

Open Terminal Series  
DeviceNet Bit Distribution I/O Terminal  
AB023-D1

# User's Manual

Ver. 1.4 May 17, 2021

# Precautions

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## Instructions about this document

1. See to it that this document reaches the end user.
2. Read this document carefully and understand it sufficiently before operating this product.
3. Be noted that this document only describes the details of functions of this product and does not guarantee that this product conforms to customer's specific purpose.
4. Transcribing or copying this document, partly or entirely, without prior permission is prohibited.
5. Content of this document is subject to change in the future without prior notice.

## Warning indication



“Warning” marking shows the content of possibilities that death or severe injury may result when this product is improperly handled.



“Caution” marking shows the content of possibilities that injury or property damage may result when this product is improperly handled.

## Safety precautions



- ◆ The AnyWire system does not provide control functions intended to ensure safety.
- ◆ In the following cases, users should give special consideration to operating conditions so as to provide a margin relative to the ratings and functions of each product, take safety measures (fail-safe measures, etc.), and consult us for details.
  - (1) Applications that need high safety
    - Applications where great influence on human life and properties can be expected
    - Medical equipment, safety equipment, etc.
  - (2) When the product is used for a system under higher reliability requirements
    - Use for vehicle control, combustion control equipment, etc.
- ◆ Be sure to turn off the power source prior to installation or replacement work.
- ◆ Be sure to use the AnyWire system within the range of the specifications and conditions specified in this manual.



- ◆ Do not turn on the 24 V power source before wiring and connection of the entire AnyWire system are completed.
- ◆ Use a 24 V stabilized DC power source for the AnyWire system device.
- ◆ Despite the AnyWire system's high resistance to noises, transmission lines and I/O cables shall be put away from high voltage wires and power cables.
- ◆ Take care not to let metal dust enter the unit or connector especially at the time of wiring work.
- ◆ Incorrect wiring may cause damage to the device. Additionally, pay attention to cable length and its layout so that connectors and electric wires may not come loose.
- ◆ In connecting a stranded wire to a terminal block, refrain from pre-soldering the stranded wire. Or bad contact can result.
- ◆ Lengthy power line can cause low power supply voltage for a remote slave unit due to the voltage drop. When this is the case, connect a local power supply to obtain the prescribed power supply voltage.
- ◆ Refrain from installing the device in the following places:
  - ◆ Where subjected to direct sunshine, or operating ambient temperature outside of 0 to 55°C,
  - ◆ Where subjected to operating relative humidity outside of 10 to 90%, or so steep a temperature change as to develop condensation,
    - Where subjected to corrosive or combustible gases, and
    - Where subjected to direct vibration or shock.
- ◆ Terminal screws shall be tightened tightly in order to avoid causing malfunction.
- ◆ Do not store the device in high temperature and high humidity. (Recommended ambient temperature: -20 to 75°C)
- ◆ An emergency stop circuit and an interlock circuit for the safety purpose shall be incorporated in an external circuit other than the AnyWire system.

# Contents

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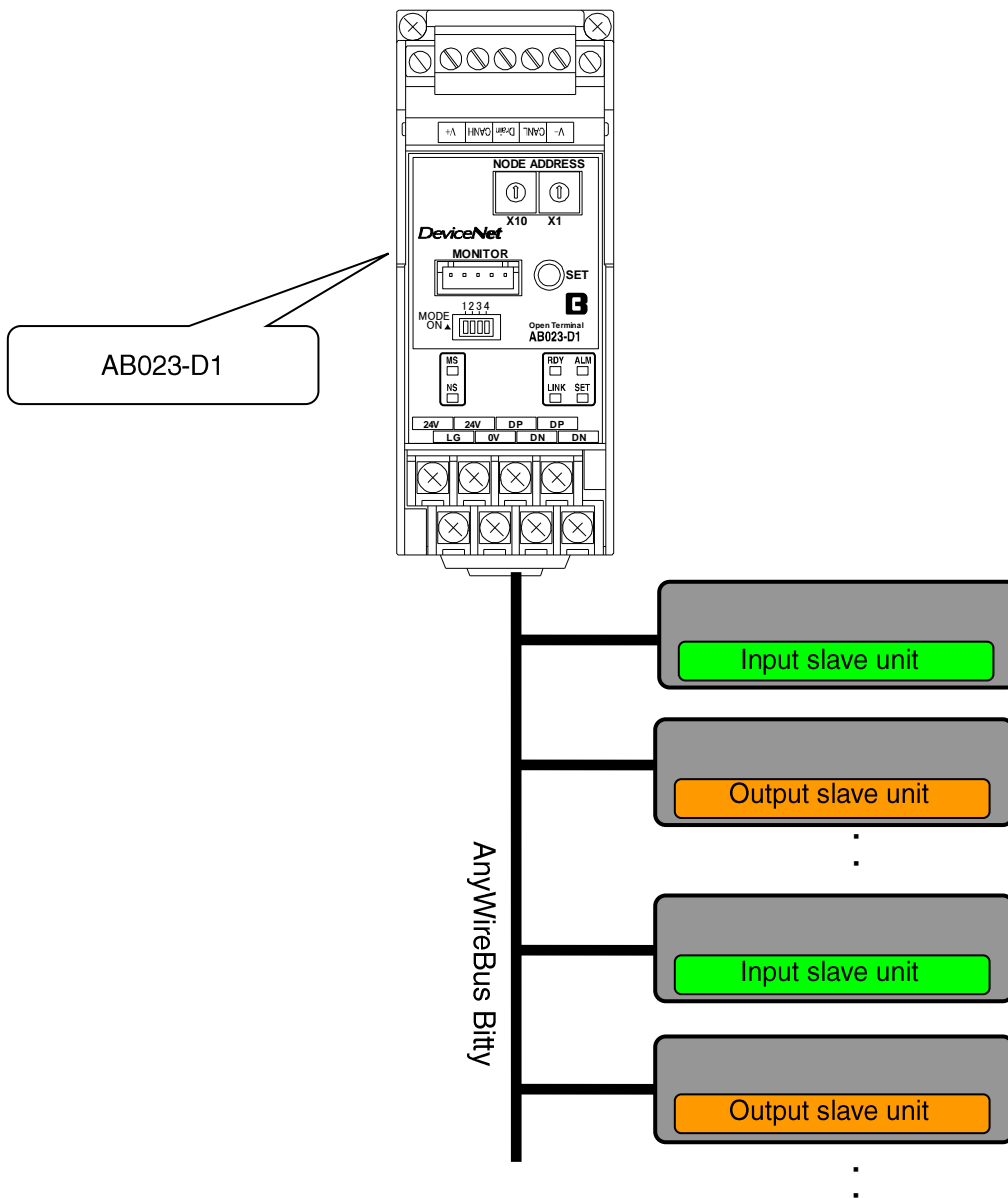
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# 1 Overview

Bit Distribution I/O Terminal is suitable for further distribution of inputs and outputs under Device Net control. AB023-D1 enables transmission of I/O signals and power supply to each terminal (D-I/O terminal) via two transmission lines.

Disconnection can be detected even with branch wiring.

AB023-D1 (one unit) enables 256 inputs and 256 outputs (max.)



## 2 Specifications

### 2.1. General specifications

Operating ambient temperature	0°C – +55°C
Storing temperature	-20°C – +75°C
Operating humidity	10% – 90% RH, without condensation
Atmosphere	No corrosive gas and no combustible gas

### 2.2. Performance specifications

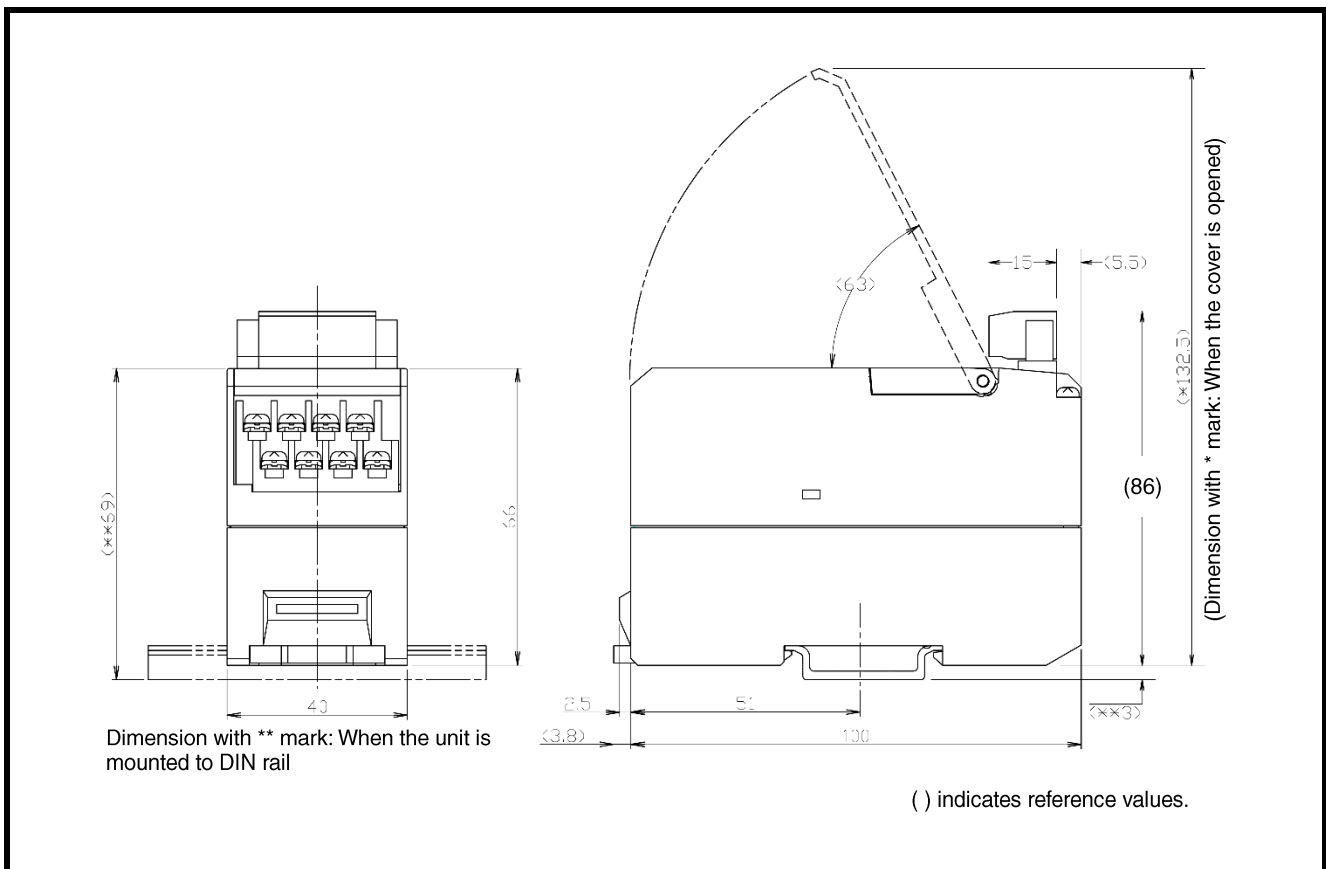
#### System specifications for Sho-Haisen bus

Transmission clock	28.7 kHz
Transmission system	DC power supply superimposed total frame/cyclic method
Connection configuration	Bus type (Multi-drop method, T-branch method, tree branch method)
Transmission protocol	Dedicated protocol (AnyWire Bus Bitty protocol)
Number of connecting I/O items	512 points (Input: 256 points), (Output: 256 points)
Number of connecting units	Max 128 units (Varies depending on current consumption of each unit)
Transmission cycle time (1 cycle time)	10.2 ms /I/O (512 points) Note) Transmission cycle time is a value between 1-cycle time and 2-cycle time.
Connecting cable	General-purpose power cable × 2 (0.75 mm <sup>2</sup> to 2.0 mm <sup>2</sup> )
Max. transmission distance	When used at 24 V (rating): 50 m (When wire diameter is 1.25 mm <sup>2</sup> ) Condition: Load current: 2 A, Allowable relay drive distance
Max. current applicable to transmission line	2A
Power supply voltage	DC26.4V (24 V DC rated power supply)
Current consumption of circuit	0.2A
Slave operating voltage range	Additional power supply is not required. (Power is supplied from transmission line.)
Slave load voltage	Additional power supply is not required. (Power is supplied from transmission line.)

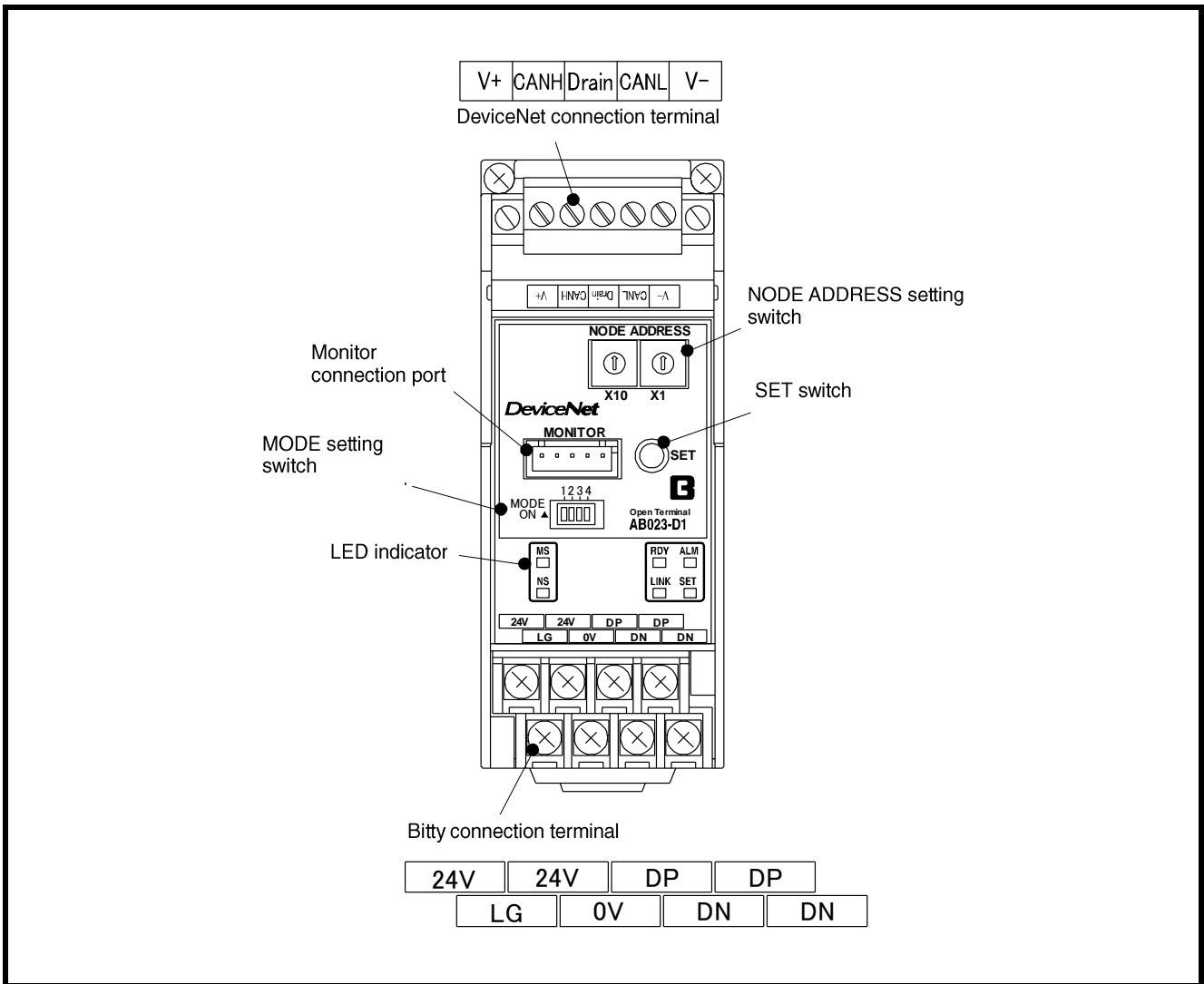
**System specifications for DeviceNet**

Applicable DeviceNet version	Ver.1.2			
Communication speed	500K/250K/125Kbit/s (Automatic follow-up)			
Communication distance	Communication speed	Communication speed	Communication speed	Total branch line length
	500 Kbit/s	100 m or less	6 m or less	39 m or less
	250 Kbit/s	250 m or less	6 m or less	78 m or less
	125 Kbit/s	500 m or less	6 m or less	156 m or less
Max. number of connectable nodes	64 units (Up to 63 slave units can be connected.)			
Error correction	CRC error, node address duplication check, verification of scan list			
Connector	MVSTBW2.5/5-STF-5.08AUM (Manufacturer: Phoenix Contact)			
Predefined master/slave connection set	Group 2 Only Server			
I/O size	Produced Connection Size (Input size) Input: 256 points — 34 Consumed Connection Size (Output size) Output: 256 points — 34			
Max. current consumption	40 mA			

**2.3. Dimensional outline drawing**



2.4. Name of Each Part





## 2.5. Attaching to/detaching from DIN rail

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Please install this device to the DIN rail before use.

### 1. DIN rail attachment procedure

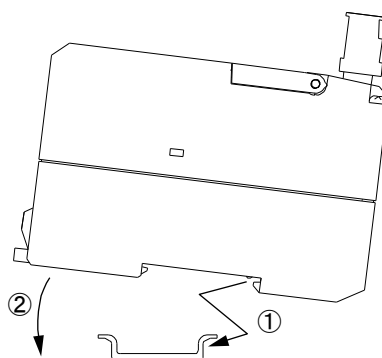
- [1] Hook the upper fastening claw at the bottom of the unit onto the DIN rail.
- [2] Insert the unit body by pressing it against the DIN rail.

### 2. DIN rail detachment procedure

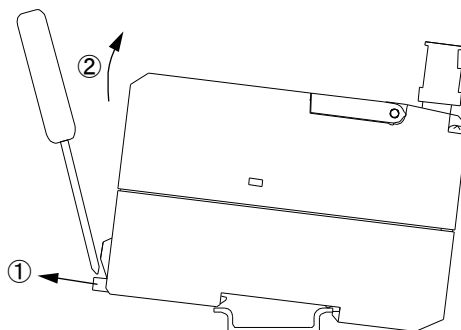
With a flat-blade screwdriver inserted in the hook, tilt the screwdriver toward this unit body. Then, the hook can be removed from the rail.

In this condition, unhook the fastening claw of the unit body, and raise the hook attached side of the unit body to remove it.

Mounting the unit



Removing the unit



### 3 Switch settings

#### 3.1 Settings for Device Net

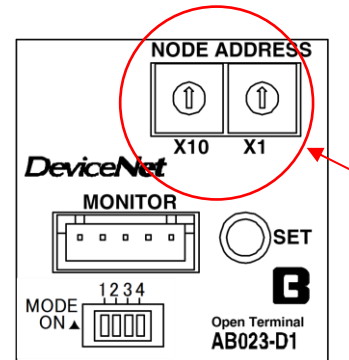
##### 3.1.1 Node address setting

Set a node address with the NODE ADDRESS setting switches.

The range in which the node address can be set varies depending on the master to be used.

If another node is already using the selected address, a node address redundancy will occur and the address cannot start communication.

NODE ADDRESS	NODE ADDRESS setting switch	
	x10	x1
0	0	0
1	0	1
2	0	2
3	0	3
.	.	.
62	6	2
63	6	3



##### 3.1.2 Communication speed setting

No setting is required. With the automatic follow-up function, communication speed will follow the setting of the master unit.

#### 3.2. Settings for Sho-Haisen bus

##### 3.2.1. Selection of specifications (MODE setting switches)

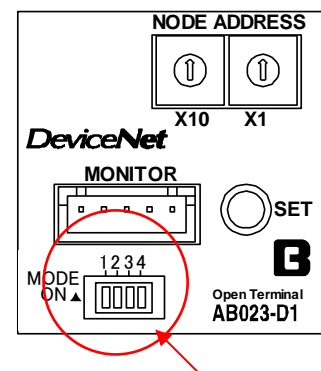
Select transmission distance and other conditions with the MODE setting switches. ("SW-\*": \* corresponds to a number (1 to 4) indicated on the label.)


SW-2, 1 Set a number of transmission points (= number of occupied bytes) depending on combination of ON/OFF settings of SW-2 and SW-1.

SW-3 Reserve. Set this switch to OFF.

SW-4 Reserve. Set this switch to ON.

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



 <b>CAUTION</b>	Before setting the DIP switches, be sure to turn OFF the power supply. While power is ON, change of setting is disabled.
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## 4 Memory map

Input offset byte addresses for the DeviceNet master unit are as per the table below.

Number of transmission points	Input area	Alarm flag area	Number of error addresses storage area	Number of bytes occupied for input
256 points	0~31	32	33	34
128 points	0~15	16	17	18
64 points	0~7	8	9	10

At occurrence of an error, the bit corresponding to the alarm flag area is set to ON.

After the error condition is removed, bit 0 is reset to "0" (not retained).

Bit 1 will be retained until the power supply is turned OFF, or until error reset operation is executed.

Bit 0	DP and DN are short-circuited.
Bit 1	When address response error occurs, this bit is set to "1". Possible causes of the error are disconnection or fault of the terminal.
Bit 2 to bit 7	Spare

A number of error IDs (binary number) is entered in the number of error addresses storage area.

Bit 0 to bit 7	Number of error IDs
----------------	---------------------

Output offset byte addresses for the DeviceNet master unit are as per the table below.

Number of transmission points	Output area	Command area 1	Command area 2	Number of bytes occupied for output
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	Turning this bit from 0 to 1 clears address response error information.
Bit 1 to bit 7	Spare



### CAUTION

If disconnection status is temporarily detected, for example, due to installation or removal of a slave unit in live status or a contact failure and then the system is restored from the error, it is possible that the error information cannot be reset by the response error reset output.

In this case, turn OFF the power supply once, and turn it ON again.

Command area 2 is reserved area.

## Memory map

### Memory assignment (Example)

The following description applies to a case where DeviceNet Master (CS1W-DRM21 or CJ1W-DRM21) for the OMRON SYSMAC CS/CJ series is used.

#### 1. To use fixed assignment area 1:

For fixed assignment, 17 node addresses (leading node address + 16 addresses) will be occupied.

	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	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 error IDs								-	-	-	-	-	-	-	-	C

In the above table, numbers 0 to 255 indicate addresses on the AnyWire bus.

**A:** Address response error information clear flag

**B:** DP-DN short-circuit flag

**C:** Address response error flag

-: Spare

## 2. To use free assignment:

The following description is based on the assumption that outputs are assigned to CH No. 500 and subsequent channels, and inputs are assigned to CH No. 100 to subsequent channels with a 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 error IDs								-	-	-	-	-	-	-	-	C

In the above table, numbers 0 to 255 indicate addresses on the AnyWire bus.

**A:** Address response error information clear flag

**B:** DP-DN short-circuit flag

**C:** Address response error flag

–: Spare

## 5 Monitoring function

### Overview

The Sho-Haisen bus slave units are provided with a specific address each.

When this unit sends an address, the slave unit corresponding to the address makes response to this unit, thus enabling detection of disconnection and slave unit presence check.

This machine stores the addresses of the slave units that are connected at the time via the automatic address recognition operation (described later) into E<sup>2</sup>PROM. This information is memorized even if the power is turned off.

Then, this unit sends registered addresses in sequence, and if there is no response from the corresponding unit, it is judged as a disconnection error. In this case, the “ALM” LED is lit to indicate the error.

### 5.1. Automatic address recognition

The function to store addresses of slave units being connected to this board into its E<sup>2</sup>PROM is called “automatic address recognition”.

#### Procedure

- 1 Make sure that all slave units are normally operating.
- 2 Press the “SET” switch until the “SET” LED (orange) turns on.
- 3 The “SET” LED flashes (at short intervals) for a while, and then turns off. This completes address storage.



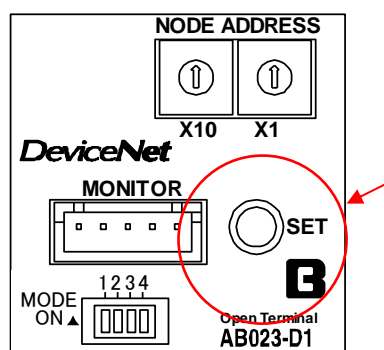
**CAUTION**

- Signals may not be inputted or outputted while an address is automatically recognized. To execute automatic address recognition, perform it in a condition not hampering the operation of the device, for instance, with the execution of a PLC program suspended.
- When an error (short-circuit, etc.) occurs with the Sho-Haisen bus, or for approx. 5 seconds after power-ON or reset, the automatic address recognition function cannot be executed.

### 5.2. Monitoring operation

This board outputs the registered addresses in sequence, and if a slave unit of the relevant address does not send a response, “ALM LED” is turned on as it is recognized as line disconnection error, and Bit 3 of the error flag is turned “1”.

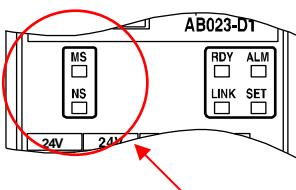
This error information will be retained until the power supply is turned OFF or the error is reset. Refer to the description of the section “About LED indicators”.



## 6 LED indicators

### 6.1. Indications for DeviceNet

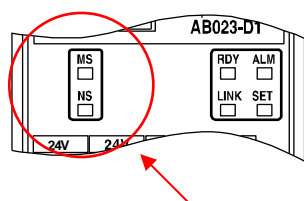
MS LED	NS LED	Status	Cause and corrective action
Lit in green 	Lit in green 	Remote I/O communication or message communication status	
Lit in green 	Unlit 	Node address duplication check status	Waiting for completion of node address duplication check in the master unit
Lit in green 	Flashing in green 	Waiting for connection	Waiting for connection establishment signal from the master unit
Lit in red 	Unlit 	Watchdog timer error	Watchdog timer error occurs with this unit. Replace the unit.
Lit in green 	Lit in red 	Node address redundancy	Node address assigned to this unit is duplicated by the address for any other slave unit. After correcting the node address setting to eliminate duplication, restart this unit.
Lit in green 	Lit in red 	Bus-off detection	Bus-off status (Communication is stopped due to multiple data errors.) After checking the following items, restart this unit. Check if the communication speeds of the master and slave units are the same. Check if each cable length (trunk line/branch line) is proper. Check each cable for disconnection or looseness. Check if the termination resistor is connected to both ends of the trunk line only. Check for much noise.
Lit in green 	Flashing in red 	Communication timeout	Timeout error in communication with master unit After checking the following items, restart this unit. Check if the communication speeds of the master and slave units are the same. Check if each cable length (trunk line/branch line) is proper. Check each cable for disconnection or looseness. Check if the termination resistor is connected to both ends of the trunk line only. Check for much noise.



## 6.2. Indications for Sho-Haisen bus

● Status indicators for Sho-Haisen bus

Indication	Name	Color	Description	
RDY	Ready	Green	Turns on	This unit is in operation.
			Turns off	Power is not supplied to this unit, or this unit has a fault.
LINK	Transmission indication	Green	Flashes	Normal transmission status
			Turns off	This unit has a fault.
ALM	Alarm indication	Red	Turns on	The DP or DN transmission line is disconnected, or there is no response from the corresponding slave unit.
			Flashes	The DP and DN lines are short-circuited.
			Turns off	Normal transmission is in progress.
SET	Automatic address recognition	Orange	Turns on	Automatic address recognition operation is in progress.
			Turns off	Normal transmission is in progress.
			Blinks	Writing a recognized address into E <sup>2</sup> PROM





## 7 Connection

### Indications for DeviceNet

Connectors can be easily connected and disconnected.

Type: MVSTBW2.5/5-STF-5.08AUM (made by Phoenix Contact GmbH)

Connectable electric wire: 0.2–2.5 mm<sup>2</sup> (AWG24–12)

Tightening torque: 0.5–0.6 N·m

A label corresponding to the cable color is attached to each connector.

Users can verify correct wiring by checking if the cable color is matched with the color of the label on the unit.

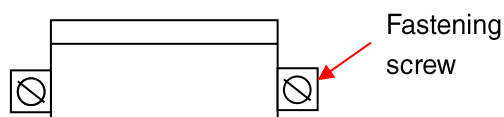
Terminal name	Signal type	Wire color
V+	Communication cable (+)	(Red)
CAN H	Communication data (high)	White
DRAIN	Shield	-
CAN L	Communication data (low)	Blue
V-	Communication cable (-)	(Black)

For details of the DeviceNet connection procedure, refer to the instruction manual for each DeviceNet master unit.

Before disconnecting the connector on the DeviceNet side, make sure that the fastening screws on both sides have been securely loosened (removed from the sockets).

Pulling the connector forcedly in engaged status may cause damage to the equipment.

When connecting the connector, check for a missing wire and possibility of short-circuiting caused by loose wires in advance, and then fasten the screws on both sides securely. (Tightening torque: 0.5 N·m)



Connection

**Connections for Sho-Haisen bus**

8-pole, M3 screw terminal block is provided.


Connectable electric wire: AWG22~14

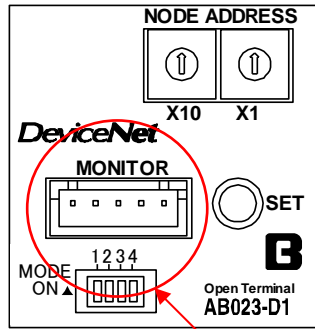
Tightening torque: 0.8 N·m

24V	Internally connected to 24 V.
0V	Capacity: current required for load and slave units + 2 A or more
DP	Transmission wire (+ side)
DN	Transmission wire (- side)
LG	Connected to neutral point of noise filter. Used for grounding when malfunction occurs due to 24 V power supply noise interference. This unit should be singly grounded under the Class D (Class 3) grinding condition.

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

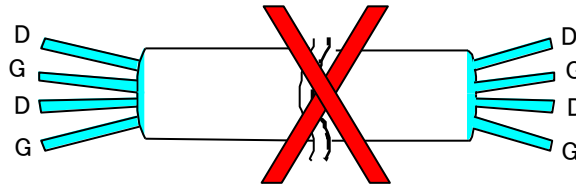
The DP and DN terminals should be connected to the DP and DN terminals of the slave unit, respectively.  
(Refer to the instruction manual for each unit.)

 <b>CAUTION</b>	<p><b>MONITOR connector</b></p> <p>A connector to connect a monitor used for maintenance.</p> <p>Do not connect the real-time monitor RM-120 of the conventional Uni-Wire system.</p>
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**! CAUTION**

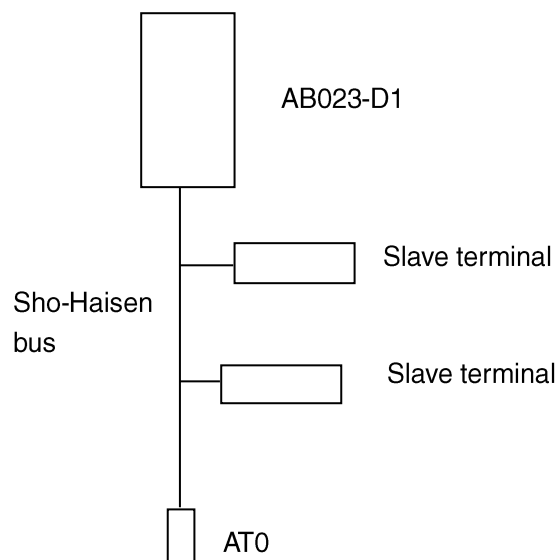
- Do not use a multi-core cable to pass several transmission lines (DP and DN). Or the unit may malfunction due to cross-talk.



- The wire size of transmission lines should be 1.25 mm<sup>2</sup> or larger.
- Connect the DP and DN transmission lines correctly.
- Care shall be taken for voltage drop due to cables. Voltage drop causes malfunctioning of devices.
- Electric wires connected to a connecting terminal shall not be pre-soldered. Or the wire may be loosened, resulting in bad contact.

## 7.1. Terminator

Connect the AT0 terminator (one unit) at the farthest position on the Sho-Haisen bus line. It is possible that normal transmission cannot be executed if AT0 is not connected.



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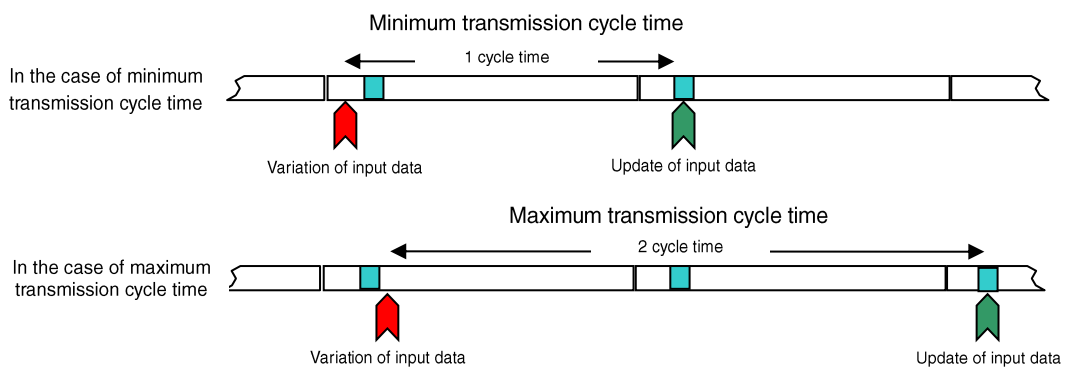
## 8 Required transmission time

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### 8.1. In the case of input

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With the Sho-Haisen bus of this unit, data in an input area will not be updated unless same data input continues twice (double collation). Therefore, transmission cycle time of 1-cycle time (at the minimum) to 2-cycle time (at the maximum) is required. Consequently it may happen that signals shorter than two cycle time cannot be caught depending on timing. Therefore, give input signals longer than two cycle time to ensure that the input signals receive a response.



## 8.2. In the case of output

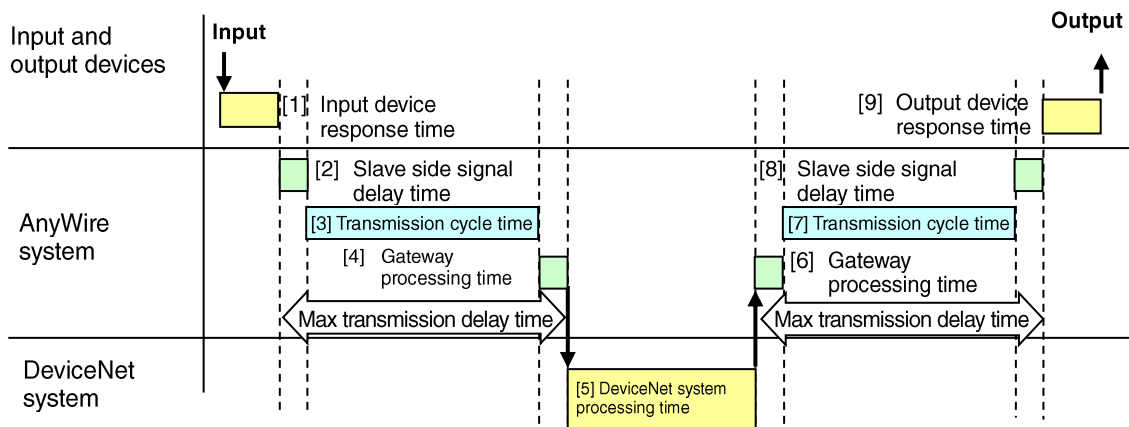
Because dual collation is conducted on the slave unit side, transmission time length of a minimum of one cycle time and a maximum of two cycle time is needed in the same way as for input.

### Description of terms

Cycle time: Repetitive transmission time of data that is actually transmitted

Maximum transmission delay time: Gateway processing time + Refresh time + Slave signal delay time

Response delay time is as shown below:



## 9 Device profile

### Device profile

General data	Compatible DeviceNet version	Volume 1 Release2.0 Volume 2 Release2.0
	Vender ID	845
	Device type	0
	Product code	3
Physical conformance data	Current consumption of network	45mA or less
	Connector type	Open plug
	Physical layer insulation	Provided
	Support LED	Module Network
	MAC ID setting	DIP switch
	Default MAC ID	0
	Transmission baud rate setting	Automatic follow-up
	Support transmission baud rate	125 Kbit/s, 250 Kbit/s, 500 Kbit/s
Communication data	Predefined master/slave connection set	Group 2 Only Server
	Dynamic connection support (UCMM)	Not provided
	Explicit message fragmentation	Provided

**Object implementation****Identity object (01H)**

Object Class	Attribute	Not supported
	Service	Not supported

Object Instance	Attribute	ID	Description	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	○	×	For each unit		
7	Product name	○	×	AB023-D1		
8	State	×	×			
9	Configuration Consistency Value	×	×			
10	Heartbeat Interval	×	×			
Service	DeviceNet service		Parameter option			
	05H	Reset	Not provided			
	0EH	Get_attribute_Single	Not provided			

**Message router object (02H)**

Object Class	Attribute	Not supported
	Service	Not supported
Object Instance	Attribute	Not supported
	Service	Not supported
Addition of vender-original specifications		Not provided

**Device Net object (03H)**

Object Class	Attribute	ID	Description	GET	SET	Value
		1	revision	○	×	02H
	Service	DeviceNet service		Parameter option		
		0EH	Get_attribute_Single	Not provided		

Object Instance	Attribute	ID	Description	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	Not provided		
		10H	Set_Attribute_Single	Not provided		
		4BH	Allocate Master/Slave_ Connection Set	Not provided		
		4CH	Release Master/Slave_ Connection Set	Not provided		

**Assembly object (04H)**

Object Class	Attribute	Not supported
	Service	Not supported

Object Instance1	Section	Information	Max. number of instances			
		Instance type	Static I/O	1		
	Attribute	Description		GET	SET	Value
		1	Number of Members in List	×	×	
		2	Member List	×	×	
		3	Data	○	○	
	Service	DeviceNet Service		Parameter option		
		0EH	Get_Attribute_Single	Not provided		
		10H	Set_Attribute_Single	Not provided		



**Connection object (05H)**

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

Object	Section	Information	Max. number of instances			
Instance 1	Instance type	Explicit Message	1			
	Production trigger	Cyclic				
	Transport type	Server				
	Transport class	3				
	Attribute	ID Description		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	Not provided		
	0EH		Get_Attribute_Single	Not provided		
	10H		Set_Attribute_Single	Not provided		

Device profile

Object	Section	Information	Max. number of instances			
Instance 2	Instance type	Polled I/O	1			
	Production trigger	Cyclic				
	Transport type	Server				
	Transport class	2				
	Attribute		ID Description	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 (IN provided)
		14	Produced connection path	○	×	20_04_24_64_30_03 (IN provided)
		15	Consumed connection path length	○	×	06H (OUT provided)
		16	Consumed connection path	○	×	20_04_24_65_30_03 (OUT provided)
		17	Production inhibit time	○	×	
Service			DeviceNet Service	Parameter option		
	05H	Reset	Not provided			
	0EH	Get_Attribute_Single	Not provided			
	10H	Set_Attribute_Single	Not provided			

## 10 Troubleshooting

### 10.1 Indications for Sho-Haisen bus

First of all, confirm the following:

- (1) Make sure that the “RDY” LED for AB023-D1 is lit.
- (2) Make sure that the “LINK” LEDs for all units are flashing.
- (3) Make sure that the AB023-D1 power supply voltage is 24 to 27.6 V.
- (4) Wiring and connection are properly done.
- (5) Address setting is accurate, not overlapped.

Refer to the Technical Manual prepared by us, together with this manual.

#### Symptom-specific checklist

Symptom	Check items
Unable to input or output data	<b>On the AB023-D1 side</b> Check if connection of the Sho-Haisen bus transmission line is correct. Check if power is supplied to the AB023-D1 unit.
	<b>On the slave unit side</b> Is the power supplied for the slave unit? Is the address of the slave unit properly set?
ALM LED (red) is lit	Are DP and DN lines not broken? Check for a change in the slave unit address after automatic address recognition.
ALM LED (red) is flashing	Are DP and DN lines not short-circuited?

## 11 Warranty

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### ■ Warranty Term

Guarantee period of a product is for one year after delivering the product to a place designated by the customer.

### ■ Warranty Range

For failure that has arisen during the above warranty term despite use of a product under its specification range according to its user's manual, the part or section of the product in question will be either replaced or repaired for free of charge.

However, the failure that can be attributed to the following will be excluded from the warranty range:

- (1) Improper use or handling of the product on the user side;
- (2) Cause of the failure can be attributed to something other than the delivered product;
- (3) Cause of the failure can be attributed to modification or repairing carried out by somebody other than the delivery person;
- (4) Natural calamity or disaster, which cannot be attributed to supplier's fault.

Warranty as mentioned here refers to a delivered product only. Note that consequential damage induced by a failure of the delivered product is excluded from the range of this warranty.

### ■ Repair at cost

After the expiration of the warranty period, the owner shall be responsible for all costs and expenses incurred for the troubleshooting and repair of the Product.

Even during the warranty term, the Company shall repair any defects arising from causes other than within the scope of the warranty as specified above, at the owner's cost.

### ■ Changes in the product specifications and the descriptions in the manual

The descriptions in this manual may be subject to change without notice.

## 12 中国版 RoHS 指令

电子信息产品上所示标记是依据 SJ/T11364-2006 规定，按照电子信息产品污染控制标识要求制定。本产品的环保使用期限为 10 年。如果遵守产品说明书中的操作条件使用电子信息产品，不会发生因产品中的有害物质泄漏或突发异变而引发严重的环境污染，人身事故，或损坏财产等情况。

的产品中有害物质的名称及含量

部件名称	有害物质					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 [Cr(VI)]	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
安装基板	×	○	○	○	○	○
框架	○	○	○	○	○	○

本表格依据 SJ/T11364 的规定编制。  
 ○：表示该有害物质在该部件所有均质材料中的含量均在 GB/T26572 规定的限量要求以下。  
 ×：表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T26572 规定的限量要求。



基于中国标准法的参考规格：GB/T15969.2

## 13 Revision history

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Version	Date	Details of revision
First issue	Mar. 15, 2005	Release
1.0	Apr. 28, 2005	Additional description in "Warranty"
1.1	Jun. 23, 2005	Assignment of serial numbers
1.2	Mar. 2, 2006	Addition of the MODE function, Change of organization name for contact
1.3	Aug. 3, 2018	New contact destination
1.4	May 17, 2021	Update of the contents of "Warranty", addition of the contents of Chinese RoHS Directive, and unification of other expressions

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