RFL Electronics Inc.

INSTRUCTION DATA

RFL 9125B 25-Watt Power Supply Modules

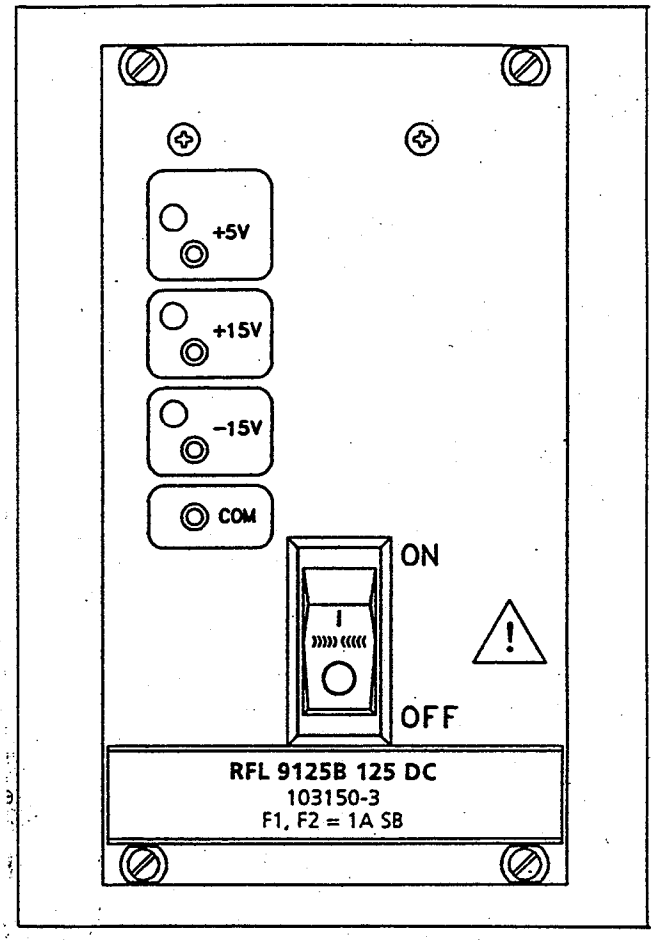


Figure 1. Typical RFL 9125B 25-Watt Power Supply Module

DESCRIPTION

RFL 9125B 25-Watt Power Supply Modules (Fig. 1) are used to supply regulated dc power to RFL communications equipment installed vertically in the RFL 98 CHAS 3U Single-Euro Chassis.

RFL 9125B power supply modules provide three regulated outputs: +5, +15, and -15 volts. Switching regulators are used for high efficiency. All outputs have overvoltage protection and short circuit protection; in addition, the entire power supply will shut down if the ambient temperature exceeds a pre-established limit.

The RFL 9125B is available in a wide range of dc input voltages to suit virtually all applications. Table 1 summarizes the differences between the various models; model numbers appear on the module handle on the front panel.

Table 1. Differences between RFL 9125B 25-Watt Power Supply Modules

Model Number	Assembly Number	Maximum Input Voltage	Input Current *
9125B 24 DC	103150-1	19 to 29 Vdc	2.4 A
9125B 48 DC	103150-2	38 to 58 Vdc	1.0 A
9125B 125 DC	103150-3	103 to 158 Vdc	440 mA

* Maximum current is drawn when power supply module is operating at full load with minimum voltage present at its input terminals.

SPECIFICATIONS

As of the date this Instruction Data Sheet was published, the following specifications apply to all RFL 9125B 25-watt power supply modules, except where indicated. Because all RFL products undergo constant refinement and improvement, these specifications are subject to change without notice.

Input Voltage: See Table 1.

Output Voltages And Currents:
+5-Volt Supply: +4.75 to +5.25 volts @ 3 A
+15-Volt Supply: +14.25 to +15.75 volts @ 1.2 A
-15-Volt Supply: -14.25 to -15.75 volts @ 0.5 A

NOTE

Output voltage variations given are over the specified temperature range of the supply, with the load current varied between 10 and 100 percent of the full-load rating.

Total Output Power: 25 watts maximum.

Efficiency: Greater than 65 percent at full load and nominal line voltage.

Output Ripple (any output): Less than 100 mVp-p.

Temperature Protection: The input converter will shut down at circuit board temperatures greater than +95°C and (+203°F).

Undervoltage Protection: Supply will not be damaged by input voltages below the minimum specified; the supply may or may not operate.

Overvoltage Protection: The input converter will shut down if the 5-volt output rises to +6.25 volts, or if either 15-volt output rises to 18.75 volts.

Overcurrent Protection:
Input Converter: The input converter senses peak switch currents, and will shut down on a pulse-by-pulse basis. The peak currents are as follows:
RFL 9125B 24 DC: 9.0 amperes.
RFL 9125B 48 DC: 4.5 amperes.
RFL 9125B 125 DC: 2.25 amperes.
Output Regulators: Each output section has a "foldback" current-limit feature. Short-circuit current is equal to 45 percent of the peak current limit for each output:
+5-Volt Supply: 3.75 amperes.
+15-Volt Supply: 1.5 amperes.
-15-Volt Supply: 0.7 amperes.

Isolation: Can withstand a 2500-Vdc test voltage for one minute.

Surge Withstand Capability: Meets the requirements of ANSI/IEEE C37.90.1.198X.

Operating Temperature: -30°C to +70°C (-22°F to +158°F).

Dimensions: 5.1 inches x 2.8 inches x 8.8 inches (130 mm x 71 mm x 225 mm; occupies twelve horizontal positions (12E) in a Single-Euro chassis.

CAUTION

Before installing an RFL 9125B power supply module, make sure the available input voltage matches the input requirements of the RFL 9125B; this can be determined by checking the model designator on the module handle against the information in Table 1. If the wrong voltage is connected to the RFL 9125B, component damage will result, either on the power supply module itself or on other modules installed in the chassis.

INSTALLATION

The RFL 9125B is a double-width module that requires four standard positions in a Single-Euro Chassis. RFL 9125B modules furnished as part of a system are installed at the factory; the following instructions are provided for installing an RFL 9125B in an existing system.

INTERCONNECT WIRING

Wiring connections can be made to the RFL 9125B through the chassis motherboard or a free-standing 64-pin mating DIN connector, using the wiring assignments shown in Figure 2.

If the RFL 9125B module is being installed in a chassis that has no motherboard, an RFL 98 PS I/O Power Supply I/O Module (RFL P/N 102025) must be installed behind the RFL 9125B. All interconnect wiring connections are then made to the terminal blocks on the I/O module, as shown in Figure 3.

CAUTION

All RFL 9125B power supply modules must be securely connected to chassis ground. If they are not properly grounded, accidental static discharges may cause the supply to shut down.

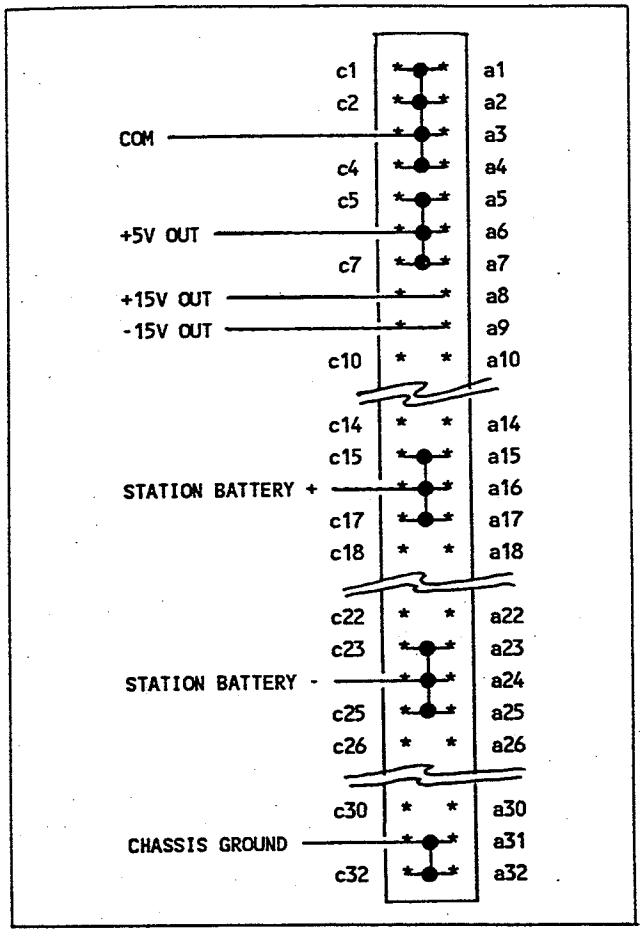


Figure 2. Edge connector terminal assignments, RFL 9125B **PS 25-Watt Power Supply Modules

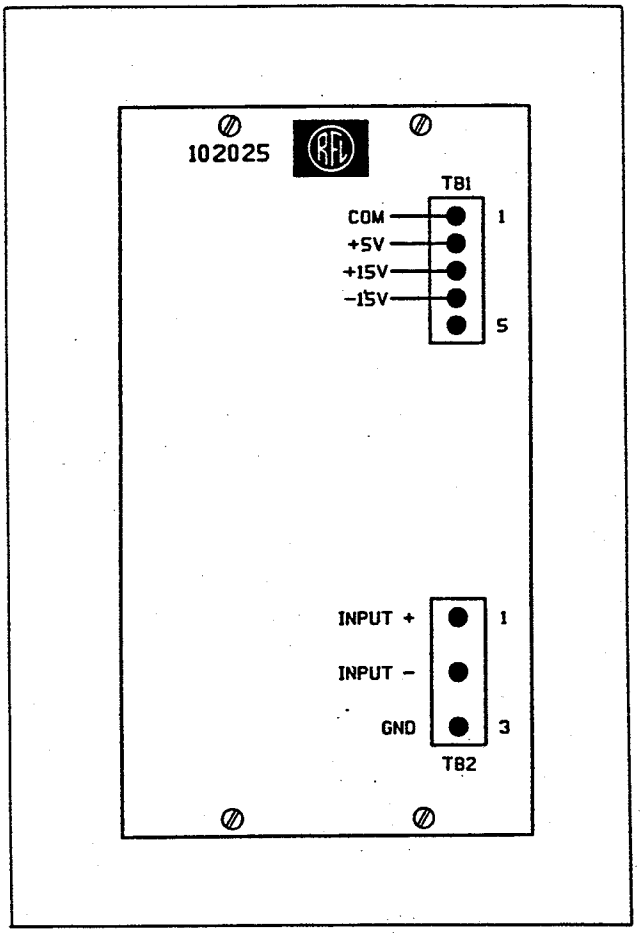


Figure 3. Wiring assignments for RFL 9125B **PS 25-watt Power Supply Modules using RFL 98 PS I/O module

INSERTING THE MODULE INTO THE CHASSIS

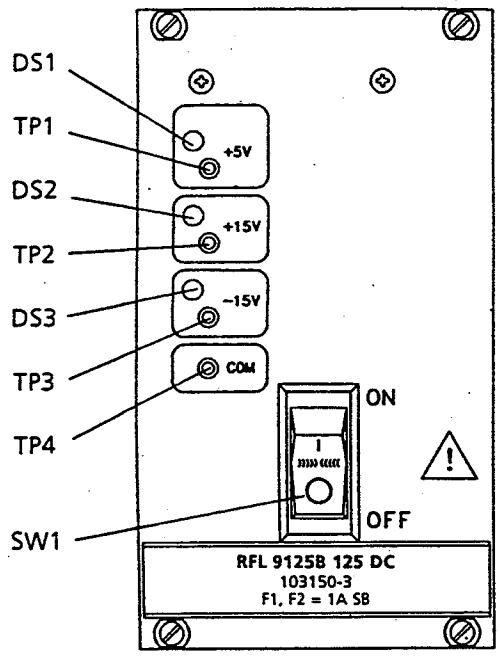
Once all interconnections have been made, the RFL 9125B can be inserted into the chassis. Push it all the way in and then use a flat-blade screwdriver to turn the four quarter-turn fasteners on its front panel to secure it in place.

OPERATION

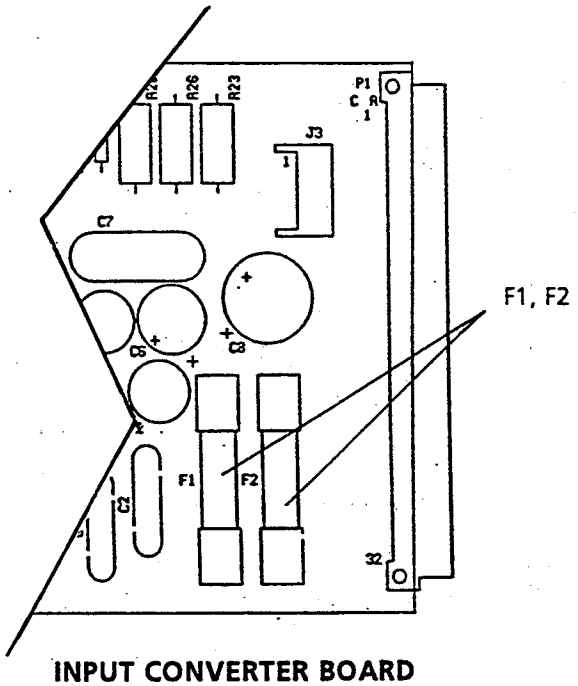
Once an RFL 9125B is installed, it is ready for continuous operation. When power switch S1 on the front panel is placed in the ON position, the RFL 9125B will produce three output voltages, which will be distributed through the interconnect wiring to the other modules in the chassis.

Indicators on the front panel will light when the three power supplies in the RFL 9125B are functioning properly, and test jacks are provided for monitoring the output voltages. Fuses are provided on the main circuit board for input current protection. Figure 4 shows the location of all front panel controls and indicators, which are described in Table 2.

The RFL 9125B is equipped with several protection circuits. These circuits will cause the module to shut down if its voltage, current, or temperature limits are exceeded. If the RFL 9125B has shut down, the fault must be cleared. If nothing is found in the rest of the chassis and the RFL 9125B is still shut down, the RFL 9125B may be defective, and should be serviced.



FRONT PANEL



INPUT CONVERTER BOARD

Figure 4. Controls and indicators, RFL 9125B 25-Watt Power Supply Modules

Table 2. Controls and indicators, RFL 9125B 25-Watt Power Supply Modules

Circuit Symbol	Name	Function
F1,F2	Input fuses	Protect input converter board against excessive input current. (See Table 3 on page 8 for ordering information.)
DS1	+5V indicator	Lights when +5-volt supply is functioning.
DS2	+15V indicator	Lights when +15-volt supply is functioning.
DS3	-15V indicator	Lights when -15-volt supply is functioning.
SW1	Power switch	Applies input power to the input converter board; serves as power switch for entire chassis.
TP1	+5V test point	Allows output of +5-volt supply to be monitored.
TP2	+15V test point	Allows output of +15-volt supply to be monitored.
TP3	-15V test point	Allows output of -15-volt supply to be monitored.
TP4	COM test point	Ground point.

THEORY OF OPERATION

RFL 9125B 25-Watt Power Supply Modules convert the available dc input power into three dc voltages: +5, +15, and -15. All models are very similar, though some component values change for different input voltage ratings. Each module contains input protection circuits, a dc-dc converter, three switching regulators with independent current-limit thresholds, and additional circuits for thermal and overvoltage protection. A block diagram appears in Figure 5.

NOTE

Throughout the following theory of operation discussion IC pin numbers are indicated by the circuit symbol number, followed by a dash and the pin number (U1-1, U1-2, etc). Signal names appear in CAPITAL letters (SENSE, OUT, etc).

INPUT PROTECTION CIRCUITS

The dc input voltage is applied to the RFL 9125B through fuses F1 and F2 and POWER switch S1. Resistor R1 limits inrush current when S1 is first closed. Transient suppressor CR1 eliminates high-voltage spikes that may appear on the dc input line; it will act as a forward-biased diode to blow F1 or F2 if the dc input polarity is reversed.

Inductors L1, L2, and L3 and their associated components form a low-pass filter. This filter prevents line transients from damaging the dc-dc converter circuit, and reduces the dc-dc converter pulsating current that may be fed back to the dc power source.

DC-DC CONVERTER

The dc input voltage is applied to the primary center-tap of transformer T1. Power transistors Q1 and Q2 are connected in a push-pull arrangement, and drive T1 with a 44-kHz square wave. This square wave is generated by pulse width modulator U1. Power for U1 is dropped to 15 volts by resistor R3 and Zener diode CR8. U1 alternately turns on Q1 and Q2 at the 44-kHz rate. Each power transistor is turned on for half of the time, except for a 2-µs dead time that prevents both transistors from being on at the same time.

The drain voltages on Q1 and Q2 are clamped to a safe limit by capacitor C9 and diodes CR4 and CR5. Because of this clamping action, the inductive stored energy spike normally produced as the transistor turns off will be squelched.

U1 also regulates the output current, and is used by the overvoltage detector to shut down the power supply if the output voltage exceeds an established limit. The voltage across resistor R2 is a function of the currents through Q1 and Q2, because their sources are returned to the input common bus through R2.

A moderate amount of excessive current will be sensed at U1-4, and U1 will respond by reducing the pulse width of the signal used to drive Q1 and Q2 until the current is back within limits. Larger and potentially damaging currents will be sensed at U1-16; this will trigger a latch inside U1 that will turn off the gate drive circuits. The dc-dc converter will be shut off; once it is off, a soft-start sequence will be initiated, during which pulse widths are gradually increased until they are again at their maximum.

If an excessive current is sensed again at U1-16, the latch will be triggered again and the soft-start sequence will be repeated. This process will continue indefinitely or until the fault has been cleared.

Optical isolator U2 is also used to drive U1-16. Its input is driven by U3, which acts as the overvoltage and high-temperature detector. When U3 detects a fault, it turns on an LED inside U2, which turns on a phototransistor inside U2. The phototransistor pulls U1-16 high, shutting down the dc-dc converter and initiating the soft-start cycle.

The dc-dc converter and its input voltage lines are dielectrically isolated from the output circuits. There are only two interfaces between the input and output circuits: T1, which couples energy from the dc-dc converter to the output regulators, and U2, which tells U1 to shut down if a fault is detected.

FULL-WAVE BRIDGE RECTIFIER

Transformer T1's secondary drives full-wave bridge rectifier CR6 and CR7. The secondary is center-tapped, so there are two positive-polarity dc output voltages; the voltage at the center tap is approximately half the bridge output voltage. The bridge output drives the +15-volt regulator, and the center tap drives the +5-volt and -15-volt regulators.

Inductors L4 and L5 limit the inrush current to the large, down-stream filter capacitors. This is required for soft-start to proportion the output voltage as the pulse width to the gates of Q1 and Q2 is increased.

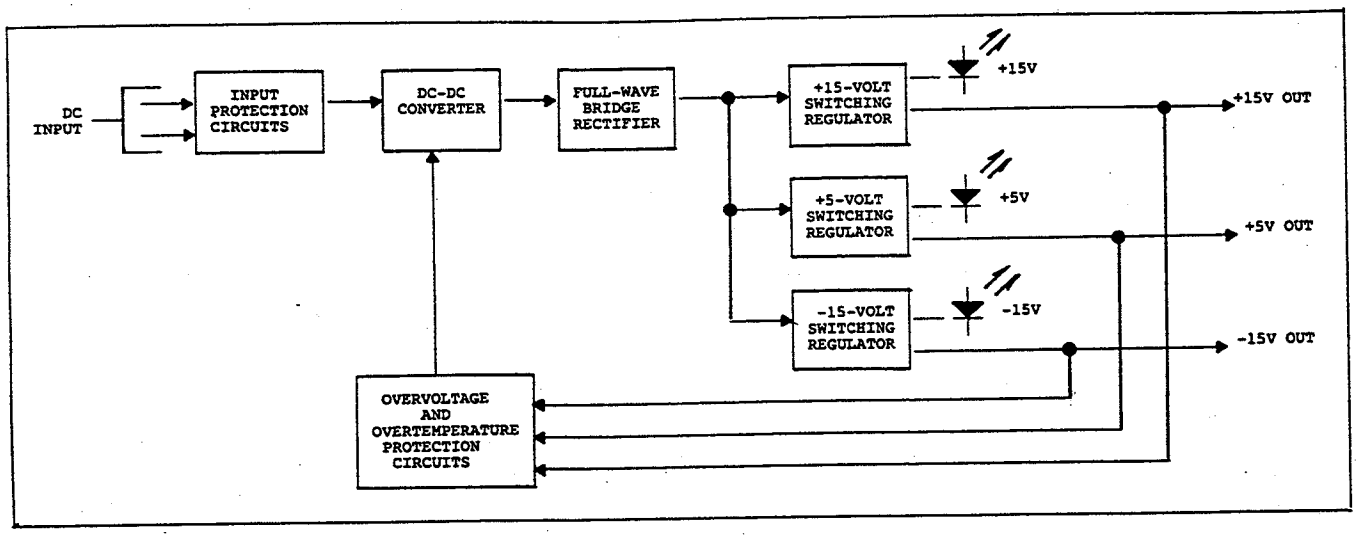


Figure 5. Block diagram, RFL 9125B 25-Watt Power Supply Modules

SWITCHING REGULATORS

Switching regulators U4, U5, and U6 accept the unregulated voltage produced by the dc-dc converter and produce three regulated outputs: +5, +15, and -15 volts. The regulators have their own built-in short circuit and overtemperature protection.

+5-Volt Regulator

U4 is the +5-volt switching regulator. It is configured as a standard buck converter and operates at 100 kHz. Its input voltage is supplied by T1's secondary center-tap. Capacitor C30 filters out input ripple, and supplies a low impedance to U4's input. Inductor L6, capacitor C34, and diode CR12 are used for energy storage and steering. Inductor L7 and capacitor C35 reduce output ripple. Diode CR14 protects the circuit from reverse voltage that might be fed back from the external load.

In addition, the 5-volt switching regulator has an external "foldback" current limit circuit. Transformer T2 senses current in steering diode CR12. Diode current during regulator "switchoff" time is directly proportional to output current. T2 provides 1/100th of the diode current to R46 when CR12 conducts. The voltage across R46 needed to current-limit the regulator is a function of R45, Q3, and R44.

+15-Volt Regulator

U6 is the +15-volt switching regulator. It is also configured as a standard buck converter, and also operates at 100 kHz. Its input voltage is supplied by the bridge rectifier. Capacitor C44 filters out input ripple and supplies a low impedance to U6's input. Inductor L10, capacitor C48, and diode CR21 are used for energy storage and steering. Inductor L11 and capacitor C49 reduce output ripple. Diode CR23 is used to protect the circuit from reverse voltage that might be fed back from the external load.

In addition, the +15-volt switching regulator has an external "foldback" current limit circuit. Transformer T4 senses current in steering diode CR20. Diode current during regulator "switchoff" time is directly proportional to output current. T4 provides 1/100th of the diode current to R68 when CR21 conducts. The voltage across R68 needed to current-limit the regulator is a function of R67, Q8, and R66.

-15-Volt Regulator

U5 and its associated components form the -15-volt switching regulator. This regulator converts positive dc voltage to a negative value.

When U5 switches on, the positive voltage across capacitor C36 charges inductor L8; when U5 turns off, the energy in L8 creates a reverse voltage that is coupled through diode CR17 to the output. The on/off duty cycle controls the output voltage; inductor L9 and capacitor C43 reduce output ripple. Diode CR19 protects the circuit from any reverse voltage that might be fed back from the external load.

In addition, the -15-volt switching regulator has an external "foldback" current limit circuit. Transformer T3 senses current in steering diode CR17. Diode current during regulator "switchoff" time is directly

proportional to output current. T3 provides 1/100th of the diode current to R60 when CR17 conducts. The voltage across R60 needed to current-limit the regulator is a function of R59, Q7, and R58.

The -15-volt regulator would draw more current if the input voltage were to fall below the specified limit. This will not damage the regulator, because it is overcurrent protected, but the regulator might not start. To avoid this, transistors Q5 and Q6 and their associated components keep U5 shut off until the input voltage rises to a usable level. As the input voltage rises, resistor R50 causes Q6 to conduct and clamp U5-2, turning the regulator off. When the input voltage reaches a usable level, Zener diode CR15 conducts, turning Q5 on; this turns Q6 off, removing the clamp from U5-2 and allowing U5 to start operating.

The -15-volt regulator could also draw excessive current during the first few milliseconds of start-up because the voltage fed to the switching inductor is on for most of the switching period. On-time is reduced when the output voltage reaches -15 volts. Excessive start-up current produces a voltage across resistor R48, which will turn on transistor Q4. This will reduce U5's on time (and start-up current) by forcing its sense input high through resistor R53.

Output Loading

The switching regulators require a small amount of loading for proper operation. Resistors R23, R25, and R26 provide this loading for the three regulators, in case the external loads are light or disconnected. Additional loading current is drawn by front panel indicators DS1, DS2, and DS3, which monitor the dc outputs. A test point is provided on the front panel for each dc output, along with an output common test point.

OVERVOLTAGE AND OVERTEMPERATURE PROTECTION CIRCUIT

U3 and its associated components are used to detect overvoltage and overtemperature conditions. If a fault is detected, U3's output (U3-9) will go low, shutting down the dc-dc converter through optical isolator U2.

Overvoltage Sensing

U3 contains an internal +2.5-volt reference. The outputs of the three switching regulators are dropped through voltage dividers and compared to this reference. If any of the divider outputs exceed the reference voltage, U3-9 will be pulled low, shutting down the dc-dc converter. Resistors R19 and R20 form the divider for the +5-volt output, resistors R21 and R22 are divider for the +15-volt output, and the divider for the -15-volt output is formed from resistors R17 and R18.

Overtemperature Sensing

Thermistor RT1 constantly monitors the surface temperature of the circuit board. It has a negative temperature coefficient, and forms a voltage divider along with resistors R16 and R24. This voltage divider is driven by 5.1-volt Zener diode CR9. If the surface of the board reaches about +95°C (+203°F), the voltage at U3-14 will reach 2.5 volts. This will cause U3-9 to go low, shutting down the dc-dc converter.

Table 3. Replaceable parts, RFL 9125B 25-watt Power Supply Modules
(See Table 1 for Assembly Numbers.)

Circuit Symbol (See Figs. 6 to 8.)	Description	Part Number
	CAPACITORS	
C1,2	Capacitor,ceramic disc,0.005µF,20%,3kV,Centralab DD30-502 or equiv.	1007 1264
C3,5,7	Capacitor,metallized polypropylene,0.47µF,10%,250V,radial leads, Illinois Capacitor 474MPR250K or equiv.	1007 1693
C4,6	Capacitor,electrolytic,radial leads, value dependent upon model:	
	RFL 9125B 24 DC: 220µF,20%,50V,Illinois Capacitor 227RMR050M or equiv.	1007 1718
	RFL 9125B 48 DC: 33µF,20%,250V,Illinois Capacitor 336RMR250M or equiv.	1007 1716
	RFL 9125B 125 DC: 100µF,20%,100V,Illinois Capacitor 107RMR100M or equiv.	1007 1717
C8	Capacitor,electrolytic,radial leads, value dependent upon model:	
	RFL 9125B 24 DC: 470µF,20%,50V,Illinois Capacitor 477RMR050M or equiv.	1007 1721
	RFL 9125B 48 DC: 220µF,20%,100V,Illinois Capacitor 227RMR100M or equiv.	1007 1720
	RFL 9125B 125 DC: 22µF,20%,250V,Illinois Capacitor 226RMR250M or equiv.	1007 1726
C9	Capacitor,metallized polypropylene,0.033µF,10%,400V,radial leads, Illinois Capacitor 333MPR400K or equiv.	1007 1694
C10	Capacitor,ceramic,0.0022µF,5%,100V,AVX SA301A222JAA or equiv.	0125 12225
C11,14,31,39,45	Capacitor,X7R ceramic,0.1µF,10%,50V,AVX SA305C104KAA or equiv.	0130 51041
C12	Capacitor,tantalum,4.7µF,10%,35V,Kemet T322C475K035AS or equiv.	1007 1623
C13	Capacitor,polyester,0.012µF,2%,100V,Wesco 32P or equiv.	5115 39
C15	Capacitor,tantalum,15µF,20%,20V,Kemet T322D156M020AS or equiv.	1007 716
C16	Capacitor,metallized polycarbonate,0.047µF,2%,200V,Wesco 32MPC or equiv.	1007 1196
C17	Capacitor,X7R ceramic,0.01µF,10%,50V,AVX SA105C103KAA or equiv.	0130 51031
C18,38	Capacitor,tantalum,1µF,20%,35V,Kemet T322B105M035AS or equiv.	1007 496
C19	Capacitor,polypropylene,0.0049µF,2%,100V,F-Dyne PPA-11-.0049-100-2 or equiv.	0105 69
C20-29	Not used.	
C30,36,42,48	Capacitor,electrolytic,470µF,20%,35V,radial leads,Illinois Capacitor 477RZS035M or equiv.	1007 1722
C32,40,46	Capacitor,tantalum,2.2µF,20%,25V,Kemet T322B225M025AS or equiv.	1007 645
C33,41,47	Capacitor,X7R ceramic,0.022µF,10%,50V,AVX SA105C223KAA or equiv.	0130 52231
C34	Capacitor,electrolytic,1000µF,20%,16V,radial leads,Illinois Capacitor 108RZS016M or equiv.	1007 1723
C35	Capacitor,tantalum,220µF,20%,10V,Kemet T350L227M010AS or equiv.	1007 1684
C37	Capacitor,tantalum,4.7µF,10%,50V,axial leads,Kemet T322D475K050AS or equiv.	1007 1727
C43,49	Capacitor,tantalum,47µF,10%,20V,radial leads,Kemet T353K476K020AS or equiv.	1007 1715
C44	Capacitor,electrolytic,100µF,20%,63V,radial leads,Illinois Capacitor 107RZS063M or equiv.	1007 1696
	RESISTORS	
R1	Resistor,wirewound,value and power rating dependent upon model:	
	RFL 9125B 24 DC: 0.5Ω,10%,5W,Clarostat Type VC5E or equiv.	1100 808
	RFL 9125B 48 DC: 2Ω,5%,5W,Clarostat Type VC5E or equiv.	1100 809
	RFL 9125B 125 DC: 0.5Ω,10%,3W,Clarostat Type VC3D or equiv.	1100 807
R2	Resistor,wirewound,value and power rating dependent upon model:	
	RFL 9150B 24 DC: 0.13Ω,10%,3W,Clarostat Type VC3D or equiv.	1100 805
	RFL 9125B 48 DC: Same as R48.	
	RFL 9125B 125 DC: 3KΩ,5%,10W,Ohmite 4835 Style 995-10A or equiv.	1100 410
R3	Resistor,wirewound,value and power rating dependent upon model:	
	RFL 9125B 24 DC: 100Ω,5%,10W,Clarostat Type VC10F or equiv.	1100 811
	RFL 9125B 48 DC: 750Ω,5%,10W,Clarostat Type VC10F or equiv.	1100 812
	RFL 9125B 125 DC: 4Ω,5%,5W,Clarostat Type VC5E or equiv.	1100 810

Table 3. Replaceable parts, RFL 9125B 25-watt Power Supply Modules - continued.

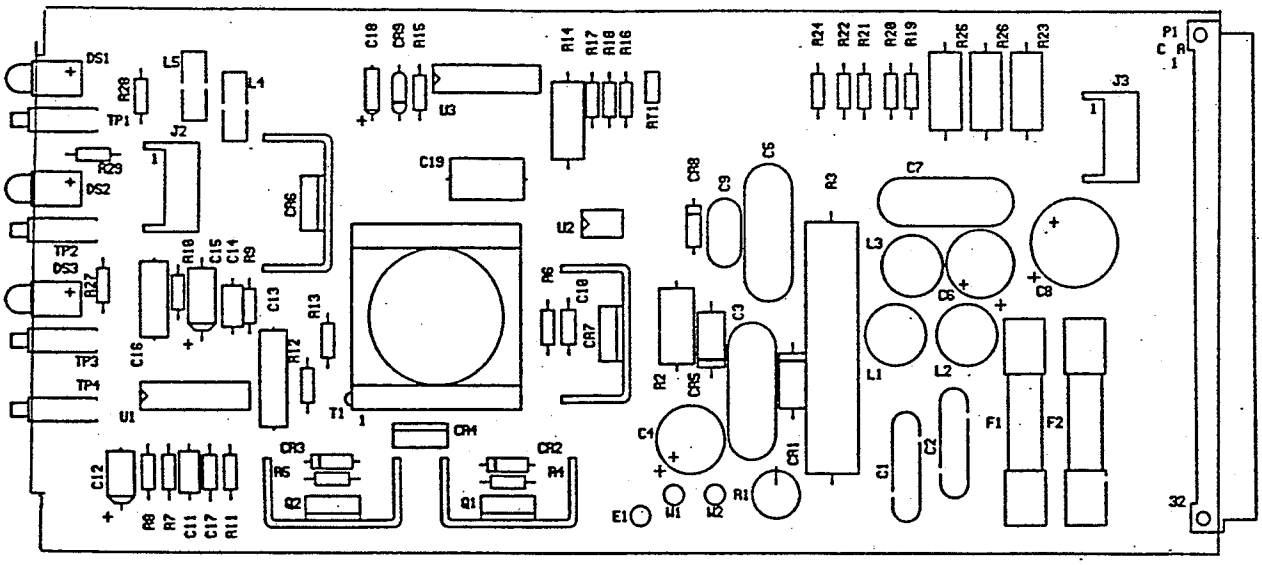
Circuit Symbol (See Figs. 6 to 8.)	Description	Part Number
	RESISTORS - continued.	
R4,5	Resistor,metal film,20Ω,1%,1/4W,Type RN60D	1510 1016
R6,41,49,55,60,63,68	Resistor,metal film,100Ω,1%,1/4W, Type RN1/4	0410 1192
R7,58,66	Resistor,metal film,8.25KΩ,1%,1/4W, Type RN1/4	0410 1376
R8	Resistor,metal film,15KΩ,1%,1/4W, Type RN1/4	0410 1401
R9	Resistor,metal film,4.02KΩ,1%,1/4W, Type RN1/4	0410 1346
R10,53	Resistor,metal film,4.75KΩ,1%,1/4W, Type RN1/4	0410 1353
R11,40,62	Resistor,metal film,2KΩ,1%,1/4W, Type RN1/4	0410 1317
R12	Resistor,metal film,2.74KΩ,1%,1/4W, Type RN1/4	0410 1330
R13	Resistor,metal film,12.1KΩ,1%,1/4W, Type RN1/4	0410 1392
R14	Resistor,composition,1.2KΩ,5%,1W, Allen-Bradley GB Series or equiv.	1009 64
R15	Resistor,metal film,1KΩ,1%,1/4W, Type RN1/4	0410 1288
R16	Resistor,metal film,2.37KΩ,1%,1/4W, Type RN1/4	0410 1324
R17	Resistor,metal film,2.49KΩ,1%,1/4W, Type RN1/4	0410 1326
R18	Resistor,metal film,17.8KΩ,1%,1/4W, Type RN1/4	0410 1408
R19	Resistor,metal film,1.74KΩ,1%,1/4W, Type RN1/4	0410 1311
R20,22	Resistor,metal film,1.24KΩ,1%,1/4W, Type RN1/4	0410 1297
R21	Resistor,metal film,7.68KΩ,1%,1/4W, Type RN1/4	0410 1373
R23,26	Resistor,composition,1KΩ,5%,1W, Allen-Bradley GB Series or equiv.	1009 6
R24,51,52	Resistor,metal film,3.92KΩ,1%,1/4W, Type RN1/4	0410 1345
R25	Resistor,composition,150Ω,5%,1W, Allen-Bradley GB Series or equiv.	1009 183
R27,29	Resistor,metal film,1.3KΩ,1%,1/4W, Type RN1/4	0410 1299
R28	Resistor,metal film,392Ω,1%,1/4W, Type RN1/4	0410 1249
R30-39	Not used.	
R42	Resistor,metal film,2.94KΩ,1%,1/4W, Type RN1/4	0410 1333
R43,57,65	Resistor,metal film,2.21KΩ,1%,1/4W, Type RN1/4	0410 1321
R44	Resistor,metal film,3.01KΩ,1%,1/4W, Type RN1/4	0410 1334
R45,59,67	Resistor,metal film,475Ω,1%,1/4W, Type RN1/4	0410 1257
R46	Resistor,metal film,47.5Ω,1%,1/4W, Type RN1/4	0410 1161
R47	Resistor,metal film,56.2KΩ,1%,1/4W, Type RN1/4	0410 1456
R48	Resistor,wirewound,0.25Ω,10%,3W,Clarostat Type VC3D or equiv.	1100 806
R50	Resistor,metal film,22.1KΩ,1%,1/4W, Type RN1/4	0410 1417
R54	Resistor,metal film,280Ω,1%,1/4W, Type RN1/4	0410 1235
R56,64	Resistor,metal film,12.7KΩ,1%,1/4W, Type RN1/4	0410 1394
R61,69	Resistor,metal film,169KΩ,1%,1/4W, Type RN1/4	0410 1502
R70	Resistor,zero-ohm,1/4-watt size,Corning OMA07 or equiv.	1510 2217
RT1	Thermistor,25K @ 25°C,10%,Keystone RL 1007-13.8-120-D1 or equiv.	30058

Table 3. Replaceable parts, RFL 9125B 25-watt Power Supply Modules - continued.

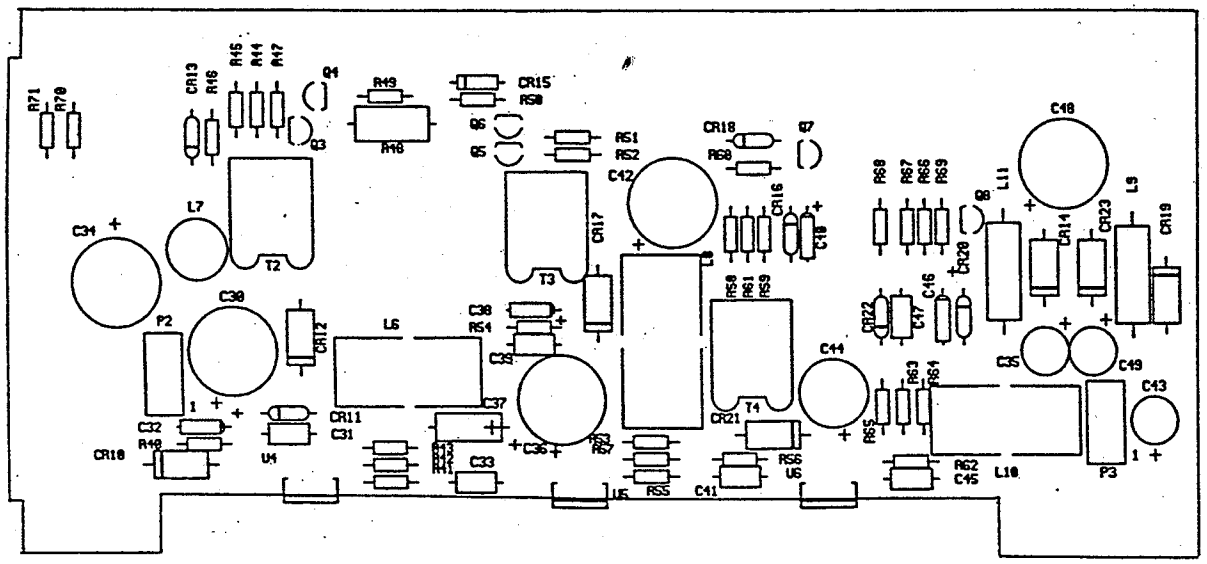
Circuit Symbol (See Figs. 6 to 8.)	Description	Part Number
	SEMICONDUCTORS	
CR1	Transient voltage suppressor,unipolar,breakdown voltage dependent upon model:	
	RFL 9125B 24 DC: 31.4- to 34.7-volt breakdown,General Semiconductor 1.5KE33A or equiv.	30447
	RFL 9125B 48 DC: 64.6- to 71.4-volt breakdown,General Semiconductor 1.5KE68A or equiv.	30448
	RFL 9125B 125 DC: 190- to 210-volt breakdown,General Semiconductor 1.5KE200A or equiv.	30449
CR2,3	Diode,Schottky,1A,30V,1N5818	30073
CR4	Rectifier,comon-cathode,type dependent upon model:	
	RFL 9125B 125 DC: 2-diode,500V,16A,50-ns TRR,3-terminal TO-220 case, General Instrument FEP16HT or equiv.	30460
	All Others: Same as CR7.	
CR5	Transient voltage suppressor,breakdown voltage dependent upon model:	
	RFL 9125B 24 DC: 66.7V,4.7A,500W for 1 ms,Motorola SA60 or equiv.	30078
	RFL 9125B 48 DC: 133V,2.3A,500W for 1 ms,Motorola SA120 or equiv.	30079
	RFL 9125B 125 DC: 189V,1.6A,500W for 1 ms,Motorola SA170 or equiv.	30083
CR6	Rectifier,common-anode,2-diode,200V,16A,35-ns TRR,3-terminal TO-220 case, General Instrument FEN16DT or equiv.	30489
CR7	Rectifier,common-cathode,2-diode,200V,16A,35-ns TRR,3-terminal TO-220 case, General Instrument FEP16DT or equiv.	30490
CR8	Diode,Zener,15V,5%,1.5W,1N5929A	30053
CR9	Diode,Zener,5.1V,5%,400mW,1N751A	37497
CR10,14,19,23	Diode,silicon,100V,3A,1N5401	94287
CR11,13,16,18,20,22	Diode,silicon,1N914B or 1N4448	26482
CR12,17,21	Diode,Schottky high-current barrier,5A,60V,DO-201AD package, General Instrument SB560 or equiv.	100513
CR15	Diode,Zener,7.5V,5%,1W,DO-41 case,1N4737A	34410
DS1-3	Light-emitting diode,green,right-angle PC mount,Industrial Devices 5300H5 or equiv.	32567
Q1,2	Transistor,type dependent upon model:	
	RFL 9125B 24 DC: N-channel MOSFET,100V,27A,TO-220AB plastic case, International Rectifier IRF540 or equiv.	0715 26
	RFL 9125B 48 DC: N-channel FET,200V,18A,TO-220AB plastic case, International Rectifier IRF640 or equiv.	0716 27
	RFL 9125B 125 DC: N-channel FET,400V,10A,TO-220AB plastic case, International Rectifier IRF740 or equiv.	0715 28
Q3,5-8	Transistor,NPN,TO-92 case,2N3903	21562
Q4	Transistor,PNP,TO-92 case,2N3905	21564
U1	Linear mode RWM controller,16-pin DIP,Silicon General SG3846N or equiv.	0620 326
U2	Photo-coupled isolator,6-pin DIP,General Electric 4N35 or equiv.	47104
U3	Linear quad fault monitor, 16-pin DIP,Silicon General SG3548N or equiv.	0620 325
U4,5	Linear switching regulator,5-pin TO-220 package,Linear Technology LT1074CT or equiv.	0620 328
U6	Linear switching regulator,64V/5A,5-terminal TO-220 package, Linear Technology LT1074HVCT or equiv.	0620 337

Table 3. Replaceable parts, RFL 9125B 25-watt Power Supply Modules - continued.

Circuit Symbol (See Figs. 6 to 8.)	Description	Part Number
	MISCELLANEOUS COMPONENTS	
F1	Fuse,3AG slow-blow,250V,current rating dependent upon model:	
	RFL 9125B 24 DC: 3A,Littelfuse 313003 or equiv.	6607
	RFL 9125B 48 DC: 2A,Littelfuse 313002 or equiv.	7549
	RFL 9125B 125 DC: 1A,Littelfuse 313001 or equiv.	6645
L1,2	Choke,high-current,12µH,4.5A,10%,40 MHz series resonant frequency, Caddell-Burns 6860-02 or equiv.	30436
L3,7	Inductor,powerline,10µH,Renco RL-1283-10 or equiv.	30063
L4,5	Inductor,powerline,25µH,Pulse Engineering 92100 or equiv.	30064
L6	Choke,swingductor,100µH,5A,radial leads,Renco RL-1386-1-100 or equiv.	30061
L8	Inductor,powerline,55µH,Pulse Engineering 92116 or equiv.	30068
L9,11	Inductor,powerline,10µH,Renco RL-1284-10 or equiv.	30059
L10	Choke,swingductor,220µH,4.5A,radial leads,Renco RL-1386-1-220 or equiv.	30062
SW1	Switch,rocker,SPST,marked,high inrush current	30441 1
T1	Transformer,input,voltage dependent upon model:	
	RFL 9125B 24 DC: 24V	99548
	RFL 9125B 48 DC: 48V	99549
	RFL 9125B 125 DC: 125V	99551
T2-4	Transformer,current-sense,one-turn primary,100-turn secondary, Pulse Engineering 67100 or equiv.	101653



a. Input converter board (Drawing No. D-103253, Rev. A).



b. Output converter board (Drawing No. D-103258, Rev. A).

Figure 6. Component locator drawings, RFL 9125B 25-watt Power Supply Modules

* FACTORY SELECTED PARTS

SYMBOL	24V	48V	125V
C4	220uF	100uF	22uF
C6	220uF	100uF	22uF
C8	470uF	220uF	33uF
R2	.13 OHM	.25 OHM	.5 OHM
R1	.5 OHM	2 OHM	4 OHM
CR4	FEP16DT	FEP16DT	FEP16HT
CR1	1.5KE33A	1.5KE6BA	1.5KE200A
CR5	SA60	SA120	SA170
Q1	IRF540	IRF640	IRF740
Q2	IRF540	IRF640	IRF740
F1	3A	2A	1A
F2	3A	2A	1A
R3	100 OHM	750 OHM	3K
T1	24V	48V	125V

Figure 7. Schematic, input board, RFL 9125B 25-watt Power Supply Module (Schematic No. D-103154, Rev. A, Sheet 1 of 2)

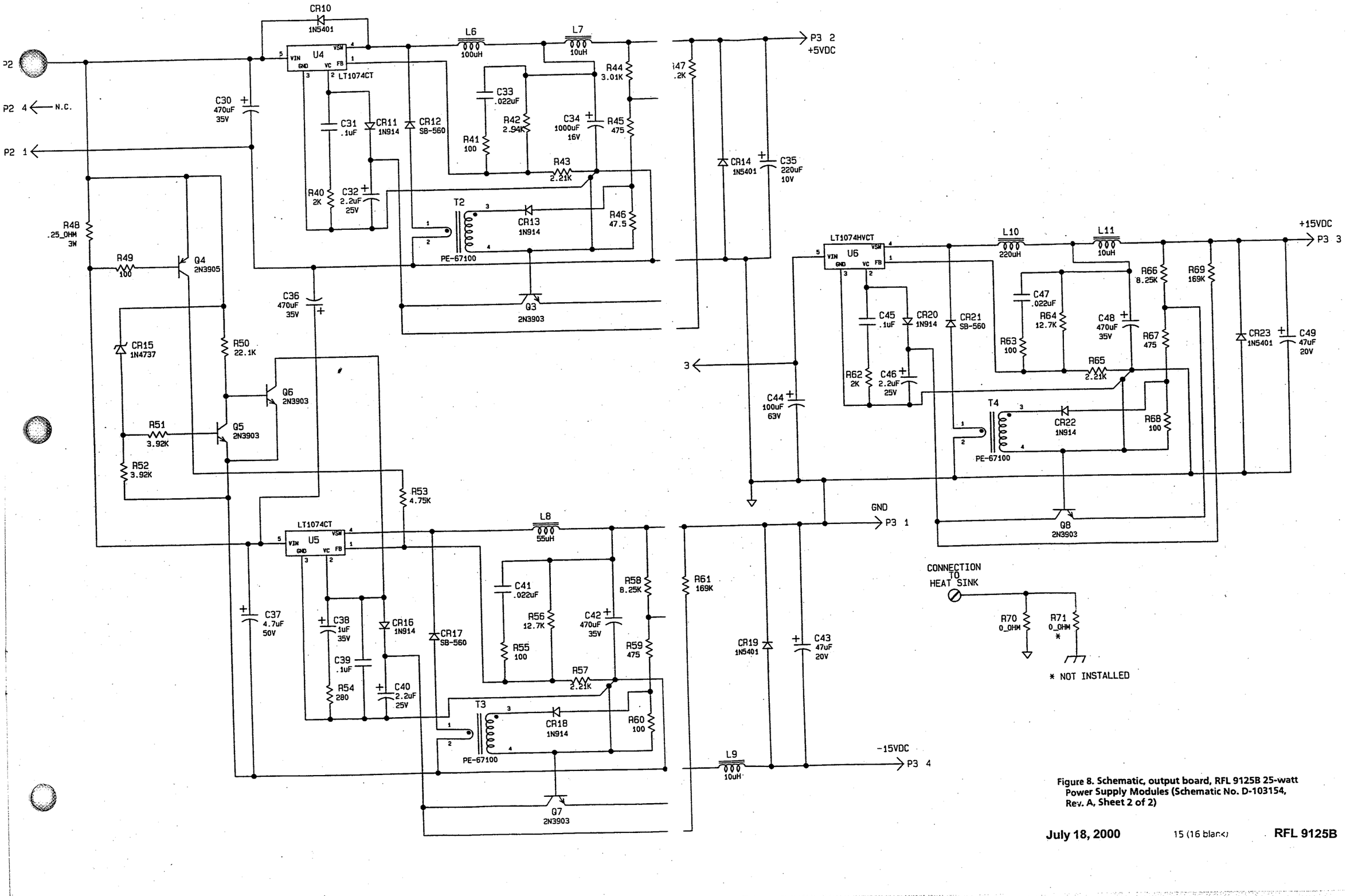


Figure 8. Schematic, output board, RFL 9125B 25-watt Power Supply Modules (Schematic No. D-103154, Rev. A, Sheet 2 of 2)

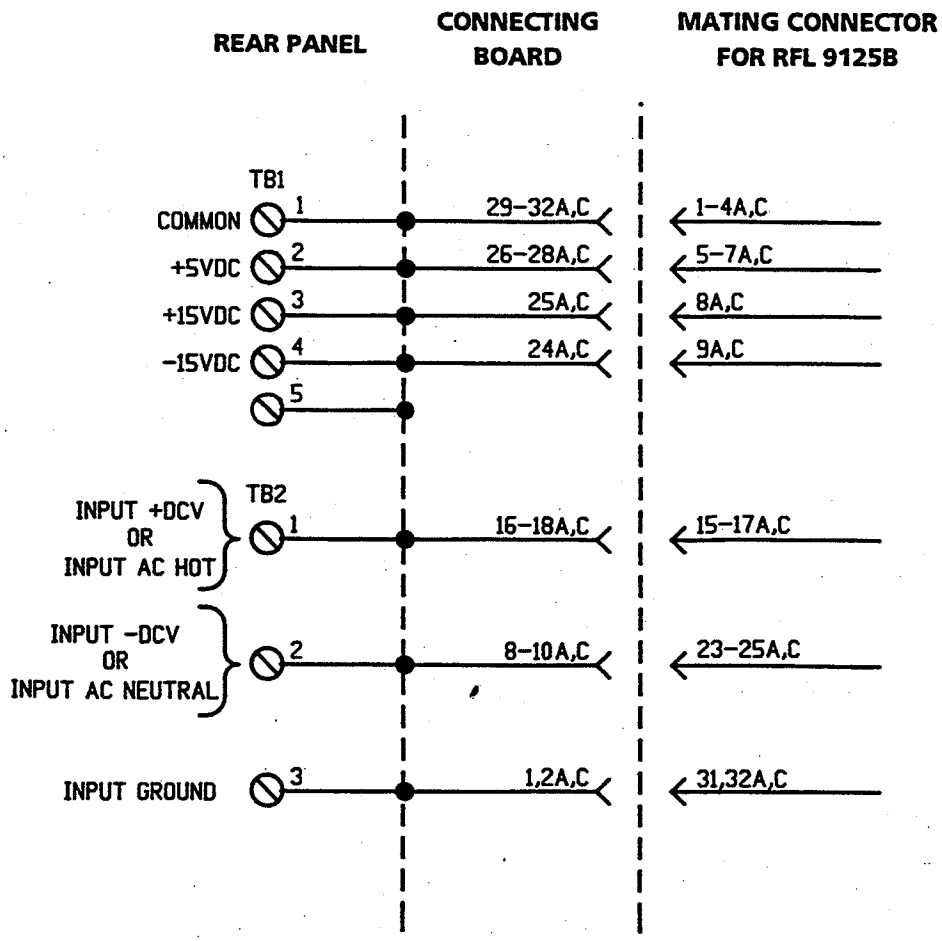


Figure 9. Schematic, RFL 98 PS I/O Power Supply I/O Module (Assembly No. 102025; Schematic No. B-102029)

NOTICE

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