# Waterloop system

## Indirect condensation system

Indirect condensation by a water circuit

Quick and easy installation

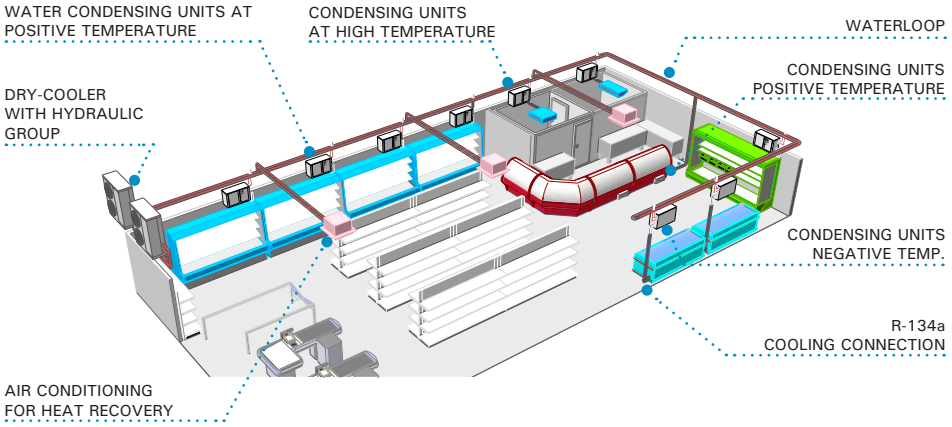
Minimal R-290 refrigerant charge

# Waterloop system

**Waterloop** is a commercial refrigeration system, consisting of: DX cooling units distributed, with indirect condensation by a water circuit; and one or more units in parallel air-cooler connected to the condensation heat dissipation.

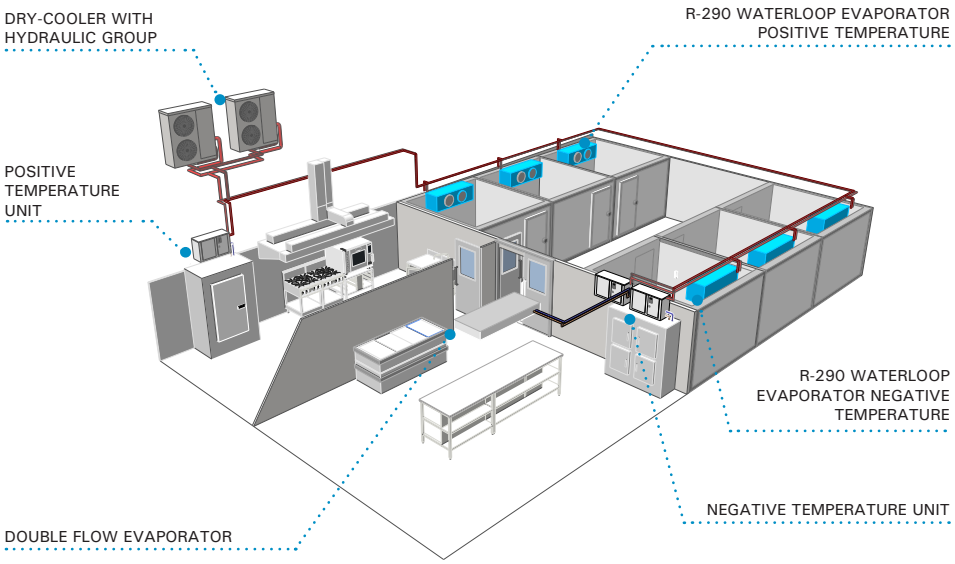
## Supermarkets and food stores applications

Waterloop system allows distributed cooling production at different temperatures, with a single condensing water loop. Condensation heat recovery from the cooling units can easily be carried out in air conditioners or fan coils.




## Application in industrial kitchens

Waterloop system makes possible to centralise a set of cold rooms and process rooms. The use of compact R-290 waterloop units in cold rooms and process rooms is a 100 % ecological solution free of greenhouse gases.




### Ecology

Distributed cooling production allows to reduce and fractionate the load of HFC refrigerant in the installation, so that the risk of leakage is reduced.

### Safety

Decentralization of the cooling production contributes a greater operation security of the installation, that guarantees a high availability of the system when faced with the isolated failure of a single unit.

The installation of a double air-cooler or dry-cooler in parallel, provides a greater operational security.

The condensation water loop contains only closed-circuit water working at low hydraulic pressure.

### Simple installation

Waterloop system is very easy to install, thanks to its condensed water units pre-charged with refrigerant, and air-coolers or dry-coolers with inbuilt hydraulic unit/circuit.

### Precision

Distributed cooling production allows adaptation of working temperatures to the needs of each service, thus obtaining an adequate degree of humidity for the best preservation of each product, and optimizing the performance of the systems.

### Energy saving

Condensing units incorporate high-efficiency scroll compressors with R-134a or R-449A refrigerant for positive temperature, and R-449A for negative temperature.

Air-coolers or dry-coolers incorporate hydraulic group with electronic pump of variable flow, that adapts its functioning speed to the demand of the installation. Motor fans are equipped with speed regulators to reduce their consumption in low ambient temperatures or low load.

### Versatility

Waterloop system is applicable both in new installations and in existing centralized direct expansion facilities, where the update of refrigeration installation is desired. In fact, existing refrigerating displays are usable and easily converted to new refrigerants.

### Easy and flexible installation

Refrigeration units are supplied with service valves and factory refrigerant pre-load with service keys.

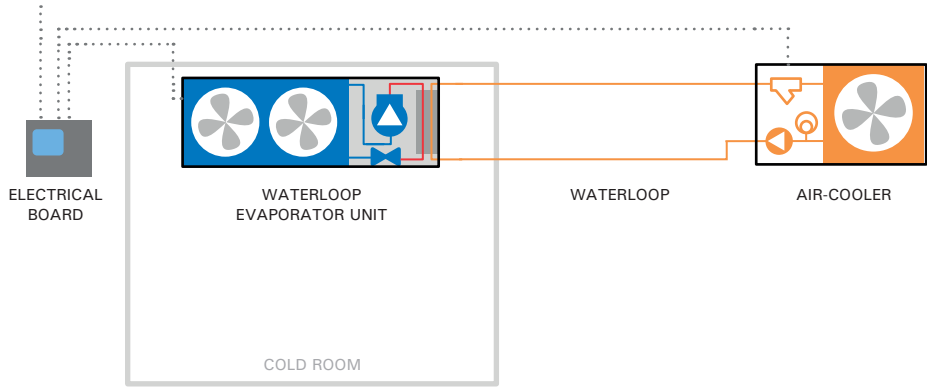
The waterloop can be made with polypropylene pipe without insulation, with service valves in each refrigeration unit, thus providing great flexibility in modifying the installation.

### Tropicalised design

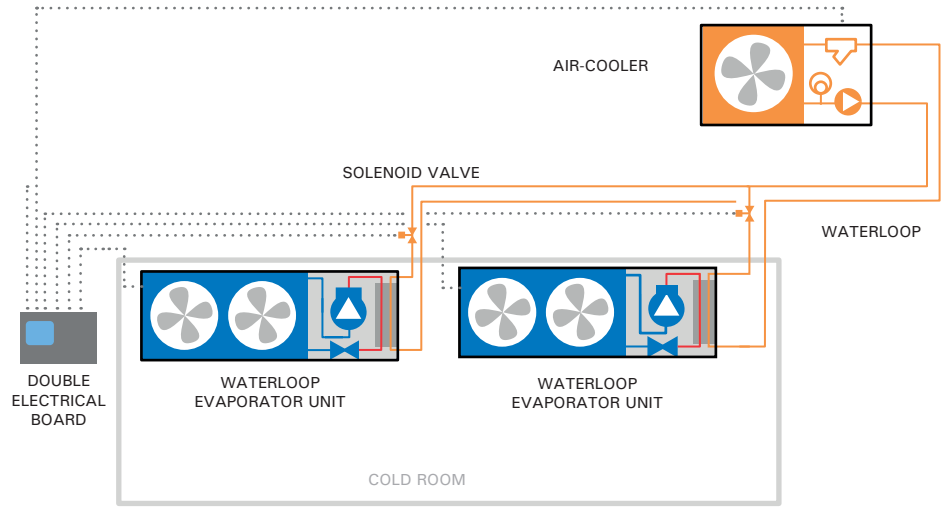
Unlike other systems on the market, the waterloop system is designed to work properly even with extreme ambient temperatures of up to 45 °C, with condensation water temperatures of up to 55 °C, and without the need to incorporate additional cooling equipment.

**Waterloop** system allows different configurations from a simple cold room up to a set of rooms and other refrigeration services at different temperatures.

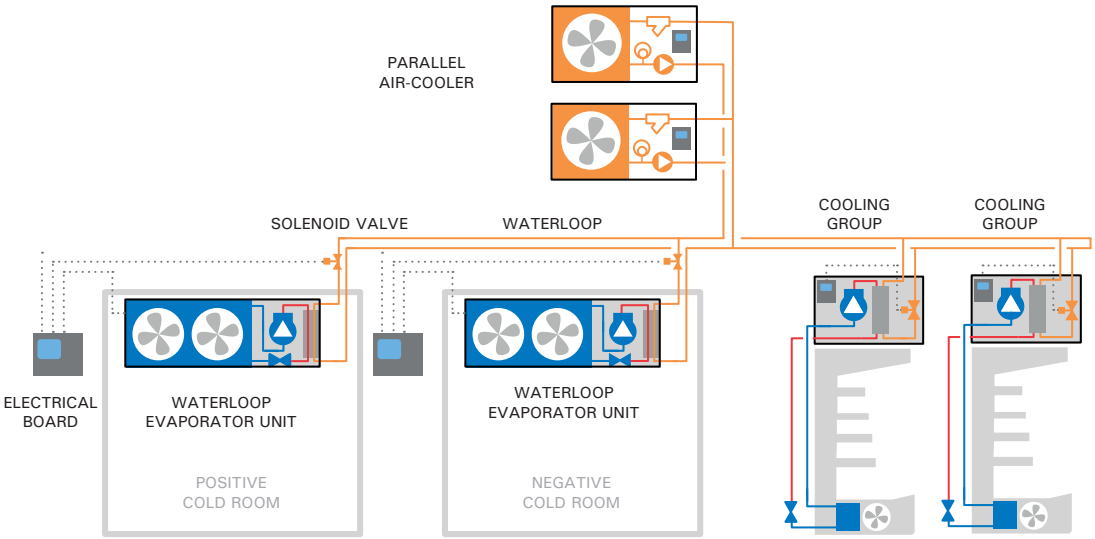
## Simple installation example 1 + 1




## Twin installation example




## Multi installation example




### Product range

Evaporator units with built-in compressor, condensed by water, and with external panel. Designed for positive or negative cold rooms temperature.

Refrigeration units condensed by water, with external panel. Designed to service refrigerated cabinets and displays.

Aero condensers with built-in hydraulic unit, at constant or variable flow, with water loop temperature control.

# Waterloop

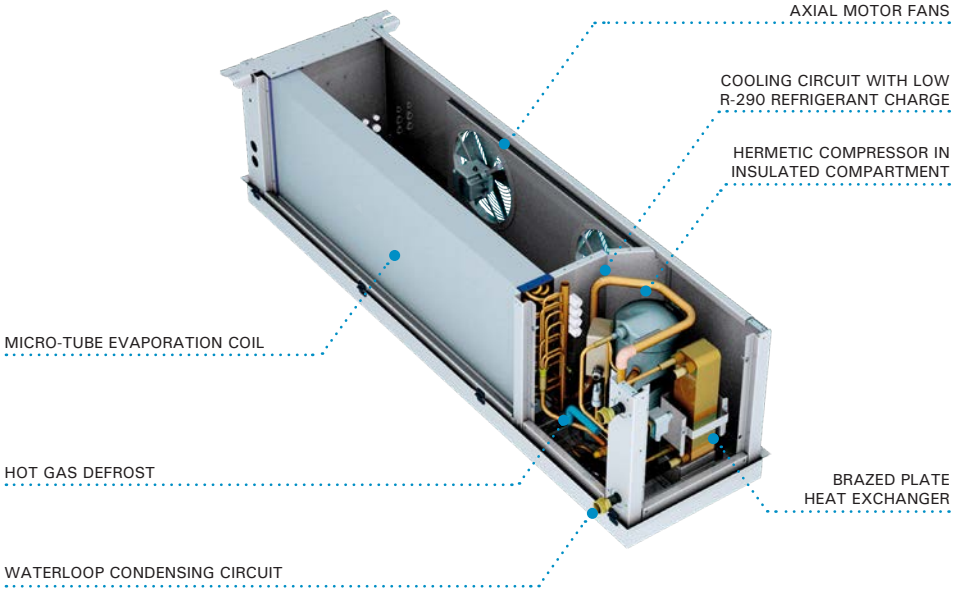
## Evaporator with built-in compressor

- Compact unit condensed by water.
- Minimal R-290 refrigerant charge.
- Easy and safe installation with connection to the condensation water circuit.

Waterloop evaporator units with compressor are compact units for installation inside small cold rooms, designed with natural refrigerant R-290 and waterloop condensed.

### Features

- 230V 50Hz or 400V 3N 50Hz power supply. Available in 60Hz. Others voltages by request.
- R-290 refrigerant charge low than 0.25 kg.
- Bodywork in aluminium sheet and structure in galvanised steel lacquered in polyester paint.
- Alternative hermetic or scroll compressor integrated in thermally insulated compartment, with crankcase heater.
- Refrigeration circuit in annealed copper tube, with high pressure switch, filter drier and load valve.
- Evaporation coil in copper pipes and aluminium fins, thermostatic expansion valve and hot gas defrost.
- Axial motor fans.
- Stainless steel brazed plates heat exchanger.
- Threaded hydraulic connections.
- Control panel in white lacquered sheet metal cabinet, with MCB protection and multifunction electronic control.
- Water solenoid valve for multi-equipment waterloop installation (without assembly).




### Installation

Installation of a closed loop water evaporator unit with an air cooler and general electrical panel:

### Compact R-290 system

The waterloop evaporator units are hermetically sealed compact systems with a minimum charge of R-290.

They have a minimum R-290 refrigerant charge lower than the practical limit of the refrigerated volume.

### Electrical board (optional)

Electrical power and control board for outside installation.

- MCB protection of compressor and manoeuvre.
- Electronic control with temperature control and recording of maximum and minimum temperatures.
- Jet Cool function.
- Energy saving function.
- Optional air condenser management with water loop temperature control and frost protection.

## 230V 50Hz / 400V 3N 50Hz | Positive temperature | Hermetic compressor - Scroll compressor | R-290

| Refrigerant | Compressor | Serie / Modelo | Compressor HP | Compressor Power supply | Cooling capacity / cold room volume (W) [1] 0 °C W | Input power (W) | Max. current (A) | Evap. air flow ($m^3/h$) | Condenser pressure drop (litre/hour) | Condenser pressure drop (kPa) [2] | Hydraulic connection | Refrigerant charge (g) | Weight (kg) | Dry-cooler model [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R-290 | 1x H | MCC-ND-1 017 | 3/4 | 230V | 1 430 | 572 | 7.7 | 1 600 | 350 | 3 | 3/4" | 210 | 50 | CWF-0 |
| | 1x | MCC-ND-1 034 | 1 1/2 | 230V | 2 640 | 1 060 | 16.4 | 1 600 | 650 | 3 | 3/4" | 170 | 59 | CWF-0 |
| | 1x Sc | MCC-SD-1 012 | 1 1/2 | 400V 3N | 3 410 | 860 | 7.7 | 1 600 | 750 | 5 | 3/4" | 265 | 62 | CWF-1 |
| | | MCC-SD-2 017 | 2 | 400V 3N | 3 930 | 1 070 | 9.0 | 1 700 | 875 | 5 | 1" | 240 | 72 | CWF-2 |

## 230V 50Hz / 400V 3N 50Hz | Negative temperature | Hermetic compressor - Scroll compressor | R-290

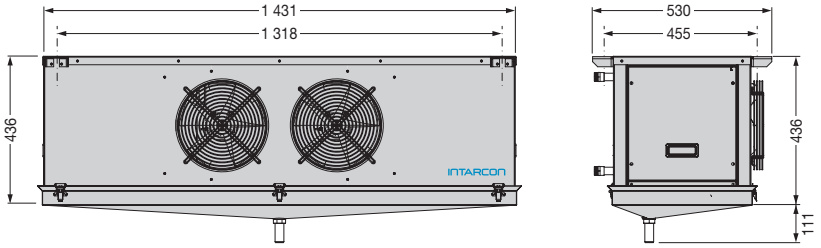
| Refrigerant | Compressor | Serie / Modelo | Compressor HP | Compressor Power supply | Cooling capacity / cold room volume (W) [1] -20 °C W | Input power (W) | Max. current (A) | Evap. air flow ($m^3/h$) | Condenser pressure drop (litre/hour) | Condenser pressure drop (kPa) [2] | Hydraulic connection | Refrigerant charge (g) | Weight (kg) | Dry-cooler model [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R-290 | 1x H | BCC-ND-1 034 | 1 | 230V | 847 | 800 | 11.0 | 1 600 | 300 | 3 | 3/4" | 150 | 59 | CWF-0 |
| | 1x Sc | BCC-SD-1 012 | 1 1/2 | 400V 3N | 1 480 | 770 | 7.6 | 1 600 | 400 | 3 | 3/4" | 150 | 68 | CWF-0 |
| | | BCC-SD-2 017 | 2 | 400V 3N | 1 980 | 1 000 | 8.9 | 1 700 | 525 | 3 | 1" | 190 | 72 | CWF-1 |

### Options

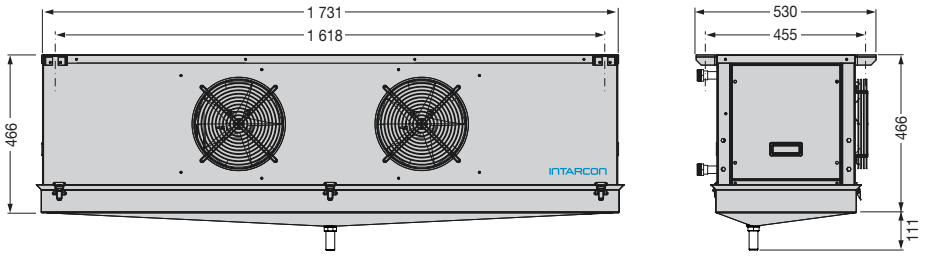
- Electrical board for twin installation .
- Without water solenoid valve for multi-equipment waterloop installation.

### Dimensions

#### 1 series




#### 2 series




Dimensions in mm.

[1] Nominal performances refer to operation with cold room temperatures of 0 °C (PT) and -20 °C (NT) and water inlet condensation temperature of 7 °C. Estimated cold room volume according to conditions of the calculation bases (page 12).

[2] Condenser pressure drop in the water circuit.

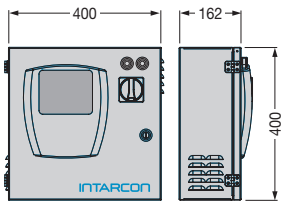
[3] Recommended air cooler model to combine with the evaporator unit.

### Electrical interconnections

For the electrical interconnection from the electrical panel to the unit and to the air condenser (optional), the following interconnection cables must be provided:

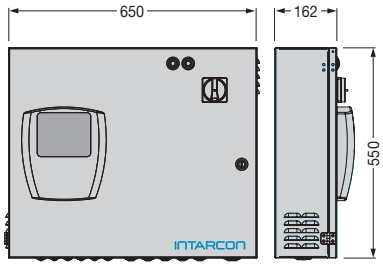
| Cabinet - Evaporator | Connection |
|---|---|
| Compressor for single-phase units (except MCC-ND-1 034)* | 3 x 1.5 $mm^2$ + T |
| Compressor for three-phase units and MCC-ND-1 034 | 3 x 2.5 $mm^2$ + T |
| Manoeuvre | 7 x 1 $mm^2$ |
| Probes | 5 x 1 $mm^2$ |
| **Cabinet - Dry-cooler** | **Connection** |
| Pump (1 + 1 system) | 2 x 1.5 $mm^2$ + T |
| Fan (1 + 1 system) | 3 x 1 $mm^2$ |
| Probes (1 + 1 system) | 3 x 1 $mm^2$ |
| Pumping permit (multi system) | 2 x 1 $mm^2$ |

### Electrical board dimensions




Dimensions mm.

### Electrical board dimensions - Twin installation




Dimensions mm.

# Waterloop

## Water-cooled condensing units

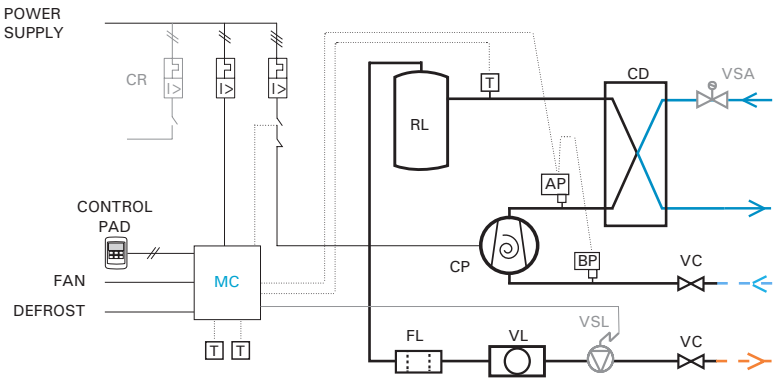

- Indirect condensation by a water circuit.
- Low noise level.
- Simple installation.
- Reduced refrigerant load.
- According to F-Gas.

Water-cooled condensing units for positive and negative temperature refrigeration, with very compact size and quiet operation, designed for on-wall or floor installation.

### Features

- 230V 50Hz or 400V 3N 50Hz power supply. Available in 60Hz. Others voltages by request.
- Casing in pre-painted galvanized steel sheet, with noise insulation, with removable front panel for access to the compressor and the electrical panel.
- Acoustically insulated scroll compressor, mounted on shock absorbers.
- Horizontal construction rotary compressor (MDM-P / BDM-P).
- Stainless steel brazed plates heat exchanger. Cooling circuit with ceramic dryer filter, sight glass, HP and LP and services valves.
- Hydraulic condensation circuit made of copper pipe with threaded connections.
- Electromechanic control panel with thermomagnetic protection.
- Liquid injection system for negative temperature models with R-449A.

### Refrigeration and electrical scheme

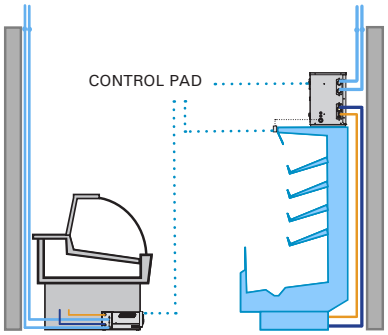



STANDARD
AP: HIGH PRESSURE SWITCH
BP: LOW PRESSURE SWITCH
CD: HEAT EXCHANGER
CP: COMPRESSOR
FL: FILTER
MC: MICRO-CONTROLLER
RL: LIQUID VESSEL
T: PROBE
VC: SHUT-OFF VALVE
VL: SIGHT GAUGE

OPTIONAL
CR: DEFROST CONTACTOR
VSA: WATER SOLENOID VALVE
VSL: LIQUID SOLENOID VALVE
OPTIONAL WITH ELECTRONIC CONTROL
MC: ELECTRONIC MICRO-CONTROLLER

### Installation

Waterloop series motor condensers can be installed on the furniture, on the floor or anchored at the wall.




### Rotary compressors

Hermetic rotary compressors provide greater reliability, lower noise and maximum design flexibility.

### Very quiet compressors

Scroll compressors Copeland, are characterized by their great robustness and reliability of operation, and being cooled exclusively by the refrigerant gas, allow effective soundproofing.

### Calculation of hydraulic connections

Visit our easy and intuitive online software to calculate the hydraulic pipes of the system.

https://intarcon.calcooling.com/

## 230V 50Hz / 400V 3N 50Hz | Positive temperature | Rotary compressor - Scroll compressor | R-134a / R-449A

| Refrigerant | Compressor | Series / Model | Compressor HP | Compressor Model | Compressor Power supply | Cooling capacity (W) [1] Evaporation temperature 0 °C | -5 °C | -10 °C | Input power (kW) | Max. current (A) | Condensing flow (l/h) | Hydraulic connection | Pressure drop (kPa) [2] | Liq-Gas cooling connection | Weight (kg) | SPL dB(A) [2] 1 m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R-134a | 1x Rot. | **MDM-PY-0 005** | 3/8 | HGA-4450Y | 230V | 900 | 730 | **585** | 0.3 | 4 | 150 | 3/4" | 5 | 1/4"-3/8" | 20 | 36 |
| | | **MDM-PY-0 007** | 1/2 | HGA-4476Y | 230V | 1 255 | 1 030 | **830** | 0.5 | 5 | 250 | 3/4" | 5 | 1/4"-1/2" | 25 | 45 |
| | 1x Scroll | **MDM-SY-1 009** | 1 1/4 | ZS09 | 400V 3N * | 1 855 | 1 540 | **1 270** | 0.7 | 3 | 350 | 3/4" | 5 | 1/4"-5/8" | 34 | 40 |
| | | **MDM-SY-1 015** | 2 | ZB15 | 400V 3N * | 2 840 | 2 360 | **1 945** | 1.1 | 5 | 500 | 3/4" | 5 | 1/4"-5/8" | 43 | 37 |
| | | **MDM-SY-1 021** | 3 | ZB21 | 400V 3N * | 4 250 | 3 520 | **2 890** | 1.5 | 7 | 750 | 3/4" | 5 | 1/4"-3/4" | 53 | 40 |
| | | **MDM-SY-1 029** | 4 | ZB29 | 400V 3N | 5 245 | 4 355 | **3 585** | 2.0 | 10 | 950 | 1" | 5 | 3/8"-7/8" | 53 | 40 |
| | | **MDM-SY-1 038** | 5 | ZB38 | 400V 3N | 7 095 | 5 880 | **4 835** | 2.5 | 13 | 1 250 | 1" | 5 | 3/8"-7/8" | 68 | 43 |
| | | **MDM-SY-1 045** | 6 | ZB45 | 400V 3N | 8 320 | 6 915 | **5 695** | 2.9 | 13 | 1 500 | 1" | 5 | 3/8"-1 1/8" | 70 | 43 |
| | | **MDM-SY-1 057** | 8 | ZB57 | 400V 3N | 10 575 | 8 780 | **7 230** | 4.0 | 16 | 1 950 | 1 1/4" | 5 | 3/8"-1 1/8" | 75 | 50 |
| R-449A | 1x Rot. | **MDM-PG-0 006** | 1/2 | HGA-4467Z | 230V | 1 285 | 1 055 | **855** | 0.5 | 5 | 200 | 3/4" | 5 | 1/4"-3/8" | 22 | 38 |
| | | **MDM-PG-0 010** | 1 | HGA-4512Z | 230V | 2 140 | 1 765 | **1 440** | 0.5 | 7 | 350 | 3/4" | 5 | 1/4"-1/2" | 27 | 41 |
| | 1x Scroll | **MDM-SG-1 009** | 1 1/4 | ZS09 | 400V 3N * | 3 095 | 2 585 | **2 135** | 1.1 | 2 | 500 | 1" | 5 | 1/4"-5/8" | 34 | 40 |
| | | **MDM-SG-1 015** | 2 | ZB15 | 400V 3N * | 4 860 | 4 050 | **3 340** | 1.8 | 5 | 800 | 1" | 5 | 3/8"-5/8" | 43 | 37 |
| | | **MDM-SG-1 021** | 3 | ZB21 | 400V 3N * | 7 365 | 6 140 | **5 080** | 2.5 | 7 | 1 200 | 1" | 5 | 3/8"-3/4" | 53 | 40 |
| | | **MDM-SG-1 029** | 4 | ZB29 | 400V 3N | 9 610 | 8 020 | **6 635** | 3.2 | 10 | 1 500 | 1 1/4" | 5 | 3/8"-7/8" | 53 | 40 |
| | | **MDM-SG-1 038** | 5 | ZB38 | 400V 3N | 12 445 | 10 380 | **8 540** | 4.1 | 13 | 1 950 | 1 1/4" | 5 | 3/8"-7/8" | 68 | 43 |
| | | **MDM-SG-1 045** | 6 | ZB45 | 400V 3N | 14 715 | 12 270 | **10 130** | 4.7 | 13 | 2 500 | 1 1/4" | 5 | 3/8"-1 1/8" | 70 | 43 |

## 230V 50Hz / 400V 3N 50Hz | Negative temperature | Rotary compressor - Scroll compressor | R-449A

| Refrigerant | Compressor | Series / Model | Compressor HP | Compressor Model | Compressor Power supply | Cooling capacity (W) [1] Evaporation temperature -20 °C | -25 °C | -30 °C | -35 °C | Input power (kW) | Max. current (A) | Condensing flow (l/h) | Hydraulic connection | Pressure drop (kPa) [2] | Liq-Gas cooling connection | Weight (kg) | SPL dB(A) [2] 1 m |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| R-449A | 1xR | **BDM-PG-0 004** | 1 | HGA-2446Z | 230V | 985 | 785 | **615** | 470 | 0.6 | 5 | 150 | 3/4" | 5 | 1/4"-1/2" | 23 | 45 |
| | 1x Scroll | **BDM-SG-1 006** | 2 | ZF06 | 400V 3N | 2 360 | 1 910 | **1 525** | 1 195 | 1.5 | 5 | 550 | 3/4" | 5 | 1/4"-5/8" | 45 | 39 |
| | | **BDM-SG-1 009** | 3 | ZF09 | 400V 3N | 3 210 | 2 590 | **2 070** | 1 620 | 1.9 | 6 | 700 | 3/4" | 5 | 3/8"-3/4" | 54 | 44 |
| | | **BDM-SG-1 011** | 3 1/2 | ZF11 | 400V 3N | 4 050 | 3 275 | **2 610** | 2 045 | 2.3 | 8 | 850 | 3/4" | 5 | 3/8"-3/4" | 55 | 45 |
| | | **BDM-SG-2 013** | 4 | ZF13 | 400V 3N | 4 595 | 3 715 | **2 970** | 2 325 | 2.5 | 9 | 950 | 1" | 5 | 3/8"-7/8" | 55 | 47 |
| | | **BDM-SG-2 015** | 5 | ZF15 | 400V 3N | 5 640 | 4 560 | **3 640** | 2 850 | 3.3 | 10 | 1 200 | 1" | 5 | 3/8"-7/8" | 73 | 47 |
| | | **BDM-SG-2 018** | 6 | ZF18 | 400V 3N | 6 685 | 5 400 | **4 310** | 3 375 | 3.9 | 14 | 1 500 | 1" | 5 | 3/8"-1 1/8" | 78 | 49 |
| | | **BDM-SG-2 025** | 8 | ZF25 | 400V 3N | 8 400 | 6 795 | **5 430** | 4 265 | 4.2 | 16 | 1 750 | 1 1/4" | 5 | 3/8"-1 1/8" | 78 | 52 |

## Options

- Change to 230V 50Hz power supply.
- Electronic control for evaporator and compressor with temperature probes and control suitable for local or remote control.
- Refrigerant pre-load for 5 m piping.
- Built-in liquid solenoid valve with body and coil.
- Water solenoid valve.
- Dynamic balancing valve.
- Glycol water condensation.

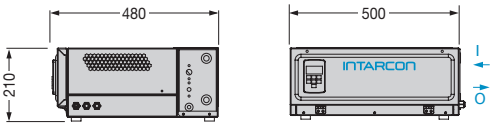
[1] Cooling capacity at nominal performances refer to operation at evaporation temperature -10 °C (PT) and -30 °C (NT), water temperature of 40 °C, 10 K super-heating and 3 K sub-cooling.

[2] Sound pressure level, with directivity 1, measured at 10 m from the unit (non-binding value calculated from sound power).

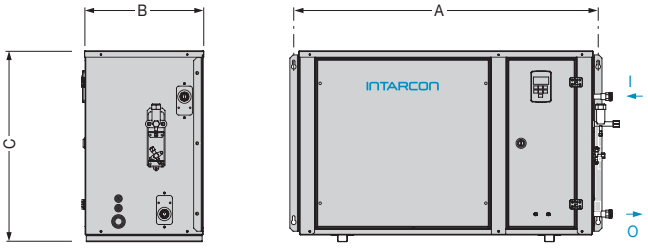
* Available units with 230V 50Hz power supply.

## Dimensions

### 0 series




### 1 and 2 series




| Dimensions (mm) | A | B | C |
|---|---|---|---|
| 1 series | 832 | 355 | 531 |
| 2 series | 957 | 375 | 600 |

Dimensions in mm.

# Waterloop

## Dry-cooler with built-in hydraulic group


- ❄ Low sound level with double acoustic insulation.
- ❄ Tropicalised design for ambient temperature up to 45 °C as standard.

Dry-coolers with built-in hydraulic group, in a low-noise construction, designed for heat dissipation of the refrigeration equipment condensation waterloop.

### Features

- ▶ Axial EC motor fans (except CWF-0 and CWF-1).
- ▶ High efficiency water coils with copper pipes and aluminium fins.
- ▶ Hydraulic group with variable flow electronic pump, expansion tank, security valve, filter, thermomanometers and auto-fill valve included.
- ▶ Closed membrane expansion tank.
- ▶ Threaded hydraulic connections.
- ▶ Electric power panel with protection of hydraulic pump, fan motor and frequency variator (except CWF-0 and CWF-1).

### Electronic control

Waterloop dry-coolers incorporate an electronic control with the next functions:

- Variation of the water pump flow adapting to the demand, depending on the impulsion pressure.
- Waterloop temperature control by fan speed variation, with floating set-point.
- Frost protection.

**230V 50Hz | Positive temperature | Water**

| | Series / Model | Flow control | Exchange capacity (W) [1] | Air Flow ($m^3/h$) | Fan (N x Ø mm) | Water flow (l/h) | Input power (kW) | Max. current (A) | Pressure drop (kPa) [2] | Cooling connection | Weight (kg) | SPL dB(A) [3] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| WATER | **CWF-0** | Constant | 3 000 | 1 700 | 1x Ø 360 | 500 | 0.14 | 1.1 | 100 | 3/4" | 76 | 30 |
| | **CWF-1** | Constant | 4 700 | 3 200 | 1x Ø 450 | 750 | 0.22 | 1.8 | 100 | 3/4" | 79 | 26 |
| | **CWF-2** | Variable | 6 000 | 3 700 | 1x Ø 450 | 1 000 | 0.24 | 2.0 | 100 | 1" | 81 | 26 |
| | **CWF-3** | Variable | 10 000 | 6 500 | 2x Ø 450 | 1 500 | 0.44 | 3.6 | 100 | 1" | 101 | 29 |
| | **CWF-4** | Variable | 12 000 | 7 000 | 2x Ø 450 | 2 000 | 0.48 | 3.9 | 100 | 1 1/4" | 113 | 29 |
| | **CWF-6** | Variable | 20 000 | 13 000 | 4x Ø 450 | 3 000 | 0.88 | 7.0 | 100 | 1 1/2" | 160 | 32 |
| | **CWF-8** | Variable | 24 000 | 14 000 | 4x Ø 450 | 4 000 | 0.96 | 7.5 | 100 | 1 1/2" | 185 | 32 |

### Options

- ▶ Water coil anti-corrosion polyurethane coating.
- ▶ Coil protection grille.

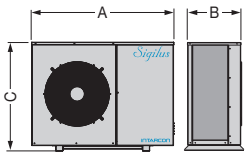
[1] Estimated heat exchange power with air temperature of 35 °C, and water inlet / outlet temperature of 45 / 40 °C.

[2] Available circuit pressure.

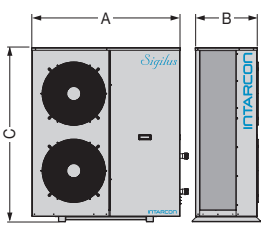
[3] Sound pressure level, with directivity 1, measured at 10 m from the unit (non-binding value calculated from sound power).

### Dimensions

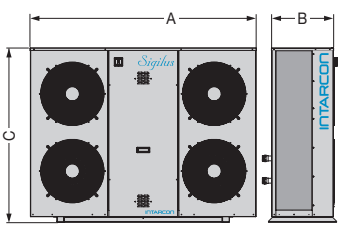
0,1 and 2 series




3 and 4 series




6 and 8 series




| Dimensions (mm) | A | B | C |
|---|---|---|---|
| 0 and 1 series | 1 030 | 380 | 577 |
| 2 series | 1 080 | 410 | 827 |
| 3 series | 1 150 | 481 | 1 097 |
| 4 series | 1 150 | 481 | 1 347 |
| 6 series | 1 748 | 481 | 1 097 |
| 8 series | 1 748 | 481 | 1 347 |