MIRAI 150 CWT

MIRAI Cold 150 T - 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:

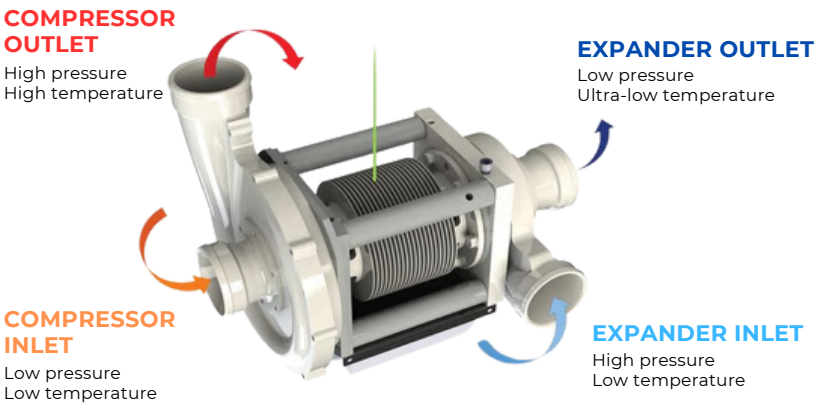
- process cooling
- chemical industry
- solvent recovery.

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



CERTIFICATION

MIRAI Cold 150 T is CE certified by respected European certification organization. CE certification covers:

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

MAIN ADVANTAGES

ENERGY EFFICIENCY
- Energy recovery
- Automatic RPM control

TEMPERATURE STABILITY
- Frequency inverter allows maintaining 0.5 K accuracy

NO VIBRATION OR NOISE
- Turbo-compressor design reduces noise and vibrations

REDUCED OPERATING COSTS
- Long equipment lifecycle
- Low maintenance

OIL-FREE
- No oil in the system
- Reduced maintenance costs
- Reduced operation costs

SAFE SOLUTION
- No chemically active substances
- No risk of fire or explosion

AIR AS REFRIGERANT
- 0 GWP, 0 ODP, and 0 TFA
- Environmentally friendly
- Refrigerant free of charge

OPERATING STABILITY
- Stable continuous operation
- Stable loads on cooling water and power grid

TECHNICAL SPECIFICATIONS

AIR CYCLE

TEMPERATURE RANGE	from -40 °C to -160 °C
NOMINAL REFRIGERATION CAPACITY	77,85 kW*
REFRIGERANT	Natural Air (R729)
COMPRESSOR	Mirai Turbo-Compressor (water-cooled)
MAXIMUM ROTATION SPEED	45 000 rpm
RATED MOTOR POWER	150 kW
COMPRESSOR OUTLET PRESSURE	16 bar

COOLING WATER

COOLING WATER MASS FLOW RATE END-COOLER	from 24 000 to 36 000 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
PRESSURE DROP ON WATER SIDE BETWEEN RM INLET AND OUTLET, MAXIMUM	20 kPa (END-COOLER) | 150 kPa (MACHINE COOLING) | 300 kPa (INVERTER COOLING)
MAXIMUM ALLOWED PRESSURE ON WATER INLET	6 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	Ø13 | Ø19

GENERAL TECHNICAL SPECIFICATION

ACOUSTIC SOUND PRESSURE, AT A DISTANCE OF 1 M FROM RM	Maximum 80 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
SAFETY PROTECTION	High pressure protection, water supply cut-off protection, over-current protection, phase failure protection, high temperature protection, sensor failure protection
PIPING MATERIAL	Stainless steel
CASE MATERIAL	Steel
MACHINE | ELECTRICAL CABINET DIMENSIONS (L x W x H)	229 x 296 x 193 cm(± 1.5 cm) | 66 x 136 x 211 cm (± 0.5 cm)
MACHINE | ELECTRICAL CABINET WEIGHT	4 710 kg (± 100 kg) | 500 kg (± 20 kg)
TECHNICAL REQUIREMENTS FOR OPERATION	Ambient temperature limits in mechanical room +5 °C to +35 °C or canopy in case of external installation
	Connection with a cooling water circuit, pressure 10 barg
OPTIONAL ACCESSORIES	Remote monitoring system

POWER SUPPLY

POWER SUPPLY	~3 PE, 400 V, 50 Hz
NOMINAL CURRENT	280 A
MAXIMUM CURRENT	400 A

HEAT TRANSFERFLUID

MAINTAINED HTF TEMPERATURE***	from -40 °C to -160 °C***
CONNECTION SIZE HTF in | out	DN100 | DN100
MAXIMUM ALLOWED PRESSURE ON HTF INLET	2 bar

MIRAI Intex is not responsible for potential mistakes in the provided data.

***** At set temp -80 °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

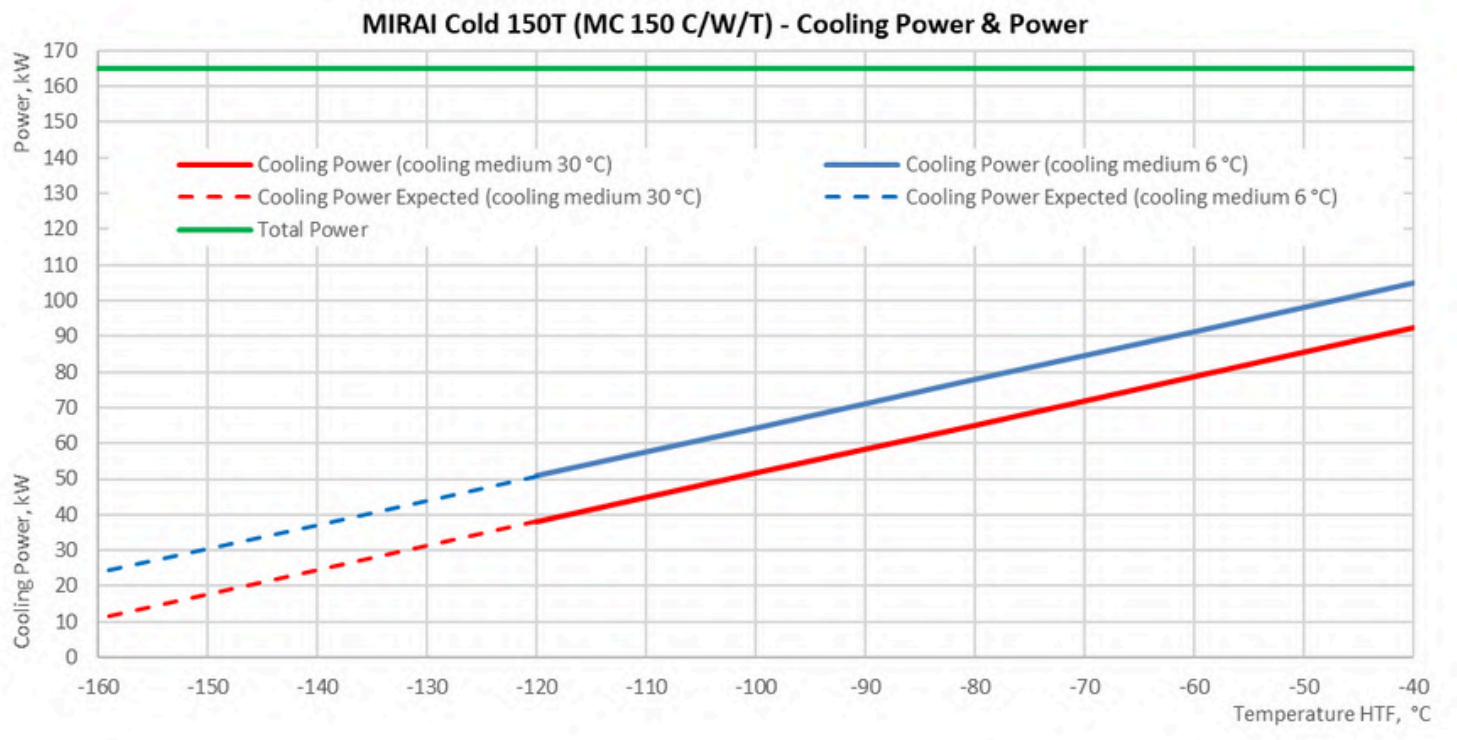
******* range depends on heat transfer fluid (HTF)

RM – Refrigeration machine

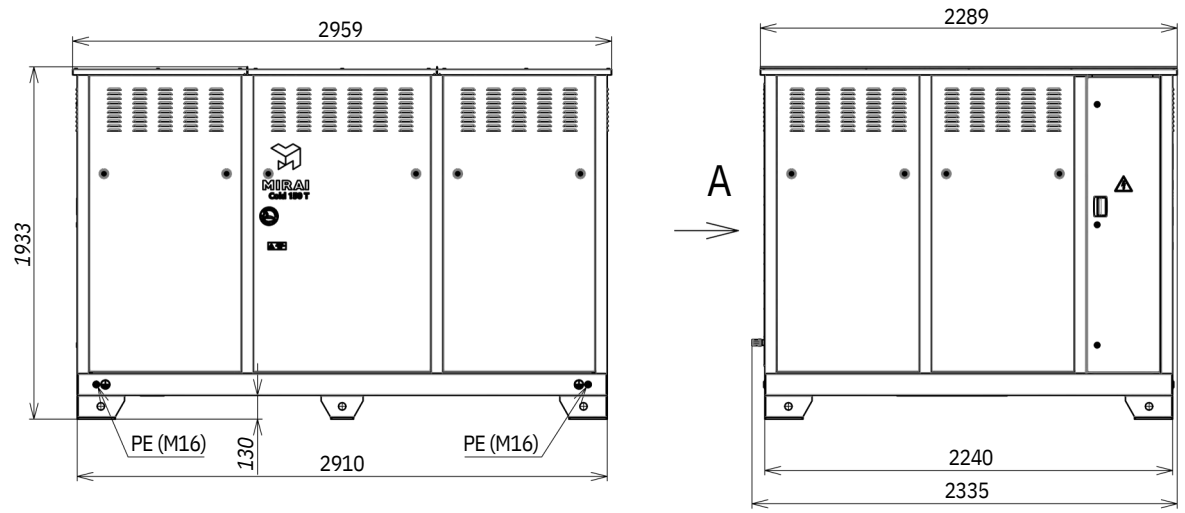
LEGISLATIVE COMPLIANCE
- Compliance with all international standards / regulations
- No special safety requirements

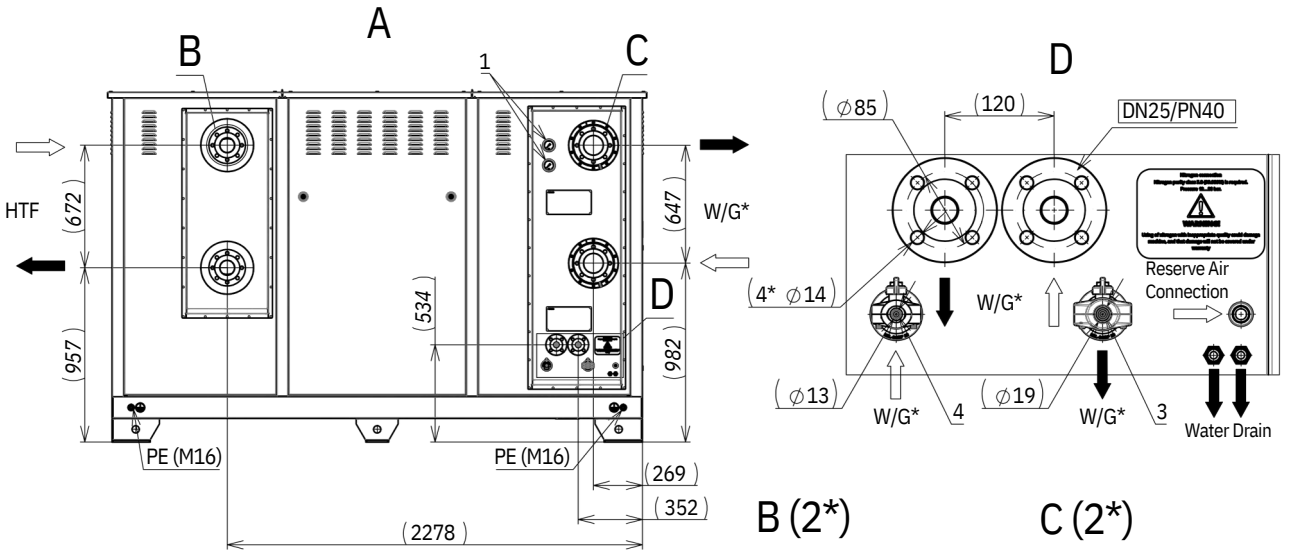
COOLING CAPACITY

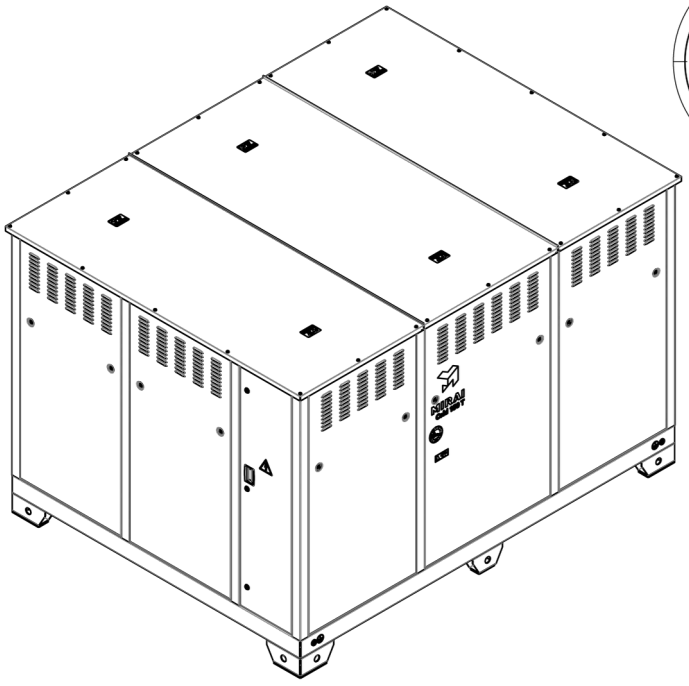
Cooling capacity of MC 150 C/W/T , at an inlet water temperature of 6°C and 30°C
Data may differ depending on application design and specific operation conditions unable to predict.

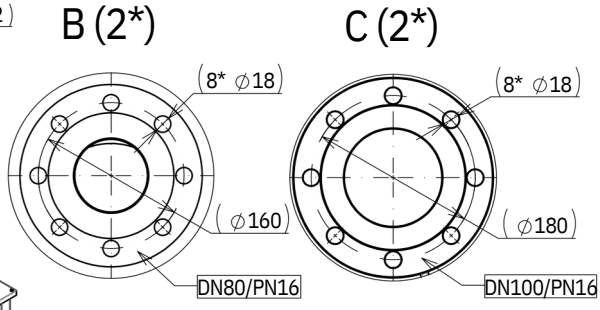


DIMENSIONS









* COOLING WATER /GLYCOL MIXTURE

INLET

OUTLET

1 - PRESSURE GAUGE
2 - ELECTRICAL CONNECTIONS
3 - NIPPLE FOR CONNECTING THE PUMP
4 - NIPPLE FOR CONNECTING AN ELECTRICAL CABINET

MC150 C/W/T