Leybold

CRYOGENIC SYSTEMS

Intelligent. Smart. Economical.

Intelligent. Smart. Economical.

Complete cryogenic systems

With regard to the increasing requirements of the market, Leybold fulfils the expectations of customers with its new range of cryogenic systems combining performant components.

The cryogenic systems offer a great range of economical products which can be easily combined to meet your application's requirements.

Performant cooling components for your application

Our aim is to provide high quality, intelligent and reliable products and thus meet the customers' demands.

The Leybold cooling systems consist of:
- COOLPAK i: Compressor unit &
- COOLPOWER i: Cryogenic refrigerator

The cryogenic pump systems consist of:
- COOLPAK i: Compressor unit &
- COOLVAC i: Cryogenic pump

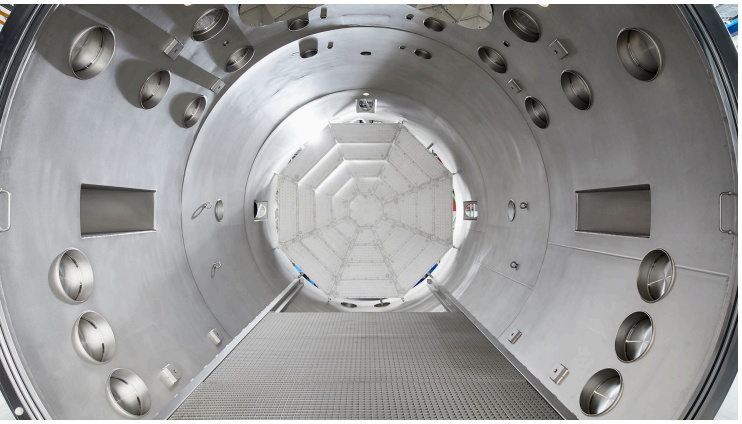
Our systems are generally certified according to all respective standards and regulations (RoHS, EU conformity, safety), specifically IEC/EN 61010 as well as UL 61010.

Cryogenic Systems - Application Areas

The Leybold Cryogenic Systems perform in a broad range of applications in various industries

Low temperature cooling systems

- Magnetic Resonance Imaging (MRI)
- Proton therapy
- Superconducting magnets
- Accelerators
- Crystal growing
- Nuclear Magnetic Resonance (NMR)

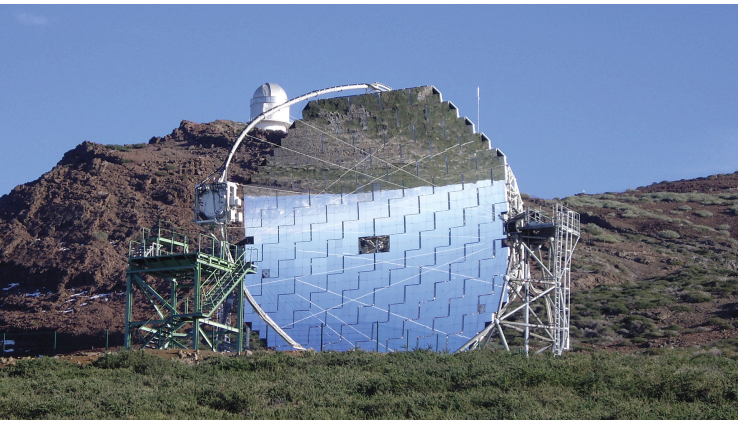


Research & Development

- Space simulation chambers
- Fusion energy
- Radiotelescopy
- Sample and detector cooling
- Cooling of pumping surfaces
- Pumping for accelerators, beamlines and research chambers

New technologies

- High temperature superconducting devices
- Gas cleaning
- Gas liquefaction



Industrial coating & processing

- Pumping for thin film coating in flexible and flat panel display technology
- Precision optics
- Electron beam welding
- Pumping of furnaces for brazing and heat treatment

COOLPAK i - Helium Compressors

Leybold's new COOLPAK i compressors are synomym for innovation, intelligence and energy savings.

COOLPAK i - Innovation and intelligence

Oil lubricated scroll technology and a variable speed drive offer excellence in system performance, energy demand and work space environment. With highly efficient separation and filtration systems the COOLPAK i generates continuous helium gas flow of high purity to the cryogenic systems.

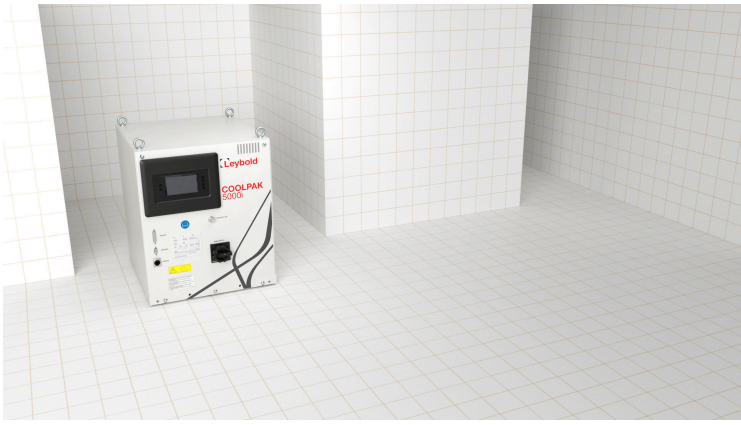
The water cooled helium compressor is controlled and maintained by an internal controller: the Atlas Copco Elektronikon used in several thousands of industrial air compressors. The system offers superior performance for our cryogenic refrigerators and pumps for a wide range of applications.

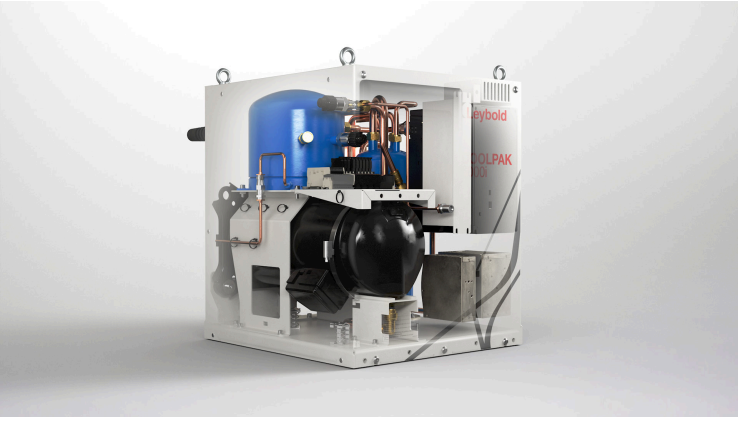
Innovative scroll technology

- Highly efficient hermetical scroll compressor
- Motor speed control
- Outstanding performance with high helium gas flow
- Robust design

Improved workspace

- Very efficient oil retention system
- Compact design
- Small footprint
- "Plug and play" system set up



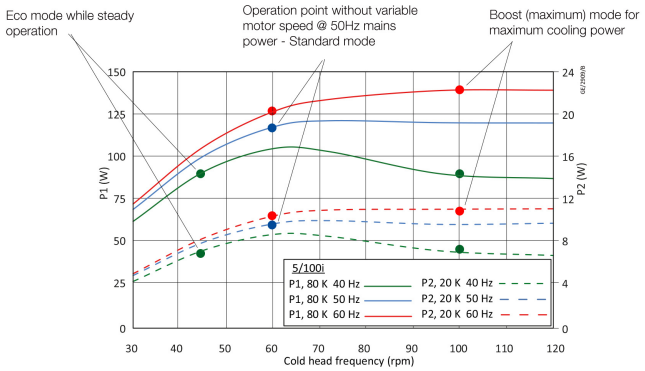


Guaranteed oil retention

- Optimum filter design for maximum oil retention
- Design ensures that the oil separators are never overloaded which extends the filter cartridge life-time
- The innovative oil restraint system minimizes the discharge of oil mist into the helium system

Integrated frequency converter & controller

- Frequency converter for industrial use
- Variable motor speed of the scroll compressor
- Variable motor speed control of the refrigerator drive unit
- Minimal components: compact, simple and user-friendly



Energy saving options & Cost of Ownership

- Energy savings due to variable motor speed of compressor and cold head
- Up to 25% power input saving by using the ECO mode
- Programmable operation modes
- Adaptable power demand
- Elongated maintenance period
- Highly efficient filtration system

Easy to use

- The "plug & play" system design supports quickest installation and start-up without complicated programming
- Easy serviceability (adsorber exchange)
- Maintenance interval of up to 22,000 h (30,000 h)

8 Different Models

This new generation of intelligent helium compressor features variable motor speed technology. Its complete and innovative design with highly efficient filtration systems enables a plug-and-play installation and long term operation. A broad range of variants for your application.

i-model

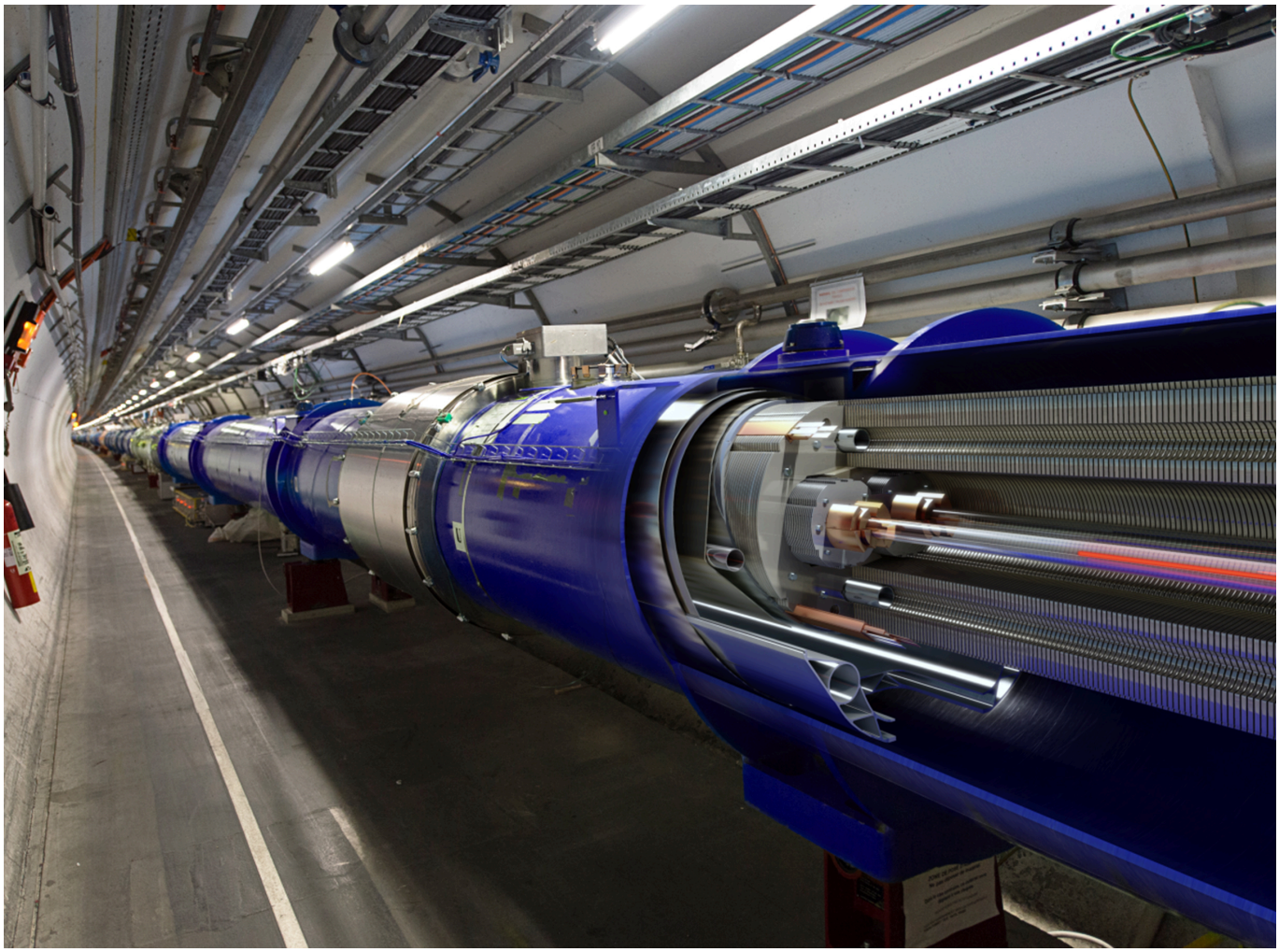
2 different types of voltage ranges can be selected 3ph/200V@50/60Hz, and 3ph/400V@50/60Hz

CP-model

This variant is especially well suited for applications with cryogenic pumps. Variants for the operation of one or two pumps are available

CH-model

This variant is recommended for applications with 1 or 2 cold heads



COOLPAK i - Variants

Compressor Unit Variants

Part Number	Compressor Unit	Mains Power	Max. Power	Weight	Connection
840000V5401	COOLPAK 5000i	400V@50Hz/460V@60Hz 3ph	8 kW @ 50 Hz; 8,7 kW @ 60 Hz	130 kg	1 Cold Head
840000V5201	COOLPAK 5000i LV	200V@50Hz/230V@60Hz 3ph			
840000V5411	COOLPAK 5000i; 1 CP	400V@50Hz/460V@60Hz 3ph			1 Cryo Pump
840000V5211	COOLPAK 5000i LV; 1 CP	200V@50Hz/230V@60Hz 3ph			
840000V5402	COOLPAK 5000i; 2 CH	400V@50Hz/460V@60Hz 3ph			2 Cold Heads
840000V5202	COOLPAK 5000i LV; 2 CH	200V@50Hz/230V@60Hz 3ph			
840000V5422	COOLPAK 5000i; 2 CP	400V@50Hz/460V@60Hz 3ph			2 Cryo Pumps
840000V5222	COOLPAK 5000i LV; 2 CP	200V@50Hz/230V@60Hz 3ph			

COOLPOWER i - Cryogenic refrigerators

Gas refrigerators for cryogenic temperature generation based on the Gifford-McMahon principle.

New benchmark

Intelligent. Smart. Economical.
The new i series cold heads with variable motor speed concept are setting a benchmark regarding efficient and powerful cooling systems. Besides their excellent refrigerating capacity they excel through very simple operation, highest reliability, lowest vibration levels and a long and maintenance-free service life.
Reliable and efficient cooling systems are decisive when it comes to competitiveness as well as the technological and economic success of new technologies.

High cooling performance

With new sophisticated stepper motor concept

- Variable motor speed by adaption from the compressor unit
- Boost mode operation for increased cooling performance at fast cool down
- Eco mode for long term operation, lifetime and energy saving
- RoHS compatible - leadfree regenerator
- Highly reliable displacer

COOLPOWER i - Technical data

Technical data

Part number	Cold Head	Cooling power	Cool down time	Lowest temperature	Weight
842140V0x	COOLPOWER 140i	140 W @ 80 K	35 min	25 K	11 kg
842100V0x	COOLPOWER 5/100i	100 W @ 80 K - 6 W @ 20 K		30/10 K	12 kg
842250V0x	COOLPOWER 250 MDi	200 W @ 80 K		25 K	20 kg
842010V0x	COOLPOWER 10 MDi	110 W @ 80 K - 18 W @ 20 K		30/8.5 K	21 kg

x = 2 CF flange
x = 6 ISO-K flange
Please contact Leybold for further information.

COOLVAC i - Cryogenic pumps

Fulfilling the rapidly increasing requirements for cryogenic pump systems.

Guaranteed high quality, high reliability and impressive performance data

The new COOLVAC i serie, with its new smart family of cryogenic pumps is perfectly adapted to both current and future economic trends and cycles.

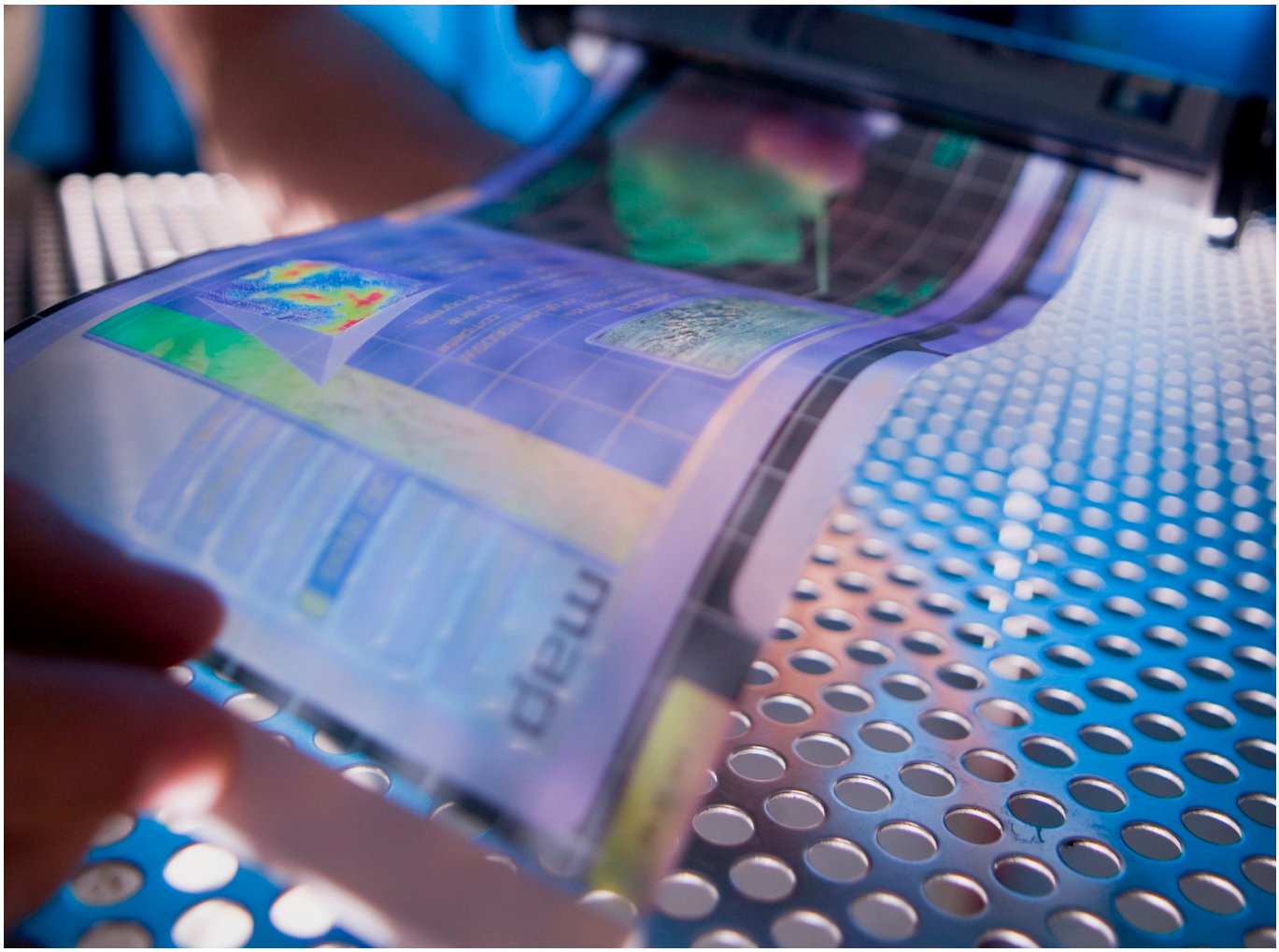
We have combined the new compact COOL.DRIVE i controller which is easy to operate with the high performance, low vibration and energy efficient cold heads and compressors of the respective i series.

Highly effective pumping speed for all gases, water vapor in particular

- Automatic control via COOL.DRIVE i controller
- Boost, Eco or standard operation mode for fast cool down, energy saving or standard operation via communication with compressor
- Integrated safety valve according EN 4126
- Simple and rapid maintenance

Depending on the variant, the cryogenic pumps offer different features:

- iBL Basic line pumps without automatic control
- iSL Smart line with automatic control and boost/eco mode
- iLN2 liquid nitrogen cooled shield



COOLVAC i - Technical data

Technical data

		COOLVAC 5000	COOLVAC 10000	COOLVAC 18000	COOLVAC 30000	COOLVAC 60000
		844402Vwxyz	844502Vwxyz	855632Vwxyz	844892Vwxyz	844902Vwxyz
Cold head		5/100i	5/100i	2x 5/100i	2x 5/100i - 140i	2x 5/100 i - 2x 140 i
Cooldown time	min	100	150	180	260	330
Cross over value	mbar*l	700	800	800	1200	1000
Pumping speed						
N_2	l/s	5,200	10,000	18,000	30,000	57,000
H_2O		18,000	30,000	46,000	93,000	180,000
Ar		4,000	8,400	13,500	25,000	47,000
H_2		6,200	10,000	14,000	30,000	60,000
Capacity						
Ar/N_2	bar*l	3,000	5,500	6,000	6,500	9,000
H_2 @ 10^{-6} mbar		32	45	65	100	150
Maximum volume flow rate						
Ar/N_2	mbar*l*s	10	10	14	14	25
H_2		7	7	7	7	12
Weight						
iSmart Line	kg	53	70	131	258	500
iBasic Line		44	63	123	246	450

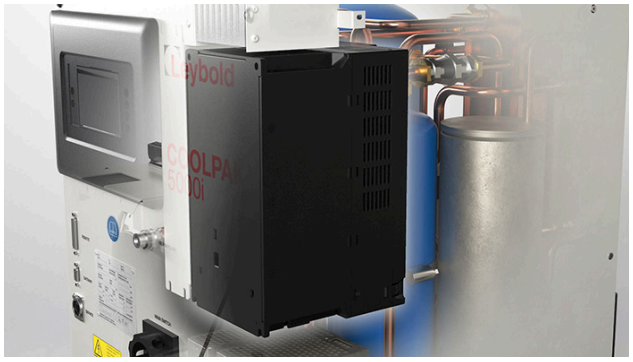
- w = 0 iSL, 1 iBL, 3 iLN2
- x,y = customer specific variants
- z = different flanges

Contact Leybold application management for further information

360° View - Cryogenic System

Highly Efficient Filtration System

Optimum filter design for retention of the oil from the helium gas flow. Increased maintenance interval of up to 22000 hours (30000 hours).



Frequency Converter

Enabling variable motor speed of the scroll compressor. Adaption of the power demand to the applications process. For a perfect adaption to the processes you are running.

Hermetically sealed Scroll Compressor

Reliable, energy efficient helium compressor technology using the well-proven scroll pump principle.

Elektronikon

Control Unit. With the Elektronikon you keep perfect control of the operation.

COOLPOWER i

New sophisticated refrigerator series, combining efficiency and reliability with cutting edge smart technology.

Drive Unit Concept

Stepper motor with electronics on board.

Displacer Concept

Sophisticated material for displacer and regenerator. RoHS compatible.

Safety Valve

Certified safety valve according to EN 4016.

Cryogenic Pump Controller - COOL.DRIVE i

Managing regeneration and operation modes of the cryo pump.

Regeneration Heater

Electrical regeneration without purge gas.

COOLPAK i - COOLPOWER i - COOLVAC i

Leybold

Pioneering products. Passionately applied.