

**EMP-2 Modulating Actuator
Installation Instructions**

SPECIFICATIONS

These actuators integrate an AE 504 paralleling relay, which allows an input resistance signal to drive the motor or slave actuator for damper control or valve control applications where it is desirable to move the crank arm in either direction, or to stop it at any point.

Ratings for Acuator

Electrical Ratings

120 Vac (+10% / -15%); 60 Hz

Power Consumption

78 VA

Electrical Connection

1/2" NPT conduit knockout

Auxiliary Switch Ratings

5.8 A Running; 34.8 A locked rotor

Ambient Temperature

-40°F to +136°F (-40°C to +58°C)

Environment and Mounting Position

NEMA Type 4; multipoised (best not to have shaft pointing downwards)

Approvals

UL Listed; CSA Certified  

Ratings for AE-504

Power

24 Vac, 50/60 Hz, 5VA, normally supplied from an actuator. Line voltage actuator must have built in transformer

Input Signal

100 to 135 ohm or 136-1000 ohm potentiometer. For use with 100 ohm internal feedback resistor.

Slave Actuating

Up to 3 actuators, each with AE-504. NOTE: For 1000 ohm input applications, the AE 504 still needs AM 332 (100 ohm external slidewire) for 100 ohm feedback.

Impedance

50 ohms @ 0Vac, 350 ohms @ 12 Vac

Ambient Temperature

-40°F to +136°F (-40°C to +58°C)

Environment

NEMA Type 1

Model #	Part #	Travel	Description	Timing (Seconds)	Torque (in.- lbs.)	Weight Lbs. (actual/shipping)
EMP-423-2	43158-2	90°	Fixed timing	12	60	9/10
EMP-424-2	43032-2	90°	Adjustable timing	12*	60	9/10
EMP-453-2	43033-2	90°	Fixed timing	40	220	9/10
EMP-454-2	43087-2	90°	Adjustable timing	40*	220	9/10

* up to ten times the set timing

ATTENTION

- Read these instructions carefully.
- Failure to follow them and/or improper installation may cause explosion, property damage and injuries.
- Installation must be done with the supervision of a licensed burner technician.
- The system must meet all applicable national and local code requirements such as but not limited to NFPA 70.
- Check the ratings in the specifications to make sure that they are suitable for your application.
- Never perform work if gas pressure or power is applied, or in the presence of an open flame.
- Once installed, perform a complete checkout.
- Label all wires prior to disconnection when servicing actuators. Wiring errors can cause improper and dangerous operation
- Verify proper operation after servicing.

WIRING

- Inspect unit before installing, look for broken parts or leaks.
- Disconnect all power to the actuator before wiring to prevent electrical shock and equipment damage.
- Do not exceed the electrical ratings given in the specifications and on the actuator.
- Attach a flexible 1/2" NPT conduit to the actuator.
- All connections to the line voltage side of the barrier (L1 and L2, 1, 5 and 6 terminals) must be made with Class 1 wiring.
- Connect the wiring to the appropriate terminals.
- Allow 6 inches (152mm) clearance above the actuator wiring compartment.



Do not apply line voltage to terminals "X", 2,3,4,7 or 8 or the motor will be permanently damaged.



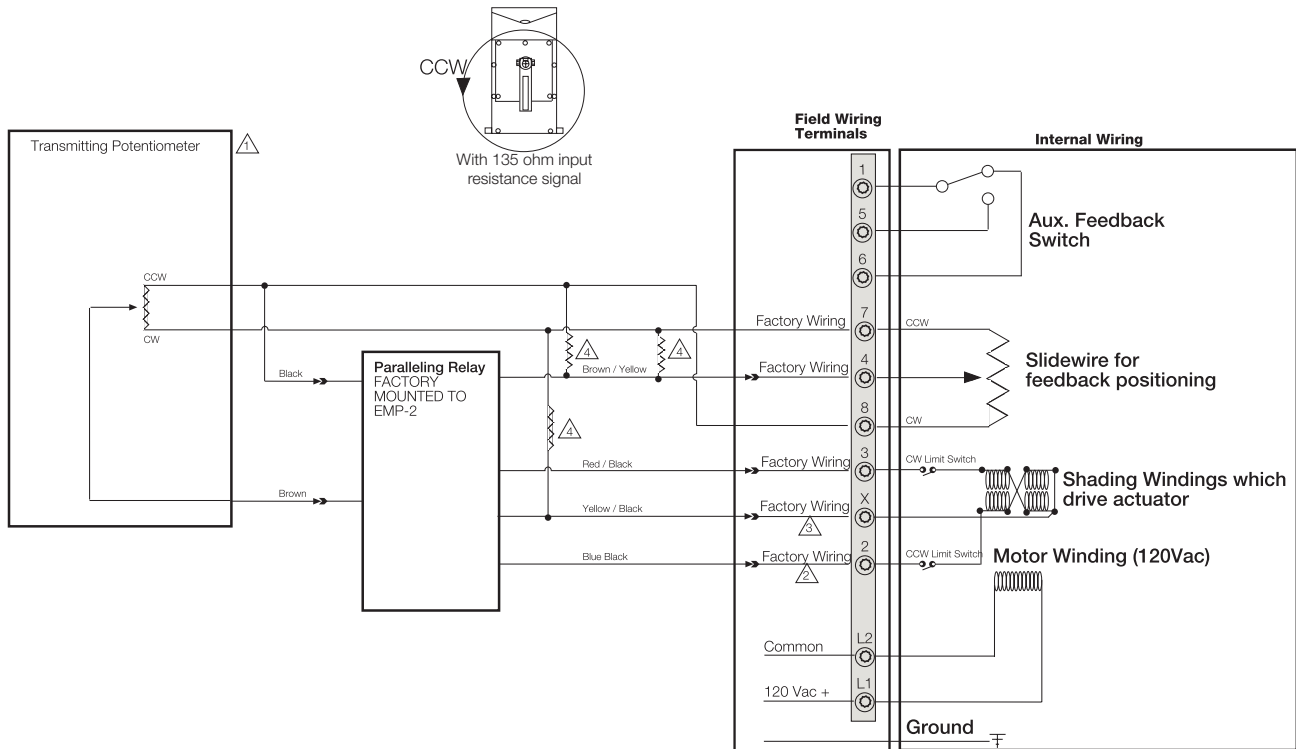
All wiring must comply with local electrical codes, ordinances and regulations.

Karl Dungs, inc.

524 Apollo Drive, Suite 10 Lino Lakes, MN 55014 U.S.A.

Phone: (651) 792-8912 Fax: (651) 792-8919 E-mail: info@karldungsusa.com

WIRING SCHEMATIC



- ⚠ Transmitting potentiometer typically AM-332 on actuator, manual potentiometer, or 135 ohm slidewire controller.
- ⚠ Shaft rotates CW
- ⚠ Shaft rotates CCW
- ⚠ Two 680 ohm 0.5 W resistors and a 50 ohm resistor for 24Vac actuators.

- This wiring diagram shows clockwise rotation to LOW fire, counterclockwise rotation to HIGH fire. As viewed from the front.
- Terminal # 1 is COMMON of the SPDT auxiliary switch
- Terminal # 5 is HIGH FIRE contact
- Terminal # 6 is LOW FIRE contact.
- Do NOT apply voltage across the slidewire .

ADJUSTMENT

Limit Switch

The counterclockwise limit switch is factory set to stop the actuator after 90° of travel. This setting can be changed in the field. To adjust the limit switch, removing the top metal cover, and locate the small opening next to the terminal block and positioned **between terminals 3 and 4**. Insert a flathead screwdriver through this opening and turn the cam clockwise as seen from the shaft end of the actuator to increase the degree of actuator rotation up to a maximum of 320°. Each click of the cam represents about 3° change in actuator rotation. Attempting to adjust for more than 320° rotation will result in both limit switches opening in the clockwise end of the actuator rotation, and the unit will no longer operate. The clockwise limit switch is fixed and cannot be field adjusted. **Do not adjust the limit switch beyond 90° unless the standard slidewire has been replaced with a 180° slidewire.**

Auxiliary Switch

An adjustable cam operated SPDT switch is built into each actuator. The switch is factory set to operate at the clockwise end of the actuator rotation, making terminal 1 to terminal 6. As the cam turns counterclockwise from this point, the cam follower drops, breaking 1 to 6 and making 1 to 5. To adjust the auxiliary switch, removing the top metal cover, and locate the small opening next to the terminal block and positioned **next to terminal 1**. Insert a flathead screwdriver through this opening and turning the disc clockwise as seen from shaft end of the actuator causes the switch to operate nearer the counterclockwise end of actuator rotation. Each click of the cam represents about 3° change in operating point. NOTE: After turning the disc, remove back plate and reposition the wiper; it will need to be repositioned back to zero.

Speed Adjustment (EMP-424-2 & EMP-454-2 only)

Actuator timing is varied by a slotted adjustment screw on the lower left side of the shaft (Models 424 & 454 only) housing. Turning the screw clockwise decreases the speed. If the adjustment screw is turned too far clockwise, the motor will stall but will not be damaged. If stalling occurs, turn the screw counterclockwise until the motor resumes operation. Total adjustment is normally 3-1/2 turns.

TESTING

Power the actuator with 120 Vac. Disconnect the field lead from terminal "X". Jumper actuator terminal "X" to terminal 2; the actuator shaft should turn clockwise. When the connection between terminals "X" and 2 is broken, the shaft should remain stationary.