

Standard



Terminal Block

Size: 2.4in x 2.28in x 0.5in (61mm x 57.9mm x 12.7in)

OPTIONS

- Pin Length
- Heatsinks
- Thru-Hole Inserts
- Negative Logic Remote On/Off
- Terminal Block
- Terminal Block with EMC Filter

FEATURES

- Soft-Start
- RoHS II and REACH Compliant
- 4:1 Ultra Wide Input Voltage Ranges
- Up to 76.8 Watts of Output Power
- Single Outputs Ranging from 3.3VDC to 48VDC
- Output Current up to 20A
- Under Voltage Lockout
- UL60950-1, EN60950-1, IEC60950-1, EN45545-2 and EN50155 Safety Approvals
- Six-Sided Shielding
- High Efficiency up to 91%
- No Minimum Load Requirements
- Adjustable Output Voltage
- Industry Standard Half-Brick Footprint
- Remote On/Off Control
- Threaded Inserts and Thru-Hole Inserts Available
- Short Circuit, Over Voltage, Over Load, and Over Temperature Protection

APPLICATIONS

- Railway Systems
- Wireless Networks
- Telecom/Datacom
- Industry Control Systems
- Semiconductor Equipment
- Distributed Power Architectures
- Military Applications

DESCRIPTION

The DCHBW75 series of DC/DC power converters provides up to 76.8 Watts of output power in an industry standard half-brick package and footprint. This series consists of single output models ranging from 3.3VDC to 48VDC with 4:1 ultra wide input voltage ranges of 9~36VDC, 18~75VDC and 43~160VDC. Some features include high efficiency up to 91%, adjustable output voltage, positive remote on/off control, and under voltage lockout. These converters also have short circuit, over voltage, over load, and over temperature protection. The DCHBW75 series is RoHS compliant and has UL60950-1, EN60950-1, IEC60950-1, EN45545-2 and EN50155 safety approvals. Several different options are available for this series including negative remote on/off, terminal block, pin length, heatsinks, and thru-hole inserts. Please call factory for more details.

MODEL SELECTION TABLE

Model Number	Input Voltage Range	Output Voltage	Output Current		Ripple & Noise	No Load Input Current ⁽¹⁾	Output Power	Maximum Capacitive Load ⁽²⁾	Efficiency ⁽³⁾
			Min Load	Max Load					
DCHBW75-24S3.3	24VDC (9~36VDC)	3.3VDC	0mA	20A	75mVp-p	85mA	66W	60600µF	87%
DCHBW75-24S05		5VDC	0mA	15A	75mVp-p	120mA	75W	30000µF	88%
DCHBW75-24S12		12VDC	0mA	6.3A	100mVp-p	185mA	75.6W	5250µF	88%
DCHBW75-24S15		15VDC	0mA	5A	100mVp-p	185mA	75W	3330µF	88%
DCHBW75-24S24		24VDC	0mA	3.2A	200mVp-p	85mA	76.8W	1330µF	87%
DCHBW75-24S28		28VDC	0mA	2.7A	200mVp-p	85mA	75.6W	960µF	87%
DCHBW75-24S48		48VDC	0mA	1.6A	300mVp-p	85mA	76.8W	330µF	87%
DCHBW75-48S3.3		48VDC (18~75VDC)	3.3VDC	0mA	20A	75mVp-p	60mA	66W	60600µF
DCHBW75-48S05	5VDC		0mA	15A	75mVp-p	60mA	75W	30000µF	90%
DCHBW75-48S12	12VDC		0mA	6.3A	100mVp-p	90mA	75.6W	5250µF	90%
DCHBW75-48S15	15VDC		0mA	5A	100mVp-p	50mA	75W	3330µF	89%
DCHBW75-48S24	24VDC		0mA	3.2A	200mVp-p	50mA	76.8W	1330µF	88%
DCHBW75-48S28	28VDC		0mA	2.7A	200mVp-p	50mA	75.6W	960µF	88%
DCHBW75-48S48	48VDC		0mA	1.6A	300mVp-p	50mA	76.8W	330µF	87%
DCHBW75-110S3.3	110VDC (43~160VDC)		3.3VDC	0mA	20A	75mVp-p	10mA	66W	60600µF
DCHBW75-110S05		5VDC	0mA	15A	75mVp-p	10mA	75W	30000µF	91%
DCHBW75-110S12		12VDC	0mA	6.3A	100mVp-p	10mA	75.6W	5250µF	91%
DCHBW75-110S15		15VDC	0mA	5A	100mVp-p	10mA	75W	3330µF	91%
DCHBW75-110S24		24VDC	0mA	3.2A	200mVp-p	10mA	76.8W	1330µF	90%
DCHBW75-110S28		28VDC	0mA	2.7A	200mVp-p	10mA	75.6W	960µF	90%
DCHBW75-110S48		48VDC	0mA	1.6A	300mVp-p	10mA	76.8W	330µF	90%

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						
Input Voltage Range	24VDC Nominal Input Models	9	24	36	VDC	
	48VDC Nominal Input Models	18	48	75		
	110VDC Nominal Input Models	43	110	160		
Start-Up Voltage	24VDC Nominal Input Models			9	VDC	
	48VDC Nominal Input Models			18		
	110VDC Nominal Input Models			43		
Shutdown Voltage	24VDC Nominal Input Models		7.5		VDC	
	48VDC Nominal Input Models		16			
	110VDC Nominal Input Models		36			
Input Surge Voltage (1 sec max.)	24VDC Nominal Input Models			50	VDC	
	48VDC Nominal Input Models			100		
	110VDC Nominal Input Models			185		
Input Current	No Load	See Table				
Input Filter ⁽⁴⁾		Pi Type				
OUTPUT SPECIFICATIONS						
Output Voltage		See Table				
Voltage Accuracy		-1.0		+1.0	%	
Line Regulation	Low Line to High Line at Full Load	-0.1		+0.1	%	
Load Regulation	No Load to Full Load	-0.1		+0.1	%	
Voltage Adjustability ⁽⁵⁾		-20		+10	%	
Remote Sense ⁽⁶⁾				10	%Vo	
Output Power		See Table				
Output Current		See Table				
Minimum Load		0			%	
Maximum Capacitive Load	Minimum Input and Constant Resistive Load	See Table				
Ripple & Noise (20MHz bandwidth)	4.7µF/50V X7R MLCC	3.3V and 5V Models		75	100	mVp-p
	4.7µF/50V X7R MLCC	12V and 15V Models		100	125	
	4.7µF/50V X7R MLCC	24V and 28V Models		200	250	
	2.2µF/100V X7R MLCC	48V Models		300	350	
Transient Response Recovery Time	25% Load Step Change		200	250	µs	
Start-Up Time	110VDC Input Models	Nominal Input and Constant Resistive Load			60	Ms
	Others	Power Up or Remote On/Off			25	
Temperature Coefficient		-0.02		+0.02	%/°C	

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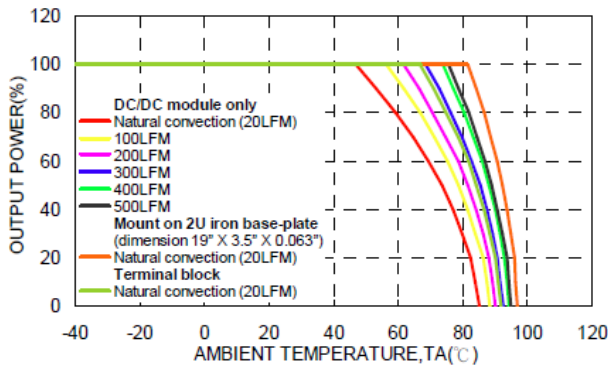
SPECIFICATION		TEST CONDITIONS		Min	Typ	Max	Unit
REMOTE ON/OFF CONTROL⁽⁷⁾							
Positive Logic (Standard)	DC-DC ON				Short or 0~1.2VDC		
	DC-DC OFF				Open or 3~12VDC		
Negative Logic (Optional)	DC-DC ON				Open or 3~12VDC		
	DC-DC OFF				Short or 0~1.2VDC		
Input Current of CTRL Pin			-0.5		1		mA
Remote OFF Input Current				3			mA
PROTECTION							
Short Circuit Protection					Continuous, Automatic Recovery		
Over Load Protection	% of Iout rated; Hiccup mode	110Vin (Nominal)		150			%
		Others	110		140		
Over Voltage Protection	% of Vout (nominal); Hiccup Mode		115		130		%
Over Temperature Protection				+115			°C
ENVIRONMENTAL SPECIFICATIONS							
Operating Case Temperature	Base-Plate			-40		+105	°C
Storage Temperature	Standard			-55		+125	°C
	Terminal Block Type			-40		+105	
Thermal Impedance ⁽⁸⁾	Standard				6.7		°C/W
	With 0.24" Heatsink				5.4		
	With 0.45" Heatsink				4.7		
Relative Humidity			5		95		%RH
Thermal Shock					MIL-STD-810F		
Shock					EN61373, MIL-STD-810F		
Vibration					EN61373, MIL-STD-810F		
MTBF	MIL-HDBK-217F, Full Load				336,200 hours		
GENERAL SPECIFICATIONS							
Efficiency	Nominal Input Voltage and Full Load				See Table		
Switching Frequency			270	300	330		kHz
Isolation Voltage	110VDC Input Models	1 minute (reinforced insulation)	Input to Output	3000			VAC
			Input (Output) to Case	1500			
	Others	1 minute (basic insulation)	Input to Output	2250			VDC
		Input (Output) to Case		1600			
Isolation Resistance	500VDC		1				GΩ
Isolation Capacitance					2500		pF
PHYSICAL SPECIFICATIONS							
Weight	Standard				3.42oz (97g)		
	Terminal Block ("T" Suffix)				7.05oz (200g)		
	Terminal Block with EMC Filter ("TF" suffix)				9.88oz (280g)		
	Terminal Block with EMC Filter, connected to PE ("TF1" suffix)				10.12oz (287g)		
Dimensions (L x W x H)	Standard				2.4in x 2.28in x 0.5in (61mm x 57.9mm x 12.7mm)		
	Terminal Block ("T" Suffix)				3.35in x 2.4in x 1.17in (85mm x 61mm x 28mm)		
	Terminal Block with EMC Filter ("TF" suffix)				3.35in x 2.4in x 1.54in (85mm x 61mm x 32.3mm)		
	Terminal Block with EMC Filter, connected to PE ("TF1" suffix)				3.35in x 2.40in x 1.59in (85.0mm x 61.0mm x 40.5mm)		
Case Material	24VDC and 48VDC Nominal Input Voltage Models				Metal		
	110VDC Nominal Input Voltage Models				Aluminum Base-Plate with Plastic Case		
Base Material	24VDC and 48VDC Nominal Input Voltage Models				FR4 PCB		
Potting Material					Silicone (UL94 V-0)		
Shielding	24VDC and 48VDC Nominal Input Models				Six-Sided		
SAFETY & EMC CHARACTERISTICS							
Safety Approvals	UL60950-1, EN60905-1, IEC60950-1, EN50155, EN45545-2						
EMI ⁽⁹⁾	EN55011, EN55022				Class A, Class B		
ESD	EN61000-4-2		Air ±8KV Contact ±6KV		Perf. Criteria A		
Radiated Immunity	EN61000-4-3		20 V/m		Perf. Criteria A		
Fast Transient ⁽¹⁰⁾	EN61000-4-4		±2KV		Perf. Criteria A		
Surge ⁽¹⁰⁾	EN61000-4-5	EN55024	±2KV		Perf. Criteria A		
		EN50155	±2KV				
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

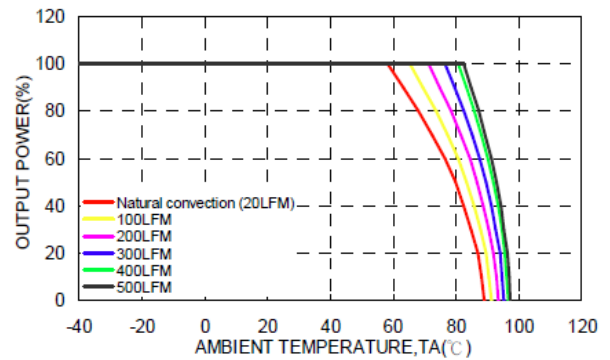
- (1) Typical Value at Nominal Input Voltage and No Load.
- (2) Test by minimum input and constant resistive load.
- (3) Typical Value at Nominal Input Voltage and Full Load.
- (4) Input source impedance: The power module will operate as specifications without external components, assuming that the source voltage has a very low impedance and reasonable input voltage regulation. Highly inductive source impedances can affect the stability of the power module. An external input capacitor is recommended for 24VDC nominal input models. We suggest 4.7 μ F/50V X7R MLCC or Nippon chemi-con KY series, 68 μ F/100V, ESR 110m Ω or better capacitor. For terminal block versions, the capacitor is included as standard and an external capacitor is not necessary.
- (5) Output voltage is adjustable for 10% trim up or -20% down of nominal output voltage by connecting a single resistor between TRIM and +SENSE pins for trim up or between TRIM and -SENSE pins for trim down. To calculate the value of the resistor R_U and R_D for a particular output voltage see page 5/6.
- (6) Maximum output deviation is +10% inclusive of remote sense and trim. If remote sense is not being used, the +SENSE should be connected to its corresponding +OUTPUT and likewise the -SENSE should be connected to its corresponding -OUTPUT.
- (7) The CTRL pin voltage is referenced to -INPUT. To order negative logic remote on/off control add the suffix "R" to the model number.
- (8) 1. The thermal test conditions for vertical direction are by natural convection (20LFM)
2. Heat sink is optional. See the "Product Options" table for suffix options.
- (9) The standard module meets EMI Class A or Class B with external components.
- (10) An external input filter capacitor is required if the module has to meet EN61000-4-4, EN61000-4-5. For 24 & 48VDC nominal input models, we recommend connecting one aluminum electrolytic capacitor (Nippon chemi-con KY series, 220 μ F/100V, ESR 48m Ω) in parallel. For 110VDC nominal input models, we recommend connecting three aluminum electrolytic capacitors (Ruby-con BXF series, 100 μ F/250V) in parallel.
- (11) CASE GROUNDING: EMI can be reduced when you connect the four screw bolts to the shield plane.
- (12) This series comes with several different options: Negative remote on/off control, heatsinks, pin length, thru-hole inserts, and terminal blocks. See the "Product Options" table on page 6 for more ordering information.
- (13) **CAUTION:** This power converter is not internally fused. An input line fuse must always be used.

DERATING CURVES

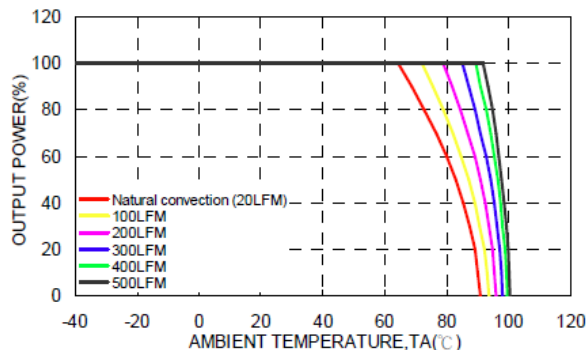
DCHBW75-48S05 Derating Curve



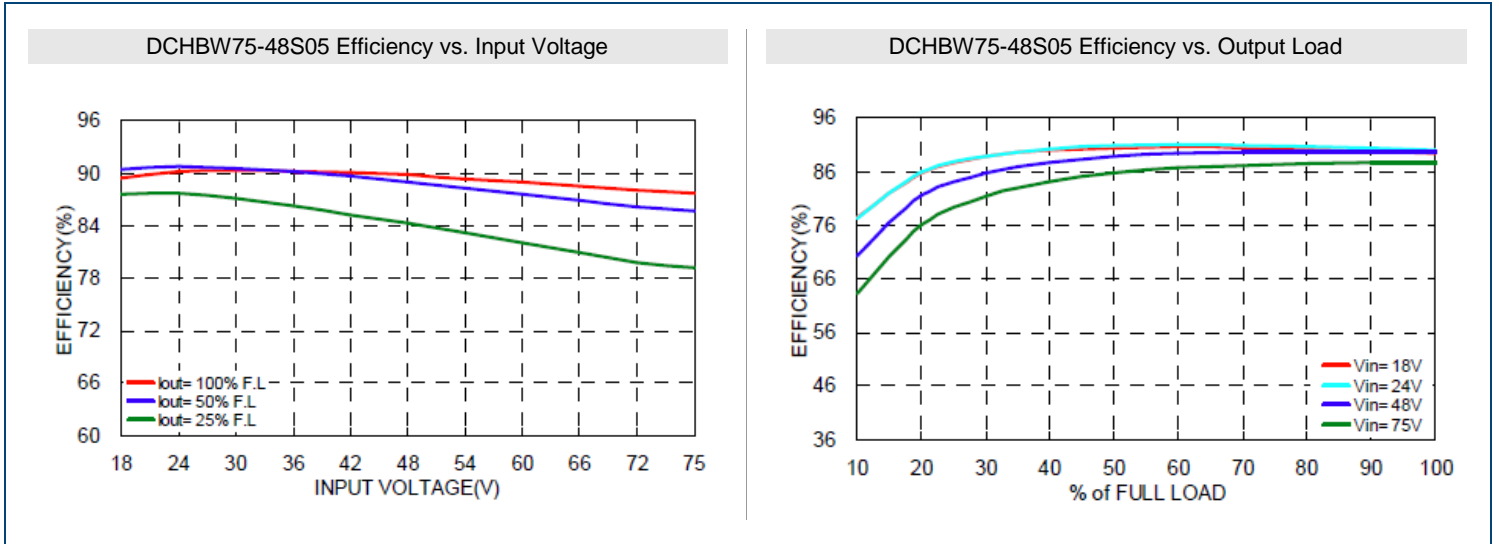
DCHBW75-48S05 Derating Curve
With 0.24" Height Heatsink (See Note 8)



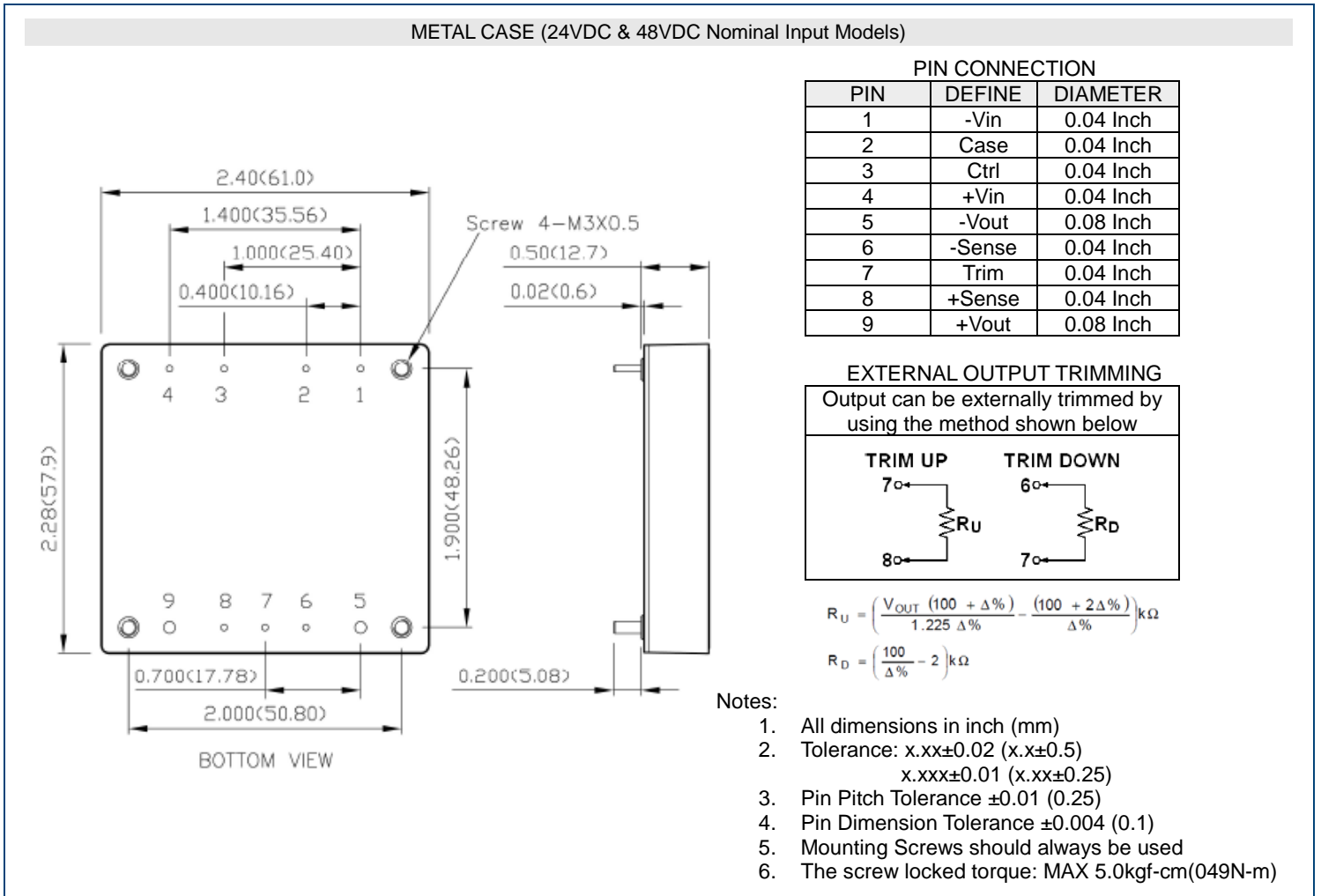
DCHBW75-48S05 Derating Curve
With 0.45" Height Heatsink (See Note 8)



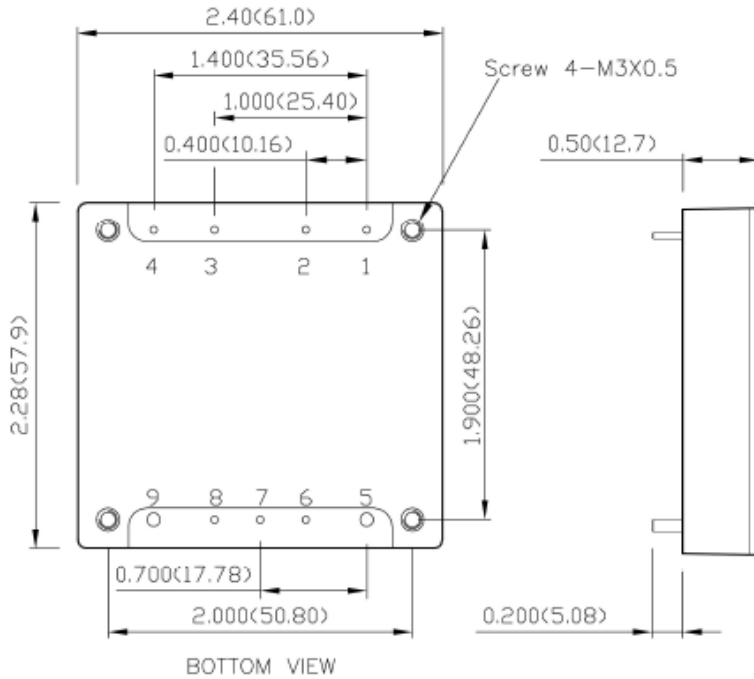
EFFICIENCY GRAPHS



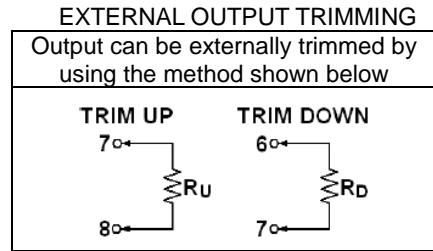
MECHANICAL DRAWINGS



PLASTIC CASE (110VDC Nominal Input Models)



PIN CONNECTION		
PIN	DEFINE	DIAMETER
1	-Vin	0.04 Inch
2	Case	0.04 Inch
3	Ctrl	0.04 Inch
4	+Vin	0.04 Inch
5	-Vout	0.08 Inch
6	-Sense	0.04 Inch
7	Trim	0.04 Inch
8	+Sense	0.04 Inch
9	+Vout	0.08 Inch



$$R_U = \left(\frac{V_{OUT} (100 + \Delta\%)}{1.225 \Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right) k\Omega$$

$$R_D = \left(\frac{100}{\Delta\%} - 2 \right) k\Omega$$

Notes:

- All dimensions in inch (mm)
- Tolerance: x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
- Pin Pitch Tolerance ±0.01 (0.25)
- Pin Dimension Tolerance ±0.004 (0.1)
- Mounting screws should always be used.
- The screw locked torque: MAX 3.5kgf-cm(0.34N-m)

Product Options		Suffix	Product Options		Suffix
Negative Remote ON/OFF Logic	0.200" pin length	R	Heatsink ⁽¹⁾	H = 0.45" Vertical	H
	0.145" pin length	RL		H = 0.24" Horizontal	H1
Positive Remote ON/OFF Logic	0.200" pin length	None		H = 0.24" Vertical	H2
	0.145" pin length	S		H = 0.45" Horizontal	H3
Thru-Hole Inserts (No Thread) ⁽¹⁾	00.126 thru-hole (no thread) inserts	TH	Terminal Block ^{(2) (3)}	Wall Mounted	T
				Wall Mounted with EMC Filter	TF
				Wall mounted with EMC Filter can be connected to PE	TF1

Notes:

- Models with thru-hole inserts cannot be equipped with heatsink.
- Terminal block models have 0.200" pin lengths. 0.145" pin lengths are not available for terminal block models
- EMI filter meets EN55011, EN55022 Class A/

HEATSINK OPTIONS

Vertical Fin Orientation, Suffixes: "HS", "HS2"

Unit: Inches (mm)
Tolerance: x.xx±0.02 (x.x±0.5)

Heatsink Options
H= 0.24 Inches ("H2" Suffix)
H= 0.45 Inches ("H" Suffix)

Horizontal Fin Orientation, Suffixes: "H1", "H3"

Unit: Inches (mm)
Tolerance: x.xx±0.02 (x.x±0.5)

Heatsink Options
H= 0.24" ("H1" Suffix)
H= 0.45" ("H3" Suffix)

TERMINAL BLOCK OPTIONS

Wall Mounted without EMC Filter (Suffix "T")

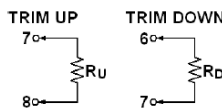
Wall Mounted with EMC Filter (Suffix "TF")

Wall Mounted with EMC Filter can be connected to PE (Suffix "TF1")

TERMINAL CONNECTION: -T, -TF

NO.	DEFINE
1	-Vin
2	Case
3	Ctrl
4	+Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

EXTERNAL OUTPUT TRIMMING
Output can be externally trimmed by using the method shown below.



$$R_U = \left(\frac{V_{OUT} (100 + \Delta\%)}{1.225 \Delta\%} - \frac{(100 + 2 \Delta\%)}{\Delta\%} \right) k\Omega$$

$$R_D = \left(\frac{100}{\Delta\%} - 2 \right) k\Omega$$

TERMINAL CONNECTION: -TF1

NO.	DEFINE
1	-Vin
2	NC
3	Ctrl
4	+Vin
5	-Vout
6	-Sense
7	Trim
8	+Sense
9	+Vout

Notes:

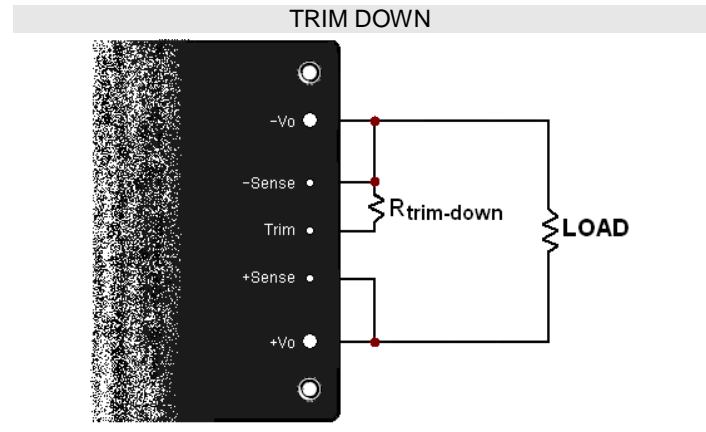
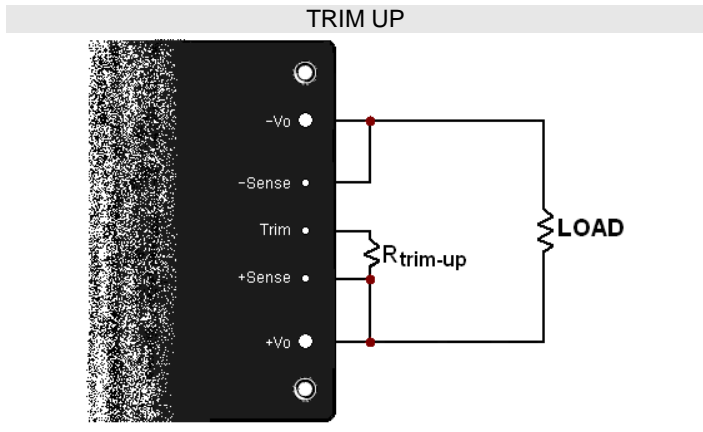
- All dimensions in inch (mm)
- Tolerance: x.xx±0.02 (x.x±0.5)
x.xxx±0.01 (x.xx±0.25)
- Screw 1 locked torque: MAX 11.2kgf-cm/ 1.10N-m
- Screw 2 locked torque: MAX 5.2kgf-cm/ 0.51N-m
- Screw 3,4 locked torque: MAX 12.0kgf-cm/ 1.18N-m

OUTPUT VOLTAGE ADJUSTMENT

Output is adjustable for 10% trim up or -20% trim down of nominal output voltage 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 set point decreases. With an external resistor between the TRIM and +SENSE pin, the output voltage set point increases. Maximum output deviation is +10% inclusive of remote sense. The value of the external resistor can be obtained by the equations below. The external TRIM resistor needs to be at least 1/8W resistor.

$$R_U = \left(\frac{V_{OUT}(100 + \Delta\%)}{1.225\Delta\%} - \frac{(100 + 2\Delta\%)}{\Delta\%} \right) K\Omega$$

$$R_D = \left(\frac{100}{\Delta\%} - 2 \right) K\Omega$$



MODEL NUMBER SETUP

DCHBW	75	-	48	S	05
Series Name	Output Power		Input Voltage	Output Quantity	Output Voltage
	75: 75 Watts		24: 9~36VDC 48: 18~75VDC 110: 43~160VDC	S: Single	3.3: 3.3VDC 05: 5VDC 12: 12VDC 15: 15VDC 24: 24VDC 28: 28VDC 48: 48VDC

R	TH	H	TF
Remote On/Off & Pin Length	Thru-Hole Inserts ⁽¹⁾	Heatsink ⁽¹⁾	Terminal Block ⁽²⁾
None: Positive Logic, 0.200" pin length S: Positive Logic, 0.145" pin length R: Negative Logic, 0.200" pin length RL: Negative Logic, 0.145" pin length	None: Threaded Inserts TH: Ø0.126 thru-hole inserts ⁽¹⁾	None: No Heatsink H: 0.45" Vertical 7G-0021A-F H1: 0.24" Horizontal 7G-0022A-F H2: 0.24" Vertical 7G0023A-F H3: 0.45" Horizontal 7G-0024A-F	None: No Terminal Block T: Wall Mounted TF: Wall Mounted with EMC Filter ⁽³⁾ T1: Wall Mounted with EMC filter can be connected to PE ⚡ ⁽³⁾

NOTES

1. Models with thru-hole inserts cannot be equipped with a heatsink.
2. Only 0.200" pin length is available with terminal block options.
3. EMI Filter meets EN55011, EN55022 Class A

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 ISO9001-2008 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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