Horizontal Package

Size: 1in x 1in x 0.46in (25.4mm x 25.4mm x 11.70mm)

Horizontal Package with Heatsink (“H” Suffix)

Size: 1in x 1in x 0.64in (25.4mm x 25.4mm x 16.2mm)

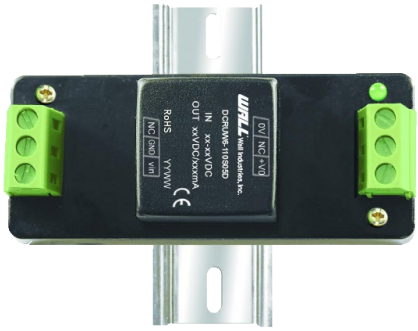
Chassis Mount (“C” Suffix)

Size: 2.99in x 1.24in x 0.84in (76mm x 31.5mm x 21.2mm)

Chassis Mount with Heatsink (“CH” Suffix)

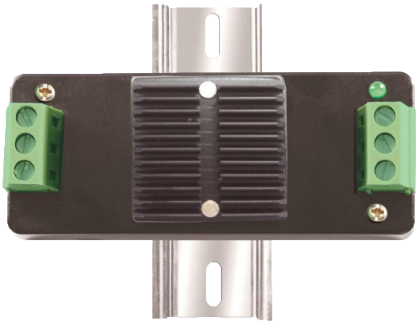
Size: 2.99in x 1.24in x 0.99in (76mm x 31.5mm x 25.2mm)

DIN Rail Mount (“D” Suffix)



Size: 2.99in x 1.24in x 1.02in (76mm x 31.5mm x 25.80mm)

DIN Rail Mount with Heatsink (“DH” Suffix)



Size: 2.99in x 1.24in x 1.17in (76mm x 31.5mm x 29.8mm)

OPTIONS

- Package
  -Through Hole
  -Chassis Mount
  -DIN Rail
- Heatsink

FEATURES

- Ultra-Wide 4:1 Input Voltage Range
- High Efficiency
- Low Ripple & Noise
- Through Hole, Chassis Mount, Or DIN Rail Mount Available
- Reverse Voltage Protection Available with Chassis Mount or DIN Rail Mount
- Short Circuit, Over Voltage, and Over Current Protection
- International Standard Pin-Out
- Heatsink Available
- RoHS Compliant
- Meets Requirements of Railway Standard EN50155
- EN60950 Approval

APPLICATIONS

- Railway Applications

DESCRIPTION

The DCRUW6 series of isolated DC/DC converters offers up to 6 watts of output power in either a through hole, chassis mount, or din rail package. This series consists of single and dual output models with an ultra-wide 4:1 input voltage range. Each model in this series features low ripple and noise, high efficiency, as well as short circuit, over voltage, and over current protection. This series meets railway standard EN50155, has EN60950 approval, and is RoHS compliant. Please contact factory for ordering information.

MODEL SELECTION TABLE

Single Output Models

Model Number[1]	Input Voltage Range	Output Voltage	Output Current		Maximum Capacitive Load	Efficiency[2]		Typ. Ripple & Noise	Output Power
			Min Load	Max Load		Min.	Typ.		
DCRUW6-110S05	110VDC (40~160VDC)	5VDC	0mA	1200mA	1000μF	78%	80%	50mVp-p	6 Watts
DCRUW6-110S12		12VDC	0mA	500mA	470μF	82%	84%		
DCRUW6-110S15		15VDC	0mA	400mA	220μF	83%	85%		
DCRUW6-110S24		24VDC	0mA	250mA	1000μF	84%	86%		

MODEL SELECTION TABLE

Dual Output Models

Model Number[1]	Input Voltage Range	Output Voltage	Output Current		Maximum Capacitive Load	Efficiency[2]		Typ. Ripple & Noise	Output Power
			Min Load	Max Load		Min.	Typ.		
DCRUW6-110D05	110VDC (40~160VDC)	±5VDC	0mA	±600mA	470μF	78%	80%	50mVp-p	6 Watts
DCRUW6-110D12		±12VDC	0mA	±250mA	100μF	82%	84%		
DCRUW6-110D15		±15VDC	0mA	±200mA	100μF	83%	85%		

SPECIFICATIONS

All specifications are based on Ta=25°C, Humidity <75%RH, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS		Min	Typ	Max	Unit
INPUT SPECIFICATIONS						
Input Voltage Range			40	110	160	VDC
	Absolute maximum[3]				170	
Input Current	Nominal Input Voltage	Full Load		68	70	mA
		No Load		3	8	
Reflected Ripple Current	Nominal Input Voltage			25		mA
Surge Voltage	1 sec. max.		-0.7		180	VDC
Starting Voltage					40	VDC
Shutdown Voltage			28	33		VDC
Input Filter			Pi Filter			
Hot Plug			Unavailable			
OUTPUT SPECIFICATIONS						
Output Voltage			See Table			
Voltage Accuracy[4]				±1	±3	%
Line Regulation	Full Load, Input Voltage from Low Voltage to High Voltage	Positive Output		±0.2	±0.5	%
		Negative Output		±0.5	±1	
Load Regulation[5]	0%-100% Load	Single Output Models		±0.5	±1	%
	5%-100% Load	Positive Output		±0.5	±1	
		Negative Output		±0.5	±1.5	
Output Power			See Table			
Output Current			See Table			
Cross Regulation	Dual Outputs, Main Circuit with 50% Load, Auxiliary Circuit with 25%-100% Load				±10	%
Maximum Capacitive Load	Tested at input voltage range and full load		See Table			
Ripple & Noise[6]	20MHz bandwidth, 5%-100% load			50	100	mVp-p
Transient Recovery Time	25% Load Step Change, Nominal Input Voltage			300	500	μs
Transient Response Deviation	25% Load Step Change, Nominal Input Voltage	5VDC & ±5VDC Output		±3	±8	%
		Others		±3	±5	
Starting Time	Nominal Input Voltage & Constant Resistance Load			10		ms
Temperature Coefficient	Full Load			±0.02	±0.03	%/ºC
REMOTE ON/OFF CONTROL[7]						
Module Switch On			Ctrl Suspended or Connected to TTL High Level (3.5-12VDC)			
Module Switch Off			Ctrl Pin Connected to GND or low level (0-1.2VDC)			
Input Current When Switched Off				3	8	mA
PROTECTION						
Short Circuit Protection	Input Voltage Range		Continuous, Self-Recovery			
Over Current Protection	Input Voltage Range		120		210	%Io
Over Voltage Protection	Input Voltage Range		110		160	%Vo

SPECIFICATIONS

All specifications are based on Ta=25°C, Humidity <75%RH, Nominal Input Voltage, and Rated Output Load unless otherwise noted.
We reserve the right to change specifications based on technological advances.

SPECIFICATION	TEST CONDITIONS	Min	Typ	Max	Unit
ENVIRONMENTAL SPECIFICATIONS					
Operating Temperature		-40		+85	ºC
Storage Temperature		-55		+125	ºC
Storage Humidity	Non-Condensing	5		95	%RH
Pin Welding Resistance Temp.	Welding spot is 1.5mm away from casing, 10 seconds			300	ºC
Vibration		IEC61373 Car Body 1 B Mold			
MTBF	MIL-HDBK-217F@25ºC	1000			kHours
GENERAL SPECIFICATIONS					
Efficiency		See Table			
Switching Frequency[8]	PWM Mode		300		KHz
Insulation Voltage	Input-Output, test time 1 min. and leak current lower than 1mA	2250			VDC
	Input and output respectively on shell, test time 1 min., leak current lower than 1mA	1600			
Insulation Resistance	Input-Output, Isolation voltage 500VDC	1000			MΩ
Isolation Capacitance	Input-Output, 100KHz/0.1V		1000		pF
PHYSICAL SPECIFICATIONS					
Weight	Without Heatsink, Horizontal Package	0.53oz (15g) typ.			
	Without Heatsink, Chassis Mount	1.23oz (35g) typ.			
	Without Heatsink, DIN Rail	1.90oz (54g) typ.			
	With Heatsink, Horizontal Package	0.71oz (20g) typ.			
	With Heatsink, Chassis Mount	1.41oz (40g) typ.			
	With Heatsink, DIN Rail	2.08oz (59g) typ.			
Dimensions (L x W x H)	Without Heatsink, Horizontal Package	1in x 1in x 0.46in (25.4mm x 25.4mm x 11.70mm)			
	Without Heatsink, Chassis Mount	2.99in x 1.24in x 0.84in (76mm x 31.5mm x 21.2mm)			
	Without Heatsink, DIN Rail	2.99in x 1.24in x 1.02in (76mm x 31.5mm x 25.8mm)			
	With Heatsink, Horizontal Package	1in x 1in x 0.64in (25.4mm x 25.4mm x 16.2mm)			
	With Heatsink, Chassis Mount	2.99in x 1.24in x 0.99in (76mm x 31.5mm x 25.2mm)			
	With Heatsink, DIN Rail	2.99in x 1.24in x 1.17in (76mm x 31.5mm x 29.8mm)			
Cooling Methods		Free Air Convection			
SAFETY CHARACTERISTICS					

EMC Specifications	EMI	CE	CISPR32/EN55032		Class B[9]
		RE	CISPR32/EN55032		Class B[9]
	EMS	ESD	IEC/EN61000-4-2	Contact ±6KV/Air ±8KV	Perf. Criteria B
		RS	IEC/EN61000-4-3	10V/m	Perf. Criteria A
		EFT	IEC/EN61000-4-4	±4KV[9]	Perf. Criteria B
		Surge	IEC/EN61000-4-5	Line to Line ±2KV (2Ω 18uF[10]) Line to Ground ±4KV (12Ω 9uF[10])	Perf. Criteria B
		CS	IEC/EN61000-4-6	10 Vr.m.s	Perf. Criteria A
EMC Specifications (EN50155)	EMI	CE		EN50121-3-2 EN55016-2-1	150kHz-500kHz 99dBuV[9] 500kHz-30MHz 93dBuV
		RE		EN50121-3-2 EN55016-2-1	30MHz-230MHz 40dBuV/m at 10m[9] 230MHz-1GHz 47dBuV/m at 10m
	EMS	ESD	EN50121-3-2	Contact ±6kV/Air ±8kV	Perf. Criteria B
		RS	EN50121-3-2	20V/m	Perf. Criteria A
		EFT	EN50121-3-2	EN50121-3-2 ±2kV 5/50ns 5kHz[9]	Perf. Criteria A
		Surge	EN50121-3-2	Line to Line ±1KV (42Ω 0.5uF[9])	Perf. Criteria B
		CS	EN50121-3-2	0.15MHz-80MHz, 10Vr.m.s	Perf. Criteria A

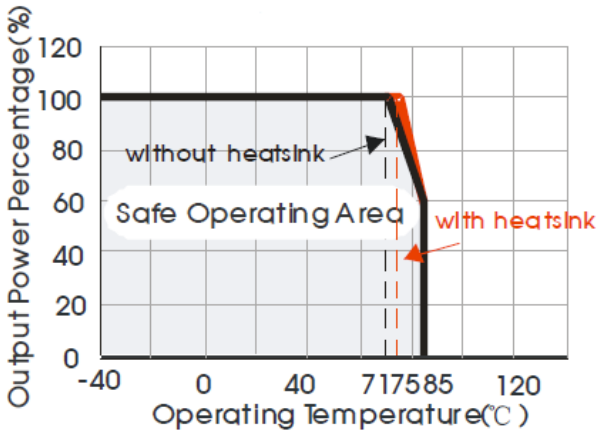
NOTES

1. Several options are available for this series. To indicate 2nd through hole option, add "P" to end of model number. To indicate chassis mount option, add "C" to end of model number. To indicate DIN rail mount option, add "D" to end of model number. Heatsink is available for all models. Heatsink is recommended for applications with higher requirement for heat dissipation. To indicate heatsink, add "H" to model number. Contact factory for more details.
2. Efficiency is measured in nominal input voltage and rated output load. Due to input reverse polarity protection in chassis mount & din rail models, minimum efficiency greater than Min.-2 is qualified.
3. This is the absolute maximum the device can handle without damage, but it is not recommended.
4. At 0%-5% load, the Max. output voltage accuracy of ±5VDC output converter negative output is ±5%.
5. When testing from 0% to 100% load working conditions. Load regulation for dual outputs series index of ±5%.
6. Ripple and noise tested with "parallel cable" method. 0%-5% load ripple & noise is no more than 5%Vo.
7. The voltage of Ctrl pin is relative to input pin GND.
8. This series of products using reduced frequency technology, the switching frequency is test value of full load. When load is reduced to below 50%, the switching frequency decreases with decreasing load.
9. See Fig. 2 or Fig. 3-② for recommended circuit.
10. See Fig. 2 for recommended circuit.
11. Customization is available, please contact factory for details.
12. Product classified according to ISO4001 and related environmental laws and regulates and should be handled by qualified units.

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

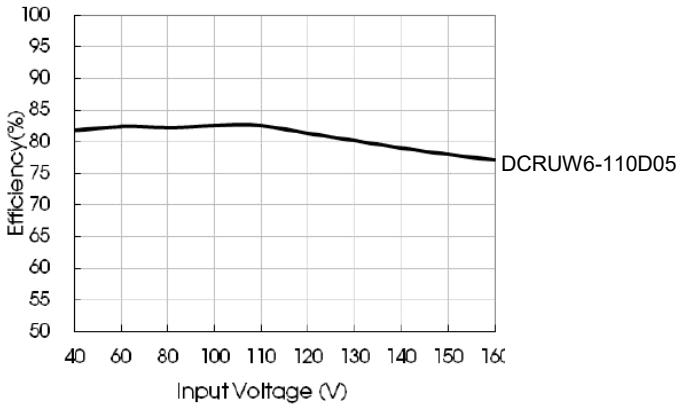
DERATING CURVES

Temperature Derating Curve

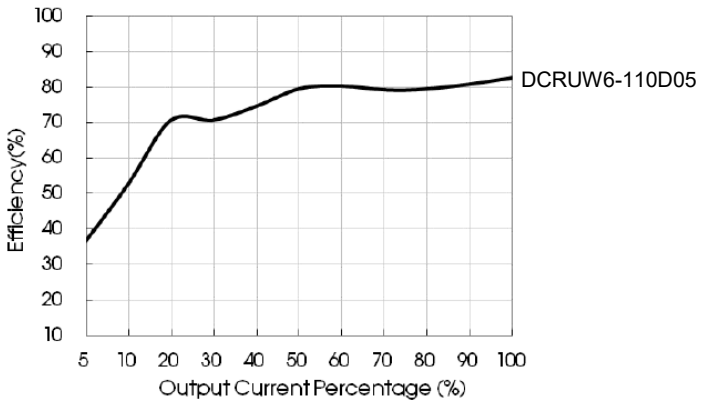


EFFICIENCY GRAPHS

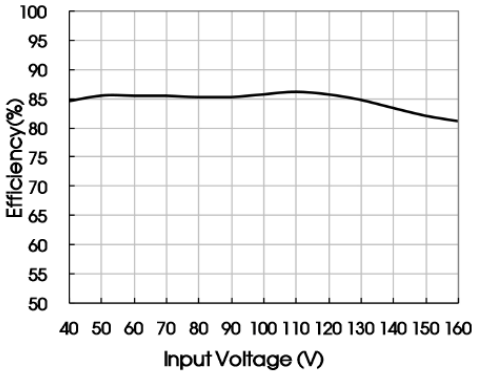
Efficiency vs. Input Voltage (Full Load)



Efficiency vs. Output Load (Vin=110V)

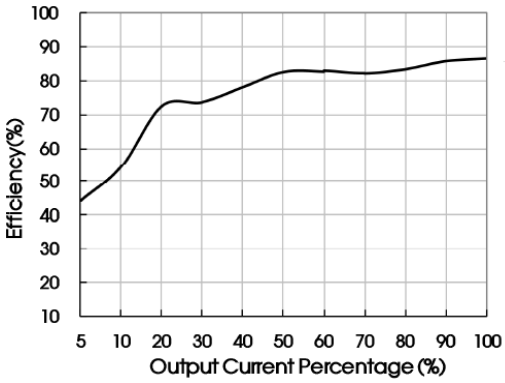


Efficiency vs. Input Voltage (Full Load)



DCRUW6-110S15

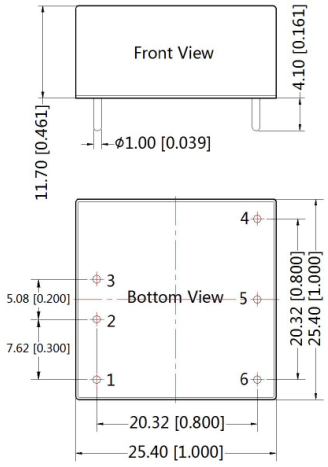
Efficiency vs. Output Load (Vin=110V)



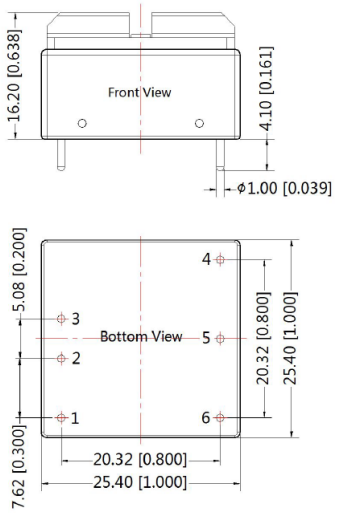
DCRUW6-110S15

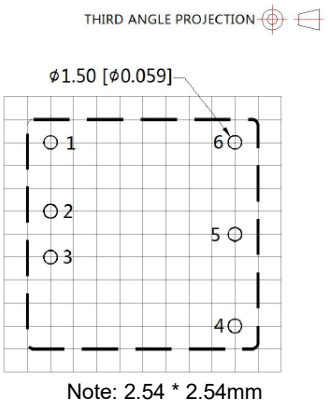
MECHANICAL DRAWINGS

Horizontal Package



Horizontal Package with Heatsink (“H” Suffix)





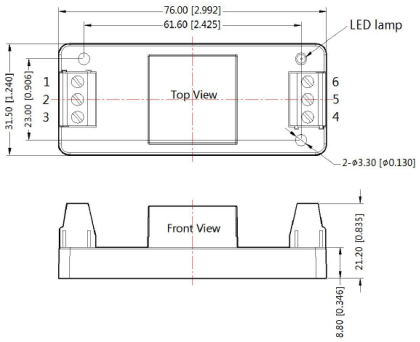
Note: 2.54 * 2.54mm

Pin-Out

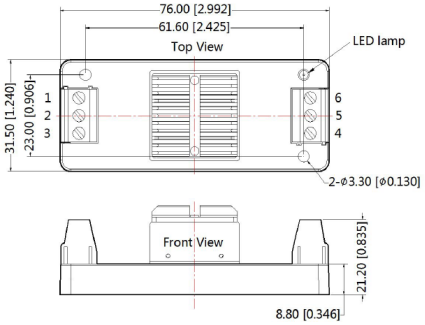
Pin	Single	Dual
1	No Pin	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	No Pin	0V
6	0V	-Vo

Note:
Unit: mm[inch]
Pin diameter tolerances: ±0.10 [±0.004]
General tolerances: ±0.50 [±0.020]

Chassis Mount (“C” Suffix)



Chassis Mount (“CH” Suffix)



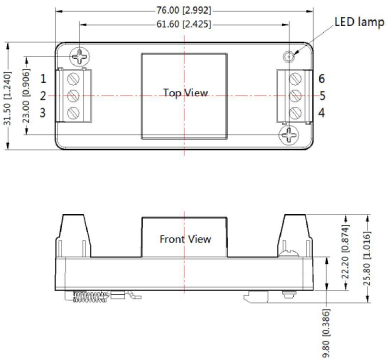
THIRD ANGLE PROJECTION

Pin-Out

Pin	Single	Dual
1	NC	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	NC	0V
6	0V	-Vo

Note:
Unit: mm [inch]
Wire range: 24-12AWG
Tightening Torque: Max 0.4 N·m
General tolerances: Chassis Mount: ±0.50 [±0.020]
With Heatsink: ±1.00 [±0.039]

DIN Rail (“D” Suffix)

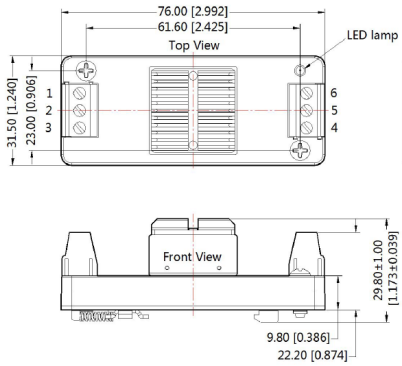


THIRD ANGLE PROJECTION

Pin-Out

Pin	Single	Dual
1	NC	Ctrl
2	GND	GND
3	Vin	Vin
4	+Vo	+Vo
5	NC	0V
6	0V	-Vo

DIN Rail with Heatsink (“DH” Suffix)



Note:
Unit: mm[inch]
Mounting Rail: TS35
Wire Range: 24-12 AWG
Tightening Torque: Max 0.4 N·m
General Tolerances: ±1.00 [±0.039]

DESIGN REFERENCE

1. Typical Application

All the DC/DC converters of this series are tested according to the recommended circuit (Fig. 1) before delivery. If a further decrease of the input and output ripple is required, properly increase the input & output of additional capacitors Cin and Cout or select capacitors of low equivalent impedance, and ensure the capacitance are lower than the max. capacitive load of the product.

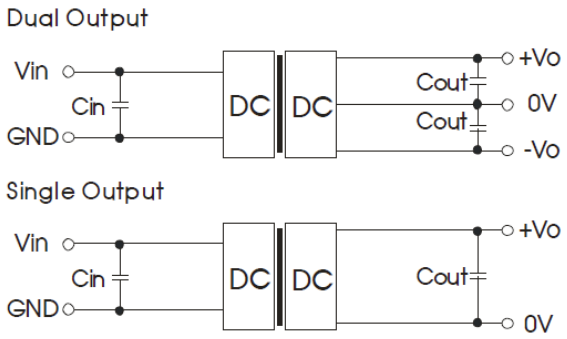


Fig. 1

Cin	Cout
10μF-47μF	10μF

2. EMC Solution-Recommended Circuit

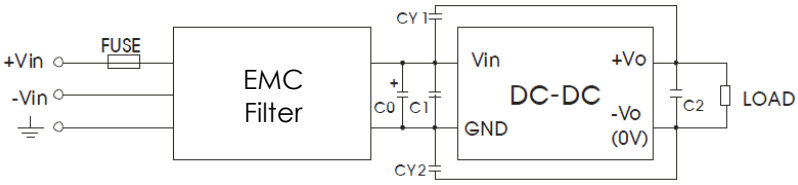
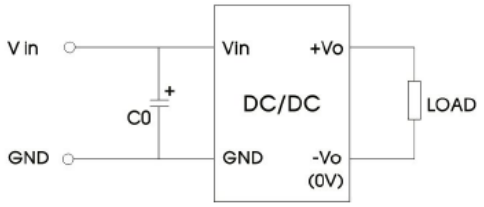


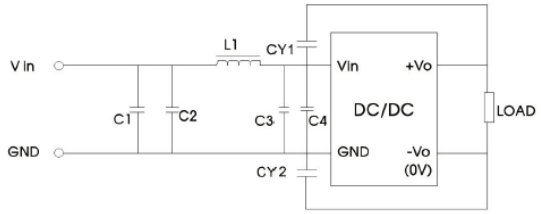
Fig. 2

Fig. 2 Parameter Description

Fuse	Choose according to actual input current
EMC Filter	Contact factory for suggestion
C0	100μF/200V
C1	Refer to Cin in Fig. 1
C2	Refer to Cout in Fig. 1
CY1, CY2	1nF/3KV



3-①



3-②

Fig. 3 Parameter Description

C0	100uF/200V
C1, C2, C3, C4	0.22uF/250V
L1	68μH
CY1, CY2	1nF/3KV

Notes: Part ① in Fig. 3 is used for EMS test and part ② for EMI filtering; selected based on needs.

Modules cannot be connected in parallel to increase power.

MODEL NUMBER SETUP

DCRUW	6	-	110	S	12	C	H
Series Name	Output Power		Input Voltage	Output Quantity	Ouptut Voltage	Form Factor	Heatsink
			110: 40-160VDC	**S:** Single	**5:** 5VDC	**None:** Through Hole	**None:** None
					12: 12VDC	**C:** Chassis Mount	**H:** Heatsink
					15: 15VDC	**D:** DIN Rail	
					24: 24VDC		
				D: Dual	**5:** ±5VDC		
					12: ±12VDC		
					15: ±15VDC		

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.

Contact **Wall Industries** for further information:

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