

COOLVAC

Refrigerator Cryopumps and Systems



COOLVAC Cryopumps

Leybold fulfils the rapidly increasing requirements for cryopump systems with its "smart" family of cryogenic pumps – adapted to current and future economic trends and cycles.

We have combined a smart controller which is easy to operate for rapid, reliable and clean regeneration with high performance, low vibration and efficient cold heads and compressors.

High quality, high reliability and impressive performance data are guaranteed and confirmed by our customers through current installations.

iClassicLine Cryopumps

The "iClassicLine" cryopumps have been prepared for fully automatic control and monitoring of their operation and for electric regeneration. In addition to the regeneration heaters and the temperature sensors, they have also been equipped with a vacuum gauge head, a forevacuum valve and control electronics.

- Highly effective pumping speed for all gases, water vapor in particular
- 100% available pumping speed and capacity after each regeneration run
- No nitrogen purge is necessary
- High-performance, low vibration and reliable cold heads integrated
- Insensitive to mechanical disturbances like process particles or external vibrations
- Easy computer process checking and control

Single, Double, or

COOLVAC iClassicLine with COOL.DRIVE

Cryopump systems with automatic control and regeneration.
Proven COOLVAC iClassicLine
pumps, equipped with a two-stage
COOLPOWER cold head, compressor
unit and COOL.DRIVE for fully automatic system control and regeneration.

Measuring data and parameters can be visualized with the optional CRYOVISION.

Installed COOLVAC ClassicLine pumps can be retrofitted with the COOL.DRIVE controller and the CRYOVISION display.

COOLVAC iClassicLine are available for nitrogen pumping speeds from 1500 l/s.

Advantages to the User

- Universally usable for almost all vacuum coating processes
- Ultra-clean vacuum
- High pumping speed
- Efficient regeneration and short regeneration intervals
- Easy operation
- Flexible system design and easy system integration
- Simple and rapid maintenance



with Smart Technology

BasicLine Cryopumps

"BasicLine" cryopumps are equipped only with a temperature sensor (Si diode) at the second stage.

However, the dimensions and the vacuum performance data are identical to the iClassicLine cryopumps.

Multiple Systems ...



ENGINEERING

In the development and optimization of new applications there is an increasing requirement for custom vacuum system solutions.

Applications

- UHV systems
- Load lock chambers
- Beam tubes of particle accelerators
- General research
- Metallization systems
- Evaporation systems
- Electron beam welding systems
- Space simulation chambers

Most of the known applications are covered by our standard cryopump systems from the iClassicLine and the BasicLine.

However, in the development and optimization of new applications in research or industry (MBE, space simulation) there is an increasing requirement for custom vacuum system solutions.

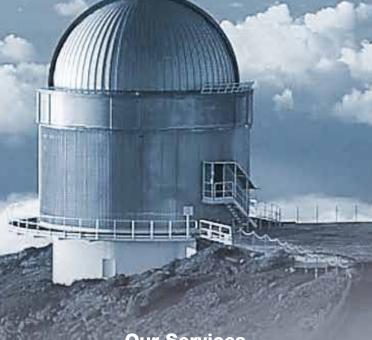
Jointly with our customers, we design and manufacture custom vacuum solutions to meet customer's specifications.

Engineering Examples

- Large cryopumps up to a pumping speed of 60,000 l/s with and without liquid nitrogen (LN₂) cooling of the thermal radiation baffle.
 - Benefit: Increased operational reliability and ease of operation.
- Cryopumps suited for applications involving high thermal loads during degassing of the process chamber to attain pressures in the UHV ranges below 10⁻¹¹ mbar.



Evaporation coating system for a telescope mirror used in astronomy



Our Services

- System design
- Application consulting

Compressors and Accessories



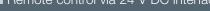
COOLPAK compressors

COOLPAK Compressors

The COOLPAK compressor units have been proven to drive cold heads and cryo pumps absolutely reliable and cost-effective.

■ COOLPAK 2000/2200 for single operation of COOLVAC pumps up to 3000 l/s

- Remote control via 24 V DC interface
- COOLPAK 6000 H/6200 H for single and multiple operation of up to three cryopumps
- LCD display for displaying the
- Easy to install and operate
- Minimal maintenance
- Small footprint
- Low cost of ownership





operating status and messages



screen for COOLVAC iCL cryopumps for visualization of measuring data and parameters in connection with the COOL.DRIVE controller.

Advantages

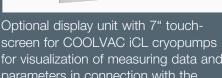
- Global voltage compatibility

Control / Visualization COOL.DRIVE Controller

The COOL.DRIVE Controller

- controls and monitors the cryopump via the integrated 24 VDC or RS 232
- provides the power supply voltage for any connected vacuum sensors or vacuum gauges
- controls and drives the cold head motor
- switches the heaters and valves required for operation of the pump
- passes the monitoring signals on to a higher-level system controller
- provides 24 V control signals for switching external vacuum equipment
- provides an analogue signal of the 2nd stage temperature. The Si diode is mounted on the 2nd cold head stage.
- Software update via USB
- optional external Profibus interface

CRYOVISION Display



Advantages

- Control and monitoring of up to 10 iClassicLine cryopumps
- Integrated data & error logger
- Compact, integrated control directly at the cryopump
- Simple wiring; modern interfaces
- Own intelligence of the pump, e.g.
 - behaviour after a power failure
 - switching the forevacuum valve depending on the application
- Software update via USB
- Simple readout and documentation of process data



COOLVAC

Technical Data

COOLVAC		1.500	2.000	3.000	5.000	10.000	18.000	30.000	60.000
High vacuum (HV) flange	DN	200 ISO-K 200 CF 6" ANSI	250 ISO-K 250 CF 8" ANSI	320 ISO-K - 10" ANSI	400 ISO-K - -	500 ISO-K - 20" ANSI	630 ISO-F - -	- - 35" ANSI	1250 ISO-F - -
Forevacuum flange	DN	25 KF	25 KF	25 KF	40 KF	40 KF	63 ISO-K	63 ISO-K	63 ISO-K
Built-in cold head COOLPOWER		7/25	7/25	7/25	5/100	5/100	5/100(2x)	5/100(2x) 140T (1x)	5/100(2x) 140T (2x)
Cooldown time to $T_2 = 20 \text{ K}$ to $T_2 = 17 \text{ K/130 K}$	min min	60 -	70 -	120 -	100	150 -	180 -	- 260	- 330
Crossover value	mbar·l	210	250	500	700	800	800	1200	1000
Pumping speed $ {\rm H_2O} \\ {\rm Ar} \\ {\rm N_2} \\ {\rm H_2} \\ $	-s ⁻¹ -s ⁻¹ -s ⁻¹	4,600 1,200 1,500 2,500	7,000 1,600 2,100 3,200	10,500 2,500 3,000 6,000	18,000 4,000 5,200 6,200	30,000 8,400 10,000 10,000	46,000 13,500 18,000 14,000	93,000 25,000 30,000 30,000	180,000 47,000 57,000 60,000
Capacity ${\rm Ar/N_2} \\ {\rm H_2~at~10^{-6}~mbar~^{1)}}$	bar·l bar·l	1,000 15	1,600 15	2,500 28	3,000 32	5,500 45	6,000 65	6,500 100	9,000 150
Maximum volume flow rate $ {\rm Ar/N_2} \\ {\rm H_2}^{\ 1)} $	mbar·l·s ⁻¹ mbar·l·s ⁻¹	12 6	12 6	15 10	10 7	10 7	14 7	14 7	25 12
Weight iClassicLine models BasicLine models	kg kg	25 23	29 25	46 35	53 44	70 63	131 123	262 246	503 450

All measurements in accordance with PNEUROP

¹⁾ The maximum throughput values given for hydrogen (H₂) are true for regenerated cryo pumps under short-term loads only. For continuous operations, both throughput and capacity values will be lower.



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