



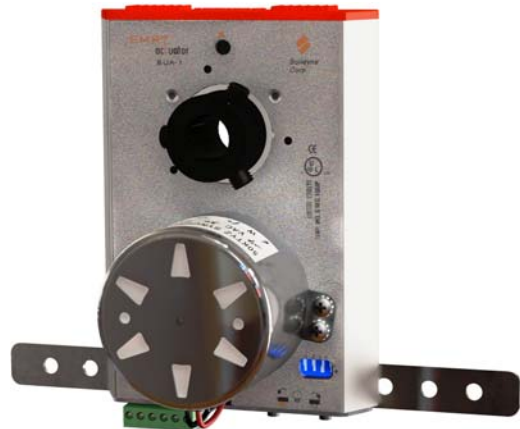
SMRT Actuator

Description:

SMRT is non spring return direct coupled Universal actuator for any types of modulating and floating type of controls.

General Features:

VAV and Economizer
Applications that require up to
60 inch-lbs (7 Nm) torque.



- **Output torque:** Over 125 inch-lbs shaft output torque
- **Typical Rotation:** Default 90°, programmable any angular travel in “Learn” mode in to its Flash memory.
- **Input Modulation Signals:** Programmable for ON-OFF, Floating, 0-10 VDC, 2-10 VDC, 0-5 VDC, 4-20 mA. Recognizes modulating signal inputs and controls accordingly
- **Shaft Position Output:** Programmable: 0 -10, 2 -10, 0-5 VDC output signals from internal shaft position sensor
- **Programmable features:** 4-Position DIP Switches for Direct-Reverse acting, Input type, Output (feedback) type, Learn and Run modes.
- **Status LEDs:** ONE Tri-color status LED. Colors: Green for CW, Red for CCW, Yellow for Alarm
- **Manual Control switches:** Two CW and CCW N.O. momentary switches for manual overriding actuator and/or programming total travel for less than default 90°.
- **Wiring-Termination:** Removable 6-position Terminal block for all required power and interface signals.

Specifications:

Supply Voltage:	24 VAC \pm 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:	ON/OFF <input type="checkbox"/> Floating <input type="checkbox"/> 0-10 VDC <input type="checkbox"/> 2-10 VDC <input type="checkbox"/> 0-5 VDC <input type="checkbox"/> 4-20 mA (external 250 Ohms resistor required) (Note: PWM Input-interface and CS [Characterized Stroke] output capabilities offered).
Feedback Output Signals:	Programmable: 0-10 VDC <input type="checkbox"/> 2-10 VDC <input type="checkbox"/> 0-5 VDC
Input impedance:	Floating Inputs (T2 and T3): 8 KOhms. Modulating Input (T4): 20 KOhms Note: Inputs are protected for over-voltages for up to 50% over max. allowed.
Feedback Output:	Can drive up to 10 VDC for 2.5 KOhms load impedance
Torque:	125 lb-in (15 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.
Total Rotation:	Factory Default: 90° . Programmable from minimum 18° to max 120° total travel.
Operational Temperature:	145° F
Storage Temperature:	175° F
Operational Humidity:	5 – 95% RH non-condensing

Mounting**Shaft Dimensions:**

$\frac{1}{8}$ " in to $\frac{1}{2}$ " in diameter round or equivalent square damper shafts

Shaft Length:

Minimum shaft length is **1.000"** long.

Housing:

Aluminum

Weight:

1.2 lbs (0.54 Kg)

Dimensions:

L: 4.500" x W: 3.200" x H: 2.000"

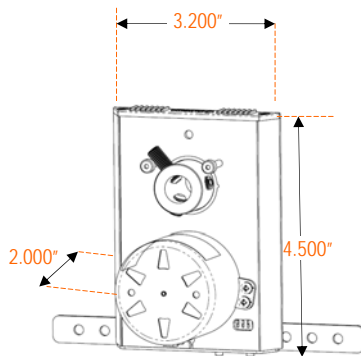


FIG - 1 SMRT Dimensions

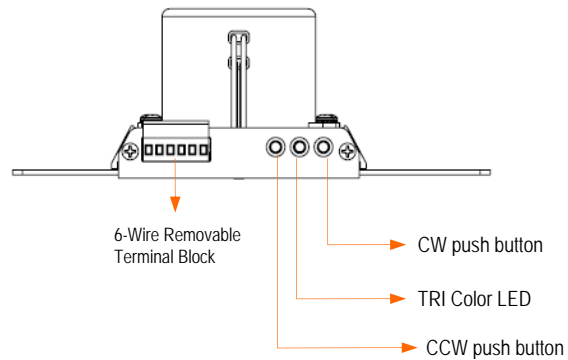


FIG - 2 SMRT Terminal Block, Manual control buttons and Tri-color LED locations

Fig 1 and **Fig 2** show the dimensions and locations of wiring, manual control, status indicators.

INSTALLATION:

FIG.3 A – G shows steps for installing SMRT Actuator to a typical damper.

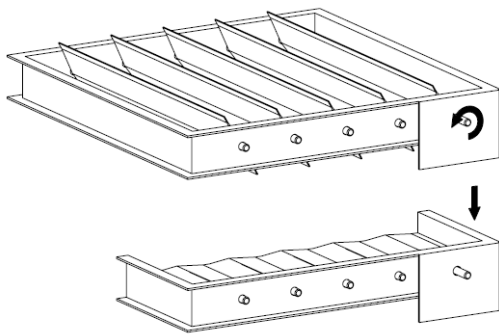


FIG. 3A: Turn the damper shaft until the blades are fully closed. SMRT is designed for Indoor applications. If required to mount outside, use proper (approved) protective enclosure.

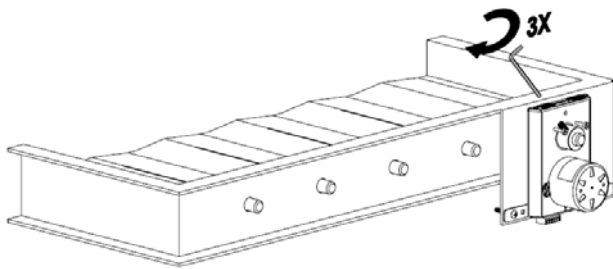


FIG. 3C: Tighten the 3-set screws. The anti-rotation bracket taped at the bottom of the actuator. The bracket can be bent "U" shape if the actuator is away from the mounting surface. Screw down the anti-rotation bracket on to the mounting surface with self tapping screws included (two # 6 or #8 hex self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

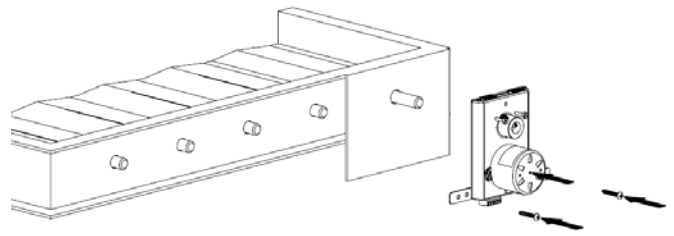


FIG. 3B: Slip the actuator over the damper shaft. SMRT can be mounted damper shafts as low as 1.00" in length.

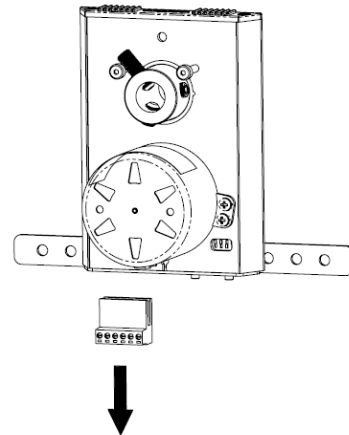


FIG. 3D: Remove the 6 position terminal block plugged in to the internal PCB. Now follow the symbols and text screened on both the terminal block and the aluminum housing (right above the terminal plug after it is plugged in to the PCB. Properly connect all required wiring based on the application SMRT is used for.

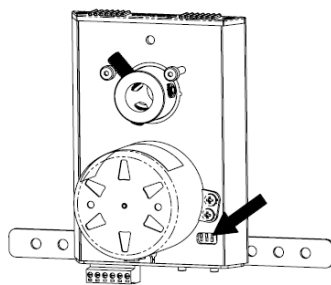


FIG. 3E: Set the 4 position program DIP switch based on the required application for modulation type, position feedback signal selection and direct-reverse acting modes. (May use a small – flat screw driver to move the dip switches). See detailed instruction sheet for operation and programming SMRT.

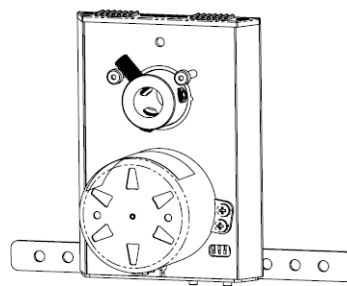


FIG. 3F: Plug the removable terminal block back in to the PCB (powering the actuator).

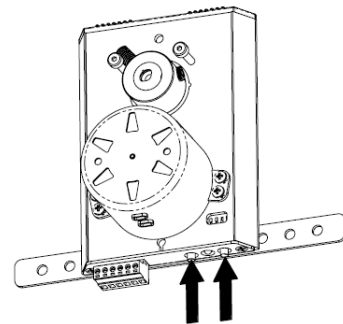


FIG. 3G: By pushing the CW and CCW push buttons, finalize the installation if it is required for other than 90° default travel SMRT comes from the factory.

WIRING AND PROGRAMMING FOR VARIOUS APPLICATIONS:

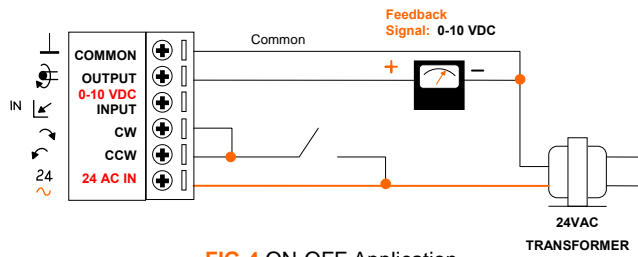


FIG-4 ON-OFF Application

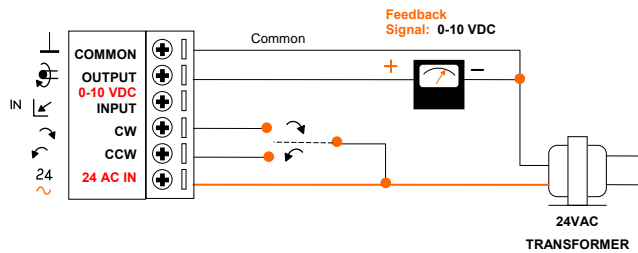
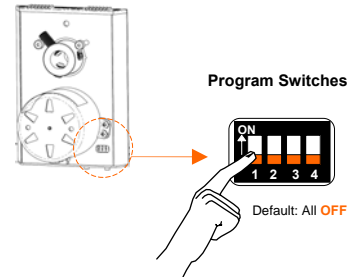


FIG-5 FLOATING POINT Application

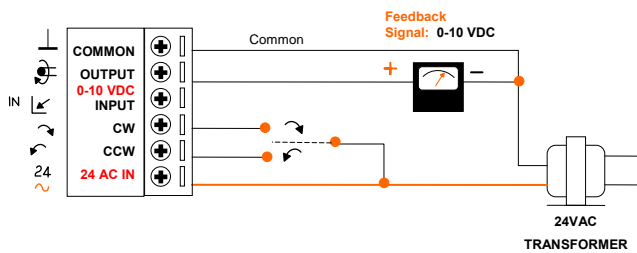


FIG-6 FLOATING POINT Application – External 24 VAC

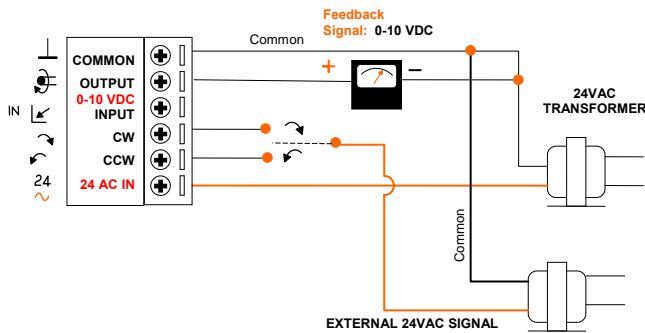
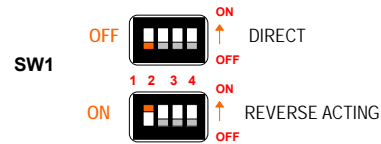
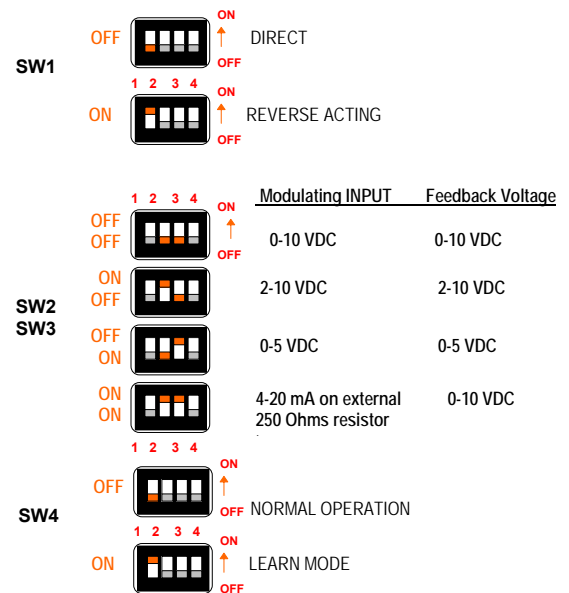
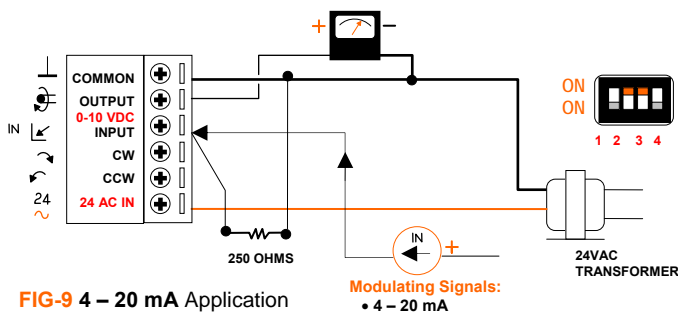
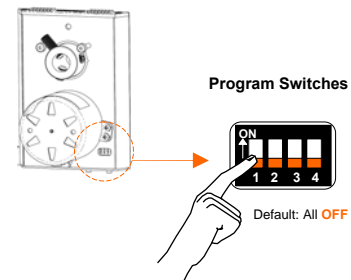
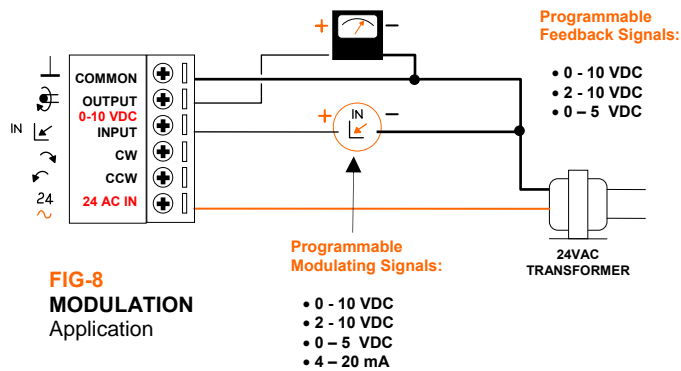


FIG-7
FLOATING POINT Application
External 24 VAC SIGNAL



	1	2	3	4	ON	Modulating INPUT	Feedback Voltage
OFF	OFF	OFF	OFF	OFF	↑	0-10 VDC	0-10 VDC
ON	ON	ON	ON	ON	↑	2-10 VDC	2-10 VDC
OFF	OFF	OFF	OFF	OFF	↑	0-5 VDC	0-5 VDC
ON	ON	ON	ON	ON	↑	4-20 mA on external 250 Ohms resistor	0-10 VDC





OPERATION:

1. Modulation Input and Feedback Signals:

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

a. Floating Mode:

When first installed, as a default **SMRT** is in Floating Mode from the factory provided that the Modulating Input is 0 volts or no wire is attached.

Applying 24 VAC to the **CW** (T3) or **CCW** (T2) terminals will move the SMRT output shaft CW or CCW.

In this case, 4-position DIP switches S2 & S3 determine the T5 Feedback Output signal. Based on the setting, the feedback signal can be 0-10V, 2-10V or 0-5V as indicated above "2".

b. Modulating Mode:

If 24 VAC **CW** & **CCW** inputs (T2 and T3) have no 24 VAC signal and T4 Modulating Input goes above 2.0 V, **SMRT** will switch to 0-10V, 2-10V, 0-5V or 4-20mA mode, as specified by DIP switches S2 & S3.

The shaft feedback signals will appear at T5 terminal based on S2 & S3 settings also.

If the T4 is set back to 0V and 24 VAC is applied to the 24 VAC CW (T3) or CCW (T2) inputs, the SUA-1 will switch back to Floating Mode.

c. ON-OFF Mode:

If 24 VAC is applied to both CW (T3) and CCW (T2) inputs, the SUA-1 will switch to ON/OFF mode.

Note: Each time the mode of operation is changed, the new mode is saved into the Controllers 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 fully closed – 100% - position.
- b. Red Steady ON: The actuator shaft is fully closed – 0% - position.
- c. SW4 is in 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 (Soft and 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 doing the same for the **Red** light.

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 01 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** unit (patent). 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. When shipped from the factory, the shaft position indicated by the long set screw attached to the shaft is at 12 o'clock position. This is the **50%** position. Let's call this **0** (fully closed) degree. The default **CW** stop (toward the right) is **+ 45** degrees. The default

CCW stop (toward the left) is - **45** degrees. Total travel is **90** degrees.

- c. To adjust the stop positions, first, put program switch **S4** to **ON** (move UP) position for **SMRT** to enter "Learn Mode".

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 **CW** stop position.
- e. Press both **CW** & **CCW** buttons to "**SET**" the new **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 **RED 5** times to show that the new **CW** stop position has been stored in its Flash memory.
- f. Press the **CW** or **CCW** buttons to move the main gear to the desired **CCW** stop position. Press both **CW** & **CCW** buttons to "**SET**" the new **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 **Floating Mode**. Its motor won't move until **SMRT** gets a signal on the 24VAC CW or CCW inputs or on the 0-10V input.