

GPU-400 & 600 TRAINING

3-Phase Solid State Transformer-Rectifiers



Series 500160-401,402,403
601,602,612,603,651,652,653

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Input/Output GPU-400

ELECTRICAL		DATA			
MODEL		6T28-400CL	5T28-400CL	6T28-400CL	
SPECIFICATION NUMBER		500160-401	500160-402	500160-403	
INPUT					
Voltage		208 / 230 / 460	220 / 380	230 / 460 / 575	
Amps		56 / 52 / 26	54 / 32	52 / 26 / 21	
Frequency		60	50	60	
Phase		3	3	3	
Convenience Receptacle		10A / 115V / 60 Hz	10A / 220V / 50 Hz	10A / 115V / 60 Hz	
For ground cable size See Section 2, Figure 1					
OUTPUT					
D.C. Voltage		28.5	28.5	28.5	
Amps		400	400	400	
Duty Cycle		100%	100%	100%	
Kilowatts		11.4	11.4	11.4	
PHYSICAL / DIMENSIONS					
Model	Length (overall)	Width (case)	Width (overall)	Height (w/o cable basket)	Weight (overall)
All Model	45.7 inches (116.1 cm)	24.1 inches (61.3 cm)	33 inches (83.8 cm)	35 inches (88.8 cm)	450 lbs. (204 kg)

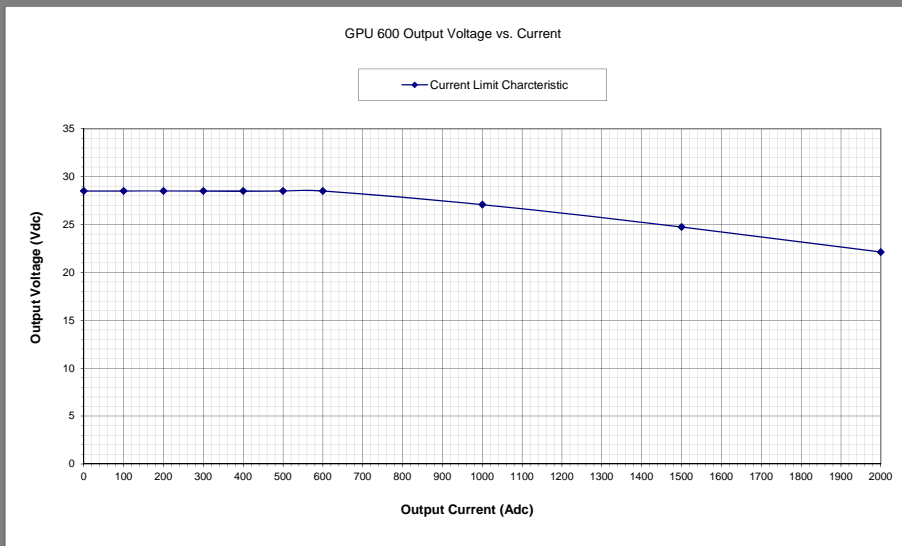
The starting current or output surge current is selected by adjusting R13 starting current control (8, Figure 4) on the front panel from the minimum 150 A DC to the maximum 1600 A DC

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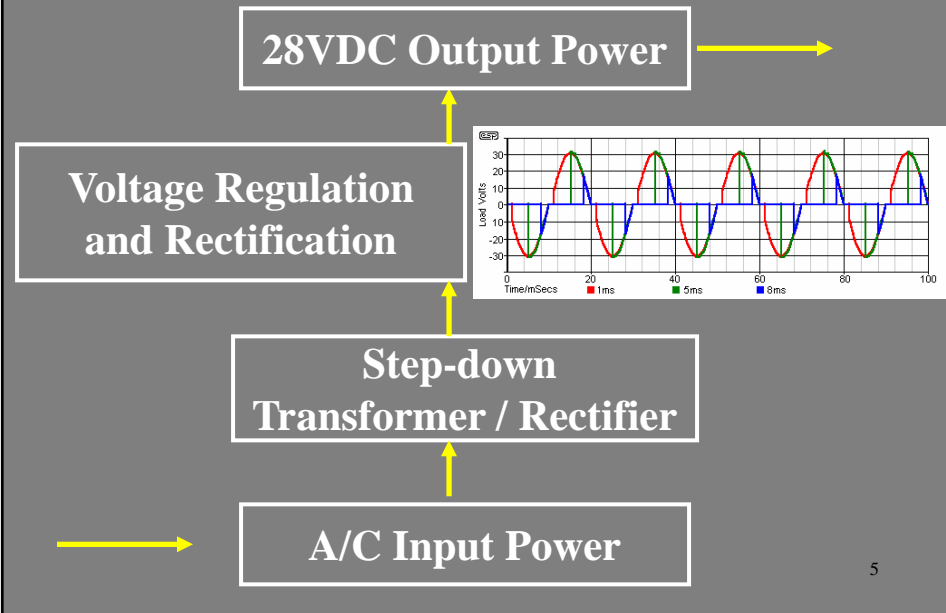
Input/Output GPU-600

ELECTRICAL		DATA			
MODEL		6T28-600CL	5T28-600CL	6T28-600CL	
SPECIFICATION NUMBER		500160-601	500160-602	500160-603	
		500160-651	500160-652	500160-653	
			500160-612		
INPUT					
Voltage		208 / 230 / 460	220 / 380	230 / 460 / 575	
Amps		86 / 78 / 39	82 / 47	79 / 39 / 32	
Frequency		60	50	60	
Phase		3	3	3	
Convenience Receptacle		10A / 115V / 60 Hz	10A / 220V / 50 Hz	10A / 115V / 60 Hz	
For ground cable size See Section 2, Figure 1					
OUTPUT					
D.C. Voltage		28.5	28.5	28.5	
Amps		600	600	600	
Duty Cycle		100%	100%	100%	
Kilowatts		17.1	17.1	17.1	
PHYSICAL / DIMENSIONS					
Model	Length (overall)	Width (case)	Width (overall)	Height (w/o cable basket)	Weight (overall)
Trailer	45.7 inches (116.1 cm)	24.1 inches (61.3 cm)	33 inches (83.8 cm)	35 inches (88.8 cm)	650 lbs. (295 kg)
Stationary	35.1 inches (89.2 cm)	24.1 inches (61.3 cm)	33 inches (83.8 cm)	29.3 inches (74.5 cm)	600 lbs. (272 kg) ³

Output Voltage Slope



Theory of Operation



Component Location

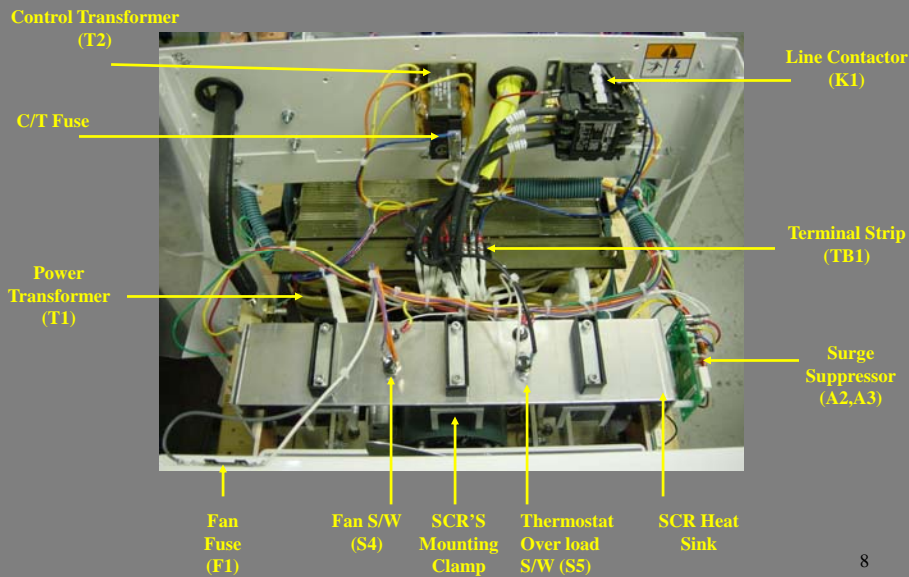
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Front Panel

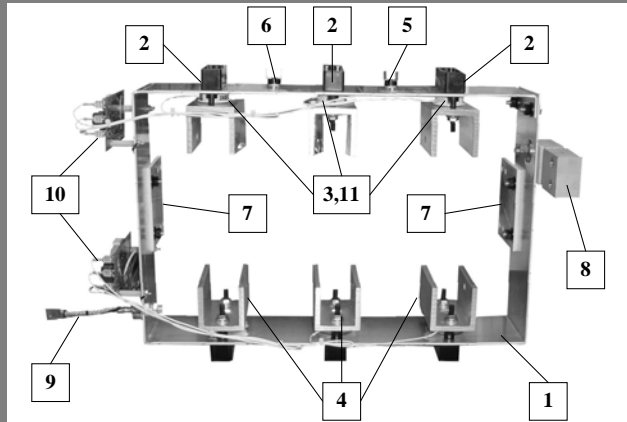


- | | |
|--|--|
| 1. Front Panel | 8. Start Level Control (R13) |
| 2. DC Ammeter (M1) | 9. Receptacle Fuse (F1) |
| 3. DC Voltmeter (M2) | 10. Input On-Off Switch (S1) |
| 4. Overload/Overvoltage Light (DS2) | 11. Output On-Off Switch (S2) |
| 5. Convenience Receptacle (J4) (115 VAC Shown) | 12. Input Power Light (DS1) (amber) |
| 6. MOV Surge Suppressor [Not Shown] | 13. Output Contactor Light (DS3) (green) |
| 7. Receptacle Weather Cover (115 VAC Shown) | |

Interior Components Rear View



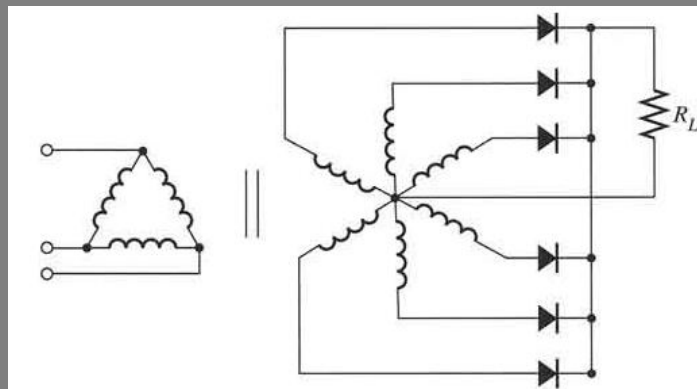
SCR/ Heat Sink Assy



- | | |
|--|---------------------------------------|
| 1. Rectifier Heat Sink | 7. Rectifier Mounting Insulator |
| 2. SCR Mounting Clamp | 8. Feedback Shunt (Not Shown) (R12) |
| 3. Silicon Rectifier (CR1 through CR6) | 9. Positive Base Silicone Diode (CR7) |
| 4. SCR Heat Sink | 10. Surge Suppressor (A2, A3) |
| 5. Overload Thermostat (S5) | 11. Pin Spring |
| 6. Fan Turn-on Thermostat (S4) | |

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6 – Phase Star Rectifier



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Right/Rear Side View



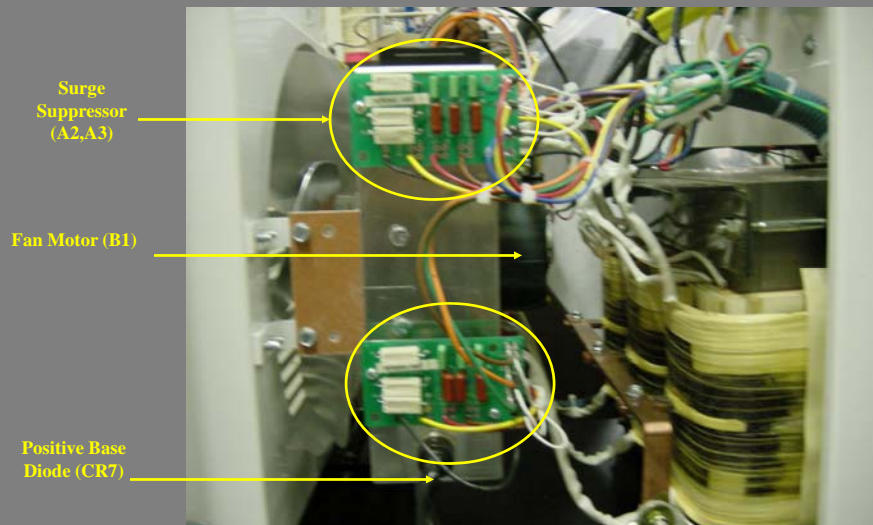
Fan
Blade

Feed-Back Shunt
(R12)

Pre-Load
Resistors
(R2,R3,R4)

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Left/Rear Side View



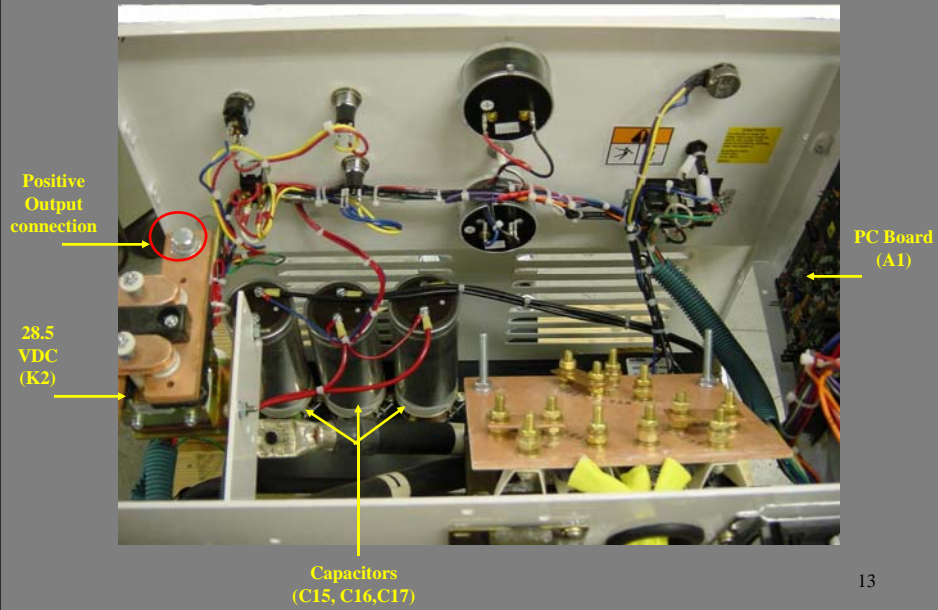
Surge
Suppressor
(A2,A3)

Fan Motor (B1)

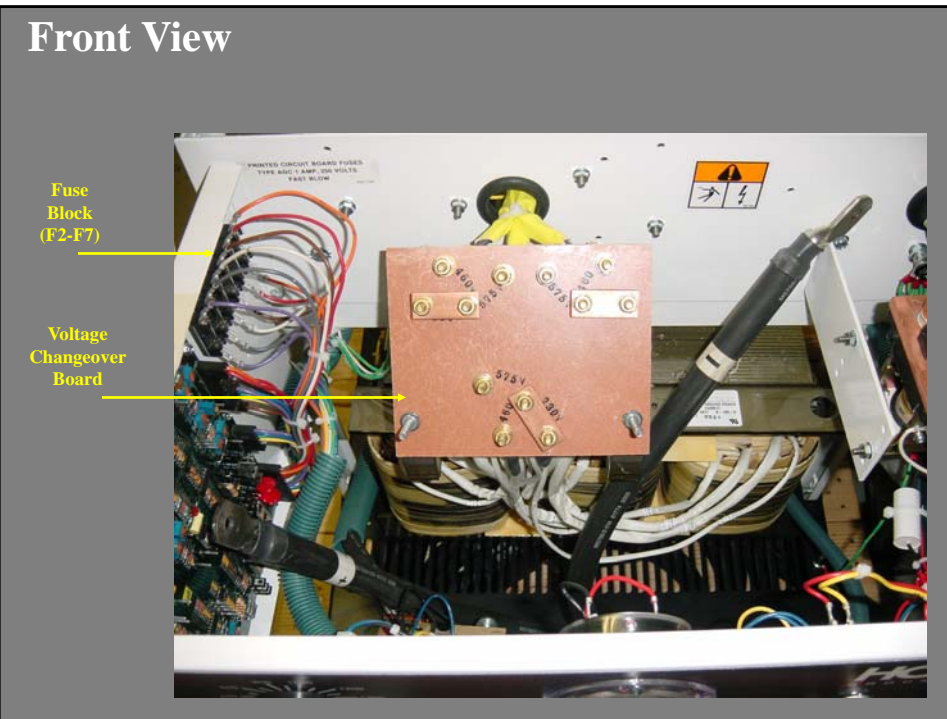
Positive Base
Diode (CR7)

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Rear View Facing Control Panel



Front View

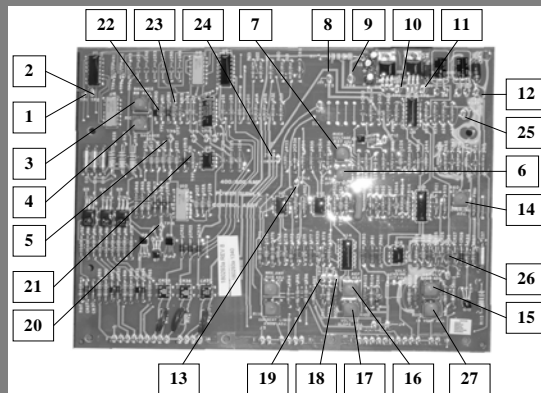


P/C Board & Fuse Block



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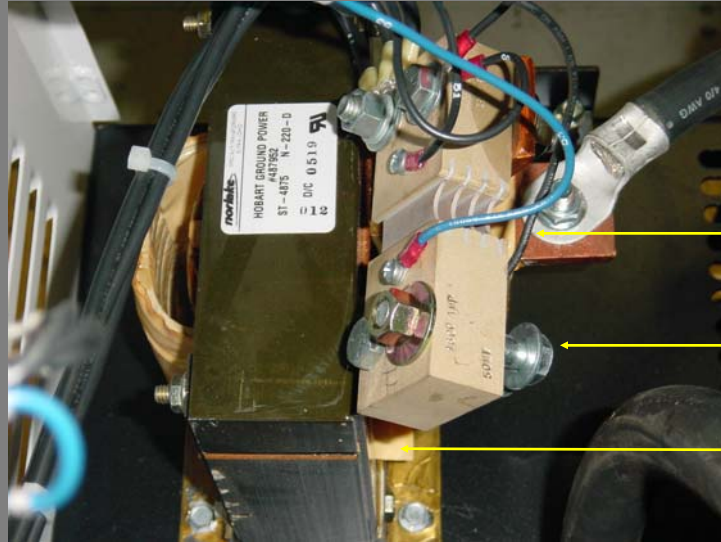
PC Board Test Point & Adjustments



1. TP1 SCR Gate Pulse from R10 Adjustment
2. TP2 SCR Gate Pulse from R9 Adjustment
3. R9 Balance Adjustment Phase 2 (TP2)
4. R10 Balance Adjustment Phase 3 (TP1)
5. TP8 Balance SCR Gate Pulse Phase1
6. R38 No Load Amp Off Set Null (TP14)*
7. R37 Over-voltage Trip Point
8. TP3 PC Board Common
9. TP4 +9.1 VDC Timer Voltage
10. TP5 +15 V Regulated Voltage
11. TP6 -15 V Regulated Voltage
12. TP7 +24 V Nonregulated Voltage
13. TP14 Null at 0 A DC TP (R38)*
14. R60 Overload Limit (TP20)
15. R109 28 V DC Output Calibration (TP13)
16. R101 5 V Reference Volt Adjustment (TP19)
17. R102 Voltage Slope Adjustment (TP17)
18. TP19 Reference Volt Test Point (R101)
19. TP17 Voltage Slope Test Point (R102)
20. TP15 Common, PC Board Volts
21. TPF SCR Gate Pulse Timer
22. TPE Gate Timer Output Phase 2
23. TPD Gate Timer Output Phase 3
24. TP13 Actual Output Volt (28.5 or 14.25)
25. TP20 Overload Limit (R60) Adjustment
26. TPL Overload Trip Summing Point
27. R110 14 V DC Output Calibration (TP13)

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Choke & Shunt Meter



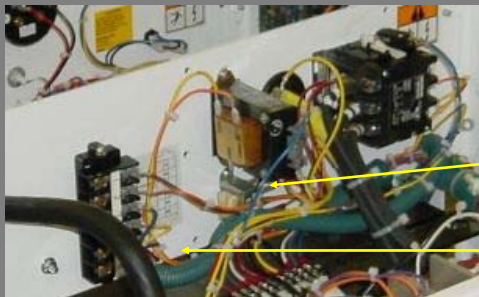
Shunt
Meter
(R11)

Negative
Out Put
connection

Choke
(L1)

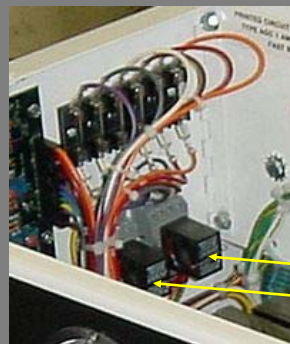
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Remote Operation



24V Transformer
(T101)

Remote Terminal Strip



Relays
K101 and K102

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Preparation For Use

A Hobart converter requires no additional preparation in order to supply power to an aircraft. It needs only to have its input cable connected to an appropriate source of power and its output cable(s) connected to an aircraft. Proceed as follows for putting the converter unit into service

The user shall furnish a suitable disconnecting means before input power is connected to the input contactor on the internal panel of the GPU. Install the input cable through the hole provided in the rear panel. Be certain the cable inside the power supply will not contact the fan or hot parts. The lower holes may provide less weather leakage.

When installing input cables phase rotation is not a factor.

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Recommended Input Cable Sizes							
GPU-400 208V, 60Hz Nominal							
	30'	50'	75'	100'	125'	150'	200'
Box Voltage	187	6	4	2	2	1	2/0
@ Load	198	6	6	6	6	4	2
	208	6	6	6	6	6	4
	218	6	6	6	6	6	6
	229	6	6	6	6	6	6
GPU-400 220V, 50Hz Nominal							
	30'	50'	75'	100'	125'	150'	200'
Box Voltage	198	6	4	2	2	1	2/0
@ Load	210	6	6	6	6	4	2
	220	6	6	6	6	6	4
	230	6	6	6	6	6	6
	241	6	6	6	6	6	6
GPU-400 230V, 60Hz and 220V, 50Hz Nominal							
	30'	50'	75'	100'	125'	150'	200'
Box Voltage	207	6	6	4	2	2	1/0
@ Load	218	6	6	6	6	4	2
	230	6	6	6	6	6	4
	241	6	6	6	6	6	6
	253	6	6	6	6	6	6
GPU-400 380V, 50Hz Nominal							
	30'	50'	75'	100'	125'	150'	200'
Box Voltage	342	8	8	8	6	6	4
@ Load	361	8	8	8	8	8	8
	380	8	8	8	8	8	8
	399	8	8	8	8	8	8
	418	8	8	8	8	8	8
GPU-400 460V, 60Hz Nominal							
	30'	50'	75'	100'	125'	150'	200'
Box Voltage	414	8	8	8	8	6	6
@ Load	437	8	8	8	8	8	8
	460	8	8	8	8	8	8
	483	8	8	8	8	8	8
	506	8	8	8	8	8	8
GPU-400 575V, 60Hz Nominal							
	30'	50'	75'	100'	125'	150'	200'
Box Voltage	518	8	8	8	8	8	8
@ Load	546	8	8	8	8	8	8
	575	8	8	8	8	8	8
	604	8	8	8	8	8	8
	633	8	8	8	8	8	8

GPU-400, Recommended Input Cable Sizes

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		Recommended Input Cable Sizes					
		GPU-600 208V, 60Hz Nominal					
		30'	50'	75'	100'	125'	150'
	187	4	4	2	1	1/0	2/0
Box Voltage	198	4	4	4	4	4	2
@ Load	208	4	4	4	4	4	4
	218	4	4	4	4	4	4
	229	4	4	4	4	4	4
		GPU-600 220V, 50Hz Nominal					
		30'	50'	75'	100'	125'	150'
	198	4	4	2	1	1/0	2/0
Box Voltage	210	4	4	4	4	4	2
@ Load	220	4	4	4	4	4	4
	230	4	4	4	4	4	4
	241	4	4	4	4	4	4
		GPU-600 230V, 60Hz and 220V, 50Hz Nominal					
		30'	50'	75'	100'	125'	150'
	207	4	4	2	2	1	1/0
Box Voltage	218	4	4	4	4	4	2
@ Load	230	4	4	4	4	4	4
	241	4	4	4	4	4	4
	253	4	4	4	4	4	4
		GPU-600 380V, 50Hz Nominal					
		30'	50'	75'	100'	125'	150'
	342	8	8	6	6	4	4
Box Voltage	361	8	8	8	8	8	8
@ Load	380	8	8	8	8	8	8
	399	8	8	8	8	8	8
	418	8	8	8	8	8	8
		GPU-600 460V, 60Hz Nominal					
		30'	50'	75'	100'	125'	150'
	414	8	8	8	8	6	6
Box Voltage	437	8	8	8	8	8	8
@ Load	460	8	8	8	8	8	8
	483	8	8	8	8	8	8
	506	8	8	8	8	8	8
		GPU-600 575V, 60Hz Nominal					
		30'	50'	75'	100'	125'	150'
	518	8	8	8	8	8	8
Box Voltage	546	8	8	8	8	8	8
@ Load	575	8	8	8	8	8	8
	604	8	8	8	8	8	8
	633	8	8	8	8	8	8

Servicing and Troubleshooting

	As required	Daily 8 hrs.	1 month 200 hrs.	3 months 600 hrs.	6 months 1200 hrs.
* EXTERIOR CABLES					
Inspect equipment		X			
Inspect AC input cables		X			
Check cable connections (internal)					X
* CONTROLS AND INSTRUMENTS					
Check voltmeter functioning	X				
Check ammeter functioning	X				
Check fan thermostat operation		X			
Check indicating lights		X			
Check starting current limit functioning			X		
Check overload thermostat					X
Check printed circuit control board				X	
Check all output contactor contacts					X
Check power input contactor contacts					X
Check voltmeter & ammeter accuracy					X
Check all wiring and connections					X
Inspect and clean general (light duty)					X
Inspect and clean general (severe duty)				X	

Fan Lubrication

The fan motor incorporates a sleeve bearing, and therefore will need periodic lubrication. The following table will furnish a recommended guide as to the frequency of this lubrication.

Type of Duty	Lubrication Interval
Light (up to 6 hours/day)	Every 12 months
Moderate (7 to 15 hours/day)	Every 6 months
Heavy Duty (16 to 24 hours/day)	Every 3 months

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Voltages of Interest

A) Across the secondary on all 3 phases - 66 VAC +/- 10%, or measure for current on all 6 transformer leads look for balance.

B) To secondary coil center tap on all phases -33 VAC +/- 10%

C) Across the 115 VAC receptacle - 115VAC (230 VAC on 50 Hz units) +/- 10%

D) Measure between each of the six glass fuses and the heat sink should be 16 -18 VAC +/- 10%

E) Test Point Values for PC Board

F) Ripple Voltage across Voltmeter should be less than 400m VAC at a 100 amp load.

G) Ripple current at a 100 amp load should be less than 60 amps for 60 Hz and less than 70 amps for 50 Hz. (Measured on the 3 or 4 Red wires connected to the DC Capacitors.)

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Voltage measurement of SCR gating. .5VDC

C2 R6
CR2
C13

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Voltage measurement across each glass fuse both sides 12 points, voltage should be 18VDC

X3
16-18 VAC-ALL 3 PHASES
X2
16-18 VAC-ALL 3 PHASES
X1
F7
F6

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DC output voltage and AC ripple voltage can be taken at this point.



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5) SCR Malfunction Instructions

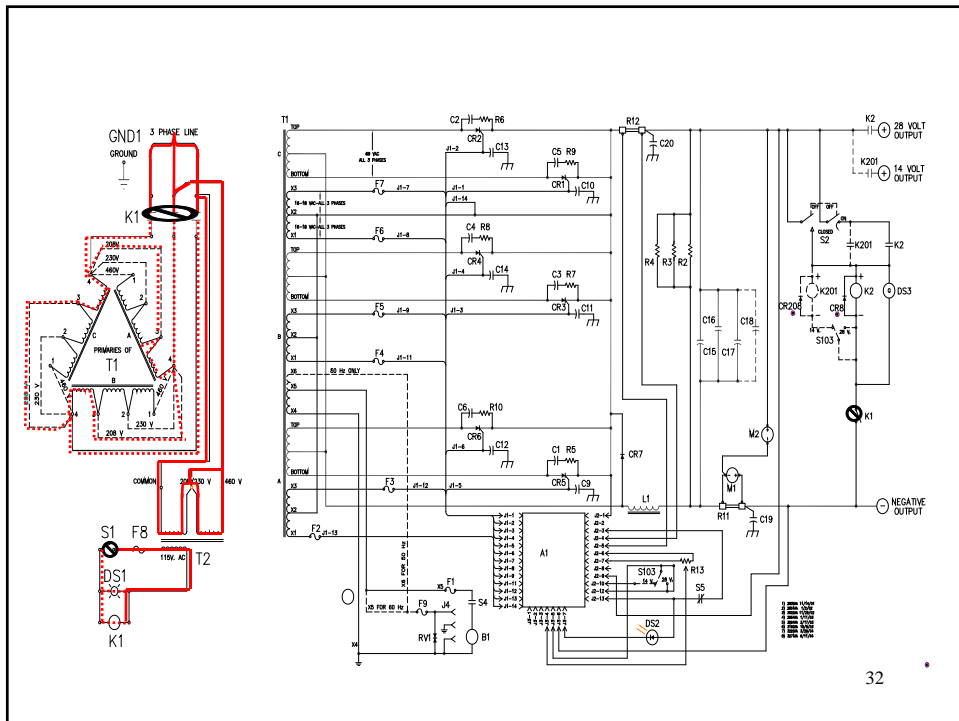
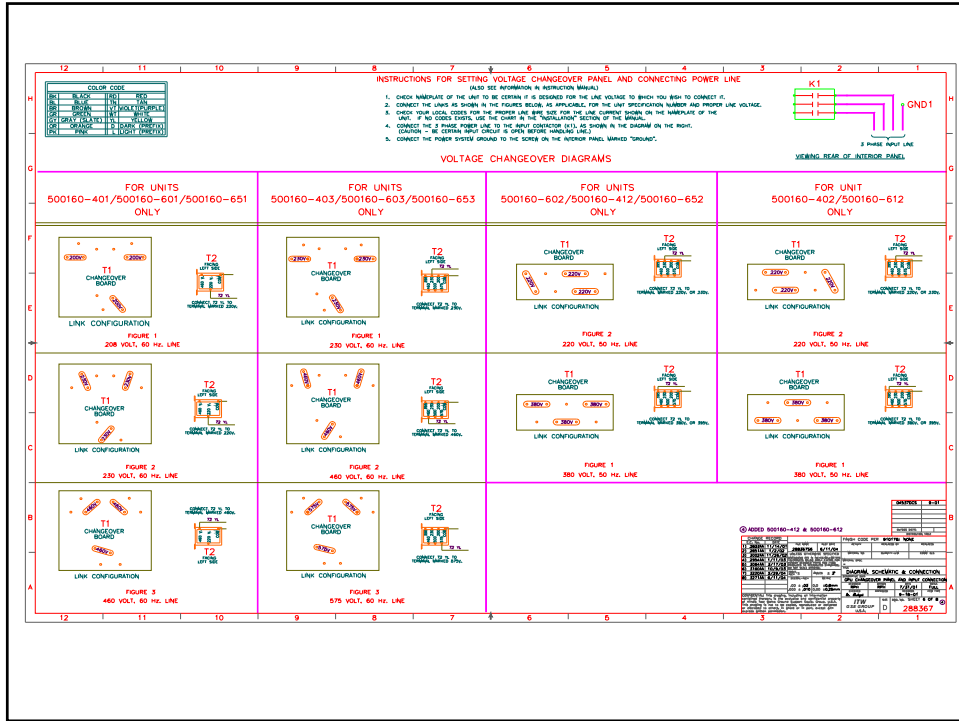
a) Normal SCR Malfunction Conditions

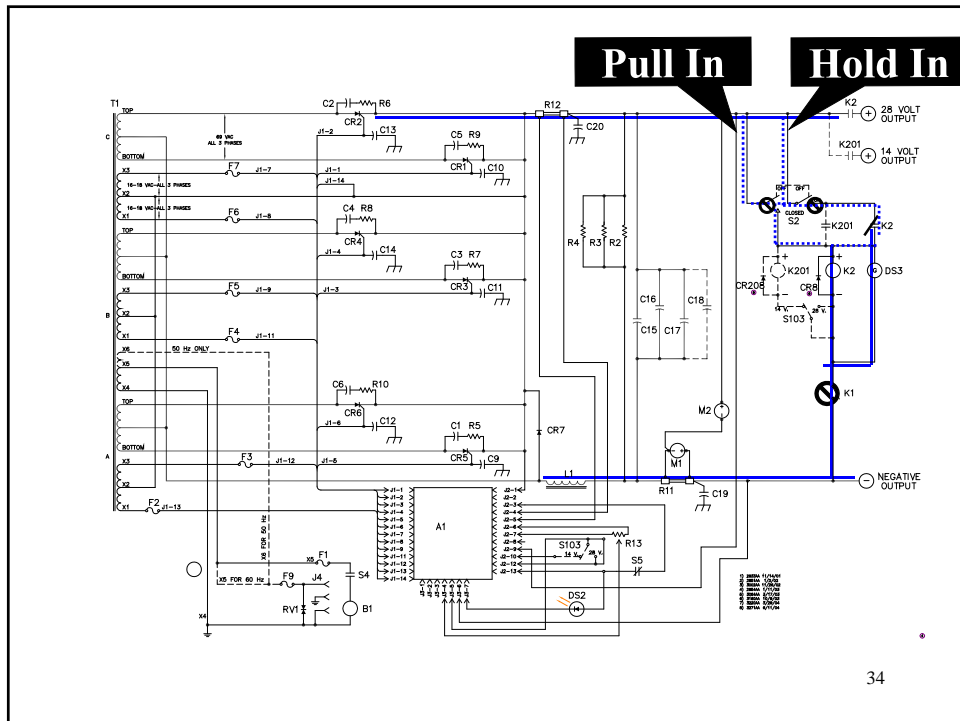
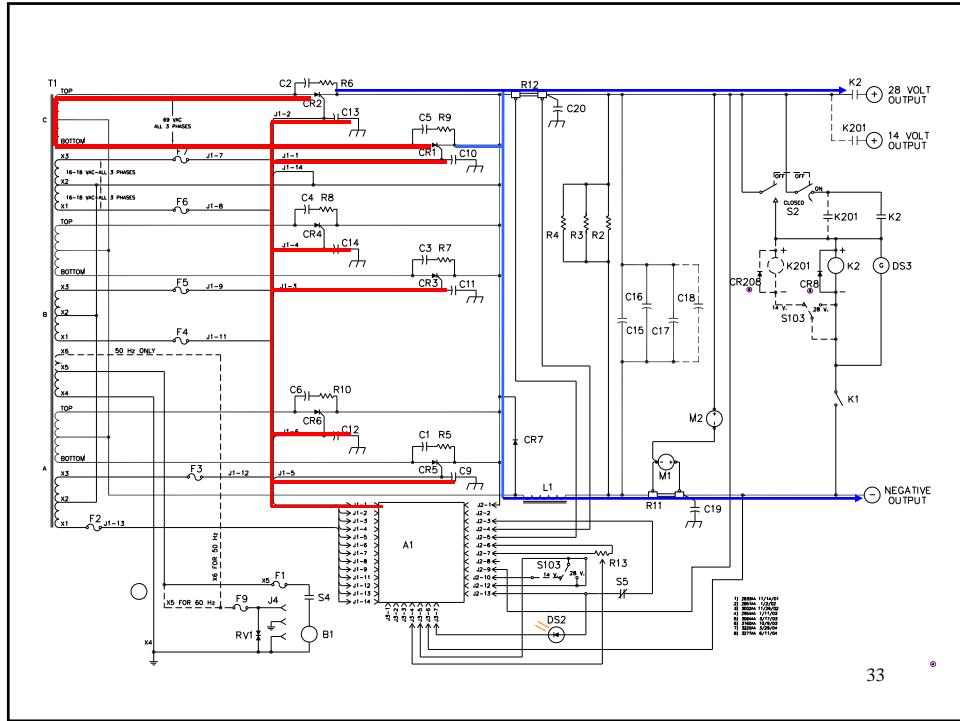
- (1) Blown line fuses as the result of a shorted SCR (similar to a shorted diode). A shorted fly-back diode will also produce this situation. This is a severe malfunction.
- (2) If one SCR does not turn on (either it is open or the gate signal is not being received by the SCR), a very small change will occur at the output which will be difficult to notice. The ripple voltage at the output will increase.
- (3) If two SCR's do not turn on, the ripple current will increase and can cause other problems. (Consult troubleshooting procedure).

b) Severe SCR Malfunction Conditions

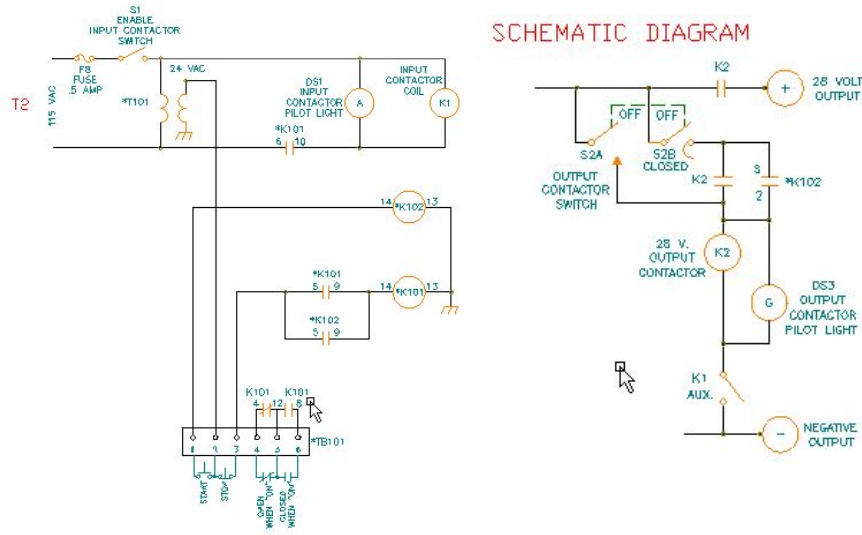
- (1) In the case of a severe malfunction, such as a shorted SCR or diode, do not turn on the unit. Disconnect the leads from the transformer to the heat sink assembly and check with a VOM for shorted SCR's or a shorted fly-back diode.
- (2) To eliminate the possibility of a control malfunction, go inside the unit and check the control circuit board. See the instructions provided for this test. It is important to run through the tests in the order they are listed. Note that the SCR devices and fly-back diode are still disconnected.

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Optional Remote Operation



SCHEMATIC DIAGRAM

Optional Plug Interlock

