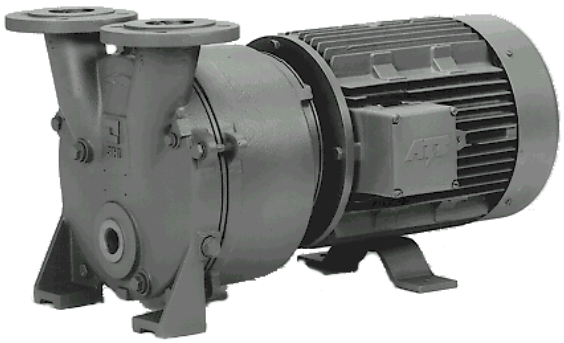
Liquid ring vacuum pumps
in compact design

LEM 325, LEM 425

FLOWSERVE
SIHI® Pumps

Pressure range: **33 to 1013 mbar**
Suction volume flow: **100 to 475 m³/h**



CONSTRUCTION TYPE

SIHI liquid ring vacuum pumps are displacement pumps of uncomplicated and robust construction with the following particular features:

- non-polluting due to nearly isothermal compression
- oil-free, as no lubrication in the working chamber
- handling of nearly all gases and vapours
- small quantities of entrained liquid can be handled
- easy maintenance and reliable operation
- low noise and nearly free from vibration
- wide choice of material, therefore applicable nearly everywhere
- shaft not contact with the medium
- protection against cavitation as standard
- incorporated dirt drain
- incorporated central drain
- no metallic contact of the rotating parts

The SIHI liquid ring vacuum pumps LEM are single-stage ones.

APPLICATION

Handling and exhausting of dry and humid gases; entrained liquid can be handled during normal duty. The pumps are applied in all fields where a pressure of 33 to 900 mbar must be created by robust vacuum pumps.

NOTE

During operation the pump must continuously be supplied with service liquid, normally water, in order to eliminate the heat resulting from the gas compression and to replenish the liquid ring, because part of the liquid is leaving the pump together with the gas. This liquid can be separated from the gas in a liquid separator (see catalogue part accessories).
It is possible to reuse the service liquid. The pumps are equipped with a device by which the contaminated service liquid can continuously be drained during operation (dirt drain), if necessary.

The direction of rotation is clockwise, when looking from the drive on the pump.

GENERAL TECHNICAL DATA

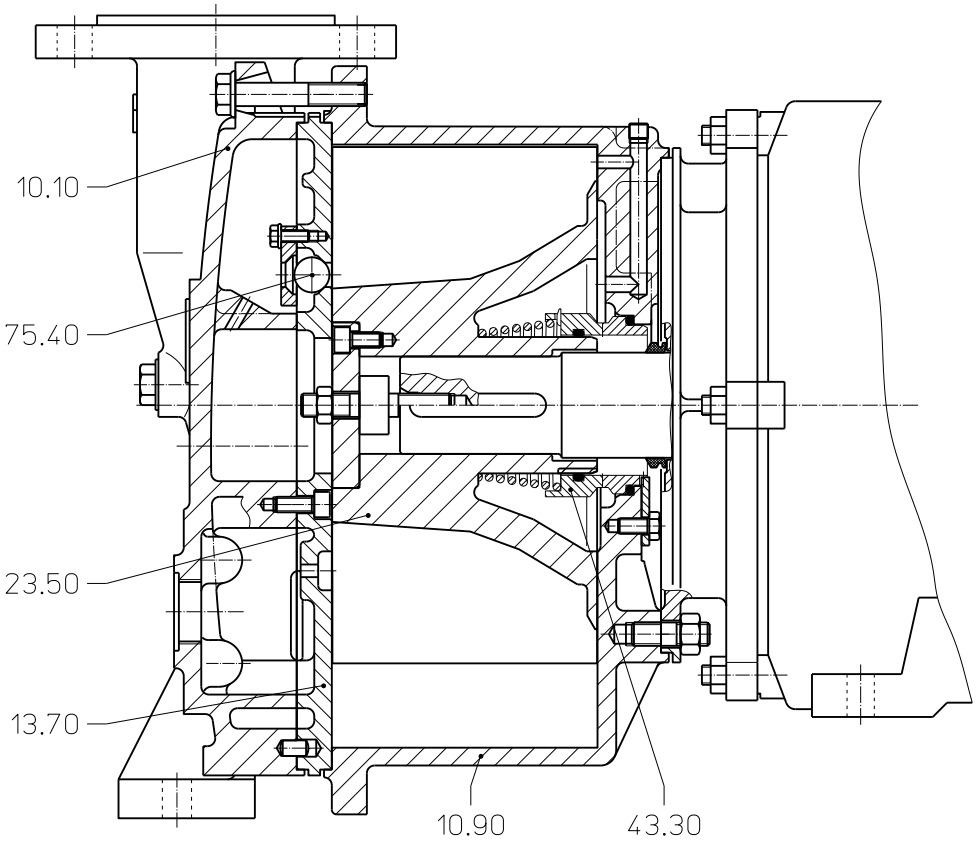
Pump Type		Units	LEM 325	LEM 425
Speed	50 Hz 60 Hz	rpm	1450 1750	
Maximum overpressure on compression		bar	0.3	
Permissible pressure difference between suction and discharge side	max. min.	bar	1.1 0.2	
Hydraulic test pressure (overpressure)		bar	3	
Moment of inertia of rotating parts of pump and water content		kg · m²	0.14	0.21
Noise level at 80 mbar suction pressure		dB (A)	70	72
Maximum gas temperature	dry saturated	°C °C	200 100	
Service liquid: Maximum permissible temperature Minimum permissible temperature Maximum viscosity Maximum density Liquid capacity up to middle of shaft		 °C °C mm²/s kg/m³ liter	 80 10 4 1200 4.3	 4.7
Maximum flow resistance of the heat exchanger		bar	0.2	

The combination of several limiting values is not admissible.

Materials

Position number	COMPONENT	MATERIALS 0B	MATERIALS 4B
10.10	Vacuum casing	0.6025	1.4408
10.90	Central body		
13.70	Guide disc		
23.50	Vane wheel impeller	0.7043	1.4517
43.30	Standard mechanical seal	Cr-Steel / Carbon / Butadiene rubber	Cr Ni Mo-Steel / Carbon / Viton
75.40	Valve balls	Polyamide A	PTFE

Cut-away diagram LEM 325, LEM 425



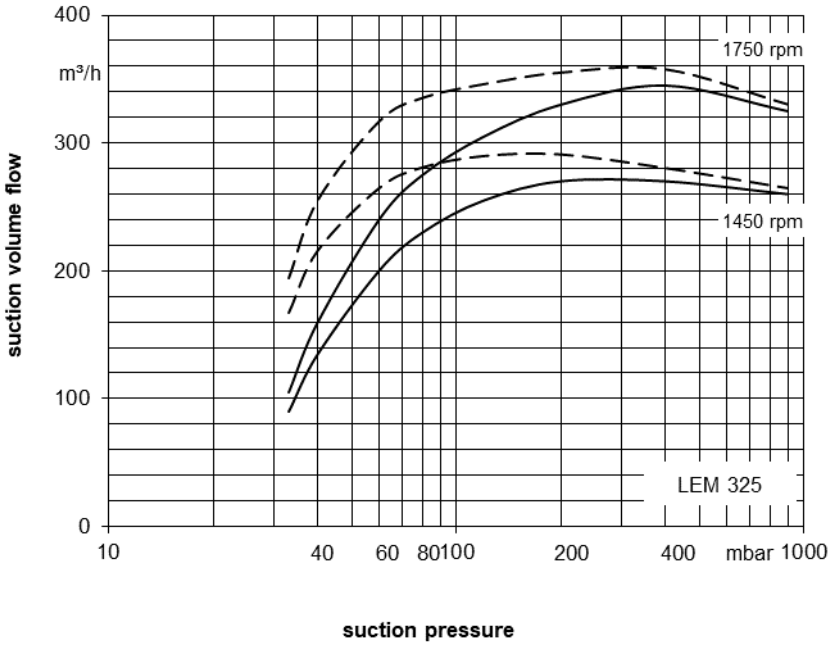
Make-up Liquid Consumption in [m³/h] dependent upon suction pressure, speed, drive type and temperature difference

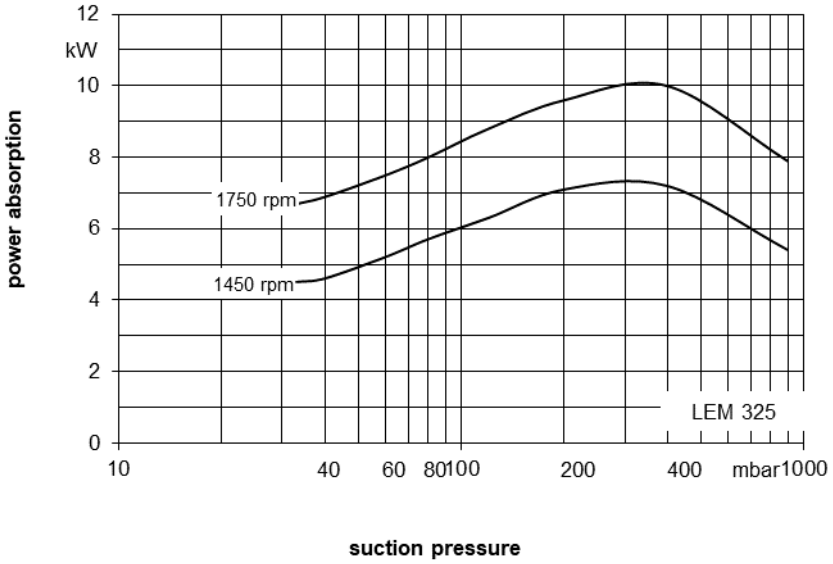
Suction Pressure [mbar]		33				120				200				400			
Pump Type	Speed [rpm]	KB Temperature Difference [°C] 10	5	2	FB	KB Temperature Difference [°C] 10	5	2	FB	KB Temperature Difference [°C] 10	5	2	FB	KB Temperature Difference [°C] 10	5	2	FB
LEM 325	1460	0.31	0.52	0.88	1.6	0.40	0.63	0.97	1.5	0.42	0.65	0.96	1.4	0.41	0.61	0.86	1.2
	1750	0.42	0.67	1.03		0.50	0.75	1.07		0.52	0.76	1.05		0.50	0.71	0.94	
LEM 425	1460	0.46	0.75	1.20	2.0	0.54	0.81	1.15	1.6	0.55	0.80	1.09	1.45	0.54	0.76	1.01	1.3
	1750	0.64	0.97	1.40		0.67	0.94	1.25		0.67	0.91	1.17		0.65	0.86	1.08	

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

Performance Characteristics LEM 325



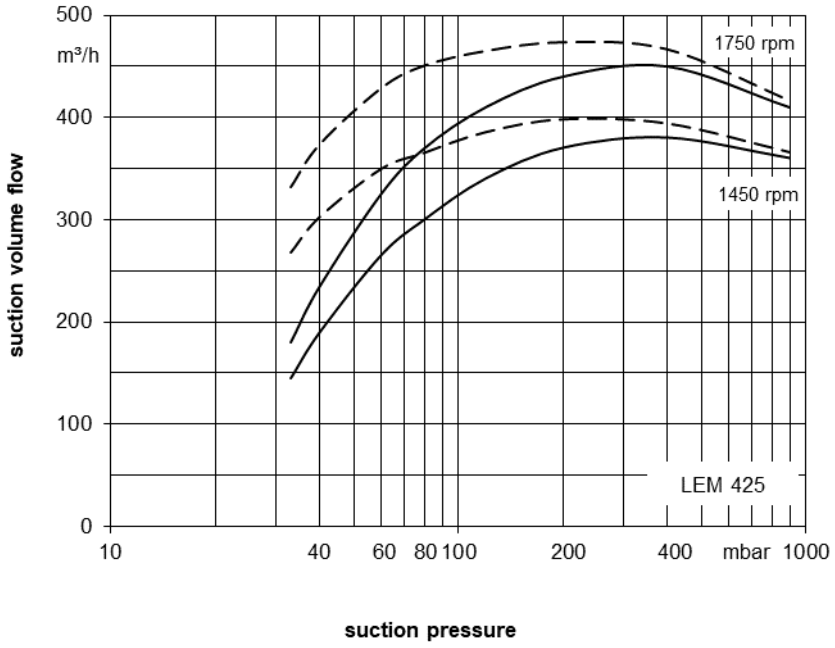


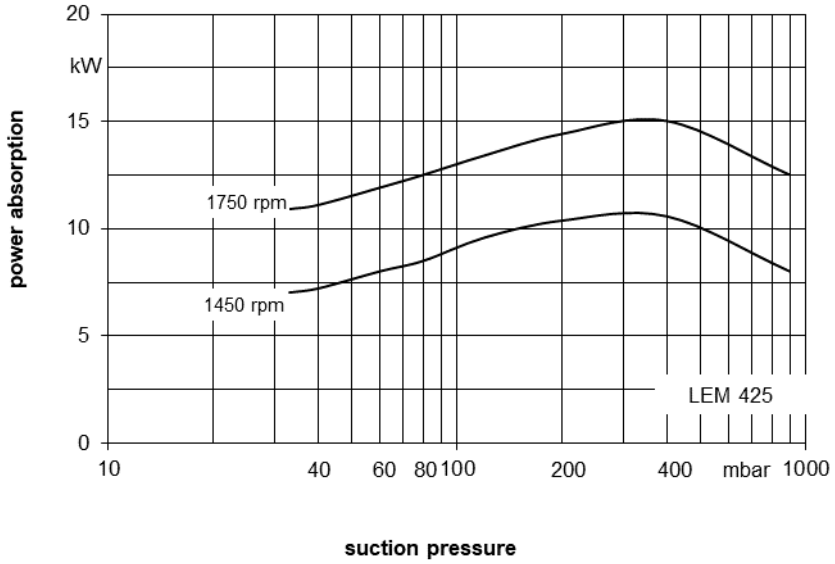
The operating data is valid under the following conditions:

- 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 LEM 425



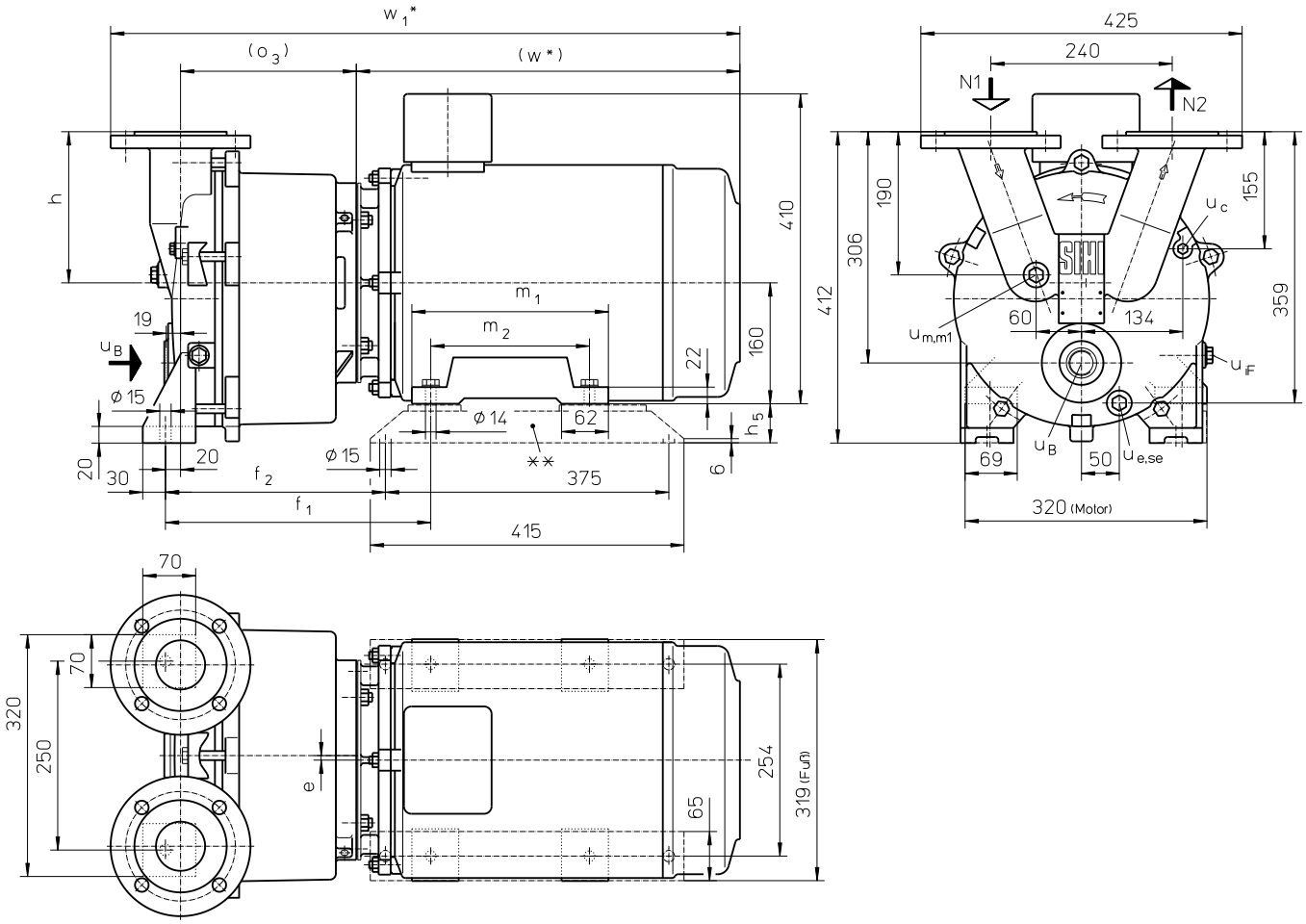


The operating data is valid under the following conditions:

- 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.

Dimensions LEM 325, LEM 425

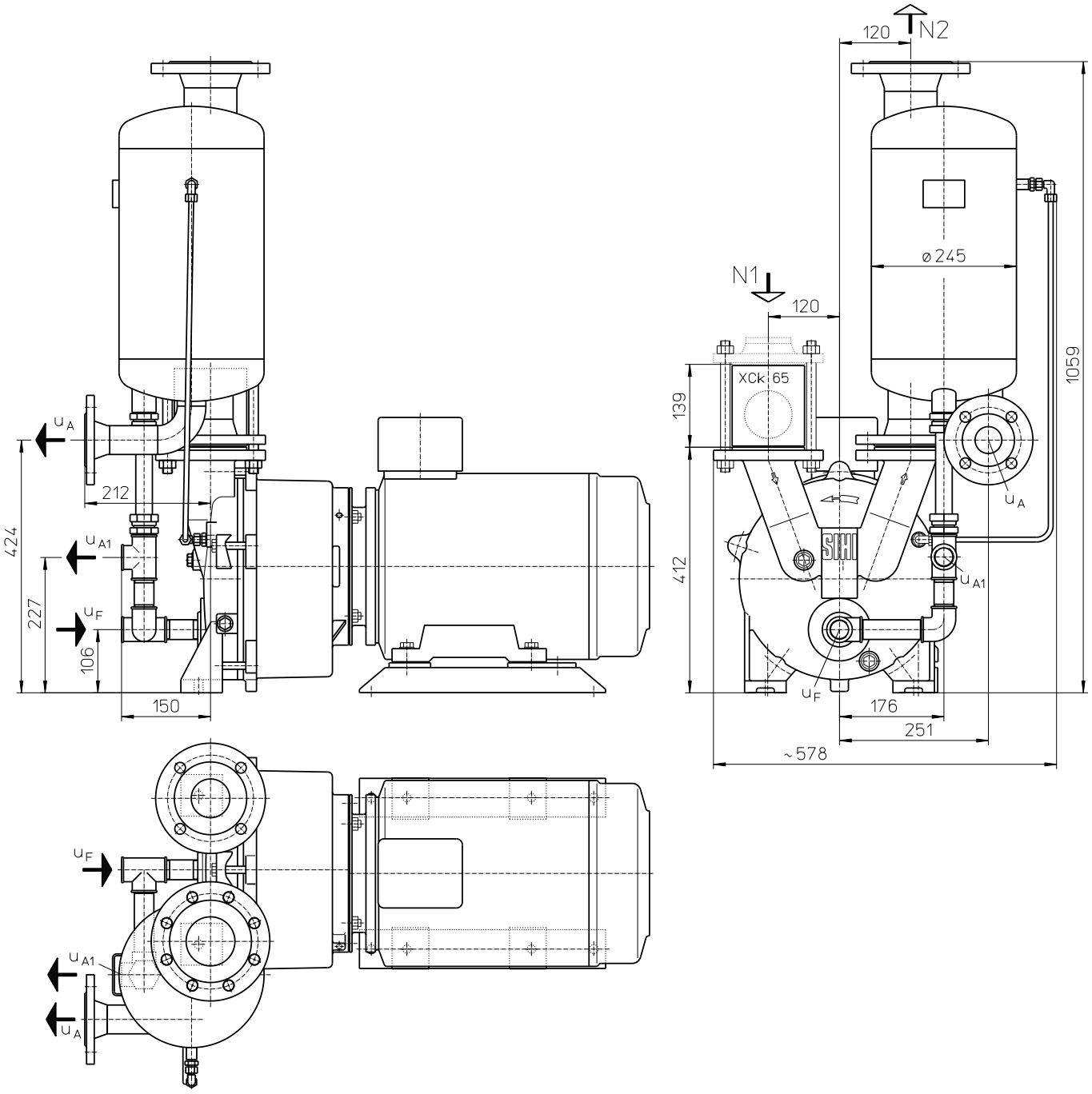


N 1 = gas inlet DN 65
N 2 = gas outlet DN 65
u_B = connection for service liquid G 1
u_c = connection for cavitation protection G ¼
u_e = connection for drain G ½
u_{iF} = adjusting screw for internal liquid return
u_{se} = connection for dirt drain G ½
u_m = connection for pressure gauge G ½
u_{m1} = connection for drain valve G ½

	electric motor IP 55			e	f_1	f_2	h	h_5	m_1	m_2	o_3	w *	w_1 *	approx. weight [kg]
	size	kW 50 Hz	kW 60 Hz											
LEM 325	160 M	7.5	12.8	4	337	277	202	50	260	210	219	508	819	185
LEM 425	160 M	11.0	-	6	351	291	200	52			233		833	190
	160 L	-	16.5						304	254		538	863	215

other motors on request
* dimensions dependent upon motor supplier
** see list of accessories
flange connections see page 7

Arrangement drawing LEM 325, LEM 425



N 1 = gas inlet DN 65

N 2 = gas outlet DN 80

u_A = liquid drain DN 40

u_{A1} = liquid drain G 1

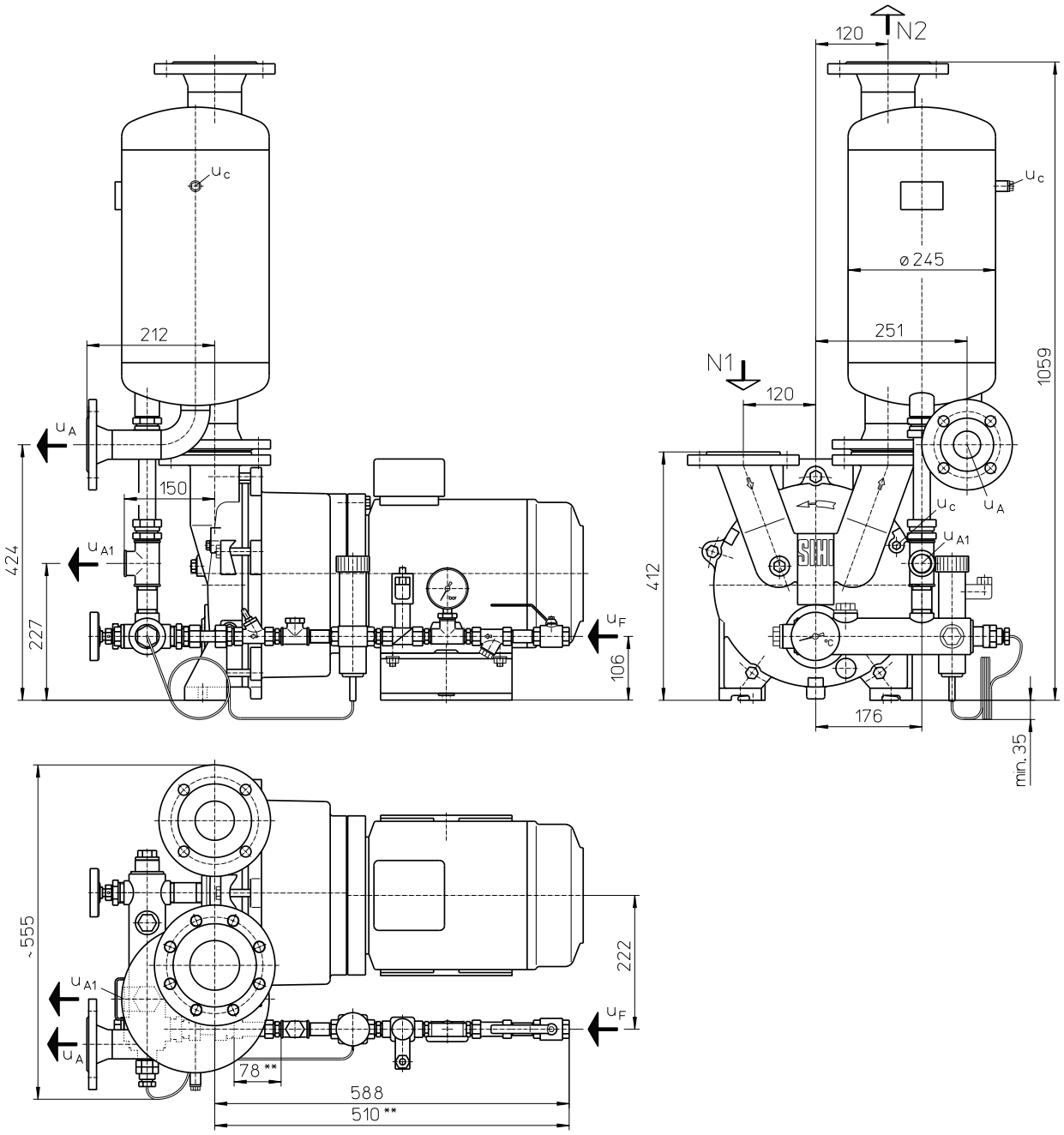
u_F = connection for make-up liquid G 1

	electric motor IP 55 size	kW 50 Hz	kW 60 Hz	approx. weight [kg]
LEM 325	160 M	7.5	12.8	215
LEM 425	160 M	11.0	-	220
	160 L	-	16.5	245

other motors on request

flange connections see page 7

Arrangement drawing LEM 325, LEM 425 with thermostatic control



support for service liquid line is necessary

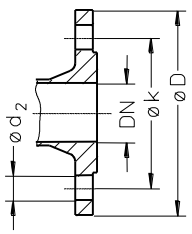
	size	electric motor IP 55 kW 50 Hz	kW 60 Hz	approx. weight [kg]
LEM 325	160 M	7.5	13.2	220
LEM 425	160 M	11.0	-	225
	160 L	-	18.0	250

other motors on request

** only at material 1.4571 the line

N 1 = gas inlet DN 65
N 2 = gas outlet DN 80
u_A = liquid drain DN 40
u_{A1} = liquid drain G 1
u_F = connection for make-up liquid G ½
u_c = connection for cavitation protection G ¼

flange connections according to DIN 2501 PN 10 [mm]			
DN	40	65	80
k	110	145	160
D	150	185	200
number x d_2	4 x 18	4 x 18	8 x 18



Data regarding the pump size - order notes

range + size	hydraulic + bearings	shaft seal	materials	casing sealing
	A• hydraulic A •Z two grease lubricated antifriction bearings arranged in the motor	AAE standard mechanical seal, o-rings butadiene rubber AA1 similar to AAE, but o-rings Viton	0B main parts out of cast iron, without non-ferrous metal 4B main parts out of stainless steel	0 liquid seal 4 soft teflon
LEM 325	AZ	AAE, AA1	0B	4
LEM 425			4B	0

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:

LEM 325 AZ AAE 0B 4 **with** 7.5 kW AC motor, 50 Hz, 400 V∆, IP55

Accessories LEM 325, LEM 425

Recommended Accessory	Material Execution		LEM 325	LEM 425
Top Mounted Liquid Separator		Type weight	XBa 2040 20 kg	
Top mounted separator	1.4571	SIHI-Part No.	43 132 217	
Service liquid pipework, standard execution	Steel, galvanised 1.4571	SIHI-Part No.	20 073 878 20 068 903	
Service liquid pipework, thermostatic control 24V	1.0254 + Brass 1.4571 + Brass	SIHI-Part No.	20 081 109 20 060 509	
Cavitation protection pipework	Steel, galvanised 1.4571	SIHI-Part No.	20 027 915 20 027 916	
SIHI – Gas Ejector see Technical Catalogue – Gas Ejector				
at service liquid temperature 15 °C		Type / weight	GEV 325 A / 28 kg	GEV 425 A / 30 kg
at service liquid temperature 30 °C		Type / weight	GEV 325 B / 27 kg	GEV 425 B / 28 kg
SIHI – Non Return Ball Valve				
Intermediate flange execution XCk 65	0.6025 + Butadiene rubber 0.6025 + Teflon 1.4571 + Teflon	SIHI-Part No. weight	20 072 794 / 5.6 kg 20 072 793 / 5.6 kg 20 029 500 / 15.8 kg	
Flange execution with glass cylinder XCk 656	0.6025 + Butadiene rubber 0.6025 + Teflon 1.4408 + Teflon	SIHI-Part No. weight	20 072 851 / 10 kg 20 072 852 / 10 kg 20 072 850 / 10 kg	
Support foot				
for motor size 160 M, 160 L		SIHI-Part No. weight	20 047 014 4 kg	20 047 015 4 kg

Designs subject to change without prior notice.

Flowserve SIHI Germany GmbH
Lindenstraße 170, D-25524 Itzehoe, Germany
Telephone +49 (0) 48 21 / 7 71-01 , Fax +49 (0) 48 21 / 7 71-274
www.flowserve.com