![Wall Industries, Inc.]

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TECHNICAL DATASHEET
In Development

HVIB SERIES

175-405 VDC Input Voltage Range
12, 24, 28, & 48 VDC Single Outputs
500W DC/DC Power Converters

APPLICATIONS

- Telecommunications Equipment
- Network (LANs/WANs) Equipment
- Industrial Equipment
- Test Equipment

FEATURES

- High Power Density
- High Input Voltage Capability
- Wide Input Range
- Fast Transient Response
- Remote Sense
- Enable/Disable Pin
- ±10% Trim Capability
- 3000Vrms I/O Isolation
- Very Low Output Ripple
- Fixed Switching Frequency
- Remote On/Off (Active High/Low)
- Short Circuit & Over Temperature Protection
- 100% Burn-in
- High Efficiency

DESCRIPTION

The HVIB Series consists of 500 watt dc/dc converters with a single output and a 175~405VDC input voltage range. The HVIB series is being introduced to answer the needs of higher power systems requiring off-line voltages at higher power levels up to 500 watts. The HVIB is particularly suited for use in telecommunications equipment, network (LANs/WANs) equipment, and industrial and test equipment. As specialists in modified standard and customized power solutions, Wall Industries is also capable of rapidly customizing the HVIB series to meet specific customer needs.

TECHNICAL SPECIFICATIONS: HVIB SERIES

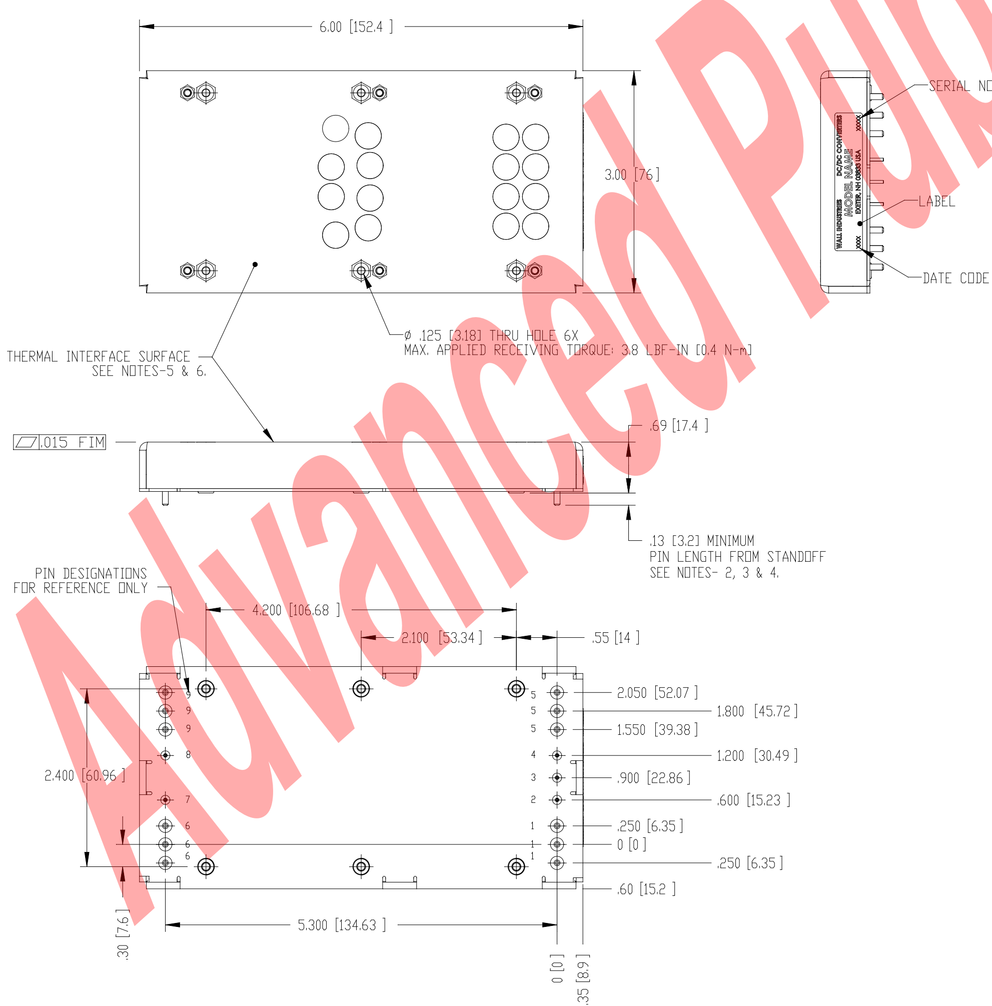
All specifications are based on 25°C, Nominal Input Voltage, and Maximum Output Current unless otherwise noted.
We reserve the right to change specifications based on technological advances.

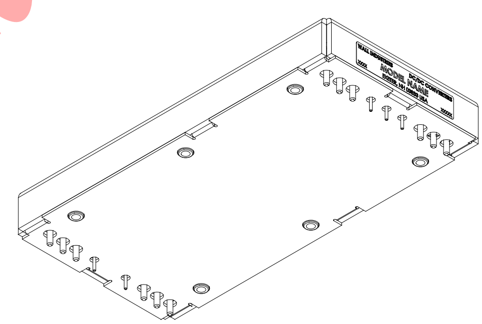
Specification	Related Condition	Min	Nom	Max	Unit
INPUT (V_{in})					
Operating Voltage Range		175		405	V
UVLO Turn On at		190	200	210	V
UVLO Turn Off at		160	165	170	V
UVLO Hysterisis		-	20	-	V
Maximum Input Current	300Vin @ 500W Output	-	108	-	A
No Load Input Current		-	TBD	-	A
Input Current under "Disable"		-	TBD	-	mA
Input Surge Voltage	100mS Wavefront	-	-	450	V
EFFICIENCY			92%		
OUTPUT (V_o)					
Voltage Set Point	Sense pins connected to respective outputs	99%	100	101	%Vo
Voltage Adjustment	Output limited to 500W	90%	-	110%	%Vo
Load Regulation	Sense pins connected to respective outputs	-	0.05	0.4	%Vo
Line Regulation	Sense pins connected to respective outputs	-	0.05	0.4	%Vo
Temperature Drift	Through operating temperature range	-	0.005	0.04	%/°C
Remote Sense Compensation		-	-	5	%Vo
Ripple					
Spikes					
Current		105	-	120	%FL
Current Limit	Threshold	-	TBD	-	A
Maximum Admissible Output Capacitance	Full load, resistive	TBD			µF
DYNAMIC RESPONSE					
Load step / Δ V	50% to 100% load step change	-	5	-	%Vo
Recovery Time	Recovery to within 1% Vo	-	1	-	mS
Turn On Delay	From enable, 1S after application of Vin	-	20	-	mS
Turn On Overshoot	Full load; resistive	0	-	-	%Vo
Hold Up Time		0			mS
DISABLE SIGNAL (Logic enable)					
Off Condition	Pulled low = off, TTL compatible (ref. to –Vin)	0	-	0.8	V
On Condition	Open = on (internally pulled up), TTL	-	3.3	-	V
ISOLATION					
Input-Output	1 minute	3000	-	-	Vrms
Isolation Resistance		100	-	-	MΩ
Isolation Capacitance		1000			pF
THERMAL					
Case *(Graph 2)*		-40		100	°C
Over Temperature Protection		-	105	-	°C
Storage Temperature		-55		125	°C
MTBF	Bellcore TR-332 Issue 6 - Calculated	TBD hours			
MECHANICAL		See Figure 1			
Weight		TBD			

MODEL SELECTION TABLE				
Model No.	**Input Voltage Range**	**Output Voltage**	**Output Current**	**Output Power**
HVIB300S12-500	300 VDC 175 ~ 405 VDC	12 VDC	41.67 A	500W
HVIB300S24-500		24 VDC	20.83 A	500W
HVIB300S28-500		28 VDC	17.86 A	500W
HVIB300S48-500		48 VDC	10.42 A	500W

Figure 1: Mechanical Dimensions

Unit: inches [mm]





PIN	DESIGNATION	PIN ø
1	+ OUTPUT	ø .081 [2.06] 3-PLACES
2	+ SENSE	ø .040 [1.02]
3	TRIM	ø .040 [1.02]
4	- SENSE	ø .040 [1.02]
5	- OUTPUT	ø .081 [2.06] 3-PLACES
6	+ Vin	ø .081 [2.06] 3-PLACES
7	SD	ø .040 [1.02]
8	SYNC	ø .040 [1.02]
9	- Vin	ø .081 [2.06] 3-PLACES

NOTES:

1. 3D MODEL ML106261 AVAILABLE FOR REFERENCE.
2. PIN TO PIN TOLERANCE: ±.01 [0.25].
3. PIN DIAMETER TOLERANCE: ±.005 [0.13].
4. PIN FINISH: LEAD-FREE, RoHS COMPLIANT.
5. CASE MATERIAL: ALUMINUM.
6. CASE FINISH: ANODIZE.

DESIGN CONSIDERATIONS

Under Voltage Lock Out (UVLO)
The converter output is disabled until the input voltage exceeds the UVLO turn-on limit. The converter will remain ON until the input voltage falls below the UVLO turn-off limit. There is approximately 20V hysteresis in the UVLO circuit.

Over Current Protection
The converter is internally protected from short circuit and over current conditions. During these fault conditions, the converter output will "hiccup"- (short) or "fold back" - (over current). The converter output will recover once the short or over current fault is removed.

Over Temperature Protection
The converter is protected from over temperature conditions. Upon exceeding this temperature, the converter will shut down. The converter will automatically recover once it has sufficiently cooled.

Input Filter
A 47µF low ESR capacitor across the input pins is recommended for most system level designs. No additional input capacitance is needed for the power supply to operate with low impedance inputs. However, most "real world" system level integration will have some amount of trace or wiring lengths – raising the inductive impedance. The added input capacitor will bring the impedance back towards unity.

Output Filter
No additional output capacitor is needed for the power supply to operate within stated specifications. However, if it is a requirement to reduce the ripple and noise on the output, additional capacitance may be added. Usually, ceramic MLCC's capacitor works best for reducing H.F. spike noise. Also, capacitance in the form of a tantalum or aluminum electrolytic capacitor may also be placed across the output in order reduce base ripple, and improve the load transient peak-to-peak voltage deviation.

Remote Sense
To improve the voltage regulation at the load, route the connections from the -Sense and the +Sense pins to the –Vout and +Vout connections AT the load. This will force the converter to regulate the voltage at the load and not at the pins of the converter. If it is not desired to use the Remotes Sense feature, the –Sense and +Sense pins should be connected to the -Vout and +Vout pins respectively.

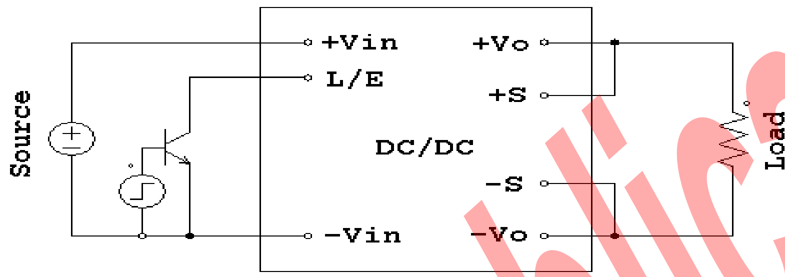
Fusing
It is required that the input to the converter be supplied with a maximum 10A appropriately rated fuse for the application

Safety
The HVIB series is CE pending and pending approval of the following: UL1950, CUL950, TUV60950 FILE 155800. The isolation provided by the HVIB Series is a reinforced insulation in accordance with EN60950.

Remote ON/OFF

The HVIB series has Remote ON/OFF (Enable/Disable) capability using TTL logic levels. This function is offered as either Active=TTL High (no suffix) or Active=TTL Low (R suffix), see order details on page 14. For Remote ON/OFF limits, see page 2.

Figure 2. Remote (L/E)

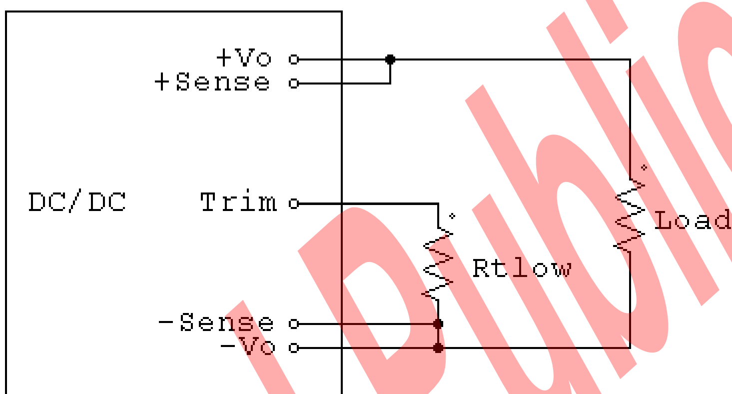


Output Voltage Trim

The following information is provided to allow quick calculation of the trim resistor value for a desired output voltage. The general procedure for calculating a trim resistor is as follows:

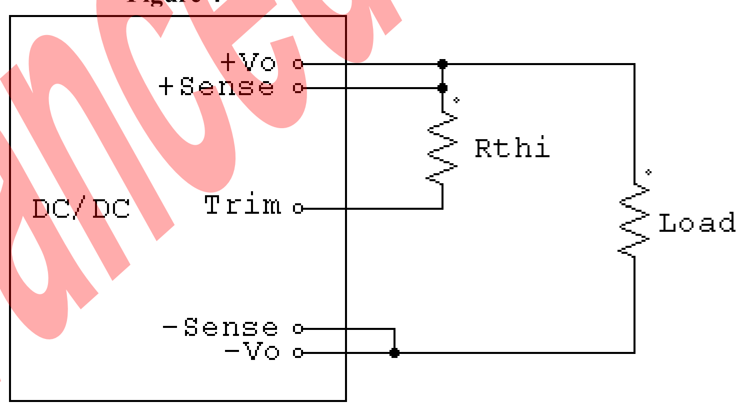
1. Determine the desired output voltage deviation %.
2. To trim down, solve for resistor value using the "Rtlow" equation.
3. To trim up, solve for resistor value using the "Rthi" equation.
4. Solved resistor values are in K ohms.

Figure 3



$$Rtlow = \left(\frac{510}{\Delta\%} - 10.2 \right)$$

Figure 4



$$Rthi = \left[\frac{5.1 \cdot Vo\,(100 + \Delta\%)}{1.2225 \cdot \Delta\%} - \frac{510}{\Delta\%} - 10.2 \right]$$

Notes:

1. Maximum trim range is ±10%. This includes remote sense drops if applicable.
2. Output current is limited to specified current when trimming down.
3. Output power is limited to specified power when trimming up.
4. Trim resistors should be placed close to the module.
5. If the trim function is not used, it is advised to leave the trim pin floating / not connected.

**Due to advances in technology, specifications subject to change without notice.*

Graph 1: HVIB300SXX-500 Efficiency vs. Output Current

TBD

Graph 2: Projected HVIB300SXX-500 Max Case vs. Output Power

TBD

Graph 3: HVIB300SXX-500 Power Dissipation vs. Input Voltage

TBD

Graph 4: HVIB300SXX-500 Input Current vs. Input Voltage

TBD

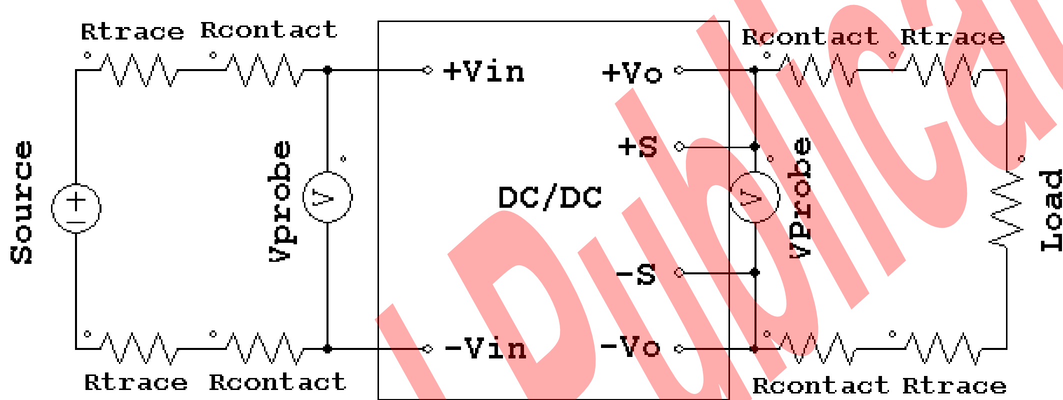
TEST SETUP:

The HVIB series specifications are tested with the following configurations:

Regulation and Efficiency Setup

To ensure that accurate measurements are taken, the voltage measurements are taken directly at the terminals of the module. This minimizes errors due to contact and trace lengths between the load and the output of the supply. The following diagram is of the test setup.

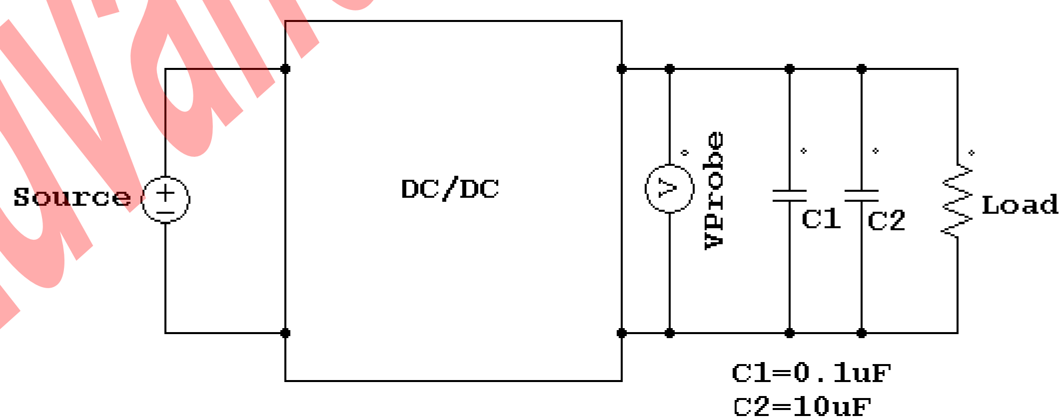
Figure 5: Regulation and Efficiency Probe Setup



Output Ripple Voltage Setup

The module is tested with a 0.1µF ceramic capacitor in parallel with a 10µF tantalum capacitor across the output terminals. Unless otherwise specified, bandwidth is limited to 20MHZ.

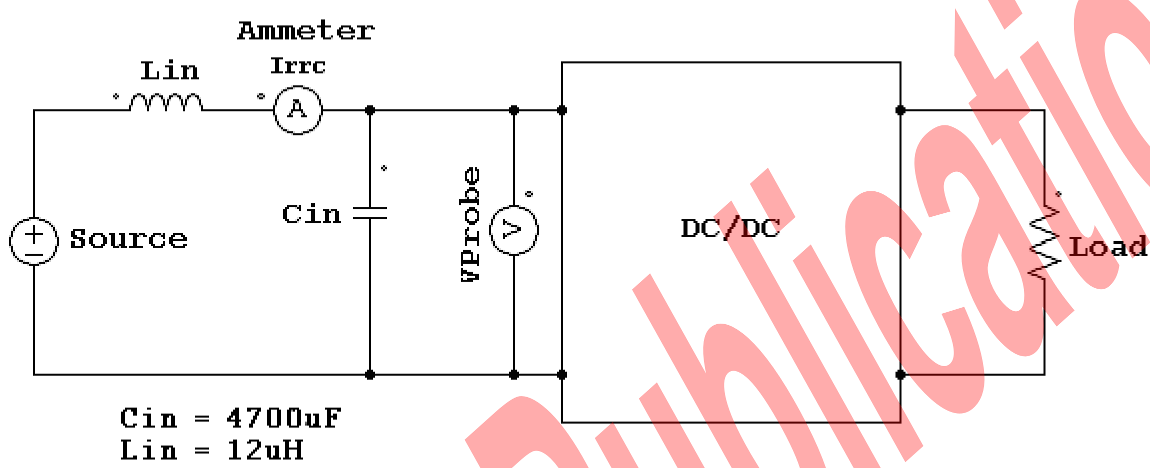
Figure 6: Ripple Voltage Probe Setup



Input Reflected Ripple Current and Input Ripple Voltage Setup

The module is tested for input reflected ripple current (Irrc). The input ripple voltage is also measured at the pins with and without an additional 4,700µF electrolytic capacitor. To reduce either the input ripple current or voltage additional capacitors and/or an inductor may be added to the input of the converter.

Figure 7: Ripple Current Setup (need new with 47uF capacitor, 200uH inductor)



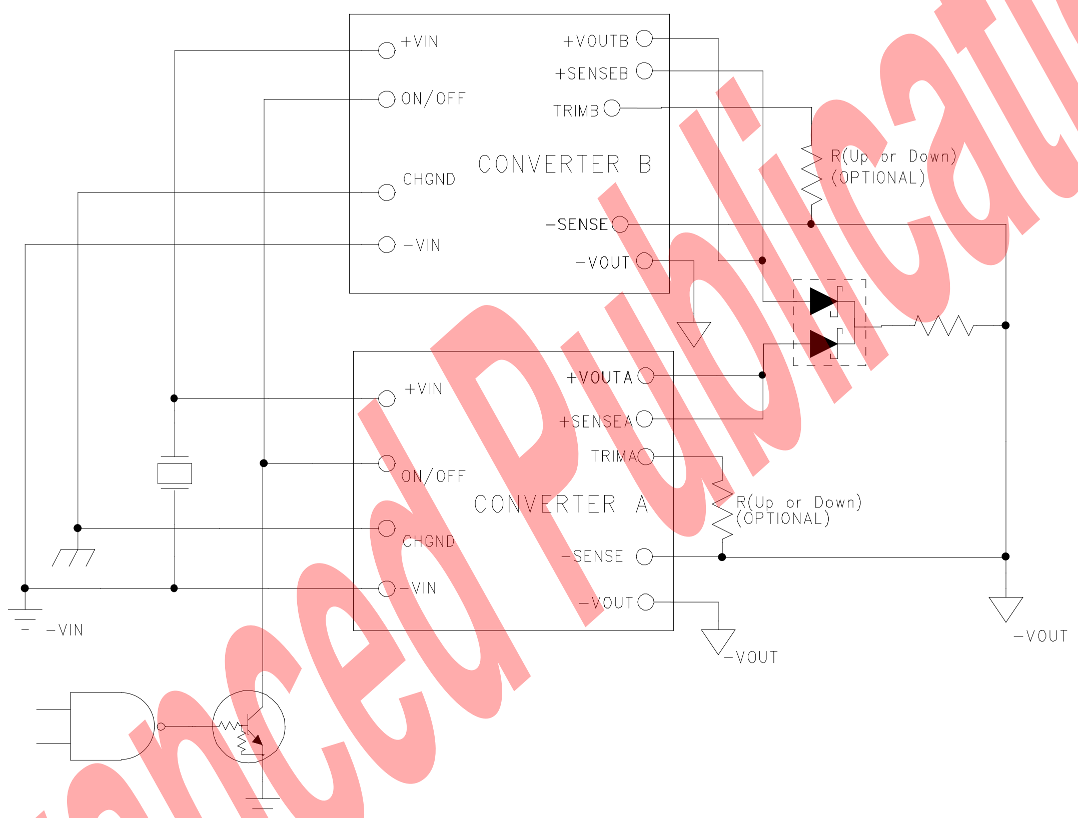
Converter Thermal Consideration

The converter is designed to operate without convective cooling if the de-rating curves are followed. The converter can operate at higher temperatures and higher output currents if airflow and/or a heatsink are applied. See Graph 2 for de-rating curves or contact factory for additional thermal information.

Paralleling Converters

The HVIB series converters may be paralleled both for redundancy and for higher output current. However, in order to do this, a high-current, low V_f, Schottky diode must be placed at the +Vo pin of each supply as shown in Figure 8. To improve sharing, tie the two TRIM pins together. The converters may be trimmed by adding a resistor value from each TRIM pin to ±RS pin, or alternatively, a single resistor of half the value from the common TRIM pins to the common ±RS pins.

Figure 8: Paralleling Converters



Ordering Information:

Part Number Example:

HVIB 300 S 24 – 500 R TH

- HVIB: Series Designation
- 300: Nominal Input Voltage
- S: Single Output
- 24: Nominal Output Voltage
- 500: Maximum Output Power
- R: see options below
- TH: see options below

Options	
Blank	Threaded Hole
TH	Through Hole

Options	
Blank	Active High Enable
R	Active Low Enable

Company Information:

Wall Industries, Inc. has created custom and modified units for over 50 years. Our in-house research and development engineers will provide a solution that exceeds your performance requirements on-time and on budget. Our ISO9001: 2015 certification is just one example of our commitment to producing a high quality, well-documented product for our customers.

Our past projects demonstrate our commitment to you, our customer. Wall Industries, Inc. has a reputation for working closely with its customers to ensure each solution meets or exceeds form, fit and function requirements. We will continue to provide ongoing support for your project above and beyond the design and production phases. Give us a call today to discuss your future projects.

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