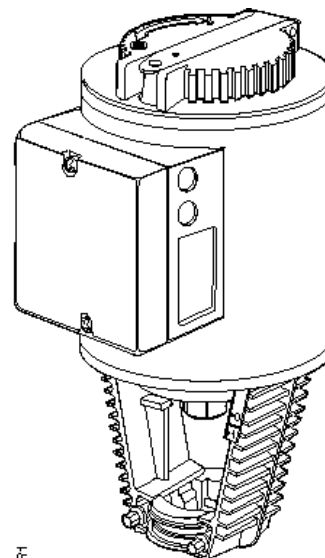


Flowrite™ EA 599 Series

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



EA0228F1

Description

The Flowrite™ EA 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 VF 599 Series valves with 3/4-inch (20 mm) and 1-1/2 inch (40 mm) 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

| | | |
|---------------------|---|--|
| WARNING : |  | Personal injury/loss of life may occur if a procedure is not performed as specified. |
| CAUTION: |  | Equipment damage or loss of data may occur if the user does not follow a procedure as specified. |

| | | | |
|-----------------------------|---|---|--------------------|
| Specifications | Operating voltage | 24 Vac \pm 20% | |
| | Frequency | 50/60 Hz | |
| Power Supply | Power consumption | | |
| | SKB82.50U | 10 VA | |
| | SKB82.51U | 15 VA | |
| | SKC82.60U | 19 VA | |
| | SKC82.61U | 20 VA | |
| Equipment rating | Rating | Class 2 according to UL, CSA | |
| Function | Nominal stroke | | |
| | SKB | 3/4-inch (20 mm) | |
| | SKC | 1-1/2 inch (40 mm) | |
| | Run time with control operation (full stroke) | 90 seconds opening and closing | |
| | Spring return time (on power failure) | | |
| | SKB82.51U | 10 seconds | |
| | SKB82.61U | 18 seconds | |
| | Nominal Force | Stroke | Force |
| | NC and 3-way upper | 0% | 610 lbs. (2684 N) |
| | NO and 3-way by-pass | 100% | 1000 lbs. (4400 N) |
| Housing | Mounting location | NEMA 1 (interior only) NEMA TYPE 3R rated when installed with 599-10065 Weather Shield. See <i>Accessories</i> . | |
| Ambient conditions | Ambient temperature | 5 to 130 °F (-15°C to 55°C) | |
| Agency certification | | UL listed to UL873 C-UL certified to Canadian standard C22.2 No. 24-93 | |
| Miscellaneous | Media temperature | 14 to 300 °F (-10 to 150°C) | |
| | Dimensions | See <i>Figures 14 and 15</i> | |
| | Conduit opening | 1/2-inch NPSM | |
| | Weight | | |
| | SKB82 | 18.5 lbs. (8.4 kg) | |
| SKC82 | 21.4 lbs. (9.7 kg) | | |

Accessories

NOTE: Installation instructions are included with each accessory.

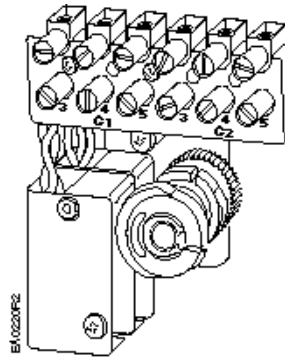


Figure 1. Double Auxiliary Switch.

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

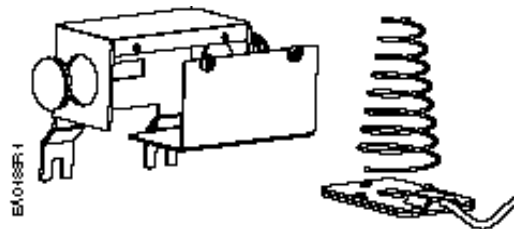


Figure 2. Packing Heating Element.

599-00418 The packing heating element 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

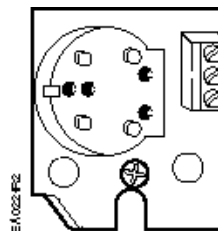


Figure 3. Potentiometer.

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

Position output 0 to 1000 Ohms

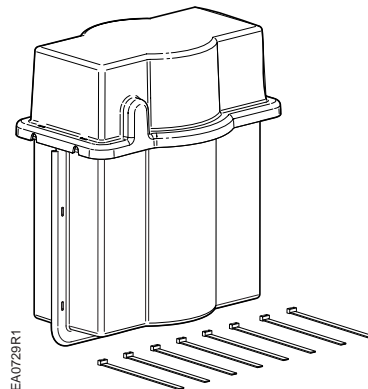


Figure 4. Weather Shield.

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.

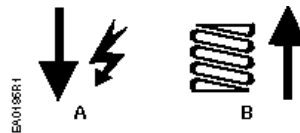


Figure 5. Spring Return.

- 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.

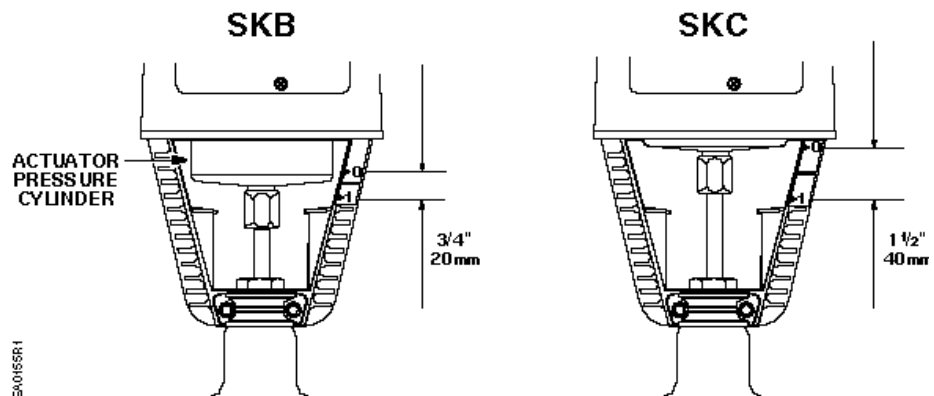
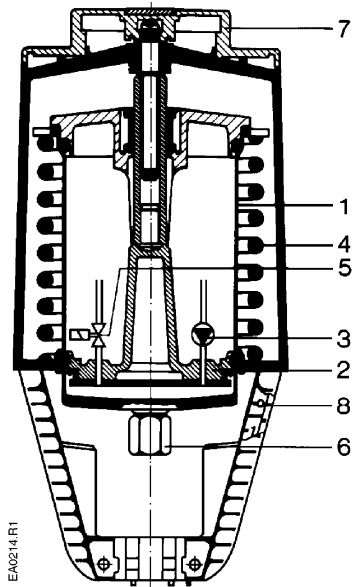


Figure 6. Valve Stem Travel Indication.

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

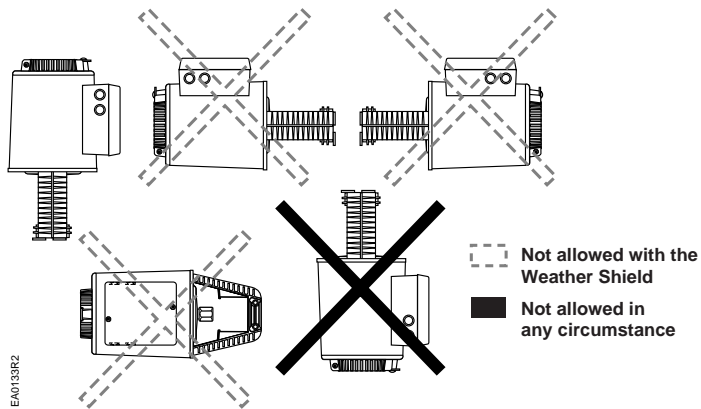


Figure 8. Mounting Positions.

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*.

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.

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.

Manual Operation

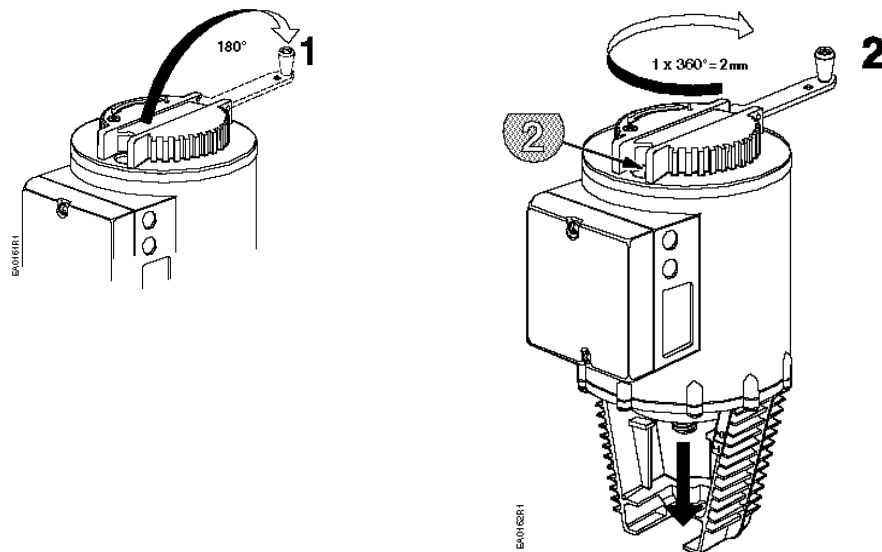


Figure 9. The Manual Setting Knob in Manual Position.

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

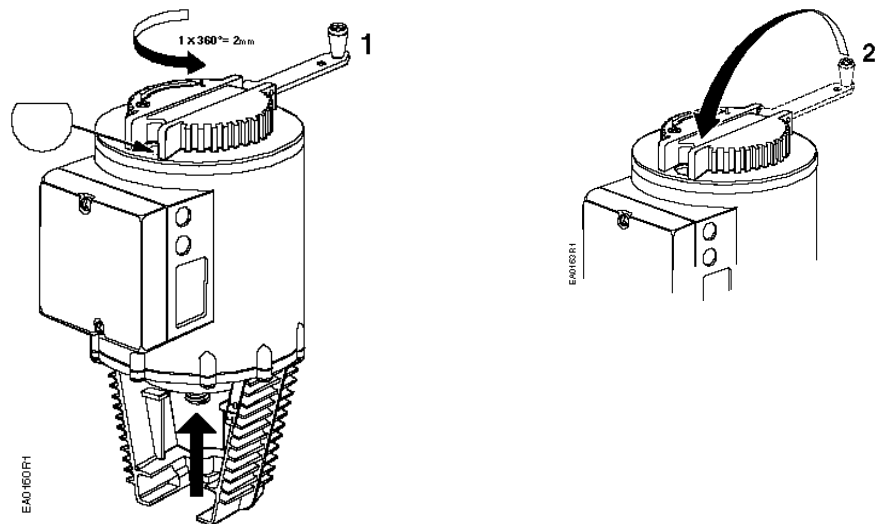


Figure 10. The Manual Setting Knob in Manual and Automatic Position.

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

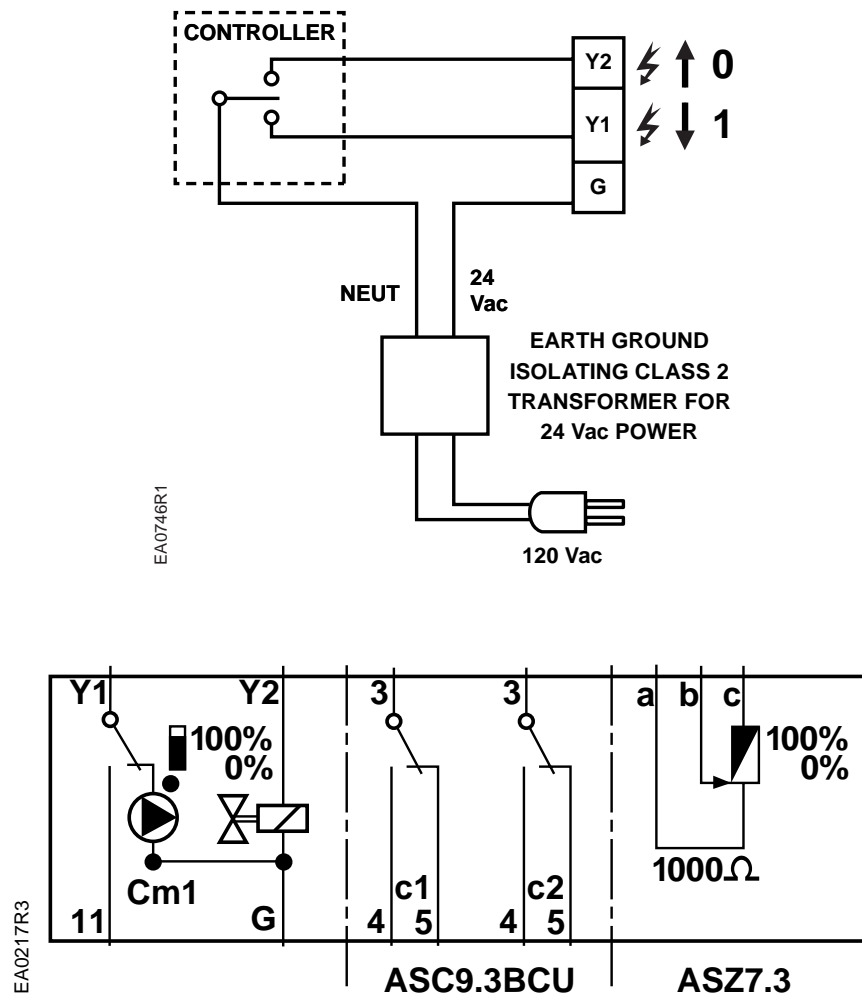


Figure 11. Non-spring Return Wiring Diagrams.

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 Ω ASZ7.3 potentiometer

**Wiring Diagrams,
continued**

Spring Return
SKB82.51U
SKC82.61U

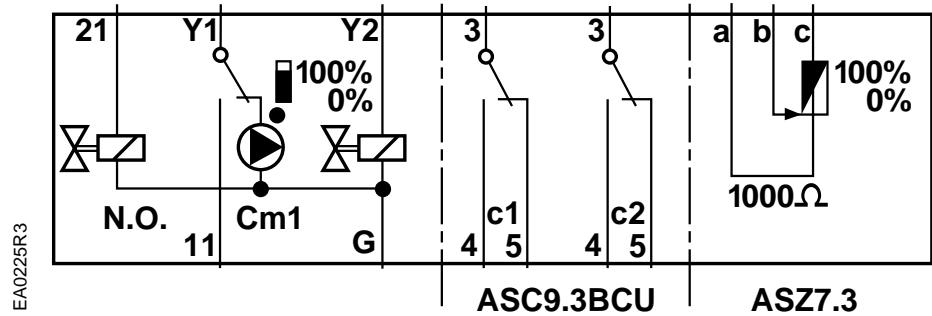
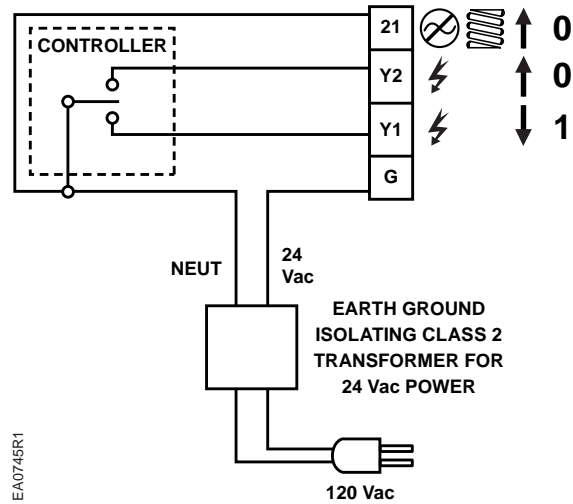


Figure 12. Spring Return Wiring Diagrams.

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

Accessory

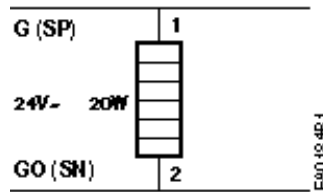


Figure 13. Packing Heating Element 599-00418.

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

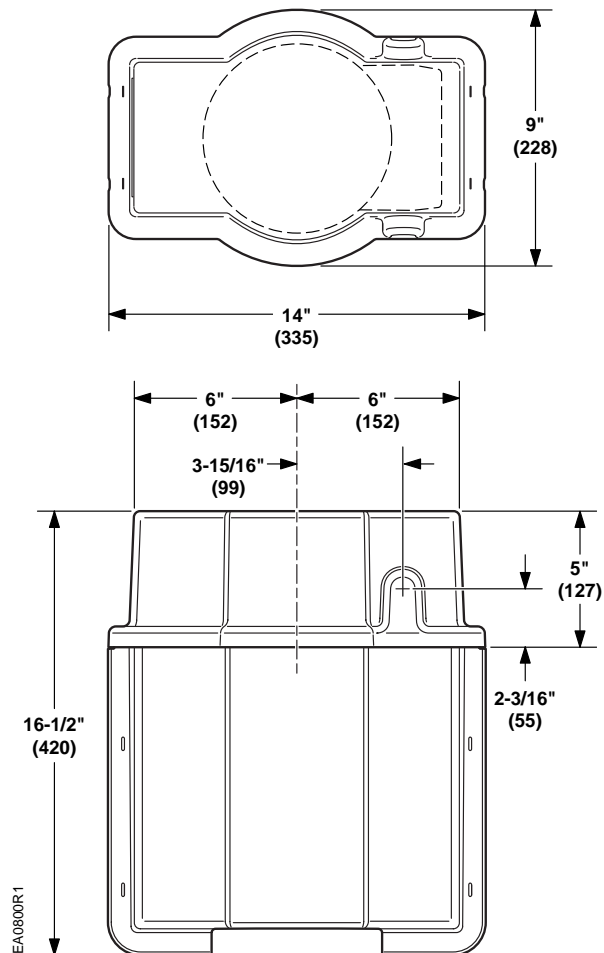


Figure 14. Dimensions of the 599-10065 Weather Shield shown in Inches (Millimeters).

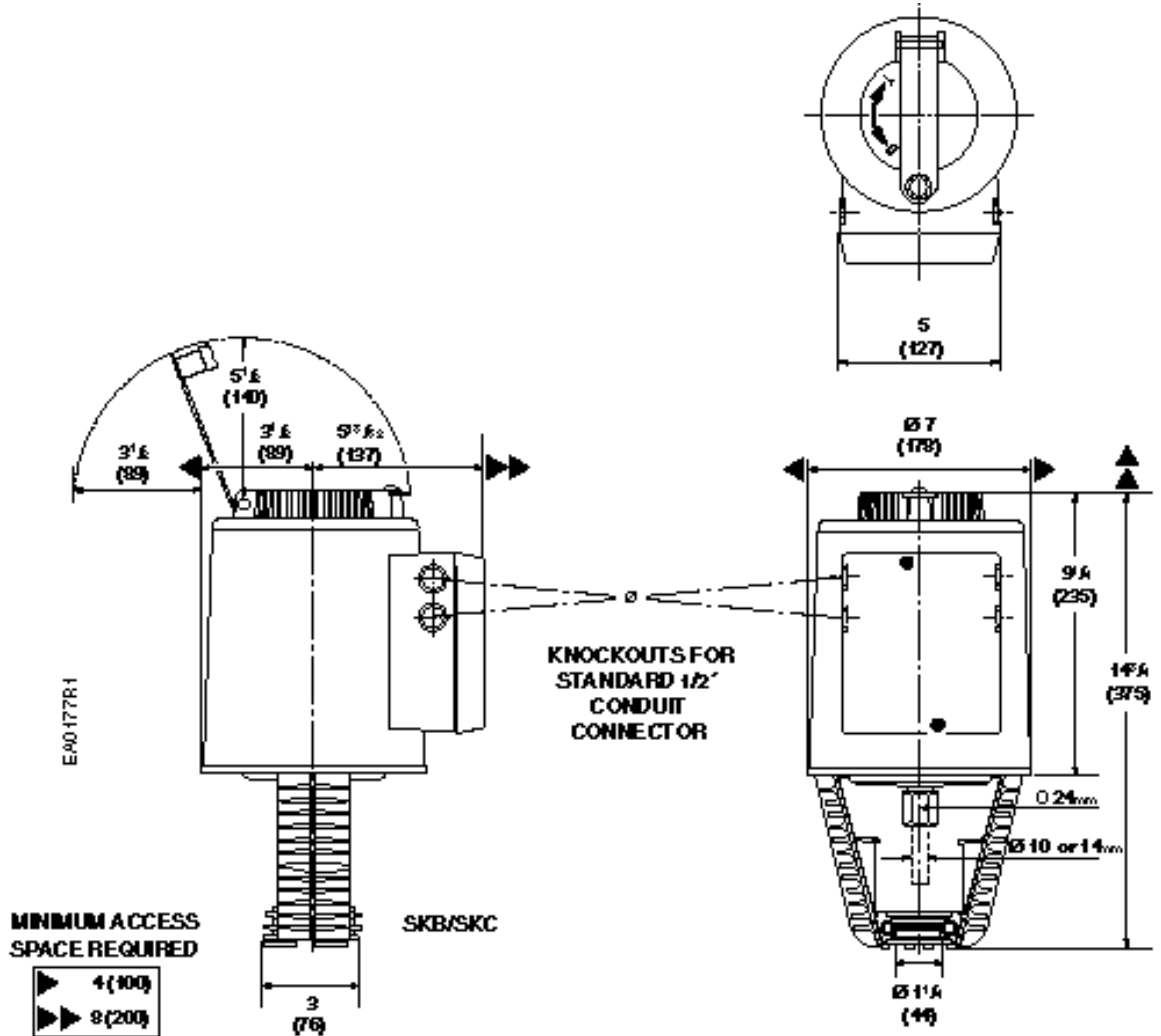


Figure 15. Dimensions of SKB/C Shown in Inches (Millimeters).

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