CKD

SM－303116-A

INSTRUCTION MANUAL

BLOCK MANIFOLD

W4G2-SERIES

SERIAL TRANSMISSION TYPE

MW4G※2－T8D※
(APPLICABLE TO DeviceNet)

- 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.

4th Edition

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 operation 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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MW4G※2-T8D※
Serial Transmission Type
Manual No. SM-303116-A

Dec.20.2002
Revision:Jun.22.2012

1. PRODUCT

1. 1 General outline of the system

1) MW4G※2-T8D※

This product is a solenoid valve equipped with remote I/O station (NW4G※ 2-T8D※), which can be connected to Omron's CompoBus/D applicable to DeviceNet, an open field network, as well as Toyota Machine Works' DLINK.

The following features are provided.

(1) It helps to curtail wiring man-hours as it requires DeviceNet cables only to connect it with PLC.

(2) This slave station is an environment-proof slave station applicable to the protection structure IP65 (dust-proof and jet-proof type).

(3) Upper and side wiring directions are provided, ensuring reduction of the installation space.

(4) The power supply for the slave station is separated from that for the valve, ensuring easy maintenance work.

(5) The slave station output status, if the communication error occurs, can be set using the switch (holding or all points OFF).

(6) Three kinds of communication speed levels can be set. (125k / 250k / 500k bps)

2) What are DeviceNet , CompoBus/D and DLNK?

The DeviceNet ,CompoBus/D and DLNK 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 and DLNK are used as a network to work with the DeviceNet.

Note: Be sure to read the User's Manual.

This manual mainly describes the MW4G※2-T8D※ and the slave station(NW4G※2-T8D※). 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.

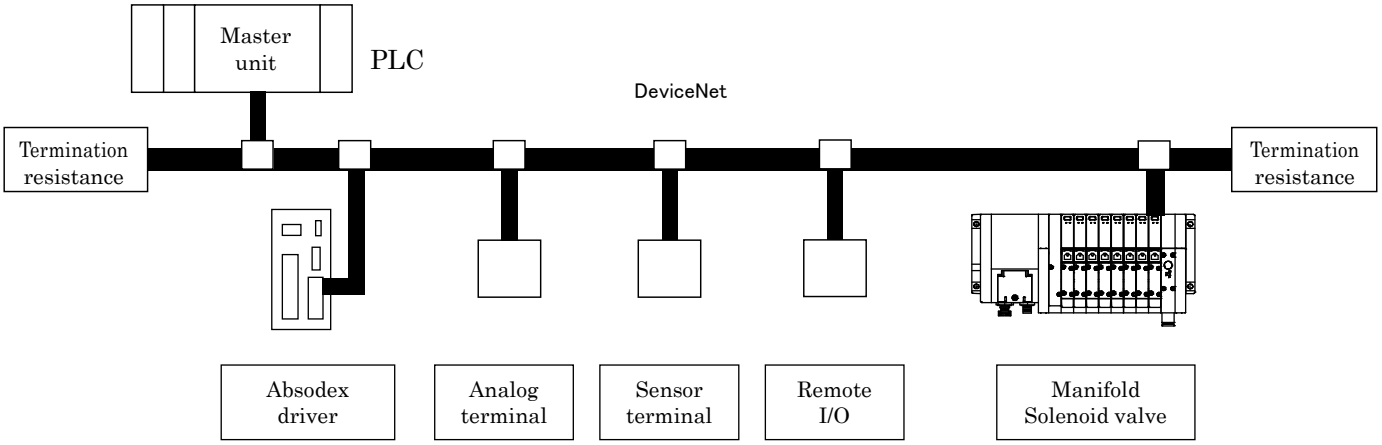
1．2 Structure of the system

This system chiefly consists of PLC body, Master unit, Solenoid valve MW4G※ 2-T8D※ and peripheral equipment.

- Combination of PLC and Master unit

Mnufacturer	Compatible PLC	Type of Master unit
OMRON Co.,Ltd.	SYSMAC CS series SYSMAC CJseries SYSMAC CV series SYSMAC α series SYSMAC C200HS series others	CS1W-DRM21 CJ1W-DRM21 CVM1-DRM21-V1 C200HW-DRM21-V1 ITNC-EI□01-DRM (Master built-in PLC) 3G8B3-DRM21 (VME board)
TOYOTA KOHKI Co.,Ltd	PC3J / 2J series PC3JD PC2F / PC2FS	THK-5398 TIC-5642 (Master built-in PLC) TFU-5359
Other equipment compatible with DeviceNet		

- Fundamental structure of system



1．3 Specifications

1) Specification of solenoid valve

(1) Common specifications

Model No. / Item		W4G2
Media		Compressed air
Valve configuration		Pilot operation
Applicable solenoid valve		Soft spool valve
Minimum working pressure MPa	2 positions	0.2
	3 positions	0.2
Maximum working pressure MPa		0.7
Proof pressure MPa		1.05
Ambient temperature ℃		-5～55
Media temperature ℃		5～55
Manual override		Common (standard) for non-locked and locked types
Pilot air exhaust method	Internal pilot	Common exhaust for main and pilot valves
	External pilot	Individual exhaust for main and pilot valves
Lubrication ※1		Not required
Protection rating ※2		Dust proof and jet-proof (IP65)
Vibration/Impact m/s²		49 or less / 249 or less
Atmosphere		Operation in the presence of corrosive gas not allowed

※1 ： If lubrication is required, use turbine oil ISO VG32 ,1st grade.
Excessive lubrication or intermittent lubrication may cause unstable operation.

※2 ： Based on IP65 (IEC60529[IEC529：1989-11]) standard test method. The sealing ability must be checked before starting operation.

Reference The unit of the pressure is MPa. The conversion rate is "1MPa=10.1972kgf/cm²".

(2) Electrical specifications

Model No. / Item		W4G2
Rated voltage V		DC24
The range of rated voltage fluctuation.		±10%
Holding current A		0.025
Power consumption W		0.6
Heat-proof class		B
Surge absorber		Standard device
Indicator		Standard

(3) Specifications by model

Item			ON	OFF
Response time ms	2 positions	Single	22	24
		Double	26	—
	3 positions	ABR connection	25	35

The response time shown in the table is with the supply pressure of 0.5 MPa and at 20℃ without lubrication. It changes depending on the supply pressure and the type of oil in the case of lubrication.

Item	Valve specifications		Change –over position class		P→A/B	A/B→R
Effective sectional area mm^2	Sole unit	W4GB2	2 positions		13	13
			3 positions	CC	11	11
				ABR connection	11	13
				PAB connection	15	11
	Manifold	MW4G2 series	2 positions		11	9 (12)
			3 positions	CC	10	10
				ABR connection	10	9 (12)
				PAB connection	12	10

- Values shown in ( ) are those when the exhaust malfunction prevention valve is not installed.
- These values are obtained when the connecting diameter of the A･B port is φ8 push-in joint.

2) Transmission specifications

Item	Specification			
Communication protocol	Conforms to DeviceNet			
Transmission speed	500k / 250k /125k bps (selectable)			
Communication media	Private 5-wire cable(2wire 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 ※1	6m or less	39m or less
	250k bps	250m or less ※1	6m or less	78m or less
	125k bps	500m or less ※1	6m or less	156m or less
Power source for communication	11.0V～25.0V DC			
Error control	CRC error			

※1 Indicates values when a thick private cable is used. The value is less than 100 mm in cases where a thin private cable is used.

Note: For details for communication, refer to DeviceNet specifications published by ODVA

(1) Specification of solenoid valve

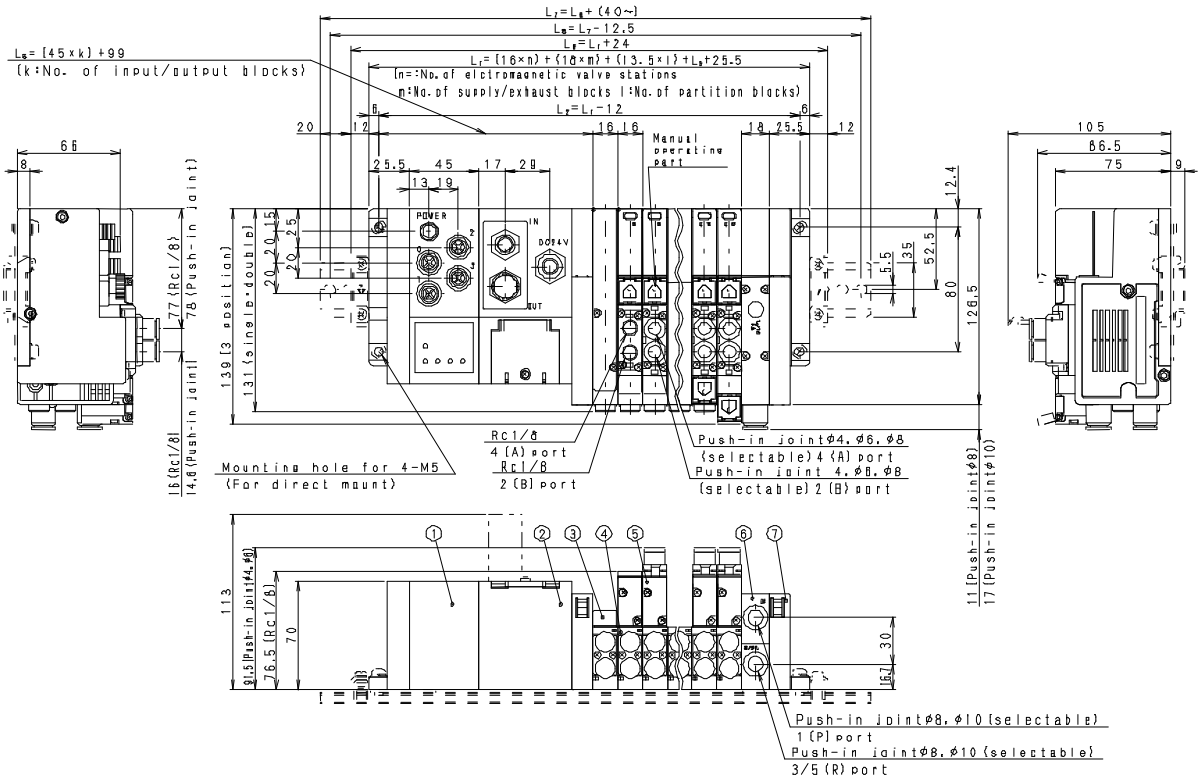
Always operate this product within its product specifications.

Item		T8D1	T8D2	T8D7
Power voltage (Unit side)		DC21.6V～26.4V (DC24V ±10%)		
Electric consumption (Unit side)		70mA or lower (While all points are ON.)	90mA or lower (While all points are ON.)	80mA or lower (While all points are ON.)
Power voltage (Communication side)		DC11.0V～25.0V		
Electric consumption (Communication side)		50mA or lower		
Power voltage (Valve side)		DC22.8V～26.4V (DC24V +10%, -5%)		
Electric consumption (Valve side)		15mA or lower (While all points are OFF.)		
I／O point		0/16	0/32	16/16
Insulation resistance		Between all external terminals in a lump and Case 30MΩ or more DC500VM		
Withstanding voltage		Between all external terminals in a lump and Case AC500V for 1 minute		
noise proof		500Vp-p Pulse width 100nsce, 1μsec		
Vibration proof	Durability	10～150～10Hz 1 octave/min. 15 sweeps in the 3 each axis of X, Y and Z while the half amplitude is 0.75mm or 98m/s² whichever smaller.		
	Wrong operation	10～150～10Hz 1 octave/min. 4 sweeps in the 3 each axis of X, Y and Z while the half amplitude is 0.5mm or 68.6m/s² whichever smaller.		
Shock proof		294m/s² 3directions 3 times		
Ambient temperature		-5～55℃		
Ambient humidity		30～85%RH (No dew fall)		
Working environment		No corrosive gas		
Communication object		In conformity with DeviceNet		
Transfer rate		500K/250K/125K bps (A desired connector type is selected using the DIP-switch).		
Connector types		Micro connector		
Output insulation type		Photo coupler insulation		
Max. load current		40mA /point		
Leak current		0.1mA or lower		
Residual voltage		0.5V or lower		
Output type		NPN transistor open collector output		
Fuse		Power supply for slave stations：24V 2A / Power supply for valve：24V 2A/ Power supply for communication：24V 1A （not replaceable）		
Action indicator		LED (Unit status, power supply for valves and communication status indicator only)		

1. 4 External dimensions of solenoid valve

1) Upper wiring type

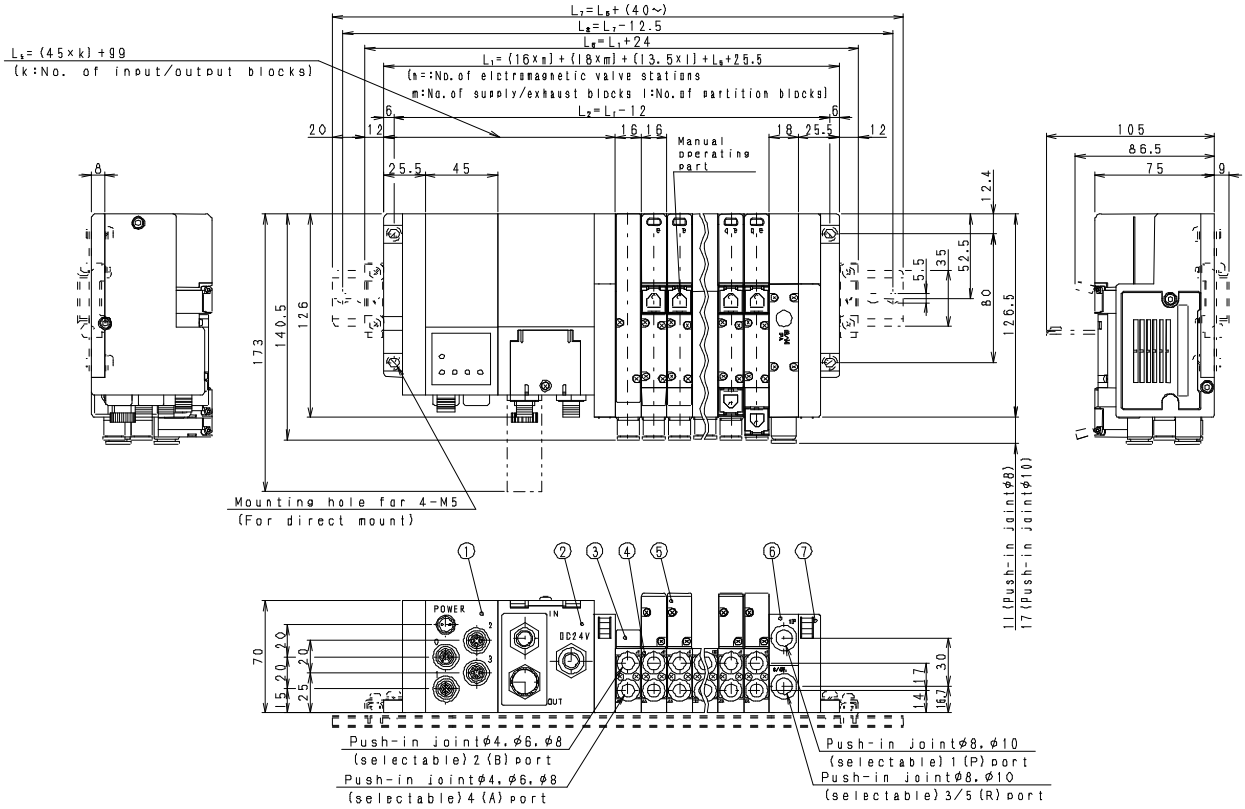
- MW4GA2※0-T8D※



No.	Name of parts
1	Input/Output block
2	Electric component block T8D※
3	Masking plate
4	Valve block
5	Solenoid valve main body
6	Supply/exhaust block
7	End block R

2) Side wiring type

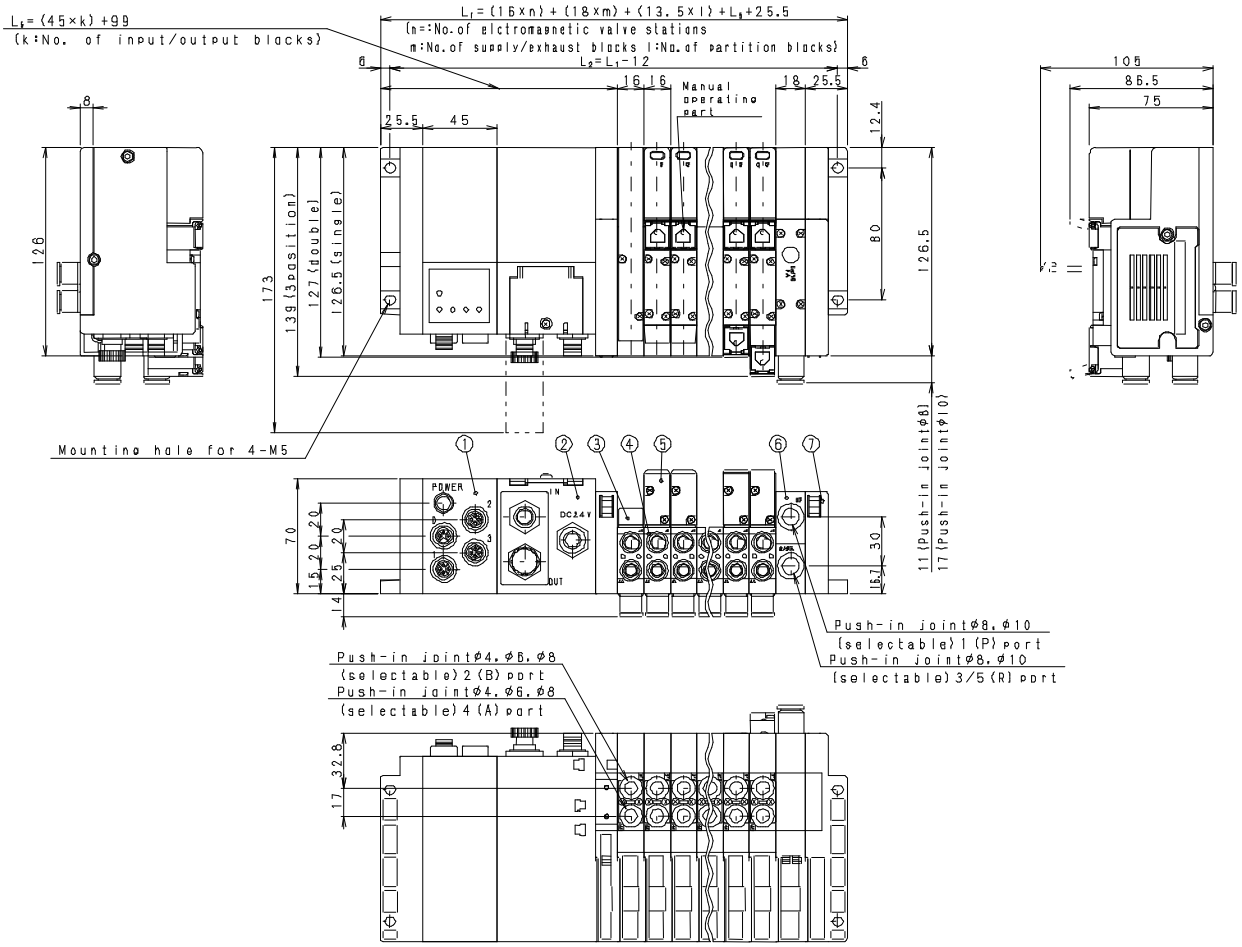
- MW4GB2※0-T8D※



No.	Name of parts
1	Input/Output block
2	Electric component block T8D※
3	Masking plate
4	Valve block
5	Solenoid valve main body
6	Supply/exhaust block
7	End block R

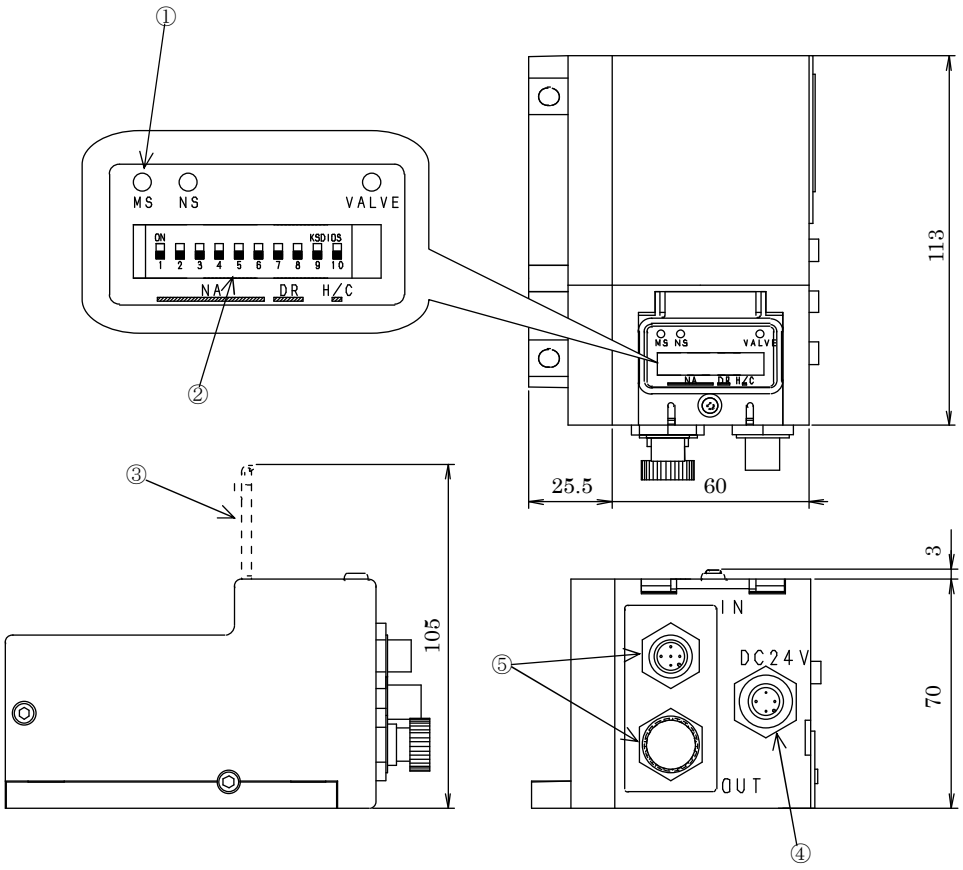
3) Side wiring type

MW4GZ2※0-T8D※



No.	Name of parts
1	Input/Output block
2	Electric component block T8D※
3	Masking plate
4	Valve block
5	Solenoid valve main body
6	Supply/exhaust block
7	End block R

1．5 Outside view of valve slave station



① Monitor lamp
The monitor lamp LED indicates the status of the slave station main body and network.

② Setting switches
These switches are used to set a station No., transmission speed, and an output of the slave station when the communication error occurs.

③ Switch cover
This switch cover protects the monitor lamp and setting switches.

④ Power supply connector (M12-connector, male-pin)
The unit power supply and valve power supply are connected to this connector.

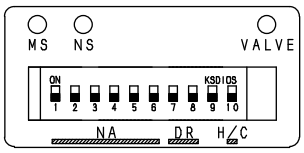
⑤ Communication connector
The communication cable of the network is connected to this connector.

1．6 Switches and LED Indications

1) Switch

The address, communication speed, and output in case of communication error are set for this slave station.

Name of switch	Content of setting
NA switch No.1-No.6 (Setting switch of Node address)	A node address of the slave station is set in a range of 0 to 63.
DR switch No.7-8 (Setting switch of communication rate)	A communication speed with the master unit is set.
H/C switch No.10 (Setting switch of output mode)	It is selected whether the output is held (H) or cleared (C) if the communication error occurs.



2) MS (Module status)・NS (Network status) LED indications

The statuses of this slave station and network are displayed. For details about LED indications, refer to the table below.

MS LED	NS LED	Content		Note
Green ☼	Green ☼	The I/O communication is being performed.	The input/output data is being communicated between the master station and slave station.	This is the normal status.
Green ☼	●	Whether or not the node address is duplicated is being checked.	Waiting for completion of node address duplication check on master	If only a specific slave station is in this status, restart the slave station after checking that the same communication speed is used.
Green ☼	Green ◐	Waiting for connection	Waiting for establishment of connection from the master	
Red ☼	●	Watch dog timer error	The watch dog timer error occurs in the slave station.	Replace the slave station with a new one.
Red ◐	●	The switch setting is incorrect.	The switch setting, such as DIP-switch is incorrect.	After checking the switch settings, restart the slave station.
Green ☼	Red ☼	The node address is duplicated.	The node address is duplicated with that of the master unit.	After the node address is set again so that it is not duplicated, restart the slave station.
Green ☼	Red ☼	Busoff detection	Busoff (The communication is stopped if the data error occurs frequently.)	After checking the following items, restart the slave station. ・Check that the communication speed of the master station is the same as that of the slave station. ・Check that the cable length (trunk line/branch line) is correct. ・Check if any cable has broken wiring or is loose. ・Check that the terminating resistor is mounted only at both ends of the trunk line. ・Check if large noise exists.
Green ☼	Red ◐	Communication time-out		
●	●	The power is not turned ON.		After checking that the address and communication speed are set correctly, turn ON the power.

3) VALVE LED indications

VALVE LED	Content
Green ☼	Valve power ON status
●	Valve power OFF status

※ ☼ lighting ◐ flashing ● light out

※ The VALVE LED can monitor the status only when the unit power is turned ON.

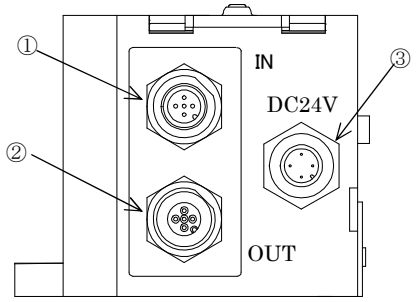
1．7 Connection connector

The wiring to this slave station is connected using the water-proof connector as shown in the Fig.

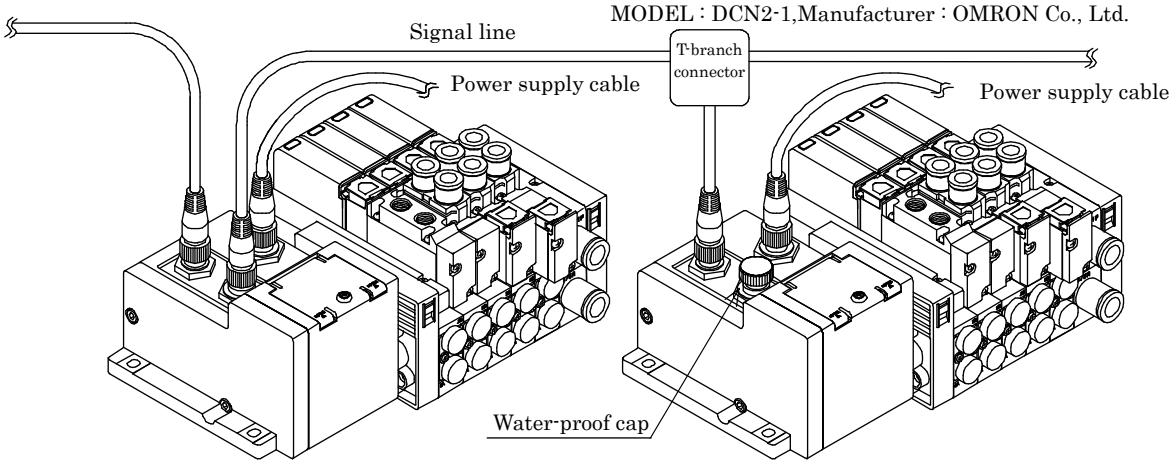
1) Wiring

The power supply and communication cables are connected to this slave station using the water-proof connectors. Tighten the power supply and communication connectors completely by hand. (Proper tightening torque: 0.4 to 0.5N・m)

Symbol	Terminal name	Function
①	Communication connector (IN)	Connect the communication cable from the fore station. (Male pins)
②	Communication connector (OUT)	Connect the communication cable to the aft station. (Female pins)
③	Power supply connector	Connect the unit power supply and valve power supply. (M12 connector)



(1) Multi-drop connection and T-branch connection methods



Multi-drop connection method　　T-branch connection method

⚠ CAUTION :

- Touching the electrical wiring connection part (bare live part) may cause an electric shock. Before starting the wiring work, always shut-down the power completely. Additionally, do not touch any electrically live part by wet hand.
- Pay special attention so that any tensile force or impact is not applied to the power cable and communication cable. Additionally, if the wiring distance is long, unexpected force due to own weight or shock may be applied, causing the unit to break. Therefore, to prevent such troubles, take appropriate measures, such as securing of the wires and cables to the machine.
- When connecting the signal lines by means of the T-branch method, always attach the water-proof cap supplied with this product to the connector on the OUT side.
- When connecting the signal lines by means of the multi-drop method, pay special attention so that the rating of the communication power current flowing through this slave station is 2A or less.

2. CAUTION

- Refer to User's manual for the master station concerning to transmission delay time. The transmission delay within the entire system depends on the scan time achieved by the PLC unit and on other devices included in the 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 flywheel diode being used for surge absorbing circuit to valve slave station.
- Connect the power supply cable and signal cable correctly within the specifications so that any incorrect wiring is not performed.
- Pay special attention so that any tensile force or impact is not applied to the power supply cable and signal cable.
- Before turning ON the power, make sure that the various connection cables and connectors are connected firmly.
- Disassembly, modification, and/or repair made by the customer may cause a trouble or malfunction. Never attempt to disassembly, modify, and/or repair the unit.
- Many precision devices are mounted inside the unit. Do not drop the unit or apply vibration or impact to the unit.
- If any connector is disconnected or connected with the electric power supplied, this may cause a trouble or malfunction. Do not disconnect or connect any connector with the electric power supplied.

3. OPERATION

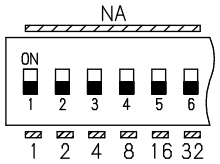
3. 1 Switch setting

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.

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.					
	1 (1)	2 (2)	3 (4)	4 (8)	5 (16)	6 (32)
0	0	0	0	0	0	0
1	1	0	0	0	0	0
2	0	1	0	0	0	0
3	1	1	0	0	0	0
≀	≀					
60	0	0	1	1	1	1
61	1	0	1	1	1	1
62	0	1	1	1	1	1
63	1	1	1	1	1	1



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

Example) To set the node address to "50":

50 = 1·(0) + 2·(1) + 4·(0) +8·(0) + 16·(1) + 32·(1)

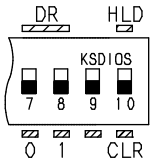
According to the above formula, turn ON the swtch Nos.6,5,and 2,and turn OFF other switches(Nos.4,3,and1).

※ T8D2 is Omron's PLC. For the fixed allocations (without configurator), two channels from the set address are shared.

2) Setting the Transmission Speed

Set the transmission speed for the master unit.

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



⚠ 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, slave 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.10 (H/C)	Content of setting
HOLD (HLD)	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.
CLEAR (CLR)	0	Used to clear to "0" all the output data 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 slave station power(including the communication power) turned OFF.
- Tighten the switch cover screw with a specified tightening torque (0.3 to 0.4N·m). If the screw is tightened insufficiently, the protection structure may not be kept.
- Always close the switch cover except for the setting work. If the switch cover is opened, any foreign matter may enter the internal circuit through the cover opening, causing the product to malfunction or the cover to break. Additionally, great care should also be taken so that no foreign matte enters the inside during setting work.
- Setting switch has been precisely built. Disorderly handling may cause damage of switch. To set station number, never touch internal circuit printed board.

3. 2 Correspondence between slave station input/output No. and PLC address No.

1) PLC address correspondence table

This correspondence table describes an example based on Omron's PLC "SYSMAC α"-series used as typical model. Additionally, the table shows the conditions when the serial transmission slave station is set at "node address 1" and the fixed allocation (without configuration) is used.

Exclusive output type

Type of slave station	Input block	Output block	Allocated channels 51ch 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	52ch 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
			Serial-transmission slave station I/O No.																															
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
T8D1 (16points output)	—	—													s13	s14	s15	s16																
		1 unit	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	**1-0**	**1-1**	**1-2**	**1-3**																
		2 unit									**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**																
T8D2 (32points output)	—	—																												s29	s30	s31	s32
		1 unit																												**1-0**	**1-1**	**1-2**	**1-3**
		2 unit	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16									**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**
		3 unit																					**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**
		4 unit																	**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**	**4-0**	**4-1**	**4-2**	**4-3**

Example 1 Example 2

※For the T8D2 (32-point output), both allocated channels, 51ch and 52ch, are shared.

Input/output mixed type

Type of slave station	Input block	Output block	Allocated channels 351ch 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	51ch 00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15
			Serial-transmission slave station I/O No.																															
			0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31
T8D7 (16 points input / 16 point output)	1 unit	—																												s13	s14	s15	s16
		1 unit	**1-0**	**1-1**	**1-2**	**1-3**													s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	**2-0**	**2-1**	**2-2**	**2-3**
		2 unit																									**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**
	2 unit	—																												s13	s14	s15	s16
		1 unit	**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**													s4	s5	s6	s7	s8	s9	s10	s11	s12	**3-0**	**3-1**	**3-2**	**3-3**
		2 unit																									**3-0**	**3-1**	**3-2**	**3-3**	**4-0**	**4-1**	**4-2**	**4-3**
	3 unit	—																												s13	s14	s15	s16
		1 unit	**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**					s1	s2	s3	s4	s5	s6	s7	s8				s12	**4-0**	**4-1**	**4-2**	**4-3**
		2 unit																									**4-0**	**4-1**	**4-2**	**4-3**	**5-0**	**5-1**	**5-2**	**5-3**
	4 unit	—																												s13	s14	s15	s16
		1 unit	**1-0**	**1-1**	**1-2**	**1-3**	**2-0**	**2-1**	**2-2**	**2-3**	**3-0**	**3-1**	**3-2**	**3-3**	**4-0**	**4-1**	**4-2**	**4-3**	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	**5-0**	**5-1**	**5-2**	**5-3**
		2 unit																									**5-0**	**5-1**	**5-2**	**5-3**	**6-0**	**6-1**	**6-2**	**6-3**

Example 3

※A numeric value in the field of the input/output block shows the number of stations(connector No.) counted from the serial transmission slave station.

※One field by bold lines shows one input/output block. : Input block : Output block : Solenoid output

How to read the table

① Check the type of the serial transmission slave station to be used and the connection style of the input/output block.

② Read out the PLC address corresponding to each input/output point of the unit on the table.

(Example 1) ＜Style＞ Serial-transmission slave station：T8D1、Output block：0 unit

《Output point》 11th solenoid output ⇒ 《Address》 Allocated channels 51ch（Input/Output relay Nos.5110）

(Example 2) ＜Style＞ Serial-transmission slave station：T8D2、Output block：3 units

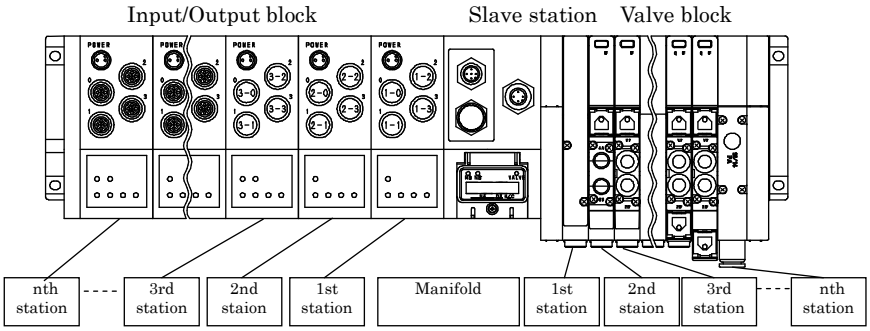
《Output point》 No.1 of 2nd output block station ⇒ 《Address》 Allocated channels 52ch（Input/Output relay Nos.5209）

(Example 3) ＜Style＞ Serial-transmission slave station：T8D7、Input block：2 units、Output block：2 units

《Input point》 No.2 of 2nd input block station ⇒ 《Address》 Allocated channels 351ch（Input/Output relay Nos.35106）

《Output point》 No.3 of 3rd output block station ⇒ 《Address》 Allocated channels 51ch（Input/Output relay Nos.5111）

How to count the number of manifold stations.



2) Valve No. assignments corresponding to T8D※ solenoid output No. (Example)

※ The numbers in valve No. 1a, 2a, 2b… indicate the station No.1 station No.2 and so on, while the alphabets (a) and (b) mean, respectively the solenoid on the side (a) and the solenoid on the side (b). The maximum number of stations on the manifold differs among the models. Refer to the specifications of the model you selected.

<Standard wiring>

● For single solenoid valve（Corresponds with up to the 16th manifold block.）

Solenoid output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	1a	2a	3a	4a	5a	6a	7a	8a	9a	10a	11a	12a	13a	14a	15a	16a																

● For double solenoid valve

Solenoid output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

● For mixed installation of single and double solenoid valve stations

Solenoid output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	1a	2a	3a	3b	4a	4b	5a	6a	7a	7b	8a	9a	10a	10b	11a	11b	12a	13a	14a	14b	15a	15b	16a									

<Double wiring>

● For single solenoid valve

Solenoid output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	1a	※1	2a	※1	3a	※1	4a	※1	5a	※1	6a	※1	7a	※1	8a	※1	9a	※1	10a	※1	11a	※1	12a	※1	13a	※1	14a	※1	15a	※1	16a	※1

● For double solenoid valve

Solenoid output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	1a	1b	2a	2b	3a	3b	4a	4b	5a	5b	6a	6b	7a	7b	8a	8b	9a	9b	10a	10b	11a	11b	12a	12b	13a	13b	14a	14b	15a	15b	16a	16b

● For mixed installation of single and double solenoid valve stations

Solenoid output No	s1	s2	s3	s4	s5	s6	s7	s8	s9	s10	s11	s12	s13	s14	s15	s16	s17	s18	s19	s20	s21	s22	s23	s24	s25	s26	s27	s28	s29	s30	s31	s32
Valve No	1a	※1	2a	※1	3a	3b	4a	4b	5a	※1	6a	※1	7a	7b	8a	※1	9a	※1	10a	※1	11a	11b	12a	12b	13a	※1	14a	※1	15a	15b	16a	※1

※1 ： Not used

3. 3 Programming

This slave station shares one node and is handled as 16-point output unit, T8D1, 32-point output unit, T8D2, or 16-point iput/16-point output unit, T8D7. When creating a program refer to the User's Manual(programming section)prepared by the PLC manufacturer.

Note) 32-point output unit, T8D2, shares the memory for two nodes when using the fixed allocation (without configurator). For details about memory allocations, refer to section 3.2, Correspondence between slave station input/output No. and PLC address No. (on page 16).

3. 4 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 2.0 Volume II - Release 2.0	Errata4
	Vendor Name	CKD Corporation	Vendor ID = 201
	Device Profile Name	Slave : Generic	Profile No. = 0
	Product Catalog Number	Manual Number (SM-303116)	
	Product Revision	10.7	
Physical Conformance Data	Network power Consumption	DC24V 50mA or lower	
	Connector Style	Shield type micro connector	
	Isolated Physical Layer	YES	
	LEDs Supported	Module, Network	
	MAC ID Setting	DIP Switch	
	Default MAC ID	1	
	Communication Rate Setting	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	
		Timeout : 2000ms	
		Normal object class : 0x01	
		Instance: 1	
		Attributes: 7	

DeviceNet Required Object Implementation

- Identity Object (0x01)

Object Class	Attributes	None Supported
	Services	None Supported

		ID Description	Get	Set	Value limit		
					T8D1	T8D2	T8D7
Object Instance	Attributes	1 Vendor	○	×	201	201	201
		2 Device type	○	×	0	0	0
		3 Product code	○	×	50	51	52
		4 Revision	○	×	10.7	10.7	10.7
		5 Status(bits supported)	○	×	bit 0 only	bit 0 only	bit 0 only
		6 Serial number	○	×	Every unit	Every unit	Every unit
		7 Product name	○	×	OPP5-1D	OPP5-2D	OPP5-7D
		8 State	×	×			
		9 Config. Consistency Value	×	×			
		10 Heartbeat Interval	×	×			
	Services	DeviceNet Services	Parameter Options				
		05H Reset	NO				
		0EH Get_Attribute_Single	NO				

- Message Router Object (0x02)

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

- DeviceNet Object (0x03)

		ID Description	Get	Set	Value limit
Object Class	Attributes	1 Revision	○	×	
		2 Max instance	×	×	
		3 Number of instances	×	×	
		4 Optional attribute list	×	×	
		5 Optional service list	×	×	
		6 Max ID class attributes	×	×	
		7 Max ID of instance attributes	×	×	
	Services	DeviceNet Services	Parameter Options		
		0EH Get_Attribute_Single	NO		

		ID Description	Get	Set	Value limit
Object Instance	Attributes	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		
		10H Set_Attribute_Single	NO		
		4BH Allocate M/S connection set	NO		
		4CH Release M/S connection set	NO		

- Assembly Object (0x04)

Object Class	Attributes	None Supported
	Services	None Supported

Object Instance		Instance Type	Instance Id (s)		
		Static Input	×		
		Static Output	×		
		Static I/O	○		100
		Static Configuration	×		
		Dynamic	×		
	Attributes	ID description	Get	Set	Value limit
		1 Number of members in list	×	×	
		2 Member list	×	×	
		3 Data	○	×	
	Services	DeviceNet Services	Parameter Options		
		0EH Get_Attribute_Single	NO		

- Connection Object (0x05)

Object Class	Attributes	None Supported
	Services	None Supported
	Total active connections possible	1

Object Instance 1	Section	Information	Max. instances		
	Instance type	Explicit Message	1		
	Production trigger	Cyclic			
	Transport type	Server			
	Transport class	3			
	Attributes	ID description	Get	Set	Value limit
	Attributes	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	○	×	1200H
		8 Consumed connection size	○	×	1200H
		9 Expected packet 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		

Object Instance 2	Section	Information	Max. number of instances				
	Instance type	Polled I/O	1				
	Production trigger	Cyclic					
	Transport type	Server					
	Transport class	2					
	Attributes	ID description	Get	Set	Value limit		
					T8D1	T8D2	T8D7
		1 State	○	×			
		2 Instance type	○	×	01H	01H	01H
		3 Transport class trigger	○	×	82H	82H	82H
		4 Produced connection ID	○	×			
		5 Consumed connection ID	○	×			
		6 Initial comm. Characteristics	○	×	01H	01H	01H
		7 Produced connection size	○	×	0000H	0000H	0200H
		8 Consumed connection size	○	×	0200H	0400H	0200H
		9 Expected packed rate	○	×			
		12 Watchdog time-out action	○	×			
		13 Produced connection path length	○	×	00	00	06
		14 Produced connection path	○	×	—	—	20_04_24_01_30_03
		15 Consumed connection path length	○	×	06	06	06
		16 Consumed connection path	○	×	20_04_24_01_30_03	20_04_24_01_30_03	20_04_24_01_30_03
		17 Production inhibit time	○	×	00	00	00
	Services	DeviceNet services	Parameter Options				
		05H Reset	NO				
		0EH Get_Attribute_Single	NO				
		10H Set_Attribute_Single	NO				

Object Instance 3	Section	Information	Max. number of instances			
	Instance type	Bit Strobed I/O	1			
	Production trigger	Cyclic				
	Transport type	Server				
	Transport class	2				
	Attributes	ID description	Get	Set	Value		
					T8D1	T8D2	T8D7
		1 State	○	×			
		2 Instance type	○	×	01H	01H	01H
		3 Transport class trigger	○	×	82H	82H	82H
		4 Produced connection ID	○	×			
		5 Consumed connection ID	○	×			
		6 Initial comm. Characteristics	○	×	01H	01H	01H
		7 Produced connection size	○	×	0000H	0000H	0200H
		8 Consumed connection size	○	×	0100H	0100H	0100H
		9 Expected packed rate	○	×			
		12 Watchdog time-out action	○	×			
		13 Produced connection path length	○	×	00	00	06
		14 Produced connection path	○	×	—	—	20_04_24_01_30_03
		15 Consumed connection path length	○	×	06	06	06
		16 Consumed connection path	○	×	20_04_24_01_30_03	20_04_24_01_30_03	20_04_24_01_30_03
		17 Production inhibit time	○	×	00	00	00
	Services	DeviceNet Services	Parameter Options				
		05H Reset	None				
		0EH Get_Attribute_Single	None				
		10H Set_Attribute_Single	None				

4. INSTALLATION

4. 1 Installation

⚠ WARNING : When installing a solenoid valve unit, never attempt to hold it in position by means of the pipes connected to it.

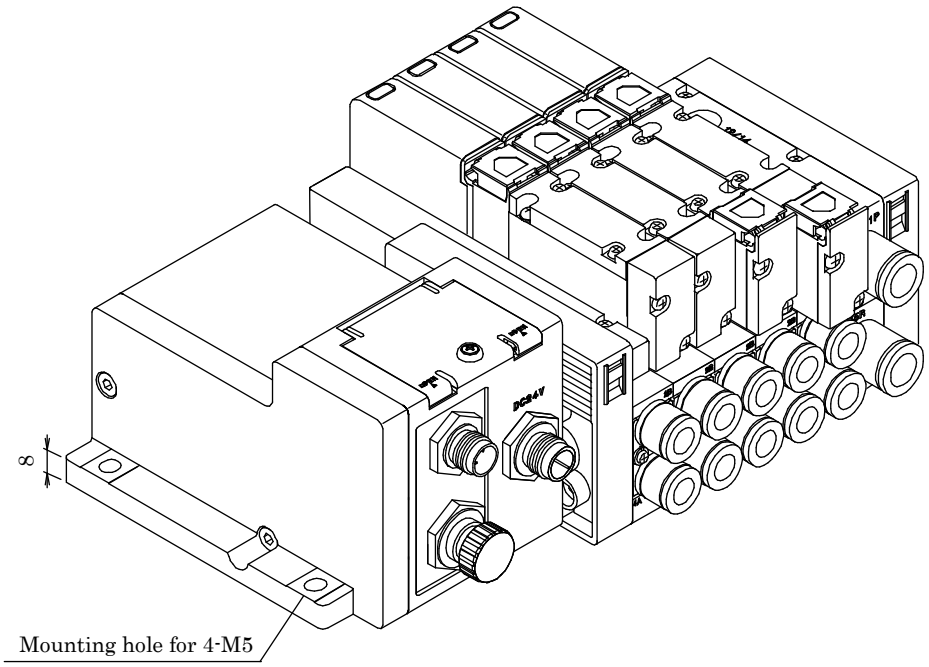
- Mount the solenoid valve by applying the mounting screws and/or mounting plate to the solenoid valve.

⚠ CAUTION : If you choose to mount the solenoid valve manifold on a DIN rail, make sure that the DIN rail is strong enough.

4.1.1 Please secure an enough space around the solenoid valve for mounting, dismounting and piping work.

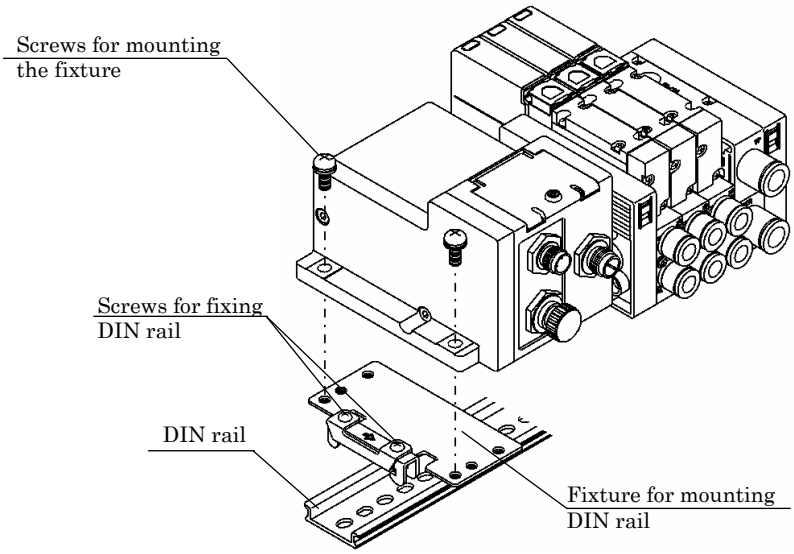
4.1.2 In case of installing directly

Mount the master station on the mounting hole by using the screw. (M5 screw, appropriate tightening torque: 1.2N･m)For the mounting hole pitch, see section 1.4, External dimensions of solenoid valve. (P8～10)



4.1.3 In case of installing by means of DIN rail

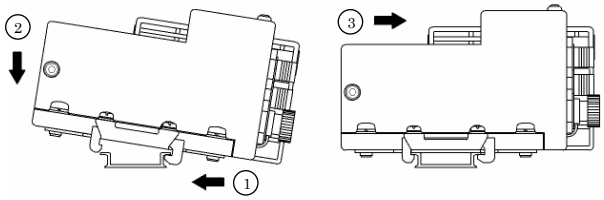
For W4G2 Series, you can change the manifold of direct mounting type to DIN rail mounting type. If not counted properly, dropping down of the manifold or damage to it may be caused, to which please pay your careful attention. In addition, in case of the gross weight of manifold exceeding 1.0kg or it is installed in an environment where vibration or shock occurs, fix DIN rail to the mounting face with a distance of 50 – 100mm. Make sure that the installation has been carried out completely and then start using. There is no restriction to the mounting direction or mounting posture, but the mounting screws may become loose due to resonance with any vibration which may cause the manifold to drop down. Please pay your careful attention to this point when operating.



●How to mount DIN rail

1. Fit the fixtures for mounting DIN rail (Tightening torque: 1.8 – 2.3N・m)
2. Hook the jaws on DIN rail in the order of ① and ②.
3. Push toward ③ direction.
4. Tighten the screws for fixing DIN rail.

(Tightening torque: 1.2 – 1.6N・m)



4. 2 Wiring

In order for the MW4G※2-T8D※ 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 MW4G※2-T8D※ 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.

⚠ CAUTION:

- Touching the electrical wiring connection part (bare live part) may cause an electric shock. Before starting the wiring work, always shut-down the power completely. Additionally, do not touch any electrically live part by wet hand.
- Pay special attention so that any tensile force or impact is not applied to the power cable and communication cable. Additionally, if the wiring distance is long, unexpected force due to own weight or shock may be applied, causing the unit to break. Therefore, to prevent such troubles, take appropriate measures, such as securing of the wires and cables to the machine.

1) Communication line

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

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

2) Communication line

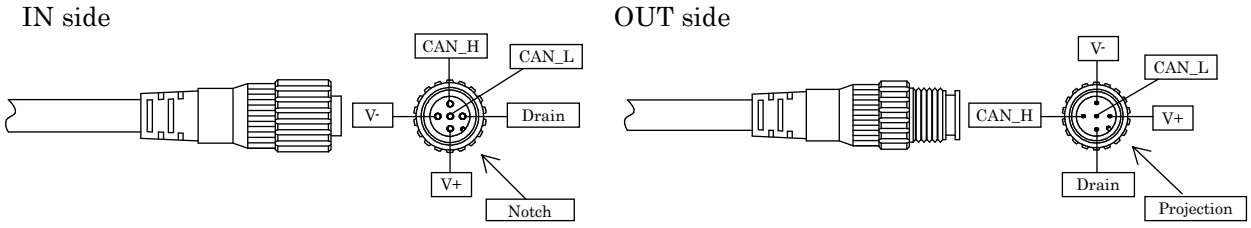
When connecting the DeviceNet cable to this product, follow the steps below.

① Turn OFF the unit power and communication power to this slave station.

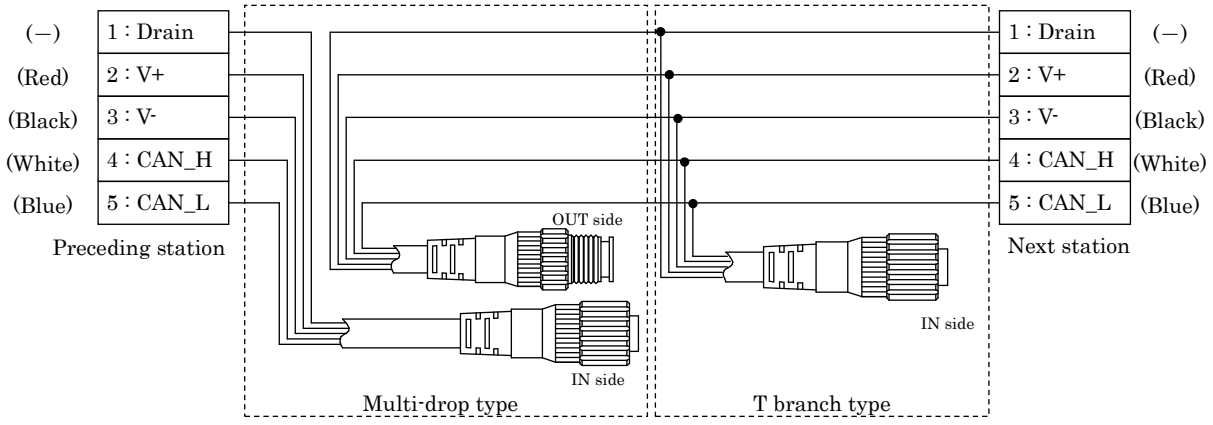
② Connect the DeviceNet cable to the communication connector as described in the following pin assignments.

③ Connect the communication cable from the fore station to the IN side and the communication cable to the aft station to the OUT side as shown in the wiring diagram.

④ Tighten the connector to the communication connector of the slave station completely by hand.



Pin No.	Terminal name	Connection object	Indication cable color
1	Drain	Shield line of cable	—
2	V+	Use a DC11 to 25V power supply with less noise.	Red
3	V-	Use a DC11 to 25V power supply with less noise.	Black
4	CAN_H	Connect to the communication cable " CAN_H" of the master or other slave station.	White
5	CAN_L	Connect to the communication cable " CAN_L" of the master or other slave station.	Blue



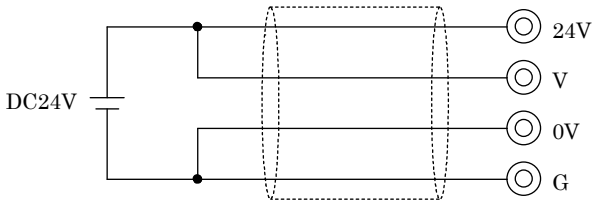
Recommended connecter Manufacturer : OMRON Corp.
Connector with cable attached to both sides : Model DCA1-5CN※※W1 (Socket/Plug)
Connector with cable attached to one side, For IN side : Model DCA1-5CN※※F1 (Socket)
For OUT side : Model DCA1-5CN※※H1 (Plug)

※ Do not use any L-type connector.

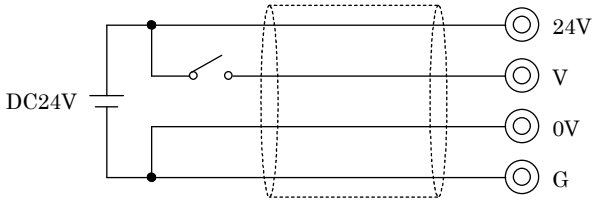
3) Power line wiring

In NW4G※2-T8D※, the unit power supply is separated from the valve power supply. Additionally, each power supply is connected by using the sensor connector (M12). The following shows examples of each power supply connections.

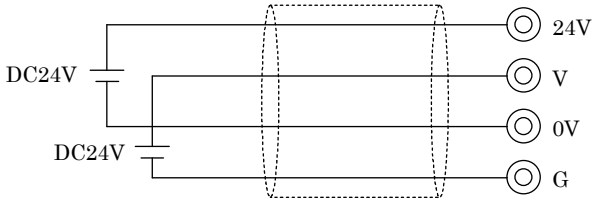
(1) When the common power supply is used for the unit power supply and valve power supply:



(2) When only the valve power supply is turned ON or OFF:



(3) When the unit power supply is separated from the valve power supply:



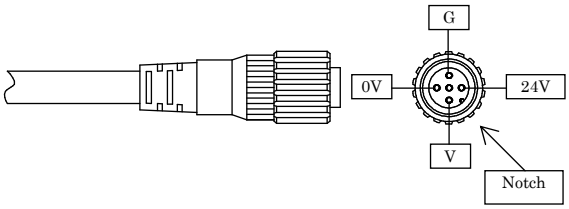
Power cable (4-pole for DC)

Follow the steps below to connect the power cable to this product.

① After checking the safety, turn OFF the power supply to be connected to the slave station.

② Check the following pin assignments and connect the slave station power supply and valve power supply to the power cable.

③ Connect the connector to the power connector on the slave station, and then tighten it firmly by hand.



Pin No.	Signal name	Remarks
1	24V	Positive(+) side of unit power supply
2	V	Positive(+) side of valve power supply
3	0V	Positive(-) side of unit power supply
4	G	Positive(-) side of valve power supply

<Recommended connectors>

Connector with cable :Model XS2F-D421-※ (one-side connector socket)

L-type connector with cable :Model XS2F-D422-※(one-side connector socket)

⚠ CAUTION:

- For the signal line, be sure to use the cable conforming to the DeviceNet specification.
- Run the communication cable far from the power and high voltage lines.
- If the OUT connector is not used, always tighten the water-proof cap completely by hand.
- Run the communication cable with a sufficient bending radius so that it is not bent forcibly.
- Always tighten the connector firmly by hand. (Appropriate tightening torque: 0.4 to 0.5N・m)
- After checking the polarities and rated voltage carefully, perform the connections.
- Select a power cable after calculating the current consumption.
- When designing the system to supply power to duplex number of slave stations and remote I/O stations, choose and wire the source of power cord with a consideration of voltage drop.
- 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.
- To avoid any problems due to noise, observe the following when wiring:

① If it is predicted that the noise may affect, provide a power source for every manifold solenoid valve wherever possible, and provide wiring individually.

② Minimize the wiring distance whenever possible.

③ Do not share a common power source with equipment such as an inverter or motor, etc. which can be a possible source of noise.

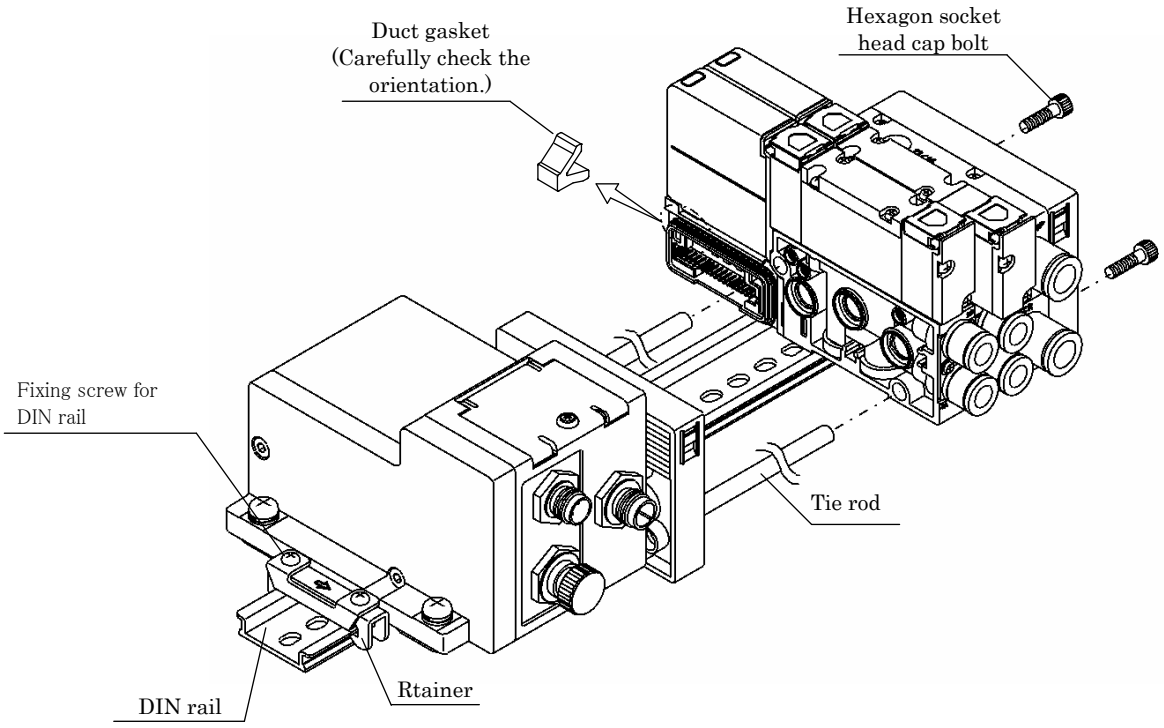
④ Do not wire the power line and signal line in parallel with another power line.

5. MAINTENANCE

5. 1 Disassembling and reassembling this product (slave station)

- Slave station(NW4G※2-T8D※)

(1) Loosen the fixing screws on DIN rail of retainer.
(2) Remove the hexagon socket bolts (2 bolts).
(3) Separate the serial transmission blocks and pull out the tie rod.
(4) Pass the serial transmission block through the tie rod and push it between the adjacent blocks without leaving any clearance and then connect.
(5) Make sure that all blocks have been connected without leaving any clearance, and then tighten the hexagon socket bolts.
(Proper tightening torque: 1.1 - 1.3N・m)
(6) Hook the retainer jaw on DIN rail securely, push in the direction of arrow indicated on the retainer and tighten the fixing screws of DIN rail.
(Proper tightening torque: 1.2 - 1.6N・m)



⚠CAUTION:

- Before turning the unit power ON, check the slave station address, transfer rate and output setting during abnormal communication.
- 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.

5. 3 Troubleshooting

Troubleshooting should address the entire system rather than a particular slave station. This slave station shows the LED indications in conformity with the DeviceNet specifications. If an error occurs, check the contents of the error according to the LED indications of the slave station and the display of the master unit, and take appropriate corrective actions. If only this LED is off, check the voltage of the power supply to the valve power and the fuse.

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

MS LED	NS LED	Description		Remarks
Green ☼	Green ☼	I/O being communicated	I/O data being communicated between the master station and slave station.	This is the normal status.
Green ☼	●	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 restart the slave station.
Green ☼	Green ◐	Waiting for connection	State of waiting for established connection from the master station.	
Red ☼	●	Watch dog timer fault	Watch dog timer fault occurred in the slave station.	Replace the slave station.
Red ◐	●	Incorrect switch setting	Setting of switch, such as dip switch, is incorrect.	Check for proper switch setting, and restart the slave station.
Green ☼	Red ☼	Node address duplication	Master unit and node address overlap.	Reset the master station while preventing the node address from overlapping, and restart the slave station.
Green ☼	Red ☼	Busoff detected	Busoff status (communication stopped due to frequent data error)	Check the following items and restart 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 ◐	Red ◐	Communication time out		Check the following items and restart 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.

☼: lighting ◐: flashing ●: light out

2) VALVE LED Indication

VALVE LED	Description
Green ☼	Valve power ON status

●

	Valve power OFF status

6. HOW TO ORDER

- Manifold

MW(4)G(A)(2)(1)0−(C8)−(T8D1)(W)(H)(D)−(5)−(3)
(a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k)

(a) No. of port		(b) Piping direction		(c) Series model		(d) Operator type	
Code	Description	Code	Description	Code	Description	Code	Description
3	3 port valve	A	Top porting(Direct piping)	2	MW4G2	1	2-position single
4	5 port valve	B	Side porting(Base piping)			2	2-position double
		Z	Back porting(Base piping)			3	3-position CC
						4	3-position ABR
						5	3-position PAB
						1	Normal close NC (3GA)
						11	Normal open NO (3GA)
						8	Mix

(e)Connecting port diameter		(f)Wiring type		(g) Pin layout		(h) Option	
Code	Description	Code	Description	Code	Description	Code	Description
See table 1 (※1)		T8D1	16 point output	No code	Standard	No code	No option
		T8D2	32 point output	W	Double wiring type	M	Manual override of non-locked type
		T8D7	16point output/input			M7	Manual override with OFF function
						H	Wrong operation prevention valve(※2)
						K	External pilot
						A	Ozone and cutting oil
						F	Built-in A･B port filters
						Y※※	Input/output block(※3)

(i) Mount type		(j) No. of stations		(k) Voltage	
Symbol	Description	Code	Description	Code	Description
No mark	Direct mount	2～16	No. of stations	3	DC24V (※4)
D	DIN rail mount				

Table 1: (e) Connecting port

	Symbol	Connection specifications	MW4GA2	MW4GB2	MW4GZ2
A/B Port	C4	One-touch joint ϕ4	●	●	●
	C6	One-touch joint ϕ6	●	●	●
	C8	One-touch joint ϕ8	●	●	●
	06	Rc1/8	●		
	CL6	One-touch joint L-shape ϕ6		●	
	CL8	One-touch joint L-shape ϕ8		●	
P/R Port (one-touch joint)			ϕ8, ϕ8 L-shape ϕ10, ϕ10 L-shape		

※1 The diameter of the P･R port is specified by the air intake/exhaust block.

※2 For the 3-position all-port block and PAB connection, valve specifications(H) for the malfunction prevention are not available.

※3 A numeric value showing the combination of continuos number of input/output block stations is put in ※※.

※4 For the serial transmission connection specifications, AC 100V and DC12V settings are not provided.

For details, check the catalog.