MAXITROL®

EXA STAR Modulating Valve Series

OPERATING INSTRUCTIONS

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

SPECIFICATIONS

Maximum Inlet Pressure: 5 psig
NOTE: Up to 10 psig available, consult Maxitrol Company.

Power Requirements: 24VAC/DC +/- 10% 50/60hz
NOTE: The 24V power supply potential must be isolated from the control signal. For more information, see our Power Supply Compatibility Bulletin.

Maximum Current Draw: 200mA

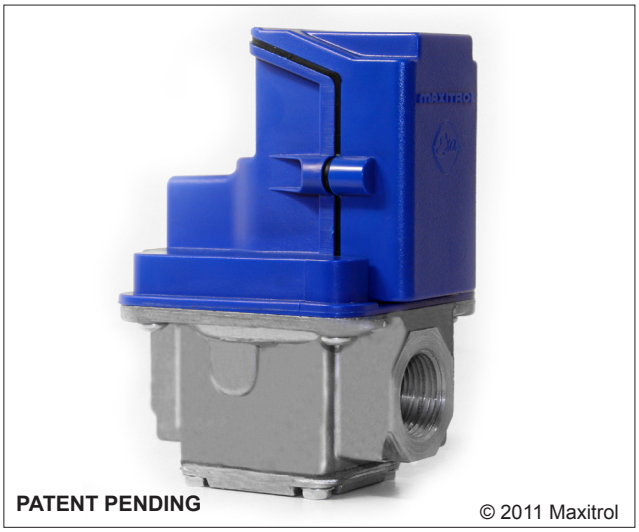

Figure 1: EXA STAR Modulating Valve Series

Temperature Limits: -40ºF to 150ºF operating

Control Signal (user selectable): 0-10VDC, 2-10VDC, 0-20mA, 4-20mA; 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: EXA40: 3/8", 1/2" NPT or Rp ISO 7-1
EXA50: 1/2", 3/4" NPT or Rp ISO 7-1
EXA60: 3/4", 1" NPT or Rp ISO 7-1

Table 1: Capacity

Capacity @ 1" Pressure Drop - 0.64 sp. gr. gas:	
EXA40 (3/8")	190 cfh
EXA40 (1/2")	215 cfh
EXA50 (1/2")	385 cfh
EXA50 (3/4")	435 cfh
EXA60 (3/4")	670 cfh
EXA60 (1")	780 cfh

DESCRIPTION CONTINUED

The EXA STAR 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 the valve for high and low fire settings (see Figure 4, page 4).

The valve has full open and full close 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 1).

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).

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 1 (+)	Power 2 (-)

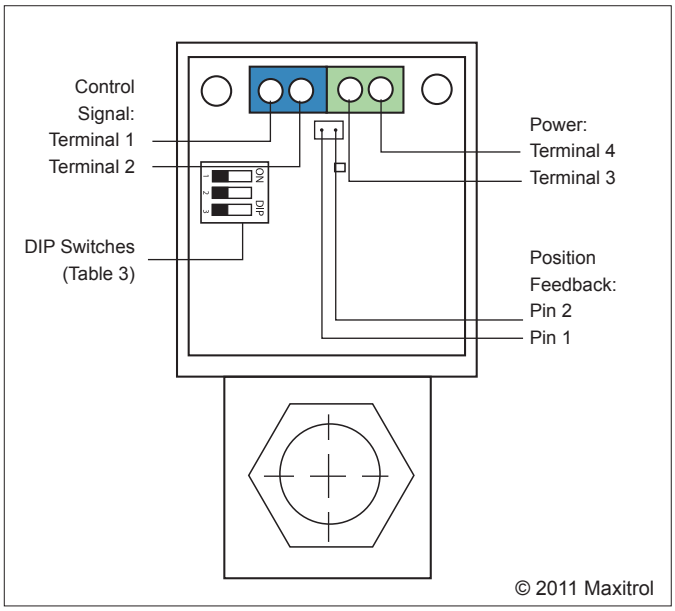

Figure 2: EXA STAR Modulating Valve Series Connections

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: 200Hz ± 1Hz

Resolution: 9-bit (0.29% duty cycle)

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

Output Impedance: 3.2kΩ ± 0.1kΩ

Output High Voltage: 5.0V nominal
5.25V maximum

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

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

Connection: TYCO MTA-100 or EQ.
(REF. 3-640442)

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 Figure 3 and Table 4).

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)

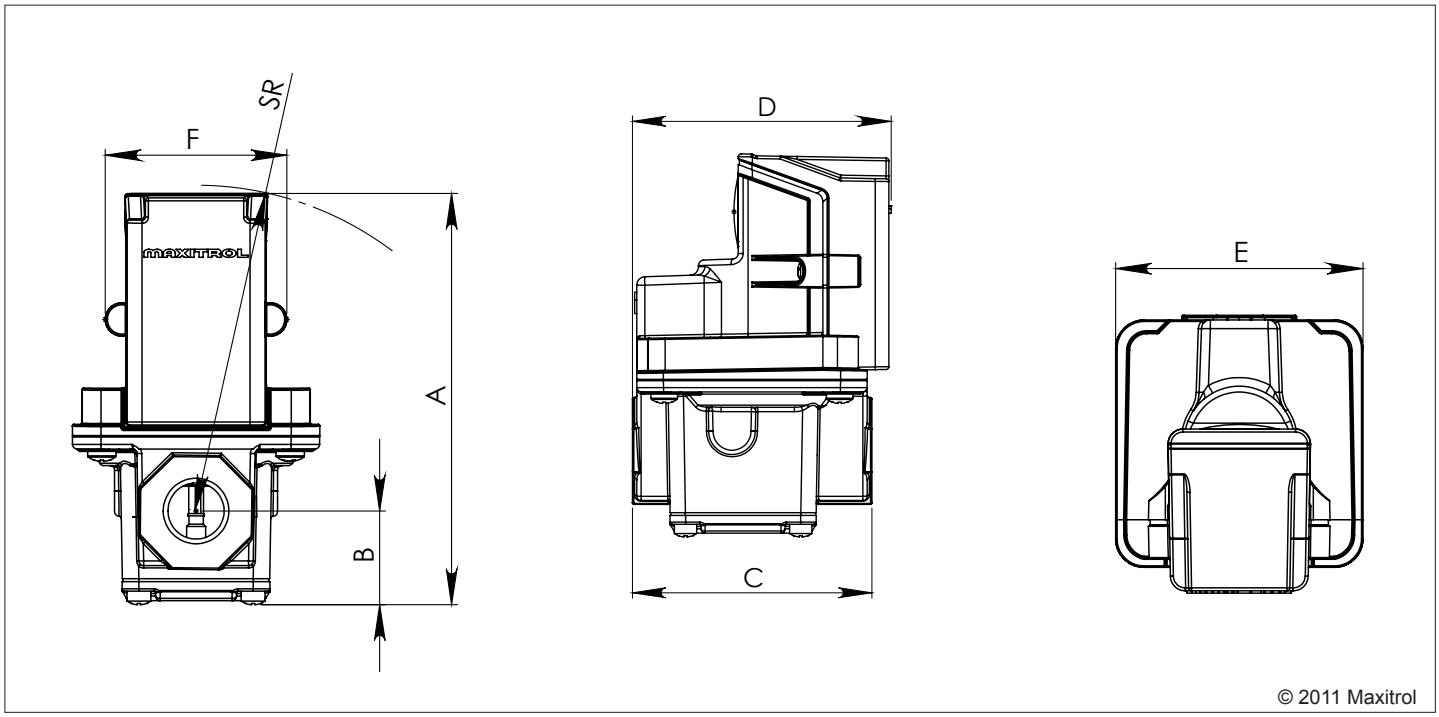

Figure 3: EXA STAR Modulating Valve Series Dimensions

CONNECTIONS

Step 1: Remove 2 screws holding cover.

Step 2: Connect switched OFF 24V (AC/DC) power source to terminals 3 and 4 (see Figure 2, page 2).

Step 3: Set DIP switches to match available control signal (see Table 3, page 2).

Step 4: Connect switched OFF 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 5: Switch power and control signal ON.

Step 6: Set valve (see “Valve Setting” in section below).

Step 7: 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)

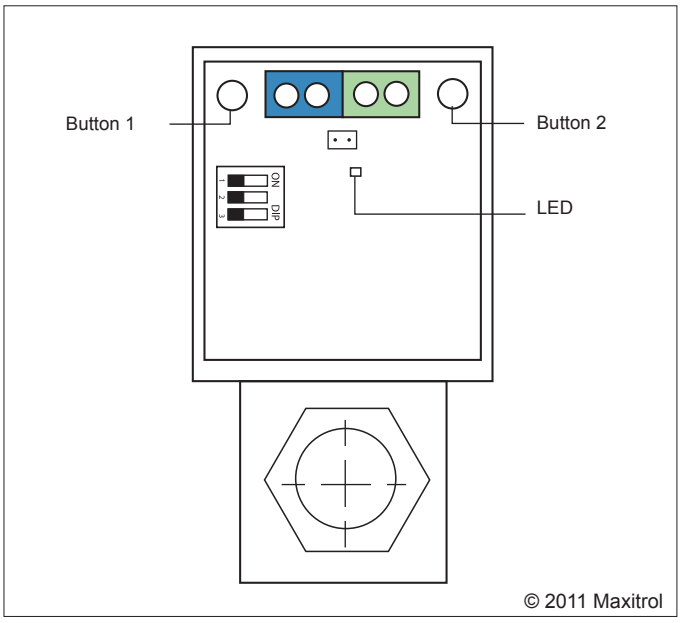

Figure 4: EXA STAR Modulating Valve Series Adjustment Controls

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.

Press or hold Button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly increase the flow.

Press or hold Button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly decrease the flow.

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.

Press or hold Button #2 to decrease gas flow. Each button press equates to the minimum available step size and will decrease flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly decrease the flow.

Press or hold Button #1 to increase gas flow. Each button press equates to the minimum available step size and will increase flow slowly. Holding the button down auto steps and eliminates the need to repeatedly press the button. Use this feature to rapidly increase the flow.

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.

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