Discontinue

CKD

SM-215017-A

INSTRUCTION MANUAL

SERIAL TRANSMISSION TYPE

MN4TB $\frac{1}{2}$-T6D1

- 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

Discontinue

For Safety Use

To use this product safely, 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

⚠ Precautions

- Incorrect address settings of serial transmission slave stations could cause the solenoid valve and the cylinder to malfunction. Before using the product, check the set addresses of the slave stations.
- For operation of 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.

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MN4TB□-T6D1
Serial Transmission Type
Manual No. SM-215017-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.

Apr.24.1998
Revision : Mar.10.1999

1. PRODUCT

1.1 General outline of the system

MN4TB□-T6D1

1) The MN4TB□-T6D1 is a solenoid valve mounted with a slave station (OPP2-1D) 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 (OPP2-1D) 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) LED lamp helps to verify at a glance whether output is ON or OFF.
   (4) The source of power for unit and valve can be installed individually and each unit has a monitor LED indicator.
   (5) The HOLD/CLEAR switch can be used to hold the output signal during a communication fault or selected to turn OFF all points.

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 MN4TB□-T6D1 and the slave station OPP2-1D. 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.

[SM-215017-A]

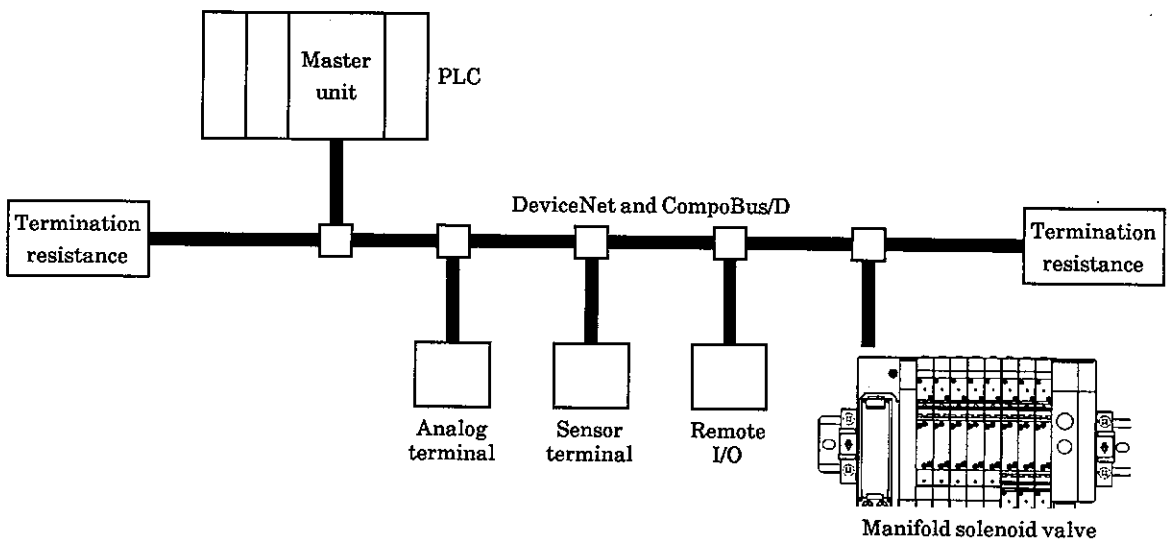
1.2 Structure of the System

This system chiefly consists of PLC body, Master unit, Solenoid valve MN4TB□-T6D1 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



1.3 Specifications

1) Specification of solenoid valve

(1) Specification of Manifold

Item	Specifications			
	MN4TB1 Series		MN4TB2 Series	
Type of manifold	Manifold block type		Manifold block type	
Applicable solenoid valve	4TB1 Series		4TB2 Series	
Number of blocks	2 to 8 blocks (Max.16 when single)		2 to 8 blocks (Max.16 when single)	
Kind of manifold	Common Supply air / Common exhaust		Common Supply air / Common exhaust	
Ambient temperature °C	5 to 50		5 to 50	
Ambient humidity	35 to 85%RH (No dewing)		35 to 85%RH (No dewing)	
Work ambience	No corrosive gas should exist		No corrosive gas should exist	
Media temperature °C	5 to 50		5 to 50	
Port size	Pressure port (P) Exhaust port (R)	Cylinder port (A · B)	Pressure port (P) Exhaust port (R)	Cylinder port (A · B)
	Snap joint (ϕ6, ϕ8)	Snap joint (ϕ4, ϕ6, ϕ8)	Snap joint (ϕ8, ϕ10, ϕ12)	Snap joint (ϕ6, ϕ8, ϕ10)

(2) Specifications of solenoid valve

Item \ Series Model No. / No. of positions, / No. of solenoids	MN4TB1 Series				
	4TB110 2-position Single	4TB120 2-position Double	4TB130 3-position All ports blocked	4TB140 3-position A · B · R ports connection	4TB150 3-position P · A · B ports connection
Media	Compressed air				
Operating method	Pilot (soft spool)				
Max. working pressure MPa	0.7				
Min. working pressure MPa	0.15	0.1	0.2		
Proof pressure MPa	1.05				
Effective sectional area mm^2	7		4		3
Response time ms	20 or less(at 0.5MPa)		30 or less(at 0.5MPa)		
Manual override	Non-lock type (Standard)				
Lubrication	Not required				
Protection structure	Dust proof				

Item \ Series Model No. / No. of positions, / No. of solenoids	MN4TB2 Series				
	4TB210 2-position Single	4TB220 2-position Double	4TB230 3-position All ports blocked	4TB240 3-position A · B · R ports connection	4TB250 3-position P · A · B ports connection
Media	Compressed air				
Operating method	Pilot (soft spool)				
Max. working pressure MPa	0.7				
Min. working pressure MPa	0.15	0.1	0.2		
Proof pressure MPa	1.05				
Effective sectional area mm^2	14.5		12		
Response time ms	20 or less(at 0.5MPa)		30 or less(at 0.5MPa)		
Manual override	Non-lock type (Standard)				
Lubrication	Not required				
Protection structure	Dust proof				

(3) Electrical specifications

Item		Specification
		MN4TB1, MN4TB2 Series
Rated voltage	(V)	DC24±10%
Current consumption	(mA)	75
Power consumption	(W)	1.8
Other		Lamp & surge killer, built-in(Standard)

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 ※	6m or less	39m or less
	250k bps	250m or less ※	6m or less	78m or less
	125k bps	500m or less ※	6m or less	156m or less
Power source for communication	DC24V±10% is supplied from an external unit.			
Error control	CRC error			

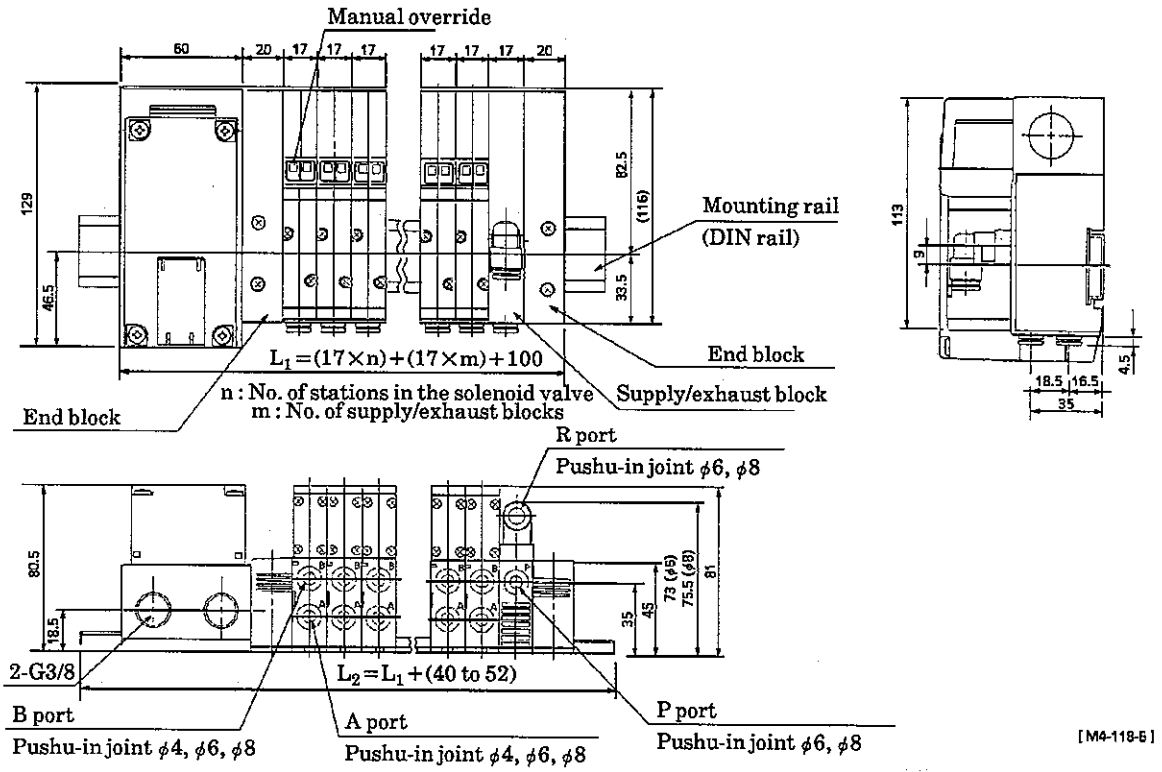
※ Indicates values when a thick private cable is used. The value is less than 100 m in cases where a thin private cable is used.

3) Slave station specification

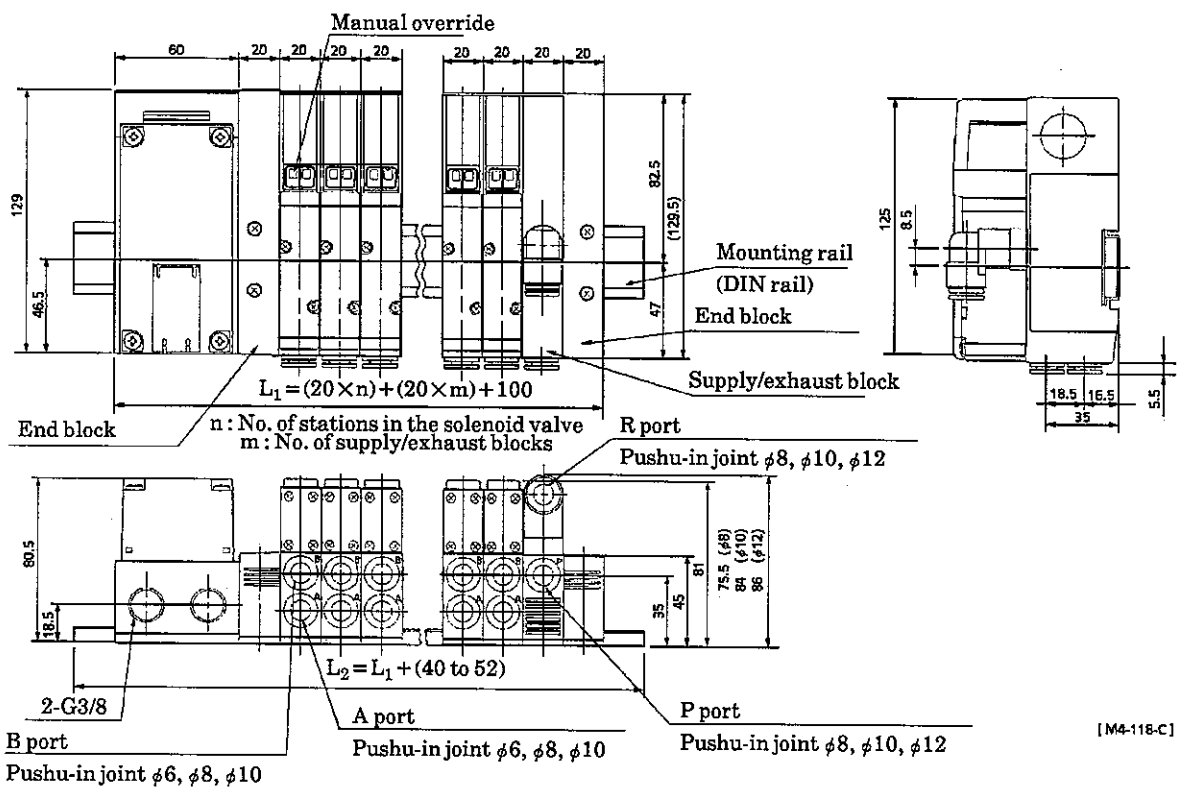
Item		Specifications
Power supply voltage (Unit side)		DC21.6V to 26.4V
Current consumption (Unit side)		100mA or lower (When all output points are ON)
Power supply voltage (Valve side)		DC22.8V to 26.4V
Current consumption (Valve side)		15mA or lower (When all output points are OFF)
Power supply voltage (Communication side)		DC11V to 25V
Current consumption (Communication side)		50mA or lower
Insulation resistance		Over 20M 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, 1μsec
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 0.75mm or 10G whichever smaller.
Mechanical shock proof		30 G 3 directions 3 times
Ambient temperature		0 to 55°C
Ambient humidity		30 to 85%RH (No dew fall)
Atmosphere used		No corrosive gas
Protection structure		IP64 (Dust proof, Drip proof)
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		100mA/1 point
Leakage current		0.1mA or lower
Residual voltage		0.5V or lower
Output type		NPN Transistor, Open collector output
Fuse		48V 2A (LM20 Products of Daito Tsushinki Co.)
Indication of operation		LED (Lit when power is ON)
No. of nodes occupied by slave station		1 node

1.4 External dimensions of solenoid valve

● MN4TB1※0-※-※T6D1-※

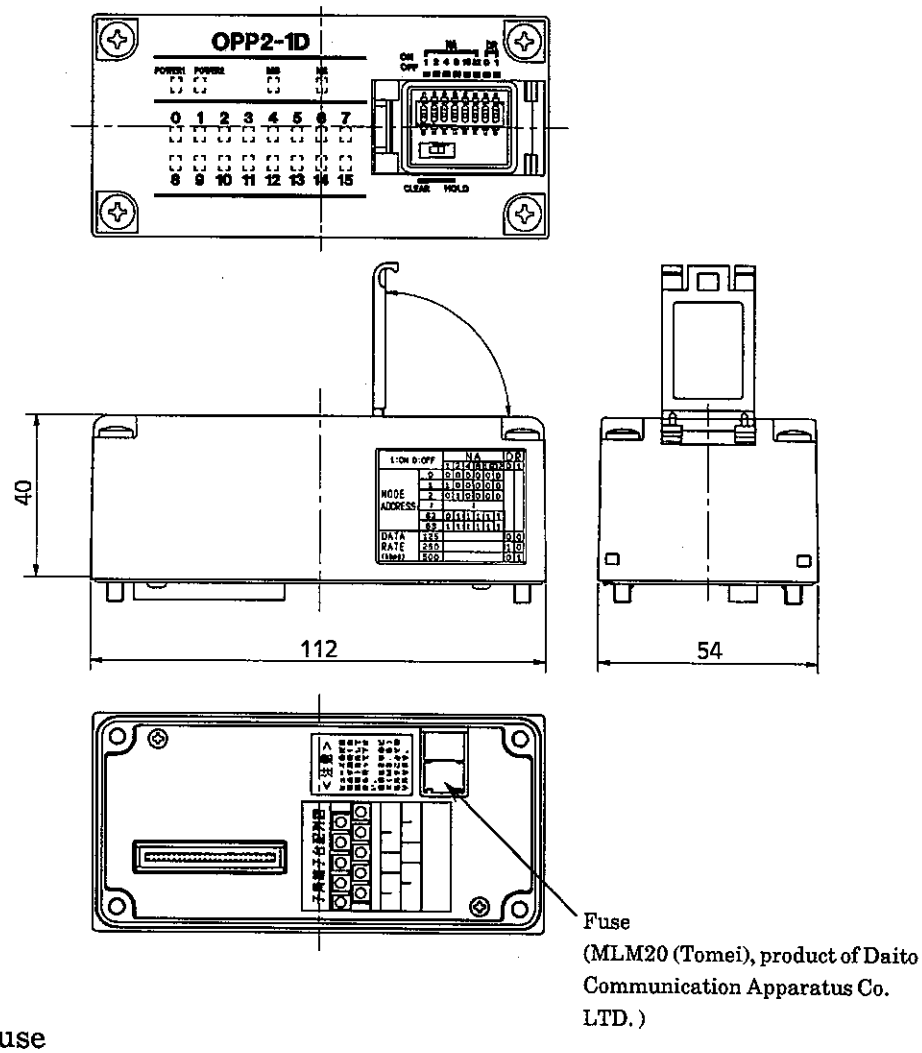


● MN4TB2※0-※-※T6D1-※



1.5 Slave station for valve

1) Appearance



Fuse
(MLM20 (Tomei), product of Daito Communication Apparatus Co. LTD.)

2) Fuse

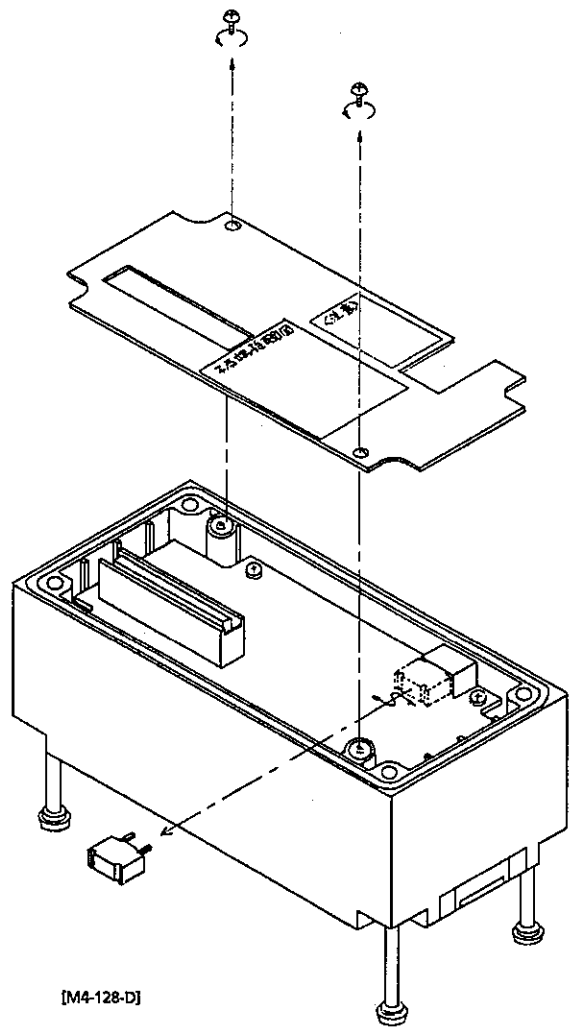
Burt out fuse is visualized at lower part of station. It is accessible through the bottom of station to replace a fuse. Remove the bottom plate (metal piece) of station and the residual fuse to replace it with the recommended fuse such as follows.

Recommended:LM20 (Tomei), product of Daito Communication Apparatus Co. LTD.
CKD model No. : 4T9-LM20

Push it into fuse socket properly straight. Discard replaced fuse immediately because it is hard to distinguish with new one. There are various causes of fuse burning such as short circuited or somethingelse. Be sure to give the remedy of the cause before turning power ON, again. (Secular change, sometimes, may be the cause although it is rare.)

Procedure for replacing fuse

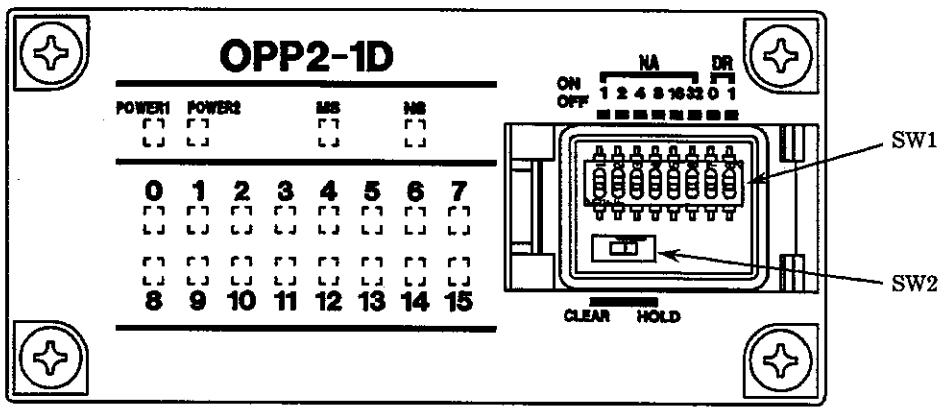
If a blown fuse is discovered, follow the procedure below to replace it.



(1) Remove the two M2.5 screws with an appropriate screwdriver.
(2) Remove the base plate.
(3) Grasp the blown fuse with your fingers and pull it out. (Do not use a tool to avoid damaging the wireing pattern on the printed board.) The fuse will come out easily if you wiggle it sideways as you pull on it.
(4) Insert a new fuse straight and fully into the fuse socket.
(5) Make sure that there are no particles or other foreign matter on the print board. Remove them if there are any.

3) 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 cover 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 LED	Content of indication
POWER 1	Green LED comes on when the unit power is ON.
POWER 2	Green LED comes on when the valve power is ON and the fuse is normal.
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].
0 to 15	Indicates output status. Red LED comes on when the power is ON.

Name of Switches	Content of Setting
Node address setting switch (SW1 of NA)	Sets the slave station address in the 0 to 63 range.
Transmission speed setting switch (SW1 of DR)	Sets the transmission speed for the master unit.
Output mode setting switch (SW2)	Selects whether to hold or clear the output data status when a communication error occurs.

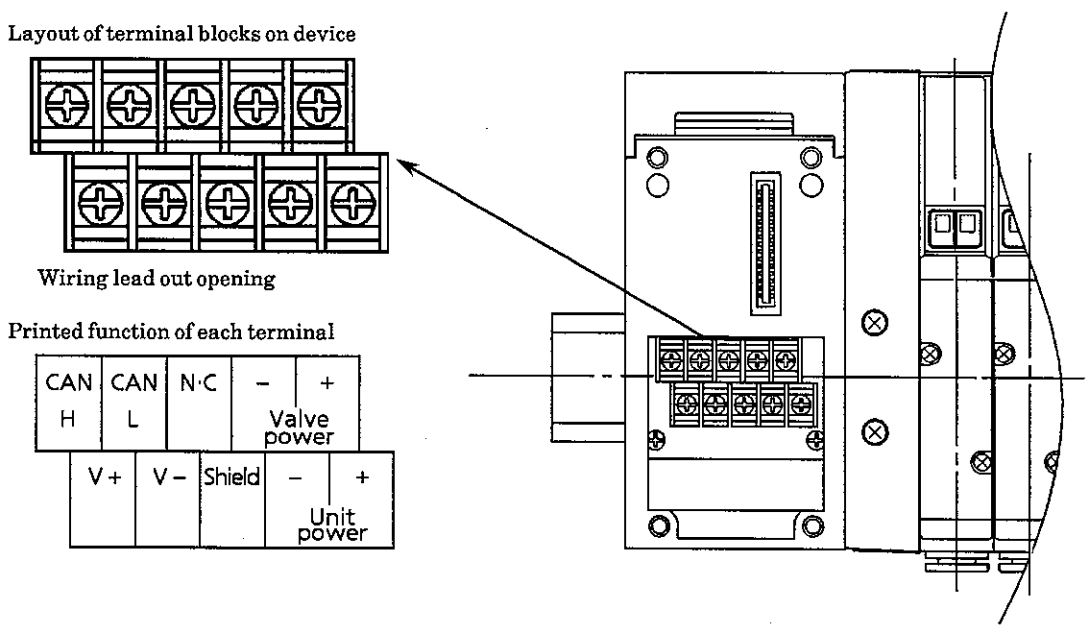
(2) A setting switch used to set the node address and transmission speed, etc. of the slave station for the valve. (Also refer to 3. Operation Method for confirmation.)

Before setting the switch, verify that the power source (including the communication power source) for the slave station is OFF.

- Cover plate for switches on the station for valve snap opens. Keep it closed always except when setting switches. Otherwise, foreign particle may penetrate into internal circuit causing unforeseen trouble. Be careful to keep foreign particle from falling into during setting process.
- Setting switch has been precisely built. Disorderly handling may cause damage of switch. To set station number, do not touch internal circuit printed board.

1.6 Mounting portion of Slave station for valve

Station for valve can be pulled away upward after removing 4 mounting screws (M4). Tighten 4 screws with the torque of 0.5 to 0.7N·m to install station while ascertaining that the connectors on the bottom face of station is inserted properly and also no cable is pinched in between station bottom and mounting device. Avoid leaving station without placing screws, wrenching body or applying excessive jerking force, as it may cause station to fall out of device or damage to connecter. Also, avoid leaving manifold blocks alone after pulling station away as it may allow foreign particles or dusts to fall into connecter slits or contacting part causing short circuit or insufficient contact. Likewise avoid touching connecter or printed circuit board while keeping them away from dusts or foreign particls.
Structure of mounting device is illustrated below.



There are terminal blocks provided on the mounting device. Wiring connection to station is accomplished through these terminal blocks. Function of each terminal is printed on the face of station mounting device.

- Choose 6mm wide or less of M3 crimp type terminal metal piece and tighten it with torque of 0.3 to 0.5N · m.

- Be ware that this mounting device is of vitally important. Carefully avoid water drop, dusts or foreign particle from falling into this device.

Function and connection destination of each terminal are shown in the table below.

Symbol		Function	Major objects to be connected	Cable color
CAN H		Communication terminal	Connect to the communication line "CAN H" and "CAN L" of the master station or slave station.	White
CAN L				Blue
Shield		Shield terminal	Connect to the shield wire of the cable.	(Bare wire)
V+		Communication power source	Use a DC11V to 25V power with less noise.	Red
V−				Black
Power for units	+	Unit power	Use a DC24V±10% power with less noise.	
	−			
Power for valves	+	Valve power	Use a DC24V+10%, -5% with less noise.	
	−			
N·C		Not used.	Do not connect anything.	

Take grounding from FG terminal as FG terminal is not connected to manifold body for the purpose of grounding.

2. CAUTIONS

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.

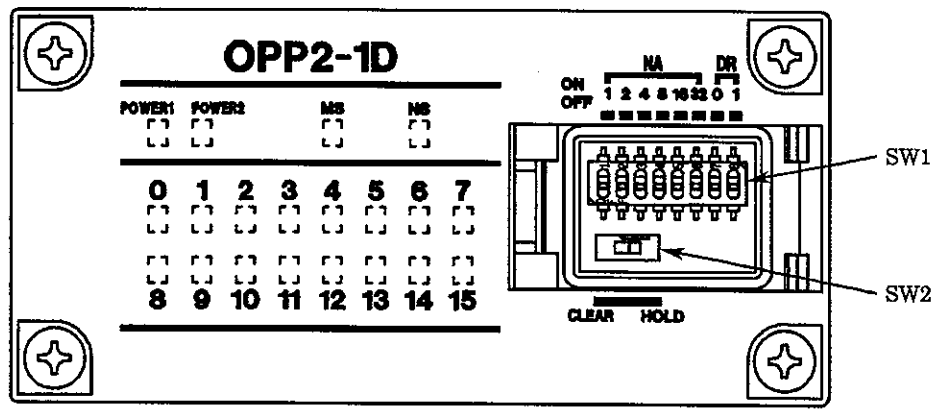
Solenoid valve responding time, of course, varies depending on model. It is advisable of referring to valve specification.

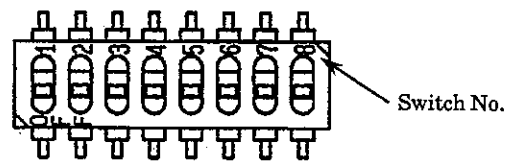
As for OFF time, there is another delay factor of approx. 20ms due to fly-wheel diode being used for surge absorbing circuit to valve slave station.

3. OPERATION

3.1 Switch setting

The switch is used to set three output modes for node address, transmission speeds and communication faults. Since the switch functions vary with the switch position, be sure to confirm the position of the switch and turn the power source OFF (including the communication power source) before setting the switch.





1) Setting the node address (NA of SW1)
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

0 : OFF 1 : ON

NOTE) Figures shown in ( ) indicate the case corresponding to each switch.

2) Setting the Transmission Speed (DR of SW1)
Set the transmission speed for the master unit.

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

0 : OFF 1 : ON

NOTE) Figures shown in ( ) indicate the case corresponding to each switch.

3) Setting the Output Mode (SW2)
Set the output data status as follows when a communication error has occurred.

CLEAR : Used to clear to "0" all the output data from the master station in case of a communication error.

HOLD : 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.

3.2 Correspondence between Output Nos. and internal connector Nos.

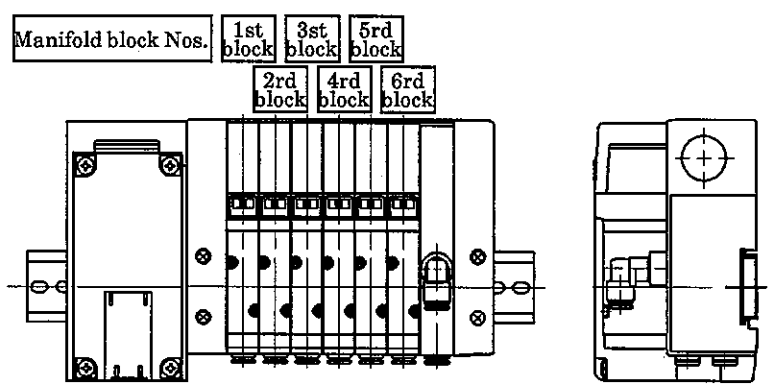
Those Numbers correspond as per table, posted below.

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

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 wiring example

◦ For Single solenoid valve

	Connector pin No.															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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 up to the 16th manifold blocks.)

◦ For Double solenoid valve

	Connector pin No.															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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.															
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
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 outputs occupying 1 node. For creating programs, refer to the User's Manual by the PLC maker (Programming Section).

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	

● 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		

Discontinue

	Section	Information	Max Instance		
Object Instance 2	Instance Type	Polled I/O	1		
	Production Trigger	Cyclic			
	Transport Type	Server			
	Transport Class	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		

	Section	Information	Max Instance
Object Instance 3	Instance Type	Bit Strobed I/O	1
	Production Trigger	Cyclic	
	Transport Type	Server	
	Transport Class	2	
	Attributes	ID Description	Get Set 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	○ × 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 MN4TB□-T6D1 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 MN4TB□-T6D1 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.

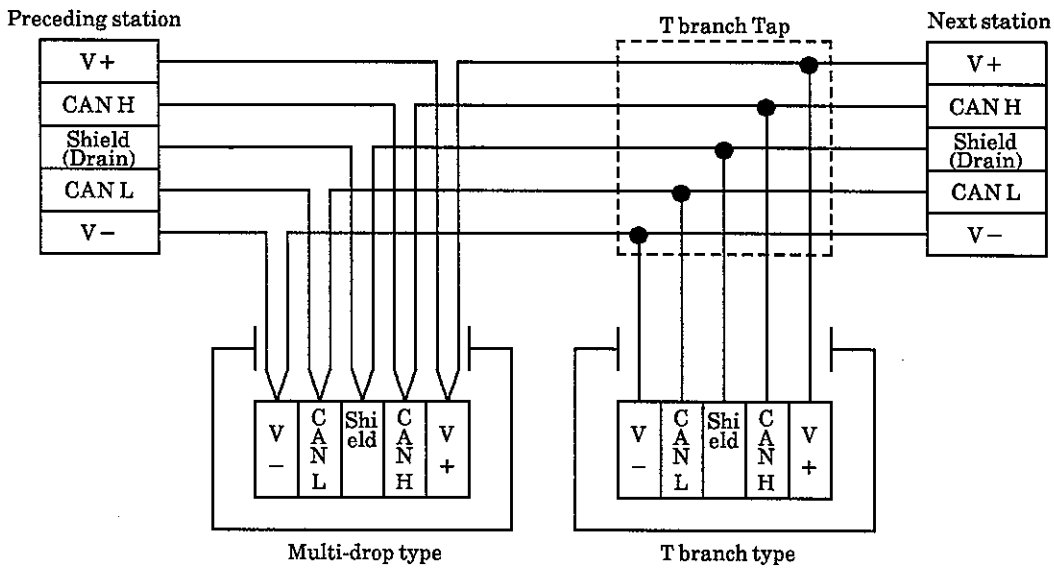
Model	Specification	Makers
Model DCA2-5C10	Thick cable, 5-wire, 100 m	OMRON Corporation
Model DCA1-5C10	Thin cable, 5-wire, 100 m	OMRON Corporation
TDN18-10G	Thick cable, 5-wire, 10 m	Showa Electric Wire and Cable
TDN18-30G	Thick cable, 5-wire, 30 m	Showa Electric Wire and Cable
TDN18-50G	Thick cable, 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

NOTE : If a cable clamp (Our model: 4T9-SCL-10B) is used in the wiring lead-out opening, thick cable cannot be passed through it.
Remove the cable clamp before using a thick cable.

2) Wiring of the Communication Line

Before connecting the DeviceNet cable to the slave station, connect the CAN H (white), CAN L (blue), V+ (red) and V− (black) lines to each of the CAN H, CAN L, V+ and V− terminals and connect the shield wire (Drain) to the shield terminal. The multi-drop type wiring and T branch types are available for wiring.

Examples of connections are shown below.



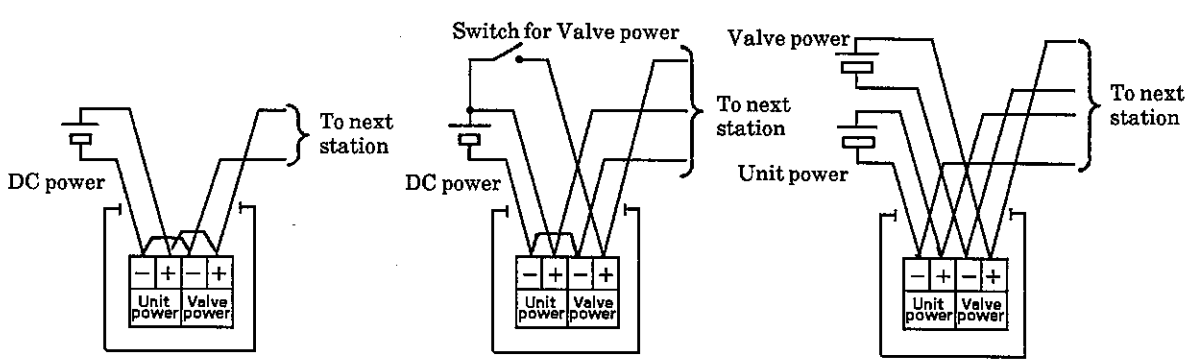
3) Wiring of the Power Line

The OPP2-1D can separate the unit power source and the valve power source and can use an independent power source for every unit. Here are some examples of connections to supply power from one power source to multiple slave stations.

① Common connection of Unit power and Valve power

② Wiring to enable Valve power to be turned On · Off.

③ Seperate connection Unit power with Valve power



NOTE : 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

4) Caution when Wiring

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

① In cases where noise influence is a consideration, 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 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 ☼	Green ☼	I/O being communicated	I/O data being communicated between the master station and the slave	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 re-start 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 re-start the slave station.
Green ☼	Red ☼	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
Green ☼	Red ☼	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 ☼	Red ◐	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.

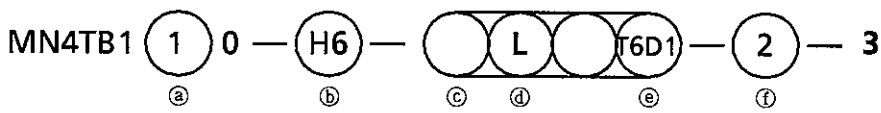
☼ : ON ◐ : Flashing ● : OFF

Discontinue

6. HOW TO ORDER

● Solenoid valve body only for manifold control

● Block manifold

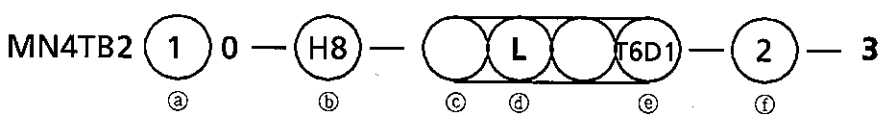


ⓐ Position		ⓑ Port size (Cylinder port)		ⓒ Manual override	
Marking	Description	Marking	Description	Marking	Description
1	2-position, Single	H4	φ4 push-in joint	No marking	Non-locking type Manual override
2	2-position, Double	H6	φ6 push-in joint		
3	3-position, All port block	H8	φ8 push-in joint	M1	Locking type manual override
4	3-position, A · B · R connection	HX	Mix type, push-in joint		
5	3-position, P · A · B connection				
8	Mixed Manifold				

ⓓ Indicator, Protection circuit		ⓔ Other options		ⓕ No. of manifold solenoid valve stations	
Marking	Description	Marking	Description	Marking	Description
L	With lamp & surge killer	No marking	None	2	2 stations
No marking	Without lamp & surge killer			to	to
		K	External pilot		

● Solenoid valve body only for manifold control

● Block manifold



ⓐ Position		ⓑ Port size (Cylinder port)		ⓒ Manual override	
Marking	Description	Marking	Description	Marking	Description
1	2-position, Single	H6	φ4 push-in joint	No marking	Non-locking type Manual override
2	2-position, Double	H8	φ6 push-in joint		
3	3-position, All port block	H10	φ8 push-in joint	M1	Locking type manual override
4	3-position, A · B · R connection	HX	Mix type, push-in joint		
5	3-position, P · A · B connection				
8	Mixed Manifold				

ⓓ Indicator, Protection circuit		ⓔ Other options		ⓕ No. of manifold solenoid valve stations	
Marking	Description	Marking	Description	Marking	Description
L	With lamp & surge killer	No marking	None	2	2 stations
No marking	Without lamp & surge killer			to	to
		K	External pilot		