



***syntax***  
***no compromise***

**POWERSYNTAX  
CONNECTOR  
SERIES**

**SPX**  
**NEW SPV**  
**SPY**



**SPZ**



# SPX/SPV/SPY - SPZ PowerSyntax®

SPX, SPZ, SPY and SPV are the new PowerSyntax® series of single pole electrical connectors. PowerSyntax® are specifically suited for the electrical supply management from 480amp up to 750amp (see technical data table at the bottom of this page). Although fully intermateable with the original (and all the previous Syntax® versions), the new PowerSyntax® features a number of mechanical and technical enhancements which have been designed and incorporated to redefine the standards on this category of connectors as for safety, reliability, ease of handling and robustness in the harshest conditions.

## TYPICAL APPLICATIONS

- Electrical power systems
- Power distribution
- Outdoor concerts and sporting events
- Outdoor broadcasting
- Theatres
- Mobile generators
- Industrial vehicles
- Railway installations
- Military installations
- Load banks
- Backup power systems
- Electrical power supply companies
- Heavy industry

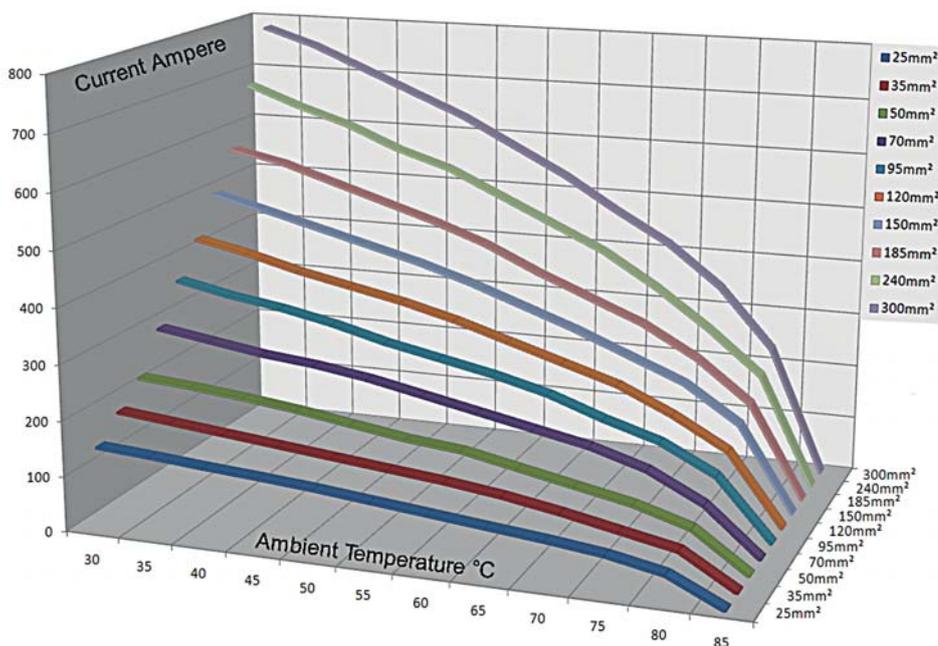
## TECHNICAL DATA

- |  |   |
|--|---|
| • Number of contacts:  | single pole                             |
| • Max continuous current rating with brass or bimetal contact: | 480amp                                  |
| • Max continuous current rating with copper contact:           | 750amp                                  |
| • Test Voltage:  | 4500 V AC                               |
| • Short Circuit Rating:  | 35.5kA peak                             |
| • Insulation Resistance:                                       | >5000 MOhm @500V                        |
| • IP rating when mated:  | IP67                                    |
| • Protection against electric shock:                           | IP2X                                    |
| • Contact resistance:  | <0.1 mOhm                               |
| • Housing material:  | high temperature thermoplastic          |
| • Flammability:  | UL94 V0                                 |
| • Coupling method:   | bayonet lock with secondary locking pin |
| • Number of mating cycles:                                     | >500                                    |
| • Operating temperature:                                       | -30°C/+125°C                            |

## GENERAL FEATURES

- Intermateable with other versions
- CE compliant
- EN/ESI compliant
- Contact retained within the thermoplastic housing with a flame-retardant UL94-V0 plastic pin. This method ensures quick assembling and disassembling. No special extracting tools are needed
- Heavy-duty ergonomic hand grip, with sides specifically designed for easy pushing/pulling when mating/unmating
- Metric thread M40 cable gland IP68 watertight compliant with EN/CE, adapters available for cables over 32 mm diameter
- Screw, Crimp and Lug terminals to facilitate cables from 25mm<sup>2</sup> to 300 mm<sup>2</sup>
- Mechanically keyed to prevent mating errors
- Permanent marking to identify phase/line and safety information embossed on connector's body
- Multipoint contact area
- Silver Plated Contacts
- High Impact bodies
- EN harmonized color coding (Europe). Also available in UK, Australia and USA color codes

## RATED CURRENT



DATA FOR 90°C COPPER CABLE RATINGS (for aluminium cable, ratings decrease by approx. 25%)

## LINE SOURCE

Innovative ergonomic hand grip for easy handling.  
Finger protection IP2X to prevent accidental touching of live contact parts.

Contact to housing retention through flame-retardant UL94-VO plastic cotter pin.

No special tools required for assembling.

Special ergonomic release-key (supplied separately) for the releasing of the secondary locking pin.

Set Screw termination for cables 25 mm<sup>2</sup> -150 mm<sup>2</sup>

Crimp termination for cables up to 300 mm<sup>2</sup>

Watertight IP68 plastic cable gland M40 for cable strain relief retention range 15 - 32 mm.

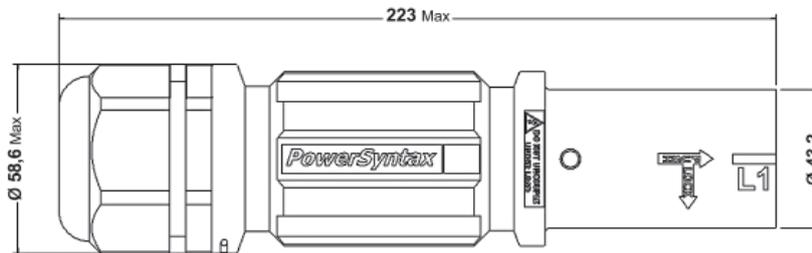
Permanent markings to identify phase/line and safety information are embossed on connector's shell.

No additional information sticker is applied.

480amp and 750amp versions available.

SPY version: Lug contact-bimetal or copper crimp terminal.

SPV version: bimetal crimp contact



## LINE DRAIN

Innovative ergonomic hand grip for easy handling.  
Finger protection IP2X to prevent accidental touching of live contact parts.

Contact to housing retention through flame-retardant UL94-VO plastic cotter pin.

No special tools are required for assembling.

Bayonet lock with secondary locking pin.

Special ergonomic release-key (supplied separately) for the releasing of the secondary locking pin.

Set Screw termination for cables 25mm<sup>2</sup> -150 mm<sup>2</sup>

Crimp termination for cables up to 300 mm<sup>2</sup>

Watertight IP68 plastic cable gland M40 for cable strain relief retention range 15 - 32 mm.

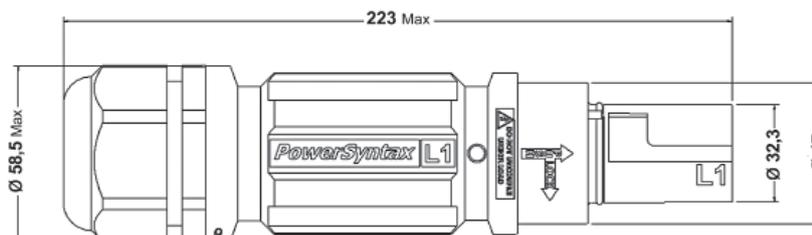
Permanent markings to identify phase/line and safety information are embossed on connector's shell.

No additional information sticker is applied.

480amp and 750amp versions available.

SPY version: Lug contact-bimetal or copper crimp terminal.

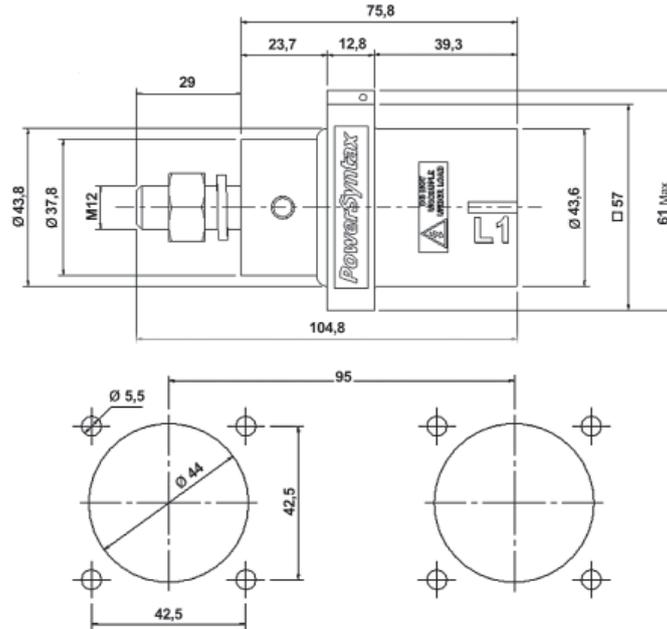
SPV version: bimetal crimp contact





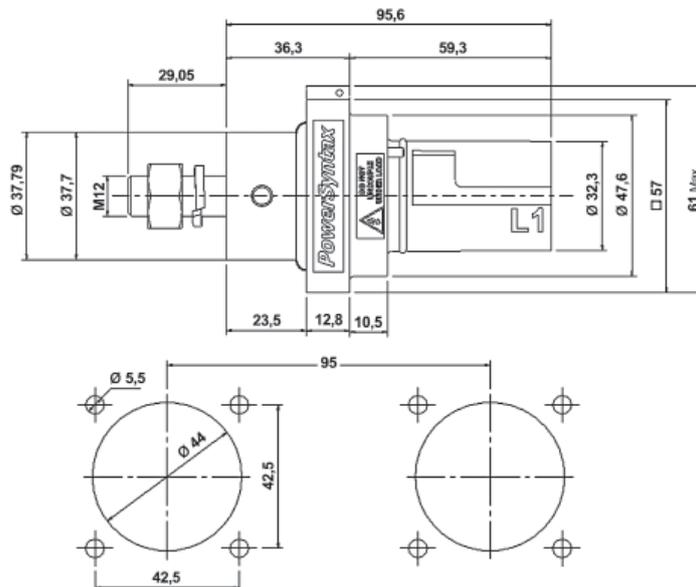
## PANEL SOURCE

Specific housing for protection cap lacing moulded on the plastic body of the flange. Finger protection IP2X to prevent accidental touching of live contact parts. Contact to housing retention through flame-retardant UL94-VO plastic cotter pin. No special tools are required for assembling. Special ergonomic release-key (supplied separately) for the releasing of the secondary locking pin. Front or rear panel mount. M12 Thread for cable attachment. Permanent markings to identify phase/line and safety information are embossed on connector's shell. No additional information sticker is applied. 480amp and 750amp versions available.



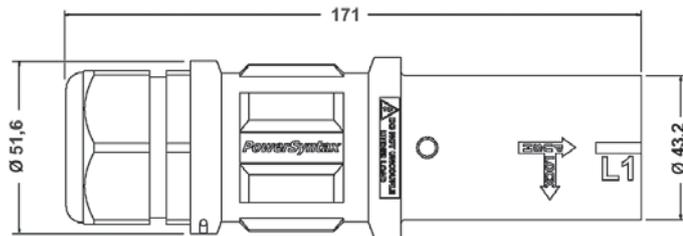
## PANEL DRAIN

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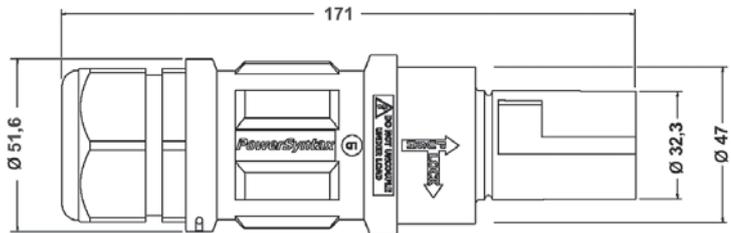
## LINE SOURCE

Innovative ergonomic hand grip for easy handling.  
 Finger protection IP2X to prevent accidental touching of live contact parts. Contact to housing retention through flame-retardant UL94-VO plastic cotter pin.  
 No special tools required for assembling.  
 Special ergonomic release-key (supplied separately) for the releasing of the secondary locking pin. Set Screw termination for cables 25 mm<sup>2</sup> - 150 mm<sup>2</sup>.  
 Watertight IP68 plastic cable gland M40 for cable strain relief retention range 15 - 28 mm. Permanent markings to identify phase/line and safety information are embossed on connector's shell.  
 No additional information sticker is applied.  
 480amp version available.



## LINE DRAIN

Innovative ergonomic hand grip for easy handling.  
 Finger protection IP2X to prevent accidental touching of live contact parts. Contact to housing retention through flame-retardant UL94-VO plastic cotter pin.  
 No special tools are required for assembling. Bayonet lock with secondary locking pin. Special ergonomic release-key (supplied separately) for the releasing of the secondary locking pin. Set Screw termination for cables 25mm<sup>2</sup> - 150 mm<sup>2</sup>. Watertight IP68 plastic cable gland M40 for cable strain relief retention range 15 - 28 mm. Permanent markings to identify phase/line and safety information are embossed on connector's shell.  
 No additional information sticker is applied.  
 480amp version available.



## Aluminium/copper bimetal contact for aluminium cable



The SPV bimetallic contact is obtained by the soldering of the aluminium and copper as raw materials. The crimp terminal of the SPV contact is made of aluminium to allow corrosion-free termination onto aluminium cables.

Since the PowerSyntax® connectors were first introduced on the market, they have been used in a number of different applications from events to mobile generators to backup power systems. As well as improved safety compared to previous standards, for most users one of the main advantages of the Power Syntax® has been its quick and easy connection.

SPX and SPZ standard Power Syntax® connectors are suitable to be used with various copper cable sections. For some applications, though, there has been a demand that these connectors may be used with aluminium cable. However, as the standard Power Syntax® connectors feature copper or copper based contacts, they should not be used for direct termination onto aluminium cables as galvanic corrosion and overheating may occur.

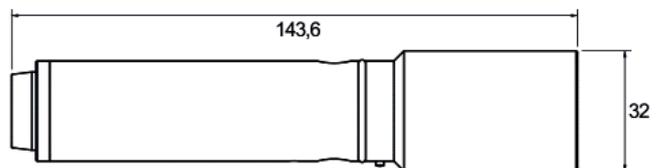
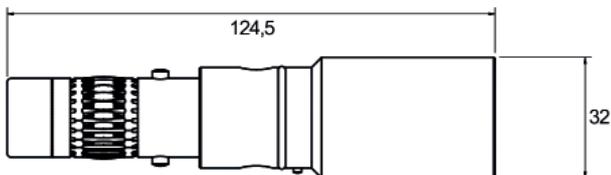
The aluminium/copper bimetal contact of the SPV allows the use of the Power Syntax® connectors with aluminium cable, combining the advantages of this type of connection with the lighter weight associated with aluminium cable.



SPV 120-240  
- 480amp Source contact  
- Crimp termination  
- For cable up to 240 mm<sup>2</sup>



SPV 120-240  
- 480amp Drain contact  
- Crimp termination  
- For cable up to 240 mm<sup>2</sup>



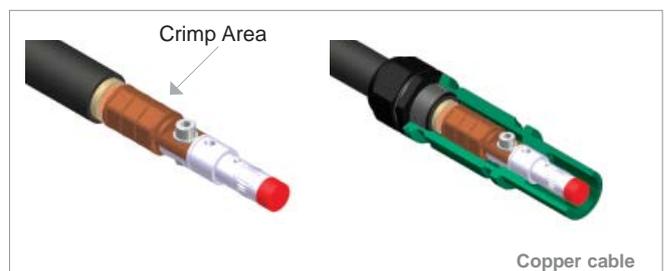
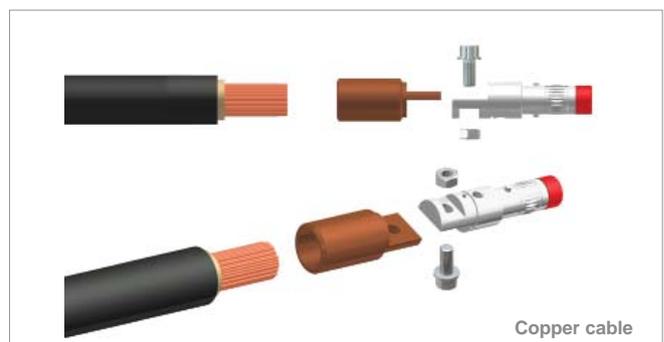
## A dual purpose system with adapters for copper and aluminium cables



SPY EasiLUG is a quick, safe and easy means to fit lug terminal single core aluminium or copper cables into a classical Power Syntax® single pole connector. It combines the reliability of a lug termination cable with the convenience of a Power Syntax® connector. The result is an IP67 waterproof terminal block, which also enables to disconnect the line without need of any tools (this operation must be carried out in absence of voltage).

- provides greater versatility than any other high power single pole connection.
- versions available for cable up to 300 mm<sup>2</sup> (aluminium or copper !)
- less maintenance than cables fitted with set screws /sleeve systems, or crimped cables.
- super quick assembly.
- standardises the single pole connections, by using the same connector's body as SPX/SPZ with crimped or set screw contacts.
- allows to quickly connect cables with lug terminals into power distro devices equipped with PowerSyntax® (or PowerSyntax® compatible) panel-mount connectors.
- reusable to fit cables of different lengths.
- lug terminal cables directly fitted into mechanically keyed, color coded PowerSyntax® connectors. This grants electrical safety and easy phase identification without need of other devices.

### Assembling elements



# Phase Inverters/Adaptors PowerSyntax®

Fast, safe and reliable reversal  
of two phase conductors



Say goodbye to those uncomfortable last minute adaptors on cable...

Available versions and Part Number				
Input male	Color	Output female	Color	P/N
L1	Orange	L2	Black	SPZ4LD1BR-LS2BK
L1	Orange	L3	Grey	SPZ4LD1BR-LS3GY
L2	Black	L1	Orange	SPZ4LD2BK-LS1BR
L2	Black	L3	Grey	SPZ4LD2BK-LS3GY
L3	Grey	L1	Orange	SPZ4LD3GY-LS1BR
L3	Grey	L2	Black	SPZ4LD3GY-LS2BK

The PowerSyntax® Phase Inverters/Adaptors (up to 480amp) have been designed to solve two specific problems

- reverse the rotation direction in three-phase motors, etc... by changing the phase sequence (L1-L2-L3) between the power source and the connected devices
- provide those who use only one model of phase conductor (L1, L2 or L3) to operate L1-L2-L3+Neutral systems with an interface between standard 3-phase power generators / distros and their devices.

The former is a common demand in industrial applications. The latter is a specific need of entertainment and cinema industries.

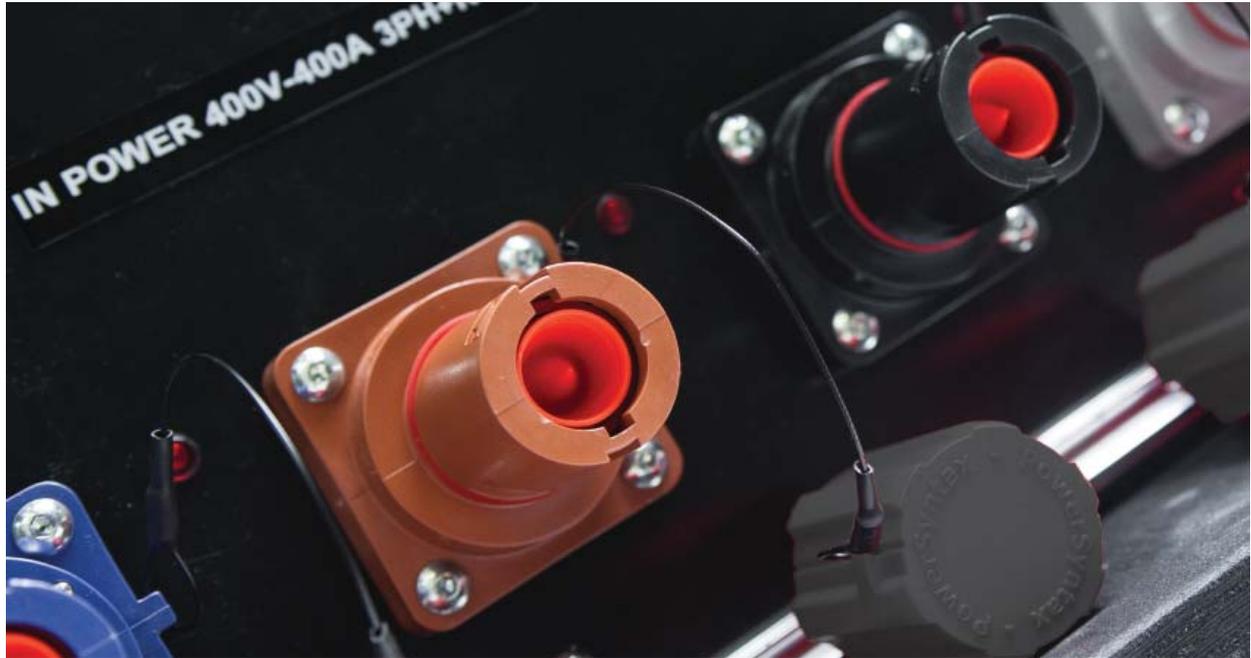
## Panels PowerSyntax®



Available versions and Part Number		
Rack unit 19" 2U, 5p (L1-L2-L3-N-E) EU standard coloration		
Drain	480amp 5p	p/n RK400PDR
Source	480amp 5p	p/n RK400PSR
Drain	750amp 5p	p/n RK750PDR
Source	750amp 5p	p/n RK750PSR

# Protection Cap PowerSyntax®

Specific protection covers designed  
to extend the connectors' life



Important details, such as newly conceived protection caps with special lacing, have been introduced in the design. A specific housing for the cap's lacing has been moulded on the flange of the panel-mount versions and on the body of the inline versions. The protection caps are laced to the connector's body through a special high-resistance cable made up of seven stainless strands, and covered by anti-scratch teflon black tubing.

The use of protective caps results in:

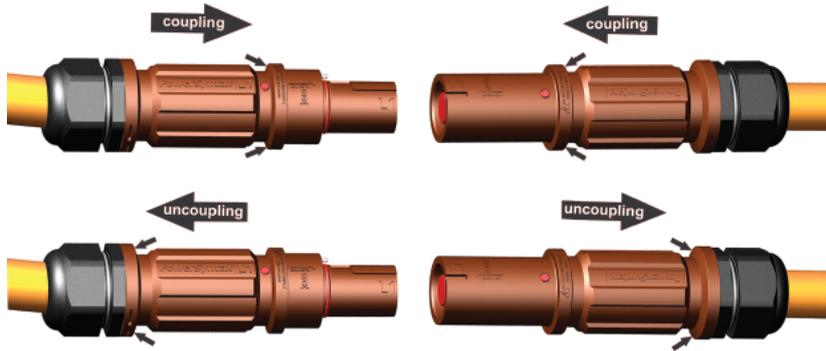
- **Extended life span of the connectors** - the mating faces are protected against impact damage and abrasion.
- **Improved safety** - also when the connectors are uncoupled, the contact is protected against dust and water.

Specific housing for protection cap lacing moulded on cap (Pic. 1) for panel version (Pic. 2) and inline version (Pic. 3).

## ERGONOMICS



The external shell has an ergonomic design which grants optimal handling and grip, also when operating with gloves. In particular, the sides of the hand grip are specifically designed for easy pushing/pulling of the connector when mating/unmating.



## SECONDARY LOCK AND RELEASE KEY

The secondary lock prevents unintentional disconnection under load. It is obtained through a simple locking pin on the drain connector which snaps into a slot on the mating source connector. As an extra safety device, each pole is mechanically keyed to prevent connection errors.



## DAISY-CHAIN HOOK-UP PATTERN



## MULTILOUVER CONTACT BAND LOCKING MECHANISM



### Enhanced Syntax® single pole source contacts.

We have further improved the heart of our connector. If the multilouver contact band gets out of its recess, the conductive surfaces will no longer be in contact, thus impeding the current transfer (1). To ensure the efficiency of the connection in any situation, we adopted a solution which keeps the multilouver spring loaded band in its positive location.

The contact band is held in its locked position by a special ring, on which a 2.5 ton. pressure has been applied (2). This solution prevents unintentional derailment of the multilouver contact band (3).

## CONTACT GUIDE PIN



To align the holes on the contact and the insulating body, and insert the red dowel pin, we created a guide pin on the contact and a corresponding recess in the insulator.

With the guide pin in its location, the assembling operations are easier and quicker.

Thanks to this solution, you can perform the needed operations even in harsh environmental situations.

The red dowel pin is reusable, so there is no need for new spare parts as it can be removed and inserted again maintaining IP67.

After locating recess A in the body, find guide pin B on the contact, then insert guide pin B inside recess A as shown in pic.1. For contact fastening, after locating hole C on the body, insert red dowel pin D in hole C. Contact retention is then completed as shown in pic. 2.



## NEW THREADED IP2X PROTECTION CAPS



We reinvented the attachment system of the touch-proof protection on source contacts to improve safety in case of damaging the plastic insulating cap.

Since this type of connection was first introduced on the market, many technicians had been experiencing breakage of the insulation cap due to strong blows. As a result, the edges of the metal conductive parts were exposed, with consequent risks for the operators' safety (Pic. 1).

Thanks to the innovative solution by Syntax®, the touch-proof protection cap is positively threaded and then blocked with specific adhesives to make it immovable. This system considerably reduces the exposure of the metal parts, as a portion of the insulating cap will remain in its position on top of the source contact even in case of damage (Pic. 2).



1

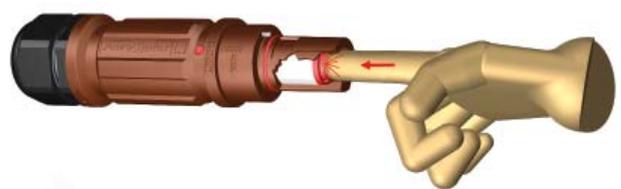
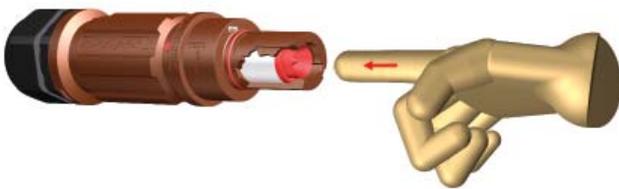
On legacy connectors, in case the plastic cap is damaged, the conductive parts are totally exposed.



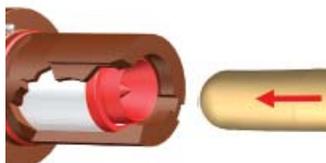
2

On Power Syntax®, the exposure of live parts is reduced even when the cap is damaged

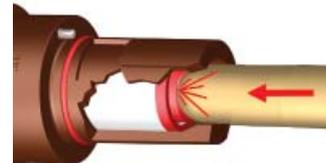
## ELECTRICAL PROTECTION OF CONTACTS



Both gender contacts are compliant with IP2X electrical safety standard, which guarantees touch-proof protection of live parts. On Drain connectors, the protective plastic elements feature a sharp-pointed insulated tip which prevents the possibility of pushing the contact inwards with fingers and are also designed so as to provide mechanical lock in case of improper pushing of the contact.



Released contact position



Furthest back position of the contact when pressed with fingers or improper tools

## CABLE RETENTION SYSTEM

According to the contact type, 3 different cable retention methods are used:

1 - Contact up to 480amp: on line connectors, cable retained through set screws and reduction sleeve.

2 - Contact up to 750amp (pure copper) and up to 480amp (bimetal): on line connectors, cable retained through crimping.

3 - Contact up to 480amp or 750amp (pure copper): on panel connectors, lug terminal retained through M12 nut.

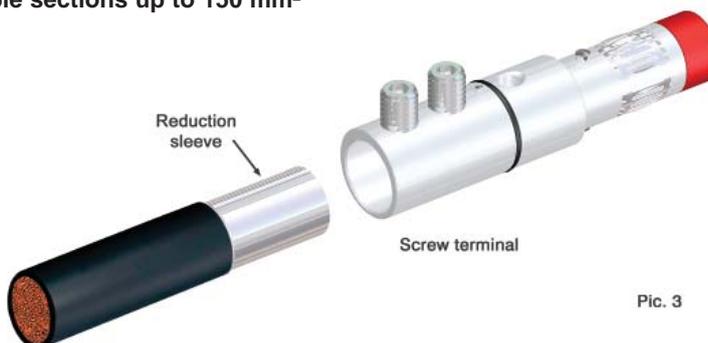


Tightening torque for set screw contacts (line connectors) and M12 locking ring nut (panel connectors) table - in Nm	Tightening torque	Cable section in mm <sup>2</sup>	Cable retention method
①	12 Nm	25-150 mm <sup>2</sup> up to 480amp	Reduction sleeve
③	12 Nm	25-150 mm <sup>2</sup> up to 480amp and 750amp	Lug terminal

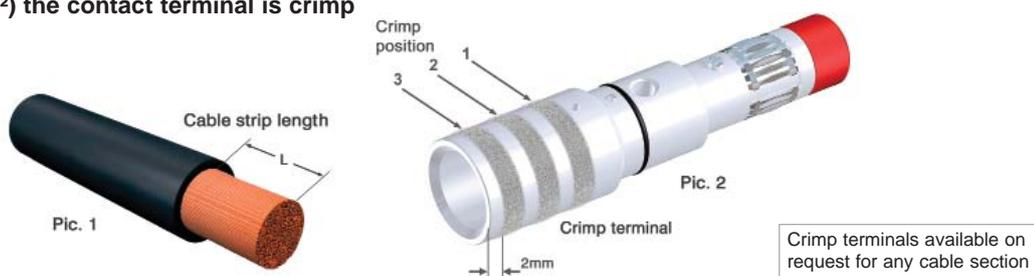
## CABLE STRIPPING

For contacts up to 480amp and cable sections up to 150 mm<sup>2</sup> (set-screw contact terminal)

For brass contacts up to 480amp and cable sections up to 150 mm<sup>2</sup> (set-screw contact terminal) 25 to 150 mm<sup>2</sup> cables are inserted into the set-screw contact terminal with the suitable reduction sleeve (Pic. 3). In this case the stripping length will be 33 mm (Pic. 1).



For copper contacts up to 750amp (cable sections up to 300 mm<sup>2</sup>) and bimetal contacts up to 480amp (up to 240 mm<sup>2</sup>) the contact terminal is crimp



② CRIMP CONTACT TERMINAL TABLE	cable size 185 mm <sup>2</sup>	cable size 240 mm <sup>2</sup>	cable size 300 mm <sup>2</sup>
Insulation strip length = L (Pic.1)	42 mm	42 mm	42 mm
Number of compressions (Pic.2)	2	3	3
Hand operated hydraulic crimp tool	HPI130-C	HPI130-C	HPI130-C
Cordless hydraulic crimp tool	B1350-C	B1350-C	B1350-C
Crimp die set	ME 37-C	ME 48-C	ME 60-C



# SPX/SPV/SPY - SPZ PowerSyntax®

## IDENTIFICATION COLOR CODES

	GROUND	NEUTRAL	LINE 1	LINE 2	LINE 3
EUROPE					
UK					
AUSTRALIA					
U.S.A.					

### EUROPEAN SERIES EXAMPLE

	LINE SOURCE	LINE DRAIN	PANEL SOURCE	PANEL DRAIN
LINE 1				
	LINE 1 - Line Source	LINE 1 - Line Drain	LINE 1 - Panel Source	LINE 1 - Panel Drain
LINE 2				
	LINE 2 - Line Source	LINE 2 - Line Drain	LINE 2 - Panel Source	LINE 2 - Panel Drain
LINE 3				
	LINE 3 - Line Source	LINE 3 - Line Drain	LINE 3 - Panel Source	LINE 3 - Panel Drain
NEUTRAL				
	NEUTRAL - Line Source	NEUTRAL - Line Drain	NEUTRAL - Panel Source	NEUTRAL - Panel Drain
GROUND				
	GROUND - Line Source	GROUND - Line Drain	GROUND - Panel Source	GROUND - Panel Drain



## PART NUMBER EXPLANATION

Part N.							
EXAMPLE Part N.	SPX	4	LD	1	BR	120	MR

CONNECTOR SERIES	
PowerSyntax® SPX Series	SPX
PowerSyntax® SPZ Series	SPZ

MAXIMUM CURRENT RATING	
Up to 480amp SCREW (25 to 150 mm <sup>2</sup> )	4
Up to 750amp CRIMP (185 to 300 mm <sup>2</sup> )	7
Crimp contact also available from 25 to 150 mm <sup>2</sup> on request	-

CONNECTOR STYLE	
Line Drain	LD
Line Source	LS
Panel Drain M 12 Thread	PD
Panel Source M 12 Thread	PS

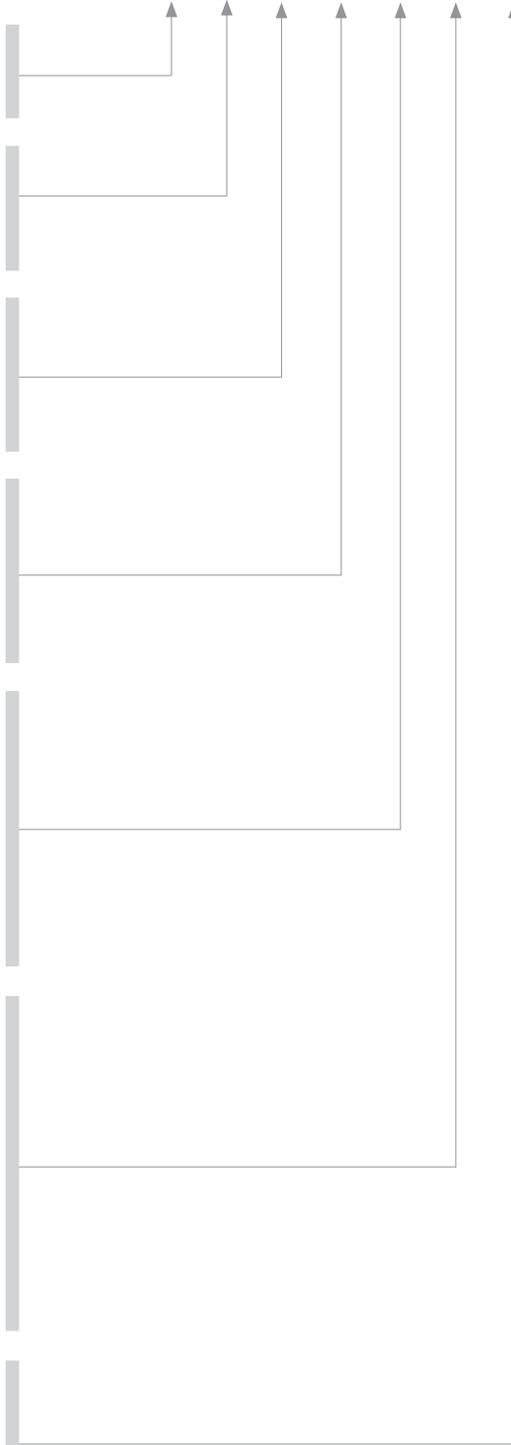
KEY COMPOSITION	
Earth	E
Neutral	N
Phase 1	1
Phase 2	2
Phase 3	3

INSULATOR COLOR	
GREEN 	GN
BLUE 	BL
BROWN 	BR
BLACK 	BK
GREY 	GY
RED 	RD
YELLOW 	YE
WHITE 	WH

CABLE CONDUCTOR SIZE (For 25-150 mm <sup>2</sup> cables the reduction sleeves are included)	
25 mm <sup>2</sup> (SPX and SPZ series)	025
35 mm <sup>2</sup> (SPX and SPZ series)	035
50 mm <sup>2</sup> (SPX and SPZ series)	050
75 mm <sup>2</sup> (SPX and SPZ series)	075
95 mm <sup>2</sup> (SPX and SPZ series)	095
120 mm <sup>2</sup> (SPX and SPZ series)	120
150 mm <sup>2</sup> (SPX and SPZ series)	150
185 mm <sup>2</sup> (SPX series)	185
240 mm <sup>2</sup> (SPX series)	240
300 mm <sup>2</sup> (SPX series)	300

CABLE GLAND	
M 40 x 1,5 Clamping Range 15 - 23 mm diameter (SPX and SPZ series)	MQ
M 40 x 1,5 Clamping Range 19 - 28 mm diameter (SPX and SPZ series)	MP
M 40 x 1,5 Clamping Range 22 - 32 mm diameter (SPX series)	MR
M 50 x 1,5 Clamping Range 30 - 38 mm diameter (SPX series)	MU

ACCESSORIES	
Secondary lock	SPXTKEY
Protective plastic cap kit for source connectors	SPXDCS-SC
Protective plastic cap kit for drain connectors	SPXD-SC



# SPV Bimetal PowerSyntax®



## PART NUMBER EXPLANATION

Part N.							
EXAMPLE Part N.	SPV	4	LD	1	BR	120	MR

CONNECTOR SERIES	
PowerSyntax® SPV Series	SPV

MAXIMUM CURRENT RATING	
Up to 480amp CRIMP (120 to 240 mm²)	4

CONNECTOR STYLE	
Line Drain	LD
Line Source	LS

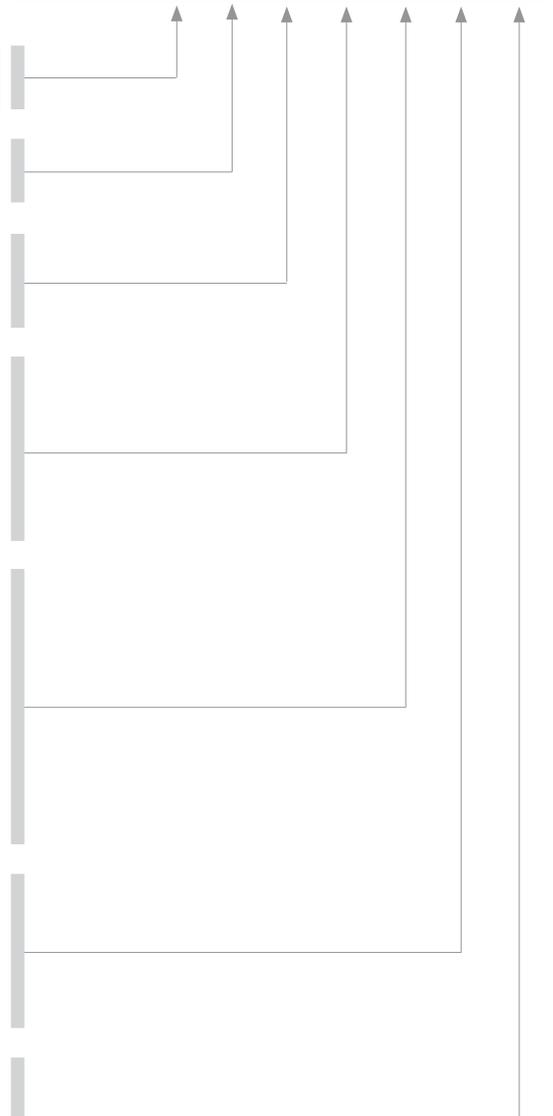
KEY COMPOSITION	
Earth	E
Neutral	N
Phase 1	1
Phase 2	2
Phase 3	3

INSULATOR COLOR	
GREEN	GN
BLUE	BL
BROWN	BR
BLACK	BK
GREY	GY
RED	RD
YELLOW	YE
WHITE	WH

CABLE CONDUCTOR SIZE (For 25-150 mm² cables the reduction sleeves are included)	
120 mm²	120
150 mm²	150
185 mm²	185
240 mm²	240

CABLE GLAND	
M 40 x 1,5 Clamping Range 19 - 28 mm diameter	MP
M 40 x 1,5 Clamping Range 22 - 32 mm diameter	MR
M 50 x 1,5 Clamping Range 30 - 38 mm diameter	MU

ACCESSORIES	
Secondary lock	SPXTKEY
Protective plastic cap kit for source connectors	SPXDCS-SC
Protective plastic cap kit for drain connectors	SPXD-SC





## PART NUMBER EXPLANATION

Part N.							
EXAMPLE Part N.	SPY	41	LD	1	BR	120	MR

CONNECTOR SERIES	
SPY EasiLUG Series	SPY

MAXIMUM CURRENT RATING	
For <b>aluminium</b> cable up to 480amp	41
For <b>copper</b> cable up to 750amp	73

CONNECTOR STYLE	
Line Drain	LD
Line Source	LS
Panel Drain M 12 Thread	PD
Panel Source M 12 Thread	PS

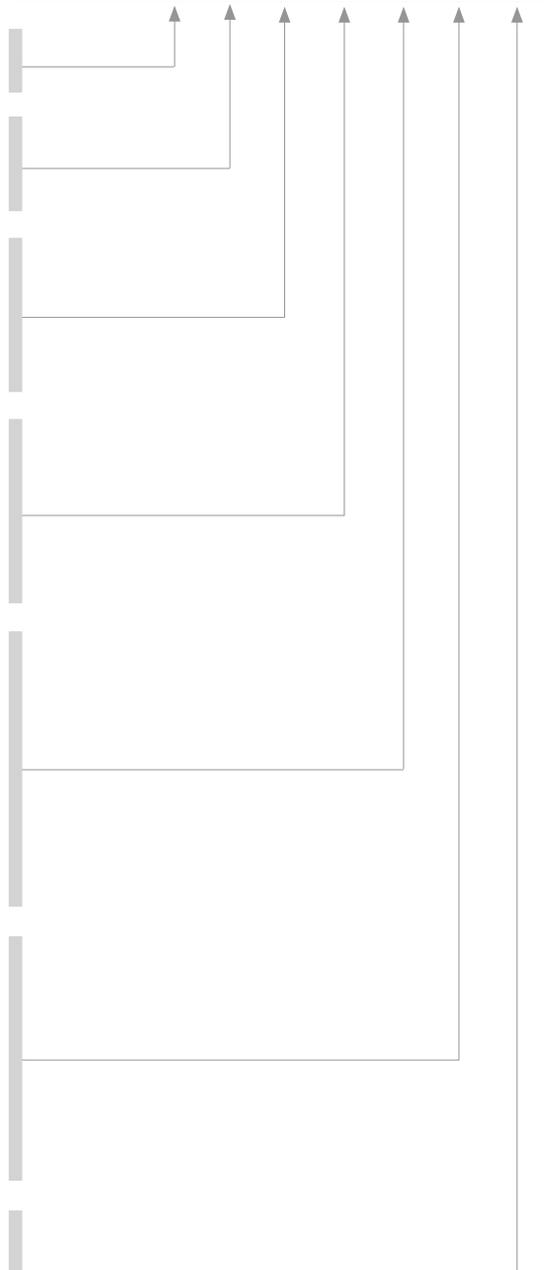
KEY COMPOSITION	
Earth	E
Neutral	N
Phase 1	1
Phase 2	2
Phase 3	3

INSULATOR COLOR	
GREEN 	GN
BLUE 	BL
BROWN 	BR
BLACK 	BK
GREY 	GY
RED 	RD
YELLOW 	YE
WHITE 	WH

CONDUCTOR SECTION	
75 mm <sup>2</sup> copper or aluminium cable	075
95 mm <sup>2</sup> copper or aluminium cable	095
120 mm <sup>2</sup> copper or aluminium cable	120
150 mm <sup>2</sup> copper or aluminium cable	150
185 mm <sup>2</sup> copper or aluminium cable	185
240 mm <sup>2</sup> copper or aluminium cable	240
300 mm <sup>2</sup> copper cable only	300

CABLE GLAND	
M 40 x 1,5 Clamping Range 22-32	MR
M 50 x 1,5 Clamping Range 27-35 (adaptor included)	MT
M 50 x 1,5 Clamping Range 30-38 (adaptor included)	MU

ACCESSORIES	
Secondary lock	SPXTKEY
Protective plastic cap kit for source connectors	SPXDCS-SC
Protective plastic cap kit for drain connectors	SPXDCCD-SC







# VALENTINI

www.syntaxnet.it  
info@syntaxnet.it  
Tel. +39 0119594160  
Fax +39 0119594166  
via Asti 84/A  
10098 Rivoli  
(TO) - ITALY

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