PARKER PAC Terminal Family

User Manual

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VICPAS
HMI Parts Center

Parker

Contents

Important User Information

Please read and follow all safety information for the PAC Terminal products, including the warning and caution statements in this guide, before installing or operating the system.

Safety Information

WARNING: PAC Terminals may be used to control electrical and mechanical components of motion control systems in industrial environments. To avoid serious injury or damage to equipment, test the motion system for safety under all potential conditions.

WARNING: PAC Terminals are not fault-tolerant and are not designed or intended for any use in any systems, machines, or applications where failure or fault of any kind of the Products could reasonably be seen to lead to death or serious bodily injury of any person, or to severe physical or environmental damage ("High Risk Use"). You are not permitted to use, distribute, or sublicense the use of these Products in High Risk Use. High Risk Use is STRICTLY PROHIBITED.

WARNING: PAC Terminals contain no user-serviceable parts. To avoid personal injury or damage to the product, do not attempt to open the case or to replace any internal components.

WARNING: USER RESPONSIBILITY- Failure or improper selection or improper use of the products described herein or related items can cause death, personal injury and property damage.

Disclaimers

This document and other information from Parker-Hannifin Corporation, its subsidiaries and authorized distributors provide product or system options for further investigation by users having technical expertise.

The user, through its own analysis and testing, is solely responsible for making the final selection of the system and components and assuring that all performance, endurance, maintenance, safety and warning requirements of the application are met. The user must analyze all aspects of the application, follow applicable industry standards, and follow the information concerning the product in the current product catalog and in any other materials provided from Parker or its subsidiaries or authorized distributors.

To the extent that Parker or its subsidiaries or authorized distributors provide component or system options based upon data or specifications provided by the user, the user is responsible for determining that such data and specifications are suitable and sufficient for all applications and reasonably foreseeable uses of the components or systems.

Trademark Information

SD is a trademark or registered trademark of SD-3C, LLC in the United States, other countries or both.

iMX-6 ARM® Cortex® A9™ is a trademark of NXP Semiconductors (formerly Freescale Semiconductors)

About This Guide

This installation guide is intended for those who are responsible for installing, configuring, and troubleshooting PAC Terminal products and their associated software and accessories. It is intended for the initial hardware installation and primary hardware configuration settings.

> **NOTE:** Stay up-to-date with the latest version of this User Manual by downloading the most current copy from the web at http://www.parker.com/emn/PT.

Assumptions of Technical Experience

Parker Hannifin Corporation assumes you are qualified in the servicing of industrial control systems, and trained in recognizing hazards in products with hazardous energy levels. To install and troubleshoot PAC Terminals, you should have a fundamental understanding of the following:

- Electronic concepts such as voltage, current, and switches
- Grounding techniques, wiring, and separation of data conductors and power
- Networking and data communications

Product Naming

This guide describes the following products:

- **PAC Terminal:** An industrial thin-client HMI for displaying embedded Xpress or Web Visualization (WebVisu) information.

Notes, Cautions, and Warnings

This guide uses warnings, cautions, and notes throughout the text to draw your attention to information that is especially important or useful.

> **WARNING:** A warning provides information about a potential for property damage, personal injury, or death.

> **CAUTION:** A caution provides information intended to help prevent malfunction of the product or damage to the product hardware or software.

> **NOTE:** A note provides information intended to help you make the best use of your product from Parker Hannifin Corporation.

Regulatory Compliance

CE Statement of Compliance

Product Type: PAC Terminals, Industrial HMI Products

PAC Terminals comply with the protection requirements set up by the European Community (EC) Electromagnetic Compatibility (EMC) Directive 2004/108/EC and 2014/30/EU as defined by the Product Specific Standard EN55022 and EN55024, which includes both emissions and immunity requirements and the power line emissions standards EN/IEC 61000-3-2, Limits for Harmonic Current Emissions and EN/IEC 61000-3-3, Limits of Voltage Fluctuations and Flicker in Low Voltage designated for Equipment used in Industrial Locations. In addition, compliance of the PAC Terminals is demonstrated by the application of the following standard:

- EN/IEC 61010-1, 3rd Edition, 2012-04-17 Safety Requirements
- EN 61326-1:2013 / EN55011:2009/A1:2010 EMC Requirements for Equipment used in Industrial Locations
- 2004/108/EC and 2014/30/EU Electromagnetic Compatibility when installed, operated, and maintained as intended

FCC Statement of Compliance

Product Type: PAC Terminals, Industrial HMI Products

Warning: This equipment has been tested and found to comply with the limits for a Class A 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Note: Any changes or modification not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

- FCC 47 CFR Part 15 Subpart B Class A, ANSI C63.4-2014

UL61010-1, CAN/CSA-C22.2 No. 61010-1, IEC61010-2-201 for Ordinary Locations

PAC Terminals have been investigated to the following standards as described in UL File: E164063-D1001-1-UL:

UL61010-1, 3rd Edition, 2012-05 / CAN/CSA-C22.2 No. 61010-1, 3rd Edition, 2012-05 and additional: IEC 61010-2-201: 2013 (First Edition).

In order to obtain Underwriters Laboratories approval for the installation, the product must meet the following criteria:

- Input power is rated at: 12 VDC or 24 VDC (-15%/+25%) SELV Limited Energy. External power to the PAC Terminals must be provided by a Class 2 power source. For customer convenience, Parker offers an AC-input, Model PS-60W, Class 2, 24VDC power supply, which is available for purchase.

Note: PAC Terminals have been evaluated to UL61010-2-201 and complies with the same level of safety as products evaluated to UL508, or vice versa.

WARNING: If the PAC Terminals are used in a manner not specified by Parker, the protection provided by the equipment may be impaired.

ANSI/ISA-12.12.01-2015, CAN/CSA C22.2 No. 213-15 for Hazardous Locations

PAC Terminal models purchased from Parker with the following suffixes PTx-xxx-xxx-x5, have been investigated to the following standards as described in UL File **E317576, Volume 3, Section 1**:

ANSI/ISA-12.12.01-2015, Issued 2015-08-21, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

CAN/CSA C22.2 NO. 213-15, Issued 2015-08-21, Nonincendive Electrical Equipment for Use in Class I and II, Division 2 and Class III, Divisions 1 and 2 Hazardous (Classified) Locations

Installation in Hazardous Locations must adhere to the following installation guidelines:

1. THESE DEVICES ARE OPEN-TYPE DEVICES AND MEANT TO BE INSTALLED IN AN ENCLOSURE SUITABLE FOR THE ENVIRONMENT, SUCH THAT THE EQUIPMENT IS ONLY ACCESSIBLE WITH THE USE OF A TOOL.

2. SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS OR NONHAZARDOUS LOCATIONS ONLY. TEMPERATURE RATING T5.

3. WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.

WARNING: If the PAC Terminals are used in a manner not specified by Parker, the protection provided by the equipment may be impaired.

CHAPTER 1:
Product Overview

Brief Description

The PAC Terminal (PT) is a thin-client HMI developed to work seamlessly with the Parker Automation Controller (PAC). With the PAC handling the control and HMI logic, the PT is responsible for displaying the embedded HMI as well as sending touch screen input from the user back to the PAC. As a thin client, the PT significantly reduces the overall system costs when compared to a traditional HMI—especially if it is desired for multiple PTs to connect to a single PAC.

Simply install the PAC Terminal and set unique IP addresses of the Terminal and the Xpress or Web Visualization server providing the HMI information; no application to load, no other configuration is required.

For more information about how to develop Xpress projects and download them to the PAC Controller, refer to the Parker Automation Controller User Guide, found online at www.parker.com/emn/PAC or the Xpress User Guide found online at www.parker.com/emn/XT.

For more information about how to develop Web Visualization projects and download them to the PAC Controller, refer to the Help Menu in the Main Menu Bar in the Parker Automation Manager (PAM) Software.

Understanding the PAC Terminal Model Numbers

The following table defines the model number breakdown of the PAC Terminal family. Note that not all model option combinations are available.

1	2		3		4	5	6		7	8
PT	A	-	010	-	1	R	1	-	1	3

1	**Series Name**		5	**Touchscreen Type**	
	PT	PAC Terminal		R	Resistive Touchscreen
2	**Frame Material**				
	A	Aluminum	6	**Storage**	
	L	Plastic		1	4GB eMMC (internal)
3	**Display Size**		7	**Operating System**	
	007	7" Touchscreen		1	Android 4.x & PAC Terminal App
	010	10" Touchscreen			
	015	15" Touchscreen	8	**Certifications**	
				3	Standard UL, CE
4	**Processor**			5	Haz-Loc Class 1, Division 2
	1	iMX6 ARM			

Hardware Features Overview

Each PAC Terminal is supplied with a flat front panel touch screen and is a fanless design intended to operate in rugged industrial environments. They are powered by a Freescale, iMX-6 ARM® Cortex™ A9 [1.0GHz] CPU and have onboard 1GB of DDR3 system memory. They support12/24VDC input power, resistive touchscreens and an IP65 compliant front panel.

- 7.0", 10.4" & 15.6" wide format display options
- LED backlight LCD
- Flat front panel resistive touch screen
- Fanless design
- NXP, iMX-6 ARM® Cortex™ A9 [1.0GHz] CPU
- Onboard 1GB DDR3 DRAM
- Onboard 4GB eMMC Flash storage
- 12VDC/24VDC auto ranging power input
- IP65 compliant front panel


Figure 1.1   7" PAC Terminal Front View

Figure 1.2   7" PAC Terminal Rear View

External Ports

DC power input and all external ports are located on the back of the PAC Terminal family. Refer to the figure below for port identification.

> ⚠️ **Caution — The DC power input and all external ports on the back of the PAC Terminals are not environmentally sealed. For IP65 installations, the units are designed to be mounted in an IP65 rated enclosure with included mounting clips and IP65 sealing gasket. For applications not requiring an IP65 rating, the PAC Terminal can be mounted as a free standing station using the VESA mounting holes located on the back of the units. See Unit Installation for further information. (Warning – PAC Terminals installed in Class 1, Division 2 Hazardous Locations MUST be mounted in a suitable enclosure!)**

VESA
Mounting Holes

DC Power
Input

Service Port
(Factory Use Only)

USB Ports
USB0 & USB1

Network Port
LAN1
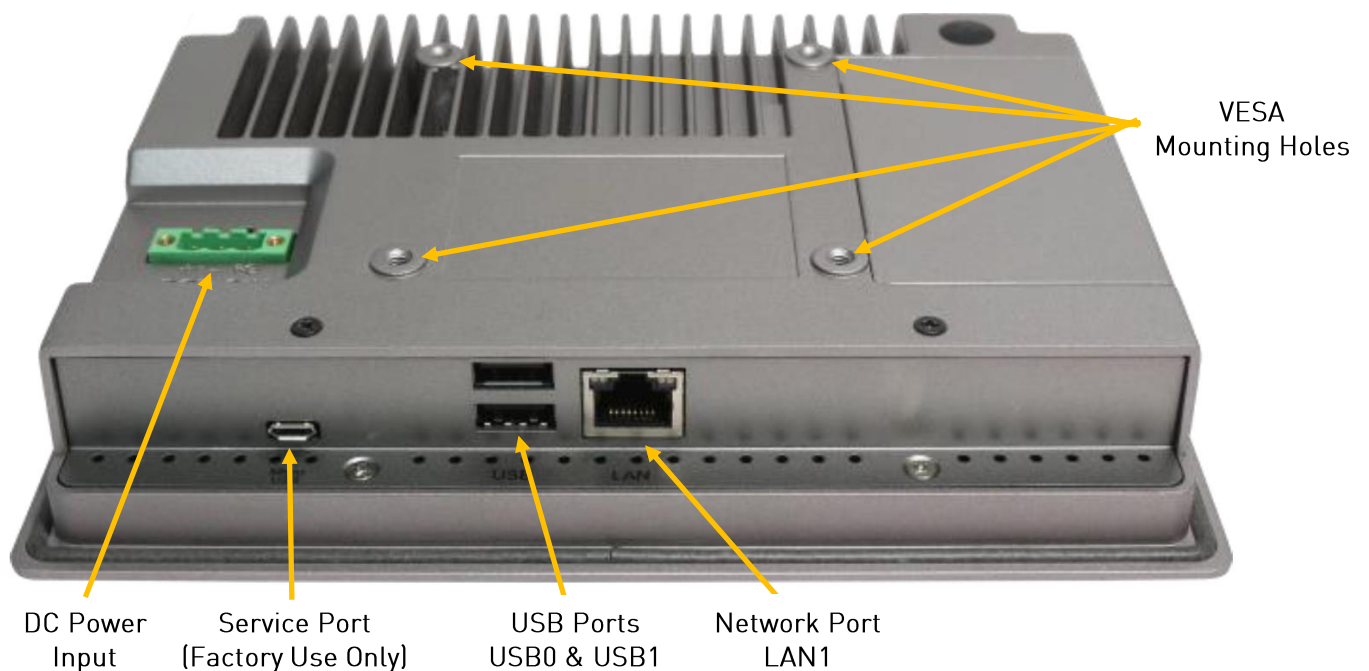
Figure 1.3   External Port Locations

The following sections describe the functionality of these ports.

LAN1 Port

The PAC Terminals provide a standard RJ45 Ethernet port with full and half duplex operation at 10/100/1000 Mb/s (GbE). The port supports auto Media Independent Interface (MDI) speed negotiation and auto MDI-X cable crossover (patch cables) support at all speeds. The RJ45 connectors indicates ACTIVE (green) and LINK (green/amber) LED's respectively located at the left-hand and right-hand side of the Ethernet port that indicate the activity and transmission speed of the LAN. The LINK LED will be green for 10/100 Mb/s and amber for 1000 Mb/s (GbE) network communications.
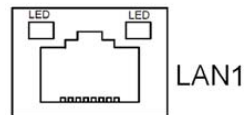
USB0/USB1 Ports

The PAC Terminals provide two USB 2.0 (USB0 & USB1) compliant ports to connect keyboards and mice. Both ports are ESD protected and have over-current shutdown.

Each USB Type A Receptacle is Current limited to 1.5A.
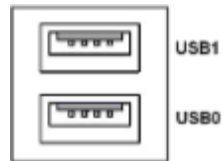
SERVICE Port

The PAC Terminals are equipped with a Micro B Type Service Port for factory use only.

Micro Secure Digital Card Slot

The PAC Terminals are equipped with a Micro Secure Digital (SD) card slot that can support both SD and SDHC cards, with a maximum capacity up to 32GBs.

The Micro SD card slot is located on the side of the unit and is provided for Factory Use Only.

CHAPTER 2:
Installation

Checking the Shipment

Upon receiving the PAC Terminal product, remove all items from the packaging and confirm that you have received each item listed in the table below.

If you are missing an item, please call the factory. For contact information, see "How to obtain Technical Assistance from Parker Hannifin" in the Troubleshooting chapter of this guide.

PAC Terminal Ship List	
Part Name	Parker Part Number
Parker PAC Terminal	PTn-nnn-nnn-nn
DC Power Input Connector, 3-Pin	57-05275
Parker Software License Agreement	A4-04291-102
Mounting Clips with Screws (quantity dependent on display size)	N/A
Quick Reference Guide	88-026742-01

Installation Safety Requirements

The PAC Terminal family meet the requirements of the Electromagnetic Compliance (EMC) directive 2004/108/EC (EN55022 / EN55024) when installed according to the instructions provided in this chapter.

WARNING: **PAC Terminals connect to other mechanical and electrical components of your system. Be sure to test your system for safety under all potential conditions. Failure to do so may result in serious personal injury or damage to equipment.**

- Incorporate emergency disconnect circuits to ensure safe and effective machine shutoff.

- Comply with local and national safety regulations and precautions for the installation.

- Control elements are to be installed in such a way as to exclude unintended operation.

- Route control and communication cables in a manner that reduces EMI interference (inductive or capacitive) which would disturb system operation or functionality. For example, do not run communication and low-voltage cables in the same raceways with power lines, motor leads, etc.

Installation Guidelines

The following section provides installation guidelines to ensure the use of best practices regarding agency, thermal, safety, and EMI considerations.

Regulatory Guidelines

The PAC Terminal products have been designed for use in industrial environments. They are to be installed and factory wired according to National Electric Code (NEC) guidelines.

When providing power to the units, you can either use a 12VDC or 24VDC, Class 2, power circuit available in the control cabinet, a purchased Class 2 power supply, or an optional Parker model PS-60W Class 2 power supply, purchased separately.

WARNING: **PAC Terminal models purchased from Parker with the following suffix PTx-xxx-xxx-x5, have been investigated for use in CLASS I, DIVISION 2, GROUPS A, B, C and D HAZARDOUS LOCATIONS or NONHAZARDOUS LOCATIONS ONLY as described in UL File E317576. The following installation guidelines must be followed for Hazardous Location:**

1. **THESE DEVICES ARE OPEN-TYPE DEVICES AND MEANT TO BE INSTALLED IN AN ENCLOSURE SUITABLE FOR THE ENVIRONMENT, SUCH THAT THE EQUIPMENT IS ONLY ACCESSIBLE WITH THE USE OF A TOOL.**
2. **SUITABLE FOR USE IN CLASS I, DIVISION 2, GROUPS A, B, C AND D HAZARDOUS LOCATIONS OR NONHAZARDOUS LOCATIONS ONLY. TEMPERATURE RATING T5.**
3. **WARNING - EXPLOSION HAZARD - DO NOT DISCONNECT EQUIPMENT WHILE THE CIRCUIT IS LIVE OR UNLESS THE AREA IS KNOWN TO BE FREE OF IGNITABLE CONCENTRATIONS.**

Thermal Guidelines

You can safely operate these products within the temperature limits specified in the Environmental Specifications in Appendix A of this document. When using a protective enclosure, remember that the temperature within an enclosure is generally higher than the external temperature. Read the following guidelines to fully understand temperature implications.

- Limit the unit's exposure to adverse conditions, such as dust, oil, moisture, and corrosive vapors in order to minimize maintenance and repair costs.
- Choose an area for the product that is free from moisture or condensing humidity.

Heat builds up rapidly in enclosed environments, compromising the performance and life span of electrical equipment. If the PAC Terminal operates inside an enclosure at temperature levels above its rated ambient temperature, you must cool the enclosure.

These products have been tested for use in 50 degrees Celsius (ºC) ambient, still-air locations (60 degrees Celsius (ºC) ambient for the Headless unit). This means that when installed, the ambient air surrounding the unit is not expected to exceed 50ºC. An example of this type of installation would be the PAC Terminal mounted in a small, sealed industrial enclosure.

The most commonly overlooked aspect of this type of installation is that heat generated by the device, and other devices in the enclosure, becomes trapped and increases the ambient temperature immediately surrounding the PAC Terminal. This increase in temperature can sometimes exceed an additional 10 ºC or more. To assist in calculating the enclosure minimum volume, the section, Electrical Specifications in Appendix A of this document, contains the thermal heat dissipation (Watts) associated with each PAC Terminal size.

Although the thermal dynamics are not always linear, a temperature rise of 10 ºC degrees inside the enclosure would imply that the environment outside the sealed enclosure could not exceed 40 ºC for the display based systems, or the product would surpass its maximum operating temperature.

Therefore, do not install the PAC Terminal with its 50 ºC operating temperature limit into a sealed enclosure without considering the effects of the internal heat buildup.

Since elevated operating temperatures can have an adverse effect on the life of electronics, it is wise to consider the internal thermal rise. Passive venting for thermal convection, internal air circulation fans, filtered exhaust fans with filtered inlets, air conditioners, and other products are available in the market to assist in reducing the heat buildup in the industrial enclosure.

There are many attractive industrial IP65, dust-tight fan/filter assemblies available today which allow the filter to be inexpensively replaced or cleaned as part of a periodic maintenance schedule. In some cases, simply increasing the size of the enclosure can have a significant, positive effect on the installation's thermal response.

Here are some points to consider when performing a site review:

- What is the expected maximum outside ambient temperature surrounding the industrial enclosure?
- Are there any additional heat-generating components inside the enclosure?
- What is the size of the enclosure? Larger enclosures dissipate more thermal energy than smaller ones.
- What kind of environment will the enclosure be installed in - clean, water-tight, dust tight? Can the enclosure be convection cooled or is active cooling required?

It is a wise investment to thermally plan the installation by anticipating and eliminating the heat build-up inside a sealed enclosure. Not only will this extend the life of the electronics, but it will also reduce costly equipment downtime.

Orientation and Clearance Guidelines

Select an enclosure that is large enough to allow free airflow in and around the PAC Terminal.

Allow a <u>minimum</u> of two inches between the inside of the enclosure and the top, bottom, and sides of the PAC Terminal to allow access to the mounting clamps, sufficient air circulation and cable clearance. Verify that the surface of the enclosure on which the terminal is mounted is flat and free of raised or depressed areas.

Consider additional clearance below the unit to allow efficient cable access and routing and to allow for insertion and removal of cables.

Mount the PAC Terminal in a vertical orientation to allow for proper ventilation.

> ⚠️ **WARNING:** **Failure to follow these guidelines may result in overheating of the PAC Terminal.**

Radiated Emissions Guidelines

The PAC Terminals have been tested to comply with international electromagnetic and emission standards (EN55022 FCC Part 15 Class A). To reduce radiated emissions, ensure that there is a low impedance earth connection to the PAC Terminal, which can be accomplished by utilizing Pin-3 on the input power connector. This connection must be made with the shortest possible, heavy gage wire or braided cable. Low-resistance (<0.5 ohms) continuity should be verified with an ohmmeter for proper grounding. In addition, all communication cables should be shielded and grounded, preferably only on one end.

Earth Grounding Guidelines

To minimize unwanted electrical interference, select a location away from equipment that produces intense electrical noise (motor drives, for example). Use good engineering practices and isolate input power to the unit and separate all data communication cables from AC power lines.

> ⚠️ **Important:** **Use the PAC Terminal ground terminal (Pin-3 on the input power connector) to connect the unit to a suitable ground reference, such as earth ground or building steel. This ensures the unit is in compliance with immunity and emissions requirements necessary for proper operation.**

Switching inductances from relays, contactors, solenoids, or switching magnets can produce significant surge voltages. It is necessary to reduce these inductive spikes to a minimum whenever possible, which may require diodes, Z-diodes, varistors, or RC elements. We recommend that you contact the manufacturer or supplier of the corresponding actuators for relevant information regarding surge protection.

Unit Installation

The PAC Terminals can be installed two ways; mounted to a flat panel or enclosure or to a VESA arm. Each recommended installation procedure follows.

Required Tools

Installing the PAC Terminal requires a small flat blade screwdriver (tip size 0.04mm x 2.5mm) for attaching the wiring to the power connector and a Phillips blade, torque screwdriver to tighten the mounting clamps.

Basic Installation Steps – Panel Mounting

Perform the following steps to install the PAC Terminal on an enclosure or cabinet panel.

1. Verify that all of the accessories are present against the items listed in the table at the beginning of this chapter, Checking the Shipment.

2. Once a suitable mounting location has been selected, a mounting cutout must be created. Cut a rectangular hole in the enclosure using the Panel Mounting Cutout dimensions below. (See also Physical Dimensions and Panel Cutouts in Appendix A) Be sure to follow the cutout dimensions precisely to ensure that the unit will seal properly against the enclosure surface. Also make sure that the cutout edges are free of burrs and smooth to allow for proper sealing of the perimeter gasket. The dimensional tolerance for each cutout is +/- 0.02" (0.5 mm).

Display Size	Panel Mounting Cutout Dimensions
7.0" Display	7.56" x 5.43" (192.0 x 138.0 mm)
10.1" Display	10.71" x 6.93" (272.0 x 176.0 mm)
15.6" Display	15.51" x 10.22" (394.0 x 259.5 mm)

3. Slide the unit into the cutout and attach the supplied mounting clamps, with their screws, to the perimeter of the unit in the slots provided as shown in the illustration below. Tighten the mounting clips to **8.7 pound-inch (0.97 Newton-meter)**. Tighten the screws in a crosswise sequence to ensure a good seal and prevent damage.

WARNING: **Do not over tighten the mounting screws! Use a torque wrench to tighten the clip mounting screws to ensure proper mounting strength and sealing capability and so that damage to the PAC Terminal chassis, mounting clips, or the equipment enclosure does not occur.**
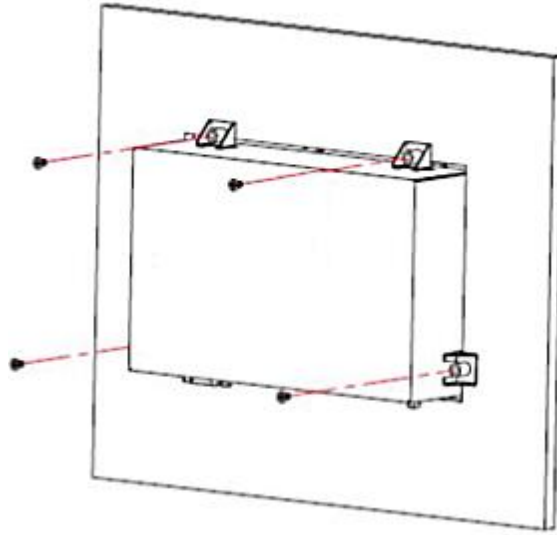
NOTE: The mounting clamps for all units can only support mounting panel thicknesses up to approximately 0.3" (8.6mm).

Fig 2.1   Panel Mounting Diagram

4. Connect any Ethernet network cables depending on the installation. Refer to Attaching Cables later in this section.

5. Connect 12VDC or 24VDC power to the PAC Terminal by following the precautions described in Connecting Power later in this section.

Basic Installation Steps – VESA Mounting

Perform the following steps to install the PAC Terminal using a VESA mounting arm or bracket. Do not use the VESA mounting technique if installing the unit in a UL Hazardous Location environment (see **Warning** below).

1. Verify that all of the accessories are present against the items listed in the table at the beginning of this chapter, Checking the Shipment.

2. Use four M4x5 screws (not supplied) to mount the unit to an appropriate swing arm or wall/pole mounting bracket. The screw length required is dependent on the thickness of the VESA mounting bracket. The VESA mount spacing on the rear of the PAC Terminal is either 75mm x 75mm or 100mm x 100mm depending on the display size. For the location of the VESA mounting holes, see: Physical Dimensions and Panel Cutout in Appendix A.

Display Size	VESA Mounting Pattern Dimensions
7.0" Display	75mm x 75mm
10.1" Display	100mm x 100mm
15.6" Display	100mm x 100mm

WARNING: Be sure to not exceed the load weight specifications supplied with the mounting arm or bracket. For example, the 15.6" PAC Terminal weighs 10 lbs. (4.55 kg) – select an arm that can safely support this weight. Unit weights can be found in the Appendix, **Physical Specifications**.

WARNING: PAC Terminal models purchased from Parker with the following suffix PTx-xxx-xxx-x**5** intended for use in Class I, Division 2 Hazardous (Classified) Locations, cannot be used with the VESA mounting arm and the unit must be installed in a suitable enclosure.
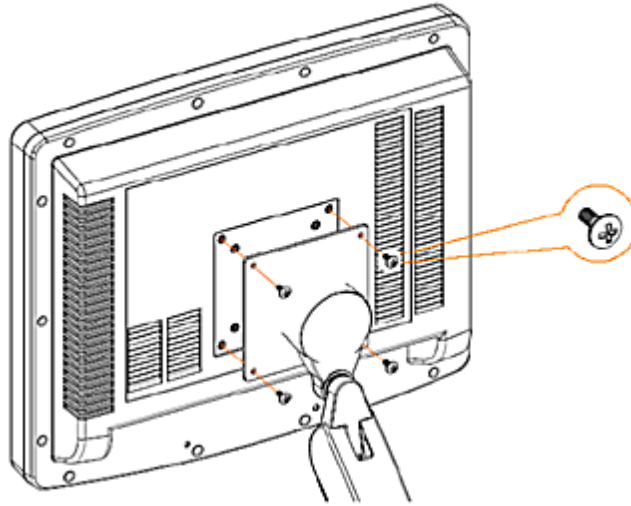
Fig 2.2   VESA Mounting Diagram

3. Connect any Ethernet network cables depending on the installation. Refer to Attaching Cables later in this section.

4. Connect 12VDC or 24VDC power to the PAC Terminal by following the precautions described in Connecting Power later in this section.

Attaching Cables

Ethernet Communication Cables

 WARNING: To avoid communication interference issues, do not install Ethernet cables in the same conduit or cable tray with AC power wiring, motor leads, or any other high potential switching currents.

To ensure reliable communications with the best performance possible, the cabling components used must conform to US standard EIA/TIA 568 (T568A or T568B) or European standard EN50173-1 Class D.

Category 5 (CAT5e) cable is recommended for Ethernet communications. The maximum allowed channel length is 100 meters or 328 feet.

Either straight through or crossover (patch) cables may be used since the PAC Terminal will auto detect and adjust to the type of cables used.

The cable must not be kinked or bent too tightly (the bend radius should be no less than four times the outer diameter of the cable).

Either shielded or unshielded cables may be used. Consider using shielded cables in electrically noisy environments. All shielded cables must be grounded for safety and effectiveness and a continuous shield connection maintained from end to end. Ground loops may develop when there is more than one ground connection and the difference in common mode voltage potential at these ground connections can introduce noise into the cabling.

Connecting DC Power

The PAC Terminal operates on nominal 12VDC or 24VDC power. Note that both the +VDC and the 0VDC pins on the input power connector are isolated from the Earth ground. Attach power as follows:

Pin Number	Marking	Description
Pin-1	(+)	+12VDC or +24VDC
Pin-2	(−)	0 VDC
Pin-3	(FG)	Earth Ground

The system input power rating for the various unit display sizes are:

Display Size	Maximum Input Power Required
7.0"	13W (max)
10.1"	14W (max)
15.6"	20W (max)

The following is the recommended wire gage for connection to the PAC Terminal power input connector:

0.20 - 1.0 mm² (IEC) / 26 – 16 AWG (UL), stripped to <10mm in length, solid or stranded wire

Connection Diagram

For convenience, the input power connector can be prewired and then plugged into the mating connector on the unit. Remember to tighten the two locking screws located on each side of the connector to prevent unintended disconnection.

⚠️ **CAUTION:** To reduce issues associated with inducing noise on the input DC power, keep the DC power input wiring away from any interfering AC sources, such as motor leads or other devices. Also keep the power wiring as short as possible.

Earth Ground

0VDC

Nominal +12VDC or +24VDC
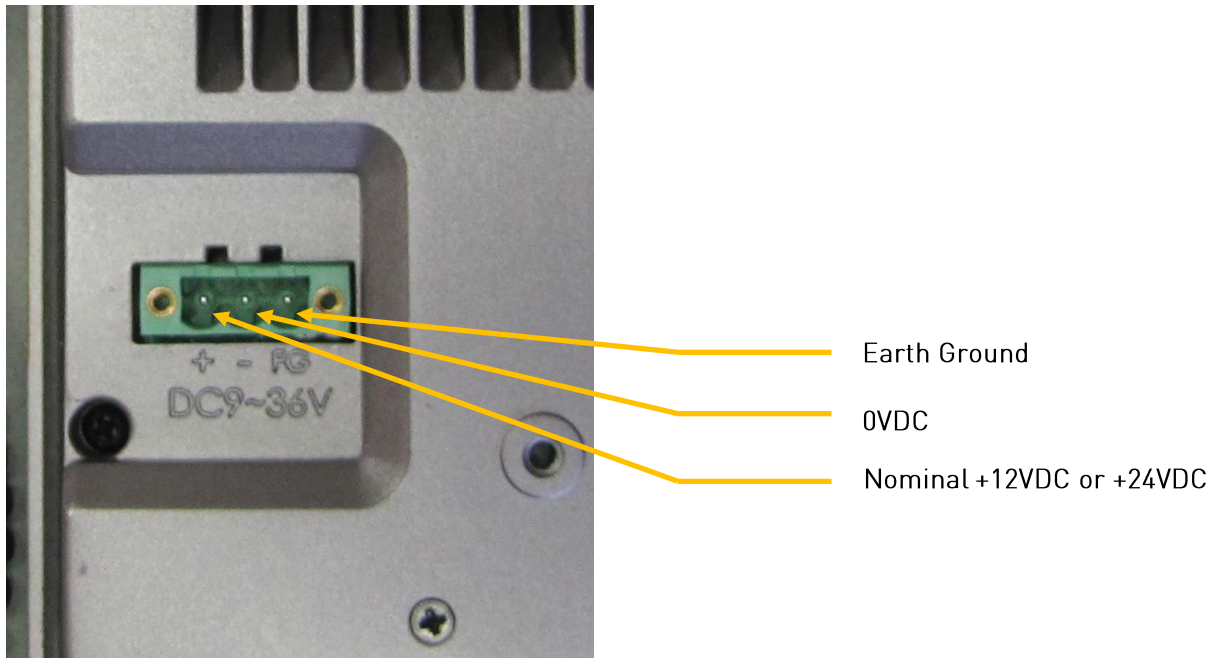
Fig 2.3   Input Power Connection Diagram

CAUTION: Do not apply AC line input power directly to the PAC Terminal or damage may occur.

Installing an Optional AC/DC Power Supply

The PAC Terminal operates on 12VDC or 24VDC Class 2 nominal input power. You can purchase an optional PS-60W Power Supply available from Parker to provide 24VDC input power if other DC machine power is not available.

> ⚠️ **CAUTION:** Do not apply AC line input power directly to the PAC Terminal or damage may occur.

Mounting the Optional PS-60W AC Power Supply

The optional PS-60W AC power supply is DIN rail mountable. To reduce issues associated with noisy DC power input, keep the 24VDC wiring away from any AC interfering sources such as motor leads or other devices. Refer to the PS-60W or the user-supplied power supply for information regarding topics such as mounting, AC power connections, or ratings.

CHAPTER 3:
Software

Configuring the Software

When you power up the PAC Terminal for the first time, the Parker logo will appear and the system will boot directly into the PAC Terminal Logon screen.

To connect the PAC Terminal to the PAC Controller, attach an Ethernet cable from the PAC Terminal LAN port to either X2 (recommended) or X3 on the PAC Controller.

Changing the Target PAC IP Address

If the PAC Terminal will be hosting the Xpress HMI project from the PAC, select the Xpress radial button on the Log On page. In the Target PAC IP field, enter the PAC IP Address, User Name, and Password. Then select Log On. The default IP Address for X2 on the PAC is 192.168.10.50. The default User Name for Xpress is Admin and the default password is blank (no password). Check with your local system administrator for the PAC if the PAC IP Address or Login credentials have changed.

For more information about how to develop Xpress projects and download them to the PAC Controller, refer to the Parker Automation Controller User Guide, found online at www.parker.com/emn/PAC or the Xpress User Guide found online at www.parker.com/emn/XT.

If the PAC Terminal will be hosting the Web Visualization HMI project from the PAC, select the Web Visualization radial button on the Log On page. In the Target PAC IP field, enter the IP Address of the PAC (the default for X2 is 192.168.10.50). There is no User Name or Password required for Web Visualization. Enter the Port number for the PAC Web Visualization in the Port field (the default Port Address is 8080). Enter the Visualization project name in the Visualization field (the default name is webvisu.htm). Select Log On to start the connection.

For more information about how to develop Web Visualization projects and download them to the PAC, refer to the Help Menu in the Main Menu Bar in the Parker Automation Manager (PAM) software.
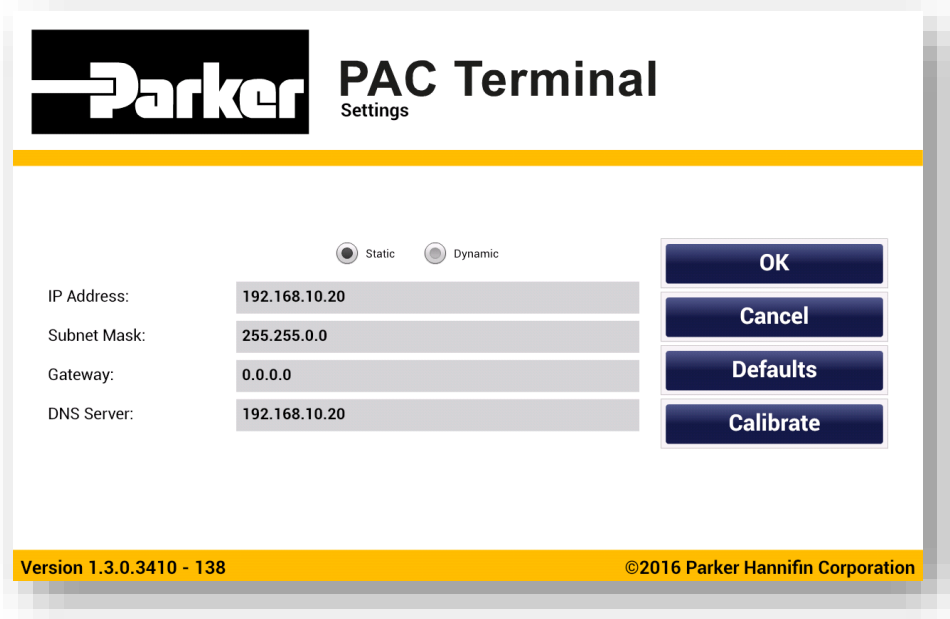
Changing the PAC Terminal Network Settings

To change the Network Settings of the PAC Terminal, select the Settings button on the Log On page. Then enter the new IP Address, Subnet Mask, Gateway and DNS Server. Then select OK to accept the changes. To set the IP Address back to the factory defaults (Static IP Address 192.168.10.20, Subnet Mask 255.255.0.0, Gateway 0.0.0.0, DNS Server 192.168.10.20), press the Defaults button.

Touchscreen Calibration

The PAC Terminal touchscreen will come calibrated from the factory. But if you need to re-calibrate the touchscreen, follow these instructions. From the Log On screen, select the Settings button and then select the Calibrate button. If the calibration is too far off to be able to select the appropriate buttons, it is recommended to us a USB mouse to activate the buttons.

At the start of this procedure, a red X will appear in the upper left hand corner of the screen (see the image below). Use a stylus or your finger or to touch the middle of the red X. This process will repeat for three of the corners of the screen. After the third red X, the calibration is complete and it will ask you to save or cancel the calibration.

Please touch/release the calibration targets
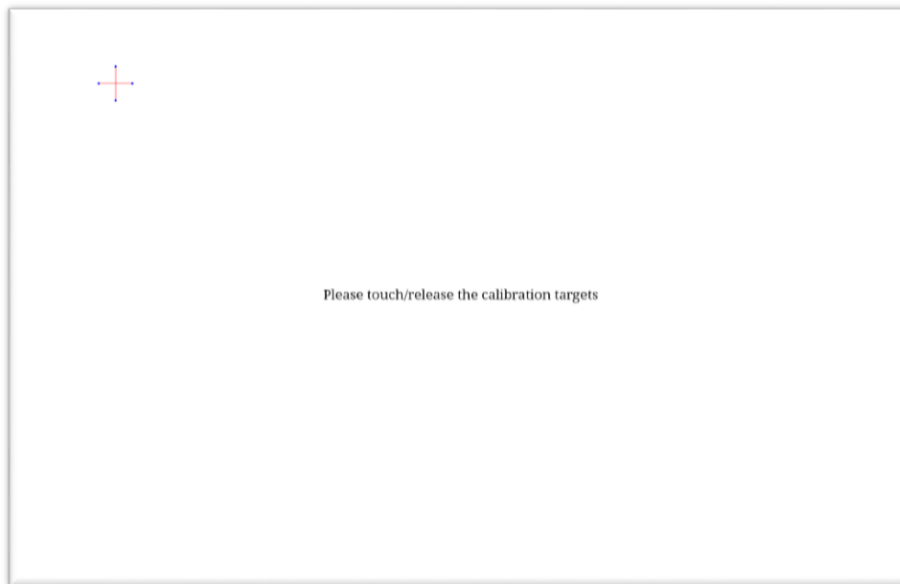
Factory Reset

The PAC Terminal can be set back to the factory default settings by selecting the Help button on the Log On screen and then selecting the Factory Reset button. It will ask you to confirm this action before completing the Factory Reset.
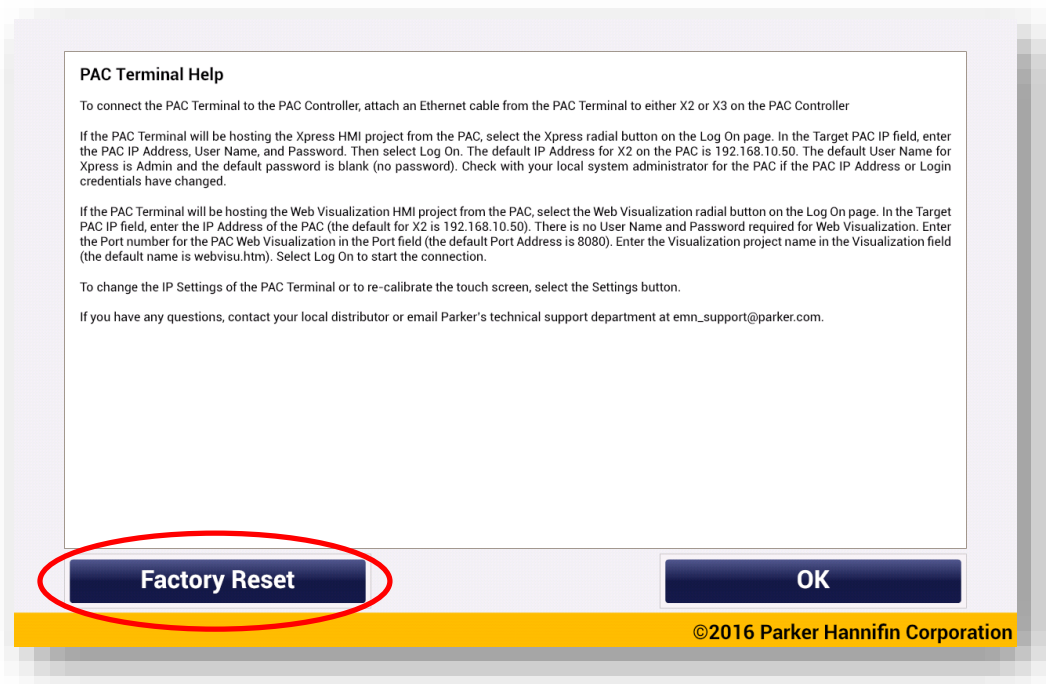
Upgrading the PAC Terminal

The PAC Terminal can be upgraded to a newer version via the USB port. Follow the instructions listed below:

1. Download the upgrade ZIP file located on the Pac Terminal product page: http://www.parker.com/emn/PT . The file name is PACTerminal_OTA_update_xxx.zip, where the xxx is the version of the application.
2. Copy the PACTerminal_OTA_update_xxx.zip file to the root directory of a USB thumb drive.
3. Power down the PAC Terminal.
4. Plug the USB thumb drive into one of the USB ports on the PAC Terminal
5. Power up the PAC Terminal
6. The upgrade process will automatically start. Wait for the upgrade process to finish. It is complete when it returns to the Log On screen.
7. Remove the USB drive
8. You may need to recalibrate the touchscreen using the Settings button.

Overriding the Automatic Connection

Once you have established a successful connection between the PAC Terminal and the PAC, the PAC Terminal will automatically attempt to reconnect to the PAC on each power cycle with the last successful settings.

To override the automatic connection, disconnect the Ethernet connection between the PAC and the PAC Terminal and power cycle the PAC Terminal. For Web Visualization, you will get an error stating it Cannot Navigate to Web Visualization. Press OK and it will return to the Log On screen. For Xpress, you will get an error stating there is a lost connection to the server. Press Cancel on this message box and it will return to the Log On Screen.

As an alternative to removing the Ethernet cable, during the boot up process, you can press the letter "a" in Parker for 2 seconds during the screen shot shown below. This will override the automatic connection and return to the Log On screen.
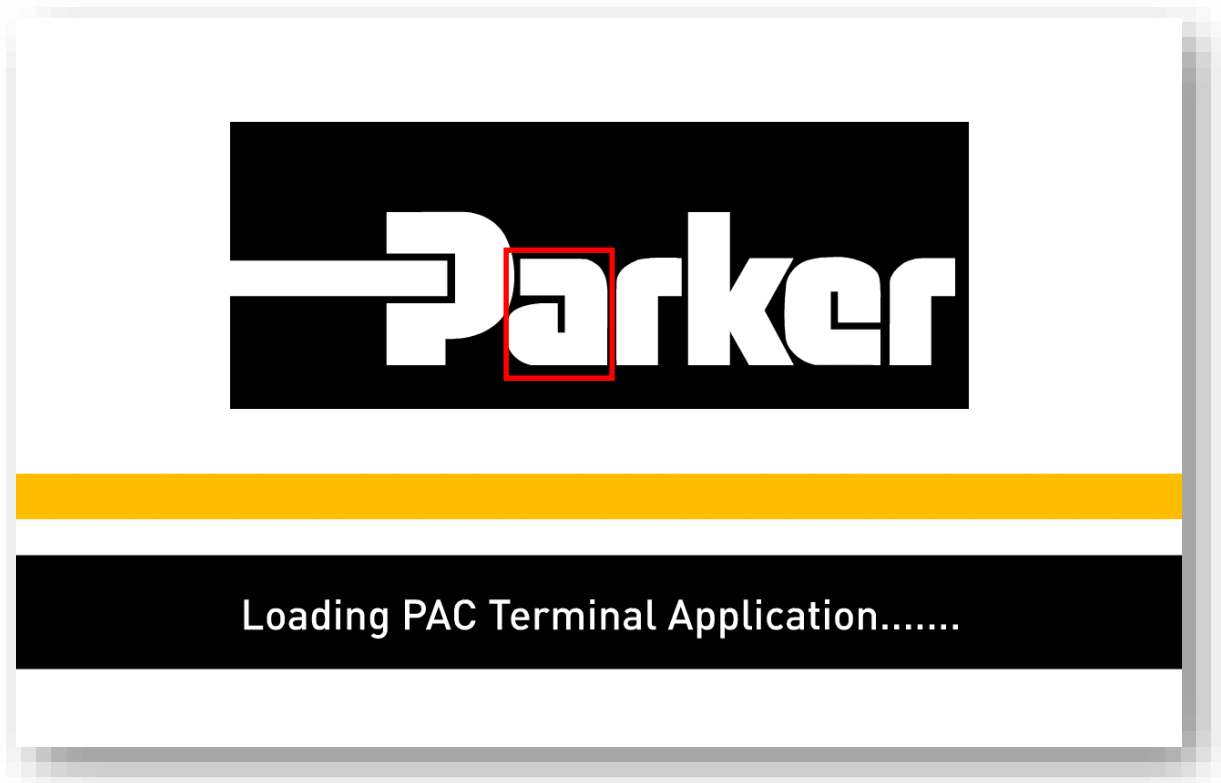
CHAPTER 4:
Troubleshooting

Troubleshooting Overview

After installation, if the PAC Terminal does not function properly, use the guidelines and procedures in this chapter to troubleshoot. These guidelines also apply to troubleshooting a malfunction during normal operation of the PAC Terminal.

LED Power Indicator

The Power LED on the front surface of the unit will be green when power is applied.

Perform the following steps if the LED is not green when power is applied:

- Check connections between the power supply and the PAC Terminal
- Verify the input power to the PAC Terminal is within the 12VDC / 24VDC specification

Ethernet Connections

If you are unable to establish Ethernet Communications between the PAC and PAC Terminal, here are areas to check:

- Verify the Target IP address of the PAC is entered correctly in the Log On screen.
- Verify the Subnet Mask is compatible between the PAC and PAC Terminal
- Check the RJ45 connections to and from the PAC and PAC Terminal.
- Verify that your cable is plugged into the correct LAN port on the PAC (X2 or X3).
- Check the LED status on the RJ45 LAN connectors.

Touchscreen Calibration

If your touchscreen is out of calibration, refer to the Calibrate Touchscreen section of this user guide.

How to obtain Technical Assistance from Parker Hannifin

Contact Information for Technical Assistance	
Contact your local automation technology center (ATC) or distributor.	
North America	Europe
Parker Hannifin Corporation	Parker Hannifin Corporation
Electromechanical & Drives, North America	Electromechanical & Drives, Europe
5500 Business Park Drive	Robert-Bosch-Strasse 22
Rohnert Park, CA 94928	77656 Offenburg (Germany)
Telephone: (707) 584-7558	Telephone: +49 (0781) 509-0
Fax: (707) 584-8029	Fax: +49 (0781) 509-98176
Email: emn_support@parker.com	Email: em-motion@parker.com
Internet: http://www.parker.com/emn	Internet: http://www.parker.com/eme

APPENDIX A:
PAC Terminal Specifications

Environmental Specifications

Environmental Specifications Table

Category	Specifications
Operating Temperature (Indoor Use Only)	0 to 50ºC (32ºF to 122ºF) Ambient (surrounding air temp)
Storage Temperature	-20 to +60ºC (-4 to 140ºF) Display based
Relative Humidity	10% to 90% @ 40ºC, non-condensing
Altitude	10,000 Feet
Heat Dissipation (approximate)	7.0" Display Size (Plastic case) – 8W 7.0" Display Size (Aluminum case) – 7W 10.1" Display Size – 5W 15.6" Display Size – 20W
Shock Rating	15g peak; 11ms (operating)
Vibration	5-500Hz: 1 Grms random, swept sine (operating)
	1, 4, 16, 40, 80, 200Hz: 0.52 Grms, random (non-operating)
Environmental Design	IP65 Compliant Front Panel
RoHS	RoHS Compliant

Electrical Specifications

Electrical Specifications Table

Category	Specifications
System	
CPU	NXP iMX6, ARM® Cortex™ A9, 2 Cores
Chipset	SoC
Memory	Onboard 1GB DDR3 DRAM
Graphics	2D/3D Hardware Graphics Accelerators
I/O Ports	
USB	2 x USB 2.0 Type A
LAN	1 x 10/100/1000 BaseT (GbE),RJ45
Power	1 x 3-pin DC Power input
Storage Device	
Storage	4GB eMMC Flash on board
Touch Screen – Resistive Touch	
TS Controller	Microchip Technology AR1021 on board
Interface	SPI
Light Transmission (%)	Over 80%

Power	
Power Input (Volts & Watts)	12VDC & 24VDC Nominal, Class 2 7.0" Display Size – 13W maximum 10.1" Display Size – 14W maximum 15.6" Display Size – 20W maximum
Battery for RTC Backup	ML1220, 3V, 17mAH
Operating System	
OS Support	Android 4.2

Display Specifications

Display Specifications Table

Display	7.0"	10.1"	15.6"
Display Type	7" TFT LCD	10.1" TFT LCD	15.6" TFT LCD
Max. Resolution	800 x 480 (WVGA)	1280 x 800 (WSVGA)	1366 x 768 (WXGA)
Max. Color	262K	16.7M	16.7M
Luminance (cd/m²)	350	350	300
Contrast Ratio	400 : 1	800 : 1	500 : 1
Viewing angle	140(H) / 120(V)	170(H) / 170(V)	160(H) / 160(V)
Backlight Lifetime	40,000 hrs	25,000 hrs	50,000 hrs
Unit VESA Mount	75 x 75mm	100 x 100mm	100 x 100mm

Agency Approvals

The PAC Terminal hardware was tested in accordance with Technical Standard: EMC Directive 2014/30/EU and Technical Standard: FCC 47 CFR Part 15 Subpart B Class A, IC ICES-003 Issue 5-2012 Class A, ANSI C63.4-2009.

European Community Approvals Table

Test	Specification
Harmonic Current Emissions	EN 61000-3-2: 2014
Voltage Fluctuations and Flicker	EN 61000-3-3: 2013
Electrostatic Discharge Immunity	IEC 61000-4-2: 2008
Radiated Electromagnetic Field Immunity	IEC 61000-4-3: 2010
Electrical Fast Transient Burst Immunity	IEC 61000-4-4: 2012
Surge Immunity	IEC 61000-4-5: 2014
Radio Frequency Common Mode Immunity	IEC 61000-4-6: 2013
Power Frequency Magnetic Field Immunity	IEC 61000-4-8: 2009
Voltage Interrupts Immunity	IEC 61000-4-11: 2004
Radiated & Conducted Emissions	EN 61326-1: 2013 / EN55011: 2009/A1: 2010 CISPR11: 2009/A1: 2010 Group1, Class A
Protection Degree IP65 (Front Panel Only)	IEC 60529:2001 (IP6X & IPX5)

Physical Specifications

Physical Specifications Table

Category	Specification			
Model	PTL-007-1R1-1x 7.0" Plastic	PTA-007-1R1-1x 7.0" Aluminum	PTA-010-1R1-1x 10.1" Aluminum	PTA-015-1R1-1x 15.6" Aluminum
Dimensions W x H x D	7.95" x 5.87" x 1.57" (202.0 x 149.0 x 40.0) mm	7.95" x 5.87" x 1.57" (202.0 x 149.0 x 40.0) mm	11.22" x 7.44" x 1.93" (285.0 x 189.0 x 48.9) mm	16.22" x 10.93' x 2.38" (412.0 x 277.5 x 60.4) mm
Cutout Dimensions W x H	7.56" x 5.43" (192.0 x 138.0) mm	7.56" x 5.43" (192.0 x 138.0) mm	10.71" x 6.93" (272.0 x 176.0) mm	15.51" x 10.22" (394.0 x 259.5) mm
Weight	1.8 lbs. (0.8 kg)	2.2 lbs. (1.0 kg)	4.0 lbs. (1.8 kg)	10.0 lbs. (4.6 kg)
Unit VESA Mount	75 x 75 mm	75 x 75 mm	100 x 100 mm	100 x 100 mm

Touchscreen Chemical Resistance Specifications

Resistive Touchscreen Chemical Resistance Table

| Chemical Applied	Test for Transmittance Due to Haze		
	Transmissivity Before	Dwell Time	Transmissivity After
Window Cleaners	81.6%	1 hour @ 22 ~ 28ºC	81.6%
Alcohol	81.4%	1 hour @ 22 ~ 28ºC	81.3%
Toluene	81.4%	1 hour @ 22 ~ 28ºC	81.1%
Oil	81.1%	1 hour @ 22 ~ 28ºC	81.4%
Phenol	81.3%	1 hour @ 22 ~ 28ºC	81.3%
Bleach	81.3%	1 hour @ 22 ~ 28ºC	81.6%
Glycol	81.6%	1 hour @ 22 ~ 28ºC	81.7%
Isopropanol	81.9%	1 hour @ 22 ~ 28ºC	81.9%
Glutaraldehyde	81.9%	1 hour @ 22 ~ 28ºC	81.6%

Test method: Samples of touchscreens were tested as follows:

1. Measurement of spectral transmissivity in target areas before application of chemical agent.
2. Apply agent to target area.
3. Dwell for 1 hour at target temperature.
4. After test period, wipe agent from target area with clean cloth.
5. Measure the target area again to determine any changes in transmittance due to haze.

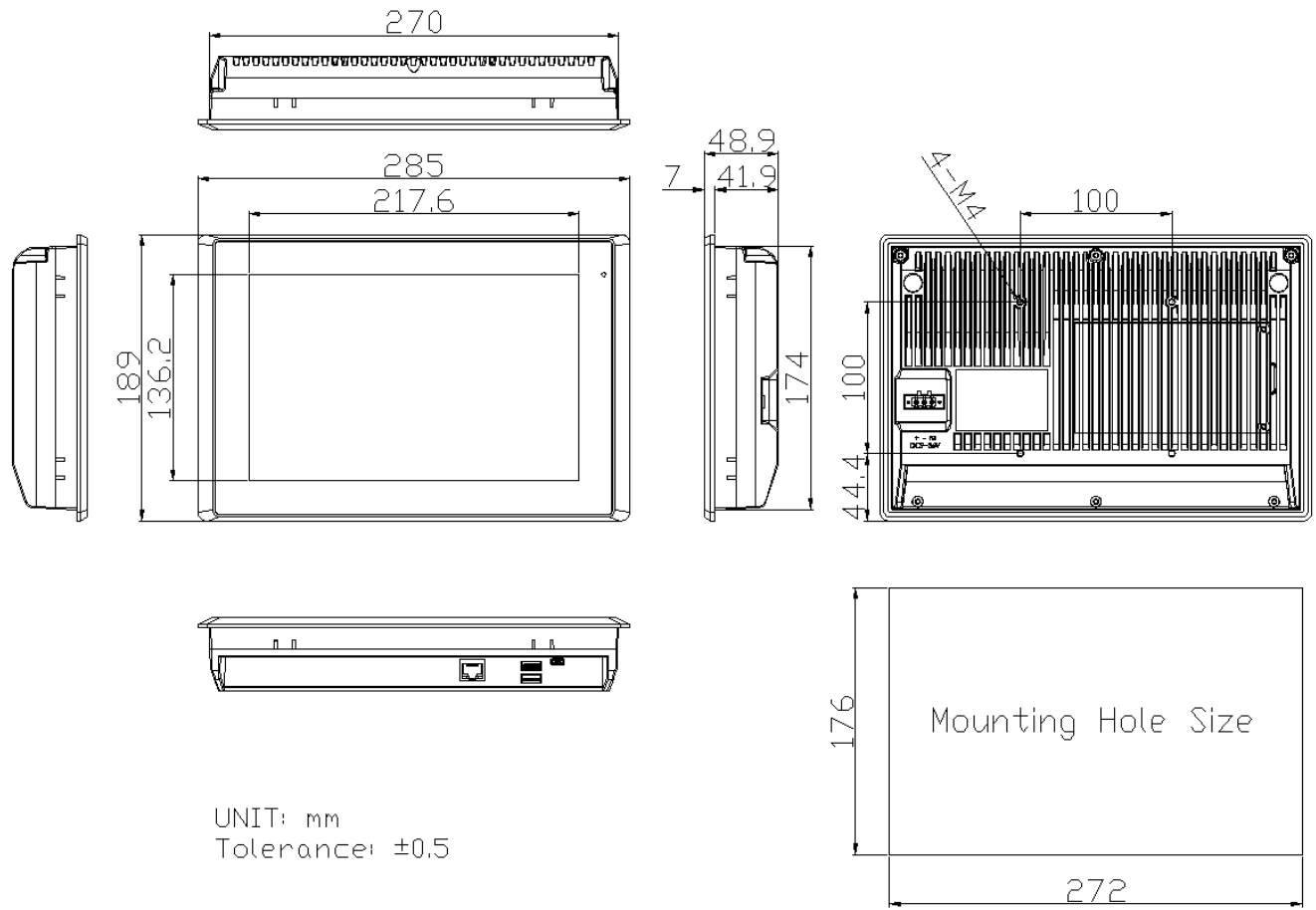## Physical Dimensions and Panel Cutouts
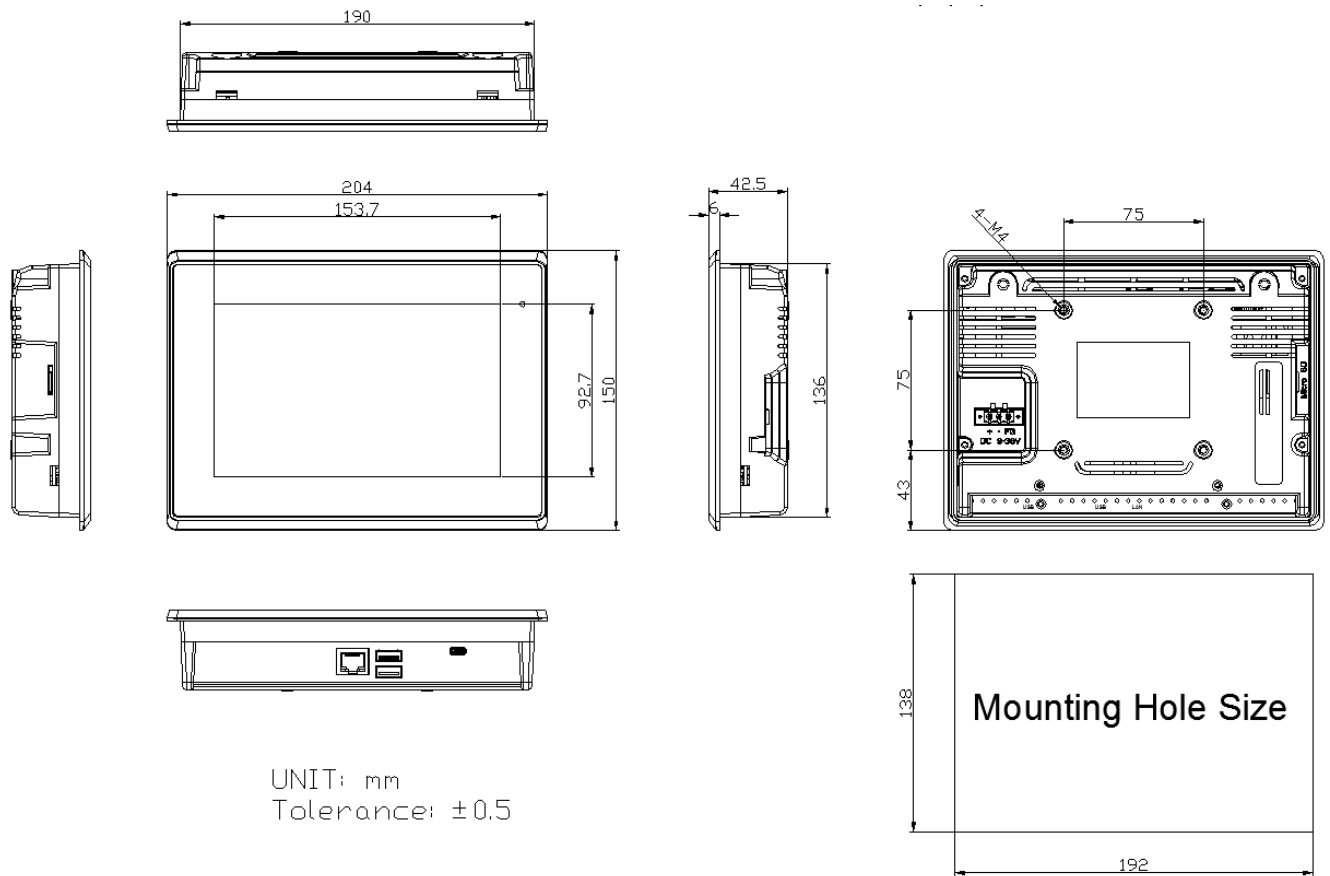
Figure A.1: PTL-007-1R1-1x (7.0" Plastic)
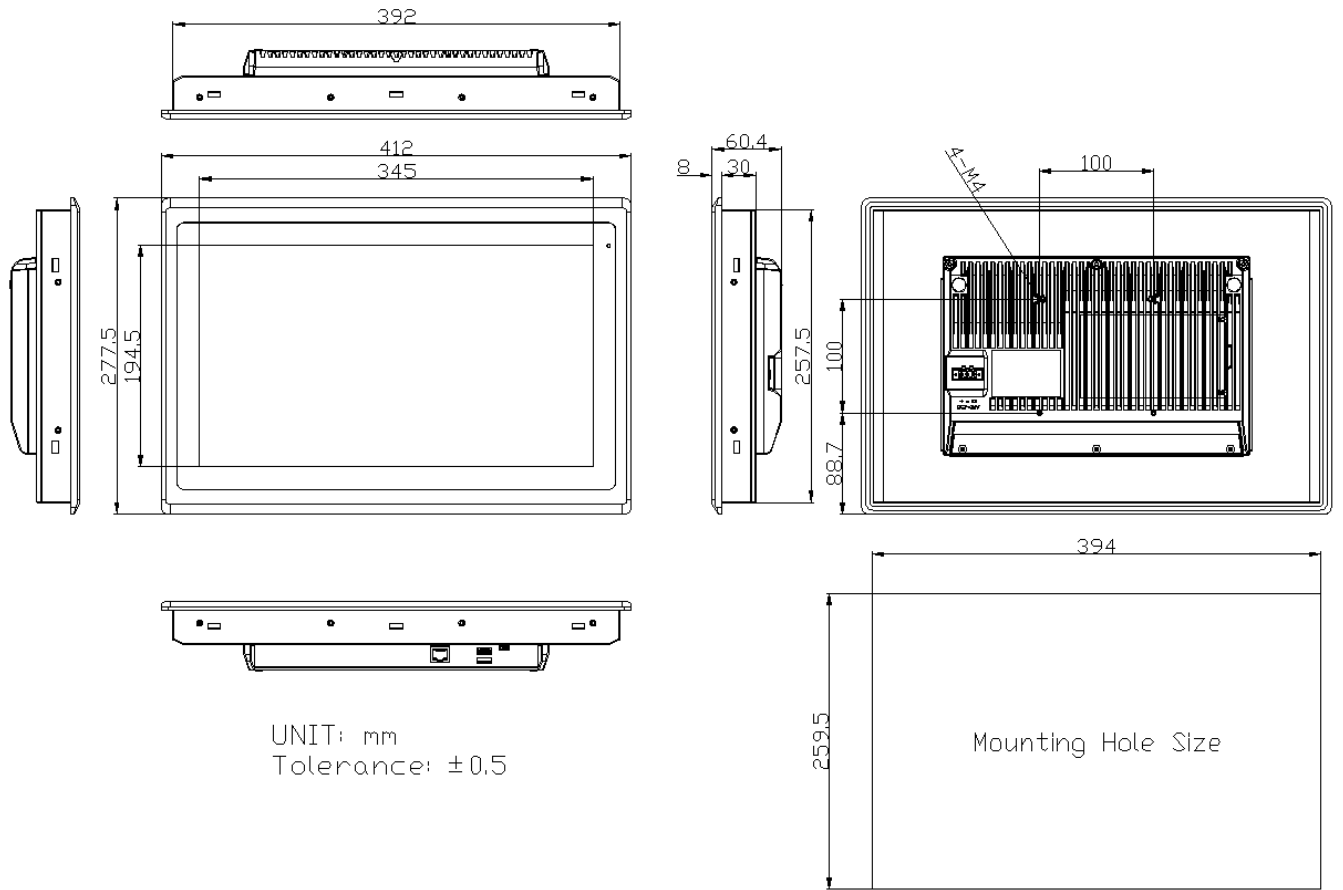
Physical Dimensions and Panel Cutout
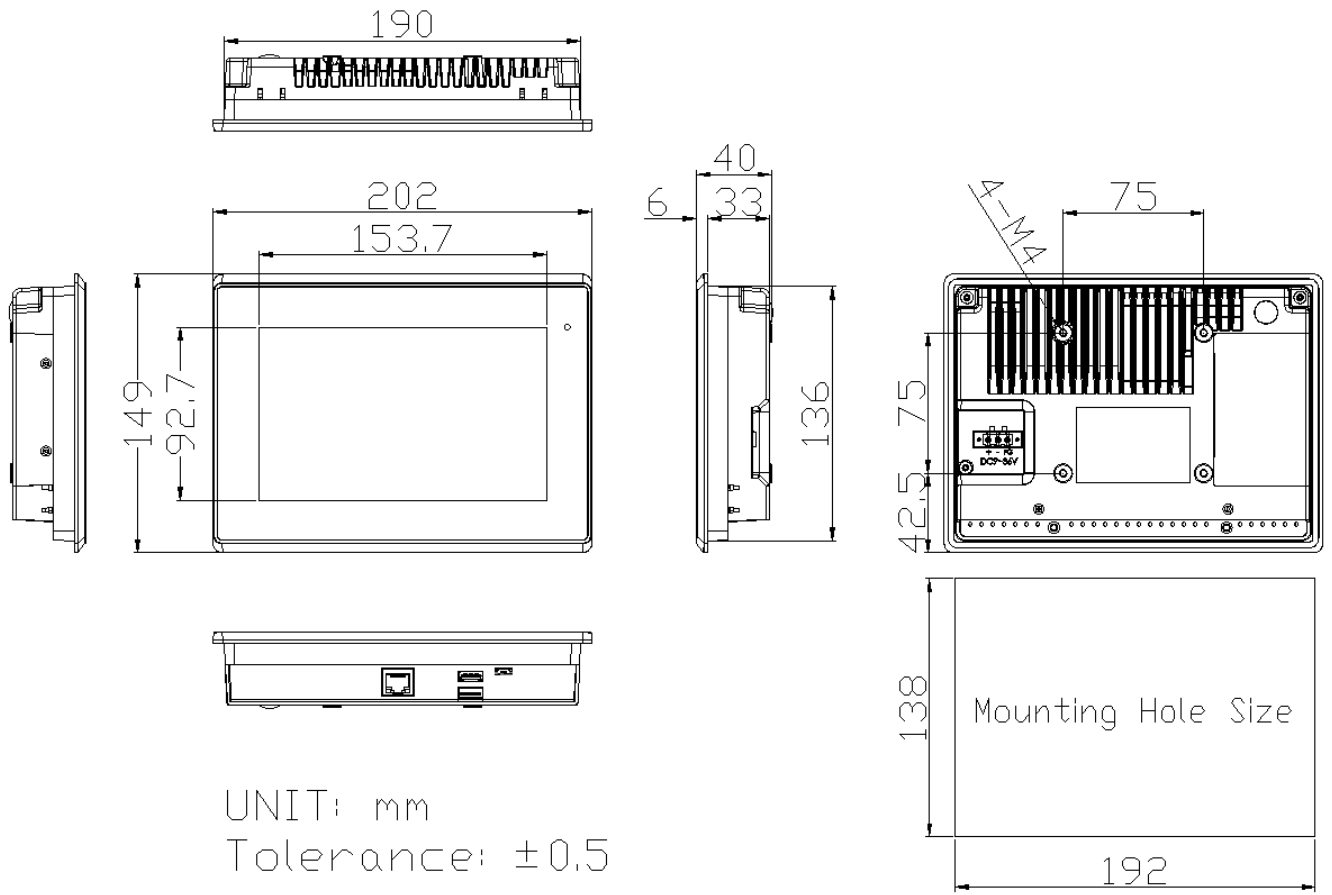
Figure A.2: PTA-007-1R1-1x (7.0" Aluminum)

Physical Dimensions and Panel Cutout

Figure A.3: PTA-010-1R1-1x (10.1" Aluminum)

Physical Dimensions and Panel Cutout

392

412
345

277.5
194.5

60.4
8
30

257.5
100
88.7

4-M4
100

UNIT: mm
Tolerance: ±0.5

394

259.5

Mounting Hole Size

Figure A.4: PTA-015-1R1-1x (15.6" Aluminum)

Physical Dimensions and Panel Cutout