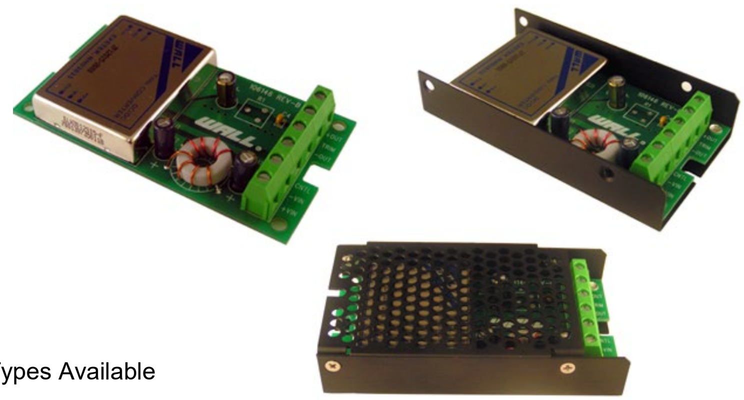
FEATURES

- Soft Start
- Output Trim
- Single Output
- 1500VDC Isolation
- Efficiency up to 89%
- Remote On/Off Control
- CSA60950-1 Safety Approval
- 2:1 Wide Input Voltage Range
- Complies with EN55022 Class A
- Call Factory for More Output Power Options
- Short Circuit, Over Voltage, and Over Temperature Protected
- Chassis Mount Options: Open Frame, U Channel, and Enclosed Types Available



DESCRIPTION

The CMMM series of chassis mount DC/DC converters offer up to 30 watts of output power. These converters operate over input voltage ranges of 9-18VDC, 18-36VDC, and 36-75VDC. This series also provides regulated single output voltages of 3.3, 5, 12, and 15VDC. Other features include remote on/off control, output trim function, and efficiencies up to 89%. All models are over voltage, over temperature and short circuit protected. The EN55022 Class A conducted noise compliance minimizes design time, cost, and eliminates the need for external filter components. These converters are best suited for data communication equipment, mobile battery driven equipment, distributed power systems, telecommunications equipment, mixed analog/digital subsystems, process/machine control equipment, computer peripheral systems, and industrial robot systems. Chassis mounts come in open frame, U channel, and enclosed types.

SPECIFICATIONS: *CMMM 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	TEST CONDITIONS	Min	Nom	Max	Unit
INPUT (V_{in})					
Input Voltage Range	12V nominal input models	9	12	18	VDC
	24V nominal input models	18	24	36	VDC
	48V nominal input models	36	48	75	VDC
Start Voltage	12V nominal input models	8.6	8.8	9	VDC
	24V nominal input models	17	17.5	18	VDC
	48V nominal input models	34	35	36	VDC
Under Voltage Shutdown	12V nominal input models	8.1	8.3	8.5	VDC
	24V nominal input models	16	16.5	17	VDC
	48V nominal input models	32	33	34	VDC
Reverse Polarity Input Current	All models			2	A
Short Circuit Input Power				4500	mW
Input Surge Voltage	12V nominal input models	-0.7		25	VDC
	24V nominal input models	-0.7		50	VDC
	48V nominal input models	-0.7		100	VDC
OUTPUT (V_o)					
Output Voltage		See Table			
Output Voltage Accuracy			±0.5	±1.0	%
Output Trim			±10		%
Load Regulation	Io = 10% to 100%		±0.1	±0.5	%
Line Regulation	Vin = min. to max.		±0.1	±0.3	%
Output Power				30	W
Output Current Range		See Table			
Ripple & Noise (20MHz)			55	80	mV_{pk-pk}
Ripple & Noise (20MHz)	Over Line, Over Load, and Over Temperature			100	mV_{pk-pk}
Ripple & Noise (20MHz)				10	mVrms
Transient Recovery Time	25% load step change		150	300	µs
Transient Response Deviation			±2	±4	%
REMOTE ON/OFF					
Supply On		2.5 to 100VDC or Open Circuit			
Supply Off		-1		1	VDC
Standby Input Current			2	5	mA
Control Input Current (On)	Vin – RC = 5.0V			5	µA
Control Input Current (Off)	Vin – RC = 0V			-100	µA
Control Common		Referenced to negative input			
PROTECTION					
Over Power Protection		110		160	%
Short Circuit Protection		Continuous			
Over Voltage Protection		See Table			
Over Temperature Protection	Case Temperature, automatic	107	112	117	°C

SPECIFICATION	TEST CONDITIONS	Min	Nom	Max	Unit
GENERAL					
Efficiency		See Table			
Switching Frequency		290	330	360	KHz
Isolation Voltage Rated	60 seconds	1500			VDC
Isolation Voltage Test	Flash Test for 1 second	1650			VDC
Isolation Resistance	500VDC	1000			MΩ
Isolation Capacitance	100KHz, 1V		1200	1500	pF
Internal Power Dissipation				5,500	mW
ENVIRONMENTAL					
Operating Temperature (Ambient)		-40		+50	°C
Operating Temperature (Case)		-40		+105	°C
Storage Temperature		-50		+125	°C
Lead Temperature	1.5mm from case for 10 seconds			260	°C
Humidity				95	%
Cooling		Free air convection			
RFI		Six-sided shielding, metal case			
Temperature Coefficient			±0.01	±0.02	%/°C
MTBF	MIL-HDBK-217F @ 25°C, Ground Benign	1000			Khours
Conducted EMI		EN55022 Class A			
PHYSICAL					
Weight		Approximately 7oz			
Dimensions (L x W x H)		4.00 x 2.25 x 0.81 inches			
Case Material of DC/DC converter		Metal with non-conductive baseplate			
Flammability		UL94V-0			

MODEL SELECTION TABLE

Model Number	Input Voltage	Output Voltage	Output Current		Input Current		Reflected Ripple Current	Efficiency (Typ)	Over Voltage Protection	Maximum Capacitive Load
			Min	Max	No Load	Max Load				
CMMM12S3.3-5500	12 VDC (9 ~ 18 VDC)	3.3 VDC	400 mA	5500 mA	40 mA	1867 mA	100 mA	81%	3.9 VDC	470 µF
CMMM12S5-5000		5 VDC	350 mA	5000 mA		2480 mA		84%	6.8 VDC	470 µF
CMMM12S12-2500		12 VDC	166 mA	2500 mA		2841 mA		88%	15 VDC	470 µF
CMMM12S15-2000		15 VDC	133 mA	2000 mA		2841 mA		88%	18 VDC	470 µF
CMMM24S3.3-5500	24 VDC (18 ~ 36 VDC)	3.3 VDC	300 mA	5500 mA	20 mA	922 mA	50 mA	82%	3.9 VDC	470 µF
CMMM24S5-5000		5 VDC	300 mA	5000 mA		1225 mA		85%	6.8 VDC	470 µF
CMMM24S12-2500		12 VDC	300 mA	2500 mA		1404 mA		89%	15 VDC	470 µF
CMMM24S15-2000		15 VDC	125 mA	2000 mA		1404 mA		89%	18 VDC	470 µF
CMMM48S3.3-5500	48 VDC (36 ~ 75 VDC)	3.3 VDC	300 mA	5500 mA	10 mA	461 mA	25 mA	82%	3.9 VDC	470 µF
CMMM48S5-5000		5 VDC	300 mA	5000 mA		613 mA		85%	6.8 VDC	470 µF
CMMM48S12-2500		12 VDC	300 mA	2500 mA		702 mA		89%	15 VDC	470 µF
CMMM48S15-2000		15 VDC	125 mA	2000 mA		702 mA		89%	18 VDC	470 µF

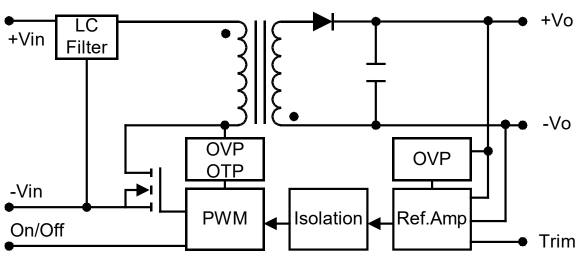
NOTES

1. Transient recovery time is measured to within 1% error band for a step change in output load of 75% to 100%.
2. The CMMM series requires a minimum output loading to maintain specified regulations. Operation under no-load conditions will not damage these devices, however they may not meet all listed specifications.
3. Other input and output voltages may be available, please contact factory.
4. Heat-sink is optional, please consult factory for ordering details.
5. Chassis Mount Options: No suffix for open frame, “U” suffix for U Channel, and “E” suffix for Enclosed type.

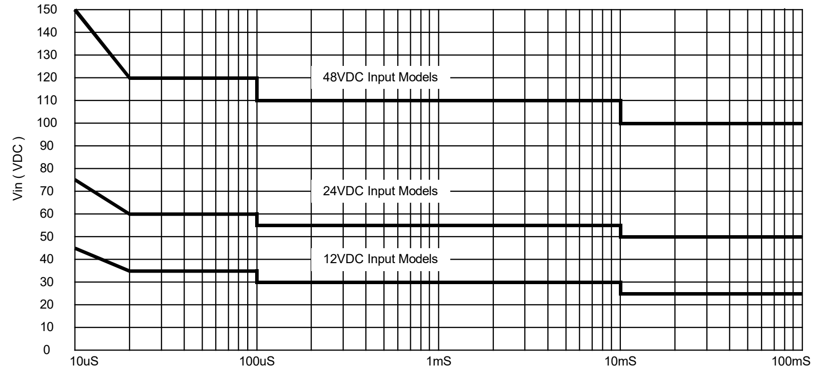
Due to advances in technology, specifications subject to change without notice.

BLOCK DIAGRAM

Single Output

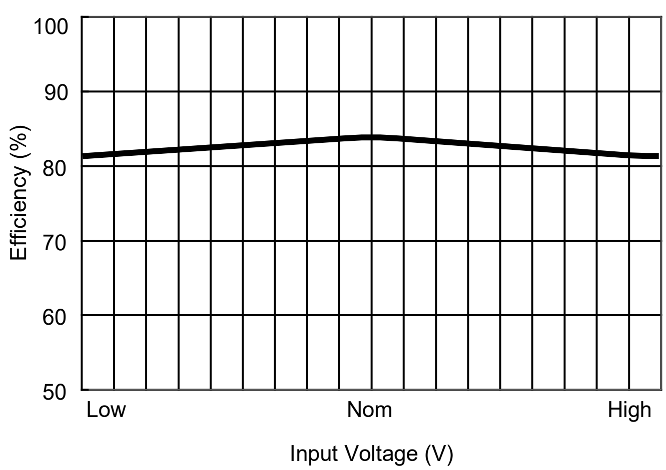


INPUT VOLTAGE TRANSIENT RATING

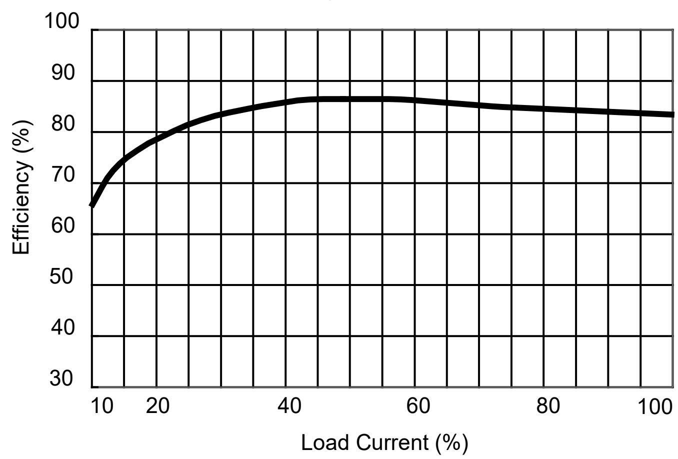


DERATING CURVES & EFFICIENCY GRAPHS

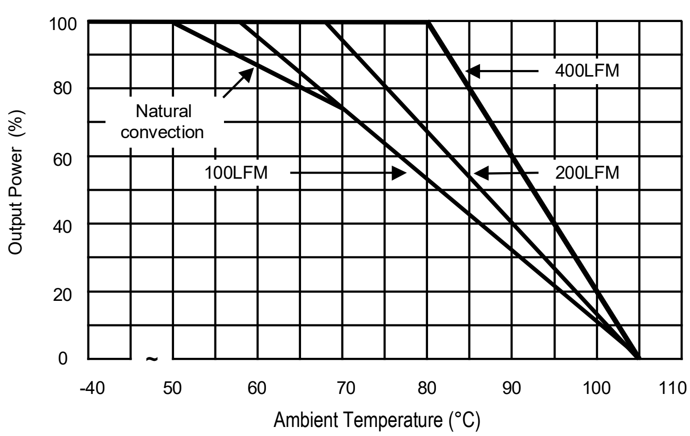
Efficiency vs Input Voltage (Single Output)



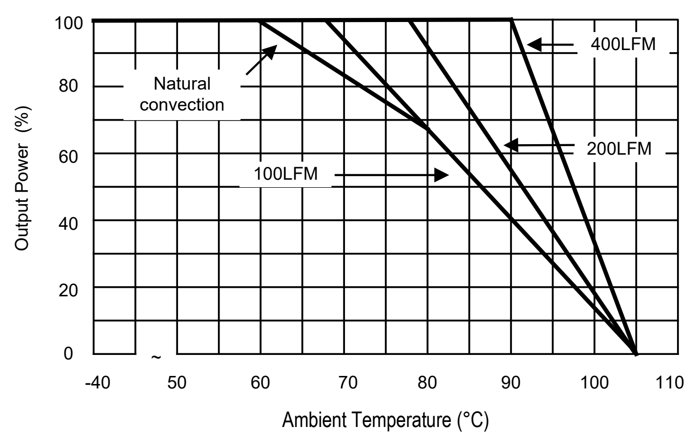
Efficiency vs Output Load



Derating Curve without Heatsink

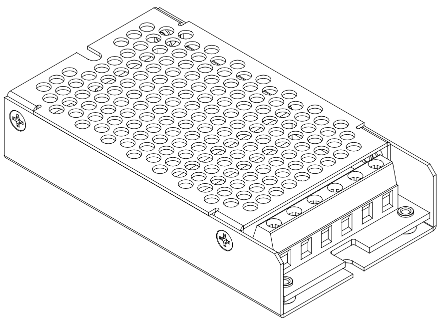


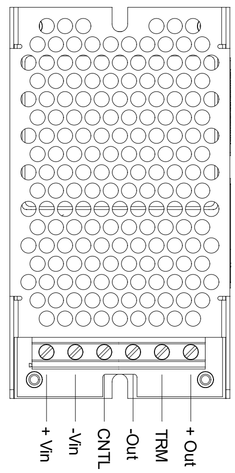
Derating Curve with Heatsink

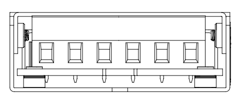


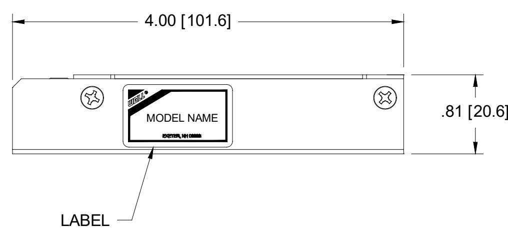
MECHANICAL DRAWINGS

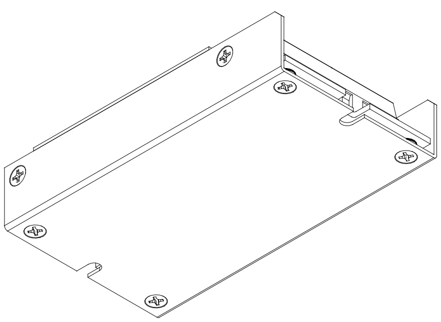
Unit: inches [mm]

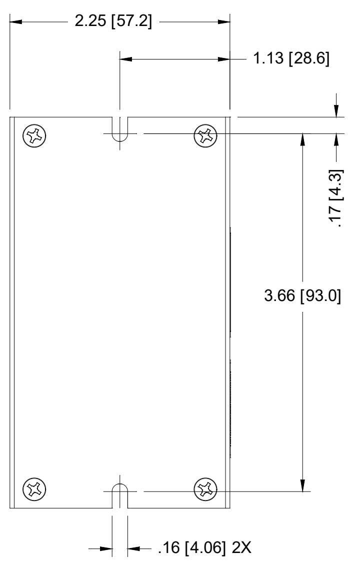












DESIGN & FEATURE CONSIDERATONS

Remote On/Off

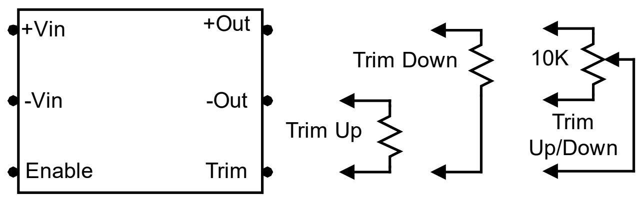
Positive logic remote on/off turns the module on during a logic high voltage on the remote on/off pin, and turns the module off during a logic low. To turn the power module on and off, the user must supply a switch to control the voltage between the on/off terminal and the -Vin terminal. The switch can be an open collector or equivalent.

A logic low is -1V to 1.0V.
A logic high is 2.5V to 100V.

The maximum sink current at the on/off terminal (pin 4) during a logic low is -100μA. The maximum allowable leakage current of the switch at the on/off terminal (pin 4) during a logic high (2.5 to 100V) is 5μA.

Output Voltage Trim

Output voltage trim allows the user to increase or decrease the output voltage set point of a module. The output voltage can be adjusted by placing an external resistor (R) between the Trim and +Vout or –Vout terminals. By adjusting R, the output voltage can be changed by ±10% of the nominal output voltage.



A 10K, 1 or 10 turn trimpot is usually specified for continuous trimming. Trim pin may be safely left floating if it is not being used. Connecting the external resistor (R_{up}) between the Trim and –Vout pins increases the output voltage to set the point as defined in the following equation:

$$R_{up} = \frac{(33 \times Vout) - (30 \times Vadj)}{Vadj - Vout}$$

Connecting the external resistor (R_{down}) between the Trim and +Vout pins decreases the output voltage set point as defined in the following equation:

$$R_{down} = \frac{(36.667 \times Vadj) - (33 \times Vout)}{Vout - Vadj}$$

Vout: Nominal Output Voltage
Vadj: Adjusted Output Voltage
Units VDC / KΩ

Over Current Protection

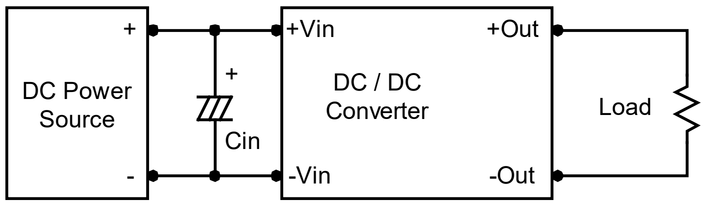
To provide protection in a fault (output overload) condition, the unit is equipped with internal current limiting circuitry and can endure current limiting for an unlimited duration. At the point of current-limit inception, the unit shifts from voltage control to current control. The unit operates normally once the output current is brought back into its specified range.

Over Voltage Protection

The output over voltage clamp consists of control circuitry that is dependent on the primary regulation loop that monitors the voltage on the output terminals. The control loop of the clamp has a higher voltage set point than the primary loop. This provides a redundant voltage control that reduces the risk of an output over voltage. The OVP level can be found in the protection specifications.

Input Source Impedance

The power module should be connected to a low ac-impedance input source. Highly inductive source impedances can affect the stability of the power module. In applications where power is supplied over long lines and output loading is high, it may be necessary to use a capacitor at the input to ensure startup. A capacitor mounted close to the power module helps ensure stability of the unit, it is recommended to use a good quality low Equivalent Series Resistance (ESR < 1.0Ω at 100KHz) capacitor of a 33µF for the 12V input models and a 10µF for the 24V and 48V input models.



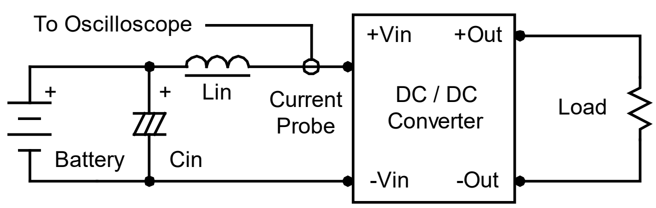
Maximum Capacitive Load

The CMMM Series has a limitation of maximum connected capacitance at the output. The power module may be operated in current limiting mode during start-up, affecting the ramp-up and the startup time. For optimum performance we recommend 330µF maximum capacitive load for 12V and 15V outputs and 10,000µF capacitive load for 3.3V and 5V outputs. The maximum capacitance can be found in the Output Voltage / Current Rating Chart.

TEST CONFIGURATIONS

Input Reflected-Ripple Current Test Setup

Input reflected-ripple current is measured with an inductor Lin (4.7µH) and Cin (220µF, ESR < 1.0Ω at 100KHz) to simulate source impedance.



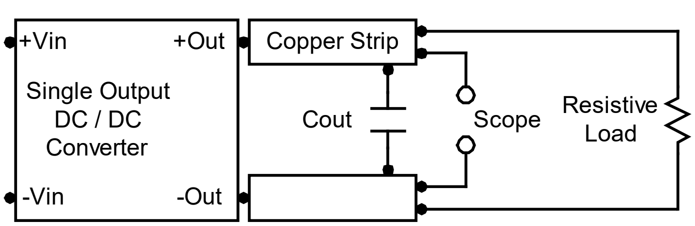
Capacitor Cin offsets possible battery impedance.

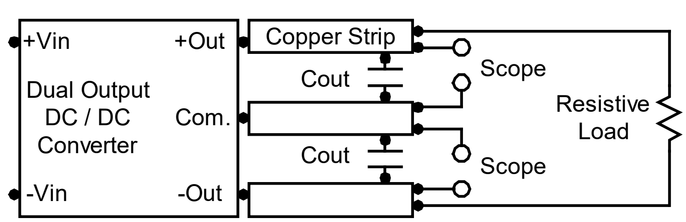
Current ripple is measured at the input terminals of the module. Measurement bandwidth is 0 ~ 500KHz.

Peak-to-Peak Output Noise Measurement Test

Use a Cout 1.0µF ceramic capacitor.

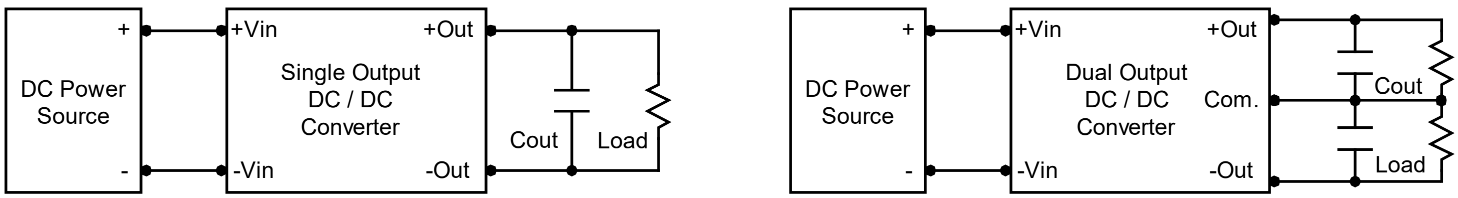
Scope measurement should be made by using a BNC socket; measurement bandwidth is 0 ~ 20MHz. Position the load between 50mm and 75mm from the DC/DC Converter.





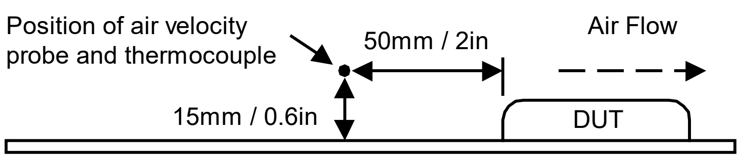
Output Ripple Reduction

A good quality low ESR capacitor placed as close as possible across the load will give the best ripple and noise performance. To reduce output ripple, it is recommended to use 4.7µF capacitors at the output.



Thermal Considerations

Many conditions affect the thermal performance of the power module, such as orientation, airflow over the module, and board spacing. To avoid exceeding the maximum temperature rating of the components inside the power module, the case temperature must be kept below 105°C. The derating curves are determined from measurements obtained in an experimental apparatus.



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 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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