[CF] SYSTEMS




# Systematic refrigeration engineering.

## Compressor packs and control technology from [CF] SYSTEMS

**[CF] SYSTEMS**
Refrigeration | Air Conditioning | System Solutions

# [CF] SYSTEMS
## Our quality promise

- 360° service
- Industrial manufacturing
- Decades of expertise
- Professional logistics
- Nationwide support network
- Smooth project execution




# Systematic refrigeration engineering.
## Welcome to [CF] SYSTEMS!

[CF] SYSTEMS is a division of Fischer Kälte-Klima specialising in custom-engineered system solutions for commercial and industrial refrigeration and air-conditioning applications.

Ever-increasing demands for efficiency, sustainability and reliability are making projects increasingly complex. Our integrated system solutions provide a comprehensive range of solutions for refrigeration and air-conditioning applications.

With more than 20 locations in Germany, Switzerland and Denmark, over 7,500 m² of production space at our Kernen plant near Stuttgart, our own delivery fleet and local contacts, [CF] SYSTEMS provides comprehensive support for its systems – from the initial enquiry through to after-sales service.

Challenge us and discover how our solutions can add value to your projects.





# Naturally efficient.
## Solutions by [CF] SYSTEMS.

As a family-owned business, we think in generations. Economic, environmental and social responsibility are inseparable for us, and we are committed to living up to that responsibility.

Across our entire value chain – from production, transport and packaging through to our buildings – we continually scrutinise our actions and have made numerous pioneering investments in recent years. Our products make our greatest positive contribution to climate protection.

More than twenty years ago, we were among the pioneers breaking new ground in the development and adoption of $CO_2$ technology in refrigeration.

Today, [CF] SYSTEMS designs, manufactures and develops state-of-the-art systems for the natural refrigerant R744/$CO_2$ at its Kernen site near Stuttgart and has become one of the leading suppliers in this field.

Our commitment to technology, quality, knowledge transfer and partnership with customers and suppliers has always been – and remains – our driving force.

Today, our portfolio includes a broad range of standardised products using the natural refrigerant R744/$CO_2$, expertise in R717/NH3 systems and partner solutions for indirect R290/propane systems

Comprehensive customer support is provided by a sales organisation comprising regional key account managers, commissioning and troubleshooting specialists, and contacts at Fischer Kälte-Klima locations in Germany, Switzerland and Denmark.






# 360° service
from [CF] SYSTEMS.

## Planning & consultancy

Our specialists support you throughout project planning and configure your compressor pack with the appropriate control technology, heat exchangers and installation materials.

## Professional project execution

From order placement through to delivery, our local sales support team ensures your project is handled professionally. Our delivery fleet ensures the equipment reaches your construction site exactly when required. On request, our [CF] SERVICE experts can also provide on-site commissioning support.

## After-sales & Support

Our local contacts remain available after installation – whether you need technical support, troubleshooting or assistance with a warranty claim.

## Training & information

In collaboration with our partners BITZER and Danfoss, we regularly offer training courses on [CF] SYSTEMS $CO_2$ systems. Online, we provide access to all relevant documents via the [CF] One app for iOS and Android.






# Think global,
work local.

From personal support by [CF] SYSTEMS key account managers and the field sales team at your local Fischer branch to our factory specialists, we provide comprehensive local service. Combined with our industrial manufacturing capabilities and extensive infrastructure, this means we are always at your side, wherever you need us.

Our specialists support you in planning your project and complete your compressor pack with the appropriate control technology, heat exchangers and all required installation materials.

## OUR SERVICES

- Dedicated contacts in internal and field sales
- System sizing and project design
- Local technical advice
- Optional commissioning support
- Professional logistics
- App and online access to technical documentation
- On-site troubleshooting by [CF] SERVICE
- Events and technical seminars



## Always at your service –
from the initial enquiry to after-sales support.

The [CF] SYSTEMS service and support package ensures you receive expert assistance at every stage. From the initial consultation and installation through to ongoing support, we are your dependable partner for professional refrigeration systems engineering.

In addition to telephone assistance and online access to the full documentation, the [CF] SERVICE team provides on-site support for commissioning and troubleshooting.

**Our experts are only a phone call away and ready to provide practical advice and assistance.**






## Delivered right on time,
when it matters.

Precision logistics is essential to keeping your projects running smoothly. [CF] SYSTEMS draws on the infrastructure of Fischer Kälte-Klima to make this possible. Working closely with you, we plan the delivery of your compressor pack and, on request, also supply the associated heat exchangers and suitable installation and assembly materials. Where required, we store your components in advance and deliver them to the construction site just in time using our own logistics fleet. We can also supply the correct refrigerant for your project and, when replacing systems, recover and dispose of the refrigerant from the existing system.

### OUR LOGISTICS PROMISE

- Professional packaging & transport protection
- Experienced hauliers
- Temporary storage in the event of construction delays
- Just-in-time delivery
- Complete package including installation materials
- Refrigerant supply
- Recovery and disposal of refrigerant from existing systems
- Flexibility when plans change
- Own fleet of more than 50 vehicles
- Professional project handling

# Quality without compromise.

## Rely on [CF] SYSTEMS.

[CF] SYSTEMS compressor packs made in Germany stand for outstanding quality, high reliability and innovative technology – systems engineered to meet the most demanding industrial standards.



### WORKFLOW

- Together with the specialist contractor, we define the project parameters
- The specialist contractor then receives a project schedule covering every milestone
- The manufacturing and approval workflow then begins
- During production, the specialist contractor receives the key technical documents
- Once the system has been completed, delivery is scheduled and coordinated reliably




### DOCUMENTATION

- Our operating instructions are based on the risk assessment of our systems in accordance with the Machinery Directive 2006/42/EC, Pressure Equipment Directive 2014/68/EU and EMC Directive 2014/30/EU
- Operating instructions in accordance with the Machinery Directive 2006/42/EC; content complies with EN 378-2» Technical data» Dimension drawings, connection drawings and P&I diagram» Product descriptions of the installed components» Commissioning checklist» in German and Danish
- Instructions, safety data sheets, inspection certificates and EU declarations of conformity for the installed components
- Wiring diagram (where a control cabinet is included)
- EU declaration of conformity (for complete machinery, e.g. a water chiller) or declaration of incorporation (for partly completed machinery, e.g. compressor packs) in accordance with the Machinery Directive 2006/42/EC
- Records of the tests carried out at the factory/before delivery in accordance with EN 378-2 (6.3)» Pressure strength test» Leak-tightness test» Functional test of actuators and sensors



### MANUFACTURING QUALITY

- Production using state-of-the-art manufacturing facilities at the Kernen plant
- Continuous quality assurance
- Robust design & heavy-duty frame
- Minimum number of joints thanks to bent and extruded-branch pipes
- Corrosion protection through high-quality components and a powder-coated welded frame
- Manufactured in accordance with the Pressure Equipment Directive and EN 378
- All pipework fabricated under nitrogen
- Helium ($HeN_2$) leak test with a leakage rate of < 3 g refrigerant/year
- Liquid receiver with salt-water-resistant coating & grease-tape wrapping
- Electrical testing of every system before delivery
- High-performance insulation with AF/ArmaFlex
- $CO_2$ systems in CuFe2P K65 as standard
- Welding procedure certified to EN ISO 15614-1



### PLUG & COOL

- Easy-to-service system design
- Easy access to all relevant components
- Components & sensors pre-wired on request
- Neat cable routing and clearly identifiable connections between electrical and electronic components
- Control cabinet supplied separately, attached or frame-mounted
- Control system preconfigured and function-tested
- Optional monitoring & supervisory solutions

# [CF] SYSTEMS
## Product range

## $CO_2$ (R744) systems

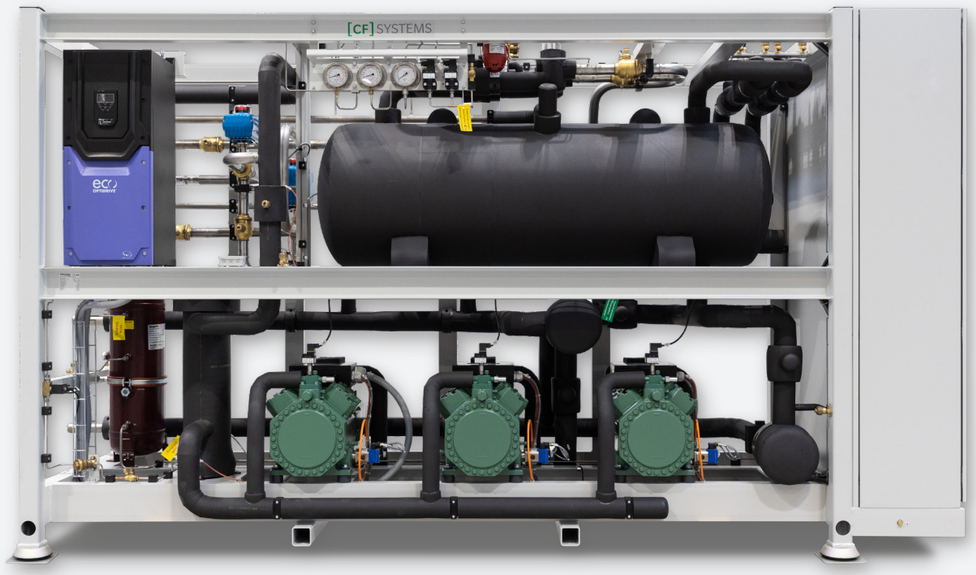
Our [CF] SYSTEMS product ranges, developed specifically for use with the natural refrigerant $CO_2$, provide future-ready, sustainable and highly efficient solutions. They are ideal for a wide variety of applications and deliver high operational reliability and outstanding performance over a long service life.

This technology is already well established in numerous applications and is increasingly regarded as the new standard – particularly for environmentally sustainable and economically viable refrigeration concepts.

The outstanding thermodynamic properties of $CO_2$ enable an exceptionally wide range of applications. Our $CO_2$ systems are highly versatile – from conventional commercial refrigeration applications and demanding industrial and process-cooling duties through to modern high-temperature heat-pump solutions.

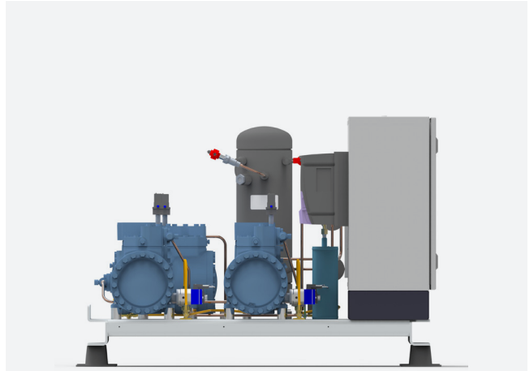
### Applications

- Discount supermarkets & supermarkets
- Organic food stores and delicatessens
- Hotels, restaurants & catering
- Filling stations & convenience stores
- Cold stores & logistics centres
- Process cooling in industry & production



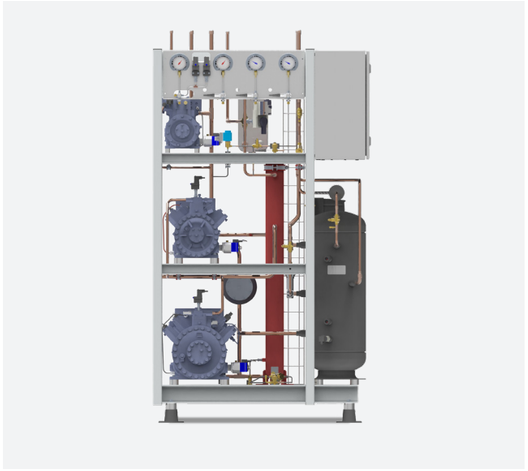



## The [CF] $CO_2$ system ranges



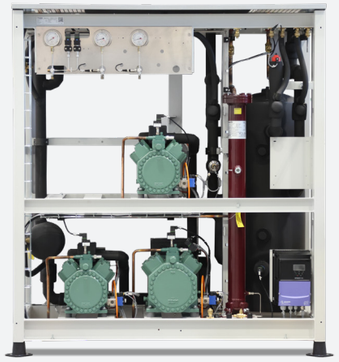
### [CF] $NANO_2$

$CO_2$ system for applications including hospitality, hotels and small-format retail.



### [CF] $CO_2$RE micro

$CO_2$ mini-booster for filling stations and small-format retail applications.



### [CF] $CO_2$RE mini

$CO_2$ compressor pack for applications including discount supermarkets, organic food stores and small-format retailers.



### [CF] $CO_2$RE

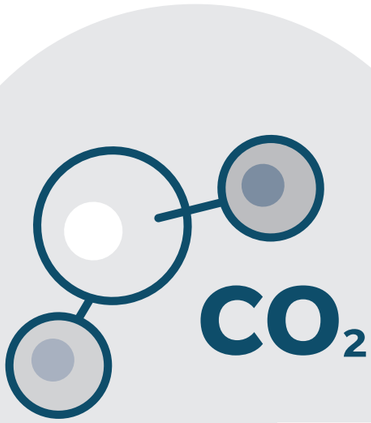
$CO_2$ compressor pack for applications including food retail, industry and logistics.

# [CF] SYSTEMS
## Product range

### Why $CO_2$?

European F-gas Regulation requirements and the potential REACH restriction on PFAS are increasingly limiting the future of synthetic refrigerants. Manufacturers and operators are increasingly being required to switch to alternative refrigerants with a lower GWP or directly to natural refrigerants such as $CO_2$, propane or ammonia.

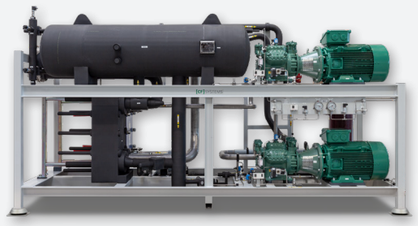
Compared with other natural refrigerants, $CO_2$ has the advantage of being non-flammable. From a technical perspective, $CO_2$ also offers numerous benefits: high discharge temperatures and transcritical operation enable efficient heat recovery. Pressure drops have a considerably smaller impact on efficiency than with other refrigerants. In addition, the upstream pressure at the injection valves remains constant throughout the year thanks to the dedicated refrigeration-circuit design, ensuring stable and precise evaporator control.




### Facts about $CO_2$ (R744)

- Natural and cost-effective refrigerant
- Environmentally friendly and future-proof
- A1 refrigerant: non-flammable and non-toxic
- Not subject to the F-gas Regulation
- Efficient thanks to low pressure losses and excellent heat-transfer properties
- For MT, LT and heat-pump applications
- High pressure levels require a design pressure of up to 120 bar
- For MT capacities from 5 kW to 1 MW





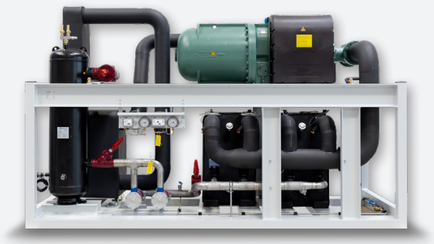
### $NH_3$ (R717) systems

[CF] SYSTEMS supplies custom water and brine chillers for industrial and commercial refrigeration applications using the natural refrigerant $NH_3$. These systems are available from a refrigeration capacity of just 50 kW and draw on [CF] SYSTEMS' extensive experience, particularly in implementing low-charge ammonia solutions.

### Propane (R290) systems

For indirect systems using the natural refrigerant propane (R290), [CF] SYSTEMS combines products manufactured in-house with solutions from its specialist technology partner Enerblue. On request, we supplement these systems with hydraulic modules or subcritical $CO_2$ compressor units for low-temperature refrigeration.



### HFC/HFO systems

For fluorinated refrigerants, we offer the standardised [CF] BASIC range for commercial refrigeration as well as custom [CF] EXPERT solutions for industrial applications using HFC (hydrofluorocarbon) or HFO (hydrofluoroolefin) refrigerants.

### Control systems

For optimum system control, [CF] SYSTEMS experts develop control concepts using solutions from your preferred supplier. Our manufacturer-independent approach allows us to integrate control solutions from CAREL, Danfoss, Elreha, Copeland and Wurm.





### Hydraulic systems

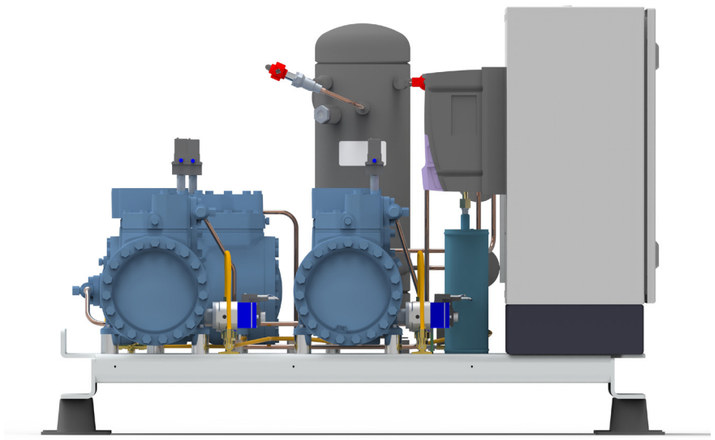
For indirect systems or heat recovery, Fischer Kälte-Klima exclusively supplies hydronic modules from Italian specialist Fiorini. The Fiorini portfolio ranges from standardised hydronic modules with a pump and buffer vessel to custom-configured systems, pump stations and storage vessels.

# [CF] $NANO_2$

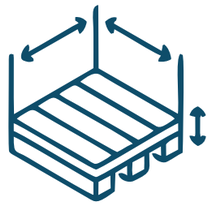
$CO_2$ system in a compact design, developed specifically for low part-load applications. Designed for applications including hospitality, hotels and small-format retailers.

## HIGHLIGHTS

- High availability through multi-compressor design
- Flexible installation – indoor & outdoor
- Designed for minimum part-load conditions
- Choice of CAREL, Danfoss or WURM control system
- Active oil management
- Compact design
- Suitable for evaporators below 1.5 kW
- Easy to service



**3 … 10 kW***



Euro-pallet footprint



Fits through a standard doorway

## TECHNICAL DATA

| FRAME SIZE | 3 x 0 |
|---|---|
| Number of MT compressors | 2 -3 |
| Length in mm ** | 1.200 |
| Width in mm *** | 800 |
| Height in mm | 950 |

* Capacity calculated at: t0 –10 °C, gas-cooler outlet 38 °C and 93 bar

** incl. control cabinet

*** excluding pipe connections





## REFRIGERATION SYSTEM SCOPE OF SUPPLY

- 2 to 3 MT compressors (transcritical)
- Capacity control of the MT lead compressor by variable-frequency drive
- Active oil management
- Liquid receiver (14 l)
- Service and shut-off valves on all service-relevant pipe sections
- Pressure and temperature sensors matched to the selected control system
- High-quality Armacell AF insulation
- All pipe connections (CuFe2P) routed to the rear.
- Pressure-rated design (HP = PS 120; all other sections PS 90)
- Fully welded baseplate including vibration isolators
- Control cabinet, frame-mounted, wired and pre-programmed

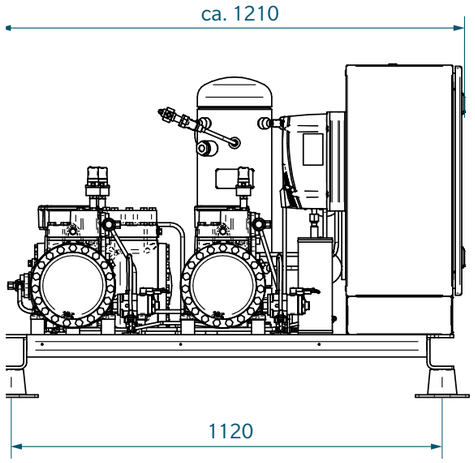
## OPTIONS/ACCESSORIES

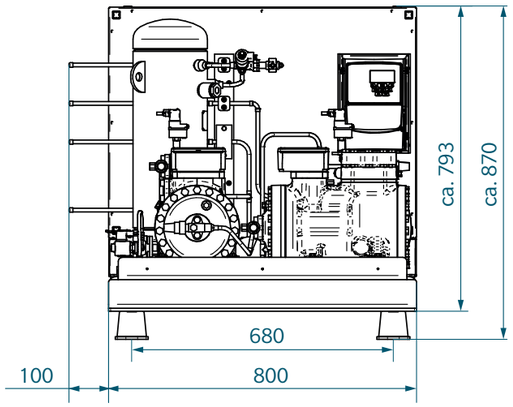
- Enclosure for indoor and outdoor installation without sound insulation
- Heat recovery with 3-way valve, supplied separately
- Filter drier, supplied separately
- Gas cooler, supplied separately

## CONTROLS & CONTROL CABINET

- Carel µRack $CO_2$, Danfoss AK-PC 572A, Wurm DCO2-BL (on request)
- Main isolator
- Control transformer
- Backup power supply for closing the HP and MP valves in the event of a power failure

## DIMENSION DRAWINGS



# [CF] CO2RE micro

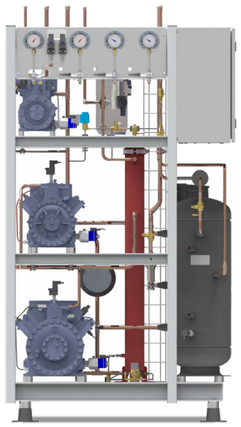
CO₂ REFRIGERATION micromized

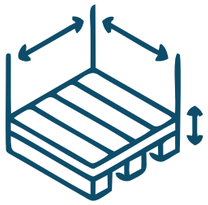
[CF] SYSTEMS

mini-booster with an exceptionally small footprint. Designed for applications including filling stations and small-format retail stores with a sales area of up to 1,000 m².

## HIGHLIGHTS

- Euro-pallet footprint (including control cabinet)
- Flexible installation – indoor & outdoor
- Quiet operation with a choice of sound-insulation options
- Compact design
- Easy to install
- Easy to service

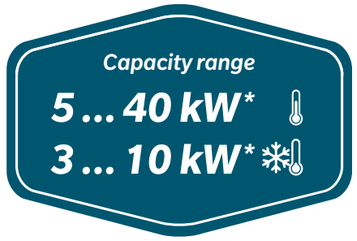




Euro-pallet footprint



Fits through a standard doorway




## SCOPE OF SUPPLY

- 1 to 2 MT compressors (transcritical) and max. 1 LT compressor (subcritical)
- Capacity control for the MT lead compressor
- Active oil management
- Liquid receiver (60 l) with low-level indicator
- Mechanical filters in the oil line and upstream of the HP valve
- Filter drier in the MT suction line
- Service and shut-off valves on all service-relevant components and pipe sections
- Pressure gauge for each pressure stage
- Pressure and temperature sensors matched to the selected control system
- High-performance Armacell AF insulation
- All pipe connections (CuFe2P) routed upwards
- Safety valves mounted on a valve panel and supplied loose for installation on site
- Fully welded heavy-duty frame including vibration isolators

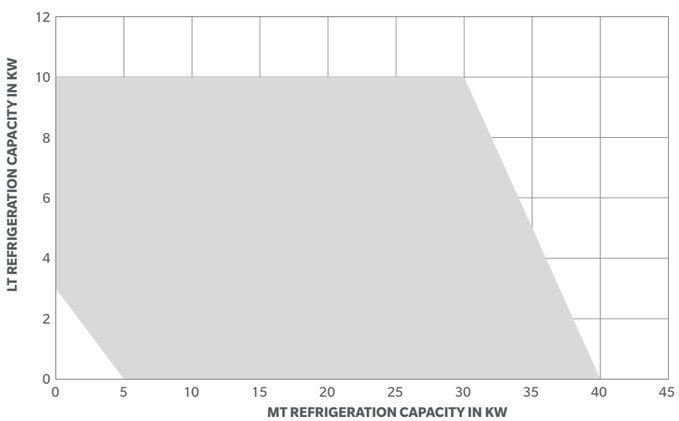
## OPTIONS

- Capacity control
  - MT lead compressor: variable-frequency drive (standard) or pulse-width modulation
  - MT lag compressor: 50/100% capacity control
  - LT lead compressor: variable-frequency drive
- Heat recovery with 3-way valve, ball valves and insulation of the discharge line, oil separator and heat exchanger
- MT hot-gas bypass injection
- MT liquid injection
- Low-pressure switch
- Pre-wiring
- Control cabinet, frame-mounted or supplied separately for installation on site
- Air-spring mounts
- Enclosure for indoor and outdoor installation

## CONTROLS & CONTROL CABINET

- Choice of CAREL, Danfoss or WURM control system
- Monitoring system (optional)
- Main isolator
- Active control-cabinet ventilation
- Control-cabinet lighting and service socket
- Control transformer
- Backup power supply for closing the HP and MP valves in the event of a power failure

## CAPACITY RANGE




## TECHNICAL DATA

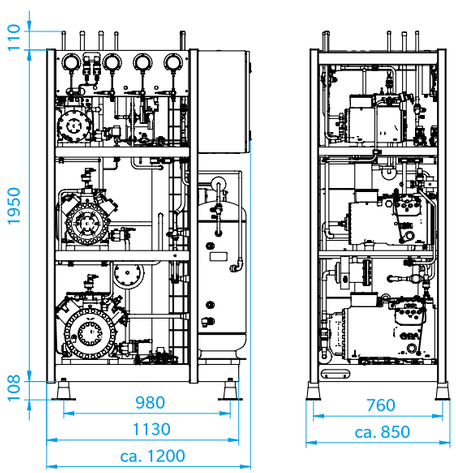
| FRAME SIZE | 2 x 1 |
|---|---|
| Number of MT compressors | 1 – 2 |
| Number of LT compressors | max. 1 |
| Length in mm ** | 1.200 |
| Width in mm | 800 |
| Height in mm *** | 1.960 |

* Capacity calculations are based on evaporating temperatures of: –8 °C MT, –30 °C LT and a gas-cooler outlet temperature of 37 °C

** incl. control cabinet

*** excluding pipe connections

## DIMENSION DRAWINGS



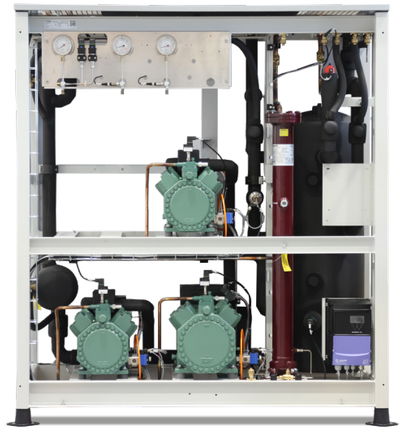
# [CF] CO2REmini

CO₂ REFRIGERATION minimized

Compact $CO_2$ compressor pack designed for applications including discount supermarkets, organic food stores and small-format retail stores with a sales area of up to 1,500 m².

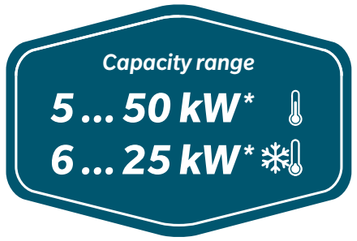
## HIGHLIGHTS

- Flexible installation – indoor & outdoor
- Quiet operation with a choice of sound-insulation options
- Compact design
- Easy to install
- Easy to service

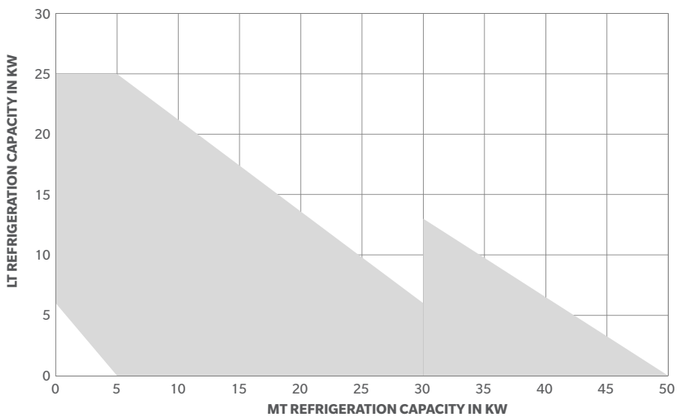




Fits through a standard doorway




## CAPACITY RANGE




| FRAME SIZE | 3 x 1 | 2 x 2 |
|---|---|---|
| Number of MT compressors | 3 | 2 |
| Number of LT compressors | max. 1 | max. 2 |
| Length in mm ** | 1.750 | 1.750 |
| Width in mm | 800 | 800 |
| Height in mm *** | 1.960 | 1.960 |

* Capacity calculations are based on evaporating temperatures of: –8 °C MT, –30 °C LT and a gas-cooler outlet temperature of 37 °C

** incl. control cabinet

*** excluding pipe connections



[CF] SYSTEMS

## SCOPE OF SUPPLY

- 2 to 3 MT compressors (transcritical) and up to 2 LT compressors (subcritical)
- Capacity control for the MT lead compressor
- Active oil management
- Liquid receiver (60 to 125 l) with low-level indicator
- Mechanical filters in the oil line, upstream of the HP valve, in the liquid line and in the LT suction line
- Filter drier in the MT suction line
- Service and shut-off valves on all service-relevant components and pipe sections
- Pressure gauge for each pressure stage
- Pressure and temperature sensors matched to the selected control system
- High-performance Armacell AF insulation
- All pipe connections (CuFe2P) routed upwards
- Safety valves mounted on a valve panel and supplied loose for installation on site
- Fully welded heavy-duty frame including vibration isolators

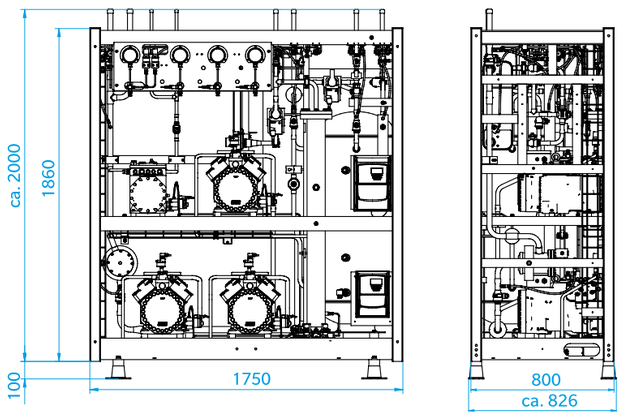
## OPTIONS

- Capacity control
  - MT lead compressor: variable-frequency drive (standard) or pulse-width modulation
  - MT lag compressor: 50/100% capacity control
  - LT lead compressor: variable-frequency drive
- Heat recovery with 3-way valve, ball valves and insulation of the discharge line, oil separator and heat exchanger; optional gas-cooler bypass
- Frame-mounted LT desuperheater
- MT and LT hot-gas bypass injection
- MT liquid injection
- Low-pressure switch
- Pre-wiring
- Control cabinet, frame-mounted or supplied separately
- Air-spring mounts
- Enclosure for indoor and outdoor installation

## CONTROLS & CONTROL CABINET

- Choice of CAREL, Danfoss or WURM control system
- Monitoring system (optional)
- Main isolator
- Active control-cabinet ventilation
- Control-cabinet light and service socket
- Control transformer
- Backup power supply for closing the HP and MP valves in the event of a power failure
- Combined energy metering (optional)
- Surge protection (optional)

## DIMENSION DRAWINGS



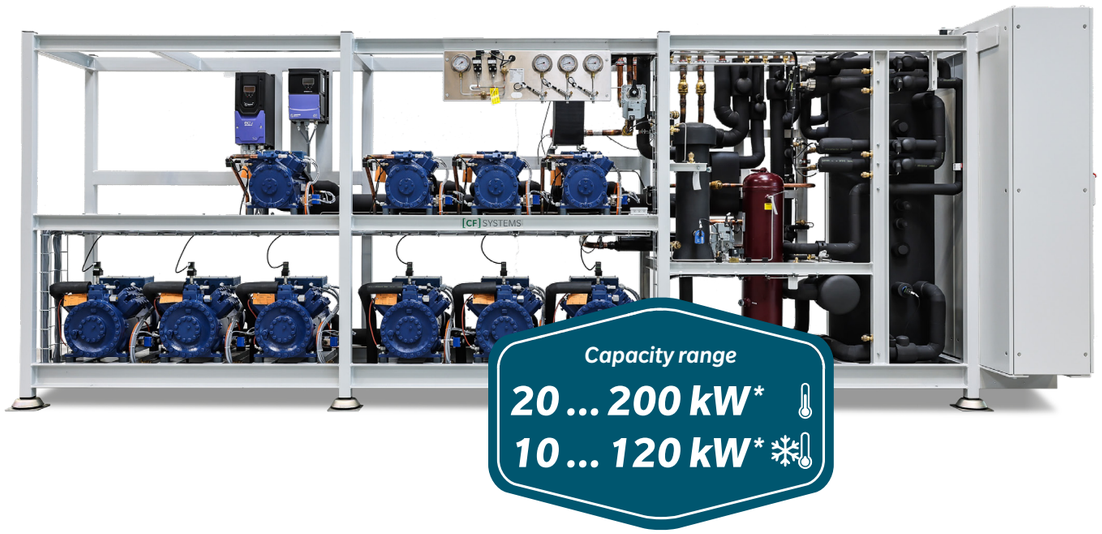
[CF] CO2RE
CO₂ REFRIGERATION SIMPLIFIED

[CF] SYSTEMS

Modular $CO_2$ compressor pack designed for higher-capacity applications in food retail, industry and logistics.

## HIGHLIGHTS

- Flexible installation – indoor & outdoor
- Quiet operation with a choice of sound-insulation options
- Modular design
- Easy to install
- Service-friendly
- Wide capacity range




## SCOPE OF SUPPLY

- 2 to 6 MT compressors (transcritical) and up to 4 LT compressors (subcritical)
- Capacity control for the MT lead compressor
- Active oil management
- Liquid receiver (83 to 285 l) with low-level indicator
- Flash-gas heat exchanger
- LT suction-gas superheater
- Mechanical filters in the oil line, upstream of the HP valve, in the liquid line and in the LT suction line
- Filter drier in the MT suction line
- Service and shut-off valves on all service-relevant components and pipe sections
- Pressure gauge for each pressure stage
- Pressure and temperature sensors matched to the selected control system
- High-performance Armacell AF insulation
- All pipe connections (CuFe2P) routed upwards.
- Safety valves mounted on a valve panel and supplied loose for installation on site
- Fully welded heavy-duty frame including vibration isolators

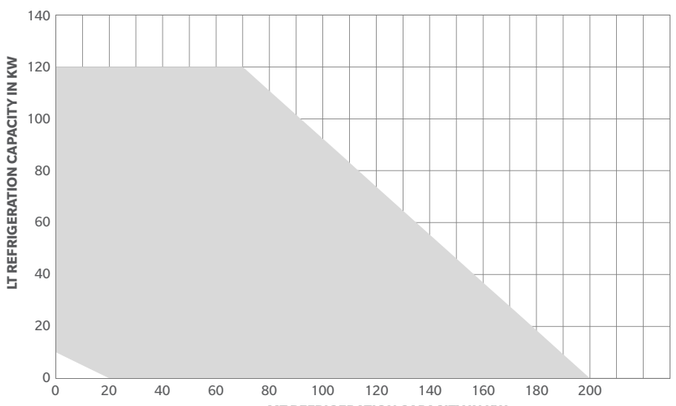
## OPTIONS

- Capacity control
  - MT lead compressor: standard or pulse-width modulated
  - MT lag compressor: 50/100% capacity control
  - LT lead compressor: variable-frequency drive
- Heat recovery with 3-way valve, ball valves and insulation of the discharge line, oil separator and heat exchanger; optional gas-cooler bypass
- Redundant HP and MP valves
- R290 standstill cooling
- Filter-drier bypass in the MT suction line
- Frame-mounted LT desuperheater or external LT desuperheater with 3-way valve and muffler
- Liquid ejector including liquid separator
- Active liquid subcooling
- MT and LT hot-gas bypass injection
- MT liquid injection
- Low-pressure switch
- Pre-wiring
- Control cabinet, frame-mounted or supplied separately
- Air-spring mounts
- Enclosure for indoor and outdoor installation

## CONTROLS & CONTROL CABINET

- Main isolator
- Active control-cabinet ventilation
- Control-cabinet light and service socket
- Backup power supply for closing the HP and MP valves in the event of a power failure
- Combined energy metering (optional)
- Control transformer
- Surge protection (optional)
- Monitoring system (optional)
- Choice of CAREL, Danfoss or WURM control system

## CAPACITY RANGE




## TECHNICAL DATA

| FRAME SIZE | 2 x 2 | 3 x 3 | 4 x 3 | 5 x 4 | 6 x 4 |
|---|---|---|---|---|---|
| Number of MT compressors | 2 | 3 | 4 | 5 | 6 |
| Number of LT compressors | max. 2 | max. 3 | max. 4 | max. 4 | max. 4 |
| Length in mm ** | 2.880 | 3.330 | 4.090 | 4.540 | 4.990 |
| Width in mm | 800 | 800 | 800 | 800 | 800 |
| Height in mm *** | 1.960 | 1.960 | 1.960 | 1.960 | 1.960 |

* Capacity calculations are based on evaporating temperatures of: –8 °C MT, –30 °C LT and a gas-cooler outlet temperature of 37 °C

** incl. control cabinet

*** excluding pipe connections

## DIMENSION DRAWINGS

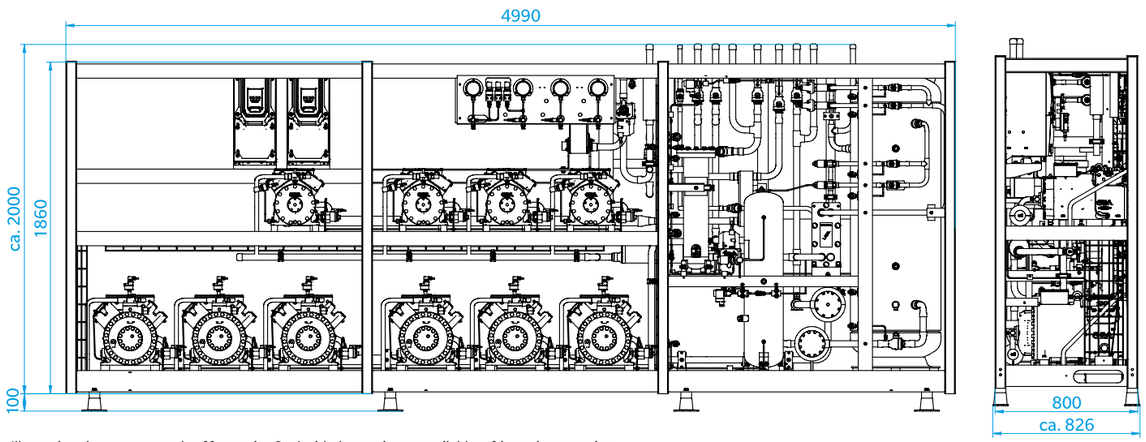



Illustration shows an example of frame size 6 x 4 with the maximum available refrigeration capacity.

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