

EDDY CURRENT

MOD 7HC

MOD 7HC

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*Installation • Operation • Maintenance*

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*Eddy  
Current  
Drives*

*Technical Manual  
TM 2201*

*This instruction manual covers installation, operation, adjustments and maintenance of the equipment, but does not provide for every possible circumstance that may occur, nor does it define all modifications, variations or details of the equipment. Should further information be desired or should particular problems develop which are not covered sufficiently herein, please contact your nearest MagneTek Drives & Systems representative.*

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## **EQUIPMENT STORAGE**

For long periods of storage, equipment should be covered to prevent corrosion. Equipment should be stored in a clean, dry location. After storage, insure that equipment is dry and no condensation has accumulated before applying power. All rotating equipment stored longer than three months requires regreasing.

## **\*\*SAFETY FIRST\*\***

This equipment has been designed to provide maximum safety for operating personnel. However, hazardous voltages exist within the confines of the enclosure. Installation and servicing should therefore be accomplished by qualified personnel only and in accordance with OSHA regulations.

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# **GROUNDING**

## **GENERAL**

For your convenience in grounding the controller, operator's control station or clutch, a ground stud is located within the controller. The ground connection can be made using any high quality, commercially available terminal.

## **CSA INSTALLATIONS**

When normal grounding techniques such as Electrical Metallic Tubing (EMT) are not employed, CSA requires that the ground termination be made via CSA approved terminals. If unable to obtain locally, the CSA terminal may be obtained from your local MagneTek Drives & Systems office. Refer to ground kit part number 46S02547-0010

## GENERAL DESCRIPTION

The MOD 7 Controller converts single phase AC power to controlled DC power. This controlled DC power is applied to the field coil of a magnetic clutch. The amount of field

coil excitation controls the drive output speed. The Controller is capable of controlling the output speed of both air and liquid cooled eddy current drives.

## SPECIFICATIONS

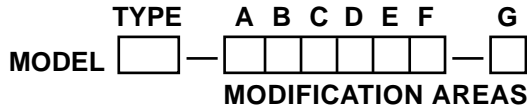
|  | HC2                           | HC2 with Integral Transformer |
|--|-------------------------------|-------------------------------|
| Input Voltage                          | 115 VAC + 10%, -5%            | 230/460 VAC + 10%, -5%        |
| Input Current                          | 2.5 Amps                      | 1.3/0.7 Amps                  |
| AC Frequency                           | 50/60 Hz                      | 50/60 Hz                      |
| Clutch Output                          | 0-95 VDC, 0-2.5 Amps          | 0-90 VDC, 0-2.5 Amps          |
| Brake Output                           | 95 VDC, 1.85 Amps             | 90 VDC, 1.85 Amps             |
| Speed Regulation                       | 0.5% of Top Speed             | 0.5% of Top Speed             |
| Drift                                  | 0.5% of Top Speed             | 0.5% of Top Speed             |
| Minimum Regulated Speed                | 50 RPM                        | 50 RPM                        |
| Tachometer Voltage<br>(at rated speed) | 17-106 VAC or<br>19.2-150 VDC | 17-106 VAC or<br>19.2-150 VDC |
| Ambient Temperature                    | 0-45°C                        | 0-45°C                        |
| Size                                   | 12.25"W x 11.62"H x 6.88"D    | 12.25"W x 14.74"H x 6.88"D    |
| Weight                                 | 9.75 Lb.                      | 21 Lb.                        |
| Fuse 1F                                | Buss ABC 3 Amps               | Buss ABC 3 Amps               |

# CONTROLLER TYPE AND MODEL IDENTIFICATION

Two methods have been established for identifying the Controller with various modifications.

## METHOD 1

This method consists of a Model Type number followed by seven digits. The Model Type number is located on the Regulator (black) cover. The first six digits correspond to the



six modification areas (A through F) on the Regulator PCB, and the seventh digit (G) refers to enclosure and transformer types. The seven digits may be obtained from the identification plates on the Regulator cover after all

Modification Kits are installed. Insert the Modification Kit number into the block corresponding to each modification area. If no Modification Kit is installed for a given area, insert the number zero in that block

## METHOD 2

If the Controller is custom designed, a serial number will be assigned at the factory and will be located on the Controller nameplate. Record the serial number in the space below.

**SERIAL NUMBER** \_\_\_\_\_

**DATE INSTALLED** \_\_\_\_\_

## MODIFICATION KITS

**Table 1. STANDARD MODIFICATION KITS**

Modification Kits for the MOD 7 eddy current drives are listed in Table 1. These Modification Kits enable modification of the basic Controller for a variety of control and operational functions. Contact your MagneTek Drives & Systems representative for ordering information for these Modification Kits.

| <b>MOD AREA</b> | <b>DESCRIPTION</b>                      | <b>PART NUMBER</b>  |
|-----------------|---|---------------------|
| <b>A</b>        | 1 Linear Accel/Decel                    | <a href="#">A1K</a> |
|                 | 2 Linear Accel/Decel with S-Curve       | <a href="#">A2K</a> |
|                 | 3 Dancer Position                       | <a href="#">A3K</a> |
|                 | 4 Dancer Trim                           | <a href="#">A4K</a> |
|                 | 5 Clutch Current                        | <a href="#">A5K</a> |
|                 | 6 Clutch Current/Speed                  | <a href="#">A6K</a> |
|                 | 7 Dancer Position/Speed                 | <a href="#">A7K</a> |
|                 | 8 Log Accel/Decel                       | <a href="#">A8K</a> |
| <b>B</b>        | 1 Voltage Follower                      | <a href="#">B1K</a> |
|                 | 2 Current Follower                      | <a href="#">B2K</a> |
|                 | 3 Voltage Follower with Man/Auto        | <a href="#">B3K</a> |
|                 | 4 Current Follower with Man/Auto        | <a href="#">B4K</a> |
|                 | 5 Master Reference                      | <a href="#">B5K</a> |
| <b>C</b>        | 1 Jog, Separately Adjustable            | <a href="#">C1K</a> |
|                 | 2 Thread, Separately Adjustable         | <a href="#">C2K</a> |
|                 | 3 Jog and Thread, Separately Adjustable | <a href="#">C3K</a> |
|                 | 4 Thread (Remote Adjustable)            | <a href="#">C4K</a> |
| <b>D</b>        | 1 Controlled Stop                       | <a href="#">D1K</a> |
|                 | 2 Adjustable Trip                       | <a href="#">D2K</a> |
|                 | 3 Differential Trip                     | <a href="#">D3K</a> |
| <b>E</b>        | 1 Adjustable Breakaway                  | <a href="#">E1K</a> |
|                 | 2 Torque Limit                          | <a href="#">E2K</a> |
|                 | 3 Torque Limit (Motor Current)          | <a href="#">E3K</a> |
| <b>F</b>        | 1 Adjustable Braking                    | <a href="#">F1K</a> |
|                 | 6 Brake Economy                         | <a href="#">F6K</a> |

## REPLACEMENT PARTS

Spare parts for the standard HC2 Controller are listed in Table 2. Custom designed orders may require special parts other than those listed in the table. When ordering spare parts for custom designed orders, specify the model number

and serial number stamped on the Controller nameplate. Contact your MagneTek Drives & Systems representative for parts ordering information.

**Table 2. SPARE PARTS LIST**

| DESCRIPTION                         | SYMBOL | PART NUMBER   | Recommended Stock Quantity<br>Based on Number of Identical<br>Drives or Assemblies |       |         |            |
|-------------------------------------|--------|---------------|--|-------|---------|------------|
|                                     |        |               | 1 - 4  | 5 - 9 | 10 - 25 | 26 or More |
| Fuse, 3 amps                        | 1F     | 05P00017-0138 | 5  | 10    | 15      | 20         |
| AC Relay                            | 1CR    | 05P00036-0287 | 0  | 1     | 2       | 2          |
| Regulator PCB                       |        | 46S02354-0012 | 1  | 2     | 3       | 4          |
| Potentiometer 2.5K                  |        | 05P00040-0137 | 1  | 1     | 2       | 2          |
| Modification PCB's                  |        |               |  |       |         |            |
| Linear Accel/Decel                  | A1     | 46S02042-0020 | 1  | 1     | 2       | 2          |
| Linear Accel/Decel w S-Curve        | A2     | 46S02042-0010 | 1  | 1     | 2       | 2          |
| Dancer Position                     | A3     | 46S02050-0041 | 1  | 1     | 2       | 2          |
| Dancer Trim                         | A4     | 46S02050-0011 | 1  | 1     | 2       | 2          |
| Clutch Current                      | A5     | 46S02064-0050 | 1  | 1     | 2       | 2          |
| Clutch Current / Speed              | A6     | 46S02050-0031 | 1  | 1     | 2       | 2          |
| Dancer Position / Speed             | A7     | 46S02050-0021 | 1  | 1     | 2       | 2          |
| Log Accel                           | A8     | 46S02085-0010 | 1  | 1     | 2       | 2          |
| Voltage Follower                    | B1     | 46S02044-0020 | 1  | 1     | 2       | 2          |
| Current Follower                    | B2     | 46S02043-0020 | 1  | 1     | 2       | 2          |
| Voltage Follower M / A              | B3     | 46S02044-0010 | 1  | 1     | 2       | 2          |
| Current Follower M / A              | B4     | 46S02043-0010 | 1  | 1     | 2       | 2          |
| Master Reference                    | B5     | 46S02052-0010 | 1  | 1     | 2       | 2          |
| Jog                                 | C1     | 46S02049-0010 | 1  | 1     | 2       | 2          |
| Thread                              | C2     | 46S02049-0020 | 1  | 1     | 2       | 2          |
| Jog / Thread                        | C3     | 46S02049-0030 | 1  | 1     | 2       | 2          |
| Thread (Remote Adjust)              | C4     | 46S02138-0010 | 1  | 1     | 2       | 2          |
| Controlled Stop                     | D1     | 46S02047-0010 | 1  | 1     | 2       | 2          |
| Adjustable Trip                     | D2     | 46S02047-0020 | 1  | 1     | 2       | 2          |
| Diff. Trip                          | D3     | 46S02047-0030 | 1  | 1     | 2       | 2          |
| Adjustable Breakaway                | E1     | 46S02046-0010 | 1  | 1     | 2       | 2          |
| Torque Limit (Clutch Current)       | E2     | 46S02045-0010 | 1  | 1     | 2       | 2          |
| Torque Limit (Motor Current)        | E3     | 46S02151-0020 | 1  | 1     | 2       | 2          |
| Adjustable Brake                    | F1     | 46S02048-0010 | 1  | 1     | 2       | 2          |
| Brake Economy                       | F6     | 46S02467-0010 | 1  | 1     | 2       | 2          |
| Ribbon Cable, 3.5 in. (for mod PCB) |        | 05P00034-0232 | 0  | 0     | 0       | 0          |
| Ribbon Cable, 10 in. (for mod PCB)  |        | 05P00034-0234 | 0  | 0     | 0       | 0          |
| Hold Down Clip (for ribbon cable)   |        | 05P00001-0126 | 0  | 0     | 0       | 0          |
| Standoff                            |        | 05P00065-0055 | 0  | 0     | 0       | 0          |
| Extracting Tool                     |        | 05P00065-0058 | 0  | 0     | 0       | 0          |
| Potentiometer                       |        | 43T01232-0000 | 0  | 0     | 0       | 0          |
| Jumper Plug                         | 1 CONN | 46S02064-0010 | 0  | 0     | 0       | 0          |
| Jumper Plug                         | 2 CONN | 46S02064-0020 | 0  | 0     | 0       | 0          |
| Jumper Plug                         | 3 CONN | 46S02064-0030 | 0  | 0     | 0       | 0          |
| Jumper Plug                         | 4 CONN | 46S02064-0040 | 0  | 0     | 0       | 0          |
| Jumper Plug                         | 6 CONN | 46S02064-0060 | 0  | 0     | 0       | 0          |

# INSTALLATION

## MECHANICAL

Mounting dimensions recommended for installation are given in Figure 1. The Controller is designed for wall mounting; however, exact positioning is not critical.

## ELECTRICAL

The electrical interconnection is shown on the last pages of this manual. The diagrams and table include interconnection with factory supplied equipment as well as user supplied equipment. If Modification Kits have been included as part of this unit, they should be installed according to the instructions contained within this manual and within the Modification Kit before power is applied to the Controller.

## NOTE

Insure that continuity plugs are properly inserted for all unused Modification Areas. Area E does not require a continuity plug.

## SYSTEM APPLICATION

When the system application calls for two or more Mod 7 Controllers to operate from a single reference source, such as a follower or master reference, isolation transformers are required on each Controller. The use of isolation transformers enables the system to operate with a single reference common.

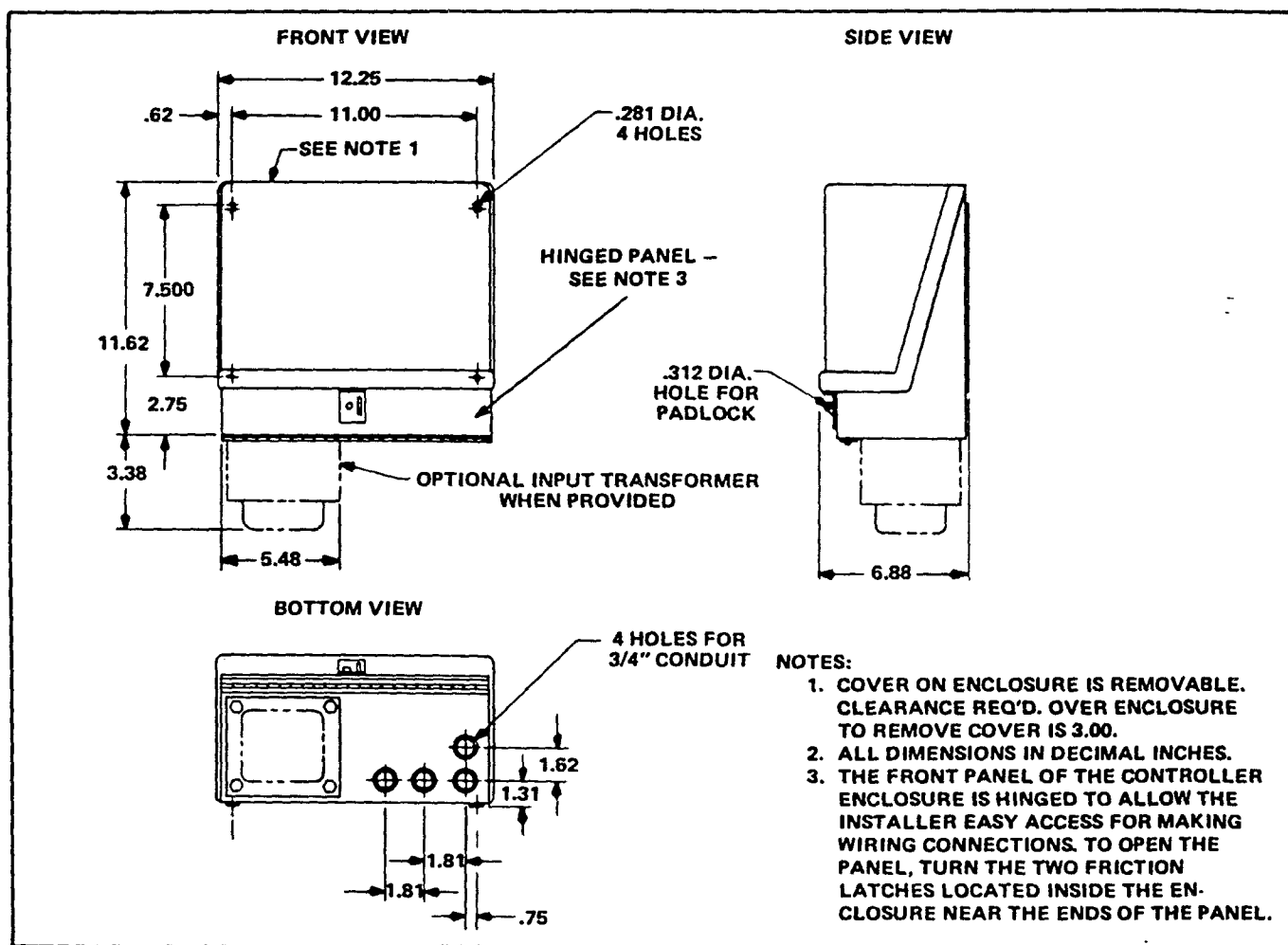


Figure 1. Controller Installation Dimensions



# DESCRIPTION OF CONTROLS

Controls are provided on and under the Regulator cover to enable calibration of drive performance.

These controls are illustrated and their function described in the figure and table below.

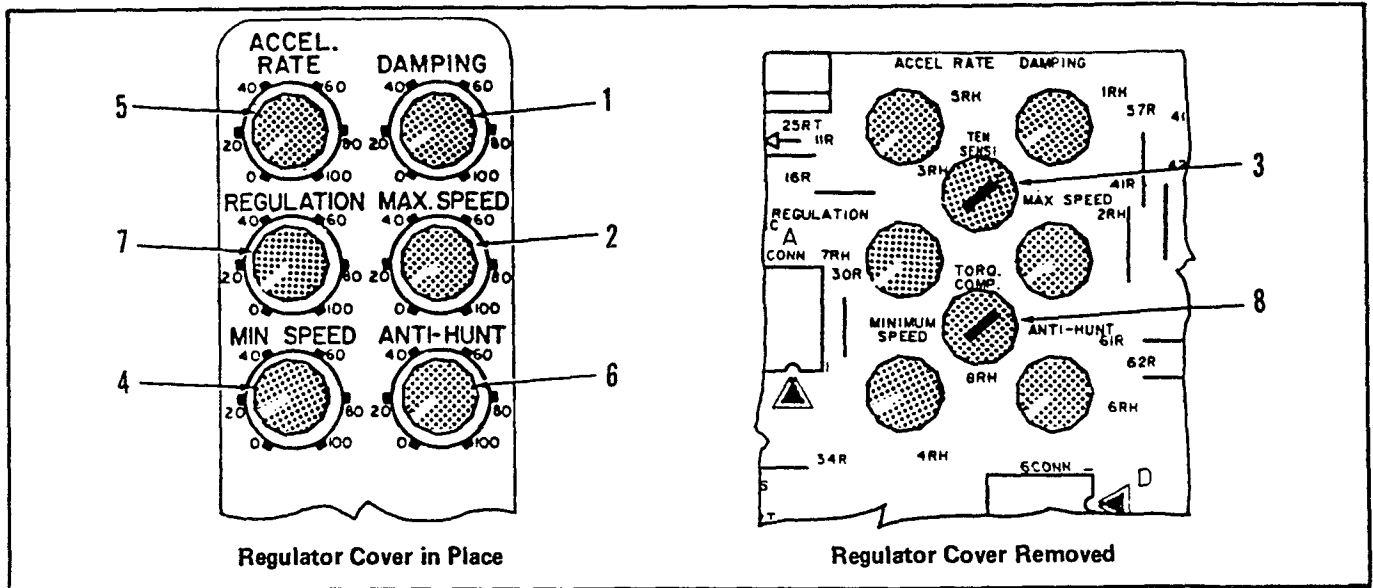


Figure 2. Location of Controls

Table 3. Function of Controls

| REF. NO. | CONTROL NAME                   | FUNCTION   |
|----------|--------------------------------|--|
| 1        | DAMPING (1RH)                  | Stabilizes drive speed with various loads. Provides tachometer rate feedback to control speed overshoot. Turning knob clockwise provides more damping and reduces speed overshoot.   |
| 2        | MAX SPEED (2RH)                | Calibrates tachometer to drive SPEED CONTROL adjustment. Turning knob clockwise increases maximum speed.   |
| 3        | TENSION SENSITIVITY (3RH)<br>* | Adjusts the steady state gain at the Controller when in the Tension or Direct Torque Control mode. Calibrates the tension control reference with the actual eddy current machine used. Turning control clockwise increases machine torque output for a given input signal. |
| 4        | MIN SPEED (4RH)                | Sets minimum running speed of the drive when SPEED CONTROL is set at zero. Turning knob clockwise increases the minimum speed.   |
| 5        | ACCEL RATE (5RH)               | Adjusts the acceleration rate of the drive reference. Turning knob clockwise increases the rate and reduces acceleration time.   |
| 6        | ANTI-HUNT (6RH)                | Stabilizes the drive Controller with the actual eddy current machine used. Turning knob clockwise increases the Controller stability   |
| 7        | REGULATION (7RH)               | Adjusts the steady state gain of the Controller when in the Speed Control mode<br>Turning knob clockwise increases gain and increases the regulating ability of the drive.   |
| 8        | TORQ. COMP. (8RH)<br>*         | Adjusts the drive Controller to compensate for wide variations in the torque response of various eddy current clutches. Turning control clockwise slows down the Controller ANTI-HUNT circuit to match the torque-time response of slow-acting eddy current machines.      |

\* Make adjustment by inserting tip of screwdriver blade in slot of potentiometer wheel and turning.

# ADJUSTMENTS

## INITIAL SWITCH SETTINGS

If the tachometer voltage expected at maximum drive speed is known or can be calculated, selector switches 1SS and 2SS should be preset as follows:

| TACHOMETER VOLTAGE AT MAX SPEED |         | SELECTOR SWITCH |        |
|---------------------------------|---------|-----------------|--------|
| VAC                             | VDC     | 1SS             | 2SS    |
| 17-40                           | 19.2-48 | CLOSED          | CLOSED |
| 36-82                           | 40-98   | OPEN            | CLOSED |
| 54-106                          | 60-150  | OPEN            | OPEN   |

If the tachometer voltage is not known, begin the adjustment procedure with both 1SS and 2SS closed.

Set selector switches 3SS, 5SS, and 6SS as listed below for the type of machine being used. This selects the proper error amplifier capacitor on the Regulator PCB for optimum performance of the Controller.

| TYPE OF MACHINE | SWITCH |       |       |
|-----------------|--------|-------|-------|
|                 | 3SS    | 5SS   | 6SS   |
| WATER COOLED    | CLOSE  | OPEN  | OPEN  |
| SLIP RINGS      | OPEN   | CLOSE | OPEN  |
| BRUSHLESS       | OPEN   | OPEN  | CLOSE |

Verify the factory settings of the following switches:

7SS      CLOSED  
8SS      OPEN

**DO NOT CHANGE.**

## ADJUSTMENTS-ENERGIZED DRIVE

Before energizing the drive, set controls as follows:

1. DAMPING (1RH) - Set at 20%.
2. MAX SPEED (2RH) - Set at zero.
3. TENSION SENSITIVITY (3RH) - Set at zero.
4. MIN SPEED (4RH) - Set at zero.
5. ACCEL RATE (5RH) - Set at 60%.
6. ANTI-HUNT (6RH) - Set at 80%.
7. REGULATION (7RH) - Set at 80%.
8. TORQ. COMP. (8RH) - Set at zero. (See Note.)
9. SPEED CONTROL (located on Operator Control Station) - Set at zero.

### NOTE: CLUTCH OUTPUT STABILITY

Some eddy current clutches have a slow buildup and decay of torque with field current changes. These machines are typically of older design, large in horsepower capacity and are likely to be liquid cooled. Normal setting of the ANTI-HUNT and DAMPING adjustments may not give adequate drive performance or stability. If the drive hesitates or oscillates during rapid acceleration or is particularly difficult to stabilize, turn the TORQ. COMP. adjustment to optimize performance, and readjust ANTI-HUNT as described in Step G. A 50% setting of TORQ. COMP. will improve operation with most liquid cooled machines.

Operation of ANTI-HUNT, DAMPING and TORQ. COMP. adjustments interact somewhat in terms of drive stability. It is possible to overcompensate with these adjustments, resulting in poor dynamic performance. Best results will be obtained when the adjustment settings are at the minimum level required to meet stability criteria.

- A. Start AC motor and apply power to Controller.
- B. Press RUN push button.
- C. Slowly turn SPEED CONTROL fully clockwise and observe drive speed increase.
- D. With SPEED CONTROL fully clockwise, turn MAX SPEED potentiometer clockwise until desired maximum operating speed is reached. Do not set MAX SPEED potentiometer to a setting which will allow a clutch speed higher than that indicated on nameplate.

## NOTE

If the desired maximum speed cannot be obtained, in Step D, stop the drive, turn off power to the Controller and open 1SS. Restore Controller power and repeat the MAX SPEED adjustment procedure. If the desired maximum speed still cannot be reached, again stop the drive, turn off Controller power and open 2SS. Again restore Controller power and repeat the MAX SPEED adjustment procedure. If the desired maximum speed cannot be reached with both 1SS and 2SS open, either the drive is overloaded or the tachometer voltage is too high for the application and must be reduced externally.

- E. Turn SPEED CONTROL fully counterclockwise and observe drive speed decrease.
- F. Turn MIN SPEED potentiometer clockwise until desired minimum operating speed is reached. If the desired minimum speed is zero, set this adjustment as high as possible, i.e. just below the point where the drive will begin to rotate. Note that the friction load placed on the machine by other connected equipment must be great enough to prevent shaft rotation with the normal transmitted torque through the eddy current clutch produced by air or liquid cooling.
- G. Turn off power to the Controller and connect a DC voltmeter to tachometer output terminals 1 (+) and 2 of the Controller. With power applied, restart the drive and set SPEED CONTROL to 50%. Slowly reduce the ANTI-HUNT adjustment until the drive speed becomes erratic and "hunts." Slowly increase ANTI-HUNT until the drive is stable again. No further adjustment of ANTI-HUNT should be necessary. (See CLUTCH OUTPUT STABILITY Note.)
- H. Turn ACCEL RATE to maximum. Quickly set SPEED CONTROL to a new position and observe drive speed performance with the tachometer voltmeter connected in Step G. Adjust DAMPING as required to obtain the fastest new speed settling time with a minimum of speed overshoot. Turn off power to Controller and remove tachometer voltmeter. (See CLUTCH OUTPUT STABILITY Note.)
- I. Turn ACCEL RATE potentiometer counterclockwise to 0%. Reapply power to Controller.
- J. Turn SPEED CONTROL fully clockwise and start and stop drive several times while observing acceleration rate. Adjust ACCEL RATE potentiometer to give desired acceleration rate.
- K. When equipment conditions permit, adjust REGULATION to achieve the required speed regulation ability under actual machine load operating conditions. Increasing the REGULATION setting may require slight readjustment of ANTI-HUNT for optimum performance.
- L. When auxiliary equipment is connected that requires direct torque control, refer to the instructions furnished with that equipment for setting the TENSION SENSITIVITY adjustment.

## START/STOP INSTRUCTIONS

After installation and adjustments have been completed, the drive can be started and stopped for normal operation in the following manner.

### TO START DRIVE

1. Start AC motor and apply power to Controller.
2. Press RUN push button.
3. Advance SPEED CONTROL to desired drive speed.

### TO STOP DRIVE

1. Press STOP push button.
2. Stop AC motor.

### LEGEND, FIGURE 3

1. Regulator PCB
2. 11CONN, Test Points
- 3 12CONN, Test Points
- 4 4RH, Minimum Speed pot
5. 7RH, Regulation pot
- 6 5RH, Accel Rate Pot
- 7 1 RH, Damping pot
- 8 3RH, Tension Sensitivity pot
- 9 2RH, Maximum Speed pot
- 10 8RH, Torq. Comp pot
11. 6RH, Anti-Hunt pot
- 12 Continuity Plug 6CONN
- 13 Continuity Plug 4CONN
- 14 Jumper, normally factory installed (see Theory of Operation section for description)
- 15 1CR, Run Relay
16. Jumper, factory installed, Drive Without Interlock
17. Terminal Block H1-H4, (only with integral XFMR)
- 18 Integral Input Transformer (when supplied)
19. Switch 4SS, filter. Close when AC tach is used.
- 20 Continuity Plug 3CONN
21. Switch 7SS, factory set to closed position.
22. Switch 8SS, factory set to open position.
- 23 Switches 3SS, 5SS & 6SS Error Amplifier Capacitor Selection
- 24 Switches 1SS & 2SS, Tach Scaling
25. Continuity Plug 2CONN
- 26 1PT, Power Supply Transformer
27. Fuse 1F (fuse retainer secures Regulator cover in place)
- 28 Continuity Plug 1CONN

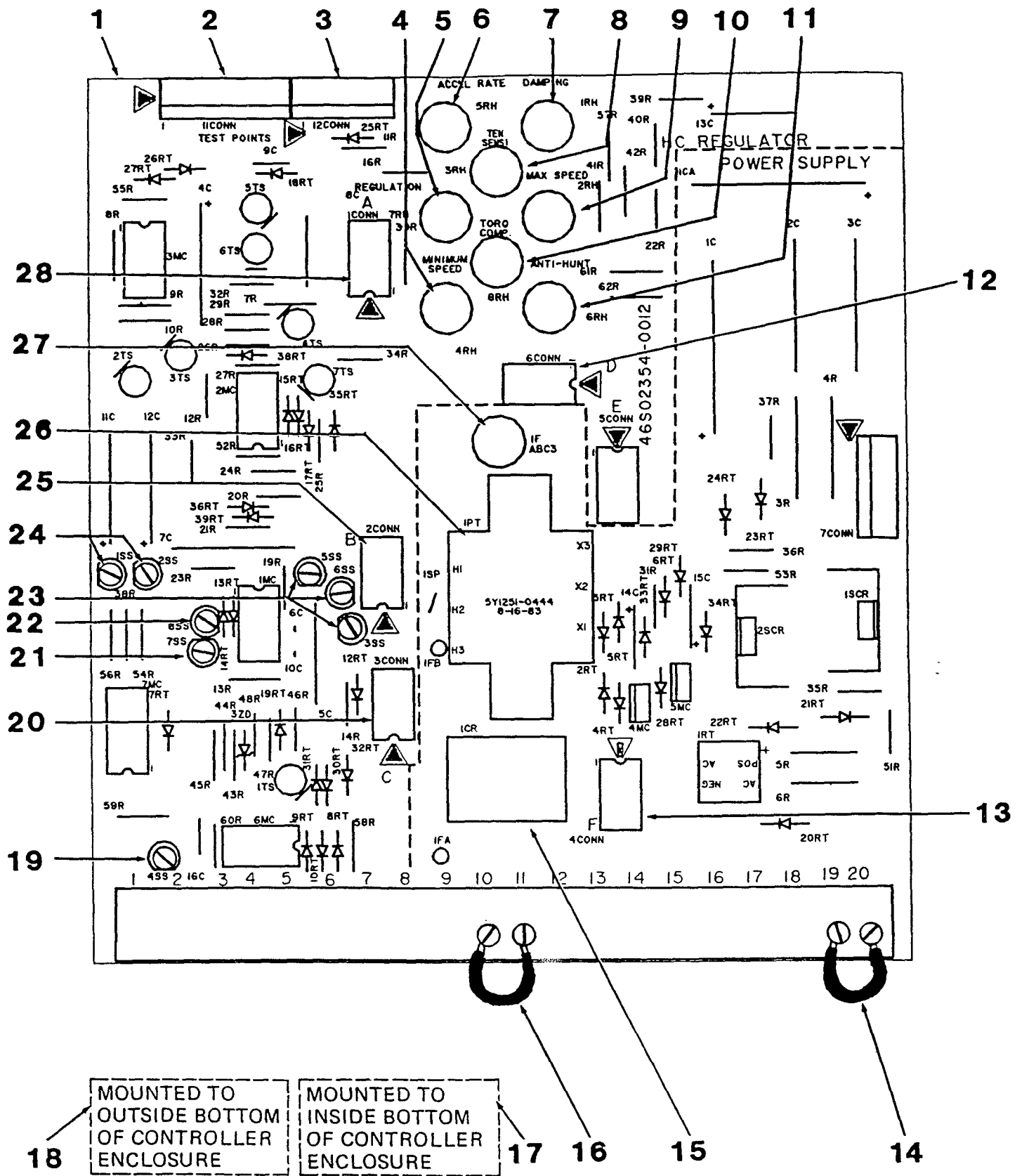


Figure 3. HC2 Controller, Major Component Location

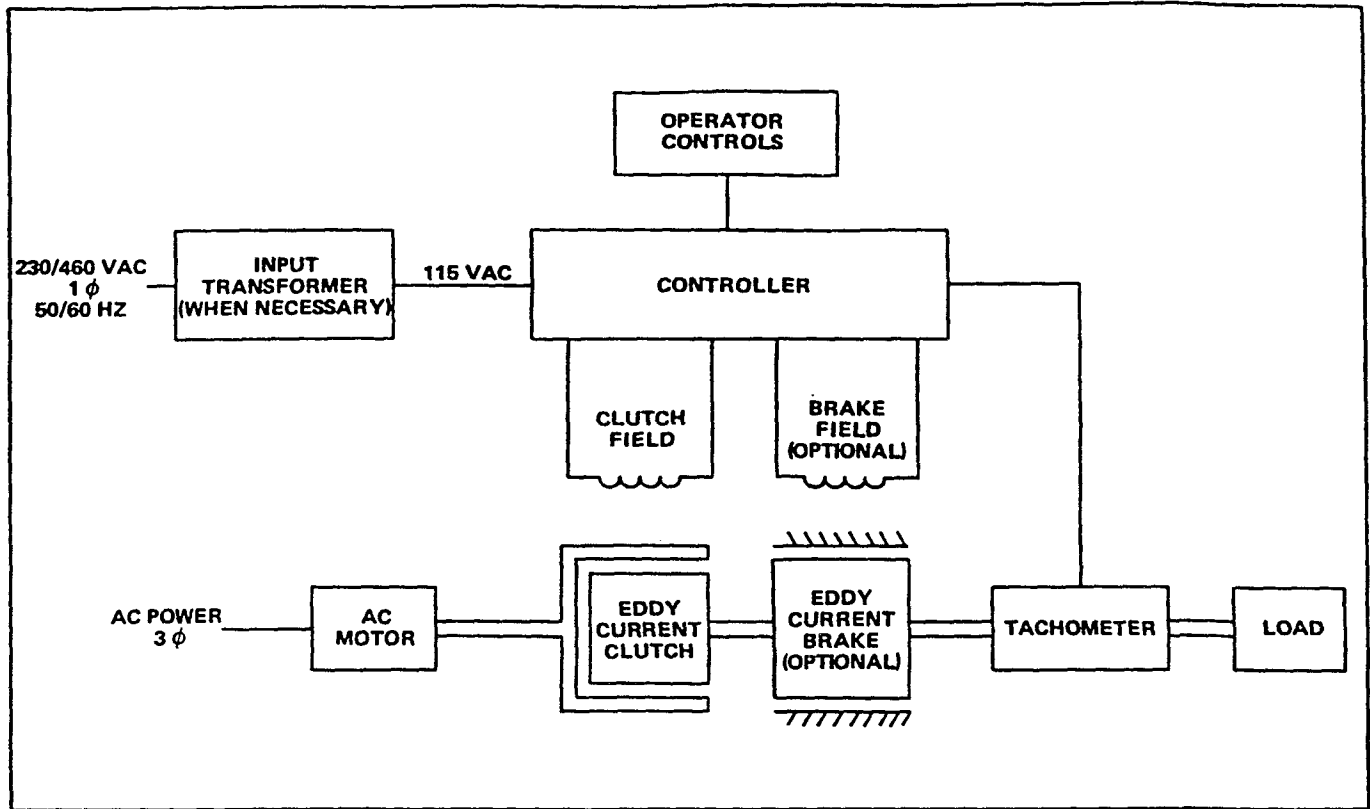


Figure 4. Eddy Current Drive System

# THEORY OF OPERATION

## DRIVE OPERATION

A typical eddy current drive system (Figure 4) consists of a MOD 7 Controller, AC motor, eddy current clutch, tachometer generator and an optional brake. Torque is transmitted from the AC motor to the load when the clutch field coil is excited by DC current from the Controller. Power to the clutch field coil is varied by the Controller to maintain desired speed or torque by means of a feedback signal.

## CONTROLLER OPERATION

Figure 9 is a simplified schematic diagram of the Controller. The external wiring installed by the user for typical operator controls and clutch and brake field coils is shown as dashed lines. Also shown are the connection terminals for tachometer generators. The areas for optional plug-in modifications are enclosed by dashed lines. When modifications have been installed, the appropriate circuitry will be shown within the designated area. When these modifications are to be installed by the user, refer to page 14 for schematic diagram modification instructions.

A reference signal (from the SPEED CONTROL) proportional to the desired speed is applied to the Acceleration Control via modification areas C, D and A. The Acceleration Control limits the rate of increase in drive speed by controlling the rate of rise of the Reference signal. The output of the Acceleration Control is applied as a reference to the Error Amplifier (1MC and associated components) via modification areas A and B. A tachometer speed feedback signal is also applied to the Error Amplifier via modification area A. Any difference between the speed reference and feedback signals is amplified and used as a power command signal to the Phase Control Firing Circuit. This circuit regulates the timing of SCR triggering with respect to the AC power line and thereby controls the magnitude of the rectified power applied to the eddy current clutch field.

A signal proportional to current flow in the eddy current clutch field is developed across power resistors 5R and 6R. This signal is amplified and used to stabilize the Controller via the ANTI-HUNT adjustment and associated components. In the Speed Regulating or Tension Regulating operating modes that signal is also used to control gain or regulating ability of the Error Amplifier via the REGULATION or TENSION SENSITIVITY adjustments, respectively.

Relay 1CR is used in conjunction with operator controls as a RUN relay. In the STOP condition, relay 1CR contacts deenergize the clutch circuit and transfer power to the brake circuit (when used).

## CAUTION

PROLONGED EXCITATION OF EDDY-CURRENT BRAKES AT ZERO SPEED MAY CAUSE EXCESSIVE HEATING AND COIL INSULATION DAMAGE. DEPRESSING THE CONTROLLER "STOP" BUTTON CAUSES EXCITATION TO BE APPLIED TO THE BRAKE REMOVE INPUT POWER TO THE CONTROLLER TO REMOVE EXCITATION TO THE EDDY-CURRENT BRAKE.

## NOTE

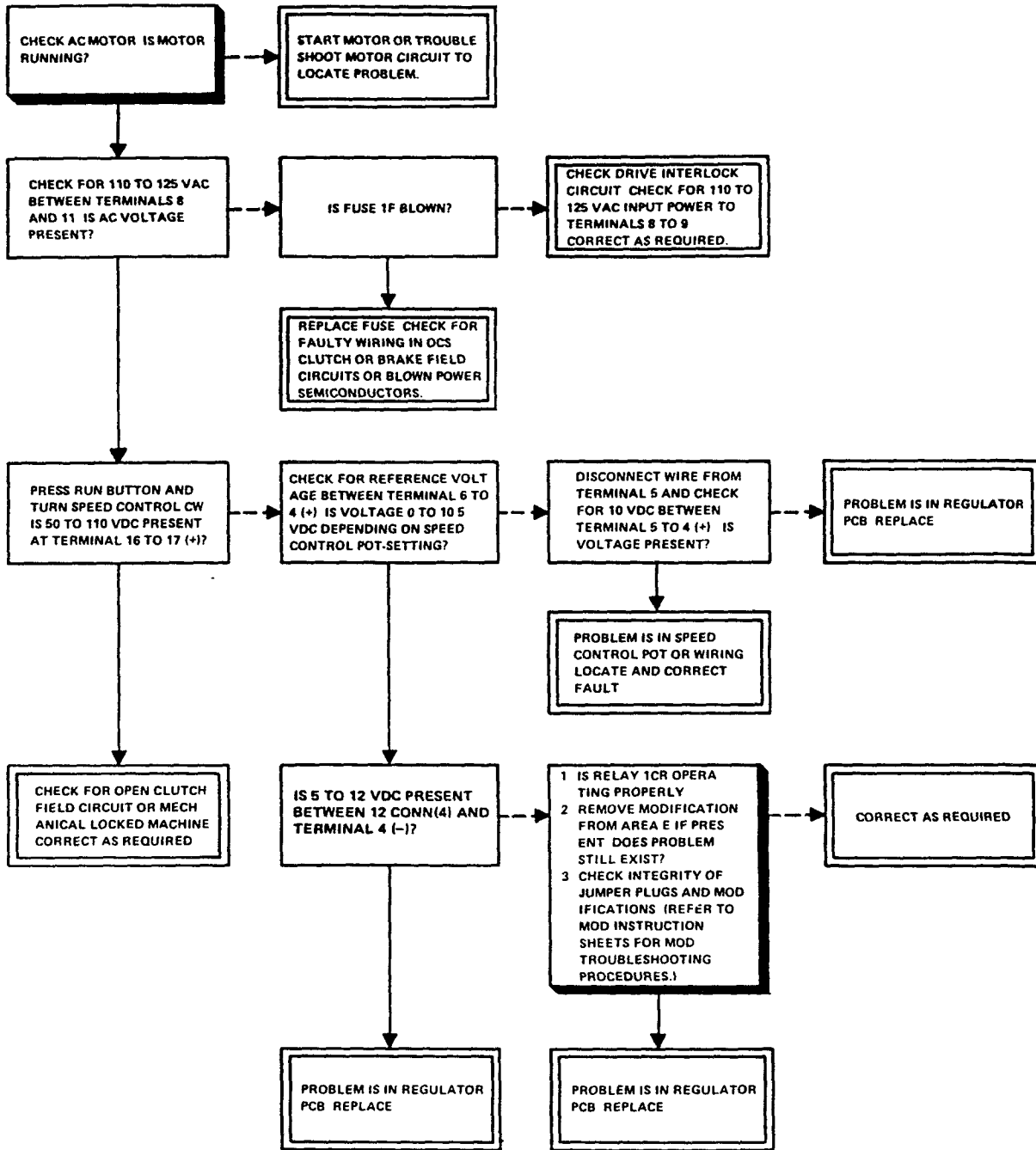
When a Brake Economy Modification Kit (F6) is installed, the Controller has adjustable braking with Brake Economy. The addition of this modification to the Controller enables the operator to adjust the brake coil voltage from 5 to 95 volts DC. The on/off control of the brake is determined by the run/stop status of the drive. The brake is activated when the STOP button is pressed. The brake is deactivated when the unit is restarted. However, if the unit is stopped for more than approximately 6.5 minutes, the brake economy feature of the option automatically de-energizes the brake circuit. This feature is provided to prevent the brake coil from overheating if the unit is stopped with input power applied for long periods of time.

The Phase Back Control circuit, also operated by relay 1CR, provides a coordinated startup and shutdown of the Error Amplifier, Phase Control Firing Circuit and Acceleration Control for smooth starting.

An interlocking contact or switch may be wired between terminals (10) and (11) on the main terminal strip (1TB) as shown in the schematic diagram. The purpose of this interlock is to prevent drive operation when unsafe or damaging circumstances exist such as open machine guards, machine overtemperature, low liquid coolant pressure, etc. If this feature is not used, leave the jumper wire installed between terminals (10) and (11) for proper operation of the Controller.

Another feature of the drive provides to the customer the capability to independently control the energizing voltage to the clutch field. This is accomplished by first removing the jumper and then wiring an external contact between terminals (19) and (20) on the main regulator board (see Figure 9). Normally, the jumper should be in place if an external contact is not used (see Figure 3). However, due to the versatility of the features, the factory may have, based on the customer purchase order, added additional internal circuitry between these two terminals and removed the jumper before shipment. **Therefore DO NOT replace the jumper or add external circuitry without first reviewing the schematic shipped with the drive to determine what effect this action would have on equipment operation.**

# TROUBLESHOOTING CHART: DRIVE DOES NOT RUN



## TROUBLESHOOTING CHARTS

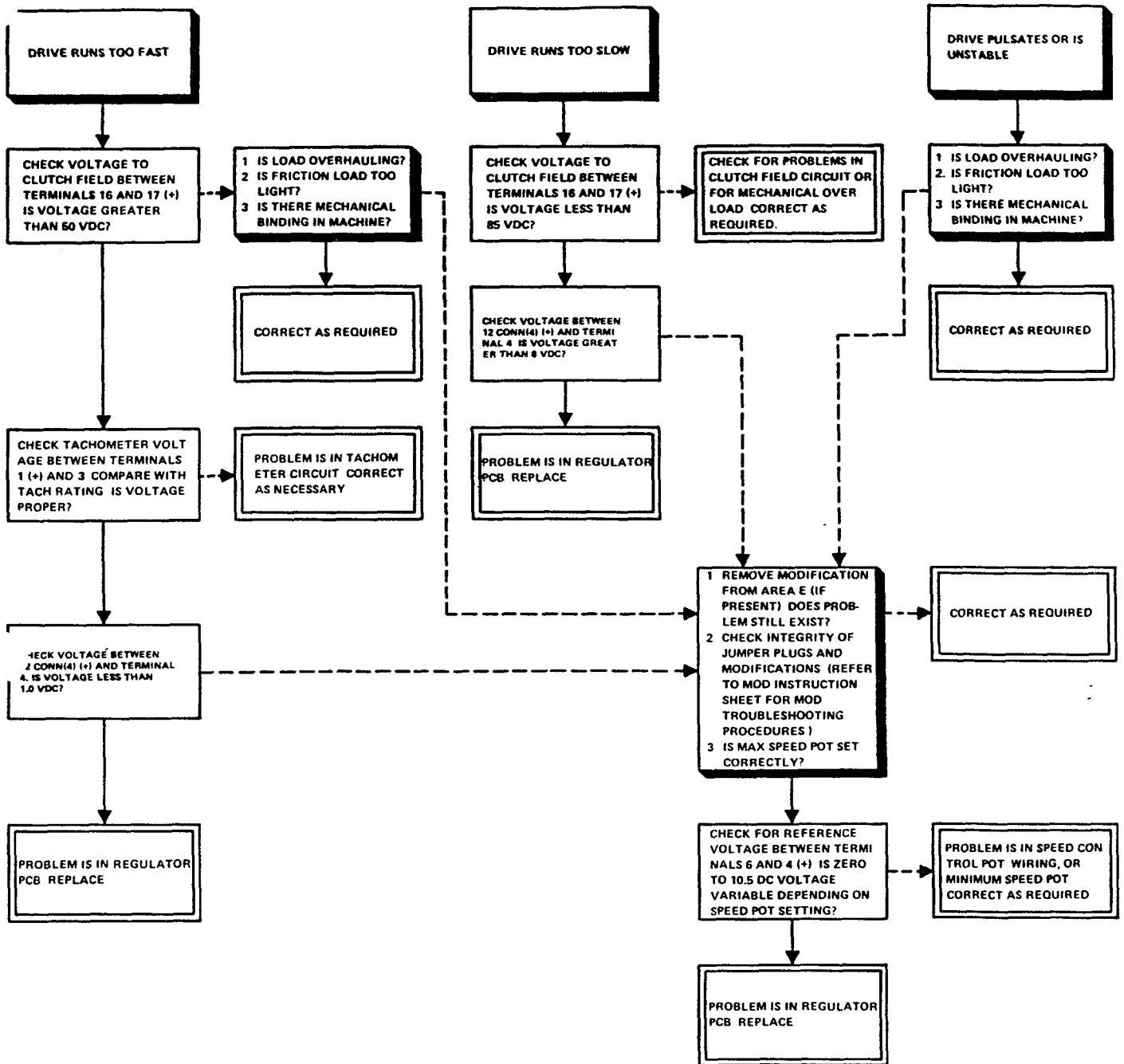
The troubleshooting charts on these two pages enable personnel to isolate a fault to a specific area by performing a series of observations and voltage measurements. Controller faults are manifested in terms of two general faults: either the drive does not run at all or the drive runs but does not run properly. A separate troubleshooting chart is provided for each of these general faults.

## WARNING

HAZARDOUS POTENTIALS EXIST ON THE REGULATOR PCB BE EXTREMELY CAREFUL WHEN MAKING TEST CONNECTIONS. AFTER FAULT HAS BEEN ISOLATED AND BEFORE ATTEMPTING REPAIR OF THE CONTROLLER, REMOVE INPUT POWER AND THEN REMOVE INPUT POWER FUSE 1F.

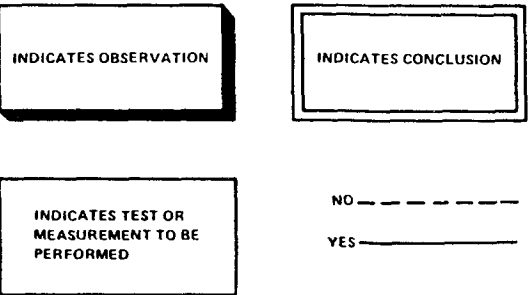


# TROUBLESHOOTING CHART: DRIVE DOES NOT RUN PROPERLY



## LEGEND

The legend at right defines the types of condition blocks and connecting lines used in these charts.



# MODIFICATION KIT INSTALLATION

## **WARNING**

DO NOT INSTALL MODIFICATION KIT WHILE POWER IS APPLIED TO CONTROLLER.

### **A. MODIFICATION PCB INSTALLATION**

1. Locate modification area on Regulator PCB as illustrated in Figure 5.
2. Remove continuity plug from modification area on the Regulator PCB. This plug may be kept for possible future use.
3. Install the three standoffs into the holes in the Regulator PCB. Standoffs will snap into place.

#### **NOTE**

Standoffs are designed for permanent mounting in the Regulator PCB. Do not attempt to remove standoffs after they are installed.

4. Insert the ribbon cable connector into the receptacle on the Regulator PCB. Insure that the polarizing

marks on the mating connectors are matched. Then curve the other end of the ribbon connector to the front of the modification PCB and insert the connector into the receptacle on the modification PCB, again matching polarizing marks on the mating connectors.

#### **NOTE**

When making connections, insure that no connector pins are bent and that all pins are properly inserted into receptacle.

5. Align a hold down clip over each connector and press gently until locked in place.
6. Align the holes in the modification PCB with the standoffs and gently press the modification PCB until it snaps into position.

#### **NOTE**

After modification PCB is installed, check that ribbon cable connections are secure.

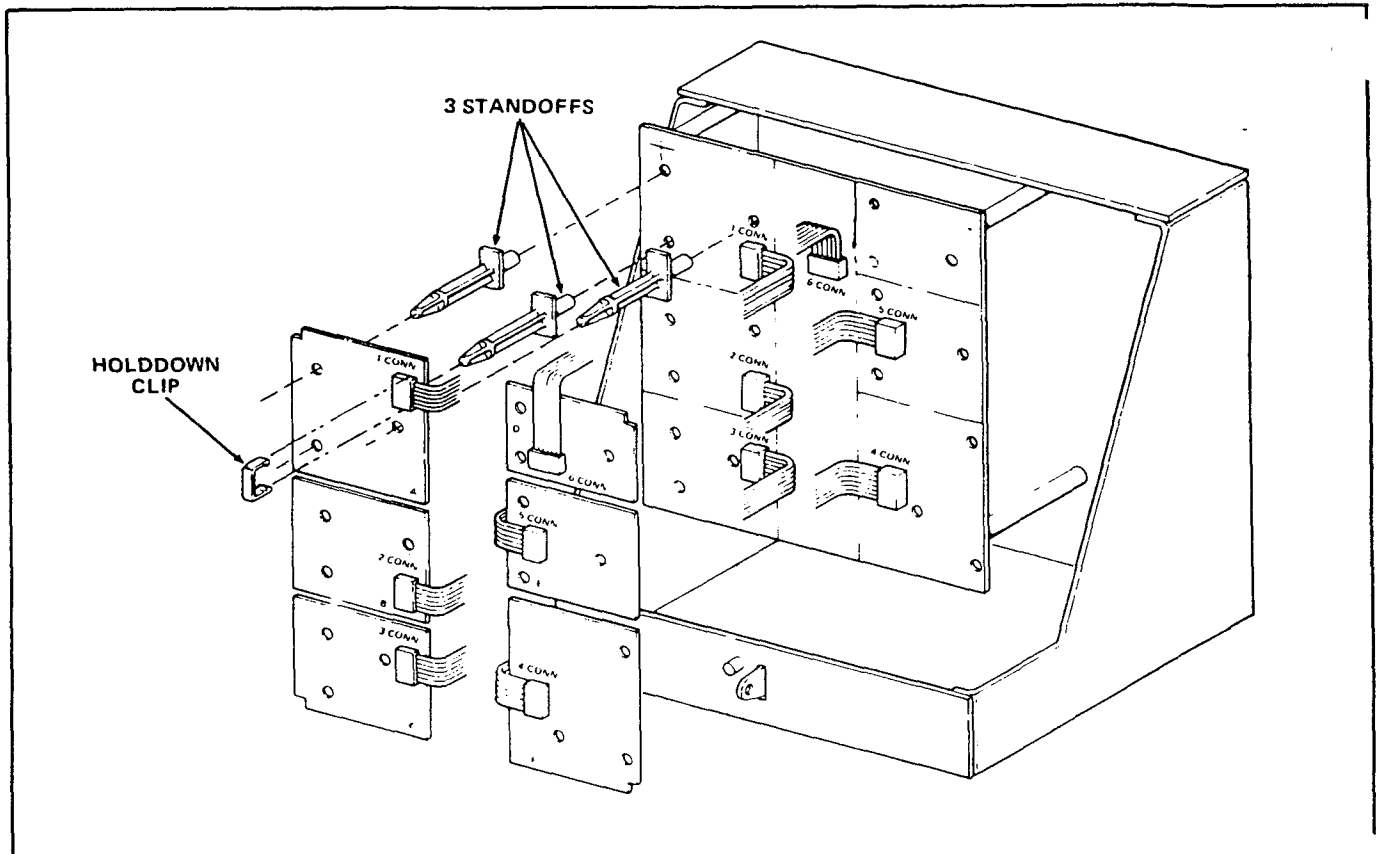


Figure 5. Modification PCB Location

## B. ADJUSTMENT KNOB INSTALLATION

1. Turn the potentiometer wheel fully counterclockwise.
2. Align the index line on the adjustment knob with the index line on the potentiometer wheel so that the adjustment knob index points down and left (approximately 7 o'clock position). See Figure 6.
3. Press the adjustment knob into place over the potentiometer wheel.

### NOTE

The adjustment knob is not intended to be removed. If removal becomes necessary, do not pull knob straight out. Apply side force to disengage the adjustment knob from the potentiometer wheel.

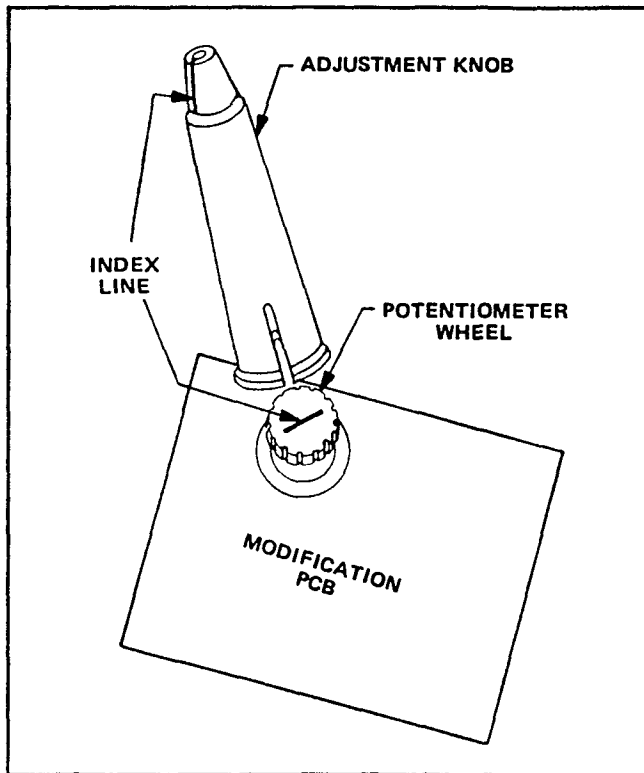


Figure 6. Adjustment Knob Installation

## C. MODIFICATION IDENTIFICATION PLATE APPLICATION

1. Use a pen knife and cut out the holes in the Regulator cover which correspond to the adjustment knobs on the modification PCB.
2. Remove backing from the identification plate.
3. Align the holes in the identification plate with the holes in the Regulator cover and press the identification plate into position. See Figure 7.

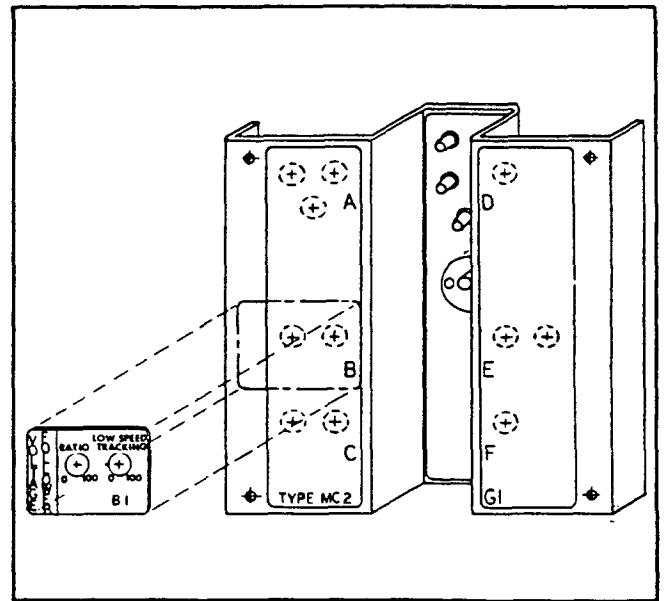


Figure 7. Identification Plate Application

## D. MODIFICATION PCB REMOVAL

An extracting tool is provided with each modification kit to enable removal of the modification PCB from its standoffs. Place the extracting tool over the end of the standoff and press until the tool contacts the PCB surface. Lift edge of the board over standoff tab. Repeat for the remaining two standoffs for that modification PCB.

# SCHEMATIC MODIFICATION

Each Modification Kit contains a schematic overlay to be applied to the simplified schematic diagram. Apply overlay(s) as follows:

## NOTE

If more than one Modification Kit has been purchased, install overlays for Jog, Thread or Controlled Stop Modifications first.

- A. Locate the proper position for installing schematic overlay to the simplified schematic diagram. Note that there are six Modification Areas (identified A through F). The schematic overlay will be coded for corresponding Modification Area.
- B. Carefully peel paper backing from the left edge of the schematic overlay and fold back about 3/8 inch of the backing.

- C. Align the schematic overlay with interconnecting wires using the corner marks on the schematic diagram as a guide.
- D. Press the left edge of the schematic overlay onto the schematic diagram.
- E. Peel off the remaining paper backing and at the same time press the overlay into position. DO NOT attempt to lift overlay after it has been pressed into position.

## NOTE

In case of loss or damage, additional schematic diagrams and schematic overlays can be obtained from your MagneTek Drives & Systems representative.

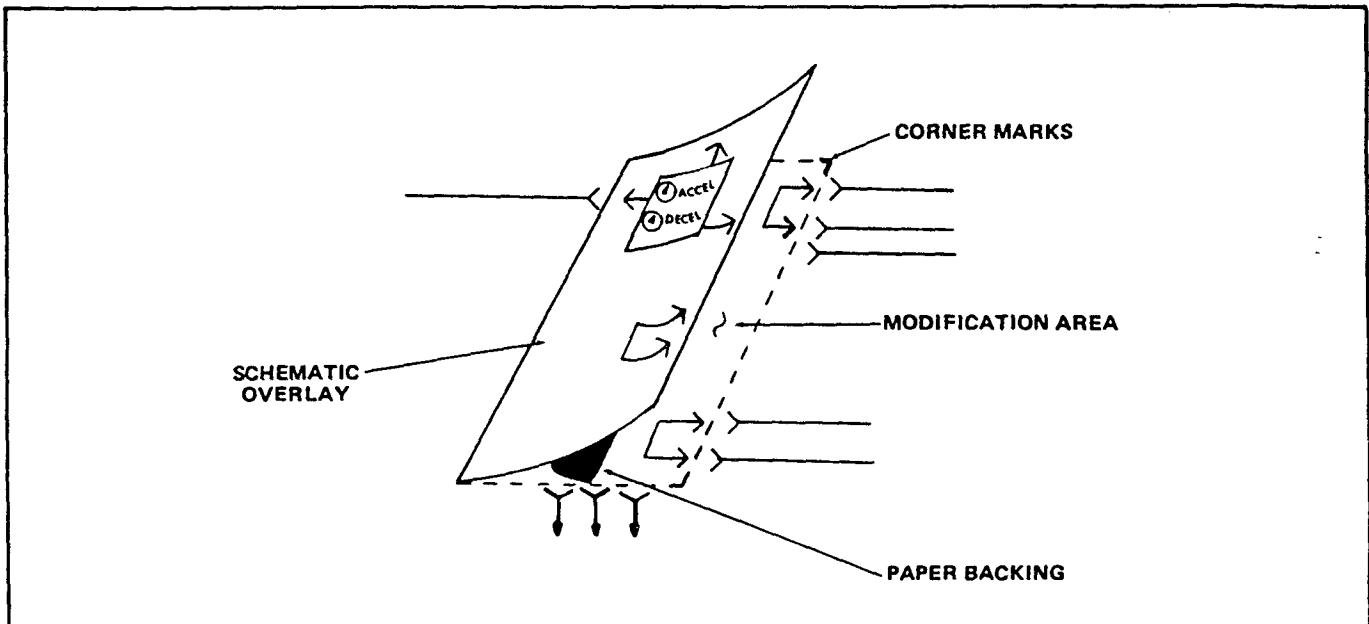
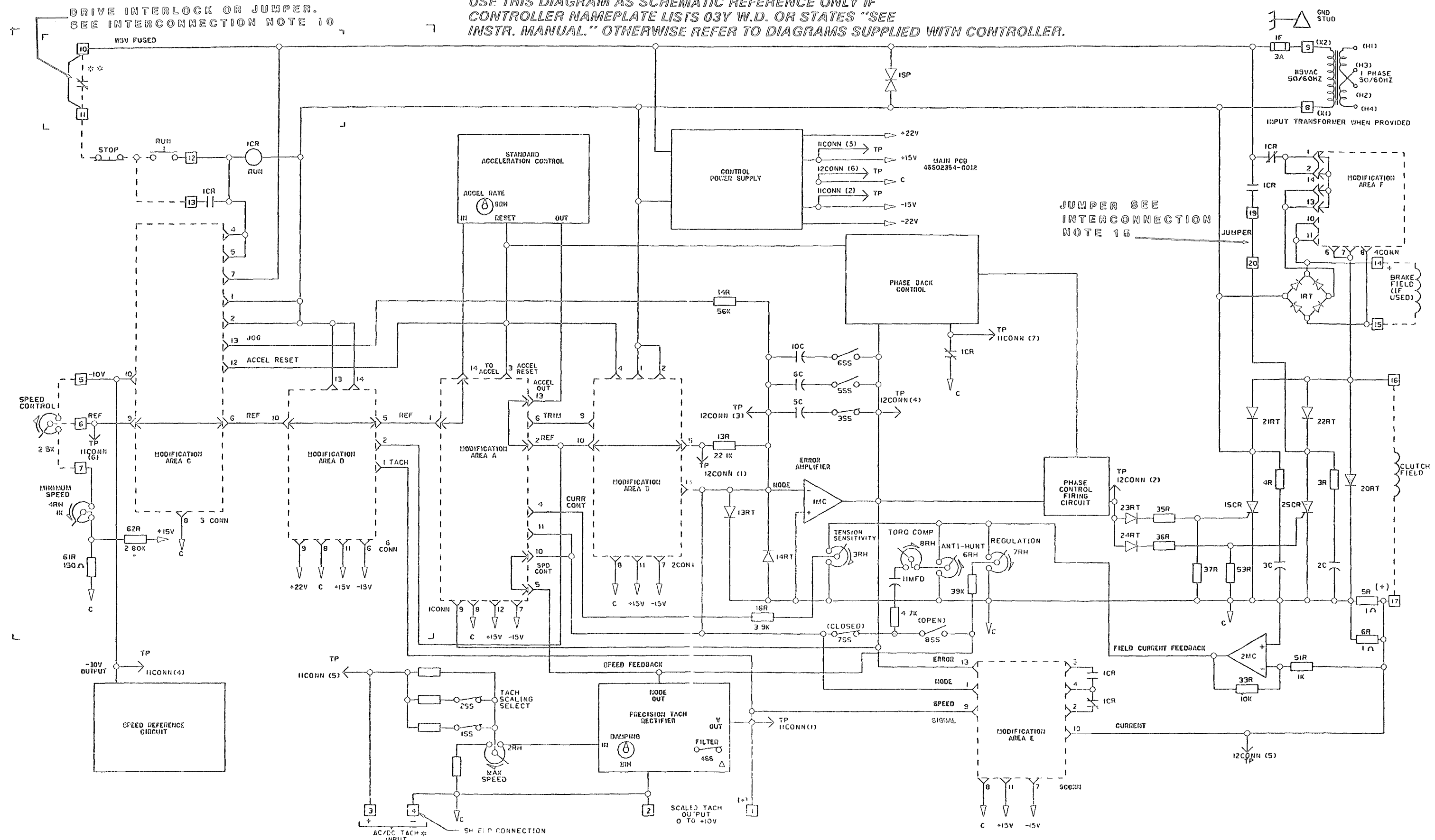


Figure 8. Application of Schematic Overlay (Typical)

USE THIS DIAGRAM AS SCHEMATIC REFERENCE ONLY IF  
 CONTROLLER NAMEPLATE LISTS 03V W.D. OR STATES "SEE  
 INSTR. MANUAL." OTHERWISE REFER TO DIAGRAMS SUPPLIED WITH CONTROLLER.



JUMPER SEE  
 INTERCONNECTION  
 NOTE 15

| TACHOMETER VOLTAGE AT MAX SPEED |           |                   |        | SELECTOR SWITCH |        |        |  |
|---------------------------------|-----------|-------------------|--------|-----------------|--------|--------|--|
| VAC                             | VDC       | SELECTOR SWITCH   |        | SELECTOR SWITCH |        |        |  |
| 17 - 40                         | 19 2 - 48 | CLOSED (SCREW IN) | CLOSED | 3SS             | 5SS    | 6SS    |  |
| 36 - 82                         | 40 - 98   | OPEN (SCREW OUT)  | CLOSED | CLOSED          | OPEN   | OPEN   |  |
| 54 - 106                        | 60 - 150  | OPEN              | OPEN   | OPEN            | CLOSED | CLOSED |  |

- ✕✕ DENOTES USER'S TERMINALS  
 USER WIRING SHOWN DASHED
- \* (OPTIONAL) TO ADD SPEED INDICATOR  
 CONNECT LEADS TO TERMINALS  
 [3] AND [4]
- \*\* DRIVE INTERLOCK OR JUMPER  
 △ MAY BE OPENED FOR DC TACH USE

Figure 9. HC2 Controller Simplified Schematic Diagram

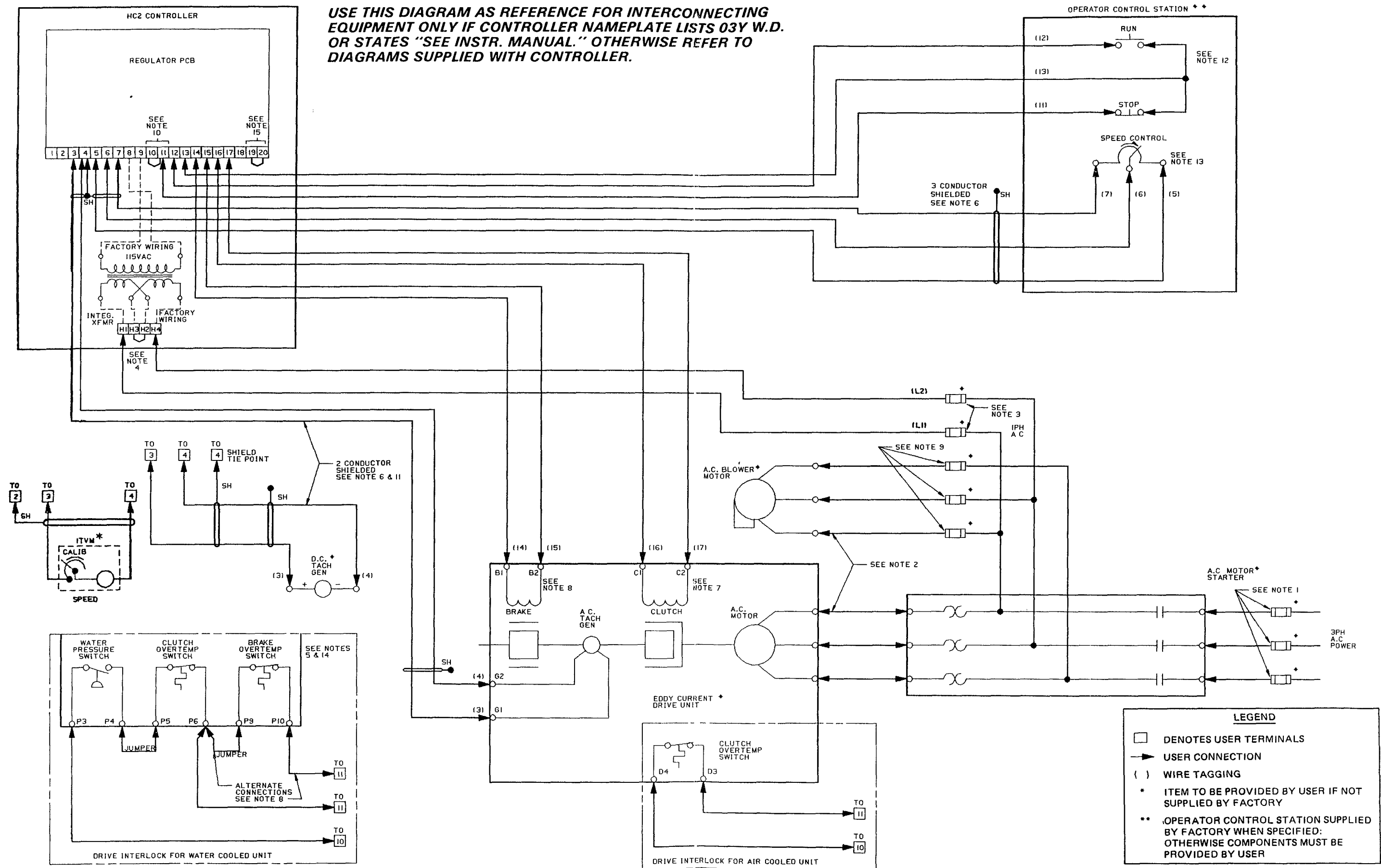
## INTERCONNECTION NOTES – CONTROLLER WITH INTEGRAL TRANSFORMER

1. Wire, fuse and provide overload protection as required by local codes
2. See AC motor, blower motor or isolating transformer nameplate for voltage selection and wire tagging for interconnections
3. The Mod7 Controller **MUST ALWAYS BE INTERLOCKED** with the AC motor, so that the clutch cannot be energized prior to starting the motor. Power source connections to the Controller should be made from the load side of the motor starter, or through motor starter interlock contacts.
4. The jumper connection indicated is for applying 460VAC input to the integral transformer. When 230VAC input is used, remove the **H2** – **H3** jumper and place jumpers from **H1** to **H3** and from **H2** to **H4**.
5. For water cooled drives, the drive unit water solenoids should be wired to the primary taps of the isolation transformer. See drive unit and transformer nameplates for required connections.
6. Where shielded wire is specified, #18 AWG insulated shielded wire is required (2-conductor Belden #8760, 3-conductor Belden #8770, or equivalent). Connect shield at Controller end only (terminal 4) as identified in the diagram. The far end of the shield is to be dressed neatly and left unconnected. Provide adequate insulation on all shields to isolate them from ground and other conductors.

### DO NOT CONNECT SHIELDS TO EARTH GROUND!

Shielded wires should be placed in a separate conduit which does not contain power, AC control or field conductors. Within cabinets these conductors should be bundled separately from power, AC control and field conductors.

7. Clutch coil leads may be alternately marked F1 and F2.
8. Brake coil and brake overtemperature switch wiring is required only when a brake is supplied
9. Blower motor fuses and/or overload protection is required only with blower ventilated units.
10. If drive safety interlocks such as clutch overtemperature switch are provided, remove jumper between terminals **10** and **11** and wire interlock contacts in series at these terminals.
11. Only one tach should be wired to the Controller. If DC tach is used, do not wire AC tach.
12. Wiring for the RUN and STOP push buttons is different for units with Jog (C1), Thread (C2), Jog and Thread (C3) or Controlled Stop (D1) modifications installed. Connect these push buttons according to the instructions provided with the modification kit(s).
13. The SPEED CONTROL potentiometer is not used on units having modifications which enable the drive to operate only in the automatic mode. This includes the Voltage Follower (B1) and Current Follower (B2) modifications
14. For interconnecting liquid-to-liquid or liquid-to-air heat exchangers, see heat exchanger instruction sheet
15. Removal of jumper between terminals **19** and **20** enables the connection of either factory or customer supplied circuitry for additional control of clutch field energizing voltage. **Therefore DO NOT replace the jumper or add external circuitry without first reviewing the schematic shipped with the drive to determine what effect this action would have on equipment operation.**

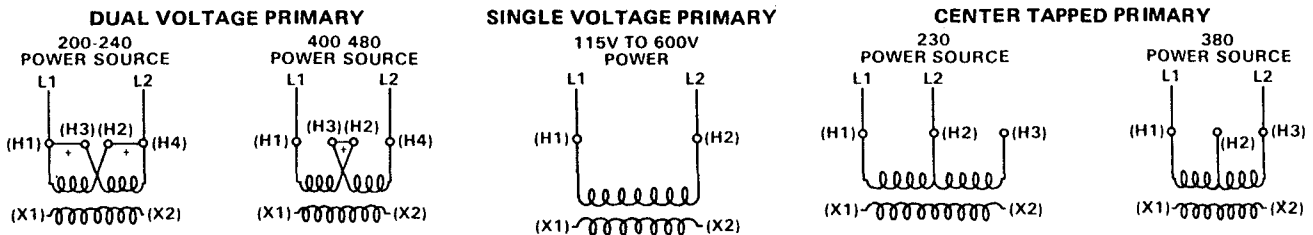


**Figure 10A. Interconnection Diagram - Controller with Integral Transformer**

## INTERCONNECTION NOTES – CONTROLLER WITHOUT INTEGRAL TRANSFORMER

1. Wire, fuse and provide overload protection as required by local codes.
2. See AC motor, blower motor or isolation transformer nameplate for voltage selection and wire tagging for interconnections.
3. The Mod7 Controller **MUST ALWAYS BE INTERLOCKED** with the AC motor, so that the clutch cannot be energized prior to starting the motor. Power source connections to the Controller should be made from the load side of the motor starter, or through motor starter interlock contacts.
4. Power supply connections to a controller with a separate input transformer should be made by referring to the transformer nameplate and one of the following figures.

### TRANSFORMER CONNECTIONS



5. For water cooled drives, the drive unit water solenoids should be wired to the primary taps of the isolation transformer. See drive unit and transformer nameplates for required connections.
6. Where shielded wire is specified, #18 AWG insulated shielded wire is required (2-conductor Belden #8760, 3-conductor Belden #8770, or equivalent). Connect shield at Controller end only (terminal 4) as identified in the diagram. The far end of the shield is to be dressed neatly and left unconnected. Provide adequate insulation on all shields to isolate them from ground and other conductors.

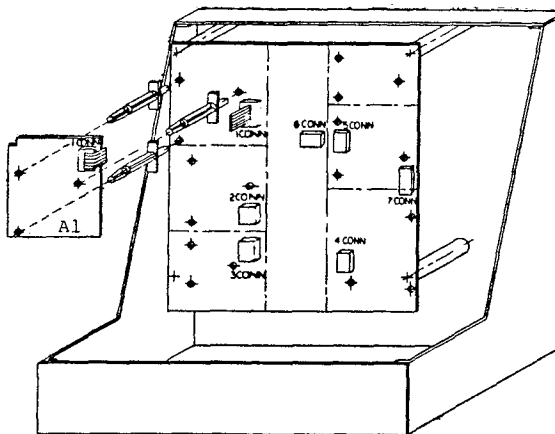
### DO NOT CONNECT SHIELDS TO EARTH GROUND!

Shielded wires should be placed in a separate conduit which does not contain power, AC control or field conductors. Within cabinets these conductors should be bundled separately from power, AC control and field conductors

7. Clutch coil leads may be alternately marked F1 and F2.
8. Brake coil and brake overtemperature switch wiring is required only when a brake is supplied.
9. Blower motor fuses and/or overload protection is required only with blower ventilated units
10. If drive safety interlocks such as clutch overtemperature switch are provided, remove jumper between terminals **10** and **11** and wire interlock contacts in series at these terminals.
11. Only one tach should be wired to the Controller. If DC tach is used, do not wire AC tach
12. Wiring for the RUN and STOP push buttons is different for units with Jog (C1), Thread (C2), Jog and Thread (C3) or Controlled Stop (D1) modifications installed. Connect these push buttons according to the instructions provided with modification kit(s)
13. The SPEED CONTROL potentiometer is not used on units having modifications which enable the drive to operate only in the automatic mode. This includes the Voltage Follower (B1) and Current Follower (B2) modifications
14. For interconnecting liquid-to-liquid or liquid-to-air heat exchangers, see heat exchanger instruction sheet
15. Removal of jumper between terminals **19** and **20** enables the connection of either factory or customer supplied circuitry for additional control of clutch field energizing voltage. **Therefore DO NOT replace the jumper or add external circuitry without first reviewing the schematic shipped with the drive to determine what effect this action would have on equipment operation.**







MOD PCB  
46SO2042-0020  
SCHEMATIC  
45SO2042-0020

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the linear accel/decel function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to separately adjust the acceleration and deceleration rates for a drive operating in the Speed Mode. Both rates are adjustable from 2.4 seconds to 40 seconds for a 100% change in drive speed. Input to the assembly is the Speed Reference signal from the SPEED CONTROL potentiometer of modification installed in area C or D. Output is applied to the speed regulator via any modification installed in area B. The assembly's controlled acceleration output is automatically reset to zero each time the STOP button is pressed or each time the drive is transferred to the automatic mode (if the drive is equipped with a Follower Assembly modification B3 or B4).

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual.

If extended acceleration and deceleration rates are desired, select a capacitor which provides the desired rates and connect between terminals A1(-) and A2(+) of the assembly terminal board.

INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows;

1. Turn the ACCEL RATE potentiometer (5RH of Regulator PCB) fully clockwise.
2. Turn the ACCEL RATE and DECEL RATE potentiometers on the modification PCB full counterclockwise. Turn the SPEED CONTROL to zero and start the drive.
3. Turn the SPEED CONTROL fully clockwise and observe drive acceleration rate. Then turn SPEED CONTROL fully counterclockwise and note deceleration rate.
4. Adjust ACCEL RATE and DECEL RATE potentiometers on the modification PCB as required to obtain desired rates. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

INSTRUCTION SHEET  
FOR MODIFICATION A1  
Sheet 1 of 2  
02Y00025-0003

1. Start the drive and rotate SPEED CONTROL fully clockwise.
2. Refer to the schematic diagram of the Linear Accel/Decel PCB and check input voltage between A1TP and I2CONN(6) of the Regulator PCB (common). Voltage should be approximately -10 VDC. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
3. Check output voltage between A2TP and I2CONN(6) (common). Voltage should be approximately -10 VDC. If voltage is incorrect, replace Linear Accel/Decel PCB.
4. Press STOP button and stop the drive. Again monitor voltage at A2TP. Voltage should be zero. If voltage is incorrect, replace Linear Accel/Decel PCB. If voltage is correct, restart drive.
5. Turn SPEED CONTROL fully counterclockwise and check input voltage between A1TP and I2CONN(6) of Regulator PCB. Voltage should be zero to -3 VDC depending on MIN SPEED potentiometer setting. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
6. Check output voltage between A2TP and I2CONN(6) (common). Voltage should be the same as voltage obtained in step 5, above. If voltage is incorrect, replace Linear Accel/Decel PCB.
7. If the acceleration or deceleration rate cannot be adjusted over the proper range or operation is erratic, replace Linear Accel/Decel PCB.

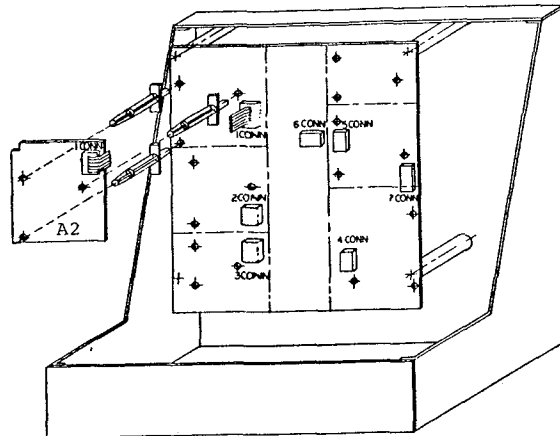
#### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "1" in the block corresponding to modification area A.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION A2  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0010)  
LINEAR ACCEL/DECEL WITH S CURVE

Effective  
2-6-81  
Supersedes  
7-77



MOD PCB  
46SO2042-0010  
SCHEMATIC  
45SO2042-0010

DESCRIPTION

This modification is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the linear accel/decel function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to separately adjust the acceleration and deceleration rates for a drive operating in the Speed Mode. Both rates are adjustable from 3.0 seconds to 40.6 seconds for a 100% change in drive speed. Input to the assembly is the Speed Reference signal from the SPEED CONTROL potentiometer or modifications installed in area C or D. Output is applied to the speed regulator via any modifications installed in area B. The assembly's controlled acceleration output is automatically reset to zero each time the STOP button is pressed or each time the drive is transferred to the automatic mode if the drive is equipped with a Follower Assembly modification B3 or B4. An internal RC network softens the transition points in the speed reference signal to allow smoother operation when multiple drives are cascaded.

The controlled deceleration action occurs only when the SPEED CONTROL setting is effectively reduced. The use of this modification alone does not constitute a controlled stop function since the accel/decel output is quickly reset to zero each time the STOP pushbutton is pressed.

INSTALLATION

WARNING  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual.

If extended acceleration and deceleration rates are desired, select a capacitor which provides the desired rates and connect between terminals A1(-) and A2(+) of the assembly terminal board.

INTERCONNECTIONS

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Turn the ACCEL RATE potentiometer (5RH of Regulator PCB) fully clockwise.
2. Turn the ACCEL RATE and DECEL RATE potentiometers on the modification PCB fully counterclockwise. Turn the SPEED CONTROL to zero and start the drive.
3. Turn the SPEED CONTROL fully clockwise and observe drive acceleration rate. Then turn SPEED CONTROL fully counterclockwise and note deceleration rate.
4. Adjust ACCEL RATE and DECEL RATE potentiometers on the modification PCB as required to obtain desired rates.
5. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

INSTRUCTION SHEET  
FOR MODIFICATION A2  
Sheet 1 of 2  
02Y00025-0002

## TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

1. Start the drive and rotate SPEED CONTROL fully clockwise.
2. Refer to the schematic diagram of the Linear Accel/Decel PCB and check input voltages between A1TP and I2CONN(6) of the Regulator PCB (common). Voltage should be approximately -10 VDC. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
3. Check output voltage between A2TP and I2CONN(6) (common). Voltage should be approximately -10 VDC. If voltage is incorrect, replace Linear Accel/Decel PCB.
4. Press STOP button and stop the drive. Again monitor voltage at A2TP. Voltage should be zero. If voltage is incorrect, replace Linear Accel/Decel PCB. If voltage is correct, restart drive.
5. Turn SPEED CONTROL fully counterclockwise and check input voltage between A1TP and I2CONN(6) of Regulator PCB. Voltage should be zero to -3 VDC depending on MIN SPEED potentiometer setting. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
6. Check output voltage between A2TP and I2CONN(6) (common). Voltage should be the same as voltage obtained in step 5, above. If voltage is incorrect, replace Linear Accel/Decel PCB.
7. If the acceleration and deceleration rate cannot be adjusted over the proper range or operation is erratic, replace Linear Accel/Decel PCB.

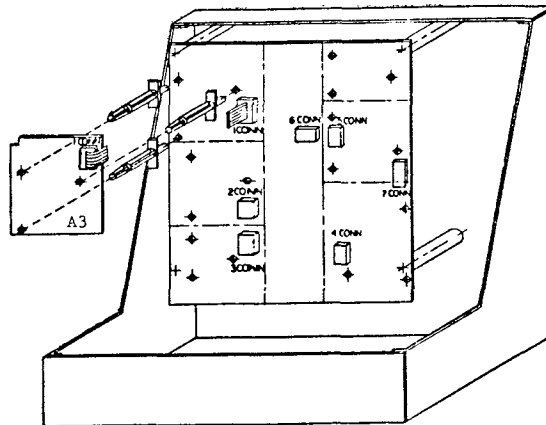
## MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "2" in the block corresponding to modification area A.
- B. Insert this instruction sheet to inside the back cover of the Controller instruction manual.

MODIFICATION A3  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0220)  
DANCER POSITION

Effective  
10-30-80  
Supersedes  
9-2-80



MOD PCB  
46SO2050-0040  
SCHEMATIC  
45SO2050-0040

DESCRIPTION

This modification kit is one of a series of kits available for Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for dancer position control. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification uses an external DANCER potentiometer to modulate the magnitude of clutch field current or torque produced at the output shaft of the rotating equipment. The clutch current reference signal varies to maintain a constant dancer position. The DANCER POSITION potentiometer sets the neutral point about which the DANCER potentiometer operates. The SENSITIVITY potentiometer sets the amount of dancer droop required to provide 100% clutch current and rated torque. The RESPONSE potentiometer compensates for system inertia and stabilizes the drive.

INSTALLATION

**WARNING**

REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

**NOTE**

The SPEED CONTROL potentiometer and Tachometer Generator are not required when this modification is used.

After installing the modification PCB, apply the schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires that a DANCER potentiometer be installed to the machinery for process control. The ohmic value of the DANCER potentiometer should be 1K ohms. Louis Allis part no. 05P00040-0192 is recommended.

Perform equipment interconnections according to the Controller instruction manual. Then wire DANCER potentiometer according to the attached interconnection diagram and table.

An external POSITION potentiometer may be remotely installed to operate in place of 2RH on the Dancer Position PCB. This external potentiometer should be 10K ohms. Louis Allis part no. 43T00572-1033 is recommended. When installing this external pot, J1 MUST BE OPENED by removing the self-tapping screw. Then wire external POSITION potentiometer according to the attached interconnection diagram and table.

When an external POSITION potentiometer is used, remove the potentiometer knob from the POSITION potentiometer on the modification PCB.

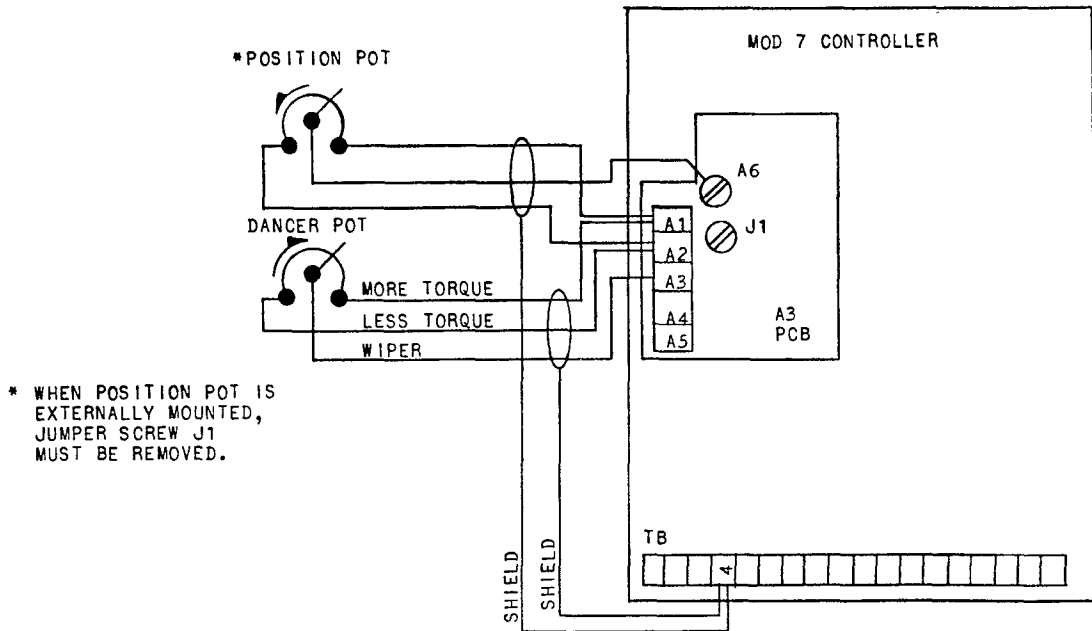
**CAUTION**

Insure that electrical parts of the DANCER potentiometer and POSITION potentiometer when externally mounted are electrically isolated from the case and earth ground to prevent damage to the equipment. Do not install a potentiometer having mechanical rotational stops as the DANCER potentiometer.

INSTRUCTION SHEET  
FOR MODIFICATION A3

Sheet 1 of 3  
02Y00025-0023

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                     |                     | TO  |                     | REMARKS   |
|----------|--------------------------|---------------------|---|---------------------|---|
|          | EQUIPMENT                | TB OR OTHER MARKING | EQUIPMENT                                     | TB OR OTHER MARKING |   |
| A1       | DANCER POSITION PCB (A3) | TB(A1)              | DANCER POTENTIOMETER (INSTALLED ON MACHINERY) | (MORE TORQUE)       | 3-CONDUCTOR SHIELDED  |
| A2       |                          | TB(A2)              |   | (LESS TORQUE)       |   |
| A3       |                          | TB(A3)              |   | WIPER               |   |
| SHIELD   | CONTROLLER               | TB(4)               |   | NO CONNECTION       | SEE NOTE IN CONTROLLER MANUAL FOR CONNECTING SHIELDED CABLES.                       |
| A1       | DANCER POSITION PCB (A3) | TB(A1)              | POSITION POTENTIOMETER (EXTERNALLY MOUNTED)   | (MORE TORQUE)       | 3-CONDUCTOR SHIELDED. SEE NOTE IN CONTROLLER MANUAL FOR CONNECTING SHIELDED CABLES. |
| A6       |                          | TB(A6)              |   | (WIPER)             |   |
| A2       |                          | TB(A2)              |   | (LESS TORQUE)       |   |
| SHIELD   | CONTROLLER               | TB(4)               |   | NO CONNECTION       |   |

### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows:

1. Set the DANCER POSITION, RESPONSE and SENSITIVITY potentiometers to mid-range.
2. Start the drive.
3. With web in the dancer loop, adjust the DANCER POSITION potentiometer so that the dancer maintains a position near its center of travel.
4. Adjust the SENSITIVITY potentiometer to make the drive as sensitive to DANCER potentiometer movement as desired. If drive becomes unstable at higher settings, turn the SENSITIVITY potentiometer counterclockwise or turn the RESPONSE potentiometer clockwise to maintain a stable condition. This step assumes that the TENSION SENSITIVITY potentiometer on the Regulator PCB is set at zero (0%). If adjustment of the SENSITIVITY potentiometer on the modification PCB does not make the drive as sensitive to DANCER potentiometer movement as desired, turn the TENSION SENSITIVITY potentiometer to 50% and repeat step.
5. Adjust the RESPONSE potentiometer to the lowest setting which provides stable dancer control while minimizing position overshoot when disturbances do occur. The RESPONSE potentiometer may require readjustment whenever the SENSITIVITY potentiometer is adjusted.
6. If desired action cannot be obtained, perform modification troubleshooting procedures below.

### TROUBLESHOOTING

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the modification while potentiometers are rotated.

1. Place the DANCER potentiometer to mid-range (50%).
2. Refer to the schematic diagram of the Dancer Position PCB and check the voltage between terminal board connection A3 and L2CONN(6) of the Regulator PCB (common). Voltage should vary from -15 VDC to +15 VDC as the DANCER potentiometer is moved over its entire range. If voltage is incorrect or erratic, check wiring and/or replace the DANCER potentiometer.

3. Set the DANCER POSITION potentiometer to mid-range (50%) and check the voltage between test point A1TP on the modification PCB and L2CONN(6) of the Regulator PCB (common). Voltage should go positive and negative as the DANCER potentiometer is moved about its normal regulated position. The actual voltage change depends on the setting of the SENSITIVITY potentiometer. The higher the setting, the larger the voltage swing for the same dancer movement (maximum swing  $\pm 14$  VDC). If the voltage does not vary with change in DANCER potentiometer, replace the Dancer Position PCB.

### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "3" in the block corresponding to modification area A.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.



**MODIFICATION A3 DANCER POSITION**  
**KIT 46S02051-0221**  
**PCB 46S02050-0041 SCHEMATIC 45S02050-0041**  
**( REPLACES 46S02050-0040 )**

Before installing this kit, a **TECHNICALLY QUALIFIED INDIVIDUAL**, who is familiar with this type of equipment and 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 modification kit is one of a series of kits available for Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for dancer position control. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification uses an external **DANCER** potentiometer to modulate the magnitude of clutch field current or torque produced at the output shaft of the rotating equipment. The clutch current reference signal varies to maintain a constant dancer position. The **POSITION** potentiometer sets the neutral point about which the **DANCER** potentiometer operates. The **SENSITIVITY** potentiometer sets the amount of dancer droop required to provide 100% clutch current and rated torque. The **RESPONSE** potentiometer compensates for system inertia and stabilizes the drive. For the Type HC Controller, the **GAIN** poten-

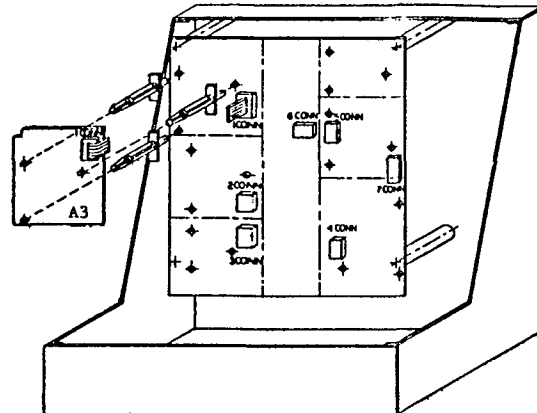


Figure 1.

tiometer (not adjustable thru front cover) sets the overall gain of the error amplifier located on the drive Regulator PCB. For the Type MC Controller, the **GAIN** potentiometer is not used, and jumper J2 must be removed.

**INSTALLATION**

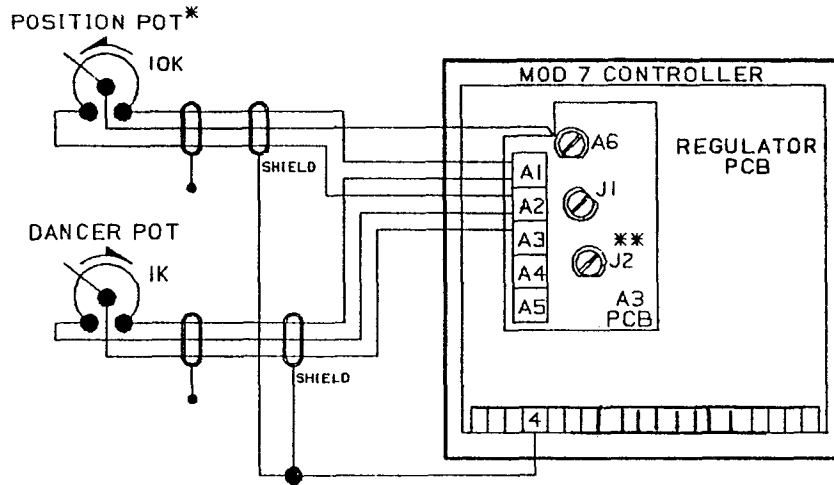
**WARNING**

**REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT.**

This modification PCB is to be installed to area A of the Regulator PCB as shown in Figure 1. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual.

| CHANGE RECORD |          |         |    | DWG. NO. 02X00025-0210<br>SHEET 1 OF 4<br>EFF. 5/21/86 (I) |
|---------------|----------|---------|----|--|
| 1             | STD-2713 | 3-2-87  | ER |  |
| 2             | STD-2824 | 8-31-87 |    |  |
| 3             | STD-2930 | 1-11-88 | ER |  |



\* - WHEN EXTERNAL POSITION POT IS USED, JUMPER J1 (SCREW) MUST BE REMOVED FROM A3 PCB.

\*\* - WHEN USED IN TYPE MC CONTROLLER, JUMPER J2 (SCREW) MUST BE REMOVED FROM A3 PCB, TO DISABLE GAIN POTENTIOMETER.

FD 1.2Y25.0210 FIG2

Figure 2. Interconnection Diagram

Table 1. Interconnection Table

| WIRE NO. | FROM                     |                  | TO  |                   | REMARKS  |
|----------|--------------------------|------------------|---|-------------------|--|
|          | EQUIPMENT                | TERMINAL MARKING | EQUIPMENT                                     | TERMINAL MARKING  |  |
| A1       | Dancer Position PCB (A3) | TB(A1)           | DANCER Potentiometer (Installed on Machinery) | CW (MORE TORQUE)  | 3-Conductor Shielded.<br><br>See Note in Controller Manual for Connecting Shielded Cables. |
| A2       |                          | TB(A2)           |   | CCW (LESS TORQUE) |  |
| A3       |                          | TB(A3)           |   | Wiper             |  |
| Shield   | Controller               | TB(4)            | No Connection                                 |                   |  |
| A1       | Dancer Position PCB (A3) | TB(A1)           | POSITION Potentiometer (Externally Mounted)   | CCW               | 3-Conductor Shielded.<br><br>See Note in Controller Manual for Connecting Shielded Cables. |
| A2       |                          | TB(A2)           |   | CW                |  |
| A6       |                          | (A6)             |   | Wiper             |  |
| Shield   | Controller               | TB(4)            | No Connection                                 |                   |  |

DWG. NO. 02Y00025-0210  
SHEET 2 OF 4  
EFF. 5/21/86 (I)

## INTERCONNECTION

This modification requires that a DANCER potentiometer be installed to the machinery for process control. The ohmic value of the DANCER potentiometer should be 1K ohms. Louis Allis part no. 05P00040-0192 is recommended.

### NOTE

The SPEED CONTROL potentiometer and tachometer generator are not required when this modification is used.

Perform equipment interconnections according to the Controller instruction manual. Then wire DANCER potentiometer as shown in Figure 2 and Table 1.

An external POSITION potentiometer may be remotely installed to operate in place of 2RH on the Dancer Position PCB. This external potentiometer should be 10K ohms. Louis Allis part no. 43T00572-1033 is recommended. To install this external pot, open jumper J1 by removing the self-tapping screw. Then wire external POSITION potentiometer as shown in Figure 2 and Table 1.

When an external POSITION potentiometer is used, remove the potentiometer knob from the POSITION potentiometer on the modification PCB.

### CAUTION

INSURE THAT ELECTRICAL PARTS OF THE DANCER POTENTIOMETER AND POSITION POTENTIOMETER WHEN EXTERNALLY MOUNTED ARE ELECTRICALLY ISOLATED FROM THE CASE AND EARTH GROUND TO PREVENT DAMAGE TO THE EQUIPMENT. DO NOT INSTALL A POTENTIOMETER HAVING MECHANICAL ROTATIONAL STOPS AS THE DANCER POTENTIOMETER.

## ADJUSTMENTS

### 1. Controller

Complete procedures as stated in ADJUSTMENTS section of manual first.

### IMPORTANT

The following pots and switches have no affect with the Dancer modification installed. Therefore, each should be set to zero or closed position.

DAMPING (1RH)  
MAX SPEED (2RH)  
MIN SPEED (4RH)  
ACCEL RATE (5RH)  
1SS & 2SS

### 2. Dancer Position Mod

A. Set the POSITION, RESPONSE and SENSITIVITY potentiometers to mid-range. For the Type HC Controllers, set GAIN potentiometer to 50%.

B. Start the drive.

C. With web in the dancer loop, adjust the POSITION potentiometer so that the dancer maintains a position near its center of travel.

D. Adjust the SENSITIVITY potentiometer to make the drive as sensitive to DANCER potentiometer movement as desired. If drive becomes unstable at higher settings, turn the SENSITIVITY potentiometer counterclockwise or turn the RESPONSE potentiometer clockwise to maintain a stable condition. This step assumes that the TENSION SENSITIVITY potentiometer on the Regulator PCB is set at 100%. For the Type HC Controller, if adjustment of the SENSITIVITY potentiometer on the modification PCB does not make the drive as sensitive to DANCER potentiometer movement as desired, increase the GAIN potentiometer setting and repeat this step.

DWG. NO. 02Y00025-0210  
SHEET 3 OF 4  
EFF. 5/21/86 (I)

E. Adjust the RESPONSE potentiometer to the lowest setting which provides stable dancer control while minimizing position overshoot when disturbances do occur. The RESPONSE potentiometer may require readjustment whenever the SENSITIVITY potentiometer is adjusted.

F. If desired action cannot be obtained, perform modification troubleshooting procedures.

#### TROUBLESHOOTING

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the modification while potentiometers are rotated.

1. Place the DANCER potentiometer to mid-range (50%).

2. Refer to the schematic diagram of the Dancer Position PCB and check the voltage between terminal board connection A3 and 12CONN(6) of the Regulator PCB (common). Voltage should vary from -15 VDC to +15 VDC as the DANCER potentiometer is moved over its entire range. If voltage is incorrect or erratic, check wiring and/or replace the DANCER potentiometer.

3. Set the POSITION potentiometer to mid-range (50%) and check the voltage between test point A1TP on the modification PCB and 12CONN(6) of the Regulator PCB (common). Voltage should go positive and negative as the DANCER potentiometer is moved about its normal regulated position. The actual voltage change depends on the setting of the SENSITIVITY potentiometer. The higher the setting, the larger the voltage swing for the same dancer movement (maximum swing  $\pm 14$  VDC). If the voltage does not vary with change in DANCER potentiometer, replace the Dancer Position PCB.

#### MODIFICATION RECORDS

After completing mod kit installation:

A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "3" in the block corresponding to modification area A.

B. For MC Controller: In the Spare Parts List in the Controller instruction manual, change the Part Number for Modification PCB A3 to read 46S02050-0041.

For HC Controller: In the Standard Modification Kits listing in the Controller instruction manual, add the following:

A3 Dancer Position A3K

Also, in the Spare Parts List, add the following line in the Modification PCB's section:

Dancer Position A3 46S02050-0041

C. Insert this instruction sheet inside the back cover of the Controller instruction manual.

DWG. NO. 02Y00025-0210  
SHEET 4 OF 4  
EFF. 5/21/86 (I)

## INTERCONNECTION

This modification requires that a DANCER potentiometer be installed to the machinery for process control. The ohmic value of the DANCER potentiometer should be 1K ohms. Louis Allis part no. 05P00040-0192 is recommended.

### NOTE

The SPEED CONTROL potentiometer and tachometer generator are not required when this modification is used.

Perform equipment interconnections according to the Controller instruction manual. Then wire DANCER potentiometer as shown in Figure 2 and Table 1.

An external POSITION potentiometer may be remotely installed to operate in place of 2RH on the Dancer Position PCB. This external potentiometer should be 10K ohms. Louis Allis part no. 43T00572-1033 is recommended. To install this external pot, open jumper J1 by removing the self-tapping screw. Then wire external POSITION potentiometer as shown in Figure 2 and Table 1.

When an external POSITION potentiometer is used, remove the potentiometer knob from the POSITION potentiometer on the modification PCB.

### CAUTION

INSURE THAT ELECTRICAL PARTS OF THE DANCER POTENTIOMETER AND POSITION POTENTIOMETER WHEN EXTERNALLY MOUNTED ARE ELECTRICALLY ISOLATED FROM THE CASE AND EARTH GROUND TO PREVENT DAMAGE TO THE EQUIPMENT. DO NOT INSTALL A POTENTIOMETER HAVING MECHANICAL ROTATIONAL STOPS AS THE DANCER POTENTIOMETER.

## ADJUSTMENTS

### 1. Controller

Complete procedures as stated in ADJUSTMENTS section of manual first.

### IMPORTANT

The following pots and switches have no affect with the Dancer modification installed. Therefore, each should be set to zero or closed position.

DAMPING (1RH)  
MAX SPEED (2RH)  
MIN SPEED (4RH)  
ACCEL RATE (5RH)  
1SS & 2SS

### 2. Dancer Position Mod

A. Set the POSITION, RESPONSE and SENSITIVITY potentiometers to mid-range. For the Type HC Controllers, set GAIN potentiometer to 50%.

B. Start the drive.

C. With web in the dancer loop, adjust the POSITION potentiometer so that the dancer maintains a position near its center of travel.

D. Adjust the SENSITIVITY potentiometer to make the drive as sensitive to DANCER potentiometer movement as desired. If drive becomes unstable at higher settings, turn the SENSITIVITY potentiometer counterclockwise or turn the RESPONSE potentiometer clockwise to maintain a stable condition. This step assumes that the TENSION SENSITIVITY potentiometer on the Regulator PCB is set at 100%. For the Type HC Controller, if adjustment of the SENSITIVITY potentiometer on the modification PCB does not make the drive as sensitive to DANCER potentiometer movement as desired, increase the GAIN potentiometer setting and repeat this step.

DWG. NO. 02Y00025-0210  
SHEET 3 OF 4  
EFF. 5/21/86 (I)

For use with Type MC and  
 HC Eddy Current Drives.

**MODIFICATION A4 DANCER TRIM**  
 KIT 46S02051-0171

**PCB 46S02050-0011 SCHEMATIC 45S02050-0011**  
 ( REPLACES 46S02050-0010 )

Before installing this kit, a **TECHNICALLY QUALIFIED INDIVIDUAL**, who is familiar with this type of equipment and 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 modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller to enable the drive to trim output speed to maintain position of a dancer on a moving process web or line. It also includes front panel nameplates and modification diagrams for the basic MOD 7 controller instruction manual.

The modification compares an external **DANCER** potentiometer with the internal **POSITION** potentiometer setting and generates a speed trim signal proportional to the difference in settings. The trim signal modifies the drive speed up to  $\pm 10\%$  to maintain the dancer position. The **POSITION** potentiometer sets the neutral position about which the **DANCER** potentiometer operates. The **SENSITIVITY** potentiometer sets the amount of dancer droop required to provide a given amount of time. The

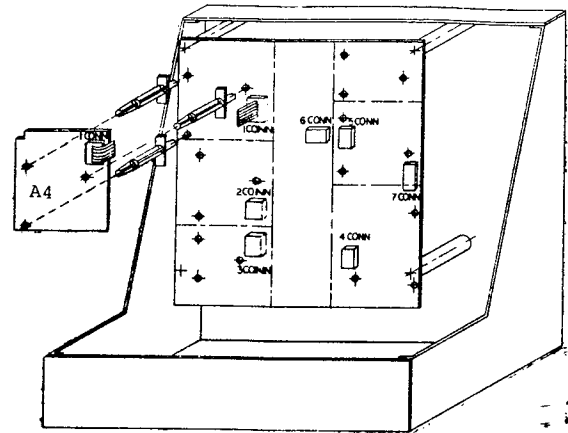


Figure 1.

**RESPONSE** potentiometer compensates for system inertia and stabilizes the drive.

The **Dancer Trim** modification must be used with either **Voltage Follower** modification (B1 or B3) or **Current Follower** modification (B2 or B4) to provide a follower with dancer trim combination drive.

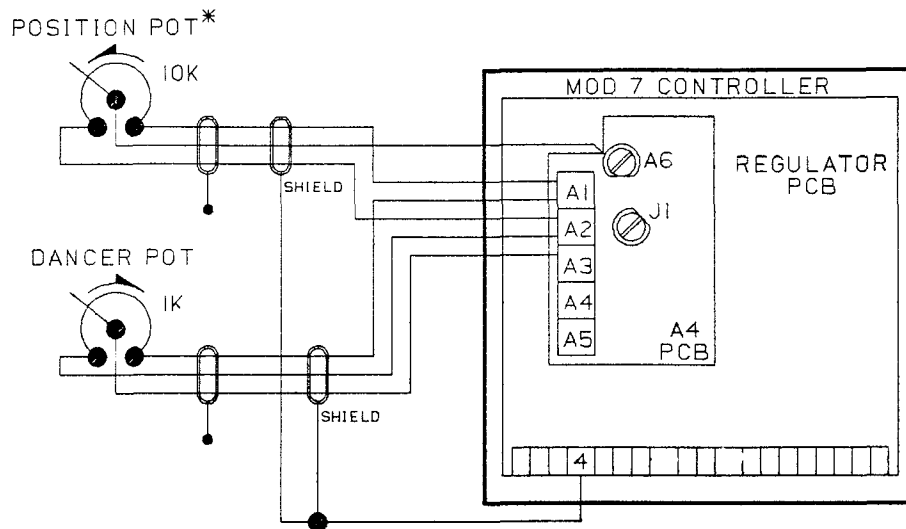
INSTALLATION

WARNING

**REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT.**

This modification PCB is to be installed to area A of the Regulator PCB as shown in Figure 1. Installation instructions are contained in the Controller instruction manual.

| CHANGE RECORD |          |         |     | DWG. NO. 02Y00025-0209<br>SHEET 1 OF 4<br>EFF. 5/21/86 (I) |
|---------------|----------|---------|-----|--|
| 1             | STD-2713 | 3-2-87  | QTY |  |
| 2             | STD-2945 | 1-25-88 | REV |  |
|               |          |         |     |  |



\* - WHEN EXTERNAL POSITION POT IS USED, JUMPER J1 (SCREW) MUST BE REMOVED FROM A4 PCB

TD I.2Y25.0209.FIG2

Figure 2. Interconnection Diagram

Table 1. Interconnection Table

| WIRE NO. | FROM                 |                  | TO  |                   | REMARKS  |
|----------|----------------------|------------------|---|-------------------|--|
|          | EQUIPMENT            | TERMINAL MARKING | EQUIPMENT                                     | TERMINAL MARKING  |  |
| A1       | Dancer Trim PCB (A4) | TB(A1)           | DANCER Potentiometer (Installed on Machinery) | CW (MORE TORQUE)  | 3-Conductor Shielded.<br><br>See Note in Controller Manual for Connecting Shielded Cables. |
| A2       |                      | TB(A2)           |   | CCW (LESS TORQUE) |  |
| A3       |                      | TB(A3)           |   | Wiper             |  |
| Shield   | Controller           | TB(4)            | No Connection                                 |                   |  |
| A1       | Dancer Trim PCB (A4) | TB(A1)           | POSITION Potentiometer (Externally Mounted)   | CCW               | 3-Conductor Shielded.<br><br>See Note in Controller Manual for Connecting Shielded Cables. |
| A2       |                      | TB(A2)           |   | CW                |  |
| A6       |                      | (A6)             |   | Wiper             |  |
| Shield   | Controller           | TB(4)            | No Connection                                 |                   |  |

DWG. NO. 02Y00025-0209  
SHEET 2 OF 4  
EFF. 5/21/86 (I)

After installing the modification PCB, apply the schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual

#### INTERCONNECTION

This modification requires that a DANCER potentiometer be installed to the machinery for process control. The ohmic value of the DANCER potentiometer should be 1K ohms. Louis Allis part no. 05P00040-0192 is recommended.

Perform equipment interconnection according to the chart in the Controller instruction manual. Then wire DANCER potentiometer as shown in Figure 2 and Table 1.

An external POSITION potentiometer may be remotely installed to operate in place of 2RH of the Dancer Trim PCB. This external potentiometer should be 10K ohms. Louis Allis part no. 43T00573-1033 is recommended. To install this external potentiometer, open jumper J1 by removing the self-tapping screw. Then wire external POSITION potentiometer as shown in Figure 2 and Table 1.

#### CAUTION

INSURE THAT ELECTRICAL PARTS OF THE DANCER POTENTIOMETER AND POSITION POTENTIOMETER WHEN EXTERNALLY MOUNTED ARE ELECTRICALLY ISOLATED FROM THE CASE AND EARTH GROUND TO PREVENT DAMAGE TO THE EQUIPMENT.

DO NOT INSTALL A POTENTIOMETER HAVING MECHANICAL ROTATIONAL STOPS AS THE DANCER POTENTIOMETER.

When an external POSITION potentiometer is used, remove the potentiometer knob from the POSITION potentiometer on the modification PCB.

#### ADJUSTMENTS

Perform the adjustments in the Controller instruction manual, and adjust the LOW SPEED TRACKING and RATIO potentiometers on the Voltage or Current Follower modification.

#### NOTE

To prevent interaction of Dancer Trim signals while adjusting the Follower modification PCB, temporarily disconnect ICONN at the Dancer Trim modification PCB. Reconnect ICONN when MAX SPEED, RATIO and LOW SPEED TRACKING adjustments have been set.

Then adjust Dancer Trim modification PCB as follows:

1. Set the POSITION, RESPONSE and STABILITY potentiometers to mid-range.
2. Start the drive.
3. With web in the dancer loop, adjust the POSITION potentiometer so that the dancer maintains a position near its center of travel.
4. Adjust the SENSITIVITY potentiometer until the drive is as sensitive to DANCER potentiometer movement as desired. If the drive becomes unstable at higher settings, turn the RESPONSE potentiometer clockwise to maintain stability.
5. Adjust the RESPONSE potentiometer to the lowest setting which provides stable dancer control while minimizing position overshoot when disturbances do occur. The RESPONSE potentiometer may require readjustment whenever the SENSITIVITY potentiometer is adjusted.
6. If desired action cannot be obtained, perform modification troubleshooting procedures.

DWG. NO. 02Y00025-0209  
SHEET 3 OF 4  
EFF. 5/21/86 (I)



## TROUBLESHOOTING

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the output voltage of the modification after the STOP push button has been pressed.

1. Place the DANCER potentiometer at mid-range.
2. Refer to the schematic diagram of the Dancer Trim PCB and check the voltage between terminal board connection A3 and 12CONN(6) of the Regulator PCB (common). Voltage should be approximately zero and should vary from -15 VDC to +15 VDC as the DANCER potentiometer is moved over its entire range. If voltage is incorrect or erratic, check wiring and/or replace the DANCER potentiometer.
3. Check the voltage between test point A2TP on the Dancer Trim PCB and 12CONN(6). The voltage should go positive and negative as the DANCER potentiometer is moved about its normal regulated position. Magnitude of voltage change depends on the setting of the SENSITIVITY potentiometer. The higher the setting, the larger the voltage swing for the same dancer movement. If voltage swing is not as expected, replace the Dancer Trim PCB.
4. If a Follower Modification with Man/Auto (B3 or B4) is installed, place the MAN/AUTO selector switch in MANUAL.

Monitor the voltage between modification test point A1TP and 12CONN(6) of the Regulator PCB (common). Press the RUN push button. Voltage should follow movement of the MANUAL SPEED potentiometer but be limited in speed of response by the controlled acceleration rate circuit on the Regulator PCB. Maximum voltage observed should be approximately -10 VDC. If voltage is not as expected, problem is in the acceleration control or in reference circuits left of modification area A on the simplified schematic diagram.

## MODIFICATION RECORDS

After completing mod kit installation:

A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "4" in the block corresponding to modification area A.

B. For MC Controller: In the Spare Parts List in the controller instruction manual, change the Part Number for Modification PCB A4 to read 46S02050-0011.

For HC Controller: In the Standard Modification Kits listing in the Controller instruction manual, add the following:

A 4 Dancer Trim A4K

Also, in the Spare Parts List, add the following line in the Modification PCB's section:

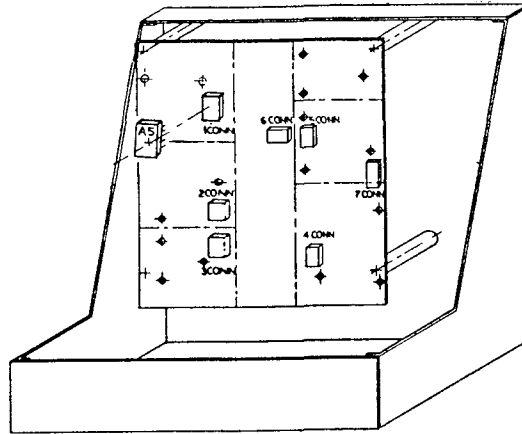
Dancer Trim A4 46S02050-0011

C. Insert this instruction sheet inside the back cover of the Controller instruction manual.

DWG. NO. 02Y00025-0209  
SHEET 4 OF 4  
EFF. 5/21/86 (I)

MODIFICATION A5  
 FOR EDDY CURRENT DRIVE  
 (KIT P/N 46SO2051-0210)  
 CLUTCH CURRENT

Effective  
 2-16-81  
 Supersedes  
 7-77



MOD PCB  
 46SO2064-0050  
 SCHEMATIC  
 NONE (See Note under  
 Installation)

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for placing the basic Controller in a clutch current mode of operation at all times. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification is a jumper plug which is inserted into the 1CONN connector. The clutch current reference is supplied to the modification through an external 2.5K ohm potentiometer normally used for speed control. The clutch current reference signal bypasses the Acceleration Control circuit when this modification is installed

INSTALLATION

WARNING  
 REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification plug is to be installed to area A of the Regulator PCB as shown in the illustration on this page, by removing the continuity plug from 1CONN and inserting the modification plug in its place.

After installing the modification plug, apply the schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual.

NOTE

The schematic overlay indicates the jumper wires internal to the modification plug.

INTERCONNECTION

Perform equipment interconnection according to the Controller instruction manual

NOTE

The instruction manual schematic illustrates the external 2.5K ohm pot labeled as SPEED control. After interconnections are completed, change the schematic marking to read CURRENT Control

ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, perform the following adjustments.

1. Set the external clutch current potentiometer fully clockwise.
2. Adjust the TENSION SENSITIVITY potentiometer on the Regulator PCB for desired maximum clutch current.
3. Set the external clutch current potentiometer for desired operating clutch current.

TROUBLESHOOTING

Troubleshooting consists of checking continuity of the modification plug as follows:

| From  | To     |
|-------|--------|
| Pin 1 | Pin 2  |
| Pin 4 | Pin 11 |

Replace the Clutch Current plug if defective.

MODIFICATION RECORDS

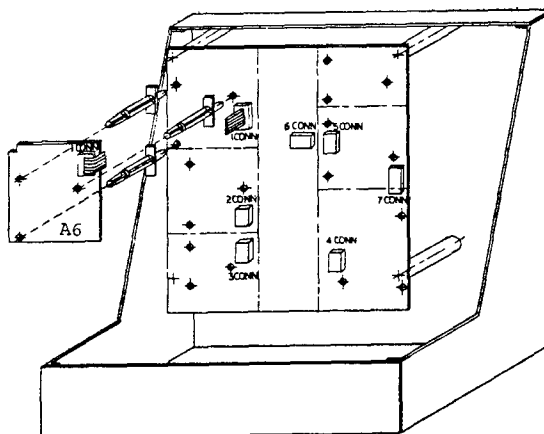
After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual Place the number "5" in the block corresponding to modification area A.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

INSTRUCTION SHEET  
 FOR MODIFICATION A5  
 Sheet 1 of 1  
 02Y00025-0022

MODIFICATION A6  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0191)  
CLUTCH CURRENT/SPEED

Effective  
2-5-81  
Supersedes  
12-78



MOD PCB  
46SO2050-0031  
SCHEMATIC  
45SO2050-0031

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller to allow the operator to switch from speed control to clutch current, or direct torque, control. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this modification to the Controller enables the operator to select speed control or current control drive operation by means of a remote selector switch. When operating in speed control (MAN/AUTO switch in the MAN position), the speed reference is supplied to the modification from the SPEED CONTROL potentiometer via the acceleration Control circuit or other modification. When operating in current control (MAN/AUTO switch in the AUTO position), the Acceleration Control circuit is reset to zero and the current reference is supplied to the modification at terminal board connection A3. In this operating mode, the torque output of the drive is proportional to the clutch field current at speeds less than 80 percent of top speed.

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the two schematic overlays to area A of the simplified schematic diagram and to the area directly above modification area C as described in the Controller instruction manual.

INTERCONNECTION

This modification requires that a two-position MAN/AUTO selector switch be added to the operator control station. Perform interconnections according to the chart in the Controller instruction manual. Then perform interconnection as shown in the attached table and diagram

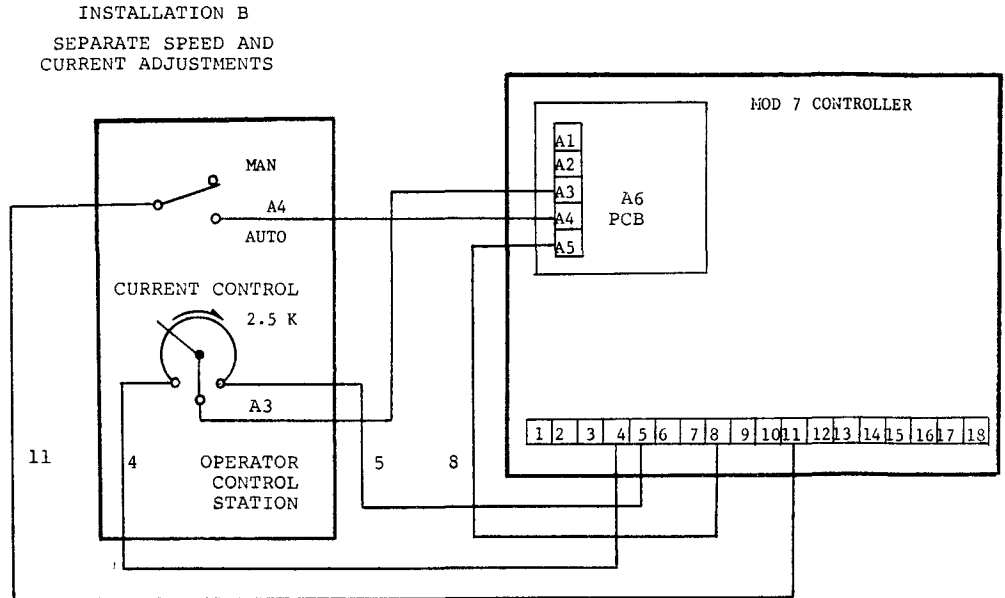
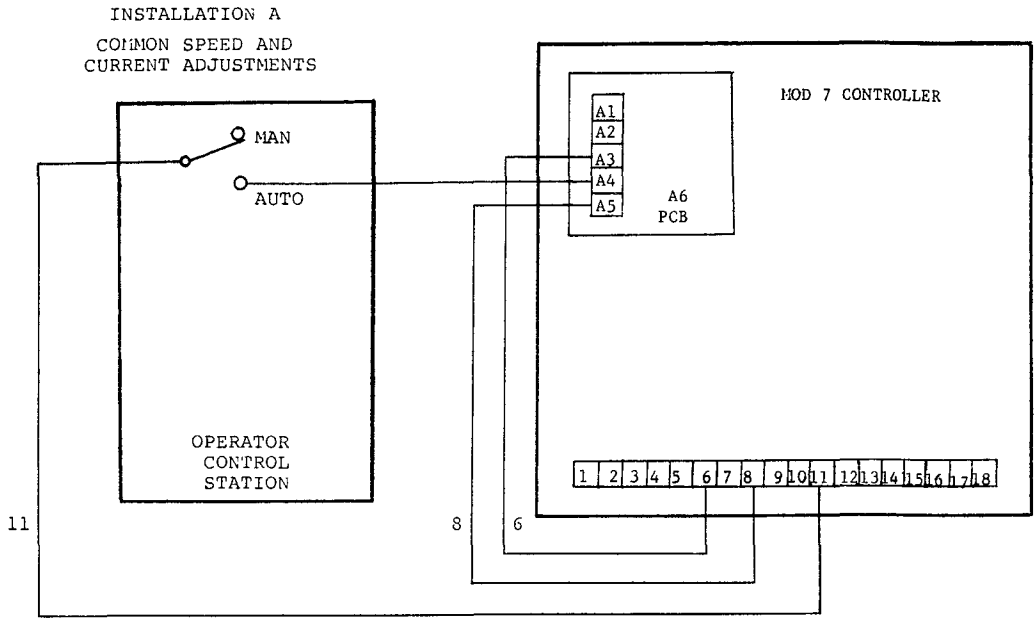
Depending on the application, the SPEED CONTROL potentiometer may be used for both speed control and current (torque) control adjustments or a separate potentiometer may be added for current control adjustment. Addition of a separate current control potentiometer enables presetting of speed and current adjustments. If the potentiometer is not added, the SPEED CONTROL potentiometer must be reset whenever the MAN/AUTO selector switch position is changed. If a separate current control potentiometer is not used, wire terminal A3 of the Clutch Current/Speed PCB to the wiper of the SPEED CONTROL potentiometer as shown in diagram A. If a separate current control potentiometer is used, wire as shown in diagram B.

ADJUSTMENTS

1. Place the MAN/AUTO selector switch to MAN and perform adjustments contained in the Controller instruction manual.
2. Place the MAN/AUTO selector switch to AUTO. If a separate current control potentiometer is used, turn the current control potentiometer fully clockwise. If the SPEED CONTROL potentiometer is used for both speed and

INSTRUCTION SHEET  
FOR MODIFICATION A6  
Sheet 1 of 3  
02Y00025-0035

INTERCONNECTION DIAGRAMS



INTERCONNECTION TABLE

| WIRE NO  | FROM                       |                     | TO                      |                            | REMARKS |  |
|----------|----------------------------|---------------------|-------------------------|----------------------------|---------|--|
|          | EQUIPMENT                  | TB OR OTHER MARKING | EQUIPMENT               | TB OR OTHER MARKING        |         |  |
| 8        | Controller                 | TB(8)               | Speed/Current Relay PCB | TB(A5)                     |         |  |
| 11       | MAN/AUTO Switch            | COMMON              | Controller              | 11                         |         |  |
| A4       | Speed/Current Relay PCB A6 | TB(A4)              | MAN/AUTO Switch         | AUTO                       |         |  |
| INSTAL A | 6                          | Controller          | TB(6)                   | Speed/Current              | TB(A3)  |  |
| INSTAL B | 5                          | CURRENT CONTROL Pot | CW                      | Controller                 | TB(5)   | 3-Conductor Shielded Cable<br><br>See Note in Controller Manual for connecting shielded cables |
|          | 4                          | CURRENT CONTROL Pot | CCW                     | Controller                 | TB(4)   |  |
|          | A3                         | CURRENT CONTROL Pot | WIPER                   | Speed/Current Relay/PCB A6 | TB(A3)  |  |
|          | SHLD                       | Controller          | TB(4)                   | No Connection              |         |  |

- current control, turn the SPEED CONTROL potentiometer fully clockwise.
3. Adjust the TENSION SENSITIVITY potentiometer on the Regulator PCB for desired maximum clutch current.
  4. Adjust the current control or SPEED CONTROL potentiometer for desired operating clutch current.

#### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty

Troubleshooting consists of checking the operating condition of the relay contacts.

- A. Apply AC input power to the Controller. Turn the SPEED CONTROL potentiometer fully clockwise and place the MAN/AUTO switch to MAN. Do not press RUN pushbutton.
- B. Refer to the schematic diagram of the Clutch Current/Speed PCB and check voltages between test point A1TP of the Clutch Current/Speed PCB and I2CONN(6) on the Regulator PCB. Voltage should be approximately 0 VDC. If voltage is incorrect, replace Clutch Current/Speed PCB.
- C. Press RUN pushbutton. Voltage at A1TP should go to approximately -10 VDC at a rate controlled by the ACCEL RATE potentiometer setting.
- D. Place the MAN/AUTO switch in AUTO position and adjust CURRENT CONTROL potentiometer fully clockwise. Check voltage between test point A1TP on Clutch Current/Speed PCB and I2CONN(6) of the Regulator PCB. Voltage should be approximately -10 VDC and be proportional to the CURRENT CONTROL potentiometer setting. If voltage is incorrect, replace Clutch Current/Speed PCB.

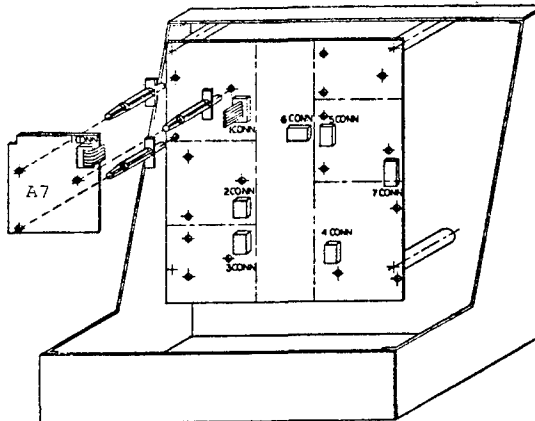
#### MODIFICATION RECORDS

After completing modification installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "6" in the block corresponding to modification area A.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION A7  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0180)  
DANCER/SPEED

Effective  
11-7-80  
Supersedes  
9-6-78



MOD PCB  
46SO2050-0020  
SCHEMATIC  
45SO2050-0020

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for dancer position control or manual speed control operation. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification allows the operator to select either dancer position or speed control operation with a remote selector switch. With the selector switch set to the Automatic mode, an external DANCER potentiometer modulates the magnitude of clutch field current or torque produced at the output shaft of the rotating equipment to maintain constant dancer position. The DANCER POSITION potentiometer sets the neutral point about which the DANCER potentiometer operates. The SENSITIVITY potentiometer sets the amount of dancer droop required to provide 100% clutch current and rated torque. The RESPONSE Potentiometer compensates for system inertia and stabilizes the drive. When in speed control (manual mode) the SPEED CONTROL potentiometer is used to vary the drive speed, the speed reference is applied to the drive via the Acceleration Control circuit, and the dancer circuit is inoperative.

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION  
KIT.

This modification PCB is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply one schematic overlay to area A and one overlay to the upper left corner of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires that a two-position MAN/AUTO selector switch be installed to the operator control station and that a DANCER potentiometer be installed on the machinery for process control. The ohmic value of the DANCER potentiometer should be 1K ohms. Louis Allis part no. 05P00040-0192 is recommended.

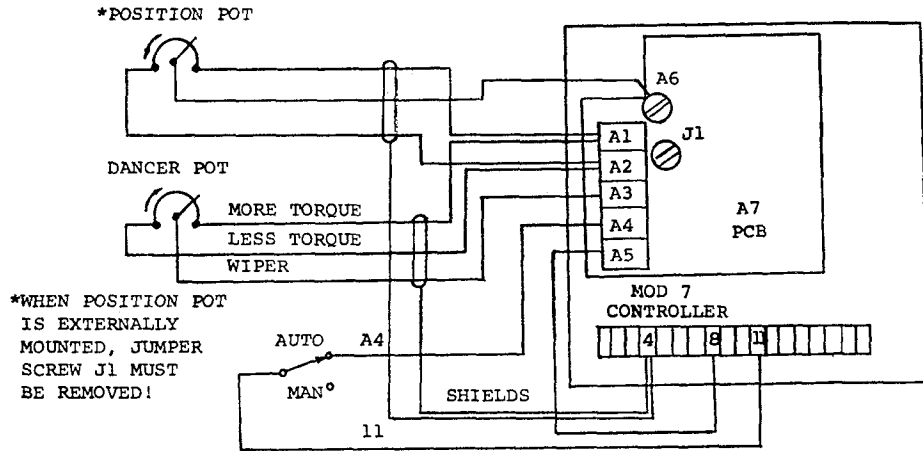
Perform equipment interconnections according to the Controller instruction manual. Then wire the selector switch and DANCER potentiometer as shown in the attached interconnection diagram and table.

When an external POSITION potentiometer is used, remove the potentiometer knob from the POSITION potentiometer on the modification PCB.

**CAUTION**  
Insure that electrical parts of  
the DANCER potentiometer and  
POSITION potentiometer are  
electrically isolated from the  
case and earth ground to prevent  
damage to equipment.

INSTRUCTION SHEET  
FOR MODIFICATION A7  
Sheet 1 of 3  
02Y00025-0019

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                                    |                     | TO  |                     | WIRE TYPE (ALL 15 AMPS OR LESS)  |
|----------|---|---------------------|---|---------------------|--|
|          | EQUIPMENT                               | TB OR OTHER MARKING | EQUIPMENT                                     | TB OR OTHER MARKING |  |
| 8        | Controller                              | TB (8)              | Dancer with Speed/Dancer Relay PCB (A7)       | TB (A5)             |  |
| 11       | Controller                              | TB (11)             | STOP Button                                   | c                   |  |
| 11       | AUTO/MAN Selector Switch                |                     | STOP Button                                   | c                   |  |
| 13       | Controller                              | TB (13)             | STOP Button                                   | d                   |  |
| A4       | Dancer with Speed/Dancer Relay PCB (A7) | TB (A4)             | AUTO/MAN Selector Switch                      |                     | 3-Conductor shielded cable. See Note in Controller Manual for Connecting Shielded Cable. |
| A1       | Dancer with Speed/Dancer Relay PCB (A7) | TB (A1)             | DANCER Potentiometer (Installed on Machinery) | More Torque         |  |
| A2       |   | TB (A2)             |   | Less Torque         |  |
| A3       |   | TB (A3)             |   | Wiper               |  |
| SHIELD   | Controller                              | TB (4)              |   |                     | 3-Conductor See Note in Controller Manual for Connecting Shielded Cable                  |
| A1       | Dancer with Speed/Dancer Relay PCB (A7) | TB (A1)             | POSITION Potentiometer (Externally Mounted)   | (More Torque)       |  |
| A6       |   | TB (A6)             |   | (Wiper)             |  |
| A2       |   | TB (A2)             |   | (Less Torque)       |  |
| Shield   | Controller                              | TB (4)              | No Connection                                 |                     |  |

### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Set the DANCER POSITION, RESPONSE and SENSITIVITY potentiometers to mid-range.
  2. Start the drive and place the MAN/AUTO selector switch to AUTO for dancer operation.
  3. With web in the dancer loop, adjust the DANCER POSITION potentiometer so that the dancer maintains a position near its center of travel.
  4. Adjust the SENSITIVITY potentiometer to make the drive as sensitive to DANCER potentiometer position as desired. If the drive becomes unstable at higher settings, turn the SENSITIVITY potentiometer counter-clockwise or turn the RESPONSE potentiometer clockwise to maintain a stable condition. This step assumes that the TENSION SENSITIVITY potentiometer on the Regulator PCB is set at zero (0%). If adjustment of the SENSITIVITY potentiometer on the modification PCB does not make the drive as sensitive to DANCER potentiometer movement as desired, turn the TENSION SENSITIVITY potentiometer to 50% and repeat step.
  5. Adjust the RESPONSE potentiometer to the lowest setting which provides stable dancer control while minimizing position overshoot when disturbances do occur. The RESPONSE potentiometer may require re-adjustment whenever the SENSITIVITY potentiometer is adjusted.
  6. If desired action cannot be obtained, perform modification kit troubleshooting procedures.
3. Set DANCER POSITION potentiometer to 50% and check the voltage between test point ALTP on the modification PCB and I2CONN(6). Voltage should go positive and negative as the DANCER potentiometer is moved about its normal regulated position. The actual voltage change depends on the setting of the SENSITIVITY potentiometer. The higher the setting, the larger the voltage swing for the same dancer movement (maximum swing  $\pm 14$  VDC). If voltage does not vary with change in DANCER potentiometer, replace the Dancer/Speed PCB.
  4. Place the MAN/AUTO selector switch to MAN. If a Follower Modification with Man/Auto (B3 or B4) is installed, place the MAN/AUTO selector switch in MANUAL. Monitor the voltage between Dancer/Speed PCB test point ALTP and I2CONN(6) of the Regulator PCB. Press the RUN pushbutton. Voltage should follow the movement of the MANUAL SPEED potentiometer but be limited in speed of response by the controlled acceleration rate circuit on the Regulator PCB. Maximum voltage should be approximately -10 VDC. If voltage is not as expected, problem is in the acceleration control or in reference circuits left of modification area A of the simplified schematic diagram.

### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "7" in the block corresponding to modification area A.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

### TROUBLESHOOTING

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking input and output voltages of the modification while potentiometers are rotated.

1. Place the MAN/AUTO selector switch to AUTO and the DANCER potentiometer to mid-range.
2. Refer to the schematic diagram of the Dancer/Speed PCB and check the voltage between terminal board connection A3 and I2CONN(6) of the Regulator PCB (common). Voltage should be approximately zero (0) and should vary from -15 VDC to +15 VDC as the DANCER potentiometer is moved over its entire range. If voltage is incorrect or erratic, check wiring and/or replace the DANCER potentiometer.



**MODIFICATION A7 DANCER POSITION/SPEED**  
**KIT 46S02051-0181**  
**PCB 46S02050-0021 SCHEMATIC 45S02050-0021**  
**( REPLACES 46S02050-0020 )**

Before installing this kit, a **TECHNICALLY QUALIFIED INDIVIDUAL**, who is familiar with this type of equipment and 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 modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for dancer position control or manual speed control operation. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification allows the operator to select either dancer position or speed control operation with a remote selector switch. With the selector switch set to the Automatic mode, an external DANCER potentiometer modulates the magnitude of clutch field current or torque produced at the output shaft of the rotating equipment to maintain constant dancer position. The POSITION potentiometer sets the neutral point about which the

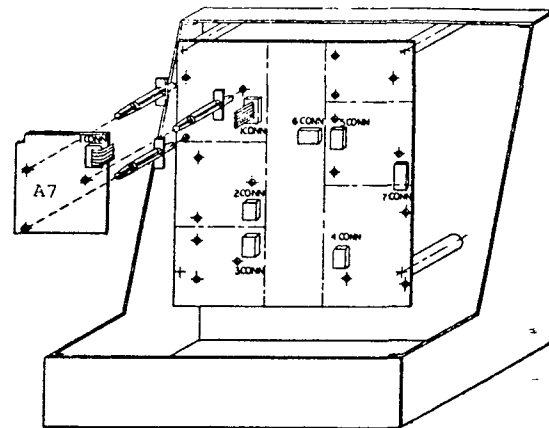


Figure 1.

DANCER potentiometer operates. The SENSITIVITY potentiometer sets the amount of dancer droop required to provide 100% clutch current and rated torque. The RESPONSE potentiometer compensates for system inertia and stabilizes the drive. When in speed control (Manual mode) the SPEED CONTROL potentiometer is used to vary the drive speed, the speed reference is applied to the drive via the Acceleration Control circuit, and the dancer circuit is inoperative. For the Type HC Controller, the GAIN potentiometer (not adjustable thru front cover) sets the overall gain of the error amplifier located on the drive Regulator PCB. For the Type MC Controller, the GAIN potentiometer is not used and jumper J2 must be removed.

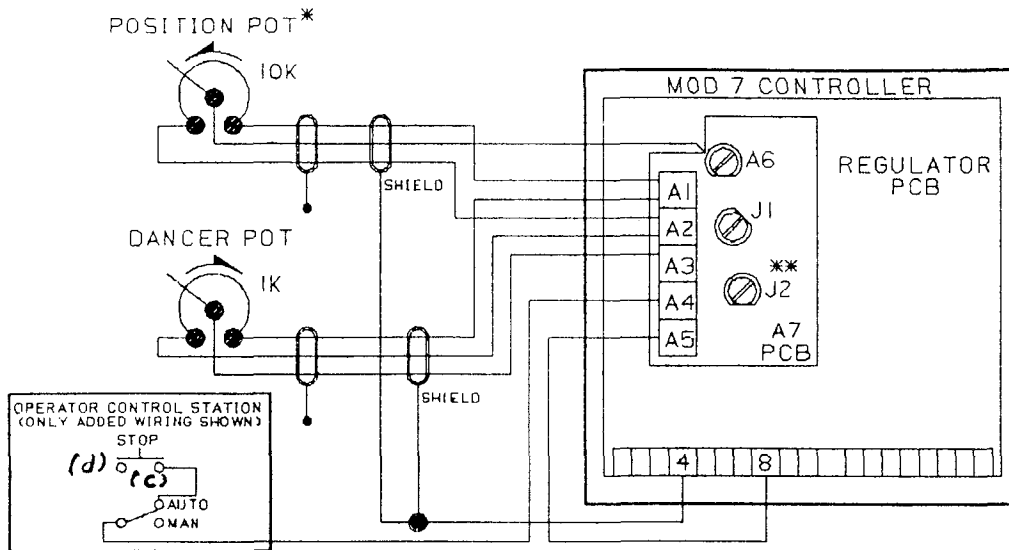
| CHANGE RECORD |          |         |     |
|---------------|----------|---------|-----|
| 1             | STD-2713 | 3-3-87  | ReR |
| 2             | STD-2945 | 1-22-88 | Rea |

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Table 1. Interconnection Table

| WIRE NO. | FROM                           |                  | TO  |                   | WIRE TYPE<br>(ALL 15 AMPS OR LESS)   |
|----------|--------------------------------|------------------|---|-------------------|--|
|          | EQUIPMENT                      | TERMINAL MARKING | EQUIPMENT                                     | TERMINAL MARKING  |  |
| 8        | Controller                     | TB(8)            | Dancer Position/Speed PCB (A7)                | TB(A5)            |  |
| 11       | AUTO/MAN Selector Switch       | AUTO             | STOP Button                                   | (c)               |  |
| A4       | Dancer Position/Speed PCB (A7) | TB(A4)           | AUTO/MAN Selector Switch                      | Common            |  |
| A1       | Dancer Position/Speed PCB (A7) | TB(A1)           | DANCER Potentiometer (Installed on Machinery) | CW (More Torque)  | 3-Conductor Shielded.<br><br>See Note in Controller Manual for Connecting Shielded Cables. |
| A2       |                                | TB(A2)           |   | CCW (Less Torque) |  |
| A3       |                                | TB(A3)           |   | Wiper             |  |
| Shield   | Controller                     | TB(4)            | No Connection                                 |                   |  |
| A1       | Dancer Position/Speed PCB (A7) | TB(A1)           | POSITION Potentiometer (Externally Mounted)   | CCW               | 3-Conductor Shielded<br><br>See Note in Controller Manual for Connecting Shielded Cables.  |
| A2       |                                | TB(A2)           |   | CW                |  |
| A6       |                                | (A6)             |   | Wiper             |  |
| Shield   | Controller                     | TB(4)            | No Connection                                 |                   |  |

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\* - WHEN EXTERNAL POSITION POT IS USED, JUMPER J1 (SCREW) MUST BE REMOVED FROM A7 PCB

\*\* - WHEN USED IN TYPE MC CONTROLLER, JUMPER J2 (SCREW) MUST BE REMOVED FROM A7 PCB, TO DISABLE GAIN POTENTIOMETER

TD 1 2Y25 0211 FIG2

Figure 2. Interconnection Diagram

INSTALLATION

WARNING

REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply one schematic overlay to area A and one overlay to the upper left corner of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires that a two-position MAN/AUTO selector switch be installed to the operator control station and that a DANCER potentiometer be installed on the machinery for process control. The ohmic value of the DANCER potentiometer should be 1K ohms. Louis Allis part no. 05P00040-0192 is recommended.

Perform equipment interconnections according to the Controller instruction manual. Then wire the selector switch and DANCER potentiometer as shown in Figure 2 and Table 1.

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An external POSITION potentiometer may be remotely installed to operate in place of 2RH of the Dancer Position/Speed PCB. This external potentiometer should be 10K ohms. Louis Allis part no. 43T00573-1033 is recommended. To install this external potentiometer, open jumper J1 by removing the self-tapping screw. Then wire external POSITION potentiometer as shown in Figure 2 and Table 1.

When an external POSITION potentiometer is used, remove the potentiometer knob from the POSITION potentiometer on the modification PCB.

#### CAUTION

INSURE THAT ELECTRICAL PARTS OF THE DANCER POTENTIOMETER AND POSITION POTENTIOMETER ARE ELECTRICALLY ISOLATED FROM THE CASE AND EARTH GROUND TO PREVENT DAMAGE TO EQUIPMENT.

#### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Set the POSITION, RESPONSE and SENSITIVITY potentiometers to mid-range. For the Type HC Controller, set GAIN potentiometer to zero.
2. Start the drive and place the MAN/AUTO selector switch to AUTO for dancer operation.
3. With web in the dancer loop, adjust the POSITION potentiometer so that the dancer maintains a position near its center of travel.
4. Adjust the SENSITIVITY potentiometer to make the drive as sensitive to DANCER potentiometer position as desired. If the drive becomes unstable at higher settings, turn the SENSITIVITY potentiometer counterclockwise or turn the RESPONSE potentiometer clockwise to maintain a stable condition. This step

assumes that the TENSION SENSITIVITY potentiometer on the Regulator PCB is set at 100%. For the Type HC Controller, if adjustment of the SENSITIVITY potentiometer on the modification PCB does not make the drive as sensitive to DANCER potentiometer movement as desired, turn the GAIN potentiometer to 50% and repeat this step.

5. Adjust the RESPONSE potentiometer to the lowest setting which provides stable dancer control while minimizing position overshoot when disturbances do occur. The RESPONSE potentiometer may require readjustment whenever the SENSITIVITY potentiometer is adjusted.

6. If desired action cannot be obtained, perform modification kit troubleshooting procedures.

#### TROUBLESHOOTING

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking input and output voltages of the modification while potentiometers are rotated.

1. Place the MAN/AUTO selector switch to AUTO and the DANCER potentiometer to mid-range.
2. Refer to the schematic diagram of the Dancer Position/Speed PCB and check the voltage between terminal board connection A3 and 12CONN(6) of the Regulator PCB (common). Voltage should be approximately zero (0) and should vary from -15 VDC to +15 VDC as the DANCER potentiometer is moved over its entire range. If voltage is incorrect or erratic, check wiring and/or replace the DANCER potentiometer.
3. Set POSITION potentiometer to 50% and check the voltage between test point A1TP on the modification PCB and 12CONN(6). Voltage should go positive

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SHEET 4 OF 5  
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and negative as the DANCER potentiometer is moved about its normal regulated position. The actual voltage change depends on the setting of the SENSITIVITY potentiometer. The higher the setting, the larger the voltage swing for the same dancer movement (maximum swing  $\pm 14$  VDC). If voltage does not vary with change in DANCER potentiometer, replace the Dancer Position/Speed PCB.

4. Place the MAN/AUTO selector switch to MAN. Monitor the voltage between Dancer Position/Speed PCB test point A1TP and 12CONN(6) of the Regulator PCB. Press the RUN push button. Voltage should follow the movement of the MANUAL SPEED potentiometer but be limited in speed of response by the controlled acceleration rate circuit on the Regulator PCB. Maximum voltage should be approximately -10 VDC. If voltage is not as expected, problem is in the acceleration control or in reference circuits left of modification area A of the simplified schematic diagram.

## MODIFICATION RECORDS

After completing mod kit installation:

A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "7" in the block corresponding to modification area A.

B. For MC Controller: In the Spare Parts List in the Controller instruction manual, change the Part Number for Modification PCB A7 to read 46S02050-0021.

For HC Controller: In the Standard Modification Kits listing in the Controller instruction manual, add the following:

A 7 Dancer Position/Speed A7K

Also, in the Spare Parts List, add the following line in the Modification PCB's section:

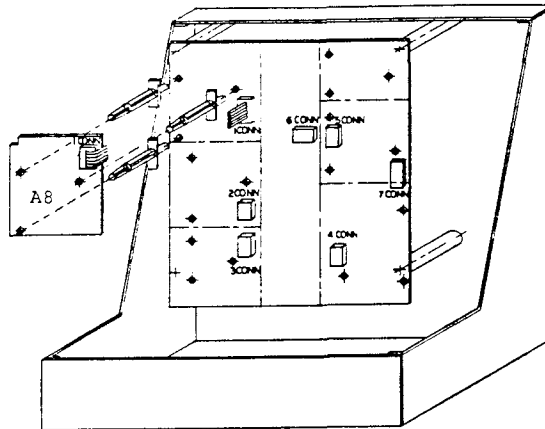
Dancer Position/Speed A7 46S02050-0021

C. Insert this instruction sheet inside the back cover of the Controller instruction manual.

DWG. NO. 02Y00025-0211  
SHEET 5 OF 5  
EFF. 5/21/86 (I)

MODIFICATION A8  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0250)  
LOG ACCEL/DECEL

Effective  
11-7-80  
Supersedes  
7-77



MOD PCB  
46SO2085-0010  
SCHEMATIC  
45SO2085-0010

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the log accel/decel function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to control the acceleration and deceleration rate of a drive operating in the manual speed mode. The rate is adjustable to give an acceleration and deceleration time between 2 and 30 seconds for a 100% change in drive speed. Acceleration or deceleration is initially at a controlled rate and gradually diminishes to zero as the desired operating speed is reached. When the STOP pushbutton is pressed, the reference output of this modification will be reset to zero by a contact on the Regulator Run relay 1CR.

Input to the assembly is the Speed Reference signal from the SPEED CONTROL potentiometer or modification installed in area C or D. Output is applied to the speed regulator via any modification installed in area B.

INSTALLATION

WARNING  
REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT

This modification kit is to be installed to area A of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing modification, apply schematic overlay to area A of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

ADJUSTMENTS

After performing adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Turn the ACCEL/DECEL RATE potentiometer to mid range. Turn the SPEED CONTROL to zero and start the drive.
2. Turn the SPEED CONTROL fully clockwise and observe drive acceleration rate. Adjust ACCEL/DECEL RATE potentiometer as required to obtain desired acceleration rate.
3. Turn SPEED CONTROL fully counterclockwise and verify that deceleration rate is as desired. If desired acceleration and deceleration rate cannot be obtained, perform modification kit troubleshooting procedures.

TROUBLESHOOTING

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

1. Start the drive and rotate the SPEED CONTROL fully clockwise.

INSTRUCTION SHEET  
FOR MODIFICATION A8

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2. Refer to the schematic diagram of the Log Accel/Decel PCB and check input of the voltage between A1TP and I2CONN(6) of the Regulator PCB (common). Voltage should be approximately -10 VDC. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
3. Check output voltage between A2TP and I2CONN(6) (common). Voltage should be approximately -10 VDC after acceleration time is complete. If voltage is incorrect, replace Log Accel/Decel PCB.
4. Press STOP pushbutton and allow drive to come to a stop. Again monitor voltage at A2TP. Voltage should be -10V. If voltage is incorrect, replace Log Accel/Decel PCB.
5. Turn SPEED CONTROL fully counter clockwise and check input voltage between A1TP and I2CONN(6). Voltage should be zero to -3 VDC depending on MIN SPEED potentiometer setting. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
6. Check output voltage between A2TP and I2CONN(6). Voltage should be the same as obtained in step 5, above. Be sure DECEL time is completed. If voltage is incorrect, replace Log Accel/Decel PCB.
7. If the acceleration and deceleration rate cannot be adjusted over the proper range or operation is erratic, replace Log Accel/Decel PCB.

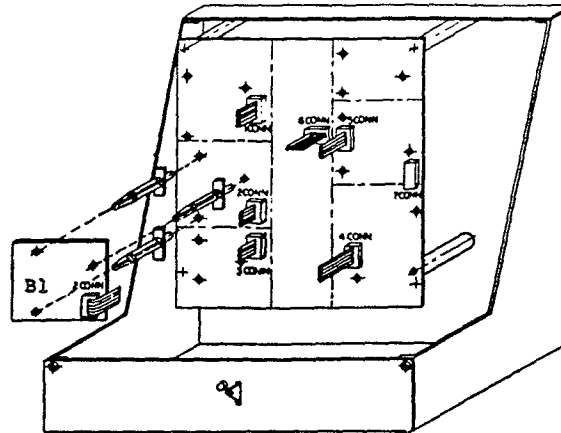
#### MODIFICATION RECORDS

After completing mod kit installation:

1. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "8" in the block corresponding to modification area A.
2. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION B1  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0060)  
VOLTAGE FOLLOWER

Effective  
11-6-80  
Supersedes  
7-77



MOD PCB  
46SO2044-0020  
SCHEMATIC  
45SO2044-0020

#### DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for a voltage follower which provides automatic drive speed control. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual. With this modification the drive's speed reference follows an external voltage signal at all times. An AC or DC voltage signal may be accommodated according to the connection on the terminal strip. The modification provides separate adjustments for ratio and plus/minus low speed tracking. If modification A4 (Dancer Trim) is also included on the Controller, the trim signal is also fed directly into the speed regulator and is allowed to vary the drive speed by as much as ten percent.

#### CAUTION

The signal input lines to this module are directly or indirectly connected to circuit common and to the 115 VAC power applied to the Controller. To prevent damage to equipment and erratic operation, be sure that the signal inputs to this module are NOT connected to earth ground nor to circuit common at any other place. An isolation transformer may be necessary either at the AC power input of the Controller or in the signal input line to avoid the application of line potentials to the following signal source.

#### INSTALLATION

##### WARNING

REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION  
KIT.

This modification PCB is to be installed to area B of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area B of the simplified schematic diagram as described in the Controller instruction manual.

#### INTERCONNECTION

This modification requires an external voltage signal. Perform equipment interconnection according to the chart in the Controller instruction manual. Then connect the external voltage signal as shown in the attached interconnection diagram and table.

The allowable voltage range is 33-150 VDC (23-106 VAC). By installing a jumper between terminals B4 and B5 of the Voltage Follower PCB, a lower input voltage range of 10-53 VDC (7-37 VAC) is obtained. Loading on the external signal is 17.5K ohms on the high range and 6.2K ohms on the low range with jumper installed. For DC inputs, the positive input lead is tied to circuit common. For AC inputs, both leads must be electrically isolated from circuit common.

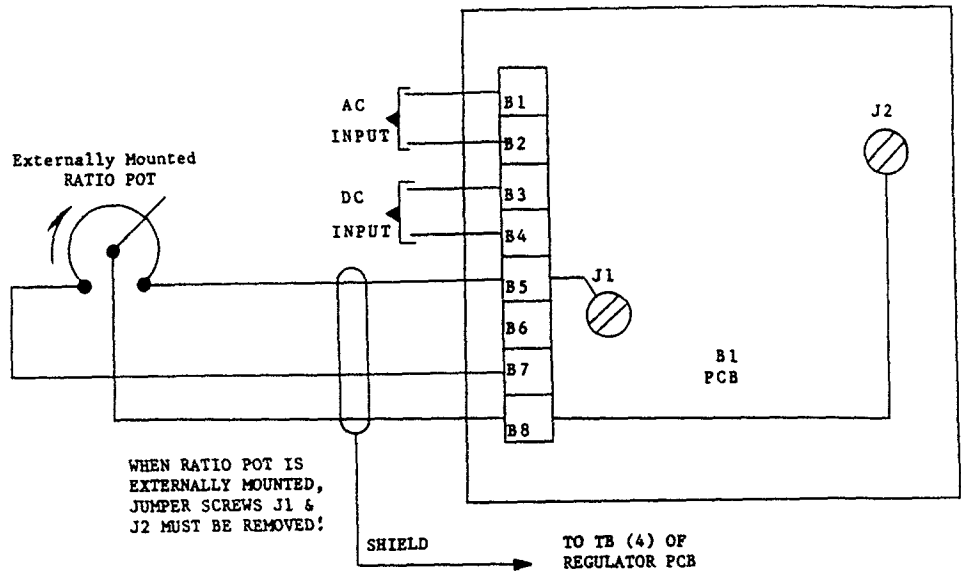
An external RATIO potentiometer may be remotely installed to operate in place of 1RH of the Voltage Follower PCB. This external potentiometer should be 5K ohms. Louis Allis part no. 43T00572-5023 is recommended. To install this external

INSTRUCTION SHEET  
FOR MODIFICATION B1

Sheet 1 of 3  
02Y00025-0007



INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                      |                     | TO                        |                     | REMARKS   |
|----------|---------------------------|---------------------|---------------------------|---------------------|---|
|          | EQUIPMENT                 | TB OR OTHER MARKING | EQUIPMENT                 | TB OR OTHER MARKING |   |
| B1       | Voltage Follower PCB (B1) | TB(B1)              | Customer's AC Input       |                     |   |
| B2       |                           | TB(B2)              |                           |                     |   |
| B3       | Voltage Follower PCB (B1) | TB(B3)              | Customer's DC Input       | (+)                 |   |
| B4       |                           | TB(B4)              |                           | (-)                 |   |
| Jumper   | Voltage Follower PCB (B1) | TB(B4)              | Voltage Follower PCB (B1) | TB(B5)              | For 10-30 Volt Range  |
| B5       | Voltage Follower PCB (B1) | TB(B5)              | External RATIO Pot        | More Torque         | 3-Conductor shielded Cable.<br>See Note in Controller Manual for Connecting shielded Cable. |
| B7       |                           | TB(B7)              |                           | Less Torque         |   |
| B8       |                           | TB(B8)              |                           | Wiper               |   |
| Shield   | Regulator                 | TB(4)               | No Connection             |                     |   |

potentiometer, open J1 and J2 by removing the self-tapping screws. Then wire external RATIO potentiometer according to the attached inter-connection diagram and table.

When an external RATIO potentiometer is used, remove the potentiometer knob from the RATIO potentiometer on the modification PCB.

#### ADJUSTMENTS

Adjust the modification PCB after performing the adjustments in the Controller instruction manual. If the MAX SPEED has not been adjusted, perform adjustment A first. If the MAX SPEED has been adjusted, proceed to adjustment B.

- A. Adjustment of MAX SPEED potentiometer with Voltage Follower (only) drives.
  1. Remove wires from modification terminals B1 through B4.
  2. Temporarily connect a wire from modification terminal B5 to terminal 5 of the Regulator PCB.
  3. Set MAX SPEED and RATIO potentiometers fully counterclockwise. Set LOW SPEED TRACKING potentiometer to mid-position.
  4. Start the drive and observe rotating unit speed. The drive should run at less than 1/3 speed.
  5. Increase the setting of the RATIO potentiometer until fully clockwise.
  6. Increase the setting of the MAX SPEED potentiometer until the drive is running at rated speed. Leave MAX SPEED at this setting.
  7. Stop drive, remove temporary wire and reconnect wires at modification terminals B1 through B4.
- B. Adjustment of modification PCB.
  1. Turn the RATIO potentiometer fully counterclockwise and the LOW SPEED TRACKING potentiometer to mid-range. Start the drive.
  2. Apply the normal minimum operating input voltage signal to the modification.
  3. Adjust the LOW SPEED TRACKING potentiometer to obtain the desired minimum drive operating speed. Range of minimum speed is  $\pm 30\%$  of rated speed.
  4. Apply the normal maximum operating input voltage signal to the modification.
  5. Adjust the RATIO potentiometer clockwise until the desired maximum drive operating speed is obtained. Do not exceed the maximum drive speed rating.
  6. If desired speeds cannot be obtained, perform modification kit troubleshooting procedures.

#### TROUBLESHOOTING

If other mod boards have been installed be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

1. Start the drive.
2. Refer to the schematic diagram of the Voltage Follower PCB and check for proper input voltage between terminal connections B4(-) and B3(+) if input voltage is DC or between terminal connections B1 and B2 if input voltage is AC. If incorrect, repair or replace external voltage follower source.
3. Check that output voltage between modification test point B1TP and I2CONN(6) of the Regulator PCB (common) varies as the external signal to the follower is varied and as the RATIO potentiometer setting is varied. If not, replace the Voltage Follower PCB.

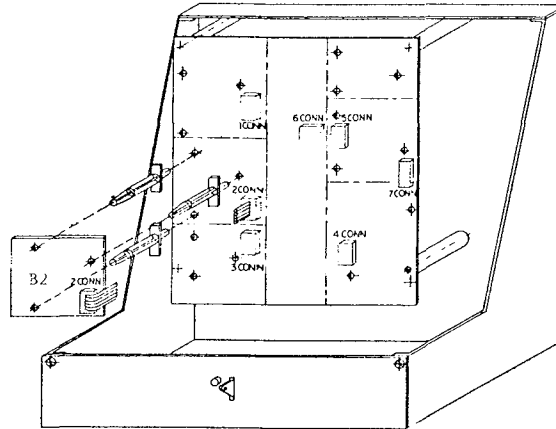
#### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "1" in the block corresponding to modification area B.
- B. Insert this instruction sheet to the inside back cover of the Controller instruction manual.

MODIFICATION B2  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0040)  
CURRENT FOLLOWER

Effective  
10-6-80  
Supersedes  
7/77



MOD PCB  
46SO2043-0020  
SCHEMATIC  
45SO2043-0020

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for automatic speed control operation. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

With this modification the drive speed is automatically controlled by an external current signal. An input DC current signal in the range of 1 to 5 milliamps is used to generate the reference voltage required by the drive. By installing jumper wires on the terminal strip, current ranges of 2 to 10, 4 to 20, and 10 to 50 milliamps can be accommodated. A RATIO potentiometer allows for an approximate -50% to +10% adjustment range. The LOW SPEED TRACKING potentiometer provides approximately +30% of rated drive speed.

The trim signal from modification A4 (Dancer Trim), if used, is also applied to the Controller. The trim signal can vary the drive speed up to 10% to maintain dancer position.

CAUTION

The signal input lines to this module are directly or indirectly connected to circuit common and to the 115 VAC power applied to the Controller. To prevent damage to the equipment and erratic operation, be sure that the signal inputs to this module are NOT connected to earth ground nor to circuit common at any other place. An isolation transformer may be necessary either at the AC power input of the Controller or in the signal input lines to avoid the application of line potentials to the follower signal source.

INSTALLATION

WARNING

REMOVE ALL INPUT POWER TO THE DRIVE  
BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area B of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area B of the simplified schematic diagram as described in the controller instruction manual.

INTERCONNECTION

This modification requires an external current signal. Perform interconnection according to the chart in the Controller instruction manual. Then connect the external current signal as shown in the attached Interconnection Table. For proper operation, the input signal should be capable of providing at least 22 volts at rated current.

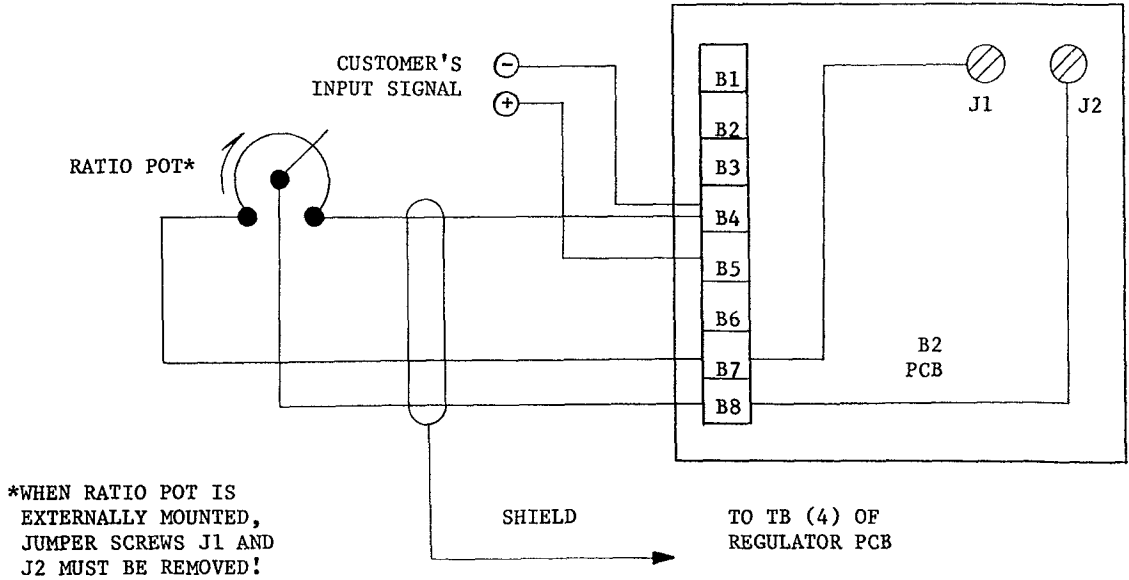
An external RATIO potentiometer may be remotely installed to operate in place of 1RH of the Current Follower PCB. This external potentiometer should be 2.5K ohms. Louis Allis part no. 43T00572-2523 is recommended. To install this external potentiometer, open J1 and J2 by removing the self-tapping screws. Then wire external RATIO potentiometer according to the attached interconnection table and diagram.

When an external RATIO potentiometer is used, remove the potentiometer knob from the RATIO potentiometer on the modification PCB.

INSTRUCTION SHEET  
FOR MODIFICATION B2

Sheet 1 of 3  
02Y00025-0005

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                      |                     | TO                      |                     | REMARKS  |
|----------|---------------------------|---------------------|-------------------------|---------------------|--|
|          | EQUIPMENT                 | TB OR OTHER MARKING | EQUIPMENT               | TB OR OTHER MARKING |  |
|          | Current Follower PCB      | TB (B4)             | Customer's 5MA DC Input | (-)                 |  |
|          | Current Follower PCB      | TB (B5)             |                         | (+)                 |  |
| Jumper   | Current Follower PCB      | TB (B4)             | Current Follower PCB    | TB (B3)             | Add for 10MA Range   |
|          | Current Follower PCB      | TB (B4)             | Current Follower PCB    | TB (B2)             | Add for 20MA Range   |
|          | Current Follower PCB      | TB (B4)             | Current Follower PCB    | TB (B1)             | Add for 50MA Range   |
| B4       | Current Follower PCB (B2) | TB (B4)             | External RATIO Pot      | More Torque         | 3-Conductor Shielded Cable.                                  |
| B7       |                           | TB (B7)             |                         | Less Torque         |  |
| B8       |                           | TB (B8)             |                         | Wiper               |  |
| SHIELD   | Regulator PCB             | TB (4)              | No Connection           |                     | See Note in Controller Manual for Connecting Shielded Cable. |

## ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB. If the MAX SPEED has not been adjusted, perform adjustment A first. If the MAX SPEED has been adjusted, proceed to adjustment B.

- A. Adjustment of MAX SPEED potentiometer with Current Follower (only) drives.
  1. Remove wires from modification terminals B1 through B5.
  2. Temporarily connect a wire from modification terminal B4 to terminal 5 of the Regulator PCB.
  3. Set MAX SPEED and RATIO potentiometers fully counterclockwise. Set LOW SPEED TRACKING potentiometer to mid-position.
  4. Start the drive and observe rotating unit speed. The drive should run at less than 1/3 speed.
  5. Increase the setting of the RATIO potentiometer until fully clockwise.
  6. Increase the setting of the MAX SPEED potentiometer until the drive is running at rated speed. Leave MAX SPEED at this setting.
  7. Stop drive, remove temporary wire and reconnect wires at modification terminals B1 through B5.
- B. Adjustment of modification PCB.
  1. Turn the RATIO potentiometer fully counterclockwise and the LOW SPEED TRACKING potentiometer to mid-range. Start the drive.
  2. Apply the normal minimum operating input current signal to the modification.
  3. Adjust the LOW SPEED TRACKING potentiometer to obtain the desired minimum drive operating speed. Range of minimum speed is  $\pm 30\%$  of rated speed.
  4. Apply the normal maximum operating input current signal to the modification.
  5. Adjust the RATIO potentiometer clockwise until the desired maximum drive operating speed is obtained. Do not exceed the maximum drive speed rating.
  6. If desired speeds cannot be obtained, perform modification kit troubleshooting procedures.

## TROUBLESHOOTING

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

1. Start the drive.
2. Refer to the schematic diagram of the current Follower PCB and check for proper DC input current to terminal connection B4 (-). If incorrect, check jumpers or repair the external follower current source.
3. Check that output voltage between modification test point B1TP and I2CONN(6) of the Regulator PCB (common) varies as the external signal to the follower is varied and as the RATIO potentiometer setting is varied. If not, replace the Current Follower PCB.

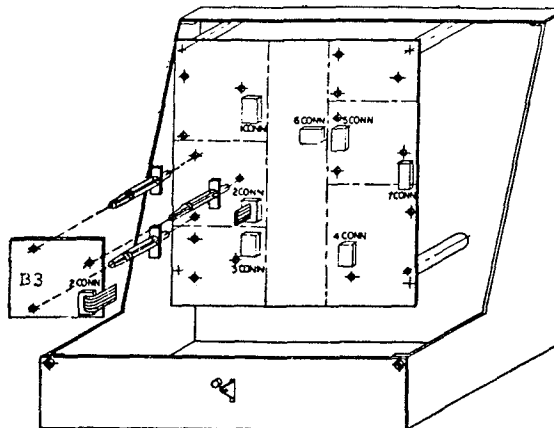
## MODIFICATION RECORDS

After completing modification installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "2" in the block corresponding to modification area B.
- B. Attach this instruction sheet to the inside back cover of the Controller instruction manual.

MODIFICATION B3  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0005)  
VOLTAGE FOLLOWER WITH MAN/AUTO

Effective  
10-6-80  
Supersedes  
7/77



MOD PCB  
46SO2044-0010  
SCHEMATIC  
45SO2044-0010

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for a voltage follower with manual or automatic speed control. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification enables the operator to control drive speed manually or automatically. In the manual speed mode (MAN/AUTO switch in MAN), the speed reference signal is supplied by the SPEED CONTROL potentiometer. In the follower speed mode (MAN/AUTO switch in AUTO), the speed reference signal follows an external voltage signal. If modification A4 (Dancer Trim) is also included on the Controller, in the follower mode the trim signal is fed directly into the speed regulator and is allowed to vary the drive speed by as much as ten percent.

**CAUTION**

The signal input lines to this module are directly or indirectly connected to circuit common and to the 115 VAC power applied to the controller. To prevent damage to equipment and erratic operation, be sure that the signal inputs to this module are NOT connected to earth ground nor to circuit common at any other place. An isolation transformer may be necessary either at the AC power input of the Controller or in the signal input lines to avoid the application of line potentials to the follower signal source.

INSTALLATION

**WARNING**

REMOVE ALL INPUT POWER TO THE DRIVE  
BEFORE INSTALLING MODIFICATION KIT.

This modification kit is to be installed to area B of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

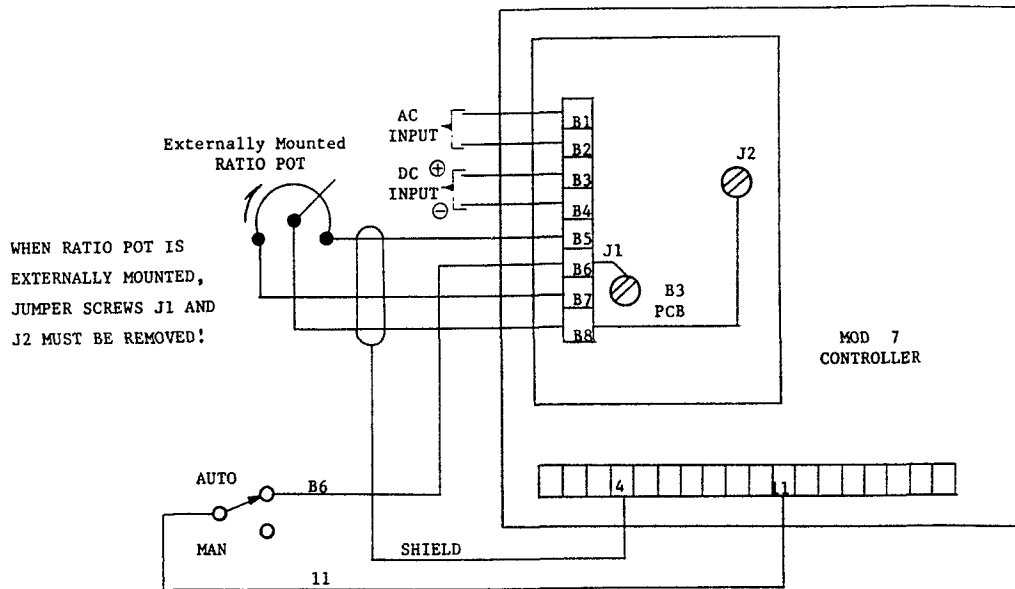
After installing the modification PCB, apply one schematic overlay to area B and one schematic overlay to the upper left corner of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires that a two position MAN/AUTO selector switch be installed to the operator control station and that an external AC or DC voltage signal be applied. Perform equipment interconnection according to the Controller instruction manual. Then perform interconnections as shown in the attached diagram and table.

The allowable input voltage range is 33-150 VDC (23-106 VAC). By installing a jumper between terminals B4 and B5 of the Voltage Follower PCB, a lower input voltage range of 10-53 VDC (7-37 VAC) is obtained. Loading on the external signal is 17.5K ohms on the high range and 6.2K ohms on the low range with jumper installed. For DC inputs, the positive input lead is tied to circuit common. For AC inputs, both leads must be electrically isolated from circuit common.

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                                    |                     | TO                                 |                     | REMARKS  |
|----------|---|---------------------|------------------------------------|---------------------|--|
|          | EQUIPMENT                               | TB OR OTHER MARKING | EQUIPMENT                          | TB OR OTHER MARKING |  |
| 11       | Controller                              | TB (11)             | MAN/AUTO Sw                        |                     |  |
| B6       |   | TB (B6)             | MAN/AUTO Sw                        | AUTO                |  |
| B1       |   | TB (B1)             | Customer's AC Input Signal         |                     |  |
| B2       | Voltage Follower With MAN/AUTO PCB      | TB (B2)             |                                    |                     |  |
| B3       |   | TB (B3)             | Customer's DC Input Signal         | (+)                 |  |
| B4       |   | TB (B4)             |                                    | (-)                 |  |
| Jumper   |   | TB (B4)             | Voltage Follower with MAN/AUTO PCB | TB (B5)             | For 10 - 30 V Range  |
| B5       | Voltage Follower with MAN/AUTO PCB (B3) | TB (B5)             | External RATIO Pot                 | More Torque         | 3-Conductor Shielded Cable.                                  |
| B7       |   | TB (B7)             |                                    | Less Torque         |  |
| B8       |   | TB (B8)             |                                    | Wiper               |  |
| Shield   | Regulator PCB                           | TB (4)              | No Connection                      |                     | See Note in Controller Manual for Connecting Shielded Cable. |

NOTE: ALL INTERCONNECTING WIRING TO BE 15 AMPS OR LESS.

An external RATIO potentiometer may be remotely installed to operate in place of 1RH of the Voltage Follower with MAN/AUTO PCB. This external potentiometer should be 5K ohms. Louis Allis part no. 43T00572-5023 is recommended. To install this external potentiometer, open J1 and J2 by removing the self-tapping screws. Then wire external RATIO potentiometer according to the attached interconnection table and diagram. When an external RATIO potentiometer is used, remove the potentiometer knob from the RATIO potentiometer on the modification PCB.

#### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows. It is important that the manual speed controls be adjusted before the automatic controls are adjusted.

1. Turn the RATIO potentiometer fully counter-clockwise and the LOW SPEED TRACKING potentiometer to mid-range. Start the drive.
2. Place the MAN/AUTO switch to AUTO and apply the minimum input voltage signal to the modification.
3. Adjust the LOW SPEED TRACKING potentiometer to obtain the desired minimum drive operating speed. Range of minimum speed is  $\pm 30\%$  of rated speed.
4. Apply the normal maximum operating input voltage signal to the modification. Adjust the RATIO potentiometer clockwise until the desired maximum drive operating speed is obtained. Do not exceed maximum drive speed rating.
5. If desired rates cannot be obtained, perform modification kit troubleshooting procedures below.

#### TROUBLESHOOTING

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

If other mod boards have been inserted, be sure to troubleshoot them thoroughly before discarding this board as faulty.

1. Start the drive and place the MAN/AUTO switch in AUTO.
2. Refer to the schematic diagram of the Voltage Follower with MAN/AUTO PCB and check for proper input voltage between terminal connections B3 (+) and B4 (-) if input signal is DC or between terminal connections B1 and B2 if input signal is AC. If input voltage is incorrect, repair or replace external voltage follower source.

3. Check that input voltage between B1TP and 12CONN(6) of the Regulator PCB (common) varies as the RATIO potentiometer setting is varied. If not, replace the Voltage Follower with MAN/AUTO PCB.
4. If modification A4 is installed, de-energize relay 4CR and check continuity between 2CONN(9) and 2CONN(13) using an ohmmeter. If continuity exists, replace the Voltage Follower with MAN/AUTO PCB.
5. Place the MAN/AUTO switch to MAN and check that the output voltage between B1TP and 12CONN(6) varies as the reference input signal on 2CONN(10) is varied. If not, replace the Voltage Follower with MAN/AUTO PCB.

#### MODIFICATION RECORDS

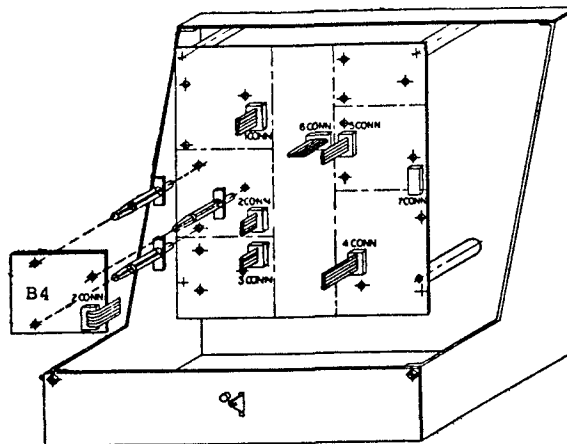
After completing modification installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "3" in the block corresponding to modification area B.
- B. Attach this instruction sheet to the inside back cover of the Controller instruction manual.



MODIFICATION B4  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0030)  
CURRENT FOLLOWER WITH MAN/AUTO

Effective  
11-3-80  
Supersedes  
7/77



MOD PCB  
46SO2043-0010  
SCHEMATIC  
45SO2043-0010

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for a current follower with manual or automatic speed control. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification enables the operator to select either the manual speed mode or follower speed mode by means of the MAN/AUTO selector switch. In the manual speed mode (MAN/AUTO switch in MAN), the speed reference signal is supplied by the SPEED CONTROL potentiometer via the Acceleration Control circuit or modification A1 or A2, if used. In the follower speed mode (MAN/AUTO switch in AUTO), the speed reference signal follows an external current signal. An input DC current signal in the range of 1 to 5 milliamps is used to generate the reference voltage required by the drive. By installing jumper wires on the terminal strip, current ranges of 2 to 10, 4 to 20 and 10 to 50 milliamps can be accommodated. A RATIO potentiometer allows for an approximate -50% to +10% adjustment range. The LOW SPEED TRACKING potentiometer provides approximately  $\pm 30\%$  of rated drive speed.

In the follower speed mode the trim signal from modification A4 (Dancer Trim), if used, is also applied to the Controller. The trim signal can vary the drive speed up to ten percent to maintain dancer position.

**CAUTION**

The signal input lines to this module are directly or indirectly connected to circuit common and to the 115 VAC power supplied to the controller. To prevent damage to equipment and erratic operation, be sure that the signal inputs to this module are NOT connected to earth ground nor to circuit common at any other place. An isolation transformer may be necessary either at the AC power input of the Controller or in the signal input lines to avoid the application of line potentials to the follower signal source.

INSTALLATION

**WARNING**

REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT.

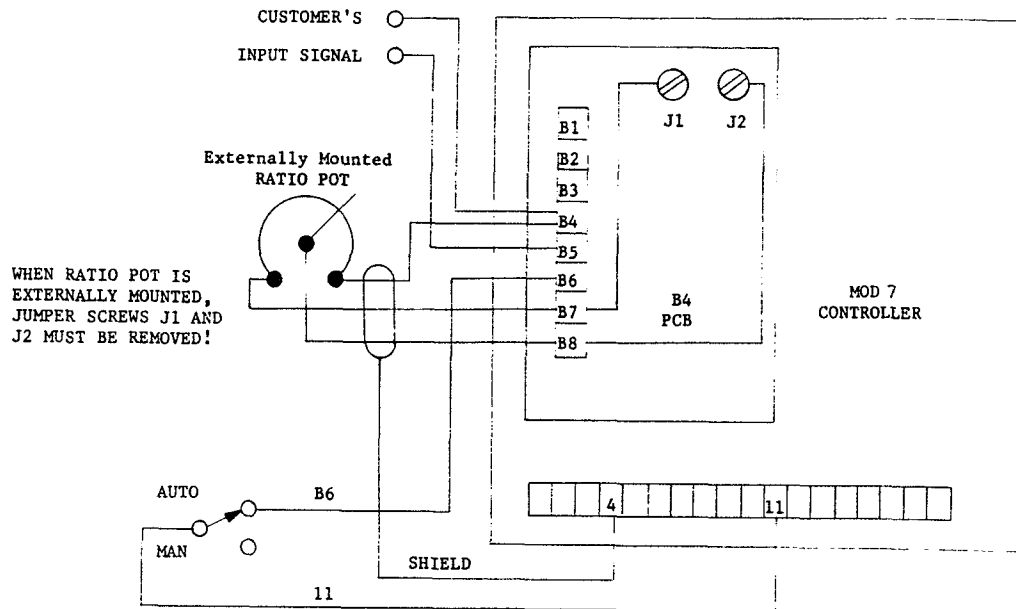
This modification kit is to be installed to area B of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply one schematic overlay to area B and one schematic overlay to the upper left corner of the simplified schematic diagram as described in the Controller instruction manual.

INSTRUCTION SHEET  
FOR MODIFICATION B4

Sheet 1 of 3  
02Y00025-0004

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                                    |                     | TO                                 |                     | REMARKS  |
|----------|---|---------------------|------------------------------------|---------------------|--|
|          | EQUIPMENT                               | TB OR OTHER MARKING | EQUIPMENT                          | TB OR OTHER MARKING |  |
| 11       | Controller                              | TB (11)             | MAN/AUTO Selector Switch           |                     |  |
| B6       |   | TB (B6)             | MAN/AUTO Selector Switch           | AUTO                |  |
| B4       | Current Follower with MAN/AUTO PCB      | TB (B4)             | Customer's SMA Input Signal        | (-)                 |  |
| B5       |   | TB (B5)             |                                    | (+)                 |  |
| Jumper   |   | TB (B4)             | Current Follower with MAN/AUTO PCB | TB (B3)             | Add for 10MA range   |
| Jumper   |   | TB (B4)             |                                    | TB (B2)             | Add for 20MA range   |
| Jumper   |   | TB (B4)             |                                    | TB (B1)             | Add for 50MA range   |
| B4       | Current Follower with MAN/AUTO PCB (B4) | TB (B4)             | External RATIO Pot                 | More Torque         | 3-Conductor Shielded Cable.                                  |
| B7       |   | TB (B7)             |                                    | Less Torque         |  |
| B8       |   | TB (B8)             |                                    | Wiper               | See Note in Controller Manual for Connecting Shielded Cable. |
| Shield   | Regulator PCB                           | TB (4)              | No Connection                      |                     |  |

NOTE: ALL INTERCONNECTING WIRING TO BE 15 AMPS OR LESS.

### INTERCONNECTION

This modification requires that a two position MAN/AUTO selector switch be installed to the operator control station and that an external DC current signal be applied. Perform equipment interconnection according to the chart in the Controller instruction manual. Then perform interconnections as shown in the attached diagram and table.

For proper operation, the external current signal should be capable of providing at least 22 volts at rated current.

An external RATIO potentiometer may be remotely installed to operate in place of LRH of the Current Follower with MAN/AUTO PCB. This external potentiometer should be 2.5K ohms. Louis Allis part no. 43T00572-2523 is recommended. To install this external potentiometer, open J1 and J2 by removing the self-tapping screws. Then wire external RATIO potentiometer according to the attached interconnection table and diagram.

When an external RATIO potentiometer is used, remove the potentiometer knob from the RATIO potentiometer on the modification PCB.

### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows. It is important that the manual speed controls be adjusted before the automatic controls are adjusted.

1. Turn the RATIO potentiometer fully counter-clockwise and the LOW SPEED TRACKING potentiometer to mid-range. Start the drive.
2. Apply the normal minimum input current signal and adjust the LOW SPEED TRACKING potentiometer to obtain the desired minimum drive operating speed. Range of minimum speed is  $\pm 30\%$  of rated speed.
3. Apply the normal maximum input current signal and adjust the RATIO potentiometer clockwise until the desired maximum drive operating speed is obtained. Do not exceed maximum drive speed rating.
4. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

1. Start the drive and place the MAN/AUTO switch in AUTO.
2. Refer to the schematic diagram of the Current Follower with MAN/AUTO PCB and check for proper input current to terminal connection B5 (+). If incorrect, repair or replace external follower current source.
3. Check that output voltage between B1TP and 12CONN(6) of the Regulator PCB (common) varies as the RATIO potentiometer setting is varied. If not, replace the Current Follower with MAN/AUTO PCB.
4. If modification A4 is installed, deenergize relay 4CR and check continuity between 2CONN(9) and 2CONN(13) using an ohmmeter. If continuity does not exist, replace the Current Follower with MAN/AUTO PCB.
5. Place the MAN/AUTO switch in MAN and check that the output voltage between B1TP and 12CONN(6) varies as the reference input signal to 2CONN(10) is varied. If not, replace the Current Follower with MAN/AUTO PCB.

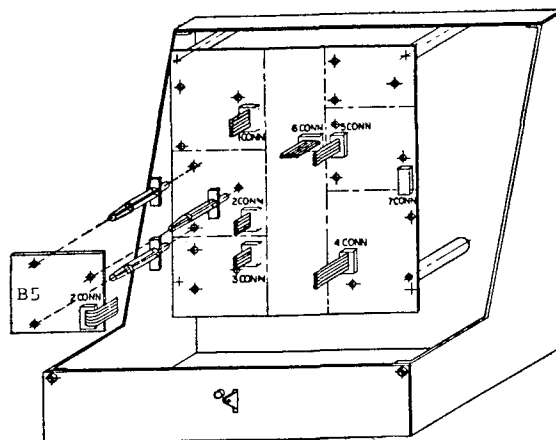
### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "4" in the block corresponding to modification area B.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION B5  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0200)  
MASTER REFERENCE

Effective  
2-16-81  
Supersedes  
7-77



MOD PCB  
46SO2052-0010  
SCHEMATIC  
45SO2052-0010

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of the components necessary for modifying the basic Controller for the master reference function. It also includes front panel nameplate and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification provides four pairs of output terminals for the speed reference signal derived from the Acceleration Control circuit. This allows simultaneous speed control of multiple Controllers from a single speed reference. The operational amplifier LMC and transistor LTS form a voltage follower circuit with LTS acting as a current source. The output voltage at terminal board connections B2, B4, B6 and B8 is zero to -10 VDC over the speed range of the drive.

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area B of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

For best drive performance, the external loading of this assembly should not exceed 20 milliamperes.

After installing modification PCB, apply the schematic overlay to area B of the simplified schematic diagram as described in the Controller instruction manual

INTERCONNECTION

Perform equipment interconnection according to the Controller instruction manual. Then connect Master Reference output terminals as shown in the Master Reference schematic diagram.

**CAUTION**

This modification connects the circuit common of the master drive to the circuit common of each slave drive. To prevent equipment damage, isolate each drive from the AC power line by installing an input transformer.

ADJUSTMENTS

This modification requires no special adjustments. Perform the adjustments in the Controller instruction manual.

TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltage of the modification while the drive is operating.

1. Start the drive and rotate SPEED CONTROL fully clockwise.
2. Refer to the schematic diagram of the Master Reference modification and check the input voltage between B1TP and 12CONN(6) of the Regulator PCB (common). Voltage should be -10 VDC.\* If -10 VDC is not present, refer to the troubleshooting charts in the Controller instruction manual. (\*After DECEL time has run out)

INSTRUCTION SHEET  
FOR MODIFICATION B5  
Sheet 1 of 2  
02Y00025-0021

3. Check the output voltages between terminal board connections B2, B4, B6, B8 and 12CONN (6) of the Regulator PCB (common). Voltage should be -10 VDC. If -10 VDC is not present at any of the connections, disconnect output connections at B2, B4, B6 and B8 and recheck output voltages. If -10 VDC is not present, refer to the troubleshooting charts in the Controller instruction manual. If -10 VDC is still not present, replace Master Reference modification.

MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "5" in the block corresponding to modification area B.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

## MODIFICATION C1 JOG

KIT 46S02051-0140

PCB 46S02049-0010 SCHEMATIC 45S02049-0010

Before installing this kit, a **TECHNICALLY QUALIFIED INDIVIDUAL**, who is familiar with this type of equipment and 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 modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for a separately adjustable jog speed of up to 25% of rated speed. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to jog the drive and separately adjust the jog speed of a drive. The jog circuitry is energized when the JOG push button is pressed and held as long as the STOP push button has been pressed and any modification transfer relays are in the manual position. The jog reference bypasses any acceleration control in the

drive. When the drive is running, pressing the JOG push button will not affect drive operation.

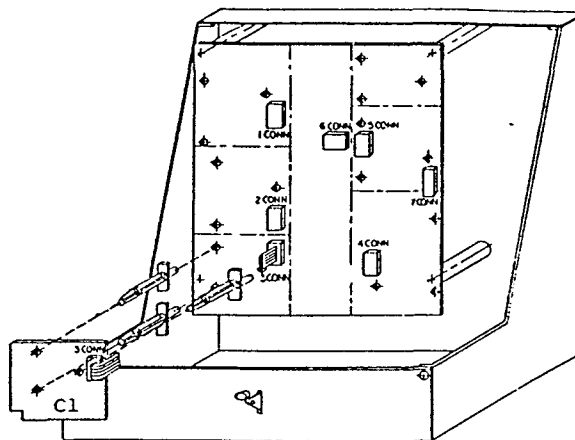


Figure 1.

### INSTALLATION

#### WARNING

**REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT.**

This modification PCB is to be installed to area C of the Regulator PCB as shown in Figure 1. Installation instructions are contained in the Controller instruction manual.

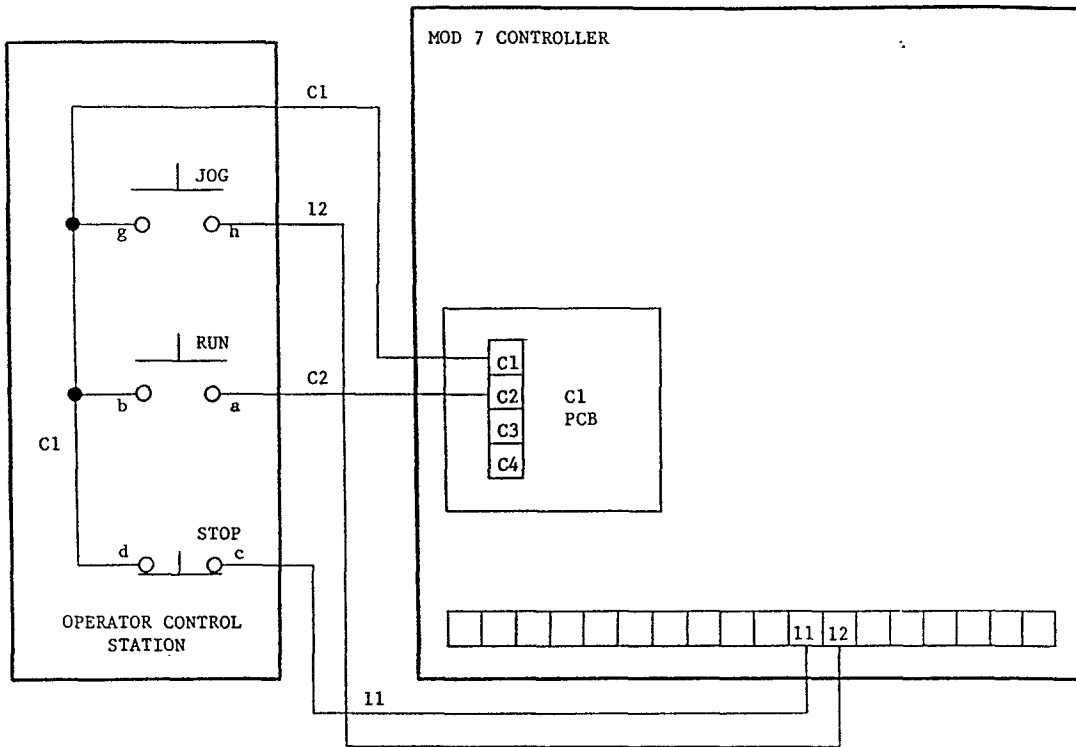
After installing the modification PCB, apply the schematic overlay to area C of the simplified schematic diagram of the Controller instruction manual.

### CHANGE RECORD

|   |                  |  |  |  |
|---|------------------|--|--|--|
| - | REFORMAT 1/21/87 |  |  |  |
|   |                  |  |  |  |
|   |                  |  |  |  |

DWG. NO. 02Y00025-0015  
SHEET 1 OF 3  
EFF. 10/29/80 (E)

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM        |                     | TO          |                     |
|----------|-------------|---------------------|-------------|---------------------|
|          | EQUIPMENT   | TB OR OTHER MARKING | EQUIPMENT   | TB OR OTHER MARKING |
| 11       | Controller  | TB (11)             | STOP Button | c                   |
| 12       |             | TB (12)             | JOG Button  | h                   |
| C1       | Jog PCB     | TB (C1)             | STOP Button | d                   |
| C2       |             | TB (C2)             | RUN Button  | a                   |
| C1       | STOP Button | d                   | RUN Button  | b                   |
| C1       |             | d                   | JOG Button  | g                   |

NOTE: THE ABOVE INTERCONNECT WIRING TO BE RATED AT 15 AMPS 115 VAC MINIMUM.

DWG. NO. 02Y00025-0015  
 SHEET 2 OF 3  
 EFF. 10/29/80 (E)

## INTERCONNECTION

This modification requires that a normally open JOG push button be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual, but substitute wiring shown in the attached diagram and table for operator control station wiring.

### NOTE

If this modification is to be used in conjunction with modification D1, Controlled Stop, refer to the D1 instruction sheet for interconnection information.

## ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Press the STOP push button and stop the drive.
2. Press the JOG push button and hold. Adjust JOG SPEED potentiometer for desired speed for jog operation. If desired adjustment cannot be obtained, perform modification kit troubleshooting procedures.

## TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is being jogged.

1. Rotate JOG SPEED potentiometer fully clockwise.
2. Apply AC input power to the Controller and start the AC motor. Do not press the RUN push button.
3. Refer to the schematic diagram of the Jog PCB and check input voltage between 3CONN(10) and 12CONN(6) of Regulator PCB (common). Voltage should be approximately -10 VDC. If voltage is incorrect, remove the Jog PCB, install continuity plug and repeat voltage check. If voltage is still incorrect, refer to the troubleshooting charts in the Controller instruction manual.
4. Check voltage between C2TP and 12CONN(6). Voltage should be approximately -10 VDC and should vary with the setting of the JOG SPEED potentiometer. If voltage is incorrect, replace the Jog PCB.
5. Press the RUN push button and check the voltage between C2TP and 12CONN(6). Voltage should be zero. If voltage is incorrect, replace the Jog PCB.

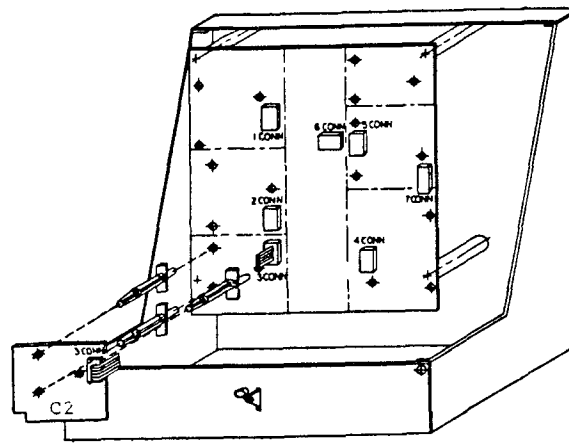
## MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "1" in the block corresponding to modification area C.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

DWG. NO. 02Y00025-0015  
SHEET 3 OF 3  
EFF. 10/29/80 (E)





MOD PCB  
46SO2049-0020  
SCHEMATIC  
45SO2049-0020

#### DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the thread function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this modification to the Controller provides a separately adjustable thread speed of up to 30% of rated speed. With the drive stopped after the STOP pushbutton has been pressed and with any optional modification transfer relays in the manual position, pressing the THREAD pushbutton applies the thread speed reference to the Acceleration Control circuit. When the drive is running at thread speed, pressing the RUN pushbutton causes the drive to accelerate to run speed. When the drive is operating at run speed, pressing the THREAD pushbutton causes the drive to operate at thread speed. When the drive is operating at thread speed or run speed, pressing the STOP pushbutton causes the drive to stop.

#### INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area C of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply schematic overlay to area C of the simplified schematic diagram as described in the Controller instruction manual.

#### INTERCONNECTION

This modification requires that a normally open THREAD pushbutton be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual but substitute wiring in the attached diagram and table for operator control station wiring.

#### NOTE

If this modification is to be used in conjunction with modification D1, Controlled Stop, refer to the D1 instruction sheet for interconnection information.

#### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Start the AC motor and apply AC input power to the drive.
2. Turn the THREAD SPEED potentiometer fully counterclockwise and press the THREAD pushbutton.
3. Adjust the THREAD SPEED potentiometer clockwise as required to obtain desired thread speed.
4. Turn the SPEED CONTROL potentiometer fully clockwise. Press the RUN pushbutton and note that drive accelerates to run speed.

#### NOTE

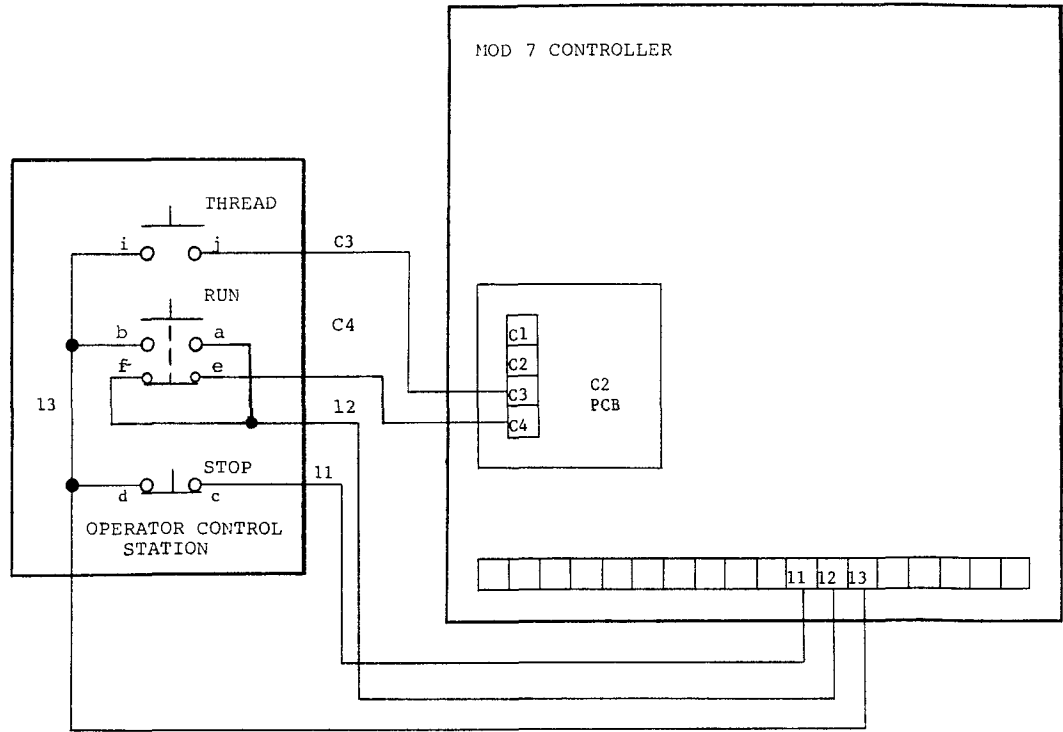
The thread speed setting may be affected by the ACCEL RATE Adjustment.

5. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

INSTRUCTION SHEET  
FOR MODIFICATION C2

Sheet 1 of 3  
02Y00025-0016

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO | FROM       |                     | TO            |                     |
|---------|------------|---------------------|---------------|---------------------|
|         | EQUIPMENT  | TB OR OTHER MARKING | EQUIPMENT     | TB OR OTHER MARKING |
| 11      | Controller | TB(11)              | STOP Button   | c                   |
| 12      | Controller | TB(12)              | RUN Button    | a                   |
| 12      | RUN Button | f                   | RUN Button    | a                   |
| 13      | Controller | TB(13)              | STOP Button   | d                   |
| 13      | RUN Button | b                   | STOP Button   | d                   |
| 13      | RUN Button | b                   | THREAD Button | i                   |
| C3      | Thread PCB | TB(C3)              | THREAD Button | j                   |
| C4      | Thread PCB | TB(C4)              | RUN Button    | e                   |

NOTE: ALL INTERCONNECTING WIRING TO BE 15 AMPS OR LESS.

### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltage of the circuit.

- 1 Rotate the THREAD SPEED potentiometer fully clockwise.
2. Start the AC motor, and apply AC input power to the Controller
3. Rotate the SPEED CONTROL fully clockwise and press the THREAD pushbutton.
4. Refer to the schematic diagram of the Thread PCB and check input voltage between 3CONN(10) and 12CONN(6) of the Regulator PCB (common). Voltage should be approximately -10 VDC. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual or remove the Thread PCB and repeat this check.
5. Check output voltage between C1TP and 12CONN(6). Voltage should be approximately -4 VDC and should vary with the setting of the THREAD SPEED potentiometer. If voltage is incorrect, replace Thread PCB.
6. Press RUN pushbutton and check output voltage between C1TP and 12CONN(6). Voltage should be approximately -10 VDC and vary with the setting of the SPEED CONTROL potentiometer. If voltage is incorrect, replace the Thread PCB.

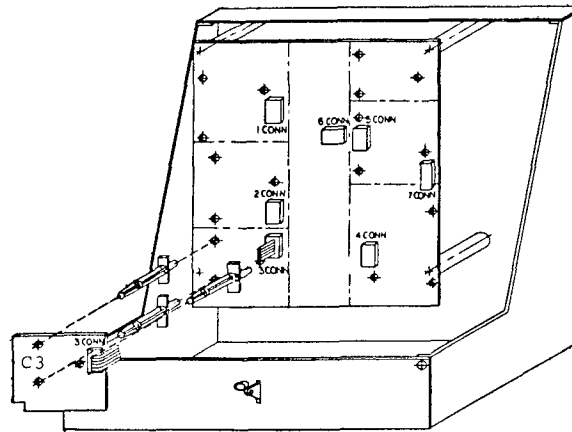
### MODIFICATION RECORDS

After completing mod kit installations:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "2" in the block corresponding to modification area C.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION C3  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0160)  
JOG, THREAD

Effective  
11-12-80  
Supersedes  
7-77



MOD PCB  
46SO2049-0030  
SCHEMATIC  
45SO2049-0030

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the jog and thread functions. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to separately adjust the jog and thread speeds of the drive. The jog speed and the thread speed is adjustable to 30%.

The jog circuit is energized by pressing and holding the JOG pushbutton as long as the STOP pushbutton has previously been pressed and any modification transfer relays are in the manual position. The jog reference signal bypasses the Acceleration Control circuit. If the drive is running, pressing the JOG pushbutton will not affect system operation.

The thread circuit is energized by pressing the THREAD pushbutton as long as any modification transfer relays are in manual. The thread reference speed signal is applied to the acceleration control circuit. With the drive operating in thread speed, pressing the RUN pushbutton will cause the speed reference to automatically accelerate to run speed. If the drive is running, pressing the THREAD pushbutton causes the drive to run at thread speed.

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area C of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area C of the simplified schematic diagram of the Controller instruction manual.

INTERCONNECTION

This modification requires that a normally open JOG pushbutton and a normally open THREAD pushbutton be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual, but substitute the wiring in the attached diagram and table for operator control station wiring.

NOTE

If this modification kit is to be used in conjunction with modification D1, Controlled Stop, refer to the D1 instruction information.

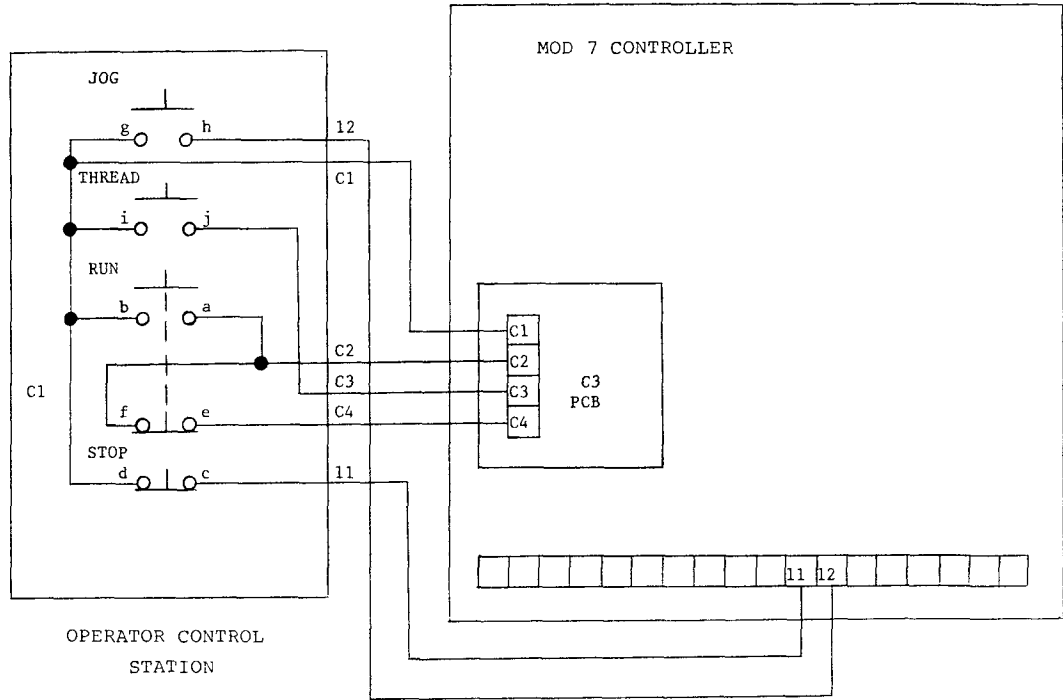
ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows:

1. Apply AC input power to the Controller and start the AC motor.
2. Press the JOG pushbutton and hold while adjusting the JOG SPEED potentiometer for the desired jog speed.
3. Press the THREAD pushbutton and adjust the THREAD SPEED potentiometer for the desired thread speed.

INSTRUCTION SHEET  
FOR MODIFICATION C3  
Sheet 1 of 3  
02Y00025-0017

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO. | FROM                 |                     | TO                   |                     |
|----------|----------------------|---------------------|----------------------|---------------------|
|          | EQUIPMENT            | TB OR OTHER MARKING | EQUIPMENT            | TB OR OTHER MARKING |
| 11       | Controller           | TB(11)              | STOP Button          | c                   |
| 12       | JOG Button           | h                   | Controller           | TB(12)              |
| C1       | RUN Button           | b (N.O.)            | STOP Button          | d                   |
| C2       | RUN Button           | a (N.O.)            | Jog, Thread PCB (C3) | TB(C2)              |
| C1       | JOG Button           | g                   | STOP Button          | d                   |
| C1       | STOP Button          | d                   | Jog, Thread PCB (C3) | TB(C1)              |
| C1       | STOP Button          | d                   | THREAD Button        | i                   |
| C3       | THREAD Button        | j                   | Jog, Thread PCB (C3) | TB(C3)              |
| C2       | Jog, Thread PCB (C3) | TB(C2)              | RUN Button           | f (N.C.)            |
| C4       | Jog, Thread PCB (C3) | TB(C4)              | RUN Button           | e (N.C.)            |

NOTE: ALL INTERCONNECTING WIRING TO BE 15 AMPS OR LESS

4. If these adjustments do not permit proper operation of the drive, perform modification kit troubleshooting procedure.

#### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

1. Rotate the JOG SPEED, THREAD SPEED and SPEED CONTROL potentiometers fully clockwise.
2. Apply AC input power to the Controller and start the AC motor.
3. Refer to the schematic diagram of the Jog, Thread PCB and check input voltage between 3CONN(10) and 12CONN(6) of the Regulator PCB (common). Voltage should be -10 VDC. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual or remove the Jog, Thread PCB and repeat voltage check.
4. Press and hold the JOG pushbutton and check the voltage between C2TP and 12CONN(6). Voltage should be -10 VDC and should vary with the setting of the JOG SPEED potentiometer. If voltage is incorrect, replace the Jog, Thread PCB.
5. With the JOG pushbutton pressed and held, check the voltage between 3CONN(12) and 12CONN(6). Voltage should be zero. If voltage is incorrect, replace the Jog, Thread PCB.
6. Press the THREAD pushbutton and check voltage between C1TP and 12CONN(6). Voltage should be approximately -4 VDC and should vary with the setting of the THREAD potentiometer. If voltage is incorrect, replace the Jog, Thread PCB.
7. Press the RUN pushbutton and check the voltage between C1TP and 12CONN(6). Voltage should be approximately -10 VDC and should vary with the setting of the SPEED CONTROL potentiometer. If voltage is incorrect, replace the Jog, Thread PCB.

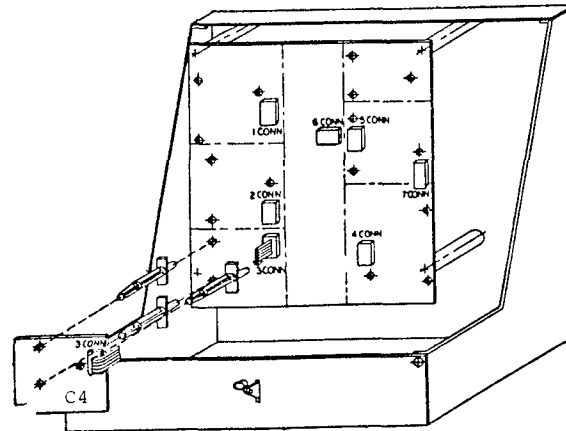
#### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "3" in the block corresponding to modification area C.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION C4  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0410)  
THREAD, REMOTE ADJUST

Effective  
2-9-81  
Supersedes  
12-78



MOD PCB  
46SO2138-0010  
SCHEMATIC  
45SO2138-0010

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the thread function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this modification to the Controller provides a separately adjustable thread speed of up to 30% of rated speed. With the drive stopped after the STOP pushbutton has been pressed and with any optional modification transfer relays in the manual position, pressing the THREAD pushbutton applies the thread speed reference to the Acceleration Control circuit. When the drive is running at thread speed, pressing the RUN pushbutton causes the drive to accelerate to run speed. When the drive is operating at run speed, pressing the THREAD pushbutton causes the drive to operate at thread speed. When the drive is operating at thread speed or run speed, pressing the STOP pushbutton causes the drive to stop.

INSTALLATION

WARNING  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area C of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

This kit differs from thread mod kit C2 in that the THREAD SPEED pot is externally mounted. It may be placed with the operator controls or remotely located as suitable.

After installing the modification PCB, apply schematic overlay to area C of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires that a normally open THREAD pushbutton be installed in the operator control station, and a THREAD SPEED potentiometer be installed where desired. Perform equipment interconnection according to the Controller manual, but substitute the wiring in the attached diagram and table for operator control station wiring.

ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Start the AC motor and apply AC input power to the drive.
2. Turn the THREAD SPEED potentiometer fully counterclockwise and press the THREAD pushbutton.
3. Adjust the THREAD SPEED potentiometer clockwise as required to obtain desired thread speed.
4. Turn the SPEED CONTROL potentiometer fully clockwise. Press the RUN pushbutton and note that drive accelerates to run speed.

NOTE

The thread speed setting may be affected by the ACCEL RATE adjustment.

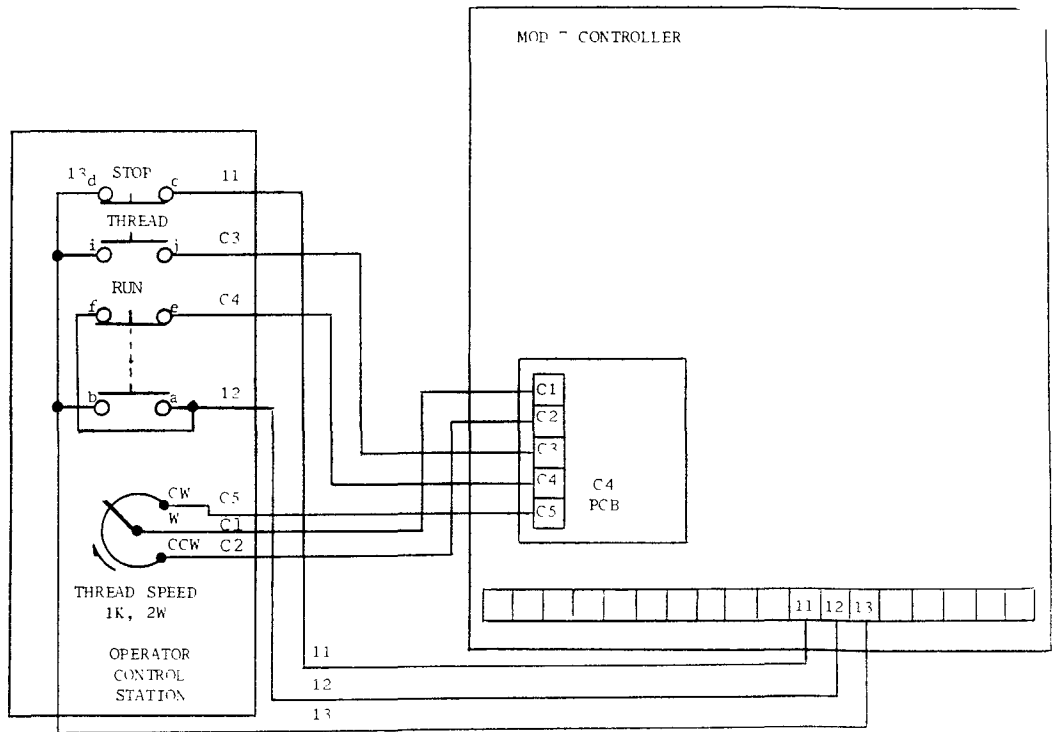
5. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

INSTRUCTION SHEET  
FOR MODIFICATION C4  
Sheet 1 of 3  
02Y00025-0037

INTERCONNECTION DIAGRAM



INTERCONNECTION TABLE

| WIRE NO | FROM       |                     | TO            |                     |
|---------|------------|---------------------|---------------|---------------------|
|         | EQUIPMENT  | TB OR OTHER MARKING | EQUIPMENT     | TB OR OTHER MARKING |
| 11      | Controller | TB(11)              | STOP Button   | c                   |
| 12      | Controller | TB(12)              | RUN Button    | a                   |
| 12      | RUN Button | f                   | RUN Button    | a                   |
| 13      | Controller | TB(13)              | STOP Button   | d                   |
| 13      | RUN Button | b                   | STOP Button   | d                   |
| 13      | RUN Button | b                   | THREAD Button | i                   |
| C1      | Thread PCB | TB(C1)              | SPEED Pot     | Wiper               |
| C2      | Thread PCB | TB(C2)              | SPEED Pot     | CCW                 |
| C3      | Thread PCB | TB(C3)              | THREAD Button | j                   |
| C4      | Thread PCB | TB(C4)              | RUN Button    | e                   |
| C5      | Thread PCB | TB(C5)              | SPEED Pot     | CW                  |

NOTE: ALL INTERCONNECTING WIRING TO BE 15 AMPS OR LESS



Troubleshooting consists of checking the input and output voltage of the circuit

1. Rotate the THREAD SPEED potentiometer fully clockwise
2. Start the AC motor, and apply AC input power to the Controller
3. Rotate the SPEED control fully clockwise and press the THREAD pushbutton
4. Refer to the schematic diagram of the Thread PCB and check input voltage between 3CONN(10) and 12CONN(6) of the Regulator PCB (common) Voltage should be approximately -10 VDC If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual, or remove the Thread PCB and repeat this check.
5. Check output voltage between C1TP and 12CONN(6). Voltage should be approximately -4 VDC, and should vary with the setting of the THREAD SPEED potentiometer If voltage is incorrect, replace Thread PCB.
6. Press RUN pushbutton and check output voltage between C1TP and 12CONN(6). The voltage should be approximately -10 VDC and vary with the setting of the SPEED CONTROL potentiometer If the Voltage is incorrect, replace the Thread PCB.

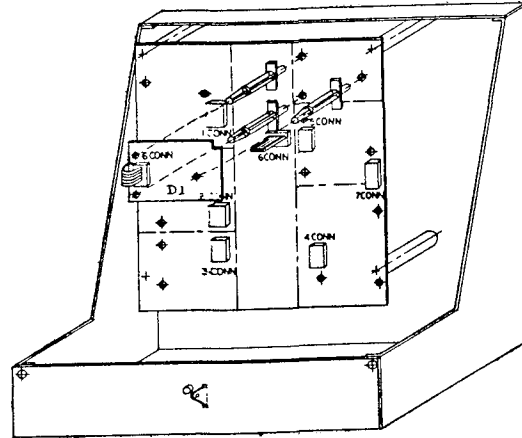
#### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "4" in the block corresponding to modification area C
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION D1  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0090)  
CONTROLLED STOP

Effective  
2-10-61  
Supersedes  
7-77



MOD PCB  
46SO2047-0010  
SCHEMATIC  
45SO2047-0010

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic controller for the controlled stop function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification should be used in conjunction with a Linear Accel/Decel modification A1 or A2. The modification consists of an auxiliary relay for holding in the run circuit and an electronically operated relay for monitoring the tachometer signal. When the STOP pushbutton is pressed, the drive linearly decelerates from run speed (or thread speed if so equipped) to a preset low speed where the tachometer sensitive relay trips and the drive is braked to a stop. The low speed trip point can be adjusted from zero to approximately 30% of rated drive speed.

If an optional EMERGENCY STOP pushbutton is pressed, the Controlled Stop circuit is bypassed, and the drive stops immediately.

If a Jog modification is installed, the Controlled Stop modification does not operate during jogging. If a Thread modification is installed, the Controlled Stop modification will operate from thread speed.

INSTALLATION:

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area D of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area D of the simplified schematic diagram as described in the Controller instruction manual. If this modification is installed in conjunction with Jog C1, Thread C2 or Jog and Thread C3 modification, there is a C1-D1, C2-D1, or C3-D1 schematic overlay which incorporates the combination of modifications. The applicable overlay is to be placed over modification areas C and D and surrounding area as indicated by corner marks.

Schematic overlays which are not used should be retained for possible future use.

INTERCONNECTION

Separate interconnection procedures are provided for the Controlled Stop modification used alone or in conjunction with a Jog or Thread modification. Select the procedure which applies to the particular application.

ADJUSTMENTS

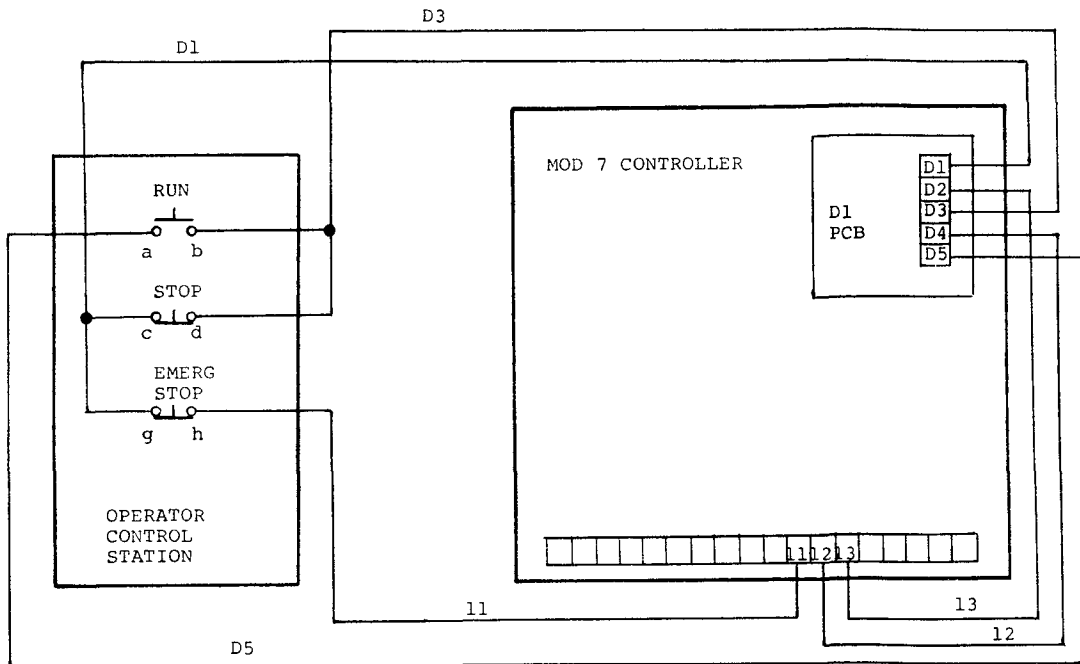
After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Turn the TRIP SPEED potentiometer to mid-range, turn the SPEED CONTROL to zero, and start the drive.
2. Turn the SPEED CONTROL fully clockwise. Press the STOP pushbutton and note the low speed trip point. The trip point is the speed at which the brake is energized.
3. Adjust the TRIP SPEED potentiometer as required to obtain desired low speed trip point. Turning the potentiometer clockwise causes trip at higher speed.
4. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

INSTRUCTION SHEET  
FOR MODIFICATION D1  
Sheet 1 of 6  
02Y00025-0010

INTERCONNECTION DIAGRAM AND TABLE

CONTROLLER STOP D1

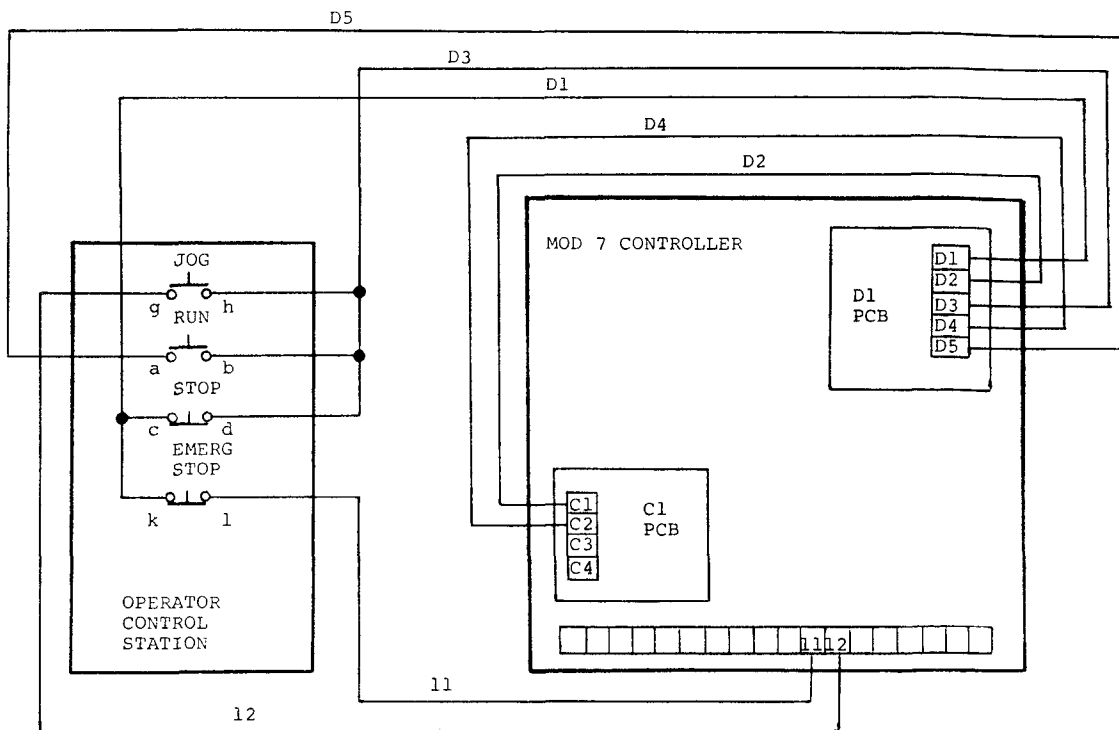


| WIRE NO | FROM                |                     | TO                  |                     |
|---------|---------------------|---------------------|---------------------|---------------------|
|         | EQUIPMENT           | TB OR OTHER MARKING | EQUIPMENT           | TB OR OTHER MARKING |
| 11      | Controller          | TB (11)             | EMERG STOP Button   | h                   |
| 12      | Controller          | TB (12)             | Controlled Stop PCB | TB (D4)             |
| 13      | Controller          | TB (13)             | Controlled Stop PCB | TB (D2)             |
| D1      | Controlled Stop PCB | TB (D1)             | STOP Button         | c                   |
| D1      | STOP Button         | c                   | EMERG STOP Button   | g                   |
| D3      | Controlled Stop PCB | TB (D3)             | STOP Button         | d                   |
| D3      | STOP Button         | d                   | RUN Button          | b                   |
| D5      | Controlled          | TB (D5)             | RUN Button          | a                   |

A. Controlled Stop without Jog or Thread

This modification requires that a normally closed EMERGENCY STOP pushbutton be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual but substitute wiring in the diagram and table above for operator control station wiring.

INTERCONNECTION DIAGRAM AND TABLE  
CONTROLLED STOP WITH JOG C1-D1

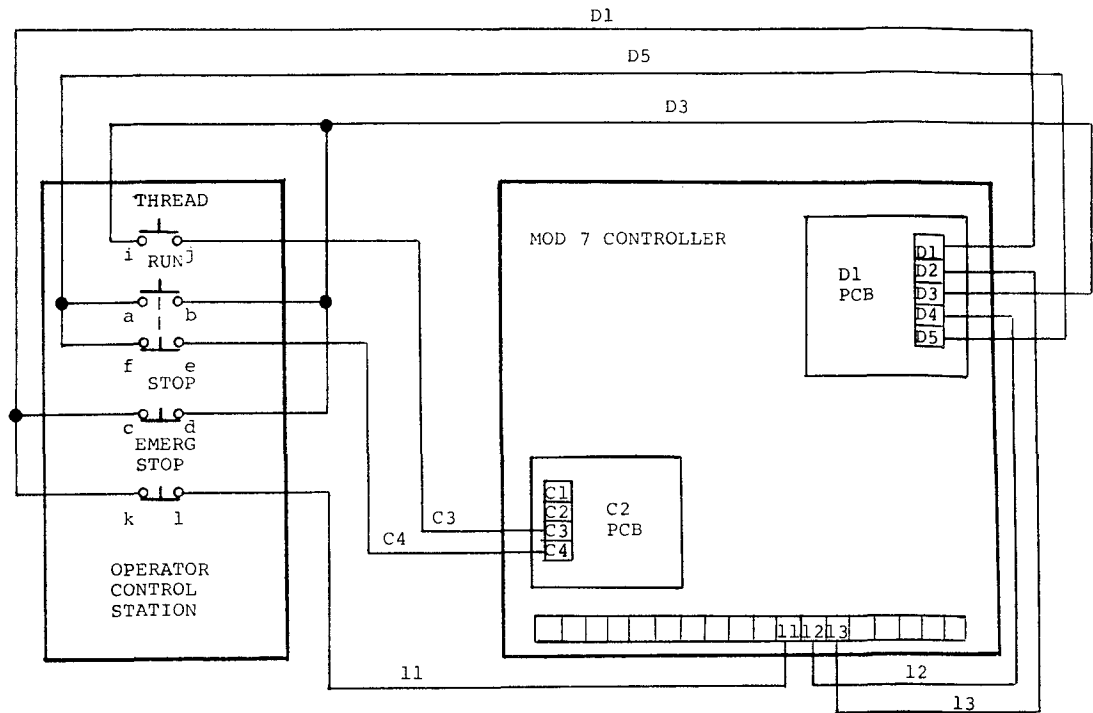


| WIRE NO | FROM                |                     | TO                |                     |
|---------|---------------------|---------------------|-------------------|---------------------|
|         | EQUIPMENT           | TB OR OTHER MARKING | EQUIPMENT         | TB OR OTHER MARKING |
| 11      | Controller          | TB (11)             | EMERG STOP Button | 1                   |
| 12      | Controller          | TB (12)             | JOG Button        | g                   |
| D1      | Controlled Stop PCB | TB (D1)             | STOP Button       | c                   |
| D1      | STOP Button         | c                   | EMERG STOP Button | k                   |
| D3      | Controlled Stop PCB | TB (D3)             | JOG Button        | h                   |
| D3      | JOG Button          | h                   | RUN Button        | b                   |
| D3      | RUN Button          | b                   | STOP Button       | d                   |
| D5      | Controlled Stop PCB | TB (D5)             | RUN Button        | a                   |
| D2      | Controlled Stop PCB | TB (D2)             | Jog PCB           | TB (C1)             |
| D4      | Controlled Stop PCB | TB (D4)             | Jog PCB           | TB (C2)             |

B. Controlled Stop with Jog C1

This modification requires that a normally closed EMERGENCY STOP pushbutton and a normally open JOG pushbutton can be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual but substitute wiring in the diagram and table above for operator control station wiring.

INTERCONNECTION DIAGRAM AND TABLE  
 CONTROLLED STOP WITH THREAD C2-D1

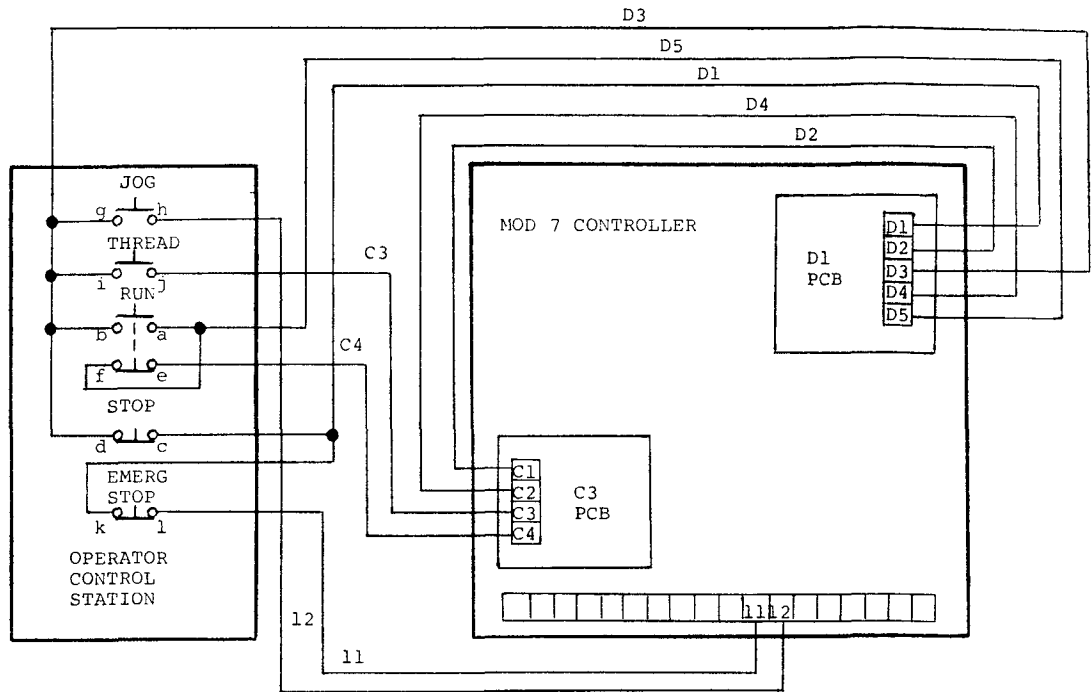


| WIRE NO | FROM                |                     | TO                  |                     |
|---------|---------------------|---------------------|---------------------|---------------------|
|         | EQUIPMENT           | TB OR OTHER MARKING | EQUIPMENT           | TB OR OTHER MARKING |
| 11      | Controller          | TB (11)             | EMERG STOP Button   | 1                   |
| 12      | Controller          | TB (12)             | Controlled Stop PCB | TB (D4)             |
| 13      | Controller          | TB (13)             | Controlled Stop PCB | TB (D2)             |
| D1      | Controlled Stop PCB | TB (D1)             | STOP Button         | c                   |
| D1      | EMERG STOP Button   | k                   | STOP Button         | c                   |
| D3      | Controlled STOP PCB | TB (D3)             | THREAD Button       | i                   |
| D3      | RUN Button          | b                   | THREAD Button       | i                   |
| D5      | RUN Button          | a                   | RUN Button          | f                   |
| D3      | RUN Button          | b                   | STOP Button         | d                   |
| D5      | Controlled          | TB (D5)             | RUN Button          | a                   |
| C3      | Thread PCB          | TB (C3)             | THREAD Button       | j                   |
| C4      | Thread PCB          | TB (C4)             | RUN Button          | e                   |

C Controlled Stop with Thread C2

This modification requires that a normally closed EMERGENCY STOP pushbutton and a normally open THREAD pushbutton be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual but substitute wiring in the diagram and table above for operator control station wiring

INTERCONNECTION DIAGRAM AND TABLE  
CONTROLLED STOP WITH JOG, THREAD C3-D1



| WIRE NO | FROM                |                     | TO                |                     |
|---------|---------------------|---------------------|-------------------|---------------------|
|         | EQUIPMENT           | TB OR OTHER MARKING | EQUIPMENT         | TB OR OTHER MARKING |
| 11      | Controller          | TB(11)              | EMERG STOP Button | 1                   |
| 12      | Controller          | TB(12)              | JOG Button        | h                   |
| D1      | Controlled Stop PCB | TB(D1)              | STOP Button       | c                   |
| D1      | EMERG STOP Button   | k                   | STOP Button       | c                   |
| D3      | Controlled Stop PCB | TB(D3)              | JOG Button        | g                   |
| D3      | THREAD Button       | i                   | Jog Button        | g                   |
| D3      | THREAD Button       | i                   | RUN Button        | b                   |
| D3      | STOP Button         | d                   | RUN Button        | b                   |
| D5      | Controlled Stop PCB | TB(D5)              | RUN Button        | a                   |
| D5      | RUN Button          | f                   | RUN Button        | a                   |
| D2      | Controlled          | TB(D2)              | Jog, Thread PCB   | TB(C1)              |
| D4      | Controlled Stop PCB | TB(D4)              | Jog, Thread PCB   | TB(C2)              |
| C3      | THREAD Button       | j                   | Jog, Thread PCB   | TB(C3)              |
| C4      | RUN Button          | e                   | Jog, Thread PCB   | TB(C4)              |

**D Controlled Stop with Jog and Thread C3**

This modification requires that a normally open JOG pushbutton, normally open THREAD pushbutton and normally closed EMERGENCY STOP pushbutton be installed to the operator control station. Perform equipment interconnection according to the Controller instruction manual but substitute wiring in the diagram and table above for operator control station wiring.

## TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit.

1. If brake is applied prematurely or does not come on at all, check the TRIP SPEED adjustment.
2. Apply AC input power to the Controller and press the RUN pushbutton. Rotate the SPEED Control potentiometer fully clockwise.
3. Refer to the schematic diagram of the Controlled Stop PCB and check contacts of 7CR as follows:
  - a. Between D5 and D3, voltage is zero when RUN or THREAD pushbutton is pressed.
  - b. Between D2 and D4, voltage is zero when RUN or JOG pushbutton is pressed.
  - c. Between 6CONN(10) and D1TP, voltage is zero.

If any of the above conditions (when applicable) is not met, replace the Controlled Stop PCB.

4. Check input voltage between 6CONN(1) and 12CONN(6) of the Regulator PCB (common). Voltage should be approximately +10 VDC at rated speed and should vary with drive speed. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
5. Check output voltage between D1TP and 12CONN(6) (common). Voltage should be approximately -10 VDC and should vary with the setting of the SPEED CONTROL potentiometer. If voltage is incorrect, check for faults in the speed control circuitry or replace the Controlled Stop PCB.
6. Press the STOP pushbutton. Voltage between D1TP and 12CONN(6) (common) should be zero VDC. If not, replace the Controlled Stop PCB.
7. With the STOP pushbutton pressed, check contacts of 6CR as follows:
  - a. Turn TRIP SPEED potentiometer fully counterclockwise. Voltage between D2 and D1 should be an AC voltage.
  - b. Turn TRIP SPEED potentiometer fully clockwise. Voltage between D2 and D1 should be 0 VAC.

If either condition is not met, replace Controlled Stop PCB.

## MODIFICATION RECORDS

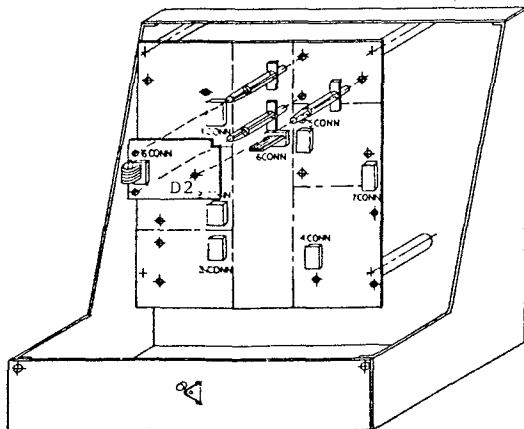
After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "1" in the block corresponding to modification area D.

- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

MODIFICATION D2  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0100)  
ADJUSTABLE SPEED TRIP

Effective  
2-6-81  
Supersedes  
7-77



MOD PCB  
46SO2047-0020  
SCHEMATIC  
45SO2047-0020

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for the adjustable speed trip function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification consists of an electronically operated relay which monitors the tachometer voltage. The relay is adjusted to energize at a predetermined tachometer voltage and remains energized as the voltage increases. Relay contacts are wired to the modification board for customer use. These contacts are rated at 125 VAC at 3 amps. The tachometer voltage (speed) trip point can be adjusted to operate from zero to above rated drive speed.

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area D of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area D of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual

ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Turn the TRIP SPEED potentiometer fully clockwise and start the drive.
2. Rotate the SPEED CONTROL potentiometer until drive is running at the desired trip speed.
3. Slowly rotate the TRIP SPEED potentiometer counterclockwise until the modification relay energizes. Trip point will be at zero speed with TRIP SPEED potentiometer in mid position and above rated speed with TRIP SPEED potentiometer fully clockwise.
4. If desired rates cannot be obtained, perform modification kit troubleshooting procedures.

TROUBLESHOOTING

Troubleshooting consists of checking the operation of the electronically operated relay when the STOP pushbutton is pressed.

1. Rotate the TRIP SPEED potentiometer fully counterclockwise. The modification relay should be energized. If not, replace the Adjustable Speed Trip PCB.
2. Monitor the voltage between 6CONN(1) and 12CONN(6) of the Regulator PCB (common). Press the RUN pushbutton and vary the drive speed from minimum to maximum. The voltage should vary proportionately. If not, refer to the troubleshooting charts in the Controller instruction manual.

MODIFICATION RECORDS

After completing mod kit installation:

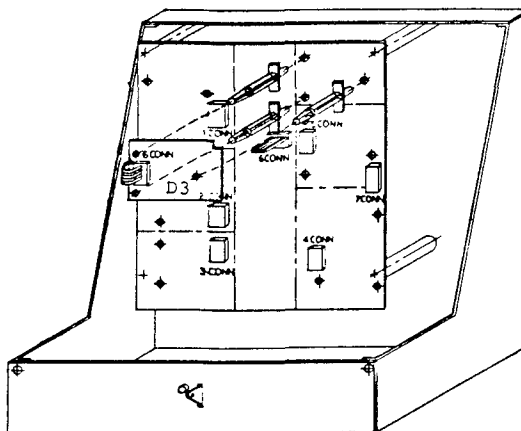
- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "2" in the block corresponding to modification area D.
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

INSTRUCTION SHEET  
FOR MODIFICATION D2  
Sheet 1 of 1  
02Y00025-0011



MODIFICATION D3  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0110)  
DIFFERENTIAL TRIP

Effective  
2-6-81  
Supersedes  
7-77



MOD PCB  
46SO2047-0030  
SCHEMATIC  
45SO2047-0030

#### DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for an adjustable differential speed trip function. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

This modification monitors the speed reference signal from the Acceleration Control circuit and the tachometer signal from the Tachometer Feedback circuit to determine if there is an error between selected speed and actual operating speed. The TRIP potentiometer on the modification allows setting of amount of error at which the electronically operated trip relay energizes. The relay can be adjusted to energize whenever the tachometer speed (voltage) is greater than or equal to a percentage (differential) of the reference speed (voltage). This percentage may be adjusted within -100% (tachometer slower than reference) to +100% (tachometer faster than reference).

The modification has a set of normally open and a set of normally closed relay contacts at the modification terminal board. These contacts are rated for 125 VAC at 3 amps and are provided for customer's connection of error annunciator.

#### INSTALLATION

##### WARNING

REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area D of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply schematic overlay to area D of the simplified schematic diagram as described in the Controller instruction manual.

#### INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

#### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows:

1. Turn the TRIP SPEED potentiometer fully clockwise. Set the SPEED CONTROL potentiometer for a known drive speed.
2. Disconnect the tachometer leads from the Regulator PCB terminal board and connect a DC voltage power supply to Regulator PCB terminal board connections 1(+) and 4(-). Determine the tachometer voltage output corresponding to the desired relay pickup speed relative to the established reference speed and adjust the DC power supply for that voltage.
3. Apply AC input power to the Controller but do not press the RUN pushbutton. Adjust the TRIP SPEED potentiometer slowly counterclockwise until the trip relay energizes. Remove AC input power and DC power supply. Reconnect tachometer leads.
4. If desired adjustment cannot be obtained, perform modification kit troubleshooting procedures.

INSTRUCTION SHEET  
FOR MODIFICATION D3

Sheet 1 of 2  
02Y00025-0012

#### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty

Troubleshooting consists of checking the relay operation while the Controller is energized

- 1 Apply AC input power to the Controller but do not press RUN pushbutton Set SPEED CONTROL potentiometer fully counterclockwise
2. Note the setting of the TRIP SPEED potentiometer Rotate the TRIP SPEED potentiometer counterclockwise The trip relay should be deenergized; if not, replace the Differential Trip PCB
- 3 Rotate the TRIP SPEED potentiometer fully clockwise The trip relay should be deenergized; if not, replace the Differential Trip PCB
- 4 Press RUN pushbutton and turn the SPEED CONTROL potentiometer fully clockwise. If the relay on the Differential Trip PCB energizes, check the differential trip adjustment

#### MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual Place the number "3" in the block corresponding to modification area D.
- B Insert this instruction sheet inside the back cover of the Controller instruction manual.

For use with Type MC and HC  
Eddy Current Drives.

## MODIFICATION E1 ADJUSTABLE BREAKAWAY

KIT 46S02051-0080

PCB 46S02046-0010 SCHEMATIC 45S02046-0010

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

After installing the modification PCB, apply the schematic overlay to area E of the simplified schematic diagram as described in the Controller instruction manual.

### 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 modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller to provide a starting torque boost each time the drive is started. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

### INSTALLATION

#### WARNING

REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area E of the Regulator PCB as shown in Figure 1. Installation instructions are contained in the Controller instruction manual.

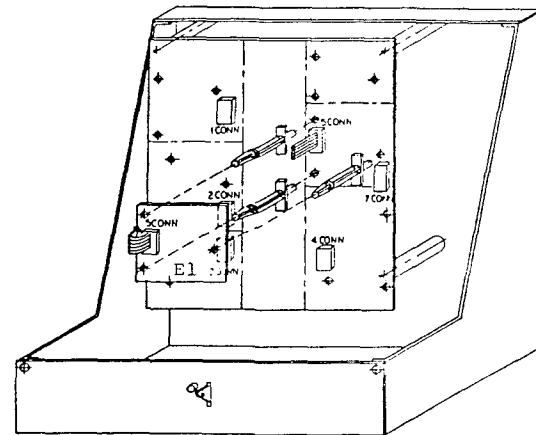


Figure 1.

### INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

### ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Turn the **BREAKAWAY** potentiometer fully counterclockwise and adjust the

### CHANGE RECORD

|   |               |  |  |  |
|---|---------------|--|--|--|
| 1 | T.D. REFORMER |  |  |  |
|   | 12/21/81      |  |  |  |
|   |               |  |  |  |
|   |               |  |  |  |

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EFF. 2/5/81 (E)

speed control settings so that the drive would normally be rotating. Start the drive and note the drive breakaway, or time required for the drive to start moving.

2. Stop the drive. If a faster breakaway is required, turn the BREAKAWAY potentiometer slightly clockwise and restart the drive, again noting the breakaway action.

3. Repeat step 2 until required breakaway is obtained. If desired action cannot be obtained, perform modification kit troubleshooting procedures.

#### TROUBLESHOOTING

Troubleshooting this modification consists of checking circuit components using a volt-ohm meter. If any component is defective, replace the Adjustable Breakaway PCB.

#### MODIFICATION RECORDS

After completing mod kit installation:

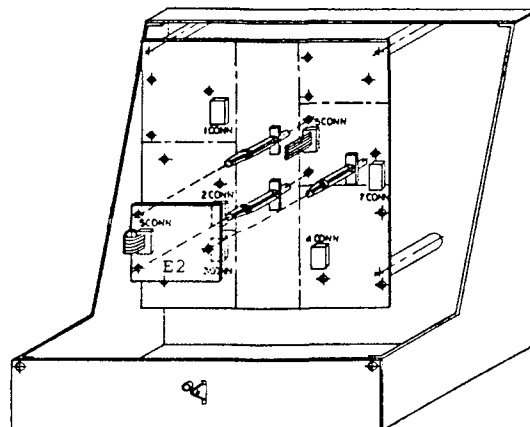
A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "1" in the block corresponding to modification area E.

B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

DWG. NO. 02Y00025-0009  
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EFF. 2/5/81 (E)

MODIFICATION E2  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0070)  
TORQUE LIMIT WITH BOOST

Effective  
2-4-81  
Supercedes  
12-80



MOD PCB  
46SO2045-0010  
SCHEMATIC  
45SO2045-0010

DESCRIPTION:

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for limiting the amount of torque the drive can deliver to the load. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The torque limit portion of this modification controls the maximum drive torque by monitoring and limiting the clutch field current. When the clutch current tries to exceed a preset value, a signal is fed to the Regulator node to prevent any additional increase in clutch current. The preset value of maximum clutch current is adjustable by means of the MAX TORQUE potentiometer. The maximum torque adjustment covers the range of 20 to 100% of Controller current rating.

The boost portion of this modification disables the torque limit feature when the tachometer speed exceeds the preset boost speed. The boost speed is adjustable by means of the BOOST potentiometer and can be adjusted from zero to beyond rated drive speed. When set at maximum, the torque limit function is always operational. This condition is undesirable under most circumstances because the clutch cannot deliver high torque to the load at high speed without an increase in clutch field current.

INSTALLATION

**WARNING**  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

This modification PCB is to be installed to area E of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area E of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

ADJUSTMENTS

After performing the adjustments in the Controller instruction manual, adjust the modification PCB as follows.

1. Turn MAX TORQUE potentiometer fully counter-clockwise and BOOST SPEED potentiometer fully clockwise.
2. Start the drive and turn SPEED CONTROL potentiometer clockwise so that drive is operating at a reasonable speed but not faster than approximately 75% of rated speed. With the drive operating, slowly turn the MAX TORQUE potentiometer clockwise until the drive output torque increases to the desired limited value.
3. Press the STOP pushbutton. Then restart the drive, noting the acceleration or other operation with limited torque. Readjust MAX TORQUE potentiometer if required to obtain desired maximum torque and repeat this step until desired torque is obtained when drive is started or running at low speed.

INSTRUCTION SHEET  
FOR MODIFICATION E2  
Sheet 1 of 2  
02Y00025-0006

- 4 Adjust the SPEED CONTROL potentiometer for the speed at which the torque limit feature is to be disabled.
5. Connect a voltmeter between E2TP on this modification and 12CON(6) of the Regulator PCB (common).
6. With BOOST SPEED potentiometer fully clockwise, the voltmeter should indicate approximately -15 VDC. Slowly turn the BOOST SPEED potentiometer counterclockwise until voltmeter indication goes to zero or positive DC voltage. The torque limit action will now be disabled whenever the tachometer is at or beyond this speed.

#### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltages of the circuit while the drive is operating.

1. Start the drive and rotate SPEED CONTROL fully clockwise
- 2 If the drive does not run at all, remove power and disconnect the flat cable connector at the modification PCB. Restart the drive and determine if drive runs normally without the Torque Limit with Boost modification. If drive runs normally, replace Torque Limit with Boost PCB.
- 3 If the drive runs while the Torque Limit with Boost modification is installed but does not run properly, perform the adjustment procedure. If adjustment cannot be performed satisfactorily, replace the Torque Limit with Boost PCB.

#### MODIFICATION RECORDS

After completing mod kit installation:

1. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "2" in the block corresponding to modification area E.
2. Insert this instruction sheet inside the back cover of the Controller instruction manual.

## MODIFICATION E3 TORQUE LIMIT (250% MOTOR CURRENT)

KIT 46S02051-0400

PCB 46S02151-0020 SCHEMATIC 45S02151-0020

Before installing this kit, a **TECHNICALLY QUALIFIED INDIVIDUAL**, who is familiar with this type of equipment and 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.

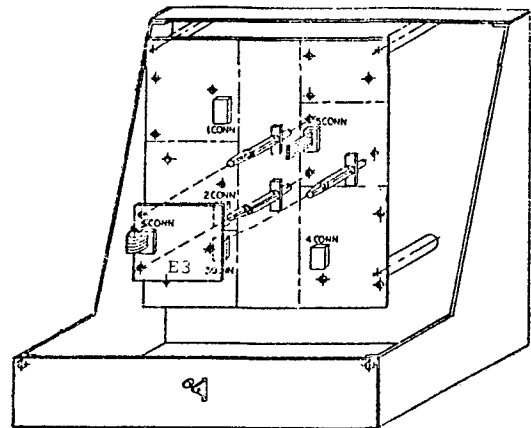


Figure 1

### DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller to limit AC motor current to a set value. This kit also includes a front panel nameplate and a modification diagram for the basic MOD 7 Controller instruction manual.

The E3 modification monitors the current drawn by the AC motor, and adjusts the clutch coil excitation to limit the motor current. Current limiting action is present during both acceleration and running conditions. The range of adjustment is from 50% to 250% of rated motor current.

The motor current is to be sampled by a standard window-type current transformer, such as the Westinghouse ECI model. The

output of the secondary winding must be two ampere when the motor is drawing its full rated current. An AC ammeter rated for five amperes at full scale may be placed in series with the CT secondary in order to read 0 to 250% of rated motor current. Procedures to achieve the correct current are presented in the Transformer Instruction sheets.

The 5-ampere secondary current transformer samples the motor current, and the current transformer burden resistor voltage is then rectified in an absolute value circuit. The output is fed to an error amplifier, which provides signals to clamp clutch excitation and to inhibit brake excitation (on clutch-brake Controllers) when the AC motor current exceeds that value set by 1RH on the modification PCB.

| CHANGE RECORD |          |         |  |  |
|---------------|----------|---------|--|--|
| 1             | STD-1271 | 7/14/81 |  |  |
| 2             | STD-3128 | 7/5/88  |  |  |
|               |          | RR      |  |  |

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## INSTALLATION

### WARNING

REMOVE ALL INPUT POWER TO DRIVE  
BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed in area E of the Regulator PCB as shown in Figure 1. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area E of the simplified schematic diagram as described in the Controller manual.

### INTERCONNECTION

This modification requires that a current transformer be installed on one of the motor leads. Wire the transformer according to the following instructions and as shown on schematic 45S02151-0020. Then perform all other equipment interconnection according to the Controller instruction manual.

#### Current Transformer Instructions

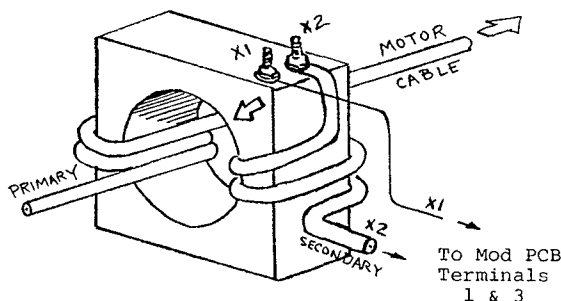
The primary/secondary turns ratio determines the current output. A ratio

of 100:5, for example, means that when 100 amperes flows in a cable passed once through the window, the secondary circuit will furnish 5 amperes to the E3 Modification PCB. The rated full load current of the motor being controlled will probably be different from the example, but the transformer must still be made to produce 5 amperes at 250% motor current or 2 amperes at rated motor current.

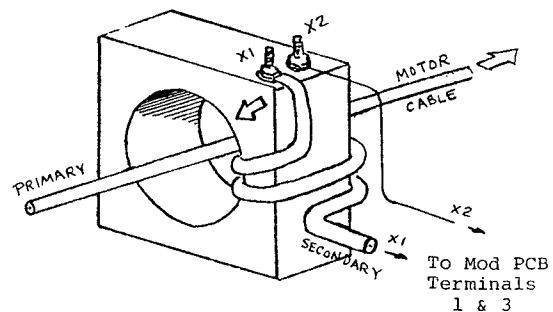
This can be done by externally altering the turns ratio in the following manner. Pass the motor cable (which is in fact the primary of the transformer) through the window more than once, and/or loop a single lead from the secondary terminals one or more times through the window. Depending on which lead is used, turns can effectively be either added to (+) or subtracted from (-) the original number of secondary turns.

In Table 1, locate the rated current of the motor being controlled. Read across to find the number of primary passes and secondary turns needed.

Figure 2 illustrates how to pass the motor cable through, as well as how to wind the secondary. Table 1 lists secondary turns as either plus or minus,



3-pass Primary  
with 2 turns ADDED  
to Secondary (+)



1-pass Primary  
with 2 turns SUBTRACTED  
from Secondary (-)

Figure 2.

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meaning to add or subtract turns. To subtract, start from the terminal nearest the arrow on the side of the case. To add turns, start from the other terminal. In either case, pass only one lead through the window, in the direction of the arrow. The other lead goes straight to the Mod PCB terminal board.

#### ADJUSTMENT

1. Turn IRH to minimum (full CCW).
2. Start the drive.
3. Accelerate drive or load heavily.
4. Note motor current through use of an external meter (not supplied).
5. Increase setting of IRH until maximum AC motor current is limited to the desired value.
6. Repeat the acceleration or heavy load to check.

#### TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

If the AC motor draws too much current, check for the presence of approximately 0.2 volts between terminals E1 and E3, to verify that the current transformer and its burden resistor are good.

When current limiting takes place, E1TP will go negative with respect to chassis common. Check for the presence of this voltage.

#### MODIFICATION RECORDS

After completing mod kit installation:

1. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number (3) in the block corresponding to modification area E.
2. Insert this instruction sheet inside the back cover of the Controller instruction manual.

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EFF. 2/9/81 (H)

Table 1. Current Transformer Wiring

| LOUIS ALLIS<br>PART NUMBER<br>05P00068- | RATED<br>FLA | C.T.<br>RATIO | PRIMARY<br>PASSES | SECONDARY<br>TURNS<br>(NOTE 1) |
|---|--------------|---------------|-------------------|--------------------------------|
| -0056                                   | 1.4          | 100:5         | 15                | -9                             |
|   | 1.7          |               | 23                | 0                              |
|   | 2.2          |               | 18                | 0                              |
|   | 2.65         |               | 15                | 0                              |
|   | 2.8          |               | 10                | -6                             |
|   | 2.9          |               | 10                | -5                             |
|   | 3.1          |               | 10                | -5                             |
|   | 3.2          |               | 12                | 0                              |
|   | 3.75         |               | 15                | +8                             |
|   | 4.3          |               | 10                | +1                             |
|   | 4.4          |               | 10                | +2                             |
|   | 5.3          |               | 10                | +6                             |
|   | 5.4          |               | 7                 | -1                             |
|   | 6            |               | 7                 | +1                             |
|   | 6.4          |               | 6                 | -1                             |
|   | 7            |               | 6                 | +1                             |
|   | 7.5          |               | 4                 | -5                             |
|   | 8.5          |               | 4                 | -3                             |
|   | 8.6          |               | 3                 | -7                             |
|   | 9.5          |               | 4                 | -1                             |
|   | 11           |               | 4                 | +2                             |

DWG. NO. 02Y00025-0036  
 SHEET 4 OF 6  
 EFF. 2/9/81 (H)

Table 1. Current Transformer Wiring (Continued)

| LOUIS ALLIS<br>PART NUMBER<br>05P00068- | RATED<br>FLA | C.T.<br>RATIO | PRIMARY<br>PASSES | SECONDARY<br>TURNS<br>(NOTE 1) |
|---|--------------|---------------|-------------------|--------------------------------|
| -0056<br>(Cont'd)                       | 12           | 100:5         | 3                 | -2                             |
|   | 13           |               | 4                 | +6                             |
|   | 14           |               | 3                 | +1                             |
|   | 16           |               | 2                 | -4                             |
|   | 17           |               | 2                 | -3                             |
|   | 18           |               | 2                 | -2                             |
|   | 19           |               | 2                 | -1                             |
|   | 22           |               | 2                 | +2                             |
|   | 24           |               | 2                 | +4                             |
|   | 25           |               | 2                 | +5                             |
|   | 27           |               | 1                 | -6                             |
|   | 36           |               | 1                 | -2                             |
|   | 37           |               | 1                 | -1                             |
|   | 38           |               | 1                 | -1                             |
|   | 50           |               | 1                 | +5                             |
| -0037                                   | 62           | 150:5         | 1                 | +1                             |
|   | 68           |               | 1                 | +4                             |
| -0058                                   | 74           | 200:5         | 1                 | -3                             |
|   | 79           |               | 1                 | 0                              |
|   | 85           |               | 1                 | +2                             |

DWG. NO. 02Y00025-0036  
 SHEET 5 OF 6  
 EFF. 2/9/81 (H)

Table 1. Current Transformer Wiring (Continued)

| LOUIS ALLIS<br>PART NUMBER<br>05P00068- | RATED<br>FLA | C.T.<br>RATIO | PRIMARY<br>PASSES | SECONDARY<br>TURNS<br>(NOTE 1) |
|---|--------------|---------------|-------------------|--------------------------------|
| -0058<br>(Cont'd)                       | 87           | 200:5         | 1                 | +3                             |
|   | 92           |               | 1                 | +6                             |
| -0059                                   | 100          | 300:5         | 1                 | -10                            |
|   | 110          |               | 1                 | -5                             |
|   | 121          |               | 1                 | 0                              |
|   | 123          |               | 1                 | +1                             |
|   | 124          |               | 1                 | +2                             |
| -0038                                   | 150          | 400:5         | 1                 | -5                             |
|   | 152          |               | 1                 | -4                             |
|   | 156          |               | 1                 | -2                             |
| -0040                                   | 190          | 600:5         | 1                 | -25                            |
| -0041                                   | 270          | 800:5         | 1                 | -25                            |

Note 1. A zero (0) indicates that neither secondary lead passes through the current transformer window.

DWG. NO. 02Y00025-0036  
 SHEET 6 OF 6  
 EFF. 2/9/81 (H)

Table 1. Current Transformer Wiring (Continued)

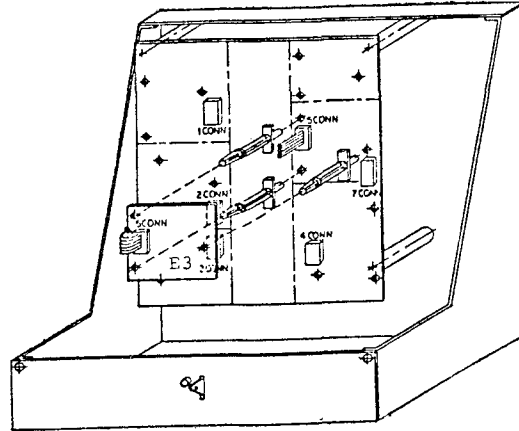
| LOUIS ALLIS<br>PART NUMBER<br>05P00068- | RATED<br>FLA | C.T.<br>RATIO | PRIMARY<br>PASSES | SECONDARY<br>TURNS<br>(NOTE 1) |
|---|--------------|---------------|-------------------|--------------------------------|
| -0058<br>(Cont'd)                       | 87           | 200:5         | 1                 | +3                             |
|   | 92           |               | 1                 | +6                             |
| -0059                                   | 100          | 300:5         | 1                 | -10                            |
|   | 110          |               | 1                 | -5                             |
|   | 121          |               | 1                 | 0                              |
|   | 123          |               | 1                 | +1                             |
|   | 124          |               | 1                 | +2                             |
| -0038                                   | 150          | 400:5         | 1                 | -5                             |
|   | 152          |               | 1                 | -4                             |
|   | 156          |               | 1                 | -2                             |
| -0040                                   | 190          | 600:5         | 1                 | -25                            |
| -0041                                   | 270          | 800:5         | 1                 | -25                            |

Note 1. A zero (0) indicates that neither secondary lead passes through the current transformer window.

DWG. NO. 02Y00025-0036  
 SHEET 6 OF 6  
 EFF. 2/9/81 (H)

MODIFICATION E3  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46SO2051-0400)  
300% AC MOTOR TORQUE CURRENT LIMIT

Effective  
11-5-85  
Supersedes  
9-15-81



MOD PCB  
46SO2151 0020  
SCHEMATIC  
45SO2151-0020

DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller to limit AC motor current to a set value. The kit also includes a front panel nameplate and a modification diagram for the basic MOD 7 Controller instruction manual.

The E3 modification monitors the current drawn by the AC motor, and adjusts the clutch coil excitation to limit the motor current. Current limiting action is present during both acceleration and running conditions. The range of adjustment is from 60% to 300% of rated motor current.

The motor current is to be sampled by a standard window-type current transformer, such as the Westinghouse ECI model. The output of the secondary winding must be 1.67 amperes when the motor is drawing its full rated current. An AC ammeter rated for five amperes at full scale may be placed in series with the CT secondary in order to read 0 to 300% of rated motor current. Procedures to achieve the correct current are presented in the Transformer Instruction sheet.

The 5-ampere secondary current transformer samples the motor current, and the current transformer burden resistor voltage is then rectified in an absolute value circuit. The output is fed to an error amplifier, which provides signals to clamp clutch excitation and to inhibit brake excitation (on clutch-brake Controllers) when the AC motor current exceeds that value set by 1RH on the modification PCB.

INSTALLATION

This modification PCB is to be installed in area E of the Regulator PCB as shown in the illustration on this page. Installation instructions are contained in the Controller instruction manual. After installing the modification PCB, apply the schematic overlay to area E of the simplified schematic diagram as described in the Controller manual.

INTERCONNECTION

This modification requires that a current transformer be installed on one of the motor leads. Wire the transformer according to the following instructions and as shown on schematic 45SO2151-0020. Then perform all other equipment interconnection according to the Controller instruction manual.

CURRENT TRANSFORMER INSTRUCTIONS

The primary/secondary turns ratio determines the current output. A ratio of 100:5, for example, means that when 100 amperes flows in a cable passed once through the window, the secondary circuit will furnish 5 amperes to the E3 Modification Kit. The rated full load current of the motor being controlled will probably be different from the example, but the transformer must still be made to produce 5 amperes at 300% motor current or 1.67 amperes at rated motor current.

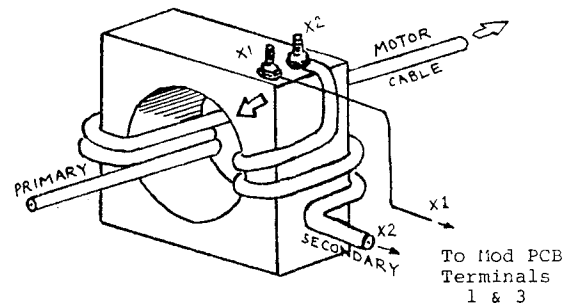
This can be done by externally altering the turns ratio in the following manner. Pass the motor cable (which is in fact the primary of the transformer) through the window more than once, and/or loop a single lead from the secondary terminals one or more times through the window. Depending on which lead is used, turns can effectively be either added to or subtracted from the original number of secondary turns.

WARNING  
REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT

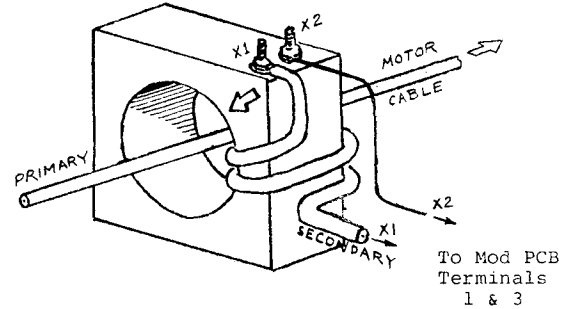
INSTRUCTION SHEET  
FOR MODIFICATION E3  
Sheet 1 of 3  
02Y00025-0052

In the chart below, locate the frequency, rated current and voltage of the motor being controlled. Read across to find the number of primary passes and secondary turns needed

Figure 1 illustrates how to pass the motor cable through, as well as how to wind the secondary. The chart lists secondary turns as either plus or minus, meaning to add or subtract turns. To subtract, start from the terminal nearest the arrow on the side of the case. To add turns, start from the other terminal. In either case, pass only one lead through the window, in the direction of the arrow. The other lead goes straight to the Mod Kit terminal board



3-pass Primary with 2 turns ADDED to Secondary



1-pass Primary with 2 turns SUBTRACTED from Secondary

FIGURE 1

CURRENT TRANSFORMER

(Specification & Connection)

For 60HP Drive Unit with 300% Amps

MC5-000300-2 Controller

| HZ | Volts | Full Load Amps (approx.) | Standard Current Trans. |       |               |                 | Alternate Current Trans. |       |               |                 |           |       |   |     |
|----|-------|--------------------------|-------------------------|-------|---------------|-----------------|--------------------------|-------|---------------|-----------------|-----------|-------|---|-----|
|    |       |                          | Part No                 | Ratio | Primary Turns | Secondary Turns | Part No.                 | Ratio | Primary Turns | Secondary Turns |           |       |   |     |
| 60 | 200   | 184                      | 5P68-0040               | 600:5 | 1             | -10             |                          |       |               |                 |           |       |   |     |
| 50 | 200   | 190                      |                         |       | 1             | -6              |                          |       |               |                 |           |       |   |     |
| 60 | 220   | 167                      | 5P68-0040               | 600:5 | 1             | -20             |                          |       |               |                 |           |       |   |     |
| 60 | 230   | 160                      | 5P68-0039               | 500:5 | 1             | -4              |                          |       |               |                 | 5P68-0038 | 400:5 | 1 | +16 |
| 50 |       |                          |                         |       |               |                 |                          |       |               |                 |           |       |   |     |
| 60 | 380   | 97                       | 5P68-0040               | 600:5 | 2             | -4              |                          |       |               |                 |           |       |   |     |
| 50 |       |                          |                         |       |               |                 |                          |       |               |                 |           |       |   |     |
| 60 | 400   | 92                       | 5P68-0040               | 600:5 | 2             | -10             |                          |       |               |                 |           |       |   |     |
| 50 |       | 95                       |                         |       | 2             | -6              |                          |       |               |                 |           |       |   |     |
| 60 | 460   | 80                       | 5P68-0039               | 500:5 | 2             | -4              |                          |       |               |                 | 5P68-0038 | 400:5 | 2 | +16 |
| 50 |       |                          |                         |       |               |                 |                          |       |               |                 |           |       |   |     |
| 60 | 575   | 64                       | 5P68-0058               | 200:5 | 1             | -2              |                          |       |               |                 |           |       |   |     |
| 50 |       |                          |                         |       |               |                 |                          |       |               |                 |           |       |   |     |

NOTE: 1 The above table for use with Torque Limit Printed Circuit Board (E-3 Mod) identified as 46S02151-0020. If E3 Mod board is 46S02151-0010 type check with factory for proper connections. Identify drive, controller and current transformer by nameplate data

2. To assure optimum performance of the drive equipment and reduce the probability of AC motor damage due to incorrect maximum torque setting it is recommended that Louis Allis Startup Service be requested

ADJUSTMENT

1. Turn lRH to minimum (full CCW)
2. Start the drive.
- 3 Accelerate drive or load heavily
4. Note motor current through use of an external meter (not supplied)
5. Increase setting of lRH until maximum AC motor current is limited to the desired value
6. Repeat the acceleration or heavy load to check.

TYPICAL SEQUENCE OF OPERATION

- A. AC Motor started (with no excitation to clutch coil) AC motor will accelerate input member of EC clutch to AC motor speed.
- B. To start slicer clutch, "Run" circuit (ICR) relay energized.
  1. MC controller will apply up to 90V to clutch coil.
  2. AC motor amps will increase to approximately 3 times full load current (as stamped on AC motor nameplate). At this level the current limit operation of the controller will reduce the clutch coil voltage so as to maintain 300% current until the slicer has accelerated to the speed set. At this point the AC motor current will reduce to approximately nameplate value (or lower) as determined by the load. (Check with clamp-on ammeter.)

NOTE: If AC motor current is allowed to exceed approximately 300% on starting, an excessive AC motor current will be experienced (up to six times full load current or greater). This excessive current indicates the motor peak torque has been exceeded by mis-setting of the controller (AC motor speed will also decrease sharply.) Stop the drive immediately and reset torque limit control (reduce torque setting). (Check AC motor speed with hand tach.)

Repeated operation of the drive under excessive current condition will deteriorate the motor winding insulation through excessive heating and eventually cause burnout.

If the excessive current condition persists and cannot be corrected by readjustment of the current limit feature, request Louis Allis Field Service.

NOTE: If the drive is repeatedly started and stopped; (300%) torque being applied at each start and acceleration of the drive, without normal running time between starting and stopping, the AC motor will be subjected to an average load much greater than nameplate rating and will probably overheat. Allow AC motor to run without clutch energized until normal temperature restored.

TROUBLESHOOTING

If other mod boards have been installed, be sure to troubleshoot them thoroughly before discarding this board as faulty.

If the AC motor draws too much current, check for the presence of approximately .167 volts between E1 and E3, to verify that the current transformer and its burden resistor are good.

When current limiting takes place, ElTP will go negative with respect to chassis common. Check for the presence of this voltage.

Perform the steps of the adjustment procedure again, and if satisfactory results are not obtained, replace the E3 PCB.

MODIFICATION RECORDS

After completing mod kit installation:

1. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "3" in the block corresponding to modification area E.
2. Insert this instruction sheet inside the back cover of the Controller instruction manual.

|                   |          |         |
|-------------------|----------|---------|
| Record of Changes |          |         |
| 1                 | STD-2400 | 11-5-85 |



## MODIFICATION F2 ADJUSTABLE BRAKING 500W KIT 46S02051-0230

PCB 46S02048-0020 SCHEMATIC 45S02048-0020

### DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the basic Controller for adjustable braking. It also includes front panel nameplates and modification diagrams for the basic MOD 7 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to adjust the brake coil voltage from 5 volts DC to 95 volts DC. The on/off control of the brake is determined by the run/stop status of the drive. The brake is deenergized whenever run relay 1CR is energized.

### CAUTION

PROLONGED EXCITATION OF EDDY CURRENT BRAKES AT ZERO SPEED MAY CAUSE EXCESSIVE HEATING AND COIL INSULATION DAMAGE. DEPRESSING THE CONTROLLER "STOP" BUTTON CAUSES EXCITATION TO BE APPLIED TO THE BRAKE. REMOVE INPUT POWER TO THE CONTROLLER TO REMOVE EXCITATION TO THE EDDY CURRENT BRAKE.

### INSTALLATION

Because this modification requires that components be mounted on the rear heat sink of the Controller, it must be factory installed.

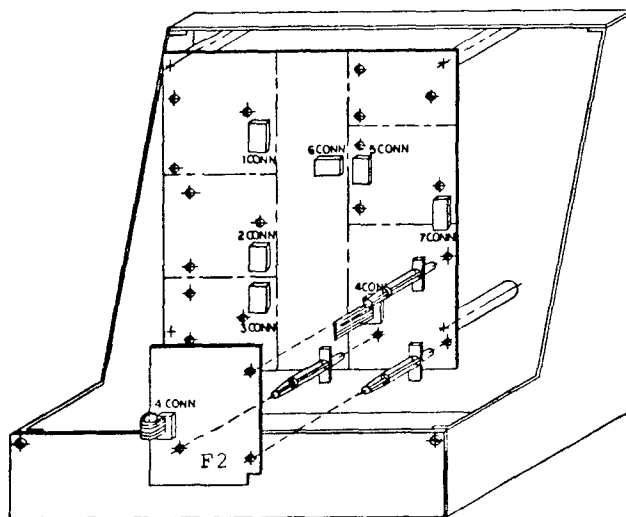


Figure 1

| CHANGE RECORD |                     | DWG. NO. 02Y00025-0014 |
|---------------|---------------------|------------------------|
| 1             | STD- 2-16-81        |                        |
| 2             | STD-2760 5-8-87 RKA | EFF. 7/77 (E)          |

During Controller set-up, check to insure that the modification PCB is in place in area F on the Regulator PCB as shown in Figure 1. Also check that the schematic overlay has been applied to the simplified schematic diagram in the Controller instruction manual.

#### INTERCONNECTION

This modification requires no special interconnections.

Perform equipment interconnection according to the Controller instruction manual.

#### ADJUSTMENTS

Perform the adjustments in the Controller instruction manual. Then, with the drive running, press the STOP push button and adjust the BRAKING potentiometer for the desired braking action. If the brake cannot be energized or cannot be adjusted with the BRAKING potentiometer, perform modification kit troubleshooting procedures below.

#### TROUBLESHOOTING

If other mod boards have been installed, troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltage of the circuit while the drive is energized.

1. Rotate the BRAKING potentiometer fully counterclockwise.

2. Apply power to the Controller but do not start the drive.

3. Refer to the schematic diagram of the Adjustable Braking 500, 900, 1800W PCB and check input voltage between Controller terminal board connections P2 and P1. Voltage should be approximately 115 VAC rms. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.

4. Check brake voltage between Controller terminal board connections P6(+) and P7(-). Voltage should be zero. Then rotate BRAKING potentiometer clockwise. Voltmeter reading should follow potentiometer setting and should reach a maximum of approximately 95 VDC with BRAKING potentiometer fully clockwise. If brake voltage is incorrect or cannot be adjusted, replace Adjustable Brake PCB.

#### MODIFICATION RECORDS

After completing mod kit installation:

A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "2" in the block corresponding to modification area F.

B. Insert this instruction sheet inside the back cover of the Controller instruction manual.

DWG. NO. 02Y00025-0014  
SHEET 2 OF 2  
EFF. 7/77 (E)

MODIFICATION F6  
FOR EDDY CURRENT DRIVE  
(KIT P/N 46S02051 J440)

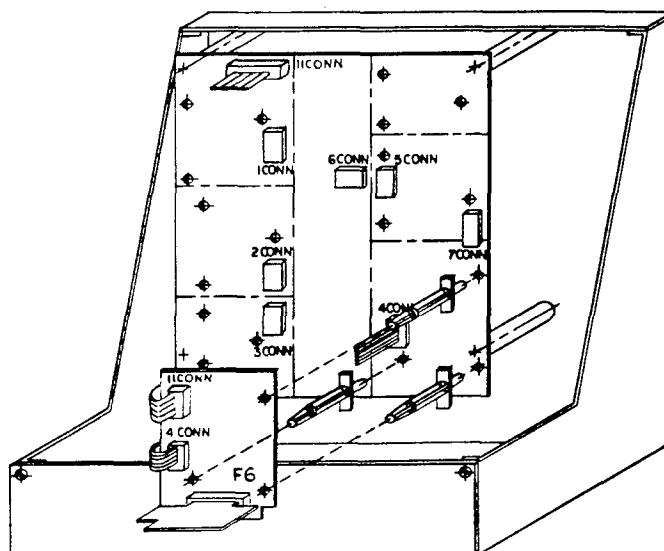
BRAKE ECONOMY 220W

EFFECTIVE:

11-4-82

MOD PCB ASSEMBLY  
46S2467-0010

SCHEMATIC  
45S2467-0010



DESCRIPTION

This modification kit is one of a series of kits available for the Louis Allis eddy current drives. It consists of components necessary for modifying the HC2 Controller for adjustable braking with Brake Economy. It also includes front panel nameplates, and modification diagrams for the MOD 7 type HC2 Controller instruction manual.

The addition of this assembly to the Controller enables the operator to adjust the brake coil voltage from 5 to 95 volts DC. The on/off control of the brake is determined by the run/stop status of the drive. The brake is activated when the STOP button is pressed. The brake is deactivated when the unit is restarted. However, if the unit is stopped for more than approximately 6.5 minutes, the brake economy feature of this option automatically de-energizes the brake circuit. This feature is provided to prevent the brake coil from overheating if the unit is stopped with input power applied for long periods of time.

INSTALLATION

**WARNING**

REMOVE ALL INPUT POWER TO DRIVE BEFORE INSTALLING MODIFICATION KIT.

This modification PCB is to be installed to area F of the Regulator PCB as shown in the illustration above. Installation instructions are contained in the Controller instruction manual.

After installing the modification PCB, apply the schematic overlay to area F of the simplified schematic diagram as described in the Controller instruction manual.

INTERCONNECTION

This modification requires no special interconnections. Perform equipment interconnections according to the Controller instruction manual.

ADJUSTMENTS

Perform the adjustments in the Controller instruction manual. Then, with the drive running, press the STOP button and adjust the BRAKING potentiometer for the desired braking action. If the brake cannot be energized or cannot be adjusted with the BRAKING potentiometer, perform modification kit troubleshooting procedures.

TROUBLESHOOTING

If other mod boards have been inserted be sure to troubleshoot them thoroughly before discarding this board as faulty.

Troubleshooting consists of checking the input and output voltage of the circuit while the drive is energized.

1. Rotate the BRAKING potentiometer fully counterclockwise.
2. Apply power to drive, but do not start drive.
3. Refer to the schematic diagram of the Brake Economy PCB and check input voltage between 4CONN (1) and terminal 8 of Regulator PCB. Voltage should be approximately 115 VAC RMS. If voltage is incorrect, refer to the troubleshooting charts in the Controller instruction manual.
4. Check output voltage between 4CONN(14) and terminal 8 of Regulator PCB. Voltage should be approximately 5VDC. If voltage is incorrect, replace the Brake Economy PCB.
5. Check brake voltage between terminals 14(+) and 15(-) of Regulator PCB. Voltage should be zero. Then rotate BRAKING potentiometer clockwise. Voltmeter reading should follow potentiometer setting and should reach a maximum of approximately 95VDC with BRAKING potentiometer fully clockwise. If brake voltage is incorrect or cannot be adjusted, replace Brake Economy.

INSTRUCTION SHEET  
FOR MODIFICATION F6

Sheet 1 of 2  
02Y00025-0116

See Sheet 2 for Record of Changes

6. Remove power from drive
7. Reapply power. After about 5 to 10 minutes, the brake should be deactivated. Verify this by measuring the voltage between terminals 14(+) and 15(-) of the Regulator PCB. If the voltage is greater than 5VDC, replace the Brake Economy PCB assembly

MODIFICATION RECORDS

After completing mod kit installation:

- A. Modify Controller identification number using Method 1 in the Controller instruction manual. Place the number "6" in the block corresponding to modification area F
- B. Insert this instruction sheet inside the back cover of the Controller instruction manual

|                               |  |  |
|-------------------------------|--|--|
|                               |  |  |
| RECORD OF CHANGES             |  |  |
| Sheet 2 of 2<br>02Y00025-0116 |  |  |