Anywire Corporation

Open Terminal series

Device Net Bit Distributed I/O Terminal
AB023-D1

User's Manual

Version 1.2 March 02, 2006

Bit Control & Information Transmission

Sho-haisen system

Open Terminal seires

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) actions requiring higher safety

1- Applications expected to have a great influence on life or property

1- Medical equipment, or safety devices

(2) actions 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.

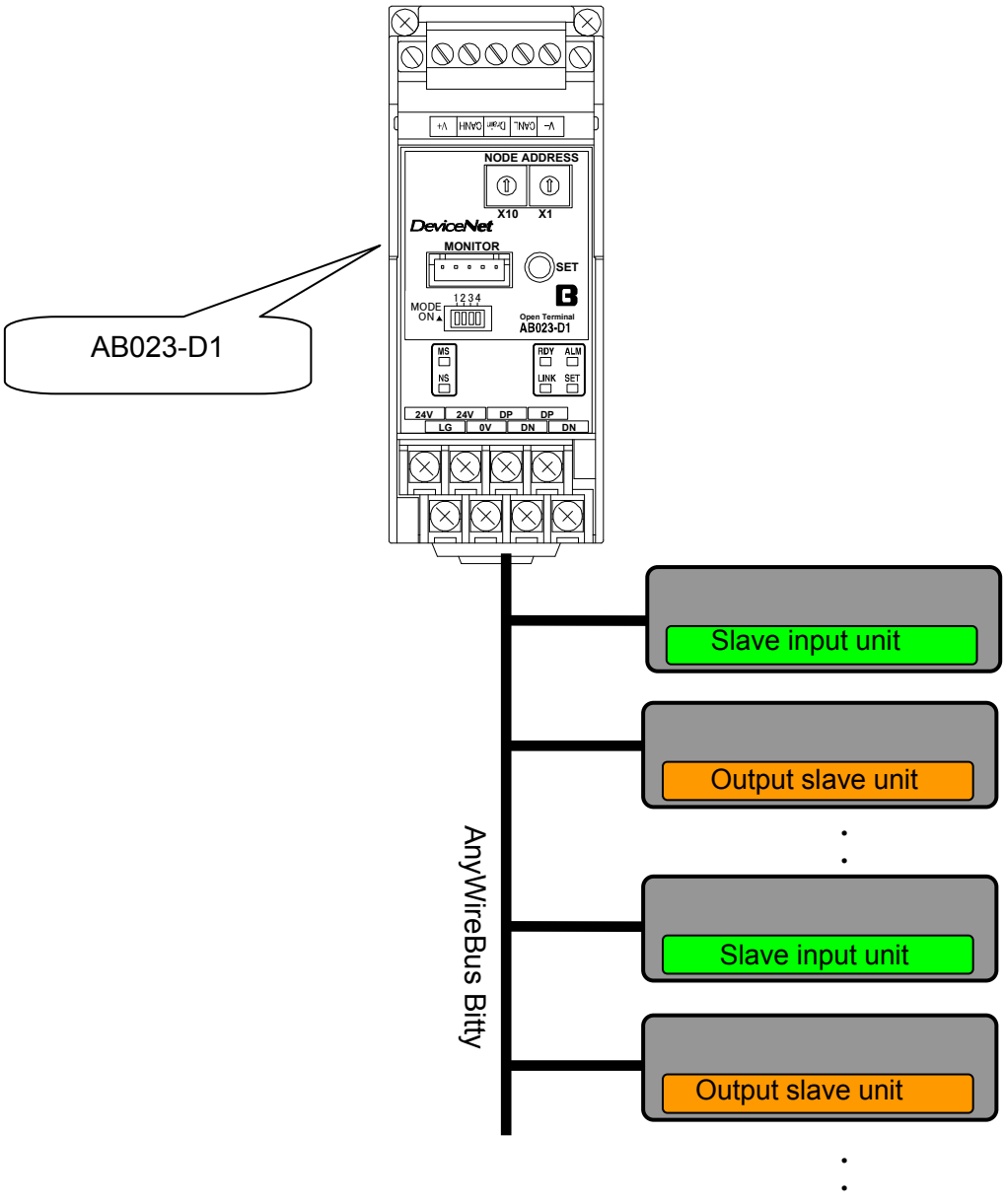
CAUTION

- 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

1 Outline

Bit decentralization I/O terminal is the best for DeviceNet 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-D1 can be capable for input and output operation.



2 Specification

2.1. General Specifications

Ambient operating Temperature	0℃ … +55℃
Storage Temperature	− 20℃ … +75℃
Storage Humidity	10% … 90%RH (No condensation)
Ambient Atmosphere	No corrosive or flammable gas

2.2. Capability Specifications

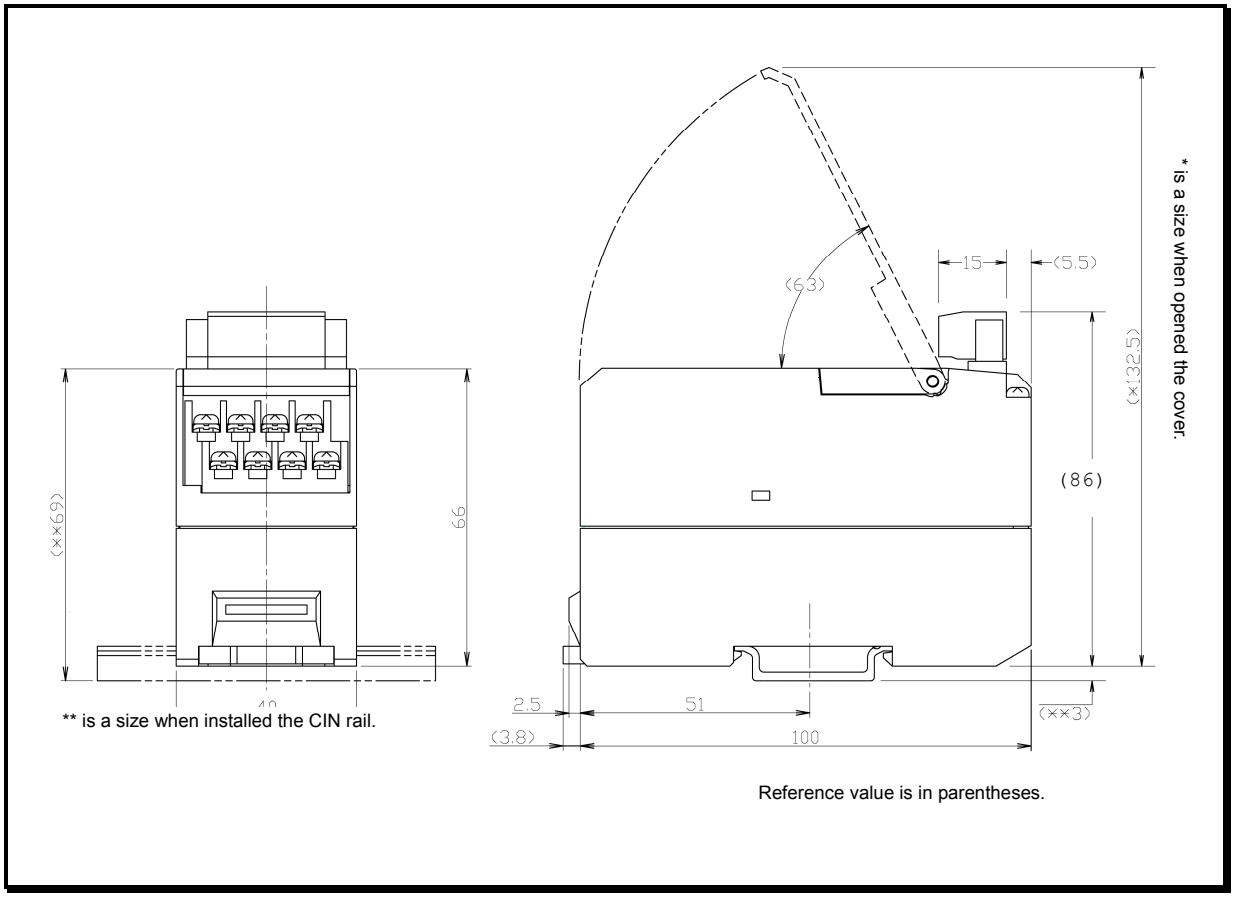
System Specifications on Sho-haisen Bus side

Transmission Clock	28.7KHz
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	Dedicated protocol (AnyWireBus Bitty protocol)
Number of Connection I/O points	512 points (IN: 256 points OUT: 256 points)
Number of the Connection points	Up to 128 units (Changed by consumption current of each unit)
Transmission Cycle Time (1 cycle time value)	10.2ms/IO 512 points Note) The transmission cycle time reaches the value between 1 to 2 cycle times.
Connection Cable	General-purpose 2-wire cable (0.75 mm² ... 2.0 mm²)
Max. Transmission Distance	During operation of rated 24 V: 50m (1.25 mm² electric cable) Condition: 2 A load current, a relay drive ability distance
Supply Maximum Current of Transmission	2A
Power Supply Voltage	DC26.4V (DC24V rated supply)
Circuit Current Consumption	0.2A
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)

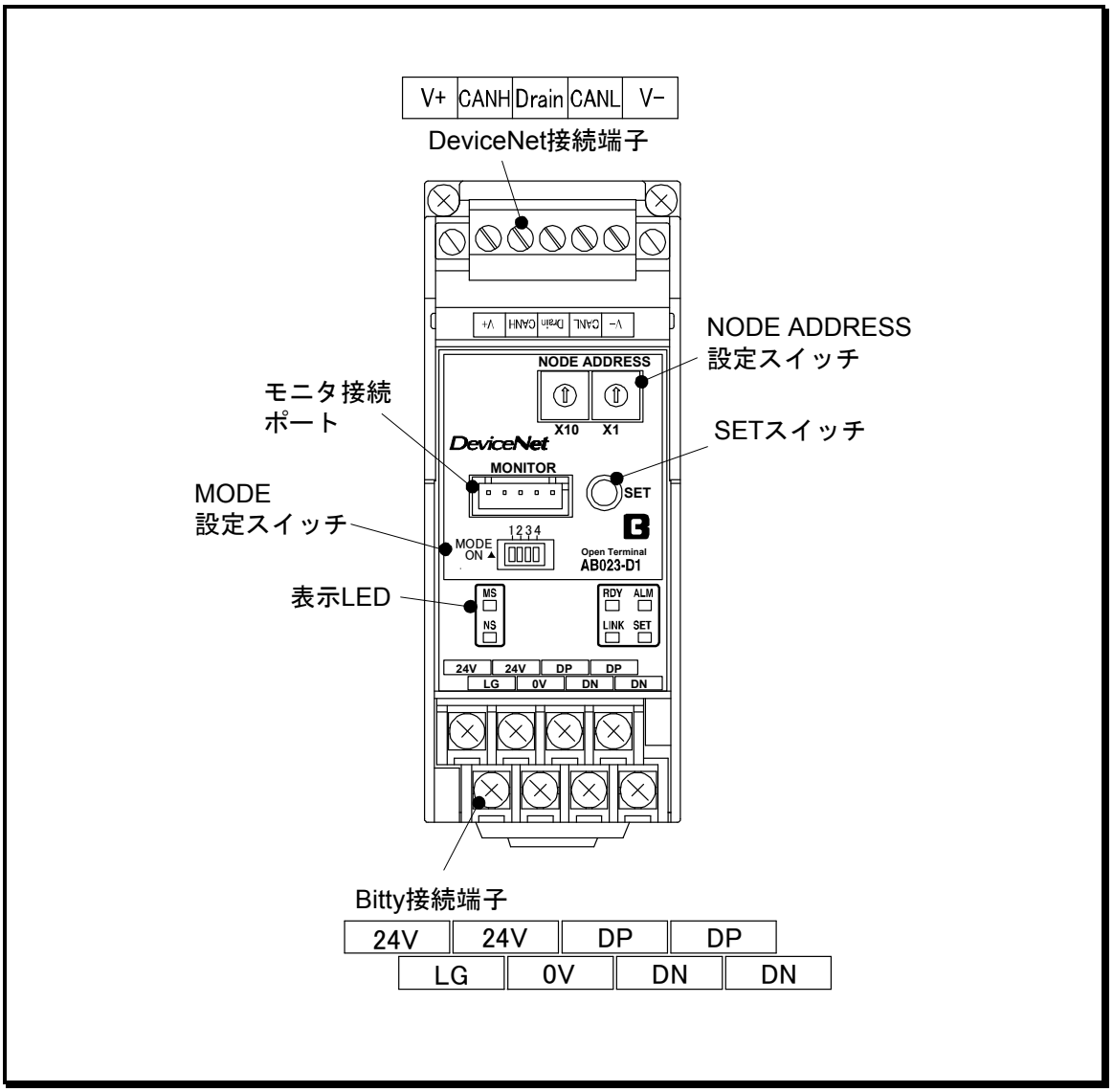
System Specification on DeviceNet side

<table>
<tr><td>Adaptive DeviceNet Specification</td><td colspan="4">Ver.1.2</td></tr>
<tr><td>Communication Speed</td><td colspan="4">500K/250K/125Kbit/s (Automatic Tracking)</td></tr>
<tr><td rowspan="4">Communication Distance</td><td>Communication Speed</td><td>Max. Network Length</td><td>Branch Length</td><td>Total Branch Length</td></tr>
<tr><td>500Kbit/s</td><td>100 m or less</td><td>6 m or less</td><td>39 m or less</td></tr>
<tr><td>250Kbit/s</td><td>250 m or less</td><td>6 m or less</td><td>78 m or less</td></tr>
<tr><td>125Kbit/s</td><td>500 m or less</td><td>6 m or less</td><td>156 m or less</td></tr>
<tr><td>Max. Number of Connection Nodes</td><td colspan="4">64 units (Slaves can be connected up to 63 units.)</td></tr>
<tr><td>Error Control</td><td colspan="4">CRC error, node address overlap check, Check the scan list</td></tr>
<tr><td>Connection Connector</td><td colspan="4">MVSTBW2.5/5-STF-5.08AUM (made by Phoenix contact)</td></tr>
<tr><td>Predefined Master/Slave Connection set</td><td colspan="4">Group 2 only server</td></tr>
<tr><td>I/O Size</td><td colspan="4">Produced Connection Size (Input size)
256-point input—— 34
Consumed Connection Size (Output size)
256-point output —— 34</td></tr>
<tr><td>Max. Current Consumption</td><td colspan="4">40mA</td></tr>
</table>

2.3. Dimension



2.4. Name of Each Part



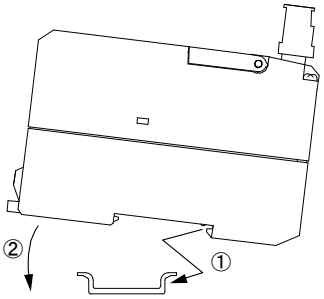
Japanese	English
DeviceNet接続端子	DeviceNet Connection Terminal
MODE ADDRESS 設定スイッチ	MODE ADDRESS Setting Switch
モニタ接続ポート	Monitor Connection Port
MODE 設定スイッチ	MODE Setting Switch
SETスイッチ	SET Switch
表示LED	Indication LED
Bitty接続端子	Bitty Connection Terminal

2.5. Detaching to DIN Rail

Please use and install this unit on the DIN.

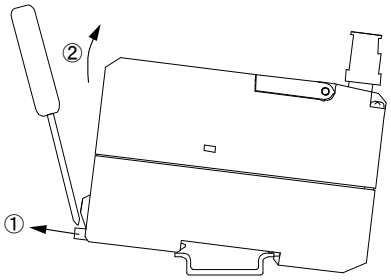
1. How to install this unit on DIN rail
   [1] A fixed pick upper in the bottom is put on the DIN rail.
   [2] This device is pressed against the DIN rail and sets it.

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



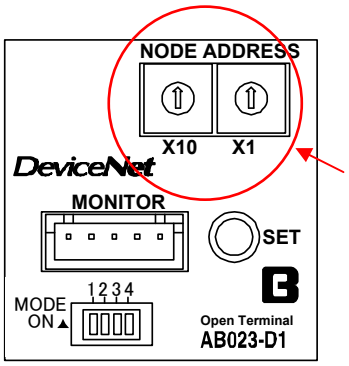
3 Switch Setting

3.1. DeviceNet side

3.1.1. Node Address Setting

The node address is set by the node address setting switch (NODE ADDRESS).
Node address ranges differ depending on the Master unit used.
Communication is not succeed if the node address overlaps with other nodes.

NODE ADDRESS	"NODE ADDRESS" Switch	
	× 10	× 1
0	0	0
1	0	1
2	0	2
3	0	3
・	・	・
62	6	2
63	6	3



3.1.2. Communication speed setting

Communication speed follows the Master by the automatic tracking function.

3.2. Sho-haisen Bus side

3.2.1. Specification Selection (MODE Switch)

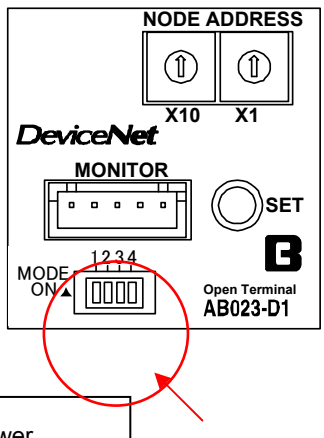
The transmission distance can be selected using MODE switch (The following "SW-*" responds to labels 1-4).

SW-2, 1 Transmission number (occupied byte number) can be set by the combination of ON/OFF of 2 and 1.

SW-3 Reserved. Use when the setting is OFF.

SW-4 Reserved. Use when the setting is ON.

SW		Number of transmission points			Number of DeviceNet occupied bytes	
1	2	Input	Output	Total	Input	Output
OFF	OFF	256	256	512	34	34
OFF	ON	128	128	256	18	18
ON	OFF	64	64	128	10	10
ON	ON	256	256	512	34	34



CAUTION

Before setting the DIP switches, be sure to turn off the power.
Setting changes when applying current are not valid.

4 Memory Map

Offset byte address of input on the DeviceNet Master side is as given in the table below.

Number of transmission points	Input area	Alarm flag area	The area in which the number of abnormal addresses is stored	Number of input occupied bytes
256 points	0-31	32	33	34
128 points	0-15	16	17	18
64 points	0-7	8	9	10

When an error occurs, the corresponding bit in alarm flag area is set to “on”.
Bit 0 is set to "0" if the error condition is canceled. They do not retain their values.
Bit 1 retains until the power turns off or the error rests.

Bit 0	Short between DP and DN
Bit 1	Set to “1” in the event of an address reply error. Possible causes include a disconnection, the terminal being faulty, and power not being supplied.
Bit 2-7	Spare

In the area in which the number of abnormal addresses is stored, the number of abnormal IDs is input in binary.

Bit 0-7	The number of abnormal IDs

Offset byte address of output on the DeviceNet Master side is as given in the table below.

Number of transmission points	Output area	Command area 1	Command area 2	Number of output occupied bytes
256 points	0-31	32	33	34
128 points	0-15	16	17	18
64 points	0-7	8	9	10

Command area 1

Bit 0	Setting the error reset bit from "0" to "1" causes the address reply error information to be cleared.
Bit 1-7	Spare

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.

The command area 2 is a reserved area.

4.1.1. Memory allocation example

This section describes the DeviceNet Master (CS1W-DRM21, CJ1W-DRM21) made by OMRON for SYSMAC CS/CJ series.

1. The use of fixed allocation area 1

If using fixed allocation areas, 17 node addresses from the starting node address to the starting address +16 are occupied.

	Offset Byte Address		CH No	bit №															
				15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OUTPUT	1	0	**3200**	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	3	2	**3201**	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	¦	¦	¦	¦															
	31	30	**3215**	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240
	33	32	**3216**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**A**
INPUT	1	0	**3300**	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	3	2	**3301**	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	¦	¦	¦	¦															
	31	30	**3315**	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240
	33	32	**3316**	Number of abnormal IDs								—	—	—	—	—	—	**C**	**B**

The number between 0 and 255 in the figure shows the address on AnyWireBus.

A: Clear flag of address reply error information

B: Short flag between DP and DN.

C: Address reply error flag

—:Spare

2. The use of Use-set allocation

The following figure shows if output from 50CH and input from 100CH are allocated by the configurator.

	Offset Byte address		CH No	bit No															
				15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
OUTPUT	1	0	**500**	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	3	2	**501**	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	¦	¦	¦	¦															
	31	30	**515**	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240
	33	32	**516**	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	**A**
INPUT	1	0	**100**	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
	3	2	**101**	31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16
	¦	¦	¦	¦															
	31	30	**115**	255	254	253	252	251	250	249	248	247	246	245	244	243	242	241	240
	33	32	**116**	Number of abnormal IDs								—	—	—	—	—	—	**C**	**B**

The number between 0 and 255 in the figure shows the address on AnyWireBus

A:Clear flag of address reply error information

B:Short flag between DP and DN

C:Address reply error flag

－:Spare

5 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 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 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.

5.1. Automatic Address Recognition

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

Procedure

1. Check that all the slave units are in the normal operation status.
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.

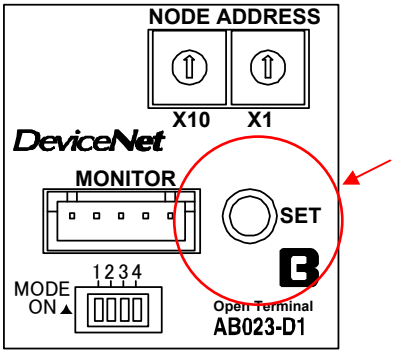
CAUTION

- 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.

5.2. Monitoring Operation

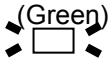
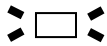
The unit sends the registered addresses sequentially. If no response is returned to any of these addresses, the unit regards the corresponding I/O terminal as being disconnected and turns on the "ALM" LED.

This alarm information is retained until the power is turned off or the information is reset by the slave response alarm reset output. (Refer to the “LED indication”)



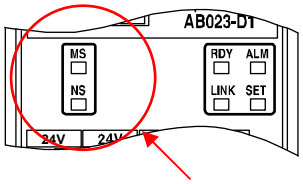
6 LED Indication

6.1. DeviceNet side

MS LED	NS LED	Status	Causes and actions
Lights up (Green) 	Lights up (Green) 	During communication of remote I/O or message	
Lights up (Green) 	Goes out 	During check of node address overlap	Waiting for overlap-checking completion of node addresses in the Master unit
Lights up (Green) 	Flashing (Green) 	Waiting for connection	Waiting for the connection established in the Master unit
Lights up (Red) 	Goes out 	Watchdog timer error	Watchdog timer error occurs. Change this unit.
Lights up (Green) 	Lights up (Red) 	Node address overlap	Node addresses in this unit overlap with other slaves. Restart the unit after setting correctly.
Lights up (Green) 	Lights up (Red) 	Bus-off detection	Bus-off (communication cancels caused by data error occurred frequency) Restart this unit after checking the following items. Is the communication speed of Master/slave the same? Are the cable lengths（trunk lines/branch lines）correctly? Is there disconnection or slack of the cable? Is there terminating resistance at the end of the trunk line? Are there a lot of noises
Lights up (Green) 	Flashing (Red) 	Communication time out	The connection to the Master is timeout. Restart this unit after checking the following items. Is the communication speed of master/slave the same? Are cable lengths（trunk lines/branch lines）correctly?

LED Indication

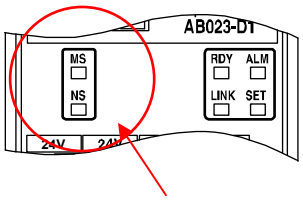
			Is there disconnection or slack of the cable? Is there the terminating resistance at the end of the trunk line? Are there a lot of noises?



6.2. Sho-haisen Bus side

●Indication of the status of Sho-haisen Bus

Indication	Function	Color	Meaning	
RDY	Ready	Green	Lights up	This unit is in operation.
			Goes out	The power is not supplied, or this unit is faulty.
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 the slave unit does not respond.
			Flashing	Short circuit between DP and DN
			Goes out	Data is being transmitted normally.
SET	Address Automatic Recognized Indication	Orange	Lights up	Automatic address recognition is in progress.
			Goes out	Data is being transmitted normally.
			Flashing	The recognized address is being written to EEPROM.



7 Connections

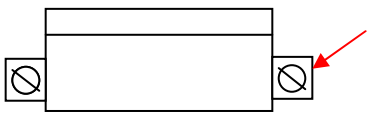
DeviceNet side

This connector terminal is an easy desorption.
Model: MVSTBW2.5/5-STF-5.08AUM (a product made by Phoenix Contact)
Connectable electric wire: 0.2n - 2.5㎜㎡ (AWG24 - 12)
Clamping torque: 0.5 - 0.6N-m
The sticker with a connector corresponds to the cable color. It is possible to check by the color of cables and units whether the wiring is collect or not.

Terminal Name	Signal Type	Line Color
V＋	Communication power supply cable (+ side)	(Red)
CAN H	Communication data High side	White
DRAIN	Shield	―
CAN L	Communication data Low side	Blue
V―	Communication power supply cable side (- side)	(Black)

Refer to the user's manual of each DeviceNet Master for connection method.

When detaching “DeviceNet side connectors” and “AnyWireBus side connectors”, check to see that the fixation screws on both ends are loosened (unplugged from the sockets) before pulling them off. The devices could be damaged if the connectors are forcedly pulled off while they are still locked. When installing the device, check to see that there will be no short-circuits due to feasings or cast-off of the wires and securely tighten the screws at the both ends. (Tightening torque 0.5N-m)



Sho-haisen Bus side

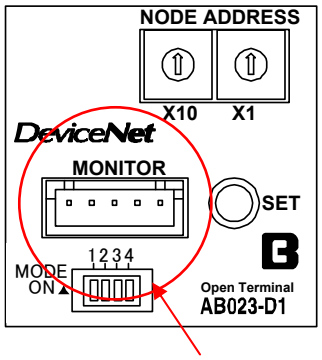
An eight-pole M3 screw terminal block is on this side.
Connectable wire: AWG22 - AWG14

Tightening torque: 0.8N-m

24V 0V	Connect a 24 VDC stabilized power supply. 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.

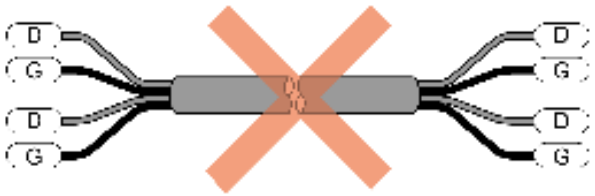
Connect a slave unit of the Bitty Series. DB series slave unit cannot be connected.
Connect the DP and DN terminals to their counterparts on the slave unit, respectively. (Refer to the user's manual of each unit in use.)

MONITOR Connector
This connector is used to connect a maintenance monitor.
Do not connect the Uniwire system's real-time monitor RM-120.



CAUTION

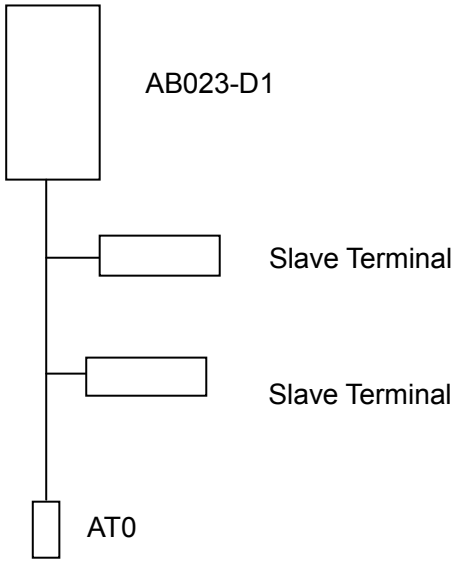
* Do not use plural transmission lines (DP, DN) with many cable lines together.
It has the possibility that the equipment operates faultily due to the cross talk when it is transmitted together.



* Set the diameter of the transmission line at more than 1.25 mm^2.
* Connect between transmission lines (DP, DN) correctly.
* 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.

7.1. Terminator

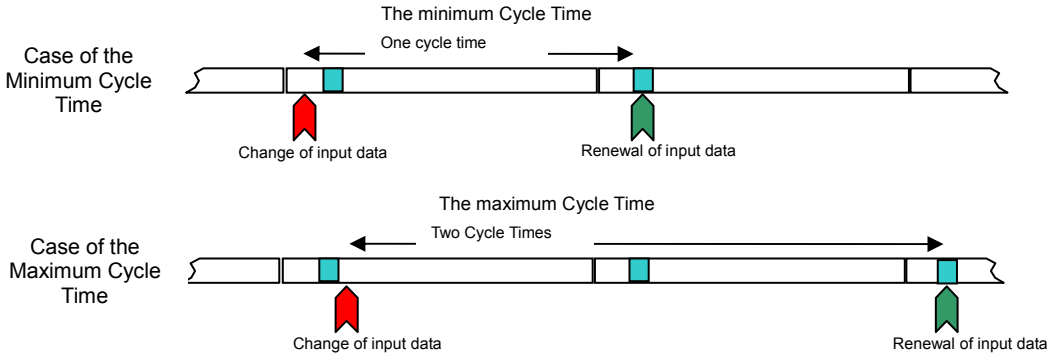
Connect one AT0 terminator to the far end of the Sho-haisen bus line.
Otherwise, the line may not be able to transmit data normally.



8 Time Required for Transmission

8.1. 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.

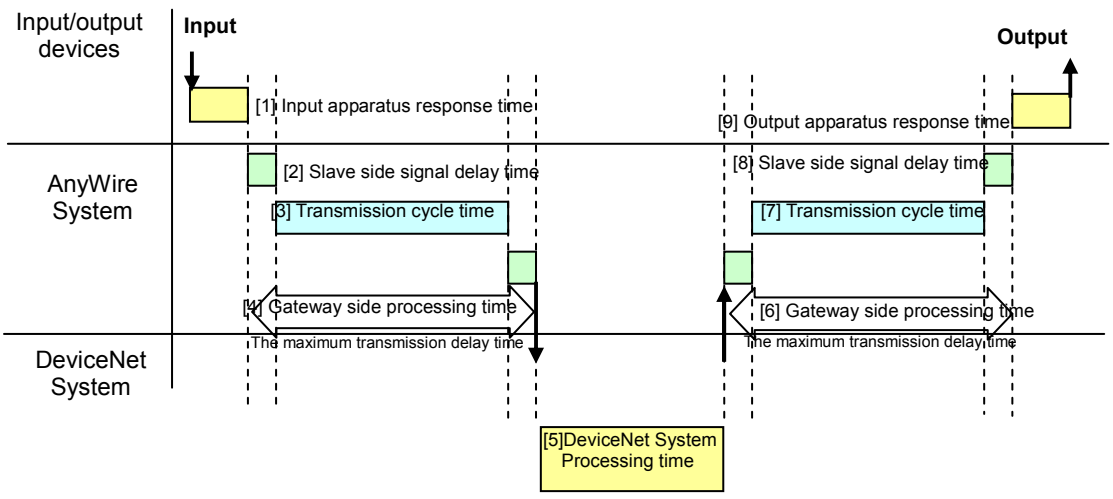


8.2. Output

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.



9 Device Profile

Device profile

General Data	Adaptive DeviceNet specification	Volume 1 Release2.0 Volume 2 Release2.0
	Vendor ID	845
	Device type	0
	Product code	3
Physical Conformance Data	Network current consumption	45mA or less
	Connector type	Open plug
	Check for insulation of physical layer	Yes
	Supported LED	Module, Network
	MAC ID setting	Dip switch
	Default MAC ID	0
	Transmission baud rate setting	Automatic Tracking
	Supported transmission baud rates	125Kbit/s, 250Kbit/, 500Kbit/s
Communication Data	Predefined Master/slave connection set	Group 2 only server
	Dynamic connection support（UCMM）	None
	Explicit message Fragmentation support	Yes

Object packaging
Identity Object (01H)

Object Class	Attribute	Not supported
	Service	Not supported

Object Instance	Attribute	ID	Contents	GET SET	Value
		1	Vendor	○ ×	845
		2	Device type	○ ×	0
		3	Product code	○ ×	3
		4	Revision	○ ×	1.1
		5	Status (bits supported)	○ ×	bit0 bit10
		6	Serial number	○ ×	Each unit
		7	Product name	○ ×	AB023-D1
		8	State	× ×	
		9	Configuration Consistency Value	× ×	
		10	Heartbeat Interval	× ×	
	Service	DeviceNet service		Parameter option	
		05H	Reset	No	
		0EH	Get attribute Single	No	

Message Router Object (02H)

Object Class	Attribute	Not supported
	Service	Not supported
Object Instance	Attribute	Not supported
	Service	Not supported
Unique Vender Specification Addition		None

Device Net Object (03H)

Object Class	Attribute	ID	Contents	GET SET	Value
		1	revision	○ ×	02H
	Service		DeviceNet Service	Parameter option	
		0EH	Get attribute Single	No	

Object Instance	Attribute	ID	Contents	GET SET	Value
		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	× ×	
	Service		DeviceNet service	Parameter option	
		0EH	Get Attribute Single	No	
		10H	Set Attribute Single	No	
		4BH	Allocate Master/Slave Connection Set	No	
		4CH	Release Master/Slave Connection Set	No	

Assembly Object （04H）

Object Class	Attribute	Not supported
	Service	Not supported

Object Instance 1	Section	Information		Number of maximum instances	
	Instance type	Static I/O		1	
	Attribute		Contents	GET SET	Value
		1	Number of Members in List	× ×	
		2	Member List	× ×	
		3	Data	○ ○	
	Service		DeviceNet Service	Parameter option	
		0EH	Get Attribute Single	No	
		10H	Set Attribute Single	No	

Connection Object (05H)

Object Class	Attribute	Not supported
	Service	Not supported
	Max. number of available active connections	1

Object Instance 1	Section	Information	Max. number of instances		
	Instance type	Explicit Message	1		
	Production trigger	Cyclic			
	Transport type	Server			
	Transport class	3			
	Attribute	ID Contents	GET	SET	Value
		1 State	○	×	
		2 Instance type	○	×	00H
		3 Transport class trigger	○	×	83H
		4 Produced connection ID	○	×	
		5 Consumed connection ID	○	×	
		6 Initial comm. characteristic	○	×	21H
		7 Produced connection size	○	×	64H
		8 Consumed connection size	○	×	64H
		9 Expected packed rate	○	○	
		12 Watchdog time-out action	○	○	One of 01,03
		13 Produced connection path length	○	×	00H
		14 Produced connection path	○	×	
		15 Consumed connection path length	○	×	00H
		16 Consumed connection path	○	×	
		17 Production inhibit time	○	×	
	Service	DeviceNet service	Parameter option		
		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			
	Attribute	ID Contents	GET	SET	Value
		1 State	○	×	
		2 Instance type	○	×	01H
		3 Transport class trigger	○	×	82H
		4 Produced connection ID	○	×	
		5 Consumed connection ID	○	×	
		6 Initial comm. characteristic	○	×	01H
		7 Produced connection size	○	×	22H
		8 Consumed connection size	○	×	22H
		9 Expected packed rate	○	○	
		12 Watchdog time-out action	○	×	00
		13 Produced connection path length	○	×	06H(with IN)
		14 Produced connection path	○	×	20_04_24_64_30_03(with IN)
		15 Consumed connection path length	○	×	06H(with OUT)
		16 Consumed connection path	○	×	20_04_24_65_30_03(with OUT)
		17 Production inhibit time	○	×	
	Service	DeviceNet Service	Parameter option		
		05H Reset	No		
		0EH Get Attribute Single	No		
		10H Set Attribute Single	No		

10 Trouble Shooting

10.1. Sho-haisen Bus side

First, check the following:

1. Whether the RDY LED of AB023-D1 is on
2. Whether the LINK LED of every unit is blinking
3. Whether the supply voltage of AB023-D1 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

Refer to our Technical Manual.

Checklist by symptom

Symptom	Check Item
Data cannot be input or output.	**AB023-D1 side** Check whether the Sho-haisen bus lines are connected correctly. Check whether power is supplied to the AB023-D1 unit. **Slave Unit side** Check whether power is supplied to the slave unit. Check whether the slave unit address is connected 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 flashing.	Check whether short between DP and DN.

11 Warranty

■Warranty period

The warranty of the Product delivered shall continue effective for one (1) year after the delivery thereof to a location as designated by the original owner.

■Scope of warranty

Should a defect occur in any part of the Product during the foregoing warranty period when it is used normally in accordance with specifications described in this User's Manual. The Company shall replace or repair the defect without charge, except when it arises out of:

(1) The misuse or abuse of the Product by the owner;
(2) Other cause than the Product delivered;
(3) The unauthorized alternation or repair of the Product by any person other than the Company's personnel;
(4) Any unusual force of nature, disasters and other causes beyond the Company's control.

The word "warranty" as used herein, means the warranty applicable to the delivered product alone, and the Company is not liable for consequential or incidental damages induced by any malfunction.

12 Change History

Version	Date	Content of Change
First edition	March 15, 2005	Release
1.0 edition	April 28, 2005	Add “Warranty”.
1.1 edition	June 23, 2005	Assignment of the serial number
1.2 edition	March 2, 2006	Add MODE function and change the contact information

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