

Installation Manual and Operating Instructions

TA360 Series USB Power Delivery Charging Port



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Manual number 9019411
Revision A, October 18, 2019

FOREWORD

This manual provides information intended for use by persons who, in accordance with current regulatory requirements, are qualified to install this equipment. If further information is required, please contact:

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We welcome your comments concerning this manual. Although every effort has been made to keep it free of errors, some may occur. When reporting a specific problem, please describe it briefly and include the manual part number, the paragraph/figure/table reference and the page number. Send your comments to:

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REVISION HISTORY

Rev.	Date	Approved	Detail
A	10/18/19	BAW	Initial release.

TABLE OF CONTENTS

SECTION 1 GENERAL DESCRIPTION

- 1.1 INTRODUCTION
- 1.2 TECHNICAL SPECIFICATIONS
 - 1.2.1 ELECTRICAL ATTRIBUTES
 - 1.2.2 PHYSICAL ATTRIBUTES
 - 1.2.3 QUALIFICATIONS
 - 1.2.4 VERSIONS

SECTION 2 PRE-INSTALLATION CONSIDERATIONS

- 2.1 COOLING
- 2.2 EQUIPMENT LOCATION
- 2.3 ROUTING OF CABLES
- 2.4 LIMITATIONS
- 2.5 MODIFICATIONS

SECTION 3 INSTALLATION PROCEDURES

- 3.1 GENERAL INFORMATION
- 3.2 UNPACKING AND INSPECTING
- 3.3 CABLE HARNESS
 - 3.3.1 WIRE GAUGE SELECTION
 - 3.3.2 PIN ASSIGNMENT INFORMATION
 - 3.3.3 HARNESS VERIFICATION
- 3.4 MOUNTING
- 3.5 INSTALLATION COMPLETION

SECTION 4 OPERATION

- 4.1 ELECTRICAL PERFORMANCE
- 4.2 PROTECTIVE FEATURES
 - 4.2.1 OVER-CURRENT PROTECTION
 - 4.2.2 SHORT CIRCUIT PROTECTION
 - 4.2.3 LOW INPUT VOLTAGE SHUTDOWN
 - 4.2.4 OVER-TEMPERATURE
 - 4.2.5 REVERSE POLARITY

SECTION 5 CONFORMANCE

- 5.1 CONTINUED AIRWORTHINESS STATEMENT
- 5.2 ENVIRONMENTAL QUALIFICATION STATEMENT

SECTION 1 GENERAL DESCRIPTION

1.1 INTRODUCTION

The TA360 Series USB Power Delivery (PD) Charging Port is a certified accessory that charges any electronic device that uses either a USB Type-A or USB Type-C charging connector.

The TA360 supports the latest version of the USB charging standard, known as USB Power Delivery (PD) version 2.0 and 3.0. This smart charger provides intelligent negotiation with the connected cable and device to supply variable voltage at up to 3 amps, allowing up to a total of 60 watts of charging power. This provides maximum charging speed to a wide variety of the latest electronic devices, including mobile phones, tablets - even laptops - and more. By determining the maximum power the device can support, the TA360 will always charge the device at the maximum speed allowed, while preventing the device from being overcharged or charged incorrectly. The TA360 also incorporates True Blue Power's proprietary Cable-Drop Compensator which cancels the effect of voltage lost through the cable, extending the flexibility of cable/device combinations while maintaining the fastest charging possible.

The TA360 accepts an input of 22-32 volts DC from the aircraft and converts it to an output voltage from 5 to 20 volts DC, at a current up to 3 amps per port. The TA360 incorporates the latest USB Type-C connector to supply PD power, offering a smaller and reversible port connection, in either a single or dual port configuration. Additionally, a version is available that includes both a traditional USB Type-A port combined with a USB PD Type-C port to support both legacy and newer cables and devices. Each version is available with or without lighting to conveniently locate the charging ports in low-light conditions. The unit has built-in protections for short circuit, over-current, and low voltage conditions. It is designed to protect against reverse polarity installation and has temperature monitoring and shutdown capability, allowing the unit to handle unforeseen conditions safely.

The TA360 is certified to FAA/TSO-C71 and qualified to multiple RTCA DO-160G environmental conditions for ease of installation and incorporation on any class or type of aircraft. The unit is easily mounted with two screws and a two-wire power input and can be installed throughout the aircraft, including the cockpit, cabin, galley, or other locations.

Small, compact and powerful, with plenty of installation flexibility, the TA360 is an ideal choice in any aircraft to charge the latest electronic devices at maximum speed.

1.2 TECHNICAL SPECIFICATIONS

1.2.1 Electrical Attributes

Input Voltage	22-32 VDC
Input Power	135 watts max; 4.8 amps @ 28 VDC
Output Voltage	Auto-adjustable: 5VDC, 9VDC, 15VDC, 20VDC per port (±0.25 VDC)
Output Power	3.0 amps max per port
Efficiency	~90% nominal

Table 1.1

1.2.2 Physical Attributes

Weight	1.0 oz (28 g) (single Type-C port) 1.8 oz (51 g) (dual Tpe-A/Type-C port) 2.1 oz (60) (dual Type-C port)
Dimensions (Single Port Units) (not including mating connector)	1.50 inches wide X 0.52 inches high X 2.0 inches deep (38mm wide X 13mm high X 50mm deep)
Dimensions (Dual Port Units) (not including mating connector)	1.50 inches wide X 1.03 inches high X 2.0 inches deep (38mm wide X 26mm high X 50mm deep)
Charging Port Connector	USB Type-A or USB Type-C
Input Connector Kit	MCIA P/N 9017960
Mounting	Panel mount; rear

Table 1.2

1.2.3 Qualifications

Certification:	FAA/TSO-C71
Environmental Qualification:	RTCA/DO-160G (See Section 5 for Categories/Levels)
USB Power Delivery (PD)	Version 2.0 and Version 3.0
USB Battery Charging (BC)	Version 1.2

Table 1.3

1.2.4 Versions

	Non-Lighted	Lighted	USB Connector
Part Numbers	6430360-1	6430360-11	Dual: Type A +Type C
	6430360-3	6430360-13	Dual: Type C +Type C
	6430360-7	6430360-17	Single: Type C

Table 1.4

SECTION 2 PRE-INSTALLATION CONSIDERATIONS

2.1 COOLING

No external cooling is required. The unit will become warm when in use. This is normal and within operational parameters. No special mounting considerations are required; however, mounting to a metal surface can help dissipate any heat generated and extend the life of the product.

2.2 EQUIPMENT LOCATION

The TA360 High Power USB Charging Port is designed for mounting flexibility, allowing for installation in the cockpit or in the cabin. It is designed for panel mounting and can be installed in a rectangular configuration or, with an available installation kit, can be front mounted with a cosmetic cover plate. An instrument mounting adapter bracket is also available to easily mount the unit in a standard 2-inch round instrument opening that may already exist in the cockpit panel. There are two versions to choose from which allow the input connector to be located either on the rear of the unit or from the bottom.

The unit can be mounted in any orientation. Clearance should be provided for the mating connector which may require up to an additional inch beyond the rear of the unit.

2.3 ROUTING OF CABLES

Avoid sharp bends in cabling and routing near aircraft control cables. Avoid close proximity and contact with aircraft structures, avionics equipment or other obstructions that could chafe wires during flight and cause undesirable effects.

2.4 LIMITATIONS

Environmental qualifications were verified per RTCA DO-160, Revision G in lieu of those identified within the minimum performance standards (MPS) of the TSO.

The conditions and tests for TSO approval of this article are minimum performance standards. Those installing this article, on or in a specific type or class of aircraft, must determine that the aircraft installation conditions are within the TSO standards, specification of the article and deviations as listed above. TSO articles must have separate approval for installation in an aircraft. The article may be installed only according to 14 CFR part 43 or the applicable airworthiness requirements.

The USB PD is an extremely capable new technology for personal electronic devices. Beyond the physical format of the Type-C connector, it also allows for a variety of interface options when communicating with compatible devices. This device-to-charger communication is defined within the USB 3.1 Specification and Power Delivery standards. However, manufacturers of consumer electronic devices and/or cables may choose to implement proprietary versions or modifications of the USB standards to operate specifically with their own charging equipment. The TA360 has been tested with and supports a wide variety of devices now emerging on the open market. However, compatibility with all devices may not be guaranteed. True Blue Power continues to be proactive in evaluating new devices and strives to continually improve the product as needed to serve the vast majority of USB-charged electronic products.

2.5 MODIFICATIONS

Each TA360 USB Power Delivery Charging Port (part number 6430360-()) has a nameplate that identifies the manufacturer, model, part number, description, certifications and technical specifications of the unit. The nameplate also includes the “MOD” or modification status representing notable changes in the design of the unit. The following identifies each “MOD” or modification.

Modification (MOD) 0 is the initial release of the TA360 USB Power Delivery Charging Port and is identified on the nameplate by the lack of marking on the MOD numbers 1 through 9 (i.e. 1-9 are visible).

All subsequent modifications are identified on the nameplate by the marking/blacking out of that particular MOD number (i.e. for MOD 1, the number 1 is not visible and 2-9 are visible). See Figure 2.1 for examples.

For additional details regarding design changes to the TA360 USB Power Delivery Charging Port, refer to individual Service Bulletins associated with each MOD.

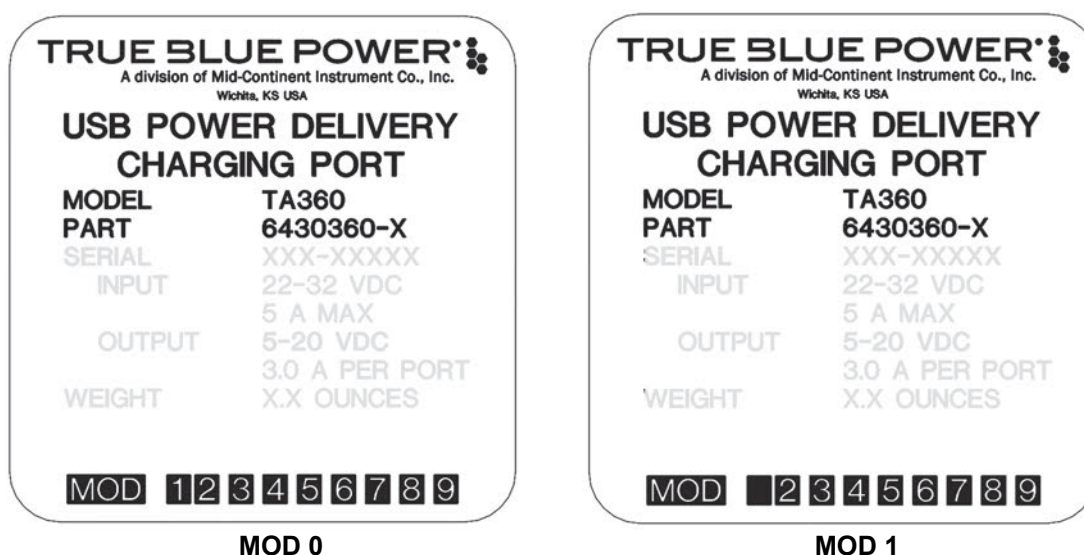


Figure 2.1
Nameplate and MOD Status Examples

SECTION 3 INSTALLATION PROCEDURES

3.1 GENERAL INFORMATION

This section contains interconnect diagrams, mounting dimensions and other information pertaining to the installation of the TA360 Single and Dual USB Charger. After installation of cabling and before installation of the equipment, ensure that power and ground are applied to the proper pins specified in Section 3.3.2, Pin Assignment Information.

3.2 UNPACKING AND INSPECTING EQUIPMENT

When unpacking this equipment, make a visual inspection for evidence of any damage that may have occurred during shipment. The following parts should be included:

- | | |
|--|----------------------|
| a. High Power USB Charging Port | MCIA P/N 6430360-() |
| b. Installation Manual | MCIA P/N 9019411 |
| c. Connector Kit | MCIA P/N 9017960 |
| i. Mating Connector, 2-pin | |
| ii. Pins (4) (2 required, 2 spares) | |
| iii. Screws, #4-40 x 1/4 flat-head (2) | |
| iv. Screws, #4-40 x 5/16 flat-head (2) | |

Optional Equipment Available:

- | | |
|---|--------------------|
| a. Instrument Mount Adapter Kit | MCIA P/N 9017947 |
| b. Single Rear Mount Installation Kit | MCIA P/N 9019351-1 |
| c. Dual Rear Mount Installation Kit | MCIA P/N 9017958 |
| d. Single Rear Mount Circular Cover Plate | MCIA P/N 9019384-3 |
| e. Dual Rear Mount Circular Cover Plate | MCIA P/N 9019384-4 |

Equipment Not Provided:

- | | |
|-----------------------------------|--------------------------------------|
| a. Cable Harness Wire | See Section 3.3.1 for specifications |
| b. Circuit Breaker Recommendation | 5 amp |

3.3 CABLE HARNESS

Construct the cable harness following the instructions outlined below and per Figure 3.1. Refer to Section 2: Pre-Installation Considerations, for routing precautions.

3.3.1 Wire Gauge Selection

Use of PTFE, ETFE, TFE, Teflon or Tefzel insulated wire is recommended for aircraft use. The wire harness should utilize 18-22 AWG stranded wire. Refer to table 3.1 below.

Wire Gauge	Wire Length
18 AWG stranded wire	30 ft
20 AWG stranded wire	20 ft
22 AWG stranded wire	10 ft

Table 3.1
Wire Gauge and Length

Note: Pins should be crimped using Molex Hand Crimp Tool 63819-0000 (Preferred), 63811-2800 (obsolete) or 11-01-0200 (obsolete). See the Molex Hand Crimp Tool User Manual for crimp procedures.

3.3.2 Pin Assignment Information

INPUT POWER:

Pin A (keyed): +28 VDC

Pin B: Ground

3.3.3 Harness Verification

Note:

The TA360 has built-in reverse polarity protection for the power connector. If Pins A and B are swapped, the unit will not function but will not be damaged.

Once the cable harness is prepared, prior to connecting the TA360, activate the aircraft power bus and use a multimeter to verify that aircraft power and ground is supplied with appropriate voltage on the proper pins within the mating harness.

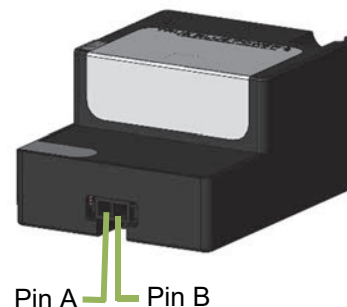


Figure 3.1
Power Input

3.4 MOUNTING

The TA360 can be installed in one of five ways:

- rear mount, rectangular
- instrument mount ^{1 2 3}
- rear mount, decorative cover plate ^{1 4}
- rear mount, circular cover plate ^{1 3}

¹ Installation kit required. See Section 3.2, Optional Equipment Available for part number reference

² Dual port units only

³ Black anodized

⁴ Brushed aluminum, bare (appropriate for additional plating/finish)

Prepare the panel cutout as shown in Figures 3.4 thru 3.11 per the selected mounting option.

- Countersinks shown in the panel cutouts for flat head screws are optional. However, flat head screws are provided for flush appearance. For Rear Mount Cover Plate Installations, countersinks in the panel are required.
- For Rear Mount Installations:
Mounting screws length MUST be between (PT +0.150") and (PT +0.210"). [PT = panel thickness]
Mounting screws provided with the unit are 0.24" and 0.31". (accommodates 0.030" to 0.160" PT)
For PT greater than 0.125, the USB connector will be below the surface of the panel (below flush).
- For Rear Mount Installation with Cover Plate: Panel thickness greater than 0.065 will cause the USB connector to be below the surface of the Cover Plate (below flush).

3.5 INSTALLATION COMPLETION

Prior to operating the unit in the aircraft, it is recommended to verify the output and functionality of the unit. In order to prevent accidental damage to other systems, it is not recommended to attach the output to other equipment prior to verification. Verify the output of the unit at the terminating end of the cable with a multimeter to ensure proper voltage and polarity. Once verified, installation can be completed, and functionality should be checked.

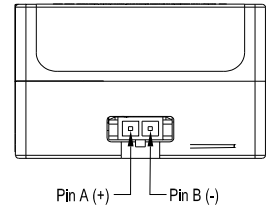
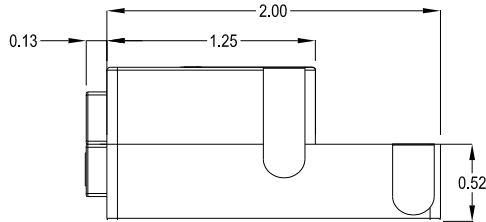
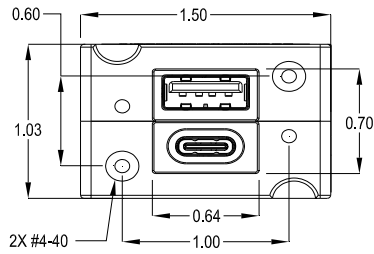


Figure 3.2
TA360 Outline Drawing
(Dual port, Type A/C version shown)

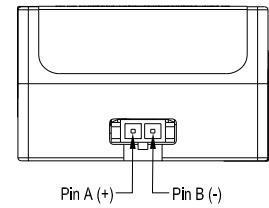
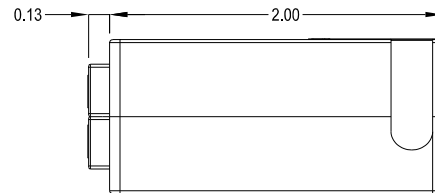
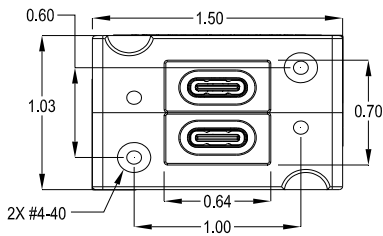


Figure 3.3
TA360 Outline Drawing
(Dual port, Type C/C version shown)

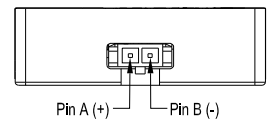
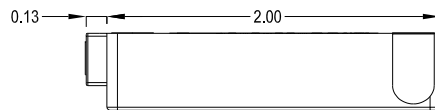
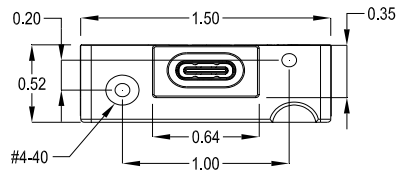


Figure 3.4
TA360 Outline Drawing
(Single, Type C version shown)

Panel Cutout Detail

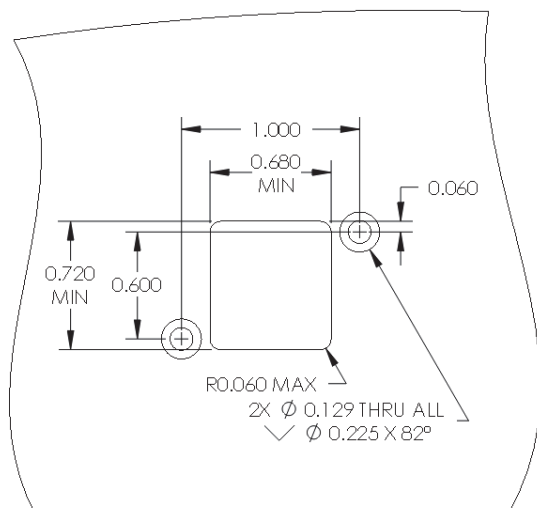
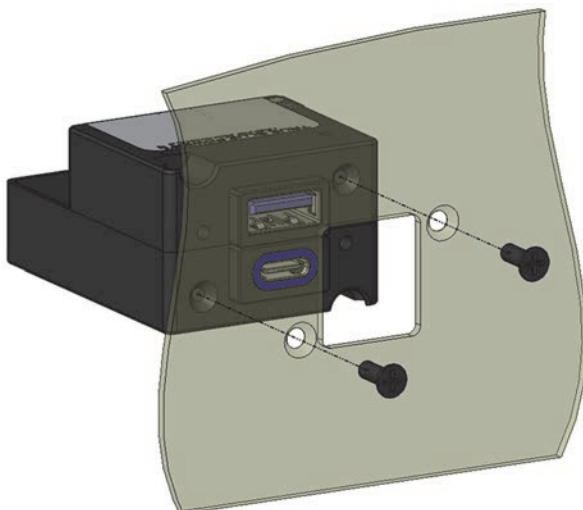
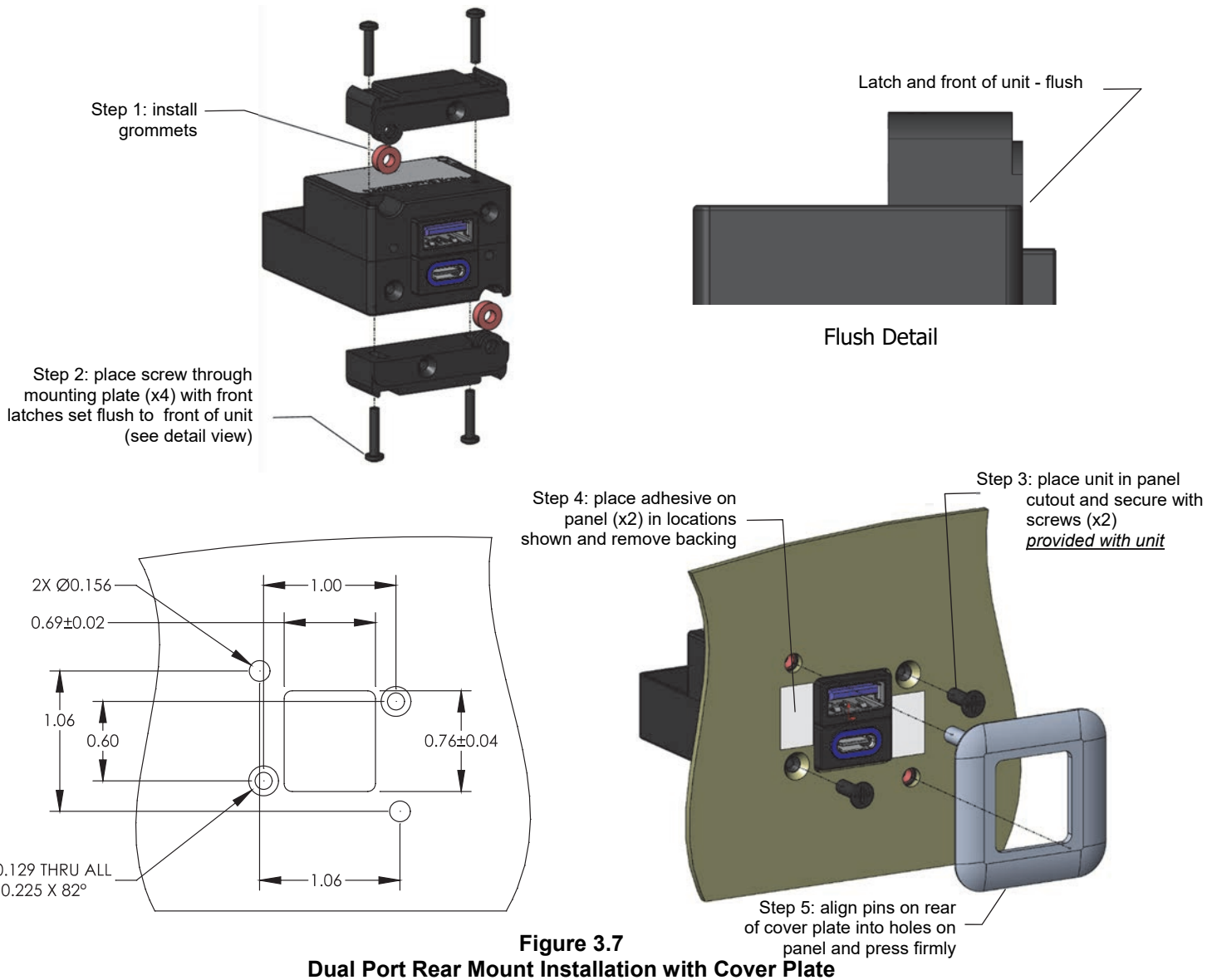
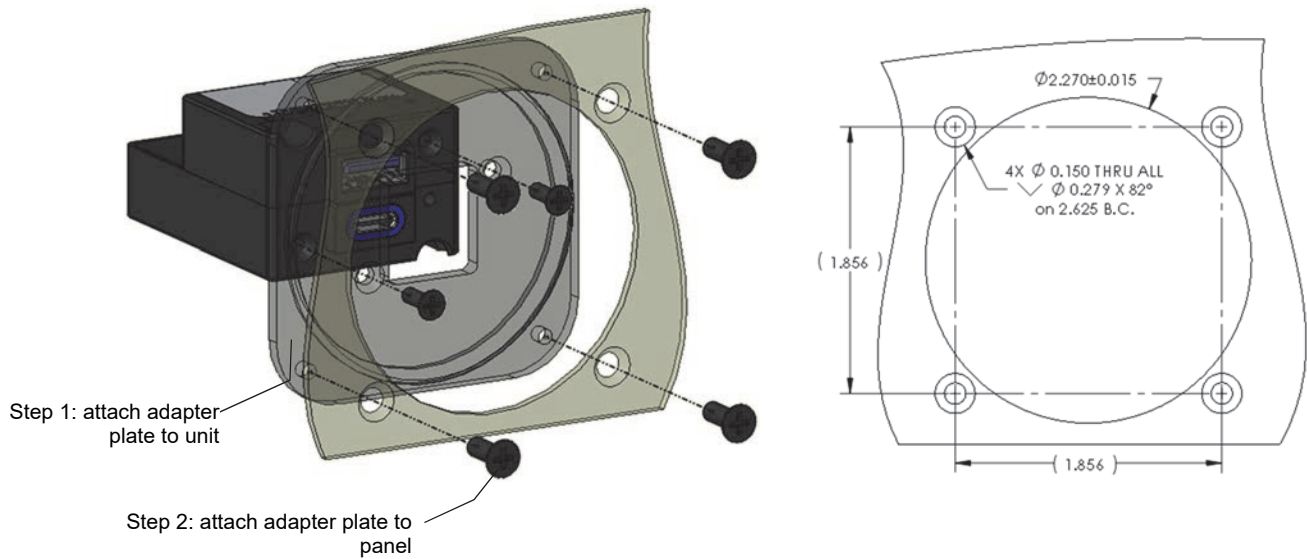


Figure 3.5
Dual Port Rear Mount Installation



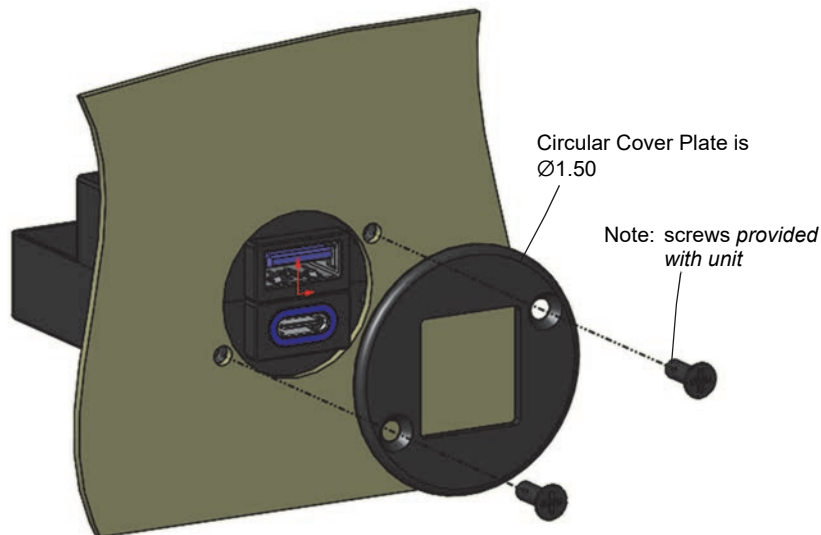
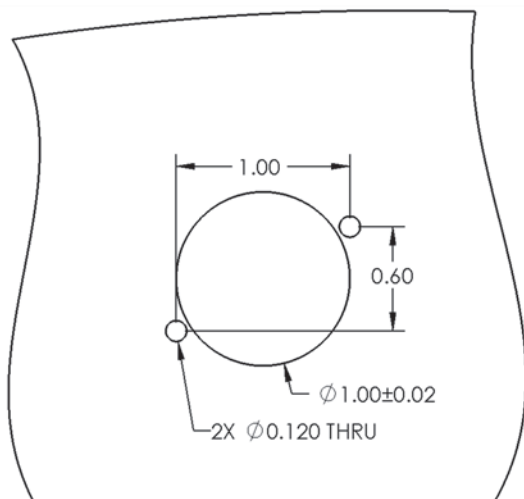


Figure 3.8
Dual Port Rear Mount Installation with Circular Cover Plate

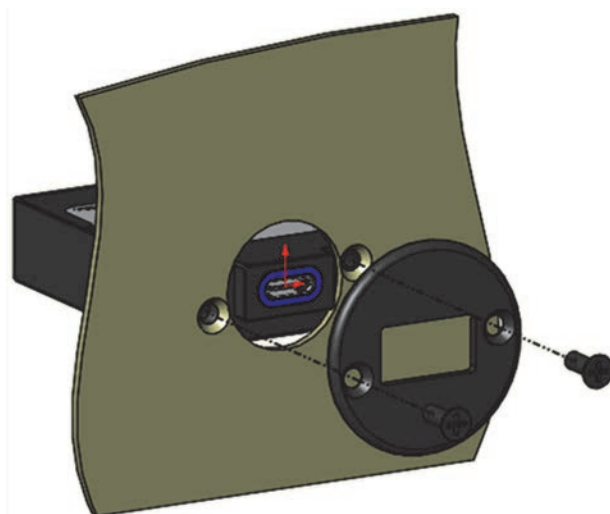
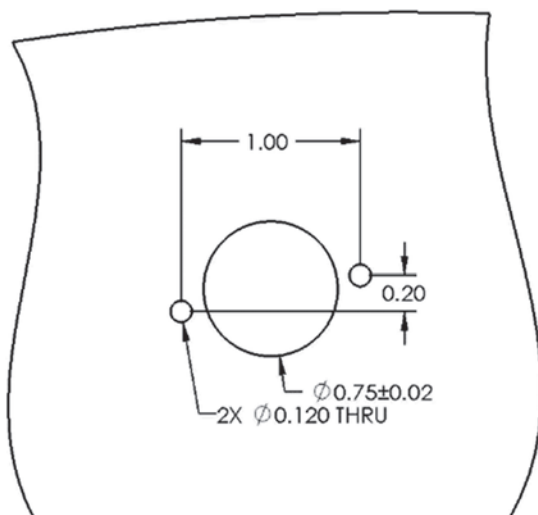


Figure 3.9
Single Port Rear Mount Installation with Circular Cover Plate

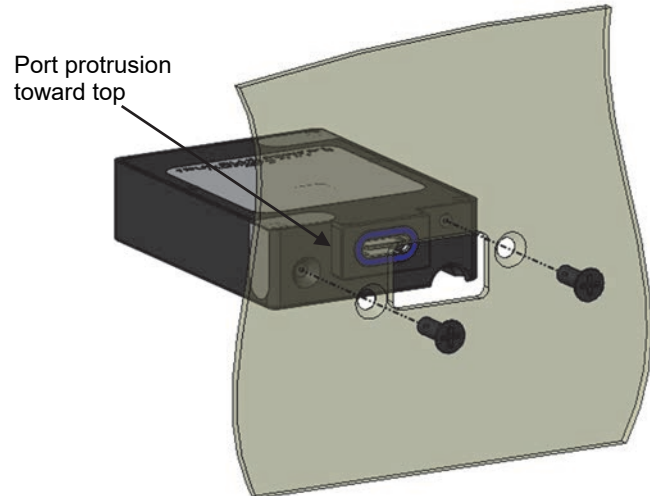
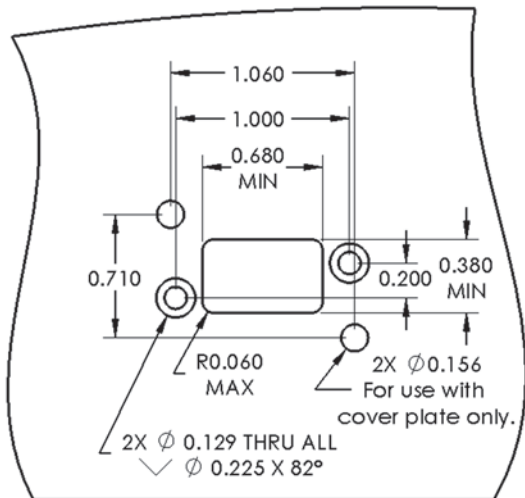


Figure 3.10
Single Port Rear Mount Installation

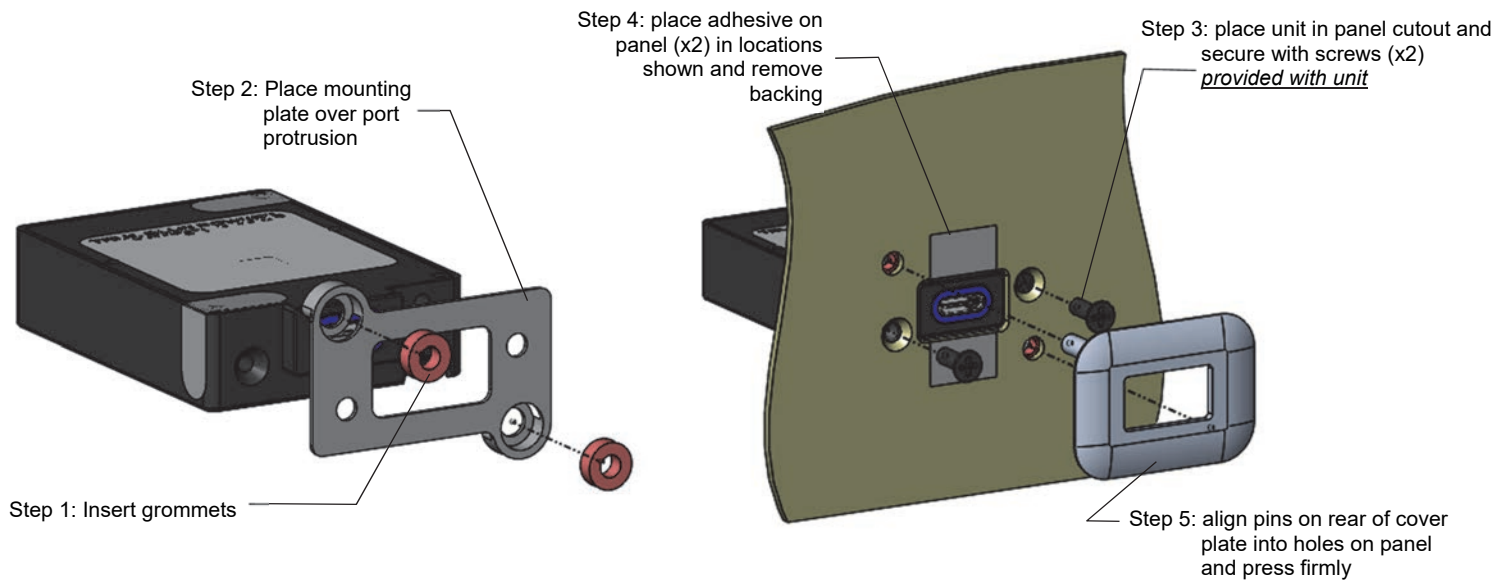


Figure 3.11
Single Port Rear Mount Installation with Cover Plate

SECTION 4 OPERATION

4.1 ELECTRICAL PERFORMANCE

The TA360 USB Power Delivery Charging Port converts an aircraft (DC) input voltage within the range specified to a voltage between 5VDC and 20VDC on the output, depending on the level negotiated between the device and the charger. This output power is independently applied to single or dual USB-C connectors in accordance with the *USB 3.1* and *USB Power Delivery* standards.

For the dual port option that includes a USB Type-A connector, the USB D+ and D- data lines communicate with the USB portable device to tell the device it is a dedicated charging port (DCP), capable of a higher current than a standard USB port. This allows the USB portable device to draw up to 3.0 Amps at 5VDC.

The unit is designed as a DC-to-DC converter with a series switch on each output to regulate current applied to that output. Each series switch independently reduces the output current to a safe level if the USB portable device draws excess current, is shorted or has a fault.

If the temperature of the TA360 becomes elevated due to a fault or excessive load, the device will seamlessly communicate with the USB portable device to lower the charge current. This allows the device to continue charging while the unit returns to a temperature within designed limits. When the temperature returns to a safe level the TA360 will automatically reestablish the higher charge current level with the device and continue charging.

4.2 PROTECTIVE FEATURES

4.2.1 Over-Current Protection

The TA360 monitors power individually on each port. During an over-current condition, the output power is disabled until the over-current condition is resolved with the connected device.

4.2.2 Short Circuit Protection

The TA360 will survive a short circuit event without permanent damage. The unit disables output power as it would for over-current protection until the short is removed.

4.2.3 Low Input Voltage Shutdown

If the input voltage applied to the TA360 drops below 22 VDC the unit will shut down until the applied voltage returns to a level within range.

4.2.4 Over-Temperature

When the internal temperature of the TA360 exceeds designed thresholds, the unit will shut down and stop providing power. When the temperature returns to an acceptable level the unit will automatically begin providing power as requested.

4.2.5 Reverse Polarity

The TA360 will protect itself against being installed with the input power wires reversed.

SECTION 5 CONFORMANCE

5.1 CONTINUED AIRWORTHINESS STATEMENT

No periodic scheduled maintenance or calibration is necessary for continued airworthiness of the TA360 Series USB PD Charging Port. If the unit fails to perform to specifications, the unit must be removed and serviced by Mid-Continent Instruments and Avionics or their authorized designee.

5.2 ENVIRONMENTAL QUALIFICATION STATEMENT

MODEL NUMBER: TA360 Series **PART NUMBER:** 6430360-()
NOMENCLATURE: USB Power Delivery Charging Port **CERTIFICATION:** FAA TSO-C71
MANUFACTURER: True Blue Power, a division of Mid-Continent Instrument Co., Inc.
ADDRESS: 9400 E. 34th St. North, Wichita, KS 67226, USA.

MANUFACTURERS SPECIFICATIONS:

Minimum Performance Specifications: TS742, TDS742
Environmental Test Standard: RTCA DO-160, Revision G, dated 12/08/10
Qualification Test Reports: QTR3904-3908, QTR3913, QTR3915-3918, QTR2621, QTR3925-3926

CONDITIONS	SECTION	DESCRIPTION OF TEST
Temperature and Altitude	4	Category F1
Temperature Variation	5	Category S2
Humidity	6	Category B
Operational Shock and Crash Safety	7	Category B
Vibration	8	Category R, Curves C, C1
Explosion	9	Category X
Waterproofness	10	Category X
Fluids	11	Category X
Sand and Dust	12	Category X
Fungus	13	Category F
Salt Spray	14	Category X
Magnetic Effect	15	Category Z
Power Input	16	Category B(XX)
Voltage Spike	17	Category B
Audio Freq Conducted Susceptibility	18	Category R
Induced Signal Susceptibility	19	Category X
Radio Frequency Susceptibility	20	Category X
Emission of Radio Frequency Energy	21	Category H
Lightning Induced Transient Susceptibility	22	Category X
Lightning Direct Effects	23	Category X
Icing	24	Category X
ESD	25	Category A
Fire, Flammability	26	Category C
REMARKS:		