

## MIRAI COLD 30 CWT

**MIRAI Cold 30 CWT** - operates in a closed cycle configuration with air working indirectly inside of the refrigeration system. Closed cycle machines are most used for process cooling applications such as:

- » process cooling
- » chemical industry
- » freeze-drying.

### ADDITIONAL HEAT EXCHANGER

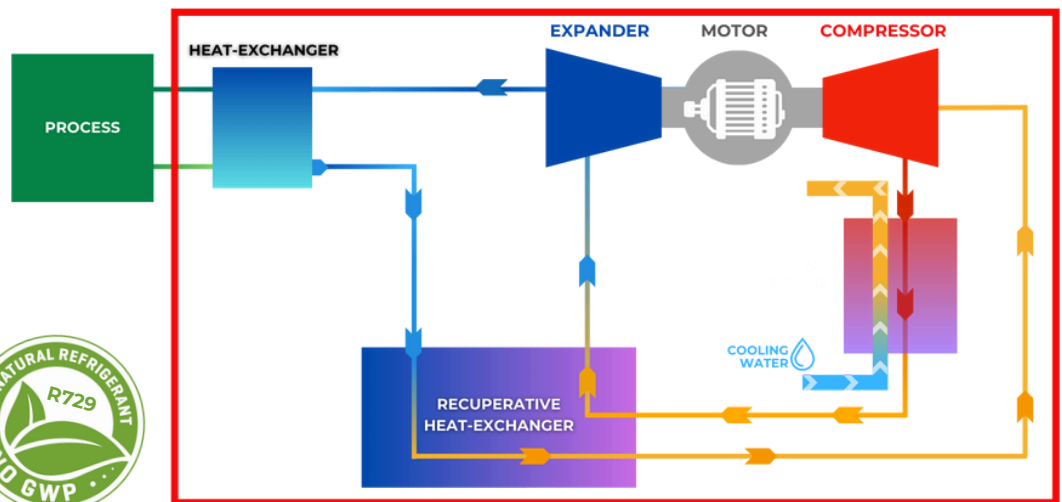
Our closed cycle machines are supplied with an additional heat exchanger. With use of industry-standard heat transfer fluids, MIRAI Cold machines are the ideal plug & play refrigeration solution for new systems as well as for retrofits.

### AIR-CYCLE TECHNOLOGY

The technology is based on the heating capability of air (R729) during compression and cooling down during the expansion process. Repetition of compression and expansion cycles allows to reach and maintain ultra-low temperatures down to -160°C.



### CLOSED CYCLE












### CERTIFICATION

MIRAI Cold 30 CWT is CE certified by respected European certification organization. CE certification covers:

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

### MAIN ADVANTAGES

- |   |   |   |
|---|---|---|
|  <p><b>OPERATING STABILITY</b></p> <ul style="list-style-type: none"> <li>• Stable continuous operation</li> <li>• Stable loads on cooling water and power grid</li> </ul>              |  <p><b>TEMPERATURE STABILITY</b></p> <ul style="list-style-type: none"> <li>• Frequency inverter allows maintaining 0.5 K accuracy</li> </ul>                            |  <p><b>ENERGY EFFICIENCY</b></p> <ul style="list-style-type: none"> <li>• Energy recovery</li> <li>• Automatic RPM control</li> </ul>   |
|  <p><b>REDUCED OPERATING COSTS</b></p> <ul style="list-style-type: none"> <li>• Long equipment lifecycle</li> <li>• Low maintenance</li> </ul>  |  <p><b>NO VIBRATION OR NOISE</b></p> <ul style="list-style-type: none"> <li>• Turbo-compressor design reduces noise and vibrations</li> </ul>                            |  <p><b>SAFE SOLUTION</b></p> <ul style="list-style-type: none"> <li>• No chemically active substances</li> <li>• No risk of fire or explosion</li> </ul>                                      |
|  <p><b>AIR AS REFRIGERANT</b></p> <ul style="list-style-type: none"> <li>• 0 GWP, 0 ODP, and 0 TFA</li> <li>• Environmentally friendly</li> <li>• Refrigerant free of charge</li> </ul> |  <p><b>OIL-FREE</b></p> <ul style="list-style-type: none"> <li>• No oil in the system</li> <li>• Reduced maintenance costs</li> <li>• Reduced operation costs</li> </ul> |  <p><b>LEGISLATIVE COMPLIANCE</b></p> <ul style="list-style-type: none"> <li>• Compliance with all international standards / regulations</li> <li>• No special safety requirements</li> </ul> |



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

## TECHNICAL SPECIFICATIONS

### AIR CYCLE

TEMPERATURE RANGE	from -40°C to -110°C
NOMINAL REFRIGERATION CAPACITY	17.8 kW*
REFRIGERANT	Natural Air (R729)
COMPRESSOR	Mirai Turbo-Compressor (water-cooled)
MAXIMUM ROTATION SPEED	51 000 rpm
RATED MOTOR POWER	30 kW
COMPRESSOR OUTLET PRESSURE	5 bar

### COOLING WATER

COOLING WATER TEMPERATURE RANGE	from +6°C to +30°C**
COOLING WATER MASS FLOW RATE END-COOLER	from 3 000 to 8 000 kg/h
COOLING WATER MASS FLOW RATE MACHINE COOLING	1300 (3 300 if electrical enclosure connected to machine) kg/h
COOLING WATER MASS FLOW RATE INVERTER COOLING	2000 kg/h
MAXIMUM ALLOWED PRESSURE ON WATER INLET	10 bar
COOLING FLUID TEMPERATURE RANGE	from -10°C (22°C**) to +50°C
CONNECTION SIZE END-COOLER IN   OUT	DN100   DN100
CONNECTION SIZE MACHINE COOLING IN   OUT	DN32   DN32

### GENERAL TECHNICAL SPECIFICATION

ACOUSTIC SOUND PRESSURE, AT A DISTANCE OF 1 M FROM <b>CM</b>	Maximum 73 dB
CONTROL PANEL	7" color touch screen display, data record, temperature control
CONTROL SYSTEM	KEB system compatible with digital communication protocols ProfiNET, EtherCAT, EtherNET/IP, and Powerlink, another protocols are on request.
SAFETY PROTECTION	High pressure protection, water supply cut-off protection, over-current protection, high temperature protection, sensor failure protection
PIPING MATERIAL	Stainless steel
CASE MATERIAL	Steel
MACHINE (L x W x H)	150 x 194 x 230 cm (± 1.5 cm)
MACHINE WEIGHT	2 300 kg (± 50 kg)
TECHNICAL REQUIREMENTS FOR OPERATION	Ambient temperature limits in mechanical room +5°C to +35°C.
OPTIONAL ACCESSORIES	Remote monitoring system

**POWER REQUIREMENTS**

POWER SUPPLY	~3 PE+N, 400 V, 50 Hz
NOMINAL CURRENT	60 A
MAXIMUM CURRENT	80 A
TOTAL POWER	33 kW

**HEAT TRANSFER FLUID**

MAINTAINED HTF TEMPERATURE***	from -40 °C to -110 °C***
CONNECTION SIZE HTF IN   OUT	DN50   DN50
MAXIMUM ALLOWED PRESSURE ON HTF INLET	6 bar
MAXIMUM ALLOWED PRESSURE DROP	20 kPa

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\* At set temp -40°C and cooling water temp. +6°C

\*\* approximate temperature (in cases of separate connection of the cooling liquid to the electrical cabinet), which should not be below the dew point at the air temperature at the installation site of the electrical cabinet, in order to avoid the appearance of condensation on the cooling surfaces

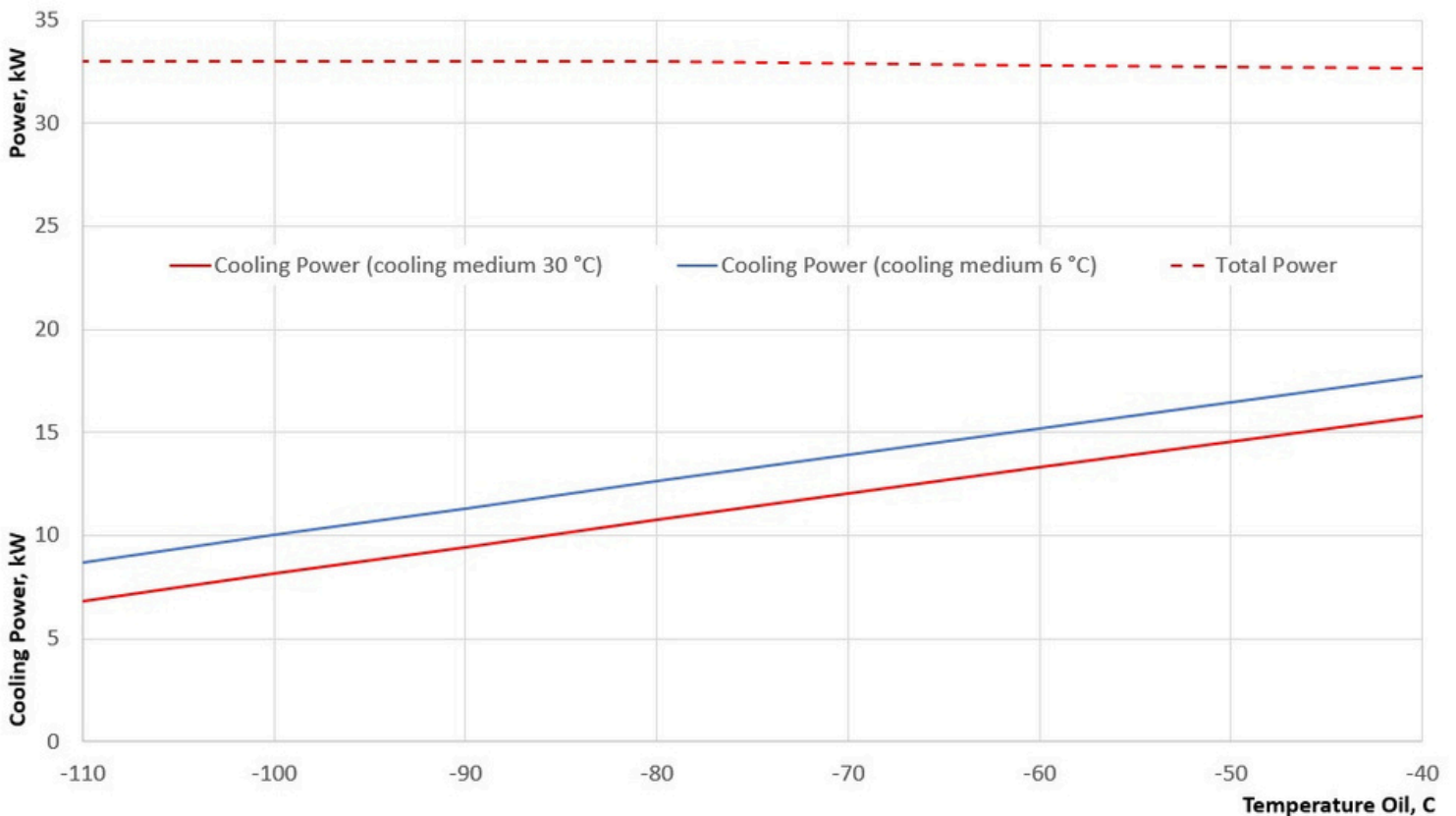
\*\*\* range depends on heat transfer fluid (HTF)

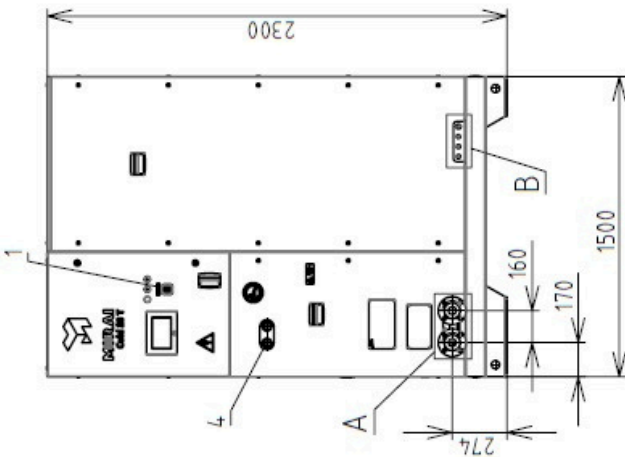
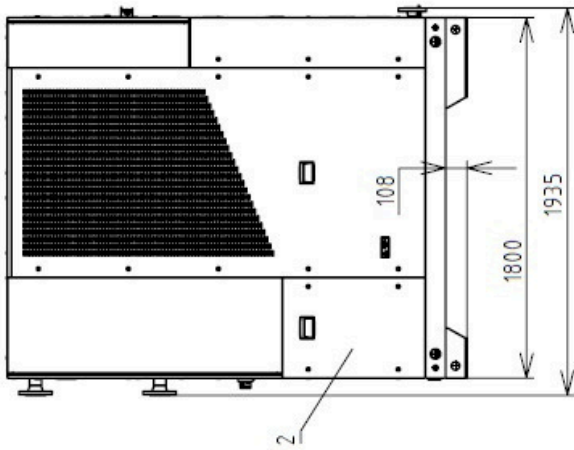
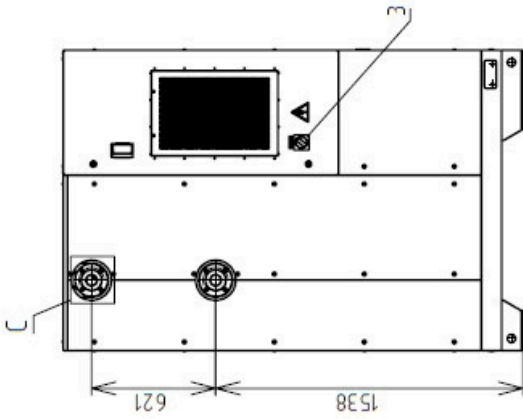
**CM** – Cooling machine

**COOLING CAPACITY**

Cooling capacity of MC 30 C/W/T , at an inlet water temperature of 6°C and 30°C

*Data may differ depending on application design and specific operation conditions unable to predict.*



**DIMENSIONS**


- 1 - EMERGENCY STOP BUTTON
- 2 - ELECTRICAL CONNECTIONS
- 3 - POWER SWITCH
- 4 - PRESSURE GAUGE

