

Air cooled water chiller

MRM industrial grade water chillers are available in cooling capacity range from 58 to 580 KW, with water working temperatures range from 0°C to 25°C and suitable for indoor or outdoor installation. The standard configuration is designed for an ambient temperature up to 45°C (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**, 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 -25°C up to +45°C, 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 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 the 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

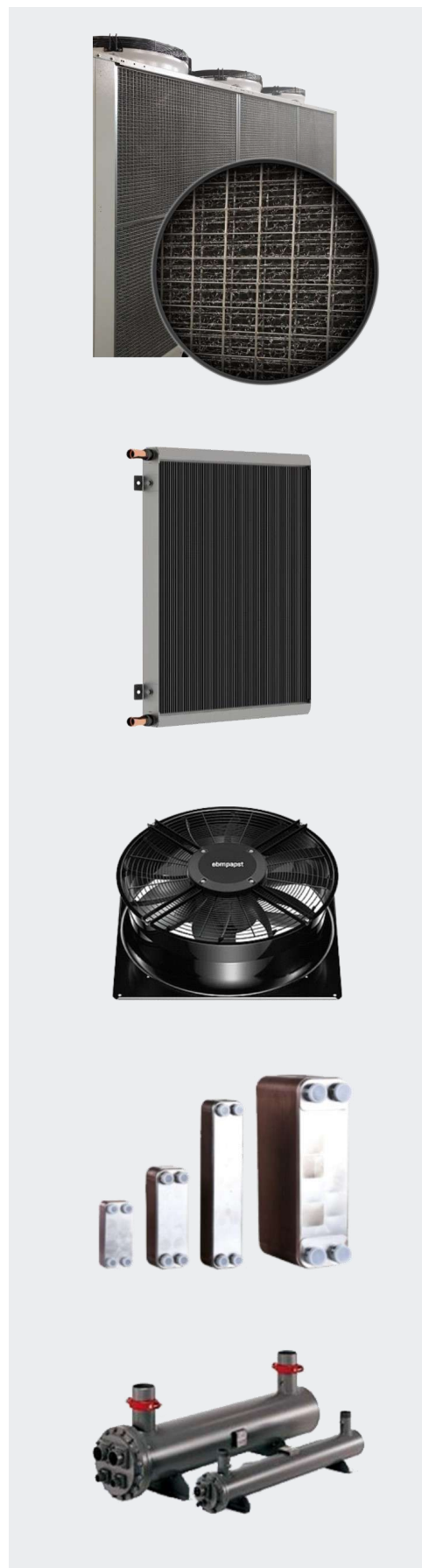
- Higher efficiency and performances
 - heat exchange from +20% to +40% compared with finned tube models;
 - reduction of air-side pressure drops;
 - lower weight and reduced dimensions;
 - thinner profile than finned tube models;
 - 60% lower weight compared to finned tube models.
- Proven reliability
 - 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 -15 °C (-5 °C with MRM402 and MRM404)
- **EC:** brushless fans with variable speed
 - For ambient temperatures greater than -25 °C
- **EH:** high head EC fans
 - Suitable for ducting on indoor installations (heat recovery)
 - For ambient temperatures greater than -25 °C

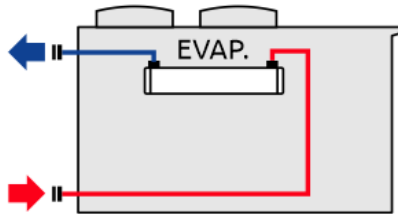
Evaporator

- **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.



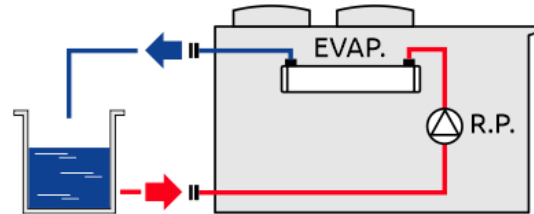
Technical features:

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



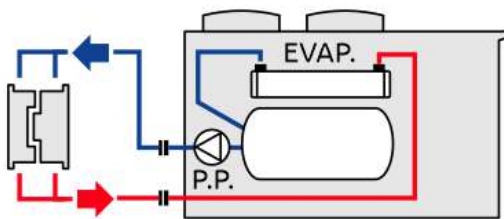
N: without pumps and tank

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

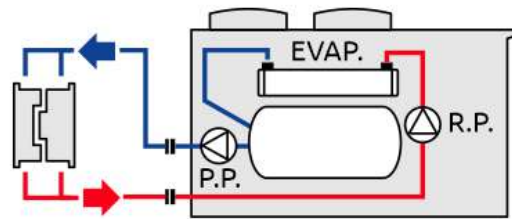


M: with evaporator's pump only

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 $T_{amb} < 0^{\circ}C$
- Electrical cabinet heater for glycol systems when $T_{amb} < -10^{\circ}C$
- Remote control with double display
- Y water 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

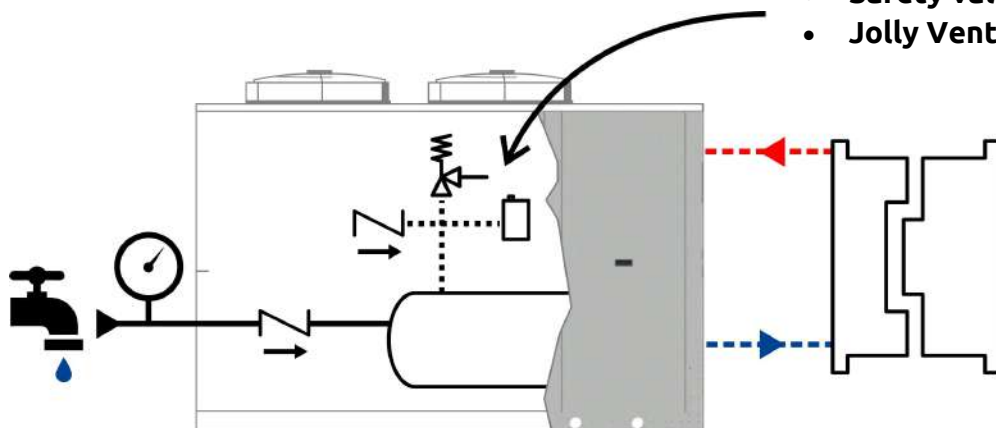
Hydraulic supply

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).

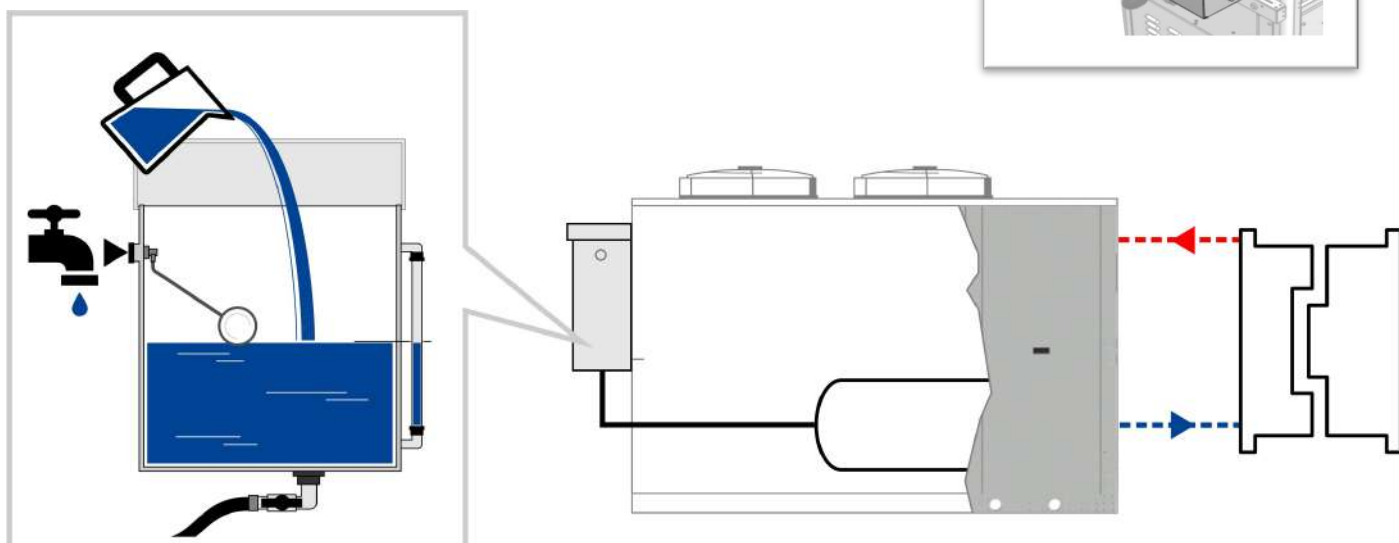
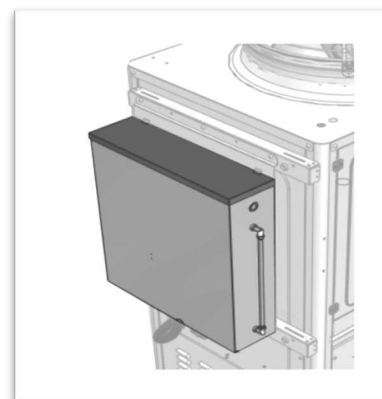
SAFETY DEVICES

- Vacuum breaker valve
- Safety valve
- Jolly Vent Valve



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

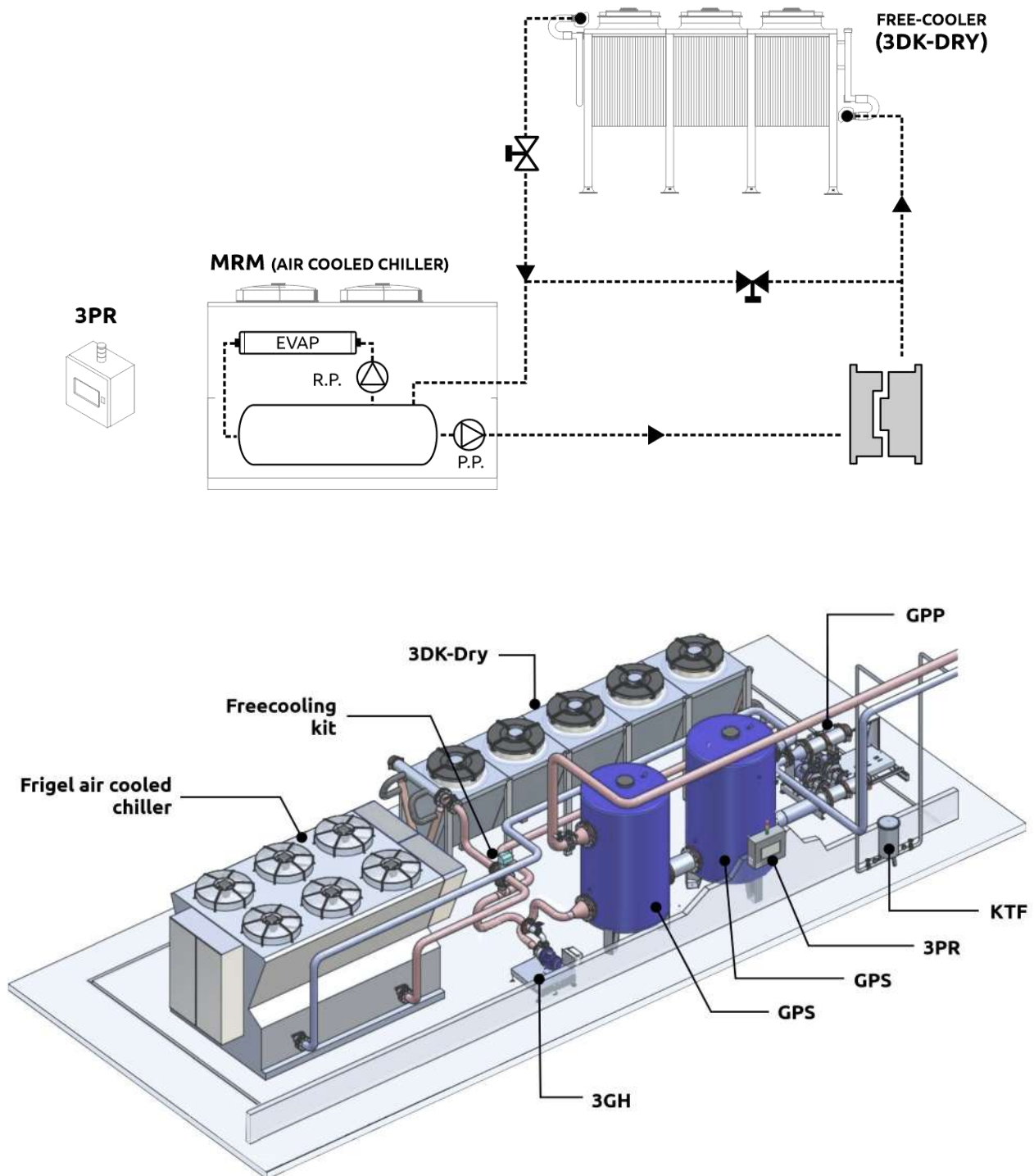
- Consisting of a stainless steel tray with flap lid
- Allows manual loading of water, or water-glycol mixture
- Allows automatic loading with float if connected to water system
- Equipped with internal visual level indicator.



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

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			400V±10%/3/50Hz																	
Cooling capacity (*) (R410A)	15°C/25°C (*)	kW	81	97	120	125	157	161	192	227	242	297	314	375	445	474	581			
	10°C/35°C	kW	63	76	94	98	123	125	150	178	182	233	244	293	350	356	456			
SEPR			5,59	5,57	5,23	6,00	5,80	6,68	6,51	6,21	6,58	6,53	6,19	6,13	5,89	5,98	6,19			
Max set point temp.		°C	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25			
Min set point temp. (no glycol)		°C	7	7	7	7	7	7	7	7	7	7	7	7	7	7	7			
Min set point temp. (with glycol)		°C	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0			
Min ambient temp.		°C	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25			
Max ambient temp.		°C	50	50	45	50	50	50	45	45	50	45	50	45	45	50	45			
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%)								
	Full Load Ampere (FLA)	A	38,8	46,8	59,8	59,8	73,4	38,8	46,8	59,8	59,8	73,4	38,8	46,8	59,8	59,8	73,4			
	N°		1						2			4								
	Circuits	N°	1						2			2								
Air condenser	Type		Microchannel						Aluminium											
	Nominal flow rate	m³/h	35.000	35.000	35.000	53.000	53.000	53.000	53.000	51.000	69.000	69.000	106.000	106.000	102.000	138.000	138.000			
Fans (***)	Type		Microchannel																	
	Material		Aluminium																	
	AC fan (Axial) (Not ductable)	kW	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0		
		A	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9		
	EC fan (Axial) (Not ductable)	kW	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9		
		A	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	2,9		
	EH fan (Axial high pressure head) (Ductable)	kW	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8		
	A	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	4,4			
	With diffuser	Yes																		
	Available pressure head [Pa]	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	150			
Evaporator	Type		Braze plate/Shell-and-tube																	
	Evaporator Braze plate	nom m³/h	14	17	21	22	27	28	33	39	42	51	54	64	77	82	100			
	nom bar	1	0,8	0,9	0,9	0,9	0,9	0,9	0,9	0,7	0,8	0,8	1,1	1,1	0,9	0,9	0,9			
Evaporator Shell-and-tube	nom m³/h	14	16	20	26	26	31	38	49	49	53	62	75	97	97	97				
	nom bar	0,8	0,7	0,8	0,8	0,8	0,8	0,6	0,9	0,8	0,8	0,9	1,1	0,9	1,0	1,0				
Process pump	Type		Centrifugal																	
	Quantity		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
		kW	3	3	3	3	4	4	4	4	4	7,5	7,5	7,5	7,5	7,5	9,2			
	min	m³/h	6	6	6	6	12	12	12	12	12	24	24	24	24	24	42			
	max	m³/h	20	20	20	20	42	42	42	42	42	72	72	72	72	72	132			
	max	bar	4,2	4,2	4,2	4,2	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,9	3,5			
Evaporator pump	Type		Centrifugal																	
	Quantity		1	1	1	1	1,5	1,5	1,5	1,5	1,5	3	3	3	3	3	3			
		kW	1,1	1,1	1,1	1,1	1,5	1,5	1,5	1,5	1,5	3	3	3	3	3	3			
	Full Load Ampere (FLA)	A	3,2	3,2	3,2	3,2	4,3	4,3	4,3	4,3	4,3	6,6	6,6	6,6	6,6	6,6	9,6			
	min	m³/h	6	6	6	6	12	12	12	12	12	24	24	24	24	24	36			
	max	bar	2,1	2,1	2,1	2,1	1,9	1,9	1,9	1,9	1,9	2,1	2,1	2,1	2,1	2,1	2			
Tank	Material		Galvanized steel with internal Teflon coating																	
	Volume	L	300	300	300	500	500	500	500	500	750	750	750	750	750	1000	1000			
Process water connections	Type		VIC.FLANGE 741																	
	In/out		DN50 2"	DN50 2"	DN50 2"	DN50 2"	DN80 3"	DN80 3"	DN80 3"	DN80 3"	DN80 3"	DN80 3"	DN100	DN100	DN100	DN100 4"	DN100 4"	DN100 4"		
Expansion valve	Type		Mechanical												Electro-			Mechanical		Electronic
	Max operating current	A	57,4 (SP+RP+E H)	65,4 (SP+RP+E H)	78,4 (SP+RP+E H)	82,8 (SP+RP+E H)	100,5 (SP+RP+E H)	104,7 (SP+RP+E H)	120,7 (SP+RP+E H)	146,7 (SP+RP+E H)	151,1 (SP+RP+E H)	185,3 (SP+RP+E H)	202,5 (SP+RP+E H)	234,5 (SP+RP+E H)	286,5 (SP+RP+E H)	295,3 (SP+RP+E H)	356,9 (SP+RP+E H)			
Power supply cable	Size		3x35+1x25mm² PVC @40°C	3x35+1x25mm² PVC @40°C	3x50+1x25mm² PVC @40°C	3x50+1x25mm² PVC @40°C	3x70+1x35mm² PVC @40°C	3x70+1x35mm² PVC @40°C	3x95+1x50mm² PVC @40°C	2X(3x50+1x25mm²) PVC @40°C	2X(3x50+1x25mm²) PVC @40°C	2X(3x50+1x25mm²) PVC @40°C	2X(3x70+1x35mm²) PVC @40°C	2X(3x70+1x35mm²) PVC @40°C	2X(3x95+1x50mm²) PVC @40°C	2X(3x95+1x50mm²) PVC @40°C	3X(3x70+1x35mm²) PVC @40°C			
	Unit Full Load Ampere (FLA)	A	57,2	65,2	78,2	82,5	100,2	104,4	120,4	146,4	150,7	184,9	201,9	233,9	285,9	294,5	356,1			
Sound level	EC fan	dB(A) 10 m	55,4	63,4	76,4	79,8	97,5	101,7	117,7	143,7	147,1	181,3	196,5	228,5	280,5	287,3	348,9			
	EH fan	dB(A) 10 m	57,4	65,4	78,4	82,8	100,5	104,7	120,7	146,7	151,1	185,3	202,5	234,5	286,5	295,3	356,9			
Protection level	Type		IP44																	
	Refrigerant Charge (R410A)	kg	15	15,5	16	28,5	28,5	29,5	30,5	34	43	43	59	61	68	86	86			
Net weight	kg	935	945	975	1.300	1.450	1.600	1.680	1.750	2.400	2.600	3.100	3.200	3.300	3.600	3.800				
Operating weight (**)	kg	1.250	1.261	1.291	1.829	1.979	2.130	2.211	2.284	3.193	3.393	3.909	4.011	4.118	4.686	4.886				

- (*) Nominal Cooling capacity (water temperature/ambient temperature °C)
- (**) Not considering the water in pipes and in exchangers
- (***) AC fans in case of Ambient Temperature > -15°C (> -5°C in case of MRM402 and MRM404) / Use EC fans in case of Ambient Temperature > -25°C / Use EH fans in case of Ambient Temperature > -25°C
- Nominal flow rate and pressure drop 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
- Capacity with process water temperature DeltaT = 5°C
- in case of lower set point, contact Frigel
- Add glycol in case of low ambient 0°C - Add glycol in case of set point lower than +7°C
- Pumps rated up to 35% of Glycol
- Glycol percentage: 20% glycol in weight -> from 0°C to the minimum set point temperature / 25% glycol in weight -> from -5°C to 0°C
- Not suitable for demi-water (due to ferrous components)
- Max water working pressure: 6 bar



Technical data

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 (*) (R410A)	15°C/25°C (*)	kW	74	97	117	130	151	148	191	223	252	287	288	374	437	493	562	
	10°C/35°C	kW	58	76	91	103	118	115	149	174	188	225	224	292	342	370	441	
SEPR			5,45	5,43	5,29	5,88	5,39	6,23	6,39	6,11	6,36	5,98	5,87	5,98	5,82	5,85	5,73	
Max set point temp.			25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
Min set point temp. (no glycol)			7	7	7	7	7	7	7	7	7	7	7	7	7	7	7	
Min set point temp. (with glycol)			0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Min ambient temp.			-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	-25	
Max ambient temp.			50	50	45	50	50	50	45	45	50	45	50	45	45	50	45	
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%)			
	Full Load Ampere (FLA)	A	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			
Air condenser	Type		Microchannel															
	Material		Aluminium															
Fans (***)	Nominal flow rate	m³/h	36.385	36.385	36.385	54.340	54.340	54.340	54.340	51.775	69.160	69.160	108.680	108.680	103.550	138.320	138.320	
	N°		2	2	2	3	3	3	3	3	4	4	6	6	6	8	8	
Evaporator	AC fan (Axial) (Not ductable)	kW	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	2,2	
		A	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 (Axial) (Not ductable)	kW	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	1,9	
		A	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 (Axial high pressure head) (Ductable)	kW	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	2,8	
		A	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			Yes															
Available pressure head [Pa]			150	150	150	150	150	150	150	150	150	150	150	150	150	150	150	
Type			Braze plate/Shell-and-tube															
Evaporator Braze plate	nom	m³/h	13	17	20	22	26	25	33	38	43	49	50	64	75	79	97	
	nom	bar	0,9	0,9	0,8	0,8	0,8	0,7	0,9	0,7	0,7	0,7	1,0	1,0	0,9	0,9	0,9	
Evaporator Shell-and-tube	nom	m³/h	13	17	20	26	26	25	33	38	49	49	50	64	75	97	97	
	nom	bar	0,7	0,8	0,8	0,8	0,8	0,7	0,7	0,9	0,8	0,8	0,8	1,2	0,8	1,0	1,0	
Process pump	Type		Centrifugal															
	Quantity		1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	kW		3,0	3,0	3,0	3,0	4,0	4,0	4,0	4,0	4,0	4,0	7,5	7,5	7,5	7,5	9,2	
	min	m³/h	6	6	6	6	12	12	12	12	12	12	30	30	30	30	42	
	max	m³/h	24	24	24	24	50	50	50	50	50	86	86	86	86	126		
	max	bar	4,1	4,1	4,1	4,1	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,7	3,6	
Evaporator pump	Type		Centrifugal															
	kW		2,2	2,2	2,2	2,2	3,0	3,0	3,0	3,0	3,0	3,0	5,5	5,5	5,5	5,5	5,5	
	Full Load Ampere (FLA)	A	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	m³/h	6	6	6	6	12	12	12	12	12	30	30	30	30	30	36	
	max	m³/h	24	24	24	24	50	50	50	50	50	86	86	86	86	120		
	max	bar	3,1	3,1	3,1	3,1	2,8	2,8	2,8	2,8	2,8	3,0	3,0	3,0	3,0	3,0	2,6	
Tank	Material		Galvanized steel with internal Teflon coating															
	Volume	L	300	300	300	500	500	500	500	500	750	750	750	750	750	1000	1000	
Process water connections			VIC.FLANGE 741 ASME															
Expansion valve			Mechanical															
Max operating current	Type		Electronic															
	A		50,1 (SP+RP+E H)	57,9 (SP+RP+E H)	67,1 (SP+RP+E H)	71,5 (SP+RP+E H)	88,8 (SP+RP+E H)	90,0 (SP+RP+E H)	105,6 (SP+RP+E H)	124,0 (SP+RP+E H)	128,4 (SP+RP+E H)	163,8 (SP+RP+E H)	175,0 (SP+RP+E H)	206,2 (SP+RP+E H)	243,0 (SP+RP+E H)	251,8 (SP+RP+E H)	308,1 (SP+RP+E H)	
Power supply cable			Size															
Unit Full Load Ampere (FLA)	AC fan	A	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	
	EC fan	A	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	A	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	
Sound level			dB(A) 10 m															
Protection level			IP44															
Refrigerant Charge (R410A)			kg															
Net weight			kg															
Operating weight (**) (R410A)			kg															

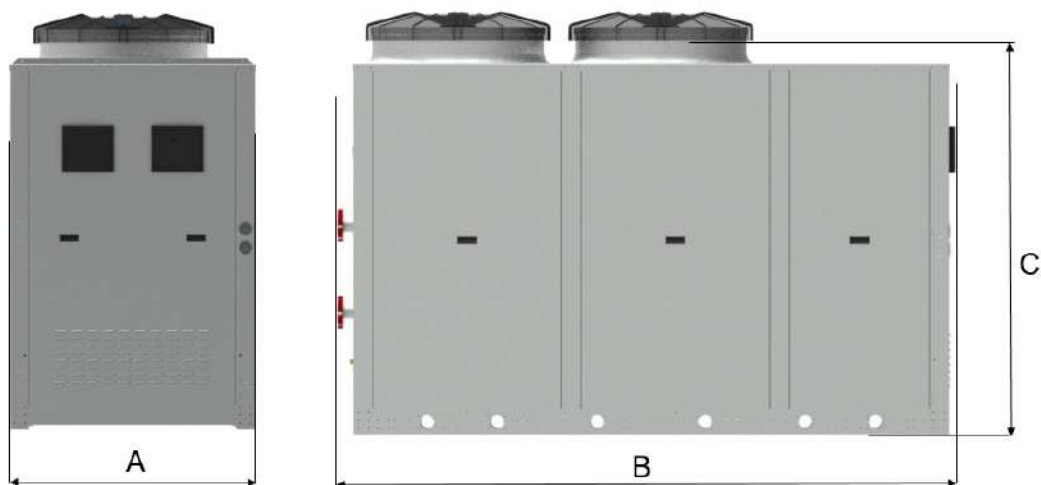
- (*) Nominal Cooling capacity (water temperature/ambient temperature°C)
- (**) Not considering the water in pipes and in exchangers
- (***) AC fans in case of Ambient Temperature >15°C (>-5°C in case of MRM402 and MRM404) / Use EC fans in case of Ambient Temperature >25°C / Use EH fans in case of Ambient Temperature >25°C
- Nominal flow rate and pressure drop 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: 2600 m a.s.l.
- Capacity with process water temperature DeltaT = 5°C
- in case of lower set point, contact Frigel
- Add glycol in case of low ambient 0°C - Add glycol in case of set point lower than +7°C
- Pumps rated up to 35% of Glycol
- Glycol percentage: 20% glycol in weight -> from 0°C to the minimum set point temperature / 25% glycol in weight -> from -5°C to 0°C
- Not suitable for demi-water (due to ferrous components)
- Max water working pressure: 6 bar



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	mm	1.165	1.165	1.165	1.165	1.165	1.165	1.165	1.165	1.165	1.165	2.137	2.137	2.137	2.137	2.137
B	mm	2.875	2.875	2.875	3.800	3.800	4.545	4.545	4.545	5.470	5.470	4.545	4.545	4.545	5.470	5.470
C	mm	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975	1.975

Dimensions refer to units in basic configuration, without added options



Order Code

