AMPSS™
Astec Modular Power Supply System

DJ80 Rev2 Distributed Power Series

DC-DC Converter Module
Technical Reference Manual

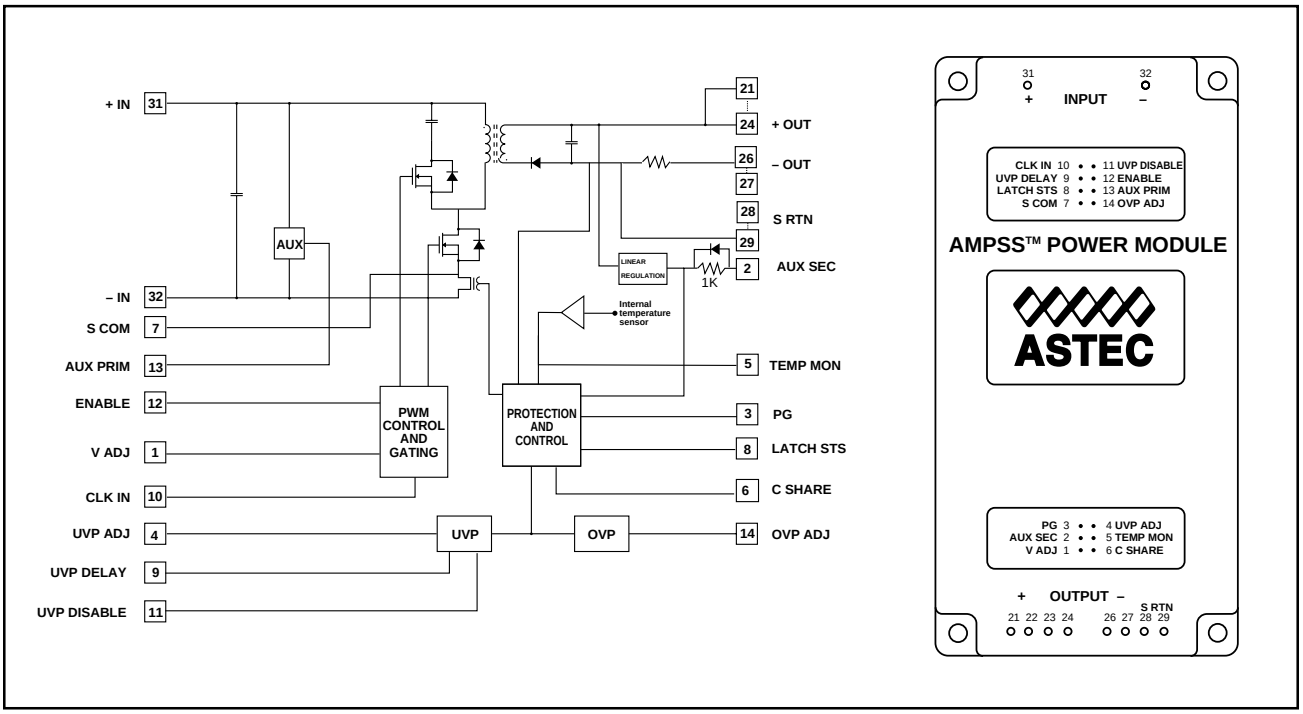
Series Highlights

- High Power Density - 90W/in^3
- High efficiency - up to 90%
- Up to 500W output power
- High Reliability - over 1 million hours MTBF
- Wide input voltage range

ASTEC

Contents

DJ80A Distributed Power Series DC-DC Converters



Introduction

The DJ80A DC-DC converter series is part of Astec's family of advanced High Density modular power supply components. Featuring high reliability and convenient control and monitoring functions, these modules are designed to reduce product development time and enhance system performance. The DJ80A is ideal for converting line voltages into 24V or 48V bus voltages for Distributed Power System Front Ends in Telecommunications, EDP and Industrial applications. This module exhibits exceptional power density, wide input voltage range and parallelability for high efficiency conversion (line to DC Bus) and battery systems.

Special Features

- High Power Density - 90W/in^3; 5.5W/cm^3
- High Efficiency - up to 90%
- 500KHz fixed frequency, zero voltage switching (ZVS)
- Low output ripple and noise
- Excellent transient response
- High Reliability - over 1 million hours MTBF
- Wide input voltage range
- TTL compatible enable
- Parallelable
- Adjustable output voltage
- Temperature monitor
- Auxiliary power supply
- Short circuit protection
- Overtemperature protection (OTP)
- Adjustable output overvoltage protection (OVP)
- Adjustable output undervoltage protection (UVP)
- Adjustable UVP timing delay
- Current share on secondary side

Ordering Information

Please contact Astec for information on other output voltages, power ranges and configurations.

Model Number	Input Voltage	Output Voltage	Output Current	Max Output Power
DJ80A-300L-480F10	300V	48V	10.4A	500W
DJ80A-300L-480F08	300V	48V	8.3A	400W
DJ80A-300L-240F20	300V	24V	20.8A	500W

Safety

UL:	UL1950
CSA:	CSA C22.2 No.950
VDE:	VDE 0805
	EN60950
CE:	CE Mark

Please contact Astec for information on specific module approvals.

Note: *Ensure all modules are used according to the Installation Instructions provided with each module.*

Electrical Specifications

Absolute Maximum Ratings – all models

Exceeding the specified absolute maximum ratings may severely damage the module. These ratings are intended as guidelines for absolute worst case operating conditions and are not to be interpreted as recommended operating condition

General	300V Input
Continuous Input Voltage	400V
Input Surge Voltage (1 sec)	425V
Isolation, Input to Output	4300VDC
Isolation Input to Baseplate	2200VDC
Isolation, Output to Baseplate	1000VDC
Operating Temperature (Baseplate)	-20 to 85˚C
Storage Temperature	-40 to 105˚C
Operating Relative Humidity (non-condensing)	10% to 95%
Storage Relative Humidity (non-condensing)	95% Max
Altitude (Operating)	< 3000m
Altitude (Storage)	< 9000m
Lead Temperature (soldering 5 Seconds)	235˚C

Primary Control Pins	
S COM	Reference
LATCH STS	-0.5 to 20 VDC
UVP DELAY	-0.5 to 10 VDC
CLK IN	-0.5 to 5 VDC
UVP DISABLE	-0.5 to 10 VDC
ENABLE	-0.5 to 20 VDC
AUX PRIM	-0.5 to 25 VDC
OVP ADJ	-0.5 to 20 VDC
Secondary Control Pins	
V ADJ	-0.5 to 7 VDC
AUX SEC	-0.5 to 15 VDC
PG	-0.5 to 20 VDC
UVP ADJ	-0.5 to 60 VDC
TEMP MON	-0.5 to 7 VDC
C SHARE	-0.5 to 7 VDC

Notes:

All isolation barriers on 300V input modules have been designed and tested to meet 4242VDC as required by IEC950 for reinforced insulation. The complete module should NOT be subjected to a 3000VAC input-to-output test because this can result in input-baseplate-output breakdown. AMPSS DC-DC modules are CLASS I equipment. Power supply systems using AMPSS modules MUST also be CLASS I equipment. Each AMPSS DC-DC module is fully tested in factory according to the standards. Therefore power supply systems need only be subjected to Hi-Pot test for BASIC insulation which is 1500Vac (AC) input to GROUND.

Specifications

Electrical characteristics are guaranteed over the full baseplate temperature range (-20 to 85˚C) and for the full range of input voltage (V_I) and for the full load range (0 to I_O rated). Except where indicated, ENABLE pin is connected to S COM. All other pins are left floating.

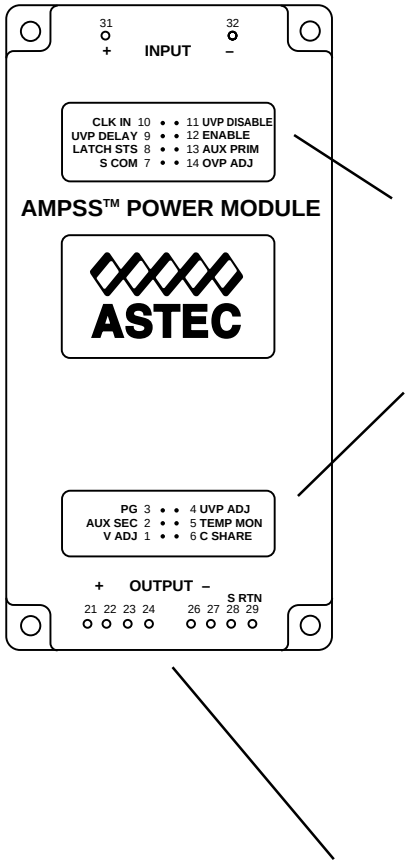
Definitions

V_I, V_O and I_O are actual operating conditions, V_{Inom}, V_{Onom} and I_{Orated} are nominal ratings.

Pin Connections - all models

INPUT PINS

Pin No	Pin Name	Type	Description	Recommended Connections
31	+INPUT	Input	Power input - positive	A 200µF electrolytic capacitor connected between the +INPUT and -INPUT pins is recommended
32	-INPUT	Input	Power input - negative (return)	See + INPUT for recommendations



CONTROL PINS

Pin No	Pin Name	Type	Description	Recommended Connections
1	V ADJ	Input	Used to adjust module output voltage	Leave unconnected if not used
2	AUX SEC	Input/Output	Auxiliary power supply on secondary side	Leave unconnected if not used
3	PG	Output	Indicates if converter is delivering >80% of nominal output voltage.	Leave unconnected if not used
4	UVP ADJ	Input	Used for adjusting the Undervoltage protection limit	Leave unconnected if not used
5	TEMP MON	Output	Provides indication of module baseplate temperature	Leave unconnected if not used
6	C SHARE	Input/Output	Allows modules connected in parallel to accurately share current	Leave unconnected if not used
7	S COM	Output	Negative reference for all primary side signals	Connect to negative side of primary control and monitoring circuitry
8	LATCH STS	Output	Indicates if converter is running	Leave unconnected if not used
9	UVP DELAY	Input	Undervoltage protection delay can be adjusted using capacitors	Leave unconnected if not used
10	CLK IN	Input	Accepts a 500KHz clock input for synchronization with other modules	Leave unconnected if not used
11	UVP DISABLE	Input	Used for disabling undervoltage protection	Leave unconnected if not used
12	ENABLE	Input	Enables or disables the output of the module	Must be connected to S COM pin or driven to <0.8V to enable the output of the module
13	AUX PRIM	Input/Output	Auxiliary Power Supply on primary side	Leave unconnected if not used
14	OVP ADJ	Input	Used for adjusting the overvoltage protection	Leave unconnected if not used

OUTPUT PINS

Pin No	Pin Name	Type	Description	Recommended Connections
21-24	+OUTPUT	Output	Power output - positive	Ensure good electrical connection and sufficient copper on PCB layouts
26-27	-OUTPUT	Output	Power output - negative	See +OUTPUT for recommendations
28-29	S RTN	Output	Negative reference for all secondary side signals	Connect to negative side of secondary control and monitoring circuitry

CONTROL SIGNALS

Control Function	Conditions	Parameter	Min	Typ	Max	Units
V ADJ - voltage adjust	Connect 390KΩ resistor from V ADJ pin to $+V_O$ (48v) and 43KΩ for (24v)					
	DJ80A-300L-480F10	V_{Omin}		85		$\%V_{Onom}$
	DJ80A-300L-480F08			85		
	DJ80A-300L-240F20			90		
	Connect V ADJ to $-V_O$	V_{Omax}		118		$\%V_{Onom}$
AUX SEC - Auxiliary power supply	1Kohm source impedence					
	V_{AUX_S} OPEN LOAD	V_{AUX_S}	7.8	8.4	9.3	V
	V_{AUX_S} SHORT CIRCUIT	I_{AUX_S}	7.8	8.4	9.3	mA
PG-power good	Converter running & Output ≥ $80\%V_{Onom}$	V_{PG}		8		V
	Converter not running or Output < $75\%V_{Onom}$	V_{PG}			0.8	V
UVP ADJ - undervoltage protection adjust	Connect UVP ADJ to $+V_o$	UVP set point		15		$\%V_{Onom}$
	UVP adjust pin open	UVP set point	75	85	95	$\%V_{Onom}$
TEMP MON - temperature monitor signal		$V_{T\ MON}$ sensitivity	9.8	10	10.2	mV/°C
		Impedance		1		KΩ
LATCH STS - latch status	Converter running (open load)	V_{LATCH_STS}	10	13	16	V
	Converter stopped	V_{LATCH_STS}			0.8	V
UVP DELAY - undervoltage protection delay	Pin 9 open circuit	UVP delay	20	50	80	ms
CLK IN - clock in	Requires external circuit - see Functional Description					
UVP DISABLE - undervoltage protection disable	Connect to S COM to disable					
ENABLE - module enable	Module enabled	V_{ENABLE}	-0.5		0.8	V
	Module disabled	V_{ENABLE}	2		10	V
	V_{ENABLE} = 0.5V	ENABLE current source		220		µA
*AUX PRIM - Auxiliary power supply	$V_O = V_{Onom}$	V_{AUX_P}	16	19	22	V
		I_{AUX_Pmax}			40	mA
OVP ADJ - overvoltage protection adjust	Pin 14 open	OVP nominal		130	140	$\%V_{Onom}$
	V_{OVP} = 0V	OVP set point	0			$\%V_{Onom}$
	V_{OVP} = 7V	OVP set point			180	$\%V_{Onom}$
C Share - current share function	C Share pins of modules connected in parallel $I_o = 80\%\ I_{orated}$ total	C SHARE accuracy		±6	±15	$\%I_{Oave}$
		Max no. of units			10	

* Notes: External Aux supply is needed for applications with output capacitance greater than 68µF.

Insulation - all models

INSULATION

Parameter	Conditions	Min	Typ	Max	Units
Input-output insulation resistance	500VDC	10			MΩ
Input-baseplate insulation resistance	500VDC	10			MΩ
Output-baseplate insulation resistance	500VDC	10			MΩ

Electrical Specifications for DJ80A-300L-xxxFyy models

INPUT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Input voltage		220	300	400	V
Input surge voltage	(1 second)			425	V
Input low line power on voltage	Module power on	150		175	V
Input low line power off voltage	Module shutdown	120		155	V
No load input power			12	25	W
Input capacitance				0.4	µF

Notes :
220µF 450V capacitor with low ESR and high ripple current rating should be connected across the input pins.

TRANSIENT CHARACTERISTICS

Parameter	Conditions	Min	Typ	Max	Units
Turn-on time	V_I = 0 to V_{Inom}		1	3	Sec
Transient response					
(25% to 75% load change @	Step-load excursion		5	10	$\%V_{Onom}$
0.1A/µS, recovery to 1% V_O)	Step-load response			800	µS

OUTPUT CHARACTERISTICS [1]

Parameter	Conditions	Min	Typ	Max	Units
Nominal (factory set) output voltage	DJ80A-300L-480F10		48		V
	DJ80A-300L-480F08		48		V
	DJ80A-300L-240F20		24		V
Output voltage set point accuracy	T_C = +25˚C, $V_I = V_{Inom}$, $I_O = I_{Orated}$	-2		2	$\%V_O$
Output voltage adjust	DJ80A-300L-480F10	85		118	$\%V_{Onom}$
	DJ80A-300L-480F08	85		118	$\%V_{Onom}$
	DJ80A-300L-240F20	90		118	$\%V_{Onom}$
Nominal (factory set) output overvoltage protection trip point			130	140	$\%V_O$
Overvoltage protection trim range		85		180	$\%V_O$
Overvoltage protection response time	$V_O = V_{Onom}$, $I_O = I_{Orated}$		10		msec
Line regulation	V_{Imin} to V_{Imax}			2.0	$\%V_{Onom}$
Load regulation	0 to I_{Omax}			2.5	$\%V_{Onom}$
Noise and ripple	20MHz bandwidth				
	DJ80A-300L-480F10		3	5	$\%V_O$
	DJ80A-300L-480F08		3	5	$\%V_O$
	DJ80A-300L-240F20		5	8	$\%V_O$
Output current	DJ80A-300L-480F10	0		10.4	A
	DJ80A-300L-480F08	0		8.3	A
	DJ80A-300L-240F20	0		20.8	A
Output current limit	V_O dropped to 95% of V_{Onom}	105	110	120	$\%I_{Omax}$
Max. output capacitance (Pri Aux left open)	All models		68		µF
Peak Output Current (Before Latch OFF)	DJ80A-300L-480F10		250		$\%I_{Omax}$
	DJ80A-300L-480F08		250		$\%I_{Omax}$
	DJ80A-300L-240F20		250		$\%I_{Omax}$
Temperature coefficient	Per ˚C Baseplate temperature			0.03	$\%V_O$/˚C
Overtemperature shutdown	Baseplate temperature	85	95	100	˚C
Efficiency	V_I = 300V, $V_O = V_{Onom}$, $I_O = I_{Orated}$				
	DJ80A-300L-480F10	85	88	90	%
	DJ80A-300L-480F08	85	88	90	
	DJ80A-300L-240F20	85	88	90	

Notes :
1. 3300pF 100V or larger capacitor should be connected from $-V_O$ to baseplate for all tests.

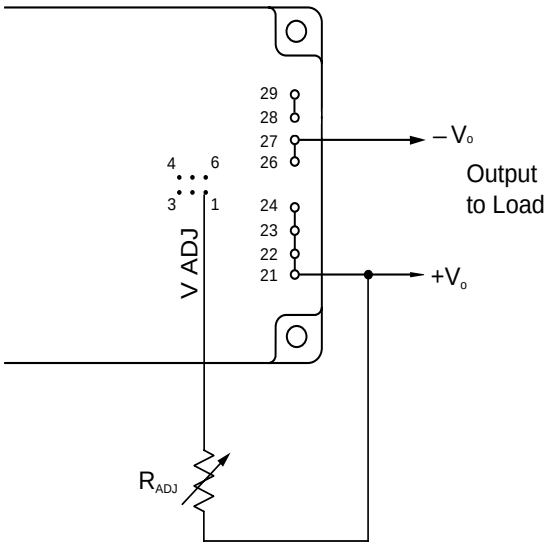
Functional Description

This section explains how to implement the functions found on the DJ80A Distributed Power Series

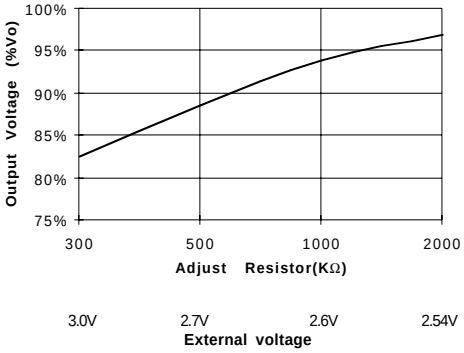
Output Voltage Adjust (V ADJ)

The output voltage on the DJ80A series may be adjusted from 85% to 118% for 48V output model and 90% to 118% for 24V output model. The adjustment may be made by connecting an external resistor as shown below or by connecting an external voltage from Vadjust to S_Rtn.

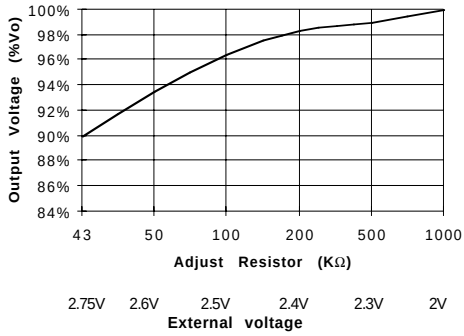
For 85/90 - 100% V_{Onom}



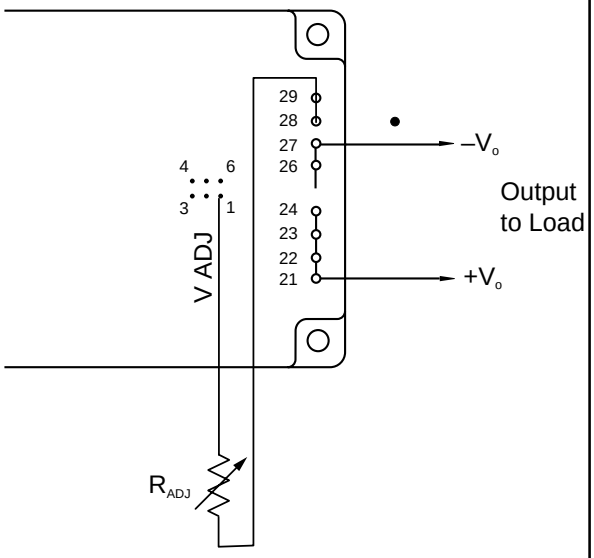
Voltage adjust programming resistor values (85 - 100%Vo) for 48V Output



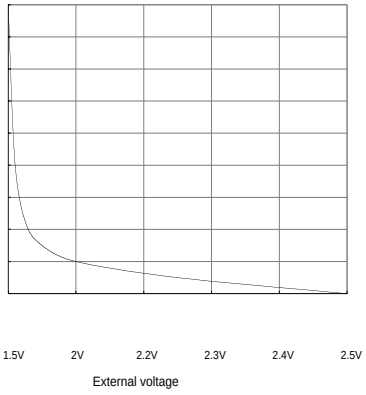
Voltage adjust programming resistor values (90-100%Vo) for 24V Output



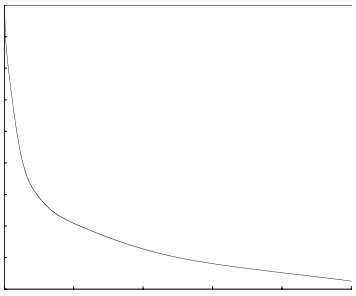
For 100 - 118% V_{Onom}



Voltage adjust programming resistor values (100-118%Vo) for 48V Output

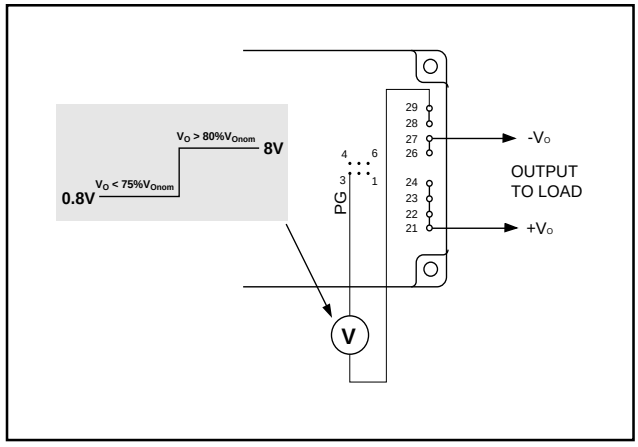


Voltage adjust programming resistor values (100-118%Vo) for 24V Output



Power Good (PG)

The power good function indicates if the module is delivering greater than 80% of the rated output voltage. If the module output voltage is > 80% of V_{Onom} then the voltage on the PG pin will read 8V. If the output voltage falls below 75% of V_{Onom} or the power converter is off, then the PG pin will read less than 0.8V.



Undervoltage Protection (UVP)

If the output voltage of the DJ80A module falls below the predetermined value (shown in the following section) the module will latch off. To restart the module, drive the module's ENABLE pin (12) to logic high(> 2V) longer than 5 seconds.

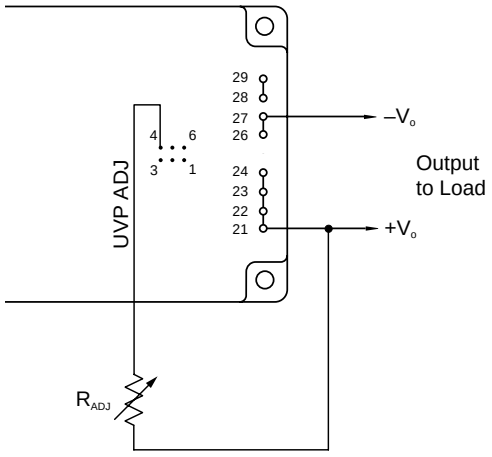
The module's UVP trip point is nominally set to 85(±10)% of the nominal voltage.

Undervoltage Protection Adjust (UVP Adjust)

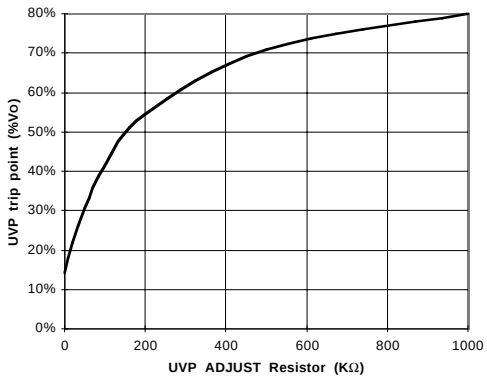
The point at which the module latches due to an undervoltage condition at the output can be preset using UVP ADJUST pin (4). With the pin left open the module will latch off when the output voltage falls to within 75%-95% of the rated output voltage.

The trip range may be lowered by connecting an external resistor from UVP ADJUST to $+V_O$. To reduce UVP to the minimum value (<15% V_{Onom}) the UVP ADJUST should be connected directly to $+V_O$.

To adjust UVP from 15% to 80% V_{Onom}



UVP ADJUST Trip Point Adjust Using External Resistor

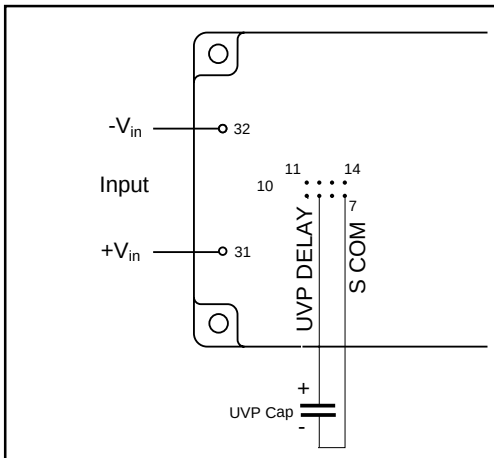


Undervoltage Protection Disable (UVP DISABLE)

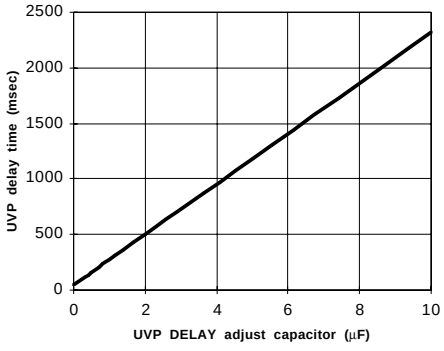
The UVP function can be disabled by connecting the UVP DISABLE pin (11) directly to the S COM pin (7). However it should be noted that this will also disable the Overtemperature Protection Function.

Undervoltage Protection Delay (UVP DELAY)

The delay between the UVP trip and the module latching off can be adjusted by connecting an external capacitor between the UVP DELAY pin (9) and the S COM pin (7). If the pin is left open the nominal delay is set to 50ms (±60%).
To increase the delay a capacitor should be connected as shown.

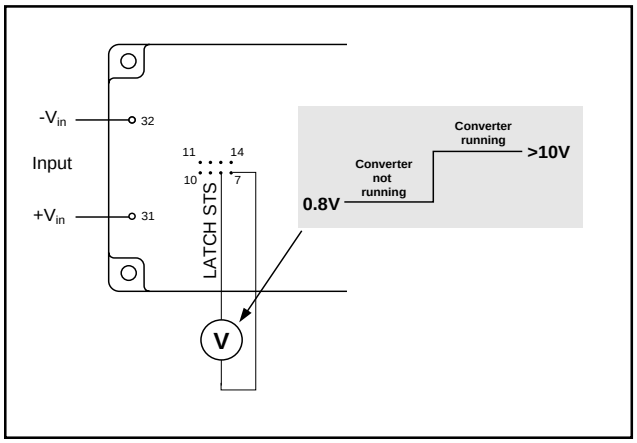


UVP DELAY programming characteristic



Latch Status (LATCH STS)

The Latch Status function provides an indication that the module's converter is running. The LATCH STS pin (8) output goes high (>10V) when the converter is running and low (<0.8) to indicate the converter has stopped operating. The converter may have stopped due to an Overvoltage, Overtemperature or Undervoltage condition or may be due to the module being disabled via the ENABLE pin (12)



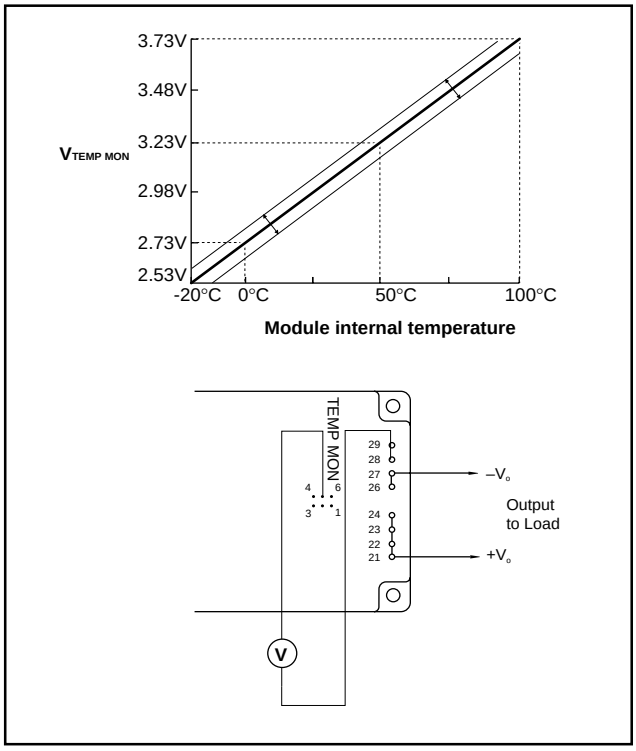
Temperature Monitoring (TEMP MON)

The TEMP MON pin provides an indication of the module's baseplate temperature.The voltage at the TEMP MON pin is proportional to the temperature of the module baseplate at 10mV per °C, where:

$$\text{Module temperature (°C)} = (V_{\text{TEMP MON}} \times 100) - 273$$

The output of the TEMP MON pin is accurate to within ± 10˚C of the actual temperature.

The temperature monitor signal can be used by thermal management systems (e.g. to control a variable speed fan). It can also be used for overtemperature warning circuits and for thermal design verification of prototype power supplies and heatsinks.

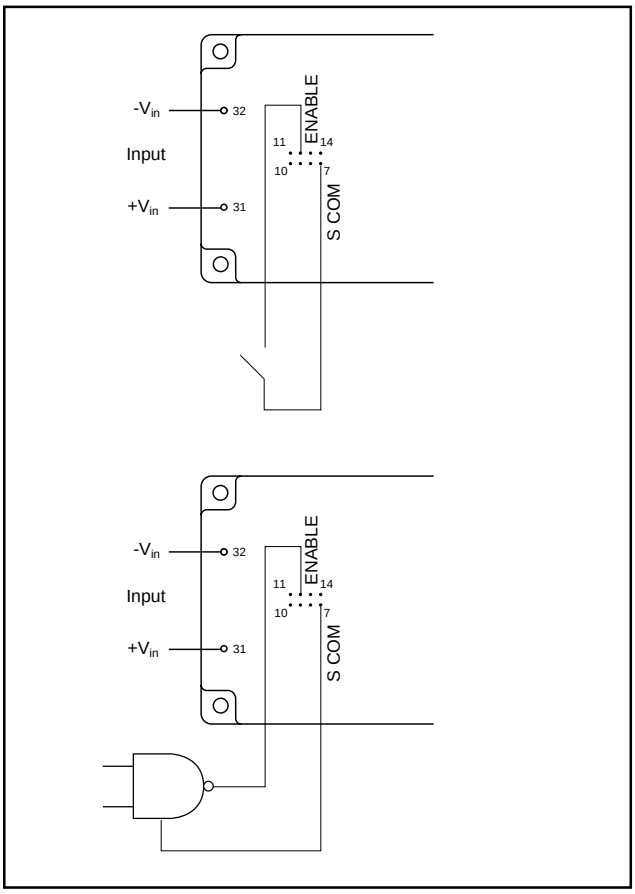


Common Primary Reference (S COM)

The S COM pin (7) is the reference point for all primary control and monitoring circuitry.

Enable Control (ENABLE)

The ENABLE pin (12) is a TTL compatible input used to turn the output of the module on or off. The module output is enabled when the ENABLE pin is connected to S COM or driven to a logic low of <0.8V (but not lower than -0.5V)
The output is disabled when the enable pin is open or driven to a logic high >2V. All monitoring and housekeeping functions continue to operate normally.



Auxiliary Supplies (Aux Prim, Aux Sec)

The DJ80A module has two auxiliary supplies which can be used to drive external circuitry. One Aux supply is derived from the primary side of the transformer, the other from the secondary side. The output voltage of the primary auxiliary will vary with the output voltage of the module. The Aux supplies are defined as follows:

Primary Auxiliary - PRIM AUX (pin 13)

	Min	Typ	Max	Condition
Primary Aux Voltage (V)	18.5	21.5	24.5	V_O = 118%V_{Onom}
	16	19	22	V_O = V_{Onom}
	12	15	18	V_O = 80%V_{Onom}
Current (mA)			40	

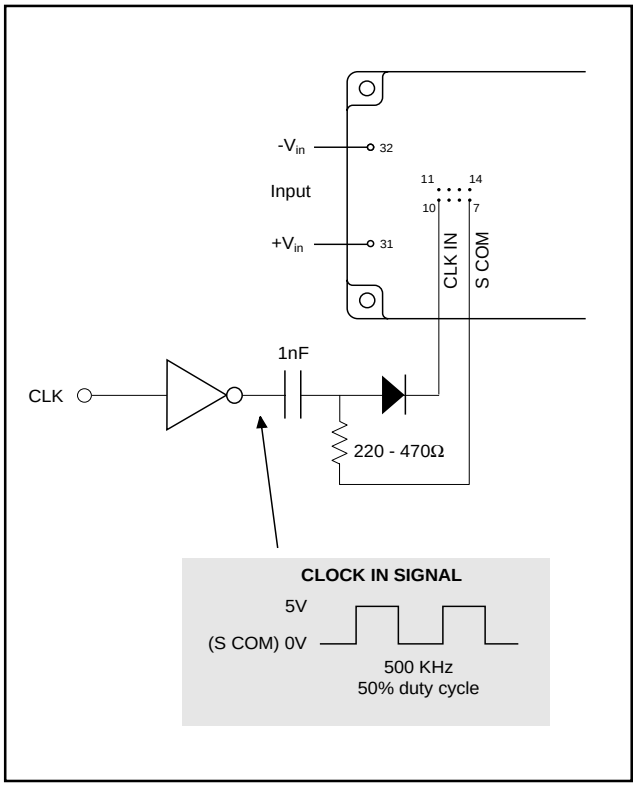
Secondary Auxiliary - SEC AUX (pin 2)

V_{AUX_S} (V) = 8.4 - 1000 x I_{AUX_S} (A)

source impedence 1Kohm

Clock In (CLK IN)

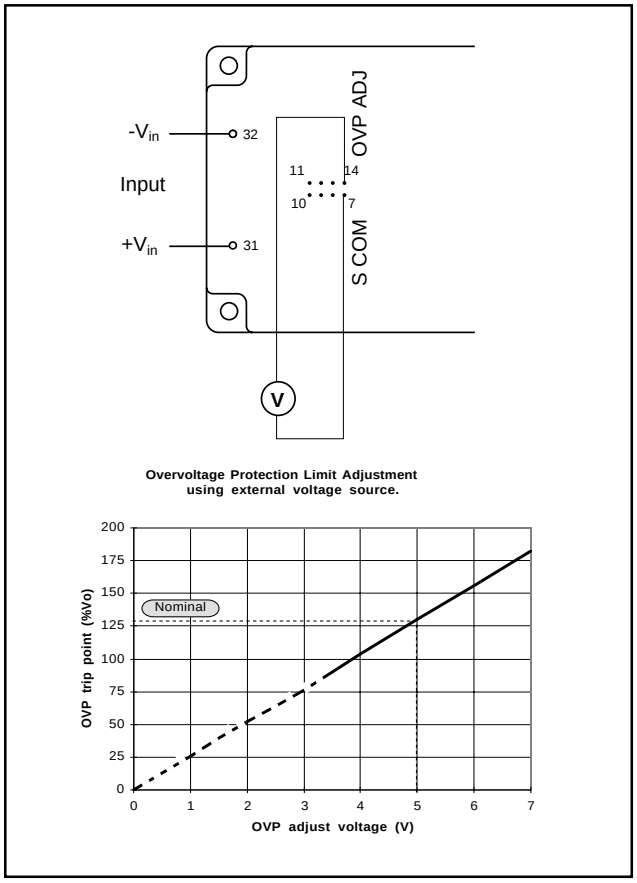
The DJ80A modules can be synchronized from an external clock signal. The signal required to ensure stable synchronisation is a narrow pulse voltage of 5V peak to peak @ 500KHz. The input circuit shown below generates the desired waveform when fed with the signal indicated.



Overvoltage Protection Adjust (OVP ADJUST)

An overvoltage protection circuit monitors the module's output and will shutdown the module in the event of an internal fault which causes the output voltage to rise above a preset limit. The module can be reset by driving the ENABLE pin (12) to logic high > 2V longer than 5 seconds.

With the OVP ADJUST pin left floating the OVP trip point will typically be 130%$V_{O.}$ To disable overvoltage protection the voltage applied to the OVP ADJUST pin should be between 7 and 10V.



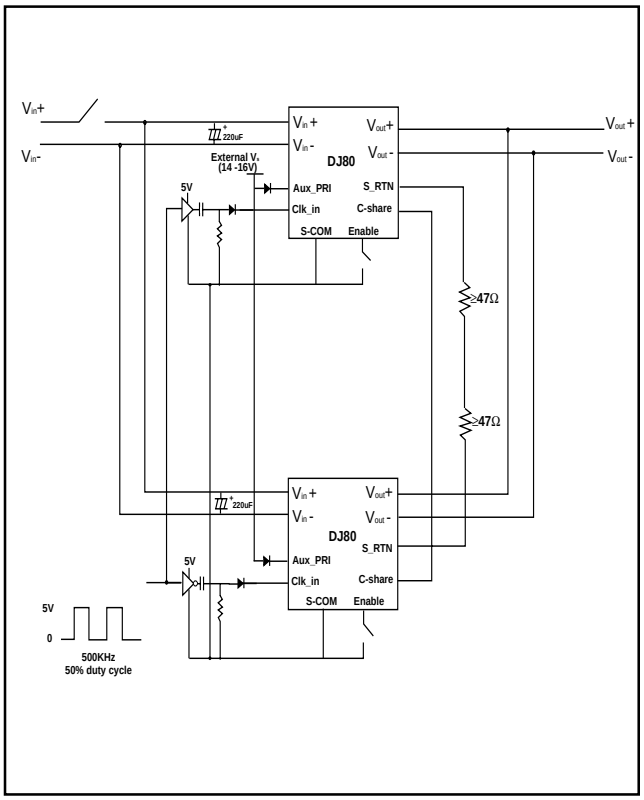
Note : The OVP trip point does not track changes made to the output voltage for the module.

C Share

To ensure that all modules in a parallel system accurately share current, the C SHARE pins on each module should be connected together. The voltage on the C SHARE pins represents the average load current per module. Each module compares this average with its own current and adjusts its output voltage to correct the error.

It is recommended to synchronize modules by anti-phase clock, resulting in ripple cancellation at the inputs and outputs of paralleled modules.

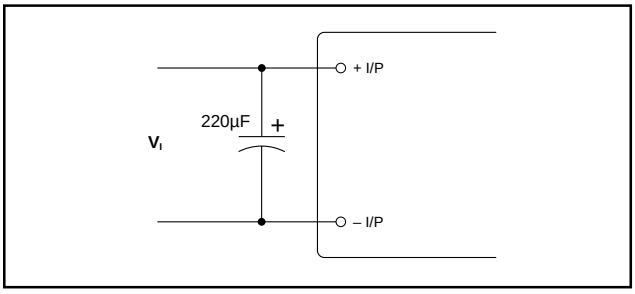
External Pri Aux supply is needed for all parallel applications and N+1 redundancy except 1+1.



Design Considerations

Input Bulk Capacitors

Electrolytic bulk reservoir capacitors placed close to the module input pins are recommended to ensure the module is fed with a low source impedance. For the DJ80A Distributed Power module typical value is 220µF/450V.



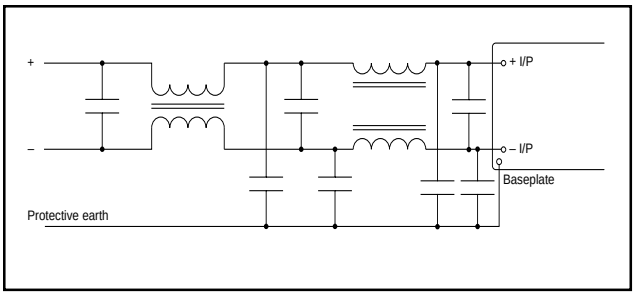
Overtemperature Protection

If the module's internal temperature exceeds 95°C, the module will latch OFF. To reset the module the input supply or the enable pin of the module must be cycled off and then on again, allowing a period of time for the module to cool down.

Overtemperature shutdown can also be programmed to occur at lower temperatures by using the TEMP MON output to control the ENABLE pin.

Conducted EMI

Although the DJ80A modules contain differential mode input EMI filtering, power supply systems using these modules will require additional EMI filtering to enable the system to meet relevant EMI standards.



MTBF

Predicted MTBF for the DJ80A Distributed Power Series is greater than 1,000,000 hours at maximum rated output and 50°C baseplate temperature. Calculated MTBF by MIL-HDBK-217E under ground benign conditions is 200,000 hours.

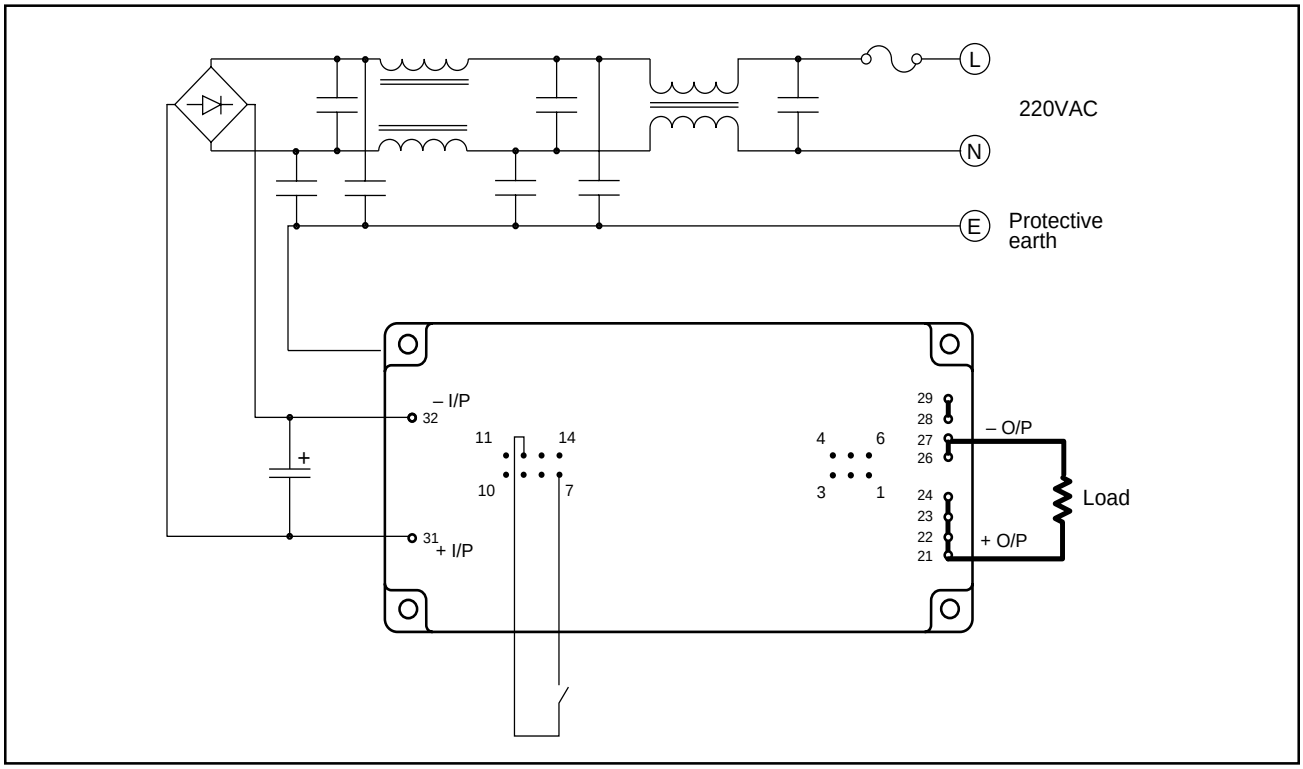
Input Fusing

AMPSS modules do not have an in-line fuse fitted internally. In order to comply with CSA, VDE and UL safety regulations it is recommended that a fuse of the following rating be fitted at the module's input.

Input	Fuse Rating
300V	10A / 250V

Application Examples

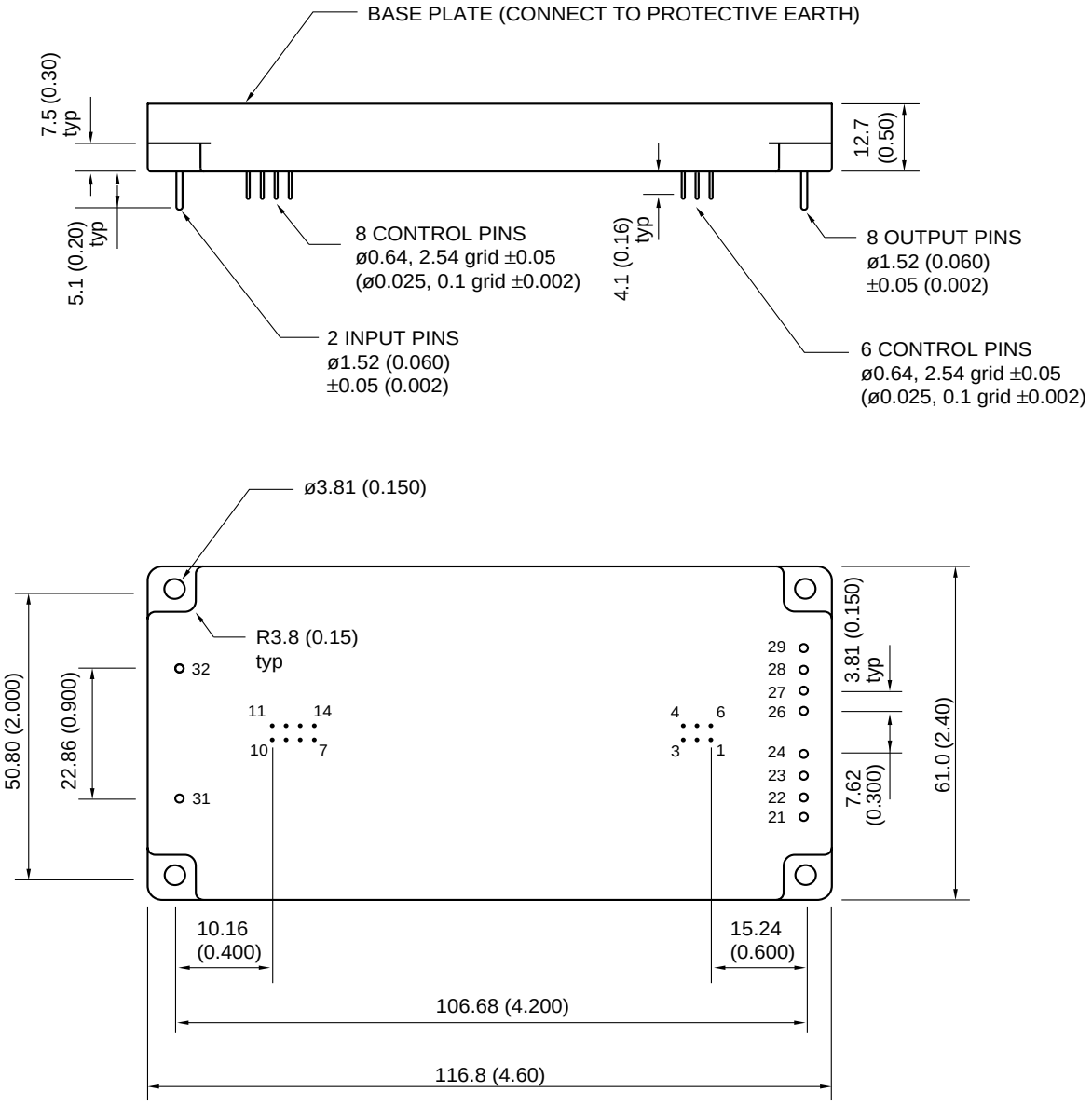
AC Input Design



Mechanical Information

Dimensions

The dimensions are given in mm (inches). Note that the baseplate must be connected to protective earth before power is supplied to the module.

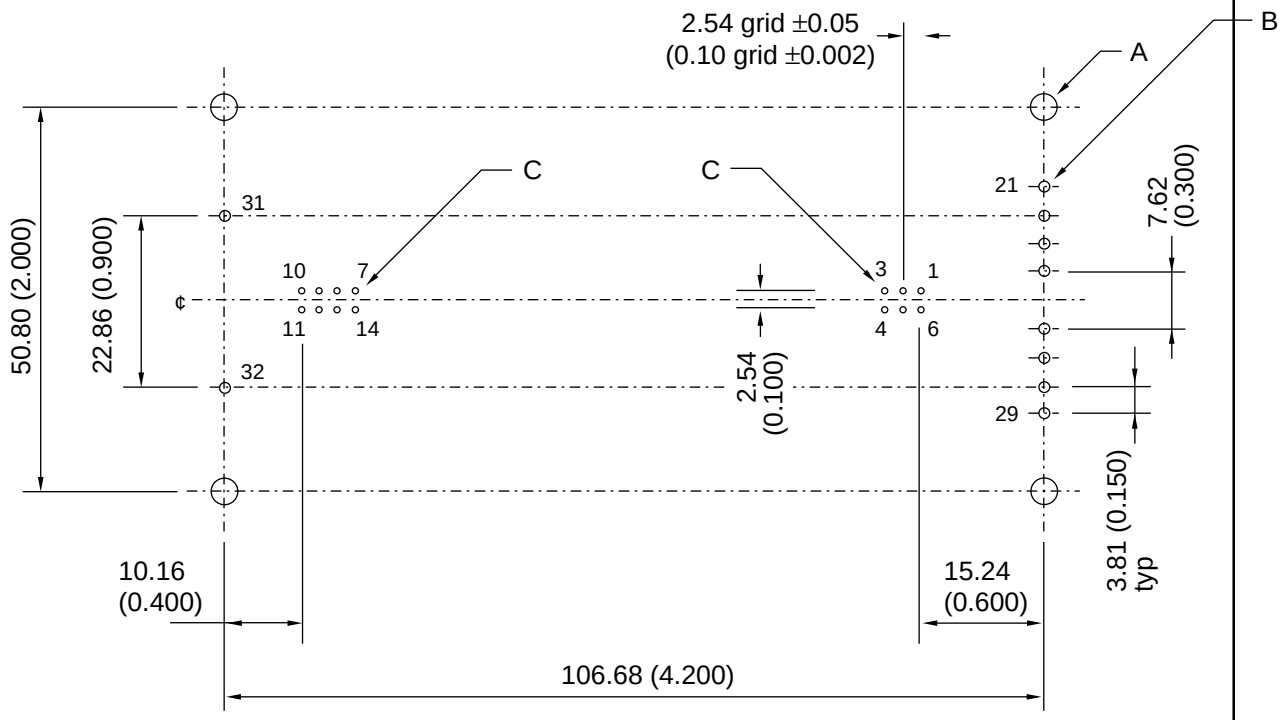


Notes:
1. All dimensions in mm and (inches)
2. Baseplate must be connected to protective earth
3. General tolerance: .X ±0.5 (0.02)
   .XX ±0.25 (0.010)
4. Surface Flatness: Concave 0.12mm max
   Convex 0.38mm max

Recommended PCB Layout

The DJ80A Distributed Power Series module may be installed to a board either by soldering or by using spring sockets.

Materials :
Control pins are tin plated phospher-bronze.
Input and output pins are tin plated copper.



VIEW FROM PCB COMPONENT SIDE

NOTES:
1. PCB COMPONENT SIDE VIEW IS SHOWN.
2. ALL DIMENSIONS IN mm AND (INCHES).
3. GENERAL TOLERANCE : .XX ± 0.1 (0.006).

RECOMMENDED HOLE SIZE TABLE :–

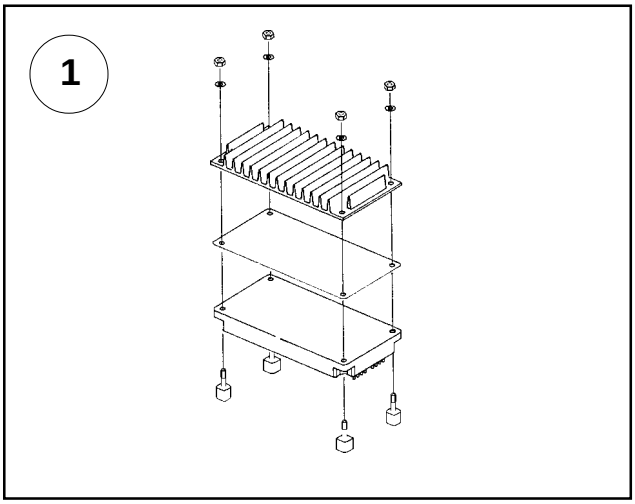
	A	B	C
HOLE SIZE FOR PCB DIRECT SOLDERING	ø2.00 + 0.15 / -0 (ø0.079 + 0.006/-0)	ø2.00 +0.15 / -0 (ø0.079 +0.006 / -0)	ø1.00 +0.15 / -0 (ø0.039 +0.006 / -0)
HOLE SIZE FOR SPRING SOCKET MOUNTING*		ø2.67 ± 0.05 (ø0.105 ± 0.002)	ø1.37 ± 0.05 (ø0.054 ± 0.002)
HOLE SIZE FOR M3.5 MACHINE SCREW	ø4.5 +0.08 / -0 (ø0.177 +0.0031 / -0) FOR M3.5		

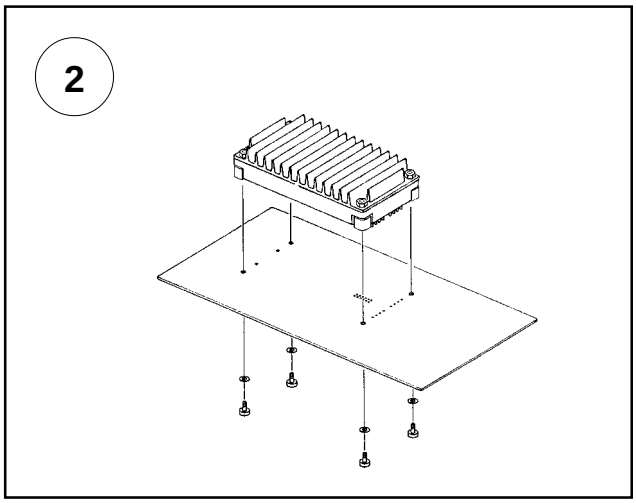
*Spring sockets are available from Astec in packs of 20 control pin sockets and 15 power pin sockets, part no. APA504-00-001. Sockets are not suitable for output current greater than 10A per pin.

Heatsink Mounting Information

Heatsinks for AMPSS™ modules are available in a variety of sizes and fin orientation. Mounting kits and thermal pads are also available. The table below shows the options available for the DJ80A Distributed Power Series.
A heatsink mounting kit provides the most convenient way to mount the heatsink to the module and then mount the assembly onto a circuit board

AMPSS™ modules may be retained by their input and output pins only, or may be fixed to the board using bolts screwed into the tapped studs which are provided as part of the mounting kit. In both cases the studs provide clearance between the module and the circuit board to facilitate PCB cleaning operations.
Note: *baseplate and heatsink must be connected to protective earth*





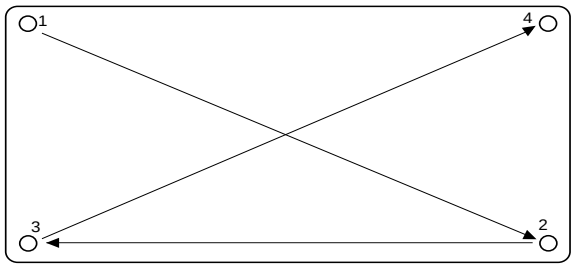
Description	Model Number	Dimensions		Free air thermal resistance
		inches	mm	
Heatsink, "80" size, vertical fin.	APA501-80-001	4.5x2.3x0.6	115x59x15	2.7˚C/W
Heatsink, "80" size, horizontal fin	APA501-80-002	4.5x2.3x0.6	115x59x15	2.4˚C/W
Heatsink, "80" size, vertical fin.	APA501-80-003	4.5x2.3x0.9	115x59x22.5	2.2˚C/W
Heatsink, "80" size, horizontal fin	APA501-80-004	4.5x2.3x0.9	115x59x22.5	2.0˚C/W
Heatsink, "80" size, vertical fin.	APA501-80-005	4.5x2.3x1.5	115x59x37	2.0˚C/W
Heatsink, "80" size, horizontal fin	APA501-80-006	4.5x2.3x1.5	115x59x37	1.7˚C/W
Heatsink, "80" size, low profile	APA501-80-007	4.6x3.5x0.5	115.6x89x12	2.0˚C/W
Thermal Pad, "80" size	APA502-80-001			
Mounting Kit, Tapped Studs	APA503-00-001			
Mounting Kit, Solder Studs	APA503-00-002			
Mounting Kit, Tapped Studs for low profile heatsink	APA503-00-007			
Mounting Kit, Solder Studs for low profile heatsink	APA503-00-008			
Spring Sockets (20 cont. 15pwr)	APA504-00-001			

To provide optimal thermal contact between heatsink and module, it is recommended that the mating surface of the heatsink should have a surface flatness of no greater than 0.1mm. The use of a thermal pad or thermal grease is also recommended.

The recommended torque of using AMPSS mounting kit for module/heatsink is:

Screw size	Torque
M3	4-6kg-cm (3.5-5.2 lb-in)
M3.5	6-8kg-cm (5.2-6.9 lb-in)

Torque sequence:



Heatsink Torquing Sequence

It is assumed that all four mounting screws are being torqued to a common surface.

Other thermal management schemes are at customer discretion as long as the maximum thermal rating of the specific module is not exceeded.

For further information contact :

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