

# 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\*

- **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

± 0,5°C under changing load



### 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 +90°C to -160°C



### WARRANTY

2 years of warranty



### ISO CERTIFICATION

ISO 9001:2020 certified



### 30 SEC SYSTEM RESTART

Rapid automatic restart of the  
cooling machine in case of power  
interruptions.

## OPTIONS



### REMOTE MONITORING

Available remote monitoring or  
remote access systems



### MACHINE WHEELS

For convenience transportation of  
machine in manufacture



### VARIOUS HIGH-LEVEL COMMUNICATION PROTOCOLS



### CUSTOMIZED HTF CONNECTION



### CUSTOMIZED WATER CONNECTION



### EXTENDED WARRANTY

Up to 4 years



### INTERNAL EXPANSION TANK

Installation of internal expansion  
tank, up to 50 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.

### 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.

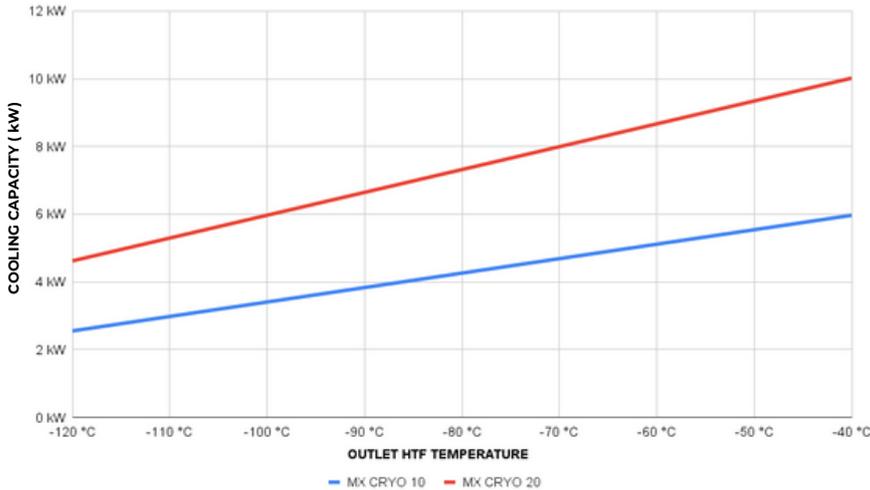
See the **MIRAI X CRYO** chiller in action across various industries, from vacuum coating and semiconductor manufacturing to industrial processes and storage.



## 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



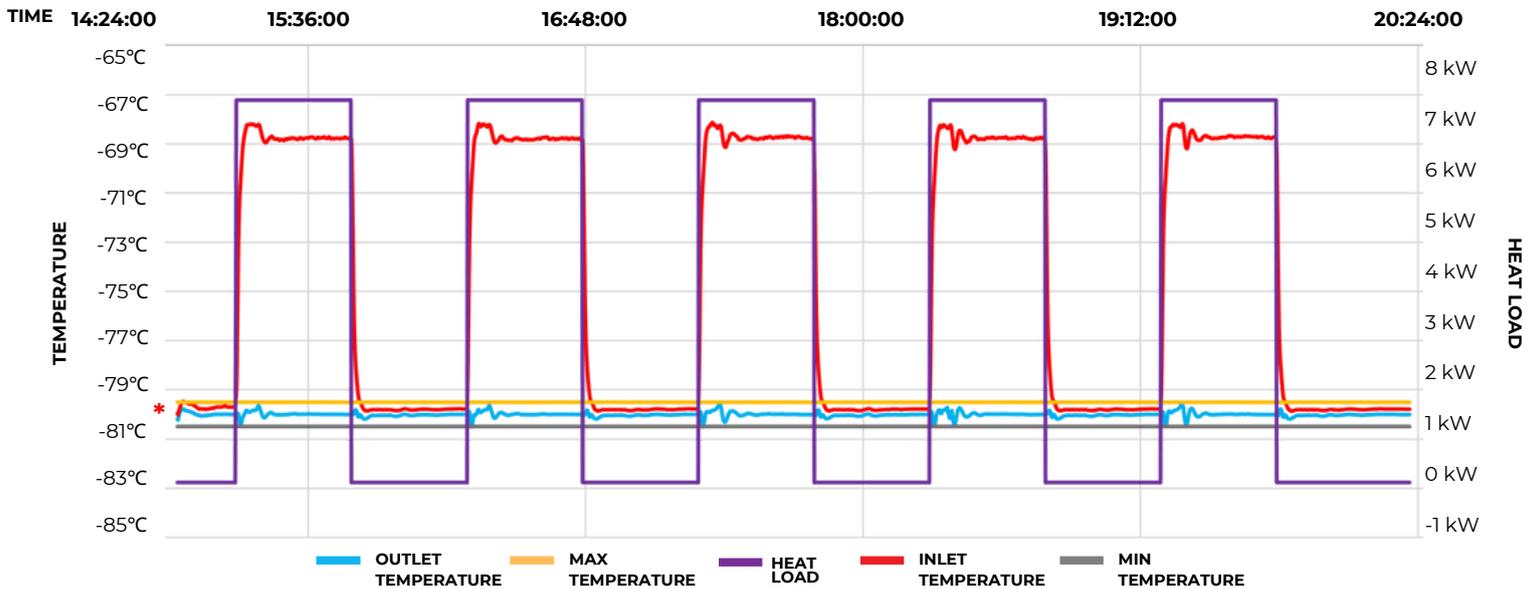
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## PERFORMANCE

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 <sup>*1</sup>	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) <sup>*2</sup>	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 <sup>*2</sup> / MAX ALLOWED PROCESS PRESSURE DROP <sup>*3</sup> (kPa)	20/50	
MIN HTF FLOW (l/min)	8,2	14,3
NOMINAL <sup>*2</sup> HTF FLOW (l/min)	16,4	28,6
MAX HTF FLOW (l/min)	72	
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 <sup>*4</sup>	

### 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 <sup>*5</sup> 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

