CKD

INSTRUCTION MANUAL

SERIAL TRANSMISSION TYPE

$$MN\frac{3}{4}GA\frac{1}{2}\text{-T7D1}$$

$$MN4GB\frac{1}{2}\text{-T7D1}$$

● Please read this instruction manual carefully before using this product, particularly the section describing safety.

● Retain this instruction manual with the product for further consultation whenever necessary.

CKD Corporation

For Safety Use

To use this product safety, basic knowledge of pneumatic equipment, including materials, piping, electrical system and mechanism is required (to the level pursuant to JIS B 8370 Pneumatic System Rules).

We do not bear any responsibility for accidents caused by any person without such knowledge or arising from improper operation.

Our customers use this product for a very wide range of applications, and we cannot keep track of all of them. Depending on operating conditions, the product may fail to operate to maximum performance, or cause an accident. Thus, before placing an order, examine whether the product meets your application, requirements, and how to use it.

This product incorporates many functions and mechanisms to ensure safety. However, improper operation could result in an accident. To prevent such accidents, **read this instruction manual carefully for proper operation.**

Observe the cautions on handling described in this manual, as well as the following instructions:

⚠ PRECAUTIONS

● Incorrect address settings of serial transmission slave stations could cause the solenoid valve and the cylinder to malfunction.

● For operation if serial transmission slave stations, read the communication system operation manual carefully.

● Do not touch electric-wiring connections (exposed live parts): this will cause an electric shock. During wiring, keep the power off. Also, do not touch these live parts with wet hands.

● This product does not meet the surge immunity requirements specified in EN61000-4-5 for CE marking. Please provide appropriate protective measures against lightning surges on the device side.

● When the valve power is turned on (i.e., at power-up), the valve lamp may light up momentarily. However, the valve itself is not turned on or off as a result of this.

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MN4G※※-T7D1
Serial Transmission Type
Manual No.   SM-270773-A

NOTE : Letters & figures enclosed within Gothic style bracket
(examples such as [C2-4PP07] · [V2-503-B] etc.) are editorial
symbols being unrelated with contents of the book.

1. PRODUCT

1.1 General outline of the system

MN4G※※-T7D1

1) The MN4G※※-T7D1 is a solenoid valve mounted with a slave station (OPP4-1D) which can be connected to the open field network DeviceNet and to the CompoBus/D, made by OMRON Corporation, which works with the DeviceNet.

    (1) It helps to curtail wiring man-hours since only the DeviceNet cable is required to connect it to a PLC.

    (2) The slave station (OPP4-1D) for the solenoid valve has 16 output points and can be connected to a maximum of 63 stations per master unit, made by Omron Corporation (when a configurator is used).

    (3) The HOLD/CLEAR switch can be used to hold the output signal during a communication fault or selected to turn OFF all points.

    (4) The communication speed can be set to : 125k, 250k, 500k bps.

2) What are DeviceNet and CompoBus/D?

The DeviceNet and CompoBus/D configure a multi-vendor network of a multiple bit system where the control and information of the Machine/Line control level exist together. The DeviceNet is maintained and controlled by ODVA (Open DeviceNet Vendor Association) and the CompoBus/D is used as a network made by Omron Corporation to work with the DeviceNet.

NOTE) Be sure to read the User's Manual.

This manual mainly describes the MN4G※※-T7D1 and the slave station OPP4-1D. Also, read the User's Manual for the master station and other slave stations to be connected to this system.

In addition, regarding the manifold solenoid valve, please read this manual and the above manuals carefully to fully understand the functions and performance of the product to be able to use it properly.

1.2 Structure of the System

This system chiefly consists of PLC body, Master unit, Solenoid valve MN4G※※-T7D1 and peripheral equipment.

● Combination of PLC and Master unit

PLC maker	Compatible CPU	Type of Master unit
OMRON Corporation	CVM1 / CV	Model CVM1-DRM21-V1
	C200HS C200HX / HG / HE	Model C200HW-DRM21-V1
Other equipment compatible with DeviceNet		

● Fundamental structure of system

Manifold solenoid valve
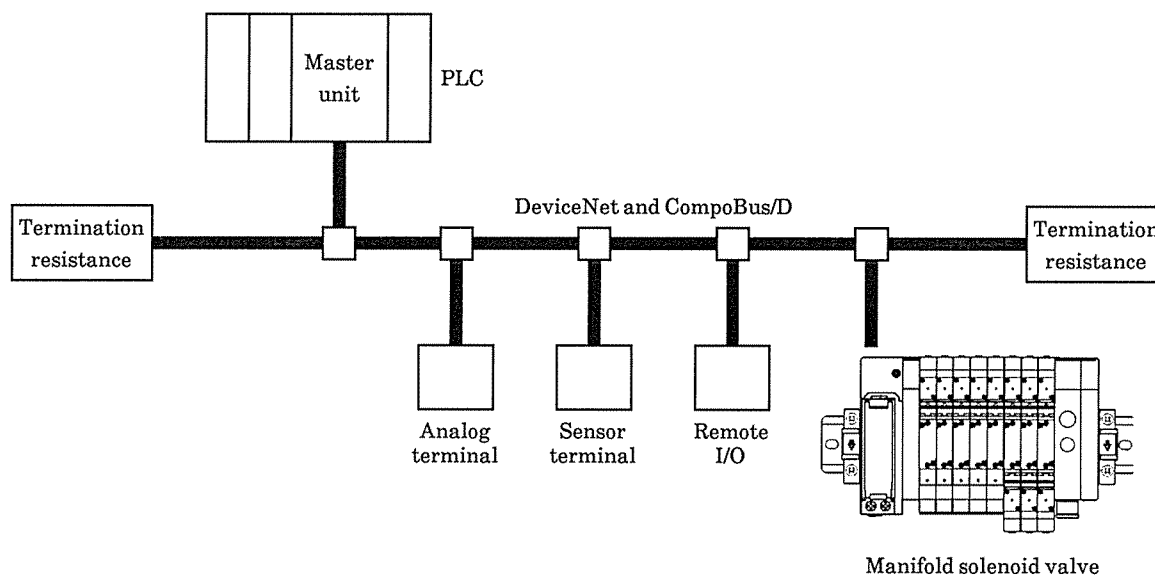
1.3 Specifications

1) Specification of solenoid valve

(1) Specification of Manifold

Item	Specification	
	MN4G※1 series	MN4G※2 series
Installation using a manifold	DIN rail mounting type	
Applicable solenoid valve	MN4G※1 series	MN4G※2 series
№ of stations	2 to 8 (16 stations Max. for single valve)	
Supply / Exhaust	Centralized supply/exhaust (with built-in exhaust-induced error prevention valve)	
Ambient temperature ℃	−5 - 55	
Atmosphere	Operation in the presence of corrosive gas not allowed	
Media temperature ℃	5 - 55	
Port size — Supply Port (P) Exhaust Port (R)	Push in joint $\phi6$, $\phi6.4$ and $\phi8$	Push in joint $\phi8$ and $\phi10$
Port size — Cylinder port (A ·B)	Push in joint $\phi4$ and $\phi6$ M5 (A type)	Push in joint $\phi6$ and $\phi8$、 Rc1/8 (A type)
Port size — External pilot port (PA · Option)	Push in joint	

(2) Electrical specifications

Model / Item	MN4G※1 series						
	4-port valve					3-port valve	
	2-position		3-position			2-position	
	Single	Double	All ports blocked	ABR connection	PAB connection	Normal close	Normal open
	N4G※110	N4G※120	N4G※130	N4G※140	N4G※150	N3GA110	N3GA1110
Media	Compressed air						
Valve configuration	Pilot soft spool						
Minimum working pressure MPa	0.2						
Maximum working pressure MPa	0.7						
Proof pressure MPa	1.05						
Effective sectional area mm²	4.0		4.5	4.0	4.5	4.0	
Responese time (Note1) ms	12	9	8			12	
Lubrication	Not required (Use Turbine oil Class 1, ISO, VG32 if and when lubrication is needed)						
Protection rating	Dust proof						
Manual override	Allows a non-lock type operation (push and release) as well as a lock type (push and lock) operation.						

Note 1 : The response time shows a value when the product is turned ON with a supply pressure of 0.5 MPa and lubrication not made. This value may vary depending on the pressure and the quality of oil to be supplied.

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Model	MN4G※2 series						
	4-port valve					3-port valve	
	2-position		3-position			2-position	
	Single	Double	All ports blockde	ABR connection	PAB connection	Normal close	Normal open
Item	N4G※210	N4G※220	N4G※230	N4G※240	N4G※250	N3GA210	N3GA2110
Media	Compressed air						
Operating method	Pilot soft spool						
Min. working pressure MPa	0.2						
Max. working pressure MPa	0.7						
Proof pressure MPa	1.05						
Effective sectional area mm²	9.0		10.0	9.0	10.0	9.0	
Responese time (Note 1) ms	19	18	30			19	
Lubrication	Not required (Use Turbine oil Class 1, ISO, VG32 if and when lubrication is needed)						
Protection rating	Dust proof						
Manual override	Allows a non-lock type operation (push and release) as well as a lock type (push and lock) operation.						

Note 1 :   The response time shows a value when the product is turned ON with a supply pressure of 0.5 MPa and lubrication not made. This value may vary depending on the pressure and the quality of oil to be

(3)   Electrical specifications

Item		Specifications
Rated voltage (V)		24
Holding current (A)		0.025 (DC24V)
Power consumption (W)		0.6
Allowable fluctuation from rated voltage		+10%, −5%
Heat-proof class		B
Surge absober		Standard device
Indicator		With lamp

The holding current and power consumption show values when the product is equipped with the lamps.

2)   Transmission specifications

Item	Specification			
Communication protocol	Conforms to DeviceNet			
Transmission speed	500k / 250k / 125k bps (Selectable)			
Communication media	Private 5-wire cable (2-wire for signal system, 2-wire for power source system, 1-wire for shield)			
Transmission distance	Transmission speed	Max. network length	Branch line length	Total branch line length
	500k bps	100m or less ※2	6m or less	39m or less
	250k bps	250m or less ※2	6m or less	78m or less
	125k bps	500m or less ※2	6m or less	156m or less
Power source for communication	DC24V ±10% is supplied from an external unit.			
Error control	CRC error			

※2 Indicates values when a thick private cable is used. The value is less than 100 m in cases where a thin private cable is used.
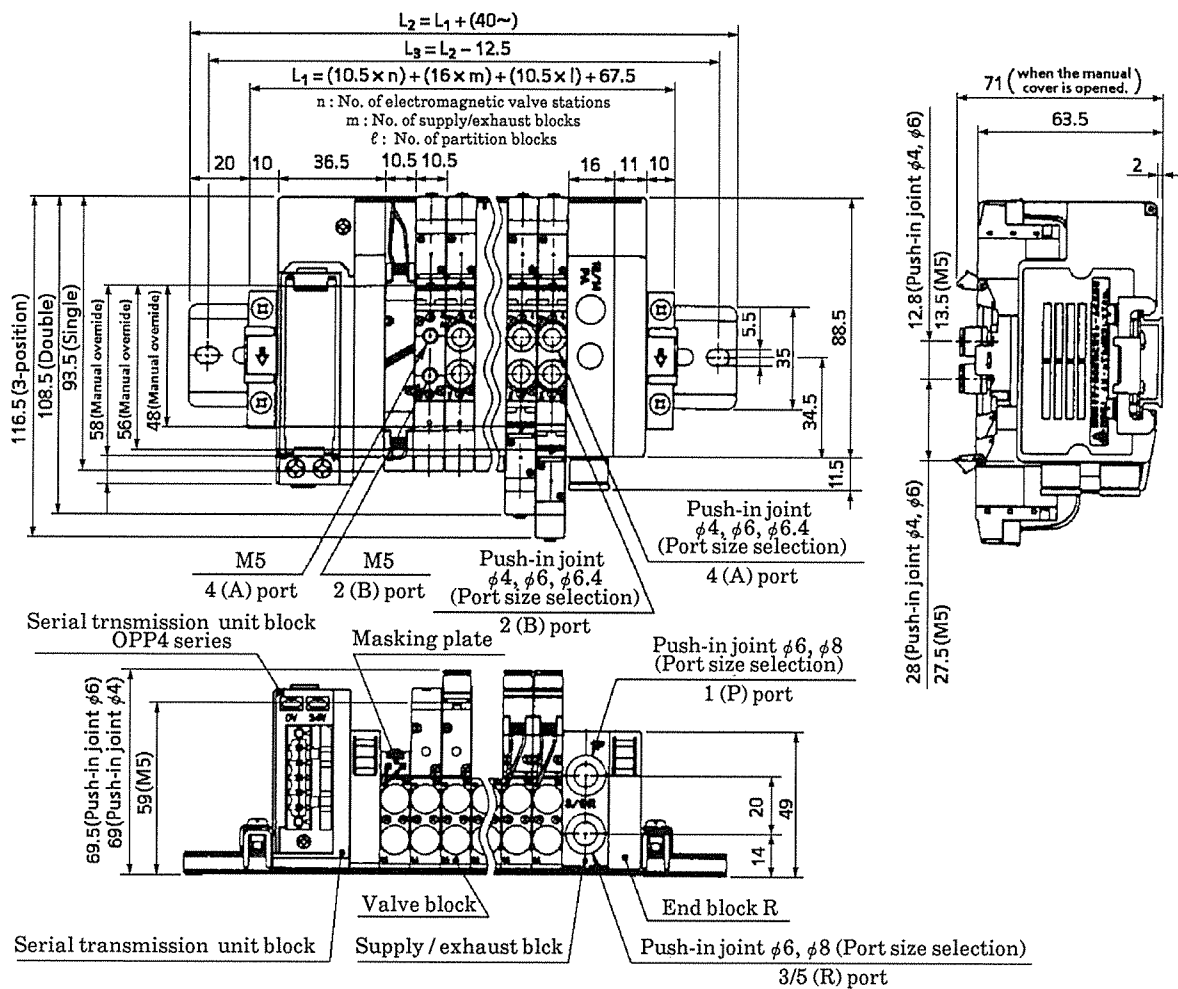
3) Slave station specification

Item		Specifications
Power supply voltage		DC22.8V to 26.4V (DC24V +10%, −5%)
Current consumption		110 mA or lower (Except for load current)
Communication power voltage		DC11V to 25V
Communication current consumption		50mA or lower
Insulation resistance		Over 30M ohm between the external terminal batch and case measured by DC500V megger.
Withstanding voltage		Between all external terminals in a lump and Case AC500V for 1 minute
Noise resistance		600Vp-p　Pulse width 100msec, 1 μsec
Mechanical vibration proof	Durability	10Hz to 150Hz to 10Hz　1 octave/min. 15 sweeps in the 3 each axis of X, Y and Z while the half amplitude is 0.75mm or 10G whichever smaller.
	Malfunction	10Hz to 150Hz to 10Hz　1 octave/min. 4 sweeps in the 3 each axis of X, Y and Z while the half amplitude is 0.5mm or 7G whichever smaller.
Mechanical shock proof		30G　3 directions　3 times
Ambient temperature		0 to 55°C
Ambient humidity		30 to 85%RH (No dew fall)
Atmosphere used		No corrosive gas
Object of communication		DeviceNet and Compobus/D
Transmission speed		500k / 250k / 125k bps (Selectable by switch)
No. of output points		16 points
Output insulation type		Photo coupler insulation
Max. load current		40mA/1 point
Leakage current		0.1mA or lower
Residual voltage		0.5V or lower
Fuse		24V　1A
Indication of operation		LED (Power and communication status only)
No. of nodes occupied by slave		1 node

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Discontinue

1.4 External dimensions of solenoid valve

● MN4GA1※0-※-※T7D1-※

$L_2 = L_1 + (40\sim)$

$L_3 = L_2 - 12.5$

$L_1 = (10.5 \times n) + (16 \times m) + (10.5 \times l) + 67.5$

n : No. of electromagnetic valve stations
m : No. of supply/exhaust blocks
ℓ : No. of partition blocks

20 10   36.5   10.5 10.5   16 11 10

116.5 (3-position)
108.5 (Double)
93.5 (Single)
58 (Manual overide)
56 (Manual overide)
48 (Manual overide)

5.5
35
88.5
34.5
11.5

71 (when the manual cover is opened.)
63.5
2

12.8 (Push-in joint φ4, φ6)
13.5 (M5)
28 (Push-in joint φ4, φ6)
27.5 (M5)

M5
4 (A) port

M5
2 (B) port

Push-in joint φ4, φ6, φ6.4 (Port size selection)
2 (B) port

Push-in joint φ4, φ6, φ6.4 (Port size selection)
4 (A) port

Push-in joint φ4, φ6, φ6.4 (Port size selection)

Serial trnsmission unit block OPP4 series

Masking plate

Push-in joint φ6, φ8 (Port size selection)
1 (P) port

69.5 (Push-in joint φ6)
69 (Push-in joint φ4)
59 (M5)

20
49
14

Serial transmission unit block

Valve block

Supply / exhaust blck

End block R

Push-in joint φ6, φ8 (Port size selection)
3/5 (R) port

● MN4GB2※0-※-※T7D1-※

$$L_2 = L_1 + (40\sim)$$

$$L_3 = L_2 - 12.5$$

$$L_1 = (16 \times n) + (18 \times m) + (10.5 \times l) + 70$$

n : No. of electromagnetic valve stations
m : No. of supply/exhaust blocks
ℓ : No. of partition blocks

20 10 36.5 16 16 18 13.5 10

139 (3-position)
127 (Double)
119 (Single)
78.5 (Manual override)
75 (Manual override)
67 (Manual override)
2.5

9.5
5.5
35
95.5
41.5

74.5
2

12 (Push-in joint $\phi8$)
17 (Push-in joint $\phi10$)

Masking plate
Serial trnsmission unit block
OPP4 series

Push-in joint $\phi8$, $\phi10$
(Port size selection)
3/5 (R) port

63
14.4 17

25
60.5
17

Serial transmission unit block
Push-in joint $\phi6$, $\phi8$
(Port size selection)
2 (B) port
Push-in joint $\phi6$, $\phi8$
(Port size selection)
4 (A) port

Valve block
Supply / exhaust blck

End block R
Push-in joint $\phi8$, $\phi10$ (Port size selection)
3/5 (R) port

[SM-270773-A]

1

PRODUCT

1.5 Slave station for valve

1) Appearance
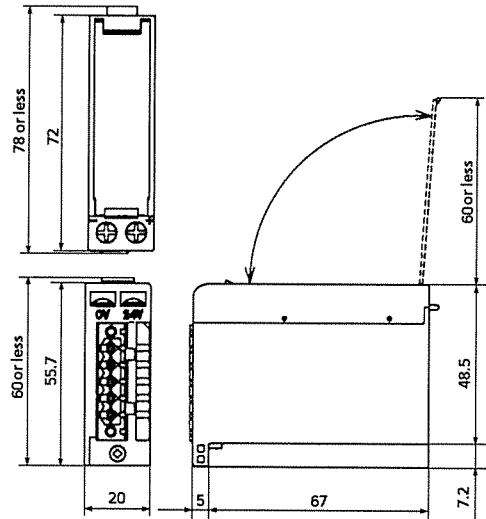
2) Indicators and switches on Slave station
  (1) Various LED lamps are installed in front of station to aid visual varification of operational conditions. Each function is printed on the sheet made of resin. The content of each function is posted in the table below. Make use of them during maintenance works or for varification of operation.
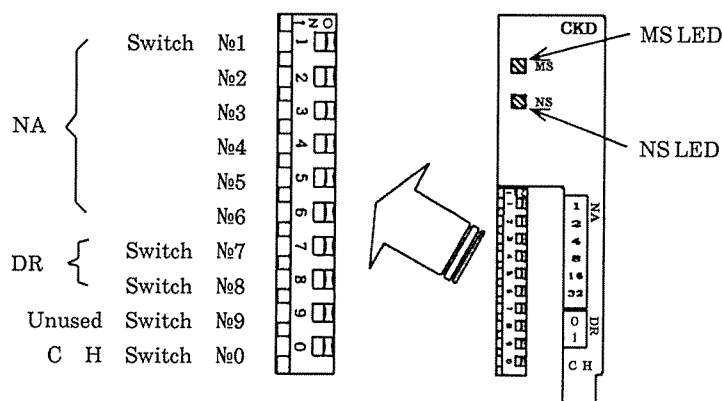
Name of switch	Content of Setting
NA Switch №1~6 (Node address setting switch)	Sets the slave station address in the 0 to 63 range.
DR Switch №7, 8 (Transmission speed setting switch)	Sets the transmission speed for the master unit.
C H Switch №0 (Output mode setting switch)	Selects whether to hold (H) or clear (C) the output data status when a communication error occurs.

Name of LED	Content of indication
MS (Module status)	Indicates the slave station status using green and red LEDs. Indicates fault status in combination with "NS LED" For details, refer to [5.1 Abnormality and Corrective Action of Slave Station].
NS (Network status)	Indicates the network status using green and red LEDs. Indicates fault status in combination with "MS LED" For details, refer to [5.1 Abnormality and Corrective Action of Slave Station].

  (2) setting switch used to set the node address and transmission speed, etc. of the slave station for the valve. (Refer to "Chapter 3. Operation".)
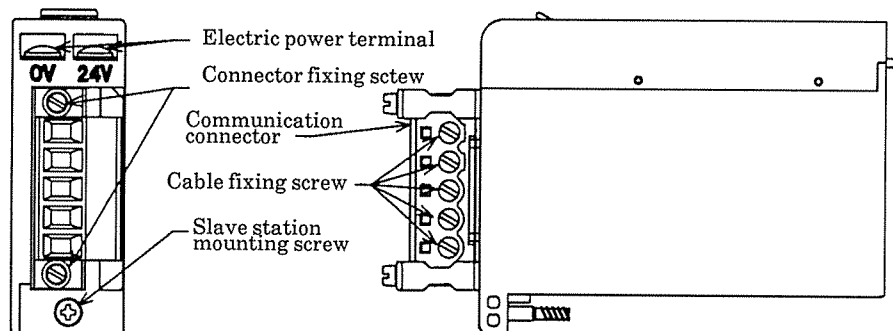
⚠ CAUTION :
• Before changing the switch positions, be sure to cut the power (including the communication power).
• The cover of the slave station unit for the solenoid valve system can easily be opened and closed. Keep the cover closed except when you have to change switch positions or reconnect wires. If you keep the cover open unnecessarily, foreign matter may enter the circuit board causing an unexpected failure, or the cover may be broken by accidental contact. While the cover is open as you change switch positions or reconnect wires, be careful not to cause the entry of foreign matter.
• Setting switch has been precisely built. Disorderly handling may cause damage of switch. To set station number, never touch internal circuit printed board.

1.6 Mounting of Slave station for valve and Removal of Slave station for valve

The slave station unit OPP4-1D is normally secured by a retainer to the DIN rail (next to the solenoid valve manifold) and connected with the solenoid valve manifold by a connector (plug and socket). If you have to dismount the slave station unit from the DIN rail when you connect signal and power cables, for example, follow the procedure below:

Electric power terminal
Connector fixing sctew
Communication connector
Cable fixing screw
Slave station mounting screw

OV 24V

1) Slave Station Mounting Method
① Turn OFF the slave station power and communication power.
② Set slave station No., transfer rate and output at abnormal communication.
③ Fix the power line and communication connector securely.
④ Holding the slave station, insert it into the slave station connecting block slowly from forward along the guide.
⑤ Ensuring the connecting block was connected with each other, tighten the slave station fixing screw firmly. (Adequate tightening torque: 0.5 N·m)
⑥ After checking for safety, turn the slave station power switch "ON".

⚠ CAUTION :   • Before turning the slave station power ON, check the slave station address, transfer rate and output setting during abnormal communication.

2) To Remove Slave Station:
① After checking the safety, turn OFF the slave station power and communication power.
② Detach the slave station fixing screw.Since the slave station fixing screw is a fall preventive one, stop loosening it where it is detached from the slave station connecting block.
③ Holding the slave station, pull it toward the operator side.
④ After checking that the slave station power and communication power have been turned OFF, disconnect the power cable and communication connector.

⚠ CAUTION :
- Avoid pulling out the slave station while pulling the cable or connector; otherwise, broken circuit and damage may result.
- Touching the electrical wiring connection part (bare live part) may cause an electric shock.

Slave station coneection cable

Guide   Mounting

Mounting

— 11 —
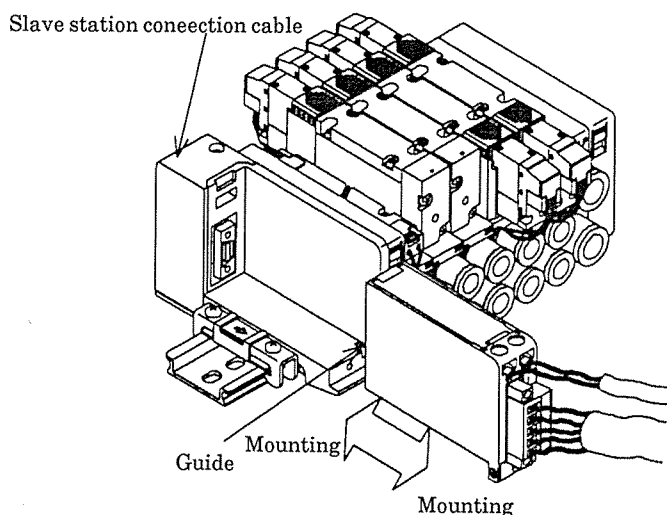
The following are the functional explanation of each terminal and main places to which the terminal is connected.
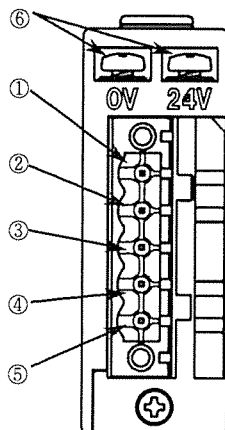
	Symbol	Function	Objects to be connected	Indicated Cable Color	
①	V−	Communication power (−)	Apply source of power with less noise, such as DC11V to 25V.	Black	
②	CAN L	Communication terminal (L)	Connect this terminal to the master or other slave communication line "CAN L".	Blue	
③	Drain	Drain terminal	Drain cable		
④	CAN H	Communication terminal (H)	Connect this terminal to the master or other slave communication line "CAN H".	White	
⑤	V+	Communication power (+)	Apply source of power with less noise, such as DC11V to 25V.	Red	
⑥	Power input	Slave station power supply (including load power supply)	Apply source of power with less noise, such as DC24V±10% and -5%.	(24V)	
				(0V)	

2. CAUTION

1) Output transmission delay time

For the delay time, refer to the User's Manual for the master station.

The delay in transmission time of the system depends on the scanning time of the PLC body and other equipment which will be connected to the same network.

Solenoid valve responding time, of course, varies depending on model. It is advisable of referring to valve specification.

As for OFF time, there is another delay factor of approx. 20ms due to fly-wheel diode being used for surge absorbing circuit to valve slave station.

[SM-270773-A]

3. OPERATION

3.1 Switch setting

The setting switches are used to set three kinds of functions, node address, transmission speed, and output mode if the communication error occurs. Since the function may vary depending on the switch positions, always carefully check the switch positions during setup work.

> ⚠ **CAUTION :**
> - Always set the switches with the slave station power (including the communication power) turned OFF.
> - The cover of the slave station unit for the solenoid valve system can easily be opened and closed. Keep the cover closed except when you have to change switch positions or reconnect wires. If you keep the cover open unnecessarily, foreign matter may enter the circuit board causing an unexpected failure, or the cover may be broken by accidental contact. While the cover is open as you change switch positions or reconnect wires, be careful not to cause the entry of foreign matter.
> - Setting switch has been precisely built. Disorderly handling may cause damage of switch. To set station number, never touch internal circuit printed board.

1) Setting the node address
   Set the node address of the slave station in the 0 to 63 range.
   (It is not possible to set duplicated node addresses.)

Node address	Switch No.					
	6(32)	5(16)	4(8)	3(4)	2(2)	1(1)
0	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
∫			∫			
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

0 : OFF   1 : ON   Value in ( ) is indicated on the sheet.

Example To set the node address to "50" :

$$50 = 32 \cdot (1) + 16 \cdot (1) + 8 \cdot (0) + 4 \cdot (0) + 2 \cdot (1) + 1 \cdot (0)$$

According to the above formula, turn ON the switch Nos. 6, 5, and 2, and turn OFF other switches (Nos. 4, 3, and 1).

2) Setting the Transmission Speed
Set the transmission speed for the master unit.

Transmission speed	Switch No.	
	7 (DR0)	8 (DR1)
125kbps	0	0
250kbps	1	0
500kbps	0	1
Cannot be set.	1	1

0 : OFF   1 : ON   ( ) is indicated on the sheet.

⚠ CAUTION : • Set the same transmission speed as that set for all nodes (master and slave stations) on the network. If the transmission speed is set incorrectly, salve stations with a transmission speed different from that of the master station cannot only be communicated, but also cause the communication error to occur in the communication between nodes with the correct transmission speed set.

3) Setting the Output Mode
The output data status if the communication error occurs in this product is set as shown below.

	Switch No. (C H)	Content of Setting
CLEAR	0	Used to clear to "0" all the output data from the master station in case of a communication error.
HOLD	1	Used to hold the output data in the status immediately before the data is output from the master station in case of a communication error.

⚠ CAUTION : • If the switches are set with the power turned ON, the set contents may not be recognized correctly. Always set the switches with the salve station power (including the communication power) turned OFF.

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3.2 Correspondence between Output Nos. and internal connector Nos.

Those Numbers correspond as per table, posted below.

Output point No.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Internal connector pin No.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

3.3 Correspondence between Output Nos. and valve solenoid

(1) Connector pin Nos. and manifold solenoid correspond with each other as per tables posted below.

(2) Manifold block number is allocated from leftmost block toward right while holding piping port facing to you, regardless the location of wiring block.

Manifold block Nos.	1st block	2rd block	3st block	......	nth block
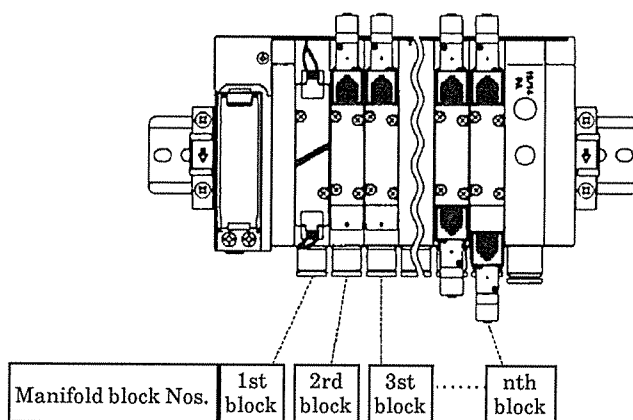
<u>Manifold wiring example</u>
- For Single solenoid valve

	Connector pin No.															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1st station	○															
2nd station		○														
3rd station			○													
4th station				○												
5th station					○											
6th station						○										
7th station							○									
8th station								○								
9th station									○							
10th station										○						
11th station											○					
12th station												○				
13th station													○			
14th station														○		
15th station															○	
16th station																○
Symbol	○ SOL. (a) side															

(Corresponds with up to the 16th manifold block.)

∘ For Double solenoid valve

	Connector pin No.															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1st block	○	●														
2nd blk			○	●												
3rd blk					○	●										
4th blk							○	●								
5th blk									○	●						
6th blk											○	●				
7th blk													○	●		
8th blk															○	●
9th blk																
10th blk																
11th blk																
12th blk																
13th blk																
14th blk																
15th blk																
16th blk																
Symbol	○ SOL. (a) side / ● SOL. (b) side															

(Corresponds with up to the 8th manifold block.)

∘ For Mixed (Single and Double) solenoid valve

	Connector pin No.															
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1st block	○															
2nd blk		○														
3rd blk			○	●												
4th blk					○	●										
5th blk							○									
6th blk								○								
7th blk									○	●						
8th blk											○					
9th blk												○				
10th blk													○	●		
11th blk															○	●
12th blk																
13th blk																
14th blk																
15th blk																
16th blk																
Symbol	○ SOL. (a) side / ● SOL. (b) side															

(Corresponds woth up to the 16th manifold block.)

3) Output pin No. sometimes become vacant depending upon manifold valve block number due to the sequential wiring. Such vacant pin is not available to be used for driving any other equipment.

3.4 Programming

This slave station is handled as a slave station with 16 output points occupying one node. When creating a program, see the User's Manual (programming section) prepared by the PLC manufacturer.

3.5 Device Profile

When connecting to a master station other than that made by OMRON Corporation, ensure you understand the following device profile before use.

Device Profile

General Device Data	Conforms to DeviceNet Specification	Volume I - Release 1.3 Volume II - Release 1.3	
	Vendor Name	CKD Corporation	Vendor ID = 201
	Device Profile Name	Slave : Generic	Profile No. = 0
	Product Catalog Number	Manual Number (SM-215017)	
	Product Revision	1.1	
Physical Conformance Data	Network Power Consumption	DC24V 50mA or lower	
	Connector Style	Open-Hardwired (Terminal strip)	
	Isolated Physical Layer	YES	
	LEDs Supported	Module Network	
	MAC ID Setting	DIP Switch	
	Default MAC ID	1	
	Communication Rate Settong	DIP Switch	
	Communication Rates Supported	125kbit/s, 250kbit/s, 500kbit/s	
Communication Data	Predefined Master/Slave Connection Set	Server for group 2 only	
	Dynamic Connections Supported (UCMM)	NO	
	Fragmented Explicit Messaging Implemented	YES	

DeviceNet Required Object Implementation
● Identity Object (0x01)

Object Class	Attributes	None Supported
	Services	None Supported

Object Instance	Attributes	ID Description	Get	Set	Value Limit
		1 Vendor	○	×	201
		2 Product type	○	×	0
		3 Product code	○	×	20
		4 Revision	○	×	1.1
		5 Status (bits supported)	○	×	Bit 0 only
		6 Serial number	○	×	Every unit
		7 Product name	○	×	OPP2-1D
		8 State	×	×	
	Services	DeviceNet Services	Parameter Options		
		05H Reset	NO		
		0EH Get attribute Single	NO		

● Message Router Object (0x02)

Object Class	Attributes	None Supported
	Services	None Supported
Object Instance	Attributes	None Supported
	Services	None Supported
Vendor Specific Additions		NO

● DeviceNet Object (0x03)

Object Class	Attributes	None Supported
	Services	None Supported

Object Instance	Attributes	ID Description	Get	Set	Value Limit
		1 MAC ID	○	×	
		2 Baud rate	○	×	
		3 BOI	○	×	00H
		4 Bus-off counter	×	×	
		5 Allocation information	○	×	
		6 MAC ID switch changed	×	×	
		7 Baud rate switch changed	×	×	
		8 MAC ID switch value	×	×	
		9 Baud rate switch value	×	×	
	Services	DeviceNet Services	Parameter Options		
		0EH Get Attribute Single	NO		
		4BH Allocate Master/Slave Connection Set	NO		
		4CH Release Master/Slave Connection Set	NO		

— 19 —

Discontinue

● Connection Object (0x05)

Object Class	Attributes	None Supported
	Services	None Supported
	Total Active Connections Possible	1

Object Instance 1	Section	Information	Max Instance		
	Instance Type	Explicit Message	1		
	Production Trigger	Cyclic			
	Transport Type	Server			
	Transport Class	3			
	Attributes	ID Description	Get	Set	Value Limit
		1 State	○	×	
		2 Instance type	○	×	00H
		3 Transport class trigger	○	×	83H
		4 Produced connection ID	○	×	
		5 Consumed connection ID	○	×	
		6 Initial comm. Characteristics	○	×	21H
		7 Produced connection size	○	×	0D00H
		8 Consumed connection size	○	×	0D00H
		9 Expected packed rate	○	○	
		12 Watchdog time-out action	○	×	01
		13 Produced connection path length	○	×	00
		14 Produced connection path	○	×	
		15 Consumed connection path length	○	×	00
		16 Consumed connection path	○	×	
		17 Production inhibit time	○	×	00
	Services	DeviceNet Services	Parameter Options		
		05H Reset	NO		
		0EH Get_Attribute_Single	NO		
		10H Set_Attribute_Single	NO		

	Section	Information	Max Instance		
	Instance Type	Polled I/O	1		
	Production Trigger	Cyclic			
	Transport Type	Server			
	Transport Class	2			
Object Instance 2	Attributes	ID Description	Get	Ser	Value Limit
		1 State	○	×	
		2 Instance type	○	×	01H
		3 Transport class trigger	○	×	82H
		4 Produced connection ID	○	×	
		5 Consumed connection ID	○	×	
		6 Initial comm. Characteristics	○	×	01H
		7 Produced connection size	○	×	0000H
		8 Consumed connection size	○	×	0200H
		9 Expected packed rate	○	○	
		12 Watchdog time-out action	○	×	00
		13 Produced connection path length	○	×	00
		14 Produced connection path	○	×	—
		15 Consumed connection path length	○	×	06
		16 Consumed connection path	○	× 20_04_24_01_30_03	
		17 Production inhibit time	○	×	06
	Services	DeviceNet Services	Parameter Options		
		05H Reset	NO		
		0EH Get_Attribute_Single	NO		
		10H Set_Attribute_Single	NO		

3
OPERATION

Section		Information	Max Instance		
	Instance Type	Bit Strobed I/O	1		
	Production Trigger	Cyclic			
	Transport Type	Server			
	Transport Class	2			
	Attributes	ID Description	Get	Set	Value Limit
Object Instance 3		1 State	○	×	
		2 Instance type	○	×	01H
		3 Transport class trigger	○	×	82H
		4 Produced connection ID	○	×	
		5 Consumed connection ID	○	×	
		6 Initial comm. Characteristics	○	×	01H
		7 Produced connection size	○	×	0000H
		8 Consumed connection size	○	×	0800H
		9 Expected packed rate	○	○	
		12 Watchdog time-out action	○	×	00
		13 Produced connection path length	○	×	00
		14 Produced connection path	○	×	
		15 Consumed connection path length	○	×	00
		16 Consumed connection path	○	×	20_04_24_01_30_03
		17 Production inhibit time	○	×	00
	Services	DeviceNet Services	Parameter Options		
		05H Reset	NO		
		0EH Get_Attribute_Single	NO		
		10H Set_Attribute_Single	NO		

4. INSTALLATION

4.1 Method of Wiring

In order for the MN4G※※-T7D1 to function, it is necessary to connect the communication line (device net cable) and the power line. If these lines are not properly connected, the MN4G※※-T7D1 may not only function improperly but may also cause serious problems to other equipment being used at the same time. Read both this manual and each User's Manual for the PLC and other units before use, and connect them properly.

1) Communication line

This system uses a private device net cable as the communication line. The following are the recommended cables.

Model	Specification	Makers
Model DCA2-5C10	Thick cable, 5-wire, 100 m	OMRON Corporation
Model DCA1-5C10	Thin cable, 5-wire, 100 m	OMRON Corporation
TDN18-10G	Thick cable, 5-wire, 10 m	Showa Electric Wire and Cable
TDN18-30G	Thick cable, 5-wire, 30 m	Showa Electric Wire and Cable
TDN18-50G	Thick cable, 5-wire, 50 m	Showa Electric Wire and Cable
TDN18-100G	Thick cable, 5-wire, 100 m	Showa Electric Wire and Cable
TDN18-300G	Thick cable, 5-wire, 300 m	Showa Electric Wire and Cable
TDN18-500G	Thick cable, 5-wire, 500 m	Showa Electric Wire and Cable
TDN24-10G	Thin cable, 5-wire, 10 m	Showa Electric Wire and Cable
TDN24-30G	Thin cable, 5-wire, 30 m	Showa Electric Wire and Cable
TDN24-50G	Thin cable, 5-wire, 50 m	Showa Electric Wire and Cable
TDN24-100G	Thin cable, 5-wire, 100 m	Showa Electric Wire and Cable
TDN24-300G	Thin cable, 5-wire, 300 m	Showa Electric Wire and Cable
TDN24-500G	Thin cable, 5-wire, 500 m	Showa Electric Wire and Cable
1485C-P1-A50	Thick cable, 5-wire, 50 m	Allen-Bradley
1485C-P1-C150	Thin cable, 5-wire, 150 m	Allen-Bradley

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Discontinue

2) Wiring of Signal Line

When connecting DeviceNet cable to the slave station, follow the procedure described below:

① Turn OFF the salve station power and communication power.

② Insert each of the DeviceNet cable wires, CAN H (white), CAN L (blue), V + (red), V- (black), and Drain into relevant hole (CAN H, CAN L, V +, V-, and Drain) while carefully referring to the orientation of the attached connection connector (MSTB2.5/5-STF5.08Au). (See the following Fig.)

③ Firmly tighten each cable, using the cable fixing screw of connecting connector. (Adequate tightening torque: 0.5N·m)

④ After ensuring that the cable name and the name indicated on this product are the same, insert the connecting connector to the slave station, and tighten the connector fixing screw firmly to the tightening torque of 0.3N·m.

＜Recommended Connector＞

● Supplied Connector

MSTB2.5 / 5 − STF5.08 Au (with connector fixing screw) Phoenix contact

● Similar connector

MSTB2.5 / 5 − ST5.08 Au (without connector fixing screw) Phoenix contact

⚠ CAUTION :
- For the signal line, be sure to use the cable conforming to the DeviceNet specification.
- When inserting a cable into the connector, the cable may intrude into not the connector tightening side but the rear side; it is, therefore, necessary to keep the cable fixing screw satisfactorily loose.
- For the connector provided with a connector fixing screw, be sure to firmly tighten the connector fixing screw when inserting the connector. If it is only inserted, the connector will come off, thereby causing malfunctions. When no connector fixing screw is provided, ensure that the connector claw is engaged securely.

Preceding station			T branch Tap	Next station

Multi-drop type   T branch type
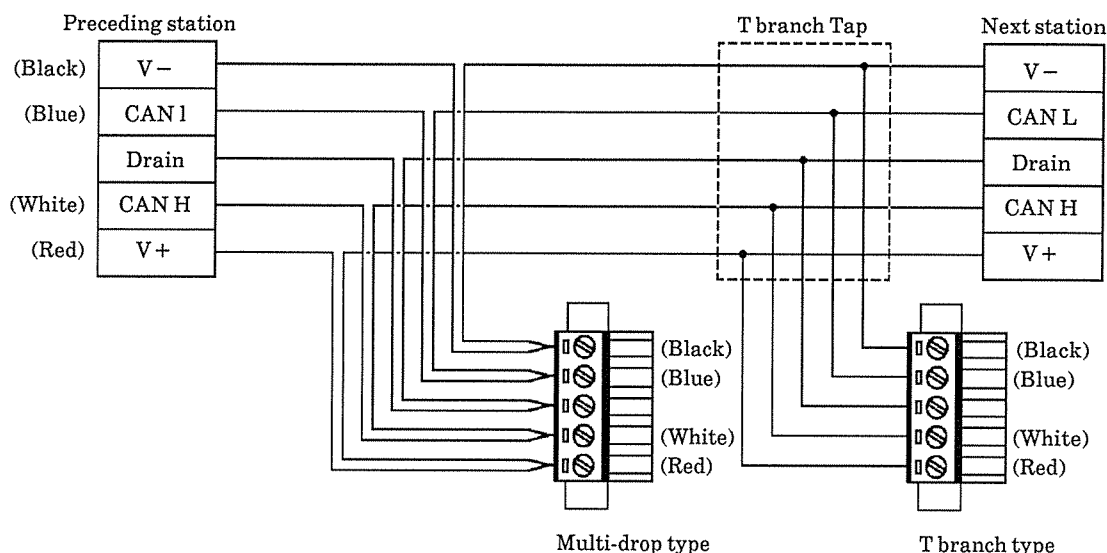
3) Power Line Wiring

When connecting the power cable to the slave station, follow the procedure described below:

① Turn the slave station power and communication power OFF.

② Mount a 6 mm or less wide solderless terminal for M3 to the power cable.

③ Fix the 24 V line of power cable to the power terminal: 24 V terminal (+ terminal) and 0 V line to 0 V terminal (- terminal) to the adequate tightening torque while aligning the polarity. (Adequate tightening torque: 0.5N·m)

In this slave station (OPP4-1D), the slave station (unit) power supply and load (valve) power supply are common, which cannot be separated from each other.

⚠ CAUTION :
- If a twisted only wire is connected direct to the terminal block, firing may result; it is, therefore, necessary to always use a crimp terminal.
- Connect the power supply after checking the slave station terminal polarity and cable terminal polarity.
- Select a power cable after calculating the current consumption.
- If one power source supplies the power to multiple salve stations, select an appropriate cable and perform the wiring work by taking the voltage drop due to electrical wires into consideration.
- Secure ample voltage within rating by providing dual wiring, if necessary, to keep as small voltage loss of single system as possible or installing source of power near-by solenoid

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4) Caution when Wiring

To avoid any problems due to noise, observe the followin when wiring :

① If it is thought that the noise affects the product, prepare the power source for each manifold solenoid valve where possible and perform the wiring work individually.

② Minimize the wiring distance whenever possible.

③ Do not connect this product to the power source, to which a device producing noise, such as an inverter or a motor has been connected.

④ Do not wire the power line and signal line in porallel with another power line.

5. MAINTENANCE

5.1 Abnormality and Corrective Action of the Slave Station

Abnormalities and corrective actions related to the slave station are shown below.

MS LED	NS LED	Description		Note
Green (ON)	Green (ON)	I/O being communicated.	I/O data being communicated between the master station and the slave station.	This is the normal status.
Green (ON)	(OFF)	Node address duplication being checked.	Waiting for completion of the node address overlap check by the master station.	In case only a specific slave station is in this state, check that the transmission speed is the same, and re-start the slave station.
Green (ON)	Green (Flashing)	Waiting for connection.	State of waiting for established connection from the master station.	
Red (ON)	(OFF)	Watch dog timer fault	Watch dog timer fault occurred in the slave station.	Replace the slave station.
Red (Flashing)	(OFF)	Incorrect switch setting	Setting of switch, such as dip switch, is incorrect.	Check for proper switch setting, and re-start the slave station.
Green (ON)	Red (ON)	Node address duplication	Master unit and node address overlap.	Re-set the master station while preventing the node address from overlapping, and re-start the slave station.
Green (ON)	Red (ON)	Busoff detected.	Busoff status (communication stopped due to frequent data error)	Check the following items and re-start the slave station. ● Check that the transmission speed of the master/slave stations is the same. ● Check for proper cable length (main line/branch line). ● Check for broken or loose cables. ● Check that termination resistance exists only on both ends of the main line. ● Check for frequent noise.
Green (ON)	Red (Flashing)	Communication time out	———	Check the following items and re-start the slave station. ● Check that the transmission speed of the master/slave stations is the same. ● Check for proper cable length (main line/branch line). ● Check for broken or loose cables. ● Check that termination resistance exists only on both ends of the main line. ● Check for frequent noise.

(ON) : ON   (Flashing) : Flashing   ● : OFF

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Discontinue
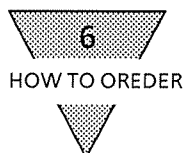
6. HOW TO ORDER

● Individual

N ④ G Ⓐ ① ① 0 — Ⓒ4 — Ⓐ2N ※1 Ⓗ — ③

● Manifold

MN ④ G Ⓑ ② ① 0 — Ⓒ8 — Ⓣ7D1 Ⓗ — ⑤ — ③

ⓐ ⓑ ⓒ ⓓ ⓔ ⓕ ⓖ ⓗ ⓘ

ⓐ № of port		ⓑ Piping direction		ⓒ Series model	
Code	Discription	Code	Discription	Code	Discription
3	3-port valve	A	Top porting (Direct piping)	1	MN4G1
4	5-port valve	B	Side porting (Base piping)	2	MN4G2

Note : There is not MN3GB

ⓓ Operator type		ⓔ Port size		ⓕ Wiring type	
Code	Discription	Code	Discription	No code	Wiring standard serial
1	2-position single	CX	Mix	W	No of wiring double serial
2	2-position double	See table 1			
3	3-position CC				
4	3-position ABR connection				
5	3-position PAB connection				
1	normal close NC (3GA)				
11	Normal open NO (3GA)				
8	Mix				

ⓖ Option		ⓗ № of stations		ⓘ Voltage	
No code	No option	Code	Discription	Code	Discription
H	Wrong operation prevention valve (Standard)	2~	№of stations	3	DC24V
K	External pilot				
A	Ozone and cutting oil resistant model				
F	Bulit-in A port filters				

Table 1　ⓔ Port size

	Code	Port size	MN4GA1	MN4GB1	MN4GA2	MN4GB2
A / B port	C4	Push-in joint φ4	●	●		
	C6	Push-in joint φ6	●	●	●	●
	C8	Push-in joint φ8			●	●
	M5	M5	●			
	06	Rc1/8			●	
P / Rport (Push-in joint)			φ6, φ8, φ6.4		φ8, φ10	

※1　Same as A / B port size solenoid

※1 Lead wire length

For details, check the catalog.