SM-11590-A/1

INSTRUCTION MANUAL

FOR

3 – port Motor Valve

MXG1 – 15~50

Prior to using the Product, it is essential to read this INSTRUCTION MANUAL, especially the description of safety-use issue.

For quick reference whenever necessary, keep this INSTRUCTION MANUAL in a good manner.

CKD Corporation

FOR SAFETY USE

The Product is to be used by those who has a basic knowledge about material, fluid, piping electricity regarding Control Valves (solenoid valves, motor valves, air operated valves and so on.)

Never use this Product by those who have no knowledge or are not well trained about Control Valves.

Should be any trouble or accident caused by a wrong selection and/or wrong use of the Product even by a person of basic knowledge about Control Valves, we are not responsible therefore.

Since any customer of the Product have a variety of its application, we are not in a position to get all the information on how and where the Product is used. There may be the cases where that the Product may not meet customers' requirement or may cause any trouble or accident, by fluid, piping or other condition that are not within the specifications of the Product.
Under such a circumstance, select with their responsibility the most suitable application and use of the Product according to the customers' requirements.

The Product incorporates a various safety arrangement, however miss-handling of the product may lead to any trouble or accident on customers side. **To avoid any possible trouble, read this INSTRUCTION MANUAL carefully and understand it fully.**

Pay your attention to the items described in this Text, as well as the items indicated below.

⚠ CAUTIONS

- **When energized, heat is generated at coil portion of solenoid valves and motor valves particularly "Class H" coil where may have a high temperature.**

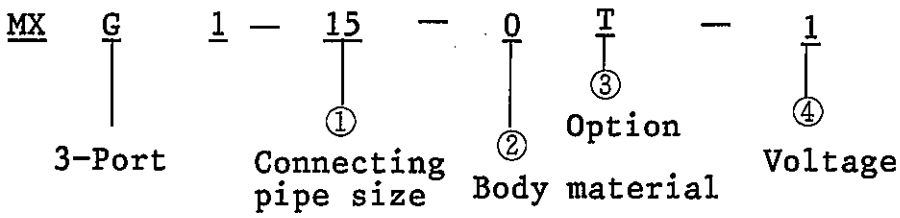
- **There my have electric shock when wire connecting portion of solenoid valves or motor valves are touched. In case of disassembly or inspection, turn off power supply beforehand. Don't touch live portion by wet hands.**

- **Make piping so as not to have leakage and check for no leakage before use, because in case of control valves for high temperature fluid like steam, leakage may cause heat injury.**

Thank you very much for adopting CKD motor valve (MXG1-type).
All CKD products are manufactured under strict quality control system to ensure their safety and effectiveness.
Read this Instruction Manual thoroughly in order to use your CKD products more effectively.

CONTENTS

1. How to Read the Model No.



①	Size of connection port
15	Rc 1/2
20	Rc 3/4
25	Rc 1
32	Rc 1-1/4
40	Rc 1-1/2
50	Rc 2

②	Material		
	Body	Valve seat	Shaft seal
0	Bronze	Teflon	Fluororubber, Nitrile rubber
H	Bronze	Teflon (Mixed special material)	Fluororubber, Nitrile rubber

③. Option	
no mark	Standard(Signal take off connection)
T	No Signal take off connection
B	With terminal box
K	Mixing type
L	With lamp (C-A lamp lighting)
R	With lamp (C-B lamp lighting)

④. Voltage	
1	AC100V
2	AC200V
3	DC24V
4	DC12V

2. Description of Function

2-1. Standard (Option : contain K,B)

(1) "C-A(flow from C to A) "function

(C-B → C-A)

※ Shows the end of C-B function

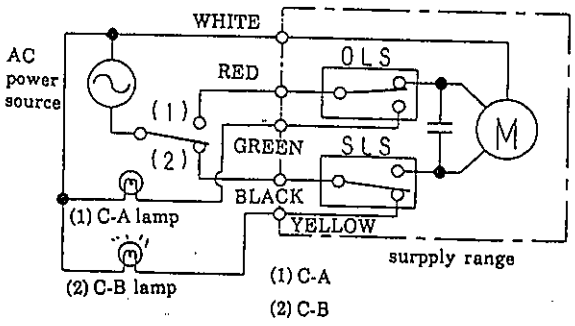


Fig.1

On turning the operating switch to C-A from the state in Fig.1,the current flows between the white lead wire and the red lead wire, the output shaft rotates counterclockwise (when the valve is seen through the bonnet top).
The cam turns off the contact of OLS to C-A the valve, causes the motor to stop.Then C-A lamp is lighting. (See Fig. 2)

Here, other components can be moved, setting relay in the substitution of lamp.

(2) "C-B(flow from C to B)"function

(C-A → C-B)

※ Shows the end of C-A function

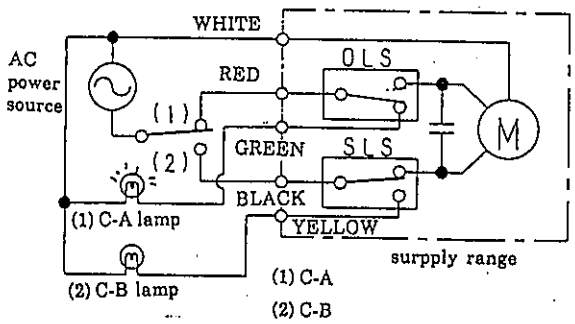


Fig.2

On turning the operating switch to C-B from the state in Fig.2,the current flows between the white lead wire and the black lead wire, causing the output shaft rotates clockwise (when the valve is seen through the bonnet top)
The cam turns off the contact of SLS to C-B the valve, causes the motor to stop.Then C-B lamp is lighting. (See Fig.1)

Here, other components can be moved, setting relay in the substitution of lamp.

(3) During C-A/C-B functions

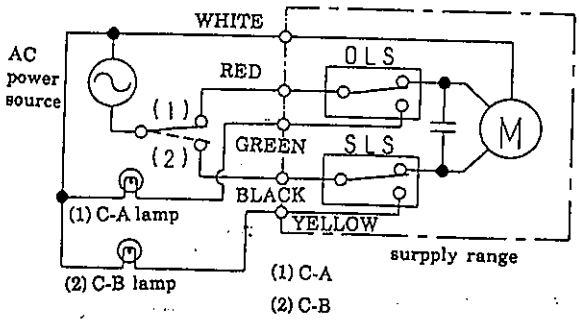


Fig.3

In the case OLS and SLS get set to COM-NC irrespective of the C-A/C-B signals, causing the output shaft to rotate according to the respective signals.

Here, don't make the reverse action during the motion, because the gears are broken down. (See Fig. 3)
(Option K type is connected all ports)

2-2. Option : T (no signal take-off connection)

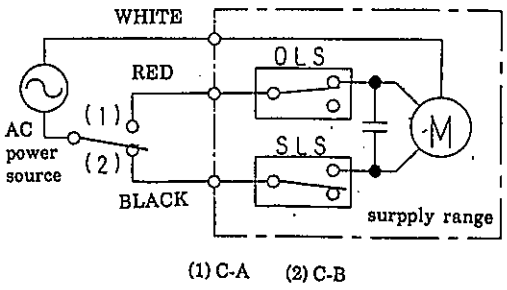


Fig.4

"C-A(flow from C to A) "function

On turning the operating switch to C-A the current flows between the white lead wire and the red lead wire, the output shaft rotates counterclockwise. The cam turns off the contact of OLS to C-A the valve, causes the motor to stop.

"C-B(flow from C to B)"function

On turning the operating switch to C-B the current flows between the white lead wire and the black lead wire, causing the output shaft rotates clockwise.
The cam turns off the contact of SLS to C-B the valve, causes the motor to stop.

2-3. Option : L (with C-A lamp)

C-A lamp of Fig. 1 is built in the terminal box, lamp in the one lights, when "C-A" function ends (C-B → C-A). It has no lighting during the motion.
(The wire is connected as the Option T.)

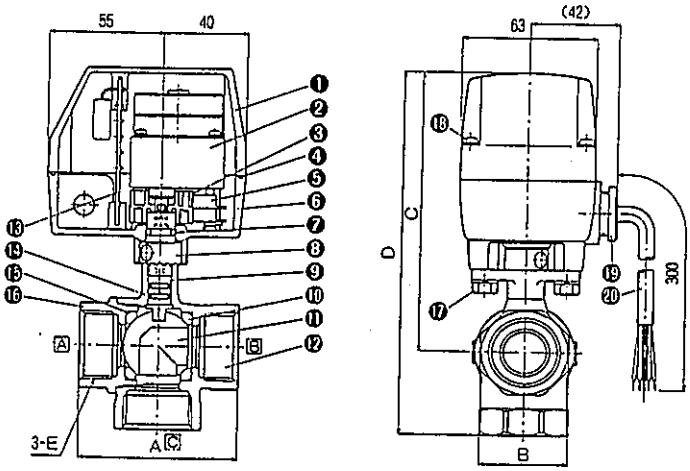
2-4. Option : R (with C-B lamp)

C-B lamp of Fig. 1 is built in the terminal box, lamp in the one lights, when "C-B" function ends (C-A → C-B). It has no lighting during the motion.
(The wire is connected as the Option T.)

3. External dimensions and internal structure

MXG1-15~25
(small connetcting pipe size)

Model name	A	B	C	D	E
MXG1-15	56	28	124.5	152.5	Rc1/2
MXG1-20	65	34	130.5	164.5	Rc3/4
MXG1-25	76	41	133.5	173.5	Rc1



NO	PARTS	MATERIAL
20	Cabtyrecable	
19	Bushing	PF
18	Cross recessed pan head screw	SWCH
17	Hex.head bolt	SWCH
16	Cap	BC6
15	"O" ring	FKM
14	"O" ring ※1	NBR,FKM
13	Circit board	
12	Body	BC6
11	Valve ball ※2	C3771
10	Valve seat	PTFE
9	Shaft	HC10
8	Bush	SUS303
7	"O" ring	NBR
6	Adaptor	ZDC2
5	Microswitch	
4	Gasket	NBR
3	Cam	PA-66
2	Gear motor	
1	Bonnet	ADC12

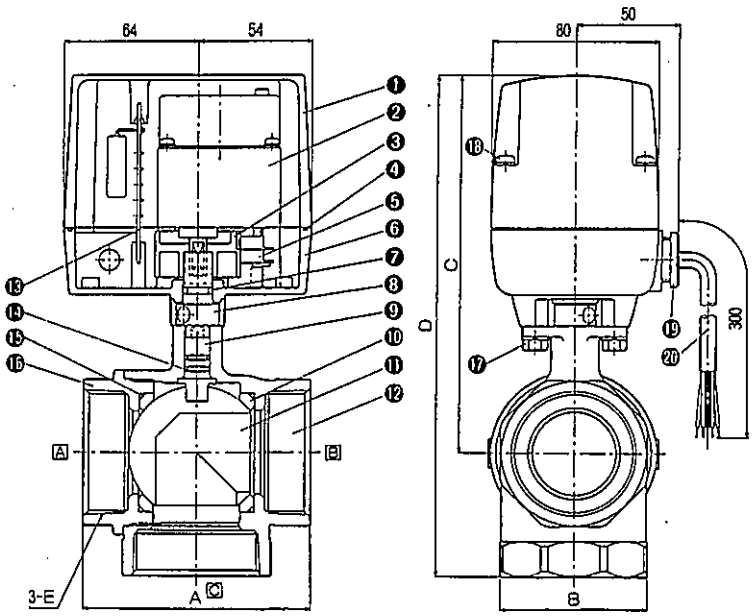
[List of parts]

※1 : Materials of top "O" ring show NBR
bottom FKM.

※2 : The surface has been treated by hard chomium plating.

MXG1-32~50
(large connetcting pipe size)

Model name	A	B	C	D	E
MXG1-32	84	50	166	211	Rc1 1/4
MXG1-40	94	57	172	223	Rc1 1/2
MXG1-50	108	70	181	240	Rc2



NO	PARTS	MATERIAL
20	Cabtyrecable	
19	Bushing	PF
18	Cross recessed pan head screw	SWCH
17	Hex.head bolt	SWCH
16	Cap	BC6
15	"O" ring	FKM
14	"O" ring ※1	NBR,FKM
13	Circit board	
12	Body	BC6
11	Valve ball ※2	C3771
10	Valve seat	PTFE
9	Shaft	HC10
8	Bush	SUS303
7	"O" ring	NBR
6	Adaptor	ZDC2
5	Microswitch	
4	gasket	NBR
3	Cam	PA-66
2	Gear motor	
1	Bonnet	ADC12

[List of parts]

※1 : Materials of top "O" ring show NBR
bottom FKM.

※2 : The surface has been treated by hard chomium plating.

4. Cautions

4-1. Cautions for handling

(1) Avoid using in the atmosphere of explosive gas, corrosive gas, etc.
(2) Do not put heavy things or step on the drive section (unit).
(3) Use within the specified limit of ambient temperature and fluid temperature.
(4) Be sure to observe the operating pressure range and the activating frequency.
(5) Intrusion of solid substances into the valve may damage the valve ball, valve seat and packing ("O" ring), causing internal leakage and external one. So, instal strainer (80 mesh or more) forward of valve. Eliminate such substances before they enter the valve.
(6) Be sure to hold the body when piping work is done (Do not fall the valve to the ground and prevent cables from being strained).
(7) After the valve has not been operated for one day or longer ,there may be the case that the first operation of the valve is delayed.

4-2. Cautions for piping

(1) Install the valve either in vertical or in horizontal position, with the motor unit at the top. Note that the drip-proof property of the valve is effective only for vertical installation.
(2) Carry out piping in the manner shown in the Fig 5.

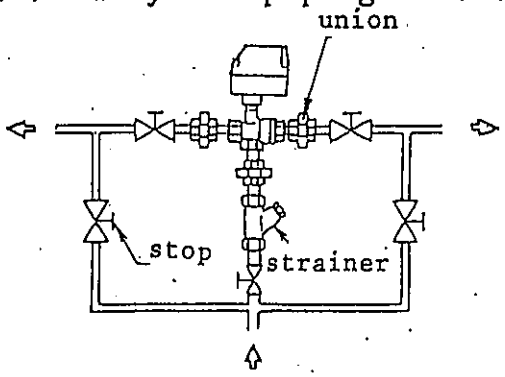


Fig.5

Use union joint or flange joint, and add by-pass piping for easy maintenance and inspection.

(3) Thoroughly remove the foreign substances such as dust, scale, etc, from the pipe line before installing the motor valve. Carry out thorough flushing, since the chips, weld wastes, etc, during piping get caught in the valve seat in the initial stage, causing leakage.

(4) Fix and suspend the pipe firmly, so that the weight and vibration of pipe may not fall directly on the valve.
(5) At places likely to cause the fluid to freeze, take appropriate measure such as warming, etc. in order to prevent freezing.
(6) Provide sufficient space to disassemble for maintenance and inspection. Particularly, Keep the space of 200mm or more on the top of valve, 150mm or more around one, to enable easy removal of the bonnet.
(7) After piping, check the joints for leakage.
(8) Hold the body when piping work at body side is done,and hold the cap when piping work at cap side is done.
(9) When the valve is tightened,please apply the torque indicated on the diagram below.

size of port	torque	
	N.m	kgf·cm
Rc 1/2	42.4	432
Rc 3/4	63.3	646
Rc 1	84.8	865
Rc 1 1/4	98.9	1009
Rc 1 1/2	106.0	1081
Rc 2	134.0	1367

4-3. Cautions for wiring

(1) See to it that the input voltage is within the range of rated voltage ±10%. The valve can be operated both at 50 Hz and 60 Hz.
(2) Make connection as shown in the "Connection Diagram" attached to the bonnet.
(3) When using more than 2 pieces of valves, use relays, etc, to prevent parallel operation. (Fig. 6)
(4) Refrain from using the red and black lead wire select switch, likely to cause the input of signals simultaneously.
(5) Give slack on the lead wire on the bottom, and connect the lead wire so it is not under tension.
(6) Cores of cabtyre cables (yellow and green) should be cut off and insulated when signal connection is not used.

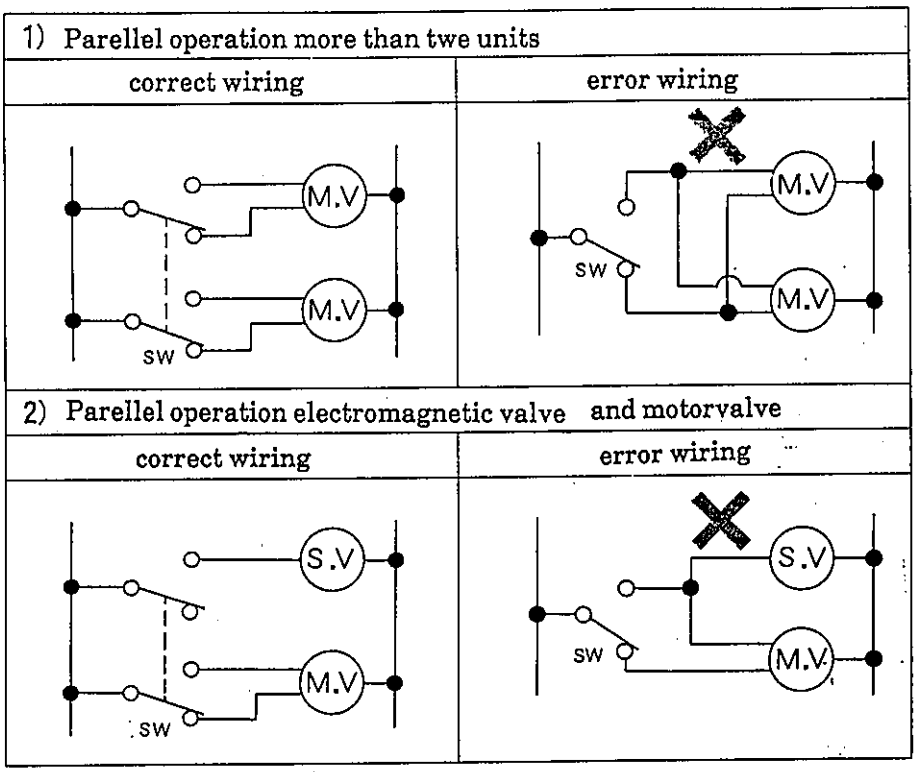


Fig 6

5. Inspection and Maintenace

5-1. Periodical inspection (check)

(1) Carry out periodical inspection, normally once every six months, in order to use the motor valve at optimum state.

(2) Make inspection of the following items.
- (a) Check to see that there is no abnormal noise or abnormal heat at the time of valve operation.
- (b) Check the bolts for slackening.
- (c) Check to see that the power cables are not worn out.
- (d) Check the valve for internal or external leakage.

(3) Cautions for inspection.
- (a) Be sure to turn off the power before inspection.
- (b) After inspection, be sure to carry out megger test to confirm the insulation.
- (c) In case the valve is not operated over a long period, carry out idling periodically to check for abnormalities.

5-2. Replacement

(1) Counsel to the purchaser, when finding malfunction in the inspection. Ball valve, Actuater can be replaced.

(2) Replacement of Actuater

(2)-1. After confirming the location of hole inserting into the Bush, set hole of new actuater to the same location. (Turn on the power supply to the actuater, reffering the connection diagram.)

(2)-2. Turn off the power supply of the previous actuater, and remove the wire.

(2)-3. Actuater and ball valve are separated,removing the Hex. head bolt by monkey wrench as shown in Fig. 7

(2)-4. Mount actuater positioning in (2)-1 on the ball valve to the same location as the direction of replaced actuater.

(2)-5. Fix the actuater with Hex. head bolt of (2)-3.Take care not to damage the cabtyre cable. Mount the actuater on the ball valve, twist and coincide with the thread hole when don't coincide.

(2)-6. Connect the wire, apply the electric signal to see that the valve operate normally for C-A/C-B functions. If valve operation is revase,remount the actuater according to items (3)-4∿7.

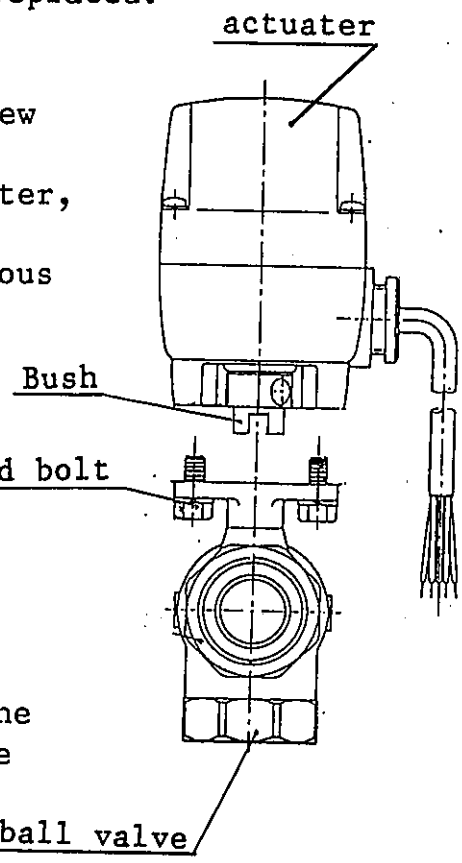


Fig.7

(2)-7. Set the valve to opposite port of valve to check for internal leakage.

(3) Replacement of ball valve

(3)-1. Turn off the power supply, close back and forth valve of ball valve.

(3)-2. As (2)-3, actuater and ball valve are separated, removing the Hex. head bolt by monkey wrench. Take care not to damage the cabtyre cable. Remember the port position of ball valve, the direction and the location of hole of bush in actuater.

(3)-3. Replace the ball valve, removing the pipe round one. (Set the ball valve to the same direction)

(3)-4. Turn on the white lead wire and black lead wire and see the motor to stop. (Set C-B)

(3)-5. See new ball valve C-B. Mount the actuater on the ball valve, twist, set C-B condition, when not C-B.

(3)-6. Mount the actuator on the ball valve. (Take care of the direction)

(3)-7. Fix the actuater with the Hex. head bolt of (3)-2. Mount the one the ball valve, twist and coincide with the thread hole, when don't conicide. Take care not to damage the cabtyre cable.

(3)-8. Apply the electric signal to see that the valve operates normally for C-A/C-B function.If valve operation is revase,remount the actuater according to items (3)-4∿7.

(3)-9. Cheak the leakage of opposite port of valve.

5-3. Troubleshooting

In case the motor valve fails to function and dose not meet the requirements, carry out inspections according to the Table below.

TROUBLE	CAUSES	COUNTERMEASURES
Fails to activate	Power not ON	See the wire, fuse, and turn the power to ON
	Less than rated voltage	See the power and supply rated voltage
	Foreign substance caught in the valve	Check the inside of valve, and eliminate the cause. Replace the fall valve according to 5-2. Replacement
	Locking of valve seat	
	Simultaneous input of C-A/C-B functions.	Make reconnection to enable C-A/C-B change-over
	Trouble in actuater	Replace the actuater according to 5-2. replacement
Valve activates, but fails to function normally (Actuater vibrates, or stops on the way)	Parallel operation of more than 2 units valves(fig 6)	Use relays, etc. to avoid parallel operation(fig 6)
	Reverse connection of C-A and C-B	Make correct connetction
	Foreign substance caught in the valve	Check the inside of valve, and eliminate the cause. Replace the ball valve according to 5-2. Replacement.
	Locking of valve seat	
Motor moves, but valve fails to do	Damage, or life of gear-head	Check the inside of valve, and see foreign substance caught in the valve. Replace actuater when normal in the one, do valve when abnormal
Leakage	Foreign substance caught in the valve	Replace the ball valve according to 5-2. Replacement
	Wear of valve seat	
	Short time of current flow	Pass the current for the time longer than the time specified in the catalog

In case the trouble is serious and is difficult to settle, confirm the trouble(s) in the above Table, and inform the type, size, and fluid conditions to CKD or out dealers through the store at which you purchased the CKD product.