

Mipco™ Connections for Refrigerated Containers

Performance — Electrical

Dielectric Voltage Withstand	3000 volts
Max. Working Voltage	480VAC
Circuit Protection	UL 489 Listed, CSA Certified circuit breaker
FLA Interrupting Capacity	Specified breaker rating
Short Circuit Withstand Rating	22,000 AIC or 18,000 AIC (shock resistant)
Operations	>10,000 cycles at rated current

Performance — Mechanical

Mounting	(6) 5/16" diameter through holes
Breaker Terminals	Pressure screw lugs (slotted) accept #14–1/0 AWG wire
Terminal Identification	In accordance with UL489 and UL1682 A,B,C,G (earth ground) on line side
Product Identification	External label on face plate
Operations	>25,000 cycles of operation

Performance — Environmental

Moisture	Watertight screw cover or spring-loaded self-aligning flap cap. O-rings on all sleeves, interior, interlock actuating pin and circuit breaker actuator rod bushings. Gasket on receptacle and module flange
Operating Temperatures	Min. continuous -20° F (non-enclosed) Max. continuous +140° F
Chemicals	Resists common industrial hydrocarbons, acids, bases and solvents
UV Resistance	Polyurethane enamel (32A) and natural metallic finishes provide maximum UV protection

Materials

Receptacle Housing Metallic	30A/50A — Brass (natural) 32A — Copper-free aluminum 356-T6 (red epoxy powder coated) 60A — Copper-free aluminum 356-T6 (natural)
Non-Metallic	30A/50A & 60A — AMTUF™ 32A — DuraV®
Interior	Molded arc-resistant thermoset phenolic (UL 94-V0 flame rating)
Contact Sleeves	Brass with beryllium copper compression springs
Terminal Screws	Brass, slotted
O-Rings	Buna-N (Nitrile)
Gaskets	Neoprene
Mounting Platform	Heavy-gauge stainless steel welded construction
Actuator Rod	1/2"-inch diameter solid stainless steel. Heavy-duty non-conductive impact-resistant plastic knob
Ground Lug	Aluminum terminal screw (slotted) accepts up to #2 AWG wire
Interlock Mechanism	Sealed self-lubricating thermoplastic
Flap Cap	12-gauge stainless steel, gasketed cover
Screw Cap	High-impact plastic, gasketed
Washers	Nylon
Springs, Fasteners	Stainless steel

Approvals

Underwriters Laboratory (UL) — Sections 489, 1682 and 1686

CSA Section — C22.2–182.1

Federal Department of Transportation — Federal Register volume 47, number 68, subpart 11.79 **United States Coast Guard (USCG)**

International Electro-Technical Commission (IEC) — 32-amp devices conform to IEC 309-1 and 309-2

International Standards Organization (ISO) — ISO 1496/2, Annex 1



Mipco™ Connections for Refrigerated Containers

Engineering Specifications

1.0 SCOPE

- 1.1 This document covers pin and sleeve marine/industrial-grade reefer power outlet assemblies. Useable in dry, damp, wet, outdoor marine locations for providing electrical power to refrigerated containers. Assemblies shall be UL Listed with enclosures incorporating interlocked reefer power outlets in a modular multi-gang arrangement. Devices are factory wired to a UL recognized power distribution block and rated 30, 32, 50 and/ or 60 amps at 250 or 480VAC, 50–60 Hz. Devices are also rated for continuous use in temperatures from -20 degrees to +140 degrees F. These devices must provide internal environmental seals for marine and extreme wet applications and are to be mechanically interlocked.
- 1.2 All assemblies specified shall be manufactured by Mipco™ as complete assemblies and shall be marked as stated.

2.0 PRODUCT CLASSIFICATION

ENCLOSURES:

- 2.1 **Construction** – All enclosures shall be specified either 12 or 14-gauge stainless steel and shall conform to NEMA 4X requirements for watertight, dust-tight and corrosion resistance.
- 2.2 **Access Panel** – Each enclosure shall provide an access panel designed to allow complete wiring compartment accessibility. Bolted plate or hinged panel to be specified.
- 2.3 **Power Distribution Block** – All interlocked reefer power outlet assemblies shall be factory wired to a UL recognized power distribution block. Line lugs shall accommodate a range of wire sizes compatible with the total amperage rating of all enclosed receptacles

RECEPTACLES

- 2.4 **Interlocked Receptacles** – The receptacles shall be of a modular design, mechanically interlocked to allow the circuit to be energized only after a mating plug is fully inserted into the receptacle and the actuating rod is pushed forward. All interlocked receptacles shall allow the de-energizing of the circuit before mated contacts are disengaged upon plug removal. Plug ground pin will activate interlock mechanism. The mounting dimensions shall be the same for interlocked receptacles with a high (65K) or nominal (greater than or equal to 20K) inrush current circuit breaker to allow for future upgrades.
- 2.5 **Grounding** – The grounding of the device shall be accomplished through a separate ground (earth) that will “make first”, “break last”. Plug ground pin will activate interlock mechanism. The ground pole shall be bonded to a UL recognized ground block labeled for connection to the ground conductor. All non-current carrying metallic components must be grounded to ensure complete system grounding.
- 2.6 **Housings** – Receptacle housings shall be metallic, copper-free aluminum or thermoplastic with performance equal to or greater than DuraV® or AMTUF™, and have a flame rating no less than UL94 V0.
- 2.7 **Interiors** – Receptacle interiors must be molded thermoset UL94 V0 and be replaceable for ease of maintenance.
- 2.8 **Contact Sleeves** – Quad-slit brass contact sleeves shall have contact pressure springs of electromotively similar material to maintain consistent contact pressure between sleeves and mating male pins and prevent galvanic corrosion.

- 2.9 **Environmental Seals** – Each device must have an environmental seal or O-ring around all interiors and around each sleeve to prevent water and contaminants from entering the wiring compartment. The seals shall provide waterproof capability if plug or screw cap are removed.
- 2.10 **Circuit Protection** – Each interlocked receptacle must be protected by a molded cased, thermal-magnetic type UL 489 listed circuit breaker. The circuit breaker must also comply with NEC® Articles 240 and 430 for branch circuit protection.
- 2.10a **High Inrush Current Protection Requirements** – Circuit breaker shall have a minimum 65,000-amp interrupting capacity.
- 2.10b **Nominal Inrush Current Protection Requirements** – Circuit breaker shall have a minimum (18,000-amp high shock) 22,000-amp interrupting capacity.
- 2.11 **Flap Cover or Screw Cover Option** – Flap cover option must provide weather-tight capability to the exposed contacts by utilizing a spring-actuated self-closing flap. Watertight capability shall be obtained by using a gasketed screw cap.

3.0 DESIGN AND WIRING REQUIREMENTS

- 3.1 **Wiring** – All enclosure assemblies must be factory wired to conform to guidelines stated in the NEC® for wire sizing, Table 310-16 and wire bending space, Article 373-6. Wiring of individual interlocked reefer outlets must allow for the removal/replacement without opening the access door.
- 3.2 **Conduit Entry** – Assemblies shall include a conduit entrance with an aluminum conduit hub; size and location to be specified.

4.0 APPLICABLE COMPLIANCES

- 4.1 **Underwriters Laboratories (UL)** – The enclosure assemblies specified herein shall be listed in applicable sections of UL Standards 489, 1682 and 1686.
- 4.2 **Canadian Standard Association (CSA)** – The devices shall be listed in the applicable sections of CSA C22.2-182.1.
- 4.3 **American Bureau of Shipping (ABS)**
- 4.4 **Federal Department of Transportation** – Devices shall comply with Federal Register volume 47, number 68, subpart 11.79 and the United States Coast Guard (USCG).
- 4.5 **International Electro-Technical Commission (IEC)** – The 32-ampere devices specified shall conform to IEC 309-1 and IEC 309-2, EN60309.
- 4.6 **International Standards Organization (ISO)** – The 32-ampere devices specified shall conform to 150 1496/2, Annex L.

NEC is a registered trademark of the National Fire Protection Association, Inc.