CASCADIA MOTION

7929 SW Burns Way
Suite F
Wilsonville, OR

Phone: 503 344-5085

sales@cascadiamotion.com

RM100 Wiring

Revision 0.5

1. Setup

This document describes details about the HV wiring of the RM100.

The RM100 uses the Amphenol PowerLok™ Single Position 300 Series Connector. A single connector is used for each of the five high voltage power connections.

Front Face of RM100 showing the Amphenol PowerLok™
From left to right, DC+,DC-, Phases U,V,W

Each of the five connectors used has a different key assigned to it. The key prevents the wrong connector from being plugged in. Each of the different key types is assigned a letter (W, Y, V, X, and U). The letters of the keying do not have any association with the function.

Each of the five keying has a color associated with it. The color is useful as a visual indication of which key is being used. However the mechanical nature of the key and only the key can determine whether the plug and receptacle can mate.

Function	Key	Color
DC Positive	W	Red
DC Negative	Y	Black
Motor Phase U	V	Green
Motor Phase V	X	Orange
Motor Phase W	U	Yellow

The connection of Phases U V W to the motor can be important and depends on the motor. However, it is IMPORTANT to note that to maintain the physical order

of the connections in the same way as the PM family of inverters it is necessary to connect the motor connections as follows:

RM Motor Phase	PM Motor Phase
Phase U (V-Key)	C
Phase V (X-Key)	B
Phase W (U-Key)	A

Many of the motor specific manuals will not specifically reference a RM inverter. In these cases the RM motor connections must follow the convention above.

The PowerLok™ series contains a high-voltage interlock (HVIL) connection. The mating plug, when properly inserted, completes the HVIL connection that exists in the receptacle. The HVIL circuit inside the RM100 is daisy-chained between all 5 connectors. The two ends of the daisy chain are brought out to the I/O connector on the front of the RM100. The RM100 does not electrically connect or monitor the HVIL circuit.

The PowerLok™ plug comes in a variety of different configurations. There are different configurations for right angle versus straight connections as well as for different cable sizes. Additionally the plug can come as part of an over-molded cable assembly or as a customer crimped connector with customer supplied cable. Over-molded cable assemblies are generally custom in nature and must be ordered from the Amphenol factory (this can be done through Cascadia Motion if desired).

The PowerLok™ 300 Series plug is available for 4 different wires sizes (35mm^2, 50mm^2, 70mm^2, 95mm^2)

The size of wire that should be used in the application must be determined by the customer. The customer must understand the ambient temperature conditions as well as the amount of current that will be flowing in the conductor. The connection system is intended to be used with shielded cable

Amphenol provides the suggested cable ratings for their power cable based on an ambient temperature of 85°C and being used with the PowerLok™ system. Current ratings are shown below.

Cable Size	Continuous Current (A)	Required Cable O.D. (mm)
35 mm^2	150	14.5 ± 0.5
50 mm^2	200	17.0 ± 0.5
70 mm^2	250	19.5 ± 0.5
95 mm^2	300	n/a

Note that the customer crimped cable receptacle for 95mm^2 size cable is not available at this time.

If the ambient temperature of the application is lower than 85°C it is possible that a higher continuous current rating could be achieved.

The customer crimped plugs require that the cable have a certain outside diameter. This allows the cable to properly seal to the connector. The required outside diameter is shown in the table above. It is important that the cable to be used is checked to make sure that it conforms to the correct outside diameter.

The table below shows the Champlain cables are offered by Cascadia Motion. These are all shielded 1000V / -55° to +150°C cables.

Cable Size	Cascadia Motion P/N	Champlain P/N	Cable O.D. (mm)
35 mm^2	81-0078	15-08172-XXX	14.99
50 mm^2	81-0081	15-08173-XXX	17.09
70 mm^2	81-0077	15-0219-001	19.38

The available plugs are shown in the table below.

Description	Key	Cable Size	Amphenol Part Number	Cascadia Motion Part Number
Straight Plug	X	35mm^2	PL18X-301-35	
Straight Plug	Y	35mm^2	PL18Y-301-35	
Straight Plug	U	35mm^2	PL18U-301-35	
Straight Plug	V	35mm^2	PL18V-301-35	
Straight Plug	W	35mm^2	PL18W-301-35	
Straight Plug	X	50mm^2	PL18X-301-50	86-0280
Straight Plug	Y	50mm^2	PL18Y-301-50	86-0281
Straight Plug	U	50mm^2	PL18U-301-50	86-0277
Straight Plug	V	50mm^2	PL18V-301-50	86-0278
Straight Plug	W	50mm^2	PL18W-301-50	86-0279
Straight Plug	X	70mm^2	PL18X-301-70	86-0192
Straight Plug	Y	70mm^2	PL18Y-301-70	86-0194
Straight Plug	U	70mm^2	PL18U-301-70	86-0252
Straight Plug	V	70mm^2	PL18V-301-70	86-0253
Straight Plug	W	70mm^2	PL18W-301-70	86-0254
Right Angle Plug	X	50mm^2	PL28X-301-50	

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Right Angle Plug	Y	50mm^2	PL28Y-301-50	
Right Angle Plug	U	50mm^2	PL28U-301-50	
Right Angle Plug	V	50mm^2	PL28V-301-50	
Right Angle Plug	W	50mm^2	PL28W-301-50	
Right Angle Plug	X	70mm^2	PL28X-301-70	
Right Angle Plug	Y	70mm^2	PL28Y-301-70	
Right Angle Plug	U	70mm^2	PL28U-301-70	
Right Angle Plug	V	70mm^2	PL28V-301-70	
Right Angle Plug	W	70mm^2	PL28W-301-70	

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Revision History

Version	Description of Versions / Changes	Responsible Party	Date
0.1	Initial version	Chris Brune	6/30/2017
0.2	Correct Phase A,B,C to read U,V,W	Chris Brune	8/29/2017
0.3	Updated footer	Chris Brune	10/4/2017
0.4	Updated wire information and RMS p/n for connectors. Added note about RM versus PM connections.	Chris Brune	8/9/2018
0.5	Updated to Cascadia Motion. Clarified some language about phase versus key designations.	Chris Brune	5/12/2021