

# ECO<sub>2</sub>CUBE

## Transcritical CO<sub>2</sub> compact condensing units



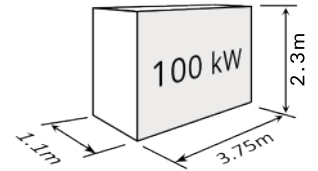
- ❄ High reliability and energy efficiency in hot climates.
- ❄ Environmental sustainability.
- ❄ Fast Plug & Play installation.
- ❄ F-Gas 2022 compliant.

Transcritical CO<sub>2</sub> condensing units with built-in gas cooler for simultaneous production of positive and negative cooling in commercial applications from 30 to 100 kW cooling capacity.



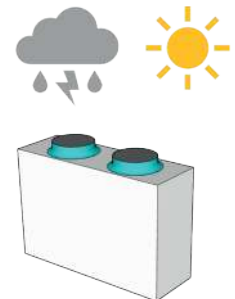
### Compact design

ECO<sub>2</sub>CUBE offer high performance in a small space, integrating all cooling elements in a compact design.



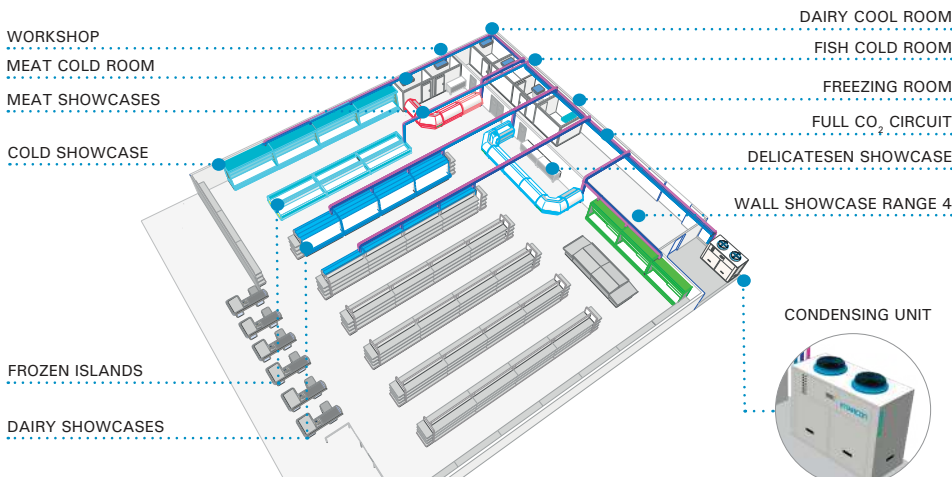
### Outdoor or machine room installation

ECO<sub>2</sub>CUBE can be installed in outdoors.

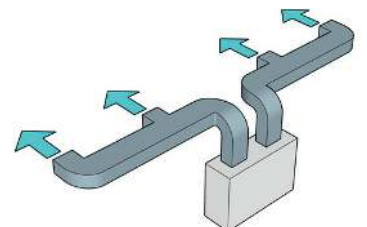


### Example of installation in a supermarket

ECO<sub>2</sub>CUBE has been designed to meet the refrigeration needs at different temperatures of medium-sized supermarkets and other commercial establishments.



Or in the machine room, with a reduced air discharge flow through ducts to comply with the most stringent municipal regulations.

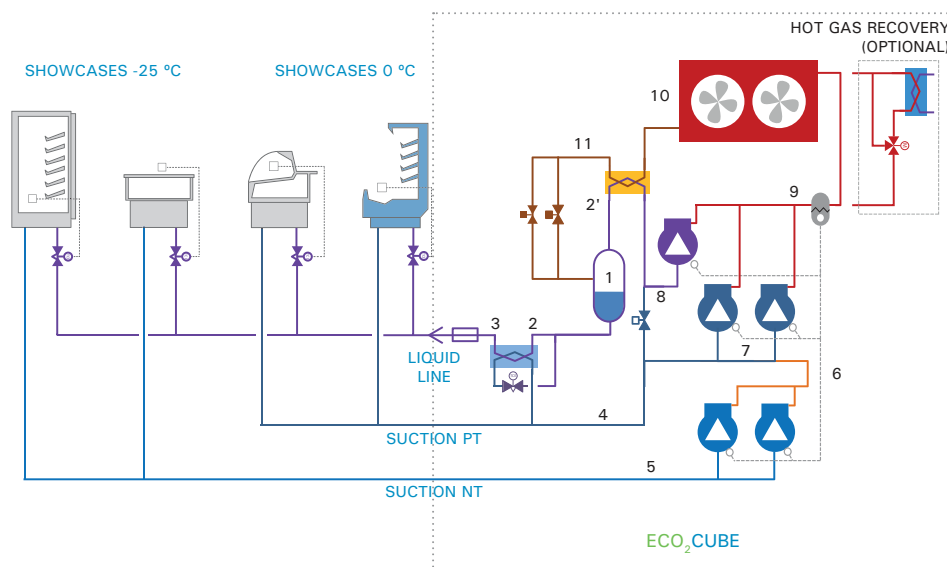


## Features

- ▶ 400 V-III-50 Hz power supply. Available at 60 Hz. Others voltages by request.
- ▶ Casing built with galvanized steel sheet with epoxy paint for outdoor use with electrical panel and gas cooler.
- ▶ Set of semihermetic CO<sub>2</sub> compressor with parallel compression.
  - 2 positive temperature transcritical compressors with Inverter.
  - 1 Inverter parallel compressor.
  - Up to 3 negative temperature booster compressors with Inverter.
- ▶ Variable speed EC axial motor fans.
- ▶ High pressure sector (SP: 120 bar) made with copper microtubes and equipped with
  - Separator - oil trap accumulator with filter and electronic oil injection on each compressor.
  - Condenser / gas cooler, made with copper microtubes and aluminium fins.
  - Internal economizer to ensure sufficient superheat in the parallel compressor suction.
  - High pressure switch, double safety valve.
  - Double gas cooler pressure control valve.
- ▶ Intermediate pressure sector (SP: 52 bar) made of copper tubing and equipped with:
  - CO<sub>2</sub> container with double safety valve (PS: 52 bar).
  - Pressure regulating valve with medium pressure relief.
  - Subcooler to ensure subcooling of the liquid line.
  - Filter drier and liquid sight glass.
- ▶ Positive temperature suction line (SP: 45 bar), made of copper tubing and equipped with a double safety valve.
- ▶ Negative temperature suction line (SP: 30 bar), made of copper tubing and equipped with a double safety valve.

## Schematic diagram of installation principle

Configuration of 3 medium temperature compressors and 2 low temperature compressors, and optional transcritical recuperator.



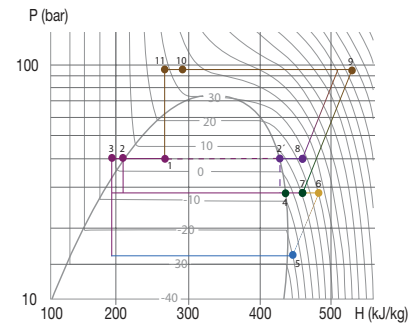
## Operational reliability

System dimensioned for operation at high ambient temperatures due to parallel compression.

To ensure continuity of operation, all components are duplicated or backed up in case of failure.

## High efficiency

Parallel compression ensures high efficiency of the transcritical CO<sub>2</sub> cycle under extreme ambient temperatures.



## Plug &amp; Play

Each ECO<sub>2</sub>CUBE unit is factory tested and adjusted prior to shipment.

They are provided with leak test and pressure test (ASP) certificates for the assembly and do not require ASP certification on site.

Refrigeration lines up to 100 kW can be executed in standard thick reinforced refrigerant copper pipe without ASP classification (application art. 4.3 of Directive 2014/68/EU).

Cooling line	PS (bar)	Max. diameter
Liquid	52	7/8" x 1.15
Suction PT	45	1 1/8" x 1.25

## Hot gas defrost option

Low-pressure recirculated hot gas can meet the needs of a commercial refrigeration installation, where only part of the services require defrosting with heat supply.

The hot gas is extracted from the discharge of the low temperature compressors at a temperature of about 50 °C, and is expanded and desuperheated in the medium or low temperature services in the defrost cycle.

The available heat output for defrosting is 25 % of the cooling capacity at low temperature.

Refrigerant	Application	Series / Model	Compressor		Cooling capacity (kW) <sup>(1)</sup> at 32 °C ambient temp.		Input power (kW)	Max. current (A)	Ecodesign SEPR	Heat recovery capacity (kW) <sup>(2)</sup>		Condenser		Cooling connection Liq-Gas				
			PT	NT	MT Evap. temp. -8 °C	BT Evap. temp. -28 °C				Water 35/40 °C	Water 55/60 °C	Fan Ø (mm)	Air flow (m³/h)	Liq-Suct.	MT - Suct.	BT		
R-744	Positive and negative temperature	MET-DE-2 23003		-	38.0	0.0	20.8	61	3.5							5/8"-7/8"		
		DET-DE-2 23014		CDS101B	30.6	5.2	20.9	64	-									
		DET-DE-2 23024	3x CD4 75-4,7H	CDS151B	28.1	6.9	20.8	68	-	39	20	2x Ø 630	24 000				5/8"-7/8"-5/8"	
		DET-DE-2 23025		2x CDS101B	24.4	9.6	20.9	67	-									
		DET-DE-2 23035		2x CDS151B	19.9	12.7	21.0	68	-									
		MET-DE-2 27003		-	52.2	0.0	28.6	72	3.5									5/8"-7/8"
		DET-DE-2 27014		CDS101B	44.8	5.2	28.6	75	-									
		DET-DE-2 27024		CDS151B	42.4	6.9	28.5	78	-									
		DET-DE-2 27025	3x CD4 90-6,4H	2x CDS101B	38.6	9.6	28.5	78	-	54	27	2x Ø 630	24 000					5/8"-7/8"-5/8"
		DET-DE-2 27035		2x CDS151B	34.2	12.7	28.6	79	-									
		DET-DE-2 27045		2x CDS181B	27.1	17.7	28.9	81	-									5/8"-7/8"-7/8"
		MET-DE-2 28003		-	59.2	0.0	32.4	72	3.5									5/8"-7/8"
		DET-DE-2 28014		CDS101B	51.7	5.2	32.4	75	-									
		DET-DE-2 28024		CDS151B	49.3	6.9	32.2	78	-									
		DET-DE-2 28025	3x CD4 90-7,3H	2x CDS101B	45.6	9.6	32.2	78	-	61	30	2x Ø 630	24 000					5/8"-7/8"-5/8"
		DET-DE-2 28035		2x CDS151B	41.1	12.7	32.3	79	-									
		DET-DE-2 28045		2x CDS181B	34.0	17.7	32.6	81	-									5/8"-7/8"-7/8"
		MET-DE-2 36004		-	69.0	0.0	35.0	96	3.5									7/8"-1 1/8"
		DET-DE-2 36015		CDS101B	62.1	4.9	35.1	99	-									
		DET-DE-2 36025		CDS151B	59.8	6.5	34.9	102	-									
		DET-DE-2 36026	4x CD4 90-6,4H	2x CDS101B	56.2	9.0	35.0	102	-	66	33	3x Ø 630	36 000					7/8"-1 1/8"-5/8"
		DET-DE-2 36036		2x CDS151B	52.1	12.0	35.1	103	-									
		DET-DE-2 36046		2x CDS181B	45.4	16.6	35.5	105	-									7/8"-1 1/8"-7/8"
		MET-DE-3 36003		-	74.6	0.0	40.8	76	3.5									7/8"-1 1/8"
		DET-DE-3 36014		CDS101B	67.1	5.2	40.7	79	-									
		DET-DE-3 36024		CDS151B	64.7	6.9	40.4	82	-									
		DET-DE-3 36025	3x CD4 120-9,2H	2x CDS101B	61.0	9.6	40.4	82	-	77	38	3x Ø 630	36 000					7/8"-1 1/8"-5/8"
		DET-DE-3 36035		2x CDS151B	56.5	12.7	40.4	83	-									
		DET-DE-3 36045		2x CDS181B	49.4	17.7	40.8	85	-									7/8"-1 1/8"-7/8"
		DET-DE-3 36066		3x CDS181B	38.0	25.8	41.1	89	-									
		MET-DE-3 36004		-	78.1	0.0	39.6	100	3.5									7/8"-1 1/8"
		DET-DE-3 36015		CDS101B	71.1	4.9	39.6	103	-									
		DET-DE-3 37025		CDS151B	68.8	6.5	39.4	106	-									
		DET-DE-3 36026	4x CD4 90-7,3H	2x CDS101B	65.3	9.0	39.5	106	-	74	37	3x Ø 630	36 000					7/8"-1 1/8"-5/8"
		DET-DE-3 36036		2x CDS151B	61.1	12.0	39.6	107	-									
		DET-DE-3 36046		2x CDS181B	54.4	16.6	40.0	109	-									7/8"-1 1/8"-7/8"
		DET-DE-3 36067		3x CDS181B	43.7	24.2	40.5	113	-									
		MET-DE-3 48004		-	99.0	0.0	49.9	101	3.5									7/8"-1 1/8"
		DET-DE-3 48015		CDS101B	92.0	4.9	49.9	104	-									
		DET-DE-3 48025		CDS151B	89.0	6.5	49.6	107	-									
		DET-DE-3 48026	4x CD4 120-9,2H	2x CDS101B	85.8	9.0	49.6	107	-	94	47	3x Ø 630	36 000					7/8"-1 1/8"-5/8"
		DET-DE-3 48036		2x CDS151B	81.6	12.0	49.7	108	-									
DET-DE-3 48046		2x CDS181B	74.9	16.6	50.1	110	-											
DET-DE-3 48067		3x CDS181B	64.1	24.2	50.6	114	-									7/8"-1 1/8"-7/8"		

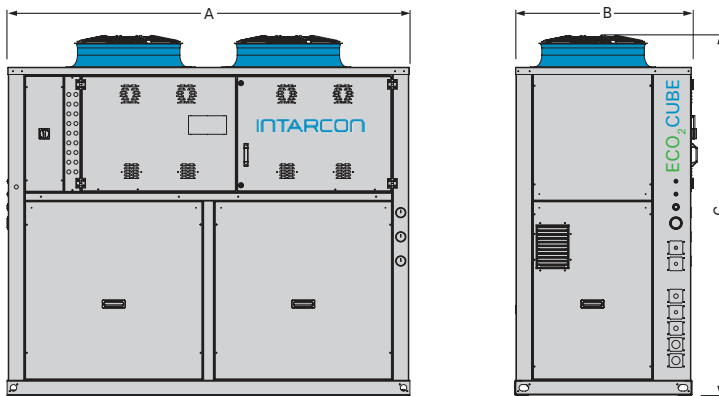
### Options

- ▶ Heat recovery for DHW or heating.
- ▶ Pre-configured replacement electronics.
- ▶ Suction filter on low and/or medium temperature lines.
- ▶ Particle separator on low and/or medium temperature suction lines.
- ▶ Emergency unit.
- ▶ Radial fans with EC motor for indoor installation.

<sup>(1)</sup> Nominal performance: ambient temperature 32 °C, evaporating temperature -8 °C (PT) and -28 °C (NT).

<sup>(2)</sup> Maximum recoverable heat output of compressor discharge gas.

## Dimensions



Dimensions (mm)	A	B	C
1 series	2 500	1 100	2 300
2 series	3 750	1 100	2 300

Dimensions in mm.

## Electronic control

ECO<sub>2</sub>CUBE cooling units incorporate a multifunctional electronic controller for transcritical systems, ideal for all climatic conditions, including hot climates, with the following features:

- ▶ Multifunctional electronic controller for control of the control unit:
  - Management of the PT line and NT line with CO<sub>2</sub> in transcritical booster configuration.
  - Management of semihermetic transcritical PT compressors (one of them Inverter).
  - Management of transcritical parallel semihermetic Inverter compressors.
  - Management of BT sub-critical semihermetic compressors (one of them Inverter).
  - Heat recovery management.
  - Management of double gas cooler pressure control valve.
  - Management of flash gas valve.
  - Management of variable speed EC electronic motor fans with floating set point.
  - Dynamic set of liquid receiver pressure: the receiver pressure set changes according to the state of the PT compressors; in this way, the energy consumption of the condensing units decreases due to a shorter running time of the parallel compressor.
  - Safety control and operation alarms for each compressor and fan.
  - Abnormal operation warnings with alarm detail.
  - RS485 connection with MODBUS RTU communication protocol.
- ▶ Digital control unit with display of parameters and operating status of the control unit.

