



For use with Saber DC Drives.

FORCE REGULATED SPEED FOLLOWER (FRSF) OPTION ASSEMBLY

46S02371-0141	SCHEMATIC	45S02371-0141
46S02371-1141	SCHEMATIC	45S02371-1141
46S02371-0250	SCHEMATIC	45S02371-0250

DESCRIPTION

This option is one of a series available for Louis Allis Saber DC drives. It is designed to monitor the feedback signal from force transducers, then compare this signal with the tension reference feedback, to modify the normal speed regulating function of the drive. This is done by injecting current into the speed regulating node. Since this is basically a trim function, the circuit interaction is limited to 20% of top speed.

The option includes the reference supply and connections for customer's external 5K TENSION potentiometer. In addition, the following items are provided:

1. Selector switch for meter damping and low scale operation.
2. Terminal connections for:
 - a. Transducer input signals.
 - b. Supply voltages $\pm 15V$, $+5V$ or $+24V$.
 - c. External damping capacitor.
 - d. External stability capacitor and reset circuit.
 - e. Voltmeter output, one milliamp meter output and 0-2V digital meter output and meter common.

- f. Upstream and downstream measurement.
- g. Non-extensible and low-scale maximum tension control inputs.
3. Tare weight adjustment (2RH).
4. Span adjustment (3RH).
5. Meter calibration adjustment (4RH).
6. Switch selectable internal tension adjustment (5RH).
7. Relay logic selectable high-range (6RH) and low range (7RH) maximum tension adjustments with 3LED and 4LED indicators controlled by 115 VAC or $+24VDC$ interfacing.
8. One set of relay logic selectable adjustments for extensible materials with 1LED indicator:
 - a. Extensible GAIN adjustment (8RH).
 - b. Extensible RESPONSE adjustment (9RH).
 - c. Extensible STABILITY adjustment (10RH).
 - d. Extensible DROOP adjustment (11RH).

CHANGE RECORD				DWG. NO. 02Y00025-0131	
1	STD-2580	7/31/86		SHEET 1 OF 8	
2	STD-2666	2-3-87	RR	EFF. 7/31/83	(D)
3	STD-4188	5-1-90	RR		

9. One set of relay logic selectable adjustments for non-extensible materials with 2LED indicator:

- a. Non-Extensible GAIN adjustment (12RH).
- b. Non-Extensible RESPONSE adjustment (13RH).
- c. Non-Extensible STABILITY adjustment (14RH).
- d. Non-Extensible DROOP adjustment (15RH).

Two versions of the Force Regulated Speed Follower option are available.

The 46S02371-0141 version operates with LVDT type transducer and provides an extra LVDT balance adjustment (1RH).

The 46S02371-1141 version operates with a strain gage type transducer and provides an additional selector switch to select between 250mV gage and 10mV gage.

INSTALLATION

WARNING

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

Refer to Figure 1. Install the option in the following manner:

1. Install PVC mounting track (L.A. part no. 43T1501-000) to the panel where option is to be mounted, using appropriate hardware.
2. Install option by pressing firmly into mounting track.
3. Using 40 conductor ribbon, fabricate and install a double-ended ribbon cable of sufficient length to fit from 12CONN on the right side of the option to 12CONN on the Main PCB in the regulator power cube, or to 12CONN on the left side of a previously installed option.

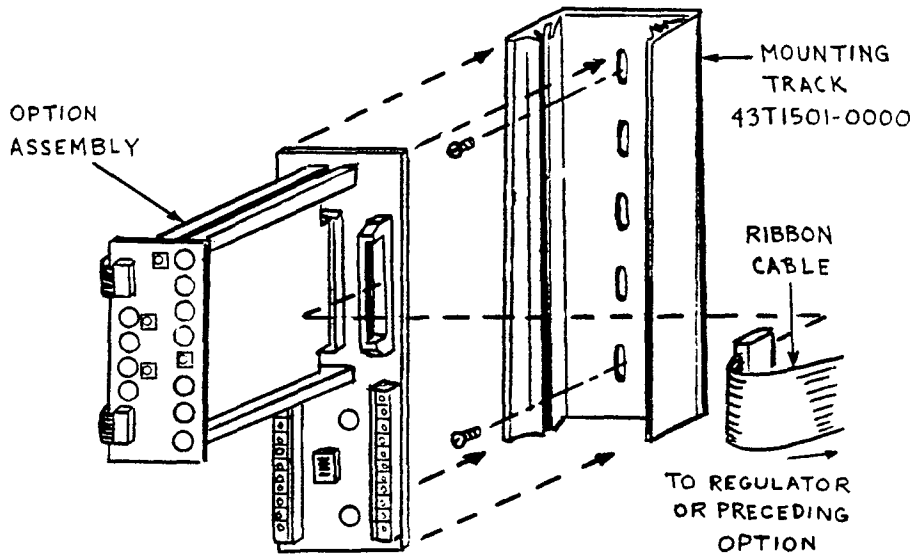


Figure 1.

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IMPORTANT

If other options are already present, the power supply capability from the Saber power cube may not be sufficient when this option is added; if so, a Booster Power Supply option (46S02371-0191) will be required.

INTERCONNECTION

Perform interconnections for this option according to Table 1.

DESCRIPTION OF CONTROLS

See Table 2 for function of controls.

ADJUSTMENTS

1. Set the following adjustments to 0% before applying power to the drive.

- a. SPAN adjustment (3RH).
- b. INTERNAL TENSION (5RH) or customer's EXTERNAL TENSION pot.
- c. HIGH SCALE (6RH) and LOW SCALE (7RH) MAX TENSION.
- d. EXTENSIBLE GAIN (8RH) and NON-EXTENSIBLE GAIN (12RH).
- e. EXTENSIBLE DROOP (11RH) and NON-EXTENSIBLE DROOP (15RH).

2. Apply power to the drive. Adjust the TARE WEIGHT (2RH) for 0.00 VDC at 4TP.

3. Apply maximum working load on the load cells. On the LVDT version (-0141), adjust the LVDT BALANCE (1RH) until the voltage at 4TP is equal to twice that at 2TP.

4. Set the SPAN adjustment (3RH) for -10.00 VDC at 4TP.

5. Adjust the METER CALIBRATION (4RH) for maximum indication on the meter which reflects the maximum working load on the load cells.

6. With system running, set the following adjustments for optimum performance:

- a. INTERNAL TENSION (5RH) or EXTERNAL TENSION pot.
- b. HIGH-RANGE MAX. TENSION (6RH).
- c. EXTENSIBLE GAIN (8RH), RESPONSE (9RH), STABILITY (10RH) and DROOP (11RH).

7. For low range operation, apply 115 VAC/+24 VDC ON/OFF control as shown in the interconnection table and adjust the LOW SCALE MAX. TENSION adjustment (7RH) at the desired range.

8. For non-extensible material operation, apply 115 VAC/+24 VDC ON/OFF control as shown in the interconnection table and set the NON-EXTENSIBLE GAIN (12RH), RESPONSE (13RH), STABILITY (14RH) and DROOP (15RH) at the desired levels.

TROUBLESHOOTING

If other options have been installed, troubleshoot them thoroughly before discarding this option as faulty.

If the desired function can not be obtained, follow the steps below for troubleshooting:

1. Remove power from the drive and refer to the interconnection table; make sure all connections are correct.

2. Check fuse 1F on the LVDT version (-0141); replace if necessary.

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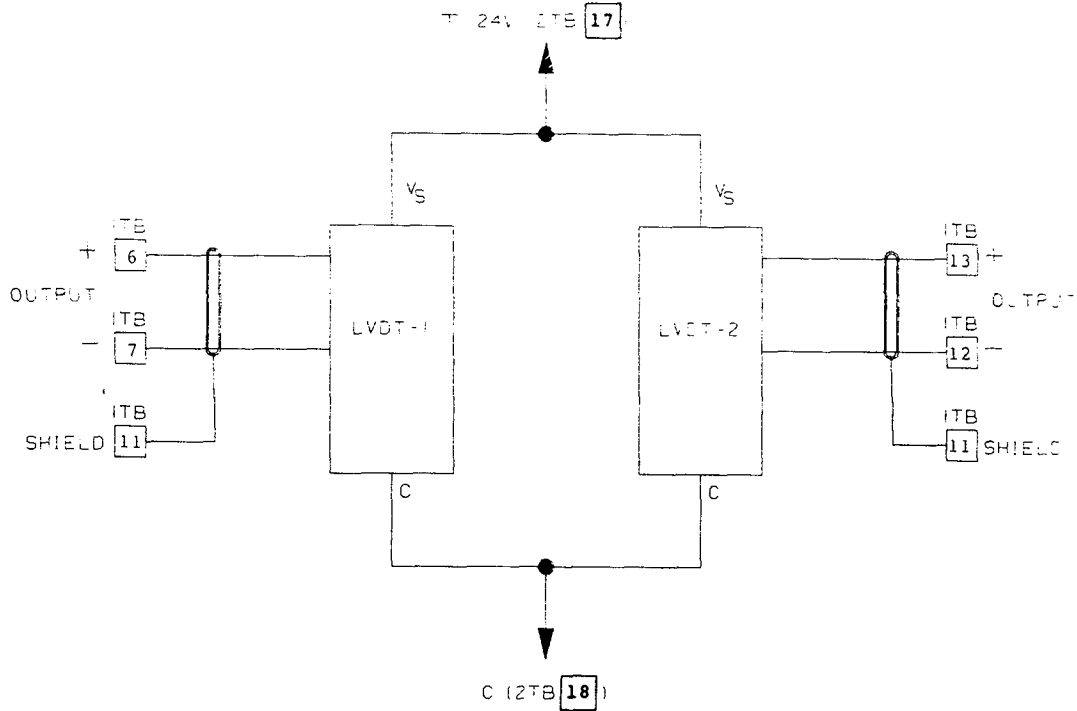


Figure 2. LVDT Transducer Connections (-0141)

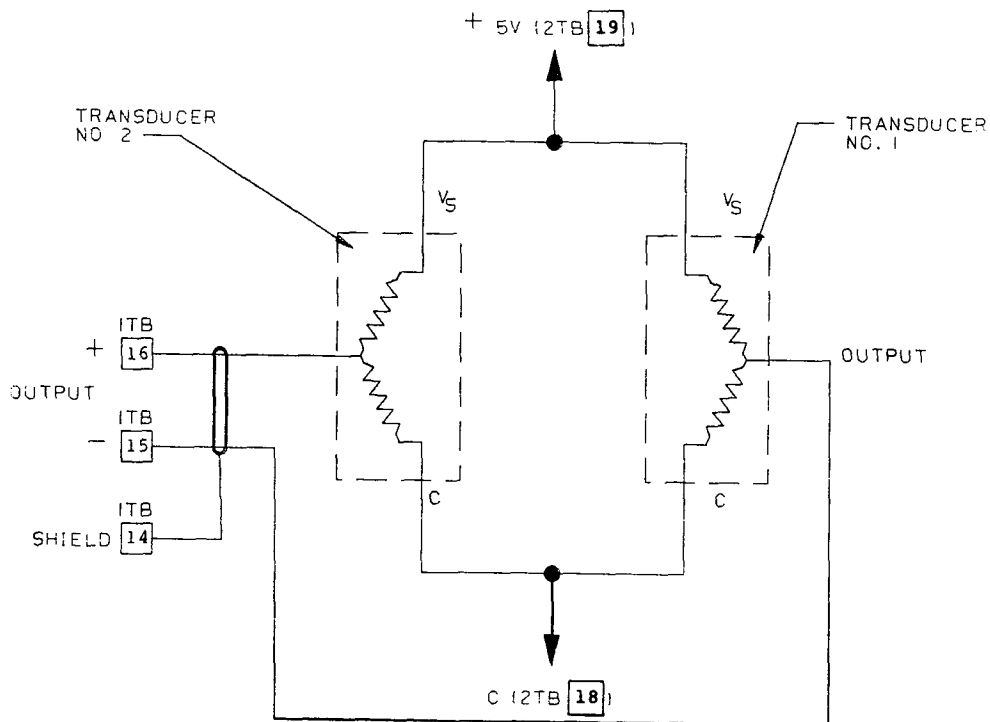


Figure 3. Strain Gage Transducer Connections (-1141)

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Table 1.

FROM	TO	REMARKS
For -0141 Version (See Figure 2)		
LVDT Supply	2TB(17)	+24 VDC Supply
LVDT Common	2TB(18)	Supply Common
LVDT-1 Output Signal	+ 1TB(16) - 1TB(17)	2-Conductor Shielded Cable
LVDT-2 Output Signal	+ 1TB(13) - 1TB(12)	2-Conductor Shielded Cable
LVDT Shields	1TB(11)	
For -1141 Version (See Figure 3)		
Strain Gage Supply	2TB(19)	+5 VDC Supply
Transducer Common	2TB(18)	Supply Common
Strain Gage Output	+ 1TB(16) - 1TB(15)	2-Conductor Shielded Cable Close 1SS(3) & 1SS(4) for 250mV gage. Open 1SS(3) & 1SS(4) for 10mV gage.
Strain Gage Shield	1TB(14)	
For Both Versions (See Schematic)		
Voltmeter	2TB(29)	
2TB(28)	2TB(29)	External Damping capacitor if required
0-2V Digital Meter	2TB(31)	Calibrated, install jumper from 2TB(21) to 2TB(30)

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Table 1. (Continued)

FROM	TO	REMARKS
1mA Tension Meter	2TB(30)	<p>Calibrated.</p> <p>Close 1SS(1) for low scale operation.</p> <p>Close 1SS(2) to increase meter damping.</p>
Meter Common	2TB(21)	
2TB(27)	2TB(26)	<p>External Stability capacitor and/or external push-to-reset circuit. (Push-to-reset is used to eliminate initial charges on stability capacitor)</p>
2TB(25)	2TB(24)	Jumper for Upstream measurement
2TB(25) 2TB(23)	2TB(22) 2TB(24)	Jumpers for Downstream measurement
Customer's External 5K TENSION Pot	<p>CW 1TB(9) Wiper 1TB(10) CCW 1TB(8) Shield 1TB(8)</p>	<p>3-Conductor shielded cable.</p> <p>5SS must be open</p> <p>If customer's external pot is not used, close 5SS for INTERNAL TENSION pot</p>
115 VAC/24 VDC ON/OFF Control for Non-extensible Materials	<p>+ 1TB(4) - 1TB(3)</p>	Jumper must be installed across 1R and 2R for 24 VDC ON/OFF control
115 VAC/24 VDC ON/OFF Control for Low Range Max. Tension	<p>+ 1TB(2) - 1TB(1)</p>	Jumper must be installed across 3R and 4R for 24 VDC ON/OFF control

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Table 2.

DESIGNATORS	ADJUSTMENTS	FUNCTION
On option I/O PCB		
1RH	LVDT BALANCE	Equalizes the two LVDT output signals.
2RH	TARE WEIGHT	Provides \pm bias to eliminate tare weight effect on the system.
3RH	SPAN	Sets the gain of transducer signals.
4RH	METER CALIBRATION	Sets the maximum indication on the meter with max. working load on load cells.
On option Adjust PCB		
5RH	INTERNAL TENSION	Sets the level of reference tension signal.
6RH	HIGH RANGE MAX TENSION	Sets the range of transducer feedback tension for high range operation.
7RH	LOW RANGE MAX TENSION	Sets the range of transducer feedback tension for low range operation.
8RH	EXTENSIBLE GAIN	Sets the gain of the difference between reference tension and transducer feedback tension for extensible materials.
9RH	EXTENSIBLE RESPONSE	Sets the RC time constant of the STABILITY CIRCUIT for extensible materials.
10RH	EXTENSIBLE STABILITY	Sets the amount of capacitor feedback on the STABILITY CIRCUIT for extensible materials.
11RH	EXTENSIBLE DROOP	Sets the amount of current injected into the speed node.
12RH	NON-EXTENSIBLE GAIN	As 8RH, but for non-extensible materials
13RH	NON-EXTENSIBLE RESPONSE	As 9RH, but for non-extensible materials.
14RH	NON-EXTENSIBLE STABILITY	As 10RH, but for non-extensible materials.
15RH	NON-EXTENSIBLE DROOP	As 11RH, but for non-extensible materials.

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3. Apply power to the drive and note that 1LED and 3LED immediately light. Measure the following supply voltages relative to common, 2TB-(18).

- +15 VDC $\pm 5\%$ at 7TP and 2TB-(20)
- 15 VDC $\pm 5\%$ at 9TP and 1TB-(5)
- +24 VDC $\pm 20\%$ at 2TB-(17) (LVDT version)
- +5 VDC $\pm 5\%$ at 2TB-(19) (Strain Gauge version)

4. Check for proper polarities at the load cell inputs by measuring voltages at 1TP, or 1TP and 2TP. The voltages should always be positive with load applied to the load cells. If not, correct wiring.

5. Remove the loadcell inputs from the option assembly. With SPAN adjustment (3RH) at 0% and TARE WEIGHT (2RH) at 100%, the voltage at 4TP should be -3.35 VDC $\pm 10\%$ on the LVDT version or -1.20 VDC $\pm 10\%$ on the Strain Gauge version.

6. Verify +3.35V $\pm 10\%$ or 1.20V $\pm 10\%$ is at 2TB(29) and 5TP. With HIGH RANGE MAX. TENSION (6RH) at 100%, EXTENSIBLE GAIN (8RH) and STABILITY (10RH) and EXTERNAL or INTERNAL TENSION (5RH) at 0%, the voltage at 6TP should be -4.47 VDC $\pm 10\%$ on the LVDT version or -1.60 VDC $\pm 10\%$ on the Strain Gauge version. The voltage at 2TB(25) should be +13 to 15 VDC.

7. Slowly turn TARE WEIGHT (2RH) CCW until voltage at 5TP is +2.00 VDC. Apply 115 VAC/+24 VDC ON/OFF control for LOW-RANGE MAX. TENSION: 4LED should be lit. With LOW RANGE MAX. TENSION (7RH) at 100%, voltage at 6TP is -7.30 VDC $\pm 10\%$.

8. Turn NON-EXTENSIBLE GAIN (12RH) to 0% and apply 115 VAC/+24 VDC ON/OFF control for NON-EXTENSIBLE: 2LED should be lit and voltage at 6TP is still -7.30 VDC $\pm 10\%$.

OPTION RECORDS

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

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