



# Modular Refrigeration/Freezer Unit

## for Insulated Shipping Containers

Mainstream's Modular Refrigeration Unit (MRU) provides thermal control to insulated containers in ambient temperatures as high as 130 °F and as low as -40°F. Both the MRU-TQ1-04 and the MRU-TQ3-404 can be rigidly attached to either Tricon or Quadcon insulated containers. The MRU is designed to replace the Thermo King VM405 and the Carrier Integra 30S with improved performance, reliability and ease of maintenance. Using a high-efficiency, environmentally safe refrigerant, the MRU meets or exceeds all requirements for military heating and cooling.

### ▶ Tested to U.S. Military Standard 810

- ▶ Designed for maintenance or repair with common tools from standard military tool kits
- ▶ Mean Time Between Failure (MTBF) rate of 5,202 hours
- ▶ 20-year storage life without performance degradation
- ▶ Designed for high ambient temperatures and desert conditions
- ▶ Straightforward, intuitive control panel
- ▶ Integrated LCD that simplifies temperature and defrost settings
- ▶ 18 LED status indicators and nine jumpers located on the PCB allow user override of sensors and relays
- ▶ Wire harnesses are straightforward plug and play
- ▶ Brazing, soldering or wire splicing never required



*Designed for High Ambient Temperatures and Desert Conditions.*

# MRU Value-Added Features

## Designed for Military Environment

The MRU was designed for the harsh military environment. The unit has been tested to MIL-STD-810F (e.g., salt-fog, humidity, sand-dust, solar, ice & freezing rain, blowing rain and watertightness, EMI [RE102 and CE102], high and low temperature operation & storage, vibration [ground mobility], rail impact and shock [transit drop]).

## Air Flow and Air Circulation

Air is drawn into the evaporator so condensation is not sprayed onto the food inside the container. The conditioned air circulates radially from the evaporator compartment to provide more uniform air flow distribution and prevent air blockage.

## Total Unit Modularity

Every component can be replaced with common tools. Brazing, soldering or wire splicing is never required.

## System Redundancy

Component redundancy allows the MRU to operate even if a condenser fan, evaporator fan, fan capacitor or heater fails. Extra terminals are available on the relays if a contact pits and fails.

## Energy Saver Option

In freezer mode, an energy saver selection switch automatically operates the MRU longer during cooler periods of the day, such as the evening, to reduce power consumption.

## Watertight Electronics

The control box and wire harness connections are watertight to improve reliability and simplify cleaning. The entire unit can be hosed off to remove dirt and other contaminants.

## LED Diagnostics

The MRU circuit board has 18 LED status indicators to simplify troubleshooting.

## Interactive Diagnostics Training and Support

Mainstream provides interactive, computer-based and internet-based training and support in addition to traditional printed media.

## Circuit Breakers

The MRU uses re-settable circuit breakers; there are no fusible links or fuses.

## Jumper Ports

PCB jumpers simplify diagnostics and allow a field override of the control board should the electronics fail.

## Black-out Control

The black-out (lights out) feature can be used in tactical situations.

## Combined Suction Line Accumulator/Liquid Receiver with Sight Glass

The suction line accumulator is located inside the liquid receiver to improve cooling capacity and performance. The liquid receiver contains a refrigerant sight glass to simplify system charging.

## Simplified Control System

The electrical control system can be quickly and easily tested with a multimeter. Electrical components can be replaced with common maintenance tools. The electrical circuit schematic is displayed on the side of the MRU to aid in troubleshooting and repair. The entire control box can be easily removed and replaced, if necessary.

## Ease of Installation

No manual lifting is required. The MRU is designed to be installed and removed with a forklift.

MODEL NUMBERS: MRU-TQ1-404

<b>POWER</b> TQ1: 120 VAC, 1-phase TQ3: 208 VAC, 3-phase	<b>REFRIGERANT</b> 404: R-404A
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Physical		
Height	21.4 inches	54.3 cm
Width	36.8 inches	93.3 cm
Depth	38 inches	96.5 cm
Weight	350 lbs	158.8 kg
Electrical Power		
MRU-TQ1-404	120 VAC, single-phase, 60 Hz	
MRU-TQ3-404	208 VAC, 3-phase, 50/60 Hz — Y Connection w/Neutral	
Cooling Capacity		
MRU-TQ1-404	2,800 Btu/hr (820 W) at 0°F/100°F	6,600 Btu/hr (1,933 W) at 35°F/100°F
MRU-TQ3-404	4,100 Btu/hr (1,200 W) at 0°F/100°F	9,750 Btu/hr (2,857 W) at 35°F/100°F
Refrigerant	R-404A	6 lbs 6 oz

**Setup Time:** The MRU can be installed in less than 60 minutes by two people and is operable by a soldier outfitted in all levels of Mission Oriented Protective Posture (MOPP) equipment. The MRU requires less than 60 minutes Mean Time To Repair (MTTR) including evacuation and recharging using standard commercial support and test equipment.



Made in the USA

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