Max-Gard interconnection systems

Pin and sleeve plugs, receptacles and systems

1.0 Scope

1.1 This document covers multi-contact pin and sleeve, industrial grade, arc-quenching, circuit interrupting-rated electrical plugs, motor plugs, connectors, receptacles, mechanically interlocked receptacles and assorted accessories. Usable in dry, damp, wet, marine and/or hazardous locations for electrical power circuits. Devices are to be rated 30, 60, 100, 200 and/or 400 amperes at 600 V AC, 50–400 Hz and 250 V DC maximum. Devices are also rated for continuous use in temperatures from -40 °C to +130 °C. These devices must provide internal environmental seals for marine and extreme wet applications and can be electrically interlocked.

1.2 The devices described shall be ABB/Russellstoll Max-Gard catalog numbers as specified.

2.0 Product classifications (features)

2.1 **Gated deadfront** – All receptacles and connectors must have a rotating disk on the face of the interior, which provides live contact isolation and environmental separation.

2.2 **Delayed action arc containment** – All devices upon disconnect under load shall have provision so the arc is contained and extinguished within the insulation cavity, making it impossible to withdraw a live plug.

2.3 **Flap cover or screw cover option** – Flap cover option must provide weathertight capability by utilizing a spring actuated self-closing flap. Watertight capability shall be obtained by using a gasketed screw cap.

2.4 **Polarization** – All devices shall be factory polarized for amperage, voltage, frequency and phase; thus providing a single voltage rating, single interface system.

2.5 **Grounding** – The grounding of the device shall be accomplished through a separate center ground (earth) make-first and break-last pole on all devices for complete system grounding.

2.6 **Pole capabilities** – All devices shall accommodate up to four power pins plus a separate center ground pin and they shall be integral with the connector bodies (five pins total).

2.7 **Interior type** – Interiors must be male (pin type) or female (sleeve type). Pins and sleeves shall also be self-aligning and self-wiping/self-cleaning.

2.8 **Control contacts** – All devices must have an option for two control contacts, which shall be make-last and break-first for use in electrical interlocks and/or control circuits. See table below.

2.9 **Conductor terminals** – Pin and sleeve connections shall employ solderless pressure-type screw terminals and be sized to accept stranded or solid copper conductors in AWG sizes (max. O.D.s as noted). The screw terminals shall also have socket heads to ensure proper torquing of wires.

2.10 **Environmental seals** – Each device must have an environmental seal or O-ring around all interiors and around each pin and sleeve to prevent water and contaminants from entering the wiring compartment. This provides waterproof capability, even when not mated.

2.11 **Hazardous location** – All standard plugs 30, 60 and 100 A shall be UL and CSA listed for hazardous location class I division 1, groups C and D; class II division 1, groups F and G. A hazardous location circuit breaker-protected interlock shall also be applicable to the same environments and possess all the same product features as outlined above. Enclosures shall meet NEMA 8 hazardous outdoor-duty classifications and shall meet shipboard use above deck in accordance with the Department of Transportation (USCG “Green Water”).

Rating for pilot/control contacts

Thermal continuous current amps	Maximum current amps								Max. volt ampere	
	120 V		240 V		480 V		600 V			
	Make	Break	Make	Break	Make	Break	Make	Break	Make	Break
10 (#12 AWG)	60	6	30	3	15	1.5	12	1.2	7200	720

Contact rating code designation A-600, Table 119.1 – UL 508 heavy pilot duty load (720 VA/600 V AC) maximum

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2.12 **Lockout devices –** Plug connection lockout is achieved by a padlock through plug sleeve housing hole provided for this purpose. On Hazardous location/explosion proof interlock receptacles, lockout shall additionally be achieved by separate lockout accessory available from the factory. On standard interlocks, lockout accessory/ construction is available from the factory.

3.0 Materials requirements

3.1 **Housings –** Plug, motor plug, receptacles, connectors and interlock housings, associated covers and caps, screw collars, and clamp holders shall be made of copper-free cast aluminum (max. 0.004% copper).

3.2 **Finish –** All external surfaces except those that provide means of grounding shall be epoxy powder coated to resist corrosion.

3.3 **Hardware –** All hardware, external and springs, shall be stainless steel. Cable clamps shall be stainless steel or epoxy powder coated, copper-free cast aluminum.

3.4 **Insulators –** All device body insulators shall be molded from glass-reinforced high-strength thermoset polyester, minimum of UL 94-V0 flammability rated.

3.5 **Contacts –** Contacts base material shall be made of a conductive copper alloy (brass CDA485) to prevent dezincification. Accessory material of the contacts shall be made of a compatible corrosion resistant material.

3.6 **Environmental seals –** Environmental gaskets and O-rings shall be made of Neoprene material.

4.0 Design and construction requirements

4.1 **circuit interrupting rating –** All devices 30, 60, 100 and 200 A shall be tested to be interrupted at 150% of rated current. Additionally, all devices shall be designed and tested to interrupt 100% of rated current.

4.2 **Wiring –** All devices shall be wired from the rear requiring no disassembly of the pins and/or sleeves from the insulated body.

5.0 Applicable documents (compliances)

5.1 **Underwriters Laboratories (UL) –** The devices specified herein shall be listed in applicable sections of UL Standards 1010, 231, 1682 and 1686, File Nos. E2630, E57324, E68085, E123752.

5.2 **Canadian Standard Association (CSA) –** The devices specified shall be listed in the applicable sections of CSA C22.2-182.1, File Number LR14096.

5.3 **International Electro-Technical Commission (IEC) –** The 30-, 60- and 100 A devices specified shall have been tested and comply with IEC 309-1.

5.4 **Federal Department of Transportation –** Refrigerated National Shipboard location devices shall meet and comply with Federal Register volume 47, number 68, subpart 111.79.

5.5 **Standards –** The devices specified shall comply with Military Standards MIL-STD-105 and 1344; ASTM Standards D570 and D2565: NEMA Standard PR4-1983; and OSHA regulations when installed in accordance with the National Electrical Code® (NEC).

5.6 **NEMA 250 enclosures standard**

NEMA 1 – General Purpose for indoor use; guards against contact with equipment.

NEMA 3R – Outdoor use primarily to protect against rain, sleet, wind-blown dust and damage from external ice formation.

NEMA 4 – Indoor or outdoor use to protect against windblown dust and rain; splashing and hose-directed water.

NEMA 4X – Watertight, dust-tight corrosion-resistant for indoor or outdoor applications.

NEMA 6 – Watertight, casual/ temporary immersion.

NEMA 7 – Class I (Hazardous) for indoor use in Class I areas, per NEC.

NEMA 8 – Class I (Hazardous) for indoor use in Class I, oil-immersed equipment.

NEMA 9 – Class II (Hazardous) for indoor use in Class II areas, per NEC.

NEMA 12 – Industrial use, dust-tight for indoor use to protect against dust, falling dirt and dripping non-corrosive liquids.