M0011452

SANMOTION

MOTION CONTROLLER

C

SMC263X, SMC265X

CPU Module

Hardware Manual

SANYO DENKI

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1. Introduction

1.1. Purpose of the document

This document describes the structure of the CPU module (SMC263X, SMC265X).

Additionally, the installation and configuration is described enough to obtain an operationally ready module. "Ready for operation" means that the assembly is ready for the synchronization of the firmware and the application.

Information

This manual is not addressed to end costumers! Necessary safety notes for the end costumer have to be taken into the costumer manual in the respective national language by the machine builders and system providers.

1.2. Preconditions

This document contains information for persons with the following skills:

Target group	Knowledge and skills pre-requirement
Project engineer	Basic technical training (University of Applied Science/University level, engineering degree or corresponding professional experience). Knowledge in: ● working mode of a PLC, ● current valid safety regulations, ● the application.
Electrician	Specialized training in the electro-technical field (in accordance with industrial training guidelines). Knowledge in: ● current valid safety regulations, ● wiring guidelines, ● circuit diagrams, ● correct installation of electrical connections according to national and international regulations.

Target group	Knowledge and skills pre-requirement
Start-up technician	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: ● current valid safety regulations, ● working mode of machine or plant, ● principal functions of the application, ● system analysis and troubleshooting, ● setting options at the operating installations.
Service technician	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: ● working mode of a PLC, ● current valid safety regulations, ● working mode of machine or plant, ● diagnosis possibilities, ● systematic error analysis and rectification.

1.3. Intended use

The CPU module was developed for control applications in industrial machines. The typical applications areas include injection molding machines, robots, presses, machine tools and similar.

The CPU module may only be used for the types of use described in the technical descriptions and in compliance with described technical general conditions. The CPU module may only be used in conjunction with recommended/approved third-party equipment/installations.

The CPU module has been developed, manufactured, tested and documented in accordance with the appropriate guidelines and standards. Therefore, the products do not pose any danger to the health of persons or a risk of damage to other property or equipment under normal circumstances, provided that the instructions and safety precautions are properly observed.

1.4. Notes on this document

This manual is integral part of the product. It is to be retained over the entire life cycle of the product and should be forwarded to any subsequent owners or users of the product.

1.4.1. Contents of the document

- Description of the module
- Mounting and installation instructions
- Description of interfaces including EMC guidelines

- Configuration
- Operating behavior
- Diagnostics functions
- Maintenance instructions
- Technical data

1.4.2. Not contained in this document

- Programming instruction
- Mounting and installation instructions
- Description of interfaces including EMC guidelines

1.5. Documentation for further reading

The following documents are to be observed depending on the system solution used:

Doc.No.	Name	Target group
M0011510	System manual	● Project engineer ● Electrician ● Programmer ● Commissioning foreman ● Service technician

1.6. EtherCAT declaration

EtherCAT® is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany .

2. Safety notes

2.1. Representation

At various points in this manual you will see notes and precautionary warnings regarding possible hazards. The symbols used have the following meaning:



DANGER!

- indicates an imminently hazardous situation which will result in death or serious bodily injury if the corresponding precautions are not taken.



WARNING!

- indicates a potentially hazardous situation which can result in death or serious bodily injury if the corresponding precautions are not taken.



CAUTION!

- means that if the corresponding safety measures are not taken, a potentially hazardous situation can occur that may result in property injury or slight bodily injury.

CAUTION

- CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in damage to property.



EDS

- This symbol reminds you of the possible consequences of touching electrostatically sensitive components.

Information

Useful practical tips and information on the use of equipment are identified by the "Information" symbol. They do not contain any information that warns about potentially dangerous or harmful functions.

2.2. General safety instructions

WARNING!

- It is absolutely essential that you also observe the safety instructions in the system manual for your automation system.
- The following areas of application are expressly excluded for the CPU module:
  - Use in areas where there is a risk of explosion or fire
  - Use in the mining sector
  - Use in the open air
  - Use in wet rooms or rooms with the risk of splashing water
  - Use in environments with heavily polluted air
  - Use in environments with harmful solutions,steams or radiations
  - Use in non-stationary applications
- Other products are to be used for these applications!
- The CPU module is not designed for safety-relevant control tasks (e.g.: shutdown in case of an emergency). For safety-relevant control tasks and personnel security, additional external safety measures must be implemented to ensure the system remains in a safe operating condition even in the event of a fault.
- At the development of the CPU module the standard EN ISO 13849-1 was not considered.
- The module is defined as "open type equipment" (UL 508) or as "open equipment" (EN 61131-2) and must therefore be installed in a control cabinet.

CAUTION

Improper use of the assembly or the control system leads to irreparable damage!

- Turn off the power supply before inserting or removing the module. Other- wise, the module can be destroyed or undefined signal states can lead to damage of the control system.

2.3. Safety instructions for personal safety

WARNING!

Danger of personal injury due to electric shock!

- Supply the device exclusively from power sources that have an extra low voltage (e.g. SELV or PELV according to EN 61131-2)
- When using a SELV power source it can become PELV by reason of the module construction and the connectors (grounding!).
- Protective low voltage circuits must always be installed safely insulated separated from circuits with dangerous voltage.

CAUTION!

Fire hazard during module failure!

- Provide suitable fuses for the 24 V DC power supply of the control system for the final application! (for details, refer to the Power supply section).

2.4. Safety instructions for device maintenance

WARNING!

- If this device is damaged, the device must be taken out of commission and repaired or replaced by qualified personnel.
- The device must only be opened by qualified personnel and only maintenance activities expressly approved by SANYO DENKI may be performed (see chapter “maintenance”). Any other manipulations to the device will result in loss of warranty.

Cautions on storage!

Please do not store to the next environment. There is a possibility that the shutdown or malfunction.

- Environment exposed to direct sunlight.
- Environment where the ambient temperature and relative humidity exceeds the range of specification values.
- Environment such as humidity change that causes condensation.
- Corrosive gas, a flammable gas environment.
- Environment Where dust, salt, iron powder is often.
- Environment Where the water and oil, the splash of chemicals such.
- Environment where direct vibration or shock is applied to the CPU module.

3. Description of the module

The CPU module is an intelligent master module designed for a performance within the automation system.

3.1. Front view

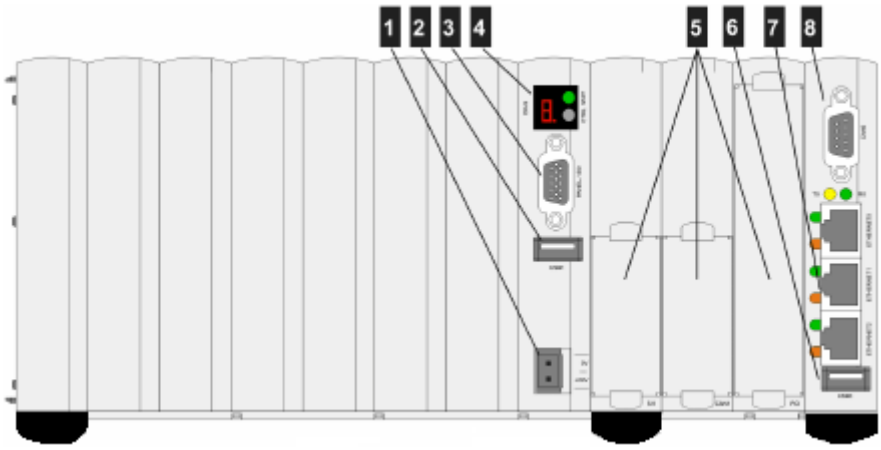


Fig.3-1: SMC263X,SMC265X Front view

1	...	Power input	2	...	USB port (USB1)
3	...	Unused(for maintenance)	4	...	Diagnosis display
5	...	slots for option modules	6	...	USB port (USB0)
7	...	Ethernet interfaces	8	...	CAN interface

3.2. Compact Flash slot（CF slot）

To operate a Compact Flash card with the respective firmware and the application must be plugged into the Compact Flash slot of the CPU module.

Depending on the application used the Compact Flash card can also be used for storing machine data (e.g. mold data or part data).

CAUTION

Use only Compact Flash cards which are recommended by SANYO DENKI. Other Compact Flash cards will not guarantee the correct functionality.

CAUTION

The Compact Flash Card cannot be used as removable medium since it also has system programs stored on it.

3.2.1. Precautions when using the CF card

CAUTION

Improper insertion can cause damage to the contact pins.

Do not use force when inserting the Compact Flash card into the slot. It is constructed so that it can only be inserted in one direction and it should slide into the slot easily with little force.

The card:

- should be kept away from moisture, heat and direct sunlight,
- should be protected against static electricity,
- should not be dropped or bent.
- should not be removed or the device switched off while the card is being written to.

3.2.2. Inserting the Compact Flash card

1) Turn off the power.

2) CF slot is located on the right side on top of the CPU module.

3) Insert the Compact Flash card into the slot (see drawing).

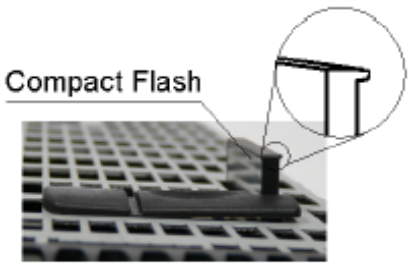


Fig.3-2: Inserting the CF card (Top of the CPU module :CF card slot)

3.2.3. Removing the Compact Flash card

1) Turn off the power.

2) Press the eject button (1, see drawing).

3) Remove the Compact Flash card (2).

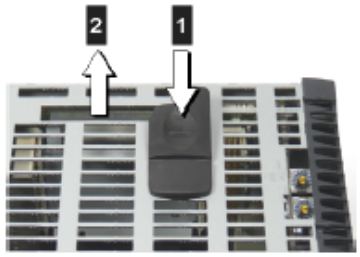


Fig.3-3: Removing the CF card (Top of the CPU module:CF card slot)

3.3. Accessories

3.3.1. Compact Flash card

Operation by the CF cards that are sold in the market is not guaranteed.

The recommended Compact Flash cards may be requested and ordered from SANYO DENKI.

3.3.2. Connector strip

The power supply connector of SMC263X and SMC265X, following the female connector can be used. The technical data for the terminals are contained in the technical data sheet of the manufacturer of the connectors.

The appropriate female connectors are not included in the delivery of SANYO DENKI, but can be purchased from SANYO DENKI.

Phoenix Contact Inc. of COMBICON plugs, are available as options.

SANYO DENKI order No.	Number	Phoenix Contact parts No.
AL-00591171-01	1	MSTB 2.5/2-ST-5.08

4. Displays and Control button

4.1. Diagnostic display (DIAG)

A single-digit 7-segment display on the front side of the CPU modules indicates the start-up and operating modes.

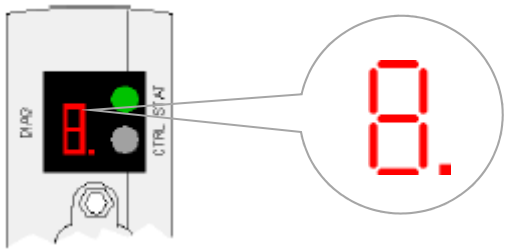


Fig.4-1: Diagnosis display (7-segment display) and CTRL button and status LED,

The following applies in general for the 7-segment display (on CPU-modules):

- Numbers >0 during the start-up denote the progress
- Different characters (e.g. ☐, II, ...) or capital letters denote the operating status after start-up
- The decimal point serves as load display. A flashing decimal point signals that the CPU's load capacity is not fully exhausted.
- Errors are displayed parallel to the states.
- Errors are always signaled by a switching-through the status and a doubleor triple-digit error/info sequence (e.g. "-,0,-,E,1,0"). Every character is displayed for 1 second.

For further information see chapter "Diagnosis".

4.2. Status LEDs

The multi-colored status LED on the CPU module is located above the control button (CTRL).

Display	Significance
Dark	No supply voltage
Flashing orange	Initialization phase
Lighting green	Operation
Flashing red	Error on module (e.g. overload, line interruption, etc.)
Lighting red	Fatal module error – the module is out of operation.

4.3. Control button (CTRL)

The CTRL button is located next to the 7-segment-display on the right and serves as simple operating element on the module. With this button the CPU module can be switched into different operating modes and/or different commands can be issued.

- Distinction is made between short (< 0.5 s), long (> 0.5 s, <10 s) and very long button operations (>10 s).
- Short button strokes allow the user to switch and selected between the individual commands, while these commands are displayed by flashing in the 7-segment display. Once the initial status has been reached again this will be indicated normally again.
- Long button strokes are used to execute a command and to change into the new status.
- If the CTRL button is held pressed longer than 10 seconds, a hardware reset of the module is triggered.

During start-up (including step "3" indicated at the diagnosis display) this button has no function.

4.4. CAN Status LEDs

The module has two CAN Status LEDs (RX- and TX-LEDs) per CAN interface, which are activated from the Microcontroller.

Display	Significance
RX-LED (green)	Flash briefly when receiving a CAN-message.
TX-LED (yellow)	Flash briefly when transmitting a CAN-message.

4.5. Ethernet Status LEDs

The Ethernet-socket (RJ-45) offers a Link-Status-LED and an Activity-LED.

Display	Significance
1Link-Status-LED (green)	Lights up as soon as an Ethernet connection is available.
2Activity-LED (yellow)	Lights up when sending and receiving data.

5. Mounting and assembly of modules

The CPU module is designed for horizontal installation in a control cabinet on a mounting rail. For the adoption to various different interfaces, option modules can be inserted into the CPU-modules. The devices communicate via internal system bus (K-Bus). The cycle time of the system bus is 1 ms.

Up to 12 modules (I/O, technology or field bus modules) can be lined up next to each other to the right side of the CPU module.

5.1. Handling of modules

CAUTION

Improper handling can damage the modules, option modules and the control system.

- Switch off the operating and onload power before carrying out assembly, installation or maintenance work.

CAUTION

Damage to components!

Handle all modules and components with care. Please ensure the following:

- Clean contact surfaces (to avoid contact faults).
- Bus plugs that are not bent.
- Ensure that no pieces of wires, fillings or swarf fall into the unit when you are drilling holes or connecting wires.

5.2. Inserting and removing the option plugin module

The front side of the CPU module provides 3 slots for the option modules. Plugin module can be inserted into these slots.

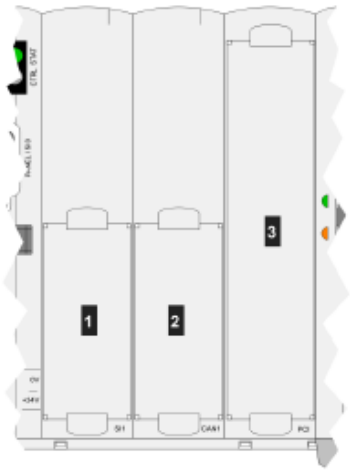


Fig. 5-1: Assignment of the slot

Assignment of the slot

1	...	SX 210/A (RS232 interface), SX 230/A (RS485,RS422 interface)
2	...	FX 200/A (CAN interface)
3	...	Corresponding plugin module is undecided.

EDS

Slots not used must be closed with reserve modules to secure contact protection of the ESD-sensitive parts.

Information

The option modules may not be plugged or removed, if the CPU module is activated.

5.2.1. Inserting an option plugin module into slot

1) Turn off power

2) Remove dummy module

3) Note the top and bottom of the plugin module, Insert the plugin module in the correct position.

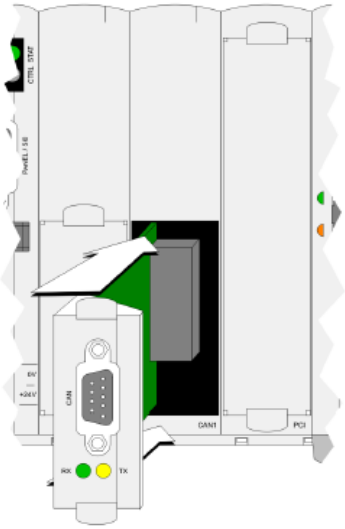


Fig.5-2: Inserting the option plugin module into slot

5.2.2. Removing an option plugin module

1) Turn off power

2) Pull plugin module out of the slot

3) Insert dummy module

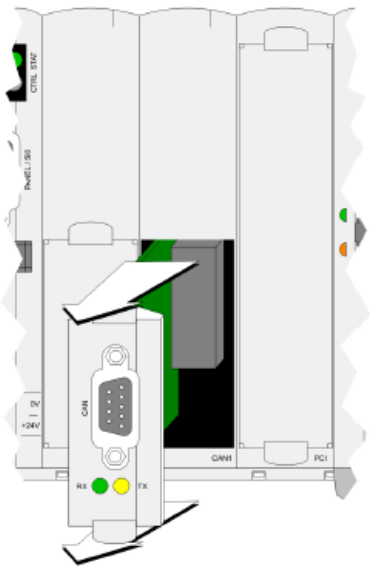


Fig.5-3: Removing the option plugin module

5.3. Adding extension modules

The CPU module makes the power supply available for up to 12 add-on modules. The connection between CPU module and the added modules is established via a parallel K-Bus. The entire package is snapped onto a mounting rail (mounting rail TS 35x7,5).

To guarantee stable functioning of the module cluster the total power demand ("Power consumption 5 V on the K-Bus" and "Power consumption 24 V on the K-Bus") on the added-on modules must not exceed the power values (Max. output power K-Bus 5 V" and "Max. output power K-Bus 24 V") of the

CPU module specified in the technical data.

Information

For the calculation of the number of modules that can be added, the performance values specified in the technical data of the hardwear manual under "Power consumption 5 V on the K-Bus" and "Power consumption 24 V on the K-Bus" must be used.

To add modules, their module address has to be set first.

5.3.1. Setting the module address

The extension modules in the system are addressed by means of a 16-position address switch. All modules within a module block thus can be differentiated.

A module block consists of the CPU module and added modules.

The address switch is located on the side of the modules, underneath the K- Bus plug. Prior to the assembly of the package the address must be set to the position configured in the application software.

CAUTION!

- Attention must be given when setting the address switch with the screw driver that none of the surrounding components is damaged.

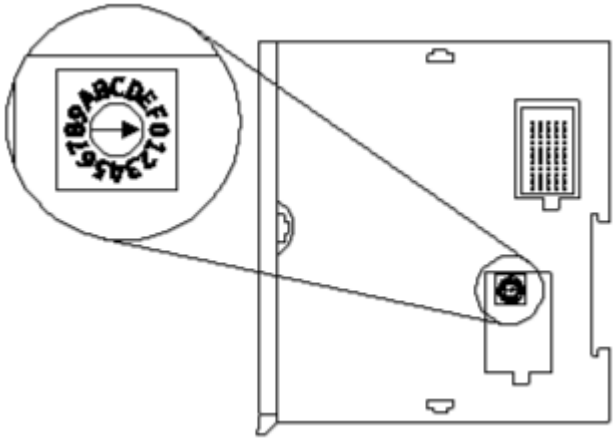


Fig.5-4: Settings the address switch of the extension module

Information

Modules of the same type must have different address switch positions within one module block. Different modules in different module blocks may have the same address switch positions.

5.3.2. Assembly of the module block

Extension modules are lined up on the right side of the CPU module. For this purpose the side lid must be removed from the left module (CPU module or extension module) in each case and the extension module has to be plugged.

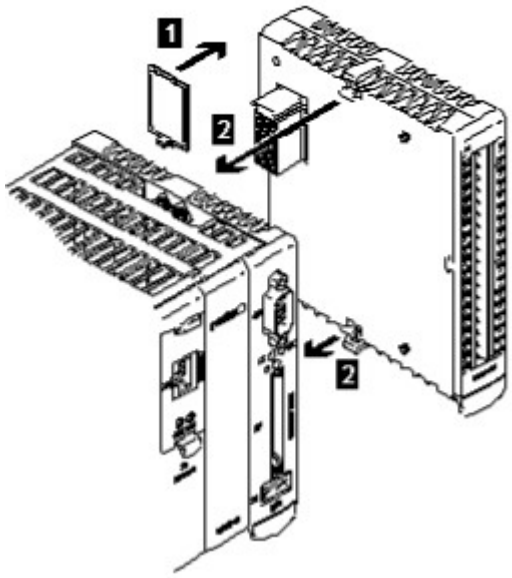


Fig.5-5: Plugging modules

1	...	Side lid
2	...	locking pins

Information

When adding extension modules to an already given module make sure that the locking pins are properly engaged.

Furthermore, ensure that the entire package (CPU module and add-on modules) is secured on either side with device end clamps to prevent it from being displaced and/or protected against vibration.

At the extreme right extension module the K-Bus plug has to be covered with the side lid.

If the package is not mounted properly, its function may be impaired.

5.4. Removing added modules

To remove extension modules the lockings at the top and at the bottom of the module have to be pressed first and then the module can be removed. Subsequently the connector opening for the K-Bus plug has to be covered with the side lid.

CAUTION

Without pressing the lockings they will break by removing the module.

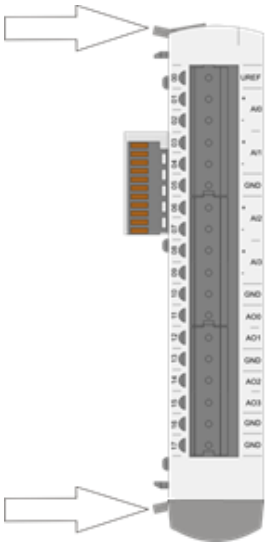


Fig.5-6: Lockings of the module

5.5. Mounting DIN rail

A steel rail TS 35x7.5 is to be used as mounting rail for the device. For the sake of stability the screw distance, as shown in the illustration, must not exceed 100 - 120 mm.

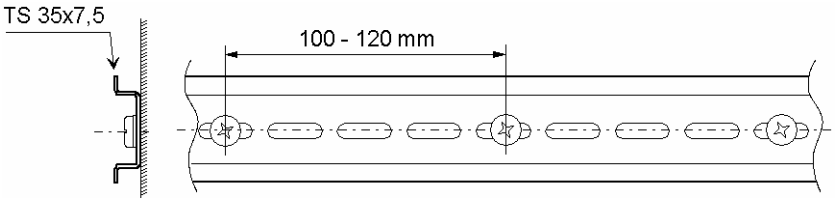


Fig.5-7: Fixing of the mounting DIN rail.

5.6. Space requirement

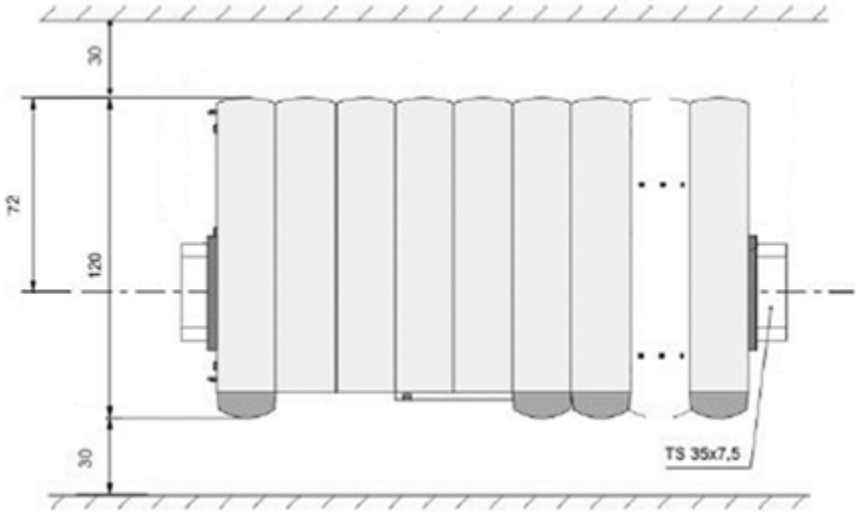


Fig.5-8: Mounting figure

Information

- *Free space for air circulation: At least 30 mm above and below the module block.*
- *Free space for maintenance (When accessing to the compact flash, or when replacing the FAN and battery in the state of mounting the CPU module to the DIN rail): At least 80 mm above and below the module block.*

5.7. Installing the module block

CAUTION

Mounting orientation:

The only permissible way to install the mounting DIN rail is that the front side of the mounted module is directed ahead and the ventilation holes are directed up wards and downwards (see the following graphics). Otherwise defects (e.g. by means of heat accumulation) may accure.

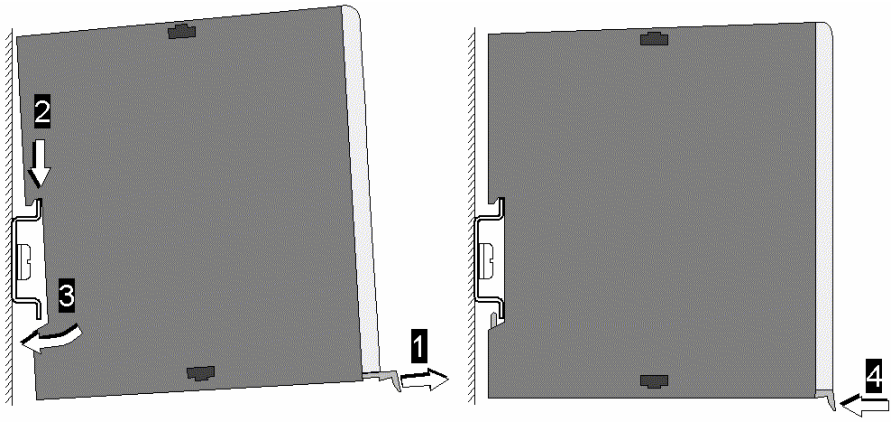


Fig.5-9: Installation on a mounting rail

1) Pull out (unlock) all locking levers on the mounting rail.

2) Slightly incline the module and place on the fixture of the mounting rail.

3) Press the lower half of the module onto the mounting rail.

4) Lock all locking levers on the mounting rail one after the other.

5) Secure the modules with the end plates against slipping or loosening due to vibration (see 5.7.1 End plate).

The module is now installed on the mounting rail. You can now wire-connect the interfaces and the inputs/outputs.

5.7.1. End plate

To prevent the modules from slipping or loosening through vibration, an end plate must be mounted on the left and right side of the mounting rail.

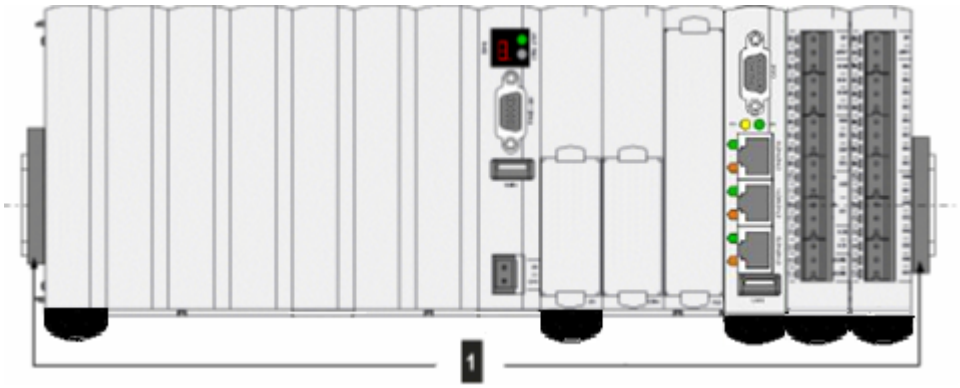


図.5-10: Endplate(1)

5.8. Removing the module block

1) Turn off power
2) Disconnect all cable connections on the module
3) Pull out (unlock) all locking levers on the mounting DIN rail.
4) Remove the module block from the mounting DIN rail.

CAUTION

Risk of damaging components during installation work under voltage.

- Therefore, switch off the power and remove all cable connections prior to starting dismantling work.

5.9. Measure against heat and ventilation

Ventilation holes for dissipating the heat are placed at the top and underside of the module. If the permissible ambient temperature is not exceeded, no external fan will be needed. Make sure that the ventilation holes are not covered.



CAUTION!

High temperatures may destroy the module!

- The operating temperature inside the control cabinet must not be higher than the permissible ambient temperature of the module. If this cannot be guaranteed through natural heat dissipation, an air conditioning of the control cabinet must be provided.
- When installed in a control cabinet attention must be given that the area around the inputs for thermocouples is not exposed to any temperature changes. (e.g. no air conditioners with intermittent operating hours)

Information

There must be a free space of at least 30 mm above and below the modules to guarantee head dissipation.

5.10. Use of air filters

To ensure that the contamination does not exceed contamination level 2 (according to EN 61131-2), the device must be installed in a dustproof, closed control cabinet. Fan openings of the control cabinet must be equipped with air filters. The filter elements must be cleaned or replaced regularly.

Information

Contamination level 2, description according to standard:

"The occurring contamination is generally not conductive. However, temporary conductivity must be expected due to condensation."

6. Connections and wiring

6.1. Power input

The 24 V terminal energizes the CPU module and all add-on modules.

To avoid problems with the electrical potential and stray electric current all 0V potential have to be linked on a neutral point with a ground rail.

Additionally a shield rail for the connections of all shields of the cables has to be used.



WARNING!

Danger of personal injury due to electric shock!

- Supply the device exclusively from power sources that have an extra low voltage (e.g. SELV or PELV according to EN 61131-2)
- When using a SELV power source it can become PELV by reason of the module construction and the connectors (grounding!).
- Protective low voltage circuits must always be installed safely insulated separated from circuits with dangerous voltage.



CAUTION!

Fire hazard during module failure!

- External line fuse with maximum 10 A must be provided in the final application.

Section

Refer to the manufacturer-specific data sheet of the female connectors used for type, cross-section and material. For further information: See chapter Accessories.

The actual permissible wire cross-section is specified by the electrical conditions of the connected equipment:

- Max. load current and required heat dissipation through the connected wire at maximum ambient temperature.
- Permissible voltage drop for error-free operation of the connected equipment.

6.1.1. Connection example

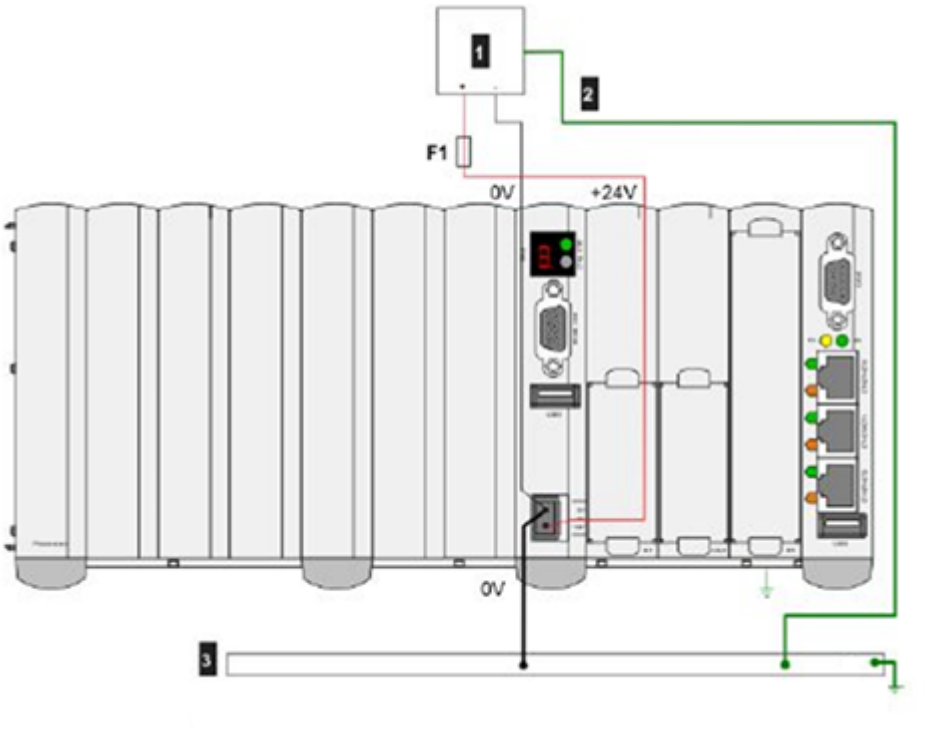


Fig.6-1: Connection of the power supply

1 ... DC24V Power supply	2 ... Grounding of the power supply
3 ... Ground rail	

6.2. Grounding

If required for reasons of electrical safety for the end usage, the metal parts of the module have to be grounded via the threaded bushing (M4) that is located on the bottom side of the enclosure (grounding point with ground icon).

CAUTION

Do not use too long screws (max. thread lenght 5 mm), because they can destroy elements within the module.

Material : Electrolytic galvanized sheet steel, blue galvanized self-clinching standoff.

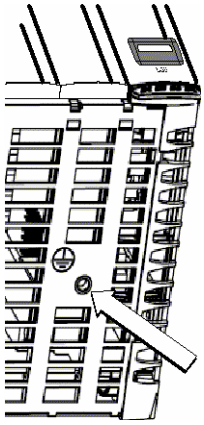


Fig.6-2: Example: grounding point on the enclosure

6.3. SI0(Unused)

The SIO interface is used for the manufacturer maintenance.

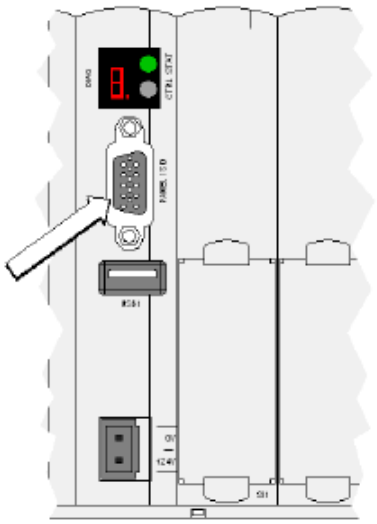


Fig.6-3: Position of the SIO interface

6.4. CAN interface (CAN0)

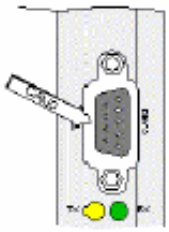


Fig.6-4: Position of the CAN interface (CAN0)

6.4.1. Pin assignment, connection example

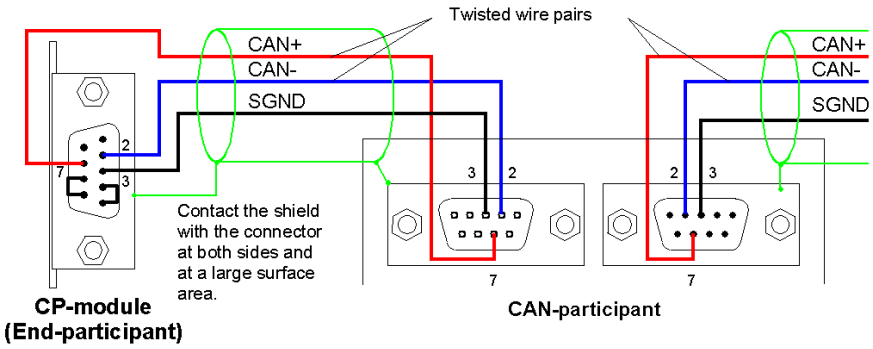


Fig.6-5: Connection example for CAN circuit

2 ... CAN-	3 ... SGND
7 ... CAN+	

Information

Both SGND (Signal Ground) and GND (optional ground) connections are connected internally. The designation was selected to correspond with the standard CiA® (CAN in Automation).

6.4.2. Cable and plug specification

Further information: See system manual.

6.4.3. CAN bus termination

To activate the bus termination at the first and last participant, both the pins 4 and 5 (TERM1) must be connected as well as the pins 8 and 9 (TERM2).

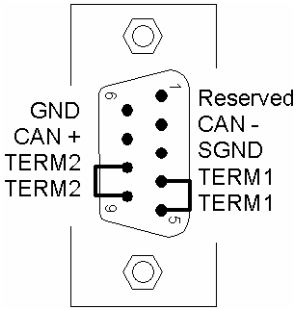


Fig.6-6: CAN interface with activated bus termination

6.5. Ethernet interface(ETHERNET0-1), EtherCat interface(EtherCAT)

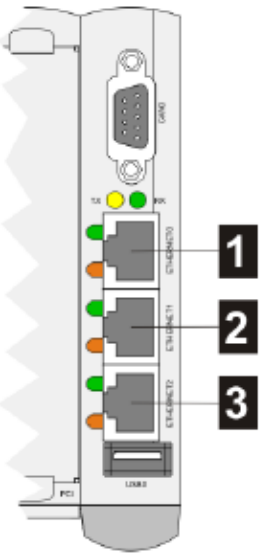


Fig.6-7: Position of the Ethernet connector and EtherCat connector

1 ... ETHERNET0	2 ... ETHERNET1
3 ... EtherCAT	

6.5.1. Pin assignment

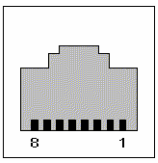


Fig.6-8: Ethernet connector

Pin no.	Signal designation		Input / Output
1	Tr. Data +	Transmit Data +	Output
2	Tr. Data -	Transmit Data -	Output
3	Re. Data +	Receive Data +	Input
4	n.c.	n.c.	---
5	n.c.	n.c.	---
6	Re. Data-	Receive Data -	Input
7	n.c.	n.c.	---
8	n.c.	n.c.	---

6.5.2. Cable and plug specification

Further information: See system manual.

6.6. USB ports(USB0,USB1)

For the connection of external USB devices (USB 2.0 High Speed) 2 ports are available.

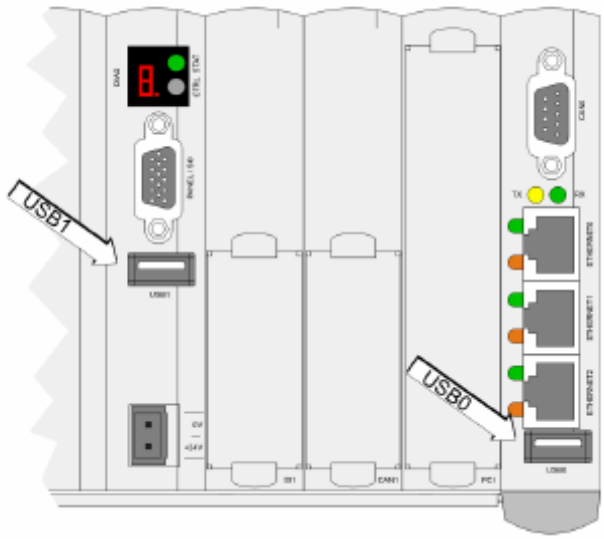


Fig.6-9: Position of the USB ports

CAUTION

- The use of common USB devices may result in unexpected system behavior or system failures, as these devices are not normally designed for operation in an environment with industrial interference.
- Never keep USB-devices constantly connected, as the USB-ports are not operationally reliable (danger of unplugging).
- For constant operations use a strain relief.

6.7. EMC and wiring guidelines

Pay attention from the outset to careful wiring and shielding.

Further information: See system manual.

7. Configuration

General information for configure devices

A “SANMOTION C” system needs data for the configuration of system performance, its I/O devices and interfaces. The system reads this data during the start-up operation and allocates them to its components and devices.

Configuration data is created by “SANMOTION C STUDIO”.

For further information to the configuration see the documentation of the “SANMOTION C STUDIO”.

8. Operating behavior

8.1. Failure of power supply

In case of a complete power supply failure a Reset is triggered. All lined-up modules are also set into reset-status and all outputs are switched off.

Data in the battery-buffered SRAM remain intact and the real-time clock continues to run.

8.2. Response to module errors

In case an error occurs, this error will be displayed on the diagnosis display on the front side of the CPU module.

8.3. Watchdog

- The CPU watchdog runs independent from the IO watchdog. After the CPU watchdog responds, all data will be saved, all device outputs switched off and then the device is reset.
- The K-Bus watchdog causes a K-Bus reset and the outputs of the K-Bus module will be disabled.

8.4. Temperature monitoring

The CPU temperature of the CPU module and therefore it's environmental temperature is checked every second.

- If the temperature violates the upper limit, the diagnosis display of the CPU module indicates an error ("E")..

CAUTION

If the error code ("E") is displayed, the failure of the CPU module will be considered. Please first check whether there is no abnormality in the fan of the FAN unit. Also, please check whether the ambient temperature of the CPU module does not exceed the operating temperature range 55 degree.

9. Diagnosis

The module has a 7-segment display for signalling status information and error codes.

During startup at the CPU module (up to status '3', which is displayed in the diagnosis display) the following error states are possible:

Error code	Significance
2 - E32	Hardware error
3 - E51	Compact Flash card is not available.

9.1. Operating states

During operation the control can be switched into the following operating states:

Main operating states:

State	Display	Description
INIT		The state "Init" is a service mode in which the start-up is stopped due to a serious system error (e.g. hardware error, etc.). In this service mode, it is possible to execute certain actions (e.g. "clear-retain"). Under normal circumstances this state is switched through during the start-up. A runtime system has not been loaded in the "Init" state.
STOP		In this operating state the IEC application program is loaded, but there is no cyclical processing of the application. This is a safety state in which no application (IEC or robotics) can set outputs. That is why this state can only be exited locally via the CTRL key on the control but not remotely via the programming tool.
RUN		The application programs can be processed in this operating state. The process data are exchanged according to the configuration.

It is possible to switch between the operating states by pressing the CTRL key.

9.2. Command switching between operating states

INIT

Status displayed		Short keystroke		Long keystroke	
	The control is in the status INIT		To next action: Load application		
	Load application		To next action: Delete retain data		The control will enter the status "STOP"
	Delete retain data and reinitialize		To next action: Delete application		The retain data are deleted and afterwards the system is newly initialized.
	Delete application		To next action: Write status report		The application is being deleted.
	Write status report		To next action: Trigger restart		Status report is being written.
	Trigger restart		On to main operating status INIT		A restart is being executed.

STOP

Status displayed		Short keystroke		Long keystroke	
	The control is in the status STOP		To next action: Starting the application		
	Starting the application		To next action: Unload retain data		The control will enter the status "RUN"
	Unload application		To next action: Write status report		The control enters the status INIT.
	Write status report		To next action: Trigger restart		Status report is being written.
	Trigger restart		On to main operating status INIT		A restart is being executed.

RUN

Status displayed		Short keystroke		Long keystroke	
	The control is in the status RUN		To next action: Stop control.		
	Stop control		To next action: Write status report		The control will enter the status "STOP"
	Write status report		On to main operating status RUN		Status report is being written.

Information

To exit the menu without any action the Ctrl key may not be pressed for 10 seconds. Afterwards the main operating state is displayed.

Example: Delete retain data:

The function "Delete retain data" can only be triggered in the main operating status INIT.

Sequence:

1) Click through the functions by using short keystrokes, until the diagnosis display  is shown.
2) Start deleting of retain data with a long keystroke.
3) Once the retain data has been deleted, the system will automatically return to the main operating mode INIT.

9.3. States display(Battery power)

State	Display	Description
Battery weak		Check the remaining battery level is performed regularly. If the battery power is low, the display of the current "operating status display" and "b" are displayed alternately.

10. Maintenance

10.1. Inspection

The motion controller "SANMOTION C" product in order for you to use in the best condition, please perform the periodic inspections.

10.1.1. Inspection interval

The motion controller routine inspection is not required. However, the motion controller inside of the electrical and electronic components mechanical wear or aging occurs. Thus, more than once a year, please inspected.In addition, please shorten the inspection interval according to the ambient environment of use. A result of the inspection, please do the necessary solution if there is an abnormality.

10.1.2. Inspection items

Inspection items	Methods	Evaluation criteria	Solution if abnormal
CPU module power supply voltage	Check the voltage of the power supply terminal	Voltage range DC19.2 ~ 30V	Set the voltage within the specified range
Option module power supply voltage	Check the voltage of the I/O power terminal	To comply with the input and output specifications of each module	Set the voltage within the specified range
Environment	Check the ambient temperature(The control panel in the temperature is the ambient temperature)	+0°C~+55°C	Set the ambient temperature within the specified range
	Check the ambient humidity (The control panel in the humidity is the ambient humidity)	10 % ～ 95 % (Non-condensing)	Set the ambient humidity within the specified range
	Check that direct sunlight does not hit	No direct sunlight	Shield the sunlight
	Check for dirt, dust, salt, and iron powder. .	There is no adhesion	Clean with cloth or air.
	Check for Water, oil, the chemicals.	There is no adhesion	Clean with cloth or air.
	Check for corrosive gas or flammable gas.	No detected.	Check in the smell or gas sensor
	Check for noise source near	Noise source is not in the near	Do away the noise source

Inspection items	Methods	Evaluation criteria	Solution if abnormal
Mounting and wiring	Check the fitting is not loose between each module	There is no loose	Fully inserted, please tighten
	Check that the connector is fully inserted	There is no loose	Fully inserted, please tighten
	Check the screws on the external wiring	There is no loose	Fasten the screws properly
	Check the crimp terminal for external wiring	Proper spacing	Correct the terminal
	Check the external wiring cable	There is no abnormality on the surface	Replace the cable
	Check the CF card	Fully inserted	Fully inserted
	Check the FAN unit	Fully inserted	Fasten the screws properly
Life parts	Or not only the exchange date of the battery	Typically 5 Years Min. 3 Years	Replacement with new part is necessary.
	Check for abnormal sound than usual.	FAN alarm is not detected.	Replacement with new part is necessary.

Tools required: driver, testers, temperature and humidity meter

10.2. Battery

10.2.1. Battery type and service life

Battery type:	CR2032 (Lithium-Mn, 3 V/220 mAh)
Service life:	min. 3 years, typically 5 years

10.2.2. Replacing the battery

CAUTION

- Do not use force!

  Otherwise you risk breaking the holder.

- Risk of explosion!

  Improper exchange of the battery, replacement of the battery by a different type or non-observance of the polarity can lead to irreparable damage to the battery.

- New batteries should not be touched with bare fingers because this could cause contact problems due to oxidation.

- If the battery is not replaced when there is a warning message, the data of the SRAM can be lost if the power supply is interrupted.

The battery is located in the battery case on the top side of the housing and may only be replaced with a battery of the same type.

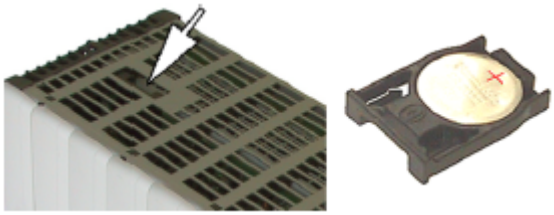


Fig.10-1: Position and view of battery case

1) To prevent a loss of data, the power supply must not be disconnected when replacing the battery.
2) Remove battery case.
3) Remove old battery and replace it with new battery. Pay attention to polarity!
4) Re-insert battery case into CPU module.

CAUTION

- If the battery is inserted incorrectly, the retain data is lost if the front panel power input is interrupted.

10.3. FAN unit

The FAN unit is placed in a flap on the bottom of the CPU module

.

10.3.1. Service life

Service life: minimum of 3 years, typically 5 years.

10.3.2. Replacing FAN unit

CAUTION

- Operation without FAN unit is not permitted since this could overheat the module and destroy it.

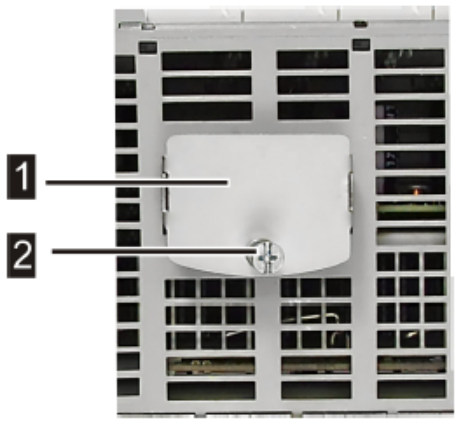


Fig.10-2: FAN unit. Position on the bottom of the CPU module

1	...	Back side of the FAN unit
2	...	Fastening screw with pressure spring

FAN unit for replacement can be purchased from SANYO DENKI. Please specify the model number of the following at the time of your order.

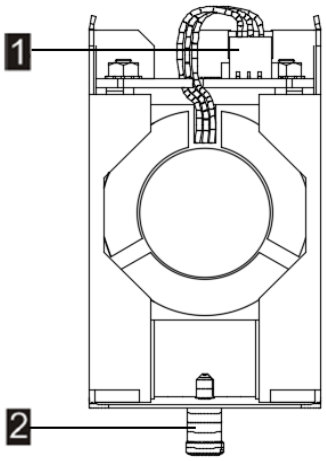


Fig.10-3: External view of the FAN unit

1	...	Connector
2	...	Fastening screw with pressure spring

Ordering infomation

Designation	Order Type
FAN unit	SMC26FAN

Replacing the FAN unit

CAUTION

Do not use force!

Otherwise you risk bending the connections on the ventilator case.

Replace FAN unit according to the following the instructions:

1) Disconnect power supply.
2) If necessary dismount the module.
3) Loose the screw on the FAN unit with a screwdriver. By reason of the spring the loosen screw would not get separate from the FAN unit.
4) Pull out FAN unit in a straight way.
5) Insert new FAN unit. Pay attention to the mounting direction, like displayed in the picture.

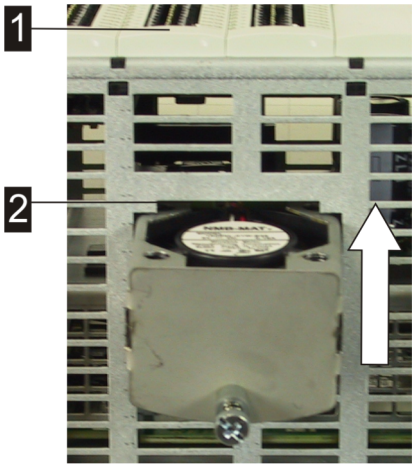


Fig.10-4: Insert new FAN unit.

1	...	Front of the CPU module, direction upwards
2	...	Cut for FAN unit

Information

The FAN unit has to be inserted straight into the slot, otherwise the internal connector would not plug in.

6) Fix the FAN unit with the screw.

   The FAN unit is now replaced.

11. Disposal

11.1. Disposal of the module

CAUTION

- Please observe the regulations regarding disposal of electric appliances and electronic devices!
- The symbol with the crossed-out waste container means that electrical and electronic devices including their accessories must not be disposed of in the household garbage.
- The materials are recyclable in accordance with their labeling. You can make an important contribution to protecting our environment by reusing, renewing and recycling materials and old appliances.

11.2. Disposal of the battery

CAUTION

- Pay attention to hazardous waste regulations when disposing of batteries.
- Although batteries have a low voltage, they can provide enough current when short-circuited to ignite flammable material. They should not be dis- posed of together with conductive material (e.g. iron filings, wire wool contaminated with oil, etc.)

12. Technical data

12.1. In general

Power input voltage	24 V DC
Max. switch-on current	10 A
Overvoltage category	II
Equipment class	III according to EN 61131-2
Galvanic isolation	No
Max. total power consumption	99 W
Power consumption own consumption	40 W
Max. output power K-Bus 24 V	40 W
Max. output power K-Bus 5 V	10 W
Fan	FAN unit, replaceable from the outside.
Ingress protection rating	IP20

12.2. Environmental conditions

Operating temperature	+0 °C to +55 °C
Storage temperature	-40 °C to +70 °C
Relative humidity of air	10 % to 95 % (non condensing)
Vibration resistance	according to EN 61131-2:2007
Shock resistance	according to EN 61131-2:2007

12.3. Processor, Memory, SRAM

Processor Clock	SMC263X(1.6GHz) / SMC265X(1.8GHz)
Memory	1GB DDR3-SDRAM
Battery-buffered SRAM	1 MB

12.4. Interfaces

CAN interface (onboard)	1
• Data transmission rate	Setting via software (125 kbit/s to 1 Mbit/s)
• Terminating resistor	Yes, can be bridged in plug
• Galvanic isolation	No
• Connection	DSUB 9-pin pin plug
Ethernet	2
• Data transmission rate	100 MBit
• Galvanic isolation	Yes, signaling lines
EtherCAT	1
USB	2 USB 2.0 high speed
Compact Flash	Type 1
Possibilities of plugs for serial interface	For SX210/A, SX230/A
Possibilities of plugs for CAN extension module	FX200/A
Possibilities of plugs for PCI modules	Corresponding plug-in module is undecided
K-Bus	At the side; used for adding extension modules.

12.5. Dimensions, weight

Module height	120 mm
Mounting width	270 mm
Module depth	100 mm
Weight	1335 g

13. EC directives and standards

13.1. EC directives

Guideline 2004/108/EC	EC guideline on electromagnetic compatibility
Guideline 2011/65/EU	RoHS guideline

13.2. Standards

The confirmation of the integrity of the system with respect to the command, has been subject to the following European standards.

13.2.1. General procedures and safety principles

EN 61131-1:2003	Programmable controllers - Part 1

Information

This product was developed for the use in industrial areas and can cause radio interference when used in residential areas.

13.2.2. EMC guideline

EN 61131-2:2007	Programmable controllers - Part 2

13.2.3. Electrical safety and fire protection

EN 61131-2:2007	Programmable controllers - Part 2

13.2.4. Environmental and surrounding conditions

EN 61131-2:2007	Programmable controllers - Part 2

13.3. UL Standard

UL 508, 2005	Industrial Control Equipment

Release
Revision A Apr. 2016

■ECO PRODUCTS
Sanyo Denki's ECO PRODUCTS are designed with the concept of lessening impact on the environment in the process from product development to waste. The product units and packaging materials are designed for reduced environmental impact.
We have established our own assessment criteria on the environmental impacts applicable to all processes, ranging from design to manufacture.

■Precautions For Adoption

Failure to follow the precautions on the right may cause moderate injury and property damage, or in some circumstances, could lead to a serious accident.
Always follow all listed precautions.

⚠ Cautions

- Read the accompanying Instruction Manual carefully prior to using the product.
- If applying to medical devices and other equipment affecting people's lives please contact us beforehand and take appropriate safety measures.
- If applying to equipment that can have significant effects on society and the general public, please contact us beforehand.
- Do not use this product in an environment where vibration is present, such as in a moving vehicle or shipping vessel.
- Do not perform any retrofitting, re-engineering, or modification to this equipment.
- The Products presented in this Instruction Manual are meant to be used for general industrial applications. If using for special applications related to aviation and space, nuclear power, electric power, submarine repeaters, etc., please contact us beforehand.

* For any question or inquiry regarding the above, contact our Sales Department.

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*Specifications are subject to change without notice.

Translated version of the original instructions