

MIRAI X CRYO

WHERE HEAT MEETS COLD

CRYOCHILLERS FOR PROCESS COOLING
FROM -160°C TO +90°C

MIRAI X CRYO 10,20 PRODUCT DATASHEET

- **THE WIDEST TEMPERATURE RANGE**

From -160°C to +90°C*

- **FAST COOL DOWN SPEED**

From +20°C to -100°C in 30 seconds

- **BOOST MODE**

Up to 7.5 kW additional capacity

- **MOTOR POWER**

10 kW, 20 kW

- **VARIOUS INDUSTRY APPLICATIONS**

- **ZERO GWP**

With the air cycle technology

** The temperature range varies based on the type of HTF selected and will be confirmed during the ordering process.*



BENEFITS



AIR AS REFRIGERANT

0 GWP, 0 ODP, and 0 TFA
Environmentally friendly
Refrigerant free of charge



TEMPERATURE ACCURACY

$\pm 0,5$ °C under changing load
 $\pm 0,02$ °C after reaching setpoint



ENERGY EFFICIENCY

High cycle efficiency
Inverter driven motor



NO VIBRATION

Turbo-compressor design
eliminates vibration



LOW OPERATING COSTS

Long equipment lifecycle
Low maintenance



TEMPERATURE RANGE*

Any temperature
from -160°C to +90°C



WARRANTY

Up to 4 years of warranty



ISO CERTIFICATION

ISO 9001:2020 certified



HTF EXPANSION TANK

Easy HTF (Heat transfer fluid) refill

OPTIONS



REMOTE MONITORING

Available remote monitoring or
remote access systems



MACHINE WHEELS

For convenience transportation of
machine in manufacture



VARIOUS HIGH-LEVEL COMMUNICATION PROTOCOLS



INDIVIDUAL HTF CONNECTION



INDIVIDUAL WATER CONNECTION



EXTENDED WARRANTY

Up to 3 years



EXTERNAL EXPANSION TANK

Installation of external expansion
tank, up to 80 liters in capacity.



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Introducing the **MIRAI X CRYO**, our latest innovation in cryochiller technology. This advanced refrigeration system is tailored to meet the diverse needs of industries ranging from semiconductor manufacturing to vacuum drying and pharma applications.

The **MIRAI X CRYO** is available in two motor power configurations: **10 kW and 20 kW**, accommodating a variety of application requirements.

COMPLIANCE WITH EU ENVIRONMENTAL REGULATIONS

The **MIRAI X CRYO** is fully compliant with EU and global environmental standards, including REACH, RoHS, and F-gas regulation. This compliance underscores our dedication to producing systems that not only meet but exceed the most stringent environmental requirements.

THE WIDEST TEMPERATURE RANGE*

MIRAI X CRYO has a temperature range from -160°C to +90°C with temperature accuracy ± 0.5 °C under changing load.

FAST COOL DOWN SPEED

From +20°C to -100°C in 30 sec.

BOOST MODE

The feature that allows **MIRAI X CRYO** to have up to **7.5 kW additional capacity for 5 minutes**.

VARIOUS INDUSTRY APPLICATIONS

MIRAI Intex machines are suitable for a wide range of applications. **MIRAI X CRYO** was developed for industrial processes, vacuum coating and etching.

ZERO GWP

With the air cycle technology, **MIRAI X CRYO** is 100% eco-friendly.

**The temperature range varies according to the type of HTF used.*

BOOST CHARGING TIME

from 6 min
(during waiting or
heating mode)

MACHINE AVAILABILITY TIME AFTER SWITCHING ON

Standard - **25 min**
With boost mode - **35 min**

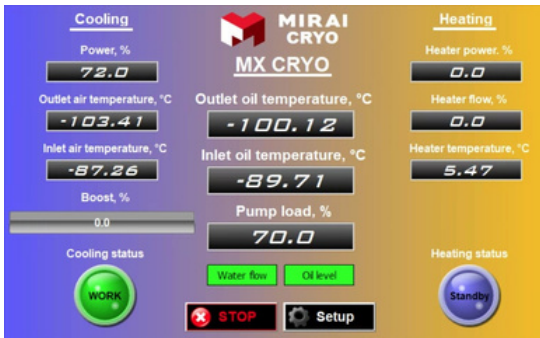
SETTINGS WINDOW



STANDBY WITH CHARGED BOOST



COOLING MODE



HEATING MODE



CONTROL PANEL

The control panel is a tool for setting the operating modes of the machine, there are 3 modes in total:

- **Cooling mode**
- **Heating mode**
- **Standby mode**

This control panel allows you to easily change settings without any additional intervention in the machine, simply by using the touch screen or by sending a command from high-level control system.

Allows to use industrial protocols:

- **ProfiNET**
- **EtherCAT**
- **EtherNET/IP**
- **Powerlink**

**Another protocols by request.*

INSTALLATION

PLUG & PLAY SOLUTION

The **MIRAI X CRYO** machine is the ideal solution for retrofitting in existing installation and is easy to implement in new projects due to its Plug & Play design, compatible with multiple industry standard connection types.

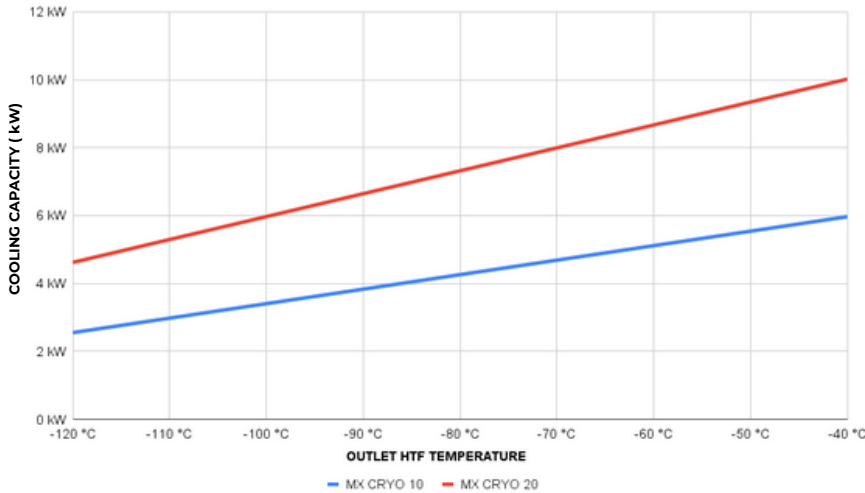
See the **MIRAI X CRYO** chiller in action across various industries, from vacuum coating and semiconductor manufacturing to industrial processes and storage.



COOLING CAPACITY

Cooling capacity of the **MIRAI X CRYO** over a temperature range of -40 °C to -120°C.

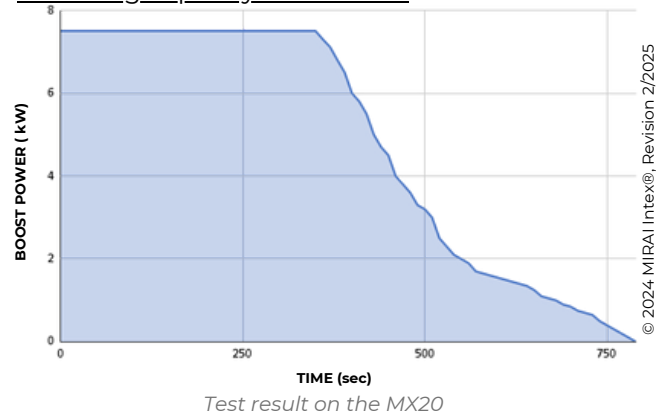
At cooling water temperature +10 °C.



COLD POWER BOOST

At -80°C setpoint, the machine cools to -110°C and accumulates cold energy with boost and generated following power. The system can accumulate boost when operating in heating or standby mode.

*+Cooling capacity of machine



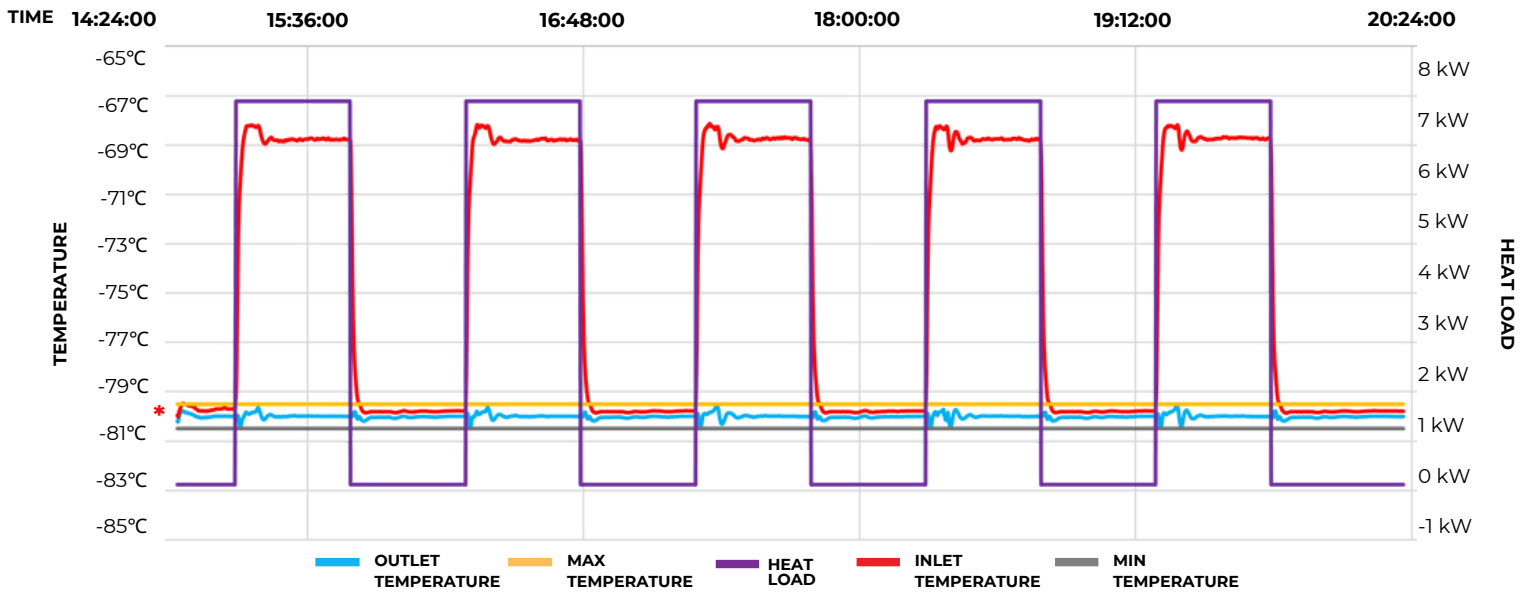
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PERFORMANCE

This test focuses on temperature maintenance when the heat load on the machine is changing. Specifically in this case, the test was conducted at a change from 0 kW to 7 kW. The results showed that temperature **control under changing load is ± 0.5°**.

Above the graph is the time interval when the test started and ended, how long the loads were measured for.

The mark [*] - indicates the location where the temperature change was measured.



Test result on the MX20

FEATURES

PRESSURIZATION

Automatic working medium pressure control and adjustment

HMI

7" color touch screen display, parameter graphs, system control

BOOST MODE

Up to 7.5 kW additional capacity

COMPLIANCE

- » Pressure equipment directive (PED) 2017/68/EU, Module A2 Certificate
- » Electromagnetic compatibility directive (EMC) Directive 2014/30/EU Certificate
- » Low voltage directive (LVD) 2014/35/EU Certificate
- » Machinery directive (MD) 2006/42/EC
- » F-gas regulation
- » Reach, Rohs

SELF-DIAGNOSTICS

The **MIRAI X CRYO** machine is equipped with sensors that immediately send a signal of any potential malfunction

SPECIFICATIONS

Performance is nominal and individual units may vary. The efficiency of each refrigeration unit will depend on the specific operating conditions.

TECHNICAL DATA

MX CRYO 10

MX CRYO 20

TEMPERATURE RANGE ^{*1}	From -160°C up to +90°C	
RATED MOTOR POWER (kW)	10	20
COMPRESSOR	Mirai Turbo-Compressor (water-cooled)	
REFRIGERANT	Natural Air (R729)	
COOLING CAPACITY (-80°C) (kW) ^{*2}	4,4	7,7
TEMPERATURE ACCURACY UNDER CHANGING LOAD	±0.5°C	

HTF PARAMETERS

HTF TANK VOLUME (l)	17	
HTF TANK LOAD (l)	10	
MIN PRESSURE (bar)	1	
MAX PRESSURE (bar)	10	
NOMINAL ^{*2} /MAX ALLOWED PROCESS PRESSURE DROP ^{*3} (kPa)	20/50	
MIN HTF FLOW (kg/h)	465	810
NOMINAL HTF FLOW (kg/h)	930	1620
MAX HTF FLOW (kg/h)	1860	
MAX VOLUME HTF CIRCUIT MIRAI (l)	~32	
MAX VOLUME HTF CIRCUIT CLIENT PROCESS (l)	~25	
HTF CONNECTION	Any, upon customer specifications	

WATER COOLING

WATER CONNECTION	DN 15	
NOMINAL PRESSURE DROP (bar)	1,2	1,2
MAX ALLOWED PRESSURE ON WATER INLET (bar)	4	10
COOLING WATER TEMPERATURE RANGE ON INLET	From +6°C to +30°C (other temperatures are possible on request)	
MIN COOLING WATER MASS FLOW (kg/h)	1200	2000
NOMINAL COOLING WATER MASS FLOW (kg/h)	2000	2500
MAX COOLING WATER MASS FLOW (kg/h)	4000	
WATER QUALITY	See specification ^{*4}	

GENERAL TECHNICAL SPECIFICATION

SAFETY PROTECTION	High pressure protection, water supply cut-off protection, over-current protection, high temperature protection, sensor failure protection, heater protection
SOUND PRESSURE, AT A DISTANCE OF 1M FROM <u>CM</u> (dB)	Up to 75
CONTROL SYSTEM	KEB system compatible with digital communication protocols ProfiNET, EtherCAT, EtherNET/IP, and Powerlink. Another protocols by request

POWER REQUIRMENTS

POWER SUPPLY	~3 PE+N/3PE, 400 V/440 V/480 V, 50 Hz/60 Hz	
TOTAL CONSUMPTION/WITH BOOST MODE (kW)	20/27,7	28/36,2
MAX REFRIGERATION MODE CONSUMPTION (kW)	13,5	22
HEATER POWER (kW)	12	
PUMP POWER (kW)	2,2	

DIMENSIONS

DIMENSIONS (HxLxW) ±5 mm	1800 ^{*5} x1340x990	
WEIGHT (kg)	860	

*1 THE TEMPERATURE RANGE VARIES BASED ON THE TYPE OF HTF SELECTED AND WILL BE CONFIRMED DURING THE ORDERING PROCESS.

*2 DATA ARE SPECIFIED FOR FRAGOLTERM X-T9-A OIL (INLET=-70°C / OUTLET=-80°C) AT COOLING WATER +10°C

*3 COOLING CAPACITY WILL BE REDUCES BY 600 W

*4 THE WATER SHOULD CONTAIN A CORROSION INHIBITOR THAT PROTECTS ALUMINUM ALLOYS AND COPPER IN THE CONCENTRATION RECOMMENDED BY THE MANUFACTURER (FOR DETAILED INFORMATION CONTACT MIRAI INTEX.)

*5 1880 MM WITH OPTIONAL WHEELS

CM - COOLING MACHINE

DIMENSIONS

