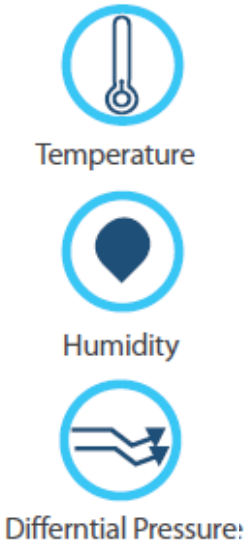
Environmental Monitor V3 Installation Manual



⚠ CAUTION

- ❑ Read all instructions carefully prior to installation.
- ❑ No field-serviceable parts. Do not attempt to disassemble the product.
- ❑ Store in a clean, dry location. Clean with a dry cloth.
- ❑ Intended for indoor use only, do not install in a wet location.
- ❑ Adhere to all local electrical codes and guidelines.
- ❑ Failure to use the product in the specified manner may lead to injury or death and damage to equipment.

REGULATORY INFORMATION

This product has been certified to meet the following requirements:

- UL / ANSI standards 61010-1,Second Edition, Dated July 12, 2004 with revisions through and including October 28, 2008
- CAN/CSA-C22.2 No. 61010-1, second edition, including Amendment 1, or a later version of the same standard incorporating the same level of testing requirements.
- Council Directive 2006/95/EC (December 12, 2006) on Low Voltage Equipment Safety; IEC 61010-1:2001 (Second Edition) and EN 61010-1:2001 (Second Edition)
- Council Directive 1999/05/EC - European Union (EU) Radio & Telecommunications Terminal Equipment Directive (R&TTE) ETSI EN 300 220-2, Issued:2006/04/01 and ETSI EN 301 489-3, Issued:2002/08/01 V1.4.1
- Council Directive 2004/108/EC (December 15, 2004) on Electromagnetic Compatibility CENELEC EN 61326-1 Issued:2006/05/01; IEC 61326-1:2005;:1997 –
- AS/NZS 4268: 2008

The products variously carry the cULus, ETL, IC, FCC and CE marks and are also eligible to carry the ICASA mark.

Class B Device Statement / FCC Regulations:

Section 15.105(a) of the FCC Rules: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications.

Section 15.19 of the FCC Rules: This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Pursuant to Part 15.21 of the FCC Rules, any changes or modifications to this product not expressly approved by Packet Power LLC might cause harmful interference and void the FCC authorization to operate this product.

Pursuant to part 2.1091c of the FCC rules device is categorically excluded from routine RF Exposure regulations.

Industry Canada (IC) Compliance Statement

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) This device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Per section RSS-102, 2.5 of Industry Canada regulations, this device is categorically excluded from Routine Evaluation Limits.

Industrie Canada (IC) Déclaration de conformité

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance iposotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

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OVERVIEW

The Packet Power Environmental Monitor provides an easy to-implement wireless environmental monitoring solution. Each monitor will accommodate six to twelve external temperature or dry contact inputs and also may have humidity or differential pressure sensing (see model references in the chart below).

ENVIRONMENTAL MONITOR V3 MODELS

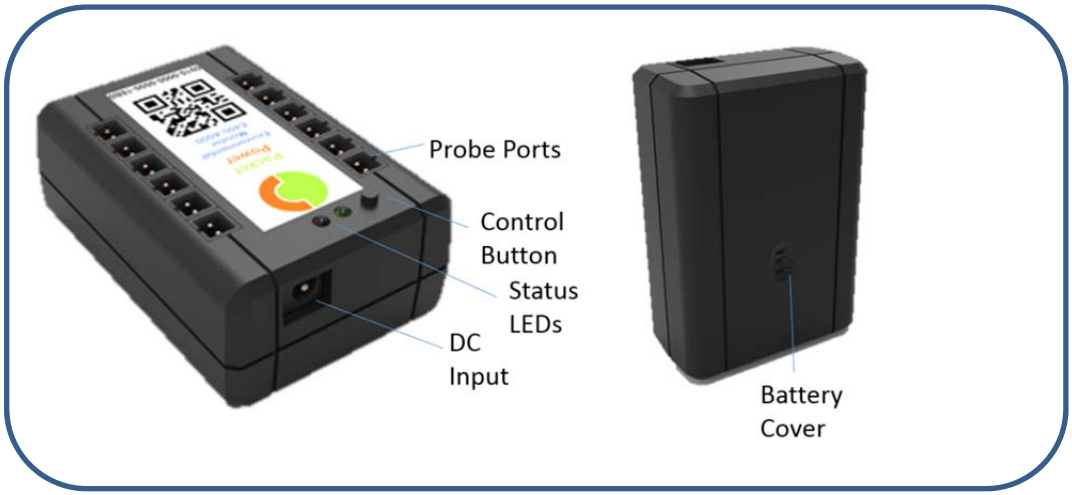
Model	Max. Probes	Relative Humidity	Differential Pressure	AC Power	Battery Power	Mounting Bracket
E306-0000	6	N	N	Y	N	Optional
E306-H000	6	N	N	Y	N	Optional
E306-P000	6	Y	Y	Y	N	Optional
E312-0000	12	N	N	Optional	Y	Y
E312-H000	12	Y	N	Optional	Y	Y

[1]**INTERNAL TEMPERATURE PROBE**: The monitor includes an internal temperature sensor located inside the monitor. This is not intended to provide an accurate ambient temperature but rather a reference temperature that may be slightly higher than the ambient temperature.

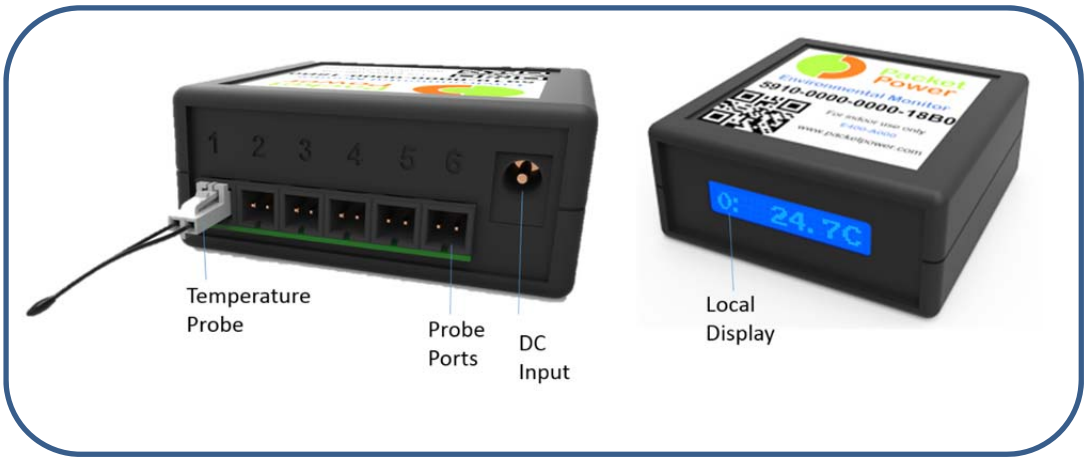
E306-0000	E306-P000	E312-H000	Temp. Probes

DEVICE INSTALLATION

Depending on the model of environmental monitor, you will have either six or 12 available probe ports for temperature probes or dry contact sensors (probes are universal). It is suggested that you label probes to assist in identification of the placement if probes are not provided pre-labelled. Probes supplied in kits will be pre-labelled.



E312 Monitor

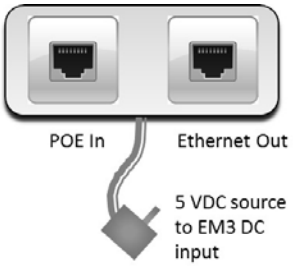


E306 Monitor

POWER SUPPLIES: The six channel models requires a 5VDC source which can be provided from the universal power supply containing plug types for most regions which is included with the device. A 5 VDC Power over Ethernet (PoE) source can also be used.

The 12 channel battery models require 2 x AA batteries which will provide a greater than two year battery life under typical applications. This model can also be supplied with 5 VDC directly from an AC source.

USING A POE (POWER OVER ETHERNET) SOURCE: The E306 and E312 and the Gateway module can be powered by a PoE source using a standard PoE splitter. The PoE source should have a 5VDC output (not 12 VDC). The monitor and Gateway consume 0.5W and 0.7W respectively making it ideal for PoE applications.

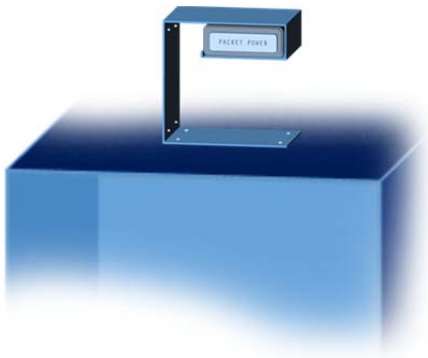


PoE Splitter

DEVICE PLACEMENT

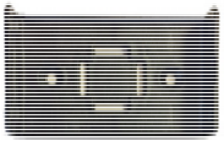
DEVICE PLACEMENT

- Do not locate the monitoring node inside of a fully enclosed metal structure
- Keep at least 2-4” (5-10 cm) away from metallic surfaces.
- Use the mounting bracket (PN: MOUNT-EGEM) to facilitate optimal mounting for the E306 Module to keep away from metal surfaces like the top of server cabinets.



E306 Mounting Bracket (PN MOUNT EGEM)

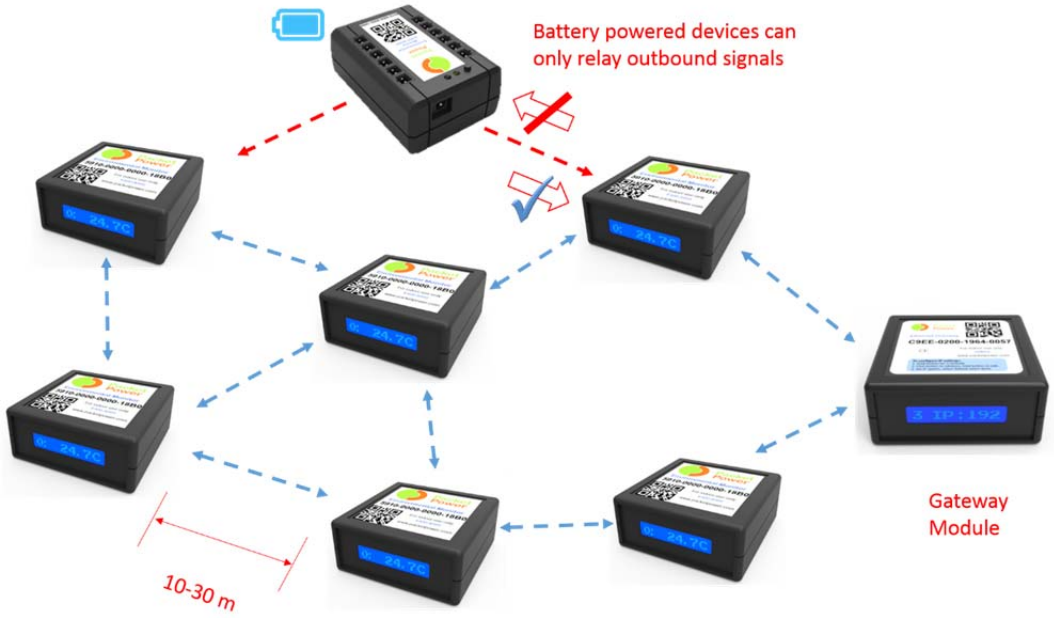
- The E312 module includes another mounting bracket (shown below) that can be fastened with tie wraps, adhesive tabs or screws. Use the same precautions when mounting this device.



E312 Mounting Bracket

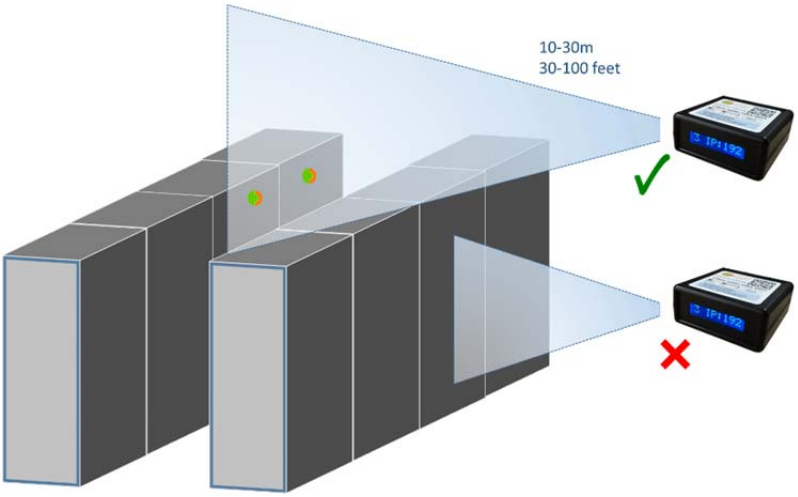
NODE SPACING AND RELAY FUNCTION: The monitoring nodes must be within 10 to 30 meters (30-100 feet) of another monitoring node or the Gateway device. The signal will be relayed through adjacent nodes to form the best possible radio path.

Note that when operating on battery power, the E312 device can only transmit through nodes that are AC powered. On battery power nodes cannot relay signals received from other nodes.



Packet Power Mesh Network

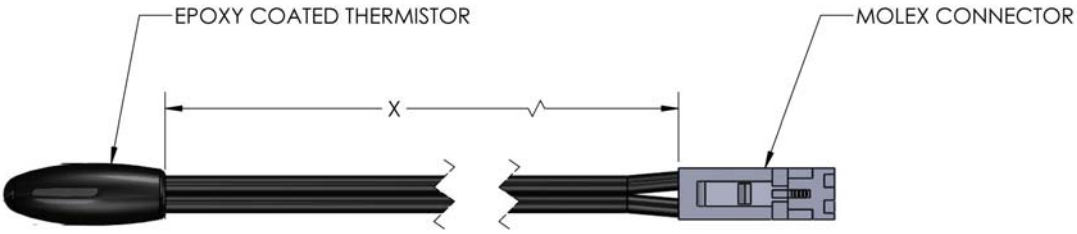
- Always mount monitors at the highest point that allows an unobstructed path to another monitoring node or Gateway.



TEMPERATURE PROBES

TEMPERATURE PROBES: Each monitor can accommodate up to six or twelve external temperature probes. Temperature probes consist of a small epoxy-coated thermistor at the end of a light gauge wire. Each probe wire has a plug in connector that can be inserted into any of the probe receptacles.

Probes are also available as kits that allow one monitoring device to monitor the temperature at from one to six server cabinets. As rack sizes and configurations and probe placement will vary on specific installation consult the "PROBE LENGTH CONFIGURATION CHART" for suggested placement.



AVAILABLE PROBE LENGTHS: Probes are available in 1 to 4 meter lengths. If a longer probe lead length is required extension cables can be added to the probe to accommodate the required length.

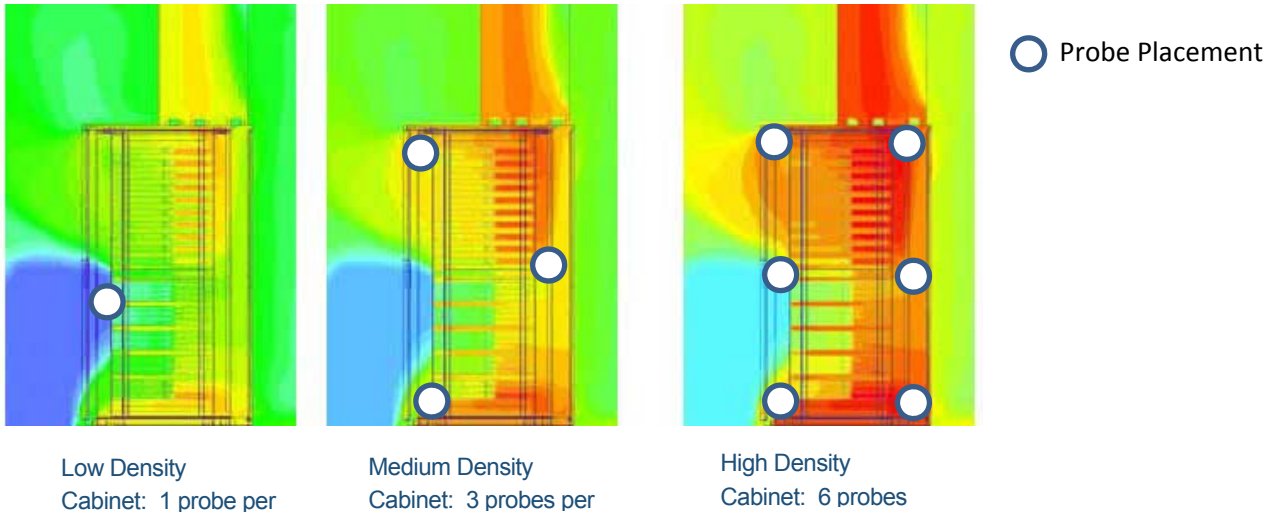
TEMPERATURE PROBES

Model	Length (meters)
TPP3-001M	**1 m**
TPP3-002M	**2 m**
TPP3-003M	**3 m**
TPP3-004M	**4 m**

EXTENSION CABLES

Model	Length (meters)
TPP3-X02M	**2 m**
TPP3-X04M	**4 m**
TPP3-X09M	**9 m**

TEMPERATURE PROBE PLACEMENT: Ideal temperature placement is a function of rack type, appliance type, air flow and specific appliance location and density. As a general rule temperature probes are placed on the intake (cool) or front side of the rack. This is to monitor the temperature of the input air flow. The input air is monitored as it can be controlled where by the output or rear air flow is a function of the device heat generation and input air temperature and flow. In high density applications, it is recommended to monitor both the input (front) and output (rear) air flow. This allows for identification of "hot spots" that may indicate devices are operating in excess of their thermal ratings.



The above diagram illustrates suggested probe placement depending on the thermal density of the cabinet.

DETERMING PROBE LENGTH: The chart below (PROBE LENGTH CONFIGURATION CHART) lists the cable lengths required for a typical 42-48 RU rack. Lengths are listed by placement locations (i.e. top 1/3, middle 1/3 or bottom third sections of the rack). Probes can be purchased individually or as kit sets for monitoring one to six racks per monitor.

The highlighted numbers in each section denote the probe lengths included with the probe kits. Probe kits provide the six probes needed for monitoring one to six cabinets.

Typical cable routing is along the inside perimeter of the rack with the cable secured using wire ties or adhesive cable tabs**.** It is assumed that the monitor will be located on the outside top section of the center of the roof of the rack.

PROBE LENGTH CONFIGURATION CHART

Number of Racks per Monitor	Cabinet	Probe Placement (section of cabinet) and Length (m)			Monitor Location
		Top	Middle	Bottom	
1	1 (Front)	2m	2m	3m	x
	1 (Back)	2m	2m	3m	x
2	1	2m	2m	3m	x
	2	2m	3m	4m	x
3	1	2m	3m	4m	
	2	2m	2m	3m	x
	3	2m	3m	4m	
4	1	2m	3m	4m	
	2	2m	2m	3m	x
	3	2m	3m	4m	x
	4	3m	4m	4m	
5	1	3m	4m	4m	
	2	2m	3m	4m	
	3	2m	2m	3m	x
	4	2m	3m	4m	
	5	3m	4m	4m	
6	1	3m	4m	4m	
	2	2m	3m	4m	
	3	2m	2m	3m	x
	4	2m	3m	4m	x
	5	3m	4m	4m	
	6	3m	4m	5m	

Probes included in the kit.

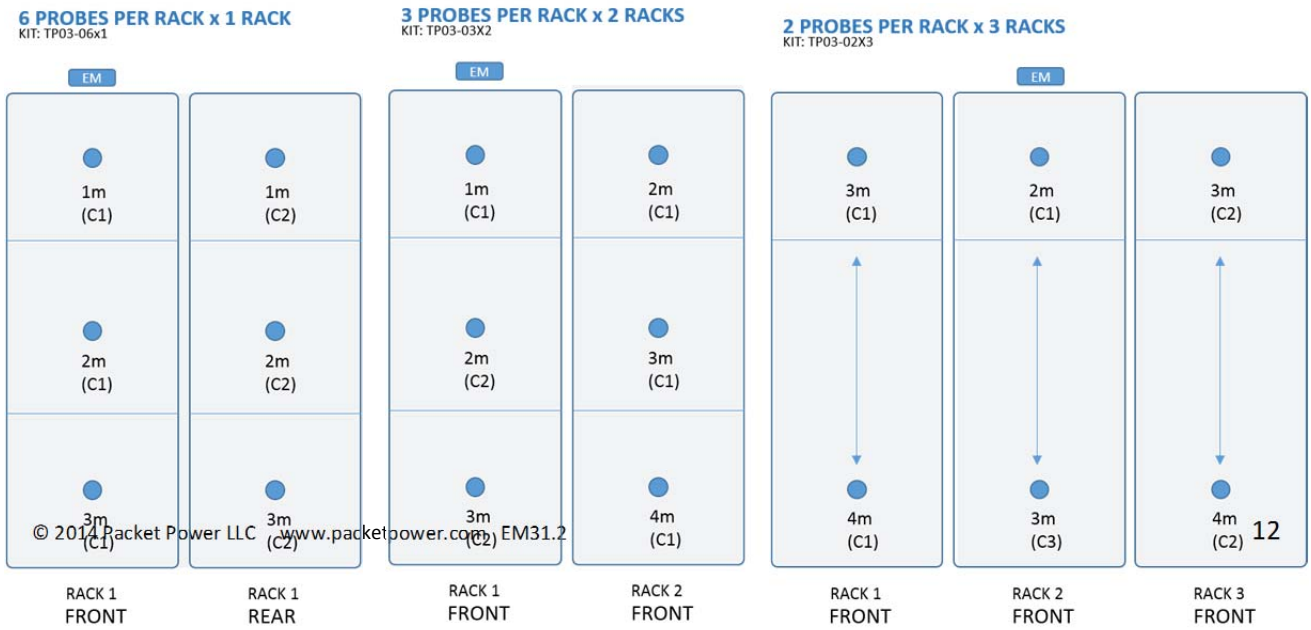
TEMPERATURE PROBE KITS

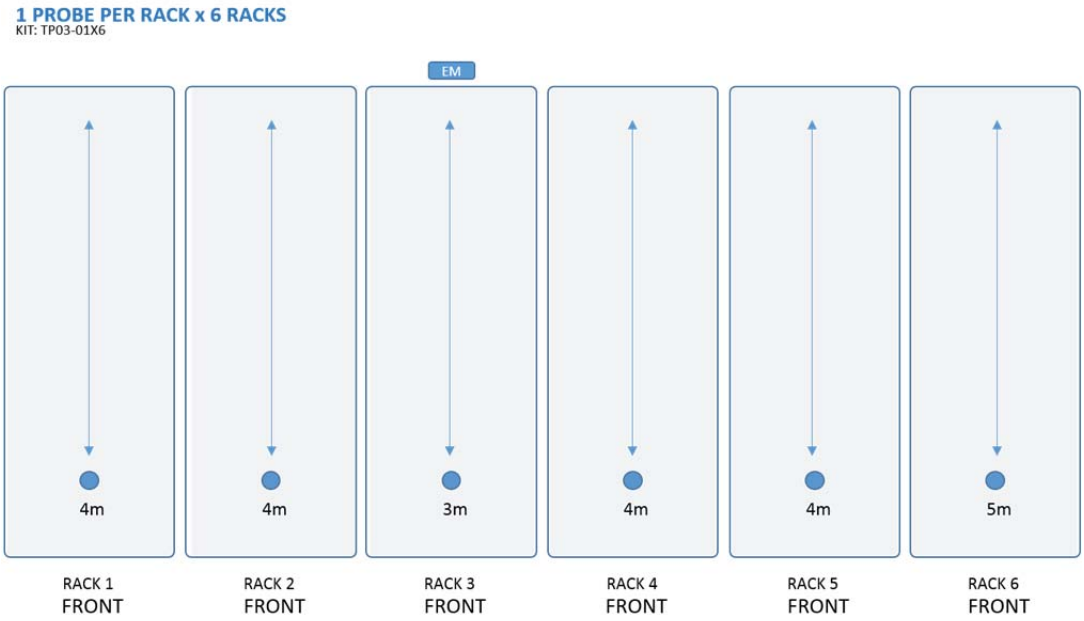
Temperature probes kits are preconfigured to provide the specific probe lengths required for monitoring one to six racks with between one and six probes per rack. Probes are labelled to indicate their length and location. Consult the diagrams below for your specific cabinet.

TEMPERATURE PROBE KITS

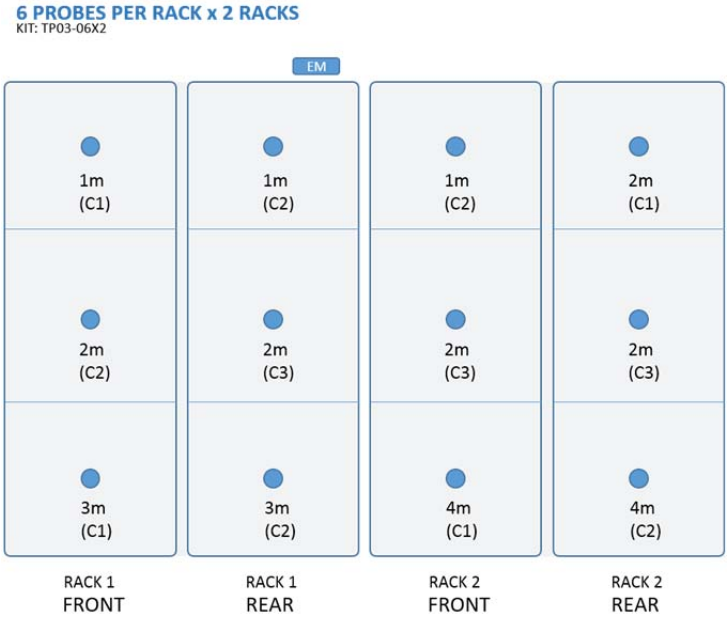
Model	Probes per Rack	Racks per Monitor	Total Probes	Probe Lengths	Use with Monitor
TP03-01X6	1	6	6	1x 3m, 4x 4m, 1x 5m	E306
TP03-02X3	2	3	6	1x 2m, 3x 3m, 2 x 4m	E306
TP03-03X2	3	2	6	1x 1m, 2x 2m, 2x 3m, 1x 4m	E306
TP03-06x1	6	1	6	2x 1m, 2x 2m, 2x 3m	E306
TP03-06X2	6	2	12	2x 1m, 5x 2m, 3x 3m, 2x 4m	E312
TP03-04X3	4	3	12	2x 1m, 4x 2m, 2x 3m, 4x 4m	E312
TP03-03X4	3	4	12	1x 1m, 3x 2m, 4x 3m, 4x 4m	E312
TP03-02X6	2	6	12	1x 1m, 2x 2m, 4x 3m, 5x 4m	E312

6 Probe Kits (E306 Monitor)

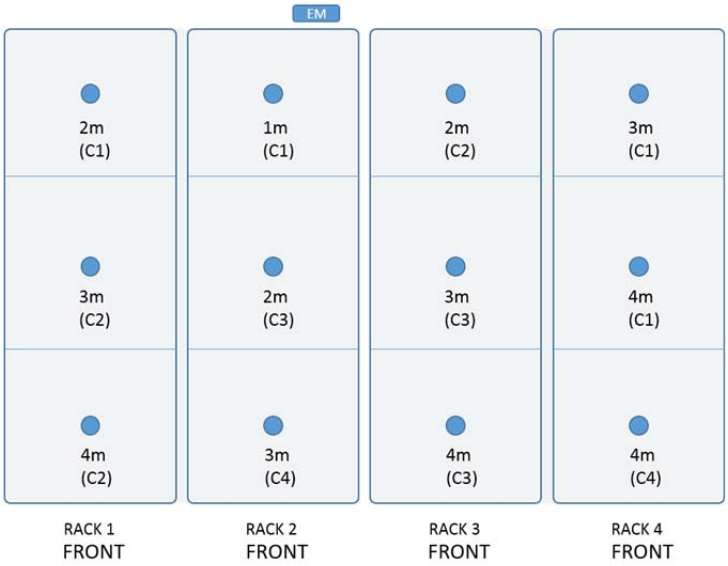




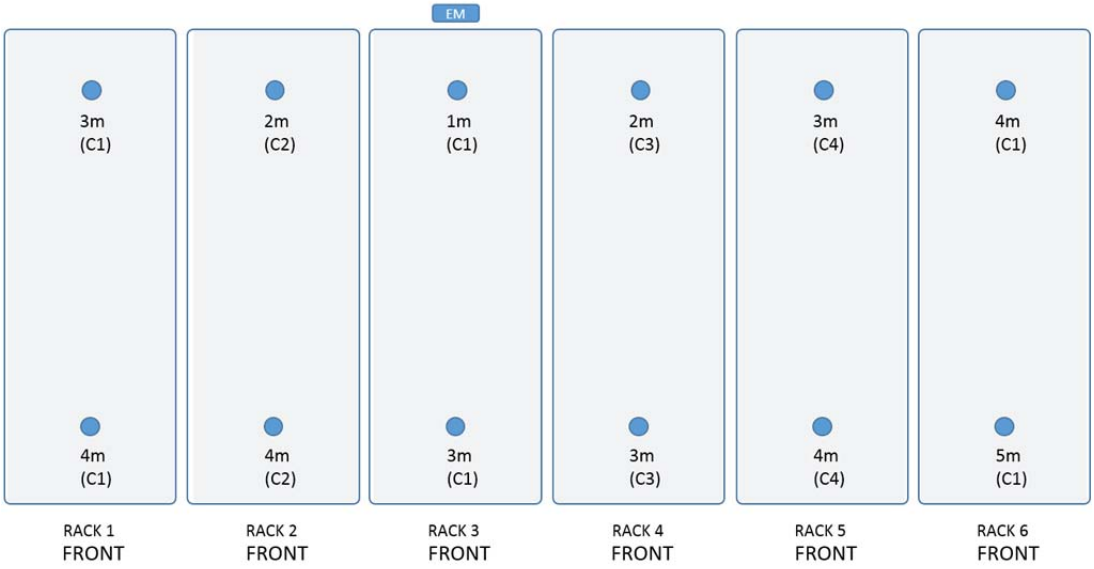
12 Probe Kits (E312 Monitor)



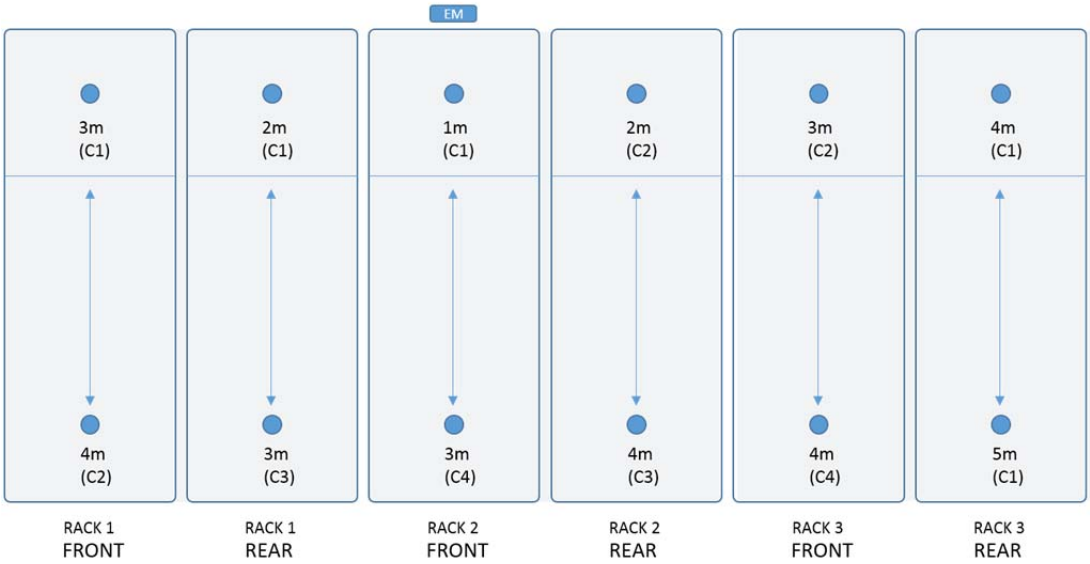
3 PROBES PER RACK x 4 RACKS
KIT: TP03-03X4



2 PROBES PER RACK x 6 RACKS
KIT: TP03-02X6



4 PROBES PER RACK x 3 RACKS
KIT: TP03-04X3

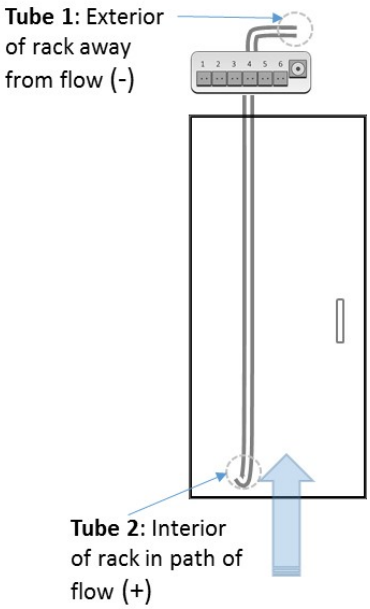


DIFFERENTIAL PRESSURE SENSING

DIFFERENTIAL PRESSURE MONITOR: Monitors equipped with the differential sensing option can sense change in air pressure between two areas. To monitor differential pressure the two sensing tubes need to be placed in areas with different pressures such is an opposites sides of a baffle, raised floor or server rack.

MONITORING AIR FLOW: By placing one tube in direct path of the flow (i.e. at the base of a server cabinet by the air intake) and the second tube in the ambient area with little air flow (i.e. the top exterior of the server cabinet), the resulting pressure differential will be indicative of the degree of air flow. Keep in mind that this is not a measurement of air flow but rather a relative indication. A lower differential pressure will indicate a lower air flow rate and a higher pressure value a higher flow rate.

Note the area monitoring the higher pressure (or faster air flow) should use the tube marked with the (+) positive symbol. The area with the lower pressure or slower flow should use the tube marked with the (-) negative symbol. The differential pressure is expressed in Pascals (±500 Pa in 0.2Pa or ±3% accuracy)



Server Rack Flow Sensing: In the above application the differential pressure will increase as the air flow speed increases.

Monitor with differential pressure sensing option.

HUMIDITY SENSING

HUMIDITY: Environmental monitors equipped with the humidity sensing option can sense relative humidity. The humidity sensor is embedded inside the monitor. Placement of monitor should be in an open, non-enclosed environment. Humidity is measured from 0 to 100% Relative Humidity at ±2 % RH at 0.1% resolution.

DRY CONTACT SENSING

Both the E306 and E312 monitors can be used to sense the status of dry contact circuits (i.e. open or closed status) using any of the temperature probe ports. Consult with Packet Power on how to configure your devices for dry contact closure. Consult Packet Power when using the device for dry contacts.

DISPLAY AND COMMUNICATIONS

LCD DISPLAY (E306 Monitor): The E306 monitor includes a local LCD display that will indicate the device status, and input measurements in a rotation indicated in the chart below:

Display	Description	Display
COM:	Communications status (indicates if the device is properly communication with the gateway)	[NONE] / [OK]
0:	Internal temperature sensor	[XX.X C]… [XX.X F]
1-6:	Probe 1-6 status; either temperature measurement or dry contact status when used as dry contact input	[XX.X C]… [XX.X F] OR [OPEN] OR [CLOSED]
RH:	Relative humidity (only on monitors equipped with relative humidity)	[XX %]
DP:	Differential pressure (only on monitors equipped with differential pressure)	[XXX P]

E306 LCD Display

LED DISPLAY AND CONTROL BUTTON (E312 Monitor)

The E312 monitor includes a local LED display that will indicate the device status as well as battery status.

Function	Description	Display
Green LED		
Red LED		
Button		

OPEN (NON-CONNECTED) AND CLOSED (SHORTED) PORTS: When there is no probe in the plugged into a probe port, the LCD display and the temperature reading will read “-48 C”. “-48 C” can be used as a finite number to indicate an unplugged probe port. Likewise a reading of “+75 C” will be caused from a dead short on the probe or contact closure. These values can be used to generate alarm conditions for

open or closed conditions when using dry contacts in place of temperature probes. Consult Packet Power when using the device for dry contacts.

NETWORK / GATEWAY INTERFACE

GATEWAY VERSIONS: Depending on the Gateway version selected, the output will be either [SNMP or Modbus TCP/IP] for export to a third party application or direct output to the EMX portal (Packet Power's monitoring application). Consult with Packet Power if you require a Gateway to communicate on a different protocol.

Refer to the Gateway Quick Start Guide for the setup and placement of Gateway Modules www.packetpower.com/support

NODE ID: Each monitoring node is equipped with a device ID code marked on the top of the monitor. This device ID code will also be transmitted electronically and can be obtained by the QR code printed on the device label. The device ID will identify the nodes on the various monitoring and configuration applications.

Device ID

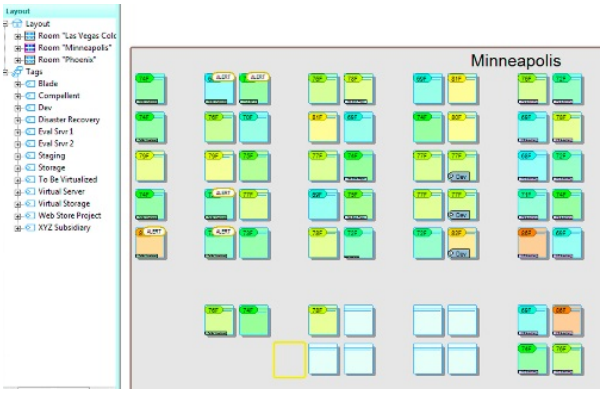
ADDING MONITORING NODES AND SCALING THE NETWORK: The Packet Power architecture allows up to 300 monitoring devices (power or environmental) per Gateway. Gateways can be added to increase system capacity and add redundancy. Redundant Gateways are always recommended for critical systems. The system can be scaled by simply adding an additional Gateway(s) to support thousands of modules per network. Additional Gateways will automatically optimize the network configuration and balance the data traffic between them.

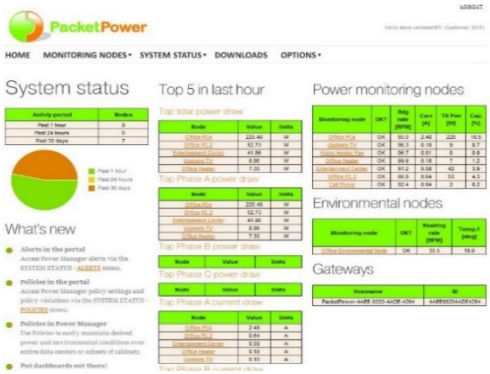
CONNECTIVITY: The monitor is designed to interface with the Packet Power Ethernet Gateway module. Multiple monitors (up to 300) may be used with a single Gateway. Refer to the Ethernet Gateway (EG3) device manual for information. Depending on the information required two versions of Gateways are available with SNMP or ModBus TCP/IP output for integration with third party monitoring systems. All Gateways are also capable of simultaneous communication with the EMX monitoring portal.

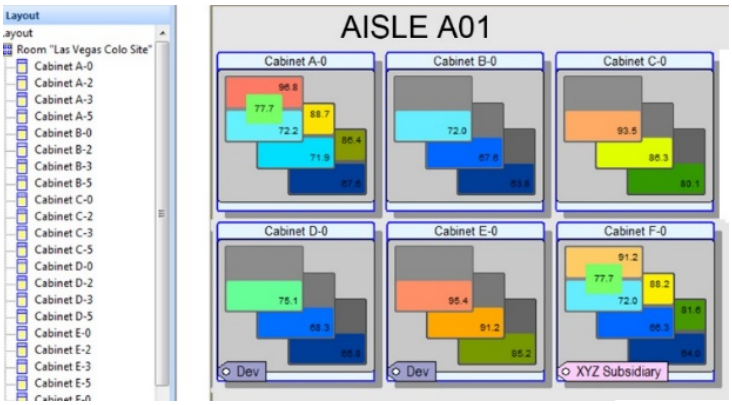
EMX Portal version: The EMX Energy manager is a plug and play monitoring solution that is the easiest way to view, log and manage data from all Packet Power monitoring devices. The system offers easy access to energy analysis, real-time data and historical reports; user defined alerts via email or SMS and detailed, easily customized reports. Refer to the EMX brochure for a product overview. - ***http://www.packetpower.com/Portals/23344/docs/em3.pdf***

EMX Portal Features:

- Cloud based or available as a locally installed application
- Instantly populates – no commissioning required
- Integrates power and environmental data
- Create custom dashboards, dynamic charts, custom reports, alerts and much more







EMX Monitoring Portal s

TECHNICAL SPECIFICATIONS

MEASUREMENT

Temperature: ±1° C at 0.1° C resolution with readings in °C or °F.
Relative Humidity: From 0 to 100% RH at ±2 % RH at 0.1% resolution
Dry Contact: Contact Packet Power for specific sensing devices
Differential Pressure: ±500 Pa (±2”H20), 0.2Pa or ±3% accuracy full span

COMMUNICATIONS

Operating Frequency: 860 to 920MHz and 2.4 GHz (frequencies vary by region)
Wireless Network Protocol: Frequency hopping self-configuring load-balancing mesh
Data Output: SNMP and Modbus TCP/IP protocols
Firmware Updates: Wireless
Typical Transmission Range: 10 to 30 meters indoors between any two devices in mesh network
Antenna: Fully enclosed, fixed configuration
Monitoring Unit to Gateway Radio Range: Up to 300 monitoring units per gateway and unlimited Gateways per site
Multi-site Support: Yes
Encryption: 128-bit
System Status: Local LCD display on E306 models

OPERATING ENVIRONMENT / MECHANICAL / POWER SUPPLY

Operating Temperature: Monitoring Unit: 0° to +40° C (+32 to +104 °F)
Temperature probes: -40° to +85 °C (-40 to +185 °F)
Operating Humidity: 10% to 90% non-condensing
Water and Dust Resistance: NEMA 1 / IP20 (indoor use)
Module Size and Weight: (E306) 65 mm (2.6”) x 65 mm (2.6”) x 28 cm (1.1”), 90 g (3 oz)
Module Size and Weight: (E312) 80 mm (3.1”) x 53 mm (2.1”) x 40 cm (1.6”) (3 oz; 5 oz with batteries)
Batteries (E312 only): 2 x AA (included)
External AC Power Supply: 100- 240 VAC input voltage, 50-60Hz / 5 VDC output; 0.5 W power consumption
Power Supply Plug Types: C14, NEMA 1-15, Euro CEE 7/16, ANZ AS 3112, China GB 2009, UK BS1363, India BS546

SUPPORT

ONLINE SUPPORT: http://www.packetpower.com/support/

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