

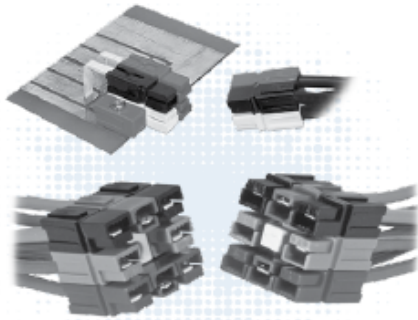
# Getting the right pin, a few notes

Ian Crotty 21 Jan 2013

The pins chosen must correspond to the LV CAEN 3009 power modules, namely PP15/45

## Power Pole 15/45

### Powerpole® Connectors - PP15 to PP45 : up to 55 Amps



PP15-45 series are the smallest Powerpole® housings. They can be used for wire-to-wire or wire-to-board applications. Wire sizes from #20 AWG (0.5 mm<sup>2</sup>) to #10 (6 mm<sup>2</sup>) offer power capabilities up to 55 amps per pole. Finger proof housings and the ability to incorporate first-mate last-break ground connectors enhance the capabilities of this Powerpole® series.

#### High Power Density

- Up to 55 amps in a compact footprint

#### Wire-to-Wire & Wire-to-Board Configurations

- Wire & PCB contacts can be used in the same housings

#### Finger Proof Housings Available

- Protects against accidental contact with live circuits

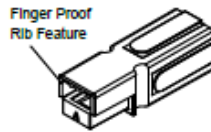
SECTION 2  
Powerpole® PP15 to 45

### PP15-45 ORDERING INFORMATION |

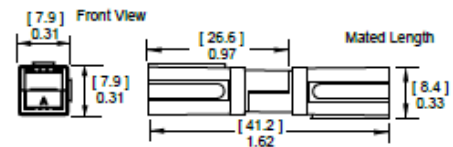
#### PP15-45 Finger Proof Housings

Improved on the original APP® design by adding ribs to mating interface to protect against accidental contact with live circuits. Meets the requirements of UL1977 section 10.2 and is rated IP20. Will not mate with standard housings.

Description	Part Numbers	
Minimum Quantity ...	2,500	200
Red	1327FP-BK	1327FP
Green	1327G5FP-BK	1327G5FP
Black	1327G6FP-BK	1327G6FP
White	1327G7FP-BK	1327G7FP
Blue	1327G8FP-BK	1327G8FP
Yellow	1327G16FP-BK	1327G16FP



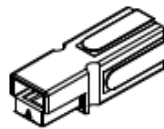
#### PP15-45 Finger Proof & Standard & Ground Housing Dimensions



#### PP15-45 Standard Housings

The original housing design has an open interface and is available in a wide array of colors. Will not mate with finger proof housings.

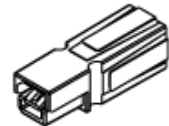
Description	Part Numbers	
Minimum Quantity ...	2,500	200
Red	1327-BK	1327
Green	1327G5-BK	1327G5
Black	1327G6-BK	1327G6
White	1327G7-BK	1327G7
Blue	1327G8-BK	1327G8
Yellow	1327G16-BK	1327G16
Orange	1327G17-BK	1327G17
Gray	1327G18-BK	1327G18
Brown	1327G21-BK	1327G21
Pink	1327G22-BK	1327G22
Purple	1327G23-BK	1327G23



#### 45A Premate Ground Housings

Green housings are keyed to prevent accidental mating with standard or finger proof Powerpole® housings.

Description	Part Number	
Minimum Quantity ...	2,500	200
Green	1827G1-BK	1827G1

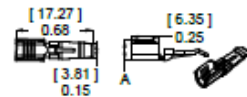


#### PP15-45 Tin Plated Power Contacts

Offer cost effective performance up to 1,500 mating cycles. See specifications and temperature charts for amperage ratings by wire size.

Barrel	AWG	mm <sup>2</sup>	Mating Force	Part Numbers		Dimensions	
				Loose Piece	Reeled	- A -	
				200	5,000	Inches	mm
Open 14 to 10 K*	2.1 to 5.3	High	269G3-LPBK	269G3	0.21	5.33	
Open 14 to 10 K*	2.1 to 5.3	Low	261G2-LPBK	261G2	0.20	5.08	
Open 14 to 10 SF*	2.1 to 6.0	High	201G1H-LPBK	201G1H	0.24	6.10	
Open 14 to 10 SF*	2.1 to 6.0	Low	200G1L-LPBK	200G1L	0.24	6.10	
Open 16 to 12	1.3 to 3.3	High	269G1-LPBK	269G1	0.18	4.57	
Open 16 to 12	1.3 to 3.3	Low	261G1-LPBK	261G1	0.18	4.57	
Open 20 to 16	0.52 to 1.3	High	269G2-LPBK	269G2	0.16	4.06	
Open 20 to 16	0.52 to 1.3	Low	261G2-LPBK	262G1	0.16	4.06	
Open 20 to 16 SF*	0.52 to 1.5	Low	200G2L-LPBK	200G2L	0.20	5.08	

#### Open Barrel Contact



High detent (Mating Force) is chosen for improved contact. This is the force that retains the pins together.

## The pin ordered for the RE1, 2 & 3

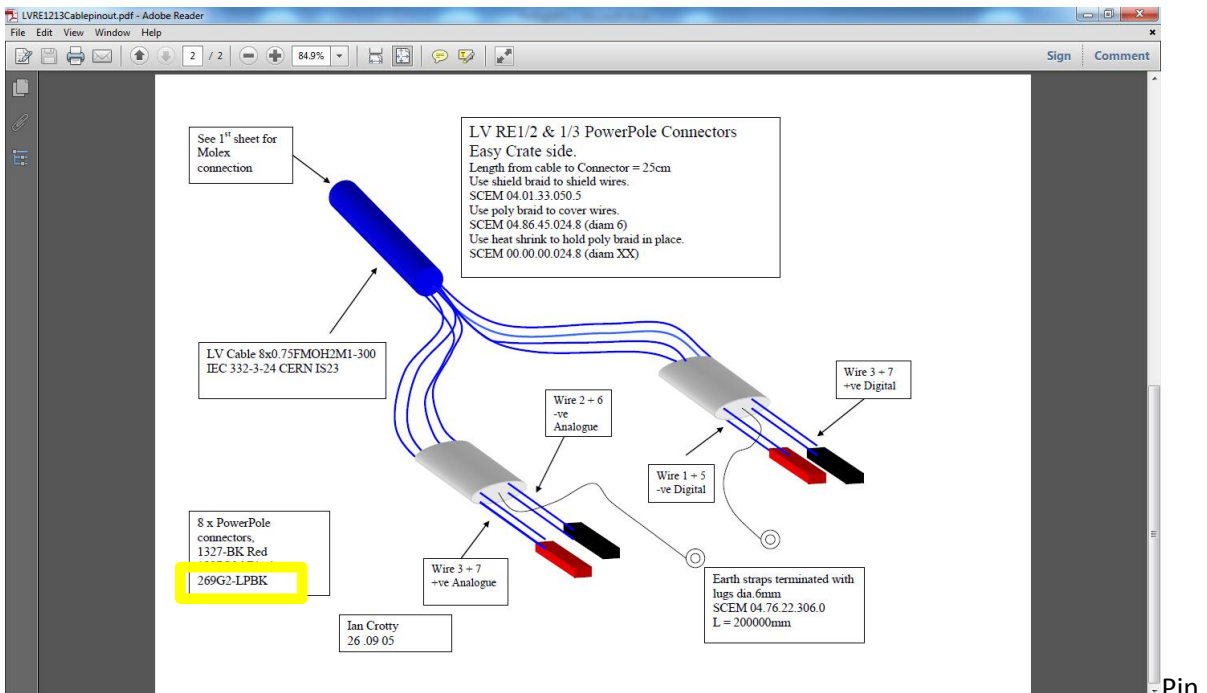
Pin ref 269G2-LPBK

The screenshot shows the RS website product page for the connector 269G2-LPBK. The page includes a search bar with the product name, a navigation menu, and a main product area. The product is described as a "Connector, Powerpole; Loose Piece; 15 A; 16-20 AWG". A table shows the price per unit for different quantities: 25 units at 0.64 €, 50 units at 0.59 €, and 100 units at 0.56 €. The manufacturer is listed as Anderson Power Products. The page also features a "Commander" button and a "Documentation technique" section.

Quantité	Prix unitaire
25	0,64 €
50	0,59 €
100	0,56 €

Pin is Tin plated for crimping. The current rating is fine wrt the LV CAEN module 9A and the FEB consumption in the worst case is 2 x 0.8A

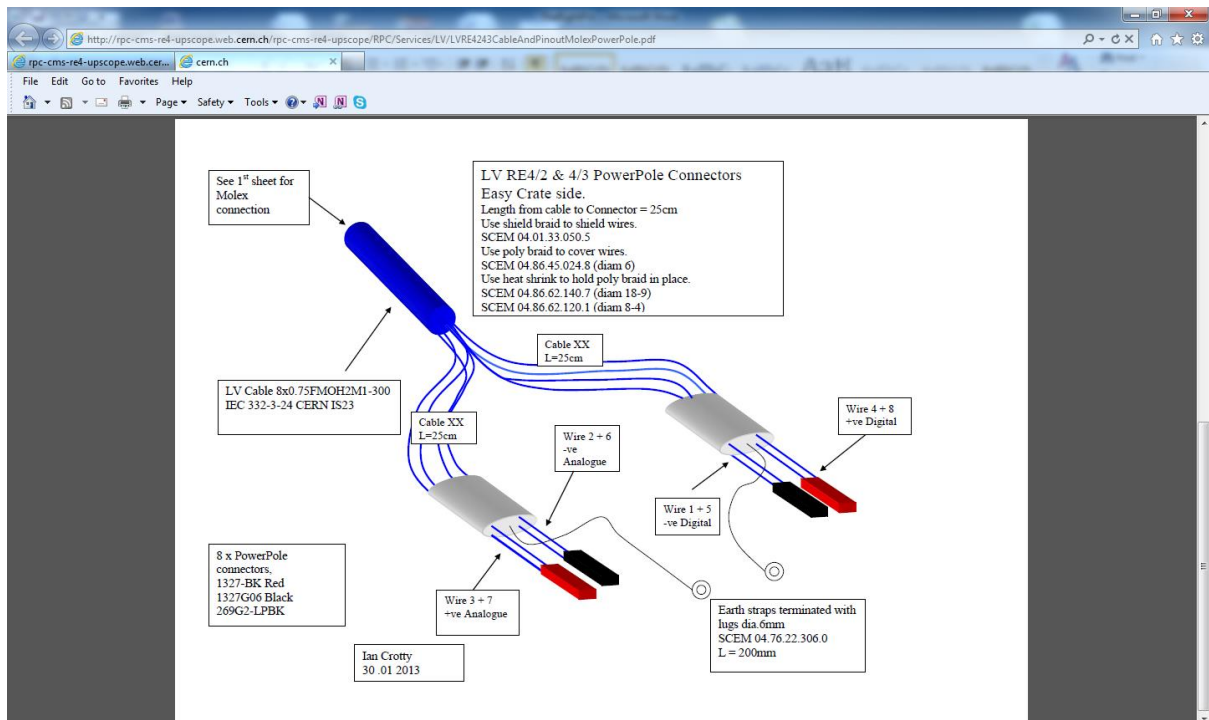
## Details from RE1,2 & 3



ref 269G2-LPBK

## RE4

<http://rpc-cms-re4-upscope.web.cern.ch/rpc-cms-re4-upscope/RPC/Services/LV/LVRE4243CableAndPinoutMolexPowerPole.pdf>



Pin ref 269G2-LPBK

## The EDH orders

<https://edh.cern.ch/Document/SupplyChain/DAI/1951569> from 2005

<https://edh.cern.ch/Document/SupplyChain/DAI/4989817> from 2012 for RE4

## Tooling

Using Anderson Power Products (APP) tool



## Cable section

LV Cable 8x0.75FMOH2M1-300

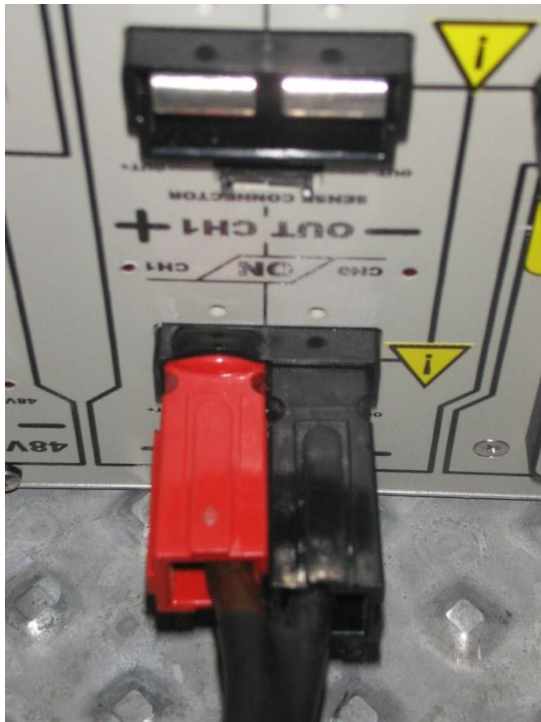
Cross section equals  $2 \times 0.75\text{mm}^2$  as 2 wires are put into one pin, this corresponds to AWG 15 or 16

As the pin is designed for AWG 20-16 then the fit will be tight in the cylindrical pin as used in the barrel, but less of a problem in the open pin to be crimped.

	AWG	Current[A]	Finish
Pin ref 269G2-LPBK	20-16	15	Tin
New pin RS ref 534 963	20-16	30	Silver

The contact surface material should be the same on the Power supply and cable connectors in order to avoid fretting corrosion as seen in the DTs with their PP75. This led to high temperatures causing molten pin housings. Caen uses the tin plate version so therefore so should we. A contact paste is available to reduce corrosion processes, oxidation and sulfation.

Example of over heating in DT Power system



Using solder version in Crimp mode.

This is what has been used in the refit of RE+4

RS 534963

Composants électroniques, énergie et connecteurs | Electrique, Process Contrôle Automatismes et câbles | Mécanique et outillage | Informatique, Test et Mesure, EPI et hygiène et sécurité

0 Article(s): 0,00 €

Accueil > Connecteurs > Connecteurs de puissance > Accessoires de connecteur à de puissance à usage intensif

### CONTACTS A SOUDER

Code commande RS: 534-963

Quantité	Prix HT catalogue	Prix contractuel
10	0,577 €	0,404 €
250	0,42 €	0,294 €
1000	0,404 €	0,283 €
2500	0,372 €	0,26 €
5000	0,333 €	0,233 €

Les prix affichés tiennent compte des accords passés entre nos deux sociétés

En stock pour livraison le prochain jour ouvré, si commandé avant 19h00

Vérifier le stock en temps réel

Commander

Référence fabricant: 1331  
Etat RoHS: RoHS  
Page: 227  
Commentaire produit (0) Ajouter un commentaire

Détail produit | Description gamme produit | Produits similaires | Commentaire produit (0)

Documentation technique

- 1331 Drawing
- 1330\_E

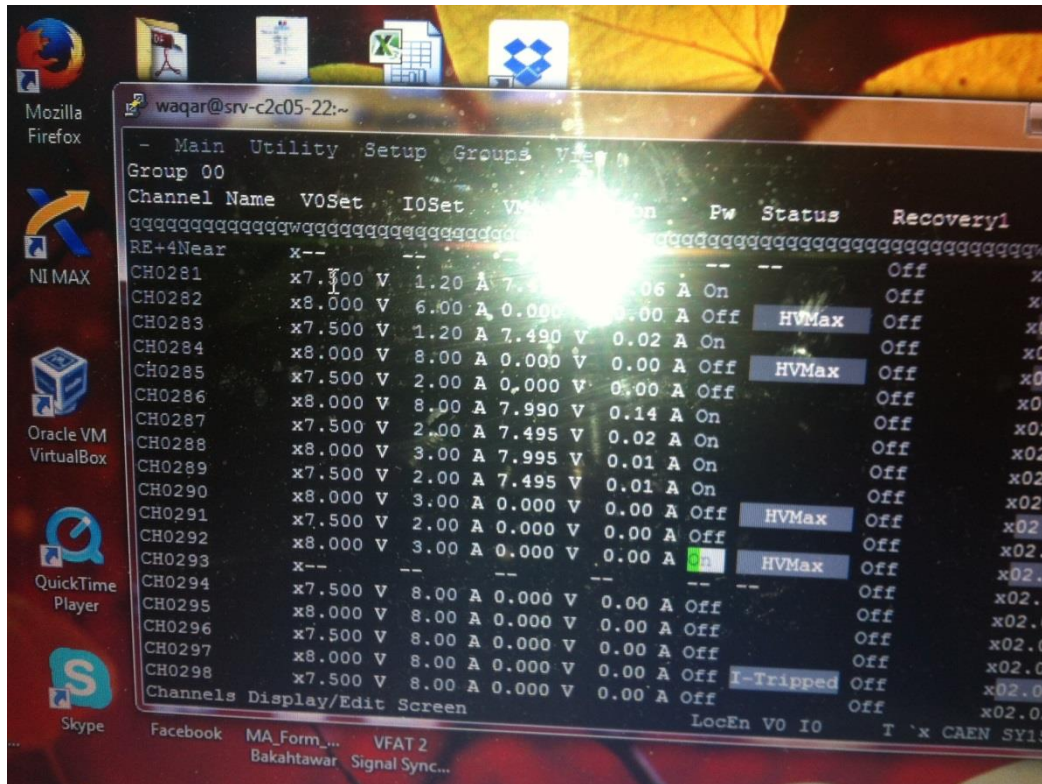
http://radiospares-fr.rs-online.com/web/p/accessoires-de-connecteur-a-de-puissance-a-usage-intensif/05349...

Pin Ref RS 534-963

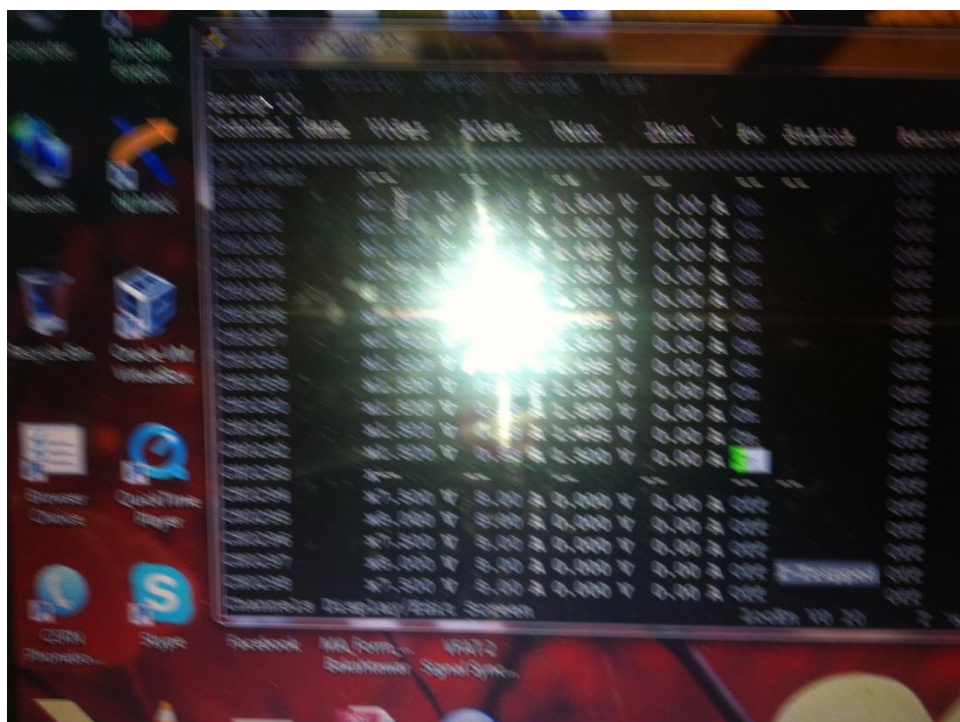
There are many other characteristics to consider when choosing the best pin for the application

### Diagnostics and commissioning practice

Waqar removed all the cables on the near side (X3J51) on 20 Jan 2013 and found that there were many faults on this module. This is after the change of the pins were faults were still reported.



Then he put in a different module and found zero errors.



Clearly the problem comes from the PS and not the few pins that were poorly crimped.

Then he cabled up the same module and found correct values

```
RE+4Near      x--      --      --      --      --      --      Off      x02.0280
CH0281        x7.500 V  8.00 A  7.490 V  0.72 A On      Off      x02.0281
CH0282        x8.000 V  8.00 A  7.995 V  1.57 A On      Off      x02.0282
CH0283        x7.500 V  8.00 A  7.500 V  0.73 A On      Off      x02.0283
CH0284        x8.000 V  8.00 A  7.995 V  1.65 A On      Off      x02.0284
CH0285        x7.500 V  8.00 A  7.505 V  0.73 A On      Off      x02.0285
CH0286        x8.000 V  8.00 A  8.010 V  1.64 A On      Off      x02.0286
CH0287        x7.500 V  8.00 A  7.505 V  0.74 A On      Off      x02.0287
CH0288        x8.000 V  8.00 A  8.010 V  1.66 A On      Off      x02.0288
CH0289        x7.500 V  8.00 A  7.505 V  0.72 A On      Off      x02.0289
CH0290        x8.000 V  8.00 A  8.000 V  1.64 A On      Off      x02.0290
CH0291        x7.500 V  8.00 A  7.505 V  0.72 A On      Off      x02.0291
CH0292        x8.000 V  8.00 A  7.995 V  1.56 A On      Off      x02.0292
CH0293        x--      --      --      --      --      --      Off      x02.0293
CH0294        x7.500 V  8.00 A  0.000 V  0.00 A Off     Off      x02.0294
CH0295        x8.000 V  8.00 A  0.000 V  0.00 A Off     Off      x02.0295
CH0296        x7.500 V  8.00 A  0.000 V  0.00 A Off     Off      x02.0296
CH0297        x8.000 V  8.00 A  0.000 V  0.00 A Off     I-Tripped Off      x02.0297
CH0298        x7.500 V  8.00 A  0.000 V  0.00 A Off     Off      x02.0298
Channels Display/Edit Screen      LocEn V0 I0      T `x CAEN SY1527
```

### Thermal camera

This device should be used to go around after running for “some time” to check for over heating.

### Question

What pin to use for the RE -4 ?

### References

1. Sliding wear and friction of electroplated and clad connector contact materials: effect of surface roughness

M. Antler \*

2. Power Pole producer

<http://www.andersonpower.com/products/singlepole-connectors.html>