

MP Series



- Configurable for Fast Time to Market
- 1 to 24 Outputs
- Floating Outputs
- Fully Featured Signal Set
- SEMI F47 Compliant
- Extra Power Available at High Line
- 3 Year Warranty

Specification

Input

Input Voltage	• 90-264 VAC
Input Frequency	• 47-63 Hz
Inrush Current	• 40 A max at 230 VAC, cold start 25 °C
Power Factor	• Compliant with EN61000-3-2, Class A
Earth Leakage Current	• <1.5 mA
Input Protection	• F3/FF: Internal T6.3 A/250 V fuse in line F4/F6: Internal T10 A/250 V fuse in line F7: Internal T12 A/250 V fuse in line F8: Internal T15 A/250 V fuse in line FX: Internal T20 A/250 V fuse in line

Output

Output Voltage	• See module table
Output Voltage Trim	• $\pm 5\%$ typical all outputs
Hold Up Time	• 20 ms min
Line Regulation	• Typically 0.1%, maximum 0.3%
Load Regulation	• 1% max for single output modules & V1 of dual & triple output modules. 2% max for V2 & V3 of dual & triple output modules. The E module requires up to 10% load & the K module up to 5% load on V1 to achieve the specified regulation figures on V2 & V3
Ripple & Noise	• 50 mV or 1% pk-pk, whichever is greater, 20 MHz bandwidth
Overvoltage Protection	• 115-130% Vnom for single output and output 1 of dual & triple output modules. No OVP fitted to G modules or H modules.
Overload Protection	• <140% of nominal rating
Short Circuit Protection	• Continuous trip & restart (Hiccup mode)
Temperature Coefficient	• 0.03%/°C
Remote Sense	• See signals & controls page
Current Share	• Single wire parallel current share. See signals & controls page
Inhibit	• TTL compatible. See signals & controls page

General

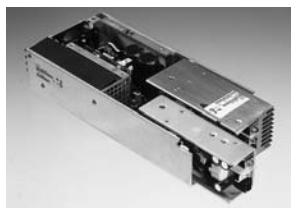
Efficiency	• 75% typical at nominal input
Isolation	• 3000 VAC Input to Output 1500 VAC Input to Ground 500 VAC Output to Ground
Signals & Controls	• AC OK, DC OK, Current share, Global Inhibit, Module Inhibit, Remote Sense, Voltage Programming & 5V Standby
MTBF	• 750 kHrs Demonstrated

Environmental

Operating Temperature	• 0 °C to +70 °C, derate linearly from 100% at +50 °C to 50% at +70 °C for standard models. Derate linearly from 100% at +40 °C to 50% at +60 °C for reverse air models.
Storage Temperature	• -40 °C to +85 °C
Operating Altitude	• 3000 m
Shock	• 30 g, 11 ms (half sine), 3 shocks each axis, 18 shocks total. Compliant with EN60068-2-27
Vibration	• 2 g, 10-500 Hz, 10 sweeps 3 axes. Compliant with EN60068-2-6

EMC & Safety

Emissions	• EN55022, level B conducted
Harmonic Currents	• EN61000-3-2, Class A
Voltage Flicker	• EN61000-3-3
ESD Immunity	• EN61000-4-2, level 3 Perf Criteria A
Radiated Immunity	• EN61000-4-3, level 3 Perf Criteria A
EFT/Burst	• EN61000-4-4, level 3 Perf Criteria A
Surge	• EN61000-4-5, level 3 Perf Criteria A
Conducted Immunity	• EN61000-4-6, level 3 Perf Criteria A
Dips & Interruptions	• EN61000-4-11, 30% 10 ms, 60% 100 ms, 100% 5000 ms, Perf Criteria A, B, B
Safety Approvals	• EN60950, UL60950, CSA22.2-No 950 CE Mark LVD, SEMI F47 compliant (high line only)



STEP 1

In order to configure a model number for your MP Series power supply first select the appropriate chassis, dependent on your application's continuous, maximum output power requirements.

STEP 2

Next, from the ratings on the following page, select the output modules that suit your output voltage and current requirements. Modules can be positioned as denoted by the ■, ▲ and ● sequence shown below.

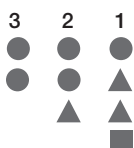
STEP 3

Once the chassis & output modules have been selected, form the model number as shown below.

F3 (300 W)⁽¹⁾ & FF (350 W)⁽¹⁾



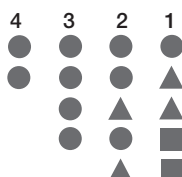
Module Position



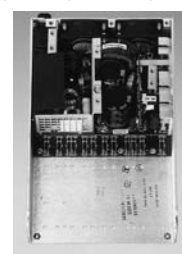
F4 (400 W)⁽¹⁾ & F6 (600 W)⁽¹⁾ & F7 (700 W)⁽¹⁾



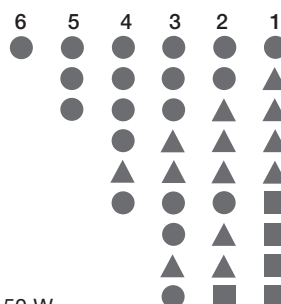
Module Position



F8 (800 W)⁽¹⁾ & FX (1000 W)⁽¹⁾



Module Position



Note

1. Output power can be increased by 200 W if used at 181-264 VAC input, FF chassis 175 W, F6 chassis 150 W.

Model Number Construction

Chassis Power		Module Position 1		Module Position 2		Module Position 3		Module Position 4		Module Position 5		Module Position 6		Option	Option
F	7	B	3	J	6	J	6	G	2					22	1R
Add the chassis code first. F7 = 700W Chassis		Add Module 1 B3 = ▲ Single O/P 5 V @ 60 A		Add Module 2 J6 = ● Single O/P 24 V @ 8 A		Add Module 3 J6 = ● Single O/P 24 V @ 8 A		Add Module 4 G2 = ● Dual O/P 15 V @ 3 A 15 V @ 3 A F4, F6, F7, F8 & FX only		Add Module 5 F8 & FX only		Add Module 6 F8 & FX only		Add Option Codes Denotes J6 modules in parallel to give 24 V @ 16 A	Denotes reverse air flow

(For single slot, single O/P modules (●), insert highest power first and the lowest voltage if power is equal.)

Option Codes

No.	Option	Function
01	2 x B modules	parallel connect in slots 1 & 2
02	2 x B modules	parallel connect in slots 2 & 3
03	2 x B modules	parallel connect in slots 3 & 4
04	4 x B modules	2 x B modules parallel connect in slots 1 & 2 and 2 x B modules parallel connect in slots 3 & 4
05	2 x C modules	parallel connect in slots 1 & 2 (2 V to 8 V)
06	2 x C modules	parallel connect in slots 1 & 2 (18 V to 48 V)
21	2 x J modules	parallel connect in slots 1 & 2
22	2 x J modules	parallel connect in slots 2 & 3
23	2 x J modules	parallel connect in slots 3 & 4
24	2 x J modules	parallel connect in slots 4 & 5
25	2 x J modules	parallel connect in slots 5 & 6
1R	Reverse Air	fans in exhaust configuration using standard fans
1S	Low Noise	standard (air inflow) configuration using low noise fans (F8 & FX only)
2R	Reverse Air	fans in exhaust configuration using low noise fans (F8 & FX only)

Note: 1. Consult sales for 1200-2400 W model numbers.

Output Voltage & Current Ratings

Single Output Modules

VOLTS	CURRENT (A)	MODULE CODE	MODULE SIZE	VOLTS	CURRENT (A)	MODULE CODE	MODULE SIZE	VOLTS	CURRENT (A)	MODULE CODE	MODULE SIZE	VOLTS	CURRENT (A)	MODULE CODE	MODULE SIZE	VOLTS	CURRENT (A)	MODULE CODE	MODULE SIZE
2 VOLTS				2.2 VOLTS				3 VOLTS				3.3 VOLTS				5 VOLTS			
2.0	20.0	A1	●	2.2	20.0	AA	●	3.0	20.0	AB	●	3.3	20.0	A2	●	5.0	7.0	H3	●
2.0	35.0	J1	●	2.2	35.0	JA	●	3.0	35.0	JB	●	3.3	35.0	J2	●	5.0	20.0	A3	●
2.0	60.0	B1	▲	2.2	60.0	BA	▲	3.0	60.0	BB	▲	3.3	60.0	B2	▲	5.0	35.0	J3	●
2.0	100.0	C1	■	2.2	100.0	CA	■	3.0	100.0	CB	■	3.3	100.0	C2	■	5.0	60.0	B3	▲
																5.0	100.0	C3	■
5.2 VOLTS				5.5 VOLTS				6 VOLTS				8 VOLTS				10 VOLTS			
5.2	7.0	HC	●	5.5	7.0	HD	●	6.0	17.0	AE	●	8.0	12.5	AF	●	10.0	10.0	AG	●
5.2	20.0	AC	●	5.5	20.0	AD	●	6.0	23.0	JE	●	8.0	20.0	JF	●	10.0	18.0	JG	●
5.2	35.0	JC	●	5.5	35.0	JD	●	6.0	50.0	BE	▲	8.0	40.0	BF	▲	10.0	25.0	BG	▲
5.2	60.0	BC	▲	5.5	55.0	BD	▲	6.0	80.0	CE	■	8.0	60.0	CF	■				
5.2	100.0	CC	■	5.5	90.0	CD	■												
11 VOLTS				12 VOLTS				14 VOLTS				15 VOLTS				18 VOLTS			
11.0	4.0	HH	●	12.0	4.0	H4	●	14.0	3.0	HJ	●	15.0	3.0	H5	●	18.0	11.0	JK	●
11.0	10.0	AH	●	12.0	10.0	A4	●	14.0	8.0	AJ	●	15.0	8.0	A5	●	18.0	17.0	BK	▲
11.0	18.0	JH	●	12.0	17.0	J4	●	14.0	14.0	JJ	●	15.0	13.0	J5	●	18.0	25.0	CK	■
11.0	25.0	BH	▲	12.0	25.0	B4	▲	14.0	20.0	BJ	▲	15.0	20.0	B5	▲				
20 VOLTS				24 VOLTS				28 VOLTS				30 VOLTS				33 VOLTS			
20.0	6.0	AM	●	24.0	2.0	H6	●	28.0	5.0	A7	●	30.0	7.0	JN	●	33.0	4.0	AP	●
20.0	10.0	JM	●	24.0	6.0	A6	●	28.0	7.0	J7	●	30.0	11.0	BN	▲	33.0	6.0	JP	●
20.0	17.0	BM	▲	24.0	8.0	J6	●	28.0	14.5	B7	▲	30.0	16.0	CN	■	33.0	11.0	BP	▲
20.0	21.0	CM	■	24.0	17.0	B6	▲	28.0	18.0	C7	■					33.0	14.0	CP	■
				24.0	21.0	C6	■												
36 VOLTS				42 VOLTS				48 VOLTS				54 VOLTS				60 VOLTS			
36.0	4.0	A8	●	42.0	3.0	AR	●	48.0	3.0	A9	●	54.0	2.5	AS	●	60.0	2.0	AT	●
36.0	6.0	J8	●	42.0	5.0	JR	●	48.0	4.0	J9	●	54.0	3.7	JS	●	60.0	3.5	JT	●
36.0	11.1	B8	▲	42.0	8.5	BR	▲	48.0	8.5	B9	▲								
36.0	14.0	C8	■	42.0	10.5	CR	■	48.0	10.5	C9	■								

Dual Output Modules

OUTPUT V1	OUTPUT V2	MODULE CODE	MODULE SIZE	OUTPUT V1	OUTPUT V2	MODULE CODE	MODULE SIZE
12 V @ 4 A	12 V @ 4 A	G1	●	24 V @ 5 A	5 V @ 10 A	K4 ⁽¹⁾	●
15 V @ 3 A	15 V @ 3 A	G2	●	12 V @ 10 A	12 V @ 4 A	K5 ⁽¹⁾	●
12 V @ 4 A	5 V @ 8 A	G3	●	15 V @ 8 A	15 V @ 4 A	K6 ⁽¹⁾	●
15 V @ 3 A	24 V @ 2 A	G4	●	48 V @ 2 A	5 V @ 10 A	K7	●
24 V @ 2 A	5 V @ 8 A	G5	●	3.3 V @ 10 A	6.5 V @ 10 A	K8	●
5 V @ 8 A	5 V @ 8 A	G6	●	5 V @ 10 A	12 V @ 10 A	D1	▲
24 V @ 2 A	24 V @ 2 A	G7	●	12 V @ 10 A	12 V @ 10 A	D2	▲
5 V @ 10 A	5 V @ 10 A	K1	●	5 V @ 10 A	24 V @ 5 A	D3	▲
5 V @ 10 A	12 V @ 8 A	K2 ⁽²⁾	●	15 V @ 8 A	15 V @ 8 A	D4	▲
5 V @ 10 A	15 V @ 6 A	K3 ⁽²⁾	●				

Notes

1. Maximum available power is 150 W

2. 25% load required to meet stated noise and ripple on V1 (or increases to 150 mV)

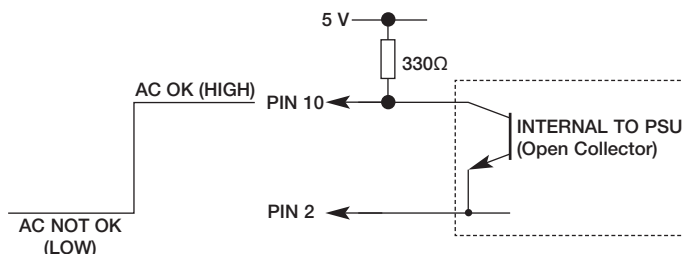
Triple Output Modules

OUTPUT V1	OUTPUT V2	OUTPUT V3	MODULE CODE	MODULE SIZE
5 V @ 20 A	12 V @ 2 A	12 V @ 2 A	E1	▲
5 V @ 20 A	15 V @ 2 A	15 V @ 2 A	E2	▲
12 V @ 10 A	15 V @ 2 A	15 V @ 2 A	E3	▲

AC OK/Power Fail

Module A, J, B, C, E & K.

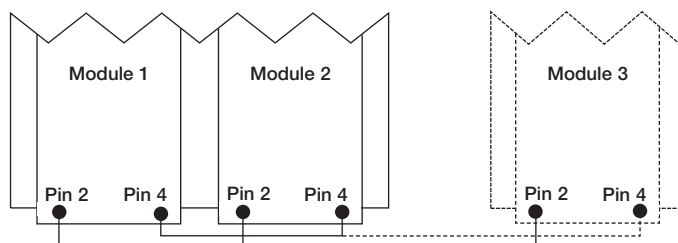
When fitted in module position 1 of the chassis, pins 10 and 2 provide a minimum of 5 ms warning of loss of output regulation.



Current Share

Module A, J, B, C & V1 of E & K.

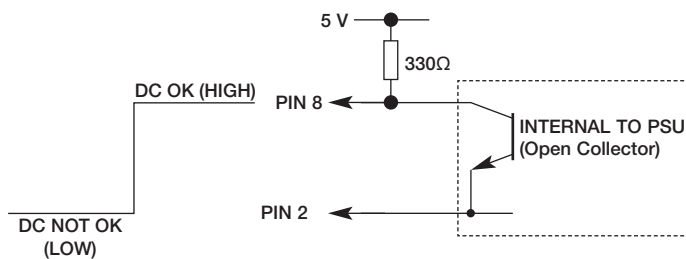
Connecting pins 2 & 4 of like part number modules (3 maximum) within the same chassis or separate chassis will force current share of the outputs.



DC OK

Module A, J, B, C & V1 of D, E & K.

Pins 8 and 2 provide notification that the output voltage is within regulation via a logic 1.



(Reverse logic option available, i.e. high or DC NOT OK).

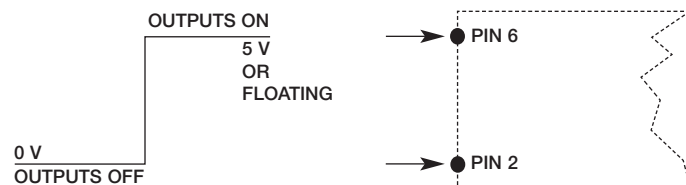
Global Inhibit

Inhibiting the module fitted in position 1 will inhibit all outputs of other modules & the cooling fan. If individual inhibit is required on the module fitted in chassis position 1 alternate configurations are available, please consult our application engineering team.

Inhibit

Module A, J, B, C, E & K.

Pins 6 and 2 (return) provide on/off control of the module. Applying a logic '0' between these pins turns the outputs off. (E module pins 6 and 7). Open or logic high to enable.



(Reverse logic option available, i.e. high for outputs off, low for outputs on). Reverse logic is standard for the 'J' & 'K' modules via Pin 7.

Lower Earth Leakage Current

All chassis can be supplied with less than 300 μ A or 500 μ A earth leakage current as an option, conducted EMC is Class A with these options, consult sales for details and part numbering.

Modules in Parallel

Single output modules with the same part number and V1 of dual and triple output modules can be paralleled to obtain increased output current. These modules can be either fitted in the same chassis or different chassis with their outputs connected directly together and current share connections made.

Modules in Series

Single output modules can be connected in series to obtain alternate output voltages not available from a single module. For example, a 10 V (AG module) can be connected in series with a 6 V (AE module) to obtain an output voltage of 16 V. For voltages >80 V consult sales for details.

Output Voltage Programming

Module J

The voltage of the 'J' module can be remotely programmed via a 0-5 V signal. Consult sales for details.

Remote Sense

Module A, J, B, C, K & V1 of E.

Pins 1 (+ve) and 2 (-ve) provide compensation for voltage drops in application wiring up to a maximum of 0.5 V.

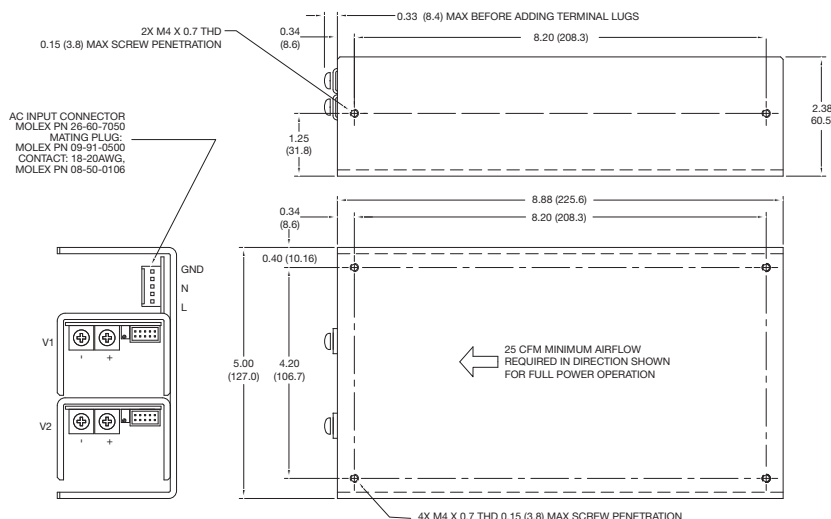
Module D.

Pins 2 (V2 -ve) and 7 (V1 -ve) provide compensation for voltage drops in the return of application wiring upto a maximum of 0.25 V.

Module H, G & V2, V3 of E.

Remote sense not fitted.

Mechanical Details

300 (500)⁽¹⁾
Watt F3 Model

F3 Models do not have an integral fan & require system cooling

Weight: 2.80 lb (1.27 kg) approx

350 (525)⁽¹⁾ - 700 (900)⁽¹⁾
Watt FF Model

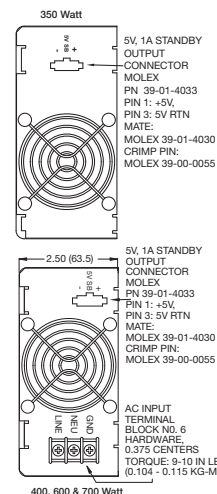
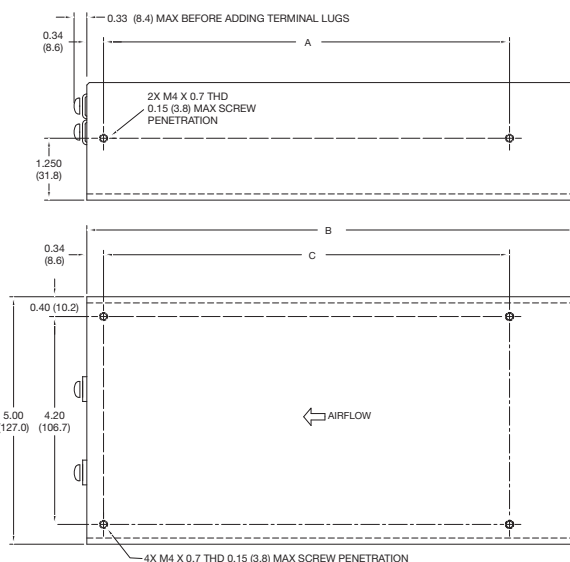
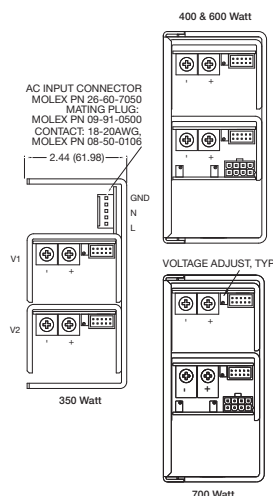
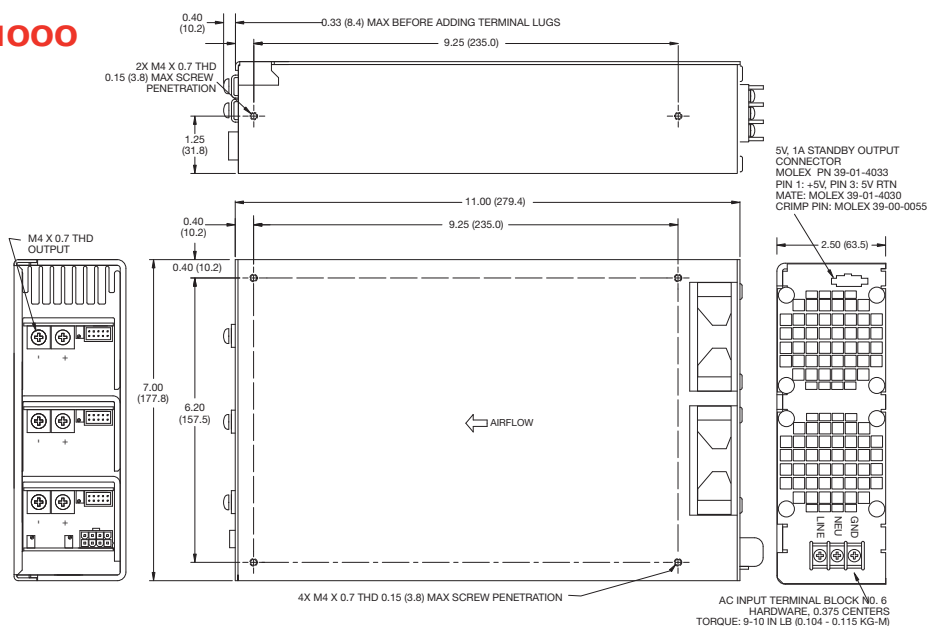
Watts	Measurements Inches (mm)		
	A	B	C
350 W	8.20 (208.3)	9.94 (252.5)	8.20 (208.3)
400 W	9.20 (233.7)	10.00 (254.0)	9.20 (233.7)
600 W	10.20 (259.1)	11.00 (279.4)	10.20 (259.1)
700 W	9.70 (246.4)	10.50 (266.7)	9.70 (246.4)

350 W - Weight: 3.95 lb
(1.80 kg) approx

400 W - Weight: 2.56 lb
(1.16 kg) approx

600 W - Weight: 2.94 lb
(1.33 kg) approx

700 W - Weight: 2.80 lb
(1.27 kg) approx

800 (1000)⁽¹⁾ Watt F8 & 1000
(1200)⁽¹⁾ FX Models

Notes (applicable for 300-800 W)

- Output power available when used with 180-264 VAC.
- Mating connector kit available, order part number 'F3,4,5,6,7,8/X CONN KIT'.
- Supplies are SEMI F47 at high line input (180-264 VAC at 100% rated power). Certification available upon request.
- All dimensions in inches (mm).
Tolerance: X.XX = ±0.02 (0.05),
X.XXX = ±0.01 (0.025)

Output Module Connection Details

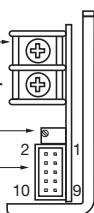
MP XP

A Module Weight: 0.46 lb (209 g) approx**Single Output**
Module Size ●

OUTPUT HARDWARE
NO. 6 HARDWARE,
0.375 CENTERS
TORQUE: 9-10 IN LB
(0.104-0.115 KG-M)

VOLTAGE ADJUST

LOGIC CONNECTOR

**Logic Connector AMP 87631-5**

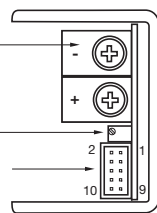
Pin	Function
1	+sense
2	-sense
3	+sense
4	Current share
5	Not used
6	Inhibit
7	-sense
8	DC OK
9	Not used
10	Power fail

B Module Weight: 1.04 lb (473 g) approx**Single Output**
Module Size ▲

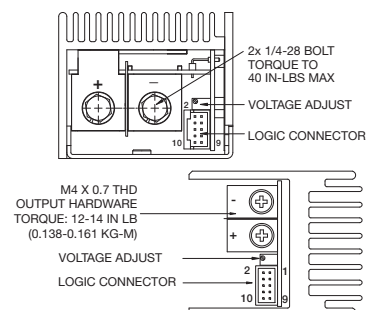
M4 X 0.7 THD
OUTPUT HARDWARE
TORQUE: 12-14 IN LB
(0.138-0.161 KG-M)

VOLTAGE ADJUST

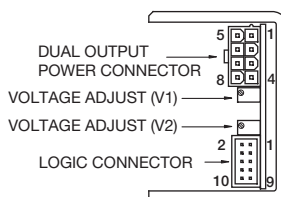
LOGIC CONNECTOR

**Logic Connector AMP 87631-5**

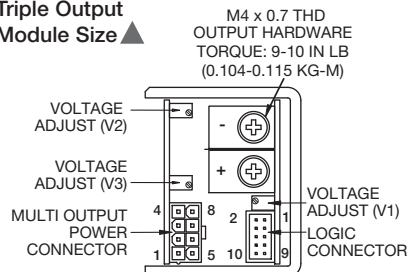
Pin	Function
1	+sense
2	-sense
3	+sense
4	Current share
5	Not used
6	Inhibit
7	-sense
8	DC OK
9	Not used
10	Power fail

C Module Weight: 1.80 lb (818 g) approx**Single Output**
Module Size ■

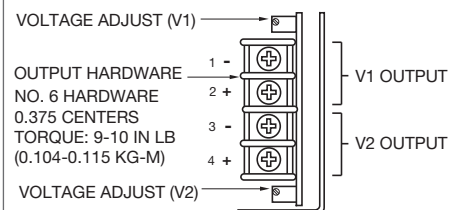
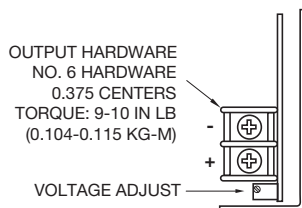
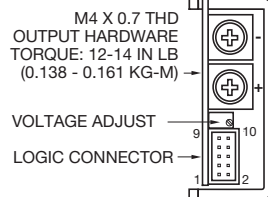
Logic Connector AMP 87631-5			
Pin	Function	Pin	Function
1	+sense	6	Inhibit
2	-sense	7	-sense
3	+sense	8	DC OK
4	Current share	9	Not used
5	Not used	10	Power fail

D Module Weight: 0.92 lb (418 g) approx**Dual Output**
Module Size ▲

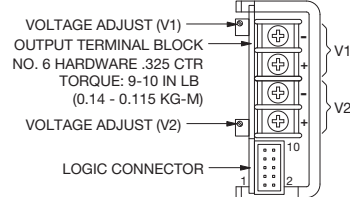
Logic Connector AMP 87631-5		Output Connector Molex 39-01-2080	
Pin	Function	Pin	Function
1	Not used	1	Output V1+
2	-sense (V2)	2	Output RTN V1
3	Not used	3	Output V2+
4	Not used	4	Output RTN V2
5	Not used	5	Output V1+
6	Inhibit	6	Output RTN V1
7	-sense (V1)	7	Output V2+
8	DC OK	8	Output RTN V2
9	GND		
10	Power fail		

E Module Weight: 0.80 lb (364 g) approx**Triple Output**
Module Size ▲

Logic Connector AMP 87631-5		Output Connector Molex 39-01-2080	
Pin	Function	Pin	Function
1	+sense (V1)	1	Output RTN V3
2	-sense (V1)	2	
3	+sense (V1)	3	
4	Current share	4	Output RTN V2
5	Not used	5	Output V3+
6	Inhibit	6	
7	-sense (V1)	7	
8	DC OK	8	Output V2+
9	Not used		
10	Power fail		

G Module Weight: 0.38 lb (173 g) approx**Dual Output**
Module Size ●**H Module** Weight: 0.28 lb (127 g) approx**Single Output**
Module Size ●**J Module** Weight: 0.68 lb (309 g) approx**Single Output**
Module Size ●

Logic Connector AMP 87631-5	
Pin	Function
1	+sense
2	-sense
3	Remote voltage ADJ
4	Current share
5	Current monitor
6	Inhibit Low
7	Inhibit High
8	DC OK
9	Alternate V Prog
10	Power fail

K Module Weight: 0.68 lb (309 g) approx**Dual Output**
Module Size ●

Logic Connector AMP 87631-5	
Pin	Function
1	+sense (V1)
2	-sense (V1)
3	Remote voltage ADJ
4	Current share
5	+sense (V2)
6	Inhibit Low
7	Inhibit High
8	DC OK (V1)
9	-sense (V2)
10	Power fail