



SPECIFICATION GUIDE

1. COMPLIANCE WITH STANDARDS & DIRECTIVES
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SPECIFICATION GUIDE

TYPICAL SPECIFICATION – PLUGS, SOCKET-OUTLETS AND COUPLERS FOR INDUSTRIAL PURPOSE

Plugs, socket-outlets, connectors and appliance inlets

ADVANTAGES MARECHAL® PLUGS AND SOCKET-OUTLETS

1. COMPLIANCE WITH STANDARDS AND DIRECTIVES	
- Plugs and sockets must comply with IEC or EN 60309-1	<i>60309-1: Plugs, socket-outlets and couplers for industrial purpose – General rules;</i> This standard covers all constructions of plugs and socket-outlets: 1. Up to 800 A 1 000 V, AC 500 Hz/DC, 2. Whatever their contact technology or contact material, 3. With an integral switching device up to 250 A, 4. With auxiliary contacts whatever their rated current, 5. With any IP rating from IP23 to IP69, etc.
- Plugs and socket-outlets must comply with the <i>European Low Voltage Directive 2014/35/EU</i> .	Compulsory
- Plugs and socket-outlets must comply with IEC or EN 60309-4;	<i>60309-4: Switched socket-outlets and connectors with or without interlock.</i> Workers safety. Three constructions fulfil this requirement: 1. An integral switching device as in MARECHAL® devices 2. The combination of a socket-outlet with a mechanically interlocked switch, 3. The combination of a socket-outlet or connector with an electrically interlocked contactor by means of cables with pilot wires.
- Plugs and socket-outlets must comply with <i>UL 2682 'Switch Rated Plugs and Receptacles'</i>	
- Plugs and socket-outlets must comply with <i>NFPA 70E Standard for Electrical Safety in the Workplace</i> , Or - Plugs and socket-outlets must comply with <i>CSA Z462: Workplace electrical safety standard</i>	Thanks to their switch ratings/Off button, safety shutter and proof of deenergization, the use of MARECHAL® plugs and socket-outlets does not require hazard analysis, voltage testing, flash boundaries and cumbersome personal Protective Equipment. NFPA: National Fire Protection Association (USA) CSA: Canadian Standard Association
Plugs and socket-outlets must comply with OSHA 18001 in terms of isolation.	OSHA: Occupational Safety and Health Administration (UK)
Plugs and socket-outlets must comply with NEC Sections 430.102 – 430.109 requiring approved disconnecting means to be located in a readily accessible location within sight of the motor and driven equipment	MARECHAL® Plugs and socket-outlets are an approved 'line of sight' disconnect switch for meeting this requirement. NEC: National Electric Code (USA).
2. CLASSIFICATIONS	
Plugs and socket-outlets must have the following classifications:	
- IP4X/IPXXD according to IEC or EN 60529	<i>60529: Degrees of protection provided by enclosures (IP Code), Degrees of protection against access to hazardous parts and against solid foreign objects</i> No access to live parts without a tool even when the cover is open The front face of MARECHAL® socket-outlets is dead: live parts are inaccessible to a thin tool or wire.
- Minimum IPX5 or IPX6 according to IEC ou EN 60529 or - Degree of IPX6/IPX7 or IPX6/IPX9 according to EN or IEC 60529	<i>60529 Degrees of protection provided by enclosures (IP Code) Degrees of protection against ingress of water</i>
- 60309-1 § 6.1.5: accessory ≤ 250 A with integral switching device	Guarantee of deenergization of the plug before it can be withdrawn from the socket-outlet or connector. Workers' safety: 1. Intrinsic safety of socket-outlets and connectors: 2. Compact construction
- 60309-1 § 6.1.9: Socket-outlets and connectors with safety shutters;	1. Workers' safety (wet hands, etc.) 2. No ingress of foreign bodies even if the lid is open.



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ADVANTAGES

MARECHAL® PLUGS AND SOCKET-OUTLETS

- Plugs and socket-outlets must be able to operate in an ambient temperature between -40 °C and +60 °C

- Plugs and socket-outlets must have an impact resistance IK08 (insulated casings) or IK09 (metal casings) according to EN or IEC 62262.

62262 Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)

3. TECHNICAL SPECIFICATIONS

- Plugs and socket-outlets must use constant-pressure butt-style contacts on solid silver-nickel rivets. Pins and contact-tubes are not allowed. Plating of contact is not allowed.

Constant-pressure butt-style contacts do not require strict tolerances such as those of pins and contact-tubes. Silver is the common contact material that has the lowest contact resistance and does not deteriorate over time. Silver contacts may withstand temperatures up to 300 °C. Silver contact have a long time constant: they heat up gradually and can withstand important overloads without an excessive temperature rise of the accessory.

1. Prevention of thermal runaway,
2. Limited temperature rise
3. Low contact resistance over time
4. High number of operation without wear.

- The contacts of the Plugs and socket-outlets must not be sensitive to corrosion or oxidation.

Ag/Ni solid contact are intrinsically protected against corrosion or oxidation.

- Plugs and socket-outlets must be protected against corrosive atmospheres and salt fog. All metal parts must be in stainless steel or protected against corrosion.

- Terminals must be spring assisted to prevent loosening due to conductor yielding, shocks, vibrations or thermal cycling.

1. Prevention of thermal runaways and hazards of exploitation
2. Spring assisted terminal do not require any regular verification.

- IP ingress protection degree must be achieved automatically when the plug or connector is fully inserted into its counterpart, without any additional manual operation.

The additional manual operation consisting in the rotation of a ring is almost never performed on the long term.

- A four-pole (five wire) (3P+N+E) socket-outlet or connector must also receive a two-pole/three-wire plug (1P+N+E) or a three-pole/four-wire plug (3P+E).

1. Flexibility of installations,
2. Decrease of the number of socket-outlets to install

- The main subassemblies (casings, interior mouldings, contacts, etc.) must be available as spare parts.

The MARECHAL® DECONTACTOR™ is an investment product, not a consumable. It can be reconditioned by means of spare parts.

1. Extended lifetime
2. Long term savings.

- Plugs and socket-outlets must have a system of different keying positions allowing to discriminate between circuits or incompatible operating voltages or frequencies.

- Plugs and socket-outlets must be able to close at least once on a conditional short-circuit current of 10 kA.

Safety of workers and installations. 60309-1 standard provides for a static withstand test only, not a close-on test.

- Plugs and socket-outlets must withstand an overload current of 5 times their rated current for one minute, without any permanent damage.

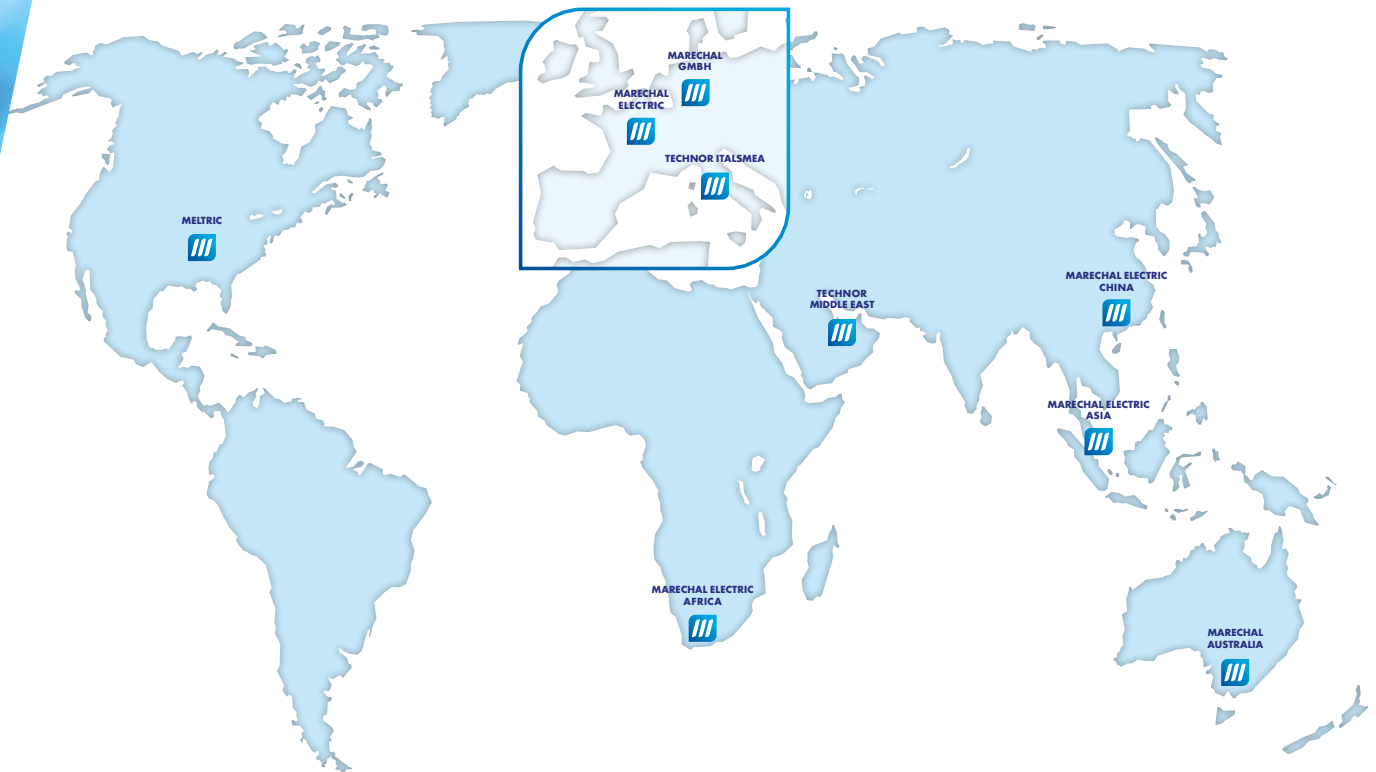
Prevention of operational hazards.

- The Plugs and socket-outlets must be able to be provided with auxiliary contacts for the remote control, whatever their size.

Signaling, remote control, etc.



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