

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

Two Stage



SIHI® Pumps

LPH 45008, LPH 45311, LPH 45316

Pressure Range: 33 to 1013 mbar
Suction Volume: 50 to 240 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 45008, LPH 45311 and LPH 45316 are two stage pumps. In addition, the LPH 45008 and LPH 45316 can be used as compressors without any modification.

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 45008	LPH 45311	LPH 45316
Speed	50 Hz 60 Hz	rpm rpm	1450 1750	
Maximum overpressure on compression	bar	1.5		
Permissible pressure difference between suction and discharge side	max. min.	bar bar	1.5 0.2	1.5 0.2
Hydraulic test pressure (Overpressure)	bar	3.0		
Moment of inertia of rotating parts of pump and water content	kg · m ²	0.05	0.063	0.09
Noise level at 80 mbar suction pressure [50Hz]	dB (A)	60		
Minimum permissible pulley diameter for V belt drive	mm	160		
Max. gas temperature:	dry saturated	°C °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	4.0	5.5	7.0
Maximum flow resistance of the heat exchanger	bar	0.2		

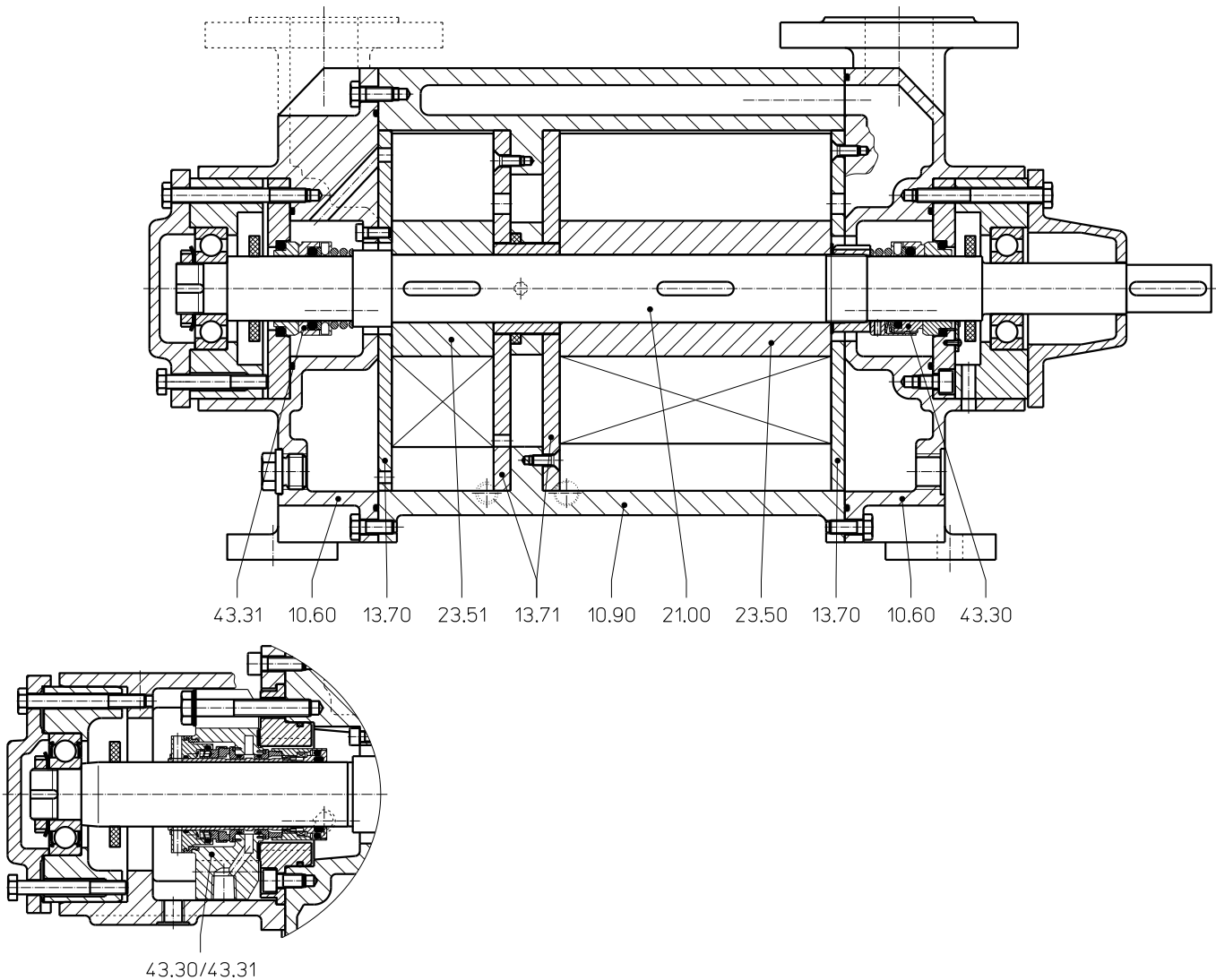
In selecting a pump, avoid choosing one which is likely to be operating at a combination of its maximum permissible limits e.g. maximum viscosity and maximum permissible pressure difference.

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Materials LPH 45008, LPH 45311, LPH 45316 with single and double mechanical seal

Position number	COMPONENT	MATERIALS	
		0K	4B
10.60	Casing	0.6025	1.4408
10.90	Central body		
13.70, 13.71	Guide disc		1.4404
21.00	Shaft	1.4021	1.4408
23.50, 23.51	Impeller	1.4308	1.4408
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	

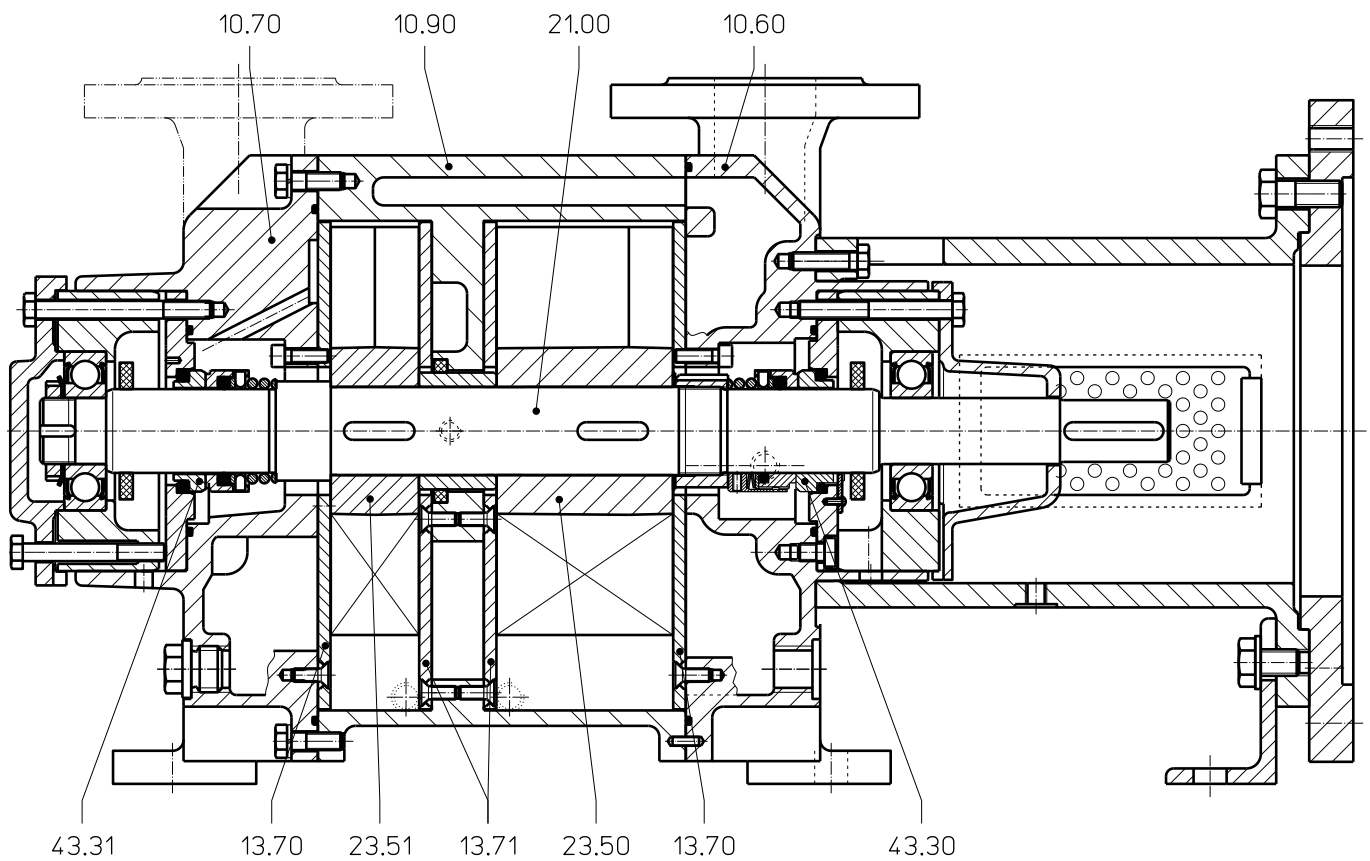
Cut-away diagram LPH 45008, LPH 45311, LPH 45316 with single and double mechanical seal



Materials LPH 45008, LPH 45311, LPH 45316 with motor carrier

Position number	COMPONENT	MATERIALS	
		0K	4B
10.60, 10.70	Casing	0.6025	1.4408
10.90	Central body		
13.70, 13.71	Guide disc		1.4404
21.00	Shaft	1.4021	1.4408
23.50, 23.51	Impeller	1.4308	1.4408
43.30, 43.31	Mechanical seal, Type SIHI FK (AG•)	Cr-Steel / Carbon / Butadiene rubber	Cr Ni Mo-Steel / Carbon / Viton

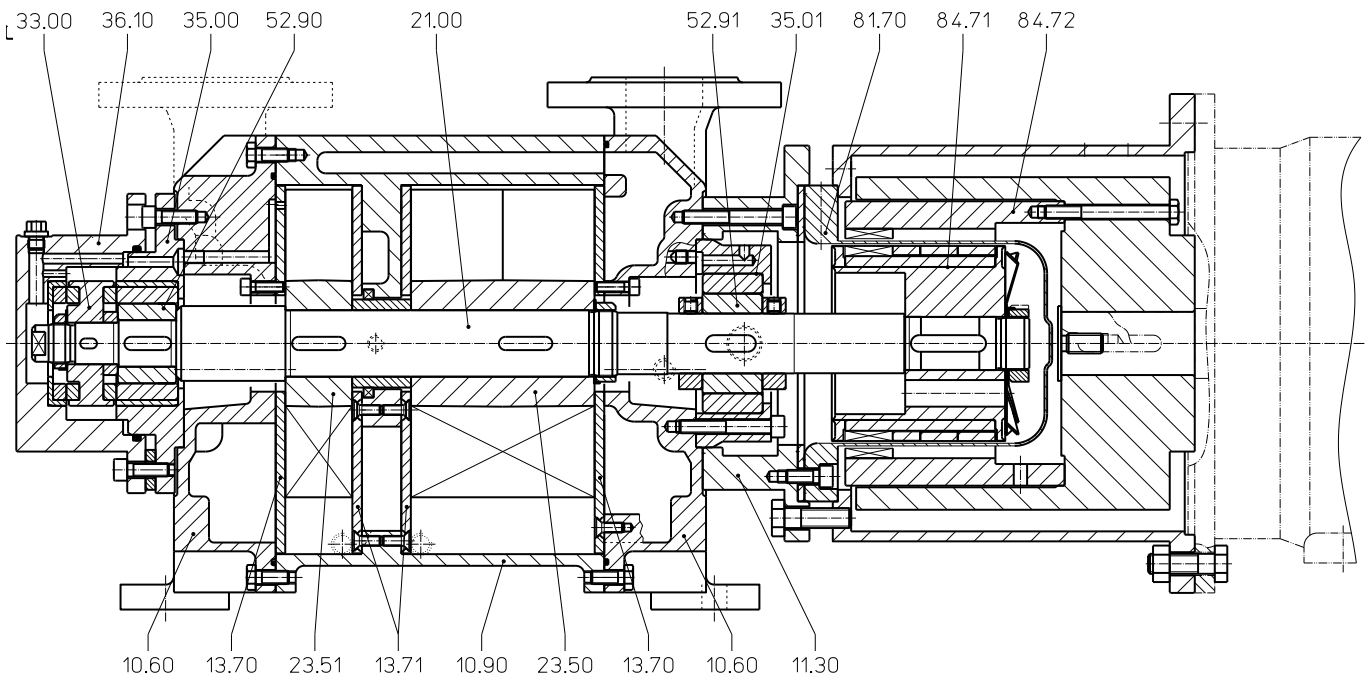
Cut-away diagram LPH 45008, LPH 45311, LPH 45316 with motor carrier



Materials LPH 45008, LPH 45311, LPH 45316 with magnetic coupling

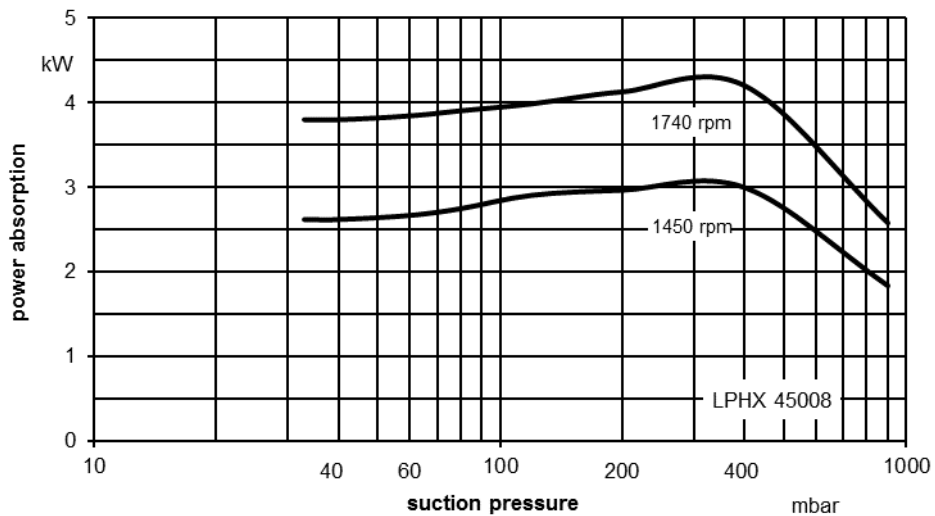
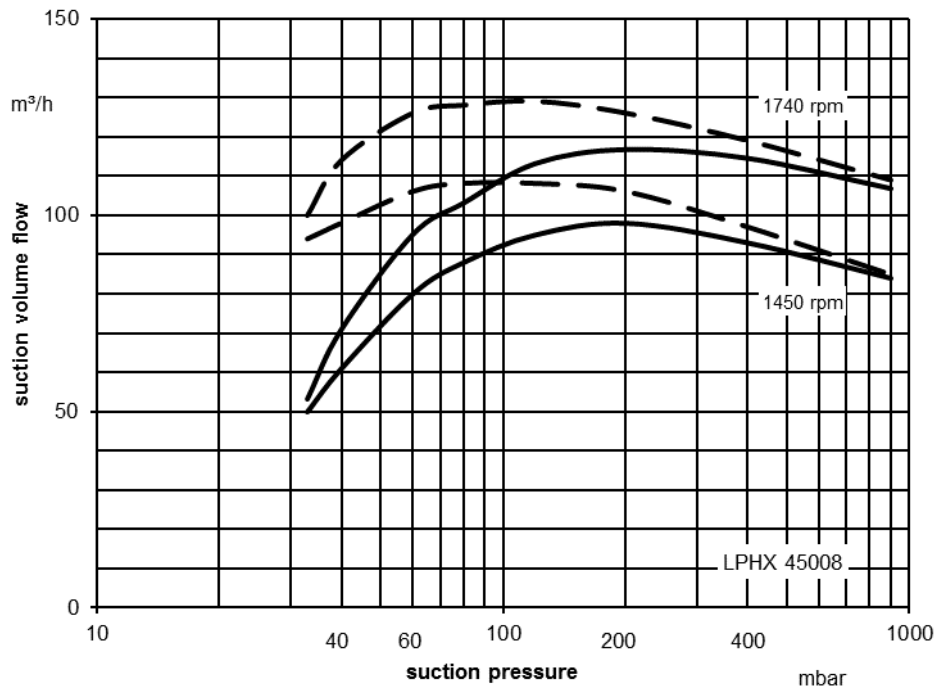
Position Number	COMPONENT	MATERIALS	
		0B	4B
10.60	Casing	0.6025	1.4408
10.90	Central body		
13.70, 13.71	Guide disc		
11.30	Intermediate casing	1.0553	1.4571
21.00	Shaft	1.4021	
23.50, 23.51	Vane wheel impeller	1.0619	1.4408
33.00	Thrust bearing	1.4462 / silicon carbide	
35.00, 35.01	Bearing housing	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 45008, LPH 45311, LPH 45316 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 45008



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

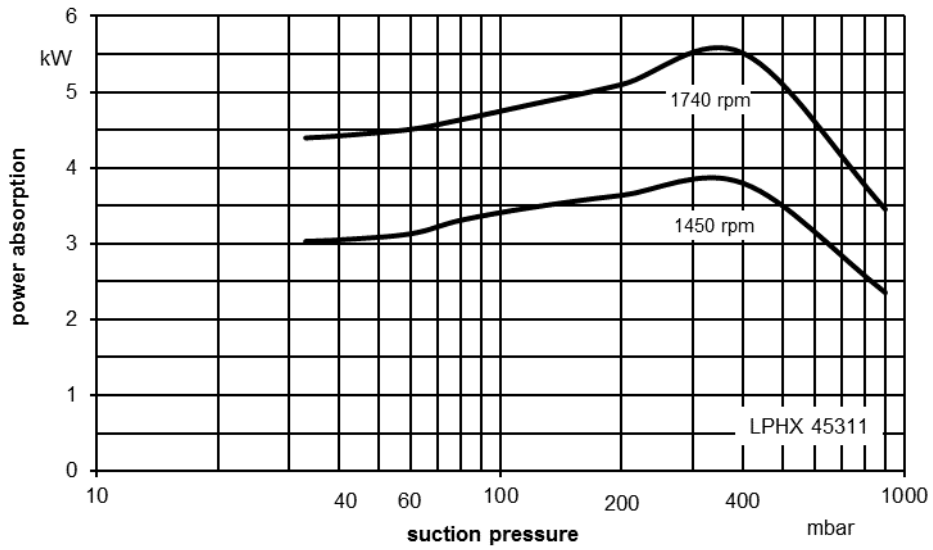
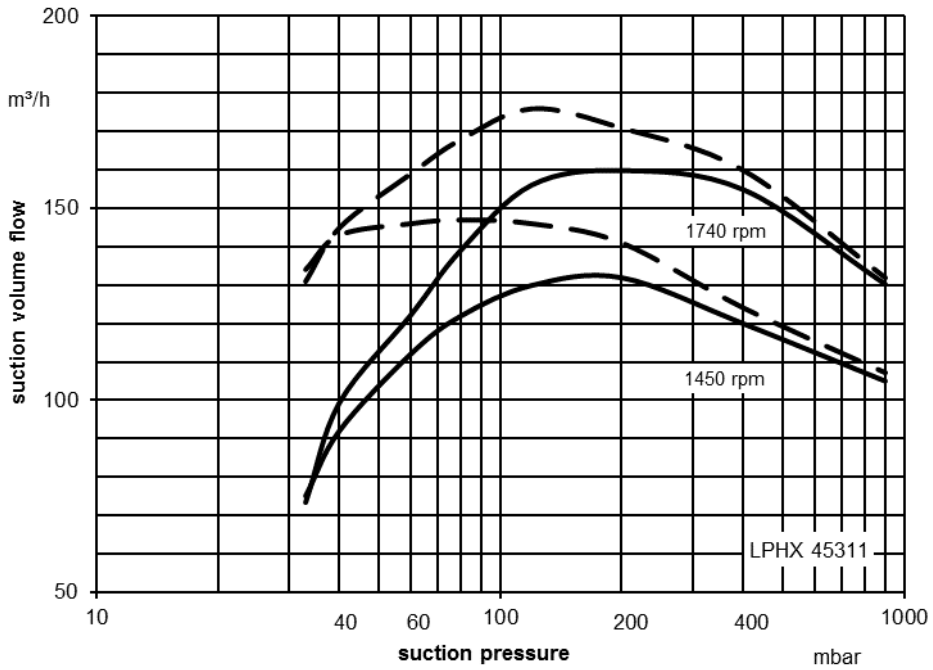
Pressure of gas to be evacuated: 1013 mbar (Atmospheric pressure)

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 45311



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

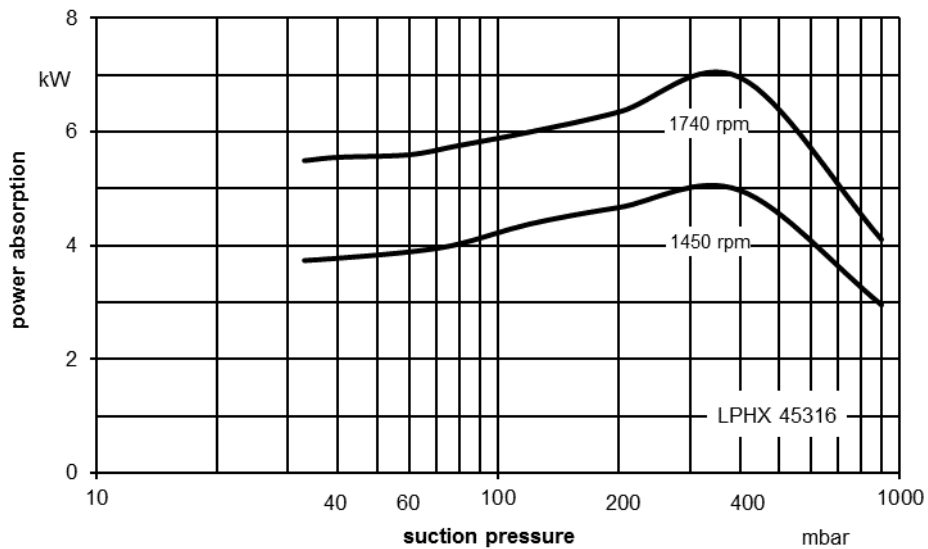
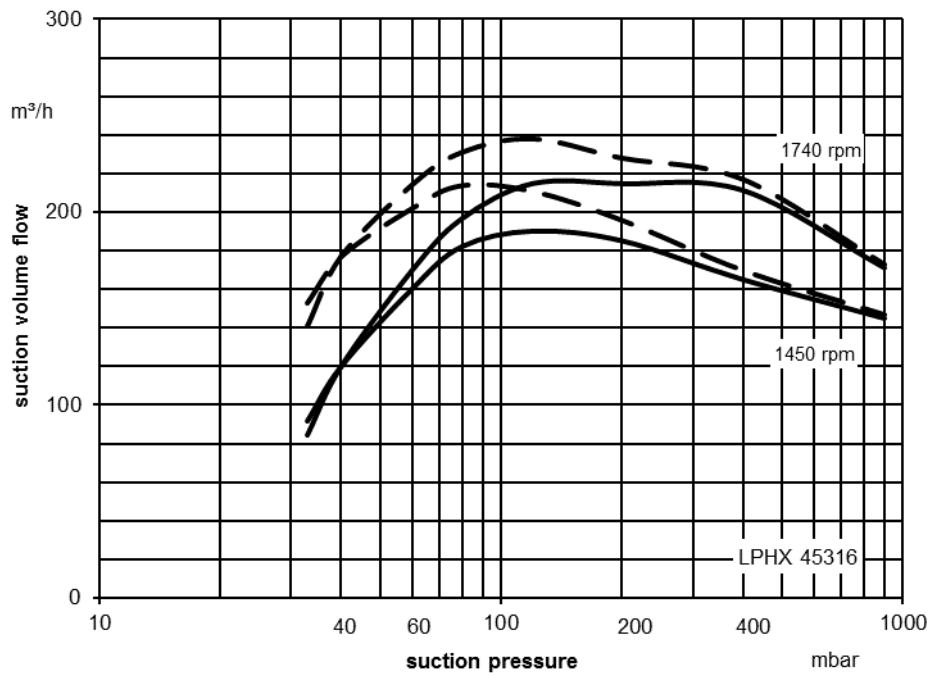
Pressure of gas to be evacuated: 1013 mbar (Atmospheric pressure)

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.

Performance Characteristics LPHX 45316



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)

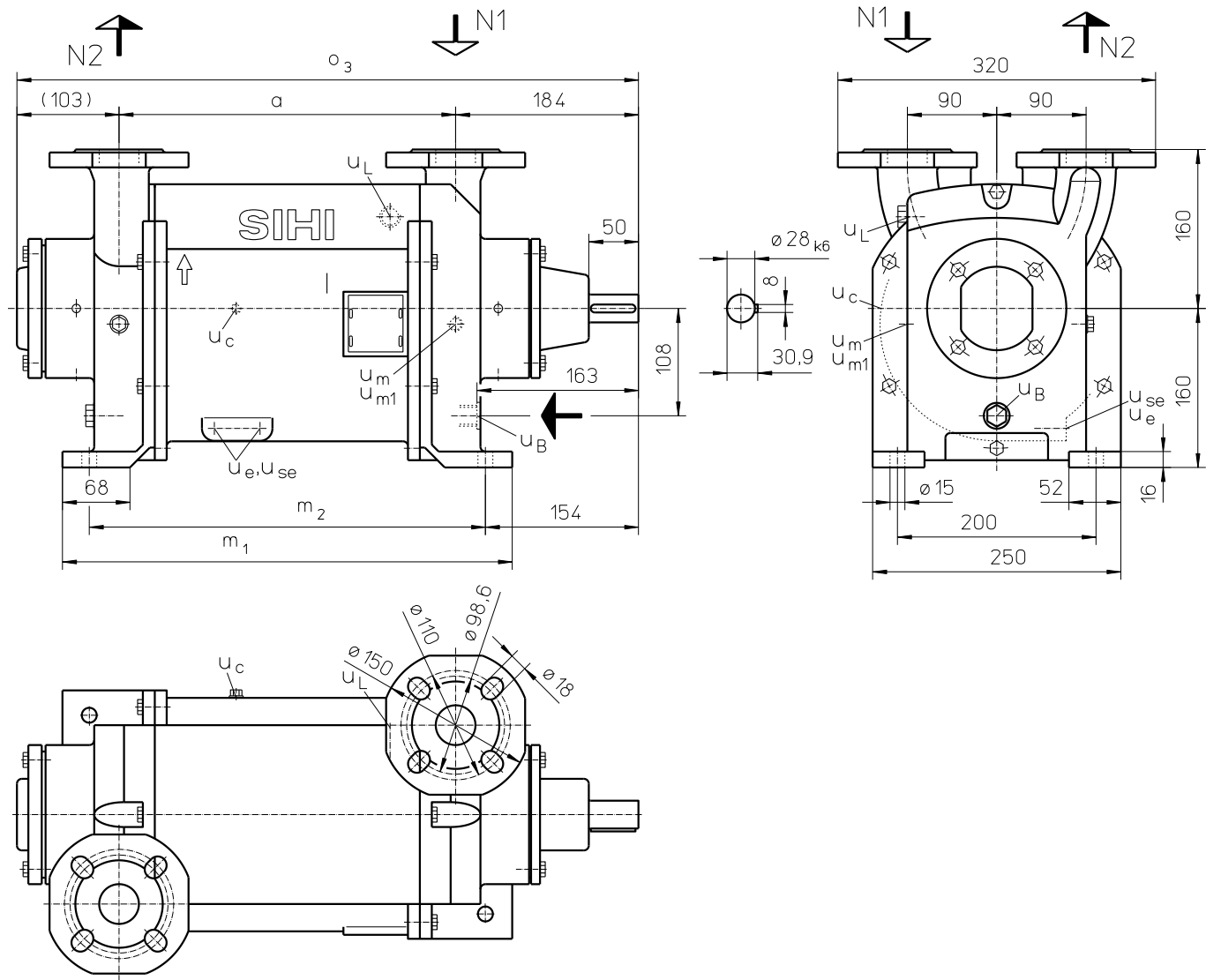
The suction volume is related to the suction pressure.

Tolerance on operating data is 10%.

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

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Dimensions LPH 45008, LPH 45311, LPH 45316 with single mechanical seal



N 1 = Gas inlet DN 40 (according to DIN EN 1092 PN 10)
 Gas inlet 1 1/2" (according to ANSI 150 lbs)

N 2 = Gas outlet DN 40 (according to DIN EN 1092 PN 10)
 Gas outlet 1 1/2" (according to ANSI 150 lbs)

u_B = Connection for service liquid G 1/2

u_c = Connection for cavitation protection G 1/8

u_e = Connection for drain G 1/8

u_{se} = Connection for dirt drain G 1/8

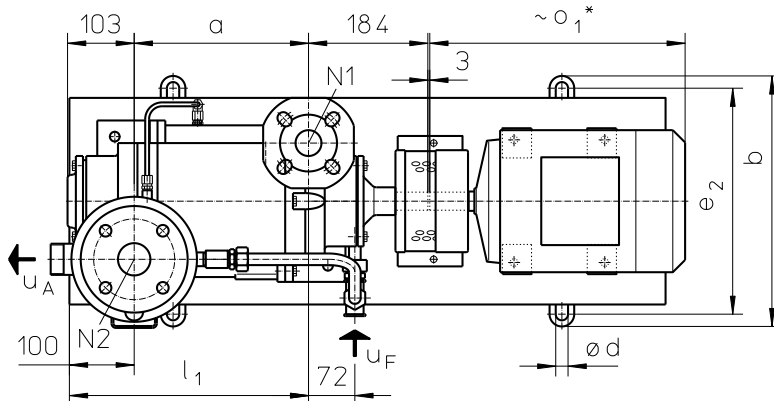
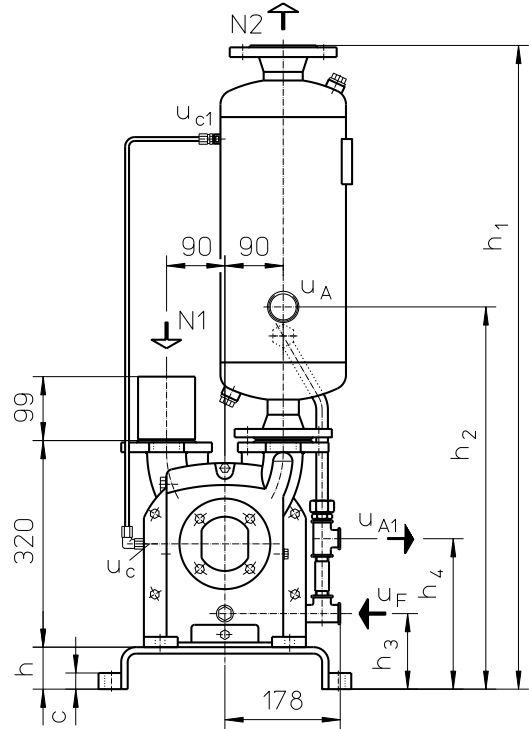
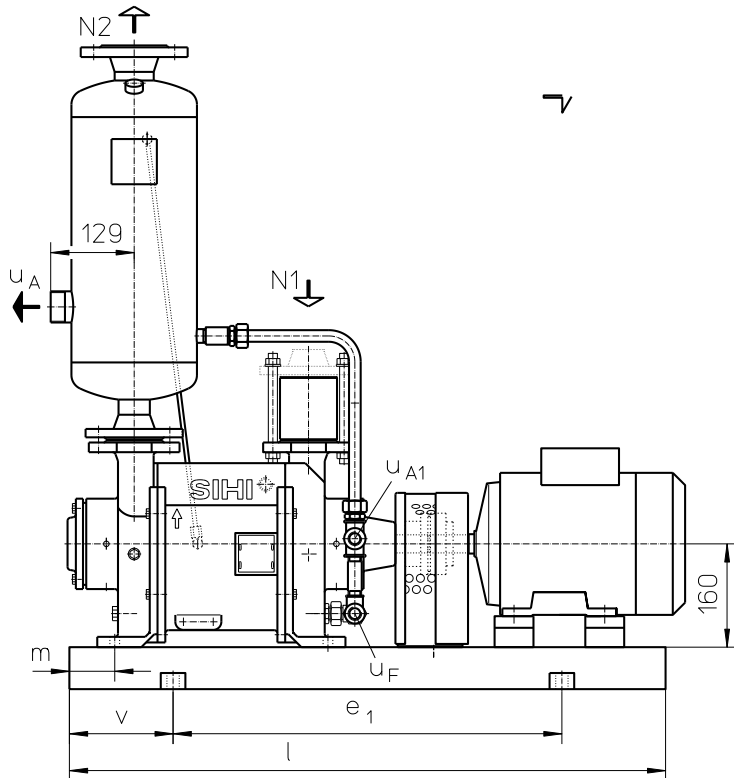
u_L = Connection for air cock G 1/2

u_m = Connection for pressure gauge G 1/4

u_{m1} = Connection for drainage valve or liquid level sensor G 1/4

	a [mm]	m_1 [mm]	m_2 [mm]	o_3 [mm]	approx. weight [kg]
LPH 45008	239	353	299	526	68
LPH 45311	269	383	329	556	72
LPH 45316	339	453	399	626	79

LPH 45008, LPH 45311, LPH 45316 with single mechanical seal and with Top-Mounted Liquid Separator



N 1 = Gas-inlet DN 40

N 2 = Gas-outlet DN 50

u_A = Liquid drain G 1 for LPH 45008, G 1½ for LPH 45311 and 45316

u_{A1} = Liquid drain G ½

u_F = Connection for make-up liquid G ½

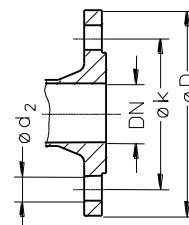
u_c = Connection for cavitation protection G ⅛

u_{c1} = Connection for cavitation protection G ⅛

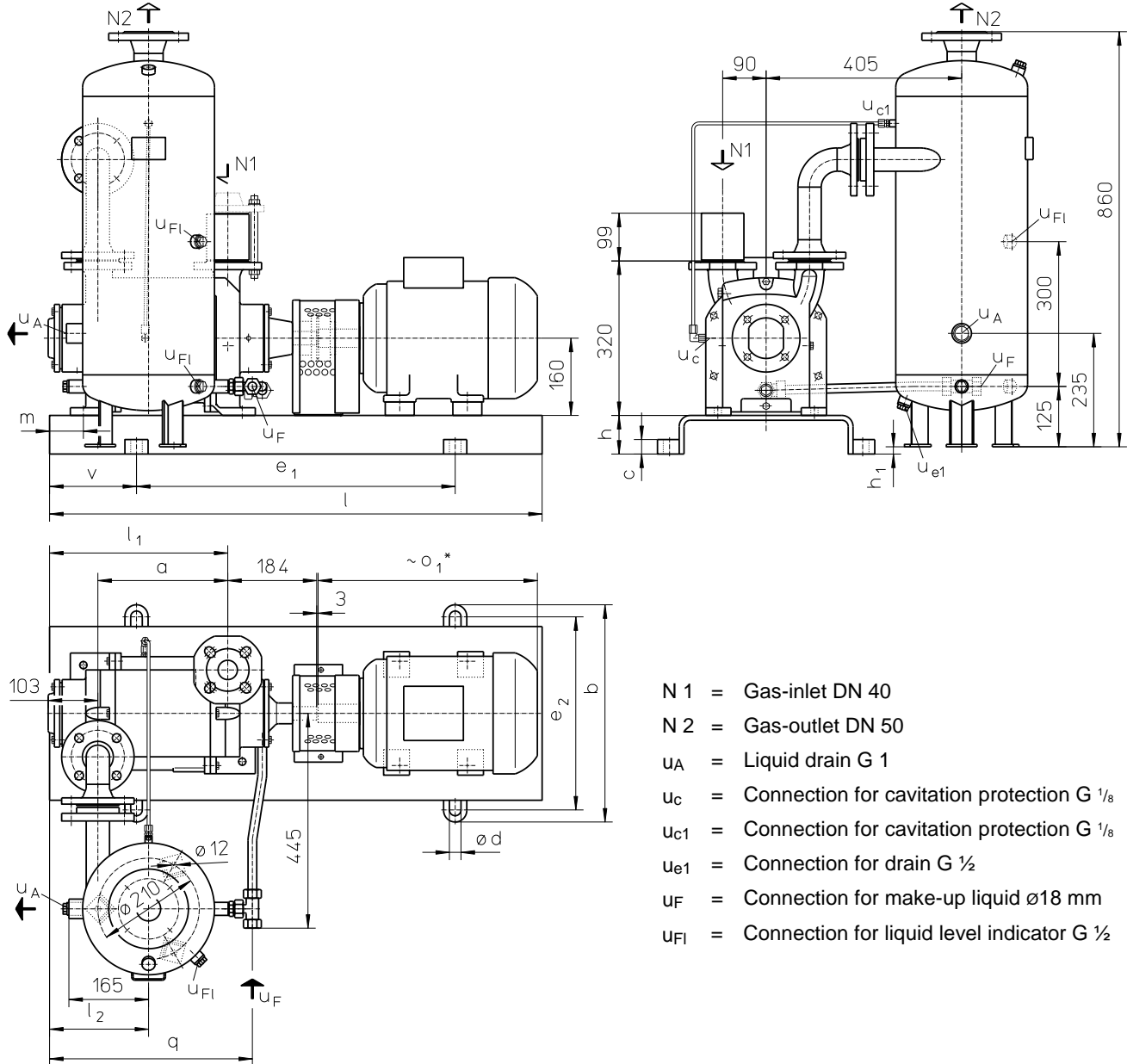
	E-Motor 50 Hz			base-plate	a [mm]	b [mm]	c [mm]	d [mm]	e ₁ [mm]	e ₂ [mm]	h [mm]	h ₁ [mm]	h ₂ [mm]	h ₃ [mm]	h ₄ [mm]	l [mm]	l ₁ [mm]	m [mm]	o ₁ * [mm]	v [mm]	approx. weight [kg]
	size	IP 55	kW EEEx e II T3																		
LPH 45008	100 L	3.0	-	S303	239	390	25	19	600	350	65	877	592	117	233	920	339	70	375	160	140
	112 M	-	3.6																		
LPH 45311	112 M	4.0	-	S344	269	450	30	24	660	400	80	997	607	132	248	1020	369	40	455	180	205
	132 S	-	5.0																		
LPH 45316	132 S	5.5	-	S344	339	450	30	24	660	400	80	1012	607	132	248	1020	439	40	495	180	235
	132 M	-	6.8																		

* Dimensions dependent upon motor supplier

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



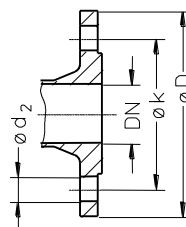
LPH 45008, LPH 45311, LPH 45316 with single mechanical seal and with Side-Mounted Liquid Separator



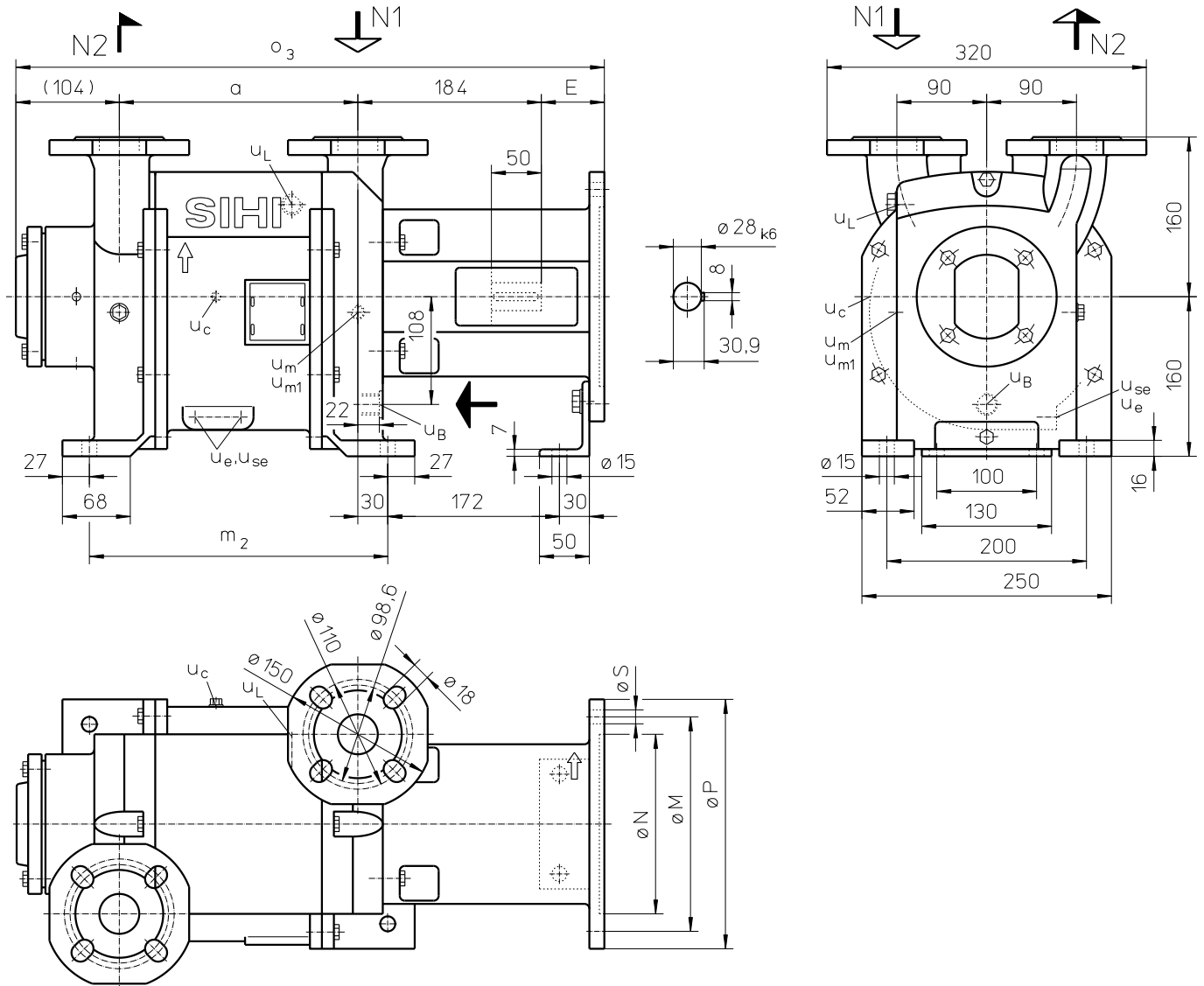
	E-Motor 50 Hz			base-plate	a [mm]	b [mm]	c [mm]	d [mm]	e ₁ [mm]	e ₂ [mm]	h [mm]	h ₁ [mm]	l [mm]	l ₁ [mm]	l ₂ [mm]	m [mm]	o ₁ * [mm]	q [mm]	v [mm]	approx. weight [kg]
	size	IP 55	kW EEx e II T3																	
LPH 45008	100 L	3.0	-	S303	239	390	25	19	600	350	65	0	920	339	205	70	375	420	160	160
	112 M	-	3.6		395															170
LPH 45311	112 M	4.0	-	S344	269	450	30	24	660	400	80	15	1020	369	175	40	455	390	180	210
LPH 45316	132 S	5.5	-		339															495
	132 M	-	6.8																	250

* Dimensions dependent upon motor supplier

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



Dimensions LPH 45008, LPH 45311, LPH 45316 with motor carrier



N 1 = Gas inlet DN 40 (according to DIN EN 1092 PN 10)
Gas inlet 1 1/2" (according to ANSI 150 lbs)

N 2 = Gas outlet DN 40 (according to DIN EN 1092 PN 10)
Gas outlet 1 1/2" (according to ANSI 150 lbs)

u_B = Connection for service liquid G 1/2

u_c = Connection for cavitation protection G 1/8

u_e = Connection for drain G 1/8

u_{se} = Connection for dirt drain G 1/8

u_L = Connection for air cock G 1/2

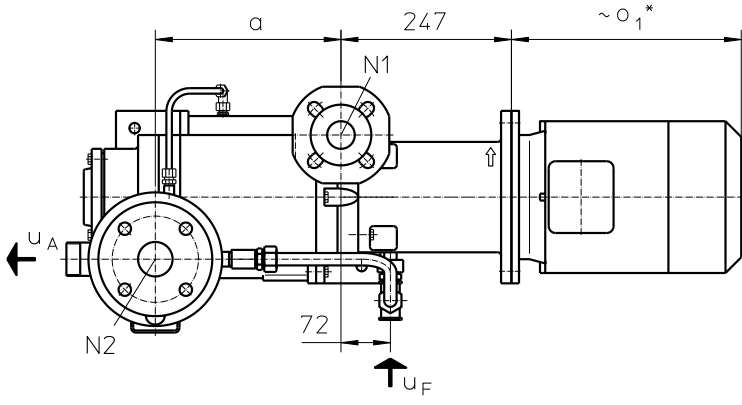
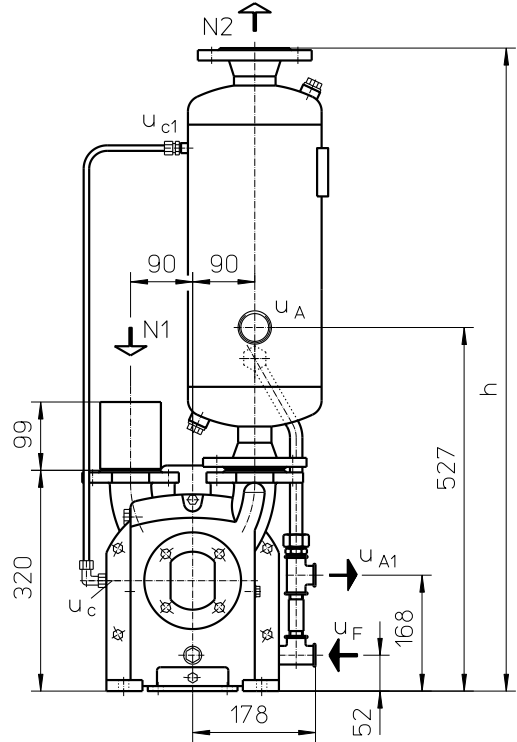
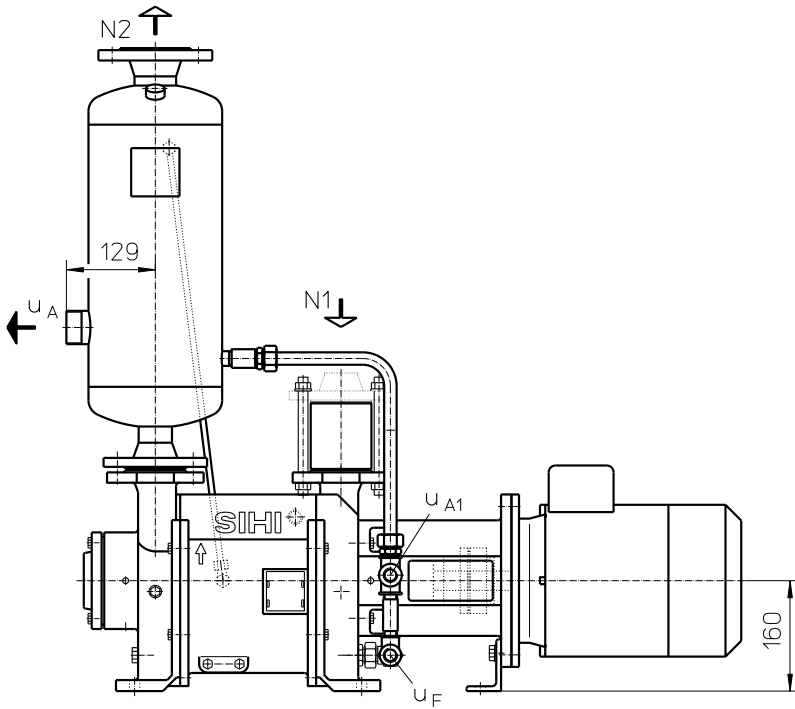
u_m = Connection for pressure gauge G 1/4

u_{m1} = Connection for drainage valve or liquid level sensor G 1/4

	code	for motor size	a [mm]	m ₂ [mm]	o ₃ [mm]	E [mm]	M [mm]	N [mm]	P [mm]	S [mm]	approx. weight [kg]
LPH 45008	LS	100L / 112M	239	299	590	63	215	180	250	4 x Ø14	79
LPH 45311	LS	112 M	269	329	620						82
	MS	132 S/M			640	90					
LPH 45316	MS	132 S/M	339	399	710	83	265	230	300	4 x M12	97

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LPH 45008, LPH 45311, LPH 45316 with motor carrier and with Top-Mounted Liquid Separator

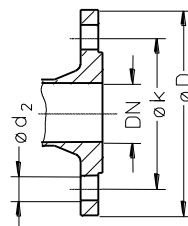


- N 1 = Gas-inlet DN 40
- N 2 = Gas-outlet DN 50
- U_A = Liquid drain G 1 for LPH 45008,
G 1½ for LPH 45311 and 45316
- U_A = Liquid drain G ½
- U_F = Connection for make-up liquid G ½
- U_C = Connection for cavitation protection G ¼
- U_{C1} = Connection for cavitation protection G ¼

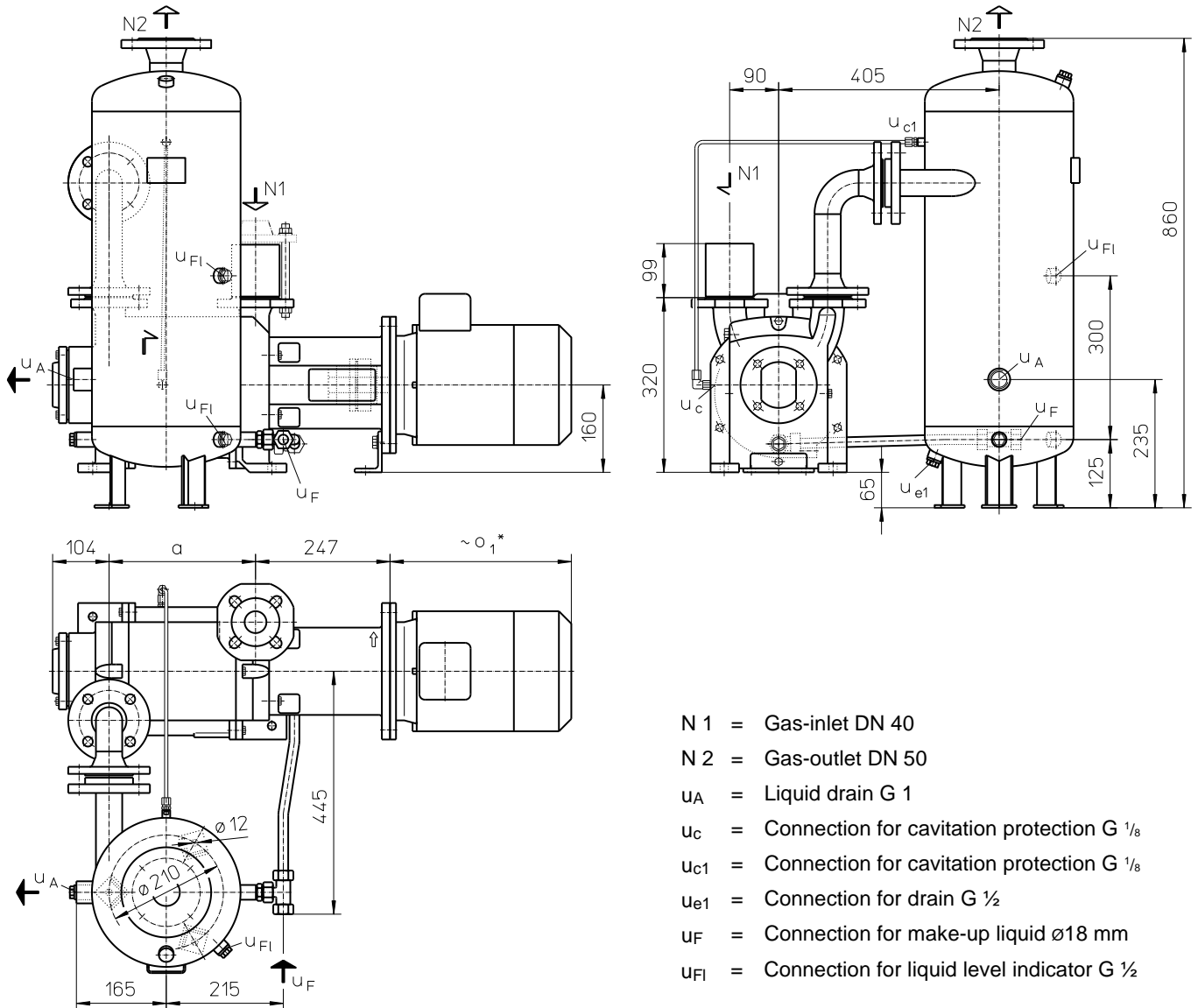
	E-Motor 50 Hz			a [mm]	h [mm]	o ₁ * [mm]	approx. weight [kg]
	size	IP 55	kW EEx e II T3				
LPH 45008	100 L	3.0	-	239	812	312	118
	112 M	-	3.6				128
LPH 45311	112 M	4.0	-	269	932	333	133
	132 S	-	5.0				178
LPH 45316	132 S	5.5	-	339		373	165
	132 M	-	6.8				200

* Dimensions dependent upon motor supplier

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



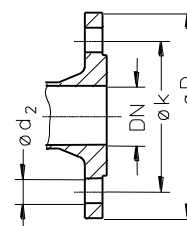
LPH 45008, LPH 45311, LPH 45316 with motor carrier and with Side-Mounted Liquid Separator



	E-Motor 50 Hz			a [mm]	o ₁ * [mm]	approx. weight [kg]
	size	IP 55 kW	EEx e II T3 kW			
LPH 45008	100 L	3.0	-	239	312	142
	112 M	-	3.6		333	152
LPH 45311	112 M	4.0	-	269	373	153
	132 S	-	5.0			198
LPH 45316	132 S	5.5	-	339	373	185
	132 M	-	6.8			220

* Dimensions dependent upon motor supplier

Flange dimensions according to DIN EN 1092 PN 10 [mm]		
DN	40	50
k	110	125
D	150	165
Number x d ₂	4 x 18	4 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]							
		10	5	2		10	5	2		10	5	2		10	5	2	
LPH 45008	1450	0.19	0.33	0.60	1.3	0.20	0.33	0.55	1.0	0.20	0.33	0.53	0.9	0.19	0.31	0.49	0.8
	1750	0.26	0.43	0.72		0.26	0.41	0.63		0.26	0.40	0.60		0.25	0.38	0.55	
LPH 45311	1450	0.22	0.37	0.65		0.23	0.38	0.60		0.23	0.37	0.57		0.23	0.36	0.54	
	1750	0.29	0.48	0.77		0.29	0.45	0.67		0.29	0.44	0.64		0.30	0.43	0.60	
LPH 45316	1450	0.26	0.43	0.72		0.27	0.43	0.65		0.28	0.43	0.62		0.28	0.41	0.58	
	1750	0.35	0.55	0.84		0.34	0.51	0.72		0.34	0.49	0.68		0.34	0.48	0.63	

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 10°C, 5°C, 2°C, warmer than make-up water.

Product Code – order details

Range + Size	Hydraulic + Bearings	Shaft Seal	Materials	Casing Sealing	Delivery without motor : code of motor connection
	<ul style="list-style-type: none"> •A 1. Hydraulic •B Two greased roller bearings •Z Two greased roller bearings, with motor carrier 	AGE Mechanical seal Type SIHI FK, O-rings butadiene rubber AG1 Mechanical seal Type SIHI FK, O-rings Viton	0K Main parts out of cast iron, impellers in low alloyed steel 4B Main parts out of stainless steel	1 O-ring sealing	LS for IMB5 motor 100L resp. 112M flange Ø 250 MS for IMB5 motor 132S resp. 132M flange Ø 300
45008 LPH 45311 45316	AB	AGE AG1	0K 4B	1	-
45008 LPH 45311 45316	AZ	AGE AG1	0K 4B	1	LS LS, MS MS

Motor Selection

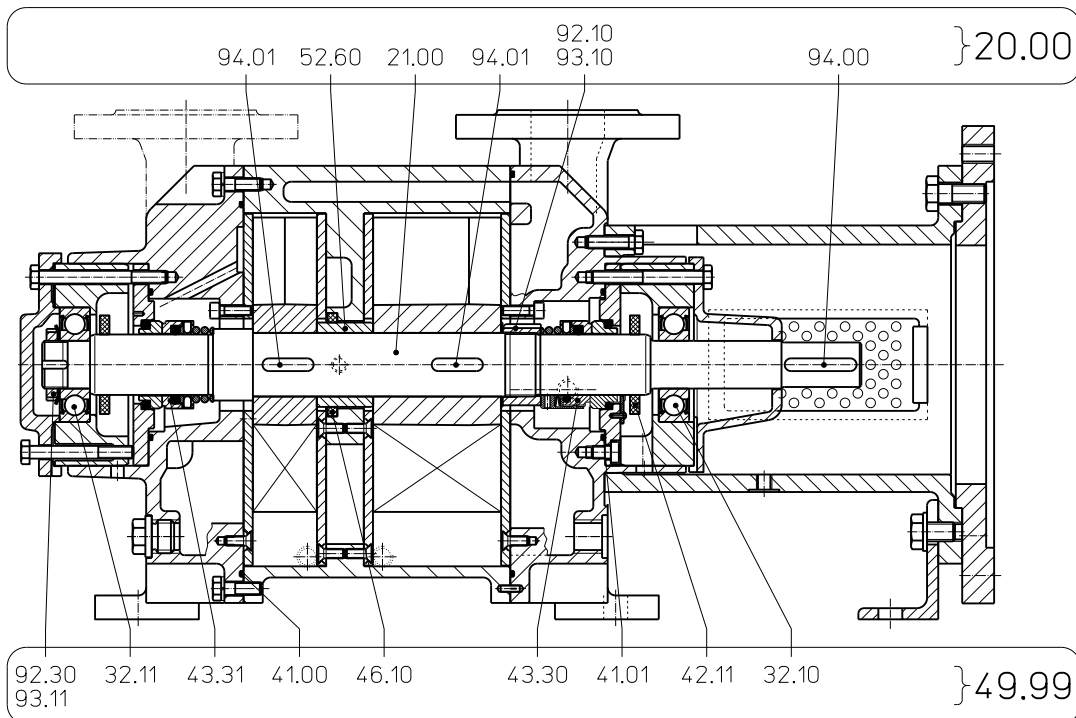
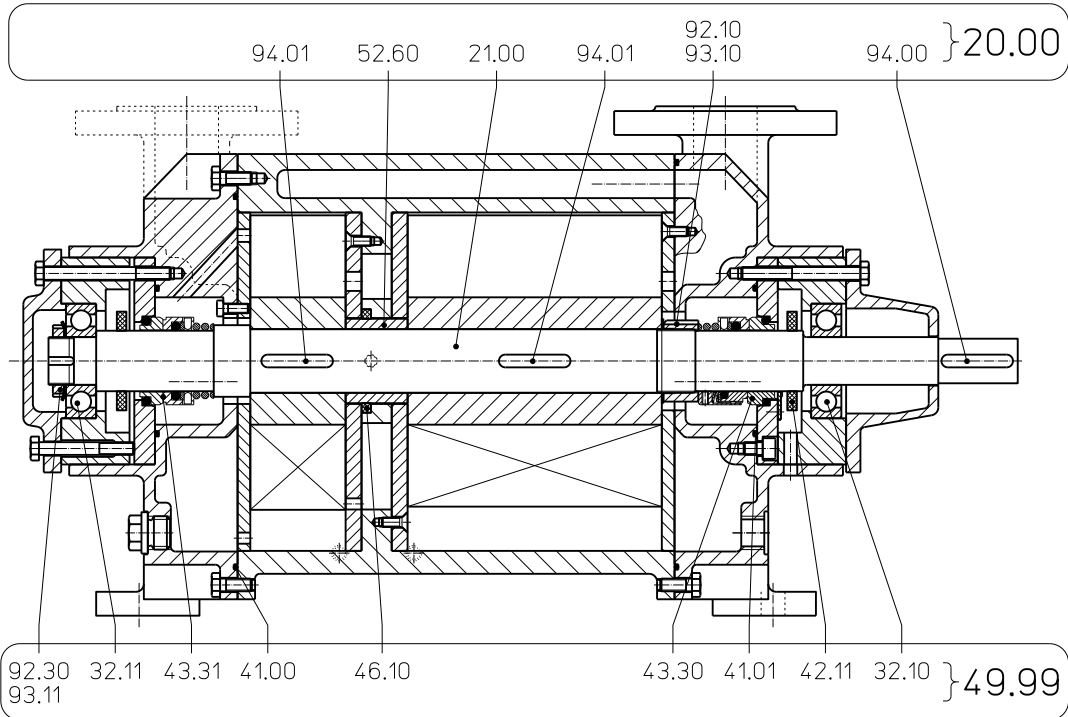
For our products we offer a lot of different motor types.

To identify the right motor please specify frequency, voltage and protection class.

Example of an Order:

LPHX 45311 AB AGE 0K 1 with 4.0 kW AC motor, 50 Hz, 400V Δ, IP55

Spare Parts Order Number



Material Design 0K

Group	Spare Parts Kit	LPH 45008	LPH 45311	LPH 45316
20.00	Shaft	65 006 712	65 006 711	65 006 710
49.99	Basic Repair AGE	65 008 221		

Material Design 4B

Group	Spare Parts Kit	LPH 45008	LPH 45311	LPH 45316
20.00	Shaft	65 006 757	65 006 758	65 006 759
49.99	Basic Repair AG1	65 008 223		

Accessories

Recommended Accessory	Material Execution		LPH 45008	LPH 45311	LPH 45316
Top Mounted Liquid Separator		Type / Weight	XBa 1040 / 10 kg		XBa 1340 / 14 kg
Top mounted separator	1.4571	SIHI-Part No.	43 253 089	43 253 090	
Service liquid pipework, standard execution	Steel, galvanised 1.4571	SIHI-Part No.	20 058 985 20 058 993		
Service liquid pipework, thermostatic control 24V	Steel, galvanised +Brass 1.4571 + Brass	SIHI-Part No.	20 059 008 20 048 978		
Cavitation protection pipework	Steel, galvanised 1.4571	SIHI-Part No.	20 040 424 20 040 423		
Side Mounted Liquid Separator		Type / Weight	XBp 0413 / 28 kg		
Side mounted separator	1.4571	SIHI-Part No.	35 000 503		
Service liquid pipework, standard execution	Steel, galvanised 1.4571	SIHI-Part No.	20 058 979 20 058 987	20 058 980 20 058 988	20 058 981 20 058 989
Service liquid pipework, thermostatic control 24V	Steel, galvanised +Brass 1.4571 + Brass	SIHI-Part No.	20 049 503 20 050 725		
Cavitation protection pipework	Steel, galvanised 1.4571	SIHI-Part No.	20 044 682 20 044 681		
Pressure pipework (bend)	1.0254 1.4571	SIHI-Part No.	35 003 165 35 003 166		
Liquid level indicator	Brass + Plexiglas 1.4571 + Plexiglas	SIHI-Part No.	43 014 911 43 040 384		
Sterling SIHI - Gas Ejector see Technical Catalogue – Gas Ejector					
At service liquid temperature 15 °C		Type / Weight	GPV 4011 / 13 kg	-	GPV 4012 / 20 kg
At service liquid temperature 30 °C		Type / Weight	GPV 4311 / 12 kg	GPV 4312 / 13 kg	GPV 4313 / 13 kg
Sterling SIHI - Non Return Ball Valve					
Intermediate flange execution XCK 40	0.6025 + Butadiene Rubber 0.6025 + Teflon 1.4408 + Teflon	SIHI-Part No. Weight	20 072 746 / 2.8 kg 20 072 745 / 2.8 kg 20 029 494 / 5.2 kg		
Flange execution with glass cylinder XCK 406	0.6025 + Butadiene Rubber 0.6025 + Teflon 1.4408 + Teflon	SIHI-Part No. Weight	20 072 835 / 7.0 kg 20 072 836 / 7.0 kg 20 072 834 / 7.0 kg		
Drain Valve XCg 015	Steel + Teflon 1.4571 + Teflon	SIHI-Part No.	43 166 248 43 014 547		
Double nipple 1/2"-3/4"	Steel, galvanised 1.4571	SIHI-Part No.	43 049 216 43 013 084		
Air Inlet Valve	Brass 1.4408	SIHI-Part No.	43 014 257 + 43 060 102 43 014 271		
Motor					
Motor Standard execution IP 55		Size Power Weight	100 L 3.0 kW 20 kg	112 M 4.0 kW 28 kg	132 S 5.5 kW 45 kg
Coupling for Motor IP 55 Pump side Motor side		Type / Weight SIHI-Part No.	B 95 / 2.6 kg 43 021 426 43 021 432		B 95 / 2.6 kg 43 021 426 43 021 433
Coupling guard	Steel	SIHI-Part No.	43 042 248		
Motor in EEx e II T3 execution		Size Power Weight	112 M 3.6 kW 30 kg	132 S 5.0 kW 65 kg	132 M 6.8 kW 80 kg
Coupling for Motor EEx e II T3 Pump side Motor side		Type / Weight SIHI-Part No.	BDS 103 / 3.1 kg 43 111 051 43 111 039	BDS 103 / 3.1 kg 43 111 051 43 111 040	
Coupling guard	Brass	SIHI-Part No.	43 042 249		
Baseplate	Steel	Type / Weight SIHI-Part No.	S 303 / 32 kg 43 040 635	S 344 / 41 kg 43 040 637	

Designs subject to change without prior notice.

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