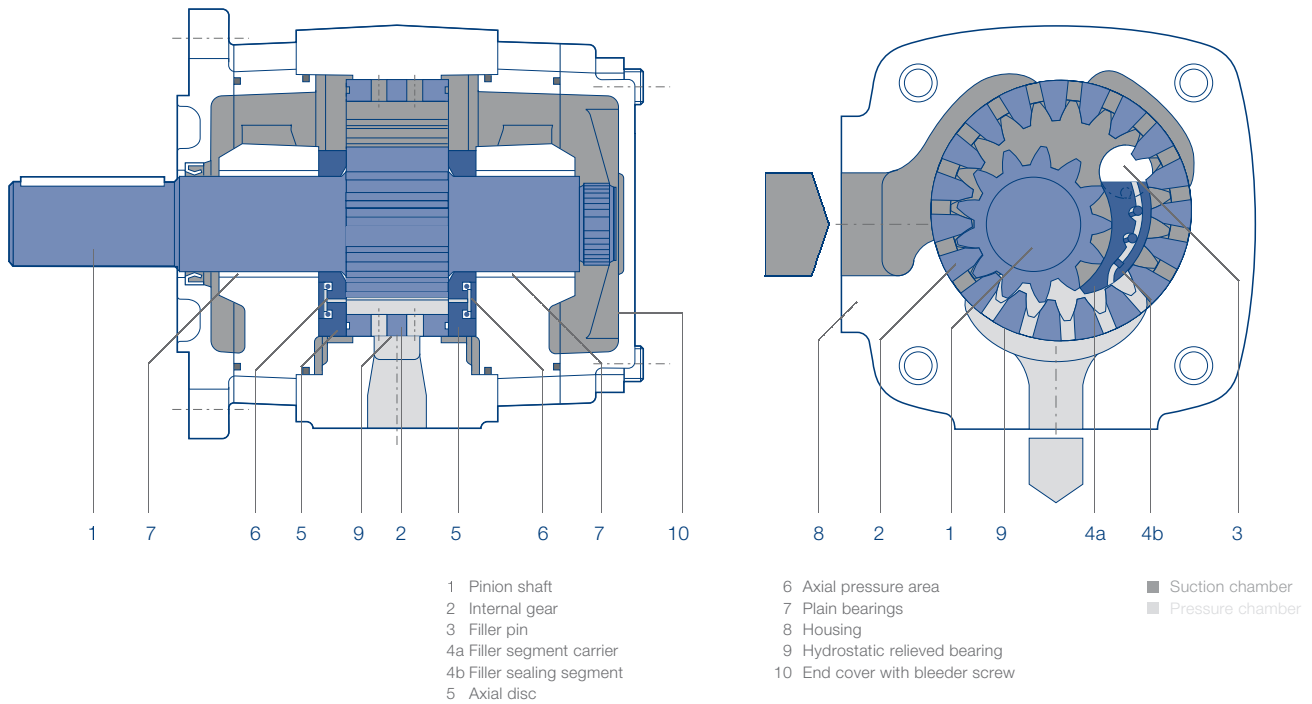


IPC Medium-Pressure Internal Gear Pumps

Technical Data Sheet



Design and Function



Function

Rotation of the gears within the pump draws in the pressure fluid (usually hydraulic oil) into the space between the pinion and internal gear. The two smooth running gears help to ensure excellent intake behavior.

In the radial direction, the gear chambers are sealed by gear meshing and the filler piece. In the axial direction, the axial

plates seal the pressure chamber with the minimal possible gap. This design minimizes volume losses and increases efficiency. When the gears rotate, the pinion teeth enter the gaps between the internal gear teeth and displace the pressure fluid.

Rotation of the gears within the pump draws in the pressure fluid (usually hydraulic oil) into the space between the pinion and internal gear. The two smooth running gears help to ensure excellent intake behavior.

Calculations

Delivery	$Q = V_{gth} \cdot n \cdot \eta_v \cdot 10^{-3} \text{ [l/min]}$
Power	$P = \frac{Q \cdot \Delta p}{600 \cdot \eta_g} \text{ [kW]}$
V_{gth}	Pump volume per revolution [cm^3]
n	Speed [min^{-1}]
η_v	Volumetric efficiency
η_g	Overall efficiency
Δp	Differential pressure [bar]

Technical Data

Design	Internal gear pump with radial and axial sealing gap compensation
Type	IPC
Mounting types	SAE hole flange; ISO 3019/1 oder VDMA hole flange; ISO 3019/2
Line mounting	SAE suction and pressure flange J 518 C code 61
Rotation direction	rechts- oder linksdrehend
Mounting position	any
Shaft load	For details of radial and axial drive shaft loads, please contact your Voith Turbo representative
Input pressure	0,8 ... 3 bar Absolutdruck (bei Start kurzzeitig 0,6 ... 3 bar)
Pressure fluid	HLP Mineralöle nach DIN 51524, Teil 2 oder 3
Viscosity range of the pressure fluid	10 ... 100 mm ² s ⁻¹ (cSt)
Permissible start viscosity	Max. 2 000 mm ² s ⁻¹ (cSt)
Permissible temperature of the pressure fluid	-20 ... +80 °C
Necessary purity of the pressure fluid in accordance with NAS 1638	Class 8
Filtration	Filtration quotient min. $\beta_{20} \geq 75$, recommended $\beta_{10} \geq 100$ (longer service life)
Permissible ambient temperature	-10 ... +60 °C

Characteristics

Type, size- delivery	Displacement per revolution [cm ³]	Speed		Delivery at 1500 min ⁻¹ [l/min]	Pressures within the range $n_{min} \dots n_{max}$	
		min.	max.		Continuous pressure	Peak pressure
		[min ⁻¹]	[min ⁻¹]		[bar]	[bar]
IPC 4 – 20	20,7	400	3 200	31,0	210	250
IPC 4 – 25	25,4	400	3 000	38,1	210	250
IPC 4 – 32	32,6	400	3 000	48,9	210	250
IPC 5 – 40	41,0	400	2 800	61,5	210	250
IPC 5 – 50	50,3	400	2 600	75,4	210	250
IPC 5 – 64	64,9	400	2 600	97,3	210	250
IPC 6 – 80	80,7	400	2 400	121,0	210	250
IPC 6 – 100	101,3	400	2 200	151,9	210	250
IPC 6 – 125	126,2	400	2 200	189,3	210	250
IPC 7 – 160	160,8	400	2 000	241,2	210	250
IPC 7 – 200	202,7	400	1 800	304,0	210	250
IPC 7 – 250	251,7	400	1 800	377,5	210	250

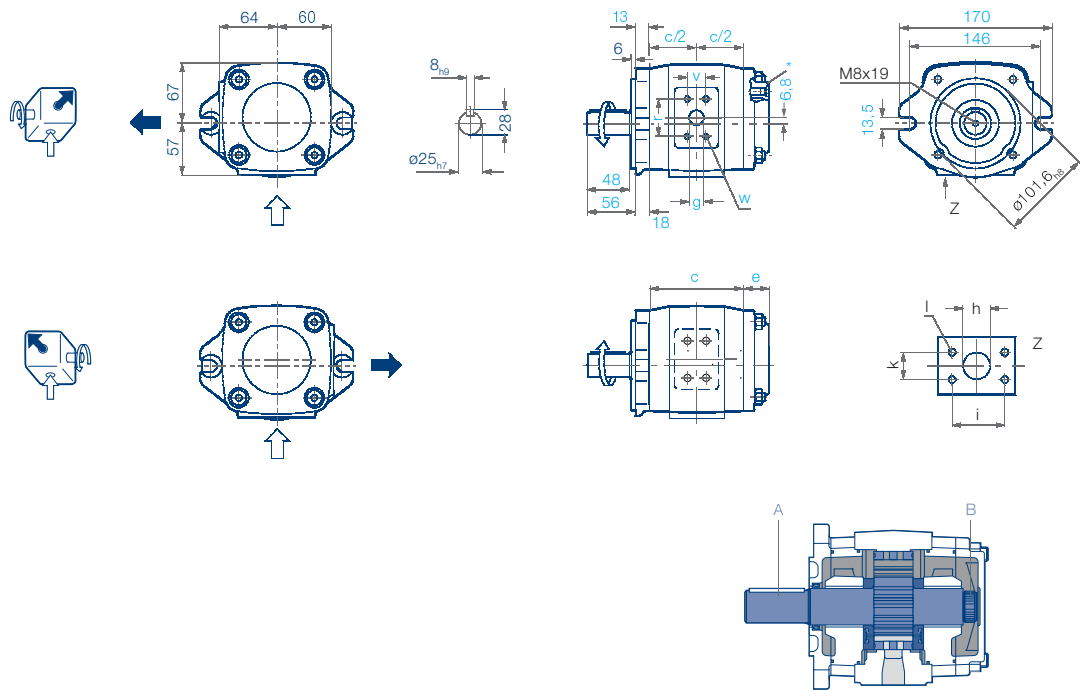
The values given apply for:

- Pumping of mineral oils with a viscosity of 20...40 mm²s⁻¹
- An input pressure of 0.8...3.0 bar absolute.

Notes:

- Peak pressures apply for 15% of operating time and a maximum cycle time of 1 minute.
- Please enquire about pressures lower than n_{min} .
- Due to production tolerances, the pump volume may be approx. 1.5 % lower.

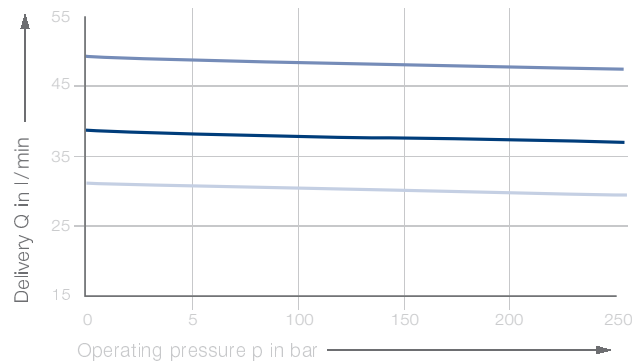
IPC Standard design 4, Rotation and Dimensions



Type / Delivery	Dimensions and Weight											SAE flange no.	
	c	e	g	h	i	k	l	r	v	w	Weight	↑	↓
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPC 4 – 20	98	31	18	27	58,7	30,2	M10x15	47,5	22	M10x15	9,6	11	13
IPC 4 – 25	104	31	18	30	58,7	30,2	M10x15	47,5	22	M10x15	10,2	11	13
IPC 4 – 32	113	31	18	32	58,7	30,2	M10x15	47,5	22	M10x15	11,0	11	13

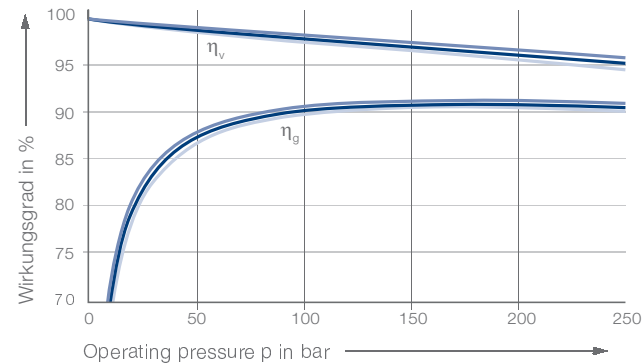
* The plug screw must be closed during operation. Ensure the M10x1 plug screw, hexagon socket SW5, is tightened to a torque of 10 Nm. Depending on the pump position, filling or ventilation is possible with the M10x1 plug screw prior to commissioning.

Delivery Q



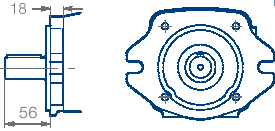
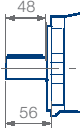
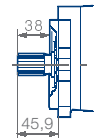
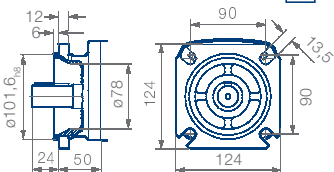
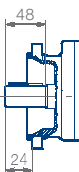
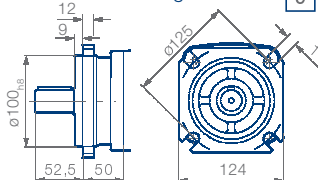
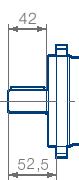
Note:
Measurement taken in a low-noise room.
In an anechoic room, the measurements are approx. 5 dB(A) lower.

Efficiency η_v and η_g



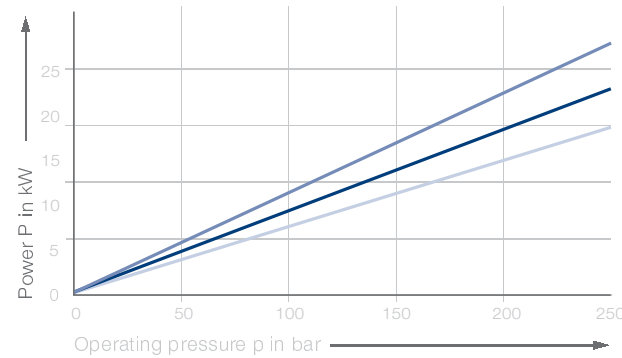
Measurement conditions:
Speed: 1500 min⁻¹ / Viscosity of pressure fluid:
46 mm²s⁻¹ / Operating temperature: 40 °C

IPC standard design 4, Designs

Type	Pump sizes	Rotation, suction connection	Mounting flange	Shaft end
IPC 4	20 25 32	Standard		
		Clockwise rotation, radial suction port	SAE-2-hole-flange, dimensions on left	Parallel shaft with keyway connection, dimensions on left
				
		Variants		
		Anti-clockwise rotation, radial suction port		Involute gearing with 2-hole SAE flange
				
				ANSI B92.1a 13T 16/32 DP 30°
			SAE 4-hole flange	
				
			VDMA 4-hole flange	
				

Designation according to type code Type code/order designation, see page 17

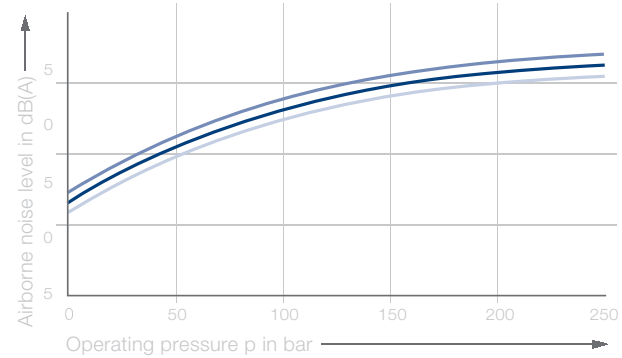
Input power P



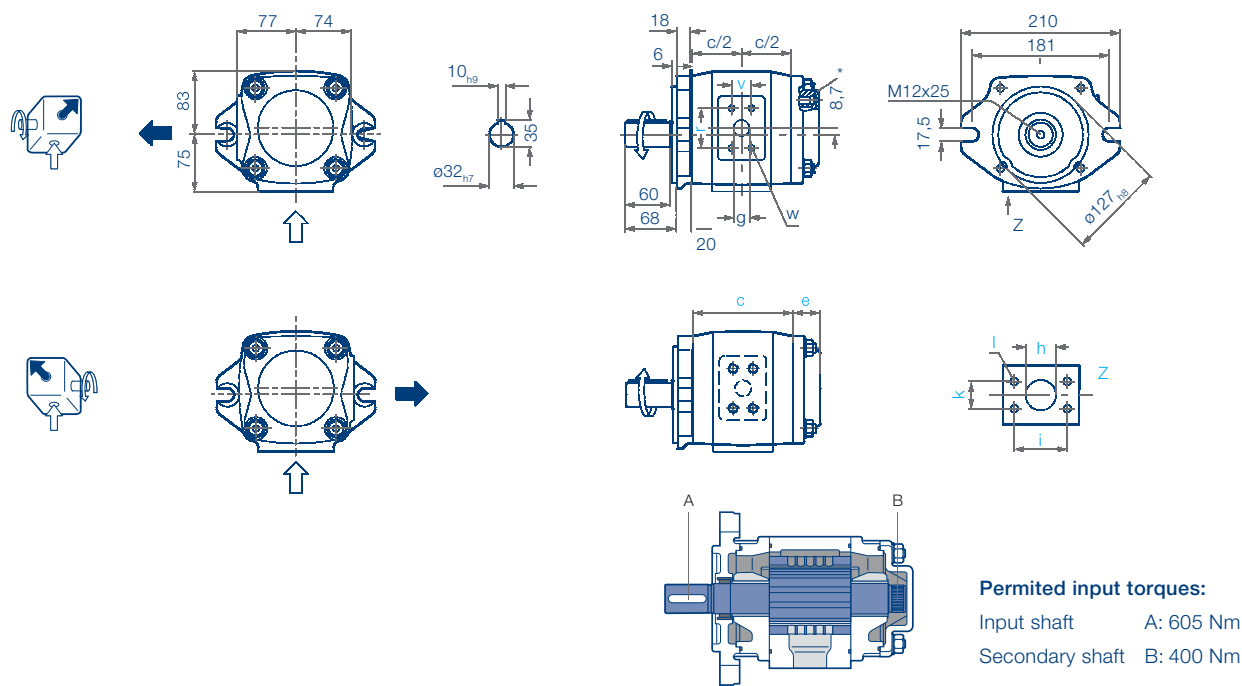
Characteristic curves:

IPC 4 - 20 IPC 4 - 25 IPC 4 - 32

Airborne noise level (Measurement site 1 m axial)



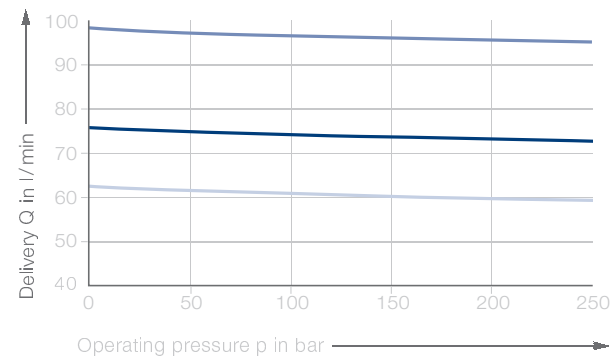
IPC Standard design 5, Rotation and Dimensions



Type / Delivery	Dimensions and Weight											SAE flange no.	
	c	e	g	h	i	k	l	r	v	w	Weight	↑	↓
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPC 5 – 40	125	36	19	35	70	36	M12x20	52,4	26,2	M10x15	16,3	12	30
IPC 5 – 50	132	36	21	40	70	36	M12x20	52,4	26,2	M10x15	17,4	12	30
IPC 5 – 64	163	36	23	40	70	36	M12x20	52,4	26,2	M10x16	18,7	12	30

* The plug screw must be closed during operation. Ensure the M10x1 plug screw, hexagon socket SW5, is tightened to a torque of 10 Nm. Depending on the pump position, filling or ventilation is possible with the M10x1 plug screw prior to commissioning.

Delivery Q

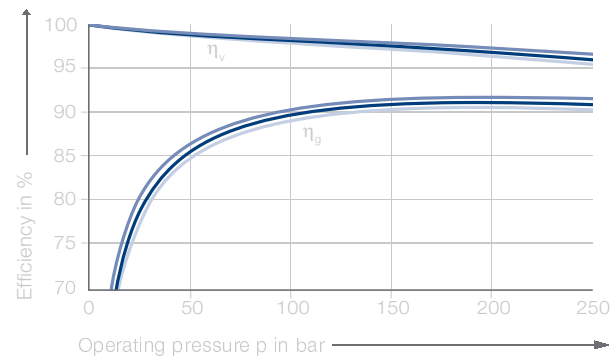


Note:

Measurement taken in a low-noise room.

In an anechoic room, the measurements are approx. 5 dB(A) lower.

Efficiency η_v and η_g

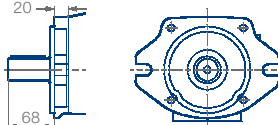
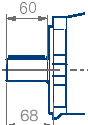
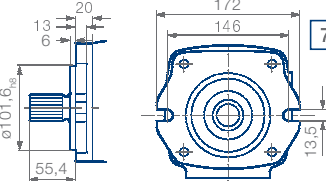
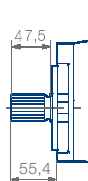
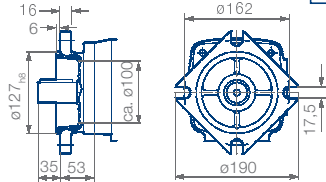
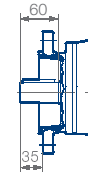
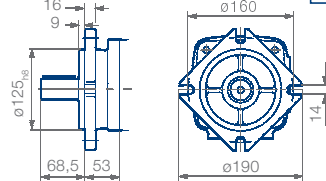
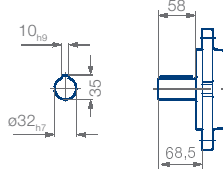


Measurement conditions:

Speed: 1500 min⁻¹ / Viscosity of pressure fluid: 46 mm²s⁻¹ /

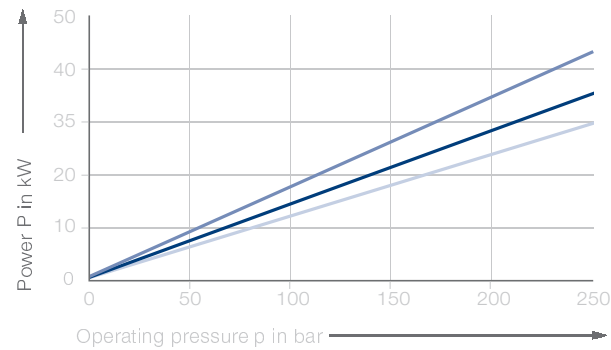
Operating temperature: 40 °C

IPC Standard design 5, Designs

Type	Pump sizes	Rotation, suction connection	Mounting flange	Shaft end
IPC 5	40 50 64	Standard		
		Clockwise rotation, radial suction port	SAE 2-hole flange, dimensions on left	Parallel shaft with keyway connection, dimensions on left
				
		Anti-clockwise rotation, radial suction port	SAE 2-hole flange, variant	Involute gearing
				
			SAE 4-hole flange	
				
			VDMA 4-hole flange	
				

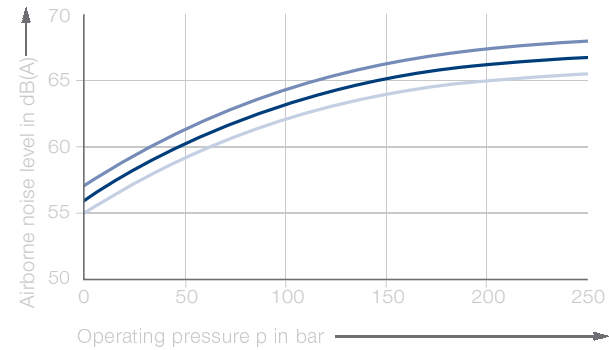
Designation according to type code Type code/order designation, see page 17

Input power P

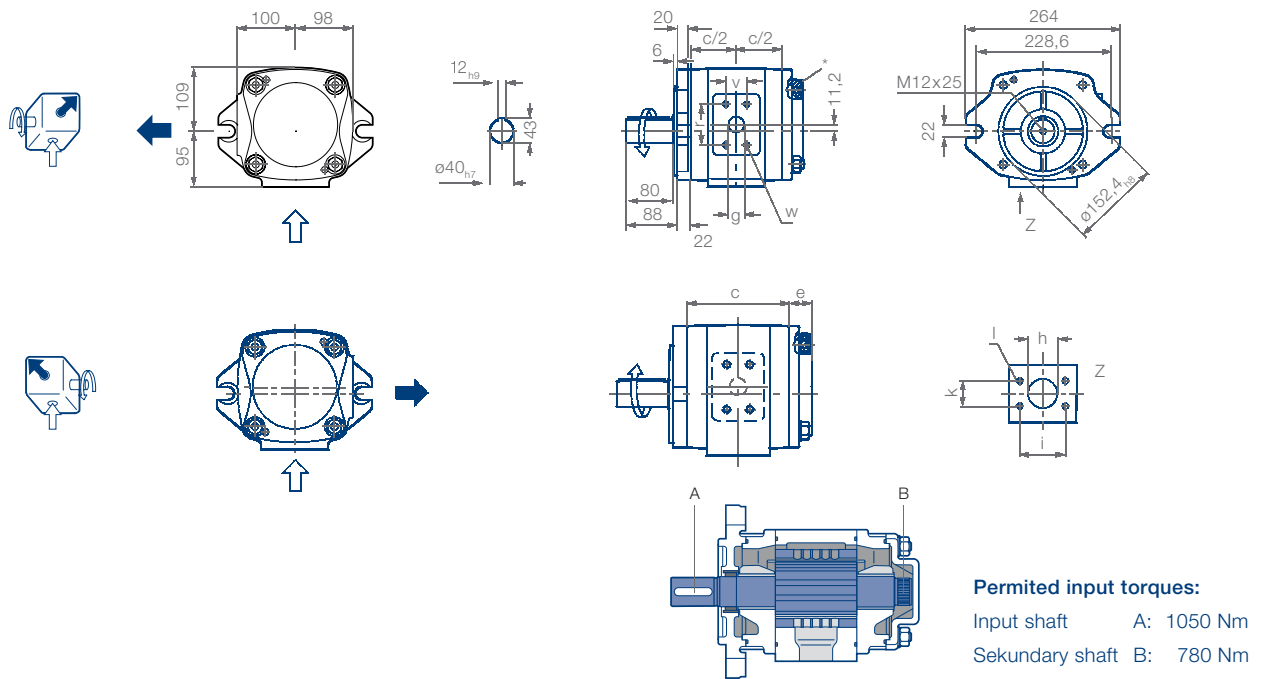


Characteristic curves:
IPC 5 - 40 IPC 5 - 50 IPC 5 - 64

Airborne noise level (Measurement site 1 m axial)



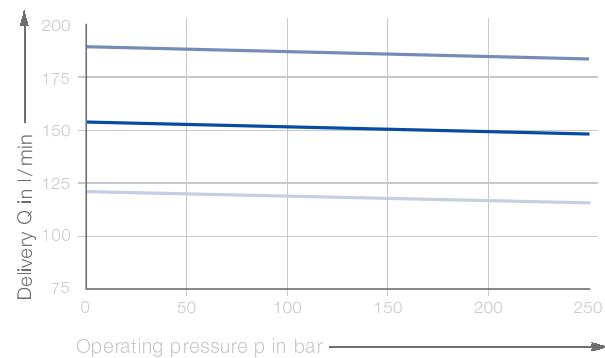
IPC Standard design 6, Rotation and Dimensions



Type / Delivery	Dimensions and Weight										SAE flange no.		
	c	e	g	h	i	k	l	r	v	w	Weight		
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPC 6 – 80	148	35	23	45	77,8	42,9	M12x20	70	36	M12x20	30,7	14	15
IPC 6 – 100	158	35	27	50	77,8	42,9	M12x20	70	36	M12x20	32,6	14	15
IPC 6 – 125	170	40	30	50	77,8	42,9	M12x20	70	36	M12x20	35,0	14	15

* The plug screw must be closed during operation. Ensure the M10x1 plug screw, hexagon socket SW5, is tightened to a torque of 10 Nm. Depending on the pump position, filling or ventilation is possible with the M10x1 plug screw prior to commissioning.

Delivery Q

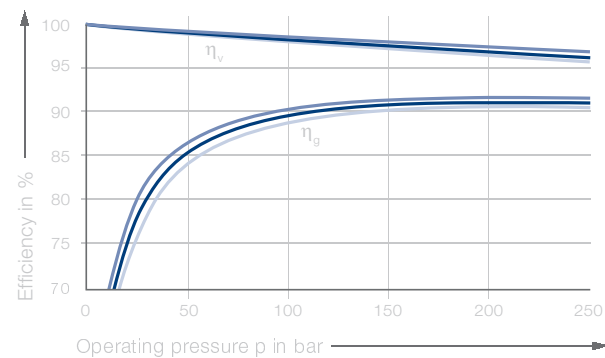


Notes:

Measurement taken in a low-noise room.

In an anechoic room, the measurements are approx. 5 dB(A) lower.

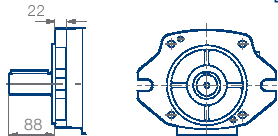
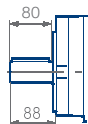
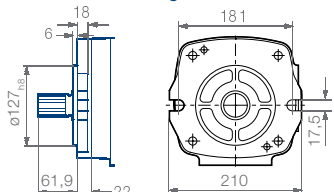
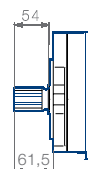
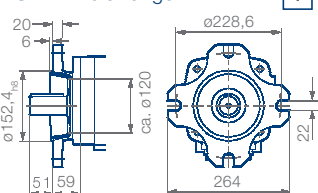
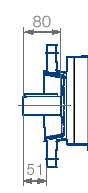
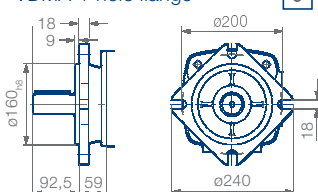
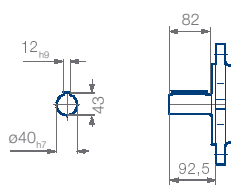
Efficiency η_v and η_g



Measurement conditions:

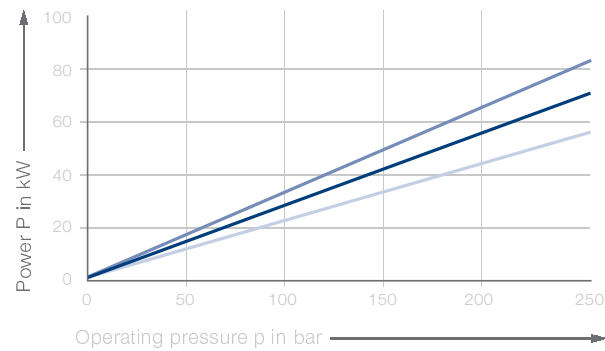
Speed: 1500 min⁻¹ / Viscosity of pressure fluid: 46 mm²s⁻¹ / Operating temperature: 40 °C

IPC Standard design 6, Designs

Type	Pump sizes	Rotation, suction connection	Mounting flange	Shaft end
IPC 6	80 100 125	Standard		
		Clockwise rotation, radial suction port	SAE 2-hole flange, dimensions on left	Parallel shaft with keyway connection, dimensions on left
				
	Variants	Anti-clockwise rotation, radial suction port	SAE 2-hole flange, variant	Involute gearing
				
			SAE 4-hole flange	
				
			VDMA 4-hole flange	
				

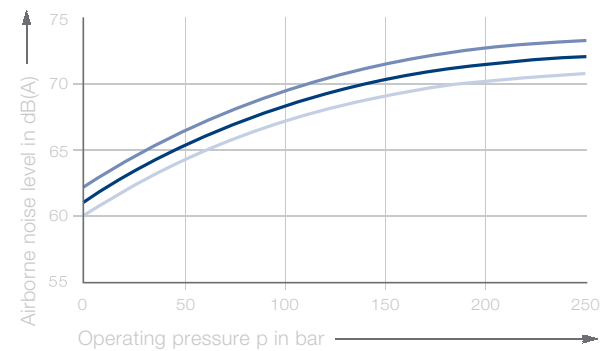
□ Designation according to type code Type code /order designation, see page 17

Input power P

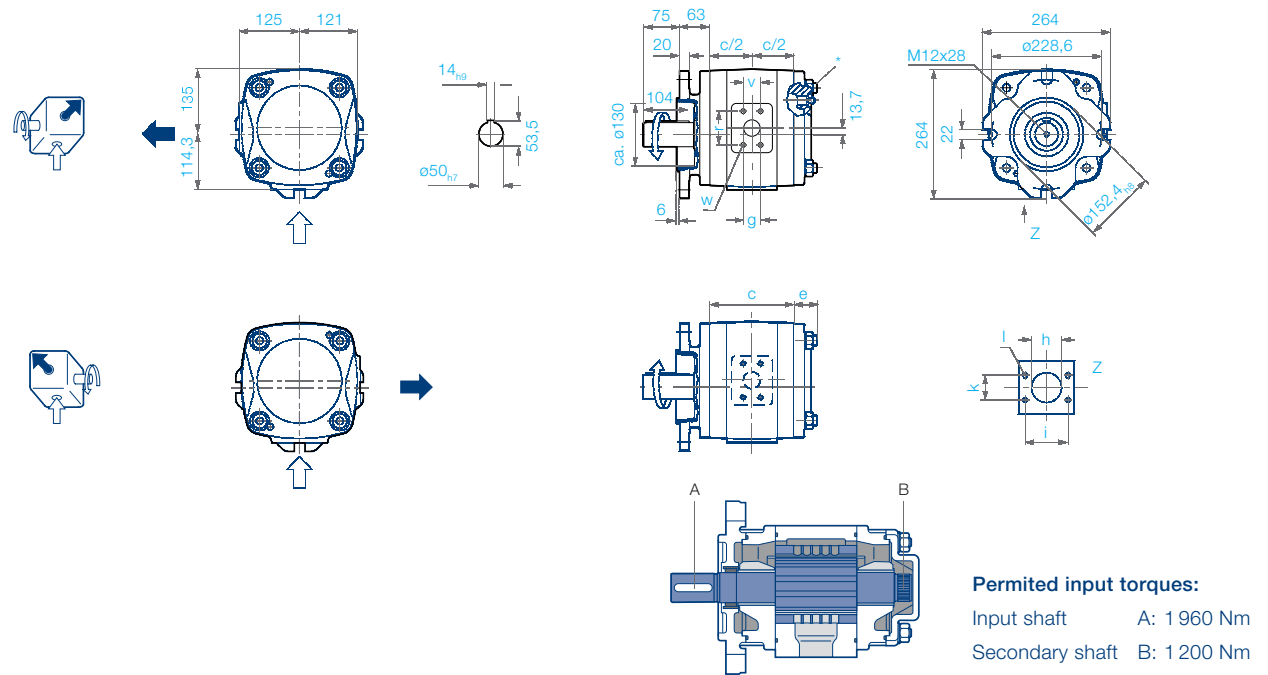


Characteristic curves:
— IPC 6 – 80 — IPC 6 – 100 — IPC 6 – 125

Airborne noise level (Measurement site 1 m axial)



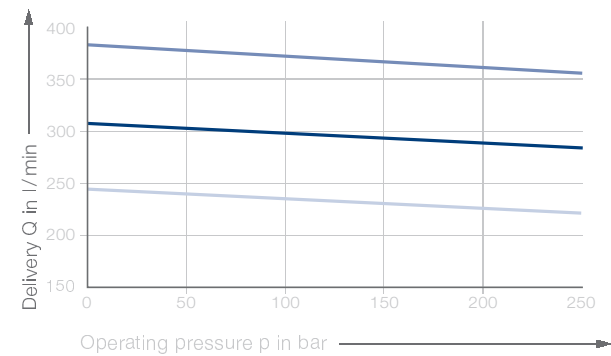
IPC Standard design 7, Rotation and Dimensions



Type / Delivery	Dimensions and Weight										SAE flange no.		
	c	e	g	h	i	k	l	r	v	w	Weight	⬆	⬇
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPC 7 – 160	162	48	30	56	89	50,8	M12x20	70	36	M12x20	50	14	16
IPC 7 – 200	174	46	34	62	89	50,8	M12x20	70	36	M12x20	54	14	16
IPC 7 – 250	188	42	38	72	106,3	62	M16x25	70	36	M12x20	59	14	16

* The plug screw must be closed during operation. Ensure the M10x1 plug screw, hexagon socket SW5, is tightened to a torque of 10 Nm. Depending on the pump position, filling or ventilation is possible with the M10x1 plug screw prior to commissioning.

Delivery Q

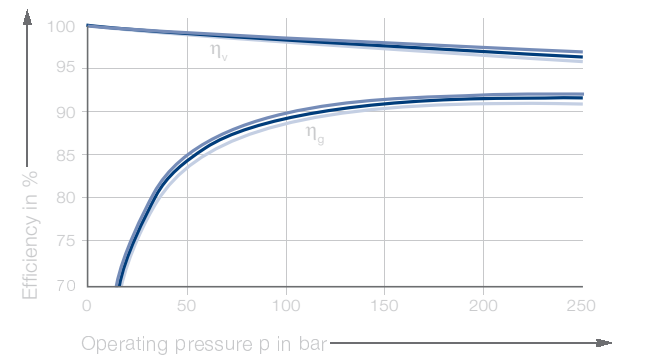


Notes:

Measurement taken in a low-noise room.

In an anechoic room, the measurements are approx. 5 dB(A) lower.

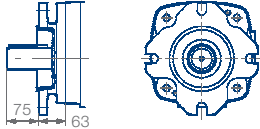
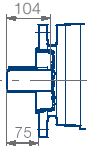
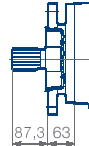
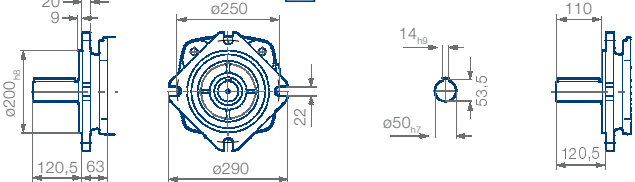
Efficiency η_v and η_g



Measurement conditions:

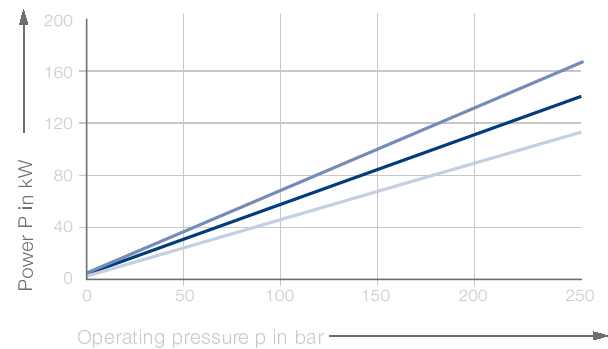
Speed: 1500 min⁻¹ / Viscosity of pressure fluid: 46 mm²s⁻¹ / Operating temperature: 40 °C

IPC Standard design 7, Designs

Type	Pump sizes	Rotation, suction connection	Mounting flange	Shaft end
IPC 7	160 200 250	Standard		
		Clockwise rotation, radial suction port	SAE 4-hole flange, dimensions on left	Parallel shaft with keyway connection, dimensions on left
				
			1	1
		Variants		
		Anti-clockwise rotation, radial suction port		Involute gearing with 4-hole SAE flange
				
			6	0
			VDMA 4-hole flange	
				
			5	1
				0

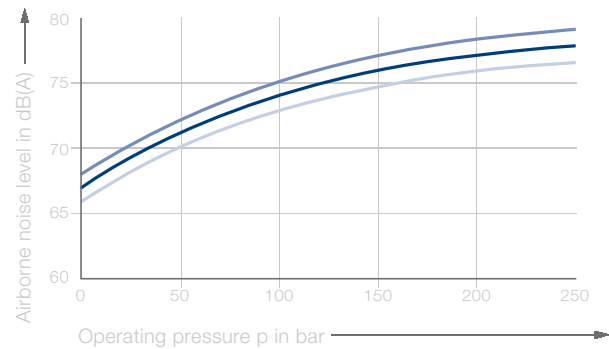
Designation according to type code Type code /order designation, see page 17

Input power P

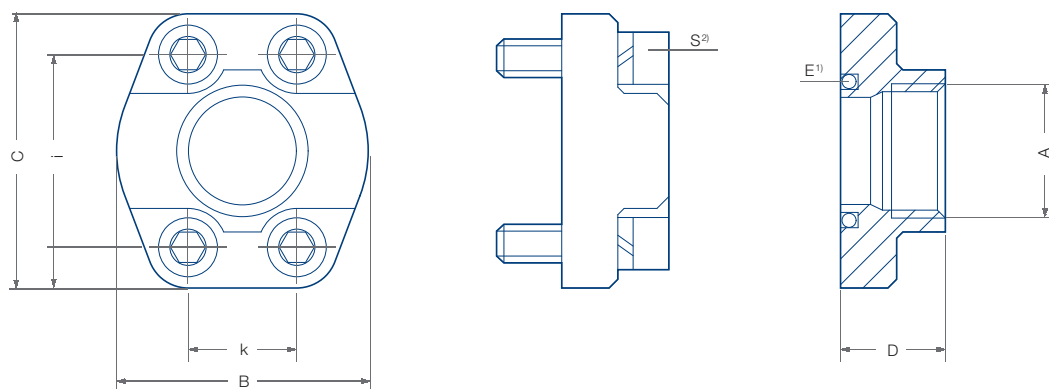


Characteristic curves:
— IPC 7 – 160 — IPC 7 – 200 — IPC 7 – 250

Airborne noise level (Measurement site 1 m axial)



Suction and pressure flanges SAE J 518 C code 61, single-piece



Wrench torque for screws according to ISO 6162

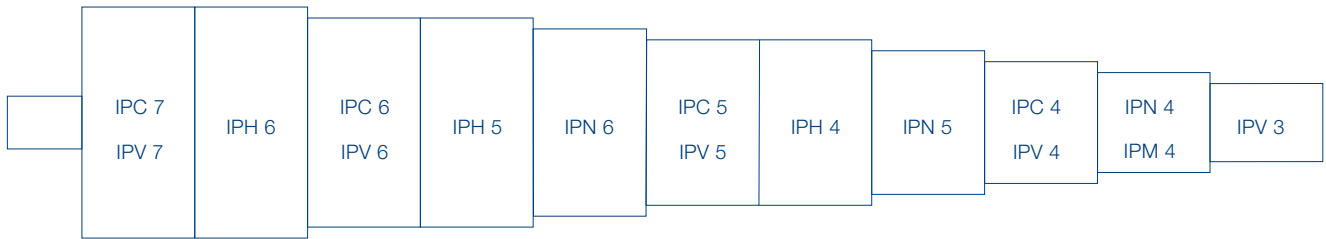
¹⁾ Round seal ring (O-ring) ISO-R 1629 NBR

²⁾ Machine screw EN ISO 4762

³⁾ Special design, deviating from SAE J 518 C code 61

SAE flange no.	A	B	C	D	E ¹⁾	i	k	S ²⁾	max. pressure
	Thread	[mm]	[mm]	[mm]	Seal ring	[mm]	[mm]	Thread	[bar]
10	G ½	46	54	36	18,66 – 3,33	38,1	17,5	M 8	345
11	G ¾	50	65	36	24,99 – 3,53	47,6	22,2	M 10	345
12	G 1	55	70	38	32,92 – 3,53	52,4	26,2	M 10	345
13	G 1-¼	68	79	41	37,69 – 3,53	58,7	30,2	M 10	276
14 ³⁾	G 1-½	82	98	50	47,22 – 3,53	70	36	M 12	345 ³⁾
30	G 1-½	78	93	45	47,22 – 3,53	70	36	M 12	207
15	G 2	90	102	45	56,74 – 3,53	77,8	42,9	M 12	207
16	G 2-½	105	114	50	69,44 – 3,53	89	50,8	M 12	172
17	G 3	124	134	50	85,32 – 3,53	106,3	62	M 16	138
18	G 4	146	162	48	110,72 – 3,53	130	77,8	M 16	34

Multi-flow pumps, pump combinations, pump combinations in order of type and size



Combinations of IPC pumps

- IPC pumps of identical or different sizes can be combined to form multi-flow pumps.
- All sizes with each displacement
- are available as two or three-flow pumps; four-flow pumps must be designed by Voith Turbo.
- The pumps are arranged in increasing order according to size and delivery.

Selection

1. Identify the pressure ranges and then choose the appropriate pump series.
2. Identify the deliveries, and then select the appropriate size(s).
3. Define the sequence of the pumps.
4. Check the torque.
5. Determine the direction of rotation and suction.
6. Specify the mounting flange and shaft end.

Combination of IPC/IP... pumps

- It is possible to combine IPC pumps with other Voith Turbo pump series (e.g. high-pressure pumps IPV or low-pressure pumps IPN).
- The pumps are arranged by type and size, as shown in the illustration above.
- If identical types or identical sizes follow each other, the pump with the higher pump flow is placed closer to the drive.

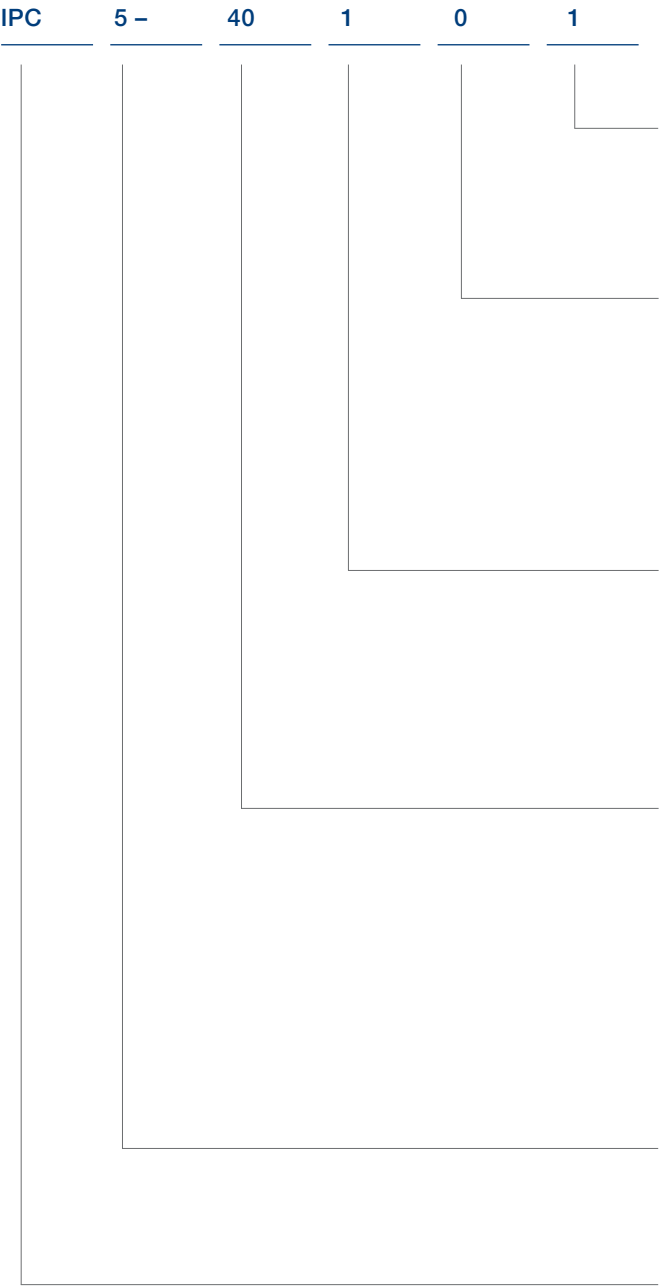
Connection, assembly

- As a rule, multi-flow pumps are mounted to the drive using a flange. All information on flange designs and shaft ends is contained in the relevant pump series catalog.
- For further relevant information, such as how to determine the adapter housing, see brochure No. G 1714 (Voith Multi-Flow Pumps).

Designs

Rotation and suction			Mounting flange			Shaft end		
clockwise		anti-clockwise						
	2	7						
	1	6	0	1	1	1	0	
	2	7	4	5	5			
	1	6	7	For designs and dimensions, see catalog for the relevant pump series.			For designs and dimensions, see catalog for the relevant pump series.	
	3	8						
	3	8	0	SAE 2- hole flange				
			1	SAE 4-hole flange				
			4	VDMA 2-hole flange				
			5	VDMA 4-hole flange				
			7	SAE 2-hole flange (variant)				
Special design	4	9	Special design					

Type code



- Shaft end**
0 Splined gear shaft ANSI B92.1a
1 Parallel shaft with keyway
- Mounting flange**
0 SAE 2-hole
1 SAE 4-hole
4 VDMA 2-hole
5 VDMA 4-hole
7 SAE-2-hole, variant
- Rotation, suction port**
1 Clockwise rotation, radial suction port
6 Anti-clockwise rotation, radial suction port
4 Clockwise rotation, special design
9 Anti-clockwise rotation, special design
- Delivery**
- | Sizes | Available deliveries | | |
|-------|----------------------|-----|-----|
| 4 | 20 | 25 | 32 |
| 5 | 40 | 50 | 64 |
| 6 | 80 | 100 | 125 |
| 7 | 160 | 200 | 250 |
- Sizes**
- Type of internal gear pump**

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Voith Turbo H+L Hydraulic GmbH & Co. KG
Schuckertstraße 15
71277 Rutesheim, Germany
Tel. +49 7152 992 3
Fax +49 7152 992 4 00
sales-rut@voith.com
www.voith.com/hydraulic-systems

