LCx-xxxAx-8.08 Linear

Contents

Installation

Mounting:

Usually, the actuator has to be mounted and supported.

Exceptionally, and only if the application is vibration free and the tubing is minimum ¼" dia. stainless, the actuator may be suspended on the tubing itself.

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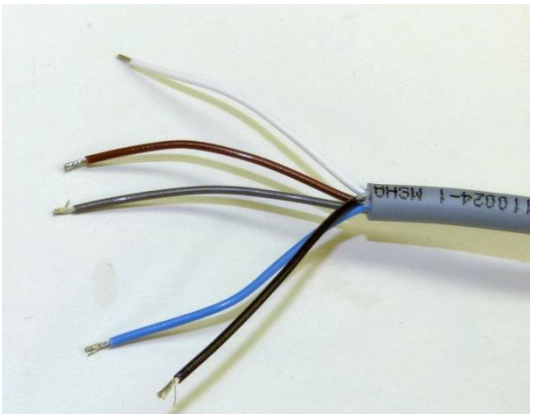
Wiring:

The actuator comes standard with a Turck 5 position connector and a 20' cable with plug. Cut the cable to the length required and then connect according to the following wire color schematic:



Wire color schematic for "Turck5" cable:

	DC Power Supply only
White ->	+24VDC
Black ->	Power Gnd
Grey ->	Output Signal (4..20mA)*
Brown->	Isolated** Input Signal Gnd
Blue ->	Isolated** Input + Signal (4..20mA)

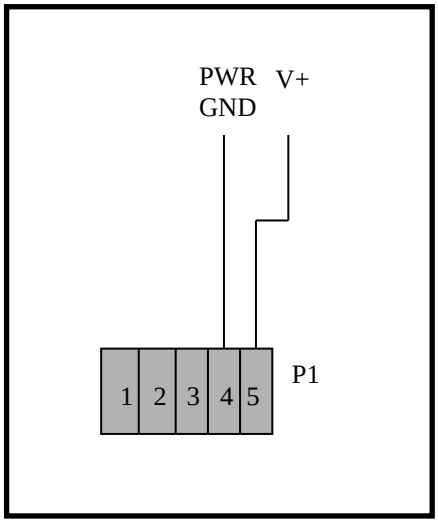
* "feedback" available in LCx-xxxA**F** version of actuator only
** "isolated" available in LCx-xxxA**I** and xxxA**F** versions of actuator only

Otherwise, if the Turck cable is not included in your actuator, see pg.8 for more detailed wiring instructions.

Connect the power:

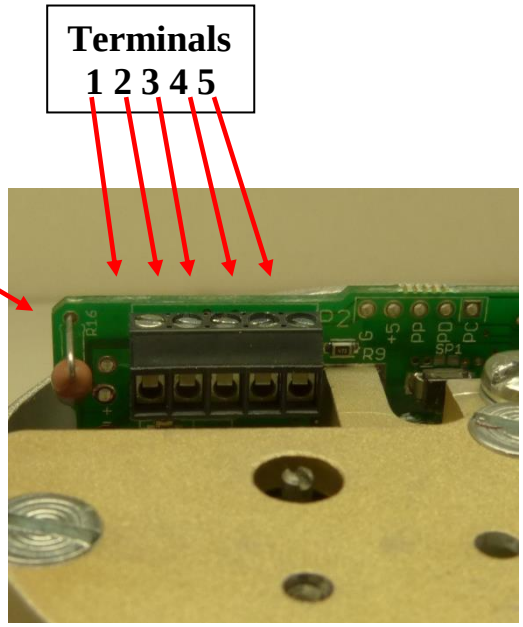
The **LCx** may be connected to voltages ranging from: 12 – 24 VDC.
18 VDC is required for full 'Digital Potentiometer' functionality (see pg. 7)

The power consumption will range from max. 3.0A to approx min. 100mA when the actuator is active. When not moving, the actuator draws less than 10mA. The **LCx-xxxAF** feedback model will draw up to 60mA more.



Locate the correct connection terminals as shown in the picture to the left then connect according to the connection schematics above.

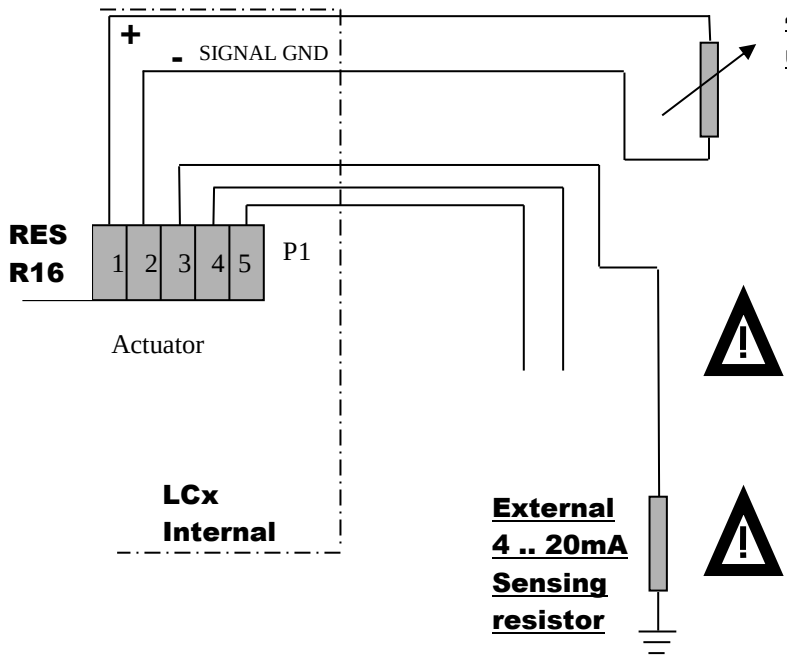
Remove R16 to convert to 1 .. 5V input signal



Locate the correct connection terminals as shown in the picture to the right then connect according to the connection schematics above.

Connect the signal:

Locate the correct connection terminals as shown on the previous page, then connect your input signal on pos. 1 and 2 as shown below. Feedback, if applicable, is connected to pos. 3.



4 .. 20mA Signal source, user powered

NOTE 1: Usually, the actuators are shipped for 4 .. 20mA signal input.

For 1 ..5 V signal input, remove 250 ohm resistor R16.

NOTE 2: Signal Gnd is ***NOT ISOLATED*** from Power Gnd in all LCx-xxxA**B** basic models.

If your signal Gnd is different from Power Gnd use HANBAY LCx-xxxA**I** or LCx-xxxA**F** model actuators.

NOTE 3: ***DO NOT CONNECT*** pin 3 directly or through a multimeter only to ground. A sensing resistor of 50 omhs or more needs to be present. Not observing this warning will damage the equipment.

The actuator 4..20 mA output is internally supplying the signal current and can drive sufficient voltage for any sensing resistor of up to 250 ohms.

The potential of the external GND after the sensing resistor may not be more than +6VDC / -2 VDC away from the power GND of the actuator.

This feedback signal output is only available in HANBAY MCx-xxxA**F** model actuators.

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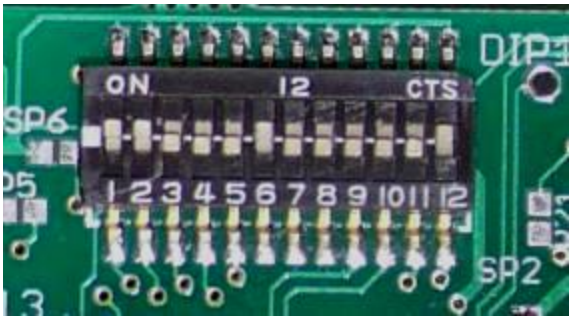
Operation

DIP switches:

The DIP switches allow you to change the settings on your actuator. To flip a switch, gently use a small flat-head screwdriver.
See chart on next page for DIP switch functionality.



In this example DIPs 1, 2, 6 and 12 are on.

DIP	Function
1 2	Speed: Choose how quickly the actuator will turn the drive wheel. See pg 6-7.
3	When turned on, regulates pressure in PSI. When off, regulates pressure in Bar. See below.
4 5 6 7 8	Chooses the pressure of the regulator. See table on page 6-7.
9	Signal loss: See below.
10 11	Power: Set how much torque the actuator exerts on the valve lever. See below and pg 6-7.
12	Direction/Calibration: Toggle switch on and off while powered to re-calibrate actuator. Also sets direction in which the actuator will open and close. See pg 5. Example: The MCM model actuator turns clockwise when the signal is decreased with DIP 12 in the OFF position. For changes to rotation to take affect flip the switch and cycle the power to the actuator.

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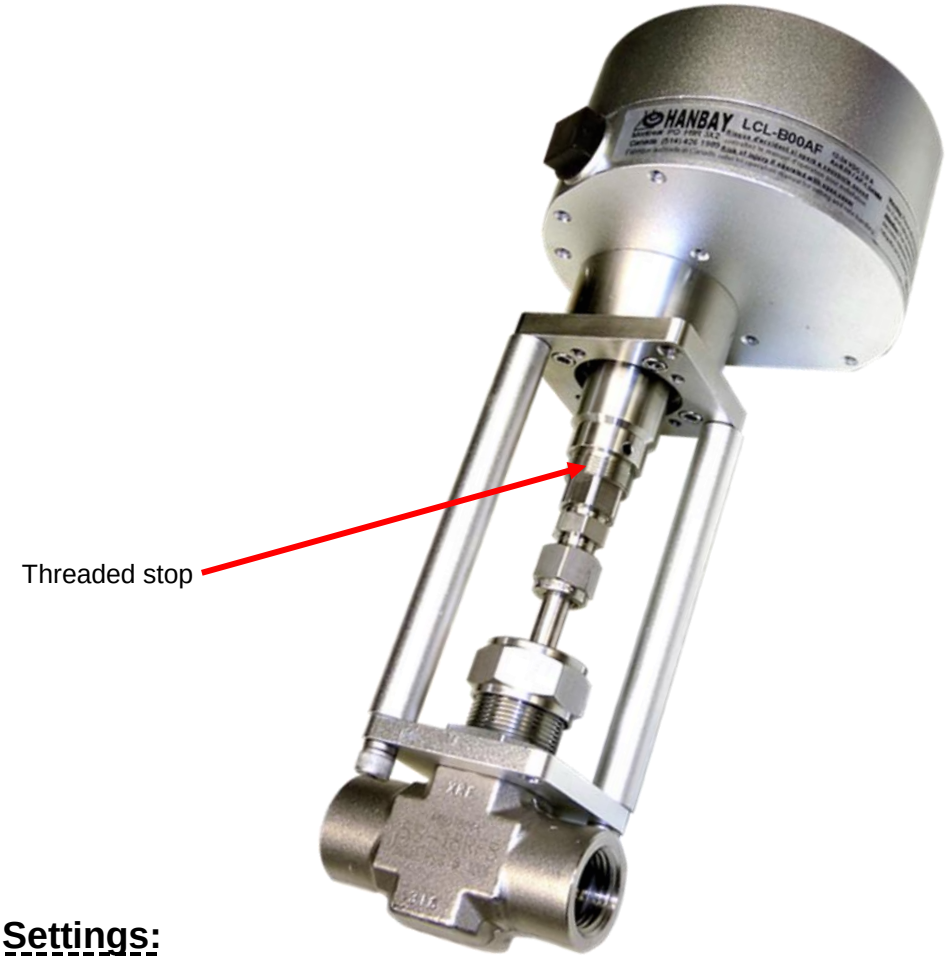

Power Settings:

To accommodate different valves and other applications with different force requirements, the actuator can be set to apply different forces.
Please see the box to the right and the tables on pg 6-7 to select the power setting that is right for your application.
The actuator will try to reach the speed set by Dip1 and Dip2. If the force required is too high, the actuator will automatically slow down and deliver the maximum available torque for a given “Permanent Power Setting”.

Permanent power settings:
(when operating at 24V)

Dip10	Dip11	Power
Off	Off	16%
Off	On	33%
On	Off	66%
On	On	100%

To deal with sticking valves, at the beginning of the first reversing movement after the seating (“zeroing”) of the valve, the actuator will apply double the power set by Dip10 and Dip11 (up to 100% power.)
This “pull out” function is always enabled.

Warning: High power settings can supply enough torque to damage your valve. Please be cautious, especially when using the 100% power setting.

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Signal Loss and Calibration:

1. - **For actuators that are not connected to a UPS** (Uninterruptible Power Supply), the loss of signal will be simultaneous with power loss. As a consequence, the actuator will not be able to move anywhere. In the shutdown process though, the actual position is automatically saved to the internal EEPROM. [this saving of the position is only happening for min. 18VDC supplies]
When power is restored, the actuator will "know" its location and will simply start to follow the signal as received.

IF YOU HAVE TO turn the actuator manually when its power is turned off, it will lose its position, and it will need to be re – zeroed (as described in section 3 on the following page).

2. - **For actuators that are connected to a UPS** the behavior on signal loss can be set as follows:

Normal position of DIP9: OFF

With DIP9 in the off position, the actuator will ignore the signal if it is lost (I.E.: if the signal falls below 0.7V) and simply remain in its current position.
Note: if the sensing resistor R16 is removed (for 1..5V input signals), we recommend placing a 10K resistor between signal and signal GND.

Predetermined signal loss position DIP9: ON

With DIP9 in the on position, the actuator will move to a predetermined position when the signal is lost (I.E.: if the signal falls below 0.7V).

Setting of the predetermined signal loss position:

a. - turn Dip9 to the "off" position
b.- re – zero the actuator by sending and holding an input signal between 2.8 and 4.16 mA (0.7 to 1.04V) wait until the device is re-zeroed, (i.e: the valve is closed)
c. - by varying the input signal, move the actuator to the position that is going to be the predetermined signal loss position.
d. - switch Dip9 to the "on" position. The current actuator position will be saved as the default signal loss position. (The default signal position is an absolute actuator position. I.e.: not a signal value.)

3. - **Re – Zeroing the actuator and initiating calibration routine:**

The actuator will re-zero when the input signal is between 2.8 and 4.16mA (0.700V – 1.040V). It will turn clockwise until the actuator has reached the fully closed position of the valve.
Different valves mounted to actuator need the calibration routine initiated manually. This is done by toggling dip switch 12 in the one way and back to its original position while the actuator is powered. This will initiate the calibration routine and is essential when changes have been made to the valve.
If you need to re-zero in the opposite direction (i.e: for pressure regulators, which typically go to the "top" fully open position at 4mA) change the setting of Dip switch DIP12 and cycle power.

4. - **Feedback calibration: [LCx-xxxAF model actuators only]**

The current feedback will be calibrated from the factory.
To re-calibrate the feedback:

a.- turn off the actuator, and disconnect the feedback and input signals
b.- connect the feedback signal to the signal input. Also connect the power and signal grounds.
c.- power up the actuator with this "signal back-loop" setup.
d.- Short SP5. It will automatically run a special routine to calibrate the feedback signal to the signal input.
The whole process takes about 1.5 seconds.
e.- turn off the power and reconnect the actuator as normal.

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Troubleshooting:

Upon noticing a problem, your first step should almost always be to recalibrate the actuator by switching DIP 12, then switching it back to its original position, all while the actuator is powered. This alone can solve basic problems. See section 3 on this page for more details.

If the actuator does not move, try following these steps:

1) Re-calibrate the actuator. This will move the actuator regardless of what signal it is receiving.
2) A sticking valve may be the problem. Remove the valve from the actuator, and re-test the actuator.
3) Remove power. Re-check the wiring and the power/signal apparatus. Power actuator, and re-calibrate. If the problem persists, please call Hanbay for technical support.

Appendix

Speed and Power Details:

The maximum speed of the actuator can be set by using the first two positions of the **DIP switch selector**. As a result of this setting, the actuator will limit the maximum speed. The tables below show the maximum torques that can be expected at the given maximum speeds.
The torque available also depends on the voltage provided in the power connection and on the Permanent power settings on DIP 10, 11 as shown below. *

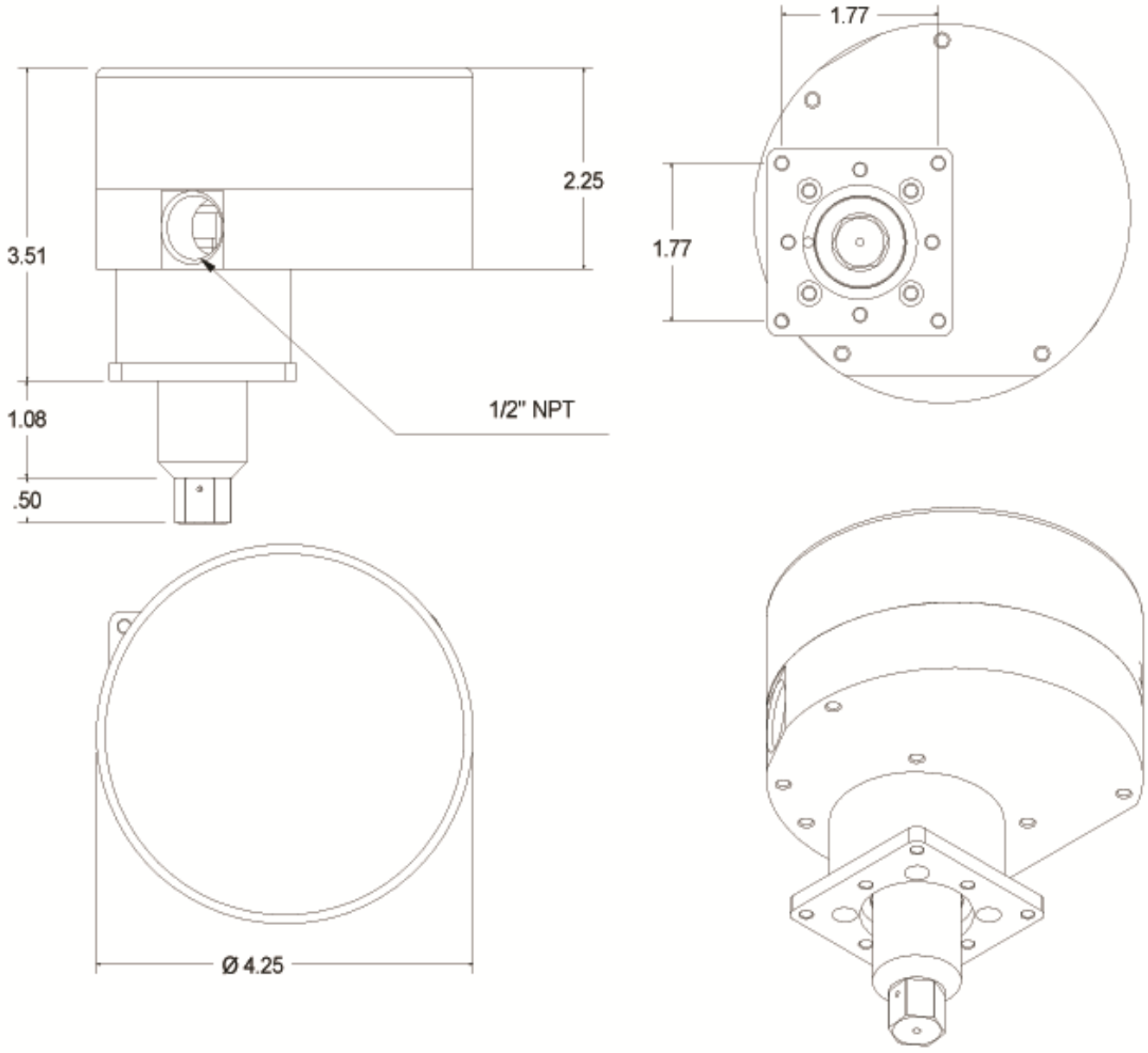
Power: For LCJ, divide LCL values by 3. For LCK, divide LCM values by 3

		Power setting **/ Force in lbs**			
Gears	TPI	100%	66%	33%	16%
LCL	8	**517**	**341.22**	**170.61**	**82.72**
LCM	8	**1551**	**1023.66**	**511.83**	**248.16**
LCL	16	**739**	**487.74**	**243.87**	**118.24**
LCM	16	**2217**	**1463.22**	**731.61**	**354.72**

Speed:

	Seconds per inch			
DIP 1	on	on	off	off
DIP 2	on	off	on	off
LCL -8	**8**	**24**	**32**	**40**
LCM -8	**32**	**64**	**96**	**128**
LCL -16	**16**	**48**	**64**	**80**
LCM -16	**64**	**128**	**192**	**256**

Main Dimensions:



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