

Process Pump

RPH

Type Series Booklet



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Type Series Booklet RPH

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Centrifugal Pumps with Shaft Seal

Process Pumps

RPH



Main applications

Pump for handling the large variety of crude oil products in refineries as well as in the chemical and petrochemical industry.

- Refineries
- Chemical industry
- Petrochemical industry

Operating data

Operating properties

Characteristic		Value
Flow rate	Q	Up to 4150 m ³ /h
Head	H	Up to 270 m
Operating temperature	T	-70 °C to +450 °C
Operating pressure ¹⁾	p	Up to 51 bar (at 20 °C) (ASME B 16.5 class 300) for A 216 Grade WBC

Designation

Example: RPH-H-I S1 80-280B

Key to the designation

Code	Description
RPH	Type series
H	Heatable model
I	Version with auxiliary impeller (inducer)
S1	Material variant to API 610
80	Nominal discharge nozzle diameter [mm]

¹⁾ Higher pressures and flange pressure ratings on request

Code	Description
280	Nominal impeller diameter [mm]
B	Special hydraulic system (type B)

Design details

Design

- Volute casing pump
- Horizontal installation
- Back pull-out design
- Single-stage
- Meets technical requirements to API 610, 11th edition / ISO 13709

Pump casing

- Volute casing with integrally cast pump feet
- Centreline pump feet
- Single or double volute, depending on the pump size
- Radially split volute casing
- Axial inlet nozzle, tangential discharge nozzle pointing vertically upwards.
(From DN 250 / from impeller diameter 500 / pump size 200-401: radial discharge nozzle pointing vertically upwards)
- Volute casing with casing wear ring
- Casing cover (with casing wear ring, as required)

Optional:

- Casing and casing cover heatable/coolable, depending on size

Impeller type

- Closed radial impeller
- Impeller with impeller wear ring on the suction side (if required also on the discharge side)
- Sealing gap and balancing holes balance axial forces.

Optional:

- Inducer to improve the NPSH value

Shaft seal

- Cartridge seal to API 682

Bearings

- Uncooled

Optional:

- Cooled bearing bracket

Drive-end bearing:

- Fixed bearing
- Paired angular contact ball bearings
- Oil bath lubrication
- **Optional:** oil mist lubrication

Pump-end bearing:

- Radial bearing

- Cylindrical roller bearing
- Absorbs radial loads only
- Oil bath lubrication
- **Optional:** oil mist lubrication

Bearing bracket designation

Example: B03

Bearing bracket designation

Designation	Description
B	Back pull-out bearing bracket
03	Size code (based on dimensions of seal chamber, shaft end and bearings)

Bearings used

Bearing design

KSB designation	FAG designation	SKF designation
B.MUA	B-MP-UA	BECBM

Standard bearing assembly

Bearing bracket	Rolling element bearings	
	Pump end	Motor end
B02	NU211C3	2 x 7309B-MUA
B03	NU213C3	2 x 7311B-MUA
B05	NU316C3	2 x 7315B-MUA
B06	NU324C3	2 x 7224B-MUA
B07	NU324C3	2 x 7324B-MUA

Reinforced bearing assembly (triple bearing assembly)

Bearing bracket	Rolling element bearings	
	Pump end	Motor end
B02	NU211C3	3 x 7309B-MUA
B03	NU213C3	3 x 7311B-MUA
B05	NU316C3	3 x 7315B-MUA
B06	NU324C3	3 x 7224B-MUA
B07	NU324C3	3 x 7324B-MUA

Bearing life

The calculated minimum bearing life is:

- 25,000 h to API 610

Materials

Materials

Part No.	Description	Design						
		S1 ²⁾	S5 ³⁾⁴⁾	S6	S8	A8	C6	D1
102	Volute casing	CS				316AUS	12Cr	DSS
161	Casing cover (uncooled)	CS				316AUS	12Cr	DSS
	Casing cover (cooled)	CS				316AUS	12Cr	DSS
210	Shaft ⁵⁾	CS	12Cr+H ³⁾ 4140AS ⁴⁾	12Cr+H ²⁾³⁾ 4140AS ⁴⁾	DSS	DSS 316AUS ⁴⁾	12Cr+H ²⁾³⁾ 12Cr ⁴⁾	DSS
230	Impeller	CI	CS	12Cr	316AUS	316AUS	12Cr	DSS

2) Europe

3) Asia

4) Americas

5) Above 250 °C: CrMo; -10 °C to 250 °C: CS; -40 °C to +300 °C: DSS

Part No.	Description	Design						
		S1 ²⁾	S5 ³⁾⁴⁾	S6	S8	A8	C6	D1
330	Bearing bracket	CS						
411.10	Joint ring	AUS/ graphite						DSS/ graphite
502.01/02	Casing wear ring	27Cr	27Cr 12Cr+H ³⁾⁴⁾	316AUS	316AUS 316AUS+HF ³⁾ 12Cr ⁴⁾	27Cr 12Cr+H ³⁾⁴⁾	AUS DSS ³⁾⁴⁾	
503.01/02	Impeller wear ring	12Cr+H	12Cr+H	316AUS	316AUS 12Cr ⁴⁾	12Cr+H	AUS DSS ³⁾⁴⁾	
542.02	Throttling bush	12Cr+H	12Cr+H 12Cr ⁴⁾	316AUS		12Cr+H 12Cr ⁴⁾	AUS DSS ³⁾⁴⁾	
902.01/920.01	Casing screws/ hexagon nut	CrMoV / CrMo 4140AS ³⁾⁴⁾						

Material variant for pump components

Description	Material class	Material		
		Europe	Asia	Americas
Cast components, general	CI	JS1025	-	-
	CS	A216 Gr WCB	A216 Gr WCB	A216 Gr WCB
	316AUS	1.4408 1.4409	A743 Gr CF3M A743 Gr CF8M	A743 Gr CF8M
	12Cr	1.4008	A743 Gr CA6NM	A743 Gr CA6NM
	27Cr	VG434	-	-
	DSS	1.4593 A890 Gr 1B	A890 Gr 1B	A890 Gr 1B
Pressure-retaining cast components	CS	A216 Gr WCB	A216 Gr WCB	A216 Gr WCB
	316AUS	A351 Gr CF3M A351 Gr CF8M	A351 Gr CF3M A351 Gr CF8M	A351 Gr CF8M
	12Cr	A217 Gr CA15	A487 Gr CA6NM	A487 Gr CA6NM
	DSS	1.4593 A995 Gr 1B	A995 Gr 1B	A995 Gr 1B
Bar stock (shaft)	CS	C45+N	-	-
	CrMo	1.7709	-	-
	316AUS	-	-	A276 Type 316
	4140AS	-	-	A434 Cl. BB
	12Cr	-	-	A276 Type 420
	12Cr+H	1.4021+QT700	A276 Type 410 H&T	-
Bar stock	DSS	1.4462	AISI 329 1.4462	1.4462
	AUS	1.4539	-	-
	316AUS	1.4571	A 276 Type 316	AISI 316 A276 Type 316
	12Cr	-	-	AISI 420 A276 Type 420
	12Cr+H	1.4027+QT	1.4024.19 A276 Type 410 H&T	AISI 420 Hard
	DSS	1.4462	AISI 329 1.4462	1.4462
Screw/bolt/stud	316AS+HF	-	A743 Gr CF8M + Colmonoy Coating	-
	4140AS	-	A193 Gr B7	A193 Gr B7
Nut	CrMo	1.7709	-	-
	4140AS	-	A194 Gr 2H	A194 Gr 2H
	CrMo	1.7258	-	-

- 2) Europe
3) Asia
4) Americas

Abbreviations used

Abbreviation	Material
CI	Cast iron
CS	Unalloyed steel
316AUS	Austenitic stainless steel >2 % molybdenum
12Cr	12 % chrome steel
27Cr	27 % chrome steel
DSS	Duplex stainless steel
4140AS	4140 alloyed steel
+H	Hardened
+HF	Hard-faced

Table of comparison of materials

Material type	Code	Material No.	Standard	Closest ASTM equivalent	
Cast iron	GJS-400-15	JS1030	EN 1563	A 536 Grade 60-40-18	
	GJS-400-18-LT	JS1025	EN 1563	A 536	
	GJL-250	JL1040	EN 1561	A 48 Class 30	
Cast steel	GP240GH+N	1.0619+N	EN 10213-2	A 216 Grade WCB	
Cast stainless steel	GX5CrNiMo19-11-2	1.4408	EN 10213-4	A 351 Grade CF8M	
	GX5CrNiMo19-11-2	1.4408	EN 10213	A 743 Grade CF8M	
	GX2CrNiMo19-11-2	1.4409	EN 10213-4	A 351 Grade CF3M	
	GX2CrNiMo19-11-2	1.4409	EN 10213	A 743 Grade CF3M	
	GX3CrNiMoCuN24-6-2-3	1.4593	-	-	
	GX2CrNiMoCuN25-6-3-3	1.4517	EN 10213	-	
Cast chrome steel	GX20Cr 14+QT	1.4027+QT	SEW 410	A 743 Grade CA15	
	GX35CrNiMo25-4	VG 434	KSB materials data sheet Material identification code 2800	-	
	GX7CrNiMo12-1	1.4008	EN 10283	A 743 Grade CA15	
	GX8CrNi12	1.4107	EN 10213-2	A 217 Grade CA15	
	GXZ5CrNi13-4	1.4317	EN 10213-2	A 487 CA6NM	
	GXZ5CrNi13-4	1.4317	EN 10283	A 743 CA6NM	
Stainless steel	X6CrNiMoTi17-12-2	1.4571	EN 10088	A 276 Type 316Ti	
	X2CrNiMoN22-5-3	1.4462	EN 10088	A 182 Grade F51	
Chrome steel	X20Cr13+QT700	1.4021+QT700	EN 10088	A 276 Type 420	
	X20Cr13	1.4021	EN 10088	AISI 420 Hard	
	X15Cr13	1.4024.19	KSB materials data sheet Material identification code 1219	A 276 Type 410	
	X29CrS13	1.4029	EN 10088	-	
	X12Cr13	1.4006	EN 10088	A 276 Type 410 H&T	
	X5CrNiMo17-12-2	1.4401	EN 10088	A 276 Type 316	
	X4CrNiMoN27-5-2	1.4460	EN 10088	AISI 329	
	X2CrNiMoN17-13-3	1.4429	EN 10088	A 276 Type 316L	
	Steel which is creep-resistant at elevated temperatures	21CrMoV5-7+QT	1.7709+QT	EN 10269	A 193 Grade B16
		P355GH	1.0566	EN 10028-3	
Carbon steel	C45+N	1.0503+N	EN 10083	A 576 Grade 1045	
	C22+N	1.0402+N	EN 10083	A 576 Grade 1020	
Cast stainless steel, hard-faced	GX5CrNiMo19-11-Colm.6	1.4408-Colm.6	-	A 743 Grade CF8M-Colm.6	

Coating and preservation

- Coating and preservation to KSB standard

Product benefits

- Double volute from DN 80 (3 in.): low radial load and less shaft deflection for longer service life of bearings and mechanical seal
- Easy to service thanks to back pull-out design

- Heatable casing covers optionally available for high-temperature applications
- Wide variety of flanges to all standards up to PN 100 equivalent (ASME Class 600)
- Max. shaft diameter in acc. with API 610 makes for very long service life of mechanical seal
- Dimensioned for longer service life than specified by API 610, reducing maintenance expenditure and work
- Tandem bearing arrangement optionally available to absorb high axial forces

- Cast steel bearing brackets with integrated cooling fins enable higher fluid temperatures and reduce bearing temperatures.
- Optional fan impeller: no cooling water supply required for high temperatures
- Seal chamber to API 610 accommodates all mechanical seals to API 682.
- Individual adjustment of axial thrust balancing for maximum bearing life
- "Low Nss hydraulic systems" (inducer on option) for optimum selection to API

Acceptance tests / Warranties

- Materials testing
 - Test report 2.2 on request
 - Test report 3.1 on request
- Final inspection
 - Inspection certificate 3.1 to EN 10204 on request
- Hydraulic test

The operating point of each pump is warranted according to ISO 9906/2B.

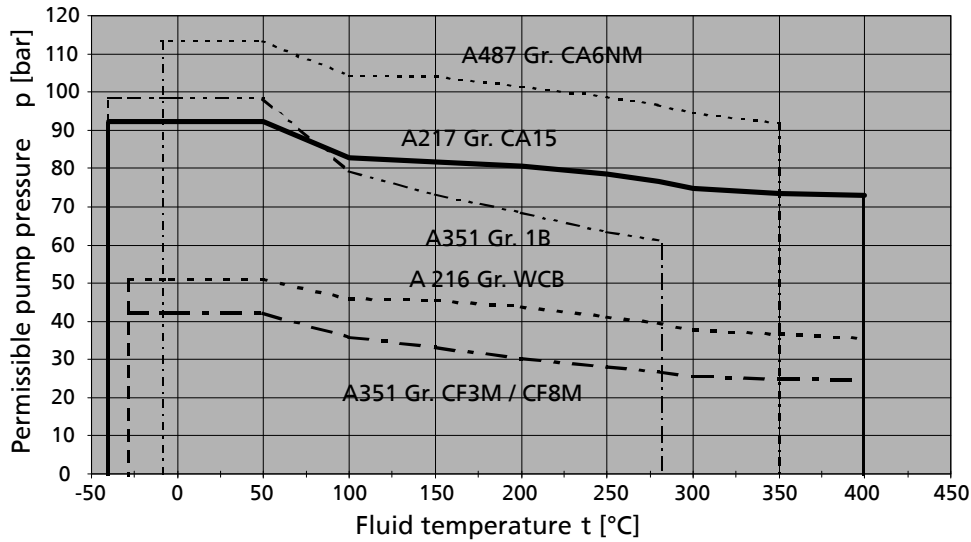
The following acceptance tests may be performed and certified at extra charge:

 - Performance test to ISO 9906
 - Performance test to API (API 610)
 - NPSH test
- Other tests (e.g. vibrations, strength) on request.
- Warranty

Warranties are given within the scope of the valid delivery conditions.

Pressure and temperature limits

Average values – the values of individual pump sizes may be higher or lower than the values indicated. (Contact KSB!)



Pressure and temperature limits of pump

Sizes

Nominal impeller diameters available

Nominal diameter of the discharge nozzle	Nominal impeller diameter																	
	180	181	230	231	280	281	360	361	400	401	450	500	501	504	506	630	670	710
25	X	-	X	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
40	X	X	X	X	X	X	-	X	-	-	-	-	-	-	-	-	-	-
50	X	-	X ⁶⁾	-	X ⁶⁾	-	X ⁶⁾	-	-	-	X ⁶⁾	-	-	-	-	-	-	-
80	X	-	X ⁶⁾	-	X ⁶⁾	-	X ⁶⁾	-	-	-	X ⁶⁾	-	-	-	-	-	-	-
100	X	-	X ⁶⁾	-	X ⁶⁾	-	X ⁶⁾	-	-	-	X ⁶⁾	-	-	-	-	-	-	-
150	-	-	X ⁶⁾	-	X ⁶⁾	-	X ⁶⁾	-	-	-	X ⁶⁾	-	X ⁶⁾⁷⁾	-	-	X ⁶⁾⁷⁾	-	-
200	-	-	-	-	X ⁶⁾	-	X ⁶⁾	-	-	X ⁶⁾⁷⁾	X ⁶⁾	-	X ⁶⁾⁷⁾	-	-	-	X ⁶⁾⁷⁾	-
250	-	-	-	-	-	-	-	-	-	X ⁶⁾⁷⁾	-	-	X ⁶⁾⁷⁾	-	-	X ⁶⁾⁷⁾	-	X ⁶⁾⁷⁾
300	-	-	-	-	-	-	-	-	X ⁶⁾⁷⁾	-	-	X ⁶⁾⁷⁾	-	-	-	X ⁶⁾⁷⁾	-	X ⁶⁾⁷⁾⁸⁾
350	-	-	-	-	-	-	-	-	X ⁶⁾⁷⁾	-	-	X ⁶⁾⁷⁾⁸⁾	-	-	-	X ⁶⁾⁷⁾⁸⁾	-	X ⁶⁾⁷⁾⁸⁾
400	-	-	-	-	-	-	-	-	-	-	-	-	-	X ⁶⁾⁷⁾⁸⁾	X ⁶⁾⁸⁾⁹⁾	X ⁶⁾⁷⁾⁸⁾	-	X ⁶⁾⁷⁾⁸⁾

- 6) Casing with double volute
- 7) Complementary sizes: only in combination with 4-pole drive
- 8) Size on request
- 9) Complementary sizes: only in combination with 6-pole drive

Technical data

Bearing brackets B02S - B06

Size	Bearing bracket ¹⁰⁾	Impeller				Shaft diameter				Drive				
		Impeller outlet width	Impeller inlet diameter	Impeller diameter		In seal chamber	At bearings		At coupling	P/n value ¹¹⁾	Max. drive power at			
				Max.	Min.		Pump end	Drive end ¹²⁾			n = 1450 rpm	n = 1750 rpm	n = 2900 rpm	n = 3500 rpm
		[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]	[mm]		[kW]	[kW]	[kW]	[kW]
25-180	BS02S	6	48	179	120	50	55	45	32	0,0226	32,77	39,55	65,54	79,10
25-230	BS02S	6	48	224	180	50	55	45	32	0,0226	32,77	39,55	65,54	79,10
40-180	BS02S	6	58	180	130	50	55	45	32	0,0226	32,77	39,55	65,54	79,10
40-230	BS02S	6,2	57	224	1	50	55	45	32	0,0226	32,77	39,55	65,54	79,10
40-181	BS02L	7,8	75	180	130	50	55	45	32	0,0334	48,43	58,45	96,86	116,90
40-231	BS02L	7,7	75	230	180	50	55	45	32	0,0334	48,43	58,45	96,86	116,90
40-280	BS02L	7,5	61	278	220	50	55	45	32	0,0334	48,43	58,45	96,86	116,90
40-281	BS02L	7,7	71	278	230	50	55	45	32	0,0334	48,43	58,45	96,86	116,90
40-361	BS02L	7,9	69	343	280	50	55	45	32	0,0334	48,43	58,45	96,86	116,90
50-180	BS02L	10,9	88	180	140	50	55	45	32	0,0334	48,43	58,45	96,86	116,90
50-230	B03	10	95	230	180	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
50-280	B03	9,6	93	286	230	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
50-360	B03	9,6	88	343	280	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
50-450	B03	10	87	430	340	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
80-180	B03	17	110	190	140	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
80-230	B03	14	113	235	190	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
80-280	B03	12,5	110	286	230	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
80-360	B03	11,5	111	350	280	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
80-450	B05S	12	110	430	350	80	80	75	60	0,2141	311,32	375,73	622,63	751,45
100-180	B03	28	133	190	150	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
100-230	B03	22,3	128	235	190	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
100-280	B03	17,8	130	295	230	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
100-360	B05S	15,5	136	355	295	80	80	75	60	0,2141	311,32	375,73	622,63	751,45
100-450	B05S	14,5	140	440	355	80	80	75	60	0,2141	311,32	375,73	622,63	751,45
150-230	B03	35	161	240	190	60	65	55	42	0,0675	97,88	118,13	195,75	236,25
150-280	B05S	28,5	164	295	230	80	80	75	60	0,2141	311,32	375,73	622,63	751,45
150-360	B05S	22	160	365	295	80	80	75	60	0,2141	311,32	375,73	622,63	751,45
150-450	B05L	19,5	171	450	360	80	80	75	60	0,3259	472,56	570,33	945,11	1140,65
150-501	B05L	23	190	504	400	80	80	75	60	0,3259	472,56	570,33	-	-
150-630	B06	20,9	201,9	636	520	100	120	120	95	0,8514	1234,53	1489,95	-	-
200-280	B05S	43,1	198	295	235	80	80	75	60	0,2141	311,32	375,73	622,63	751,45
200-360	B05L	35,5	204	360	295	80	80	75	60	0,3259	472,56	570,33	945,11	1140,65
200-401	B05L	40	222	408	320	80	80	75	60	0,3259	472,56	570,33	-	-
200-450	B05L	28	204	456	360	80	80	75	60	0,3259	472,56	570,33	945,11	1140,65
200-501	B05L	32	222	509	400	80	80	75	60	0,3259	472,56	570,33	-	-
200-670	B06	26	220	690	530	100	120	120	95	0,8514	1234,53	1489,95	-	-
250-401	B05L	63	294	404	320	80	80	75	60	0,3259	472,56	570,33	-	-
250-501	B05L	43	280	504	400	80	80	75	60	0,3259	472,56	570,33	-	-
250-630	B06	38	275	630	515	100	120	120	95	0,8514	1234,53	1489,95	-	-
250-710	B06	38	275	719	520	100	120	120	95	0,8514	1234,53	1489,95	-	-
300-400	B05L	68	294	404	353	80	80	75	60	0,3259	472,56	570,33	-	-
300-500	B05L	58	320	504	410	80	80	75	60	0,3259	472,56	570,33	-	-
300-630	B06	59	317	638	548	100	120	120	95	0,8514	1234,53	1489,95	-	-
350-400	B06	115,4	337	408	380	100	120	120	95	0,4530	656,70	792,60	-	-
400-506	B07	106,4	400	560	450	120	120	120	95	1,2357	1186,3 ¹³⁾	1421,1 ¹³⁾	-	-

10) Coolable on request

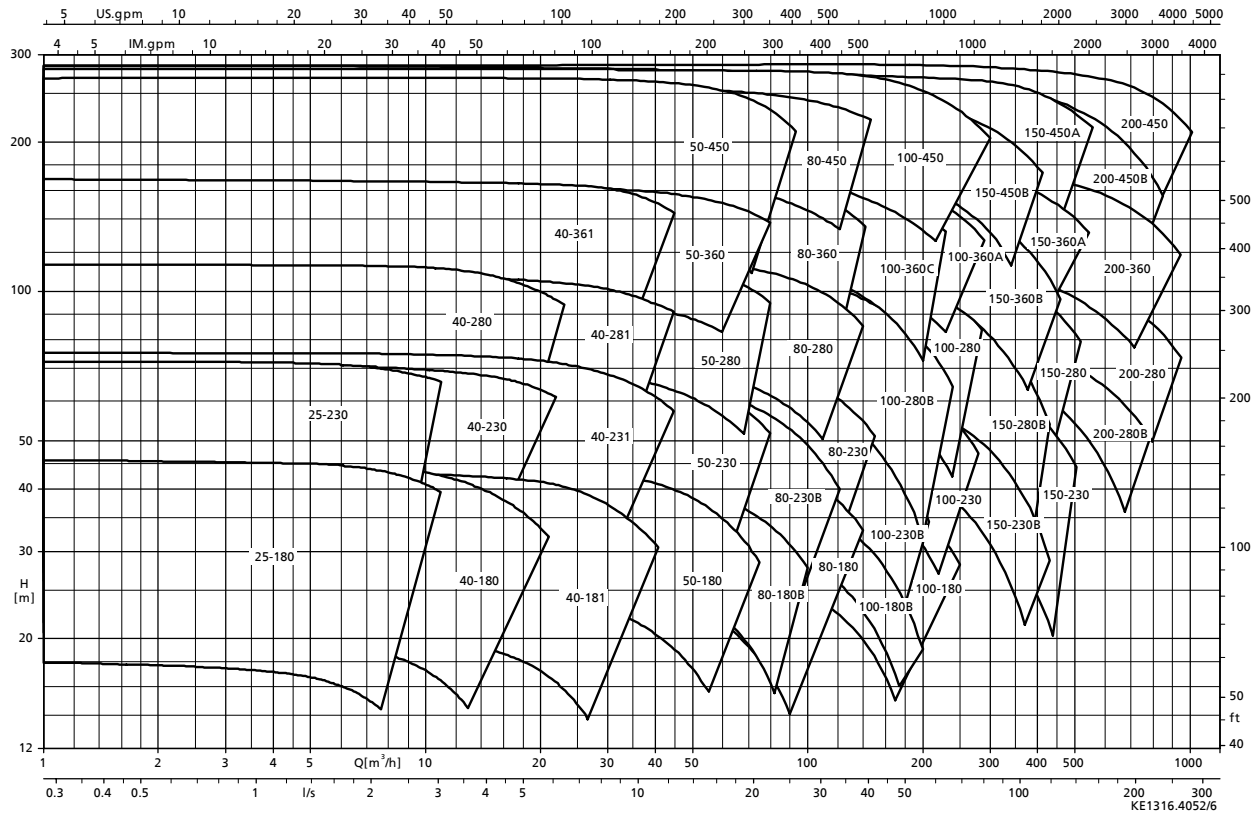
11) Values indicated refer to shaft in material C45+N, key in C45+K, impeller in JS1025 and T < 100 °C; for other materials and higher temperatures contact KSB.

12) For triple bearing assembly: 3 identical bearings as indicated, for high inlet pressures

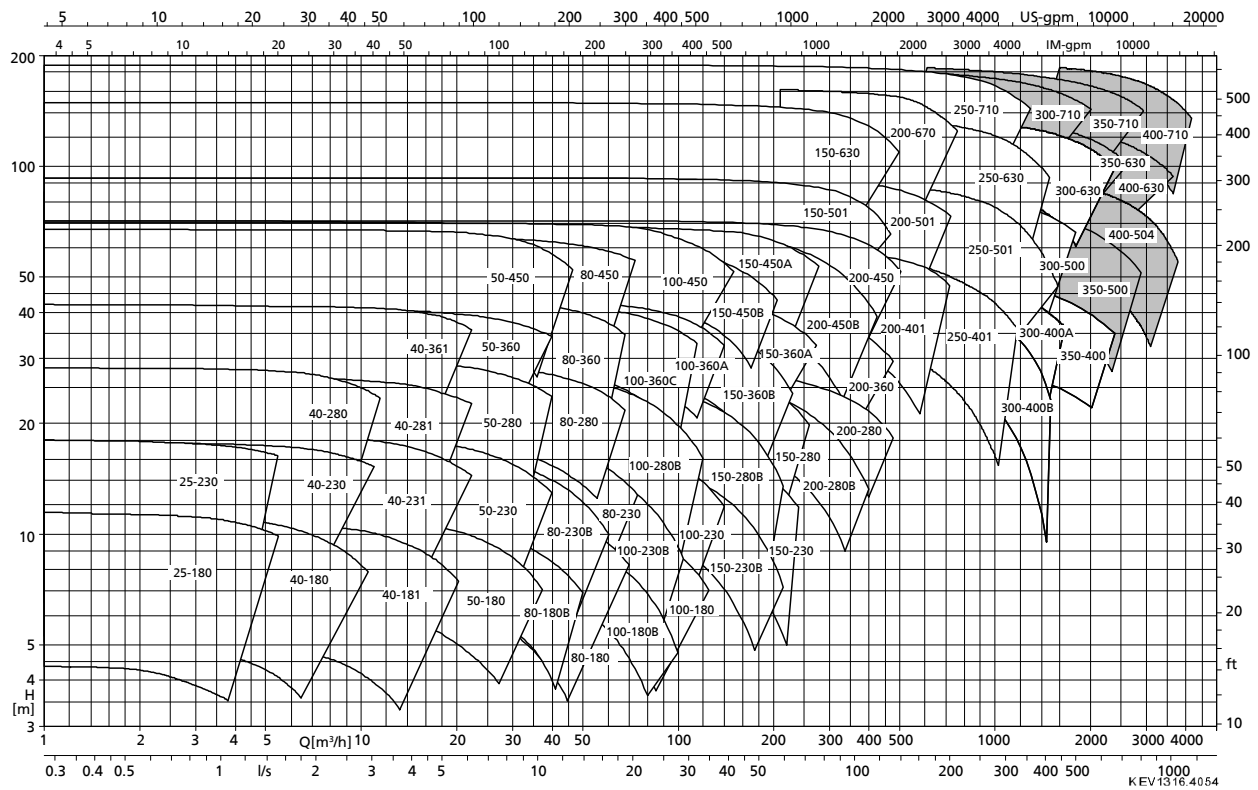
13) Only 6-pole operation is permissible for 960 rpm or 1150 rpm.


Selection charts

RPH, n = 2900 rpm

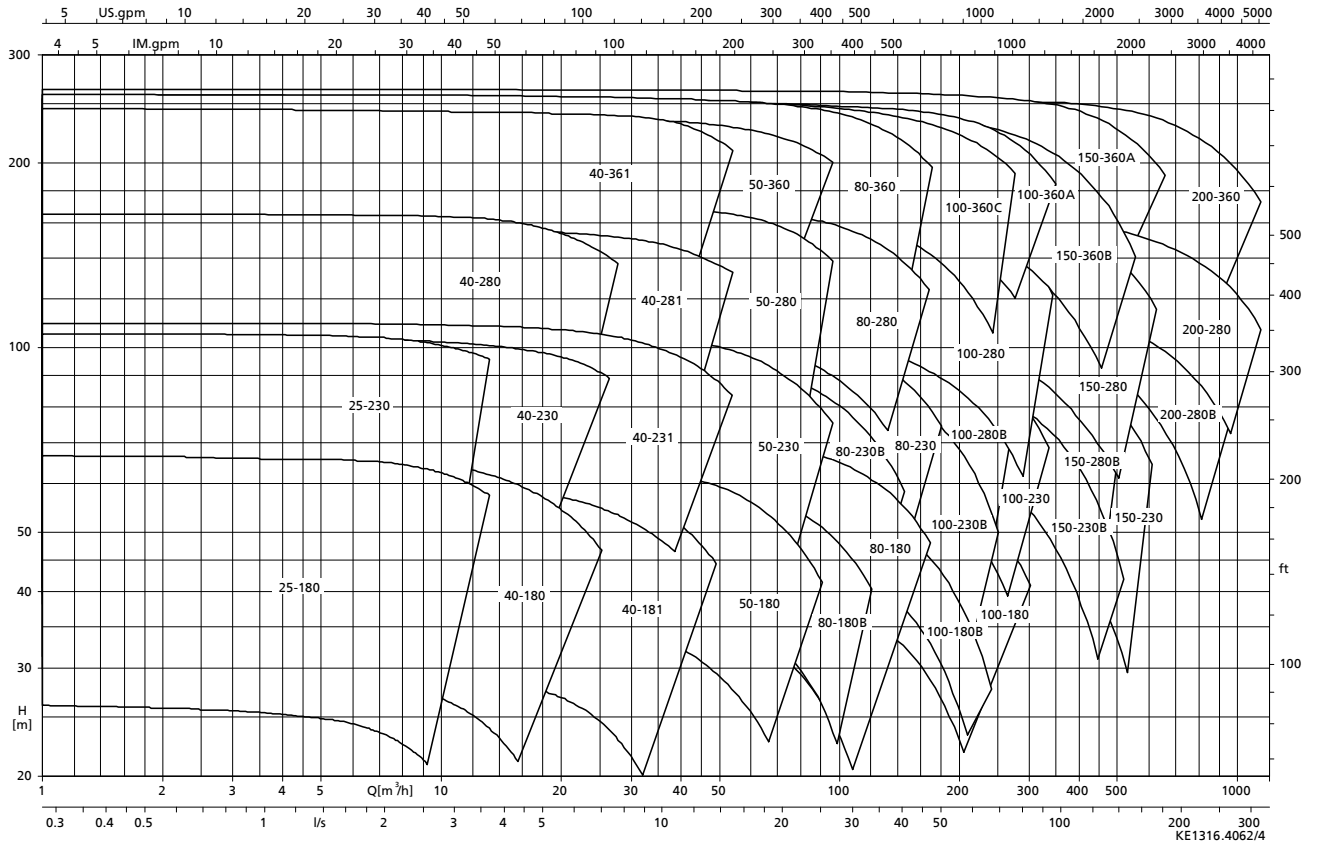


RPH, n = 1450 rpm

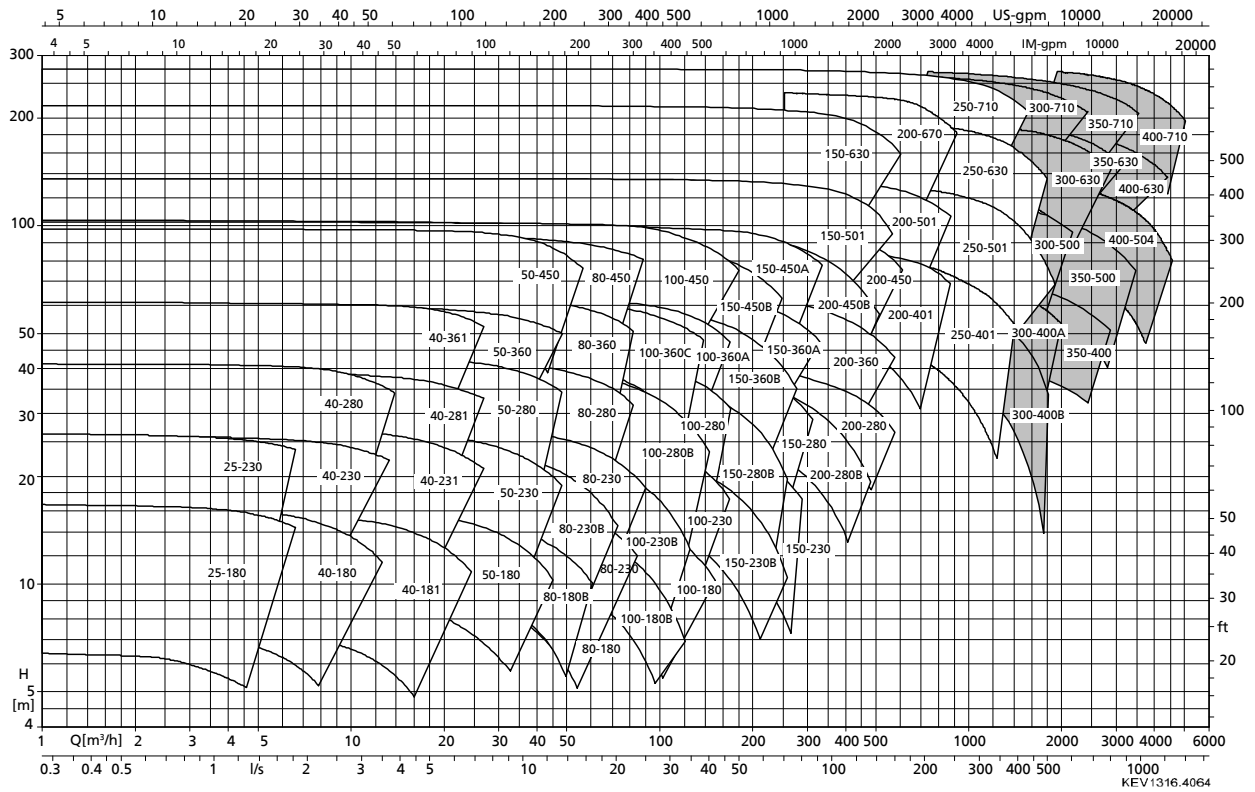


 Size on request

RPH, n = 3500 rpm



RPH, n = 1750 rpm



■ Size on request

Dimensions and connections

Shaft seal connections

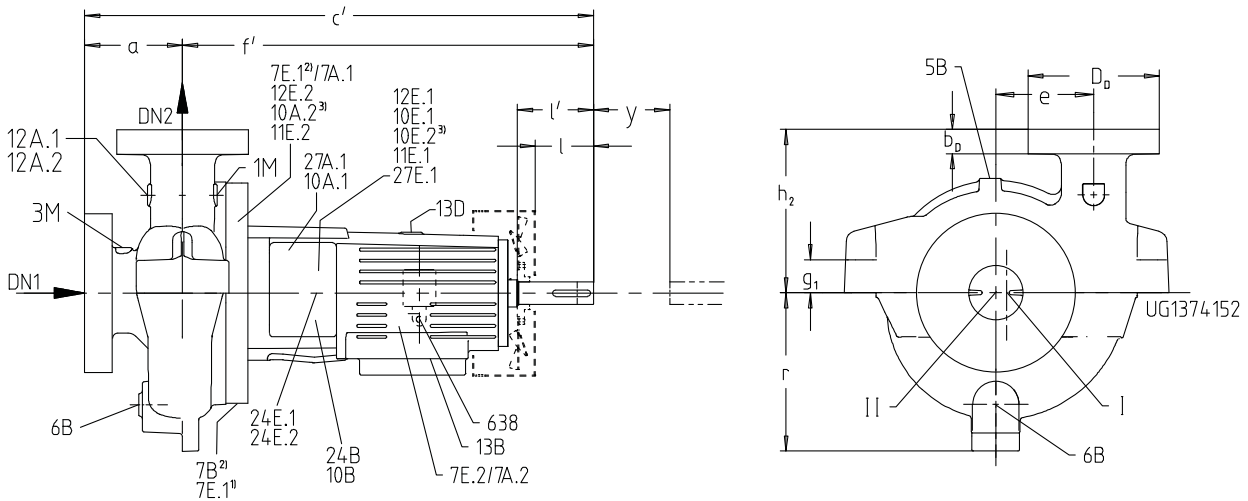
Design	Mechanical seal with quench supply, single	Mechanical seal, double (unpressurised tandem arrangement)	Mechanical seal, double (pressurised tandem arrangement)	Mechanical seal, back-to-back	Mechanical seal, single (API 23)
KSB standard	<p>API 11/61 (62-DAMPF) (1CW-FL)</p>	<p>API 11/52/61 (2CW-CW)</p>	<p>API 02/53/61 (3CW-FB)</p>	<p>API 53/61 (3CW-BB)</p>	<p>API 23/61 (1CW-FL)</p>
API standard	<p>API 11/61 (62-DAMPF) (1CW-FL)</p>	<p>API 11/52/61 (2CW-CW)</p>	<p>API 02/53/61 (3CW-FB)</p>	<p>API 53/61 (3CW-BB)</p>	<p>API 23/61 (1CW-FL)</p>

Connection types

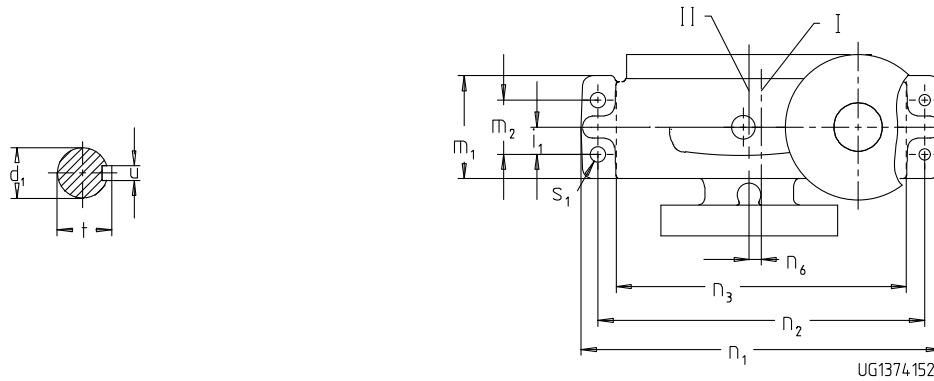
Connection	≤ DN 50	≥ DN 80	Description
1M	NPT 1/2-14	NPT 1/2-14	Pressure gauge
3M	NPT 1/2-14	NPT 1/2-14	Pressure gauge
5B	NPT 1/2-14	NPT 1/2-14	Vent
6B	DN15 ASME B16.5		Fluid drain
7B	NPT 1/2-14	NPT 1/2-14	Cooling liquid drain
7E.1/A.1	NPT 1/2-14	NPT 1/2-14	Cooling liquid IN/OUT
7E.2/A.2	NPT 1/2-14	NPT 1/2-14	Cooling liquid IN/OUT
10B	NPT 1/2-14	NPT 1/2-14	Barrier fluid drain
10E.1/A.1	NPT 1/2-14	NPT 1/2-14 ¹⁴⁾	Barrier fluid IN/OUT
10E.2/A.2	NPT 1/2-14	NPT 1/2-14 ¹⁴⁾	Barrier fluid IN/OUT
11E.1	NPT 1/2-14	NPT 1/2-14	Flushing liquid IN
11E.2	NPT 1/2-14	NPT 1/2-14	Flushing liquid IN
12E.1/A.1	NPT 1/2-14	NPT 1/2-14	Circulation liquid IN/OUT
12E.2/A.2	NPT 1/2-14	NPT 1/2-14	Circulation liquid IN/OUT
13B	NPT 1/2-14	NPT 1/2-14	Oil drain
13D	NPT 1/2-14	NPT 1/2-14	Vent plug
24B	NPT 3/8-18	NPT 3/8-18	Quench liquid drain
24 E.1/A.1	NPT 3/8-18	NPT 3/8-18	Quench liquid IN/OUT
24 E.2/A.2	NPT 3/8-18	NPT 3/8-18	Quench liquid IN/OUT
27B	NPT 1/2-14	NPT 1/2-14	Buffer liquid drain
27 E.1/A.1	NPT 1/2-14	NPT 1/2-14 ¹⁴⁾	Buffer liquid inlet/outlet
638	NPT 3/8-18	NPT 3/8-18	Constant level oiler

14) NPT3/4-14 on bearing brackets B05 and B06

Standard sizes



Dimensions of standard pump sizes



Foot bolt and shaft end dimensions of standard pump sizes

1)	Not for material variant S and bearing bracket B06
2)	For pressurised tandem seals
3)	For "back-to-back" seals
I	Middle of pump foot
II	Middle of DN_1 , shaft

Dimensions of standard pump sizes

Size	Bearing bracket	Weight [kg]	Pump dimensions												
			DN_1	DN_2	a	c'	e	f'	g_1	h_2	m_1	n_1	n_3	n_6	r
25-180	B02S	116	40	25	120	772	105	652	40	230	130	420	320	0	185
25-230	B02S	131	40	25	120	772	125	652	40	255	130	460	360	0	205
40-180	B02S	122	50	40	130	782	105	652	40	250	130	420	320	0	188
40-181	B02L	136	50	40	130	786	110	656	40	250	130	420	320	0	198
40-230	B02S	138	50	40	130	782	130	652	40	265	136	460	360	0	215
40-231	B02L	158	50	40	140	796	135	656	40	265	146	460	360	0	220
40-280	B02L	197	50	40	140	796	160	656	40	290	146	540	440	0	238
40-281	B02L	195	50	40	140	796	160	656	40	290	150	540	440	0	248
40-361	B02L	249	50	40	150	806	195	656	40	305	150	640	540	0	275
50-180	B02L	153	80	50	150	806	120	656	50	265	150	470	360	0	220
50-230	B03	240	80	50	155	910	140	755	50	265	150	510	400	0	230
50-280	B03	289	80	50	170	915	170	755	50	290	150	550	440	0	255
50-360	B03	347	80	50	170	915	200	755	50	310	150	650	540	0	285
50-450	B03	441	80	50	180	935	245	755	50	365	150	750	640	0	325
80-180	B03	242	100	80	175	945	140	770	60	290	170	510	400	0	235
80-230	B03	264	100	80	170	925	160	755	60	290	170	550	440	20	265
80-280	B03	317	100	80	180	935	180	755	60	300	170	590	480	20	290
80-360	B03	361	100	80	190	945	210	755	60	310	170	650	540	15	325

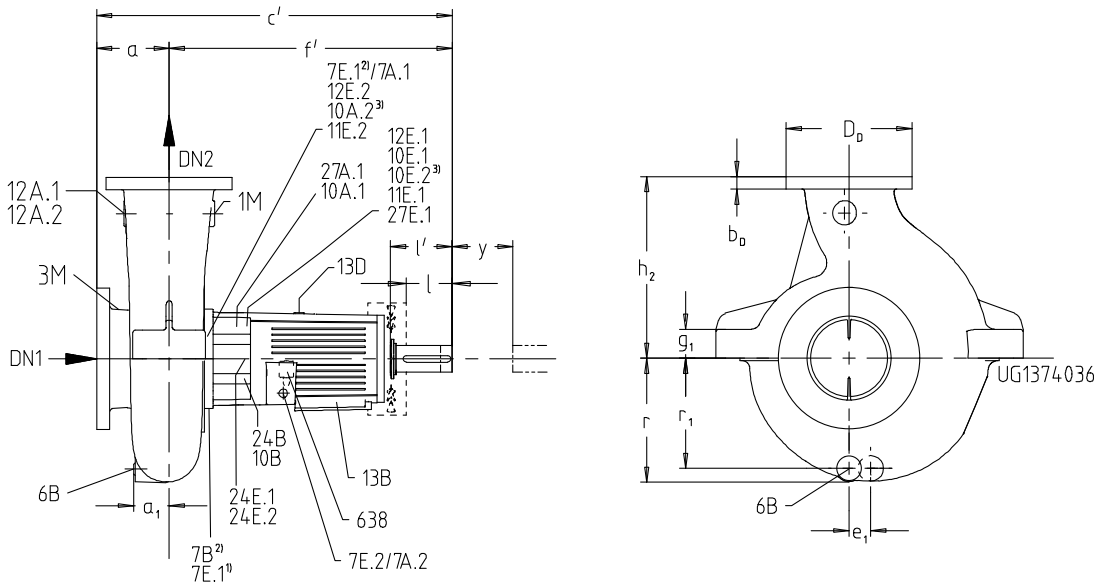
Size	Bearing bracket	Weight [kg]	Pump dimensions												
			DN ₁	DN ₂	a	c'	e	f'	g ₁	h ₂	m ₁	n ₁	n ₃	n ₆	r
80-450	B05S	547	100	80	200	1080	260	880	60	370	170	760	650	20	375
100-180	B03	289	150	100	185	955	170	770	70	325	190	590	480	25	275
100-230	B03	303	150	100	170	925	175	755	70	325	170	590	480	30	285
100-280	B03	345	150	100	170	925	200	755	70	335	190	650	540	30	315
100-360	B05S	477	150	100	200	1080	225	880	70	355	190	730	590	25	340
100-450	B05S	576	150	100	210	1090	270	880	70	385	190	860	720	30	395
150-230	B03	369	200	150	200	955	210	755	80	335	200	730	590	45	330
150-280	B05S	461	200	150	200	1080	225	880	80	365	200	730	590	40	355
150-360	B05S	533	200	150	230	1110	250	880	80	365	200	780	640	40	385
150-450	B05L	659	200	150	230	1110	280	880	80	415	200	870	720	35	420
200-280	B05S	575	250	200	230	1110	260	880	90	395	230	870	720	50	400
200-360	B05L	683	250	200	230	1110	275	880	90	395	230	910	760	60	430
200-450	B05L	804	250	200	250	1130	310	880	90	435	230	970	820	50	475

Shaft end and foot bolt dimensions of standard pump sizes

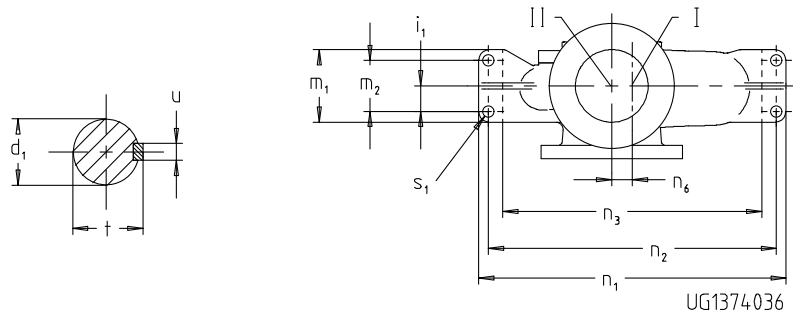
Size	Bearing bracket	Shaft end						Foot bolts			
		d ₁ ¹⁵⁾	l	l'	t	u	y	i ₁	m ₂	n ₂	s ₁
25-180	B02S	32	80	115	35	10	140	30	60	380	17,5
25-230	B02S	32	80	115	35	10	140	30	60	420	17,5
40-180	B02S	32	80	115	35	10	140	30	60	380	17,5
40-230	B02S	32	80	115	35	10	140	30	60	420	17,5
40-181	B02L	32	80	115	35	10	140	30	60	380	17,5
40-231	B02L	32	80	115	35	10	140	30	60	420	17,5
40-280	B02L	32	80	115	35	10	140	35	70	500	17,5
40-281	B02L	32	80	115	35	10	140	35	70	500	17,5
40-361	B02L	32	80	115	35	10	140	35	70	600	17,5
50-180	B02L	32	80	115	35	10	140	35	70	420	22
50-230	B03	42	110	140	45	12	140	35	70	460	22
50-280	B03	42	110	140	45	12	140	35	70	500	22
50-360	B03	42	110	140	45	12	140	45	90	600	22
50-450	B03	42	110	140	45	12	140	45	90	700	22
80-180	B03	42	110	140	45	12	140	45	90	460	22
80-230	B03	42	110	140	45	12	140	45	90	500	22
80-280	B03	42	110	140	45	12	140	45	90	540	22
80-360	B03	42	110	140	45	12	140	45	90	600	22
80-450	B05S	60	140	182	64	12	180	45	90	710	22
100-180	B03	42	110	140	45	12	140	50	100	540	26
100-230	B03	42	110	140	45	12	140	50	100	540	26
100-280	B03	42	110	140	45	12	140	50	100	600	26
100-360	B05S	60	140	140	64	18	180	55	110	670	26
100-450	B05S	60	140	182	64	18	180	55	110	800	26
150-230	B03	42	110	140	45	12	140	50	100	670	33
150-280	B05S	60	140	182	64	18	180	60	120	670	33
150-360	B05S	60	140	182	64	18	180	60	120	720	33
150-450	B05L	60	140	182	64	18	180	55	110	800	33
200-280	B05S	60	140	182	64	18	180	55	110	800	36
200-360	B05L	60	140	182	64	18	180	55	110	840	36
200-450	B05L	60	140	182	64	18	180	55	110	900	36

15) d1 Ø k6 for bearing brackets B02 and B03; d1 Ø n6 for bearing bracket B05

Complementary sizes



Dimensions of complementary pump sizes



Foot bolt and shaft end dimensions of complementary pump sizes

1)	Not for material variant S and bearing bracket B06
2)	For pressurised tandem seals
3)	For "back-to-back" seals
I	Middle of pump foot
II	Middle of DN ₁ , shaft

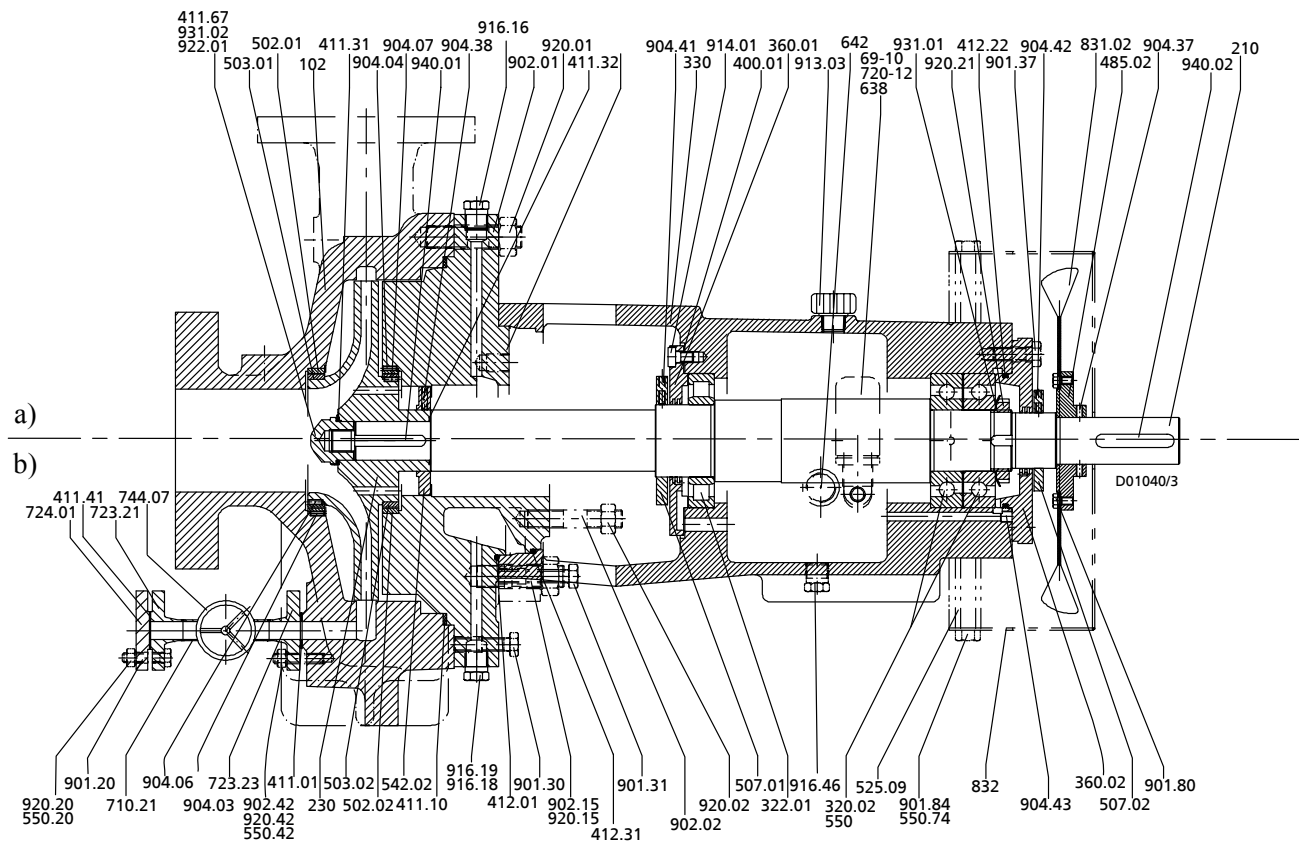
Dimensions of complementary pump sizes

Size	Bearing bracket	Weight [kg]	Pump dimensions										
			DN ₁	DN ₂	a	c'	f'	g ₁	h ₂	m ₁	n ₁	n ₃	n ₆
150-501	B05L	516	200	150	180	1080	900	90	500	180	960	820	0
150-630	B06	1190	200	150	250	1435	1185	90	670	310	1200	1020	60
200-401	B05L	528	250	200	190	1095	905	90	510	180	960	820	0
200-501	B05L	676	250	200	200	1085	885	90	560	180	1060	920	0
200-670	B06	1440	250	200	250	1430	1180	90	670	310	1360	1180	0
250-401	B05L	734	300	250	240	1140	900	90	600	210	1160	1000	0
250-501	B05L	926	300	250	200	1100	900	90	670	210	1200	1040	0
250-630	B06	1500	300	250	300	1440	1140	90	750	310	1200	1020	70
250-710	B06	1630	300	250	300	1430	1130	90	800	310	1460	1280	0
300-400	B05L	1135	350	300	310	1197	887	90	640	310	1200	1020	0
300-500	B05L	1255	350	300	300	1174	874	120	750	300	1270	1070	85
300-630	B06	1722	350	300	300	1489	1189	90	800	300	1460	1280	0
350-350	B06	1690	350	300	350	1509	1159	120	750	310	1370	1180	80
400-506	B07	2410	400	400	350	1615	1265	120	900	400	1560	1320	90

Shaft end and foot bolt dimensions of complementary pump sizes

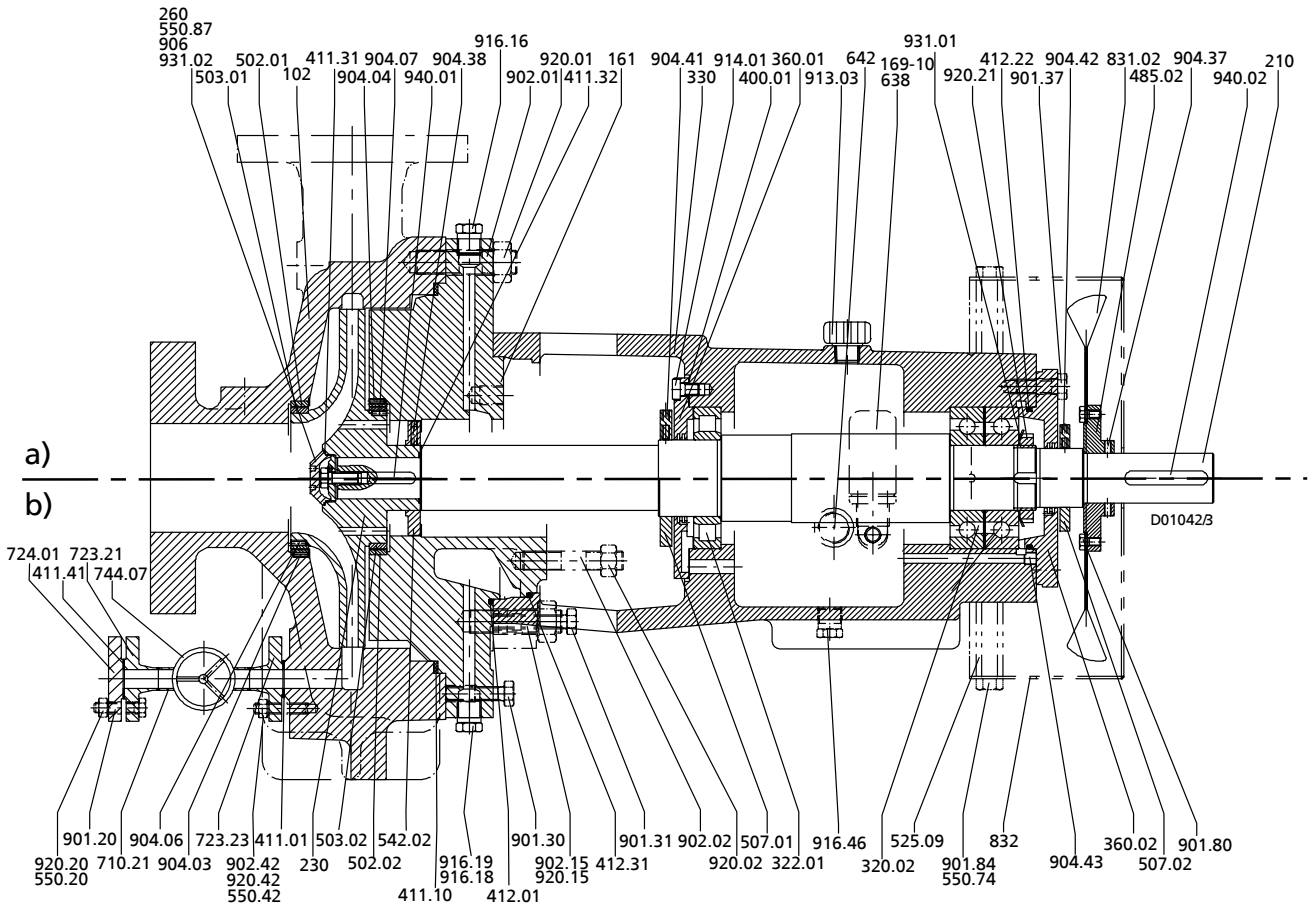
Size	Bearing bracket	Shaft end						Foot bolts				Drain line		
		d ₁ ¹⁶⁾	l	l'	t	u	y	i ₁	m ₂	n ₂	s ₁	e ₁	r ₁	a ₁
150-501	B05L	60	140	182	64	18	180	60	120	900	33	0	315	63,5
150-630	B06	95	170	215	100	25	250	105	210	1120	36	85	412,5	80
200-401	B05L	60	140	182	64	18	180	60	120	900	33	0	330	64,5
200-501	B05L	60	140	182	64	18	180	60	120	1000	33	0	360	78,5
200-670	B06	95	170	215	100	25	250	105	210	1280	36	0	425	73
250-401	B05L	60	140	182	64	18	180	75	150	1080	33	0	365	105
250-501	B05L	60	140	182	64	18	180	75	150	1120	33	0	412	102
250-630	B06	95	170	215	100	25	250	105	210	1120	36	0	425	108
250-710	B06	95	170	215	100	25	250	105	210	1380	36	0	500	122
300-400	B05L	60	140	182	64	18	250	130	210	1120	33	0	395	167
300-500	B05L	60	140	182	64	18	250	105	210	1190	33	0	455	147
300-630	B06	95	170	215	100	25	250	105	210	1380	36	0	503	173
350-350	B06	95	170	215	100	25	330	105	210	1280	33	50	500	161
400-506	B07	110	205	255	116	28	350	150	300	1460	36	90	585	186

General assembly drawing with list of components



Bearing brackets B02 to B05, a) uncooled and b) cooled

16) d1 Ø n6



Bearing brackets B06 and B07, a) uncooled and b) cooled

List of components

Part No.	Comprising	Description
102	102	Volute casing
	411.10	Joint ring
	502.01	Casing wear ring
	902.01	Stud
	904.03	Grub screw
	916.01 ¹⁷⁾	Plug
	920.01	Hexagon nut
161	161	Casing cover
	411.10	Joint ring
	412.01/.31 ¹⁸⁾	O-ring
	502.02 ²⁵⁾	Casing wear ring
	901.30	Hexagon head bolt
	902.15	Stud
	904.04 ²⁵⁾	Grub screw
210	210	Shaft
	920.21	Slotted round nut
	931.01	Lock washer
	940.01/.02	Key
230	230	Impeller
	931.02	Lock washer
	503.01/.02	Impeller wear ring

17) Not shown in drawing

18) For cooled design only

Part No.	Comprising	Description
	904.06/.07	Grub screw
	411.31 ¹⁹⁾ /.32 ¹⁹⁾ /.67 ¹⁹⁾ 20)	Joint ring
260 ²¹⁾	260	Impeller hub cap
	550.87	Disc
	906	Impeller screw
320.02/550 ²²⁾	320.02 ²³⁾	Angular contact ball bearing
	550 ²⁴⁾	Adjusting washer
322.01	322.01	Cylindrical roller bearing
330	330	Bearing bracket
	69.10	Protective cage
	360.01/.02	Bearing cover
	400.01	Gasket
	412.22	O-ring
	638	Constant level oiler
	642	Oil level sight glass
	710.21	Pipe
	901.31/.37	Hexagon head bolt
	913.03	Vent plug
	916.46	Plug
	914.01	Hexagon socket head cap screw
360.01/.02	360.01/.02	Bearing cover
	400.01	Gasket
	412.22	O-ring
	914.01	Hexagon socket head cap screw
502.01/.02 ²⁵⁾	502.01/.02	Casing wear ring
	904.03/.04 ²⁵⁾	Grub screw
503.01/.02 ²⁵⁾	503.01/.02	Impeller wear ring
	904.06/.07 ²⁵⁾	Grub screw
507.01/.02	507.01/.02	Thrower
	904.41/.42	Grub screw
542.02	542.02	Throttling bush
	904.38	Grub screw
638	638	Constant level oiler
70-3 ²⁰⁾	70-3	Drain line
	411.01	Joint ring
	902.42	Stud
	920.42	Hexagon nut
	550.42	Disc
	723.23	Flange
	744.07	Gate valve
	710.21	Pipe
	723.21	Flange
	411.41	Joint ring
	724.01	Blind flange
	901.20	Hexagon head bolt
	920.20	Hexagon nut
	550.20	Disc
831.02 ²⁰⁾	831.02	Fan impeller
	832	Fan hood
	485.02	Fan hub
	904.37	Grub screw
922.01 ¹⁹⁾	922.01	Impeller nut
	931.02	Lock washer
99-g ¹⁷⁾	99-g ¹⁷⁾	Set of sealing elements, complete

-
- 19) For bearing brackets B02 to B05 only
20) Optional
21) For bearing brackets B06 and B07 only
22) For bearing brackets B03 and B05 only
23) For bearing brackets B03 and B05 only
24) For bearing brackets B03 and B05 only
25) For impellers with balancing of axial thrust only

Design variants

Design variants

Design	Detailed view
Design with coolable bearing bracket	
Design with thrower	
Design with plug	
Design with welded drain	

Design	Detailed view
<p>Design with bearings in tandem arrangement</p>	
<p>Design with heatable casing</p>	
<p>Design with auxiliary impeller</p>	



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