



General Description:

SMRT is non spring return direct coupled universal actuator for any type of modulating and floating type of controls. VAV and Economizer Applications that require up to 60 inch-lbs (7 Nm) torque.

General Features:

- Programmable angular rotation up to 120° (default: 90°)
- Multiple control signals
 - 0-5vdc
 - 0-10vdc
 - 2-10vdc
 - 4-20mA
 - Floating
 - ON/OFF (2 position)
- Automatic detection of control signal
- Selectable Position feedback
 - 0-5vdc
 - 0-10vdc
 - 2-10vdc
 - 4-20mA
- All programmable features via 4 position DIP switch
- Single TRI-color LED for modulation and position indication
- 2 manual control switches for overriding of actuator position
- Removable 6 position terminal block for simple wiring termination

Specifications:

| | |
|---------------------------------|--|
| Supply voltage: | 24 VAC +/- 25%, 50/60 Hz |
| Power consumption: | 2.5 VA when internal motor energized. 0.1 VA motor off. |
| Termination: | 6 position removable terminal block |
| Control signals: | 0-5vdc 0-10vdc 2-10vdc 4-20mA Floating ON/OFF (2 position) (Note: PWM Input-interface and CS [Characterized Stroke] output capabilities offered) |
| Feedback output signals: | Programmable: 0-5vdc 0-10vdc 2-10vdc |
| Torque: | 60 lb-in (7 Nm) |
| Direction of rotation: | Programmable for Direct and Reverse Acting |
| Manual override: | Built in two momentary push buttons (CW and CCW). |
| Runtime: | 78 sec for 90° total travel-independent of load. (90 sec in 50Hz applications) |
| Total rotation: | Factory Default: 90°. Programmable to max 120° total travel. |
| Operational temp: | 145°F |
| Storage temperature: | 175°F |
| Operational humidity: | 5 – 95% RH non-condensing |
| Shaft diameter: | 1/8" in to 1/2" in diameter round or equivalent square damper shafts |
| Shaft length: | Minimum shaft length is 1.0" |
| Housing: | Aluminum |
| Weight: | 1.2 lbs (0.54 Kg) |
| Dimensions: | L: 4.500" x W: 3.200" x H: 2.000" |

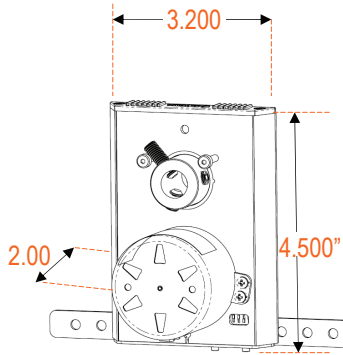


Figure 1

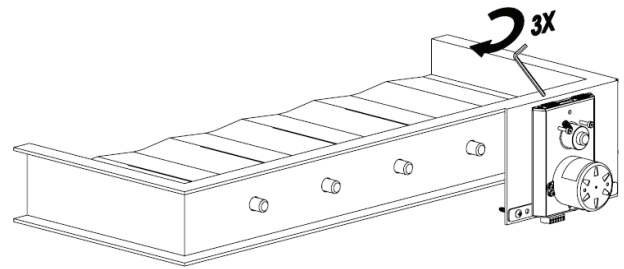


FIG. 3C: Tighten the 3-set screws and install the anti-rotation bracket. The bracket can be bent "U" shape if the actuator is raised from the mounting surface. Screw down the anti-rotation bracket on to the mounting surface with self tapping screws included (two # 6 or #8 hex self tapping).

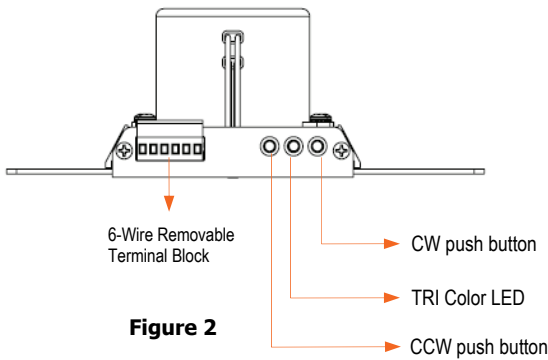


Figure 2

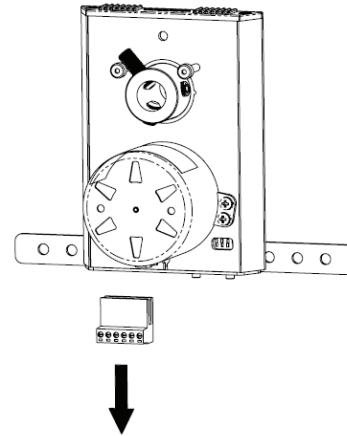


FIG. 3D: Remove the 6 position terminal block and terminal proper wiring (see page 4)

Installation: Figures 3A—3G show steps for installation on a typical damper

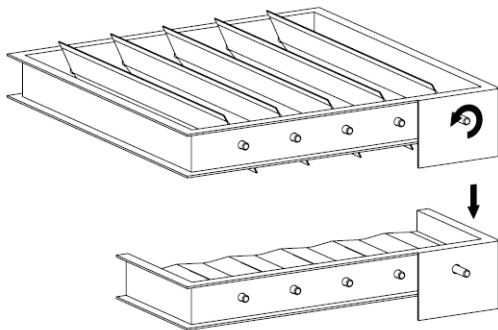


FIG. 3A: Turn the damper shaft until the blades are fully closed. SMRT is designed for Indoor applications. If required to mount outside, use proper (approved) protective enclosure.

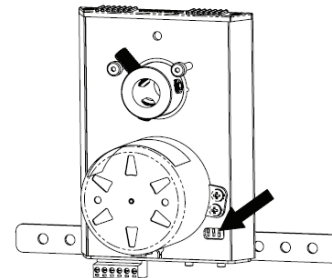


FIG. 3E: Set the 4 position program DIP switch based on the required application (see page 4)

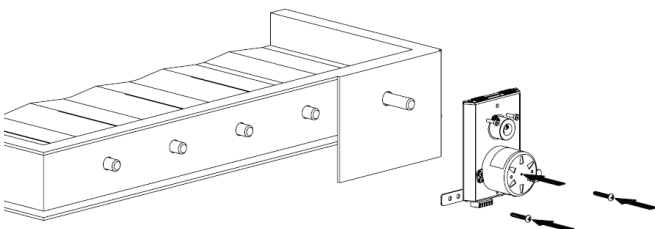


FIG. 3B: Slip the actuator over the damper shaft. SMRT can be mounted to damper shafts as low as 1.00" in length.

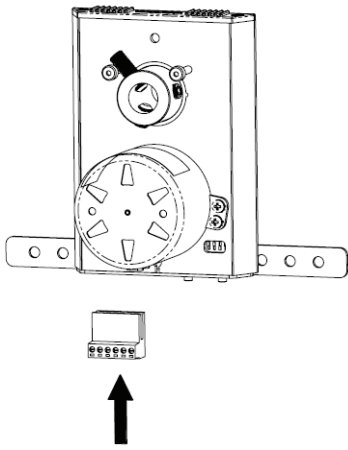


FIG. 3F: Plug the removable terminal block back in to the PCB (powering the actuator).

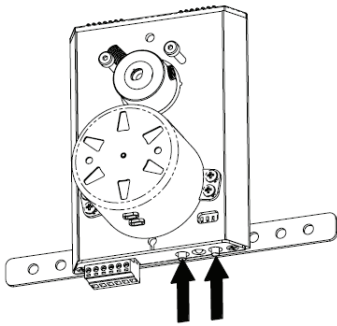


FIG. 3G: By pushing the CW and CCW push buttons, finalize the installation.

Wiring & DIP Switch Configuration:

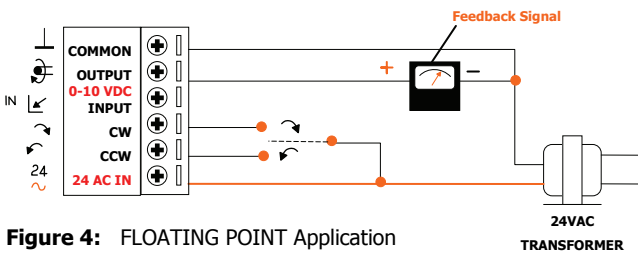


Figure 4: FLOATING POINT Application

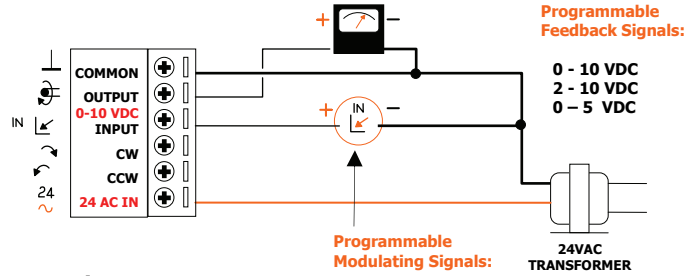


Figure 8: PROPORTIONAL Application
 Programmable Modulating Signals:
 0 - 10 VDC
 2 - 10 VDC
 0 - 5 VDC
 4 - 20 mA

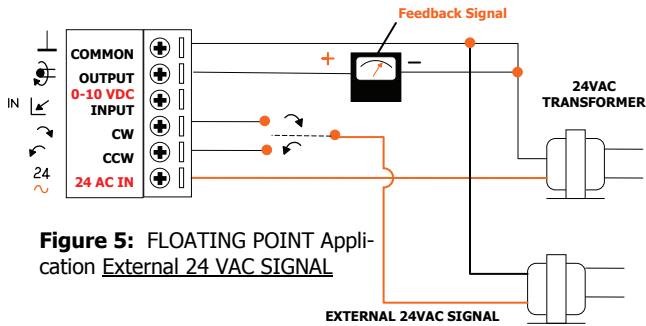


Figure 5: FLOATING POINT Application External 24 VAC SIGNAL

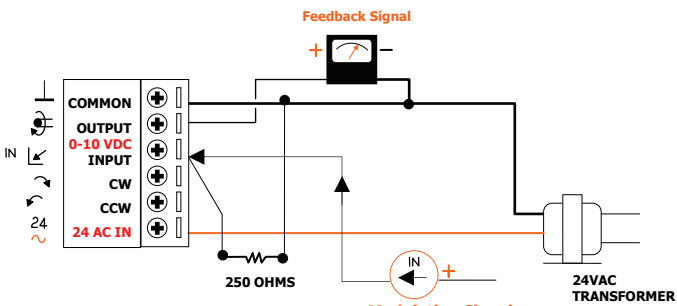


Figure 6: 4 - 20 mA Application

Modulating Signals:
 4 - 20 mA

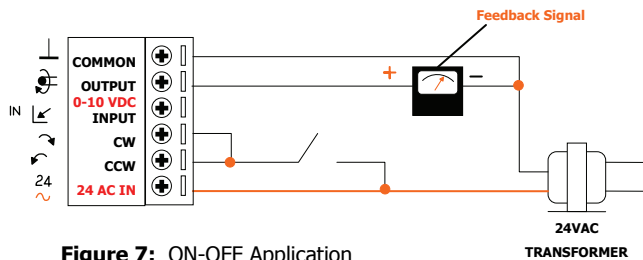
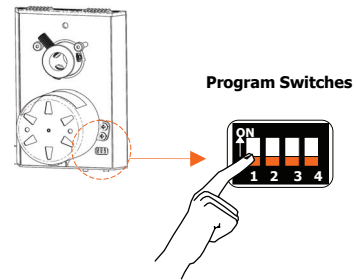


Figure 7: ON-OFF Application



| SW | SW1 | SW2 | SW3 | SW4 | Modulating INPUT | Feedback Voltage |
|-----|-----|-----|-----|-----|---------------------------------------|------------------|
| OFF | ON | OFF | OFF | OFF | 0-10 VDC | 0-10 VDC |
| ON | ON | ON | OFF | ON | 0-5 VDC | 0-5 VDC |
| OFF | ON | OFF | ON | OFF | 2-10 VDC | 2-10 VDC |
| ON | ON | ON | ON | ON | 4-20 mA on external 250 Ohms resistor | 0-10 VDC |

NOTE: when in floating mode, SW2 & SW3 only used for feedback configuration

| | | |
|-----|----|------------------|
| OFF | ON | NORMAL OPERATION |
| ON | ON | LEARN MODE |

Figure 9: Dip Switch Configuration

OPERATION:

1. Modulation Input and Feedback Signals:

SMRT can interface any type of signal automatically and by self detecting and learning.

a. Proportional Mode:

When first installed, the SMRT actuator is in proportional mode and DIP switches SW2 and SW3 determine the analog signal that will drive the actuator.

The shaft feedback signals will appear at T5 terminal based on DIP switch SW2 & SW3 positions.

If the actuator is NOT in proportional mode, a voltage signal of > 2vdc will be need to be applied to the input terminal (T4) for the actuator to switch back to proportional mode.

b. Floating Mode:

Applying 24 VAC to the CW (T3) or CCW (T2) terminals will move the SMRT output shaft CW or CCW and switch from default proportional mode to floating mode.

In this case, DIP switches S2 & S3 determine the T5 Feedback Output signal.

c. ON-OFF Mode:

If 24 VAC is applied to both CW (T3) and CCW (T2) inputs, the SMRT actuator will switch to ON/OFF mode.

Note: Each time the mode of operation is changed, the new mode is saved into the SMRT actuator's internal Flash memory. When the power is cycled, the SMRT will "remember" the mode it was in.

2. Status LED:

SMRT has one Tri-Color LED indicator which generates 3 different colors (Green-Red-Yellow). SMRT makes use of flashing these colors to indicate various modes and status of the actuator. The mode-status indication list are as follows:

- a. Green Steady ON: The actuator shaft is in the full CW position
- b. Red Steady ON: The actuator shaft is in the full CCW position
- c. When Dip switch SW4 is ON "Learn" Mode: The LED will flash Red-Red-Green-Green-Red-Red-Green-Green (R-R-G-G-R-R-G-G...)
- d. Green or Red LED is flashing at high speed: Based on the LED color, the actuator is in motion. It is always Green = CW and Red = CCW direction.

3. Shaft Position Display (slow flashing colors Green followed by Red):

One of the unique features of the SMRT (Patent Pending) is to flash its LED colors, first Green from 1 up to 9 times, then followed by the same for Red.

Number of Green color flashes indicates digit 10s and number of Red color flashes indicates digit 1s. When combined, the flashing sequence indicates a number from 1 to 99%. This corresponds to 1 to 99% modulation. (Note: 0% = Steady Red and 100% = Steady Green color).

Example: 43 % Modulation (or opening): Green will flash 4 times ... pause...Red will flash 3 times. This indicates number 43.

This unique feature acts as an accurate shaft position indicator where it can be seen from far away without getting close to the SMRT actuator. It has increments of 1%.

4. Programming total mechanical travel (if other than 90°):

- a. SMRT has a default total travel for 90° from the factory. This can be changed for any reason for less than 90° via built in CW and CCW push buttons.
- b. To adjust the stop positions, first, put program switch SW4 to ON (move UP) position for SMRT to enter "Learn Mode".
- c. At this time, the LED will flash and change colors: R-R-G-G-R-R-G-G ...
- d. Press the CW or CCW buttons to move the shaft to the desired full CW stop position.
- e. Press both CW & CCW buttons to "SET" the new full CW stop position. As long as you hold both the CW & CCW buttons, the LED will be off. When you release the CW & CCW buttons, the LED will blink Green 5 times to show that the new CW stop position has been stored in to its Flash memory.

OPERATION Cont'd:

- f. Press the CW or CCW buttons to move the main gear to the desired full CCW stop position. Press both CW & CCW buttons to "SET" the new full CCW stop position. LED will be off while both switches are pressed. When they are released, the LED will blink GREEN 5 times to show that the new CCW stop position has been set.
- g. SMRT travel can be set only 1 stop and leave the other direction as is, no need to set both. To keep the total travel 90°, then, both stops have to be set.
- h. SMRT will not allow to set CW stop to the left of 12 o'clock position. The CW stop must be between +8 & +60° and to the right of 12 o'clock position.
- i. Similarly, SMRT will not allow to set CCW stop to the right of 12 o'clock. The CCW stop must be between -8 & -60° and to the left of 12 o'clock position.
- j. When the new stop position(s) are set, turn S4 OFF to exit learn mode and save the settings.

5. Manually Overriding SMRT Actuator:

When either the CW or CCW button pushed, the SMRT will go into manual override and ignore its 0-10V and 24VAC CW & CCW inputs.

The LED will flash and change colors: RGRGRGRGRG...

By pressing both CW & CCW buttons manual override mode will be canceled. (Note that S4 is not in "Learn" – "ON" position).

6. Stall Lockout Feature:

If SMRT activates its internal motor to run, if no movement is detected for "4-seconds", SMRT will stop and try to restart the motor. This counts as 1-stall. After 4-stalls, SMRT will go into lockout and the LED will blink YELLOW slowly. The lockout can be reset by cycling power, going into override or into learn mode.

When 24VAC power is applied to SMRT, no "saved" mode settings will be found in its Flash memory, so SMRT will default to Proportional Mode. Its motor won't move until SMRT gets a signal on the 24VAC CW or CCW inputs or on the 0-10V input.

7. Reset to default

To reset the SMRT back to its factory defaults, disconnect power to the SMRT, put DIP switch #4 to ON and hold down both CW and CCW override buttons while reapplying power. When the LED turns yellow, let go of the CW and CCW buttons and turn switch #4 back to OFF. The SMRT will now be set back to its default factory settings.