



Electro-Hydraulic Actuators

MHPWS-QNN Series

User Manual



Important notice!

This manual consists of content to guide the installation and operation of MHPWS-QNN product.

Safety notices in the manual are specific precautions to reduce the risk of personal injury and equipment damage.

Users should read and understand these instructions. Failure to observe these safety notices may result in personal injury, equipment damage, and voiding warranty.

The safety notices are designated as follows.

WARNING

: Signifies potential dangers that, if not followed, can result in serious injury or even death.

CAUTION

: Outlines precautions for the user to avoid injury or equipment damage.

NOTE

: Important information in understanding the installation and operation of the MHPWS-QNN actuator.

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1. Introduction

The MHP series valve actuators designed and manufactured by RPM Tech Co., Ltd., are powerful all-in-one hydraulic actuators with built-in hydraulics, control, and communication functions. The hydraulic generator is composed of a motor and a hydraulic pump, with a manual hydraulic pump installed for emergency operations.

MHP series products can be used for quarter-turn and linear valves and is designed for a wide range of valve applications. This product can be installed in various locations, and its main functions, like valve positioning and proportional control, can be accessed and controlled remotely in groups of multiple MHP series products. The MHP series is also capable of separate installment of the hydraulic cylinder and the control module, which can prove advantageous in tight spaces.

The MHPWS-QNN series can generate an output torque of 600 Nm to 32,000 Nm depending on the configuration of the hydraulic cylinder and oil pressure settings. This series of products can be installed directly on most valves without a gear reducer.

Another notable feature of the MHP series is that even if a large load is applied to the valve, the torque will automatically adjust up to the maximum torque (maximum pressure of the hydraulic cylinder), which eliminates the need for a torque switch.

All electronic control parts are waterproof and explosion proof. The MHPWS-QNN can be operated manually, locally, and remotely (via remote relay contact methods and also via 4-20mA current control signals). This product is compatible with the PROFIBUS industrial control network system and can be implemented as a Slave in the PROFIBUS network.

The MHPWS-QNN generates hydraulic pressure through the motor and the hydraulic pump to operate the hydraulic cylinder to its maximum capacity. The controller receives real-time information on the valve's position from the potentiometer and executes valve positioning commands at the highest precision. In addition, this product features a manually operated hydraulic pump that can be used in emergencies such as a power failure.

All of our products support both local and remote operation as standard. We also manufacture other products that are equipped with more advanced features that allow the speed to vary precisely at different phases of the open and close movement.

1.1 MHPWS-QNN Parts

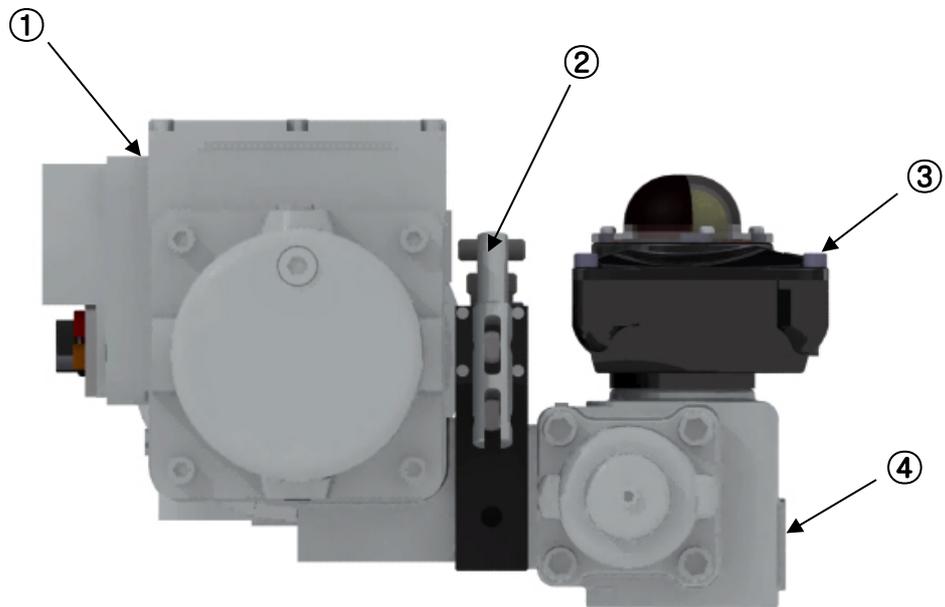


Figure 1.1 [MHPWS-QNN Parts]

- ① Power Pack (MHPWS)
- ② Hand Pump
- ③ Position Meter
- ④ Hydraulic Quarter Turn Cylinder

1.2 Identification

Each product component (MHPWS-QNN, Position meter) has a Nameplate in the following location:



①-MHPWS-QNN

②-Position Meter

Figure 1.2 [MHPWS-QNN Nameplate Location]

1) Identification data on the MHPWS-QNN nameplate

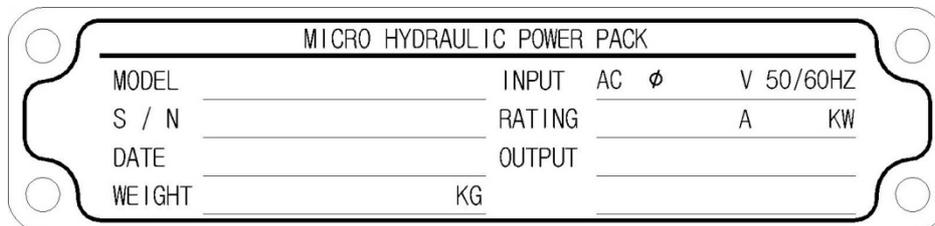


Figure 1.3 [MHPWS-QNN Nameplate]

1	MODEL	Model number of the MHPWS-QNN
2	INPUT RATING	Power input compatibility
3	S / N	Serial number
4	DATE	Date manufactured
5	OUTPUT	Maximum output torque
6	WEIGHT	Product weight

2) Identification data on the Position meter nameplate

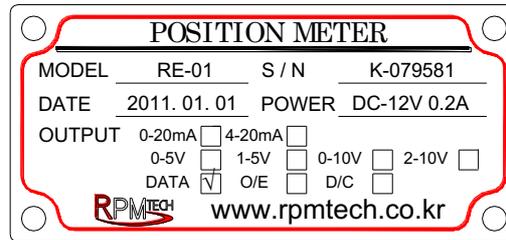


Figure 1.3 [Position meter Nameplate]

- | | | |
|---|--------|---|
| 1 | MODEL | Model number of the Waterproof Position Meter |
| 2 | S / N | Manufacture number |
| 3 | DATE | Date manufactured |
| 4 | POWER | Input power |
| 5 | OUTPUT | Output signal |

2. Safety

2.1 User Safety

User(s) of this product must read this manual thoroughly before installation and comprehend all of the functions that this product is equipped with. Any tampering or dismantling of the product should be avoided.

2.2 Mechanical and Electrical Safety



Please supply power to the product according to the details specified on the nameplate of the product. The body of the MHP series is constructed with aluminum. Consult the manufacturer for additional inquiries regarding the product.

2.3 Transport

Please consider the following precautions when transporting the product.

- Unused cable sockets should be sealed using a plug before shipping
- Make sure the needle valve at the top of the hand pump is locked during transport to prevent malfunction or damage.
- Do not attach a hoist or rope to the hand pump to prevent damage.
- Avoid exposing the display to strong impacts.

2.4 Storage

It is best to store this product indoors. However, if storing it indoors for a long term is not possible, place the product elevated from the ground and avoid direct sunlight using a cover.

Consider the following precautions if the product will be stored for more than 6 months.

- Before Storing
 - Check for any paint damage and prepare appropriate measures for such damages.
- During and After Storage
 - Make frequent checks for any paint damage. Conduct appropriate tests before operating after a prolonged period.

2.5 Packaging

Packaging is environmentally friendly making it easy to disassemble and recycle. Packaging material consists of wood, cardboard, and paper. We recommend recycling if possible, and advise proper disposal of the materials in a designated place to prevent detrimental impact on the environment.

2.6 Installation Precautions

Upon delivery of the MHP Series product, the user should commence a thorough inspection of the product(s) for damage, loose or missing screws. The packaging material should be recycled or disposed of properly to prevent environmental contamination.

WARNING

- Ensure that the product being installed is the correct model by checking the nameplate.
- Check for any exterior defects or damages.
- Check for any signs of leakage.
- Ensure that the valve shaft is clean before installation.
- Ensure that the appropriate connection parts are prepared before installation.
- Make sure that the valve is in the FULL CLOSE state before installation.
- Placing the MHP hydraulic pump (on the right) in the vertical upper position during the installation may hinder it from operating at maximum torque output.

3. Installation

3.1 Valve Alignment

3.1.1 Shaft Coupling Connection

In the case where the valve shaft of the MHPWS-QNN does not align with the shaft connection, manufacture a shaft coupling and connect before installing the actuator. Ensure that the key and the shaft coupling does not inflict any damage.

CAUTION

The shaft coupling and the valve shaft must be completely aligned when assembling.

3.1.2 Flange Adapter Connection

After connecting the shaft coupling, mount the manufactured flange adapter on to the valve flange. Align the bolt holes on the valve flange and the flange adapter before screwing, and then screw the flange adapter and the valve flange using the appropriate bolts and nuts.

3.2 MHPWS-QNN Mounting

Ensure that the valve being mounted is in the Full Close position. Note that the MHPWS-QNN is set to the Full Close position at the time of delivery. Upon confirming that both the valve and the MHPWS-QNN is set to the Full Close position, install the actuator in any of the 4 directions of the key. When the connection is complete, use appropriate bolts to join the valve flange (or flange adapter) with the MHPWS-QNN.

CAUTION

Ensure that the pump is not facing up during and after installation.

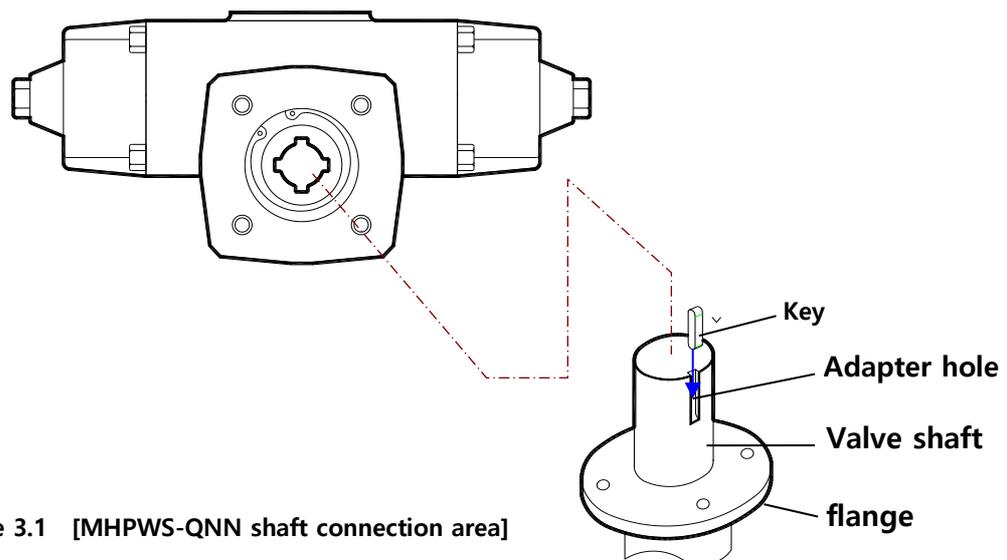


Figure 3.1 [MHPWS-QNN shaft connection area]

3.3 Connecting Power and Signal Cables

- 1) Make sure a single-phase 110V ~ 220V AC power cable is connected, and then open the terminal cover of the MHPWS.
- 2) Connect the power cable to terminals 1 and 2 on the terminal block to ground the cable.



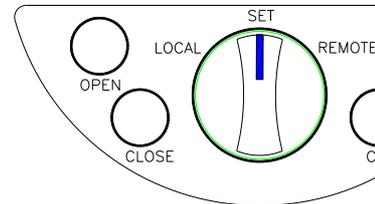
Figure 3.2 [Grounding connection position]

NOTE

4SQ is recommended for the grounding cable.
Refer to the table below for specifications on the external cables.

Signal	Analog signal	contact signal	Power
Wire specifications	1.5SQ (shield)	1.5SQ	2.5SQ

- 4) Turn on the power of the MHPWS.
- 5) Place the SELECT switch on the front of the MHPWS into SET position.



- 6) Ensure that the installation is successful by testing the OPEN/CLOSE buttons function properly.

Figure 3.3 [LOCAL SWITCH]

- 7) Turn off the power for the MHPWS-QNN and refer to the (Doc.No: E-MHPWS-***-CAN-EN) to make wiring connections to the terminals.
- 8) Ensure that the cable gland and any flexible parts are all waterproof and IP68 rated. Seal any unused cable sockets using plugs and close the terminal covers when the connection is complete.

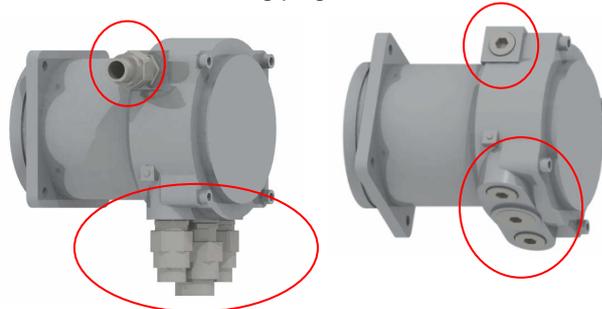


Figure 3.4 [CABLE GLAND & PLUG]

CAUTION

Be sure to use IP68 rated waterproof cable glands.
The cable socket type and specifications are shown in the table below.

Position (signal)	Upper Sides	Bottom left	Bottom center	Bottom right
Signal	Gate positioner	Analog signal	Contact signal	Power
Inlet specification (PF)	1/2	3/4	1	3/4
Inlet Specifications (CTG)	16	22	28	22

3.4 Position Setting

3.4.1 Stroke Limiter Setting

- Full Close Stroke Limiter Setting –

- 1) Set the **selector switch** on the MHPWS-QNN to **SET MODE** as shown in **Figure 3.5** and press the **CLOSE** button to ensure that the valve is fully closed.

NOTE

The main controller will not perform the close operation if the gate positioner is in the full close limit state. Disable the gate positioner limit function or utilize the gate calibration setting mode to perform the close operation.

- 2) If the valve does not fully close even after pressing the CLOSE button on the MHPWS-QNN, open the MHPWS-QNN valve slightly, then loosen the plug cap on the closing side of the hydraulic cylinder as shown in **Figure 3.6**, and turn the stroke limiter counterclockwise.

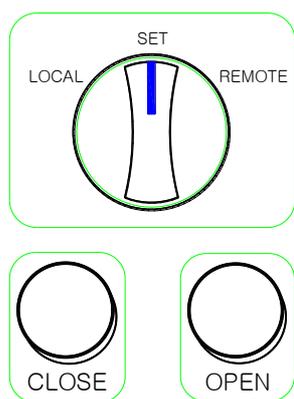


Figure 3.5 [Full Close Setting]

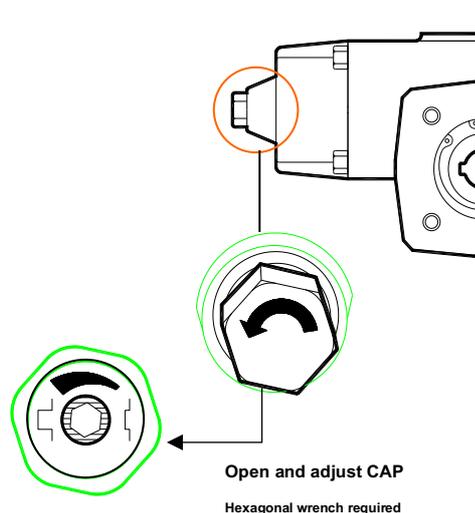


Figure 3.6 [F/C Stroke Limiter]

CAUTION

The Full Close Stroke Limiter setting can be adjusted by 1/4 turns per step using a hexagonal wrench. Please be aware that turning too much may unlock the limit, causing leakage of the hydraulic oil.

Model	01	02	03	04	05	06	07
Plug Cap	24	30	36	41	41	55	65
Stroke Limiter	4	6	8	10	10	17	19

* In case of Plug Cap, it is recommended to use a Monkey Spanner due to thick paint. (mm)

- 3) After adjusting the stroke limiter, close the valve on the MHPWS-QNN and ensure its full close status. If the valve is still not fully closed, repeat procedure 2.

- Full Open Stroke Limiter Setting -

- 1) Set the **selector switch** on the MHPWS-QNN to **SET MODE** as shown in **Figure 3.7** and press the **OPEN** button to ensure that the valve is fully open.

NOTE

The main controller will not perform the close operation if the gate positioner is in the full close limit state. Disable the gate positioner limit function or utilize the gate calibration setting mode to perform the open operation.

- 2) If the valve does not fully open even after pressing the OPEN button on the MHPWS-QNN, close the MHPWS-QNN valve slightly, then loosen the plug cap on the opening side of the hydraulic cylinder as shown in **Figure 3.8**, and turn the stroke limiter counterclockwise.

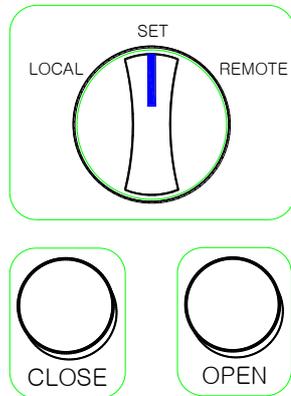


Figure 3.7 [Full Open Setting]

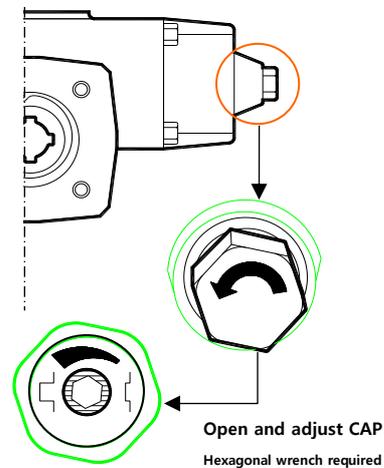


Figure 3.8 [F/O Stroke Limiter]

CAUTION

The Full Open Stroke Limiter setting can be adjusted by 1/4 turns per step using a hexagonal wrench. Please be aware that turning too much may unlock the limit, causing leakage of the hydraulic oil.

Model	01	02	03	04	05	06	07
Plug Cap	24	30	36	41	41	55	65
Stroke Limiter	4	6	8	10	10	17	19

* In case of Plug Cap, it is recommended to use a Monkey Spanner due to thick paint. (mm)

- 3) After adjusting the stroke limiter, open the valve on the MHPWS-QNN and ensure its full open status. If the valve is still not fully open, repeat procedure 2.

3.4.2 Testing for Proper Functioning

Upon installment of the MHPWS-QNN, perform the Full Close / Full Open operations to ensure proper functioning of the valve's disk. Check that the F/O and F/C indication lights next to the display and the position meter are functioning properly according to the signals sent by the gate positioner.

NOTE Refer to Figure 3.9 below for visuals of a successful test case for proper functioning after installment.

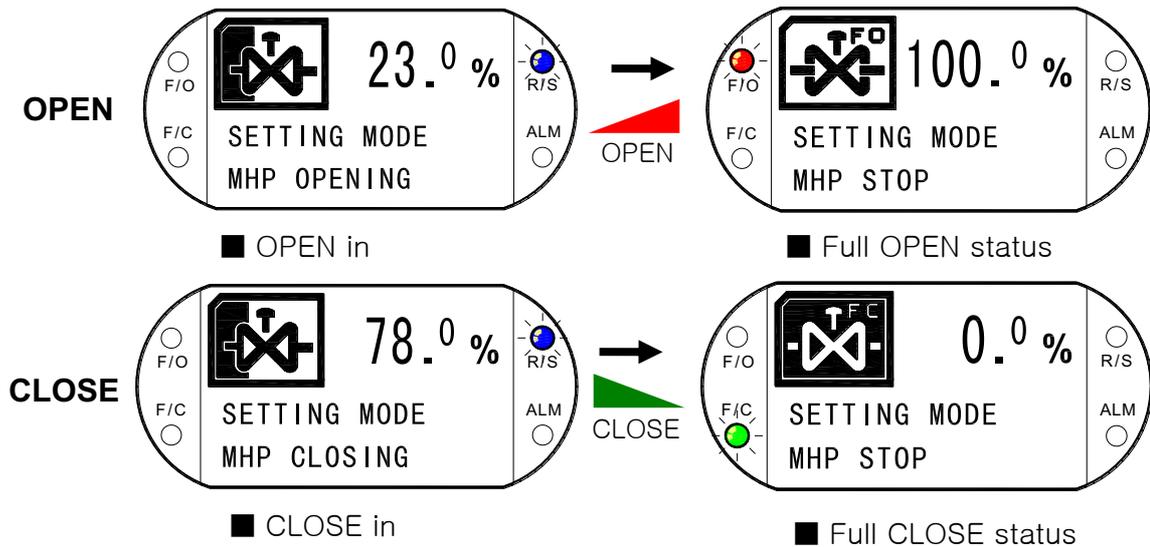


Figure 3.9 [Checking Normal Operation Status]

3.4.3 OPEN/CLOSE Calibration Function

The MHPWS-QNN opening and closing calibration can be performed using the front switch, and the procedure is as follows.

1) Set the SELECT switch to Local Mode.

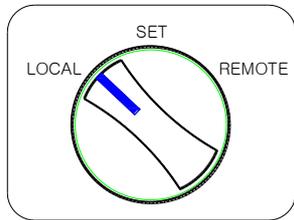


Figure 3.10 [Select Switch-Local Three Mode]

2) Press and hold the CAL button for about 3 seconds until the display shifts to Calibration settings.

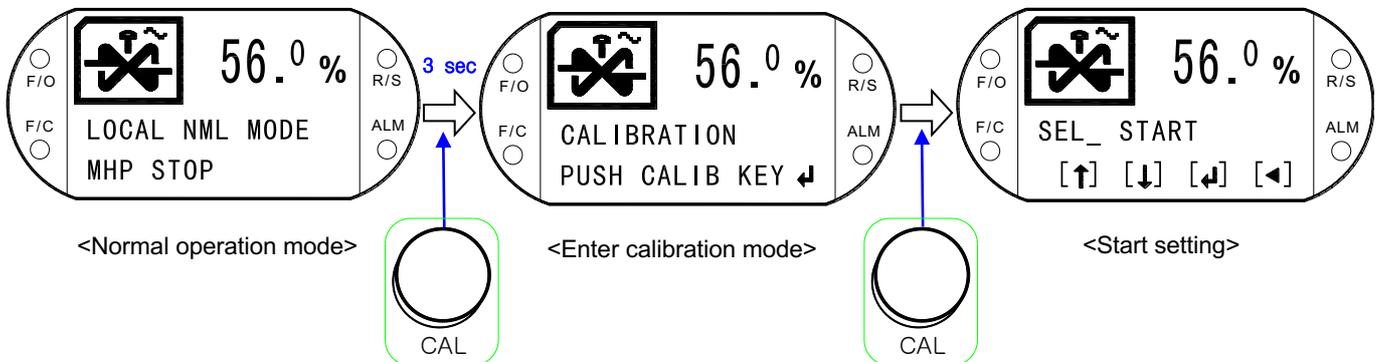
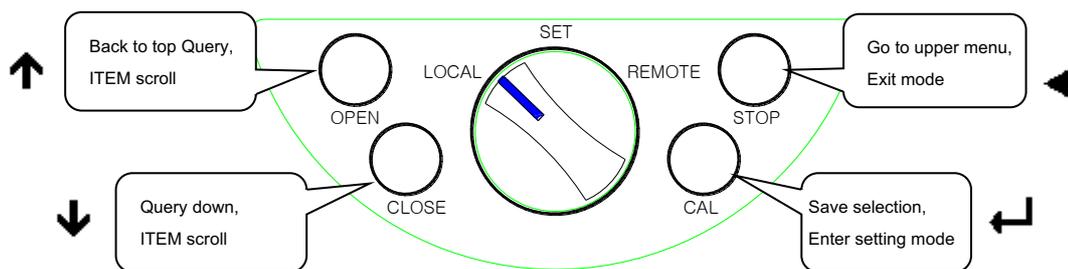


Figure 3.11 [Switch to Calibration Mode]

3) Press the CAL button once more to move into the Calibration settings and start the calibration process.

4) Refer to Figure 3.12 for the functions of the buttons within the Calibration settings.



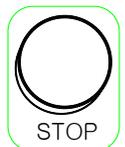
- OPEN, CLOSE: Used to move through menu or option items
- CAL: Used to select menu or option item
- STOP: Used to move to previous menu or cancel

Figure 3.12 [Description of Button Function during Calibration]

5) Press the 'STOP' button to end the calibration process and exit the menu.

NOTE

MHPWS will automatically return to Normal Operation Mode after 1 minute of idle time.



3.4.4 FULL CLOSE Calibration Instructions

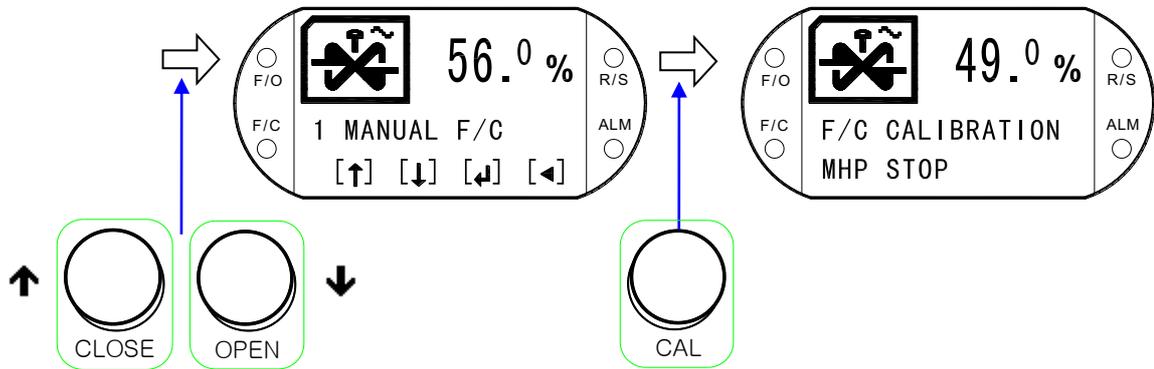
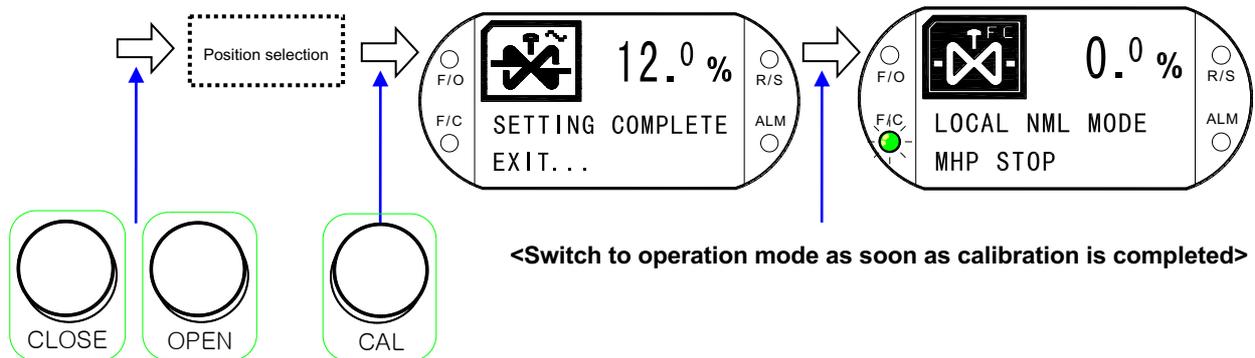


Figure 3.13 [Calibration Example-1]

- 1) Press the OPEN/CLOSE buttons to move to the Calibration menu item ('1 MANUAL F/C').
- 2) Press the CAL button to select the '1 MANUAL F/C' menu. The valve position displayed on the screen indicates the uncalibrated position.
- 3) Press the OPEN and CLOSE buttons to move the actuator to the desired position, and press the CAL button to set the current position as the FULL CLOSE position.
- 4) Press STOP to return to Local Operation mode.



<Switch to operation mode as soon as calibration is completed>

Figure 3.14 [Calibration Example-2]

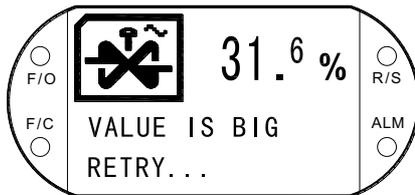
NOTE

Follow the same procedure for FULL OPEN Calibration.

3.4.5 Precautions During Calibration

- 1) The valve position displayed during calibration is based on factory calibrated settings of the position meter (potentiometer). The valve position displayed after the calibration is the newly calibrated position.
- 2) The user can only enter calibration value that is greater/less than 10% of the valve position to prevent any errors during the calibration process.

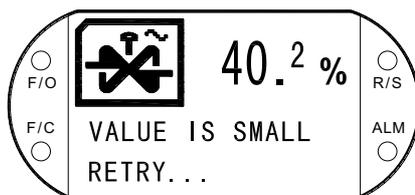
FULL OPEN Setting calibration: 40%



▶ During the FULL CLOSE calibration the desired calibration value should have a difference of $\pm 10\%$ from the FULL OPEN position. Figure 3.15 shows the MHPWS-QNN displaying an error message because the FULL CLOSE calibration value entered (31.6%) does not have a difference of 10% or more. The calibration process does not happen.

Figure 3.15 [Exceeding initial calibration warning during FULL CLOSE calibration]

FULL CLOSE Setting calibration: 31%



▶ During the FULL OPEN calibration the desired calibration value should have a difference of $\pm 10\%$ from the FULL CLOSE position. Figure 3.15 shows the MHPWS-QNN displaying an error message because the FULL OPEN calibration value entered (31.6%) does not have a difference of 10% or more. The calibration process does not happen.

Figure 3.16 [Exceeding initial calibration warning during FULL OPEN calibration]

- 3) After completing FULL OPEN/FULL CLOSE calibration, recheck for normal operation.

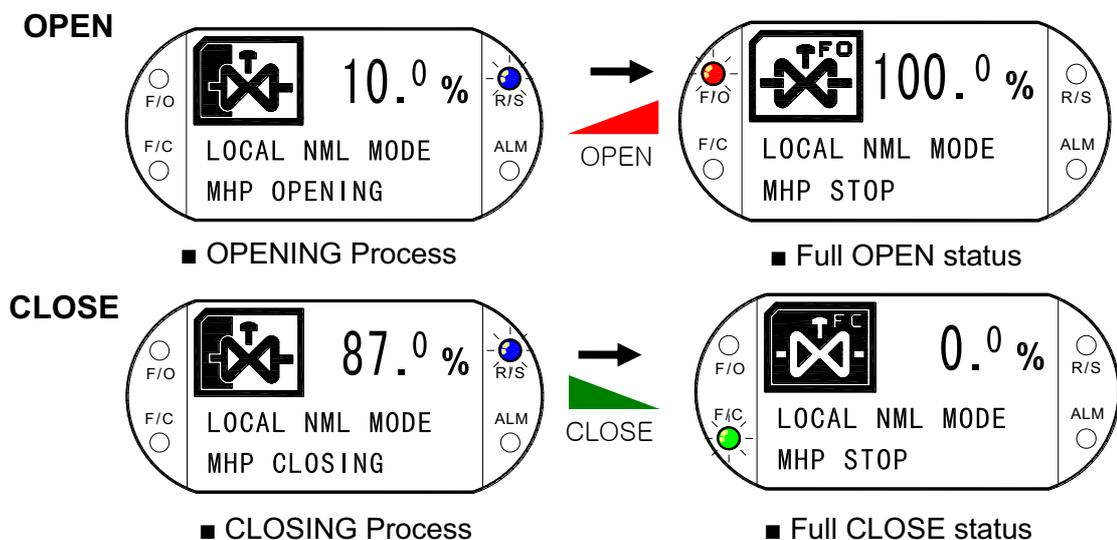


Figure 3.17 [Normal operation]

4. Operation

4.1 Normal Operations Check / Inspection

4.1.1 Normal Operation

- 1) Turn on the power and check the version.

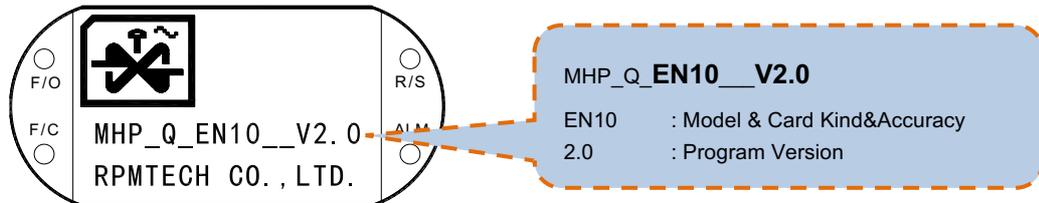


Figure 4.1 [Normal Power & Status Display]

- 2) Test and ensure that full / partial opening and closing of the valve functions properly.

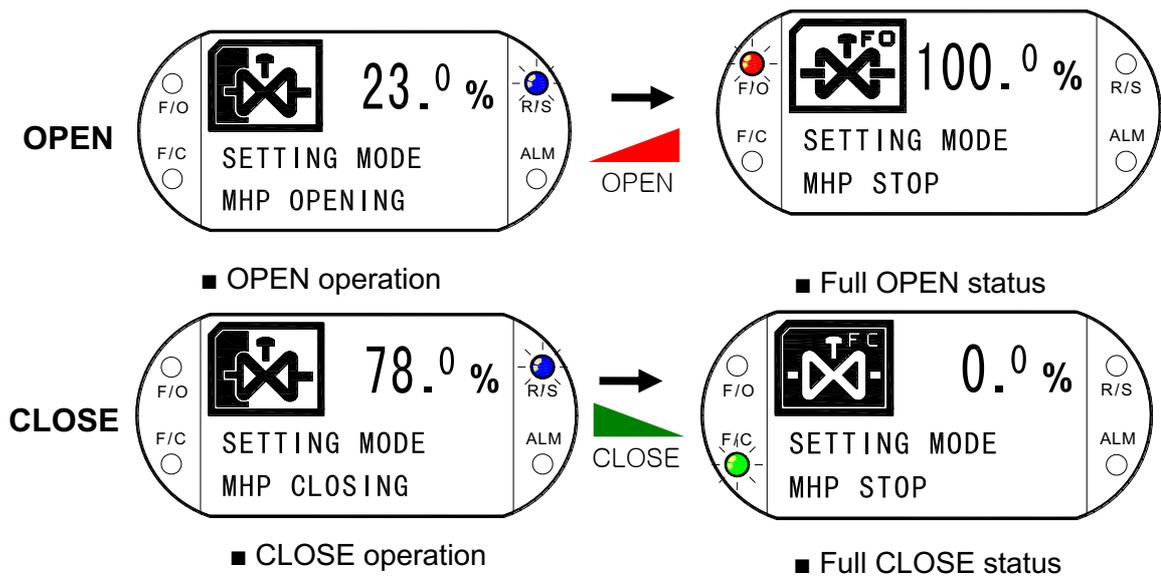
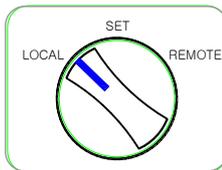


Figure 4.2 [Normal OPEN & CLOSE Display]

4.1.2 Changing Operation Modes

Use the Select switch to alternate between the 3 modes of operation. LOCAL Mode is for local manual operation. SET Mode is for accessing the function settings and is mostly used during the initial setup of the MHPWS-QNN. REMOTE Mode allows the MHPWS-QNN to be monitored and operated remotely.

1) LOCAL operation mode



- One press of the **OPEN/CLOSE** buttons would execute the commands accordingly
- Pressing the **STOP** button will stop the ongoing operation
- Pressing the **CAL** button for more than 3 seconds will enter the **OPEN/CLOSE Calibration Mode**.
- Automatically stops when valve is fully closed (F/C) or fully Open (F/O).



→ Local Normal Mode

- OPEN/CLOSE at constant speed
- Available in all E, G, K, M, S, I models.
- Default mode in Local Mode



→ Local Speed Control Mode

- Speed control mode divides the OPEN/CLOSE movement into three sections. The speed and time for each section is configurable.
- Available in the K and S models only.
- Select this mode in PARAMETER settings.

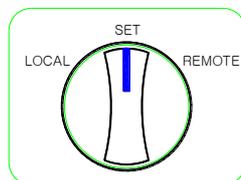


→ Local Step Control Mode

- Operable in two sections one of which operates in incremental steps (1%).
- Available in the I model only.
- Select this mode in PARAMETER settings.

Figure 4.3 [Each Mode of LOCAL MODE Display]

2) SET operation mode



- Operates only when the **OPEN/CLOSE** button is pressed
- Press the **CAL** button for more than 3 seconds to enter the **PARAMETER Settings Mode**.
- Automatically stops when the valve is fully closed or open

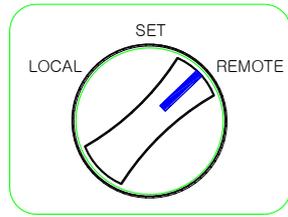


→ Local Setting Mode

- OPEN/CLOSE at constant speed
- Available in all E, G, K, M, S, I models.
- Default mode in Local Mode

Figure 4.4 [Each mode of SET MODE Display]

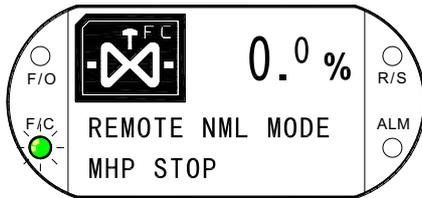
3) REMOTE Operation Mode



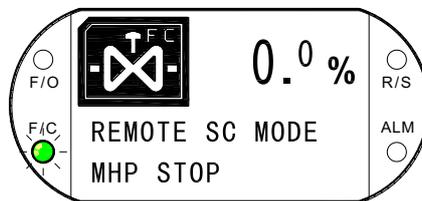
- Used for operating remotely
- Mode selectable by two inputs on the control input terminal.

(* Refer to Remote Control Instruction Manual)

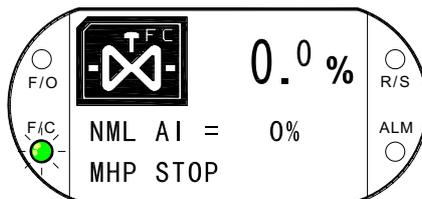
- Limited by model and card types.



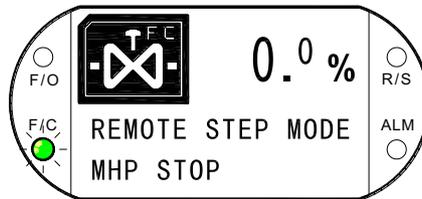
- ➔ Remote Normal Mode
 - OPEN/CLOSE at constant speed.
 - Available in all E, G, K, M, S, I models.



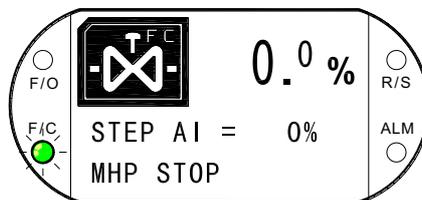
- ➔ Remote Speed Control Mode
 - Speed control mode divides the OPEN/CLOSE movement into three sections. The speed and time for each section is configurable.
 - Available in the K and S models only.



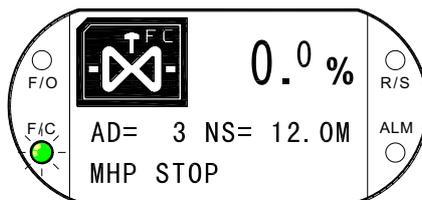
- ➔ Remote Normal AI Control Mode
 - Calibration control mode uses a 4 ~ 20mA current signal
 - Operates at normal speed. 'SIGNAL LOW' appears when input signals are less than 3mA.
 - Available in the M, S models only.



- ➔ Remote Step Control Mode
 - Operable in two sections one of which operates in incremental steps (1%).
 - Available in the I model only.



- ➔ Remote Step AI Control Mode
 - A combination of both the Calibration Control Mode and the Step Control Mode.
 - Available in the I model only



- ➔ Communication Mode(Profibus interface)
 - Communication interface mode and displays will differ slightly depending on the interface.
 - Displays Address and Network Speed
 - Available in the G, K, M, S, I models only

Figure 4.5 [Each Mode of REMOTE MODE Display]

4.1.3 What to Do When the Alarm Flashes / Sounds

When the valve operation encounters problems, the ALM LED indicator on the lower right will flash and an emergency alarm will sound simultaneously. If this happens, inspect the MHPWS-QNN to identify and resolve the issue before running it again.

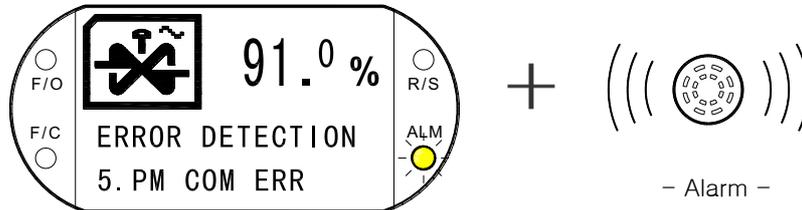


Figure 4.6 [Problem Displays]

Error Status	Major Causes of the Issue	Countermeasures
1. F/O ERR	Abnormal Full Open limit → Check the Full Open Limit setting → Inspect for jammed foreign matter on valve	- STOP (3 seconds) to reset the alarm - Reset AC power → Resume operation after eliminating the problem
2. F/C ERR	Abnormal Full Close limit → Full Close limit setting check → Inspect for jammed foreign matter on valve	- STOP (3 seconds) to reset the alarm - Reset AC power → Resume operation after eliminating the problem
3. MOTOR ERR	Occurs when motor is overloaded or damaged → Resume operation after resetting the alarm → Contact the manufacturer if the problem persists	- STOP (3 seconds) to reset the alarm (skip for 200W) - Reset AC power
4. TORQUE ERR	Occurs when the pipeline pressure of the valve is greater than the torque setting → Recheck current pressure and torque values of the pipeline → Contact the manufacturer if the problem persists.	- STOP (3 seconds) to reset the alarm - Reset AC power
5. PM COM ERR	Occurs when there is an issue in the connection between the main controller and the position meter. → Check the connection cable and connector for poor contact or tears. → Check for leakage inside the position meter.	- STOP (3 seconds) to reset the alarm - Reset AC power → Alarm will continue to sound If the problem is not resolved
6. VALVE JAMMED	Occurs when valve disc is stuck → Check for foreign objects between the valve and the disc → Recheck current pressure and torque values of the pipeline	- STOP alarm reset (3 seconds) - Reset AC power
7. MEMORY FAIL	Indicates saved settings have been erased due to power overload. Alarm sounds to prevent malfunction.	- Unable to disarm alarm → Contact manufacturer

<Understanding and taking countermeasure for different error messages>

4.2 Manual Override

The following are instructions on how to take manual control over the MHPWS-QNN using the manual hand pump in the case of a power failure or a malfunctioning hydraulic actuator.

- 1) Turn ① to align the direction. (clockwise to close, counterclockwise to open)
- 2) Turn ② counterclockwise as much as possible.
- 3) Insert the handle bar in ③ and pump it forwards and backwards.
- 4) When the desired manual control is finished, close ② by turning it clockwise.

CAUTION

Not fully closing ② may result in the power not being delivered properly when the power is restored.

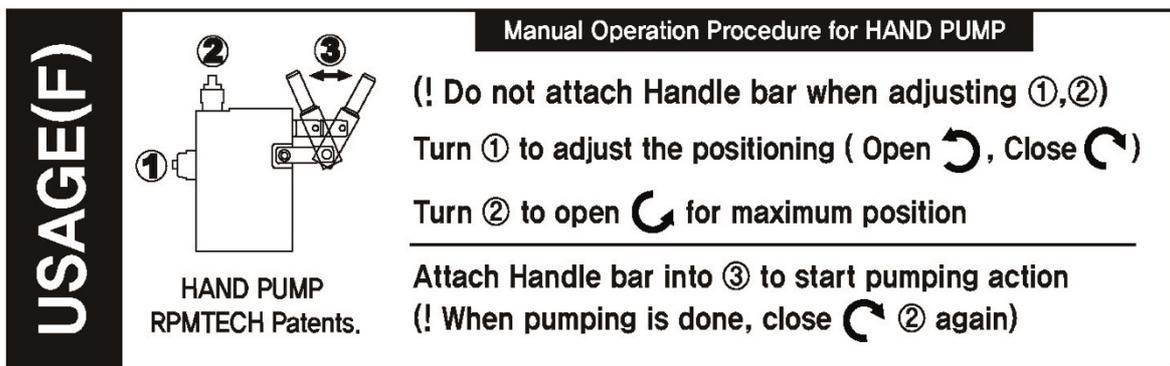


Figure 4.7 [Hand Pump Operation Sequence]

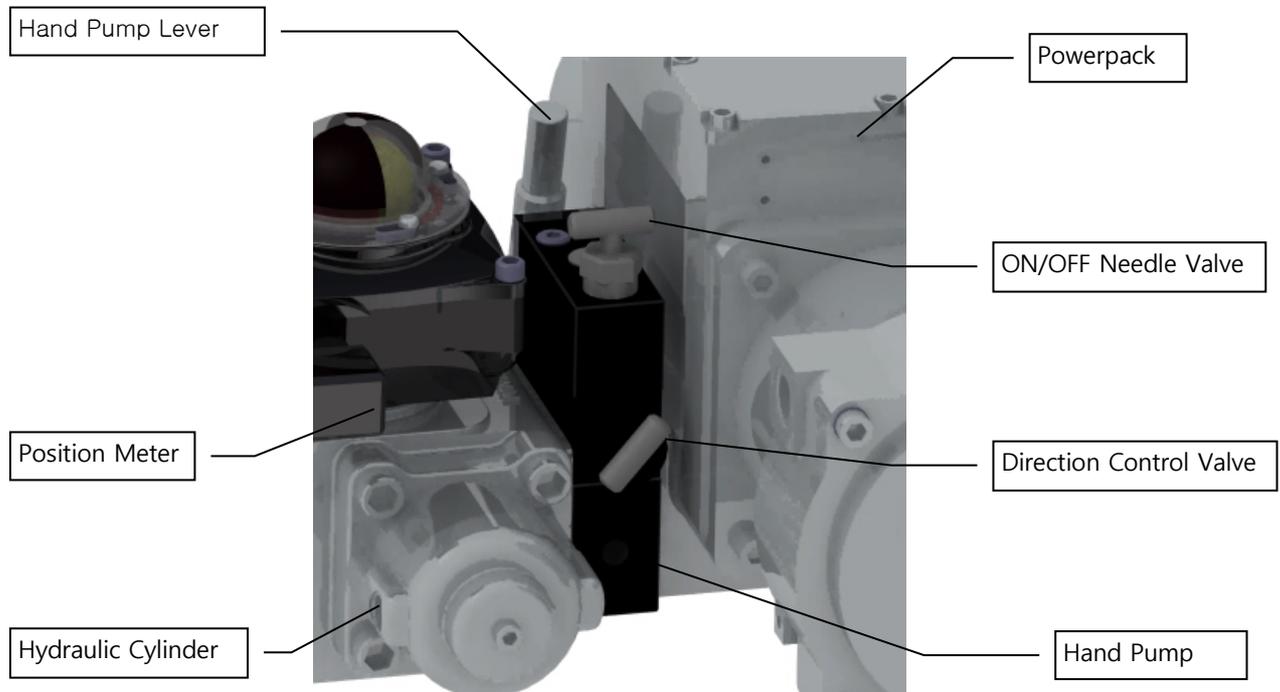


Figure 4.8 [Hand Pump Location]

5. Maintenance

5.1 Troubleshooting

Types of Malfunctions	Indications of Malfunction	Recommended Solution
No Power	Display is off	<ul style="list-style-type: none"> - Check the main power supply line. Refer to the electrical blueprint in referencing the circuit diagram. - Check the fuse of main controller.
Motor Malfunction	Local Switch is operational, but the motor is not.	<ul style="list-style-type: none"> - Check the motor power line. - Turn the power off, wait 4-5 seconds and then turn the power back on. - Check the fuse of motor driver.
Insufficient pressure generated	Motor is operational, but the valve is not.	<ul style="list-style-type: none"> - Inspect the actuator for any leakages. - Ensure that the needle valve of the manual hand pump is locked (Refer to 4.2 Manual Override > Step 4).
Manual Hand Pump	Unable to control the valve using the manual hand pump.	<ul style="list-style-type: none"> - Make sure that the needle valve is open (Refer to 4.2 Manual Override > Step 2). - It is possible that some air is trapped near the inlet of the hand pump. May require several pumping before the oil is supplied.
Full Close / Full Open Malfunction	F/C or F/O LED indicators do not function	<ul style="list-style-type: none"> - Check to see if the valve flange and actuator are aligned and connected properly. - Confirm F/C and F/O settings of the POSITION METER. - Check the STROKE LIMITER settings of F/C and F/O.
Oil Leakage	Leakage around the actuator	<ul style="list-style-type: none"> - Replace the O-ring if damaged. - Leaking parts should be replaced.
Remote Control Signals are not recognized or transmitted	Remote monitoring is not working	<ul style="list-style-type: none"> - Refer to the circuit diagram to identify signal connections.
Remote control malfunction	Remote control is not working	<ul style="list-style-type: none"> - Ensure that the SELECT SWITCH is in REMOTE mode. - Refer to the circuit diagram to identify signal connections. - Check to see if the control signal is being delivery to the actuator properly.

* Refer to the Maintenance Manual for a more detailed diagnostic process.

6. Specifications

6.1 Model Information

MODEL GUIDE QUARTER TURN ACTUATORS												
MHP	W	S	E	N	10	2	QN	N	0011	*	*	
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫	
NO	CODE	DESCRIPTION										
①	Power Pack	MHP	Single Motor Series									
		DHP	Dual Motor Series									
②	Enclosure	W	Water proof									
		X	Explosion proof									
③	Input Voltage & Motor	S	AC 1Ø 110V~220V ±10%, 50/60Hz, 0.6KW									
		T	AC 3Ø 380V~460V ±10%, 50/60Hz, 0.6KW									
		H	AC 3Ø 380V~460V ±10%, 50/60Hz, 1.5KW									
		D	DC Input Type									
④	Operation Mode	Category	ON/OFF	Position Out	Speed Control	Modulating	Step Control / EMC					
		E (L)	O									
		G	O	O								
		K	O	O	O							
		M	O	O			O					
		S	O	O	O		O					
		I	O	O							O	
⑤	Communication	N	AIO/DIO		P	Profibus		M	Modbus RTU		F	Foundation FB
		H	HART		C	CANopen		L	Lonworks		E	Ethernet
⑥	Resolution	00	If ④ is L									
		01~99	$(01\sim99)/10 = \pm 0.1 \sim \pm 9.9 \%$									
⑦	Gear Pump Volume	Category	0	1	2	3	4	5	6			
		Gear Pump (cc/rev)	0.2	0.5	1.0	1.5	2.0	2.5	3.0			
⑧	Cylinder Type	QN	Quarter turn Normal									
		QS	Quarter turn Spring return									
		QW	Quarter turn counter-Weight									
⑨	Emergency DIR.	N	No emergency action									
		O	Opening direction during emergency									
		C	Closing direction during emergency									
⑩	Torque	0001~0009	X 100 N.m									
⑪ ~ ⑫		Not applicable to Quarter turn Actuators										

6.2 Product Specifications

TECHNICAL DATA QUARTER TURN ACTUATORS								
CLASS								
POWER PACK	ENCLOSURE	ELECTRIC MOTOR (kW)		DISPLACEMENT (l/min)	WORKING PRESSURE (bar)	OPERATION MODE		
MHPX	Ex d II B T4	0.6		Standard: 1 Option: 0.4, 2, 3	Standard: 160 Option: 40~210	E(L), G, K, M, S, I		
MHPW	IP68							
MAX TORQUE								
CODE	MAX TORQUE (Nm)	OPERATION TIME Min~Max (sec±10%)				VALVE ATTACHMENT		
		0	1	2	3	FLANGE ISO5211	STEM φDxL(mm)	STEM KEY (mm)
0006	600	11~41	5~16	4~11	-	F10	φ22x60	8x7
0011	1,100	19~74	8~28	5~15	-	F12	φ30x70	10x8
0022	2,200	36~141	14~53	8~28	-	F14	φ40x80	12x8
0050	5,000	81~316	31~119	16~61	-	F16	φ65x100	20x12
0090	9,000	202~807	76~301	39~154	-	F16	φ75x110	20x12
0160	16,000	362~1200	136~539	70~276	-	F25	φ95x150	25x14
0320	32,000	658~1200	249~979	126~500	-	F30	φ110x180	28x16
ELECTRIC MOTOR								
Output		0.6KW BLDC Motor, rating at 30 minutes						
Input Power		Three phase 380~460VAC (±10%) 50/60Hz, Max Current of 3A						
Control Mode		3 phase PWM						
Protection		Over current, Reset signal, Out of phase(Hall sensor & Motor cable)						
HYDRAULIC PUMP								
Type		Bi-directional gear pump						
Displacement (cc/rev)		0.2 (precision control), 0.5 (Standard), 1 (fast operation), 1.5 (very fast)						
Maximum pressure		210bar						
HAND PUMP								
Type		Piston pump						
Displacement		9cc / stroke						
Maximum Pressure		250bar						
Directional Valve		Manual (for OPEN & CLOSE)						
POSITION METER								
Type		Potentiometer						
Output		RS-232 Interface						
ENVIRONMENTAL PERFORMANCE								
Vibration		33.3 Hz, 66.7 m/s ²						
Ambient Temperature		-20~60°C						
OTHER INFORMATION								
Oil		Standard: GS ISO VG 46 (Option: PANOLIN HLP SYNTH, VG32/68)						
Finish Coating		70 μm Powder coating						
Color		KCC PX4327-LPG Gray (Powerpack), PX4324-BLACK (Positioner)						

MEMO



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