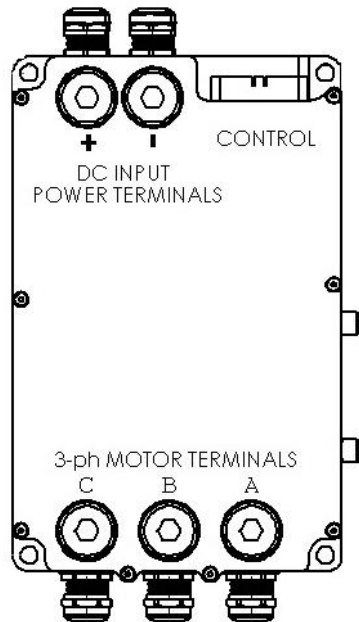


# **PM Family HV Connection Manual**

**Revision 0.5**

## 1. Introduction

The PM Family of inverters have 5 High Voltage Connections (DC+, DC-, Phase A, Phase B, Phase C). Careful attention should be made to how these connections are made.



Above is a picture of the Terminal designations for both the PM100 and PM150. PM 250 designations are machined into the housing.

Cascadia Motion recommends the use of shielded high voltage cable for these connections. The wire size may depend on the particular motor and application; however, we generally recommend the use of 2 AWG / 35 mm<sup>2</sup> for the PM100DX, PM100DZ, and PM150DZ. For the PM150DX, we recommend 2/0 AWG / 70 mm<sup>2</sup> cables. For the PM250DZ, we recommend 2/0 AWG / 70 mm<sup>2</sup> cables.

Minimum and Maximum Wire Sizes by model

| Model                                | Minimum Conductor Size      | Maximum Conductor Size      |
|--------------------------------------|-----------------------------|-----------------------------|
| PM100DX, PM100DXR, PM100DZ, PM100DZR | 4 AWG [25 mm <sup>2</sup> ] | 1 AWG [50 mm <sup>2</sup> ] |
| PM150DZ                              | 4 AWG [25 mm <sup>2</sup> ] | 1 AWG [50 mm <sup>2</sup> ] |

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|                   |                             |                               |
|-------------------|-----------------------------|-------------------------------|
| PM150DX, PM150DZR | 2 AWG [35 mm <sup>2</sup> ] | 3/0 AWG [95 mm <sup>2</sup> ] |
| PM250DZ, PM250DZR | 2 AWG [35 mm <sup>2</sup> ] | 3/0 AWG [95 mm <sup>2</sup> ] |

Minimum and Maximum Outside Diameter of cable by model

| <b>Model</b>                            | <b>Minimum<br/>Cable Outside<br/>Diameter</b> | <b>Maximum<br/>Cable Outside<br/>Diameter</b> |
|---|---|---|
| PM100DX, PM100DXR,<br>PM100DZ, PM100DZR | 9.0 mm  | 16.5 mm                                       |
| PM150DZ                                 | 11.0 mm                                       | 21.0 mm                                       |
| PM150DX, PM150DZR                       | 11.0 mm                                       | 21.0 mm                                       |
| PM250DZ, PM250DZR                       | 11.0 mm                                       | 21.0 mm                                       |

Cascadia Motion recommends the use of:

Champlain Cable Corporation  
175 Hercules Drive  
Colchester, Vermont 05446

Phone: 800.451.5162  
Fax: 802.654.4224  
E-mail: [sales@champcable.com](mailto:sales@champcable.com)

This wire can be purchased directly from Cascadia Motion if desired.

Cascadia Motion generally stocks the following wire sizes:

35 mm<sup>2</sup> / 1000V, part number 81-0078  
50 mm<sup>2</sup> / 1000V, part number 81-0081  
70 mm<sup>2</sup> / 1000V, part number 81-0077

**Important Note:** Not all manufacturers of high voltage cable conform to the exact same size conductor and outside diameter. Please make sure to check the dimensions of the cable.

The inverter uses a cable gland to secure and seal the HV cable to the unit. The cable gland provides several functions, environmental seal, cable strain relief, shield termination. The PM100 units are designed to use a cable gland that has an M25-1.5 thread and does not penetrate more than 8 mm into the unit. The PM150 and PM250 units use a cable gland that has a M32-1.5 thread. The cable gland that is provided with the unit is from:

Lapp Group / Lapp USA  
29 Hanover Road

Florham Park, NJ 07932  
Tel: 973-660-9700  
Fax: 973-660-9330  
SKINTOP® MS-SC-M  
p/n 53112640 (for PM100)  
p/n 53112650 (for PM150/PM250)

It is important to note that these cable glands can easily be damaged when trying to remove the cable. If possible remove the back shell of the cable gland first and insert something into the back of the cable gland to spread the fingers of the cable gland.

A set of cable glands are provided with the inverter. Additional cable glands may be purchased from Cascadia Motion.

Kit of 5 PM100 Cable Glands (p/n G1-0004-01)  
Kit of 5 PM150/PM250 Cable Glands (p/n G1-0005-01)

## 2. Installation Process

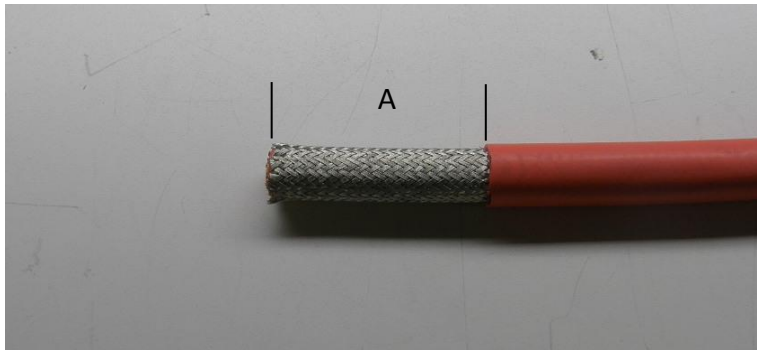
The installation process assumes that the above-mentioned cable gland and wire are being used.

Dimension Reference Table:

| Product      | Dimension <b>[A]</b> | Dimension <b>[B]</b> |
|--------------|----------------------|----------------------|
| PM 100 / 150 | 42 mm                | 17 mm                |
| PM 250       | 52 mm                | 32 mm                |

Step 1:

Strip the outer layer of insulation **[A] mm** from the end.



Step 2:

Apply 2 layers of ½ inch wide Copper tape about **1-2 mm** away from the insulation.



**Step 3:**

Trim the shield away about **1-2 mm** from the Copper tape.

**Step 4:**

Trim the inner layer of insulation **[B] mm** from the end.



**Step 5:**

Place and crimp a ferrule to the inner conductor. A ferrule is absolutely necessary as it will keep the small strands of the wire from breaking off and getting loose inside the inverter. An example ferrule can be found from:

**American Electrical Inc.**

For PM 100/150 (18mm length):

p/n 1218135 for 2AWG/35mm<sup>2</sup>

p/n 1218150 for 1AWG/50mm<sup>2</sup>

Crimper: TRAP8-1



For PM 250 (32mm length):

p/n 1232170 for 2/0 AWG/70mm<sup>2</sup>

p/n 1232195 for 3/0 AWG/95mm<sup>2</sup>

Crimper: VICE70150



All ferrules and crimpers are generally available from Allied Electronics (or other similar distributors).

The PM100 and PM150 require a ferrule with a length of 18mm. The PM250 uses a ferrule with a length of 32mm.

**Step 6:**

Cut two pieces of heatshrink with adhesive, each piece **15mm** long. Place one piece over the outside insulation and approximately 1mm of the copper tape. Place the 2<sup>nd</sup> piece over the inner insulation, end of the ferrule and approximately 1 mm of the copper tape. Shrink the heatshrink into place with a heat gun.

**Step 7:**

Remove the outer cap of the cable gland and slide onto the wire to be installed. Remove the access plug from the PM unit for the wire to be installed. Use a 6mm Allen wrench to make sure that the clamp screws, accessed at the top of the unit, are unscrewed enough that the clamp pieces are fully apart. **DO NOT** remove the screws completely from the clamps. It may be necessary to push down on the screws to get the clamp to open completely. Install the cable gland into the unit. Tighten with a wrench. **Verify** electrical conductivity of cable gland to case using an ohmmeter.



**Step 8:**

Install wire into PM unit by pushing the wire through the cable gland into the PM unit. For the PM 100 and 150, use the view port hole at the top of the unit to verify that the wire ferrule is completely within the clamps, the black heatshrink insulation should be visible. Tighten the clamp screws to an ultimate torque of  $6\text{Nm} \pm 1\text{Nm}$ . Note that the PM250 uses two screws and both should be tightened to the same torque.

**IMPORTANT NOTE:** The clamp system depends on these set screws being tightened properly. If they are not tight, a high resistance connection can damage the unit. After an initial tightening it is good practice to go back and

double check the connections as the copper wire may adjust slightly after the initial tightening.



Step 9:

Tighten cable gland cover until the seal is compressed on to the outer insulation of the cable.



Step 10:

Install the access port plug. Tighten the access plug to 3.0 Nm maximum.



END OF PROCESS

**Revision History**

| <b>Version</b> | <b>Description of Versions / Changes</b>                            | <b>Responsible Party</b> | <b>Date</b> |
|----------------|---|--------------------------|-------------|
| 0.1            | Initial version   | Chris Brune              | 2/2/2011    |
| 0.2            | Corrected the title in the document footer.                         | Azam Khan                | 4/8/2011    |
| 0.3            | Added cable type for PM150 on page 3.                               | Azam Khan                | 2/22/2012   |
| 0.4            | Added updates related to PM150                                      | Chris Brune              | 5/13/2014   |
| 0.5            | Added updates related to PM 250                                     | Ken Edwards              | 1/10/2017   |
| 0.6            | Updated to Cascadia Motion. Updated available wire sizes to metric. | Chris Brune              | 1/2/2020    |