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# INSTRUCTION MANUAL

## JFS2000 SERIES POWER SUPPLY

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## **JFS SERIES INSTRUCTION MANUAL**

### RATINGS AND SPECIFICATIONS FOR LAMBDA MODEL NO. JFS2000:

#### I. MAXIMUM RATINGS

SPECIFICATION	UNITS	JFS2000-24	JFS2000-48
OUTPUT VOLTAGE RANGE	V	20-29	36-56
MAXIMUM OUTPUT CURRENT (POWER) AT 50°C (AT $V_{OUTNOM}$ )	A (W)	84.0 (2000)	42.0 (2000)
MAXIMUM OUTPUT CURRENT (POWER) AT 60°C (AT $V_{OUTNOM}$ )	A (W)	63.0 (1500)	31.5 (1500)
MAXIMUM OUTPUT CURRENT (POWER) AT 70°C (AT $V_{OUTNOM}$ )	A (W)	42.0 (1000)	21.0 (1000)
OPERATING TEMPERATURE	°C	CONTINUOUS DUTY FROM -20°C TO +70°C THIRTY MINUTE WARM-UP REQUIRED AT -20°C	

#### II. INPUT SPECIFICATIONS

SPECIFICATION	UNITS	JFS2000-24	JFS2000-48
INPUT VOLTAGE RANGE	VAC	170-265 (47-63 Hz.)	
INPUT CURRENT (RMS)	A	12.0 AT 220VAC	
INPUT CURRENT (PEAK, AT COLD START)	A	70 AT 220VAC <sub>IN</sub>	
INPUT POWER (MAXIMUM)	W	2450 AT 170 VAC <sub>IN</sub>	
INPUT SURGE PROTECTION	—	COMPLIANT TO IEC1000-4-5, LEVEL 3 STANDARDS	
INPUT EMI, CONDUCTED EMISSIONS	—	FCC CFR PART 15, SUBPART J CLASS A STANDARDS EN55022 CLASS A STANDARDS	
EFFICIENCY AT $P_{OUTMAX}$	%	82 TYPICAL AT 170VAC <sub>IN</sub>	
POWER FACTOR CORRECTION AT $P_{OUTMAX}$	%	99 TYPICAL, PER IEC1000-3-2 STANDARDS	
INPUT CURRENT HARMONICS	—	COMPLIANT WITH EN60555-2 ABOVE TEN PERCENT RATED POWER	

#### III. OUTPUT SPECIFICATIONS

SPECIFICATION	UNITS	JFS2000-24	JFS2000-48
LINE AND LOAD REGULATION	%	±1 FROM NO LOAD TO FULL LOAD, 170-265VAC	
RIPPLE AND NOISE AT 20 MHz MEASUREMENT BANDWIDTH (0-70°C) PER EIAJ METHOD	mV	250 <sub>PEAK TO PEAK</sub>	500 <sub>PEAK TO PEAK</sub>
TEMPERATURE DRIFT	%	±2 OVER TEMPERATURE RANGE AND LIFE	
HOLD-UP TIME	ms	OUTPUT REMAINS ABOVE $V_{OUTMIN}$ LIMIT FOR 16ms UPON REMOVAL OF INPUT VOLTAGE AT $V_{in Nom}$ (220Vac)	
LOAD TRANSIENT RESPONSE (± 25% LOAD CHANGE)	—	RECOVERY TO WITHIN TWO PERCENT OF OUTPUT WITHIN 5ms.	
ESD SUSCEPTIBILITY	—	IEC1000-4-2 LEVEL 4 (8kV DIRECT DISCHARGE) STANDARDS	

#### IV. OPERATING MODES

DESCRIPTION	OPERATIONAL DEFINITION
PARALLEL OPERATION (ACTIVE CURRENT SHARE CONFIGURATION)	REFER TO JFS SERIES APPLICATION NOTES

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**FEATURES:**

**I. DC OUTPUT, CONTROLS AND INDICATORS**

DESCRIPTION	OPERATIONAL DEFINITION
OUTPUT VOLTAGE ADJUST	FACTORY SET AT 24VDC OR 48VDC. CONSULT FACTORY FOR ADJUSTMENT. IT IS RECOMMENDED THAT THE VOLTAGE ADJUST POTENTIOMETER BE SEALED WITH RTV SEALANT AFTER ADJUSTMENT TO PREVENT OUTPUT VOLTAGE DRIFT IN THE EVENT THAT THE UNIT IS SUBJECTED TO VIBRATION.
OVERVOLTAGE PROTECTION ADJUST	FACTORY SET AT 30VDC OR 60VDC. CONSULT FACTORY FOR ADJUSTMENT (NON LATCHING).
OUTPUT- GOOD INDICATOR	GREEN-COLORED LED ILLUMINATES WHEN THE OUTPUT VOLTAGE IS WITHIN THE SPECIFIED OPERATING RANGE.

**II. REMOTE CONTROL FEATURES**

DESCRIPTION	OPERATIONAL DEFINITION
REMOTE VOLTAGE SENSING	PROVIDES PRECISE REGULATION DIRECTLY AT LOAD. THE MAXIMUM TOTAL DC VOLTAGE DROP BETWEEN THE OUTPUT TERMINALS AND THE LOAD MUST BE LIMITED TO LESS THAN 1.0 VOLT.
REMOTE ON-OFF CONTROL	DC OUTPUT IS INHIBITED VIA A CONTACT CLOSURE BETWEEN PINS 7 AND 8 OF THE TERMINAL STRIP.
SIGNAL ISOLATION	REMOTE ON-OFF PINS ARE REFERENCED TO THE -V <sub>OUT</sub> TERMINAL.
REMOTE VOLTAGE CONTROL	ALLOWS ADJUSTMENT OF OUTPUT VOLTAGE USING EXTERNAL PROGRAMMING RESISTOR OR VOLTAGE SOURCE. REFER TO JFS SERIES APPLICATION NOTES; SEE FIGURES 3 AND 4 FOR CONNECTION DIAGRAMS.

**III. AUXILIARY MONITORING AND ALARM SIGNALS — OPTICALLY COUPLED, CONDUCTANCE OUTPUTS.**  
(CONDUCT UP TO 5mA AT A VOLTAGE OF LESS THAN 1.0VDC WHEN ACTIVE.)

DESCRIPTION	OPERATIONAL DEFINITION
AC FAIL SIGNAL	CONDUCTANCE SIGNAL WHICH INDICATES SUFFICIENT AC INPUT IS PRESENT TO PROVIDE A MINIMUM OF FIVE MILLISECONDS OF HOLD-UP TIME AFTER THE REMOVAL OF INPUT.
OUTPUT GOOD SIGNAL	CONDUCTANCE SIGNAL WHICH INDICATES THAT DELIVERED OUTPUT VOLTAGE, AS MEASURED AT THE +V AND -V TERMINALS IS WITHIN THE SPECIFIED OPERATING RANGE.
SIGNAL ISOLATION	SIGNALS ARE ISOLATED FROM POWER SUPPLY OUTPUT AND EACH OTHER FOR VOLTAGES UP TO 500VDC MAXIMUM AND 3000VAC ISOLATION FROM AC INPUT TO AUXILIARY SIGNALS.

## **JFS SERIES INSTRUCTION MANUAL**

### FEATURES (CONT'D)

#### IV. PROTECTION FEATURES

DESCRIPTION	OPERATIONAL DEFINITION
OVERCURRENT PROTECTION	OUTPUT CURRENT IS LIMITED TO APPROXIMATELY 110 PERCENT OF 50°C RATED POWER FROM $V_{OUTMAX}$ TO $V_{OUTNOM}$ . CURRENT LIMIT CHARACTERISTICS WILL PROVIDE FOLDBACK TO APPROXIMATELY 80 PERCENT OF RATED CURRENT BELOW $V_{OUTNOM}$ .
OVERVOLTAGE PROTECTION	INVERTER SHUTDOWN, NON-LATCHING. CONSULT FACTORY FOR ADJUSTMENT.
THERMAL PROTECTION (OVERTEMPERATURE PROTECTION)	SELF-RESETTING INVERTER SHUTDOWN.
ISOLATION VOLTAGES	3000VAC, INPUT TO OUTPUT 500VDC, OUTPUT TO CHASSIS GROUND 1500VAC, INPUT TO CHASSIS GROUND
LEAKAGE CURRENT (AC LINE TO CHASSIS GROUND)	LESS THAN 3.5mA WHEN OPERATED AT 250VAC (47-63Hz) OR LOWER VOLTAGES.
REGULATORY AGENCY COMPLIANCE	JFS SERIES POWER MODULES ARE COMPLIANT WITH THE FOLLOWING STANDARDS: <ul style="list-style-type: none"> <li>• UL1950</li> <li>• CSA 22.2-234</li> <li>• EN60950</li> <li>• CE MARKED FOR EUROPEAN COMMUNITY COMPLIANCE</li> <li>• IEC950</li> </ul>

#### V. MECHANICAL FEATURES

SPECIFICATION	UNITS	JFS2000-24	JFS2000-48
STORAGE TEMPERATURE (NON-OPERATING)	°C	-40 TO +85	
OPERATING TEMPERATURE	°C	-20 TO +70 WITH DERATING ABOVE +50 (-20 OPERATION REQUIRES A THIRTY MINUTE WARM-UP PERIOD)	
WEIGHT (NET)	LBS	10.0	
WEIGHT (SHIP)	LBS	11.0	
SIZE (L x W x H)	INCHES	12.75 x 5.00 x 5.55 (INCLUDES MOUNTING FLANGE)	
FINISH	—	GRAY	
MOUNTING	—	SEE OUTLINE DRAWING FOR MOUNTING	

#### VI. OTHER FEATURES

DESCRIPTION	DEFINITION
COOLING	FORCED AIR, FAN COOLED FROM THE FRONT OF THE POWER SUPPLY EXITING AT THE CONNECTOR END.
FUNGUS INERT	ALL JFS POWER SUPPLIES ARE INHERENTLY FUNGUS INERT.
GUARANTEE	FIVE YEARS FROM THE TIME OF DELIVERY, PARTS AND LABOR.

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### **VII. CONNECTOR INFORMATION**

<b>SENSING AND SIGNAL</b>	<b>DESIGNATION</b>	<b>DESCRIPTION</b>
1	+S	+SENSE CONNECTION. CONNECT TO +V TERMINAL OF LOAD FOR REMOTE-SENSING. CONNECT TO +LS FOR LOCAL SENSING.
2	+LS	+LOCAL SENSE CONNECTION
3	-LS	-LOCAL SENSE CONNECTION
4	-S	-SENSE CONNECTION. CONNECT TO -V TERMINAL OF LOAD FOR REMOTE-SENSING. CONNECT TO -LS FOR LOCAL SENSING.
5	PROG	JUMPER TO PIN 4 (-S) FOR INTERNAL PROGRAMMING. ALLOWS FOR REMOTE, EXTERNAL PROGRAMMING VIA INSERTION OF RESISTOR BETWEEN THE PROGRAMMING PIN AND PIN 4 (-S).
6	ISHARE	CURRENT SHARE BUSS
7	INTLK 1	FUNCTIONS TO ENABLE AND DISABLE THE INVERTER OF THE POWER SUPPLY. A DIRECT SHORT TO INTERLOCK 2 (PIN 8) THROUGH A CONTACT CLOSURE WILL INHIBIT THE UNIT. AN OPEN CIRCUIT TO INTERLOCK 2 WILL ENABLE POWER SUPPLY.
8	INTLK 2	(SEE DESCRIPTION, PIN 7)
9	AC FAIL 1	2 TRANSISTOR "DARLINGTON" OUTPUT SIGNAL INDICATING THAT A FAULT CONDITION HAS OCCURRED ON THE AC LINE. THIS PIN REPRESENTS THE COLLECTOR CAPABLE OF SINKING UP TO 5mA WITH 20 VOLTS MAXIMUM APPLIED FROM COLLECTOR TO EMITTER.
10	AC FAIL 2	REPRESENTS THE EMITTER OF THE 2 TRANSISTOR "DARLINGTON" OUTPUT CAPABLE OF SINKING UP TO 5mA WITH 20 VOLTS MAXIMUM APPLIED FROM COLLECTOR TO EMITTER.
11	DC GOOD 1	2 TRANSISTOR "DARLINGTON" OUTPUT SIGNAL INDICATING THE OUTPUT IS PRESENT. THIS PIN REPRESENTS THE COLLECTOR CAPABLE OF SINKING UP TO 5mA WITH 20 VOLTS MAXIMUM APPLIED FROM COLLECTOR TO EMITTER.
12	DC GOOD 2	REPRESENTS THE EMITTER OF THE 2 TRANSISTOR "DARLINGTON" OUTPUT CAPABLE OF SINKING UP TO 5mA WITH 20 VOLTS MAXIMUM APPLIED FROM COLLECTOR TO EMITTER.

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### Lambda JFS Series Safety and Installation Instructions for Lambda Model JFS2000

To comply with published safety standards; the following instructions must be used in conjunction with the Lambda JFS Series:

For earth fault protection, the unit must be protected in the final installation by suitable overcurrent protection means. If protection relies upon building wiring, the end product installation must ensure that the necessary protection is provided.

The internal fuse F101 may only be replaced with Littelfuse type JLLN-35 rated at 35A, 300VAC.

The internal fuse F601 may only be replaced with a Littelfuse type 324015 rated at 15A, 250VAC.

The power supply is intended for use as a component of other equipment. When installing the power supply, the relevant safety standards (EN60950, IEC950, UL1950 or CSA-22.2-950) must be complied with.

In particular, creepage and clearance distances and distances through insulation between primary and earth or primary and secondary must be maintained.

The power supply output is SELV in accordance with requirements IEC-950. The output available has power greater than 240VA.

The CE mark on the product is applied to show conformance with the requirements outlined in the European Union's Low Voltage Directive [72/23/EEC] as amended by the CE Mark Directive [93/68/EEC].

The maximum ambient temperature of the operating environment must not exceed 50°C at 2000W, 60°C at 1500W or 70°C at 1000W.

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### Sicherheits und Installationsanleitung für Lambda Modell JFS2000

Die folgende Sicherheitshinweise müssen bei der Verwendung der Netzteile beachtet werden:

Gegen Isolationsfehler zum Schutzleiter muß in der Endanwendung eine angemessene Absicherung vorgenommen werden. Falls die Absicherung durch die Gebäudeinstallation erfolgt, muß beim Einbau in das Endgerät entsprechend darauf hingewiesen werden.

Die interne Sicherung F101 darf nur gegen den gleichen Typ mit gleichen Werten ausgetauscht werden. Es ist die Sicherung Littelfuse Typ JLLN-35 mit 35A und 300VAC zu verwenden.

Die interne Sicherung F601 darf nur gegen den gleichen Typ mit gleichen Werten ausgetauscht werden. Es ist die Sicherung Littelfuse Typ 324015 mit 15A und 250VAC zu verwenden.

Das Netzteil ist nur als Baugruppe zum Einbau in Endgeräte vorgesehen und nicht zur eigenständigen Verwendung. Beim Einbau in Endgeräte sind die entsprechenden Sicherheitsbestimmungen (z. B. EN 60950, IEC-950, UL-1950, CSA 22.2-950) zu beachten.

Im Speziellen ist auf das Einhalten ausreichender Kriech- und Luftstrecken sowie Isolationsabständen zwischen dem Primaer- und Sekundaerkreis sowie zum Schutzleiter zu achten.

Das Netzteil liefert eine SELV-Spannung in Uebereinstimmung mit IEC-950. Die verfügbare Ausgangsleistung ist größer als 240VA.

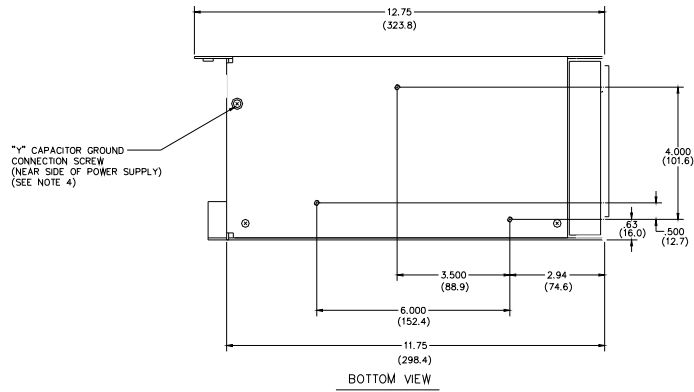
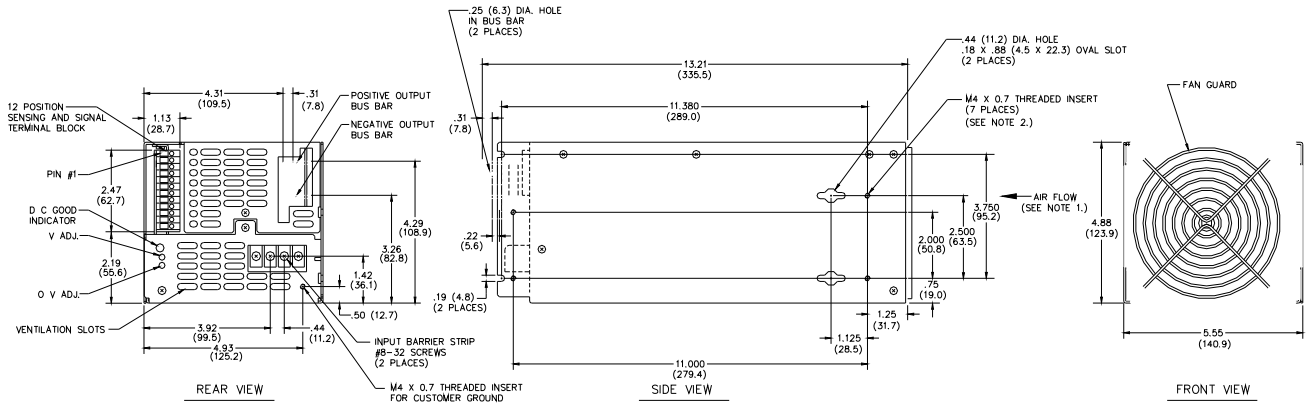
Das CE-Konformitätszeichen auf dem Produkt zeigt die Uebereinstimmung mit den Anforderungen der EG-Niederspannungs-Richtlinie [72/23/EWG] und der Ergänzung [93/68/EWG].

Die maximale Arbeitsumgebungstemperatur darf 50°C bei 2000W, 60°C bei 1500W und 70°C bei 1000W nicht ueberschreiten.

Die Sicherung muß im L-Leiter (Phase) eingefuegt werden.



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- NOTE:**
1. CUSTOMER MUST PROVIDE ADEQUATE CLEARANCE AT FRONT AND REAR SURFACES FOR AIR FLOW.
  2. CUSTOMER MOUNTING SCREWS (M4 X 0.7) MUST NOT PROTRUDE INTO THE POWER SUPPLY BY MORE THAN .25 (6.3)
  3. DIMENSIONS ARE IN INCHES EXCEPT DIMENSIONS IN ( ) ARE IN MM.
  4. REMOVE SCREW TO DISCONNECT INPUT \*Y\* CAPACITOR TO REDUCE INPUT LINE LEAKAGE CURRENT. REMOVAL OF THIS SCREW WILL AFFECT EMI.

TABLE OF WEIGHTS		
MODEL	NET (LBS.)	SHIPPING (LBS.)
JFS2000 SERIES	10 (LBS.)	11 (LBS.)
JFS1500 SERIES	10 (LBS.)	11 (LBS.)

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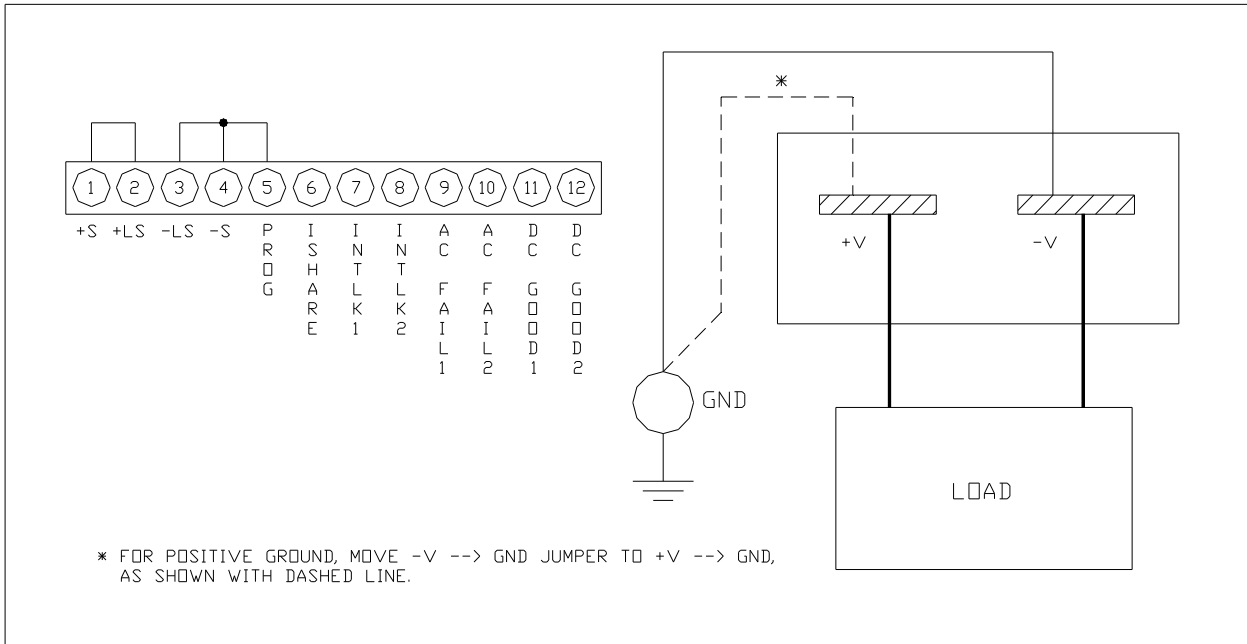


FIGURE 1: TYPICAL LOCAL SENSE CONNECTION

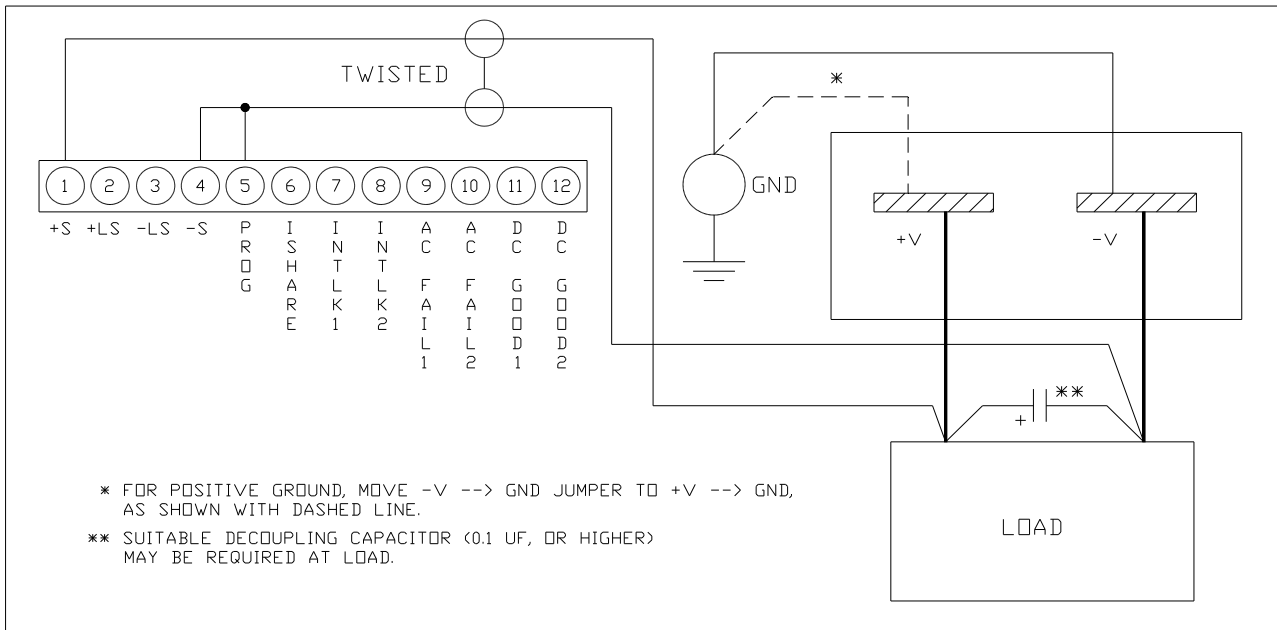


FIGURE 2: TYPICAL REMOTE SENSE CONNECTION

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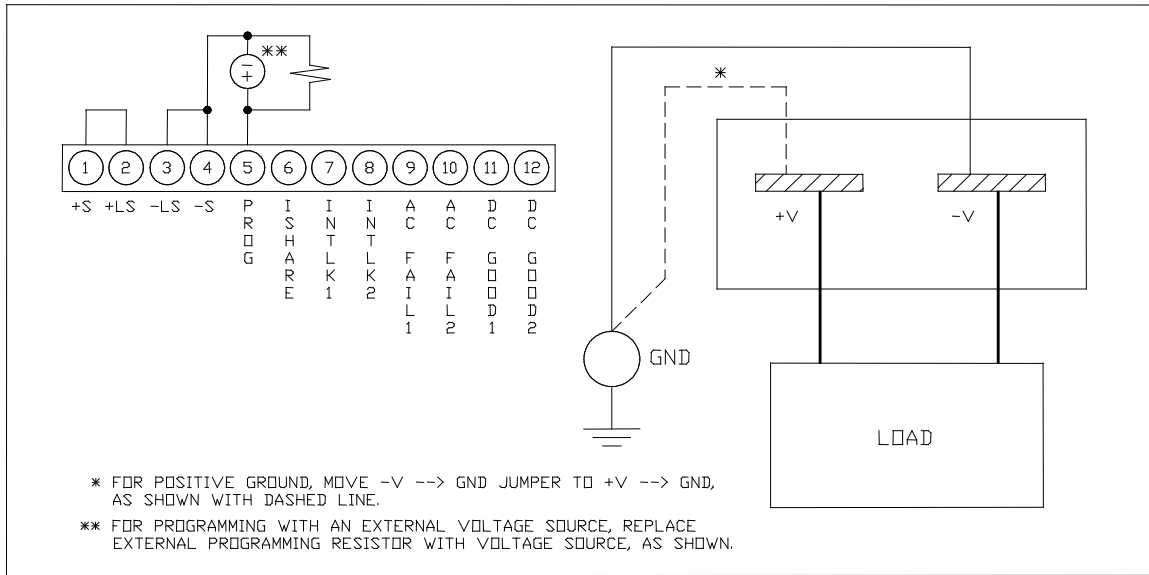


FIGURE 3: REMOTE VOLTAGE CONTROL WITH AN EXTERNAL PROGRAMMING RESISTOR OR VOLTAGE SOURCE (LOCAL SENSING)

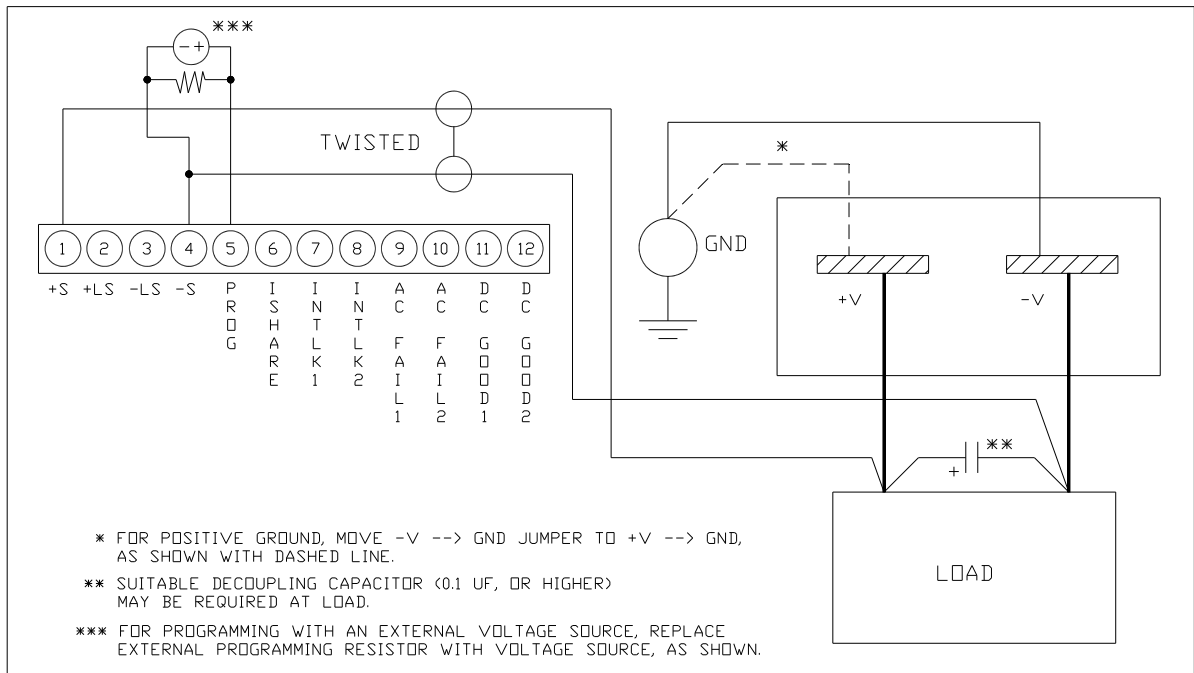
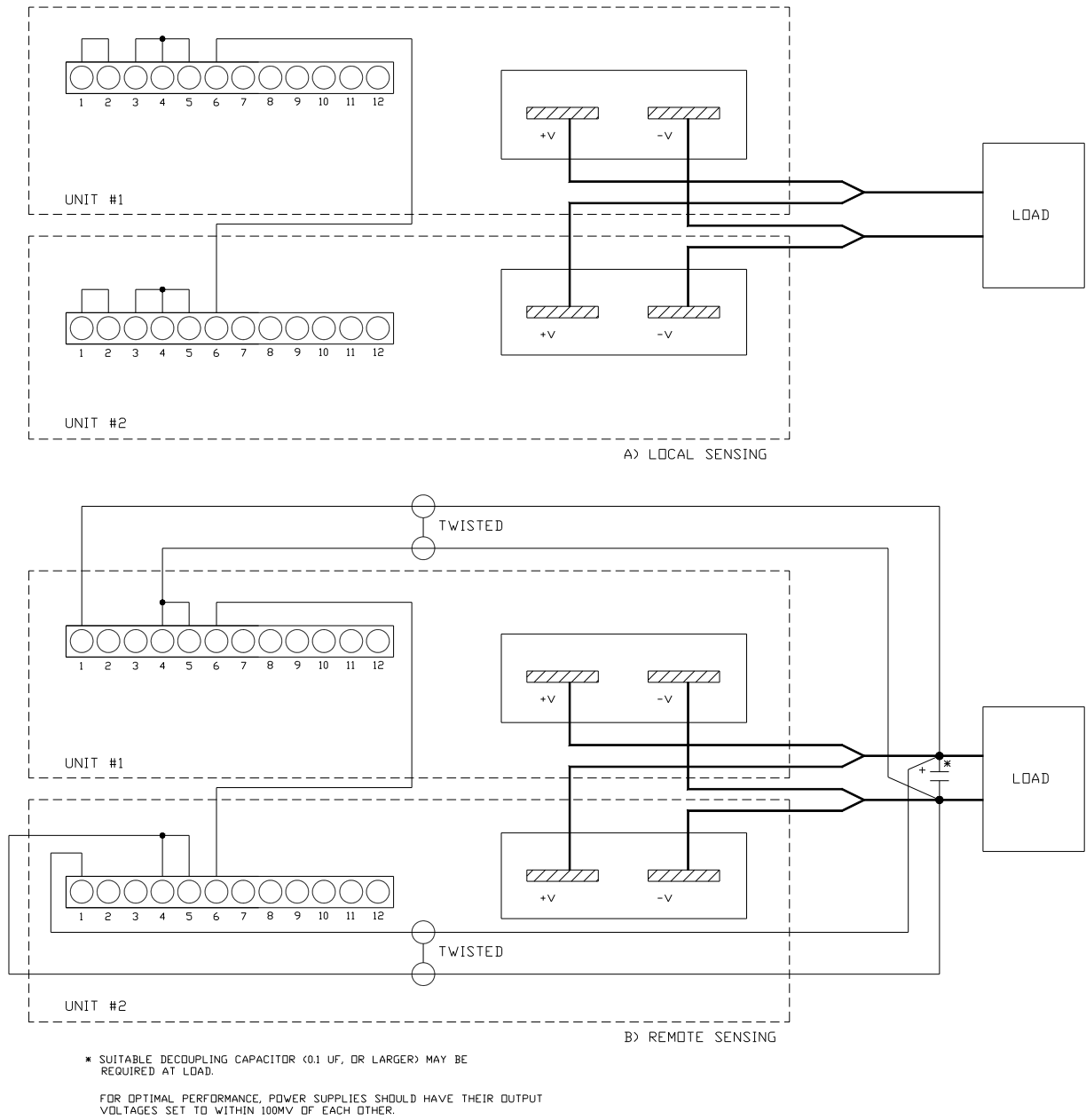


FIGURE 4: REMOTE VOLTAGE CONTROL WITH AN EXTERNAL PROGRAMMING RESISTOR OR VOLTAGE SOURCE (REMOTE SENSING)

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**FIGURE 5: PARALLEL OPERATION**