M0006999D

SANMOTION

MOTION CONTROLLER

C

CP 232/Z

CPU Module

Project Engineering Manual

SANYO DENKI

E

ENGLISH

Notes on This Manual

At various points in this manual you will see notes and precautionary warnings regarding possible hazards. The meaning of the symbols used is explained below.

⚠ DANGER

- **DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.**

⚠ WARNING

- **WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.**

⚠ CAUTION

- **CAUTION indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.**

CAUTION

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



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

Notice

Notes on use of equipment and useful practical tips are identified by the "Notice" symbol. Notices do not contain any information that draws attention to potentially dangerous or harmful functions.

History

Modification from / to	Date	Modified pages	Description	Author
V1.0	130904		new	meis
V1.0 / V1.1	140405		Various changes	meis
V1.1 / V1.2	290705	25	New chapter "Change battery"	meis
V1.2 / V1.3	111005	25, 26	Update chapter "Change battery"	meis
V1.3 / V1.4	071106		Details of the serial interface changed	meis

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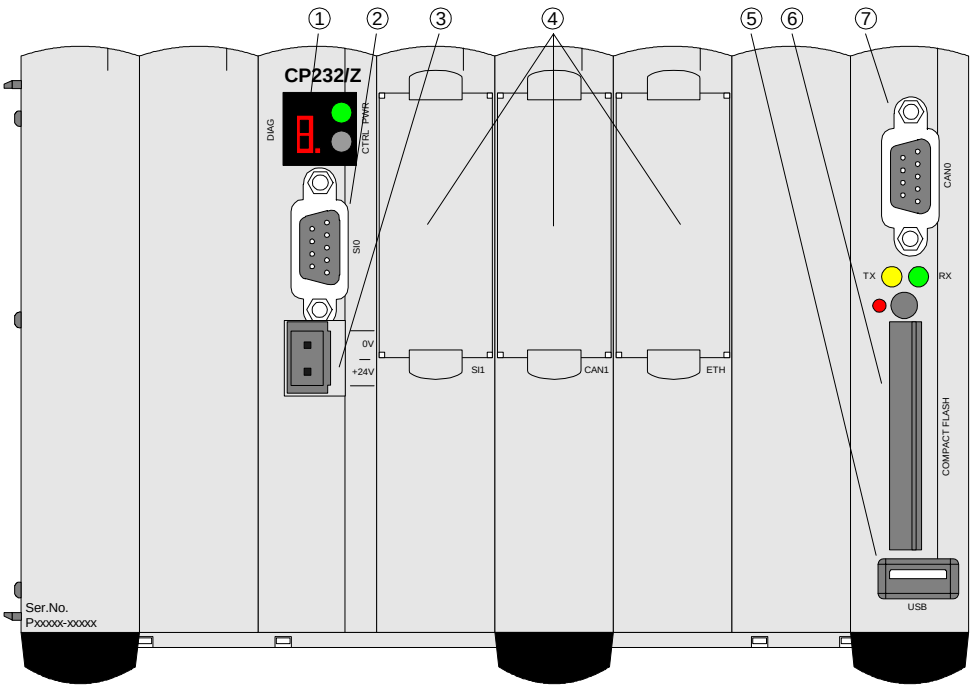
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1 Brief description

The CPU-module CP 232/Z is an intelligent master module designed for the medium range of the performance spectrum for use in the SANMOTION C automation system. It is fitted with one RS 485 interface, a USB port, a Compact Flash slot and one CAN interface.

3 slots for option modules are available for extensions.



① Diagnosis display
② RS 485 interface
③ Power input
④ 3 Slots for option modules
⑤ USB Port
⑥ Compact Flash slot
⑦ CAN interface

CP 232/Z Front view

2 General safety instructions

- The device is defined as an "open type equipment" and has to be mounted into a housing.
- For project engineering of the module the system manual " SANMOTION C Automation system" is necessary.
- Also the safety instructions of the system manual " SANMOTION C Automation system" have to be followed.

CAUTION
• **Turn off the power supply before inserting or removing the module. Otherwise, the module can be destroyed or undefined signal states can lead to damage of the control system.**

Opening the device, maintenance activities

Before opening the device:

► Disconnect all power supplies

► Disconnect all interface connections

CAUTION
• **The device may only be opened by qualified personnel and only maintenance activities expressly approved by SANYODENKI may be performed (see chapter "Maintenance instructions"). Any other manipulations to the device will result in loss of warranty.**

Battery

The battery, located in the right side of the module under the lower cover, may only be replaced by a battery of the same type. The use of incorrect batteries can lead to combustion or explosion. The battery may not be taken apart, recharged or short-circuited nor exposed to fire or water.

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 disposed of together with conductive material (e.g. iron filings, wire wool contaminated with oil, etc.)**

3 Configuration, installation of optional modules

The configuration of the module is carried out by software. For that purpose, a file must be created with the configuration data in the initial development stage of the SANMOTION C system. In the final development stage of the SANMOTION C system, this file will be created by the configurator. The value for the configuration can then be entered with a configuration tool.

Setting the address

The station address of the CP 232/Z is entered via 2 rotary switches.
(Front address switch: HIGH; back address switch: LOW)

The address switches are located on the top right hand side of casing.



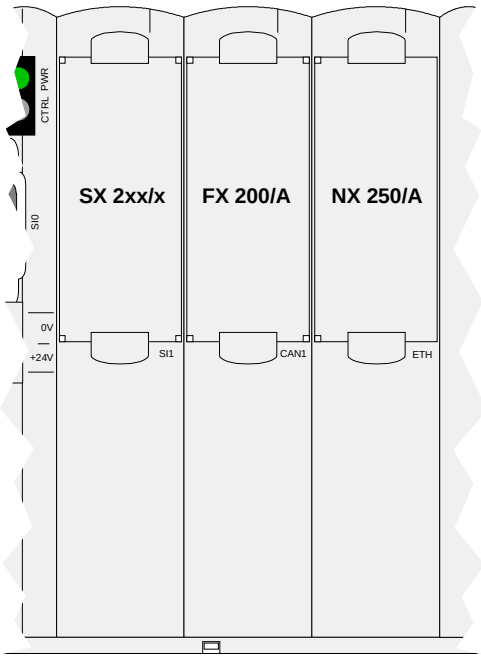
Position of address switches

On leaving the factory all modules are set to address 0.

Inserting option modules

The front side of the CP 232/Z provides 3 slots for the option modules. Modules from the SANMOTION C product range can be inserted into these slots.

Assignment of the slots:
Left slot: SX 210/A for RS 232 or SX 230/A for RS 485/422
Middle slot: FX 200/A for CAN
Right slot: NX 250/A for Ethernet.



Assignment of the slots

CAUTION

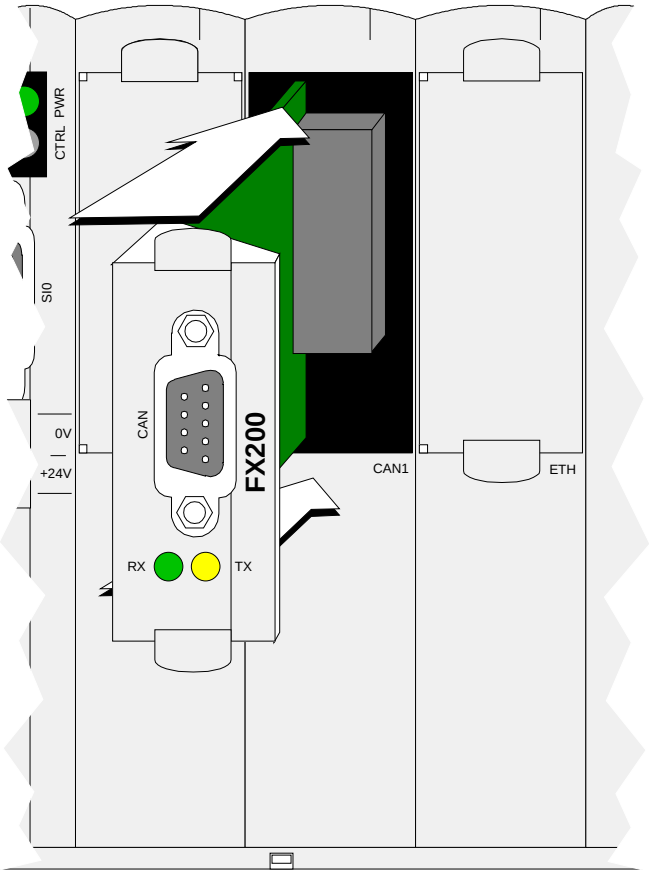
- **Slots not used must be closed with reserve modules to secure contact protection of the ESD-sensitive parts.**

Note
*The option modules may **not** be plugged or removed, if the CP 232/Z is switched on.*

For further information on connection and operation:
Refer to the Project Engineering Manuals of the option modules used.

Inserting option module into slot:

- Turn off power supply
- Remove cover
- Insert module in the right position (labeling of option module must on the right) into the intended position.

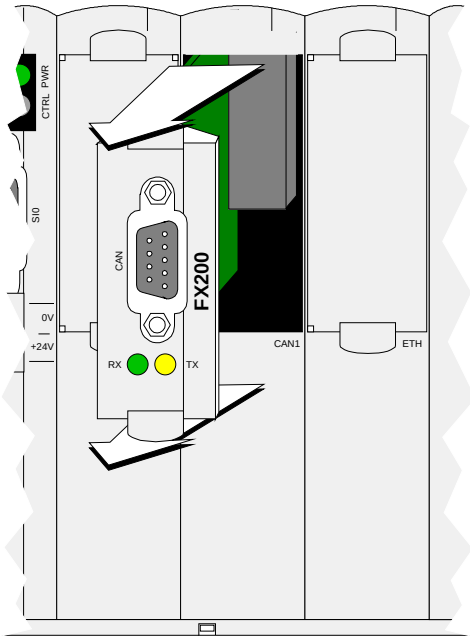


Inserting an option module into slot

Removing an option module:

In reverse order:

- Turn off power supply
- Pull module from the slot.
- Insert cover.



Removing an option module

Supply of the modules added-on

The CP 232/Z supplies 7W for the supply of up to 12 modules that are added-on. The own power uptake of the CP 232/Z stands at 8W.

To guarantee stable functioning of the module cluster the power demand on the added-on modules must not exceed 7W.

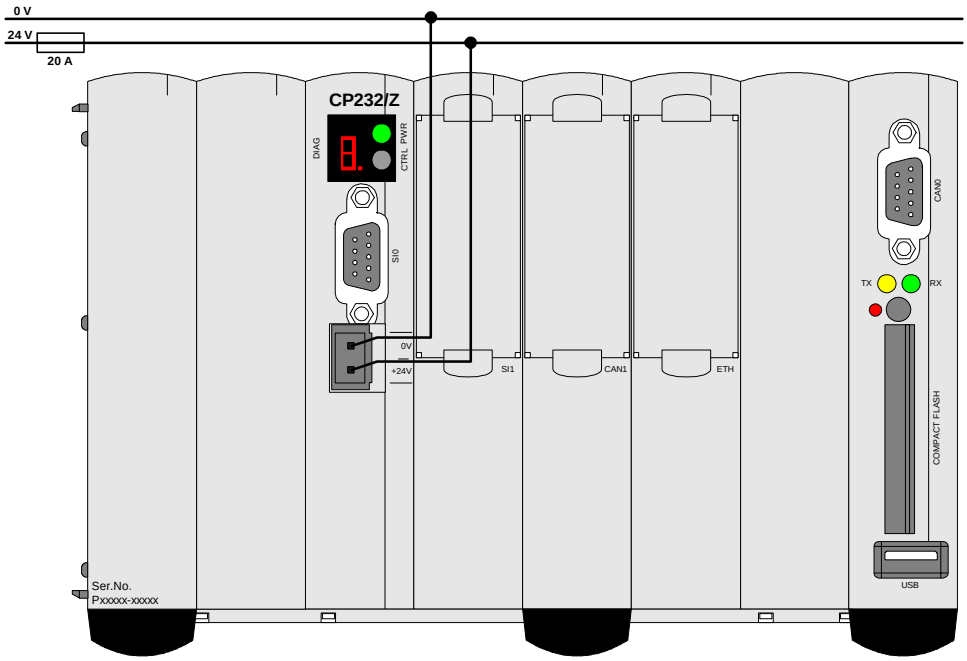
For a list of the individual modules power consumption see "SANMOTION C automation system"

4 Connections, wiring

Power input

The 24 V terminal supplies the CP 232/Z and all modules added-on in line.

Own power consumption: 8W
power consumption for modules added-on: 7W



Power input

⚠ WARNING

- **The power supplies have to meet SELV according to IEC61131.**

CAUTION

- **In the final application the power supply must be protected with 20 A fuses (see graphic "Power input...").**

Connector for wiring

The following female connectors are required for the CP 232/Z:

COMBICON Plugs made by Phoenix Contact
MSTB 2,5/2-ST-5,08 (1 block)
or Omnimate Raster made by Weidmuller
BLZ5.08/2 (1 block)

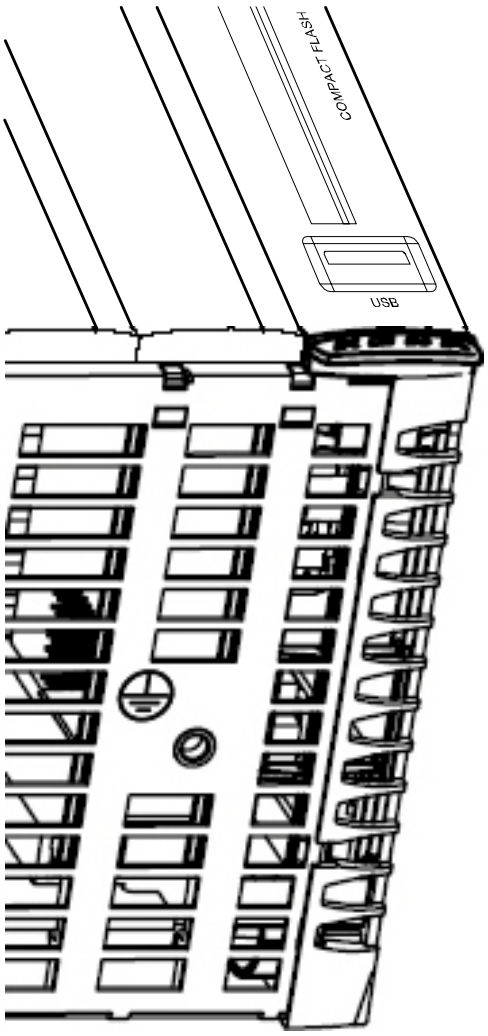
The following optional peripheral equipment is available for SANMOTION C.

Model number	Content
AL-00591171-01	MSTB 2,5/2-ST-5,08 (1 block)

Grounding

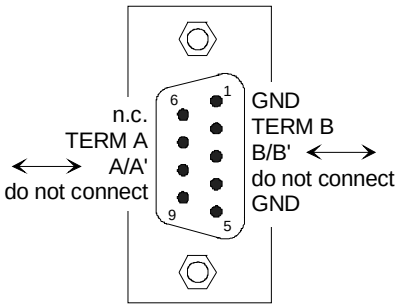
If required for reasons of electrical safety by the end usage, the metal parts of the module can be grounded by the threaded bushing (M4) on the underside of the casing (grounding point).

Material: electrolytically galvanized sheet steel, blue galvanized self-clinching standoff



Position of the grounding point

RS 485 interface (SI0)



n.c.: not connected

Assignment RS-485, DSUB-plug connection seen from front

RS -485	Signal designation	PIN-No.	Input / Output
A / A'	Transmit / Receive -	8	Input or Output
B / B'	Transmit / Receive +	3	Input or Output
TERM A	Terminating resistor	7	---
TERM B	Terminating resistor	2	---
GND ext.	Signal ground	1, 5	---

Further information: See " SANMOTION C automation system project engineering manual"

CAN interface

Cable

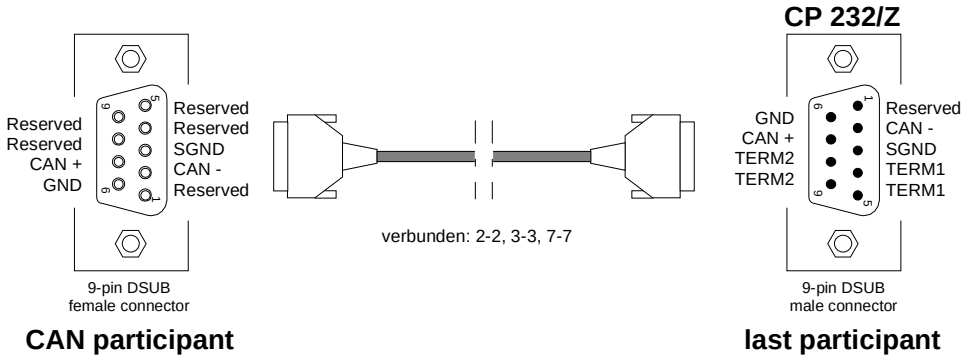
The CAN connection must be made with a suitable line. We recommend a data cable in accordance with ISO/DIS 11898 (CAN norm).

Structure:
Twisted pair, shielded with signal ground.



A multi-core twisted cable can also be used. At the same time, it is important to note that the CAN+ and the CAN- lines are guided in a common twisted pair of wires.

Surge impedance: min. 108 Ω, typically 120 Ω, max. 132 Ω.
Line resistance: typically 70 mΩ/m
Specific line delay: typically 5 ns/m



CAN-connection at module: 9-core DSUB male connector

The cable shield must be installed on either side of the switch.

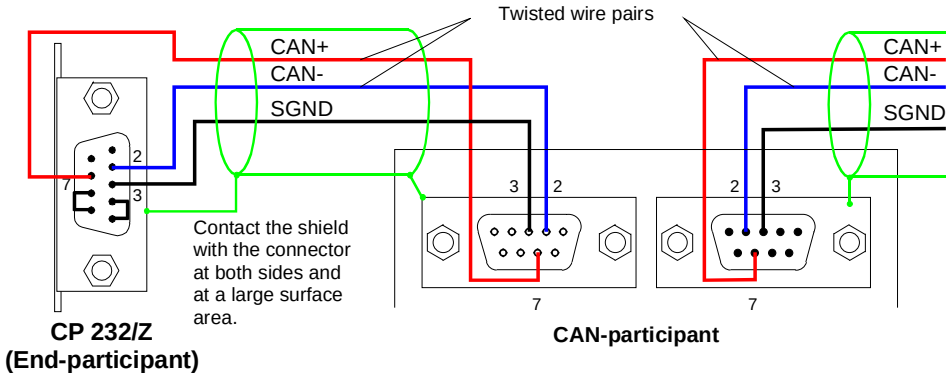
Note
Only use appropriate conductive DSUB-plugs for CAN connection cables. These must be connected with the cable shield covering large connection areas.

Further information: See " SANMOTION C automation system project engineering manual"

Cable routing CAN-Bus

Signal and data lines that are foreign to the system and not connected to the SANMOTION C-control must not be routed in the same cable as the system's own signal and data lines. All shielded signal, data and low voltage supply lines with contacted shields on either side can be routed parallel to one another and parallel to the energy supply lines.

Example for connecting



Example for connecting the CP 232/Z to other CAN-participants

5 Operation and displays

Status displays

1 green Power-LED:

- LED is lit: Supply voltage is present
- LED is not lit : No supply voltage

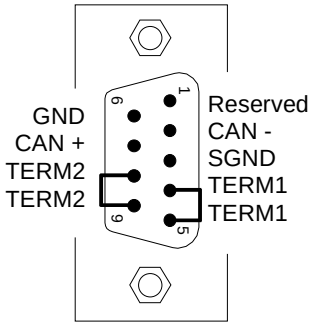
CAN-status-LEDs

The module is fitted with two Status-LEDs (RX- and TX-LEDs at the front side of the module), which are activated from the Microcontroller.

The meaning of these is as follows:
RX-LED (green): Briefly lights up on receipt of a CAN-message
TX-LED (yellow): Briefly lights up on transmission of a CAN-message.

CAN bus termination

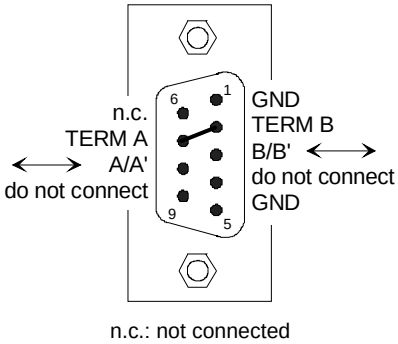
The Bus termination at the first and last participant must be activated, therefore the pins 4 and 5 (TERM1) must be connected as well as the pins 8 and 9 (TERM2)



CAN interface with activated bus termination

RS 485 Terminating resistor

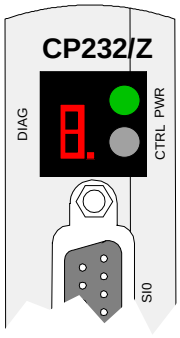
To activate the bus terminating board at the last participant during RS-485 operation the pins 2 and 7 (TERM A, TERM B) must be connected.



RS-485 with activated bus termination board

Diagnosis display

The diagnosis display shows the states during startup.



Diagnosis display and CTRL key

Further information: See " SANMOTION C automation system project engineering manual"

Program load key (CTRL)

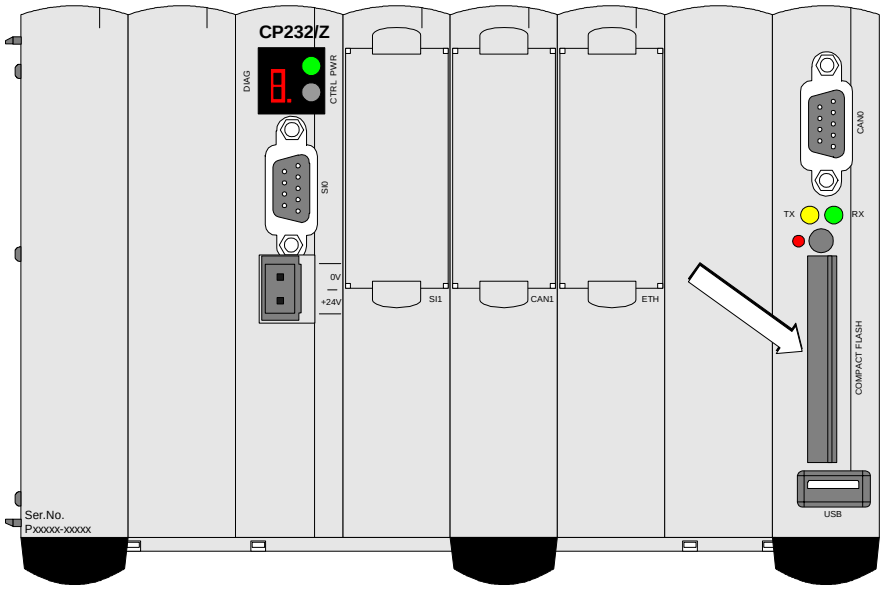
The program load key (CTRL) is located next to the 7-segment-display.

The program load key is used to perform various functions.

Further information: See " SANMOTION C automation system project engineering manual"

Compact Flash slot

To operate the CP 232/Z, a Compact Flash disk with the firmware and the application must be plugged into the Compact Flash slot.

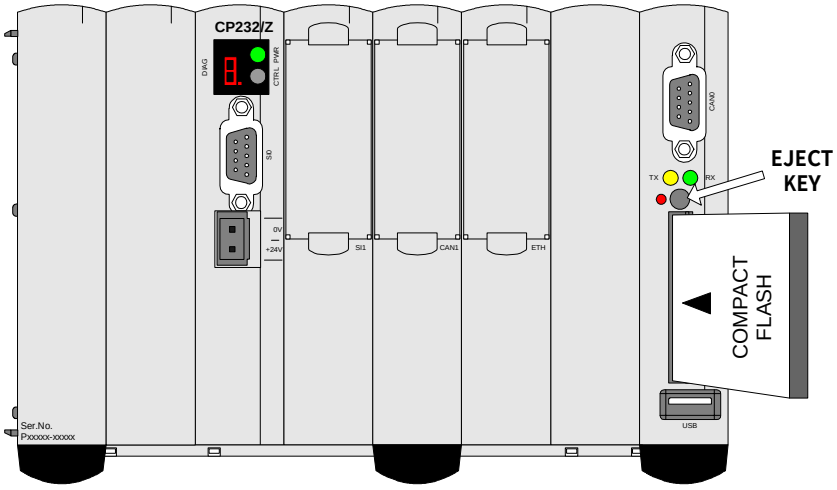


Position of the Compact Flash slot

CAUTION

- **The Compact Flash card may not be plugged in or unplugged during operation.**

Inserting the CF card



- ▶ Turn off power supply
- ▶ Insert the Compact Flash card in the direction of the arrow.

CAUTION

- **Insert the Compact Flash card as shown in the diagram with the arrow to the front. Improper insertion can cause damage to the contact pins.**

Removing the CF card

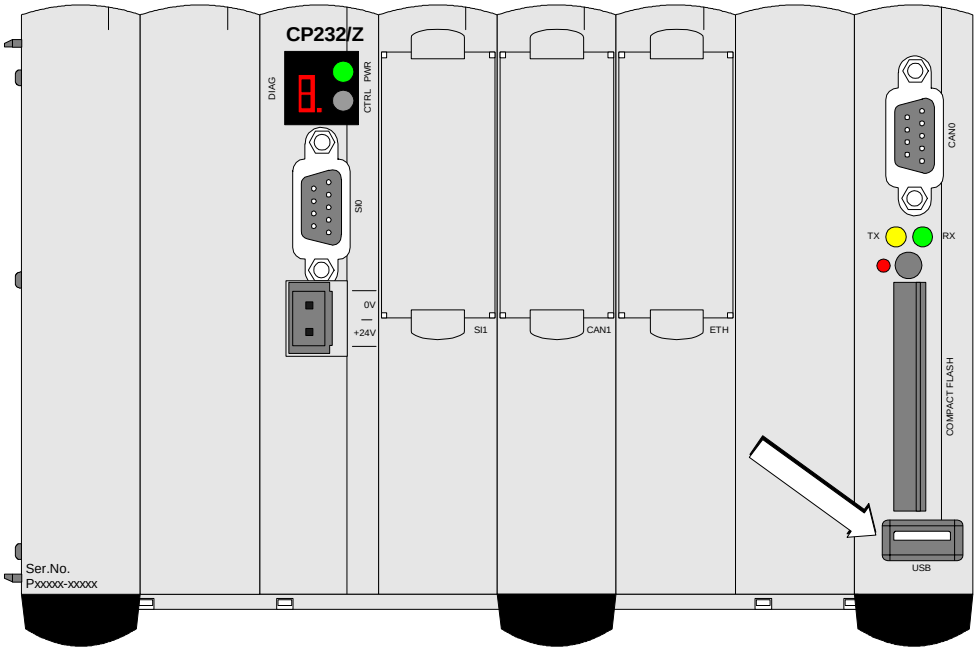
- ▶ Turn off power supply
- ▶ Remove Compact Flash card.

Precautions when using the CF card:

- Do NOT use force when inserting the card in the slot. It is constructed so that it can only be inserted in one direction. The card should simply slide in the slot.
- Keep the card away from moisture, heat and direct sunlight.
- Keep the card away from electrostatic sources or magnetic fields.
- Do not let the card fall and do not bend it.
- Do not remove the card and do not turn off the device while it is writing on to the card.

USB Port

1 port is available for the connection of external USB-devices.



Location of the USB-port

Note
USB devices must not remain plugged-in continuously, as this may cause danger of mechanical damage.

6 Module response

Failure of supply voltage

In case of a complete power supply failure a Reset is triggered. All lined-up modules are also set into Reset-status.

Data in the battery-buffered SRAM are stored intact.

Response to module errors

In case an error occurs, this error will be displayed on the diagnosis display on the front side of the CP 232/Z.
Further information: See " SANMOTION C automation system project engineering manual".

7 Maintenance instructions

Change battery

The battery that is located underneath the cover on the right side of the module may only be replaced by a battery of the same type. The use of incorrect batteries can lead to combustion or explosion. The battery may not be taken apart, recharged or short-circuited nor exposed to fire or water.

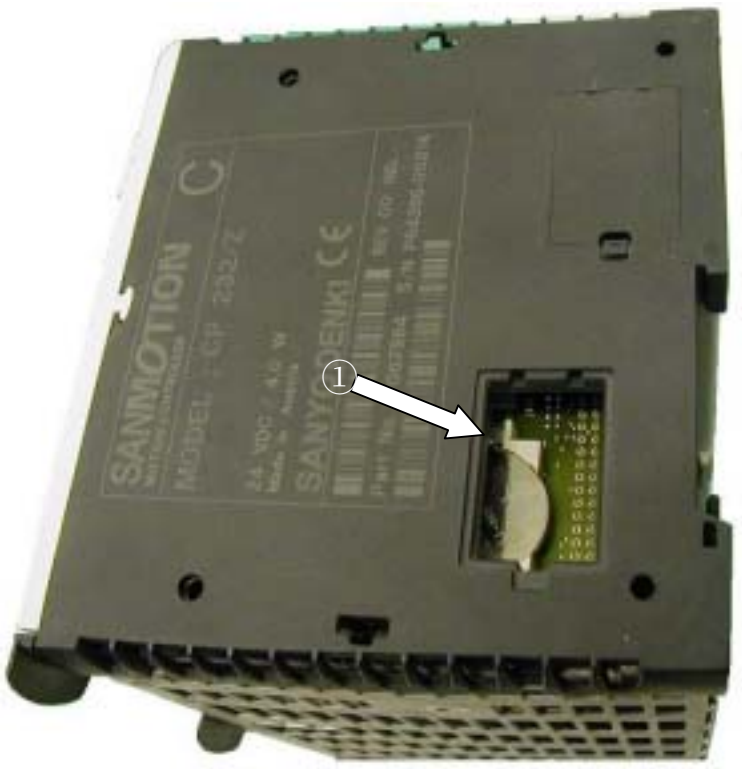
Battery type: CR2032 (Lithium-Mn, 3 V/220 mAh).
The battery has a minimum life cycle of 3 years.

► Remove the lower cover on the right side of the module.



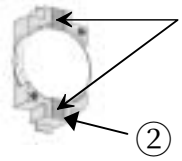
Position of battery

► Remove old battery with anti-static, non-conductive tweezers (Use tweezers at the arrow marked position)



Insert battery

- Insert new battery as shown above at the Position ① and click it into place as shown below at position ②.



Make sure that the battery is properly clicked into place at the upper and lower holding clamp.

- Close the battery cover again.

Notice
Do not use force!
Otherwise, there is a danger of bending the contact clip, which could lead to the short-circuit of the battery.

It is recommended to change the battery after 3 years.

An indication for the end of the battery life cycle is the case where the control is switched off and on again and the time indicated on the control no longer corresponds with the actual time. If this is the cast replace the battery immediately.

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 disposed of together with conductive material (e.g. iron filings, wire wool contaminated with oil, etc.)**

8 Technical data

General information

Nominal supply voltage:	24 V DC
Supply voltage range:	19.2 V to 30 V, according to IEC 61131-2
Ingress protection rating:	III (according to IEC61131-2)
Ventilator:	No outside ventilation, no ventilator
Galvanic isolation:	No

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 IEC61131-2
Shock resistance:	according to IEC61131-2

Computer kernel

Processor:	Embedded Processor ~400 MHz
Memory:	64 MB
Buffered SRAM:	512 kB

Interfaces

CAN interface onboard	Communication with periphery components
CAN bus Baud rates:	To be set via software
Serial interface onboard	RS 485
RS485 Baud rate:	To be set via software
Possibilities for plugs for serial interface	for SANMOTION C serial interface module
Possibilities for plugs for CAN extension module:	for SANMOTION C CAN module
Possibilities for plugs for Ethernet interface	for SANMOTION C Ethernet module
USB:	USB 1.1
Compact Flash:	Type 1

Casing, dimensions

Dimensions in mm (H x W x D)	120x180x100
Type of assembly:	Mounting rail
Connection plug power supply:	2-core male connector, grid 5.08 mm
Ingress protection rating:	IP20
Weight:	580 g

Standards:

The module conforms to the norms:

General information	
UL 508	UL – listed
Product standard for programmable controllers:	
IEC 61131-1:2003	General information
IEC 61131-2:2003	Hardware

Release
Revision A Aug.2005
Revision B Sep.2007
Revision C Mar.2008
Revision D Jun.2008

Precautions For Adoption

⚠ Cautions

The possibility of moderate or minor injury
and the occurrence of physical damage are assumed
when the precautions at right column are not observed.
Depending on the situation,
this may cause serious consequences.
Be sure to follow all listed precautions.

⚠ Cautions

- Be sure to read the instruction manual before using this product.
- Take sufficient safety measures and contact us before applying this product to medical equipment that may involve human lives.
- Contact us before adapting this product for use with equipment that could cause serious social or public effects.
- The use of this product in high motion environments where vibration is present, such as in vehicles or shipping vessels, is prohibited.
- Do not convert or modify any equipment components.

* Please contact our Business Division for questions and consultations regarding the above.

http://www.sanyodenki.com

SANYO DENKI CO., LTD.
1-15-1, Kita-Otsuka, Toshima-ku, Tokyo 170-8451, Japan
Phone: +81 3 3917 2223

SANYO DENKI *AMERICA,INC.*
468 Amapola Avenue Torrance, CA 90501 U.S.A.
Phone: +1 310 783 5400

SANYO DENKI *EUROPE SA.*
P.A. Paris Nord II 48 Allee des Erables-VILLEPINTE B P.57286 F-95958 ROISSY CDG Cedex France
Phone: +33 1 48 63 26 61

SANYO DENKI *GERMANY GmbH*
Frankfurter Strasse 63-69 65760 Eschborn Germany
Phone: +49 6196 76113 0

SANYO DENKI *KOREA CO., LTD.*
9F 5-2, Sunwha-dong Jung-gu Seoul, 100-130, Korea
Phone: +82 2 773 5623

SANYO DENKI *SHANGHAI CO., LTD.*
Room 2116, Bldg B, FAR EAST INTERNATIONAL PLAZA, No.317 XianXia Rd., Shanghai 200051 China
Phone: +86 21 6235 1107

SANYO DENKI *TAIWAN CO., LTD.*
Room 1208,12F, No.96 Chung Shan N, Rd., Sec.2, Taipei 104, Taiwan, R.O.C.
Phone: +886 2 2511 3938

SANYO DENKI *(H.K.)CO., LIMITED*
Room 2305, 23/F, South Tower, Concordia Plaza, 1 Science Museum Rd., TST East, Kowloon, Hong Kong
Phone: +852 2312 6250

SANYO DENKI *SINGAPORE PTE. LTD.*
10 Hoe Chiang Road #14-03A/04 Keppel Towers Singapore 089315
Phone: +65 6223 1071

*Remarks : Specifications Are Subject To Change Without Notice.