Trusted Controller Chassis

Product Overview

The Trusted® Controller Chassis can be either swing frame or fixed frame mounted and houses the Trusted Triple Modular Redundant (TMR) Processor and Trusted Input/Output (I/O) and / or Interface Modules.

The Chassis may be panel (rear) mounted by the addition of a Panel Mounting Kit, (T8380) which comprises a pair of brackets with rear facing ears.

The Inter-Module Bus (IMB) backplane is part of the Trusted Controller Chassis and provides electrical interconnection and other services for the modules.

Features:

- 2 mm x 90 mm (3.6 inches) Trusted TMR Processor slots.
- 8 mm x 30 mm (1.2 inches) single width Trusted I/O and / or Interface Module slots.
- No user-serviceable parts inside.
- Fast assembly.
- Minimum tooling/parts.
- 32, 48, 64 and 96-way DIN 41612 I/O port connector capability.
- Cable entry options.
- Convection cooling of modules through the chassis.

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PREFACE

In no event will Rockwell Automation be responsible or liable for indirect or consequential damages resulting from the use or application of this equipment. The examples given in this manual are included solely for illustrative purposes. Because of the many variables and requirements related to any particular installation, Rockwell Automation does not assume responsibility or reliability for actual use based on the examples and diagrams.

No patent liability is assumed by Rockwell Automation, with respect to use of information, circuits, equipment, or software described in this manual.

All trademarks are acknowledged.

DISCLAIMER

It is not intended that the information in this publication covers every possible detail about the construction, operation, or maintenance of a control system installation. You should also refer to your own local (or supplied) system safety manual, installation and operator/maintenance manuals.

REVISION AND UPDATING POLICY

This document is based on information available at the time of its publication. The document contents are subject to change from time to time. The latest versions of the manuals are available at the Rockwell Automation Literature Library under "Product Information" information "Critical Process Control & Safety Systems".

TRUSTED RELEASE

This technical manual applies to **Trusted Release: 3.6.1**.

LATEST PRODUCT INFORMATION

For the latest information about this product review the Product Notifications and Technical Notes issued by technical support. Product Notifications and product support are available at the Rockwell Automation Support Centre at
http://rockwellautomation.custhelp.com

At the Search Knowledgebase tab select the option "By Product" then scroll down and select the Trusted product.

Some of the Answer ID’s in the Knowledge Base require a TechConnect Support Contract. For more information about TechConnect Support Contract Access Level and Features please click on the following link:

https://rockwellautomation.custhelp.com/app/answers/detail/a_id/50871

This will get you to the login page where you must enter your login details.

IMPORTANT A login is required to access the link. If you do not have an account then you can create one using the "Sign Up" link at the top right of the web page.

DOCUMENTATION FEEDBACK

Your comments help us to write better user documentation. If you discover an error, or have a suggestion on how to make this publication better, send your comment to our technical support group at http://rockwellautomation.custhelp.com

SCOPE

This manual specifies the maintenance requirements and describes the procedures to assist troubleshooting and maintenance of a Trusted system.

WHO SHOULD USE THIS MANUAL

This manual is for plant maintenance personnel who are experienced in the operation and maintenance of electronic equipment and are trained to work with safety systems.

SYMBOLS

In this manual we will use these notices to tell you about safety considerations.

	SHOCK HAZARD: Identifies an electrical shock hazard. If a warning label is fitted, it can be on or inside the equipment.
	WARNING: Identifies information about practices or circumstances that can cause an explosion in a hazardous environment, which can cause injury or death, property damage or economic loss.
	ATTENTION: Identifies information about practices or circumstances that can cause injury or death.
	CAUTION: Identifies information about practices or circumstances that can cause property damage or economic loss.
	BURN HAZARD: Identifies where a surface can reach dangerous temperatures. If a warning label is fitted, it can be on or inside the equipment.
	This symbol identifies items which must be thought about and put in place when designing and assembling a Trusted controller for use in a Safety Instrumented Function (SIF). It appears extensively in the Trusted Safety Manual.
IMPORTANT	Identifies information that is critical for successful application and understanding of the product.
NOTE	Provides key information about the product or service.
TIP	Tips give helpful information about using or setting up the equipment.

WARNINGS AND CAUTIONS

WARNING: EXPLOSION RISK

Do not connect or disconnect equipment while the circuit is live or unless the area is known to be free of ignitable concentrations or equivalent

AVERTISSEMENT - RISQUE D'EXPLOSION

Ne pas connecter ou déconnecter l'équipement alors qu'il est sous tension, sauf si l'environnement est exempt de concentrations inflammables ou équivalente

MAINTENANCE

Maintenance must be carried out only by qualified personnel. Failure to follow these instructions may result in personal injury.

CAUTION: RADIO FREQUENCY INTERFERENCE

Most electronic equipment is influenced by Radio Frequency Interference. Caution should be exercised with regard to the use of portable communications equipment around such equipment. Signs should be posted in the vicinity of the equipment cautioning against the use of portable communications equipment.

CAUTION:

The module PCBs contains static sensitive components. Static handling precautions must be observed. DO NOT touch exposed connector pins or attempt to dismantle a module.

ISSUE RECORD

Issue	Date	Comments
8	Sep 05	Format
9	Aug 06	TC-006 connection
10	Sep 06	Earthing
11	Feb 10	System |Configuration deleted
12	Jul 12	Correction
13	Jun 16	Rebranded and updated to incorporate IEEE standards with correction of typographical errors and also standardise the Relative Humidity and Operating Temperature Specifications.

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1. Description

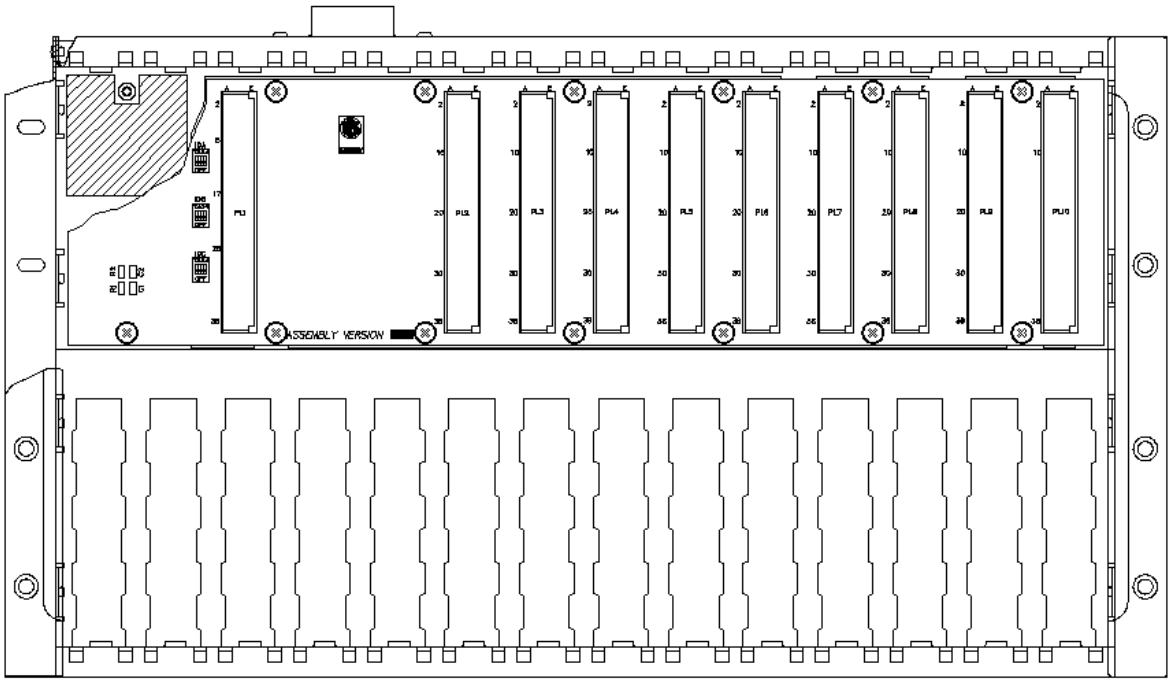

Figure 1 Trusted Controller Chassis and Backplane

The Controller Chassis may be populated in different ways dependent on the requirements of each system, to accommodate a maximum of 8 single-width (30 mm) Trusted I/O and / or Interface Module slots and up to two triple-width (90 mm) Trusted TMR Processors. The Chassis assembly has screw positions, four on each flange, that are used to enable secure attachment to the side brackets on the frame.

Modules are inserted by sliding them carefully into their slot position, ensuring that the 'U'-channels of the module top and bottom casings engage the raised guides of the upper and lower chassis plates. Ejector levers on the modules secure the handleless modules within the Chassis.

A 90 mm space must be provided between chassis on a frame to assist the cooling process.

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2. Inter-Module Bus Backplane

The Chassis houses the Inter-Module Bus backplane which is a single, printed circuit board assembly. The Inter-Module Bus backplane provides the electrical interconnections between modules in a Trusted Controller Chassis. These interconnections are part of the physical layer communications between modules.

Figure 2 shows a simplified top-level block diagram of the Inter-Module Bus backplane.

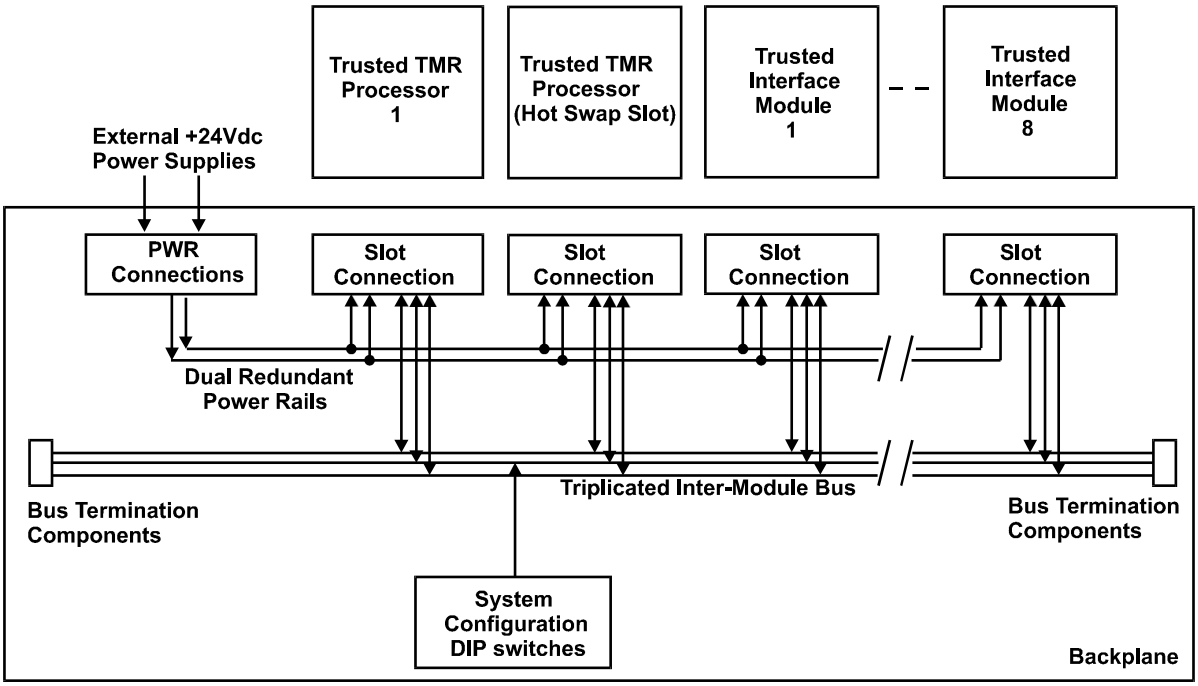

Figure 2 Inter-Module Bus Backplane

Please note that the above diagram illustrates only Trusted Interface modules. The chassis can also accommodate a combination of Trusted I/O and / or Interface Modules.

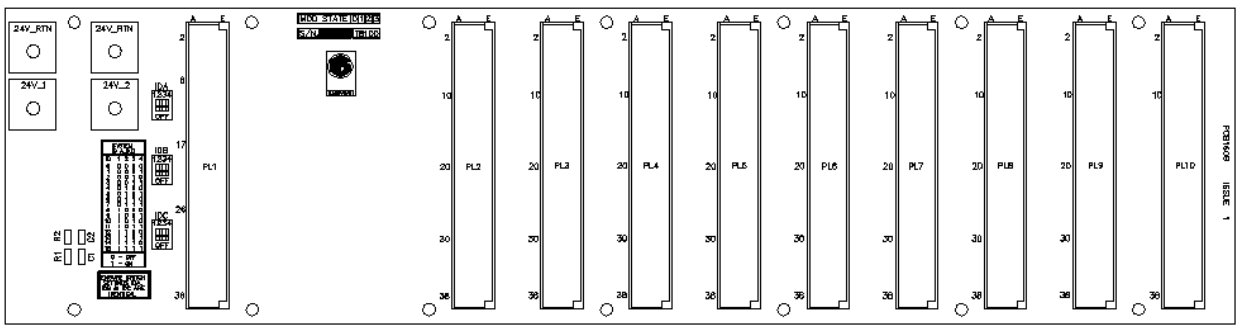

Figure 3 Backplane Front View

Note: The three switches shown on the backplane are unused and should be left with the tape covering them.

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3. Bus Terminations

The backplane contains termination circuits for certain bus signals. The terminators are used to reduce signal reflections on critical signals and also to provide default logic levels for open or tri-stated signals. Termination circuits are located at the end slot positions, 1 and 10.

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4. Bus Connections

All bus connections are triplicated except for the +24 Vdc external power supply, which is dual redundant.

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5. Slot Positions

The two left-most module positions are triple width and are used to accommodate Trusted TMR Processors. The first slot is designated Logical 0 in the system configuration and there is no need to configure the second slot. The remaining module positions are designated Logical 1 to 8 from left to right. The modules occupying these slots are defined by the user via the System Configuration Manager - see PD-T8082 Trusted Toolset Suite.

Notes:

1. The Trusted TMR Interfaces are designed to operate in the active/standby mode, known as Companion Slot. One or both positions may be occupied, but both must be configured in the System Configuration manager to allow for hot standby replacement. If both positions are occupied, the active module defaults to the left-most position, i.e. the lower chassis slot number.
2. In multi-chassis systems, Logical slots 1 and 2 are normally reserved for the Trusted TMR Expander Interfaces.
3. Communications modules may be fitted in any Processor chassis or Expander chassis slot, but Peer to Peer communications is only supported if it is fitted in a Processor chassis.

All connections between the module and the backplane are via a single, self-aligning high-density connector. The male connector is on the backplane.

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6. External Power

The backplane has two terminal blocks, one for each of the redundant external +24 Vdc power supplies, which are connected to the input power connectors. Redundant power is supplied to all modules in the Chassis.

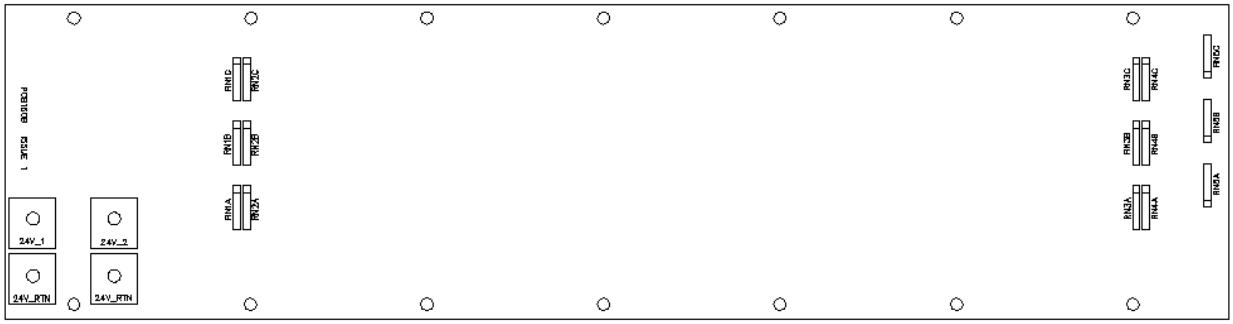

Figure 4 Backplane Back View

The dual 24 Vdc input power supply leads are connected to terminal blocks TB1 and TB2 on the rear of the chassis backplane.

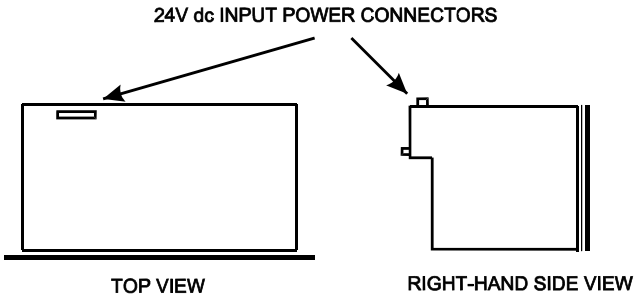

Figure 5 Chassis 24 Vdc Input Power Connectors

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7. SmartSlot Referencing

For a SmartSlot configuration, the secondary slot is not required to be unique to each primary slot. Instead, a single secondary slot can be shared among many primary slots. This technique provides the highest density of modules to be fitted in a given physical space. SmartSlot between chassis can be performed if the chassis are version 2 (or higher) as these have the connector fitted to enable connection of a TC-006 Dual I/O SmartSlot Cable that ensures the IMB 0 V of each chassis is at the same potential.

7.1. Location of SmartSlots

Design considerations should be given to the location of SmartSlots within the system. One option is to allocate a spare slot on each chassis or per module type. Another option is to allocate one SmartSlot per system panel; if this option is selected then the IMB 0 V of each chassis needs connecting together using a TC-006 cable. Each chassis (processor and expander) requires a TC-006 to connect to the Molex socket on the back of each chassis. The crimps on the other end are taken to terminals that are commoned together. This ensures that each isolated IMB 0 V is at the same potential. Refer to PD-TC600 Trusted Dual IO SmartSlot Cables for further information on TC-006.

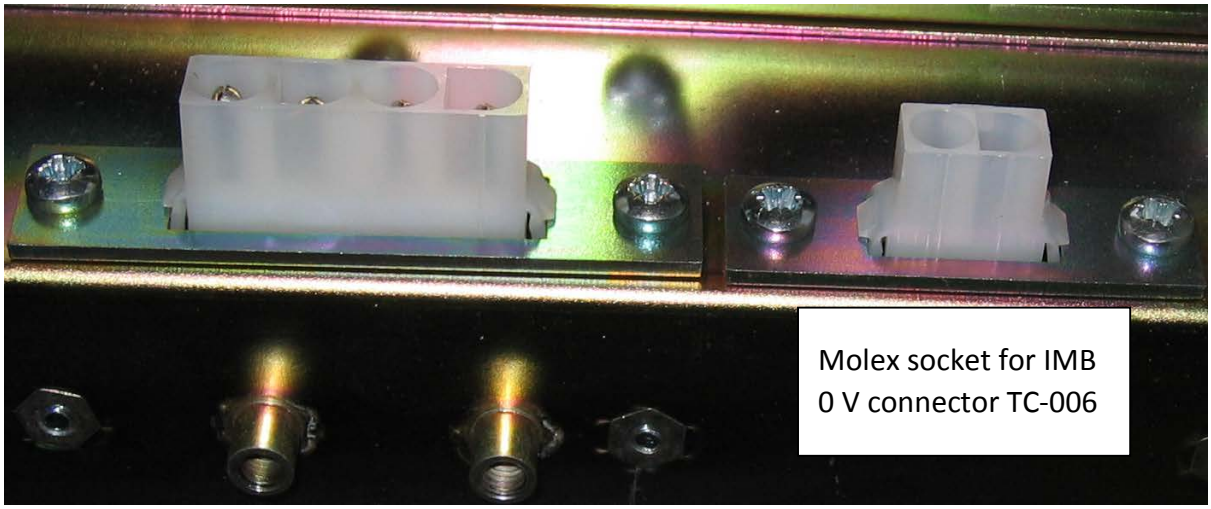

Figure 6 Molex Sockets on the Rear of each Processor and Expander Chassis

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8. I/O Connectors

Up to eight DIN 41612 I/O connectors, slotted into the chassis back-plate, can be provided for connection to Trusted I/O and / or Interface Modules to their sub-systems. Double and single connector options are available where applicable.

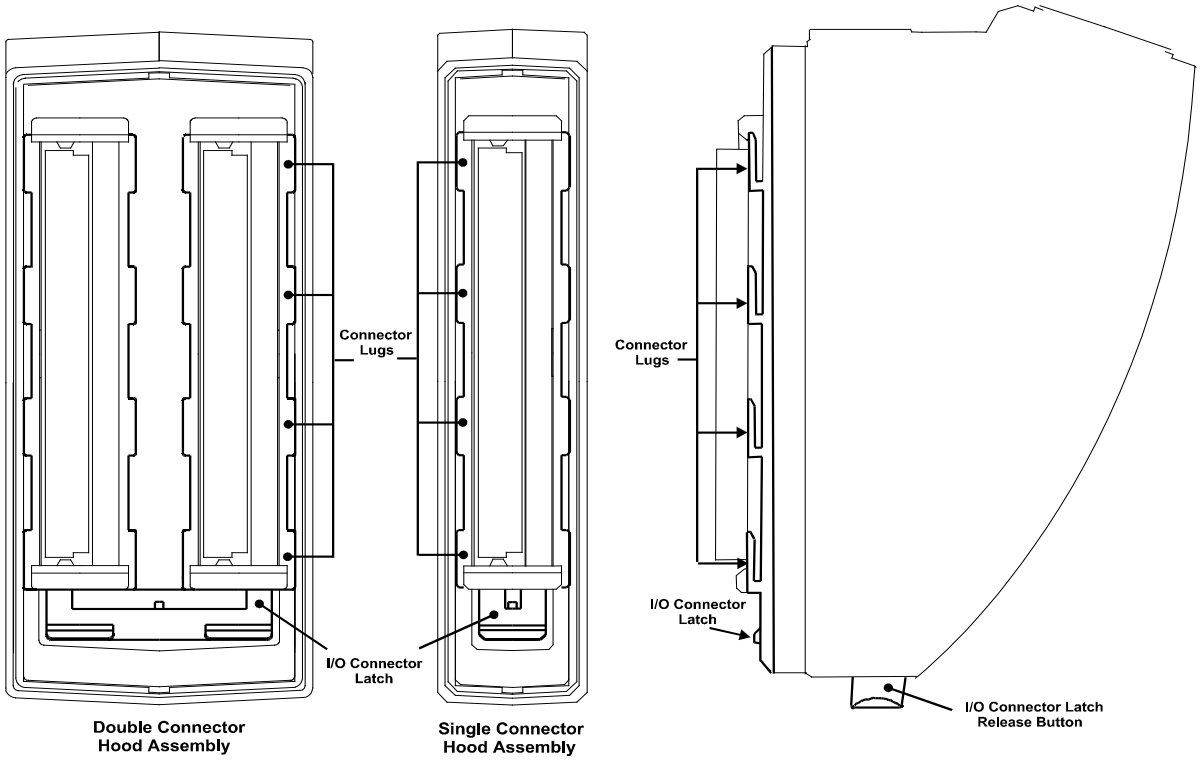

Figure 7 Connector to Chassis Attachment Features

Each I/O connector has an earth tail which should be fixed to the cable saddle bracket across the rear of the chassis using M5 x 10 Pan Head Taptite screws. The strap holes must be tapped in fitting the Taptite screws to ensure a good earth bond.

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9. Chassis Dimensions

The dimensions of the Trusted Controller Chassis are shown in Figure 8.

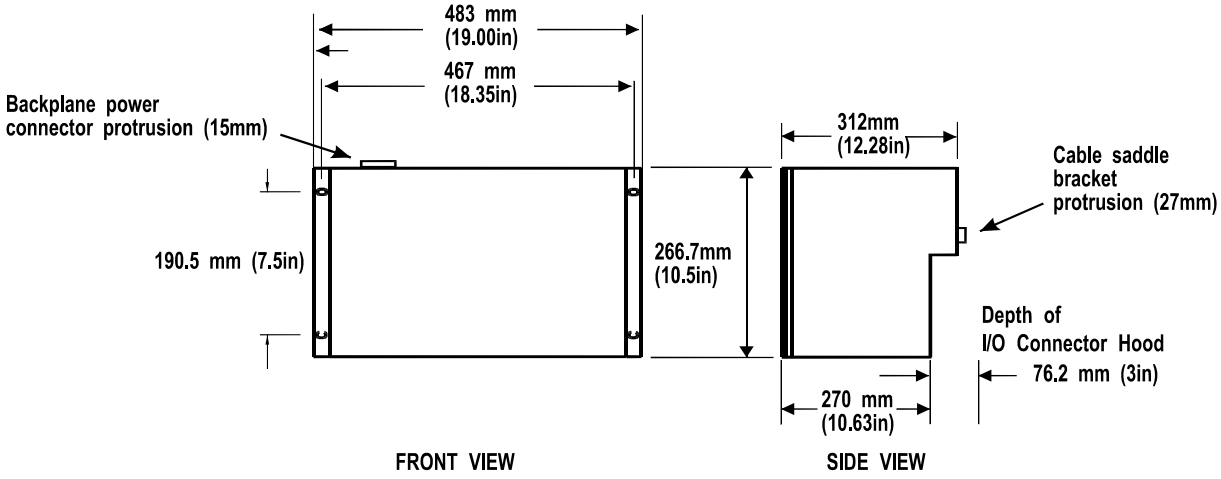

Figure 8 Chassis Dimensions

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10. Chassis Installation

The Trusted Controller Chassis is installed into a swing-frame or fixed frame as shown in Figure 9 using M5 x 12 Pan Head Taptite screws.

Figure 9 Installation of Chassis

Note that only the inner pair of holes in the mounting ears are used at this stage to secure the Chassis in the swing-frame. The outer holes are used to fit the plastic facia ears once all chassis and fan trays are fitted and alignment is correct

Alternatively, the Chassis may be mounted on a panel or equipment sheet using a Panel Mounting Kit (T8380), which comprises a pair of brackets with rear facing ears.

The brackets are first located and fitted using M5 fixings in four positions per bracket. The chassis is then fitted to the front ears of the brackets using M5 x 12 Pan Head Taptite screws.

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11. Specifications

Voltage Range	20 Vdc to 32 Vdc
Fusing	External, 20 A
Connectors	10 x DIN 41642, male
Operating Temperature	0 °C to +60 °C (+32 °F to +140 °F)
Non-operating Temperature	-25 °C to 70 °C (-13 °F to 158 °F)
Relative Humidity range (operating, storage and transport)	10 % – 95 %, non-condensing
Environmental Specifications	Refer to Document 552517
Dimensions Height Width Depth	 268 mm (10.5 in) 483 mm (19 in) 312 mm (10.5 in)
Weight	5 kg (11 lb)