Amphenol
MILITARY HIGH SPEED

M4268 SERIES

DC/DC POWER SUPPLY



PRODUCT HIGHLIGHTS

- VITA 62 COMPLIANT
- 6U VPX FORM FACTOR
- SIX OUTPUTS
- DC/DC CONVERTER
- UP TO 1200W

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M4268 SERIES VPX DC/DC POWER SUPPLY

Special 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 batteryprotection
- Over temperature shutdown withauto-recovery
- EMI filtersincluded
- IPMI communication

Electrical Specifications

DC Input
18 to 48 V_{DC}

Operation during transient IAW MIL-STD-704F

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 V_{DC} Input to Case: 200 V_{DC}
Output to Case: 100 V_{DC}

Line/Load regulation
See Table 2

Efficiency
Up to 90 %

EMC
Designed to meet† MIL-STD-461F: CE101, CE102, CS101

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

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

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

Notes: Compliance achieved with 50µH LISN, shielded cable and static resistive load.

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Protections ‡

Input

Input Reverse Polarity:
Protection for unlimited time

Inrush Current Limiter
Peak value of 5 x IIN for initial inrush currents lasting more than 50 µSec.

Under Voltage
Unit shuts down when input voltage drops below 16.5± 0.5VDC.
Automatic restart when input voltage returns to nominal range.

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.

Output

Passive over voltage protection on Aux outputs
Zener selected at 25% ± 5% above nominal voltage, is placed across the output for passive voltage limit.

Active over voltage protection on VS# outputs
20% ± 5% above nominal voltage.
Automatic recovery when output voltage drops below threshold.

Overload / Short-Circuit Protection
Continuous protection (10-30% above maximum current) for unlimited time (Hiccup). Automatic recovery when overload/short circuit removed.

General

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.

Note 1: Thresholds and protections can be modified / removed (please consult factory)

Environmental [1]

Design to Meet MIL-STD-810G

Temperature
Operating: –55 °C to +85 °C at unit edge
Storage: –55 °C to +125 °C

Altitude
Method 500.5, Procedure I & II Storage/Air Transport: 40 kft Operation/Air carriage: 70 kft

Salt Fog:
Method 509.5

Fungus
Does not support fungus growth, in accordance with the guidelines of MIL- STD-454, Requirement 4.

Humidity
Method 507.5, Up to 95% RH

Shock
Method 516.6
40g, 11msec saw-tooth (all directions)

Vibration
Shock: Saw-tooth, 20g peak, 11mS.
Vibration: Figure 514.6E-1. General minimum integrity exposure. (1 hour per axis.)
Note 1: ***Environmental Stress Screening (ESS)*** Including random vibration and thermal cycles is also available. **Please consult factory for details.**

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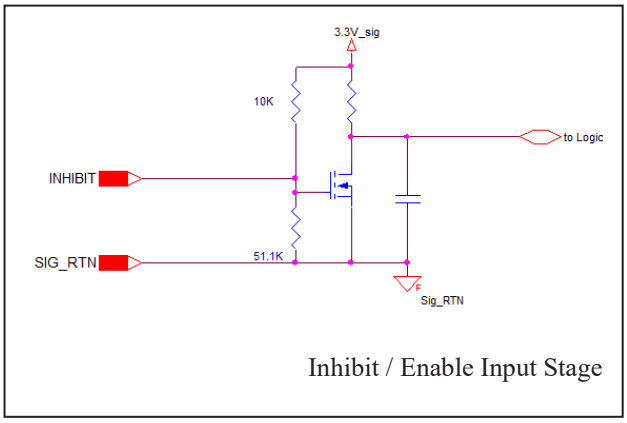
Functions and Signals - According to VITA 62

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 combination of **INHIBIT*** & **ENABLE***.
5	SYSRESET*	Input	Indicates to other modules in the system that all outputs are within their working level.
6	PO#_SHARE	Bidirectional	Enables current share between two paralleled outputs on two devices. Connect required outputs (same voltage) of both devices in parallel, and their appropriate SHARE signals for proper operation.
7	PO#_SENSE PO#_SENSE_RTN	Input	Used to correct output voltage at regulation point, when voltage droop occurs due to current flowing through output wires. This feature is limited up to approximately 0.5V above nominal voltage.
8	GA0*,GA1*,GA2* GA3*& GAP*	Input	Used for geographical addressing. GA4* is the most significant bit and GA0* is the least significant bit. GAP* indicates the parity.
9	SCL	Bidirectional	I2C bus Clock Through this bus the voltage and temperature readouts can be shared.
10	SDA	Bidirectional	I2C bus Data
11	+/-CLK	Input	The REF_CLK signal is used to allow the power supply frequency to sync with the system frequency.

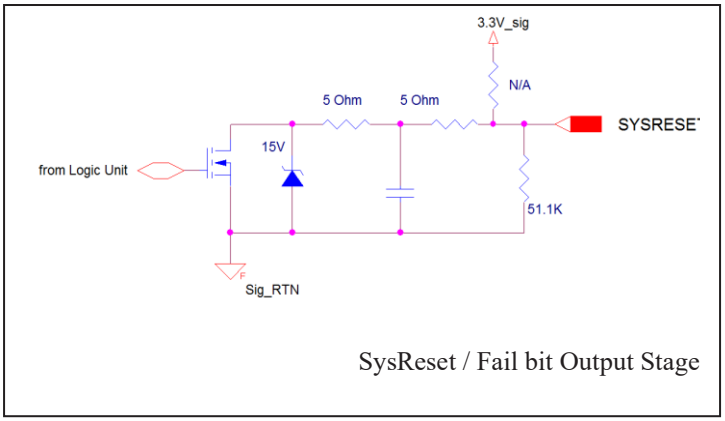
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*INHIBIT	Low	Low	High	High
*ENABLE	Low	High	Low	High
VS1, VS2, VS3, ±12VAux	OFF	OFF	ON	OFF
3.3V_AUX	ON	OFF	ON	OFF

Table 1



Inhibit / Enable Input Stage



SysReset / Fail bit Output Stage

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Detailed Information

1. M4268 Input Voltage Operation Range.

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

1.1 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.

2. 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 -55 °C – 85 °C

2.1. 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 1.
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.

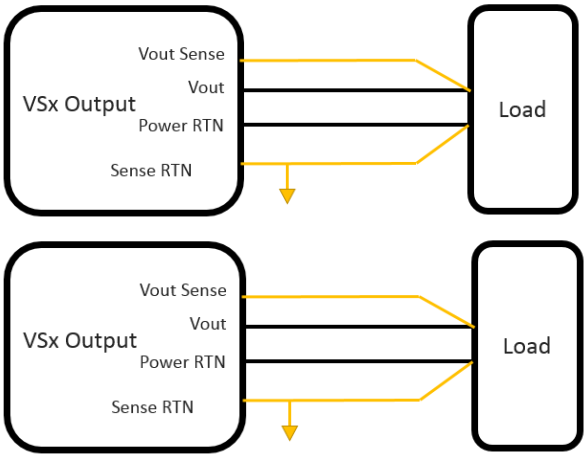


Figure 1: M4268 Sense line connection

3. 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

3.1 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.

4. 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	

*** Slot location is determined by GAx per VITA 62**

*** Global Address N/A**

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	

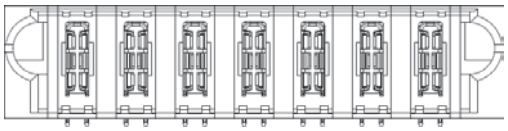
S – Start, **P**- Stop
W – Write bit
A – Acknowledge by master
A – Acknowledge by slave, DATA – Slave response

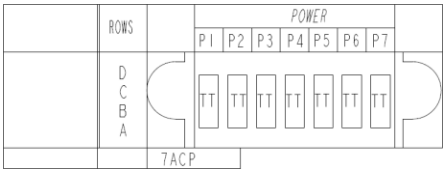
Memory Space

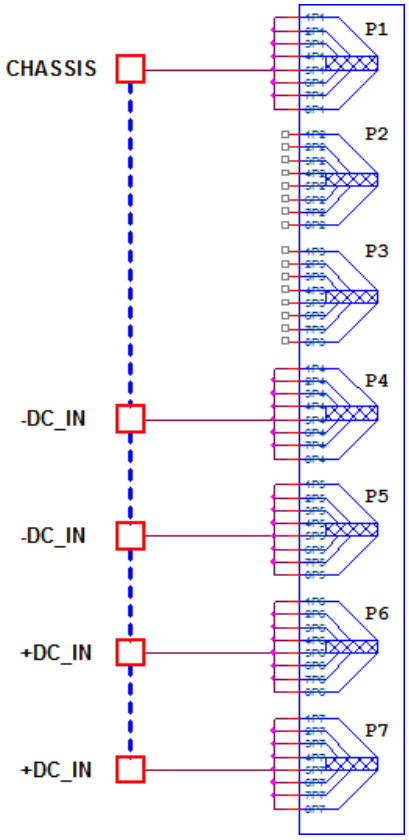
Address [8Bit]	Data [8Bit]	Description [00-FF]
0x00	Temperature 1	-55 °C to +120 °C Range
0x01	Vin	0V to 64V Range
0x02	+12V VS1 & VS2	0V to 16V Range
0x03	+12V Aux	0V to 16V Range
0x04	+12V VS1 & VS2	0V to 16V Range
0x05	+5V VS3	0V to 16V Range
0x06	+3.3V Aux	0V to 16V Range
0x07	-12V Aux	0V to 16V 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



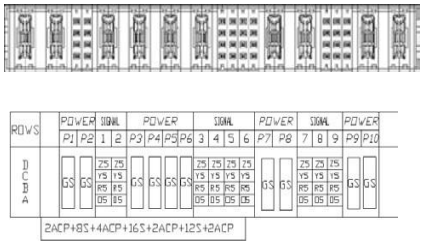


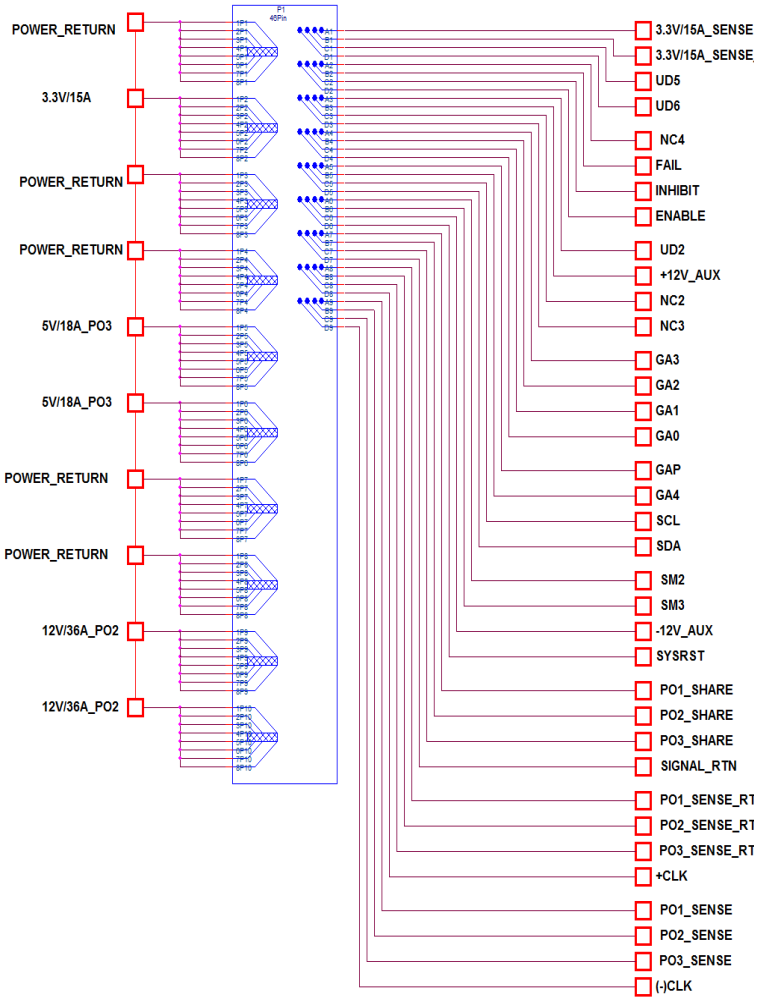


Pin Number	Signal Name
P7	+DC_IN
P6	+DC_IN
P5	-DC_IN
P4	-DC_IN
P3	
P2	
P1	CHASSIS_GND

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Connector P1

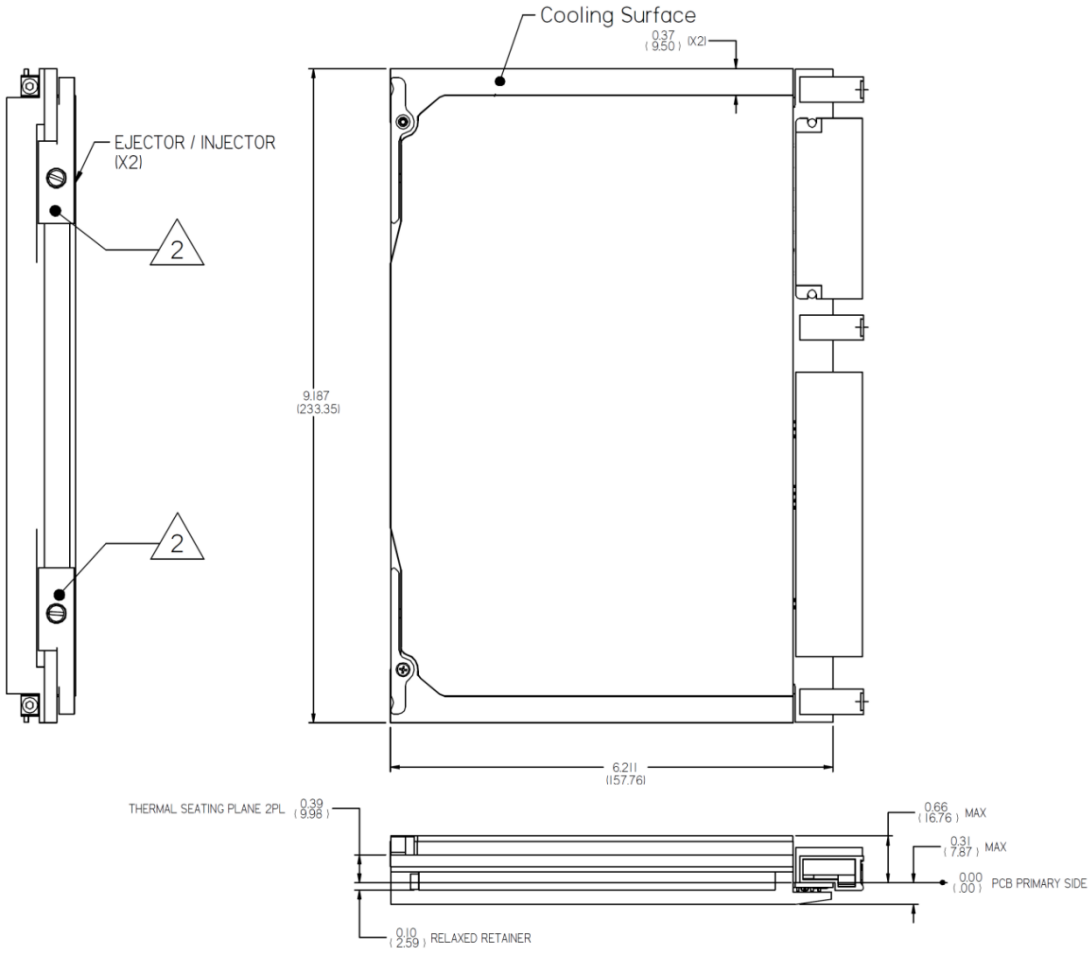




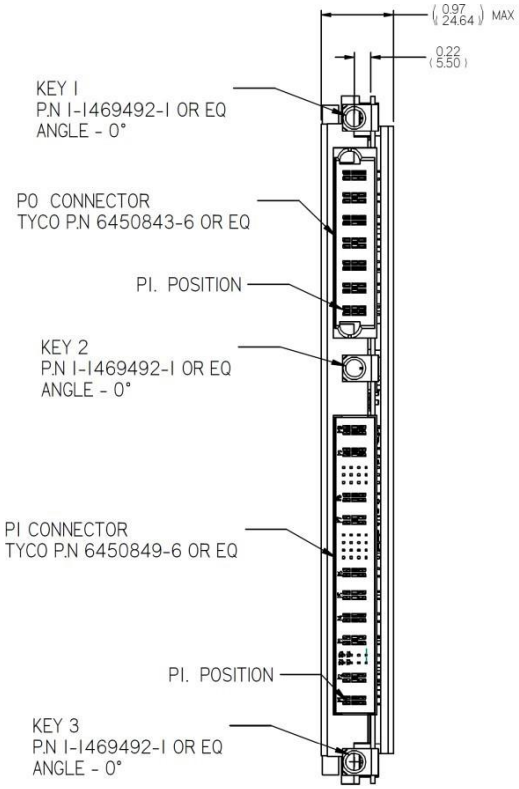
Pin Number	Pin Name
P10	12V/36A PO1
P9	12V/36A PO2
A9	PO1_SENSE
B9	PO2_SENSE
C9	PO3_SENSE
D9	(-)CLK
A8	PO1_SENSE_RTN
B8	PO2_SENSE_RTN
C8	PO3_SENSE_RTN
D8	+CLK
A7	PO1_SHARE
B7	PO2_SHARE
C7	PO3_SHARE
D7	SIGNAL_RETURN
P8	POWER_RETURN
P7	POWER_RETURN
A6	+CLK
B6	-CLK
C6	-12V_AUX
D6	SYSRESET*
A5	GAP*
B5	GA4*
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

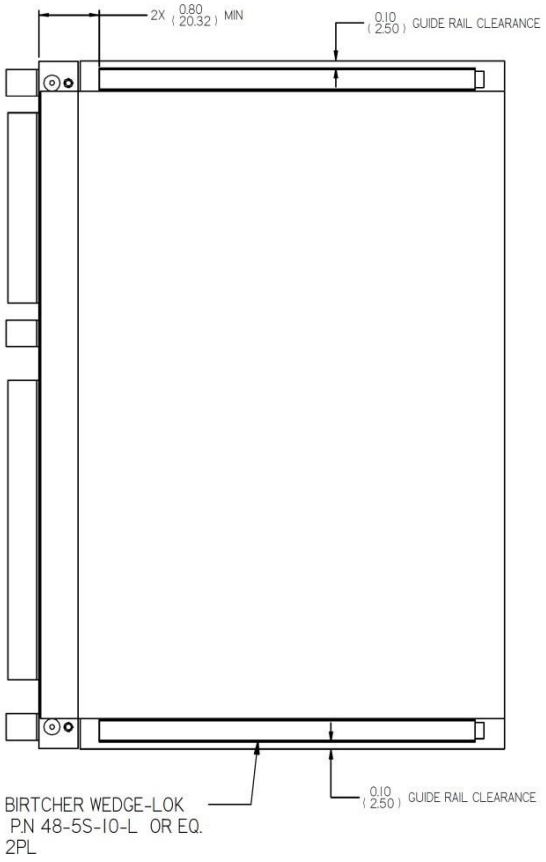
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Outline Drawing



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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

Note: Specifications are subject to change without prior notice by the manufacturer

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