Melec

AL-II Series Slave I/O Unit

2CB-01V1/3232-MIL

2CB-02V1/1616-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.

MN0196

Introduction

This instructions manual explains the handling of "AL-**II** Series Slave I/O Unit 2CB-01v1/3232-MIL and 2CB-02v1/1616-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 "AL-**II** series device driver manual for Windows" also when you handle this product.

Instructions Manual

Introduction
Description of safety
Before use

Contents PAGE

The main parts which revised by this manual

1. Overview

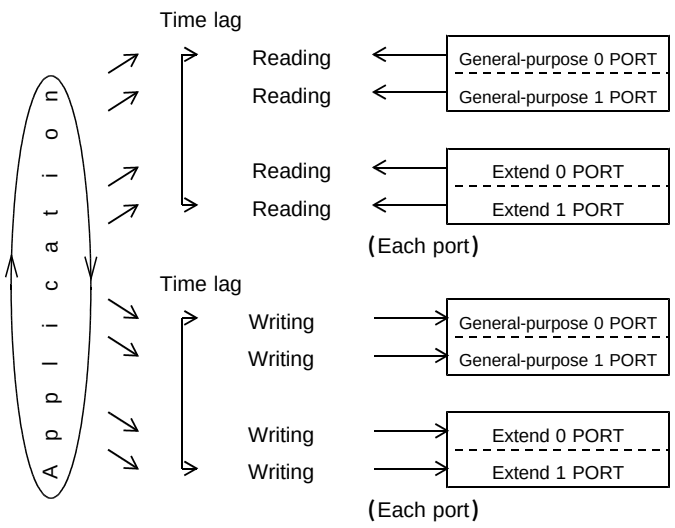
1-1. Features

● The AL-II series is a high speed serial communication system of original controlling the flexible stepping motor, servo motor which can cope easily as well and I/O in the decentralization of the device and supporting axial addition.
- The AL-II series is an insulation type high-speed serial communications of 20 Mbps/ 50m or 10 Mbps/ 100m. As a result, the saving wiring for the personal computer system can be attempted by the performance (ratio of our company) that equals a board controller so far.
- The shift of board controller C-VX870 series (Device-function) for PCI made of our company and the USB series (Device-function and Unit-function) is easy depending on the device driver function for Windows.

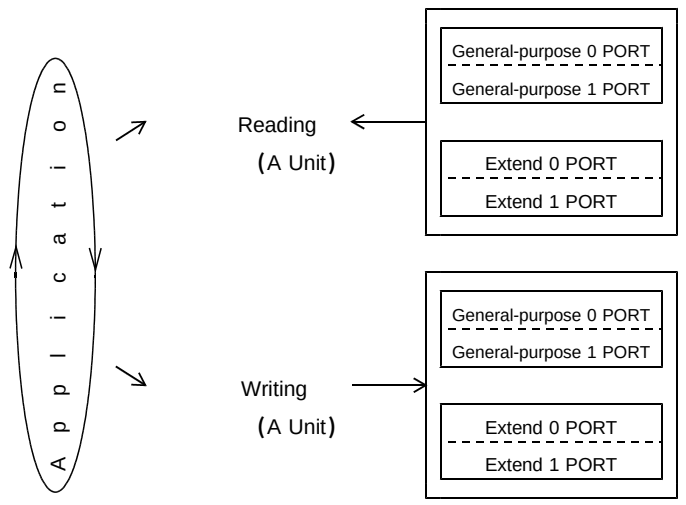
● 2CB-01v1/3232-MIL and 2CB-02v1/1616-MIL are slave I/O unit that can be connected with the AL-II series.
- 2CB-01v1/3232-MIL is slave I/O unit of 32/32 points, and 2CB-02v1/1616-MIL is slave I/O unit of 32/32 points.
- Extend I/O unit can be increased further without increasing the number of slaves from each slave I/O unit.
- All the input signals and the output signals are isolated by the photocoupler. Moreover, because 2CB-01v1/3232-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 following function is provided in the input signal of two points(H' x0 and H' x1) in 16 points.
  A temporary changing the input signal can be captured.
  The rising edge or the falling edge of the input signal can be detected.
  The input signal can be maintained until being cleared from application.
- The I/O connector has improved the each company terminal and the connectivity by adopting MIL type 20P.
- The slave I/O unit is a structure that the DIN rail installation and the base can be set up that treats easily.

● 2CB-01v1/3232-MIL and 2CB-02v1/1616-MIL correspond to the Unit-function.
This Unit-function can perform a unit and AL-II interface by one function execution from an application.
By this,
- The time crunch can be done compared with accessed I/O-port-function of each I/O port.
- The reading of Unit-I/O-function suppresses the difference at time until the I/O input signal between each port is obtained.
- The Unit-function (writing) suppresses the difference at time until it instructs time each I/O output signal.
- The Unit-function can reduce the load of the application.
- It supports the Device-function, and can use the Device-function.
- The Unit-function can be used together with the Device-function and the I/O-function.

Access example in I/O-port-function



Access example in Unit-I/O-port-function



1-2. Product configuration

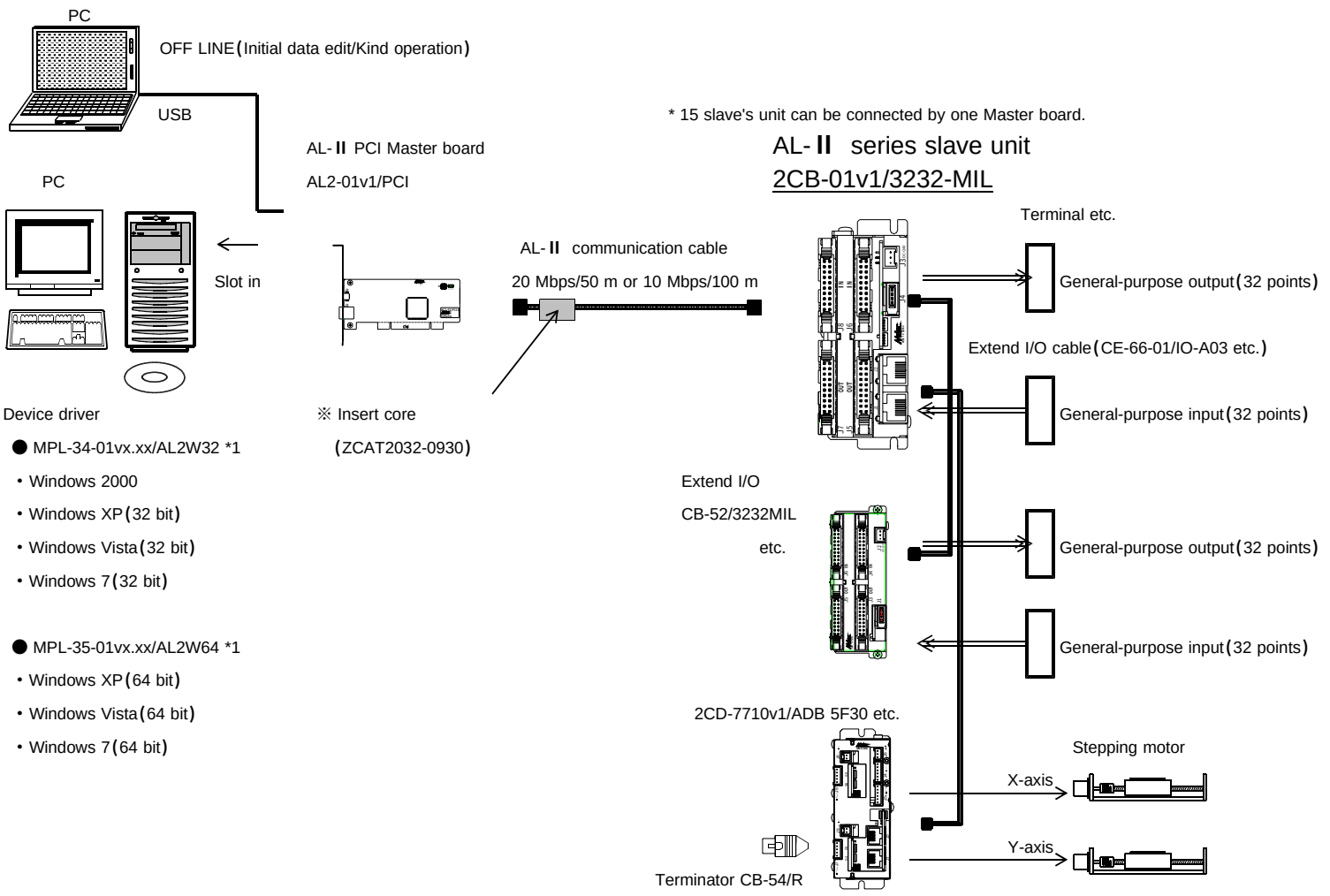
● 2CB-01v1/3232-MIL

Product name	Rating	Maker	Quantity	Remarks
Slave I/O Unit	2CB-01v1/3232-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)

● 2CB-02v1/1616-MIL

Product name	Rating	Maker	Quantity	Remarks
Slave I/O Unit	2CB-02v1/1616-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)

1-3. Example of system configuration



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

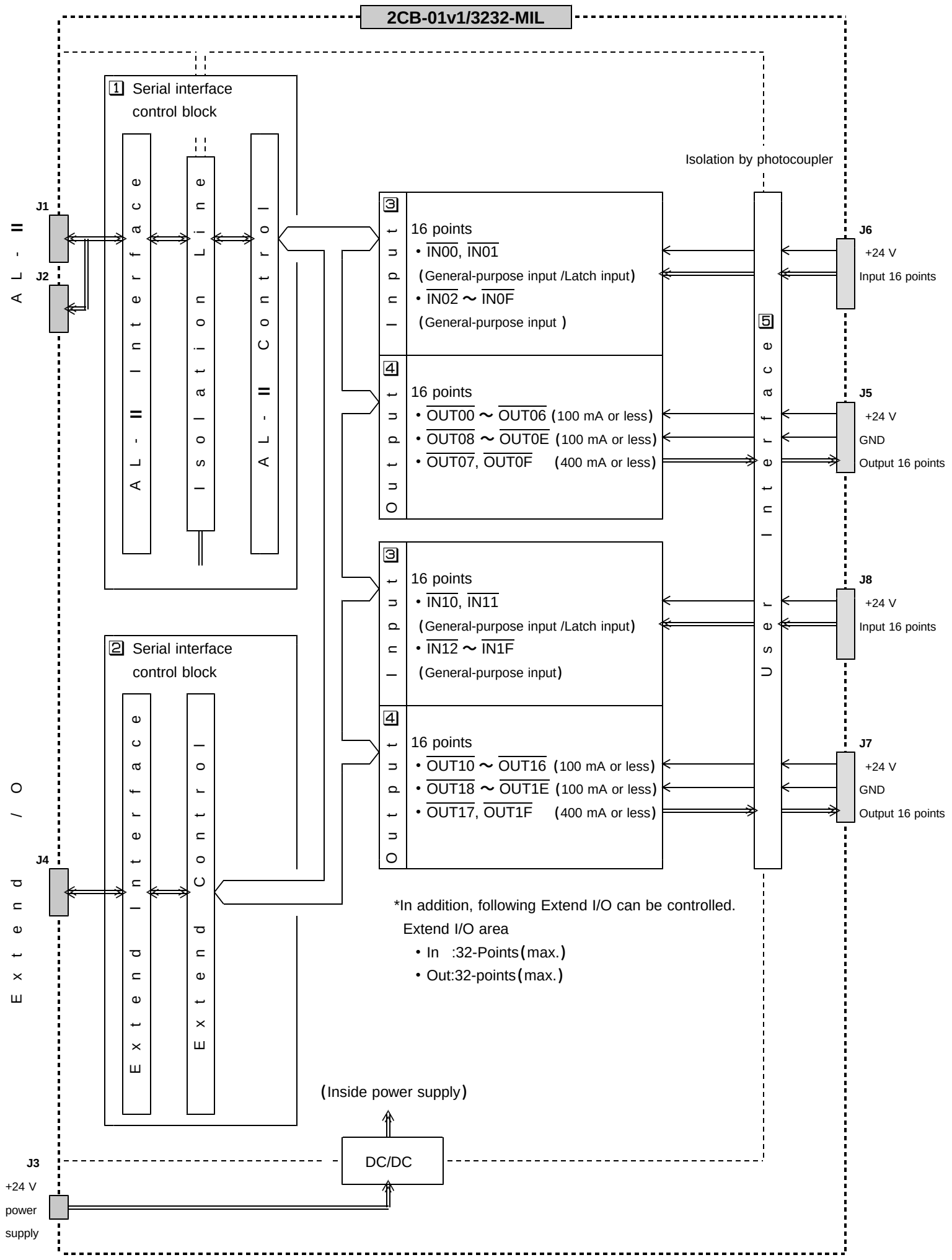
- AL-II series prepared connectable cables easily.
  Please refer to the "connection / others" instruction manual for details of connection of the AL-II series.

Example of other AL-II series

Power supply relay board	Controller for servo or stepping motor		Controller with built-in driver	General-purpose I/O (Extend type and Slave type)	
CB-55-01/PS-T35	2C-771v1	2C-776Av1	2CD-7713v1/GDB5F40	CB-53/1616-MIL	2CB-02v1/1616-MIL
• 4-distribution output of DC24 V • 1 A/terminal (3.5 A in total)	• 4-axes • For stepping or simple servo	• 4-axes • For encoder input	• 2-axes for 5-phase stepping motor • 1.4 A/phase	• Extend type • In:16-points • Out:16-points	• Slave type • In:16-points • Out:16-points

1-4. Function block diagram

(1) 2CB-01v1/3232-MIL



1 Serial interface control block

This department is control block for AL-II serial communication.

The AL-II serial communications interface department is insulated with +24 V power supply and the internal logics.

2 Serial interface control block

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

This block performs an Extend I/O unit and serial communication and can extend the I/O of 32 points /32 points input output(at the maximum).

The serial communication interface part is insulated from power supply +24 V.

3 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.

As for $\overline{\text{IN00}}$, $\overline{\text{IN01}}$, $\overline{\text{IN10}}$, and $\overline{\text{IN11}}$ signal can do the latch by detecting the rising edge or the falling edge of the input signal.

4 General-purpose output block

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

The output current of $\overline{\text{OUT00}}$ ~ $\overline{\text{OUT06}}$, $\overline{\text{OUT08}}$ ~ $\overline{\text{0UT0E}}$, $\overline{\text{OUT10}}$ ~ $\overline{\text{OUT16}}$ and $\overline{\text{OUT18}}$ ~ $\overline{\text{0UT1E}}$ are 100 mA.

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

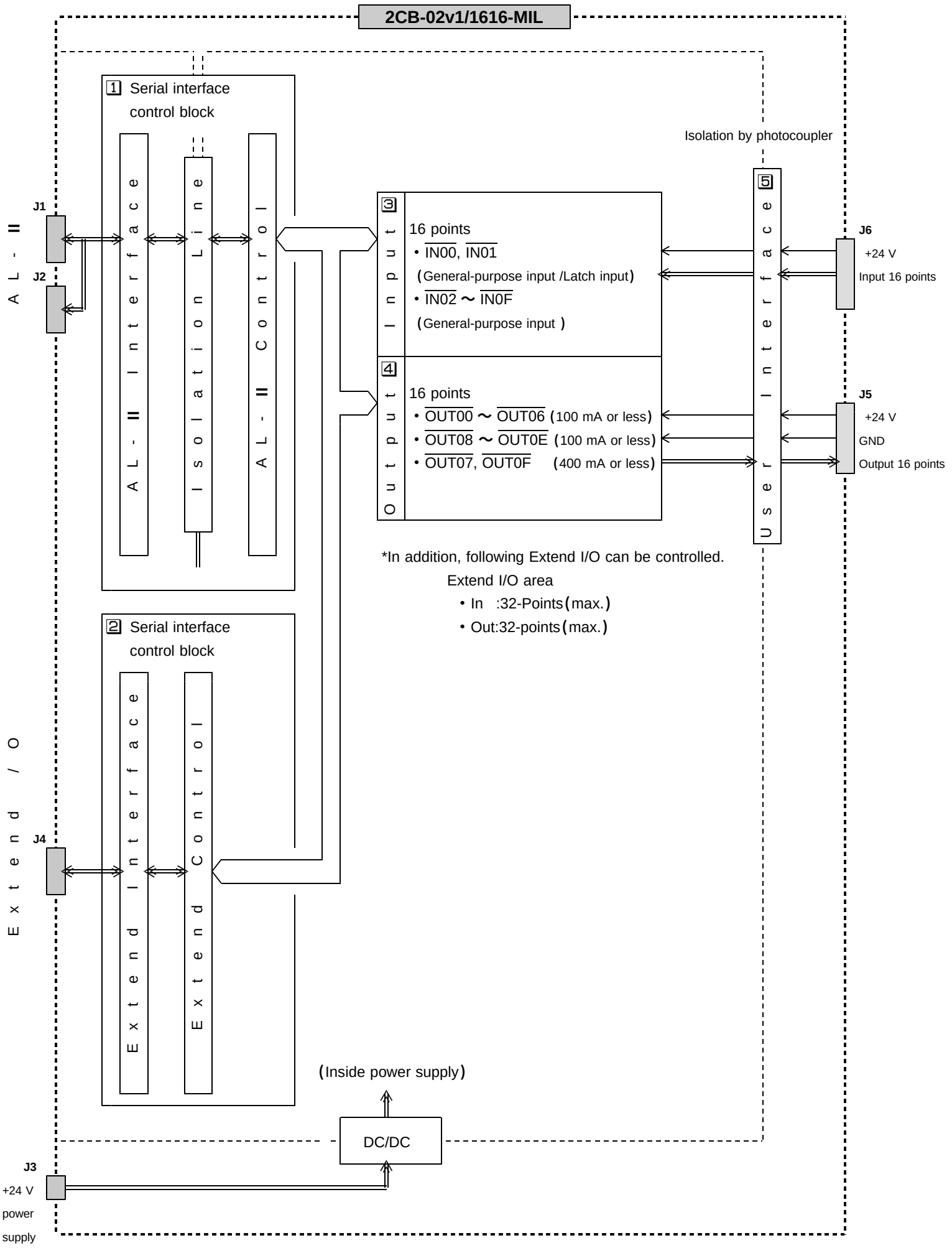
5 User Interface block

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

All the I/O signals are isolated by the photocoupler.

* It is independent in 16 points between each power supply of VoCOM+ and ViCOM+ of J5, J6, J7 and J8.
  It is necessary to connect the interface power supply of each connector of J5, J6, J7 and J8.

(2) 2CB-02v1/1616-MIL



1 Serial interface control block

This department is control block for AL-II serial communication.

The AL-II serial communications interface department is insulated with +24 V power supply and the internal logics.

2 Serial interface control block

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

This block performs an Extend I/O unit and serial communication and can extend the I/O of 32 points /32 points input output(at the maximum).

The serial communication interface part is insulated from power supply +24 V.

3 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.

As for $\overline{IN00}$ and $\overline{IN01}$ signal can do the latch by detecting the rising edge or the falling edge of the input signal .

4 General-purpose output block

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

The output current of $\overline{OUT00}$ ~ $\overline{OUT06}$ and $\overline{OUT08}$ ~ $\overline{0UT0E}$ are 100 mA.

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

5 User Interface block

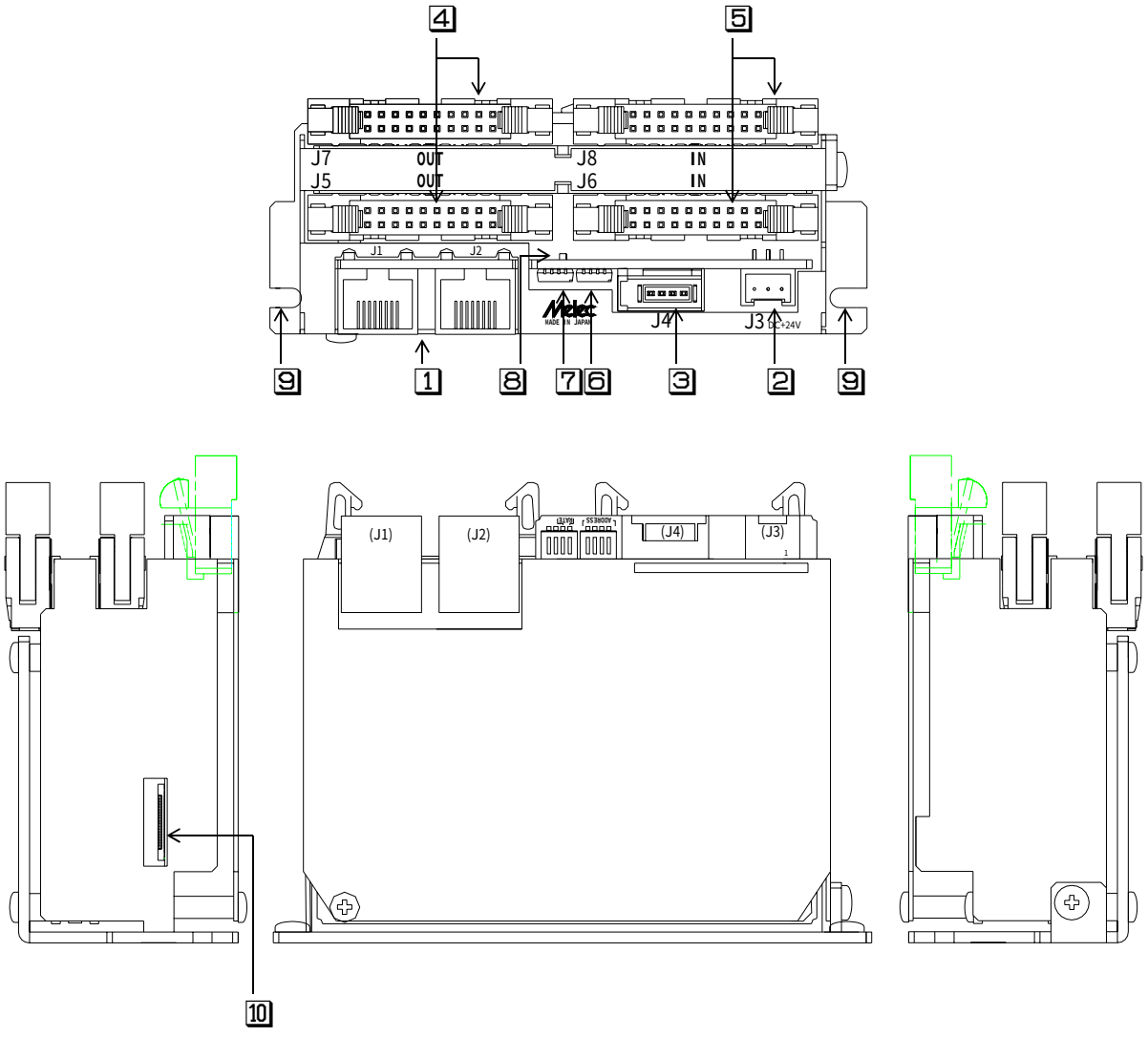
This department is control block for general purpose input and output equipment.

All the I/O signals are isolated by the photocoupler.

* It is independent in 16 points between each power supply of VoCOM+ and ViCOM+ of J5 and J6.
It is necessary to connect the interface power supply of each connector of J5 and J6.

1-5. Externals of product

(1) 2CB-01v1/3232-MIL



1 J1,J2 ---------- These are shield connector of the RJ-45 type that connects the AL-**II** communication.
J1 and J2 are connected with each unit and the communications cable can be connected in the multidrop.

2 J3 ---------- This is a connector to connect +24 V power supply.

3 J4 ---------- This is a connector to connect an Extend I/O unit.

4 J5,J7 ---------- These are MIL20 pin connector for a general-purpose output.
- J5: $\overline{\text{OUT00}}$ -- $\overline{\text{OUT0F}}$ (16 points)
- J7: $\overline{\text{OUT10}}$ -- $\overline{\text{OUT1F}}$ (16 points)

It is possible to connect it with the equipment of another potential in 16 points.

5 J6,J8 ---------- These are MIL20 pin connector for a general-purpose input.
- J6: $\overline{\text{IN00}}$ -- $\overline{\text{IN0F}}$ (16 points)
- J8: $\overline{\text{IN10}}$ -- $\overline{\text{IN1F}}$ (16 points)

It is possible to connect it with the equipment of another potential in 16 points.

6 S1 ---------- This is a setting switch of the slave address of the AL-**II** communication.

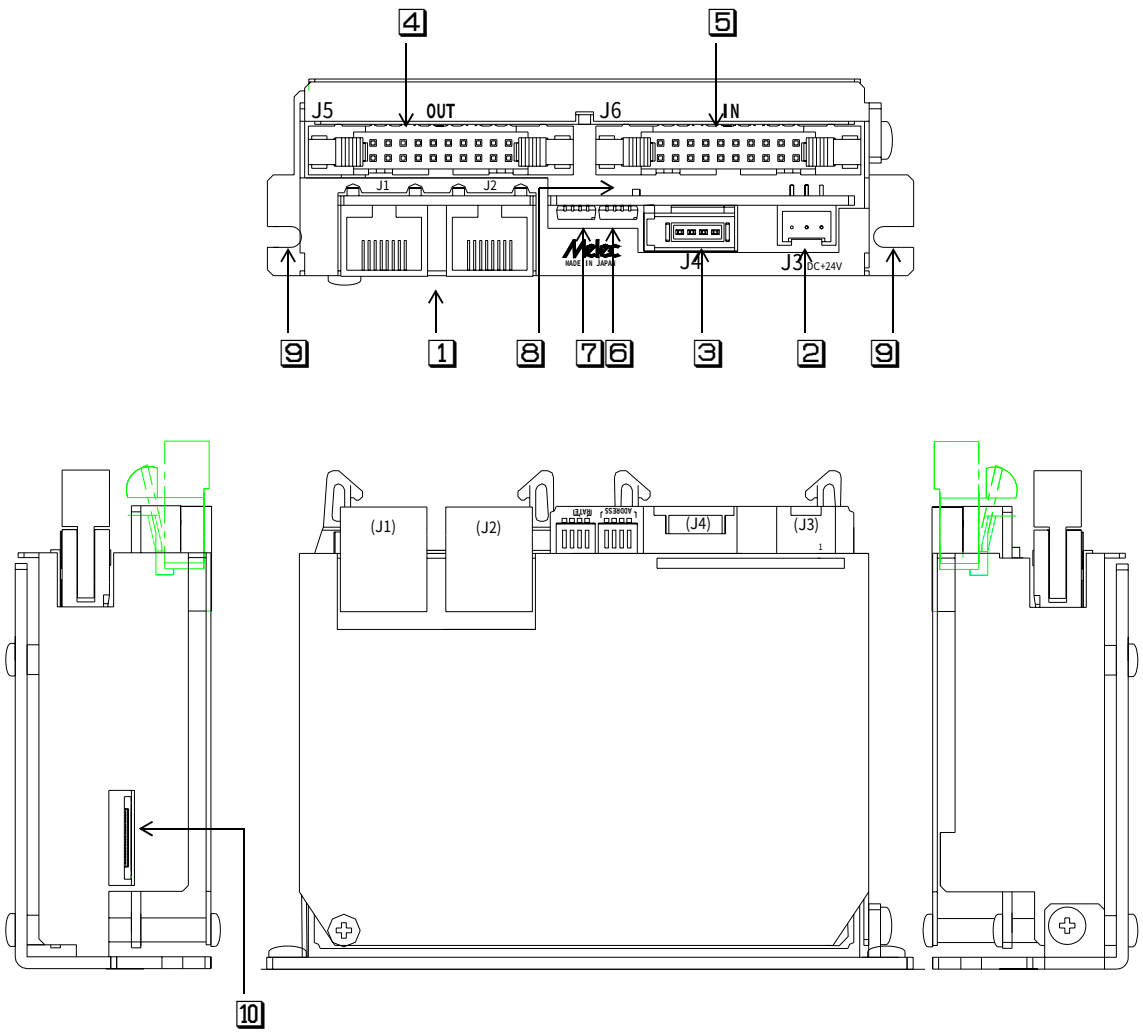
7 S2 ---------- This is a setting switch of the baud rate of the AL-**II** communication.

8 POWER LED ----- LED lights when power supply +24 V enters.

9 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.

10 Connector for adjustment ---- This is a connector for adjustment of the main unit.
Do not connect anything.

(2) 2CB-02v1/1616-MIL



1 J1,J2 ---------- These are shield connector of the RJ-45 type that connects the AL-II communication.
J1 and J2 are connected with each unit and the communications cable can be connected in the multidrop.

2 J3 ---------- This is a connector to connect +24 V power supply.

3 J4 ---------- This is a connector to connect an Extend I/O unit.

4 J5 ---------- These are MIL20 pin connector for a general-purpose output.
• J5: $\overline{\text{OUT00}}$ -- $\overline{\text{OUT0F}}$ (16 points)

5 J6 ---------- These are MIL20 pin connector for a general-purpose input.
• J6: $\overline{\text{IN00}}$-- $\overline{\text{IN0F}}$ (16 points)

6 S1 ---------- This is a setting switch of the slave address of the AL-II communication.

7 S2 ---------- This is a setting switch of the baud rate of the AL-II communication.

8 POWER LED ----- LED lights when power supply +24 V enters.

9 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.

10 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	
		2CB-02v1/1616-MIL	2CB-01v1/3232-MIL
1	Supply voltage	• Main unit : DC +24 V ± 2 V • General-purpose input power supply (ViCOM+) : DC +24 V ± 2 V • General-purpose output power supply (VoCOM+) : DC +24 V $^{+2\ V}_{-4\ V}$	
2	Power consumption	• Main unit : 80 mA or less • Interface power supply: 100 mA or less *1	• Main unit : 80 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 33.1× H 84 × D 109 (mm)	W 42.6 × H 84 × D 109 (mm)
7	Weight	Approx. 0.2 kg	Approx. 0.25 kg

2-2. Communication specifications

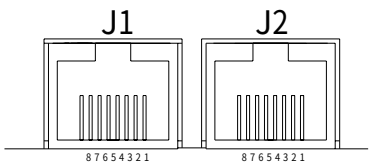
No.	Item	Specifications	
		2CB-02v1/1616-MIL	2CB-01v1/3232-MIL
1	AL-II interface	• Conformity standard :RS485 (insulation type) • Transmission protocol :Protocol for AL-II communication • Slave connection number :1 ～ 15 slave (slave address setting range: H' 1 ～ H' F) • Wiring distance/baud rate :100 m(10 Mbps) / 50 m(20 Mbps)	
2	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	
		2CB-02v1/1616-MIL	2CB-01v1/3232-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 ± 2 V • Input impedance : 6.8 K Ω (isolation by photocoupler) • Input current: 3.3 mA (typ) • Response time: 0.5 ms or less • The following function is provided in the input signal of two points (H' x0 and H' x1) in 16 points. A temporary changing the input signal can be captured. The rising edge or the falling edge of the input signal can be detected. The input signal can be maintained until being cleared from application. As a result, the input signal can be prevented overlooking at depended on AL-II communication and OS.	
3	Output specification	• Interface voltage: +24 V $^{+2\ V}_{-4\ V}$ • Output N ch 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. * In the unit access, the input or the output can be read and written by the batch by combining slave I/O unit and Extend I/O unit.	
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, J2)



- Connector :RJ-45 (shield type)
- Recommendation cable :KB-STP-□□ L □□: length (～ 30 m or less)
  (Made by Sanwa Supply : It is not an accessory.)

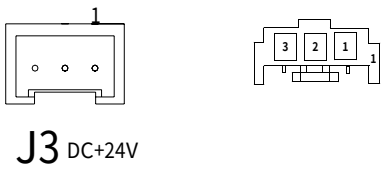
Reference

For more information about a cable preparing in the AL-II series and a recommended cable, refer to the instruction manual of "connection / others" .

No.	Direction	Signal name	Description
1	–	N.C	Connection is prohibited.
2	–	N.C	Connection is prohibited.
3	I/O	+AL II	+ side input/output signal of the serial data (line driver positive logic)
4	I	+V	Power supply for AL-II communication (+6 V)
5	I	-V	GND for AL-II communication (0 V)
6	I/O	-AL II	- side input/output signal of the serial data (line driver negative logic)
7	–	N.C	Connection is prohibited.
8	–	N.C	Connection is prohibited.

- J1 and J2 are the same terminal arrays. It is possible to connect with either.
- When the multidrop is connected, the divergence connection is done to other slave equipment through J1 or the J2 connector.

(2) Power supply connector (J3)

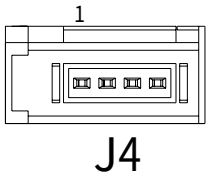


(Contact insertion side)

- 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) Extend I/O communication connector (J4)

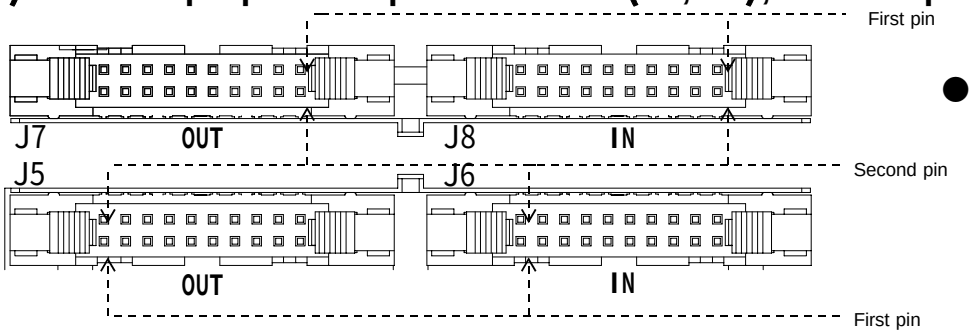


- Connector : 1565994-4 (e-CON: Tyco Electronics)
- Conformity cable : CE-66-01/IO-A03 (0.3 m, It is not an accessories.)
  : CE-66-02/IO-A10 (1 m, It is not an accessories.)

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.

- Number of Extend I/O that can be connected from J4 is one unit.

(4) General-purpose output connector(J5, J7), General-purpose input connector(J6, J8)



● Connector : MIL 20P

*J7 and J8 are connectors for 2CB-01v1/3232-MIL.

■ J5【General-purpose output signal connector】

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

■ J6【General-purpose input signal connector】

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	$\overline{\text{IN0F}}$	I	General-purpose input signal_0F
6	$\overline{\text{IN07}}$	I	General-purpose input signal_07
7	$\overline{\text{IN0E}}$	I	General-purpose input signal_0E
8	$\overline{\text{IN06}}$	I	General-purpose input signal_06
9	$\overline{\text{IN0D}}$	I	General-purpose input signal_0D
10	$\overline{\text{IN05}}$	I	General-purpose input signal_05
11	$\overline{\text{IN0C}}$	I	General-purpose input signal_0C
12	$\overline{\text{IN04}}$	I	General-purpose input signal_04
13	$\overline{\text{IN0B}}$	I	General-purpose input signal_0B
14	$\overline{\text{IN03}}$	I	General-purpose input signal_03
15	$\overline{\text{IN0A}}$	I	General-purpose input signal_0A
16	$\overline{\text{IN02}}$	I	General-purpose input signal_02
17	$\overline{\text{IN09}}$	I	General-purpose input signal_09
18	$\overline{\text{IN01}}$	I *2	General-purpose input signal_01
19	$\overline{\text{IN08}}$	I	General-purpose input signal_08
20	$\overline{\text{IN00}}$	I *2	General-purpose input signal_00

■ J7 【General-purpose output signal connector】

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	$\overline{\text{OUT1F}}$	O *1	General-purpose output signal_1F
6	$\overline{\text{OUT17}}$	O *1	General-purpose output signal_17
7	$\overline{\text{OUT1E}}$	O	General-purpose output signal_1E
8	$\overline{\text{OUT16}}$	O	General-purpose output signal_16
9	$\overline{\text{OUT1D}}$	O	General-purpose output signal_1D
10	$\overline{\text{OUT15}}$	O	General-purpose output signal_15
11	$\overline{\text{OUT1C}}$	O	General-purpose output signal_1C
12	$\overline{\text{OUT14}}$	O	General-purpose output signal_14
13	$\overline{\text{OUT1B}}$	O	General-purpose output signal_1B
14	$\overline{\text{OUT13}}$	O	General-purpose output signal_13
15	$\overline{\text{OUT1A}}$	O	General-purpose output signal_1A
16	$\overline{\text{OUT12}}$	O	General-purpose output signal_12
17	$\overline{\text{OUT19}}$	O	General-purpose output signal_19
18	$\overline{\text{OUT31}}$	O	General-purpose output signal_11
19	$\overline{\text{OUT18}}$	O	General-purpose output signal_18
20	$\overline{\text{OUT10}}$	O	General-purpose output signal_10

■ J8【General-purpose input signal connector】

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	$\overline{\text{IN1F}}$	I	General-purpose input signal_1F
6	$\overline{\text{IN17}}$	I	General-purpose input signal_17
7	$\overline{\text{IN1E}}$	I	General-purpose input signal_1E
8	$\overline{\text{IN16}}$	I	General-purpose input signal_16
9	$\overline{\text{IN1D}}$	I	General-purpose input signal_1D
10	$\overline{\text{IN15}}$	I	General-purpose input signal_15
11	$\overline{\text{IN1C}}$	I	General-purpose input signal_1C
12	$\overline{\text{IN14}}$	I	General-purpose input signal_14
13	$\overline{\text{IN1B}}$	I	General-purpose input signal_1B
14	$\overline{\text{IN13}}$	I	General-purpose input signal_13
15	$\overline{\text{IN1A}}$	I	General-purpose input signal_1A
16	$\overline{\text{IN12}}$	I	General-purpose input signal_12
17	$\overline{\text{IN19}}$	I	General-purpose input signal_19
18	$\overline{\text{IN11}}$	I *2	General-purpose input signal_11
19	$\overline{\text{IN18}}$	I	General-purpose input signal_18
20	$\overline{\text{IN10}}$	I *2	General-purpose input signal_10

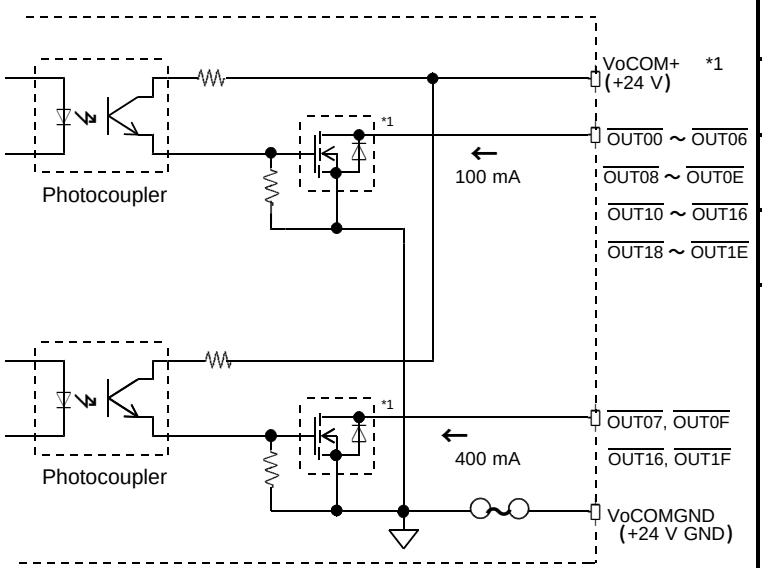
*1 It is possible to drive in the load of 400 mA.

*2 The latch of the input signal is possible.

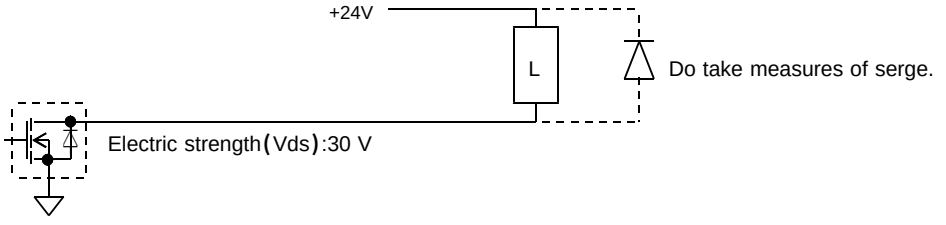
• It is necessary to connect the interface power supply of each connector of J5, J6, J7 and J8.

2-5. Input and output specifications

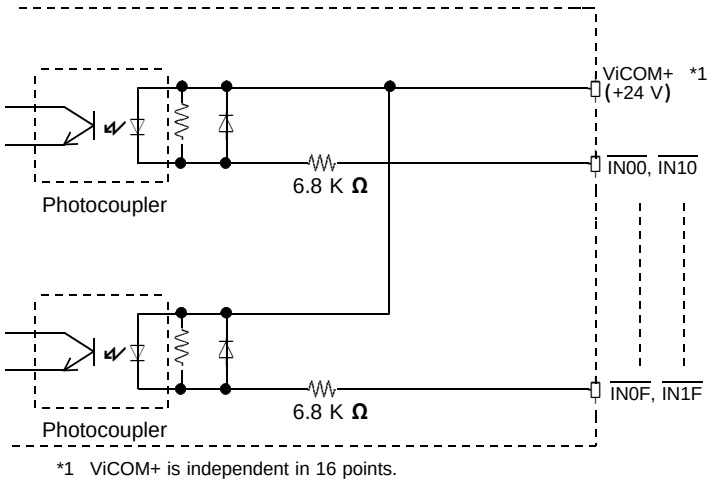
(1) Output specifications

Circuit	Description	
 *1 VoCOM + and VoCOMGND are independent in 16 points.	Signal name	● OUT00 -- OUT0F ● OUT10 -- OUT1F (at 2CB-01v1/3232-MIL) 2CB-01v1/3232-MIL can connect another potential in 16 points.
	Interface voltage	+24 V +2V -4V
	VCOM current	1.5 mA (typ)/Output of 1 point
	Output method	Nch Open drain output
	Output current	● OUT00--OUT06, OUT08--OUT0E ● OUT10--OUT16, OUT18--OUT1E ON: 100 mA (Vds = 1 V or less) Moment: 1 A/point (10 ms or less) OFF: 0.1 mA or less ● OUT07,OUT0F,OUT17 and OUT1F ON: 400 mA (Vds = 1 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 → OFF、 OFF → ON)
	Insulation	Photocoupler isolation (Between internal circuits and external circuits.)

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



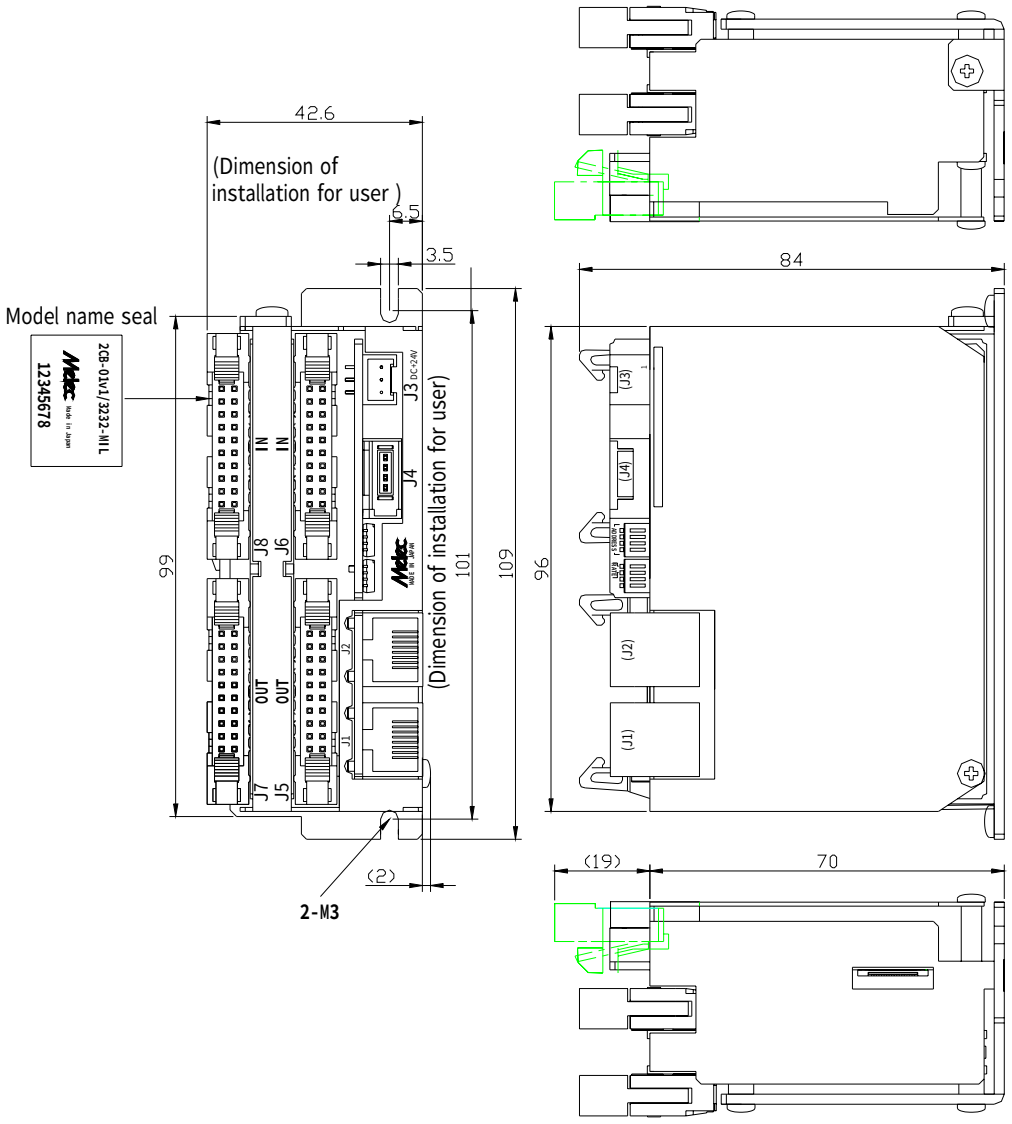
(2) Input specifications

Circuit	Description	
 *1 ViCOM+ is independent in 16 points.	Signal name	● IN00 -- IN0F ● IN10 -- IN1F (at 2CB-01v1/3232-MIL) 2CB-01v1/3232-MIL can connect another potential in 16 points.
	Interface voltage	+24 V ± 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 → OFF、 OFF → ON) * Input pulse width: 0.5 ms or more
	Insulation	Photocoupler isolation (Between internal circuits and external circuits.)

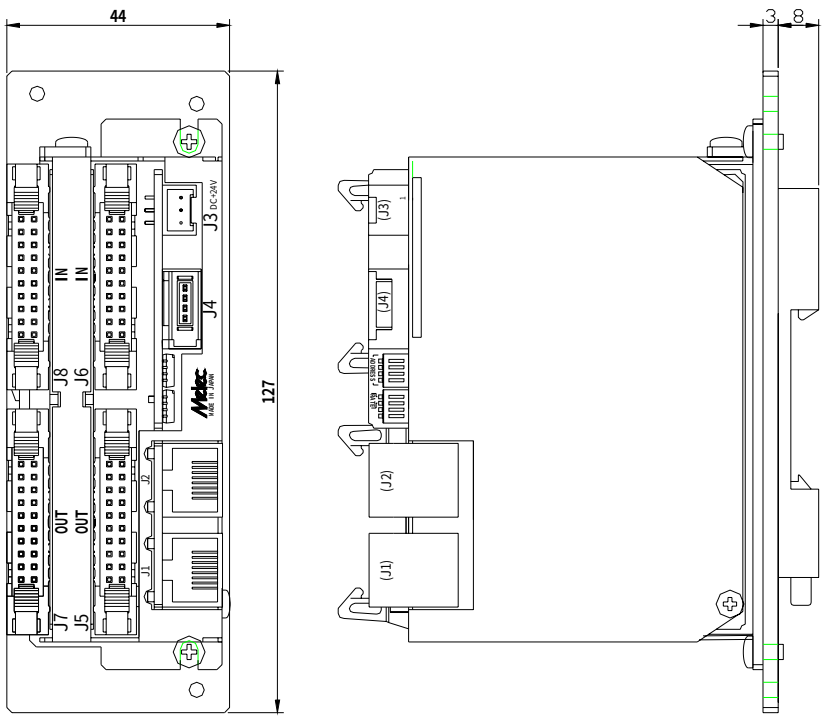
2-6. Outside dimensions

(1) 2CB-01v1/3232-MIL

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

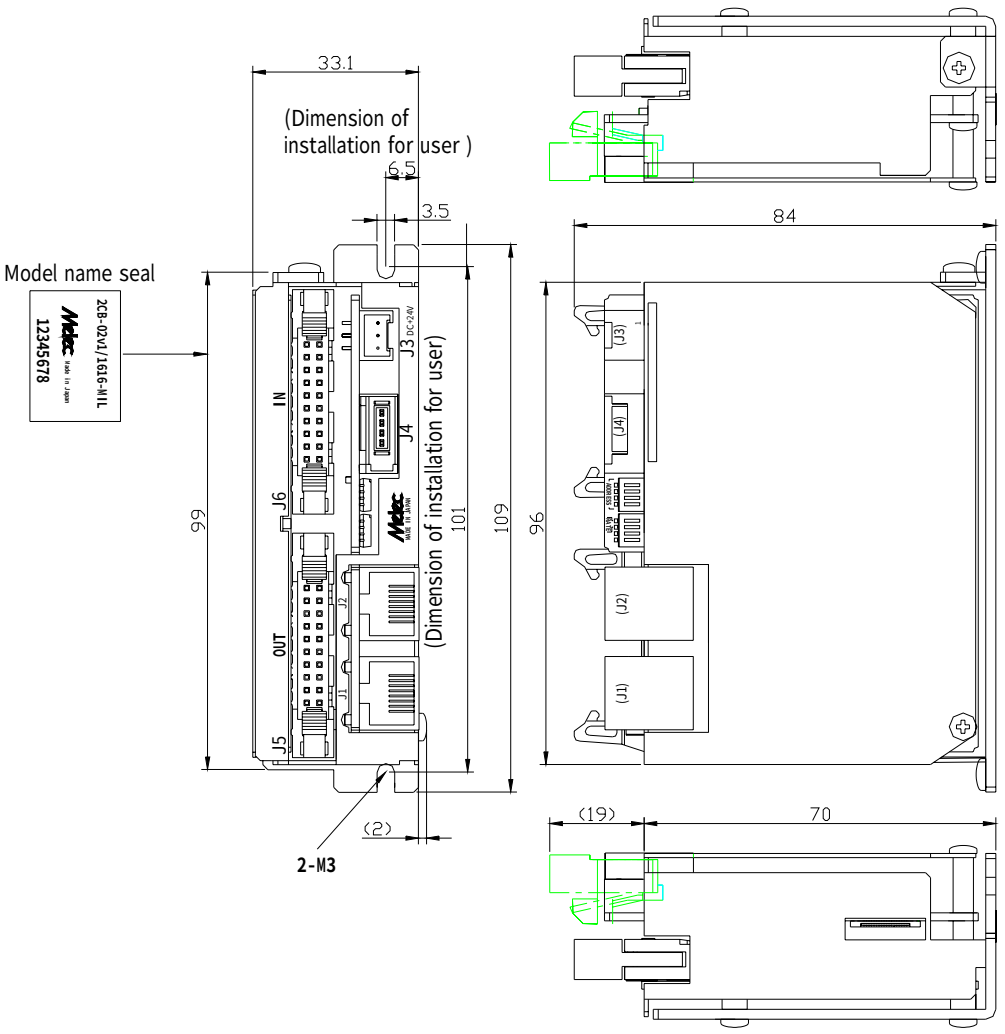


When DIN attachment lug (CP-13v1/AT1) is installed

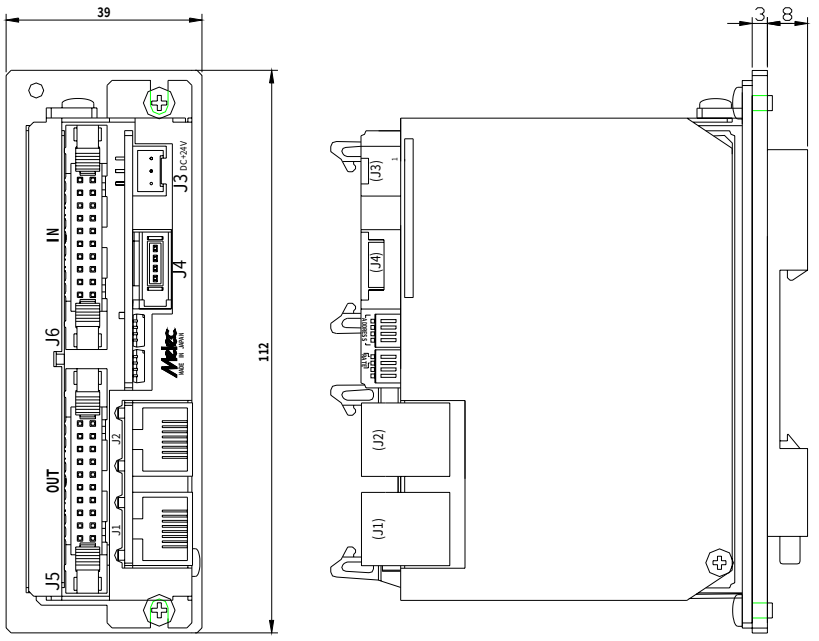


(2) 2CB-02v1/1616-MIL

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



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



3. Setting

3-1. Installation of device driver for Windows

Device driver for Windows is necessary to operate this product.

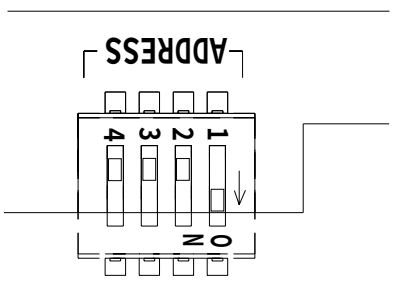
- Please refer to the installation manual attachment to a exclusive use device driver 「MPL-34-01vx.xx/AL2W32 or MPL-35-01vx.xx/AL2W64」 for details of the installation method.

- Please refer to the PCI master manual of the AL-Ⅱ series when it sets and operating by using application MAP-19-01vx.xx.

* Version No. ··· Please confirm the latest version of vx.xx at the manual of the device driver, and MAP-19 application.

3-2. Address setting of the AL-Ⅱ series (S1)

The slave address of the AL-Ⅱ communication is set with dip switch S1.
The master address is H' 0 fixation. And, please set not to overlap the address of each slave unit.

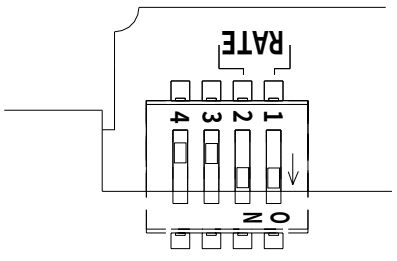


ADDRESS \ SWITCH No.	4	3	2	1	
Setting is prohibited.	OFF	OFF	OFF	OFF	
H' 1	OFF	OFF	OFF	ON	← Factory-set
H' 2	OFF	OFF	ON	OFF	
H' 3	OFF	OFF	ON	ON	
H' C	ON	ON	OFF	OFF	
H' D	ON	ON	OFF	ON	
H' E	ON	ON	ON	OFF	
H' F	ON	ON	ON	ON	

- When turning on power, the setting of S1 becomes effective.
  Set switch while turning off the power supply.
  And, turn on the power supply after the setting change.

3-3. Baud rate setting of the AL-Ⅱ series (S2)

The baud rate of the slave units of AL-Ⅱ communication is set with dip switch S2.
Set to masters the baud rate by an Environment-function.
And, set the same transmission rate as master to all slave units connected with the AL-Ⅱ series by the dip switch S2.



RATE \ SWITCH No.	4	3	2	1	
Setting is prohibited.	OFF	OFF	OFF	OFF	
Setting is prohibited.	OFF	OFF	OFF	ON	
10 Mbps	OFF	OFF	ON	OFF	
20 Mbps	OFF	OFF	ON	ON	← Factory-set

- Turn off the 3rd and 4th bit of S2. These are the set prohibition.
- When turning on power, the setting of S2 becomes effective.
  Set switch while turning off the power supply.
  And, turn on the power supply after the setting change.

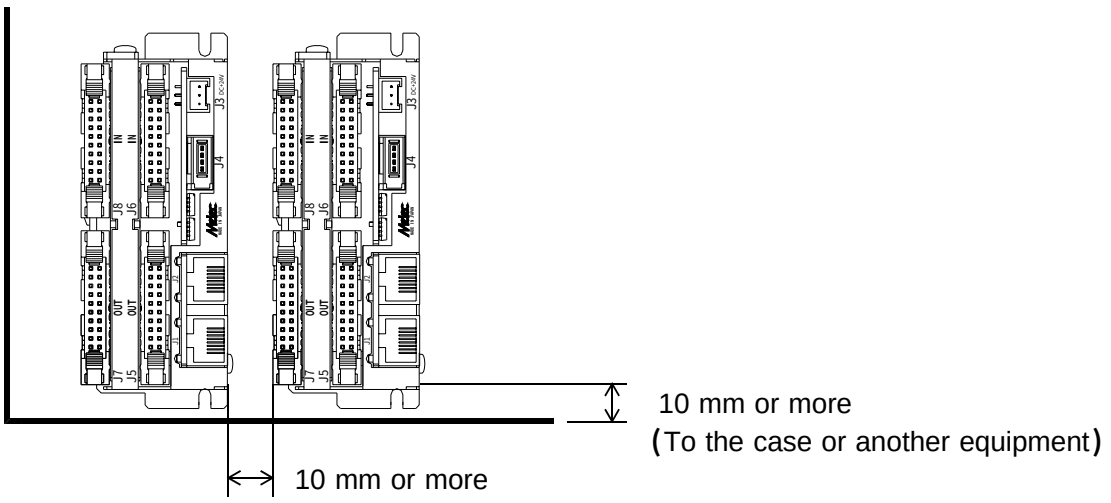
4. Installation and connection

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 2CB-01v1/3232-MIL or the 2CB-02v1/1616-MIL as follows.

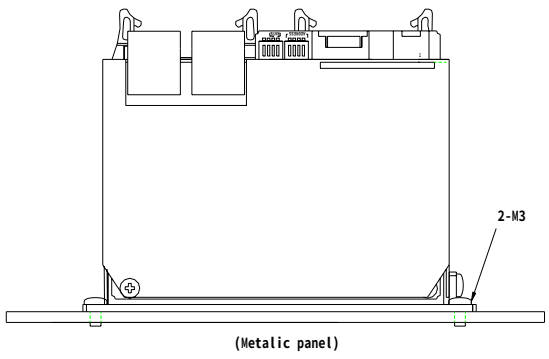
- Distance when two or more is arranged.
- Distance with panel of case.
- Distance with another equipment.



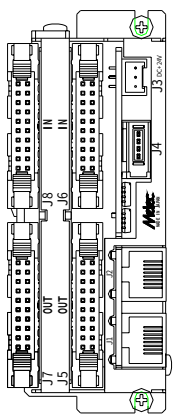
(2) Installation method

● 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

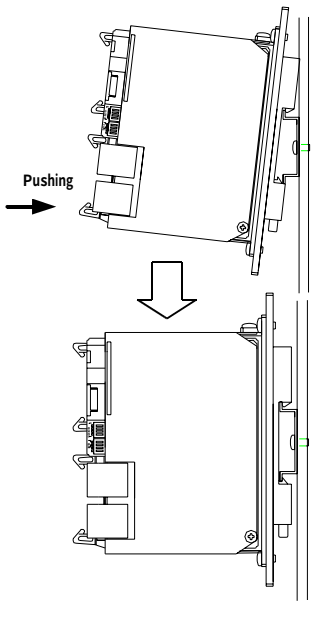


← Make the J3 connector upward, and install it with the M3 screw. The length of the screw must use appropriate length corresponding to the thickness of a metallic panel.

● DIN rail installation

* Please refer to the "Connection/other" manual about the specification of DIN attachment lug.

- CP-13v1/AT1 ··· For 2CB-01v1/3232-MIL
- CP-14/AT2 ··· For 2CB-02v1/1616-MIL



Exclusive use DIN attachment lug is installed on the main unit. Make J3 to the upward and install in the DIN rail.

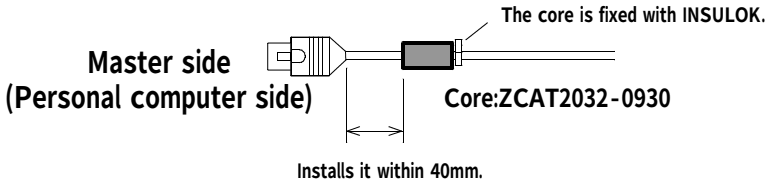
4-2. Connection of AL-Ⅱ communication system

⚠ QAUTION

Operation not anticipated may cause damage of the machine and the product.
To prevent the malfunction by the noise, the AL-Ⅱ communications cable recommends recommended cable.

(1) Core connection of AL-Ⅱ communications cable

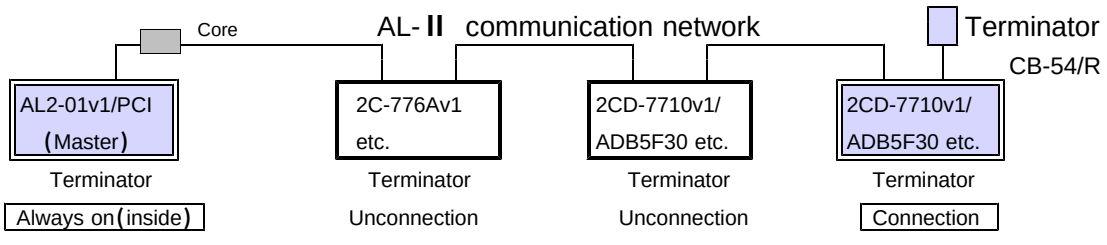
Please install the core in the master side. And, the personal computer system including the AL -Ⅱ communication is made to operated with stability.



The core is prepared by our company.
Please refer to the "connection/other" manual.

(2)Connection of terminator

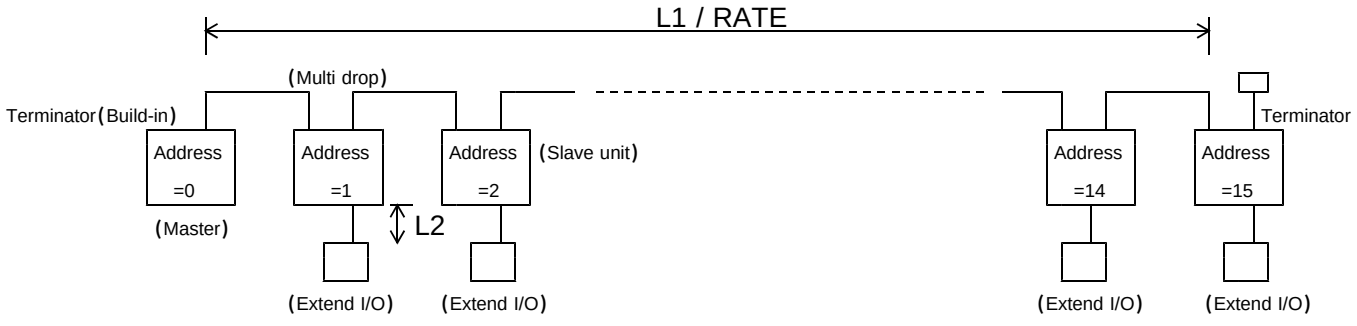
Please connect terminator (CB-54/R) with the slave unit arranged on the AL-Ⅱ communication network edge.
Please do not connect the terminator with other equipment.
There is no problem even if AL-Ⅱ communications or the terminator are connected with either of J1, J2.



(3) Wiring distance of AL-Ⅱ communication

The total wiring distance of the AL-Ⅱ communications cable is the following range including the multidrop wiring.

- The wiring distance of Extend I/O doesn't relate to AL-Ⅱ communication baud rate (RATE).
- The wiring distance of Extend I/O from each slave is within 1 m.



● AL-Ⅱ communication baud rate and wiring distance

Wiring distance	RATE	
	10 Mbps	20 Mbps
L1 (AL-Ⅱ communication)	100 m or less	50 m or less
L2 (Extend I/O communication)	1 m or less	

● The number of slaves that can be connected directly with the AL-Ⅱ communication are 15 units or less.
Extend I/O that can be extended directly from the slave unit is not included in the number of slaves.

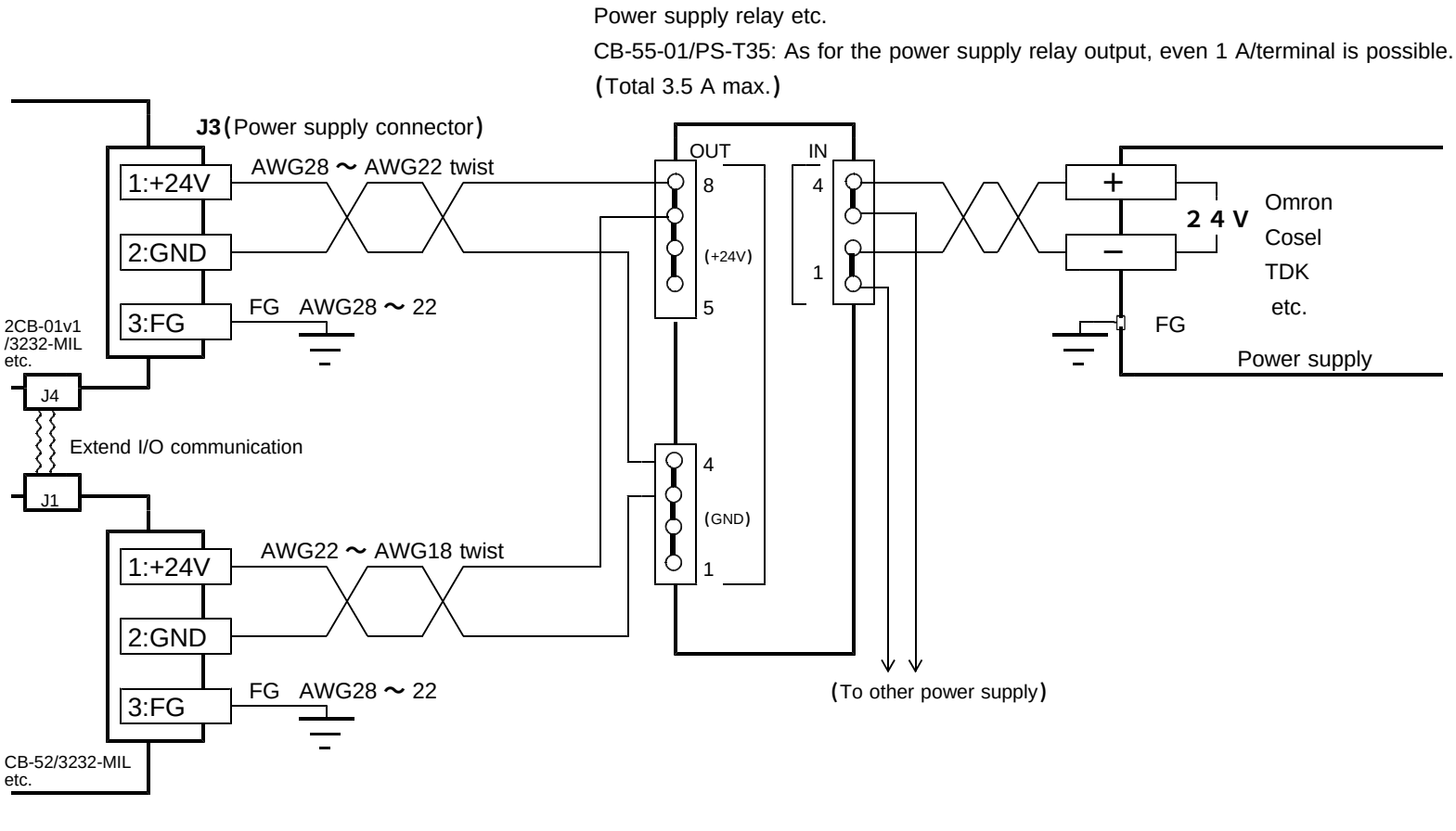
(4) Power supply and slave power supply for communication

The AL-Ⅱ communication power supply of each slave unit is supplied from the AL-Ⅱ master through the communications cable so that the entire AL-Ⅱ communication network should not become unstable when the power supply on each slave unit side is intercepted.
The reconnection of communications can be done by executing Environment-function to the master when the power supply of the main unit on the slave side is obstructed.

4-3. Connection example

(1) Examples of connection to power supply

> ⚠ QAUTION
>
> 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.
> - AL-Ⅱ communications cable.



- 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.

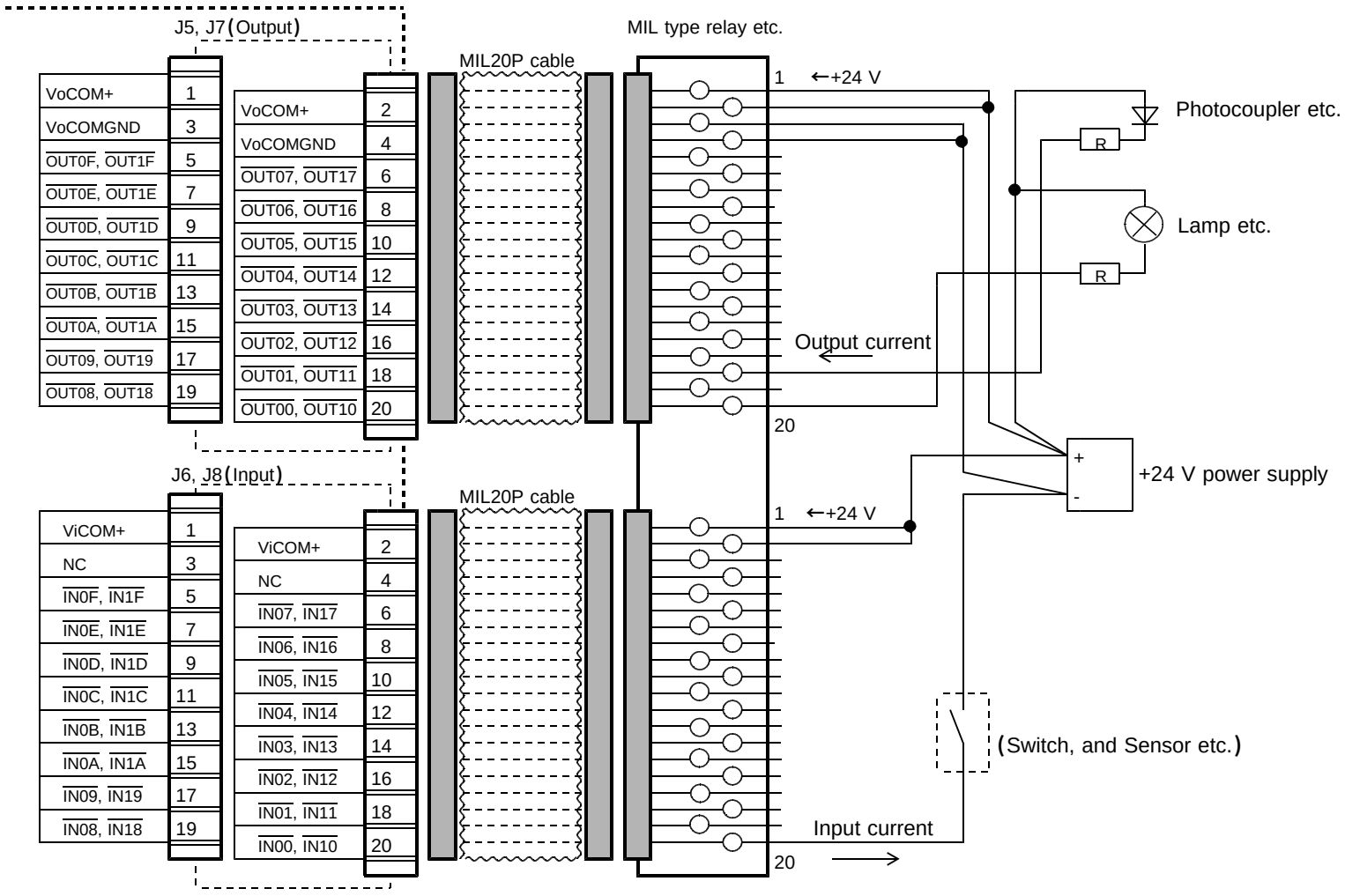
- Take the external equipment power supply from the same power supply as ViCOM+ (general-purpose input side) and VoCOM+ ～ VoCOMGND (general-purpose output side) power supply of 2CB-01v1/3232-MIL or 2CB-02/1616-MIL.

- The power supply of slave I/O unit can be connected with CE-76/003C10-51103 (1 m) without crimp.

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

⚠ QAUTION

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 J7 (OUT1x signal) and J8 (IN1x signal) is the one for 2CB-01v1/3232-MIL.
- It is possible to connect it directly with the external equipment by using the MIL cable in the rose line.

Reference

● MIL reray 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

⚠ QAUTION

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.

⚠ QAUTION

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	

Technical Service

TEL.(042)664-5382 FAX.(042)666-5664
E-mail s-support@melec-inc.com

Sales and Service

TEL.(042)664-5384 FAX.(042)666-2031
URL:http://www.melec-inc.com

Melec Inc. Control equipment marketing department
516-10,Higashiasakawa-cho,Hachioji-shi,Tokyo 193-0834,Japan

C1106