

Open Terminal series  
**MECHATROLINK Bit Distributed I/O Terminal**  
AB023-M1

# User's Manual

Version 1.0 June 23, 2005

Bit Control & Information Transmission

**Sho-haisen system**

**Open Terminal series**

# Precautions

---

## Precautions for this manual

1. Please deliver this User's Manual to the end user.
2. Please read this User's Manual carefully and understand the details of the product well before you start using it.
3. This manual explains the details of the functions including in the product, but does not guarantee the compatibility to user's own purpose.
4. It is prohibited to reprint or reproduce a part of this manual or all without permission.
5. The contents of this manual may be changed without notice.

## The indications of warnings and cautions for safe and correct use



Indicates a potentially hazardous situation, which, if not avoided, could result in death or serious injury.



Indicates a potentially hazardous situation, which, if not avoided, could cause personal injury or damage.

## The precautions for using the system under safety condition



- ◆ AnyWire System is not intended to have control functions for securing safety.
- ◆ In the following cases, special consideration is necessary for the usage sufficient for ratings and functions, and necessary for safeguard such as fail-safe function. And also, please contact our company.
  - (1) ications requiring higher safety
    - 1- Applications expected to have a great influence on life or property
    - 1- Medical equipment, or safety devices
  - (2) ications requiring higher reliability of system
    - 1- Applications for vehicle control or burning control system
- ◆ Be sure to turn the power off before installation or replacement.
- ◆ Be sure to use AnyWire System within the specifications and conditions prescribed in this manual.



- ◆ Be sure not to turn on the 24V power before completing wiring and connecting in AnyWire System.
- ◆ Use a regulated power supply of 24V DC. Non-regulated power supply may cause a trouble to the system.
- ◆ Keep transmission cables and I/O cables away from high-voltage and power cables, though the AnyWire System has high noise margin.
- ◆ Be careful not to allow metal bits into the unit, the connectors or the terminal blocks, especially when wiring.
- ◆ Mis-wiring may cause failure. Consider the length and installation of cable wiring to keep connectors and cables from disconnecting or excessive distortion.
- ◆ Never solder the stranded wire to be connected with the terminal block, otherwise causing a defective contact.
- ◆ In case of long cable length of power line along the transmission lines, large voltage drops will occur and may cause voltage shortage for the distant Slave Units. In that circumstance, connect the local power supply units so that the prescribed voltage is secured at each local Slave Unit.
- ◆ Be careful of the following items about installation environment.
  - No exposing directly to the sunlight and ambient temperature is 0 to +55 °C.
  - Operating relative humidity is 10 to 90 % and no dew condensation by sudden temperature change
  - No corrosive or inflammable gases
  - No direct vibration or impact
- ◆ Fasten terminal screws securely to avoid malfunction.
- ◆ In case of storage of the product, keep away from high temperature and high humidity. (Storage temperature is -20 to 75°C.)
- ◆ When the emergency stop circuit or the interlock circuit for safety are arranged, provide these circuits outside the AnyWire System.

# INDEX

---

<b>1</b>	<b>OUTLINE</b> .....	<b>1-1</b>
<b>2</b>	<b>SPECIFICATION</b> .....	<b>2-1</b>
2.1.	GENERAL SPECIFICATIONS .....	2-1
2.2.	CAPABILITY SPECIFICATIONS .....	2-1
2.3.	DIMENSION .....	2-3
2.4.	NAME OF EACH PART .....	2-4
2.5.	DETACHING TO DIN RAIL .....	2-5
<b>3</b>	<b>SWITCH SETTING</b> .....	<b>3-1</b>
3.1.	MECHATROLINK SIDE .....	3-1
3.1.1.	Operating mode setting (MODE) .....	3-1
3.1.2.	The station number setting (Station No.) .....	3-1
<b>4</b>	<b>REGISTER ALLOCATION</b> .....	<b>4-1</b>
4.1.	MP2000 SERIES .....	4-1
4.1.1.	17byte mode .....	4-1
4.1.2.	32byte mode .....	4-2
4.1.3.	Alarm .....	4-3
4.1.4.	Status .....	4-3
4.1.5.	Slave response alarm reset output .....	4-3
4.2.	DATA FORMAT .....	4-4
<b>5</b>	<b>SETTING FROM THE PROGRAMMING TOOL</b> .....	<b>5-1</b>
5.1.	MODULE DEFINITION .....	5-1
5.1.1.	Parameter setting .....	5-2
5.1.2.	Link allocation .....	5-3
5.1.3.	I/O Map .....	5-5
5.1.4.	Status .....	5-6
5.1.5.	MECHATROLINK Saving Defined Data .....	5-6
5.1.6.	I/O register allocation example .....	5-7
<b>6</b>	<b>MONITORING FUNCTION</b> .....	<b>6-1</b>
6.1.	AUTOMATIC ADDRESS RECOGNITION .....	6-1
6.2.	MONITORING OPERATION .....	6-1
<b>7</b>	<b>LED INDICATION</b> .....	<b>7-1</b>
7.1.	MECHATROLINK SIDE .....	7-1
7.2.	SHO-HAISEN BUS SIDE .....	7-1
<b>8</b>	<b>CONNECTIONS</b> .....	<b>8-3</b>
8.1.	TERMINATOR .....	8-4
<b>9</b>	<b>TIME REQUIRED FOR TRANSMISSION</b> .....	<b>9-1</b>

9.1.	INPUT .....	9-1
9.2.	OUTPUT .....	9-1
<b>10</b>	<b>TROUBLE SHOOTING .....</b>	<b>10-1</b>
10.1.	MECHATROLINK SIDE .....	10-1
10.2.	SHO-HAISEN BUS SIDE .....	10-1
<b>11</b>	<b>CHANGE HISTORY .....</b>	<b>11-1</b>

# 1 Outline

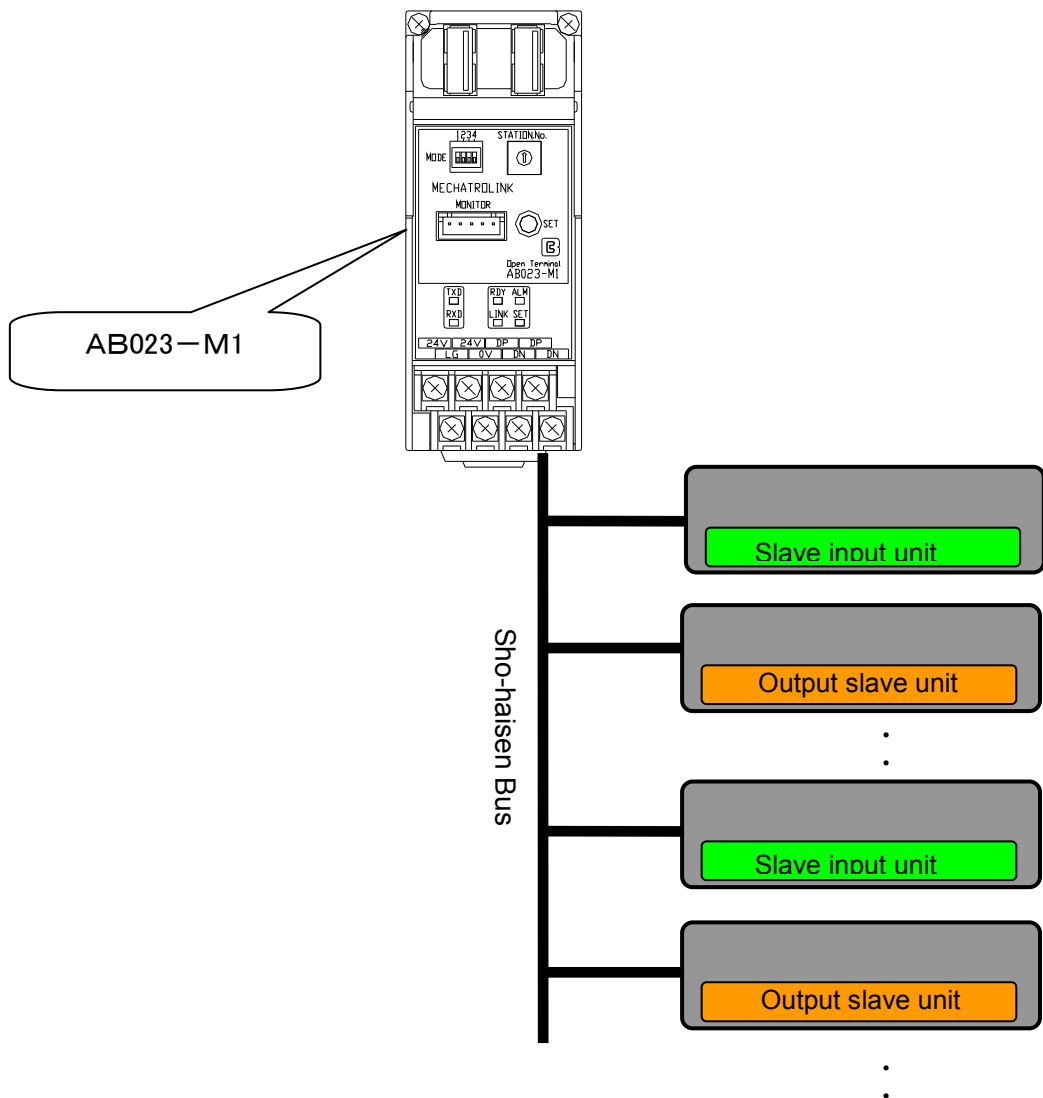
Bit decentralization I/O terminal is the best for MECHATROLINK when I/O under the Link controlling more distribution in detail.

The I/O signal and the power supply can be sent to the terminal (D-I/O terminal) in two wires transmission lines. Even if the divergence of wiring is done, the disconnection detection is possible.

The maximum input 256 points and the output 256 points a unit of AB023-M1 can be capable for input and output operation.

(The number of I/O points per one system of AB023-M1 <Bit distributed I/O terminal/bus copular>

NOTE) Note) MECHATROLINK is the registered trademark of YASKAWA Electric Corporation in Japan.



## 2 Specification

### 2.1. General Specifications

Ambient operating Temperature	0°C ... +55°C
Storage Temperature	- 20°C ... +75°C
Storage Humidity	10% ... 90%RH (No condensation)
Ambient Atmosphere	No corrosive or flammable gas

### 2.2. Capability Specifications

#### System Specifications on Sho-haisen Bus side

Transmission Clock	28.7 KHz
Transmission Mode	Total frame cyclic method with DC power supply on common wire
Connection Form	Bus Form (A Multi-drop Method, a T-branch Method, a Tree Branch Method)
Transmission Protocol	Special protocol (AnyWire Bus-e protocol)
Number of Connection I/O points	432 points (IN: 216 points OUT: 216 points) or 192 points (IN: 96 points OUT: 96 points)
Number of the connection points	Up to 128 units (Changed by consumption current of each unit)
Transmission Cycle Time (1 cycle time value)	5.5ms/IO 192 points 10.2ms/IO432 points Note) The transmission cycle time reaches the value between 1 to 2 cycle times.
Connection Cable	General-purpose 2-wire cable (0.75 mm <sup>2</sup> ... 2.0 mm <sup>2</sup> )
Maximum Transmission Distance	During operation of rated 24 V: 50m(1.25 mm <sup>2</sup> electric cable) Condition: 2 A load current, a relay drive ability distance
Supply Maximum Current of transmission	2A
Power supply voltage	DC26.4V (24-VDC rated supply)
Range of voltage during use slaves	Power source supply is unnecessary. (supplied from the transmission line)
Supply voltage of slave load	Power source supply is unnecessary. (supplied from the transmission line)

**System Specification on MECHATROLINK side** (when connected to the MP2000 series machine controller made by YASUKAWA Electric Corp.)

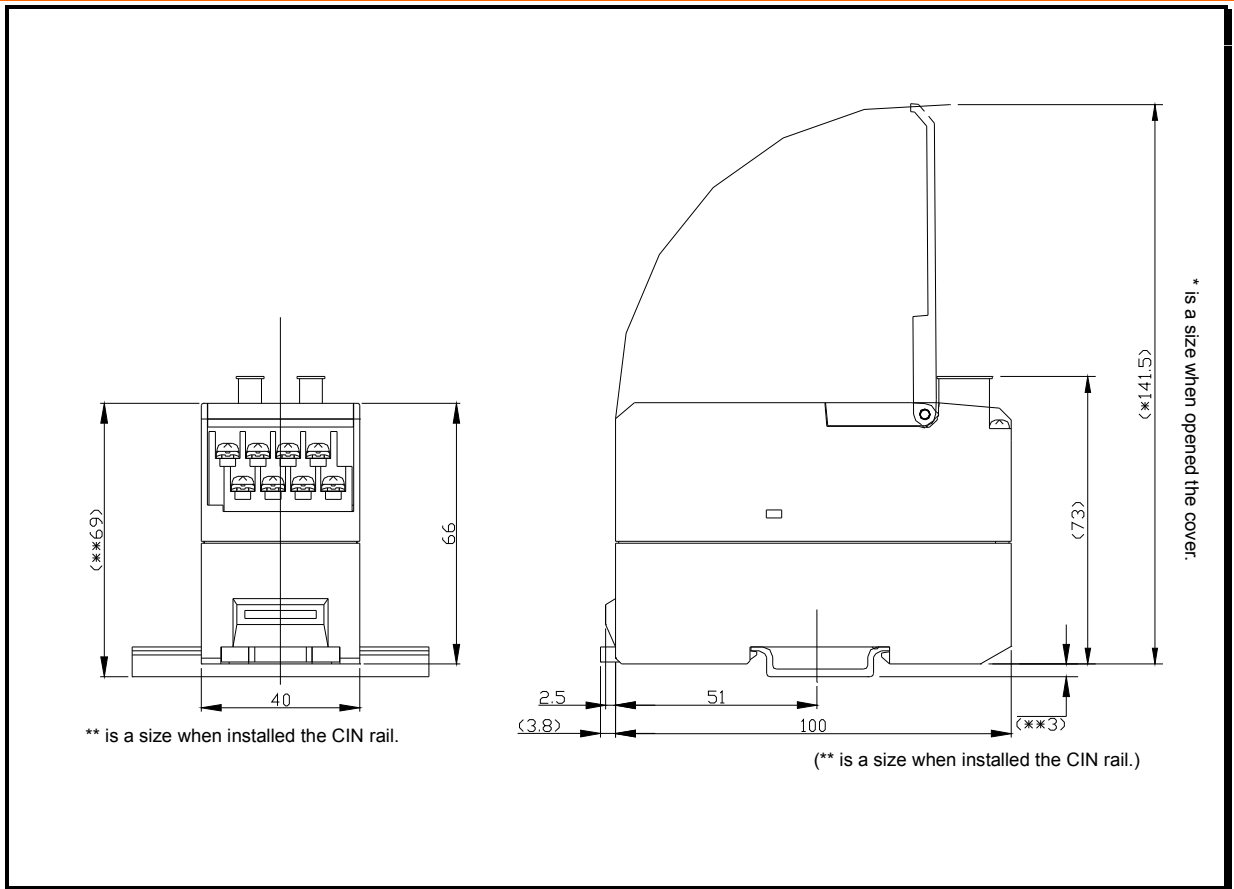
Version	MECHATROLINK- I	MECHATROLINK- II
Transmission Method	Bus	Bus
Maximum Transmission Distance	50 m	50 m
Minimum Station Distance	0.5 m	0.5 m
Transmission Speed	4Mbps	10Mbps
Communication Cycle	2ms	1ms, 1.5 ms or 2 ms
Number of Maximum Connection stations	14 stations	21 stations
Transmission Control Method	Cyclic Method	Cyclic Method



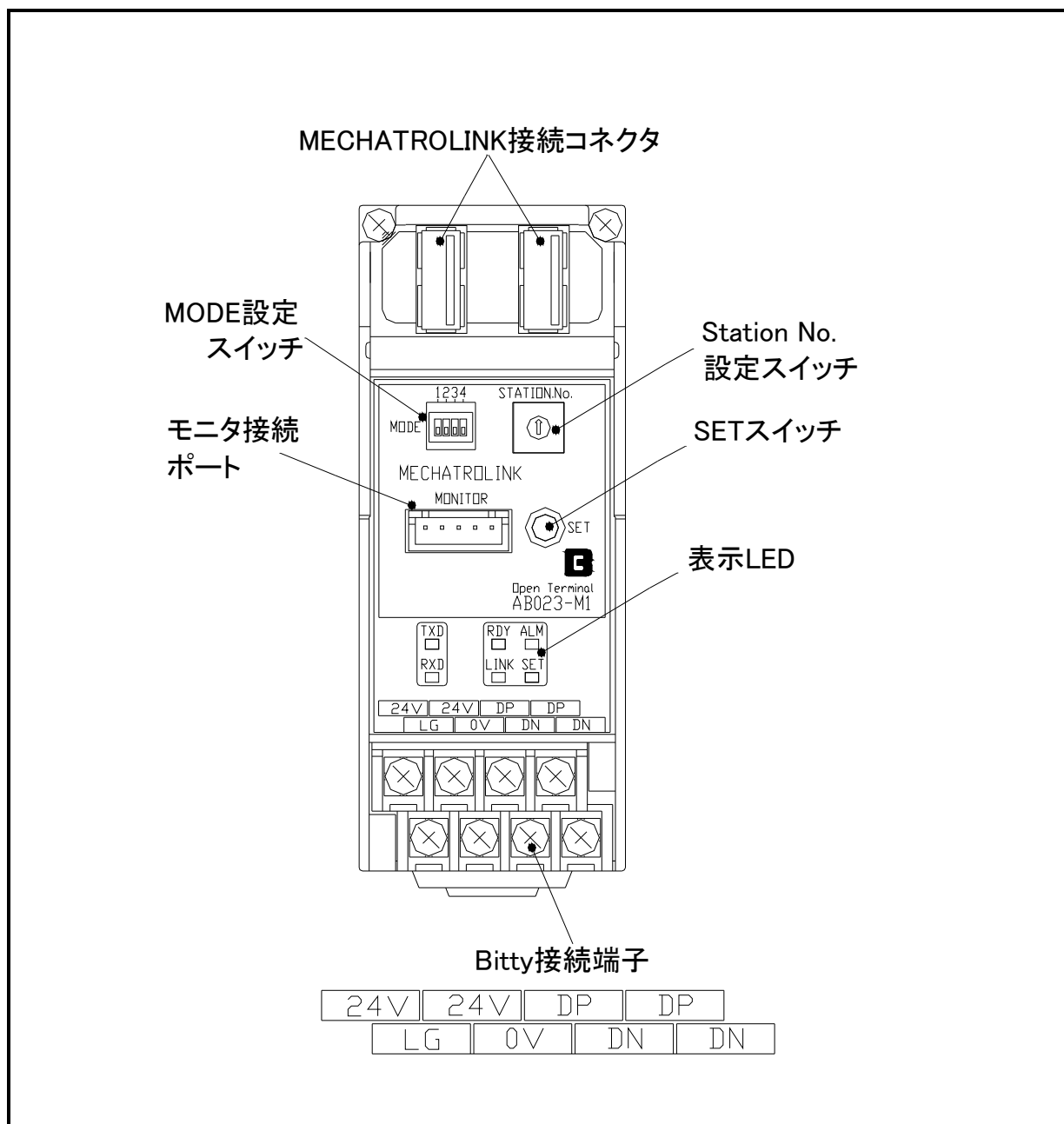
- This unit can be used with the products of the versions shown below or later.  
 Programming device software MPE720: V5.32  
 MP2000 Series machine controller CPU: V2.42  
 MECHATROLINK interface module SVB-01: V1.15
- This unit uses intelligent I/O.
- MECHATROLINK-I (17-byte mode), MECHATROLINK-II (17-byte mode), and MECHATROLINK-II (32-byte mode) are supported.
- The unit supports asynchronous communication, but not synchronous communication.
- The 0.5-ms communication cycle is not supported.
- It takes about 30 ms before the data input from this unit or the data output from the slave unit is updated after the status of the MP2000 Series CPU is changed from STOP to RUN. Data before the update is treated as "off" data.



### 2.3. Dimension



## 2.4. Name of Each Part



Japanese	English
MECHATROLINK接続コネクタ	MECHATROLINK Connection Connector
MODE設定スイッチ	MODE setting switch
モニタ接続ポート	Monitor Connection Port
Station No. 設定スイッチ	Station No. setting switch
SETスイッチ	SET Switch
表示LED	Indication LED

## 2.5. Detaching to DIN Rail

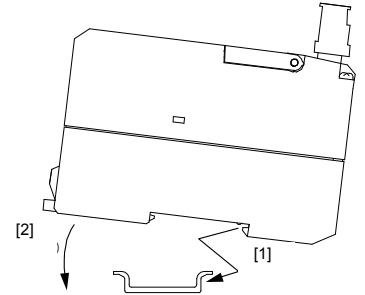
---

Please use and install this unit on the DIN.

### 1. How to install this unit on DIN rail

- [1] A fixed pick upper in the bottom is put on the DIN rail.
- [2] This device is pressed against the DIN rail and sets it.

Install

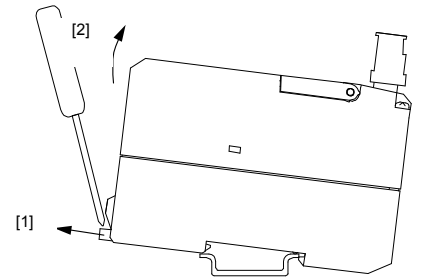


### 2. How to detach this unit from DIN rail

The hook comes off from the rail when a minus driver is defeated to the difference all-in in the hook and the driver is defeated to this device side.

The main body fixation pick side is detached, and under such a condition, please lift and detach the main body hook side to the starting point.

Detach



## 3 Switch Setting

### 3.1. MECHATROLINK side

#### 3.1.1. Operating mode setting (MODE)

Indication Name	Name	Status	Function	Setting at shipping
1	Communication speed setting	ON	MECHATROLINK-II (10Mbps)	ON
		OFF	MECHATROLINK-I (4Mbps)	
2	I/O byte setting	ON	32byte mode	OFF
		OFF	17byte mode	
3	MECHATROLINK Upper address setting	ON	7xh	OFF
		OFF	6xh	
4	System reserved	—	Use at OFF	OFF

432 points at 32byte-mode transmission (IN: 216 points, OUT: 216 points)

192 points at 17byte-mode transmission (IN: 96 points, OUT: 96 points)

For MECHATROLINK-I, a baud rate of 4 Mbps and the 17-byte mode are used.

#### 3.1.2. The station number setting (Station №)

Set the station number of MECHATROLINK-I.

When connecting more than one unit, take care to avoid station number overlap.

Station numbers from 61H to 7EH can be set using the Station number switch in combination with the MODE switch 3. For the MP2000 Series machine controller made by YASUKAWA Electric Corp., however, the maximum station number must be as shown in the table below.

Communication Method	Transmission Speed	Communication Cycle	Number of slave stations	Maximum Station No.
MECHATROLINK-I	4Mbps	2 ms	14 stations	6EH
MECHATROLINK-II (17byte mode)	10Mbps	1 ms	15 stations	6FH
MECHATROLINK-II (32byte mode)	10Mbps	1 ms	9 stations	69H
		1.5ms	15 stations	6FH
		2 ms	21 stations	75H

The station number setting list

ST# (station No.)	Switch Setting	
	MODE Switch "3"	Station No. Switch
01 (61H)	OFF	1
02 (62H)	OFF	2
03 (63H)	OFF	3
04 (64H)	OFF	4
05 (65H)	OFF	5
06 (66H)	OFF	6
07 (67H)	OFF	7
08 (68H)	OFF	8
09 (69H)	OFF	9
10 (6AH)	OFF	A
11 (6BH)	OFF	B
12(6CH)	OFF	C
13 (6DH)	OFF	D
14 (6EH)	OFF	E
15 (6FH)	OFF	F
16 (70H)	ON	0
17 (71H)	ON	1
18 (72H)	ON	2
19 (73H)	ON	3
20 (74H)	ON	4
21 (75H)	ON	5

Values 01 to 21 are the station numbers that are displayed in the Link Allocation window and other windows of the programming device software MPE720.



- The 0.5-ms communication cycle is not supported.
- Communication cannot be performed when station number 60H is set.
- Before setting the DIP switches, be sure to turn off the power.
- Set the DIP switches according to the transmission specifications in use.
- If the transmission specifications of this unit do not match those of the connected slave unit, data may not be transmitted normally, possibly causing a malfunction.

## 4 Register allocation

### 4.1. MP2000 series

This section describes the register allocation pattern to be used when the MP2000 series machine controller made by YASUKAWA Electric Corporation is used as the master unit.

#### 4.1.1. 17byte mode

In the 17-byte mode, 96 points of input and 96 points of output can be transmitted.

Input

Input Register	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IWxxxx	Alarm								System Usage							
IWxxxx+1	Status High								Status Low							
IWxxxx+2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IWxxxx+3	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
IWxxxx+4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
IWxxxx+5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
IWxxxx+6	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
IWxxxx+7	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80

Output

Output Register	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OWxxxx	For option								System reserved							
OWxxxx+1	For option															*1
OWxxxx+2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OWxxxx+3	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
OWxxxx+4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
OWxxxx+5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
OWxxxx+6	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
OWxxxx+7	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80

\* Slave response alarm reset output

#### 4.1.2. 32byte mode

In the 32-byte mode, 216 points of input and 216 points of output can be transmitted.

##### Input

Input Register	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IWxxxx	Alarm								System Used							
IWxxxx+1	Status High								Status Low							
IWxxxx+2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
IWxxxx+3	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
IWxxxx+4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
IWxxxx+5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
IWxxxx+6	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
IWxxxx+7	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
IWxxxx+8	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
IWxxxx+9	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
IWxxxx+A	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
IWxxxx+B	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
IWxxxx+C	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
IWxxxx+D	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
IWxxxx+E	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
IWxxxx+F		Not	Used						215	214	213	212	211	210	209	208

##### Output

Output Register	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OWxxxx	For Option								System reserved							
OWxxxx+1	For option															*1
OWxxxx+2	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OWxxxx+3	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
OWxxxx+4	47	46	45	44	43	42	41	40	39	38	37	36	35	34	33	32
OWxxxx+5	63	62	61	60	59	58	57	56	55	54	53	52	51	50	49	48
OWxxxx+6	79	78	77	76	75	74	73	72	71	70	69	68	67	66	65	64
OWxxxx+7	95	94	93	92	91	90	89	88	87	86	85	84	83	82	81	80
OWxxxx+8	111	110	109	108	107	106	105	104	103	102	101	100	99	98	97	96
OWxxxx+9	127	126	125	124	123	122	121	120	119	118	117	116	115	114	113	112
OWxxxx+A	143	142	141	140	139	138	137	136	135	134	133	132	131	130	129	128
OWxxxx+B	159	158	157	156	155	154	153	152	151	150	149	148	147	146	145	144
OWxxxx+C	175	174	173	172	171	170	169	168	167	166	165	164	163	162	161	160
OWxxxx+D	191	190	189	188	187	186	185	184	183	182	181	180	179	178	177	176
OWxxxx+E	207	206	205	204	203	202	201	200	199	198	197	196	195	194	193	192
OWxxxx+F		Not	Used						215	214	213	212	211	210	209	208

\*1 Slave response alarm reset output

#### 4.1.3. Alarm

The high-order bytes of IWxxx contain alarm information.

The code is represented in hexadecimal notation. Code 00 indicates the normal status. Codes 01 to 7F are for MECHATROLINK, and codes 80 and larger are for Sho-haisen bus.

Alarm code (Hex)	Factors
00	Normal
01	An unsupported command was received.
02	A command inconsistent with the communication phase was received. The command execution condition is not met.
03	The data in the command is invalid.
80	Short circuit between Sho-haisen bus DP and DN
81	Slave response alarm (transmission line cut, slave failure, etc.)

#### 4.1.4. Status

IWxxx+1 contain status information.

This unit does not use a warning bit.

Bit	Name	Factors	
B0	Alarm bit	0	No alarm
		1	Alarm
B1	Warning bit	0	No warning
		1	Warning
B2	Command ready bit	0	Not ready to receive a command
		1	Ready to receive a command
B3 ... 15	System reserved		Always "0"

#### 4.1.5. Slave response alarm reset output

Bit 0 of OWxxx+1 is used for slave response alarm reset output.

If the cause of the response alarm has been eliminated, changing the value of this bit from 0 to 1 resets the alarm code to 00 and turns off the ALM LED.



The slave response alarm reset output may fail to reset alarm information when the alarm is remedied after the slave unit is detached and attached with the power on or there is a temporary line disconnection due to poor contact or some other cause. In this case, turn the power off and then back on.



## 4.2. Data Format

This section describes the data format of MECHATOLINK.

Refer to this section when used in other controller.

Output data is started from 5 byte at command. Alarm is from 2 byte, status is from 3 or 4 byte and input data is from 5 byte at response.

17byte mode

Byte	Command								Response									
1	System used								System used									
2	For option								Alarm									
3	For option							*1	Status Low									
4	For option								Status High									
5	O U T P U T D A T A	7	6	5	4	3	2	1	0	I N P U T D A T A	7	6	5	4	3	2	1	0
6		15	14	13	12	11	10	9	8		15	14	13	12	11	10	9	8
7		23	22	21	20	19	18	17	16		23	22	21	20	19	18	17	16
8		31	30	29	28	27	26	25	24		31	30	29	28	27	26	25	24
9		39	38	37	36	35	34	33	32		39	38	37	36	35	34	33	32
10		47	46	45	44	43	42	41	40		47	46	45	44	43	42	41	40
11		55	54	53	52	51	50	49	48		55	54	53	52	51	50	49	48
12		63	62	61	60	59	58	57	56		63	62	61	60	59	58	57	56
13		71	70	69	68	67	66	65	64		71	70	69	68	67	66	65	64
14		79	78	77	76	75	74	73	72		79	78	77	76	75	74	73	72
15	87	86	85	84	83	82	81	80	87	86	85	84	83	82	81	80		
16	95	94	93	92	91	90	89	88	95	94	93	92	91	90	89	88		

\*1 Slave response alarm reset output

32byte mode

Byte	Command								Response									
1	System used								System used									
2	For option								Alarm									
3	For option							*1	Status Low									
4	For option								Status High									
5	O U T P U T D A T A	7	6	5	4	3	2	1	0	I N P U T D A T A	7	6	5	4	3	2	1	0
6		15	14	13	12	11	10	9	8		15	14	13	12	11	10	9	8
7		23	22	21	20	19	18	17	16		23	22	21	20	19	18	17	16
8		31	30	29	28	27	26	25	24		31	30	29	28	27	26	25	24
9		39	38	37	36	35	34	33	32		39	38	37	36	35	34	33	32
10		47	46	45	44	43	42	41	40		47	46	45	44	43	42	41	40
11		55	54	53	52	51	50	49	48		55	54	53	52	51	50	49	48
12		63	62	61	60	59	58	57	56		63	62	61	60	59	58	57	56
13		71	70	69	68	67	66	65	64		71	70	69	68	67	66	65	64
14		79	78	77	76	75	74	73	72		79	78	77	76	75	74	73	72
15	O U T P U T D A T A	87	86	85	84	83	82	81	80	I N P U T D A T A	87	86	85	84	83	82	81	80
16		95	94	93	92	91	90	89	88		95	94	93	92	91	90	89	88
17		103	102	101	100	99	98	97	96		103	102	101	100	99	98	97	96
18		111	110	109	108	107	106	105	104		111	110	109	108	107	106	105	104
19		119	118	117	116	115	114	113	112		119	118	117	116	115	114	113	112
20		127	126	125	124	123	122	121	120		127	126	125	124	123	122	121	120
21		135	134	133	132	131	130	129	128		135	134	133	132	131	130	129	128
22		143	142	141	140	139	138	137	136		143	142	141	140	139	138	137	136
23		151	150	149	148	147	146	145	144		151	150	149	148	147	146	145	144
24		159	158	157	156	155	154	153	152		159	158	157	156	155	154	153	152
25	O U T P U T D A T A	167	166	165	164	163	162	161	160	I N P U T D A T A	167	166	165	164	163	162	161	160
26		175	174	173	172	171	170	169	168		175	174	173	172	171	170	169	168
27		183	182	181	180	179	178	177	176		183	182	181	180	179	178	177	176
28		191	190	189	188	187	186	185	184		191	190	189	188	187	186	185	184
29		199	198	197	196	195	194	193	192		199	198	197	196	195	194	193	192
30		207	206	205	204	203	202	201	200		207	206	205	204	203	202	201	200
31		215	214	213	212	211	210	209	208		215	214	213	212	211	210	209	208

\*1 Slave response alarm reset output

## 5 Setting from the Programming Tool

### 5.1. Module definition

This section describes how to define AB023-M1 from the Engineering window of the programming device software MPE720, using an example of MP2300. (Use MPE720 of Version 5.32 or later.)

#### (1) Module configuration

When you open "Module Configuration Definition" in "Definition Folder" in the "File Manager" window of MPE720, the following window appears.

モジュール構成 MP2300#AB023M1 TEST1 MP2300 オンライン ローカル  
PT#: 2 IP#:192.168.1.1 CPU#: 1

コントローラ

No.	00	01	02	03
モジュール	MP2300	218IF-01	AFMP-01	UNDEFINED
制御CPU番号	-	-	-	-
回線番号	-	-	-	-
入出力先頭レジスタ番号	----	----	----	----
入出力終了レジスタ番号	----	----	----	----
入力DISABLE				
出力DISABLE				
モーション先頭レジスタ番号	----	----	----	----
モーション終了レジスタ番号	----	----	----	----
詳細				
ステータス	運転中	運転中	運転中	

MP2300 : CPUモジュールです。I/O、ネットワークサーボコントロール、仮想軸機能を内蔵しています。

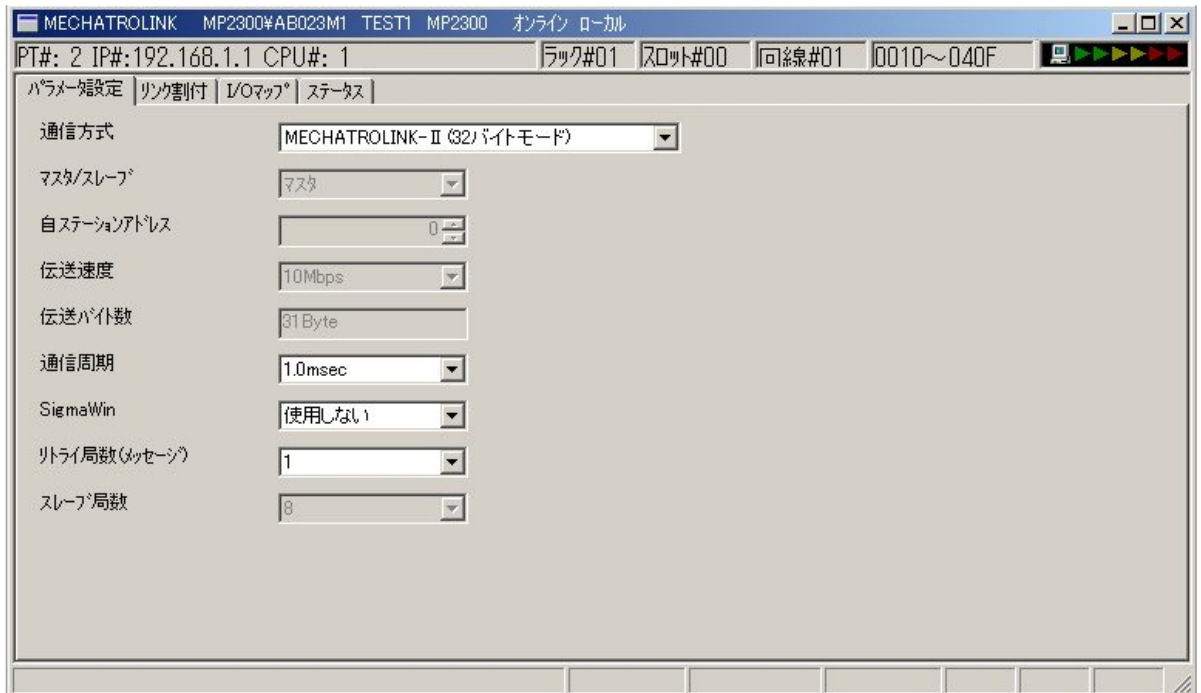
モジュール詳細 MP2300 SLOT#00

No.	1	2	3	4
モジュール	CPU	IO	SVB	SVR
制御CPU番号	-	-	01	01
回線番号	-	-	01	02
入出力先頭レジスタ番号	----	0000	0010	----
入出力終了レジスタ番号	----	0001	040F	----
入力DISABLE		Enable	Enable	
出力DISABLE		Enable	Enable	
モーション先頭レジスタ番号	----	----	8000	8800
モーション終了レジスタ番号	----	----	87FF	8FFF
詳細			MECHATROLINK	
ステータス	運転中	運転中	運転中	運転中

SVB : ネットワークサーボコントロール機能です。

## (2) MECHATROLINK Definition window

When you double-click "MECHATROLINK" for the module "SVB" in the Module Configuration window, the following MECHATROLINK Definition window appears.



### 5.1.1. Parameter setting

#### Communication method

From the combo box menu, select MECHATROLINK-I, MECHATROLINK-II (17-byte mode), or MECHATROLINK-II (32-byte mode).

#### Communication Cycle

The communication cycle is determined by the communication method, as shown in the table below.

Communication method	Communication Cycle
MECHATROLINK-I	2 ms, fixed
MECHATROLINK-II (17byte mode)	1 ms, fixed
MECHATROLINK-II (32byte mode)	Select 1 ms, 1.5 ms, or 2 ms.

#### SigmaWin

Available only for MECHATROLINK-II. Select Do not use or Use.

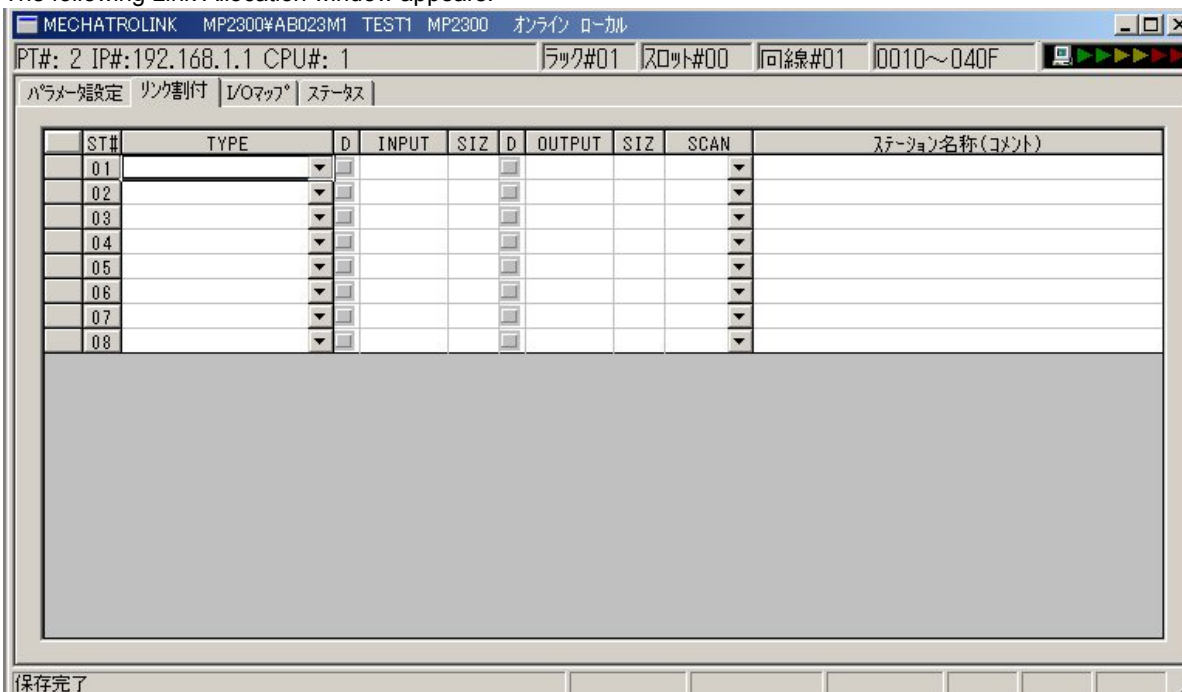
#### Number of retry stations (message)

Available only for MECHATROLINK-II.

### 5.1.2. Link allocation

When you double-click the "Link Allocation" tab window in the MECHATROLINK Definition window, the message "Saving data, OK?" appears. To save the data, click "Yes" (when any data in the Parameter Setting tab window has been changed).

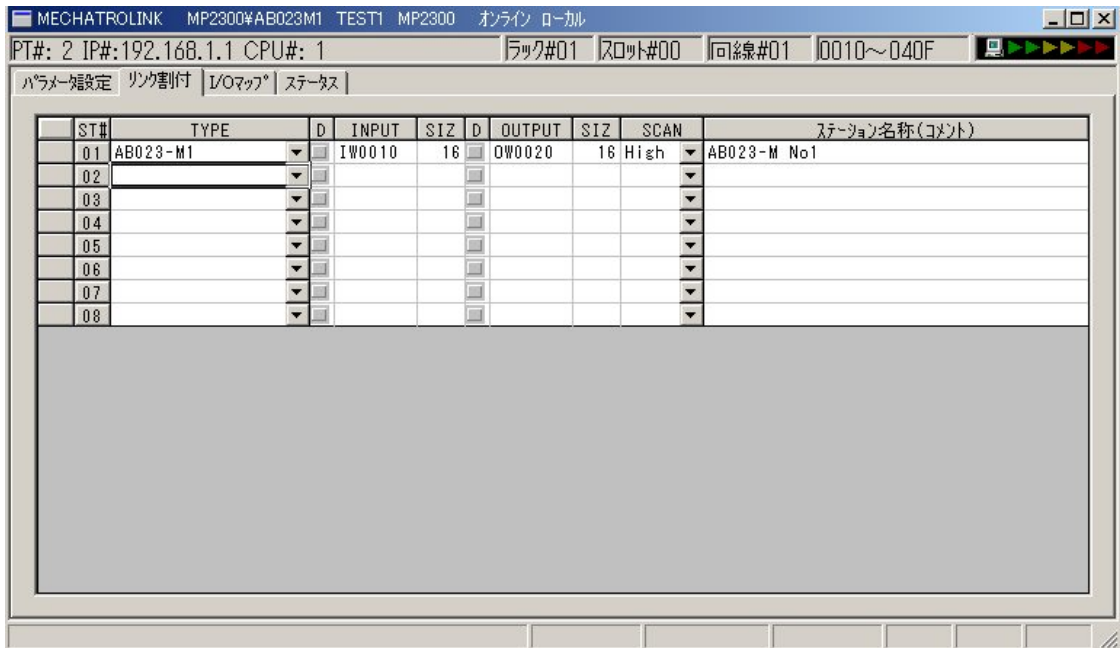
The following Link Allocation window appears.



Setting Items	Contents
<b>ST #</b>	The station numbers are shown. The ST# column is set according to the station numbers of AB023-M1. "01" is set for station number 61H, or "16" is set for 70H. The maximum station number to be displayed is determined by the communication method and communication cycle.
<b>TYPE</b>	Select AB023-M1 from the combo box menu.
<b>D</b>	This indicates the disable status of the input register. Checking the box disables the corresponding register.
<b>INPUT, SIZE</b>	Set the start input register number and the register count (SIZE) (hexadecimal word address). Make sure that there is no register range overlap among stations. The range of specifiable register numbers is determined by the range defined by the I/O start and end register numbers specified in the Module Configuration window. When you set the input register, the register size is automatically set to either 8 if the 17-byte mode is set as the communication method or 16 (decimal) if the 32-byte mode is set as the communication method.
<b>D</b>	This indicates the disable status of the output register. Checking the box disables the corresponding register.
<b>OUTPUT, SIZE</b>	Set the start output register number and the register count (SIZE) (hexadecimal word address). Make sure that there is no register range overlap among stations. The range of specifiable register numbers is determined by the range defined by the I/O start and end register numbers specified in the Module Configuration window. When you set the output register, the register size is automatically set to either 8 if the 17-byte mode is set as the communication method or 16 (decimal) if the 32-byte mode is set as the communication method.

<b>SCAN</b>	In SCAN (data exchange cycle), specify the timing for the exchange of I/O data between the controller CPU and AB023-M1. Select either High or Low. High: Exchange I/O data by the CPU's high-speed scan. Low: Exchange I/O data by the CPU's low-speed scan.
<b>Station Name</b>	Enter a comment on each station using up to 32 one-byte characters (or 16 two-byte characters).

The following window shows a setting example where MECHATROLINK-II (32-byte mode) and station number 61H are set.

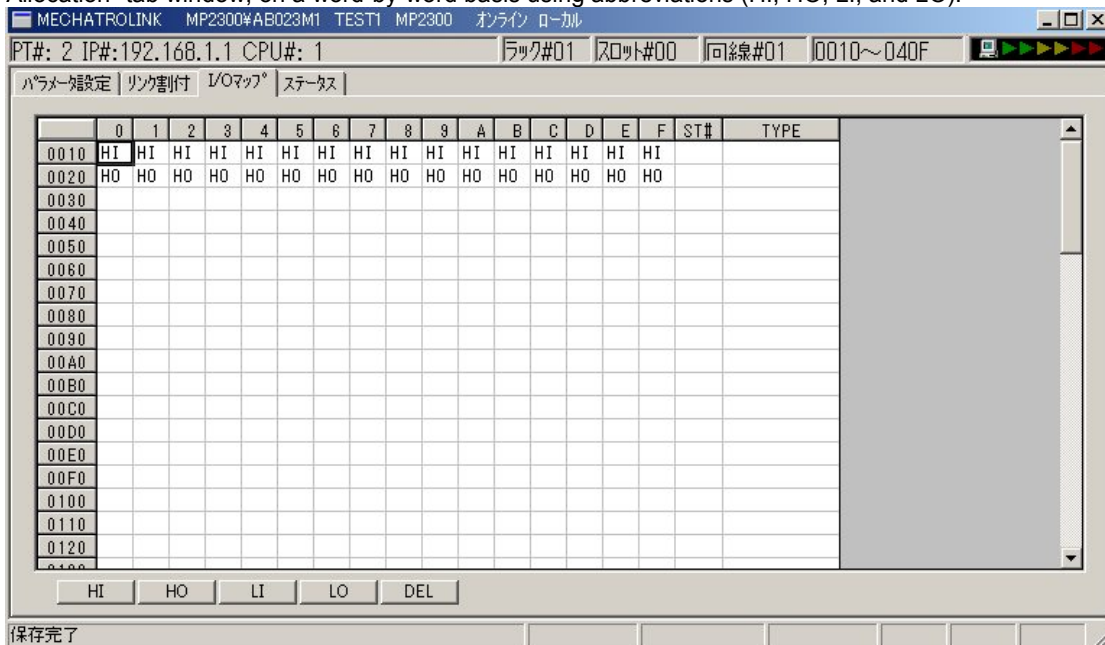


### 5.1.3. I/O Map

When you double-click the "I/O Map" tab window in the MECHATROLINK Definition window, the message "Saving data, OK?" appears. To save the data, click "Yes" (when any data in the Link Allocation tab window has been changed).

The following I/O Map window appears.

This window allows you to check and change the scan type (High or Low) you have allocated to each station in the "Link Allocation" tab window, on a word-by-word basis using abbreviations (HI, HO, LI, and LO).

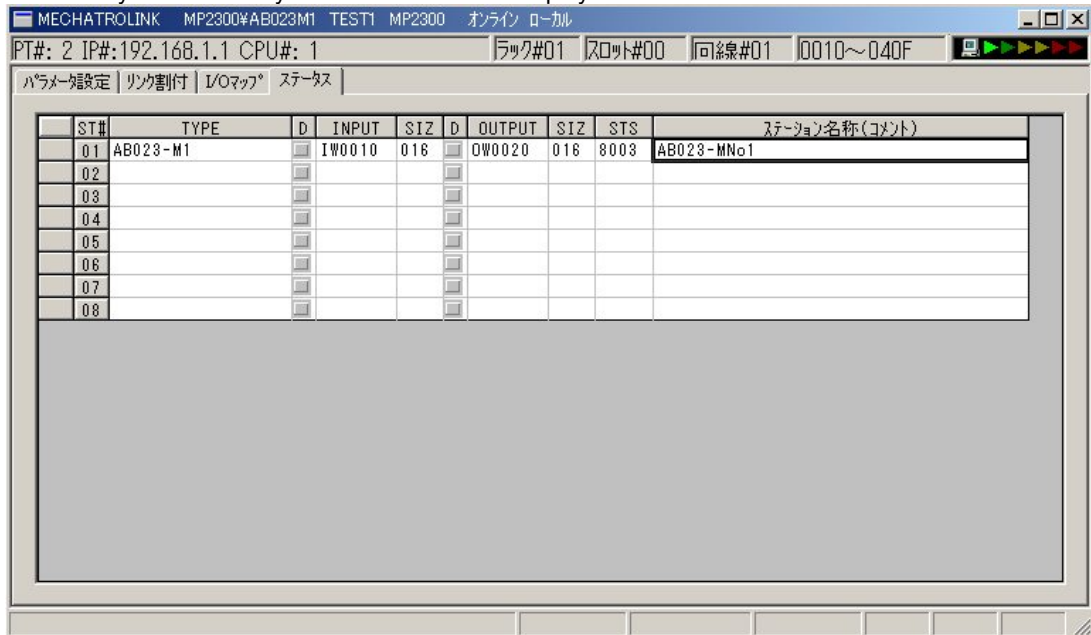


Operation button	Meaning
HI	Allocated to high scan input.
HO	Allocated to high scan output.
LI	Allocated to low scan input.
LO	Allocated to low scan output.
DEL	Delete the allocation.

In the I/O Map window, you can change the scan type (from LI to HI or vice versa), but not the I/O type (from LO to LI or vice versa).

### 5.1.4. Status

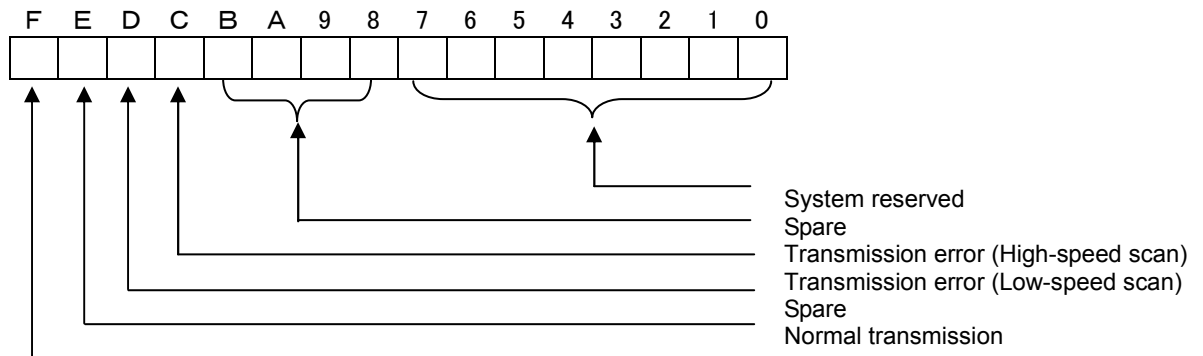
Click the "Status" tab window in the MECHATROLINK Definition window.  
The data currently transmitted by MECHATROLINK is displayed.



This tab window is for status display only and cannot be used to change the set values.  
The items in this window have the same meanings as those in the "I/O Map" tab window, except for the additional "STS" column.

### STS

In online mode, the MECHATROLINK transmission status is displayed in hexadecimal notation.  
The meaning of each bit is described below. Note that the field is blank when in offline mode.



### 5.1.5. MECHATROLINK Saving Defined Data

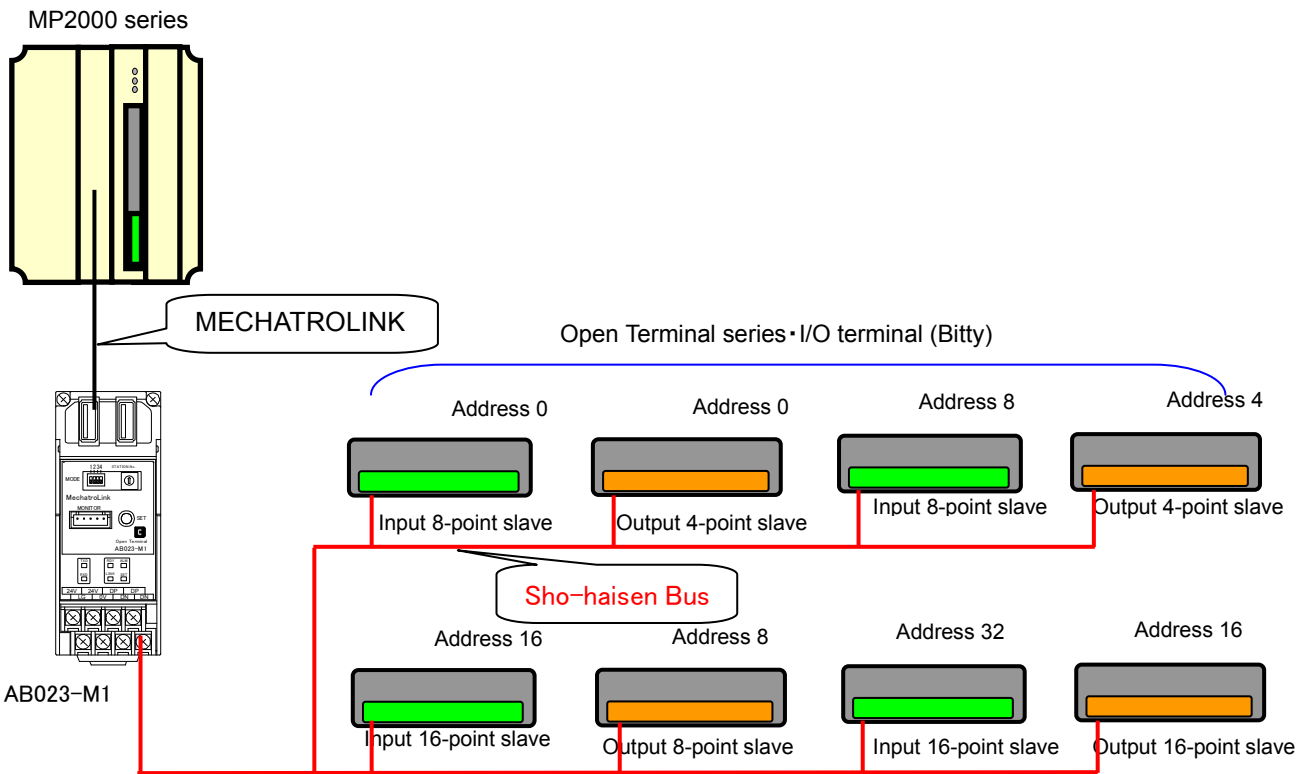
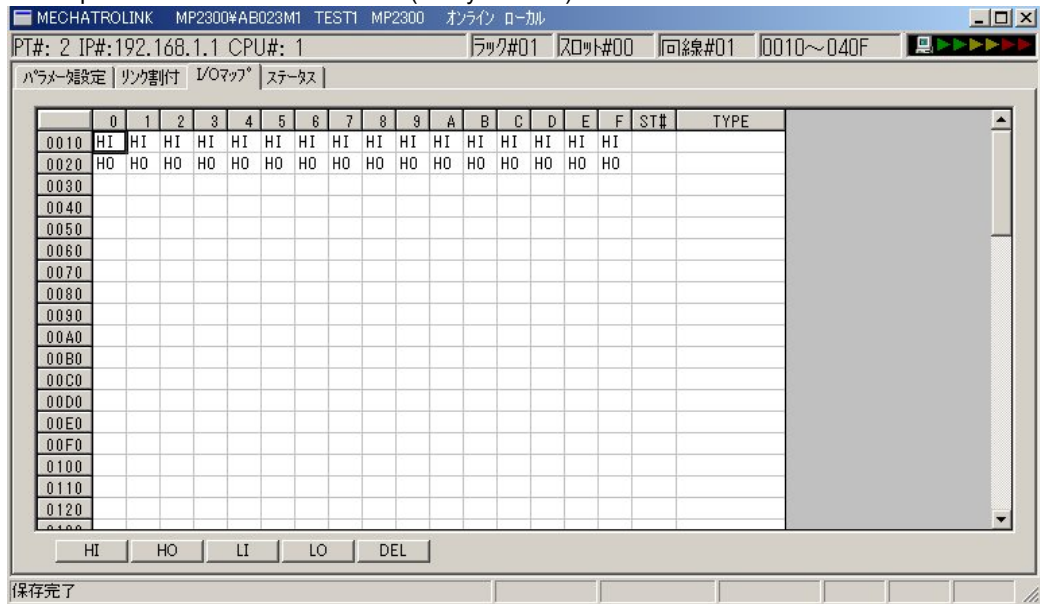
The procedure for saving the defined MECHATROLINK data is as follows.

1. Click "File (F)" - "Save (S)".
2. To save the defined data, click "Yes (Y)" in the message box.  
Choosing "Save & Save to Flash" saves the defined data to the CPU's flash memory as well.



### 5.1.6. I/O register allocation example

This is an example where MECHATROLINK-II (32-byte mode) and station number 61H are set.



Input unit	Address	Register and bits used	Output unit	Address	Register and bits used
Input 8-point unit	0	0 ... 7 of IW0012	Output 4-point unit	0	0 ... 3 of OW0022
Input 8-point unit	8	8 ... F of IW0012	Output 4-point unit	4	4 ... 7 of OW0022

Input 16-point slave	16	0 ... F of IW0013	Output 8-point unit	8	8 ... F of OW0022
Input 16-point unit	32	0 ... F of IW0014	Output 16-point unit	16	0 ... F of OW0023

\*\* Registers and bits other than the ones shown above are not used.

---

## 6 Monitoring Function

---

### Overview

Each I/O terminal of Sho-haisen Bus series has unique address, and returns back the reply when the address sent from this device is correspondent to its own address number. The device, by checking the response signals, detects wire disconnection and confirms that the I/O terminal is in place.

This device, with its address auto-recognizing operation (description given later), memorizes the ID (addresses) of the connected I/O terminal into EEPROM. This information will remain in storage even if power is turned off.

Then the device sends out the registered ID (addresses) in sequence through the transmission line, and if there is no response to these, it will recognize this as wire disconnection, which will be displayed by the "ALM" LED.

### 6.1. Automatic Address Recognition

---

Storing the IDs (addresses) of the connected I/O terminals in this unit's E2PROM is called "automatic address recognition".

Procedure

1. Check that all the IDs (addresses) are in the normal operation status (the "LINK" LED is blinking).
2. Hold down the "SET" switch until the "SET" LED (orange) comes on.
3. When the "SET LED" rapidly blinks and then goes off, the storage of the address is complete.



- During automatic address recognition, input/output operation may not work. Be sure to carry on automatic address recognition, when the program of PLC stops or in the condition that there is no interference in the movement of the machine.
- On abnormal status in the Sho-haisen Bus such as short-circuit, or for five seconds after turning on the power or resetting, automatic address recognition can not be operated.

### 6.2. Monitoring Operation

---

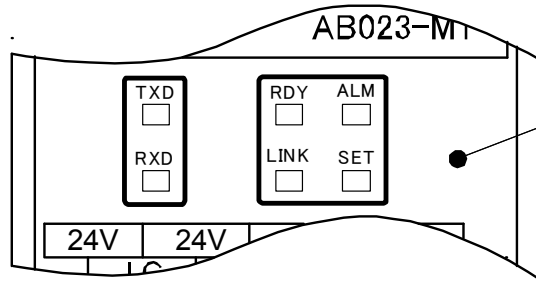
The unit sends the registered addresses sequentially. If no response is returned to any of these addresses, the unit regards the corresponding I/O terminal as being disconnected and turns on the "ALM" LED.

This alarm information is retained until the power is turned off or the information is reset by the slave response alarm reset output.

When the ALM LED is on before automatic address recognition is performed or because of line disconnection, data is transmitted for the normally connected I/O terminals.

## 7 LED Indication

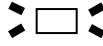
LED indication part



Indication part

### 7.1. MECHATROLINK side

LED Name	Function	Color	Contents of Light up indication
TXD	Send indication	Green	Lights up while MECHATROLINK is sending
RXD	Receive indication	Green	Lights up while MECHATROLINK is received.

TXD LED	RXD LED	Causes
Goes out	Lights up (Green) 	The settings of the MECHATROLINK master unit do not match those of AB023-M1. 1. Communication speed 2. Number of Input/output bytes 3. Station Number
Goes out	Goes out	Disconnection of the communication line The cable is not plugged properly. Unit failure

### 7.2. Sho-haisen Bus side

- Indication of the status of Shohai-sen Bus

LED Name	Function	Color	Meaning	
RDY	Ready	Green	Lights up	This unit is in operation.
			Goes out	The transmission line DP or DN is disconnected, or the slave unit does not respond.
LINK	Transmission Indication	Green	Flashing	Data is being transmitted normally.
			Goes out	This unit is faulty.
ALM	Alarm Indication	Red	Lights up	The transmission line DP or DN is disconnected or No response from slaves.
			Flashing	Short circuit between DP and DN
			Goes out	Data is being transmitted normally.
SET	Address automatic	Orange	Lights up	Automatic address recognition is in progress.
			Goes out	Data is being transmitted normally.

	recognition indication		Flashing	The recognized address is being written o EEPROM.
--	---------------------------	--	----------	---

## 8 Connections

### MECHATROLINK side

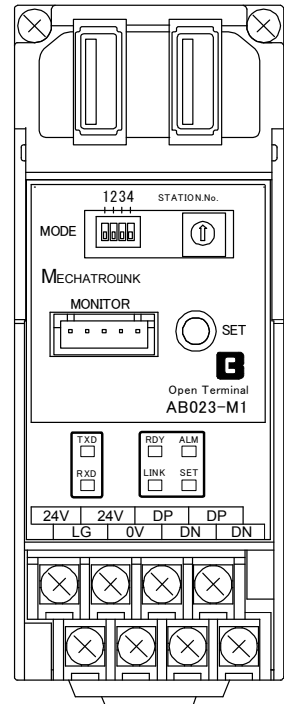
For information about how to connect the MECHATROLINK part, refer to the user's manual of the machine controller made by YASUKAWA Electric Corporation or other relevant documents.

There are two connectors. The right one and the left one are both the same.

No.	Signal Name	Content
1	NC	Not used
2	/DATA	Signal - side
3	DATA	Signal + side
4	SH	Communication cable shield
Shell	Shield	Frame ground

As the MECHATROLINK cable, use JEPMC-W6002-\*\*.

Plug USB terminator JEPMC-W6022 into each unused port.



### Sho-haisen Bus side

An eight-pole M3 screw terminal block is on this side.

Connectable wire: AWG22 - AWG14

Tightening torque: 0.8N-m

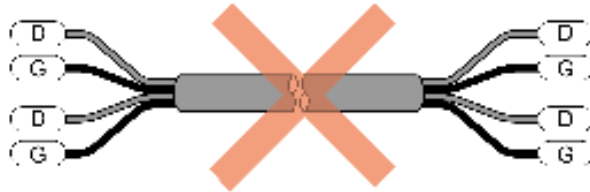
24 V	Connect a 24 VDC stabilized power supply.
0 V	Its capacity of electric current must be +2 A or more, which is necessary for the load and slave unit.
DP	Transmission line (+ side)
DN	Transmission line (- side)
LG	Connected to the neutral point of the noise filter. Ground it in the event of a malfunction caused by 24-V power noise. In that case, the grounding work of Class D rating must be conducted individually.

Connect a slave unit of the Bitty Series. DB series slave unit cannot be connected.

Connect the DP and DN terminals to their counterparts on the slave unit, respectively. (Refer to the user's manual of each unit in use.)



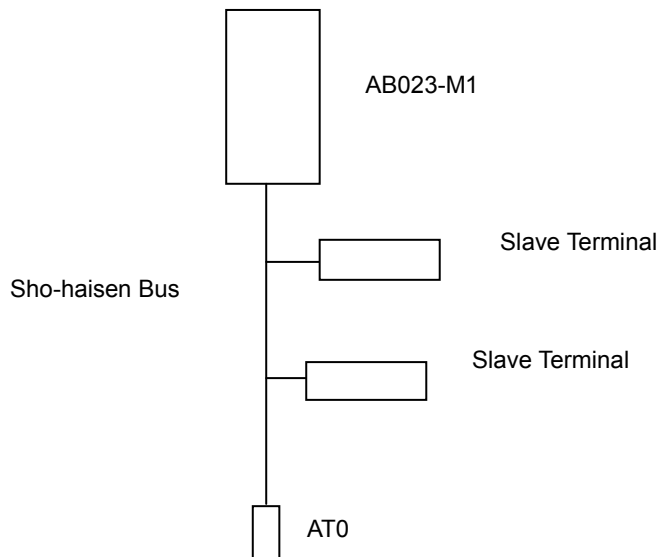
\* Do not use plural transmission Line (D, G) with many cable lines together. It has the possibility that the equipment operates faultily due to the cross talk when it is transmitted together.



- \* Set the diameter of the transmission line at more than  $0.75 \text{ mm}^2$ , when transmission distance is until 200 m. Set the diameter of the transmission line at more than  $0.9 \text{ mm}^2$ , when transmission distance is more than 200 m.
- \* When transmission distance is until 200 m, the lower limit of the power supply voltage is more than 21.6 V. When transmission distance is more than 200 m, the lower limit of the power supply voltage is 24 V.
- \* Be careful of the voltage drop by the cable. Equipment operates faultily due to the voltage drop. Supply a power supply in the terminal side when a voltage drop is big. (A local power supply)
- \* A line to connect to the connector terminal isn't to do solder. A line causes a looseness contact defect.

## 8.1. Terminator

Connect one AT0 terminator to the far end of Sho-haisen bus line.  
Otherwise, the line may not be able to transmit data normally.



---

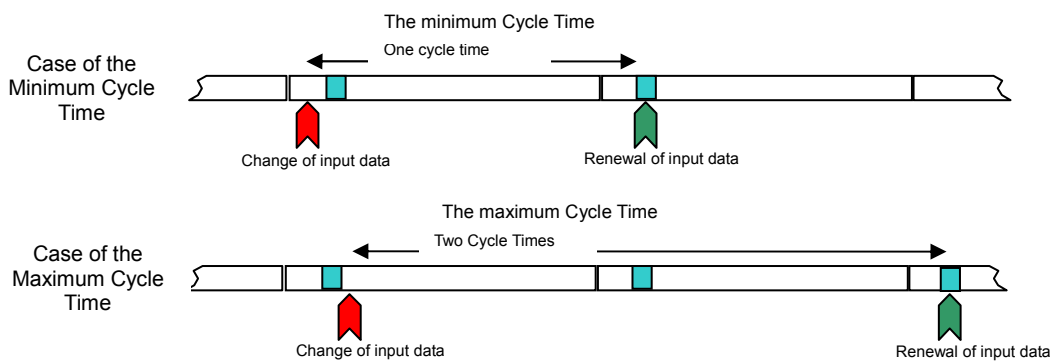
## 9 Time Required for Transmission

---

### 9.1. Input

---

Since the input area data is not updated unless the same data is received twice consecutively on Sho-haisen bus side of the unit (double checking), the transmission time must be at least 1-cycle time or up to 2-cycle time. The unit may not be able to capture a signal shorter than the 2-cycle time depending on the timing. To ensure a response is returned, therefore, a signal longer than the 2-cycle time must be input.



### 9.2. Output

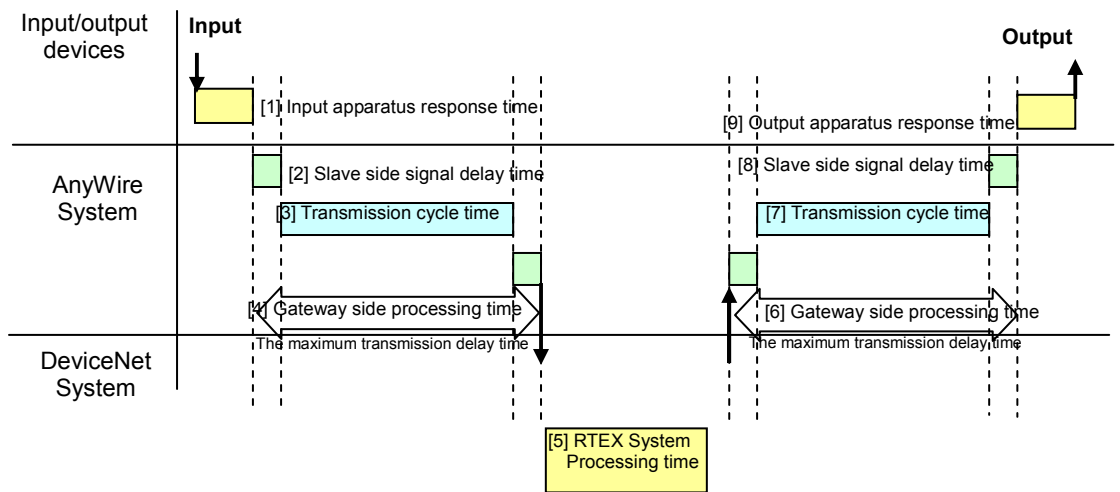
---

Since double collation performed by the slave unit side, the transmission time of a minimum of one cycle time and a maximum of two cycles time is needed like the case of an input.

Term
Cycle time: Repetition transmission time of the actual data transmitted.
Maximum transmission delay time: Processing time by the side of a gateway + Refresh time + Slave side Signal delay time

Response delay time becomes as it is shown in the following figure.





## 10 Trouble Shooting

### 10.1. MECHATROLINK side

Content of Trouble	Causes	How to check
TXD LED Goes out RXD LED Lights up	The settings of the MECHATROLINK master unit do not match those of AB023-M1. [1] Communication speed [2] Number of I/O byte [3] Station No. The station number is set to 60H.	Check the switch settings of AB023-M1. Check settings of the MECHATROLINK master unit using MPE720.
TXD LED Goes out RXD LED Goes out	The AnyWireBus communication line is disconnected. Cable is not connected properly. Unit failure	Replace the cable. Check the cable. Replace the unit.
Input data of AB023-M1 can not be installed.	Not read from the correct address of the input register.	Check the sequence program.
	There is station number overlap.	Check the station number.
	Terminator is not connected.	Connect a terminator.
Output data of AB023-M1 can not turn off or on.	Not read from the correct address of the output register.	Check the Sequence program
	There is station number overlap.	Check the station number.
	Terminator is not connected.	Connect a terminator.

### 10.2. Sho-haisen Bus side

First, check the following:

1. Whether the RDY LED of AB023-M1 is on
2. Whether the LINK LED of every unit is blinking
3. Whether the supply voltage of AB023-M1 is within the range of 24 V to 27.6 V
4. Whether wires are connected correctly and firmly
5. Whether the addresses are correct and whether there is no address overlap

#### Checklist by symptom

Symptom	Check Item
Data cannot be input or output.	<b>AB023-M1 side</b> Check whether the sho-haisen bus lines DP and DN are connected correctly. Check whether power is supplied to the AB023-M1 unit.
	<b>Slave Unit side</b> Check whether the sho-haisen bus lines DP and DN are connected correctly. Check whether the address of the slave unit is set correctly.
The ALM LED (red) turns on.	Check whether the DP and DN lines are not disconnected. Check whether the address of the slave unit has not been changed after automatic address recognition.
The ALM LED (red) is blinking.	Check whether short between DP and DN

---

## 11 Change History

---

Version	Date	Content of Change
First edition	March 14, 2005	Release
1.0 edition	June 23, 2005	Assignment of the serial number



## **Anywire Corporation**

### ■ **Headquarters (West Japan Office)**

8-1, Shimoinden, Inouchi, Nagaokakyo-shi, Kyoto  
617-0813 JAPAN  
TEL: 075-956-1611 FAX: 075-956-1613

### ■ **East Japan Office**

47, Kandakonya-cho, Chiyoda-ku, Tokyo 101-0035  
JAPAN  
TEL: 03-5209-5711 FAX: 03-5209-5713

### ■ **Chubu Office**

2-26-15-507, Noritake, Nakamura-ku, Nagoya-shi,  
Aichi 453-0014 JAPAN  
TEL: 052-452-8711 FAX: 052-452-8713

### ■ **Kyoto Factory**

19-2, Umatate, Kamiueno-cho, Muko-shi, Kyoto  
617-0006 JAPAN  
TEL: 075-922-1911 FAX: 075-922-1913