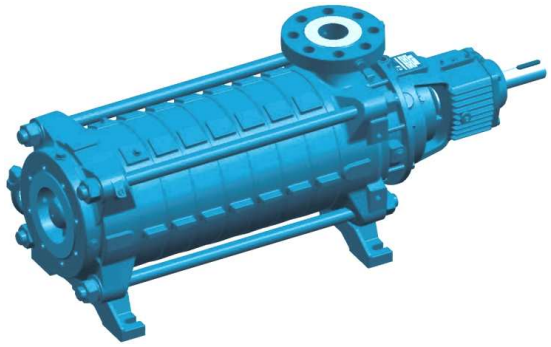
SIHI Multi

Type MSC

Modular multistage pumps

Description

The SIHI*multi* MSC range of horizontal, ring-section multi-stage pumps have been designed for long-term reliability when pumping high pressure liquids. The design features within this range of high pressure pumps, provide our customers with unique solutions to long-term concerns about power consumption, efficiency, and reliability.
A special feature is the wide range of speed, which is excellent suitable for frequency inverter running.
Meeting the technical requirements of ISO 5199 / EN25199, they have a modular concept in order to reduce the number of parts, and consequently our customers' inventory.
Premium levels of efficiency are available by selecting an appropriate set of impellers and diffusers that give an ideal fit to the process requirement. Unique to the multi-stage arena portfolio is the, SIHI, patented self-adjusting drum style of axial thrust balancing. The MSC employ a device that reduces the bypass flow to an absolute minimum, while not being susceptible to long(er) term wear-sensitive clearances.



Applications

Pumps of the SIHI*multi* range meet the specific requirements of our customers in selected applications, such as

- Renewable energy
- Fossil power stations
- Biomass
- Geothermal
- Paper and Pulp

Optional special designs

Customised solutions, which are not covered by the standard design, like de-staging decive, interstage bleed-off or different sealing options are possible on request.

Materials

Suction-, Stage- and Discharge casing:	Chrome steel
Impeller/Diffuser:	Grey cast iron or stainless steel
Shaft:	Chrome steel

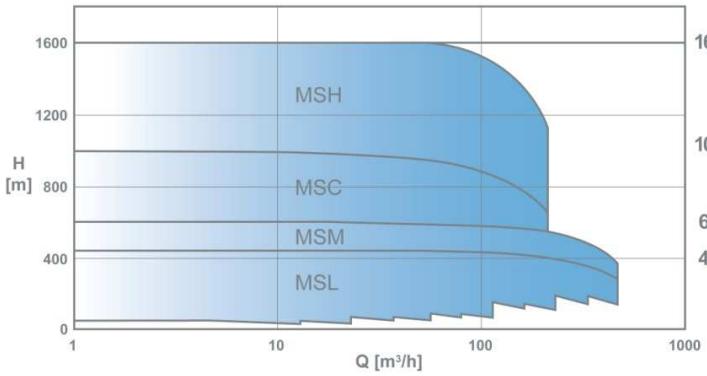
Technical Data

Flow rate:	max. 250 m³/h
Head:	max. 1000 m
Medium temperature:	-10℃ to +180℃
Speed:	400 to 3600 rpm
Final pressure:	max. 100 bar
Shaft sealing	packed gland or mechanical seal
Direction of rotation	counter-clockwise, when viewed from discharge side

Construction

Different hydraulic impeller and diffuser sizes can be installed in a standard casing, thus enabling the pump to be designed exactly for the duty point required. The first stage of each pump size is equipped with an optimised NPSH suction impeller.
Axial thrust is hydraulically balanced by a patented balance drum system with a self-adjusting throttling device. Residual thrust is absorbed by a generously sized angular-contact ball bearing. The balancing line is returned to the suction casing.
The pump rotor is supported on the drive side by grease lubricated anti-friction bearings. Support on the suction side is effected by means of a low-velocity product lubricated, and self-aligning sleeve bearing.
The pump is driven from the discharge side, in a counter-clockwise direction, when viewed from the discharge side.
Simple installation adaptation is possible with the modular design which allows discharge casing flange to be supplied radially upwards, horizontal-left or horizontal-right. The pump is usually constructed with an axial or radial inlet suction.
As standard the pump is mounted with integrated thermal compensation.
The shaft sealing consist of a single-acting mechanical seal, or optionally as packed gland configuration. These two executions are supported with an internal circulation flow.
For even higher liquid temperatures, the pumps can be supplied with an optional external jacket-cooling.
The static casing sealing, consist of EPDM O-rings, as standard, with the option of FKM material.
Condition-based monitoring, via the SIHI*detect* type of vibration device, is optional in which to give advanced failure warning. Other standard equipment is available to monitor: Suction and discharge pressure; Liquid temperature; and bearing temperature. Low pressure-drop, filters can be supplied for use of the suction side of the pump, as can minimum flow-bypass valves.

SIHI^multi MSC



160 bar **MSH** (please see specific brochure)

100 bar **MSC**

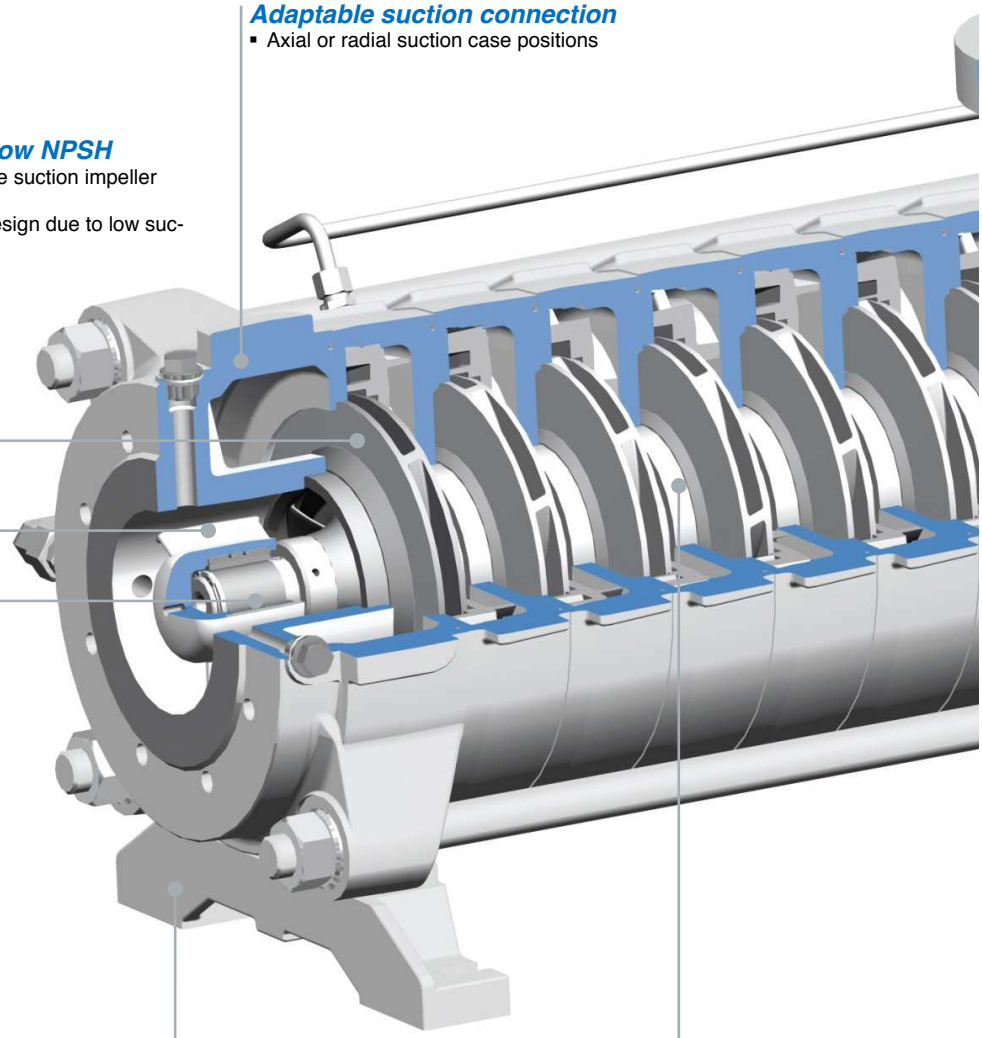
63 bar **MSM** (please see specific brochure)

40 bar **MSL** (please see specific brochure)

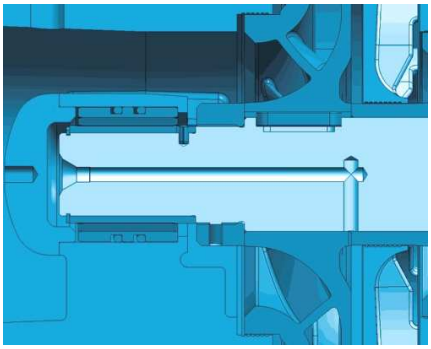
Optimized streaming diffuser geometry
- Optimized flow pattern
- Short inlete piping possible

Adaptable suction connection
- Axial or radial suction case positions

Reliability with low NPSH
- Enhanced first stage suction impeller size and geometry.
- Compact system design due to low suction head.



Self-adjusting sleeve bearing
- Only one shaft seal.
- Self-adjusting for higher reliability.
- Reliable flushing at high temperatures and low speed.
- Prepared for frequency inverter running

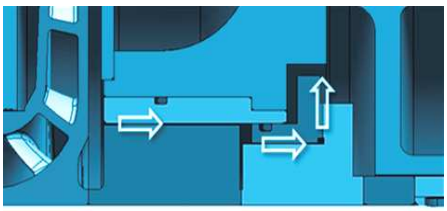


Non-distorted assembly
- With integrated thermal compensation (ITC) as standard.
- No installation or adjustment necessary.

Optimum process fit
- Modular sets of impellers & diffusers for perfect duty match.
- Optimised efficiency over the performance range

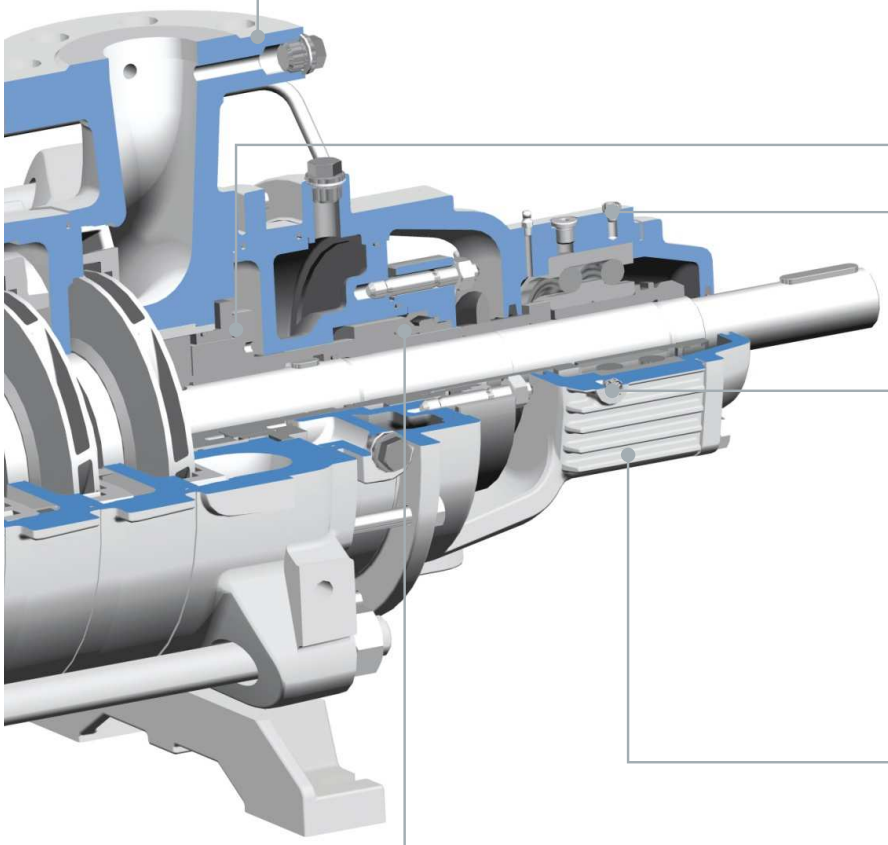
Balance drum system secures long-term premium efficiency

- Patented balance drum system for axial thrust balancing.
- Applicable also for Start/Stop cycles.
- Reduced internal bypass flow, and associated losses.
- Self-adjusting.
- Maintenance free, no wear parts.



Adaptable discharge connection

- Discharge casing flange to be supplied radially upwards, horizontal-left or horizontal-right.



Ready for SIHI^detect

- Connection for condition-based monitoring via SIHI^detect available.
- Applicable for measurements of
  - Suction pressure
  - Final pressure
  - Liquid temperature
  - Bearing temperature
  - Casing vibration

Increased bearing life time

- Air cooling fans.

Reliable sealing solutions

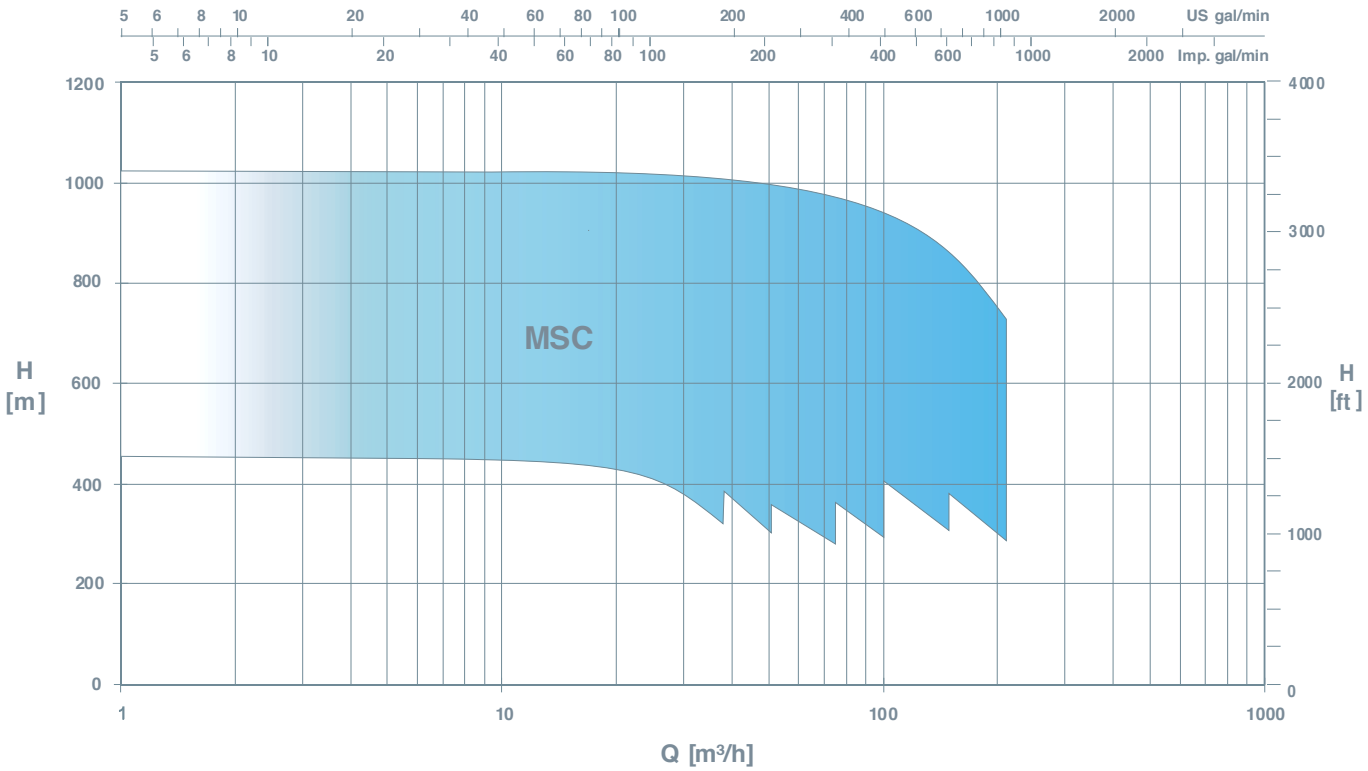
- Single or double acting mechanical seal.
- Cooled or un-cooled.
- Packed gland.

Benefits

- ***Reduced life-cycle cost***
  - higher efficiency due to SIHI patented balance drum system
  - only one shaft seal
  - lower power consumption
  - high reliability
- ***Easy to maintenance***
  - simple dismantling and assembly
- ***Minimised wear***
  - Reduced usage of spare parts
- ***Global service network***

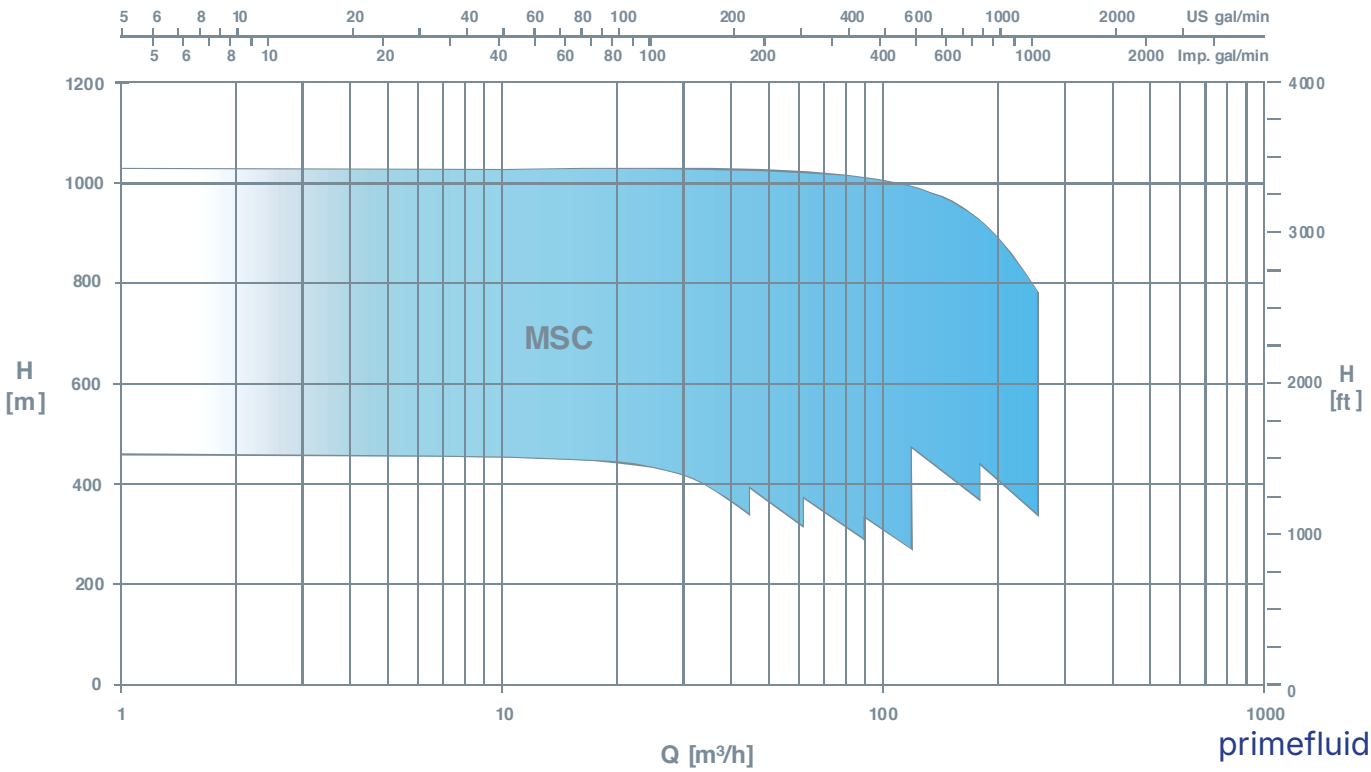
Range coverage 50 Hz

n = 2950 rpm



Range coverage 60 Hz

n = 3550 rpm



Allowable casing pressure

Flange	Suction casing				Discharge casing			
	Pressure stage	Medium temperature			Pressure stage	Medium temperature		
		-10… +120°C	<140°C	<180°C		-10… +120°C	<140°C	<180°C
1	PN 16	16 bar	15,8 bar	15,5 bar	PN 100	100 bar	98,9 bar	96,8 bar
2	PN 25	25 bar	24,7 bar	24,2 bar	PN 100	100 bar	98,9 bar	96,8 bar
A	Class 300	25 bar	24,7 bar	24,2 bar	Class 600	100 bar	98,9 bar	96,8 bar

Nozzle position

Suction casing


axial


radial left


radial top


radial right

Every combination of Suction- and Discharge casing is possible.

Discharge casing

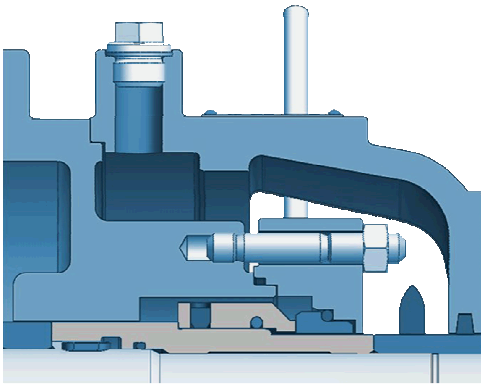

radial top


radial left

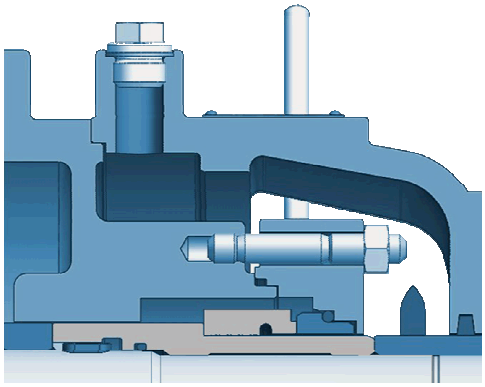

radial right

Shaft sealing

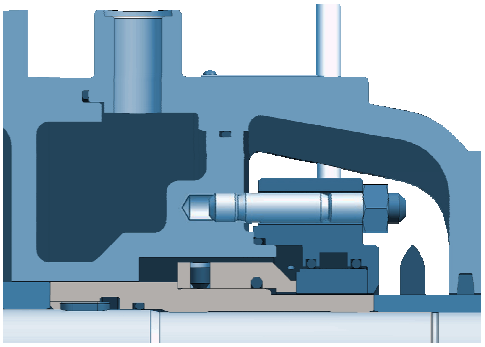
Mechanical seal arrangement



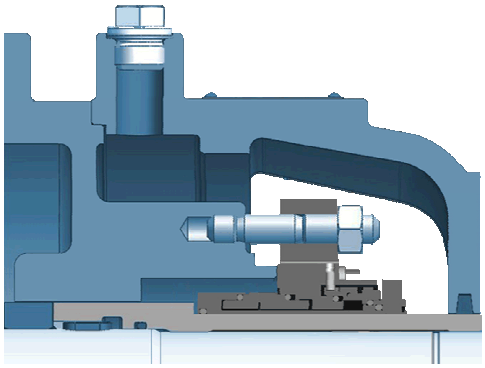
Mechanical seal balanced,
un-cooled with internal feed



Mechanical seal unbalanced
un-cooled with internal feed

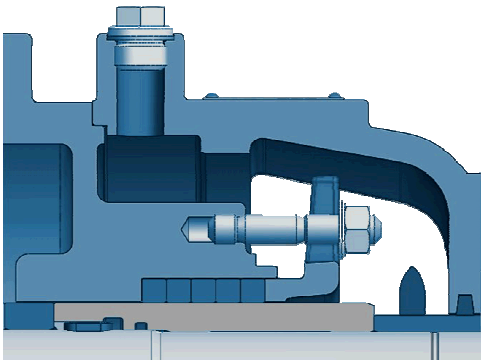


Option: Mechanical seal with
counter ring cooling

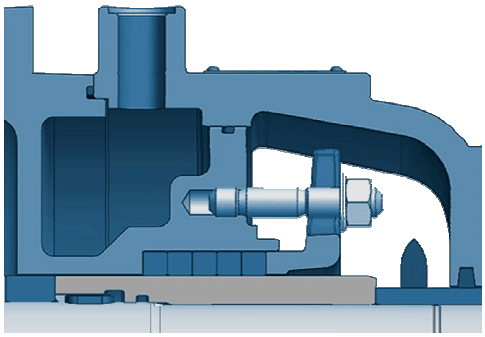


Option: Cartridge seal

Packed gland arrangement



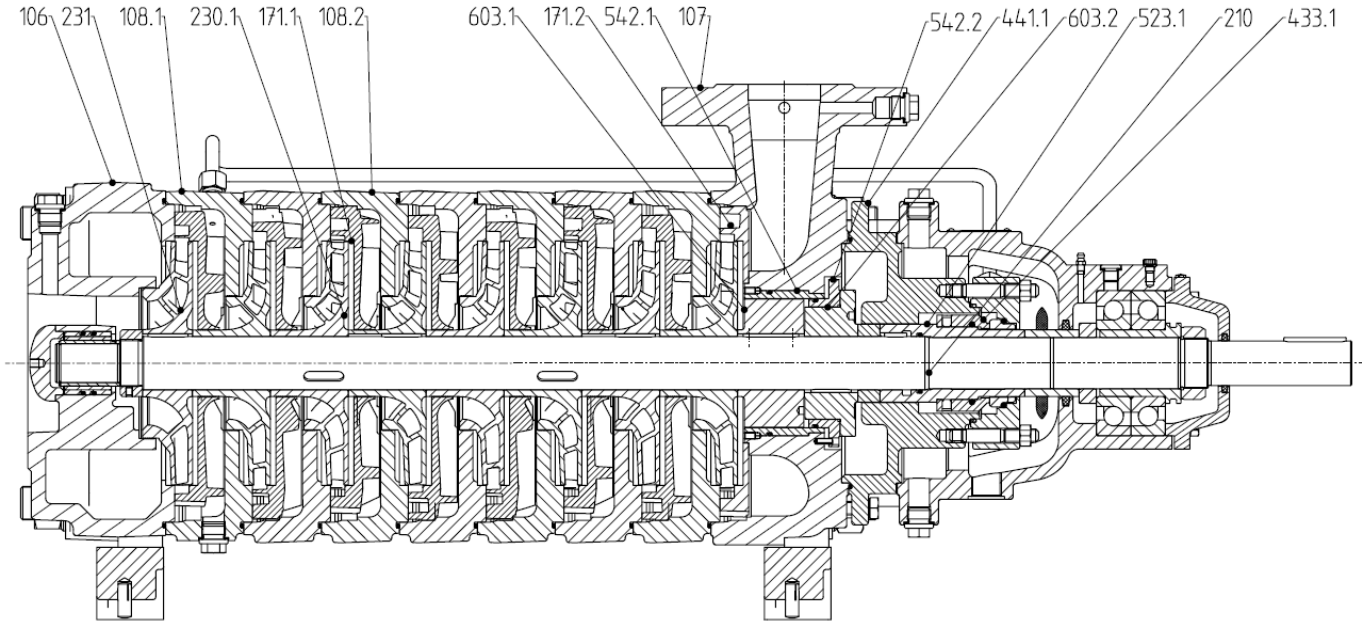
Packet gland, un-cooled



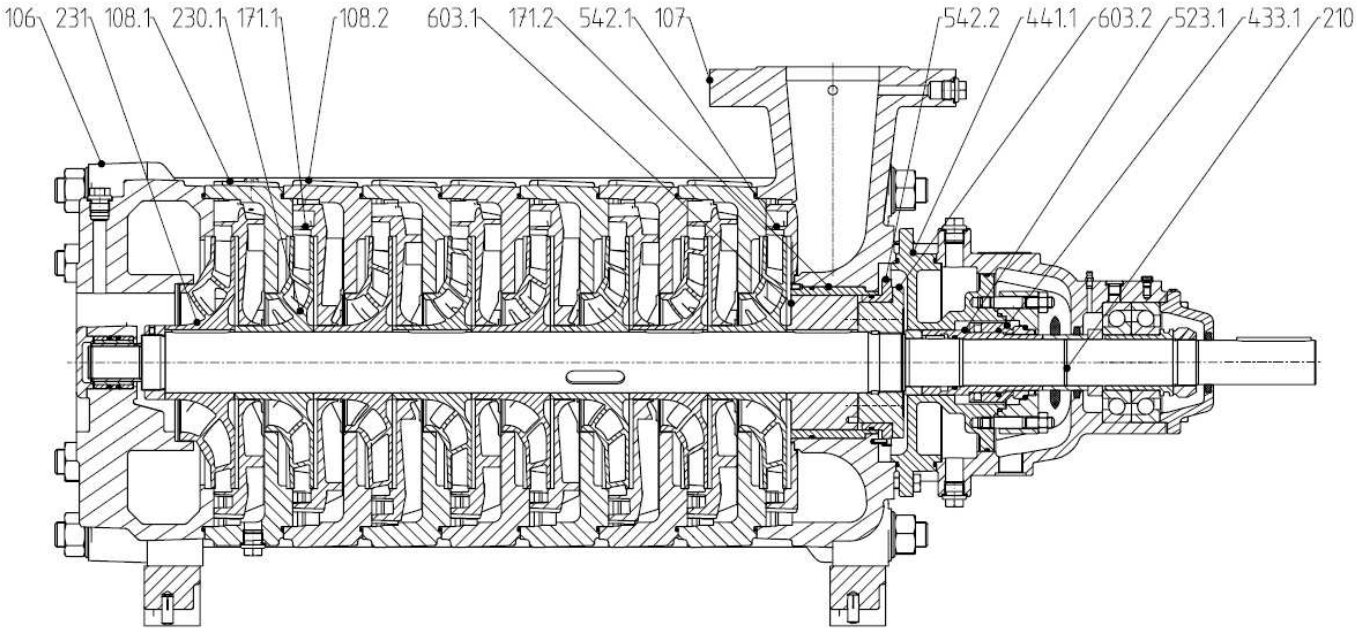
Packet gland, cooled,
with external jacket cooling

Sectional drawing MSC with end-suction

Size 050 and 065

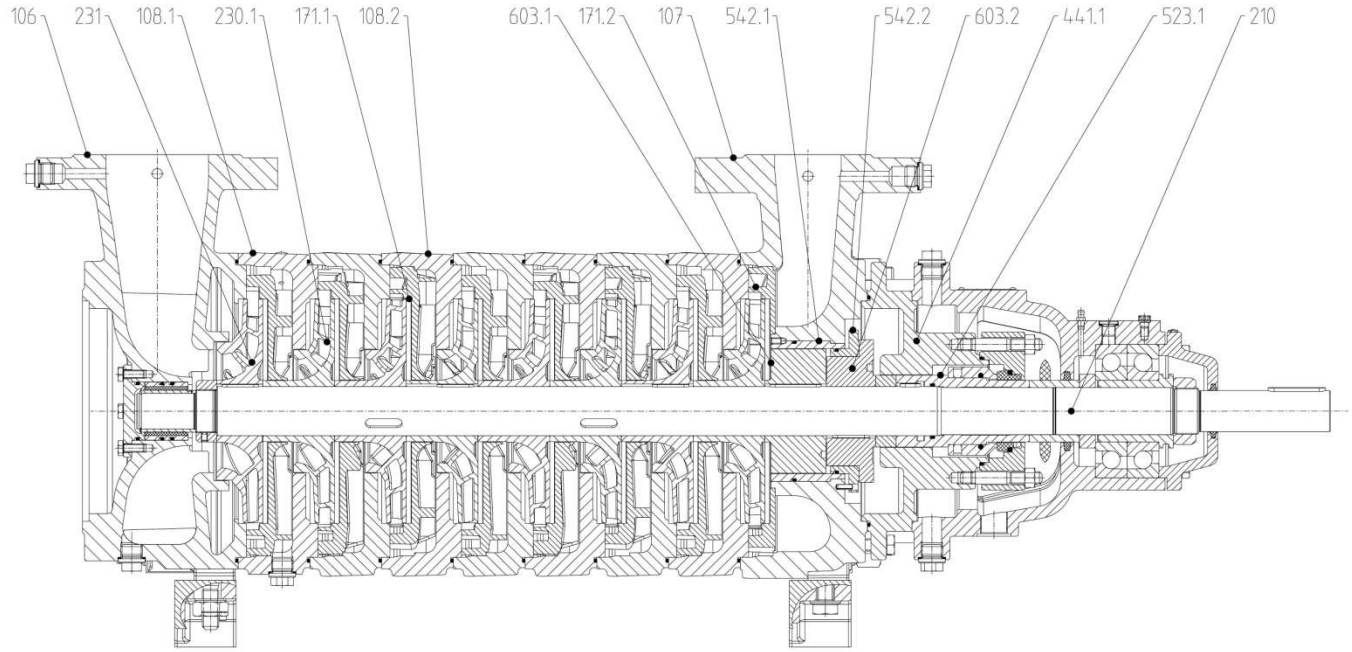


Size 100

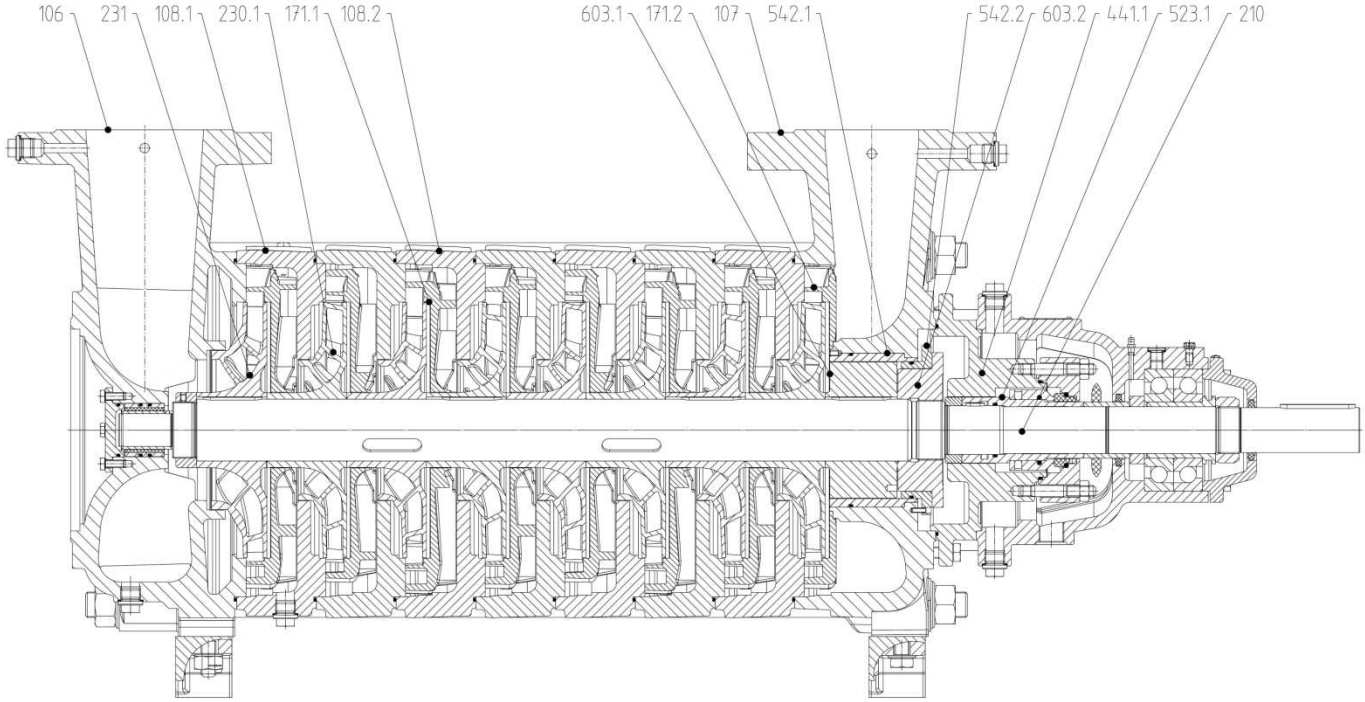


Sectional drawing MSC with radial inlet

Size 050 and 065



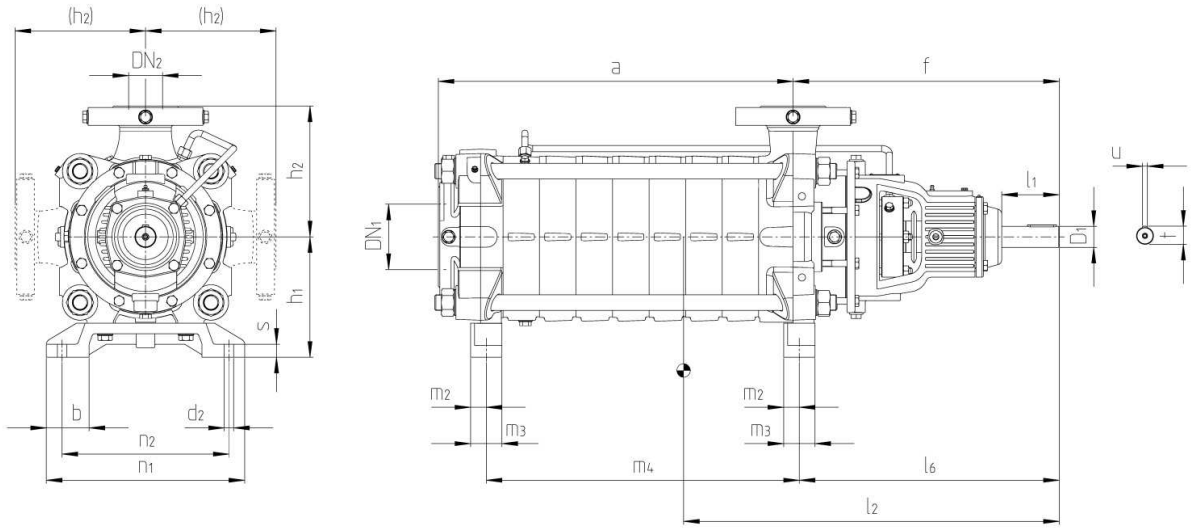
Size 100



Parts and material design

Position	Item	Material of construction	
		TE	TF
106	Suction casing	1.4008– EN 10283	
107	Discharge casing	1.4008 – EN 10283	
108.1	Stage casing	1.4008 – EN 10283	
108.2			
171.1	Diffuser	EN-GJL-HB 195	1.4408 – EN 10283
171.2			
210	Shaft	1.4021 – EN 10088	
230.1	Impeller	EN-GJL-HB 195	1.4408 – EN 10283
231	Suction Impeller	1.4408 – EN 10283	
433.1	Shaft sealing	different, see page with shaft sealing	
441.1	Shaft sealing casing	1.4408 – EN 10283	
523.1	Shaft sleeve	1.4021 – EN 10088	
542.1	Throttle bush	1.4021 – EN 10088	
542.2	Throttle bush	1.4034 – EN 10088	
603.1	Balance drum system	1.4122 – EN 10088	
603.2		1.4021 – EN 10088	

Dimensional drawing MSC with end-suction

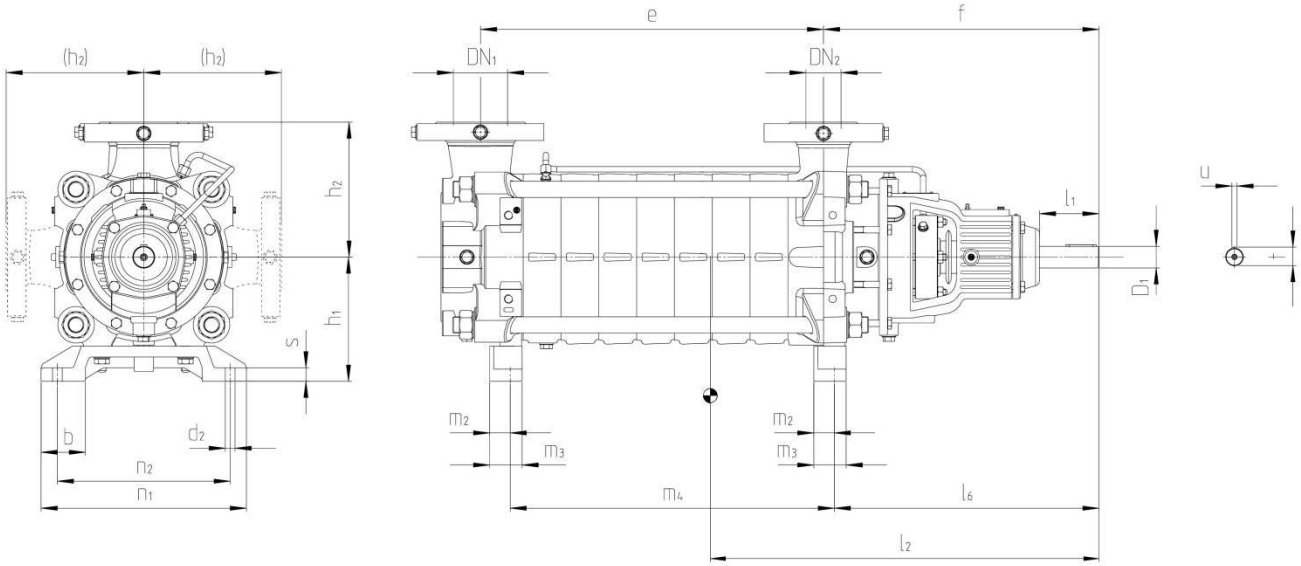


Size	Pumps													Shaft End			
	DN1	DN2	b	d2	f	h1	h2	l6	m2	m3	n1	n2	s	Ø D1	l1	t	u
050	100	50	70	13,5	415	185	200	385	32	45	335	300	21	28 k6	60	31	8
065	125	65	82	18	510	230	250	490	38	60	380	320	25	40 k6	110	43	12
100	150	100	82	18	520	285	320	485	38	60	380	320	25	48 k6	110	51	14
Dimensions in mm																	

Size		Number of stages (hydraulic stages + blind stages)															
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
050	a	-	-	-	-	450	505	560	615	670	725	780	835	890	945	1000	1055
	m4	-	-	-	-	410	465	520	575	630	685	740	795	850	905	960	1015
	weight	-	-	-	-	193	207	221	235	249	263	277	291	305	319	333	347
065	a	-	400	470	540	610	680	750	820	890	960	1030	1100	1170	1240	1310	1380
	m4	-	320	390	460	530	600	670	740	810	880	950	1020	1090	1160	1230	1300
	weight	-	250	279	308	337	366	395	424	453	482	511	540	569	598	627	656
100	a	390	475	560	645	730	815	900	985	1070	-	-	-	-	-	-	-
	m4	314	399	484	569	654	739	824	909	994	-	-	-	-	-	-	-
	weight	363	410	457	504	551	598	645	692	739	-	-	-	-	-	-	-
Dimensions in mm; ca. Weight in kg																	

Size		Centre of gravity subject to number of stages															
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
050	l2	-	-	-	-	536	563	591	618	646	673	701	728	756	783	811	838
065	l2	-	586	621	656	691	726	761	796	831	866	901	936	971	1006	1041	1076
100	l2	610	653	695	738	780	823	865	908	950	-	-	-	-	-	-	-
Dimensions in mm																	

Dimensional drawing MSC with radial inlet

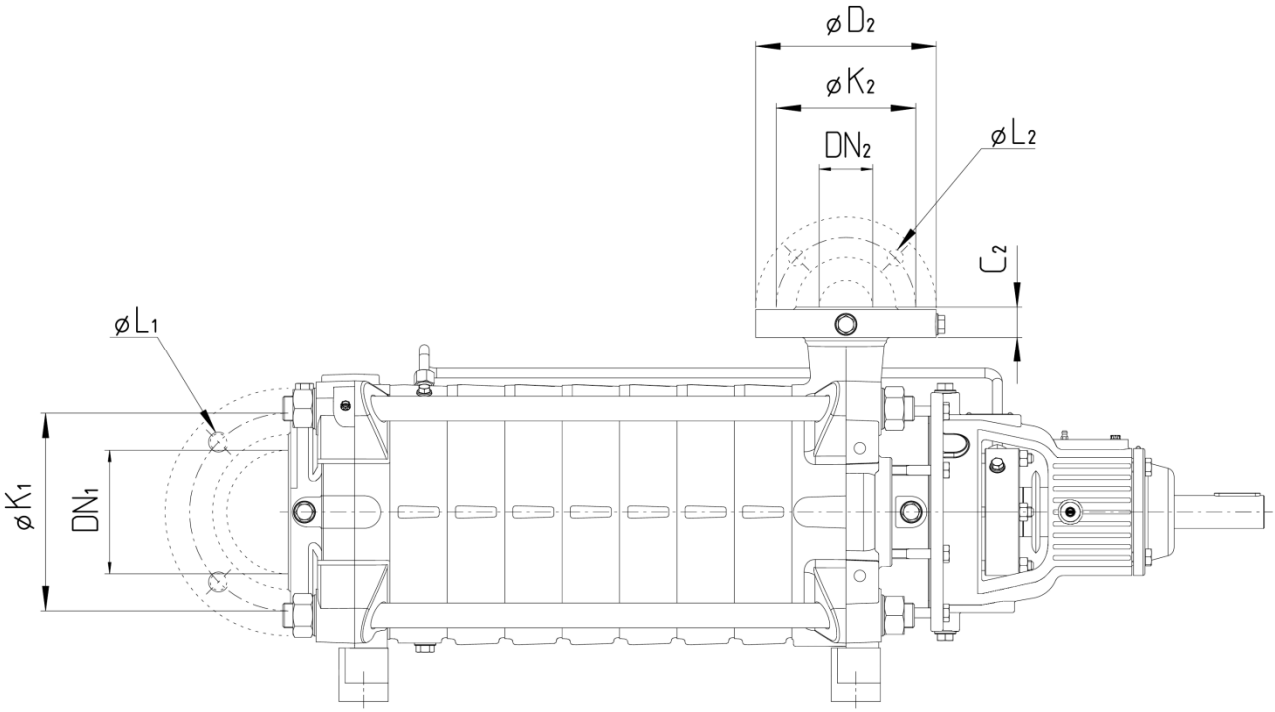


Size	Pumps													Shaft end			
	DN1	DN2	b	d2	f	h1	h2	l6	m2	m3	n1	n2	s	Ø D1	l1	t	u
050	80	50	70	13,5	415	185	200	385	32	45	335	300	21	28 k6	60	31	8
065	100	65	82	18	510	230	250	490	38	60	380	320	25	40 k6	110	43	12
100	125	100	82	18	520	285	320	485	38	60	380	320	25	48 k6	110	51	14
Dimensions in mm																	

Size		Number of stages (hydraulic stages + blind stages)															
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
050	e	-	-	-	-	430	485	540	595	650	705	760	815	870	925	980	1035
	m4	-	-	-	-	410	465	520	575	630	685	740	795	850	905	960	1015
	Weight	-	-	-	-	191	206	221	236	251	266	281	296	311	3226	324	356
065	e	-	355	425	495	565	635	705	775	845	915	985	1055	1125	1195	1265	1335
	m4	-	320	390	460	530	600	670	740	810	880	950	1020	1090	1160	1230	1300
	Weight	-	269	296	323	350	377	404	431	458	485	512	539	566	593	620	647
100	e	350	435	520	605	690	775	860	945	1030	-	-	-	-	-	-	-
	m4	314	399	484	569	654	739	824	909	994	-	-	-	-	-	-	-
	Weight	371	418	468	512	559	606	653	700	747	-	-	-	-	-	-	-
Dimensions in mm; ca. Weight in kg																	

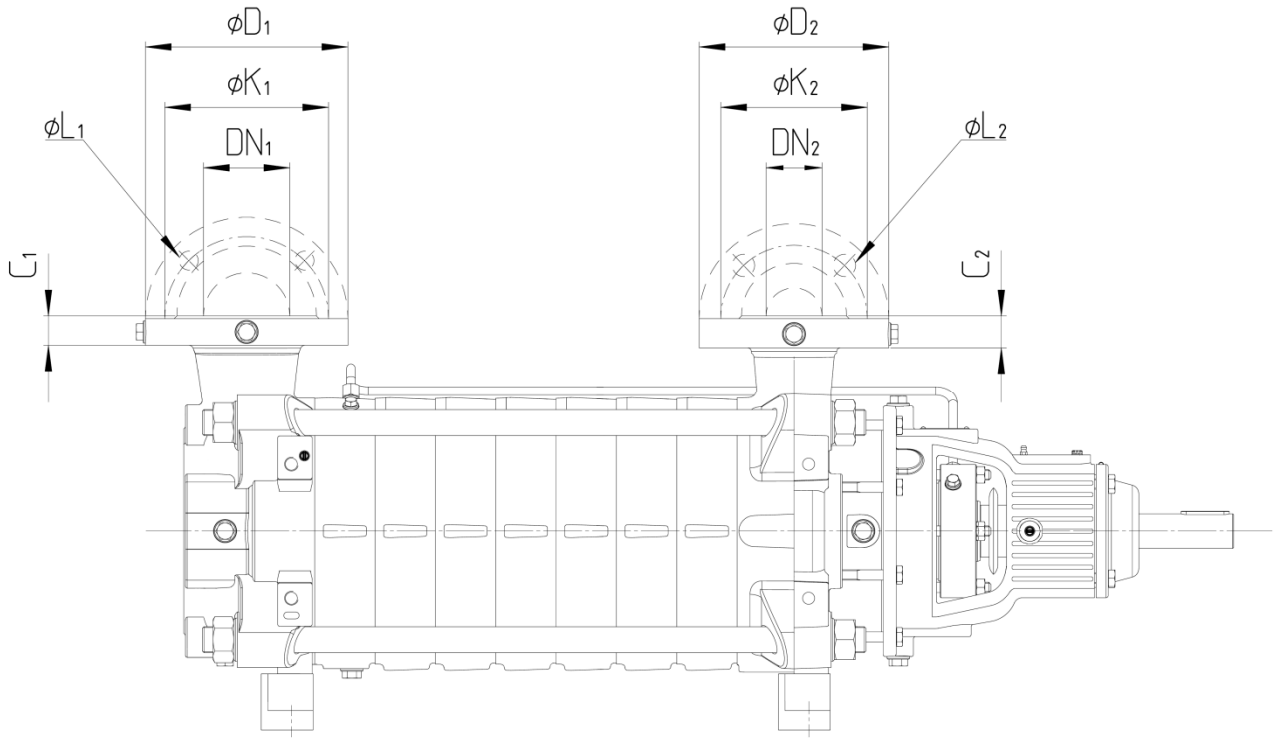
Sizes		Centre of gravity subject to number of stages															
		3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
050	l2	-	-	-	-	555	583	611	639	667	695	723	751	779	807	835	863
065	l2	-	600	635	670	705	740	775	810	845	880	915	950	956	1020	1055	1090
100	l2	603	647	691	735	779	823	867	911	955	-	-	-	-	-	-	-
Dimensions in mm																	

Nominal size, nominal pressure and flange rating with end suction



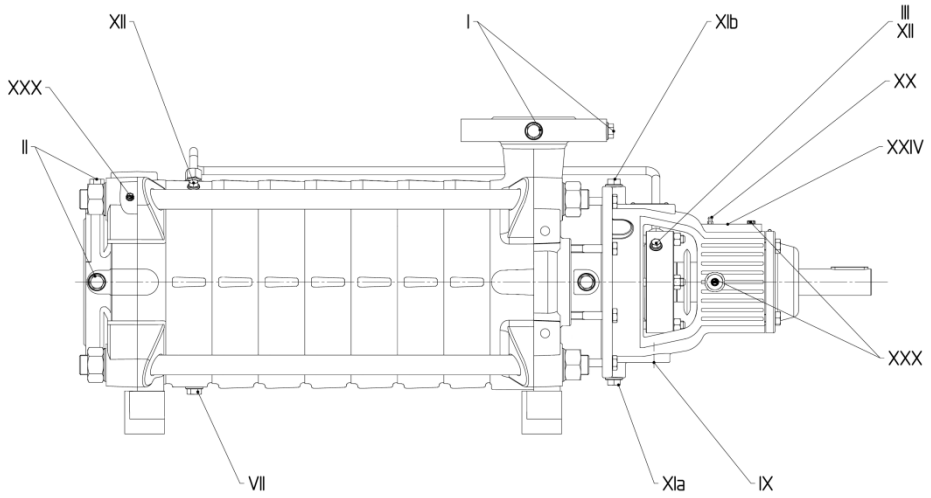
Size	Flanges	Suction side				Discharge side					
		drilled acc. to	DN1	ØK1	n x ØL1	drilled acc. to	DN2	ØD2	C	ØK2	n x ØL2
050	1	PN 16	100	180	8 x M16	PN 100	50	195	36	145	4 x 26
	2	PN 25	100	190	8 x M20						
	A	Class 300	100 (4“)	200	8 x ¾“ UNC	Class 600	50 (2“)	195	37	127	8 x 19
065	1	PN 16	125	210	8 x M16	PN 100	65	220	37	170	8 x 26
	2	PN 25	125	220	8 x M24						
	A	Class 300	125 (5“)	235	8 x ¾“ UNC	Class 600	65 (2½“)	220	38	149,2	8 x 22
100	1	PN 16	150	240	8 x M20	PN 100	100	265	43	210	8 x 30
	2	PN 25	150	250	8 x M24						
	A	Class 300	150 (6“)	269,9	12 x ¾“ UNC	Class 600	100 (4“)	265	45	215,9	8 x 26
Dimensions in mm											
Note: The axial suction casings are supplied with the required threaded blind holes.											

Nominal size, nominal pressure and flange rating with radial inlet

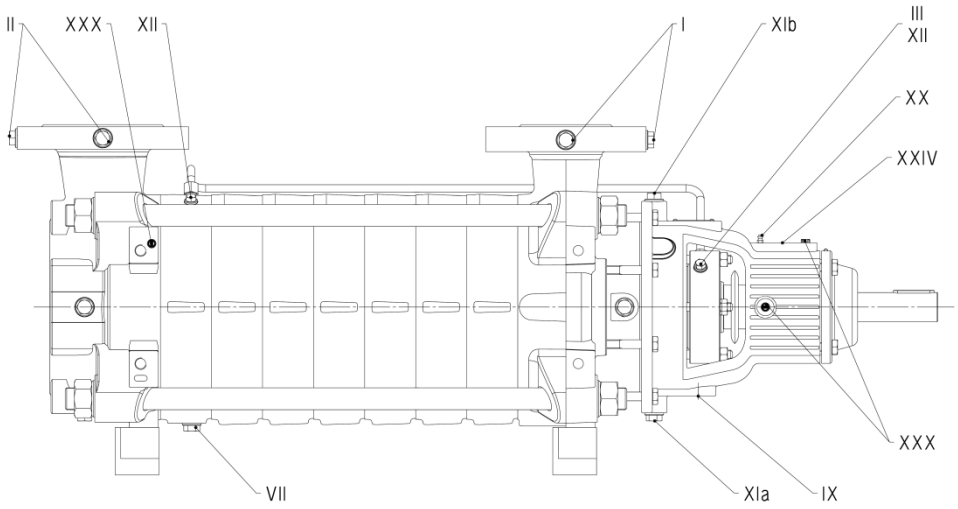


Size	Flanges	Suction side						Discharge side					
		drilled acc. to	DN1	Ø D1	C1	Ø K1	n x Ø L1	drilled acc. to	DN2	Ø D2	C2	Ø K2	n x Ø L2
050	1	PN 16	80	200	35	160	8 x 18	PN 100	50	195	36	145	4 x 26
	2	PN 25	80	200	35	160	8 x 18						
	A	Class 300	80 (3")	210	35	168,3	8 x 23	Class 600	50 (2")	195	37	127	8 x 19
065	1	PN 16	100	220	34	180	8 x 18	PN 100	65	220	37	170	8 x 26
	2	PN 25	100	235	34	190	8 x 22						
	A	Class 300	100 (4")	254	34	200	8 x 23	Class 600	65 (2 1/2")	220	38	149,2	8 x 22
100	1	PN 16	125	250	36	210	8 x 18	PN 100	100	265	43	210	8 x 30
	2	PN 25	125	270	36	220	8 x 26						
	A	Class 300	125 (5")	279	36	234,9	8 x 23	Class 600	100 (4")	265	45	215,9	8 x 26
Dimensions in mm													

Connections with end-suctions



Connections with radial inlet



Pos.	Connection	Size	
		050	065, 100
I	Measurement of discharge pressure or liquid temperature	3 x G 1/2	
II	Measurement of suction pressure or liquid temperature	2 x G 1/2	
III	Shaft seal vent/flush	G 1/4	
VII	Drain	G 3/8	G 1/2
IX	Seal drain	G 3/8	G 3/4

Pos.	Connection	Size	
		050	065, 100
XIa	external jacket-cooling (inlet)	G 3/8	G 1/2
XIb	external jacket-cooling (outlet)	G 3/8	G 1/2
XII	Circulation pipe	2 x G 1/4	
XX	Grease lubrication anti-friction bearing	DIN 71412- A M6	
XXIV	Measurement of bearing temperature	G 1/4	
XXX	SIHI^detect or measurement thrust impulse	3x M8	

Additional innovative solutions from SIHI

SIHI*detect*

Condition based monitoring

Detect wear before damage occurs

+ Cavitation and process turbulence
+ Simple to connect
+ LED display
+ Available Ex
+ All rotating machinery
+ DCS integration and continual monitoring

Noise and Vibration analysis allows this compact device to diagnose the (often hidden) symptoms of longer term damage even before vibration occurs.

SIHI*multi*

MSH Boiler feed pumps

Multistage centrifugal pumps

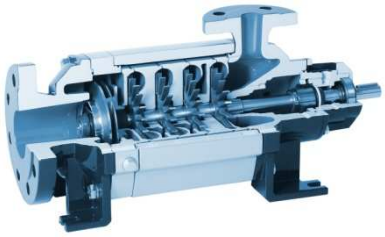
Flowrate:	up to 250 m³/h
Head:	up to 1,600 m
Materials:	Chrome steel

MSL Condensate pumps

Multistage centrifugal pumps

Flowrate:	up to 450 m³/h
Head:	up to 400 m
Materials:	Cast iron, stainless steel

SIHI*prime*



CEH Low NPSH pumps

Side channel pumps

Flowrate:	up to 35 m³/h
Head:	up to 354 m
Materials:	Cast iron, stainless steel

SIHI*SuperNova*

ZLN Cooling water pumps

Single stage Volute casing pumps

Flowrate:	up to 1,800 m³/h
Head:	up to 140 m
Materials:	Cast iron, stainless steel

Supplied by
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