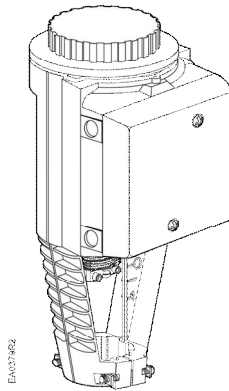


## Flowrite™ EA 599 Series

### SKD Electronic Valve Actuator 24 Vac 3-Position (Floating) Control



#### Description

The Flowrite™ EA 599 Series SKD electronic valve actuator requires a 24 Vac supply to provide three-position control. This actuator is designed to work with Flowrite 599 Series with a 3/4-inch (20 mm) stroke.

#### Features

- Direct-coupled installation requires no special tools or adjustments
- Visual and electronic stroke indication
- Die-cast aluminum housing
- Manual override
- Spring return available for fail-safe position
- Maintenance-free

#### Application

These electronic actuators are designed to be used with Flowrite VF 599 Series valves with a 3/4-inch (20 mm) stroke in liquid service applications.





#### CAUTION:

Do not use in low pressure steam applications.

#### Product Numbers

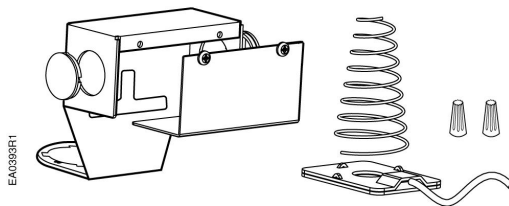
Product Number	Action	Actuator Prefix Code
SKD82.50U	Non-spring Return	275
SKD82.51U	Spring Return	276

## Warning/Caution Notations

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

<b>Specifications</b> Power supply	Operating voltage	24 Vac $\pm$ 20%	
	Frequency	50/60 Hz	
	Power consumption		
	SKD82.50U	13 VA/8W	
SKD82.51U	18 VA/11W		
	Control signal	3-position (floating)	
Equipment Rating	Rating	Class 2 according to UL, CSA	
Function	Nominal stroke	3/4-inch (20 mm)	
	Run time with control operation (full stroke)		
	SKD82.50U		
	Power stroke, 0 to 100%	120 seconds	
	Return stroke, 100 to 0%	120 seconds	
	Run time with control operation (full stroke)		
	SKD82.51U		
	Power stroke, 0 to 100%	120 seconds	
	Return stroke, 100 to 0%	120 seconds	
	Fail-safe	8 seconds	
Housing	Nominal Force	<b>Stroke</b>	<b>Force</b>
	NC and 3-way upper	0%	225 lb (1000 N)
	NO and 3-way bypass	100%	258 lb (1150 N)
	NEMA Rating	NEMA 1 (interior only) See <i>Accessories</i> .	
Agency certification	C-UL	Certified to Canadian standard C22.2 No. 24-93	
Ambient conditions	Ambient temperature (Operation)	5°F to 122°F (-15°C to 50°C)	
	Media temperature	-13°F to 300°F (-25°C to 150°C)	
Miscellaneous	Dimensions	See Figure 13.	
	Conduit opening	1/2-inch NPSM	
	Weight	7.5 lb (3.4 kg)	

## Accessories



**599-00417** Packing heating element.

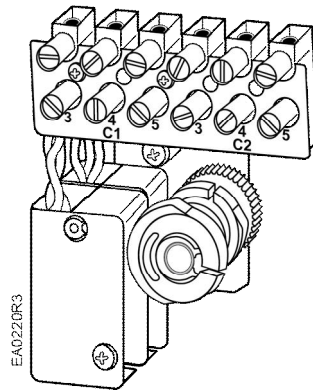
The heater allows the stem to move freely in valves which control fluids at temperatures below 32°F (0°C). It reduces ice crystal formation on the stem that may damage the packing.

**Figure 1. Packing Heating Element.**

Operating Voltage	24 Vac
Heating Output	20 W

**Accessories,  
 Continued**

**NOTE:** Installation instructions are included with each accessory.



**Figure 2. Double Auxiliary Switch.**

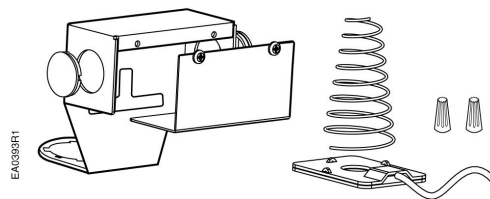
**ASC9.3DU** Double auxiliary switch.

The switch has adjustable cams that can be set to give a signal at a desired position of the stroke.

Includes NEC Class I compliant wiring compartment cover.

Switching capacity            max 250 Vac  
    6 A resistive,  
    2.5 A inductive

Lowest recommended current  
    10 mA

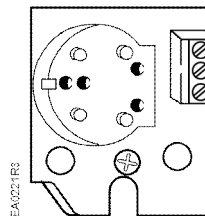


**Figure 3. Packing Heating Element.**

**599-00417** Packing heating element.

The heater allows the stem to move freely in valves which control fluids at temperatures below 32°F (0°C). It reduces ice crystal formation on the stem that may damage the packing.

Operating Voltage            24 Vac  
 Heating Output                20 W

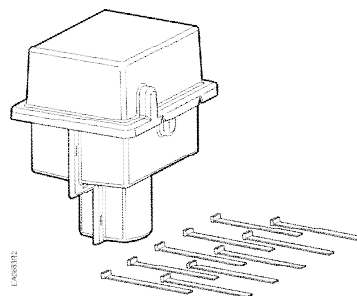


**Figure 4. Potentiometer.**

**ASZ7.3** Potentiometer.

The potentiometer is used for remote indication of valve stem position.

Position Output                0 to 1000 ohms



**Figure 5. Weather Shield.**

**599-10071** Weather Shield. See *Service Kits* for replacement ultraviolet resistant cable ties.

**Service Kits**

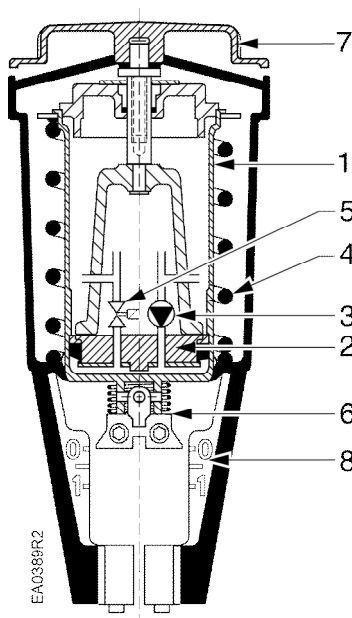
Plastic wiring compartment cover	4 104 5634 8
Manual override kit	4 268 5504 8
Ultraviolet (UV) resistant cable ties (pkg. of 10)	538-996



**WARNING:**

This product contains a spring under high compression. Do not attempt to disassemble the actuator.

**SKD Details**



**Legend**

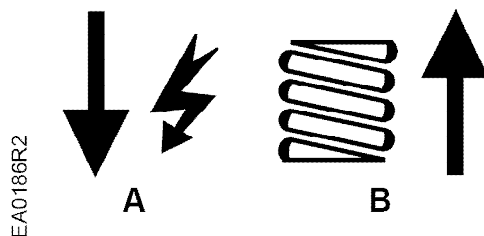
1. Pressure cylinder
2. Piston
3. Oscillating pump
4. Return spring
5. Bypass valve
6. Valve stem retainer
7. Manual override knob
8. Position indicator

**Figure 6. SKD Details.**

**Operation**

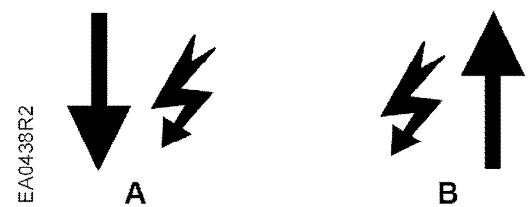
A 24 Vac control signal to Y1 causes the pressure cylinder to move toward the valve.

A 24 Vac control signal to Y2 causes the pressure cylinder to move toward the actuator. The stroke travel is proportional to the length of time the signal is applied. The total time for full stroke opening and closing is two minutes.



**Figure 7. Spring Return.**

Spring return: When power is turned off or in the event of a power failure, the actuator spring returns the valve to its normal position.

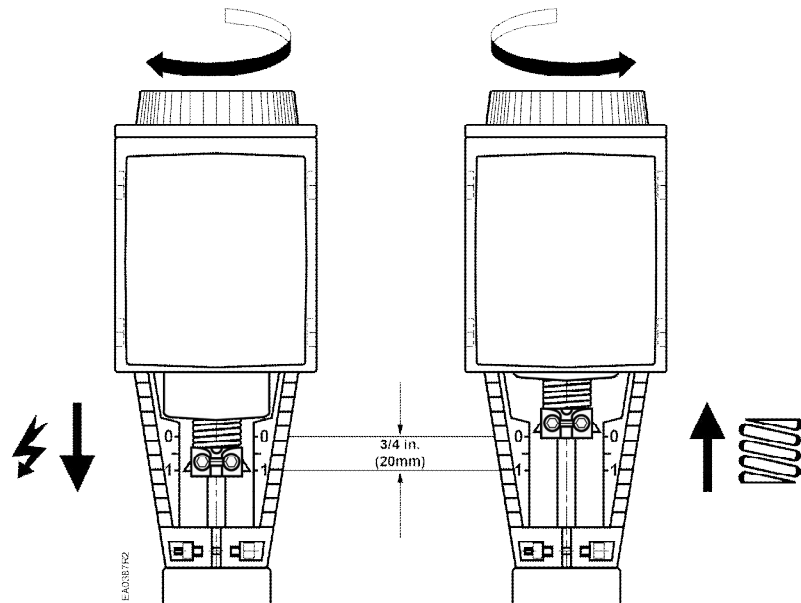


**Figure 8. Non-spring Return.**

Non-spring return: When power is turned off or in the event of a power failure, the actuator maintains its position.

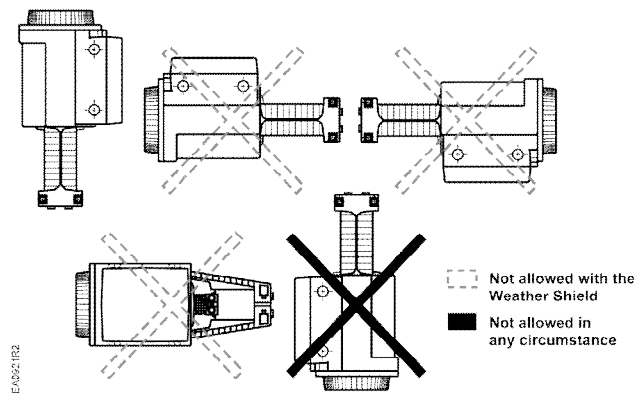
Fail-safe return time is 8 seconds.

**Operation,  
 Continued**



**Figure 9. Valve Stem Travel Indication.**

**Mounting and  
 Installation**



**Figure 10. Mounting Positions.**

- The vertical position is the recommended position for mounting. Figure 10 shows the acceptable mounting positions.
- Allow 4 inches (100 mm) around the sides and back of the actuator and 8 inches (200 mm) above and to the front of the actuator.
- See *Dimensions* in Figure 16.
- Detailed installation instructions for field mounting are shipped with the actuator.

**Start-Up**

Check the wiring for proper connections.

**NOTE:** The valve body assembly determines the complete assembly action.

**Normally Closed Valve**

Actuator pressure cylinder moves outward (0 to 1): Valve opens.  
 Actuator pressure cylinder moves inward (1 to 0): Valve closes.

**Start-Up, Continued**

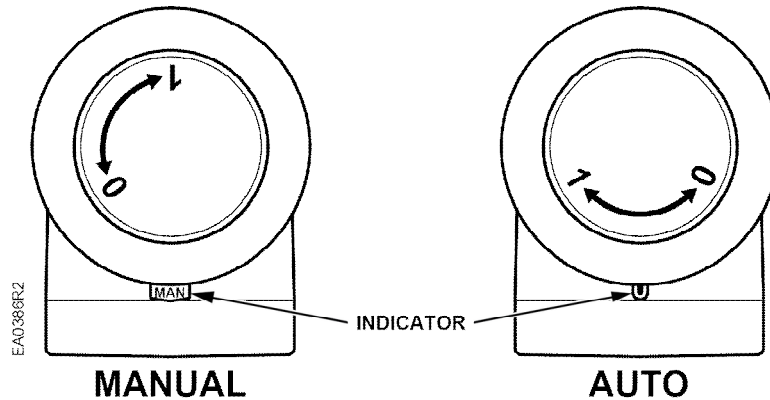
**Normally Open Valve**

Actuator pressure cylinder moves outward (0 to 1): Valve closes.  
 Actuator pressure cylinder moves inward (1 to 0): Valve opens.

**Three-Way Valve**

Actuator pressure cylinder moves outward (0 to 1): Valve opens between ports NC and C.  
 Actuator pressure cylinder moves inward (1 to 0): Valve opens between ports NO and C.

Manual Operation



**Figure 11. The Manual Setting Knob in Manual and Automatic Position.**

Turn the manual setting knob clockwise for manual override. As you begin to turn, a red indicator becomes visible. Each complete revolution (360°) is equal to 3/32-inch (2.5 mm) stroke.

If a signal is sent to the actuator while it is in manual operation, the actuator will move but the control will not be accurate. The valve cannot be commanded to its 0% position while in manual operation.

Automatic Operation

For automatic operation the manual setting knob must be in the fully closed position.

Turn the manual setting knob counterclockwise until the red indicator disappears.

**Wiring**

Do not use auto transformers. Use earth ground isolating step-down Class 2 transformers.

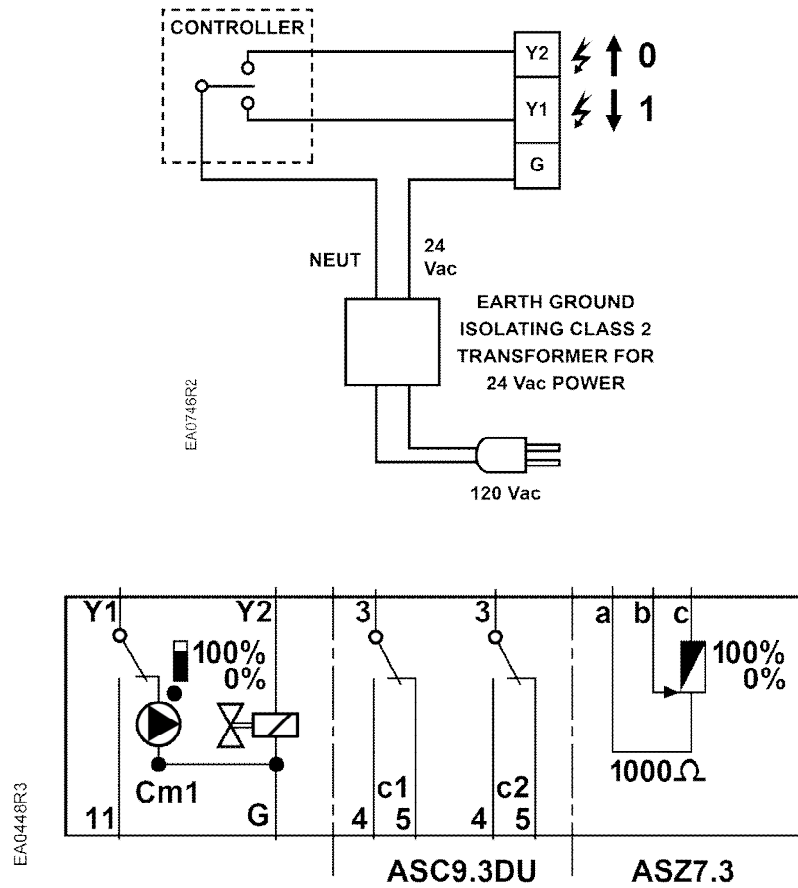
Determine supply transformer rating by summing total VA of all actuators used. The maximum rating for a Class 2 step-down transformer is 100 VA.

Actuator	Power Consumption	Actuators per Class 2 Supply Circuit* (80% of Transformer VA)
SKD82.50U	10 VA	8
SKD82.51U	15 VA	5

\* Operating more actuators requires additional transformers or separate 100 VA power supplies.

**Wiring Diagrams**

Non-spring Return  
 SKD82.50U



**Figure12. Non-spring Return Wiring Diagrams.**

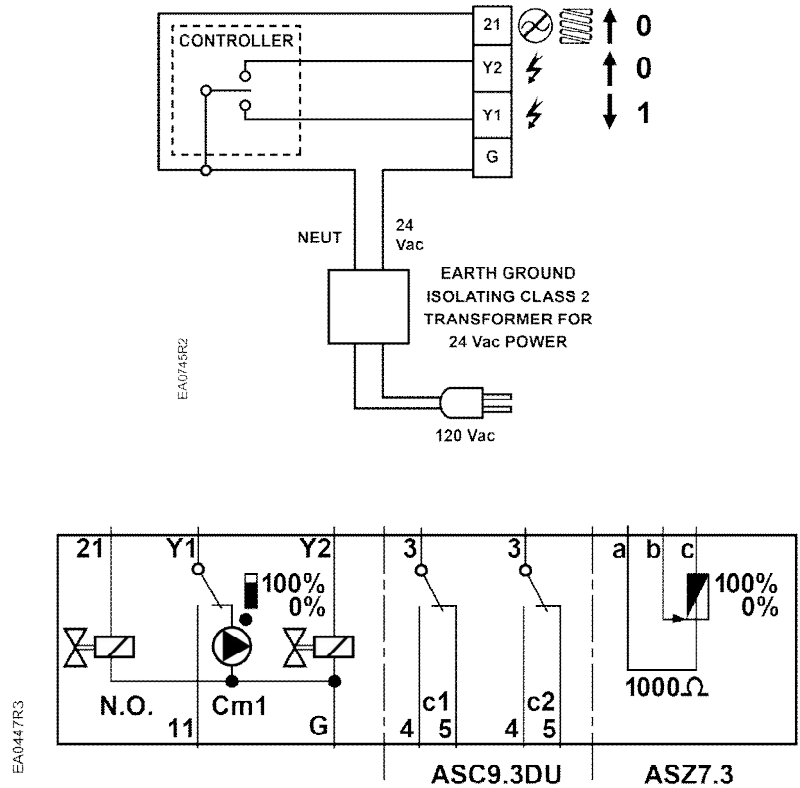
The diagram shows all possible connections. The application determines which connections are used.

**Connecting Terminals**

- G System Potential 24 Vac (+)
- Y1 Outward movement of the valve stem retainer (0 to 1)
- Y2 Inward movement of the valve stem retainer (1 to 0)
- Cm1 Limit switch for 100% stroke
- C1 ASC9.3DU double auxiliary switch
- C2 ASC9.3DU double auxiliary switch
- 1000 W ASZ7.3 potentiometer

**Wiring Diagrams,  
 Continued**

Spring Return  
 SKD82.51U



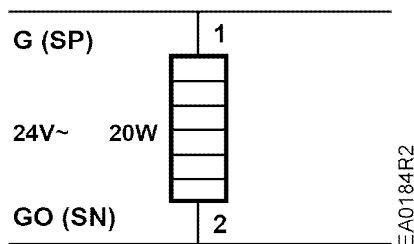
**Figure 13. Spring Return Wiring Diagrams.**

The diagram shows all possible connections. The application determines which connections are used.

**Connecting Terminals**

- G System Potential 24 Vac (+)
- 21 System Neutral (SN)
- Y1 Outward movement of the valve stem retainer (0 to 1)
- Y2 Inward movement of the valve stem retainer (1 to 0)
- Cm1 Limit switch for 100% stroke
- c1 ASC9.3DU double auxiliary switch
- c2 ASC9.3DU double auxiliary switch
- 1000 W ASZ7.3 potentiometer

**Accessory**



**Figure 14. Packing Heating Element 599-00417.**



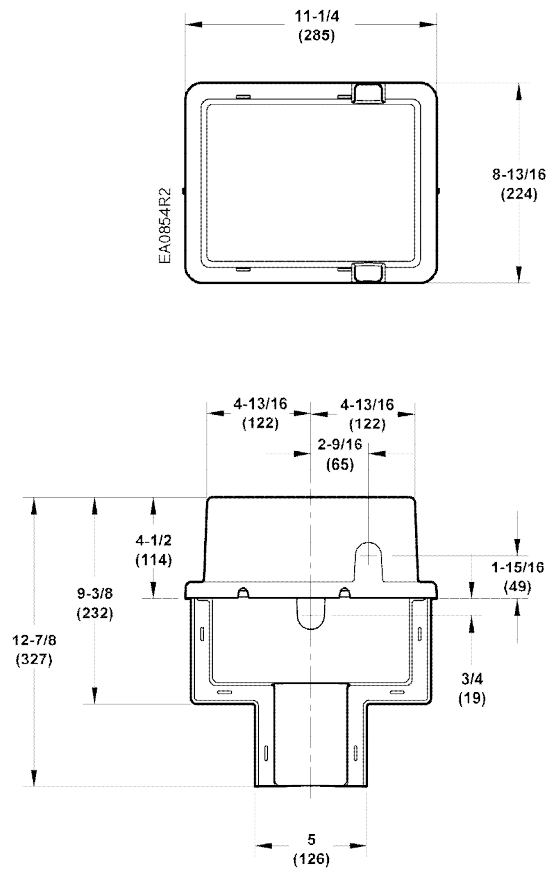
**Troubleshooting**

- Check that the wires are connected correctly and attached securely.
- Check for adequate power supply.
- Check that the actuator is set for automatic operation. See the *Start-up* section.

**Dimensions**

In inches (Millimeters)

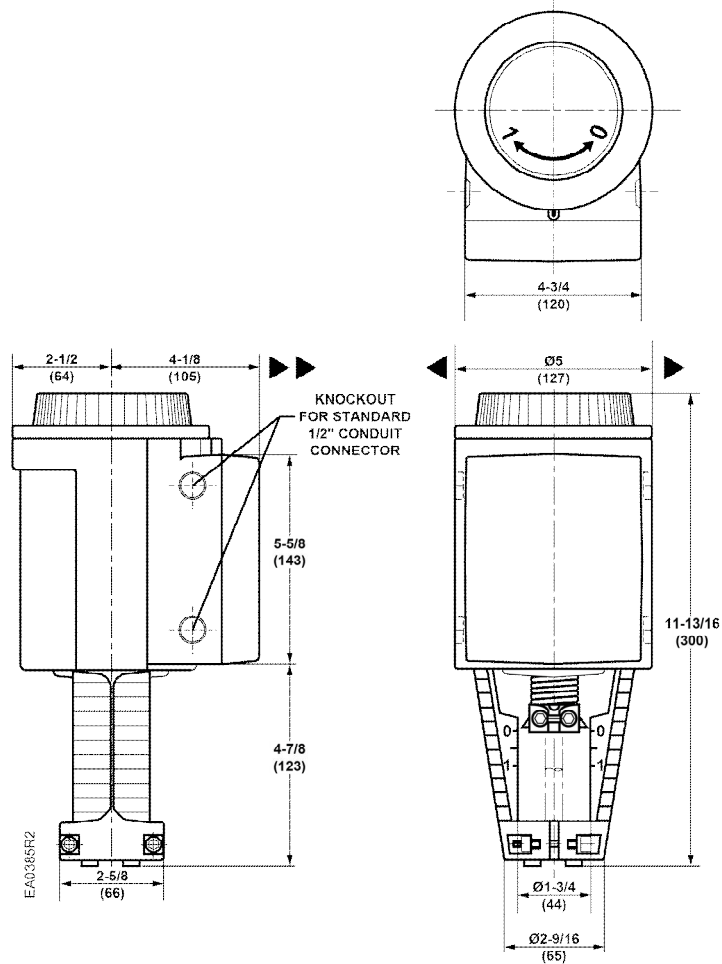
**NOTE:** The top knockout position should be used when installing the Weather Shield. See Figure 16.



**Figure 15. Dimensions of SKD.**

**Dimensions,  
 Continued**

**NOTE:** The top knockout position should be used when installing the Weather Shield.



**Figure 16. Dimensions of SKD.**

Minimum access space recommended



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