

MXM CRYO

SUSTAINABLE SOLUTION FOR YOUR
PRODUCTION PROCESSES

MIRAI XM CRYO 20

(MXM CRYO 20)

PRODUCT DATASHEET

- **ZERO GWP**

With the air cycle technology
Not a subject of F-Gas Regulation

- **THE WIDEST TEMPERATURE RANGE**

From -120 °C to +80 °C*

Accuracy ± 0.5 °C under changing load

Accuracy ± 0.02 °C after reaching setpoint

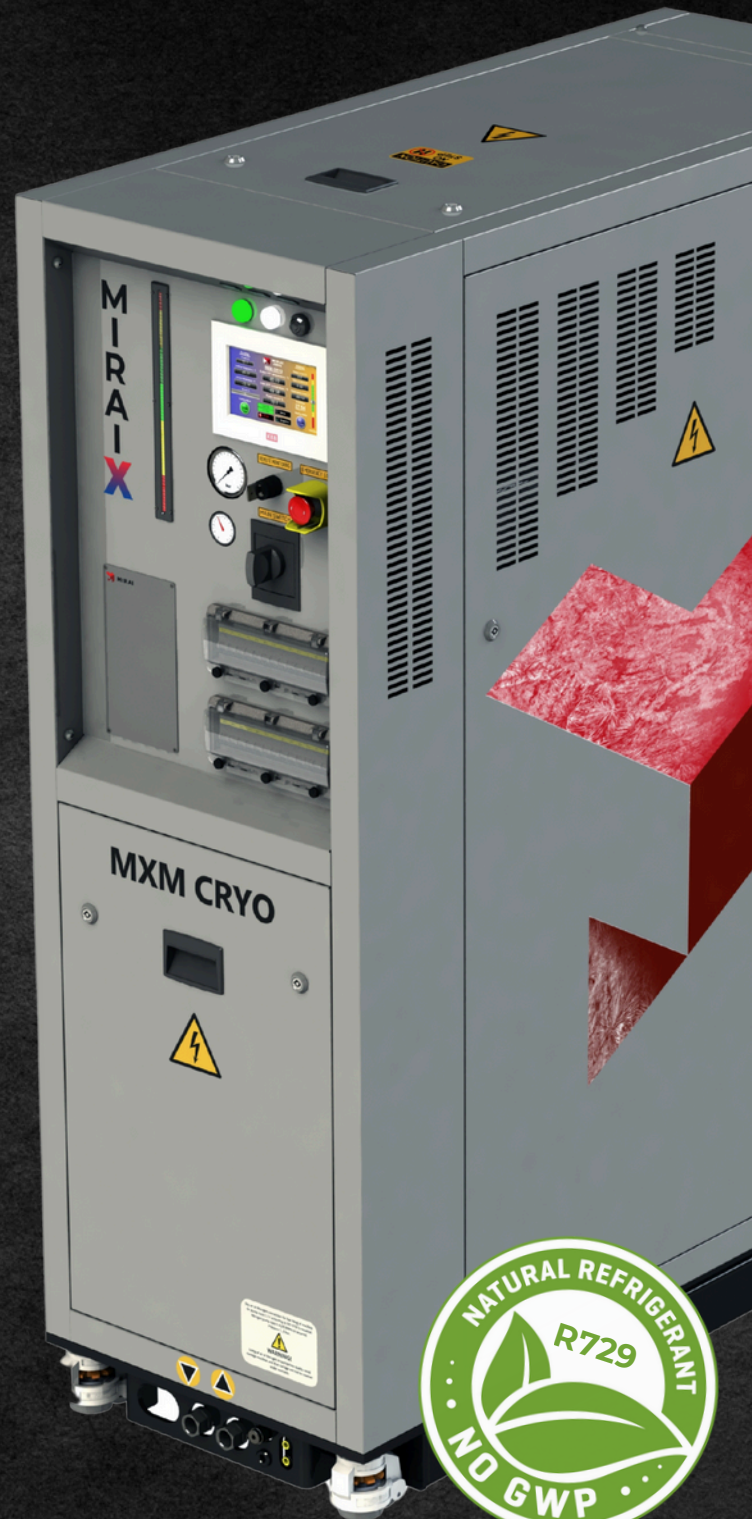
- **EASY CONNECTIVITY**

Plug & Play system, configurable connections

- **COMPACT AND NARROW DESIGN**

- **FAST RETURN OF INVESTMENT**

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



MIRAI

FEATURES

MIRAI XM CRYO machines are ideal solution for the **applications that need compact but powerful refrigeration solution.**

In addition to safe and environmentally friendly cooling, it represents the latest solution in technology, providing highly-precise temperature and process control covering dramatic changes in temperature and machine load.



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
 $\pm 0.02^{\circ}\text{C}$ after reaching setpoint



QUICK SWITCHING BETWEEN COOLING AND HEATING MODES

From $+40^{\circ}\text{C}$ to -100°C - within 2 min



VARIOUS INDUSTRY APPLICATIONS

Suitable for a wide range of application
from industrial processes to storage



ENERGY EFFICIENCY

High cycle efficiency
Inverter driven motor



NO VIBRATION

Turbo-compressor design
eliminates vibration



LOW OPERATING COSTS

Long equipment lifecycle
Low maintenance



MACHINE WHEELS

For convenient transport
machine in production



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INSTALLATION

PLUG & PLAY SOLUTION



The **MIRAI XM 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. The **MIRAI XM CRYO's** compact design makes it perfect for industries requiring a small but powerful machine.

OPTIONS



REMOTE MONITORING

Available remote monitoring or
remote access systems



VARIOUS HIGH-LEVEL COMMUNICATION PROTOCOLS



CUSTOMIZED WATER CONNECTION



EXTENDED WARRANTY

Up to 4 years



HTF EXPANSION TANK VARIATIONS

Optional 25/50/100 l HTF expansion tank



AIR PRESSURIZATION UNIT



MACHINE BODY OPTIONS

Stainless steel (Cleanroom)



PRESSURE REGULATOR

HTF pressure control



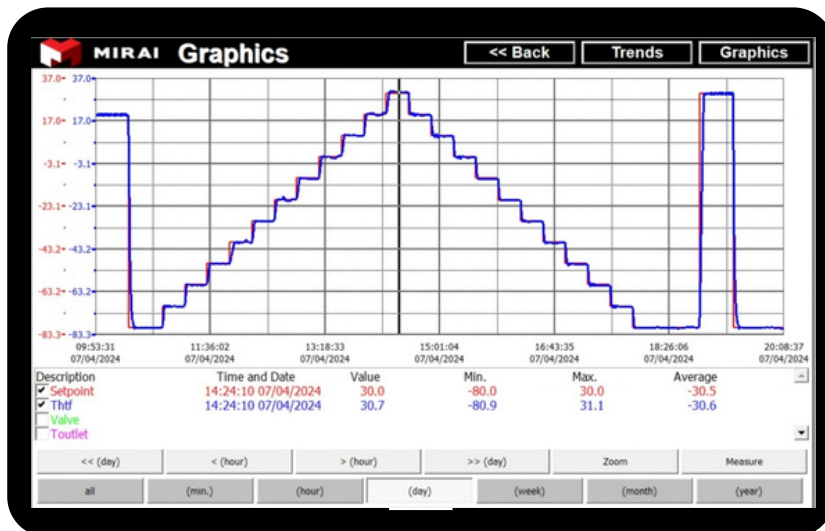
MONITORING THE QUALITY OF THE ELECTRICAL CONNECTION AND THE CONDITION OF CIRCUIT BREAKER

TESTS

The following section focuses on the various tests of the **MIRAI XM CRYO 20** machine, which are very important and decisive for use in various applications in different markets. Temperature accuracy and machine control are very important aspects in selecting the right machine for production.

PROCESS CONTROL ACCURACY TEST

This screenshot from the machine's control system screen shows the results of a heat-up and cool-down process with high-precision temperature control, at 10 °C intervals every 20 minutes. This screenshot demonstrates that the temperature control accuracy of the **MIRAI XM CRYO 20** is very precise.

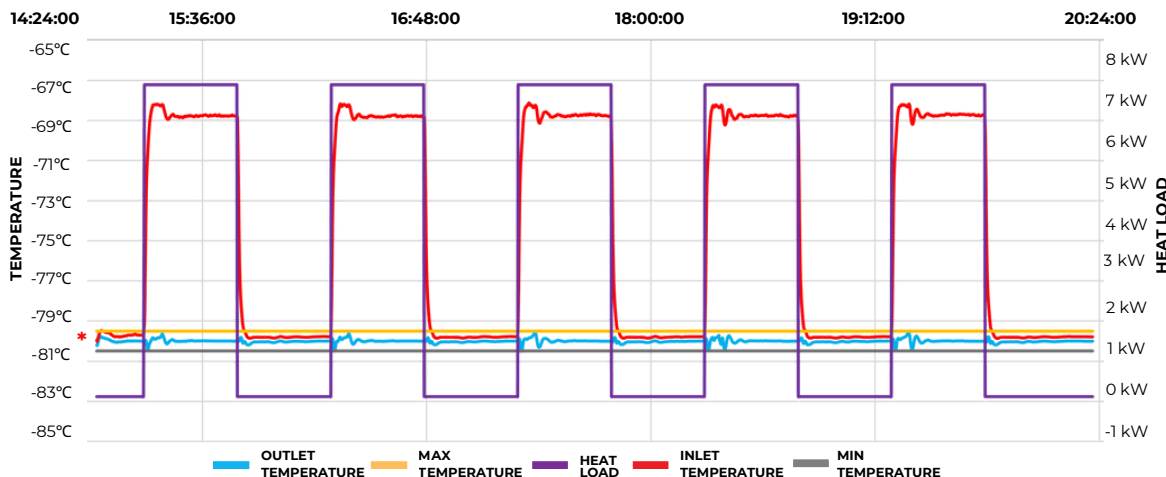


CHANGING LOAD TEST

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 °C**.

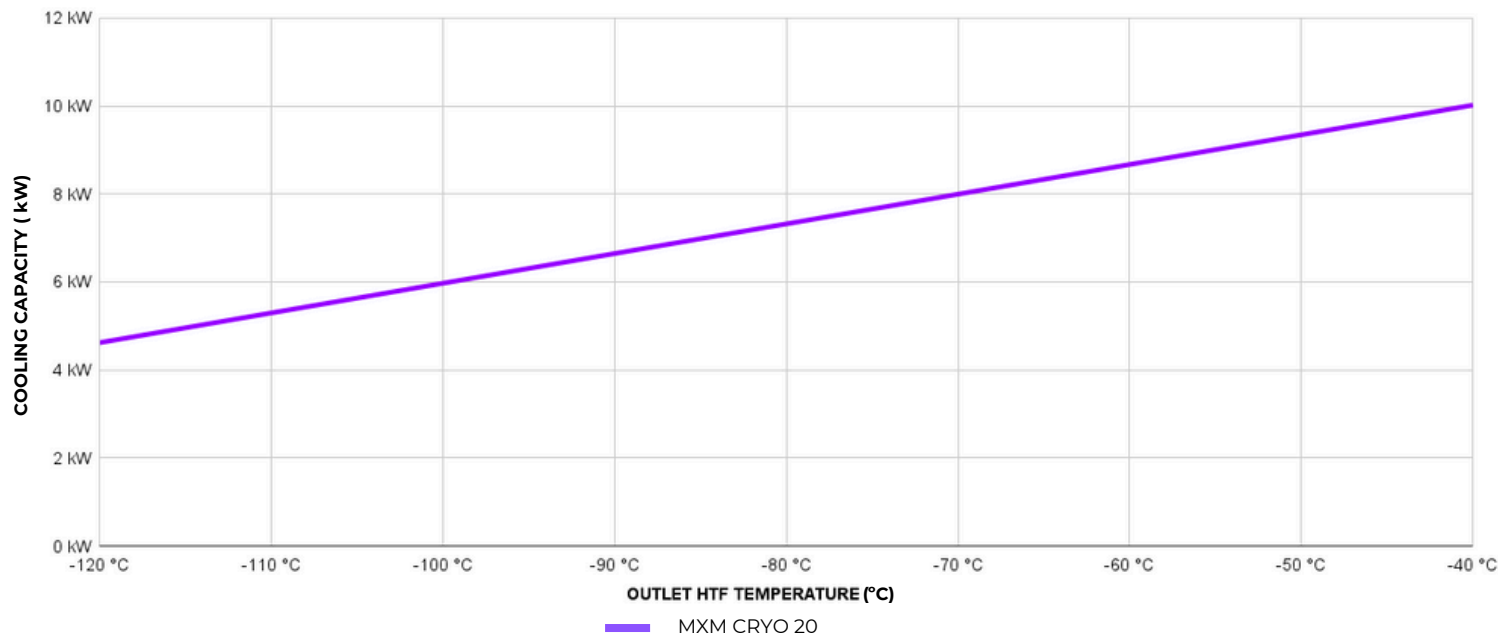
Above the graph is the time interval when the test started and ended, how long the loads were measured for.

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



COOLING CAPACITY

Cooling capacity of the **MIRAI XM CRYO 20** over a temperature range of -40 °C to -120 °C. At cooling water temperature +10 °C.



SPECIFICATIONS

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

TECHNICAL DATA

MIRAI XM CRYO 20

Cooling method	Air cycle
Heating method	Electrical heater
Temperature range ^{*1}	-120...+80 °C
Rated motor power (kW)	20
Compressor	Mirai Turbo-compressor
Refrigerant	Natural air (R729)
Nominal cooling capacity ^{*2}	7.7
Temperature accuracy under changing load	±0.5 °C
Temperature accuracy after reaching setpoint	±0.02 °C

HTF PARAMETERS

HTF tank volume, l	Various options on customer request
Inlet pressure (bar) ^{*3}	On customer request
Max outlet pressure (bar) ^{*1}	10
Nominal/maximum allowed pressure drop (bar) ^{*1}	0.2/10
Min HTF flow (l/min)	Depending on customer process ^{*3,4}
Nominal HTF flow (l/min) ^{*1,2}	29
Max HTF flow (l/min)	72
HTF connection	3/4" NPT

WATER COOLING

Water connection	1" NPT (Other on request)
Nominal pressure drop, bar	1
Max allowed pressure on water inlet, bar	10
Cooling water temperature range on inlet	+6...+30 °C (other on request)
Mass flow min (kg/h)	4000
Mass flow nominal (kg/h) ^{*2}	5000
Mass flow max (kg/h)	6000
Water quality	See specification ^{*5}

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 REQUIREMENTS

Power supply	~3 PE+N/3PE, 400VAC / 440VAC / 480VAC, 50/60Hz
Total consumption (kW)	25.5
Power consumption on the shaft in the cooling mode (kW)	20
Heater power, (kW)	18
Pump power (kW)	2.2
Main circuit breaker	60A@400VAC, 60A@440VAC, 50A@480VAC

DIMENSIONS

Dimensions (HxLxW)	1787x600x1600 mm
Weight (kg)	950 (can vary depending on options)

OTHER REQUIREMENTS

Air/nitrogen requirements	6-10bar, -80 °C pdp, 20lpm ^{*6}
Installation room requirements	+5...+35 °C, RH 10-80% no condensation, altitude up to 1000m

*1 - depending on the HTF used.

*2 - HTF - Frigoltherm X-T9-A, HTF setpoint -80 °C, HTF volume flow 29 l/min, water temperature +10 °C, water/glycol composition – pure water, direct connection heat load to machine, pressure drop on heat load <20kPa.

*3 – If customer equipment located above machine inlet/outlet - flow throttling on machine inlet is required to provide positive pressure on customer side. In case of throttling without regulation – minimum HTF flow calculated according to required pressure drop.

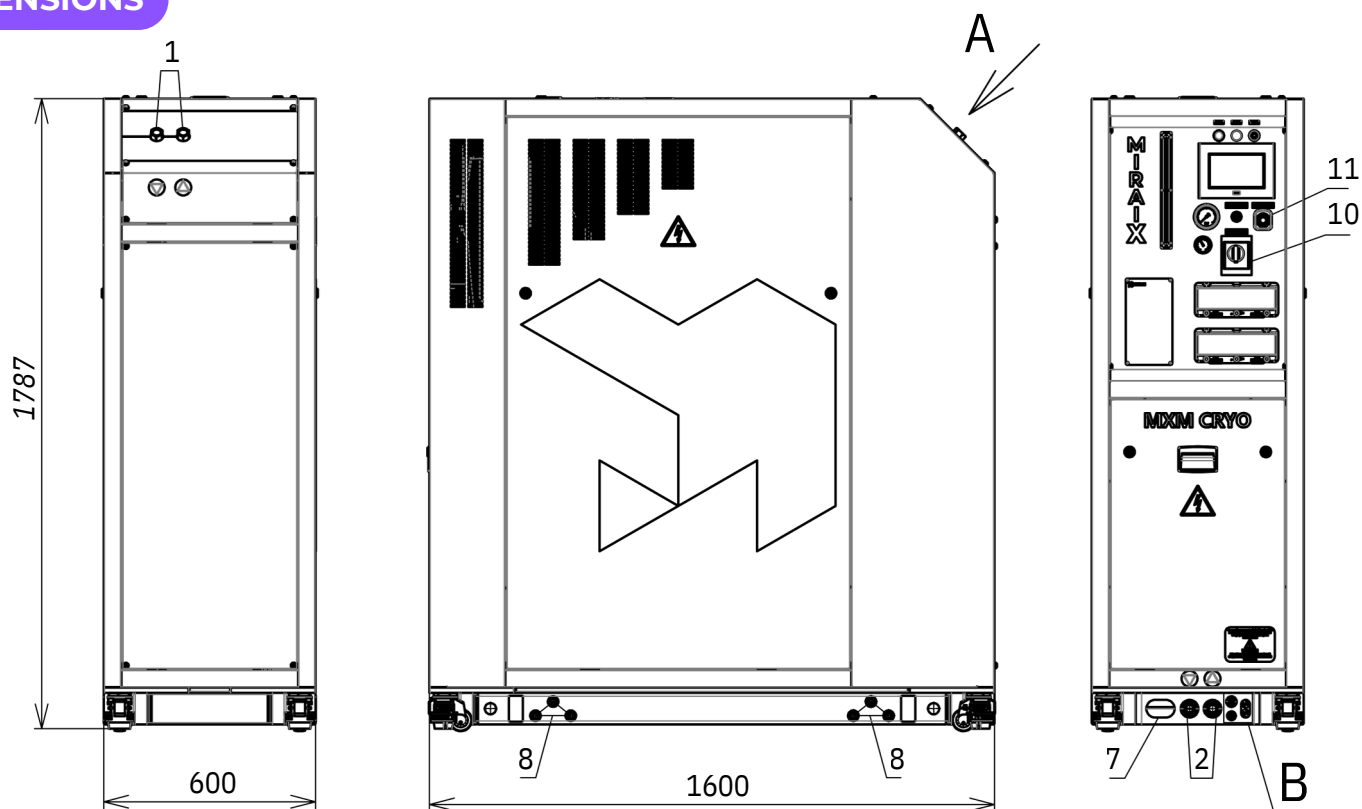
*4 – actual minimum value dependent on allowed temperature difference and cooling/heating capacity.

*5- 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.)

*6 - For more information contact MIRAI INTEX.

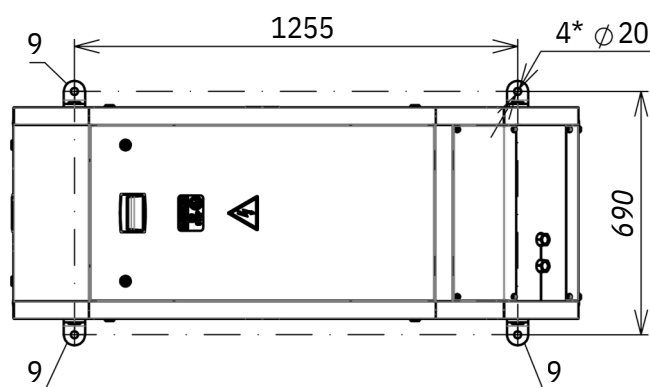
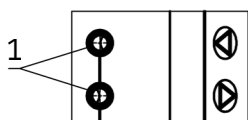
CM - Cooling machine

DIMENSIONS

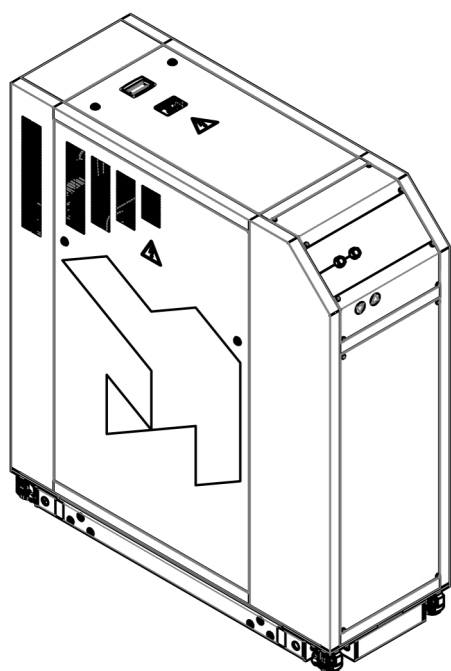
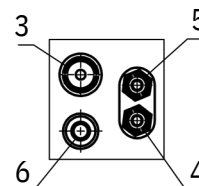


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A 45°



B



1. Heat transfer fluid (HTF), connection: 4x(3/4-14 NPT)
2. Cooling water/glycol mixture, connection: 2x(1-11.5 NPT)
3. Air/Nitrogen, Quick disconnect coupling DN 7.2 (Euro standard)
4. Cooling liquid drain, connection for plastic tube 8/6 mm
5. Condensate drain, connection for plastic tube 8/6 mm
6. Grounding point (PE) - M12
7. Cable entry point
8. Sliding place
9. Fixing place to floor (optionally with brackets, possibility of fixation from any side)
10. Main switch
11. Emergency stop button