



## EVC Series

### EVC (Stand-Alone)

### EVCB (BACnet®)

The VAV package consists of 2 parts, namely the thermostat and the EVC which is a combination of an actuator and a controller.

The EVC's are available in the stand-alone version (EVC) or in a BTL listed BACnet application specific version (EVCB).

They are designed to control pressure independent single duct VAV or fan powered VAV with or without terminal reheat.

The controller incorporates flow sensor, electronics and firmware of the VAV package. The EVC mounts directly to the damper jackshaft on the side of the VAV box.

The attractive thermostat has a large LCD display with four push buttons for set point, occupancy override and programming.

## Applications

The EVC is suitable for BACnet® or stand-alone pressure independent VAV applications and fully configurable.

Change-over, heating and/or cooling with 4 stages ON/OFF or TPM or 2 stages floating and 2 outputs 0-10 Vdc.

### Application examples:

- Single duct, cooling only
- Single duct cooling, 1-2 stage digital reheat
- Single duct cooling &/or heating, 0-10 Vdc reheat
- Single duct cooling &/or heating, one stage time proportioned (TPM) reheat
- Supply/exhaust (requires an additional EVC)

## Features

- Main supply 24 Vac
- Integrated actuator and control module
- Field configured VAV algorithms
- True differential pressure sensor
- BACnet® MS/TP communications (EVCB)
- Auto Baud Rate
- Micro-processor based backlit LCD thermostat
- BACnet® service port on the thermostat (EVCB)
- Simple air balancing and commissioning with the thermostat keypad
- Copy Config function: Allows to push the configuration to other EVCs over the BACnet network.

# EVC Series

BACnet® or stand-alone VAV controller

## Connections



## Controller Specifications

- **Input**
  - 2 thermistor inputs (10kΩ)
  - 1 digital input for night set back or occupancy
  - 1 extra digital input (BACnet® only)
- **Outputs**
  - 2 analog outputs
  - Optional actuator position reading (BACnet® only)
- **Controller Module - EVC Actuator**

The EVC comes with a 8Nm (70 in.lb.)
- **On Board Differential Pressure**

0-1.0" WC
- **Communications Ports (EVCB)**

BACnet® MS/TP @ 9600, 19200, 38400 or 76800 bps (maximum of 99 devices per BACnet® MS/TP segment)
- **BACnet® Device Profile**

BACnet® Application Specific Controller (B-ASC)
- **Connections**

3 wire connection
- **Wiring Class: Class 2**
- **Ambient: 0°C to 50°C (32°F to 122°F)**

5-95% RH (non-condensing)
- **Dimensions & Weight**

18.3 x 12.8 x 8.2 cm  
(7.2 x 5.1 x 3.2 in)  
1.25 kg (2.75 lbs)
- **Compliance**

## Thermostat Specifications

- **Thermostat**

Attractive modern look with large backlit LCD  
Icons driven information and 1 line of text information
- **Push Buttons**

4 push buttons
- **Temperature Sensor**

Set point range 10°C to 40°C (50°F to 104°F)  
Control accuracy +/- 0.4°C (0.8°F)  
Thermistor input 10kΩ at 25°C (77°F)  
Temperature resolution +/- 0.1°C (0.2°F)
- **Service Port**

Mini-USB connector giving access to the BACnet® network (If connected to EVCB)



100022\_GB  
EVC-0E2-ASLI-130712



### Control Features

- Field configured VAV algorithms, inputs and outputs
- Built-in actuator with brushless motor (70 lb-in)
- On board differential pressure sensor
- Pressure sensor air balancing program
- Programmable PI (Proportional-Integral) function
- Selectable proportional control band and dead band
- Selectable internal or external temperature sensor (10KΩ)
- Change over by contact or external temperature sensor
- Internal and external temperature sensor calibration
- Anti-freeze protection

### Operational Features

- Backlit LCD with simple icon and text driven menus
- Manual night set back or no occupancy override
- Multi level lockable access menu
- Lockable setpoint
- Selectable Fahrenheit or Celsius scale
- Removable, raising clamp, non-strip terminals
- 24Vac thermal fuse for overheat protection
- LED indication of relay status

### BACnet Features (EVCB only)

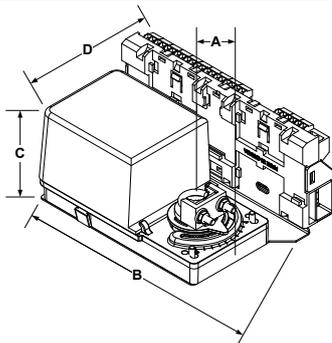
- BACnet<sup>®</sup> MS/TP @ 9600, 19200, 38400, or 76800 bps
- Set MAC address via DIP switch or thermostat menu
- Automatically assigns device instance
- Automatic Baud Rate Detection
- Copy and broadcast configuration to other controllers

### Technical Data

	EVC	EVCB
Communication	Stand alone	BACnet <sup>®</sup> MS/TP @ 9600, 19200, 38400 or 76800 bps
Communication connection		24 AWG twisted-shield cable (Belden 9841 or equivalent)
Torque	70 in.lb. [8 Nm] at rated voltage	
Power consumption	10 VA max	
Running time through 90°	90 seconds	
Power supply	22 to 26 Vac 50/60 Hz	
Inputs	2 Thermistor inputs	
	2 digital inputs	
	Differential pressure sensor 0-1.0" WC	
Outputs	2 analog outputs (0-10 Vdc)	
Electrical connection	0.8 mm <sup>2</sup> [18 AWG] minimum	
Operating temperature	0°C to 50°C [32°F to 122°F]	
Storage temperature	-30°C to 50°C [-22°F to 122°F]	
Relative Humidity	5 to 95% non condensing	
Weight	1.8 kg. [4 lb]	

 **The actuator will do an auto-stroke on power up. When changing the actuator adjustment screws, make sure to cycle power to initiate the auto-stroke.**

### Dimensions



Dimension	Imperial (in)	Metric (mm)
<b>A</b>	1.50	38
<b>B</b>	7.2	183
<b>C</b>	3.2	82
<b>D</b>	5.1	128
<b>Tubing ID</b>	1/8	3.175

### Terminal Description

#### Low Voltage Supply (TB1)

- 1- Common
- 2- Common
- 3- 24 Vac Output
- 4- 24 Vac Output

#### Triac Output (TB2)

Not Available

#### Digital Input (TB3)

- 1- Digital Input 1 (DI1)
- 2- Common (DI1 & DI2)
- 3- Digital Input 2 (DI2)

#### Analog Output (TB4)

- 1- Analog Output 1 (AO1)
- 2- Common (AO1 & AO2)
- 3- Analog Output 2 (AO2)

#### Analog Input (TB5)

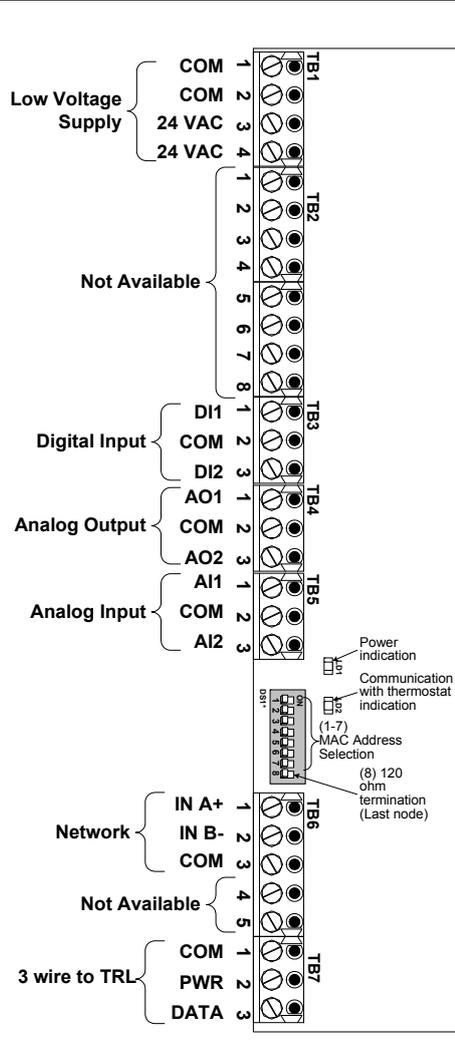
- 1- Analog Input 1 (AI1)
- 2- Common (AI1 & AI2)
- 3- Analog Input 2 (AI2)

#### Network (TB6) Only on BACnet models

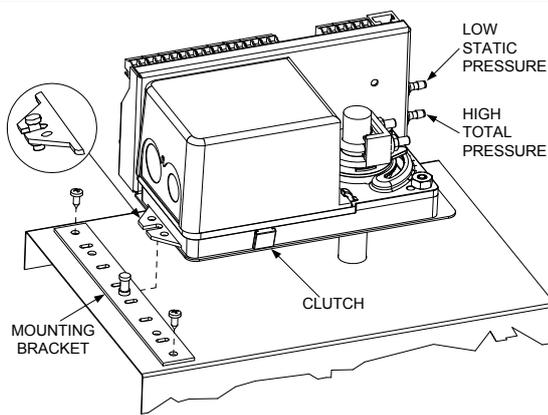
- 1- Input (IN A+)
- 2- Input (IN B+)
- 3- Common
- 4- Output (A+)
- 5- Output (B-)

#### Thermostat Connection (TB7)

- 1- Common
- 2- Power
- 3- Data



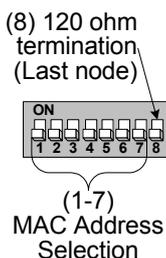
### Mechanical Installation



1. Manually close the damper blades and position the actuator at 0° or 90°.
2. Slide the actuator onto the shaft.
3. Tighten the nuts on the “U” bolt to the shaft with an 8mm wrench to a torque of 60 in.lb. [6.7 Nm].
4. Slide the mounting bracket under the actuator. Ensure free movement of the slot at the base of the actuator. The bracket pin must be placed in the mid distance of the slot.
5. Fix the bracket to the ductwork with #8 self-tapping screws.

### BACnet® MAC address DIP switches

MSTP/MAC address for communication, are selectable in binary logic by dip switch. If you do not change device instance in programme mode, it will be automatically modified according to the MAC address.



MAC Address	B0	B1	B2	B3	B4	B5	B6	Default Device Instance
	DS.1	DS.2	DS.3	DS.4	DS.5	DS.6	DS.7	
0	OFF	153000						
1	ON	OFF	OFF	OFF	OFF	OFF	OFF	153001
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	153002
3	ON	ON	OFF	OFF	OFF	OFF	OFF	153003
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	153004
...	...	...	...	...	...	...	...	...
126	OFF	ON	ON	ON	ON	ON	ON	153126
127	ON	153127						

## Programming Mode

When in this mode the  symbol is displayed. Press on the  button to advance to the next program function. Press on the button  to return to the previous function and press on the arrow buttons  or  to change values. You can exit the programming mode at any time. Changed values will automatically be recorded.

Step	Display	Description	Values
1		<b>Internal temperature sensor Calibration:</b> Display scrolls between "tS1" and temperature read by internal temperature sensor. You can adjust the calibration of the sensor by comparison with a known thermometer. For example if thermostat was installed in an area where temperature is slightly different than the typical room temperature (thermostat placed right under the air diffuser).	 Range : 10 to 40°C [50 to 104°F] Increment: 0.1°C [0.2°F] (max. offset ± 5°C) (Factory calibrated)
2		<b>Minimum setpoint:</b> Display scrolls between "StP" and the minimum setpoint temperature. MIN is also displayed.  Select the desired minimum setpoint temperature. The minimum value is restricted by the maximum value (step #3).	 Minimum range: 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F]  <i>Default value: 15°C [59°F]</i>
3		<b>Maximum setpoint</b> Display scrolls between "StP" and the maximum setpoint temperature. MAX is also displayed.  Select the desired maximum setpoint temperature. The maximum value is restricted by the minimum value (step #2).	 Maximum range 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F]  <i>Default value: 30°C [86°F]</i>
4		<b>Locking the setpoint :</b> Display scrolls between "LOc" and the selected value.  You can lock or unlock the setpoint adjustment by end user. If locked the lock symbol will appear.	   <i>Default value: Unlocked (no)</i>
5		<b>Adjust setpoint:</b> Display scrolls between "StP" and the temperature setpoint.  Select the desired setpoint. It should be within the temperature range. Lock symbol will appear if the setpoint was locked at the previous step.  Setpoint value is restricted by the minimum and maximum value (step #2 & 3).	 Setpoint range : 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F]  <i>Default value: 22°C [72°F]</i>
6		<b>Adjust the control mode:</b> Display scrolls between "CtL" and "Aut".  Select which control mode to authorize: Automatic, cooling or heating, heating only or cooling only (represented by "on" and the symbols in the lower portion of the screen).  If you want to authorize all modes, choose Automatic mode.  ON mode will the user allow to switch between heat & cool mode.  If you want to authorize only Automatic mode, select CLHT mode.	     <i>Default value: on cool (Cooling only)</i>
7		<b>Set On/Off function enable or disable:</b> Display scrolls between "OFF" and "EnA".  You can enable or disable the Off mode adjustment by end user.	  <i>Default value: Ena (Enable)</i>
8		<b>Set motor signal ramp:</b> Display scrolls between "Mr" and the selected ramp. Select the desired ramp for the motor from the options provided:  Hr1: Heating ramp 1, Hr2: Heating ramp 2, Cr1: Cooling ramp 1, Cr2: Cooling ramp 2, CO: Change over ramp, CH1: Cool-Heat ramp 1. StF: If this ramp is selected the Motor will be driven by the proportional input coming from the StF  *CH1 (cool-heat without change over) will make the actuator follow the demand in cooling & heating for ramp 1 (Cr1+Hr1).	       <i>Default value: Cr1 (Cooling ramp 1)</i>

Step	Display	Description	Values
9		<b>Set motor direction:</b> Display scrolls between “Mr” and the selected rotation direction. Select the desired direction for the motor, either: dlr: Direct “clockwise” (0 to 90°) or rEv: Reverse “counter clockwise” (90 to 0°)	  Default value: dir (Direct)
10		<b>Motor minimum position in cooling:</b> Display scrolls between “Pos” and the selected minimum position. The cool icon is also displayed. <i>Note: This option is used only if Cr1, Cr2 or CO was selected at step #8.</i>	 Range: 0 to 100% Increment: 5 % Default value: 10%
11		<b>Motor minimum position in heating:</b> Display scrolls between “Pos” and the selected minimum position. The heat icon is also displayed. <i>Note: This option is used only if Hr1, Hr2 or CO was selected at step #8 and another output is using Hr1.</i>	 Range: 0 to 100% Increment: 5 % Default value: 10%
12		<b>Set AO1 signal ramp:</b> Display scrolls between “Ao1” and the selected ramp.  Select the desired ramp for analog signal on AO1 from the options provided:  Hr1: Heating ramp 1, Hr2: Heating ramp 2, Cr1: Cooling ramp 1, Cr2: Cooling ramp 2, CO2: CO2 Ramp StF: If this ramp is selected the output will be driven by the proportional input coming from the StF OFF.	       Default value: Hr1 (Heating ramp 1)
13		<b>Set AO2 signal ramp:</b> Display scrolls between “Ao2” and the selected ramp.  Select the desired ramp for analog signal on AO2 from the options provided:  Hr1: Heating ramp 1, Hr2: Heating ramp 2, Cr1: Cooling ramp 1, Cr2: Cooling ramp 2, CO2: CO2 Ramp StF: If this ramp is selected the output will be driven by the proportional input coming from the StF OFF.  <b>If “OFF” was selected for AO1, go to step #16.</b> <b>If “OFF” is selected for AO1 &amp; AO2, go to step #18.</b>	       Default value: OFF
14		<b>Minimum voltage of AO1 output:</b> (Only if “OFF” hasn’t been selected at step #12) Display scrolls between “Ao1” and the value of the minimum voltage of the AO1 ramp. MIN symbol is also displayed. Select the desired value for the minimum voltage of the AO1 output. (This is the “zero” value)	 Range: 0.0 to 10.0 Volt Increment: 0.1 Volt Default value: 0.0 Volt
15		<b>Maximum voltage of AO1 output:</b> (Only if “OFF” hasn’t been selected at step #12) Display scrolls between “Ao1” and the value of the maximum voltage of the AO1 ramp. MAX symbol is also displayed. Select the desired value for the maximum voltage of the AO1 output. (This is the “span” value)	 Range: 0.0 to 10.0 Volt Increment: 0.1 Volt Default value: 10.0 Volt
16		<b>Minimum voltage of AO2 output:</b> (Only if “OFF” hasn’t been selected at step #13) Display scrolls between “Ao2” and the value of the minimum voltage of the AO2 ramp. MIN symbol is also displayed. Select the desired value of the minimum voltage for the AO2 output. (This is the “zero” value)	 Range: 0.0 to 10.0 Volt Increment: 0.1 Volt Default value: 0.0 Volt
17		<b>Maximum voltage of AO2 output:</b> (Only if “OFF” hasn’t been selected at step #13) Display scrolls between “Ao2” and the value of the maximum voltage of the AO2 ramp. MAX symbol is also displayed. Select the desired value for the maximum voltage of the AO2 output. (This is the “span” value)	 Range: 0.0 to 10.0 Volt Increment: 0.1 Volt Default value: 10.0 Volt

Step	Display	Description	Values
18*		<p><b>Set AI1 input signal:</b>                      Display scrolls between “AI1” and the selected input.                      Select the desired signal for AI1 input from the options provided:</p> <ul style="list-style-type: none"> <li>• <b>Off:</b> Input is not used</li> <li>• <b>EtS:</b> External temperature sensor 10KΩ (replaces internal sensor)</li> <li>• <b>nC:</b> Changeover contact normally cool. Heating mode activates when the contact is closed and cooling mode activates when the contact is opened.</li> <li>• <b>nH:</b> Changeover contact normally heat. Cooling mode activates when the contact is closed and heating mode activates when the contact is opened.</li> <li>• <b>COs:</b> External changeover sensor 10KΩ. Heating mode activates when the temperature read by the external sensor is above the Changeover Set Point and cooling mode activates when the temperature read by the external sensor is below the Changeover Set Point (step # 21).</li> <li>• <b>CO2:</b> External CO2 sensor. Enables control of the actuator for IAQ, (0-10 Vdc)</li> <li>• <b>STf:</b> Setpoint Air Flow is proportional to 0-10Vdc                      0Vdc = AirFlowCoolMin                      10Vdc = AirFlowCoolMax</li> <li>• <b>ASt:</b> Air supply temperature sensor. Press the  button for 5 seconds and then use the arrow keys to toggle between the “Airflow” and “Air Supply Temp” values.</li> </ul>	    Default value: OFF
19*		<p><b>Set AI2 input signal:</b>                      Display scrolls between “AI2” and the selected input.                      Select the desired signal for AI2 input from the options provided:                      (Same as AI1 see step #18)</p> <p>Note: AI1 input signal has priority to AI2, if you have selected the same function AI2 will not be functional.</p>	Default value: OFF
20*		<p><b>External temperature sensor Calibration:</b> (If “EtS” was selected at step #18 or 19)                      Display scrolls between “EtS” and the temperature read by the external temperature sensor (if connected on the selected input).                      If the sensor is not connected or short circuited, the display shows “Err”. You can adjust the calibration of the external sensor by comparison with a known thermometer.</p>	 Range: -30 to 90°C [-22 to 194.0°F] (max. offset ± 5°C) Increment: 0.1°C [0.2°F]
21*		<p><b>Change over setpoint temperature:</b> (If “COs” was selected at step #18 or 19)                      Display scrolls between “tCo” and the change over setpoint temperature.                      Select the change over setpoint temperature.                      Note: heating mode will be activated when temperature read by external sensor is above the change over setpoint temperature, and cooling mode will be activated when temperature read by external sensor is under.</p>	 Range: 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F] Default value: 24°C [75°F]
22*		<p><b>CO2 maximum range:</b> (If “CO2” was selected at step #18 or 19)                      Display scrolls between “CO2” and the value of the maximum CO2 reading in ppm.</p>	Range: 100 to 5000 ppm Increment: 50 ppm (or 100 for value over 1000ppm) Default value: 2.0 (2000)
23*		<p><b>CO2 setpoint:</b> (If “CO2” was selected at step #18 or 19)                      Display scrolls between “CO2” and the value of the setpoint of CO2 in ppm.                      The setpoint value is restricted by the CO2 maximum range (step # 22).</p>	Range: 100 to 5000 ppm Increment: 10 ppm (or 100 for value over 1000ppm) Default value: 800 ppm
24*		<p><b>Set DI1 input signal:</b>                      Display scrolls between “dI1” and the selected value. Moon  symbol is also displayed.</p> <p>You can choose:</p> <ul style="list-style-type: none"> <li>• nb.o (Night set back, normally open) contact,</li> <li>• nb.c (Night set back, normally close) contact,</li> <li>• oC.o (Occupancy, normally open) contact or</li> <li>• oC.c (Occupancy, normally close) contact.</li> </ul> <p><b>If you selected Occupancy, go directly to step #27.</b></p>	  Default value: Occupancy normally open (oC.o)
25*		<p><b>Night set back mode:</b>                      Select if you want to enable heating/cooling set point and override when in night set back by choosing “StP” or “OFF” to have all outputs turned off when in night set back.</p> <p><b>If you selected Off, go directly to step #30.</b></p>	 Default value: StP (Set point/override enabled)
26*		<p><b>Night set back override time :</b>                      Display scrolls between “nbt” and the override time in minute. NSB  symbol is also displayed.                      Select the desired override time, if no override time is desired select “0”.</p> <p><b>Go to step #28.</b></p>	 Range: 0 to 180 min. Increment: 15 min. Default value: 120 min.

Step	Display	Description	Values
27*		<b>No occupancy override time :</b> (Only available if oC.o or oC.c was selected at step 24.) Display scrolls between "oCt" and the override time in minute. NSB ☾ symbol is also displayed. Select the desired override time. If no override time is desired select "0".	 Range: 0 to 180 min. Increment: 15 min. Default value: 60 min.
28		<b>Heating setpoint during Night set back or No occupancy:</b> Display scrolls between "StP" and the value of the heating setpoint temperature during night set back or no occupancy. Moon ☾ and heating symbols are also displayed. Select the heating setpoint temperature during night set back or no occupancy. The maximum value is restricted by the night set back or no occupancy cooling setpoint (step #29).	 Range: 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F] Default value: 16°C [61°F]
29		<b>Cooling setpoint during Night set back or No occupancy:</b> Display scrolls between "StP" and the value of the cooling setpoint temperature during night set back or no occupancy. Moon ☾ and cooling symbols are also displayed. Select the cooling setpoint temperature during night set back or no occupancy. The minimum value is restricted by the night set back or no occupancy heating setpoint (step #28).	 Range: 10 to 40°C [50 to 104°F] Increment: 0.5°C [1°F] Default value: 28.0°C [82°F]
30		<b>Set DI2 input signal:</b> (If "Off, EtS, Stf, CO2, or Ast" was selected at step #18 or 19) Display scrolls between "dI1" and the selected value. Select the desired setting from the options provided: <ul style="list-style-type: none"> <li>• <b>OFF:</b> Input is not used.</li> <li>• <b>nC:</b> Changeover contact normally cool. Heating mode activates when the contact is closed and cooling mode activates when the contact is opened.</li> <li>• <b>nH:</b> Changeover contact normally heat. Cooling mode activates when the contact is closed and heating mode activates when the contact is opened.</li> </ul>	 Default value: Off
31		<b>Proportional band of changeover ramp:</b> Display scrolls between "Pb0" and the value of the changeover ramp proportional band, cooling and heating symbols are also displayed. Select the desired value of changeover ramp proportional band.	 Proportional band range: 0.5 to 5.0°C [1 to 10°F] Increment: 0.5°C [1°F] Default value: 2.0°C [4°F]
32		<b>Proportional band of heating ramp1:</b> Display scrolls between "Pb1" and the value of the heating ramp1 proportional band, heating symbol is also displayed. Select the desired value of heating ramp1 proportional band.	 Proportional band range: 0.5 to 5.0°C [1 to 10°F] Increment: 0.5°C [1°F] Default value: 2.0°C [4°F]
33		<b>Proportional band of heating ramp2:</b> Display scrolls between "Pb2" and the value of the heating ramp2 proportional band, heating symbol is also displayed. Select the desired value of heating ramp2 proportional band.	 Proportional band range: 0.5 to 5.0°C [1 to 10°F] Increment: 0.5°C [1°F] Default value: 2.0°C [4°F]
34		<b>Proportional band of cooling ramp1:</b> Display scrolls between "Pb1" and the value of the cooling ramp1 proportional band, cooling symbol is also displayed. Select the desired value of cooling ramp1 proportional band.	 Proportional band range: 0.5 to 5.0°C [1 to 10°F] Increment: 0.5°C [1°F] Default value: 2.0°C [4°F]
35		<b>Proportional band of cooling ramp2:</b> Display scrolls between "Pb2" and the value of the cooling ramp2 proportional band, cooling symbol is also displayed. Select the desired value of cooling ramp2 proportional band.	 Proportional band range: 0.5 to 5.0°C [1 to 10°F] Increment: 0.5°C [1°F] Default value: 2.0°C [4°F]
36		<b>Dead band of changeover ramp:</b> Display scrolls between "db.0" and the value of the changeover ramp dead band, cooling and heating symbols are also displayed. Select the desired value of changeover ramp dead band.	 Dead band range : 0 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
37		<b>Dead band of heating ramp1:</b> Display scrolls between "db1" and the value of the heating ramp1 dead band, heating symbol is also displayed. Please select the desired value of heating ramp1 dead band.	 Dead band range : 0 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
38		<b>Dead band of heating ramp2:</b> Display scrolls between "db2" and the value of the heating ramp2 dead band, heating symbol is also displayed. Select the desired value of heating ramp2 dead band.	 Dead band range : 0 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
39		<b>Dead band in cooling ramp1:</b> Display scrolls between "db1" and the value of the cooling ramp1 dead band, cooling symbol is also displayed. Select the desired value of cooling ramp1 dead band.	 Dead band range : 0 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]
40		<b>Dead band in cooling ramp2:</b> Display scrolls between "db2" and the value of the cooling ramp2 dead band, cooling symbol is also displayed. Select the desired value of cooling ramp2 dead band.	 Dead band range : 0 to 5.0°C [0.6 to 10.0°F] Increment: 0.1°C [0.2°F] Default value: 0.3°C [0.6°F]

Step	Display	Description	Values
41		<b>Integration time factor setting for heating:</b> Display scrolls between "Int" and the time in seconds for the integration factor compensation, heating symbol is also displayed. Select the desired value of the integration factor compensation.	 Range: 0 to 250 seconds Increment: 5 seconds <i>Default value: 0 seconds</i>
42		<b>Integration time factor setting for cooling:</b> Display scrolls between "Int" and the time in seconds for the integration factor compensation, cooling symbol is also displayed. Select the desired value of the integration factor compensation.	 Range: 0 to 250 seconds Increment: 5 seconds <i>Default value: 0 seconds</i>
43		<b>Enable or disable anti-freeze protection:</b> Display scrolls between "FrE" and the selected setting. You can enable or disable the Anti-freeze function. When enabled, if temperature drops to 4°C [39°F], heat will start even if thermostat is in OFF mode. Heat will stop when temperature reaches 5°C [41°F].	  <i>Default value: no (Disable)</i>
		<b>For model without BACnet (EVC), go directly to step #1.</b>	
44 <sup>1</sup>		<b>Auto bauds rate:</b> Display shows "Abr". You can enable or disable the Auto bauds rate function.  When enabled, the EVC automatically detects the baud rate of the system and coordinates it and you cannot change the bauds rate value yourself.	  <i>Default value: Yes</i>
		<b>If disable, you must select yourself the right bauds rate at step #46.</b>	
45 <sup>1</sup>		<b>Auto bauds, current baud:</b> Display shows "Abr" and the detected baud rate.	 Range: 9600, 19200, 38400, 76800
		<b>Go to step #47.</b>	
46 <sup>1</sup>		<b>Communication bauds rate:</b> Display scrolls between "bAu" and the value of the baud rate in kbds. Select the desired bauds for communication: 9.6, 19.2, 38.4, 76.8.	 Range: 9600, 19200, 38400, 76800 <i>Default value: 76.8 kbds</i>
47 <sup>1</sup>		<b>BACnet MAC address:</b> Display scrolls between "Add" and the value of the MAC address.  If dip switches 0 to 7 of DS1 on the EVC are all in the Off position, then you can change the MAC address by using the "Δ" or "∇" buttons.  Each device must have a unique MAC address on a network.	Range: 0 to 127 <i>Default value: 0</i>
48 <sup>1</sup>		<b>Copy config:</b> Display scrolls between "CPy" and "NO" Select "YES" if you want to copy the configuration you did to this device to others on the network.	  <i>Default value: No</i>
		<b>If you selected "NO", go back to step #1.</b>	
49 <sup>1</sup>		<b>Select "start" address:</b> Display scrolls between "Add" and "0". The "MIN" icon is also displayed.  Select the first address you want to copy to.  For example if you select MAC address 1 here and 54 in the next step, all the devices from 1 to 54 will receive the configuration of the current device.	Range: 0 to 254 <i>Default Value: 0</i>
50 <sup>1</sup>		<b>Select "end" address:</b> Display scrolls between "Add". The "MAX" icon is also displayed.  Select the last address you want to copy to. You cannot copy on more than 64 addresses at once.	Range: begin address + 63 <i>Default Value: begin address</i>
51 <sup>1</sup>		<b>Copy config result:</b> Display shows "SCd" if everything went ok.  If not, the display will show "Err" you will be able to scroll the addresses and see the error message associated with each address.  See the Annex section for the complete list of error messages.	
52 <sup>1</sup>		<b>Communication device Instance:</b> You cannot modify the device instance address through the TRL5x menus.  The device instance will automatically be modified according to the MAC address selected by dip switch on EVCB PCB.	

<sup>1</sup>Only on BACnet models

### Air Flow & BACnet Program Mode (Available when in Operation Mode; JP1 set on RUN)

Push on both and buttons for 5 seconds to access the user air flow program mode.

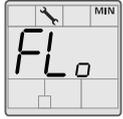
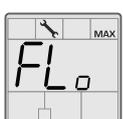
Step	Display	Description	Values
F1		<p><b>Password:</b>                      Display shows “PAs” and “000”.                      You have 1 minute to enter the password by incrementing or decrementing the blinking digit with <math>\Delta</math> and <math>\nabla</math> buttons. To modify following digit on right press  , to return to digit on the left press .</p> <p>When the password is entered press on . If you do a mistake, you will see “Err” and the thermostat will return in operation mode. You need to redo this step.</p>	Password: <b>637</b>

When the password is entered and you are in the balancing mode, this symbol is displayed. Press on the button to advance to the next program function, press on the button to return to previous step and press on the  $\Delta$  or  $\nabla$  button to change value. The system will exit the menus and return to normal function if you navigate through the entire menu or if no button is pressed for 5 minutes, changed values will be saved.

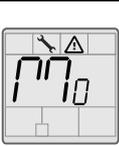
Step	Display	Description	Values
B1 <sup>1</sup>		<p><b>Auto bauds rate:</b>                      Display shows “Abr”.                      You can enable or disable the Auto bauds rate function.</p> <p>When enabled, the EVC automatically detects the baud rate of the system and coordinates it and you cannot change the bauds rate value yourself.</p> <p><b>If disable, you must select yourself the right bauds rate at step #B3.</b></p>	  Default value: Yes
B2 <sup>1</sup>		<p><b>Auto bauds, current baud:</b>                      Display shows “Abr” and the detected baud rate.</p> <p><b>Go to step #B4.</b></p>	 Range: 9600, 19200, 38400, 76800
B3 <sup>1</sup>		<p><b>Communication bauds rate:</b>                      Display scrolls between “bAU” and the value of the baud rate in kbds.                      Select the desired bauds for communication: 9.6, 19.2, 38.4, 76.8.</p>	 Range: 9600, 19200, 38400, 76800 Default value: 76.8 kbds
B4 <sup>1</sup>		<p><b>BACnet MAC address:</b>                      Display scrolls between “Add” and the value of the MAC address.</p> <p>If dip switches 0 to 7 of DS2 on the RFC are all in the Off position, then you can change the MAC address by using the “<math>\Delta</math>” or “<math>\nabla</math>” buttons.</p> <p>Each device must have a unique MAC address on a network.</p>	Range: 0 to 127 Default value: 0
B5 <sup>1</sup>		<p><b>Copy config:</b>                      Display scrolls between “CPy” and “NO”                      Select “YES” if you want to copy the configuration you did to this device to others on the network.</p> <p><b>If you selected “NO”, go to step #F11.</b></p>	  Default value: No
B6 <sup>1</sup>		<p><b>Select “start” address:</b>                      Display scrolls between “Add” and “0”. The “MIN” icon is also displayed.</p> <p>Select the first address you want to copy to.</p> <p>For example if you select MAC address 1 here and 54 in the next step, all the devices from 1 to 54 will receive the configuration of the current device.</p>	Range: 0 to 254 Default Value: 0
B7 <sup>1</sup>		<p><b>Select “end” address:</b>                      Display scrolls between “Add”. The “MAX” icon is also displayed.</p> <p>Select the last address you want to copy to. You cannot copy on more than 64 addresses at once.</p>	Range: begin address + 63 Default Value: begin address
B8 <sup>1</sup>		<p><b>Copy config result:</b>                      Display shows “SCd” if everything went ok.</p> <p>If not, the display will show “Err” you will be able to scroll the addresses and see the error message associated with each address.</p> <p>See the Annex section for the complete list of error messages.</p>	
B9 <sup>1</sup>		<p><b>Communication device instance:</b></p> <p>You cannot modify the device instance address through the TRL5x menus.</p> <p>The device instance will automatically be modified according to the MAC address selected by dip switch on EVCB PCB.</p>	
F2		<p><b>Internal temperature sensor calibration:</b>                      Display scrolls between “tS1” and temperature read by internal temperature sensor.</p> <p>You can adjust the calibration of the sensor by comparison with a known thermometer. For example if thermostat has been installed in an area where temperature is slightly different than the room typical temperature (thermostat place right under the air diffuser).</p>	 Range : 10 to 40°C [50 to 104°F] Increment: 0.1°C [0.2°F] (Factory calibrated)

<sup>1</sup>Only on BACnet models

Step	Display	Description	Values
F3		<b>External temperature sensor calibration:</b> (If "Ets" was selected at step #18 or 19) Display scrolls between "Ets" and the temperature read by the external temperature sensor (if connected on the selected input). If the sensor is not connected or short circuited, the display shows "Err". You can adjust the calibration of the external sensor by comparison with a known thermometer.	 Range: -30 to 90°C [-22 to 194.0°F] (max. offset ± 5°C)  Increment: 0.1°C [0.2°F]
F4		<b>Pressure filter setting:</b> Display shows "FLt" and the time in seconds for the numeric filter applied to the pressure analog input. Please select the desired value of the numeric filter. This filter stabilize the reading and slowed down the answer of the system	 Range: 1 to 10 seconds Increment: 1 seconds  <i>Default value: 2 seconds</i>
F5		<b>Integration air time factor setting:</b> Display shows "AIf" and the time in minutes for the integration factor compensation. Please select the desired value of the integration factor compensation.	 Range: 0 to 60 min. Increment: 1 min.  <i>Default value: 0 min.</i>
F6		<b>Air flow K factor:</b> Display shows "FAc" and the value of the k factor. $V = k\sqrt{\Delta P}$ when $\Delta P=1$ Please select the desired value of k factor.  <i>Note: From 100 to 995 full digits are displayed. From 1000 to 9900 only the thousands and hundreds digits are displayed like in the example to the right.</i>	 Range: 100 to 9900 Increment: 5 (or 100 for value over 1000)  <i>Default value: 1.2 (1200)</i>
F7		<b>Minimum cooling airflow:</b> Display shows "CL" and the value of the minimum airflow in cooling. The MIN and cooling symbol are also displayed. Please select the desired value of the minimum airflow in cooling.  The minimum value is restricted by the maximum value (step F8). <i>Note: This option is only available if the Motor Signal Ramp is set to either Cr1, Cr2, CO or CH1 (step 28 in programming mode).</i>	Range: 0 to maximum cooling airflow + 5 Increment: 5 <i>Default value: 100</i>
F8		<b>Maximum cooling airflow:</b> Display shows "CL" and the value of the maximum airflow in cooling. The MAX and cooling symbol are also displayed. Please select the desired value of the maximum airflow in cooling.  The maximum value is restricted by the minimum value (step F7). <i>Note: This option is only available if the Motor Signal Ramp is set to either Cr1, Cr2, CO or CH1 (step 28 in programming mode).</i>	Range: minimum cooling airflow + 5 to k factor Increment: 5 <i>Default value: 1000</i>
F9		<b>Minimum heating airflow:</b> Display shows "Ht" and the value of the minimum airflow in heating. The MIN and heating symbol are also displayed. Please select the desired value of the minimum airflow in heating.  The minimum value is restricted by the maximum value (step F10). <i>Note: This option is only available if the Motor Signal Ramp is set to either Hr1, Hr2, CO or CH1 (step 8 in programming mode).</i>	Range: 0 to maximum heating airflow + 5 Increment: 5 <i>Default value: 100</i>
F10		<b>Maximum heating airflow:</b> Display shows "Ht" and the value of the maximum airflow in heating. The MAX and heating symbol are also displayed. Please select the desired value of the maximum airflow in heating.  The maximum value is restricted by the minimum value (step F9). <i>Note: This option is only available if the Motor Signal Ramp is set to Hr1, Hr2, CO or CH1 (step 8 in programming mode).</i>	Range: minimum heating airflow + 5 to k factor Increment: 5 <i>Default value: 1000</i>
F11		<b>Motor override:</b> Display shows "Mr" and current value. This option enables you to force the motor into a specific position until you set this option back to Aut (automatic).  Aut: Motor follows normal operation (automatic). OPn: Motor remains in the fully opened position. CLs: Motor remains in the fully closed position. FLo min: Motor remains in the minimum cooling air flow position (step F7) FLo max: Motor remains in the maximum cooling air flow position (step F8)	 <i>Default value: Aut (Automatic)</i>
F12		<b>Enable or disable airflow balancing:</b> Display shows "FLo" and the selected setting. You can enable or disable the balancing airflow function.  If you do not need to balance system, select <b>no</b> . You will leave the balancing menu and return to operation mode. If you want to balance system, select <b>YES</b> . In this case, you will access the min & max airflow calibration menus (Steps F13 and F14) and will have 1 hour before returning to operation mode if no buttons are pressed. Changed values will be saved.	 <i>Default value: Disable (No)</i>

Step	Display	Description	Values
F13		<p><b>Minimum airflow calibration:</b>                      Display shows "FLo" and the value of the minimum airflow detected by the pressure sensor. The MIN icon is also shown.                      The thermostat will send a signal to the actuator close the VAV box at minimum airflow. When the value on thermostat is stable, you can adjust the calibration of the sensor by comparison with the reading on a manometer or a balometer.                      If you can't stabilize the system, you will need to increase the filter value (step F4).</p>	<p>Range: 0 to k factor                      (max. offset ± ½ value)                      Increment: 1</p>
F14		<p><b>Maximum airflow calibration:</b>                      Display shows "FLo" and the value of the maximum airflow detected by the pressure sensor. The MAX icon is also shown.                      The thermostat will send a signal to the actuator open the VAV box at maximum airflow. When the value on thermostat is stable, you can adjust the calibration of the sensor by comparison with the reading on a manometer or a balometer.                      If you can't stabilize the system, you will need to increase the filter value (step F4).  <b>Go back to step F12.</b></p>	<p>Range: 0 to k factor                      (max. offset ± ½ value)                      Increment: 1</p>

**Annex – Error Codes for Copy Config**

CC1		<p><b>Succeed:</b> If there are problems with the copy, user will be able to scroll through the range of addresses to find out the error codes for each address.</p> <p>In the event that some worked, the address will scroll with “SCd”.</p>
CC2		<p><b>Program mode error:</b> Display scroll “Prg” with the address.</p> <p>The target device is in program mode, the copy is not possible.</p>
CC3		<p><b>Device type error:</b> Display scroll “tYp” with the address.</p> <p>The target device is not the same type as the source, the copy is not possible.</p> <p>For example trying to copy an EVC configuration to an EFC.</p>
CC4		<p><b>Model type error:</b> Display scroll “Mo” with the address.</p> <p>The target device is not the same model as the source, the copy is not possible.</p> <p>For example trying to copy an EVCB configuration to an EVC.</p>
CC5		<p><b>Memory error:</b> Display scroll “ME” with the address.</p> <p>The target device is not the same application version (eeprom) as the source, the copy is not possible.</p>
CC6		<p><b>Slave address:</b> Display scroll “SLA” with the address.</p> <p>The target device is at a slave address. It cannot respond to the master if the copy went ok or not.</p> <p>User should manually check to make sure copy was done correctly or avoid using slave addresses (128-254).</p>
CC7		<p><b>Communication error:</b> Display scroll “Err” with the address.</p> <p>No responses were received from the target device (after 3 tries).</p> <p>Either the address doesn't exist (not used) or there is a problem with wiring/noise.</p>

**Operation Mode**

Step	Description	Display
A	<p>At powering up, thermostat will light display and activate all LCD segments for 2 seconds.</p> <p><b>Illuminating the LCD</b> To illuminate the LCD, simply push any of the 4 buttons. LCD will light for 4 seconds.</p> <p><b>Temperature display</b> In operation mode, thermostat will automatically display temperature read. If "--" and alarm symbol are displayed, the temperature sensor is not connected or short circuited. To change the scale between °C and °F, press on  button.</p> <p><b>Air flow and air supply temperature display</b> Press the  button for 5 seconds. The screen displays "AIRFLOW" and the value for 5 seconds. If "RST" is enabled at step #18 or 19, use the arrow keys to toggle between the "Airflow" and "Air Supply Temp" values.</p>	   
B	<p><b>Setpoint display and adjustment</b> To display the setpoint, press twice on  or . Setpoint will be displayed for 3 seconds. To adjust setpoint, press on  or  while the temperature setpoint is displayed. <i>Note: If setpoint adjustment has been locked,  symbol will be displayed.</i></p>	 
C	<p><b>Night set back (NSB) or no occupancy:</b> When thermostat is in night set back or no occupancy mode, moon symbol  is displayed, so setpoint for cooling and/or heating are increased as per the setting made in programming mode. If not locked, night set back or no occupancy can be overridden for a predetermined period by pressing any of the 4 buttons. During the override period the  symbol will flash. If  does not flash, the override period is finished or the night set back or no occupancy override has been locked in programming mode.</p>	
D	<p><b>Control mode selection :</b> To verify which control mode is set, press on  button. Control mode will be displayed during 5 seconds. To change of control mode, press on  or  while control mode is displayed. You can choose one of the following:  <ul style="list-style-type: none"> <li>✓ Automatic Cooling &amp; Heating</li> <li>✓ Cooling and Heating OFF</li> <li>✓ Cooling only</li> <li>✓ Heating only</li> </ul> </p> <p><i>Note: These selections can vary according to the choice made on steps #6 &amp; #7.</i></p>	 

**Recycling at end of life**

	<p>At end of life, please return the product to your local distributor for recycling.</p>
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### Feature:

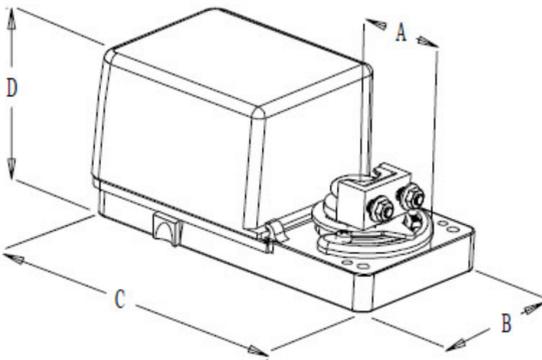
- Mounts easy on round & square shaft (with option -8).
- External clutch for manual adjustments.
- Maintenance free.
- Position indicator.
- Fail safe by *Enerdrive System*<sup>1</sup> (on model 60S, 65S & 80S).
- Auxiliary switches (on model 20S & 80S).

**ST100S**  
**ST105S**  
**ST120S**  
**ST160S**  
**ST165S**  
**ST180S**  
**ST200S**  
**ST205S**  
**ST220S**  
**ST260S**  
**ST265S**  
**ST280S**

Technical Data	ST100S	ST105S	ST120S	ST200S	ST205S	ST220S	ST160S	ST165S	ST180S	ST260S	ST265S	ST280S
Auxiliary switches	No	No	Yes (2)	No	No	Yes (2)	No	No	Yes (2)	No	No	Yes (2)
Feedback	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
Power supply	110 to 130 VAC 50/60Hz			220 to 250 VAC 50/60Hz			110 to 130 VAC 50/60Hz			220 to 250 VAC 50/60Hz		
Fail safe - <i>Enerdrive</i>	No						Yes					
Power consumption	8 VA						20VA Peak, 8VA					
Control signal	3 wire / 2 position, 4 wire / 3 point floating						2 wire / 2 position, 4 wire / 3 point floating					
Ingress protection	IP22 equivalent to Nema type 2, IP54 equivalent to Nema type 3R if water tight inlet bushings (not supplied NEP617) are installed						IP22 equivalent to Nema type 2					
Running time through 90°	90 - 110 sec (Fail-safe 20-30 sec)											
Torque	70 in.lb. [8 Nm] at rated voltage											
Electrical connection	18 AWG [0.8 mm <sup>2</sup> ] minimum											
Inlet bushing	2 inlet bushing of 5/8 in [15.9 mm] & 7/8 in [22.2 mm]											
Angle of rotation	0 to 90 degrees, mechanically adjustable (factory set with 90° stroke)											
Direction of rotation	Reversible, Clockwise (CW) or Counterclockwise (CCW) (factory set with CW direction)											
Ambient temperature	-22°F to +122°F [-30° C to +50° C]											
Storage temperature	-22°F to +122°F [-30° C to +50° C]											
Relative Humidity	5 to 95 % non condensing.											
Weight	3 lbs. [1.4 kg]											

**Warning: Do not press the clutch when actuator is powered**

### Dimensions



Dimension	Inches	Metric (mm)	
<b>A</b>	1.50	38.1	
<b>B</b>	3.26	82.8	
<b>C</b>	6.60	167.5	
<b>D</b>	model 00S, 05S & 20S	3.01	76.4
	model 60S, 65S & 80S	3.72	94.5

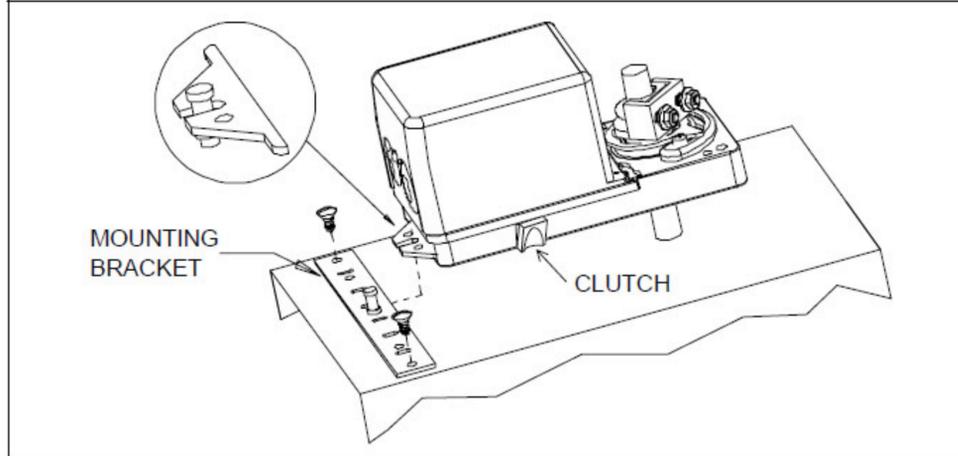
### Caution

We strongly recommend that all neptronic® products be wired to a separate transformer and that transformer shall service only neptronic® products. This precaution will prevent interference with, and/or possible damage to incompatible equipment. When multiple actuators are wired on a single transformer, polarity must be observed. Long wiring runs create voltage drop which may affect the actuator performance.

<sup>1</sup> *Enerdrive System* U.S.A. Patent #5,278,454



**Mechanical installation**



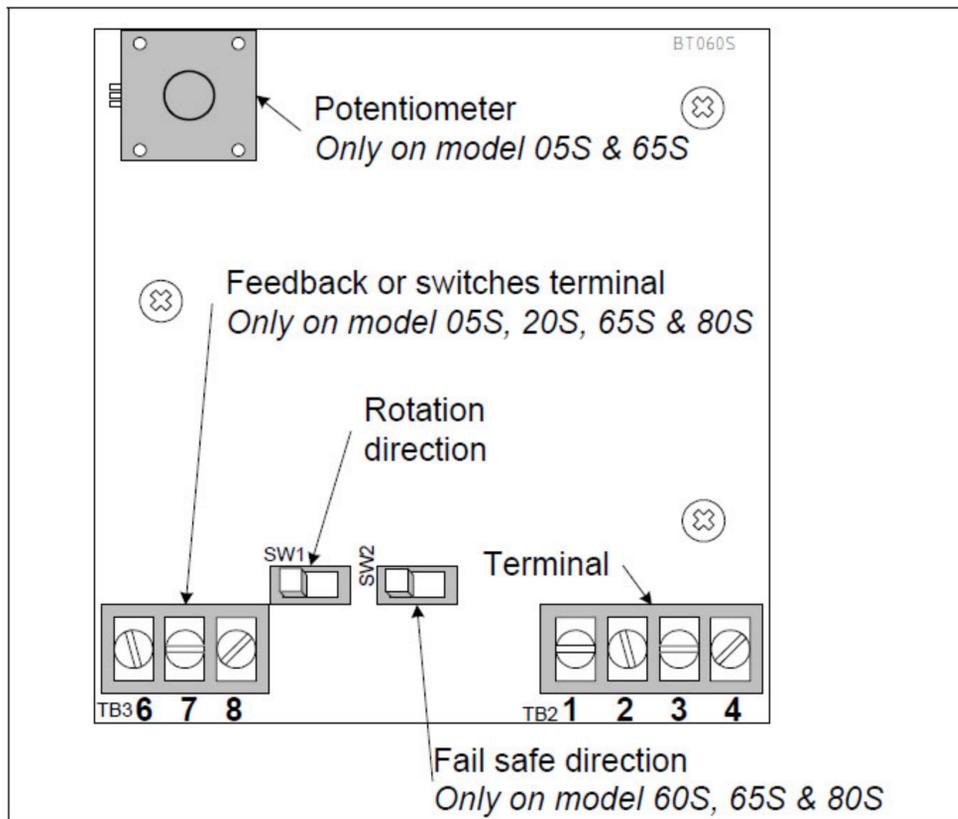
1. Manually close the damper blades and positioned the actuator at 0° or 90°.
2. Slide the actuator onto the shaft.
3. Tighten the nuts on the "U" bolt to the shaft with a 8mm wrench to a torque of 60 in.lb. [6,7 Nm].
4. Slide the mounting bracket under the actuator. Ensure free movement of the slot at the base of the actuator. The bracket pin must be placed in the mid distance of the slot.
5. Fix the bracket to the ductwork with #8 self-tapping screws.

**Wiring Diagrams**

**Caution: Risk of electric shock. Remove power prior to connect.**

Models ST100S, 105S, 120S, 200S, 205S & 220S	Models ST160S, 165S, 180S, 260S, 265S & 280S
<p><b>3 wire / 2 position (ON-OFF)</b></p>	<p><b>2 wire / 2 position (ON-OFF)</b></p>
<p><b>4 wire / 3 point floating</b></p>	<p><b>4 wire / 3 point floating</b></p>

**PC Board**

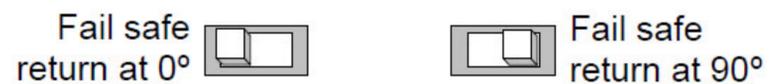


**Dip switch settings**

Rotation direction (SW1)



Fail safe direction (SW2)



**Stroke adjustment**

To adjust the stroke, move the adjustment screws at the desired position.

**Feature:**

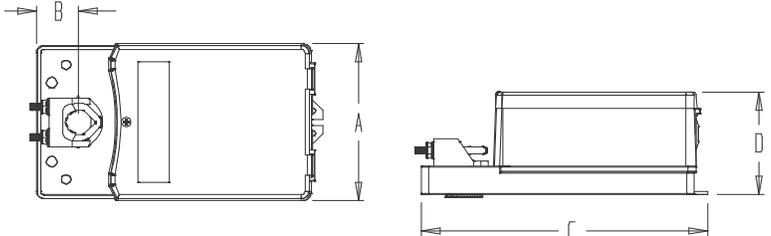
- Power supply high voltage 120 or 240 VAC (on model LT3...).
- Clutch for manual adjustments.
- Maintenance free.
- Position indicator.
- Fail safe by *Enerdrive System*<sup>1</sup> (on model 060, 065, 080, 360, 365 & 380).
- Auxiliary switches (on model 020, 080, 320 & 380).

**Old Number**

<b>LDT3000A</b>	<b>LT000</b>
<b>LDT3005A</b>	<b>LT005</b>
<b>LDT3021A</b>	<b>LT020</b>
<b>LDT3060A</b>	<b>LT060</b>
<b>LDT3065A</b>	<b>LT065</b>
<b>LDT3080A</b>	<b>LT080</b>
<b>LDTHV3300A</b>	<b>LT300</b>
<b>LDTHV3305A</b>	<b>LT305</b>
<b>LDTHV3321A</b>	<b>LT320</b>
<b>LDTHV3360A</b>	<b>LT360</b>
<b>LDTHV3365A</b>	<b>LT365</b>
<b>LDTHV3380A</b>	<b>LT380</b>

Technical Data	LT000 LDT 3000A	LT005 LDT 3005A	LT020 LDT 3021A	LT060 LDT 3060A	LT065 LDT 3065A	LT080 LDT 3080A	LT300 LDTHV 3300A	LT305 LDTHV 3305A	LT320 LDTHV 3321A	LT360 LDTHV 3360A	LT365 LDTHV 3365A	LT380 LDTHV 3380A
<b>Auxiliary switches</b>	No	No	Yes(2)	No	No	Yes (2)	No	No	Yes(2)	No	No	Yes (2)
<b>Feedback</b>	No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No
<b>Fail safe - Enerdrive</b>	No			Yes			No			Yes		
<b>Power consumption</b>	5 VA			30 VA Peak, 5 VA			8 VA			35 VA Peak, 8 VA		
<b>Control signal</b>	3 wire / 2 position, 3 wire / 3 point floating			2 wire / 2 position, 4 wire / 3 point floating			3 wire / 2 position, 4 wire / 3 point floating			2 wire / 2 position, 4 wire / 3 point floating		
<b>Weight</b>	4.5 lbs. [2 kg]						4.8 lbs. [2.2 kg]					
<b>Power supply</b>	28 to 32 VDC or 22 to 26 VAC						110 to 130 VAC or 220 to 250 VAC 50/60Hz					
<b>Approvals</b>												
<b>Torque</b>	140 in.lb. [16 Nm] at rated voltage											
<b>Running time through 90°</b>	60 to 85 sec Torque dependant											
<b>Electrical connection</b>	18 AWG [0.8 mm <sup>2</sup> ] minimum											
<b>Inlet bushing</b>	2 inlet bushing of 7/8 in [22.2 mm]											
<b>Angle of rotation</b>	0 to 90 degrees, mechanically adjustable with SLD (optional), (factory set with 90° stroke)											
<b>Direction of rotation</b>	Reversible, Clockwise (CW) or Counterclockwise (CCW) (factory set with CW direction)											
<b>Ambient temperature</b>	0°F to +122°F [-18° C to +50° C]											
<b>Storage temperature</b>	-22°F to +122°F [-30° C to +50° C]											
<b>Relative Humidity</b>	5 to 95 % non condensing.											
<b>Warning: Do not press the clutch when actuator is powered</b>												

**Dimensions**



Dimension	Inches	Metric (mm)
<b>A</b>	5.20	132.1
<b>B</b>	1.33	33.8
<b>C</b>	9.13	231.9
<b>D</b>	3.39	86.1

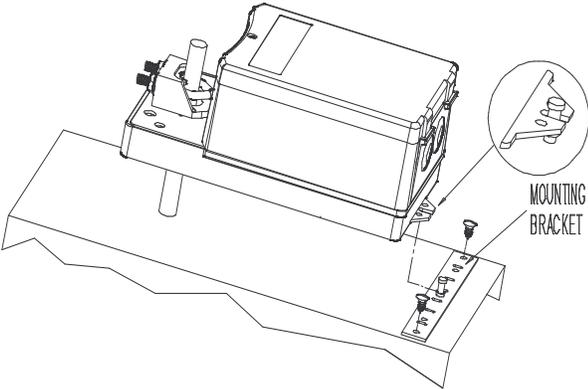
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<sup>1</sup> Enerdrive System U.S.A. Patent #5,278,454

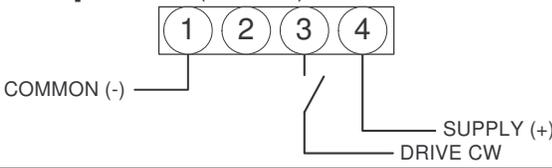
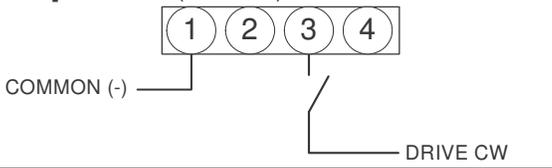
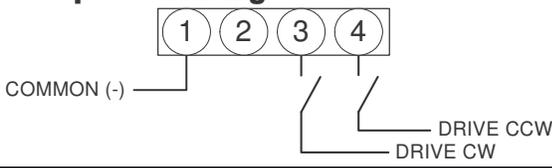
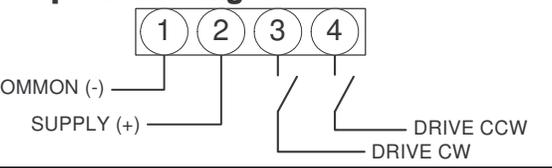


**Mechanical installation**

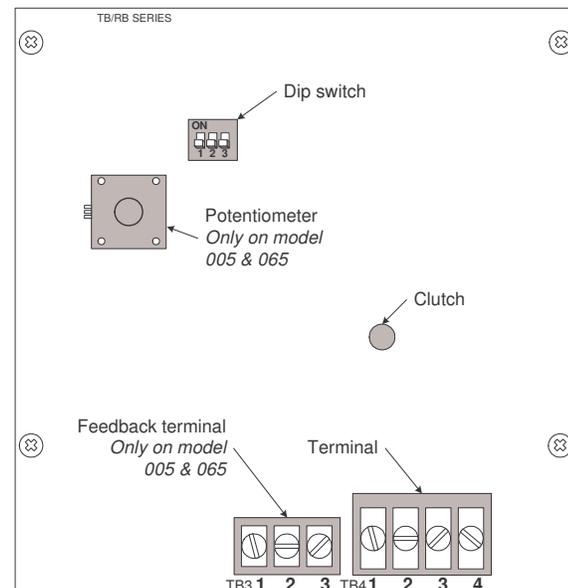


1. Manually close the damper blades and positioned the actuator at 0° or 90°.
2. Slide the actuator onto the shaft.
3. Tighten the nuts on the "U" bolt to the shaft with a 10mm wrench to a torque of 150 in.lb. [17 Nm].
4. Slide the mounting bracket under the actuator. Ensure free movement of the slot at the base of the actuator. The bracket pin must be placed in the mid distance of the slot.
5. Fix the bracket to the ductwork with #8 self-tapping screws.

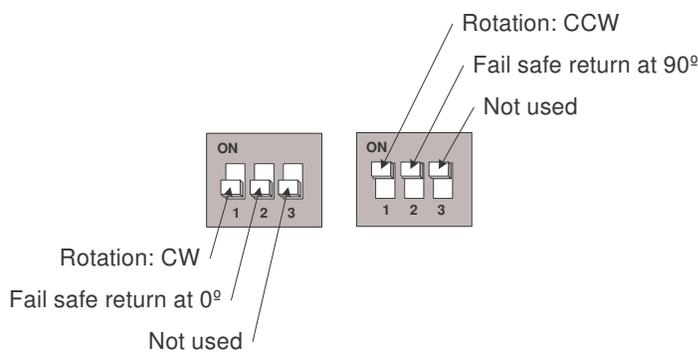
**Wiring Diagrams LT0...**

<p><b>Models LT000, 005 &amp; 020</b></p> <p><b>3 wire / 2 position (ON-OFF)</b></p> 	<p><b>Models LT060, 065 &amp; 080</b></p> <p><b>2 wire / 2 position (ON-OFF)</b></p> 
<p><b>3 wire / 3 point floating</b></p> 	<p><b>4 wire / 3 point floating</b></p> 

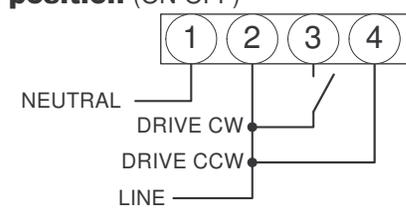
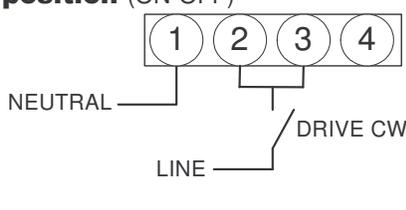
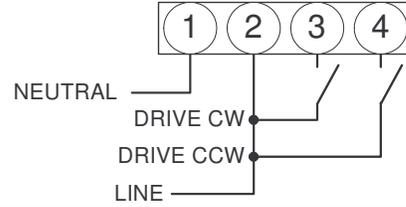
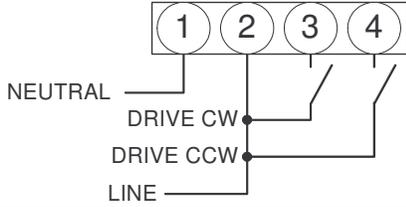
**PC Board LT0...**



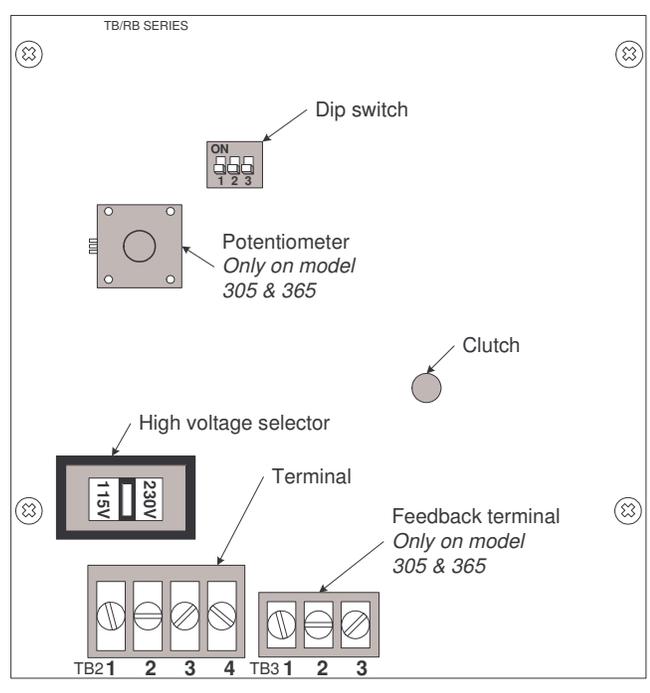
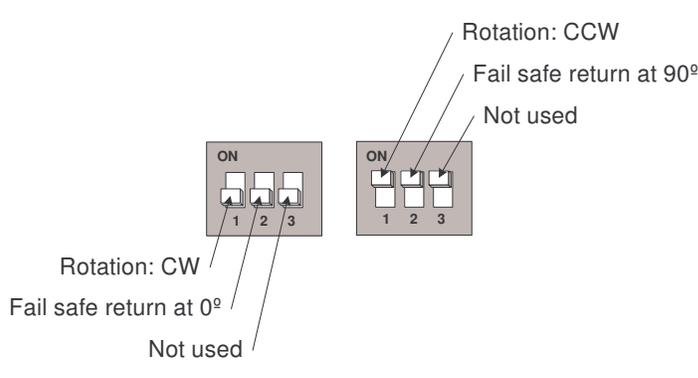
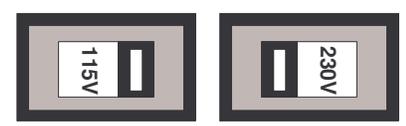
**Dip switch settings**



**Wiring Diagrams LT3...**

Models LT300, 305 & 320	Models LT360, 365 & 380
<p><b>3 wire / 2 position (ON-OFF)</b></p> 	<p><b>2 wire / 2 position (ON-OFF)</b></p> 
<p><b>4 wire / 3 point floating</b></p> 	<p><b>4 wire / 3 point floating</b></p> 

**PC Board LT3...**

	<p><b>Dip switch settings</b></p>  <p>Rotation: CW Fail safe return at 0° Not used</p> <p>Rotation: CCW Fail safe return at 90° Not used</p> <hr/> <p><b>High voltage selector</b></p>  <p>Slide the high voltage selector as per voltage used.</p>
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**Stroke adjustment**

To adjust the stroke, use the stroke limiting device (SLD). (not included)

