EPIC® Pin & Sleeve Connectors

Technical Data: Key Features

KEY FEATURES:

MULTIMAX:

- Patented click-lock housing
- Patented integral cable grip with shade ring locking device
- Patented universal membrane seal
- High copper, solid brass contacts

CEE Series:

- Integral cable clamp
- Peelable neoprene grommet
- PG threaded cable gland
- Stainless steel assembly screws
- High copper, solid brass contacts with nickel plated male pins

Common Features:

- Tough Type 6 Nylon Housing
- Make first/break last ground contact
- Voltage polarized contacts and color coded housings
- Conformance to IEC 60309-1, -2; UL 1682 and 1686 approved.

ELECTRICAL:	
Dielectric Voltage Withstand	Up to 3000 volts for 1 minute
Maximum Working Voltage	600 volts (North American); 690 volts (International)
Insulation Resistance	5 megohms minimum
Overload	150% rated current at rated voltage for 50 make/break cycles
Current Interrupting / Load Breaking	Tested to 125% rated current at 110% rated voltage per IEC 60309-1
Conditional Short Circuit Current	clause 20
Endurance, Connect and Disconnect	10k amps at rated voltage per IEC 60309-1 clause 29
Cycles	See Table 2
Ground Path Current	See Table 1

MECHANICAL:	
Impact Resistance (-25°C for 6 hours)	Per UL 1682 Section 34 and IEC 60309-1 Clause 24
Crush Resistance (-25°C for 6 hours)	250 pounds for 1 minute
Withdrawal Force	See Table 4
Cable Secureness	See Table 3
Polarization Integrity	Maintained by oversized ground pin and "clock key"
Wire Size Accommodation	See Table 6
Cable OD Accommodation	See Table 5

ENVIRONMENTAL:	
Operating Temperature Range	Plugs, Connectors, Outlets, Inlets: -25° to +70° C Interlocked Switch Outlets: -40° to +70°C
Flammability (self-extinguishing)	• Contact Holders 20A & 30A (16A & 32A): Glow Wire 850°C (UL94-V2) • Contact Holders 60A &100A (63A &125A): Glow Wire 960°C (UL94-V0) • Other components: Glow Wire 650°C • ULYSSE Interlocked Switch Outlet Housing: Glow Wire 960°C (UL94-V0)
Moisture Resistance	• MULTIMAX: IP44 (Indoor Splash Proof) • CEE Series: IP44 (Indoor Splash Proof); IP67 (Indoor/Outdoor Watertight) • ULYSSE: IP66 & IP67 (Indoor/Outdoor Watertight) • ALUPRES: IP55 & IP65 (Indoor/Outdoor Watertight)
Corrosion Resistance	External screws and cover springs are stainless steel. Contact pins for CEE Series are nickel plated brass
Chemical Resistance	Resists standard industrial hydrocarbons, acids, bases, and solvents
UV Resistance	Exposed plastic materials are UV stabilized

ALL ABOVE DATA, WHERE APPLICABLE, ARE ACCORDING TO “IEC 60309” STANDARD.

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Technical Data: Test Data & Cable OD Accommodation

TABLE 1
GROUND PATH CURRENT TEST

Device Rating Amperes	Minimum Size Grounding Conductor AWG	mm²	Time in Seconds	Test Current Amperes
20	12	3.3	4	470
30	10	5.3	4	750
60	10	5.3	4	750
100	8	8.4	4	1180

A test current that far exceeds the device rating is passed through the mating device and grounding wires.

TABLE 2
ENDURANCE TEST

Device Rating Amperes	Cycles with load at rated current and voltage	No-Load Cycles	Sequence
20	5000	0	-
30	1000	1000	Alternating
60	1000	1000	Alternating
100	250	250	Alternating

The test sequence is conducted using a no-load, followed by a load sequence. The power factor of the load is 0.75 to 0.80.

TABLE 3
CABLE SECURENESS TEST

Device Rating Amperes	Force lb.	N	Torque ft-lb	N•M	Maximum Displacement Inches	mm
20	30	133	0.4	0.54	3/32	2.38
30	75	333	0.5	0.68	3/32	2.38
60	150	667	1.0	1.4	3/32	2.38
100	150	667	2.0	2.7	3/32	2.38

The flexible cord or cable is simultaneously twisted and pulled. Values for the applied twisting torque and force of pull are shown in table 3. In all cases the cord displacement is less than 3/32.

TABLE 4
WITHDRAWAL FORCE TEST

Device Rating Amperes	Minimum Withdrawal Force lb.	N
20	5	22
30	6	27
60	15	67
100	20	89

The pressure exerted by mating contacts of a plug and a connector must be sufficient to prevent unintentional withdrawal during normal use. During the test any locking rings or retaining means are not to be engaged.

TABLE 5
CABLE OD ACCOMMODATION

Product	Sleeve/Cable Gland (PG)	Cable Diameter min-max 2+PE (mm)	Cable Diameter min-max 3+PE (mm)	Cable Diameter min-max 3+N+PE (mm)
MULTIMAX: 20/16A	-	8.1 - 14	8.5 - 14	10 - 15.3
MULTIMAX: 30/32A	-	11.5 - 17.3	12.5 - 19.3	14 - 21.3
CEE: 2P+PE, 20/16A	13.5	8.1 - 13.5	-	-
CEE: 3P+PE, 20/16A	16	-	8.8 - 15.3	-
CEE: 3P+N+PE, 20/16A	16	-	-	8.8 - 15.3
CEE: 30/32A	21	11.5 - 21.3	11.5 - 21.3	11.5 - 21.3
CEE: 60/63A	29	16 - 28.5	16 - 28.5	16 - 28.5
CEE: 100/125A	2" Gas	26 - 49	26 - 49	26 - 49.0
ULYSSE: 20/16A	29	18 - 25	18 - 25	18 - 25
ULYSSE: 30/32A	29	18 - 25	18 - 25	18 - 25
ULYSSE: 60/63A	2 x 29	18 - 25	18 - 25	18 - 25
ALUPRES: 20/16A, 2P+PE &	1/2" Gas (NPT)	11.5 - 17.3	12.5 - 19.3	-
3P+PE	3/4" Gas (NPT)	-	-	14 - 21.3
ALUPRES: 20/16A, 3P+N+PE	1/2" Gas (NPT)	Min 12 - Max 16		
ALUPRES: 30/32A & 60/63A	3/4" Gas (NPT)	Min 16 - Max 20		
(choose and order separately)	1" Gas (NPT)	Min 16 - Max 22		
	1 1/4" Gas (NPT)	Min 25 - Max 26		

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Technical Data: Wire Size Accommodation & Construction Materials

TABLE 6
WIRE SIZE ACCOMMODATION

Connector Rated Current NA/Intl	Largest Wire Size* Accommodated AWG (mm²)	Recommended Contact Set Screw Torque CEE foot pounds (Nm)	Recommended Contact Set Screw Torque MULTIMAX foot pounds (Nm)
20/16A	12 (4)	0.6 (0.8)	0.6 (0.8)
30/32A	8 (10)	2 x 0.6 (0.8)	1.48 (2)
60/63A	6 (16)	2 x 1.48 (2)	-
100/125A	1 (50)	2 x 2.95 (4)	-

* subject to stranding configuration

CONSTRUCTION MATERIALS

PLUG, CONNECTOR, RECEPTACLE, INLET	
Housing	Thermoplastic
Cable Grip	Thermoplastic
Cover (Splashproof)	Thermoplastic
Locking Ring/Cover (Watertight)	Thermoplastic
Contact Carrier (20/16A; 30/32A)	Thermoplastic
Contact Carrier (60/63A; 100/125A)	Thermoset Plastic
Cable Grommet/Seal	Neoprene
Locking Ring Gasket	Neoprene
Flange Seal Gasket	Neoprene
Contact Pins (MULTIMAX)	High-copper Brass
Contact Pins (CEE)	High-Plated, High-copper Brass
Contact Sleeves	High-Copper Brass
Terminal Screws (Splashproof)	Brass
Terminal Screws (Watertight)	Nickel-Plated Brass
Assembly Screws	Stainless Steel
Cover Spring	Stainless Steel

CONSTRUCTION MATERIALS

INTERLOCKED SWITCHED SOCKETS	ULYSSE	ALUPRES
Housing	Thermoset Plastic	Aluminum Alloy with baked polymerized paint finish
Control Grip	Thermoset Plastic	Thermoplastic
Locking Ring/ Cover	Thermoplastic	Thermoplastic
Entry Gland	Thermoplastic	-
Contact Carrier (20/16A; 30/32A)	Thermoplastic	Thermoplastic
Contact Carrier (60/63A)	Thermoset Plastic	Thermoset Plastic
Cable Grommet	Neoprene	Neoprene
Locking Ring Gasket	Neoprene	Neoprene
Contact Sleeves	High-copper Brass	High-copper Brass
Terminal Screws	Brass	Brass
Mechanical Interlock	Tropicalized Steel	Tropicalized Steel
Switch Lock-out Device	Stainless Steel	-
Assembly Screws	Stainless Steel	Stainless Steel
Cover Spring	Stainless Steel	Stainless Steel

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Technical Data: Plugs & Connectors Reference Data

Reference Standards:

- General Characteristics:	• CEI EN 60309-1	• IEC 309	• CEI 23-12/1
- Standardization:	• CEI EN 60309-2	• IEC 309-2	• CEI 23-12/2
- Protection Ratings:	• CEI EN 60529	• IEC 529	• CEI 70-1

Constructional characteristics of both the IP 44 and the IP 67 versions:

- Pins and plug contacts are made of solid brass bars with a high level of copper.
- External screws, where present, and spring clasps for lids are made of stainless steel.
- The cable clamp is designed to prevent strain from torque and/ or traction on the wires in the terminals, also assures that the wire covering stays in good condition.
- Elements holding live parts are made (for 20A and 30A North American or 16A and 32 A International power) in self-extinguishing thermoplastic technopolymer (UL94-V2), with GLOW-WIRE resistance to 850°C and resist ance to tracking of >600V. For 60A and 100A North American and 63A and 125A International, they are made of self extinguishing thermoset technopolymer (UL94-V0), with GLOW- WIRE resistance to 960°C and resistance to tracking of >600V.
- Body and lids are made of technopolymer with high impact resistance and excellent dimensional stability.

Constructional characteristics of the IP 67 versions:

- Pins are subject to a thick nickel-plating treatment to increase their resistance to oxidation and wear even under the worst operating conditions.
- 60A and 100A North American and 63A and 125A international types are inclusive of a standard pilot contact.
- Cable glands have parts in peelable rubber for adapting them to the size of the cable used.
- 60A and 100A North American and 63A and 125A International plug and socket-outlet bodies are made of extra-durable thermoplastic technopolymer to assure improved impact resistance even under extreme conditions.

Resistance to excess heat and fire:

Glow-wire test (according to Publication IEC 695-2-1): This test checks the reaction of a given insulation after overheating of adjacent metallic parts caused by bad connections or faults in the system.

A glow wire coil is pressed into the specimen for 30 seconds, penetrating up to 7mm. A sheet of tissue paper is put under the point of contact. The temperature of the wire required by the standards is 850°C for items used for holding parts that carry current, and 650°C for other insulations. The test is considered to have a positive outcome if the specimen does not catch fire, or if it self extinguishes within 30 seconds of the wire being removed without burning entirely and causing continuous burning of the tissue paper beneath.

All plugs and connector components meet or exceed the temperature test requirements set by IEC.

UL 94: Self extinguishing test:

A bunsen burner is twice brought into contact with an insulation specimen in a vertical position, each time lasting 10 seconds. Cotton wool is placed under the point of contact.

Classification	Reaction of specimen
V0	Extinguishes within 5 seconds and the cotton beneath does not ignite.
V1	Extinguishes within 25 seconds and the cotton beneath does not ignite
V2	Extinguishes within 25 seconds and the cotton beneath ignites.
HB	Does not extinguish within 25 seconds, and when testing the specimen horizontally, burns at a speed lower that 38 mm/min. (at a thickness greater than 3mm) and less than 76 mm/min (at a thickness of up to 3mm).

Values for Products: HB V2 V1 V0

Testing for resistance to tracking (in compliance with IEC 112 publication):

The surfaces of the insulated item being tested are arranged horizontally, and two platinum electrodes are placed on them at a distance of 4 mm which are connected to a 50 Hz supply source.

Every 30 seconds a drop of 0.1% ammonium chloride in distilled water falls between the two electrodes. The test is passed if there are no electrical charges between the two electrodes before 50 drops have fallen. Obviously, the results depend on the level of voltage applied to the electrodes, and this is taken as the index of resistance to tracking.

All plugs and connectors comply with the tracking resistance requirement of IEC.

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Technical Data: Switched Outlet Reference Data

Reference Standards:

- **Socket-Outlets:**	• CEI EN 60309-1	• IEC 309-1	• CEI 23-12/1	• CEI EN 60309-2	• IEC 309-2	• CEI 23-12/2
- Enclosures:	• CEI EN 60529	• IEC 529	• CEI 70-1			
- Safety Transformer:	• CEI EN 60742	• IEC 742	• CEI 96-2			
- Switches:	• CEI EN 60947-3	• IEC 947-3	• CEI 17-11			

Constructional Characteristics of Socket-Outlets with Mechanical Interlock:

- Socket Outlets which are interlocked, both mechanically and electrically, make it possible to create electricity distribution systems in maximum safety, as well as meeting specific require ments of systems regulations for special system configurations, as described in the following:
  According to CEI 64-8/7, sect 752.55.1- in electrical systems for public entertainment places “socket outlets with a power load over 16A must be the interlocking type.”

  According to CEI 64-2, chap. XII, sect. 3, para. 12.3.03- “socket-outlet”: in making an operating safety system (AD-FT), “in C2 sites the socket outlets must be of the interlocking type.”

- The interlock device prevents the switch from being closed if the plug has not been inserted in the socket-outlets and there after, stops it from being taken out if the switch is in the “closed” position. In addition, to this safety feature, the switch knob is connected to a “door lock” which only allows the enclosure to be opened for maintenance purposes if the switch is in the “open” position
- The complete functional unit is assembled onto the light alloy frame which is, in turn, coupled to the thermoset plastic enclosure: the entire functional structure thus makes up a “rigid” sub-assembly which is mechanically “defined”, guaranteeing that the regulations and original functions are maintained in the long term;
- The parts making up the mechanical interlocking device are made in troplicalized steel plate, which guarantees the necessary rigidity and strength even if “forced through wrong use”
- The fuse-holder bases, where included, are in thermoset plastic (ULYSSE) or (ALUPRES) ceramic mounted and wired in the switched outlet. Unless specifically requested, the fuses are not normally included with the equipment;
- The interlocked socket outlets are available in the following forms:
  - with rotary control switch and fuse-holder base;
  - with rotary control switch, without fuse-holder base;

Constructional Characteristics of Enclosures and Housings of ULYSSE Interlocked Socket-Outlets in Thermoset Plastic:

- Bottom boxes and covers are made of very thick reinforced thermoset plastic (SMC or CMC or BMC, according to use), with excellent dimensional stability, non-deformability and resistance to extremes of heat and to fire, to the action of chemical and atmospheric agents and to mechanical stress even at very low temperatures. All these characteristics in the material used for the enclosures ensures maximum perform ance in any environment, even when chemically aggressive, and represents perfection in terms of insulating material.
- The transparent covers are made of thick polycarbonate with a long- chain molecular structure; they are self-extinguishing and U.V. Stabilized for maximum resistance to atmospheric and chemical agents.
- Captive screws for closing the covers are made of stainless steel, with gaskets in non-aging elastomer;
- All the enclosures in this series are suitable for creating systems in compliance with standards CEI 64-8, and particularly for installation in places at “greater risk in case of fire” (64-8/7 sect 751); they also permit the fitting out of distribution boards with protection through complete insulation (standard CEI EN 60439-1) and meet the requirements of the IEC 670 publication.
- The entire series is completely modular and ideal for making even complex distribution boards using predefined configurations and standard accessories.

Constructional Characteristics of Enclosures and Housings of ALUPRES Interlocked Socket-Outlets in Light Alloy:

- Bottom boxes and covers are made of UNI-5076 light alloy with a high aluminum content, oven painted internally and externally over a pretreatment of chromate galvanizing for a maximum resistance to corrosion. The heavy thickness of the material used for making these enclosures assures maximum results in any environment, even when chemically aggressive, and repre sents perfection in terms of metal structures thanks to the very high impact resistance;
- Captive screws for closing the covers are made of stainless or tropicalized steel, with gaskets in non-aging elastomer;
- Internal and external earth connection screws;
- All the enclosures in this series are suitable for creating systems in compliance with standards CEI 64/8, and particularly for installation in places with “greater risk in case of fire” (64-8/7 sect. 751);
- The entire series is completely modular and ideal for making even complex distribution boards using predefined configurations and standard accessories.