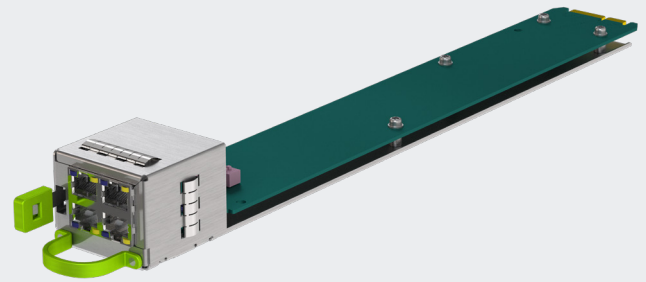


ARTESYN Open Rack V3 HPR PMI

ORv3 Power Monitoring Interface (PMI) Module



Advanced Energy's Artesyn™ PMI is an extension module, which brings MODBUS of the PSU directly out for upstream communication. PMI sits on Open Rack V3 Power Shelves. On one end, it has communication with the PSU – through sliver straddle connector. On the other end, interacts with centralized system through the use of RJ45 connectors.

AT A GLANCE

Typical Application

Open Compute Project

Input Connector

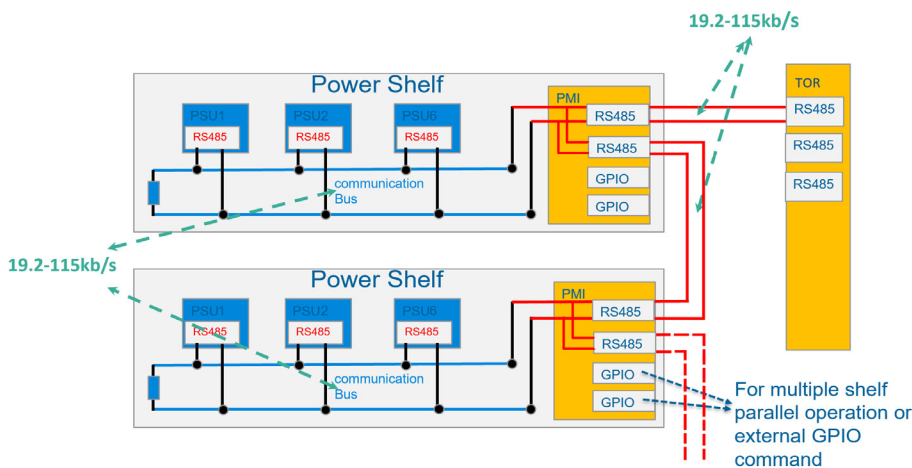
Edge Connector

Output Connector

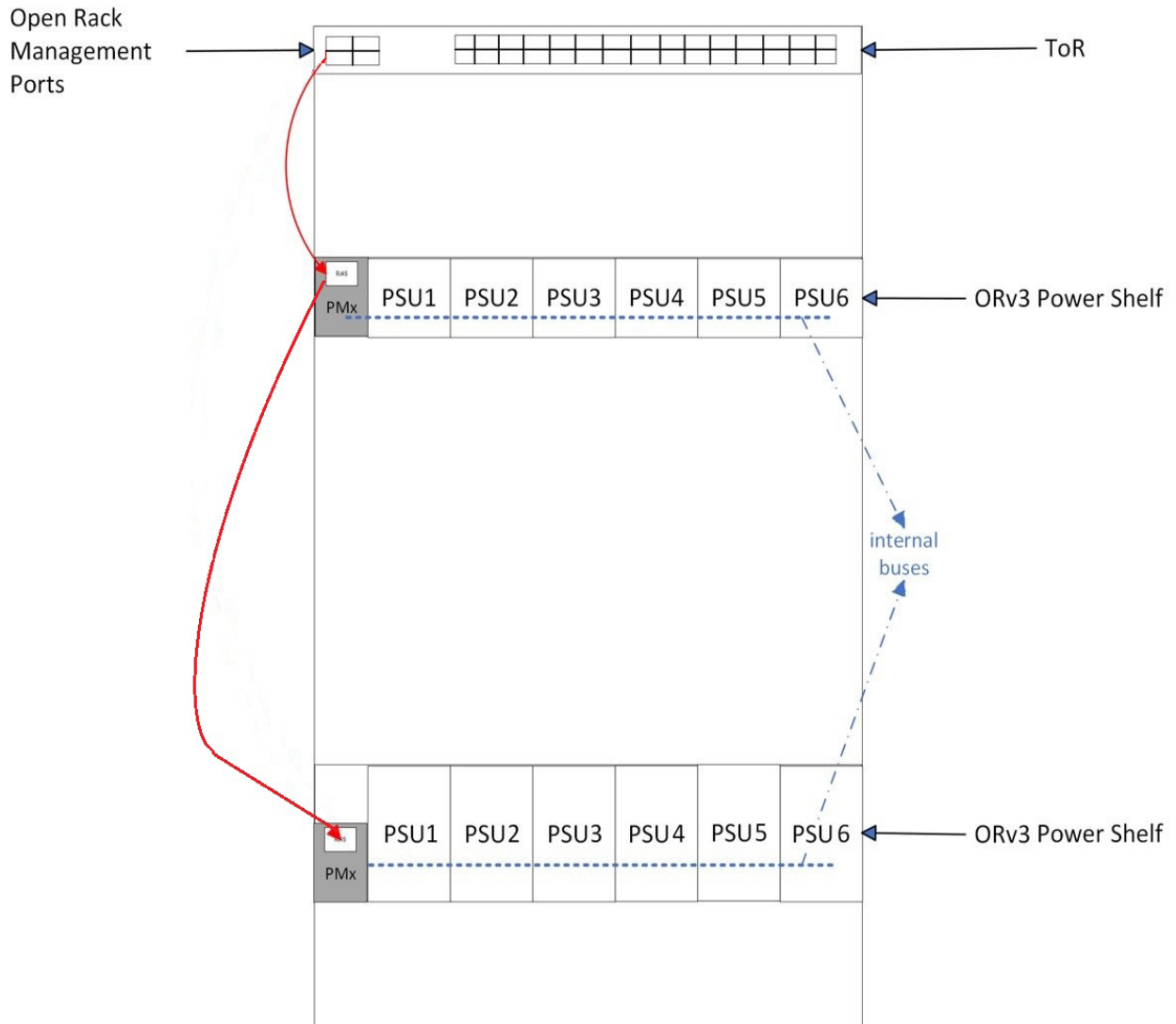
4 x RJ45 Connector

Communication Protocol

MODBUS



OVERVIEW



ELECTRICAL SPECIFICATIONS

4 x RJ45 Connectors

The PMI contains four RJ45 connectors located on the bulkhead of the assembly. The pinouts of the four connectors are shown below. The RJ45 location is defined in the mechanical section.

Looking from the front, top left RJ45 is #1, top right is #2, bottom left is #3, bottom right is #4.

RJ45 #1			RJ45 #2		
Pin	Wire Color	Function	Pin	Wire Color	Function
1	White/Orange	GND	1	White/Orange	GND
2	Orange	PLS	2	Orange	PLS
3	White/Green	CLS	3	White/Green	CLS
4	Blue	RS485A	4	Blue	RS485A
5	White/Blue	RS485B	5	White/Blue	RS485B
6	Green	RS485_Addr2	6	Green	RS485_Addr2
7	White/Brown	RS485_Addr1	7	White/Brown	RS485_Addr1
8	Brown	RS485_Addr0	8	Brown	RS485_Addr0

RJ45 #3			RJ45 #4		
Pin	Wire Color	Function	Pin	Wire Color	Function
1	White/Orange	ISHARE	1	White/Orange	ISHARE
2	Orange	GND	2	Orange	GND
3	White/Green	SYNC_START_L	3	White/Green	SYNC_START_L
4	Blue	CAN_H ¹	4	Blue	CAN_H ¹
5	White/Blue	CAN_L ¹	5	White/Blue	CAN_L ¹
6	Green	SYNC_STOP_L	6	Green	SYNC_STOP_L
7	White/Brown	SOH_L	7	White/Brown	SOH_L
8	Brown	Missing_Daisy_Chain_Cable	8	Brown	GND

Note 1 - Not used for power shelf applications (only for BBU shelves).

ELECTRICAL SPECIFICATIONS

Edge Connector

There are several signals on the edge connector. The following signals have no use-case currently, for future expansions - A6, B6, A7, B7, A8, B8, B12, A13, B13, A14, B14, A15, B16, B19, A20, B20, A21, B21, A22, B22, A23, B23, A24, B24, A25, B34, A35, B35, A36, B36, A37, B37, A39, B39.

All other signals are routed in the power shelf backplanes.

Pin #	Signal Name	I/O	Description
A1	ADDR_ID_0	I	Shelf ID: 000 1U power shelf
B1	ADDR_ID_1	I	
A2	ADDR_ID_2	I	
B2	GND	I	Ground
A3	ALERT_0_N	I	PSU alert
B3	ALERT_1_N	I	PSU alert
A4	ALERT_2_N	I	PSU alert
B4	ALERT_3_N	I	PSU alert
A5	ALERT_4_N	I	PSU alert
B5	ALERT_5_N	I	PSU alert
A6	ALERT_6_N	I	PSU alert
B6	ALERT_7_N	I	PSU alert
A7	ALERT_8_N	I	PSU alert
B7	ALERT_9_N	I	PSU alert
A8	ALERT_10_N	I	PSU alert
B8	ALERT_11_N	I	PSU alert
A9	GND	I	Ground
B9	RESET_0	O	PSU reset
A10	RESET_1	O	PSU reset
B10	RESET_2	O	PSU reset
A11	RESET_3	O	PSU reset
B11	RESET_4	O	PSU reset
A12	RESET_5	O	PSU reset
B12	RESET_6	O	PSU reset
A13	RESET_7	O	PSU reset
B13	RESET_8	O	PSU reset
A14	RESET_9	O	PSU reset
B14	RESET_10	O	PSU reset
A15	RESET_11	O	PSU reset
B15	GND	I	Ground
A16	PLS	I	PSU power loss siren
B16	BKP	I	PSU BKP
A17	RS485_Addr0	O	PSU MODBUS address
B17	RS485_Addr1	O	PSU MODBUS address
A18	RS485_Addr2	O	PSU MODBUS address
B18	RS485A	I/O	Shared PSU MODBUS

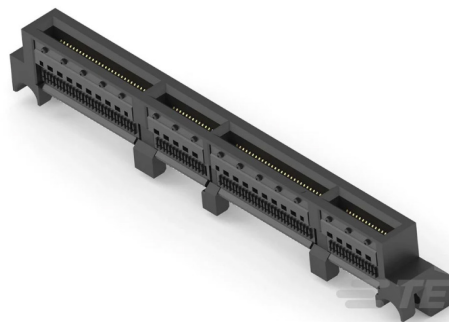
Pin #	Signal Name	I/O	Description
A19	RS485B	I/O	Shared PSU MODBUS
B19	I2C_SDA_0	I/O	PSU #0 PMBUS
A20	I2C_CLK_0	I/O	PSU #0 PMBUS
B20	I2C_SDA_1	I/O	PSU #1 PMBUS
A21	I2C_CLK_1	I/O	PSU #1 PMBUS
B21	I2C_SDA_2	I/O	PSU #2 PMBUS
A22	I2C_CLK_2	I/O	PSU #2 PMBUS
B22	I2C_SDA_3	I/O	PSU #3 PMBUS
A23	I2C_CLK_3	I/O	PSU #3 PMBUS
B23	I2C_SDA_4	I/O	PSU #4 PMBUS
A24	I2C_CLK_4	I/O	PSU #4 PMBUS
B24	I2C_SDA_5	I/O	PSU #5 PMBUS
A25	I2C_CLK_5	I/O	PSU #5 PMBUS
B25	I2C_SDA_shelf	I/O	I2C for shelf temp and FRU
A26	I2C_CLK_shelf	O	I2C for shelf temp and FRU
B26	Shelf_Addr3	I/O	Add one bit to the PSU shelf address
A27	GPIO3	I/O	PRESENT_L for slot 1, pull high through 4.7k ohm
B27	GPIO4	I/O	PRESENT_L for slot 2, pull high through 4.7k ohm
A28	GPIO5	I/O	PRESENT_L for slot 3, pull high through 4.7k ohm
B28	GPIO6	I/O	PRESENT_L for slot 4, pull high through 4.7k ohm
A29	GPIO7	I/O	PRESENT_L for slot 5, pull high through 4.7k ohm
B29	GPIO8	I/O	PRESENT_L for slot 6, pull high through 4.7k ohm
A30	CAN_H ¹	I/O	-
B30	CAN_L ¹	I/O	-
A31	SYNC_STOP_L	I/O	-
B31	GND	O	Ground
A32	ISHARE	A	PSU current sharing
B32	SYNC_START_L	I/O	PSU sync start
A33	-	O	-
B33	P3V3_shelf	O	3.3 V for shelf I2C
A34	GND	O	Ground

Note 1 - Not used for power shelf applications (only for BBU shelves).

ELECTRICAL SPECIFICATIONS

Edge Connector

Pin #	Signal Name	I/O	Description
B34	ADC0	A	
A35	ADC1	A	
B35	ADC2	A	
A36	ADC3	A	
B36	ADC4	A	
A37	ADC5	A	
B37	ADC6	A	
A38	Shelf_EEPROM_WP (ADC7)	A	Shelf EEPROM write protection
B38	Power_KILL	I	Power Kill, short pin Connect to 2.5 V via 1k ohm resistor DNI; Connect to GND via 1k ohm on shelf.
A39	RSVD	-	Reserved
B39	RSVD	-	Reserved
A40	P48V_RTN (GND)	I	Ground
B40	P48V_RTN (GND)	I	Ground
A41	NC (clearance)	-	No Connect
B41	NC (clearance)	-	No Connect
A42	P48V_IN	I	48 V Power In
B42	P48V_IN	I	48 V Power In



ELECTRICAL SPECIFICATIONS

Shelf Address and RS485/CAN¹ Termination Select Switches

Two sets of small signal DIP switches have been added for the purposes of:

- 1) Selecting the Modbus address of the shelf based on its position upon installation;
- 2) Selecting the RS485/CAN¹ termination resistor based on shelf position.

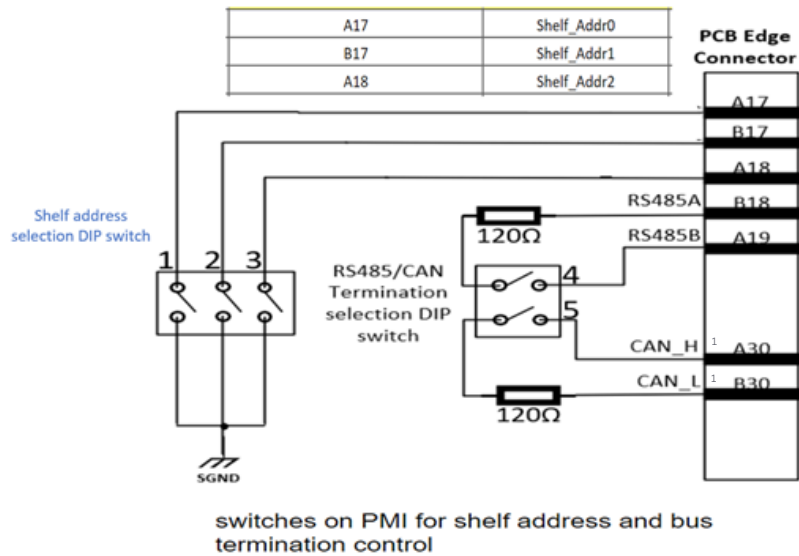
The shelf address signals Shelf_addr<2:0> are not connecting to the front panel. Each of Shelf_addr<2:0> are pulled high to 3.3 V through 100k ohm.

The shelf RS485 address is determined by the settings of SW1-3, following the table below:

PMI	psu 1	psu 2	psu 3	psu 4	psu 5	psu 6
ON	F8	F9	FA	FB	FC	FD
ON	D8	D9	DA	DB	DC	DD
ON	E8	E9	EA	EB	EC	ED
ON	C8	C9	CA	CB	CC	CD
ON	F0	F1	F2	F3	F4	F5
ON	D0	D1	D2	D3	D4	D5
ON	E0	E1	E2	E3	E4	E5
ON	C0	C1	C2	C3	C4	C5

The RS485/CAN¹ termination is determined by the settings of SW4-5, following the table below:

Shelf Position (from the top) #	SW4 (RS485)	SW5 (CAN ¹)
First Shelf (for multi-shelves only)	Open (as default)	Open (as default)
Last Shelf (including single shelf)	Close	Close

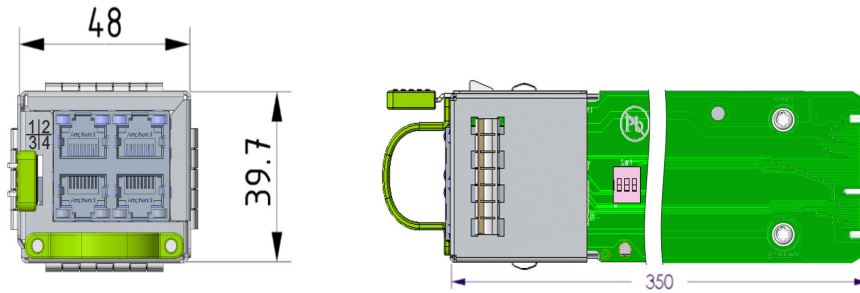


Note 1 - Not used for power shelf applications (only for BBU shelves).

MECHANICAL SPECIFICATIONS

PMI Physical Dimensions

The PMI is 39.7 mm x 48 mm x 350 mm [Width x Height x Depth].



Construction

The PMI base can be welded, riveted, or screwed together, consistent with meeting shock and vibration requirements. There are no sharp corners or edges.

The sheet metal material is pre-plated hot-dip zinc coated, with 0.8 to 1.0 mm of thickness.

Latch and Handle Requirements

A latch and handle are required for PMI removal and installation. The latch is attached in the location shown on the mechanical drawing, to interface with the cutout in the chassis. The latch design may vary, but the finger interface of the latch must be Pantone 375C (Green).

The handle is to be designed so it does not interfere with the removal and insertion of cables into the RJ45 connectors. Handle touch points are to be Pantone 375C (Green).

EMI Gaskets

EMI gaskets are to be placed on the left & right and/or top & bottom sides of the PMI. The main purpose of the gaskets is for PMI module to shelf grounding and secondary purpose is for EMI containment. Gaskets are to be placed towards the front of the PMI so they make full contact with the walls of the shelf.

Labeling and Markings

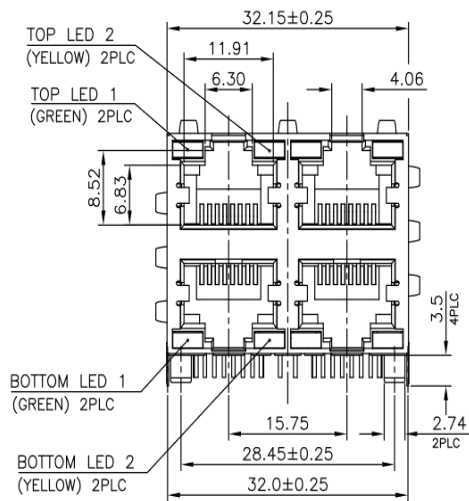
Markings are placed on the front of the PMI module to indicate RJ45 connector positions. Preferred method is silk screening/pad printing.



MECHANICAL SPECIFICATIONS

RJ45 Connector

In the front of the PMI, there is a single 4x RJ45 connector. This is a modular jack connector in a 2x2 configuration of RJ45s with LEDs. The MPN is TE 2041376-2, Amphenol RJSAE-J384-04 or equivalent. Note that this connector comes with spring fingers. These must contact the PMI chassis in order to provide sufficient EMI sealing.



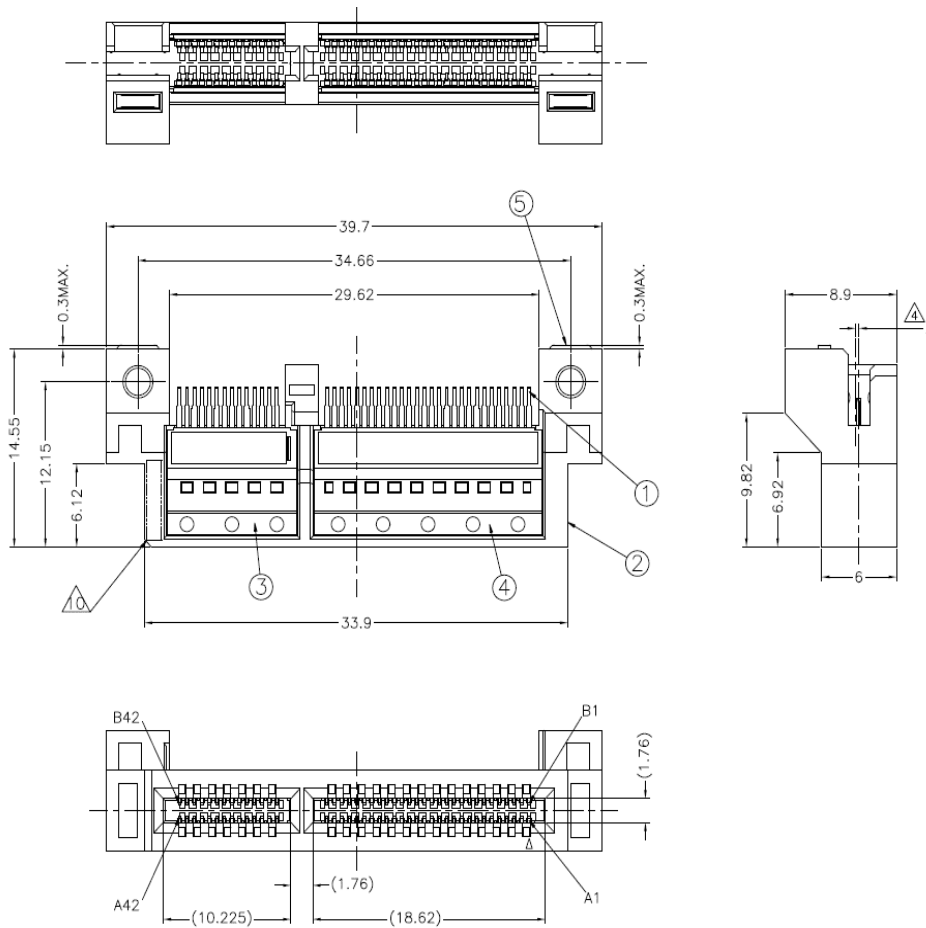
MECHANICAL SPECIFICATIONS

Blind Mate Connector

The PCB (card edge) of the PMI module blind mates into a 2C connector on the shelf side. The location of this connector is fixed, but the connector itself may either be mounted on a PCB or a panel-mounted cable. There are no specific requirements for the interface of this blind mate connector to the main shelf PCB. Please refer to the ORV3 Power Shelf specification for more details on this.

Approved connectors are:

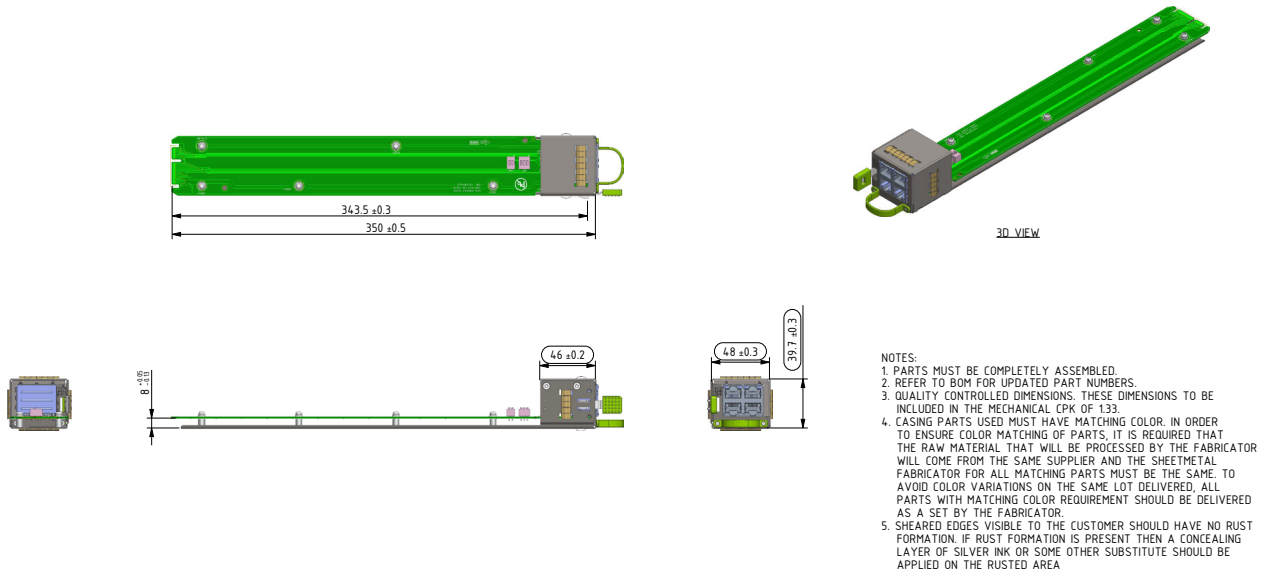
- TE Sliver 2340326-01
- Amphenol Mini Cool Edge ME1008413401101
- Molex Edgeline Sliver 2086104157



MECHANICAL SPECIFICATIONS

Mechanical Drawings

All dimensions are in mm.



ORDERING INFORMATION

Model	Description
700-037149-0100	Standard ORV3 HPR Power Monitoring Interface

ENVIRONMENTAL SPECIFICATIONS

Safety Standards

Power Monitoring Interface (PMI) is tested together in the OCP power shelf and comply with all safety requirements specified in OCP Open Rack V3 Power shelf.

Any component or signal that controls charging and discharging battery is evaluated under single fault condition per UL62368-1 Annex M.

EMC Requirements

Power Monitoring Interface (PMI) is tested together in the OCP power shelf and comply with all EMC requirements specified in OCP Open Rack V3 Power shelf document.

Environmental Compliance

Manufacturer of PMI provides full material disclosure, and technical documentations to demonstrate compliance to environmental compliance requirements such as ROHS, REACH, WEEE etc, depending on the end user's goals and business need.

Documentation

Power Monitoring Interface (PMI) is covered under all documents specified in OCP Open Rack V3 Power shelf document.

Operating Temperature

Power Monitoring Interface (PMI) will operate within stated specifications at cold aisle (inlet) temperature from -5°C to 45°C.

Altitude

Power Monitoring Interface (PMI) will operate within specifications at altitudes up to 3050m (10,000 ft) above sea level.

Humidity

Power Monitoring Interface (PMI) will operate within specifications when subjected to a relative humidity from 10% to 90% non-condensing.

Vibration and Shock (non-packaged)

The PMI meets vibration and shock test per EN 60068-2-6 and 60068-2-27 respectively and is to be performed at system shelf level (i.e. power shelf installed with PSUs and PMI module).

Package Vibration, Drop and Compression

PMI in their package meet the following requirements:

Package Vibration	1.146 G _{rms} , 2-200-2 Hz, all three axes, random vibrate	ISTA 3E 06-06
Package Drop	8-inch drop	ISTA 3E 06-06
Package Compression	Maximum compression loading on a bulk pack	ASTM D 642-94

Operational Thermal Requirements

Reserving adequate margins on components is critical. These margins should be defined with respect to de-rated values, as appropriate.

Component thermal margin of ≥7% or ≥5°C up to 30°C inlet/ambient and 3050 m (10,000 ft) above sea-level. Target whichever value is larger.

Component thermal margin of ≥4% or ≥3°C at greater than 30°C inlet/ambient and up to 3050 m (10,000 ft) above sea-level. Target whichever value is larger.

Margin to de-rated temperatures should account for associated differences in reading and measurement location. Impact to reliability should also be considered when determining required margin.



For international contact information,
visit advancedenergy.com.

powersales@aei.com (Sales Support)
productsupport.ep@aei.com (Technical Support)
+1 888 412 7832

ABOUT ADVANCED ENERGY

Advanced Energy (AE) has devoted more than four decades to perfecting power for its global customers. AE designs and manufactures highly engineered, precision power conversion, measurement and control solutions for mission-critical applications and processes.

Our products enable customer innovation in complex applications for a wide range of industries including semiconductor equipment, industrial, manufacturing, telecommunications, data center computing, and medical. With deep applications know-how and responsive service and support across the globe, we build collaborative partnerships to meet rapid technological developments, propel growth for our customers, and innovate the future of power.

PRECISION | POWER | PERFORMANCE | TRUST

Specifications are subject to change without notice. Not responsible for errors or omissions. ©2025 Advanced Energy Industries, Inc. All rights reserved. Advanced Energy®, AE® and Artesyn™ are U.S. trademarks of Advanced Energy Industries, Inc.