

For use with Lancer JR. Type L1
General Purpose AC Inverter Drives.

**PI Control Mod Kit
(Pump & Fan Pressure Control)
MODEL 92294 46S02671-0010**

Before installing this kit, a TECHNICALLY QUALIFIED INDIVIDUAL who is familiar with this type of equipment and the hazards involved, should READ this ENTIRE INSTRUCTION SHEET.

IMPORTANT

This kit may have been installed by the factory. However, certain steps can only be completed at the installation site. Therefore, review and then perform those steps which complete the installation process.

DESCRIPTION

This Louis Allis kit includes all the material described in Table 1 and illustrated in Figure 1. It can only be installed in a Lancer JR. Type L1 inverter drive which contains local operator control devices. It may be installed directly on the Main Control PCB of a Lancer JR. Type L1 inverter if no other mod kits are present. If used with other mod kits, it must be mounted in the Multi Adapter mod kit, (Model 92327).

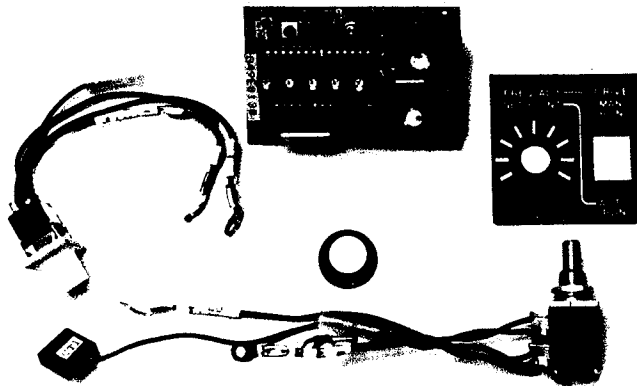


FIGURE 1.

TABLE 1. KIT CONTENTS

ITEM	QTY	DESCRIPTION	PART NO.
1	1	P.I. Control PCB W/Mounting Hardware	05P00090-0164
2	1	Dual 2.5K Ohm Potentiometer Assembly	46S02671-0020
3	1	2PDT Lever Switch Assembly	46S02671-0030
4	1	Adhesive Backed Nameplate	45T00282-0040
5	1	Knob	05P00022-0020

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1	STD 2512-4/1/86				

When installed, this kit enables the drive to function in either a Manual or Auto Run mode of operation. In the Manual Run mode the drive output frequency (speed) is set at the inverter via the FREQ. ADJ. pot on the local Operators Control Station (OCS) plate. This Manual mode is normally used for initial drive set-up and in the event of a failure in the process measurement control loop. When in the Auto Run

mode, the PI control receives either a signal input of 1-5 VDC or 4-20mA DC and compares it with an internal reference signal (set point on OCS) to provide a proportional integral (PI) of the difference which represents the frequency reference signal to the inverter. The PI control input is compatible with various process controls such as pressure, amount and level of fluid.

TABLE 2. P.I. CONTROL BOARD SPECIFICATIONS

Input	Voltage	1 to 5 VDC *
	Current	4-20 mA Input resistance = 240 ohm
Output voltage		0 to 13 VDC
Proportional gain adjustment range		0.2 to 20
Integral time adjustment range	J11 OFF Normal	1.2 to 12 sec.
	J11 ON	12 to 120 sec.
Output limit adjustment range	Upper Limit (H)	1 to 13V
	Lower Limit (L)	0 to 13V
Reference voltage		5 VDC

* Use of a 1 to 5 VDC signal requires the removal of resistor R54 located on the P.I. Control printed circuit board (see step 8).

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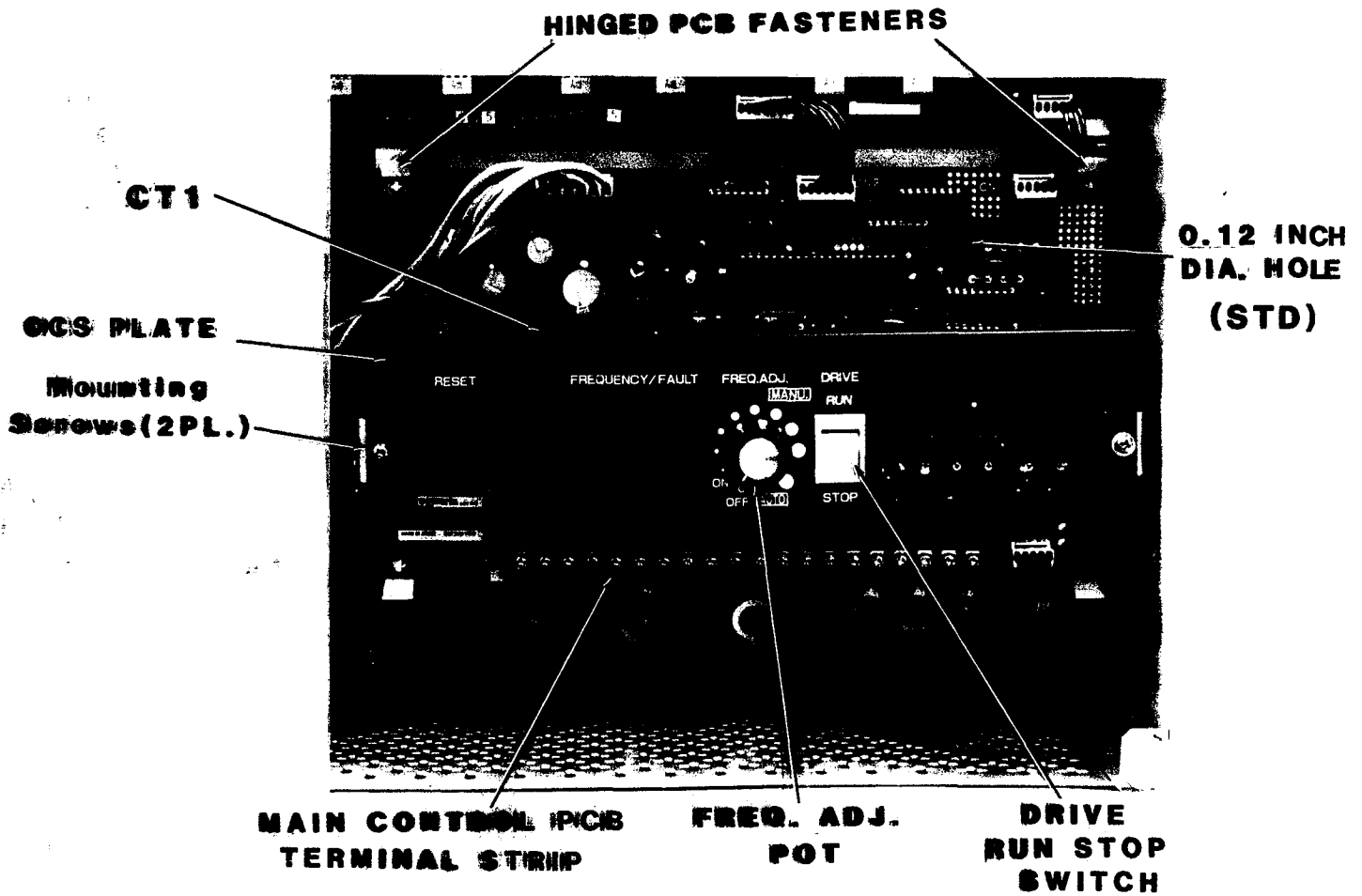


FIGURE 2.

INSTALLATION

IMPORTANT

- a. If the Mod Kit is to be installed in the inverter, proceed to install according to these installation instructions.
- b. If the Mod Kit is to be installed in a Multi Adapter mod assembly, FIRST complete installation steps stated in 02Y00025-0204. Then continue with these installation instructions.
1. Disconnect all electrical power to drive.

2. Open or remove drive front cover.
3. Verify voltage has been disconnected by using a voltmeter to check for voltage at incoming power terminals.

WARNING

HAZARDOUS VOLTAGE CAN CAUSE SEVERE INJURY OR DEATH.

LOCK ALL POWER SOURCES FEEDING DRIVE IN "OFF" POSITION.

4. See Figure 2. Remove and retain the two screws which secure the existing Operators Control Station (OCS) plate.

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OCS PLATE MODIFICATION

5. See Figure 2. Remove the **FREQ. ADJ.** pot and the **DRIVE RUN-STOP** switch from the OCS plate. Disconnect component wires at the Main Control PCB terminal board, and discard these two components.

6. Remove protective backing from supplied nameplate. Align over holes in OCS plate and press firmly in place covering the original pot and switch captions.

7. Install and secure the Dual 2.5K ohm pot assembly to the OCS plate. Insure that the pot terminals **POINT TOWARDS BOTTOM** of OCS plate.

8. Turn pot shaft fully **CCW**. Place knob on shaft, aligning white dot on knob with first nameplate gradient. Secure to shaft.

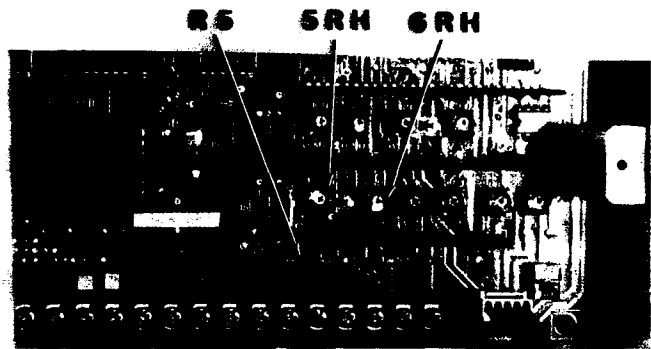
9. Pass leads of 2PDT Lever Switch assembly thru **FRONT OF OCS** plate. Insure that terminals containing red lead (**ST**) and orange (**CRF**) leads are positioned **TOWARDS BOTTOM** of OCS plate. Snap Switch assembly into place. Set OCS Plate aside for later installation.

MAIN CONTROL PCB MODIFICATION

10. See Figure 3. Use diagonal wire cutters and cut resistor **R5** lead wires as close to the PCB as possible. Discard resistor.

NOTE

Removing resistor **R5** changes the drive's normal current follower input to a voltage follower input. **ANY REPLACEMENT** of the Main Control PCB in the future will require that the **REPLACEMENT BE MODIFIED IN THE SAME MANNER.**



**MAIN CONTROL PCB (PART OF)
OCS PLATE REMOVED
FOR CLARITY.**

FIGURE 3.

PI CONTROL PCB INSTALLATION

IMPORTANT

Complete step 11 **ONLY IF** the process measurement signal input to the PI Control PCB is 1-5 VDC. If the input signal is 4-20mA DC proceed directly to step 12.

11. See Figure 4. Use diagonal wire cutters and cut resistor **R54** lead wires as close to PCB as possible. Discard resistor.

NOTE

Removing resistor **R54** changes the PCB normal 4-20mA DC input to one which is compatible with a 1-5 VDC signal input. **ANY REPLACEMENT** of the PI Control PCB in the future will require that the **REPLACEMENT BE MODIFIED IN THE SAME MANNER.**

12. Remove both sets of mounting hardware and the metal spacer from the PI Control PCB.

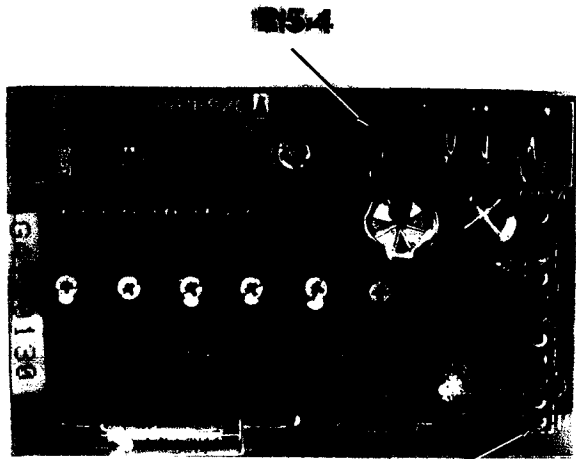
13. If installed in Multi Adapter assembly:

a. At the option position where the board will be installed in the Multi

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Adapter, remove the hardware from the end of the metal spacer.

b. See Figure 4. The PCB has a 11-pin female (CN13A) connector mounted on the back side of the board. Align with male pin connector CN13() on Multi Adapter Assembly PCB. Ensure all pins are engaged, then snap PCB into place.



CN13A

FIGURE 4.

c. The PCB should now be flush against spacer. Secure PCB to spacer with 6-32 Phillips screw, lock and flat washer.

d. Proceed directly to step 17 and continue installation instructions.

14. If installed in inverter:

a. See Figure 2. The Main Control PCB is held in place by (4) hinged locking PCB fasteners. Grasp the

top of board in a convenient location and release from the top (2) fasteners by gently pulling the board forward while pushing upward on the locking portion of the fasteners. Pivot the top portion of PCB out and away from chassis.

METAL SPACER

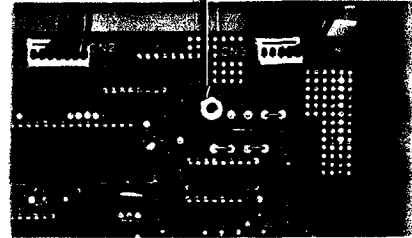


FIGURE 5.

b. See Figure 2. Insert one set of mounting hardware thru the 0.12 inch diameter hole designated "STD" on the Main Control PCB from the rear side.

c. See Figure 5. Finger tighten the metal spacer onto the screw.

d. Snap Main Control PCB back into place.

15. See Figure 4. The modification PCB has a 11 pin female (CN13A) connector mounted on the back side of the board. Align this connector with male connector CN13 on the Main Control PCB. Ensure that all 11 pins are engaged, then snap PCB into place.

16. See Figure 6. The modification PCB should now be flush against the spacer. Secure the modification PCB to the spacer, using the remaining set of attaching hardware.

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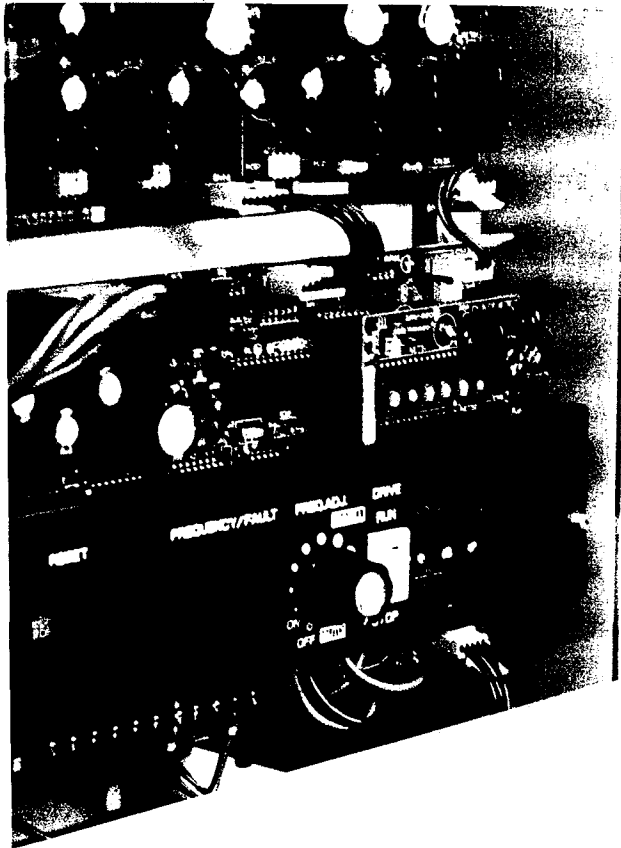


FIGURE 6.

OCS WIRE CONNECTIONS

17. Both the Dual 2.5K ohm pot and 2PDT Lever Switch assembly have an orange lead with a snap-together connector. Complete this connection.

18. See Figure 2. Connect the CT1 female connector of the Dual 2.5K ohm pot assembly to the 5 pin CT1 male plug located on the Main Control PCB. Ensure pins labeled N15 on both connectors ALIGN WITH EACH OTHER.

19. Secure remaining ring lugged leads of both the Dual 2.5K ohm pot and 2PDT Lever Switch assemblies to their respective designated terminals on the Main Control PCB.

20. Reposition and secure the OCS plate to the inverter chassis.

PRESSURE CONVERTER CONNECTIONS

IMPORTANT

Use twisted shielded wire #22AWG minimum for distances of 150 feet or less that meets local and national code requirements. Use #16AWG for distances of more than 150 feet. Connect ONE END of the shield to EARTH GROUND.

21. Final connections to the pressure converter:

a. 2-wire pressure converter REQUIRING 24 VDC power supply. Connect per Figure 7. MAXIMUM ALLOWABLE RESISTANCE of pressure converter is 240 ohms.

b. 3-wire pressure converter REQUIRING 24 VDC power supply. Connect per Figure 8. Maximum allowable resistance of pressure converter is 240 ohms.

c. Pressure converter with self-contained power supply. See Figure 9.

IMPORTANT

Pressure converter output CANNOT BE GROUNDED.

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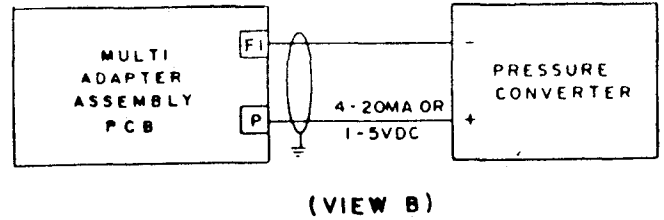
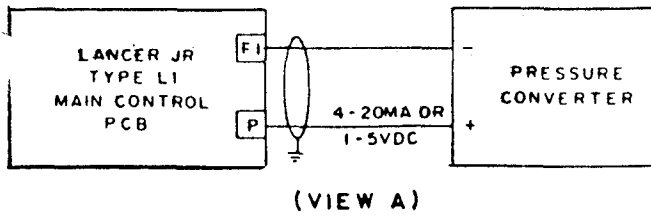


FIGURE 7

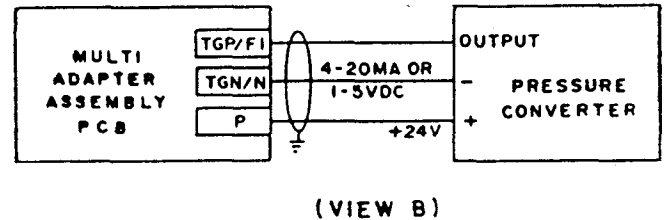
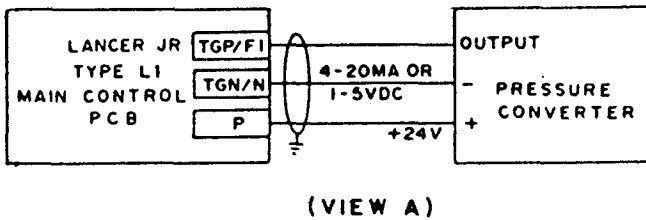


FIGURE 8

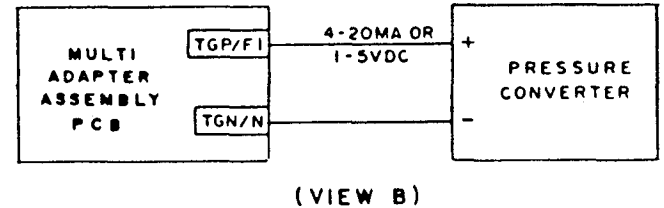
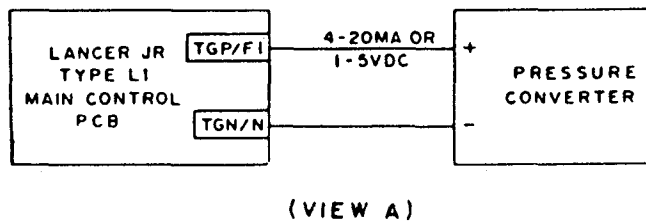


FIGURE 9

NOTE:

1. USE VIEW A IF MULTI ADAPTER ASSEMBLY KIT IS NOT PRESENT.
2. USE VIEW B WHEN MULTI ADAPTER ASSEMBLY IS PRESENT.

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ADJUSTMENTS

Manual Run Mode:

22. Complete the adjustments specified in the drive instruction manual.

23. Run the drive in the Manual Run mode. Observe the OCS plate FREQUENCY display and RECORD both minimum and maximum frequency settings.

Minimum Freq. _____

Maximum Freq. _____

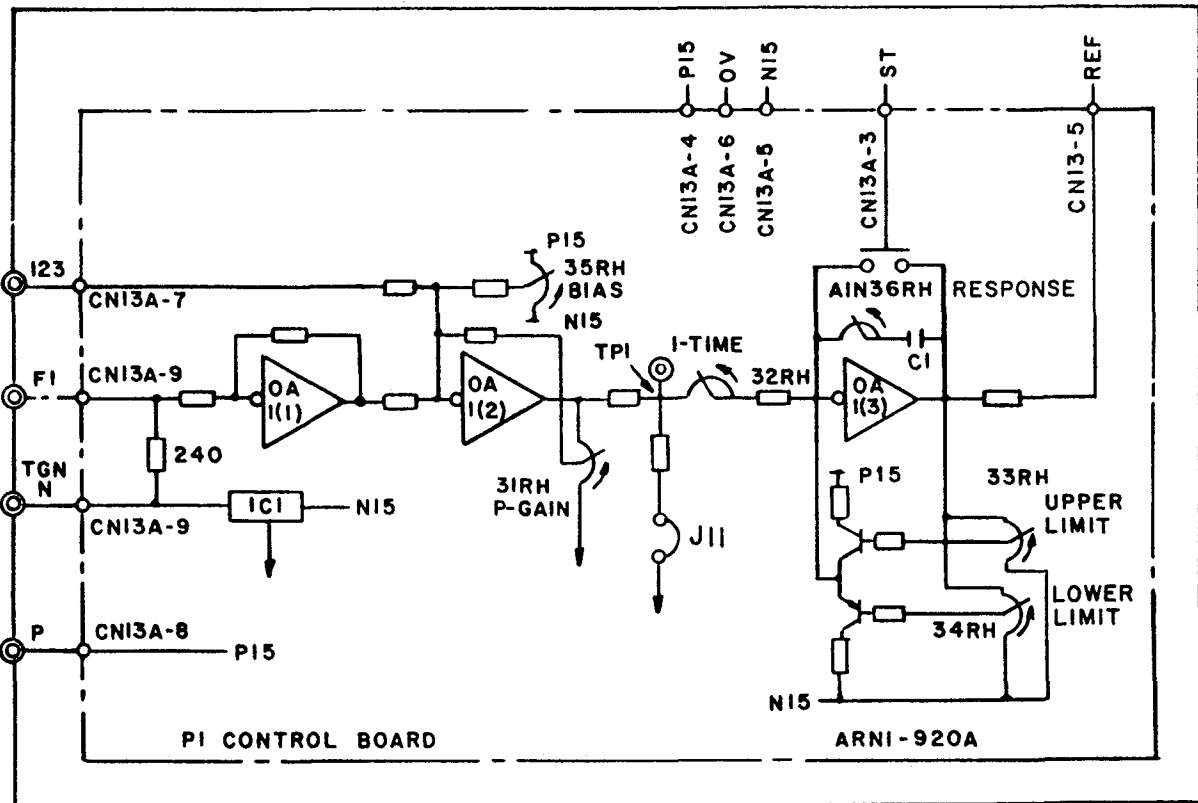
Auto Run Mode:

24. Place drive in Auto Run mode.

25. Place SET POINT adjustment at zero (fully CCW).

26. Apply minimum pressure converter signal (4mA or +1 VDC).

27. Refer to the PI Control PCB block diagram (Figure 10) and make the following adjustments.



THE ARROW ON THE VARIABLE RESISTOR INDICATES CLOCKWISE ROTATION

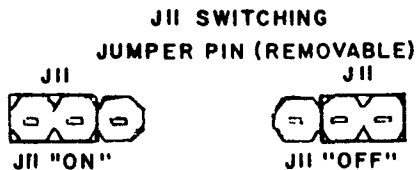


FIGURE 10. BLOCK DIAGRAM - PI CONTROL PCB

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a. Bias adjustment (35RH) - The bias voltage is adjusted to obtain zero voltage at the output of OAl-(2) when the set point reference voltage is at zero and pressure converter feedback signal is at its minimum (4mA or +1 VDC). Adjust 35RH to obtain zero volts at TP1.

b. Proportional gain adjustment (31RH) - The gain increases when turned CCW. The range of proportional gain is from 0.2 to 20. Adjust to the appropriate value according to the process to be controlled.

c. Integration time adjustment (32RH, J11) - The integration time is extended when turned CCW. The range of integration time is 1.2 to 12 seconds with J11 in the OFF position, and 12 to 120 seconds with J11 in the ON position. Adjust the integral time to the appropriate delay value requirement of the process to be controlled.

d. Process control response adjustment (36RH) - Response time is increased when turned CW.

If the control system is unstable and hunting occurs, increase the response time to stabilize the control system. If it cannot be stabilized with 36RH, increase the integral time with 32RH.

NOTE

Hunting may also occur when the accel/decel time (as set by adjustments 7RH and 8RH on the Main Control PCB) is too long. However, if the accel/decel time is set too short the speed reference signal will be decreased and the letters OC may be displayed indicating an overcurrent condition in the motor circuit. Too short of a deceleration time coupled

with a large motor inertia load may also cause an overvoltage condition in the DC link circuit and the letters OP may be displayed. The accel/decel times must be extended if either of these two conditions are encountered.

e. Output limit adjustments (33RH, 34RH) - These two adjustments set the Auto mode minimum and maximum frequency.

(1). With the Set Point reference voltage at zero, adjust 34RH for minimum desired output frequency.

IMPORTANT

This adjustment WILL NOT allow for a lower minimum frequency setting than that which was set in the Manual mode of operation.

(2). With the Set Point reference voltage at 100%, adjust 33RH for maximum desired output frequency.

NOTE

This adjustment WILL NOT allow for a higher maximum frequency setting than that which was set in the Manual mode of operation.

28. Check inverter instructions manual and other mod kit instruction sheets to ensure that all wiring required for proper operations have been completed.

29. Close and secure all enclosure covers.

30. Place this instruction sheet immediately behind the inverter instruction manual front cover.

This completes the installation of this kit.

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