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.*

MIRAI

MIRAI X CRYO

MIRAI X CRYO 10,20
PRODUCT DATASHEET

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 -160°C to +90°C

WARRANTY
2 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.

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°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
6 min (during waiting or heating mode)
MACHINE AVAILABILITY TIME AFTER SWITCHING ON
Standard - **25 min** With boost mode - **35 min**
CONSUMER COOLING RATE +40°C/-100°C
Standard up to **5 min** With boost mode up to **2 min**
CONSUMER HEATING RATE -100°C/+40°C
Standard up to **5 min**

INSTALLATION

PLUG AND 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 and 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 food processing and pharmaceuticals.

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.

SETTINGS WINDOW

STANDBY WITH CHARGED BOOST

COOLING MODE

HEATING MODE

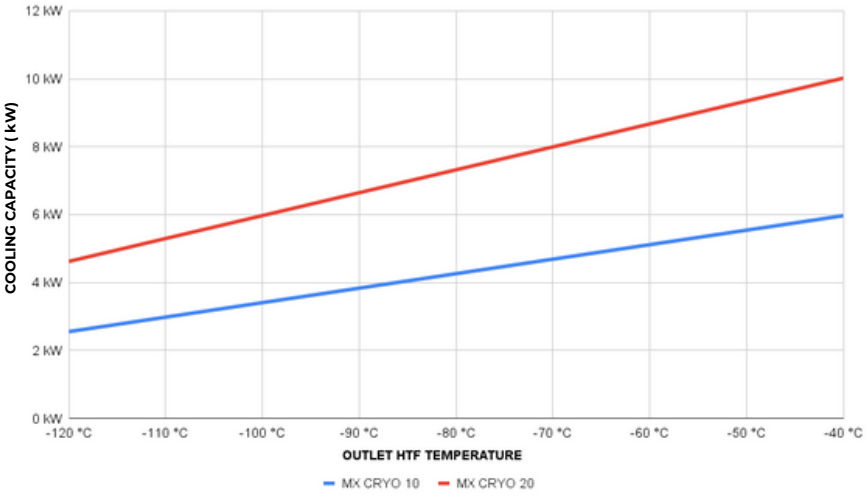
DESIGN FEATURES

HTF LEVEL AND PRESSURE GAUGES

TANK FOR REFILLING THE HTF IN THE MACHINE

COOLING CAPACITY

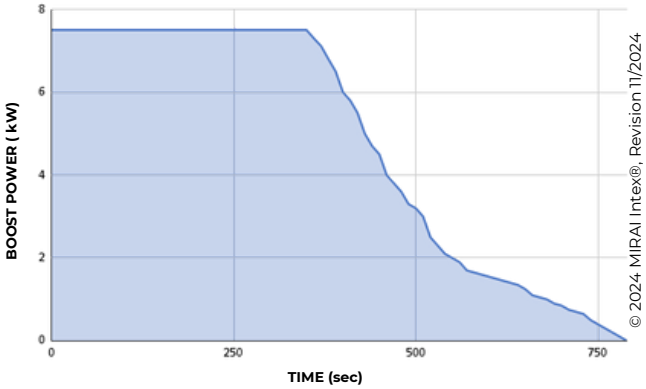
Cooling capacity of the **MIRAI X CRYO** over a temperature range of -40 °C to -120°C.
At cooling water temperature +10 °C.



COLD POWER BOOST

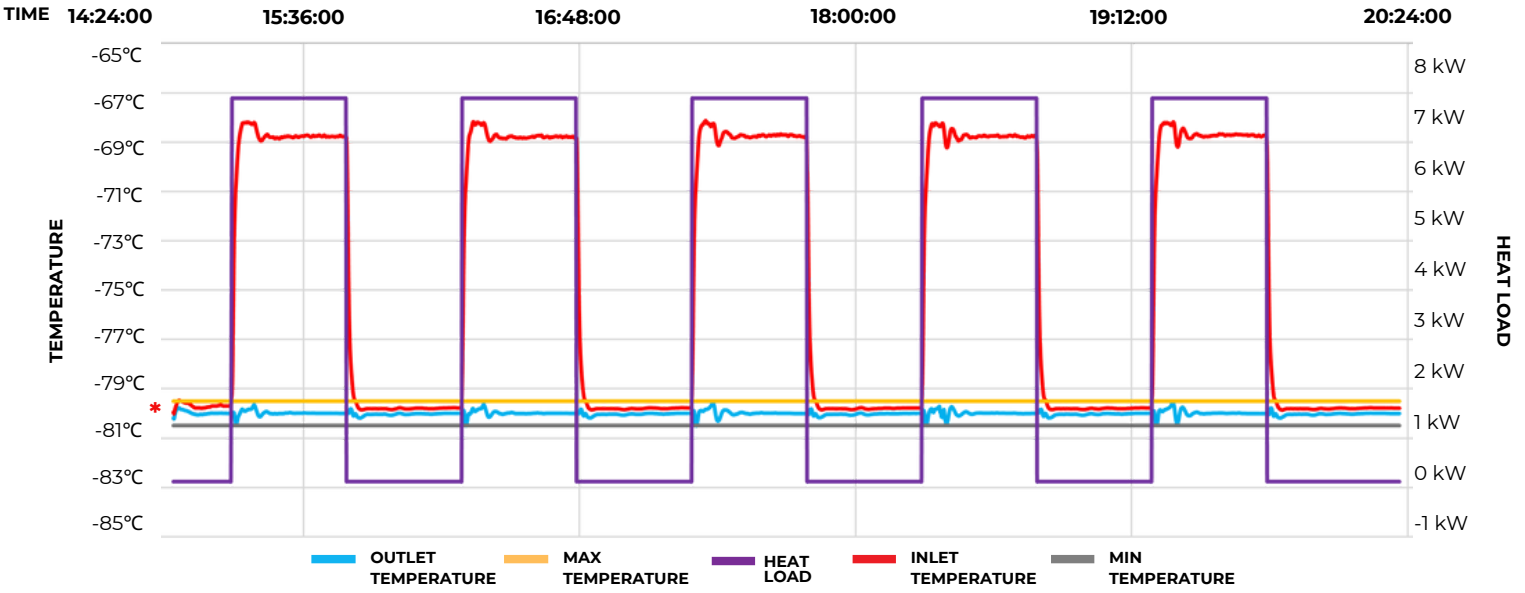
At -80°C setpoint, the machine cools to -110°C and accumulates cold energy with boost and generated following power. The system can accumulate boost when operating in heating or standby mode.

*+Cooling capacity of machine



PERFOMANCE

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.



FEATURES

PRESSURIZATION

Automatic refrigerant 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

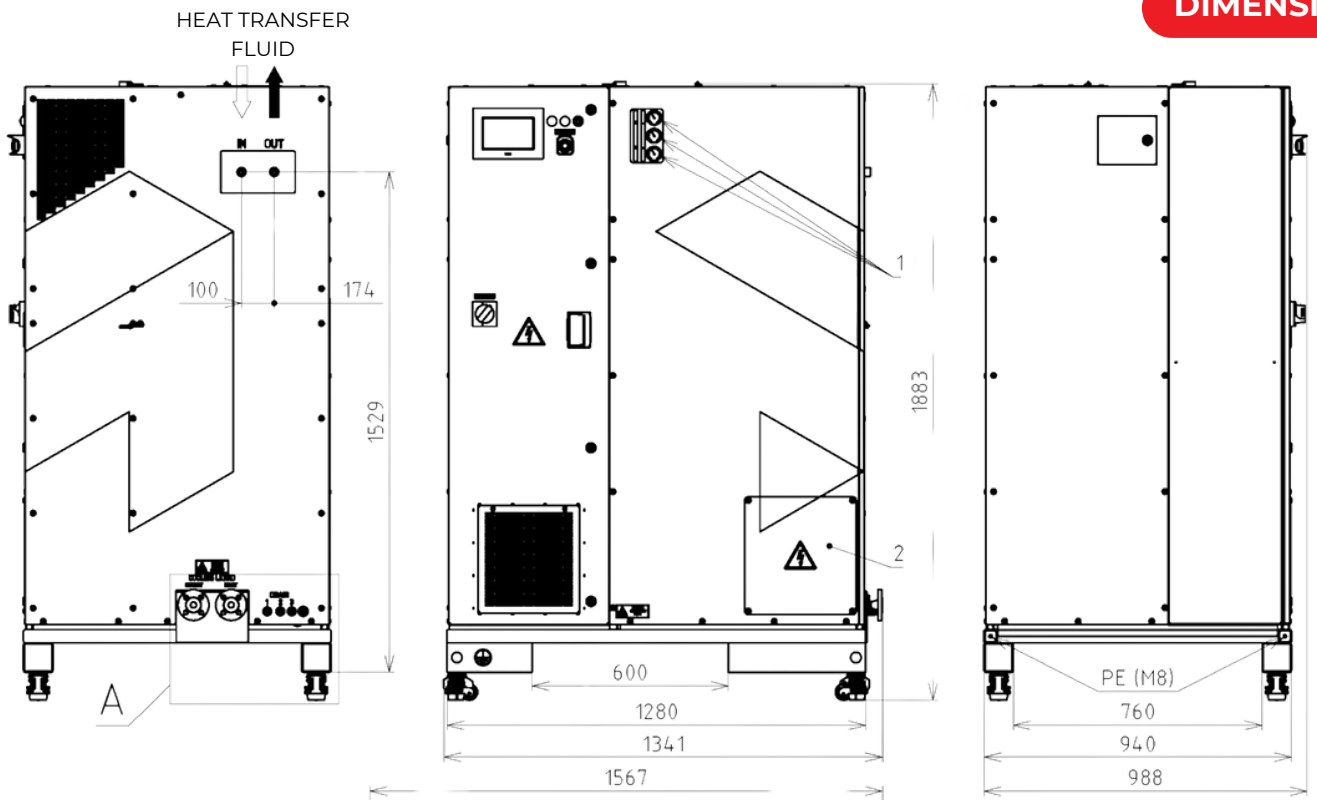
SPECIFICATIONS MIRAI X CRYO

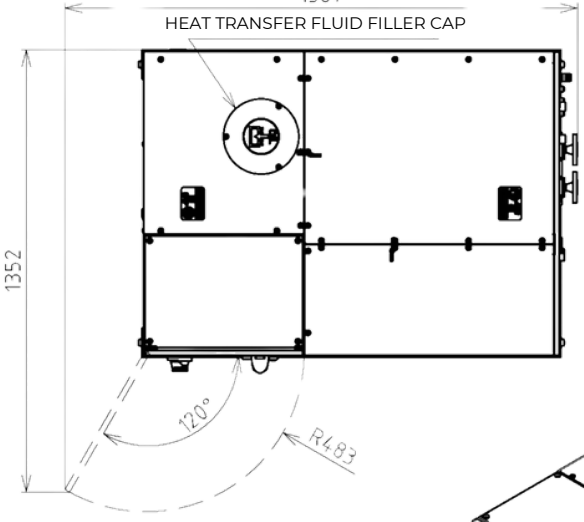
Performance is nominal and individual units may vary.
The efficiency of each refrigeration unit will depend on the specific operating conditions.

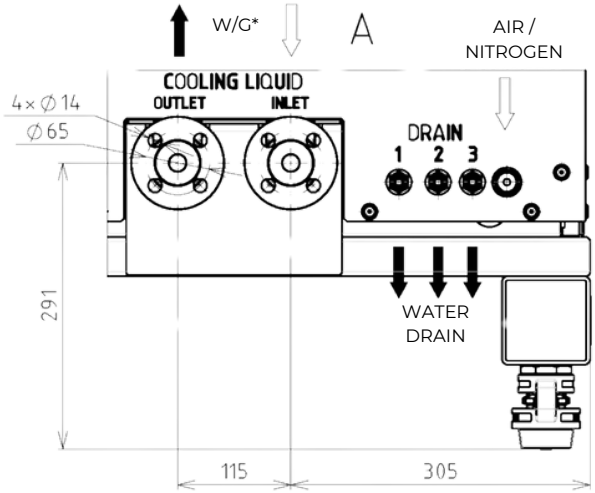
TECHNICAL DATA	MX CRYO 10	MX CRYO 20
AIR-CYCLE		
TEMPERATURE RANGE	From -160°C up to +90°C	
RATED MOTOR POWER (kW)	10	20
REFRIGERATION CAPACITY (-80°C)* (kW)	4,4	7,7
REFRIGERANT	Natural Air (R729)	
COMPRESSOR	Mirai Turbo-Compressor (water-cooled)	
HTF PARAMETERS		
MIN PRESSURE (bar)	1	
MAX PRESSURE (bar)	10	
NOMINAL*/MAX ALLOWED PROCESS PRESSURE DROP (kPa)**	20/50	
MIN HTF FLOW (l/h)	450	810
NOMINAL HTF FLOW (l/h)*	900	1620
MAX HTF FLOW (l/h)	2000	
WATER COOLING		
WATER CONNECTION	DN 15	
PRESSURE DROP, NOMINAL (bar)	1,2	1,2
MAXIMUM ALLOWED PRESSURE ON WATER INLET (bar)	4	10
COOLING WATER TEMPERATURE RANGE	From +6°C to +30°C (other temperatures are possible on request)	
MIN WATER FLOW (kg/h)	1200	2000
NOMINAL COOLING WATER MASS FLOW (kg/h)	2000	2500
MAX WATER FLOW (kg/h)	4000	
GENERAL TECHNICAL SPECIFICATION		
SAFETY PROTECTION	High pressure protection, water supply cut-off protection, over-current protection, phase failure protection, high temperature protection, sensor failure protection, Heater protection	
SOUND PRESSURE, AT A DISTANCE OF 1M FROM RM (dB)	Up to 75	
CONTROL SYSTEM	KEB system compatible with digital communication protocols ProfiNET, EtherCAT, EtherNET/IP, and Powerlink. Another protocols by request	
HTF CONNECTION	Any, upon customer specifications	
POWER REQUIRMENTS		
POWER SUPPLY	~3 PE+N/3PE, 400 V/440 V/480 V, 50 Hz/60 Hz	
REFRIGERATION (kW)	13,5	22
TOTAL CONSUMPTION (kW)	27,7	36,2
HEATING (kW)	12	
PUMP (kW)	2,2	
DIMENSIONS		
DIMENSIONS (HxLxW) ±5 mm	1800x1340x990	
HTF TANK VOLUME (l)	17	
HTF TANK LOAD (l)	10	
WEIGHT (kg)	860	
MAX VOLUME HTF CIRCUIT MIRAI (l)	~30	
MAX VOLUME HTF CIRCUIT CLIENT PROCESS (l)	~25	

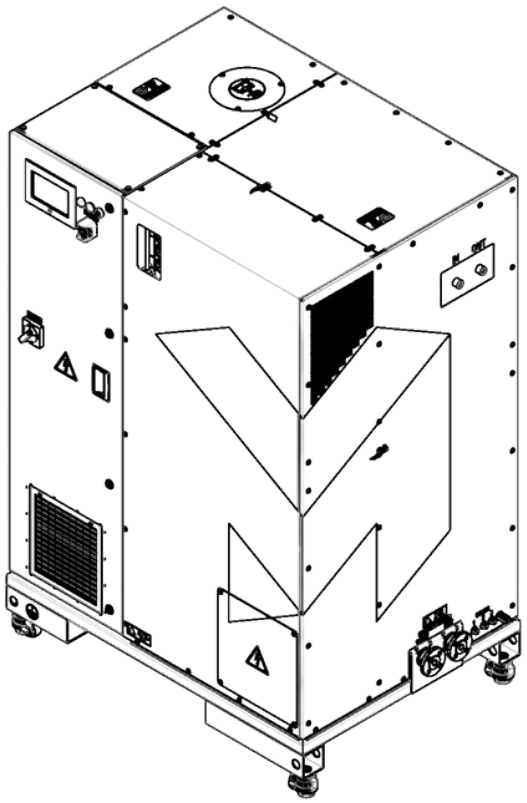
*DATA ARE SPECIFIED FOR FRAGOLTERM X-T9-A OIL (INLET=-70 °C / OUTLET=-80 °C) AT COOLING WATER +10°C
**COOLING CAPACITY WILL BE REDUCE BY 600 W
RM - REFRIGERATION MACHINE

DIMENSIONS









*COOLING WATER/ GLYCOL MIXTURE

⇨ INLET

⬅ OUTLET

1-PRESSURE GAUGE

2-ELECTRICAL CONNECTIONS