

EXA Modulating E40, E50, E60 Valve Series

⚠ WARNING

Read these instructions carefully. Failure to follow them could result in a fire or explosion causing property damage, personal injury, or loss of life.

Service and/or installation must be performed by a trained, experienced service technician.

Disconnect power before installation to prevent electrical shock, equipment or control damage.

WHAT TO DO IF YOU SMELL GAS

1. Do not operate any appliance.
2. Do not touch any electrical switch; do not use any phone in your building.
3. Immediately evacuate the area and contact the gas supplier. Follow the gas supplier's instructions.
4. If you cannot reach the gas supplier, call the fire department.

⚠ WARNING

This control **must** be installed and operated **strictly** in accordance with the instructions of the OEM and with all applicable government codes and regulations, e.g. plumbing, mechanical, and electrical codes and practices. These instructions do not supersede OEM's installation or operating instructions.

DESCRIPTION

The E40(H), E50(H), E60(H) modulating valves are highly accurate and precise modulating control valves (see figure 1). EXA valves provide repeatable process control with minimal hysteresis throughout the entire range of modulation.

The EXA modulation system's high fire setting and low fire setting are user programmable.

The EXA modulating valve series has a built-in digital controller that provides a seamless interface with a process controller.

The valve has two (2) buttons and a communication LED for the user interface. The buttons are used to set high and low fire settings (see figure 4, page 4).

The valve has full open and full close (not gas tight) mechanical limits. The user can program settings that are within the valve's mechanical limits. This added dimension for sizing and applying the valve is an important feature. It allows the valve to be set up for an entirely different net output characteristic (dependent upon supply pressure) (see table 1, page 2).

There are six (6) electrical connections on the EXA valve. Two (2) are for power, two (2) are for the control signal, and two (2) are for position feedback (see figure 2, page 2).

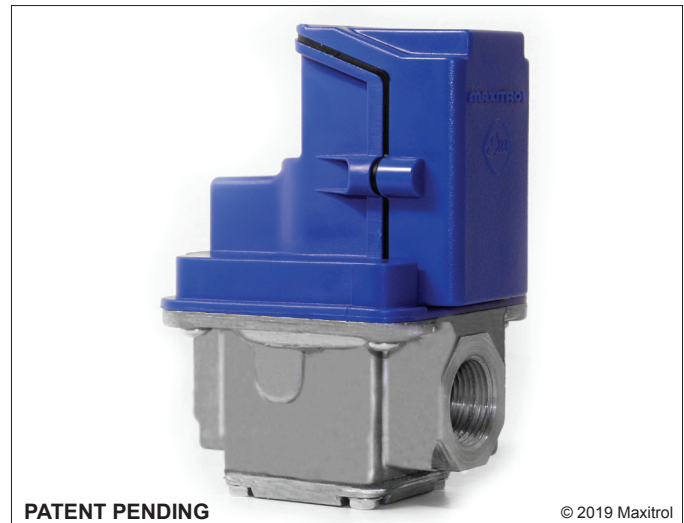


Figure 1: EXA Modulating Valve Series

SPECIFICATIONS

Maximum Inlet Pressure: 5 psig

NOTE: Up to 10 psig available, consult Maxitrol Company.

Power Requirements: 24 VAC/DC +/- 10% 50/60 hz

NOTE: The E40H, 50H, 60H use half-wave rectifiers.

When using a single transformer for powering the E40H, 50H, 60H and devices with half-wave rectifiers, the common for each must be connected to the same leg of the transformer. Control signal devices with full-wave bridge rectifiers require a separate transformer.

See "Power Supply Compatibility" bulletin.

Maximum Current Draw: 200mA

Temperature Limits: -40°F to 150°F operating

Control Signal (user selectable): 0-10 VDC, 2-10 VDC, 0-20 mA, 4-20 mA; 100KOhm Input Impedance

Mounting: Multipoise

Gases: Suitable for natural, manufactured, mixed gases, liquefied petroleum gases, and LP gas-air mixtures.

Certifications:

EMC (EN 61000:2001)

Immunity (EN 61000-6-2:2001)

Emissions (EN 61000-6-4:2001)

UL Recognized

CE

Enclosure: IP40

Electrical Connection: UL310

Sizes: E40: 3/8", 1/2" NPT or Rp ISO 7-1

E50: 1/2", 3/4" NPT or Rp ISO 7-1

E60: 3/4", 1" NPT or Rp ISO 7-1

SPECIFICATIONS CONTINUED

Sizing

Valve sizing and selection is based on the typical 1.0" w.c. pressure drop allowance at maximum flow rate. Using the sizing chart (table 1), find the closest flow rate which meets or exceeds the appliance's maximum modulated flow rate.

Table 1: Sizing Chart

Flow Capacity in Btu/h @ 1" Pressure Drop:		
Model	Nat Gas	LP
EXA40 (3/8")	190K	315K
EXA40 (1/2")	215K	355K
EXA50 (1/2")	385K	640K
EXA50 (3/4")	435K	725K
EXA60 (3/4")	670K	1115K
EXA60 (1")	780K	1300K

Control Signal

The control signal indicates a position within the valve's programmed range of modulation.

NOTE: Control signal is polarity sensitive. Connect control signal positive (+) to terminal 1 and control signal return (-) to terminal 2 (see table 2).

The control signal is "scaled" between the high and low fire setting of the valve. The minimum control signal will correspond to the programmed low fire setting, and the maximum control signal will correspond to the programmed high fire setting.

Table 2: Connection Table

Connection Table			
Terminal 1	Terminal 2	Terminal 3	Terminal 4
Signal (+)	Signal (-)	Power (+)	Power (-)

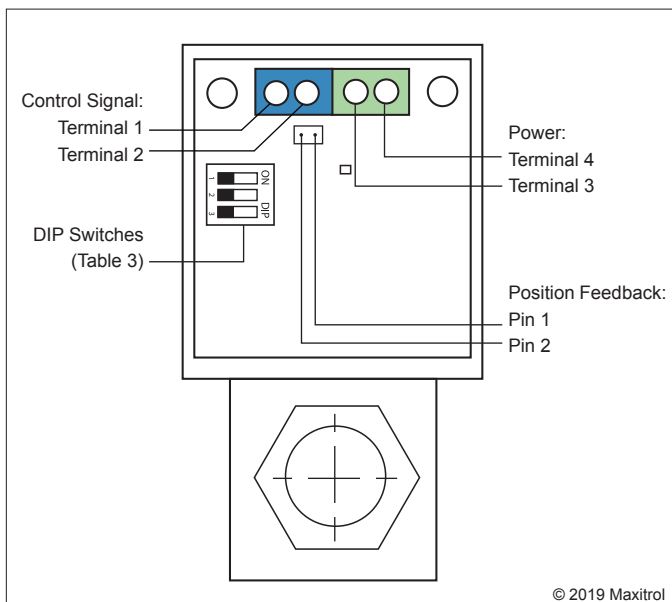


Figure 2: EXA Modulating Valve Series Connections

DIP Switches

A three (3) position DIP switch is located on the PCB (see Figure 2). Change the signal type and offset by changing the position of DIP switches. (For DIP switch position and corresponding current/voltage ranges, see Table 3).

Table 3: Dip Switch Position Table

DIP Switch Position Table			
Control Signal	SW1 Signal	SW2 Offset	SW3 Characteristic
0-10V	OFF	OFF	OFF
2-10V	OFF	ON	OFF
0-20 mA	ON	OFF	OFF
4-20 mA	ON	ON	OFF

POSITION FEEDBACK OUTPUT SPECIFICATION

The PWM output will give a feedback to correspond with the current valve position between the programmed minimum and maximum positions. The duty cycle range is always scaled from the programmed minimum to the programmed maximum position.

Frequency: 200 Hz \pm 1 Hz

Resolution: 9-bit (0.29% duty cycle)

Duty Cycle: 3% @ programmed minimum position
97% @ programmed maximum position

Output Impedance: 3.2 k Ω \pm 0.1 k Ω

Output High Voltage: 5.0 V nominal
5.25 V maximum

NOTE: Output high level varies with the load current at the PWM output.

Output Low Voltage: 0.0 V + 0.01 V
Pin 1: (+) positive polarity
Pin 2: (-) negative polarity
(see Figure 2)

Connection: TYCO MTA-100 or EQ.

NOTE: Optional pre-wired connector for control signal/power/feedback available. Contact Maxitrol Customer Service for details and availability.

EXA Modulating Valve Series

DIMENSIONS

NOTE: Dimensions are to be used only as an aid in designing clearance for the valve. Actual production dimensions may vary somewhat from those shown (see Table 4 and Figure 3).

Table 4: Dimensions

Model #	Swing Radius (SR)	Dimensions inches (millimeters)					
		A	B	C	D	E	F
EXA40	4.0 (102)	4.8 (122)	1.0 (26)	2.1 (54)	3.7 (94)	2.4 (61)	2.4 (61)
EXA50	4.3 (110)	5.5 (140)	1.3 (34)	3.4 (87)	3.7 (94)	3.3 (84)	2.4 (61)
EXA60	4.6 (117)	6.0 (153)	1.5 (39)	4.1 (105)	4.1 (105)	3.9 (100)	2.4 (61)

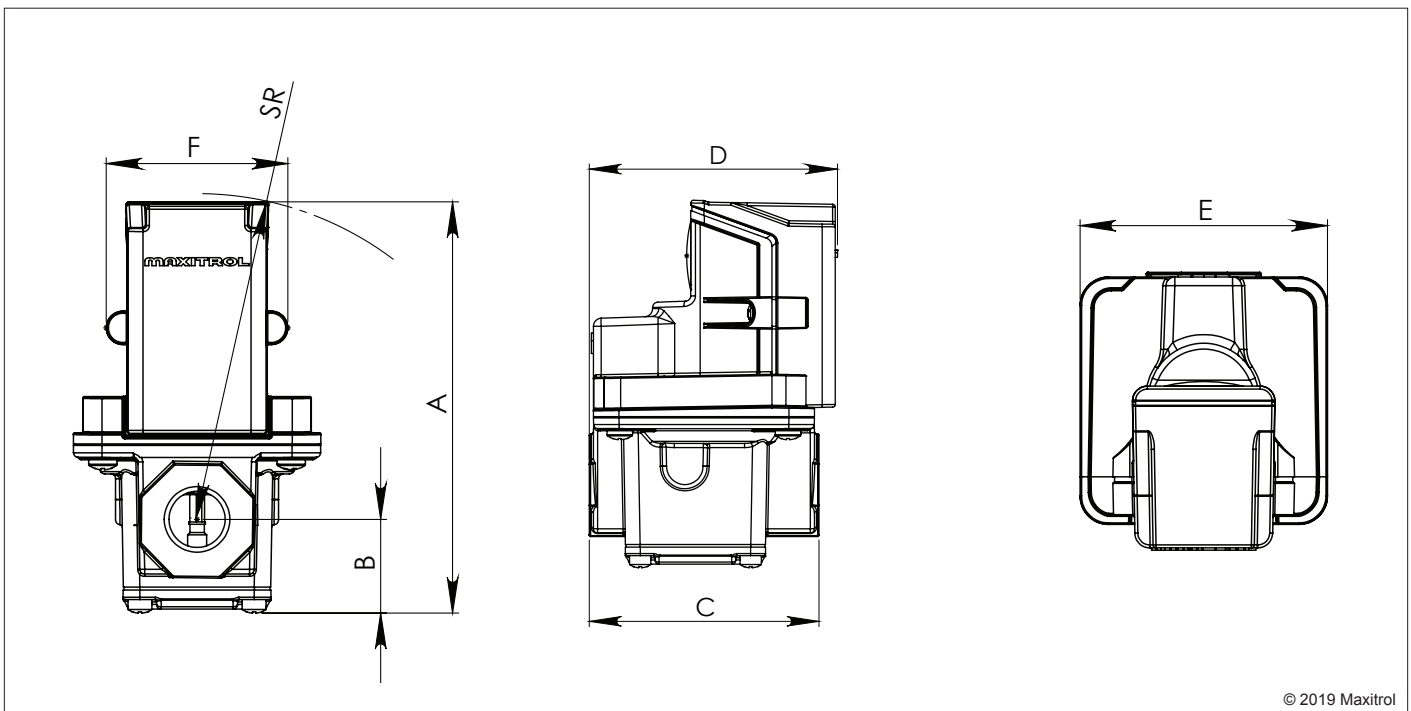


Figure 3: EXA Modulating Valve Series Dimensions

CONNECTIONS

- Step 1: Remove 2 screws holding cover.
- Step 2: Switch power and control signal off.
- Step 3: Connect switched OFF 24V (AC/DC) power source to terminals 3 and 4. Note polarity when using a DC power source or if one leg of an AC transformer secondary is externally grounded or is sharing power with another half-wave device (see figure 2, page 2).
- Step 4: Set DIP switches to match available control signal (see table 3, page 2).
- Step 5: Connect control signal to terminals 1 and 2. Observe polarity. Note that the return, or signal ground, must be connected to terminal 2 (see figure 2, page 2).
- Step 6: Switch power and control signal ON.
- Step 7: Set valve (see "Valve Setting" in section below).
- Step 8: Replace cover.

VALVE SETTING

The EXA STAR modulating valve series has two (2) buttons and a communication LED for the user interface. The buttons are used to set the valve for high and low fire settings (see figure 4).

1. High Fire Setting (LED will be solid red)
2. Low Fire Setting (LED will be blinking red)
3. Operating Mode (LED will be OFF)

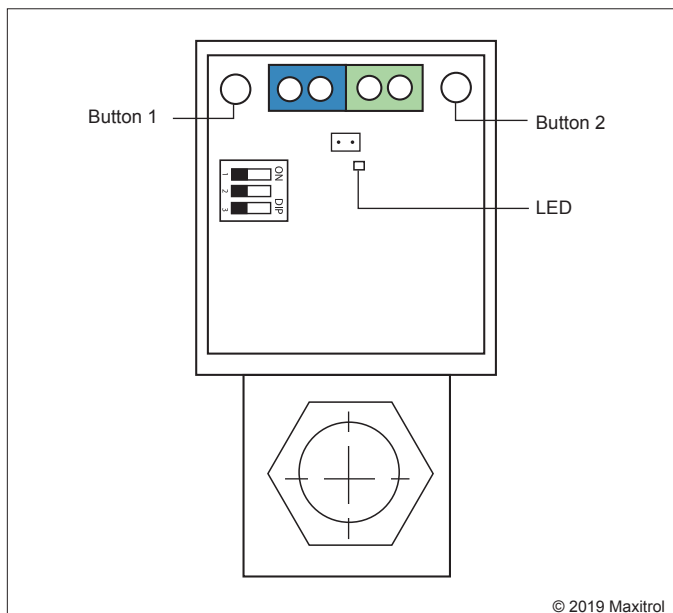


Figure 4: EXA Modulating Valve Series Adjustment Controls

HIGH FIRE SETTING - BUTTON #1

To enter the high fire setting mode, press and hold Button #1 until the LED lights solid red. Release. The valve is now in the high fire setting mode. Buttons #1 and #2 are used to set desired high fire setting.

To increase gas flow slowly, press button #1. Each button press will increase gas flow by the minimum available step size. To increase gas flow rapidly, hold button #1. Holding the button down allows the valve to auto step and eliminates the need to repeatedly press the button.

To decrease gas flow slowly, press button #2. Each button press will decrease gas flow by the minimum available step size. To decrease gas flow rapidly, hold button #2. Holding the button down allows the valve to auto step and eliminates the need to repeatedly press the button.

To save the high fire setting, simultaneously hold buttons #1 and #2 until the LED turns OFF.

NOTE: Controls left in any setting mode will default to the current settings and return to normal operating mode after 5 minutes of inactivity.

LOW FIRE SETTING - BUTTON #2

To enter into the low fire setting mode, press and hold Button #2 until the LED light blinks red. Release. The valve is now in the low fire setting mode. buttons #1 and #2 are used to set the desired low fire setting.

To decrease gas flow slowly, press button #2. Each button press will decrease gas flow by the minimum available step size. To decrease gas flow rapidly, hold button #2. Holding the button down allows the valve to auto step and eliminates the need to repeatedly press the button.

To increase gas flow slowly, press button #1. Each button press will increase gas flow by the minimum available step size. To increase gas flow rapidly, hold button #1. Holding the button down allows the valve to auto step and eliminates the need to repeatedly press the button.

To save the low fire setting, simultaneously hold Buttons #1 and #2 until the blinking LED turns OFF.

NOTE: Controls left in any setting mode will default to the current settings and return to normal operating mode after 5 minutes of inactivity.