

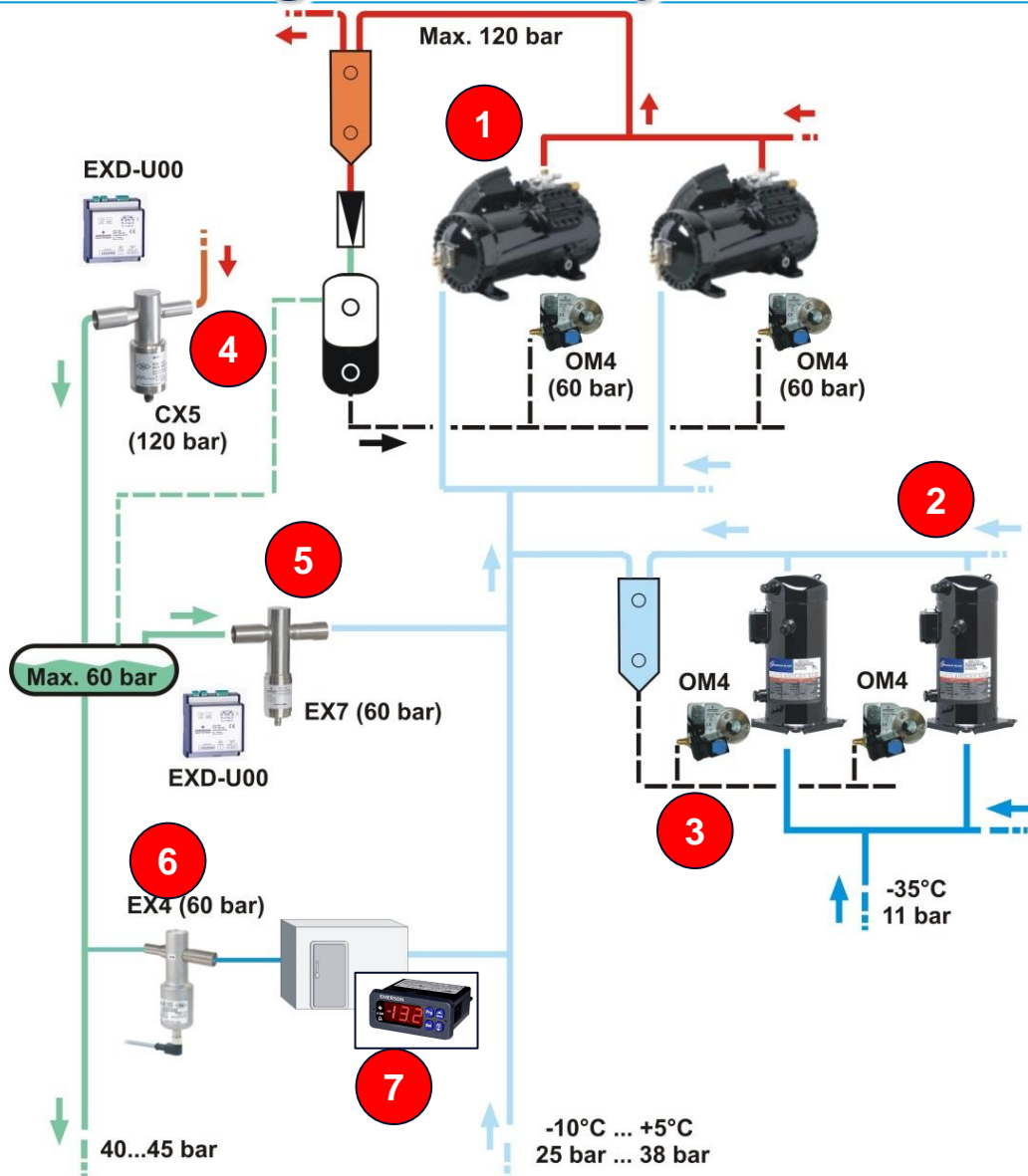
Emerson Solutions For The Needs Of CO2 Refrigeration Systems

October 2013

Atmosphere Brussels



Emerson Solutions For The Needs Of CO2 Refrigeration Systems



Emerson Offering

1. Compressors For MT Semi-Technology
2. Compressors For LT Semi (High Standstill) & Scroll Technology
3. Compressor Oil Management
4. Gas Cooler Pressure Control Valve
5. Receiver Pressure Control Valve
6. Display Case Expansion valve
7. Display Case Controller
8. Rack Controllers

iPro.RACK

8



1

Compressors For Medium Temperature Stream CO2 With CoreSense Diagnostics

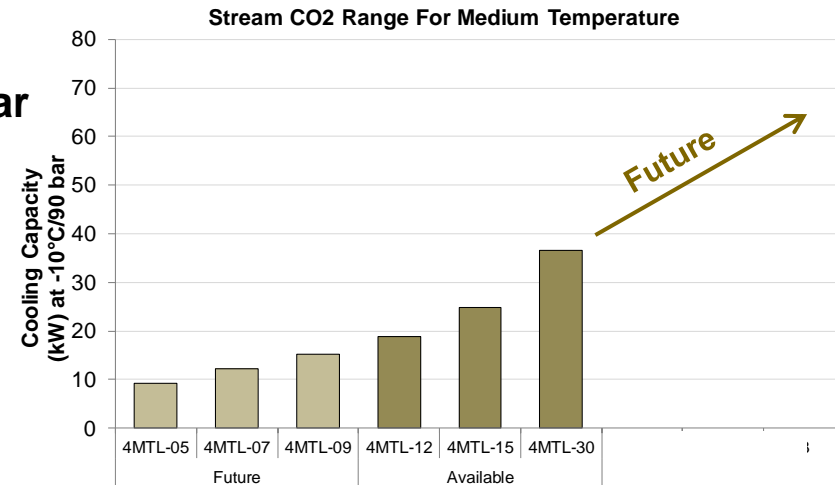
Description:

- CO2 Compressors For MT CO2-Transcritical
- From 9kW to 36kW Cooling Capacity (More Planned)
- Integrated Electronics For Protection/Diagnostics



Main Benefits/Characteristics

- Pressures: Operating 120bar Design 90/135bar
- Inverter Release 25-70hz
- Individual Compressor Power Monitoring
- Coresense Diagnostics On All Models



**Coresense Guarantees Extended Compressor Life And Sustainable System
Protects The Compressor And Detect Problems Before They Become Fatal
Provide Troubleshooting Assistance To Service Technicians**

Compressors For Low Temperature Stream CO2 With CoreSense Diagnostics

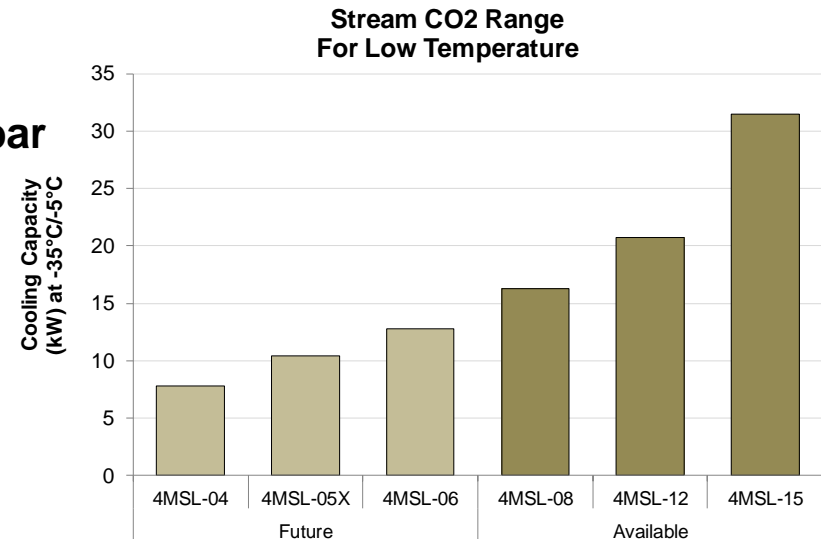
Description:

- CO2 Compressors For LT Cascade & Booster Systems
- From 8kW to 32kW Cooling Capacity
- Systems Requiring High Standstill Pressure (Up To 90bar)
- Integrated Electronics For Protection/Diagnostics



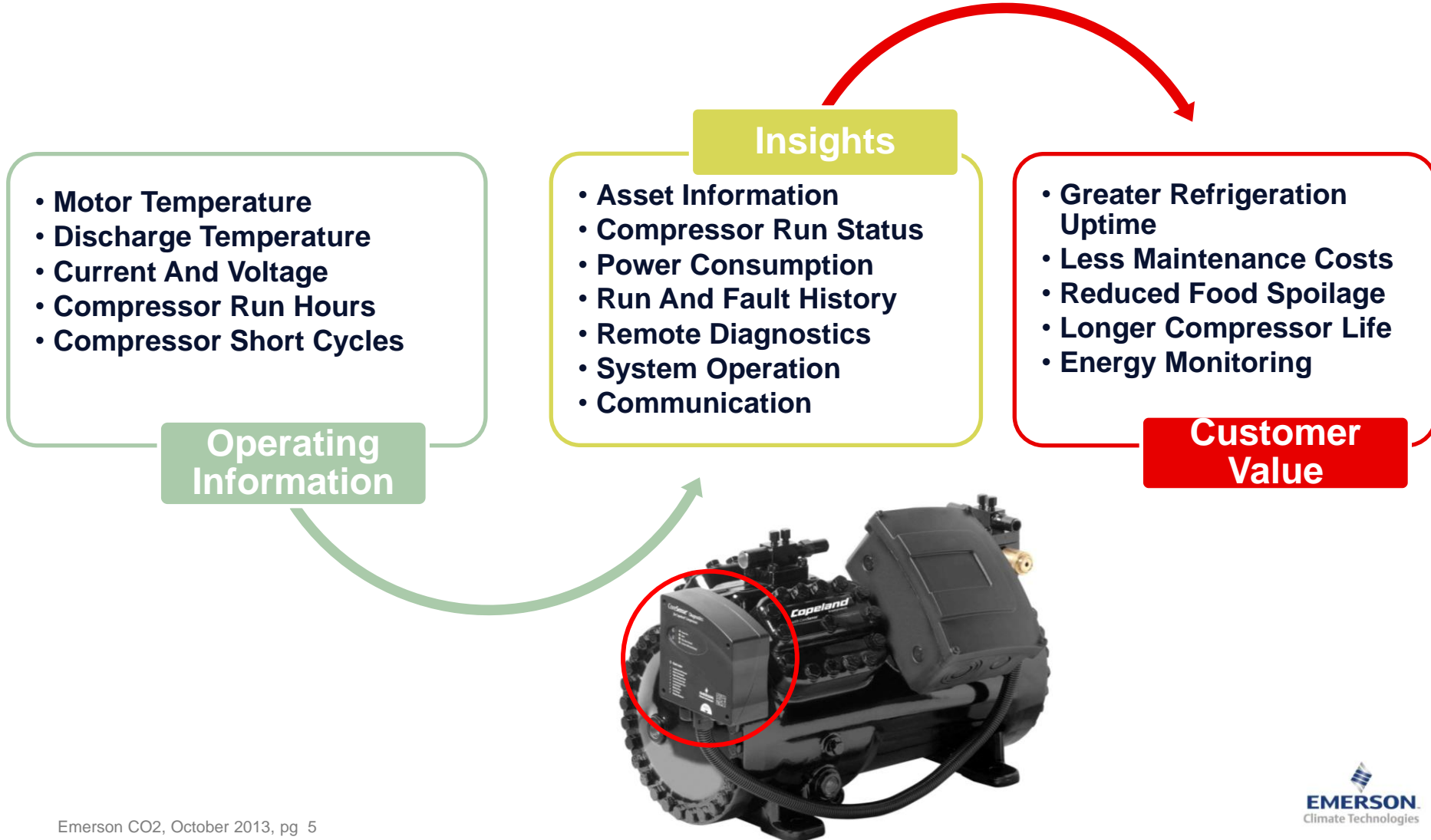
Main Benefits/Characteristics

- Pressures: Operating 120bar Design 90/135bar
- Inverter Release 25-70hz
- Individual Compressor Power Monitoring
- Coresense Diagnostics On All Models



Using Transcritical Compressors In MT Side & LT Sides Ensures That In Case Of Power Outage, The System Features Full Resilience & No Operation Disruption.

CoreSense™ Technology – Uses Compressor-As-A-Sensor For Reliable System Performance



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Communication – Local and Remote Access

1) Status LED On CoreSense



1. Multi-color Status LEDs
2. Indicate Nature Of Failure
3. Enables Quick Troubleshooting

Local Troubleshooting

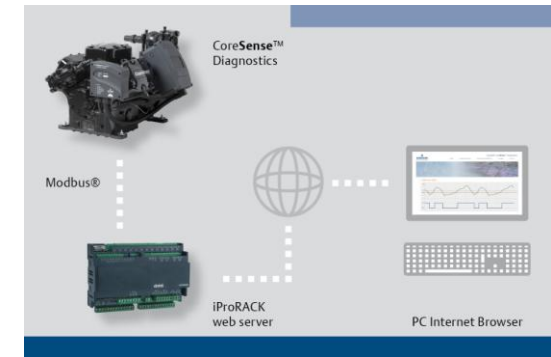
2) Connect To Computer



1. Modify User Adjustable Features
2. Download Compressor Fault History
3. Use As Data Logger

Service Engineer On Site

3) Connect to Pack Controller



1. Modify Adjustable Features
2. Download Fault History
3. Use As Data Logger

Modbus Protocol

2

Scroll ZO Range Suited For Booster & Cascade CO2 Applications

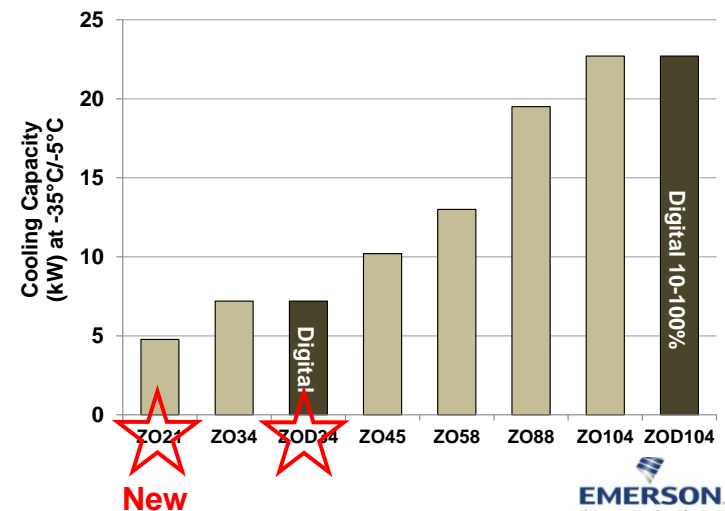
Description:

- CO2 Scroll Compressors For LT Cascade & Booster Systems
- From 5kW to 23kW Cooling Capacity In Low Temperature



Main Benefits/Characteristics

- Compact, Half The Weight Of Equivalent Semi-hermetic
- Digital Modulation From 10...100% - Alternative to Inverters Drives
- Optional Sound Shell (-12dBA) For Noise Sensitive Supermarket
- Pressure Ratings 30/45Bar
- ZOD34 modulates From 0,7kW to 7kW
- Opportunity To Contain Cost Impact Of Hybrid Systems Using R134a in MT And CO2 in LT



OM4 & OM5 Electronic Oil Management system For LT and HT CO₂ Applications

Description:

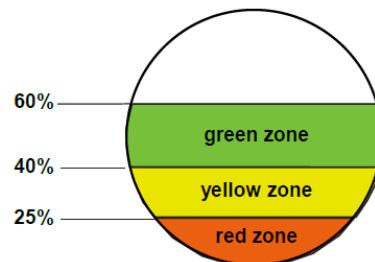
- Compressor Electronic Oil Level Management System
- CO₂ Compressors For Cascade & Booster Systems



Main Benefits/Characteristics

- Max. Operating Pressure 60 Bar (OM4) And 130 Bar (OM5)
- Test Pressure 66 Bar (OM4) And 143 Bar (OM5)
- Zone Level Control By Using Precise Hall-sensor Measurement
- Self Contained Unit With Oil Level Sensor And Integral Solenoid To Manage Oil Level Supply
- 24 VAC Or 230 VAC Power Supply
- Adapters Suitable For Various Types Of Compressors

Sight-Glass Level Control Zones:



| LEDs | Status / Function | Function | Alarm |
|------|-------------------------------------|----------------------|------------------------|
| • | Oil Level in green zone (60 - 40%) | | |
| • • | Oil Level in green zone (60 - 40%) | Injection, delay 10s | |
| • | Oil Level in yellow zone (40 - 25%) | Injection | |
| • • | Oil Level in red zone (25 - 0%) | Injection | Yes, delay 20s or 120s |

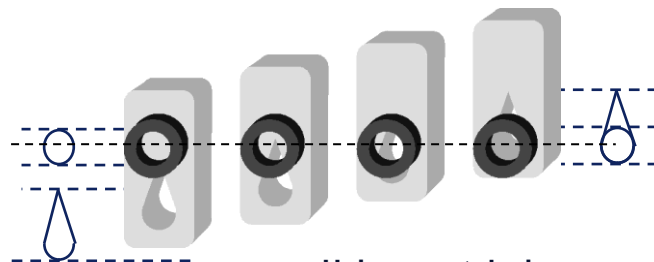
CX Gas Cooler Pressure Control Valve

Description:

- Electric Control Valve For Gas Cooler Pressure Control
- Trans-critical CO₂ Systems
- Four Sizes: CX4, CX5, CX6 And CX7

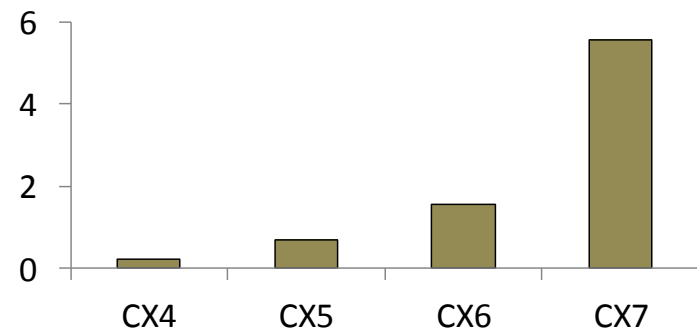
Main Benefits/Characteristics

- Max. Operating Pressure 120 Bar
- Test Pressure 172 Bar, Burst >360 Bar
- Braze Or Screw Connections
- Linear Flow Characteristics (Control Accuracy)
- EXD-U00 Universal Driver (0-10 V Or 4-20 Ma Signal)



Unique port design:
linear flow characteristic

Kv (m³/hr)



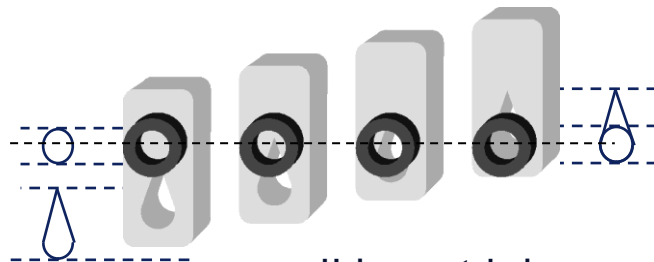
EX Receiver Pressure Control Valve

Description:

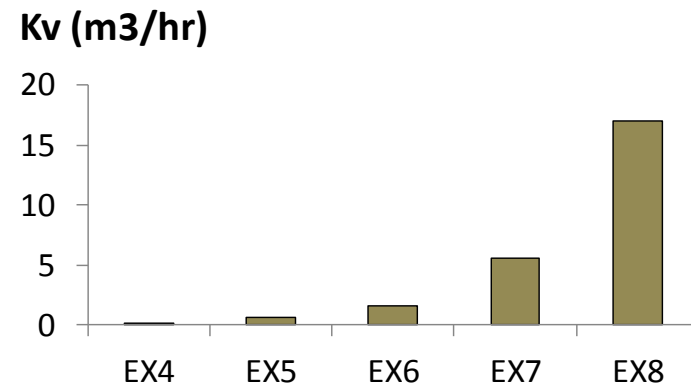
- Electric Control Valve For Receiver Pressure Control
- Trans-critical CO₂ Systems
- Five Sizes: EX4, EX5, EX6, EX7 And EX8

Main Benefits/Characteristics

- Max. Operating Pressure 60 Bar (EX8 45 Bar)
- Test Pressure 66 Bar (EX8 50 Bar)
- Linear Flow Characteristics
- EXD-U00 Universal Driver (0-10 V Or 4-20 Ma Signal)



Unique port design:
linear flow characteristic



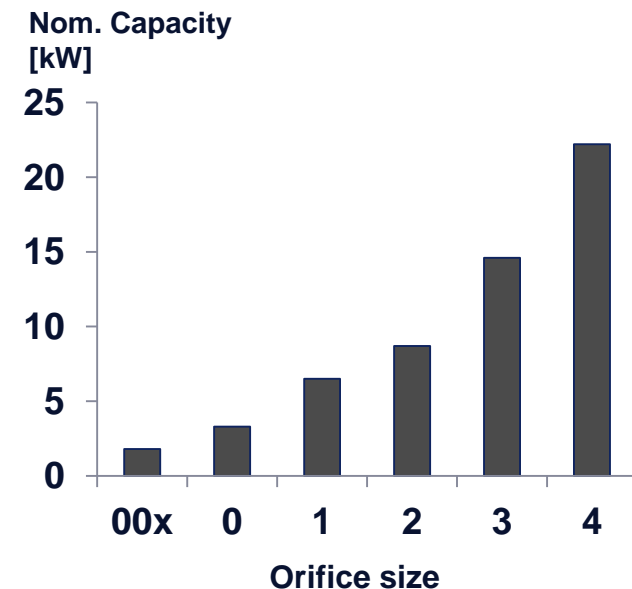
EX2/CX2 Electrical Expansion Valve

Description:

- Electronic Expansion Valve For Use In Display Cases
- Medium And Low Temperature Display Cases

Main Benefits/Characteritics

- Max. Operating Pressure 40 Bar (EX2) And 90 Bar (CX2)
- Test Pressure 44 Bar (EX2) And 99 Bar (CX2)
- Pulse Width Modulated Valve
- Slider Valve Mechanism, Minimizing Noise & Pulsations
- Positive Shut Off: No Need For Additional Solenoid Valve
- Orifices To Optimize Valve Capacity
- Controller: EC2 37x (Incl. Superheat Control)



EC2-372 Display case controller

Description:

- **Electronic display case controller for use with compressor racks, mainly used in display cases**

Main Benefits/Characteritics

- **Display Case controller with self adaptive superheat control algorithm**
- **Using pressure and temperature for superheat control**
- **Free Relay available eg. for lightning control**
- **Communication capability using either LON or TCP/IP protocol**



Dixell Solution For Transcritical & Subcritical CO₂

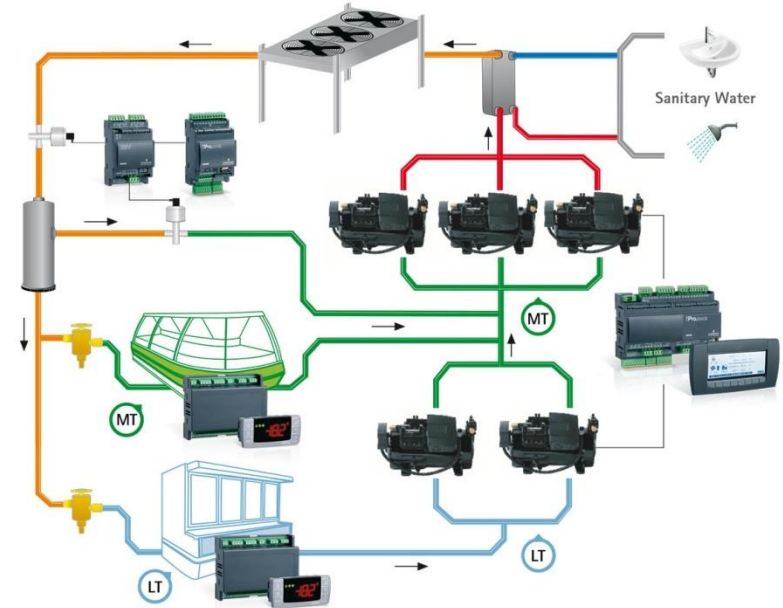


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Dixell Solution for Transcritical System

Compressor management
iProRACK + XEV20D

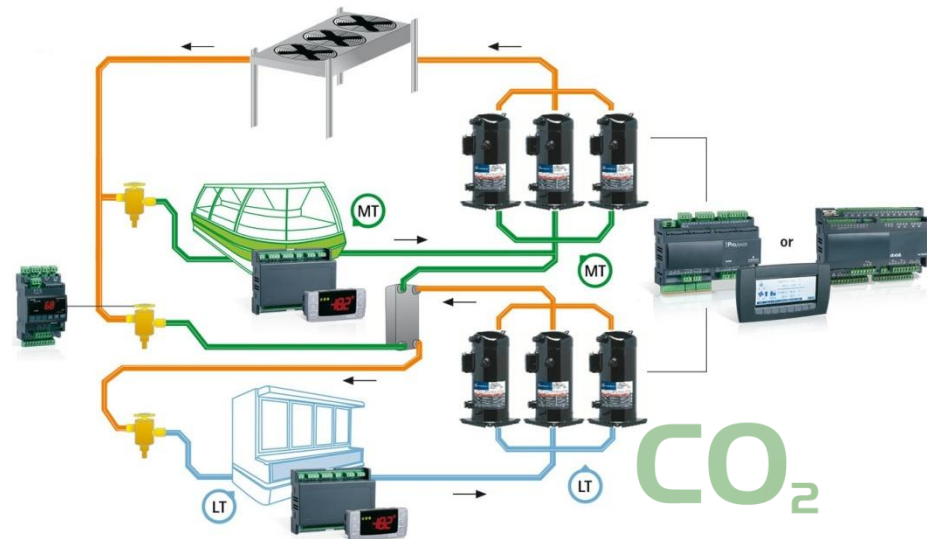
Cabinet management
XM600



Dixell Solution for Cascade System

Compressor management
iProRACK or XC1000D + XEV32D

Cabinet management
XM600



CO₂ Rack and Cabinet Management



IPRO.Rack & IPRO-Co₂

- Management Of 2 Circuits With Up To 2 Inverters For Each One
- Transcritical & Subcritical CO₂ Control With Synchronization Of The Circuits
- Dual Gas Management For MT And LT Circuits
- SH Calculation With Alarm Management
- Liquid Injection Valve Activation

iPro.RACK



CO₂



XC1000

- Subcritical CO₂ Regulation: Synchronization Of The Circuit
- Sub-cooling Management
- Inverter Control Of The Compressor
- Compressor Unloading In Case Of Alarm
- SH Calculation With Alarm Management
- Liquid Injection Valve



8 **CO₂ Rack and Cabinet Management**



CO₂



XM600

- **Medium And Low Temperature Cabinets**
- **Auto Adaptive Superheat**
- **Back Up Battery Management**
- **Hot Gas Defrost For Stepper Valve**

