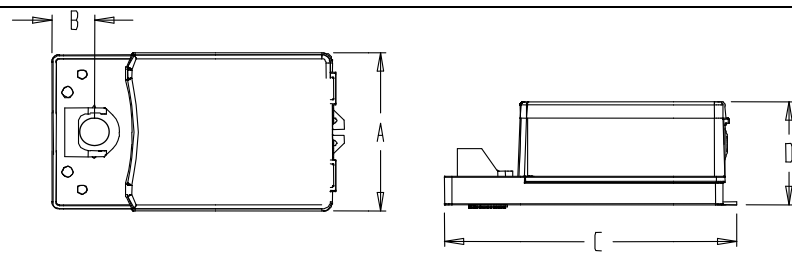**neptronic**®

Features:

- Clutch for manual adjustments.
- Maintenance free.
- Position indicator.
- Control signal fully programmable.
- Brushless DC driven motor.
- Fail safe by *Enerdrive System* [1] (on models 060 & 080).
- Auxiliary switches (on models 020 & 080).

TM000N
TM020N
TM060N
TM080N
RM000N
RM020N
RM060N
RM080N

Technical Data	TM000N	TM020N	TM060N	TM080N	RM000N	RM020N	RM060N	RM080N
Auxiliary switches	No	Yes(2)	No	Yes (2)	No	Yes (2)	No	Yes (2)
Fail safe - *Enerdrive*	No		Yes		No		Yes	
Power consumption	15 VA		40 VA Peak, 15 VA		24 VA		40 VA Peak, 24 VA	
Torque	180 in.lb. [20 Nm] at rated voltage				360 in.lb. [40 Nm] at rated voltage			
Power supply	22 to 26 Vac or 28 to 32 Vdc							
Running time through 90º	40 to 50 sec torque dependant							
Feedback	4 to 20 mA or 2 to 10 Vdc adjustable							
Electrical connection	18 AWG [0.8 mm^2] minimum							
Inlet bushing	2 inlet bushing of 7/8 in [22.2 mm]							
Control signal	Analog, Digital or PWM programmable (factory set with analog control signal)							
Angle of rotation	0 to 90 degrees, electronically adjustable (factory set with 90º stroke)							
Direction of rotation	Reversible, Clockwise (CW) or Counterclockwise (CCW) (factory set with CW direction)							
Operating temperature	0ºF to 122ºF [-18º C to 50ºC]							
Storage temperature	-22ºF to 122ºF [-30º C to 50ºC]							
Relative Humidity	5 to 95 % non condensing.							
Weight	6 lbs. [2.7 kg]				8.5 lbs. [3.8 kg]			
Warning: Do not press the clutch when actuator is powered								

Dimensions
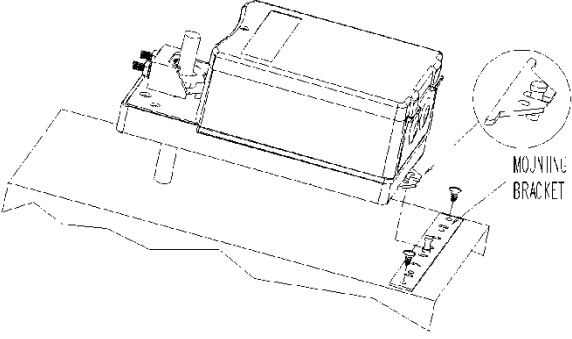
Dimension	Imperial (in)	Metric (mm)
A	5.20	132.1
B	1.33	33.8
C	9.13	231.9
D	3.55	90.2

Caution

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[1] *Enerdrive System* U.S.A. Patent #5,278,454
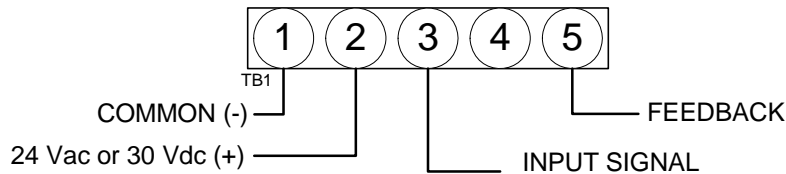
$C \epsilon$ CSA_{US} UL

Mechanical Installation

1. Manually close the damper blades and positioned the actuator at 0º or 90º.
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.
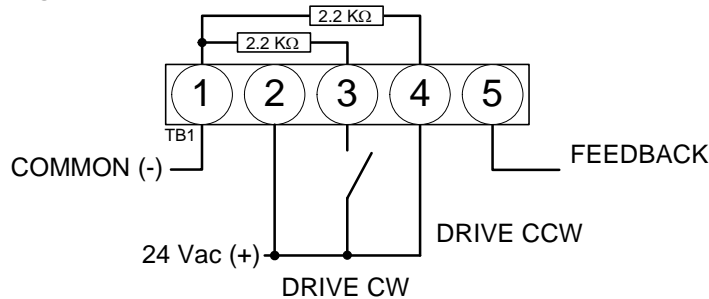5. Fix the bracket to the ductwork with #8 self-tapping screws.
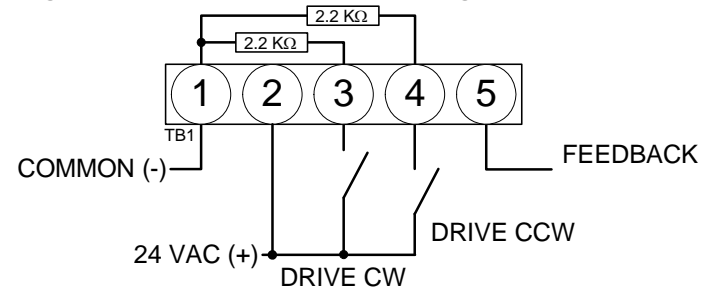
Wiring Diagrams

Analog or PWM

COMMON (-)
24 Vac or 30 Vdc (+)
FEEDBACK
INPUT SIGNAL

Digital signal	
Digital – 3 wire / 2 position	**Digital – 4 wire / 3 point floating**

2.2 KΩ
2.2 KΩ
COMMON (-)
FEEDBACK
DRIVE CCW
24 Vac (+)
DRIVE CW

2.2 KΩ
2.2 KΩ
COMMON (-)
FEEDBACK
DRIVE CCW
24 VAC (+)
DRIVE CW

Special consideration for Digital control
In this mode, the actuator is sensitive to induced electrical voltages **from external sources**. To prevent such interference, if the signal on pins 4 and 3 on TB1 are from an **external 24 Vac source**, install a resistor 2.2kohm, 0.5W between pins 4 and 1 and another of 2.2kohms, 0.5W between pins 3 and 1 of TB1. These resistors are included.

Input Signal and Feedback setup

	Input Signal	Feedback
Analog Mode	Input Signal is set with Dipswitch # 3 DS1-3 at OFF = 2 – 10Vdc (default setting) DS1-3 at ON = 4 – 20mA	Feedback is set with Dipswitch #4 DS1-4 at OFF = 4 – 20mA (default setting) DS1-4 at ON = 2 – 10Vdc
Digital & PWM Mode	No Input Signal Setting ⚠ *DS1-3 MUST be at OFF*	

PC Board

DIP switch settings

#	Description	ON	OFF (*)
1	Rotation	CCW	CW
2	Fail safe return at	90°	0°
3	Control input signal	4-20 mA	2-10 Vdc
4	Feedback output signal	2-10 Vdc	4-20 mA

(*) default setting = All DIP switches OFF

Fail Safe (on models 060 and 080)

Operation
- *Upon power failure the actuator will move to the position defined by DIP switch #2 (see above).*
- *Even if power returns or is applied, the actuator ignores all operation until the failsafe position is reached.*

To disengage the clutch

Ensure the actuator's stroke adjustment was completed (see stroke adjustment procedure below).
1) Remove power from the actuator.
2) Wait until the motor rotates to its failsafe position.
3) Change the failsafe direction (only once), via DIP switch #2. If the actuator does not rotate, go to step 5.
4) If the actuator rotates, wait until motor rotation is complete. Repeat step 3 until the motor no longer rotates after changing the failsafe direction (DIP switch#2). Go to step 5.
5) The clutch can now be disengaged.

Stroke adjustment – No control signal change

1. Apply power and, **WAIT FOR LED TO BE OFF (around 10 seconds)**.
2. Press and release the reset button to start the auto-stroke process.
   The LED should be illuminated.

   - **First option:**
     The actuator will then travel in both directions to find its limit and position itself according to the demand.
     The LED will extinguish, the process is complete.

   - **Second option:**
     When the desired start position is reached, press and release the reset button. The actuator will now go the end position. (you can also press and release the reset button when It's reaches the end position)
     The LED will extinguish, the process is complete.

CE CSA UL

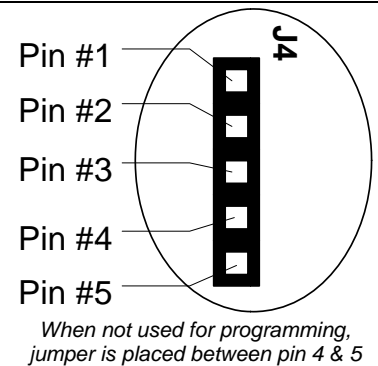## Programming – Change of control signal & PWM pulse setting

1. Remove power and put all dip switches "OFF" (factory preset).
2. Apply power and, **within 10 seconds**, press and release the reset button. The LED should be blinking.
3. Select the control signal with dip switches:

	Digital or Analog Modes	PWM Mode
Move switch **No1** "ON" and then "OFF".	**Digital** (On/Off or 3 point floating)	5 sec. pulse (factory preset)
Move switch **No2** "ON" and then "OFF".	**Analog** (Default)	25 sec. pulse

Stroke adjustment
see the stroke adjustment section above.

Enabling or disabling PWM mode

1. Remove power supply to actuator
2. Install jumper between pin 3 & 4 of J4
3. Select the desired action using the dipswitches (DS1):

DS1-1	DS1-2	Action
OFF	ON	Enable PWM Mode
ON	OFF	Disable PWM Mode

4. Re-apply power supply to actuator
5. **Wait 5 seconds**
6. Remove power supply to actuator
7. Remove jumper between pin 3 & 4 of J4, re-install it between pin 4 & 5.
8. Re-apply power supply to actuator
   PWM is factory preset at 5 sec. pulse,
   refer to programming section above to change pulse setting.

Pin #1
Pin #2
Pin #3
Pin #4
Pin #5

J4

When not used for programming, jumper is placed between pin 4 & 5
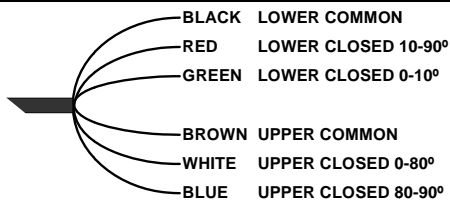
Zero and span calibration

This feature is applicable to analog control signal only.

1. Remove power and put all dip switches "OFF". (factory preset).
2. Apply power and, **within 10 seconds** press and **hold** the reset button until the LED blinks once.
   The Zero and span calibration process then start.
3. Release the reset button. The LED is now constantly illuminated.
4. Apply new minimum voltage.
   It can be any value between 0 to 7 Vdc, with an external 0 to 10 volt supply (ex: MEP).
5. Press and release the reset button to memorize the new minimum voltage. The LED blinks.
6. Apply new maximum voltage.
   It can be any value between 3 to 10 Vdc, this value should be greater than the new minimum value.
7. Press and release the reset button to memorize the new maximum voltage. The LED blinks.
   The Zero and span calibration process is complete.

Note: To reset zero and span to 2 to 10 Vdc (factory value). You just have to re-select the analog control signal mode, see Programming.

Wiring Diagrams for auxiliary switches (on model 020 & 080)

BLACK   LOWER COMMON
RED   LOWER CLOSED 10-90°
GREEN   LOWER CLOSED 0-10°

BROWN   UPPER COMMON
WHITE   UPPER CLOSED 0-80°
BLUE   UPPER CLOSED 80-90°

Auxiliary switch rating:
5 Amp resistive, 250 Vac