

# Liquid ring vacuum pumps

in compact design



## LEM 250 LEL 250

**Pressure range:** 33 to 1013 mbar  
**Suction volume flow:** 100 to 280 m<sup>3</sup>/h

### CONSTRUCTION

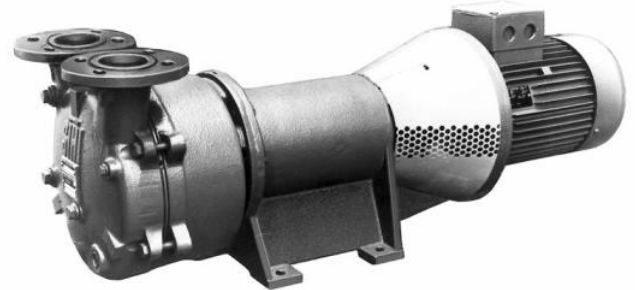
SIHI liquid ring vacuum pumps are displacement pumps of uncomplicated and robust construction with the following particular features:

- 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/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 250 LEL 250
Speed	50 Hz 60 Hz	rpm	1450 1750
Maximum overpressure on compression		bar	LEM 0.3 / LEL 0.5
Permissible pressure difference between suction and discharge side	max. min.	bar	LEM 1.1 / LEL 1.3 0.2
Hydraulic test pressure (overpressure)		bar	3
Moment of inertia of rotating parts of pump and water content		kg · m <sup>2</sup>	0.097
Noise level at 80 mbar suction pressure		dB (A)	65
Maximum gas temperature	dry saturated	°C °C	200 100
Service liquid			
Maximum permissible temperature		°C	80
Minimum permissible temperature		°C	10
Maximum viscosity		mm <sup>2</sup> /s	4
Maximum density		kg/m <sup>3</sup>	1200
Liquid capacity up to middle of shaft		litre	4
Maximum flow resistance of the heat exchanger		bar	0.2

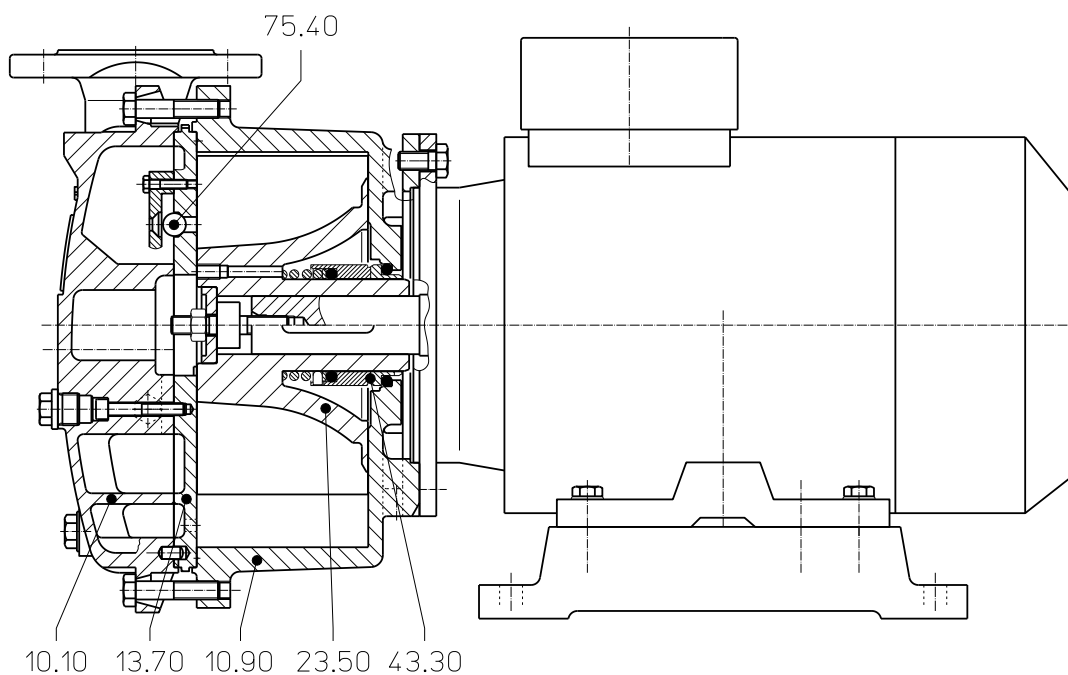
The combination of several limiting values is not admissible.

## Materials

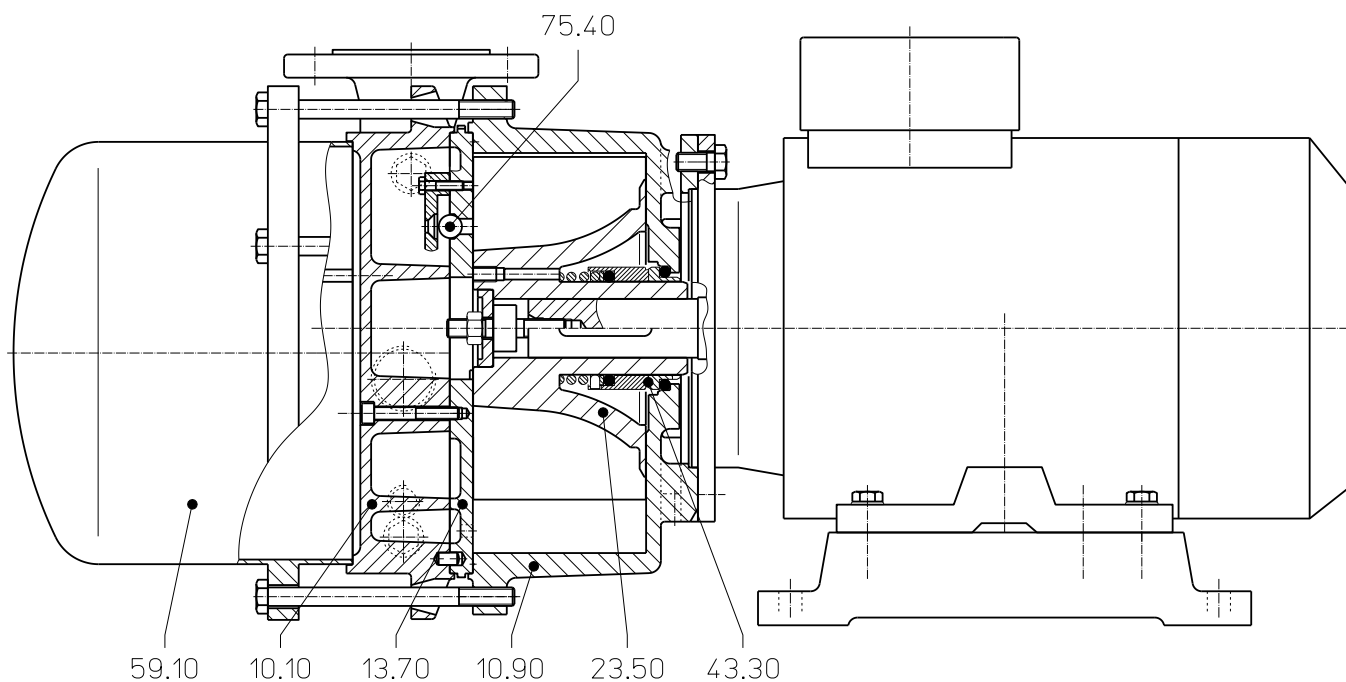
Item	COMPONENTS	MATERIALS OK
10.10	Vacuum casing	0.6025
10.90	Central body	
13.70	Guide disc	
21.00*	Shaft	1.0503
23.50	Vane wheel impeller	1.4308
34.01*	Motor carrier	0.6025
43.30	Mechanical seal	Cr-Steel / Carbon / Butadiene rubber
59.10	Integrated pre-arranged separator	1.0038
75.40	Valve balls	Polyamide A

\* only for LEL 250

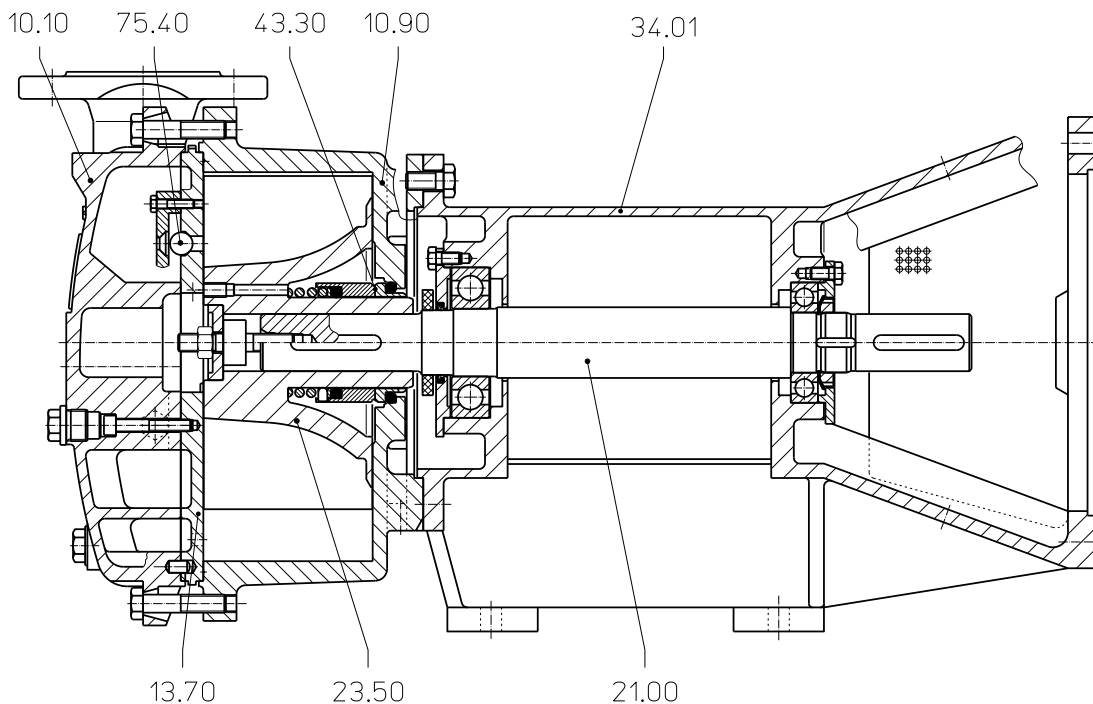
### Cut-away diagram LEM 250



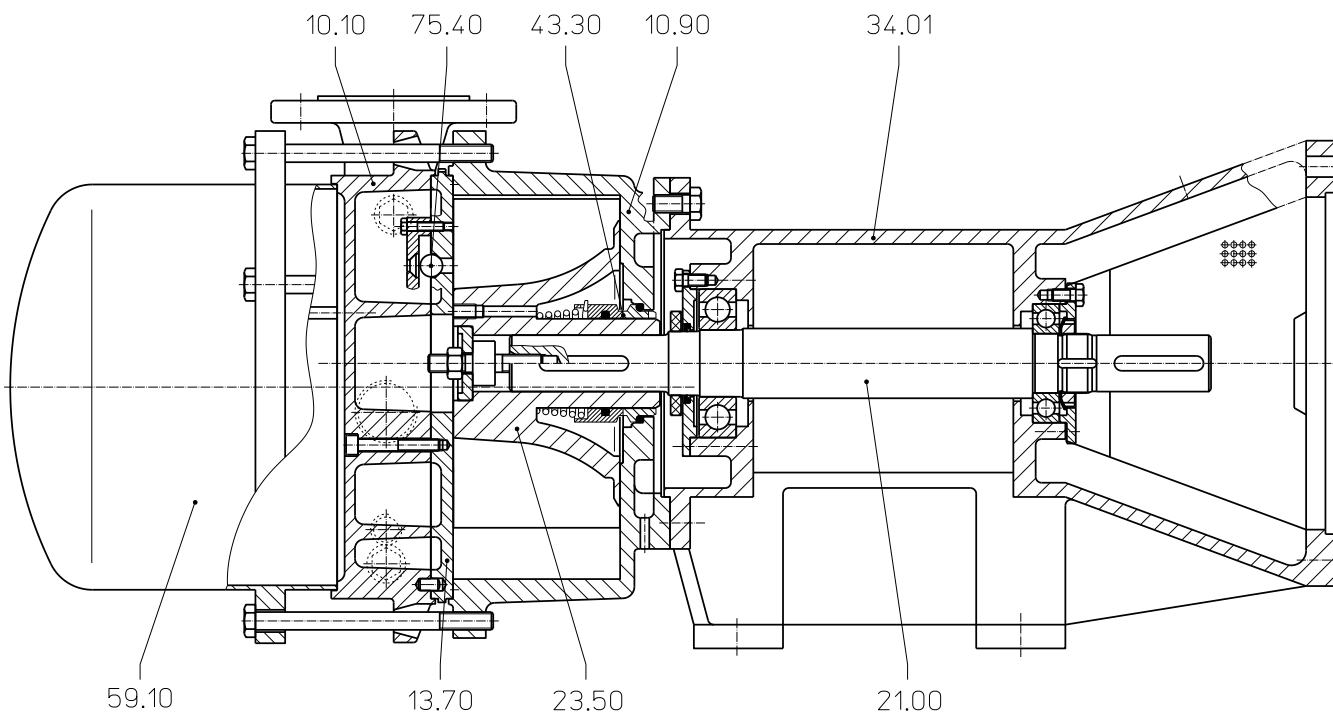
### Cut-away diagram LEM 250 with integrated pre-arranged separator



**Cut-away diagram LEL 250**



**Cut-away diagram LEL 250 with integrated pre-arranged separator**



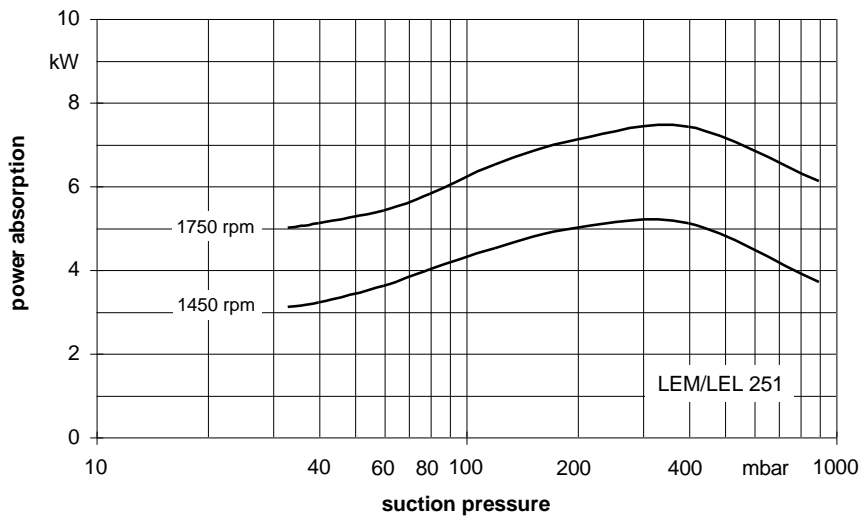
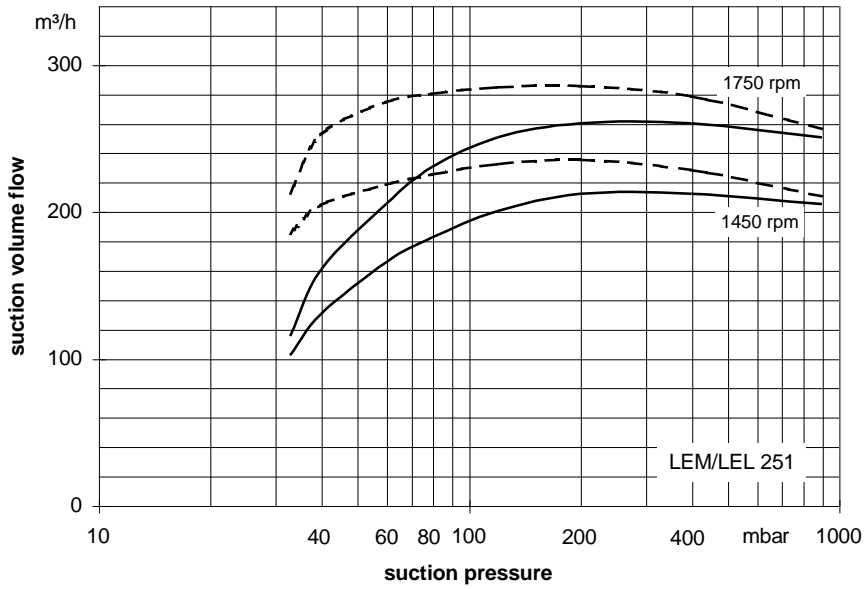
**Make-up Liquid Consumption** in [m³/h] dependent upon suction pressure, speed, drive type and temperature difference.

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				
LEM/LEL 250	1450	0.22	0.37	0.63	1.2	0.29	0.45	0.70	1.1	0.30	0.46	0.68	1.0	0.28	0.42	0.59
	1750	0.32	0.50	0.77		0.37	0.55	0.79		0.38	0.55	0.75		0.35	0.49	0.64

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 250 / LEL 250**



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)

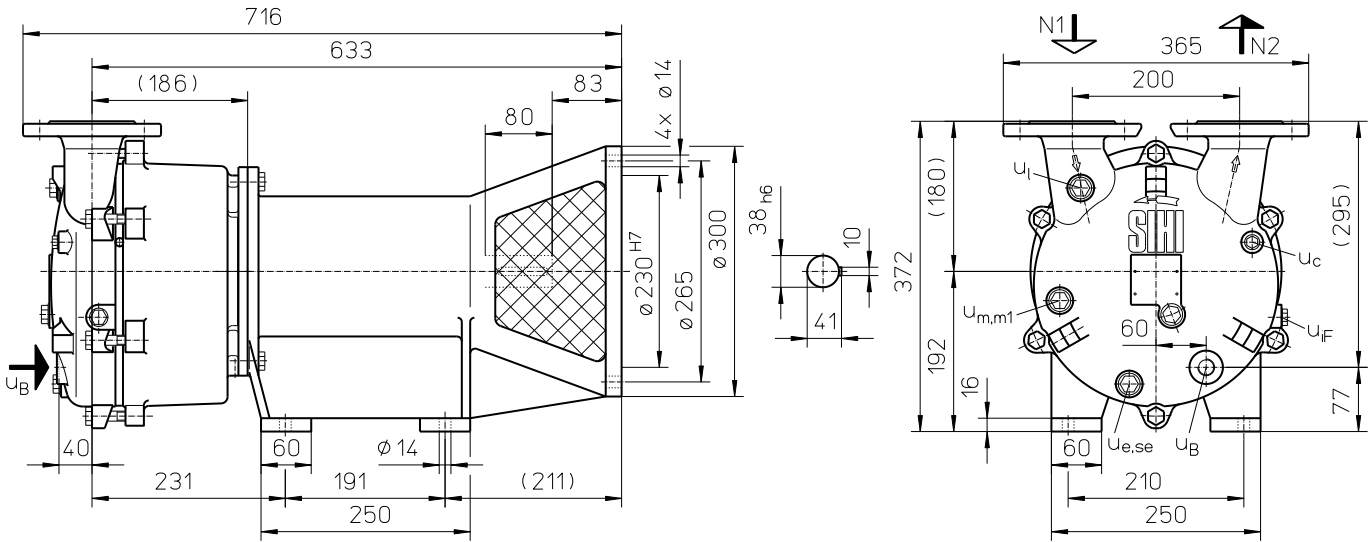
The suction volume is related to the suction pressure.

Tolerance on operating data is 10%.

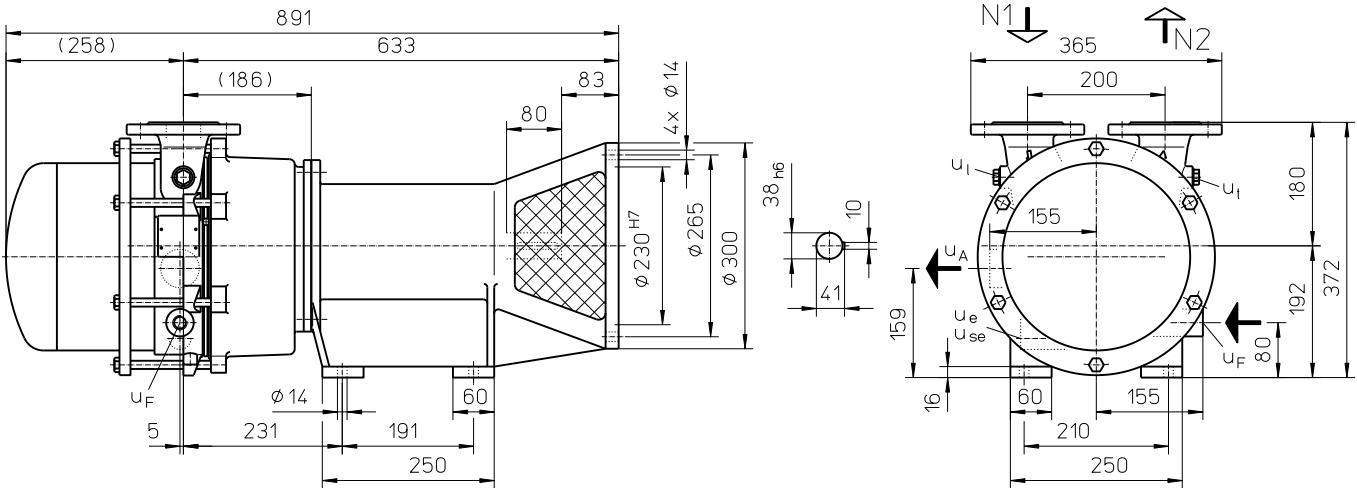
The maximum consumption of make-up water occurs at the lowest suction pressure.



### Dimensions LEL 250



### Dimensions LEL 250 with integrated pre-arranged separator



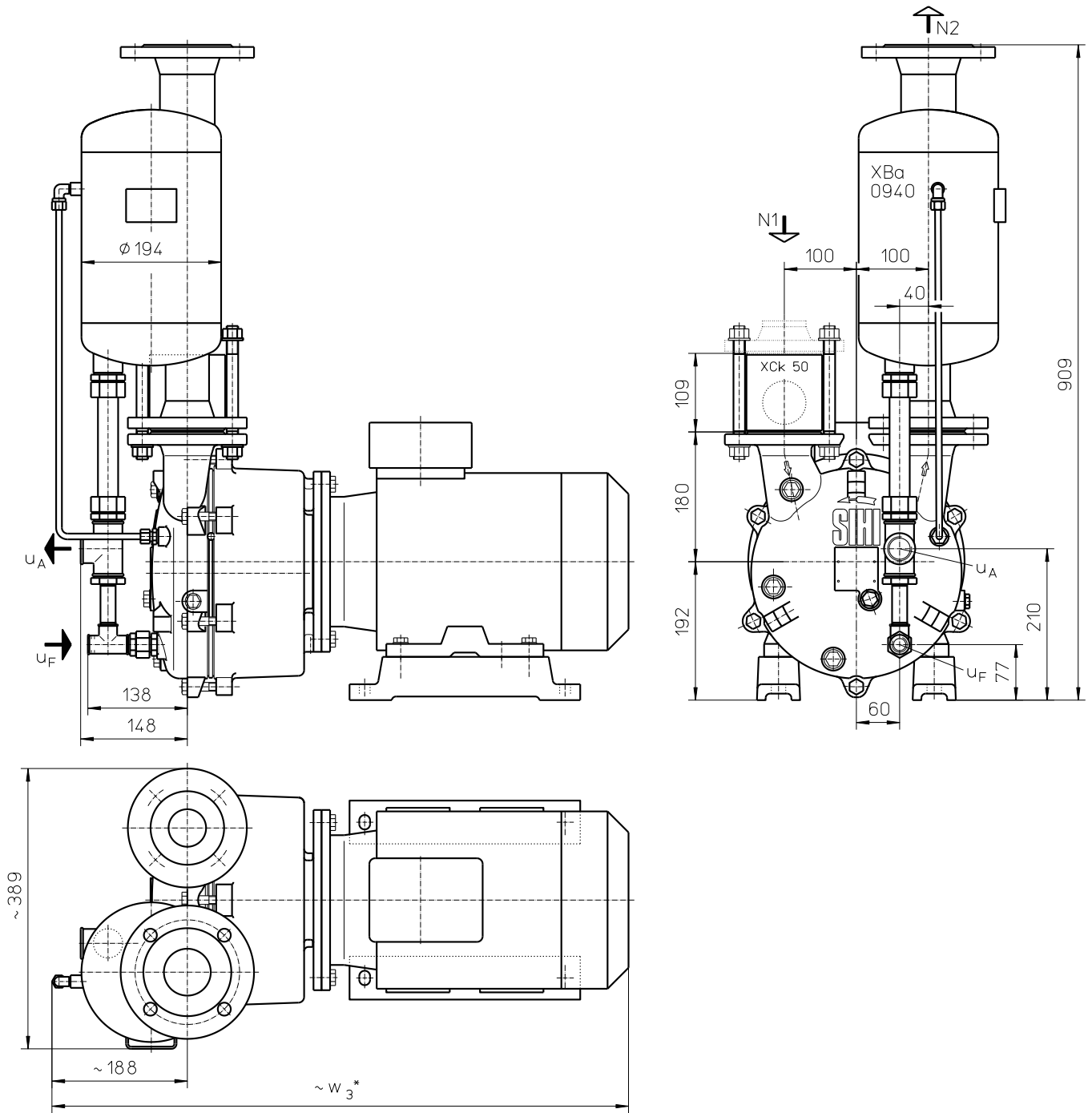
- N 1 = gas inlet DN 50
- N 2 = gas outlet DN 50
- u<sub>A</sub> = liquid drain G 1 1/4
- u<sub>B</sub> = connection for service liquid G 1/2
- u<sub>F</sub> = connection for make-up liquid G 1/2
- u<sub>c</sub> = connection for protection against cavitation G 1/4

- u<sub>e</sub> = connection for drain G 1/2
- u<sub>se</sub> = connection for dirt drain G 1/2
- u<sub>l</sub> = connection for air cock G 1/2
- u<sub>m</sub> = connection for pressure gauge G 1/2
- u<sub>m1</sub> = connection for drainage valve G 1/2
- u<sub>t</sub> = connection for thermometer G 1/2
- u<sub>iF</sub> = adjusting screw for internal liquid return

	approx. weight [kg]	
	LEL	+ integr. pre-arranged separator
LEL 250	91	100

flange connections see page 8

Arrangement drawing LEM 250



- N 1 = gas inlet DN 50
- N 2 = gas outlet DN 65
- U<sub>A</sub> = liquid drain G 1
- U<sub>F</sub> = connection for make-up liquid G ½

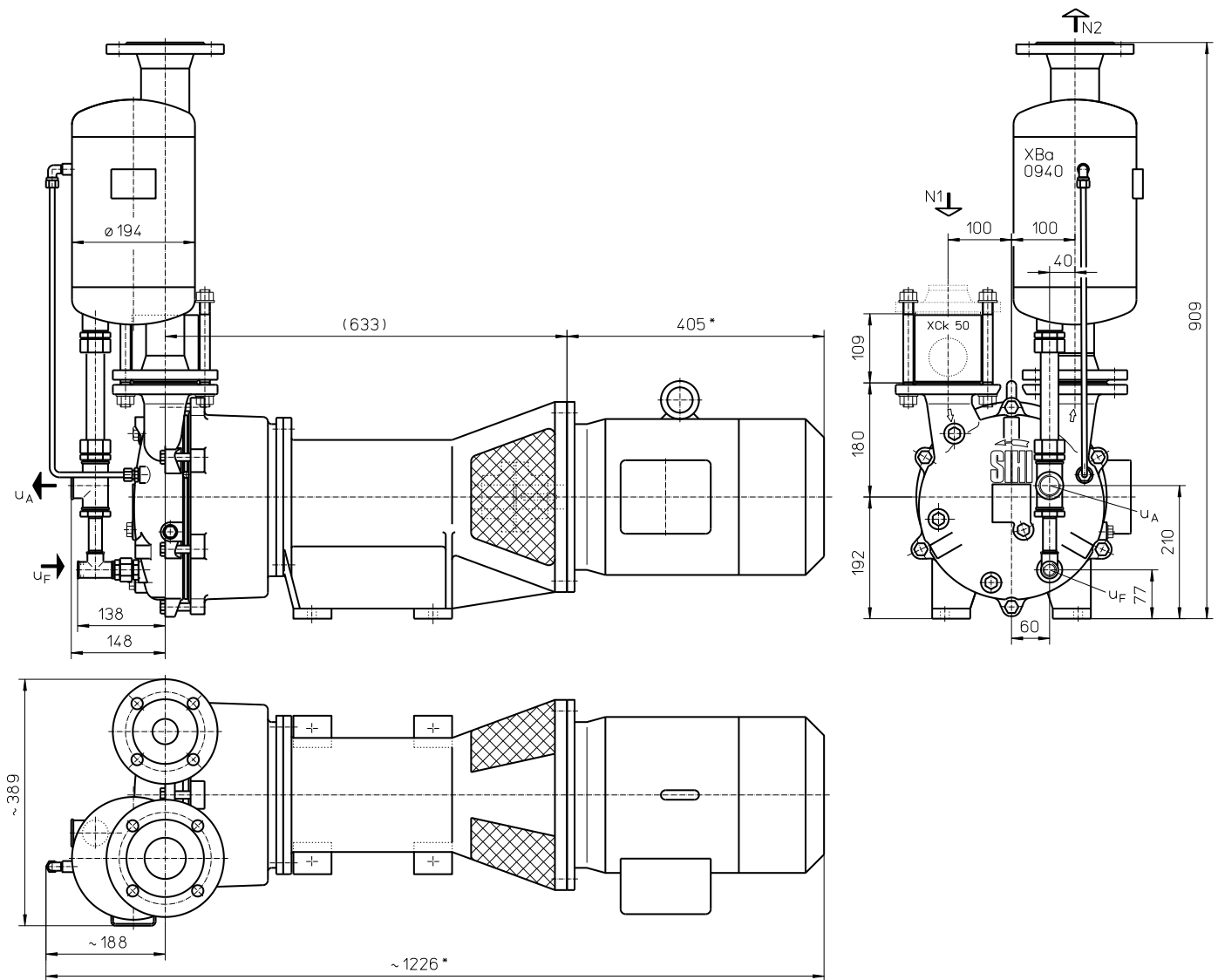
	electric motor IP 55			w <sub>3</sub> * [mm]	approx. weight [kg]
	size	kW			
		50 Hz	60 Hz		
LEM 250	132 S	5.5	-	800	129
	132 M	-	8.0	850	144

other motors on request

\* dimensions dependent upon motor supplier

flange connections see page 8

# Arrangement drawing LEL 250



N 1 = gas inlet DN 50

N 2 = gas outlet DN 65

$U_A$  = liquid drain G 1

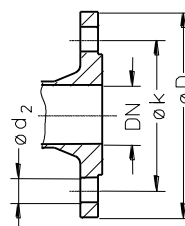
$U_F$  = connection for make-up liquid G  $\frac{1}{2}$

	electric motor 50 Hz			approx. weight [kg]
	size	kW		
LEL 250	132 S	5.5	-	150
	132 M	-	6.8	185

other motors on request

\* dimensions dependent upon motor supplier

flange connections according to DIN 2501 PN 10 [mm]		
DN	50	65
k	125	145
D	165	185
number x $d_2$	4 x 18	4 x 18





## Data regarding the pump size - order notes

range + size	hydraulic + bearings	shaft seal	materials	casing sealing
	<ul style="list-style-type: none"> <li>A• hydraulic A</li> <li>R• with integrated pre-arranged separator</li> <li>•Z two grease lubricated antifriction bearings arranged in the motor</li> <li>•B similar to •Z, but arranged in the motor carrier</li> </ul>	AAE standard mechanical seal, o-rings Perbunan	OK main parts out of cast iron, impeller in low alloyed steel	0 liquid seal
LEM 250	AZ, RZ	AAE	OK	0
LEL 250	AB, RB			

### 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 for ordering LEM:

LEM 250 AZ AAE 0K 0 **with** 5.5 kW AC motor 50 Hz, 400 VΔ, IP55

#### Example for ordering LEL:

LEL 250 AB AAE 0K 0 **for** 5.5 kW AC motor 50 Hz, 400 VΔ, IP55 has the complete designation:

LEL 250 AB AAE 0K 0

## Accessories LEM 250, LEL 250

Recommended Accessory	Material Execution		LEM 250 LEL 250
<b>Top Mounted Liquid Separator</b>		Type	XBa 0940
		weight	10.5 kg
Top mounted separator	1.4571	SIHI-Part No.	43 132 190
Service liquid pipework, standard execution	Steel, galvanised 1.4571	SIHI-Part No.	20 060 809 20 060 810
Service liquid pipework, thermostatic control 24V	1.0254 + Brass 1.4571 + Brass	SIHI-Part No.	20 051 110 20 051 111
Cavitation protection pipework	Steel, galvanised 1.4571	SIHI-Part No.	20 050 494 20 050 495
<b>Side Mounted Liquid Separator</b>		Type	XBp 0414
		weight	31 kg
Side mounted separator	1.4571	SIHI-Part No.	35 000 505
Pressure pipework (bend)	1.0254 1.4571	SIHI-Part No.	35 003 214 35 003 215
Service liquid pipework, standard execution	1.0254 1.4571	SIHI-Part No.	20 054 574 20 054 575
Cavitation protection pipework	1.0254 1.4571	SIHI-Part No.	20 041 563 20 041 564
<b>Sterling SIHI – Gas Ejector</b> see Technical Catalogue – Gas Ejector			
	at service liquid temperature 15 °C	Type / weight	GEV 250 A / 13 kg
	at service liquid temperature 30 °C	Type / weight	GEV 250 B / 13 kg
<b>Sterling SIHI – Non Return Ball Valve</b>			
Intermediate flange execution XCK 50	0.6025 + Butadiene rubber 0.6025 + Teflon 1.4571 + 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
<b>Motor</b> standard execution IP 55	only for LEL	Size Power Weight	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 43 021 429 43 021 433
<b>Motor</b> in EEx e II T3 execution	only for LEL	Size Power Weight	132 M 6.8 kW 61 kg
Coupling for motor EEx e II T3 pump side motor side		Type / weight SIHI-Part No.	BDS 103 / 3.1 kg 43 111 064 43 111 040

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

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