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**Keeping the World Flowing
for Future Generations**

M series

MCx-xxxAS-1.05 user manual

HANBAY INC.

A rotork Brand

MCx-xxxAS-1.05
(12-24 VDC; Modbus Control)

USER MANUAL

Contents

MEANING OF SYMBOLS

⚠️ The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the product.

⚡ The Lightning Flash with arrowhead symbol within an equilateral triangle, is intended to alert the user to the presence of un-insulated "dangerous voltage" within the product enclosure that may be of sufficient magnitude to constitute a risk of shock to persons.

INSTALLATION

The safety of any system incorporating the equipment is the responsibility of the assembler of the system.

Environmental Conditions

The M-Series actuator has an IP66 rating but is recommended for indoor use in environments with a relative humidity below 80%. For outdoor use, or for use in higher humidity environments, please consider the equivalent R-Series actuator with its IP68 rating.

The ambient temperature range for the standard M-Series is -20 to 40 °C (-4 to 104 °F).
The internal heater option shifts the temperatures to a lower range of -40 to 40 °C (-40 to 104 °F).

The standard M-Series has been approved for use at altitudes of up to 2000 m.

Mounting

In most cases, the actuator must be mounted and supported as shown in the image to the right. The mounting bracket is not supplied by Rotork.

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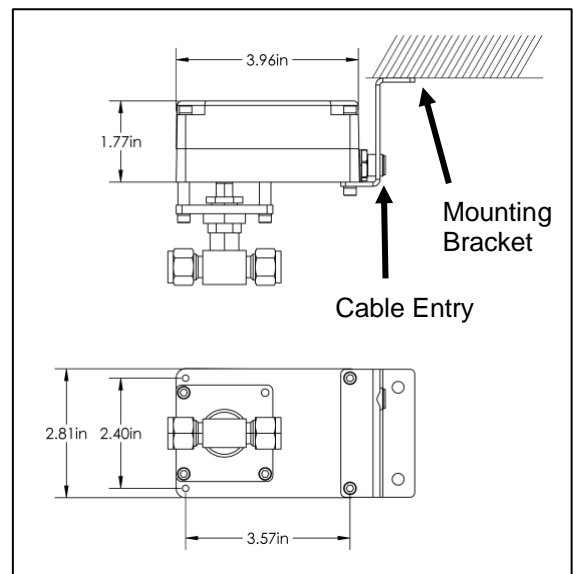
Wiring

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. Pins indicate the connection of the cables to the terminal block on the PCB board within the actuator. Unless specified by the customer, these are pre-wired at the factory.

Wire color schematic for "Turck 6" cable:

Pin	Color	DC power supply only
6	White	+24 VDC
5	Black	Power Gnd
4	Pink	TD(A)
3	Grey	TD(B)
2	Brown	Isolated Input Signal Gnd
1	Blue	Isolated Input + Signal (4-20 mA)

If you have chosen to exclude the Turck cable from your order, connect the wires to the corresponding pins on the terminal block as indicated in the schematic:

Terminal
1 2 3 4 5 6

Remove R66 to convert from 4-20 mA to 1-5 V input signal
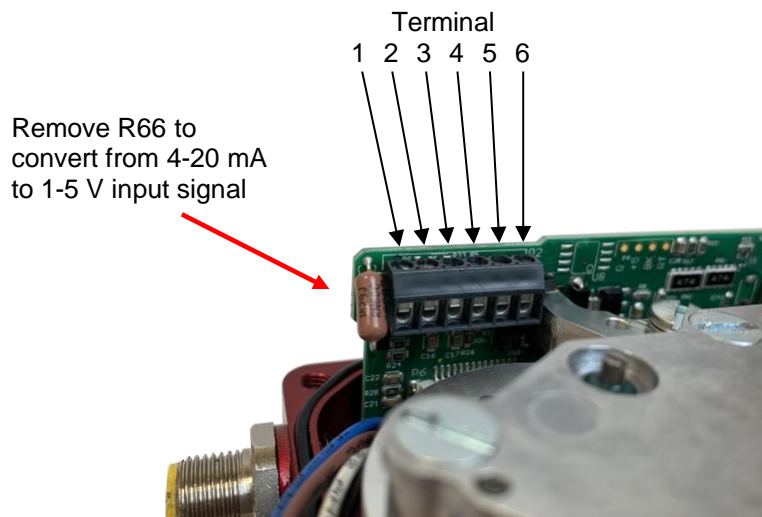
Power Supply and Draw

The **MCx-xxxAS** may be connected to voltages ranging within 12-24 VDC. The DC supply to the actuator must be limited by a 4 A fuse or circuit breaker; it is recommended to have this installed near the actuator.

The current draw will range from minimum 100 mA to maximum 3 A while the actuator is active. When not moving, the actuator draws approx. 50 mA.

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Control Signal and Feedback

Locate the correct connection terminals as shown in the picture on p.4, then connect your communication wires to PIN 3 and PIN 4 (grey and pink wires), as shown below.

4-20 mA Signal source, user powered

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

For 1-5 V signal input, remove 250 ohm resistor R66 (or cut just one wire as shown in picture on p.2)

NOTE 2: Signal Gnd is <u>ISOLATED</u> from Power Gnd. in all MCx-xxxAS models.
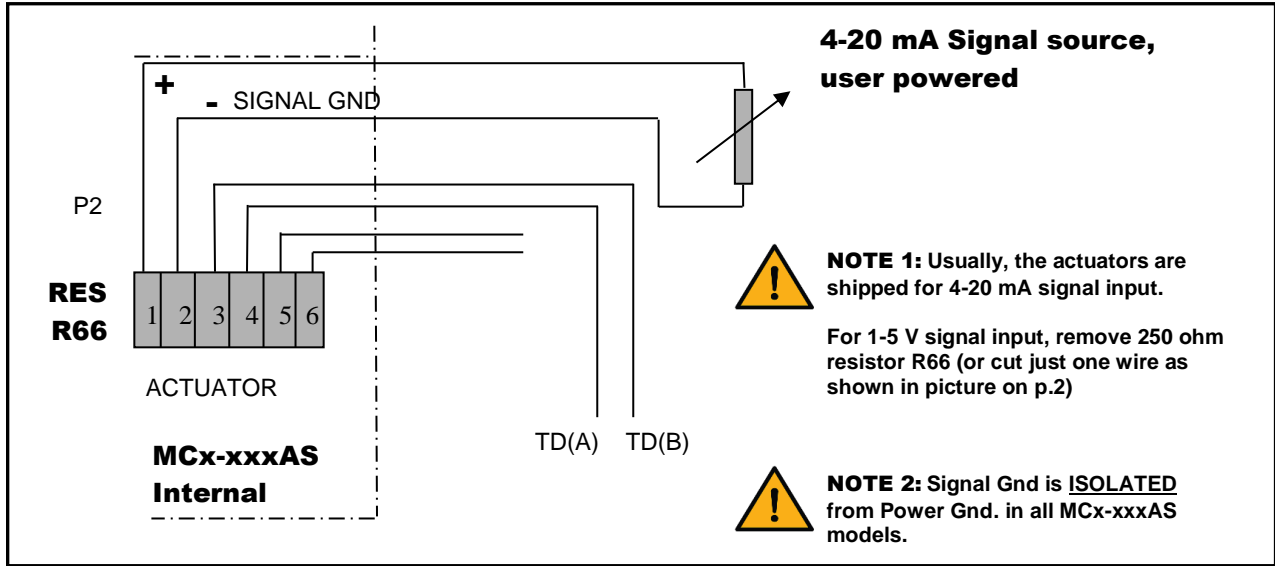
Serial Port Connection

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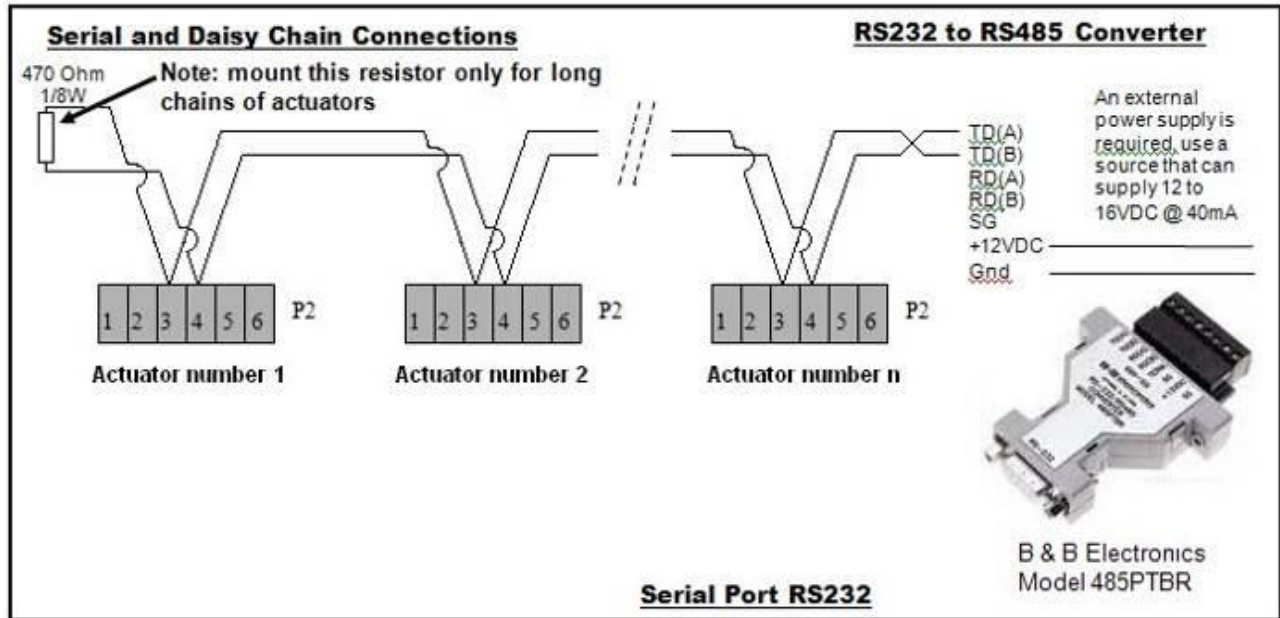
OPERATION

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 the table below for DIP switch functionality.

In this example DIPs 1, 2, 5 and 12 are on.

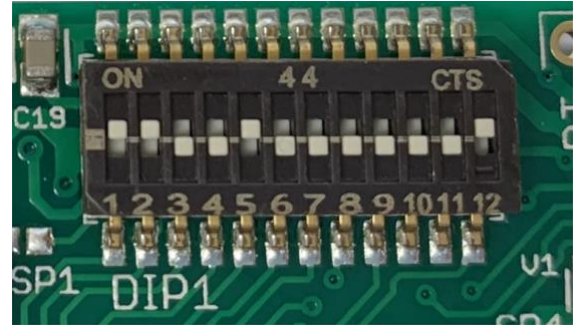| DIP	Function
1 2	**Baud Rate:** Choose the rate at which information is transferred. See p.6.
3 – 8	**Actuator Address:** See p.7.
9 – 11	**Deactivated**
12	**Direction/Calibration:** Toggle while powered to re-calibrate actuator (find valve seat). Also sets direction in which the actuator will open and close. See p.15. Example: The RCM model actuator turns clockwise when the signal is decreased with DIP 12 in the OFF position. Putting DIP 12 in the ON position will cause counter-clockwise turning for a decrease in signal. For changes in DIP 12 position to take effect, the power to the actuator must be cycled.

Set the communication parameters

Data bits: 8

Parity: None

Stop bits: 1

Baud Rate: The communication baud rate can be set by using the first two positions of the **DIP switch selector**. Check the table below for settings.
To change the baud rate, turn off the actuator, change the setting of DIP switches and power it up again.

DIP 1	DIP 2	Baud rate
OFF	OFF	2400 bps
OFF	ON	4800 bps
ON	OFF	9600 bps
ON	ON	19200 bps

Response time: The response time is between 8ms to 35ms. This means, after sending a frame, you have to wait at least 35ms for the answer coming back from the actuator.

Set the actuator address

With the **DIP switch selector**, you can set any address between 1 and 63. (1 = "On"   0 = "Off").
To change the address, turn off the actuator, change the setting of DIP switches and power it up again.

Actuator Address	Dip3	Dip4	Dip5	Dip6	Dip7	Dip8
reserved	0	0	0	0	0	0
1	0	0	0	0	0	1
2	0	0	0	0	1	0
3	0	0	0	0	1	1
4	0	0	0	1	0	0
5	0	0	0	1	0	1
6	0	0	0	1	1	0
7	0	0	0	1	1	1
8	0	0	1	0	0	0
9	0	0	1	0	0	1
10	0	0	1	0	1	0
11	0	0	1	0	1	1
12	0	0	1	1	0	0
13	0	0	1	1	0	1
14	0	0	1	1	1	0
15	0	0	1	1	1	1
16	0	1	0	0	0	0
17	0	1	0	0	0	1
18	0	1	0	0	1	0
19	0	1	0	0	1	1
20	0	1	0	1	0	0
21	0	1	0	1	0	1
22	0	1	0	1	1	0
23	0	1	0	1	1	1
24	0	1	1	0	0	0
25	0	1	1	0	0	1
26	0	1	1	0	1	0
27	0	1	1	0	1	1
28	0	1	1	1	0	0
29	0	1	1	1	0	1
30	0	1	1	1	1	0
31	0	1	1	1	1	1
32	1	0	0	0	0	0
33	1	0	0	0	0	1
34	1	0	0	0	1	0
35	1	0	0	0	1	1
36	1	0	0	1	0	0
37	1	0	0	1	0	1
38	1	0	0	1	1	0
39	1	0	0	1	1	1
40	1	0	1	0	0	0
41	1	0	1	0	0	1
42	1	0	1	0	1	0
43	1	0	1	0	1	1
44	1	0	1	1	0	0
45	1	0	1	1	0	1
46	1	0	1	1	1	0
47	1	0	1	1	1	1
48	1	1	0	0	0	0
49	1	1	0	0	0	1
50	1	1	0	0	1	0
51	1	1	0	0	1	1
52	1	1	0	1	0	0
53	1	1	0	1	0	1
54	1	1	0	1	1	0
55	1	1	0	1	1	1
56	1	1	1	0	0	0
57	1	1	1	0	0	1
58	1	1	1	0	1	0
59	1	1	1	0	1	1
60	1	1	1	1	0	0
61	1	1	1	1	0	1
62	1	1	1	1	1	0
63	1	1	1	1	1	1

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Modbus Protocol

Actuator parameters can be set by using the MODBUS (RTU) protocol.

Standard supported function codes:
02 (0x02) Read Discrete Inputs
03 (0x03) Read Holding Registers.
04 (0x04) Read Input Registers.
06 (0x06) Write Single Register.

Function codes: (see p.15 for examples)
100 (0x64) Re-zero the actuator.
101 (0x65) Close the valve.
102 (0x66) Open the valve.

⚠️ If you try to use any other function code, the actuator will answer with the exception code **0x01** indicating that the attempted function code is not supported.

Actuator memory map:

Address (DEC)	Address (HEX)	Offset	Register Name	Type
0	0x0000	4001	MaximumSpeed	Holding registers. **READ** and **WRITE**
1	0x0001	4002	MaximumPower	
2	0x0002	4003	NumberOfTurns	
3	0x0003	4004	TargetFromRS485Flag	
4	0x0004	4005	InputRangeLow	
5	0x0005	4006	InputRangeHigh	
6	0x0006	4007	OutputRangeLow	
7	0x0007	4008	OutputRangeHigh	
8	0x0008	4009	TargetPosition	
9	0x0009	4010	SignalLostPosition	
10	0x000A	4011	Reserved	
11	0x000B	4012	Reserved	
12	0x000C	4013	Reserved	
13	0x000D	4014	Reserved	
14	0x000E	4015	Reserved	
15	0x000F	4016	Reserved	
16	0x0010	4017	Reserved	
17	0x0011	4018	Reserved	
18	0x0012	4019	Reserved	
19	0x0013	4020	Reserved	
20	0x0014	4021	CurrentPosition	Input registers. **READ** only
21	0x0015	4022	StatusRegister	

IMPORTANT: All the values sent to the actuator are "HEX" values

Speed and Torque Settings

During normal operation, the actuator will try to reach the speed set by "**MaximumSpeed**". If the torque required to reach this speed exceeds the actuator model's capability, the actuator will automatically slow down. Please refer to the tables in the Speed and Torque Details section for each actuator model's torque capability.

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. Torque during normal operation is always 100% of the actuator's capability.

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 "**MaximumPower"** (up to 100% power.)
This "pull out" function is always enabled.

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Register new value	CRC
MaximumSpeed	0x0000	3	0	N/A					
Example: Set Maximum speed to 0 in actuator number 8					0x08	0x06	0x0000	0x0000	0x----
					1 byte	1 byte	2 bytes	2 bytes	2 bytes

Possible values for the "**MaximumSpeed**" register are shown in the following table. To see how these values relate to physical speed, see the Speed and Torque Details section.

Maximum speed value	Speed level
0	16%
1	33%
2	66%
3	100%

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Register new value	CRC
MaximumPower	0x0001	3	0	N/A					
Example: Set Maximum power to 3 in actuator number 9					0x09	0x06	0x0001	0x0003	0x----
					1 byte	1 byte	2 bytes	2 bytes	2 bytes

Possible values for the "**MaximumPower**" register are shown in the following table. To see how these values relate to physical torque values, see the Speed and Torque Details section.

Maximum power value	Power level
0	16%
1	33%
2	66%
3	100%

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

<u>Note:</u> **The 66% and 100% power settings have the following particularities:**
- Supply voltage needs to be min. 14 VDC for 66% setting
- Supply voltage needs to be min. 16 VDC for 100% setting
- When operating above 20 VDC 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)

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                                                                                                      hanbaysales@hanbayinc.com

Speed and Torque Details

MC**L**-xxxAS Actuators

Speed:		Torque:			
Maximum Speed Address 0x0000	**Time for 1 turn (sec)**	**Torque Address 0x0001**	**Seating Torque (in-lbs)**		Operating torque is 100%
			12VDC	**24VDC**	
0	7	0	6	12	
1	3	1	10	20	
2	2	2	19	38	
3	1	3	24	48	

NOTE: If actuator is RC**J**-xxxAS, divide torque values by 3.
To convert in-lbs to Nm, divide by 9.

MC**M**-xxxAS Actuators

Speed:		Torque:			
Maximum Speed Address 0x0000	**Time for 1 turn (sec)**	**Torque Address 0x0001**	**Seating Torque (in-lbs)**		Operating torque is 100%
			12VDC	**24VDC**	
0	23	0	17	35	
1	11	1	30	60	
2	7	2	55	115	
3	4	3	70	145	

NOTE: If actuator is RC**K**-xxxAS, divide torque values by 3.
To convert in-lbs to Nm, divide by 9.

MC**H**-xxxAS Actuators

Speed:		Torque:			
Maximum Speed Address 0x0000	**Time for 1 turn (sec)**	**Torque Address 0x0001**	**Seating Torque (in-lbs)**		Operating torque is 100%
			12VDC	**24VDC**	
0	72	0	60	120	
1	45	1	102	205	
2	30	2	200	400	
3	18	3	248	497	

To convert in-lbs to Nm, divide by 9.

MC**F**-xxxAS Actuators

Speed:		Torque:			
Maximum Speed Address 0x0000	**Time for 1 turn (sec)**	**Torque Address 0x0001**	**Seating Torque (in-lbs)**		Operating torque is 100%
			12VDC	**24VDC**	
0	197	0	115	230	
1	99	1	190	380	
2	54	2	360	720	
3	38	3	457	915	

To convert in-lbs to Nm, divide by 9.

Writing to All Other Holding Registers

The "**NumberOfTurns**" register allows the user to set the number of turns the actuator performs in the full signal range.

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Register new value	CRC
NumberOfTurns	**0x0002**	100	1	N/A					
Example: Set number of turns to 32 in actuator number 10					0x0A	0x06	0x0002	0x0020	0x----
					1 byte	1 byte	2 bytes	2 bytes	2 bytes

The "**TargetFromRS485Flag**" register tells the actuator where to read its target position from. If the flag is set to 1, the actuator will take the value from a 4-20 mA input as its target position. If the flag is set to 0, the actuator will take the value from the "**TargetPosition**" register as its target position.
Remember: all values sent to actuator are HEX values.

Register name	Address	Max	Min	Default	Actuator address	Fct. code	Register address	Register new value	CRC
TargetFromRS485Flag	**0x0003**	1	0	N/A					
Example: Make actuator number 11 take the target position from the "TargetPosition" register					0x0B	0x06	0x0003	0x0000	0x----
					1 byte	1 byte	2 bytes	2 bytes	2 bytes

The "**InputRangeLow**" register allows the user to set the lower limit of the input signal (i.e. the value of the input signal at which the actuator will move to the fully closed position).

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Register new value	CRC
InputRangeLow	**0x0004**	64900	0	0					
Example: Set input range low to 4000 in actuator number 12					0x0C	0x06	0x0004	0x0FA0	0x----
					1 byte	1 byte	2 bytes	2 bytes	2bytes

The "**InputRangeHigh**" register allows the user to set the upper limit of the input signal (i.e. the value of the input signal at which the actuator will open the valve to the number of turns specified in the "**NumberOfTurns**" register – fully open).

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Register new value	CRC
InputRangeHigh	**0x0005**	65000	100	10000					
Example: Set input range high to 65000 in actuator number 23					0x17	0x06	0x0005	0xFDE8	0x----
					1 byte	1 byte	2 bytes	2 bytes	2bytes

The value stored in the "**InputRangeLow**" register must always be lower than the value stored in the "**InputRangeHigh**" register. If you try to write an illogical range, the actuator will answer with exception code **0x03** indicating that the new value is not valid.
Remember: all values sent to actuator are HEX.

The "**OutputRangeLow**" register allows the user to set the lower limit of the feedback signal (i.e. the value of the feedback signal when the actuator is in the fully closed position).

Register name	Address	Max	Min	Default	Actuator address	Fct. code	Register address	Register new value	CRC
OutputRangeLow	**0x0006**	64900	0	0					
Example: Set input range low to 4000 in actuator number 12					0x0C	0x06	0x0006	0x0FA0	0x----
					1 byte	1 byte	2 bytes	2 bytes	2bytes

The "**OutputRangeHigh**" register allows the user to set the upper limit of the feedback signal (i.e. the value of the feedback signal when the actuator is opened to the number of turns specified in the "**NumberOfTurns**" register – fully open).

Register name	Address	Max	Min	Default	Actuator address	Fct. code	Register address	Register new value	CRC
OutputRangeHigh	**0x0007**	65000	100	10000					
Example: Set input range high to 65000 in actuator number 23					0x17	0x06	0x0007	0xFDE8	0x----
					1 byte	1 byte	2 bytes	2 bytes	2bytes

⚠ The value stored in the "**OutputRangeLow**" register must always be lower than the value stored in the "**OutputRangeHigh**" register. If you try to write an illogical range, the actuator will answer with exception code **0x03** indicating that the new value is not valid.
Remember: all values sent to actuator are HEX.

The "**TargetPosition**" is the input signal, which tells the actuator where to position the valve.

Register name	Address	Max	Min	Default	Actuator address	Fct. code	Register address	Register new value	CRC
TargetPosition	**0x0008**	Input Range Low	Input Range High	N/A					
Example: Set the target position to 3000 in actuator number 18					0x12	0x06	0x0008	0x0BB8	0x----
					1 byte	1byte	2 bytes	2 bytes	2bytes

If the value in "**TargetPosition**" is the same as the value in "**InputRangeLow**" the actuator will re-zero, finding the valve seat and closing the valve completely. This enables a new fully closed position to be established based on normal wear of the valve seat.
If the value in "**TargetPosition**" is the same as the value in "**InputRangeHigh**" the valve will be opened to the maximum number of turns, as set by the "**NumberOfTurns**" register.

Example:
The actuator parameters are set to (decimal representation for simplicity):
NumberOfTurns = 10
InputRangeLow = 500
InputRangeHigh = 2500
- To close the valve, the "TargetPosition" register has to be set to 500.
- To open the valve 5 turns, the TargetPosition" register has to be set to 1500.

⚠ To have the actuator use "**TargetPosition**" as its target position, "**TargetFromRS485Flag**" must be 0.
The value stored in the "**TargetPosition**" register must always be lower or equal to "**OutputRangeHigh**" and greater or equal to "**OutputRangeLow**". If you try to write a value out of the range, the actuator will answer with exception code **0x03** indicating that the new value is not valid.

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Signal Loss

The "**SignalLostPosition**" register can be used (optional) to set the position of the actuator upon signal loss. Signal loss can only occur when controlling the actuator with 4-20 mA (or 1-5 V) input signals, i.e. when "**TargetFromRS485Flag**" is set to 1. The signal is considered lost when it falls below 2.80 mA (or 0.700 V).

Register name	Address	Max	Min	Default	Actuator address	Fct. code	Register address	Register new value	CRC
SignalLost Position	**0x0009**	Input Range Low	Input Range High	0xFFFF					
Example: Set the signal lost position to 3000 in actuator number 19					0x13	0x06	0x0009	0x0BB8	0x----
					1 byte	1byte	2 bytes	2 bytes	2bytes

1. **For actuators that are not connected to a UPS** (Uninterruptible Power Supply), the loss of signal will be simultaneous with power loss. Consequently, the actuator will not be able to move anywhere. In the shutdown process, the actual position is automatically saved to the internal EEPROM. [This saving of the position only happens for min. 18 VDC supplies] When power is restored, the actuator will "know" where it's at 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 the Calibration section)

2. **For actuators that are connected to a UPS** the actuator will move to the position defined by the value in the "SignalLostPosition" register.

   The default value is 0xFFFF (DEC: 65535). The actuator will ignore the lost signal, and simply remain in its current position.
   If the value is between "InputRangeLow" and "InputRangeHigh", the actuator will move to the value in SignalLostPosition when the signal is lost

Reading the Input Registers

The physical meaning of the value in the "**CurrentPosition**" register depends on the values in the "**OutputRangeLow**" and "**OutputRangeHigh**" registers, as well as the "**NumberofTurns**" register.

Example:
The actuator parameters are set to (decimal representation for simplicity):
NumberOfTurns = 10
OutputRangeLow = 500
OutputRangeHigh = 2500
- If "CurrentPosition" equals to 500, that means the valve is closed
- If "CurrentPosition" equals to 1500, that means the valve is 5 turns opened

To read the value from the "**CurrentPosition**" register:

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Qty of registers	CRC
CurrentPosition	**0x0014**	N/A	N/A	N/A					
Example: Read the current position in actuator number 31					0x1F	0x04	0x0014	0x0001	0x----
					1 byte	1 byte	2 bytes	2 bytes	2 bytes

The meaning of the value in the "**StatusRegister**" is described below. Only Bits 0-4 are associated with a physical meaning.

Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bits 5 to 15
Discrete input 1	Discrete input 2	Discrete input 3	Discrete input 4	Discrete input 5	Discrete input 6 to 16
Opened	Closed	Stalled opening	Stalled closed	Signal lost	Reserved
This bit will be '1' if the actuator is in the completely open position.	This bit will be '1' if the actuator is in the completely closed position.	This bit will be '1' if the actuator gets stalled while moving in the opening direction.	This bit will be '1' if the actuator gets stalled while moving in the closing direction.	This bit will be '1' if the input signal falls below 2.80 mA or 0.700 V.	-

To read the value from the "**StatusRegister**" register:

Register name	Address	Max	Min	Default	Actuator address	Function code	Register address	Qty of registers	CRC
StatusRegister	**0x0015**	N/A	N/A	N/A					
Example: Read the status register in actuator number 32					0x20	0x04	0x0015	0x0001	0x----
					1 byte	1 byte	2 bytes	2 bytes	2 bytes

Alternatively, the Bits in "**StatusRegister**" can be read independently by using function code 2. In the PDU, Discrete Inputs are addressed starting at zero. Therefore, Discrete Inputs numbered 1-5 are addressed as 0-4.

Example 1
To read all discrete inputs in actuator number 33, the master needs to send:

Actuator address	Function code	Input address	Qty of inputs	CRC
0x21	0x02	0x0000	0x0005	0x----
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example 2
To read the discrete inputs 1 and 2 (opened and closed) in actuator number 33, the master needs to send:

Actuator address	Function code	Input address	Qty of inputs	CRC
0x21	0x02	0x0000	0x0002	0x----
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Example 3
To read the discrete input 4 (stalled closed) in actuator number 33, the master needs to send:

Actuator address	Function code	Input address	Qty of inputs	CRC
0x21	0x02	0x0003	0x0001	0x----
1 byte	1 byte	2 bytes	2 bytes	2 bytes

Using Function Codes

Register name	Address	Max	Min	Default	Actuator address	Function code	CRC
N/A	**0x0064**	N/A	N/A	N/A			
Example: Re-zero actuator number 1					0x01	0x64	0x----
					1 byte	1 byte	2 bytes

Register name	Address	Max	Min	Default	Actuator address	Function code	CRC
N/A	**0x0065**	N/A	N/A	N/A			
Example: Close the valve on actuator number 1					0x01	0x65	0x----
					1 byte	1 byte	2 bytes

Register name	Address	Max	Min	Default	Actuator address	Function code	CRC
N/A	**0x0066**	N/A	N/A	N/A			
Example: Open the valve on actuator number 1					0x01	0x66	0x----
					1 byte	1 byte	2 bytes

Calibration

If the actuator is being controlled via 4-20 mA (resp. 1-5 V) input, i.e. the "**TargetFromRS485Flag**" register contains value 1, the actuator will re-zero when the input signal is between 2.80 and 4.16 mA (resp. 0.700 and 1.04 V). It will turn clockwise until the actuator has reached the fully closed position of the valve.

If the actuator is being controlled via Modbus protocol, i.e. "**TargetFromRS485Flag**" register contains value 0, the actuator will re-zero when the value in the "**TargetPosition**" register is the same as the value in the "**InputRangeLow**" register.

If the valve is removed for any reason, the calibration routine must be initiated on the actuator manually after re-mounting the valve. This is done by toggling DIP 12 (switch position, then back to the original position) while the actuator is powered. Alternatively, use command code 0x64 (refer also to the Modbus Protocol section). The valve will close very slowly, finding the seat and preventing any damage.

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 4 mA) change the setting of DIP 12 and cycle power.

WARNING: It is <u>VERY</u> important that you put DIP 12 back to its original setting. Failing to do so will make the actuator turn in the opposite direction next time you power it up.

Troubleshooting

Upon noticing a problem, your first step should almost always be to recalibrate the actuator by toggling DIP 12, or using command code 0x64, while the actuator is powered. This alone can solve basic problems. See the Calibration section above for more details.

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

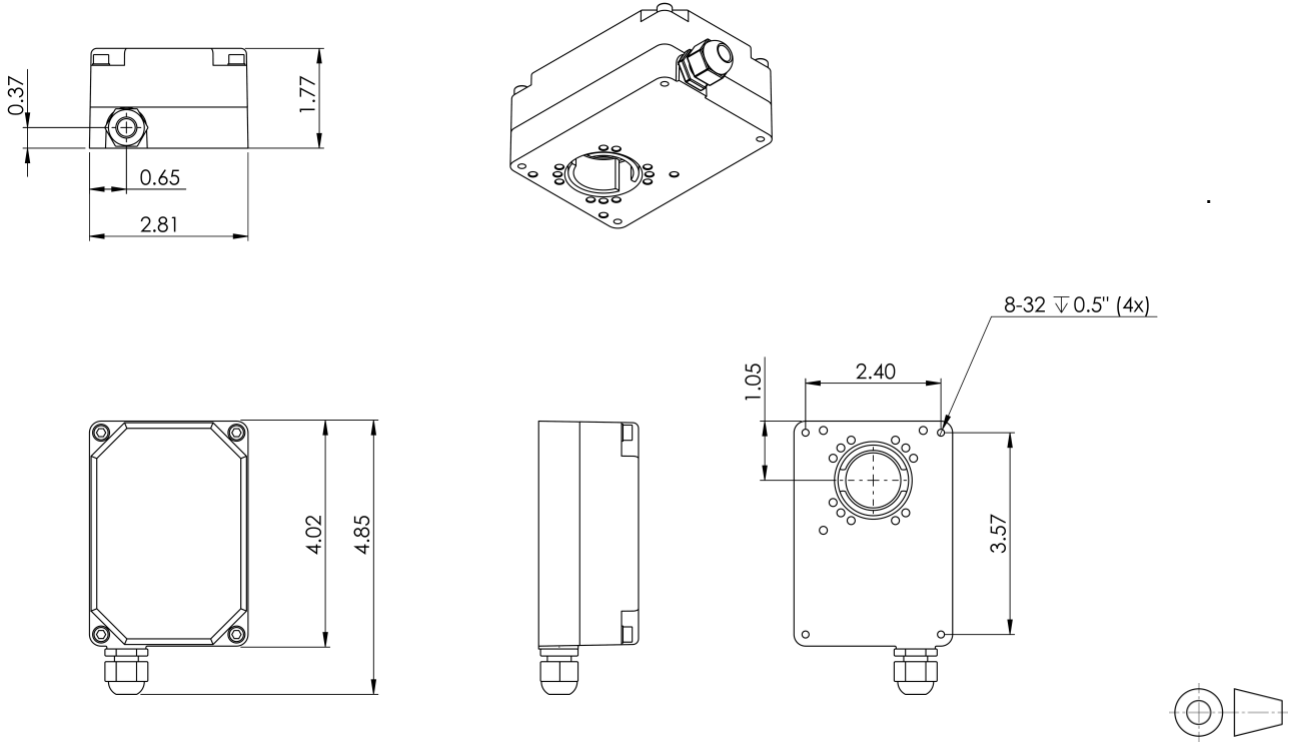1)   Re-calibrate the actuator. This will move the actuator regardless of what signal it is receiving.
2)   A sticking valve may be the problem. Remove the valve from the actuator, and re-test the actuator.
3)   Remove power. Re-check the wiring and the power/signal apparatus. Power actuator and re-calibrate.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

Any parts found to be defective should be examined and/or replaced by Rotork.

ACTUATOR DIMENSIONS

MCJ, MCL & MCM   -xxxAS models

MCH-xxxAS models

rotork®

MCF-xxxAS models

1/4-20 Holes (4x)

1.95 □

1.25

0.21

2.40

8-32 ⊽ 0.75" (4x)

0.65

3.14

4.49

3.08

2.81

4.02

4.85
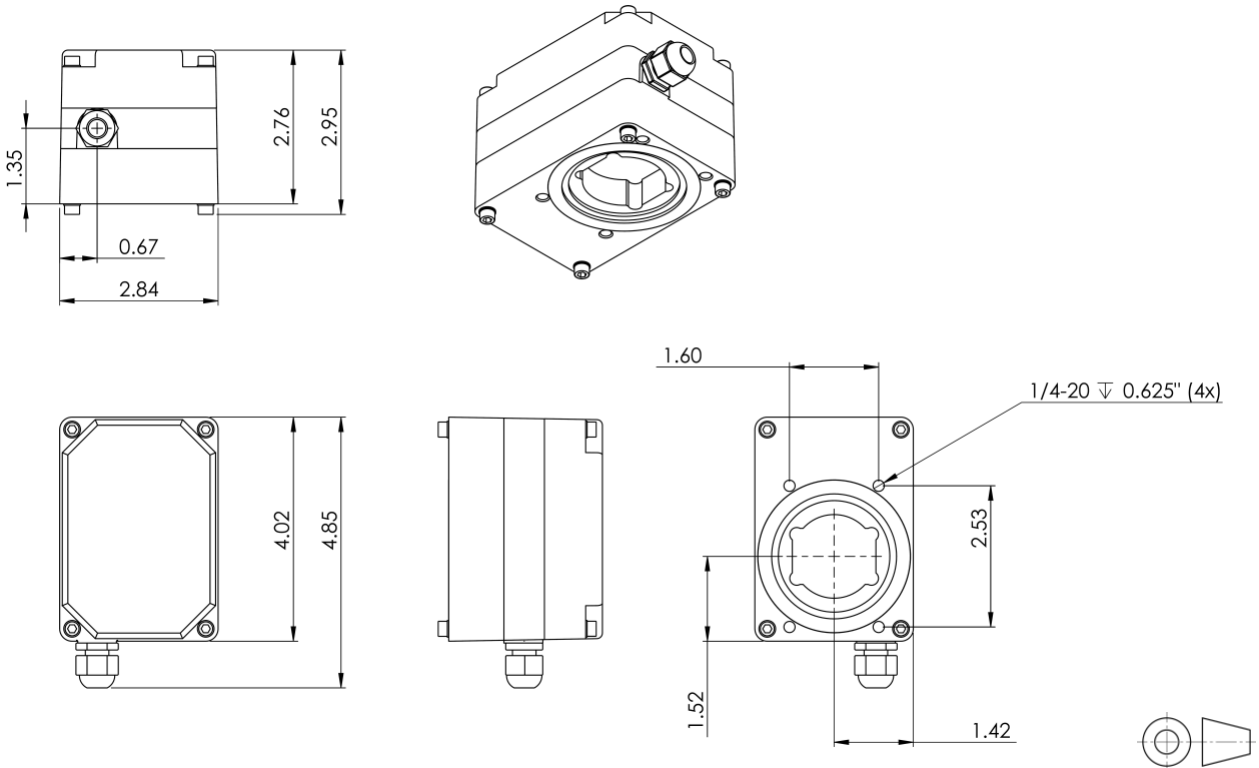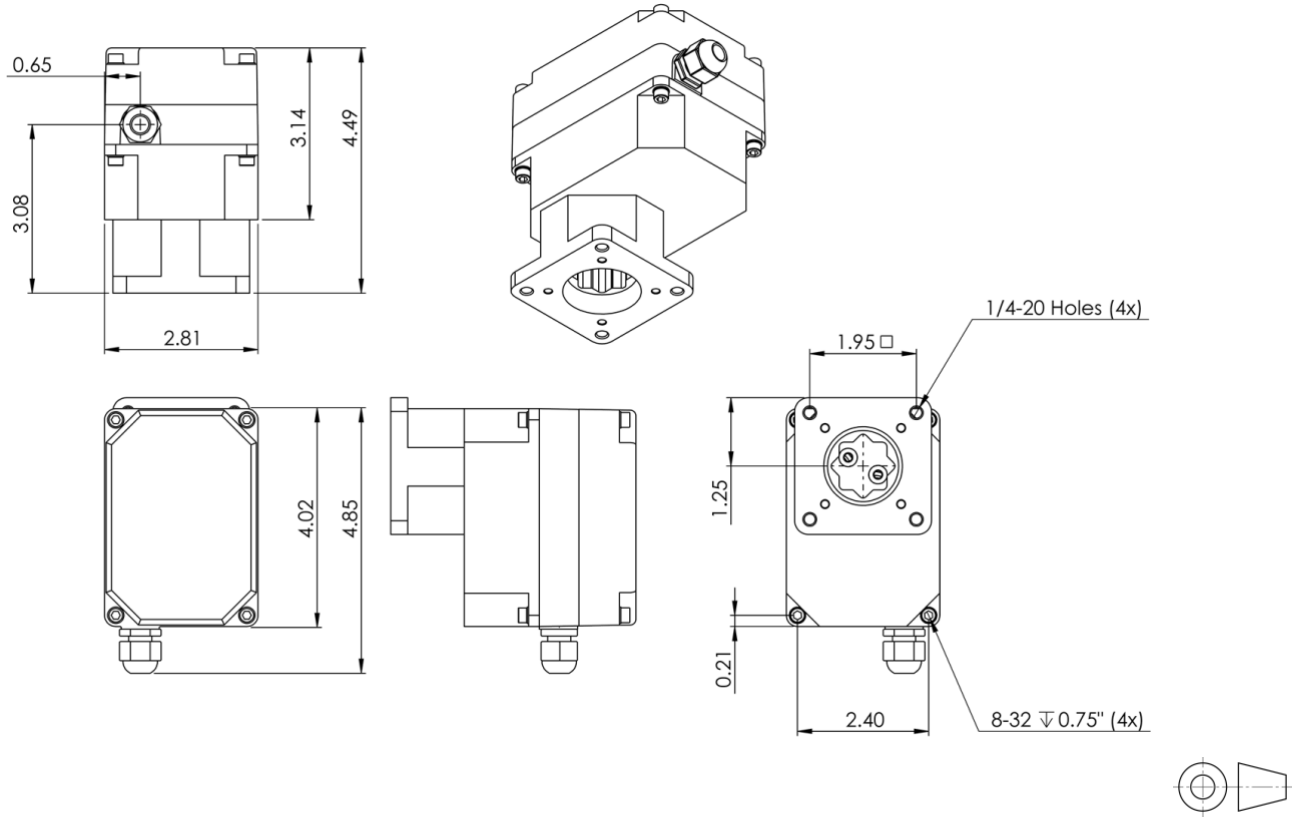
PART NUMBER BREAKDOWN

Full Part Number: M C ☐ - ☐ - ☐☐☐ AS - ☐ - ☐

Categories (diagonal labels): Base Enclosure, Positioning, Gear Train, Special Options, Enclosure Options, Wiring, Thermal Management, PCB, Mounting Kit, Valve Part Number

| M | | | - | | - | | | | | - | | | - | Valve Manufacturer's Part # / CU # |

Mounting Kit:

0	No Valve or Mounting Kit
1	Mounting Kit, Customer Supplies Valve, does not send valve to Hanbay
2	Mounting Kit, Customer Supplies Valve, sends valve to Hanbay
3	Mounting Kit, Hanbay Provides Valve

Base Enclosure:

M	M-Series

Positioning:

C	Continuous
D	Discrete

Gear Train:

J	Extra Low Torque
L	Low Torque
M	Medium Torque
H	High Torque (Add. Gear Stage)
F	F-Gear Stage (Add. Gear Stage)

PCB:

AB	Analog Signal Board
AF	Analog Signal Board Isolated with Feedback
AI	Analog Signal Board Isolated Input
AS	Modbus Control with Feedback
DC24	Continuous TTL Board, 0V input / 24V feedback signal
DC5	Continuous TTL Board, 0V Input / 5V feedback signal
DT24	Discrete TTL Board, 0V Input / 24V feedback signal
DT5	Discrete TTL Board, 0V Input / 5V feedback signal

Thermal Management:

0	No Option
FH	Horizontal External Fan
FV	Vertical External Fan
H	Internal Heater
FHH	Horizontal External Fan & Internal Heater
FVH	Vertical External Fan & Internal Heater

Wiring:

0	Cable Gland (Specify Cable & length at added cost)
4	Custom Dual Gauge Cable, 10ft.
5	TURCK 5 Position Connector w. 20' Cable and Plug
6	TURCK 6 Position Connector w. 20' Cable and Plug
7	TURCK 5 Position Connector Only
9	TURCK 6 Position Connector Only

Enclosure Options:

0	Standard Red Alloy Enclosure
N	Black Alloy Enclosure
S	Stainless Steel Enclosure

Special Options:

0	No Special Options
AC	110-240 VAC Power Supply
B	Battery Backup
BS	Bottom Stop
G	G-Stage Gate Valve (with MCM or MCL)
HT	High Temperature Mounting Kit
L1	Linear 16 TPI
L2	Linear 8 TPI
M	Manual Override
P	Position Indicator (Quarter-turn)
PM	Position Indicator (Multi-turn)
QR	Quick Release Mounting Kit

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rotork®
www.hanbayinc.com | 1 800 315 4461
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LABEL BREAKDOWN

Firmware Version

AF-1.05
AB-1.05
AS-1.05

MM = Multiturn
MML = Multiturn Low Torque
MMUL = Multiturn Extra Low Torque
QM = Quarter turn
QM97 = Quarter turn 97°

DT-2.01
DC-2.01
M-Dx V2.34

Actuator Supply Voltage
12-24 VDC @ 3.0 A or
110-240 VAC @ 1.5 A

Circuit Board Version
Ax-8.09
Dx-10.41
Px-10.3

Actuator Series
M-Series or R-Series

M-Series | 12-24 VDC 3.0A

Ax-8.09
AB-1.05MM

User Manual:

rotork
HANBAY
www.hanbayinc.com
(336) 659 3400
NC, 27103 Made in USA

MCM-050AB
POWER OFF UNIT BEFORE REMOVING COVER
S/N: 19103201-01

Actuator Part Number
Refer to part number breakdown for available options.

QR Code
Scan this QR code for a direct link to the user manual for your unit!

Actuator Serial Number
This serial number is unique for each individual unit and is directly tied to your order/invoice number.