

AD-8100 & AD-8200 Servo Amplifiers

Table of Contents

General Information	2
Basic Models	3
Specifications	3
Installation Wiring	3
Setup & Calibration	4-6
Troubleshooting Guide	7
Typical Wiring Diagrams	8-12
AD-8130/EC-10835 Physical Layout	13
AD-8230/EC-10836 Physical Layout	14
Major Dimensions	15

WARNING

Failure to properly wire torque/thrust switches will result in actuator damage.

Refer to the specific wiring diagram supplied with your actuator for correct wiring.

Due to wide variations in the terminal numbering of actuator products, actual wiring of this device should follow the print supplied with the unit.

GENERAL INFORMATION

INTRODUCTION

Jordan Controls, Inc., designs, manufactures, and tests its products to meet many national and international standards. For these products to operate within their normal specifications, they must be properly installed and maintained. The following instructions must be followed and integrated with your safety program when installing, using, and maintaining Jordan Controls products:

- Read and save all instructions prior to installing, operating, and servicing this product.
- If you do not understand any of the instructions, contact your Jordan Controls representative for clarification.
- Follow all warnings, cautions, and instructions marked on, and supplied with, the product.
- Inform and educate personnel in the proper installation, operation, and maintenance of the product.
- Install equipment as specified in Jordan Controls installation instructions and per applicable local and national codes. Connect all products to the proper electrical sources.
- To ensure proper performance, use qualified personnel to install, operate, update, tune, and maintain the product.
- When replacement parts are required, ensure that the qualified service technician uses replacement parts specified by Jordan Controls. Substitutions may result in fire, electrical shock, other hazards, or improper equipment operation, and will void product warranty.
- Keep all product protective covers in place (except when installing, or when maintenance is being performed by qualified personnel), to prevent electrical shock, personal injury, or damage to the actuator.

WARNING - SHOCK HAZARD

Installation and servicing must be performed only by qualified personnel.

WARNING - ELECTROSTATIC DISCHARGE

This electronic control is static-sensitive. To protect the internal components from damage, never touch the printed circuit cards without using electrostatic discharge (ESD) control procedures.

RECEIVING/INSPECTION

Carefully inspect for shipping damage. Damage to the shipping carton is usually a good indication that it has received rough handling. Report all damage immediately to the freight carrier and Jordan Controls, Inc.

Unpack the product and information packet—taking care to save the shipping carton and any packing material should return be necessary. Verify that the items on the packing list or bill of lading agree with your own.

STORAGE

If the product will not be installed immediately, it should be stored in a clean, dry area where the ambient temperature is not less than -20° F, and is a non-corrosive environment.

EQUIPMENT RETURN

A Returned Goods authorization (RG) number is required to return any equipment for repair. This must be obtained from the Jordan Controls Service Department. (Telephone: 414/461-9200) The equipment must be shipped, freight prepaid, to the following address after the RG number is issued:

Jordan Controls, Inc.
5607 West Douglas Avenue
Milwaukee, Wisconsin 53218
Attn: Service Department

To facilitate quick return and handling of your equipment, include:

RG Number on outside of box
Your Company Name, Contact Person, Phone/Fax number
Address
Repair Purchase Order Number
Brief description of the problem

ABBREVIATIONS USED IN THIS MANUAL

AC	Alternating Current
DC	Direct Current
DIP	Dual Inline Package (switch)
Hz	Hertz
LED	Light Emitting Diode
LOS	Loss of Signal
mA	Milliamp
NC	No Connection
RG	Return of Goods
Vac	Volts ac
Vdc	Volts dc

GENERAL DESCRIPTION

The AD-8000 series of servo amplifiers are on/off triac output AC servo amplifiers suitable for operating a variety of Jordan Controls actuators. Standard features include on-board switch selectable command input for 0-5 Vdc, 0-10

Vdc, or 4-20mA; selectable loss of command signal operation; 4-20mA isolated output transmitter tracking actuator shaft position; dynamic motor braking; 120 or 240 Vac, 50/60 Hz. input power depending on actuator motor being used; and on-board LED's and adjustment pots for ease of set-up. The customer's command signal is isolated from both the ac line and the electric motor in the actuator.

In addition, the AD-8230 servo amplifiers features an isolated, "null" output for customer use. The amplifier will output line voltage AC, or half wave DC, when the actuator is stopped, or when running - selectable by the customer.

BASIC MODELS

AD-8130: For integral installation on all Jordan AC powered 1100, 1700, 2400 and 5100 Series actuators

AD-8130/EC-10835: For direct replacement of AD-8850 and AD-8860

AD-8230: For integral installation on all Jordan AC powered 1500, 1600 and 3330 Series actuators

AD-8230/EC-10836: For new installations requiring remote servo amplifier installation or for direct replacement of existing AD-8813, AD-8823, AD-8833 and AD-8843 series amplifiers. Also used as an integral amplifier with Jordan SM-5220 actuator.

AD-8230/EC-10842: For replacement of all AD-8210 and AD-8220 Series amplifiers. (Same as AD-8230, except with a wire harness and molex connectors)

SPECIFICATIONS

POWER:

Voltage Input: 120 or 240 Vac, 50 or 60 Hz, single phase
(Voltage input **must** match actuator motor voltage rating)

Power Consumption: less than 20 watts for amplifier functions only

Voltage Output: identical to voltage input
Current output: 10 amps maximum at 120 or 240 Vac
Fuse protection: customer supplied. Size based on actuator controlled, and local codes
Null output (AD-8230): rated 2 amperes @ 120 or 240 Vac, 50 or 60 Hz

COMMAND SIGNAL INPUTS, FIELD SELECTABLE:

4-20mA current command into a 200 ohm impedance
0 to 5 or 0 to 10 vdc voltage command into a 100,000 ohm impedance
1000 ohm potentiometer command is an option on the AD-8230/EC-10836 model only

POSITION FEEDBACK SIGNAL:

1000 ohm potentiometer
4 to 20mA (optional on AD-8230/EC-10836 models only)

POSITION SIGNAL OUTPUT: Isolated, 2 wire,
4 to 20mA signal

APPROXIMATE WEIGHTS:

AD-8130, AD-8230 & AD-8230/EC-10842 - 2 lbs. (0.9 kg)
AD-8130/EC-10835 & AD-8230/EC-10836 - 4 lbs. (2 kg)
with enclosure "E" - 25 lbs. (11 kg)
with enclosure "X" - 40 lbs. (18 kg)

INSTALLATION WIRING

Most installations locate the servo amplifier inside a Jordan actuator, for ease of mounting and to protect the amplifier.

This is the preferred mounting arrangement. For remote mounting, the servo amplifier and actuator should be as close to each other as possible.

Ensure all connections are correct and tight before applying power. Power, command signal, feedback signal, and motor output are the minimum required connections. To connect optional features for electromagnetic brake control or optional indicator lights, refer to the wiring diagram for the specific amplifier and actuator.

- All wiring should be done in accordance with prevailing codes by qualified personnel.

- Typical wiring diagrams are shown on pages 8 thru 12. **Actual wiring should follow the print supplied with the actuator.**
- Fusing must be installed in line power, and should be of the slow blow type.
- After installation, it is recommended that all conduits be sealed to prevent water damage.
- All low level signal wiring should be a shielded type with the shield grounded at source common.

SET-UP & CALIBRATION

When placing the amplifier and actuator into service, the amplifier must be calibrated for the application. The servo amplifier is supplied factory calibrated when ordered with a Jordan Actuator and should require only minor adjustment.

Read and follow the instructions carefully before attempting to make adjustments to the servo amplifier.

1. First, be sure that the line power to the actuator matches the actuator nameplate. Improper input voltage will cause the actuator to misperform. The amplifier voltage selector switch must be in the correct position for the motor voltage being used. Refer to the actuator nameplate for correct voltage to apply.

Operating voltage changes cannot be made simply by changing the position of the amplifier voltage switch.

2. Check connections. POWER SHOULD BE OFF. Check that the amplifier is properly mounted, that all connections to the actuator are in accordance with the correct Jordan Controls wiring diagram, and that the unit is properly grounded in accordance with all prevailing Electric Codes. Incorrect wiring may cause permanent damage to the servo amplifier and actuator. Verify that the command signal is connected to the proper terminals. Using a voltmeter, confirm that the command signal is present and properly polarized.

Dynamic braking is standard on this amplifier and, when used, reduces coasting and improves positioning accuracy by applying a braking action to the motor during stopping. Dynamic braking must be selected "on" or "off" prior to making any amplifier adjustments. The dynamic brake functions by energizing both motor windings for a fraction of a second. Select either "on" or "off" using the appropriate DIP switches.

3. Verify DIP switch settings. Refer to the DIP switch location and table on pages 5 and 6 for the specific amplifier being adjusted. Confirm that the switches are properly set for the intended application. For special applications not listed, consult factory. Incorrect DIP SWITCH settings will prevent proper operation. Check position of the null output jumper P1 and verify that it is in the correct position.
4. NOW APPLY POWER.
5. Set **HI TRIM** and **LO TRIM**. Apply command signal at minimum input value. For 4-20mA systems this would normally be 4mA. Adjust pot labeled **LO TRIM** to move actuator position to correspond with minimum desired position without actuating the end-of-travel limit switch. Next apply command signal at maximum input value. For 4-20mA systems this would normally be 20mA. Adjust pot labeled **HI TRIM** to move actuator position to correspond with maximum desired position without actuating the end-of-travel limit switch. Some interaction of the above pot settings will require repeating this procedure until proper accuracy is achieved.
6. Set **DEADBAND**. Deadband prevents unstable operation, or "hunting". The deadband pot is torque

sealed at the factory at 0.1% of the control signal span, and this setting will normally be satisfactory. Should the deadband need to be increased, counterclockwise rotation of the **DEADBAND** pot will increase the deadband, preventing "hunting". Clockwise rotation of the pot will decrease the deadband. **The correct setting is the point where no "hunting" is observed AND when both the green and yellow LED's go out when the actuator stops.**

CAUTION: The deadband must NEVER be adjusted to allow both the yellow and green LED's to be on at the same time. This will result in dangerous overheating and burnout.

7. Loss of signal. In the event of a loss of command signal ("LOS"), the servo amplifier can be programmed to either lock in place or go to a customer adjusted preset position. Loss of signal feature is only available when using 4-20mA command signal. This feature is normally factory supplied in the lock-in-place selection. A signal level below 3mA results in a loss of signal detection by the servo-amplifier. Refer to the DIP SWITCH chart on pages 5 and 6 to select desired operation. Then, with the servo amplifier in normal operation, apply a command signal below the minimum 3 mA position. If lock-in-place is selected the actuator should stop and the red LOS LED should light. If "move to preset" is selected, rotate the LOS pot until the actuator moves to the desired position and stops. Reapply and then remove the command signal several times to verify correct operation.
8. Loop powered 4-20mA transmitter. This amplifier is equipped with an on-board two wire transmitter that transmits the true actuator output shaft position and requires an external 12 to 36 Vdc power supply. Adjustment is as follows: Apply a command signal to the actuator at the minimum value. For 4-20mA systems this would normally be 4mA. After the actuator moves to position and stops, adjust the pot labeled **4mA** until the indicator displays 4mA. Then apply a 20mA command signal and wait for the actuator to move and stop. Then adjust the pot labeled **20mA** until the indicator displays 20mA. Repeat this procedure until the desired accuracy is achieved.
9. Switched null output: The AD-8230 is equipped with a TRIAC that will switch line voltage to a customer available connection. This feature may be used to operate a brake in the actuator or to light remote indicating lights. If used for an internal electromagnetic brake, proper adjustment and set-up was performed at the factory. For remote indicating lights, this feature can be configured for either AC or DC output, and to be ON when either the motor is running or when it is idle. A jumper on the printed circuit board indicates the output as AC or DC. Refer to the DIP SWITCH chart to select the output as either ON when the actuator is running, or ON when it is idle.

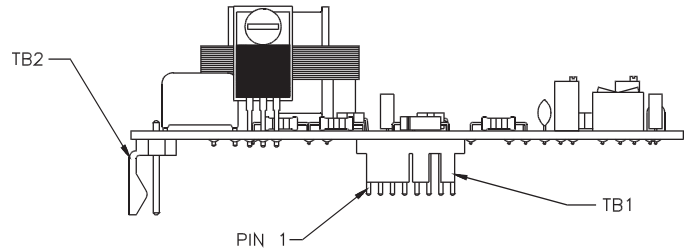
AD-8130 SET-UP AND CALIBRATION

SW2 DIP SWITCH TABLE

SWITCH	POSITION	FUNCTION
1	ON	0-5 VDC OR 4-20mA COMMAND INPUT
	OFF	0-10 VDC VOLTAGE COMMAND INPUT
2	ON	0-10 VDC OR 4-20mA COMMAND INPUT
	OFF	0-5 VDC VOLTAGE COMMAND INPUT
3	ON	LOSS OF SIGNAL - OFF
	OFF	LOSS OF SIGNAL - ON
4	ON	MOVE TO PRESET POSITION ON LOSS OF SIGNAL
	OFF	DO NOT MOVE TO PRESET ON LOSS OF SIGNAL
5	ON	LOCK IN PLACE ON LOSS OF SIGNAL
	OFF	DO NOT LOCK IN PLACE ON LOSS OF SIGNAL
6	ON	DYNAMIC BRAKE ON
	OFF	DYNAMIC BRAKE OFF
7	ON	0-5 OR 0-10 VOLTAGE COMMAND INPUT
	OFF	4-20mA COMMAND INPUT

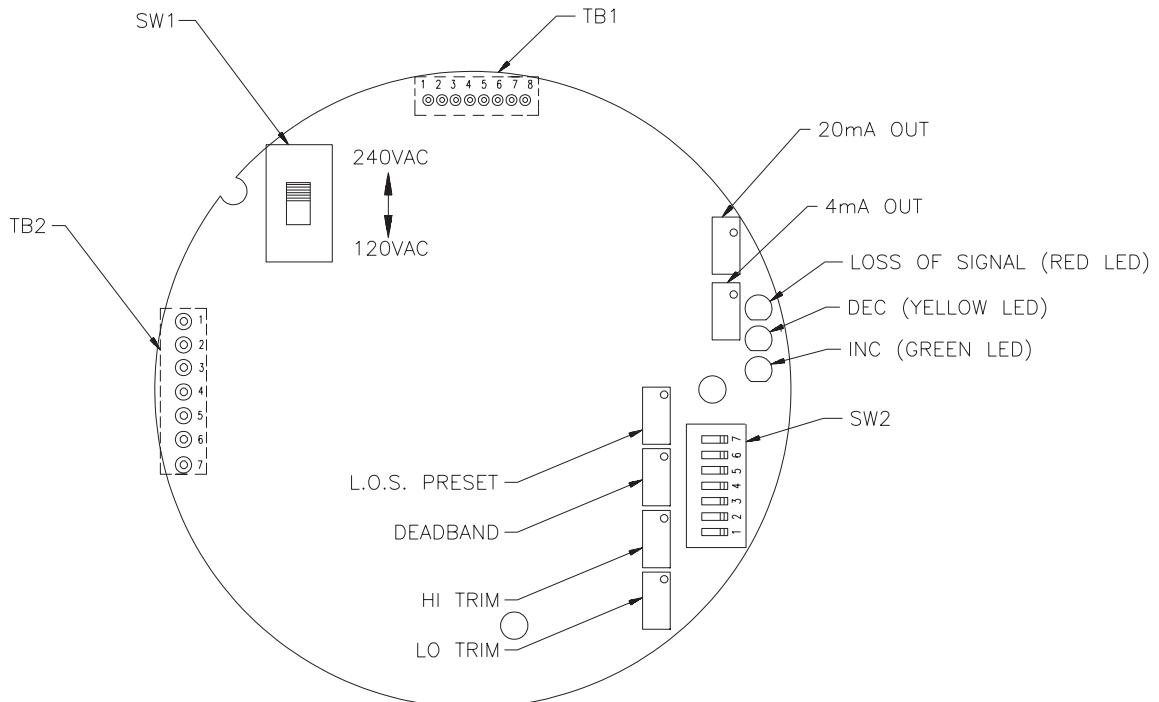
NOTE: When using loss of signal, if DIP switches 4 and 5 are in their on position, the loss of signal action will be lock in place.

COMPONENT SIDE



NOTE: When retrofitting the AD-8130 to replace models AD-8110 or AD-8120, note that the actuator mating connector for TB1 is a 6 pin connector that should engage pins 1 through 6 only. Pins 7 and 8 are 4-20mA outputs for new installations and are not used for replacements. (Note location of pin 1 on above drawing; pins are numbered left to right.) Contact factory if your connectors are located on the component side of the board.

COMPONENT LOCATION (Looking at component side of board)



AD-8230

SET-UP AND CALIBRATION

SW1 DIP SWITCH TABLE

SWITCH	POSITION	FUNCTION
1	ON	0-5 VDC OR 4-20mA COMMAND INPUT
	OFF	0-10 VDC VOLTAGE COMMAND INPUT
2	ON	0-10 VDC OR 4-20mA COMMAND INPUT
	OFF	0-5 VDC VOLTAGE COMMAND INPUT
3	ON	LOSS OF SIGNAL - OFF
	OFF	LOSS OF SIGNAL - ON
4	ON	MOVE TO PRESET ON LOSS OF SIGNAL
	OFF	DO NOT MOVE TO PRESET ON LOSS OF SIGNAL
5	ON	LOCK IN PLACE ON LOSS OF SIGNAL
	OFF	DO NOT LOCK IN PLACE ON LOSS OF SIGNAL
6	ON	DYNAMIC BRAKE ON
	OFF	DYNAMIC BRAKE OFF
7	ON	0-5 OR 0-10 VOLTAGE COMMAND INPUT
	OFF	4-20mA COMMAND INPUT
8	ON	NULL OUTPUT IS ON WHEN MOTOR IS RUNNING
	OFF*	NULL OUTPUT IS ON WHEN MOTOR IS IDLE
9	ON*	NULL OUTPUT IS ON WHEN MOTOR IS IDLE
	OFF	NULL OUTPUT IS ON WHEN MOTOR IS RUNNING

*Must be in these positions when used with 3330 model actuators.

ON-BOARD JUMPER SETTING CONTROLS NULL OUTPUT ONLY

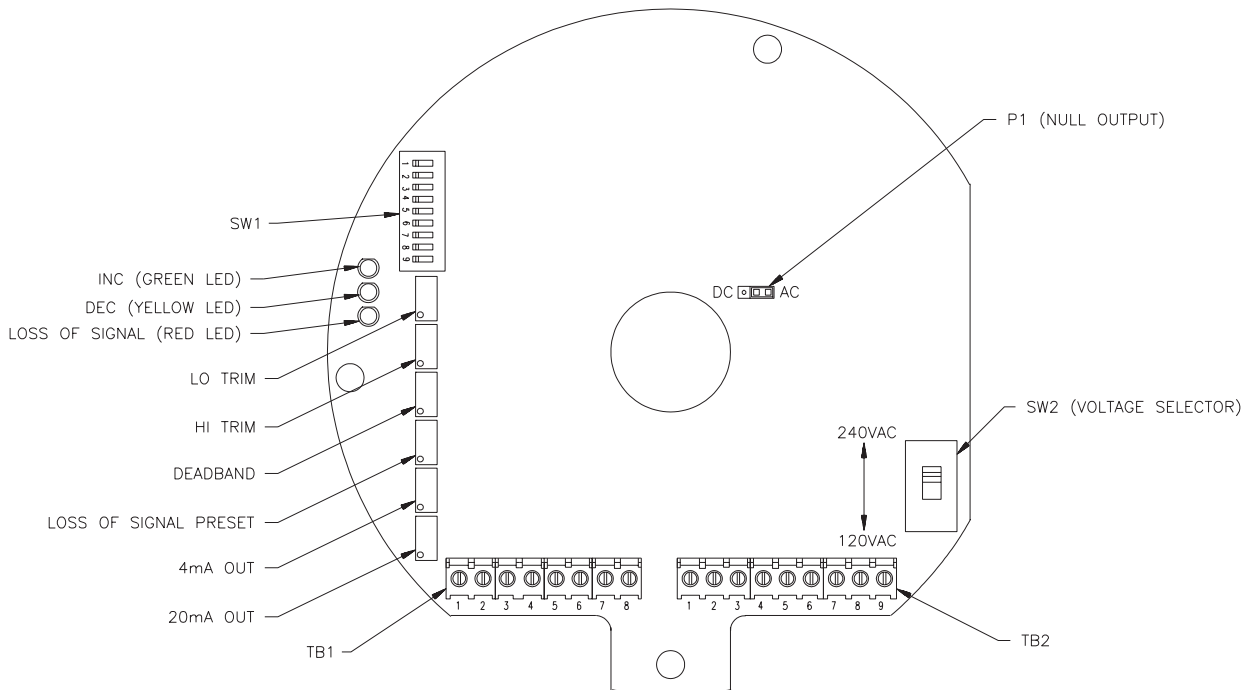
JUMPER POSITION	NULL OUTPUT RESULT
AC*	LINE VOLTAGE
DC	HALF WAVE dc

*Must be in ac position when used with 3330 model series actuator equipped with EC-10678 Brake Module.

Caution

Dip Switch 8 & 9 must be off when no connections are made to TB2-7 and TB2-8.

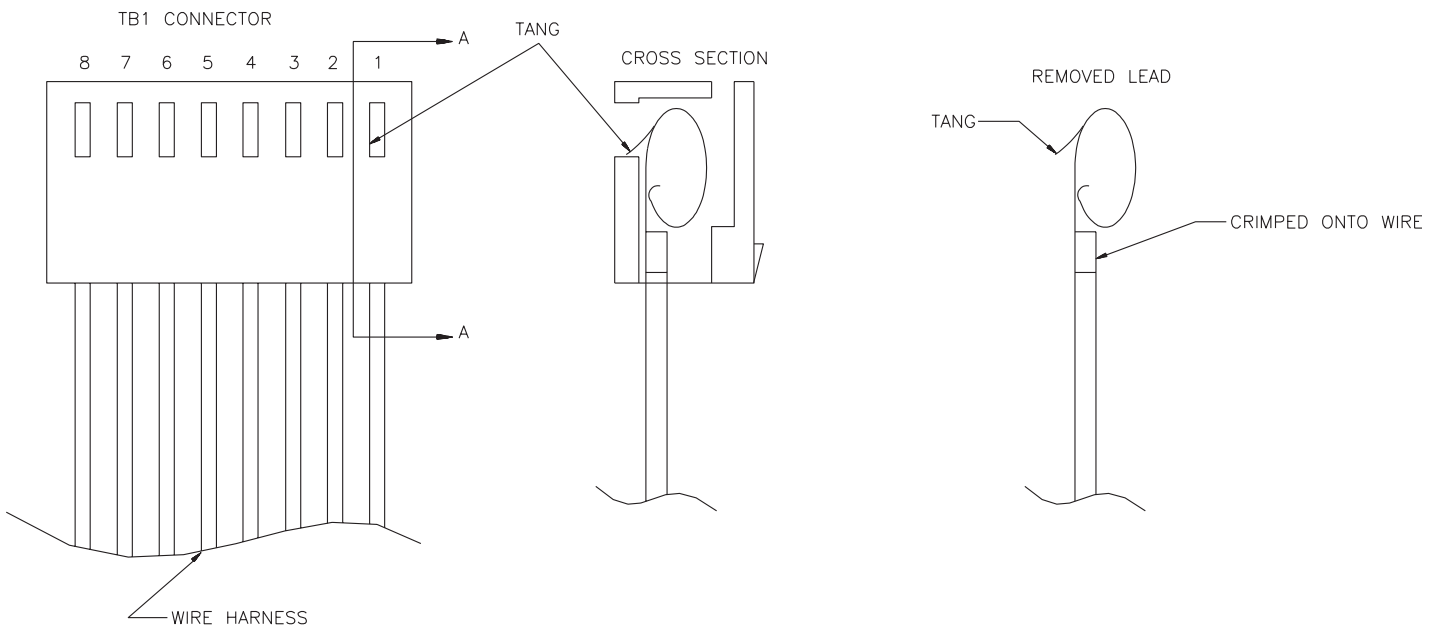
COMPONENT LOCATION (Looking at component side of board)



TROUBLESHOOTING GUIDE

TROUBLE	POSSIBLE CAUSE	REMEDY
1. Motor does not operate	a) No power to amplifier b) Amplifier is in Loss-of-Signal (LED3 is on) c) Amplifier deadband is too wide d) Actuator is wired incorrectly e) Amplifier is defective	a) Restore power b) Check command signal c) Reduce deadband setting d) Correct per wiring diagram e) Replace with new amplifier
2. Motor moves in only one direction	a) Motor and feedback potentiometer are out of phase or no control b) Amplifier is defective	a) For AD-8130, reverse potentiometer leads at TB1-4 & 6 molex connector (see illustration below); for AD-8230 reverse potentiometer leads at TB1-4 & 6 terminal strip b) Replace with new amplifier
3. LED's stay on around null or at null	a) Deadband is too narrow b) Command signal is too noisy	a) Increase deadband settings b) Shield command signal wires

AD-8130 MOLEX CONNECTOR (Shown larger than actual)

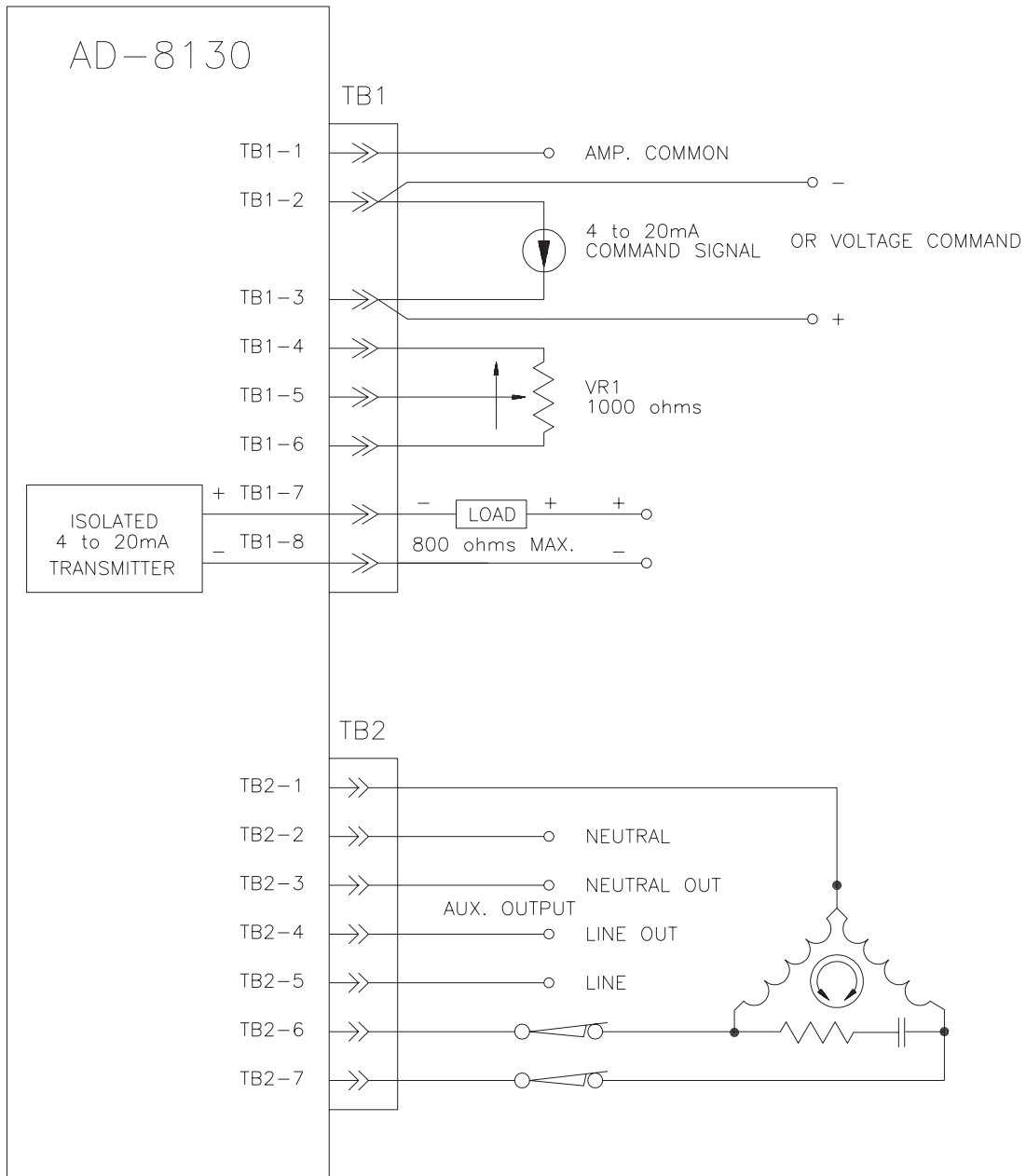


Procedure to change leads in molex connectors (AD-8130 only).

1. With a small screwdriver, depress tang in the small rectangular opening on the connector, and gently remove wires corresponding to pins 4 and 6. Note wire colors so they can be reversed in step 3.
2. Gently bend the tangs outward with a small screwdriver or knife blade to ensure they will lock tightly when reinserted into the connector block.
3. Reverse lead wire color from original location and reinsert back into the connector block.

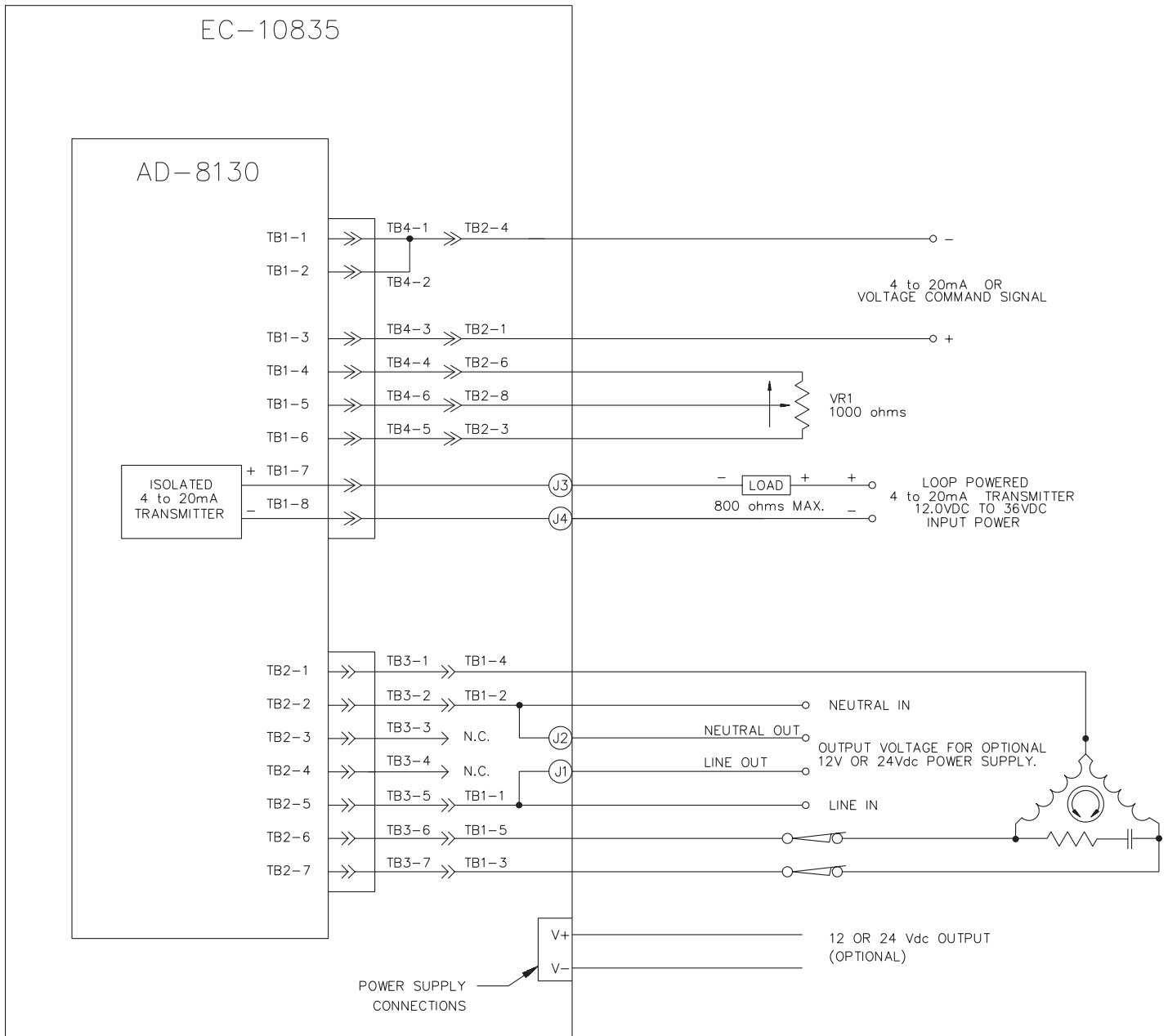
TYPICAL WIRING DIAGRAMS

AD-8130 INTERCONNECT WIRING



TYPICAL WIRING DIAGRAM

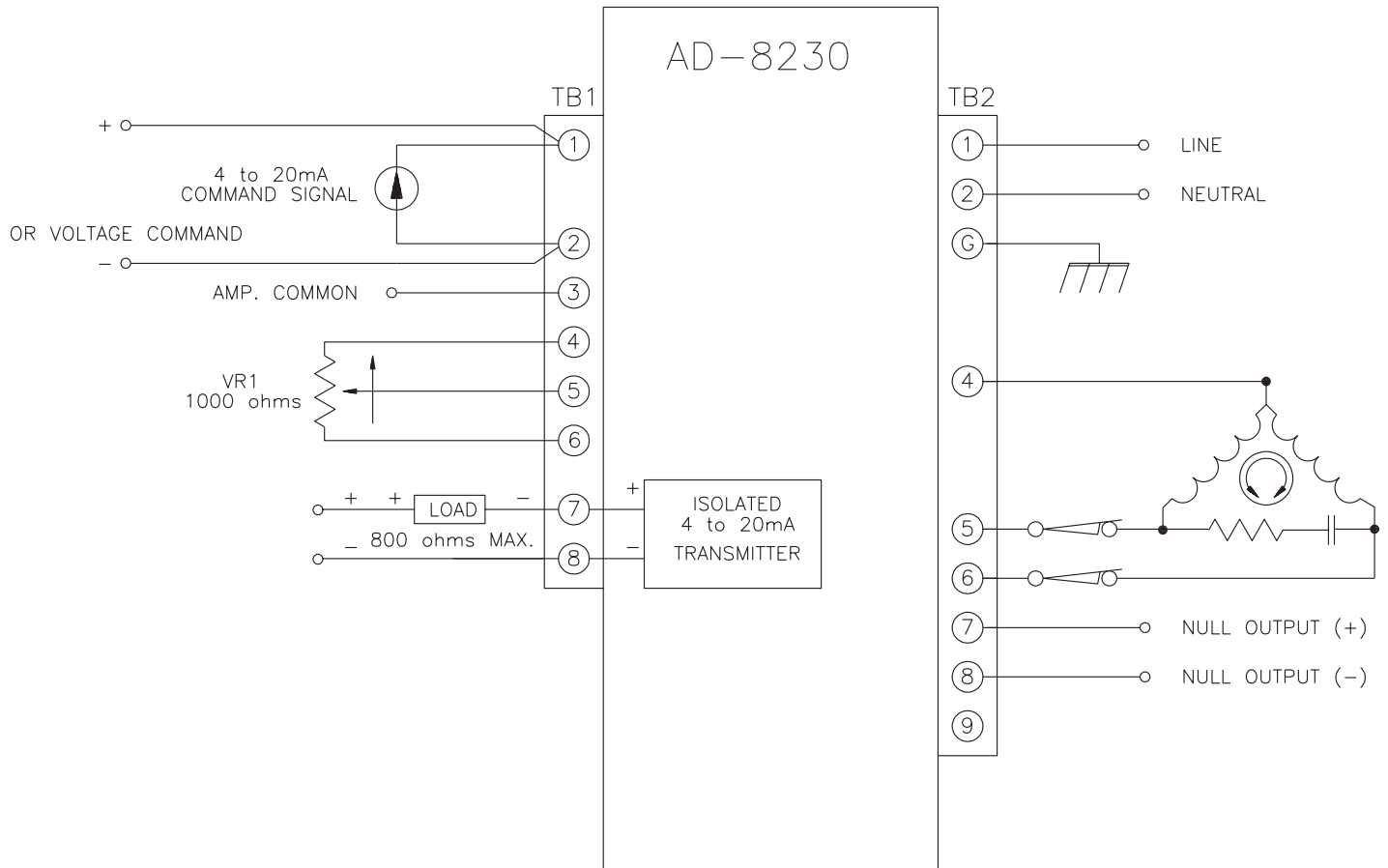
AD-8130/EC-10835 INTERCONNECT WIRING (REPLACEMENT FOR AD-8850 AND AD-8860)



N.C. = NO CONNECTION

TYPICAL WIRING DIAGRAM

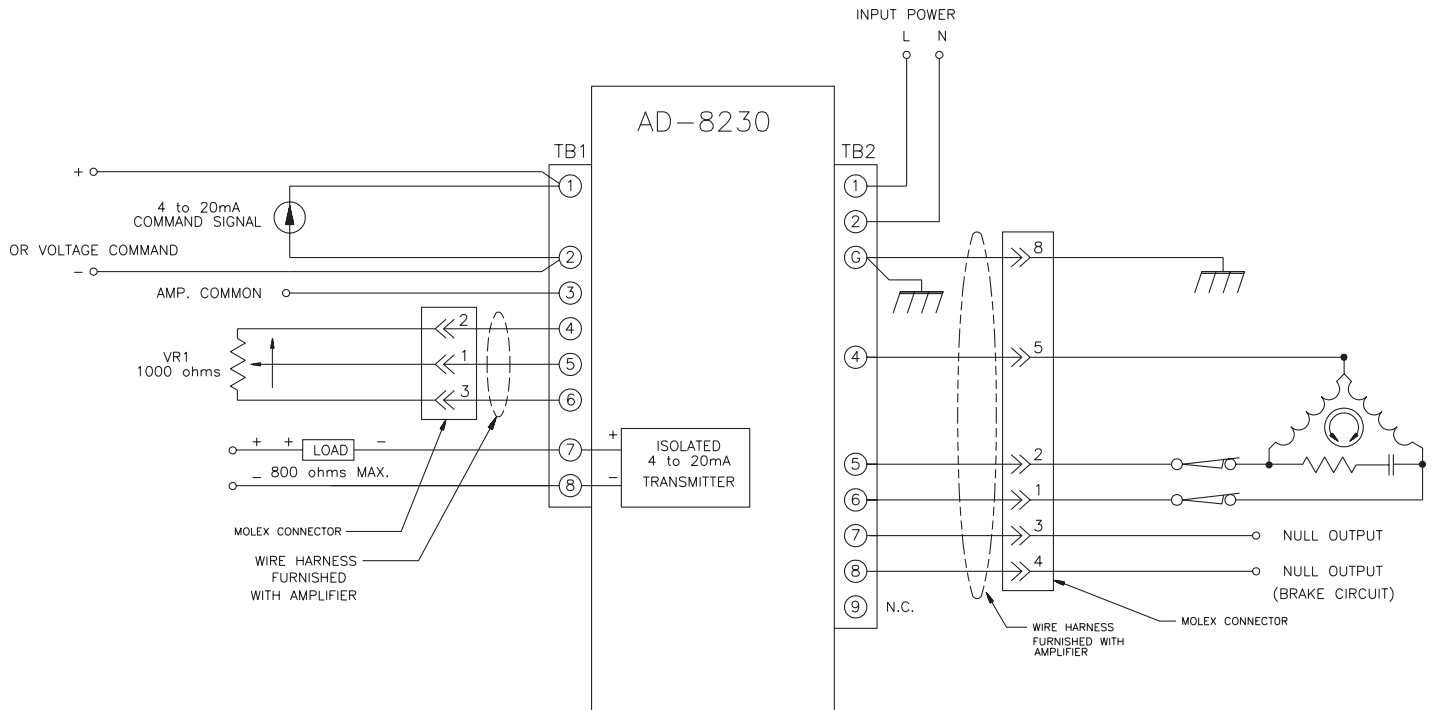
AD-8230 INTERCONNECT WIRING



TYPICAL WIRING DIAGRAM

AD-8230/EC-10842

(REPLACEMENT FOR AD-8210, AD-8220 AND AD-8210-1001)



NOTE: When replacing AD-8210 or AD-8220 with this amplifier, remove and relocate field wiring as follows:

AD-8210/AD-8220 TERMINAL	AD-8230 TERMINAL
1*	Move to TB1-8
3*	Move to TB1-7
4	Move to TB1-2
5	Move to TB1-1
6	None**
7	Move to TB2-3
8	Move to TB2-2
9	Move to TB2-1

*These terminals will only have field wiring when 4 to 20mA position feedback signal transmitter (ST-4130) is used.

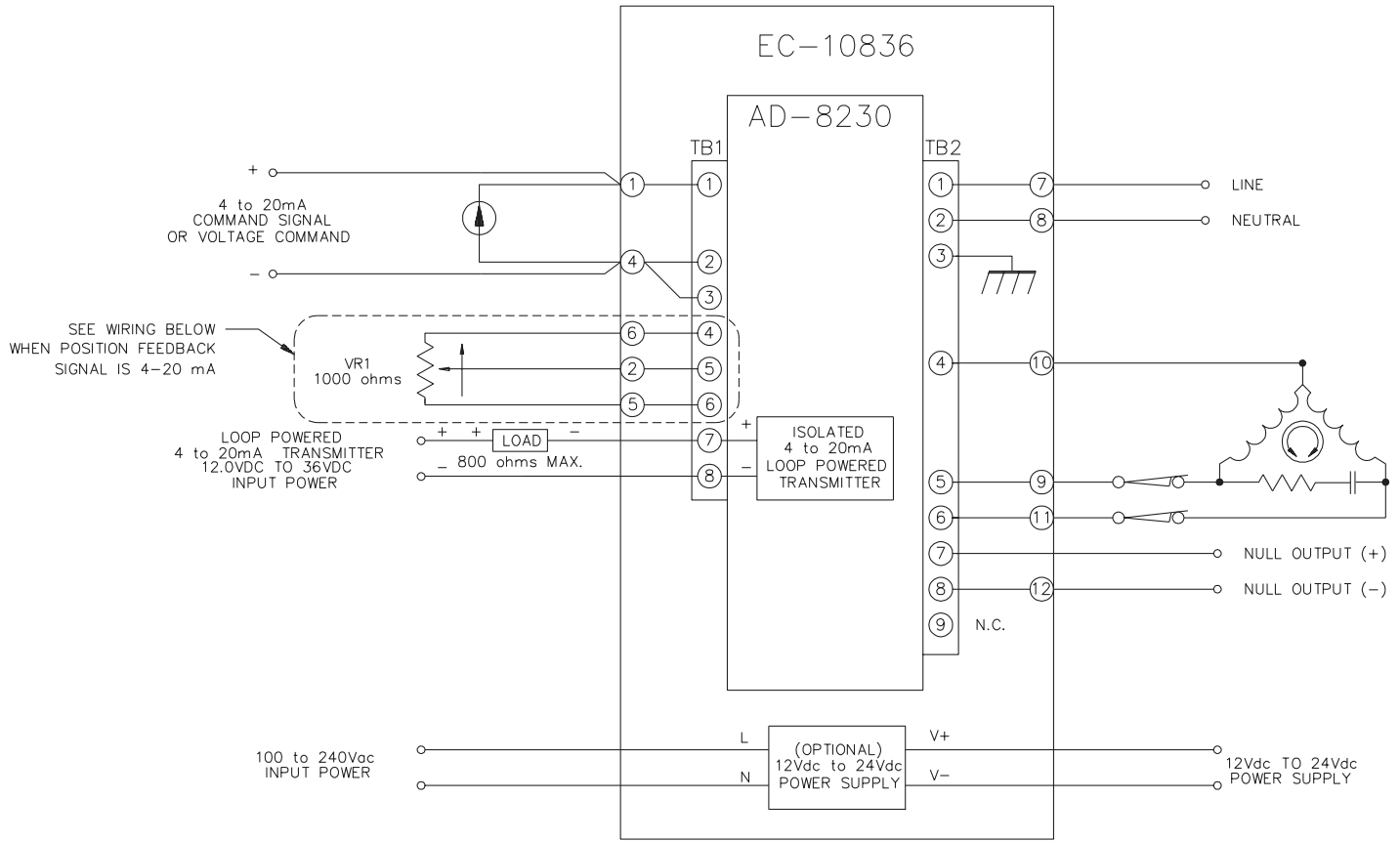
**Command signal ground shield should be grounded at source common and left "floating" at AD-8230.

TYPICAL WIRING DIAGRAMS

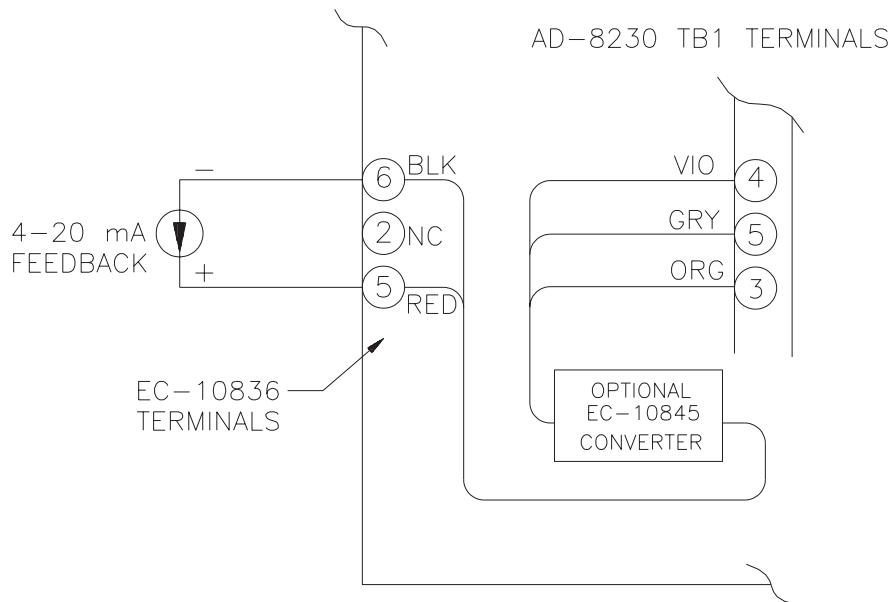
AD-8230/EC-10836

(REPLACEMENT FOR AD-8813, AD-8823, AD-8833 AND AD-8843)

(Also used as an integral amplifier in Jordan model SM-5220 actuators)

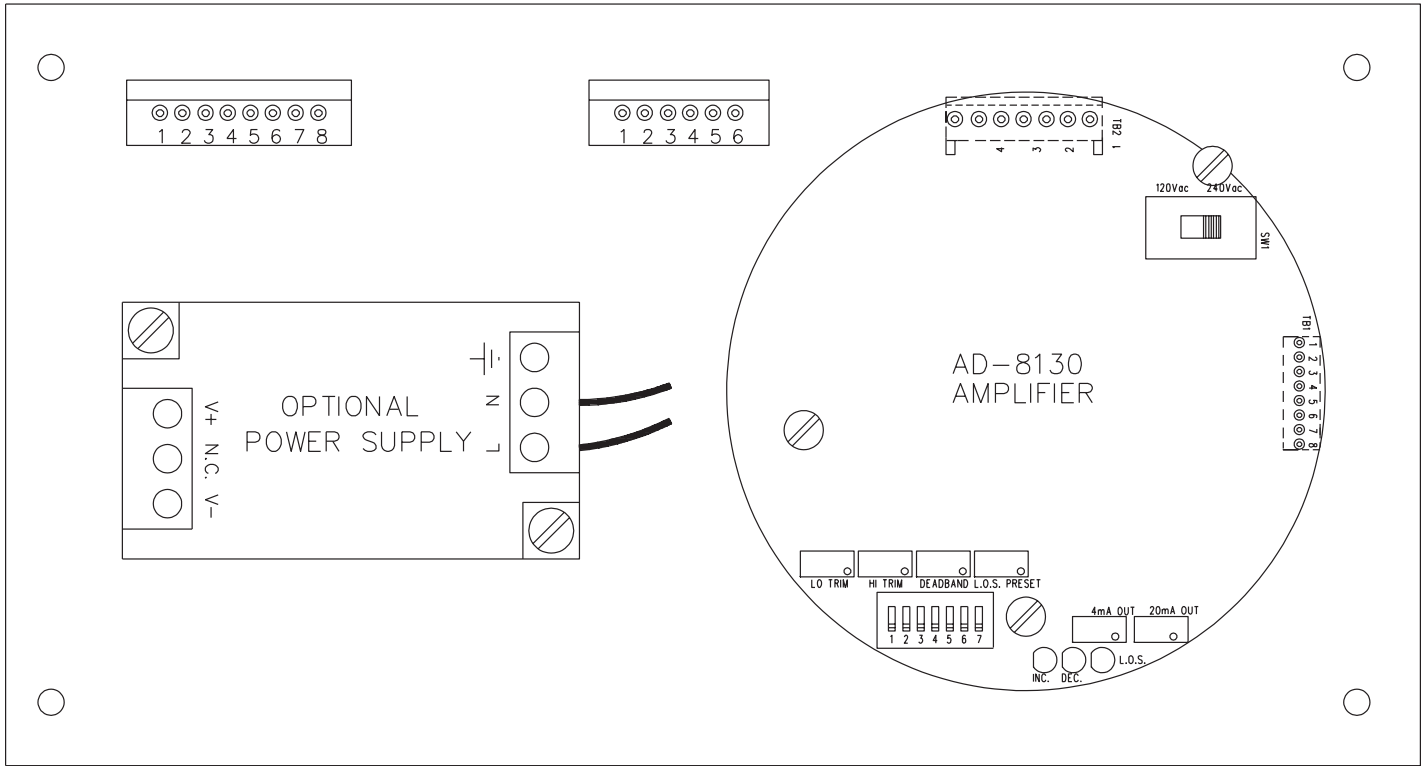


4 to 20mA POSITION FEEDBACK SIGNAL

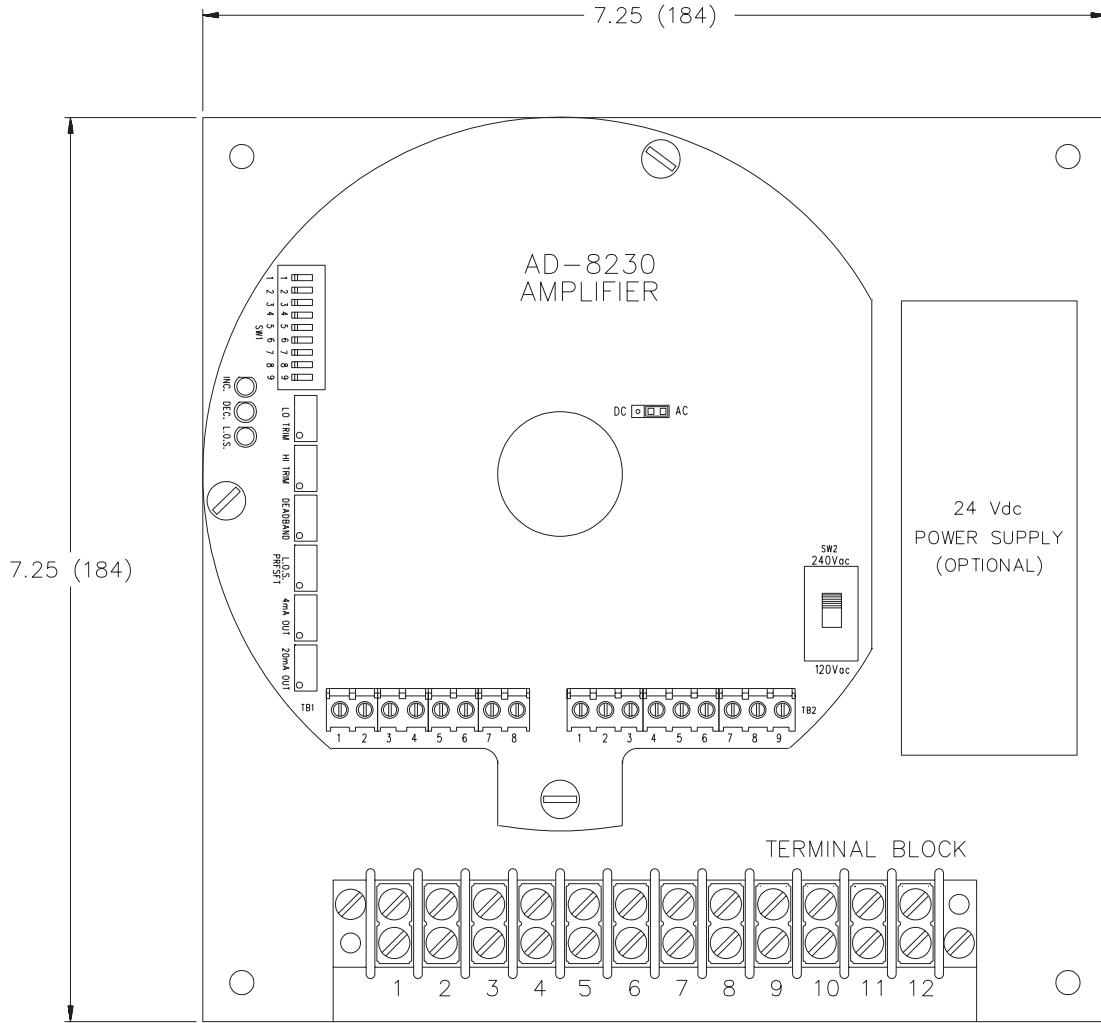


NOTE: The above diagram illustrates 4 to 20mA position feedback signal with customer supplied loop power. An optional 24 Vdc loop power supply is also available from Jordan. Refer to the wiring diagram furnished with the actuator for special calibration instructions when 4 to 20mA feedback is furnished.

AD-8130/EC-10835 PHYSICAL LAYOUT



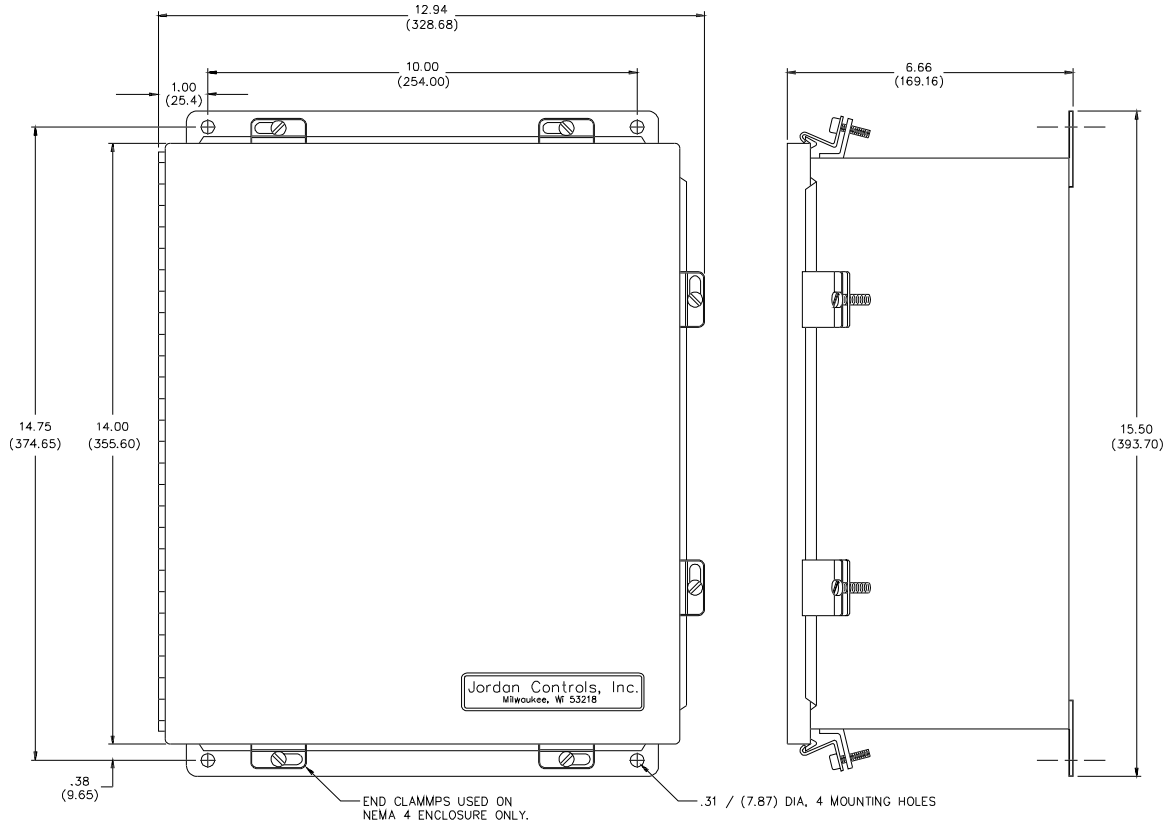
AD-8230/EC-10836 PHYSICAL LAYOUT



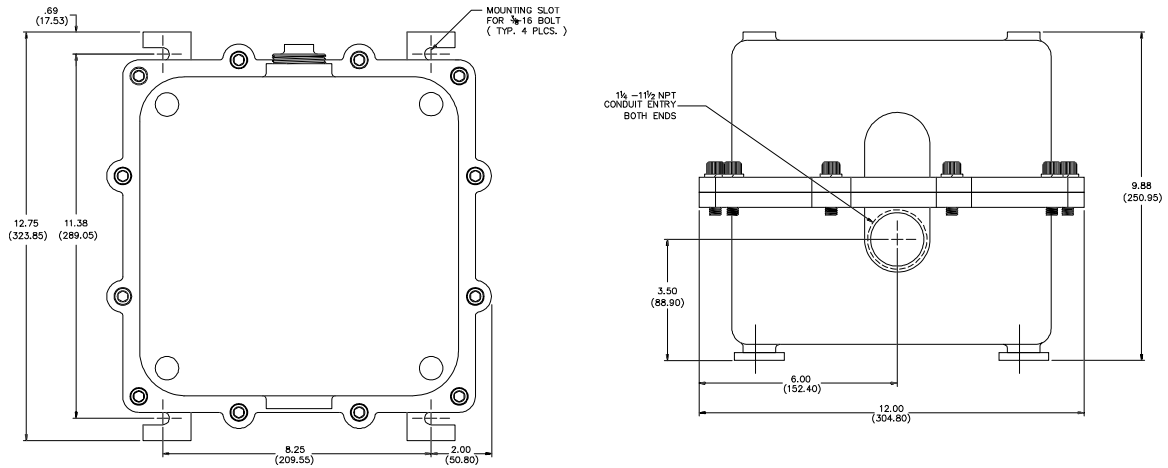
DIMENSIONS = INCHES (MILLIMETERS)

MAJOR DIMENSIONS

AD-8230/EC-10836 INSTALLED IN REMOTE ENCLOSURE



NEMA 7 & 9



The dimensions in this manual are subject to change without notice and should not be used for preparation of drawings or fabrication of installation mounting. Current installation dimension drawings are available upon request.

JORDAN CONTROLS, INC.
5607 West Douglas Avenue
Milwaukee, Wisconsin 53218
Phone: (414) 461-9200
FAX: (414) 461-1024
E-Mail: jordan@jordancontrols.com
www.jordancontrols.com
IM-0607 5/00

