



**THORNE &
DERRICK
INTERNATIONAL**

Thorne & Derrick
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www.heatingandprocess.com



PF

HEAVY-DUTY PLUGS & SOCKETS

- ▶ Up to 600 A / 1 000 V
 - ▶ Automatic IP66/IP67 water- and dust-tight
 - ▶ Mechanical and electrical interlocking
 - ▶ Up to 6 auxiliary and 2 pilot contacts
- page 86



DS4

HIGH-CURRENT CONNECTORS

- ▶ Up to 400 A / 1 000 V
 - ▶ 2 pilot contacts as standard
 - ▶ Electrical locking system
 - ▶ Insertion mechanism
- page 92



CS1000

SINGLE-POLE POWER CONNECTORS

- ▶ Up to 400 A / 1 000 V
 - ▶ Automatic IP66/IP67 water- and dust-tight
 - ▶ Mechanical fool-proofing
 - ▶ Padlocking ring
- page 94

RANGE HIGH CURRENT

MARECHAL® high-current plugs provide a reliable connection up to 700 A / 1000 V, even under the harshest environments.

Find all information on our website:



marechal.com



Technical documentation



Product configurator

HIGH CURRENT



SP

SINGLE-POLE POWER CONNECTORS

- ▶ Up to 700 A / 1 000 V
 - ▶ Automatic IP66/IP67 water- and dust-tight
 - ▶ Electromechanical interlocking system
- page 96



CS

SINGLE-POLE WELDING CONNECTORS

- ▶ From 75 to 400 A
 - ▶ Bayonet contact system
 - ▶ Self-cleaning contacts
 - ▶ 16 to 150 mm² conductors
- page 98

PF

HEAVY-DUTY PLUGS & SOCKETS 315 A / 400 A / 500 A / 600 A

- ▶ UP TO 600 A / 1000 V
- ▶ AUTOMATIC IP66/IP67 WATER- AND DUST-TIGHT
- ▶ MECHANICAL AND ELECTRICAL INTERLOCKING
- ▶ UP TO 6 AUXILIARY AND 2 PILOT CONTACTS

Big equipment and gensets power supply : in quarries, tunnel boring machines, port cranes, mining equipment...

MECHANICAL FEATURES



1 Off load engagement. 2 Automatically watertight. 3 Locking the plug in the socket closes the pilots and connects the main circuit.

Pilot contacts: Designed to connect after and disconnect before the phase contacts

IK10 metal casing
High resistance to shocks

Electromechanical interlocking mechanism

The locking mechanism guarantees safe and watertight connection and engages the pilot contacts

Lateral spring-loaded silver butt-contacts. Silver is an excellent conductor and the plug engagement cleans contacts automatically.

**Safety shutter IP4X/
IPXXD (PFQ) IP2X (PFC)**

SPECIFICATION

315 to 600 A, IP66/IP67 socket-outlets with separate connection of phases and pilots (pilots first), safety shutter (IP4X/IPXXD socket-outlet) solid silver butt-contacts.



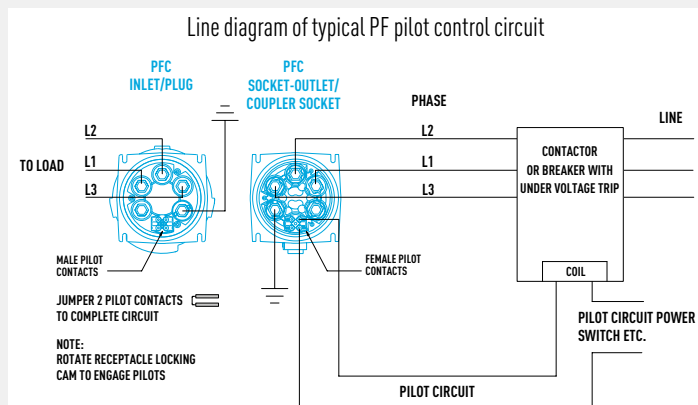
TECHNICAL FEATURES

Socket-outlets that must be linked to switch/contactor via the pilot contacts.

	PFQ3	PFQ4	PFC4	PFC5	PFC6
Rated current (In)	315 A	400 A	400 A	500 A	600 A
Umax	690 V	690 V	1000 V	1000 V	1000 V
Auxiliary contacts available	6	6	2	2	2
Pilot contacts	2	2	2	2	2
Keying positions ⁽¹⁾	10	10	7	7	7
Ambient temperature	-40 °C to +60 °C for all PF				

⁽¹⁾ To distinguish between different power supplies and applications

INFO +



Pilot Contacts

	PFC	PFQ
Pilot contacts	2	2
Pilot Amperage	20 A	10 A
Interlocking Type	Mechanical	Mechanical
Terminal Type	Screw	Solder/crimp

Notes:

- The mechanical locking of the plug to the socket-outlet, via the rotation of a cam, closes the pilot contacts.
- Failure to use a pilot/relay system can create an electrical shock hazard.

STANDARDS ASPECTS

PF plugs and sockets comply with:

- The European Low Voltage Directive 2006/95/CE (2014/35/EU from April 20 2016),
- The French decree dated 20 December 2011 pertaining to the wiring and operating conditions of movable electrical apparatuses, and to NF C15-100 French standard
- The decrees relating to workers' protection in Belgium, Spain and Italy.

Also certified by UL, TR CU (GOST) and CSA (American, Russian and Canadian inspection laboratories).

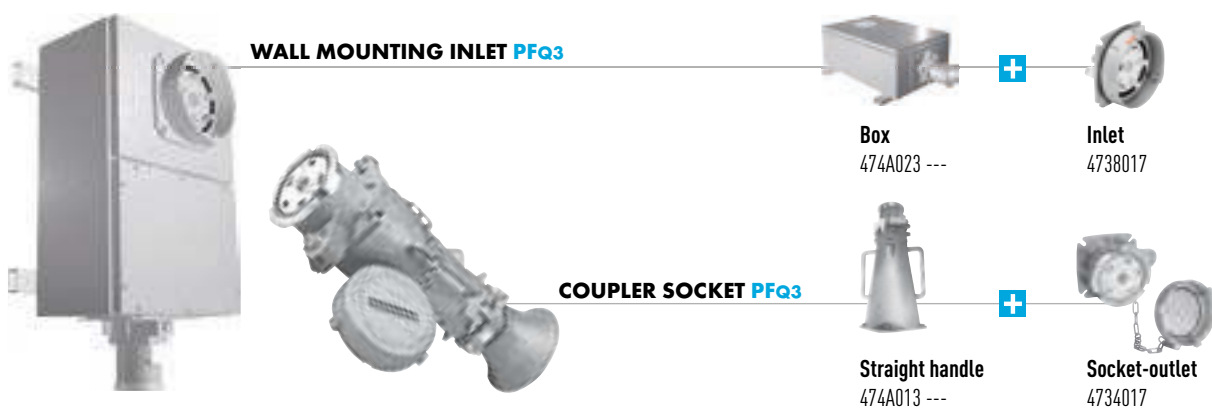


PFQ3 & Q4

HIGH-CURRENT PLUGS & SOCKETS

315 A and 400 A
IP66/IP67

TYPICAL CONFIGURATION



MAIN FEATURES

Rated current	315 A (PFQ3) / 400 A (PFQ4)	Flexible wiring (min-max)	95 - 185 mm ²
Maximum voltage	690 V	Stranded wiring (min-max)	95 - 185 mm ²
IP protection lid closed	IP66/IP67	Wiring for single or multi entry	
IP protection connected plug	IP66/IP67	Keying positions	10
Shock resistance	IK10	Auxiliary contacts (10 A / 400 V)	6
Ambient temperature	-40 °C to +60 °C	Pilot contacts (10 A / 400 V)	2

SOCKET-OUTLET female PFQ3 (315 A)

INLET male PFQ3 (315 A)

Voltage 50 Hz	Polarity	Part no.	Part no.
380 - 440 V	3P+E	4734013	4738013
380 - 440 V	3P+N+E	4734017	4738017
660 - 690 V	3P+E	4734193	4738193
660 - 690 V	3P+N+E	4734197	4738197

► Other voltages, frequencies and contact configurations are available (see page 10).

SOCKET-OUTLET female PFQ4 (400 A)

INLET male PFQ4 (400 A)

Voltage 50 Hz	Polarity	Part no.	Part no.
380 - 440 V	3P+E	4744013	4748013
380 - 440 V	3P+N+E	4744017	4748017
660 - 690 V	3P+E	4744193	4748193
660 - 690 V	3P+N+E	4744197	4748197

► Other voltages, frequencies and contact configurations are available (see page 10).

BOXES

Cable gland included



	Wiring from 95 to 150 mm ²	Wiring from 150 to 185 mm ²
46 - 50 mm	474A023050	474A023550
51 - 55 mm	474A023055	474A023555
56 - 60 mm	474A023060	474A023560
61 - 65 mm	474A023065	474A023565
66 - 70 mm	474A023070	474A023570
71 - 75 mm	474A023075	474A023575
76 - 80 mm	474A023080	474A023580
81 - 85 mm	474A023085	474A023585
86 - 90 mm	474A023090	474A023590

On request: boxes for installation in ducts, boxes equipped with circuit breaker, earth-leakage switch, contactor,...

HANDLES**Straight *****Angled 90°**

	Straight *	Angled 90°
46 - 50 mm	474A013-50	474A913-50
51 - 55 mm	474A013-55	474A913-55
56 - 60 mm	474A013-60	474A913-60
61 - 65 mm	474A013-65	474A913-65
66 - 70 mm	474A013-70	474A913-70
71 - 75 mm	474A013-75	474A913-75
76 - 80 mm	474A013-80	474A913-80
81 - 85 mm	474A013-85	474A913-85
86 - 90 mm	474A013-90	474A913-90

* Trumpet gland
available on requestA right angled cable
lug M14
with insulated sleeveStraight cable
lug M14
with insulated sleeve**INFO +****Electrical interlocking**

PFC/PFQ devices are not intended for connection or disconnection under load. Electrical interlocking with a switch or a pilot controlled contactor is required. Boxes with the following

equipment are available upon request:

- circuit breaker or differential switch,
- contactor,
- fuses,
- loop-out enclosures,
- terminals for single pole cables...

ACCESSORIES & OPTIONS

**Key for locking and
operating pilot contacts**
473A393



Inlet lid
474A126

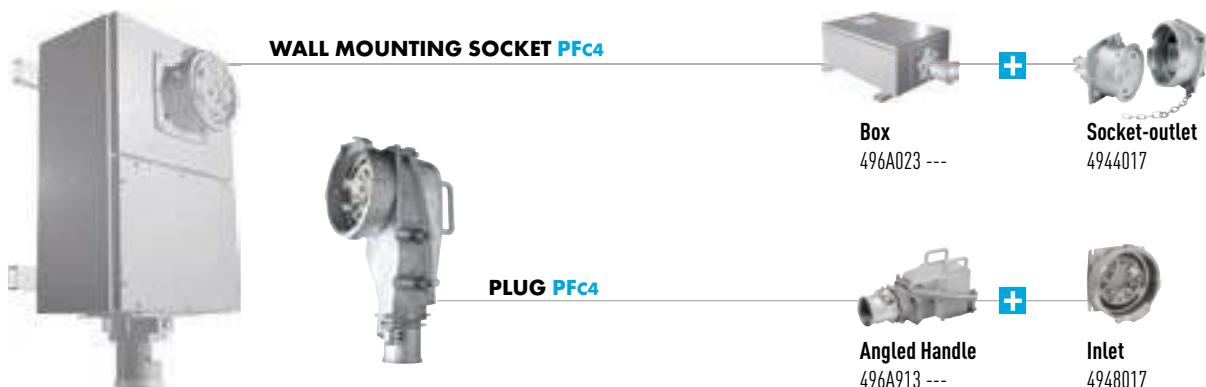


PFC4, C5 & C6

HIGH-CURRENT PLUGS & SOCKETS

400 A to 600 A
IP66/IP67

TYPICAL CONFIGURATION



MAIN FEATURES

Rated current	400 A (PFC4) / 500 A (PFC5) / 600 A (PFC6)
Maximum voltage	1000 V
IP protection lid closed	IP66/IP67
IP protection connected plug	IP66/IP67
Shock resistance	IK10
Ambient temperature	-40 °C to +60 °C

Flexible wiring (min-max)	95 - 240 mm ²
Stranded wiring (min-max)	95 - 240 mm ²
Wiring for multi entry	
Keying positions	7
Auxiliary contacts (20 A / 400 V)	2
Pilot contacts (20 A / 400 V)	2

**SOCKET-
OUTLET** female
PFC4 (400 A)



INLET male
PFC4 (400 A)



Voltage 50 Hz	Polarity	Part no.	Part no.
380 - 440 V	3P+E	4944013	4948013
380 - 440 V	3P+N+E	4944017	4948017
660 - 690 V	3P+E	4944193	4948193
660 - 690 V	3P+N+E	4944197	4948197
1000 V	3P+E	4944223	4948223

**SOCKET-
OUTLET** female
PFC5 (500 A)



INLET male
PFC5 (500 A)



Voltage 50 Hz	Polarity	Part no.	Part no.
380 - 440 V	3P+E	4954013	4958013
380 - 440 V	3P+N+E	4954017	4958017
660 - 690 V	3P+E	4954193	4958193
660 - 690 V	3P+N+E	4954197	4958197
1000 V	3P+E	4954223	4958223

**SOCKET-
OUTLET** female
PFC6 (600 A)



INLET male
PFC6 (600 A)



Voltage 50 Hz	Polarity	Part no.	Part no.
380 - 440 V	3P+E	4964013	4968013
380 - 440 V	3P+N+E	4964017	4968017
660 - 690 V	3P+E	4964193	4968193
660 - 690 V	3P+N+E	4964197	4968197
1000 V	3P+E	4964223	4968223

BOXES

Cable gland included



	Wiring from 95 to 150 mm ²	Wiring from 150 to 240 mm ²
46 - 50 mm	496A023050	496A023550
51 - 55 mm	496A023055	496A023555
56 - 60 mm	496A023060	496A023560
61 - 65 mm	496A023065	496A023565
66 - 70 mm	496A023070	496A023570
71 - 75 mm	496A023075	496A023575
76 - 80 mm	496A023080	496A023580
81 - 85 mm	496A023085	496A023585
86 - 90 mm	496A023090	496A023590

On request: boxes for installation in ducts, boxes equipped with circuit breaker, earth-leakage switch, contactor,...

HANDLES**Straight *****Angled 90°**

	Straight *	Angled 90°
46 - 50 mm	496A013-50	496A913-50
51 - 55 mm	496A013-55	496A913-55
56 - 60 mm	496A013-60	496A913-60
61 - 65 mm	496A013-65	496A913-65
66 - 70 mm	496A013-70	496A913-70
71 - 75 mm	496A013-75	496A913-75
76 - 80 mm	496A013-80	496A913-80
81 - 85 mm	496A013-85	496A913-85
86 - 90 mm	496A013-90	496A913-90

* Trumpet gland
available on requestA right angled cable
lug M14
with insulated sleeveStraight cable
lug M14
with insulated sleeve**INFO +****Electrical interlocking**

PFC/PFQ devices are not intended for connection or disconnection under load. Electrical interlocking with a switch or a pilot controlled contactor is required. Boxes with the following

equipment are available upon request:

- circuit breaker or differential switch,
- contactor,
- fuses,
- loop-out enclosures,
- terminals for single pole cables...

ACCESSORIES & OPTIONSInlet lid
494A126

DS4

HIGH-CURRENT CONNECTORS 400 A / 1 000 V

- ▶ UP TO 400 A / 1 000 V
- ▶ 2 PILOT CONTACTS AS STANDARD (REQUIRED)
- ▶ ELECTRICAL LOCKING SYSTEM
- ▶ INSERTION MECHANISM

The DS4 socket-outlets offer a compact solution for connections up to 400 A / 1000 V. The silver butt-contact system offers perfect current conductivity. The robust metal enclosure ensures a safe and reliable operation, even under harsh conditions. The DS4 is equipped, in standard version, with an easy inlet closing device made of stainless steel.

The DS4 socket outlets are especially suitable for the following applications: connection of drilling equipments and tunnel boring machines, cranes (e.g. in harbours), generators, quarries, large switchracks and switchboards...

INFO +

DS4 boxes / 400 A up to 1000 V

The DS4 is also available as a complete box, equipped with a contactor, LED signal lights and ON/OFF emergency pushbutton. Please contact us for Part Numbers.





■ MAIN FEATURES

Rated current (with wiring according to standard)	400 A	Flexible wiring (min-max)	95 - 150 mm ²
Maximum voltage	1000 V	Stranded wiring (min-max)	95 - 185 mm ²
Protection	IP54 (IP66/IP67 optional)	Connectors without breaking capacity	
Shock resistance	IK09	Pilot contacts for electrical interlock	2
Ambient temperature	-40 °C to +60 °C	Mechanical interlock	as standard
Keying positions	12	Inlet closing device in stainless steel	as standard

SOCKET-OUTLET
female
DS4 (400 A)



INLET male
DS4 (400 A)



Voltage 50 Hz	Polarity	Part no.	Part no.
380-440 V	3P+E+ 2pil.	3944013172	3948013172
1000 V	3P+E+ 2pil.	3944223172	3948223172

WALL BOX
Cable gland included



Wall box 70° SS

SLEEVE*



Inclined 60° metal

HANDLE



**Straight metal
with cable gland**

35-48,5 mm	394A02563M	394A02768	53-57 mm	394A91557
48-65 mm	394A02575M		58-62 mm	394A91562
			62-68 mm	394A91568
			69-73 mm	394A91573

* If the socket-outlet and the inlet are mounted directly on a panel, a spacer should be used (see accessories & options)

ACCESSORIES & OPTIONS

Inlet cap	312A126
IP66/IP67 (socket & inlet)	Contact us
Spacer (68 mm)	394A12768
Spacer (115 mm)	394A127115

CS1000

SINGLE-POLE POWER CONNECTORS

400 A / 1 000 V

- ▶ UP TO 400 A / 1 000 V
- ▶ AUTOMATIC IP66/IP67 WATER- AND DUST-TIGHT
- ▶ MECHANICAL FOOL-PROOFING
- ▶ PADLOCKING RING

Perfect safety

- Socket-outlet: IP2X finger protection, without cap.
- IP66/IP67 watertightness with cap ; or upon connection.
- Locking mechanism preventing disconnection by accident.

Easy connection

- Mechanical fool-proofing system between phases, neutral and earth,
- Standardised colour coding (according to local regulation),
- Replacable crimping lug in case of cable damage.

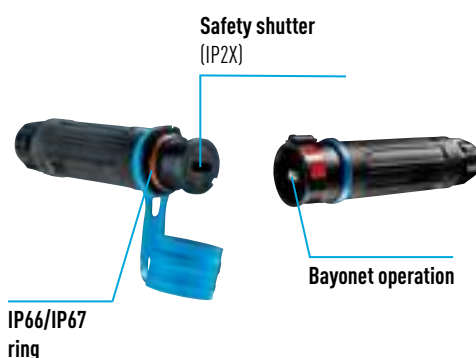
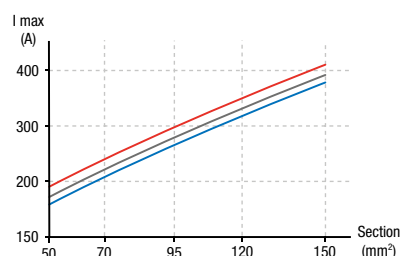
High Performance

Thanks to its silver butt-contact technology the CS1000 connector withstands permanent current of 400 A / 1 000 V a.c. or 1 500 V d.c. (wiring from 50 to 150 mm²).

CS1000 electrical rating

Permanent permissible current for a H07RNF cable, at 30 °C ambient temperature

- Maximum permanent permissible current in the CS1000 after 2 000 operations depending on cable cross-section
- Maximum intensity of permanent current specified by the cable manufacturers to maintain a conductor core temperature < 85 °C
- Maximum intensity of permanent current specified by the NFC 15-100 or the IEC 60 364-5-52 standards to maintain a conductor core temperature < 70 °C



5 mechanical keying positions





MAIN FEATURES

Rated current (depending on the wire ø)	400 A	Shock resistance	IK08
Maximum voltage a.c.	1000 V	Ambient temperature	-40 °C to +60 °C
Maximum voltage d.c.	1500 V	Flexible wiring (min-max)	50 - 150 mm ²
Short-circuit current I _{cc}	20 kA during 250 ms	Keying positions	mechanical (5) and visual
Protection	IP66/IP67	Number of operations	2000

SOCKET-OUTLET
female
CS1000 (400 A)
Without lug



INLET male
CS1000 (400 A)
Without lug



Type	European color coding*	Part no.	Part no.
L1	Brown	4534001	4538001
L2	Black	4534002	4538002
L3	Grey	4534003	4538003
Neutral	Blue	453400N	453800N
Earth	Green	453400T	453800T
Positive	Red	453400P	453800P
Negative	Black	453400M	453800M

* Part-numbers valid for Europe and Japan.

For other countries: add the suffix : P80 for the USA / P67 for Australia / P40 for UK and South-Africa

LUGS

Lug choice depends on the cable: the cross-section of the flexible cable mentioned in the table below is for information only. Please check dimensions as these may vary according to cable types and manufacturers.



Wiring (mm ²)		Straight with hole	Straight threaded M12*	Internal diameter (mm)
Flexible	Stranded	Part no.	Part no.	
50	70	454A50C	454A50D	11
70	95	454A70C	454A70D	13,1
95	120	454A95C	454A95D	14,5
120	150	454A12C	454A12D	16,2
150	185	454A15C	454A15D	18

* Wiring with crimping lugs, according to NF C20-130 standard (for VDE 0220 standard, please contact us)

Crimping: Double hexagonal crimping is recommended.

PADLOCKING RING



453A844

SLEEVE**
Inclined 30° with
adapter plate



453A027

ADAPTER PLATE



453A540

HANDLE
Straight



M32

453A753

14-25 mm

INLET CAP



453A126

M40 453A783 18-32 mm

** The inclined sleeve is recommended to reduce cable weight effect.

SP

SINGLE-POLE POWER CONNECTORS 700 A / 1 000 V

- ▶ UP TO 700 A
- ▶ AUTOMATIC IP66/IP67 WATER- AND DUST-TIGHT
- ▶ ELECTROMECHANICAL INTERLOCKING SYSTEM

The highest possible safety

- Reliable mechanical and electrical interlocking with pilot-contact circuit.
- IP2X socket-outlet when cap removed,
- Automatic IP66/IP67 watertightness when plug is connected.

An easily operable connector

- Straight insertion of the plug into the socket-outlet without any rotation,
- Different mechanical keying of L1, L2, L3, N and E,
- Visual identification by standard colours,
- Screwed crimping lugs facilitate cable replacement.

Performances

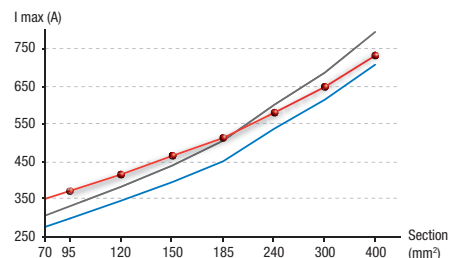
Thanks to the butt-contact principle, the SP withstands continuously up to 700A / 1000 V a.c. or 1500V d.c. (70 mm² to 400 mm² conductors), withstands at least 2000 operations.



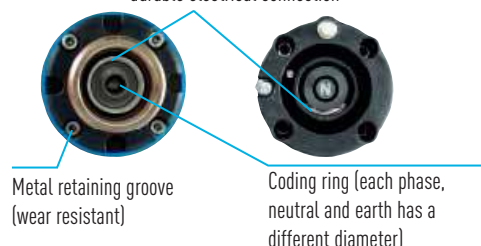
SP Characterisation

Permissible current according to conductor cross-section at 30 °C ambient temperature

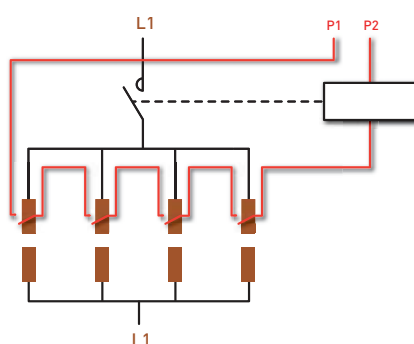
- Maximum permanent permissible current in the SP after 2 000 operations depending on cable cross-section
- Maximum intensity of permanent current specified by the cable manufacturers to maintain a conductor core temperature < 85 °C
- Maximum intensity of permanent current specified by the NFC 15-100 or the IEC 60 364-5-52 standards to maintain a conductor core temperature < 70 °C



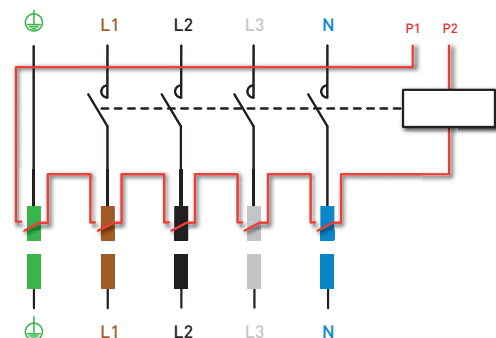
Silver-tipped butt-contact ensure perfect and durable electrical connection



Interlocking electrical wiring diagram: increased power with parallel connection



Interlocking electrical wiring diagram: last connection close all the circuit





MAIN FEATURES

Rated current	700 A	Shock resistance	IK08
	For higher current, please contact us	Ambient temperature	-40 °C to +60 °C
Maximum voltage a.c.	1000 V	Flexible wiring (min-max)	50 - 400 mm ²
Maximum voltage d.c.	1500 V	Keying positions	mechanical (5) and visual
Short-circuit current I_{cc}	20 kA during 250 ms	Number of operations	2000
IP protection lid closed	IP66/IP67	Pre-wired pilot circuit	6 A / 250 V

SOCKET-OUTLET
female
SP (700 A)
Without lug



INLET male
SP (700 A)
Without lug



Type	European color coding*	Part no.	Part no.
L1	Brown	4544001	4548001
L2	Black	4544002	4548002
L3	Grey	4544003	4548003
Neutral	Blue	454400N	454800N
Earth	Green	454400T	454800T
Positive	Red	454400P	454800P
Negative	Black	454400M	454800M

* Part-numbers valid for Europe and Japan.

For other countries: add the suffix : P80 for the USA / P67 for Australia / P40 for UK and South-Africa

LUGS

Lug choice depends on the cable: the cross-section of the flexible cable mentioned in the table below is for information only.

Please check dimensions as these may vary according to cable types and manufacturers.



Wiring (mm ²)		Straight with hole	Straight threaded M12*	Internal diameter (mm)
Flexible	Stranded	Part no.	Part no.	
50	70	454A50C	454A50D	11
70	95	454A70C	454A70D	13,1
95	120	454A95C	454A95D	14,5
120	150	454A12C	454A12D	16,2
150	185	454A15C	454A15D	18
185	240	454A18C	454A18D	20,6
240	300	454A24C	454A24D	23,1
300	400	454A30C	454A30D	26,1
400	500	454A40C	454A40D	29,2

SLEEVE*
Inclined metal 45°



454A027

* The inclined sleeve is recommended to reduce cable weight effect.

HANDLE
Straight



454A753	17-38 mm	M50
454A783	35-48 mm	M63

* Wiring with crimping lugs, according to NF C20-130 standard (for VDE 0220 standard, please contact us) **Crimping:** Double hexagonal crimping is recommended.



SINGLE-POLE WELDING CONNECTORS 250 A

- ▶ FROM 75 TO 250 A - VERY LOW VOLTAGE (MAXIMUM 50 V)
- ▶ BAYONET CONTACT SYSTEM
- ▶ SELF-CLEANING CONTACTS
- ▶ 16 TO 95 MM² CONDUCTORS

MAIN FEATURES

Type CS	Wiring (mm²)	In rated current (A)	i max welding cycle (A)	
			5 min cycles	
			60%	30%
CS2	16	75	100	150
	25	100	125	200
	35	125	150	250
	50	150	200	300
CS3	50	150	200	300
	70	200	250	350
	95	250	300	400

* Definition of 30% welding cycle: on a 5 min cycle, 30% of the time working (i.e. 1 min 30 s) and 70% off (i.e. 3 min 30 s).

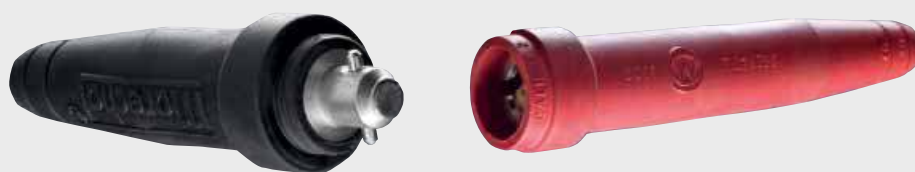
INLET male



PLUG male



Wire cross-section (mm ²)	Rated current welding cycle		CS2	CS3	CS2	CS3
	60%	30%				
16	100 A	150 A	4 2901 016		4 0201 016	
25	125 A	200 A	4 2901 030		4 0201 030	
35	150 A	250 A	4 2901 040		4 0201 040	
50	200 A	300 A	4 2901 050	4 3901 050	4 0201 050	4 0301 050
70	250 A	350 A		4 3901 075		4 0301 075
95	300 A	400 A		4 3901 100		4 0301 100
with screw	200 A	300 A	4 2901 121			
with screw	300 A	400 A		4 3901 121		


SOCKET-OUTLET
female

COUPLER-SOCKET
female


			CS2	CS3	CS2	CS3
Rated current welding cycle						
Wire cross-section (mm ²)	60%	30%				
16	100 A	150 A	4 2401 016		4 2301 016	
25	125 A	200 A	4 2401 030		4 2301 030	
35	150 A	250 A	4 2401 040		4 2301 040	
50	200 A	300 A	4 2401 050	4 3401 050	4 2301 050	4 3301 050
70	250 A	350 A		4 3401 075		4 3301 075
95	300 A	400 A		4 3401 100		4 3301 100
with screw	200 A	300 A	4 2401 121			
with screw	300 A	400 A		4 3401 121		

COPPER LUGS

Lug choice depends on the cable: the cross-section of the flexible cable mentioned in the table below is for information only. Please check dimensions as these may vary according to cable types and manufacturers.



Wiring (mm ²)		Straight threaded M10*	Straight threaded M14*	Internal diameter (mm)
Flexible	Stranded	CS2	CS3	
16	25	4 2 301 416		6,6
25	35	42 301 430		7,9
35	50	42 301 440		9,2
50	70	42 301 450	4 3301 450	11
70	95		4 3301 475	13,1
95	120		4 3301 400	14,5

* Wiring with crimping lugs, according to NF C20-130 standard (for VDE 0220 standard, please contact us)

Crimping: double hexagonal crimping is recommended.



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