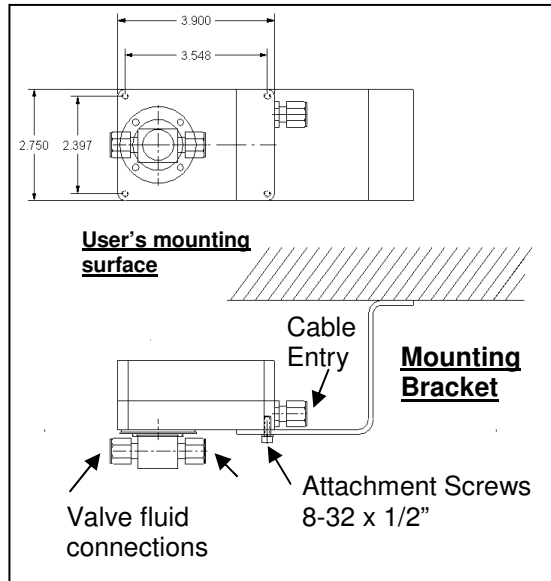


MDx-xxxDT-4.06**Connections and Settings****Install Actuator:**

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

Actuator connection cable:

Select a connection cable with 6 leads if you plan to use the feedback signals and 4 leads if you ignore the feedback.

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 bigger than this!



1.- Remove the liquid tight fitting from the actuator casing and insert the cable into it.



2.- The cable has to be stripped of its jacket for 2 inches (50mm) and the wires need 1/8" (3mm) stripped ends



3.- Bend the wires so that insertion becomes easy



4.- Insert the cable into the actuator base



5.- Put the liquid tight fitting back and tighten (lightly with tool)



6.- Hand tighten the liquid tight fitting to establish seal



7.- Connect wires according to your application (see next page)

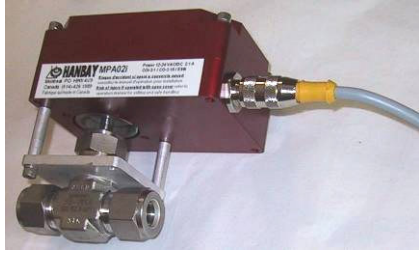


8.- Mount actuator cover and tighten 4 screws



OR, if you have ordered the “Turck6” cable option:

you can simply cut the cable to the length required and then connect according to the following wire color schematic:

**wire color schematic for “Turck6” cable:**

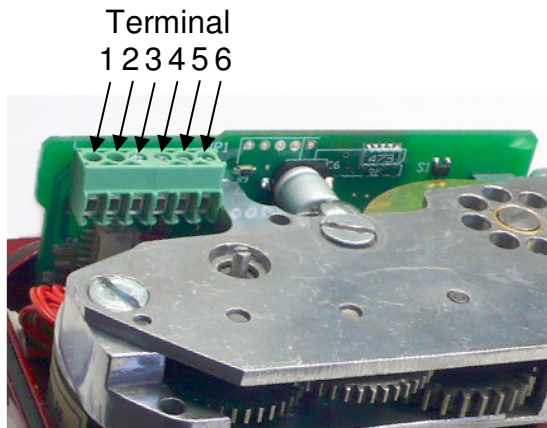
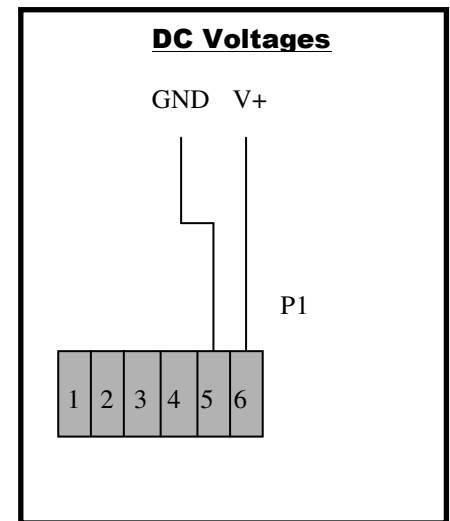
	DCPower Supply
White ->	+24VDC
Black ->	Power Gnd
Brown->	Signal TT1
Blue ->	Signal TT2
Grey ->	Output TT1
Pink ->	Output TT2

Connect the power:

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

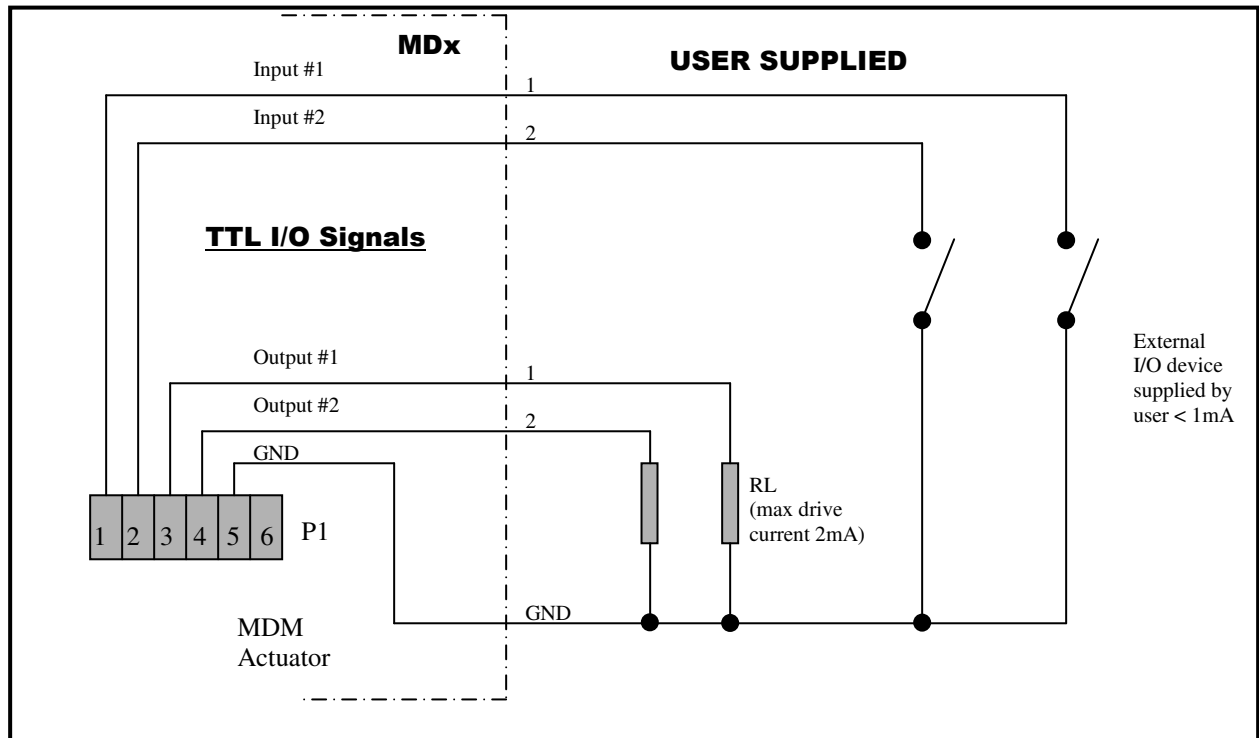
The power consumption will range from max. 3.0A to approx min. 100mA when the actuator is active. When not moving, the actuator draws less than 20mA.

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



Connect the signal:

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



Functionality of the MDx-xxxDT

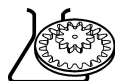
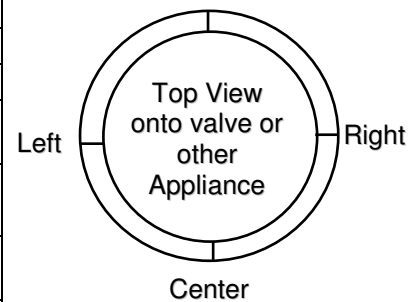
The MDx can operate as a 3-position or 4-position actuator. The 4th position is enabled by turning Dip 8 ON

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 right position (Input#1 has precedence over Input #2)

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 again by setting Input#1 and Input#2. I.E.: toggle Input #1 low for a few milliseconds and back to high if this was what you were asking for initially. If the problem persists, you have to trouble shoot the unit.

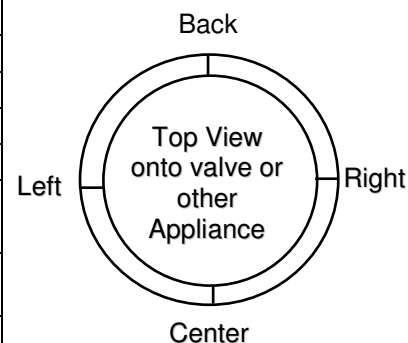
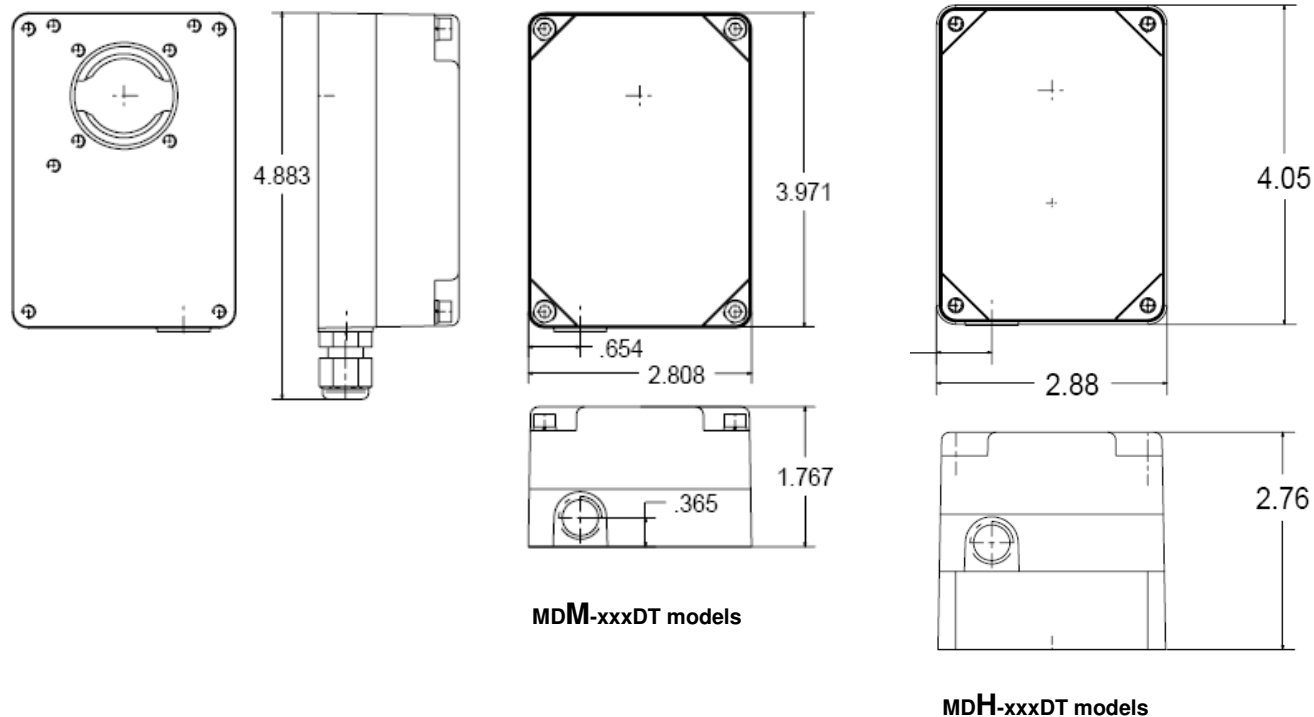


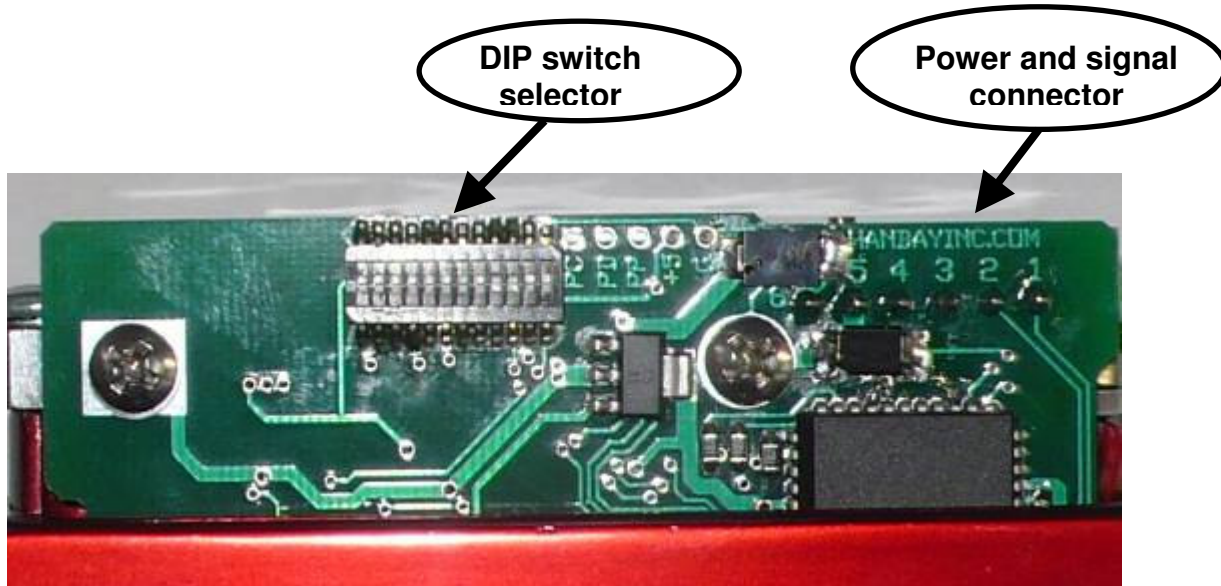
4-pos Functionality (Dip 8 ON)

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
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.

**Main Dimensions**



Set the speed:

The maximum speed of the actuator can be set by using the first two positions of the **DIP switch selector** that is shown in the picture above.

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. Dips 1 and 2 will have effect on the speed only if Dips 3, 4 and 5 are OFF (see page 6).

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. *

Speed and Torque of MDM-xxxDT Actuators

Dip1	Dip2	Time for 1/4 turn (sec)	Torque in in-lbs		Torque in in-lbs		Torque in in-lbs		Torque in in-lbs	
			16% Power*		33% Power*		66% Power*		100% Power*	
			12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
OFF	OFF	4	6	15	13	30	27	60	40	90
OFF	ON	3	5	13	11	27	21	53	32	80
ON	OFF	2	4	12	7	23	15	47	22	70
ON	ON	1	N/A	11	N/A	22	N/A	43	N/A	65

To convert in-lbs to Nm, divide the in-lbs value by 9

Speed and Torque of MDH-xxxDT Actuators

Dip1	Dip2	Time for 1/4 turn (sec)	Torque in in-lbs		Torque in in-lbs		Torque in in-lbs		Torque in in-lbs	
			16% Power*		33% Power*		66% Power*		100% Power*	
			12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
OFF	OFF	15	22	51	44	101	91	203	135	304
OFF	ON	11	17	44	37	91	71	179	108	270
ON	OFF	8	14	41	24	78	51	159	74	236
ON	ON	4	N/A	37	N/A	74	N/A	145	N/A	219

To convert in-lbs to Nm, divide the in-lbs value by 9



Speed and Torque of MDU-xxxDT Actuators

Dip1	Dip2	Time for 1/4 turn (sec)	Torque in in-lbs		Torque in in-lbs		Torque in in-lbs		Torque in in-lbs	
			16% Power*		33% Power*		66% Power*		100% Power*	
			12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
OFF	OFF	60	86	203	176	405	365	810	540	1215
OFF	ON	45	68	176	149	365	284	716	432	1080
ON	OFF	30	54	162	95	311	203	635	297	945
ON	ON	15	N/A	149	N/A	297	N/A	581	N/A	878

To convert in-lbs to Nm, divide the in-lbs value by 9

N/A in these tables means:

The actuator will not be able to reach the requested speed for this combination of power / voltage / speed settings. It will always run slower to be able to overcome the internal torque requirements.

So these points can be set but the expected end speeds would not be reached.

Set the slow speed:

The actuator speed can be reduced by using Dips 3, 4 and 5. When the slow speed setting is being used, Dips 1 and 2 will not control the speed any more.

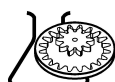
The torque available also depends on the voltage provided in the power connection and on the Permanent Power settings on DIP 10, 11 as shown below. *

Slow speed and Torque of MDM-xxxDT Actuators

Dip3	Dip4	Dip5	Time for 1/4 turn (sec)	Torque in in-lbs		Torque in in-lbs		Torque in in-lbs		Torque in in-lbs	
				16% Power*		33% Power*		66% Power*		100% Power*	
				12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
OFF	OFF	OFF	Dip1 and Dip2 speed setting								
OFF	OFF	ON	5	6	15	13	30	27	60	40	90
OFF	ON	OFF	10	6	15	13	30	27	60	40	90
OFF	ON	ON	20	6	15	13	30	27	60	40	90
ON	OFF	OFF	40	6	15	13	30	27	60	40	90
ON	OFF	ON	80	6	15	13	30	27	60	40	90
ON	ON	OFF	160	6	15	13	30	27	60	40	90
ON	ON	ON	320	6	15	13	30	27	60	40	90

Slow speed and Torque of MDH-xxxDT Actuators

Dip3	Dip4	Dip5	Time for 1/4 turn (sec)	Torque in in-lbs		Torque in in-lbs		Torque in in-lbs		Torque in in-lbs	
				16% Power*		33% Power*		66% Power*		100% Power*	
				12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
OFF	OFF	OFF	Dip1 and Dip2 speed setting								
OFF	OFF	ON	11	22	51	44	101	91	203	135	304
OFF	ON	OFF	11	22	51	44	101	91	203	135	304
OFF	ON	ON	20	22	51	44	101	91	203	135	304
ON	OFF	OFF	40	22	51	44	101	91	203	135	304
ON	OFF	ON	80	22	51	44	101	91	203	135	304
ON	ON	OFF	160	22	51	44	101	91	203	135	304
ON	ON	ON	320	22	51	44	101	91	203	135	304



Slow speed and Torque of MDU-xxxDT Actuators

Dip3	Dip4	Dip5	Time for ¼ turn (sec)	Torque in in-lbs 16% Power*		Torque in in-lbs 33% Power*		Torque in in-lbs 66% Power*		Torque in in-lbs 100% Power*	
				12VDC	24VDC	12VDC	24VDC	12VDC	24VDC	12VDC	24VDC
OFF	OFF	OFF	Dip1 and Dip2 speed setting								
OFF	OFF	ON	50	108	253	219	506	456	1013	675	1519
OFF	ON	OFF	50	108	253	219	506	456	1013	675	1519
OFF	ON	ON	50	108	253	219	506	456	1013	675	1519
ON	OFF	OFF	50	108	253	219	506	456	1013	675	1519
ON	OFF	ON	80	108	253	219	506	456	1013	675	1519
ON	ON	OFF	160	108	253	219	506	456	1013	675	1519
ON	ON	ON	320	108	253	219	506	456	1013	675	1519

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.

Please see the box to the right and the tables above 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 torque required is too high, the actuator will automatically slow down and deliver the maximum available torque for a given "Permanent Power Setting", i.e: the torque shown in line 1 of each of the tables above.

***Permanent power settings:**

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

**Note: 66% setting and 100% setting require voltage supply minimum values as follows:**

- Supply voltage needs to be min 14 VDC for 66% setting
- Supply voltage needs to be 16 VDC for 100% setting
- When operating above 20VDC and 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)

Setting the type of actuator

The actuator electronics must be set to correctly operate with the mechanical assembly based on the amount and ratio of gears of the actuator. The factory default should always be left in place but in the event of an upgrade or change to the mechanics of the actuator Dip settings 6 and 7 as outlined in the table sets the actuator to a specific type:

Direction of rotation and using Input 1

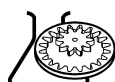
To change the direction of rotation on the actuator change the setting on Dip12 and power up the actuator again.



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.

Actuator type:

Dip6	Dip7	Type
Off	Off	Reserved
Off	On	MDM
On	Off	MDH
On	On	MDU



Centre Position Calibration of MDM-xxxDT Actuators

The centre position calibration routine can be initiated by switching Dip9 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 only if the actuators output gear gets manually rotated while the actuator is powered down and can't properly realign to the center by itself.

Calibration of MDH-xxxDT & MDU-xxxDT Actuators

The calibration routine can be initiated by switching Dip9 momentarily “on” then “off”. This will cause the actuator to go to the same position as it would if Input 1 was pulled to ground. It will then do a self calibration and then return to the position indicated by input 1 and 2.

This function is useful only if the actuators output gear gets manually rotated while the actuator is powered down and can't properly realign to the correct by itself.



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