

Voith Turbo

VOITH

Voith multiple flow pumps – Programme



Voith – Our company

Voith is a reliable partner to essential industries. We set standards worldwide for paper making technology, power transmission, power plant equipment and for industrial services. With annual sales of approx. € 3.3 billion, 24,000 employees and 180 locations worldwide Voith is one of the large family-owned companies in Europe.

We want to be
our customers' preferred supplier
and business partner



Quality, reliability and soundness are key concepts of our identity.

These are expressed in three words:

Voith – Engineered reliability.

Our markets are the markets of the future

The world's demand for paper, energy, mobility, automation and technical services will continue to grow over the next few years. Voith will participate in this coming growth.

Pioneering innovations from Voith – to our customers' advantage

1873
1st Voith Francis turbine

1903
Niagara (largest turbines at the time)

1927
Voith-Schneider-Propeller

1952
Voith water tractor, Voith automatic transmission (DIWA)

1869
1st Voith patent (Refiner)

1881
1st Voith paper machine

1922
Kaplan turbine

1929
Voith turbo transmission

The engine of our strong growth: innovative power and reliability

Voith has operated in the black since its founding on January 1, 1867. The dynamic development and the growth over the last few years confirm that we have taken the right steps.

Voith engineers have again and again written new chapters in the history of technology. Today, Voith holds over 7000 active patents worldwide. Approximately 400 new ones are added every year.

Business relations – spanning generations



For example, since

- 1897 Zanders, Germany (Paper)
- 1904 Scheufelen, Germany (Paper)
- 1905 Haindl, Germany (Paper)
- 1909 Yunnan Power, China (Hydro)
- 1914 EnBW, Germany (Hydro)
- 1930 Bodensee-Schiffsbetriebe, Germany (Marine Technology)
- 1950 Renault, France (Turbo)
- 1955 MAN, Germany (Turbo)

We will continue to expand our worldwide dedication to our markets. The fundamentals of our dealings are the values and long-term strategies of Voith, one of Europe's large family-owned companies.

1960
Hydrodynamic brake,
flotation deinking process

1965
Turbo reversing transmission for shunting locomotives

1978
Itaipú (largest hydro power plant in the world)

1985
1st Voith Vorecon

1995
Fishfriendly turbine

2001
One Platform Concept for the paper production process

2002
Aquatarder

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Voith internal gear pumps setting standards



The market requires hydraulic pumps to be compact and requires a further reduction of noise level and pressure pulsation at high efficiency.

Voith internal gear pumps have a large range of applications where low operation noise, high efficiency, compact dimensions and light weight are required.

Applications:

Plastics engineering

Plastics injections moulding and blow moulding machines

Metal working machines

Press brakes, shears, punching machines

General press manufacturing

Materials handling

Crane construction, lifting platforms, electric fork lifts

Shipbuilding

Steering gear, stabilizers, deck cranes

Public service vehicles

Refuse-collecting vehicles, special vehicles

Power generation

Hydrostatic support and lifting of gas, steam, and water turbine runners and generators

1 Single pumps

1.1 Procedure for selection of single pumps



In order to be able to select an internal gear pump the following parameter are required:

- continuous pressure in the system
- maximum pressure in the system
- capacity per revolution or absolute flow-rate at the given speed.

The following data sheets are available:

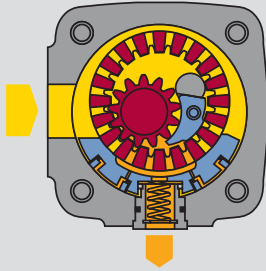
- data sheets for IPH 4 to IPH 6 leaflet G 1209 internal gear pump
- data sheets for IPC 4 to IPC 7 leaflet G 1209 internal gear pump
- data sheets for IPV 3 to IPV 7 leaflet G 1485 high pressure internal gear pump model IPV
- data sheets for IPN 4 to IPN 6 leaflet G 1418 low pressure internal gear pump IPN with the Voith Superlip System

The model code for the single pumps can be found on the following pages.

It is made up of the pump model, size, capacity and a 3 digit design number.

Order description and model Code

1.2 Model IPH



IPH 4 - 20 1 0 1 Example of order description

- Shaft end
0 Toothed shaft ANSI B92.1a
1 Feather key
- Fastening flange
0 SAE 2-hole
1 SAE 4-hole

- Direction of rotation and suction
1 Clockwise rotation
Radial suction mounting
6 Anti-clockwise rotation
Radial suction mounting
4 Special design pumps,
clockwise rotation
9 Special design pumps,
anti-clockwise rotation

Capacity [m³/rev.]

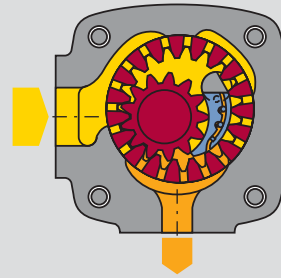
20	40	80
25	50	100
32	64	125

Size

4	5	6
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Internal gear pump model **IPH**

1.3 Model IPV



IPV 3 - 3,5 1 0 0 Example of order description

- Shaft end
0 Toothed shaft ANSI B92.1a
1 Feather key
- Fastening flange
0 SAE 2-hole
1 SAE 4-hole
4 VDMA 2-hole, DIN/ISO 3019/2
5 VDMA 4-hole, DIN/ISO 3019/2
7 SAE 2-hole
(except for IPV 4 with differing
centering diameter)

- Direction of rotation and suction
1 Clockwise rotation
Radial suction mounting
6 Anti-clockwise rotation
Radial suction mounting
4 Special design pumps,
clockwise rotation
9 Special design pumps,
anti-clockwise rotation

Capacity [m³/rev.]

3.5	13	32	64	125
5	16	40	80	160
6.3	20	50	100	200
8	25	64	125	250
10	32			

Size

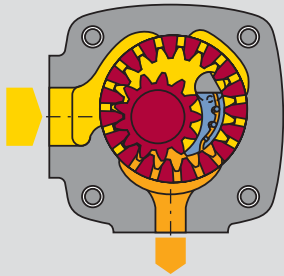
3	4	5	6	7
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Internal gear pump model **IPV**

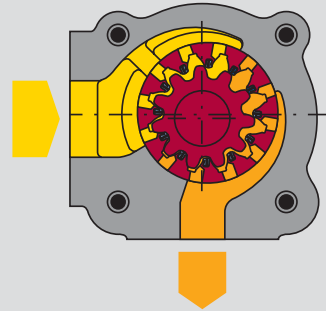
For identification data and identification size model IPH see individual catalogue G 1209.

For identification data and identification size model IPV see individual catalogue G 1485.

1.4 Model IPC



1.5 Model IPN



IPC 5 - 40 1 7 0 Example of order description

Shaft end
0 Toothed shaft ANSI B92.1a
 1 Feather key

Fastening flange
 0 SAE 2-hole
 1 SAE 4-hole
 5 VDMA 4-hole, DIN/ISO ...
7 SAE 2-hole
 (except for IPC 4 with differing centering diameter)

Direction of rotation and suction
1 Clockwise rotation
Radial suction mounting
 6 Anti-clockwise rotation
 Radial suction mounting
 4 Special design pumps,
 clockwise rotation
 9 Special design pumps,
 anti-clockwise rotation

Capacity [m³/rev.]
 20 **40** 80 160
 25 50 100 200
 32 64 125 250

Size
 4 **5** 6 7

Internal gear pump model **IPC**

IPN 4 - 32 1 4 1 Example of order description

Shaft end
 0 Toothed shaft ANSI B92.1a
1 Feather key

Fastening flange
 0 SAE 2-hole
4 VDMA 2-hole, DIN/ISO ...

Direction of rotation and suction
1 Clockwise rotation
Radial suction mounting
 6 Anti-clockwise rotation
 Radial suction mounting
 4 Special design pumps,
 clockwise rotation
 9 Special design pumps,
 anti-clockwise rotation

Capacity [m³/rev.]
32 64 125
 40 80 160
 50 100 200

Size
4 5 6

Internal gear pump model **IPN**

For identification data and identification size model IPC see individual catalogue G 1209.

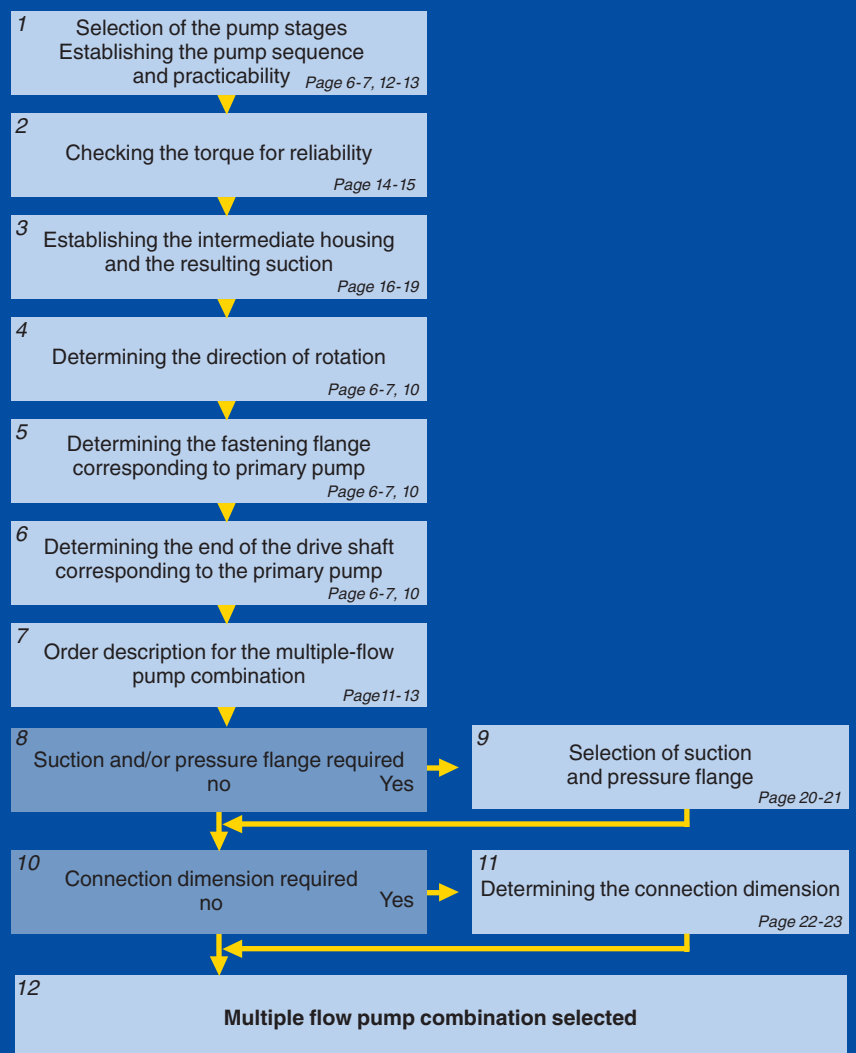
For identification data and identification size model IPN see individual catalogue G 1418.

2. Multiple flow pumps

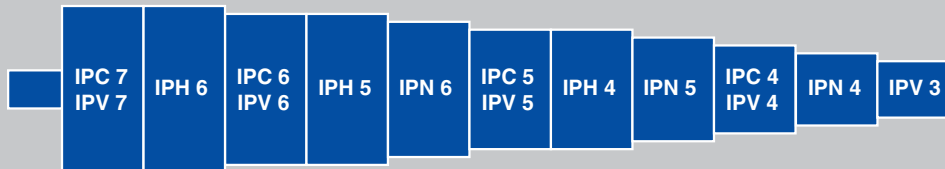
2.1 Procedure for determining multiple-flow pumps

Please unfold page 29 to enter your order details.

- 1 Fill in the selected pump stages on the order details form; Assistance can be taken from the single pump catalogues
- 2 Check the torque with the assistance of the selecting criteria point 2.5
- 3 Select the intermediate housing, see selecting criteria point 2.6
- 4 Fill in the direction of rotation and suction points and order code
- 5 Selection of the fastening flange with order code (see single pump catalogue)
- 6 Selection of the end of the drive shaft
- 7 **Points 1-6 form the complete order description**
- 10/11 Connecting dimensions of two and three pump combinations see point 2.9 page 22
- 8/9 Selection of the suction or pressure flanges see single pump and/or intermediate housing



2.2 Determining pump sequence for multiple-flow pump combinations



Combining IP pumps

IP pumps of the same or of different sizes can be combined to multiple-flow pumps.

All sizes listed as single pumps with the respective capacities are available as two and three pump combinations ordered in ascending order according to size and flow-rate.

It is important to observe the sequence of pumps shown above according to model and size. It is possible to skip over sizes.

With the same models (V,C,N) and the same sizes (3,4,5,6,7) the pump with the bigger flow-rate is placed next to the drive.

Possible pump combination can be found out on table on page 12-13.

Mounting and assembly

As a rule the multiple-flow pumps are fastened to the drive by means of fastening flanges.

It is possible to select between different fastening flanges, see individual catalogues. The same applies to the shaft ends.

The intermediate housings required can be found on pages 16-19.

In addition to pump combinations of two or three pumps it is possible to combine four pumps, but this requires agreement from the manufacturers.

Suction connections for multiple-flow pumps

With combinations of IPV and/or IPC pumps it is partly possible to select between suction connection at the intermediate housing and/or at the pump stages.

With IPN pumps the suction connection is always at the single pump.

See individual catalogue for determination of the 3-digit design number for direction of rotation, suction, fastening flange, shaft end

(See individual catalogue G1485, G1209, G1418, or page 6, 7 and 11)

Designs

Direction of rotation and suction			Fastening flange			Shaft end	
clockwise		anti-clockwise					
	2	7		1	1		1
	1	6		5	5		0
	2	7		4	4		
	1	6		7	7		
	3	8					
	3	8					
Special design	4	9					

See individual pump sheets for designs and dimensions

See individual pump sheets for dimensions

- 1 = 4-hole SAE
- 5 = 4-hole VDMA
- 0 + 7 = 2-hole SAE
- 4 = 2-hole VDMA

2.3 Order description of multiple-flow pumps

Two pump combination

Example of order description

IPV/N 7/5 - 200/80 111
pump 1 IPV 7-200 111
pump 2 IPN /5-/80

IPV/N 7/5 - 200/80 1 1 1

Shaft end
1 Cylinder shaft end with feather key.

Fastening flange
1 SAE 4-hole flange.

Direction of rotation and suction
1 one suction connection per pump stage
 Is determined according to required intermediate housing.
 Clockwise rotation

Flow rate of the individual pump stages see point 2.2 to 2.5 of the individual pumps.
200 80

Size of the individual pump stages.
7 5

Two internal gear pump combination consisting of **model IPV, IPN.**

Exception:

If all pump stages are the same pump model use the model in the order description only once.

Example: IPV 5/3-50/10 111
 pump 1 IPV 5-50 111
 pump 2 IPV /3-/10

Three pump combination

Example of order description

IPV/N/V 7/5/3 - 200/80/10 111
pump 1 IPV 7-200 111
pump 2 IPN /5-/80
pump 3 IPV /3-/10

IPV/N/V 7/5/3 200/80/10 1 1 1

Shaft end
1 Cylinder shaft end with feather key.

Fastening flange
1 SAE 4-hole flange.

Direction of rotation and suction
1 one suction connection per pump stage
 Is determined according to required intermediate housing.
 Clockwise rotation

Flow rate of the individual pump stages see point 2.2 to 2.5 of the individual pumps.
200 80

Size of the individual pump stages.
7 5

Two internal gear pump combination consisting of **model IPV, IPN.**

Exception:

If all pump stages are the same pump model use the model in the order description only once.

Example: IPV 5/4/3-64/25/8 211
 pump 1 IPV 5-64 111
 pump 2 IPV /4-/25
 pump 3 IPV /3-/8

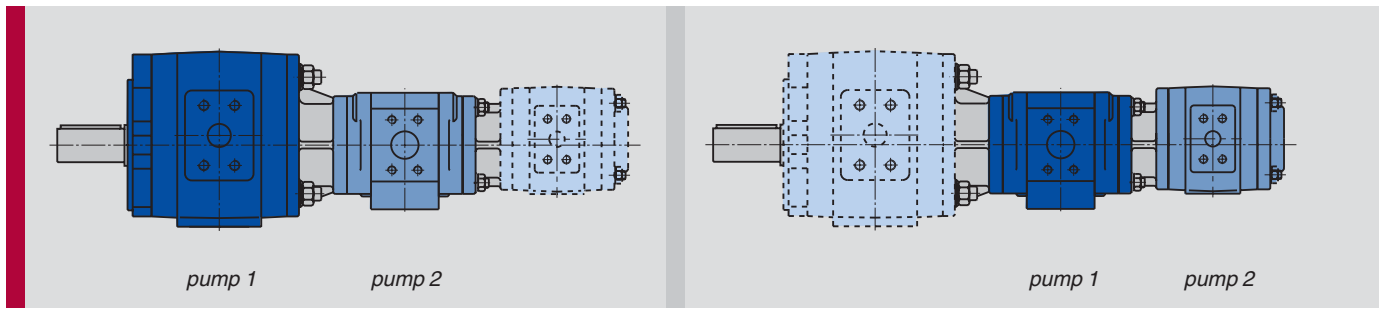
2.4 Possible pump combinations of two or more pumps

● Example of selection IPV/N/V 7/5/3-200/80/10 111.

▬ Possible pump combinations.

▬ Pump sequence in any order (as chosen) with the same model size sequence of the flow-rates in any order (as chosen).

		capacity [m ³ /rev.] 3,5-5-6,3-8-10 ●	13-16-20-25-32	32-40-50-64	64-80-100-125	125-160-200-250	20-25-32	40-50-64
pump 2		IPV /3	IPV /4	IPV /5	IPV /6	IPV /7	IPC /4	IPC /5
pump 1	capacity [m ³ /rev.]							
IPV 3 IPV /3	3,5-5-6,3-8-10	IPV 3/3-... IPV /3/3-...						
IPV 4 IPV /4	13-16-20-25-32	IPV 4/3-... IPV /4/3-...	IPV 4/4-... IPV /4/4-...				IPV/C 4/4-... IPV/C /4/4-...	
IPV 5 IPV /5	32-40-50-64	IPV 5/3-... IPV /5/3-...	IPV 5/4-... IPV /5/4-...	IPV 5/5-... IPV /5/5-...			IPV/C 5/4-... IPV/C /5/4-...	IPV/C 5/5-... IPV/C /5/5-...
IPV 6 IPV /6	64-80-100-125	IPV 6/3-... IPV /6/3-...	IPV 6/4-... IPV /6/4-...	IPV 6/5-... IPV /6/5-...	IPV 6/6-... IPV /6/6-...		IPV/C 6/4-... IPV/C /6/4-...	IPV/C 6/5-... IPV/C /6/5-...
IPV 7 IPV /7	125-160-200-250 ●	IPV 7/3 IPV /7/3-...	IPV 7/4-... IPV /7/4-...	IPV 7/5-... IPV /7/5-...	IPV 7/6-... IPV /7/6-...	IPV 7/7-... IPV /7/7-...	IPV/C 7/4-... IPV/C /7/4-...	IPV/C 7/5-... IPV/C /7/5-...
IPC 4 IPC /4	20-25-32	IPC/N 4/3-... IPC/N /4/3-...	IPC/N 4/4-... IPC/N /4/4-...				IPC 4/4-... IPC /4/4-...	
IPC 5 IPC /5	40-50-64	IPC/N 5/3-... IPC/N /5/3-...	IPC/N 5/4-... IPC/N /5/4-...	IPC/N 5/5-... IPC/N /5/5-...			IPC 5/4-... IPC /5/4-...	IPC 5/5-... IPC /5/5-...
IPC 6 IPC /6	80-100-125	IPC/N 6/3-... IPC/N /6/3-...	IPC/N 6/4-... IPC/N /6/4-...	IPC/N 6/5-... IPC/N /6/5-...	IPC/N 6/6-... IPC/N /6/6-...		IPC 6/4-... IPC /6/4-...	IPC 6/5-... IPC /6/5-...
IPC 7 IPC /7	160-200-250	IPC/N 7/3-... IPC/N /7/3-...	IPC/N 7/4-... IPC/N /7/4-...	IPC/N 7/5-... IPC/N /7/5-...	IPC/N 7/6-... IPC/N /7/6-...	IPC/N 7/7-... IPC/N /7/7-...	IPC 7/4-... IPC /7/4-...	IPC 7/5-... IPC /7/5-...
IPH 4 IPH /4	20-25-32	IPH/V 4/3-... IPH/V /4/3-...	IPH/V 4/4-... IPH/V /4/4-...				IPH/C 4/4-... IPH/C /4/4-...	
IPH 5 IPH /5	40-50-64	IPH/V 5/3-... IPH/V /5/3-...	IPH/V 5/4-... IPH/V /5/4-...				IPH/C 5/4-... IPH/C /5/4-...	IPH/C 5/5-... IPH/C /5/5-...
IPH 6 IPH /6	80-100-125	IPH/V 6/3-... IPH/V /6/3-...	IPH/V 6/4-... IPH/V /6/4-...				IPH/C 6/4-... IPH/C /6/4-...	IPH/C 6/5-... IPH/C /6/5-...
IPN 4 IPN /4	32-40-50	IPN/V 4/3-... IPN/V /4/3-...						
IPN 5 IPN /5	64-80-100 ●	IPN/V 5/3-... IPN/V /5/3-...	IPN 5/4-... IPN /5/4-... ●				IPN/C 5/4-... IPN/C /5/4-...	
IPN 6 IPN /6	125-160-200	IPN/V 6/3-... IPN/V /6/3-...	IPN/V 6/4-... IPN/V /6/4-...	IPN/V 6/5-... IPN/V /6/5-...			IPN/C 6/4-... IPN/C /6/4-...	IPN/C 6/5-... IPN/C /6/5-...



80-100-125	160-200-250	20-25-32	40-50-64	80-100-125	32-40-50-64	64-80-100	125-160-200
IPC /6	IPC /7	IPH /4	IPH /5	IPH /6	IPN /4	IPN /5	IPN /6
					IPV/N 4/4-...		
					IPV/N /4/4-...		
					IPV/N 5/4-...	IPV/N 5/5-...	
					IPV/N /5/4-...	IPV/N /5/5-...	
IPV/C 6/6-...					IPV/N 6/4-...	IPV/N 6/5-...	IPV/N 6/6-...
IPV/C /6/6-...					IPV/N /6/4-...	IPV/N /6/5-...	IPV/N /6/6-...
IPV/C 7/6-...	IPV/C 7/7-...				IPV/N 7/4-...	IPV/N 7/5-...	IPV/N 7/6-...
IPV/C /7/6-...	IPV/C /7/7-...				IPV/N /7/4-...	IPV/N /7/5-...	IPV/N /7/6-...
					IPC/N 4/4-...		
					IPC/N /4/4-...		
		IPC/H 5/4-...			IPC/N 5/4-...	IPC/N 5/5-...	
		IPC/H /5/4-...			IPC/N /5/4-...	IPC/N /5/5-...	
IPC 6/6-...		IPC/H 6/4-...	IPC/H 6/5-...		IPC/N 6/4-...	IPC/N 6/5-...	IPC/N 6/6-...
IPC /6/6-...		IPC/H /6/4-...	IPC/H /6/5-...		IPC/N /6/4-...	IPC/N /6/5-...	IPC/N /6/6-...
IPC 7/6-...	IPC 7/7-...	IPC/H 7/4-...	IPC/H 7/5-...	IPC 7/6-...	IPC/N 7/4-...	IPC/N 7/5-...	IPC/N 7/6-...
IPC /7/6-...	IPC /7/7-...	IPC/H /7/4-...	IPC/H /7/5-...	IPC/H /7/6-...	IPC/N /7/4-...	IPC/N /7/5-...	IPC/N /7/6-...
		IPH 4/4-...			IPH/N 4/4-...	IPH/N 4/5-...	
		IPH /4/4-...			IPH/N /4/4-...	IPH/N /4/5-...	
		IPH 5/4-...	IPH 5/5-...		IPH/N 5/4-...	IPH/N 5/5-...	IPH/N 5/6-...
		IPH /5/4-...	IPH /5/5-...		IPH/N /5/4-...	IPH/N /5/5-...	IPH/N /5/6-...
IPH/C 6/6-...		IPH 6/4-...	IPH 6/5-...	IPH 6/6-...	IPH/N 6/4-...	IPH/N 6/5-...	IPH/N 6/6-...
IPH/C /6/6-...		IPH /6/4-...	IPH /6/5-...	IPH /6/6-...	IPH/N /6/4-...	IPH/N /6/5-...	IPH/N /6/6-...
					IPN 4/4-...		
					IPN /4/4-...		
					IPN 5/4-...	IPN 5/5-...	
					IPN /5/4-...	IPN /5/5-...	
		IPN/H 6/4-...			IPN 6/4-...	IPN 6/5-...	IPN 6/6-...
		IPN/H /6/4-...			IPN /6/4-...	IPN /6/5-...	IPN /6/6-...

dark blue: primary pump at double pumps
First secondary pump at triple pumps

light blue: First secondary pump at double pumps
Second secondary pump at triple pumps

2.5 Torque control

With pump combinations of three or more pumps the torque occurring between the pump stages can reach high values that are not permissible and, if left unheeded, will lead to damage to the pumps! The sum of the torques of the single pump stages may not exceed the permissible values!

The following procedure is to check and calculate the torque values.

2.5.1 Calculation of the torque of a hydraulic pump

$$M_d = \frac{V_{\text{gth}} \times \Delta p}{2\pi \times 10}$$

M_d = input torque in Nm

V_{gth} = capacity in m³/rev.

Δp = pressure in bar

2.5.2 Calculation of the total torque of a pump combination

$$M_{\text{dges}} = M_{\text{dA}} + M_{\text{dB}} + M_{\text{dC}}$$

M_{dA} = input torque A pump (1st pump)

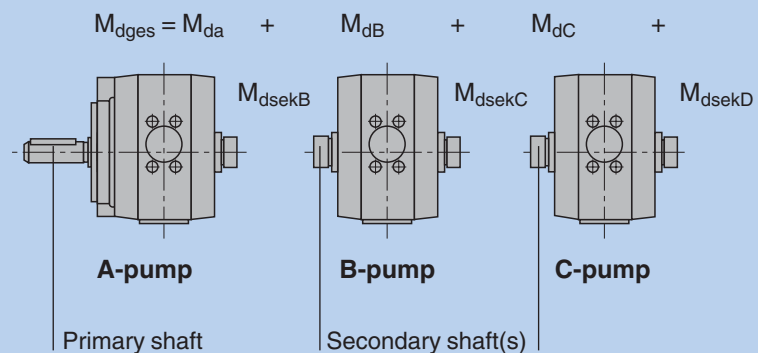
M_{dB} = input torque B pump (2nd pump)

M_{dC} = input torque C pump (3rd pump)

The maximum permissible torque at each secondary shaft can be taken from table 3.5.4.

The torque at the secondary shaft of the B pump is the critical torque: $M_{\text{dsekB}} = M_{\text{dB}} + M_{\text{dC}}$

2.5.3 Torque calculation at the secondary shaft (connecting sleeves)



2.5.4 Permissible input torques for Voith internal gear pumps

Permissible input torque M_d in Nm

Type	Primary shaft	Secondary shaft
IPH 4	450	300
IPH 5	800	540
IPH 6	1350	800
IPV 3	160	80
IPV 4	335	190
IPV 5	605	400
IPV 6	1050	780
IPV 7	1960	1200
IPC 4	335	190
IPC 5	605	400
IPC 6	1050	780
IPC 7	1960	1200
IPN 4	160	100
IPN 5	295	200
IPN 6	605	400

If the check shows that the permissible values are exceeded it is primary to check whether the pressures occur at the same time.

If necessary please contact Voith.

2.6 Determining the intermediate housing

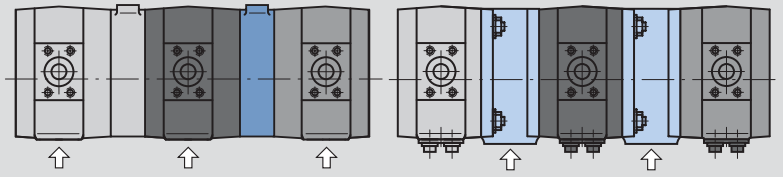
● Example of selection IPV/N/V 7/5/3-200/80/10 111.

■ Suction only via pump stages.

■ Suction only via intermediate housing.

■ Suction only possible via intermediate housing or pump stages.

		capacity [m ³ /rev.] 3,5-5-6,3-8-10	13-16-20-25-32	32-40-50-64	64-80-100-125	125-160-200-250	20-25-32	40-50-64
pump 2		IPV /3	IPV /4	IPV /5	IPV /6	IPV /7	IPC /4	IPC /5
pump 1	capacity [m ³ /rev.]							
IPV 3 IPV /3	3,5-5-6,3-8-10	101						
IPV 4 IPV /4	13-16-20-25-32	102	103				103	
IPV 5 IPV /5	32-40-50-64	104	105	106			105	106
IPV 6 IPV /6	64-80-100-125	107	108	109	110	231	108	109
IPV 7 IPV /7	125-160-200-250	111	112	113	114	115	232	113
IPC 4 IPC /4	20-25-32	102	103				103	
IPC 5 IPC /5	40-50-64	104	105	106			105	106
IPC 6 IPC /6	80-100-125	107	108	109	110	231	108	109
IPC 7 IPC /7	160-200-250	111	112	113	114	115	232	113
IPH 4 IPH /4	20-25-32	122	123				123	
IPH 5 IPH /5	40-50-64	124	125				125	128
IPH 6 IPH /6	80-100-125	126	127				127	129
IPN 4 IPN /4	32-40-50	201						
IPN 5 IPN /5	64-80-100	202	203				203	
IPN 6 IPN /6	125-160-200	204	205	206			205	206

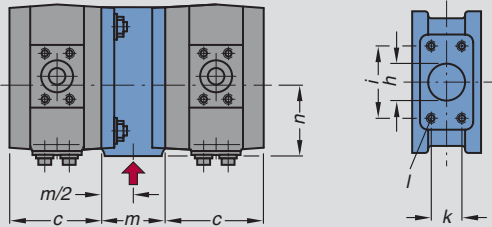


Suction via pump stages

Suction via intermediate housing

80-100-125		160-200-250		20-25-32		40-50-64		80-100-125		32-40-50-64		64-80-100		125-160-200			
IPC /6		IPC /7		IPH /4		IPH /5		IPH /6		IPN /4		IPN /5		IPN /6			
										208							
										209		210					
110	231									211		212		213			
114	115	232									214		215	216			
										208							
				116						209		210					
106			117		118		233			211		212		213			
109	115	232	119		120		121		234	214		215		216			
113			131		235						217		218				
				132		133		236				219		220		221	
130			134		135		136		237	222		223		224			
										225							
										226		227					
				207						228		229		230			

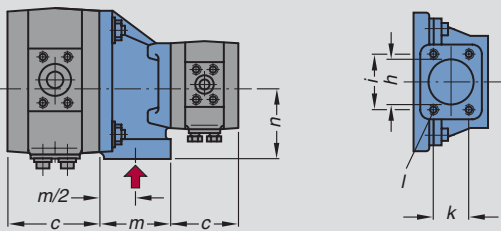
2.7 Dimensions of intermediate housing for multiple-flow pumps



Intermediate housing with joint suction from 2 pump stages, the same size.

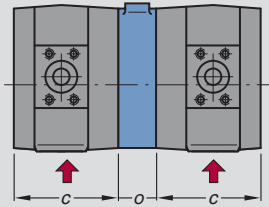
Selection of the intermediate housing see point 2.6.

No.	m	m/2	n	h	i	k	l	SAE Suction flange No.
101	45	22,5	65	25	52,4	26,2	M 10x15 deep	12
103	66	33	70	40	70	36	M 12x20 deep	30
106	90	45	82	60	89	50,8	M 12x20 deep	16
110	110	55	100	76	106,3	62	M 16x25 deep	17
115	140	70	120	100	130,2	77,8	M 16x25 deep	18
116	90	45	82	60	89	50,8	M 12x20 deep	16
118	110	55	100	76	106,3	62	M 16x25 deep	17
121	140	70	120	100	130,2	77,8	M 16x25 deep	18
131	70	35	74,3	40	70	36	M 12x20 deep	14
133	90	45	90	60	89	50,8	M 12x20 deep	16
136	110	55	110	76	106,3	62	M 16x25 deep	17



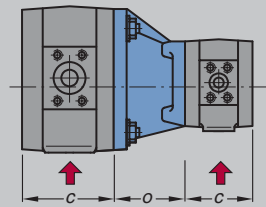
Intermediate housing with joint suction from 2 pump stages of different sizes.

No.	m	m/2	n	h	i	k	l	SAE Suction flange No.
102	66	33	70	40	70	36	M 12x20 deep	30
104	80	40	82	50	77,8	42,9	M 12x20 deep	15
105	90	45	82	60	89	50,8	M 12x20 deep	16
107	90	45	90	60	89	50,8	M 12x20 deep	16
108	110	55	110	76	106,3	62	M 16x25 deep	17
109	110	55	110	76	106,3	62	M 16x25 deep	17
111	110	55	110	76	106,3	62	M 16x25 deep	17
112	110	55	110	76	106,3	62	M 16x25 deep	17
113	110	55	110	76	106,3	62	M 16x25 deep	17
114	140	70	120	100	130,2	77,8	M 16x25 deep	18
117	110	55	100	76	106,3	62	M 16x25 deep	17
119	110	55	110	76	106,3	62	M 16x25 deep	17
120	110	55	100	76	106,3	62	M 16x25 deep	17
122	66	33	74,3	40	70	36	M 12x20 deep	30
123	70	35	74,3	40	70	36	M 12x20 deep	30
124	80	40	90	50	77,8	42,9	M 12x20 deep	15
125	90	45	90	60	89	50,8	M 12x20 deep	16
126	90	45	110	60	89	50,8	M 12x20 deep	16
127	110	55	110	76	106,3	62	M 16x25 deep	17
128	90	45	90	60	89	50,8	M 12x20 deep	16
129	110	45	110	76	106,3	62	M 16x25 deep	17
130	110	55	110	76	106,3	62	M 16x25 deep	17
132	90	45	90	60	89	50,8	M 12x20 deep	16
134	110	55	110	76	106,3	62	M 16x25 deep	17
135	110	55	110	76	106,3	62	M 16x25 deep	17



No.	o
201	46
203	60
206	64
208	52
210	64
213	72
225	48
227	62
230	67
231	55
232	56
233	55
234	56
235	48
236	55
237	56

Intermediate housing with separate suction from 2 pump stages, the same size.



No.	o
202	50
204	58
205	64
207	64
209	60
211	60
212	70
214	60
• 215	70
216	72
217	60
218	64
219	60
220	70
221	72
222	60
223	70
224	72
226	54
228	63
229	66

Intermediate housing with separate suction from 2 pump stages, different sizes.

• Example of selection

2.7.1 SAE mounting flange

Suction flange no.

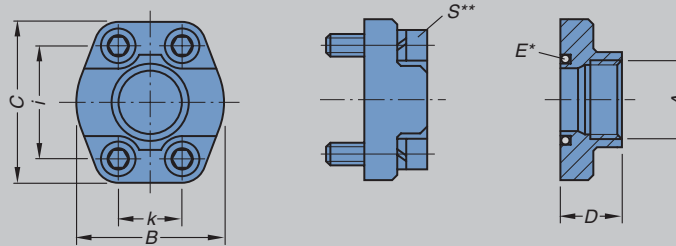
	Capacity																		
	3,5	5	6,3	8	10	13	16	20	25	32	40	50	64	80	100	125	160	200	250
IPV 3	10	10	11	11	12														
IPV 4						12	12	13	13	13									
IPV 5										13	30	30	30						
IPV 6													30	15	15	15			
IPV 7																15	16	16	17
IPC 4								13	13	13									
IPC 5											30	30	30						
IPC 6														15	15	15			
IPC 7																	16	16	17
IPH 4								13	13	13									
IPH 5											30	30	30						
IPH 6														15	15	15			
IPN 4										13	30	30							
IPN 5													30	15	15				
IPN 6																15	16	17	

Pressure flange no.

	Capacity																		
	3,5	5	6,3	8	10	13	16	20	25	32	40	50	64	80	100	125	160	200	250
IPV 3	10	10	10	10	10														
IPV 4						10	10	11	11	11									
IPV 5										11	12	12	12						
IPV 6													12	14	14	14			
IPV 7																14	14	14	14
IPC 4								11	11	11									
IPC 5											12	12	12						
IPC 6														14	14	14			
IPC 7																	14	14	14
IPH 4								11	11	11									
IPH 5											12	12	12						
IPH 6														14	14	14			
IPN 4										12	12	13							
IPN 5													13	13	30				
IPN 6																30	30	15	

2.8 SAE suction and pressure flanges

corresponding to SAE J518c, Code 61



One-piece SAE flange

Flange no.	Dimensions								perm. pressure [bar]
	A	B	C	D	E*	i	k	S**	
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	22,2	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 ¹⁾	G 1 1/2"	82	98	50	47,22 – 3,53	70	36	M 12	345 ¹⁾
30	G 1 1/2"	78	93	50	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 1/2"	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

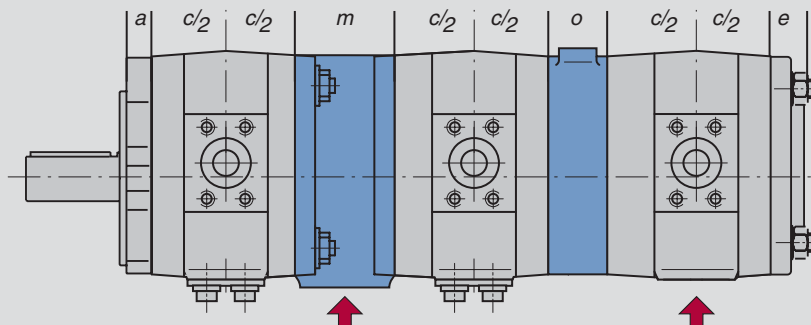
Scope of supply: flange, O-ring,
fillister head cap screw and spring washers.

* O-ring ISO-R 1629 NBR (Buna N)

** Fillister head cap screw DIN 912, material 8.8

¹⁾ Voith special design,
differing from SAE J 518 C Code 61

2.9 Dimension chains for pump combinations calculation of total length



Flange thickness "a" primary pump

Length of housing "c" primary pump

Length dimension "m/o" intermediate housing
Primary / secondary pump shown "m" with suction

Length of housing "c" 1st B-stage

Length dimension "m/o" intermediate housing
1st B-stage / 2nd B-stage depending on suction, shown "o" without suction

Length of housing "c" 2nd B-stage

End cover "e" of the 2nd B-stage

The example shows a combination of three pumps.

The dimensions for a combination of two pumps can be determined correspondingly.

- Dimension "a" thickness of flange see individual catalogue G 1485 or table 2.9.1.
- Length of housing "c" see individual catalogue G 1485, G 1209, G 1418 or the following table.
- Length dimension intermediate housing "m" or "o" see pages 18/19 depending on suction.
- Dimension "e" end cover see individual catalogue G 1485 or the following table.

2.9.1 Length dimensions of Voith IP pumps [mm]

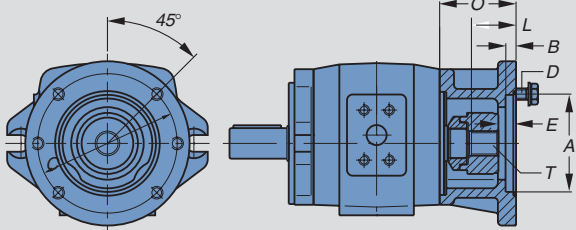
IPV					IPC				
Size	m ³ /rev.	"a"	"c"	"e"	Size	m ³ /rev.	"a"	"c"	"e"
3	3,5	19,5	66	20,5	4				
	5		70						
	6,3		73						
	8		77,5						
	10		82,5						
4	13	26	88,5	31	4	20	18	98	25
	16		92,5						
	20		98						
	25		104						
	32		113						
5	32	20	119	36	5	40	20	125	31
	40		125						
	50		132						
	64		143						
	64		140						
6	80	22	148	35	6	80	22	148	35
	100		158						
	125		170						
	125		152						
	160		162						
7	200	63	174	46	7	200	63	174	46
	250		188						
	250		188						
	250		188						
	250		188						

"a" = Thickness of flange
 "c" = Length of housing
 "e" = Thickness of cover

IPH					IPN				
Size	m ³ /rev.	"a"	"c"	"e"	Size	m ³ /rev.	"a"	"c"	"e"
(2)	3,5	19	64	19,5	4				
	5		69						
	6,3		73						
	8		78						
(3)	10	22	88	25	5				
	13		94						
	16		99						
	20		102						
4	25	20	108	36	4	32	20	100,5	31
	32		116						
	32		116						
5	40	22	138	35	5	64	26	119,5	33,5
	50		145						
	64		155						
6	80	26	171	47	6	125	24	151	40
	100		181						
	125		193						

3. Combining Voith IP pumps with pumps from other manufacturers

3.1 Mounting pumps from other manufacturers on to Voith IP pumps



L = Max. possible shaft length
 T = Tooth number of the toothed hub with involute flank (ANSI B 92, 1a) pressure angle 30°

Dimensions for Voith internal gear pumps IPV 4 to 7, IPC 4 to 7 and IPH 4 to 6 can be taken from the dimension sheet for the individual pump, dimensions for pumps of other designs can be taken from the respective manufacturer's catalogue.



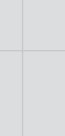



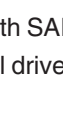
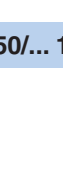
The choice of possibilities for mounting flange and shaft end correspond to the data on the single pump sheets.

Combinations of Voith internal gear pumps model IPN with pumps from other manufacturers on request.

Model	Inter-mediate housing	O	A	B	C	D	O-Ring	E	L	T	pitch
IPC 4/	100	64	82,55 ^{G7}	7	106,5±0,3	M 10	83x3	18	38	11	16/32
IPH 4/ IPV 5/ IPC 5/	101	80	82,55 ^{G7}	8	106,5±0,3	M 10	83x3	18	38	11	16/32
IPH 5/ IPV 6/ IPC 6/	102	92	82,55 ^{G7}	8	106,5±0,3	M 10	83x3	18	38	11	16/32
IPH 6/ IPV 7/ IPC 7/	103	92	82,55 ^{G7}	8	106,5±0,3	M 10	83x3	18	38	11	16/32
IPH 4/ IPV 5/ IPC 5/	104	80	101,6 ^{G7}	10	146±0,3	M 12	102x3	17	41	13	16/32
IPH 5/ IPV 6/ IPC 6/	105	92	101,6 ^{G7}	10	146±0,3	M 12	102x3	17	41	13	16/32
IPH 6/ IPV 7/ IPC 7/	106	92	101,6 ^{G7}	10	146±0,3	M 12	102x3	17	41	13	16/32
IPV 5/ IPC 5/	107	80	101,6 ^{G7}	10	146±0,3	M 12	102x3	17,5	46	15	16/32
IPH 5/ IPV 6/ IPC 6/	108	92	101,6 ^{G7}	10	146±0,3	M 12	102x3	17,5	46	15	16/32
IPH 6/ IPV 7/ IPC 7/	109	92	101,6 ^{G7}	10	146±0,3	M 12	102x3	17,5	46	15	16/32
IPH 5/ IPV 6/ IPC 6/	110	92	127 ^{G7}	13	181±0,3	M 16	126x3	8	59	14	12/24
IPH 6/ IPV 7/ IPC 7/	111	92	127 ^{G7}	13	181±0,3	M 16	126x3	8	59	14	12/24
IPV 6/ IPC 6/	112	92	127 ^{G7}	13	181±0,3	M 16	126x3	8	63	17	12/24
IPH 6/ IPV 7/ IPC 7/	113	92	127 ^{G7}	13	181±0,3	M 16	126x3	8	63	17	12/24
IPV 7/ IPC 7/	114	150	152,4 ^{G7}	13	228,6±0,3	M 18	150x3	8	118	13	8/16

Fastening bolts and O-ring are part of the Voith scope of supply.

3.1.1 Intermediate housing with coupling

Model	Inter- mediate housing	Direction of rotation and suction		Mounting flange		Shaft end*
		clockwise	anti-clockwise			
						
		1	6	0	1	1
IPC 4/	100	1	6	0	1	1
IPH 4/ IPV 5/ IPC 5/	101	1	6	0	1	1
IPH 5/ IPV 6/ IPC 6/	102	1	6	0	1	1
IPH 6/ IPV 7/ IPC 7/	103	1	6	0	1	1
IPH 4/ IPV 5/ IPC 5/	104	1	6	0	1	1
IPH 5/ IPV 6/ IPC 6/	105	1	6	0	1	1
IPH 6/ IPV 7/ IPC 7/	106	1	6	0	1	1
IPV 5/ IPC 5/	107	1	6	0	1	1
IPH 5/ IPV 6/ IPC 6/	108	1	6	0	1	1
IPH 6/ IPV 7/ IPC 7/	109	1	6	0	1	1
IPH 5/ IPV 6/ IPC 6/	110	1	6	0	1	1
IPH 6/ IPV 7/ IPC 7/	111	1	6	0	1	1
IPV 6/ IPC 6/	112	1	6	0	1	1
IPH 6/ IPV 7/ IPC 7/	113	1	6	0	1	1
IPV 7/ IPC 7/	114	1	6	0	1	1

Combinations consisting of Voith internal gear pumps model IPV, IPC or IPH and intermediate housing with coupling, suitable for mounting of pumps with mounting flange to DIN ISO 3019-1 and drive shaft with involute splining to ANSI B 92.1a.

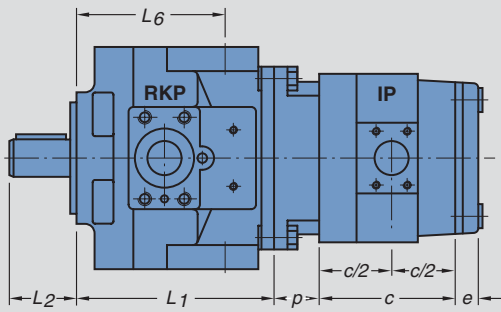
Ordering example

IPV 5-50 with intermediate housing 104 rotating clockwise with SAE-2-hole flange and cylindrical drive shaft with feather key.

IPV 5/104-50/... 101

* Further possibilities of selection see dimension sheets for the single pumps.

3.2 Mounting Voith IP pumps on to pumps from other manufacturers



Mounting Voith internal gear pumps on to

- Wepuko radial piston pumps
- Moog adjustable piston pumps, only with heavy through-drive.
- Combinations of IPN with radial piston pumps on request.

Ordering example

for mounting pump, intermediate housing and drive shaft.

IPV /5 508-/40 129

IPV /5/5 508-/50/40 229

Dimension table 1 (RKP)

Model	L ₁	L ₂	L ₆	Supplier
RKP 16 RKP 19	See Moog data sheets for dimensions			Moog
RKP 32 RKP 45	See Moog data sheets for dimensions			Moog
RKP 63 RKP 80	See Moog data sheets for dimensions			Moog
RKP 90 RKP 100	See Moog data sheets for dimensions			Moog
RKP 140 RKP 110	See Moog data sheets for dimensions See Wepuko data sheets for dimensions			Moog Wepuko
RKP 125 RKP 160	See Wepuko data sheets for dimensions			Wepuko
RKP 180 RKP 250	See Wepuko data sheets for dimensions			Wepuko

Dimension table 2 (length of intermediate flange) and description of intermediate flange

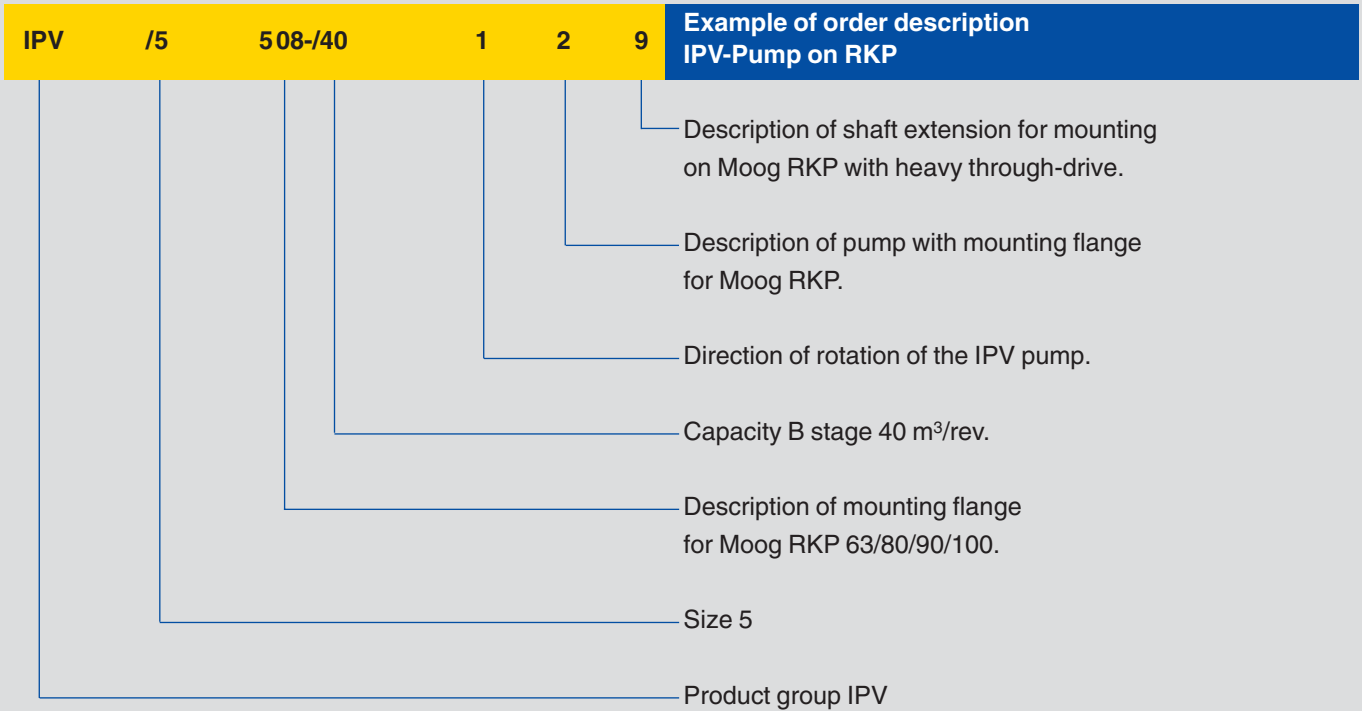
	RKP 16/19		RKP 32/45		RKP 63/80/90/100		RKP 140		RKP 110/125/160/180		RKP 250	
	p	Des.	p	Des.	p	Des.	p	Des.	p	Des.	p	Des.
IPV 3	50	500	50	501	50	502	50	503	17	–	17	–
IPC 4/IPV 4	–	–	55	504	55	505	55	506	17	–	17	–
IPC 5/IPV 5	–	–	55	507	55	508	55	509	40	–	17	–
IPC 6/IPV 6	–	–	–	–	55	510	55	511	66,5	–	72,5	–
IPC 7/IPV 7	–	–	–	–	–	–	56	512	66,5	–	72,5	–

Please refer to the data sheets for the single pumps for IP dimensions.

	RKP 110 to 250	RKP 16 to 140
Supplier RKP	Wepuko	Moog
Supplier of mounting parts	Wepuko	Voith
Supplier of IP pump	Voith	Voith

Dimensions of the RKP pumps L₁, L₂, L₆ are to be requested from the respective manufacturers.

3.2.1 Order description for Voith IP pumps on to pumps from other manufacturers



IPV /5/5 508-50/40 229		Example of order description for combination of two IPV pumps on RKP
IPV		Product group
/5		Size 1 st B-stage
/5		Size 2 nd B-stage
/50		Capacity 1 st B-stage
/40		Capacity 2 nd B-stage
2		Direction of rotation clockwise, joint suction for IPV 5/5.
2		Description of pump with mounting flange for Moog RKP.
9		Description of shaft extension for mounting on Moog RKP with heavy through-drive.

Order details

Original form for copying

Pump 1 continuous pressure in system _____ bar maximum pressure in system _____ bar capacity/rev. _____ bar
Pump 2 continuous pressure in system _____ bar maximum pressure in system _____ bar capacity/rev. _____ bar
Pump 3 continuous pressure in system _____ bar maximum pressure in system _____ bar capacity/rev. _____ bar

Internal gear pumps		Sizes	Capacity	Direction of rotation Suction	Faste-ning flange	Shaft end																																
Pre-selection	primary pump IP <input type="text"/>	<input type="text"/>	<input type="text"/>	Order code / <input type="text"/>																																		
Pump-	1 st B pump IP / <input type="text"/>	/ <input type="text"/>	/ <input type="text"/>																																			
sequence	2 nd B pump IP / <input type="text"/>	/ <input type="text"/>	/ <input type="text"/>																																			
Direction of rotation anti-clockwise, clockwise																																						
Suction connection joint, separate, mixed																																						
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Direction of rotation and suction</p> <table style="width: 100%; text-align: center;"> <tr> <td></td> <td><input type="text" value="2"/></td> <td><input type="text" value="7"/></td> <td></td> </tr> <tr> <td></td> <td><input type="text" value="1"/></td> <td><input type="text" value="6"/></td> <td></td> </tr> <tr> <td></td> <td><input type="text" value="2"/></td> <td><input type="text" value="7"/></td> <td></td> </tr> <tr> <td></td> <td><input type="text" value="1"/></td> <td><input type="text" value="6"/></td> <td></td> </tr> <tr> <td></td> <td><input type="text" value="3"/></td> <td><input type="text" value="8"/></td> <td></td> </tr> <tr> <td></td> <td><input type="text" value="3"/></td> <td><input type="text" value="8"/></td> <td></td> </tr> <tr> <td>clockwise </td> <td></td> <td></td> <td>anti-clockwise </td> </tr> <tr> <td>Special design <input type="text" value="4"/></td> <td></td> <td><input type="text" value="9"/></td> <td>Special design</td> </tr> </table> </div>								<input type="text" value="2"/>	<input type="text" value="7"/>			<input type="text" value="1"/>	<input type="text" value="6"/>			<input type="text" value="2"/>	<input type="text" value="7"/>			<input type="text" value="1"/>	<input type="text" value="6"/>			<input type="text" value="3"/>	<input type="text" value="8"/>			<input type="text" value="3"/>	<input type="text" value="8"/>		clockwise			anti-clockwise	Special design <input type="text" value="4"/>		<input type="text" value="9"/>	Special design
	<input type="text" value="2"/>	<input type="text" value="7"/>																																				
	<input type="text" value="1"/>	<input type="text" value="6"/>																																				
	<input type="text" value="2"/>	<input type="text" value="7"/>																																				
	<input type="text" value="1"/>	<input type="text" value="6"/>																																				
	<input type="text" value="3"/>	<input type="text" value="8"/>																																				
	<input type="text" value="3"/>	<input type="text" value="8"/>																																				
clockwise			anti-clockwise																																			
Special design <input type="text" value="4"/>		<input type="text" value="9"/>	Special design																																			
Intermediate housing	Intermediate housing no. _____ / _____																																					
Torque control	Maximum torque occurring at secondary shaft _____ Nm Permissible torque at secondary shaft _____ Nm																																					
Fastening flange	SAE 2-hole	SAE 4-hole	Order code	/ <input type="text"/>																																		
	VDMA/DIN ISO 2-hole	VDMA/DIN ISO 4-hole																																				
Shaft end	cylindrical shaft end	involute splining		/ <input type="text"/>																																		
Final																																						
sequence	two pump combination IP <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> - <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>																																					
of the pump																																						
stages	three pump combination IP <input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> / <input type="text"/> / <input type="text"/> - <input type="text"/> / <input type="text"/> / <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>																																					

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