

# MDx-xxxDT-10.31

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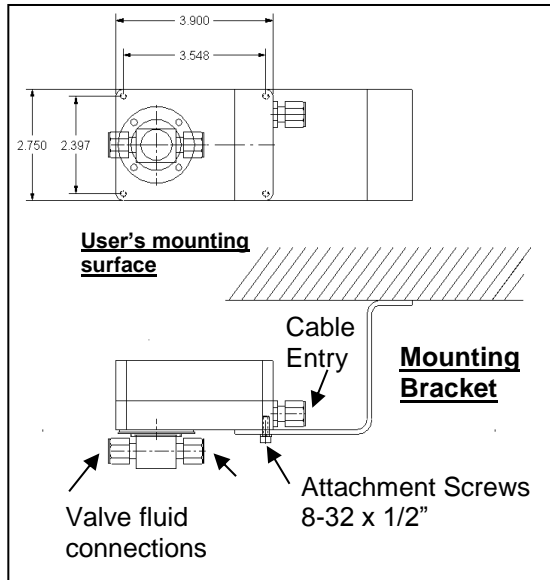
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## Installation

### Mounting:

Usually, the actuator has to be mounted and supported as shown in the picture to the left. Exceptionally, and only if the application is vibration free and the tubing is minimum 1/4" dia. stainless, the actuator may be suspended on the tubing itself.



**Wiring:**

The actuator comes standard with a Turck 6 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 "Turck6" cable:**

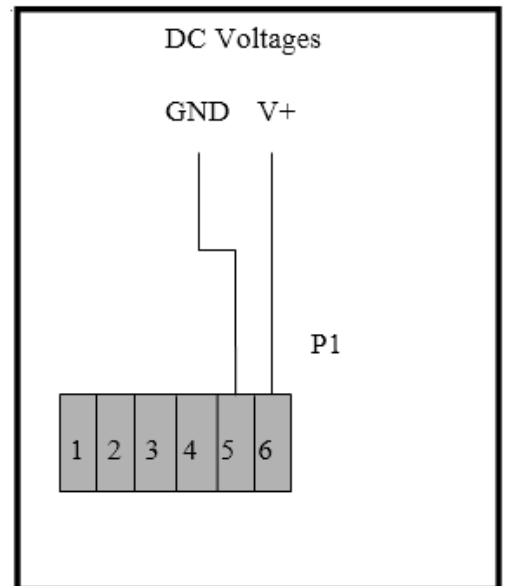
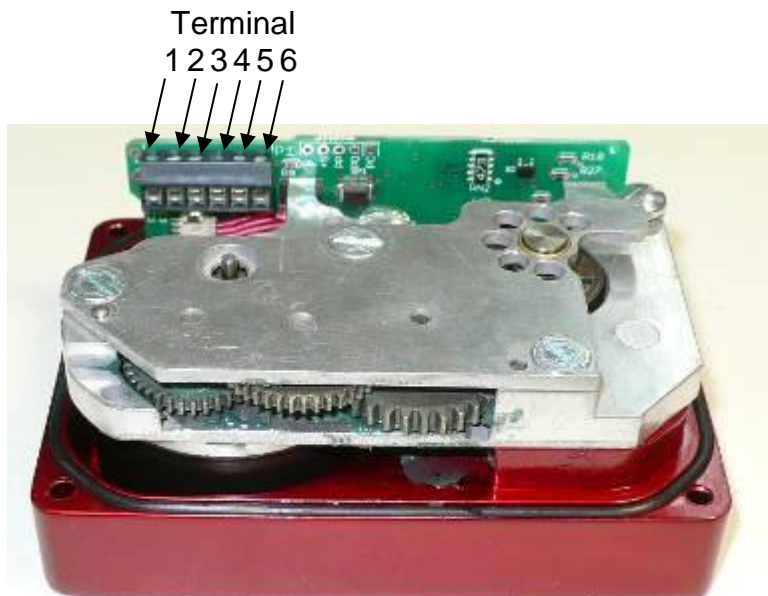
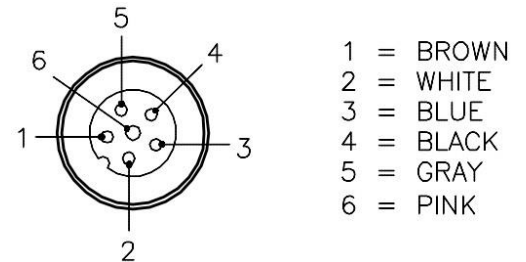
Pin	Colour	Function
6	White ->	+24VDC
5	Black ->	Power Gnd.
4	Pink ->	Output TT2
3	Grey ->	Output TT1
2	Blue ->	Signal Input TT2
1	Brown ->	Signal Input TT1

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

**Connect the power:**

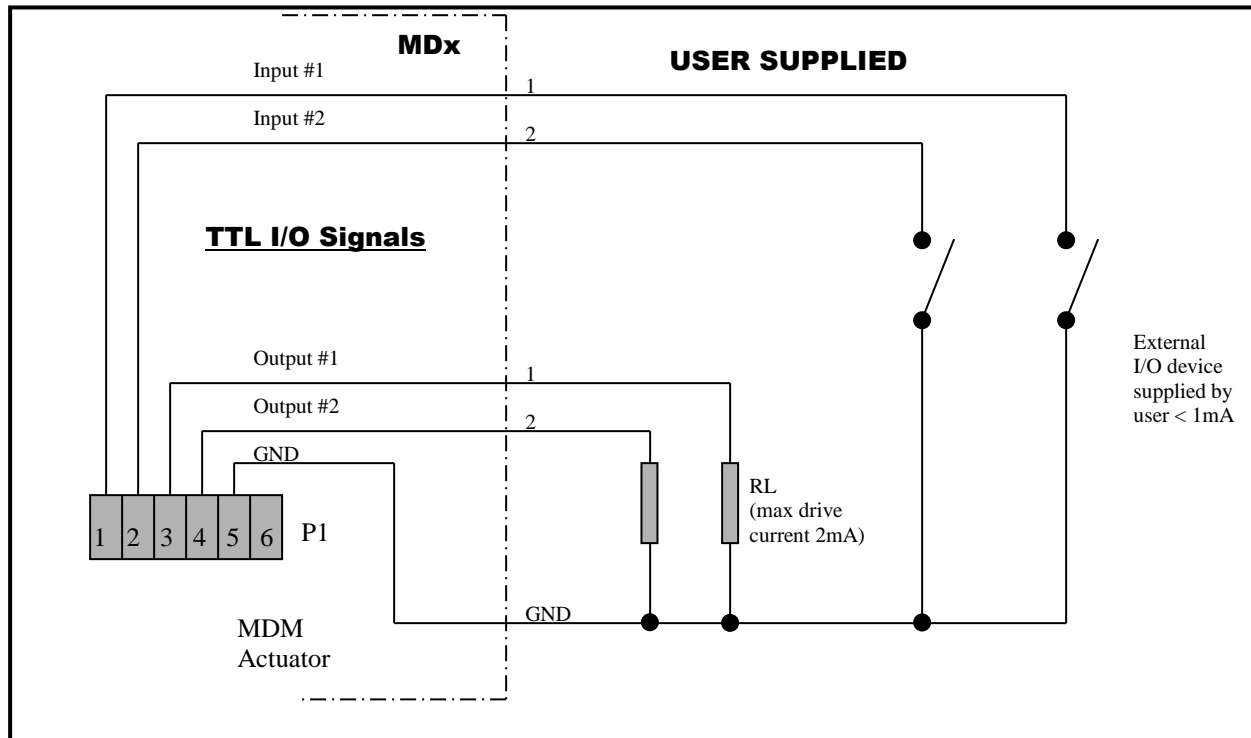
The **MDx-xxxDT** may be connected to voltages ranging from 12 – 24 VDC

The power consumption will range from max. 3.0A to approx. min. 100mA when the actuator is active. When not moving, the actuator draws around 30mA.



## Connect the signal:

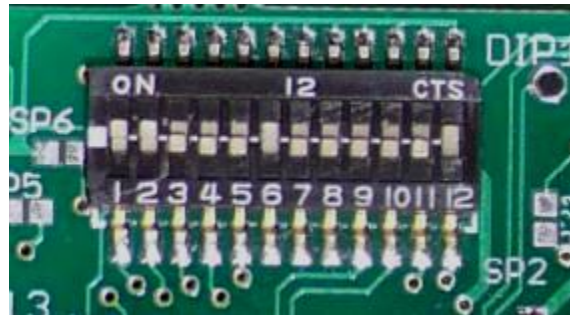
Locate the correct connection terminals as shown on the previous page then connect your input signal on pos. 1 and 2 and the output signals on 3 and 4 as shown below.



## 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 below for DIP switch functionality.



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

DIP 1	DIP 2		
Off	Off	Fastest settling	Use only for low torque valves
Off	On	Medium-fast	Typical setting
On	Off	Medium-slow	Typical setting
On	On	Slowest settling	Use for high torque valves

Switches 1 and 2 set the actuator position control parameters. High settling speed settings are suitable for fast positioning of light valves. Longer settling times will allow heavier valves to reach their target positions; trying to use a fast settling setting on a high torque valve will increase current consumption when holding position, and cause heating of the motor.

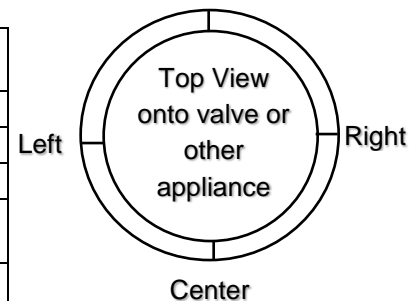
<b>DIP 3</b>	Reserved for custom function.				
<b>DIP 4</b>	Sets direction of offset. (Offset only available in MDH and MDF series)				
<b>DIP 5</b>	Sets the highest amount of offset, typically 12°. <b>NOTE:</b> To set maximum offset DIP's 5,6 and 7 will need to be high for a total of 21°. The max. offset can also be set differently upon customer request.				
<b>DIP 6</b>	Sets medium offset, typically 6°.				
<b>DIP 7</b>	Sets the lowest amount of offset, typically 3°.				
<b>DIP 8</b>	With DIP switch 8 in the ON position, the actuator will move to 4 positions. When switch 8 is off, the actuator is limited to three positions. Switch 8 also changes the function of the output signals.				
<b>DIP 9</b>	Run / Calibrate Putting DIP switch 9 into the off position will disable the actuator positioning control, and the motor will not move regardless of the input signals. When DIP 9 is moved back into the on position, the actuator will perform its homing routine, and then move to the position commanded by the input signals.				
<b>DIP 10</b>	<b>DIP 11</b>	Description		Approximate stall current	
Off	Off	Low torque	16%	0.75A	
Off	On	Medium-low	33%	1A	
On	Off	Medium-high	66%	2A	
On	On	High torque	100%	3A	
Approximate stall torque					
<b>DIP 10</b>	<b>DIP 11</b>	MDL	MDM	MDH	MDF
Off	Off	55 in-lbs.	120 in-lbs.	405 in-lbs.	756 in-lbs.
Off	On	82 in-lbs.	160 in-lbs.	540 in-lbs.	1008 in-lbs.
On	Off	88 in-lbs.	180 in-lbs.	608 in-lbs.	1134 in-lbs.
On	On	94 in-lbs.	195 in-lbs.	657 in-lbs.	1241 in-lbs.
<b>DIP 12</b>	DIP 12 sets the direction of rotation				

**Functionality of the MDx-xxxDT:**

The MDx can operate as a 3-position or 4-position actuator. The 4<sup>th</sup> position is enabled by turning DIP 8 ON.

3-pos Functionality (DIP 8 OFF)

Input#1 (Pin 1)	Input#2 (Pin 2)	Action taken
High	High	Moves to or remains in center position
Low	High	Moves to or remains in right position
High	Low	Moves to or remains in left position
Low	Low	Moves to or remains in left position (Input#2 has precedence over Input #1)

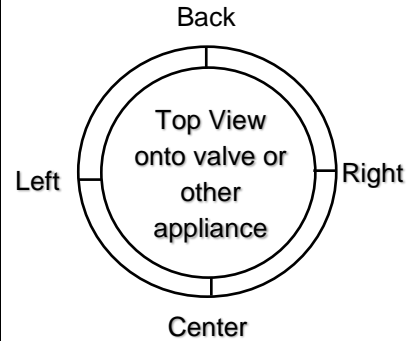


**The feedback from the MDx-xxxDT is as follows:**

Output#1 (Pin 3)	Output#2 (Pin 4)	Meaning
High	High	Actuator output is in center position
High	Low	In Right position
Low	High	In Left position
Low	Low	Actuator is moving, or has stalled and given up trying to reach a requested position. You may retry to reach any position by cycling alternate inputs and trying the original again. Repeated failures to reach position will require troubleshooting.

4-pos Functionality (Dip 8 ON)

Input#1 (Pin 1)	Input#2 (Pin 2)	Action taken
High	High	Moves to or remains in center position
Low	High	Moves to or remains in right position
High	Low	Moves to or remains in left position
Low	Low	Moves to or remains in back position



**The feedback from the MDx-xxxDT is as follows:**

Output#1 (Pin 3)	Output#2 (Pin 4)	Meaning	High = 4.55vDC Low = 0.8vDC
Low	Low	Actuator is at requested position	
High	Low	Actuator is moving	
Low	High	Actuator has stalled. The stall can be cleared by making the actuator turn in the other direction.	

**Direction of rotation and using Input 1**

To change the direction of rotation on the actuator change the setting on Dip12 and power up the actuator again.



**VERY IMPORTANT:** Input 1 must always be used if only one input is used to operate the valve. When the actuator is operated using input 1 an automatic calibration is done every time the valve is actuated. This does not happen on input 2.

**Torque Settings:**

Effect of power settings and speed settings:

To accommodate different valves and other applications with different torque requirements, the actuator can be set to apply different torque on the valve stem when in the seating mode. Please see table on pg. 4 to select the power setting that is right for your application.

The actuator will use 100% of available torque to try and reach maximum speed. Current drawn will be limited proportionally to the DIP setting applied actuator will automatically slow down and deliver the maximum available torque for a given "Permanent Power Setting".



**Note: 66% setting and 100% setting may alter duty cycle:**

- When operating above 66% power, Duty cycle is reduced to 50% - 25% maximum. At these levels, the electronics produce more heat which must be dissipated (depending on environmental temperature)

## Appendix

### Setting the type of actuator

The actuator is configured at the factory to operate with the mechanical assembly based on the amount and ratio of gears of the actuator. This is not a user selectable option.

### Calibration

The center position calibration routine can be initiated by switching DIP 9 momentarily “on” then “off”. This will cause the actuator to go through a series of movements to determine the proper center position. This function is useful if the actuators output gear gets manually rotated while the actuator is powered down and can’t properly realign to the center by itself.

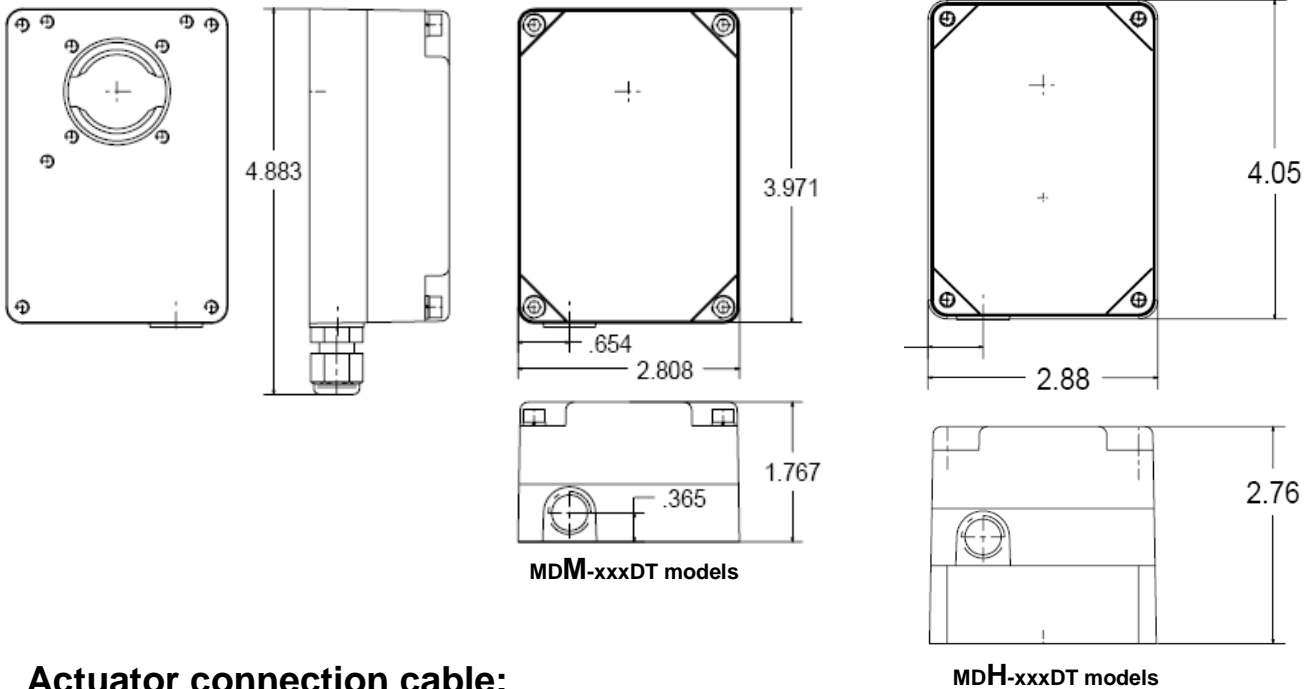
### Troubleshooting:

Upon noticing a problem, your first step should almost always be to recalibrate the actuator by switching DIP 9 on then off, all while the actuator is powered. This alone can solve basic problems. See above for instructions.

**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.






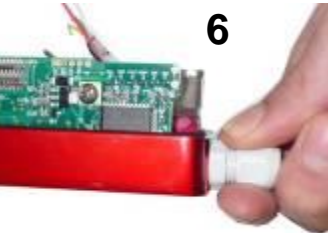


### Main Dimensions



### Actuator connection cable:

Select a connection cable with 6 leads.

The liquid tight strain relief on the base of the actuator is designed to accommodate a cable of **O.D. 2.5 - 6.5mm (0.10 - 0.26in)**. Be sure to not use a cable with an OD that is no bigger than this!

1.  1.- Remove the liquid tight fitting from the actuator casing and insert the cable into it.
2.  2.- The cable has to be stripped of its jacket for 2 inches (50mm) and the wires need 1/8" (3mm) stripped ends.
3.  3.- Bend the wires so that insertion becomes easy.
4.  4.- Carefully insert the cable into the actuator base. Mind the red motor cable and its plug into the board. Moving the plug out of its fully inserted position may cause malfunction of the actuator.
5.  5.- Put the liquid tight fitting back and tighten (lightly with tool).
6.  6.- Hand tighten the liquid tight fitting to establish seal.
7.  7.- Connect wires according to your application (see pg 2).
8.  8.- Mount actuator cover and tighten 4 screws.

# Part Number Breakdown

Serial Number:

Full Hanbay Part Number: **M** **D**  -  -     **DT** -  -

