SIEMENS

Technical Instructions
Document No. 155-181P25
EA 599-5
March 7, 2005

Flowrite™ EA 599 Series

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

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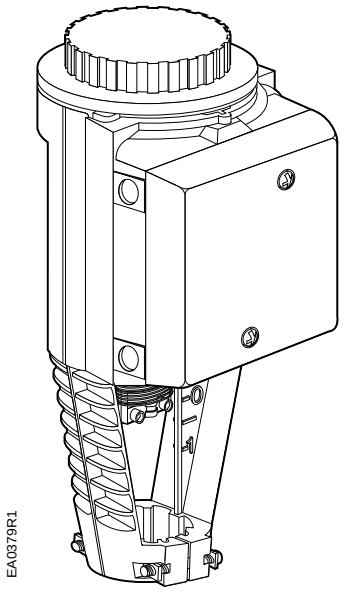

Description

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 and steam service applications.

Product Numbers

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

Installation Conventions

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

Specifications

Power supply	Operating voltage	24 Vac ±20%	
	Frequency	50/60 Hz	
	Power consumption		
	SKD82.50U	10 VA	
	SKD82.51U	15 VA	
	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%	90 seconds	
	Return stroke, 100 to 0%	90 seconds	
	Run time with control operation (full stroke)		
	SKD82.51U		
	Power stroke, 0 to 100%	90 seconds	
	Return stroke, 100 to 0%	90 seconds	
	Fail safe	8 seconds	
	Nominal Force	**Stroke**	**Force**
	NC and 3-way upper	0%	225 lb (1000 N)
	NO and 3-way by-pass	100%	258 lb (1150 N)
Housing	NEMA Rating	NEMA 1 (interior only) See *Accessories*.	
Agency certification		C-UL certified to Canadian standard C22.2 No. 24-93	
Ambient conditions	Ambient temperature	5°F to 130°F (-15°C to 55°C)	
	Media temperature	14°F to 300°F (-10°C to 150°C)	
Miscellaneous	Dimensions	See Figure 13.	
	Conduit opening	1/2-inch NPSM	
	Weight	7.5 lb (3.4 kg)	

Accessories

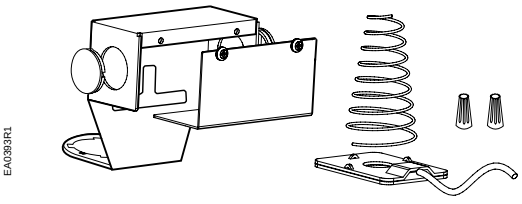

Figure 1. Packing Heating Element.

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

Accessories, Continued

NOTE: Installation instructions are included with each accessory.

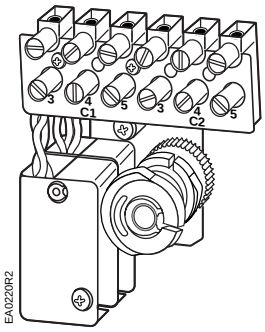

Figure 2. Double Auxiliary Switch.

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

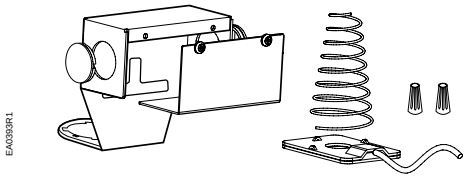

Figure 3. Packing Heating Element.

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

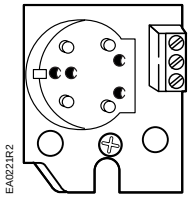

Figure 4. Potentiometer.

ASZ7.3 Potentiometer.

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

Position Output	0 to 1000 ohms

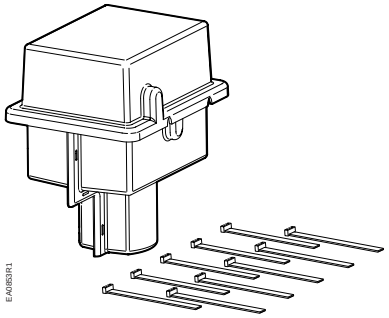

Figure 5. Weather Shield.

599-10071 Weather Shield. See *Service Kits* for replacement UV 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

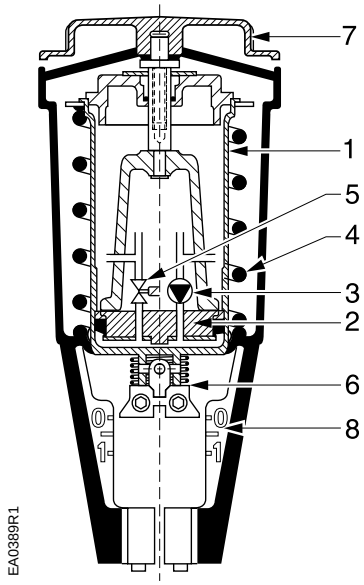

Figure 6. SKD Details.

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

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.

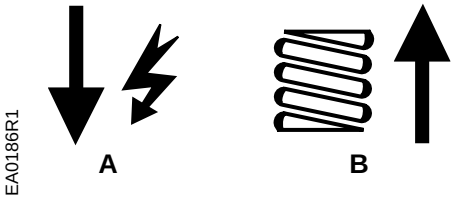

Figure 7. Spring Return.

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.

Fail-safe return time is 8 seconds.

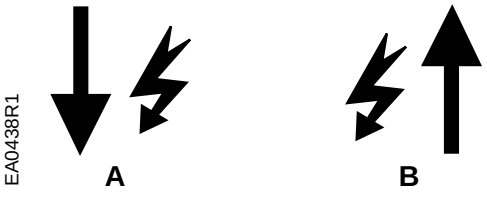

Figure 8. Non-spring Return.

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

Operation, Continued

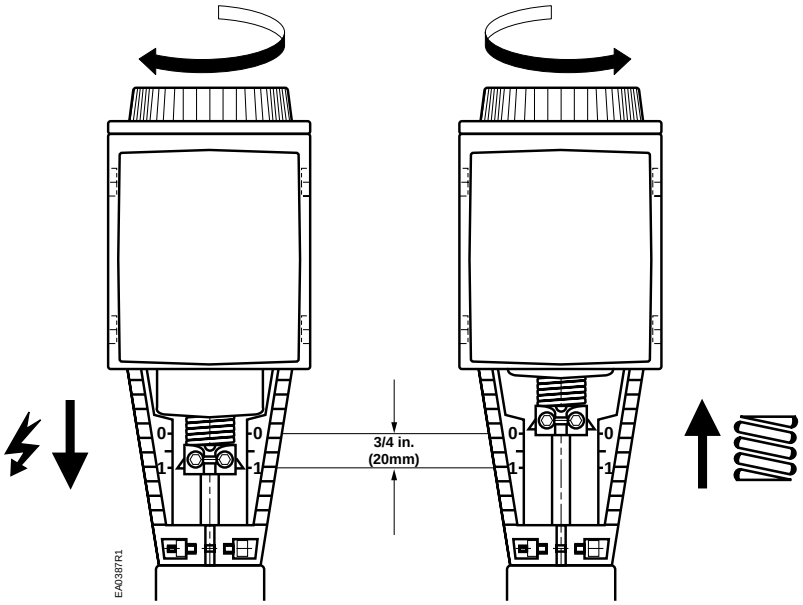

Figure 9. Valve Stem Travel Indication.

Mounting and Installation

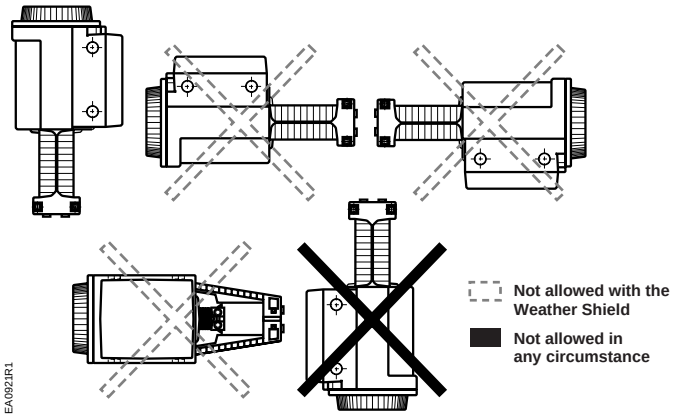

Figure 10. Mounting Positions.

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

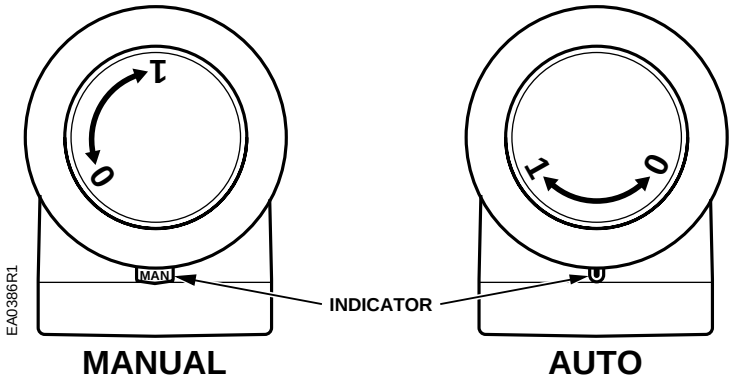

Figure 11. The Manual Setting Knob in Manual and Automatic Position.

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

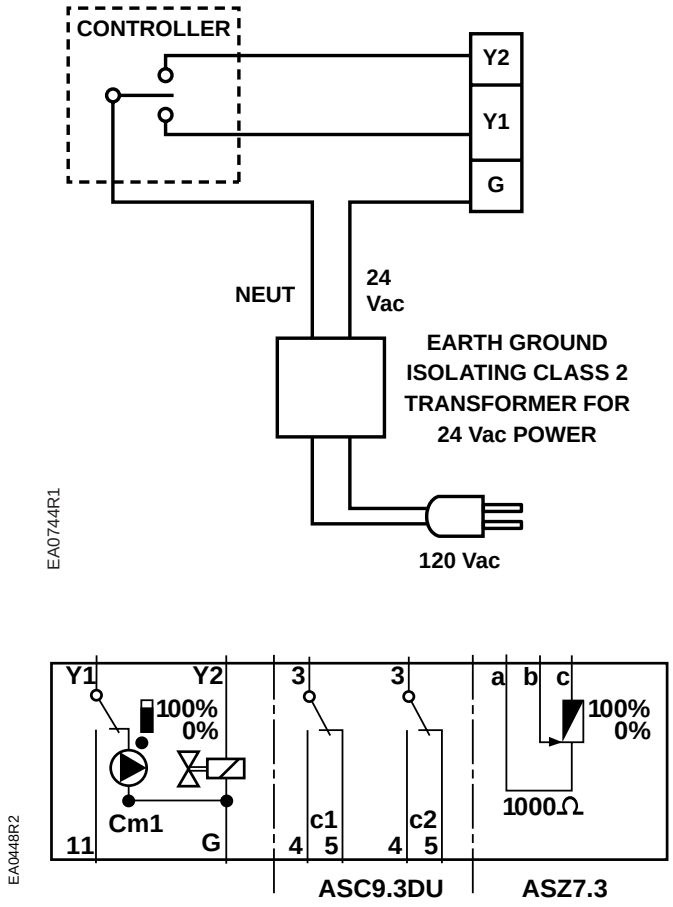

Figure12. Non-spring Return Wiring Diagrams.

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 Ω	ASZ7.3 potentiometer

Wiring Diagrams, continued

Spring Return
SKD82.51U

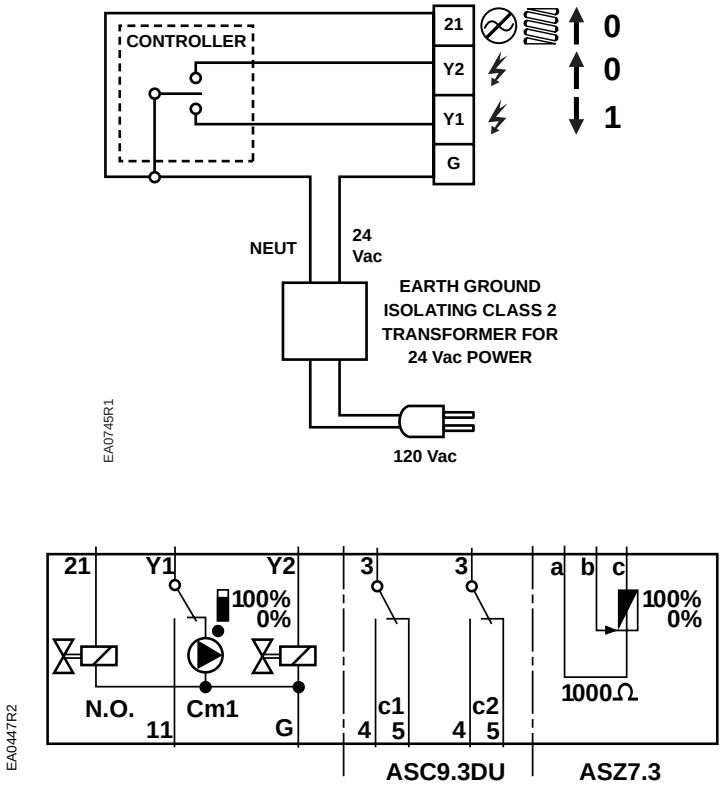

Figure 13. Spring Return Wiring Diagrams.

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 Ω	ASZ7.3 potentiometer

Accessory

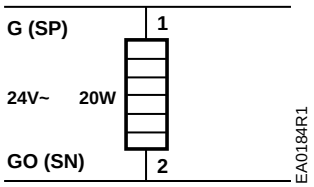

Figure 14. Packing Heating Element 599-00417.

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

Dimensions in inches (millimeters)

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

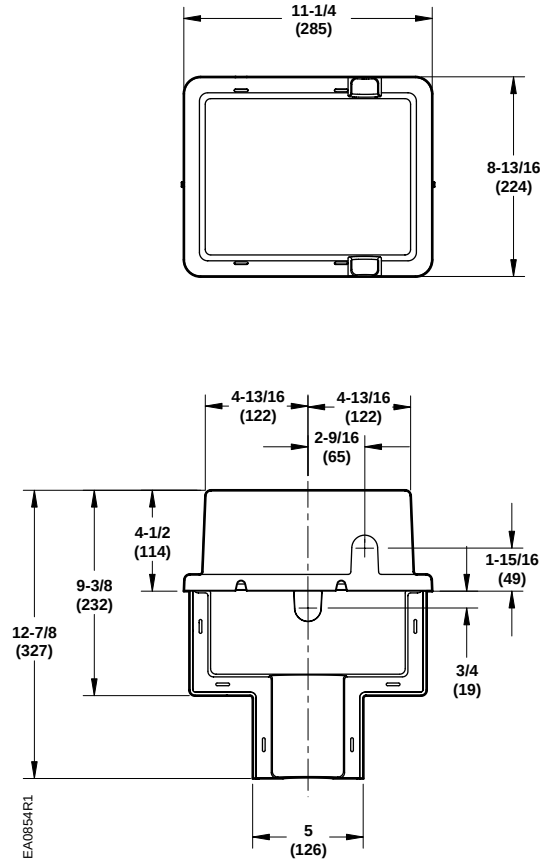

Figure 15. Dimensions of SKD.

Dimensions, Continued

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

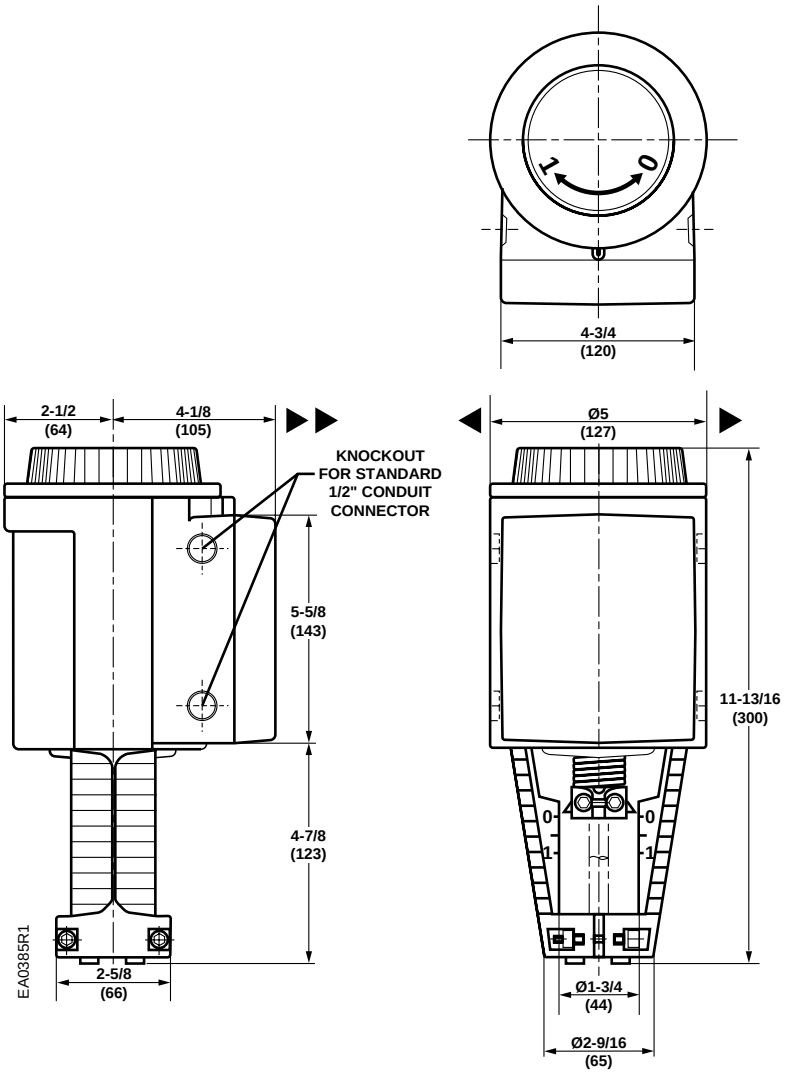

Figure 16. Dimensions of SKD.

Service envelope — Minimum access space recommended

▶ 4 inch (100 mm) ▲ ▲ 8 inch (200 mm)