



Chemical Injection Technologies

Installation/Service Bulletin

SAFE-T-CLOSE™ -- GAS CYLINDER OR TON CONTAINER VALVE SAFETY CLOSING SYSTEM

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1.0– GENERAL

1.1– PURPOSE

The **SAFE-T-CLOSE™** system is intended to safely close a gas cylinder or ton container valve when electronically triggered to do so. This system is ideally paired with a gas leak detection device, such as the **SUPERIOR GAS DETECTOR**, to automatically and safely close any open cylinder or ton container valves in the event that a gas leak is detected. The **SUPERIOR SAFE-T-CLOSE™** can also have remote E-STOP style emergency buttons, as well as any dry-contact normally-open switch/relay connected to it that will allow a button press or SCADA signal to remotely actuate the closure of all valves connected to the system. The systems primary power source is an integrated battery held within the controller which, when fully charged, will operate the system for up to multiple days depending on valve actuation frequency.

1.2 - DESCRIPTION AND FEATURES

The SAFE-T-CLOSE™ system is composed of a single controller and up to six (6) actuators to simultaneously close up to six (6) cylinder or ton container valves.

1.2.1 CONTROLLER FEATURES

- There are two (2) controller options for the SAFE-T-CLOSE™ system.
 - The STC-CON-1 controller can be used with up to two (2) actuators.
 - The STC-CON-2 controller can be used with up to six (6) actuators.
- The controllers are equipped with one (1) dry-contact relay for each actuator (up to 6) connected to the controller to indicate the status of the valve. The relay contacts will close when the actuator has closed its respective valve.
- The controllers are equipped with one (1) dry-contact relay to indicate when the battery has reached a critically low level. The relay contact will close once the series battery voltage reaches 21VDC.
- An on-board user selectable power supply voltage switch is used to switch the input power from 110VAC to 220VAC.

1.2.2 ACTUATOR FEATURES

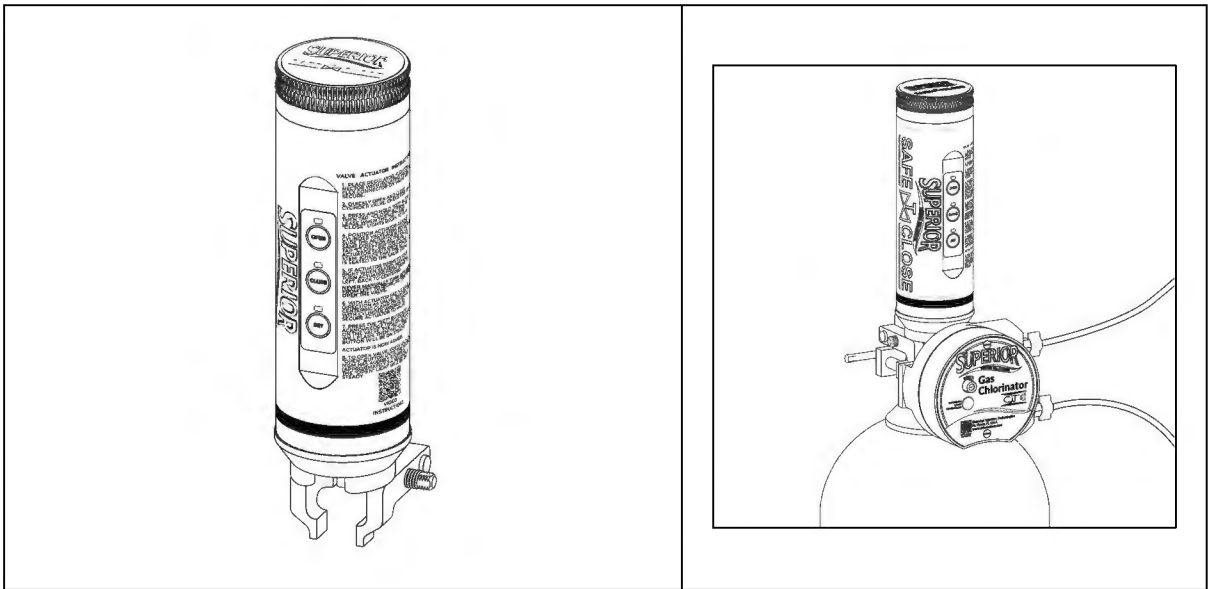
- There are three (3) actuator options for the SAFE-T-CLOSE™ system.
 - The STC-AC-1 actuator is designed to be mounted directly on a 150lb cylinder valve.
 - The STC-AC-2 actuator is designed to be mounted on the top (gas) valve of a ton container. It is offset from the valve stem axis to allow space for use of a ton container adaptor and direct mount vacuum regulator.
 - The STC-AC-3 actuator is designed to be mounted directly on the top (gas) valve of a ton container. This actuator should be used when the ton container is directly connected to a gas pressure manifold instead of a valve mounted vacuum regulator.
- The clamping mechanism on the actuators uses a custom machined screw mechanism to self-center for ease of mounting.
- The actuators can open the valve with the press of a button.
- The actuators are equipped with a high gear-reduction ratio to generate 50 ft-lb of torque for effective valve operation.
- Each actuator can be placed up to 100 ft away from the controller. Standard supplied cables are 30 ft long.
- The LEDs on the actuator can be used to indicate valve status, diagnostics, and display battery level.
- Each actuator is preset from the factory to open the cylinder/container valve stem ½ turn. ***Optional** This can be changed at the factory to ¼ turn, ¾ turn, or 1 full turn of the valve stem.
- ***Optional** Each actuator has a built-in safety mechanism that will automatically close the valve if the battery level becomes critically low. **This feature is disabled by default from the factory and must be requested when ordering.**

***Contact CHEMICAL INJECTION TECHNOLOGIES for more information on optional features.**

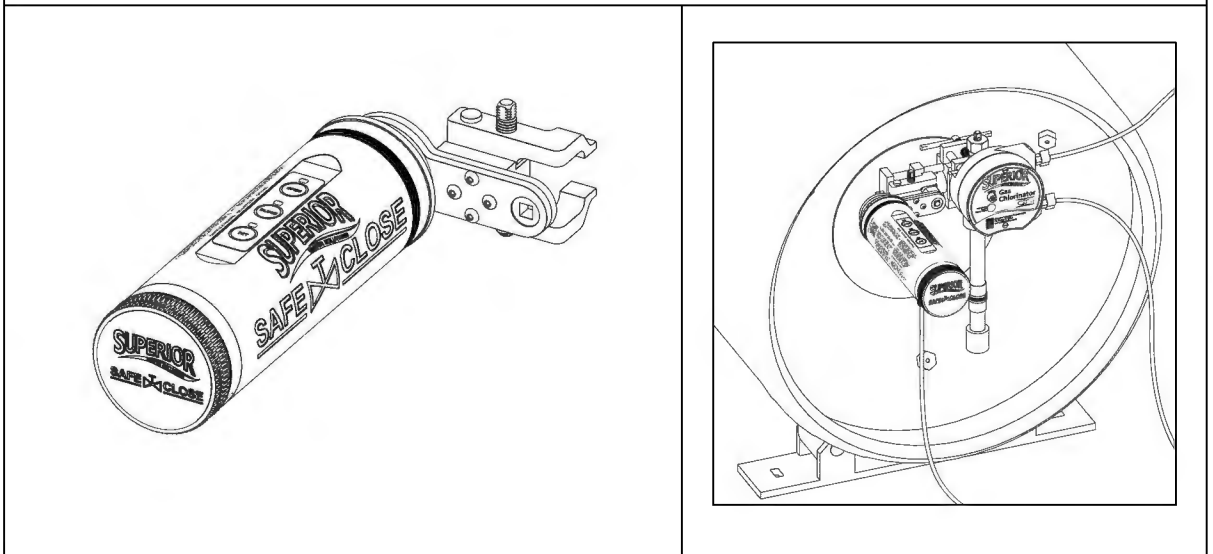
1.3 - TECHNICAL SPECIFICATIONS

ELECTRICAL SPECIFICATIONS		PHYSICAL SPECIFICATIONS	
INPUT VOLTAGE	110V/220V @ 50/60Hz	CONTROLLER ENCLOSURE MATERIAL	FIBERGLASS REINFORCED POLYCARBONATE
POWER CONSUMPTION	5W [IDLE], 20W [CHARGING]	CONTROLLER ENCLOSURE RATING	IP67 [MEETS NEMA TYPE 6]
PUSH-BUTTON/RELAY INPUTS	2 [DRY CONTACT]	CONTROLLER WEIGHT	17.5 LB [STC-CON-1] TBD [STC-CON-2]
ACTUATOR CONTROL OUTPUTS	2 [STC-CON-1] 6 [STC-CON-2]	ACTUATOR TORQUE RATING	50 FT-LB
ACTUATOR STATUS RELAY OUTPUTS	2 [STC-CON-1] 6 [STC-CON-2]	ACTUATOR WEIGHT	6 LB [STC-AC-1 & STC-AC-3] 7 LB [STC-AC-2]
LOW BATTERY INDICATOR RELAY	1 [N/O]	ACTUATOR CONTROL WIRE LENGTH	UP TO 100 FT
RELAY CURRENT RATING	10A [RESISTIVE] 5A [INDUCTIVE]	DRY CONTACT INPUT WIRE	UP TO 1500 FT [20 AWG]
RELAY VOLTAGE RATING	250VAC		
BATTERIES	(2) 12V 8AH SLA		

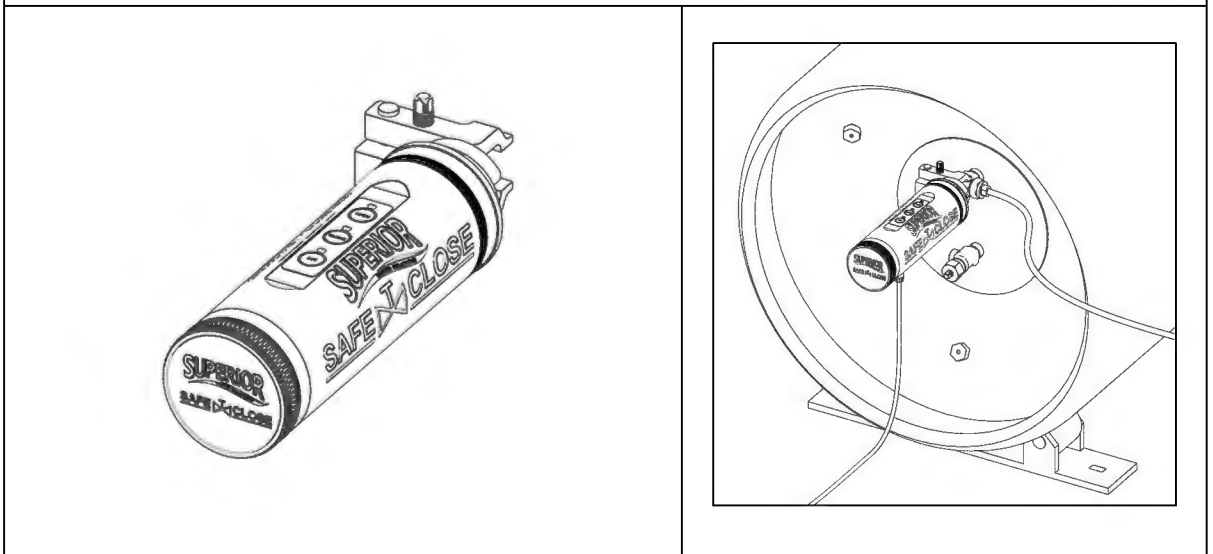
1.4- DRAWINGS AND WIRING DIAGRAMS



STC-AC-1

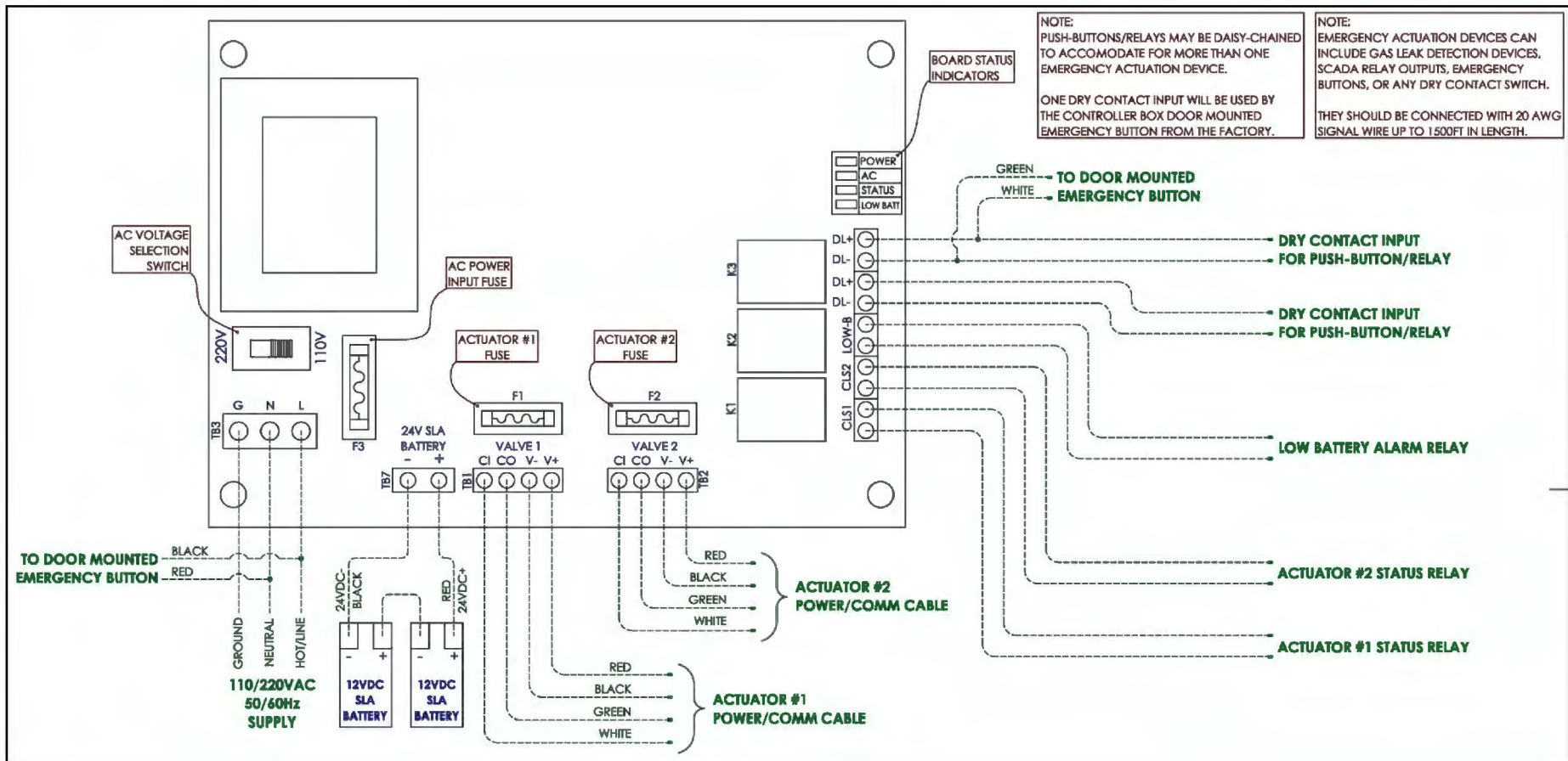


STC-AC-2



STC-AC-3

STC-CON-1 WIRING DIAGRAM



2.0– WARNINGS AND CAUTIONS

WARNING

ALWAYS FOLLOW THE PROPER SAFETY PROCEDURES WHENEVER CHANGING CHLORINE CYLINDERS/CONTAINERS.

BE CERTAIN YOU FULLY UNDERSTAND THE INFORMATION PRESENTED IN THIS PROCEDURE AS WELL AS THE INSTRUCTIONS SUPPLIED BY YOUR DISTRIBUTOR BEFORE HANDLING CHLORINE EQUIPMENT. BE SURE TO FOLLOW YOUR CHLORINE SUPPLIER'S ADVICE WHEN HANDLING CHLORINE EQUIPMENT OR CONTAINERS.

IF THERE ARE ANY PROBLEMS WITH YOUR EQUIPMENT OR IF YOU HAVE ANY QUESTIONS, CONTACT CHEMICAL INJECTION TECHNOLOGIES OR YOUR LOCAL DISTRIBUTOR. IF THERE IS ANY PROBLEM WITH THE CHLORINE CONTAINER OR VALVE, CONTACT YOUR CHLORINE SUPPLIER IMMEDIATELY.

WHENEVER CHANGING CONTAINERS, CHEMICAL INJECTION TECHNOLOGIES, INC. STRONGLY RECOMMENDS THAT A GAS MASK (A PRESSURE-DEMAND TYPE AIR PACK IS PREFERRED) BE AVAILABLE AND ALL OPERATING PERSONNEL SHOULD BE PROPERLY TRAINED IN ITS USE. CHLORINE GAS OR THE FUMES FROM CHLORINE SOLUTIONS CAN BE LETHAL IN LARGE ENOUGH DOSES. YOU SHOULD ALWAYS HAVE A CO-WORKER OBSERVE FROM A SAFE LOCATION WHEN YOU ARE WORKING ON ANY TYPE OF CHLORINATION EQUIPMENT.

CHLORINE GAS LEAKS ARE EASILY DETECTED WITH AMMONIA FUMES. A WHITE SMOKE, LIKE CIGARETTE SMOKE, WILL FORM WHEN AMMONIA FUMES COME IN CONTACT WITH CHLORINE GAS. USE A PLASTIC SQUEEZE BOTTLE PARTIALLY FILLED WITH AMMONIA SOLUTION TO SQUEEZE AMMONIA FUMES AROUND THE VALVE TO DETECT LEAKS. DO NOT POUR LIQUID AMMONIA ONTO THE CYLINDER VALVE OR CHLORINATOR TO TEST FOR LEAKS.

NEVER ALLOW LIQUID CHLORINE TO BE TRAPPED BETWEEN TWO VALVES IN A CHLORINATION MANIFOLD AS EXPANSION MAY CAUSE DAMAGE OR LEAKS TO OCCUR.

3.0– INSTALLATION INSTRUCTIONS

3.1 - UNBOXING/START-UP GUIDE

WARNING: DO NOT PLUG UNIT INTO MAINS AC POWER UNTIL STEP 5

1. Secure SUPERIOR SAFE-T-CLOSE Controller (STC-CON-1 or STC-CON-2) to panel or wall in the desired location.
2. Open the front panel of the SUPERIOR SAFE-T-CLOSE Controller and plug in the 24V SLA Battery pigtail that came pre-wired to the batteries. Refer to wiring diagram (Section 1.4) for locating 24V SLA Battery terminal socket.
3. Select the AC voltage supplied by your region's electrical grid. Mains AC voltages between 100VAC-127VAC should select the 110V option while voltages between 220VAC-240VAC should select the 220V option. Refer wiring diagram (Section 1.4) for voltage selection switch location.

WARNING

ALWAYS FOLLOW THE PROPER SAFETY PROCEDURES WHENEVER CONNECTING ELECTRICAL EQUIPMENT. FAILURE TO DO SO MAY CAUSE DAMAGE TO THE EQUIPMENT OR BODILY INJURY.

CONNECTING THE EQUIPMENT TO MAINS POWER WITHOUT PROPERLY SELECTING THE APPROPRIATE AC INPUT VOLTAGE MAY CAUSE DAMAGE TO THE EQUIPMENT. DAMAGE DUE TO IMPROPER HANDLING OF THE EQUIPMENT IS NOT COVERED BY WARRANTY.

INCORRECT WIRING, THE USE OF POWER/COMM CABLES THAT WERE NOT SUPPLIED WITH THE UNIT, OR IMPROPER GROUNDING MAY CAUSE DAMAGE TO THE EQUIPMENT. IT IS STRONGLY RECOMMENDED THAT THE CONTROLLER IS CONNECTED TO MAINS VOLTAGE THROUGH A SURGE PROTECTOR/LIGHTNING ARRESTOR TO AVOID DAMAGE TO THE UNIT DUE TO VOLTAGE FLUCTUATION. DAMAGE DUE TO VOLTAGE SPIKES OR LIGHTNING IS NOT COVERED BY WARRANTY.

4. If using the supplied pre-wired Type B electrical plug, skip this step.

Feed power supply cable through the leftmost cable gland located at the bottom of the controller enclosure. Connect the Ground, Neutral, and Line wires to the AC POWER terminal block. Make sure to also re-install the black and red wires to the Line and Neutral terminals for proper operation of the door mounted emergency button light. Make sure the wires are all secured tightly within the terminal blocks by lightly tugging on each individual wire. Loose wires are a hazard, see above warning.
5. Close the SUPERIOR SAFE-T-CLOSE Controller front panel and secure the latches to ensure the electronics are protected from dust/moisture ingress. Plug the controller into mains power.
6. The SUPERIOR SAFE-T-CLOSE Controller will now begin charging the batteries. Depending on the state of charge of the batteries when the controller was first connected to mains power, charging can take UP TO 24 hours to complete (0% to 100%). To avoid damaging the batteries, it is best to allow the unit to charge for at least one (1) hour to ensure there is enough charge to complete actuator mounting.

NOTE: If you CAN NOT wait one (1) hour, you can easily check the battery charge level by connecting an actuator to the supplied 30ft. Actuator Power/Communications cable (Step 2 of the appropriate actuator mounting instructions in Section 3.2), then press the "SET" button on the actuator. The pattern of the indicator lights on the actuator will tell you the charge status of the battery. Refer to Section 4.3 to determine battery charge status. If the battery charge is above 24% (no blinking indicators), the batteries are charged enough to move on to mounting (Section 3.2)

3.2 - MOUNTING ACTUATOR

WARNING

ALWAYS CHECK EXISTING EQUIPMENT FOR LEAKS AT EVERY THREADED JOINT AND GASKET JOINT LOCATION THAT WILL BE EXPOSED TO PRESSURIZED GAS PRIOR TO INSTALLING A SAFE-T-CLOSE ACTUATOR. THIS INCLUDES FLEXIBLE CONNECTORS THAT THREAD DIRECTLY ONTO VALVES, PRESSURE MANIFOLD JOINTS, VACUUM REGULATOR INLET GASKETS, TON CONTAINER ADAPTOR INLET/OUTLET GASKETS, AND VALVE JOINTS.

CHLORINE GAS LEAKS ARE EASILY DETECTED WITH AMMONIA FUMES. A WHITE SMOKE, LIKE CIGARETTE SMOKE, WILL FORM WHEN AMMONIA FUMES COME IN CONTACT WITH CHLORINE GAS. USE A PLASTIC SQUEEZE BOTTLE PARTIALLY FILLED WITH AMMONIA SOLUTION TO SQUEEZE AMMONIA FUMES AROUND THE VALVE TO DETECT LEAKS. DO NOT POUR LIQUID AMMONIA ONTO THE CYLINDER VALVE OR CHLORINATOR TO TEST FOR LEAKS.

3.2.1 – STC-AC-1

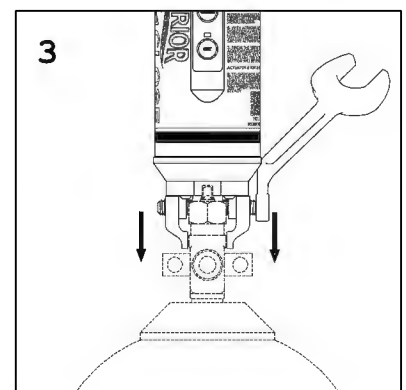
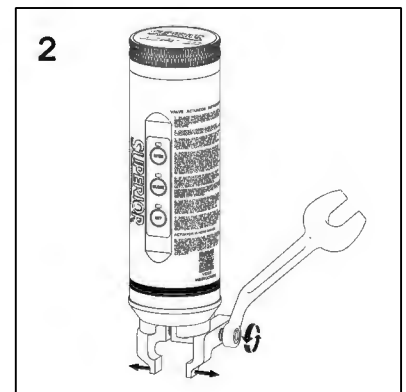
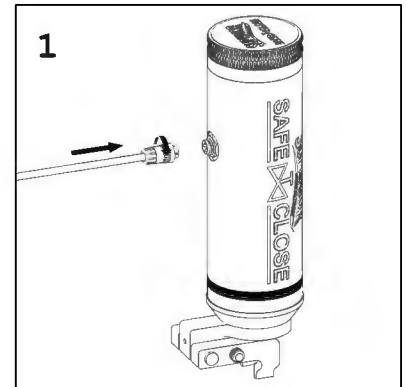
The STC-AC-1 Actuator is designed to be mounted vertically onto the valve of a gas cylinder. Typical gas cylinders would include chlorine, ammonia, and sulfur dioxide. If using a vacuum regulator, be sure to install the regulator onto the cylinder prior to installing actuator.

1. Make sure the vacuum regulator or flexible connector is already securely attached/mounted onto the cylinder valve and the valve is **CLOSED** before installing the actuator. Use a cylinder wrench to verify that the valve is closed.
2. Connect the supplied 30ft. actuator power/communications cable to the back of the actuator making sure to align the male 4-pin connector correctly with the female 4-pin socket. Twist the connector collar clockwise to lock connector to the actuator. (Figure 1)
3. While holding the actuator in your hands, **BEFORE MOUNTING ONTO VALVE**, press and hold the “SET” button, then tap the “CLOSE” button. Once the SET and CLOSE indicators begin blinking 🟢🟡 you have successfully entered SETUP MODE, the “SET” button can be released.
4. Using the box end of a cylinder wrench, pre-adjust the width of the self-centering mounting clamp to slightly wider than the width of the cylinder valve by turning the clamp adjustment screw. If the cylinder valve has a regulator mounted to it, make sure mounting clamp arms are not set too wide that the clamp arms will run in to the yoke during mounting. (Figure 2)
5. With the clamp arms pre-adjusted, hold the actuator above valve and place the actuator on top of the valve stem. If the actuator does not make contact with the valve stem, adjust the clamp arms to ensure they are not interfering with the regulator yoke or any raised edges on the valve. (Figure 3)

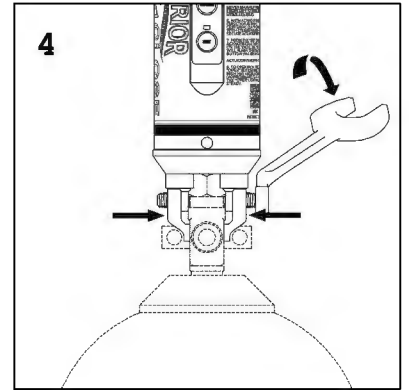
[NOTE: Vacuum regulator not shown in step-by-step images. Regulator should already be installed prior to mounting actuator.]

6. Tap the “CLOSE” button on the actuator to align the actuator’s square socket with the square on the valve stem. Keep tapping the “CLOSE” button until the actuator drops down onto the valve, signaling successful alignment of the actuator socket and valve stem.

If the motor no longer continues turning as you press the “CLOSE” button, the motor position sensor has reached its rotation limit and the setup process must be restarted. Remove the actuator from the cylinder valve, press the “SET” button, wait until all the indicator lights have stopped flashing, then go back to Step 3.



- Once the actuator is completely seated down onto the valve stem, tighten the self-centering mounting clamp by turning the mounting screw clockwise with the box end of a cylinder wrench. Tighten firmly. (Figure 4)

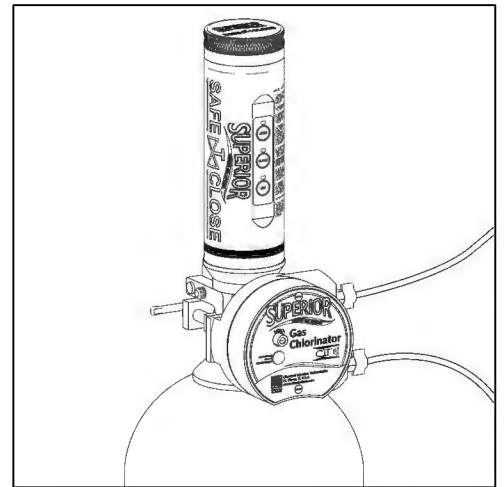


- Tap the “CLOSE” button two times to apply full motor torque to the valve stem, then press the “SET” button to confirm that the valve is closed and the actuator is in the closed position. The SET indicator will blink ☀️ for 3 seconds then the CLOSE indicator will turn on solid ■.

The actuator is now **ARMED**.

- The cylinder valve can now be opened by pressing **and holding** the “OPEN” button until the motor mechanism has audibly stopped. The OPEN indicator will be on solid ■ when the valve is open.

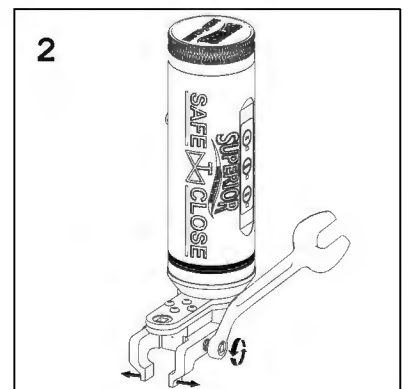
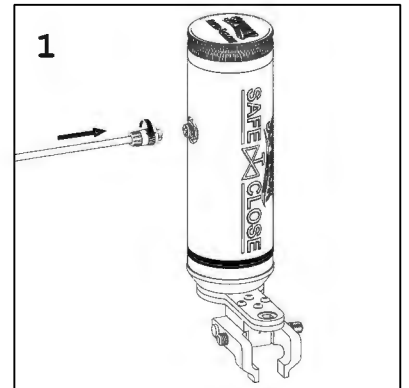
NOTE: If the OPEN indicator is **NOT** on solid after completed mounting procedure and opening the valve, the valve packing nut may be loose. Close the valve and remove the actuator (Section 3.3), tighten the valve packing nut, then reinstall the actuator by following the steps in Section 3.2.1.



3.2.2 – STC-AC-2

The STC-AC-2 Actuator is designed to be mounted horizontally, with the main actuator body offset from the container valve stem to give room for a ton container adaptor and vacuum regulator. Typically, this will be used for a chlorine ton container with ton container adaptor and vacuum regulator.

- Make sure the ton container adaptor and vacuum regulator are already securely attached/mounted onto the container valve. The ton container valve must be **CLOSED**. The ton container adaptor valve must be **CLOSED** if no vacuum regulator is already installed on the ton container adaptor, otherwise it may remain open.
- Connect the supplied 30ft. actuator power/communications cable to the back of the actuator making sure to align the male 4-pin connector correctly with the female 4-pin socket. Twist the connector collar clockwise to lock connector to the actuator. (Figure 1)
- While holding the actuator in your hands, **BEFORE MOUNTING ONTO VALVE**, press and hold the “SET” button, then tap the “CLOSE” button. Once the SET and CLOSE indicators begin blinking 🌟☀️ you have successfully entered SETUP MODE, the “SET” button can be released.
- Using the box end of a cylinder wrench, pre-adjust the width of the self-centering mounting clamp to slightly wider than the width of the container valve by turning the clamp adjustment screw. Make sure the self-centering mounting clamp is not set too wide that the clamp arms will run into the ton container adaptor yoke during mounting. (Figure 2)



- With the clamp arms pre-adjusted, hold the actuator square socket in-line with the valve stem and slide the actuator on top of the valve stem. If the actuator does not make contact with the valve stem, adjust the clamp arms to ensure they are not interfering with the regulator yoke or any raised edges on the valve. (Figure 3)

[NOTE: Vacuum regulator not shown in step-by-step images. Regulator should already be installed prior to mounting actuator.]

- While applying a small amount of force on the actuator towards the ton container, tap the “CLOSE” button on the actuator to align the actuator’s square socket with the square on the valve stem. Keep tapping the “CLOSE” button until the actuator socket seats onto the valve stem, signaling successful alignment of the actuator socket and valve stem. The offset design allows you to see the socket alignment process.

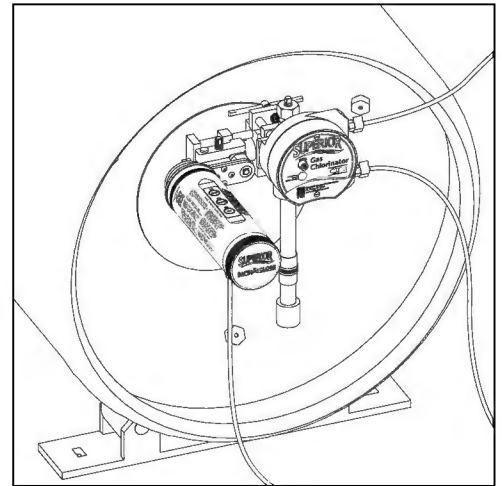
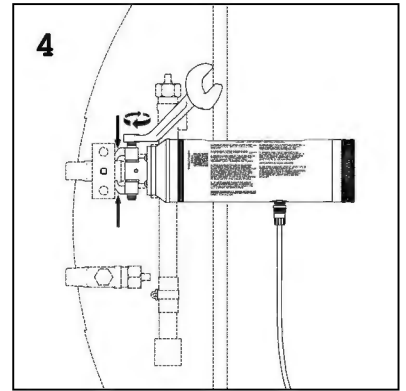
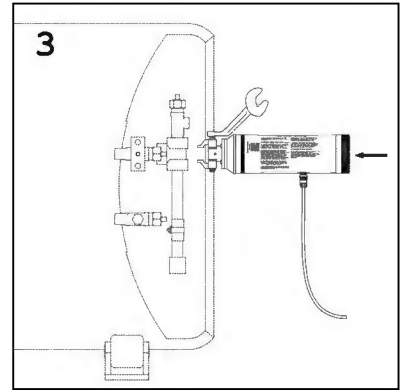
If the motor no longer continues turning as you press the “CLOSE” button, the motor position sensor has reached its rotation limit and the setup process must be restarted. Remove the actuator from the container valve, press the “SET” button, wait until all the indicator lights have stopped flashing, then go back to Step 3.

- Once the actuator is completely seated onto the valve stem, tighten the self-centering mounting clamp by turning the mounting screw clockwise with the box end of a cylinder wrench. Tighten firmly. (Figure 4)

- Tap the “CLOSE” button one or two times to apply full motor torque to the valve stem, then press the “SET” button to confirm that the valve is closed and the actuator is in the closed position. The SET indicator will blink ☀ for 3 seconds then the CLOSE indicator will turn on solid ■.

The actuator is now **ARMED**.

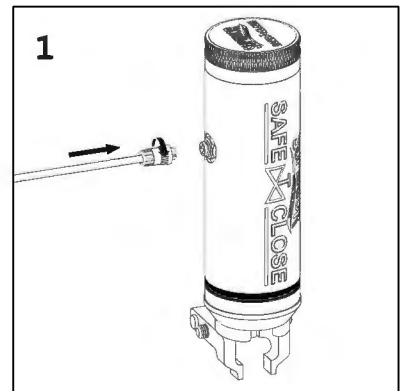
- The container valve can now be opened by pressing and holding the “OPEN” button until the motor mechanism has audibly stopped. The OPEN indicator will be on solid ■ when the valve is open.



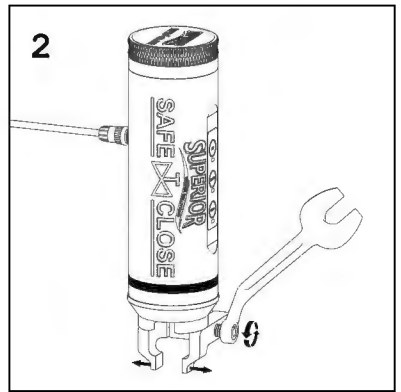
3.2.3 – STC-AC-3

The STC-AC-3 Actuator is designed to be mounted horizontally, on-axis with the ton container valve stem. Typically, this will be used for a chlorine ton container with a pressurized flexible connector attached to the ton container valve.

- Make sure the flexible connector is already securely attached/mounted onto the container valve and the valve is **CLOSED** before installing the actuator. Use a cylinder wrench to verify that the valve is closed.
- Connect the supplied 30ft. actuator power/communications cable to the back of the actuator making sure to align the male 4-pin connector correctly with the female 4-pin socket. Twist the connector collar clockwise to lock connector to the actuator. (Figure 1)
- While holding the actuator in your hands, **BEFORE MOUNTING ONTO VALVE**, press and hold the “SET” button, then tap the “CLOSE” button. Once the SET and CLOSE indicators begin blinking ☀☀ you have successfully entered SETUP MODE, the “SET” button can be released.



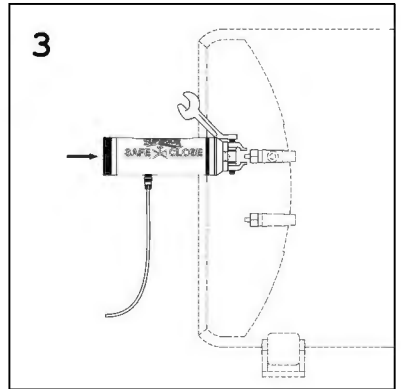
- Using the box end of a cylinder wrench, pre-adjust the width of the self-centering mounting clamp to slightly wider than the width of the container valve by turning the clamp adjustment screw. (Figure 2)



- With the clamp arms pre-adjusted, hold the actuator square socket in-line with the valve stem and slide the actuator on top of the valve stem. If the actuator does not make contact with the valve stem, adjust the clamp arms to ensure they are not interfering with any raised edges on the valve. (Figure 3)

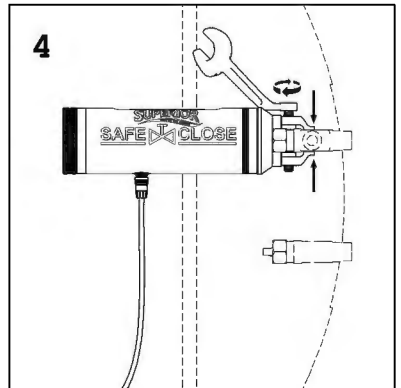
[NOTE: Flexible connector not shown in step-by-step images. Flexible connector should already be installed prior to mounting actuator.]

- While applying a small amount of force on the actuator towards the ton container, tap the "CLOSE" button on the actuator to align the actuator's square socket with the square on the valve stem. Keep tapping the "CLOSE" button until the actuator socket seats onto the valve stem, signaling successful alignment of the actuator socket and valve stem.



If the motor no longer continues turning as you press the "CLOSE" button, the motor position sensor has reached its rotation limit and the setup process must be restarted. Remove the actuator from the container valve, press the "SET" button, wait until all the indicator lights have stopped flashing, then go back to Step 3.

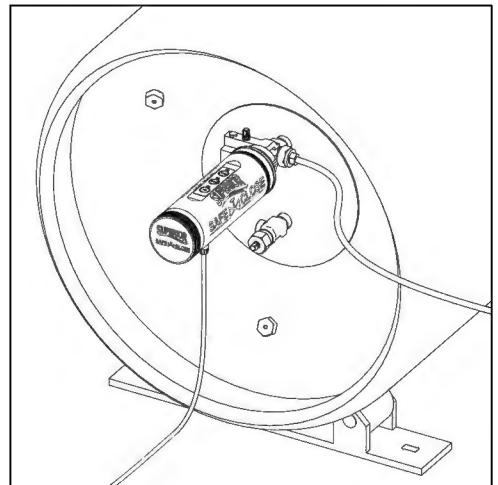
- Once the actuator is completely seated onto the valve stem, tighten the self-centering mounting clamp by turning the mounting screw clockwise with the box end of a cylinder wrench. Tighten firmly. (Figure 4)





- Tap the "CLOSE" button one or two times to apply full motor torque to the valve stem, then press the "SET" button to confirm that the valve is closed and the actuator is in the closed position. The SET indicator will blink ☀ for 3 seconds then the CLOSE indicator will turn on solid ■.

The actuator is now **ARMED**.

- The container valve can now be opened by pressing and holding the "OPEN" button until the motor mechanism has audibly stopped. The OPEN indicator will be on solid ■ when the valve is open.





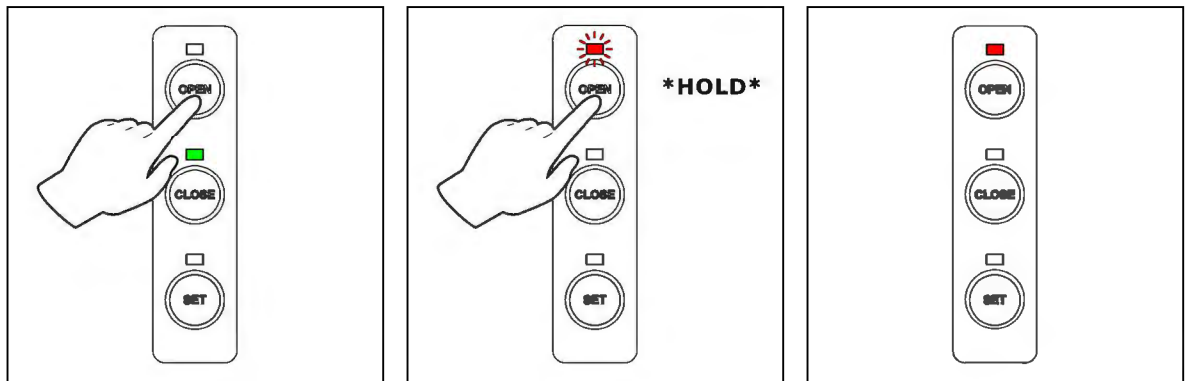
3.3 - REMOVING ACTUATOR (ALL MODELS)

1. Press the "CLOSE" button on the actuator. The CLOSE indicator will blink green  while the motor closes the cylinder/container valve. When the valve is fully closed the CLOSE indicator will remain on solid .
2. Once the CLOSE indicator is on solid, the self-centering adjustment screw can be turned counterclockwise to loosen the clamp arms from the cylinder/container valve. If removing the actuator from a valve that has a yoke attached to it, be sure not to turn the adjustment screw too far as the clamp arms will open wide enough to run into the yoke.
3. The actuator can now be removed from the valve.
To avoid damaging the actuator and causing a trip hazard, hang the actuator on the wall hook provided with the system.

4.0 – OPERATION

4.1 - OPENING VALVE

To open the valve, press AND HOLD the "OPEN" button on the front of the actuator. The OPEN indicator will blink  while the motor mechanism runs until the preset opening angle has been reached and then the motor will audibly stop. The "OPEN" button can now be released, and the OPEN indicator will remain on solid .





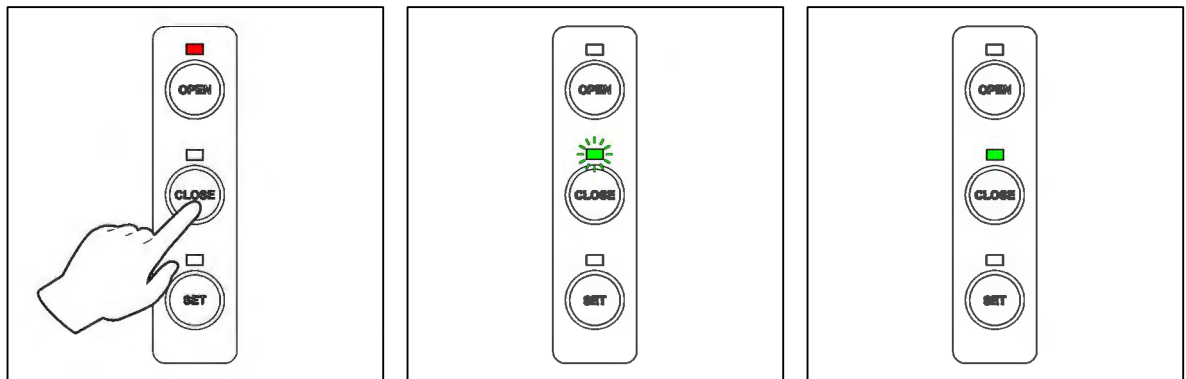
The actuator is now in the **ARMED STANDBY** mode, ready to react to a signal to close.

NOTE: The preset opening angle will open the valve one half turn (180°). The valve can be adjusted to open one-quarter turn (90°), three-quarters turn (270°), or one full turn (360°). Do not forget to mention your desired opening angle when ordering a new actuator as this setting must be adjusted at the factory. If you need the actuator opening angle adjusted, contact CHEMICAL INJECTION TECHNOLOGIES for more information.

4.2 - CLOSING VALVE

LOCAL CLOSE

To close the valve locally, press the "CLOSE" button on the front of the actuator. The CLOSE indicator will blink  while the motor mechanism runs until the valve has reached the closed position and then the motor will audibly stop. The CLOSE indicator will remain on solid .



The actuator can now be removed from the valve if executing a cylinder/container change or left closed until needed again.

ALL CLOSE

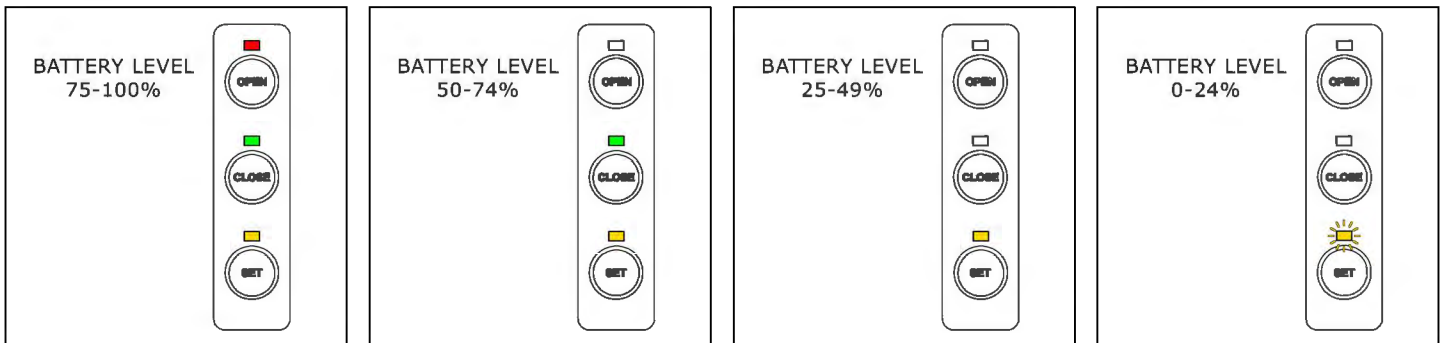
In an emergency situation, all of the actuators can be closed simultaneously the following ways:

1. Press the EMERGENCY STOP button on the front of the controller box. This will cause all valves currently connected to the controller in ARMED STANDBY mode to close.
2. Connect a gas leak detector to either DRY CONTACT INPUT of the main controller board. See wiring diagram in Section 1.4 for wiring. A gas leak detector will continuously monitor the concentration of a desired gas in the air. When a threshold setpoint has been reached, the gas leak detector will close a dry contact relay which should be connected directly to the DRY CONTACT INPUT of the main controller board (a maximum of 1500ft away). When this relay closes, this will cause all valves currently connected to the controller in ARMED STANDBY mode to close.
3. Connect a remote EMERGENCY STOP button (SUPERIOR STC-RSS) to either DRY CONTACT INPUT of the main controller board. See wiring diagram in Section 1.4 for wiring. A remote EMERGENCY STOP button can be placed up to 1500 ft away from the main controller board. When pressed, all valves currently connected to the controller in ARMED STANDBY mode will close.
4. Connect any normally-open dry contact switch or relay to either DRY CONTACT INPUT of the main controller board. See wiring diagram in Section 1.4 for wiring. When the DRY CONTACT INPUT detects the closure of contacts, such as from a normally-open switch or relay all valves currently connected to the controller in ARMED STANDBY mode will close.

4.3– CHECKING BATTERY LEVEL

The **SUPERIOR SAFE-T-CLOSE** controllers have a built-in battery that is the main supply of power for the actuators. In the case of grid level power outages or electrical maintenance, the **SAFE-T-CLOSE** system will continue to operate normally as the system feeds off the batteries.

If the system is running on batteries with the mains power charging off, it is a good idea to check on the battery charge status occasionally. This is done by pressing the “SET” button on any operational actuator that is properly connected to the controller. The indicator lights will turn on for 4 seconds which corresponds to the battery charge status. See indicator pattern below.



5.0– MAINTENANCE

5.1 – GENERAL

The **SUPERIOR SAFE-T-CLOSE** actuators and controllers do not require significant maintenance.

Be sure to keep the controller access door closed at all times other than when adding an actuator to the system, adding accessories to relays, installing a new input device, or replacing the batteries. Also be sure to seal any unused cable glands to keep dust and moisture from damaging circuit components or batteries.

5.2– BATTERIES

The **SUPERIOR SAFE-T-CLOSE** controllers have a built-in battery that is the main supply of power for the actuators. In the case of grid level power outages or electrical maintenance, the **SAFE-T-CLOSE** system will continue to operate normally as the system feeds off the batteries.

It is important to replace the batteries **YEARLY** to ensure safe and reliable function of the SAFE-T-CLOSE system. Contact CHEMICAL INJECTION TECHNOLOGIES for more information on ordering replacement batteries. Failure to replace the batteries on the recommended maintenance schedule will VOID the warranty and can lead to serious bodily injury due to failure of the system to close a valve when needed.

When replacing the batteries, the system will not be able to close a valve to which the actuators are mounted, it is important that operators are aware that the system will not function when the batteries are unplugged. It is best practice to close all valves connected to the system prior to replacing the batteries. Take any precaution necessary to avoid the need to operate the valves during battery changing procedure.

To replace the batteries, follow the procedure outlined below.

1. Remove mains power from the SUPERIOR SAFE-T-CLOSE Controller by either unplugging the power plug or shutting off the switch or breaker that is supplying high voltage to the controller.

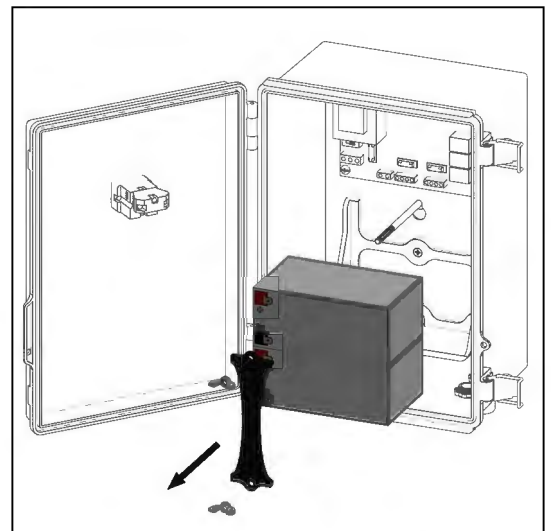
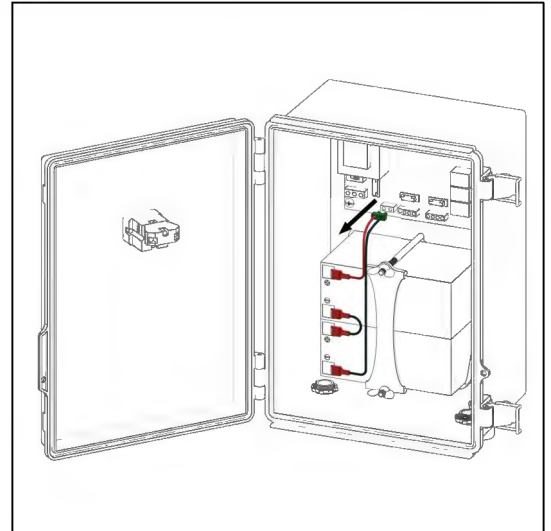
WARNING

DO NOT OPEN THE SUPERIOR SAFE-T-CLOSE CONTROLLER BEFORE TURNING OFF THE MAIN AC VOLTAGE (110/220VAC) SUPPLY UNLESS YOU ARE A PROFESSIONAL ELECTRICIAN AND HAVE THE PROPER PERSONAL PROTECTION EQUIPMENT TO WORK ON THE VOLTAGES FOUND IN THE CONTROLLER. FAILURE TO FOLLOW THIS INSTRUCTION CAN LEAD TO DAMAGE TO THE EQUIPMENT AND BODILY HARM.

2. Open the front panel of the SUPERIOR SAFE-T-CLOSE Controller and unplug the 24V SLA battery pigtail from the main controller board. Detach the wires from the battery terminals as well so you are left with the loose wires detached from the main board and the batteries. You will have the main 24V SLA battery pigtail and the series jumper wire that connects the two (2) batteries together.
3. Unscrew the two (2) thumb screws that are holding the battery tie-down bar and remove the battery tie-down bar from the top of the batteries.
4. Slide the old batteries out of the battery holder. These are Sealed Lead Acid (SLA) batteries that can be recycled by certain battery recycling centers. Contact your local battery recycling center for disposal of the old used batteries.
5. Install the new batteries in the same orientation as the previous batteries that were just removed from the controller and reinstall the battery tie-down bar securely with the two (2) thumb screws.
6. Reconnect the 24V SLA battery pigtail to the newly installed batteries. The **RED** wire connects to the **TOP** battery positive (+) terminal, while the **BLACK** wire connects to the **BOTTOM** battery negative (-) terminal. The series jumper wire then connects the **TOP** battery negative (-) terminal to the **BOTTOM** battery positive (+) terminal. See wiring diagram in Section 1.4 for more detailed view.
7. Plug the 24V SLA battery pigtail back into the main board of the controller. The power status light will turn back on in the upper right corner of the mainboard.

Close the controller front panel and latch the door to ensure the controller electronics are protected from dust, moisture, and gas leaks.

It is now safe to re-energize the equipment and resume normal operation.



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