

# SUPPORT FOR DRAFTING

## YOUR TECHNICAL SPECIFICATIONS

To request MARECHAL® technology and to comply with international standards for plugs and socket-outlets, connectors, switch-disconnectors for industrial or hazardous areas from 5 A to 1250 A.



SUPPORT

# SUPPORT FOR DRAFTING YOUR TECHNICAL SPECIFICATIONS

## STANDARD SPECIFICATIONS

- PLUGS AND SOCKET-OUTLETS FOR INDUSTRIAL PURPOSES (PLUGS, FIXED OR PORTABLE SOCKET-OUTLETS, AND APPLIANCE INLETS)  
- SWITCH-DISCONNECTORS

TECHNICAL BENEFITS  
OF MARECHAL® DEVICES

### 1. COMPLIANCE WITH STANDARDS AND REGULATIONS

Plugs and socket-outlets must comply with IEC EN 60309-1 standard.	60309-1: Plugs, socket-outlets, and couplers for industrial purposes – general requirements. This standard covers all plug and socket-outlet constructions: 1. up to 800 A 1000 V AC 500 Hz DC, 2. regardless of their contact technology/material, 3. with integral switching device up to 250 A, 4. with auxiliary contacts, 5. with IP ratings from IP23 to IP69.
Socket-outlets must comply with IEC EN IEC 60309-4 standard.	60309-4: Plugs, socket-outlets and couplers for industrial purposes. Switched socket-outlet and connectors with or without interlock. About worker safety: This requirement can be met by three constructions: 1. a MARECHAL® socket-outlets with integral switching 2. the combination of a socket-outlet with a switch, together with a locking device (mechanical interlock), 3. the combination of a socket-outlet with pilot contacts, piloted by a contactor (electrical interlock).
Switch-disconnectors must comply with IEC EN 60947-1 and 60947-3 standards.	60947-1: Low-voltage switchgear and controlgear – Part 1: General rules, 60947-3: Low-voltage switchgear and controlgear – Part 3: Switches, disconnectors, switch-disconnectors and fuse-combination units.
In potentially explosive atmosphere, plugs and socket-outlets must comply with IEC EN 60079 standards.	MARECHAL® devices are certified to ATEX and IECEx standards.
In potentially explosive atmosphere, plugs and socket-outlets must comply with ATEX Directive 2014/34/EU.	Mandatory in the European union.
Plugs, socket-outlets, and switch-disconnectors must comply with European Low Voltage Directive 2014/35/EU.	Mandatory in the European union.
Plugs, socket-outlets, and switch-disconnectors must comply with the Machine Directive 2006/42/EU, §1.6.3 Isolation of energy sources.	Compliance is ensured by a lockable (padlock) device for the plug out of the socket, preventing unwanted reconnection. <b>1.6.3. Isolation of energy sources</b> <i>Machinery must be fitted with devices to isolate it from all energy sources. Such isolators must be clearly identified. They must be capable of being locked if reconnection could endanger persons. Isolators must also be capable of being locked where an operator is unable, from any of the points to which he has access, to check that the energy is still cut off. (In the case of machinery capable of being plugged into an electricity supply, removal of the plug is sufficient, provided that the operator can check from any of the points to which he has access that the plug remains removed. After the energy is cut off, it must be possible to dissipate normally any energy remaining or stored in the circuits of the machinery without causing any risk to operators. As an exception to the requirement laid down in the previous paragraphs, certain circuits may remain connected to their energy sources in order, for example, to hold parts, to protect information, to light interiors, etc. In this case, particular steps must be taken to ensure operator safety.)</i>
Plugs and socket-outlets must comply with the French Order of December 20th, 2011 about removable electrical appliances and their conditions of connection and use.	This French decree prohibits on-load connection and disconnection of plugs and socket-outlets > 32 A. MARECHAL® socket-outlets DECONTACTOR™ feature an integral switch which fulfils this requirement.
Plugs and socket-outlets must comply with UL 2682 « Switch-Rated Plugs and socket-outlets» (USA).	
Plugs and socket-outlets must comply with NFPA 70E on protection against the risks associated with electric arcs, and, Plugs and socket-outlets must comply with CSA Z462: Workplace Electrical Safety Standard.	With their switches/stop button, safety shutter and means of visible disconnection, the use of MARECHAL® plugs and socket-outlets does not require risk analysis, voltage testing, flash limits and cumbersome personal protective equipment. NFPA: National Fire Protection Association (USA). CSA: Canadian Standard Association.
Plugs and socket-outlets must comply with NEC (USA) sections 430.102 - 430.109 requiring the disconnecting means to be located in an easily accessible location with "line-of sight" of the motor and driven equipment piece.	MARECHAL® devices are disconnect switches with visible cut-off approved to meet this requirement.

### 2. CLASSIFICATIONS

Plugs and socket-outlets must have the following classifications:

- IP4X/IPXXD according to IEC EN 60529 standard.	60529 : Degrees of protection provided by enclosures (IP Code) No access to live parts with a tool or a thin wire, even so when the lid is open.
- IPX5 ou IPX6 according to IEC EN 60529 standard, or - IPX6/IPX7 or IPX6/IPX9 according to IEC EN 60529 standard.	60529 : Degrees of protection provided by enclosures (IP Code)  Protection against: - water jetting/powerful jetting (IPX5 and IPX6), - temporary immersion (IPX7), and - high pressure and temperature water jet (IPX9).

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- SWITCH-DISCONNECTORS

## TECHNICAL BENEFITS OF MARECHAL® DEVICES

- Protection against mechanical impacts IK09 (non-metallic enclosure) or IK10 (metallic enclosure) according to EN/IEC 62262	62262: Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
- 60309-1 § 6.1.5 : socket ≤ 250 A with integral switch	Ensuring that the plug is not energized before it can be removed from the socket-outlet or mobile socket-outlet; Personal safety: 1. Intrinsic safety of socket-outlets and couplers; 2. Compactness of the devices ;
- 60309-1 § 6.1.9 : socket-outlets with safety shutter ;	1. Safety of persons (wet hands ...) 2. Prevents the penetration of solid foreign bodies, even so when the lid is open.
- Operating ambient temperature from -40 °C to +60 °C	
- Protection against mechanical impacts IK09 (non-metallic enclosure) or IK10 (metallic enclosure) according to EN/IEC 62262	62262: Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
Switch-disconnectors shall have the following classifications:	
- Utilization category AC-23A or AC-3 (On load making/breaking capacity) according to EN/IEC 60947-1/-3 standards	EN/IEC 60947: Low-voltage switchgear and controlgear – - Part 1: General rules, - Partie 3 : Switches, disconnectors, switch-disconnectors and fuse-combination units
- IP66/IP67/IP69 according to EN or IEC 60529 standard	60529 : Degrees of protection provided by enclosures (IP Code)  Protection against: - Water jetting/powerful jetting (IPX5 and IPX6), - Temporary immersion (IPX7), and - High pressure and temperature water jet (IPX9).
- Protection against mechanical impacts IK09 according to EN/IEC 62262	62262: Degrees of protection provided by enclosures for electrical equipment against external mechanical impacts (IK code)
- Operating ambient temperature from -25 °C to +60 °C	
- Ability to mechanically separate the load from the supply, without unwiring the switch-disconnector.	The MARECHAL® EVO switch-disconnector is composed of two parts easy to separate in complete safety without unwiring the device.
- Designed for environments with high level of pollution (pollution degree 3), inside or outside buildings.	
<b>3. TECHNICAL SPECIFICATIONS</b>	
- Plugs and socket-outlets shall have silver-nickel tips on spring-loaded with constant pressure. Pin and sleeve contacts or plating of contact surfaces are not allowed.	Spring-loaded contacts do not require the tight tolerances of pin and sleeve contacts. Silver is the common material which offers the lowest contact resistance and does not deteriorate over time. It can withstand temperatures up to 300 °C without damage. Silver contacts have a high time constant and heat up slowly. They allow high short-time overloads without excessive temperature rise. 1. prevention of thermal runaway; 2. limitation of temperature rise; 3. maintain low contact resistance over time; 4. high number of operations without wear and tear.
- Device contacts shall not be sensitive to corrosion or oxidation.	Intrinsic protection of silver-nickel (Ag/Ni) contact tip.
- The devices must be protected against corrosive atmospheres and salt spray. All metal parts must be made of stainless steel or protected against corrosion.	
- Connection terminals shall be spring assisted to prevent loosening due to strand settlement, vibration, or thermal cycling.	1. prevention of thermal runaway and operational hazards. 2. spring-assisted terminals do not require periodic inspection..
- The IP degree of protection must be achieved automatically as soon as a plug or a connector (portable socket-outlet) is connected, without any additional operation.	An additional operation may consist in tightening a ring for pins and contact-tube plugs and socket-outlets, which is almost never done on the long term. All MARECHAL® devices have an automatic IP degree of protection, without any additional operation.
- A three-phase socket-outlet (3P+N+E) must accept a single-phase plug (1P+N+E) or a three-phase plug (3P+E or 3P+N+E).	1. Great flexibility of the installation, 2. Reduction in the number of installed socket-outlets.
- The main components of the devices (enclosures, interior mouldings, contacts, etc.) must be available as spare parts.	MARECHAL® DECONTACTOR™ can be repaired and reconditioned with parts or sub-assemblies, which provide for: 1. an extended life, 2. savings in the long term.
- Plugs and socket-outlets must have a keying system to discriminate between different circuits or between incompatible voltages and frequencies.	
- Plugs and socket-outlets must resist to a 10 kA conditional short circuit .	Safety of persons and installations. The 60309-1 standard only requires static resistance test and not a short-circuit closing test.
- Plugs and socket-outlets must be able to withstand a 5 In overload for 1 min. without damage.	Prevention of operational hazards.
- Plugs and socket-outlets must be available with auxiliary contacts for control or monitoring, regardless of their ratings.	Signalling, remote control, etc.

# WORLD PRESENCE



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