



with RainCycle™

# Provide data center racks with free cooling.

## CO<sub>2</sub> Data Center In-Row Rack Cooling.

Inspired by the natural cycle of water, our patented Rain Cycle economizer cycle uses the thermosiphon principle to recirculate CO<sub>2</sub> refrigerant in free cooling mode.



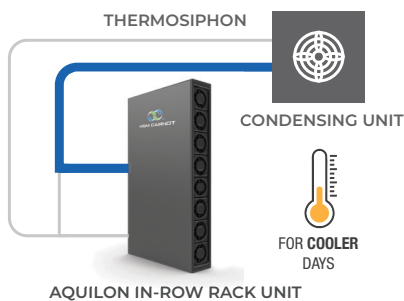
### Design Features:

- Patented rain cycle economizer mode using thermosiphon standard on all units
- Less piping required compared to synthetic refrigerants
- Adiabatic condenser option available when required
- Readily available standard components
- CO<sub>2</sub>/CO<sub>2</sub> and CO<sub>2</sub>/Chilled Water options available

### Benefits:

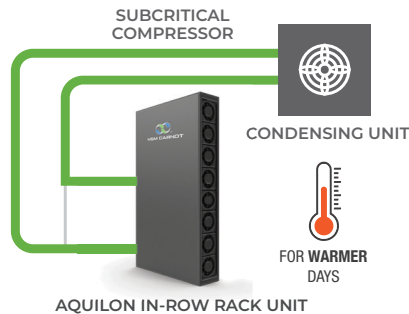
- Free cooling with CO<sub>2</sub> thermosiphon, removes need for recirculation pump
- Significant reduction in footprint than synthetic systems
- Less energy consumption during compression mode with CO<sub>2</sub>
- Utilizes Future proof natural refrigerant against regulations with GWP-1
- CO<sub>2</sub> is Non-toxic & Non-flammable refrigerant
- Higher heat capacity compared to synthetics, requiring smaller components and providing higher efficiency
- Condenser height is not limited with CO<sub>2</sub>, unlike synthetic solutions available when required

## RainCycle™ Cooling Modes



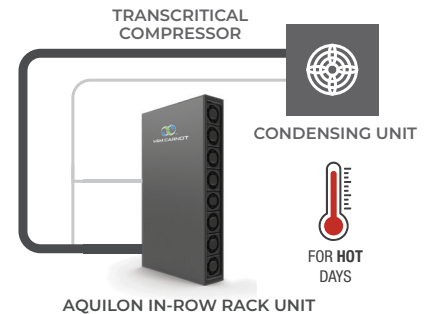
### Mode A: RainCycle™ with Free-Cooling

- Ambient Temp of 53.6°F (12°C)
- Circuit in thermosiphon free-cooling mode (No Compression)



### Mode B: Partial Compressor

- Ambient Temp of 64.4°F (18°C)
- Circuit in subcritical compression mode



### Mode C: Full Compressor Transcritical

- Ambient Temp of 95°F (35°C)
- Circuit in transcritical compression mode

## Types of Heat Rejection:

- CO<sub>2</sub>/CO<sub>2</sub>: rejecting heat via the air with a heat exchanger separating the CO<sub>2</sub> refrigerant system with the clean rack CO<sub>2</sub>
- CO<sub>2</sub>/Chilled Water: rejecting heat to a chilled water (not condenser water) with a heat exchanger separating the chilled water and CO<sub>2</sub>

The natural solution.

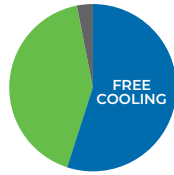


## Regional Efficiency Examples:



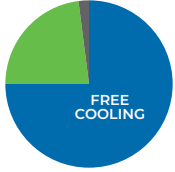
### NEW YORK

**60%** FREE COOLING MODE  
**33%** PARTIAL COMPRESSOR MODE  
**7%** FULL COMPRESSOR MODE



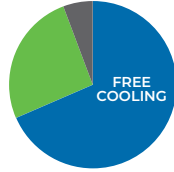
### SAN FRANCISCO

**55%** FREE COOLING MODE  
**43%** PARTIAL COMPRESSOR MODE  
**2%** FULL COMPRESSOR MODE



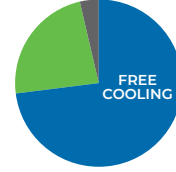
### MONTREAL

**75%** FREE COOLING MODE  
**23%** PARTIAL COMPRESSOR MODE  
**2%** FULL COMPRESSOR MODE



### SEATTLE

**69%** FREE COOLING MODE  
**25%** PARTIAL COMPRESSOR MODE  
**6%** FULL COMPRESSOR MODE



### TORONTO

**74%** FREE COOLING MODE  
**23%** PARTIAL COMPRESSOR MODE  
**3%** FULL COMPRESSOR MODE

Estimated hours based on historical temperature data.

## Model:

### Model IRC12

	Weight Lbs.	Length (in)	Width (in)	Height (in)
IN-ROW RACK UNIT	–	44" (1098 mm)	12" (300 mm)	79" (1992 mm)
CONDENSING UNIT	2000 (910 kg)	61" (1537 mm)	59" (1486 mm)	82" (2083 mm)



## Associated Standards for CO<sub>2</sub> Refrigeration Systems:

- Construction per ASME B31.5 “Refrigeration Piping and Heat Transfer Components”
- Stainless Steel Tubing per ASTM A249 TP304
- Nitrogen Pressure Test per ASME B31.5 Edition 2019 Article 53.8
- Ability to meet Title 24 Requirements
- UL/CSA Approved

Contact us to learn how you can increase operational efficiency.

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