ELECTRIC FAIL-SAFE ACTUATOR
Safe & Secure Series SNS20-28
 Installation, Operation & Maintenance Manual
INTRODUCTION:
Thank you for selecting Indelac Controls, Inc. (ICI) for your valve or damper automation requirement. We at ICI are proud of our products and feel confident they will meet or exceed your expectations of quality and reliability.

Every precaution has been taken to insure that your equipment will arrive undamaged; however, accidents do occur. Therefore, the first thing you must do upon receipt of your package is to inspect it for damage. If the box is damaged there is a possibility that the equipment inside the box may be damaged as well. If this is the case YOU MUST FILE A CLAIM with the delivering CARRIER. All shipments are F.O.B. our factory and it is YOUR RESPONSIBILITY to file a claim for damages.

STORAGE:
If the actuators are scheduled for installation at a later date:
1. Store off the floor.
2. Store in a climate controlled building.
3. Store in a clean and dry area.

FOR FUTURE REFERENCE RECORD:
1. Actuator model number
2. Actuator enclosure type NEMA 4__, NEMA 4X__, NEMA 7__, NEMA 4 & 7
3. Actuator output torque ____________LB-IN
4. Motor characteristics, Voltage ____________ Hertz ____________ Phase ____________
5. Actuator serial number
6. Date of installation ____________ Put into operation ____________
7. Valve Data:
   7a. Manufacturer
   7b. Style & fig. No.
   7c. Size
   7d. End connection
   7e. Material of construction, Body ____________ Stem & ball ____________
   7f. Brake away torque ____________LB-IN @ ____________ PSI
   7g. Other helpful data

MEDIA:
1. System media
2. Temperature, _____ (deg. F.) Maximum, _______. Minimum, _______.
3. Pressure ____________ PSI

*As this information is listed it is important to pay attention to all of the actuator specifications relative to the valve specifications and system requirements. If the actuator is not properly sized for the valve and application the life will be shortened or it may not work at all.
TOOLS REQUIRED:

*Additional tools will be required for the screws to mount the valve to the actuator.

**SNS20 – 28C SERIES**

<table>
<thead>
<tr>
<th>Tool Description</th>
<th>Tool Size/Type</th>
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<tr>
<td>Cover Screws</td>
<td>7/16&quot; Socket</td>
</tr>
<tr>
<td>Terminal Strip Screws</td>
<td>3/16&quot; Wide Flat Head Screwdriver</td>
</tr>
<tr>
<td>Cam Set Screw</td>
<td>5/64&quot; Allen Wrench</td>
</tr>
<tr>
<td>Mounting Pad Screws</td>
<td>9/16&quot; Socket</td>
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</tbody>
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**SUGGESTED MAXIMUM TORQUE VALUES FOR FASTENERS (In-Lbs.)**

<table>
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<tr>
<th>Screw Size</th>
<th>Low Carbon Steel</th>
<th>18-8 SS</th>
<th>316 SS</th>
<th>Aluminum</th>
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<td>2.5</td>
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<td>8-32</td>
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<td>10-24</td>
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<tr>
<td>10.32</td>
<td>30</td>
<td>32</td>
<td>33</td>
<td>19</td>
</tr>
<tr>
<td>1/4-20</td>
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<tr>
<td>5/8-11</td>
<td>1000</td>
<td>1110</td>
<td>1160</td>
<td>715</td>
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PRODUCT DESCRIPTION:

The SNS20 – 28C Safe & Secure Series Actuator is a quarter turn Open/Close Actuator with Battery Backup Power – ALL IN ONE! No more mounting a separate Fail Safe Unit to provide power in case of external power failure. The actuator’s internal battery will provide power to the motor in the event of an external power failure. The actuator can be configured in the field for FAIL OPEN or FAIL CLOSE.

This new series of actuator can operate loads from 2000 in/lbs. to 2800 in/lbs. These actuators can be ordered to operate on input voltages of 115vac, 230vac, 24vac, 24vdc or 12vdc and are enclosed in a standard “L” series NEMA 7 style housing.

Switching from external power to battery power is seamless – when the external power source fails, the internal transfer circuit switches to battery power automatically without any operator intervention. Depending on the fail setting that the operator made for the actuator, the valve will go to that position. Once the external power is restored, the actuator will automatically switch back to external power and the battery will be re-charged! The actuator will then return to its last position before the power had failed.

This unit is available as a Standard OPEN/CLOSE Actuator or with the Modulating Option for precise valve position control using 4-20mA, 0-10V or 1-5V external input signal.

UNIT SPECIFICATIONS:

- Enclosure rating: NEMA 4 Standard; NEMA 7 also available
- Motor Duty Cycle: 75% Standard
- Weight: 40 Lbs.
- Mounting Pad: ISO 5211 F10 BC 4.015"
- Operating Voltages: 115vac, 230vac, 24vac, 24vdc, 12vdc
- Incoming Power Fuse: TR5 Pico Fuse, 250V / 5A
- Motor Fuse: 10A Glass Cartridge, Slow Blow 5x20mm
- Power: 120 Watts Max. / add 20 Watts for optional heater
- Position Indication: Dome Style Visual Indicator
- Battery: 12vdc, 2.9AHr
- Battery Recharge Time: Approximately 8 Hours
- Battery Life on Trickle Charge: 4-5 years
- Auxiliary Switch Rating: Dry Contact, 15 Amps @ 125vac
- Input Signal Contact Rating: 12vdc @ 1A
- Temperature Range: -40°F to 150°F
- Heater and Thermostat required below 0°F
MECHANICAL MOUNTING:

The Safe & Secure Actuator can be direct mounted to any valve using the standard ISO 5211 F10 Output. See the drawing below for the actuator output mounting dimensions for valves requiring mounting hardware.
CUSTOMER ELECTRICAL CONNECTIONS FOR STANDARD OPEN/CLOSE:

All customer electrical connections are done per the below wiring diagrams. Incoming power should be wired using 12awg minimum. Control signal wiring may be 22awg or larger for direction control and indicator lamps. All wiring is to be completed through the conduit opening using the appropriate conduit – Refer to your local electrical codes. Remove the actuator cover by loosening the cover screws and pulling straight up on the cover to complete the wiring and set-up.

WARNING!
Pay close attention to the Wiring Diagrams when connecting the input power to the actuator. Improper power connection can result in damage to the actuator or serious injury to the installer.
NOTE: Make sure the connectors are fully seated after making all wiring connections.
CUSTOMER ELECTRICAL CONNECTIONS FOR MODULATING OPTION:

AC CONNECTION WITH 4-20mA CONTROL WIRING DIAGRAM
24VDC CONNECTION WITH 4-20mA CONTROL WIRING DIAGRAM
**ACTUATOR SET-UP FOR STANDARD OPEN/CLOSE ACTUATOR:**

After the actuator is mounted mechanically to the valve and the external electrical wiring is complete, the actuator is ready for set up. The actuator cover will need to be removed, if not already done so.

1) On the circuit board, move the “Fail Switch” to the desired “FAIL” position. The description of the 2 positions are as follows:

   OPEN = ACTUATOR WILL MOVE TO THE OPEN POSITION WHEN POWER FAILS.
   CLOSE = ACTUATOR WILL MOVE TO THE CLOSE POSITION WHEN POWER FAILS.

   **DO NOT switch the FAIL switch while the actuator is moving – Turn OFF power before moving switch!**

2) Plug the battery connector onto the battery RED Terminal. **NOTE:** If the “Fail Switch” was moved to the “CLOSE” position, the actuator will begin to move to the Close location since the actuator is shipped in the OPEN Position.

3) Apply external power to the actuator.

4) Using the external direction control signal, run the actuator open and closed to verify that the valve is opening and closing fully. If not, the Open and Close CAMs may be adjusted to allow more or less motion in both directions. The CAM set screw needs to be loosened to rotate the CAM. Re-tighten the set screw when the desired valve position is achieved.

   **If control signal is provided by a PLC, program needs to incorporate a delay between the OPEN & CLOSE signal.**
ACTUATOR SET-UP FOR MODULATING OPTION ACTUATOR:

After the actuator is mounted mechanically to the valve and the external electrical wiring is complete, the actuator is ready for set up. The actuator cover will need to be removed and the enclosure door opened, if not already done so.

1) The Safe & Secure board will supply power to the Modulating Controller Board, which is located inside the external enclosure. When the incoming power to the unit fails, the battery will supply power to the Controller Board and run the motor to the selected FAIL position.

2) Set the DIP Switch #3 to ON (up) & #4 to OFF (down) on the DMC 102 Controller Board. This will run the actuator to the CLOSED position in the event of a loss of input control signal. If it is desired to have the actuator go to the OPEN position when the input signal is lost, then DIP Switch #3 is set to OFF (down) & #4 is set to ON (up).

3) Plug the battery connector onto the battery RED Terminal.

4) Apply external power to the actuator.

5) Apply the input signal (4-20mA, 0-10v, etc.) to run the actuator open and closed to verify that the valve is opening and closing fully. If not, the ZERO and SPAN pots on the Controller Board may be adjusted to allow more or less motion in both directions.
OPERATION:

Upon applying external supply power to the actuator, the Blue LED on the Safe & Secure Board should illuminate indicating that the power from the external source is on. When the external power fails, the Blue LED will turn off and the Green Battery LED will illuminate indicating that the actuator is now running on battery power. When this occurs, the actuator will move to the desired position (OPEN or CLOSED), as selected by the operator during set-up.

For example, if the actuator is moving towards the Open position with the Fail Switch set for CLOSED, the actuator will STOP, and move to the Closed position if the external power should fail.

On the Modulating version, the actuator will continue to operate from the input signal, as long as it is present. **Only when the input control signal fails, will the actuator move to the CLOSED or OPEN FAIL set position.**

If the Safe and Secure Board Green LED should turn off and the Red LED turn on, this indicates that the battery power is low. The battery either needs to be charged or replaced. There is a battery charge circuit built into the Safe & Secure actuator that will charge the battery when the external power is on. If after 8 hours of “on board” charging, the Red LED remains on, then the battery needs to be replaced. **If the battery is too low, the actuator will FAIL in place.**

With the external power on, switch the direction control contact or change the input control signal from Open to Close to verify that the actuator/valve Opens and Closes. The Open and Close LEDs on the Safe and Secure Board will turn on when moving in that selected direction. The Close Lamp will come on when the valve gets to the fully closed position.

If the Optional Heater and Thermostat have been installed, the Heater will operate when the external power supply is on. If the external power supply should fail and the actuator runs on battery power, the Heater will **NOT** be operational.

EXTERNAL INDICATOR WIRING CONNECTIONS:

The diagram below describes the wiring connections that may be made by the user to remotely indicate the condition of the Safe and Secure Actuator. The relay connections on the board are dry contact rated for up to 250v and can handle current loads of up to 5A. Indication can be wired to inform the user if the actuator is running on external power source or internal battery. Separate indicators can be wired so that when a user wired Test Switch is closed, the battery condition can be detected.
TESTING AND TROUBLESHOOTING:

Battery Condition Test
1) Install a switch or jumper wire into J11 terminals 11 & 12.
2) Indicator Lamps can be installed into J11 terminals 8, 9 & 10 as shown in the diagram, for external indicators.
3) Short the jumper or close the Test Switch.
4) If the Red LED on the Safe and Secure Board (and/or external LOW BATTERY Lamp) illuminates, the battery is low.
5) Apply external power to the actuator and verify that the Blue LED illuminates.
6) Wait 8 hours and close the Test Switch again.
7) If the Green LED on the Safe and Secure Board (and/or external BATTERY GOOD Lamp) illuminates, the battery is good and is charged.
8) If the Red LED is still lit, or is OFF, the battery is bad and needs to be replaced.

Power Test  **DO NOT CHANGE ANY SWITCH SETTINGS WITH THE POWER ON**
1) Apply external power to the actuator. The Blue LED should illuminate.
2) If there is no Blue LED, check that the incoming power is terminated & the breaker is on.
3) Next, verify that the power is correctly connected to the actuator and the wires are tight in the input connector.
4) Make sure that the input voltage is connected to the proper terminals.
5) If still no Blue LED, check the on board fuse (TR5 style – brown) in the Safe & Secure Actuator.
6) If the fuse is blown, replace the fuse.
7) If the fuse is good, the circuit board is bad and needs to be replaced.
8) On modulating versions, a control input signal needs to be present to run the actuator.

DUTY CYCLE:
All SNS 2000 Series actuators are rated 75% duty cycle at 100% ambient temperature at rated torque.

THERMAL OVER LOAD:
The Safe and Secure series actuator motors are internally fused with a 10A glass cartridge slow blow fuse. When the motor current rises to an overload level, the on-board fuse will blow and need to be replaced. The fuse must be replaced with an equivalent fuse to keep from damaging the system. It is the responsibility of the operator to check the entire system and clear any jams or valve binding prior to restarting the system.

MECHANICAL OVER LOAD:
ICI’ actuators are all designed to withstand stall conditions. It is not recommended to subject the unit to repeated stall conditions; however, should it occur the actuator would not experience gear damage.

ORDERING PARTS:
When ordering parts please specify:
Actuator Model Number, Actuator Serial Number, Part Number & Part Description.

RECOMMENDED SPARE PARTS:
Set of limit switches, spare battery, spare fuses for specified input voltage.
NEMA 7 ENCLOSURE, GENERAL:

In general, operation and maintenance of a NEMA 7 electric actuator is no different than that of a NEMA 4 electric actuator. However, there are some precautions that must be followed.

1. **DO NOT** install in ambient temperatures that exceed 140 degrees F.

2. **DO NOT** under any circumstances remove the actuator cover while in a hazardous location when the contacts are still live, this could cause ignition of hazardous atmospheres.

3. **DO NOT** under any circumstances use a NEMA 7 electric actuator in a hazardous location that does not meet the specifications for which the actuator was designed. The actuator is clearly tagged with the NEMA classification it was designed for.

4. Mount, test and calibrate actuator on valve in non-hazardous location.

5. When removing the cover care must be taken not to scratch, scar or deform the flame path of the cover or base of the actuator, this will negate the NEMA 7 rating of the enclosure.

6. When replacing the cover on actuators rated NEMA 4 and 7 take care that the gasket is in place to assure the proper clearance after the cover is secured. After securing the cover screws check the clearance between the cover and the base, a .002" thick by 1/2" wide feeler gauge may not enter between the two mating faces more than .125".

7. All electrical connections must be to state and local codes and in accordance with the specifications for which the unit is being used.

*After proper installation the actuator will require little or no maintenance. In the event maintenance is required remove it from the hazardous location before attempting to work on it. If the actuator is in a critical application and down time is not permitted it is advisable to have a spare actuator in stock.*
## Frequently Asked Questions

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<th>PROBLEM</th>
<th>SOLUTION</th>
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<td>Power not on</td>
<td>Turn on power</td>
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<td></td>
<td>Actuator wired wrong</td>
<td>Check wiring diagram &amp; rewire</td>
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<td>Wrong voltage</td>
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<td>Actuator and valve in opposite positions when actuator was mounted.</td>
<td>Remove actuator and rotate 90 degrees &amp; remount</td>
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<td></td>
<td>Fuse Blown</td>
<td>Replace with proper value fuse</td>
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<td>Valve torque too high for actuator</td>
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<td></td>
<td>Mechanical stops not removed</td>
<td>Remove stops, CAUTION: Do not remove any part required for proper operation</td>
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<tr>
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<td>Valve torque too high for actuator</td>
<td>Install correct size actuator</td>
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<td>Motor brake out of adjustment.</td>
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<td></td>
<td>Set screw loose in brake disc</td>
<td>Adjust brake and tighten set-screw</td>
</tr>
<tr>
<td><strong>Motor Runs But Output Shaft Does Not Rotate.</strong></td>
<td>Gear damage or sheared pin</td>
<td>Contact ICI or nearest distributor</td>
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Contact Information

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