

## Air cooled water chiller

MRM industrial grade water chillers are available in cooling capacity range from 16 to 125 tons, with water working temperatures range from 32°F to 77°F and suitable for indoor or outdoor installation. The standard configuration is design for an ambient temperature up to 113°F (for higher temperatures, consult the MRT range with R134a gas).

According to the model, these units are equipped with up to four hermetic rotary Scroll compressors in one or two refrigeration circuits with ozone-friendly refrigerant R410A, axial-flow fans and microchannel full-aluminium condenser. The MRM range offers a large number of model variations that covers all process cooling requirements and climate conditions.



### Versions:

- **Fan type**
  - **AC:** on-off asynchronous fans
  - **EC:** brushless EC variable speed fans
  - **EH:** high pressure EC fans, suitable for ducting indoor installation
- **Evaporator type**
  - **BP:** brazed-plate
  - **S&T:** shell-and-tube
- **Water configuration type**
  - **N:** no pumps and tanks
  - **M:** with evaporator pump only
  - **P:** with tank and process pump
  - **S:** with tank, evaporator pump and process pump



Scroll & Tandem-Scroll

## Advantages

- **Maximum efficiency and reliability**, both at full load and part loads, by using multi-circuit and multi-compressor systems
- **Accurate multi-step management of the cooling capacity in multi compressors/circuit models**, in order to precisely meet the most demanding needs of the industrial applications
- **Wide operating ambient temperature range**, from -13°F up to 113°F, granting high performance in any weather location
- **Operating versatility and high flexibility of installation** thanks to a large number of variations and accessories available
- **Plug&play and modular design** for an easy installation and future expandability, thanks to the integrated hydronic group version
- **Reduced refrigerant volume** and easy to clean aluminum microchannel condensers
- **Last generation microprocessor control** with touch screen interface and ready to be connected to a digital supervisor system (MiND™)
- **Easy service** thanks to the recording in the local memory of the operating status, working conditions and alarm history

## Technical features:

### Chiller system:

- Scroll & Twin Scroll Compressors;
- 1 or 2 refrigerant circuits;
- R410A refrigerant;
- High and low pressure gauges.

### High efficiency microchannel aluminium condenser

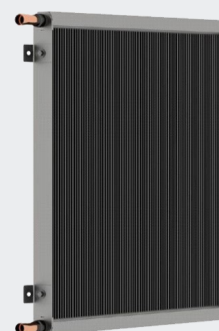
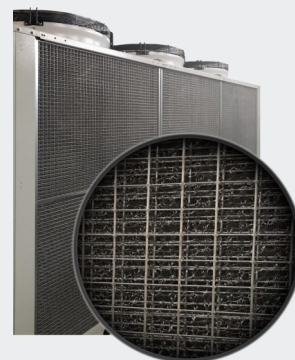
- Higher efficiency and performances
  - heat exchange from +20% to +40% compared with finned tube models;
  - reduction of air-side pressure drops;
  - lower weight and reduced dimensions;
  - thinner profile than finned tube models;
  - 60% lower weight compared to finned tube models.
- Proven reliability
  - robust design and easy to clean with pressurized water;
  - process and materials proven over time;
  - engineered with long-life aluminium alloys.
- Low cost
  - lower refrigerant charge;
  - optimized material cost.
- Factory equipped with the standard pollen filter
  - Galvanized metal frame and protective grille;
  - Aluminium filament filter material.

### Fan type

- **AC:** asynchronous on-off fans
  - For temperatures greater than 5 °F (23 °F with MRM402 and MRM404)
- **EC:** brushless fans with variable speed
  - For ambient temperatures greater than -13 °F
- **EH:** high head EC fans
  - Suitable for ducting on indoor installations (heat recovery)
  - For ambient temperatures greater than -13 °F

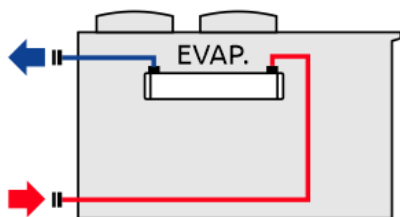
### Evaporator

- **BP:** brazed plates
  - all configurations available;
  - SS316L copper brazed plates;
  - oversized exchange surface;
  - reduced dimensions and high-efficiency herringbone pattern.
- **S&T:** shell & tube
  - available with N and M configurations only;
  - cleanable;
  - gas and water low approach;
  - carbon steel body and copper pipes;
  - anti-corrosion extra thick design.



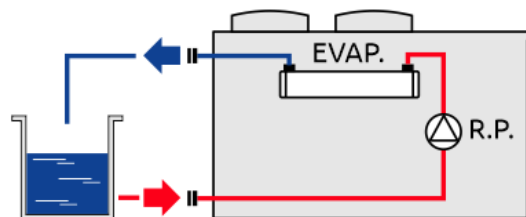
## Technical features:

- Self water-filling
- Chilled-water storage tank pressurized and insulated
- Galvanized steel frame and panels, painted with polyester powders
- Stainless steel pumps



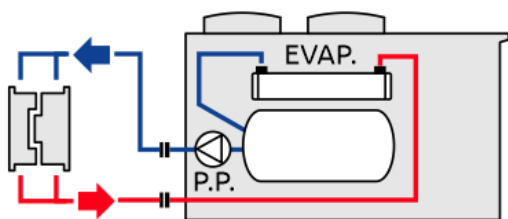
**N:** without pumps and tank

Process pumping stations available on request for GPP/GPV series, with and without inverters, recirculating pumping stations and its storage tanks.

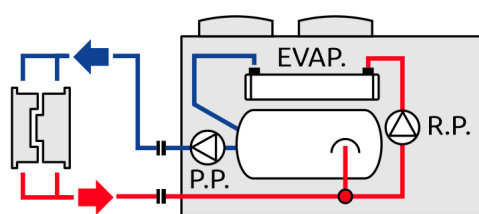


**M:** with evaporator's pump only

Process pumping stations available on request for GPP/GPV series, with and without inverters.



**P:** with tank and process pump

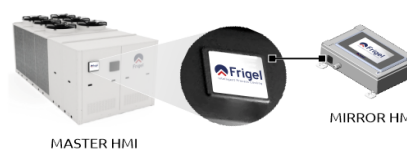


**S:** with tank, recirculating and process pumps

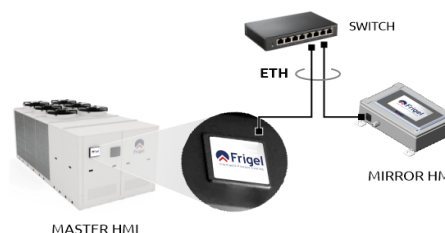
## Options

- Cold Climate for no glycol systems when  $T_{amb} < 32^{\circ}\text{F}$
- Electrical cabinet heater for glycol systems when  $T_{amb} < 50^{\circ}\text{F}$
- Remote control with double display
- Y filters
- Optional feet for ground support
- Electronic thermostatic valve (included on MRM402 and MRM404 models)

### Mirror HMI Remote panel



**Direct connection**



**Connection through access point**

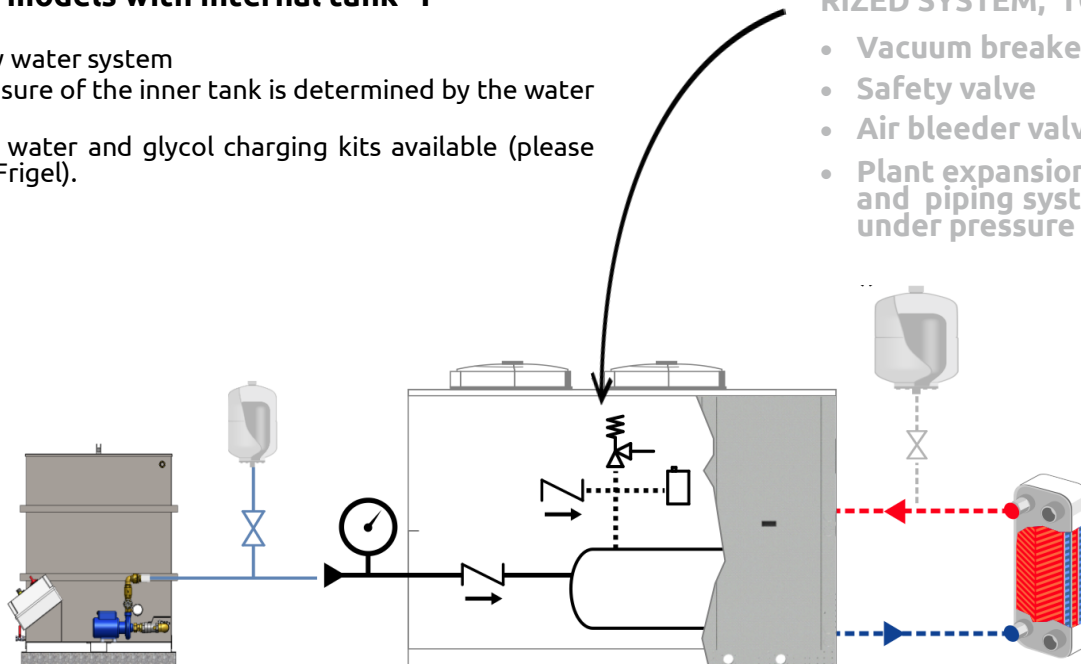
## Hydraulic supply

### Standard models with internal tank "P"

- Filling by water system
- The pressure of the inner tank is determined by the water supply
- External water and glycol charging kits available (please contact Frigel).

DEVICES NEEDED WITH PRESSURIZED SYSTEM, TO BE ADDED

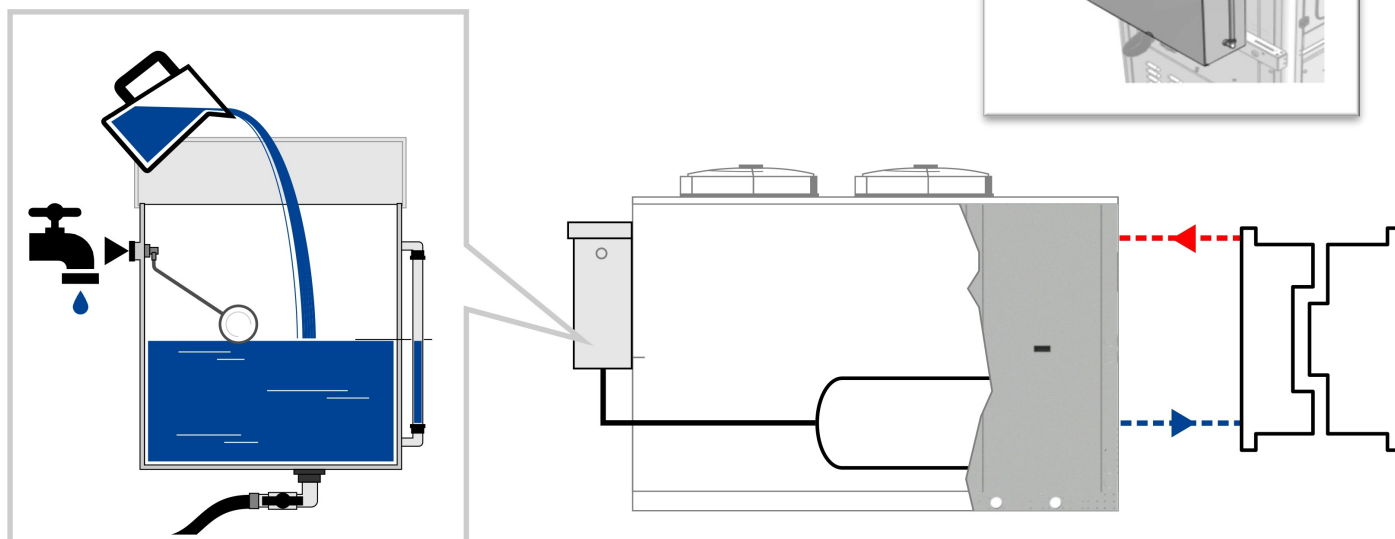
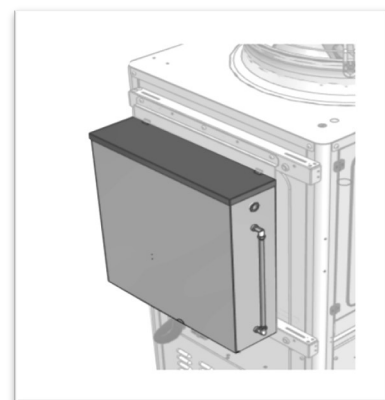
- Vacuum breaker valve
- Safety valve
- Air bleeder valve
- Plant expansion tank and piping systems for fluids under pressure



\*NOTE: Select according to the total volume of water in the system, temperature variation, and working/precharge pressures.

### Models with internal tank "P", "S" and tray for manual loading

- Consisting of a stainless steel tray with flap lid
- Allows manual loading of water, or water-glycol mixture
- Allows automatic loading with float if connected to water system
- Equipped with internal visual level indicator.

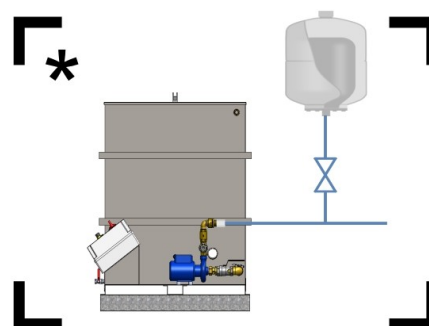
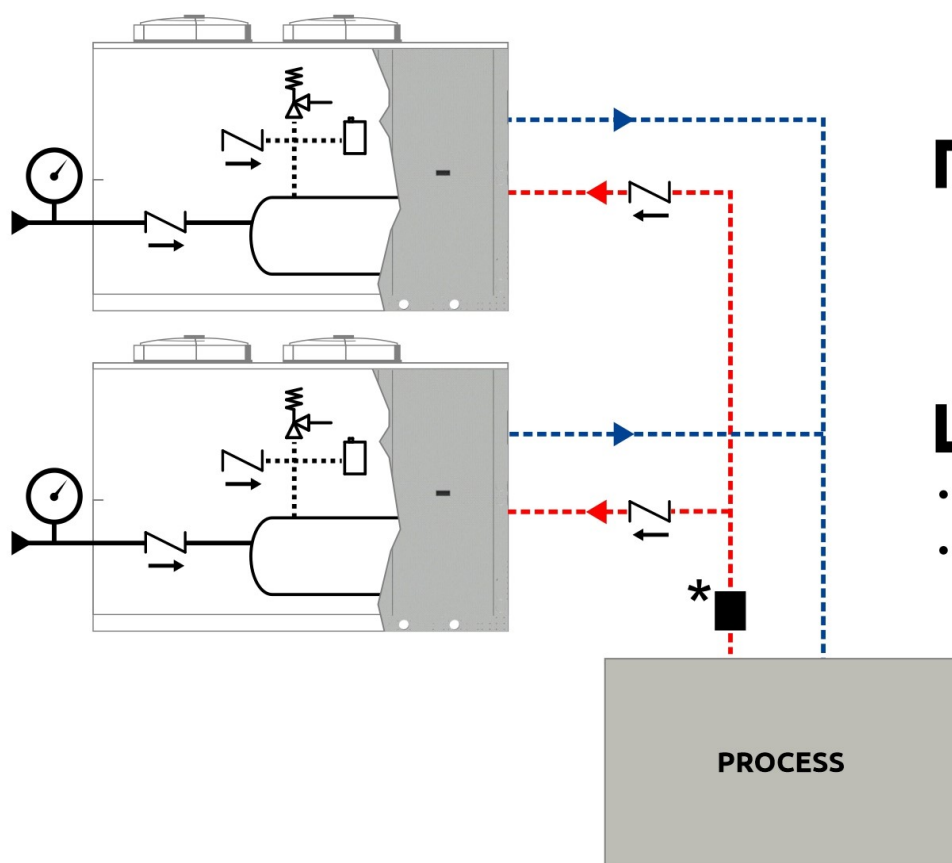


## Parallel Chiller configuration

- Filling with external water-glycol filling kits (please contact Frigel)

### DEVICES NEEDED WITH PRESSURIZED SYSTEM, TO BE ADDED

- Plant expansion tank and piping systems for fluids under pressure
- Check valve on process supplies
- Air bleeder valve (on the higher pipes point)



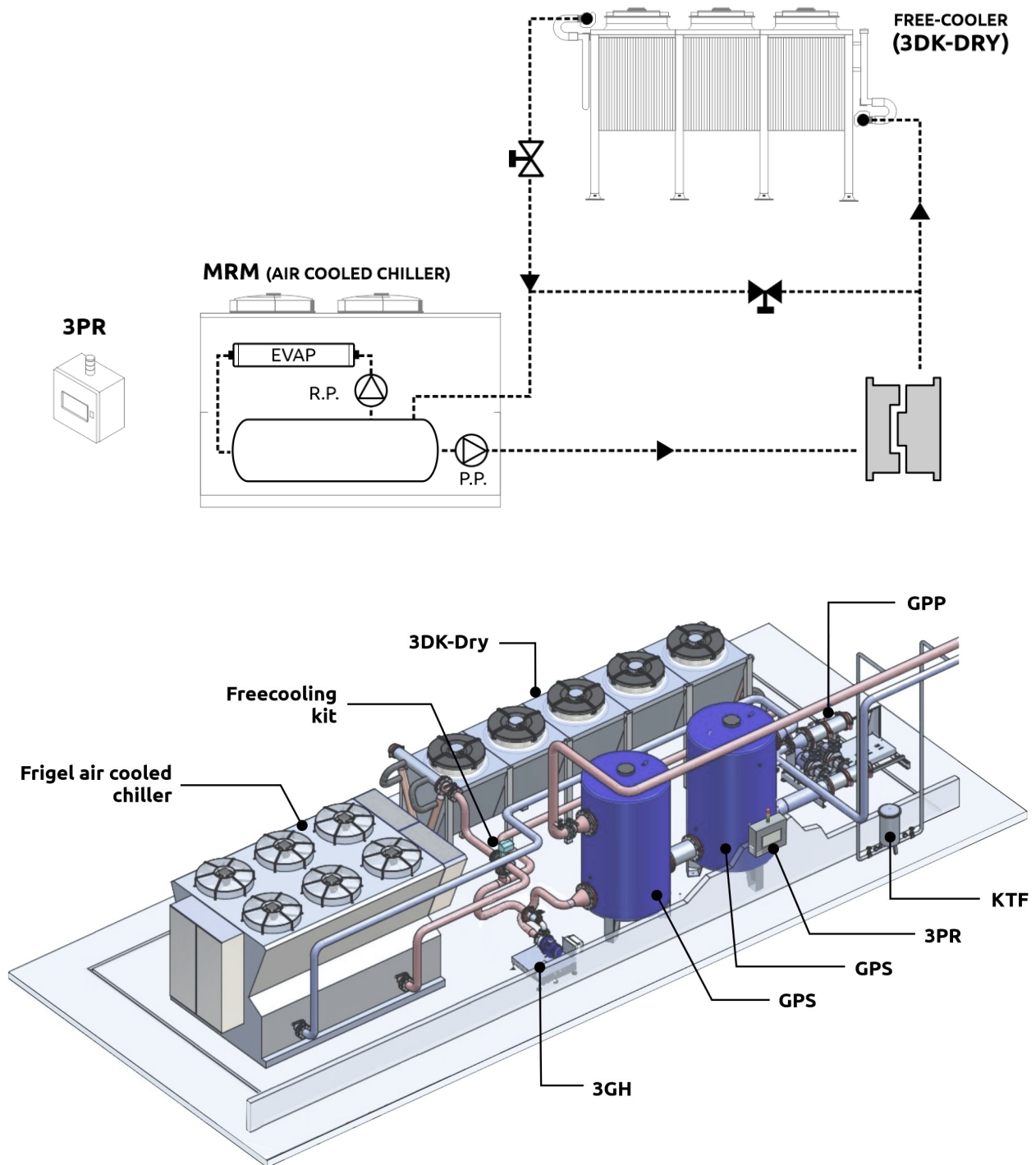
- FILLING KIT FOR PRESSURIZED SYSTEM +
- EXPANSION TANK

\*NOTE: Select according to the total volume of water in the system, temperature variation, and working/precharge pressures.

## Freecooling option

Through the control panel, it is possible to combine an air/water cooler to the refrigerating unit to create a freecooling system.

Using the ambient air, the system allows to cool the water return from the process, by shutting down, partially and/or completely, the refrigerating unit, with consequent energy saving.



The above scheme is for illustrative purposes only

# Technical data

# 60Hz

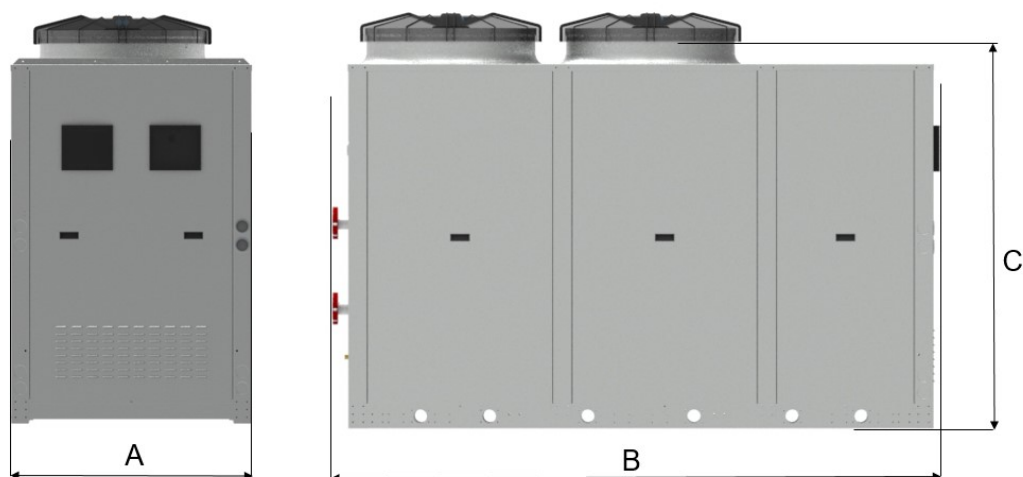
| IndustrialChiller Air cooled - Medium capacity - MRM |                                               |                                                           |                                               |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
|------------------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|-----------------------------------------------|-----------------|-----------------|-----------------|-----------------|------------------------------------|------------------|------------------|------------------|------------------|------------------------------------------|------------------|------------------|------------------|------------------|
| Model                                                |                                               |                                                           | 201                                           | 251             | 301             | 311             | 401             | 202                                | 252              | 302              | 312              | 402              | 204                                      | 254              | 304              | 314              | 404              |
| Power supply voltage and frequency                   |                                               |                                                           | 460V±10%/3/60Hz                               |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
| Cooling capacity (*)<br>(R410A)                      | 59°F/77°F                                     | Tons                                                      | 21                                            | 28              | 33              | 37              | 43              | 42                                 | 54               | 63               | 72               | 82               | 82                                       | 106              | 124              | 140              | 160              |
|                                                      | 50°F/95°F                                     | Tons                                                      | 16                                            | 22              | 26              | 29              | 33              | 33                                 | 42               | 50               | 53               | 64               | 64                                       | 83               | 97               | 105              | 125              |
| Max set point                                        |                                               | °F                                                        | 77                                            | 77              | 77              | 77              | 77              | 77                                 | 77               | 77               | 77               | 77               | 77                                       | 77               | 77               | 77               | 77               |
| Min set point temp.<br>(no glycol)                   |                                               | °F                                                        | 45                                            | 45              | 45              | 45              | 45              | 45                                 | 45               | 45               | 45               | 45               | 45                                       | 45               | 45               | 45               | 45               |
| Min set point temp.<br>(with glycol)                 |                                               | °F                                                        | 32                                            | 32              | 32              | 32              | 32              | 32                                 | 32               | 32               | 32               | 32               | 32                                       | 32               | 32               | 32               | 32               |
| Min ambient temp.                                    |                                               | °F                                                        | -13                                           | -13             | -13             | -13             | -13             | -13                                | -13              | -13              | -13              | -13              | -13                                      | -13              | -13              | -13              | -13              |
| Max ambient temp.                                    |                                               | °F                                                        | 122                                           | 122             | 113             | 122             | 122             | 122                                | 113              | 113              | 122              | 113              | 122                                      | 113              | 113              | 122              | 113              |
| Compressor                                           | Type                                          |                                                           | Scroll                                        |                 |                 |                 |                 | Multiscroll                        |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
|                                                      | Capacity control                              |                                                           | ON/OFF (0-100%)                               |                 |                 |                 |                 | ON/OFF (2 compressors = 0-50-100%) |                  |                  |                  |                  | ON/OFF (4 compressors = 0-25-50-75-100%) |                  |                  |                  |                  |
|                                                      | FLA                                           | Amps @ 460/3/60                                           | 31.6                                          | 39.4            | 48.6            | 48.6            | 62.0            | 31.6                               | 39.4             | 48.6             | 48.6             | 62.0             | 31.6                                     | 39.4             | 48.6             | 48.6             | 62.0             |
|                                                      | N°                                            |                                                           | 1                                             |                 |                 |                 |                 | 2                                  |                  |                  |                  |                  | 4                                        |                  |                  |                  |                  |
|                                                      | Circuits<br>Totally installed                 | N°<br>HP                                                  | 1                                             |                 |                 |                 |                 |                                    |                  |                  |                  |                  | 2                                        |                  |                  |                  |                  |
| Air condenser                                        | Type                                          |                                                           | Microchannel                                  |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
|                                                      | Material                                      |                                                           | Aluminium                                     |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
|                                                      | Nominal flow rate                             | CFM                                                       | 21,415                                        | 21,415          | 21,415          | 31,985          | 31,985          | 31,985                             | 31,985           | 30,475           | 40,710           | 40,710           | 63,970                                   | 63,970           | 60,950           | 81,415           | 81,415           |
| Fans (***)                                           | N°                                            |                                                           | 2                                             | 2               | 2               | 3               | 3               | 3                                  | 3                | 3                | 4                | 4                | 6                                        | 6                | 6                | 8                | 8                |
|                                                      | AC fan<br>(Axial)<br>(Not ductable)           | HP                                                        | 2.95                                          | 2.95            | 2.95            | 2.95            | 2.95            | 2.95                               | 2.95             | 2.95             | 2.95             | 2.95             | 2.95                                     | 2.95             | 2.95             | 2.95             | 2.95             |
|                                                      |                                               | Amps @ 460/3/60                                           | 3.8                                           | 3.8             | 3.8             | 3.8             | 3.8             | 3.8                                | 3.8              | 3.8              | 3.8              | 3.8              | 3.8                                      | 3.8              | 3.8              | 3.8              | 3.8              |
|                                                      | EC fan<br>(Axial)<br>(Not ductable)           | HP                                                        | 2.55                                          | 2.55            | 2.55            | 2.55            | 2.55            | 2.55                               | 2.55             | 2.55             | 2.55             | 2.55             | 2.55                                     | 2.55             | 2.55             | 2.55             | 2.55             |
|                                                      |                                               | Amps @ 460/3/60                                           | 2.9                                           | 2.9             | 2.9             | 2.9             | 2.9             | 2.9                                | 2.9              | 2.9              | 2.9              | 2.9              | 2.9                                      | 2.9              | 2.9              | 2.9              | 2.9              |
|                                                      | EH fan<br>(Axial high pressure)<br>(Ductable) | HP                                                        | 3.75                                          | 3.75            | 3.75            | 3.75            | 3.75            | 3.75                               | 3.75             | 3.75             | 3.75             | 3.75             | 3.75                                     | 3.75             | 3.75             | 3.75             | 3.75             |
|                                                      |                                               | Amps @ 460/3/60                                           | 4.4                                           | 4.4             | 4.4             | 4.4             | 4.4             | 4.4                                | 4.4              | 4.4              | 4.4              | 4.4              | 4.4                                      | 4.4              | 4.4              | 4.4              | 4.4              |
|                                                      |                                               | With diffuser<br>Available pressure [In H <sub>2</sub> O] | Yes                                           |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
| Evaporator                                           | Type                                          |                                                           | Braze plate/Shell-and-tube                    |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
| Evaporator Braze plate                               | nom                                           | GPM                                                       | 57.2                                          | 74.8            | 88.1            | 96.9            | 114.5           | 110.1                              | 145.3            | 167.3            | 189.3            | 215.7            | 220.1                                    | 281.8            | 330.2            | 374.2            | 427.1            |
|                                                      | nom                                           | PSI                                                       | 13.1                                          | 13.1            | 11.6            | 11.6            | 11.6            | 10.2                               | 13.1             | 10.2             | 10.2             | 10.2             | 14.5                                     | 14.5             | 13.1             | 13.1             | 13.1             |
| Evaporator Shell-and-tube                            | nom                                           | GPM                                                       | 57.2                                          | 74.8            | 88.1            | 114.5           | 114.5           | 110.1                              | 145.3            | 167.3            | 215.7            | 215.7            | 220.1                                    | 281.8            | 330.2            | 427.1            | 427.1            |
|                                                      | nom                                           | PSI                                                       | 10.2                                          | 11.6            | 11.6            | 11.6            | 11.6            | 10.2                               | 10.2             | 13.1             | 11.6             | 11.6             | 11.6                                     | 17.4             | 11.6             | 14.5             | 14.5             |
| Process pump                                         | Type                                          |                                                           | Centrifugal                                   |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
|                                                      | Quantity                                      |                                                           | 1                                             | 1               | 1               | 1               | 1               | 1                                  | 1                | 1                | 1                | 1                | 1                                        | 1                | 1                | 1                | 1                |
|                                                      | HP                                            |                                                           | 4.0                                           | 4.0             | 4.0             | 4.0             | 5.4             | 5.4                                | 5.4              | 5.4              | 5.4              | 10.1             | 10.1                                     | 10.1             | 10.1             | 10.1             | 12.3             |
|                                                      | min                                           | GPM                                                       | 26.4                                          | 26.4            | 26.4            | 26.4            | 52.8            | 52.8                               | 52.8             | 52.8             | 52.8             | 132.1            | 132.1                                    | 132.1            | 132.1            | 132.1            | 184.9            |
|                                                      | max                                           |                                                           | 105.7                                         | 105.7           | 105.7           | 105.7           | 220.1           | 220.1                              | 220.1            | 220.1            | 220.1            | 378.6            | 378.6                                    | 378.6            | 378.6            | 554.8            |                  |
|                                                      | max                                           | PSI                                                       | 59.5                                          | 59.5            | 59.5            | 59.5            | 53.7            | 53.7                               | 53.7             | 53.7             | 53.7             | 53.7             | 53.7                                     | 53.7             | 53.7             | 53.7             | 52.2             |
| min                                                  |                                               | 37.7                                                      | 37.7                                          | 37.7            | 37.7            | 29.0            | 29.0            | 29.0                               | 29.0             | 29.0             | 29.0             | 29.0             | 29.0                                     | 29.0             | 29.0             | 24.7             |                  |
| Evaporator pump                                      | Type                                          |                                                           | Centrifugal                                   |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
|                                                      | HP                                            |                                                           | 3.0                                           | 3.0             | 3.0             | 3.0             | 4.0             | 4.0                                | 4.0              | 4.0              | 4.0              | 7.4              | 7.4                                      | 7.4              | 7.4              | 7.4              | 7.4              |
|                                                      | FLA                                           | Amps @ 460/3/60                                           | 4.1                                           | 4.1             | 4.1             | 4.1             | 5.6             | 5.6                                | 5.6              | 5.6              | 5.6              | 8.9              | 8.9                                      | 8.9              | 8.9              | 8.9              | 8.9              |
|                                                      | min                                           | GPM                                                       | 26.4                                          | 26.4            | 26.4            | 26.4            | 52.8            | 52.8                               | 52.8             | 52.8             | 52.8             | 132.1            | 132.1                                    | 132.1            | 132.1            | 132.1            | 158.5            |
|                                                      | max                                           |                                                           | 105.7                                         | 105.7           | 105.7           | 105.7           | 220.1           | 220.1                              | 220.1            | 220.1            | 220.1            | 378.6            | 378.6                                    | 378.6            | 378.6            | 528.3            |                  |
|                                                      | max                                           | PSI                                                       | 45.0                                          | 45.0            | 45.0            | 45.0            | 40.6            | 40.6                               | 40.6             | 40.6             | 40.6             | 43.5             | 43.5                                     | 43.5             | 43.5             | 43.5             | 37.7             |
| min                                                  |                                               | 24.7                                                      | 24.7                                          | 24.7            | 24.7            | 14.5            | 14.5            | 14.5                               | 14.5             | 14.5             | 18.9             | 18.9             | 18.9                                     | 18.9             | 18.9             | 14.5             |                  |
| Tank                                                 | Material                                      |                                                           | Galvanized steel with internal Teflon coating |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
| Process water connections                            | Volume                                        | gal                                                       | 79.3                                          | 79.3            | 79.3            | 132.1           | 132.1           | 132.1                              | 132.1            | 132.1            | 198.2            | 198.2            | 198.2                                    | 198.2            | 198.2            | 264.2            | 264.2            |
|                                                      | Type                                          |                                                           | VIC.FLANGE 741 ASME                           |                 |                 |                 |                 |                                    |                  |                  |                  |                  |                                          |                  |                  |                  |                  |
| Expansion valve                                      | In/out                                        |                                                           | DN50 2"                                       | DN50 2"         | DN50 2"         | DN50 2"         | DN80 3"         | DN80 3"                            | DN80 3"          | DN80 3"          | DN80 3"          | DN100 4"         | DN100                                    | DN100            | DN100            | DN100            | DN100 4"         |
|                                                      | Type                                          |                                                           | Mechanical                                    |                 |                 |                 |                 |                                    |                  |                  |                  | Electronic       |                                          | Mechanical       |                  |                  |                  |
| Max operating current                                |                                               | Amps @ 460/3/60                                           | 50.1 (SP+RP+EH)                               | 57.9 (SP+RP+EH) | 67.1 (SP+RP+EH) | 71.5 (SP+RP+EH) | 88.8 (SP+RP+EH) | 90.0 (SP+RP+EH)                    | 105.6 (SP+RP+EH) | 124.0 (SP+RP+EH) | 128.4 (SP+RP+EH) | 163.8 (SP+RP+EH) | 175.0 (SP+RP+EH)                         | 206.2 (SP+RP+EH) | 243.0 (SP+RP+EH) | 251.8 (SP+RP+EH) | 308.1 (SP+RP+EH) |
| Unit Full Load Ampere (FLA)                          | AC fan                                        | Amps @ 460/3/60                                           | 49.0                                          | 56.8            | 66.0            | 69.9            | 87.2            | 88.4                               | 104.0            | 122.4            | 126.3            | 161.7            | 171.8                                    | 203.0            | 239.8            | 247.6            | 303.9            |
| Sound level                                          | EC fan                                        |                                                           | 48.1                                          | 55.9            | 65.1            | 68.5            | 85.8            | 87.0                               | 102.6            | 121.0            | 124.4            | 159.8            | 169.0                                    | 200.2            | 237.0            | 243.8            | 300.1            |
|                                                      | EH fan                                        |                                                           | 50.1                                          | 57.9            | 67.1            | 71.5            | 88.8            | 90.0                               | 105.6            | 124.0            | 128.4            | 163.8            | 175.0                                    | 206.2            | 243.0            | 251.8            | 308.1            |
| Protection level                                     |                                               | dB (A) @ 33 ft                                            | 54                                            | 58              | 58              | 61              | 61              | 57                                 | 61               | 61               | 64               | 64               | 60                                       | 64               | 64               | 67               | 67               |
| Refrigerant Charge (R410A)                           |                                               | Lb                                                        | 35                                            | 35              | 35              | 65              | 65              | 65                                 | 65               | 75               | 95               | 95               | 130                                      | 135              | 150              | 190              | 190              |
| Net weight                                           |                                               | Lb                                                        | 2,060                                         | 2,085           | 2,150           | 2,865           | 3,195           | 3,525                              | 3,705            | 3,860            | 5,290            | 5,730            | 6,835                                    | 7,055            | 7,275            | 7,935            | 8,375            |
| Operating weight (**)<br>(R410A)                     |                                               | Lb                                                        | 2,174                                         | 2,199           | 2,264           | 3,062           | 3,392           | 3,722                              | 3,902            | 4,067            | 5,583            | 6,023            | 7,163                                    | 7,388            | 7,623            | 8,389            | 8,829            |

- (\*) Nominal Cooling capacity (water temperature/ambient temperature °F)
- (\*\*) Not considering the water in pipes and in exchangers
- (\*\*\*) AC fans in case of Ambient Temperature >5°F (>23°F in case of MRM402 and MRM404) / Use EC fans in case of Ambient Temperature >13°F / Use EH fans in case of Ambient Temperature >13°F
- Flow rate and pressure drop nominal at nominal cooling capacity
- Available supply voltage: 400V±10%/3/50Hz; 460V±10%/3/60Hz; 380V±10%/3/60Hz
- On request: UL electrical panel for 60Hz versions
- Altitude limit: 8,500 ft
- Capacity with process water temperature Delta T = 9°F
- In case of lower set point, contact Frigel
- Add glycol in case of ambient <32°F - Add glycol in case of set point lower than 50°F
- Pumps rated up to 35% of Glycol
- Glycol percentage: 20% glycol in weight -> from 32°F to the minimum set point temperature / 25% glycol in weight -> from 23°F to 32°F
- In case of setpoint <41 °F, contact Frigel
- Not suitable for DI water
- Max water working pressure: 87 psi

## Dimensional technical data

| IndustrialChiller Air cooled - Medium capacity - MRM |    |     |     |     |     |     |     |     |     |     |     |     |     |     |     |     |
|------------------------------------------------------|----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|-----|
| Model                                                |    | 201 | 251 | 301 | 311 | 401 | 202 | 252 | 302 | 312 | 402 | 204 | 254 | 304 | 314 | 404 |
| A                                                    | in | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 46  | 84  | 84  | 84  | 84  | 84  |
| B                                                    | in | 113 | 113 | 113 | 150 | 150 | 179 | 179 | 179 | 216 | 216 | 179 | 179 | 179 | 216 | 216 |
| C                                                    | in | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  | 78  |

Dimensions refer to units in basic configuration, without added options



## Order Code

