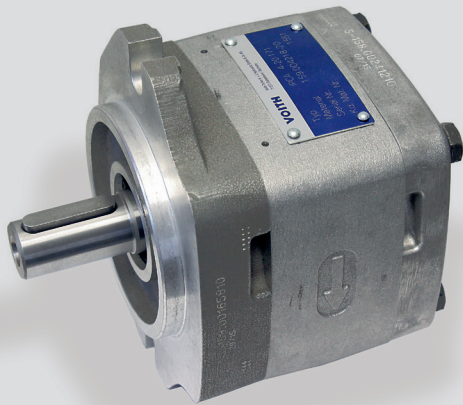
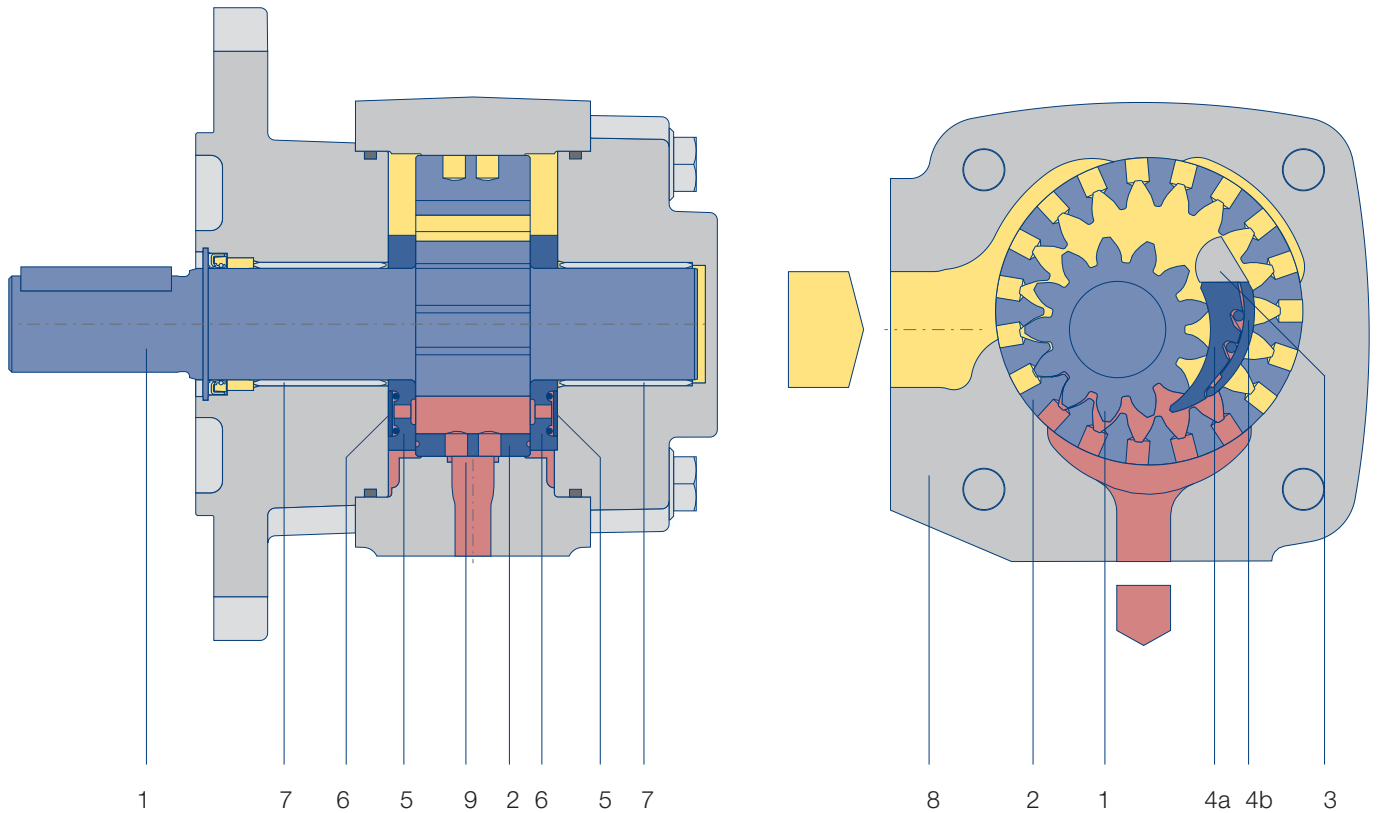


# IPCA Medium-pressure Internal Gear Pumps Technical Data Sheet



## Design and Function



- |                           |                       |
|---------------------------|-----------------------|
| 1 Pinion shaft            | 6 Axial pressure area |
| 2 Internal gear           | 7 Plain bearings      |
| 3 Filler pin              | 8 Housing             |
| 4a Filler segment carrier | 9 Hydrostatic bearing |
| 4b Filler sealing segment |                       |
| 5 Axial disc              |                       |

- Suction chamber
- Pressure chamber

## Function

By rotation of the gears inside the pump, the pressure fluid (usually hydraulic oil) is drawn into the cavity between the pinion and internal gear. Optimized cross-sectional areas on suction side as well as on pressure side allow operation over a wide range of speed.

In the radial direction, the gear chambers are closed 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.

## Technical Data

Design	Internal gear pump with radial and axial sealing gap compensation
Type	IPCA
Mounting types	SAE hole flange; ISO 3019/1
Line mounting	SAE suction and pressure flange J 518 C Code 61
Sense of rotation	Right hand rotation
Mounting position	any
Shaft load	For details of radial and axial drive shaft loads please contact your Voith Turbo H + L Hydraulic representative
Input pressure	0.8...3 bar absolute pressure (at start up for short time 0.6 bar)
Pressure fluid	HLP mineral oils DIN 51524, part 2 or 3
Viscosity range of the pressure fluid	10...300 mm <sup>2</sup> s <sup>-1</sup> (cSt)
Permissible start viscosity	max. 2000 mm <sup>2</sup> s <sup>-1</sup> (cSt)
Permissible temperature of the pressure fluid	-10 ... +80 °C
Required purity of the pressure fluid according to NAS 1638	Class 20 / 18 / 15 (ISO 4406), Class 9 (NAS 1638)
Filtration	Filtration quotient min. $\beta_{20} \geq 75$ , recommended $\beta_{10} \geq 100$ (longer life)
Permissible ambient temperature	-10 ... +60 °C

## Calculations

Pump flow	$Q = V_{g\ th} \cdot n \cdot \eta_v \cdot 10^{-3}$ [l/min]
Power	$P = \frac{Q \cdot \Delta p}{600 \cdot \eta_g}$ [kW]
$V_{g\ th}$	Pump volume per revolution [cm <sup>3</sup> ]
n	Speed [min <sup>-1</sup> ]
$\eta_v$	Volumetric efficiency
$\eta_g$	Overall efficiency
$\Delta p$	Differential pressure [bar]

## Characteristics

	Displacement per revolution [cm <sup>3</sup> ]	Rotation speed		Delivery rate at 1500 min <sup>-1</sup> [l/min]	Continuous pressure [bar]	Peak pressure at 1500 min <sup>-1</sup> [bar]	Moment of inertia [kg cm <sup>2</sup> ]
		min. [min <sup>-1</sup> ]	max. [min <sup>-1</sup> ]				
<b>IPCA 3</b> – 3.5	3,6	400	3 600	5,4	210	250	0,34
IPCA 3 – 5	5,2	400	3 600	7,8	210	250	0,42
IPCA 3 – 6.3	6,4	400	3 600	9,6	210	250	0,49
IPCA 3 – 8	8,2	400	3 600	12,3	210	250	0,58
IPCA 3 – 10	10,2	400	3 600	15,3	210	250	0,70
<b>IPCA 4</b> – 13	13,3	400	3 600	19,9	210	250	2,25
IPCA 4 – 16	15,8	400	3 400	23,7	210	250	2,64
IPCA 4 – 20	20,7	400	3 200	31,0	210	250	3,29
IPCA 4 – 25	25,4	400	3 000	38,1	210	250	3,70
IPCA 4 – 32	32,6	400	2 800	48,9	210	250	4,44
<b>IPCA 5</b> – 40	41,0	400	2 800	61,5	210	250	10,20
IPCA 5 – 50	50,3	400	2 600	75,4	210	250	11,60
IPCA 5 – 64	64,9	400	2 600	97,3	210	250	14,40
<b>IPCA 6</b> – 80	80,7	400	2 400	121,0	210	250	30,90
IPCA 6 – 100	101,3	400	2 200	151,9	210	250	36,10
IPCA 6 – 125	126,2	400	2 200	189,3	210	250	43,70

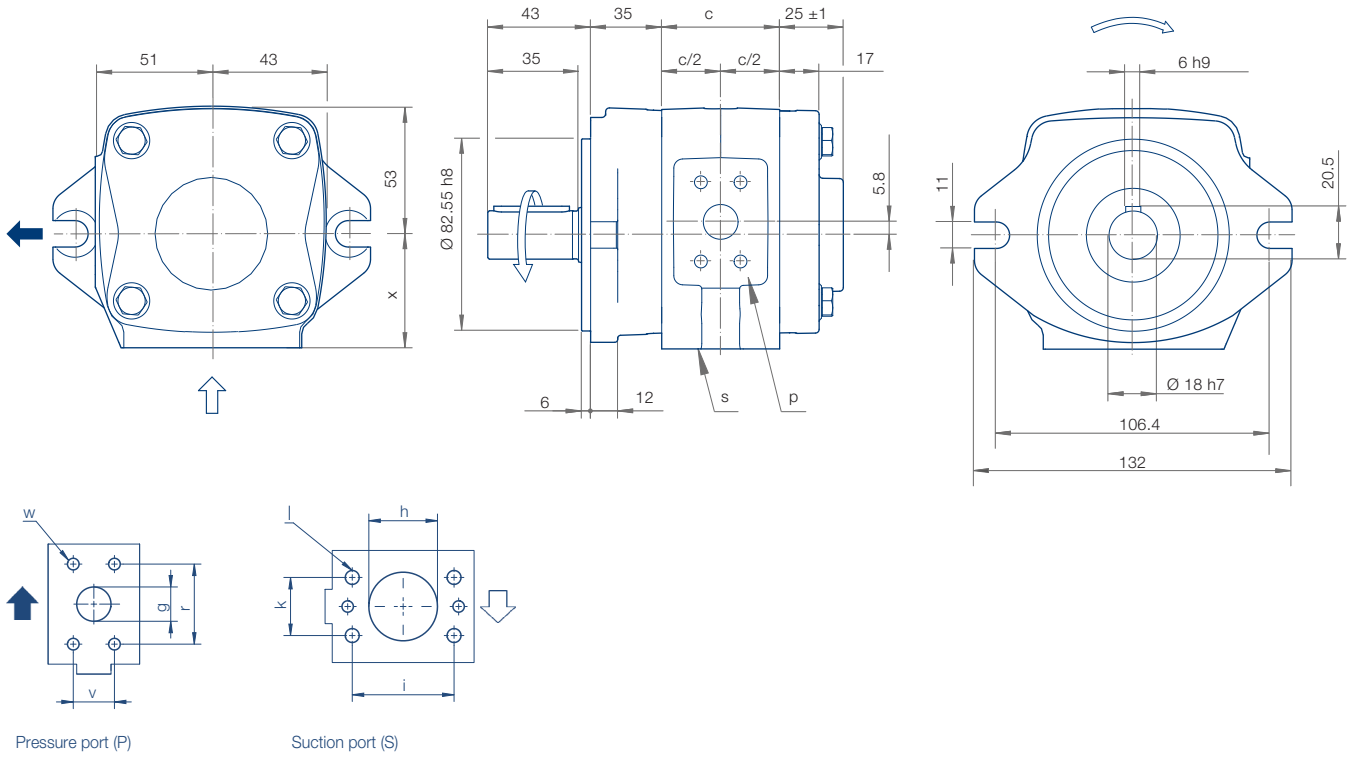
The values given apply for:

- Pumping of mineral oils with a viscosity of 20...40 mm<sup>2</sup>s<sup>-1</sup>
- An input pressure of 0.8...3.0 bar absolute

Notes:

- Peak pressures apply for 15% of operating time with a maximum cycle time of 1 minute.
- Please inquire about peak pressures at non-standard speeds.
- Due to production tolerances, the pump volume may be reduced by up to 1.5%.

## IPCA Size 3, Rotation and Dimensions



Type/ Delivery	Dimensions and Weight											SAE Flange No.	
	c	x	g	h	i	k	l	r	v	w	Weight	↑	↓
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPCA 3 – 3.5	35	47.2	9	15	38.1	17.5	M8x13	38.1	17.5	M8x15	2.6	10	10
IPCA 3 – 5	39	47.2	11	15	38.1	17.5	M8x13	38.1	17.5	M8x15	2.8	10	10
IPCA 3 – 6.3	42	50.2	11	20	47.6	22.3	M10x15	38.1	17.5	M8x15	2.9	10	11
IPCA 3 – 8	46.5	50.2	13	25	52.4	26.2	M10x15	38.1	17.5	M8x15	3.0	10	12
IPCA 3 – 10	51.5	51.2	13	25	52.4	26.2	M10x15	38.1	17.5	M8x15	3.1	10	12

## IPCA Size 3, Design

### Rotation

### Mounting flange

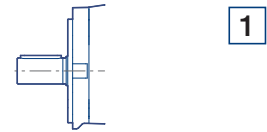
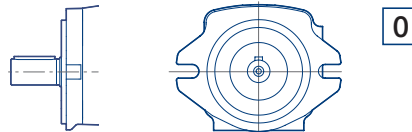
### Shaft end

### Standard

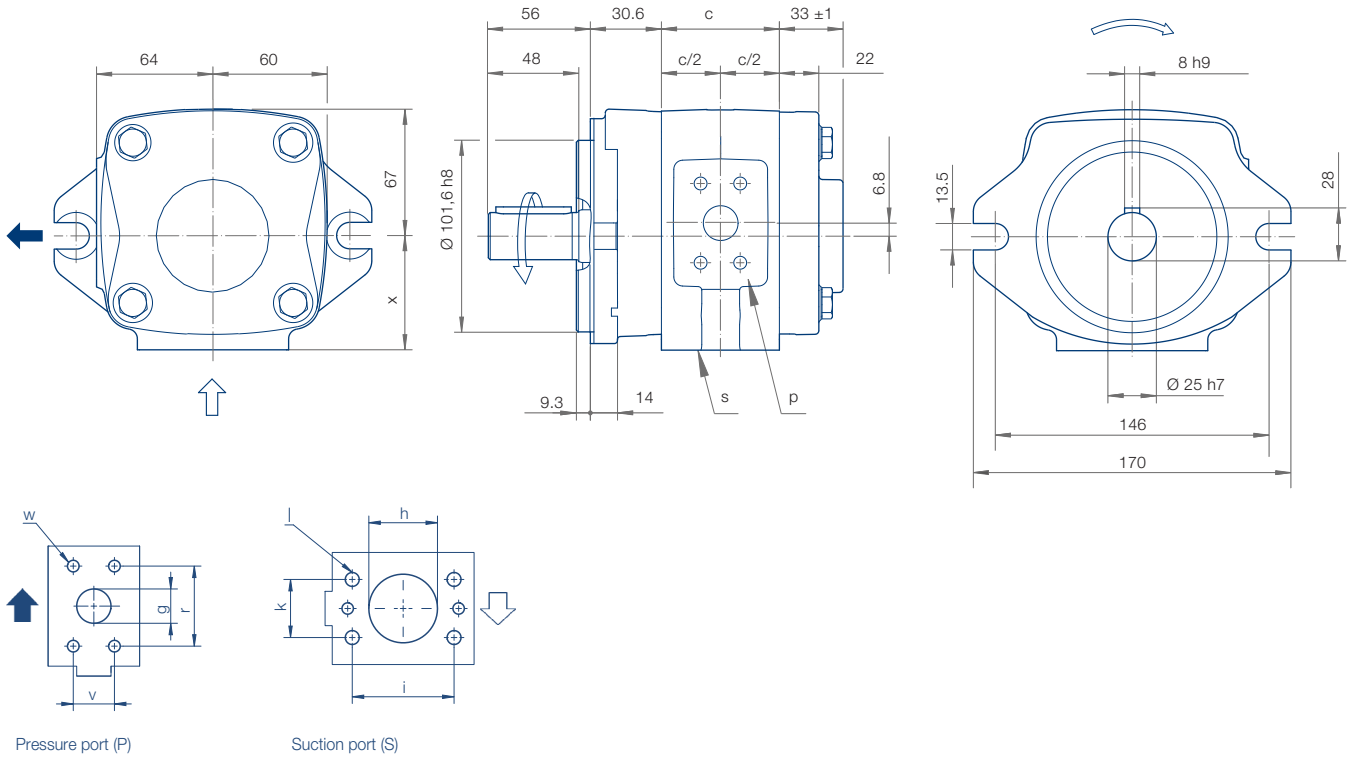
Rotation clockwise

SAE 2-hole flange

Parallel shaft with keyway connection

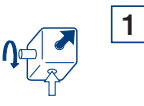
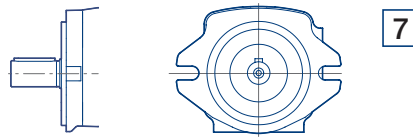
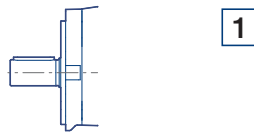


## IPCA Size 4, Rotation and Dimensions

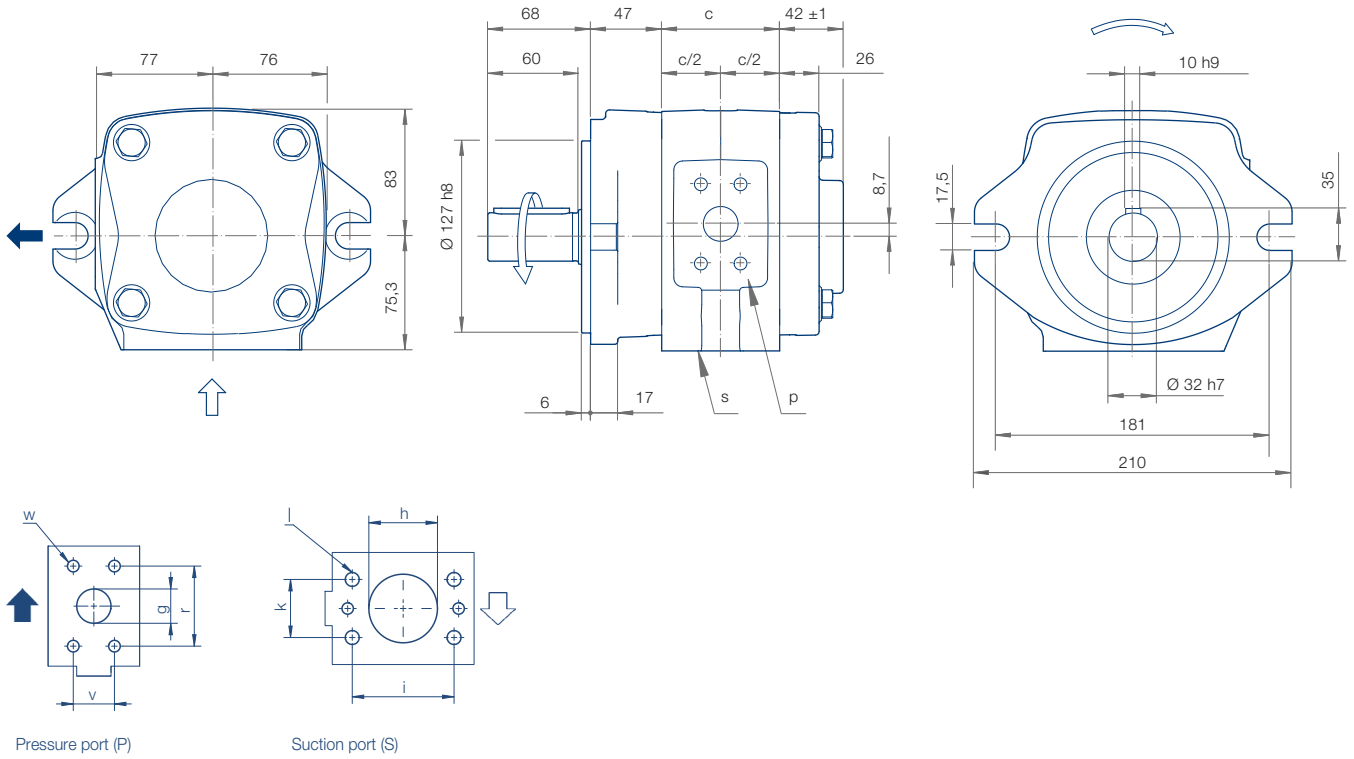


Type/ Delivery	Dimensions and Weight										SAE Flange No.		
	c	x	g	h	i	k	l	r	v	w	Weight	↑	↓
	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPCA 4 – 13	48.5	57.2	14	25	52.4	26,2	M10x15	38.1	17.5	M8x15	5.5	10	12
IPCA 4 – 16	52.5	57.2	18	30	58.7	30,2	M10x15	47.6	22.3	M10x15	5.7	11	13
IPCA 4 – 20	58	57.2	18	30	58.7	30,2	M10x15	47.6	22.3	M10x15	6.0	11	13
IPCA 4 – 25	64	63.2	18	40	69.9	35.7	M12x20	47.6	22.3	M10x15	6.2	11	30
IPCA 4 – 32	73	63.2	18	40	69.9	35.7	M12x20	47.6	22.3	M10x15	6.7	11	30

## IPCA Size 4, Design


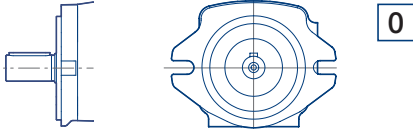
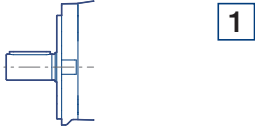
Rotation	Mounting flange	Shaft end
Standard		
Rotation clockwise	SAE 2-hole flange	Parallel shaft with keyway connection
		

## IPCA Size 5, Rotation and Dimensions

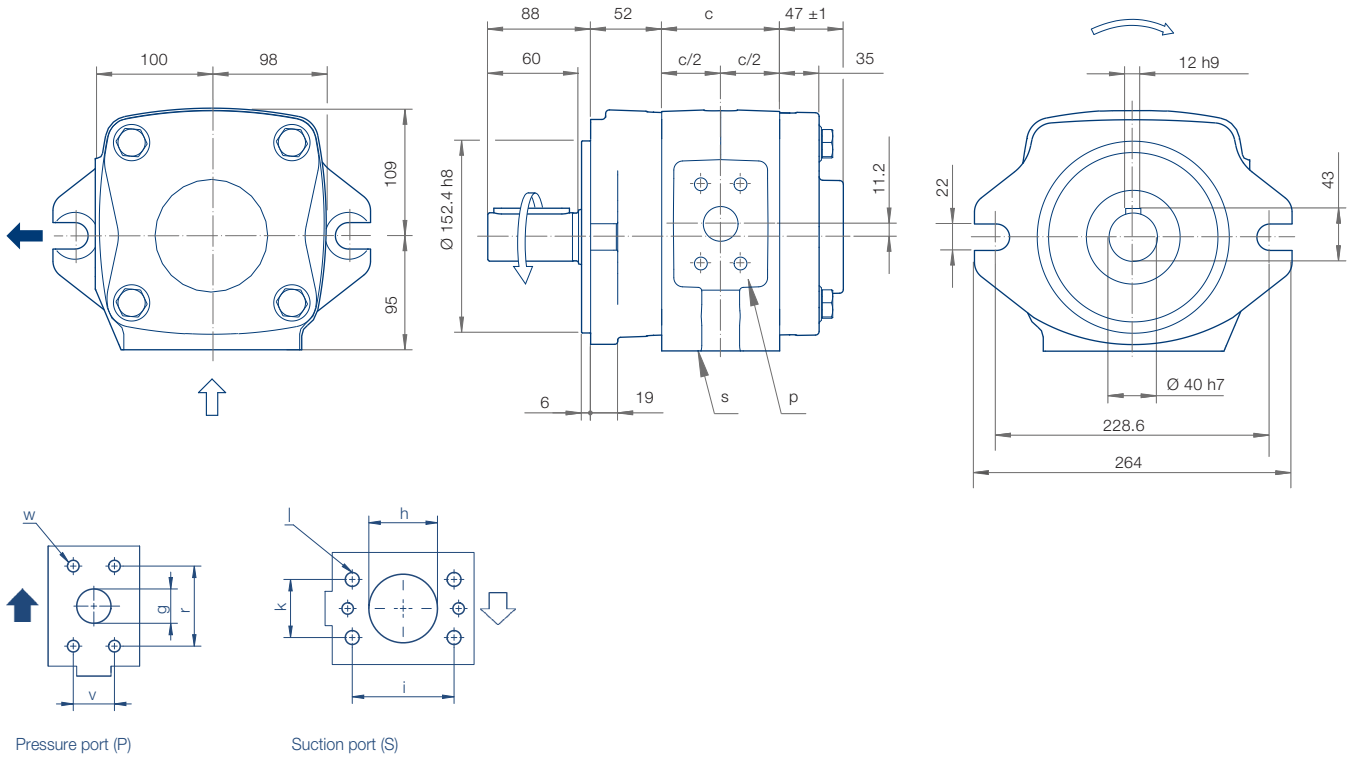


Type/ Delivery	Dimensions and Weight										SAE Flange No.	
	c	g	h	i	k	l	r	v	w	Weight	▲	▼
	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPCA 5 – 40	71	19	40	69.9	35.7	M12x20	52.4	26.2	M10x15	11.6	12	30
IPCA 5 – 50	78	23	45	77.8	42.9	M12x20	52.4	26.2	M10x15	12.2	12	15
IPCA 5 – 64	89	23	45	77.8	42.9	M12x20	52.4	26.2	M10x15	13.1	12	15

## IPCA Size 5, Design


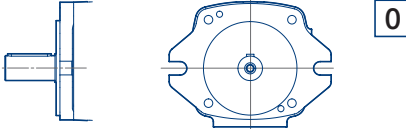
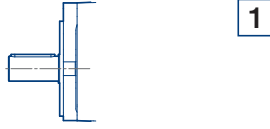
Rotation	Mounting flange	Shaft end
Standard		
Rotation clockwise	SAE 2-hole flange	Parallel shaft with keyway connection
		

## IPCA Size 6, Rotation and Dimensions



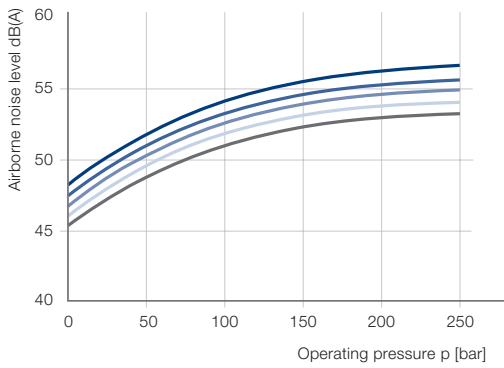
Type/ Delivery	Dimensions and Weight										SAE Flange No.	
	c	g	h	i	k	l	r	v	w	Weight	↑	↓
	[mm]	[mm]	[mm]	[mm]	[mm]	Thread	[mm]	[mm]	Thread	[kg]		
IPCA 6 – 80	88	25	50	77,8	42.9	M12x20	69.9	35.7	M12x20	22.2	14	15
IPCA 6 – 100	98	30	60	88.9	50.8	M12x20	69.9	35.7	M12x20	23.2	14	16
IPCA 6 – 125	110	30	60	88.9	50.8	M12x20	69.9	35.7	M12x20	24.7	14	16

## IPCA Size 6, Design

Rotation	Mounting flange	Shaft end
Standard		
Rotation clockwise	SAE 2-hole flange	Parallel shaft with keyway connection
 <b>1</b>	 <b>0</b>	 <b>1</b>



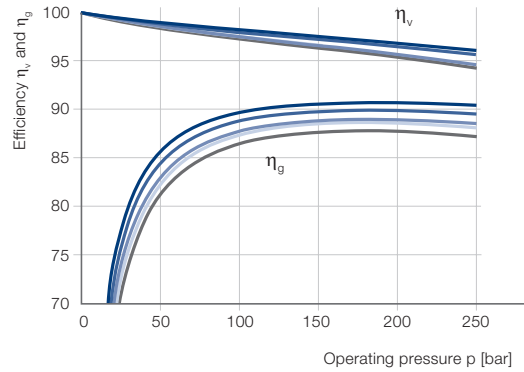
IPCA 3 – Airborne noise level (measuring location 1 m axial)



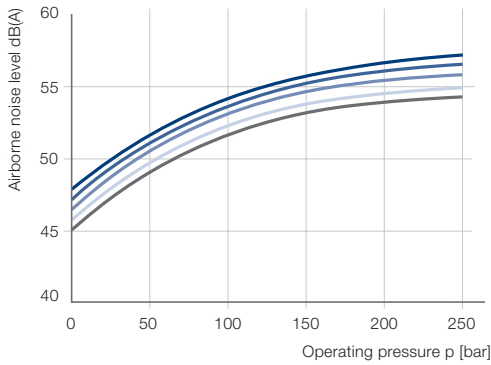
Characteristic curves:

— IPCA 3 – 10 — IPCA 3 – 8 — IPCA 3 – 6.3 — IPCA 3 – 5 — IPCA 3 – 3.5

IPCA 3 – Efficiency  $\eta_v$  and  $\eta_g$



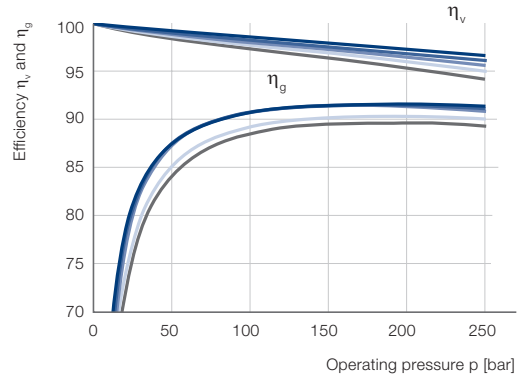
IPCA 4 – Airborne noise level (measuring location 1 m axial)



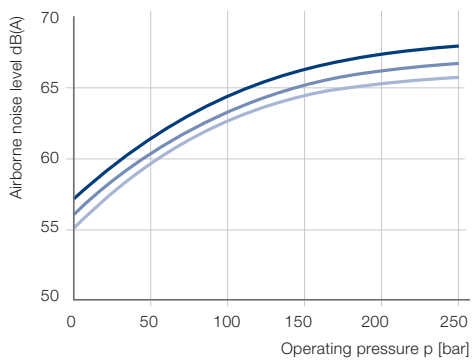
Characteristic curves:

— IPCA 4 – 32 — IPCA 4 – 25 — IPCA 4 – 20 — IPCA 4 – 16 — IPCA 4 – 13

IPCA 4 – Efficiency  $\eta_v$  and  $\eta_g$



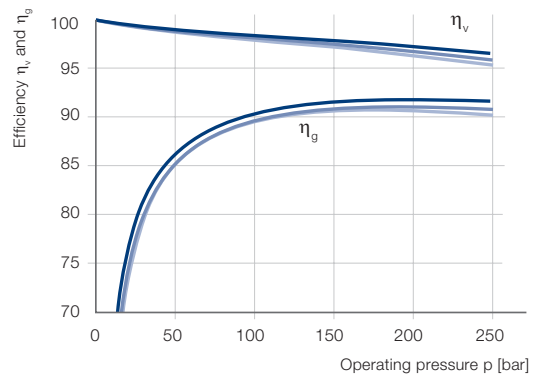
IPCA 5 – Airborne noise level (measuring location 1 m axial)



Characteristic curves:

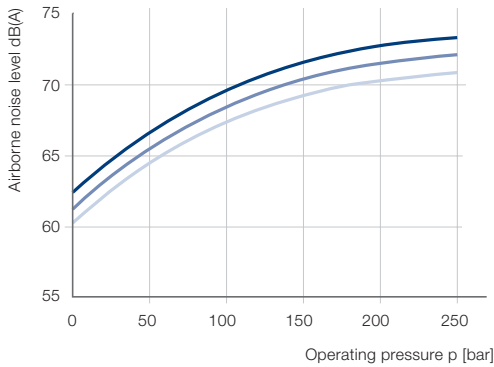
— IPCA 5 – 64 — IPCA 5 – 50 — IPCA 5 – 40

IPCA 5 – Efficiency  $\eta_v$  and  $\eta_g$

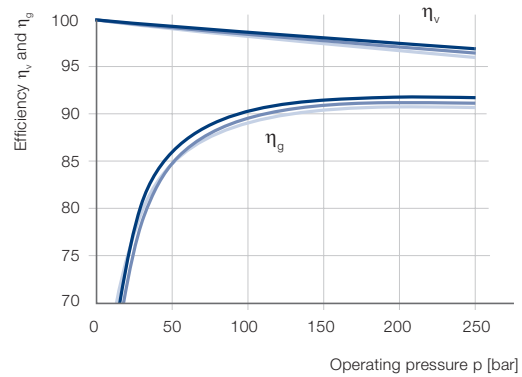


## Measurement Values - Airborne Noise Level, Efficiency

### IPCA 6 – Airborne noise level (measuring location 1 m axial)



### IPCA 6 – Efficiency $\eta_v$ and $\eta_g$



#### Characteristic curves:

— IPCA 6 – 125 — IPCA 6 – 100 — IPCA 6 – 80

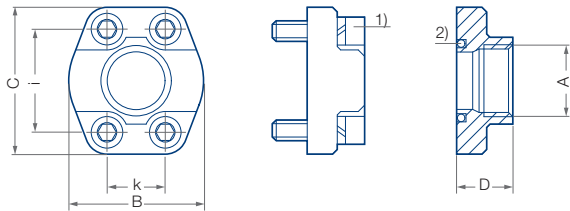
#### Measurement Conditions:

Speed: 1.500 rpm / Viscosity of pressure fluid:  $46 \text{ mm}^2\text{s}^{-1}$  / Operating temperature:  $40^\circ\text{C}$

#### Note:

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

## SAE-Flange, SAE J 518 C Code 61, single-piece



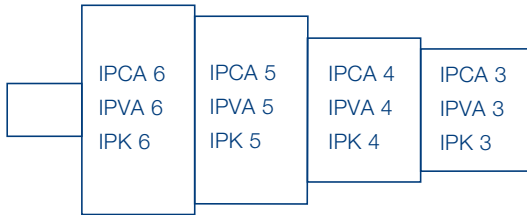
Wrench torque for screws according to ISO 6162

<sup>1)</sup> Round seal ring (O-Ring) ISO-R 1629 NBR

<sup>2)</sup> Screw EN ISO 4762

<sup>3)</sup> Special design, deviation from SAE J 518 C Code 61

SAE flange no.	A	B	C	D	E <sup>1)</sup>	i	k	S <sup>2)</sup>	max. pressure
	thread	[mm]	[mm]	[mm]	seal ring	[mm]	[mm]	thread	[bar]
10	G 1/2	46	54	36	18.66 – 3.53	38.1	17.5	M 8	345
11	G 3/4	50	65	36	24.99 – 3.53	47.6	22.3	M 10	345
12	G 1	55	70	38	32.92 – 3.53	52.4	26.2	M 10	345
13	G 1-1/4	68	79	41	37.69 – 3.53	58.7	30.2	M 10	276
14 <sup>3)</sup>	G 1-1/2	82	98	50	47.22 – 3.53	69.9	35.7	M 12	345 <sup>3)</sup>
30	G 1-1/2	78	93	45	47.22 – 3.53	69.9	35.7	M 12	207
15	G 2	90	102	45	56.74 – 3.53	77.8	42.9	M 12	207
16	G 2-1/2	105	114	50	69.44 – 3.53	88.9	50.8	M 12	172
17	G 3	124	134	50	85.32 – 3.53	106.3	61.9	M 16	138
18	G 4	146	162	48	110.72 – 3.53	130.2	77.8	M 16	34



**Pump combinations**

- IPCA,IPVA, IPK pumps of identical or different sizes can be combined in multiflow pumps.
- All sizes of the relevant pump volume are available as two- or three-flow pumps; four-flow pumps must be designed by Voith Turbo H + L Hydraulic.
- The pumps are arranged in increasing order according to frame size and delivery.

**Selection**

1. Determine pressure ranges and define the appropriate pump serie(s).
2. Determine pump volume and select the appropriate size
3. Define sequence of the pumps.
4. Check the torques.

**Mounting, assembly**

- Multi-flow pumps are generally mounted to the drive by means of a flange.

**Rotation and suction**

**Mounting flange**

**Shaft end**

clockwise (cw)



1



1

Special design

4



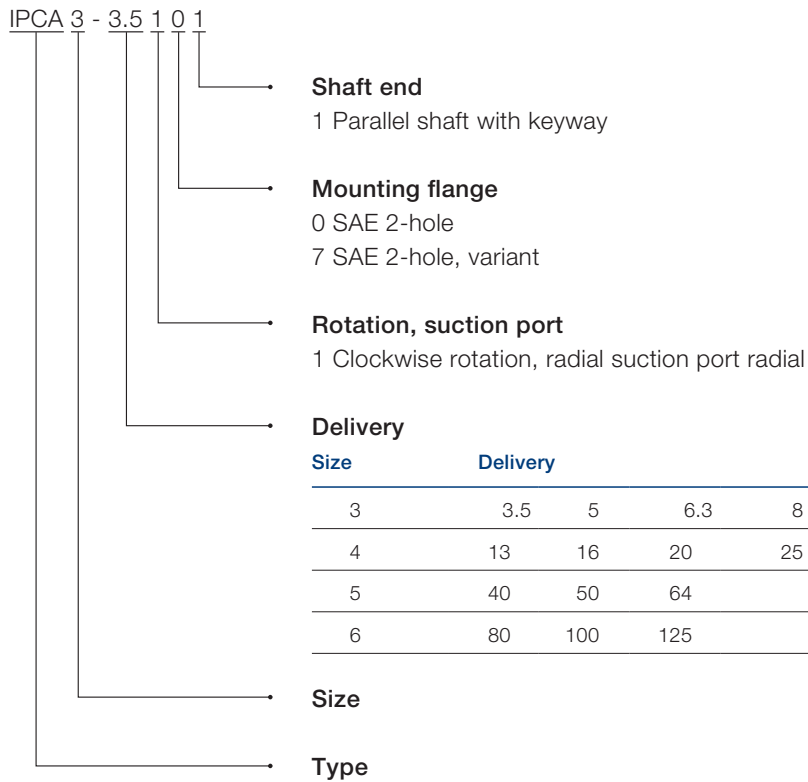
0 SAE-2-hole-flange

7 SAE-2-hole-flange (variant)



1

## Type Code



This is a translated document. Original language: german.  
Legally binding language version of document: german.

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