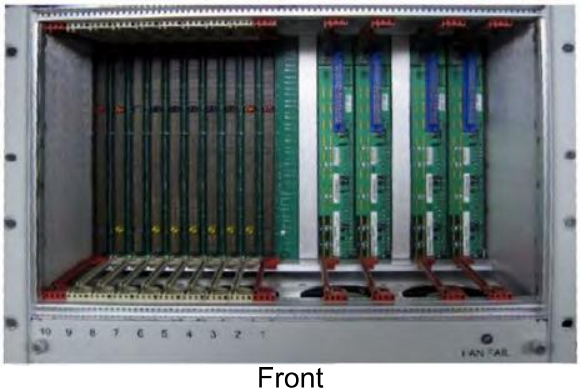
Series 5 Vanguard
Duplex Chassis
CPCI-10-D2-NPS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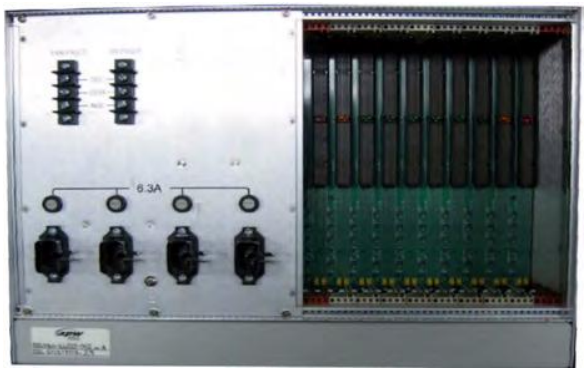
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Figure 1 Vanguard Duplex Chassis CPCI-10-D2-NPS

Description

This document describes and specifies the Vanguard duplex ten-slot Vac and HVdc chassis (CPCI-10-D2-NPS), which supports the card sets of a duplex Vanguard controller and four PSMU-350-3 power supplies, specified in *Vanguard Power Supply Module* [DS5112]. Refer to the following manuals for additional installation and maintenance information:

- *System Installation* [UM5105]
- *System Maintenance* [UM5106]

This duplex chassis accommodates a cooling fan tray. The subrack in the back of the chassis provides cable connections that allow front-card replacements without disconnecting the cables in the back (see Figure 2 on page 3).

LED Indicators

The individual cards and transition modules support local LED indicators, which are described in their respective data sheets. The fan tray supports a Fan Fail LED indicator on the front of the chassis, see Figure 1.

Chassis Loading Limitations and Card Locations

This duplex chassis supports a duplex set of Vanguard controller cards. Cards mount in the front of the chassis (Figure 1 on page 1) numbered (1-10) right-to-left, while transition modules mount in the back numbered (1-10) left-to-right. Transition module positions must match their corresponding front-card positions. Table 1 shows typical slot assignments.

Card Limitations

- MPU cards: MPU A must be in slot 1 and MPU B must be in slot 10 (see DS5127)
- IOC-555-D cards (up to 3 pair): IOC A in slots 3,5,7 and IOC B in slots 4,6,8 (see DS5208)
- RCC cards: not allowed
- EVC cards if required: EVC A in slot 2 and EVC B in slot 9 (see DS5126)

Note: All unused slots must be covered with blank panels.

Table 1 Example of Valid Slot Assignments

Slot 10	Slot 9	Slot 8	Slot 7	Slot 6	Slot 5	Slot 4	Slot 3	Slot 2	Slot 1
MPU B TMPU B	EVC B Blank	IOC B3 TIOC B3	IOC A3 TIOC A3	IOC B2 TIOC B2	IOC A2 TIOC A2	IOC B1 TIOC B1	IOC A1 TIOC A1	EVC A Blank	MPU A TMPU A

Power Supply Loading Requirements

Duplex chassis are always installed with four power supplies. This chassis supports the PSMU-350 power supply (DS5112).

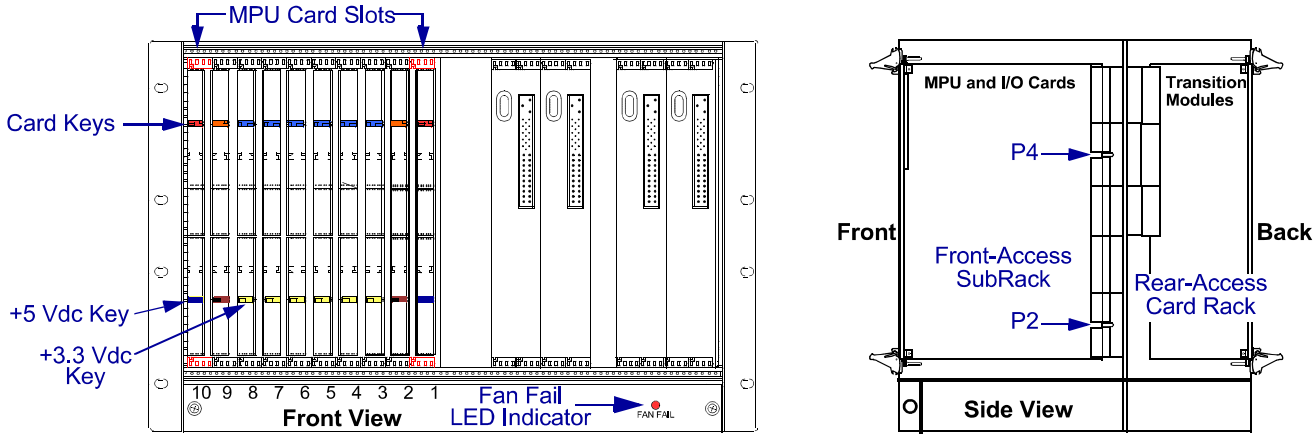

Figure 2 MPU Location, Fan Fail LED, Card Slot Keys, and SubRack

Card and Module Keying

This chassis provides color-coded keying for each card and associated module type to allow for easy installation and to prevent mismatch errors between cards and transition modules. See Table 2 for key color-codes and see Figure 2 for key positions.

Caution: Removing or changing the location of the colored card keys is prohibited.

Table 2 Key Color Codes

CARD	CONNECTOR	CHASSIS SLOT	KEY COLOR
MPUs	P4	1 and 10	Red
Duplex IOCs	P4	3 to 8	Steel Blue
EVC Host Card	P2	2 and 9	Nut Brown
Unused Slots	P4	2 and 9	Orange
+3.3 Vdc	P2	3 to 8	Yellow
+5 Vdc	P2	1 and 10	Cyan Blue

Installation and Mounting

This section provides basic installation information. See *System Installation* [UM5105] for additional details, including safety precautions.

Note: All unused slots must be covered with blank ejector panels.

Spacing Requirements

CCC requires at least one unit rack, 1.75" (44.5 mm) spacing, above and below the installed chassis to allow for adequate air flow and cooling in the panel layout. Note that this is a minimum requirement; and that additional spacing is highly recommended whenever possible to achieve a successful installation.

This duplex chassis can be mounted on a 19" rack. Front and rear access to chassis is required for installing the cards, transition modules, fans, power supplies, and cables. Refer to Figure 3 on page 4.

This duplex chassis can mount forward with the flange mounted in the front, or recessed with the flange mounted in the back (see Figure 4).

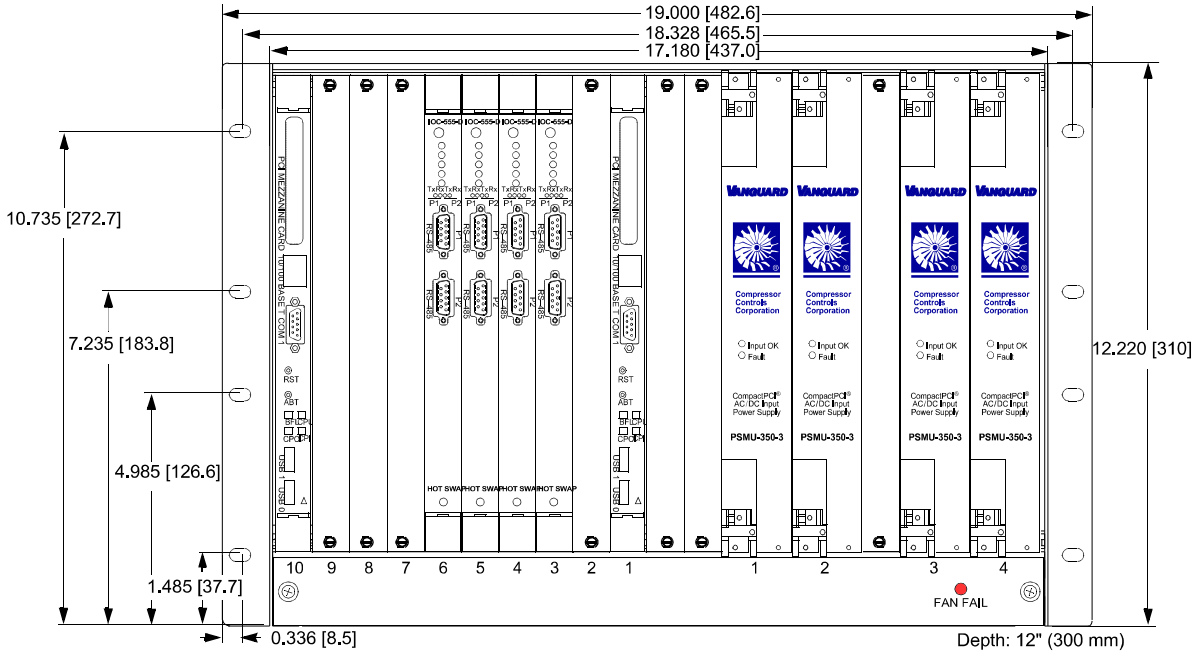

Figure 3 Rack Mount Duplex CPCI-10-D2-NPS Chassis Dimensions

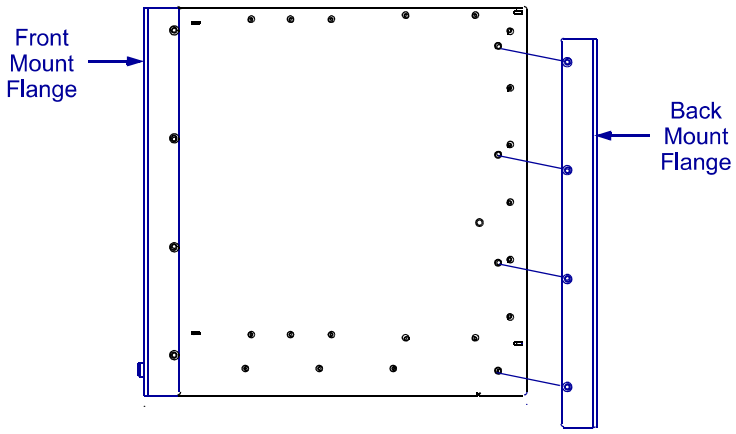

Figure 4 Flange Mounting Locations

Connections

Power and fault relay connections are provided on the chassis. Serial port connections are located on the processor transition module (TMPU-1002). FTA connections are located on each TIOC card (TIOC-555HD).

Input Power Connections

Four Vac or HVdc input power connections on the back of the chassis (shown in Figure 1 on page 1) provide power to the four chassis PSMs. This chassis supports Vac and HVdc power supply (DS5112).

Note: There is a jumper on the left side of the chassis backplane that is used to connect the 5 Vdc (+5V-1) and VI/O-1 terminals. This jumper is installed by manufacturing. It is required for MPU to IOC card communications.

Line Fuses

Line fuses are provided for each power supply. Replacement fuses must be Type F with the same electrical ratings. Part numbers are provided in *Vanguard Control System Parts List* [DS5003].

Chassis Ground Connection

The chassis case must be connected to Safety Ground (SG) using the Chassis Ground connection located between the input power connectors. Refer to the rear chassis view in Figure 1 on page 1.

Fault Relay Connections

If power supply fails (any voltage output) or if a power supply is not fully inserted, a power fault will be indicated (red LED on the power supply) and the Power Fault Relay will change state. If the Fault Relay was set to normally-open (NO), it will close; and if the Fault Relay was set to normally-closed (NC), it will open, see Figure 5.

Note: A power fault may or may not be reported when a functioning power supply is removed from a redundant group or when input power is removed from one of the supplies in a redundant group.

A fan tray assembly provides multiple fans for cooling the cards and power supplies. When the fans are operating normally, the FAN FAULT LED indicator will be green. This LED indicator will be red when a fan failure is detected. Figure 5 shows the fan fault and power fault connections.

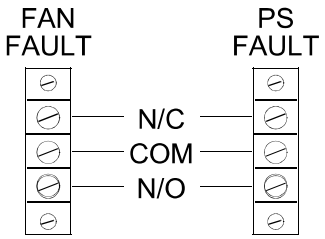

Figure 5 Fan Fault and Power Fault Terminal Block Connections

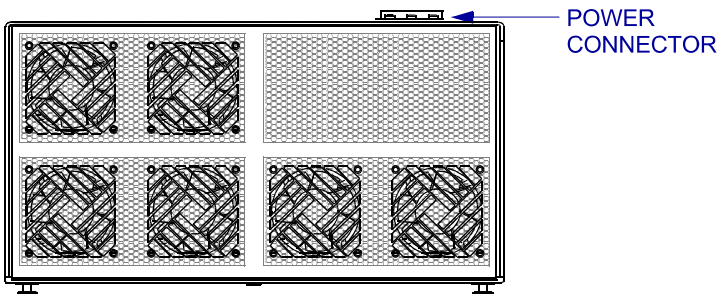

Figure 6 Fan Tray Assembly

Fan Tray Installation

Fan tray (FAN-10-2) provides multiple fans. The fan tray assembly slides in from the front of the chassis. Two locking screws connect the fan tray to the chassis. The FAN FAIL LED indicates the fan tray status. When the LED indicator is green all the fans are operating normally. When the LED indicator is red a fan tray fault has occurred.

Fan Tray Maintenance

Although the FAN-10-2 fan tray assembly can be removed and replaced while powered, it should not be absent for more than one minute.

- It is recommended to inspect the fans on a quarterly basis. Check them for free movement, look for any signs of wear, and clean them when covered with dust.
- It is recommended to replace the fan tray assembly every five years. Replacement procedure is located in *System Maintenance for Duplex Systems* [UM5106].

Caution: Removing the fan tray for extended periods of time can cause the various cards high temperature limits to be exceeded.

Specifications

Specifications for the duplex chassis are listed in Table 3. Specifications for the duplex chassis fan tray assembly are listed and Table 4.

Table 3 CPCI-10-D2-NPS Chassis Specifications

Part Number	CPCI-10-D2-NPS
Product Revision	C
AC Power Input (Max Range)	90 to 264 Vac, 475W
DC Power Input (Max Range)	90 to 320 Vdc, 475W
Capacity	Four power supplies (PSMU-350), two MPU cards, three pair I/O cards
Hold Time	Minimum one AC cycle (equivalent time for high voltage DC input)
Power and Fan Relay Contacts	1A at 30 V max
Internal Fuse Rating	Four power inputs: 6.3 A, 200 V, Type F fuses (20-401800-063)
Approvals	CE; Safety (CSA) is pending
Dimensions	12.22" high x 19.00" wide x 12" deep (310 x 483 x 300 mm)

Table 4 FAN-10-2 Assembly Specifications

Fan Part Number	FAN-10-2
Fan Types	Six 3.62" (92 mm) fans with total air flow of 60 cfm each
Fans Bearing	Abec 3, double shielded, chrome, ball bearings
Fan MTBF	60,000 hours
Fan Tray Dimensions	16.5" wide x 1.5" high x 10.25" deep (419 x 38 x 261)

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