

FIELD LOSS PROTECTION OPTION PCB

46S02493-0010	SCHEMATIC 45S02493-0010
46S02493-0020	SCHEMATIC 45S02493-0020
46S02493-0030	SCHEMATIC 45S02493-0030

DESCRIPTION

This option is one of a series available for Louis Allis Saber DC drives. The Field Loss Protection PCB is provided to prevent the motor speed from running away if the field current is disrupted for any reason. This protection is achieved by using a hall effect device and a toroidal core to sense field current. It produces a proportional voltage signal which is monitored to determine if the field current level is proper. If the field current level drops below a preset point, the field fault relay on this board is de-energized to open the run/stop circuit to shut down the drive.

The following adjustments and LED indicator are provided on this board.

a. A TRIP LEVEL adjustment (1RH) which is provided to set the minimum allowable field current trip point. The range of this adjustment is from 10% to 80% of full field current.

b. A CALIB (Calibration) adjustment (2RH) which is provided to scale the voltage signal representing field current for 2.0V at 1TP at rated field current.

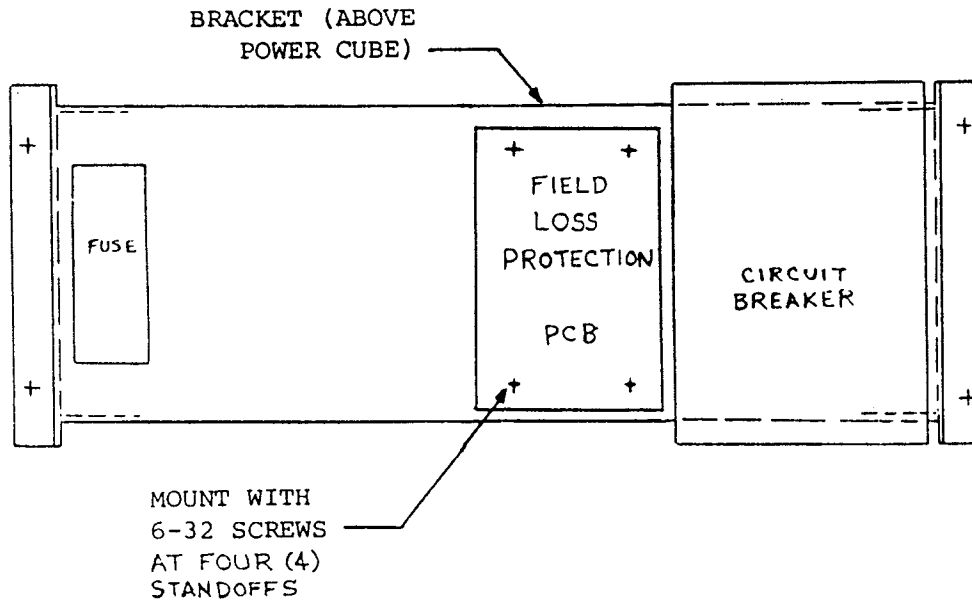


Figure 1.

CHANGE RECORD			DWG. NO. 02Y00025-0139 SHEET 1 OF 4 EFF. 8/31/84 (M)
1	STD-2347	7-3-85	
2	T.D. Chg.	11-21-85	
3	STD-2666	2-3-87	

c. An OFFSET adjustment (3RH) which is provided to cancel out the offset output of the hall effect device at zero field current.

d. FIELD LOSS indicator (ILED) which provides a visual indication of a field loss trip.

To cover the range of field current ratings from 0.50A to 25.0A, there are three versions of the Field Loss Protection board. They are:

1. The 46S02493-0010 version covers the field current range from 0.50A to 5.00A in two steps. Fifteen turns of 20GA wire are wrapped through the core between 2TB-7 and 2TB-8 to provide for field current range from 0.50A to 1.50A, and five turns of 18GA wire are wrapped through the core between 2TB-8 and 2TB-9 to provide for the field current range from 1.50A to 5.00A.

2. The 46S02493-0020 suffix covers the field current range from 1.50A to 12.50A in two steps similar to -0010 suffix version. Five turns of 18GA wire are wrapped through the core between 2TB-7 and 2TB-8 to provide for a field current range from 1.50A to 5.00A, and two turns of 14GA wire are wrapped through the core between 2TB-8 and 2TB-9 to provide for the field current range from 5.00A to 12.50A.

3. The 46S02493-0030 suffix covers the field current range from 5.00A to 25.00A in two steps. Two turns of 14GA wire are wrapped through the core between 2TB-7 and 2TB-8 to provide for a field current range from 5.0A to 12.50A, and one turn

of 10GA wire is wrapped through the core between 2TB-8 and 2TB-9 to provide for the field current range from 12.50A to 25.00A.

INSTALLATION

WARNING

REMOVE ALL INPUT POWER TO THE DRIVE BEFORE INSTALLING OPTION COMPONENTS.

Mechanical

Install the option onto the panel or circuit breaker bracket (depending on HP rating and the presence or absence of the reversing option), aligning four of the standoffs on the bottom of the option PCB with four predrilled holes on the panel or circuit breaker bracket. Secure option using four 6-32 x 1 self-tapping metal screws with attached SEMS star washer.

Electrical

1. If this option was NOT factory installed, an 18 gauge wire (tagged with wire number 18) must be installed by the USER between 3TB-F2 in the power cube and 2TB-8 on this PCB. Also, wire numbered 25A must be disconnected from 1TB-16 in the power cube and reconnected to 2TB-3 on this PCB. An 18 gauge wire (tagged 25B) must be installed by the user between 2TB-2 on this PCB and 1TB-16 in the power cube.

2. Refer to the motor nameplate and determine the rated motor field current in amperes.

3. Install wire F1 between 3TB-F1 on the power cube and the motor shunt field. Install wire F2 between the

DWG. NO. 02Y00025-0139
SHEET 2 OF 4
EFF. 8/31/84 (M)

motor shunt field and the proper terminal on this PCB as indicated below.

Suffix Version No.	Field Current Range in Amps	Input/Output Connections	
		Input (+)	Output (-)
-0010	0.50 - 1.50	2TB-7	2TB-8
	1.50 - 5.00	2TB-9	
-0020	1.50 - 5.00	2TB-7	
	5.00 - 12.5	2TB-9	
-0030	5.00 - 12.5	2TB-7	
	12.5 - 25.0	2TB-9	

4. Using two 4-pin female MOLEX connectors (MOLEX #09-50-3041; Louis Allis #05P0034-0818), construct a cable using 18 gauge wire which is long enough to be run between 32CONN on the Field Loss Protection PCB and 32CONN on the Relay Interface PCB in the power cube. They are pin for pin compatible (pin 1 to pin 1, etc.). Installation of this cable completes the installation of the Field Loss Protection option.

ADJUSTMENTS

CAUTION

BEFORE REMOVING OR REPOSITIONING ANY FIELD WIRING AT 2TB ON THIS ASSEMBLY, INSURE THAT ALL INCOMING POWER IS OFF.

1. The OFFSET adjustment potentiometer (3RH) is normally properly factory adjusted. However, should it become misadjusted, its function and its adjustment procedure are as follows.

a. With no field current applied to the motor, the voltage at 1TP with respect to 3TP should be zero.

b. Remove the wire from 2TB-8 on this assembly to ensure zero field current, and then energize the drive. It should be noted that the FIELD LOSS lamp will be energized during this step.

c. Measure the voltage between the two test points. If it is not zero, adjust 3RH to obtain zero volts on 1TP.

d. De-energize the drive and reconnect the wire to 2TB-8.

2. Energize the motor field. At nameplate rated field current, the voltage between 1TP and 3TP should be +2.0 VDC. If not, adjust the CALIBRATION adjustment potentiometer (2RH) until the voltage is +2.0 VDC. Note that if the motor is cold, the field current may be higher than the rated value and there may be a time delay while waiting for the motor to achieve its normal operating temperature and field current.

3A. If the drive is not equipped with a field weakening regulator option, the TRIP LEVEL adjustment potentiometer (1RH) should be set totally clockwise (with the arrow pointing at the 100 position).

3B. If the drive is equipped with a field weakening regulator, then the minimum field current required must be determined and 1RH must be set accordingly.

Example:

For a 3.0 amp field weakened to 0.75 amps, the field weakening percent equals

$$\frac{0.75}{3.0} \text{ or } 25\%$$

Since the adjustment range of 1RH is from 10-80% of rated field current, the potentiometer setting which corresponds

DWG. NO. 02Y00025-0139
SHEET 3 OF 4
EFF. 8/31/84 (M)

to 25% for this example would be

$$\frac{80}{100} = \frac{25}{\text{SET}}$$

$$\text{SET} = \frac{2500}{80} = 31.25$$

For this example the TRIP LEVEL potentiometer would be set slightly lower than the 30 position on the pot.

If the field is weakened to 10% of its rated value, the TRIP LEVEL potentiometer should be set totally counter-clockwise (with the arrow pointing to the 0 position).

OPTION RECORDS

After completing installation of this option, insert this instruction sheet immediately behind the front cover of the Controller instruction manual.

TROUBLESHOOTING

Follow the steps below to troubleshoot the option:

1. Refer to interconnection and adjust sections and make sure that they are properly followed.

2. Verify the supply voltages thru 32CONN:

+15 VDC ±15% at 2TP

Common at 3TP

-15 VDC ±5% at 4TP

-24 VDC ±20% at 5TP

3. Check if field current is proper. Correct as required.

4. Replace the option PCB.

DWG. NO. 02Y00025-0139
SHEET 4 OF 4
EFF. 8/31/84 (M)