The natural answer to your cooling needs

R290 chillers
with inverter reciprocating compressors

Cooling capacity: 170 – 320 kW_1

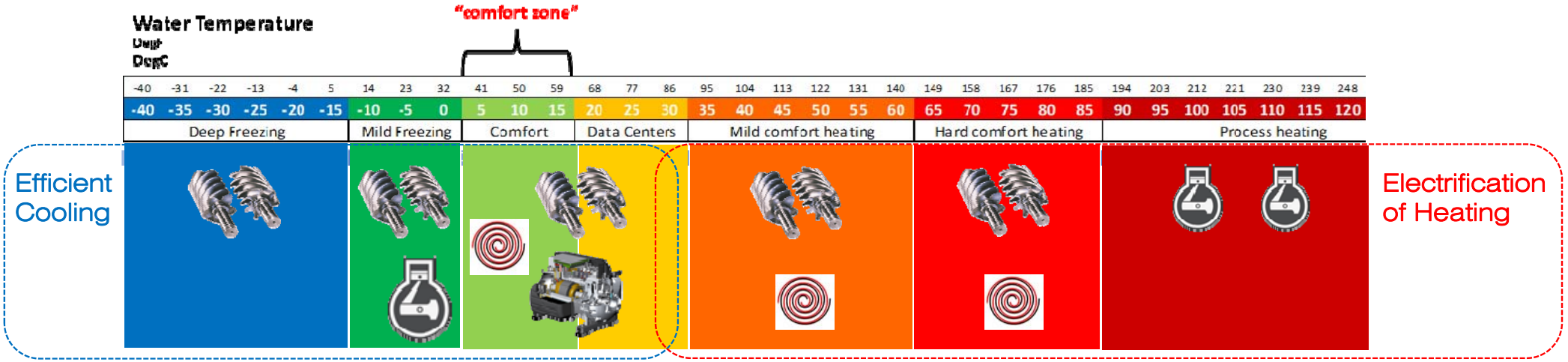
1) Nominal cooling capacity with water 12/7°C & ambient 35°C

ARIES N inverter

Product line-up

Thermal Systems Overview

A look inside



LCWT -10°C ⟷ +20°C

R290 is a pure refrigerant with

A. No ozone depletion potential
B. Negligible impact on global warming with direct GWP = 0,02 (IPCC AR6)
C. Excellent thermodynamic properties (efficiency and operating maps)
D. Safety Class A3 (ASHRAE), non-toxic

Mission Critical cooling

Food and beverages example

Storage Temperature	-70°C	-60°C	-50°C	-40°C	-30°C	-20°C	-10°C	0°C	10°C
Food									
Bakery Products									
Ready meals									
Ice-cream									
Confectionary									
Fish	Sushi and Sashimi								
Potatoes									
Meat and Poultry									
Vegetables									
Fruits and Berries									
Cheese									
Banana									
Chilly									
Ice Rink									
Pharma Cold Storage	mRNA vaccines								

Customer requirements

- ✓ Ultra-low GWP refrigerant
- ✓ High product reliability
- ✓ Efficiency => Lowest TCO
- ✓ Safety
- ✓ Services 24/7, 365 days

RTDF
Brine water down to -30°C

i-Chiller Process LT
- Small capacity < 80 kW at -8°C brine & 35°C air
- ~~High GWP R449A~~

R290

iARES N HE MWT
- Medium capacity 110-190 kW at -8°C brine water & 35°C ambient air
- Mild freezing & Comfort

RTAF G Process
- Large capacity 400-750 kW at -8°C brine water & 35°C ambient air
- Mild freezing only

ARIES N
Versions

2 Acoustic Versions

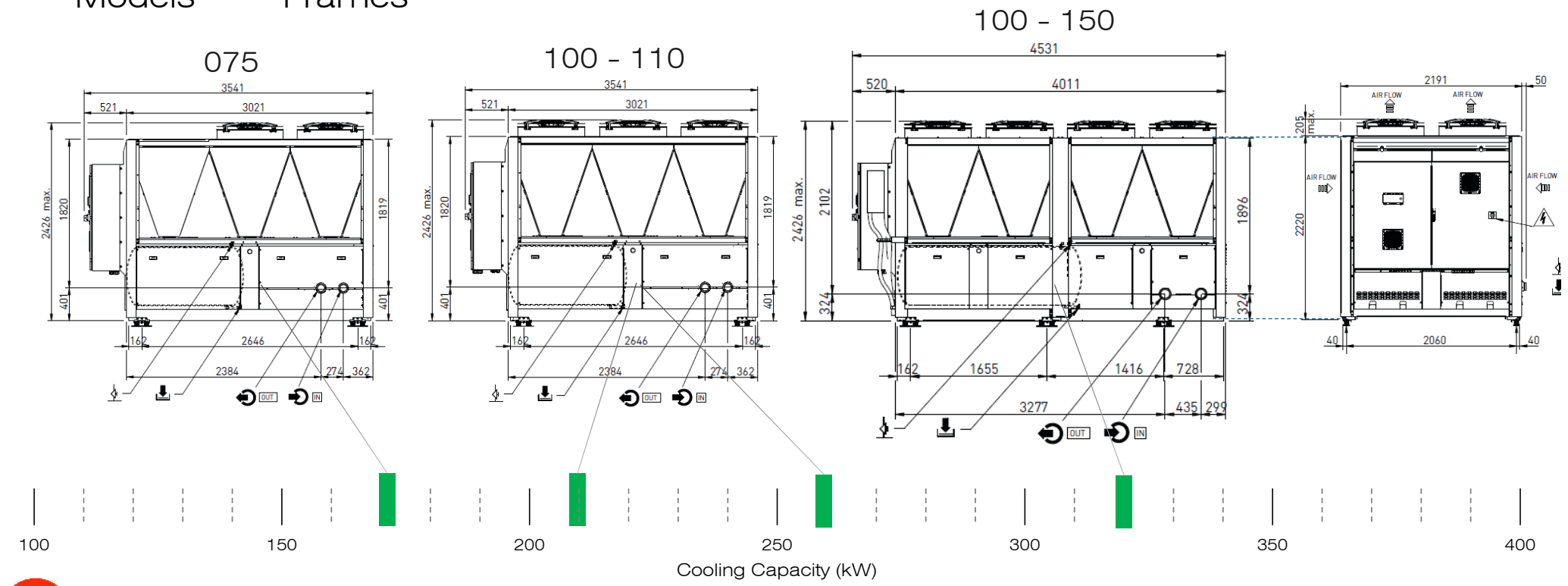
	Versions	Description	Features	Noise Reduction	SEPR HT Reg 2016/2281	SEPR MT Reg 2015/1095	SEER Reg 2016/2281
iASN	HE	High efficiency	EC fans Integral Enclosure *Acoustic insulation on compressors*		✓	MWT ✓	✓
	SHE	High efficiency Low noise	EC fans with reduced rpm Integral Enclosure *Double acoustic insulation on compressors*	Up to -7 dB(A)	✓		✓

MWT Version (for HE only) for low water temperature, from - 1°C to -10 °C.
Includes low evaporation temperature design and increased thermal insulation of the hydraulic circuit.

TRANE

ARIES N
Line-up

4 Models **2** Frames



ARIES N
Performances

		075		100		110		150	
		HE	SHE	HE	SHE	HE	SHE	HE	SHE
Cooling capacity (1)	kW	170,2	166,2	215,5	211,1	259,8	252,5	318,9	309,5
Total absorbed power (1)	kW	61,2	60,2	76,6	74,3	95,6	94,0	112,5	109,3
EER (1)	-	2,78	2,76	2,81	2,84	2,72	2,69	2,84	2,83
SEER (2)	-	4,10	4,11	4,15	4,14	4,12	4,10	4,10	4,11
SEPR HT (3)	-	5,34	5,36	5,58	5,75	5,02	5,04	5,10	5,13
SEPR MT (4)	-	3,85	-	3,94	-	3,68	-	3,58	-
Compressors									
Cooling circuits	N°	2							
Refrigerant charge C1 / C2	kg	4 / 5		6 / 6		7 / 7		8 / 8	
Compressors	N°	1 on/off + 1 inverter							
Capacity control	%	25 - 100							
Electrical power supply									
Power	V/Ph/Hz	400 ± 10% / 3 - PE / 50							
Auxiliary	V/Ph/Hz	24 - 230 ± 10% / 1 / 50							
Protection class	-	IP54							
Condenser coils									
Coils	N°	4	4	6	6	6	6	8	8
Total frontal surface	m^2	8,4	8,4	12,6	12,6	12,6	12,6	16,8	16,8
Fans									
Fans	N°	4	4	6	6	6	6	8	8
Total airflow	m^3/h	80000	60800	120000	91200	120000	91200	160000	121600
Nominal power (each)	kW	1,35	0,6	1,35	0,6	1,35	0,6	1,35	0,6
Plate evaporator									
Min/max evaporator flow rate	m^3/h	10/60		10/60		15/108		15/108	
Evaporator water volume	l	22		22		39		48	
Sound levels									
Sound power (5)	dB (A)	93,2	85,9	95,1	87,6	95,2	87,9	96,6	89,3
Sound pressure (6)	dB (A)	65,2	57,9	67,1	59,6	67,2	59,9	68,6	61,3

ARIES N
Operating limits

			Min	Max
			HE/SHE	HE/SHE
External air temperature	STD	°C	-10 (1)	45
	Low ambient temperature option	°C	-20	45
Evaporator inlet water temperature (2)		°C	4 (*) / -6 (**)	25 (*) / 4 (*)
Evaporator outlet water temperature		°C	0 (*) / -10 (**)	20 (*) / 0 (*)
Water delta T		°C	4	10
Pressure in the hydraulic circuit without integrated hydronic module		barg	0	6
Pressure in the hydraulic circuit with pump/s (no storage tank)		barg	0	6
Pressure in the hydraulic circuit with storage tank and pump/s		barg	0	3

(1) See performance data table.
(2) Comply with the exchangers minimum and maximum flow rate values.
(*) For water outlet temperatures lower than 6 °C you must add a suitable quantity of anti-freeze additives.
(**) MWT configuration.

Water outlet temperature

0°C ÷ 20°C

-10°C ÷ -1°C MWT version

ΔT in/out

4 ÷ 10K

Outdoor ambient temperature

-20°C ÷ 45°C

ARIES N
Features

High efficiency axial EC fans
Continuous adjustment of fans speed to control the condensation

V-shape condensing coil
Aluminium Microchannel heat exchangers
Reduced refrigerant charge (up to -30% in comparison to std tubes and fins)

Electronic expansion valve
Stability at partial load

Relief valve
On each circuit in the high-pressure side and low-pressure side
(according to EN378 standards)

Reciprocating semi-hermetic compressors (ATEX certified)
in 2 independent refrigerant circuits

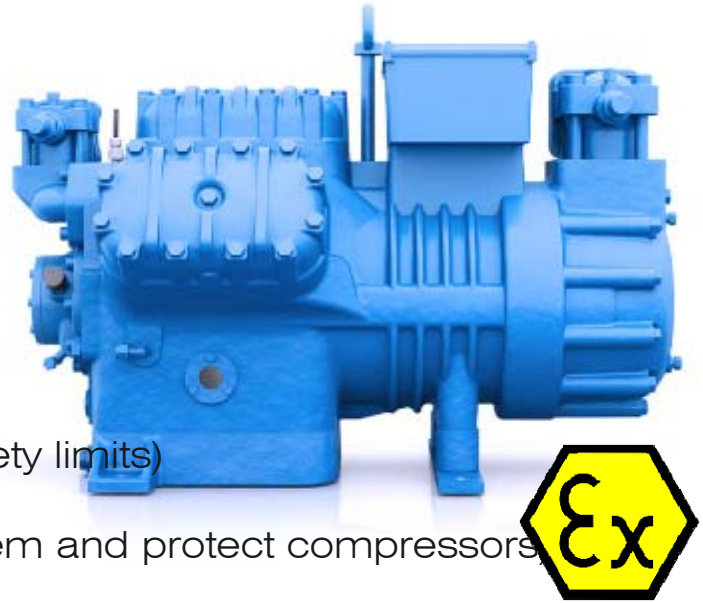
Detached Electrical Panel
- IP54 protection rating
- Automatic circuit breakers on compressors, fans and pumps
- Phase monitor
- Programmable electronic controller
- Touch-screen keyboard

Complete enclosure
Sturdy galvanized carbon steel structure with epoxy polyester powder coating
Main refrigerant components are housed in a mechanically ventilated compartment

Brazed Plate Evaporator
- External anti-condensation cladding
- flow switch to avoid operations with low water flow values

Integrated hydraulic kit
Victaulic type with stub pipe (victaulic kit supplied as standard) Pumps and tank (option)

Compressors
In detail



RECIPROCATING SEMI-HERMETIC COMPRESSORS
With 4, 6 and 8 cylinders

Equipped with:
- IP65 electric terminal box;
- Oil level sight glass;
- Shut-off valves on suction and discharge line;
- Discharge temperature cut-off device;
(stops the compressor if the discharge temperature exceeds the safety limits)
- Electronic pressure switch on the oil pump;
(monitors the differential pressure in the compressor lubrication system and protect compressors)
- Thermal overload protection sensors.

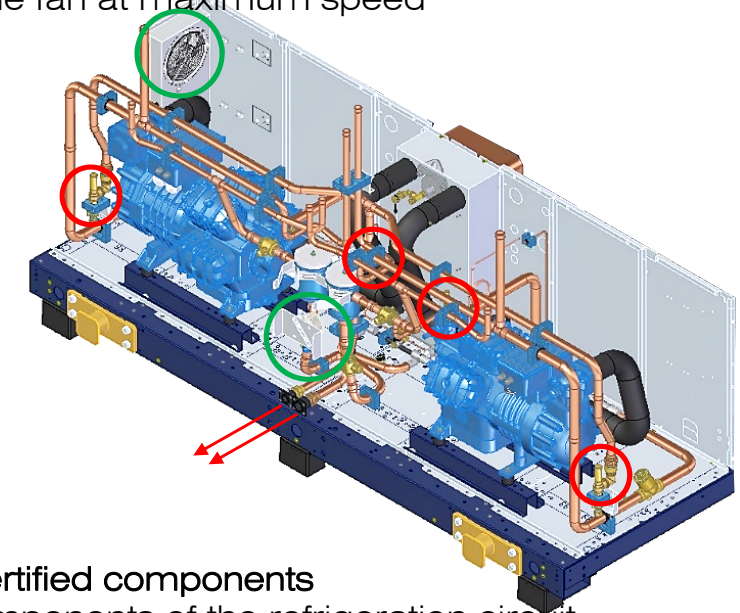
ATEX certified in category 3G (high protection level in Zone 2)

ARIES N
2 compressors (1 ON-OFF/ 1 with inverter) / 2 circuits

TRANE

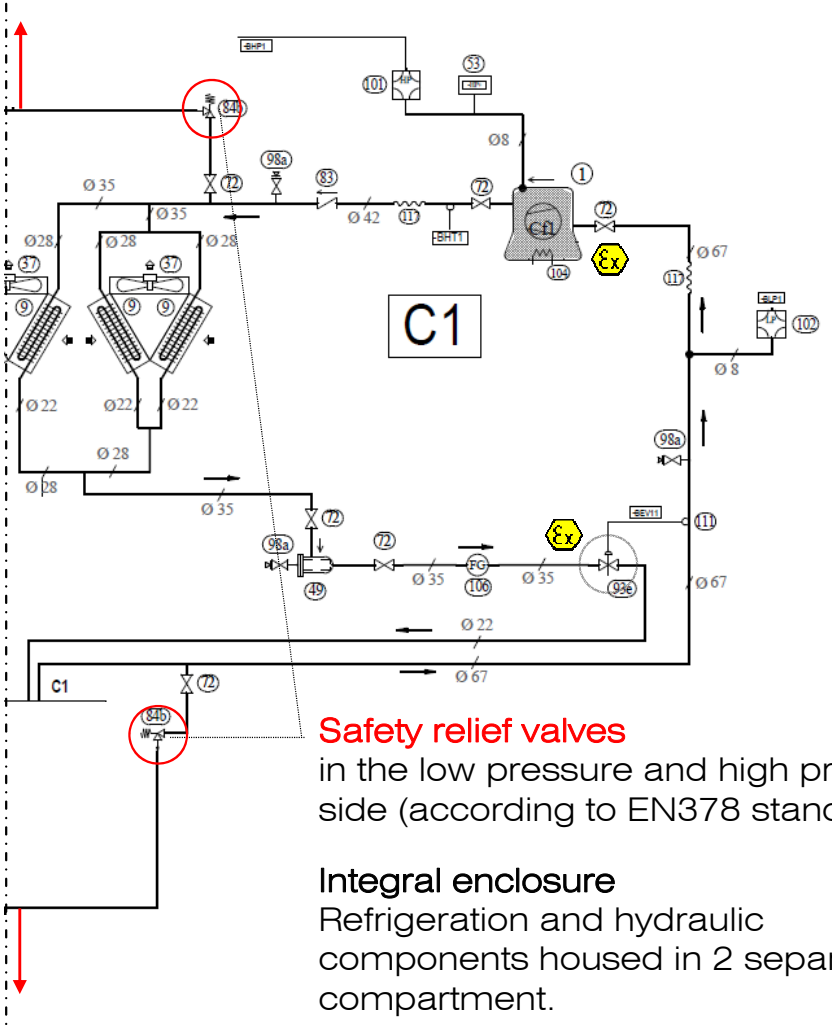
Safety equipment
In detail

Leak detector + ATEX fan
Compressor compartment is equipped with a leak detector, which cuts the power supply to the main loads and activates the fan at maximum speed



ATEX zone 2 certified components
All the main components of the refrigeration circuit (e.g. Compressors, EEV) are housed in a dedicated compartment
that is mechanically ventilated.

Safety valves discharge outlet (HP)

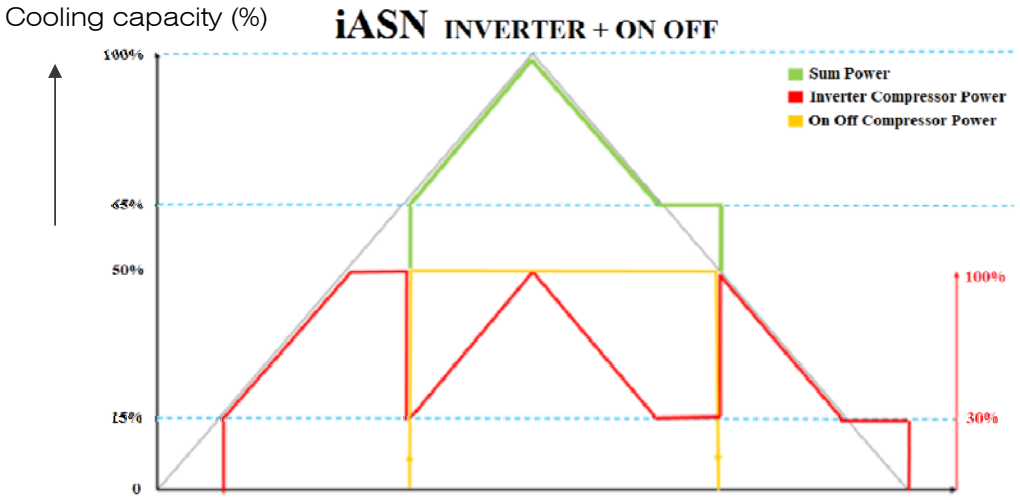


Safety relief valves
in the low pressure and high pressure side (according to EN378 standards)

Integral enclosure
Refrigeration and hydraulic components housed in 2 separate compartment.

Safety valves discharge outlet (LP)

Capacity modulation and unit controller
In detail



- One inverter driven compressor + one on/off compressor
- Inverter driven compressor always start first
- On/off compressor starts when cooling demand >50%

- CAREL **c.pCO** electronic unit controller
- Controller software developed in-house
- User friendly touch screen interface
- Management of alarm messages in addition to the temperature control
- 24 V AC powered remote general alarm
- RS485 and RJ-45 serial output with standard ModBus protocol

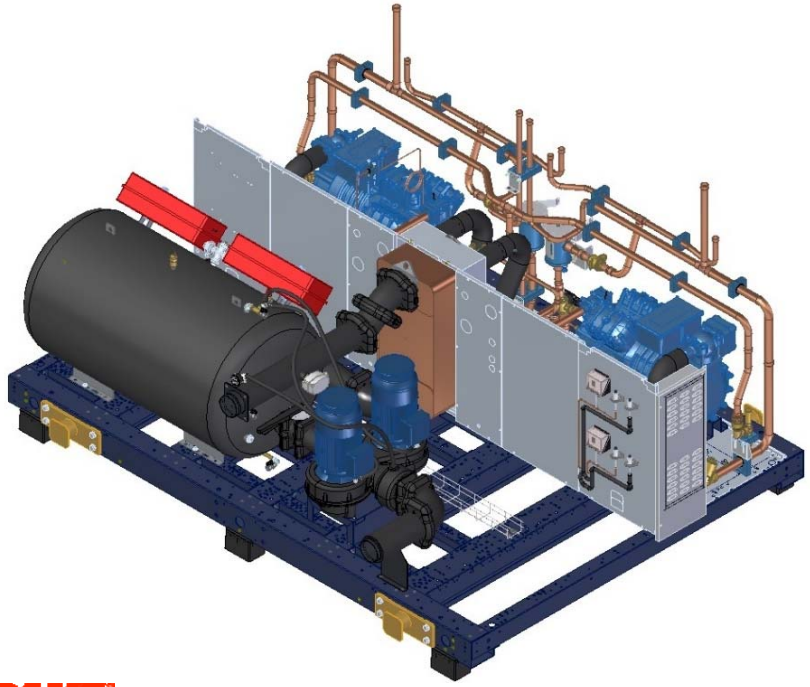
ARIES N inverter

Options and kits

Integrated hydronic module
Configurations

Single pump or double pump (twin version with stand-by operation)

P2 ~ 200 [kPa] nominal available head pressure ΔP
P3 ~ 300 [kPa]



- No pump
- P2 ± Storage tank
- P3 ± Storage tank
- P2+P2 twin ± Storage tank
- P3+P3 twin ± Storage tank

Model		075	100	110	150
CC	kW	170	215	260	320
Evaporator volume	l	22	22	39	48
Tank volume	l	800	800	800	1100

Options
Factory mounted

- Low ambient temperature configuration -20°C
The configuration includes and electrical heater managed by thermostat within the electrical panel;
It is recommended to match this option with antifreeze additives in adequate concentration, or alternatively, provide the antifreeze heaters option

- Energy Meter
It provides a solution for measuring energy data, installed within the electric
It allows to monitor the energy data directly from the on-board display;

- Antifreeze heaters
Resistance wires installed on evaporator and pumps, immersion heater on tank;

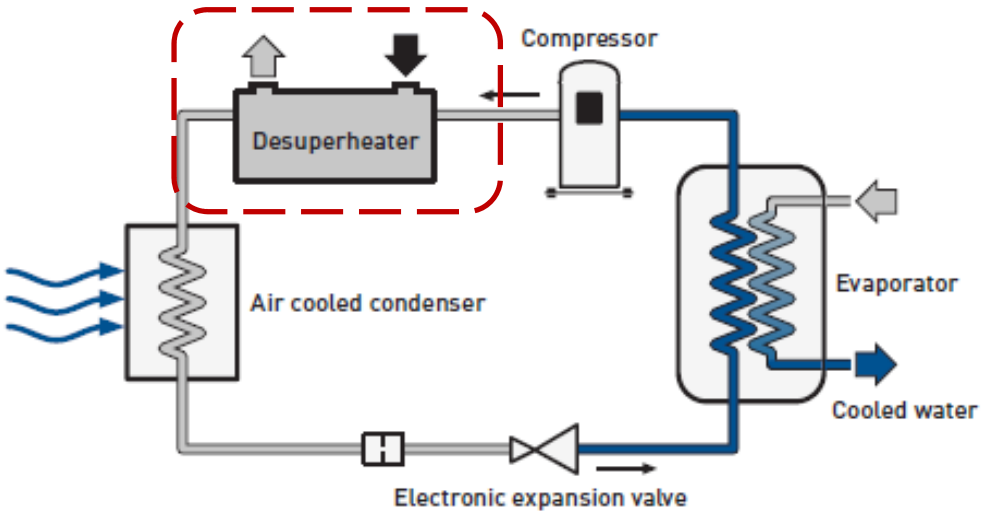
- Metallic mesh filters
For condensing coils protection;

- Protective epoxy primer and polyurethane-based paint on condensing coils;.
It is recommended to select this option for installation in aggressive environments

- Partial heat recovery

TRANE

Partial Heat Recovery
In detail



Desuperheater (PHR) = Energy saving by recovering and reusing heat from the refrigeration cycle

One brazed plate heat exchanger per circuit is placed on the discharge line between the compressor and condenser coil as shown.

At the discharge line (hot gas) of the compressor, refrigerant is de-superheated by transferring its sensible heat to the water which will rise its temperature.

At full load condition approximately 20% of the delivered cooling capacity can be recovered.

PHR option is not available in combination with an integrated hydraulic module including water buffer tank.

A great option to enhance Sustainability by recovering and reusing heat

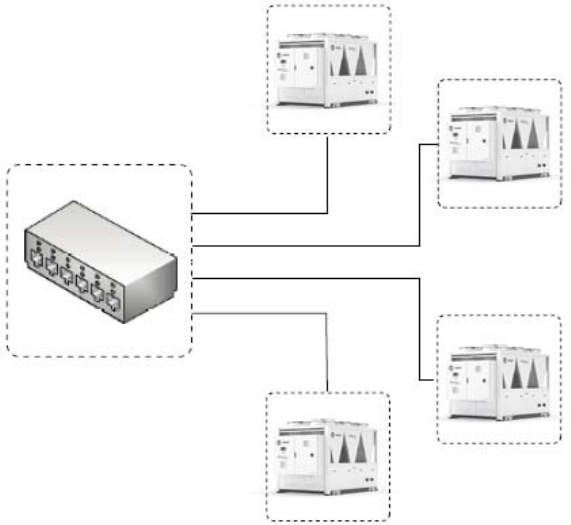
Kits
Supplied loose

- **Modularity kit (for Master unit only)**
Up to **4** units (1 MASTER + 3) via Ethernet connection to create a modular system.
The kit's control system manages the units and compressors on/off to guarantee the same operating hours between the different loads.
The modularity between 2 units can be managed without using the kit through direct connection with a crossed RJ-45 Ethernet cable.

- **Antivibration mounts;**

- **Metal mesh protection filters** for condenser coils;

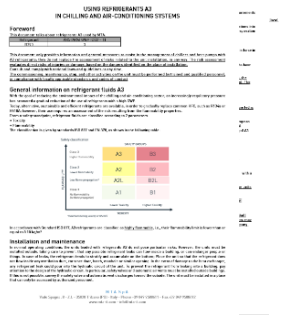
- **Victaulic hydraulic connections kit**
complete with connection joints and welded stubs;
Already supplied with each unit as per STD



ARIES N inverter

Safety considerations

Using A3 refrigerants
General recommendations



From a safety standpoint, refrigerant fluids are classified according to 2 parameters:

Toxicity Flammability

R290 Propane is A3 classified according to ISO 817:
Highly flammable, i.e., flammability limit is lower than or equal to 0.10 kg/m³, and **Non-toxic**

Installation and maintenance

The machine should be installed outdoors, in full compliance with Standards EN 378, and / or with current regulations in force in the Country of installation. The end user must assess the individual risk, taking all local standards and regulations into account. […]

Transporting the unit

The unit must be transported in compliance with local regulations. For shipping methods, refer to international ADR, IMDG and IATA directives. For road transport in Europe, the European Agreement on International Transportation of Dangerous Goods on Road (ADR) shall apply.
The transport temperature should not exceed 50°C. […]

Storing the unit

In general, the unit should be stored outside, in compliance with all applicable regulations, local laws and building
The unit may be equipped with pressure limiting valves, which could release refrigerant, if the unit is exposed to high temperatures.
The storage temperature should not exceed 50°C. […]

This information do not replace the assessment of risks related to the unit installation, in any way. The risk assessment evaluates direct risks of injuries or damage, based on the dangers identified on the place of installation.
Consult and comply with national laws and guidelines at any time.
The commissioning, maintenance, stop, and other activities on the unit must be performed by trained and qualified personnel, in compliance with locally applicable standards and codes of conduct.

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