

Liquid ring vacuum pumps in compact design



LEM 251 LEL 251

Pressure range: 33 to 1013 mbar
Suction volume flow: 100 to 280 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
- 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/LEL 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	unit	LEM 251 LEL 251
speed	50 Hz 60 Hz	rpm 1450 1750
Max. compression over pressure	bar	LEM 0,3 / LEL 0,5
Max. admissible pressure difference	bar	LEM 1,1 / LEL 1,5
Hydraulic test (over pressure)	bar	3
Moment of inertial of the rotating pump parts and of the water filling	kg · m ²	0,097
Sound pressure level at a suction pressure of 80 mbar	dB (A)	65
Max. gas temperature	dry saturated	°C 200 °C 100
Service liquid		
max. admissible temperature	°C	80
max. viscosity	mm ² /s	4
max. density	kg/m ³	1200
volume up to shaft level	liter	2,7
max. flow resistance of the heat exchanger	bar	0,2

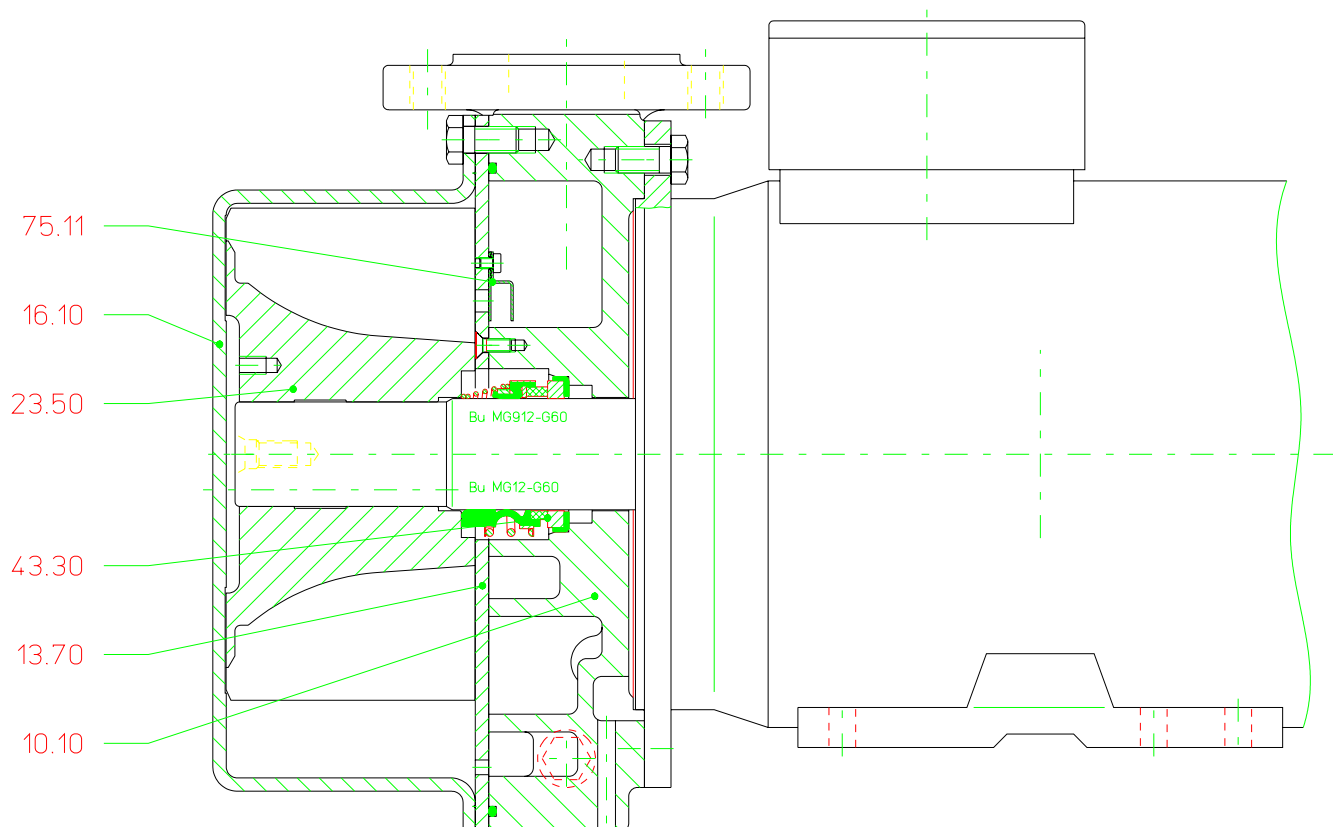
The combination of several limiting values is not admissible.

Material design

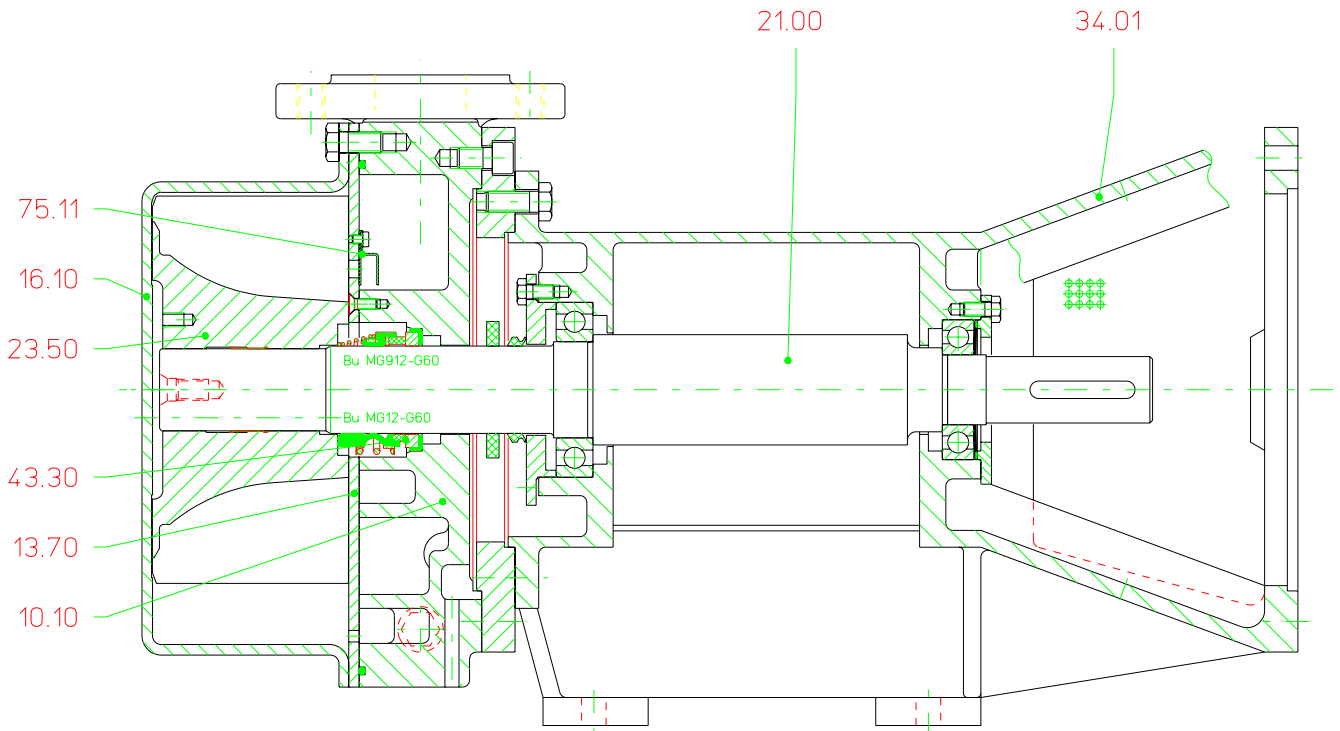
Item	COMPONENTS	MATERIAL DESIGN	
		0A	4B
10.10	Casing	0.6025	1.4408
13.70	Guide disk	1.4404	
16.10	Cover	1.4404	
21.00*	Shaft	1.4571	
23.50	Vane wheel impeller	2.1096.01	1.4517
34.01*	Motor carrier	0.6025	0.6025 (with annealing lacquer)
43.30	Standard mechanical seal	ceramik / carbon / Viton	SiC / carbon / Viton
75.11	Valve plate	PTFE	

* only LEL 251

Sectional drawing LEM 251



Sectional drawing LEL 251



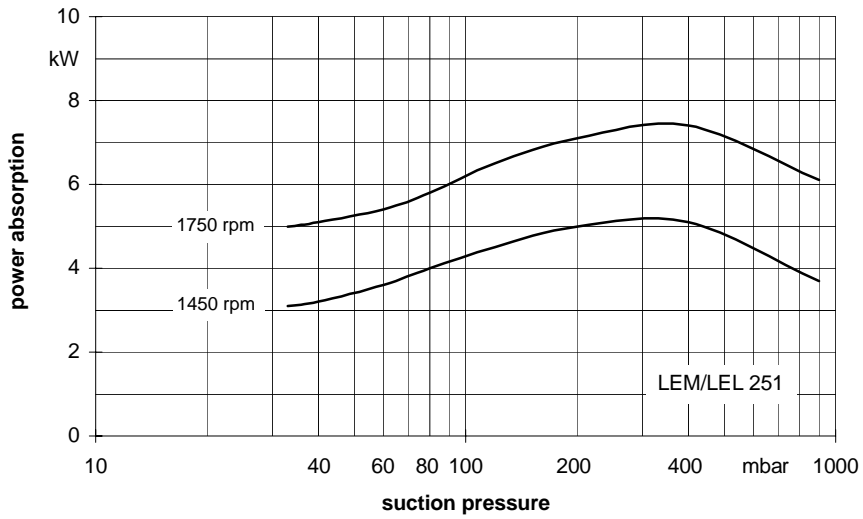
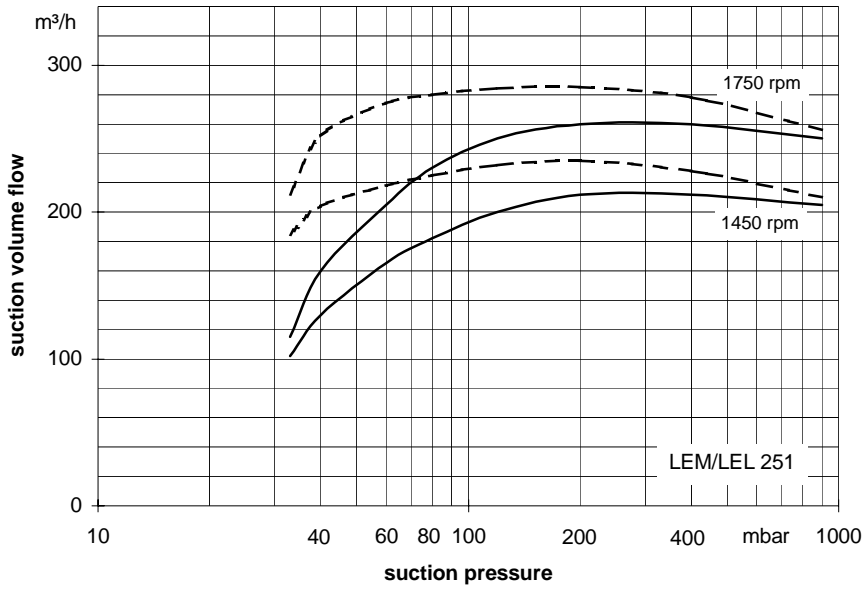
Fresh water requirements in [m³/h] dependent on suction pressure, speed, mode of operation and difference in temperature

suction pressure [mbar]		33				120				200				400			
pump	speed [rpm]	KB			FB	KB			FB	KB			FB	KB			FB
		difference in temperature [°C]				difference in temperature [°C]				difference in temperature [°C]				difference in temperature [°C]			
		10	5	2		10	5	2		10	5	2		10	5	2	
LEM/LEL 251	1450	0,22	0,39	0,68	1,4	0,30	0,48	0,78	1,3	0,31	0,49	0,75	1,15	0,30	0,46	0,66	0,95
	1750	0,33	0,53	0,85		0,39	0,60	0,89		0,40	0,59	0,84		0,38	0,54	0,73	

FB = fresh liquid service

KB = combined liquid service with service water 10 °C, 5 °C, 2 °C warmer than the fresh water.

Suction volume flow and power absorption LEM 251 / LEL 251

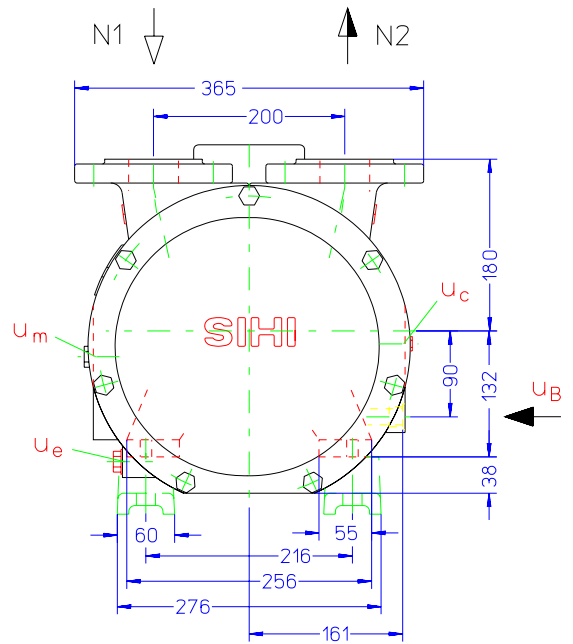
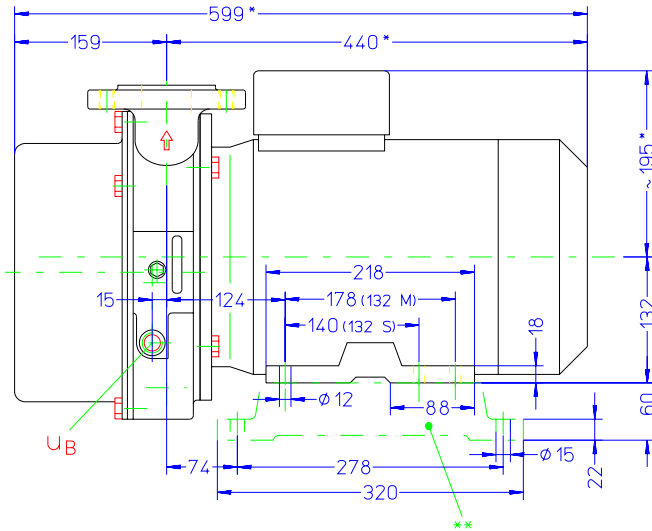


The operating data are applicable under the following conditions:

- pumping medium:
 - dry air: 20°C _____
 - water vapour saturated air: 20°C
- service liquid:
 - water: 15°C

Compression pressure 1013 mbar (atmospheric pressure)
 The suction volume flow is applied to the suction pressure
 Tolerance of the operating data 10%
 Max. fresh water need with lowest suction pressure

Dimension table LEM 251



	size	electric motor IP 55 kW		weight ca kg
		50 Hz	60 Hz	
LEM 251	132 S	5,5	-	100
	132 M	-	8,0	105

other motors on request

* dimensions dependent on the motor make

** see list of accessories

N 1 = gas inlet DN 50

N 2 = gas outlet DN 50

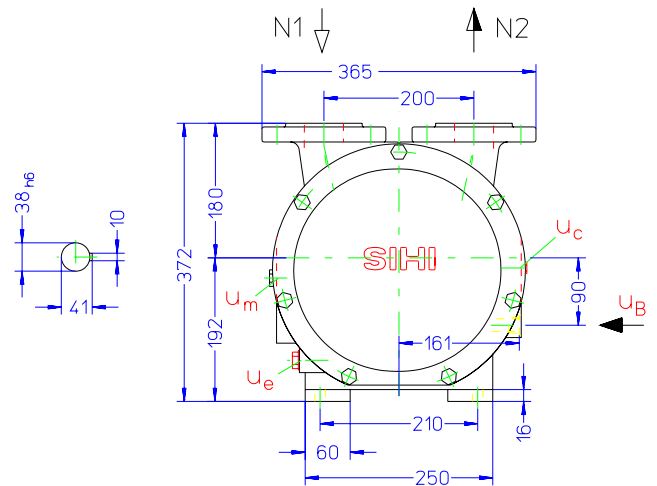
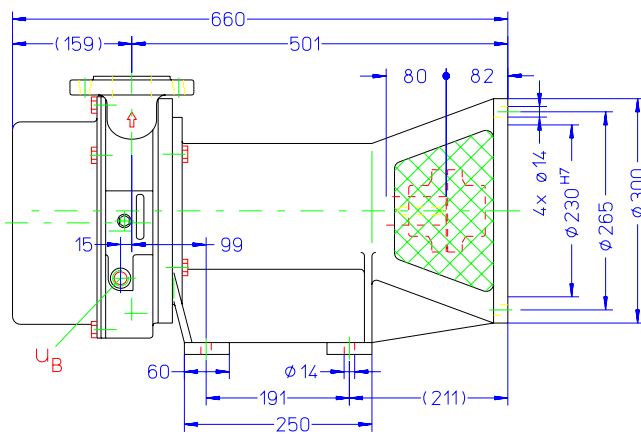
u_B = connection for service liquid G ½

u_c = connection for protection against cavitation G ¼

u_e = drain connection G ½

u_m = connection for pressure gauge G ½

Dimension table LEL 251



weight: 92 kg

flange connections see page 8

N 1 = gas inlet DN 50

N 2 = gas outlet DN 50

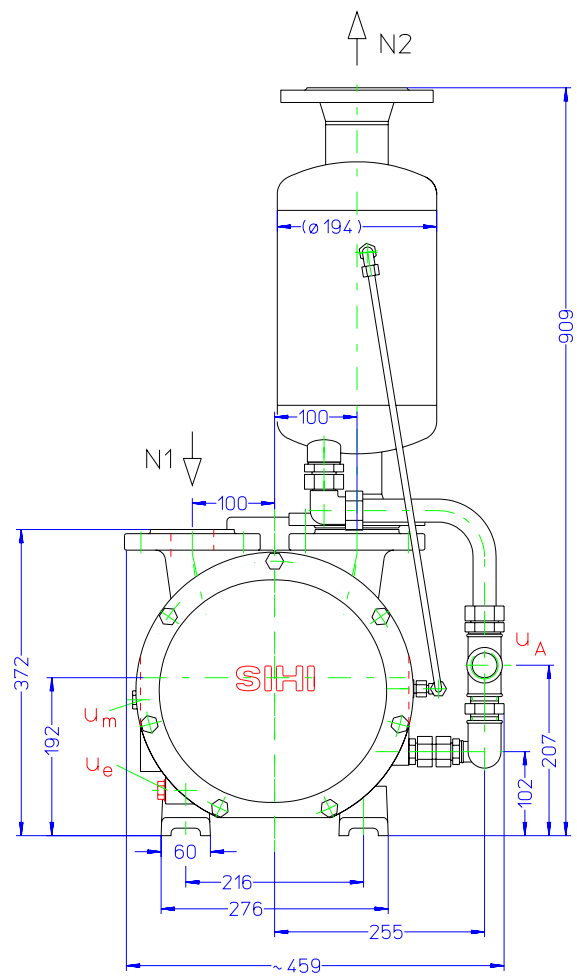
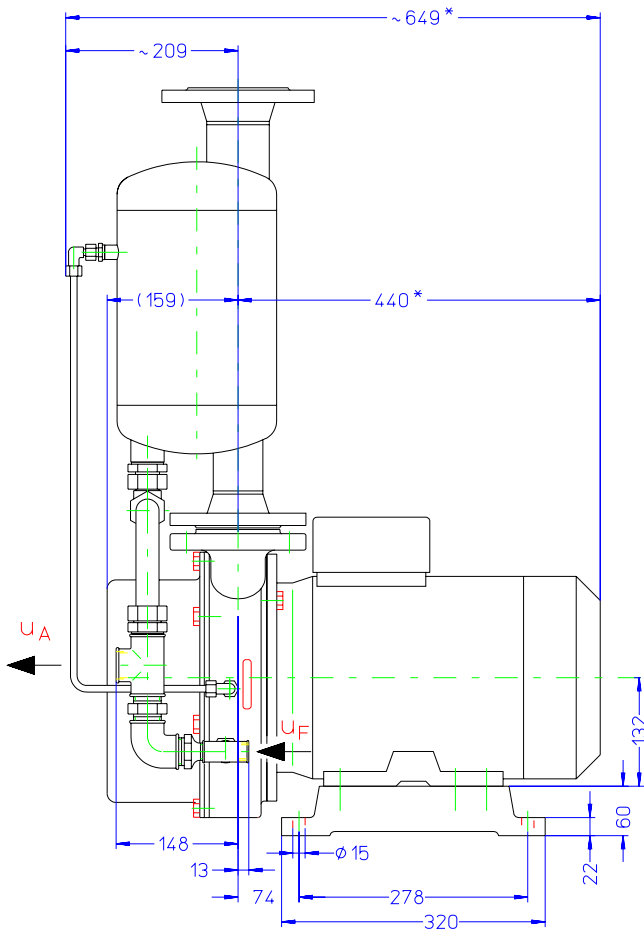
u_B = connection for service liquid G ½

u_c = connection for protection against cavitation G ¼

u_e = drain connection G ½

u_m = connection for pressure gauge G ½

Arrangement drawing LEM 251



	electric motor IP 55		weight ca kg	
	size	kw		
		50 Hz	60 Hz	
LEM 251	132 S	5,5	-	120
	132 M	-	8,0	125

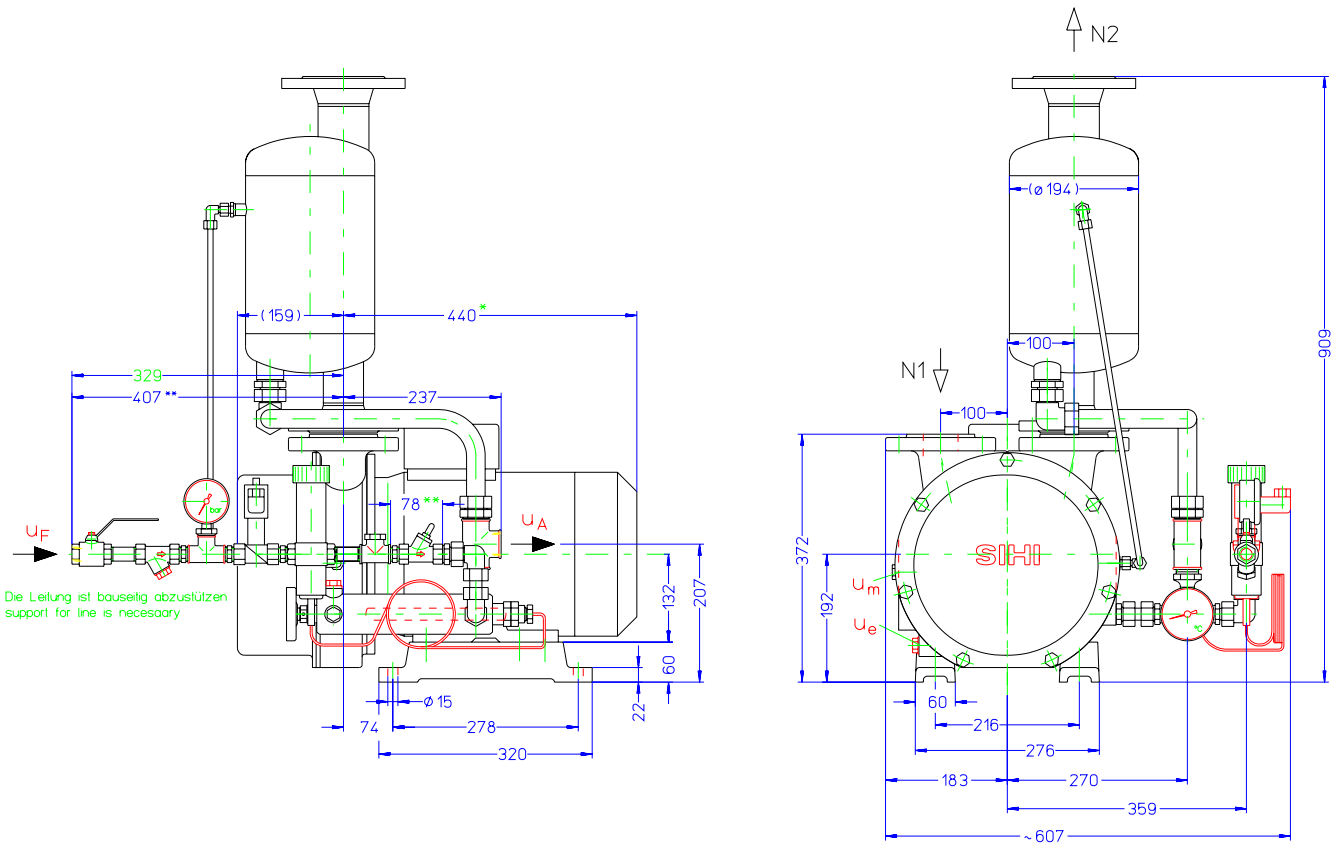
other motors on request

* dimensions dependent on the motor make

- N 1 = gas inlet DN 50
- N 2 = gas outlet DN 65
- u_A = connection for liquid drain G 1
- u_F = connection for fresh liquid G ½
- u_e = drain connection G ½
- u_m = connection for pressure gauge G ½

flange connections see page 8

Arrangement drawing LEM 251 with thermostatic control



	electric motor IP 55			weight ca kg
	size	kW		
		50 Hz	60 Hz	
LEM 251	132 S	5,5	-	125
	132 M	-	8,0	130

other motors on request

* dimensions dependent on the motor make

** only at material 1.4571 the line

N 1 = gas inlet DN 50

N 2 = gas outlet DN 65

U_A = connection for liquid drain G 1

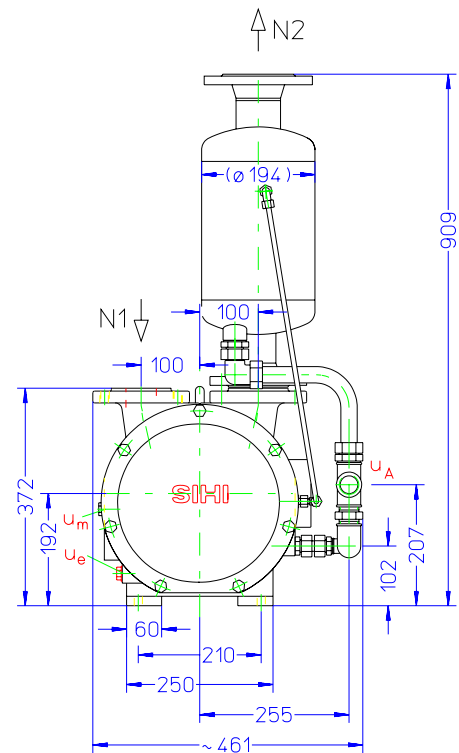
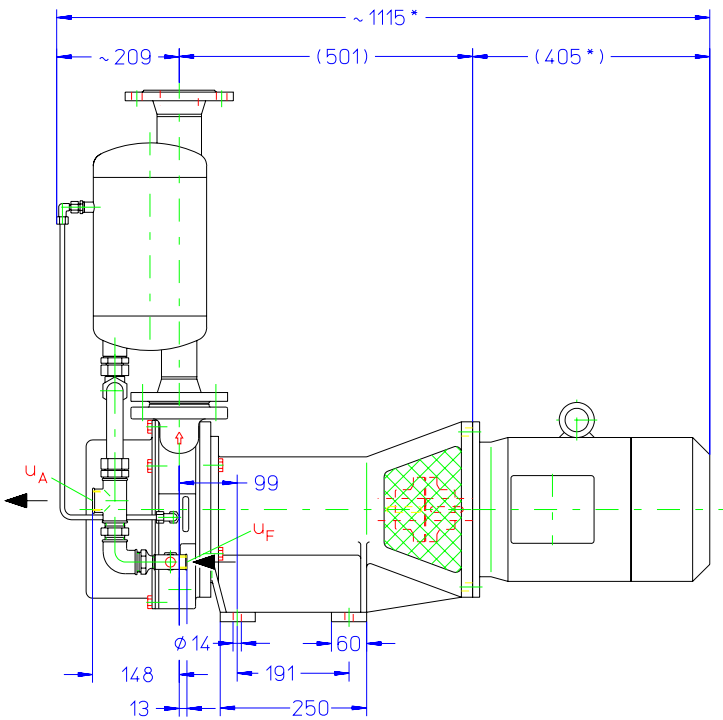
U_F = connection for fresh liquid G ½

U_e = drain connection G ½

U_m = connection for pressure gauge G ½

flange connections see page 8

Arrangement drawing LEL 251



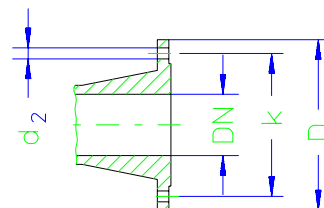
	electric motor 50 Hz			weight ca kg
	size	kW		
		IP 55	EEx e II T3	
LEL 251	132 S	5,5	-	151
	132 M	-	6,8	186

- N 1 = gas inlet DN 50
- N 2 = gas outlet DN 65
- u_A = connection for liquid drain G 1
- u_F = connection for fresh liquid G ½
- u_e = drain connection G ½
- u_m = connection for pressure gauge G ½

flange connections to DIN 2501 PN 10		
DN	50	65
k	125	145
D	165	185
numberx d ₂	4 x M16	4 x 18

other motors on request

* dimensions dependent on the motor make



Data regarding the pump size - order notes

series + size	hydraulics + bearings	shaft sealing	material design	casing seal
	<ul style="list-style-type: none"> •C hydraulic A with flange connection •Z two grease lubricated antifriction bearings arranged in the motor •B as •Z but arranged in the motor carrier 	B3N mechanical seal O-rings Viton BLU mechanical seal O-rings Viton	0A main parts of GG 4B main parts of Cr Ni Mo cast steel	7 O-rings Teflon cord
LEM 251	CZ	B3N, BLU	0A, 4B	7
LEL 251	CB			

Motor selection table LEM

	motor enclosure IP 55 50 Hz					motor enclosure IP 55 60 Hz				
	Y-voltage V +/- 5%	Δ-voltage V +/- 5%	power kW	size	motor-design.	Y-voltage V +/- 5%	Δ-voltage V +/- 5%	power kW	size	motor-design.
LEM 251	660-725	380-420	5,5	132 S	AW	---	380-480	8,0	132 M	BW

Example for ordering:

The construction size LEM 251 CZ B3N 0A 7 with 5,5 kW three-phase ac motor (50 Hz, 400 VΔ) 1450 rpm has the complete order number:

LEM• 251 CZ B3N 0A 7 AW

Design for LEL

	designation	electric motor 50 Hz					
		motor enclosure IP 55			motor enclosure EEx e II T3		
		kW	size	designation	kW	size	designation
pump with free shaft end	01						
pump with coupling, pre-drilled at motor side	04						
as above , but with motor, for example 5,5 kW three-phase motor (50 Hz, 400 VΔ) at 1450 rpm	z.B. NB	5,5	132 S	NB	6,8	132 M	PK

Example for ordering:

The construction size LEL 251 CB B3N 0A 7 with 5,5 kW three-phase ac motor (50 Hz, 400 VΔ) 1450 rpm has the complete order number:

LEL• 251 CB B3N 0A 7

NB

If motors with the other voltage or frequency are required a special information should be given.

On delivery the point (•) in the fourth place of the type code is replaced by a letter in the factory.

Accessories LEM 251, LEL 251

Recommended accessories		LEM 251 LEL 251
Overhead liquid separator	type	XBa 940
material design 130 / galvanized	weight	10,5 kg
172 / 1.4571	SIHI part No.	35 000 385
service liquid line		35 000 386
material design 072 / St 37-0	SIHI part No.	35 013 395
172 / 1.4571		35 013 396
service liquid line, thermostatically controlled		
material design 072+345 / St 37-0+Messing	SIHI part No.	20 048 237
172+345 / 1.4571+Messing		20 048 238
cavitation protection line		
material design 072 / St 37-0	SIHI part No.	20 047 177
172 / 1.4571		20 047 178
Upright liquid separator	type	XBp 414
material design 130 / galvanized	weight	31 kg
172 / 1.4571	SIHI part No.	35 000 504
service liquid line		35 000 505
material design 072 / St 37-0	SIHI part No.	35 013 397
172 / 1.4571		35 013 398
discharge line (bend)		
material design 072 / St 37-0	SIHI part No.	35 003 214
172 / 1.4571		35 003 215
cavitation protection line		
material design 072 / St 37-0	SIHI part No.	20 047 179
172 / 1.4571		20 047 180
SIHI-gas ejector		
at service liquid temperature	15 °C	GEV 250 A
at service liquid temperature	30 °C	GEV 250 B
SIHI-ball type non-return valve	type / weight	XCK 50 / 3,6 resp. 10,8 kg
material design 767 / GG-25	SIHI part No.	43 016 892
784 / 1.4408		20 029 498
Support foot only for LEM	weight	5 kg
	SIHI part No.	20 047 012
Standard motor only for LEL		
IP 55	size	132 S
	power	5,5 kW
	weight	45 kg
EEx e II T3	size	132 M
	power	6,8 kW
	weight	80 kg
Coupling only for LEL		
for motor IP 55	type / weight	A 63 / 1,6 kg
pump side	SIHI part No.	20 006 464
motor side		20 006 464
coupling star		43 015 174
for motor EEx e II T3	type / weight	PKZ 14 / 7,1 kg
pump side	SIHI part No.	43 015 327
motor side		43 015 334

Any changes in the interest of the technical development are reserved.

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