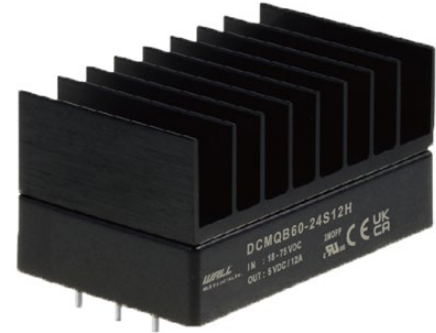


Standard Package



Size: 1.45in x 2.28in x 0.50in (36.8mm x 57.9mm x 12.7mm)

Heatsink Package ("H" Suffix)



Size: 1.45in x 2.28in x 1.19in (36.8mm x 57.9mm x 30.2mm)

OPTIONS

- Remote Control Logic
- Heatsink

FEATURES

- Wide 4:1 Input Voltage Range
- 5000VAC Reinforced Insulation
- No Minimum Load Requirement
- Low Standby Power
- Remote On/Off
- 2xMOPP
- High Efficiency
- Optional Heatsink
- Over Voltage, Over Load, Over Temperature, and Short Circuit Protection
- IEC/EN/ANSI/AAMI ES 60601-1 and IEC/EN/UL 62368-1 Safety Approvals

APPLICATIONS

- Medical
- PV
- Automation
- Datacom/Telecom
- IPC
- Industrial

DESCRIPTION

The DCMQB60 series of quarter-brick DC/DC converters offers up to 60 watts of output power in a compact 1.45" x 2.28" x 0.50" package with optional heatsink. This series consists of single and dual output models with a wide 4:1 input voltage range. Each model in this series features low standby power, no minimum load requirement, remote on/off, and 5000VAC reinforced insulation. This series also has over voltage, over load, over temperature, and short circuit protection as well IEC/EN/ANSI/AAMI ES 60601-1 and IEC/EN/UL 62368-1 safety approvals.

MODEL SELECTION TABLE								
Single Output Models								
Model Number ⁽¹⁾	Input Voltage Range	Output Voltage	Full Load Output Current	Ripple & Noise	Efficiency	Maximum Capacitive Load	No Load Input Current	Output Power
DCMQB60-24S05	24VDC (9~36VDC)	5VDC	12A	75mVp-p	89.5%	17000µF	15mA	Up to 60 Watts
DCMQB60-24S51		5.1VDC	12A	75mVp-p	89.5%	17000µF	15mA	
DCMQB60-24S12		12VDC	5A	100mVp-p	91.5%	3000µF	15mA	
DCMQB60-24S15		15VDC	4A	100mVp-p	90%	1900µF	15mA	
DCMQB60-24S24		24VDC	2.5A	150mVp-p	90%	730µF	15mA	
DCMQB60-48S05	48VDC (18~75VDC)	5VDC	12A	75mVp-p	89.5%	17000µF	10mA	Up to 60 Watts
DCMQB60-48S51		5.1VDC	12A	75mVp-p	89.5%	17000µF	10mA	
DCMQB60-48S12		12VDC	5A	100mVp-p	92%	3000µF	10mA	
DCMQB60-48S15		15VDC	4A	100mVp-p	92.5%	1900µF	10mA	
DCMQB60-48S24		24VDC	2.5A	150mVp-p	90%	730µF	10mA	

MODEL SELECTION TABLE								
Dual Output Models								
Model Number ⁽¹⁾	Input Voltage Range	Output Voltage	Full Load Output Current	Ripple & Noise	Efficiency	Maximum Capacitive Load	No Load Input Current	Output Power
DCMQB60-24D12	24VDC (9~36VDC)	±12VDC	±2.5A	100mVp-p	90%	±1500µF	15mA	Up to 60 Watts
DCMQB60-24D15		±15VDC	±2A	100mVp-p	90%	±940µF	15mA	
DCMQB60-48D12	48VDC (18~75VDC)	±12VDC	±2.5A	100mVp-p	90%	±1500µF	15mA	Up to 60 Watts
DCMQB60-48D15		±15VDC	±2A	150mVp-p	90%	±940µF	15mA	

SPECIFICATIONS

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	Typ	Max	Unit
INPUT SPECIFICATIONS						
Operating Input Voltage Range	24Vin Nominal Input		9	24	36	VDC
	48Vin Nominal Input		18	48	75	
Start-Up Voltage	24Vin Nominal Input				9	VDC
	48Vin Nominal Input				18	
Shutdown Voltage	24Vin Nominal Input		7.8	8	8.6	VDC
	48Vin Nominal Input		15.8	16	17.4	
Input Surge Voltage	3 Second, max.	24Vin Nominal Input			50	VDC
		48Vin Nominal Input			100	
Input Filter			Pi Type			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy			-1.0		+1.0	%
Line Regulation	Low Line to High Line at Full Load	Single	-0.2		+0.2	%
		Dual	-0.5		+0.5	
Load Regulation	No Load to Full Load	Single	-0.2		+0.2	%
		Dual	-1.0		+1.0	
Voltage Adjustability	Maximum output deviation is inclusive of remote sense	5Vout, 5.1Vout, 12Vout	-10		+10	%
		15Vout, 24Vout	-10		+20	
Remote Sense ⁽²⁾	% of Vout(nom)				10	%
Cross Regulation	Asymmetrical load 25%/100% FL, Dual Output		-5.0		5.0	%
Output Power			See Table			
Output Current			See Table			
Maximum Capacitive Load			See Table			
Ripple & Noise (20MHz bandwidth)	With a 10µF/25V X7R MLCC	5Vout, 5.1Vout		75		mVp-p
	With a 10µF/25V X7R MLCC	12Vout, 15Vout		100		
	With a 4.7µF/50V X7R MLCC	24Vout		150		
	With a 10µF/25V X7R MLCC	±12Vout, ±15Vout		100		
Transient Response Recovery Time	25% Load step change			250		µs
Start-Up Time	Constant resistive load	Power Up		30	60	ms
		Remote On/Off		30	60	
Temperature Coefficient			-0.02		+0.02	%/°C
Leakage Current	240VAC, 60Hz			4	4.5	µA
REMOTE ON/OFF CONTROL⁽⁴⁾						
Positive Logic	DC-DC ON		Open or 3~12VDC			
	DC-DC OFF		Short or 0~1.2VDC			
Negative Logic (Option)	DC-DC ON		Short or 0~1.2VDC			
	DC-DC OFF		Open or 3~12VDC			
Input Current of CTRL Pin			-0.5		0.5	mA
Remote OFF Input Current				3		mA
PROTECTION						
Short Circuit Protection			Continuous, Automatic Recovery			
Over Load Protection	% of Iout rated; Hiccup Mode			150	195	%
				120		
Over Voltage Protection	% of Vout(nom); Hiccup Mode	5Vout, 5.1Vout, 12Vout,		120		%
		15Vout, 24Vout		130		
Over Temperature Protection				120		°C
				+115		
ENVIRONMENTAL SPECIFICATIONS						
Operating Ambient Temperature	With Derating		-40		+105	°C
Storage Temperature			-55		+125	°C
Maximum Case Temperature					+105	°C
Relative Humidity			5		95	%RH
Thermal Impedance	Natural Convection	Without Heat-Sink		9.7		°C/W
		With Heat-Sink		5.5		
Operating Altitude					5000	m
Thermal Shock			MIL-STD-810F			
Vibration			MIL-STD-810F			
MTBF	MIL-HDBK-217F, Full Load			1,064,000		Hours

SPECIFICATIONS

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	Typ	Max	Unit
GENERAL SPECIFICATIONS					
Efficiency		See Table			
Switching Frequency		225	250	275	kHz
Isolation Voltage	Reinforced insulation for 250VAC working voltage, 1 minute, Input to Output	5000			VAC
Isolation Resistance	500VDC	10			GΩ
Isolation Capacitance			40		pF
Clearance/Creepage		8			mm
PHYSICAL SPECIFICATIONS					
Weight		1.80oz (51g)			
Dimensions (L x W x H)	Standard Package	1.45in x 2.28in x 0.50in (36.8mm x 57.9mm x 12.7mm)			
	Heatsink Option ("H" Suffix)	1.45in x 2.28in x 1.19in (36.8mm x 57.9mm x 30.2mm)			
Case Material		Non-Conductive Black Plastic			
Base Material		Non-Conductive Black Plastic			
Potting Material		Silicone (UL94 V-0)			
SAFETY CHARACTERISTICS					
Safety Approvals ⁽⁴⁾		IEC/EN/ANSI/AAMI ES 60601-1 IEC/EN/UL 62368-1		CB: UL (Demko)	
EMI	EN5011, EN55032, EN60601-1-2 with External Components	Class A, Class B			
EMS	EN55035 and EN60601-1-2				
ESD	EN61000-4-2	Air ±15kV and Contact ±8kV		Perf. Criteria A	
Radiated Immunity	EN61000-4-3	10V/m		Perf. Criteria A	
Fast Transient ⁽⁵⁾	EN61000-4-4	±2kV		Perf. Criteria A	
Surge ⁽⁵⁾	EN61000-4-5	±2kV		Perf. Criteria A	
Conducted Immunity	EN61000-4-6	10Vr.m.s		Perf. Criteria A	
Power Frequency Magnetic Field	EN61000-4-8	100A/m continuous; 1000A/m 1 second		Perf. Criteria A	

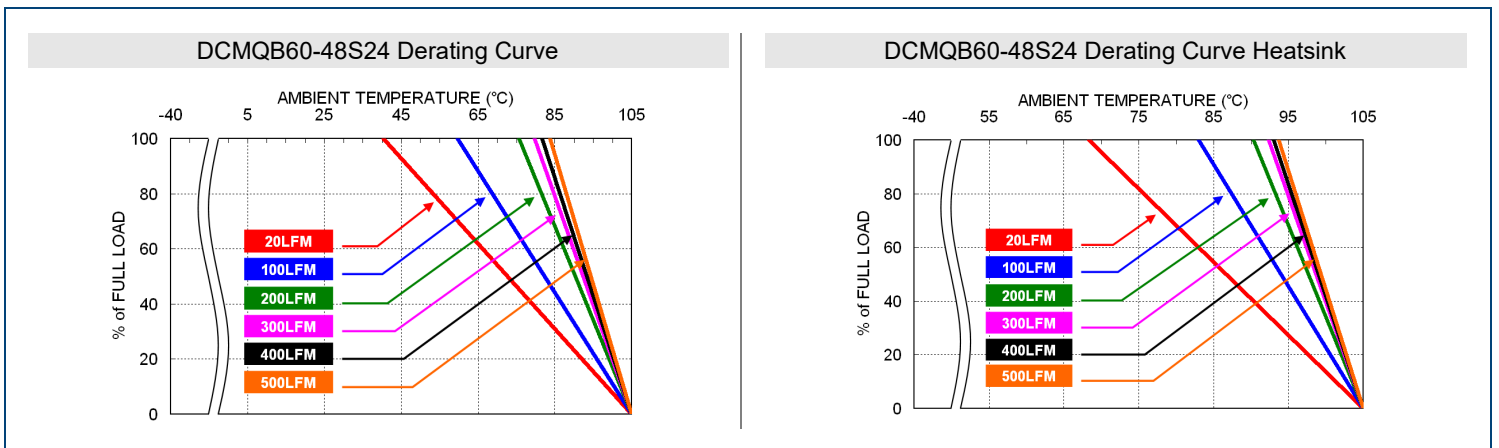
NOTES

1. Add "H" to model number to indicate product with heatsink.
2. If remote sense is not being used, SENSE pins should be connected to corresponding polarity OUTPUT pins.
3. Referred to -Vin pin
4. This product is Listed to applicable standards and requirements by UL.
5. 24VDC Input: With 2 pcs of aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ58A, 58V, 3000 Watt peak pulse power) in parallel.
48VDC Input: With 2 pcs of aluminum electrolytic capacitor (Nippon chemi-con KY series, 220µF/100V) and a TVS (SMDJ120A, 120V, 3000 Watt peak pulse power) in parallel.

CAUTION: This power module is not internally fused. An input line fuse must always be used.

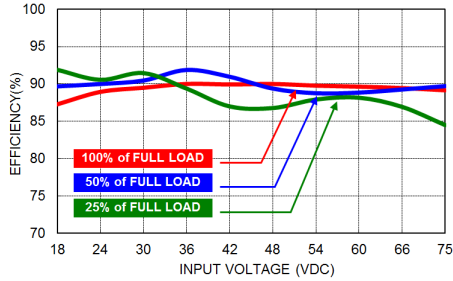
**Due to advances in technology, specifications subject to change without notice.*

DERATING CURVES

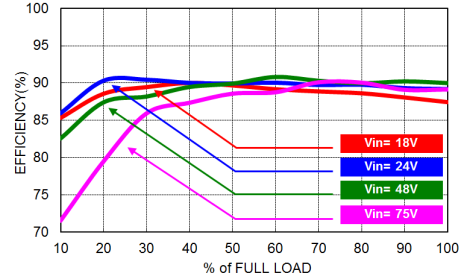


EFFICIENCY GRAPHS

DCMQB60-48S24 Efficiency vs. Input Voltage

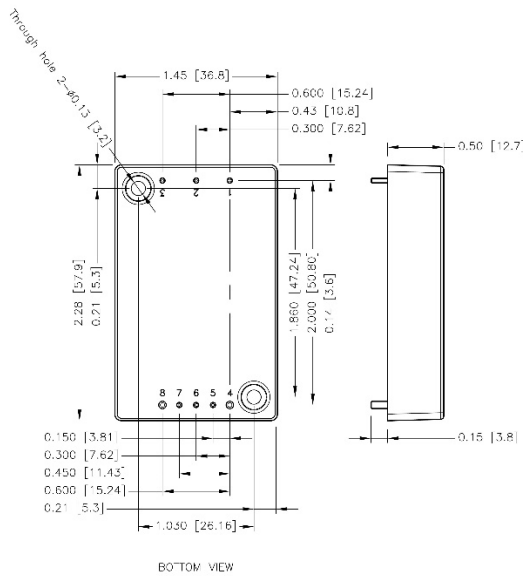


DCMQB60-48S24 Efficiency vs. Output Load



MECHANICAL DRAWINGS

Standard Package



PIN Connection

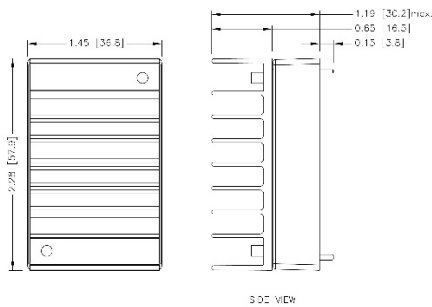
PIN	SINGLE	DUAL	DIAMETER
1	-Vin	-Vin	0.04 Inch
2	Ctrl	Ctrl	0.04 Inch
3	+Vin	+Vin	0.04 Inch
4	-Vout	-Vout	0.06 Inch
5	-Sense	-Sense	0.04 Inch
6	Trim	Trim	0.04 Inch
7	+Sense	+Sense	0.04 Inch
8	+Vout	+Vout	0.06 Inch

Notes:

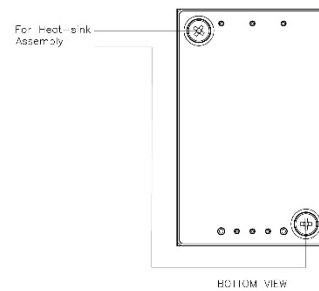
1. All dimensions in inch [mm]
2. Tolerances: $x.xx \pm 0.02$ [$x.x \pm 0.5$]
 $x.xxx \pm 0.01$ [$x.xx \pm 0.25$]
3. Pin dimension tolerance ± 0.004 [0.10]
4. The through hole used 2PCS M3X0.5
5. The screw locked torque: MAX 3.5kgf-cm [0.34N-m]

Heatsink Options

Heatsink Option ("H" Suffix) 7GA0131P01-F

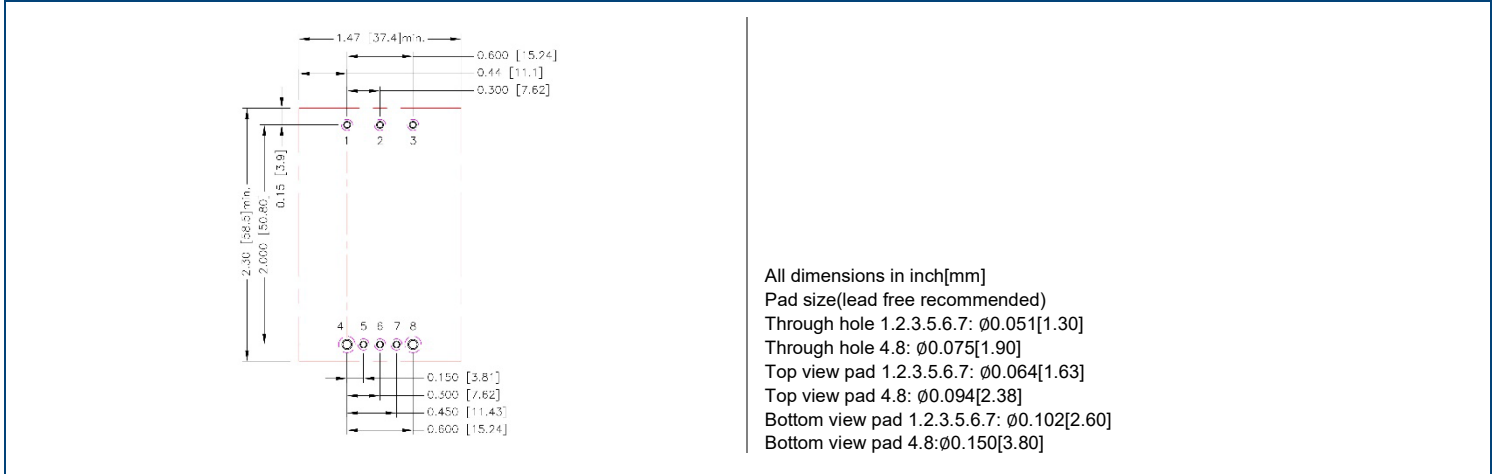


Assembly Instruction



All dimensions in inch [mm]
Tolerance: $x.xx \pm 0.02$ [$x.x \pm 0.5$]

RECOMMENDED PAD LAYOUT



FUSE CONSIDERATIONS

This power module is not internally fused. An input line fuse must always be used. This encapsulated power module can be used in a wide variety of applications, ranging from simple stand-alone operation to an integrated part of sophisticated power architecture. To maximum flexibility, internal fusing is not included; however, to achieve maximum safety and system protection, always use an input line fuse. The input line fuse suggest as below :

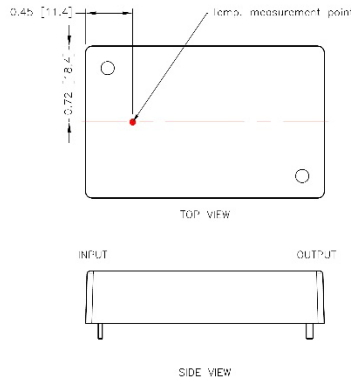
Model	Fuse Rating (A)	Fuse Type
DCMQB60-24Sxx	10	Fast-Acting
DCMQB60-48Sxx	6.3	Slow-Blow

Table based on information provided in data sheet on inrush energy and maximum DC input current at low Vin.

THERMAL CONSIDERATIONS

The power module operates in a variety of thermal environments. However, sufficient cooling should be provided to help ensure reliable operation of the unit. Heat is removed by conduction, convection, and radiation to the surrounding environment. Proper cooling can be verified by measuring the point as the figure below. The temperature at this location should not exceed "Maximum case temperature". When operating, adequate cooling must be provided to maintain the test point temperature at or below "Maximum case temperature". You can limit this temperature to a lower value for extremely high reliability.

- Thermal test condition with vertical direction by natural convection (20LFM).



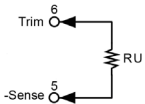
OUTPUT VOLTAGE ADJUSTMENT

It allows the user to increase or decrease the output voltage of the module.
This is accomplished by connecting an external resistor between the Trim pin and either the +Sense or -Sense pins.
With an external resistor between the Trim and -Sense pin, the output voltage increases.
With an external resistor between the Trim and +Sense pin, the output voltage decreases.
The external Trim resistor needs to be at least 1/8W of rated power.

External Output Trimming

Output can be externally trimmed using the method shown below

Trim-Up



5VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	5.05	5.10	5.15	5.20	5.25	5.30	5.35	5.40	5.45	5.50
RU	(k Ω)	35.360	16.244	9.752	6.483	4.514	3.198	2.257	1.550	1.000	0.559

5.1VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	5.151	5.202	5.253	5.304	5.355	5.406	5.457	5.508	5.559	5.610
RU	(k Ω)	36.753	16.700	10.001	6.649	4.637	3.295	2.337	1.618	1.059	0.611

12VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	12.12	12.24	12.36	12.48	12.60	12.72	12.84	12.96	13.08	13.20
RU	(k Ω)	392.864	172.175	101.446	66.591	45.837	32.068	22.264	14.929	9.234	4.685

15VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	15.15	15.30	15.45	15.60	15.75	15.90	16.05	16.20	16.35	16.50
RU	(k Ω)	413.163	198.115	125.754	89.445	67.618	53.050	42.636	34.820	28.739	23.872

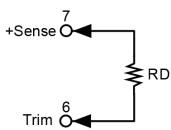
ΔV	(%)	11	12	13	14	15	16	17	18	19	20
Vout	(V)	16.65	16.80	16.95	17.10	17.25	17.40	17.55	17.70	17.85	18.00
RU	(k Ω)	19.888	16.568	13.759	11.350	9.262	7.434	5.822	4.389	3.106	1.951

24VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	24.24	24.48	24.72	24.96	25.20	25.44	25.68	25.92	26.16	26.40
RU	(k Ω)	947.146	472.772	303.499	216.605	163.724	128.153	102.589	83.329	68.298	56.240

ΔV	(%)	11	12	13	14	15	16	17	18	19	20
Vout	(V)	26.64	26.88	27.12	27.36	27.60	27.84	28.08	28.32	28.56	28.80
RU	(k Ω)	46.353	38.099	31.104	25.101	19.892	15.330	11.302	7.718	4.509	1.619

Trim Down



5VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	4.95	4.90	4.85	4.80	4.75	4.70	4.65	4.60	4.55	4.50
RU	(k Ω)	46.686	20.817	12.360	8.162	5.653	3.984	2.794	1.903	1.210	0.656

5.1VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	5.049	4.998	4.947	4.8960	4.845	4.794	4.743	4.692	4.641	4.590
RU	(k Ω)	47.801	21.688	13.003	8.663	6.061	4.326	3.088	2.159	1.436	0.859

12VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	11.88	11.76	11.64	11.52	11.40	11.28	11.16	11.04	10.92	10.80
RU	(k Ω)	435.294	201.116	120.429	79.573	54.894	38.371	26.535	17.639	10.709	5.157

15VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	14.85	14.70	14.55	14.40	14.25	14.10	13.95	13.80	13.65	13.50
RU	(k Ω)	302.154	132.978	78.547	51.685	35.680	25.055	17.489	11.826	7.429	3.916

24VDC Output Models

ΔV	(%)	1	2	3	4	5	6	7	8	9	10
Vout	(V)	23.76	23.52	23.28	23.04	22.80	22.56	22.32	22.08	21.84	21.60
RU	(k Ω)	736.063	326.672	192.473	125.790	85.913	59.383	40.459	26.282	15.263	6.454

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.

Contact **Wall Industries** for further information:

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