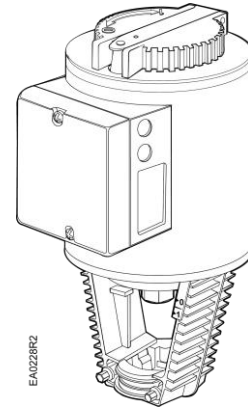


# Flowrite™ 599 Series

## SKB/C Electronic Valve Actuator 24 Vac, 3-Position (Floating) Control



### Description

The Flowrite 599 Series SKB/C electronic valve actuator requires a 24 Vac supply signal to provide three-position control. This actuator is designed to work with Flowrite 599 Series valves with 3/4-inch (20 mm) and 1-1/2-inch (40 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 599 Series valves with 3/4-inch (20 mm) stroke (SKB) and 1-1/2-inch (40 mm) stroke (SKC) in liquid and steam service applications.

### Product Numbers

Action	Stroke	Product Number	Actuator Prefix Code
Spring Return	3/4-inch (20 mm)	SKB82.51U	289
	1-1/2-inch (40 mm)	SKC82.61U	292
Non-spring Return	3/4-inch (20 mm)	SKB82.50U	290
	1-1/2-inch (40 mm)	SKC82.60U	293

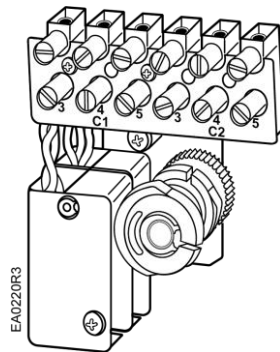
## Warning/Caution Notations

<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 or loss of data may occur if you do not perform a procedure as specified.

<b>Specifications</b>	Operating voltage	24 Vac $\pm$ 20%		
	Frequency	50/60 Hz		
<b>Power Supply</b>	Power consumption			
	SKB82.50U	13 VA/8W		
	SKB82.51U	18 VA/11W		
	SKC82.60U	19 VA/16W		
	SKC82.61U	24 VA/21W		
<b>Equipment rating</b>	Rating	Class 2 according to UL, CSA		
<b>Function</b>	Nominal stroke			
	SKB	3/4-inch (20 mm)		
	SKC	1-1/2 inch (40 mm)		
	Run time with control operation (full stroke)	120 seconds opening and closing		
	Spring return time (on power failure)			
	SKB82.51U	10 seconds		
	SKC82.61U	18 seconds		
	Nominal Force	<b>Stroke</b>	<b>Force</b>	
	NC and 3-way upper	0%	610 lbs (2684 N)	
	NO and 3-way bypass	100%	1000 lbs (4400 N)	
<b>Housing</b>	Mounting location	NEMA 1 (interior only) NEMA TYPE 3R rated when installed with 599-10065 Weather Shield. See <i>Accessories</i> .		
<b>Ambient conditions</b>	Ambient temperature (Operation)	5°F to 130°F (-15°C to 55°C)		
	Media temperature	-13°F to 337°F (-25°C to 170°C)		
<b>Agency certification</b>	UL	Listed to UL873		
	C-UL	Certified to Canadian standard C22.2 No. 24-93		
<b>Miscellaneous</b>	Dimensions	See Figure 14 and Figure 15.		
	Conduit opening	1/2-inch NPSM		
	Weight			
	SKB82	21 lbs (9.5 kg)		
SKC82	22 lbs (10 kg)			

**Accessories**

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



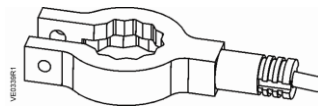
**Figure 1. Double Auxiliary Switch.**

**ASC9.3BCU** The double auxiliary 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

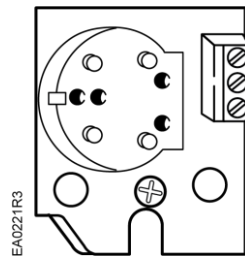
Lowest recommended current  
 10 mA



**Figure 2. Stem Heating Element ASZ6.6.**

**ASZ6.6** The stem heating element prevents the formation of ice on the stem when the medium temperature drops below 32°F (0°C). It is suited for universal use with valves having a stem or spindle diameter of 10 or 14 mm.

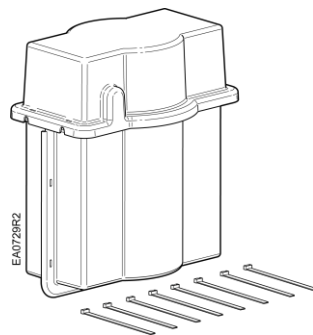
Operating voltage      24 Vac/dc ± 20%  
 Power consumption      ≤ 40 VA/30W



**Figure 3. Potentiometer.**

**ASZ7.3** The potentiometer is used for remote indication of valve stem position.

Position output 0 to 1000 ohms



**Figure 4. Weather Shield.**

**599-10065** The SKB/C actuator is UL listed to meet NEMA TYPE 3R requirements (a degree of protection against rain, sleet, and damage from external ice formation) when installed with this weather shield and outdoor-rated conduit fittings in the vertical position. See *Service Kits* for replacement UV resistant cable ties.

**Service Kits**

Manual override handle kit	4 268 5510 8
Plastic wiring compartment cover	4 104 5582 8
Stem retainer kit	
Contains one stem nut ( <i>Item 6, Figure 7</i> ) and one stem retainer clip.	
2-1/2 and 3-inch valves	599-10048
4, 5, and 6-inch valves	599-10049
Retainer clamp kit	599-10200
Ultraviolet (UV) resistant cable ties (pkg. of 8)	538-994



**WARNING:**

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

**Operation**

A 24 Vac control signal to Y1 causes the actuator's coupling piece to move toward the valve.

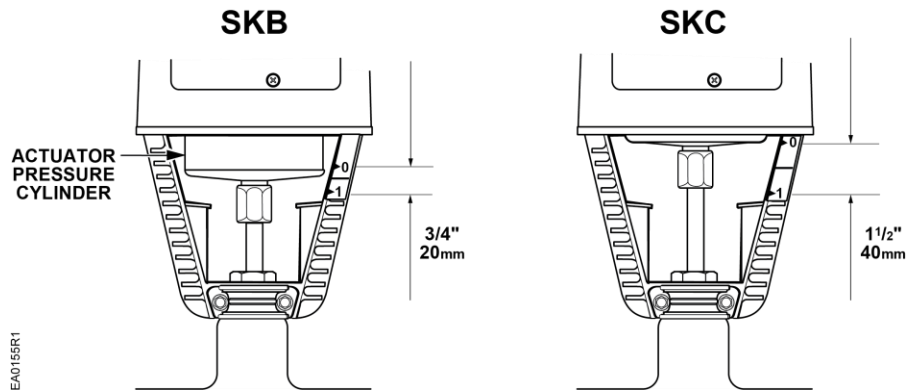
A 24 Vac control signal to Y2 causes the actuator's coupling piece to move toward the actuator.

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.



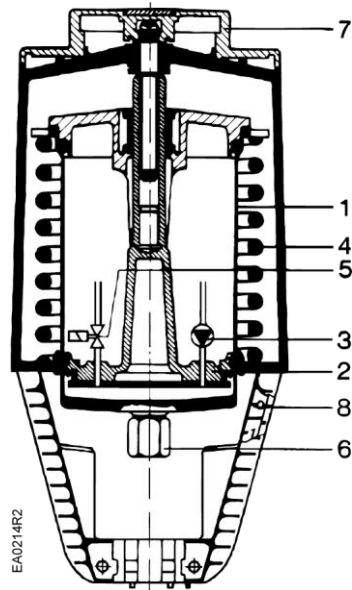
**Figure 5. Spring Return.**

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



**Figure 6. Valve Stem Travel Indication.**

**SKB/C Details**

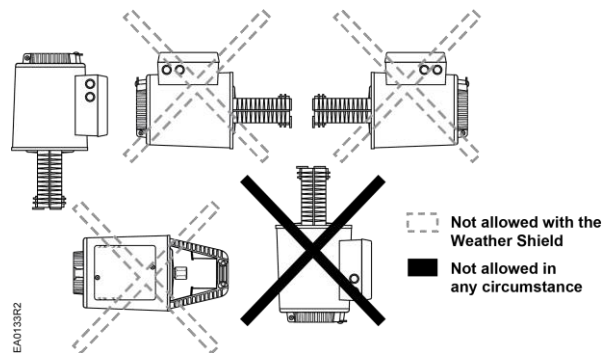


**Legend**

- 1. Pressure cylinder
- 2. Piston
- 3. Oscillating pump
- 4. Return spring
- 5. Bypass valve
- 6. Coupling piece (Stem nut)
- 7. Manual setting knob
- 8. Position indicator

**Figure 7. SKB/C Details.**

**Mounting and Installation**



**Figure 8. Mounting Positions.**

The vertical position is the recommended position for mounting and the only position for NEMA Type 3R rating with the Weather Shield. The acceptable mounting positions are shown in Figure 8.

Allow four inches (100 mm) around the sides and back of the actuator and eight inches (200 mm) above and to the front of the actuator.

See dimensions in Figure 14 and Figure 15.

Detailed installation instructions for field mounting are shipped with the actuator.



**CAUTION:**

Be careful when removing the knockout. Do not damage the circuit board. Use the top knockout position, if possible.

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## Start-Up

Check the wiring for proper connections.

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.

### Normally Open Valve

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

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

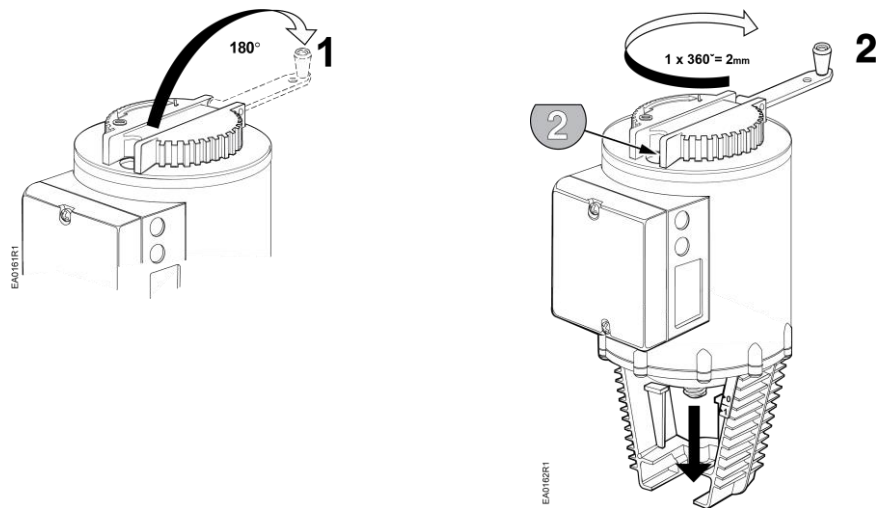
### Three-way Valve

Actuator pressure cylinder moves outward (**0 to 1**): Valve opens between port NC and C.

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

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## Manual Operation



**Figure 9. The Manual Setting Knob in Manual Position.**

Release the crank arm of the manual setting knob located on the top of the actuator. As you turn the crank, a red scale appears in a window in the manual setting knob. This scale indicates the effective valve stroke in millimeters. Each complete revolution (360°) is equal to 2 mm of stroke. The numbers 2 to 20 or 2 to 40 are visible depending on the stroke of the actuator.

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.

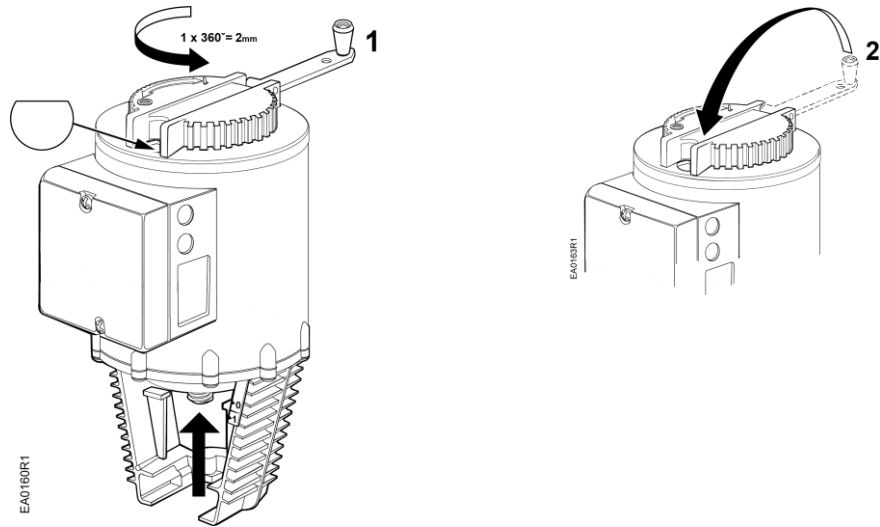
## Start-Up, Continued



### CAUTION:

Do not attempt automatic operation of the actuator when the red scale is visible.

## Automatic Operation



**Figure 10. The Manual Setting Knob in Manual and Automatic Position.**

When returning to automatic control, you must turn the crank arm of the manual setting knob counterclockwise until the red numbers disappear. It is essential that the window is clear and the crank arm is snapped into position.

**NOTE:** It is possible to secure the manual override handle in place by inserting a # 8 x 1-1/4 or M5 x 30 mm thread-forming screw through the handle.

## 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 Class 2 step-down transformer is 100 VA.

Actuator	Power Consumption	Actuators per Class 2 Supply Circuit* (80% of transformer VA)
SKB82.50U	10 VA	8
SKB82.51U	15 VA	5
SKC82.60U	19 VA	4
SKC82.61U	20 VA	4

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

## Wiring Diagrams

### Non-spring Return

SKB82.50U

SKC82.60U

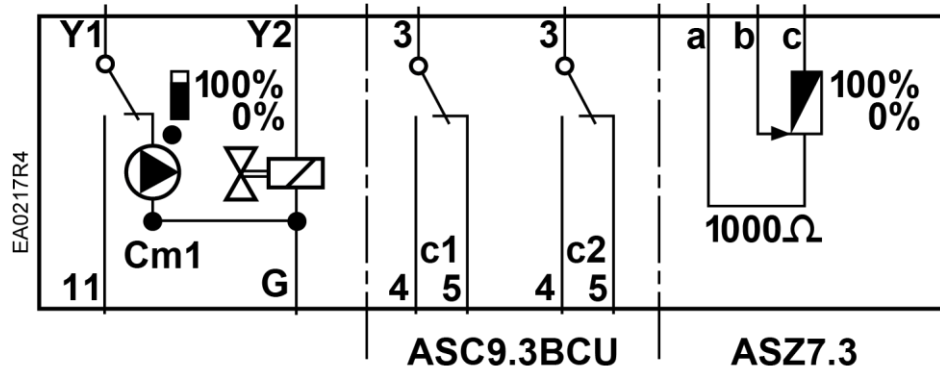
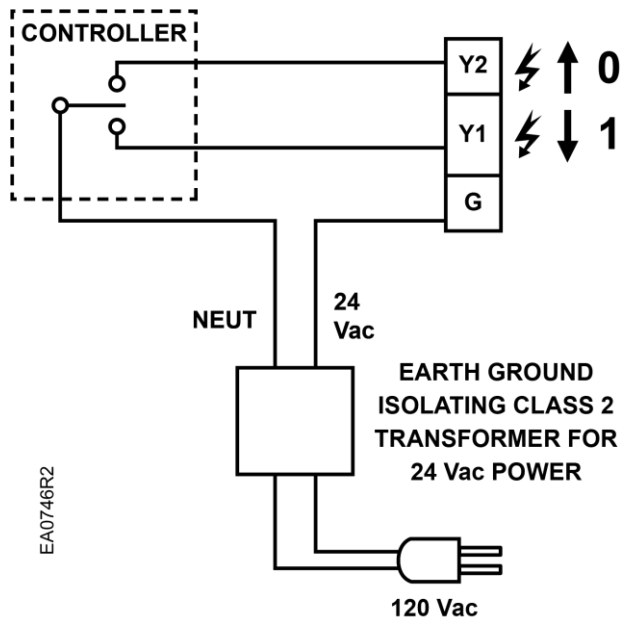


Figure 11. Non-spring Return Wiring Diagrams.

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

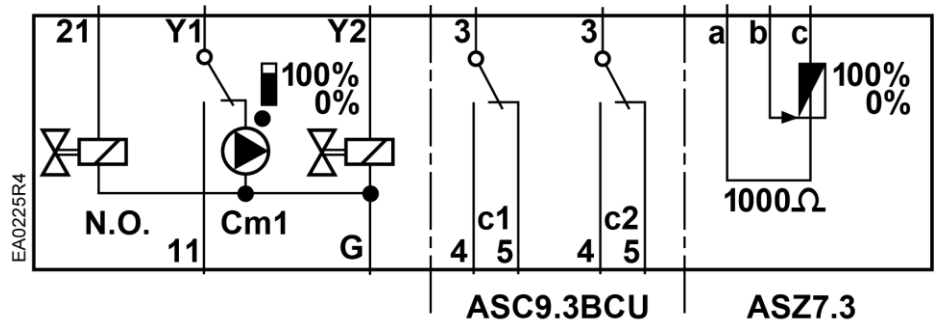
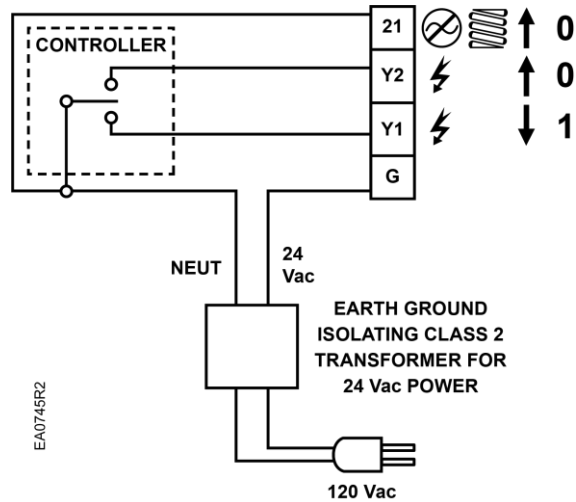
#### Connecting Terminals

- G System Potential 24 Vac (+)
- Y1 Outward movement of the coupling piece (0 to 1)
- Y2 Inward movement of the coupling piece(1 to 0)
- Cm1 Limit switch for 100% stroke
- C1 ASC9.3BCU double auxiliary switch
- C2 ASC9.3BCU double auxiliary switch
- 1000  $\Omega$  ASZ7.3 potentiometer



**Wiring Diagrams,  
 Continued**

**Spring Return**  
**SKB82.51U**  
**SKC82.61U**



**Figure 12. 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 coupling piece (0 to 1)
- Y2 Inward movement of the coupling piece(1 to 0)
- Cm1 Limit switch for 100% stroke
- C1 ASC9.3BCU double auxiliary switch
- C2 ASC9.3BCU double auxiliary switch
- 1000 Ω ASZ7.3 potentiometer

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## Accessory

- 1** — System neutral (SN) red
- 2** — System potential (SP) black

24Vac/30W

**Figure 13. Stem Heating Element ASZ6.6.**

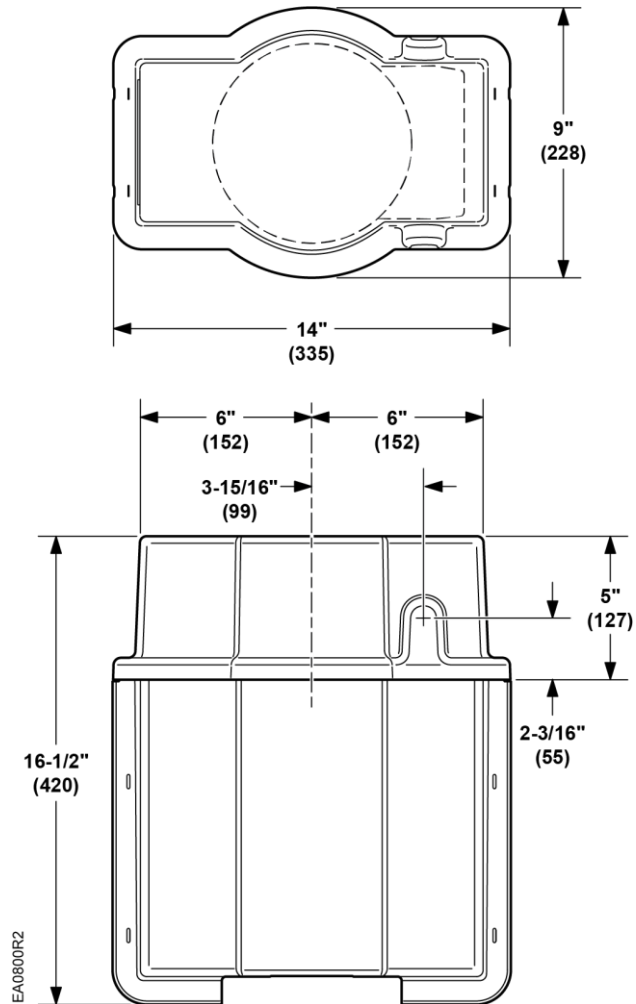
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## Troubleshooting

- 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.

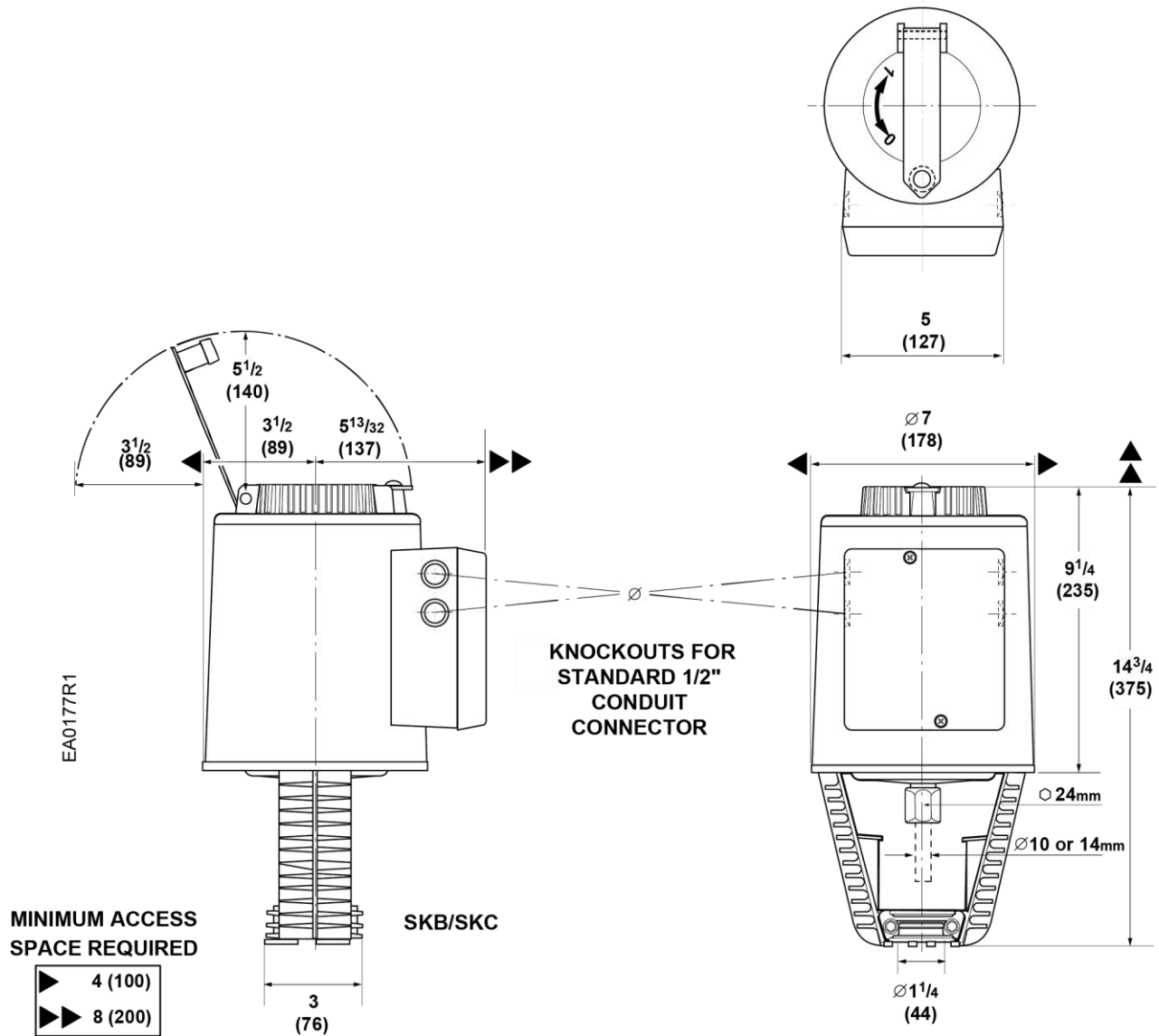
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## Dimensions



**Figure 14. Dimensions of the 599-10065 Weather Shield in Inches (Millimeters).**

**Dimensions, Continued**



**Figure 15. Dimensions of SKB/C in Inches (Millimeters).**

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