PHASE 3
CONNECTORS USA

POWERSAFE

POWER CONNECTOR ASSEMBLY GUIDE

usa.p3connectors.com

Contents

1. Overview

Phase 3 Connectors strive to make sure that customers are 100% satisfied with our product. To do so we have written detailed procedures to guide you through the steps of correctly assembling and maintaining the product.

Due to the wide range of cable types available in today's market, to guarantee that an acceptable result is obtained when Powersafe Connectors are terminated to cables, the process for the variety of terminations has to be evaluated.

This procedure provides all the details of how to successfully terminate powersafe connectors, either by crimping, set screws or threaded post methods.

This Procedure tells you:

- How to perform a set screw termination
- How terminate a threaded post panel type connector
- The recommended crimp tools and dies
- How to perform a crimped termination
- Safety checks

The recommended assembly methods are detailed in the pages to follow.
If in doubt please contact Phase 3 Connectors USA.

2. Termination Methods

There are three methods on how to terminate cables on the Powersafe contacts: Set Screw termination (page 2), Threaded Post termination (page 3) and Crimp termination (page 4).

2.1. Set Screw Termination Procedure

The recommended assembly procedure has been devised to show step-by-step how to terminate cables to our set screw contact. For a satisfactory termination it is essential that the recommended assembly procedure is used.

1. From the packaging: Remove the cable gland from the insulator and remove the contact.

2. Check the cable overall diameter. The standard Black M40A gland will facilitate cable diameter of .75-1.1" (19-28mm). If your cable is of a diameter between .59-.71" (15-18mm) diameter, the PP00131 reduction bush supplied should be fitted to the M40A cable gland. To do this, remove the black rubber sealing ring inside the rear of the gland and replace with the PP00131 M40S bush (*see tables 1 and 1a).

3. Slide the completed cable gland along the cable jacket.

4. With care, strip back the cable insulation 1.25" (33mm). Try not to damage any of the conductor's stranding.

5. Fit the correct end sleeve or combination of end sleeves (see table below) over the conductor strands. Take care to ensure all the wire strands are inside the end sleeve.

Set Screw End Sleeve Selection Guide & Wire Guage Assembly Chart (N.American) (Table 1)

WIRE AWG	AVERAGE CONDUCTOR OD (INCHES)	NOMINAL CONDUCTOR SIZE RANGE (INCHES)	REDUCTION SLEEVE KIT	REDUCTION SLEEVE KIT PART #	ACCEPTABLE JACKET RANGE OD (INCHES)	CABLE CLAMP	REDUCTION CABLE BUSHING PART #
4	0.23	.22 - .26	R25	PP00015	.39 - .63	M40SS	PP00575
2	0.29	.27 - .31	R35	PP00016	.39 - .63	M40SS	PP00575
1	0.33	.33 - .37	R50	PP00017	.39 - .63	M40SS	PP00575
1/0	0.37	.33 - .37	R50	PP00017	.59 - .90	M40S	PP00131
2/0	0.42	.39 - .43	R70	PP00018	.59 - .90	M40S	PP00131
3/0	0.47	.46 - .5	R95	PP00006	.59 - .90	M40S	PP00131
4/0	0.53	.52 - .54	R120	STD	.75 - 1.1	M40A	STD
250MCM	0.58	.52 - .56	R120	STD	.75 - 1.1	M40A	STD

Using the table above (See next page for European measurements), select the appropriate reduction sleeves and slide in sequence on to the exposed conductor stranding. Please note; all sleeves down to the size recommended for the cable in use must be used.

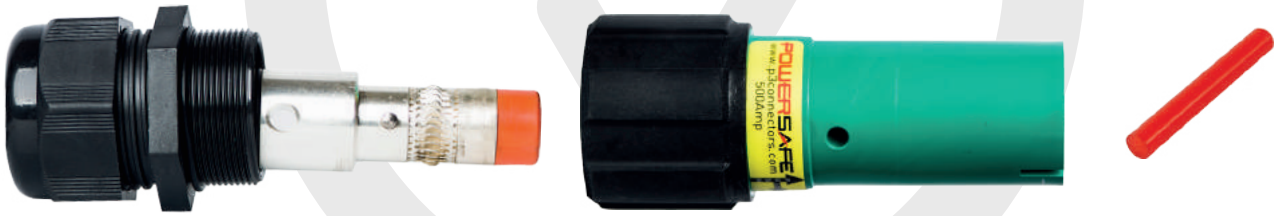
i.e. For a #2 (35mm2) cable, the R120, R95, R70, R50 and R35 sleeves should all be used in sequence. All the sleeves fit perfectly inside each other to create a gradual reduction span. The flared end of the sleeves should be against the cable insulation.

Set Screw End Sleeve Selection Guide & Wire Guage Assembly Chart (European) (Table 1a)

CSA MM2	AVERAGE CONDUCTOR OD (MM)	NOMINAL CONDUCTOR SIZE RANGE (MM)	REDUCTION SLEEVE KIT	REDUCTION SLEEVE KIT PART #	ACCEPTABLE JACKET RANGE OD (MM)	CABLE CLAMP	REDUCTION CABLE BUSHING PART #
25	6.5	5.7 - 6.7	R25	PP00015	10 - 16	M40SS	PP00575
35	7.4	6.9 - 7.9	R35	PP00016	10 - 16	M40SS	PP00575
50	8.9	8.4 - 9.4	R50	PP00017	15 - 23	M40SS	PP00575
70	10.5	10 - 11	R50	PP00018	15 - 23	M40S	PP00131
95	12.2	11.7 - 12.7	R70	PP00006	15 - 23	M40S	PP00131
120	13.8	13.3 - 14.3	R95	STD	19 - 28	M40A	STD

6. Slide the cable and reduction sleeves into the back of the contact ensuring they are fully inserted inside the contact. Using a 5mm Allen bit, tighten the set screws 93 in/lbs.

7. Now insert the contact into the rear of the insulator and align the hole in the contact so that it is in line with the holes in the insulator.



8. Now align the dowel pin with the tapered end first with the hole in the insulator. The dowel pin is designed to be a tight interference fit with insulator hole and it is necessary to drive the pin using a hammer through the insulator and contact. When fully inserted the pin will be flush with the surface of the insulator body.

Dowel pins are designed to be used only once. In the event that the connector is unassembled a new dowel pin should be fitted on re-assembly.

Also, never use a dowel pin that is not a tight interference fit within the Insulator as this could lead to failure of the watertight barrier or allow the contact to dislodge from the insulator.

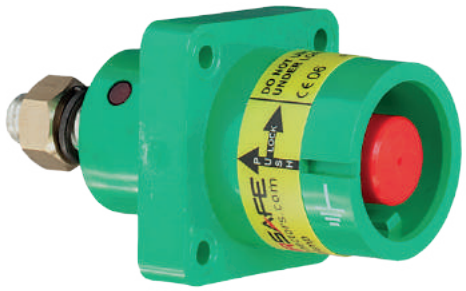
Periodic checks should be made to ensure security of dowel pins.

9. Now screw the cable gland onto the insulator and tighten the body and dome nut to 97 in/lbs.

Your connector should now be complete and ready for an overall inspection.

2.2 Panel Mounted Connectors Procedure

Panel connectors are supplied fully assembled and ready for direct mounting to equipment.



1. When the panel Connector is mounted in equipment: remove the nut and washer from the threaded post section.

2. Fit your selected terminal or accessory over the threaded area.

3. Refit the Washer and bolt on to the threaded area and tighten to a MAXIMUM of 106 - 124 in/lbs.

2.3 Crimp Termination

It is important to use the recommended Crimp tool and Die to ensure a satisfactory crimp.

Tools Required:

- ME series Crimp Die
- Hand Held Crimping Tool: HT 131-C
- Cordless Hydraulic 14.4v Crimping Tool: B 131-C

A hydraulic crimping tool and hexagonal Die set is used to perform a crimp termination. Selection of the correct crimp die is essential to achieve a reliable result.

As cable conductor sections vary widely, the table below is intended as a guide to appropriate die selection.

Cable tensile test should be performed to ensure the final crimp termination meets the tensile and mv drop test of a particular specification.

The assembly of the Insulator and Glands is the same as previously described for the set screw terminations (page 2).

1. Select the appropriate Die set from Table 2/Table 2a (page5/6), (For example if you are using a 500MCM (240mm2) cable use Die set ME48).

2. Strip the cable jacket to leave 1.75" (43mm) of conductor exposed.

3. Slide the conductor into the rear of the contact. Take care to ensure all the wire strands are inside the contact.

Continues on Page 7.

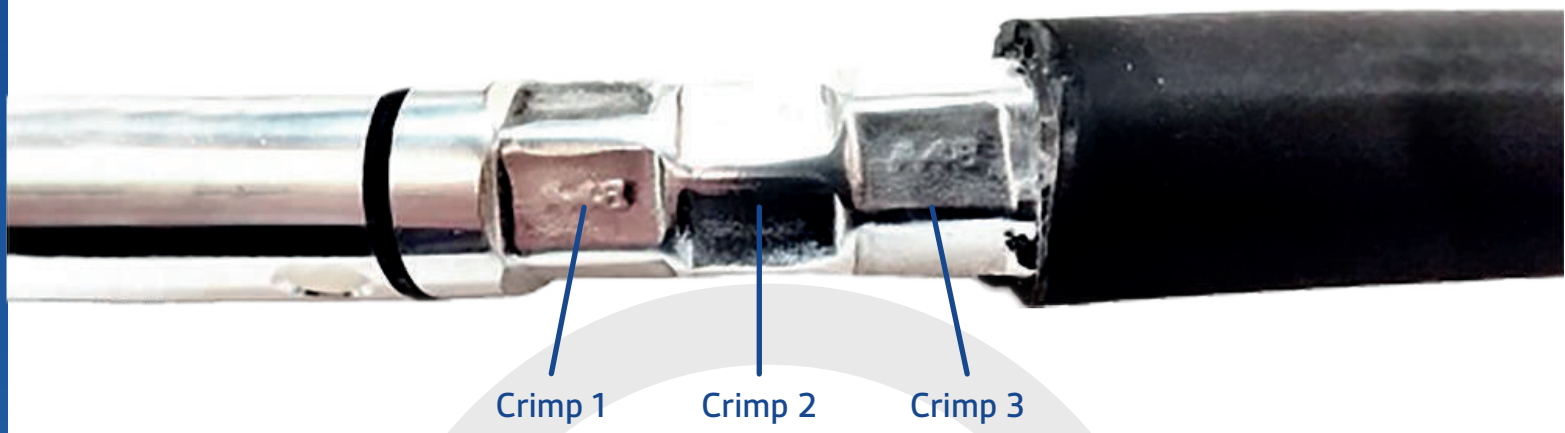
Single Conductor Crimp Contact & Wire Guage Assembly Chart (N.American) (Table 2)

CONTACT RATING	CONTACT SIZE	CONTACT INNER DIAMETER (INCHES)	NOMINAL CONDUCTOR SIZE RANGE (INCHES)	WIRE AWG	AVERAGE CONDUCTOR OD (INCHES)	WIRE AMPACITY RATING	ACCEPTABLE JACKET RANGE OD (INCHES)	CABLE CLAMP	REDUCTION CABLE BUSHING PART #	TENSILE STRENGTH IEC61238-1 (IN/LBS)	DIE SET CODE & (NO. OF CRIMPS)
UP TO 500A	C25	TBD	.22 - .26	4	0.23	140A	.39 - .63	M40SS	PP00575	13.25	ME 05 (2)
	C35	0.37	.27 - .31	2	0.29	190A	.39 - .63	M40SS	PP00575	18.5	ME 07 (2)
	C50	0.39	.33 - .37	1	0.33	220A	.39 - .63	M40SS	PP00575	26.5	ME 10 (2)
	C50	0.39	.33 - .37	1/0	0.37	260A	.59 - .90	M40S	PP00131	26.5	ME 10 (2)
	C70	0.45	.39 - .43	2/0	0.42	300A	.59 - .90	M40S	PP00131	37	ME 14 (2)
	C95	0.53	.46 - .5	3/0	0.47	350A	.59 - .90	M40S	PP00131	50.5	ME 19 (2)
	C107	0.57	.52 - .54	4/0	0.53	405A	.75 - 1.1	M40A	STD	50.5	ME 19 (2)
	C120	0.6	.52 - .56	250MCM	0.58	455A	.75 - 1.1	M40A	STD	63.75	ME 24 (2)
UP TO 800A	C150	0.67	.59 - .63	300MCM	0.63	505A	.75 - 1.1	M40A	STD	79.5	ME 30 (2)
	C185	0.76	.65 - .69	350MCM	0.68	570A	.87 - 1.26	M40B	STD	98.25	ME 37 (2)
	C240	0.83	.75 - .79	500MCM	0.81	700A	.87 - 1.26	M40B	STD	127.5	ME 48 (3)
	C300	1	.85 - .89	600MCM	0.89	780A	.87 - 1.26	M40B	STD	159.25	ME 60 (3)

Single Conductor Crimp Contact & Wire Guage Assembly Chart (European) (Table 2a)

CONTACT RATING	CONTACT SIZE	CONTACT INNER DIAMETER (MM)	NOMINAL CONDUCTOR SIZE RANGE (MM)	CSA MM2	AVERAGE CONDUCTOR OD (MM)	WIRE AMPACITY RATING	ACCEPTABLE JACKET RANGE OD (MM)	CABLE CLAMP	REDUCTION CABLE BUSHING PART #	TENSILE STRENGTH IEC61238-1 (N/M)	DIE SET CODE & (NO. OF CRIMPS)
UP TO 500A	C25	TBD	5.7 - 6.7	25	6.2	136A	10 - 16	M40SS	PP00575	1.5	ME 05 (2)
	C35	9.5	6.9 - 7.9	35	7.4	200A	10 - 16	M40SS	PP00575	2.1	ME 07 (2)
	C50	10	8.4 - 9.4	50	8.9	250A	15 - 23	M40SS	PP00575	3	ME 10 (2)
	C70	11.5	10 - 11	70	10.5	310A	15 - 23	M40S	PP00131	4.2	ME 14 (2)
	C95	13.5	11.7 - 12.7	95	12.2	369A	15 - 23	M40S	PP00131	5.7	ME 19 (2)
	C107	14.5	13.1 - 13.6	107	13.1	380A	15 - 23	M40A	STD	5.7	ME 19 (2)
	C120	15.2	13.3 - 14.3	120	13.8	432A	19 - 28	M40A	STD	7.2	ME 24 (2)
UP TO 800A	C150	16.95	14.9 - 15.9	150	15.4	497A	19 - 28	M40A	STD	9	ME 30 (2)
	C185	19.2	16.4 - 17.4	185	16.9	564A	22 - 32	M40B	STD	11.1	ME 37 (2)
	C240	21	19 - 20	240	19.5	673A	22 - 32	M40B	STD	14.4	ME 48 (3)
	C300	25.4	21.5 - 22.5	300	22	773A	22 - 32	M40B	STD	18	ME 60 (3)

4. Place the contact and cable carefully into the die set and close the crimping tool. In the case of tool HT131 the tool hands are pumped until they go no further. As the tool reaches the required compression you will feel and hear a click. The tool can then be opened to release the finished crimp.



5. In some case more than one crimp is recommended to ensure the maximum surface are of crimp are achieved. From table 2 we can see for example that a 500MCM (240mm2) crimp should be made in 3 equidistant positions along the contact crimp area.

3. Safety and Maintenance Checks

a) Check external surface of Insulators periodically for signs of cracks or breaks. If there are any signs of damage, then the insulator should be replaced.

b) Check cable glands for tightness. In use, cable glands can become loose and this could lead to water ingress, so periodic checking is essential.

c) Check condition and position of Cable gland seal within the cable gland. If any degradation is suspected a new seal or gland should be fitted.

d) With Drain connectors: check condition of the front O ring for signs of degradation. Also periodically a film of Silicone grease should be applied to the O ring surface. This will allow continued ease of mating and protect the O ring.

e) With Drain connectors: check the secondary locking pin which is spring loaded moves freely. It should travel fully down to the insulator surface and fully extend.

f) Check security and position of dowel pins. With a slight tap with a hammer the dowel pins should not move.

Following these steps above will ensure the long term safety and continued performance of your connectors.

** Replacement parts for service are readily available from the factory

WARNING!

Do not alter this product in any way. Doing so may lead to serious injury or death. Use copper conductors only. Read Instructions completely before wiring. Ensure all safety checks are carried out before and after use. This product should be installed, Inspected and maintained by qualified electricians only, in accordance with local and national electrical codes.

DID YOU KNOW

Phase 3 manufactures Sequential Mating Boxes for power distribution in the Powersafe range. Ask your sales rep

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