Dual Stage Vacuum System
incl. Liquid Ring Vacuum Pump in Compact Design

SIHI^{boost} CL
Sizes 3500, 5000, 6500, 8000

Pressure range: **< 0,01 to 1013 mbar**
Suction Speed: **2700 to 5700 m³/h**

DESIGN

SIHI^{boost} CL Vacuum systems have been developed for the requirements of industrial applications. The compact skid consists of a Liquid Ring Vacuum Backing Pump and a Booster Spindle Pump with integrated drives.

This dual stage system solution offers the following unique features:

- Handling of gases and condensable vapours
- Optimized for process and load lock applications
- Capable of handling solid carry over
- Entirely oil free operation
- Simple to maintain
- Highly reliable
- Low noise and vibration
- Condition monitoring options adaptable

APPLICATION

Processing of gases and condensable vapours, capable of handling particles. Particles from process carry over are being washed out in the Liquid Ring Vacuum Pump which acts like a scrubber in order to provide a pre-cleaned discharge flow.

NOTE

In contradiction to conventional shaft synchronisation via a mechanic gear box in Roots Blowers, the SIHI^{boost} spindles are electronically synchronized. This well established, innovative concept in all SIHI Dry Pumps not only enables a silent operation, it also makes all efforts for maintaining and changing gear oil obsolete. SIHI Liquid Ring Vacuum Pumps are simple, single shaft pumps with outstanding reliability and robustness.

HYDRAULIC DATA

Booster		3500	5000	6500	8000
Max. Pump Speed with Backing Pump Speed:		Air or N_2 with 0,5 mbar inlet pressure / 20°C			
160	m³/h	≤ 2700	≤ 3500	≤ 4500	≤ 5600
250	m³/h	≤ 2800	≤ 3600	≤ 4600	≤ 5600
500	m³/h	≤ 2900	≤ 3700	≤ 4800	≤ 5700
Ultimate Pressure					
	mbar a	< 0,02	< 0,007	< 0,005	< 0,003
Compression allowance					
max. static	mbar ü	200			
max. dynamic	mbar a	≤ 2000			
Noise level					
DIN ISO 9614 / 21680	dB (A)	< 75			

SIHI^{boost} CL

Benefits

Integral System Control
+ integrated continuous system control
+ condition monitoring
+ opportunity for data communication

Innovative Booster-Stage
+ high pressure ratio
+ very energy efficient
+ no gear oil

Dual Stage System
+ remarkably high pump speed at low pressure
+ no process contamination
+ low energy consumption
+ small footprint
+ simple maintenance

Utilization of the most reliable Liquid Ring Vacuum Backing Pump
+ forgiving with particle carry over
+ absorbs process particles
+ absorbs condensable process media
+ long life bearings
+ no wearing parts
+ contact less

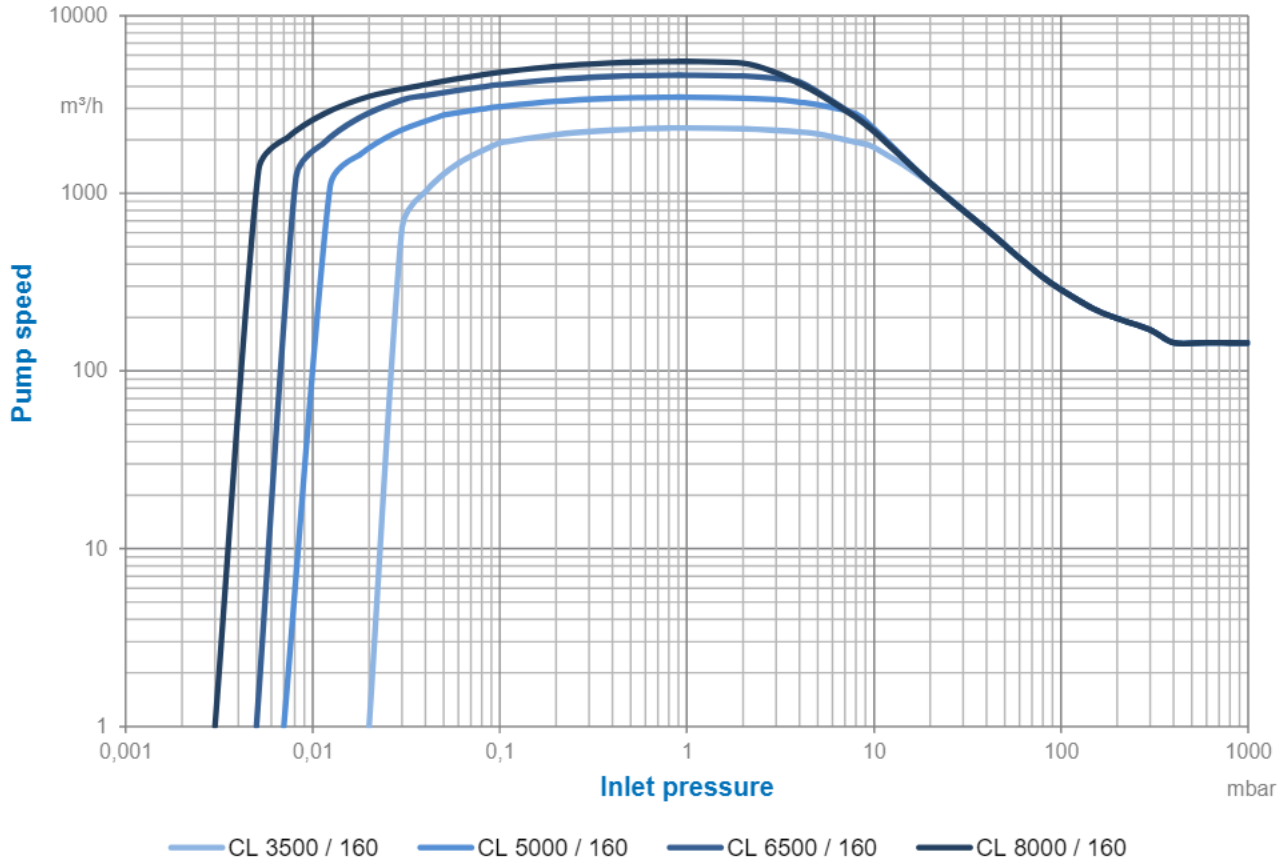
Plug and Pump
+ quick connectors for utilities

Available drive versions

The ***Standard***-Version of **SIHI**^{boost} - Vacuum systems have been designed specifically for **process applications** for remarkably high performance combined with low power consumption.

The ***Ultra***-Version is based on the concept of the *Standard*-Version however specifically tuned for load **lock applications**, when the most prominent focus is on cycle time and pump down time.

Pump Speed Curves



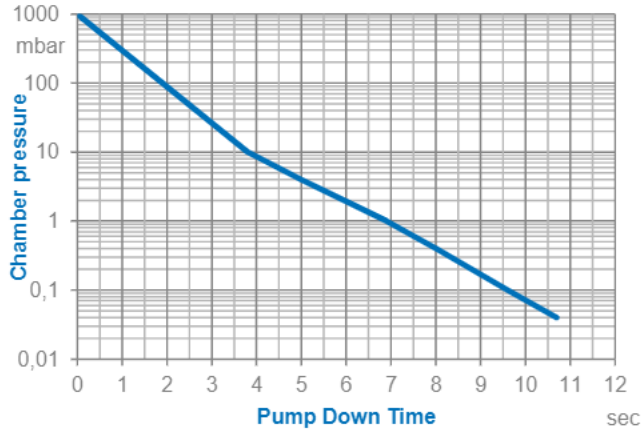
Data valid under following conditions:

- Media : dry air: 20°C
- Service Liquid (LRVP): water: 25°C
- Cooling water inlet: water: 25°C
- Discharge pressure: 1013 mbar (atm)
- The inlet pump speed is related to the inlet pressure

Data deviation tolerance 10%

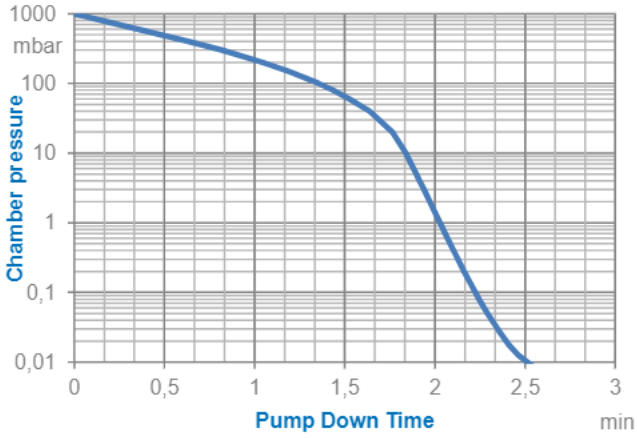
Pump down curve (600 l camber)

Example: SIHI^boost CL 8000 / 160 Ultra



Pump down curve (5 m³ camber)

Example: SIHI^boost CL 5000 / 500



Electrical Data

Booster		3500			5000			6500			8000		
Backing pump		**160**	**250**	**500**	**160**	**250**	**500**	**160**	**250**	**500**	**160**	**250**	**500**
Max Power													
Ultimate Pressure	kW	< 5,0	< 5,5	< 14	< 5,5	< 6,0	< 15	< 6,5	< 7,0	< 16	< 7,5	< 8,0	< 17
max at 400V / 50Hz	kW	17,0	18,5	28,0	17,0	18,5	28,0	17,0	18,5	28,0	17,0	18,5	28,0
max at 460V / 60Hz	kW	18,5	20,5	-	18,5	20,5	-	18,5	20,5	-	18,5	20,5	-
Electrical Connection													
50 Hz	V AC	400 ± 10 %											
60 Hz	V AC	460 ± 10 %											
		TN-System (L1, L2, L3, PE (without N)											
Classification													
DIN EN 60529		IP 42											

Purge gas

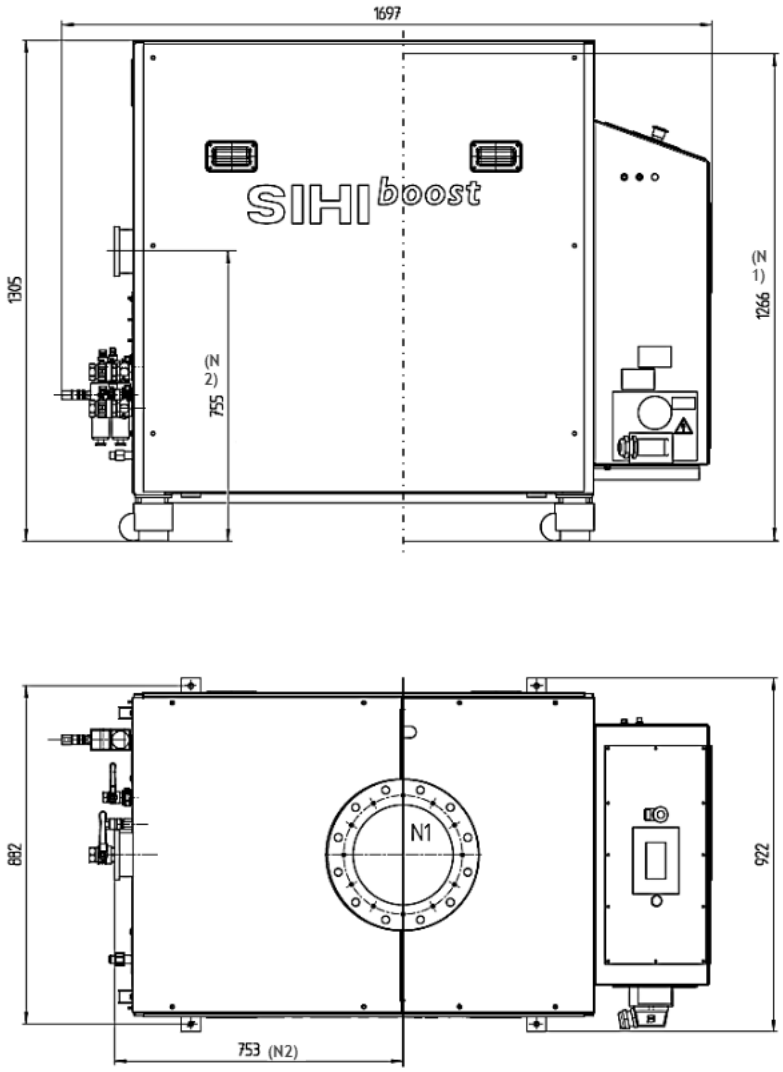
Booster		3500	5000	6500	8000
Purge Gas Connection					
Media allowance		Nitrogen / Argon / CDA see specification (Purge purity following ISO 8573-1:2010: min Class 2.4.2)			
Pressure Allowance	bar ü	6 to 8			
Max. Flow	Nl/min	30	30	40	54

Cooling water / service liquid

Backing pump		160	250	500
General Requirements				
Cooling Water Temperature	°C	5 to 25		
Max. stat. Supply Pressure	bar ü	6		
Connection N5.1				
Media allowance		Water Conductivity > 50 µS (Distilled water on request)		
Min. Flow	l/min	23	23	10
Connection N5.2				
Media allowance		-	-	Water Conductivity > 50 µS
Min. Flow	l/min	-	-	35
Connection N5.3				
Media		Water (recommended Quality: pH 6,5 to 8,5; Carbonate 7°dH bis 9°dH)		

Dimensions

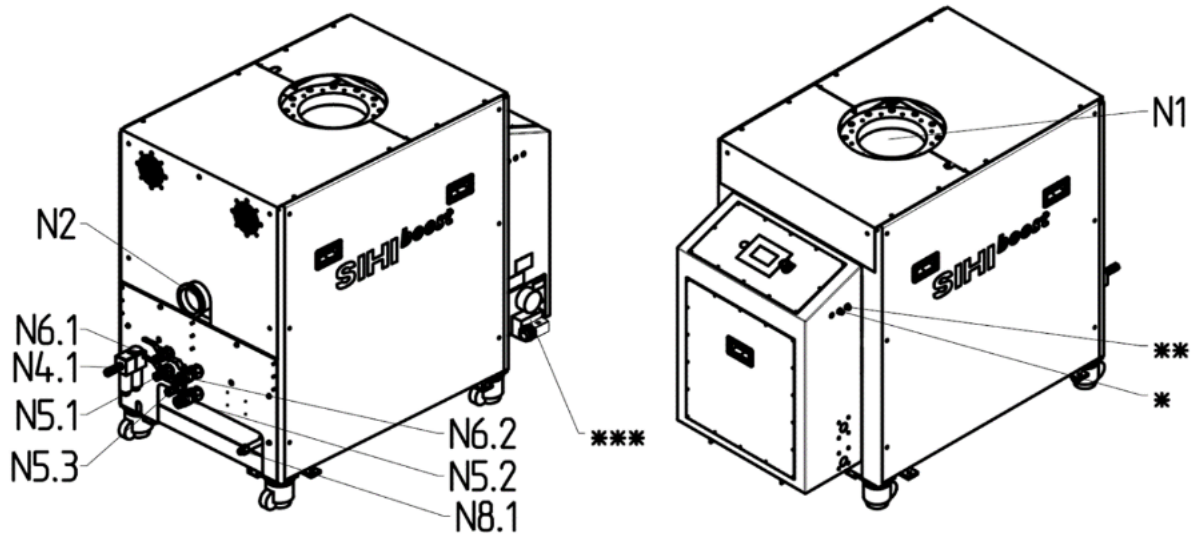
Dimensions in mm.



Design material

Backing pump	160	250	500
Process Exposed Parts			
SIHI boost	Cast Iron / SS - Cr		
Internal Piping	PTFE / PVC / SS CrNi		PTFE / SS CrNi
Backing Pump	SS-CrNi		
Service Liquid Loop	ABS / EPDM / PP / PTFE / SS CrNi		
Cooling Loop	EPDM / PAN / PUN / SS - CrNi / Brass		
Discharge Pipe / Valves	Mild Steel / SS - Cr / SS CrNi		

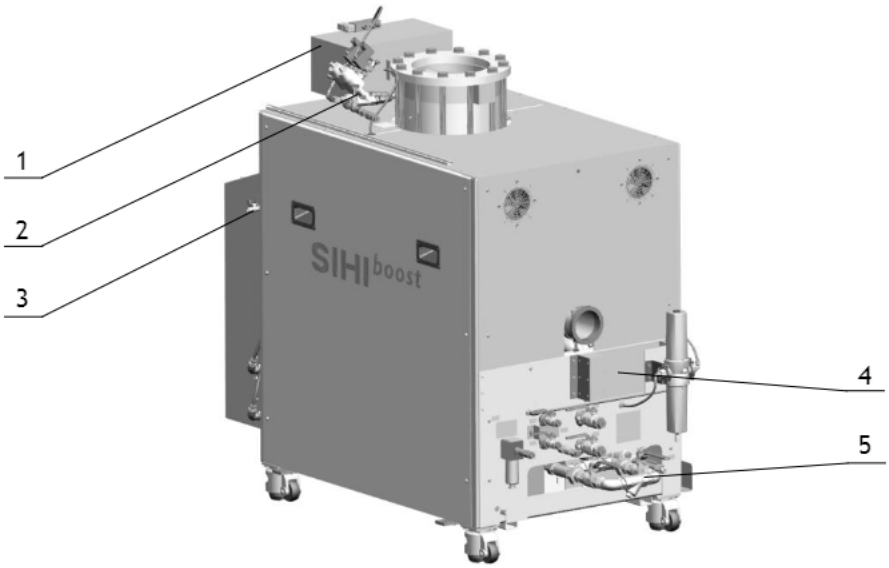
Connections



Backing pump	160	250	500
Process media			
N1: Gas Inlet	ISO K/F DN250		
N2: Gas Outlet	ISO K 100		
Purge Gas			
N4.1: Inlet	Quick Connector - G½“ (IG)		
Cooling System			
N5.1: CW Inlet	Quick Connector - G½“ (IG)		
N6.1: CW Outlet	Quick Connector - G½“ (IG)		
Additional Cooling Backing Pump			
N5.2: Cooling Water Inlet	-		Quick Connector – G1“ (IG)
N6.2: Cooling water Outlet	-		Quick Connector – G1“ (IG)
Service Liquid Backing Pump			
N5.3: Liquid Fill	Quick Connector - G½“ (IG)		
N8.1: Liquid Drain	G½“ (AG)		
Electrical Connection			
* : Process Communication	SACCBP – M12FSB – 2CON – M16		
** : Ethernet	VS – DISV – M12FSD/1,0 – RJ45		
*** : Power Supply	HAN K4/0 – STI – S MALE		HAN K6/6 - M

(IG) : Female Thread
(AG) : Male Thread

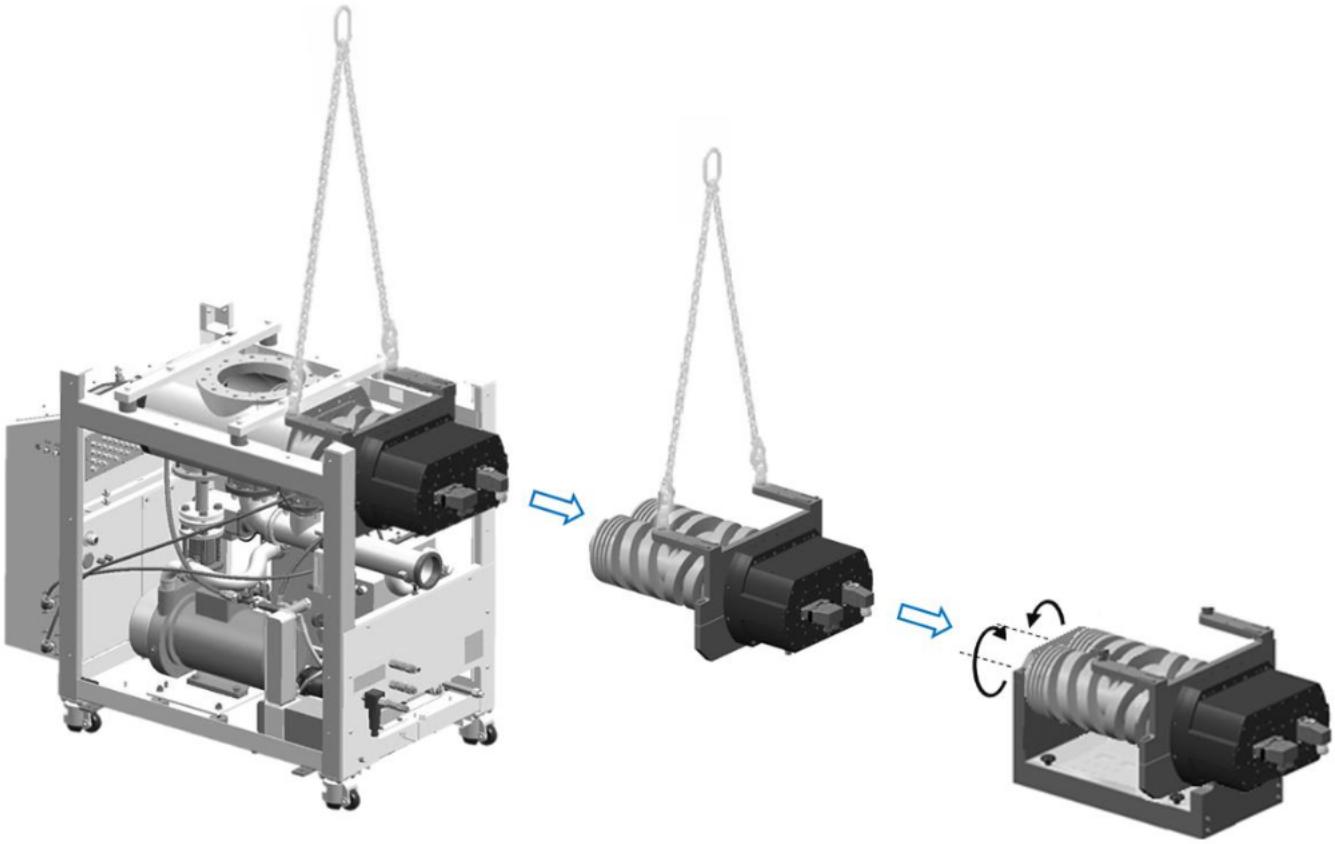
Accessories



Booster	3500	5000	6500	8000
1 Inlet Valve	This optional, pneumatically actuated valve enables a safe isolation of the suction line which prevents residue media to enter the pump as well as back flow from the discharge while pump is shut down.			
2 Inline Flush	In order to clean the pump chamber of the SIHI boost, this option allows the introduction of cleaning liquid via an inlet flush module. The compact system can be then operated in a flush mode initiated and controlled by the customer on demand. This measure enables significantly shorter maintenance phases.			
3 Control Unit	On customer demand, the compact system can be optionally equipped with the following control modules: • Profibus • PROFINET • EtherCAT • DeviceNET • I/O-Schnittstelle See data sheet for details.			
4 Membrane-Purge gas module	SIHI boost only acceptable purge gas is Nitrogen. In case Nitrogen is not available, this option can be added to generate Nitrogen from CDA.			
5 Filter unit for service liquid	The Liquid Ring Vacuum Backing Pump offers the advantage of capturing particles from the process in the service liquid. With increasing contamination of the service liquid with solids, the liquids however needs cleaning. This filter enables this continuous cleaning function while operating.			
6 Gas Dilution *(not shown)*	This optional, additional gas dilution can be added in order to handle larger amounts of particles or excessive amounts of condensable vapor. In order to prevent too high purge gas consumption, this option only gets activiated by the control in „Vacuum Mode“.			

Accessories

Booster	3500	5000	6500	8000
7 Service-Tool Kit	This service tool kit enables an efficient and ergonomic cleaning procedure of the **SIHI**[boost] - spindle and housing on site via trained personnel. The Service-Lifting device permits the disassembly of the spindle unit. The design is set for the gravity point of the unit, for ergonomic and easier handling. The spindle rest is a device to safely place the spindle unit after removal from the casing for better cleaning.			



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