



TrilliumSeries™ CO₂ Condenser

Offering you all CO₂ benefits

- No regulatory liability or restrictions
- Reduced system carbon footprint with global warming potential of “1” and ozone depleting potential of “0”

Greenhouse
Gas **ZERO**

at an optimal efficiency

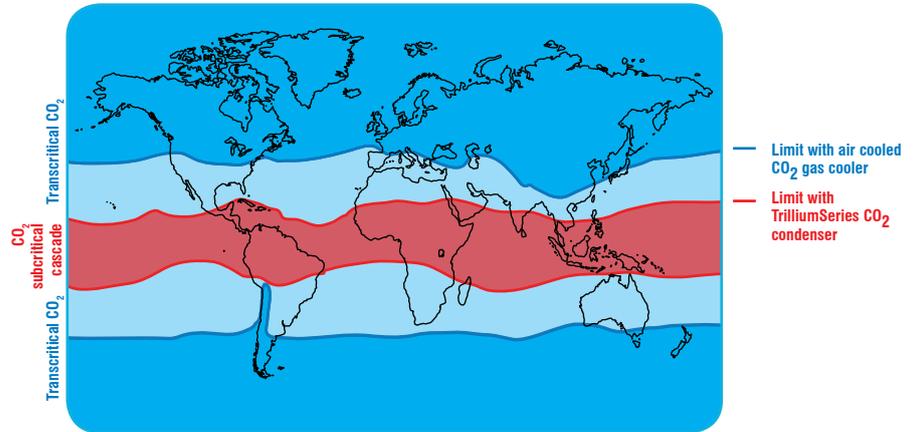
- Reduced system energy
- Low installation cost
- Minimal maintenance
- Long term reliability
- Low sound

TrilliumSeries CO₂ Condenser

The TrilliumSeries CO₂ Condenser empowers transcritical CO₂ applications in warmer climates

There are many **benefits** of CO₂ refrigeration systems including:

- No regulatory liability or restrictions
- No expensive future retrofits due to refrigerant phase out
- Reduced system carbon footprint with global warming potential of “1” and ozone depleting potential of “0”
- Low installed cost due to lower refrigerant cost and no refrigerant tax



Today, more than 2885 European supermarkets are using transcritical CO₂ systems and **the number is constantly growing**. Energy efficient, economical transcritical CO₂ systems with air cooled gas coolers are limited to colder climates due to the limitations of the dry bulb ambient temperature. However, by using the **TrilliumSeries Condenser's unique adiabatic design**, it is possible to **reduce the air temperature** and hence improve the system efficiency. Transcritical CO₂ systems can now be applied to **southern regions with higher ambient temperatures** and **additional energy can be saved in cooler climates**.

TrilliumSeries CO₂ Condenser benefits

The TrilliumSeries CO₂ Condenser uses a patented Dry-Coil Adiabatic Design that **saves energy, reduces refrigerant charge** and **lowers operating costs**. With the use of proprietary logic and EcoFlex controls, the On-Demand Adiabatic Pre-Cooler uses water only on the hottest days to maintain refrigerant temperatures that typical air cooled technology cannot achieve.

REDUCES SYSTEM ENERGY

- Up to 37% annual system energy reduction by operating at lower condensing temperatures
- Direct drive variable speed EC motors minimize fan energy required

REDUCES INSTALLATION COST

- Reduces overall system size and pressures by operating at lower CO₂ temperatures
- Shrunk size of the rack and reduced weight
- Lower refrigerant charge than comparable air cooled condensers

NEEDS MINIMAL MAINTENANCE

- No water treatment required
- Requires the same time to maintain as an air cooled condenser

PROVIDES LONG TERM RELIABILITY

- Industrial grade Type 304 Stainless Steel and an exclusive Thermosetting Hybrid Polymer coating on all structural panels

LOW SOUND

- Lower airflows due to the unique adiabatic design result in low sound levels
- Whisper Quiet Fans are standard



Modes of operation

DRY MODE

When the ambient air temperature is below the set point, the unit operates as an air cooled condenser. Ambient air is drawn over the dry finned coils by axial fans and condenses the refrigerant.

ON-DEMAND ADIABATIC PRE-COOLER MODE

When the unit is in On-Demand Adiabatic Pre-Cooler mode, water is evenly sprayed over the highly efficient pads located in front of the dry finned coils. At the same time axial fans draw ambient air through the pads.

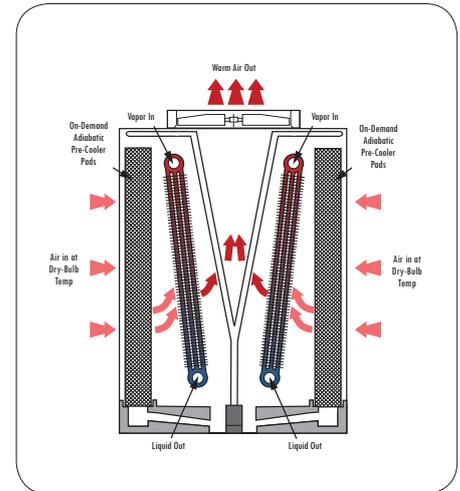
A portion of the water evaporates and cools down the air from the dry-bulb temperature close to the wet bulb temperature (typically 8 to 10°C lower). This increases the cooling capacity significantly. The cooler air passes over the coils and extracts the heat from the refrigerant.

The excess water assists in rinsing the pads and is recirculated by an industrial duty pump. The EcoFlex Controls regularly purge the water from the sump.

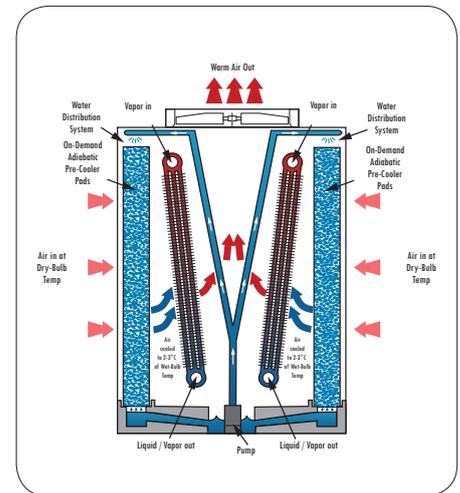
ON-DEMAND ADIABATIC PRE-COOLER OPERATION MODES:

There are three different ways to optimize unit operation:

- **Optimal System Efficiency Logic (Default):** The controller will start the Pre-Cooler Mode at a preset outside air temperature to increase the unit's capacity and efficiency.
- **Water Saver Logic:** The controller will optimize the unit's dry efficiency and only use water when the conditions require the extra cooling capacity.
- **Low Sound Logic:** The controller will activate the pre-coolers to minimize the fan speed and sound levels while meeting the load.



Dry Mode



On-Demand Adiabatic Pre-Cooler Mode

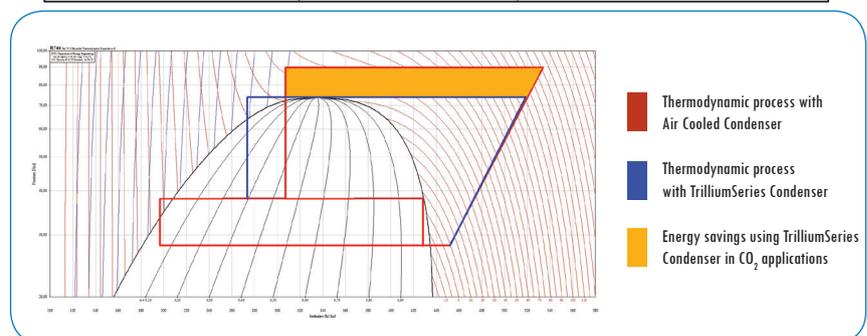
Example

The critical point of CO₂ is 31°C which means that the unit works as a conventional condenser in subcritical mode when the high side is below 31°C and as a gas cooler in transcritical mode above 31°C.

In this example for a supermarket in Frankfurt, the TrilliumSeries CO₂ Condenser improves the energy efficiency of the CO₂ transcritical system by reducing the leaving refrigerant temperature from 36°C to 26,7°C.

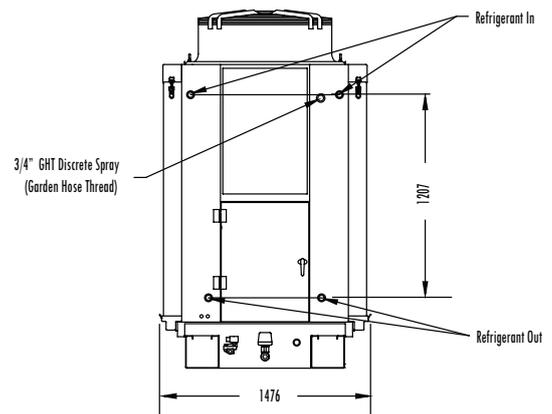
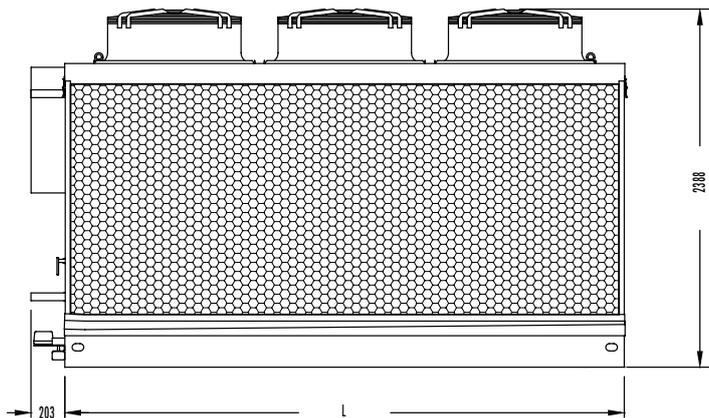
This results in a compressor energy saving of approximately 40%.

Condenser Type	Air Cooled	TrilliumSeries CO ₂ Condenser
Summer Conditions	30,8°C Dry-Bulb	30,8°C Dry-Bulb/19,2°C Wet-Bulb
Air Temp to the Condenser	30,8 °C	21 °C
Gas Temperature	116,7°C in / 36°C out	93,3°C in / 26,7°C out
Gas Pressure	89,6 bar	73,8 bar
Compressor Power	89 kW	54 kW



Using the TrilliumSeries CO₂ Condenser drastically reduces your direct and indirect carbon emissions while making energy efficient designs possible in warmer climates!

Engineering data



Model	Fan Qty	Base Heat Rejection (kW) ⁽¹⁾	Motor BHP (kW)	Airflow (m ³ /s)	Pump (kW)	Unit Length L (mm)	Shipping Weight (kg)	Operating Weight (kg)
TSDC-CO2-044-3	1	109	2,2	7,17	0,18	1600	748	835
TSDC-CO2-077-6.2	2	188	4,4	13,59	0,18	2413	1043	1148
TSDC-CO2-112-9.6	3	271	7,2	20,10	0,18	3378	1347	1474
TSDC-CO2-152-12.4	4	371	9,0	27,14	0,18	4750	1787	1946

Note ⁽¹⁾: Base heat rejection (kW) is based on R-744 CO₂ gas cooling with entering gas temperature 95°C and leaving gas temperature 28,5°C at 31°C dry-bulb / 21°C wet-bulb ambient and optimal COP/EER.

Do not use for construction. Refer to factory certified dimensions. This catalog includes data current at the time of publication, which should be reconfirmed at the time of purchase.

SCONCO2v00EN



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