A. DESCRIPTION

1. AD-7530-1007

The AD-7530-1007 is a Linear DC Drive used for running a Model LA-1140-1030 Linear Actuator.

Features include automatic current limiting when the actuator is overloaded or mechanically stalled, a customer selectable motor speed clamp circuit, position limit switch circuitry where if a connection is opened between two terminals of the amplifier, the motor will cease to run in one direction and a Command Signal Bias circuit used to offset the zero level voltage input.

The amplifier accepts a 0-9Vdc Command Signal input at terminal 1 and compares it to the Feedback Signal input at terminal 2 (from a 1K ohm potentiometer in the actuator).

If the Command input voltage at terminal 1 is (-) with respect to terminal 2, the motor output voltage at terminal 22 will be (+) with respect to terminal 21 and the actuators output rack will extend. While the actuator is running with amplifier terminal 22 (+), light emitting diode LED 1 (near terminal 22 on the amplifier circuit board) will glow brighter than LED 2.

If the Command input voltage at terminal 1 is (+) with respect to terminal 2, the motor output voltage at terminal 22 will be (-) with respect to terminal 21 and the actuators output rack will retract. While the actuator is running with amplifier terminal 22 (-), light emitting diode LED 2 (near terminal 21 on the amplifier circuit board) will glow brighter than LED 1.

When the Command input voltage at terminal 1 is equal to the Feedback input voltage at terminal 2, the motor output voltage will be 0 Vdc and the motor stops running. LED 1 and LED 2 will both be turned on with equal intensity.

Limit Switch Circuitry (terminals 6,7 and 8) is provided to inhibit motor power when an end of travel limit switch is opened. Opening the circuit from terminal 7 to 6 inhibits motor output terminal 22 from going (+) with respect to terminal 21. Light emitting diode LED 5 (near terminal 7) will turn on at that time. Opening the circuit from terminal 8 to 6 inhibits motor output terminal 21 from going (+) with respect to terminal 22. Light emitting diode LED 6 (near terminal 8) will turn on at this time.

INPUT RESISTANCE

Between terminals 1 and 6 with terminal 2 connected to 6	30K ohm
Between terminals 2 and 6 with terminal 1 connected to 6	130K ohm
Between terminals 1 and 2	60K ohm

NULL OUTPUT

Voltage at terminal 3 at null	15 Vdc at 10K ohm
Voltage at terminal 3 away from null	.25V, sink up to 100mA

15 VOLT POWER SUPPLIES

Maximum current terminals 4 and 5	200mA

LIMIT SWITCH CIRCUIT

Open terminal voltage	terminal 7	+10 Vdc
	terminal 8	-10 Vdc
Current when shorted to terminal 6	terminal 7	10mA DC
	terminal 8	10mA DC

INPUT POWER

Between terminals 17 and 18 with terminal 19 the center tap	44V ac Rms at 180VA

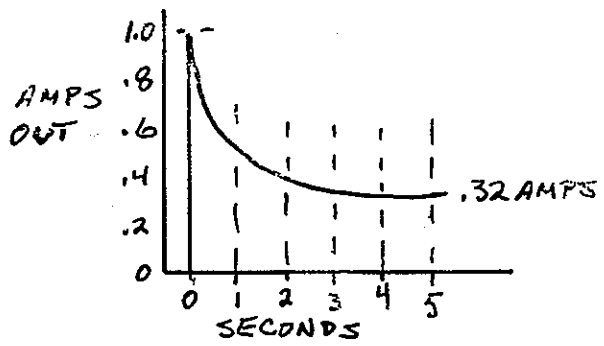
SPEED CLAMP

The Speed Clamp adjust pot is included on the top PC board.

Voltage necessary at terminal 10 to obtain 24Vdc armature voltage	8.0 Vdc
Maximum armature voltage with terminal 10 connected to 9	28 Vdc
Armature voltage range with terminal 10 connected to terminal 23, variable with speed clamp adjustment 7VR	0 to 28 Vdc

CURRENT LIMITING

The timing diagram shows current through terminals 22,21 when jumpered with a digital ammeter and there is a differential input.



The AD-7530-1007 Amplifier is a special modified version of the standard AD-7530 Amplifier and is intended to be used with a Model LA-1140-1030 Linear Actuator.

The modifications include:

Terminal 24	Command Bias
Terminal 23	Speed Control
Current Limit Shunt	7.25" long 33A-031247-001 (1 AMP)
9VR Adjusted	.32 AMP Hold Current

The Command Bias terminal 24 is connected to terminal 4 (+15Vdc) to create an offset to the 0Vdc Command Input Signal eliminating the need for a Zero Trim Adjustment. If the feedback potentiometer is adjusted for 50 ohms resistance at the 0Vdc Command position (retract) of the actuator, the only trim adjustment required is the HI Trim on the amplifier when the Command signal is 9.0 Vdc and the actuator is at the full extend position.

The Speed Control is used as a customer selected function. If terminal 10 is shorted to terminal 9, the actuator will operate at full speed. If terminal 10 is shorted to terminal 23, the maximum speed of the actuator can be adjusted with speed clamp pot 7VR to the desired actuator speed.

The Current Limit Shunt is used to limit the peak current output of the amplifiers armature output circuit to 1 AMP.

The adjustment of 9VR is used to set the holding current at .32 AMPS in the event of a stalled actuator condition. The armature current will drop to this level after a stall period of about 10 seconds.

Schematic 90B-031246

B. DESCRIPTION

2. LA-1140-1030

The LA-1140-1030 Linear Actuator is designed to push-pull a maximum load of 100 Lbs at a rate of 9 inches per minute. The output travel is limited to a full range stroke of 3.24 inches with the use of end of travel position limit switches. The output end of the actuators rack has an impact absorber which is a spring loaded device designed to deflect when the load on the output exceeds 100 Lbs push or pull. The intent of this device is to cushion the actuator power gearing and slowly stall the unit when operated with a model AD-7530-1007 Amplifier and the maximum output thrust is exceeded. The impact absorber is not intended to operate in the compression state during normal actuator operation, thru its 3.24 inch stroke of travel or at the ends of travel. The actuators end of travel position limit switches must be properly adjusted at final installation by the customer to insure they trip and remove motor power without compressing the shock absorber in either direction. When this actuator is operated with the AD-7530-1007 Amplifier, the shock absorber and the current limit circuit in the amplifier will allow for 125 push-pull compression cycles of the shock absorber without an actuator power gearing failure. Exceeding the 125 push-pull compression cycles will eventually destroy the actuators gearing.

SPECIFICATIONS
LA-1140-1030

Housing	Explosionproof
Maximum Thrust	100 LBS Push-Pull
Output Rack Speed	9" per minute
Output Stroke	3.24"
Full Stroke Shift Time	22 Seconds
Motor Voltage	24 Vdc
Motor Current	.40 AMPS at 100 LBS Thrust
	.10 AMPS with 100 LBS Aiding Load
Shock Absorber	Push-Pull starts deflecting at 100 LBS
Rack is Bellows Covered	
End Clevis is special	
Feedback	3 SPDT cam operated switches
	1000 ohm potentiometer

The actuator can withstand 125 Push-Pull cycles when the shock absorber is attached to a mechanical stop if operated with a Model AD-7530-1007 Amplifier.

LA-1140-1030
ACTUATOR ALIGNMENT

Refer to actuator wiring print 95B-031139
Refer to physical installation print 96B-030961

A) Apply motor power to actuator terminals 1 and 2 with proper polarity to drive the actuator to the 11.69 inch extended length position as shown on the physical installation print.

B) With the actuator at the extended position, adjust the cam (red) for position limit switch LS2 to open the circuit on terminals 8 to 9.

C) Apply motor power to drive the actuator to the retracted position.

D) With the actuator at the retracted position, adjust the cam (white) for position limit switch LS1 to open the circuit on terminals 6 to 7.

E) With the actuator at the retracted position, measure the feedback potentiometer resistance from termninal 3 to 4. The required resistance at this position is 50 ohms. If the resistance is not 50 ohms, loosen the potentiometer lock nut and rotate the body of the pot until 50 ohms is obtained. While holding the body in this position, tighten the lock nut.

F) Apply motor power to drive the actuator to the extended position. While the actuator is running, monitor the resistance from terminal 3 to 4. The resistance should increase in a linear fashion with no loss of reading. At the extended position the resistance reading should be approximately 860 ohms.

G) Apply motor power to drive the actuator to the retracted position. This is the position the actuator is to be at for shipping purposes and for installation.

AMPLIFIER/ACTUATOR CALIBRATION

A) Pre-align the actuator limit switches and feedback potentiometer as described in the LA-1140-1030 Actuator Alignment procedure.

B) Connect the Amplifier and Actuator as shown on Installation Wiring print 95B-031248. If the customer supplied limit switch circuit is not being used at this time, connect actuator terminals 6 and 9 to amplifier terminal 6, connect actuator terminal 7 to amplifier terminal 7 and connect actuator terminal 8 to amplifier terminal 8. Connect a jumper wire from terminal 10 to terminal 9.

C) Connect a variable 0 to 9.0 Vdc Command Signal to amplifier terminals 1 and 11 with terminal 1 being the (+). Adjust the Command Signal to 0.0 Vdc.

D) Apply power to the Input Transformer.

E) Slowly increase the Command Signal toward 9 Vdc. The actuator will drive toward the extend position. Adjust the "HI TRIM" pot on the amplifier to obtain the desired actuator extend position without tripping position limit switch LS2 (as indicated when LED 6 turns on). As a reference, the voltage from amplifier terminal 12 (+) to 11 (-) will be approximately 11.2 Vdc. The voltage from amplifier terminal 2 (+) to terminal 11 (-) will be approximately 9.56 Vdc. The voltage from amplifier terminal 1 (+) to 11 (-) should be 9.00 Vdc. The difference in voltages from terminal 2 to terminal 1 is a result of the Command Bias connection of terminal 24 to 4.

F) Decrease the Command Input toward 0.0 Vdc. The actuator will drive in the retract direction. When the Command is at 0.0 Vdc, the actuator will be at the fully retracted position. With proper alignment, position limit switch LS1 will not be tripped and LED 5 will not turn on. The voltage at amplifier terminal 1 should be 0.0 Vdc as measured to terminal 11 and the feedback voltage at terminal 2 will be about .56 Vdc due to the Command Bias connection.

G) Adjust the "GAIN" for the desired actuator response without causing oscillation at any position within the stroke range.

AMPLIFIER
CONVERSION INSTRUCTIONS
AD-7530-1006 to AD-7530-1007

A) Remove existing AD-7530-1006 Amplifier from service.
B) Locate SHUNT WIRE RESISTOR on top circuit board. Remove with the use of a 25 watt soldering iron.
C) Obtain a new SHUNT WIRE RESISTOR. JORDAN CONTROLS PART # 33A-031247-001
D) Solder the new shunt wire resistor onto the board in the same place as the old one was removed from.
E) Refer to INSTALLATION WIRING PRINT 95B-031248.

a) Connect the INPUT POWER TRANSFORMER. DO NOT TURN ON POWER.
b) CONNECT JUMPER WIRES TO AMPLIFIER TERMINALS:
Terminal 13 to 14
Terminal 15 to 16
Terminal 9 to 10
Terminal 6 to 7
Terminal 6 to 8
Terminal 2 to 11

F) Obtain a DC AMMETER (Digital perfered) and connect it across terminals 21, 22.
G) Connect terminal 1 to 4
H) While observing the dc ammeter, turn on input power.
The meter should read about 1 amp instantly and then the current will drop. After the current drops to a constant level, locate Current Limit pot 9VR on the bottom of the board and carefully adjust it until the meter reads .32 AMPS.