

# Pressure Independent Control Series

## SSD Electronic Valve Actuators Floating or 0 to 10 Vdc Control



Spring Return

Non-Spring Return

### Description

Pressure Independent Control Series SSD Electronic Valve Actuators require a 24 Vac power supply and receive a floating control signal (SSD81...) or a proportional 0 to 10 Vdc signal (SSD61...) to control a valve. The 0 to 10V SSD61U actuator also accepts a 24 Vdc power supply.

These actuators are designed to work with 1/2- to 1-1/4 inch Pressure Independent Control Series Valves with a 1/10-inch (2.5 mm), 1/5-inch (5 mm), or 7/32-inch (5.5 mm) stroke and a threaded valve bonnet that fits the actuator.

### Features

- Nominal force >56 lbs (250 N)
- Automatic stroke calibration on the SSD61...
- UL listed for plenum installation
- Reduced power consumption in holding position
- Direct coupled installation without tools (hand-tightened)
- Manual override
- Visual position indication

### Application

For use in heating and cooling HVAC applications with Pressure Independent Control valves. They can be used in chilled/hot water applications or in water-glycol solutions up to 50% in closed loop systems. The Spring Return SSDx1.5U Series actuators accept plenum cable or 3/8-inch flex conduit connections.

### Product Numbers

Table 1.

Product Number	Description	Operating Mode	Actuator Prefix Code
SSD81U	Floating	Fail-in-place	230
SSD61U	0 to 10 Vdc	Fail-in-place	231
SSD81.5U	Floating	Fail-safe	232
SSD61.5U	0 to 10 Vdc	Fail-safe	233

**Ordering Information**

To order a complete valve plus actuator assembly from the factory, combine the actuator prefix code with the suffix of the valve product number. To order an actuator only, use the product number.

**Specifications**

		<b>SSD81U</b>	<b>SSD61U</b>	<b>SSDx1.5U</b>
<b>Power supply</b>	Operating voltage Vac	24 Vac $\pm$ 20%	24 Vac $\pm$ 20%	24 Vac $\pm$ 20%
	Frequency	50/60 Hz	50/60 Hz	50/60 Hz
	Operating voltage Vdc	—	24 Vdc $\pm$ 25%	—
	Power consumption			
	Normal operation	0.8 VA max.	2.5 VA max.	2 VA
At ultra cap load	—	—	3 VA	

**Control Characteristics**

	<b>SSD81...</b>	<b>SSD61...</b>
Control signal	Floating	0 to 10 Vdc
Output impedance	—	>100K ohm
Positioning accuracy 0 to 10 Vdc	—	<2% of nominal stroke

**Function**

	<b>SSD81U</b>	<b>SSD61U</b>	<b>SSD81.5U</b>	<b>SSD61.5U</b>
Run time (in seconds)				
2.5 mm stroke	75	45	70	15
5/5.5 mm stroke	150	90	125	30
Spring return (in seconds)				
2.5 mm stroke	—	—	15	15
5/5.5 mm stroke	—	—	30	30
Nominal force	>56 lbs. (250N)	>56 lbs. (250N)	>67 lbs. (300N)	>67 lbs. (300N)
Capacitor charge time (in seconds)	—	—	180 max.	180 max.
Spring return (SSDx1.5U only)	—	—	Non-mechanical, electronic. Returns to stem up (0 position).	

**Agency Certification**

UL cUL Canadian Standard	Listed to UL873	Certified to
	C22.2 No. 24-93	

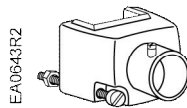
**Ambient Conditions**

Ambient temperature	
Operation	41°F to 122°F (5°C to 50°C)
Transport/Storage	-13°F to 158°F (-25°C to 70°C)
Humidity	
Operation	5 to 85% rh
Transport	<95% rh
Storage	5% to 95% rh

**Miscellaneous**

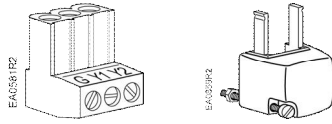
Dimensions	See Figure 13 and Figure 14.
Weight	
SSDx1U	12.3 oz. (0.35 kg)
SSDx1.5U	1.3 lbs. (0.6 kg)

## Accessories



**Figure 1. Conduit Connector.**

**ASY97** Conduit connector (quantity one).  
 For SSD61U and SSD81U only.



**Figure 2. Terminal Block Cover and Plug**

Terminal block cover and terminal plug (quantity: one each). For SSD61U and SSD81U only.

- **ASY99** SSD81U actuator floating control.
- **ASY100** SSD61U actuator 0 to 10 Vdc control.

**ASY98** Replacement screw and nut for use on the conduit connector or the terminal connector, quantity one each. For SSD61U and SSD81U only.

## Warning/Caution Notations

<b>WARNING:</b>		Personal injury or loss of life may occur if you do not perform a procedure as specified.
<b>CAUTION:</b>		Equipment damage may occur if you do not perform a procedure as specified.

## Operation



### CAUTION:

A valve must be connected to the actuator before applying power. If applying power to the actuator when a valve is not connected, the actuator will respond to a control signal and the shaft will extend until it reaches its maximum end stop. Thereafter, it will not respond to any signal. If this occurs:

1. Disconnect power.
2. Turn the manual position indicator (see Figure 7) on the top of the actuator to the 0 position and verify the actuator shaft completely retracts.
3. Connect a valve to the actuator.
4. Reapply power. The actuator will return to normal operation.

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## Operation, Continued

A 24 Vac control signal to terminal Y1 extends the actuator shaft proportionately to the length of time the signal is applied.

### SSD81U

A 24 Vac control signal to terminal Y2 retracts the actuator shaft proportionately to the length of time the signal is applied.

In the event of a power failure with no control voltage, the non-spring return SSD81U will hold its last position.

The SSD81U floating actuator does not self-calibrate.

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### SSD61U

The stroke travel on the SSD61U is proportional to the control signal Y. A zero voltage control signal retracts the stem and returns the valve to its normal position. With no supply voltage, the SSD61U actuator maintains its last position.

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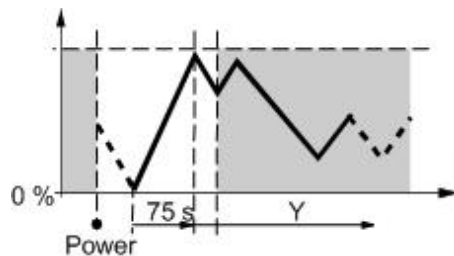
#### Calibration Stroke

The SSD61U is equipped with a microprocessor to control the valve stroke length. The actuator will complete a stroke calibration each time the power supply voltage is connected.



#### CAUTION:

Whenever the SSD61U runs a self-calibration routine (Valve stroke 0 " Max. stroke " Setpoint), do not manually intervene in this process. See Figure 3.



**Figure 3. SSD61U Self-Calibration.**

**NOTE:** Correct calibration is possible only with valve strokes >1.5 mm. For valve strokes <1.5 mm, the actuator/valve combination locks after three failed calibration attempts.

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### SSDx1.5U

For the SSD81.5U, a 24 Vac control signal to terminal Y1 extends the actuator shaft proportionately to the length of time the signal is applied.

A 24 Vac control signal to terminal Y2 retracts the actuator shaft proportionately to the length of time the signal is applied.

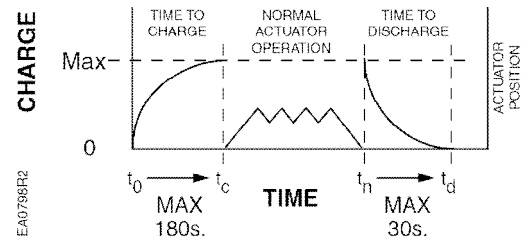
The stroke of the SSD61.5U is proportional to the control signal on terminal Y. A 0 Vdc control signal retracts the stem and returns the valve to its normal position.

In the event of a power failure, the SSDx1.5U returns to the stem up, or normal position. The SSDx1.5U includes an electronic return mechanism that functions as follows. See Figure 4.

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## Operation, SSDx1.5U Continued

- At power-up ( $t_0$ ), a capacitor must charge to its maximum capacity (Max,  $t_c$ ). This will take a maximum of 180 sec, during which time no actuator movement occurs.
- Once the capacitor is fully charged ( $t_c$ ), normal actuator operation occurs.
- If a subsequent power failure occurs ( $t_n$ ) of greater than 5 seconds, the capacitor discharges ( $t_d$ ) and the actuator spring returns to stem up 0 position.

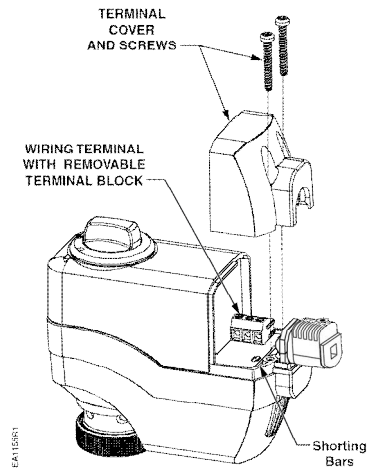


**Figure 4. SSDx1.5U Electronic Spring Return Mechanism.**

## Calibration Stroke SSD61.5U

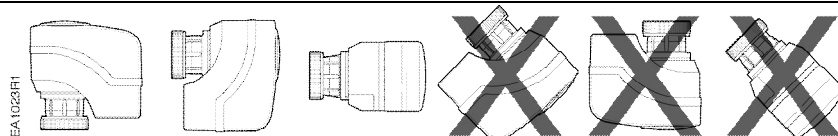
The SSD61.5U writes its calibration stroke parameters to nonvolatile memory on the first startup of the actuator. Successive startups bypass the calibration stroke unless the memory is manually cleared. If installing the actuator on a different valve (such as on a replacement valve), manually clear the calibration stroke from memory as follows:

- Remove the terminal cover using a Phillips head screwdriver.
- Locate hole on the circuit board shorting bars.
- Insert and gently twist a flat-blade screwdriver to electrically connect the shorting bars (see Figure 5). The SSD61.5U then performs a new calibration stroke.
- Secure the terminal cover back in place.



**Figure 5. Manually Clearing Calibration Stroke from Memory.**

## Mounting and Installation



**Figure 6. Mounting Positions.**

Mount the actuator in one of the allowable positions shown in Figure 6.

When mounting the actuator in a plenum, the proper cable must be attached to meet local codes.

Allow 8 inches (200 mm) above the actuator and 8 inches (200 mm) behind the cable for service.

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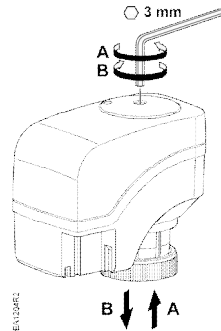
Installation instructions are included with the actuator.

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## Manual Override

The actuator can be driven manually to any position between 0 and 1 with a 3 mm hex wrench. The control signal from the controller, however, will take priority over any manual position.

For manual positioning (without power), insert the 3 mm hex wrench in the center of the position indicator. See Figure 7. The actuator will maintain its position until power is provided or restored.



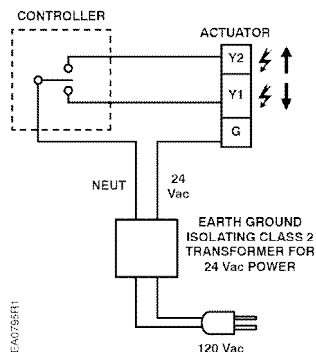
**Figure 7. Manual Override Operation.**

- (A) Turn hex wrench counterclockwise to retract the spindle.
- (B) Turn hex wrench clockwise to extend the spindle.

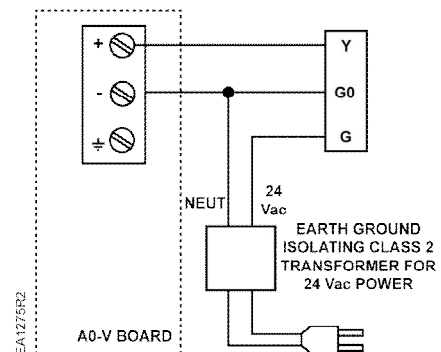
**NOTE:** Do not perform manual override while the power supply is connected; the actuator will not track accurately when the control signal is applied. A short power off/power on sequence is recommended to recalibrate the SSD61U actuator.

## Wiring

- Do not use autotransformers. Use earth ground isolating step-down Class 2 power supplies.
- Determine supply transformer rating by summing total VA of all actuators used.
- It is recommended that no more than 10 actuators be powered by one transformer.



**Figure 8. SSD81U Wiring Diagram.**

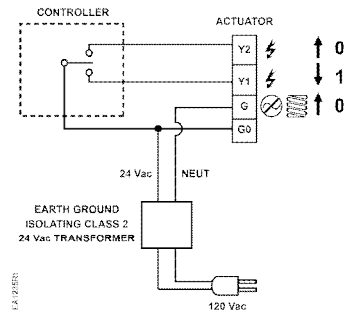
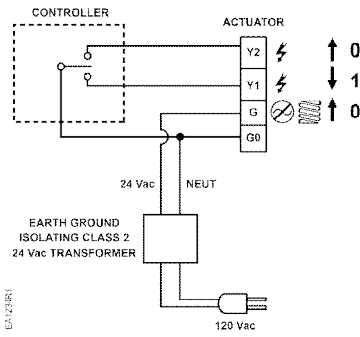


**WARNING:**

Terminal connection **G0** is Common, not ground.

**Figure 9. SSD61... Wiring Diagram.**

**Wiring, Continued**



**Figure 10. SSD81.5U Neutral Switching Spring Return.**

**Figure 11. SSD81.5U Hot Switching Spring Return.**



**CAUTION:**

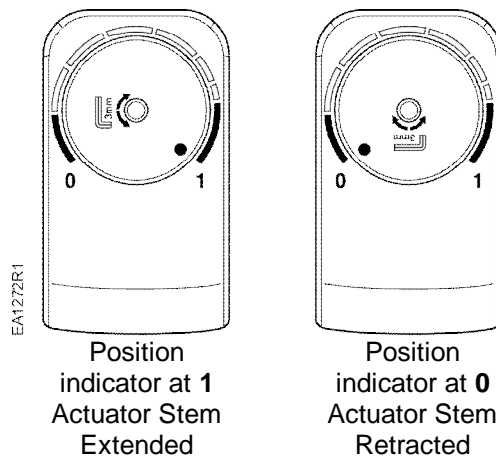
Terminals must be properly wired for correct function and full life of the actuator.

**NOTE:** SSD81.5U can be wired either neutral or hot switched. For hot switching:

- G = System Neutral
- G0 = System Potential

**Table 2. Terminal Designations.**

G, G0	24 Vac Operating Voltage
G	System Potential
G0	System Neutral
Y	0 to 10 Vdc Control Signal
Y1	Output shaft extends
Y2	Output shaft retracts
Start-Up	Check the wiring and the position indication. When the position indicator is in the <b>1</b> position, the output shaft is extended. When the position indicator is on the <b>0</b> position, the output shaft is retracted.



**NOTE:**

The **1** and **0** position markings are intended for reference only and not for stroke measurement.

**Figure 12. Position Indicator.**



## Troubleshooting

Check *Wiring* for proper connections.

If the actuator does not provide full flow or full close-off, check that the actuator is properly attached to the valve.

If not:

1. Turn the power off.
2. Manually retract output shaft with 3mm wrench to zero position.
3. Tighten the bonnet ring onto the valve completely.
4. Power up.

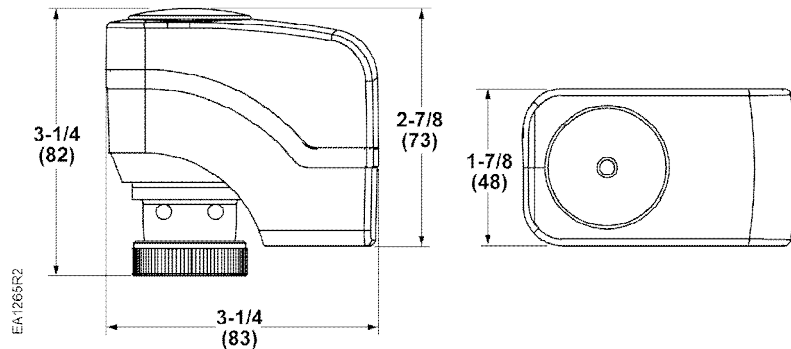
## Disposal



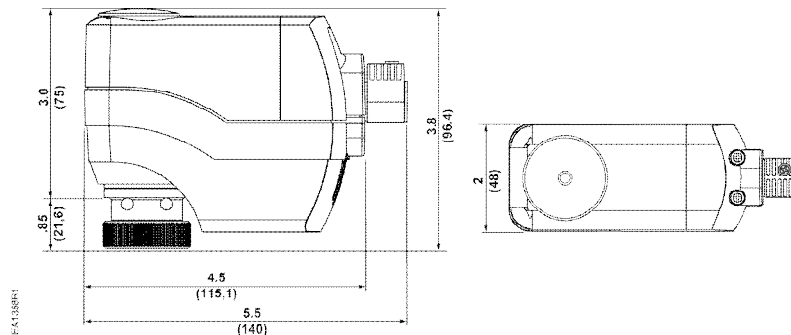
The device is considered electrical and electronic equipment for disposal in terms of the applicable European Directive and may not be disposed of as domestic garbage.

- Dispose of the device through channels provided for this purpose.
- Comply with all local and currently applicable laws and regulations.

## Dimensions



**Figure 13. SSD Actuator Dimensions in Inches (Millimeters).**



**Figure 14. SSDx1.5U Actuator Dimensions in Inches (Millimeters).**

## Service Envelope

Minimum access space recommended:  
 8 inches (200 mm) above the actuator and beside the terminal plug.