INSTALLATION CONDITION FOR UL RECOGNITION

For UL recognition of the product, FANUC Series 500i-A shall be installed after due considerations on UL requirements.

1 Environmental conditions

- Indoor use
- Altitude up to 1,000 m (Operating)
- Operating ambient temperature (The temperature outside the enclosure):
  0°C to 45°C
- Operating ambient temperature (The temperature inside the enclosure):
  0°C to 58°C
- Humidity (Operating): 75%RH or less, no condensation
- Use the equipment in Pollution degree 2 *1 environment or cleaner environment
  (*1. "Pollution Degree 2" is defined in the standard UL/CSA.)

2 Technical specifications

Model *2) *3)	Input		Output		Enclosure
	Volt	[A]	Volt	[A]	*4)
A02B-037x-B500	DC24V±10%	4.8 A	DC24V±10%	2.0 A	Open Type

(*2. A suffix "(0slot)" or "(2slot)" is added according to the number of slots.

(*3. x is a number to show the each model.

(*4. Open type is defined in the standard UL/CSA.

Power for the LCD unit is supplied via control unit. For UL recognition of the LCD unit, specification of the input power is indicated on the LCD unit.

Model	Input		Enclosure
	Volt	[A]	*1)
A02B-0370-C060	DC24V±10%	0.9 A	Type 1

(*1. Type 1 is defined in the standard UL/CSA

3 Power supply unit for the equipment must have a double insulation or reinforced insulation device from AC mains supply and the output voltage must be less than DC 60 V and Limited Energy Circuit. However, input voltage to the control unit shall not exceed DC 26.4 V.
(The insulation can be achieved with the use of an insulated DC power supply unit that complies with UL/CSA standard.)

4 Use the input power cable and the connector as following.
Housing: Tyco Electronics 1-178288-3
Contact: Tyco Electronics 1-175218-5
Wire: Copper conductors 16AWG or thicker

5 Use the output power cable and the connector as following.
Housing: Tyco Electronics 2-178288-3
Contact: Tyco Electronics 1-175218-5
Wire: Copper conductors According to a necessary current capacity

6 If the equipment is used in a manner not specified by the manufacturer, the protection provided by the equipment may be impaired.

7 Caution of laser product

Some of the FSSB optical modules included in this product are Class 1 laser products and conform to 21 CFR, Subchapter J of the FDA of the USA and to the international standard IEC60825-1.
Class 1 lasers are safe for observation by the naked eye or using a telephotographic optical system such as glasses; however, avoid directly viewing the laser if possible.
In particular, the laser used in this product is near infrared light with a wavelength of 850 nm which is difficult to check visually, so if observation is necessary, use a near-infrared camera or the like rather than a loupe or the like.
Caution - use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous radiation exposure.

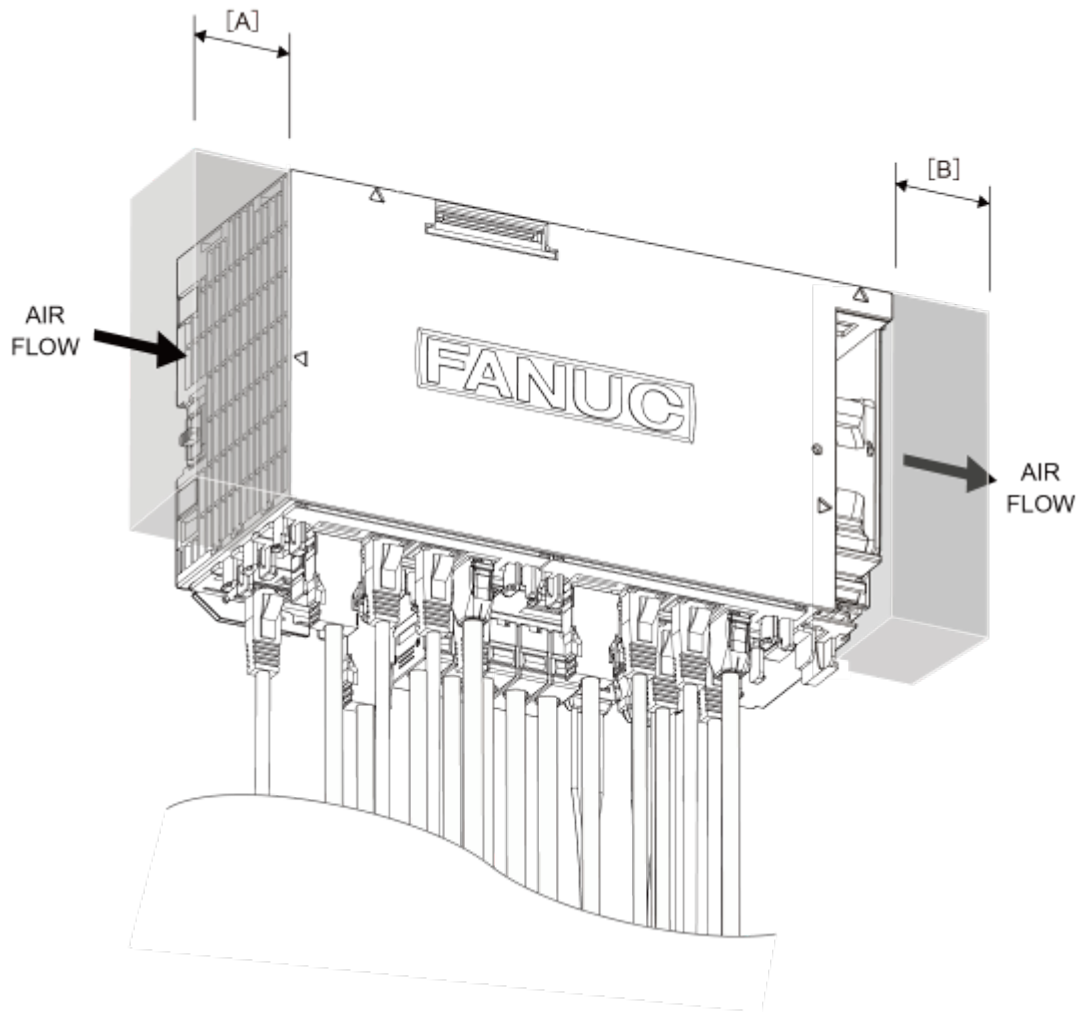
8 Equipment installation

The control unit and the peripheral units have been designed on the assumption that they are housed in closed cabinets. The cabinet should basically be made of metal.
Set up the LCD unit on a flat surface of a Type 1 Enclosure.

8.1 Installing the control unit as LCD-mounted type

8.1.1 Clearance needed for exhausting heat

Air is fed into the control unit, drawn by the fan motors which are attached to the control unit. The spaces shown in the figure below (areas [A] and [B]) must be provided to ensure smooth air flow.



[A]	Clearance needed for exhausting heat (air inlet) ≥ 10 mm

[B]	Clearance needed for exhausting heat (air outlet) ≥ 10 mm

8.1.2 Recommended installation procedure

Directly install the control unit to the dedicated connector on the back of the LCD unit installed to the cabinet.

Follow the procedure below.

NOTE

The hole for installing the LCD unit needs to be made on the cabinet beforehand.

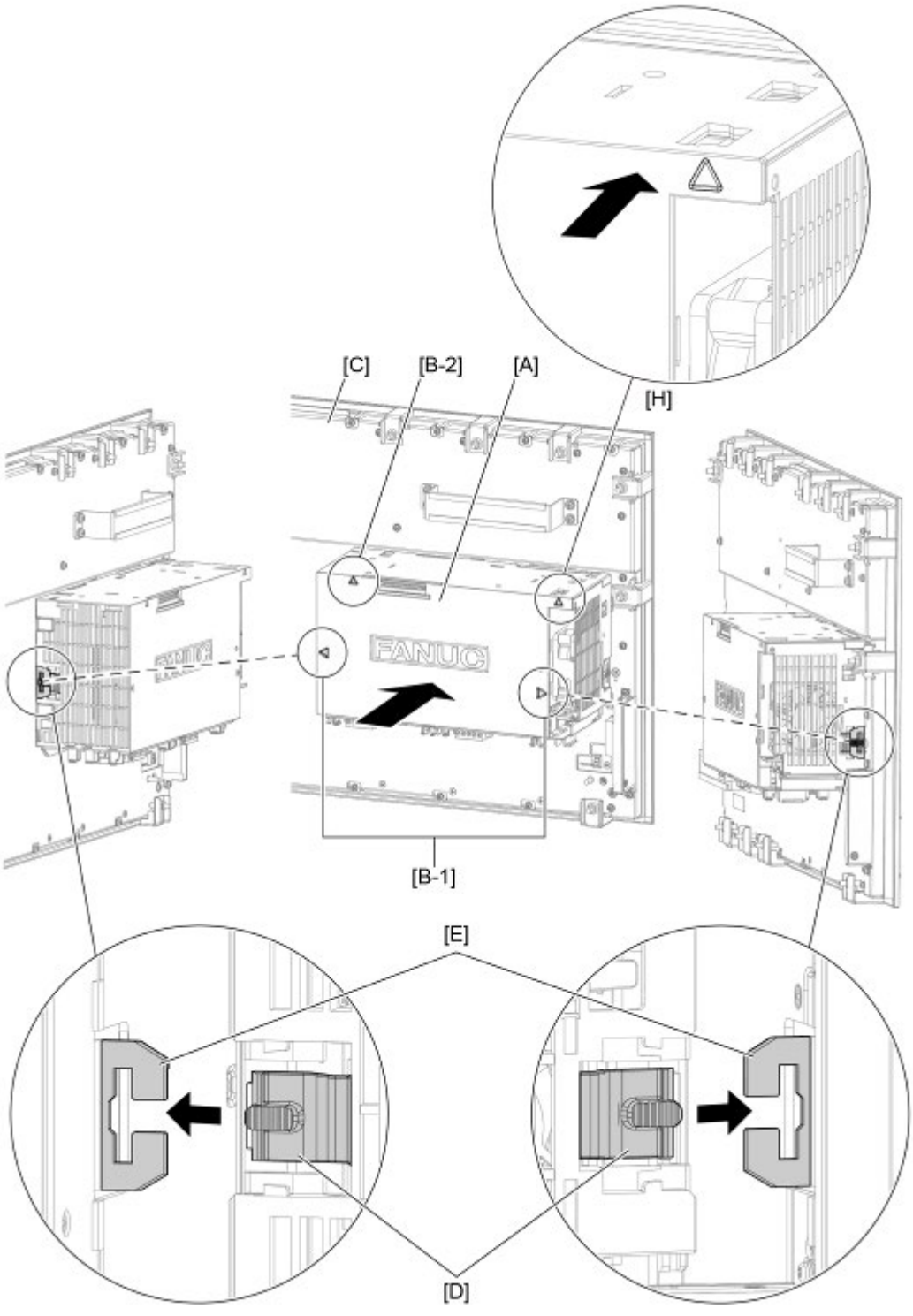
(1) Install the LCD unit to the cabinet.

(2) Connect the required cables to the control unit.

(3) Engage the latch for maintenance work on the LCD unit to the hole for maintenance work on the top of the control unit.

Refer to figure below.

- Place the control unit so the "FANUC" logo is displayed correctly.
- Align the position of the hole for maintenance work [F] of the control unit with the latch for maintenance work [G] on the LCD unit.
- Using the △ mark [B-2] on the top left of the control unit as a guide, position the hole for maintenance work [F] so that it fits into the latch for maintenance work of the LCD unit [G] at two points on the left and right.
- After aligning their positions, slowly insert the control unit into the LCD unit.
- When doing it, pay attention so that the latch for maintenance work will not be caught in the hole for maintenance work.
- At this step, the control unit has not been fixed to the LCD unit.



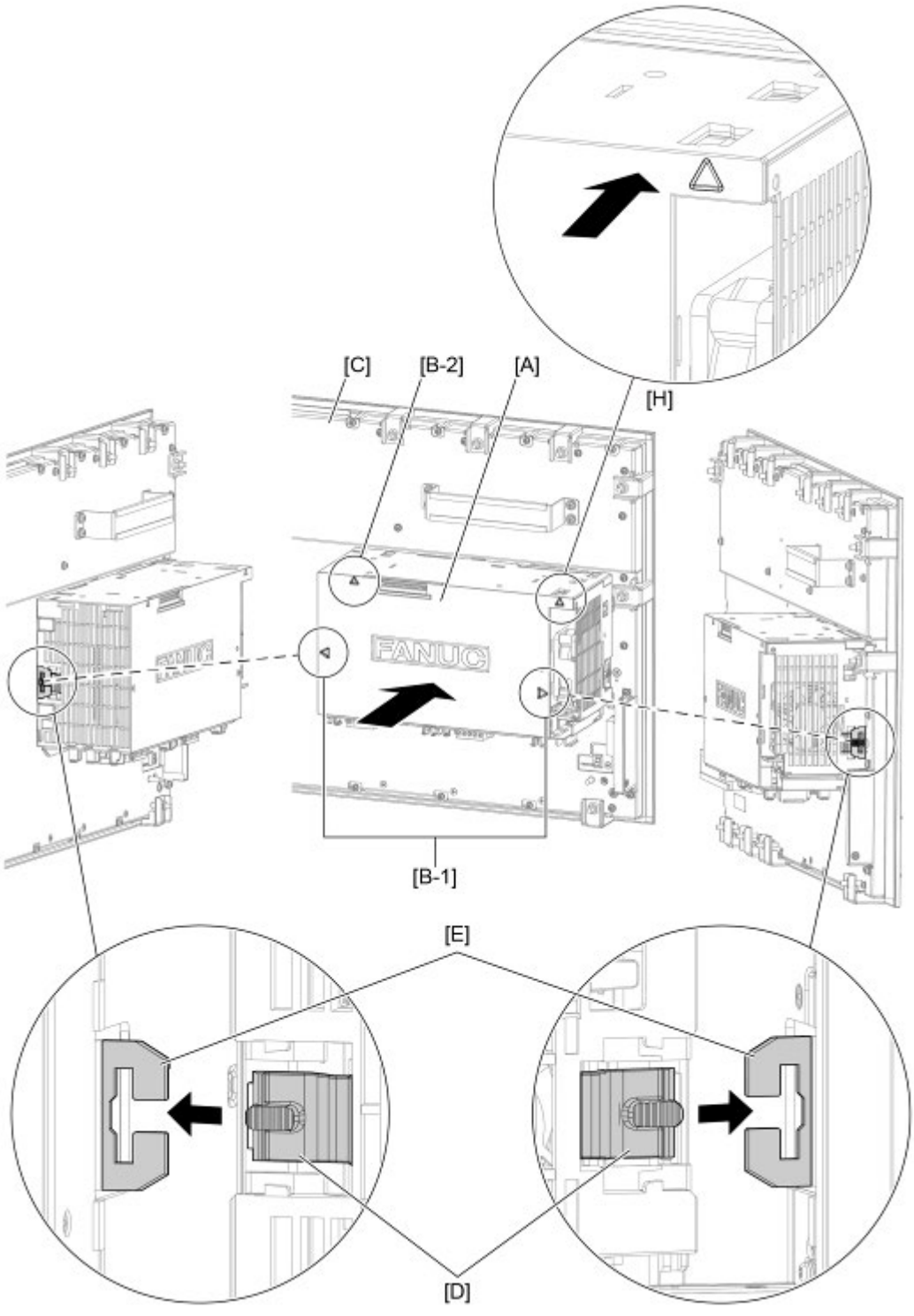
Part	Name
[A]	Control unit
[B-2]	△ mark (a guide to check the hole for maintenance work)
[C]	LCD unit
[D]	Latch

[E]	Sheet metal for fixing
[F]	Hole for maintenance work
[G]	Latch for maintenance work

(4) Engage the latches on the left and right of the control unit to the sheet metal for fixing on the left and right of the LCD unit.

Refer to figure below.

- Align the position of the latch [D] of the control unit with the sheet metal for fixing [E] of the LCD unit.
- Using the △ marks [B-1] on the left and right of the center of the control unit as a guide, position the latch [D] so that it fits into the sheet metal of the LCD unit [E] at two points on the left and right.
- After aligning their positions, slowly insert the unit so that the latches are fixed to the sheet metal.
- Push again around the connector [H] at the upper right of the "FANUC" logo, so that the control unit is perfectly engaged to the LCD unit.

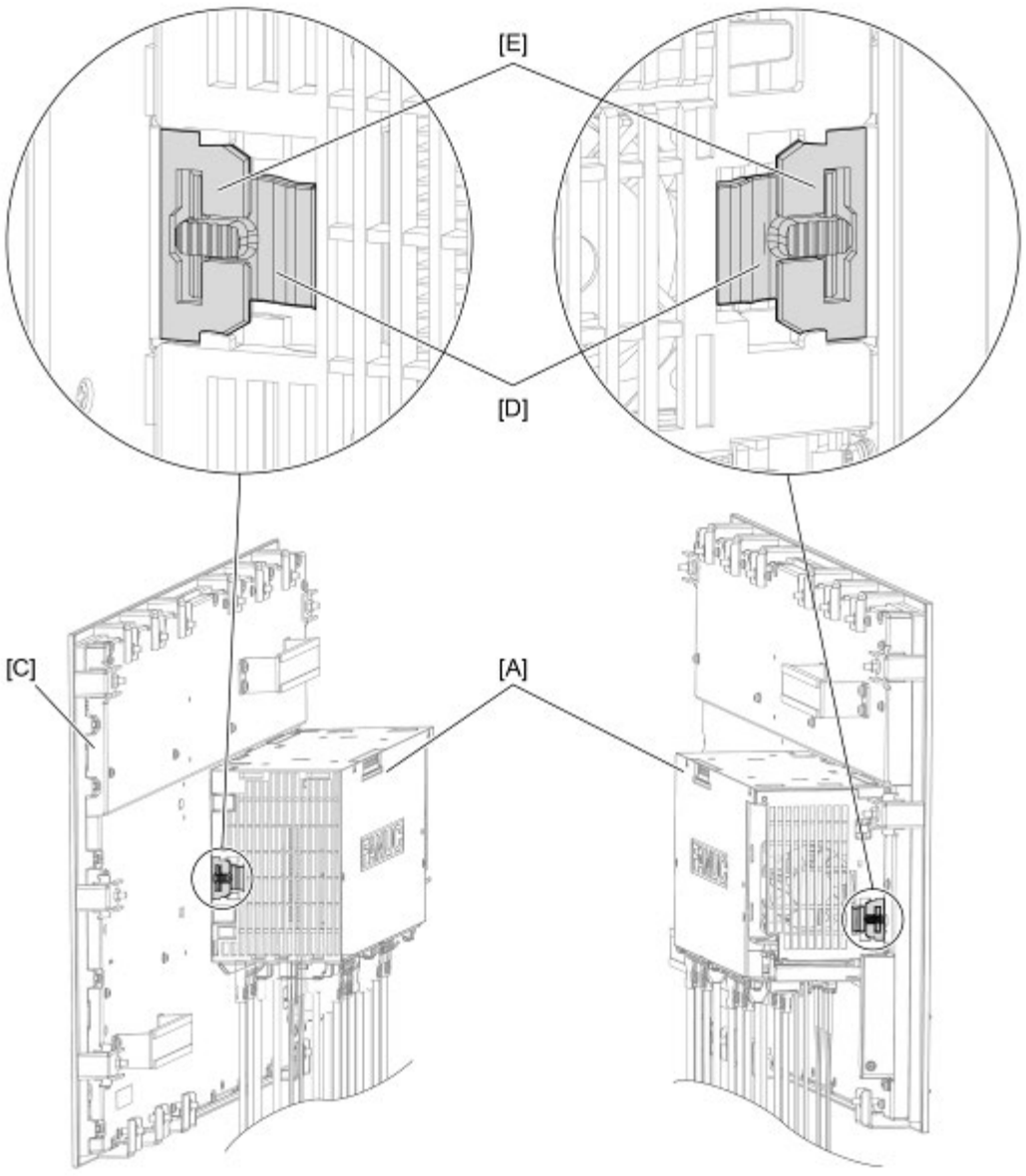


Part	Name
[A]	Control unit
[B-1]	△ mark (a guide to check the latch)
[B-2]	△ mark (a guide to check the hole for maintenance work)
[C]	LCD unit

[D]	Latch
[E]	Sheet metal for fixing
[H]	Position to push

(5) Check that the control unit is firmly fixed to the LCD unit.

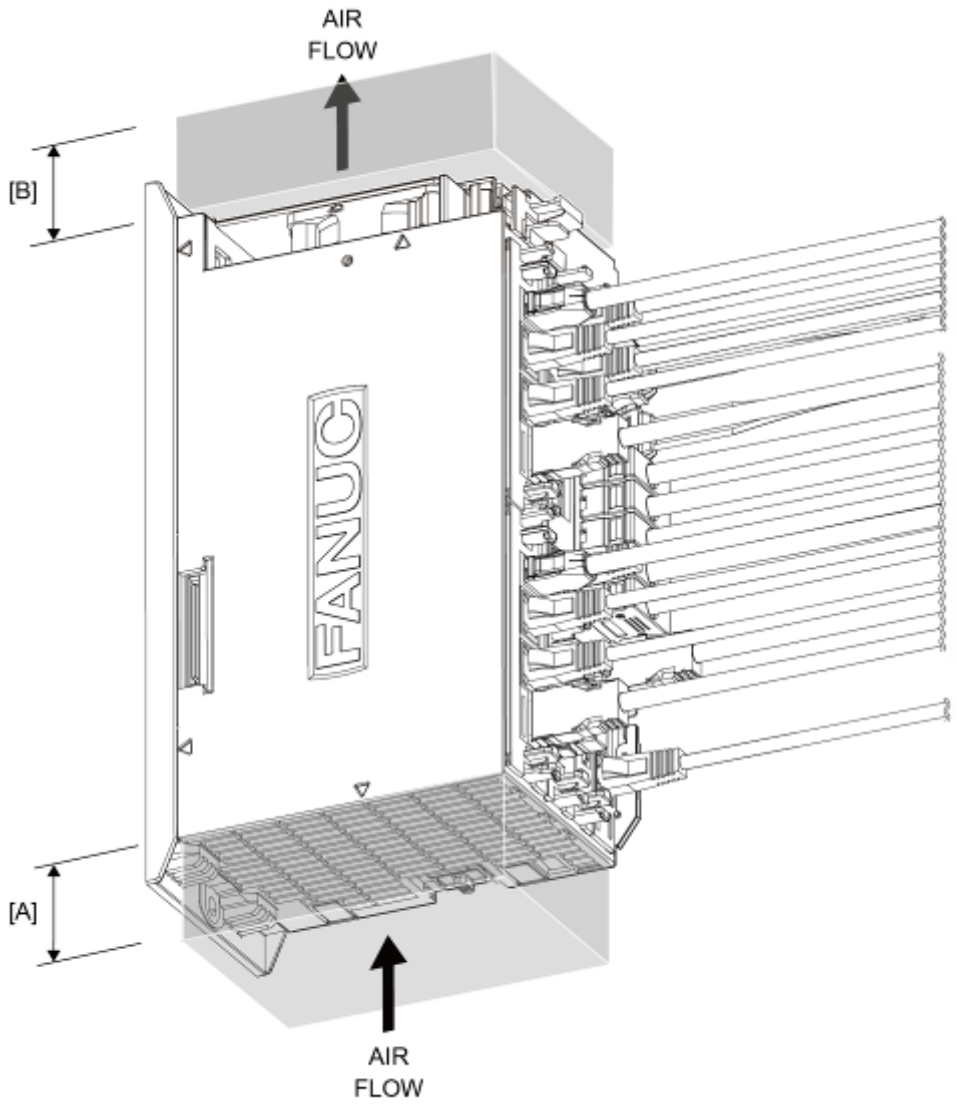
Check that the latch [D] of the control unit is firmly fixed.



Part	Name
[A]	Control unit
[C]	LCD unit
[D]	Latch
[E]	Sheet metal for fixing

8.2 Installing the control unit as Stand-alone type

Air is fed into the control unit, drawn by the fan motors which are attached to the control unit. The spaces shown in the figure below (areas [A] and [B]) must be provided to ensure smooth air flow.



[A]	Clearance needed for exhausting heat (air inlet) ≥ 10 mm
[B]	Clearance needed for exhausting heat (air outlet) ≥ 10 mm

8.3 Connecting the Ground Terminal of the Control Unit

Connection between ground terminal of the control unit and 0 V.

⚠ CAUTION

In the control unit, the 0 V and the ground terminals are electrically connected to each other. So, do not connect any external unit's 0 V connected to the control unit's 0 V to any other line's grounding electrode that can have an electrical potential different from that of the grounding electrode connected to the control unit.

The following table lists the tightening torque for screws and nuts used to fasten the units (except LCD units) explained herein and ground terminals in the units.

Screw and nut diameter	Tightening torque
M3	0.9±0.1 N・m
M4	1.8±0.2 N・m

The following table lists the tightening torque for nuts used to fasten the LCD units.

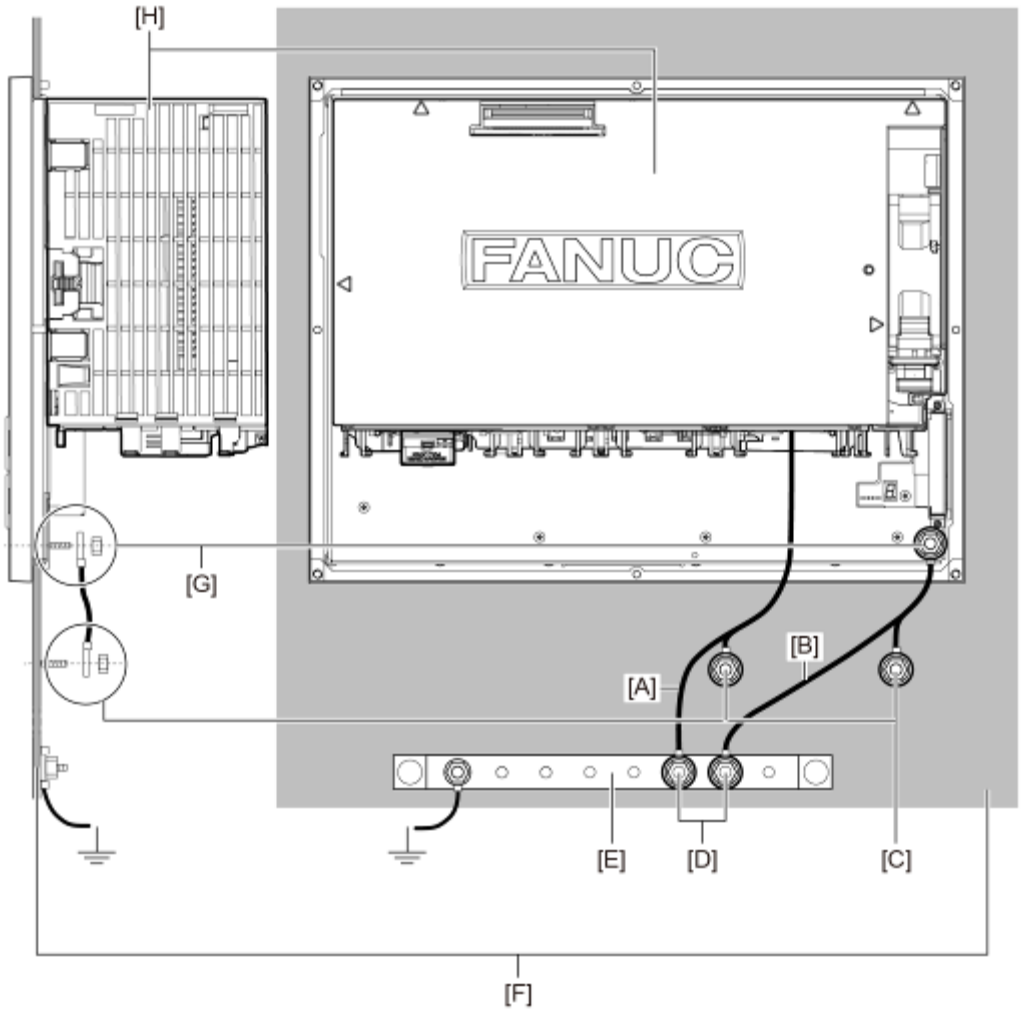
Name	Nut diameter	Tightening torque
18.5-inch LCD unit A02B-0370-C060	M4	0.9±0.1 N・m

The following table lists the tightening torque for screws and nuts used to fasten those units having molded mounting parts, such as Stand-alone type control units.

Screw and nut diameter	Tightening torque
M4	1.3±0.2 N・m
M5	2.6±0.2 N・m

8.3.1 Connecting the ground terminal of control unit used as LCD-mounted type

Connect the 0 V line in the control unit to the cabinet's metal plate or signal system ground bar nearby via the ground terminal (see below).

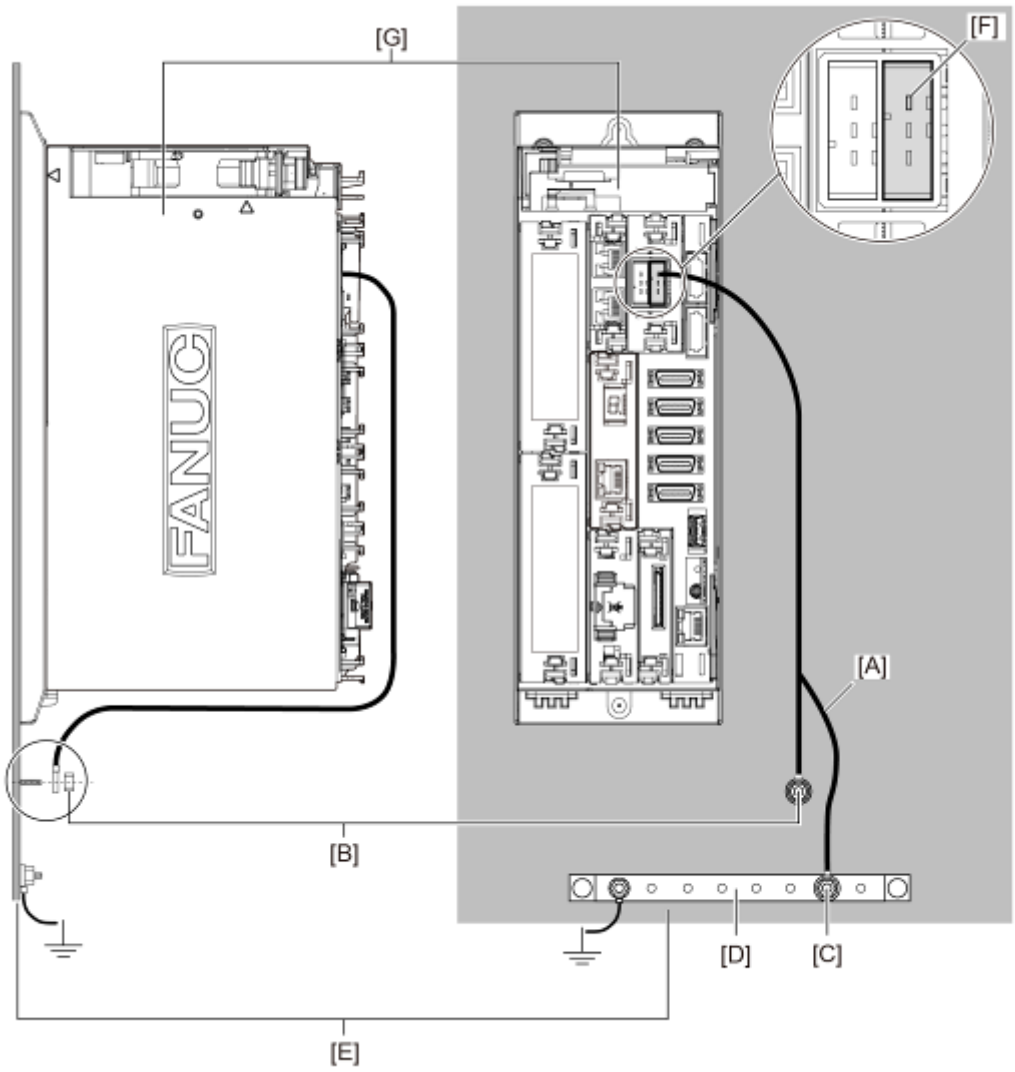


[A]	Ground wire (16 AWG or more)
[B]	Ground wire (2mm^2 or more) *1)
[C]	Multipoint grounding *1)
[D]	Single-point grounding *1)
[E]	Signal ground bar
[F]	Cabinet
[G]	LCD unit ground terminal (stud (M4)) *1)
[H]	LCD-mounted type control unit

*1) LCD units are not evaluation targets of the UL recognition.

8.3.2 Connecting the ground terminal of control unit used as Stand-alone type.

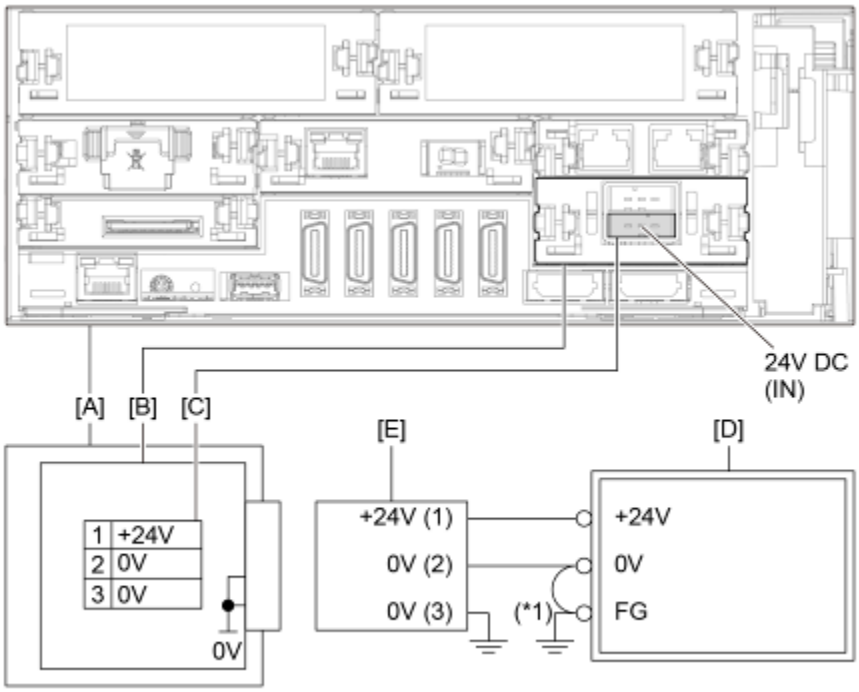
Connect the 0 V line in the control unit to the cabinet's metal plate or signal system ground bar nearby via the ground terminal (see below).



[A]	Ground wire (16 AWG or more)
[B]	Multipoint grounding
[C]	Single-point grounding
[D]	Signal ground bar
[E]	Cabinet
[F]	Signal ground terminal
[G]	Stand-alone type control unit

8.4 Connecting the Power supply of the Control Unit

Supply the power to the control unit from a DC24 Power supply unit.

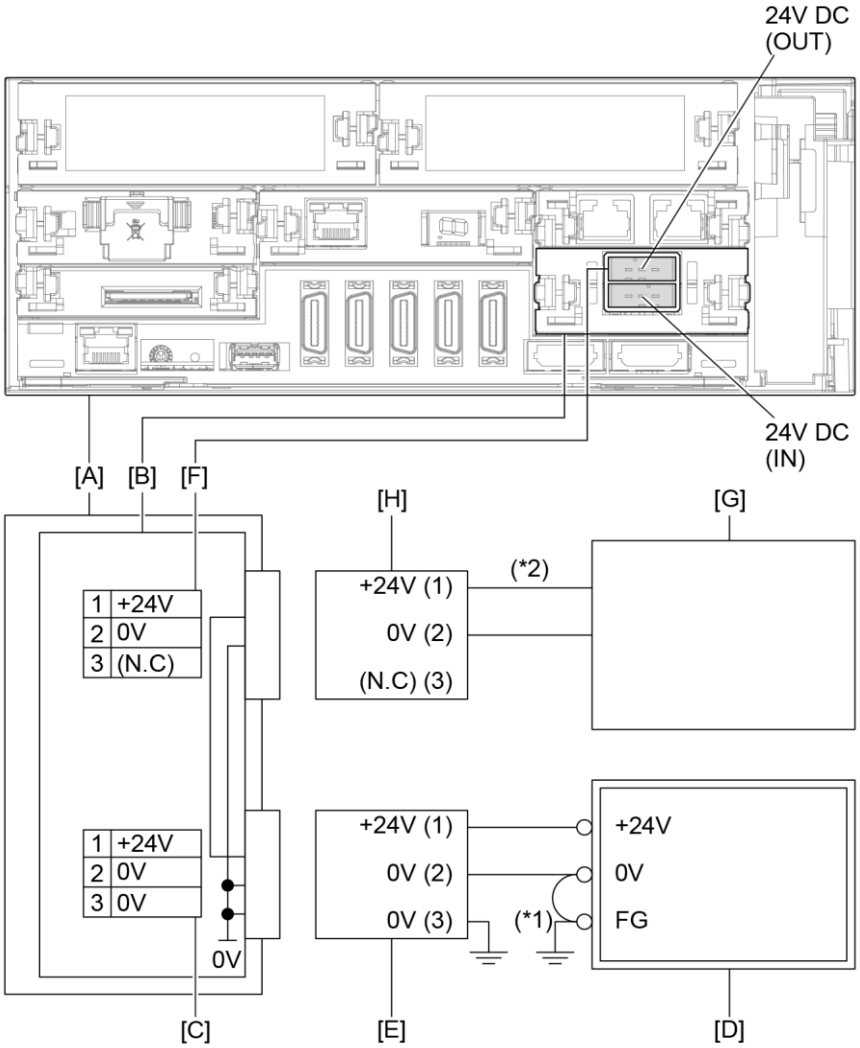


[A]	Control unit
[B]	Power suppry board
[C]	Connector for power supply input (connector number: CPD34A)
[D]	24V DC power supply
[E]	Power cable (for 24V DC power supply)

*1: Short-circuit the 0V terminal and the FG terminal of the 24V DC power supply, then earth to the frame ground (cabinet).

The 24V DC supplied from CPD34A to the control unit is output from CPD34B as shown in below and can be used to feed power to external equipment. This configuration requires a 24V DC power supply capable of supplying the total current that the control unit and external equipment consume.

The current-carrying capacity of CPD34B is 2.0 A.



[A]	Control unit
[B]	Power suppry board
[C]	Connector for power supply input (connector number: CPD34A)
[D]	24V DC power supply
[E]	Power cable (for 24V DC power supply)
[F]	Connector for power supply output (connector number: CPD34B)
[G]	External equipment
[H]	Power cable (for external equipment)

[*1]: Short-circuit the 0V terminal and the FG terminal of 24V DC power supply, then earth to the frame ground (cabinet).

[*2]: Connect the external equipment using terminals and connectors applicable to the external equipment.

8.5 Outline drawings of units

Control Unit

Name		Specifications	Panel cutout
Control unit used as Stand-alone type	0-slot model	Depends on components	Figure 1
	2-slot model	Depends on components	Figure 2

LCD Unit

Name		Specifications	Panel cutout
18.5-inch LCD Unit	485 mm × 290 mm	A02B-0370-C060	Figure 3 Figure 4

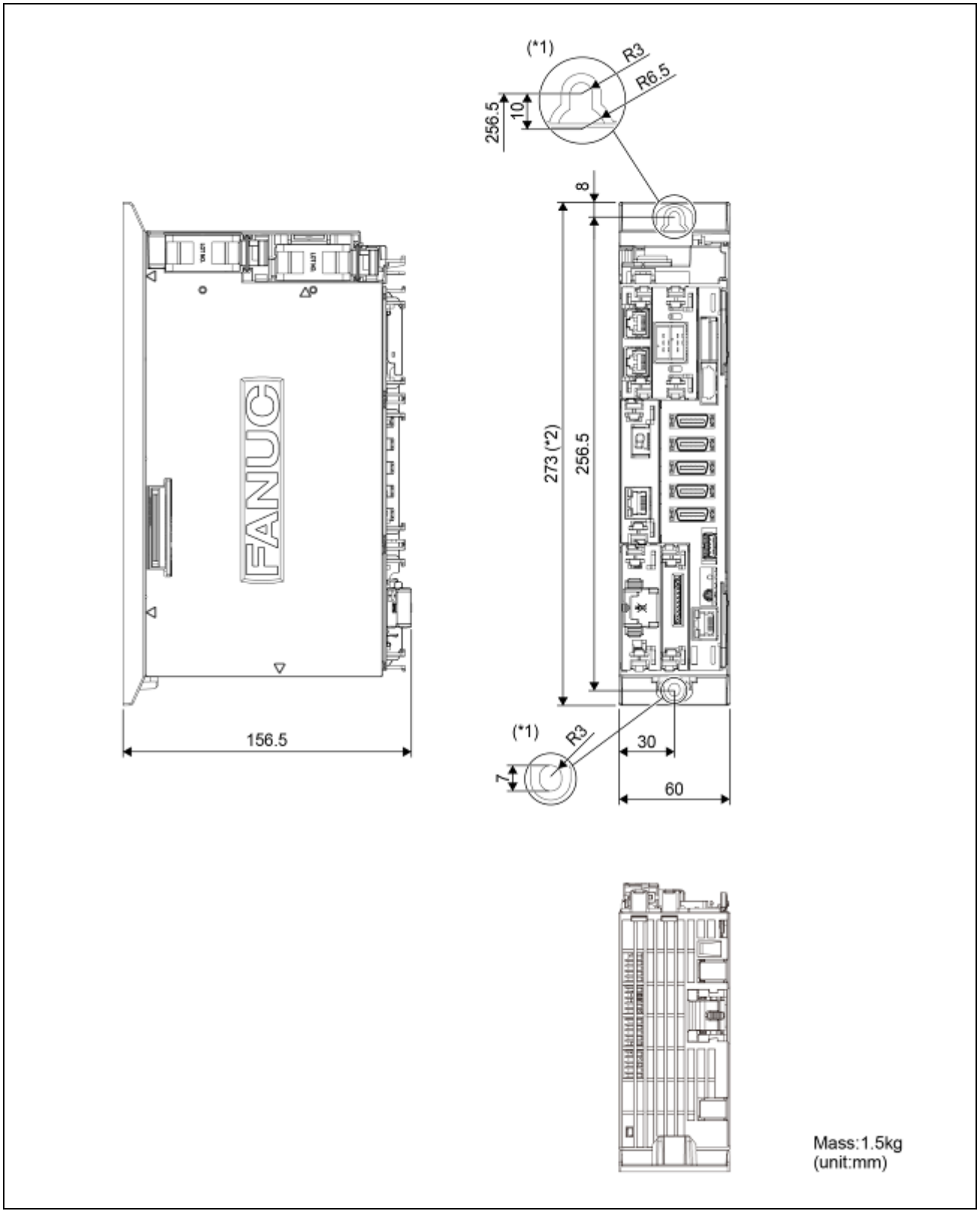


Figure 1 0-slot Model Control Unit (Stand-alone Type)

*1: Hole for fixing the cabinet (two holes)

*2: The dimensions include the bracket

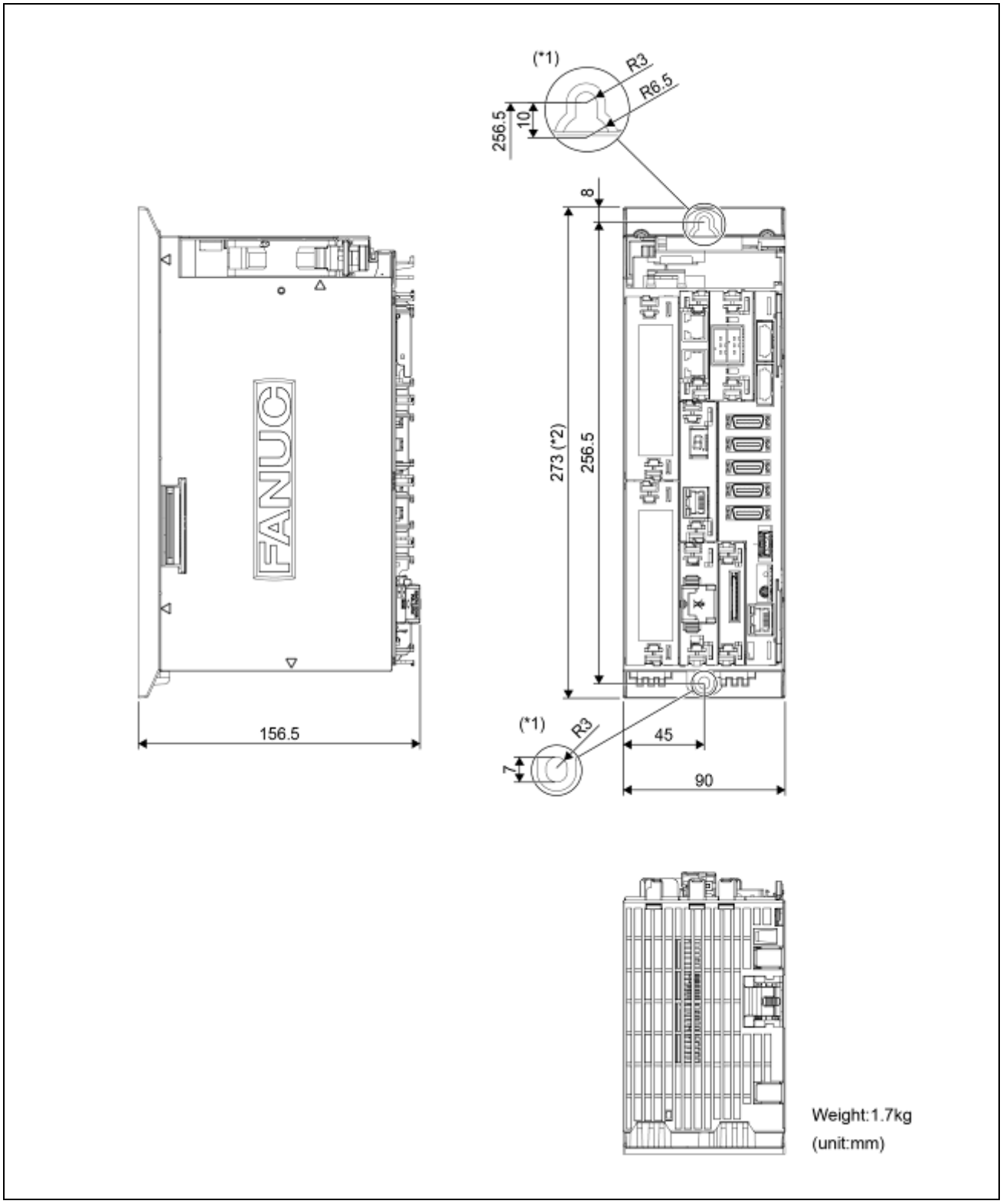


Figure 2 2-slot Model Control Unit (Stand-alone Type)

*1: Hole for fixing the cabinet (two holes)

*2: The dimensions include the bracket

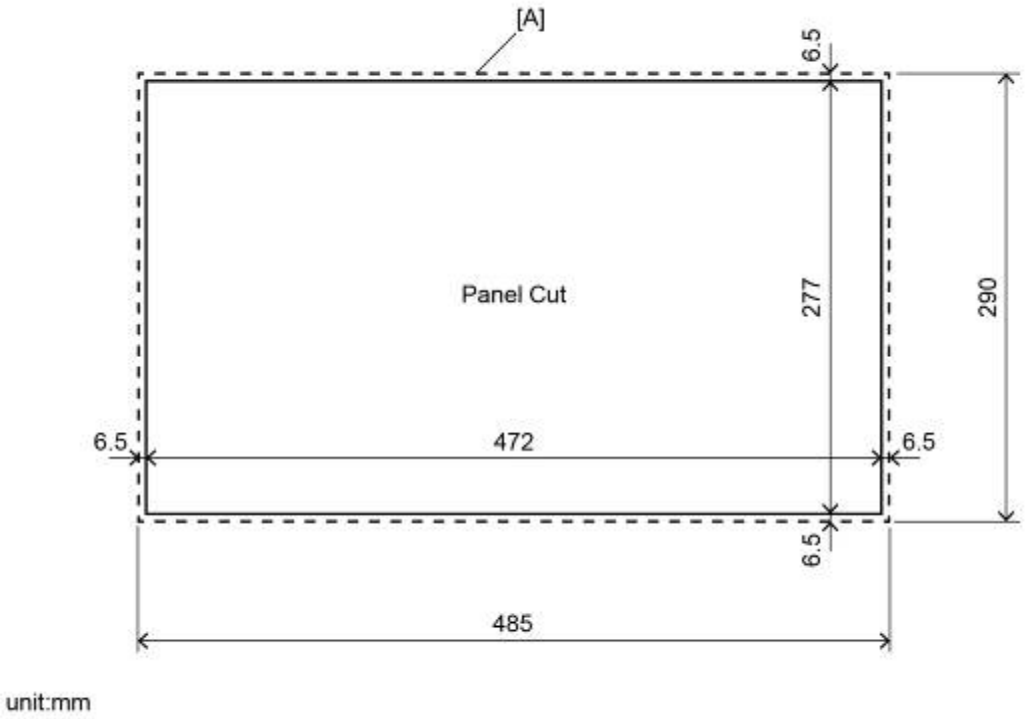


Figure 3 18.5-inch LCD unit horizontal position panel cut diagram

[A]	External dimensions of LCD unit (dashes line)

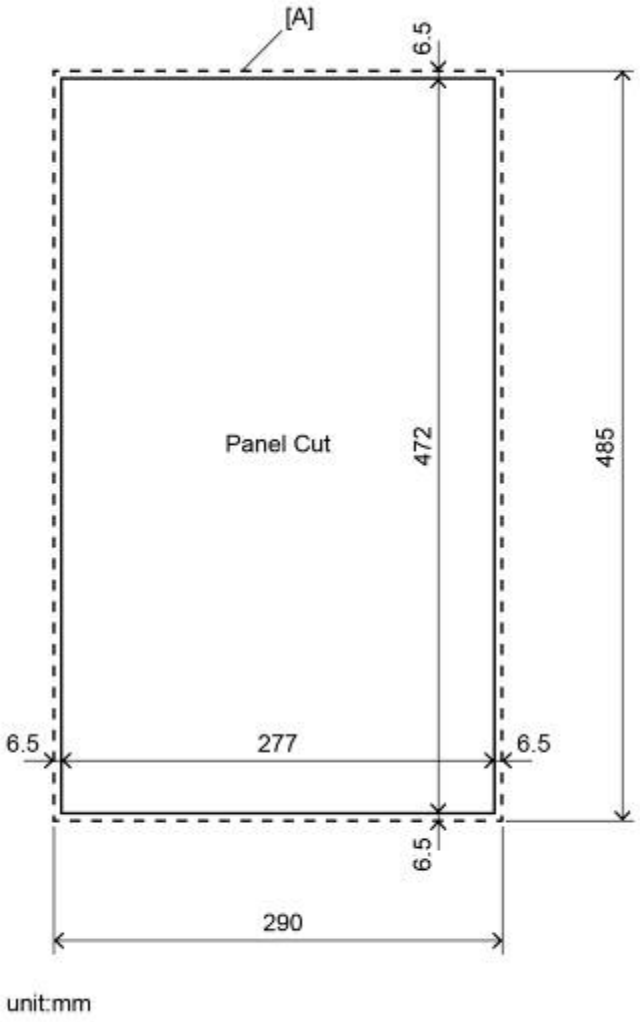


Figure 4 18.5-inch LCD unit vertical position panel cut diagram

[A]	External dimensions of LCD unit (dashes line)

9 Replacement control unit maintenance parts

The maintenance of the control unit involves various danger. It must be undertaken only by a person who is trained in the related maintenance and safety requirements. Before replacing the control unit or its components, be sure to shut off externally supplied power.

9.1 Replacement of the Fan

This section describes replacement of the fan.

⚠ CAUTION

Make sure that the fan is rotating normally, and an alarm is not generated after replacement.

Use of the unit with abnormal fan operation may lead to failures of the unit.

Type of Fan Unit and Fan

Name	Ordering specification	Note
Fan Unit (0-slot model)	A02B-0370-C100	Fan Case + 40mm fan x2
Fan Unit (2-slot model)	A02B-0370-C102	Fan Case + 60mm fan x1
40mm fan x2	A02B-0370-K120	For 0-slot model
60mm fan x1	A02B-0370-K121	For 2-slot model

Replacement procedure of the Fan

Replacement procedure of the Fan is different between LCD-mounted type and Stand-alone type.

- LCD-mounted type: Replace the Fan
- Stand-alone type: Remove the Fan Unit and replace the Fan

9.1.1 Removal/Attachment of the fan unit

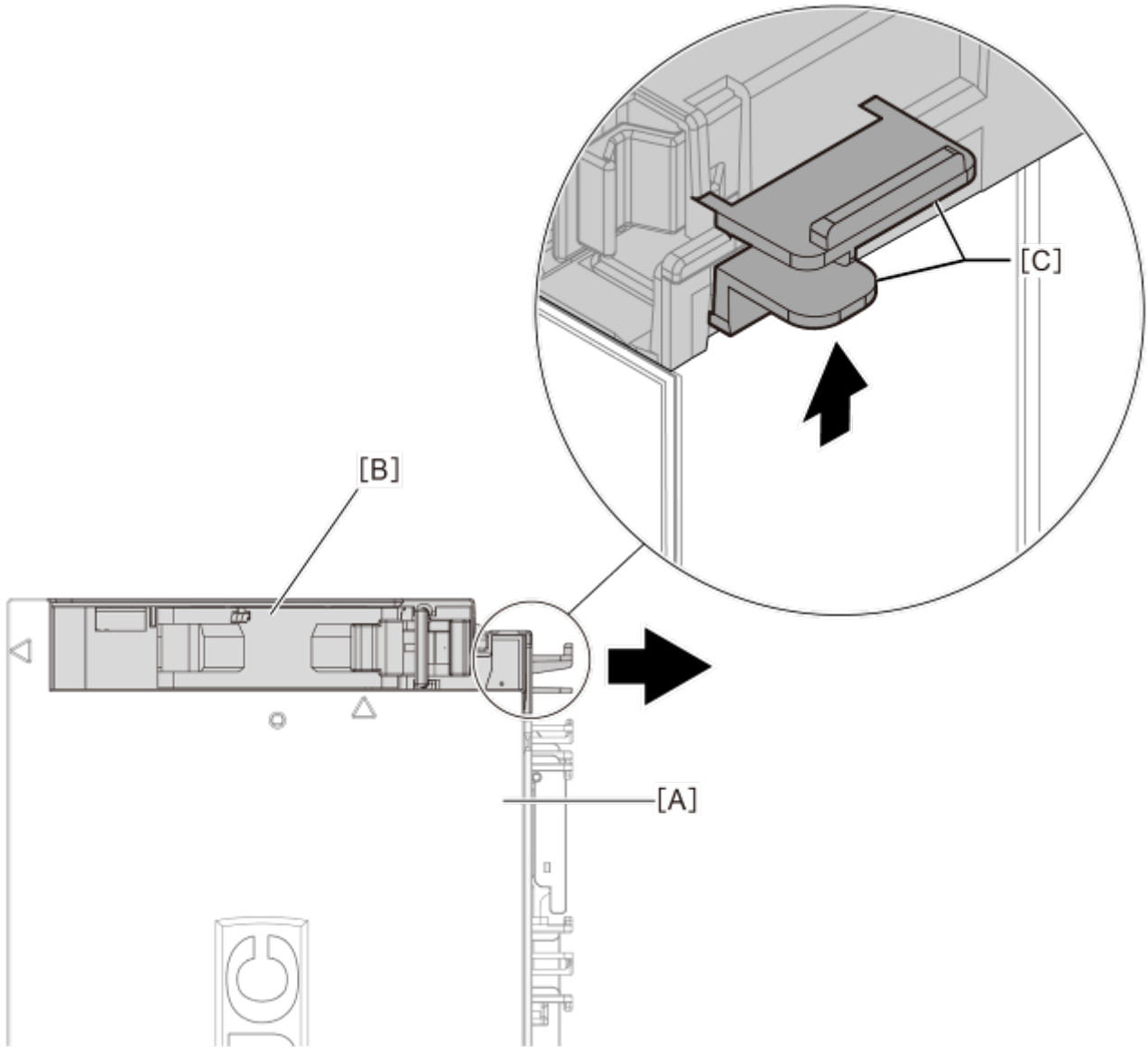
Remove/attach the fan unit of control unit as follows.

Removal procedure

(1) Shut down the applications and OS following the regular shutdown procedure.
(2) Turn off the power of control unit.
(3) Remove the fan unit from control unit.

- Hold the fan unit fixing latch ([C] in Figure) with fingertips and pull out towards the arrow

direction.

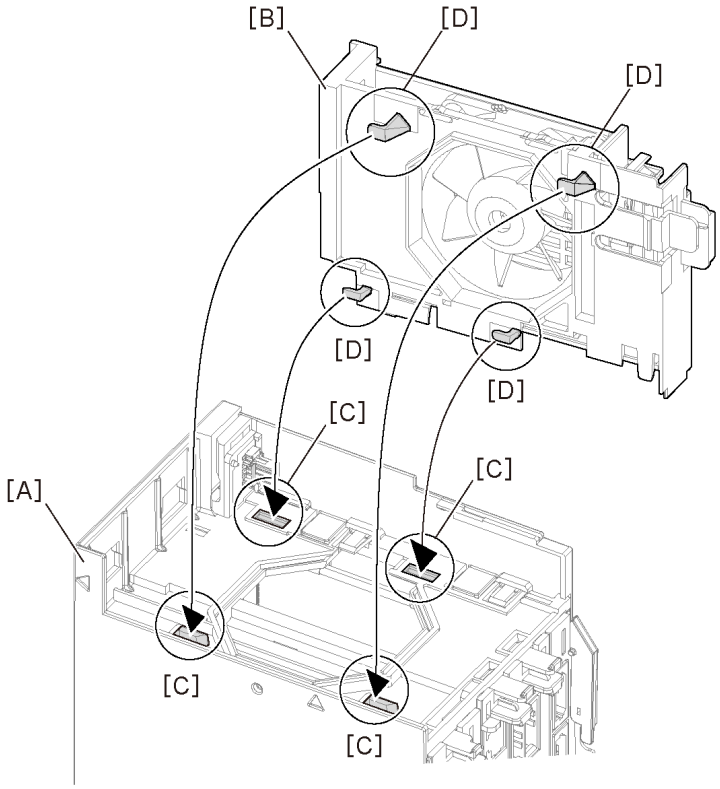


[A]	Control Unit
[B]	Fan Unit
[C]	Fan Unit fixing latch

Attachment procedure

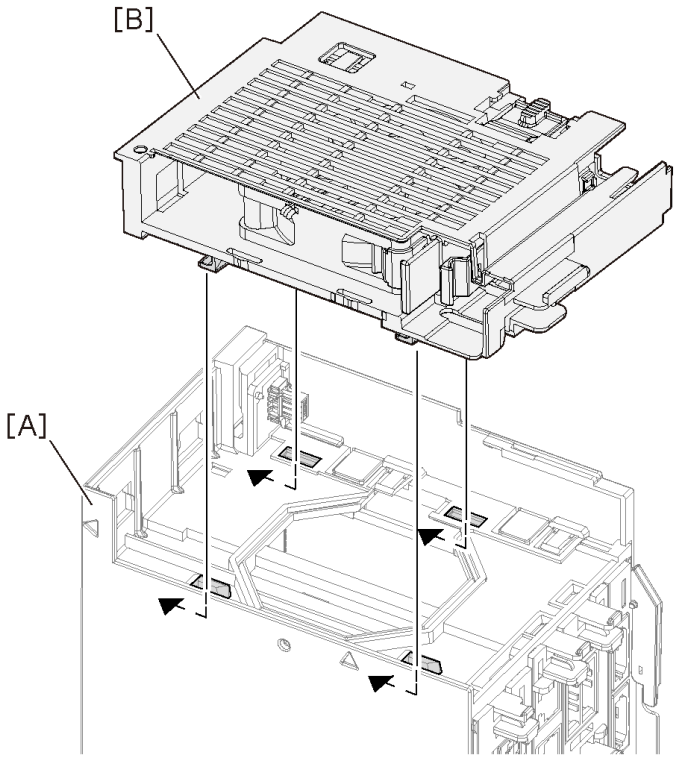
(1) Attach the fan unit to control unit.

- Position the fan unit fixing latches ([D]) to the fan unit attachment slots on control unit ([C])



[A]	Control Unit
[B]	Fan Unit
[C]	Fan unit attachment slots
[D]	Fan Unit fixing latch

- Insert the fan unit fixing latches into the fan unit attachment slots located on control unit.
- After insertion, push in the fan unit towards the arrow direction until the fixing latches make clicking sound.



[A]	Control Unit
[B]	Fan unit

(2) Confirm that the fan unit is securely fixed to control unit.

(3) Turn on the power of control unit and confirm that the fan rotates normally, and an alarm is not generated.

9.1.2 Replacement of the fan of Control Unit

This section describes how to replace the fan of control unit.

0-slot model control unit is equipped with two 40mm fan, and 2-slot model is equipped with one 60mm fan for radiation.

The replacement procedures are in common for 0-slot and 2-slot models.

In this instruction, an example of 2-slot model is shown.

Removal Procedure

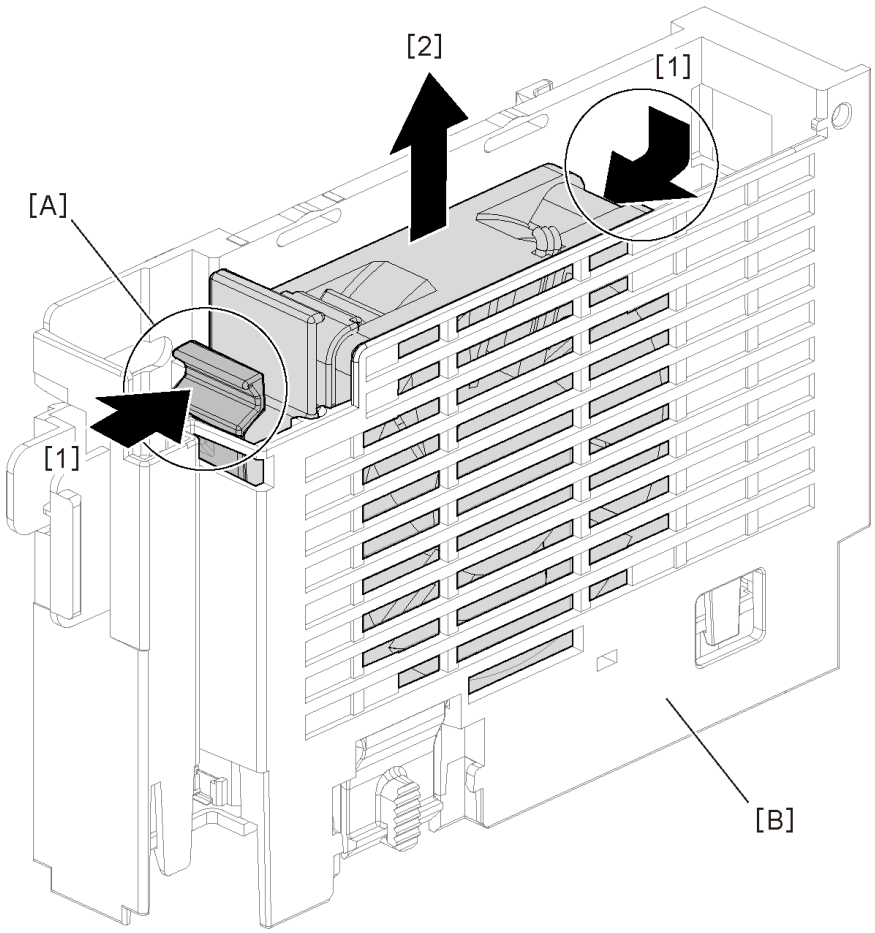
(1) Shut down the applications and OS following the regular shutdown procedure.

(2) Turn off the power of control unit.

(3) Remove the fan from Fan Case.

- Press down and hold the fan fixing latches ([A] in Figure) towards [1] direction in Figure and pull

out the fan towards [2] direction.



[A]	Fan fixing latch
[B]	Fan Case

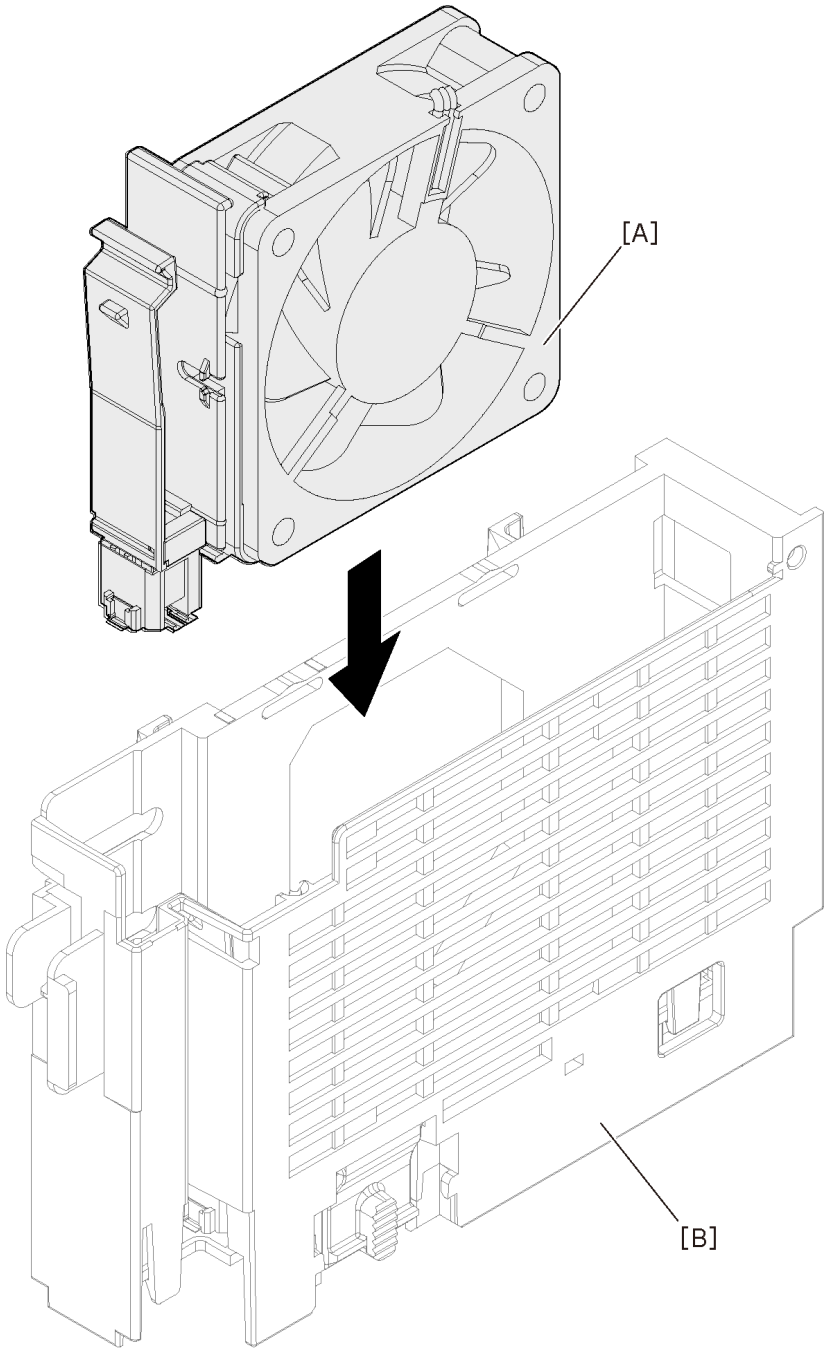
Attachment procedure

(1) Attach the fan to control unit.

- Insert the fan towards the arrow direction shown in Figure.
- Push in the fan until the fixing latch makes clicking sound.

(2) Confirm that the fan is securely fixed to Fan Case.

(3) Turn on the power of control unit and confirm that the fan rotates normally, and an alarm is not generated.



[A]	Fan
[B]	Fan Case

9.2 Replacing the battery for Real Time Clock in the control unit

Battery	Note

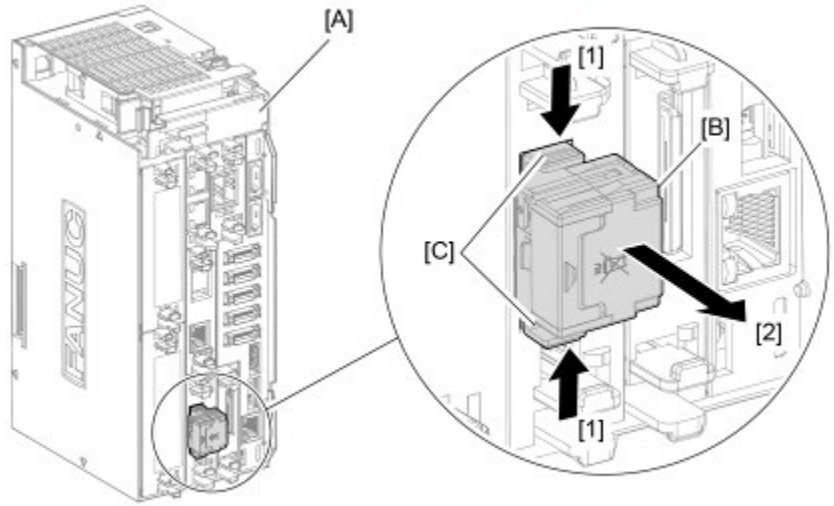
Battery	Note
Battery Box (A02B-0370-K101) Lithium Coin Battery (CR1632) (A02B-0370-K102)	Install the battery box containing lithium coin batteries directly to the control unit

9.2.1 Replacement procedure of the Lithium Battery

Removal procedure

(1) Turn on the power of the control unit and keep it for one minute or more.
(2) Terminate the application and OS according to the shutdown procedure.
(3) Turn off the power of the control unit.
(4) Remove the lithium battery from the control unit.

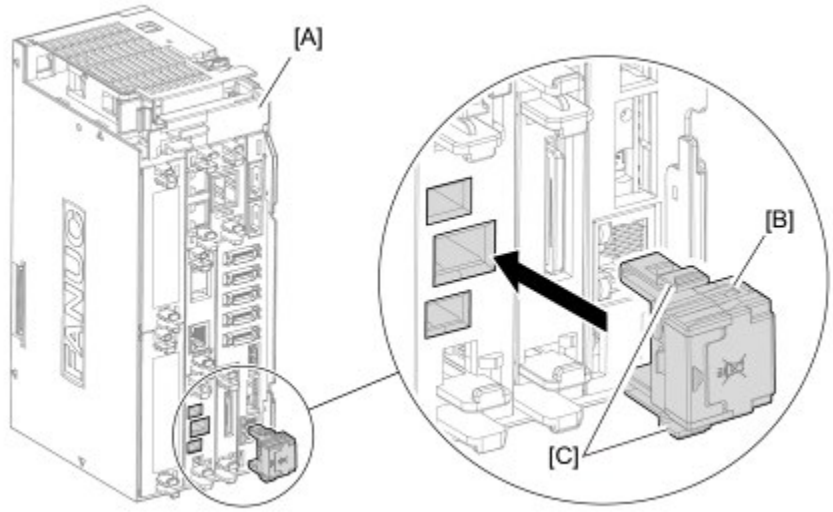
- Press and hold the latch of the lithium battery from the direction of [1], and then pull it out in the direction of [2].



[A]	Control Unit
[B]	Lithum Battery
[C]	Latch (lithium battery)

Attachment procedure

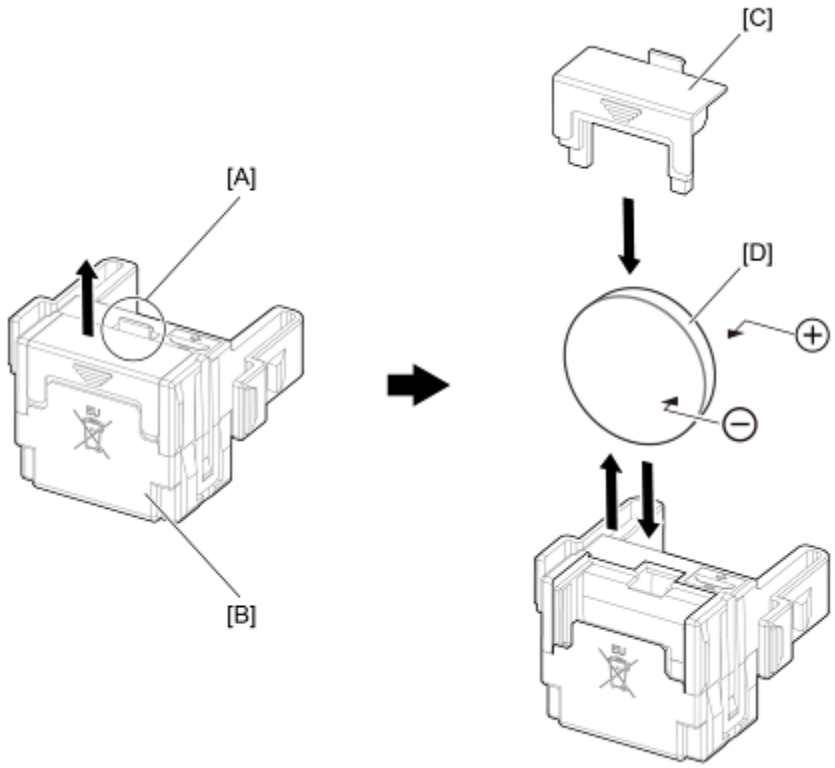
(1) Align the position of the lithium battery connector with the battery input connector of the control unit.
(2) Hold the lithium battery and insert it into the direction shown by the arrow.
(3) Push it in until the fixing part of the latch clicks.
(4) Check that the lithium battery is firmly fixed to the control unit.



[A]	Control unit
[B]	Lithium battery
[C]	Latch (lithium battery)

Removal/Attachment of a lithium battery from/to the battery box

(1) Hold the battery cover latch with your fingers, and remove the cover in the direction shown by the arrow while unlocking the latch.
(2) Remove the lithium coin battery from the battery box.
(3) Pay attention to the battery polarity so that the positive one faces the end side and put a new lithium coin battery in the box.
(4) Put the battery cover to the box by pushing it until the latch is locked.
(5) Slightly move the battery cover to check that the latch is firmly fixed.



[A]	Latch (battery cover)
[B]	Battery box
[C]	Battery cover
[D]	Lithium coin battery

9.3 Replacement Fuse

⚠ WARRING

Before replacement of a blown fuse, its cause must be corrected. So, fuse replacement work must be done only by a person who is trained in the related maintenance and safety requirements.

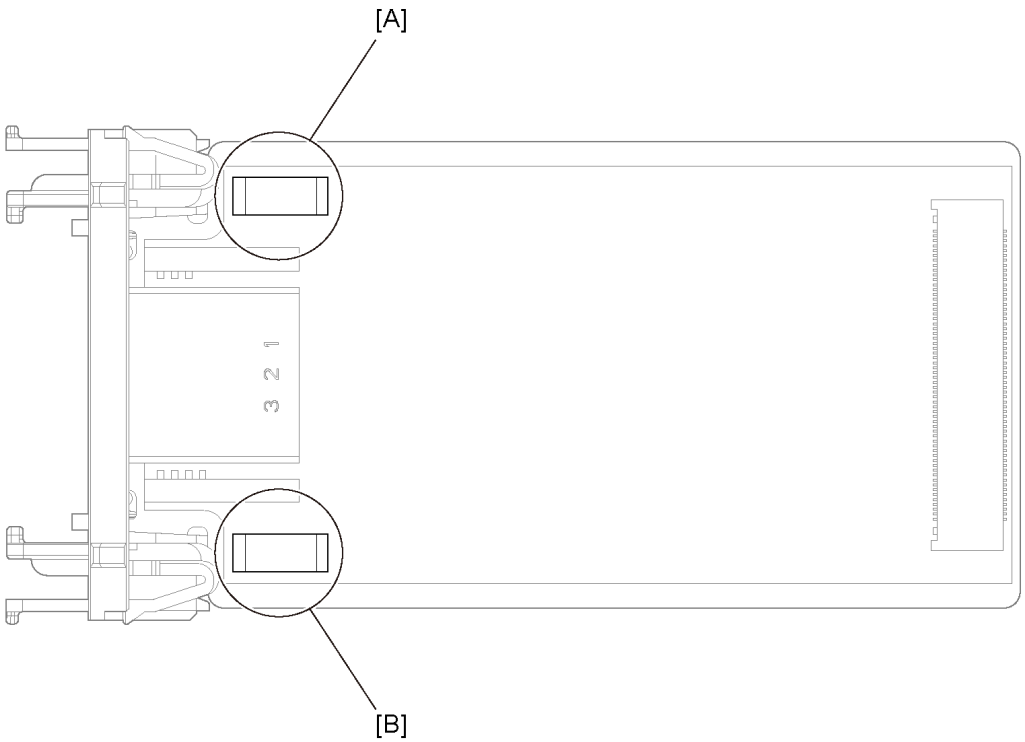
NOTE

Replace the fuse only with the specified fuse purchased from FANUC. Order number of each fuse is shown below. Also, all fuses specified by FANUC are UL/cUL certified.

9.3.1 Replacement Fuse of Power Supply Board

Type of Fuse

Two type of Fuses are mounted on Power Supply Board. Current rating of each fuse are different.



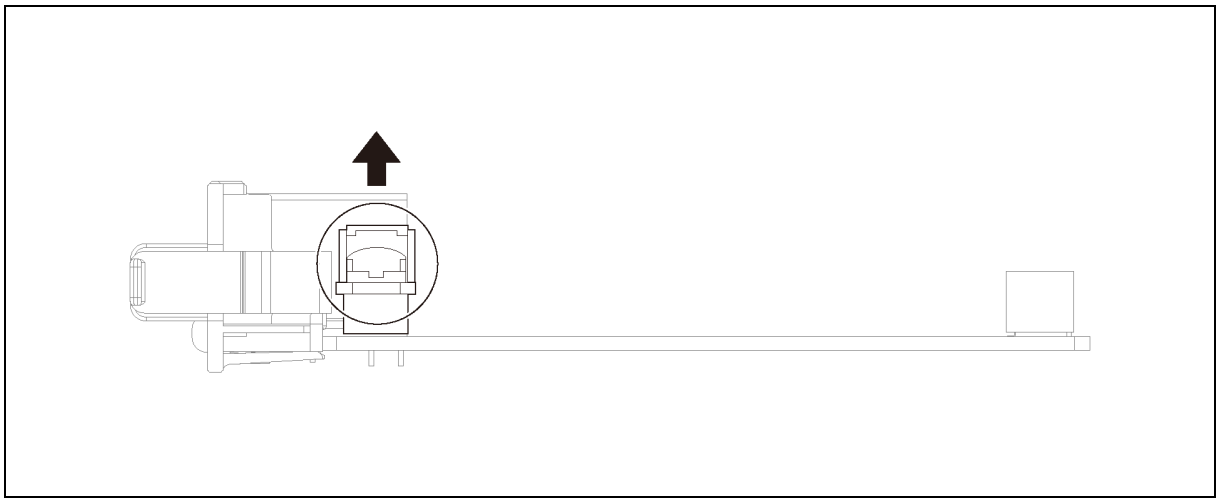
[A]	Fuse for Power supply board (6.3A)
[B]	Fuse for Power supply board (5A)

Name	Ordering specification	Note
Fuse for Power supply board (6.3A, 5A)	A02B-0370-K020	Voltage rating: 48 V AC/DC, Current rating: 6.3A Voltage rating: 48 V AC/DC, Current rating: 5A
Fuse for Power supply board (6.3A)	A02B-0370-K021	Voltage rating: 48 V AC/DC, Current rating: 6.3A
Fuse for Power supply board (5A)	A02B-0236-K100	Voltage rating: 48 V AC/DC, Current rating: 5A

Removal procedure of Fuse

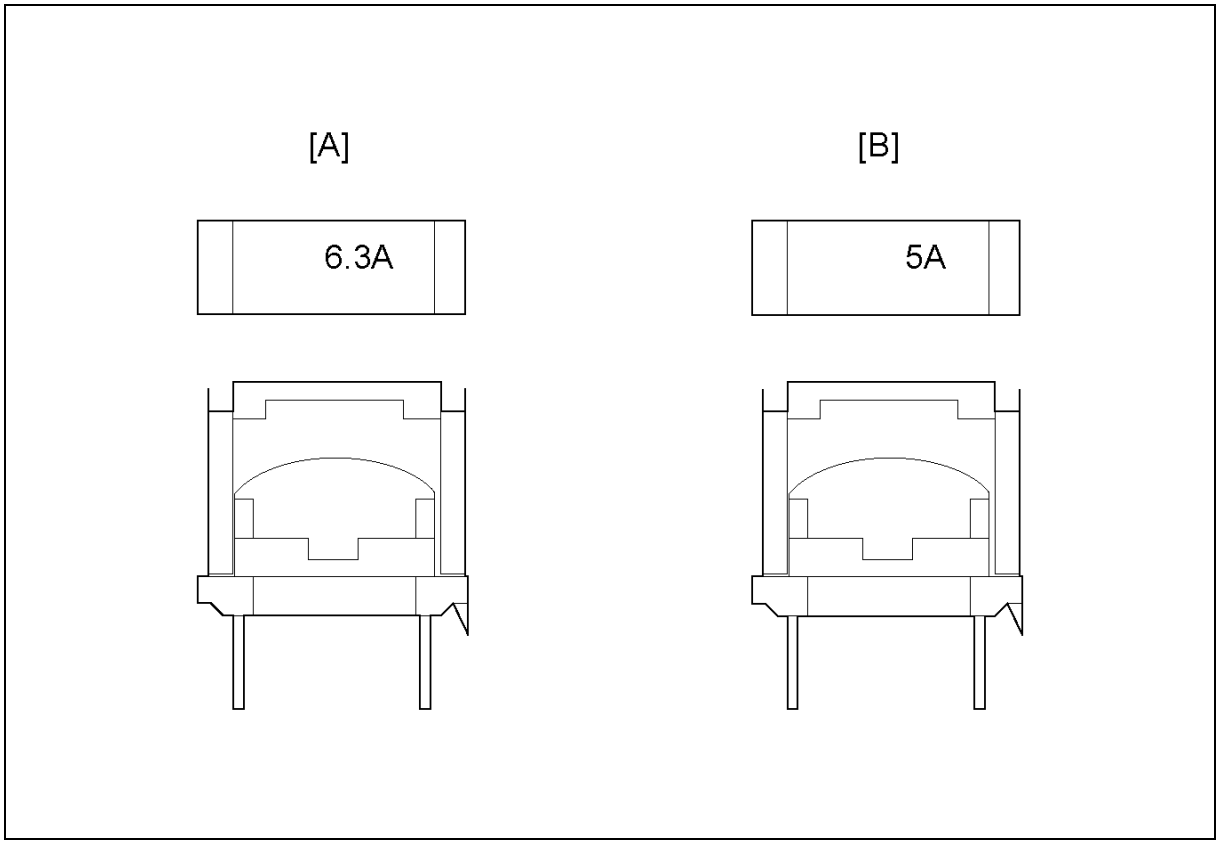
(1) Remove Power Supply Board from Control Unit.

(2) Remove Fuse towards the arrow direction shown in Figure.



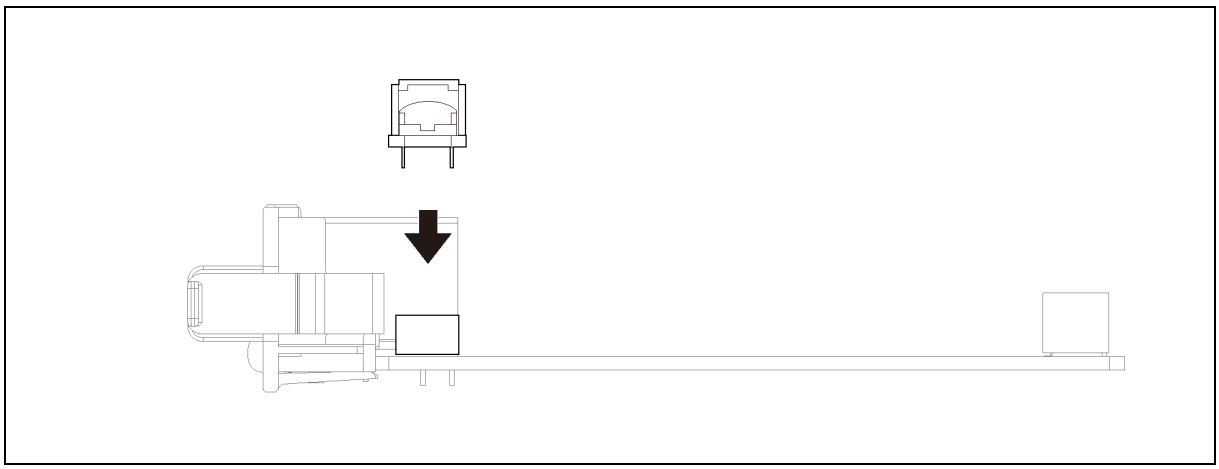
Attachment procedure of Fuse

(1) Confirm the current rating of the Fuse.

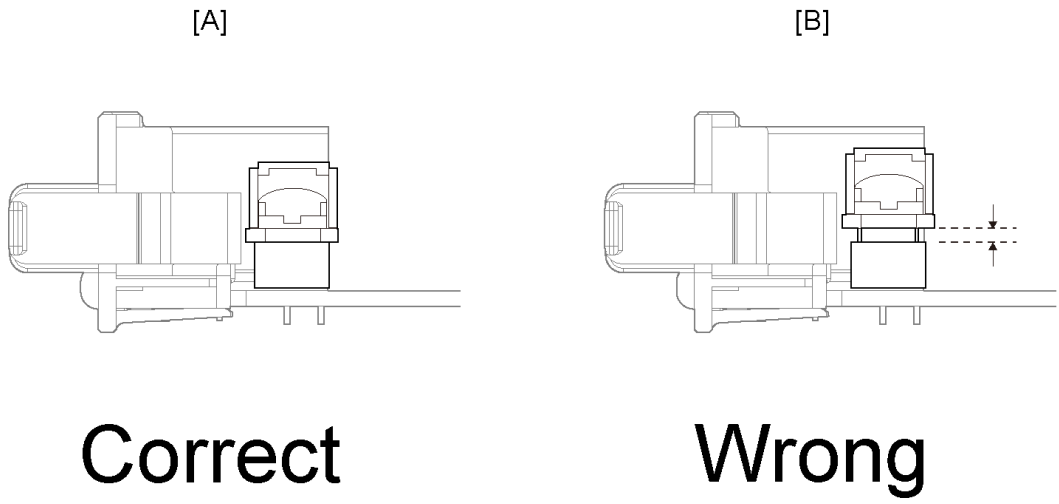


[A]	Display example of current rating of the Fuse for Power Supply Board (6.3A)
[B]	Display example of current rating of the Fuse for Power Supply Board (5A)

(2) Attach Fuse towards the arrow direction shown in Figure.



(3) Confirm that the Fuse is securely attached to Power Supply Board.



[A]	Fuse is securely attached to Power Supply Board
[B]	Fuse is not securely attached to Power Supply Board.

(4) Attach Power Supply Board to Control Unit.

10 Separate detector interface unit

10.1 Specifications

Model	Input		Output		Enclosure
	Volt	[A]	Volt	[A]	*1)
A02B-0370-C300 (Basic unit)	DC24V±10%	1.5 A *2)	DC24V±10%	1.5 A	Open Type
A02B-0370-C301 (Additional unit)	-	-	-	-	Open Type

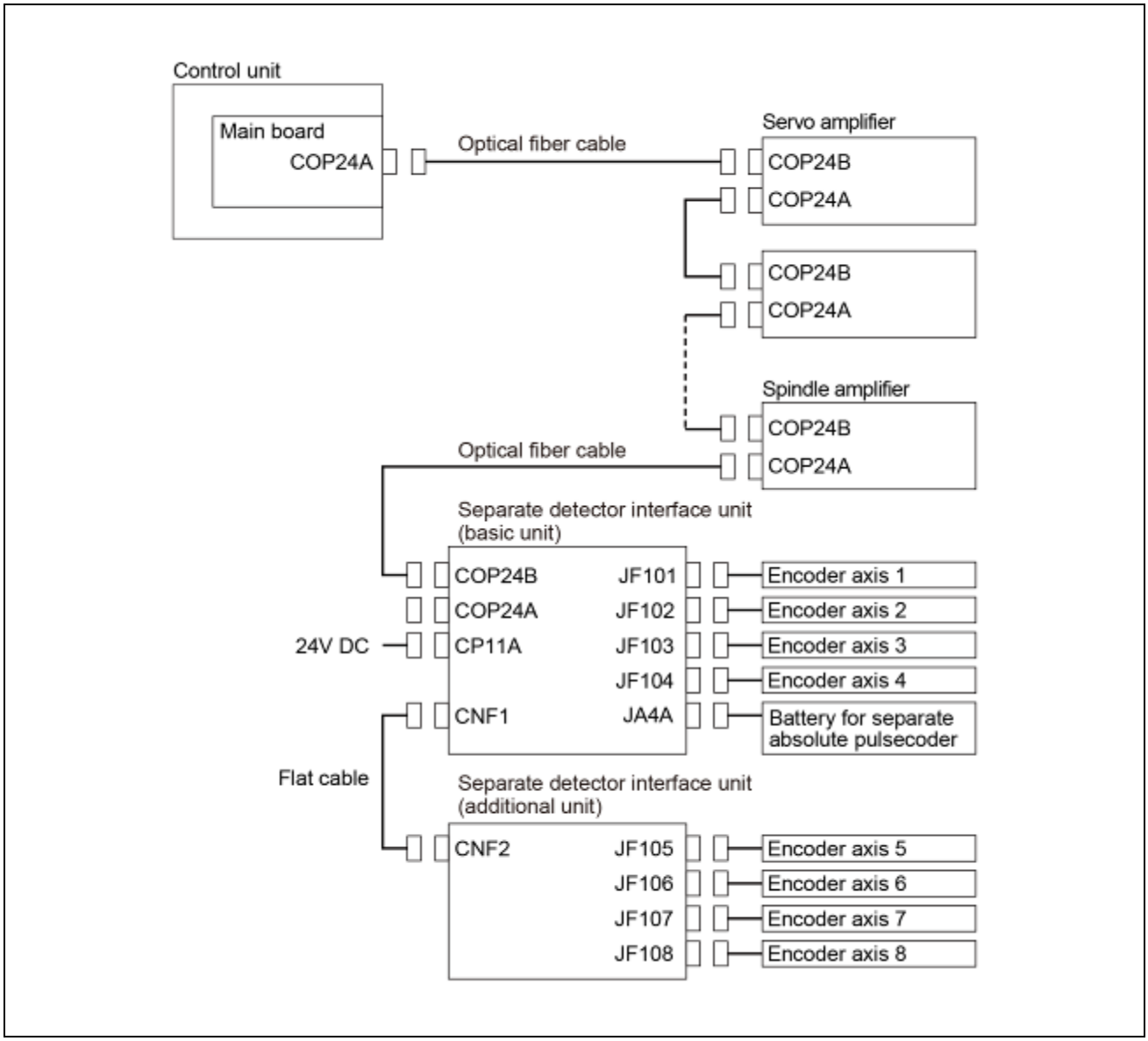
(*1. Open type is defined in the standard UL/CSA.

(*2. Including the power for A02B-0370-C301. Power for A02B-0370-C301 is supplied via A02B-0370-C300.

- Power supply unit for the equipment must have a double insulation or reinforced insulation device from AC mains supply and the output voltage must be less than DC 60 V and Limited Energy Circuit. However, input voltage to the control unit shall not exceed DC 26.4 V. (The insulation can be achieved with the use of an insulated DC power supply unit that complies with UL/CSA standard.)

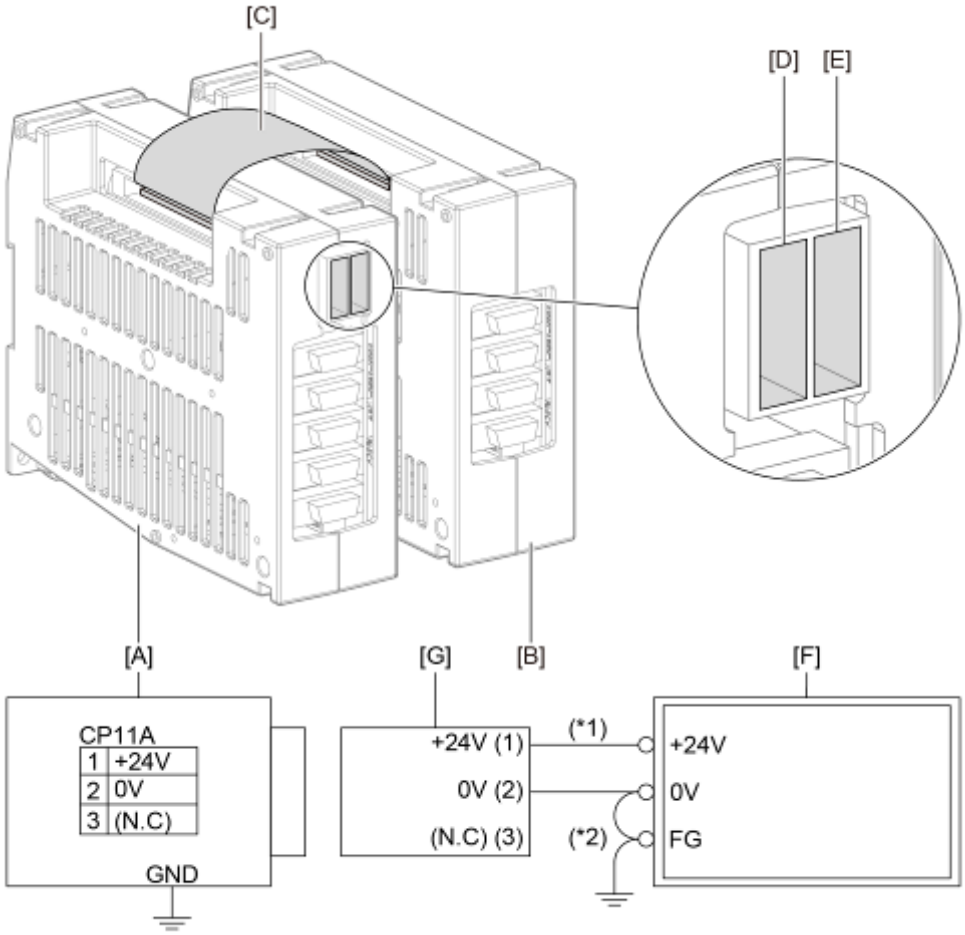
10.2 Connection diagram

The connection of the control unit to the separate detector interface units and to separate detectors is shown in figure below.



10.3 Power supply connection and grounding

The connection of the separate detector interface unit to the power supply is shown in figure below.



Part	Name
[A]	Basic unit: A02B-0370-C300
[B]	Additional unit: A02B-0370-C301
[C]	Flat cable
[D]	Connector for power supply input (connector number: CP11A)
[E]	Connector for power supply output (connector number: CP11B)
[F]	External power supply
[G]	Power cable

*1: Connect with terminals suitable for the power supply.

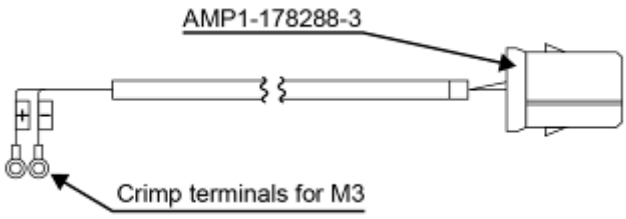
*2: Short-circuit the 0V terminal and the FG terminal of 24V DC power supply, then earth to the frame ground (cabinet).

NOTE

Do not connect anything with the pin of (N. C).

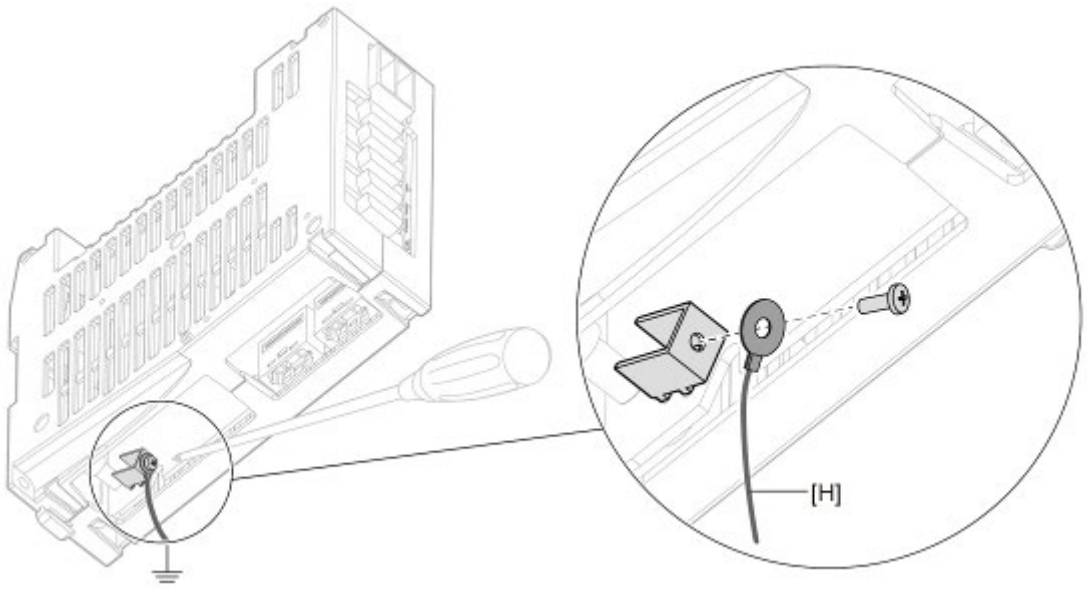
Recommended power cable specification is shown in table below.

Purpose	Ordering specification, model number	
For external power supply	Connector model number	Housing: 1-178288-3 (manufactured by Tyco Electronics) Contact: 1-175218-5 (manufactured by Tyco Electronics)
	Wire	Copper conductors 20AWG or thicker
	Recommended cable (Provided by FANUC)	A02B-0124-K830 (5m) (Crimp terminals for M3 are attached to the 24V DC power supply side)



A02B-0124-K830 outline drawing

For all separate detector interface units, fix a ground wire to the ground terminal for signals, which is located at the bottom of the unit, with an M3 screw as shown in figure below and connect one end of the ground wire to the frame ground.



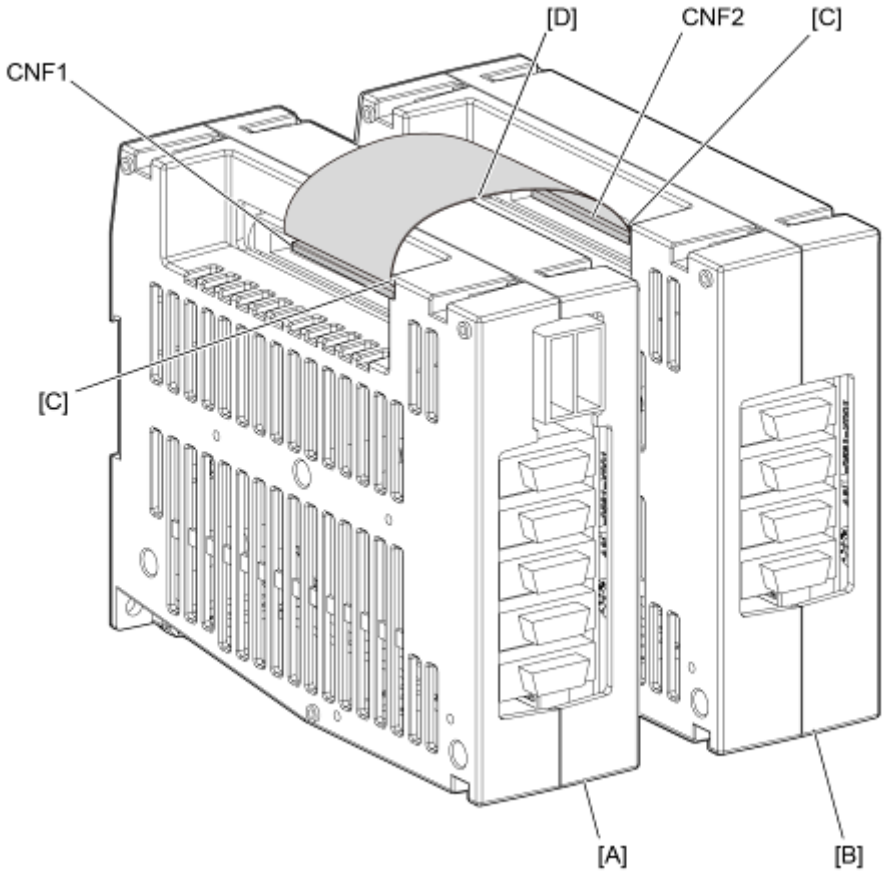
Part	Name
[H]	GND cable

NOTE

The torque with which a screw is tightened should be 0.5 N·m or less.

10.4 Connection between the basic unit and additional unit

Connect the basic unit (or analog basic unit) and additional unit using a flat cable as shown in figure below.



Part	Name
[A]	Basic unit
[B]	Additional unit
[C]	▼Mark*1
[D]	Marking*1

*1: Connect the flat cable and the connector so their markings will match.

10.5 Installing the separate detector interface unit (cabinet)

This section describes the space around the separate detector interface unit to be secured when designing the cabinet.

When positioning the separate detector interface unit in the cabinet, it is necessary to secure the space around the unit, considering airflow and cable routing.

Notes on installation

Note the following when installing the separate detector interface unit.

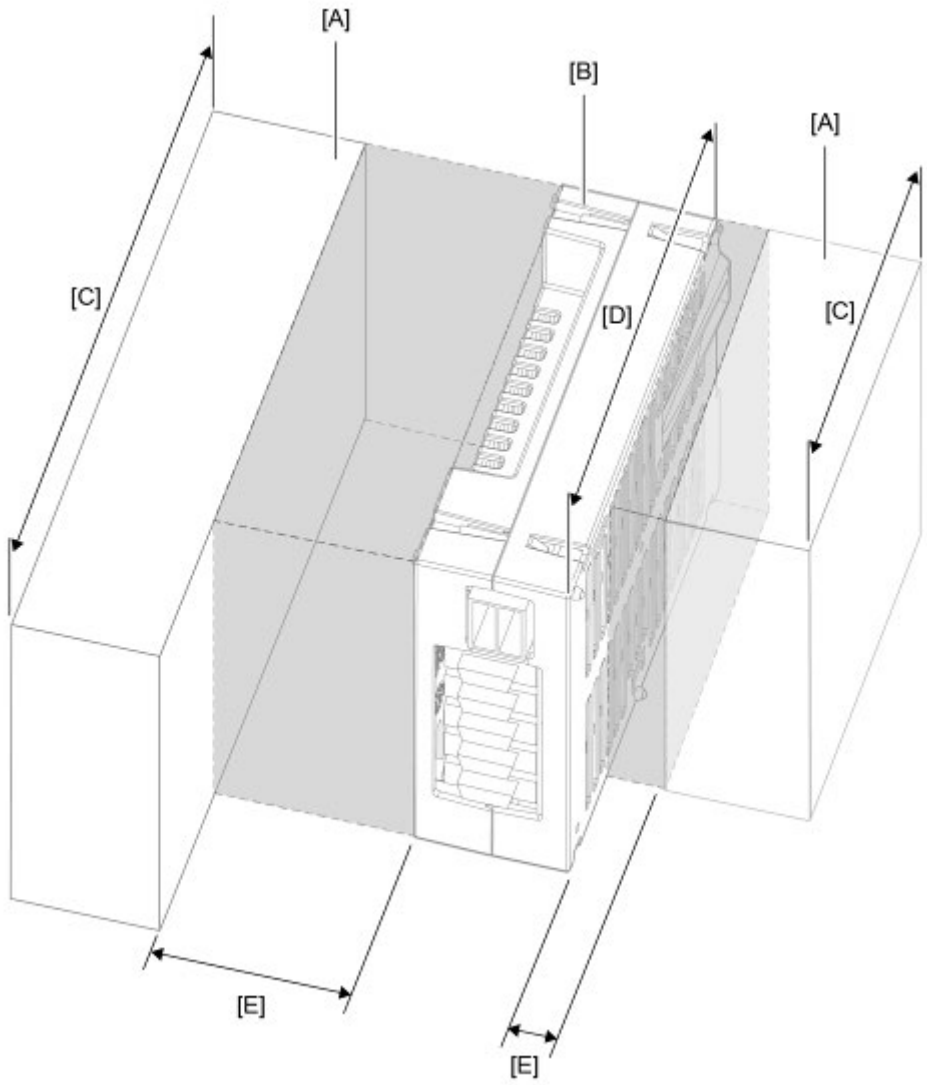
- Use the interface unit in a completely enclosed cabinet. The cabinet should basically made of metal.
- Be sure to install the interface unit on a vertical surface.
- Leave at least 100 mm of space at the top and bottom of the unit, respectively.
- Do not place any device that generates a large amount of heat below the unit.

Installation interval

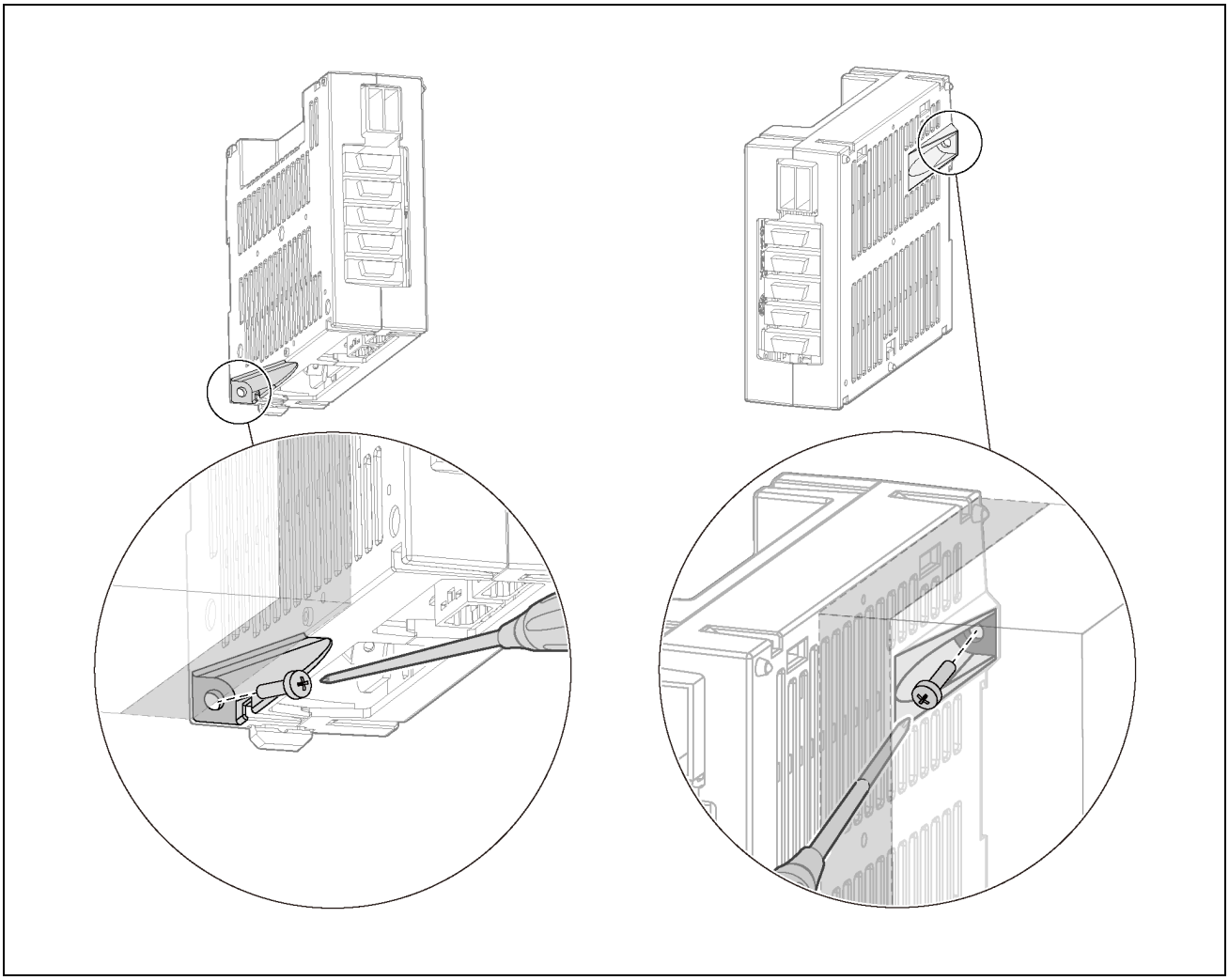
Since a screwdriver is inserted obliquely at the installation or removal of the separate detector interface unit, it is necessary to leave space on both sides of the unit for maintenance.

It is required to secure space on the sides of the unit for airflow as heat is radiated there.

As figure shows, secure the installation interval required for the separate detector interface unit and its adjacent unit.



Part	Name/Condition
[A]	Adjacent unit
[B]	Separate detector interface unit
[C]	Adjacent unit dimensions
[D]	Separate detector interface unit dimensions
[E]	Separate detector interface unit dimensions ≥ Adjacent unit dimensions: at least 20 mm Separate detector interface unit dimensions < Adjacent unit dimensions: at least 70 mm When the cabinet sides are adjacent: at least 70 mm



10.6 Installing the separate detector interface unit (DIN rail)

This section describes how to install and uninstall the separate detector interface unit on and from the DIN rail.

For the Installation interval with the adjacent unit, see”10.5 Installing the separate detector interface unit (cabinet)”.

⚠CAUTION
When installing and uninstalling the unit, hold the upper and lower ends of the unit so that stress is not applied to the side (the surface with the slits) of the unit. Holding the side of the unit (the surface with the slits) while installing or uninstalling the unit may change the shape of the slits.

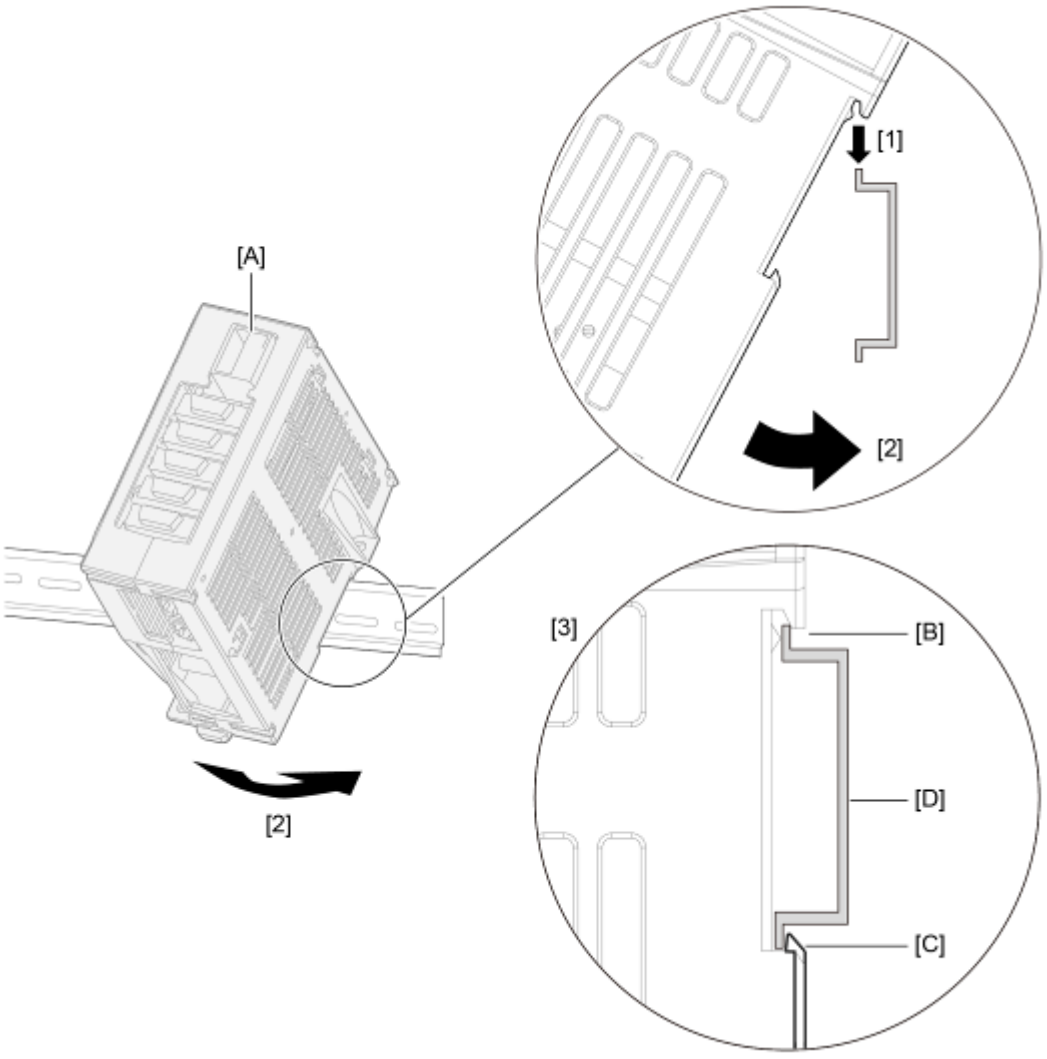
Installing the separate detector interface unit on the DIN rail

For the procedures to install the separate detector interface unit on the DIN rail, see figure below.

(1) Hook the hook part [B] of the separate detector interface unit on the top of the DIN rail as shown in [1]

(2) Using the hooked part as a fulcrum, push the bottom of the separate detector interface unit in the direction of [2] until [3] clicks and fits into the DIN rail.

(3) Move the separate detector interface unit slightly and see if it has been fixed on the DIN rail.



Part	Name

[A]	Separate detector interface unit
[B]	Hook part
[C]	Lock part
[D]	DIN rail

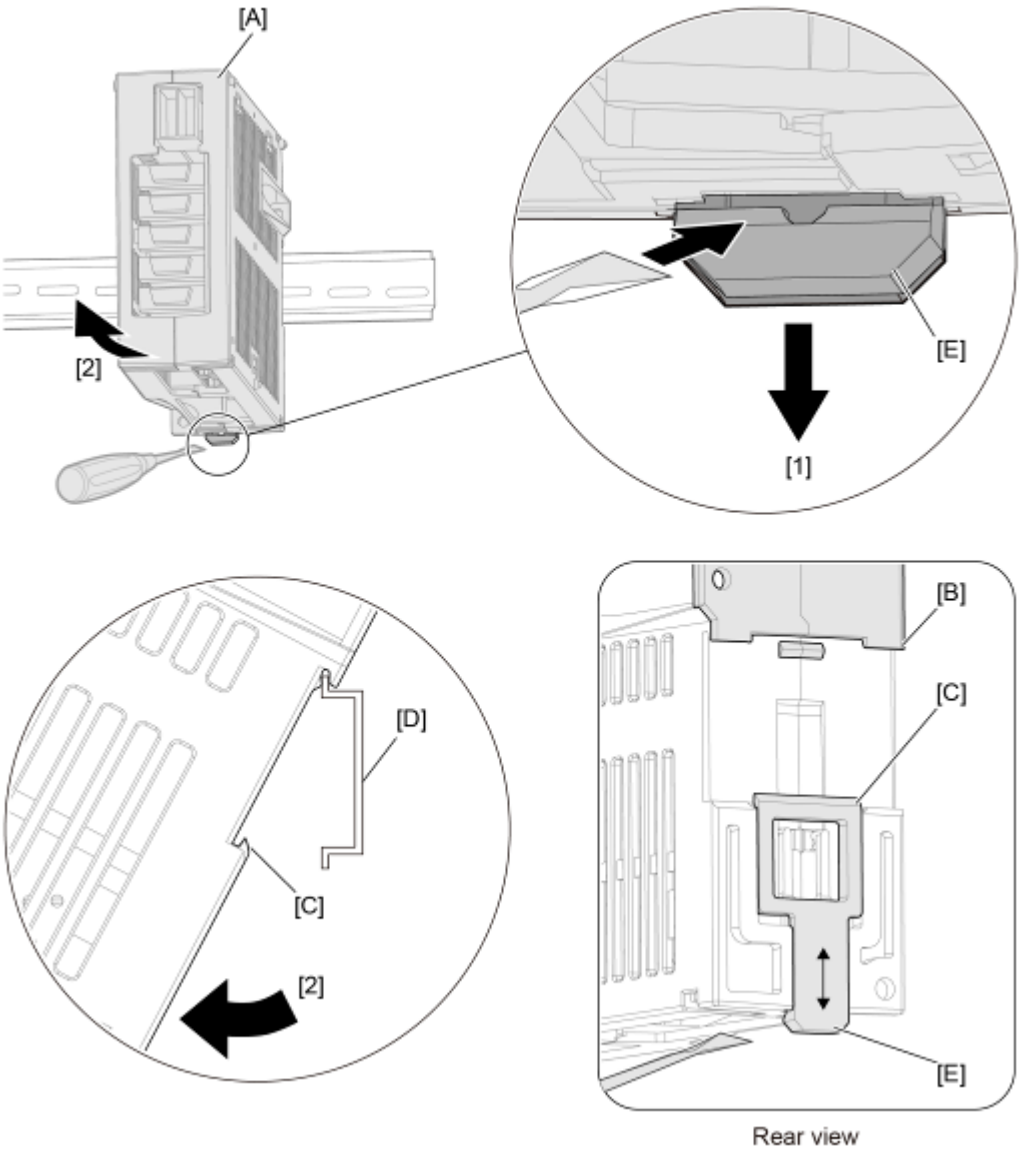
Uninstalling the separate detector interface unit from the DIN rail

For the procedures to uninstall the separate detector interface unit from the DIN rail, see figure below.

(1) Use a straight-head screwdriver and push down the unlocking part [E] at the bottom of the separate detector interface unit in the direction of [1] to unlock.

(2) With the lock released, pull the bottom part of the separate detector interface unit in the direction of [2] and remove the locking part [C] from the DIN rail.

(3) Remove the hook part [B] of the separate detector interface unit from the DIN rail.



Part	Name
[A]	Separate detector interface unit
[B]	Hook part
[C]	Lock part
[D]	DIN rail
[E]	Unlocking part

CAUTION
• When releasing the lock, be careful not to apply excessive force to the driver, etc. Applying excessive force may damage the unlocking and locking parts. • Do not remove the separate detector interface unit from the DIN rail with the lock not released. That may damage the separate detector interface unit.

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