TSDC

Dry and adiabatic cooling



Key benefits

- Empowers transcritical CO_2 applications in warmer climates
- Minimum system energy
- Low installation cost

TrilliumSeries Cooler

TSDC, TrilliumSeries characteristics

Counter flow, adiabatic pre-cooling, axial fan, induced draft

Typical applications

- supermarket refrigeration systems

For transcritical CO_2 applications in warmer climates

- 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.

Energy efficient, economical transcritical CO_2 systems with air cooled gas coolers are limited to colder climates due to the limitations of the dry bulb ambient temperature.

By using the TrilliumSeries condenser’s **unique adiabatic design**, it is possible to reduce the air temperature and hence improve the system efficiency. **Transcritical CO_2 systems** can now be **applied to southern regions** with higher ambient temperatures and additional **energy can be saved in cooler climates**.

Minimum 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.

Low insallation cost

- Reduces overall system size and pressures by operating at lower CO_2 temperatures.
- Shrinked size of the rack and reduced weight.
- Lower refrigerant charge than comparable air cooled condensers.

Minimal maintenance

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

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.

Interested in the TrilliumSeries condenser for your commercial refrigeration project? Contact your local BAC representative for more information.

Downloads

- TSDC TrilliumSeries
- TrilliumSeries CO2 condenser

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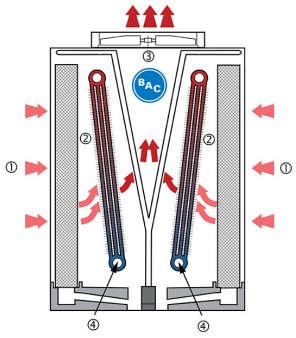
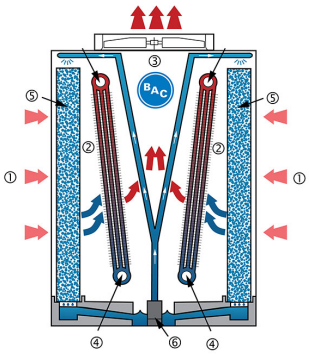
Principle of operation

Dry Mode

When the ambient air temperature is below the set point, the unit operates as an air cooled condenser.
Ambient air (1) is drawn over the **dry finned coils (2)** by **axial fans (3)** and condenses the **refrigerant (4)**.



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 (5)** located in front of the **dry finned coils (2)**. At the same time **axial fans (3)** draw **ambient air (1)** 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 a **pump (6)**. The EcoFlex Controls regularly purge the water from the sump.

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Construction details

1. Material options

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

2. Heat transfer media

- Robust industrial grade all aluminium, **microchannel coils**.
- **Superior corrosion resistant** coils: high quality expoxy coating and all aluminium construction, special alloys and brazing flux.
- Proof tested and helium leak checked
- Thicker aluminium channel walls
- Unique top feed design with vertical tubes allowing for **gravity drainage** of the condensed refrigerant. No need for external manifolding.

3. Air movement system

- **Axial fan** with **direct drive** integrated VSCE motor(s) and fan guard.

4. Adiabatic pre-cooler

- Evaporative cooling pad of **impregnated cellulose** with different flute angles.

5. EcoFlex controls

- **Energy monitoring**: measures the energy use of the TrilliumSeries condenser and verifies efficient operation over the life of the equipment.
- **Water monitoring:** measures the water use and maintains efficient operation of the unit.
- **Alarms:** signals provided for fans, pumps or valves to reduce instances of high system head pressure.
- **Communication cards:** allows for seamless integration over Modbus and BACnet to monitor all system components in a single location.
- **Self clean mode:** once every 24 hours, the EcoFlex controls turn on the self clean mode which reverses the fans and blows dirt/debris off the microchannel and the pre-cooler media.

Like to know more about the TSDC TrilliumSeries condenser construction details? Contact your local BAC representative.

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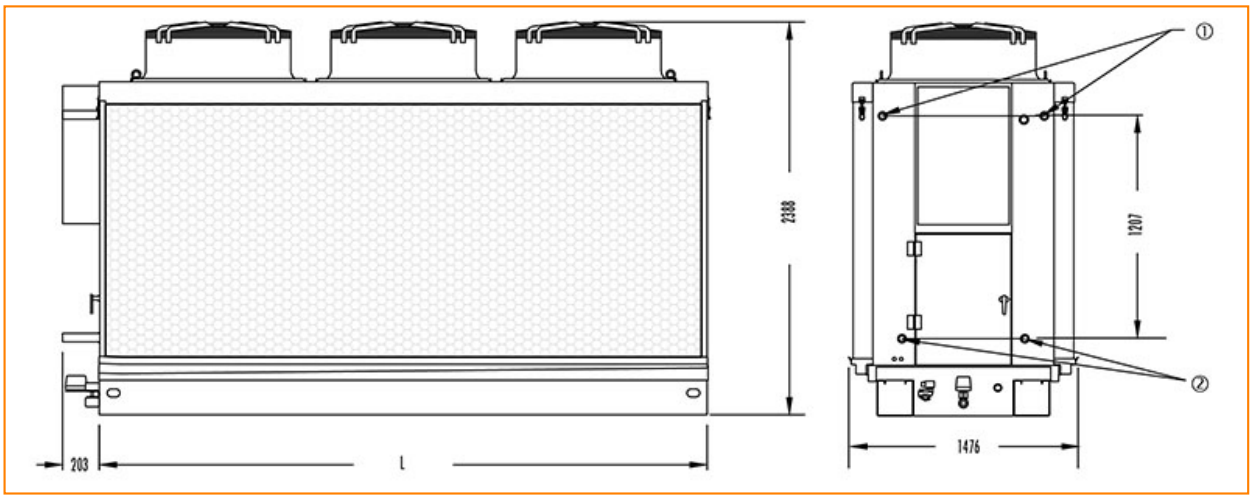
Engineering data

REMARK: Do not use for construction. Refer to factory certified dimensions & weights. This page includes data current at time of publication, which should be reconfirmed at the time of purchase. In the interest of product improvement, specifications, weights and dimensions are subject to change without notice.

General notes

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.

TSDC-CO2-044-152



1. Refrigerant inlet connections; 2. Refrigerant outlet connections. TSDC-CO2-044-3

TSDC-CO2-077-6.2

TSDC-CO2-112-9.6

TSDC-C02-152-12.4