

SIHI^{LPH-X} - Liquid Ring Vacuum Pump

Two Stage



SIHI® Pumps

LPH 55312, LPH 55316, LPH 55320

Pressure Range: 33 to 1013 mbar
Suction Volume: 130 to 560 m³/h

CONSTRUCTION

SIHI liquid ring vacuum pumps have a simple but robust construction with the following features and benefits:

- Near isothermal compression
- Oil free, with no internal lubrication
- Capable of handling almost all gases and vapours
- Able to handle quantities of liquid "carry over"
- Low maintenance and safe operation
- Low noise and almost vibration free
- Available in a wide range of materials
- Broad range of applications
- O-ring sealing as standard
- Cavitation protection as standard
- Drain hole as standard
- Built-in solids drain
- Rotating metallic parts are non contacting to minimise wear
- ATEX compliance



SIHI liquid ring vacuum pumps of the range LPH 55312, LPH 55316 and LPH 55320 are two stage pumps.

APPLICATIONS

Evacuation and pumping of dry gases and saturated vapours. The pumps can also handle liquids. These units offer pressures in the range of 33...900 mbar(a) to atmospheric. Much lower pressures are available by using ancillaries such as ejectors and lobular boosting pumps. Typical application areas include:

- Chemical and pharmaceutical industry for distillation, drying and degassing
- Food and beverage industry for low temperature cooking, and bottle filling
- Electronic industry for impregnation and drying
- Plastics & Rubber industry for degassing
- Healthcare for sterilisers and general vacuum

Note

By continuously feeding the pump with a small amount of service liquid (usually water), the heat due to gas/vapour compression is conducted away. This also replenishes the liquid ring and ensures that it does not become saturated with process media. Recharging the pump with service liquid at ambient temperature enables the unit to condense evacuated gases / vapours. It can therefore be used for solvent recovery. The condensed gas and liquid can be separated in a liquid separator. More information is provided in the accessory catalogues.

The integrated solids drain permits the removal of any entrained solids whilst the pump is operating. The service liquid can therefore, simply be re-circulated. The rotation of the pump is clockwise when viewed from the drive end.

GENERAL TECHNICAL DATA

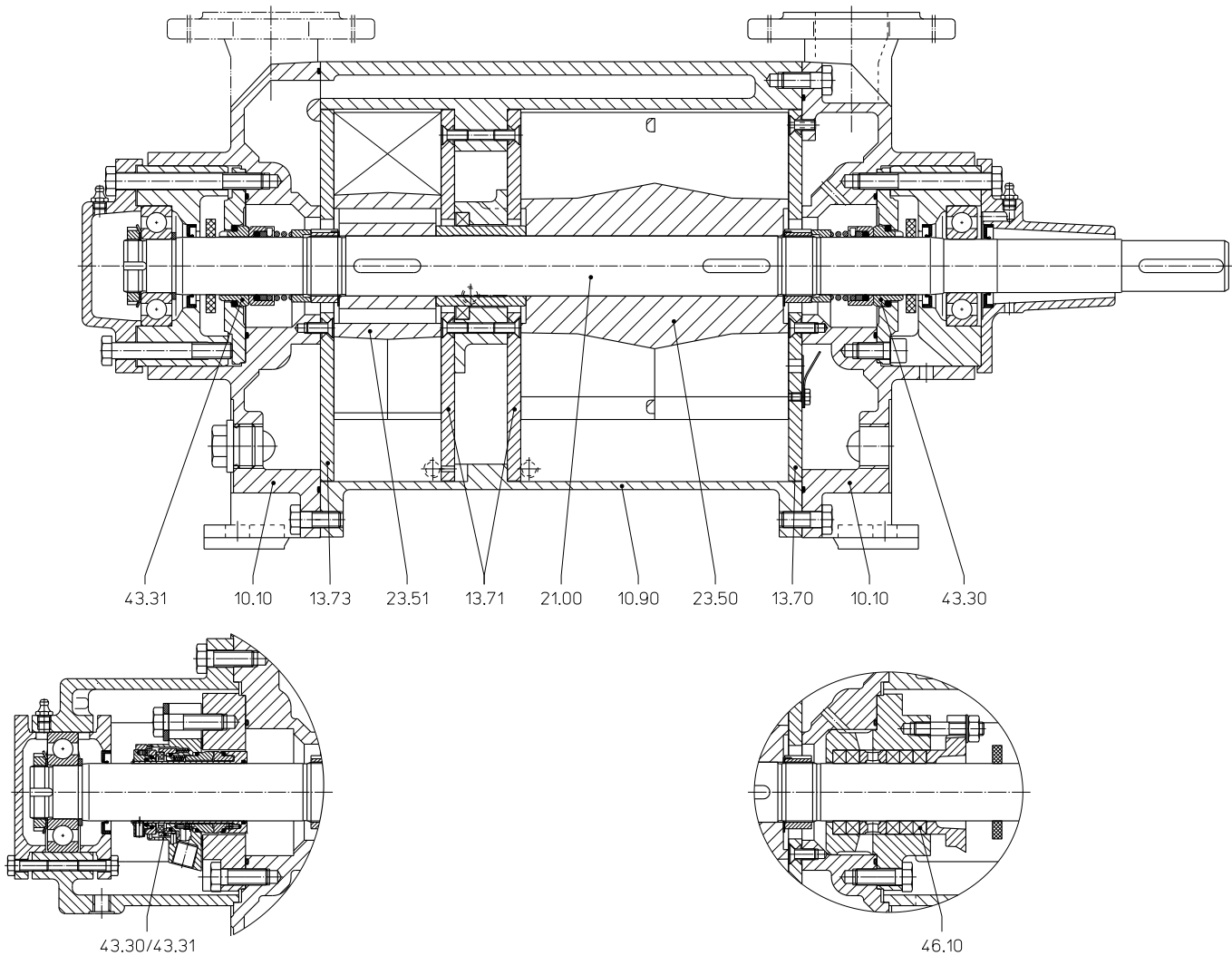
Pump Type	Units	LPH 55312	LPH 55316	LPH 55320
Speed	50 Hz 60 Hz	rpm		
		1450 1740		
Maximum overpressure on compression	bar	1.8		
Permissible pressure difference between suction and discharge side	max. min.	bar		
		2.0 0.2		
Hydraulic test pressure (overpressure)	bar	3.0		
Moment of inertia of rotating parts of pump and water content	kg · m ²	0.137	0.162	0.205
Noise level at 80 mbar suction pressure [50Hz]	dB (A)	66	67	68
Minimum permissible pulley diameter for V belt drive	mm	200	200	not allowed
Maximum gas temperature:	dry saturated	°C		
		200 100		
Service liquid:				
Maximum permissible temperature	°C	80		
Minimum permissible temperature	°C	10		
Maximum viscosity	mm ² /s	90		
Maximum density	kg/m ³	1200		
Liquid capacity up to middle of shaft	litre	9.0	10.0	12.0
Maximum flow resistance of the heat exchanger	bar	0.2		

In selecting a pump, avoid choosing one which is likely to be operating at a combination of its maximum permissible limits e.g. maximum viscosity and maximum permissible pressure difference.

Materials

Position number	Component	MATERIALS	
		0K	4B
10.10	Vacuum casing	0.6025	1.4408
10.90	Central body		
13.70, 13.71, 13.73	Guide disc		1.4404
21.00	Shaft	1.4021	1.4408
23.50, 23.51	Impeller	1.4308	
43.30, 43.31	Mechanical seal, Type SIHI FK (AG●)	Cr-Steel / Carbon / Butadiene rubber	Cr Ni Mo-Steel / Carbon / Viton
43.30, 43.31	Double mechanical seal	on request	
46.10	Gland packing	GORE	-

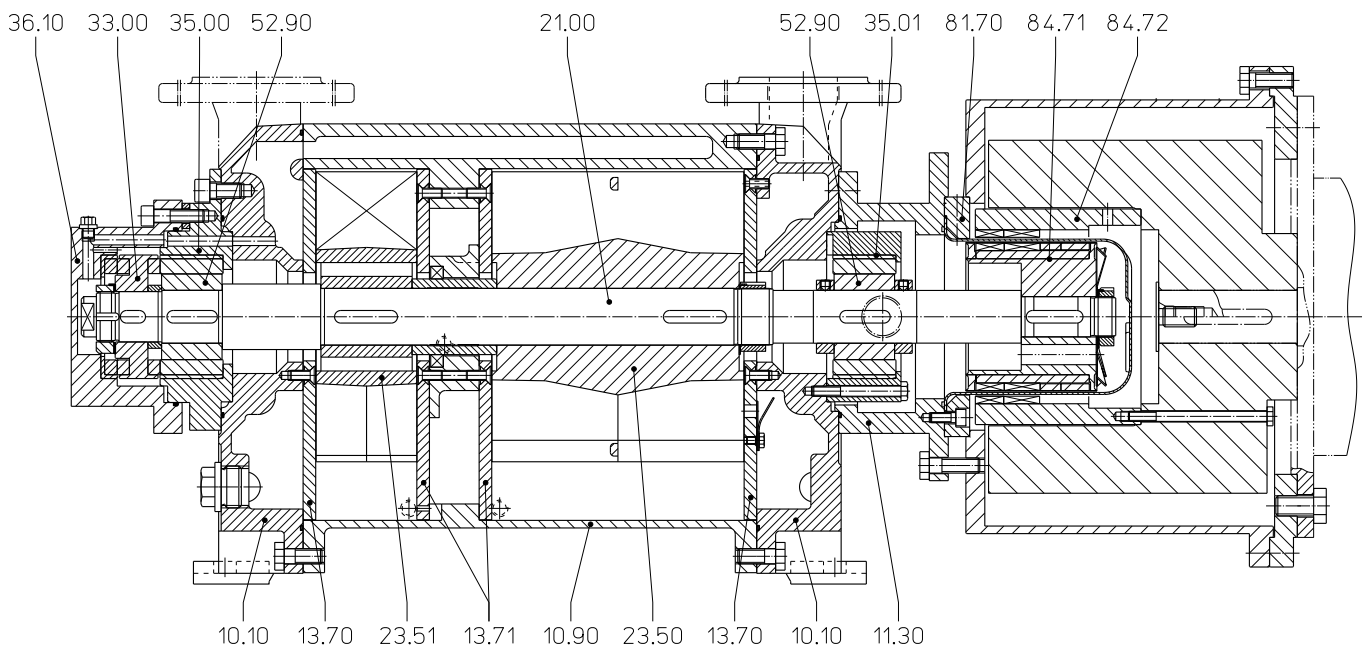
Cut-away diagram LPH 55312, LPH 55316, LPH 55320 with single, double mechanical seal and gland packing



Materials LPH 55312, LPH 55316, LPH 55320 with magnetic coupling

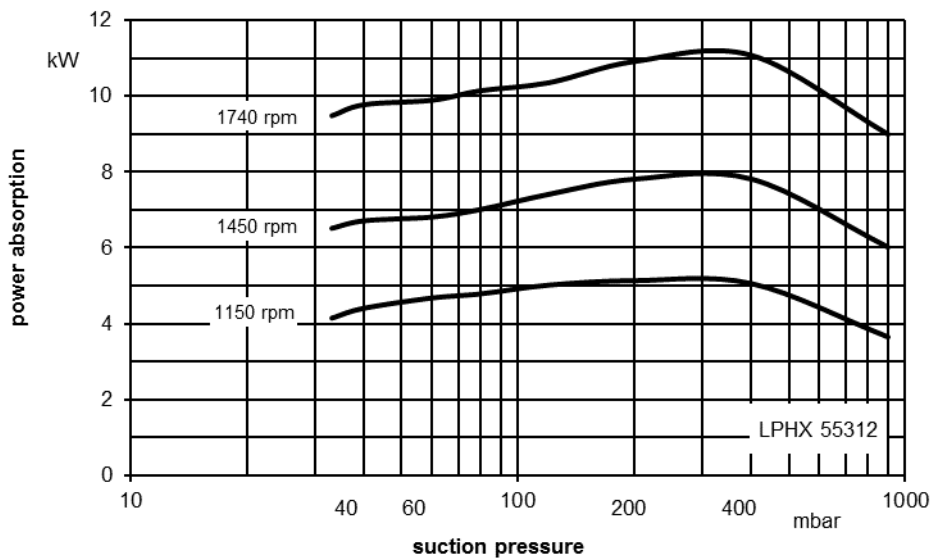
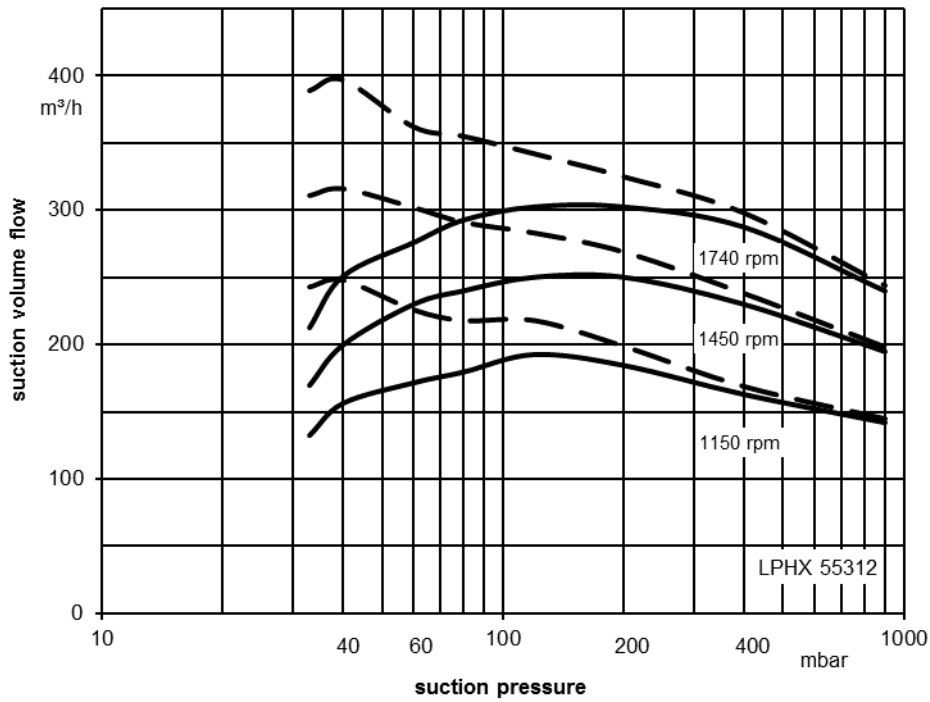
Position Number	COMPONENT	MATERIALS	
		0E	4B
10.60	Casing	0.6025	1.4408
10.90	Central body		
13.70, 13.71	Guide disc		
11.30	Intermediate casing	1.0553	1.4571
21.00	Shaft	1.4021	
23.50, 23.51	Vane wheel impeller	1.4408	
33.00	Thrust bearing	1.4462 / silicon carbide	
35.00, 35.01	Bearing housing	1.0553 / silicon carbide	1.4571 / silicon carbide
36.10	Bearing cover		
52.90, 52.91	Bushing	tungsten carbide	
81.70	Isolation shroud	1.4571 / 2.4610	
84.71	Inner magnet	1.4571 / 2.4610 / magnet	
84.72	Outer magnet	1.0553 / magnet	

Cut-away diagram LPH 55312, LPH 55316, LPH 55320 with magnetic coupling



All information in this catalogue, like general technical data, performance data, dimensions, arrangement drawings, accessories, etc. don't refer to the magnetic coupling execution. Please contact the manufacturer about more information.

Performance Characteristics LPHX 55312



The operating data is valid under the following conditions:

- Process media:
 - dry air: 20°C —————
 - steam saturated air: 20°C - - - - -
- Service liquid:
 - water: 15°C

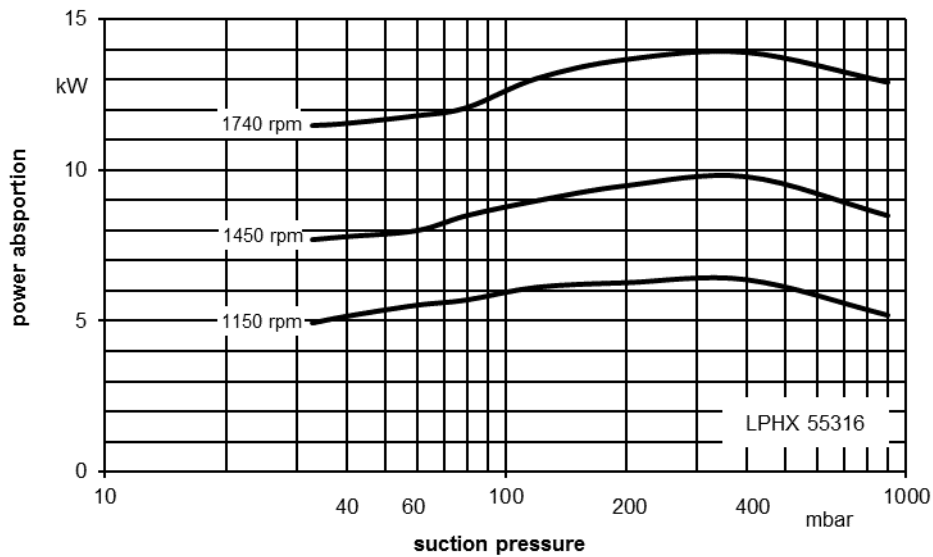
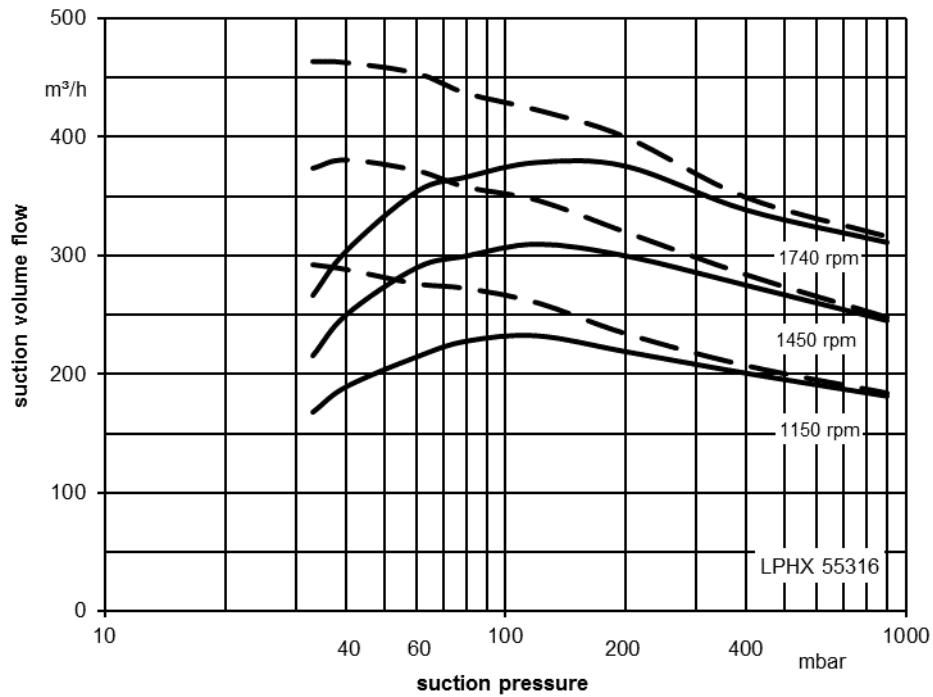
Pressure of gas to be evacuated: 1013 mbar (atmospheric pressure)

The suction volume is related to the suction pressure.

Tolerance on operating data is 10%.

The maximum consumption of make up water occurs at the lowest suction pressure.

Performance Characteristics LPHX 55316



The operating data is valid under the following conditions:

- Process media:
 - dry air: 20°C (solid line)
 - steam saturated air: 20°C (dashed line)
- Service liquid:
 - water: 15°C

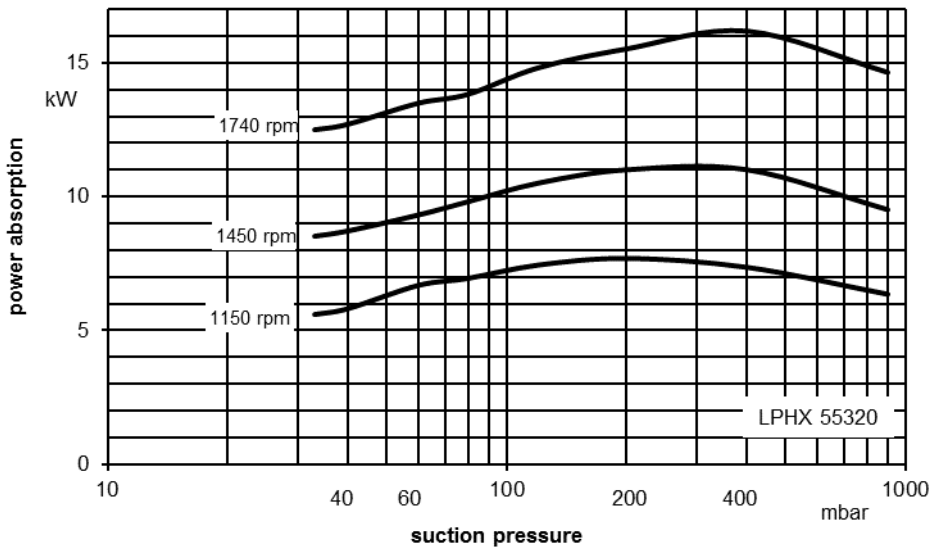
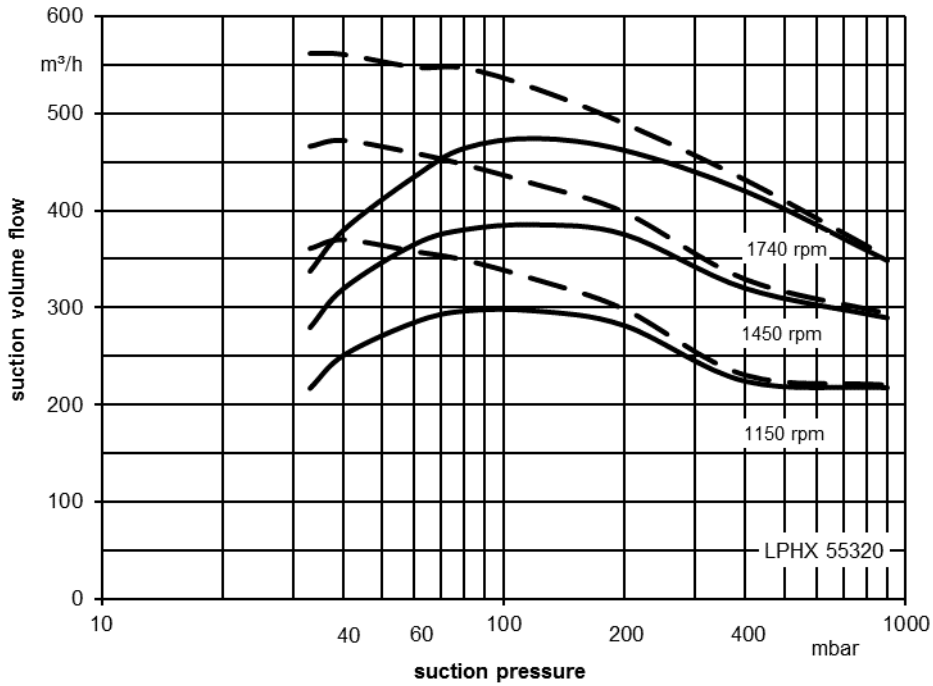
Pressure of gas to be evacuated: 1013 mbar (atmospheric pressure)

The suction volume is related to the suction pressure.

Tolerance on operating data is 10%.

Maximum consumption of make up water occurs at the lowest suction pressure.

Performance Characteristics LPHX 55320

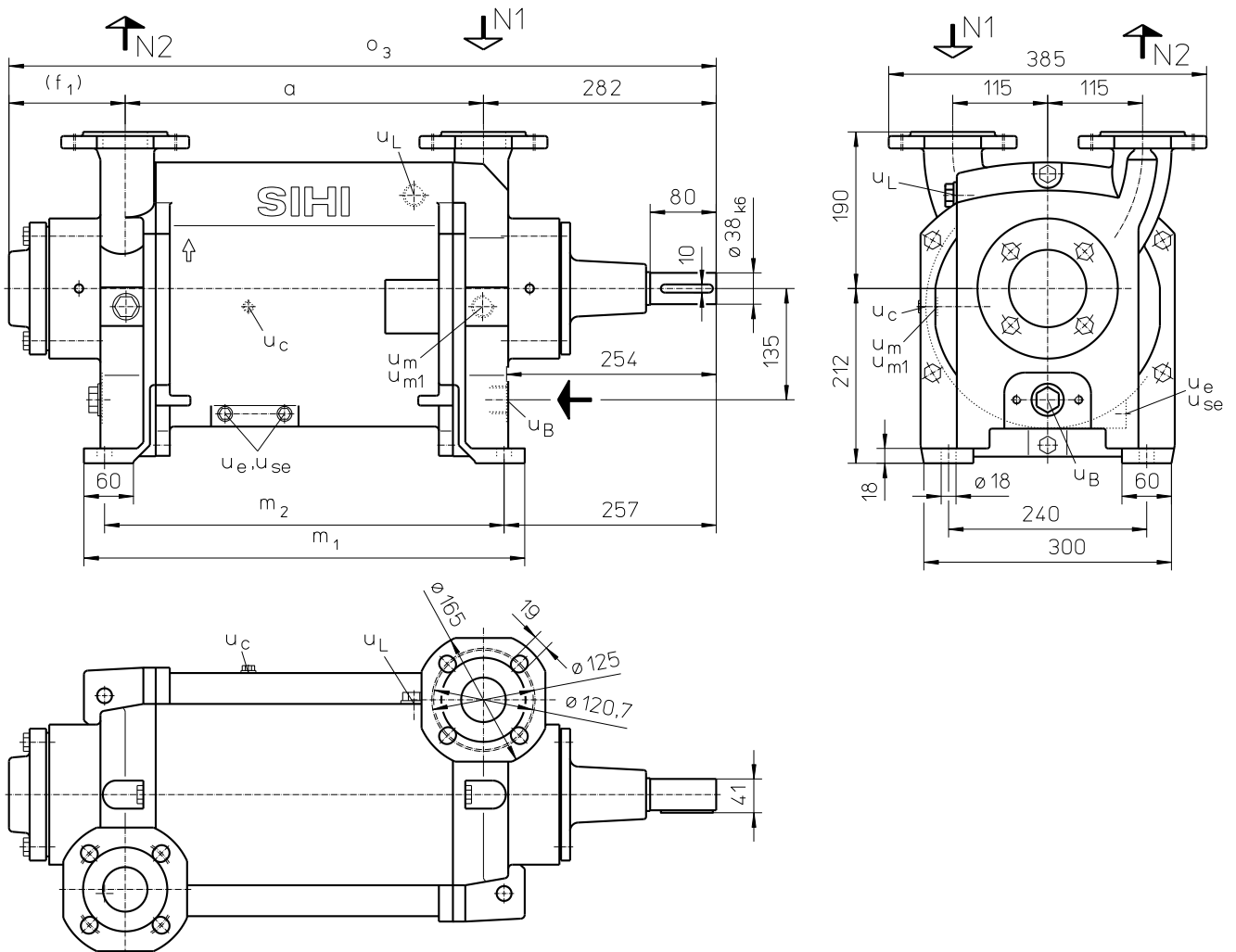


The operating data is valid under the following conditions:

- Process media:
 - dry air: 20°C —————
 - steam saturated air: 20°C - - - - -
- Service liquid:
 - water: 15°C

Pressure of gas to be evacuated: 1013 mbar (atmospheric pressure)
 The suction volume is related to the suction pressure.
 Tolerance on operating data is 10%.
 Maximum consumption of make-up water occurs at the lowest suction pressure.

Dimensions LPH 55312, LPH 55316, LPH 55320 with single mechanical seal and gland packing



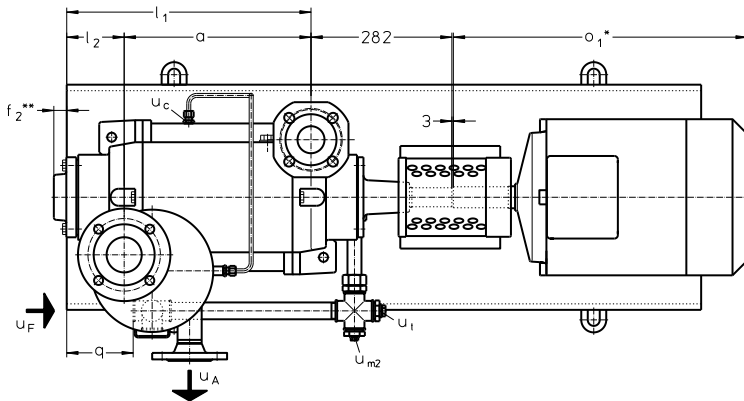
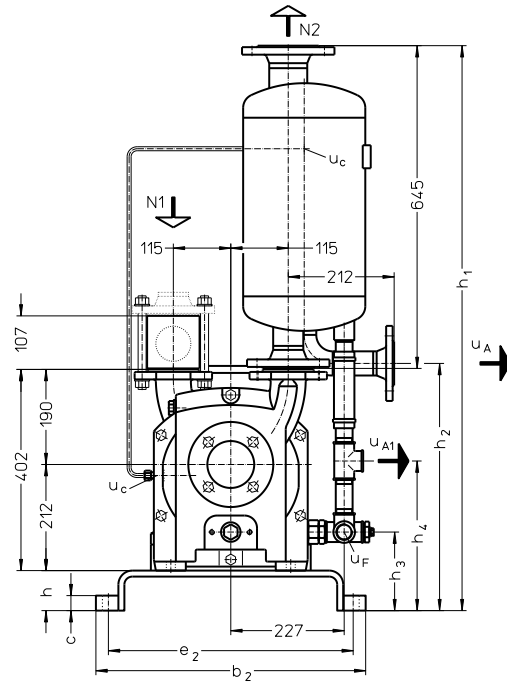
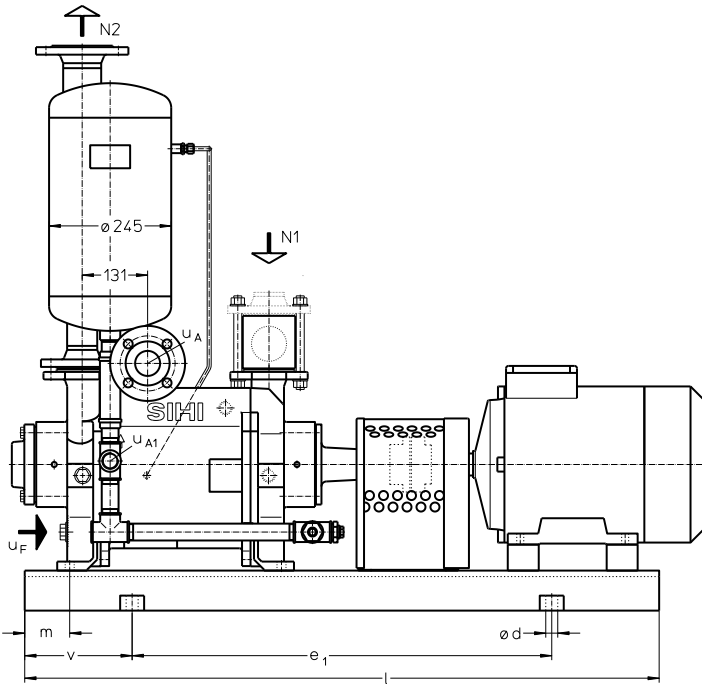
- N 1 = Gas-inlet DN 50 (according to DIN EN 1092 PN 10)
Gas-inlet 2" (according to ANSI 150 lbs)
- N 2 = Gas-outlet DN 50 (according to DIN EN 1092 PN 10)
Gas-outlet 2" (according to ANSI 150 lbs)
- u_B = Connection for service liquid G 1
- u_c = Connection for cavitation protection G $\frac{1}{4}$
- u_e = Connection for drain G $\frac{1}{4}$ (grey cast iron)
Connection for drain G $\frac{1}{2}$ (stainless steel)
- u_{se} = Connection for dirt drain G $\frac{1}{4}$ (grey cast iron)
Connection for dirt drain G $\frac{1}{2}$ (stainless steel)
- u_L = Connection for air cock G $\frac{3}{4}$
- u_m = Connection for pressure gauge G $\frac{3}{4}$
- u_{m1} = Connection for drainage valve or liquid level sensor G $\frac{3}{4}$

	execution	a [mm]	f_1 [mm]	m_1 [mm]	m_2 [mm]	o_3 [mm]	approx. weight [kg]
LPH 55312	mechanical seal	334	141	434	384	757	140
	gland packing		218			834	
LPH 55316	mechanical seal	374	141	474	424	797	150
	gland packing		218			874	
LPH 55320	mechanical seal	434	141	534	484	857	180
	gland packing		218			934	

SIHI LPH-X

LPH 55312, LPH 55316, LPH 55320

with single mechanical, gland packing and with top-mounted liquid separator



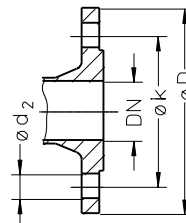
- N 1 = Gas-inlet DN 50
- N 2 = Gas-outlet DN 65 (4 bolt)
- u_A = Liquid drain DN 40
- u_{A1} = Liquid drain G1
- u_F = Connection for make-up liquid G 1
- u_c = Connection for cavitation protection G 1/4
- u_{m2} = Connection for pressure gauge G 1/4
- u_t = Connection for thermometer G 1/2

	E-Motor 50 Hz size			base-plate	a [mm]	b ₂ [mm]	c [mm]	d [mm]	e ₁ [mm]	e ₂ [mm]	f ₂ ** [mm]	h [mm]	h ₁ [mm]	h ₂ [mm]	h ₃ [mm]	h ₄ [mm]	l [mm]	l ₁ [mm]	l ₂ [mm]	m [mm]	o ₁ * [mm]	q [mm]	v [mm]	approx. weight [kg]
	IP 55	kW	EEEx e II T3																					
LPH 55312	132 M	7,5	-	S385	334	490			740	440	26						1140	449	115	90	588	133	200	286
	160 M	11,0	-																					324
	160 M	-	10,0																					321
LPH 55316	160 M	11,0	-	S436	374	540	30	24	840	490	66	80	1129	494	157	299	1270	489	75	50	628	93	215	334
	160 M	-	10,0																					331
	160 L	-	13,5																					374
LPH 55320	160 M	11,0	-	S487	434	610	35	28	940	550	26	100	1149	514	177	319	1420	549	115	90	628	133	240	364
	160 L	15,0	-																					413
	160 L	-	13,5																					438

* Dimensions dependent upon motor supplier

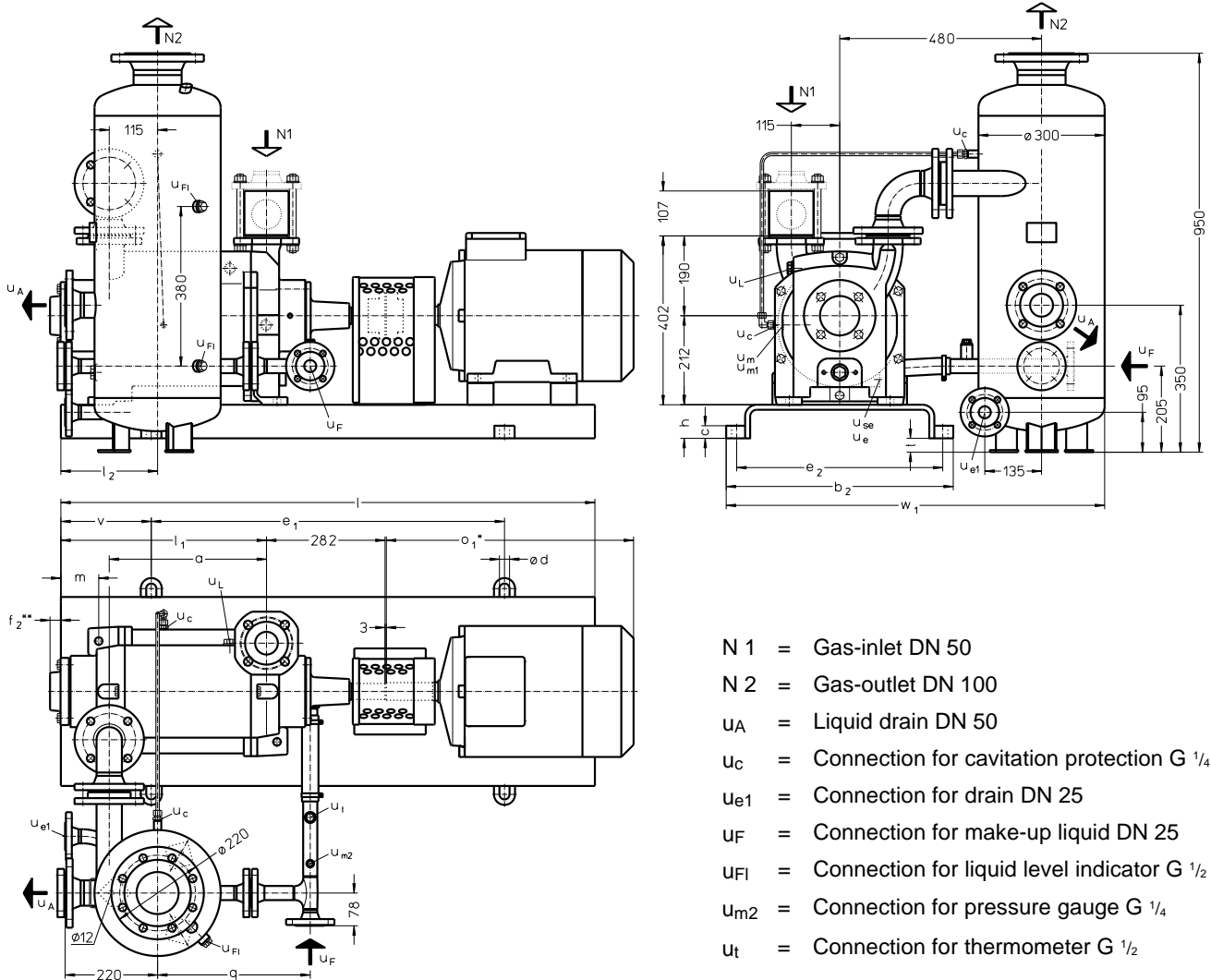
** Dimension +77mm at execution with gland packing

Flange dimensions according to DIN EN 1092 PN 10 [mm]			
DN	40	50	65
k	110	125	145
D	150	165	185
Number x d ₂	4 x 18	4 x 18	4 x 18



LPH 55312, LPH 55316, LPH 55320

with single mechanical, gland packing and with side-mounted liquid separator

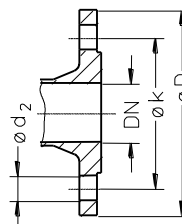


	E-Motor 50 Hz			base-plate	a [mm]	b ₂ [mm]	c [mm]	d [mm]	e ₁ [mm]	e ₂ [mm]	f ₂ ** [mm]	h [mm]	l [mm]	l ₁ [mm]	l ₂ [mm]	m [mm]	o ₁ * [mm]	q [mm]	t [mm]	v [mm]	w ₁ [mm]	approx. weight [kg]																			
	size	IP 55	kW																																						
LPH 55312	132 M	7.5	-	S385	334	490	30	24	740	440	26	80	1140	449	230	90	588	453	323	33	200	875	308																		
	160 M	11.0	-																					S436	374	540	30	24	840	490	66	1270	489	190	50	628	423	363	215	900	356
	160 M	-	10.0																																						
LPH 55316	160 M	11.0	-	S436	374	540	30	24	840	490	66	80	1270	449	190	50	628	453	323	33	215	900	356																		
	160 M	-	10.0																					374	540	30	24	840	490	66	1270	489	190	50	628	423	363	215	900	353	
	160 L	-	13.5																					374	540	30	24	840	490	66	1270	449	190	50	628	423	363	215	900	396	
LPH 55320	160 M	11.0	-	S487	434	610	35	28	940	550	26	100	1420	549	230	90	628	453	323	33	240	935	386																		
	160 L	15.0	-																					434	610	35	28	940	550	26	100	1420	549	230	90	628	423	363	240	935	435
	160 L	-	13.5																					434	610	35	28	940	550	26	100	1420	549	230	90	628	423	363	240	935	460

* Dimensions dependent upon motor supplier

** Dimension +77mm at execution with gland packing

Flange dimensions according to DIN EN 1092 PN 10 [mm]			
DN	25	50	100
k	85	125	180
D	115	165	220
Number x d ₂	4 x 14	4 x 18	8 x 18



Make-up Liquid Consumption in [m³/h] dependent upon suction pressure, speed, drive type and temperature difference.

Suction pressure in [mbar]		33				120				200				400							
Pump type	Speed [rpm]	KB				FB	KB				FB	KB				FB					
		Temperature Difference [°C]					Temperature Difference [°C]					Temperature Difference [°C]									
		20	10	5	2		20	10	5	2		20	10	5	2		20	10	5	2	
LPH 55312	1150	0.17	0.32	0.58	1.13	3.0	0.20	0.37	0.66	1.23	2.9	0.21	0.38	0.67	1.22	2.7	0.20	0.37	0.63	1.10	2.2
	1450	0.26	0.47	0.81	1.45		0.29	0.52	0.88	1.52		0.30	0.54	0.90	1.5		0.29	0.51	0.83	1.33	
	1750	0.36	0.64	1.06	1.73		0.39	0.68	1.11	1.76		0.40	0.70	1.11	1.71		0.39	0.67	1.02	1.51	
LPH 55316	1150	0.20	0.37	0.66	1.24	3.0	0.24	0.44	0.77	1.38	2.9	0.25	0.45	0.77	1.35	2.7	0.24	0.44	0.73	1.22	2.2
	1450	0.30	0.54	0.92	1.57		0.34	0.61	1.01	1.66		0.35	0.63	1.02	1.62		0.35	0.61	0.95	1.44	
	1750	0.42	0.74	1.19	1.87		0.47	0.81	1.26	1.91		0.48	0.82	1.26	1.85		0.47	0.77	1.15	1.61	
LPH 55320	1150	0.22	0.41	0.73	1.34	3.0	0.29	0.53	0.89	1.53	2.9	0.29	0.53	0.89	1.49	2.7	0.28	0.49	0.81	1.30	2.2
	1450	0.33	0.59	0.98	1.65		0.39	0.69	1.11	1.77		0.40	0.70	1.11	1.72		0.39	0.66	1.02	1.5	
	1750	0.46	0.79	1.25	1.92		0.52	0.88	1.35	1.99		0.53	0.89	1.34	1.92		0.53	0.85	1.23	1.67	

FB = Total service liquid flow rate on once-through system

KB = Flow of make-up water when combined with partial recirculation liquid at a temperature of 20°C, 10°C, 5°C, 2°C, warmer than make-up water.

Product Code – order details

Range + Size	Hydraulic + Bearings	Shaft Seal		Materials		Casing Sealing	
	<ul style="list-style-type: none"> •A 1. Hydraulic •B two greased roller bearings •5 Similar to •B, however non-driving side with self-aligning roller bearing 	041	Gland packing	0K	Main parts out of cast iron (GG) and impellers in low alloyed steel	1	O-ring sealing
		AGE	Mechanical seal type SIHI FK, O-rings butadiene rubber	4B	Main parts out of stainless steel		
		AG1	Mechanical seal type SIHI FK, O-Rings Viton				
LPH	55312 55316 55320	AB / A5	041 AGE AG1	0K 4B		1	

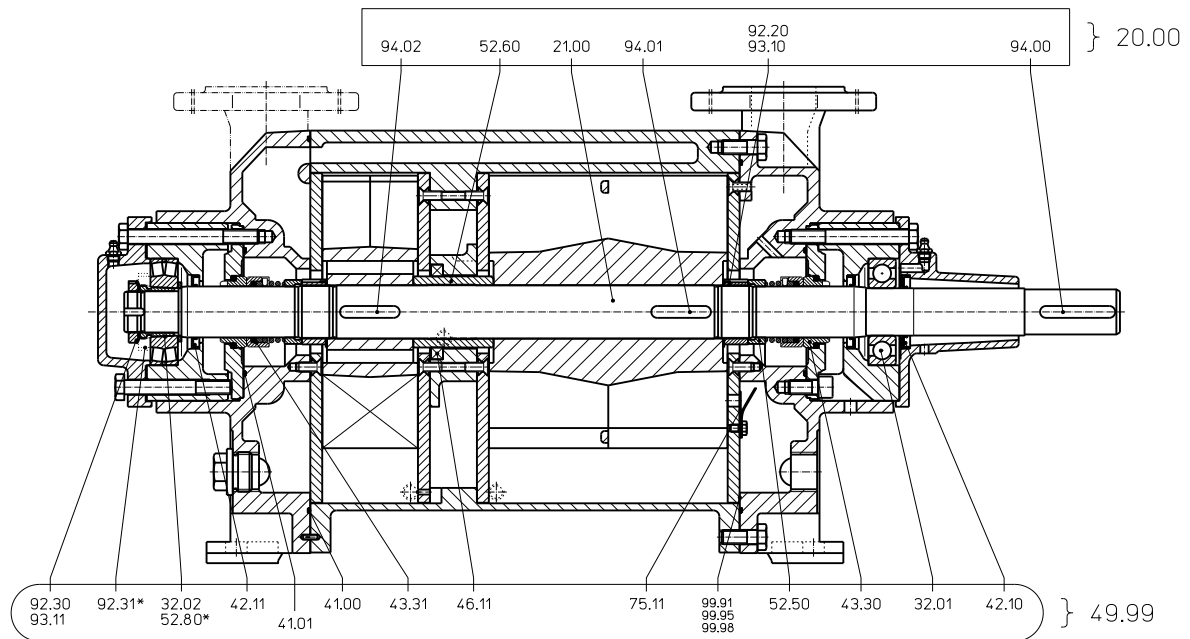
Motor Selection

For our products we offer a lot of different motor types. To identify the right motor please specify frequency, voltage and protection class.

Example of an Order:

LPHX 55316 AB AGE 0K 1 with 11.0 kW AC motor, 50 Hz, 400V Δ, IP55

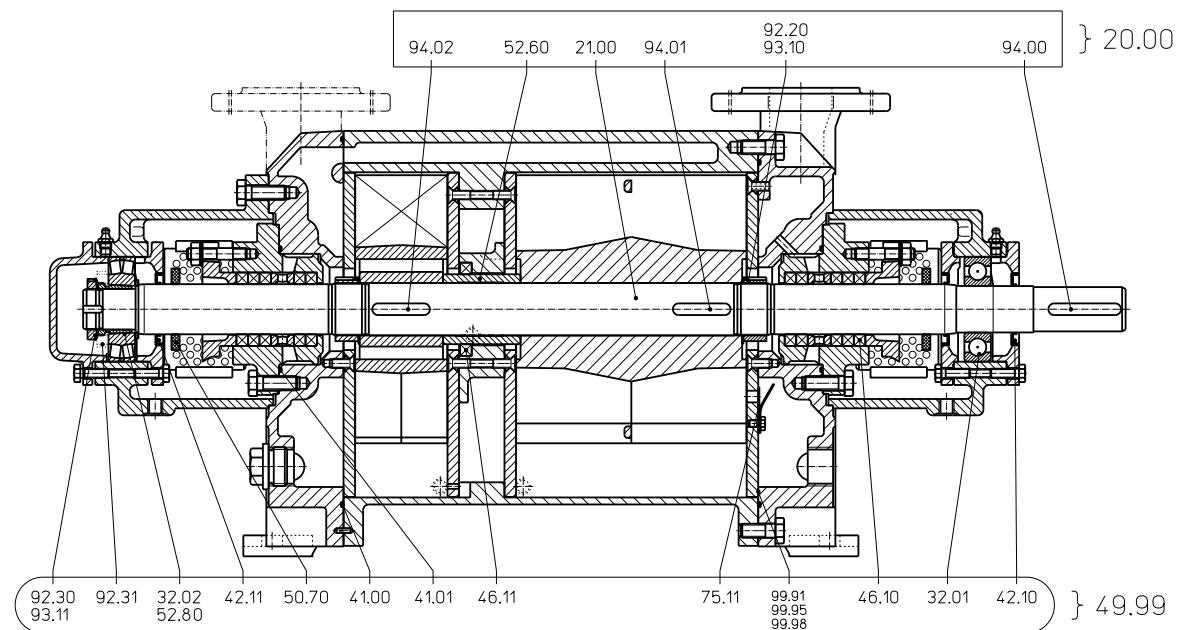
Spare Parts Order Number



* only for design 4B

Material Design 0K				
Group	Spare parts kit	LPH 55312	LPH 55316	LPH 55320
20.00	Shaft	65 007 935	65 007 937	65 007 891
49.99	Basic repair AGE	65 007 892		

Material Design 4B				
Group	Spare parts kit	LPH 55312	LPH 55316	LPH 55320
20.00	Shaft	65 008 799	65 008 782	65 008 803
49.99	Basic repair AG1	65 008 794		



Material Design 0K				
Group	Spare parts kit	LPH 55312	LPH 55316	LPH 55320
20.00	Shaft	65 008 754	65 008 755	65 008 756
49.99	Basic repair 041	65 008 796		

Accessories

Recommended Accessory	Material Execution		LPH 55312	LPH 55316	LPH 55320
Top Mounted Liquid Separator		Type / Weight	XBa 2041 / 23 kg		
Top mounted separator	1.4571	SIHI-Part No.	35 000 420		
Service liquid pipework, standard execution	Steel, galvanised 1.4571	SIHI-Part No.	20 067 931 20 067 932	20 067 933 20 067 934	20 067 935 20 067 936
Service liquid pipework, thermostatic control 24V	Steel, galvanised + Brass 1.4571 + Brass	SIHI-Part No.	20 073 164 20 073 165	20 073 166 20 073 167	
Cavitation protection pipework	Steel, galvanised 1.4571	SIHI-Part No.	20 050 621 20 042 945		
Side Mounted Liquid Separator		Type / Weight	XBp 0512 / 40 kg		
Side mounted separator	1.4571	SIHI-Part No.	35 000 519		
Service liquid pipework, standard execution	Steel 1.4571	SIHI-Part No.	35 003 137 35 003 138	35 003 146 35 011 251	35 003 139 35 003 141
Service liquid pipework, thermostatic control 24V	Steel + Brass 1.4571 + Brass	SIHI-Part No.	20 055 649 20 073 245		
Cavitation protection pipework	Steel, galvanised 1.4571	SIHI-Part No.	20 040 460 20 043 589		
Pressure pipework (bend)	1.0254 1.4571	SIHI-Part No.	35 003 203 35 003 205		
Liquid level indicator	Brass + Plexiglas 1.4571 + Plexiglas	SIHI-Part No.	43 014 912 43 040 384		
Sterling SIHI - Gas Ejector		Type / Weight	GPV 5011 / 25 kg	-	GPV 5012 / 30 kg
at service liquid temperature 15 °C		Type / Weight	GPV 5311 / 25 kg	GPV 5312 / 25 kg	GPV 5313 / 25 kg
at service liquid temperature 30 °C					
Sterling SIHI - Non Return Ball Valve					
Intermediate flange execution XCk 50	0.6025 + Butadiene rubber 0.6025 + Teflon 1.4408 + Teflon	SIHI-Part No. Weight	20 072 792 / 3.6 kg 20 072 791 / 3.8 kg 20 029 498 / 10.8 kg		
Flange execution with glass cylinder XCk 506	0.6025 + Butadiene rubber 0.6025 + Teflon 1.4408 + Teflon	SIHI-Part No. Weight	20 072 838 / 8.5 kg 20 072 849 / 8.5 kg 20 072 837 / 8.5 kg		
Drain Valve XCg 015	Steel + Teflon 1.4571 + Teflon	SIHI-Part No.	43 166 248 43 014 547		
Double nipple ³ / ₄ " - ¹ / ₂ "	Steel, galvanised 1.4571	SIHI-Part No.	43 013 096 43 013 097		
Air Inlet Valve (+ Double nipple)	Brass 1.4408	SIHI-Part No.	43 045 945 + 43 013 090 43 053 736 + 43 013 091		
Motor standard execution IP 55		Size Power Weight	132 M 7.5 kW 49 kg	160 M 11.0 kW 73 kg	160 L 15.0 kW 85 kg
Coupling for motor IP 55 Pump side Motor side		Type / Weight SIHI-Part No.	B 95 / 2.6 kg 43 021 429 43 021 433	B 110 / 3.9 kg 43 021 446 43 021 448	B 125 / 6.2kg 43 021 460 43 021 464
Coupling guard ¹)	Steel	SIHI-Part No.	43 042 269	43 042 273	43 042 306
Coupling guard ²)	Steel	SIHI-Part No.	43 042 267	43 042 269	43 042 304
Baseplate for standard execution	Steel	Type / Weight SIHI-Part No.	S 385 / 58 kg 43 040 639	S 436 / 71 kg 43 040 641	S 487 / 105 kg 43 040 642
Motor in EEx e II T3 execution		Size Power Weight	160 M 10.0 kW 67 kg		160 L 13.5 kW 107 kg
Coupling for motor EEx e II T3 Pump side Motor side		Type / Weight SIHI-Part No.	BDS 118 / 4.0 kg 43 111 044 43 110 928	BDS 135 / 6.6 kg 43 111 062 43 111 072	
Coupling guard ¹)	Brass	SIHI-Part No.	43 042 274	43 042 307	
Coupling guard ²)	Brass	SIHI-Part No.	43 042 270	43 042 305	
Baseplate for EEx e II T3 execution	Steel	Type / Weight SIHI-Part No.	S 436 / 71 kg 43 040 641		S 487 / 105 kg 43 040 642

¹) execution with mechanical seal

²) execution with gland packing

Designs subject to change without prior notice.

Flowserve SIHI Germany GmbH

Lindenstraße 170, D-25524 Itzehoe, Germany, Tel. +49 (0) 48 21 / 7 71 - 01, Fax +49 (0) 48 21 / 7 71-274