



Extend I/O Unit for AL- Series & USB Series

CB-53/1616-MIL

CB-52/3232-MIL

Instructions Manual

(For designers' use)

USER'S MANUAL

Please ensure to read and understand this
Instructions Manual before using the Product.
Please keep this Instructions Manual at hand
so that it is always available for reference.

Introduction

This instructions manual explains the handling of "Extension I/O Unit CB-52/3232-MIL and CB-53/1616-MIL", emphasizing the specifications to enable proper and safe use.

The manual is thus intended for designers of control systems.

Before using the product, read this manual carefully for better understanding.

Keep the manual handy so that you can read it whenever you want.

Description of safety

This product must be handled correctly.

Handling the product incorrectly may cause unexpected accidents resulting in personal injuries or damage to your properties.

Many of those accidents can be avoided if you have advance information on dangerous situations.

This manual provides precautions where dangerous situations are predicted. The manual provides the following alert marking and messages for this purpose:

WARNING

This indicates a hazardous situation that could result in death or serious personal injury if you do not perform the procedure correctly.

CAUTION

This indicates a potentially hazardous situation that could result in personal injury or physical damage if you do not perform the procedure correctly.

Before use

- This product is not designed for use in the equipment related to nuclear power, aerospace equipment, vehicles, marine vessels, medical equipment directly in touch with human body, equipment anticipated to give a serious impact to properties, and other equipment required to provide high reliability.
- Take failsafe measures so that the whole system operates safely even if the input power causes an error, a signal line is disconnected, or the main unit fails.
- Be sure to use this product within the scope of the specifications described in this instruction manual in accordance with the specification method described therein.
- Please refer to separate manual "USB series or AL- series device driver manual for Windows" also when you handle this product.

Introduction
Description of safety
Before use

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The main parts which revised by this manual

1 . Overview

1-1. Features

CB-52/3232-MIL and CB-53/1616-MIL are I/O units that can be extended when I/O is needed in the system of our company AL- series and the USB series.

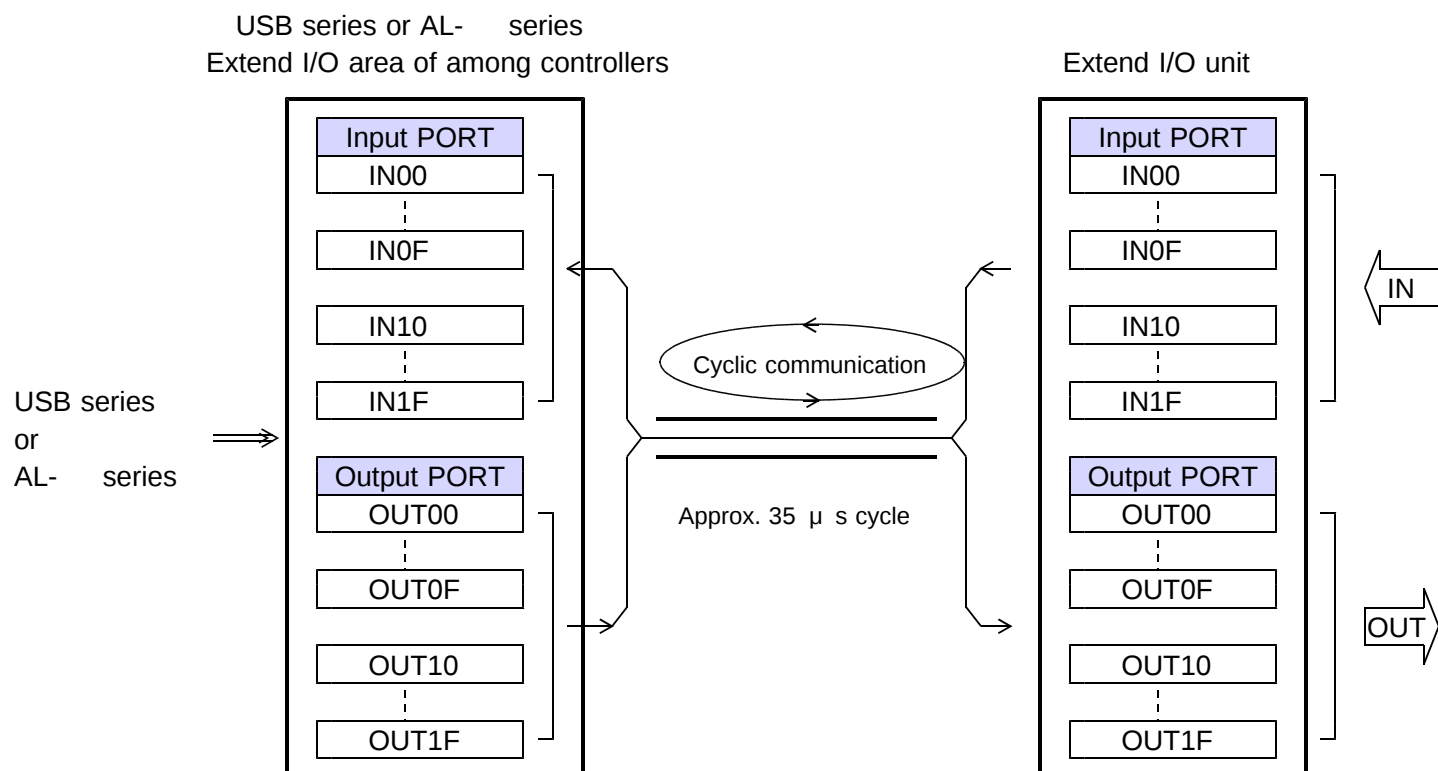
- It is possible to extend it from the slave unit of the AL- series as the settings of the address and the communication, etc. do not worry.
- It is possible to extend it directly from the unit of the USB series.

CB-53/1616-MIL is Extend I/O unit of 16/16 points, and CB-52/3232-MIL is Extend I/O unit of 32/32 points.

The input signal and the output signal can be controlled by the response that equals parallel I/O by high-speed serial communications of 5 Mbps between the unit and Extend I/O unit of the connection destination.

The data of the I/O of the Extend I/O unit connected with each controller of the AL- series or the USB series by serial communications is updated to the I/O area among controllers at approx. 35 μ s cycle.

The user application accesses the Extend I/O area that is among controllers, and controls the Extend I/O unit.



All the input signals and the output signals are isolated by the photocoupler.

Moreover, because CB-52/3232-MIL is independent in 16 points electrically, the input-output equipment and the I/O signal of another potential can be connected.

The load of 100 mA can be driven from all the outputs.

Moreover, the load up to 400 mA can be driven in two points (H' x7 and H' xF) of 16 point inside.

The I/O connector has improved the each company terminal and the connectivity by adopting MIL type 20P.

The Extend I/O unit is a structure that the DIN rail installation and the base can be set up that treats easily.

1-2. Product configuration

• CB-53/1616-MIL

Product name	Rating	Maker	Quantity	Remarks
Extend I/O Unit	CB-53/1616-MIL	Melec Inc.	1	16/16 points (Main Unit)
Connector	51103-0300	Molex	1	For power supply connector (Accessory)
Contact	50351-8100	Molex	4	For 51103 connector (Accessory)
Mounting foot	209-120	Wago	2	For DIN rail installation (Accessory)
Screw	M3 × 5	-	2	For Mounting foot fixation (Accessory)

• CB-52/3232-MIL

Product name	Rating	Maker	Quantity	Remarks
Extend I/O Unit	CB-52/3232-MIL	Melec Inc.	1	32/32 points (Main Unit)
Connector	51103-0300	Molex	1	For power supply connector (Accessory)
Contact	50351-8100	Molex	4	For 51103 connector (Accessory)

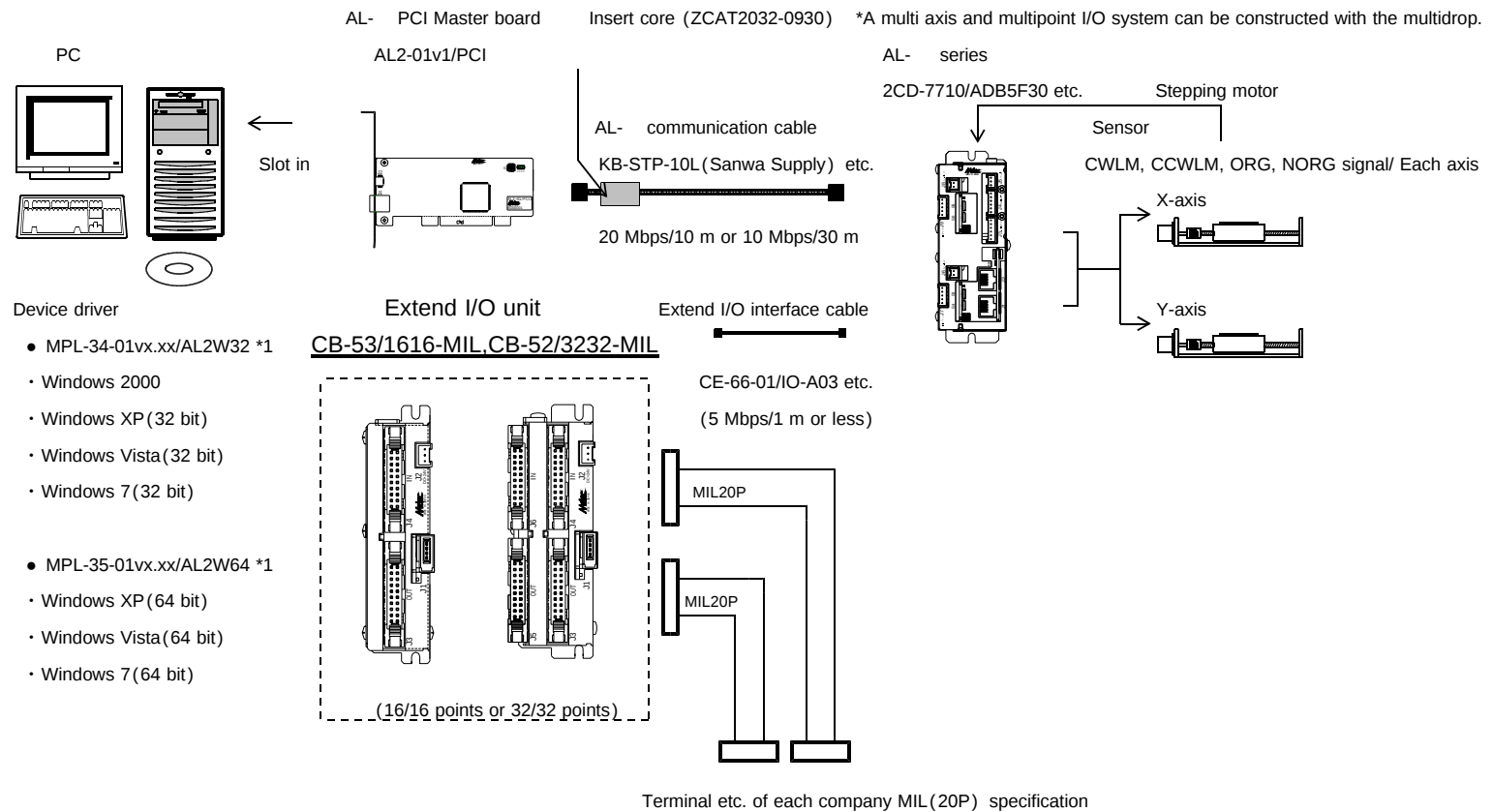
1-3. Example of system configuration

(1) AL- series system

For the equipment for which a lot of axes and the I/O numbers are necessary.

Or, for the equipment for which the distance of wiring is necessary.

The Extend unit can increase I/O without including it in the number of slaves of AL- communications.



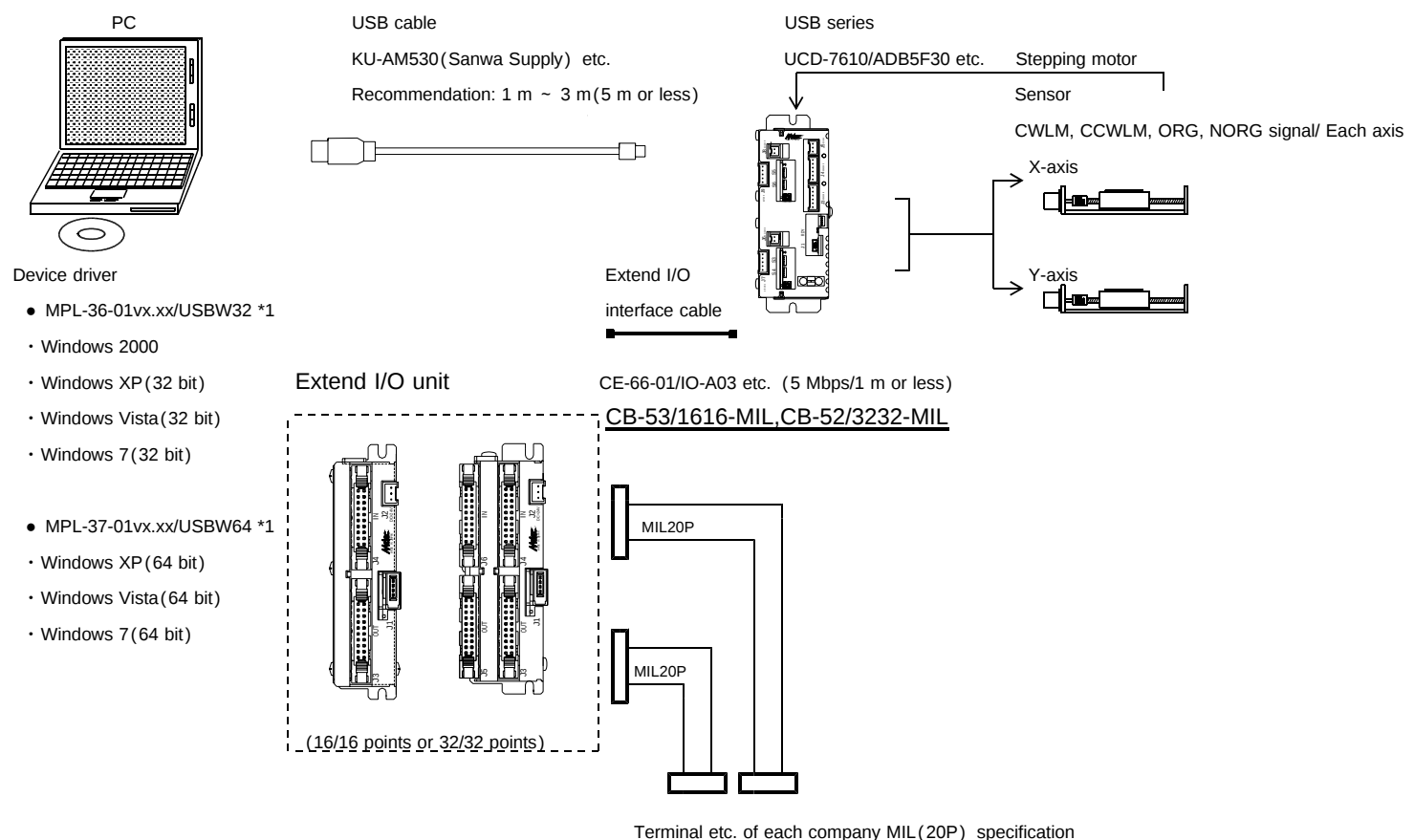
*1 Version No. ... Please confirm the latest version of vx.xx at the manual of the device driver.

(2) USB series system

For the equipment with little number of axes and I/O number.

Or for the equipment with wiring distance short.

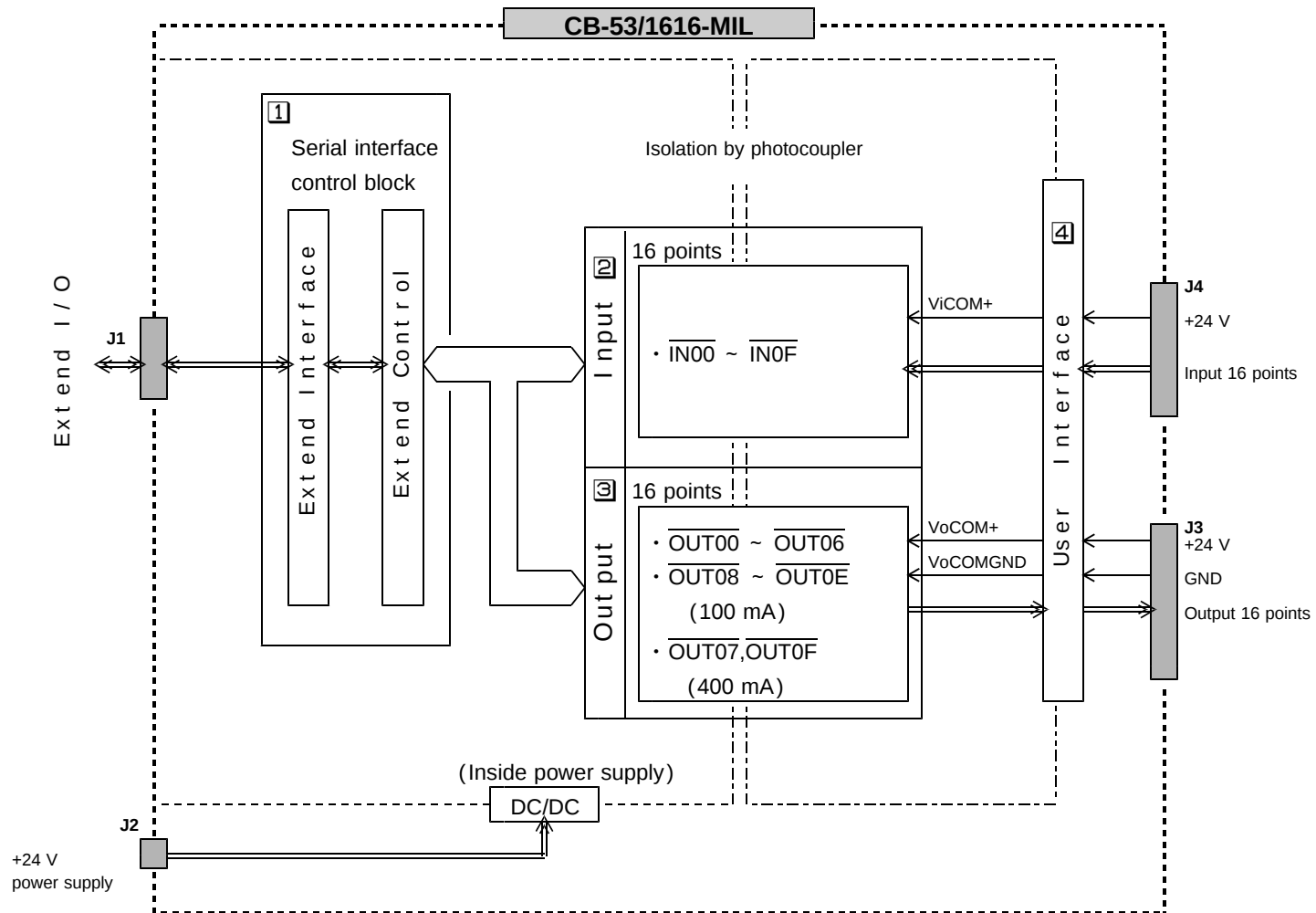
A small system of the motion controller and I/O can be easily composed without the USB hub.



*1 Version No. ... Please confirm the latest version of vx.xx at the manual of the device driver.

1-4. Function block diagram

(1) CB-53/1616-MIL



① Serial interface control block

This department is control block for serial communication of Extend unit.

This block is controlled by between slave unit of the AL- series or the USB series unit by serial communication.

② General-purpose input block

This department is control block for general-purpose input.

The state of the input signal can be read with 16 points.

③ General-purpose output block

The output signal can be written with the output data of 16 points.

The output current of $\overline{OUT00} \sim \overline{OUT06}$ and $\overline{OUT08} \sim \overline{OUT0E}$ are 100 mA.

Two points ($\overline{OUT07}$ and $\overline{OUT0F}$) can drive the load of 400 mA.

④ User Interface block

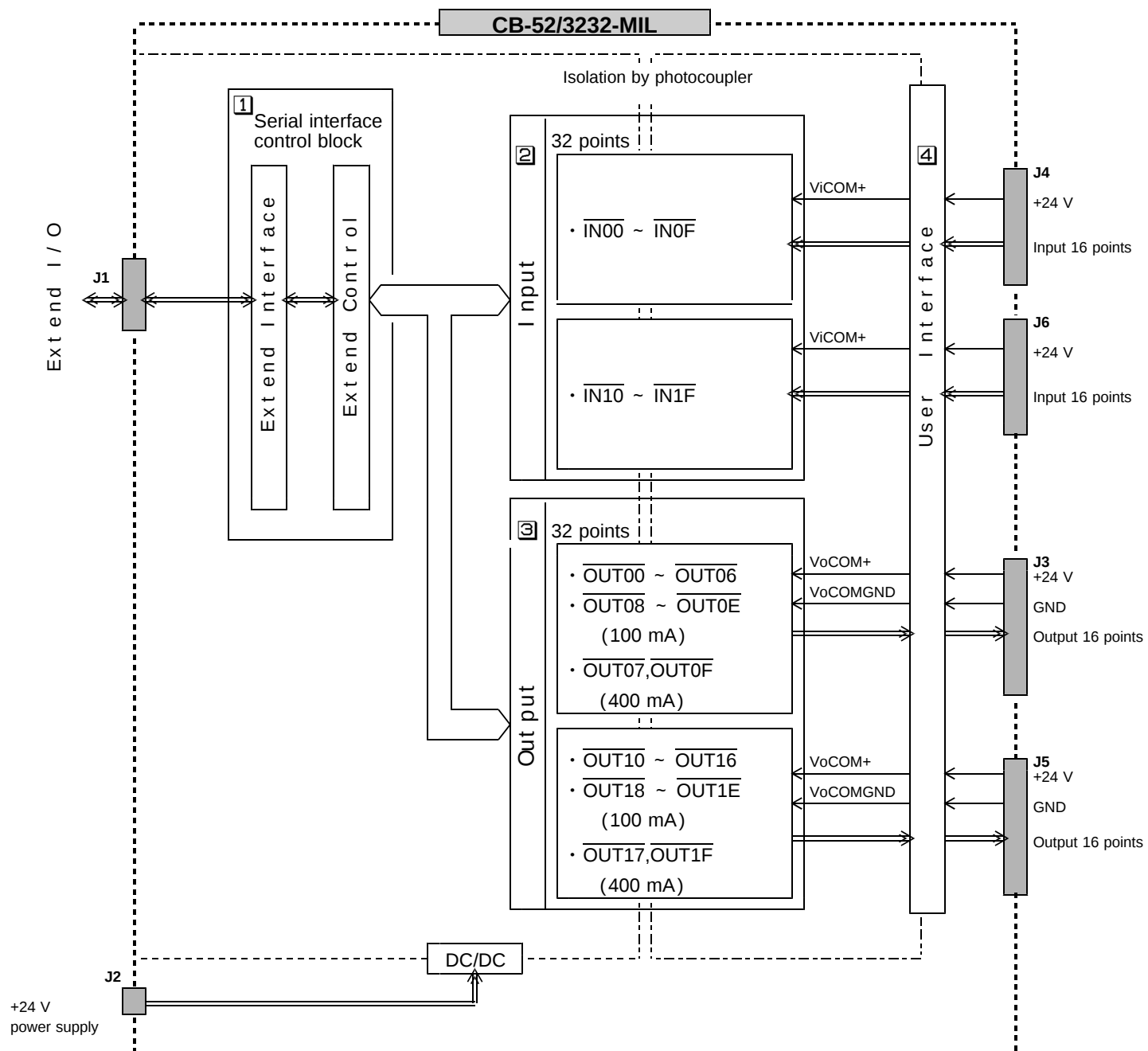
This department is control block for general purpose input and output equipment.

All the I/O signals are isolated by the photo coupler.

* It is independent in 16 points between each power supply of VoCOM+ and ViCOM+ of J3 and J4.

It is necessary to connect the interface power supply of each connector of J3 and J4.

(2) CB-52/3232-MIL



1 Serial interface control block

This department is control block for serial communication of Extend unit.

This block is controlled by between slave unit of the AL- series or the USB series unit by serial communication.

2 General-purpose input block

This department is control block for general-purpose input.

The state of the input signal can be read with 16 points or 32 points.

3 General-purpose output block

The output signal can be written with the output data of 16 points or 32 points.

The output current of $\overline{OUT00} \sim \overline{OUT06}$, $\overline{OUT08} \sim \overline{OUT0E}$, $\overline{OUT10} \sim \overline{OUT16}$ and $\overline{OUT18} \sim \overline{OUT1E}$ are 100 mA.

Four points ($\overline{OUT07}$, $\overline{OUT0F}$, $\overline{OUT17}$ and $\overline{OUT1F}$) can drive the load of 400 mA.

4 User Interface block

This department is control block for general purpose input and output equipment.

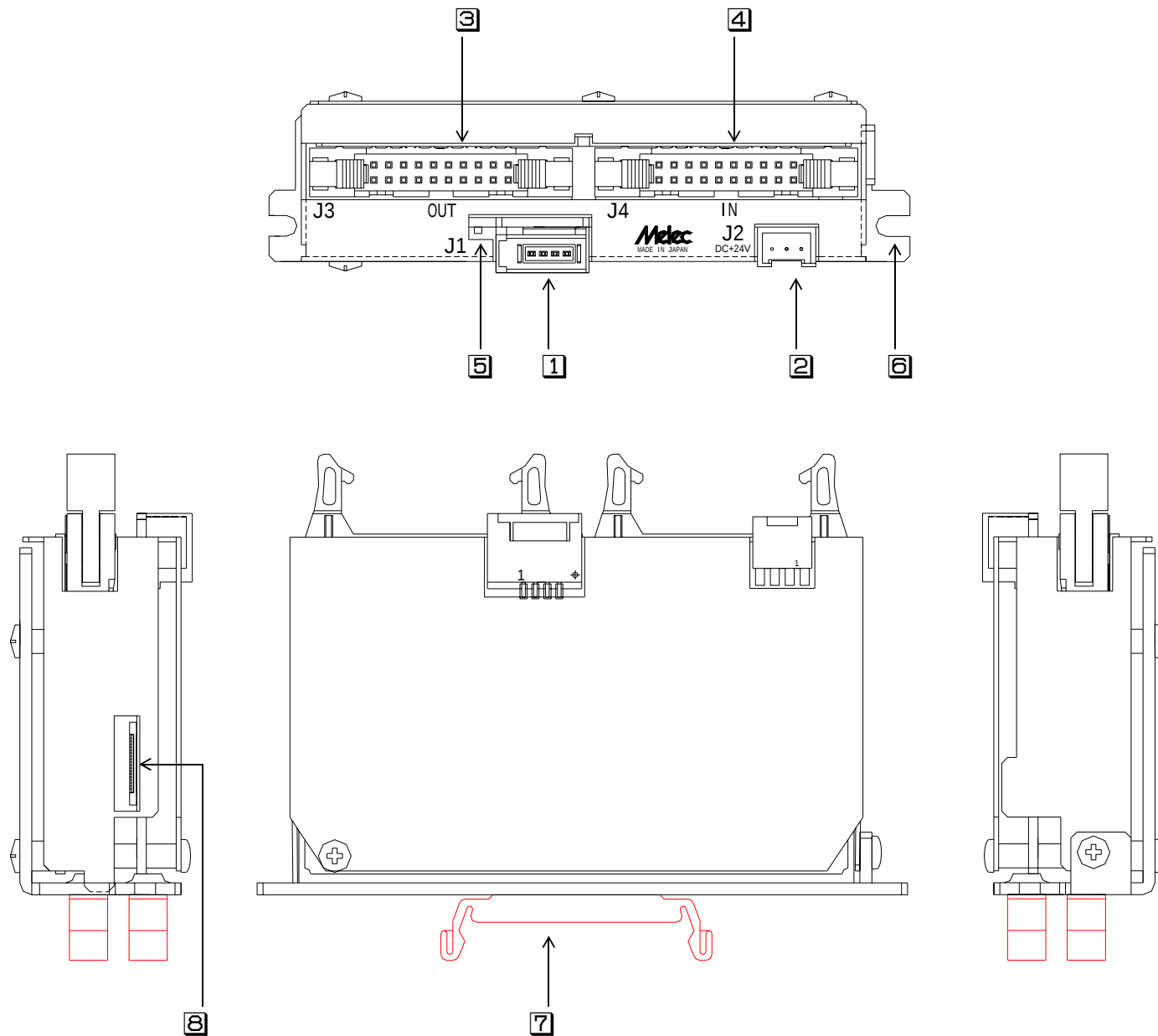
All the I/O signals are isolated by the photo coupler.

* It is independent in 16 points between each power supply of V_{OCOM+} and V_{ICOM+} of J3, J4, J5 and J6.

It is necessary to connect the interface power supply of each connector of J3, J4, J5 and J6.

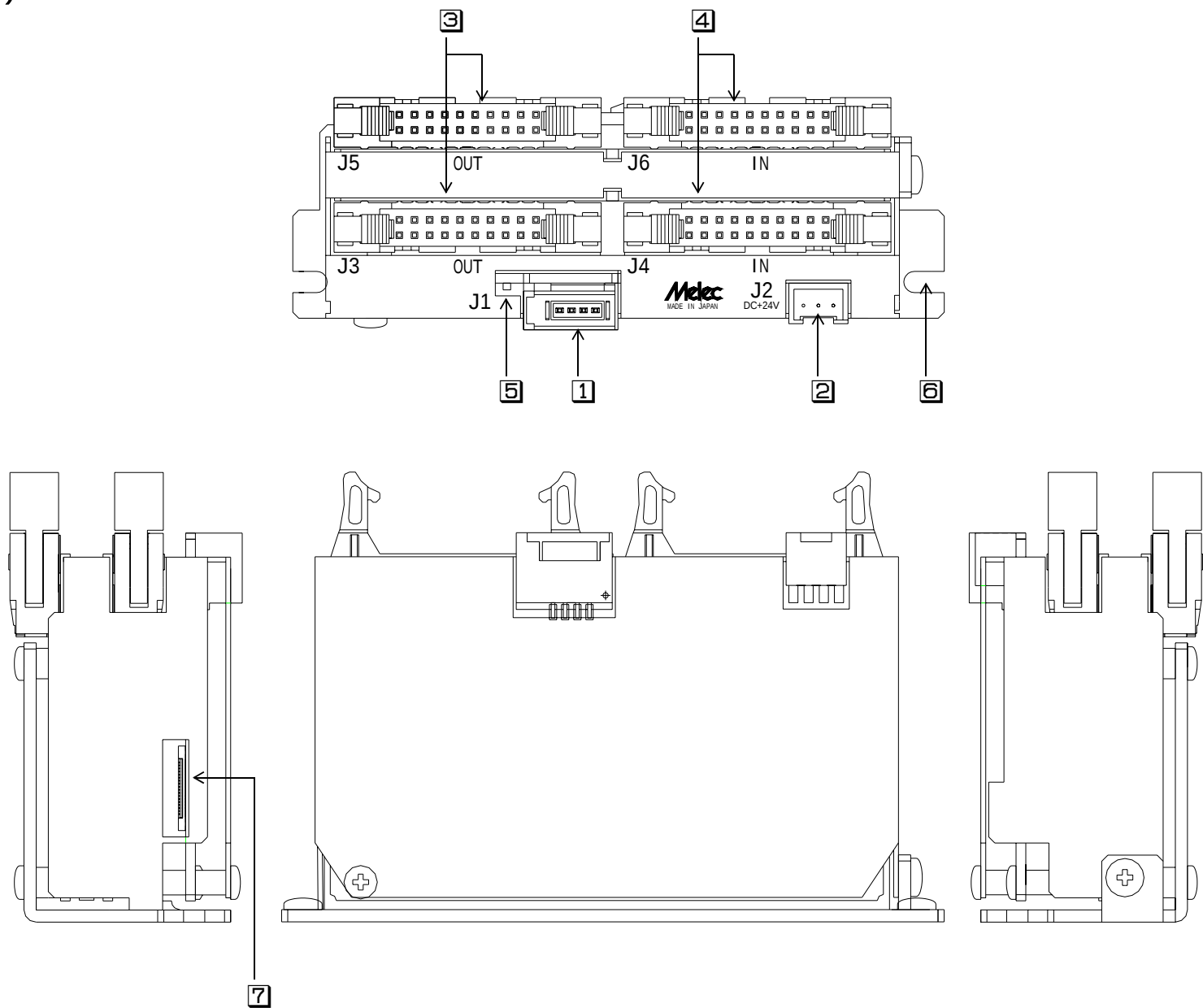
1-5. Externals of product

(1) CB-53/1616-MIL



- 1** J1 ----- This is a connector that connects the serial communications cable with the controller side.
The exclusive use connection cables of 0.3 m in length and 1m are prepared.
- 2** J2 ----- This is a connector to connect +24 V power supply.
The cable for the power supply connection of 1 m is prepared.
- 3** J3 ----- This is MIL20 pin connector for a general-purpose output.
• J3: OUT00 -- OUT0F (16 points)
- 4** J4 ----- This is MIL20 pin connector for a general-purpose input.
• J4: IN00-- IN0F (16 points)
- 5** POWER LED ----- LED lights when power supply +24 V enters.
- 6** Base installation part -- These are part that fixes the main unit to the installation base. (two places)
Use the M3 screw.
- 7** Mounting foot --- When the DIN rail is installed, the mounting foot of the attachment (two pieces) is attachable.
Use the screw (M3-5) of the attachment.
- 8** Connector for adjustment ---- This is a connector for adjustment of the main unit.
Do not connect anything.

(2) CB-52/3232-MIL



- 1 J1** ----- This is a connector that connects the serial communications cable with the controller side.
The exclusive use connection cables of 0.3 m in length and 1 m are prepared.
- 2 J2** ----- This is a connector to connect +24 V power supply.
The cable for the power supply connection of 1 m is prepared.
- 3 J3, J5** ----- These are MIL20 pin connector for a general-purpose output.
• J3: $\overline{\text{OUT00}}$ -- $\overline{\text{OUT0F}}$ (16 points) ☐ It is possible to connect it with the equipment of
• J5: $\overline{\text{OUT10}}$ -- $\overline{\text{OUT1F}}$ (16 points) ☐ another potential in 16 points.
- 4 J4, J6** ----- These are MIL20 pin connector for a general-purpose input.
• J4: $\overline{\text{IN00}}$ -- $\overline{\text{IN0F}}$ (16 points) ☐ It is possible to connect it with the equipment of
• J6: $\overline{\text{IN10}}$ -- $\overline{\text{IN1F}}$ (16 points) ☐ another potential in 16 points.
- 5 POWER LED** ----- LED lights when power supply +24 V enters.
- 6 Base installation part** -- These are part that fixes the main unit to the installation base. (two places)
Use the M3 screw.
Moreover, it is possible to install it in the DIN rail with a exclusive use DIN attachment lug.
Please refer to the connection/other manual for details.
- 7 Connector for adjustment** ----- This is a connector for adjustment of the main unit.
Do not connect anything.

2 . Specifications

2-1. General specifications

No.	Item	Specifications	
		CB-53/1616-MIL	CB-52/3232-MIL
1	Supply voltage	• Main unit : DC +24 V $\pm$ 2 V • General-purpose input power supply (ViCOM+) : DC +24 V $\pm$ 2 V • General-purpose output power supply (VoCOM+): DC +24 V $\begin{smallmatrix} +2\text{ V} \\ -4\text{ V} \end{smallmatrix}$	
2	Power consumption	• Main unit : 70 mA or less • Interface power supply: 100 mA or less *1	• Main unit : 70 mA or less • Interface power supply: 200 mA or less *1
		*1 Total current consumption of power supply terminal (VoCOM+, ViCOM+) for interface.	
3	Operating ambient temperature and humidity	• 0 ~ + 40 • 80 % RH or less (without dew condensation)	
4	Storage temperature and humidity	• 0 ~ + 55 • 80 % RH or less (without dew condensation)	
5	Installation environment	• Inside a well-ventilated cabinet installed indoor, free from direct sunlight. • Not exposed to corrosive and flammable gasses, and not affected by oil mist, dust, salt, iron powder, water, and chemicals. • Not subject to constant vibration or excessive shock. • Not affected by electromagnetic noise caused by power equipment. • Free of radioactive materials and magnetic fields, and not in vacuum.	
6	Dimensions	W 29× H 74 × D 109 (mm)	W 38.5 × H 74 × D 109 (mm)
7	Weight	Approx. 0.2 kg	Approx. 0.3 kg

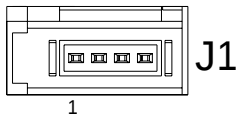
2-2. Communication specifications

No.	Item	Specifications	
		CB-53/1616-MIL	CB-52/3232-MIL
1	Extend interface	• Conformity standard :RS485 (non-insulation: but there is insulation with +24 V.) • Connection number :Up to one unit • Wiring distance/ baud rate :1 m/5 Mbps • Cyclic cycle :Approx. 35 μ s	

2-3. I/O specifications

No.	Item	Specifications	
		CB-53/1616-MIL	CB-52/3232-MIL
1	Number of I/O	Input: 16 points / Output: 16 points	Input: 32 points / Output: 32 points It is possible to connect it in another interface power supply in 16 points.
2	Input specification	- Interface voltage: + 24 V $\pm$ 2 V - Input impedance: 6.8 K Ω (isolation by photocoupler) - Input current: 3.3 mA(typ) - Response time: 0.5 ms or less	
3	Output specification	- Interface voltage: + 24 V $\pm$ 2 V - Output Nch open drain (isolation by photocoupler) - Output current: 100 mA(Vds=1 V or less) H' x7 and H' xF bit are 400 mA(Vds=1 V or less). - Response time: 0.5 ms or less	
4	Unit of I/O reading and writing	- The output data of 16 points can be written. - The input data of 16 points can be read. - The input data of 16 points and the now outputting data of 16 points can be read at the same time.	
5	Others	• AND writing When the output port is written in under the AND condition, the output signal of each bit can be turned on and off based on the specified data. • When "0" is written with AND, the output of the bit is made OFF (NOT ACTIVE). • When "1" is written with AND, the output of the bit maintains a present output status. • OR writing When the output port is written in under the OR condition, the output signal of each bit can be turned on and off based on the specified data. • When "0" is written with OR, the output of the bit maintains a present output status. • When "1" is written with OR, the output of the bit is made ON (ACTIVE).	

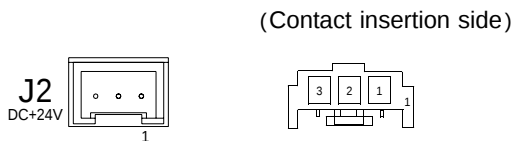
2-4. Input and output signal table
(1) Serial communication connector(J1)



- Connector : 1565994-4 (e-CON:Tyco Electronics)
- Conformity cable : CE-66-01/IO-A03(0.3 m, It is not an accessories.)
: CE-66-02/IO-A10(1 m, It is not an accessories.)

No.	Direction	Signal name	Description
1	I/O	+RS485(EXT)	+ side signal of the Extend I/O serial data(line driver positive logic)
2	I/O	-RS485(EXT)	- side signal of the Extend I/O serial data(line driver negative logic)
3	-	S.G	Signal GND for Extend I/O
4	-	F.G	Frame GND is connected with case.

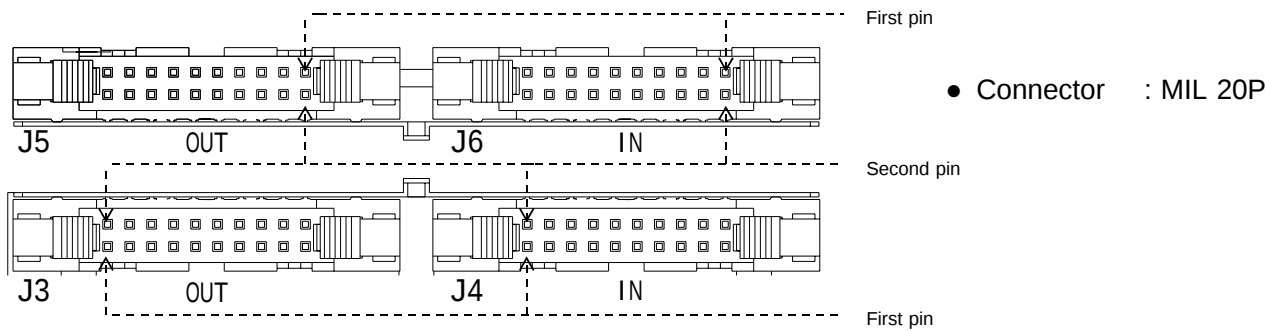
(2) Power supply connector(J2)



- Connector : 53426-0310 (Molex)
- Conformity connector : 51103-0300 (Molex: accessories)
- Conformity contact : 50351-8100 (Molex: accessories)
- Conformity crimp tool : 57295-5000 (Molex)
- Acceptable wire : AWG28 ~ AWG22
(Coating φ 1.15 ~ φ 1.8)
- Conformity cable : CE-76/003C10-51103
(1 m: It is not an accessories.)

No.	Direction	Signal name	Description
1	I	+24 V	DC +24 V power supply
2	-	GND	GND of +24 V power supply
3	-	F.G	Frame GND is connected with case.

(3) General-purpose output connector(J3, J5), General-purpose input connector(J4, J6)



*J5 and J6 are connectors for CB-52/3232-MIL.

【 General-purpose output signal connector 】

■ J3

Pin	Signal name	Dirction	Description
1	VoCOM+	I	+24 V(for interface)
2	VoCOM+	I	+24 V(for interface)
3	VoCOMGND	-	+24 V GND(for interface)
4	VoCOMGND	-	+24 V GND(for interface)
5	OUT0F	O	General-purpose output signal_0F
6	OUT07	O	General-purpose output signal_07
7	OUT0E	O	General-purpose output signal_0E
8	OUT06	O	General-purpose output signal_06
9	OUT0D	O	General-purpose output signal_0D
10	OUT05	O	General-purpose output signal_05
11	OUT0C	O	General-purpose output signal_0C
12	OUT04	O	General-purpose output signal_04
13	OUT0B	O	General-purpose output signal_0B
14	OUT03	O	General-purpose output signal_03
15	OUT0A	O	General-purpose output signal_0A
16	OUT02	O	General-purpose output signal_02
17	OUT09	O	General-purpose output signal_09
18	OUT01	O	General-purpose output signal_01
19	OUT08	O	General-purpose output signal_08
20	OUT00	O	General-purpose output signal_00

【 General-purpose input signal connector 】

■ J4

Pin	Signal name	Dirction	Description
1	ViCOM+	I	+24 V(for interface)
2	ViCOM+	I	+24 V(for interface)
3	NC	-	Connection is prohibited.
4	NC	-	Connection is prohibited.
5	IN0F	I	General-purpose input signal_0F
6	IN07	I	General-purpose input signal_07
7	IN0E	I	General-purpose input signal_0E
8	IN06	I	General-purpose input signal_06
9	IN0D	I	General-purpose input signal_0D
10	IN05	I	General-purpose input signal_05
11	IN0C	I	General-purpose input signal_0C
12	IN04	I	General-purpose input signal_04
13	IN0B	I	General-purpose input signal_0B
14	IN03	I	General-purpose input signal_03
15	IN0A	I	General-purpose input signal_0A
16	IN02	I	General-purpose input signal_02
17	IN09	I	General-purpose input signal_09
18	IN01	I	General-purpose input signal_01
19	IN08	I	General-purpose input signal_08
20	IN00	I	General-purpose input signal_00

【 General-purpose output signal connector 】

■ J5

Pin	Signal name	Dirction	Description
1	VoCOM+	I	+24 V(for interface)
2	VoCOM+	I	+24 V(for interface)
3	VoCOMGND	-	+24 V GND(for interface)
4	VoCOMGND	-	+24 V GND(for interface)
5	OUT1F	O	General-purpose output signal_1F
6	OUT17	O	General-purpose output signal_17
7	OUT1E	O	General-purpose output signal_1E
8	OUT16	O	General-purpose output signal_16
9	OUT1D	O	General-purpose output signal_1D
10	OUT15	O	General-purpose output signal_15
11	OUT1C	O	General-purpose output signal_1C
12	OUT14	O	General-purpose output signal_14
13	OUT1B	O	General-purpose output signal_1B
14	OUT13	O	General-purpose output signal_13
15	OUT1A	O	General-purpose output signal_1A
16	OUT12	O	General-purpose output signal_12
17	OUT19	O	General-purpose output signal_19
18	OUT31	O	General-purpose output signal_11
19	OUT18	O	General-purpose output signal_18
20	OUT10	O	General-purpose output signal_10

【 General-purpose input signal connector 】

■ J6

Pin	Signal name	Dirction	Description
1	ViCOM+	I	+24 V(for interface)
2	ViCOM+	I	+24 V(for interface)
3	NC	-	Connection is prohibited.
4	NC	-	Connection is prohibited.
5	IN1F	I	General-purpose input signal_1F
6	IN17	I	General-purpose input signal_17
7	IN1E	I	General-purpose input signal_1E
8	IN16	I	General-purpose input signal_16
9	IN1D	I	General-purpose input signal_1D
10	IN15	I	General-purpose input signal_15
11	IN1C	I	General-purpose input signal_1C
12	IN14	I	General-purpose input signal_14
13	IN1B	I	General-purpose input signal_1B
14	IN13	I	General-purpose input signal_13
15	IN1A	I	General-purpose input signal_1A
16	IN12	I	General-purpose input signal_12
17	IN19	I	General-purpose input signal_19
18	IN11	I	General-purpose input signal_11
19	IN18	I	General-purpose input signal_18
20	IN10	I	General-purpose input signal_10

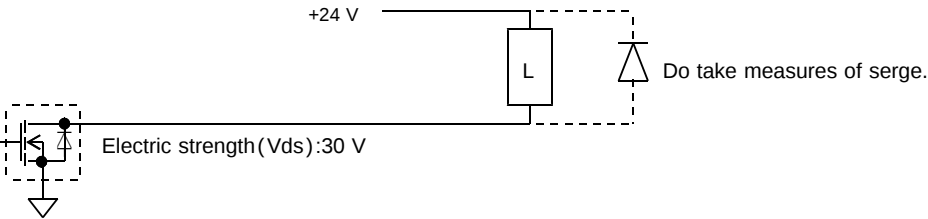
*J5 and J6 are connectors for CB-52/3232-MIL.

- is possible to drive in the load of 400 mA.
- It is independent in 16 points between each power supply of VoCOM+ and ViCOM+ of J3, J4, J5 and J6.
It is necessary to connect the interface power supply of each connector of J3, J4, J5 and J6.

2-5. Input and output specifications
(1) Output specifications

Circuit	Description
*1 VoCOM + and VoCOMGND are independent in 16 points.	Signal name • $\overline{\text{OUT00}} \text{ -- } \overline{\text{OUT0F}}$ • $\overline{\text{OUT10}} \text{ -- } \overline{\text{OUT1F}}$ (at CB-52/3232-MIL) CB-52/3232-MIL can connect another potential in 16 points.
	Interface voltage +24 V $\pm$ 2 V +24 V -4 V
	VCOM current 1.5 mA (typ)/output of 1 point
	Output method Nch Open drain output
	Output current • $\overline{\text{OUT00}} \text{--} \overline{\text{OUT06}}, \overline{\text{OUT08}} \text{--} \overline{\text{OUT0E}}$ • $\overline{\text{OUT10}} \text{--} \overline{\text{OUT16}}, \overline{\text{OUT18}} \text{--} \overline{\text{OUT1E}}$ ON: 100 mA ($V_{ds} = 1 \text{ V}$ or less) Moment: 1 A/point (10 ms or less) OFF: 0.1 mA or less • $\overline{\text{OUT07}}, \overline{\text{OUT0F}}, \overline{\text{OUT17}}$ and $\overline{\text{OUT1F}}$ ON: 400 mA ($V_{ds} = 1 \text{ V}$ or less) Moment: 1 A/point (10 ms or less) OFF: 0.1 mA or less
	Output response time 0.5 ms or less (ON $\rightarrow$ OFF、OFF $\rightarrow$ ON)
	Insulation Photocoupler isolation (Between internal circuits and external circuits.)

Put up the surge killer to the side of the load (L) when the load is inductivity.



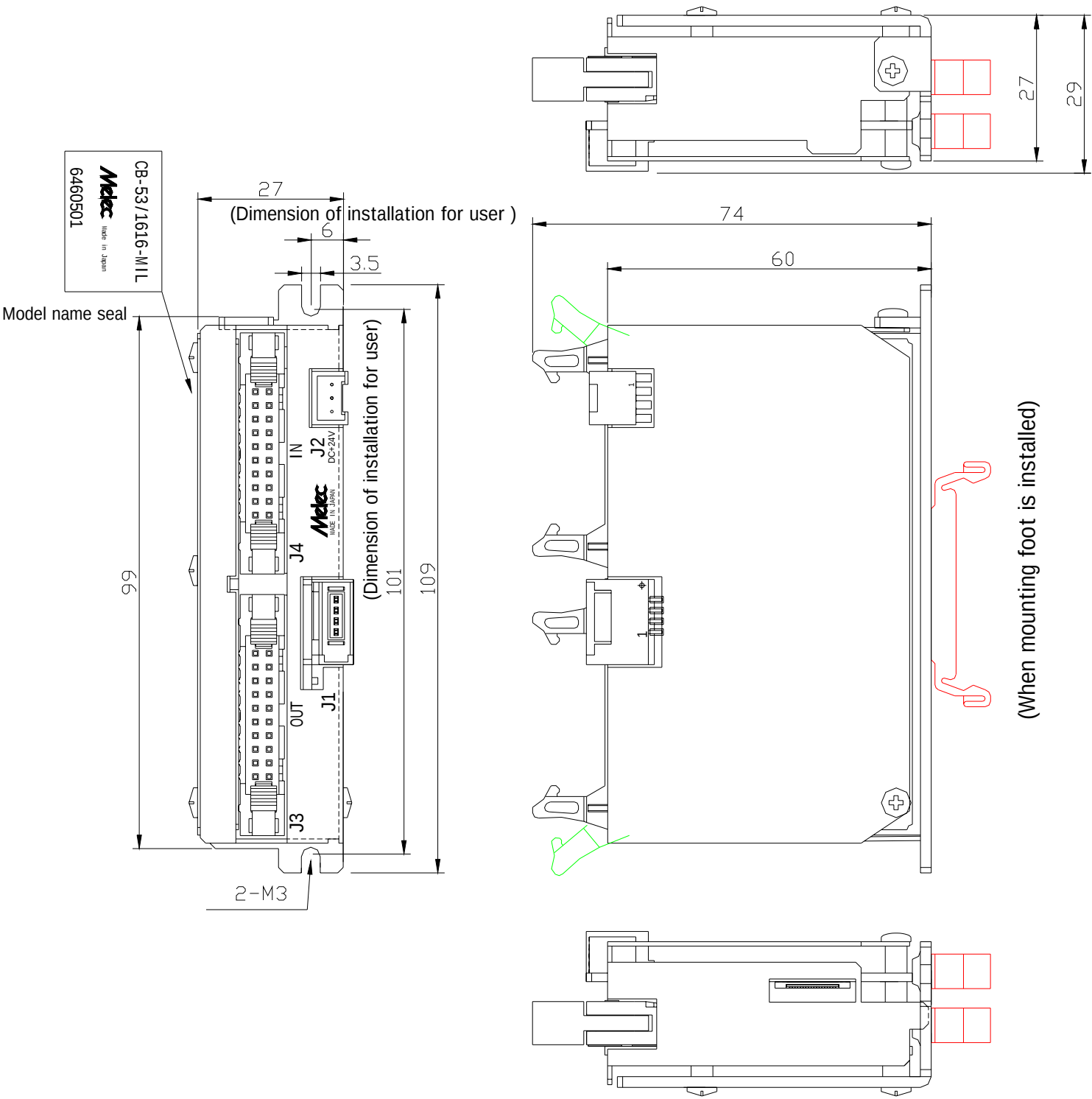
(2) Input specifications

Circuit	Description
*1 ViCOM+ is independent in 16 points.	Signal name • $\overline{\text{IN00}} \text{ -- } \overline{\text{IN0F}}$ • $\overline{\text{IN10}} \text{ -- } \overline{\text{IN1F}}$ (at CB-52/3232-MIL) CB-52/3232-MIL can connect another potential in 16 points.
	Interface voltage +24 V $\pm$ 2 V
	VCOM current 3.3 mA (typ)/Input of 1 point
	Input impedance 6.8 K Ω
	ON/OFF level ON :2.5 mA or more OFF :0.8 mA or less
	Input response time 0.5 ms or less (ON $\rightarrow$ OFF、OFF $\rightarrow$ ON) * Input pulse width: 0.5 ms or more
	Insulation Photocoupler isolation (Between internal circuits and external circuits.)

2-6. Outside dimensions

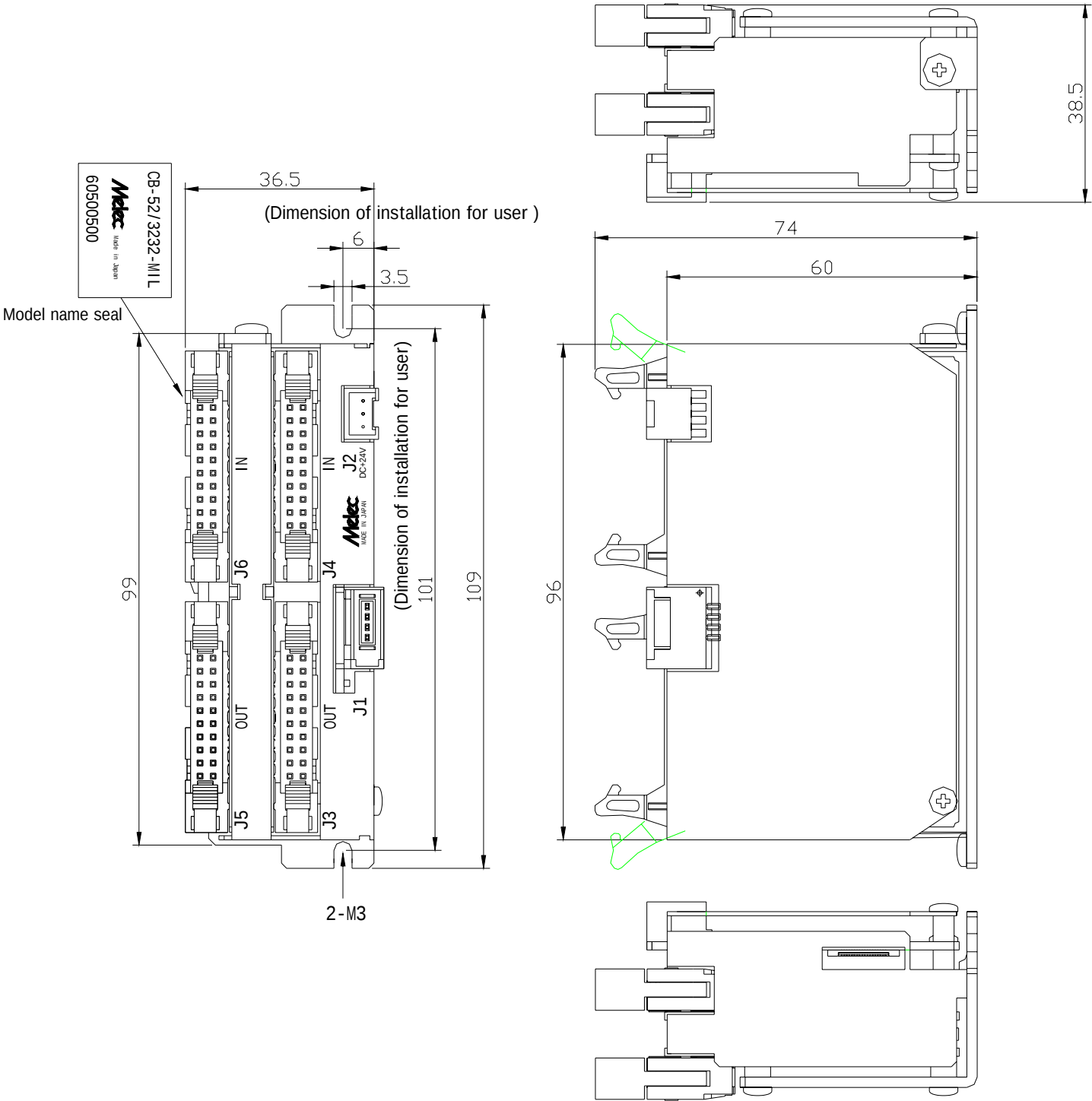
(1) CB-53/1616-MIL

General tolerance ± 0.5 mm or less
Externals tolerance ± 1 mm or less

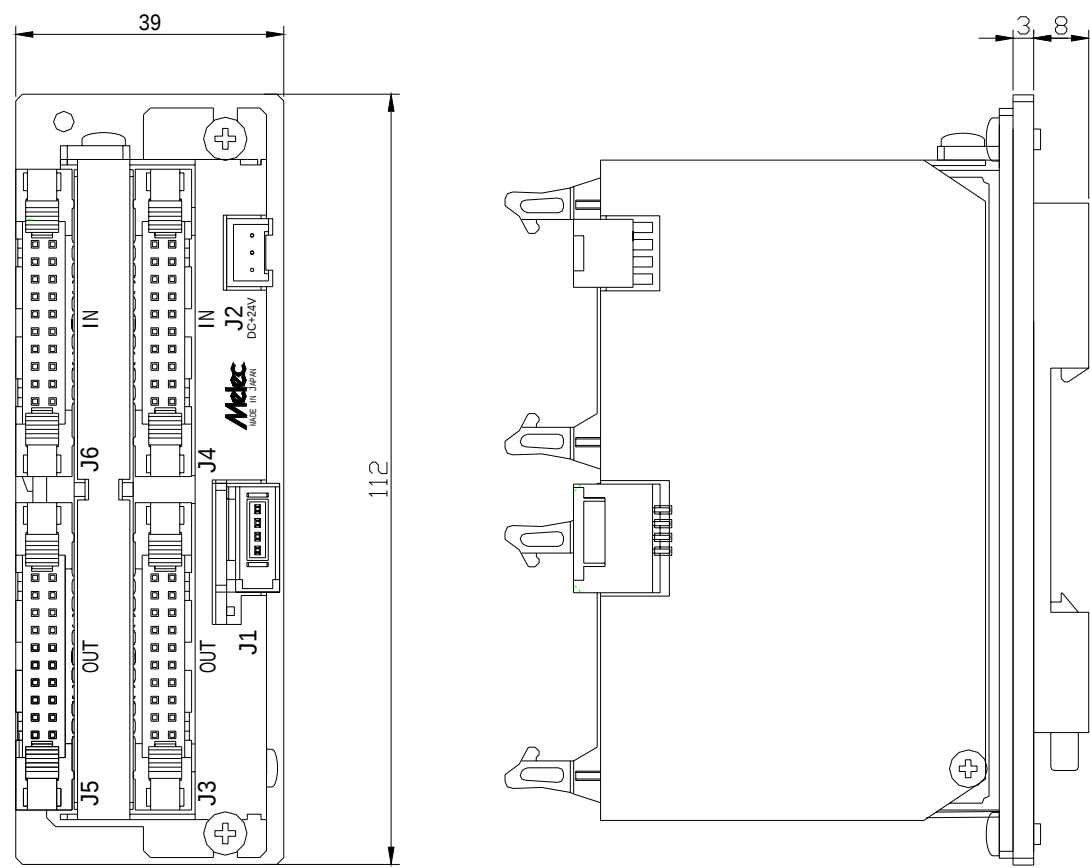


(2) CB-52/3232-MIL

General tolerance ± 0.5 mm or less
Externals tolerance ± 1 mm or less



When DIN attachment lug (CP-14/AT2) is installed



3 . Setting

As for Extend I/O unit, the switch settings such as the address, transmission rates, and terminators are unnecessary.

The Extend unit control the communication by the Extend-unit-communication-setting-function and the Extend-unit-communication-control-function.

Please refer to the device driver manual for Windows of the AL- series or the USB series for details of the function specification.

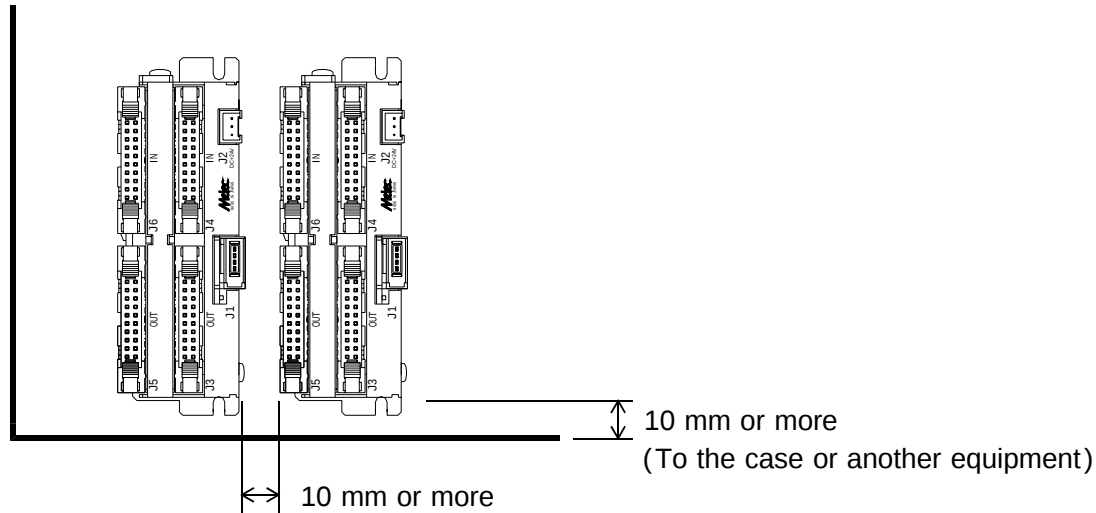
4 . Installation and connection

4-1. Installation

(1) Installation distance

Secure the flow of the wind for the upper and lower right and left 10 mm or more apart and set up the CB-53/1616-MIL or the CB-52/3232-MIL as follows.

- Distance when two or more is arranged.
- Distance with panel of case.
- Distance with another equipment.

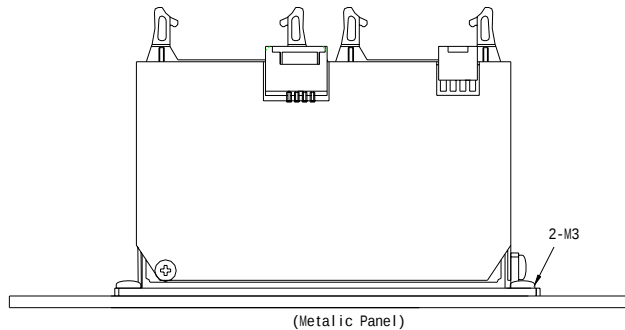


(2) Installation method

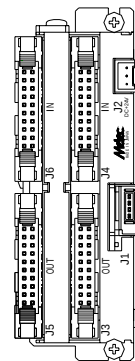
- Horizontal installation

Install in a metallic panel by M3 screw.

The length of the screw must use appropriate length corresponding to the thickness of a metallic panel.



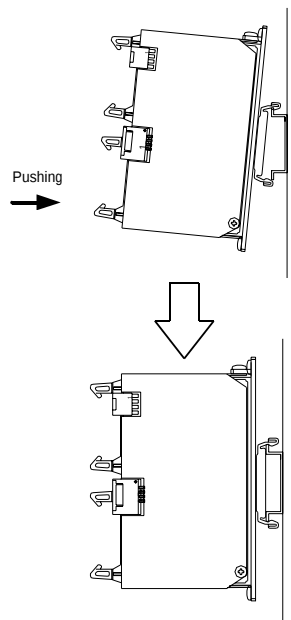
- Vertical installation



Make the J2 connector upward, and install it with the M3 screw. The length of the screw must use appropriate length corresponding to the thickness of a metallic panel.

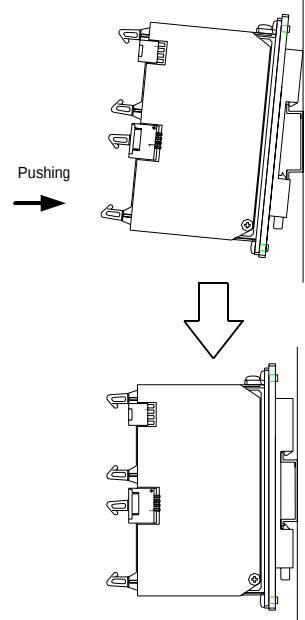
- DIN rail installation

For CB-53/1616-MIL



Install the attached mounting foot with the M3-5 screw. Make J2 to the upward and install in the DIN rail.

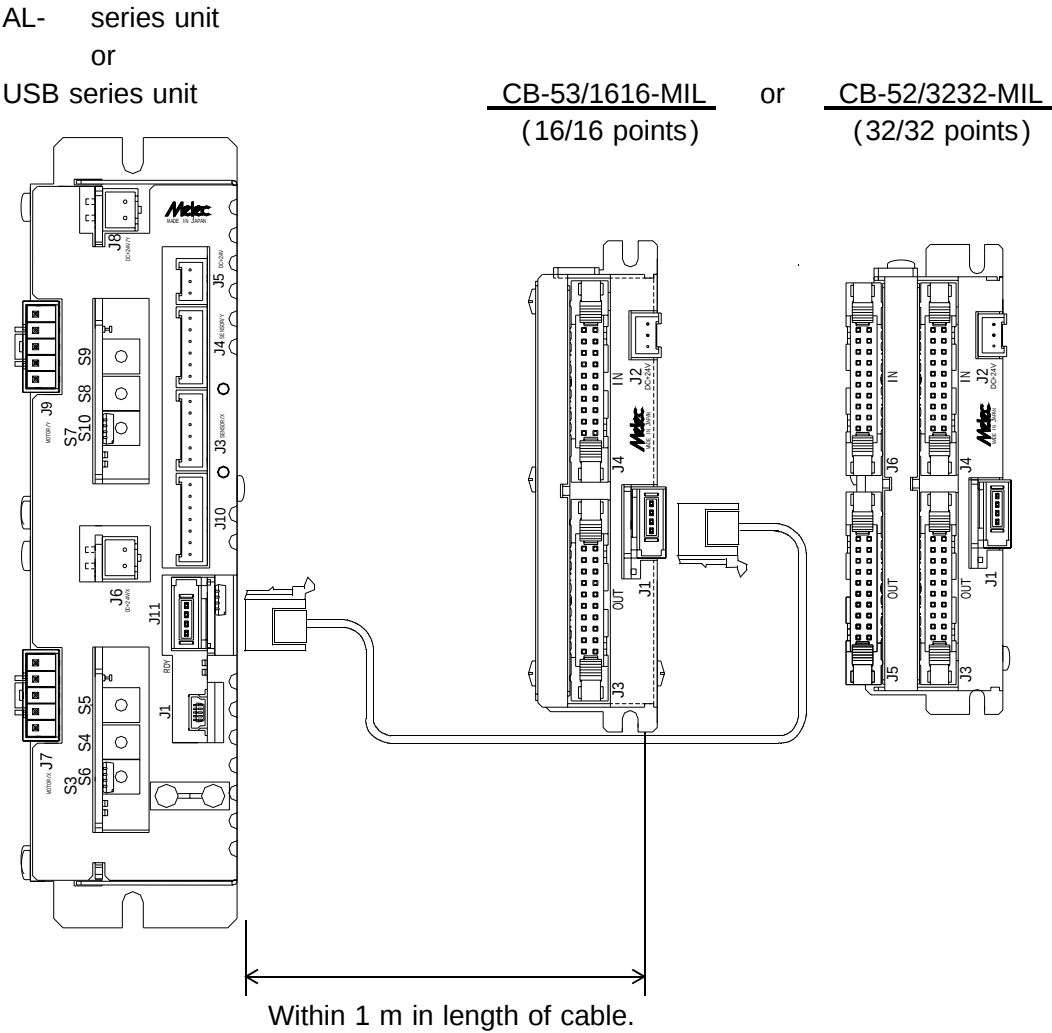
For CB-52/3232-MIL



Exclusive use DIN attachment lug (CP-14/AT2: optional) is installed on the main unit. Make J2 to the upward and install in the DIN rail.

* Please refer to the "Connection/other" manual about the specification of CP-14/AT2.

4-2. Connection of Extend I/O communication



The controller can be connected directly with Extend I/O unit by using Extend I/O connecting cable CE-66/IO-A03(0.3 m) or CE-71/IO-A10(1 m).

- Crimping is unnecessary.
- The confirmation of wiring is unnecessary.

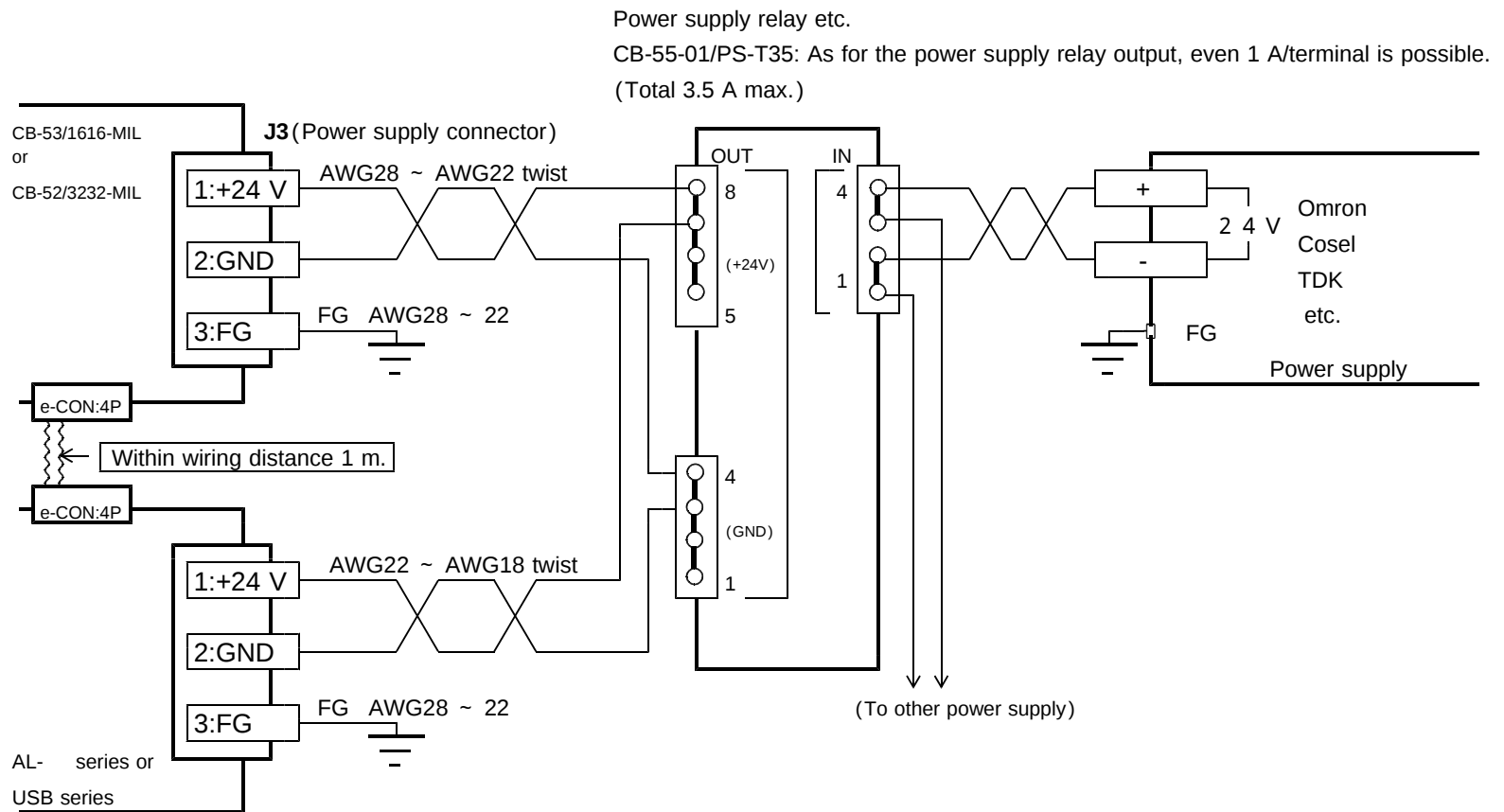
4-3. Connection example

(1) Examples of connection to power supply

CAUTION

Operation not anticipated may cause damage of the machine and the product.
Separate the wiring for the power supply line by the following signal and 50 mm or more to prevent the malfunction by the noise.

- Principal circuit of another equipment.
- Power line of another equipment.

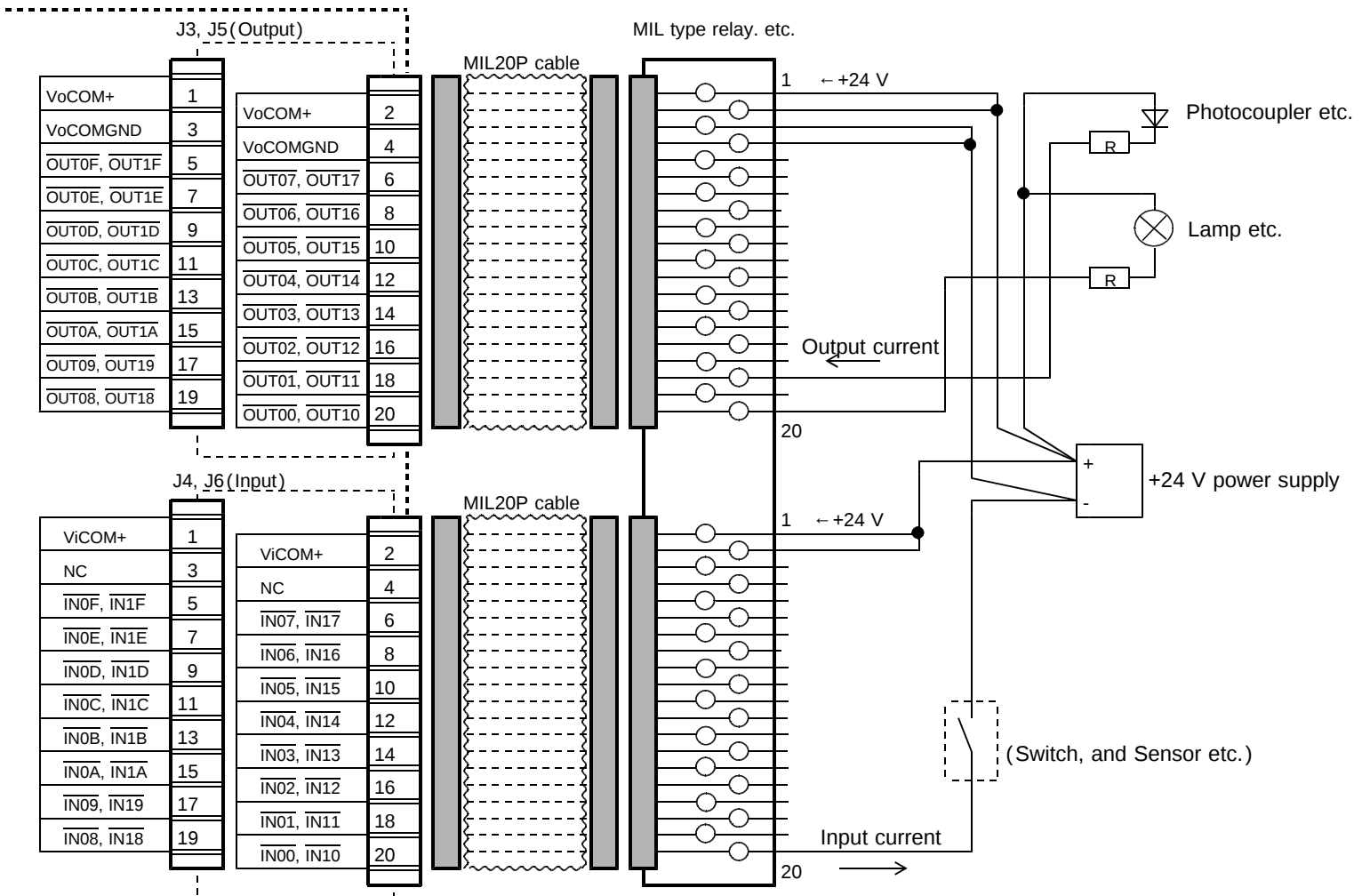


- Consider to confirm the current consumption of the wiring distance (resistance of the wire rod), and for the voltage drop of wiring to fill the input power supply specification of the product the thickness of the wire rod of the power supply.
- Take the external equipment power supply from the same power supply as ViCOM+ (general-purpose input side) and VoCOM+ ~ VoCOMGND (general-purpose output side) power supply of CB-53/1616-MIL or CB-52/3232-MIL.
- The power supply of Extend I/O unit can be connected with CE-76/003C10-51103 (1 m) without crimp.

(2) Examples of connection to general-purpose I/O

⚠ CAUTION

Operation not anticipated may cause damage of the machine and the product.
Separate the signal wire by the power line and 50 mm or more to prevent the malfunction by the noise.
Wire each signal within 5 m.



- The connector of J5 ($\overline{\text{OUT1x}}$ signal) and J6 ($\overline{\text{IN1x}}$ signal) is the one for CB-52/3232-MIL.
- It is possible to connect it directly with the external equipment by using the MIL cable in the rose line.

Reference

- MIL relay unit
There are conversion terminals from the MIL20 pin.
 - Terminal of crimp type.
 - Strip wire type.
 - Terminal of non screw type. etc.
 (TOYOGIKEN CO., LTD. etc.)

5 . Maintenance

⚠ CAUTION

Incorrect handling may lead to an electric shock.
Inspection and maintenance need to be conducted by an expert engineer only.
Before inspecting and maintaining this product, turn off the power.

⚠ CAUTION

An electric shock, injuries, and fire may be caused.
Do not make repair and modification such as product disassembly and parts replacement.

5-1. Maintenance and inspection

(1) Cleaning method

To use the product in a favorable condition, conduct cyclic cleaning as follows.

- During the cleaning of the connector terminal plating part, wipe it with a dry, soft cloth.
- If stain is not removed by the dry wiping, soak a cloth in a solution in which neutral detergent is diluted, wring it out, and wipe off the stain with it.
- Do not use a high-volatile solvent such as benzene and thinner, and a wipe.
This may deteriorate gold plating by transformation and oxidation.

(2) Inspection method

To use the product in a favorable condition, conduct periodic inspection.

Usually conduct the inspection every six months or every year.

To use the product in an extremely hot and humid or dusty environment, shorten the inspection interval.

Inspection item	Inspection details	Criteria	Inspection method
Environment state	Check whether ambient and intra-device temperatures are appropriate.	0 ~ + 40	Thermometer
	Check whether ambient and intra-device humidifies are appropriate.	10 % ~ 80 % RH (without dew condensation)	Hygrometer
	Check whether dust is deposited.	No dust	Visual check
Installation state	Check whether the product is firmly secured.	Not loose (6 kg·cm)	Torque wrench
	Check whether connectors are completely inserted.	Not loose and removed	Visual check
	Check whether cables are to be removed.	Not loose and removed	Visual check
	Check whether connecting cables are to be broken.	Appearance is normal.	Visual check

(3) Replacement method

If the product becomes faulty, repair it immediately because the entire device system may be affected.

To make the repair smoothly, a spare product should be prepared.

- To prevent an accident such as an electric shock during replacement, stop the device and turn off the power.
- If poor contacting is assumed, wipe contacts with a clean cotton cloth that is wet with industrial alcohol.
- Take a record of switch settings during replacement and return them to their state before the replacement.
- After the replacement, confirm that the new product is normal.
- For the faulty product replaced, have it repaired by returning it to the company with a report indicating as much details on the failure as possible.

5-2. Saving and disposal

(1) Saving method

Save the product in the following environment.

- Indoor (place in which the product is not in the path of direct sunlight.)
- Place at ambient temperature and humidity within the specifications.
- Place free of corrosive and inflammable gases.
- Place free of dust, dirt, salt, and iron powder.
- Place free of direct vibration and shock to the product body.
- Place free of water, oil, and chemicals droplets.
- Place where a person cannot ride or put objects on the product.

(2) Disposal method

Handle the product as industrial waste.

The main parts which revised by this manual

Parts	Content
None	

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