Amphenol
MILITARY HIGH SPEED

M4268 SERIES
DC/DC POWER SUPPLY

DESCRIPTION

M4268 is a military grade 3U VPX, 28V DC-DC power supply that provides six outputs per VITA 62 and is rated at 1000W output power. Features include: 1" pitch, fast initialization, reverse battery protection, internal EMI filters, I2C and VITA 46.11 system management. DC input range is 18-50V per MIL-STD-704 and DO-160, but variants support ranges of 12-100V per MIL-STD-1275 and Def Stan 61-5. Designed to meet MIL-STD-810 and MIL-STD-461.

FEATURES

- VITA 62 Compliant
- Remote sense
- High Efficiency
- Fixed switching frequency (250khz)
- External synchronization capability
- Indefinite short circuit Protection
- Over-voltage shutdown with auto-recovery
- Reverse battery protection
- Over temperature shutdown with auto-recovery
- EMI filters included
- IPMI communication

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HOW TO ORDER

PART NUMBER	CF-02EM4012	DC/DC Power Supply

PRODUCT SPECIFICATIONS:

DC Input (18 to 48 VDC)
Operation during transient IAW MIL-STD-704F

Efficiency
Up to 90 %

EMC
Designed to meet† MIL-STD461F: CE101, CE102, CS101

Load Transient Overshoot and Undershoot
Output dynamic response of less than5% at load Step of 30%-90%. Output returns to regulation in less than 1mSec

Ripple and Noise
Typically, less than 50mVp-p (max.1%p). Measured across a 0.1µF capacitor and 10µF capacitor on load at Input Voltage of 18V-48V, all Temperature Range.

Communication
IPMI protocol available for voltages, currents and temperature for all positive voltages (GAx, SCL, SDA)

DC Output
PO1: 12 V up to 40 A
PO2: 12 V up to 40 A
PO3: 5 V up to 12 A
+12V_Aux: +12 V up to 1 A
–12V_Aux: –12 V up to 1
A 3.3V_Aux: 3.3 V up to 12 A

Isolation
Input to Output: 200 VDC Input to
Case: 200 VDC
Output to Case: 100 VDC

PRODUCT SPECIFICATIONS:

Input	Output	General
Input Reverse Polarity: Protection for unlimited time	Passive over voltage protection on Aux outputs Zener selected at 25% ± 5% above nominal voltage, is placed across the output for passive voltage limit.	Over Temperature Protection Automatic shutdown at temperature of 95 ± 5 °C (at unit edge) Automatic recovery when temperature drops below 90 ± 5 °C. 5 °C Hysteresis guaranteed.
Inrush Current Limiter Peak value of 5 x IIN for initial inrush currents lasting more than 50 µSec.	Active over voltage protection on VS# outputs 20% ± 5% above nominal voltage. Automatic recovery when output voltage drops below threshold.	
Under Voltage Unit shuts down when input voltage drops below 16.5± 0.5VDC. Automatic restart when input voltage returns to nominal range.	Overload / Short-Circuit Protection Continuous protection (10-30% above maximum current) for unlimited time (Hiccup). Automatic recovery when overload/short circuit removed.	
Over Voltage Lock-Out Unit shuts down when input steady state voltage rise above 55 ± 2VDC (Can be configured for 100V) Automatic restart when input voltage returns to nominal range.		

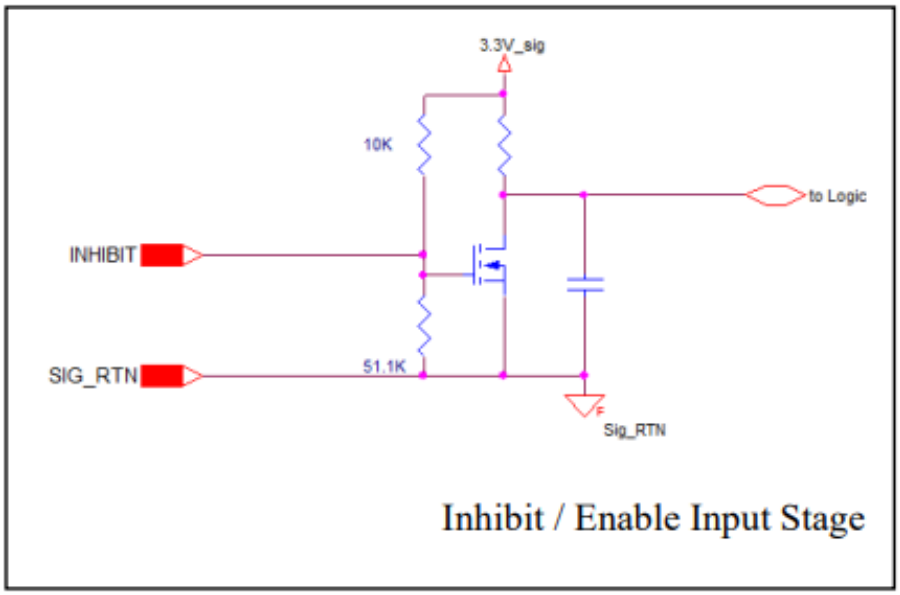
Environmental	
Temperature	Operating: –55 °C to +85 °C at unit edge Storage: –55 °C to +125 °C
Fungus	Does not support fungus growth, in accordance with the guidelines of MIL- STD454, Requirement 4.
Vibration	Shock: Saw-tooth, 20g peak, 11mS. Vibration: Figure 514.6E-1. General minimum integrity exposure. (1 hour per axis.)
Altitude	Method 500.5, Procedure I & II Storage/Air Transport: 40 kft Operation/Air carriage: 70 kf
Humidity	Method 507.5, Up to 95% RH
Salt Fog	Method 509.5
Shock	Method 516.6 40g, 11msec saw-tooth (all directions)

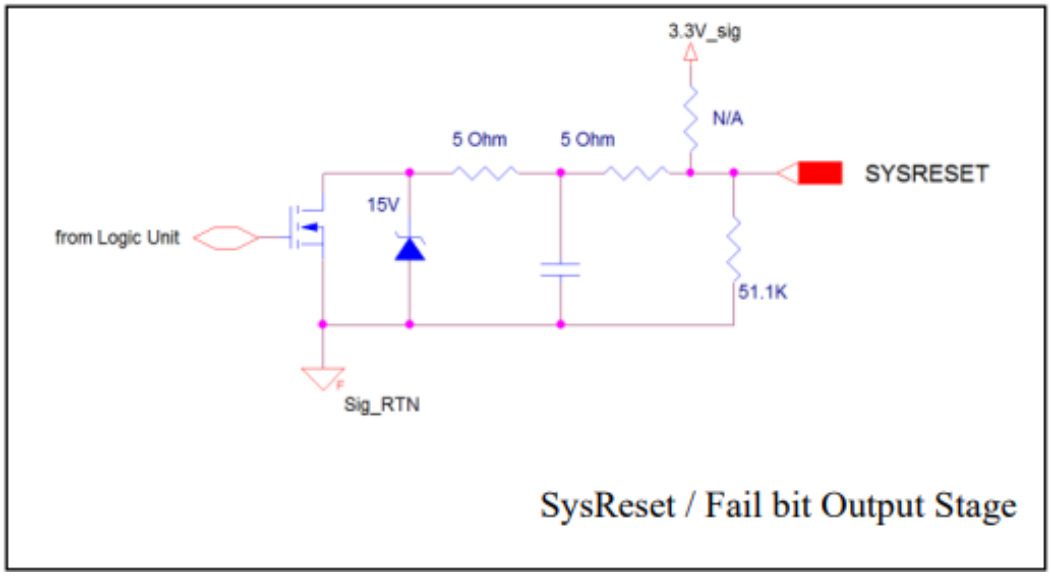
Functions and Signals - According to VITA 62:

Signal No.	Signal Name	Type	Description	
1	FAIL*	Output	Indicates to other modules in the system that a failure has occurred in the module. Normally Open, low during failure	
2	SYSRESET*	Output	Indicates to other modules in the system that all outputs are within their Nominal Range. Goes Open when outputs are within their range.	
3	INHIBIT*	Input	Controls power supply outputs. Connecting this signal to SIG_RTN turns the output power OFF.	
4	ENABLE*	Input	Controls the input power to the power supply. This signal in conjunction with INHIBIT turns the output power ON and OFF. Please refer to Table 1 for COmbinita-tion of INHIBIT & ENANABLE.	
5	SYSRESET*	Input	Used for geographical addressing. GA1 is the most significant bit and GA0 is the least signifi-cant bit. This signal is referenced to SIGNAL RTN.	
6	PO#_SHARE	Bidirectional	I2C bus Clock and Data respectively. Through this bus the voltage and temperature readouts can be shared. This signal is referenced to SIGNAL RTN.	
7	PO#_SENSE PO#_SENSE_RTN	Input	The REF_CLK signal is used to allow the power supply frequency to sync with the system frequency. This signal is referenced to SIGNAL RTN	
8	GA0*,GA1*,GA2*-GA3*& GAP*	Input	The SENSE is used to achieve accurate load regulations at load terminals (this is done by connecting the pins directly to the load's terminals).	
9	SCL	Bidirectional	Indicates to other modules in the system about Holdup event. Please refer to This signal is referenced to SIGNAL RTN.	
10	SDA	Bidirectional	I2C bus Clock I2C bus Data	Through this bus the voltage and temperature readouts can be shared.
11	+/- CLK	Input	The REF_CLK signal is used to alllow the power supply frequency to sync wih the system frequency.	

*INHIBIT	Low	Low	High	High
*ENABLE	Low	High	Low	High
VS1, VS2, VS3, ±12VAux	OFF	OFF	ON	OFF
3.3V_AUX	ON	OFF	ON	OFF

Table 1





DETAILED INFORMATION:

M4268 Input Voltage Operation Range.

The M4268 steady state operation voltage is 18V to 48V, continuously work up to 50V Input line.

Low Line Turn-on and Turn-off Limits

To avoid Turn-on and Turn-off glitch the unit have about 3.5V Hysteresis. The Turn-on threshold is under 20V and turn- off below 18V.
Those limits can be adjusted, contact Factory for more information.

Outputs Voltage Regulation

The M4268 contains accurate internal sense lines to keep output voltage at less than 1.5% regulation for all Line/ Load and temperature range (see Table 2).

Output	12V/35A	12V/35A	5V/12V 18A	3.3VAux/15A	12VAux/1A	(-)12VAux/1A	Remark
Voltage Range	11.85 – 12.15	11.85 – 12.15	4.95 – 5.05	3.25 – 3.35	VS1 – VS1-0.2V	(-)11.85 – (-)12.15	
Voltage Range	11.8 – 12.2	11.8 – 12.2	4.8 – 5.2	3.2 – 3.4	11.7 – 12.2	(-)11.7 – (-)12.2	Current Sharing for VS1, VS2 and VS3

Table 2: Outputs voltage regulation. VIN 18V – 48V, Temperature v-55°C – 85°C

Sense Lines

Sense Lines are provided for VS1, VS2 and VS3 output to compensate line voltage drop.
Sense Lines proper connection is shown in Figure 3.
Each VSx output has its own Sense Lines, additional common Sense RTN Line is provided for all VSx Outputs (VITA 62 Standard).
Contact Factory for Sense configuration different than the VITA 62 standard.

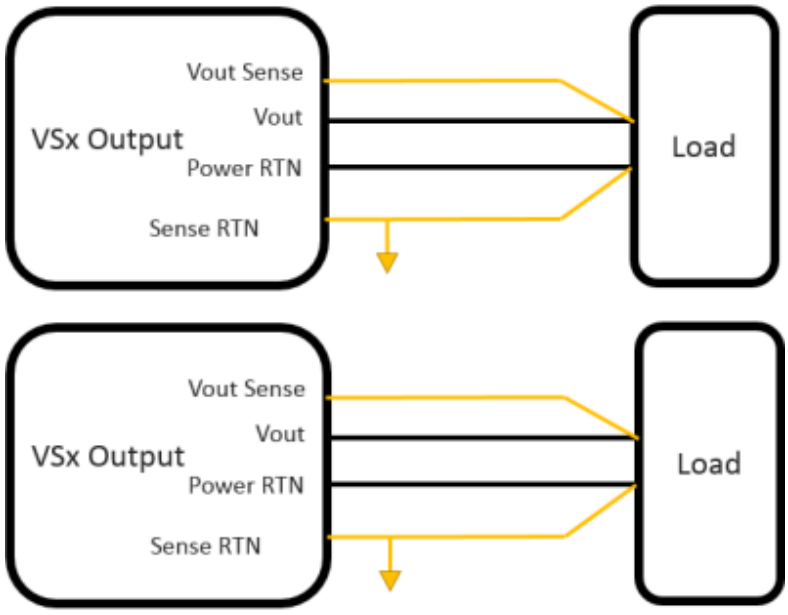


Figure 1: M4268 Sense line connection

Output Power

The M4268 can deliver up to 1200 steady State at all temperature and input range.

Total Power Output	12V/35A	12V/35A	5V/12V 18A	3.3VAux/15A	12VAux/1A	(-)12VAux/1A
1200W	35A	35A	18A	15A	1A	1A

Table 3: M4268 Max current per output

Current Sharing (Optional)

Current sharing is available for VS1, VS2 and VS3 outputs. Load share pins should be connected for Hiccup synchronization. 3.3V Aux and ±12V Aux can be safely paralleled.
To obtain a good current sharing the following steps should be taken

- Connect hiccup pins of desired outputs to guarantee simultaneously Turn-on of paralleled outputs.
- Connect Sense Line of both paralleled outputs to the same point.
- Make sure Power traces are as identical as possible for both current sharing outputs.

IPMI Communication

Electrical Parameters
Vcc: 3.3VDC
Pull-up: 2.2kOhm Input capacitance: 330pf

Slave Device Addressing

- 256 address spaces
- Baud rate: 400kHz maximum
- 7 Bit Protocol
- Support Slot Addressing per VITA 62
- Support Global Address 1010101 R/W

	MSB							LSB
Slot Number	A6	A5	A4	A3	A2	A1	A0	R/W
Slot1	1	0	0	0	0	0	1	
Slot2	1	0	0	0	0	1	0	
Slot3	1	0	0	0	0	1	1	
Slot4	1	0	0	0	1	0	0	
Slot5	1	0	0	0	1	0	1	
Slot6	1	0	0	0	1	1	0	
Slot7	1	0	0	0	1	1	1	
Slot8	1	0	0	1	0	0	0	
Slot9	1	0	0	1	0	0	1	
Slot10	1	0	0	1	0	1	0	
Slot11	1	0	0	1	0	1	1	
Slot12	1	0	0	1	1	0	0	
Slot13	1	0	0	1	1	0	1	
Slot14	1	0	0	1	1	1	0	
Slot15	1	0	0	1	1	1	1	
Slot16	1	0	1	0	0	0	0	
Global Address	1	0	1	0	1	0	1	

Single read request

S	Physical Address	W	A	Memory Address	A	S	Physical Address	R	A	DATA	A	P
	A6:A0	0	0	B7:B0	0		A6:A0	1	0	D7:D0	1	

S	Physical Address	W	A	Memory Address	A	S	Physical Address	R	A	DATA	A	DATA	A	...	DATA	A	P
	A6:A0	0	0	B7:B0	0		A6:A0	1	0	D7:D0	0	D7:D0	0		D7:D0	1	

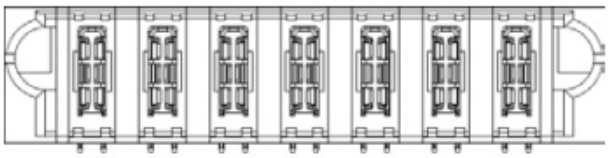
S – Start, **P**- Stop
W – Write bit
A – Acknowledge by master
A – Acknowledge by slave, DATA – Slave response

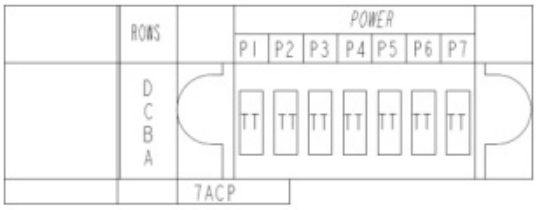
Memory Space

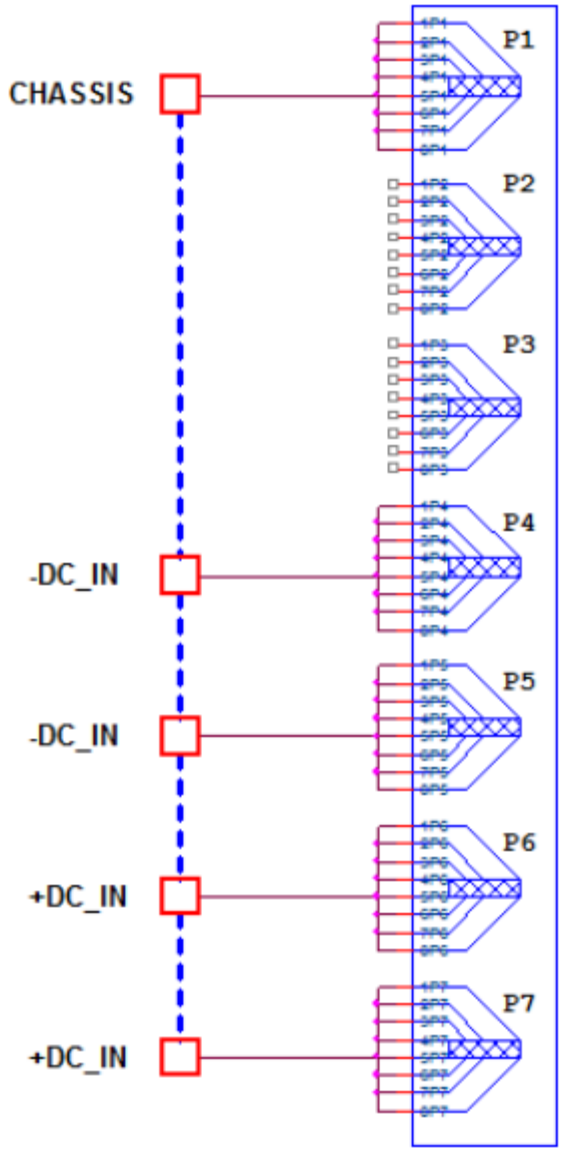
Address [8Bit]	Data [8Bit]	Description [00-FF]
0x00	Temperature 1	-55 °C to +120 °C Range
0x01	Vin	0V to 64V Range
0x02	+12V VS1 & VS2	0V to 16V Range
0x03	+12V Aux	0V to 16V Range
0x04	+12V VS1 & VS2	0V to 16V Range
0x05	+5V VS3	0V to 16V Range
0x06	+3.3V Aux	0V to 16V Range
0x07	-12V Aux	0V to 16V Range
0x08	+12V VS1 & VS2 Current	0A to 80A Range
0x09	+12V Aux Current	0A to 4A Range
0x0A	+12V VS1 & VS2 Current	0A to 80A Range
0x0B	+5V VS3 Current	0A to 32A Range
0x0C	+3.3V Aux Current	0A to 32A Range
0x0D	Temperature 2	-55 °C to +120 °C Range
0x0E	Software Version	X,Y Hex
0x0F – 0xFF		

PIN ASSIGNMENT:

Connector PO

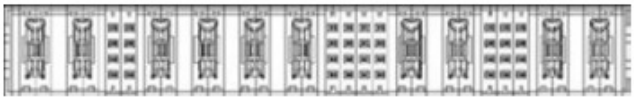


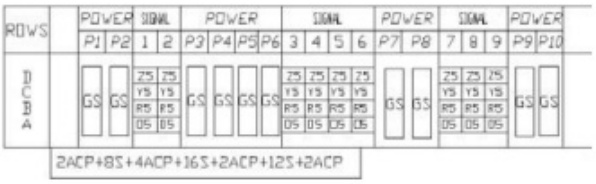


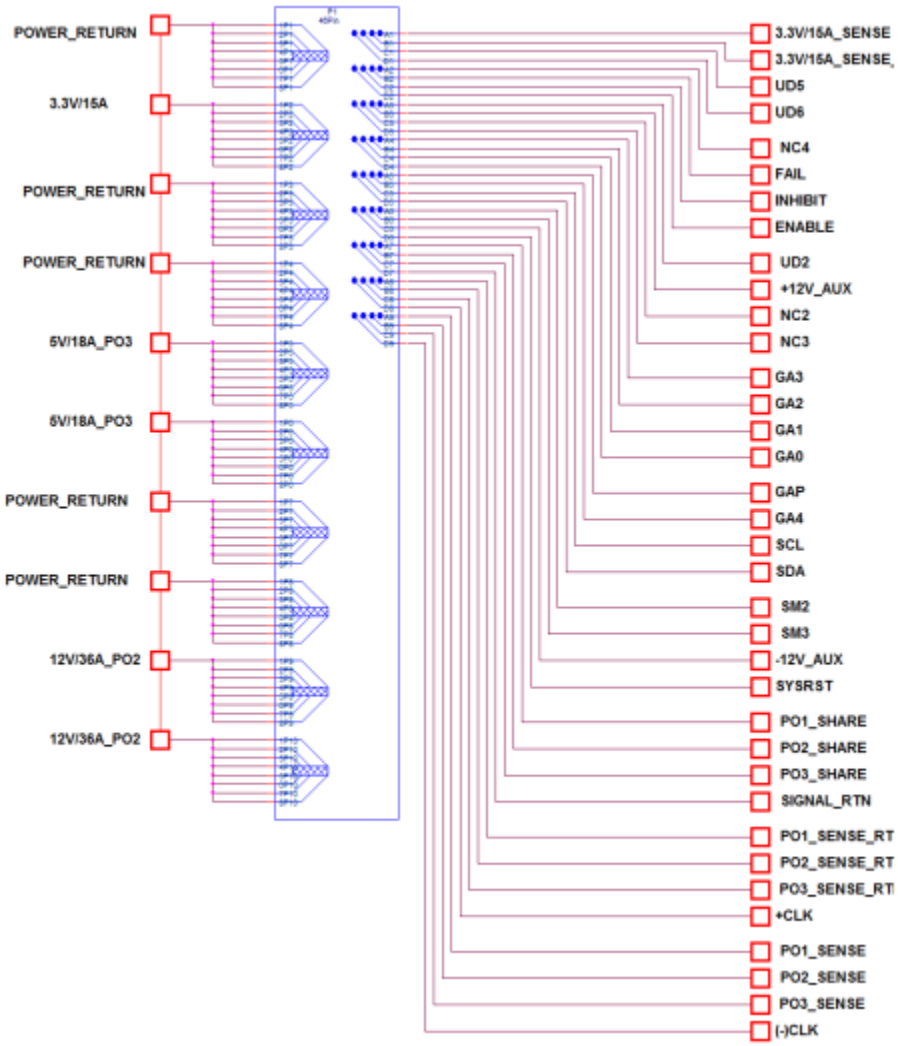


Pin Number	Signal Name
P7	+DC_IN
P6	+DC_IN
P5	-DC_IN
P4	-DC_IN
P3	
P2	
P1	CHASSIS_GND

Connector P1

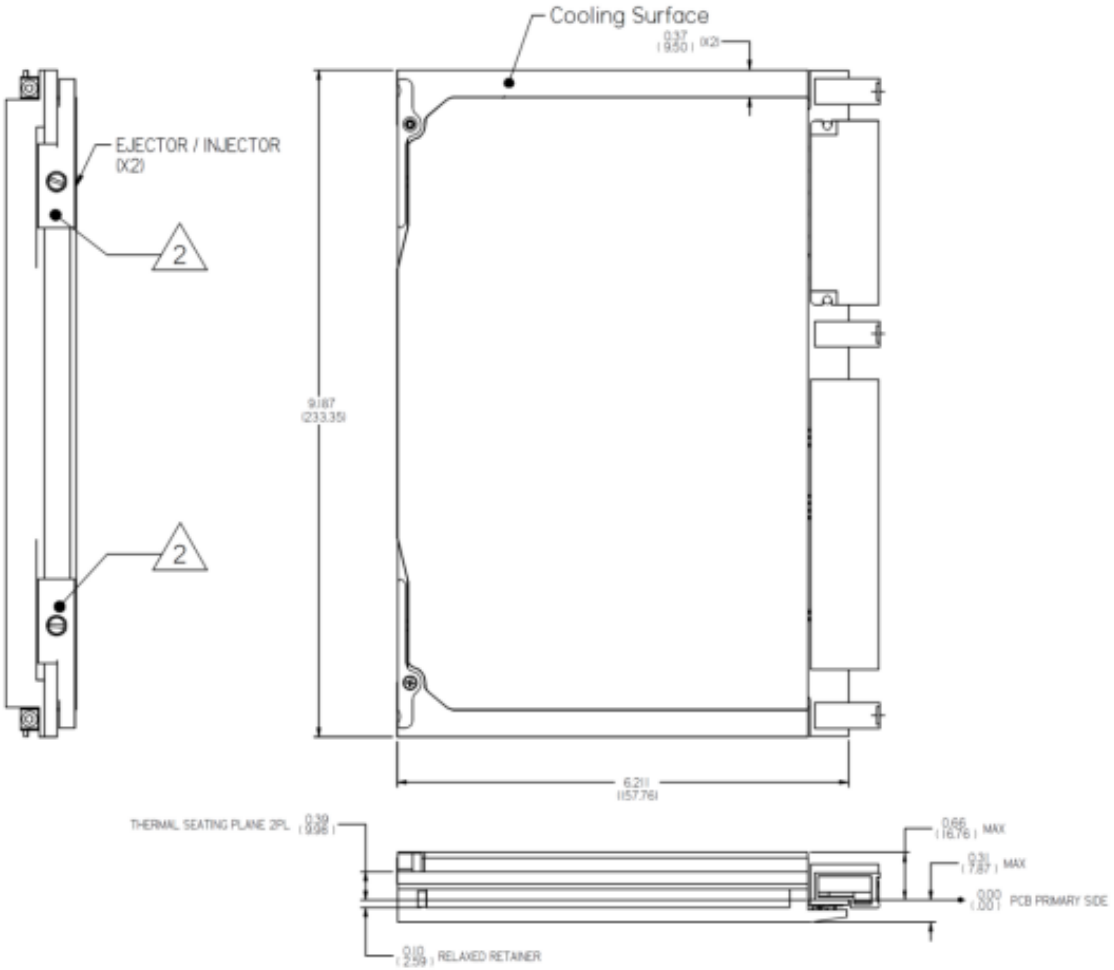






Pin Number	Pin Name
P10	12V/36A PO1
P9	12V/36A PO2
A9	PO1_SENSE
B9	PO2_SENSE
C9	PO3_SENSE
D9	(-)CLK
A8	PO1_SENSE_RTN
B8	PO2_SENSE_RTN
C8	PO3_SENSE_RTN
D8	+CLK
A7	PO1_SHARE
B7	PO2_SHARE
C7	PO3_SHARE
D7	SIGNAL_RETURN
P8	POWER_RETURN
P7	POWER_RETURN
A6	+CLK
B6	-CLK
C6	-12V_AUX
D6	SYSRESET*
A5	GAP*
B5	GA4*
C5	SCL
D5	SDA
A4	GA3*
B4	GA2*
C4	GA1*
D4	GA0*
A3	UD2
B3	+12V_AUX
C3	N.C
D3	N.C
P6	5V/18A PO3
P5	5V/18A PO3
P4	POWER_RETURN
P3	POWER_RETURN
A2	N.C
B2	FAIL*
C2	INHIBIT*
D2	ENABLE*
A1	UD3
B1	UD4
C1	UD5
D1	UD6
P2	3.3V/15A
P1	POWER_RETURN

OUTLINE DRAWING:



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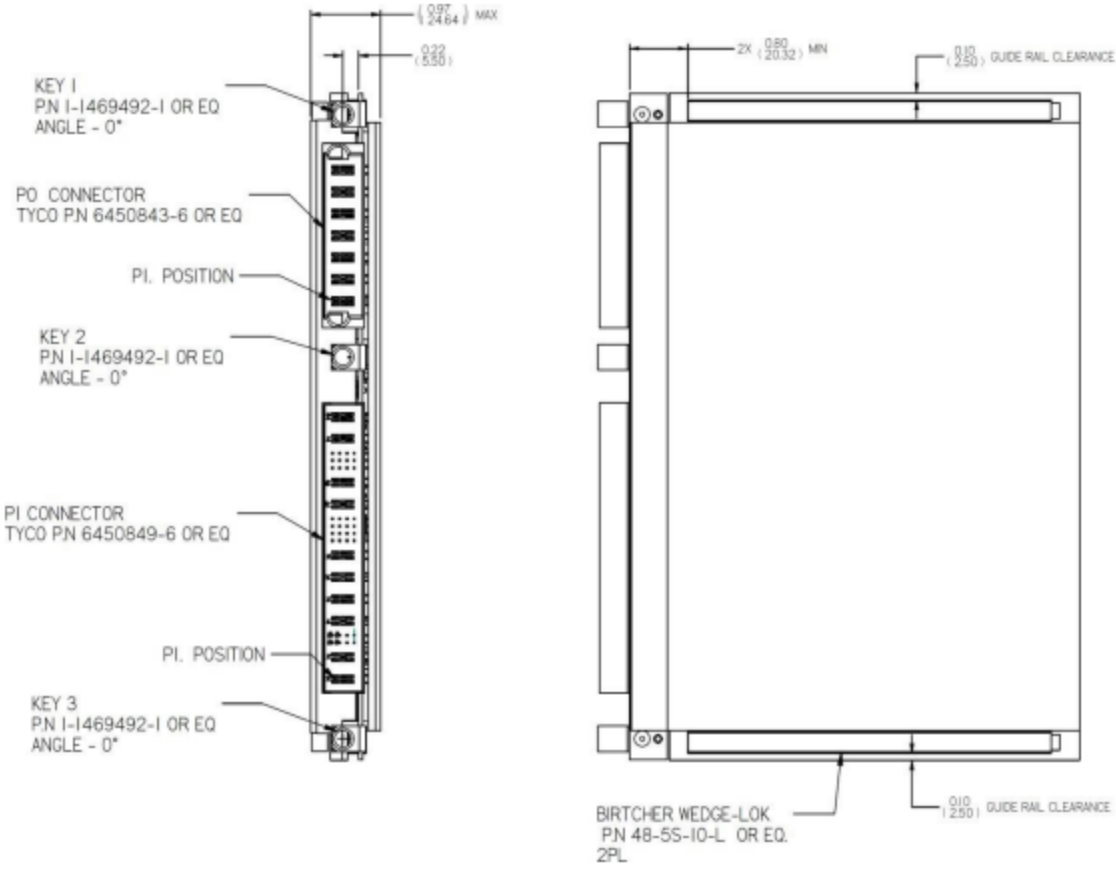

Notes
1. Dimensions are in Inches[mm]
2. Tolerance is:
.XX ± 0.01 IN
.XXX ± 0.005 IN
3. Weight: Approx. 3.9 lbs

Amphenol
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