

# 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\*

- **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.*



MIRAI

### BENEFITS



#### AIR AS REFRIGERANT

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



#### TEMPERATURE ACCURACY

$\pm 0,5^{\circ}\text{C}$  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  $+90^{\circ}\text{C}$  to  $-160^{\circ}\text{C}$



#### 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



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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 ENVIROMENTAL 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  $-160^{\circ}\text{C}$  to  $+90^{\circ}\text{C}$  with temperature accuracy  $\pm 0.5^{\circ}\text{C}$  under changing load.

#### 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.

#### MACHINE AVAILABILITY TIME AFTER SWITCHING ON

**25 min**

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

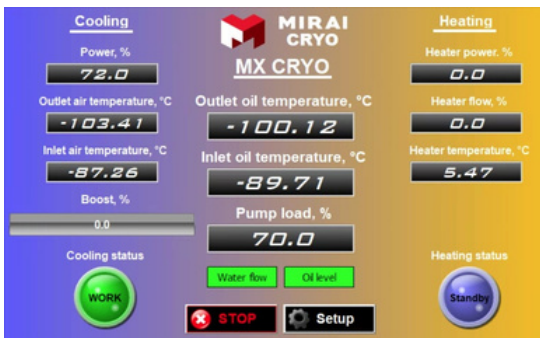
### SETTINGS WINDOW



### 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.

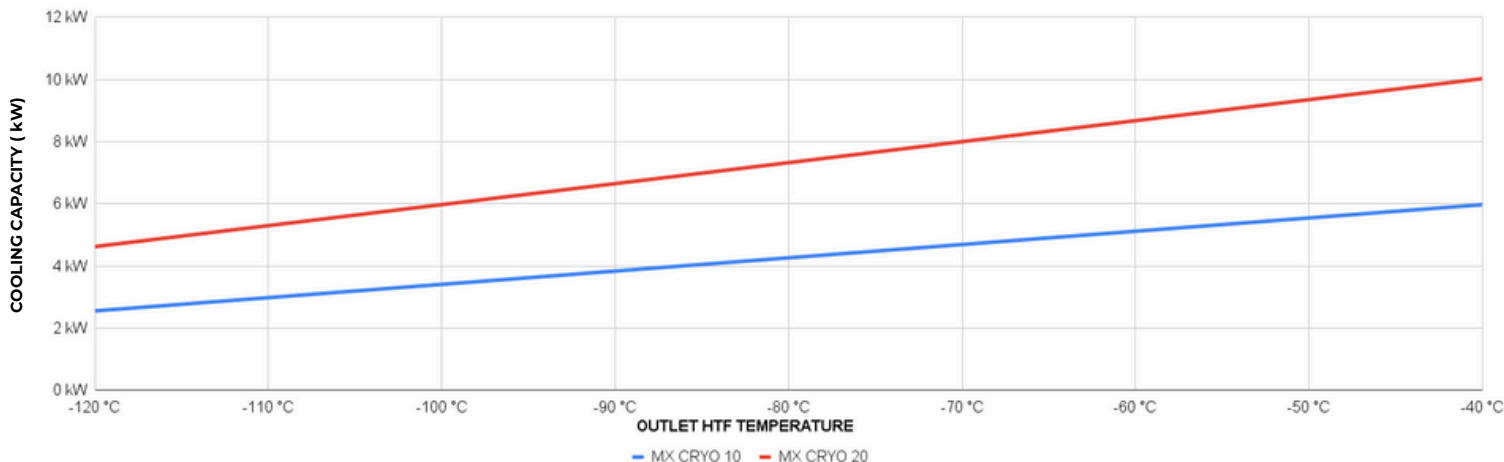




### COOLING CAPACITY

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

At cooling water temperature +10 °C.



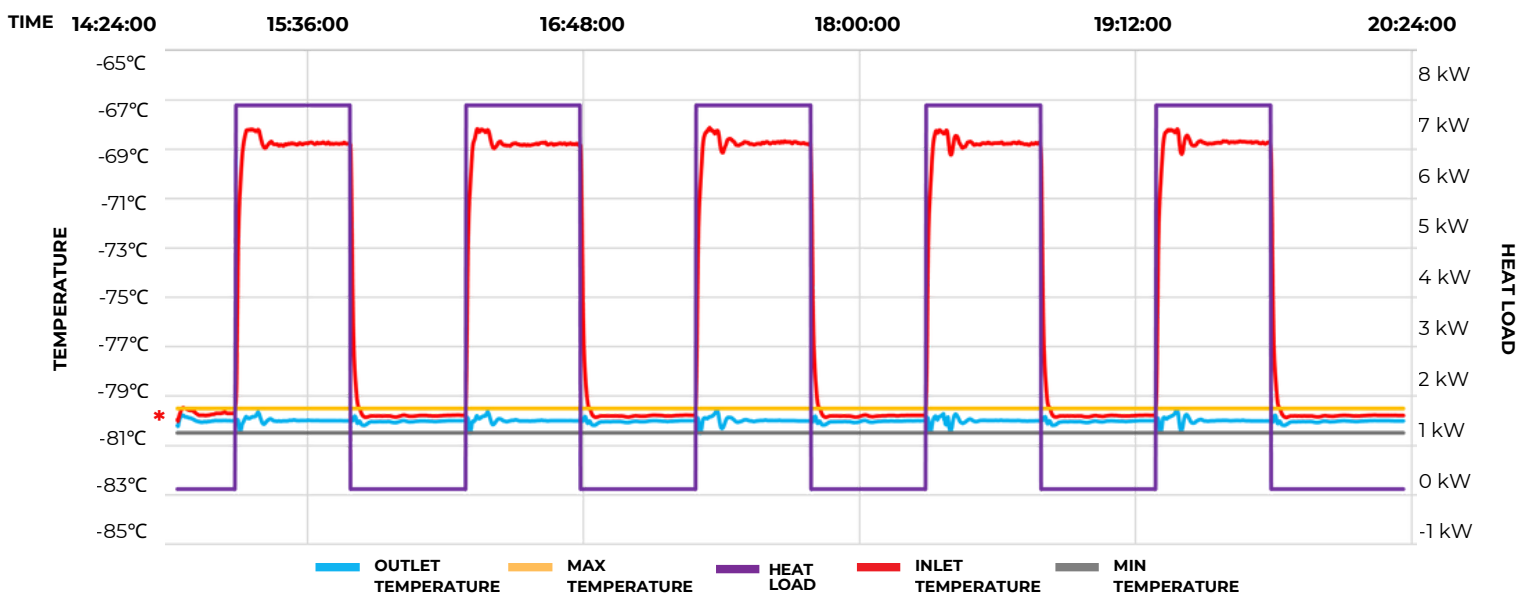
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### PERFORMANCE

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  $\pm 0.5^\circ$** .

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

#### SELF-DIAGNOSTICS

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

#### 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

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			
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)	~22		
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 70		
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 (kW)	15,5	24,5	
POWER CONSUMPTION ON THE SHAFT IN THE COOLING MODE (kW)	10	20	
HEATER POWER (kW)	12		
PUMP POWER (kW)	2,2		
DIMENSIONS			
DIMENSIONS (HxLxW) ±5 mm	1800 <sup>*5</sup> x1340x990		
WEIGHT (kg)	860		

<sup>\*1</sup> THE TEMPERATURE RANGE VARIES BASED ON THE TYPE OF HTF SELECTED AND WILL BE CONFIRMED DURING THE ORDERING PROCESS.  
<sup>\*2</sup> DATA ARE SPECIFIED FOR FRAGOLTERM X-T9-A OIL (INLET=-70°C / OUTLET=-80°C) AT COOLING WATER +10°C  
<sup>\*3</sup> COOLING CAPACITY WILL BE REDUCES BY 600 W  
<sup>\*4</sup> 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.)  
<sup>\*5</sup> 1880 MM WITH OPTIONAL WHEELS  
CM - COOLING MACHINE

DIMENSIONS

