

PROPANE TURBO- COMPRESSOR

Advanced oil-free two-stage centrifugal compressor
developed to enhance the cooling industry



LOW INVESTMENT COSTS



LOW MAINTENANCE



LOW OPERATING COSTS



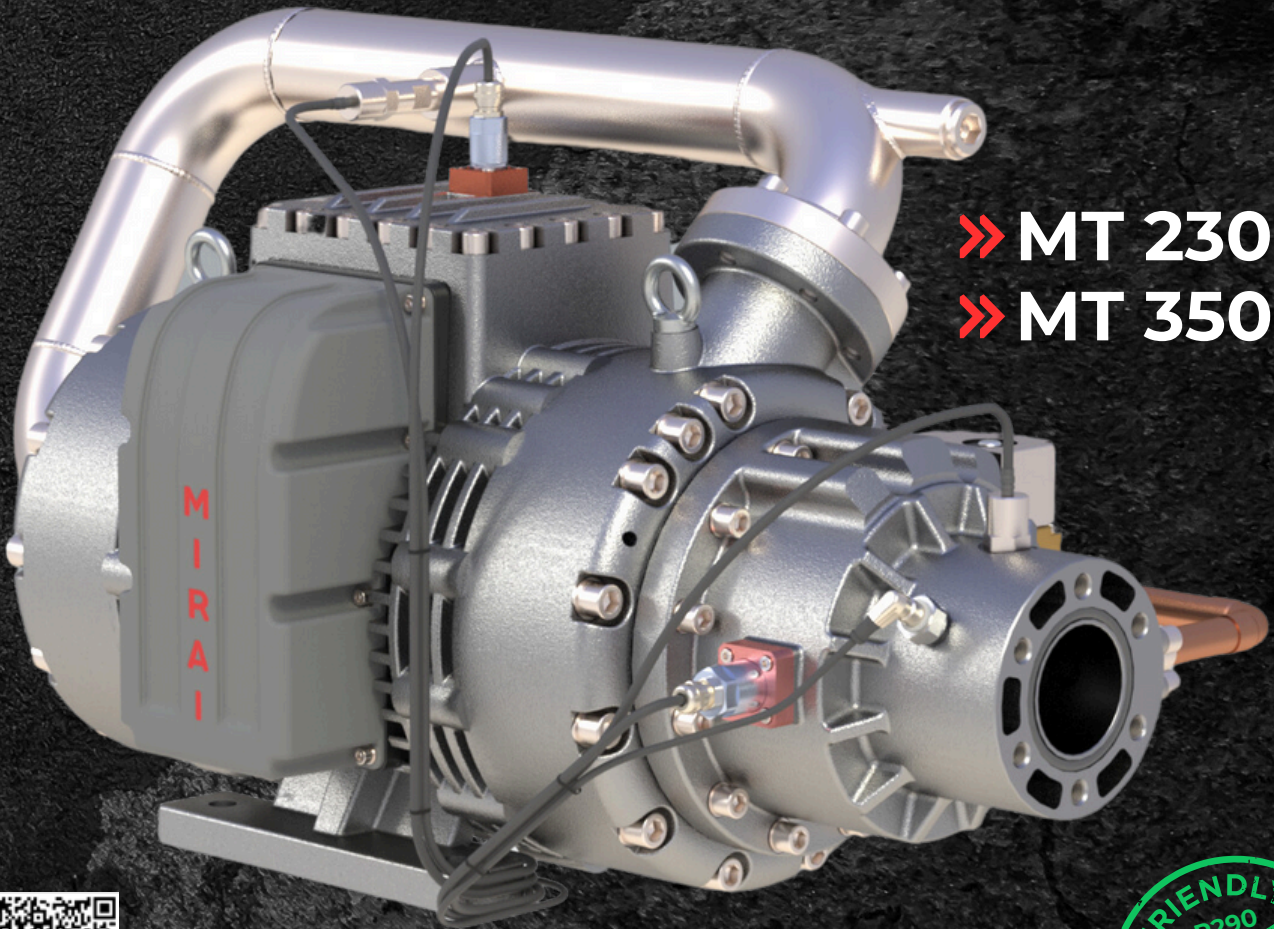
HIGH SUSTAINABILITY



HIGH EFFICIENCY



**ENVIRONMENTAL AND LEGAL
STANDARDS COMPLIANCE**



» **MT 230**

» **MT 350**



BENEFITS OF MIRAI PROPANE TURBO-COMPRESSOR

LOW INVESTMENT COSTS

- » Simple design with minimum of components and oil circuit absence.
- » Small geometric dimensions and low weight ensure ease and low cost of transportation and installation.
- » No additional sound insulation due to low noise and vibration level.
- » Low refrigerant costs (propane) and its availability.

LOW OPERATING COST, HIGH EFFICIENCY

- » No heat exchangers efficiency reduction due to absence of oil film formation.
- » No operational mechanical losses.
- » Excellent thermodynamic properties of R290 refrigerant.
- » High efficiency at partial loads (2-stage compression, IGV, bypass, frequency converter).
- » Low inrush current and motor energy consumption.

LOW MAINTENANCE, HIGH SUSTAINABILITY

- » Minimal moving parts, no friction components to replace or maintain.
- » More than 500 000 starts/stops cycles*.
- » No oil circuit maintenance or oil change.
- » No risk of abrasive particles or acids/hydroxides formation.
- » Smooth adjustment and no overheat during partial loads.
- » Designed for 20 years life-cycle with minimal maintenance.
- » Compressor is certificated with an IP54 rating against splashes.

**Provided by R&D department at MIRAI INTEX.*

ENVIRONMENTAL AND LEGAL STANDARDS COMPLIANCE

- » Natural refrigerant, GWP100 - 0.02** and ODP - 0.
- » Full legislation support even after 2050.

***Based on the Sixth Assessment Report adopted by the Intergovernmental Panel on the Climate Change.*

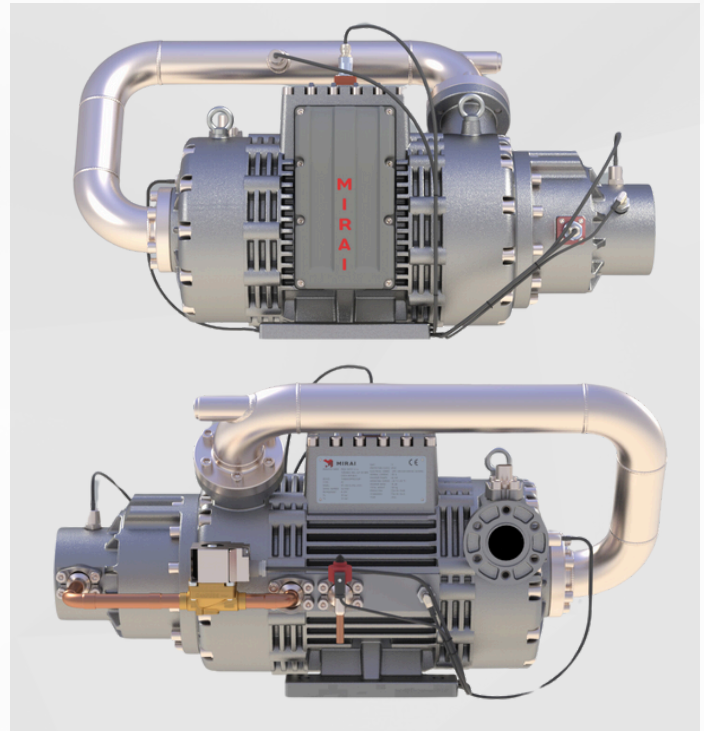
APPLICATIONS

- » **COMMERCIAL COOLING**
- » **INDUSTRIAL PROCESS COOLING**

Our propane turbo-compressor opens up new market opportunities for chiller manufacturers and end users.

R290 CHARGE

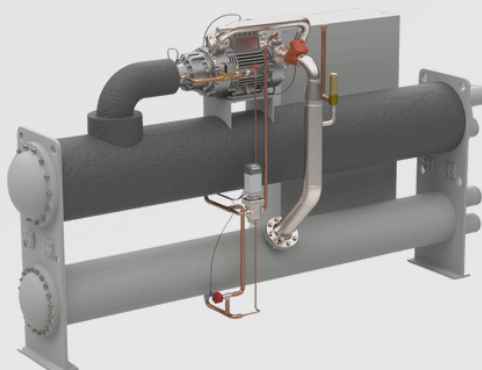
Proper design and placement allow for an **unlimited R290 charge**, according to EN378.



SUSTAINABLE DEVELOPMENT



With this innovative development, **MIRAI INTEX highlights the dedication to Climate Action as one of key goals of Sustainable Development.**



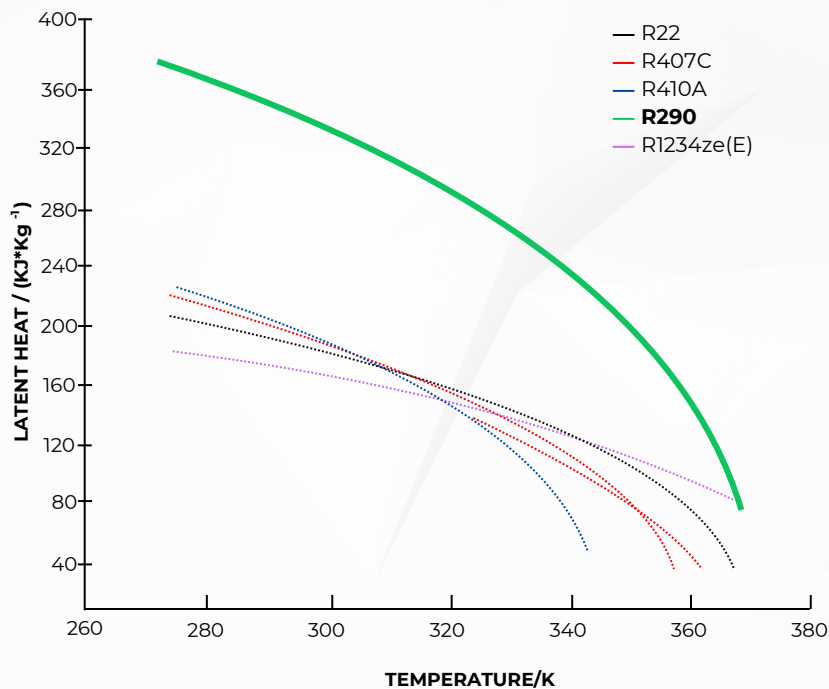
WATER-COOLED CHILLERS



AIR-COOLED CHILLERS

PROPANE R290 PROPERTIES

LATENT HEAT



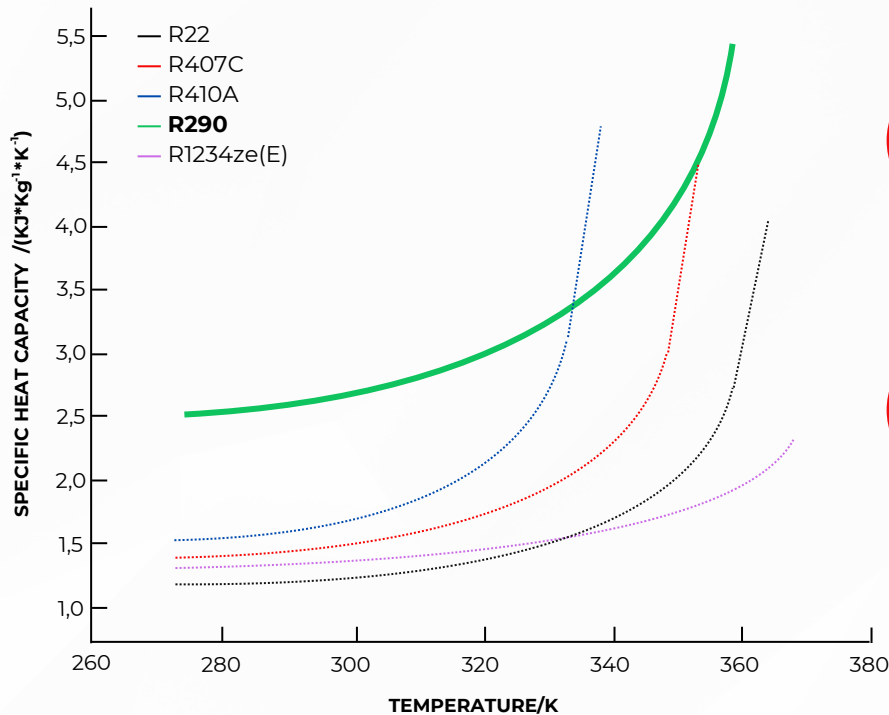
Source: https://www.researchgate.net/figure/Comparison-of-latent-heat-Colour-figure-can-be-viewed-at-wileyonlinelibrarycom_fig8_347795188

Comparison of the latent heat and specific heat capacity of refrigerants is critical when choosing one for compressors. These parameters directly affect the system's cooling efficiency and energy consumption.

A refrigerant with a higher latent heat and specific heat capacity, such as propane (R-290), absorbs and releases more heat during phase changes, allowing more heat to be transferred with a smaller amount of refrigerant. This results in higher cooling efficiency with less refrigerant charge, reducing compressor power consumption and extending compressor life.

Additionally, higher efficiency, smaller refrigerant charge with low Global Warming Potential make it an environmentally friendly and cost-effective choice for refrigeration systems.

SPECIFIC HEAT CAPACITY



Source: https://www.researchgate.net/figure/Comparison-of-latent-heat-Colour-figure-can-be-viewed-at-wileyonlinelibrarycom_fig8_347795188



EXTENDED WARRANTY

Free extended warranty in case of purchasing the optional full RMS.



MINIMAL SERVICE

Due to oil-free design there is no need for regular maintenance.

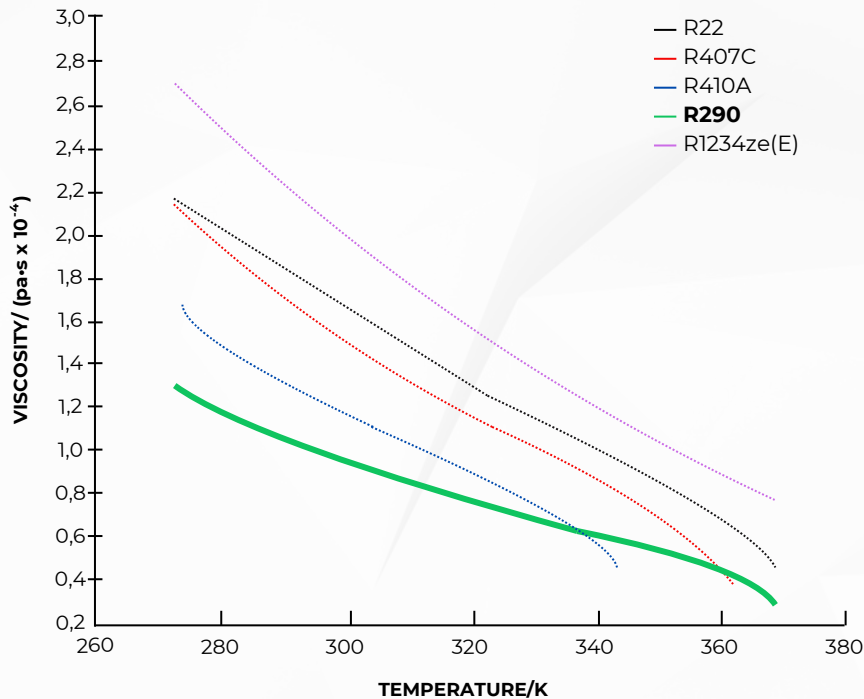


Watch the video



PROPANE R290 PROPERTIES

COMPARISON OF VISCOSITY

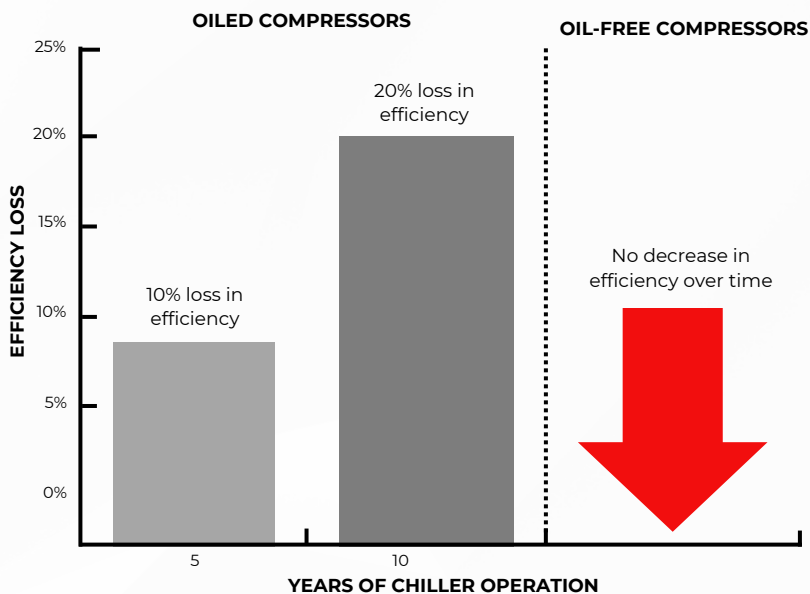


Source: https://www.researchgate.net/figure/Comparison-of-latent-heat-Colour-figure-can-be-viewed-at-wileyonlinelibrarycom_fig8_347795188

It is important to compare the viscosity of refrigerants in order to select one that will allow efficient flow without causing excessive resistance.

Propane (R-290) is an excellent choice due to its low viscosity. This results in a significant reduction in system pressure drop (dP), compressor power consumption and an increase in efficiency.

WHY OIL-FREE COMPRESSORS ARE BETTER*



*Source: Tsinghua University Study 2014

MAIN ADVANTAGES OF OUR OIL-FREE COMPRESSORS

- » **RELIABILITY**
- » **HIGH ENERGY EFFICIENCY**
- » **NO COMPRESSOR WEAR**
- » **NO PERFORMANCE LOSSES**

MIRAI turbo-compressors are completely OIL-FREE, meaning there is no performance degradation due to oil contamination.

» **OIL-FREE DESIGN:** Eliminates the risk of system contamination with oil, improving energy efficiency, reducing capital costs and minimizing service requirements. Eliminates the risk of failure due to oil mismanagement.



**EMERGENCY
STABILITY**



**ENERGY
EFFICIENCY**



**ENVIRONMENTALLY
FRIENDLY**



NO VIBRATION



RELIABILITY



OIL-FREE

CONSTRUCTION FEATURES

VIBRATION AND NOISE

- » The MIRAI INTEX compressor does not require balancing or calibration during standard operation. Bearings of the compressor are designed to last the lifetime of the compressor.
- » MT compressors includes minimal rotating parts, one of which is rotor, that rotates without friction or interaction with other components.

ELECTRICAL POWER SUPPLY AND REGULATION SYSTEM

- » In the MIRAI INTEX compressor all electrical parts are installed in a separate electrical cabinet***, which ensures stable operation in hot and humid climates.
- » Our compressor is certified with an IP54 rating against splashes.
- » Integration with the main chiller controller:
 - ProfiNet or EtherNet/IP protocols with an RJ-45 "Plug and Play" connection.
 - ModBus protocol via RS-485 module (alternative).
 - No additional transformer needed

*** Not supplied by MIRAI INTEX.



REMOTE MONITORING

Available remote monitoring system (RMS).

GAS-DYNAMIC BEARINGS

- » MIRAI INTEX has developed a new generation of gas-dynamic bearings, which have millions of operating hours, demonstrating their high efficiency and reliability. These bearings we used in our compressors.
- » The use of gas-dynamic bearings has significantly simplified the design of the compressor by eliminating electrical components, which increases the efficiency and sustainability of the compressor.
- » In addition, gas dynamic bearings consume no electricity to support their operation.



EMERGENCY STABILITY

Gas-dynamic bearings developed by MIRAI INTEX, ensure stability in case of power outages or sudden power failure.

INLET GUIDE VANES

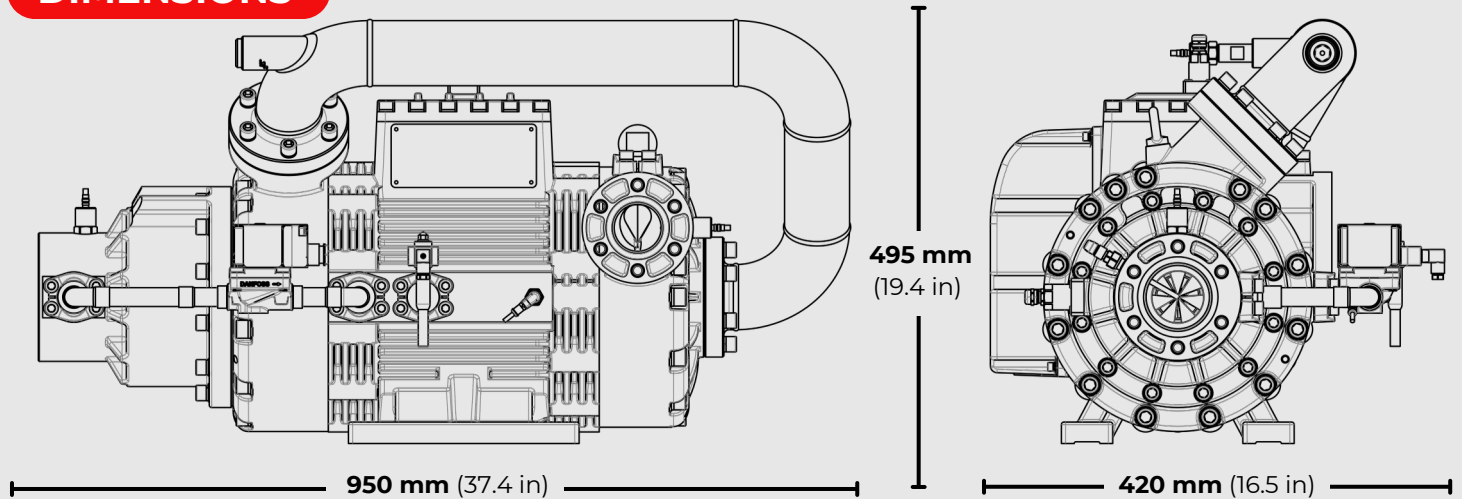
- » The MIRAI compressor controller regulates the bypass valve, manages the IGV, and ensures compressor protection and operational safety.
- » The chiller controller sets the power percentage for the MIRAI compressor controller.



EFFICIENT PART LOAD

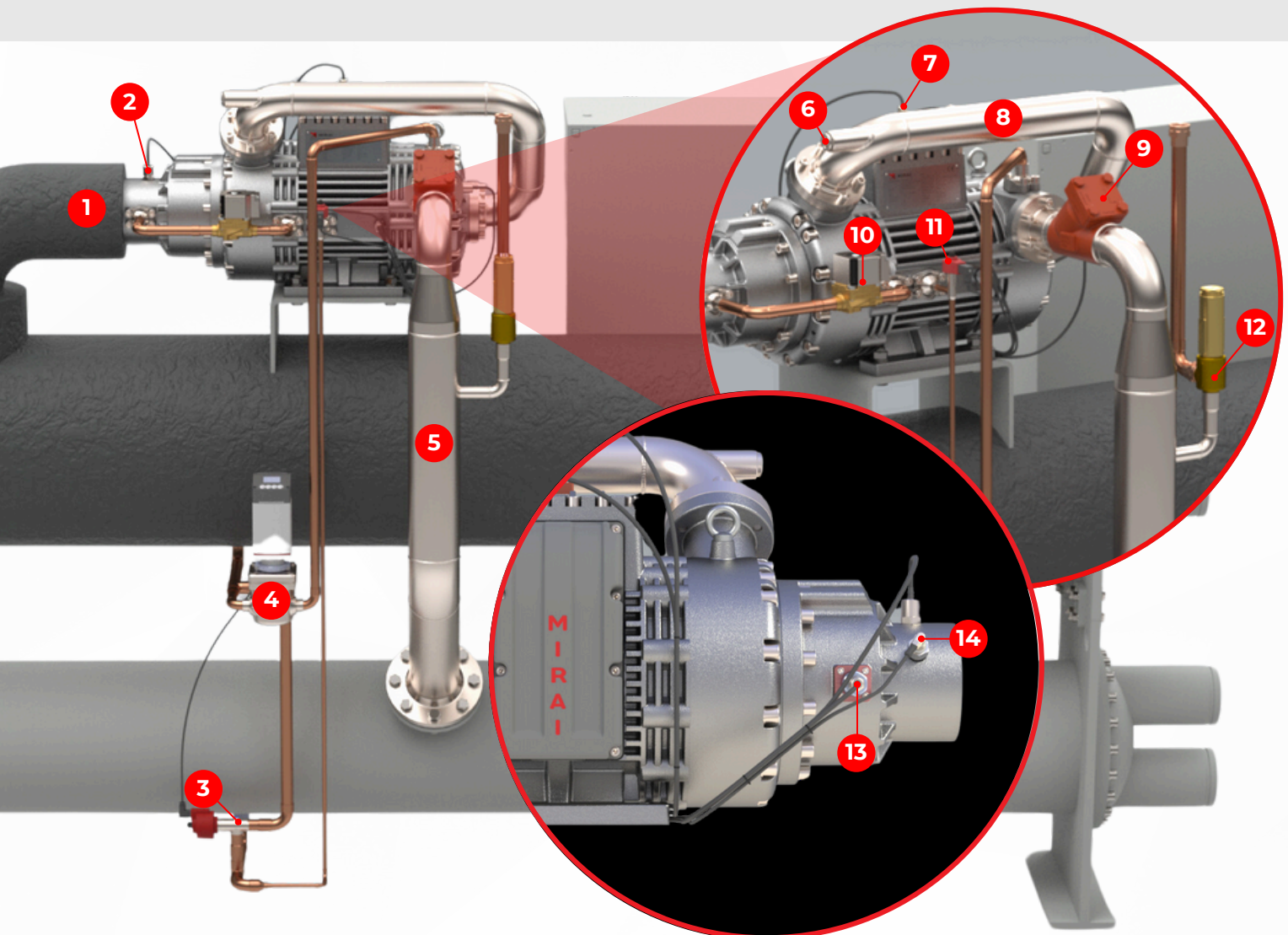
Thanks to the IGV (Inlet Guide Vanes), the MIRAI propane turbo compressors have an efficient, controlled operation in part load scenarios, resulting in energy savings.

DIMENSIONS



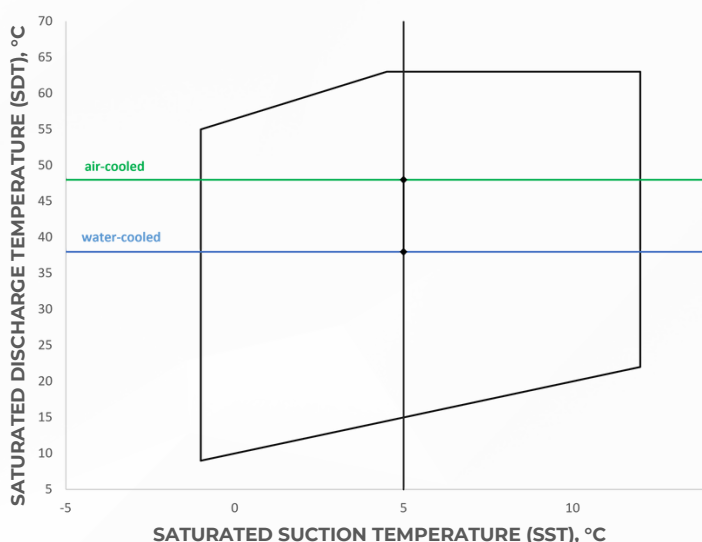
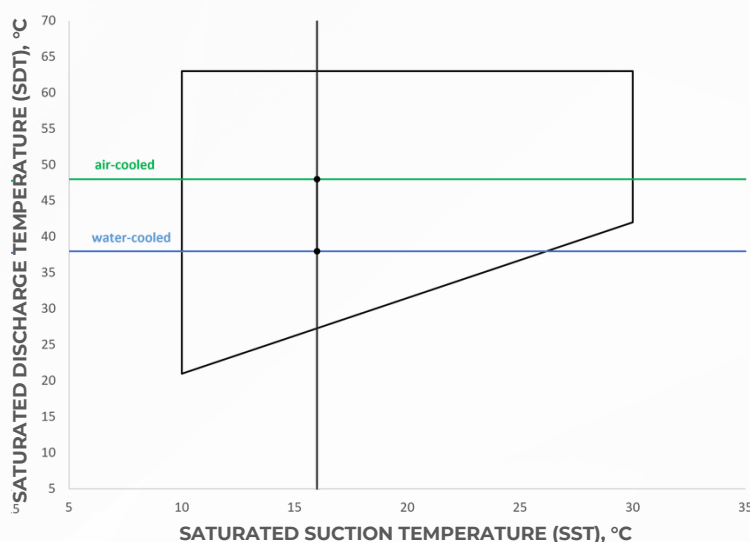
INSTALLATION

- | | | | |
|--------------------------------|-----------------------------------|--------------------------|------------------------------------|
| 1 PROPANE SUCTION | 5 PROPANE DISCHARGE | 9 CHECK VALVE | 13 IGV CONTROL |
| 2 INLET PRESSURE SENSOR | 6 ECONOMIZER CONNECTION | 10 START-UP VALVE | 14 INLET TEMPERATURE SENSOR |
| 3 EXPANSION VALVE | 7 MOTOR TEMPERATURE SENSOR | 11 MOTOR COOLING | |
| 4 BYPASS VALVE | 8 INTERSTAGE PIPELINE | 12 SAFETY VALVE | |



TECHNICAL DATA

MODEL	MT 230	MT 350
REFRIGERANT	R-290 (Propane)	
NOMINAL COOLING CAPACITY	65 tons / 230 kW	100 tons / 350 kW
SCOPE OF APPLICATION	Air or Water-Cooled chillers	
MOTOR POWER	60 kW	
VOLTAGE	~3 PE, 400 V/440V/460V/480V , 50 Hz/60 Hz	
WEIGHT	155 kg (372 lbs)	
DIMENSIONS (DxHxW)	950 mm (37.4 in) x 495 mm (19.4 in) x 420 mm (16.5 in)	
LOADING CAPABILITIES RANGE (MIN/MAX%) AT NOMINAL POINT	30 %-100 %	
MAX SATURATED DISCHARGE TEMPERATURE	63°C	63°C
MAX SATURATED SUCTION TEMPERATURE	12°C	30°C
MIN SATURATED SUCTION TEMPERATURE	-1°C	10°C
MAX ALLOWABLE LIFT ON COMPRESSOR	1715 kPa	1630 kPa
MIN REQUIRED LIFT ON COMPRESSOR	160 kPa	225 kPa
INVERTOR COOLING	Air / Water	
COMPRESSOR COOLING	Liquid propane	

OPERATION RANGE

MT 230

MT 350
OPTIONS

REMOTE MONITORING

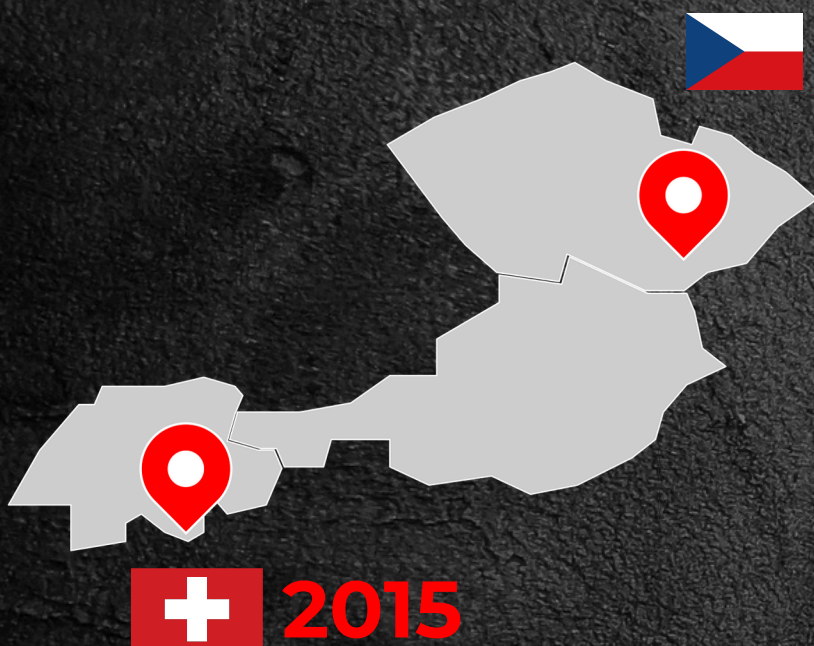
**PREPARATION FOR THE ECONOMIZER
CONNECTION**

BYPASS VALVE

**SET OF CONNECTING GASKETS, FLANGES, CABLES,
EMC FILTER, INPUT CHOCK**

ABOUT MIRAI

MIRAI INTEX is a leading provider of innovative air cycle refrigeration solutions, dedicated to delivering cutting edge technology under the MIRAI Cold brand, with a focus on sustainability and performance. With a track record of excellence and a commitment to customer satisfaction, MIRAI INTEX continues to push the boundaries of what is possible in the field of refrigeration and introduces the new product line for process cooling, MIRAI X CRYO, meeting the stringent requirements of various industry applications. The latest innovation, the MIRAI Propane Turbo-Compressor, was developed to enhance the cooling industry and has already strongly resonated with the market.



2017-NOW

Brno, Czech Republic

- » Headquarters
- » Manufacturing Facility
- » Service Support
- » Testing Facility
- » Research & Development



2015

Founded in
Schwitzerland

With our latest innovative development, MIRAI INTEX reinforces its commitment to Climate Action, aligning with one of the key goals of **Sustainable Development**.



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