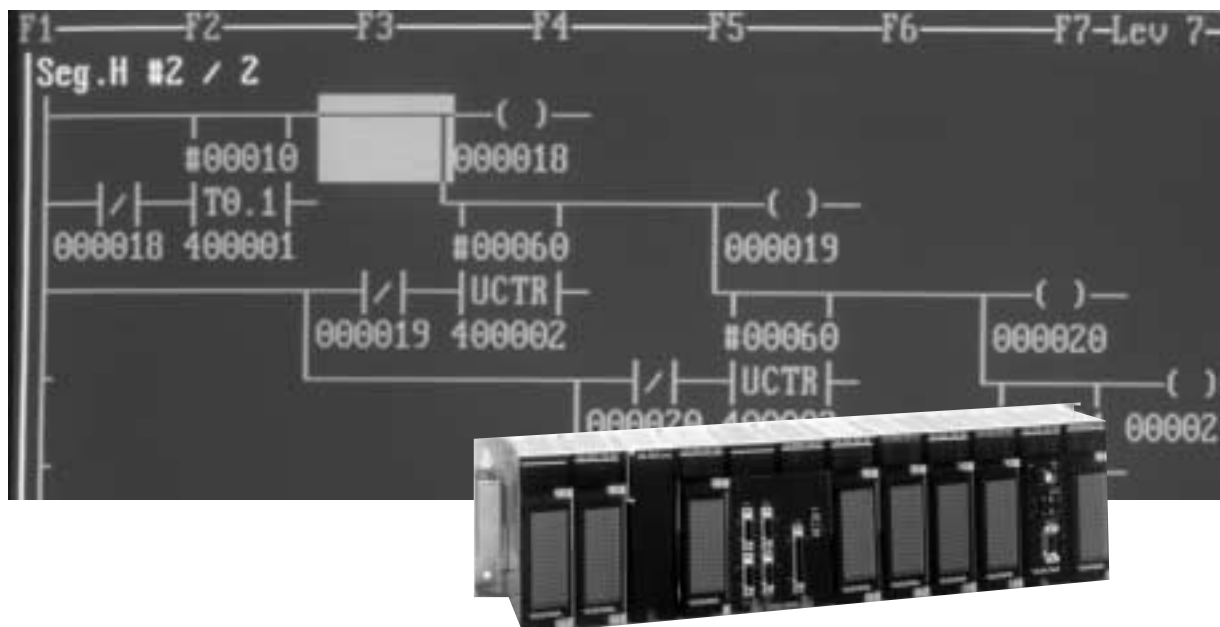


MEMOCON GL120, GL130 HARDWARE USER'S MANUAL



Manual Contents

This manual describes the hardware specifications and applications of the MEMOCON GL120, GL130.

Please read this manual carefully and be sure you understand the information provided before attempting to install and use the MEMOCON GL120, GL130.

Visual Aids

The following aids are used to indicate certain types of information for easier reference.



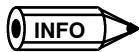
Indicates references for additional information.

IMPORTANT

Indicates important information that should be memorized.



Indicates application examples.



Indicates supplemental information.



Indicates a summary of the important points of explanations.

Note

Indicates inputs, operations, and other information required for correct operation but that will not cause damage to the device.



Indicates definitions of terms used in the manual.

NOTICE

The following conventions are used to indicate precautions in this manual. Failure to heed precautions provided in this manual can result in injury to people or damage to the products.



WARNING

Indicates precautions that, if not heeded, could possibly result in loss of life or serious injury.



Caution

Indicates precautions that, if not heeded, could result in relatively serious or minor injury, damage to the product, or faulty operation.

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CONTENTS

CHAPTER 1	Introduction and Precautions	1-1
1.1	Overview of Manuals	1-2
1.2	Precautions	1-7
1.2.1	Safety Precautions	1-7
1.2.2	Installation Precautions	1-8
1.2.3	Removal Precautions	1-12
1.2.4	Wiring Precautions	1-13
1.2.5	Applications Precautions	1-16
1.2.6	Maintenance	1-18
1.3	Using this Manual	1-19
CHAPTER 2	Overview	2-1
2.1	Overview of the MEMOCON GL120 and GL130	2-2
CHAPTER 3	System Components	3-1
3.1	Overview of System Components	3-2
CHAPTER 4	System Components: Functions and Specifications	4-1
4.1	General Specifications	4-3
4.2	Power Supply Modules	4-4
4.2.1	Appearance of Power Supply Modules	4-4
4.2.2	Power Supply Modules: Function and Models	4-9
4.2.3	Specifications of Power Supply Modules	4-10
4.2.4	Selecting Power Supply Modules	4-14
4.2.5	Using Power Supply Modules	4-18
4.3	CPU Modules	4-24
4.3.1	Appearance of CPU Modules	4-24
4.3.2	CPU Modules: Functions and Models	4-30
4.3.3	Specifications of CPU Modules	4-35
4.3.4	Using CPU Modules 1 (For CPU20, CPU30, and CPU35)	4-65
4.3.5	Using CPU Modules 2 (For CPU21)	4-80
4.3.6	Using CPU Modules 3 (For CPU10)	4-88
4.4	Communications Modules	4-100
4.4.1	Models of Communications Modules	4-100
4.4.2	Remote I/O Driver Module	4-105
4.4.3	Remote I/O Receiver Module	4-111
4.4.4	2000-Series Remote I/O Driver Module	4-121
4.4.5	MEMOBUS Modules (RS-232)	4-127
4.4.6	MEMOBUS Modules (RS-422)	4-135
4.4.7	PC Link Module	4-147
4.4.8	Uniwire Interface Module	4-159
4.4.9	Uniwire H-system Interface Module	4-166
4.4.10	Distributed I/O Driver Module	4-175
4.4.11	M-NET Module	4-182

CONTENTS

4.4.12	YENET 1600-D Module	4-188
4.4.13	Ethernet Interface Module	4-199
4.4.14	Optical/Electrical Conversion Module	4-209
4.5	I/O Modules	4-218
4.5.1	Models of I/O Modules	4-218
4.5.2	Appearance of I/O Modules	4-220
4.5.3	Functions and Specifications of I/O Modules	4-223
4.5.4	Using I/O Modules	4-229
4.6	Special Purpose Modules	4-231
4.6.1	Models of Special Purpose Modules	4-231
4.6.2	High-speed Counter Module	4-233
4.6.3	Pulse Catch Module	4-239
4.7	Motion Modules	4-245
4.7.1	Models of Motion Modules	4-245
4.7.2	Four-axis Motion Module	4-246
4.7.3	One-axis Motion Module	4-257
4.7.4	Two-axis Motion Module	4-265
4.8	Other Module	4-277
4.8.1	Expander Module	4-277
4.8.2	Battery Module	4-283
4.9	Mounting Base	4-296
4.10	Rack-to-rack I/O Cables	4-300
CHAPTER 5 Installation and Wiring		5-1
5.1	Designing the Control Panel	5-2
5.1.1	Structure of Control Panel	5-2
5.1.2	Cooling the Control Panel	5-2
5.1.3	Preventing Electrical Noise	5-3
5.1.4	Approximate Masses of Modules and Mounting Bases	5-5
5.1.5	Maximum Heating Value by Modules	5-7
5.1.6	Mounting Base Layout	5-8
5.1.7	Module Mounting Dimensions	5-12
5.2	Installing Mounting Bases and Modules	5-16
5.2.1	Installing Mounting Bases	5-16
5.2.2	Installing Modules	5-20
5.2.3	Installing the CPU and the Power Supply Module	5-25
5.2.4	Installing the Terminal Block for Field Connection Module	5-29
5.2.5	Connector for Field Connections Module	5-35
5.2.6	Installing the Communications Modules	5-39
5.2.7	Installing the Motion Module	5-44
5.2.8	Installing Rack-to-Rack I/O Cables	5-49
5.3	Panel Wiring	5-51
5.3.1	Separation of Power Supply Systems	5-51
5.3.2	Wiring the Power Supply Module	5-51
5.3.3	Wiring Digital I/O Modules	5-55

CONTENTS

5.3.4	Wiring Other Modules	5-68
5.3.5	Grounding	5-70
5.3.6	Hot Swapping	5-76
5.4	External Wiring	5-80

CHAPTER 6 Low Voltage Directives 6-1

6.1	Power Supply Modules	6-2
6.1.1	Models of Power Supply Modules	6-2
6.1.2	Appearance of Power Supply Modules	6-3
6.1.3	Functions and Specifications of Power Supply Modules	6-5
6.1.4	Using Power Supply Modules	6-6
6.2	I/O Modules	6-11
6.2.1	Models of I/O Modules	6-11
6.2.2	Appearance of I/O Modules	6-12
6.2.3	EN Standard for I/O Module	6-14
6.2.4	Specifications of the I/O Module	6-16

APPENDICES

Examples of Panel Layout and Hole Dimensions	A-1
A.1 Panel Layout	A-2
A.2 Drilling Plan	A-4
Dimensions	B-1
B.1 Power Supply Modules	B-2
B.2 CPU Modules	B-3
B.3 Communications Modules	B-5
B.4 I/O Modules	B-10
B.5 Special Purpose Modules	B-13
B.6 Motion Modules	B-14
B.7 Other Modules	B-16
B.8 Mounting Bases	B-19
B.9 Cables	B-22

INDEX

Introduction and Precautions

1

This chapter introduces this manual and provides precautions for the use of this manual and the product. **You must read this chapter before attempting to read the rest of the manual or using the product.**

1.1	Overview of Manuals	1-2
1.2	Precautions	1-7
1.2.1	Safety Precautions	1-7
1.2.2	Installation Precautions	1-8
1.2.3	Removal Precautions	1-12
1.2.4	Wiring Precautions	1-13
1.2.5	Applications Precautions	1-16
1.2.6	Maintenance	1-18
1.3	Using this Manual	1-19

1.1 Overview of Manuals

- This manual provides hardware information on the GL120 and GL130 and contains the following items.
 - 1) System configuration
 - 2) Types of devices used in the system configuration
 - 3) Functions and specifications of the devices used in the system configuration
 - 4) Installation and wiring
 - 5) Examples of panel layout and dimensions for boring
 - 6) Dimensions
- Read this manual carefully in order to properly use the hardware of the MEMOCON GL120 and GL130 Programmable Controllers. Also, keep this manual in a safe place so that it can be referred to whenever necessary.
- Refer to the following manuals for related peripheral devices, Modules, and software.

Product	Manual Name	Manual Number	Content
CPU Module	MEMOCON GL120 CPU10 Module User's Manual	SIEZ-C825-20.1-1	Describes the functions, specifications, usage, and ROM operation of the CPU10 Module.
	MEMOCON GL120 CPU21 Module User's Manual	SIEZ-C825-20.1-2	Describes the functions, specifications, usage, and expansion memory access instructions of the CPU21 Module.
	MEMOCON GL120, GL130 Software User's Manual, Volume 1	SIEZ-C825-20.11	Describes the following for the GL120 and GL130: 1) Operating principles 2) I/O allocation 3) Overview of instructions 4) Instruction processing times
	MEMOCON GL120, GL130 Software User's Manual, Volume 2	SIEZ-C825-20.12	Describes the programming instructions used to create ladder programs for the GL120 and GL130. The following instructions are described in other manuals. 1) Expansion Math Instructions: Software User's Manual (Vol. 3) 2) Process Control Instructions: Software User's Manual (Vol. 4) 3) Communications Instructions COM: COM Instructions User's Manual FBUS: PC Link Module User's Manual MSTR: MEMOBUS PLUS User's Manual 4) Motion Control Instructions (ladder motion instructions) Motion Module MC20 Software User's Manual 5) Motion Language Motion Module MC20 Software User's Manual
	MEMOCON GL120, GL130 Software User's Manual, Volume 3	SIEZ-C825-20.13	Describes expansion math instructions (floating point math instructions, etc.) used for the GL120 and GL130.
	MEMOCON GL120, GL130 Software User's Manual, Volume 4	SIEZ-C825-20.14	Describes process control instructions used for the GL120 and GL130.
	I/O Modules	MEMOCON GL120, GL130 120-series I/O Modules User's Manual	SIEZ-C825-20.22
MEMOCON GL120, GL130 Distributed I/O Module User's Manual (MECHATROLINK)		SIEZ-C825-20.71	Describes the functions, specifications, and usage of the Distributed I/O Module for MECHATROLINK.

Product	Manual Name	Manual Number	Content
Special Purpose Modules	MEMOCON GL120, GL130 120-series High-speed Counter Module User's Manual	SIEZ-C825-20.24	Describes the functions, specifications, and usage of the 120-series High-speed Counter Module.
	MEMOCON GL120, GL130 Pulse Catch and Counter Module User's Manual	SIEZ-C825-20.28	Describes the functions, specifications, and usage of the 120-series Pulse Catch and Counter Module.
	MEMOCON GL120, GL130 Counter Module User's Manual (MECHATROLINK)	SIEZ-C825-20.79	Describes the functions, specifications, and usage of the Counter Module for MECHATROLINK.
	MEMOCON GL120, GL130 Pulse Output Module User's Manual (MECHATROLINK)	SIEZ-C825-20.80	Describes the functions, specifications, and usage of the Pulse Output Module for MECHATROLINK.
Motion Modules	MEMOCON GL120, GL130 Motion Module MC10 User's Manual	SIEZ-C825-20.41	Describes the functions, specifications, and usage of the One-axis Motion Module MC10.
	MEMOCON GL120, GL130 Motion Module MC15 User's Manual	SIEZ-C825-20.43	Describes the functions, specifications, and usage of the Two-axis Motion Module MC15.
	MEMOCON GL120, GL130 Motion Module MC20 Hardware User's Manual	SIEZ-C825-20.51	Describes the functions, specifications, and usage of the Four-axis Motion Module MC20.
	MEMOCON GL120, GL130 Motion Module MC20 Software User's Manual	SIEZ-C825-20.52	Describes motion control instructions (ladder motion instructions) and motion program language used for the Four-axis Motion Module MC20.
	MEMOCON GL120, GL130 Teach Pendant TB120 for Motion Module MC20 User's Manual	SIEZ-C825-60.3	Describes the functions, specifications, and usage of the Teach Pendant TB120.
Human-Machine Interface	MEMOCON GL120, GL130 MEMOSOFT for P120 Programming Panel User's Manual	SIEZ-C825-60.7	Describes the functions, specifications, and usage of the Programming Panel P120 (with built-in MEMOSOFT).
	MEMOCON GL120, GL130 MEMOSOFT User's Manual	SIEZ-C825-60.10	Describes the functions and usage of the MEMOSOFT for DOS.
	MEMOCON GL120, GL130 MEMOSOFT for Windows User's Manual	SIEZ-C825-60.25	Describes the functions and usage of the MEMOSOFT for Windows.
	MEMOCON GL120, GL130 Online Programmer for P120 Programming Panel User's Manual	SIEZ-C825-60.19	Describes the functions, specifications, and usage of the Online Programmer for the GL120 and GL130.
	MEMOCON GL120, GL130 MEMOMAIL for P120 Programming Panel User's Manual	SIEZ-C825-60.19-2	Describes the functions, specifications, and usage of the Online Programmer MEMOMAIL for the GL120 and GL130.
	MEMOCON GL120, GL130 Online Programmer for P140 Programming Panel User's Manual	SIEZ-C825-60.22	Describes the functions, specifications, and usage of the Online Programmer for the GL120 and GL130.
	FA Monitor for MEMOCON Series ACGC4200 User's Manual	SIE-C825-60.57	Describes the functions, specifications and usage of the FA Monitors ACGC4250/4260.

Product	Manual Name	Manual Number	Content
Communication Modules	MEMOCON GL120, GL130 PC Link Module User's Manual	SIEZ-C825-70.4	Describes the functions, specifications, and usage of the PC Link Module for the GL120 and GL130.
	MEMOCON GL120, GL130 MEMOBUS PLUS User's Manual	SIEZ-C825-70.5	Describes the functions, specifications, and usage of the MEMOBUS PLUS.
	MEMOCON GL120, GL130 MEMOBUS PLUS SA85 Network Adapter User's Manual	SIEZ-C825-70.6	Describes the SA85 Network Adapter for the MEMOBUS PLUS.
	MEMOCON GL120, GL130 MEMOBUS PLUS BM85 Bridge/Multiplexer User's Manual	SIEZ-C825-70.7	Describes the BM85 Bridge/Multiplexer for the MEMOBUS PLUS.
	MEMOCON GL120, GL130 Coaxial Remote I/O System User's Manual	SIEZ-C825-70.8	Describes the functions, specifications, and usage of the Coaxial Remote I/O System for the GL120 and GL130.
	1000/2000-Series Coaxial Remote I/O System User's Manual	SIEZ-C825-70.9	Describes the functions, specifications, and usage of the Coaxial Remote I/O System for the GL120 and GL130 using 1000 I/O and 2000 I/O
	MEMOCON GL120, GL130 Uniwire Interface Module User's Manual	SIEZ-C825-20.26	Describes the functions, specifications, and usage of the 120-series Uniwire Interface Module.
	MEMOCON GL120, GL130 Uniwire H-system Interface Module User's Manual	SIEZC82052100	Describes the functions, specifications, and usage of the 120-series Uniwire Interface Module.
	MEMOCON GL120, GL130 Distributed I/O Driver Module User's Manual	SIEZ-C825-20.29	Describes the functions, specifications, and usage of the 120-series Distributed I/O Driver Module for MECHATROLINK.
	MEMOCON GL120, GL130 M-NET Module User's Manual	SIEZ-C825-70.12	Describes the functions, specifications, and usage of the M-NET Module.
	MEMOCON GL120, GL130 MEMOBUS User's Manual	SIEZ-C825-70.13	Describes the functions, specifications, and usage of the MEMOBUS.
	MEMOCON GL120, GL130 COM Instructions User's Manual	SIEZ-C825-70.14	Describes the functions, specifications, and usage of the COM instructions. It also describes the specifications and usage of the MEMOBUS Module.
	MEMOCON GL120, GL130 Optical/Electrical Conversion Module User's Manual	SIEZ-C825-70.18	Describes the functions, specifications, and usage of the Optical/Electrical Conversion Module.
	MEMOCON GL120, GL130 YENET 1600-D Module User's Manual	SIEZ-C825-70.20	Describes the functions, specifications, and usage of the YENET 1600-D Module.
	MEMOCON GL120, GL130 Ethernet Interface Module User's Manual	SIEZ-C825-70.21	Describes the functions, specifications, and usage of the Ethernet Interface Module.

Product	Manual Name	Manual Number	Content
Communication Modules	MEMOCON GL120, GL130 FIX Ethernet MEMOBUS Driver (YME) User's Manual	SIEZ-C825-70.22	Describes the functions, specifications, and usage of the FIX Ethernet MEMOBUS Driver.
Other Products	MEMOCON GL120, GL130 Traceback User's Manual	SIEZ-C825-60.10-4	Describes the functions, specifications, and usage of the Traceback.

- Thoroughly check the specifications and conditions or restrictions of the product before use.

1

1.2 Precautions

This section outlines general precautions that apply to using this manual and the product. **You must read this section first before reading the remainder of the manual.**

1.2.1	Safety Precautions	1-7
1.2.2	Installation Precautions	1-8
1.2.3	Removal Precautions	1-12
1.2.4	Wiring Precautions	1-13
1.2.5	Applications Precautions	1-16
1.2.6	Maintenance	1-18

1.2.1 Safety Precautions

- The GL120 and GL130 were not designed or manufactured for use in devices or systems directly related to human life. Users who intend to use the product described in this manual for special purposes such as devices or systems relating to transportation, medical, space aviation, atomic power control, or underwater use must contact Yaskawa Electric Corporation beforehand.
- This product has been manufactured under strict quality control guidelines. However, if this product is to be installed in any location in which a failure of GL120 and GL130 involves a life and death situation or in a facility where failure may cause a serious accident, safety devices **MUST** be installed to minimize the likelihood of any accident.
- Any illustrations, photographs, or examples used in this manual are provided as examples only and may not apply to all product to which this manual is applicable.
- The products and specifications described in this manual or the content and presentation of the manual may be changed without notice to improve the product and/or the manual. A new version of the manual will be released under a revised manual number when any changes are made.
- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order a new manual whenever this manual is damaged or lost. Please provide the manual number listed on the front cover of this manual when ordering.
- Contact your Yaskawa representative or a Yaskawa office listed on the back of this manual to order new nameplates whenever a nameplate becomes worn or damaged.
- Yaskawa cannot guarantee the quality of any products which have been modified. Yaskawa assumes no responsibility for any injury or damage caused by a modified product.

1.2.2 Installation Precautions

Abide by the following precautions when installing GL120 and GL130 systems.

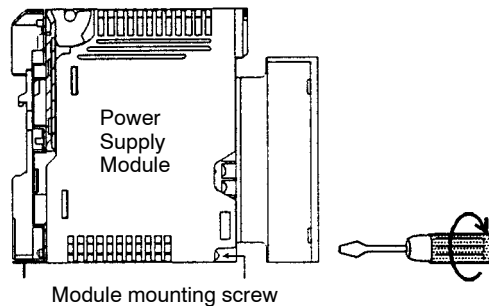
! Caution The installation environment must meet the environmental conditions given in product catalogs and manuals. Using the GL120 and GL130 in environments subject to high temperatures, high humidity, excessive dust, corrosive gases, vibration, or shock can lead to electrical shock, fire, or faulty operation. Do not use the GL120 and GL130 in the following locations.

- Locations subject to direct sunlight or ambient temperatures not between 0 and 60 °C.
- Locations subject to relative humidity in excess of 95%, or condensation because of rapid changes in humidity.
- Locations subject to corrosive or flammable gas.
- Locations that would subject the GL120 and GL130 to direct vibration or shock.
- Locations subject to contact with water, oil, chemicals, etc.

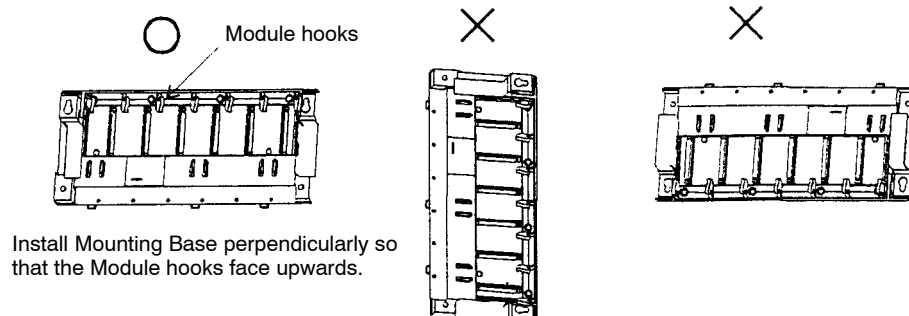
! Caution Install the GL120 and GL130 as described in this product manual. Improper installation can cause product failure, malfunctions, or Modules or other components to fall off.


- 1) Make sure that all mounting screws are securely tightened.

Make sure that all installation screws for Modules or terminal block for field connection are securely tightened so that they do not become loose. Loose screws will cause failures in the GL120 and GL130.




- 2) Install Mounting Bases in the correct direction. Faulty or inappropriate installation may result in detachment, failure, or malfunction.




 **Caution** Never install a Mounting Base on the DIN track when transporting over long distances or when the control panel which houses the GL120 or GL130 will be used in an environment subject to excessive vibration. In such cases, install the Mounting Base directly onto a steel installation plate.


If the Mounting Base is installed on DIN track, it may fall off if subject to strong shock or vibration.

 **Caution** Connector covers are attached to the Module connectors on the Mounting Base. Leave the Module connectors attached to the connector covers when mounting the Mounting Base so that foreign matter does not enter the Module connectors during mounting operations.


The GL120 and GL130 may malfunction if any foreign matter enters a Module connector.

 **Caution** When installing the Power Supply Module, turn OFF the power supply to the field wiring terminals.

Installing the Power Supply Module while the power is being supplied may damage the Module or cause malfunction of the GL120 and GL130.

 **Caution** When installing the CPU or the Expander Module, turn OFF the power supply to all Power Supply Modules.


Installing the CPU or the Expander Module while the power is being supplied to Power Supply Modules may damage the Module or cause malfunction of the GL120 and GL130.

 **Caution** When installing the terminal block for the AC I/O Modules, turn OFF the AC power supply to the AC I/O Modules for input signal or driving loads.


Installing a terminal block with AC power to the external power supply terminal of the AC I/O Modules may cause an electric shock at touching the power supply terminals.

 **Caution** Make sure that all mounting screws for the terminal block are securely tightened.

Make sure that all mounting screws for the terminal block are securely tightened so that they do not become loose. Loose screws may cause malfunctioning of the GL120, GL130.

 **Caution** Make sure that all cable connectors for the Module are securely inserted and tightened.

Insufficient insertion and/or looseness may cause malfunction of the GL120 and GL130.

 **Caution** Mount the Modules mentioned in the table below on CPU racks (racks with CPU Modules).


Mounting these Modules on any other racks may damage the Modules or cause a malfunction of the GL120 and GL130.

Modules to be Mounted on CPU Rack	Model No.
Remote I/O Driver Module	JAMSC-120CDR13100
2000-series Remote I/O Driver Module	JAMSC-120CDR13110
PC Link Module	JAMSC-120NFB23100
Ethernet Interface Module	JAMSC-120NET12100

 **Caution** Mount the Modules mentioned in the table below on local channel racks.


Mounting these Modules on remote channel racks may damage the Modules or cause a malfunction of the GL120 and GL130.

Modules to be Mounted on Local Channel Rack	Model No.
MEMOBUS Module (RS-232)	JAMSC-120NOM13100
MEMOBUS Module(RS-422)	JAMSC-120NOM13110


 **Caution** When installing the Modules that do not support hot swapping, turn OFF the power supply to Power Supply Modules.

Installing the Modules that do not support hot swapping while the power is being supplied to Power Supply Modules may damage the Module or cause malfunction of the GL120 and GL130.


Modules that Do Not Support Hot Swapping	Model No.
Remote I/O Driver Module	JAMSC-120CDR13100
2000-series Remote I/O Driver Module	JAMSC-120CDR13110

 **Caution** When connecting the cables connected to the Ethernet Interface Modules, turn OFF the power supply to the Power Supply Modules on the racks where the Ethernet Interface Modules are mounted.


Connecting the cables while power is being supplied to the Power Supply Modules may damage the Ethernet Interface Module or cause a malfunction of the GL120 and GL130.

 **Caution** Mount the MC20 Module on a CPU Rack(a rack with CPU Module).


Installing the MC20 Module on any other rack may damage the Module or cause the malfunction of the GL120 and GL130.

 **Caution** When using the absolute position detecting function with the MC15 Module, it must be mounted on the CPU Rack (a rack with CPU Module).


Installing the MC15 Module on any other rack may damage the Module or cause the malfunction of the GL120 and GL130.

-  **Caution** When installing the Motion Module, turn OFF the power supply to the Power Supply Module on the rack with the Motion Module mounted.

Installing the Motion Module while the power is being supplied to the Power Supply Module may damage the Module or cause malfunction of the GL120 and GL130.

-  **Caution** When connecting the cables to the Motion Module, turn OFF the power supply to the Power Supply Module on the rack with the Motion Module mounted.


Connecting cables to a Motion Module while the power is being supplied may damage the Module or cause malfunction of the GL120 and GL130.

-  **Caution** When connecting the Rack-to-rack I/O cables to the Motion Module, turn OFF the power Supply to all Power Supply Modules.


Connecting the cables while the power while the power is being supplied may damage the Module or cause a malfunction of the GL120 and GL130.

-  **Caution** The total length of the rack-to rack I/O cable for each station is always 6.0 m or less.


If the total length of the cables exceeds 6.0 m, operational errors may occur at the station.

-  **Caution** Make sure that all cable connectors for the Module are securely inserted and tightened.

Insufficient insertion and/or looseness may cause malfunction of the GL120 and GL130.

-  **Caution** Do not remove the connector covers from the Module connectors on the Mounting Base slots where no Modules are installed.

The GL120 and GL130 may malfunction if any foreign matter enters a Modules connector.

-  **Caution** Make sure that all mounting screws for the Module are securely tightened.

Make sure that all mounting screws for the Modules are securely tightened so that they do not become loose. Loose screws may cause malfunction of the GL120 and GL130.

-  **Caution** Do not mount more than one Power Supply Modules on a single Mounting Base.

Mounting more than one Power Supply Modules on a single Mounting Base may damage the Power Supply Module and cause malfunction of the GL120 and GL130.

-  **Caution** Do not mount more than CPU Modules and Expander Module on a single Mounting Base.

Mounting more than CPU Modules and Expander Module on a single Mounting Base may damage the CPU Modules and Expander Module or cause malfunction of the GL120 and GL130.

Caution Always turn OFF the power to field wiring terminals before removing the Power Supply Module.

Removing the Power Supply Module while power is supplied to field wiring terminals may damage the Power Supply Module or cause malfunction of the GL120 and GL130.

Caution Always turn OFF the power to the Power Supply Module before removing the CPU Modules or Expander Module.

Removing the CPU Modules and Expander Module while power is supplied to Power Supply Module may damage the CPU Modules and Expander Module or cause malfunction of the GL120 and GL130.

Caution Always turn OFF the AC power supply to the AC I/O Modules for inputting signal or for driving loads before removing the terminal block from the AC I/O Modules.

Removing a terminal block with AC power supply to the external power supply terminal of the AC I/O Modules may cause an electric shock at touching the power supply terminals.

Caution When inserting or removing an AC I/O Module while the AC power supply is turned ON, install a safety switch for each Module and always turn this safety switch OFF to turn OFF the AC power supply to the Module.

Inserting or removing an AC I/O Module while the AC power supply is being supplied may result in an electric shock at touching the power supply terminals.


Caution Always turn OFF the power to the Power Supply Module before removing the Modules that do not support hot swapping.

Removing the Modules that do not support hot swapping while the power is being supplied to the Power Supply Module may damage the Modules or cause a malfunction of the GL120 and GL130.


Modules that Do Not Support Hot Swapping	Model No.
Remote I/O Driver Module	JAMSC-120CDR13100
2000-series Remote I/O Driver Module	JAMSC-120CDR13110

Caution Always turn OFF the power to Power Supply Modules on the rack having the Ethernet I/F Module Mounted, before removing the cables connected to the Ethernet I/F Module.


Removing cables connected to the Ethernet I/F Module while power is being supplied to Power Supply Module may damage the Modules or cause malfunction of the GL120 and GL130.

-  **Caution** Always turn OFF the power to Power Supply Module on the Rack, having the Motion Module mounted, control power of Servo Amp, and power supply for the external I/O devices, before removing cables to the Motion Module.

Removing cables connected to the Motion Module while power is being supplied to these devices may damage the Motion Module or cause malfunction of the GL120 and GL130.


-  **Caution** Always turn OFF the power to Power Supply Module on the rack, having the Motion Module mounted, control power of Servo Amp, and power supply for the external I/O devices before removing the Motion Module.

Removing the Motion Module while the power is being supplied to these devices may damage the Motion Module or cause malfunction of the GL120 and GL130.


-  **Caution** Always turn OFF the power to Power Supply Module before removing the Rack-to rack I/O cables connected to the Expander Module.

Removing cables connected to the Expander Module while power is being supplied to Power Supply Module may damage the Expander Module or cause malfunction of the GL120 and GL130.

1.2.4 Wiring Precautions

-  **Caution** Connect the correct power supply for the required ratings.


Connecting unsuitable power supplies may result in fires.

-  **Caution** Wiring must be performed by qualified personnel.


Wrong or inappropriate wiring may result in fire, product failure, or electric shock.

-  **Caution** Wire power supply wires to the DC Power Supply Module with the correct polarity.

Wiring with incorrect polarity may result in damage to the DC Power Supply Module.

-  **Caution** Connect power supplies of the same phases to the common 1 and common 2 of the AC I/O Module.

If power supplies of different phases are connect, overheating or fire may occur.

 **Caution** When inserting or removing an AC I/O Modules while the AC power supply is turned ON, install a safety switch for each Module and always turn this safety switch OFF to turn OFF the AC power supply to the Module.

Inserting or removing an AC I/O Modules while the AC power supply is being supplied may result in an electric shock at touching power supply terminals.

 **Caution** When using one of the following Output Modules, connect an external fuse corresponding to the specifications of the load and in series with the load.

- a) 100/200-VAC 8-point Output Module (Model No.: JAMSC-120DAO83000)
(Model No.: JAMSC-120DAO83009)
- b) 100/200-VAC 16-point Output Module (Model No.: JAMSC-120DAO84300)
(Model No.: JAMSC-120DAO84309)
- c) 12/24-VDC 16-point Output Module (sinking) (Model No.: JAMSC-120DDO34310)
- d) 12/24-VDC 16-point Output Module (sourcing) (Model No.: JAMSC-120DDO34320)
- e) 12/24-VDC 32-point Output Module (sinking) (Model No.: JAMSC-120DDO35410)
- f) 12/24-VDC 64-point Output Module (sinking) (Model No.: JAMSC-120DDO36410)
- g) Relay Contact 16-point Output Module (Model No.: JAMSC-120DRA84300)
(Model No.: JAMSC-120DRA84309)

Not connecting an external fuse may result in fire, damage to the device, or damage to output circuit due to an overload or a short-circuit at the load.

 **Caution** Ground the protective ground terminal to a resistance of 100 Ω max.

Not grounding the protective ground terminal may result in electric shock or malfunction.

Insert the Interface Cables Properly

- Insert the connectors of the various interface cables that are to be connected to GL120 and GL130 into the communication ports and secure them properly.

Improper insertion of interface cables may cause operational errors in the GL120 and GL130.

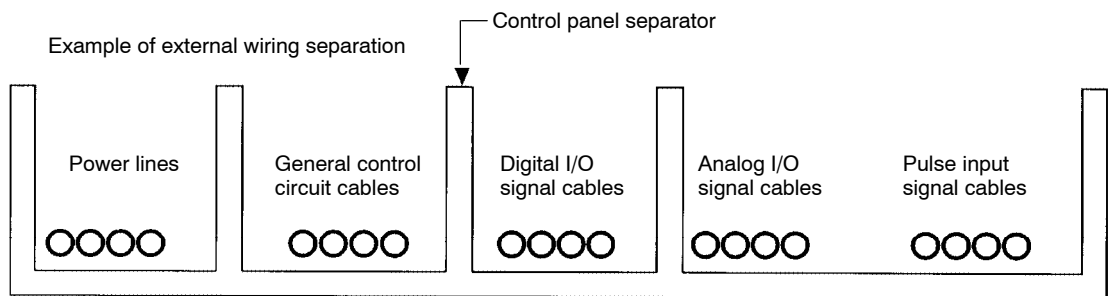
Power Supply Noise Reduction

- Prevent noise from penetrating into the product by installing an isolation transformer or a noise filter for the external power supply.

Noise from power supply may result in the malfunctioning of GL120 and GL130.

Select, Separate, and Lay External Wiring Correctly

- I/O lines connecting external devices to the 120-series I/O Modules must be selected based on the following considerations: mechanical strength, resistance to noise, wiring distance, signal voltage, etc.
- I/O lines must be separated from power lines both inside and outside the control panel to minimize the affects of noise. Faulty operation may result if I/O lines are not sufficiently separated from power lines.



1.2.5 Applications Precautions

! WARNING Do not touch terminals while the power is ON.

Touching live terminals may cause electric shock.

! WARNING Construct an emergency stop circuit and an interlock circuit outside of the GL120 and GL130.

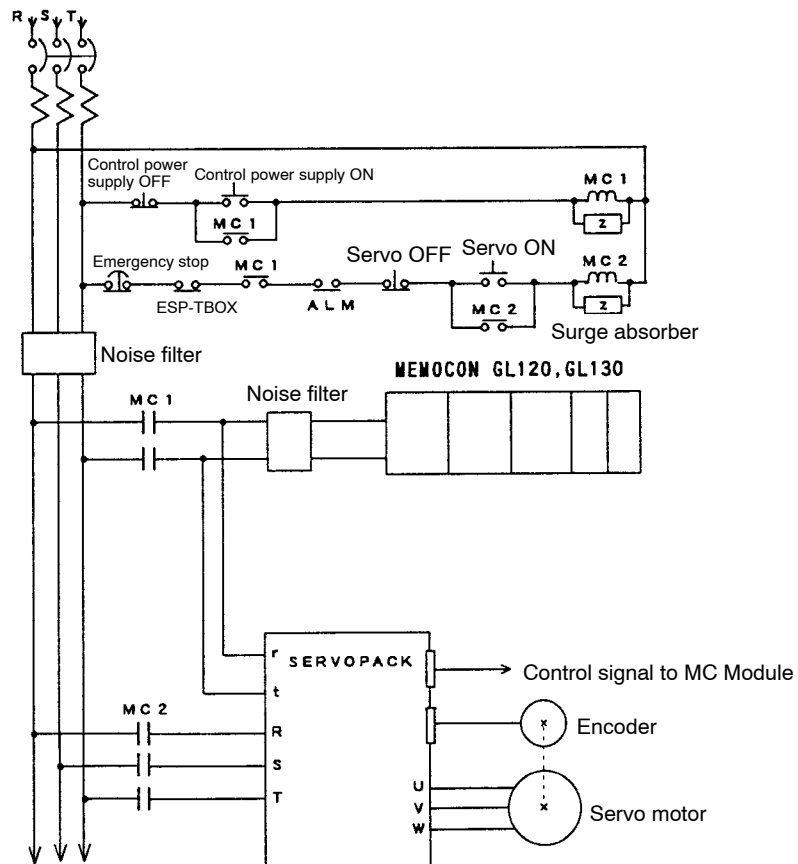
The absence of emergency stop and interlock circuits may result in machine damage or accidents should the GL120 or GL130 fail.

Install an Emergency Stop Circuit Outside the GL120 and GL130.

An emergency stop circuit for the control system should not be constructed using the ladder programming in the GL120 and GL130. Always construct the emergency stop circuit externally using a relay circuit, as shown in the figure below.

Use an N.C. contact (mechanical contact) in the emergency stop switch. The main power supply to the servo must be cut off by pressing the switch.

Failure to provide an emergency stop circuit as described above, may result in failure of the emergency stop when input circuits fail or cables break, and may cause machine damage or injury.

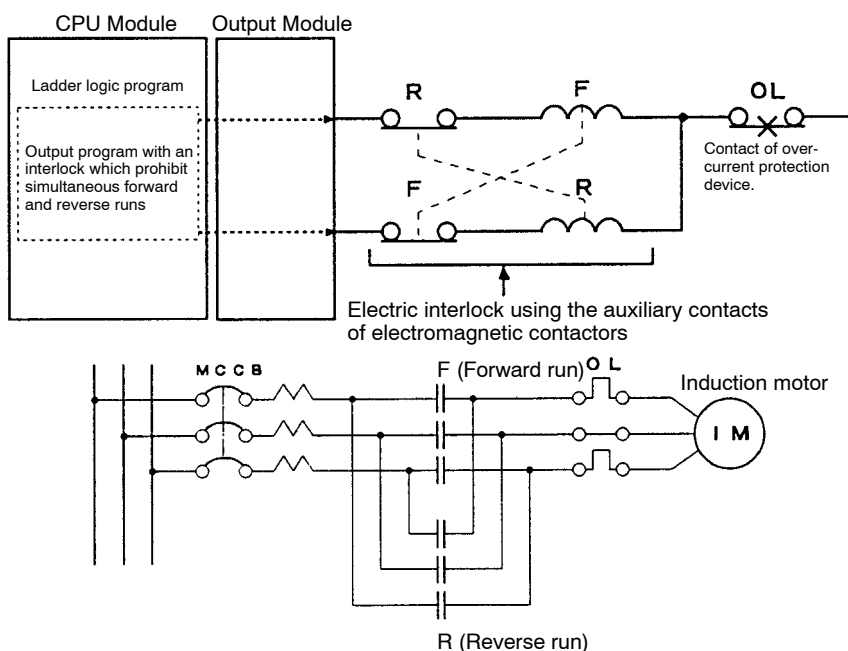


External Interlocks for the GL120 and GL130

Externally connect an interlock to the GL120 and GL130 if there is any chance that GL120 and GL130 failure could result in bodily harm or equipment damage.

Always use an external interlock system as shown in the following example when reciprocal operations (e.g., forward and reverse directions) are being performed with a motor.

An interlock is generally programmed in the GL120/GL130 ladder program to ensure that forward and reverse signals are not simultaneously output. An external interlock circuit must also be provided using the auxiliary contacts of electromagnetic contactors.



Caution Always make sure that power supply to the external power supply terminals (AC1, AC2) is OFF when operating the input voltage selector switch of Power Supply Module.


Operating the input voltage selector switch of Power Supply Module while power is being supplied to the external power supply terminals may damage the Module.

Caution Set the Rack numbers according to the following rules.


If the Rack No. is not set according to the following rules, the PLC system will not run normally. In other words, it may result in failure of the CPU Module to run, communication errors, I/O process errors, etc.

- Set each Rack No. between 1 and 4 (rotary switch No: between 0 and 3).
- Always set the Rack No. where CPU Module or Remote I/O Receiver Module is installed to 1 (rotary switch: 0).
- Do not use the same Rack No. more than once at the same station.

1.2.6 Maintenance

 **WARNING** Do not reverse the positive and negative terminals, charge, dismantle, heat, throw into fire or short-circuit batteries.

These may cause explosion and/or ignition.

 **Caution** Do not disassemble or modify Modules and Mounting Bases.

Doing so can cause fires, product failure, or malfunction.

 **Caution** Do not replace any of the built-in fuses.

Replacing built-in fuse by users may result in failure or malfunction of the Power Supply Modules. Built-in fuse must be replaced by a Yaskawa service department.

Monitor the Life of Battery

- Monitor the life of the built-in battery in the CPU Module. If the “BAT ALM” indicator lights, replace the battery with a new one (replacement battery: BR-2/3A-1) within 2 weeks.

Delay in replacing the battery may result in the memory content loss of the ladder program and the motion program in the CPU Module and any Motion Modules.

- When the BAT Module’s “ALARM1” indicator lights, be sure to replace the battery with an ER6VC3N replacement battery within one week. Delay in replacing the battery may result in the memory content loss of the rotation data in the absolute encoder.

Regularly Overhaul Power Supply Modules

- Overhaul the Power Supply Module once every 5 years.

Deterioration of parts such as smoothing capacitors may result in malfunctioning of power supply sections. When a Power Supply Module is used in one of the following environment, overhaul more frequently.

- When used in places subject to high temperature or humidity, or subject to high variations in these.
- When variations in the power supply (voltage, frequency, wave-form distortion, etc.) or load are high.
- When subject to bad storage environments before use, including long-term storage or stoppage.

1.3 Using this Manual

This Manual is compiled for the following readers:

- 1) Those estimating purchase prices of GL120 or GL130 systems.
- 2) Those considering application of the GL120 or GL130.
- 3) Those designing control panels for the installation of the GL120 or GL130.
- 4) Those creating control panels to include the GL120 or GL130.
- 5) Those inspecting control panels on which GL120 or GL130 has been installed.
- 6) Those testing or adjusting control panels on which GL120 or GL130 has been installed.
- 7) Those maintaining control panels on which the GL120 or GL130 has been installed.

• Meaning of Basic Terms

In this manual, the following terms are defined as follows, unless otherwise specified:

- **PLC = Programmable (Logic) Controller**
- **PP = Programming Panel**
- **GL120, GL130 = MEMOCON GL120 and/or MEMOCON GL130 Programmable Controller**

Overview

2



This chapter provides an outline of the MEMOCON GL120 and GL130, including system configuration examples, main modules, etc.

2.1 Overview of the MEMOCON GL120 and GL130 2-2

2.1 Overview of the MEMOCON GL120 and GL130

This section outlines the MEMOCON GL120 and GL130.

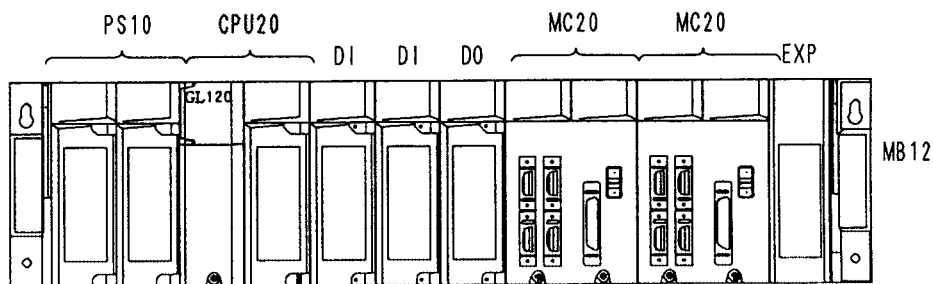
- 1) The MEMOCON GL120 (abbreviated GL120) and MEMOCON GL130 (abbreviated GL130) are programmable controllers (PLCs) developed to succeed the MEMOCON-SC GL60 Series. The MEMOCON-SC GL60 Series has been well received and is very popular for key controllers in FA systems. The GL120 and GL130 are mid- to large-capacity programmable controllers. They provide greater compactness, higher quality, and higher performance while retaining the functions of the GL60 Series. The GL120 and GL130 have program memory capacity of 8K words, 16K words, 32K words, and 40K words, making the GL120 a mid-capacity controller and the GL130 a large-capacity controller.

- 2) The GL120 and GL130 can be used as high-speed machine controllers or as key controllers for various automatic devices, and can be applied to the following control:
 - Sequence control
 - Motion control
 - Process control
 - Computational control

- 3) The difference between the GL120 and GL130 lies in the CPU Module that is used. A PLC using the CPU20 CPU Module is a GL120, while a PLC using a CPU30 CPU Module is a GL130. All devices other than the CPU Module can be used in both PLCs.

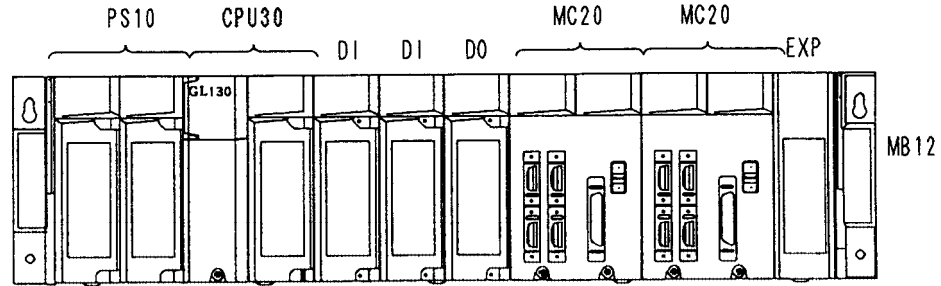
Example 1

Example of system configuration for MEMOCON GL120



Example 2

Example of system configuration for MEMOCON GL130



- PS10: Power Supply Module (7 A)
- CPU20: CPU Module (16 KW)
- CPU30: CPU Module (32 KW)
- DI: Digital Input Module
- DO: Digital Output Module
- MC20: Four-axis Motion Module
- EXP: Expander Module
- MB12: 12-slot Mounting Base

4) The following table shows the main Modules and other devices used in the GL120 and GL130. Any items listed as "Optional" in the Use column may be used as required according to the system control specifications of the GL120 or GL130.

Table 2.1 Main GL120 and GL130 Modules and other Products

Use	Name	Features
Required	Power Supply Module	Supplies DC power to various Modules to operate them.
Required	CPU Module	<ol style="list-style-type: none"> 1) Stores the user program, solves the program based on the information from the input section, and outputs the results to the output section. There are 5 types of CPU Modules, namely the CPU10, CPU20, CPU21, CPU30, and CPU35. 2) Equipped with 1 MEMOBUS port (slave, RS-232C). (CPU20, CPU21, CPU30, CPU35) 3) Equipped with 1 MEMOBUS PLUS port (CPU20, CPU21, CPU30, CPU35) 4) Execute the ROM operation. (CPU10, CPU21)

Use	Name	Features
Optional	Communications Module	<ol style="list-style-type: none"> 1) Remote I/O Driver Module: Used as the master station of a Remote I/O system. 2) Remote I/O Receiver Module: Used as the slave station of a Remote I/O system. 3) 2000-Series Remote I/O Driver Module: Used as the master station of a Remote I/O system for 2000 I/O. 4) MEMOBUS Module (RS-232): Used to increase the number of RS-232C MEMOBUS ports. 5) MEMOBUS Module (RS-422): Used to increase the number of RS-422 MEMOBUS ports. 6) PC Link Module: Used for high-speed communications between PLCs. 7) Uniwire Interface Module: Used as the master station of a Uniwire system. 8) Uniwire H-system Interface Module: Used as the master station of a Uniwire H-system. 9) Distributed I/O Driver Module: Used as the master station of the VINUS I/O system. 10) M-NET Module: Used for high-speed communications between PLCs. 11) YENET 1600-D Module: Used for high-speed communications between PLCs. 12) Ethernet Interface Module: Used for communications between PLCs. 13) Optical/Electrical Conversion Module: Used for an Optical PC Link system or an Optical Remote I/O system.
Optional	I/O Module	<ol style="list-style-type: none"> 1) Digital Input Module: Used to input digital signals. 2) Analog Input Module: Used to input analog signals. 3) Digital Output Module: Used to output digital signals. 4) Analog Output Module: Used to output analog signals.

2

Use	Name	Features
Optional	Special Purpose Module	1) High-speed Counter Module (1 channel): Used to count high-speed pulses. 2) Pulse Catch Module (16 channels): Used to read input signals that are ON for less than one scan time. 3) Register I/O Module: Used to input/output the signal of the numerical value.
Optional	Motion Module	1) Four-axis Motion Module: Used for 4-axis motion control. 2) One-axis Motion Module: Used for 1-axis motion control. 3) Two-axis Motion Module: Used for 2-axis motion control.
Optional	Expander Module	Used to expand the number of racks.
Required	Mounting Base	Used to install Modules.
Optional	Rack-to-rack I/O Cable	Used to connect between Expander Modules of adjacent racks.
Required (one or the other)	Programming Panel P120	1) A dedicated programming panel for MEMOCON PLCs. 2) Used for online or offline programming of the GL120 and GL130.
	MEMOSOFT	A general-purpose personal computer software application for online or offline programming of the GL120 and GL130. (Software package)

- 5) The difference of the GL120 and GL130 lies in the difference in specifications of the CPU Modules. The following table shows the specifications of the CPU10, CPU20, CPU21, CPU30, and CPU35 Modules. The main differences in specifications of the CPU Modules lies in their program memory capacities, the numbers of digital I/O points and scan times.

Table 2.2 CPU Module Summary Specifications

Item	CPU10 (DDSCR- 120CPU14200)	CPU20 (DDSCR- 120CPU34100)	CPU21 (DDSCR- 120CPU34110)	CPU30 (DDSCR- 130CPU54100)	CPU35 (DDSCR- 130CPU54110)
Execution control method	Cyclic scan method				
I/O connection method	1) Direct I/O 2) Remote I/O				
I/O control method	1) Synchronous refresh 2) Direct (direct I/O)				
CPU	General-purpose 16-bit microprocessor			General-purpose 32-bit microprocessor	
Programming language	Ladder diagram				

2

Item		CPU10 (DDSCR- 120CPU14200)	CPU20 (DDSCR- 120CPU34100)	CPU21 (DDSCR- 120CPU34110)	CPU30 (DDSCR- 130CPU54100)	CPU35 (DDSCR- 130CPU54110)
Types and number of instructions CPU20: 166 CPU30: 166 CPU35: 166 CPU21: 169 CPU10: 165		1) Basic instructions: 16 2) Math operations: 25 3) Data manipulation instructions: 48 4) System status monitoring instruction: 1 5) Sequence control instructions: 3 6) Program control instructions: 7 7) I/O control instructions: 2 8) Communications instructions: 9 (CPU10: 8) 9) Motion control instructions: 22 10) Expansion math instructions: 32 11) Process control instruction: 1 12) Expansion memory access instructions: 2 (CPU21)				
Scan time		Ladder logic program: Approx. 1 ms for 1K-word program			Ladder logic program: Approx. 0.6 ms for 1K-word program	
Program memory capacity		16K words (1 word = 24 bits)			32K words (1 word = 24 bits)	40K words (1 word = 24 bits)
Maximum number of input and output points	Digital I/O	1,024 points (1 point = 1 bit) *1			4,096 points (1 point = 1 bit) *1	
	Register I/O	512 registers (1 register= 16 bits) * 2				
	Local I/O	1) Number of channels: 1 2) Number of racks: 4 racks (including CPU rack) 3) Number of mountable I/O Modules: 54 The total number of points, including remote I/O points, must not exceed the limits indicated at * 1 and * 2, above.				
	Remote I/O	1) Number of channels: 2 2) Number of stations per channel: 15 3) Number of racks per station: 4 4) Number of I/O points per station: (Digital input points + 8) + (register input points × 2) ≤ 512 bytes (Digital output points + 8) + (register output points × 2) ≤ 512 bytes The total number of points, including local I/O points and remote I/O points of other remote stations, must not exceed the limits indicated at * 1 and * 2, above.				

Item	CPU10 (DDSCR- 120CPU14200)	CPU20 (DDSCR- 120CPU34100)	CPU21 (DDSCR- 120CPU34110)	CPU30 (DDSCR- 130CPU54100)	CPU35 (DDSCR- 130CPU54110)		
Maximum number of coils, relays, etc.	1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520.						
	2) The maximum value for each reference can be freely set within the above limit from the Programming Panel (Unit: point (1 point = 1 bit)).						
	Item	Setting range		Setting unit	Defaults	Example 1	Example 2
	Coils	16 to 65,472		16	8,192	57,328	65,472
	Link coils	0 to 4,096		1,024	2,048	2,048	0
	MC coils	0 to 512		256	512	512	0
	MC control coils	0 to 320		160	320	320	0
	Input relays	16 to 65,472		16	1,024	4,096	16
	MC relays	0 to 512		256	512	512	0
	MC control relays	0 to 512		256	512	512	0
M code relays	0 to 192		96	192	192	0	
Maximum capacity of data register	1) When the number of coils and relays is the initial value, the number of words of holding registers plus the number of words of constant registers plus the number of words of link registers must not exceed 25,998.						
	2) The maximum value for each reference can be freely set within the above limit from the Programming Panel (Unit: word (1 word = 16 bits)).						
		Setting range		Setting unit	Defaults	Example 1	Example 2
	Holding register	1 to 25,995		1	9,999	19,854	25,995
	Constant register	1 to 4,096		1	4,096	4,096	1
Link register	0 to 4,096		1,024	2,048	2,048	0	

6) Figure 2.2 shows GL120 and GL130 system configurations.

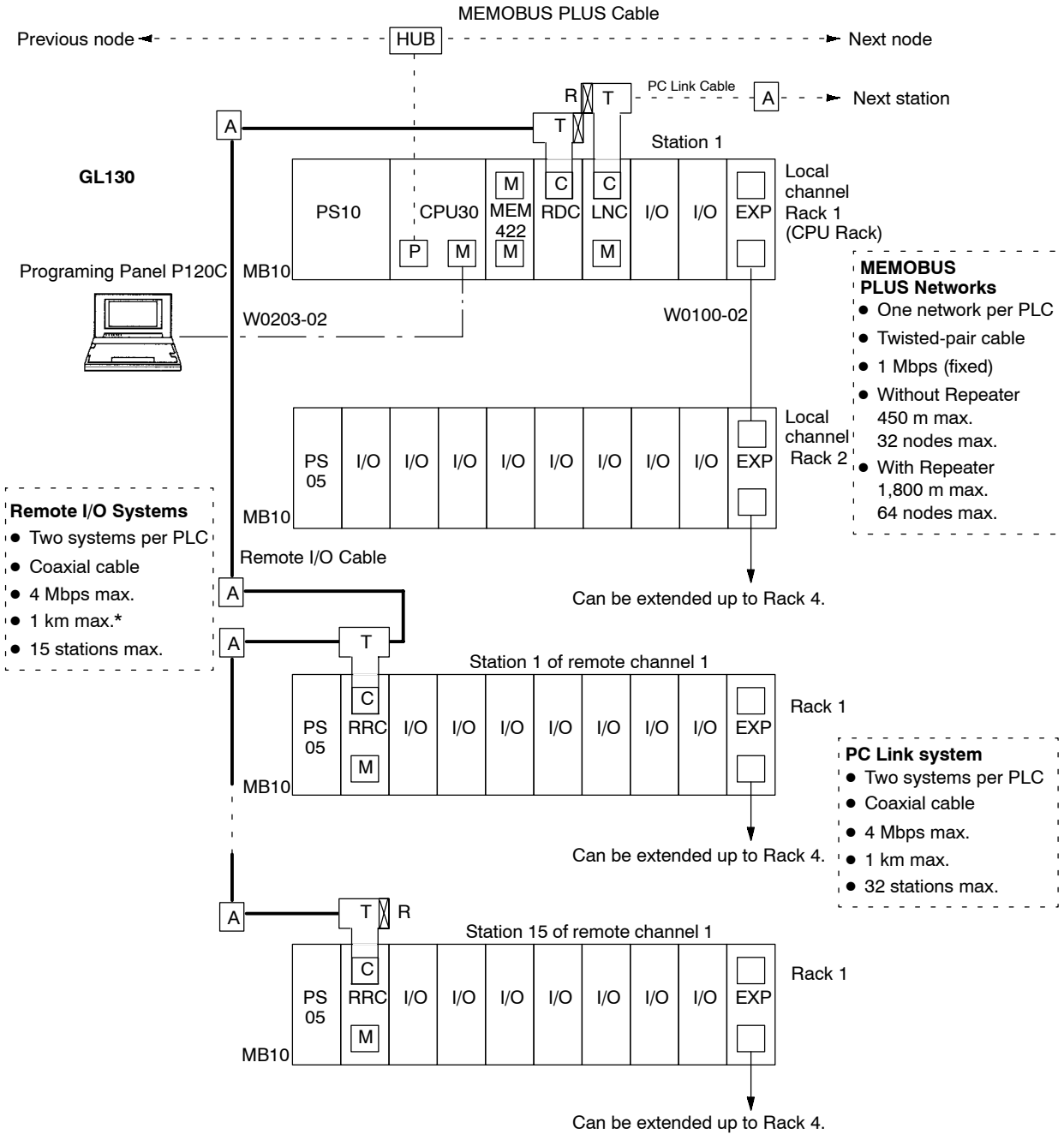
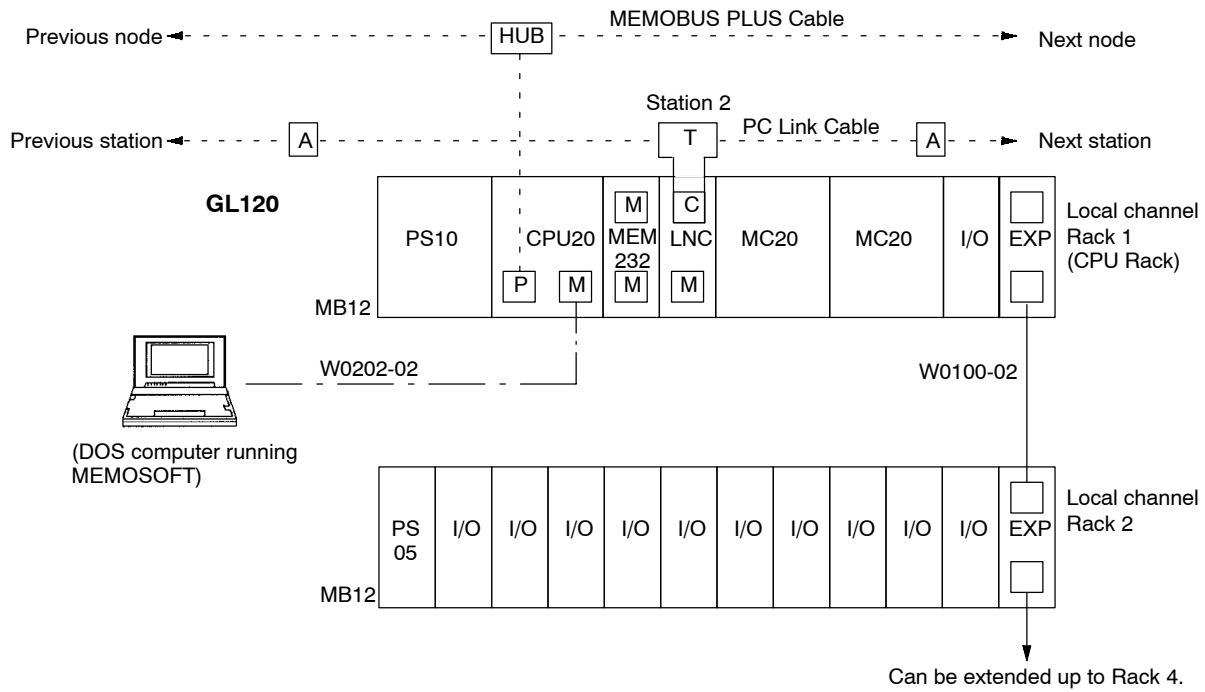


Figure 2.1 Outline of GL120/GL130 System Configuration

* The transmission distance varies according to the baud rate and specifications of the coaxial cable. For example, if the baud rate is 4 Mbps and the 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.



1) Legend

PS10:	Power Supply Module (7 A)	MC20:	4-axis Motion Module	HUB:	Hub Module
PS05:	Power Supply Module (3 A)	I/O:	Input/Output Module	T:	T-adapter
CPU20:	CPU Module (16 KW)	EXP:	Expander Module	R:	Terminator
CPU30:	CPU Module (32 KW)	MB10:	10-slot Mounting Base	A:	Conversion Adapter
RDC:	Remote I/O Driver Module	MB12:	12-slot Mounting Base	P:	MEMOBUS PLUS port
RRC:	Remote I/O Receiver Module	W0100-02:	Rack-to-rack I/O Cable	M:	MEMOBUS port
LNC:	PC Link Module	W0202-02:	MEMOBUS Cable	C:	Coaxial cable communications port
MEM232:	MEMOBUS Module (RS-232)	W0203-02:	MEMOBUS Cable		
MEM422:	MEMOBUS Module (RS-422)	MEMOSOFT:	Programming device		

2) The following five types of Mounting Base are available. Up to four Mounting Bases can be used for each station.

- MB06: 6-slot Mounting Base
- MB08: 8-slot Mounting Base
- MB10: 10-slot Mounting Base
- MB12: 12-slot Mounting Base
- MB16: 16-slot Mounting Base

3) Up to two of each of the following Modules can be used for each GL120 or GL130 PLC.

- Remote I/O Driver Module: Mount to CPU Rack
- PC Link Module: Mount to CPU Rack
- MEMOBUS Module (RS-232/RS-422): Mount to any Rack of the local channel
- 4-axis Motion Module: Mount to CPU Rack

4) I/O Modules can be used within the maximum number of I/O points shown in the following table.

Item	GL120 (CPU20, CPU21, CPU10)	GL130 (CPU30 and CPU35)
Number of digital I/O points	1,024 points max. (1 point = 1 bit)	4,096 points max. (1 point = 1 bit)
Number of I/O registers	512 registers max. (1 register = 16 bits)	
Number of remote I/O points	The number of I/O points and registers at each station must meet the following conditions: 1) (No. of digital input points + 8) + (No. of input registers x 2) ≤ 512 (bytes) 2) (No. of digital output points + 8) + (No. of output registers x 2) ≤ 512 (bytes)	

Figure 2.2 Outline of GL120, GL130 System Configuration (Continued)

System Components

3



3.1 Overview of System Components 3-2

3.1 Overview of System Components

This section describes the GL120/GL130 system components and provides an overview of each component.

Table 3.1 shows the GL120/GL130 system components and provides an overview of each component.

Table 3.1 Overview of System Components: Modules and Mounting Bases

Product	Name	Model Name	Model Number	Features	Number of Slots Required
Power Supply Module	AC Power Supply Module (7 A)	PS10	JRMSP-120CPS11300	1) Supplies DC power to operate Modules. 2) One AC Power Supply Module is required for each Mounting Base.	2
	AC Power Supply Module (3 A)	PS05	JRMSP-120CPS11100	3) PS10: 100/200 VAC (switchable), 7 A 4) PS05: 100/200 VAC (switchable), 3 A	1
	DC Power Supply Module (7 A)	PS11	JRMSP-120CPS21300	1) Supplies DC power to operate Modules. 2) One DC Power Supply Module is required for each Mounting Base.	2
	DC Power Supply Module (3 A)	PS06	JRMSP-120CPS21100	3) PS11: 24 VDC, 7 A 4) PS06: 24 VDC, 3 A	1

3

Product	Name	Model Name	Model Number	Features	Number of Slots Required
CPU Module	CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	<p>1) Stores user program, executes programs according to information from the input section, and outputs processing results to the output section.</p> <p>2) CPU10 Program memory capacity: 8K words Number of digital I/O points: 1,024 max. Number of I/O registers: 512 max. Approx. scan time: 1 ms/KW</p>	1
	CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	<p>3) CPU20 Program memory capacity: 16K words Number of digital I/O points: 1,024 max. Number of I/O registers: 512 max. Approx. scan time: 1 ms/KW</p> <p>4) CPU21 Program memory capacity: 16K words Number of digital I/O points: 1,024 max. Number of I/O registers: 512 max. Approx. scan time: 1 ms/KW</p>	2
	CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	<p>5) CPU30 Program memory capacity: 32K words Number of digital I/O points: 4,096 max. Number of I/O registers: 512 max. Approx. scan time: 0.6 ms/KW</p>	2
	CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	<p>6) CPU35 Program memory capacity: 40K words Number of digital I/O points: 4,096 max. Number of I/O registers: 512 max. Approx. scan time: 0.6 ms/KW</p> <p>7) MEMOBUS Ports CPU10: Equipped with one MEMOBUS Port 1 (slave, RS-232C). Equipped with one MEMOBUS Port 2 (shared by master and slave, RS-232C).</p>	2
	CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	<p>CPU20, CPU21, CPU30, CPU35: Equipped with one MEMOBUS Port (slave, RS-232C).</p> <p>8) MEMOBUS PLUS Ports CPU10: None CPU20, CPU21, CPU30, CPU35: Equipped with one MEMOBUS PLUS port.</p>	2

Product	Name	Model Name	Model Number	Features	Number of Slots Required
Communica-tions Modules	Remote I/O Driver Module	RIOD-COAX	JAMSC-120CRD13100	<ol style="list-style-type: none"> 1) Used to install input and output sections at a remote site. 2) Serves as a master station for the Remote I/O System. 3) Up to two Remote I/O Driver Modules can be used. 4) Uses coaxial cables as transmission cables. 5) Mounted to CPU Rack. 	1
	Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	<ol style="list-style-type: none"> 1) Used to install input and output sections at a remote site. 2) Serves as a slave station for the Remote I/O System. 3) Up to 15 Remote I/O Receiver Modules can be connected to each Remote I/O Driver Module. 4) Uses coaxial cables as transmission cables. 5) Equipped with one MEMOBUS port with the following specifications: Usable for both master and slave ports RS-232C 	1
	2000-Series Remote I/O Driver Module	RIOD-2000	JAMSC-120CRD13110	<ol style="list-style-type: none"> 1) Used to install 1000 I/O and 2000 I/O at remote sites. 2) Serves as a master station for the Remote I/O System. 3) Up to two Remote I/O Driver Modules can be used. 4) Uses coaxial cables as transmission cables. 5) Mounted to CPU Rack. 	1
	MEMOBUS Module (RS-232)	MEMOBUS-RS232	JAMSC-120NOM26100	<ol style="list-style-type: none"> 1) Used to add MEMOBUS ports. 2) Equipped with two MEMOBUS ports that have the following specifications: Usable for both master and slave ports RS-232C 3) Up to two RS-232/RS-422 MEMOBUS Modules can be used. 4) Can be mounted to any Rack of the local channel. 	1

3

Product	Name	Model Name	Model Number	Features	Number of Slots Required
Communica- tions Mod- ules, contin- ued	MEMOBUS Module (RS-422)	MEMOBUS- RS422	JAMSC- 120NOM27100	<ol style="list-style-type: none"> 1) Used to add MEMOBUS ports. 2) Equipped with two MEMOBUS ports that have the following specifications: Usable for both master and slave ports RS-422 3) Up to two RS-232/RS-422 MEMOBUS Modules can be used. 4) Can be mounted to any Rack of the local channel. 	1
	PC Link Module	PCLINK- COAX	JAMSC- 120NFB23100	<ol style="list-style-type: none"> 1) Used for high-speed data communications between PLCs. 2) Serves as a station of PC Link System. 3) Up to two PC Link Modules can be used. 4) Uses coaxial cables as transmission cables. 5) Equipped with one MEMOBUS port that has the following specifications: Usable for both master and slave ports RS-232C 6) Mounted to CPU Rack. 	1
	Uniwire Interface Module	UNIWIRE I/F	JAMSC- 120CRD21110	<ol style="list-style-type: none"> 1) Used for Uniwire system to reduce wiring. 2) Serves as the master station of a Uniwire system. 3) Number of transmission points: 256 points max. (One register is 16 points.) 4) Up to 20 slave stations (Uniwire system devices) can be connected to each Uniwire Interface Module. 5) Uses two-core cable for transmission cables. 	1

Product	Name	Model Name	Model Number	Features	Number of Slots Required
Communications Modules, continued	Uniwire H-system Interface Module	UNIWIRE (H) I/F	JAMSC-120CRD21120	<ol style="list-style-type: none"> 1) Used for a Uniwire H-system to reduce wiring. 2) Serves as the master station of a Uniwire H-system. 3) Number of transmission points: 256 points max. (One register is 16 points.) 4) Up to 50 slave stations (Uniwire H-system devices) can be connected to each Uniwire Interface Module. 5) Can detect the error of I/O Terminal Unit. 6) Indicates the broken line detection of the transmission cable. 7) Branch the transmission line and detecting breaks in branch lines. 8) Uses two-core cable for transmission cables. 	1
	Distributed I/O Driver Module	VIOD	JAMSC-120CRD21100	<ol style="list-style-type: none"> 1) Used for a VINUS I/O System to reduce wiring. 2) Serves as a master station of VINUS I/O Systems. 3) Number of transmission points: 480 inputs, 512 outputs (One register is 16 points.) 4) Up to 30 slave stations (distributed I/O slave devices) can be connected to each Distributed I/O Driver Module. 5) Uses special VINUS I/O cables for transmission cables. 	1

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Product	Name	Model Name	Model Number	Features	Number of Slots Required
Communica- tions Mod- ules, contin- ued	M-NET Module	M-NET	JAMSC- 120NMN31000	<ol style="list-style-type: none"> 1) Used for high-speed data communications between PLCs. 2) Serves as a station of the M-NET System. 3) Up to 15 M-NET Modules (slaves) can be connected to each M-NET Module (master). 4) Can be connected to GL60S and U84 M-NET Modules. 5) Uses special M-NET cables as transmission cables. 6) Can be mounted to any Rack. 	1
	YENET 1600-D Module	YENET 1600-D	JAMSC- 120NDN31110	<ol style="list-style-type: none"> 1) Used for high-speed data communications between PLCs. 2) Serves as a station of the YENET 1600-D System. 3) Up to 63 YENET 1600-D Modules (slaves) can be connected to each YENET 1600-D Module (master). 4) Can be connected to masters and slaves conforming to the DeviceNet protocol. 5) Uses special YENET 1600-D cables as transmission cables. 6) Can be mounted to any Rack. 	1
	Ethernet Interface Module	EIF	JAMSC- 120NET12100	<ol style="list-style-type: none"> 1) Used for data communications between PLCs. 2) Serves as an interface for connections in Ethernet network systems. 3) Communications supported for up to 19 connections for each Ethernet Interface Module. 4) Provides a 10Base5 port and a 10Base-T port. 5) Mounted to CPU Rack. 	1

Product	Name	Model Name	Model Number	Features	Number of Slots Required
Commu- nica- tions Mod- ules, contin- ued	Optical/ Electrical Conversion Module	O/E CONVERT	JAMSC- 120NAH93500 (4 models)	<ol style="list-style-type: none"> 1) Used in combination with PC Link Module or Remote I/O Module to configure an Optical PC Link System or Optical Remote I/O System. 2) Equipped with an electric port for connecting a PC Link Module or Remote I/O Module, and two optical ports for connecting pairs of O/E Conversion Modules. 3) Enables duplex optical communications paths. 4) The following optical fiber cables are used as transmission cables: H-PCF cables Quartz crystal fiber cable 5) Can be mounted to any Rack. 	1
Digital Input Modules	100-VAC 16-point Input Module	AC100IN-16P	JAMSC- 120DAI54300	<ol style="list-style-type: none"> 1) Used to input digital signals. 2) 100 VAC, 16 points, 7 mA (50 Hz) 	1
	200-VAC 16-point Input Module	AC200IN-16P	JAMSC- 120DAI74300	<ol style="list-style-type: none"> 1) Used to input digital signals. 2) 200 VAC, 16 points, 7 mA (50 Hz) 	1
	12/24-VDC 16-point Input Module	DC24IN-16P	JAMSC- 120DDI34300	<ol style="list-style-type: none"> 1) Used to input digital signals. 2) 12/24 VDC, 16 points, 4 mA (12 VDC), 8 mA (24 VDC) 	1
	12/24-VDC 32-point Input Module	DC24IN-32P	JAMSC- 120DDI35400	<ol style="list-style-type: none"> 1) Used to input digital signals. 2) 12/24 VDC, 32 points, 2 mA (12 VDC), 4 mA (24 VDC) 	1
	12/24-VDC 64-point Input Module	DC24IN-64P	JAMSC- 120DDI36400	<ol style="list-style-type: none"> 1) Used to input digital signals. 2) 12/24 VDC, 64 points, 2 mA (12 VDC), 4 mA (24 VDC) 	1
Analog Input Modules	Analog Input Module (±10 V, 4 channels)	A/D-VOL- 4CH	JAMSC- 120AVI02000	<ol style="list-style-type: none"> 1) Used to input analog signals. 2) -10 to 10 V, 4 channels 	1
	Analog Input Module (0 to 10 V, 4 channels)	A/D 0-10V 4CH	JAMSC- 120AVI02100	<ol style="list-style-type: none"> 1) Used to input analog signals. 2) 0 to 10 V, 4 channels 	1
	Analog Input Module (4 to 20 mA, 4 channels)	A/D-CUR- 4CH	JAMSC- 120ACI02000	<ol style="list-style-type: none"> 1) Used to input analog signals. 2) 4 to 20 mA/1 to 5 V, 4 channels 	1

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Product	Name	Model Name	Model Number	Features	Number of Slots Required
Digital Output Modules	100/200-VAC 8-point Output Module	ACOUT-8P	JAMSC-120DAO83000	1) Used to output digital signals. 2) 100/200 VAC 8 points , 1.0 A/point	1
	100/200-VAC 16-point Output Module	ACOUT-16P	JAMSC-120DAO84300	1) Used to output digital signals. 2) 100/200 VAC 16 points , 0.3 A/point	1
	12/24-VDC 8-point Output Module	DC24OUT-8P	JAMSC-120DDO33000	1) Used to output digital signals. 2) 12/24 VDC, 8 points, sourcing/sinking outputs, 2.0 A/point	1
	12/24-VDC 16-point Output Module (sinking)	DC24OUT-16PSN	JAMSC-120DDO34310	1) Used to output digital signals. 2) 12/24 VDC, 16 points, sinking outputs, 0.5 A/point, 1.0A/4 points	1
	12/24-VDC 16-point Output Module (sourcing)	DC24OUT-16PSR	JAMSC-120DDO34320	1) Used to output digital signals. 2) 12/24 VDC, 16 points, sourcing outputs, 0.5 A/point, 1.0A/4 points	1
	12/24-VDC 32-point Output Module (sinking)	DC24OUT-32PSN	JAMSC-120DDO35410	1) Used to output digital signals. 2) 12/24 VDC, 32 points, sinking outputs, 0.3 A/point, 0.4A/4 points	1
	12/24-VDC 64-point Output Module (sinking)	DC24OUT-64PSN	JAMSC-120DDO36410	1) Used to output digital signals. 2) 12/24 VDC, 64 points, sinking outputs, 0.1 A/point	1
	Relay Contact 16-point Output Module	RELAY-16P	JAMSC-120DRA84300	1) Used to output digital signals. 2) Relay contacts, 16 points, 1.0 A/point	1
Analog Output Modules	Analog Output Module (0 to 10 V, 2 channels)	D/A 0–10V 2CH	JAMSC-120AVO01100	1) Used to output analog signals. 2) 0 to 10 V, 2 channels	1
	Analog Output Module (0 to 5 V, 2 channels)	D/A 0–5V 2CH	JAMSC-120AVO01200	1) Used to output analog signals. 2) 0 to 5 V, 2 channels	1
	Analog Output Module (4 to 20 mA, 2 channels)	D/A-CUR-2CH	JAMSC-120ACO01000	1) Used to output analog signals. 2) 4 to 20 mA, 2 channels	1

Product	Name	Model Name	Model Number	Features	Number of Slots Required
Special Purpose Modules	High-speed Counter Module (1 channel)	COUNTER-1CH	JAMSC-120EHC21110	1) Used to count high-speed pulses. 2) Incorporates a high-speed pulse count circuit. 3) Can be used for both A- and B-phase pulses and sign + pulse counting. 4) Can count the following frequencies: A/B-phase pulses: 200 kpps (1X) 400 kpps (2X) 800 kpps (4X) Sign + pulse: 200 kpps (1X) 5) Notch point outputs: 4 points	1
	Pulse Catch Module	COUNTER-16CH	JAMSC-120RD134400	1) Equipped with pulse catch and counter functions. 2) The pulse catch function is used to read input signals that are ON less than one scan time of the CPU Module. ON signal width: 1 ms min. (8 channels) 2 ms min. (16 channels) 3) Equipped with 16 built-in pulse catch circuits. 4) Can count the following frequencies: 8 channels: 500 Hz 16 channels: 250 Hz	1
	Register Input Module	REGISTER-IN	JAMSC-120RDI34410	1) Input the maximum value of 8 or 16 channels, and 16 bit or the 4 digits of BCD. 2) Can choose the following input cycle. 8 channels: 10/32/64/192/320 ms 16 channels: 20/64/128/384/640 ms	1
	Register Output Module	REGISTER-OUT	JAMSC-120RDO34410	1) Output the maximum value of 8 or 16 channels, and 16 bit or the 4 digits of BCD. 2) Can choose the following input cycle. 8 channels: 10/32/64/192/320 ms 16 channels: 64/128/384/640 ms	1

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Product	Name	Model Name	Model Number	Features	Number of Slots Required
Motion Modules	Four-axis Motion Module	MC20	JAMSC-120MMB10400	<ol style="list-style-type: none"> 1) Used for 4-axis motion control. 2) Uses analog reference mode. 3) Can be used for both absolute and incremental encoders. 4) Performs simultaneous 4-axis positioning and linear interpolation. Performs simultaneous 3-axis helical interpolation. Performs simultaneous 2-axis circular interpolation. Performs individual-axis independent control. 5) Two 4-axis Motion Modules can be used. 6) Mounted to CPU Rack. 	2
	One-axis Motion Module	MC10	JAMSC-120MMB10100	<ol style="list-style-type: none"> 1) Used for 1-axis motion control. 2) Uses analog reference mode. 3) Can be used for both absolute and incremental encoders. 4) Performs single-step speed operations. Performs multi-step speed operation (between 1 and 16 steps). Performs transition point output. Performs external positioning. 	1
	Two-axis Motion Module	MC15	JAMSC-120MMB20200	<ol style="list-style-type: none"> 1) Used for two-axis motion control. 2) Uses pulse reference mode. 3) Can be used for both absolute and incremental encoders. 4) Performs one-point positioning. Performs consecutive point positioning. Performs transition point output. Performs external positioning. 	1

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Product	Name	Model Name	Model Number	Features	Number of Slots Required
Other Modules	Expander Module	EXPANDER	JAMSC-120CBE37000	Used to add Racks.	1
	Battery Module	BATTERY	JRMSP-120XCP96000	Used to back up encoder data when Motion Control Module and SERVOPACK are combined to control a servomotor with an absolute encoder.	---
	MEMOBUS PLUS Hub Module	MEMOPLUS-HUB	JAMSC-120XCA39300	Used in MEMOBUS PLUS network to: 1) Connect trunk cables to each other. 2) Connect trunk cables to branch cables.	---
	2000 Series Modem Module	J2078	DISCT-J2078	1) Used when MEMOBUS communications cable exceeds 15 meters. 2) Uses shielded twisted-pair cables as inter-modem transmission cables.	---
Mounting Bases	6-slot Mounting Base	MB06	JRMSI-120XBP00600	1) Used to mount Modules. 2) Number of slots MB06: 6 slots MB10: 10 slots MB12: 12 slots MB16: 16 slots 3) Up to four Mounting Bases can be used for each station on the local or a remote channel.	---
	8-slot Mounting Base	MB08	JRMSI-120XBP00800		---
	10-slot Mounting Base	MB10	JRMSI-120XBP01000		---
	12-slot Mounting Base	MB12	JRMSI-120XBP01200		---
	16-slot Mounting Base	MB16	JRMSI-120XBP01600		---

Table 3.2 Overview of System Components: Cables

Product	Name	Model Name	Model Number	Features	Cable Length
Rack-to-Rack I/O Cables	W0100 Cable	W0100-02	JZMSZ-120W0100-02	1) Used to connect to Expander Modules mounted on adjacent Racks. 2) Up to three cables can be used for each station of the local or a remote channel. The total cable length must be 6.0 meters or less.	0.2 m
		W0100-05	JZMSZ-120W0100-05		0.5 m
		W0100-10	JZMSZ-120W0100-10		1.0 m
		W0100-15	JZMSZ-120W0100-15		1.5 m
		W0100-20	JZMSZ-120W0100-20		2.0 m
		W0100-30	JZMSZ-120W0100-30		3.0 m
		W0100-40	JZMSZ-120W0100-40		4.0 m
		W0100-50	JZMSZ-120W0100-50		5.0 m

Product	Name	Model Name	Model Number	Features	Cable Length
32-point I/O Module Cables	W0300 Cable	W0300-01	JZMSZ-120W0300-01	1) Used to connect external devices to 32-point Input Modules, 32-point Output Modules, and Motion Control Modules (MC10 and MC15). 2) Cables provide connector on Module end and with loose wires (AWG28: 0.08 mm ²) on external device end.	1.0 m
		W0300-03	JZMSZ-120W0300-03		3.0 m
		W0300-05	JZMSZ-120W0300-05		5.0 m
	W0302 Cable	W0302-01	JZMSZ-120W0302-01	1) Used to connect external devices to 32-point Input Modules, 32-point Output Modules, and Motion Control Modules (MC10 and MC15). 2) Cables provide connector on Module end and with loose wires (AWG24: 0.2 mm ²) on external device end.	1.0 m
		W0302-03	JZMSZ-120W0302-03		3.0 m
		W0302-05	JZMSZ-120W0302-05		5.0 m
	W0301 Cable	W0301-01	JZMSZ-120W0301-01	1) Used to connect external devices to 32-point Input Modules, 32-point Output Modules, and Motion Control Modules (MC10 and MC15). 2) Cables provide connector on both Module and external device ends. 3) Used in combination with a connector terminal block (made by OMRON, e.g., XW2B-40F5-P) for 32-point I/O Modules.	1.0 m
		W0301-03	JZMSZ-120W0301-03		3.0 m
		W0301-05	JZMSZ-120W0301-05		5.0 m
64-point I/O Module Cables	W5410 Cable	W5410-05	JEPMC-W5410-05	1) Used to connect external devices to 64-point I/O Modules. 2) Cables provide connector on Module end and with loose wires on external device end.	0.5 m
		W5410-10	JEPMC-W5410-10		1.0 m
		W5410-30	JEPMC-W5410-30		3.0 m
Motion Module I/O Cables	W0400 Cable	W0400-01	JZMSZ-120W0400-01	1) Used to connect external devices (such as limit switches) to 4-axis Motion Control Modules (MC20). 2) Cables provide connector on MC20 end and with loose wire (AWG28: 0.08 mm ²) on external device end.	1.0 m
		W0400-03	JZMSZ-120W0400-03		3.0 m
		W0400-05	JZMSZ-120W0400-05		5.0 m
	W0402 Cable	W0402-01	JZMSZ-120W0402-01	1) Used to connect external devices (such as limit switches) to 4-axis Motion Control Modules (MC20). 2) Cables provide connector on MC20 end and with loose wire (AWG24: 0.2 mm ²) on external device end.	1.0 m
		W0402-03	JZMSZ-120W0402-03		3.0 m
		W0402-05	JZMSZ-120W0402-05		5.0 m
	W0401 Cable	W0401-01	JZMSZ-120W0401-01	1) Used to connect external devices (such as limit switches) to 4-axis Motion Control Modules (MC20). 2) Cables provide connector on both MC20 and external device ends. 3) Used in combination with a Connector Terminal Block Conversion Unit (made by OMRON, e.g., XW2B-50Y5) for MC20 Modules.	1.0 m
		W0401-03	JZMSZ-120W0401-03		3.0 m
		W0401-05	JZMSZ-120W0401-05		5.0 m

Product	Name	Model Name	Model Number	Features	Cable Length
Servo Cables	W0500 Cable	W0500-05	JZMSZ-120W0500-05	1) Used to connect speed control type SERVOPACK (for analog speed reference) to Motion Control Module.	0.5 m
		W0500-10	JZMSZ-120W0500-10		1.0 m
		W0500-30	JZMSZ-120W0500-30	2) Cables provide connector on Motion Control Module end and with loose wire on SERVOPACK end.	3.0 m
	W0501 Cable	W0501-05	JZMSZ-120W0501-05	1) Used to connect SR Series SERVOPACK (for incremental encoder) to Motion Control Module.	0.5 m
		W0501-10	JZMSZ-120W0501-10		1.0 m
		W0501-30	JZMSZ-120W0501-30	2) Cables provide connector on both Motion Control Module and SERVOPACK ends.	3.0 m
	W0502 Cable	W0502-05	JZMSZ-120W0502-05	1) Used to connect SR Series SERVOPACK (for absolute encoder) to Motion Control Module.	0.5 m
		W0502-10	JZMSZ-120W0502-10		1.0 m
		W0502-30	JZMSZ-120W0502-30	2) Cables provide connector on both Motion Control Module and SERVOPACK ends.	3.0 m
	W0503 Cable	W0503-05	JZMSZ-120W0503-05	1) Used to connect Σ Series SGDA SERVOPACK (for both incremental and absolute encoders) to Motion Control Module.	0.5 m
		W0503-10	JZMSZ-120W0503-10		1.0 m
		W0503-30	JZMSZ-120W0503-30	2) Cables provide connector on both Motion Control Module and SERVOPACK ends.	3.0 m
	W0504 Cable	W0504-05	JZMSZ-120W0504-05	1) Used to connect Σ Series SGDB or Σ -II Series SGDM or SGDH SERVOPACKs (for both incremental and absolute encoders) to Motion Control Modules.	0.5 m
		W0504-10	JZMSZ-120W0504-10		1.0 m
		W0504-30	JZMSZ-120W0504-30	2) Cables provide connector on both Motion Control Module and SERVOPACK ends.	3.0 m
	W0505 Cable	W0505-05	JZMSZ-120W0505-05	1) Used to connect Σ Series DR2 SERVOPACK (for both incremental and absolute encoders) to Motion Control Module.	0.5 m
		W0505-10	JZMSZ-120W0505-10		1.0 m
		W0505-30	JZMSZ-120W0505-30	2) Cables provide connector on both Motion Control Module and SERVOPACK ends.	3.0 m
	W0510 Cable	W0510-05	JZMSZ-120W0510-05	1) Used to connect SERVOPACK (for position control in pulse reference mode) to Motion Control Module MC15.	0.5 m
		W0510-10	JZMSZ-120W0510-10		1.0 m
		W0510-30	JZMSZ-120W0510-30	2) Cables provide connector on Motion Control Module end and loose wires on SERVOPACK end.	3.0 m

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Product	Name	Model Name	Model Number	Features	Cable Length	
Teach Pendant Cables	W0600 Cable	W0600-02	JZMSZ-120W0600-02	1) Used to connect Teach Pendant (TB120) to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232).	2.0 m	
		W0600-04	JZMSZ-120W0600-04		4.0 m	
		W0600-08	JZMSZ-120W0600-08	2) Used in combination with W0601 or W0602 cable.	8.0 m	
	W0601 Cable	W0601-02	JZMSZ-120W0601-02	1) Used to connect Teach Pendant (TB120) to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232).	2.0 m	
		W0601-04	JZMSZ-120W0601-04	2) Used in combination with W0600 Cable. 3) Provides a plate for securing cable to control panel.	4.0 m	
	W0602 Cable	W0602-02	JZMSZ-120W0602-02	1) Used to connect Teach Pendant (TB120) to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232).	2.0 m	
		W0602-04	JZMSZ-120W0602-04	2) Used in combination with W0600 Cable. 3) Does not provide a plate for securing cable to control panel.	4.0 m	
	MEMO-BUS Cables	W0200 Cable	W0200-03	JZMSZ-120W0200-03	1) Used to connect NEC PC-9801 personal computer to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). 2) Cables provide D-sub connector (25-pin, male) on personal computer end.	2.5 m
			W0200-15	JZMSZ-120W0200-15		15.0 m
		W0201 Cable	W0201-03	JZMSZ-120W0201-03	1) Used to connect NEC PC-9801 personal computer to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). 2) Cables provide half-pitch connector (MDR 14-pin, plug-in, straight) on personal computer end.	2.5 m
			W0201-15	JZMSZ-120W0201-15		15.0 m
		W0202 Cable	W0202-03	JZMSZ-120W0202-03	1) Used to connect DOS personal computer to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). 2) Cables provide D-sub connector (9-pin, female) on personal computer end.	2.5 m
W0202-15			JZMSZ-120W0202-15	15.0 m		
W0203 Cable		W0203-03	JZMSZ-120W0203-03	1) Used to connect Programming Panel (P120) to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). 2) Cables provide D-sub connector (9-pin, female) on P120 end.	2.5 m	
		W0203-15	JZMSZ-120W0203-15		15.0 m	
W0204 Cable		W0204-05	JZMSZ-120W0204-05	1) Used to connect the RS-232C or RS-422 port on an FA Monitor (ACGC4200) to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232).	5.0 m	
		W0204-10	JZMSZ-120W0204-10		10.0 m	
		W0204-15	JZMSZ-120W0204-15	2) Cables provide D-sub connector (25-pin, female) on ACGC4200 end.	15.0 m	

Product	Name	Model Name	Model Number	Features	Cable Length
MEMO-BUS Cables, continued	W0205 Cable	W0205-01	JZMSZ-120W0205-01	1) Used to connect 2000 Series Modem (J2078) to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). 2) Cables provide D-sub connector (9-pin, male) on 2000 Series Modem (J2078) end.	1.0 m
		W0205-03	JZMSZ-120W0205-03		3.0 m
		W0205-05	JZMSZ-120W0205-05		5.0 m
	W0206 Cable	W0206-01	JZMSZ-120W0206-01	1) Used to connect a standard modem* to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). * The PV-AF3361WW modem made by AIWA is recommended for MEMOMAIL. 2) Cables provide D-sub connector (25-pin, male) on modem end.	1.0 m
		W0206-03	JZMSZ-120W0206-03		3.0 m
		W0206-05	JZMSZ-120W0206-05		5.0 m
	W0207 Cable	W0207-03	JZMSZ-120W0207-03	1) Used to connect the RS-232C port (PP port) on an ACGC4200 FA Monitor or the MEMOBUS port on a MEMOCON-SC Series Module to the MEMOBUS port on a CPU Module or MEMOBUS Module (RS-232). 2) Cables provide D-sub connector (9-pin, male) on ACGC4200 or MEMOCON-SC end.	2.5 m
		W0207-15	JZMSZ-120W0207-15		15.0 m
	W0208 Cable	W0208-03	JZMSZ-120W0208-03	1) Used to connect the MEMOBUS port on a CPU Module to the MEMOBUS port on a MEMOBUS Module (RS-232). 2) Cables provide D-sub connectors (9-pin, male) at both ends.	2.5 m
		W0208-15	JZMSZ-120W0208-15		15.0 m
	W0220 Cable	W0220-05	JZMSZ-120W0220-05	1) Used to connect the RS-232C or RS-422 port on an FA Monitor (ACGC4200) to the MEMOBUS port on a MEMOCON-SC Series Module. 2) Cables provide D-sub connector (25-pin, female) on ACGC4200 end and D-sub connector (9-pin, male) on MEMOCON-SC end.	5.0 m
		W0220-10	JZMSZ-120W0220-10		10.0 m
		W0220-15	JZMSZ-120W0220-15		15.0 m
	W0221 Cable	W0221-01	JZMSZ-120W0221-01	1) Used to connect 2000 Series Modem (J2078) to the RS-232C or RS-422 port on an FA Monitor (ACGC4200). 2) Cables provide D-sub connector (25-pin, female) on ACGC4200 end and D-sub connector (9-pin, male) on 2000 Series Modem (J2078) end.	1.0 m
		W0221-03	JZMSZ-120W0221-03		3.0 m
		W0221-05	JZMSZ-120W0221-05		5.0 m
	W0222 Cable	W0222-05	JZMSZ-120W0222-05	1) Used to connect the RS-232C port (PP port) on an FA Monitor (ACGC4200) to the MEMOBUS port on a MEMOCON-SC Series Module. 2) Cables provide D-sub connector (9-pin, male) on ACGC4200 end and D-sub connector (9-pin, female) on MEMOCON-SC end.	5.0 m
		W0222-10	JZMSZ-120W0222-10		10.0 m
W0222-15		JZMSZ-120W0222-15	15.0 m		

3

Product	Name	Model Name	Model Number	Features	Cable Length	
MEMO-BUS Cables, continued	W0240 Cable	W0240-01	JZMSZ-120W0240-01	1) Used to connect 2000 Series Modem (J2078) to the RS-232C port on NEC PC-9801 personal computer.	1.0 m	
		W0240-03	JZMSZ-120W0240-03		3.0 m	
		W0240-05	JZMSZ-120W0240-05	2) Cables provide D-sub connector (25-pin, male) on personal computer end.	5.0 m	
	W0241 Cable	W0241-01	JZMSZ-120W0241-01	1) Used to connect 2000 Series Modem (J2078) to the RS-232C port on a DOS personal computer.	1.0 m	
		W0241-03	JZMSZ-120W0241-03		3.0 m	
		W0241-05	JZMSZ-120W0241-05	2) Cables provide D-sub connector (9-pin, female) on personal computer end.	5.0 m	
	W0260 Cable	W0260-03	JZMSZ-120W0260-03	1) Used to connect the RS-232C port (PP port) on an FA Monitor (ACGC4200) or the MEMOBUS port on a MEMOCON-SC Series Module to the RS-232C port on a DOS personal computer.	2.5 m	
		W0260-15	JZMSZ-120W0260-15	2) Cables provide D-sub connector (9-pin, male) on ACGC4200 or MEMOCON-SC end and D-sub connector (9-pin, female) on personal computer end.	15.0 m	
	MEMO-BUS PLUS Cables	W0800 Cable	W0800-03	JZMSZ-120W0800-03	1) Used as a branch cable to connect the MEMOBUS PLUS port on the CPU Module to SA85 Network Adapter.	2.5 m
			W0800-15	JZMSZ-120W0800-15	2) Cables provide terminal block connector (3-pin, male) on CPU Module end and with D-sub connector (9-pin, male) on SA85 end.	15.0 m
W0801 Cable		W0801-02	JZMSZ-120W0801-02	1) Used as a branch cable to connect the MEMOBUS PLUS port on the CPU Module to MEMOBUS PLUS Hub Module.	2.0 m	
		2) Cables provide terminal block connector (3-pin, male) on CPU Module end and with D-SUB connector (9-pin, female) on Hub Module end.				
W0802 Cable		W0802-05	JZMSZ-120W0802-05	1) Used as a trunk cable to connect MEMOBUS PLUS Hub Modules to each other.	5.0 m	
		W0802-10	JZMSZ-120W0802-10	2) Cables provide D-sub connector (9-pin, male) on both ends.	10.0 m	
		W0802-15	JZMSZ-120W0802-15		15.0 m	
W0803 Cable	W0803-02	JZMSZ-120W0803-02	1) Used as a branch cable to connect MEMOBUS PLUS Hub Module to Network Adapter SA85.	2.0 m		
		2) Cables provide D-sub connector (9-pin, female) on Hub Module end and with D-sub connector (9-pin, male) on SA85 end.				

Product	Name	Model Name	Model Number	Features	Cable Length
Coaxial Cables	W60 Cable	W60-1	JZMSZ-W60-1	1) Used as a branch cable (internal panel cable) within a Remote I/O System (Coaxial) or PC Link System (Coaxial). 2) Cables provide BNC connector on both ends.	2.0 m
		W60-2	JZMSZ-W60-2		3.0 m
		W60-3	JZMSZ-W60-3		5.0 m
	W61 Cable	W61-1	JZMSZ-W61-1	1) Used as a branch cable (external panel cable) within a Remote I/O System (Coaxial) or PC Link System (Coaxial). 2) Cables provide F-connector (F-5FB) on both ends	2.0 m
		W61-2	JZMSZ-W61-2		5.0 m
		W61-3	JZMSZ-W61-3		10.0 m
		W61-4	JZMSZ-W61-4		20.0 m
	W1000 Cable	W1000-02	JZMSZ-120W1000-02	1) Used as a branch cable (internal panel cable) within a Remote I/O System (Coaxial) or PC Link System (Coaxial). 2) Cables provide BNC connector on both ends. 3) Same specifications as W60 Cable.	2.0 m
		W1000-03	JZMSZ-120W1000-03		3.0 m
		W1000-05	JZMSZ-120W1000-05		5.0 m

Table 3.3 Overview of System Components: Interfaces, Software, and Other Products

Product	Name	Model Name	Model Number	Features	Re- marks
Human-Machine Interfaces	Programming Panel	P120C	DISCT- P120C	1) Used as dedicated Programming Panel for the MEMOCON PLCs. 2) Applicable models: MEMOCON GL120, GL130 MEMOCON-SC R84, R84H, R84HM, GL20 MEMOCON-SC U84 Series MEMOCON-SC GL40 Series MEMOCON-SC GL60 Series MEMOCON-SC GL70H 3) Display: Color TFT LCD, 640 x 480 dots, 9" 4) Communications ports PC connection: 1 port (MEMOBUS master, RS-232C) Printer connection: 1 port (Centronics) CRT connection: 1 port (VGA) Mouse connection: 1 port (PS/2) 5) Auxiliary storage device Floppy disk drive: 1 drive (3.5") Hard disk drive: 256 MB	---
		P120CN	DISCT- P120CN	Same as for P120C, except for the following: ● MEMOBUS PLUS port added for PC connection	---
		P120D	DISCT- P120D	Same as for P120C, except for the following: ● Display: DSTN LCD, 640 x 480 dots, 9"	---

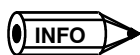
Product	Name	Model Name	Model Number	Features	Remarks
Human-Machine Interfaces, continued	Programming Panel	P120DN	DISCT-P120DN	Same as for P120C, except for the following: <ul style="list-style-type: none"> ● Display: DSTN LCD, 640 x 480 dots, 9" ● MEMOBUS PLUS port added for PC connection 	---
		P120M	DISCT-P120M	Same as for P120C, except for the following: <ul style="list-style-type: none"> ● Display: Monochrome STN LCD, 640 x 480 dots, 9" Note: This is a manufacture stop product.	---
		P120MN	DISCT-P120MN	Same as for P120C, except for the following: <ul style="list-style-type: none"> ● Display: Monochrome STN LCD, 640 x 480 dots, 9" ● MEMOBUS PLUS port added for PC connection Note: This is a manufacture stop product.	---
	Teach Pendant	TB120E	DISCT-TB120E	<ol style="list-style-type: none"> 1) Used to teach 4-axis Motion Control Module (MC20). 2) Language: English 3) Display: Backlit LCD panel, 16 characters x 4 lines 4) Communications port PC connection: 1 port (MEMOBUS master, RS-232C) 	---
	FA Monitor	ACGC4250	DISCT-ACGC4250	<ol style="list-style-type: none"> 1) Used to operate and monitor the machine or process controlled by Programmable Controller. 2) Applicable models: MEMOCON Micro MEMOCON GL120, GL130 MEMOCON-SC R84HM, GL20 MEMOCON-SC U84 Series MEMOCON-SC GL40 Series MEMOCON-SC GL60 Series MEMOCON-SC GL70H 3) Language: Japanese or English 4) Display: Color CRT (provided by user) 5) Communications ports: Subordinate PC connection: 1 port (RS-232C or RS422) Programming Panel/Tablet connection: 1 port (RS-232C) 6) Expansion slots: 2 slots (for Communications Option Boards) 7) Auxiliary storage device: Floppy disk drive: 1 drive (3.5") 	---
		ACGC4260	DISCT-ACGC4260	Same as for ACGC4250, except for the following <ul style="list-style-type: none"> ● Hard disk drive: 1 drive (120 MB) 	---

Product	Name	Model Name	Model Number	Features	Re- marks
Soft- ware Pack- ages Others	MEMOSOFT	---	FMSGL-AT3	1) Used to perform MEMOCON GL120/GL130 online or offline programming through PC/AT compatible personal computer. 2) Applicable models: MEMOCON GL120, GL130 3) OS: MS-DOS Ver 5.0 or more 4) Language: English 5) Data medium: 3.5" floppy disk	---
			FMSGL-WDC E	1) Used to perform MEMOCON GL120/GL130 online or offline programming through PC/AT compatible personal computer. 2) Applicable models: MEMOCON GL120, GL130 3) OS: Windows 95/98/Me/NT4/2000 4) Language: English 5) Data medium: CD-ROM	---
			FMSGL-PP3E	1) Used to perform GL120/GL130 online or offline programming through P120 Programming Panel. 2) Applicable models: MEMOCON GL120, GL130 3) Language: English 4) Data medium: 3.5" floppy disk	---
P120 GL120, GL130 Online Programmer	---	---	FMGLON-PP3	1) Used to perform GL120/GL130 online programming through P120 Programming Panel. 2) Applicable models: MEMOCON GL120, GL130 3) Language: Japanese or English 4) Data medium: 3.5" floppy disk	---
P140 GL120, GL130 Online Programmer	---	---	PGL120-001	1) Used to perform GL120/GL130 online programming through P140 Programming Panel. 2) Applicable models: MEMOCON GL120, GL130 3) Language: Japanese or English 4) Data medium: ROM pack	---

3

Product	Name	Model Name	Model Number	Features	Remarks
Software Packages	P120 MEMOCON-SC Online Programmer	---	FMSC-PP3	<ol style="list-style-type: none"> Used to perform MEMOCON-SC online programming through P120 Programming Panel. Applicable models: MEMOCON-SC R84HM, GL20 MEMOCON-SC U84 Series MEMOCON-SC GL40 Series MEMOCON-SC GL60 Series MEMOCON-SC GL70H Language: Japanese or English Data medium: 3.5" floppy disk 	---
	P120 MEMOCON-SC Ladder Lister	---	FMLST-PP3	<ol style="list-style-type: none"> Used to perform MEMOCON-SC ladder list printing through P120 Programming Panel. Applicable models: MEMOCON-SC R84HM, GL20 MEMOCON-SC U84 Series MEMOCON-SC GL40 Series MEMOCON-SC GL60 Series MEMOCON-SC GL70H Language: Japanese or English Data medium: 3.5" floppy disk 	---
	FIX Ethernet MEMOBUS DRIVER	---	FMEFIX-WD3E	<ol style="list-style-type: none"> Used to establish an interface between FIX (the distributed monitoring control software, developed by Intellution Co.) and Yaskawa PLCs that support Ethernet. Installing this MEMOBUS Driver in the FIX allows FIX to monitor and control the process of the GL120 and GL130 PLCs on an Ethernet network. Applicable models: Yaskawa PLCs supporting Ethernet such as GL120, GL130. Language: English Data medium: 3.5" floppy disk 	---

Product	Name	Model Name	Model Number	Features	Remarks
Others	T-adapter	---	413592-2	Used to connect a coaxial cable with BNC connector within a Remote I/O System (Coaxial) or PC Link System (Coaxial) to a Module (such as Remote I/O Driver Module) used as a station.	---
	Conversion Adapter	---	T-0298	Used to connect a coaxial cable with BNC connector within a Remote I/O System (Coaxial) or PC Link System (Coaxial) to a coaxial cable with F-connector.	---
	Terminator	---	221629-5	Used at the end of a channel within a Remote I/O System (Coaxial) or PC Link System (Coaxial).	---
		---	JZMSZ-120W0804	Used at the end of a channel within a MEMOBUS PLUS network.	---
	Battery	---	BR-2/3A-1	1) Replacement battery for memory backup battery in CPU Module. 2) Backs up programs and data stored in the CPU Module, 4-axis Motion Modules, etc., during power interruptions.	---
	Connector Terminal Block Conversion Unit with I/O Connector for PCB	---	XW2B-40F5-P	1) Used to connect external devices to 32-point Input Modules, 32-point Output Modules, and 1-axis Motion Control Modules (MC10). 2) Used in combination with the W0301 Cable.	---
Connector Terminal Block Conversion Unit with Multipole Rectangular Connector Plug	---	XW2B-50Y5	1) Used to connect external devices to 4-axis Motion Control Modules (MC20). 2) Used in combination with the W0401 Cable.	---	



- 1) The W0202, W0241, and W0260 Cables, which can be connected to DOS personal computers, can also be connected to the P120. The applications supported in this case will be the same for each Cable. The P120's element status function, however, is not supported when these Cables are used.
- 2) The XW2B-40F5-P and XW2B-50Y5 Connector Terminal Block Conversion Units used when using Cables for 32-point Input Modules or 32-point Output Modules, or when using 4-axis Motion Control Modules (MC20), are made by OMRON. These Connector Terminal Block Conversion Units are handled by Yaskawa Control. For details, contact Yaskawa Control at the following:

Tokyo Office, Yaskawa Control Co., Ltd.
Phone: 03-3907-3171

System Components: Functions and Specifications

4

4.1	General Specifications	4-3
4.2	Power Supply Modules	4-4
4.2.1	Appearance of Power Supply Modules	4-4
4.2.2	Power Supply Modules: Function and Models	4-9
4.2.3	Specifications of Power Supply Modules	4-10
4.2.4	Selecting Power Supply Modules	4-14
4.2.5	Using Power Supply Modules	4-18
4.3	CPU Modules	4-24
4.3.1	Appearance of CPU Modules	4-24
4.3.2	CPU Modules: Functions and Models	4-30
4.3.3	Specifications of CPU Modules	4-35
4.3.4	Using CPU Modules 1 (For CPU20, CPU30, and CPU35)	4-65
4.3.5	Using CPU Modules 2 (For CPU21)	4-80
4.3.6	Using CPU Modules 3 (For CPU10)	4-88
4.4	Communications Modules	4-100
4.4.1	Models of Communications Modules	4-100
4.4.2	Remote I/O Driver Module	4-105
4.4.3	Remote I/O Receiver Module	4-111
4.4.4	2000-Series Remote I/O Driver Module	4-121
4.4.5	MEMOBUS Modules (RS-232)	4-127
4.4.6	MEMOBUS Modules (RS-422)	4-135
4.4.7	PC Link Module	4-147
4.4.8	Uniwire Interface Module	4-159
4.4.9	Uniwire H-system Interface Module	4-166
4.4.10	Distributed I/O Driver Module	4-175
4.4.11	M-NET Module	4-182
4.4.12	YENET 1600-D Module	4-188
4.4.13	Ethernet Interface Module	4-199
4.4.14	Optical/Electrical Conversion Module	4-209

4.5	I/O Modules	4-218
4.5.1	Models of I/O Modules	4-218
4.5.2	Appearance of I/O Modules	4-220
4.5.3	Functions and Specifications of I/O Modules	4-223
4.5.4	Using I/O Modules	4-229
4.6	Special Purpose Modules	4-231
4.6.1	Models of Special Purpose Modules	4-231
4.6.2	High-speed Counter Module	4-233
4.6.3	Pulse Catch Module	4-239
4.7	Motion Modules	4-245
4.7.1	Models of Motion Modules	4-245
4.7.2	Four-axis Motion Module	4-246
4.7.3	One-axis Motion Module	4-257
4.7.4	Two-axis Motion Module	4-265
4.8	Other Module	4-277
4.8.1	Expander Module	4-277
4.8.2	Battery Module	4-283
4.9	Mounting Base	4-296
4.10	Rack-to-rack I/O Cables	4-300

4.1 General Specifications

■ This section provides the general specifications of the GL120 and GL130.

The general specifications of the GL120 and GL130 are shown in the following table.

Table 4.1 General Specifications

Item		Specifications
Dielectric Strength		1) Between the primary side and the grounding or between the primary side and the secondary side: Detected current 10 mA max. with 1,500 VAC for 1 minute or 1,800 VAC for 1 s. 2) Between the secondary side and the grounding: Detected current 30 mA max. with 500 VAC for 1 minute or 550 VAC for 1 s.
Insulation Resistance		1) 10 M Ω min. between the primary side and the grounding or between the primary side and the secondary side (via the 500-VDC insulation resistance meter) 2) 100 M Ω min. between the secondary side and the grounding (via the 500-VDC insulation resistance meter)
Environment Conditions	Ambient Operating Temperature	0 to 60 °C
	Ambient Storage Temperature	-25 to 85 °C (except batteries)
	Ambient Operating Humidity	30% to 95% RH (with no condensation)
	Ambient Storage Humidity	5% to 95% RH (with no condensation)
	Pollution Level	Pollution level 1 according to JIS B 3501
	Corrosive Gas	No corrosive gas
	Operating Altitude	Less than 2,000 m above sea level
Mechanical Operating Conditions	Vibration Resistance	10 to 57 Hz with half-amplitude of 0.075 mm 57 to 150 Hz with fixed acceleration of 9.8 m/s ² 10 sweep times each in X, Y, and Z directions (according to JIS B 3502)/(sweep time: 1 octave/min)
	Shock Resistance	Peak acceleration of 147 m/s ² twice for 11 ms in X, Y, and Z directions (according to JIS B 3502)
Electrical Operating Conditions	Noise Resistance	1,500 V in either normal or common mode with pulse widths of 100 ns/1 μ s and rise time of 1 ns (according to JIS B 3502) (with impulse noise simulator)
Installation Requirements	Ground	Ground to 100 Ω or less
	Configuration	Building-block, wall-mounted or DIN track-mounted
	Cooling Method	Natural cooling

4.2 Power Supply Modules

This section describes the functions, models, specifications, and other information on Power Supply Module.

4.2.1	Appearance of Power Supply Modules	4-4
4.2.2	Power Supply Modules: Function and Models	4-9
4.2.3	Specifications of Power Supply Modules	4-10
4.2.4	Selecting Power Supply Modules	4-14
4.2.5	Using Power Supply Modules	4-18

4.2.1 Appearance of Power Supply Modules

1. Appearance of PS10 (Model No. JRMSP-120CPS11300)

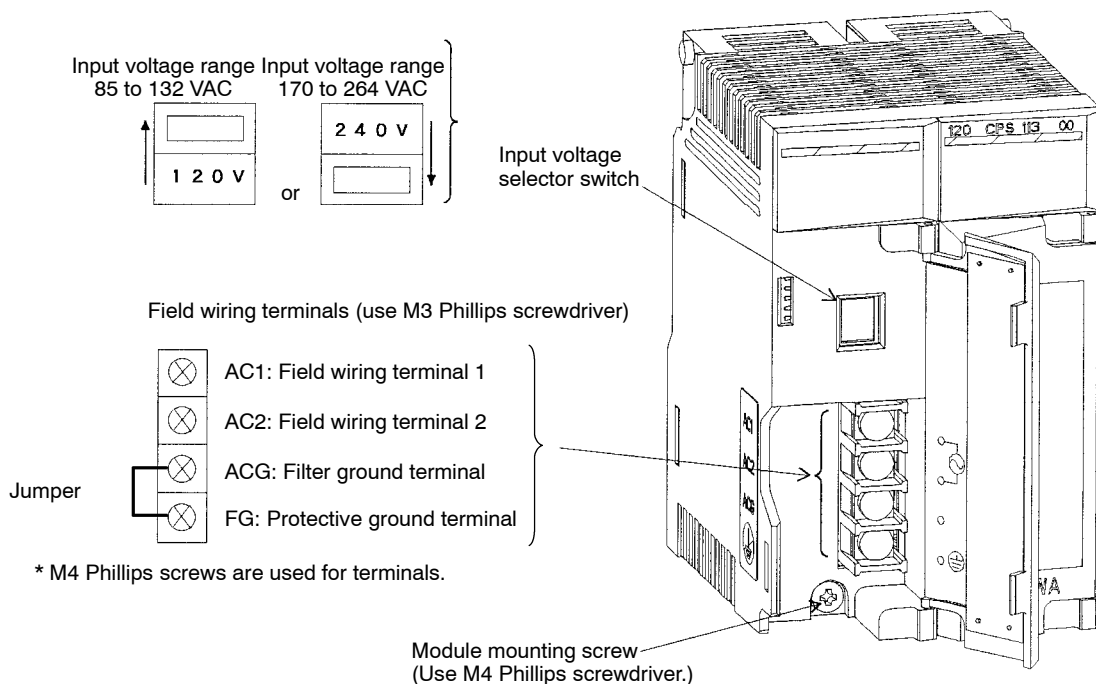
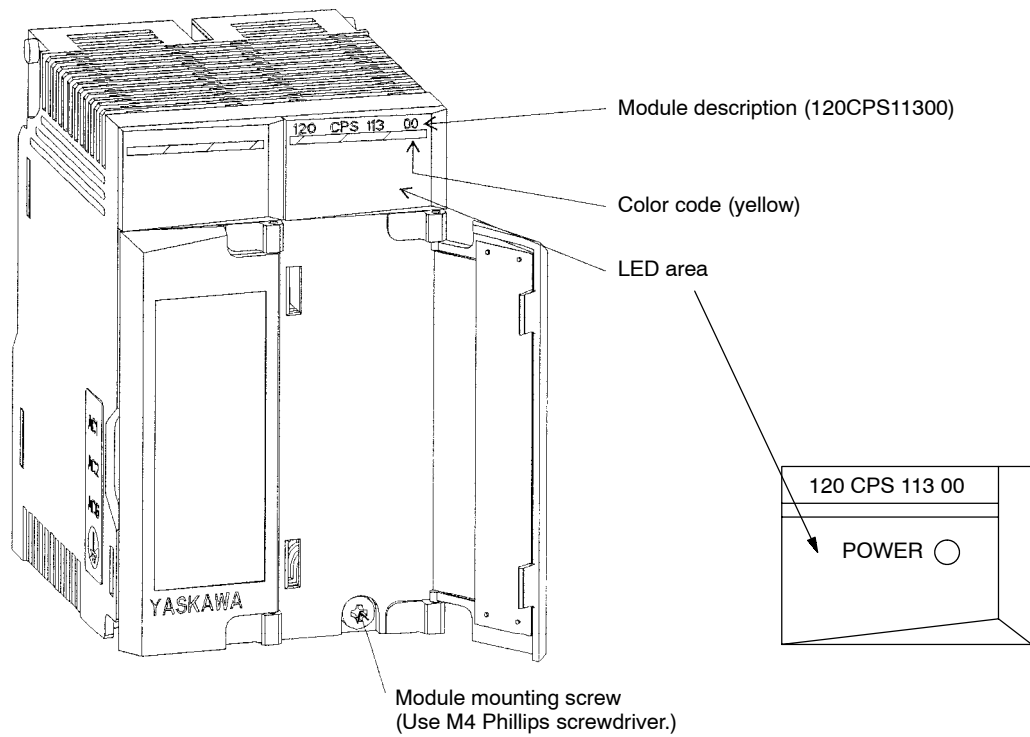


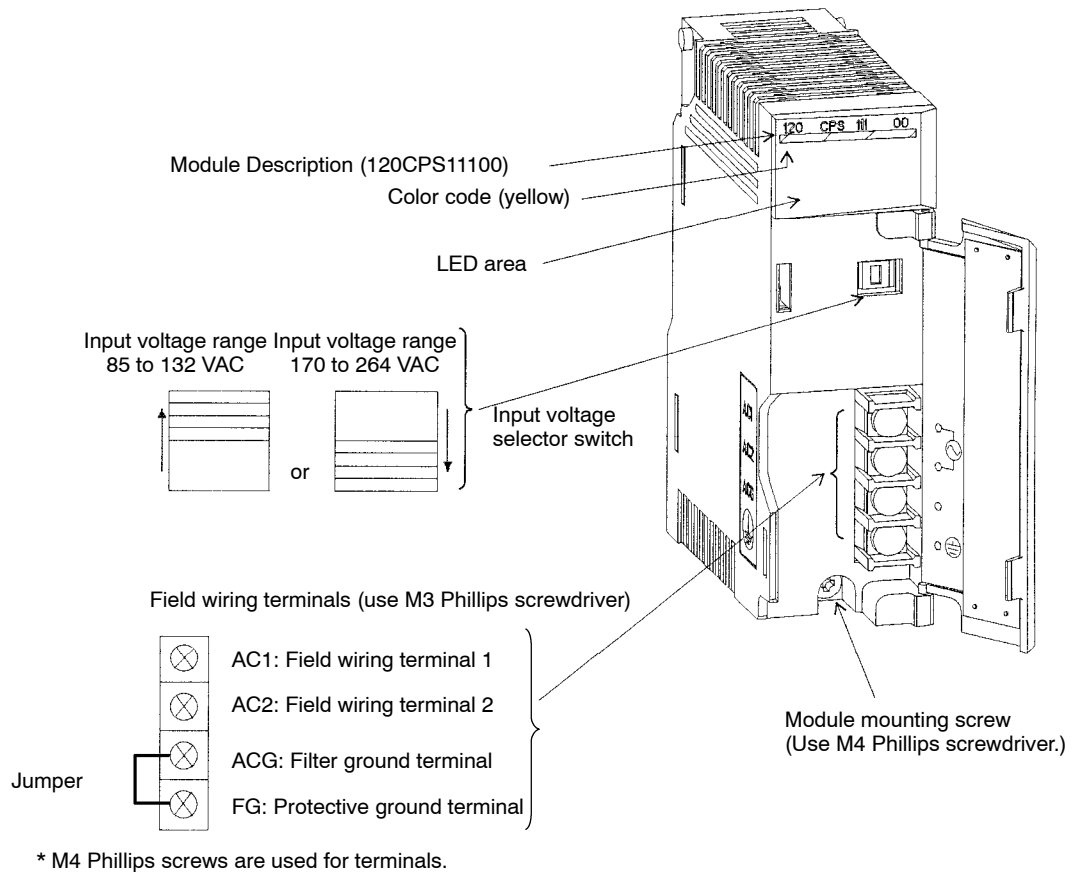
Figure 4.1 Appearance with Left Cover Open



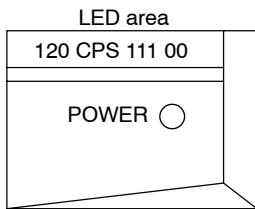
LED	Color	Indication when ON
POWER	Green	Power Supply Module is operating normally.

Figure 4.2 Appearance with Right Cover Open

2. Appearance of PS05 (Model No. JRMSP-120CPS11100)



* M4 Phillips screws are used for terminals.



LED	Color	Indication when ON
POWER	Green	Power Supply Module is operating normally.

Figure 4.3 Appearance with Cover Open

3. Appearance of PS11 (Model No. JRMSP-120CPS21300)

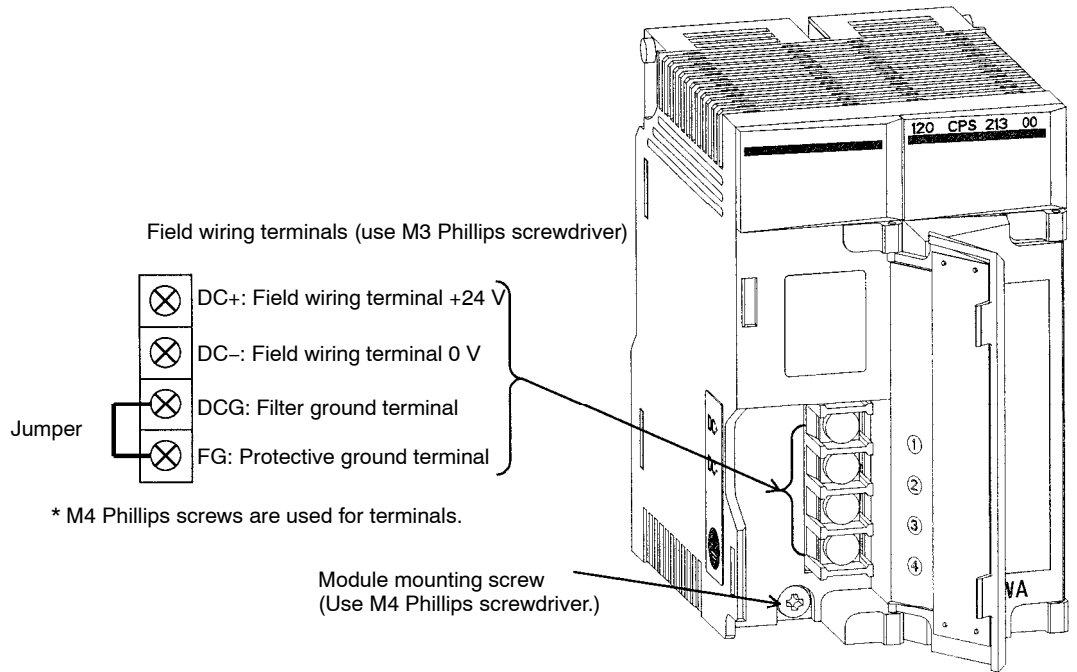
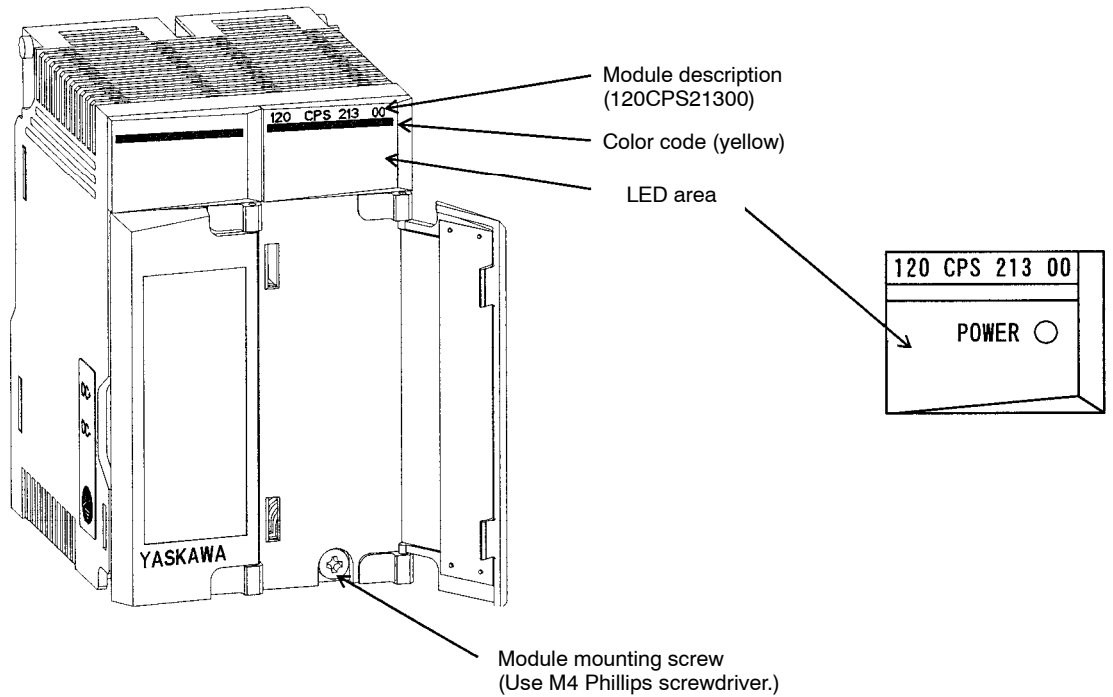


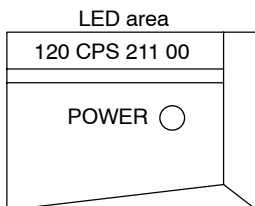
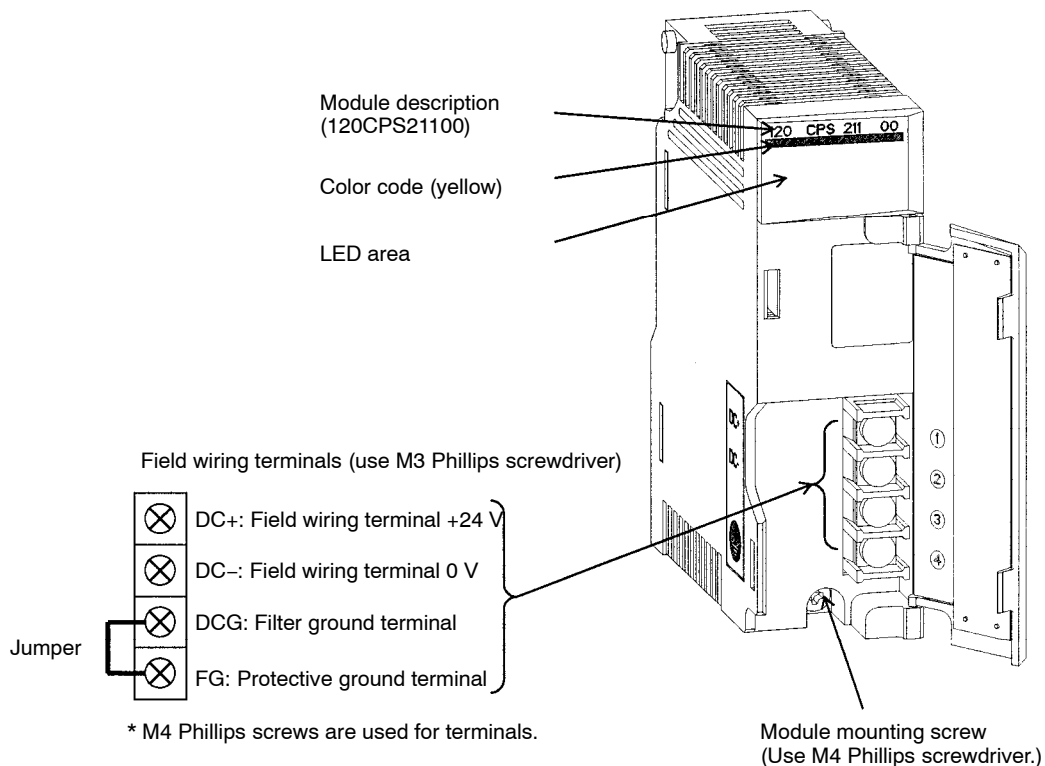
Figure 4.4 Appearance with Left Cover Open



LED	Color	Indication when ON
POWER	Green	Power Supply Module is operating normally.

Figure 4.5 Appearance with Right Cover Open

4. Appearance of PS06 (Model No. JRMSP-120CPS21100)



LED	Color	Indication when ON
POWER	Green	Power Supply Module is operating normally.

Figure 4.6 Appearance with Cover Open

4.2.2 Power Supply Modules: Function and Models

1. Functions

Power Supply Modules supply the DC current required to operate various Modules including CPU Modules.

2. Models

There are four models of Power Supply Modules, as shown in the following table.

Table 4.2 Models of Power Supply Modules

Name		AC Power Supply Modules		DC Power Supply Modules	
Model Name		PS10	PS05	PS11	PS06
Model No.		JRMSP-120CPS 11300	JRMSP-120CPS 11100	JRMSP-120CPS 21300	JRMSP-120CPS 21100
Overview Specifica- tions	Rated Voltage	100/200 VAC (Selectable)		24 VDC	
	Permissible Voltage Range	85 to 132 VAC or 170 to 264 VAC		20.4 to 28.8 VDC	
	Rated Frequency	50/60 Hz		---	
	Permissible Frequency Range	47 to 63 Hz		---	
	Power Consumption	1) At 100 VAC: 100 VA max. 2) At 200 VAC: 120 VA max.	1) At 100 VAC: 60 VA max. 2) At 200 VAC: 75 VA max.	55 W (at rated I/O)	24 W (at rated I/O)
	Input Current	---	---	2.3 A max. (at rated I/O)	1.0 A max. (at rated I/O)
	Output Current Capacity	7.0 A	3.0 A	7.0 A	3.0 A
	No. of Slots Required	2	1	2	1
	External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	Width: 81 mm Height: 130 mm Depth: 103.9 mm	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
	Approximate Mass	600 g	350 g	600 g	350 g

4.2.3 Specifications of Power Supply Modules

1. Specifications of PS10 (Model No. JRMSP-120CPS11300)

PS10 specifications are shown in the following table.

Table 4.3 Specifications of PS10

Item		Specifications
Input	Rated Voltage	100/200 VAC (Selectable)
	Permissible Voltage Range	85 to 132 VAC or 170 to 264 VAC
	Rated Frequency	50/60 Hz
	Permissible Frequency Range	47 to 63 Hz
	Permissible Momentary Power Interruption Time	Less than one cycle. Momentary power interruption intervals must be 1 s min.
	Wave Distortion Factor	10% or less
	Power Consumption	1) At 100 VAC: 100 VA max.
		2) At 200 VAC: 120 VA max.
	Current Leakage	1) At 132 VAC: 1.4 mA max.
		2) At 264 VAC: 2.8 mA max.
Inrush Current	1) At 132 VAC, cold start: 25 A max.	
	2) At 264 VAC, cold start: 50 A max.	
No. of Phases	Single-phase	
Output Characteristics	Rated Voltage	5.1 VDC
	Rated Current	7.0 A
Fuse	Standard fusing glass tube fuse (250 VAC, 3.15 A)	
Field Wiring Terminals	1) Equipped with three types of terminals: field wiring terminals (AC1, AC2), filter ground terminal (ACG), and protective ground terminal (FG). 2) M4 Phillips screws are used for the terminals. 3) Use wire size 1.5 mm ² (AWG16) to 2.5 mm ² (AWG13) to connect to the terminals.	
Hot Swapping (Removal/Insertion Under Power)	Not permitted.	
Maximum Heating Value	20 W	
Approximate Mass	600 g	
External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm	

2. Specifications of PS05 (Model No. JRMSP-120CPS11100)

PS05 specifications are shown in the following table.

Table 4.4 Specifications of PS05

Item		Specifications
Input	Rated Voltage	100/200 VAC (Selectable)
	Permissible Voltage Range	85 to 132 VAC or 170 to 264 VAC
	Rated Frequency	50/60 Hz
	Permissible Frequency Range	47 to 63 Hz
	Permissible Momentary Power Interruption Time	Less than one cycle. However, momentary power interruption intervals must be more than 1 s.
	Wave Distortion Factor	10% or less
	Power Consumption	1) At 100 VAC: 60 VA max. 2) At 200 VAC: 75 VA max.
	Current Leakage	1) At 132 VAC: 1.4 mA max. 2) At 264 VAC: 2.8 mA max.
	Inrush Current	1) At 132 VAC, cold start: 25 A max. 2) At 264 VAC, cold start: 50 A max.
	No. of Phases	Single-phase
Output characteristics	Permissible Voltage Range	5.1 VDC
	Rated Current	3.0 A
Fuse	Standard fusing glass tube fuse (250 VAC, 2 A)	
Field Wiring Terminals	1) Equipped with three kinds of terminals: field wiring terminals (AC1, AC2), filter ground terminal (ACG), and protective ground terminal (FG). 2) M4 Phillips screws are used in each terminal. 3) Use wire size 1.5 mm ² (AWG16) to 2.5 mm ² (AWG13) to connect terminals.	
Hot Swapping (Removal/Insertion Under Power)	Not permitted	
Maximum Heating Value	10 W	
Approximate Mass	350 g	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	

3. Specifications of PS11 (Model No. JRMSP-120CPS21300)

PS11 specifications are shown in the following table.

Table 4.5 Specifications of PS11

Item		Specifications
Input	Rated Voltage	24 VDC
	Permissible Voltage Range	20.4 to 28.8 VDC
	Permissible Input Power Interruption Time	20 ms max. (at power interruption intervals of 1 s min.)
	Permissible Ripple	4% max.
	Input Current	2.3 A max. (at rated I/O)
	Current Leakage	1.0 mA max. (at rated I/O)
	Inrush Current	At cold start: 50 A max. (at rated I/O)
Output characteristics	Permissible Voltage Range	5.1 VDC
	Rated Current	7.0 A
Fuse	Standard fusing glass tube fuse (125 VAC, 5 A)	
Field Wiring Terminals	1) Equipped with three kinds of terminals: field wiring terminals (DC+, DC-), filter ground terminal (DCG), and protective ground terminal (FG). 2) M4 Phillips screws are used in each terminal. 3) Use wire size 1.5 mm ² (AWG16) to 2.5 mm ² (AWG13) to connect terminals.	
Hot Swapping (Removal/Insertion Under Power)	Not permitted	
Maximum Heating Value	20 W	
Approximate Mass	600 g	
External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm	

4

4. Specifications of PS06 (Model No. JRMSP-120CPS21100)

PS06 specifications are shown in the following table.

Table 4.6 Specifications of PS06

Item		Specifications
Input	Rated Voltage	24 VDC
	Permissible Voltage Range	20.4 to 28.8 VDC
	Permissible Input Power Interruption Time	20 ms max. (at power interruption intervals of 1 s min.)
	Permissible Ripple	4% max.
	Input Current	1.0 A max. (at rated I/O)
	Current Leakage	1.0 mA max. (at rated I/O)
	Inrush Current	At cold start: 50 A max. (at rated I/O)
Output characteristics	Permissible Voltage Range	5.1 VDC
	Rated Current	3.0 A
Fuse	Standard fusing glass tube fuse (125 VAC, 2 A)	
Field Wiring Terminals	<ol style="list-style-type: none"> 1) Equipped with three kinds of terminals: field wiring terminals (DC+, DC-), filter ground terminal (DCG), and protective ground terminal (FG). 2) M4 Phillips screws are used in each terminal. 3) Use wire size 1.5 mm² (AWG16) to 2.5 mm² (AWG13) to connect terminals. 	
Hot Swapping (Removal/Insertion Under Power)	Not permitted	
Maximum Heating Value	10 W	
Approximate Mass	350 g	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	

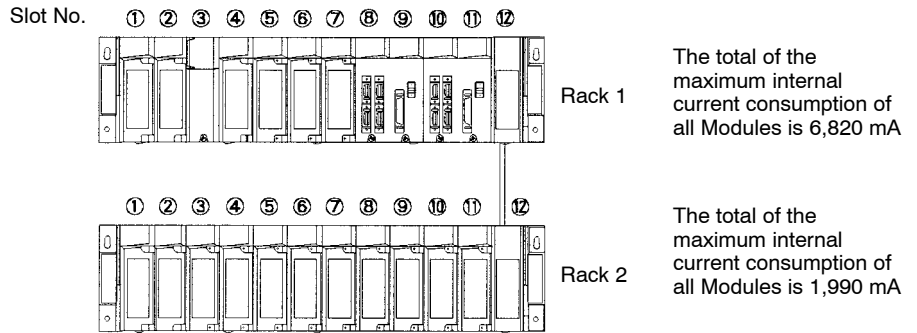
4.2.4 Selecting Power Supply Modules

1. Selection

- 1) Select appropriate Power Supply Modules considering the following conditions.
 - a) One Power Supply Module can be mounted to one Mounting Base.
 - b) More than one Power Supply Module can not be used on the same Mounting Base.
 - c) The DC power supplied from the Power Supply Module is limited to the Modules on the Mounting Base where the Power Supply Module is mounted. The Power Supply Module does not supply power to Modules that are mounted on a different Mounting Base.
 - d) The output current capacity of Power Supply Modules are as follows:
 - PS10 and PS11: 7.0 A
 - PS05 and PS06: 3.0 A
 - e) The total of the maximum internal current consumption of all Modules mounted on a Mounting Base must be equal to or less than the output current capacity of the Power Supply Modules that is mounted on the same Mounting Base. Refer to *Table 4.7* for the maximum internal current consumption of each Module.

Note If a Power Supply Module is used where the total of the maximum internal current consumption of the Modules is larger than the output current capacity of the Power Supply Module, parts inside the the Power Supply Module will deteriorate, shortening the life of the Power Supply Module.

2) The following figure and tables show an example of a Power Supply Module selection.



Rack 1

Slot	Name	Current Consumption
1	Power Supply Module PS10 (7 A)	---
2		
3	CPU Module CPU20 (16 KW)	930 mA
4		
5	MEMOBUS Module (RS-232)	600 mA
6	Remote I/O Driver Module	800 mA
7	PC Link Module	800 mA
8	Four-axis Motion Module	1650 mA
9		
10	Four-axis Motion Module	1650 mA
11		
12	Expander Module	390 mA

Rack 2

Slot	Name	Current Consumption
1	Power Supply Module PS05 (3A)	---
2	12/24-VDC 16-point Input Module	100 mA
3	12/24-VDC 16-point Input Module	100 mA
4	12/24-VDC 16-point Input Module	100 mA
5	12/24-VDC 16-point Input Module	100 mA
6	12/24-VDC 16-point Input Module	100 mA
7	12/24-VDC 16-point Output Module	220 mA
8	12/24-VDC 16-point Output Module	220 mA
9	12/24-VDC 16-point Output Module	220 mA
10	12/24-VDC 16-point Output Module	220 mA
11	12/24-VDC 16-point Output Module	220 mA
12	Expander Module	390 mA

2. Internal Current Consumption of Modules

The following table shows the maximum internal current consumption of each Module.

Table 4.7 The Maximum Internal Current Consumption of Modules

Product	Name	Model Name	Model No.	Maximum Internal Current Consumption (mA)
CPU Modules	CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	500
	CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	930
	CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	950
	CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	1130
	CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	1130
Communications Modules	Remote I/O Driver Module	RIOD-COAX	JAMSC-120CRD13100	800
	Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	800
	2000-Series Remote I/O Receiver Module	RIOD-2000	JAMSC-120CRD13110	800
	MEMOBUS Module (RS-232)	MEMOBUS-RS232	JAMSC-120NOM26100	600
	MEMOBUS Module (RS422)	MEMOBUS-RS422	JAMSC-120NOM27100	600
	PC Link Module	PCLINK-COAX	JAMSC-120NFB23100	800
	Uniwire Interface Module	UNIWIRE I/F	JAMSC-120CRD21110	200
	Uniwire H-system Interface Module	UNIWIRE (H) I/F	JAMSC-120CRD21120	200
	Distributed I/O Driver Module	VIOD	JAMSC-120CRD21100	200
	M-NET Module	M-NET	JAMSC-120NMM31000	300
	YENET 1600-D Module	YENET 1600-D	JAMSC-120MDN31110	250
	Ethernet Interface Module	EIF	JAMSC-120NET12100	1,500
	Optical/Electrical Conversion Module	O/E CONVERT	JAMSC-120NAH93500 JAMSC-120NAH93510 JAMSC-120NAH93520 JAMSC-120NAH93530	430 430 430 430
	Digital Input Modules	100-VAC 16-point Input Module	AC100IN-16P	JAMSC-120DAI54300
200-VAC 16-point Input Module		AC200IN-16P	JAMSC-120DAI74300	90
12/24-VDC 16-point Input Module		DC24IN-16P	JAMSC-120DDI34300	100
12/24-VDC 32-point Input Module		DC24IN-32P	JAMSC-120DDI35400	80
12/24-VDC 64-point Input Module		DC24IN-64P	JAMSC-120DDI36400	100

4

Product	Name	Model Name	Model No.	Maximum Internal Current Consumption (mA)
Analog Input Modules	Analog Input Module (± 10 V, 4 channels)	A/D-VOL-4CH	JAMSC-120AVI02000	450
	Analog Input Module (0 to 10 V, 4 channels)	A/D 0-10V 4CH	JAMSC-120AVI02100	450
	Analog Input Module (4 to 20 mA, 4 channels)	A/D-CUR-4CH	JAMSC-120ACI02000	450
Digital Output Modules	100/200-VAC 8-point Output Module	ACOUT-8P	JAMSC-120DAO83000	150
	100/200-VAC 16-point Output Module	ACOUT-16P	JAMSC-120DAO84300	300
	12/24-VDC 8-point Output Module	DC24OUT-8P	JAMSC-120DDO33000	220
	12/24-VDC 16-point Output Module (sinking)	DC24OUT-16PSN	JAMSC-120DDO34310	220
	12/24-VDC 16-point Output Module (sourcing)	DC24OUT-16PSR	JAMSC-120DDO34320	300
	12/24-VDC 32-point Output Module (sinking)	DC24OUT-32PSN	JAMSC-120DDO35410	330
	12/24-VDC 64-point Output Module (sinking)	DC24OUT-64PSN	JAMSC-120DDO36410	650
	Relay Contact 16-point Output Module	RELAY-16P	JAMSC-120DRA84300	610
Analog Output Modules	Analog Output Module (± 10 V, 2 channels)	D/A-VOL-2CH	JAMSC-120AVO01000	400
	Analog Output Module (0 to 10 V, 2 channels)	D/A 0-10V 2CH	JAMSC-120AVO01100	400
	Analog Output Module (0 to 5 V, 2 channels)	D/A 0-5V 2CH	JAMSC-120AVO01200	400
	Analog Output Module (4 to 20 mA, 2 channels)	D/A-CUR-2CH	JAMSC-120ACO01000	500
Special Purpose Modules	High-speed Counter Module (1 channel)	COUNTER-1CH	JAMSC-120EHC21110	350
	Pulse Catch Module	COUNTER-16CH	JAMSC-120RDI34400	200
	Register Input Module	REGISTER-IN	JAMSC-120RDI34410	150
	Register Output Module	REGISTER-OUT	JAMSC-120RDO34410	400
Motion Modules	One-axis Motion Module	MC10	JAMSC-120MMB10100	1050
	Two-axis Motion Module	MC15	JAMSC-120MMB20200	750
	Four-axis Motion Module	MC20	JAMSC-120MMB10400	1650
Others	Expander Module	EXPANDER	JAMSC-120CBE37000	390

4.2.5 Using Power Supply Modules

1. Number of Modules and Installation Location

A. Number of Modules

Only one Power Supply Module may be mounted to one Mounting Base. More than one Power Supply Module may not be used on the same Mounting Base.

B. Installation Location

- 1) The Power Supply Module may be mounted to any slot on the Mounting Base. PS10 or PS11 will occupy 2 slots while PS05 or PS06 will occupy one slot.

EXAMPLE

- 2) The Power Supply Module is normally mounted to the left end slot of the Mounting Base to maximize its heat radiation efficiency, as shown in the following example:

Example

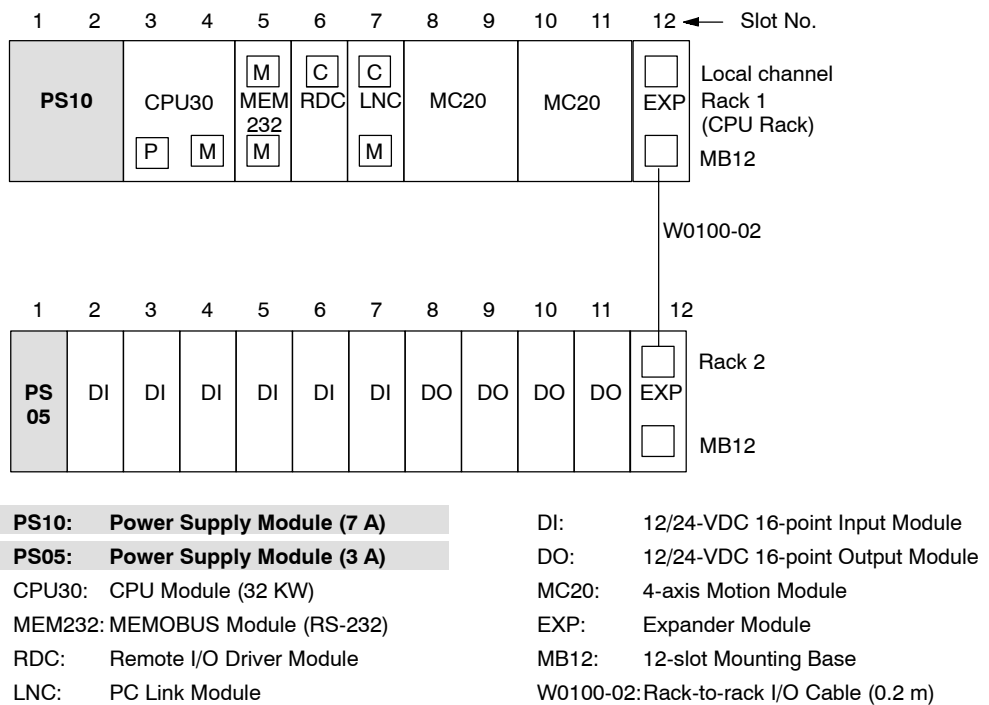


Figure 4.7 Example of Mounting Power Supply Modules

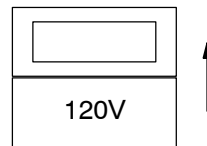
2. Input Voltage Selector Switch (AC Power Supply Modules Only)

Set the Input Voltage Selector Switch according to the range of voltage of AC power needed supplied to the exterior power terminals (AC1, AC2), as shown in the following diagrams.

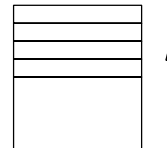
- 1) When the range of voltage of AC power supply is 85 to 132 VAC:

Set the input voltage selector switch to the top as shown below.

- 1) PS10 selector switch



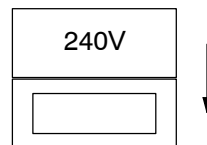
- 2) PS05 selector switch



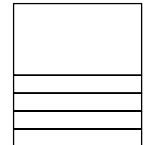
- 2) When the range of voltage of AC power supply is 170 to 264 VAC:

Set the input voltage selector switch to the bottom as shown below.

- 1) PS10 selector switch



- 2) PS05 selector switch



Caution Always make sure that there is no power being supplied to the field wiring terminals (AC1, AC2) before you operate the input voltage selector switch.

Operating the input voltage selector switch while power is being supplied to the field wiring terminals may result in damages to the Power Supply Module.

3. Field Wiring Terminals for AC Power Supply Modules (AC1, AC2)

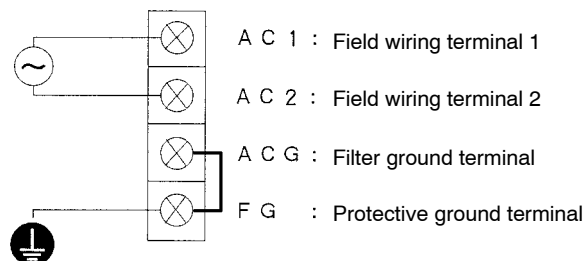
Caution Connect the correct power supply for the required ratings.

Connecting unsuitable power supply may result in fires.

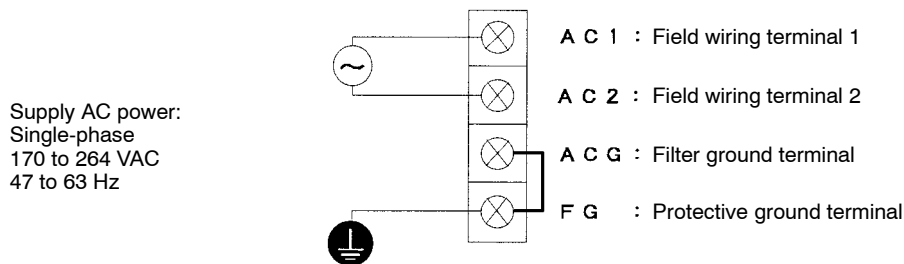
- 1) As shown in the following diagram, supply AC power to the field wiring terminals according to the setup of the input voltage selector switch.

- a) When the input voltage selector switch is set to the top

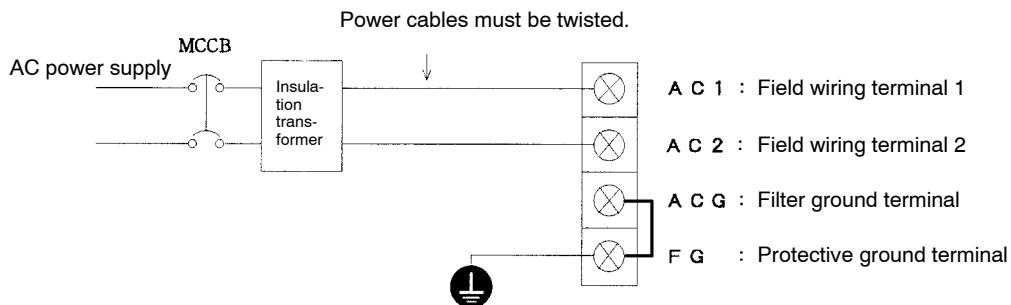
Supply AC power:
Single-phase
85 to 132 VAC
47 to 63 Hz



b) When the input voltage selector switch is set to the bottom:



2) Use power supply wires of 1.5 mm² (AWG16) to 2.5 mm² (AWG13) to connect to the field wiring terminals and make sure they are twisted. M4 Phillips screws are used on the terminals.



4. Field Wiring Terminals for DC Power Supply Modules (DC+, DC-)

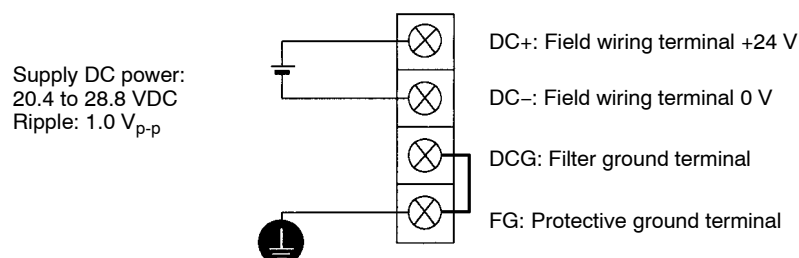
Caution Connect the correct power supply for the required ratings.

Connecting unsuitable power supply may result in fires.

Caution Wire power supply wires to the field wiring terminals with the correct polarity.

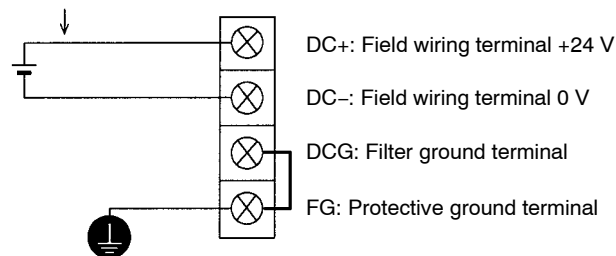
Wiring with incorrect polarity may result in damage to the DC Power Supply Module.

1) Wire a DC power supply to the field wiring terminals as shown in the following diagram.



- 2) Use power supply wires of 1.5 mm² (AWG16) to 2.5 mm² (AWG13) to connect to the field wiring terminals and make sure they are twisted. M4 Phillips screws are used on the terminals.

Power cables must be twisted.



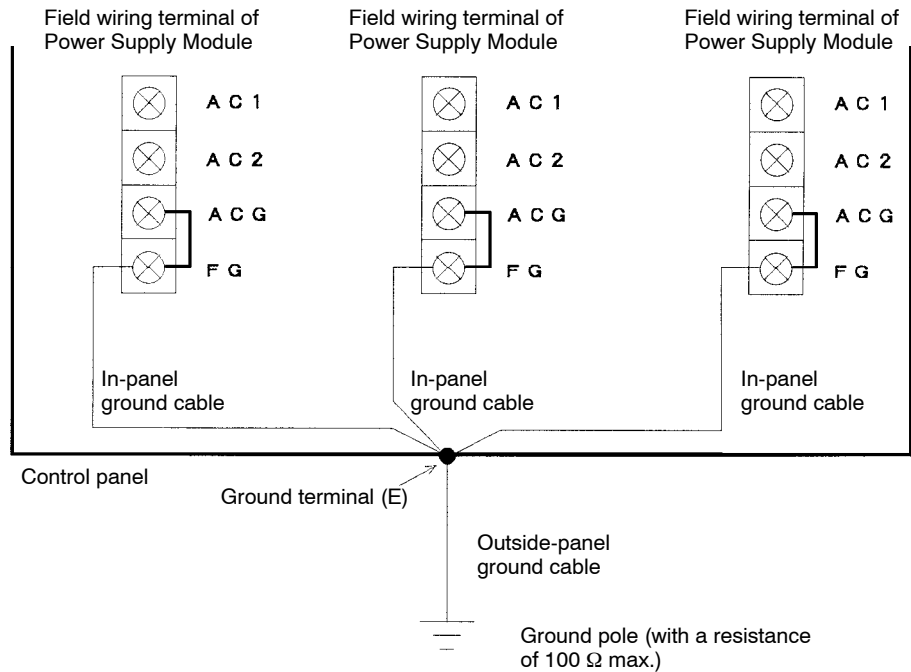
5. Protective Ground Terminal (FG)

WARNING Ground the protective ground terminal to a resistance of 100 Ω max.

Not grounding this terminal may result in serious electrical shock and/or malfunction.

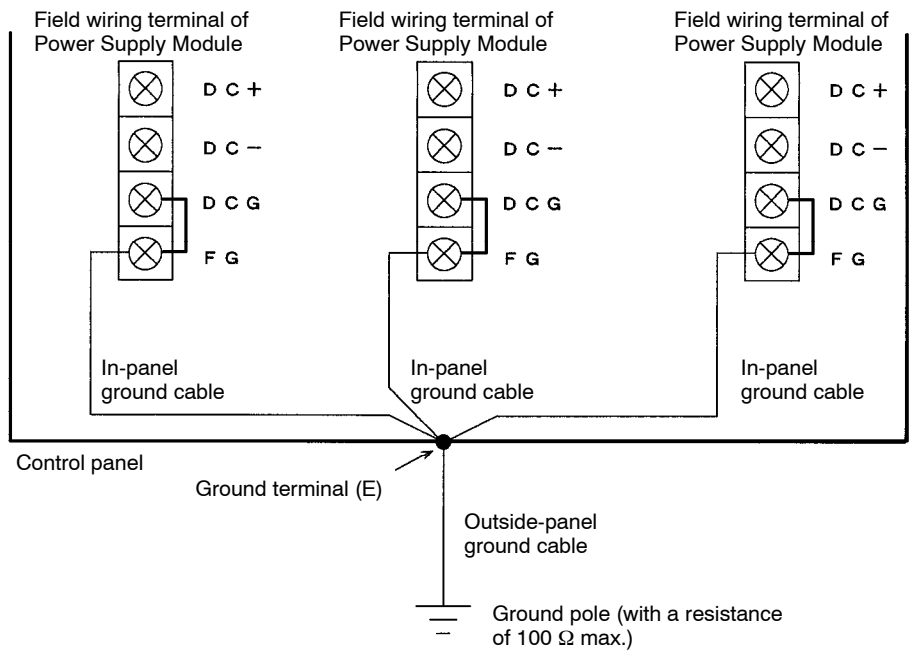
- 1) Connect the protective ground terminal (FG) and the ground terminal of the control panel with 1.5 mm² (AWG16) to 2.5 mm² (AWG13) wire (in-panel ground cable). M4 Phillips screws are used on the protective ground terminal.
- 2) If more than one Power Supply Module is used, do not cross-wire between the protective ground terminals. Connect the protective ground terminal of each Power Supply Module to the ground terminal of the control panel separately, as shown in the following diagram.
- 3) Connect the ground terminal of the control panel to a ground pole with a wire (outside-panel ground cable) of 8 mm² (AWG 8) or larger. Make sure that the length of this ground cable is as short as possible.
- 4) Use a ground pole with a resistance of 100 Ω max. or higher. Do not use the same ground cable and/or ground pole with other strong electrical equipment.

EXAMPLE 1) AC Power Supply Modules




4

EXAMPLE 2) DC Power Supply Modules




6. Filter Ground Terminal (AC Modules: ACG, DC Modules: DCG)

The filter ground terminal is used to ground the input line filter built inside Power Supply Module. This terminal is short-circuited with protective ground terminal when the Power Supply Module is shipped. Normally, use as it is.

 **Caution** If a current leakage occurs from the filter ground terminal causes problems, remove the short piece from between the filter ground terminal and the protective ground terminal. This will render the input line filter inside the Power Supply Module ineffective. Make sure to insert either a noise filter or a insulation transformer in the power supply circuit to the Power Supply Module to increase noise resistance.

7. Built-in Fuse

- 1) The fuse inside a Power Supply Module is to prevent the Power Supply Module from damage which may occur in the following causes:
 - a) External causes: For example, when an over-voltage is applied to the field wiring terminals of Power Supply Module.
 - b) Internal causes: For example, when foreign matter such as chips happen to be present inside a Power Supply Module, thereby short-circuiting internal circuits.
- 2) When the built-in fuse burns out, the “POWER” indicator of Power Supply Module will go out. If the fuse burns out, eliminate the cause of fuse breakage and replace it with a spare Power Supply Module.

 **Caution** Do not replace the built-in fuses of the Power Supply Modules.

If the built-in fuses are replaced by anyone other than a Yaskawa-approved technician, a failure or malfunction may occur in the Power Supply Modules.

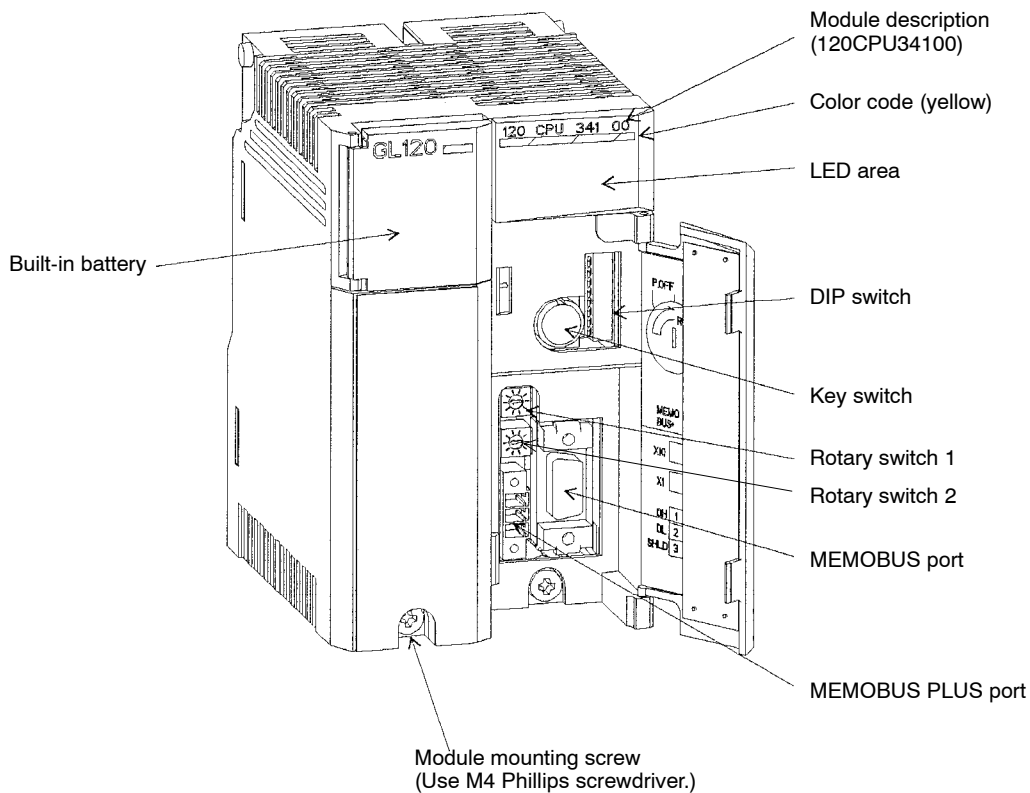
4.3 CPU Modules

This section describes the functions, models, specifications, and other information on the CPU Modules.

4.3.1	Appearance of CPU Modules	4-24
4.3.2	CPU Modules: Functions and Models	4-30
4.3.3	Specifications of CPU Modules	4-35
4.3.4	Using CPU Modules 1 (For CPU20, CPU30, and CPU35)	4-65
4.3.5	Using CPU Modules 2 (For CPU21)	4-80
4.3.6	Using CPU Modules 3 (For CPU10)	4-88

4.3.1 Appearance of CPU Modules

1. Appearance of CPU20 (Model No. DDSCR-120CPU34100)



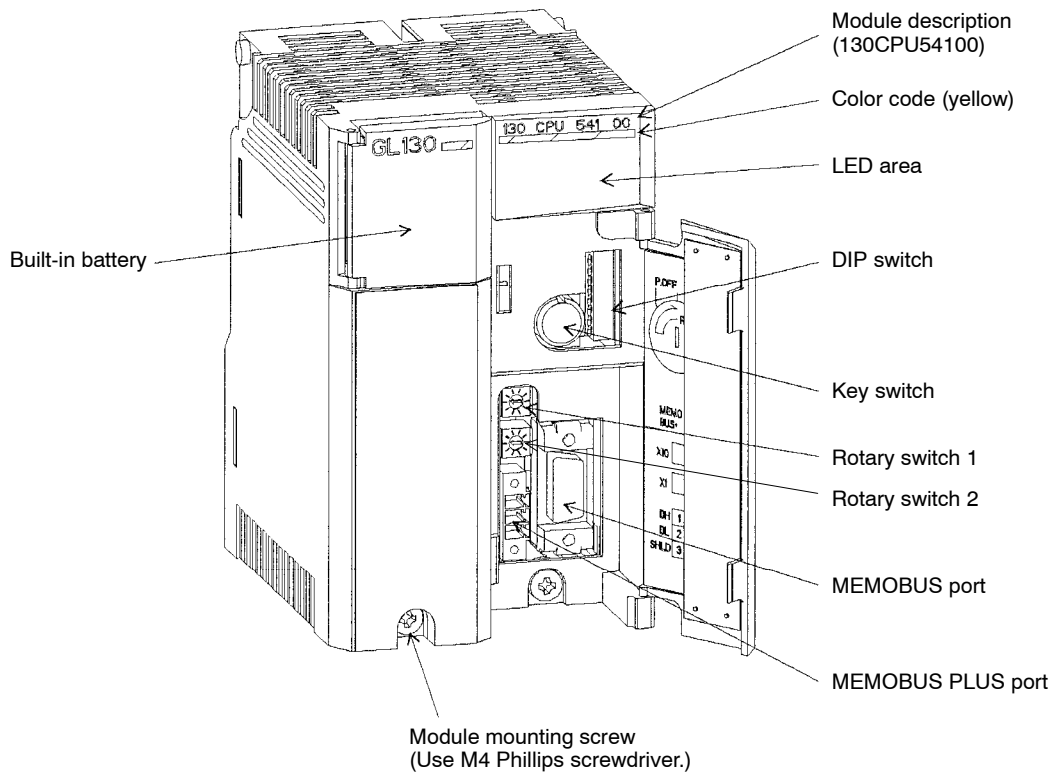
LED	Color	Indication when ON
READY	Green	CPU Module is normal.
RUN	Green	CPU Module is running.
MB+/ERR	Green	MEMOBUS PLUS port is transmitting/receiving data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS PLUS port.
BAT ALM	Red	Voltage in the built-in battery in CPU Module is running down.
ACTIVE	Green	Access to CPU Module from other Module is possible.
TX/ERR	Green	MEMOBUS port is transmitting data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS port.
RX	Green	MEMOBUS port is receiving data normally.
MEM PRT	Green	Key switch has selected memory protect ON.

LED area	
120 CPU 341 00	
READY <input type="checkbox"/>	<input type="checkbox"/> ACTIVE
RUN <input type="checkbox"/>	<input type="checkbox"/> TX/ERR
MB+/ERR <input type="checkbox"/>	<input type="checkbox"/> RX
BAT ALM <input type="checkbox"/>	<input type="checkbox"/> MEM PRT

Figure 4.8 Appearance of CPU20

Note Replace the battery in the CPU Module within two weeks after the BAT ALM indicator lights (replacement battery: BR-2/3A-1). Programs or data stored in the CPU Module or Motion Modules will be lost if replacement is delayed.

2. Appearance of CPU30 (Model No. DDSCR-130CPU54100)



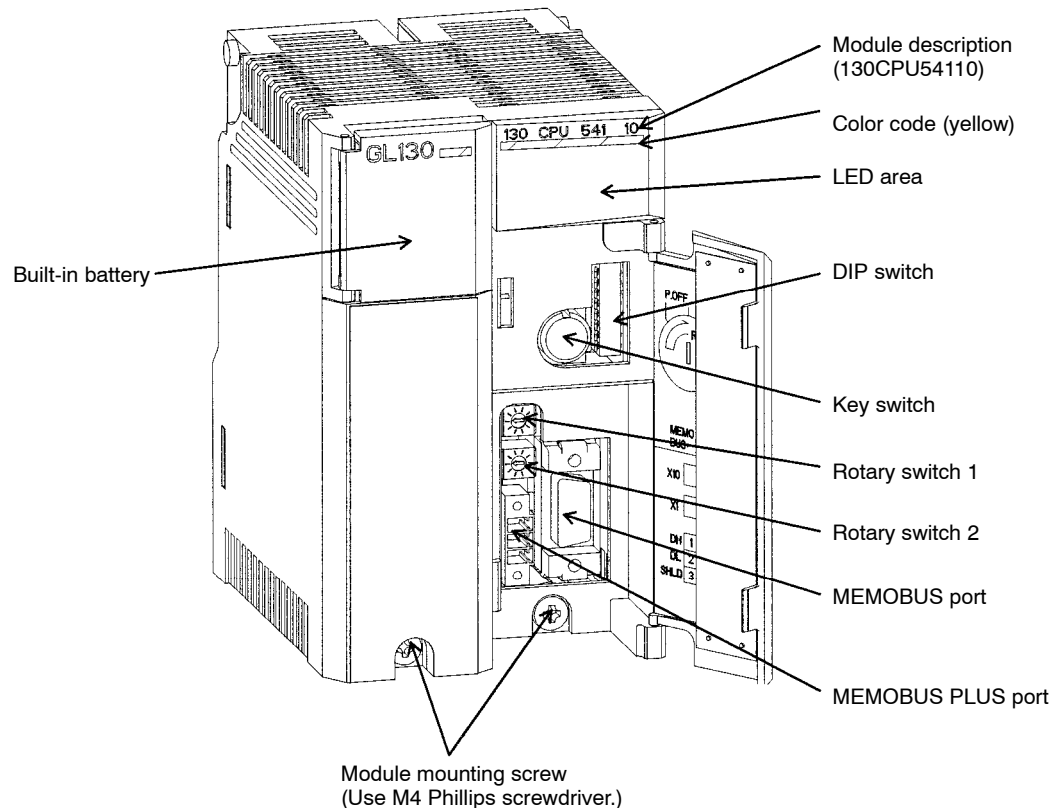
LED area	
130 CPU 541 00	
READY <input type="checkbox"/>	<input type="checkbox"/> ACTIVE
RUN <input type="checkbox"/>	<input type="checkbox"/> TX/ERR
MB+/ERR <input type="checkbox"/>	<input type="checkbox"/> RX
BAT ALM <input type="checkbox"/>	<input type="checkbox"/> MEM PRT

LED	Color	Indication when ON
READY	Green	CPU Module is normal.
RUN	Green	CPU Module is running.
MB+/ERR	Green	MEMOBUS PLUS port is transmitting/receiving data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS PLUS port.
BAT ALM	Red	Voltage in the built-in battery in CPU Module is running down.
ACTIVE	Green	Access to CPU Module from other Module is possible.
TX/ERR	Green	MEMOBUS port is transmitting data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS port.
RX	Green	MEMOBUS port is receiving data normally.
MEM PRT	Green	Key switch has selected memory protect ON.

Figure 4.9 Appearance of CPU30

Note Make sure to replace the battery in the CPU Module within two weeks after the BAT ALM indicator lights (replacement battery: BR-2/3A-1). Programs or data stored in the CPU Module or Motion Modules will be lost if replacement is delayed.

3. Appearance of CPU35 (Model No. DDSCR-130CPU54110)



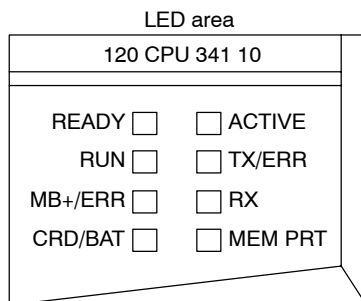
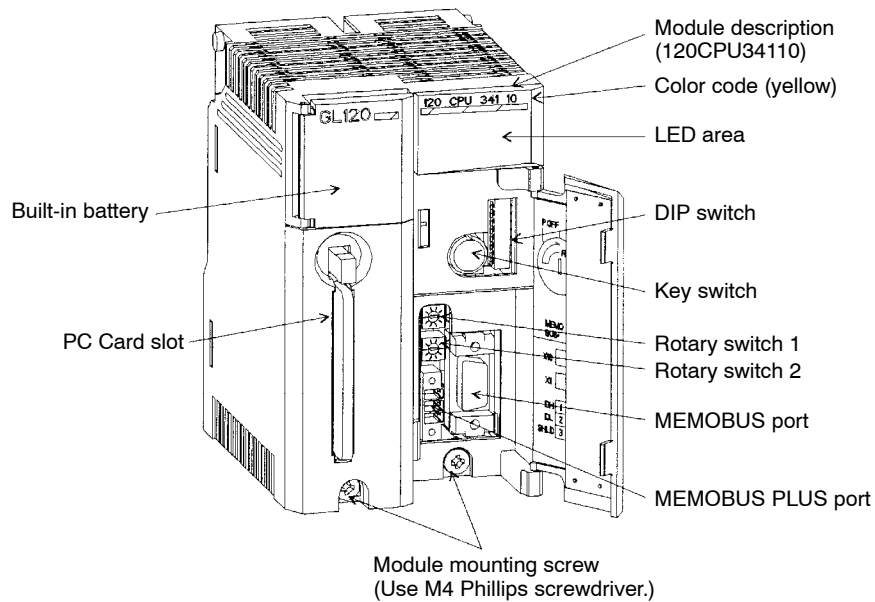
LED area	
130 CPU 541 10	
READY <input type="checkbox"/>	<input type="checkbox"/> ACTIVE
RUN <input type="checkbox"/>	<input type="checkbox"/> TX/ERR
MB+/ERR <input type="checkbox"/>	<input type="checkbox"/> RX
BAT ALM <input type="checkbox"/>	<input type="checkbox"/> MEM PRT

LED	Color	Indication when ON
READY	Green	CPU Module is normal.
RUN	Green	CPU Module is running.
MB+/ERR	Green	MEMOBUS PLUS port is transmitting/receiving data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS PLUS port.
BAT ALM	Red	Voltage in the built-in battery in CPU Module is running down.
ACTIVE	Green	Access to CPU Module from other Module is possible.
TX/ERR	Green	MEMOBUS port is transmitting data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS port.
RX	Green	MEMOBUS port is receiving data normally.
MEM PRT	Green	Key switch has selected memory protect ON.

Figure 4.10 Appearance of CPU35

Note Make sure to replace the battery in the CPU Module within two weeks after the BAT ALM indicator lights (replacement battery: BR-2/3A-1). Programs or data stored in the CPU Module or Motion Modules will be lost if replacement is delayed.

4. Appearance of CPU21 (Model No. DDSCR-120CPU34110)

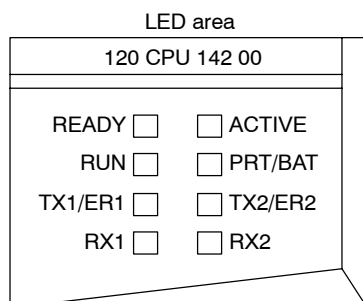
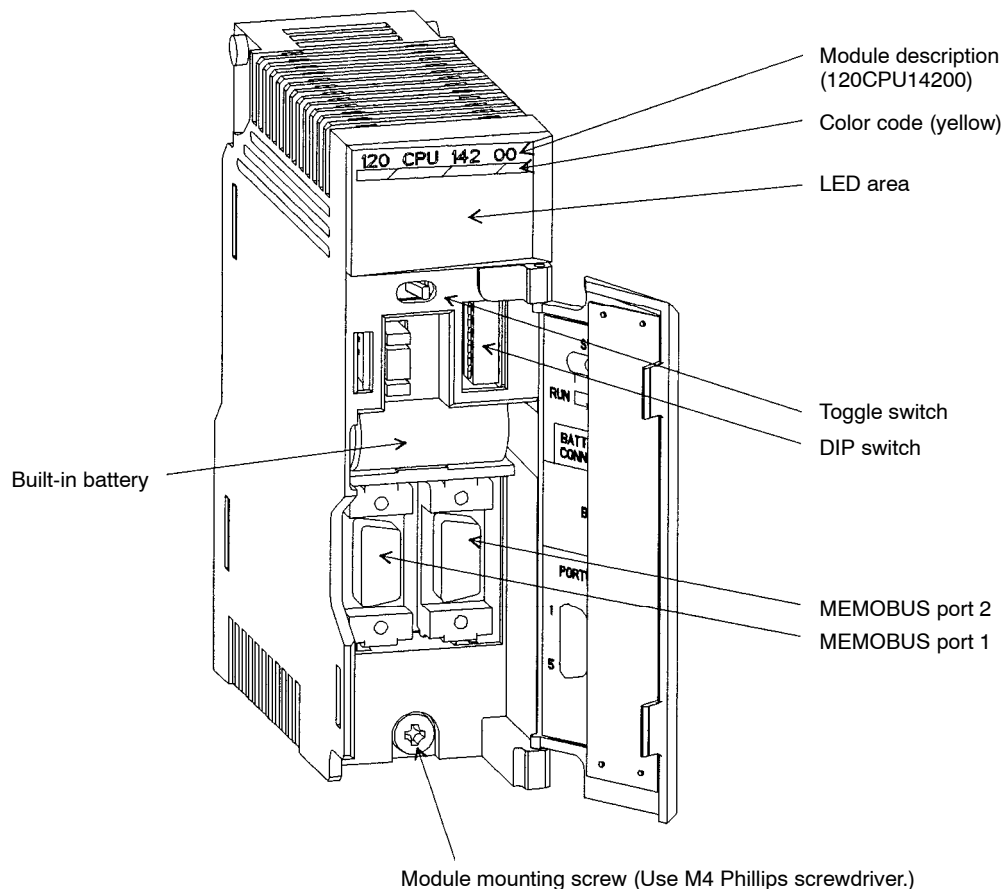


LED	Color	Indication when ON
READY	Green	CPU Module is normal.
RUN	Green	CPU Module is running.
MB+/ERR	Green	MEMOBUS PLUS port is transmitting/receiving data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS PLUS port.
CRD/BAT	Green	Lit: CPU Module is accessing PC Card. Flash: PC Card error has occurred in CPU Module.
	Red	Voltage in the built-in battery in CPU Module is running down.
ACTIVE	Green	Access to CPU Module from other Module is possible.
TX/ERR	Green	MEMOBUS port is transmitting data normally.
	Red	Transmitting/receiving error has occurred in MEMOBUS port.
RX	Green	MEMOBUS port is receiving data normally.
MEM PRT	Green	Key switch has selected memory protect ON.

Figure 4.11 Appearance of CPU21

Note Make sure to replace the battery in the CPU Module within two weeks after the CRD/BAT indicator lights red (replacement battery: BR-2/3A-1). Programs or data stored in the CPU Module or Motion Modules will be lost if replacement is delayed.

5. Appearance of CPU10 (Model No. DDSCR-120CPU14200)



LED	Color	Indication when ON
READY	Green	CPU Module is normal.
RUN	Green	CPU Module is running.
TX1/ER1	Green	MEMOBUS port 1 is transmitting data normally.
	Red	Transmission/reception error has occurred on MEMOBUS port 1.
RX1	Green	MEMOBUS port 1 is receiving data normally.
ACTIVE	Green	The CPU Module can access other Modules.
	Green	The toggle switch is set to ON to protect memory.
PRT/BAT	Red	Voltage in the built-in battery in CPU Module is dropping.
	Green	MEMOBUS port 2 is transmitting data normally.
TX2/ER2	Red	Transmission/reception error has occurred on MEMOBUS port 2.
	Green	MEMOBUS port 2 is receiving data normally.
RX2	Green	MEMOBUS port 2 is receiving data normally.

Figure 4.12 Appearance of CPU10

Note Make sure to replace the battery in the CPU10 Module within two weeks after the PRT/BAT indicator lights red (replacement battery: BR-2/3A-1). Programs or data stored in the CPU10 Module or Motion Modules will be lost if replacement is delayed.

4.3.2 CPU Modules: Functions and Models

1. Functions

- 1) The CPU Module stores the applications program written in ladder diagram language and solve the ladder diagram program based on the information from the input section. The results of solution are output via the output section.
- 2) Through MEMOBUS port, the CPU Module will run RS-232C communications with MEMOBUS masters such as Programming Panels and personal computers.
- 3) Through MEMOBUS PLUS port, the CPU Module will execute high-speed (1 Mbps) communications with other transmitting equipment such as the GL120, GL130 and personal computers on MEMOBUS PLUS networks.

2. Models

There are five models of CPU Modules, as shown in the following table. The main differences among CPU Modules are shown in the following table. For details, refer to section 4.3.3 Specifications of CPU Modules.

Table 4.8 Models of CPU Modules

Model Name	CPU10	CPU20	CPU21	CPU30	CPU35
Model No.	DDSCR-120CPU14200	DDSCR-120CPU34100	DDSCR-120CPU34110	DDSCR-120CPU54100	DDSCR-120CPU54110
Execution Control Method	Cyclic scan method				
Input/Output Connection Method	1) Online input/output method 2) Remote input/output method				
Input/Output Control Method	1) Sync refresh method 2) Direct method (direct input/output)				
CPU	General-purpose 16-bit microprocessor			General-purpose 32-bit microprocessor	
Programming Language	Ladder diagram language				

Model Name	CPU10	CPU20	CPU21	CPU30	CPU35
Instructions (166)	1) Basic instructions (16 instructions) 2) Math instructions (25 instructions) 3) Data processing instructions (48 instructions) 4) System status read instruction (1 instruction) 5) Sequence control instructions (3 instructions) 6) Program control instructions (7 instructions) 7) I/O control instructions (2 instructions) 8) Communications instructions (9 instructions) 9) Motion control instructions (22 instructions) 10) Expansion math instructions (32 instructions) 11) Process control instruction (1 instruction)				
Scan Time	Approx. 1 ms per 1K words of ladder logic program			Approx. 0.6 ms per 1K words of ladder logic program	
	The following elements were used in the percentages given in the ladder program used to measure the scan time. <ul style="list-style-type: none"> • Contacts: 60% • Coils: 15% • SDAT instructions: 10% • SUB instructions: 10% • BLKM instructions: 5% 				
Program Memory Capacity	8K words (1 word: 24 bits)	16K words (1 word: 24 bits)	16K words (1 word: 24 bits)	32K words (1 word: 24 bits)	40K words (1 word: 24 bits)

Model Name		CPU10	CPU20	CPU21	CPU30	CPU35	
Maximum I/O Points/Registers	Digital I/O points	1,024 points max. (1 point: 1 bit) *1			4,096 points max. (1 point: 1 bit) *1		
	I/O registers	512 registers max. (1 register: 16 bits) *2					
	Local I/O	1) Number of channels: 1 2) Number of Racks: 4 Racks max. including CPU Rack. 3) Number of mountable I/O Modules: 54 max. The total number of remote I/O points and registers must meet the above conditions *1 and *2.					
	Remote I/O	1) Number of channels: 2 2) Number of stations per channel: 15 3) Number of Racks per channel: 4 Racks max. 4) Number of I/O points per station: (Digital input points ÷ 8) + (Input registers × 2) ≤ 512 bytes (Digital output points ÷ 8) + (Output registers × 2) ≤ 512 bytes The total number of local I/O points and registers must meet the above conditions *1 and *2.					
Maximum Capacity of Data Register		1) When the number of coils and relays is the default value, the following condition must be met: (Number of holding register words) + (Number of constant register words) + (Number of link register words) ≤ 25,998 2) The maximum value of each reference can be freely set within the above limit and the following ranges using MEMOSOFT.					
		Unit: word (1 word = 16 bits)					
		Register	Setting Range	Setting Unit	Default Value	Example 1	Example 2
		Holding registers	1 to 25,995	1	9,999	19,854	25,995
		Constant registers	1 to 4,096	1	4,096	4,096	1
Link registers	1 to 4,096	1,024	2,048	2,048	0		

4

Model Name		CPU10	CPU20	CPU21	CPU30	CPU35	
Maximum Number of Coils and Relays		1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520					
		2) The maximum value of each reference can be freely set within the above limit and the following ranges using MEMOSOFT. Unit: point (1 point = 1 bit)					
		Coil/Relay	Setting Range	Setting Unit	Default Value	Example 1	Example 2
		Coils	16 to 65,472	16	8,192	57,328	65,472
		Link coils	0 to 4,096	1,024	2,048	2,048	0
		MC coils	0 to 512	256	512	512	0
		MC control coils	0 to 320	160	320	320	0
		Input relays	16 to 65,472	16	1,024	4,096	16
		MC relays	0 to 512	256	512	512	0
		MC control relays	0 to 512	256	512	512	0
M code relays	0 to 192	96	192	192	0		
MEMOBUS Communications	Slave Functions	Port 1, port 2	Port 1	Port 1	Port 1	Port 1	
	COMM Instructions	Possible from Port 2	No	No	No	No	
MEMOBUS PLUS Communications		No	Yes	Yes	Yes	Yes	
High-speed Scan		No	Yes	Yes	Yes	Yes	
Automatic RUN operation	Power ON	DIP switch	DIP switch	DIP switch	DIP switch	DIP switch	
	After power ON	Toggle switch	Key switch	Key switch	Key switch	Key switch	
Analog Module		Permitted	Permitted	Permitted	Permitted	Permitted	
Special-purpose Modules	Counter	Permitted	Permitted	Permitted	Permitted	Permitted	
	Pulse Catch	Permitted	Permitted	Permitted	Permitted	Permitted	
	Register I/O	Permitted	Permitted	Permitted	Permitted	Permitted	
Communications Modules	Remote I/O	1 channel	2 channels	2 channels	2 channels	2 channels	
	Remote I/O for 2000 I/O						
	MEMOBUS	2 Modules	2 Modules	2 Modules	2 Modules	2 Modules	
	PC Link	1 channel	2 channels	2 channels	2 channels	2 channels	
	Uniwire Interface	Supported	Supported	Supported	Supported	Supported	
	Uniwire H-system Interface	Supported	Supported	Supported	Supported	Supported	
	Distributed I/O	Supported	Supported	Supported	Supported	Supported	
	M-NET	Supported	Supported	Supported	Supported	Supported	
YENET 1600-D	Supported	Supported	Supported	Supported	Supported		
Ethernet	Not supported	1 Module	Not supported	1 Module	1 Module		

Model Name		CPU10	CPU20	CPU21	CPU30	CPU35
Motion Modules	MC20	2 Modules (8-axis)	2 Modules (8-axis)	2 Modules (8-axis)	2 Modules (8-axis)	2 Modules (8-axis)
	MC15	No	8 Modules (16-axis)	8 Modules (16-axis)	16 Modules (32-axis)	16 Modules (32-axis)
	MC10	16 Modules (16-axis)	16 Modules (16-axis)	16 Modules (16-axis)	18 Modules (18-axis)	18 Modules (18-axis)
Other Functions	Traceback	Yes	Yes	Yes	Yes	Yes
	PC Card	No	No	Yes	No	No

Note The MEMOSOFT versions shown in the following table must be used with the CPU10 Module version B01 onwards, CPU21 Module, or CPU35 Module. Using incorrect versions with the CPU Module may result in malfunction or failure.

Table 4.9 MEMOSOFT Versions Supporting CPU35 Modules

MEMOSOFT Model	Version Number	Location of Version Number
FMSGL-AT3 (for English DOS)	1.41 onwards	In the middle at the bottom of the MEMOSOFT startup screen.
FMSGL-PP3E (for P120 English version)		

Table 4.10 MEMOSOFT Versions Supporting CPU21 Modules

MEMOSOFT Model	Version Number	Location of Version Number
FMSGL-AT3 (for English DOS)	1.30 onwards	In the middle at the bottom of the MEMOSOFT startup screen.
FMSGL-PP3E (for P120 English version)		

Table 4.11 MEMOSOFT Versions Supporting Functions of CPU10 Version B01 Onwards

MEMOSOFT Model	Version Number	Location of Version Number
FMSGL-AT3 (for English DOS)	1.41 onwards	In the middle at the bottom of the MEMOSOFT startup screen.
FMSGL-PP3E (for P120 English version)		

4

4.3.3 Specifications of CPU Modules

1. Specifications of CPU20 (Model No. DDSCR-120CPU34100)

CPU20 specifications are shown in the following table.

Table 4.12 Specifications of CPU20

Item	Specifications
Model Name	CPU20
Model No.	DDSCR-120CPU34100
Internal Current Consumption	930 mA
Maximum Heating Value	4.7 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	500 g
External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm
Execution Control Method	Cyclic scan method
Input/Output Connection Method	1) Online input/output method 2) Remote input/output method
Input/Output Control Method	1) Sync refresh method 2) Direct method (direct input/output)
CPU	General-purpose 16-bit microprocessor
Memory	The following memories are standard: 1) CMOS RAM: 512K bytes 2) FLASH ROM: 384K bytes
Programming Language	Ladder diagram language

Item	Specifications	
Instructions (167)	Basic Instructions (16 instructions)	1) Relays (10) 2) Timers (4) 3) Counters (2)
	Math Instructions (25 instructions)	1) Unsigned, Four-digit, Decimal Arithmetic Instructions (4) 2) Unsigned, Eight-digit, Decimal Arithmetic Instructions (4) 3) Signed, Four-digit, Decimal Arithmetic Instructions (4) 4) Signed, Eight-digit, Decimal Arithmetic Instructions (2) 5) 16-bit Arithmetic Instructions (4) 6) 32-bit Arithmetic Instructions (3) 7) Decimal Square Root Instructions (2) 8) Decimal Trigonometric Instructions (2)
	Data Processing Instructions (48 instructions)	1) Data Transfer Instructions (12) 2) Indexed Block Transfer Instructions (4) 3) Matrix Instructions (10) 4) 16-bit Process Instructions (5) 5) Data Conversion Instructions (6) 6) Other Instructions (11)
System Status Read Instruction (1 instruction)		
	Sequence Control Instructions (3 instructions)	1) Stepping Switch Instructions (2) 2) Sequence Control Interface Instructions (1)
	Program control Instructions (7 instructions)	1) Skip Instructions (2) 2) Subroutine Instructions (3) 3) Master Control Instructions (2)
I/O Control Instructions (2 instructions)		
	Communications Instructions (9 instructions)	1) COM Instructions (2) 2) MEMOBUS PLUS Communications Instruction (1) 3) FBUS Communications Instructions (4) 4) ASCII Instructions (2)
Motion Control Instructions (22 instructions)		
	Expansion Math Instructions (32 instructions)	1) Logarithmic Calculation Instructions (2) 2) Floating-point Decimal Calculation Instructions (30)
Process Control Instruction (1 instruction)		
Traceback Instruction (1 instruction)		

4

Item	Specifications
Instruction Word Length	1) Relays: 1 word per instruction 2) Timers/Counters: 2 to 3 words per instruction 3) Math instructions: 2 to 3 words per instruction 4) Data process instructions: 2 to 3 words per instruction
Instruction Execution Time	1) Contacts: 1.30 to 1.45 μ s 2) Coils: 1.90 to 2.50 μ s 3) Unsigned 4-digit Decimal Addition Instructions: 4.80 to 5.35 μ s 4) Block Transfer Instructions (size: 1): 2.65 μ s Block Transfer Instructions (size: 50): 22.25 μ s Block Transfer Instructions (size: 100): 42.25 μ s
Scan Time	Approx. 1ms per 1K words by ladder diagram program Remarks: The components of ladder diagram program and their ratio used in measuring the scan time are as follows: <ul style="list-style-type: none"> ● Contacts: 60% ● Coils: 15% ● SDAT instructions: 10% ● SUB instructions: 10% ● BLKM instructions: 5%

Item	Specifications																																																						
Program Memory Capacity	16K words (1 word: 24 bits)																																																						
Maximum I/O Points/Registers	<p>1) Digital I/O points: 1,024 points max. (1 point: 1 bit)</p> <p>2) I/O registers: 512 registers max. (1 register: 16 bits)</p> <p>3) Local I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 1 ● Number of Racks: 4 Racks max. including CPU Rack. ● Number of mountable I/O Modules: 54 max. The total number of points/registers including all remote input/output points must meet the above conditions 1) and 2). <p>4) Remote I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 2 ● Number of stations per channel: 15 ● Number of Racks per channel: 4 Racks max. ● Number of I/O points per station: (Digital input points + 8) + (Input registers x 2) ≤ 512 bytes (Digital output points + 8) + (Output registers x 2) ≤ 512 bytes The total number of points/registers including all remote input/output points must meet the above conditions 1 and 2. 																																																						
Maximum Number of Coils and Relays	<p>1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520</p> <p>2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: point (1 point = 1 bit)).</p> <table border="1"> <thead> <tr> <th>Coil/Relay</th> <th>Setting range</th> <th>Setting unit</th> <th>Defaults</th> <th>Example 1</th> <th>Example 2</th> </tr> </thead> <tbody> <tr> <td>Coils</td> <td>16 to 65,472</td> <td>16</td> <td>8,192</td> <td>60,400</td> <td>65,472</td> </tr> <tr> <td>Link coils</td> <td>0 to 4,096</td> <td>1,024</td> <td>2,048</td> <td>2,048</td> <td>0</td> </tr> <tr> <td>MC coils</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control coils</td> <td>0 to 320</td> <td>160</td> <td>320</td> <td>320</td> <td>0</td> </tr> <tr> <td>Input relays</td> <td>16 to 65,472</td> <td>16</td> <td>1,024</td> <td>1,024</td> <td>16</td> </tr> <tr> <td>MC relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>M code relays</td> <td>0 to 192</td> <td>96</td> <td>192</td> <td>192</td> <td>0</td> </tr> </tbody> </table> <p>Note: Number of I/O allocatable input relays = 1024 – (Number of output coils which have been allocated)</p>	Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2	Coils	16 to 65,472	16	8,192	60,400	65,472	Link coils	0 to 4,096	1,024	2,048	2,048	0	MC coils	0 to 512	256	512	512	0	MC control coils	0 to 320	160	320	320	0	Input relays	16 to 65,472	16	1,024	1,024	16	MC relays	0 to 512	256	512	512	0	MC control relays	0 to 512	256	512	512	0	M code relays	0 to 192	96	192	192	0
Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2																																																		
Coils	16 to 65,472	16	8,192	60,400	65,472																																																		
Link coils	0 to 4,096	1,024	2,048	2,048	0																																																		
MC coils	0 to 512	256	512	512	0																																																		
MC control coils	0 to 320	160	320	320	0																																																		
Input relays	16 to 65,472	16	1,024	1,024	16																																																		
MC relays	0 to 512	256	512	512	0																																																		
MC control relays	0 to 512	256	512	512	0																																																		
M code relays	0 to 192	96	192	192	0																																																		

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Item	Specifications					
Timers	1) Timing method:		Increment method			
	2) Types:		ON-delay, OFF-delay			
	3) Number of timers:		2,457 timers max.			
	4) Timer unit and ranges					
	Name		Unit		Range	
	1-s Timer		1 s		1 to 65535 s	
0.1-s Timer		0.1 s		0.1 to 6553.5 s		
0.01-s Timer		0.01 s		0.01 to 655.35 s		
0.001-s Timer		0.001 s		0.001 to 65.535 s		
5) External setting:		Possible				
6) Power interruption preservation:		Possible				
Counters	1) Types:		Up Counter, Down Counter			
	2) Number of counters:		2,457 counters max.			
	3) Counting range:		1 to 65,535			
	4) External setting:		Possible			
	5) Power interruption preservation:		Possible			
Maximum Capacity of Data Register	1) When the number of coils and relays is the default value, the following condition must be met: (Number of holding registers) + (Number of constant registers) + (Number of link registers) \leq 25,998					
	2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: word (1 word = 16 bit)).					
	Register	Setting range	Setting unit	Defaults	Example 1	Example 2
	Holding registers	1 to 25,995	1	9,999	19,854	25,995
	Constant registers	1 to 4,096	1	4,096	4,096	1
Link registers	0 to 4,096	1,024	2,048	2,048	0	
Memory Back-up	● Back-up range:					
	1) Program memory 2) Data memory					
	● Backup method					
	1) One lithium battery 2) five year warranty on battery (25 °C)					
● Back-up time						
The total memory back-up time is 1 year (25 °C)						

Item	Specifications
Data Types (Numeric Expressions)	<ol style="list-style-type: none"> 1) Unsigned decimal, 4-digit integers: 0 to 9999 2) Signed decimal, 4-digit integers: -9999 to 9999 (sign + absolute-value) 3) Unsigned decimal, 8-digit integers: 0 to 99999999 4) Signed decimal, 8-digit integers: -99999999 to 99999999 (sign + absolute-value) 5) 16-bit unsigned binary integers: 0 to 65535 6) 16-bit signed binary integers: -32768 to 32767 (2's complement) 7) 32-bit unsigned binary integer: 0 to 4294967295 8) 32-bit signed binary integer: -2147483648 to 2147483647 (2's complement) 9) 32-bit floating-point number: IEEE, 32-bit data 10) BCD: 0 to 9999 (16-bit data) <p>Note: Usable data types differ according to instruction.</p>
Self-diagnostics	<ol style="list-style-type: none"> 1) Memory total check 2) Processor check 3) Internal timer check 4) System memory check 5) Program memory total check 6) Ladder element type check 7) Remote system check 8) Watchdog timer check 9) EOS/EOL check 10) Data memory check 11) Battery voltage low-level check
Other Features	<ol style="list-style-type: none"> 1) Calendar 2) Constant sweep 3) Single sweep 4) High-speed scan 5) Segment schedule 6) MEMOBUS communications function 7) MEMOBUS PLUS communications function

4

2. Specifications of CPU30 (Model No.: DDSCR-130CPU54100)

CPU30 specifications are shown in the following table.

Table 4.13 Specifications of CPU30

Item	Specifications
Model Name	CPU30
Model No.	DDSCR-130CPU54100
Internal Current Consumption	1,130 mA
Maximum Heating Value	5.7 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	500 g
External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm
Execution Control Method	Cyclic-scan method
Input/Output Connection Method	1) Online input/output method 2) Remote input/output method
Input/Output Control Method	1) Sync refresh method 2) Direct method (direct input/output)
CPU	General-purpose 32-bit microprocessor
Memory	The following memories are standard: 1) CMOS RAM: 1M bytes 2) FLASH ROM: 512k bytes
Programming Language	Ladder diagram language

Item	Specifications	
Instructions (167 instructions)	Basic Instructions (16 instructions)	1) Relays (10) 2) Timers (4) 3) Counters (2)
	Numeric Instructions (25 instructions)	1) Unsigned, 4-digit, Decimal Arithmetic Instructions (4) 2) Unsigned, 8-digit, Decimal Arithmetic Instructions (4) 3) Signed, 4-digit, Decimal Arithmetic Instructions (4) 4) Signed, 8-digit, Decimal Arithmetic Instructions (2) 5) 16-bit Arithmetic Instructions (4) 6) 32-bit Arithmetic Instructions (3) 7) Decimal Square Root Instructions (2) 8) Decimal Trigonometric Instructions (2)
	Data Processing Instructions (48 instructions)	1) Data Transfer Instructions (12) 2) Indexed Block Transfer Instructions (4) 3) Matrix Instructions (10) 4) 16-bit Process Instructions (5) 5) Data Conversion Instructions (6) 6) Other Instructions (11)
	System Status Read Instruction (1 instruction)	
	Sequence Control Instructions (3 instructions)	1) Stepping Switch Instructions (2) 2) Sequence Control Interface Instructions (1)
	Program Control Instructions (7 instructions)	1) Skip Instructions (2) 2) Subroutine Instructions (3) 3) Master Control Instructions (2)
I/O Control Instructions (2 instructions)		
	Communications Instructions (9 instructions)	1) COM Instructions (2) 2) MEMOBUS PLUS Communications Instruction (1) 3) FBUS Communications Instructions (4) 4) ASCII Instructions (2)
Motion Control Instructions (22 instructions)		
	Expansion Math Instructions (32 instructions)	1) Integer Instructions (2) 2) Floating-point Decimal Instructions (30)
Process Control Instruction (1 instruction)		
Traceback Instruction (1 instruction)		

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Item	Specifications
Instruction Word Length	1) Relays: 1 word per instruction 2) Timers/Counters: 2 to 3 words per instruction 3) Math instructions: 2 to 3 words per instruction 4) Data process instructions: 2 to 3 words per instruction
Instruction Execution Time	1) Contacts: 0.80 to 0.95 μ s 2) Coils: 1.55 μ s 3) Unsigned 4-digit Decimal Addition Instructions: 2.25 to 2.60 μ s 4) Block Transfer Instructions (size: 1): 1.85 μ s Block Transfer Instructions (size: 50): 11.65 μ s Block Transfer Instructions (size: 100): 21.65 μ s
Scan Time	Approx. 0.6 ms per 1K words in ladder diagram program Remarks: The components of the ladder diagram program and their ratio used in measuring the scan time are as follows: <ul style="list-style-type: none"> ● Contacts: 60% ● Coils: 15% ● SDAT instructions: 10% ● SUB instructions: 10% ● BLKM instructions: 5%

Item	Specifications																																																						
Program Memory Capacity	32K words (1 word: 24 bits)																																																						
Maximum I/O Points	<p>1) Digital I/O points: 4,096 points max. (1 point: 1 bit)</p> <p>2) I/O registers: 512 registers max. (1 register: 16 bits)</p> <p>3) Local I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 1 ● Number of Racks: 4 Racks max. including CPU Rack. ● Number of mountable I/O Modules: 54 Modules max. The total number of points/registers including all remote input/output points must meet the above conditions 1 and 2. <p>4) Remote I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 2 ● Number of stations per channel: 15 ● Number of Racks per channel: Max. 4 Rack ● Number of I/O points per station: (Digital input points + 8) + (Input registers x 2) ≤ 512 bytes (Digital output points + 8) + (Output registers x 2) ≤ 512 bytes The total number of points/registers including all remote input/output points must meet the above conditions 1) and 2). 																																																						
Maximum points of coils and relays	<p>1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520</p> <p>2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: point (1 point = 1 bit)).</p> <table border="1"> <thead> <tr> <th>Coil/Relay</th> <th>Setting range</th> <th>Setting unit</th> <th>Defaults</th> <th>Example 1</th> <th>Example 2</th> </tr> </thead> <tbody> <tr> <td>Coils</td> <td>16 to 65,472</td> <td>16</td> <td>8,192</td> <td>57,328</td> <td>65,472</td> </tr> <tr> <td>Link coils</td> <td>0 to 4,096</td> <td>1,024</td> <td>2,048</td> <td>2,048</td> <td>0</td> </tr> <tr> <td>MC coils</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control coils</td> <td>0 to 320</td> <td>160</td> <td>320</td> <td>320</td> <td>0</td> </tr> <tr> <td>Input relays</td> <td>16 to 65,472</td> <td>16</td> <td>1,024</td> <td>4,096</td> <td>16</td> </tr> <tr> <td>MC relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>M code relays</td> <td>0 to 192</td> <td>96</td> <td>192</td> <td>192</td> <td>0</td> </tr> </tbody> </table> <p>Note: Number of I/O allocatable input relays = 4096 – (Number of output coils which have been allocated)</p>	Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2	Coils	16 to 65,472	16	8,192	57,328	65,472	Link coils	0 to 4,096	1,024	2,048	2,048	0	MC coils	0 to 512	256	512	512	0	MC control coils	0 to 320	160	320	320	0	Input relays	16 to 65,472	16	1,024	4,096	16	MC relays	0 to 512	256	512	512	0	MC control relays	0 to 512	256	512	512	0	M code relays	0 to 192	96	192	192	0
Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2																																																		
Coils	16 to 65,472	16	8,192	57,328	65,472																																																		
Link coils	0 to 4,096	1,024	2,048	2,048	0																																																		
MC coils	0 to 512	256	512	512	0																																																		
MC control coils	0 to 320	160	320	320	0																																																		
Input relays	16 to 65,472	16	1,024	4,096	16																																																		
MC relays	0 to 512	256	512	512	0																																																		
MC control relays	0 to 512	256	512	512	0																																																		
M code relays	0 to 192	96	192	192	0																																																		

4

Item	Specifications					
Timers	1) Timing method:		Increment method			
	2) Types:		ON-delay, OFF-delay			
	3) Number of timers:		4,914 timers max.			
	4) Timing unit and range:					
	Name		Unit		Range	
	1-s Timer 0.1-s Timer 0.01-s Timer 0.001-s Timer		1 s 0.1 s 0.01 s 0.001 s		1 to 65535 s 0.1 to 6553.5 s 0.01 to 655.35 s 0.001 to 65.535 s	
5) External setting:		Possible				
6) Power interruption preservation:		Possible				
Counters	1) Types:		Up Counter, Down Counter			
	2) Number of counters:		4,914 counters max.			
	3) Counter range:		1 to 65,535			
	4) External setting:		Possible			
	5) Power interruption preservation:		Possible			
Maximum capacity of data register	1) When the number of coils and relays is the default value, the following condition must be met: (Number of holding registers) + (Number of constant registers) + (Number of link registers) \leq 25,998					
	2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: word (1 word = 16 bit)).					
	Register	Setting range	Setting unit	Defaults	Example 1	Example 2
	Holding registers	1 to 25,995	1	9,999	19,854	25,995
	Constant registers	1 to 4,096	1	4,096	4,096	1
Link registers	0 to 4,096	1,024	2,048	2,048	0	
Memory back-up	<ul style="list-style-type: none"> ● Back-up range: 					
	<ol style="list-style-type: none"> 1) Program memory 2) Data memory 					
	<ul style="list-style-type: none"> ● Backup method 					
	<ol style="list-style-type: none"> 1) One lithium battery 2) Five year warranty on battery (25 °C) 					
<ul style="list-style-type: none"> ● Back-up time <p>The total memory back-up time is 1 year (25 °C)</p>						

Item	Specifications
Data Types (Numeric Expressions)	<ol style="list-style-type: none"> 1) Unsigned decimal, 4-digit integers: 0 to 9999 2) Signed decimal, 4-digit integers: -9999 to 9999 (sign + absolute-value) 3) Unsigned decimal, 8-digit integers: 0 to 99999999 4) Signed decimal, 8-digit integers: -99999999 to 99999999 (sign + absolute-value) 5) 16-bit unsigned binary integers: 0 to 65535 6) 16-bit signed binary integers: -32768 to 32767 (2's complement) 7) 32-bit unsigned binary integer: 0 to 4294967295 8) 32-bit signed binary integer: -2147483648 to 2147483647 (2's complement) 9) 32-bit floating-point number: IEEE, 32-bit data 10) BCD: 0 to 9999 (16-bit data) <p>Note: Usable data types differ according to instruction.</p>
Self-diagnostics	<ol style="list-style-type: none"> 1) Memory total check 2) Processor check 3) Internal timer check 4) System memory check 5) Program memory total check 6) Ladder element type check 7) Remote system check 8) Watchdog timer check 9) EOS/EOL check 10) Data memory check 11) Battery voltage low-level check
Other features	<ol style="list-style-type: none"> 1) Calendar 2) Constant sweep 3) Single sweep 4) High-speed scan 5) Segment schedule 6) MEMOBUS communications function 7) MEMOBUS PLUS communications function

4

3. Specifications of CPU35 (Model No.: DDSCR-130CPU54110)

CPU35 specifications are shown in the following table.

Table 4.14 Specifications of CPU35

Item	Specifications
Model Name	CPU35
Model No.	DDSCR-130CPU54110
Internal Current Consumption	1,130 mA
Maximum Heating Value	5.7 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	500 g
External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm
Execution Control Method	Cyclic-scan method
Input/Output Connection Method	1) Online input/output method 2) Remote input/output method
Input/Output Control Method	1) Sync refresh method 2) Direct method (direct input/output)
CPU	General-purpose 32-bit microprocessor
Memory	The following memories are standard: 1) CMOS RAM: 1M bytes 2) FLASH ROM: 512k bytes
Programming Language	Ladder diagram language

Item	Specifications	
Instructions (167 instructions)	Basic Instructions (16 instructions)	1) Relays (10) 2) Timers (4) 3) Counters (2)
	Numeric Instructions (25 instructions)	1) Unsigned, 4-digit, Decimal Arithmetic Instructions (4) 2) Unsigned, 8-digit, Decimal Arithmetic Instructions (4) 3) Signed, 4-digit, Decimal Arithmetic Instructions (4) 4) Signed, 8-digit, Decimal Arithmetic Instructions (2) 5) 16-bit Arithmetic Instructions (4) 6) 32-bit Arithmetic Instructions (3) 7) Decimal Square Root Instructions (2) 8) Decimal Trigonometric Instructions (2)
	Data Processing Instructions (48 instructions)	1) Data Transfer Instructions (12) 2) Indexed Block Transfer Instructions (4) 3) Matrix Instructions (10) 4) 16-bit Process Instructions (5) 5) Data Conversion Instructions (6) 6) Other Instructions (11)
System Status Read Instruction (1 instruction)		
	Sequence Control Instructions (3 instructions)	1) Stepping Switch Instructions (2) 2) Sequence Control Interface Instructions (1)
	Program Control Instructions (7 instructions)	1) Skip Instructions (2) 2) Subroutine Instructions (3) 3) Master Control Instructions (2)
I/O Control Instructions (2 instructions)		
	Communications Instructions (9 instructions)	1) COM Instructions (2) 2) MEMOBUS PLUS Communications Instruction (1) 3) FBUS Communications Instructions (4) 4) ASCII Instructions (2)
Motion Control Instructions (22 instructions)		
	Expansion Math Instructions (32 instructions)	1) Integer Instructions (2) 2) Floating-point Decimal Instructions (30)
Process Control Instruction (1 instruction)		
Traceback Instruction (1 instruction)		

4

Item	Specifications
Instruction Word Length	1) Relays: 1 word per instruction 2) Timers/Counters: 2 to 3 words per instruction 3) Math instructions: 2 to 3 words per instruction 4) Data process instructions: 2 to 3 words per instruction
Instruction Execution Time	1) Contacts: 0.80 to 0.95 μ s 2) Coils: 1.55 μ s 3) Unsigned 4-digit Decimal Addition Instructions: 2.25 to 2.60 μ s 4) Block Transfer Instructions (size: 1): 1.85 μ s Block Transfer Instructions (size: 50): 11.65 μ s Block Transfer Instructions (size: 100): 21.65 μ s
Scan Time	Approx. 0.6 ms per 1K words in ladder diagram program Remarks: The components of the ladder diagram program and their ratio used in measuring the scan time are as follows: <ul style="list-style-type: none"> ● Contacts: 60% ● Coils: 15% ● SDAT instructions: 10% ● SUB instructions: 10% ● BLKM instructions: 5%

Item	Specifications																																																						
Program Memory Capacity	40K words (1 word: 24 bits)																																																						
Maximum I/O Points	<p>1) Digital I/O points: 4,096 points max. (1 point: 1 bit)</p> <p>2) I/O registers: 512 registers max. (1 register: 16 bits)</p> <p>3) Local I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 1 ● Number of Racks: 4 Racks max. including CPU Rack. ● Number of mountable I/O Modules: 54 Modules max. The total number of points/registers including all remote input/output points must meet the above conditions 1 and 2. <p>4) Remote I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 2 ● Number of stations per channel: 15 ● Number of Racks per channel: Max. 4 Rack ● Number of I/O points per station: (Digital input points + 8) + (Input registers x 2) ≤ 512 bytes (Digital output points + 8) + (Output registers x 2) ≤ 512 bytes The total number of points/registers including all remote input/output points must meet the above conditions 1) and 2). 																																																						
Maximum points of coils and relays	<p>1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520</p> <p>2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: point (1 point = 1 bit)).</p> <table border="1"> <thead> <tr> <th>Coil/Relay</th> <th>Setting range</th> <th>Setting unit</th> <th>Defaults</th> <th>Example 1</th> <th>Example 2</th> </tr> </thead> <tbody> <tr> <td>Coils</td> <td>16 to 65,472</td> <td>16</td> <td>8,192</td> <td>57,328</td> <td>65,472</td> </tr> <tr> <td>Link coils</td> <td>0 to 4,096</td> <td>1,024</td> <td>2,048</td> <td>2,048</td> <td>0</td> </tr> <tr> <td>MC coils</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control coils</td> <td>0 to 320</td> <td>160</td> <td>320</td> <td>320</td> <td>0</td> </tr> <tr> <td>Input relays</td> <td>16 to 65,472</td> <td>16</td> <td>1,024</td> <td>4,096</td> <td>16</td> </tr> <tr> <td>MC relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>M code relays</td> <td>0 to 192</td> <td>96</td> <td>192</td> <td>192</td> <td>0</td> </tr> </tbody> </table> <p>Note: Number of I/O allocatable input relays = 4096 – (Number of output coils which have been allocated)</p>	Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2	Coils	16 to 65,472	16	8,192	57,328	65,472	Link coils	0 to 4,096	1,024	2,048	2,048	0	MC coils	0 to 512	256	512	512	0	MC control coils	0 to 320	160	320	320	0	Input relays	16 to 65,472	16	1,024	4,096	16	MC relays	0 to 512	256	512	512	0	MC control relays	0 to 512	256	512	512	0	M code relays	0 to 192	96	192	192	0
Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2																																																		
Coils	16 to 65,472	16	8,192	57,328	65,472																																																		
Link coils	0 to 4,096	1,024	2,048	2,048	0																																																		
MC coils	0 to 512	256	512	512	0																																																		
MC control coils	0 to 320	160	320	320	0																																																		
Input relays	16 to 65,472	16	1,024	4,096	16																																																		
MC relays	0 to 512	256	512	512	0																																																		
MC control relays	0 to 512	256	512	512	0																																																		
M code relays	0 to 192	96	192	192	0																																																		

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Item	Specifications																				
Timers	1) Timing method:		Increment method																		
	2) Types:		ON-delay, OFF-delay																		
	3) Number of timers:		4,914 timers max.																		
	4) Timing unit and range:		<table border="1"> <thead> <tr> <th>Name</th> <th>Unit</th> <th>Range</th> </tr> </thead> <tbody> <tr> <td>1-s Timer</td> <td>1 s</td> <td>1 to 65535 s</td> </tr> <tr> <td>0.1-s Timer</td> <td>0.1 s</td> <td>0.1 to 6553.5 s</td> </tr> <tr> <td>0.01-s Timer</td> <td>0.01 s</td> <td>0.01 to 655.35 s</td> </tr> <tr> <td>0.001-s Timer</td> <td>0.001 s</td> <td>0.001 to 65.535 s</td> </tr> </tbody> </table>				Name	Unit	Range	1-s Timer	1 s	1 to 65535 s	0.1-s Timer	0.1 s	0.1 to 6553.5 s	0.01-s Timer	0.01 s	0.01 to 655.35 s	0.001-s Timer	0.001 s	0.001 to 65.535 s
	Name	Unit	Range																		
	1-s Timer	1 s	1 to 65535 s																		
0.1-s Timer	0.1 s	0.1 to 6553.5 s																			
0.01-s Timer	0.01 s	0.01 to 655.35 s																			
0.001-s Timer	0.001 s	0.001 to 65.535 s																			
5) External setting:		Possible																			
6) Power interruption preservation:		Possible																			
Counters	1) Types:		Up Counter, Down Counter																		
	2) Number of counters:		4,914 counters max.																		
	3) Counter range:		1 to 65,535																		
	4) External setting:		Possible																		
	5) Power interruption preservation:		Possible																		
Maximum capacity of data register	<p>1) When the number of coils and relays is the default value, the following condition must be met: (Number of holding registers) + (Number of constant registers) + (Number of link registers) ≤ 25,998</p> <p>2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: word (1 word = 16 bit)).</p>																				
	Register	Setting range	Setting unit	Defaults	Example 1	Example 2															
	Holding registers	1 to 25,995	1	9,999	19,854	25,995															
	Constant registers	1 to 4,096	1	4,096	4,096	1															
	Link registers	2 to 4,096	1,024	2,048	2,048	0															
Memory back-up	<ul style="list-style-type: none"> • Back-up range: 																				
	<ol style="list-style-type: none"> 1) Program memory 2) Data memory 																				
	<ul style="list-style-type: none"> • Backup method 																				
	<ol style="list-style-type: none"> 1) One lithium battery 2) Five year warranty on battery (25 °C) 																				
<ul style="list-style-type: none"> • Back-up time <p>The total memory back-up time is 1 year (25 °C)</p>																					

Item	Specifications
Data Types (Numeric Expressions)	<ol style="list-style-type: none"> 1) Unsigned decimal, 4-digit integers: 0 to 9999 2) Signed decimal, 4-digit integers: -9999 to 9999 (sign + absolute-value) 3) Unsigned decimal, 8-digit integers: 0 to 99999999 4) Signed decimal, 8-digit integers: -99999999 to 99999999 (sign + absolute-value) 5) 16-bit unsigned binary integers: 0 to 65535 6) 16-bit signed binary integers: -32768 to 32767 (2's complement) 7) 32-bit unsigned binary integer: 0 to 4294967295 8) 32-bit signed binary integer: -2147483648 to 2147483647 (2's complement) 9) 32-bit floating-point number: IEEE, 32-bit data 10) BCD: 0 to 9999 (16-bit data) <p>Note: Usable data types differ according to instruction.</p>
Self-diagnostics	<ol style="list-style-type: none"> 1) Memory total check 2) Processor check 3) Internal timer check 4) System memory check 5) Program memory total check 6) Ladder element type check 7) Remote system check 8) Watchdog timer check 9) EOS/EOL check 10) Data memory check 11) Battery voltage low-level check
Other features	<ol style="list-style-type: none"> 1) Calendar 2) Constant sweep 3) Single sweep 4) High-speed scan 5) Segment schedule 6) MEMOBUS communications function 7) MEMOBUS PLUS communications function

4

4. Specifications of CPU21 (Model No.: DDSCR-120CPU34110)

CPU21 specifications are shown in the following table.

Table 4.15 Specifications of CPU21

Item	Specifications
Model Name	CPU21
Model No.	DDSCR-120CPU34110
Internal Current Consumption	950 mA (with PC Card: 1,150 mA)
Maximum Heating Value	4.75 W (with PC Card: 5.75 W)
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	500 g
External Dimensions	Width: 81 mm Height: 130 mm Depth: 103.9 mm
Execution Control Method	Cyclic-scan method
Input/Output Connection Method	1) Online input/output method 2) Remote input/output method
Input/Output Control Method	1) Sync refresh method 2) Direct method (direct input/output)
CPU	General-purpose 16-bit microprocessor
Memory	The following memories are standard: 1) CMOS RAM: 512 kbytes 2) FLASH ROM: 384 kbytes
Programming Language	Ladder diagram language

Item	Specifications	
Instructions (169 instructions)	Basic Instructions (16 instructions)	1) Relays (10) 2) Timers (4) 3) Counters (2)
	Numeric Instructions (25 instructions)	1) Unsigned, 4-digit, Decimal Arithmetic Instructions (4) 2) Unsigned, 8-digit, Decimal Arithmetic Instructions (4) 3) Signed, 4-digit, Decimal Arithmetic Instructions (4) 4) Signed, 8-digit, Decimal Arithmetic Instructions (2) 5) 16-bit Arithmetic Instructions (4) 6) 32-bit Arithmetic Instructions (3) 7) Decimal Square Root Instructions (2) 8) Decimal Trigonometric Instructions (2)
	Data Processing Instructions (48 instructions)	1) Data Transfer Instructions (12) 2) Indexed Block Transfer Instructions (4) 3) Matrix Instructions (10) 4) 16-bit Process Instructions (5) 5) Data Conversion Instructions (6) 6) Other Instructions (11)
System Status Read Instruction (1 instruction)		
	Sequence Control Instructions (3 instructions)	1) Stepping Switch Instructions (2) 2) Sequence Control Interface Instructions (1)
	Program Control Instructions (7 instructions)	1) Skip Instructions (2) 2) Subroutine Instructions (3) 3) Master Control Instructions (2)
I/O Control Instructions (2 instructions)		
	Communications Instructions (9 instructions)	1) COM Instructions (2) 2) MEMOBUS PLUS Communications Instruction (1) 3) FBUS Communications Instructions (4) 4) ASCII Instructions (2)
Motion Control Instructions (22 instructions)		
	Expansion Math Instructions (32 instructions)	1) Integer Instructions (2) 2) Floating-point Decimal Instructions (30)
Process Control Instruction (1 instruction)		
Traceback Instruction (1 instruction)		
Expansion Memory Access Instructions (2 instructions)		

4

Item	Specifications
Instruction Word Length	1) Relays: 1 word per instruction 2) Timers/Counters: 2 to 3 words per instruction 3) Math instructions: 2 to 3 words per instruction 4) Data process instructions: 2 to 3 words per instruction
Instruction Execution Time	1) Contacts: 1.30 to 1.45 μ s 2) Coils: 1.90 to 2.50 μ s 3) Unsigned 4-digit Decimal Addition Instructions: 4.80 to 5.35 μ s 4) Block Transfer Instructions (size: 1): 2.65 μ s Block Transfer Instructions (size: 50): 22.25 μ s Block Transfer Instructions (size: 100): 42.25 μ s
Scan Time	Approx. 1 ms per 1K words in ladder diagram program Remarks: The components of the ladder diagram program and their ratio used in measuring the scan time are as follows: <ul style="list-style-type: none"> ● Contacts: 60% ● Coils: 15% ● SDAT instructions: 10% ● SUB instructions: 10% ● BLKM instructions: 5%

Item	Specifications																																																						
Program Memory Capacity	16K words (1 word: 24 bits)																																																						
Maximum I/O Points	<p>1) Digital I/O points: 1,024 points max. (1 point: 1 bit)</p> <p>2) I/O registers: 512 registers max. (1 register: 16 bits)</p> <p>3) Local I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 1 ● Number of Racks: 4 Racks max. including CPU Rack. ● Number of mountable I/O Modules: 54 Modules max. The total number of remote I/O points and registers must meet the above conditions 1) and 2). <p>4) Remote I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 2 ● Number of stations per channel: 15 ● Number of Racks per channel: Max. 4 Rack ● Number of I/O points per station: (Digital input points ÷ 8) + (Input registers x 2) ≤ 512 bytes (Digital output points ÷ 8) + (Output registers x 2) ≤ 512 bytes The total number of remote and local I/O points and registers must meet the above conditions 1) and 2). 																																																						
Maximum Points of Coils and Relays	<p>1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520</p> <p>2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: point (1 point = 1 bit)).</p> <table border="1"> <thead> <tr> <th>Coil/Relay</th> <th>Setting range</th> <th>Setting unit</th> <th>Defaults</th> <th>Example 1</th> <th>Example 2</th> </tr> </thead> <tbody> <tr> <td>Coils</td> <td>16 to 65,472</td> <td>16</td> <td>8,192</td> <td>60,400</td> <td>65,472</td> </tr> <tr> <td>Link coils</td> <td>32 to 4,096</td> <td>1,024</td> <td>2,048</td> <td>2,048</td> <td>32</td> </tr> <tr> <td>MC coils</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control coils</td> <td>0 to 320</td> <td>160</td> <td>320</td> <td>320</td> <td>0</td> </tr> <tr> <td>Input relays</td> <td>16 to 65,472</td> <td>16</td> <td>1,024</td> <td>1,024</td> <td>16</td> </tr> <tr> <td>MC relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>M code relays</td> <td>0 to 192</td> <td>96</td> <td>192</td> <td>192</td> <td>0</td> </tr> </tbody> </table> <p>Note: Number of I/O allocatable input relays = 1024 – (Number of output coils which have been allocated)</p>	Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2	Coils	16 to 65,472	16	8,192	60,400	65,472	Link coils	32 to 4,096	1,024	2,048	2,048	32	MC coils	0 to 512	256	512	512	0	MC control coils	0 to 320	160	320	320	0	Input relays	16 to 65,472	16	1,024	1,024	16	MC relays	0 to 512	256	512	512	0	MC control relays	0 to 512	256	512	512	0	M code relays	0 to 192	96	192	192	0
Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2																																																		
Coils	16 to 65,472	16	8,192	60,400	65,472																																																		
Link coils	32 to 4,096	1,024	2,048	2,048	32																																																		
MC coils	0 to 512	256	512	512	0																																																		
MC control coils	0 to 320	160	320	320	0																																																		
Input relays	16 to 65,472	16	1,024	1,024	16																																																		
MC relays	0 to 512	256	512	512	0																																																		
MC control relays	0 to 512	256	512	512	0																																																		
M code relays	0 to 192	96	192	192	0																																																		

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Item	Specifications					
Timers	1) Timing method:		Increment method			
	2) Types:		ON-delay, OFF-delay			
	3) Number of timers:		2,457 timers max.			
	4) Timing unit and range:					
			Name	Unit	Range	
	1-s Timer 0.1-s Timer 0.01-s Timer 0.001-s Timer		1 s 0.1 s 0.01 s 0.001 s	1 to 65535 s 0.1 to 6553.5 s 0.01 to 655.35 s 0.001 to 65.535 s		
5) External setting:		Possible				
6) Power interruption preservation:		Possible				
Counters	1) Types:		Up Counter, Down Counter			
	2) Number of counters:		2,457 counters max.			
	3) Counter range:		1 to 65,535			
	4) External setting:		Possible			
	5) Power interruption preservation:		Possible			
Maximum capacity of data register	1) When the number of coils and relays is the default value, the following condition must be met:					
	(Number of holding registers) + (Number of constant registers) + (Number of link registers) \leq 25,998					
	2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: word (1 word = 16 bit)).					
	Register	Setting range	Setting unit	Defaults	Example 1	Example 2
	Holding registers	1 to 25,995	1	9,999	19,854	25,995
Constant registers	1 to 4,096	1	4,096	4,096	1	
Link registers	2 to 4,096	1,024	2,048	2,048	2	
Memory back-up	● Back-up range:					
	1) Program memory					
	2) Data memory					
	● Backup method					
1) One lithium battery						
2) Five year warranty on battery (25 °C)						
● Back-up time						
The total memory back-up time is 1 year (25 °C)						

Item	Specifications
Data Types (Numeric Expressions)	<ol style="list-style-type: none"> 1) Unsigned decimal, 4-digit integers: 0 to 9999 2) Signed decimal, 4-digit integers: -9999 to 9999 (sign + absolute-value) 3) Unsigned decimal, 8-digit integers: 0 to 99999999 4) Signed decimal, 8-digit integers: -99999999 to 99999999 (sign + absolute-value) 5) 16-bit unsigned binary integers: 0 to 65535 6) 16-bit signed binary integers: -32768 to 32767 (2's complement) 7) 32-bit unsigned binary integer: 0 to 4294967295 8) 32-bit signed binary integer: -2147483648 to 2147483647 (2's complement) 9) 32-bit floating-point number: IEEE, 32-bit data 10) BCD: 0 to 9999 (16-bit data) <p>Note: Usable data types differ according to instruction.</p>
Self-diagnostics	<ol style="list-style-type: none"> 1) Memory total check 2) Processor check 3) Internal timer check 4) System memory check 5) Program memory total check 6) Ladder element type check 7) Remote system check 8) Watchdog timer check 9) EOS/EOL check 10) Data memory check 11) Battery voltage low-level check
Other features	<ol style="list-style-type: none"> 1) Calendar 2) Constant sweep 3) Single sweep 4) High-speed scan 5) Segment schedule 6) MEMOBUS communications function 7) MEMOBUS PLUS communications function 8) PC Card access function

4

5. Specifications of CPU10 (Model No.: DDSCR-120CPU14200)

CPU10 specifications are shown in the following table.

Table 4.16 Specifications of CPU10

Item	Specifications
Model Name	CPU10
Model No.	DDSCR-120CPU14200
Internal Current Consumption	500 mA
Maximum Heating Value	2.5 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	400 g
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Execution Control Method	Cyclic-scan method
Input/Output Connection Method	1) Online input/output method 2) Remote input/output method
Input/Output Control Method	1) Sync refresh method 2) Direct method (direct input/output)
CPU	General-purpose 16-bit microprocessor
Memory	The following memories are standard: 1) CMOS RAM: 512 kbytes 2) FLASH ROM: 384 kbytes (Ver. B01 onwards)
Programming Language	Ladder diagram language

Ver.
B01

Item	Specifications	
Instructions (166 instructions)	Basic Instructions (16 instructions)	1) Relays (10) 2) Timers (4) 3) Counters (2)
	Numeric Instructions (25 instructions)	1) Unsigned, 4-digit, Decimal Arithmetic Instructions (4) 2) Unsigned, 8-digit, Decimal Arithmetic Instructions (4) 3) Signed, 4-digit, Decimal Arithmetic Instructions (4) 4) Signed, 8-digit, Decimal Arithmetic Instructions (2) 5) 16-bit Arithmetic Instructions (4) 6) 32-bit Arithmetic Instructions (3) 7) Decimal Square Root Instructions (2) 8) Decimal Trigonometric Instructions (2)
	Data Processing Instructions (48 instructions)	1) Data Transfer Instructions (12) 2) Indexed Block Transfer Instructions (4) 3) Matrix Instructions (10) 4) 16-bit Process Instructions (5) 5) Data Conversion Instructions (6) 6) Other Instructions (11)
System Status Read Instruction (1 instruction)		
Sequence Control Instructions (3 instructions)	1) Stepping Switch Instructions (2)	
	2) Sequence Control Interface Instructions (1)	
Program Control Instructions (7 instructions)	1) Skip Instructions (2)	
	2) Subroutine Instructions (3)	
	3) Master Control Instructions (2)	
I/O Control Instructions (2 instructions)		
Communications Instructions (8 instructions)	1) COM Instructions (2)	
	2) FBUS Communications Instructions (4)	
	3) ASCII Instructions (2)	
Motion Control Instructions (22 instructions)		
Expansion Math Instructions (32 instructions)	1) Integer Instructions (2)	
	2) Floating-point Decimal Instructions (30)	
Process Control Instruction (1 instruction)		
Traceback Instruction (1 instruction)		

4

Item	Specifications
Instruction Word Length	1) Relays: 1 word per instruction 2) Timers/Counters: 2 to 3 words per instruction 3) Math instructions: 2 to 3 words per instruction 4) Data process instructions: 2 to 3 words per instruction
Instruction Execution Time	1) Contacts: 1.30 to 1.45 μs 2) Coils: 1.90 to 2.50 μs 3) Unsigned 4-digit Decimal Addition Instructions: 4.80 to 5.35 μs 4) Block Transfer Instructions (size: 1): 2.65 μs Block Transfer Instructions (size: 50): 22.25 μs Block Transfer Instructions (size: 100): 42.25 μs
Scan Time	Approx. 1 ms per 1K words in ladder diagram program Remarks: The components of the ladder diagram program and their ratio used in measuring the scan time are as follows: <ul style="list-style-type: none"> ● Contacts: 60% ● Coils: 15% ● SDAT instructions: 10% ● SUB instructions: 10% ● BLKM instructions: 5%

Item	Specifications																																																						
Program Memory Capacity	8K words (1 word: 24 bits)																																																						
Maximum I/O Points	<p>1) Digital I/O points: 1,024 points max. (1 point: 1 bit)</p> <p>2) I/O registers: 512 registers max. (1 register: 16 bits)</p> <p>3) Local I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 1 ● Number of Racks: 4 Racks max. including CPU Rack. ● Number of mountable I/O Modules: 54 max. The total number of remote I/O points and registers must meet the above conditions 1) and 2). <p>4) Remote I/O:</p> <ul style="list-style-type: none"> ● Number of channels: 2 ● Number of stations per channel: 15 ● Number of Racks per channel: 4 Racks max. ● Number of I/O points per station: (Digital input points + 8) + (Input registers x 2) ≤ 512 bytes (Digital output points + 8) + (Output registers x 2) ≤ 512 bytes The total number of local points and registers must meet the above conditions 1) and 2). 																																																						
Maximum points of coils and relays	<p>1) When the number of data registers is the initial value, the following condition must be met: (Number of coils) + (Number of relays) ≤ 65,520</p> <p>2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: point (1 point = 1 bit)).</p> <table border="1"> <thead> <tr> <th>Coil/Relay</th> <th>Setting range</th> <th>Setting unit</th> <th>Defaults</th> <th>Example 1</th> <th>Example 2</th> </tr> </thead> <tbody> <tr> <td>Coils</td> <td>16 to 65,472</td> <td>16</td> <td>8,192</td> <td>60,400</td> <td>65,472</td> </tr> <tr> <td>Link coils</td> <td>0 to 4,096</td> <td>1,024</td> <td>2,048</td> <td>2,048</td> <td>0</td> </tr> <tr> <td>MC coils</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control coils</td> <td>0 to 320</td> <td>160</td> <td>320</td> <td>320</td> <td>0</td> </tr> <tr> <td>Input relays</td> <td>16 to 65,472</td> <td>16</td> <td>1,024</td> <td>1,024</td> <td>16</td> </tr> <tr> <td>MC relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>MC control relays</td> <td>0 to 512</td> <td>256</td> <td>512</td> <td>512</td> <td>0</td> </tr> <tr> <td>M code relays</td> <td>0 to 192</td> <td>96</td> <td>192</td> <td>192</td> <td>0</td> </tr> </tbody> </table> <p>Note: Number of I/O allocatable input relays = 1024 – (Number of output coils which have been allocated)</p>	Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2	Coils	16 to 65,472	16	8,192	60,400	65,472	Link coils	0 to 4,096	1,024	2,048	2,048	0	MC coils	0 to 512	256	512	512	0	MC control coils	0 to 320	160	320	320	0	Input relays	16 to 65,472	16	1,024	1,024	16	MC relays	0 to 512	256	512	512	0	MC control relays	0 to 512	256	512	512	0	M code relays	0 to 192	96	192	192	0
Coil/Relay	Setting range	Setting unit	Defaults	Example 1	Example 2																																																		
Coils	16 to 65,472	16	8,192	60,400	65,472																																																		
Link coils	0 to 4,096	1,024	2,048	2,048	0																																																		
MC coils	0 to 512	256	512	512	0																																																		
MC control coils	0 to 320	160	320	320	0																																																		
Input relays	16 to 65,472	16	1,024	1,024	16																																																		
MC relays	0 to 512	256	512	512	0																																																		
MC control relays	0 to 512	256	512	512	0																																																		
M code relays	0 to 192	96	192	192	0																																																		

4

Item	Specifications					
Timers	1) Timing method:		Increment method			
	2) Types:		ON-delay, OFF-delay			
	3) Number of timers:		2,457 timers max.			
	4) Timing unit and range:					
			Name	Unit	Range	
	1-s Timer 0.1-s Timer 0.01-s Timer 0.001-s Timer		1 s 0.1 s 0.01 s 0.001 s	1 to 65535 s 0.1 to 6553.5 s 0.01 to 655.35 s 0.001 to 65.535 s		
5) External setting:		Possible				
6) Power interruption preservation:		Possible				
Counters	1) Types:		Up Counter, Down Counter			
	2) Number of counters:		2,457 counters max.			
	3) Counter range:		1 to 65,535			
	4) External setting:		Possible			
	5) Power interruption preservation:		Possible			
Maximum capacity of data register	1) When the number of coils and relays is the default value, the following condition must be met: (Number of holding registers) + (Number of constant registers) + (Number of link registers) \leq 25,998					
	2) The maximum value of each reference can be freely set within the above limit from the Programming Panel (Unit: word (1 word = 16 bit)).					
	Register	Setting range	Setting unit	Defaults	Example 1	Example 2
	Holding registers	1 to 25,995	1	9,999	19,854	25,995
	Constant registers	1 to 4,096	1	4,096	4,096	1
Link registers	0 to 4,096	1,024	2,048	2,048	0	
Memory back-up	● Back-up range:					
	1) Program memory 2) Data memory					
	● Backup method					
	1) One lithium battery 2) Five year warranty on battery (25 °C)					
● Back-up time The total memory back-up time is 1 year (25 °C)						

Item	Specifications
Data Types (Numeric Expressions)	<ol style="list-style-type: none"> 1) Unsigned decimal, 4-digit integers: 0 to 9999 2) Signed decimal, 4-digit integers: -9999 to 9999 (sign + absolute-value) 3) Unsigned decimal, 8-digit integers: 0 to 99999999 4) Signed decimal, 8-digit integers: -99999999 to 99999999 (sign + absolute-value) 5) 16-bit unsigned binary integers: 0 to 65535 6) 16-bit signed binary integers: -32768 to 32767 (2's complement) 7) 32-bit unsigned binary integer: 0 to 4294967295 8) 32-bit signed binary integer: -2147483648 to 2147483647 (2's complement) 9) 32-bit floating-point number: IEEE, 32-bit data 10) BCD: 0 to 9999 (16-bit data) <p>Note: Usable data types differ according to instruction.</p>
Self-diagnostics	<ol style="list-style-type: none"> 1) Memory total check 2) Processor check 3) Internal timer check 4) System memory check 5) Program memory total check 6) Ladder element type check 7) Remote system check 8) Watchdog timer check 9) EOS/EOL check 10) Data memory check 11) Battery voltage low-level check
Other features	<ol style="list-style-type: none"> 1) Calendar 2) Constant sweep 3) Single sweep 4) High-speed scan 5) Segment schedule 6) MEMOBUS communications function

Note Items that refer to the functions supported by CPU10 Module versions B01 onwards are indicated by the icon



4

4.3.4 Using CPU Modules 1 (For CPU20, CPU30, and CPU35)

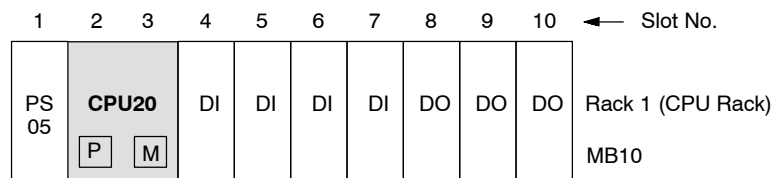
1. CPU Module Installation Location

1) The CPU Module can be mounted to any slot on the Mounting Base of Rack 1. It will occupy 2 slots of the Rack.

◀ **EXAMPLE** ▶

2) As shown in *Example 1* and *Example 2* below, the CPU Module is normally mounted to the slots on the left next to the Power Supply Module on Rack 1.

Example 1



PS05: Power Supply Module (3 A)

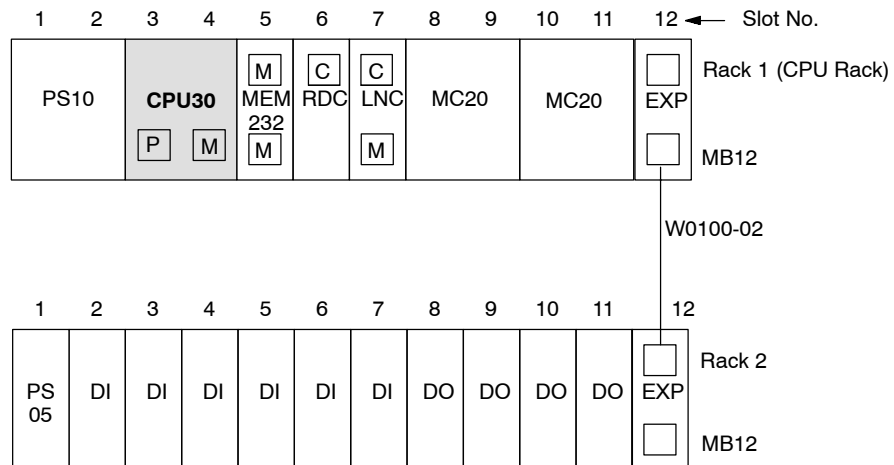
CPU20: CPU Module (16 KW)

MB10: 10-slot Mounting Base

DI: 12/24 VDC 16-point Input Module

DO: 12/24 VDC 16-point Output Module

Example 2



PS10: Power Supply Module (7 A)

PS05: Power Supply Module (3 A)

CPU30: CPU Module (32 KW)

MEM232: MEMOBUS Module (RS-232)

RDC: Remote I/O Driver Module

LNC: PC Link Module

DI: 12/24-VDC 16-point Input Module

DO: 12/24-VDC 16-point Output Module

MC20: 4-axis Motion Module

EXP: Expander Module

MB12: 12-slot Mounting Base

W0100-02: Rack-to-rack I/O Cable (0.2 m)

Figure 4.13 Example of Mounting CPU Modules

2. MEMOBUS Port

- 1) Through the MEMOBUS port (slave port), the CPU Module runs RS-232C communications with other communications devices connected on MEMOBUS network.
- 2) The following are some of the communications devices which can be connected to MEMOBUS port. Each of them is used as the MEMOBUS master.
 - a) P120 Programming Panels (P120M/P120MN/P120D/P120DN/P120C/P120CN)
 - b) Personal computer with RS-232C interface
 - c) ACGC4000/400-series FA Monitor
 - d) TB120 Teaching Pendant

EXAMPLE

- 3) An example of using MEMOBUS port is shown below:

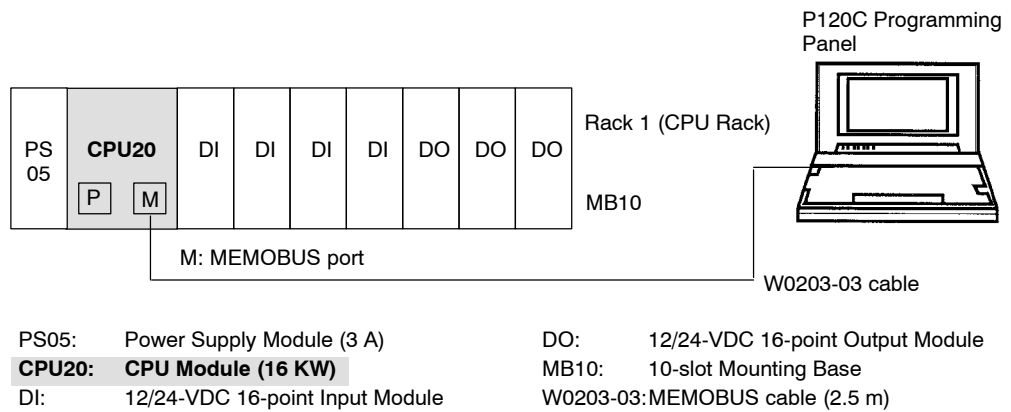


Figure 4.14 Example: Using the MEMOBUS Port

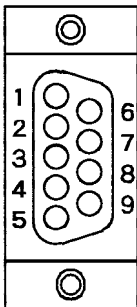
4) MEMOBUS network communications specifications are shown in the following table.

Table 4.17 MEMOBUS Network Communications Specifications

Item	Specifications
Communications Method	Half-duplex, stop-start synchronization
Transmission Levels	Conform to RS-232C.
Protocol	MEMOBUS Protocol
Baud Rate	19,200/9,600/7,200/4,800/3,600/2,400/2,000/1,800/1,200/600/300/150 bps
Communications Mode	RTU mode or ASCII mode
Data Format	The following data format is used between the master and slaves, between the master and modems, and between the modems and slaves: 1) Data bit length: 8 (RTU mode) or 7 (ASCII mode) bits 2) Parity check: Yes/No 3) Parity: Odd or even 4) Stop bits: 1 or 2
Transmission Distance	15 m (Can be extended to 4.5 km maximum by using Yaskawa modem.)
Transmission Error Detection	CRC-16 (RTU Mode), LRC (ASCII Mode)

5) D-sub connector (9-pin, female) is used to connect MEMOBUS port. The connector pin arrangements and the signal names are shown below:

Table 4.18 Pin Arrangement and Names of Signals

	Pin No.	Symbol	Signal Name
	1	FG	Frame ground
	2	TXD	Transmission data
	3	RXD	Reception data
	4	RTS	Request to send
	5	CTS	Clear to send
	6	DSR	Data set ready
	7	GND	Signal ground
	8	EST	Element status
	9	DTR	Data terminal ready

6) COM Instructions (COMM, COMR)

Note (1) The MEMOBUS port of CPU Module does not support the COM instructions (COMM, COMR).

- (2) The COMM instruction can only be used for the MEMOBUS port of the following two Communications Modules:

MEMOBUS Module (RS-232): Model JAMSC-120NOM26100
 MEMOBUS Module (RS-422): Model JAMSC-120NOM27100

- (3) The COMR instruction can only be used for the MEMOBUS port of the following Communications Module:

Remote I/O Receiver Module: Model JAMSC-120CRR13100

3. MEMOBUS PLUS Port

- 1) Through the MEMOBUS PLUS port, the CPU Module runs high-speed communications (baud rate: 1 Mbps) with other communications devices on a MEMOBUS network.

- 2) The following are some of the communications devices which can be connected to the MEMOBUS port.

- a) Programmable Controllers: MEMOCON GL120, GL130
- b) Programming Panels: P120DN, P120MN, P120CN (with a SA85 Network Adapter)
- c) Personal computers: IBM PC/AT or compatibles (with a SA85 Network Adapter)

- 3) Examples of system configuration of MEMOBUS PLUS network are shown below:

◀EXAMPLE▶

Example 1
 Connecting Programming Panel and GL120

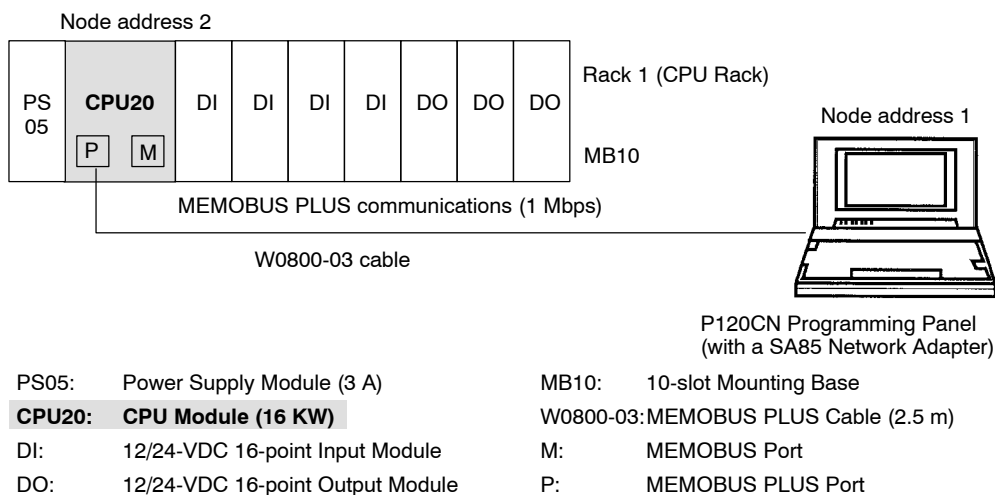
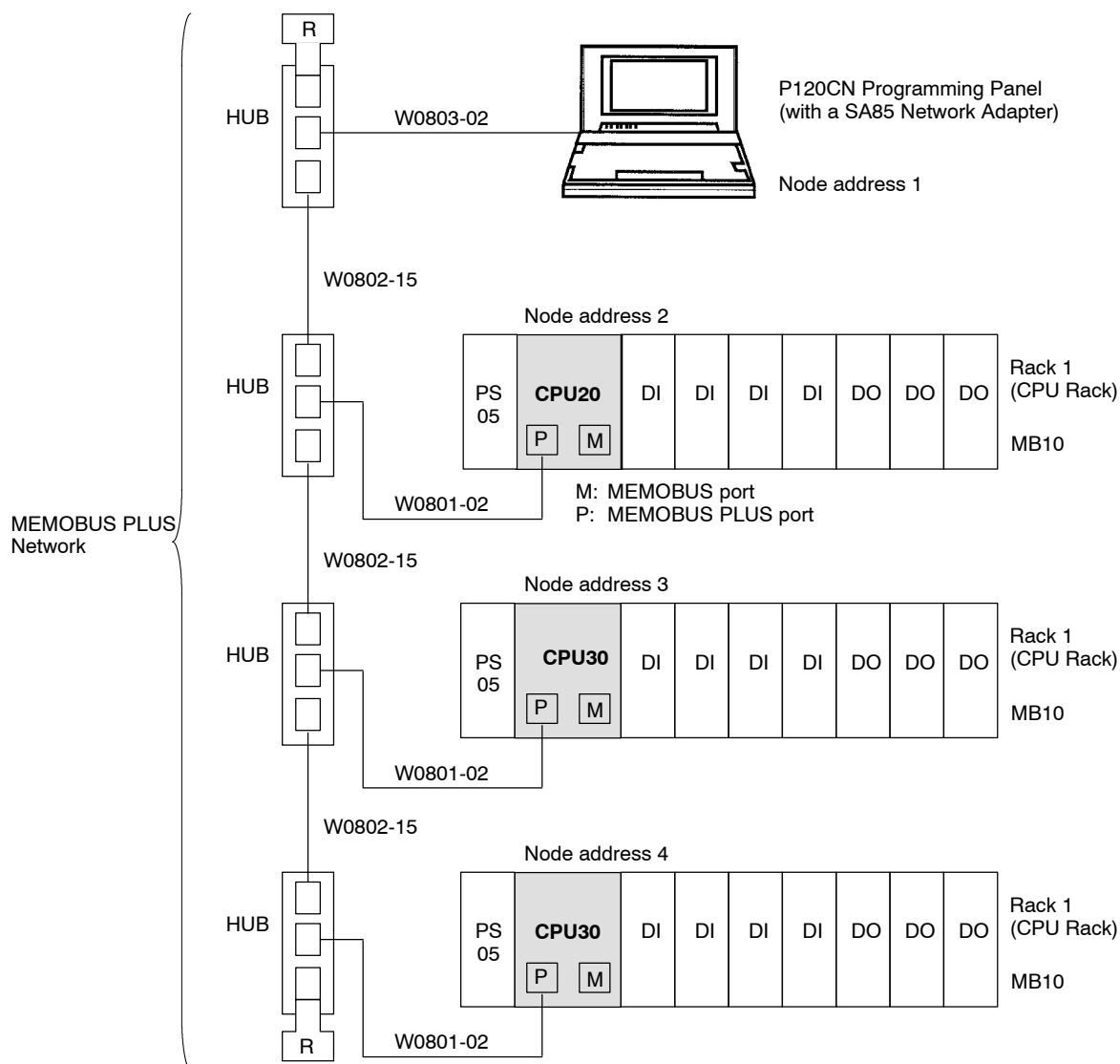


Figure 4.15 Connecting Programming Panel and GL120

EXAMPLE

Example 2
Connecting Programming Panel, GL120, and GL130



PS05: Power Supply Module (3 A)

CPU20: CPU Module (16 KW)

CPU30: CPU Module (32 KW)

DI: 12/24-VDC 16-point Input Module

DO: 12/24-VDC 16-point Output Module

MB10: 10-slot Mounting Base

HUB: MEMOBUS PLUS Hub Module

R: MEMOBUS PLUS Terminator

W0801-02: MEMOBUS PLUS Branch Line Cable (2.0 m)

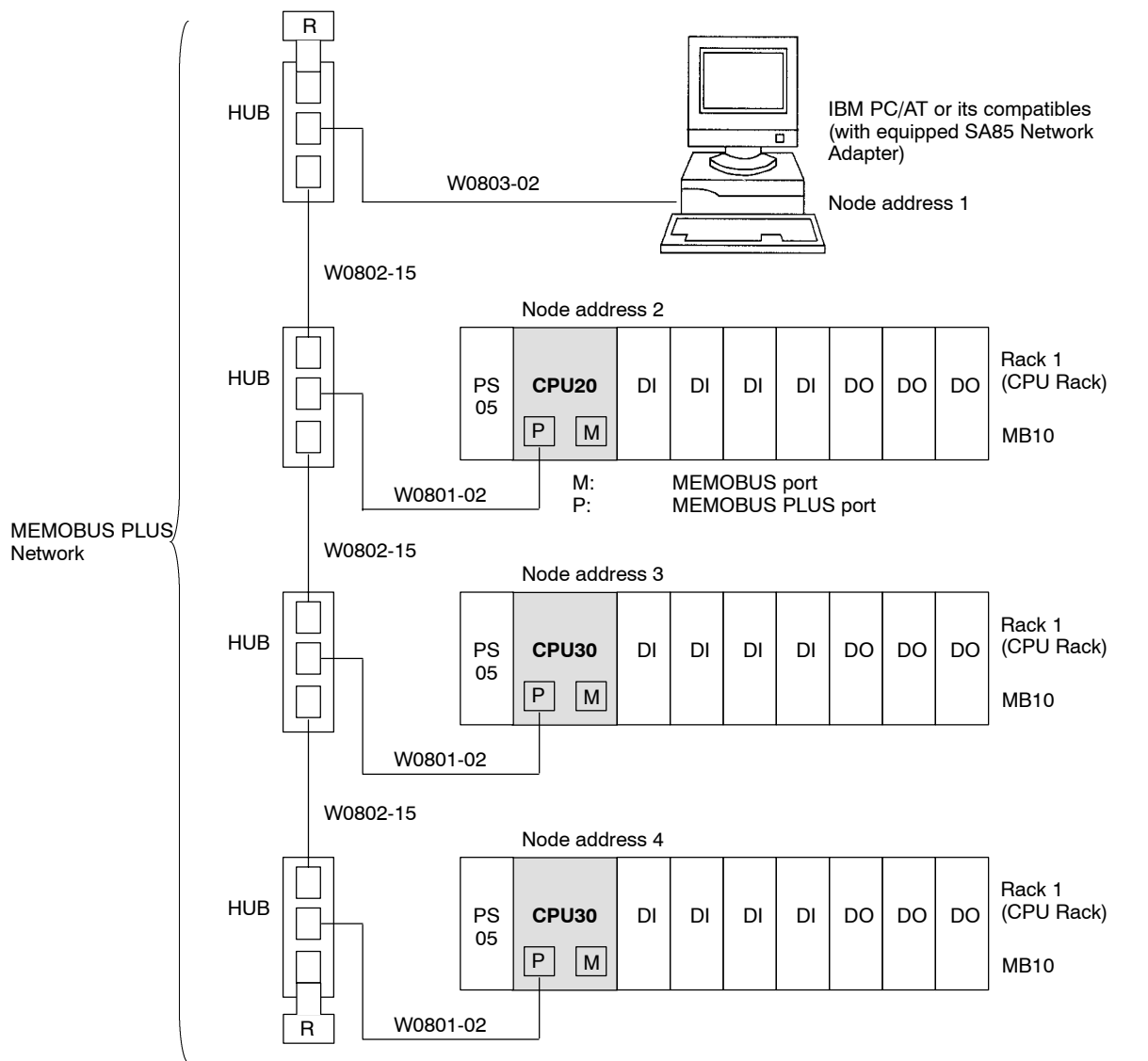
W0802-15: MEMOBUS PLUS Trunk Line Cable (15.0 m)

W0803-02: MEMOBUS PLUS Branch Line Cable (2.0 m)

Figure 4.16 Connecting Programming Panel, GL120, and GL130

EXAMPLE

Example 3
Connecting a personal computer, GL120 and GL130



PS05: Power Supply Module (3 A)
CPU20: CPU Module (16 KW)
CPU30: CPU Module (32 KW)
 DI: 12/24-VDC 16-point Input Module
 DO: 12/24-VDC 16-point Output Module
 MB10: 10-slot Mounting Base

HUB: MEMOBUS PLUS Hub Module
 R: MEMOBUS PLUS Terminator
 W0801-02: MEMOBUS PLUS Branch Line Cable (2.0 m)
 W0802-15: MEMOBUS PLUS Trunk Line Cable (15.0 m)
 W0803-02: MEMOBUS PLUS Branch Line Cable (2.0 m)

Figure 4.17 Connecting a Personal Computer, GL120 and GL130

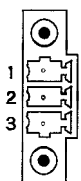
- 4) MEMOBUS PLUS network communications specifications are shown in the following table.

Table 4.19 MEMOBUS PLUS Network Communications Specifications

Item	Specifications
Baud Rate	1 Mbps
Transmission Distance	450 m max. without a repeater 1,800 m max. with a repeater
Number of Nodes (Number of Connectable Communications Devices)	32 nodes max. without a repeater 64 nodes max. with a repeater
Transmission Media	Shielded twisted-pair cable
Transmission Error Detection	CRC-16
Media Access Control Method	Token bus

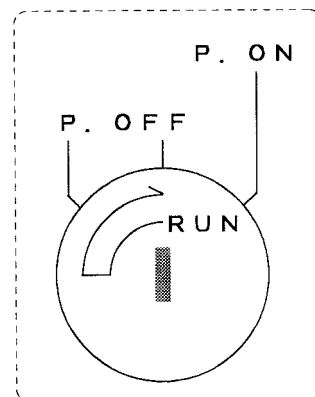
- 5) The connector for the MEMOBUS PLUS port is a terminal block connector (3-pin, female). The connector pin arrangement and the signal names are shown in the following table.

Table 4.20 Pin Arrangement and Signal Names

	Pin Number	Symbol	Signal Name
1	1	DH	DATA HIGH
2	2	DL	DATA LOW
3	3	SHLD	SHIELD

4. Key Switch

- 1) The key switch is a non-automatic-return switch and has three positions (right, center, and left) as shown in the diagram on the right.
- 2) The key switch has the following two functions:
 - a) Memory protection ON/OFF
 - b) RUN operation



3) Memory Protection

Memory protection can be turned ON and OFF to prohibit or enable alterations to the user program and other data by programming devices such as Programming Panel or personal computer. Select the position required by referring to the following table.

Table 4.21 Memory Protection

Position	Name	Function
Right	P. ON	When the key switch is set to P.ON, the CPU Module memory is protected from alteration. When memory is protected, the following operations from programming devices (Programming Panels and/or personal computer, etc.) connected to any Communications port are prohibited. 1) Creating or altering the user program 2) Load operations 3) Disable operation for coils, relays, etc. 4) Altering reference data (e.g., holding register data, etc.)
Middle	P. OFF	When the key switch is set to P.OFF, the CPU Module memory can be altered. When memory is not protected, the operations prohibited above become possible.
Left		

4) RUN Operation

- a) The RUN operation setting is used to change the CPU Module from STOP mode to RUN mode. The CPU Module will be changed from STOP mode to RUN mode when the key switch is turned as follows: Center, then left, and then back to center.
- b) When the CPU Module is in RUN mode, operating the key switch will not change the CPU Module back to STOP mode.
- c) RUN operation can also be entered by using programming devices such as Programming Panel or personal computer. Refer to the following manual for operation methods:
 - MEMOCON GL120, GL130 MEMOSOFT for DOS User's Manual (SIEZ-C825-60.10)
 - MEMOCON GL120, GL130 MEMOSOFT for Windows User's Manual (SIEZ-C825-60.25)
 - MEMOCON GL120, GL130 MEMOSOFT for P120 Programming Panel User's Manual (SIEZ-C825-60.7)

5. DIP Switch

- 1) The DIP switch consists of 8 pins. The pins are numbered from 1 to 8, as shown in the diagram.
- 2) Each pin turns ON when it is moved to the left (toward the Key switch).
- 3) Pins are effective at the following times:
 - a) Pins 1 to 3: Whenever the pin is turned ON.
 - b) Pin 5: When power is turned ON to the Power Supply Module on the CPU Rack.
- 4) Each pin's function is shown in the following table. Refer to following pages for details.

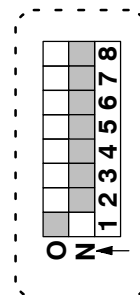


Table 4.22 Function of DIP Switch Pins

Pin No.	Setting	Function	
1	ON	1) Sets communications mode of MEMOBUS port according to the setting of pin 2. 2) Sets communications parameter of MEMOBUS port to defaults.	
	OFF	Sets communications mode and parameters of MEMOBUS port to the user settings.	
2	ON	Effective when pin 1 is ON.	Sets communications mode of MEMOBUS port to ASCII.
	OFF		Sets communications mode of MEMOBUS port to RTU.
3	ON	Sets the CPU Module to bridge mode.	
	OFF	Release the CPU Module from bridge mode.	
4	ON	For future use. It does not matter whether the pin is turned ON or OFF.	
	OFF		
5	ON	Sets start mode of CPU Module to automatic RUN operation.	
	OFF	Sets start mode of CPU Module to normal operation.	
6	ON	For future use. It does not matter whether the pin is turned ON or OFF.	
	OFF		
7	ON	For future use. It does not matter whether the pin is turned ON or OFF.	
	OFF		
8	ON	For future use. It does not matter whether the pin is turned ON or OFF.	
	OFF		

5) Setting Pins 1 and 2

- a) Pins 1 and 2 are used to determine communications parameters. Set them to meet the requirements of your system.

Table 4.23 Setting Communications Parameters for MEMOBUS Port

Pin 1	Pin 2	Function
ON	OFF	Sets communications mode of MEMOBUS port to RTU and sets the communications parameters for the MEMOBUS port to the RTU mode defaults shown below: 1) Slave address: 1 2) Baud rate: 9,600 bps 3) Parity check Yes 4) Parity: Even 5) Stop bits: 1 6) Data bit length: 8 7) Delay time: 0 ms
	ON	Sets communications mode of MEMOBUS port to ASCII and sets the parameters for the MEMOBUS port to the ASCII mode defaults shown below: 1) Slave address: 1 2) Baud rate: 2,400 bps 3) Parity check: Yes 4) Parity: Even 5) Stop bits: 1 6) Data bit length: 7 7) Delay time: 0 ms
OFF	Any	Enables the user to define and set the communications mode and communications parameters for the MEMOBUS port through programming devices (Programming Panel, personal computer, etc.) .

4

EXAMPLE

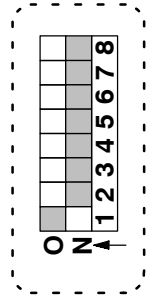
b) Setting examples of pins 1 and 2 are shown below:

- (1) When the DIP switch pins 1 and 2 are set as shown in the diagram on the right, the communications parameters of MEMOBUS port are set to the RTU mode defaults shown below:

Communications mode: RTU

Communications parameters:

Slave address: 1
 Baud rate: 9,600 bps
 Parity check: Yes
 Parity: Even
 Stop bits: 1
 Data bit length: 8
 Delay time: 0 ms



- (2) When connecting the Programming Panel to the CPU Module, the communications parameters must be matched the above values (except the delay time).

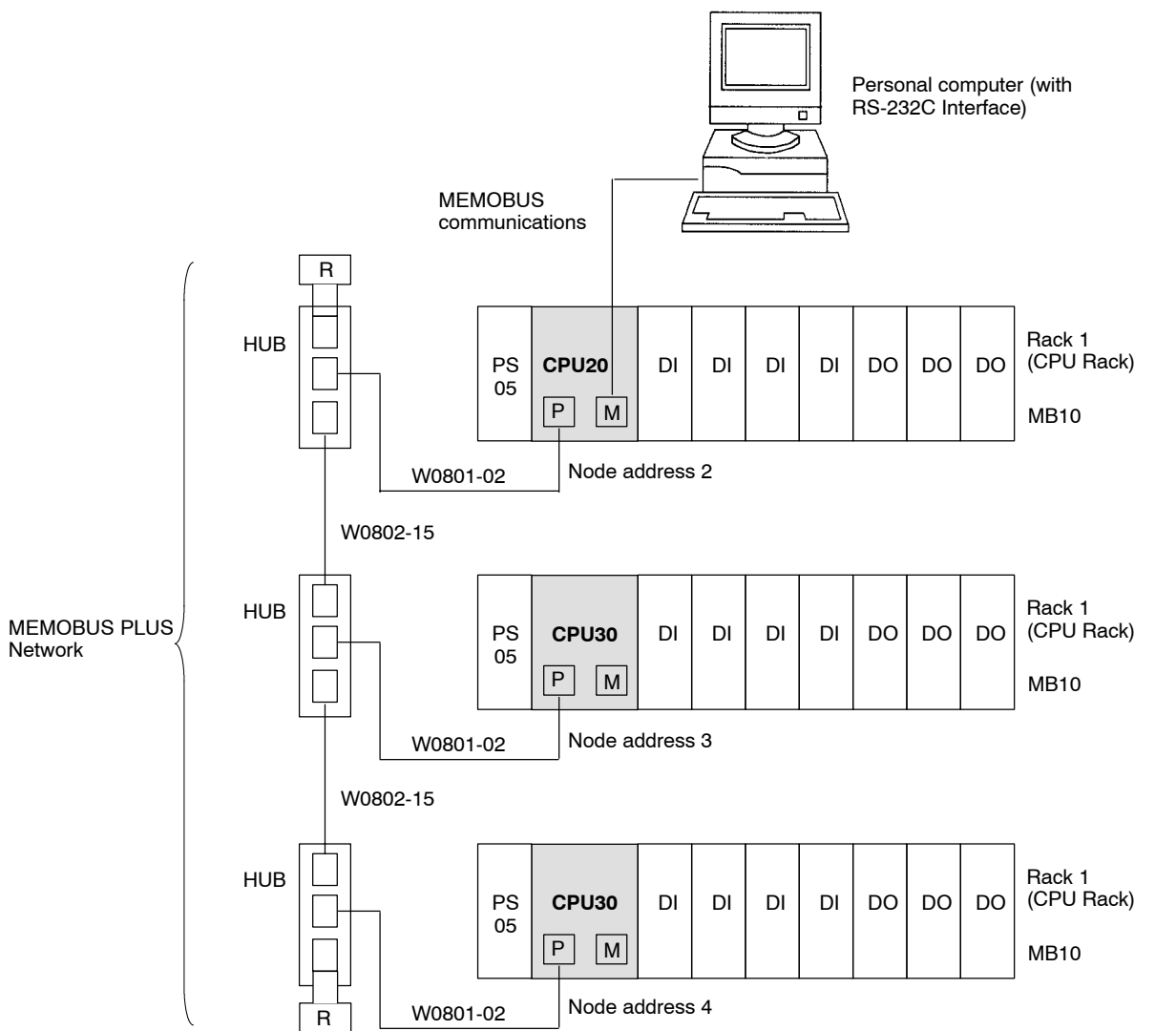
6) Setting Pin 3

- a) When pin 3 is turned ON, the CPU Module will change to bridge mode. In this mode, a MEMOBUS master connected to MEMOBUS ports will run high-speed communications between communications devices on MEMOBUS PLUS network.
- b) In bridge mode, MEMOBUS master must use the node address set for the MEMOBUS PLUS port to specify the communications partner on the network. Refer to following information on the rotary switches for the setting. In bridge mode, the slave address set for the MEMOBUS port is invalid.

EXAMPLE

c) An example using bridge mode is shown below:

(1) System Configuration



PS05: Power Supply Module (3 A)
CPU20: CPU Module (16 KW)
CPU30: CPU Module (32 KW)
 DI: 12/24-VDC 16-point Input Module
 DO: 12/24-VDC 16-point Output Module
 MB10: 10-slot Mounting Base

HUB: MEMOBUS PLUS Hub Module
 R: MEMOBUS PLUS Terminator
 W0801-02: MEMOBUS PLUS Branch Line Cable (2.0 m)
 W0802-15: MEMOBUS PLUS Trunk Line Cable (15.0 m)
 M: MEMOBUS Port
 P: MEMOBUS PLUS Port

Figure 4.18 Using Bridge Mode

(2) Setting Pins 1 to 3

Set DIP switch pins 1 to 3 of the CPU20 of node 2 as shown in the diagram at the right. Turning ON pin 3 sets the CPU20 of node 2 to bridge mode. Turn ON pin 1 and turning OFF pin 2 sets the communications parameters between personal computer and the MEMOBUS port to the following settings:

Communications mode: RTU mode

Communications parameters:

Baud rate: 9,600 bps

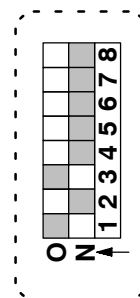
Parity check: Yes

Parity: Even

Stop bits: 1

Data bit length: 8

Delay time: 0 ms



- (3) The communications parameters of the RS-232C interface the personal computer must match the above values (except the delay time).
- (4) A personal computer can run high-speed communications, via the CPU20 of node 2, with any CPU Module (including the CPU20 of node 2) on the MEMOBUS PLUS network.

7) Setting Pin 5

Pin 5 is used to determine the start mode of the CPU Module. See the following table to set this according to your system.

Table 4.24 Setting the Start Mode

Setting	Function
ON	1) Sets the start mode of the CPU Module to automatic RUN operation. 2) In this mode, the CPU Module will start in RUN mode when power is turned ON to the CPU Rack.
OFF	1) Sets the start mode of the CPU Module to normal operation. 2) In this mode, the CPU Module will start in the mode it was in just before the power supply was cut off (i.e., either RUN or STOP mode).

Note The setting of pin 5 is effective (read) only when the power is turned ON to the Power Supply Module of the CPU Rack.

6. Rotary Switches

- The rotary switches are used to set the node address of the MEMOBUS PLUS port.
- There are two rotary switches. The upper switch is rotary switch 1 and the lower switch is rotary switch 2. Each switch has positions numbered from 0 to 9.

- 3) The node address is set between 1 and 64. The following table shows setting the node address.

Table 4.25 Setting the Node Address

Example Setting of Node Address 2	Node Address	Rotary Switch 1	Rotary Switch 2
<p>Rotary Switch 1</p> <p>Rotary Switch 2</p>	1 to 9	0	1 to 9
	10 to 19	1	0 to 9
	20 to 29	2	0 to 9
	30 to 39	3	0 to 9
	40 to 49	4	0 to 9
	50 to 59	5	0 to 9
	60 to 64	6	0 to 4

- Note**
- (1) The setting of the rotary switches is effective (read) only when power is turned ON to the Power Supply Module of the CPU Rack.
 - (2) Set the node address to between 1 and 64. If the address is set to 0 or, to 65 or above, normal communications will not be possible.
 - (3) The same node address must not be used more than once within a single network. If communications devices in the same network have the same node address, correct communications will not be possible.

7. Built-in Battery

- 1) The CPU Module is equipped with one replaceable battery. This battery provides backup for programs or data stored in the CPU Module and 4-axis Motion Module. The battery backup prevents the program and data from being lost when the power supply to the Power Supply Module in the CPU Rack is turned off.

When the Motion Module controls a servomotor with a built-in absolute encoder, use a JRMS-120XCP96000 Battery Module as a power supply for the encoder's backup circuit. The CPU Module's built-in battery cannot be used as a power supply for the absolute encoder's backup circuit.

- 2) The built-in battery has enough power to back up the contents of memory through a total of one year of power interruptions. The battery itself has a guaranteed lifetime of 5 years, although this lifetime varies with the ambient temperature and usage conditions.
- 3) When the CPU Module's "BAT ALM" LED lights, be sure to replace the battery with a BR-2/3A-1 replacement battery within two weeks. The program and data stored in the CPU Module or 4-axis Motion Module will be lost if the battery isn't replaced within two weeks.

4) The battery-replacement procedure is described below.

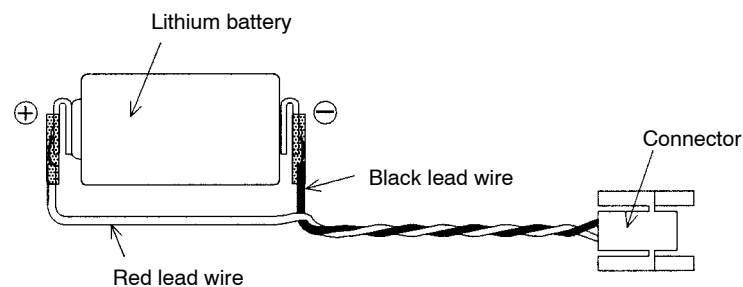
a) Preliminary Steps

(1) Saving the Contents of Memory

Before replacing the battery, save the program and data stored in the CPU Module or Motion Module to a floppy disk or other storage media. The saved program and data can be reinstalled if the contents of the Module's memory are lost accidentally when replacing the battery.

(2) Acquiring the Replacement Battery

Acquire a BR-2/3A-1 replacement battery. This battery is not commercially available; it must be ordered from Yaskawa. The battery is shown in the following diagram.



b) Battery Replacement Procedure



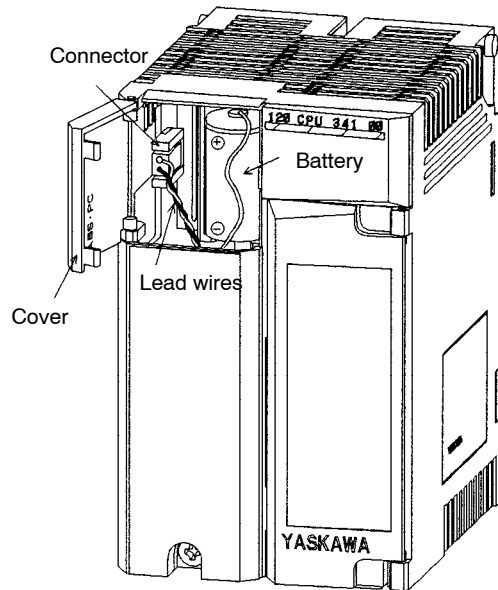
Caution

Always replace the battery with the CPU Module or Motion Module installed in the Mounting Base and power supplied to the Power Supply Module in the CPU Rack. The program such as the Ladder Program or the Motion Program, and data stored in the Module's memory will be lost if the battery is replaced while the Module is separated from the Mounting Base or power is not being supplied to the CPU Rack's Power Supply Module.

Use the following procedure to replace the battery. Refer to the diagram below for details.

- (1) Make sure that the "POWER" indicator on the CPU Rack's Power Supply Module is on.
- (2) Open the cover at the upper-left corner of the CPU Module.
- (3) Disconnect the battery's connector from the CPU Module and remove the battery from the battery holder.
- (4) Place the replacement battery in the battery holder and insert the battery's connector securely into the CPU Module's connector.

- (5) Make sure that the “BAT ALM” indicator light on the CPU Module is off.
- (6) Close the cover.



4

8. MEMOSOFT Versions Supporting CPU35 Modules

The versions of MEMOSOFT required for using CPU35 Modules are shown in the following table.

MEMOSOFT Model	Version Number	Location of Version Number
FMSG-L-AT3 (for English DOS)	1.41 onwards	In the middle at the bottom of the MEMOSOFT start up screen
FMSG-L-PP3E (for P120 English version)		

4.3.5 Using CPU Modules 2 (For CPU21)

1. Operations Common to CPU20

The CPU21 Module is operated in almost the same way as the CPU20 Module. For information on the following items, refer to the section on the CPU20 in 4.3.4 Using CPU Modules 1 (For CPU20, CPU30, and CPU35).

- Installation Location
- MEMOBUS ports
- MEMOBUS PLUS ports
- Key switch
- Rotary switch
- Built-in battery

2. Operations Different from CPU20

The operation of the following items, which are used differently, are described in this section.

- DIP switch
- PC Card slot

3. DIP Switch

- 1) The DIP switch consists of 8 pins. The pins are numbered from 1 to 8, as shown in the diagram.
- 2) Each pin turns ON when it is moved to the left (toward the key switch).
- 3) Pins are effective at the following times:
 - a) Pins 1 to 3: Whenever the pin is turned ON.
 - b) Pin 5: When power is turned ON to the Power Supply Module on the CPU Rack.
- 4) Each pin's function is shown in the following table. Refer to following pages for details.

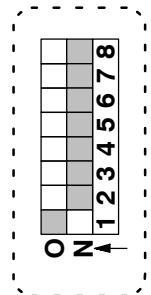


Table 4.26 Function of DIP Switch Pins

Pin No.	Setting	Function	
1	ON	1) Sets communications mode of MEMOBUS port according to the setting of pin 2. 2) Sets communications parameter of MEMOBUS port to defaults.	
	OFF	Sets communications mode and parameters of MEMOBUS port to the user settings.	
2	ON	Effective when pin 1 is ON.	Sets communications mode of MEMOBUS port to ASCII.
	OFF		Sets communications mode of MEMOBUS port to RTU.
3	ON	Sets the CPU Module to bridge mode.	
	OFF	Releases the CPU Module from bridge mode.	
4	ON	Set when a PC Card is used.	
	OFF	Set when a PC Card is not used.	
5	ON	Sets start mode of CPU Module to automatic RUN operation.	
	OFF	Sets start mode of CPU Module to normal operation.	
6	ON	Set when all ROM operation files are to be read. (See note.)	
	OFF	Set when ROM operation files other than those containing reference data are to be read.	
7	ON	For future use. It does not matter whether the pin is turned ON or OFF.	
	OFF		
8	ON	For future use. It does not matter whether the pin is turned ON or OFF.	
	OFF		

Note ROM operation is a function by which the CPU Module reads ladder logic programs at power ON and controls the relevant devices. The CPU21 Module reads the ladder logic programs from the PC Cards.

5) Setting Pins 1 and 2

a) Pins 1 and 2 are used to determine communications parameters. Set these pins according to the requirements of your system by referring to the following table.

Table 4.27 Setting Communications Parameters for MEMOBUS Port

Pin 1	Pin 2	Function
ON	OFF	Sets communications mode of MEMOBUS port to RTU and sets the communications parameters for the MEMOBUS port to the RTU mode defaults shown below: 1) Slave address: 1 2) Baud rate: 9,600 bps 3) Parity check Yes 4) Parity: Even 5) Stop bits: 1 6) Data bit length: 8 7) Delay time: 0 ms
	ON	Sets communications mode of MEMOBUS port to ASCII and sets the parameters for the MEMOBUS port to the ASCII mode defaults shown below: 1) Slave address: 1 2) Baud rate: 2,400 bps 3) Parity check: Yes 4) Parity: Even 5) Stop bits: 1 6) Data bit length: 7 7) Delay time: 0 ms
OFF	Any	Enables the user to define and set the communications mode and communications parameters for the MEMOBUS port through programming devices (Programming Panel, personal computer, etc.).

4

EXAMPLE

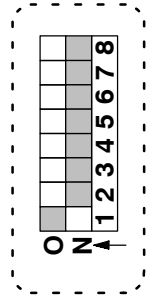
b) Setting examples of pins 1 and 2 are shown below:

- (1) When DIP switch pins 1 and 2 are set as shown in the diagram on the right, the communications parameters of MEMOBUS port are set to the RTU mode defaults shown below:

Communications mode: RTU

Communications parameters:

Slave address: 1
 Baud rate: 9,600 bps
 Parity check: Yes
 Parity: Even
 Stop bits: 1
 Data bit length: 8
 Delay time: 0 ms



- (2) When connecting the Programming Panel to the CPU Module, the communications parameters must match the above values (except the delay time).

6) Setting Pin 3

- a) When pin 3 is turned ON, the CPU Module will change to bridge mode. In this mode, a MEMOBUS master connected to a MEMOBUS port on the CPU Module runs communications between communications devices on the MEMOBUS PLUS network.
- b) In bridge mode, MEMOBUS master must use the node address set for the MEMOBUS PLUS port to specify the communications partner on the network. Refer to following information on the rotary switches for the setting. In bridge mode, the slave address set for the MEMOBUS port is invalid.

◀EXAMPLE▶

c) An example using bridge mode is shown below:

(1) System Configuration

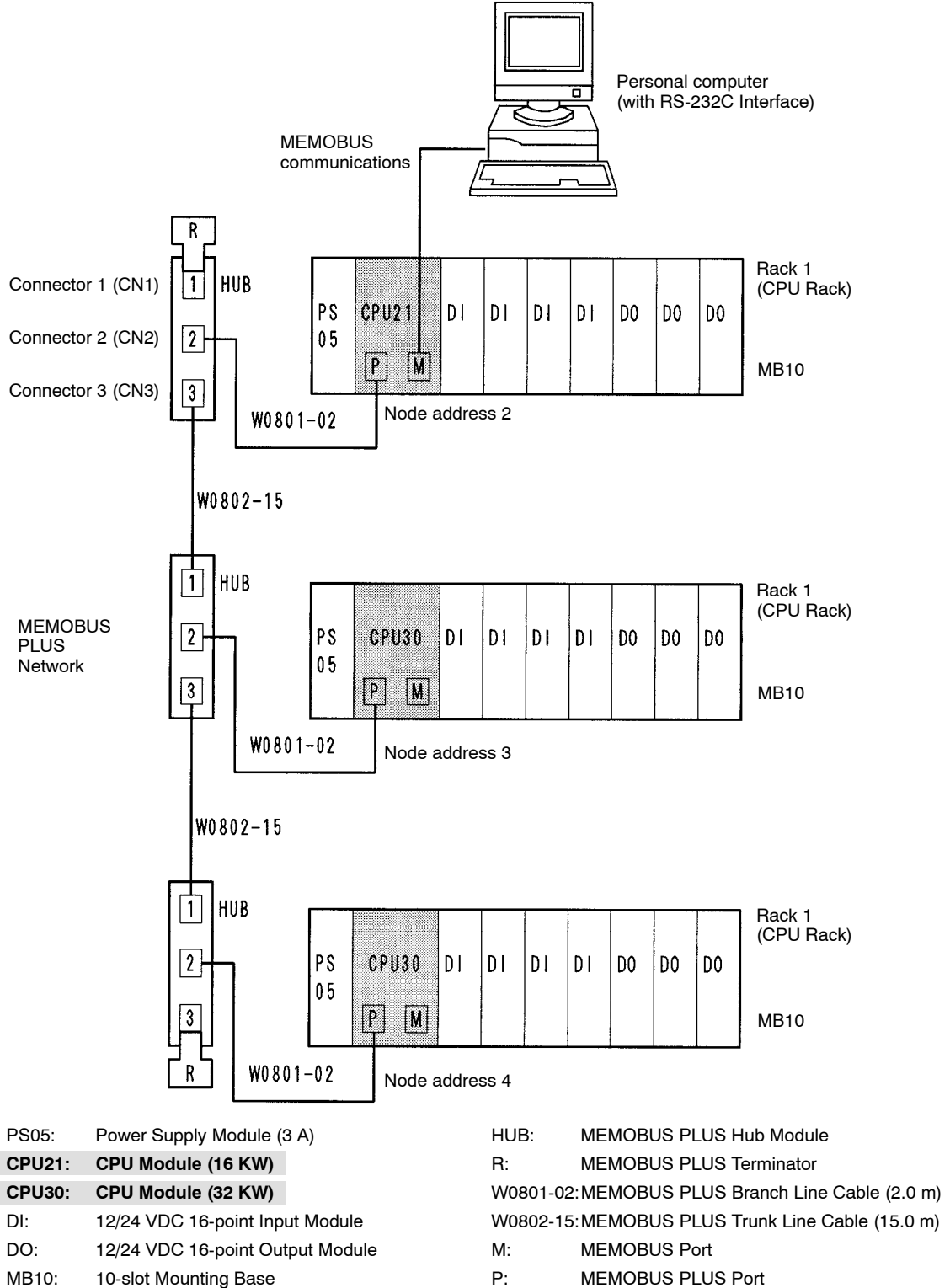


Figure 4.19 Using Bridge Mode

4

(2) Setting Pins 1 to 3

Set DIP switch pins 1 to 3 of the CPU21 of node 2 as shown in the diagram at the right. Turning ON pin 3 sets the CPU21 of node 2 to bridge mode. Turn ON pin 1 and turning OFF pin 2 sets the communications parameters between personal computer and the MEMOBUS port to the following settings:

Communications mode: RTU mode

Communications parameters:

Baud rate: 9,600 bps

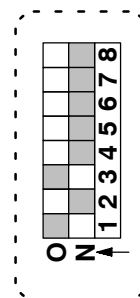
Parity check: Yes

Parity: Even

Stop bits: 1

Data bit length: 8

Delay time: 0 ms



(3) The communications parameters of the RS-232C interface on the personal computer must match the above values (except the delay time).

(4) A personal computer can run communications, via the CPU21 of node 2, with any CPU Module (including the CPU21 of node 2) on the MEMOBUS PLUS network.

7) Setting Pin 5

Pin 5 is used to determine the start mode of the CPU Module. See the following table to set this according to your system.

Table 4.28 Setting the Start Mode

Pin 5	Function
ON	1) Sets the start mode of the CPU Module to automatic RUN operation. 2) In this mode, the CPU Module will start in RUN mode when power is turned ON to the CPU Rack.
OFF	1) Sets the start mode of the CPU Module to normal operation. 2) In this mode, the CPU Module will start in the mode it was in just before the power supply was cut off (i.e., either RUN or STOP mode).

Note The setting of pin 5 is effective (read) only when the AC power is turned ON to the Power Supply Module of the CPU Rack.

8) Setting Pins 4 to 6

Pins 4 to 6 are used to determine whether or not a ROM operation is to be performed when the CPU21 Module is turned ON. Set these pins according to the system requirements by referring to the following table.

Table 4.29 Settings for ROM Operation

Pin 4	Pin 5	Pin 6	Function
OFF	Any	Any	Does not recognize PC Cards or load ROM operation files.
ON	OFF	OFF	Reads the ROM operation files, other than those containing reference data, when the power is turned ON. The start mode is normal operation.
		ON	Reads all the ROM operation files when the power is turned ON. The start mode is normal operation.
	ON	OFF	Reads the ROM operation files, other than those containing reference data, when the power is turned ON. The start mode is automatic RUN operation.
		ON	Reads all the ROM operation files when the power is turned ON. The start mode is automatic RUN operation.

Note Be sure to turn OFF DIP switch pin 4 before removing a PC Card from the CPU21 Module. If the PC Card is removed with DIP switch pin 4 turned ON, the files in the PC Card may be destroyed.

4

4. PC Card Slot

A CPU21 Module can be operated from a ladder logic program read from a PC Card when the Module power is turned ON. The PC Card slot is used for inserting the PC Card.

A. What are PC Cards?

- 1) PC Cards are IC cards that satisfy the requirements of the PC Card Standard. This standard is set out in PCMCIA Release 2.1 and JEIDA Version 4.2.
- 2) There are various types of PC Card, such as RAM cards, EEPROM cards, flash cards, ATA cards, and LAN cards. Only ATA cards can be used with the GL120 Series PLCs.

B. PC Cards Used By the GL120 Series

- 1) Phoenix Card Manager Plus, which is the PCMCIA software for PC Cards, is installed in the P120 Programming Panel.
- 2) The recommended PC Cards and the PC Cards approved for operation are listed below.

a) Recommended PC Cards

PCMCIA Solid State File Cards Manufactured by IBM:

- IBM17JSSFP3MB 3 MB
- IBM17JSSFP5MB 5 MB

- IBM17JSSFP10MB 10 MB
- IBM17JSSFP20MB 20 MB
- IBM17JSSFB7MB 7 MB
- IBM17JSSFB10MB 10 MB
- IBM17JSSFB20MB 20 MB

b) PC Cards Approved for Operation

(1) PC Cards Manufactured by Mitsubishi Plastic Industries, Ltd.:

- SA6000F2SDSA 6 MB
- SA010MF2SDSA 10 MB

(2) PC Cards Manufactured by Fujisoku Corporation:

- JT4MA3-B-07 4 MB
- JT12MA3-B-07 12 MB
- JT20MA3-B-07 20 MB

3) Selecting the PC Card Capacities

When operating PC Cards with the CPU21 Module, use the following table as a guide for the size of files stored in the PC Cards.

File Type	Required Capacity
ROM operation file	120 KB (three files)
Expansion memory file	128 KB (per file)
System status file	2 KB (per file)

A group of up to 100 expansion memory files can be created. In this case, 128 KB × 100 files = 12.8 MB is required as PC Card capacity. The capacity should be selected according to the PC Card used.

5. MEMOSOFT Versions Supporting CPU21 Modules

The versions of MEMOSOFT required for using CPU21 Modules are shown in the following table.

Table 4.30 MEMOSOFT Versions Supporting CPU21 Modules

MEMOSOFT Model	Version Number	Location of Version Number
FMSGL-AT3 (for English DOS)	1.30□ onwards	In the middle at the bottom of the MEMOSOFT startup screen.
FMSGL-PP3E (for P120 English version)		

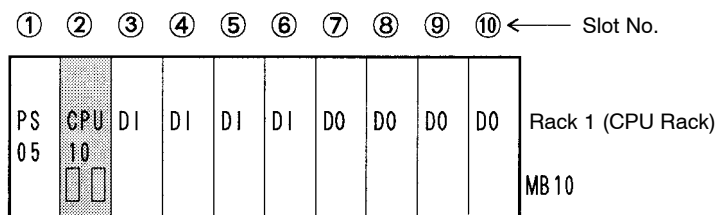
4.3.6 Using CPU Modules 3 (For CPU10)

1. Installation Location

- 1) The CPU10 Module can be mounted to any slot on the Mounting Base of Rack 1. It will occupy 1 slot of the Rack.
- 2) The CPU10 Module is normally mounted to the slot on the left next to the Power Supply Module on Rack 1, as is shown in the following two examples.

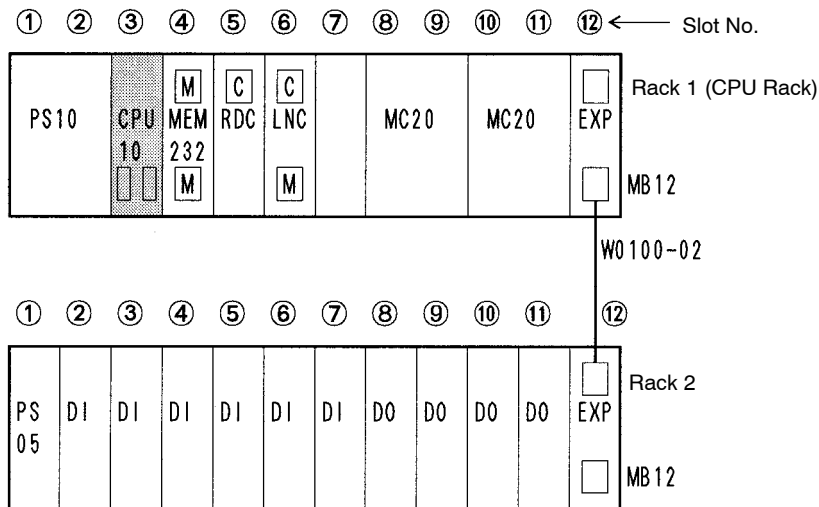
◀EXAMPLE▶

a) Mounting the CPU10 with One Rack



PS05:	Power Supply Module (3 A)	DI:	12/24 VDC 16-point Input Module
CPU10:	CPU10 Module (8 KW)	DO:	12/24 VDC 16-point Output Module
MB10:	10-slot Mounting Base		

b) Mounting the CPU10 with Two Racks



PS10:	Power Supply Module (7 A)	DI:	12/24 VDC 16-point Input Module
PS05:	Power Supply Module (3 A)	DO:	12/24 VDC 16-point Output Module
CPU10:	CPU10 Module (8 KW)	MC20:	4-axis Motion Module
MEM232:	RS-232 MEMOBUS Module	EXP:	Expander Module
RDC:	Remote I/O Driver Module	MB12:	12-slot Mounting Base
LNC:	PC Link Module	W0100-02:	Rack-to-rack I/O Cable (0.2 m)

Figure 4.20 Example of Mounting CPU10 Modules

2. MEMOBUS Port

- 1) Through the MEMOBUS ports, the CPU10 Module communicates using RS-232C communications with other communications devices connected to the MEMOBUS network.
- 2) The following tables list some of the communications devices that can be connected to MEMOBUS ports. These devices must have an RS-232C interface. For some devices, the MEMOBUS port settings must be changed. These settings are changed on the DIP switch on the front of the Module. Refer to the next section, *4. DIP Switch*, for details on setting the DIP switch.

Table 4.31 Devices Connectable to MEMOBUS Port 1

Type	Device	Remarks
MEMOBUS master devices	P120 Programming Panels	<ul style="list-style-type: none"> ● The MEMOBUS protocol is used for communications. ● A communications program is not required. ● If the personal computer does not have MEMOSOFT installed, a communications program based on the MEMOBUS protocol will have to be created.
	Personal computers with MEMOSOFT	
	ACGC4000/400-series FA Monitors	
	TB120 Teaching Pendants	

Table 4.32 Devices Connectable to MEMOBUS Port 2

Type	Device	Remarks
MEMOBUS master devices	P120 Programming Panels	<ul style="list-style-type: none"> ● Connect MEMOBUS port 2 as a slave port. ● The MEMOBUS protocol is used for communications. ● A communications program is not required. ● If the personal computer does not have MEMOSOFT installed, a communications program based on the MEMOBUS protocol will have to be created.
	Personal computers with MEMOSOFT	
	ACGC4000/400-series FA Monitors	
	TB120 Teaching Pendants	
ASCII devices	Bar code readers	<ul style="list-style-type: none"> ● Connect MEMOBUS port 2 as the master port. ● Set MEMOBUS port 2 to Transparent Mode. ● Create a communications program in the CPU10 using the COMM instruction.
	Printers	

Refer to *Table 4.33 Specifications of CPU10* for MEMOBUS port communications specifications.

3) Examples of using the MEMOBUS ports are provided below.

EXAMPLE

a) Connecting Port 2 to an ASCII Device: Printer

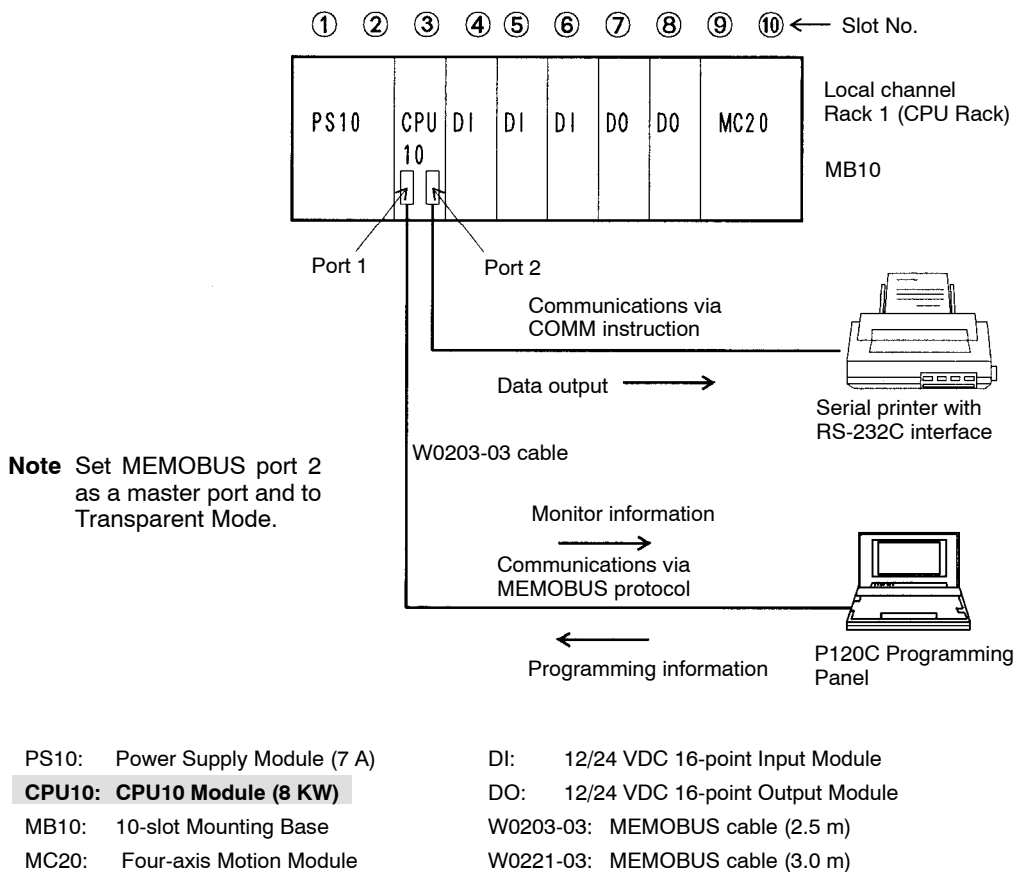


Figure 4.21 Application Examples for MEMOBUS Ports: Printer

b) Connecting Port 2 to an ASCII Device: Bar Code Reader

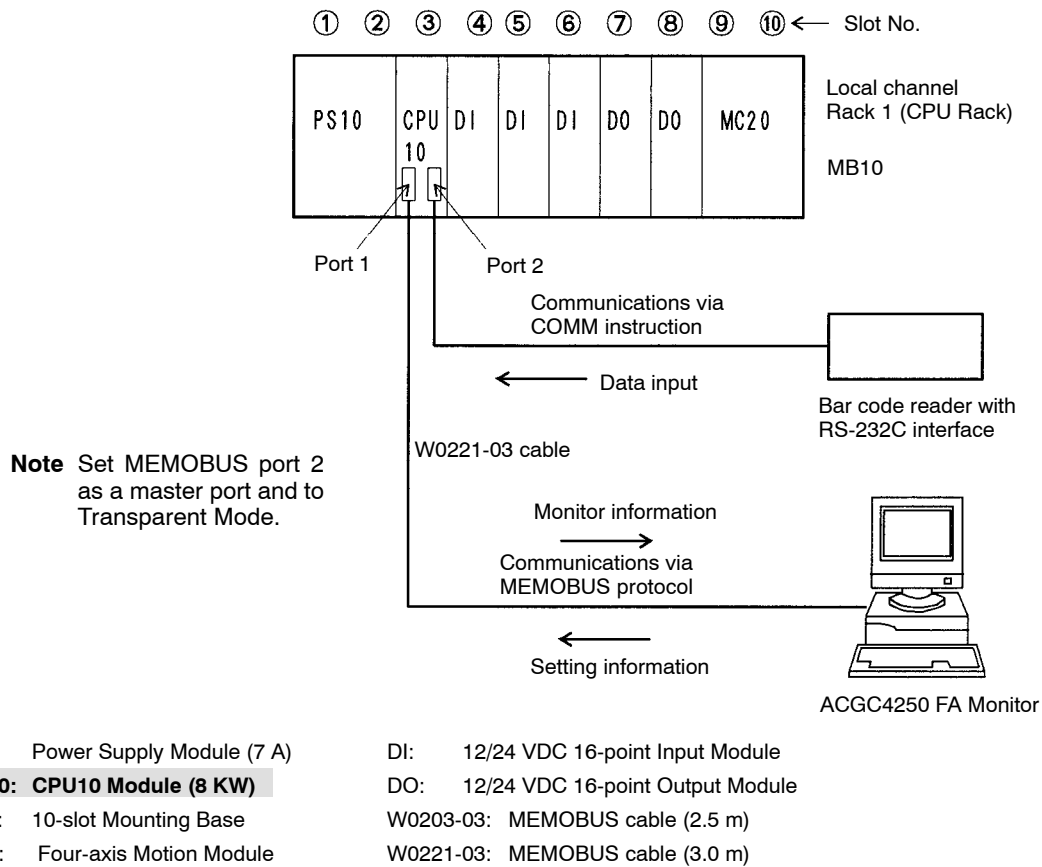


Figure 4.22 Application Examples for MEMOBUS Ports: Bar Code Reader

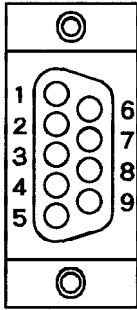
- 4) The following table shows the communications specifications of the MEMOBUS network.

Table 4.33 MEMOBUS Network Communications Specifications

Item	Specifications
Communications Mode	Half-duplex, start-stop synchronization
Transmission Levels	Conforms to RS-232C
Protocol	MEMOBUS protocol
Baud Rate	19,200/9,600/7,200/4,800/3,600/2,400/2,000/1,800/1,200/600/300/150 bps
Communications Mode	RTU mode or ASCII mode
Data Format	The following data format is used between master and slaves, between master and modems, and between modems and slaves: 1) Data bit length: 8 (RTU mode) or 7 (ASCII mode) 2) Parity check: Yes or no 3) Parity: Odd or even 4) Stop bits: 1 or 2
Transmission Distance	15 m (Can be extended to 4.5 km maximum by using a Yaskawa modem)
Transmission Error Detection	CRC-16 (RTU mode) or LRC (ASCII mode)

- 5) D-sub connectors (9-pin, female) are used to connect the MEMOBUS ports. The connector pin arrangements and the signal names are shown below.

Table 4.34 Pin Arrangement and Names of Signals for MEMOBUS Ports

	Pin No.	Symbol	Signal Name
	1	FG	Frame ground
	2	TXD	Transmission data
	3	RXD	Reception data
	4	RTS	Request to send
	5	CTS	Clear to send
	6	DSR	Data set ready
	7	GND	Signal ground
	8	EST	Element status
	9	DTR	Data terminal ready

6) COM Instructions (COMM, COMR)

IMPORTANT

- (1) The **COM instructions (COMM and COMR)** cannot be used for MEMOBUS port 1 of the CPU10 Module.
- (2) The **COMM instruction** can be used for MEMOBUS port 2 of the CPU10 Module.
- (3) The **COMR instruction** cannot be used for MEMOBUS port 2 of the CPU10 Module.

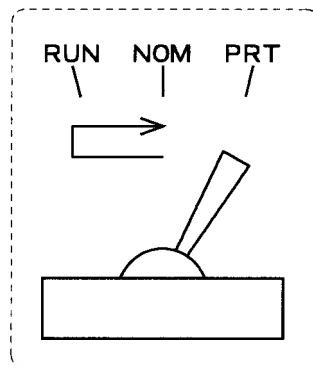
- (4) The **COMR instruction** can be used for the MEMOBUS ports of the following Communications Module: Remote I/O Receiver Module.

The following tables summarizes the communications functions of the MEMOBUS ports on the CPU10 Module.

Port	Communications Functions		
	Slave Communications	Master Communications (COM Instructions)	
		COMM	COMR
MEMOBUS port 1	Supported.	Not supported.	Not supported.
MEMOBUS port 2	Supported.	Supported.	Not supported.

3. Toggle Switch

- 1) The toggle switch is a non-self-returning switch with the three setting positions shown in the following diagram (left: RUN, center: NOM, right: PRT).



- 2) The toggle switch is used for the following two functions.

- Turning ON/OFF memory protection
- Entering RUN operation

a) Memory Protection

The toggle switch can be used to turn ON/OFF memory protection to prevent/allow changes to the user program and other data from a programming device, such as a Programming Panel or personal computer. Set the toggle switch to the required position as described in the following table.

Table 4.35 Memory Protection Settings

Position	Name	Function
Right	PRT	Setting the toggle switch to the right turns ON memory protection for the CPU10 Module. With this setting, none of the following operations can be performed from a programming device (Programming Panel or personal computer) connected to a communications port. 1) Inputting or changing the user program 2) Loading data 3) Manipulating coils or relays 4) Changing reference data (e.g., holding registers)
Center	NOM	Setting the toggle switch to the center or left turns OFF memory protection for the CPU10 Module. With this setting, all of the operations disabled by turning ON memory protection can be performed.
Left	RUN	

4

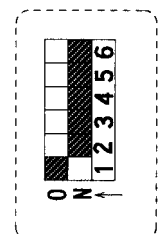
b) RUN Operation

- (1) The RUN position is used to change the CPU10 Module from STOP mode to RUN mode. The CPU10 Module will change from STOP mode to RUN mode when the key switch is set as follows: Center, then left, and then back to center.
- (2) When the CPU10 Module is in RUN mode, operating the toggle switch will not change the CPU10 Module back to STOP mode.
- (3) RUN operation can also be entered by using a programming device, such as a Programming Panel or personal computer. Refer to the following manuals for operation methods:

- MEMOCON GL120, GL130 MEMOSOFT for P120 Programming Panel User's Manual (SIEZ-C825-60.7)
- MEMOCON GL120, GL130 MEMOSOFT for Windows User's Manual (SIEZ-C825-60.25)
- MEMOCON GL120, GL130 MEMOSOFT User's Manual (SIEZ-C825-60.10)

4. DIP Switch

- 1) The DIP switch consists of 6 pins. The pins are numbered from 1 to 6, as shown in the diagram on the right.
- 2) Each pin turns ON when it is moved to the left (toward the toggle switch).



- 3) Pins are effective at the following times:
- Pins 1 to 4: Whenever the pin is turned ON.
 - Pins 5 and 6: When AC power is turned ON to the Power Supply Module on the CPU Rack.
- 4) Each pin's function is shown in the following table. Refer to the following pages for details.

Table 4.36 Function of DIP Switch Pins

Pin No.	Setting	Function	
1	ON	Sets the communications mode and parameters of MEMOBUS port 1 to the defaults.	
	OFF	Sets the communications mode and parameters of MEMOBUS port 1 to the user settings.	
2	ON	Sets the communications mode and parameters of MEMOBUS port 2 to the defaults.	
	OFF	Sets the communications mode and parameters of MEMOBUS port 2 to the user settings.	
3	ON	1) Sets MEMOBUS port 2 as a master port. 2) Master communications will be enabled and slave communications will be disabled when the CPU10 Module is in RUN mode. Turn ON this pin to use the COMM instructions for MEMOBUS port 2. 3) Master communications will be disabled and slave communications will be enabled when the CPU10 Module is in STOP mode.	
	OFF	Sets MEMOBUS port 2 as a slave port. Master communications will be disabled.	
4	ON	Effective when pin 3 is ON.	Sets the communications mode to Transparent Mode when using MEMOBUS port 2 as a master port.
	OFF		Sets the communications mode to MEMOBUS Mode when using MEMOBUS port 2 as a master port.
5	ON	Sets the start mode of CPU10 Module to automatic RUN operation.	
	OFF	Sets the start mode of CPU10 Module to normal operation.	
6	ON	1) Sets the CPU10 Module to ROM operation. (Ver. B01 onwards) 2) The CPU10 Module will start in STOP mode if the program data and other data is not stored in ROM. (Ver. B01 onwards)	
	OFF	Sets the CPU10 Module to RAM operation. (Ver. B01 onwards)	

Ver.
B01

5) Setting Pin 1

- a) Pin 1 is used to set communications parameters for MEMOBUS port 2. Set it to meet the requirements of your system.

Table 4.37 Setting Communications Parameters for MEMOBUS Port 1

Pin 1	Function
ON	Sets communications mode of MEMOBUS port 1 to RTU and sets the communications parameters for the MEMOBUS port 1 to the RTU mode defaults shown below: 1) Slave address: 1 2) Baud rate: 9,600 bps 3) Parity check: Yes 4) Parity: Even 5) Stop bits: 1 6) Data bit length: 8 7) Delay time: 0 ms
OFF	Enables the user to define and set the communications mode and communications parameters for the MEMOBUS port 1 through a programming device (Programming Panel, personal computer, etc.).

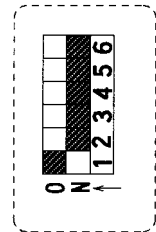
4

◀EXAMPLE▶

- b) A setting example of pin 1 is shown below.

- (1) When the DIP switch pin 1 is set as shown in the diagram on the right, the communications parameters of MEMOBUS port 1 are set to the RTU mode defaults shown below:

Communications Mode: RTU
 Communications Parameters
 Slave address: 1
 Baud rate: 9,600 bps
 Parity check: Yes
 Parity: Even
 Stop bits: 1
 Data bit length: 8
 Delay time: 0 ms



- (2) When connecting a Programming Panel to the CPU10 Module, the communications parameters must match the above values (except the delay time).

6) Setting Pin 2

- a) Pin 2 is used to set communications parameters for MEMOBUS port 2. Set this pin to meet the requirements of your system.

Table 4.38 Setting Communications Parameters for MEMOBUS Port 2

Pin 2	Function								
ON	<p>Sets communications mode of MEMOBUS port 2 to RTU and sets the communications parameters for the MEMOBUS port 2 to the RTU mode defaults shown below:</p> <table> <tr> <td>1) Slave address: 1</td> <td>5) Stop bits: 1</td> </tr> <tr> <td>2) Baud rate: 9,600 bps</td> <td>6) Data bit length: 8</td> </tr> <tr> <td>3) Parity check: Yes</td> <td>7) Delay time: 0 ms</td> </tr> <tr> <td>4) Parity: Even</td> <td></td> </tr> </table>	1) Slave address: 1	5) Stop bits: 1	2) Baud rate: 9,600 bps	6) Data bit length: 8	3) Parity check: Yes	7) Delay time: 0 ms	4) Parity: Even	
1) Slave address: 1	5) Stop bits: 1								
2) Baud rate: 9,600 bps	6) Data bit length: 8								
3) Parity check: Yes	7) Delay time: 0 ms								
4) Parity: Even									
OFF	Enables the user to define and set the communications mode and communications parameters for the MEMOBUS port 2 through a programming device (Programming Panel, personal computer, etc.).								

7) Setting Pins 3 and 4

- a) Pins 3 and 4 are used to set communications parameters for MEMOBUS port 2. Set them to meet the requirements of your system.

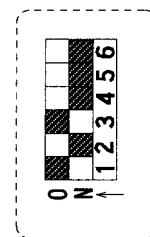
Table 4.39 Setting Communications Parameters for MEMOBUS Port 2

Pin 3	Pin 4	Function
ON	ON	<p>1) Sets MEMOBUS port 2 as a master port.</p> <p>2) Master communications (COMM instruction) will be enabled for MEMOBUS port 2 when the CPU10 Module is in RUN mode and the communications mode will be set to Transparent Mode.</p> <p>3) Slave communications will be enabled when the CPU10 Module is in STOP mode.</p>
	OFF	<p>1) Sets MEMOBUS port 2 as a master port.</p> <p>2) Master communications (COMM instruction) will be enabled for MEMOBUS port 2 when the CPU10 Module is in RUN mode and the communications mode will be set to MEMOBUS Mode.</p> <p>3) Slave communications will be enabled when the CPU10 Module is in STOP mode.</p>
OFF	ON or OFF	Sets MEMOBUS port 2 as a slave port. Master communications will be disabled.

EXAMPLE

b) A setting example for pins 3 and 4 is shown below.

- (1) When the DIP switch pins 2 and 3 are set as shown in the diagram on the right, the communications parameters of MEMOBUS port 2 are set to MEMOBUS mode and a master port.



8) Setting Pin 5

Pin 5 is used to set the start mode of the CPU10 Module. Refer to the following table to set the start mode for your system.

Table 4.40 Setting the Start Mode

Pin 5	Function
ON	<ul style="list-style-type: none"> 1) Sets the start mode of the CPU10 Module to automatic RUN operation. 2) In this mode, the CPU10 Module will start in RUN mode when power is turned ON to the CPU Rack.
OFF	<ul style="list-style-type: none"> 1) Sets the start mode of the CPU10 Module to normal operation. 2) In this mode, the CPU10 Module will start in the mode it was in just before the power supply was turned OFF (i.e., either RUN or STOP mode). 3) If DIP switch pin 6 is set for ROM operation, the CPU10 will start in STOP mode. (Ver. B01 onwards)

Ver. B01 →

4

IMPORTANT

The setting of pin 5 is effective (read) only when power is turned ON to the Power Supply Module of the CPU Rack.

Ver. B01 →

9) Setting Pin 6

- a) Pin 6 is used to set whether or not ROM operation will be used when power is turned ON to the CPU10 Module. Refer to the following table to set ROM operation if required for your system.

Table 4.41 ROM Operation Setting

Pin 6	Function
ON	<ul style="list-style-type: none"> 1) Sets the CPU10 Module to ROM operation. The ladder program, holding register data, and other data stored in the flash ROM will be transferred to RAM when the power supply is turned ON to the CPU Rack. 2) If the ladder logic program, holding register data, and other data is not stored in the flash ROM when the power supply is turned ON to the CPU Rack, a ROM operation error will occur and the CPU10 Module will start in STOP mode.
OFF	Sets the CPU10 Module to RAM operation. The RAM data will be used for operation when the power supply is turned ON to the CPU Rack.

5. Built-in Battery

The built-in battery is used in the same way as for the CPU20. Refer to the details for the CPU20 in 4.3.4 Using CPU Modules 1 (For CPU20, CPU30, and CPU35).

6. Versions Supporting Functions of CPU10 Version B01 Onwards

The following table shows the CPU10 Module and the MEMOSOFT versions that support the new functions added to CPU10 Module versions B01 onwards.

Table 4.42 Versions Supporting New Functions on Versions B01 Onwards

Name	Model Name	No.	Version Number	Location of Version Number
CPU Module (8 KW)	CPU10	DDSCR-120CPU14 200	□□ B01 onwards	Module nameplate (See note.)
MEMOSOFT		FMSG-L-AT3 (for English DOS) FMSG-L-PP3E (for P120 English version)	1.41□ onwards	In the middle at the bottom of the MEMOSOFT startup screen.

Note The Module nameplate is on the right side of the Module.

4.4 Communications Modules

This section provides a summary of the Communications Modules.

4.4.1	Models of Communications Modules	4-100
4.4.2	Remote I/O Driver Module	4-105
4.4.3	Remote I/O Receiver Module	4-111
4.4.4	2000-Series Remote I/O Driver Module	4-121
4.4.5	MEMOBUS Modules (RS-232)	4-127
4.4.6	MEMOBUS Modules (RS-422)	4-135
4.4.7	PC Link Module	4-147
4.4.8	Uniwire Interface Module	4-159
4.4.9	Uniwire H-system Interface Module	4-166
4.4.10	Distributed I/O Driver Module	4-175
4.4.11	M-NET Module	4-182
4.4.12	YENET 1600-D Module	4-188
4.4.13	Ethernet Interface Module	4-199
4.4.14	Optical/Electrical Conversion Module	4-209

4.4.1 Models of Communications Modules

There are 13 models of Communications Modules.

Table 4.43 Models of Communications Modules

Name	Model Name	Model No.	Features
Remote I/O Driver Module	RIOD-COAX	JAMSC-120CRD 13100	<ol style="list-style-type: none"> 1) Used for remote installation of I/O sections. 2) Functions as a master station of Remote I/O System. 3) Up to two Remote I/O Driver Modules can be used. 4) Coaxial cable is used for the transmission cable. 5) Mounted to CPU Rack.
Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR 13100	<ol style="list-style-type: none"> 1) Used for remote installation of I/O sections. 2) Functions as a slave station of the Remote I/O System. 3) Up to 15 Remote I/O Receiver Modules can be connected to each Remote I/O Driver Module. 4) Coaxial cable is used for the transmission cable. 5) Equipped with 1 MEMOBUS port with the following specifications: <ul style="list-style-type: none"> • Combined master/slave port • RS-232C

Name	Model Name	Model No.	Features
2000-Series Remote I/O Driver Module	RIOD-2000	JAMSC-120CRD 13110	<ol style="list-style-type: none"> 1) Used to install 1000 and 2000 I/O at a remote site. 2) Serves as a master station for the Remote I/O System. 3) Up to two Remote I/O Driver Modules can be used. 4) Uses coaxial cables as transmission cables. 5) Mounted to CPU Rack.
MEMOBUS Module (RS-232)	MEMOBUS-RS232	JAMSC-120NOM 26100	<ol style="list-style-type: none"> 1) Used for adding more MEMOBUS ports. 2) Equipped with 2 MEMOBUS ports with the following specifications: <ul style="list-style-type: none"> ● Combined master/slave port ● RS-232C
MEMOBUS Module (RS-422)	MEMOBUS-RS422	JAMSC-120NOM 27100	<ol style="list-style-type: none"> 1) Used for adding more MEMOBUS ports. 2) Equipped with 2 MEMOBUS ports with the following specifications: <ul style="list-style-type: none"> ● Combined master/slave port ● RS-422
PC Link Module	PCLINK-COAX	JAMSC-120NFB 23100	<ol style="list-style-type: none"> 1) Used for running high-speed communications between PLCs. 2) Forms a station of a PC Link System. 3) Coaxial cable is used for the transmission cable. 4) Equipped with 1 MEMOBUS port with the following specifications: <ul style="list-style-type: none"> ● Slave port ● RS-232C 5) Mounted to CPU Rack.
Uniwire Interface Module	UNIWIRED I/F	JAMSC-120CRD 21110	<ol style="list-style-type: none"> 1) Used for a Uniwire system to reduce wiring. 2) Serves as the master station of a Uniwire system. 3) Number of transmission points: 256 points max. (One register is 16 points.) 4) Up to 20 slave stations (Uniwire system devices) can be connected to each Uniwire Interface Module. 5) Uses two-core cable for transmission cables.

System Components: Functions and Specifications

4.4.1 Models of Communications Modules cont.

Name	Model Name	Model No.	Features
Uniwire H-system Interface Module	UNIWIRE (H) I/F	JAMSC-120CRD 21120	<ol style="list-style-type: none"> 1) Used for a Uniwire H-system to reduce wiring. 2) Serves as the master station of a Uniwire H-system. 3) Number of transmission points: 256 points max. (One register is 16 points.) 4) Up to 50 slave stations (Uniwire H-system devices) can be connected to each Uniwire H-system Interface Module. 5) Detects I/O Terminal Units with errors. 6) Displays the break positions of the transmission line. 7) Branches the transmission line and detects the breaks in the branch lines. 8) Uses two-core cable for transmission cables.
Distributes I/O Driver Module	VIOD	JAMSC-120CRD 21100	<ol style="list-style-type: none"> 1) Used for a VINUS I/O System to reduce wiring. 2) Serves as a master station of VINUS I/O Systems. 3) Number of transmission points: 480 inputs, 512 outputs (One register is 16 points.) 4) Up to 30 slave stations (distributed I/O slave devices) can be connected to each Distributed I/O Drive Module. 5) Uses special VINUS I/O cables for transmission cables.
M-NET Module	M-NET	JAMSC-12NMN 31000	<ol style="list-style-type: none"> 1) Used for high-speed data communications between PLCs. 2) Serves as a station of the M-NET System. 3) Up to 15 M-NET Modules (slaves) can be connected to each M-NET Module (master). 4) Can be connected to GL60S and U84 M-NET Modules. 5) Uses special M-NET cables as transmission cables. 6) Can be mounted to any Rack.

4

Name	Model Name	Model No.	Features
YENET 1600-D Module	YENET 1600-D	JAMSC-12NDN 31110	<ol style="list-style-type: none"> 1) Used for high-speed data communications between PLCs. 2) Serves as a station of the YENET 1600-D System. 3) Up to 63 YENET 1600-D Modules (slaves) can be connected to each YENET 1600-D Module (master). 4) Can be connected to masters and slaves conforming to the DeviceNet protocol. 5) Uses special YENET 1600-D cables as transmission cables. 6) Can be mounted to any Rack.
Ethernet Interface Module	EIF	JAMSC-12NET 12100	<ol style="list-style-type: none"> 1) Used for data communications between PLCs. 2) Serves as an interface for connections in Ethernet network systems. 3) Connects and communications with up to 19 Modules for each Ethernet Interface Module. 4) Provides a 10Base-5 port and a 10Base-T port. 5) Mounted to CPU Rack.
Optical/Electrical Conversion Module	O/E CONVERT	JAMSC-120NAH 93500	<ol style="list-style-type: none"> 1) Used in combination with PC Link Module or Remote I/O Module to configure an Optical PC Link system or Optical Remote I/O system. 2) Equipped with an electric port for connecting PC Link Module or Remote I/O Module, and two optical ports for connecting pairs of Optical/Electrical Conversion Modules. 3) Enables duplex optical communications paths. 4) The following optical fiber cables are used as transmission cables: H-PCF cables Quartz crystal fiber cables 5) Can be mounted to any Rack.

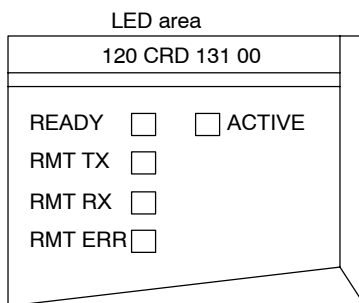
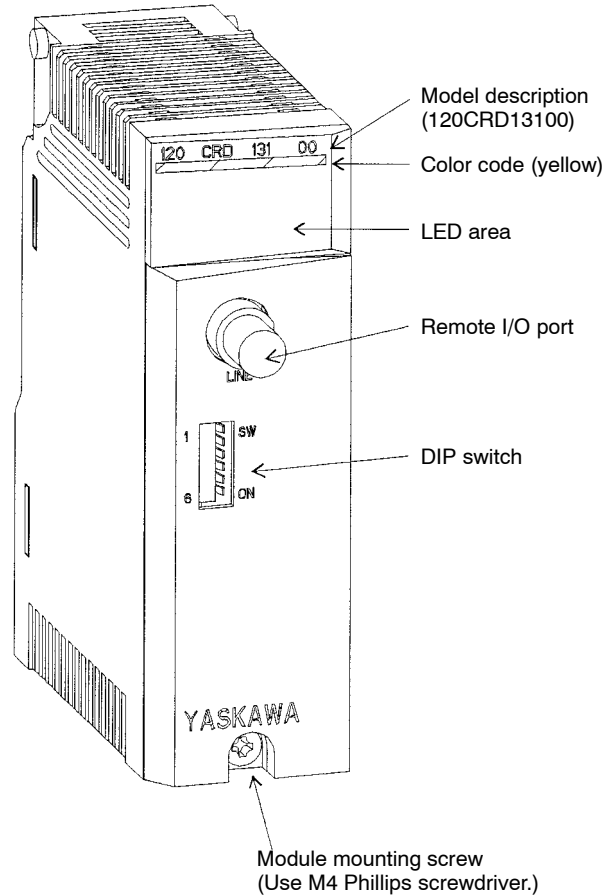
Refer to the following manuals for details on Communications Modules.

- MEMOCON GL120, GL130 Coaxial Remote I/O System User's Manual (SIEZ-C825-70.8)
- MEMOCON GL120, GL130 1000/2000-Series Coaxial Remote I/O System User's Manual (SIEZ-C825-70.9)
- MEMOCON GL120, GL130 COM Instruction User's Manual (SIEZ-C825-70.14)
- MEMOCON GL120, GL130 PC Link Module User's Manual (SIEZ-C825-70.4)
- MEMOCON GL120, GL130 Uniwire Interface Module User's Manual (SIEZ-C825-20.26)

- *MEMOCON GL120, GL130 Uniwire H-System Interface Module User's Manual (SIEZC82052100)*
- *MEMOCON GL120, GL130 Distributed I/O Driver Module User's Manual (SIEZ-C825-20.29)*
- *MEMOCON GL120, GL130 M-NET Module User's Manual (SIEZ-C825-70.12)*
- *MEMOCON GL120, GL130 YENET 1600-D Module User's Manual (SIEZ-C825-70.20)*
- *MEMOCON GL120, GL130 Ethernet Interface Module User's Manual (SIEZ-C825-70.21)*
- *MEMOCON GL120, GL130 Optical/Electrical Conversion Module User's Manual (SIEZ-C825-70.18)*

4.4.2 Remote I/O Driver Module

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is processing I/O.
RMT TX	Green	Module is transmitting data from the remote I/O port.
RMT RX	Green	Module is receiving data from the remote I/O port.
RMT ERR	Red	An error has occurred in the transmission from the remote I/O port. Lit for 10 ms.

If a status error occurs, the READY indicator will go off and the RMT ERR indicator will flash as described in the following table.

Type of Error	RMT ERR Indication
ROM error	RMT ERR will flash continuously.
RAM error	RMT ERR will flash twice, go off for 1 s, and then repeat the cycle.
Common memory error	RMT ERR will flash three times, go off for 1 s, and then repeat the cycle.
Watchdog timer error	RMT ERR will flash four times, go off for 1 s, and then repeat the cycle.

Figure 4.23 Appearance of Remote I/O Driver Module

2. Function

Remote I/O Driver Modules function as the master station for a Remote I/O System using coaxial cable as the transmission cable.

3. Specifications

The specifications of the Remote I/O Driver Module are shown in the following table.

Table 4.44 Specifications of Remote I/O Driver Module

Item	Specifications	
Model Name	RIOD-COAX	
Model No.	JAMSC-120CRD13100	
Internal Current Consumption	800 mA	
Maximum Heating Value	4.0 W	
Hot Swapping (Removal/Insertion Under Power)	Not permitted	
Approximate Mass	300 g	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	
Remote I/O Port Specifications	Topology (Communications Network)	Bus
	Media Access Control Method	Multi-drop (1:n communications)
	Media (Transmission Medium)	Coaxial cable (75Ω)
	Modulation Method	Base band
	Encoding Method	Manchester code
	Baud Rate	Choose from 0.5/1/2/4 Mbps
	Transmission Distance	Transmission distance varies according to the baud rate and specifications of coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.
	Number of Stations	15 max. (Up to 15 Remote I/O Receiver Modules are connectable.)
	Error Measures (RAS)	Automatic parallel off and malfunctioning station recovery
	Synchronization Method	Frame
	Communications Format	Conforms to HDLC.
	Insulation Method	Pulse transformer
Connector	BNC connector	

4

4. Using Remote I/O Driver Modules

1) Number of Units

Two Remote I/O Driver Modules can be used.

2) Installation Location

- a) A Remote I/O Driver Module can be mounted to any slot on the Mounting Base of Rack 1 (CPU Rack) of the local channel.
- b) An example of how to mount a Remote I/O Driver Module is shown on the next page.

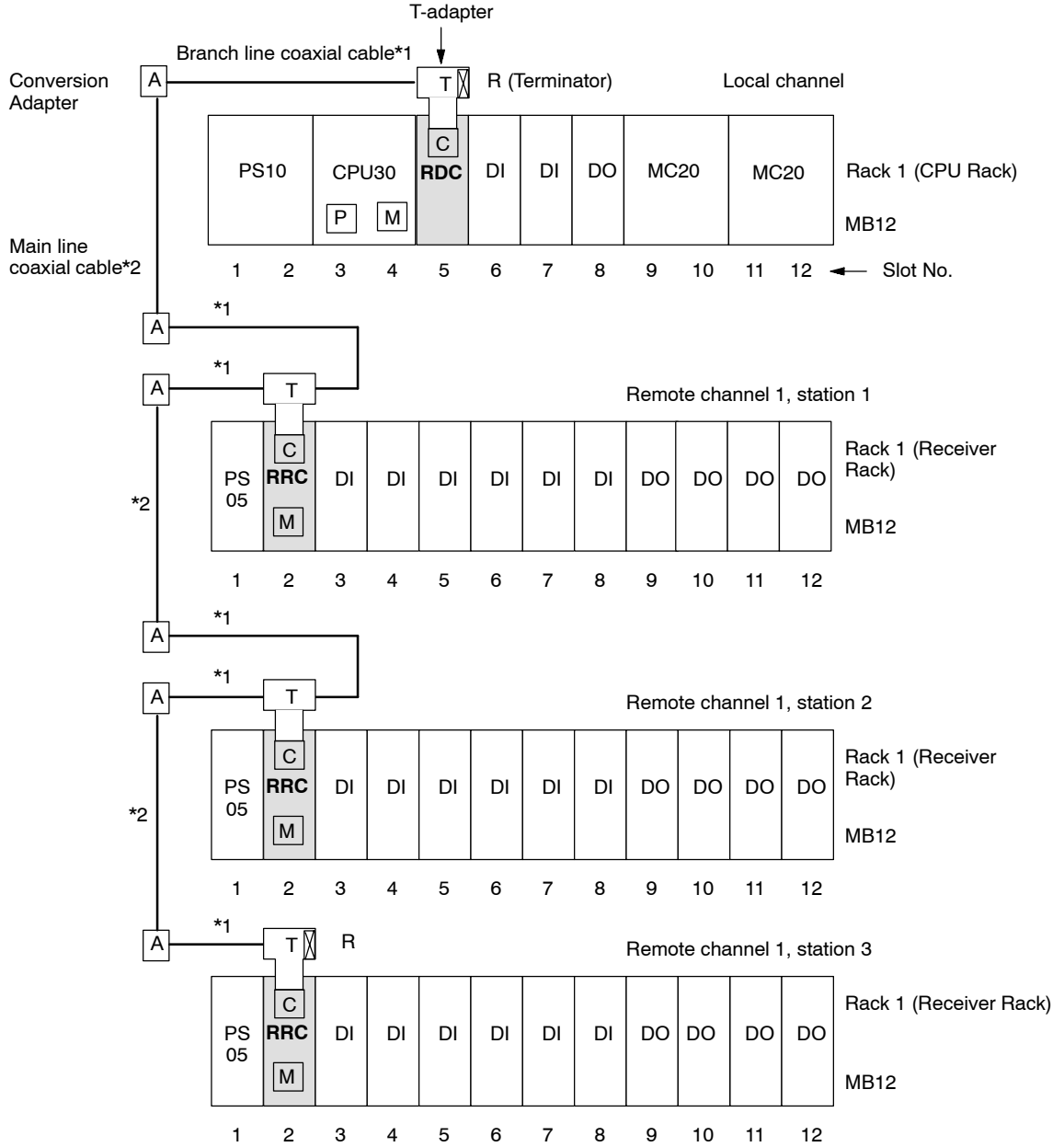
3) Remote I/O Port

- a) Through the remote I/O port, the Remote I/O Driver Module runs communications (4 Mbps) with up to 15 Remote I/O Receiver Modules. The transmission distance varies according to the baud rate and specifications of the coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF coaxial cable is used, it is possible to transmit up to 1 km max.
- b) An example of how to connect a Remote I/O Driver Module and Remote I/O Receiver Modules is shown on the next page.

EXAMPLE

Example

Connecting a Remote I/O Driver Module and Remote I/O Receiver Modules



PS10:	Power Supply Module (7 A)	DI:	12/24-VDC 16-point Input Module
PS05:	Power Supply Module (3 A)	DO:	12/24-VDC 16-point Output Module
CPU30:	CPU Module (32 KW)	MC20:	4-axis Motion Module
RDC:	Remote I/O Driver Module	MB12:	12-slot Mounting Base
RRC:	Remote I/O Receiver Module		

Figure 4.24 Connecting Remote I/O Driver/Receiver Modules

4) DIP Switch

- a) The DIP switch consists of 6 pins. The pins are numbered from 1 to 6 as shown in the diagram.
- b) Each pin is turned ON when pressed to the right.
- c) The setting of each pin is effective when power is turned ON to Rack 1 (CPU Rack).
- d) Each pin's function is shown in the following table.

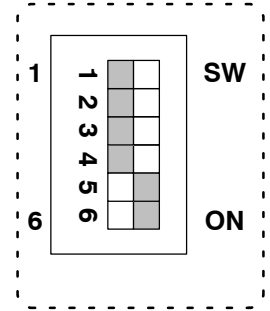


Table 4.45 Function of DIP Switch

Pin No.	Settings	Function		
1	ON	Sets Module to self diagnosis mode.		
	OFF	Sets Module to remote mode.		
2	ON	For future use		
	OFF	Sets Module to 120 I/O mode.		
3	ON	Sets Module to master station of channel 2.		
	OFF	Sets Module to master station of channel 1.		
4	ON	Not used. Set this pin to OFF.		
	OFF			
5	Set the baud rate of Remote I/O System according to the table shown on the right.	Pin 5	Pin 6	Baud rate
6		ON	ON	4 Mbps
		ON	OFF	2 Mbps
		OFF	ON	1 Mbps
		OFF	OFF	0.5 Mbps

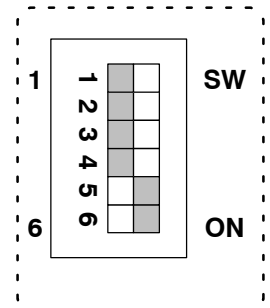
- e) Examples of setting the DIP switch are shown below:

EXAMPLE

Example 1

When the DIP switch is set as shown in the diagram on the right, the Remote I/O Driver Module is set as follows:

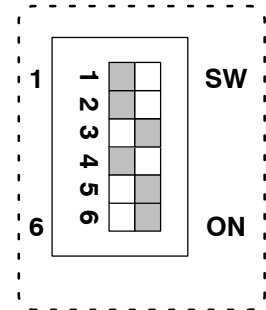
- Remote mode
- 120 I/O mode
- Master station of channel 1
- Baud rate: 4 Mbps



Example 2

When the DIP switch is set as shown in the diagram on the right , the Remote I/O Driver Module is set as follows:

- Remote mode
- 120 I/O mode
- Master station of channel 2
- Baud rate: 4 Mbps



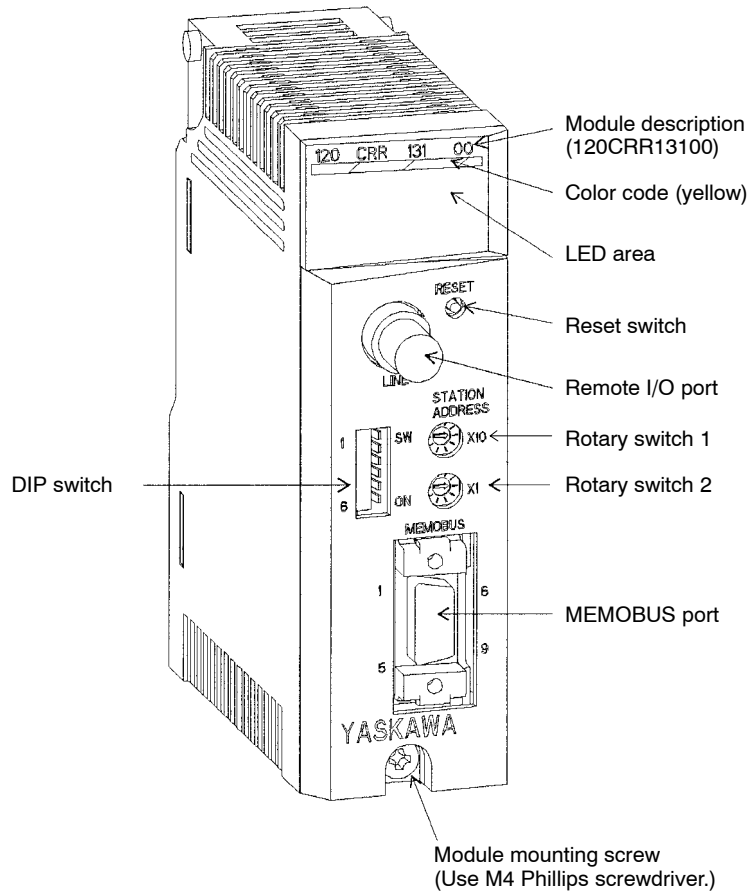
5. Related Manuals

Before operating a Remote I/O Driver Module, read the following manual carefully and be sure that you fully understand the information on specifications, application methods, safety precautions, etc.

MEMOCON GL120, GL130 Coaxial Remote I/O System User's Manual (SIEZ-C825-70.8)

4.4.3 Remote I/O Receiver Module

1. Appearance



LED area

120 CRR 131 00			
READY	<input type="checkbox"/>	<input type="checkbox"/>	ACTIVE
RMT TX	<input type="checkbox"/>	<input type="checkbox"/>	PP TX
RMT RX	<input type="checkbox"/>	<input type="checkbox"/>	PP RX
RMT ERR	<input type="checkbox"/>	<input type="checkbox"/>	PP ERR

LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is processing I/O.
RMT TX	Green	Module is transmitting data from the remote I/O port.
RMT RX	Green	Module is receiving data from the remote I/O port.
RMT ERR	Red	An error has occurred in the transmission from the remote I/O port. (Lit for 10 ms.)
PP TX	Green	Module is transmitting data from the MEMOBUS port.
PP RX	Green	Module is receiving data from the MEMOBUS port.
PP ERR	Red	An error has occurred in the transmission from the MEMOBUS port. Lit for 10 ms.

Figure 4.25 Appearance of Remote I/O Receiver Module

If a status error occurs, the READY indicator will go off and the RMT ERR indicator will flash as described in the following table.

Type of Error	RMT ERR Indication
ROM error	RMT ERR will flash continuously.
RAM error	RMT ERR will flash twice, go off for 1 s, and then repeat the cycle.
ASIC error	RMT ERR will flash three times, go off for 1 s, and then repeat the cycle.
Watchdog timer error	RMT ERR will flash four times, go off for 1 s, and then repeat the cycle.

2. Function

The Remote I/O Receiver Module functions as a slave station in a Remote I/O System using coaxial cable as the transmission cable.

3. Specifications

The specifications of the Remote I/O Receiver Module are shown in the following table.

Table 4.46 Specifications of Remote I/O Receiver Module

Item	Specifications	
Model Name	RIOR-COAX	
Model No.	JAMSC-120CRR13100	
Internal Current Consumption	800 mA	
Maximum Heating Value	4.0 W	
Hot Swapping (Removal/Insertion Under Power)	Permitted	
Approximate Mass	300 g	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	
Remote I/O Port Specifications	Topology (Communications Network)	Bus
	Media Access Control Method	Multi-drop (1: n communications)
	Media (Transmission Medium)	Coaxial cable (75Ω)
	Modulation Method	Base band
	Encoding Method	Manchester code
	Baud Rate	Choose from 0.5/1/2/4 Mbps
	Transmission Distance	Transmission distance varies according to the baud rate and specifications of coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.
	Number of Stations	15 max. (Up to 15 Remote I/O Receiver Modules can be connected)
	Error Measures (RAS)	Automatic parallel off and malfunctioning station recovery
	Synchronization Method	Frame
	Communications Format	Conforms to HDLC.
	Insulation Method	Pulse transformer
Connector	BNC connector	

Item	Specifications	
MEMOBUS Port Specifications	Communications Method	Half-duplex stop-start synchronization
	Transmission Levels	Conform to RS-232C
	Protocol	MEMOBUS protocol or any other protocol
	Baud Rate	19,200/9,600/7,200/4,800/3,600/2,400/2,000/ 1,800/1,200 bps
	Communications Mode	RTU mode or ASCII mode
	Data Format	<p>The following data format is used between master and slaves, between master and modems, and between modems and slaves:</p> <p>1) Data bit length: 8 (RTU mode) or 7 (ASCII mode)</p> <p>2) Parity check: Yes or No</p> <p>3) Parity: Odd or even</p> <p>4) Stop bits: 1 or 2</p>
	Transmission Distance	15 m (Can be extended to 4.5 km maximum by using a Yaskawa modem.)
	Transmission Error Detection	CRC-16 (RTU mode) or LRC (ASCII mode)
	Connector	D-sub connector (9-pin, female)

4. Using Remote I/O Receiver Modules

1) Number of Modules

Fifteen Remote I/O Receiver Modules can be connected to each Remote I/O Driver Module.

2) Installation Location

- a) A Remote I/O Receiver Module can be mounted to any slot on the Mounting Base of Rack 1 of a remote station.
- b) Normally, a Remote I/O Receiver Module is mounted to the slot next to the Power Supply Module on the left hand side of Rack 1.

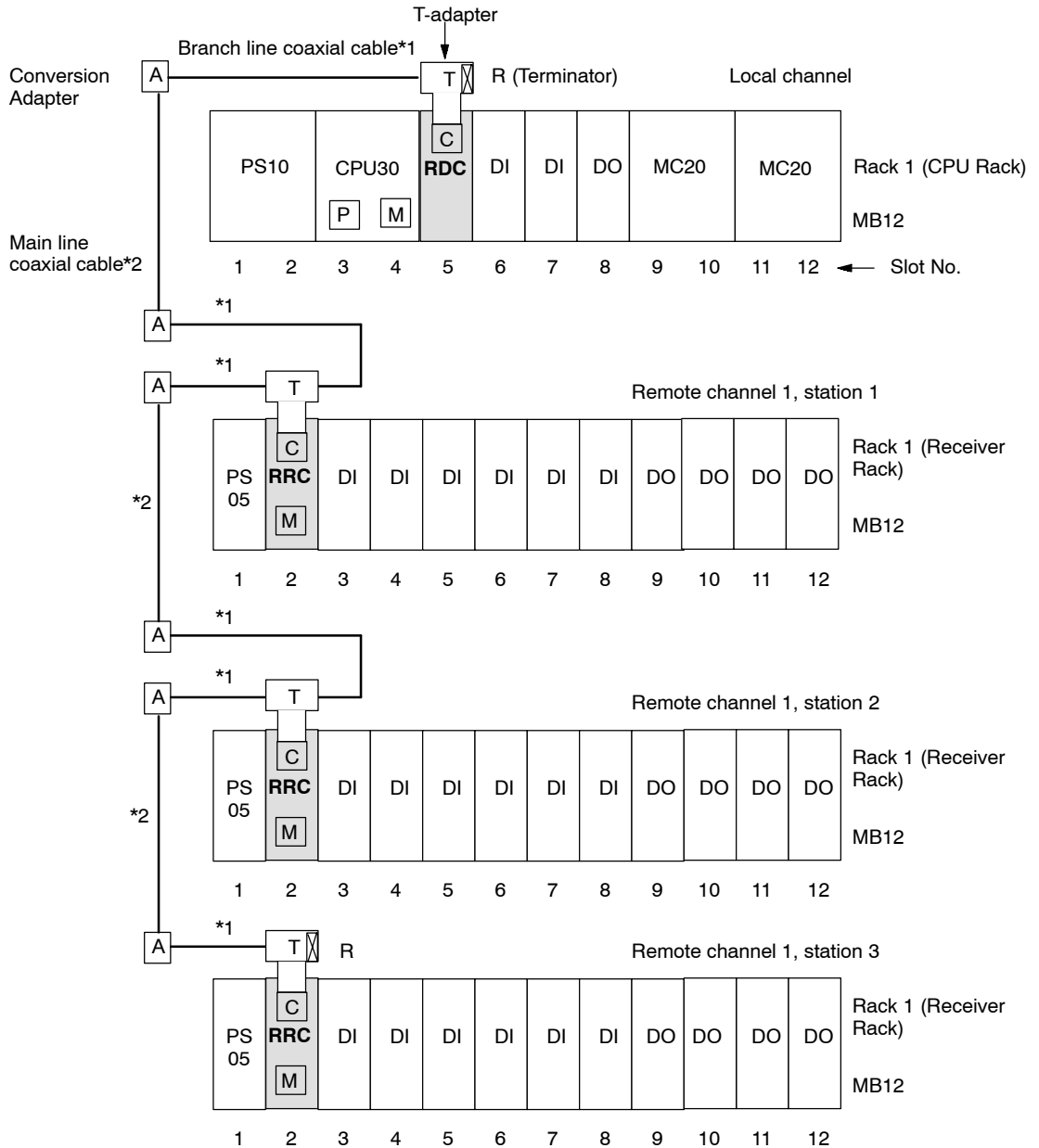
3) Remote I/O Port

- a) The Remote I/O Driver Module runs high-speed communications of 4Mbps through the remote I/O port with Remote I/O Receiver Modules. The transmission distance varies according to the baud rate and specifications of coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.
- b) An example of connecting a Remote I/O Driver Module and Remote I/O Receiver Modules is shown on the next page.

EXAMPLE

Example

Connecting a Remote I/O Driver Module and Remote I/O Receiver Modules



PS10:	Power Supply Module (7 A)	DI:	12/24-VDC 16-point Input Module
PS05:	Power Supply Module (3 A)	DO:	12/24-VDC 16-point Output Module
CPU30:	CPU Module (32 KW)	MC20:	4-axis Motion Module
RDC:	Remote I/O Driver Module	MB12:	12-slot Mounting Base
RRC:	Remote I/O Receiver Module		

Figure 4.26 Connecting Remote I/O Driver/Receiver Modules

4

4) MEMOBUS Port

- a) A Remote I/O Receiver Module run RS-232C communications (master communications or slave communications) through the MEMOBUS port. Either MEMOBUS protocol or any other protocol can be used for the communications protocol.
- b) Devices that can be connected to the MEMOBUS port are shown in the following table. Each of these devices must be equipped with an RS-232C interface. In addition, depending on the type of device, the MEMOBUS port settings will need to be altered. This settings are altered using the DIP switch on the front of the Module.

Table 4.47 Example of Devices Connectable to the MEMOBUS Port

Type	Device	Remarks
MEMOBUS master	P120-series Programming Panel	<ul style="list-style-type: none"> Set MEMOBUS port to slave port. Communications performed using the MEMOBUS protocol
	Personal computer (with MEMOSOFT)	<ul style="list-style-type: none"> Creation of communications program not needed.
	ACGC4000/400-series FA Monitor	<ul style="list-style-type: none"> If your computer does not have MEMOSOFT, create a communications program based on the MEMOBUS protocol.
ASCII devices	Bar code reader	<ul style="list-style-type: none"> Set the MEMOBUS port to combined master/slave port. Set the MEMOBUS port to transparent mode.
	Serial printer	<ul style="list-style-type: none"> Create a communications program using the COMR instructions in the GL120 and GL130.

- c) Number of Connectable MEMOBUS Masters

Note When connecting a MEMOBUS master such as a P120 Programming Panel to the MEMOBUS port of the Remote I/O Receiver Module, only one master can be connected per remote channel. More than one master cannot be connected to one remote channel.

- d) Number of Connectable ASCII Devices

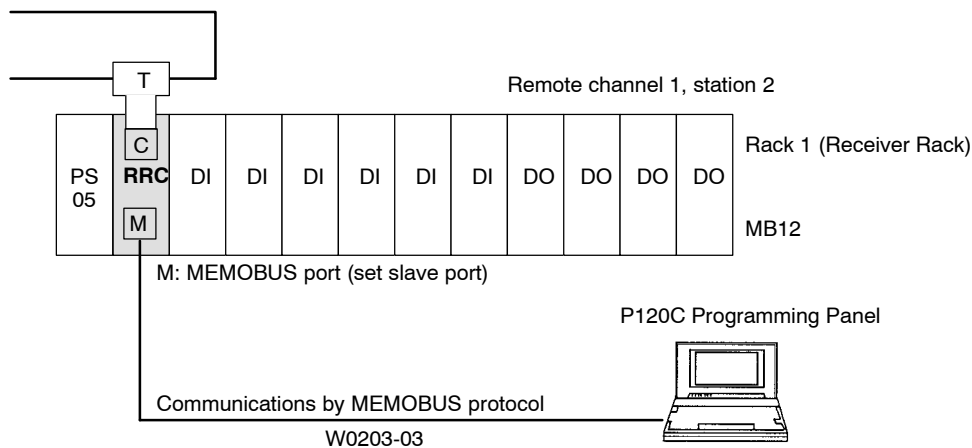
When connecting ASCII devices such as printers to the MEMOBUS port of the Remote I/O Receiver Module, between 1 and 15 devices can be connected per remote channel.

- e) Refer to *Table 4.46* on page 4-113 for the transmission specifications of the MEMOBUS port.

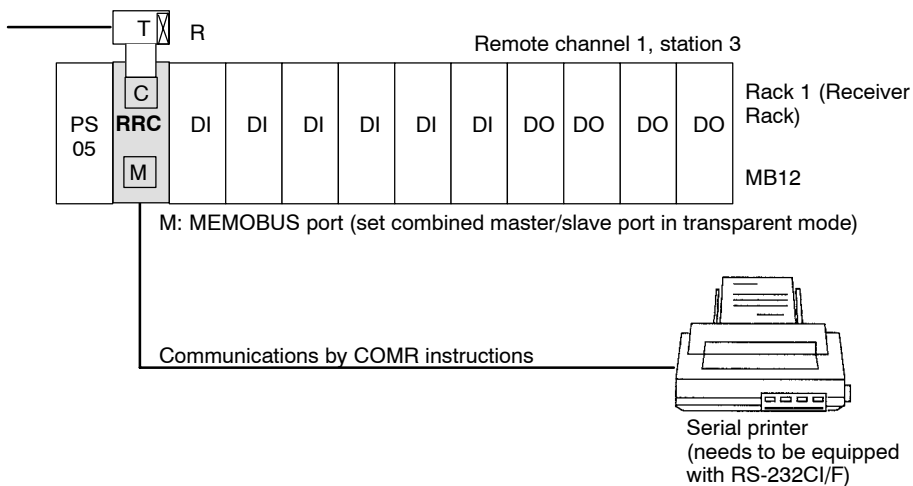
f) An example using the MEMOBUS port is shown below:

EXAMPLE

Example 1
Connecting Programming Panel to MEMOBUS port



Example 2
Connecting serial printer to MEMOBUS port



- | | | | |
|-------------|-----------------------------------|-----------|----------------------------------|
| PS05: | Power Supply Module (3 A) | DO: | 12/24-VDC 16-point Output Module |
| RRC: | Remote I/O Receiver Module | MB12: | 12-slot Mounting Base |
| DI: | 12/24-VDC 16-point Input Module | W0203-03: | MEMOBUS Cable (2.5 m) |

Figure 4.27 Using the MEMOBUS Port

- g) The connector for the MEMOBUS port is a D-sub connector (9-pin, female). The connector pin arrangement and signal names are shown in the following table:

Table 4.48 Pin Arrangement and the Signal Names of MEMOBUS Port

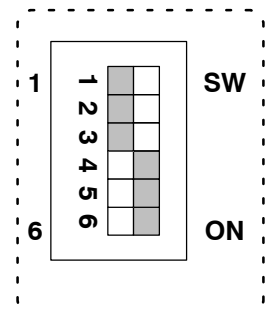
Pin No.	Symbol	Signal Name
1	FG	Protective ground
2	TXD	Transmission data
3	RXD	Reception data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	Signal ground
8	-	Not used
9	DTR	Data terminal ready

h) COM Instructions (COMM, COMR)

- Note**
- (1) The COMR instruction can be used only for the MEMOBUS port of the Remote I/O Receiver Module.
 - (2) The COMM instruction cannot be used for the MEMOBUS port of the Remote I/O Receiver Module. The COMM instruction can be used for the MEMOBUS port of the following two communications Modules:
 - MEMOBUS Module (RS-232): Model JAMSC-120NOM26100
 - MEMOBUS Module (RS-422): Model JAMSC-120NOM27100

5) DIP Switch

- a) The DIP switch is composed of 6 pins. The pins are numbered from 1 to 6 as shown in the diagram.
- b) Each pin is turned ON when pressed it to the right.
- c) Each pin becomes effective at the following times.



- (1) Pins 2 to 4: When the pin setting is changed.
- (2) Pin 1, pin 5, and pin 6: When the reset switch is pressed, or when power is turned ON to the Power Supply Module of Rack 1 (Receiver Rack).

d) Each pin's function is shown in the following table.

Table 4.49 Function of DIP Switch

Pin No.	Settings	Function		
1	ON	Sets Module to self diagnosis mode.		
	OFF	Sets Module to remote mode.		
2	ON	Sets MEMOBUS port to slave port. Master communications becomes ineffective.		
	OFF	Sets MEMOBUS port to combined master/slave port. Master communications becomes effective. When using COMR instruction, turn OFF this pin.		
3	ON	When using MEMOBUS port as master port, sets communications mode to transparent mode.		
	OFF	When using MEMOBUS port as master port, sets communications mode to MEMOBUS mode.		
4	ON	When using MEMOBUS port as slave port, sets communications mode and parameters to the defaults.		
	OFF	When using MEMOBUS port as slave port, sets communications mode and parameters to user settings.		
5	Sets the baud rate of the Remote I/O System as shown at the right.	Pin 5	Pin 6	Baud rate
6		ON	ON	4 Mbps
		ON	OFF	2 Mbps
		OFF	ON	1 Mbps
		OFF	OFF	0.5 Mbps

e) The default communications mode and parameters are as follows:

(1) Communications mode: RTU mode

(2) Communications parameters:

Baud rate: 9,600 bps
 Parity check: Yes
 Parity: Even
 Stop bits: 1
 Data bit length: 8
 Delay time: 0 ms

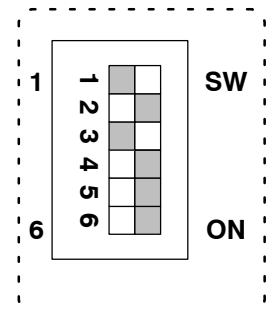
f) Examples of setting the DIP switch are shown below:

EXAMPLE

Example 1

When the DIP switch is set as shown in the diagram on the right, the Remote I/O Receiver Module is set as follows:

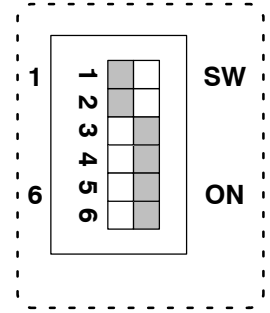
- Module in remote mode.
- MEMOBUS port is used as slave port.
- When MEMOBUS port is used as slave port, communications mode and parameters are set to the defaults.
- Baud rate of Remote I/O System is 4 Mbps.



Example 2

When the DIP switch is set as shown in the diagram on the right, the Remote I/O Receiver Module is set as follows:

- Module in remote mode.
- MEMOBUS port is used as combined master/slave port.
- When MEMOBUS port is used as master port, communications mode is in transparent mode.
- When MEMOBUS port is used as slave port, communications mode and parameters are set to the defaults.
- Baud rate of Remote I/O System is 4 Mbps.



6) Rotary Switches

- a) The rotary switches are used to set the station address of the Remote I/O Receiver Module.
- b) There are two rotary switches. The top rotary switch is rotary switch 1 and the bottom switch is rotary switch 2. Each switch has positions from 0 to 9.
- c) The settings of the rotary switches are effective (read) when the reset switch is pressed, or when power is turned ON to the Power Supply Module of the Rack where the Remote I/O Receiver Module is mounted.
- d) Station addresses are set between 1 and 15. The following table shows the settings.

Table 4.50 Setting the Station Address

Example Settings of Node Address 1	Node Address	Rotary Switch 1	Rotary Switch 2
	1 to 9	0	1 to 9
	10 to 15	1	0 to 5
	0 or 16 to 99	Not permitted.	

- Note**
- (1) Set the station address to between 1 and 15. If the address is set to 0 or, to 16 or above, normal communications will not be possible.
 - (2) Do not use the same address for more than one station within the same channel. If this occurs, remote stations with the same address will not be able to communicate normally.

7) Reset Switch

- a) Press the reset switch in the following cases:
- (1) When you have changed the setting of DIP switch pins 1, 5, or 6.
 - (2) When you have changed the setting of the rotary switches.
 - (3) When errors have occurred.
- b) When the reset switch is pressed, communications between the Remote I/O Receiver Module and Remote I/O Driver Module are interrupted. Communications restart when the switch is released.

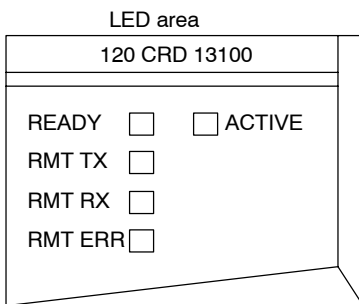
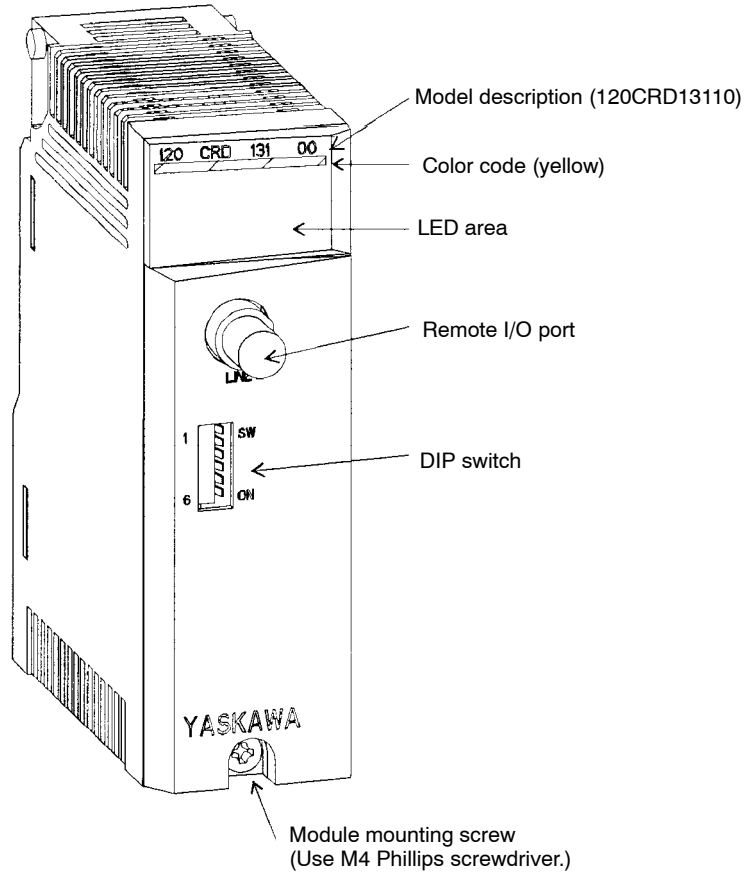
8) Related Manuals

Before operating your Remote I/O Receiver Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 Coaxial Remote I/O System User's Manual
(SIEZ-C825-70.8)

4.4.4 2000-Series Remote I/O Driver Module

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is processing I/O.
RMT TX	Green	Module is transmitting data from the remote I/O port.
RMT RX	Green	Module is receiving data from the remote I/O port.
RMT ERR	Red	An error has occurred in the transmission from the remote I/O port. Lit for 10 ms.

If a status error occurs, the READY indicator will go off and the RMT ERR indicator will flash as described in the following table.

Type of Error	RMT ERR Indication
ROM error	RMT ERR will flash continuously.
RAM error	RMT ERR will flash twice, go off for 1 s, and then repeat the cycle.
Common memory error	RMT ERR will flash three times, go off for 1 s, and then repeat the cycle.
Watchdog timer error	RMT ERR will flash four times, go off for 1 s, and then repeat the cycle.

Figure 4.28 Appearance of 2000-Series Remote I/O Driver Module

2. Function

2000 series Remote I/O Driver Modules function as the master station for a Remote I/O System using coaxial cable as the transmission cable.

3. Specifications

The specifications of the 2000-Series Remote I/O Driver Module are shown in the following table.

Table 4.51 Specifications of 2000-Series Remote I/O Driver Module

Item	Specifications	
Model Name	RIOD-2000	
Model No.	JAMSC-120CRD13110	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	
Approximate Mass	300 g	
Internal Current Consumption	800 mA	
Maximum Heating Value	4.0 W	
Hot Swapping	Not permitted	
Mounting Location	Any slot of Rack 1 (CPU Rack) of local channel.	
Remote I/O Port Specifications	Topology (Communications Network)	Bus
	Media Access Control Method	Multi-drop (1:n communications)
	Media (Transmission Medium)	Coaxial cable (75Ω)
	Modulation Method	Base band
	Encoding Method	Manchester code
	Baud Rate	Choose from 0.5/1/2/4 Mbps
	Transmission Distance	Transmission distance varies according to the baud rate and specifications of coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.
	Number of Stations	15 max. (Up to 15 Remote I/O Receiver Modules are connectable.)
	Error Measures (RAS)	Automatic parallel off and malfunctioning station recovery
	Synchronization Method	Frame
	Communications Format	Conforms to HDLC.
Insulation Method	Pulse transformer	
Connector	BNC connector	

4. Using Remote I/O Driver Modules

1) Number of Units

Two 2000-Series Remote I/O Driver Modules can be used.

2) Installation Location

- a) A 2000-Series Remote I/O Driver Module I/O can be mounted to any slot on the Mounting Base of Rack 1 (CPU Rack) of the local channel.
- b) An example of how to mount a 2000-Series Remote I/O Driver Module is shown on the next page.

3) Remote I/O Port

- a) Through the remote I/O port, the 2000-Series Remote I/O Driver Module runs communications (4 Mbps) with up to 15 Remote I/O Receiver Modules for 1000 I/O and 2000 I/O. The transmission distance varies according to the baud rate and specifications of the coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF coaxial cable is used, it is possible to transmit up to 1 km max.
- b) An example of how to connect a Remote I/O Driver Module and Remote I/O Receiver Modules is shown on the next page.

EXAMPLE

Example

Connecting a Remote I/O Driver Module and Remote I/O Receiver Modules

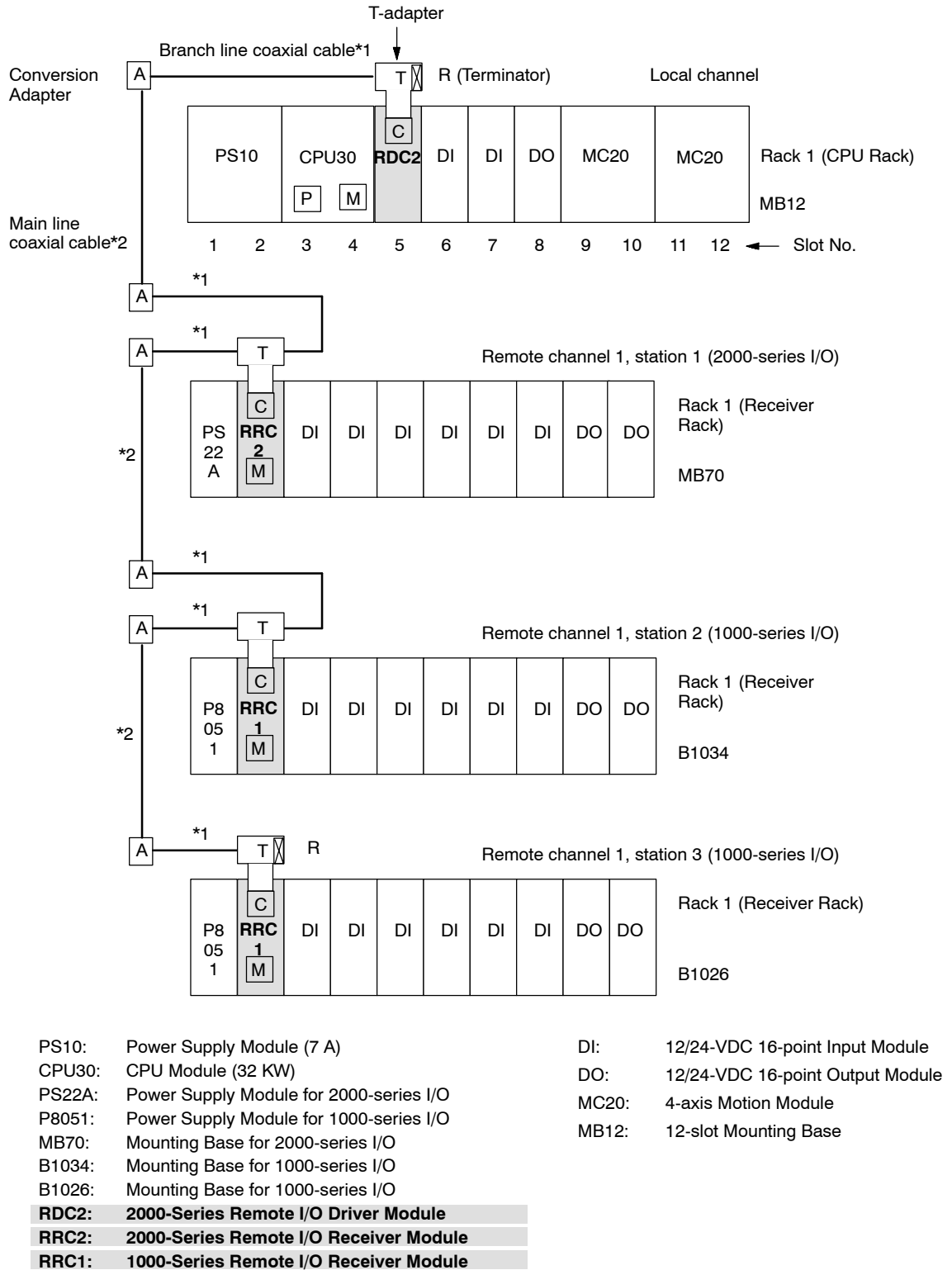


Figure 4.29 Connecting Remote I/O Driver/Receiver Modules

4) DIP Switch

- a) The DIP switch consists of 6 pins. The pins are numbered from 1 to 6 as shown in the diagram.
- b) Each pin is turned ON when pressed to the right.
- c) The setting of each pin is effective when power is turned ON to Rack 1 (CPU Rack).
- d) Each pin's function is shown in the following table.

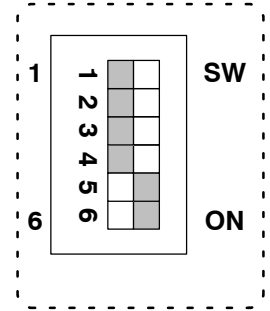


Table 4.52 Function of DIP Switch

Pin No.	Settings	Function		
1	ON	Sets Module to self diagnosis mode.		
	OFF	Sets Module to remote mode.		
2	ON	Not used. Set this pin to OFF.		
	OFF			
3	ON	Sets Module to master station of channel 2.		
	OFF	Sets Module to master station of channel 1.		
4	ON	Not used. Set this pin to OFF.		
	OFF			
5	Set the baud rate of Remote I/O System according to the table shown on the right.	Pin 5	Pin 6	Baud rate
6		ON	ON	4 Mbps
		ON	OFF	2 Mbps
		OFF	ON	1 Mbps
		OFF	OFF	0.5 Mbps

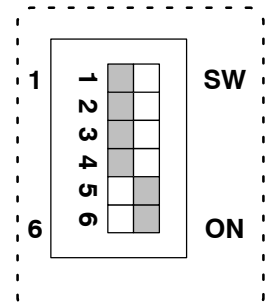
- e) Examples of setting the DIP switch are shown below:

EXAMPLE

Example 1

When the DIP switch is set as shown in the diagram on the right, the Remote I/O Driver Module is set as follows:

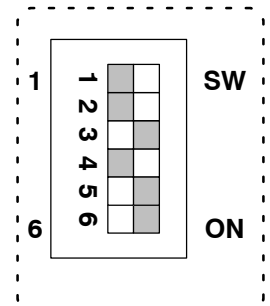
- Remote mode
- Master station of channel 1
- Baud rate: 4 Mbps



Example 2

When the DIP switch is set as shown in the diagram on the right, the Remote I/O Driver Module is set as follows:

- Remote mode
- Master station of channel 2
- Baud rate: 4 Mbps



5. CPU Module Versions

The CPU Module and MEMOSOFT versions that are required to use a 2000-Series Remote I/O Driver Module are shown in the following table.

Table 4.53 Versions Supporting the 2000-Series Remote I/O Driver Module for 2000 I/O

Name	Model Name	Model No.	Version Number	Location of Version Number
CPU Module (8 kW)	CPU10	DDSCR-120CPU14200	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
CPU Module (16 kW)	CPU20	DDSCR-120CPU34100	<input type="checkbox"/> <input type="checkbox"/> B01 onwards	---
	CPU21	DDSCR-120CPU34110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
CPU Module (32 kW)	CPU30	DDSCR-130CPU54100	<input type="checkbox"/> <input type="checkbox"/> B01 onwards	
CPU Module (40 kW)	CPU35	DDSCR-130CPU54110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	
MEMOSOFT		FMSG-L-AT3 (for English DOS)	1.31 <input type="checkbox"/> onwards	In the middle at the bottom of the MEMOSOFT startup screen.
		FMSG-L-PP3E (for P120 English version)		

Note The nameplate is on the right side of the Module.

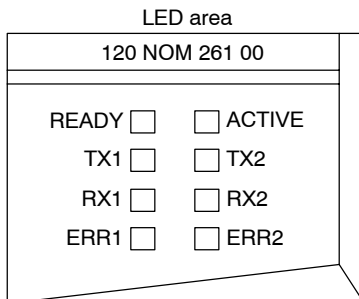
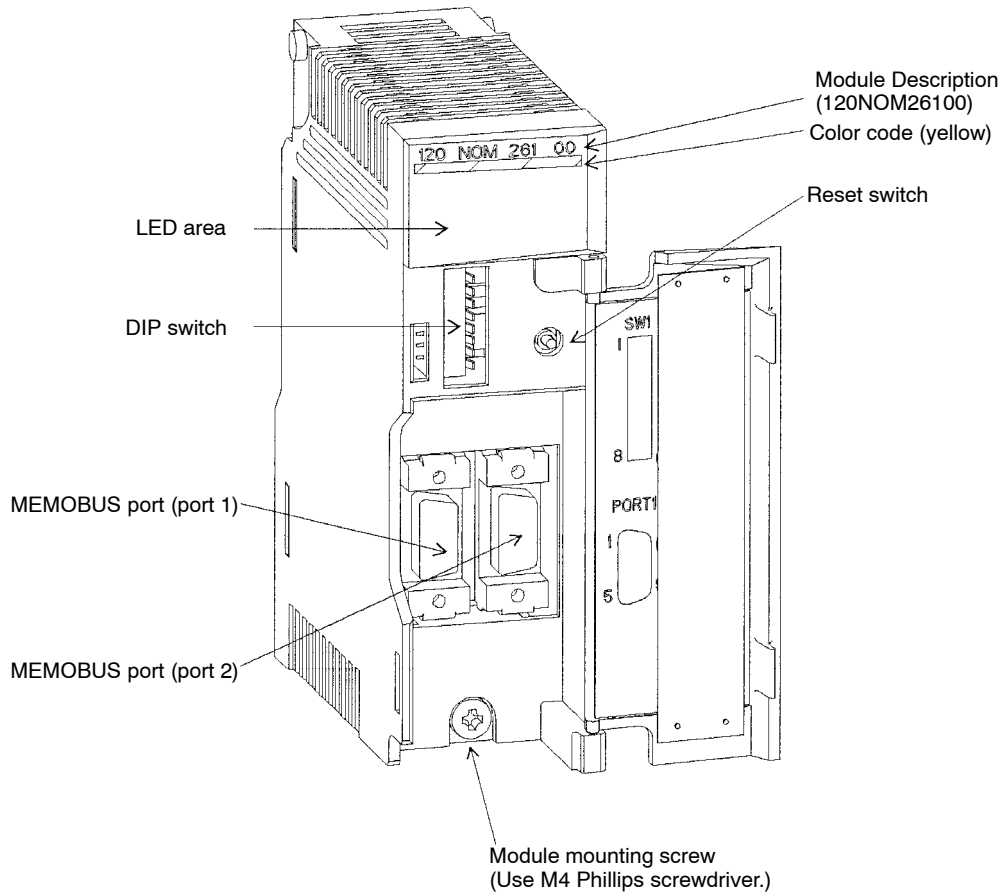
6. Related Manuals

Before operating a Remote I/O Driver Module for 2000 I/O, read the following manual carefully and be sure that you fully understand the information on specifications, application methods, safety precautions, etc.

MEMOCON GL120, GL130 1000/2000-Series Coaxial Remote I/O System User's Manual (SIEZ-C825-70.9)

4.4.5 MEMOBUS Modules (RS-232)

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is engaged in service with the CPU Module
TX1	Green	Module is transmitting data from port 1.
RX1	Green	Module is receiving data from port 1.
ERR1	Red	An error has occurred in the transmission of port 1.
TX2	Green	Module is transmitting data from port 2.
RX2	Green	Module is receiving data from port 2.
ERR2	Red	An error has occurred in the transmission of port 2.

Figure 4.30 Appearance of MEMOBUS Module (RS-232)

When a status error has occurred, the READY, ERR1, and ERR2 indicators will operate as shown in the following table:

Type of Error	READY	ERR1	ERR2	Remarks
ROM error	Flashes	Not lit	Not lit	Checked all the time.
RAM error	Not lit	Flashes	Not lit	Checked when power is turned ON.
Common memory error	Flashes	Flashes	Not lit	Checked when power is turned ON.
Watchdog timer error	Not lit	Flashes	Flashes	Checked all the time.

2. Function

- 1) The MEMOBUS Module (RS-232) is equipped with two MEMOBUS ports (master/slave) for RS-232C communications.
- 2) The MEMOBUS Module (RS-232) runs communications using RS-232C (master communications or slave communications) through MEMOBUS ports. MEMOBUS protocol or any other protocol can be used for the communications protocol.

3. Specifications

The specifications of MEMOBUS Module (RS-232) are shown in the following table.

Table 4.54 Specifications of MEMOBUS Module (RS-232)

Item	Specification
Model Name	MEMOBUS-RS232
Model No.	JAMSC-120NOM26100
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Approximate Mass	300 g
Internal Current Consumption	600 mA
Maximum Heating Value	3.0 W
Hot Swapping (Removal/Insertion Under Power)	Permitted

Item	Specification	
MEMOBUS Port Specifications	Communications Method	Half-duplex stop-start synchronization
	Transmission Levels	Conform to RS-232C.
	Protocol	MEMOBUS protocol or any other protocol
	Baud Rate	19,200/9,600/7,200/4,800/3,600/2,400/2,000/1,800/1,200/600/300/150 bps
	Communications Mode	RTU mode or ASCII mode
	Data Format	<p>The following data format is used between the master and slaves, between the master and modems, and between modems and slaves:</p> <ol style="list-style-type: none"> 1) Data bit length: 8 (RTU mode) or 7 (ASCII mode) bits 2) Parity check: Yes or No 3) Parity: Odd or even 4) Stop bits: 1 or 2
	Transmission Distance	15 m (Can be extended to 4.5 km maximum by using Yaskawa modem.)
	Transmission Error Detection	CRC-16 (RTU mode) or LRC (ASCII mode)
	Connector	D-sub connector (9-pin, female)

4. Using MEMOBUS Modules (RS-232)

1) Number of Modules

Together with MEMOBUS Modules (RS-422) explained in 4.4.6 *MEMOBUS Modules (RS-422)*, two MEMOBUS Modules can be used.

2) Installation Location

MEMOBUS Modules (RS-232) can be mounted to any slot of the Mounting Base of any Rack of the local channel. It will occupy one slot.

3) MEMOBUS Ports

- a) Devices connectable to MEMOBUS ports are shown in the following table. Each of these devices must be equipped with an RS-232C interface. In addition, depending on the type of device, the MEMOBUS port settings will need to be altered. This settings are altered using the DIP switch on the front of the Module. Refer to 4) *DIP Switch* later in this section.

Table 4.55 Example of Devices Connectable to MEMOBUS Ports

Type	Device	Remarks
MEMOBUS master	P120-series Programming Panel	<ul style="list-style-type: none"> Set MEMOBUS port to slave port. Communications performed using the MEMOBUS protocol
	Personal computer (with MEMOSOFT)	<ul style="list-style-type: none"> Creation of communications program not needed.
	ACGC4000/400-series FA Monitor	<ul style="list-style-type: none"> If your computer does not have MEMOSOFT, create a communications program based on the MEMOBUS protocol.
ASCII devices	Bar code reader	<ul style="list-style-type: none"> Set the MEMOBUS port to combined master/slave port. Set the MEMOBUS port to transparent mode.
	Serial printer	<ul style="list-style-type: none"> Create a communications program using the COMM instructions in the GL120 and GL130.

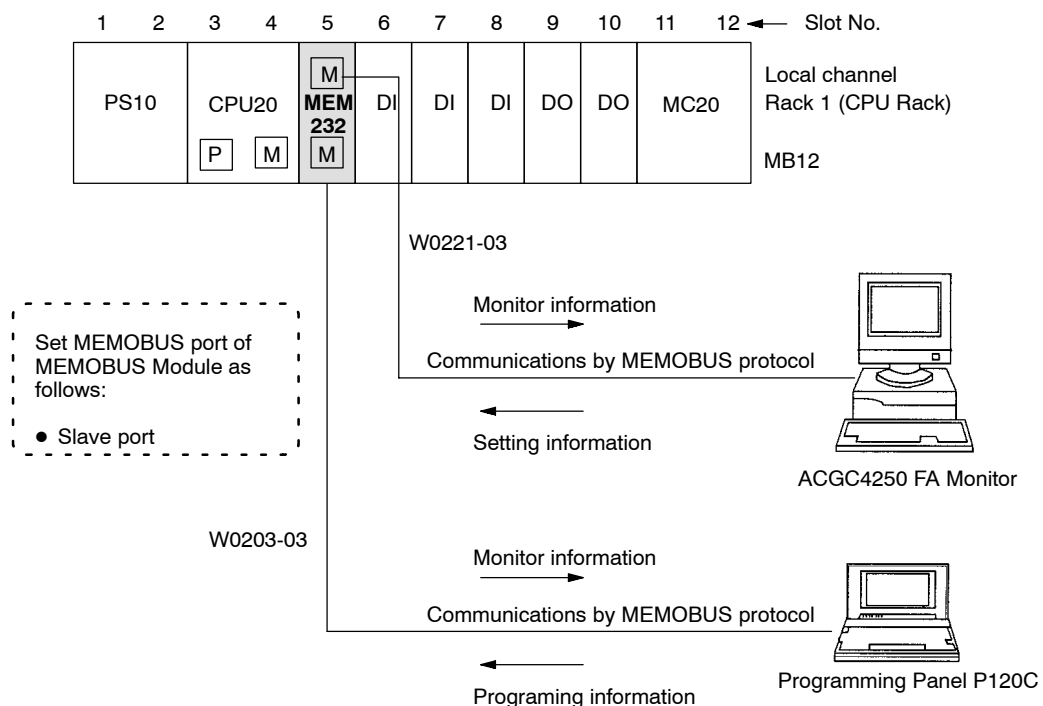
4

b) For details on MEMOBUS port specifications, refer to *Table 4.54* on page 4-129.

c) An example using a MEMOBUS Module (RS-232) is shown below:

EXAMPLE

Example 1
Connecting MEMOBUS Masters



Example 2
Connecting ASCII Devices

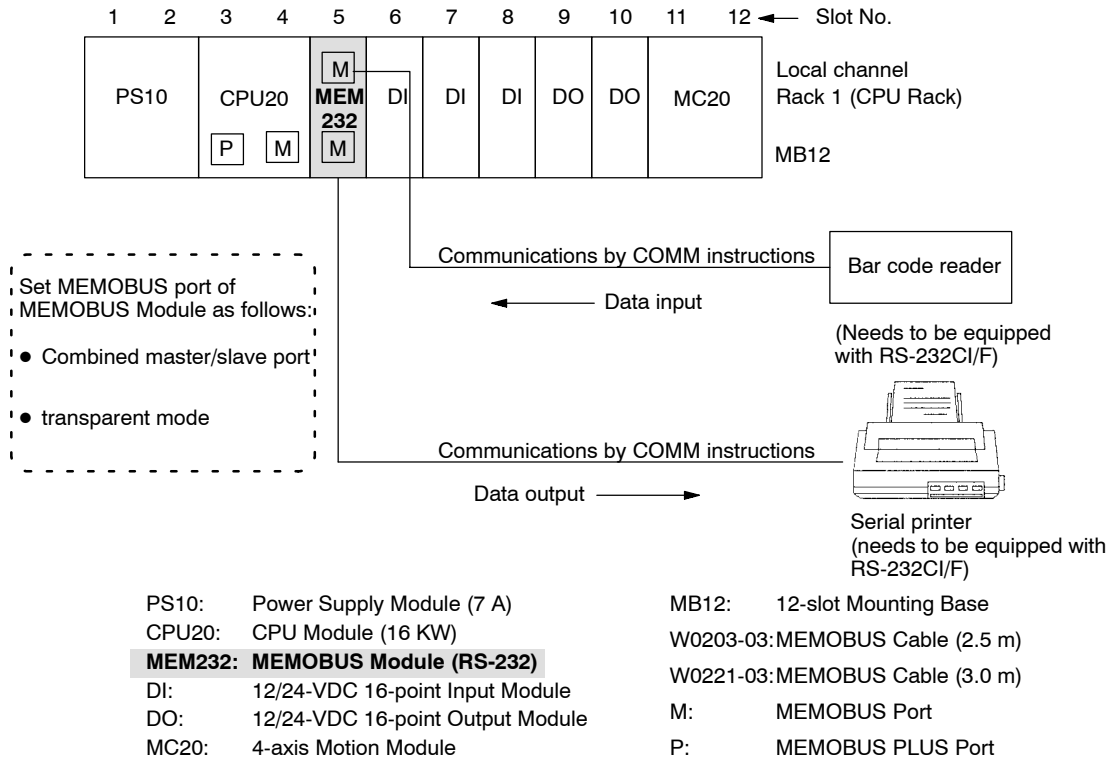


Figure 4.31 Using the MEMOBUS Module (RS-232)

d) The connector for the MEMOBUS port is a D-sub connector (9-pin, female). The connector pin arrangement and signal names are shown in the following table:

Table 4.56 Pin Arrangement and the Signal Names of MEMOBUS Port

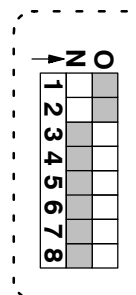
Pin No.	Symbol	Signal Name
1	FG	Protective ground
2	TXD	Transmission data
3	RXD	Reception data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	Signal ground
8	-	Not used.
9	DTR	Data terminal ready

e) COM Instructions(COMM, COMR)

- Note**
- (1) The communications instruction used for MEMOBUS ports of the MEMOBUS Module (RS-232) is the COMM instruction.
 - (2) The COMR instruction cannot be used for MEMOBUS ports of MEMOBUS Modules (RS-232). This communications instruction can be used only for MEMOBUS ports of Remote I/O Receiver Modules.

4) DIP Switch

- a) The DIP switch consists of 8 pins. The pins are numbered from 1 to 8 as shown in the diagram at the right.
- b) Each pin is turned ON when pressed to the right.
- c) The settings of the pins are effective (read) at the following times:



- (1) Pins 1 to 6: When the pin is turned ON.
- (2) Pins 7 and 8: When the reset switch is pressed or when power is turned ON to the Power Supply Module of the Rack where the MEMOBUS Module (RS-232) is mounted.

- d) Each pin's function is shown in the following table.

Table 4.57 Function of DIP Switch

Pin No.	Settings	Function
1	ON	Sets communications mode and parameters of Port 2 to the defaults.
	OFF	Sets communications mode and parameters of Port 2 to user settings.
2	ON	Sets communications mode and parameters of Port 1 to the defaults.
	OFF	Sets communications mode and parameters of Port 1 to user settings.
3	ON	When using Port 2 as master port, sets communications mode to transparent mode.
	OFF	When using Port 2 as master port, sets communications mode to MEMOBUS mode.
4	ON	When using Port 1 as master port, sets communications mode to transparent mode.
	OFF	When using Port 1 as master port, sets communications mode to MEMOBUS mode.
5	ON	Sets Port 2 as slave port. Master communications become ineffective.
	OFF	Sets Port 2 as combined master/slave port. Master communications become effective. When using COMM instruction for Port 2, turn this pin OFF.
6	ON	Sets Port 1 as slave port. Master communications become ineffective.
	OFF	Sets Port 1 as combined master/slave port. Master communications become effective. When using COMM instruction for Port 1, turn this pin OFF.
7	ON	Sets Module number to 2.
	OFF	Sets Module number to 1.
8	ON	Sets Module to self diagnosis mode.
	OFF	Sets Module to normal operation mode.

Note When using two MEMOBUS Modules, do not use the same Module number. If you use the same Module number, the following will result:

- If the two MEMOBUS Modules are mounted to the same Rack, the MEMOBUS Module mounted to the slot with the larger slot number will not operate normally.
- If the two MEMOBUS Module are mounted to different Racks, the MEMOBUS Module mounted to the Rack with the larger Rack number will not operate normally.

e) The default communications mode and parameters are as follows:

(1) Communications mode: RTU mode

(2) Communications parameters:

Baud rate: 9,600 bps
 Parity check: Yes
 Parity: Even
 Stop bits: 1
 Data bit length: 8
 Delay time: 0 ms

f) When the communications mode and parameters of MEMOBUS port is set to the user settings, you can set and use any settings from the communications modes and parameters shown in *Table 4.54* on page 4-129. Selection is done from the MEMOSOFT.

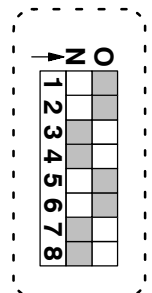
g) Examples of setting DIP switch are shown below:

◀ **EXAMPLE** ▶

Example 1

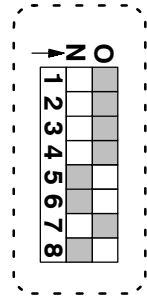
When the DIP switch is set as shown in the diagram at the right, the MEMOBUS Module (RS-232) is set as follows:

- Communications parameters of port 2 are set to the defaults.
- Communications parameters of port 1 are set to the defaults.
- Port 2 is in MEMOBUS Mode.
- Port 1 is in MEMOBUS Mode.
- Port 2 is slave port.
- Port 1 is slave port.
- Module number: 1
- Normal operation mode



Example 2

When the DIP switch is set as shown in the diagram at the right, the MEMOBUS Module (RS-232) is set as follows:



- Communications parameters of port 2 are set to the defaults.
- Communications parameters of port 1 are set to the defaults.
- Port 2 is in transparent mode.
- Port 1 is in transparent mode.
- Port 2 is combined master/slave port.
- Port 1 is combined master/slave port.
- Module number: 2
- Normal operation mode

5) Reset Switch

- a) Press the reset switch at the following times:
 - (1) When you have changed the setting of DIP switch pin 7 or 8.
 - (2) When errors have occurred.
- b) When the reset switch is pressed, communications between the MEMOBUS Module (RS-232) and connected devices will be interrupted. Communications will restart when the switch is released.

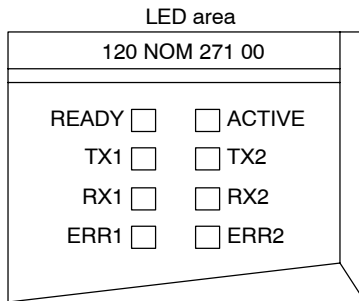
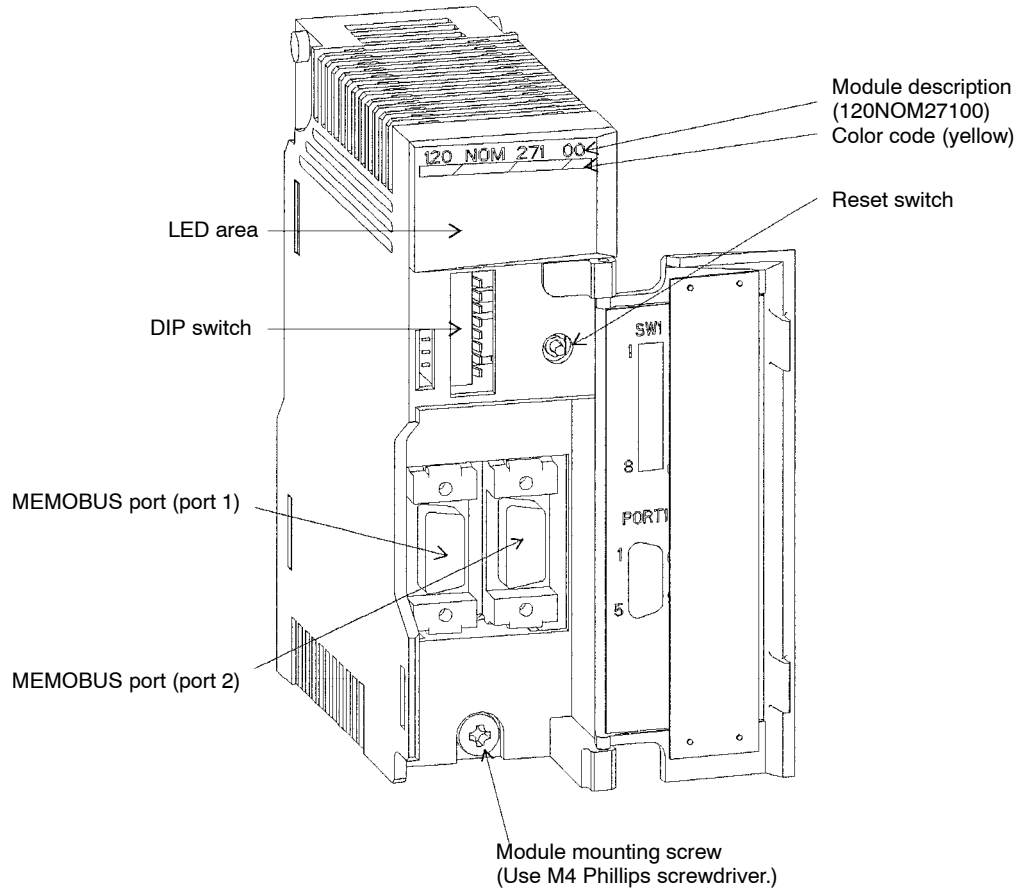
6) Related Manuals

Before operating your MEMOBUS Module (RS-232), read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 COM Instructions User's Manual (SIEZ-C825-70.14)

4.4.6 MEMOBUS Modules (RS-422)

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is engaged in service with the CPU Module
TX1	Green	Module is transmitting data from port 1.
RX1	Green	Module is receiving data from port 1.
ERR1	Red	An error has occurred in the transmission of port 1.
TX2	Green	Module is transmitting data from port 2.
RX2	Green	Module is receiving data from port 2.
ERR2	Red	An error has occurred in the transmission of port 2.

Figure 4.32 Appearance of MEMOBUS Module (RS-422)

When a status error has occurred, the READY, ERR1, and ERR2 indicators will operate as shown in the following table:

Type of Error	READY	ERR1	ERR2	Remarks
ROM error	Flashes	Not lit	Not lit	Checked all the time.
RAM error	Not lit	Flashes	Not lit	Checked when power is turned ON.
Common memory error	Flashes	Flashes	Not lit	Checked when power is turned ON.
Watchdog timer error	Not lit	Flashes	Flashes	Checked all the time.

2. Function

- 1) The MEMOBUS Module (RS-422) is equipped with two MEMOBUS ports for RS-422 communications.
- 2) The MEMOBUS Module (RS-422) performs communications using RS-422 (master communications or slave communications) through the MEMOBUS ports. The MEMOBUS protocol or any other protocol can be used for the communications protocol.
- 3) The features of the MEMOBUS Module (RS-422) are as follows:
 - a) The transmission distance can be extended up to 500 m without a modem.
 - b) Communications in 1:n format are possible without a modem: 1 master and up to 31 slaves.
- 4) The MEMOBUS Module (RS-422) can use either 2-line or 4-line communications.

Note The maximum transmission distance and the number of slaves for 1:n communications vary according to the specifications of connected communications devices.

3. Specifications

The specifications of the MEMOBUS Module (RS-422) are shown in the following table.

Table 4.58 Specifications of MEMOBUS Module (RS-422)

Item	Specifications	
Model Name	MEMOBUS-RS422	
Model No.	JAMSC-120NOM27100	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	
Approximate Mass	300 g	
Internal Current Consumption	600 mA	
Maximum Heating Value	3.0 W	
Hot Swapping (Removal/Insertion Under Power)	Permitted	
MEMOBUS Port Specifications	Communications Method	Half-duplex stop-start synchronization
	Transmission Levels	Conform to RS-422.
	Protocol	MEMOBUS protocol or any other protocol
	Baud Rate	19,200/9,600/7,200/4,800/3,600/2,400/2,000/ 1,800/1,200/600/300/150 bps
	Communications Mode	RTU mode or ASCII mode
	Data Format	Transmission between the master and slaves uses the following data format: 1) Data bit length: 8 (RTU mode) or 7 (ASCII mode) 2) Parity check: Yes or No 3) Parity: Odd or even 4) Stop bits: 1 or 2
	Transmission Distance	500 m max.
	Transmission Error Detection	CRC-16 (RTU mode) or LRC (ASCII mode)
	Connector	D-sub connector (9 pin, female)

4. Using MEMOBUS Modules (RS-422)

1) Number of Modules

Together with MEMOBUS Modules (RS-232) explained in 4.4.5 *MEMOBUS Modules (RS-232)*, two MEMOBUS Modules (RS-422) can be used.

2) Installation Location

The MEMOBUS Module (RS-422) can be mounted to any slot of the Mounting Base of any Rack of the local channel. It will occupy one slot.

3) MEMOBUS Port

- a) Devices connectable to the MEMOBUS ports are shown in the following table. Each of these devices must be equipped with an RS-422 interface. In addition, depending on the type of device, the MEMOBUS port settings will need to be altered. This settings are altered using the DIP switch on the front of the Module. Refer to 4) *DIP Switch* later in this section.
- b) Refer to *Table 4.58* on page 4-137 for details on MEMOBUS port specifications.
- c) Examples of how to use the MEMOBUS Module are shown in *Figure 4.33* to *Figure 4.36*.

◀EXAMPLE▶

Table 4.59 Example of Devices connectable to MEMOBUS Port

Type	Devices	Remarks
Master	Yaskawa ACGC4000-series FA Monitors	<ul style="list-style-type: none"> ● Set MEMOBUS port to slave port. ● Creation of communications program not needed. ● Communications performed using MEMOBUS protocol
Slaves	Yaskawa Inverters	<ul style="list-style-type: none"> ● Set MEMOBUS port to combined master/slave port. ● Create communications program using COMM instructions in the GL120/GL130. ● Use MEMOBUS protocol for communications protocol.
	1) VS-616G3 plus	
	2) VS-606PC3	
	3) VS-mini C	
	Note Use Inverters which support MEMOBUS protocol.	
	Yaskawa Servo Amplifiers	<ul style="list-style-type: none"> ● Set MEMOBUS port to combined master/slave port. ● Set MEMOBUS port to transparent mode. ● Create communications program using COMM instructions in the GL120/GL130.
	1) SGD-□□H	
	2) CACR-HR□□BAB	
	3) CACR-HR□□BB	
	ASCII devices	<ul style="list-style-type: none"> ● Use slave protocol for communications protocol.
	1) Bar code readers	
	2) Electronic scales	

EXAMPLE

Example 1

Connecting ACGC4250 FA Monitor (1:1 Communications)

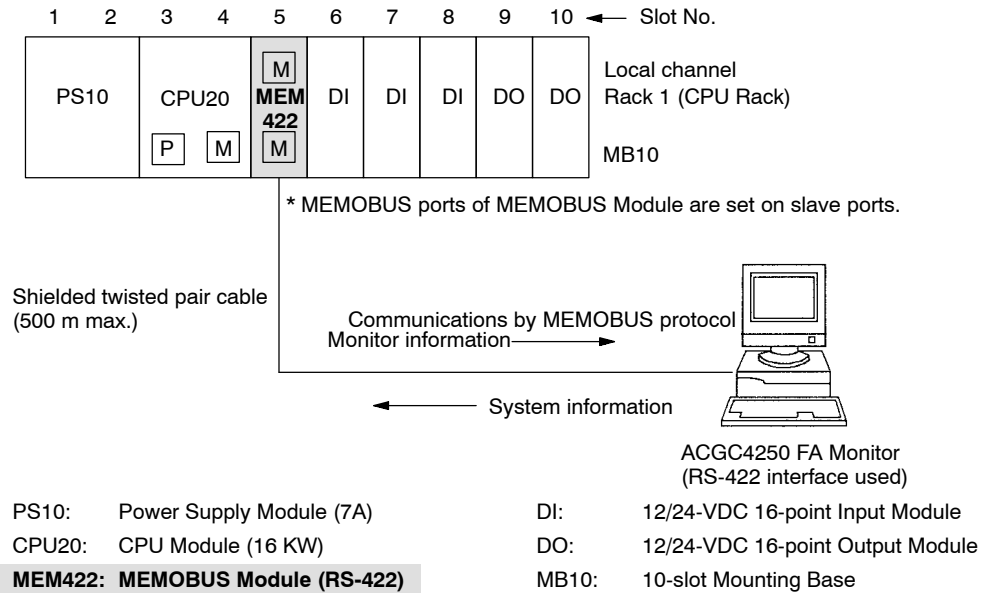


Figure 4.33 Connecting ACGC4250 FA Monitor (1:1 Communications)

EXAMPLE

Example 2
Connecting ACGC4250 FA Monitor (1:31 Communications)

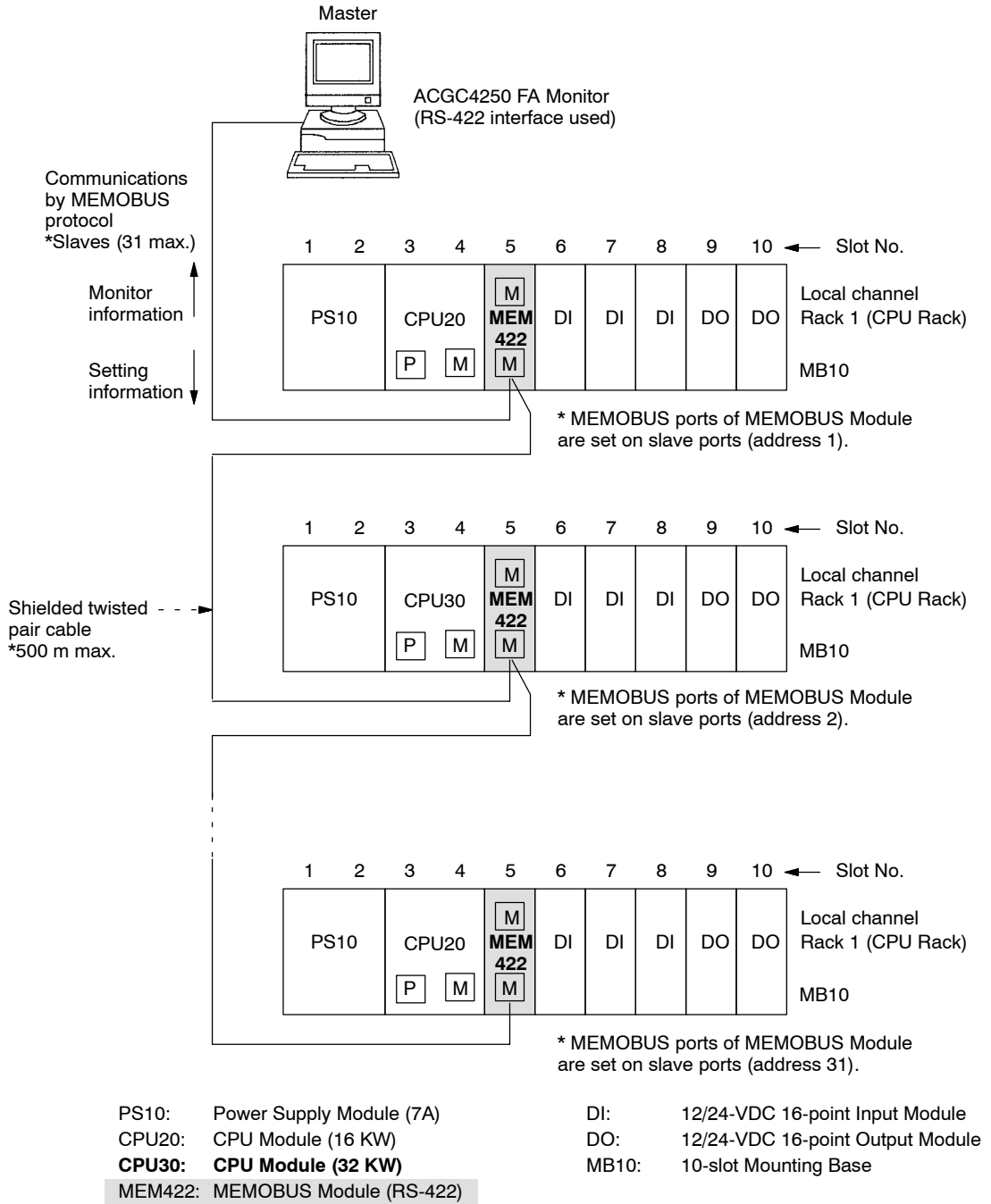


Figure 4.34 Connecting ACGC4250 FA Monitor (1: 31 communications)

◀EXAMPLE▶

Example 3

Connecting VS-616G3 plus Inverters (1:31 Communications)

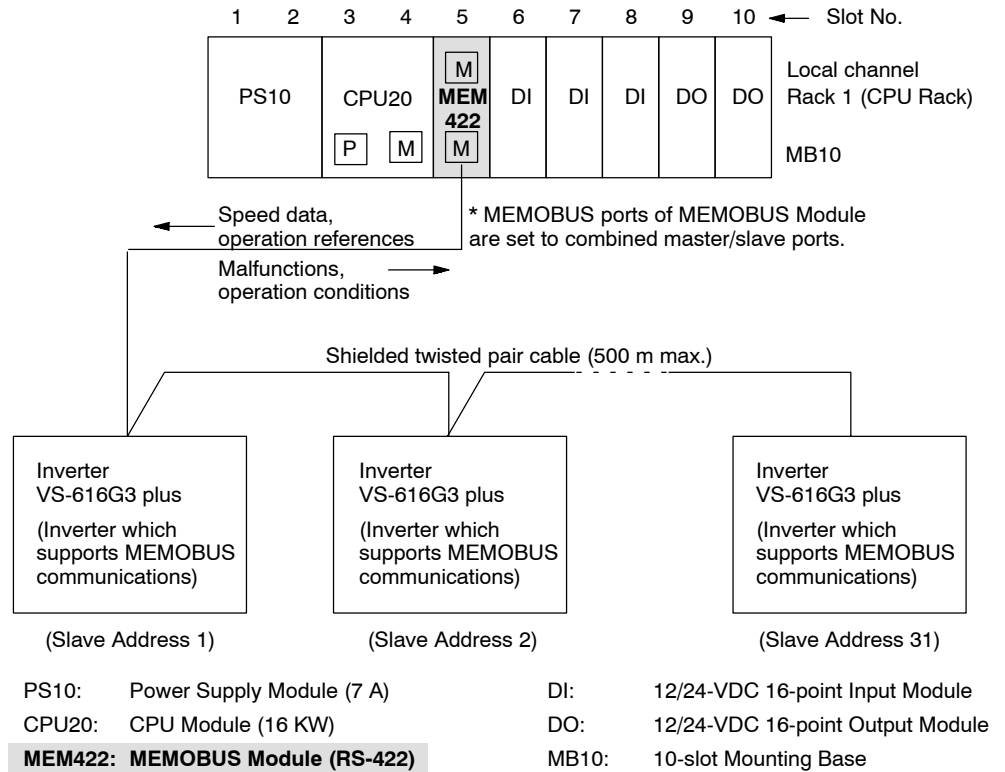


Figure 4.35 Connecting VS-616G3 Plus Inverters (1:31 Communications)

EXAMPLE

Example 4
Connecting ASCII Device (1:1 Communications)

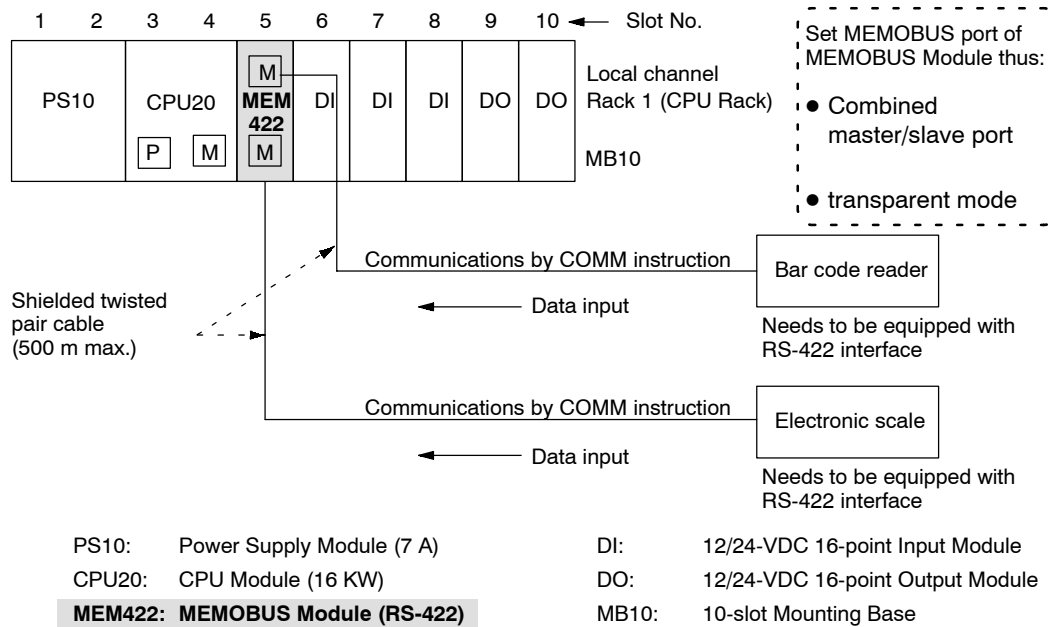


Figure 4.36 Connecting ASCII Devices (1: 1 Communications)

d) The connector for a MEMOBUS port is a D-sub connector (9-pin, female). The connector pin arrangement and signal names are shown in the following table:

Table 4.60 Pin Arrangement and the Signal Names

Pin No.	Symbol	Signal Name
1	PGND	Protective ground
2	TXD	Transmission data
3	RXD	Reception data
4	RXDRT	Receiver termination resistance:120 Ω
5	-	Not used
6	R̄XD	Reception data inversion
7	SGND	Signal ground
8	TXRD	Sender termination resistance:120 Ω
9	T̄XD	Transmission data inversion

e) Transmission Circuit

The communications circuits of the MEMOBUS Module (RS-422) are shown in the following figure.

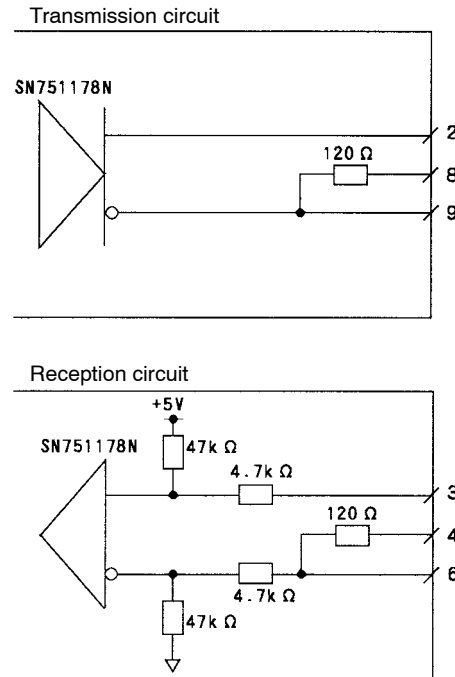


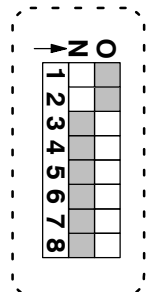
Figure 4.37 Transmission Circuit of MEMOBUS Port

f) COM Instructions (COMM, COMR)

- Note**
- (1) The communications instruction for the MEMOBUS ports of MEMOBUS Modules (RS-422) is the COMM instruction.
 - (2) The COMR instruction cannot be used for the MEMOBUS ports of MEMOBUS Modules (RS-422). This communications instruction can be used only for the MEMOBUS ports of the Remote I/O Receiver Module.

4) DIP Switch

- a) DIP switch is composed of 8 pins. The pins are numbered from 1 to 8 as shown in the diagram at the right.
- b) Each pin is turned ON when pressed to the right.
- c) The setting of each pin is effective (read) at the following times:



- (1) Pin 1 to 6: When the pin is turned ON.
- (2) Pins 7 and 8: When the reset switch is pressed or when the power is turned ON to the Power Supply Module of the Rack where the MEMOBUS Module (RS-422) is mounted.

d) Each pin's function is shown in the following table.

Table 4.61 Function of DIP Switch

Pin No.	Settings	Function
1	ON	Sets communications mode and parameters of Port 2 to the defaults.
	OFF	Sets communications mode and parameters of Port 2 to user settings.
2	ON	Sets communications mode and parameters of Port 1 to the defaults.
	OFF	Sets communications mode and parameters of Port 1 to user settings.
3	ON	When using Port 2 as master port, sets communications mode to transparent mode.
	OFF	When using Port 2 as master port, sets communications mode to MEMOBUS mode.
4	ON	When using Port 1 as master port, sets communications mode to transparent mode.
	OFF	When using Port 1 as master port, sets communications mode to MEMOBUS mode.
5	ON	Sets Port 2 as slave port. Master communications become ineffective.
	OFF	Sets Port 2 as combined master/slave port. Master communications become effective. When using COMM instruction for port 2, turn this pin OFF.
6	ON	Sets Port 1 as slave port. Master communications become ineffective.
	OFF	Sets Port 1 as combined master/slave port. Master communications become effective. When using COMM instruction for port 1, turn this pin OFF.
7	ON	Sets Module number to 2.
	OFF	Sets Module number to 1.
8	ON	Sets Module to self diagnosis mode.
	OFF	Sets Module to normal operation mode.

Note When using two MEMOBUS Modules, do not use the same Module number. If you use the same Module number, the following will result:

- If the two MEMOBUS Modules are mounted to the same Rack, the MEMOBUS Module mounted to the slot with the larger slot number will not operate normally.
- If the two MEMOBUS Modules are mounted to different Racks, the MEMOBUS Module mounted to the Rack with the larger Rack number will not operate normally.

e) The default communications mode and parameters are as follows:

- (1) Communications mode: RTU mode

(2) Communications parameters:

Baud rate: 9,600 bps
 Parity check: Yes
 Parity: Even
 Stop bits: 1
 Data bit length: 8
 Delay time: 0 ms

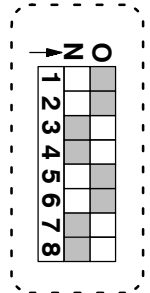
- f) When the communications mode and parameters of MEMOBUS port are set to the user settings, you can set and use any setting from the communications modes and parameters shown in *Table 4.58* on page 4-137. Selection is done using the MEMOSOFT.
- g) Examples of setting the DIP switch are shown below:

◀EXAMPLE▶

Example 1

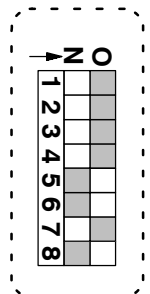
When the DIP switch is set as shown in the diagram at the right, the MEMOBUS Module (RS-422) is set as follows:

- Communications parameters of port 2 are set to the defaults.
- Communications parameters of port 1 are set to the defaults.
- Port 2 is in MEMOBUS Mode.
- Port 1 is in MEMOBUS Mode.
- Port 2 is slave port.
- Port 1 is slave port.
- Module number: 1
- Normal operation mode

**Example 2**

When the DIP switch is set as shown in the diagram at the right, the MEMOBUS Module (RS-422) is set as follows:

- Communications parameters of port 2 are set to the defaults.
- Communications parameters of port 1 are set to the defaults.
- Port 2 is in transparent mode.
- Port 1 is in transparent mode.
- Port 2 is combined master/slave port.
- Port 1 is combined master/slave port.
- Module number: 2
- Normal operation mode



5) Reset Switch

a) Press the reset switch at the following times:

(1) When you have changed the setting of DIP switch pin 7 or 8.

(2) When errors have occurred.

b) When the reset switch is pressed, communications between the the MEMOBUS Module (RS-422) and connected devices will be interrupted. Communications will re-start when the switch is released.

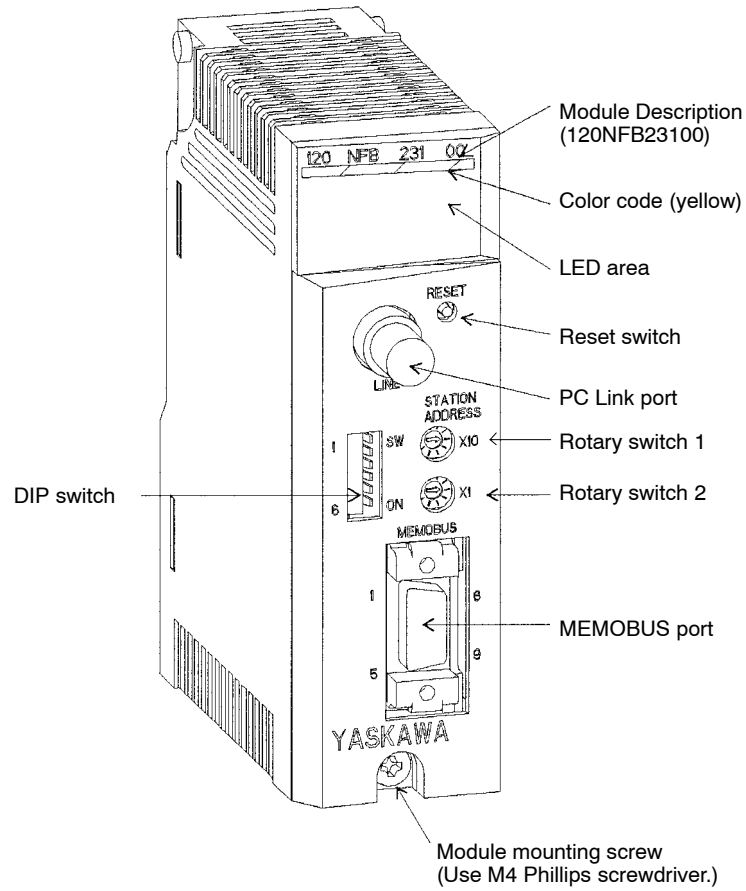
6) Related Manuals

Before operating your MEMOBUS Module (RS-422), read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 COM Instructions User's Manual (SIEZ-C825-70.14)

4.4.7 PC Link Module

1. Appearance



LED area	
120 NBF 231 00	
READY <input type="checkbox"/>	ACTIVE <input type="checkbox"/>
L-TX <input type="checkbox"/>	PP TX <input type="checkbox"/>
L-RX <input type="checkbox"/>	PP RX <input type="checkbox"/>
L-ERR <input type="checkbox"/>	PP ERR <input type="checkbox"/>

LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is engaged in service with the CPU Module
L-TX	Green	Module is transmitting data from PC Link port.
L-RX	Green	Module is receiving data from PC Link port.
L-ERR	Red	An error has occurred in the transmission of PC Link port. Lit for 10 ms.
PP TX	Green	Module is transmitting data from MEMOBUS port.
PP RX	Green	Module is receiving data from MEMOBUS port.
PP ERR	Red	An error has occurred in the transmission of MEMOBUS port.

Figure 4.38 Appearance of PC Link Module

When a status error has occurred, the READY, PP ERR, and L-ERR indicators will operate as shown in the following table:

Type of Error	READY	PP ERR	L-ERR	Remarks
ROM error	Flashes	Flashes	Flashes	Checked all the time.
RAM error	Flashes	Not lit	Flashes	Checked when power is turned ON.
Common memory error	Flashes	Flashes	Not lit	Checked when power is turned ON.
Watchdog timer error	Lit	Flashes	Flashes	Checked all the time.
Station address error	Lit	Flashes	Not lit	Checked when power is turned ON.

2. Function

The PC Link Module functions as station of a PC Link System using coaxial cable for the transmission cable.

3. Specifications

The specifications of the PC Link Module are shown in the following table.

Table 4.62 Specification of PC Link Module

Item	Specifications
Model Name	PCLINK-COAX
Model No.	JAMSC-120NFB23100
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Approximate Mass	300 g
Internal Current Consumption	800 mA
Maximum Heating Value	4.0 W
Hot Swapping (Removal/Insertion Under Power)	Permitted

Item	Specifications	
PC Link Port Specifications	Topology (Communications Network)	Bus
	Media Access Control Method	Token passing (n:n communications)
	Media (Transmission Medium)	Coaxial cable (75Ω)
	Modulation Method	Base band
	Encoding Method	Manchester code
	Baud Rate	Choose from 0.5/1/2/4 Mbps
	Transmission Distance	Transmission distance varies according to the baud rate and specifications of the coaxial cable. If, for example, the baud rate is 4 Mbps and a 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.
	Number of Stations	32 stations max. A total of 32 PC Link Modules can be connected, including the local one.
	Error Measures (RAS)	Automatic parallel off and malfunctioning station recovery
	Synchronization Method	Frame
	Communications Format	Conforms to HDLC.
	Insulation Method	Pulse transformer
	Connector	BNC connector
MEMOBUS Port Specifications	Communications Method	Half-duplex stop-start synchronization
	Transmission Levels	Conform to RS-232C
	Protocol	MEMOBUS protocol
	Baud Rate	9,600 bps (fixed)
	Communications Mode	RTU mode
	Data Format	1) Data bit length: 8 2) Parity check: Yes 3) Parity: Even 4) Stop bits: 1
	Slave Address	Between 1 and 32. The station address of the PC Link Module is the MEMOBUS slave address.
	Transmission Distance	15 m (Can be extended to 4.5 maximum by using Yaskawa modem.)
	Transmission Error Detection	CRC-16
	Connector	D-sub connector (9-pin, female)

4. Using PC Link Modules

1) Number of Modules

Two PC Link Modules can be used.

2) Installation Location

- a) A PC Link Module can be mounted to any slot on the Mounting Base of Rack 1 (CPU Rack) of local channel. It will occupy one slot.
- b) A mounting example of PC Link Modules is shown on the next page.

3) PC Link Port

- a) A PC Link Module runs, via the PC Link ports, high-speed communications (4 Mbps) with up to 31 PC Link Modules. The transmission distance varies according to the baud rate and the specifications of the coaxial cable. For example, if the baud rate is 4 Mbps, and the 12C-5AF Coaxial Cable is used for the communications cable, it is possible to transmit up to 1 km max.
- b) A connection example of PC Link Modules is shown on the next page.

EXAMPLE

Example
Connection of PC Link Module

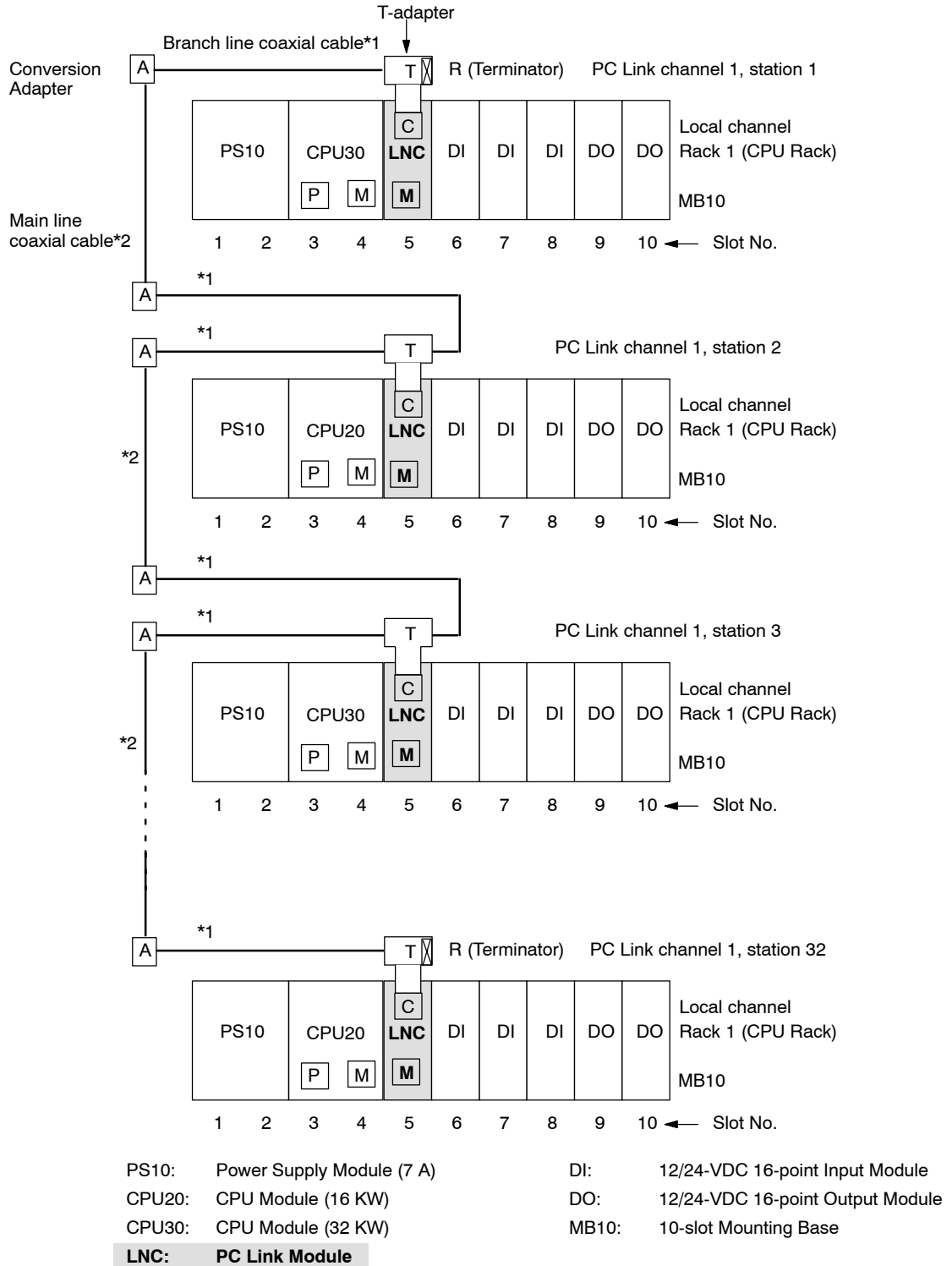


Figure 4.39 Connection of PC Link Module

4) MEMOBUS Port

- a) The PC Link Module runs communications (slave communications) using RS-232C via MEMOBUS ports (slave ports). The MEMOBUS protocol is used for the communications protocol.
- b) The devices that can be connected to the MEMOBUS port are shown in the following table. Each one of these devices must be equipped with an RS-232C interface.

Table 4.63 Devices Connectable to MEMOBUS Port

Type	Device	Remarks
MEMOBUS master	P120-series Programming Panel	<ul style="list-style-type: none"> • Communications performed using the MEMOBUS protocol • Creation of communications program not needed.
	Personal computer (with MEMOSOFT)	<ul style="list-style-type: none"> • If your computer does not have MEMOSOFT, create a communications program based on the MEMOBUS protocol.
	ACGC4000/400-series FA Monitor	

- c) A master connected to the MEMOBUS port can run communications through the PC Link System between all the stations on the same PC Link channel through the CPU Modules. See *Example 1* on the next page.
- d) More than one master can be connected on the same PC Link channel. See *Example 2*.

4

EXAMPLE

Example 1
Connecting One P120 Programming Panel

The P120C Programming Panel can run communications with all the CPU Modules through the PC Link System.

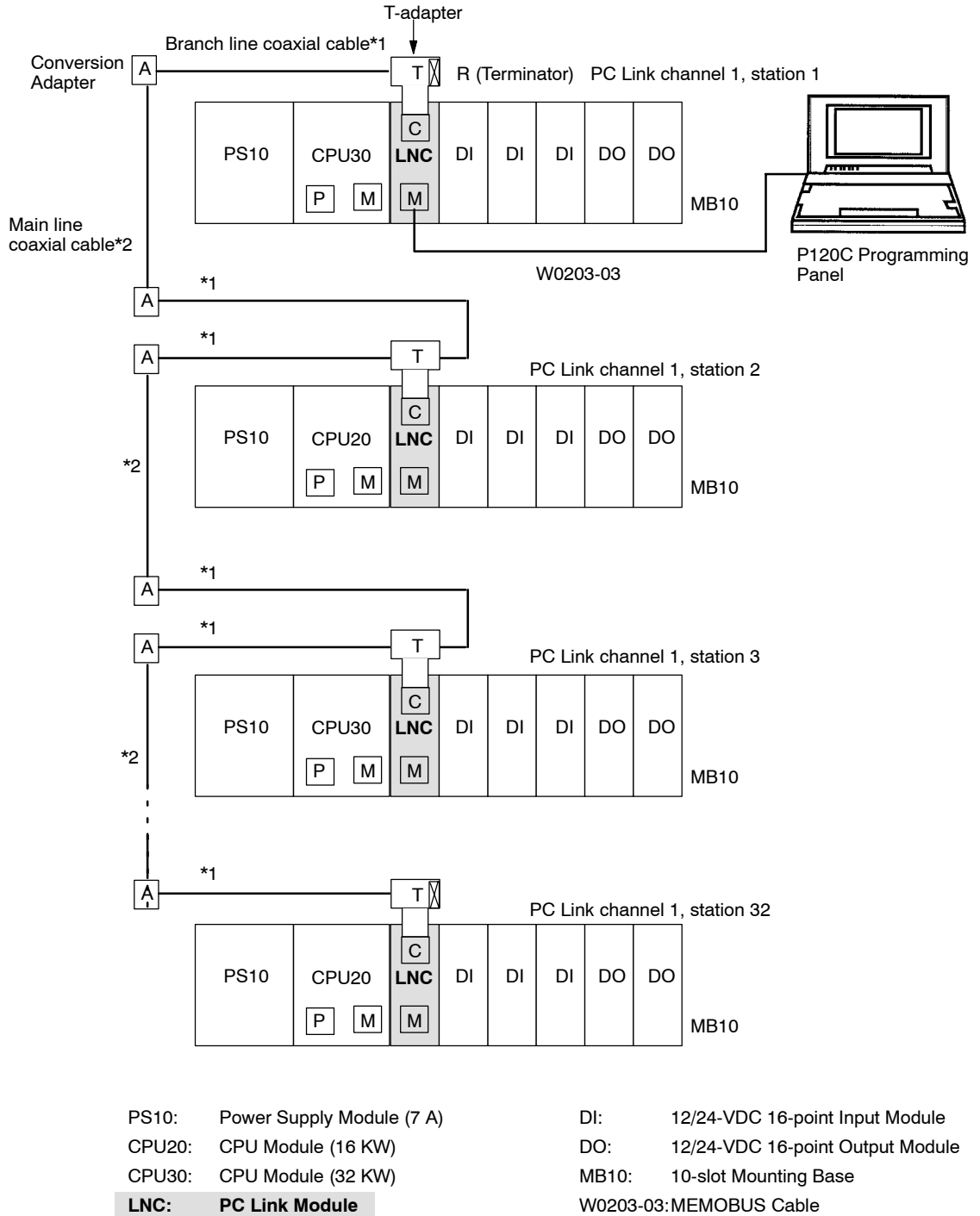


Figure 4.40 Connecting One P120 Programming Panel

EXAMPLE

Example 2

Connecting ACGC4250 FA Monitor and P120 Programming Panel.

The ACGC4250 FA Monitor and P120C Programming Panel can run communications with all the CPU Modules through the PC Link System.

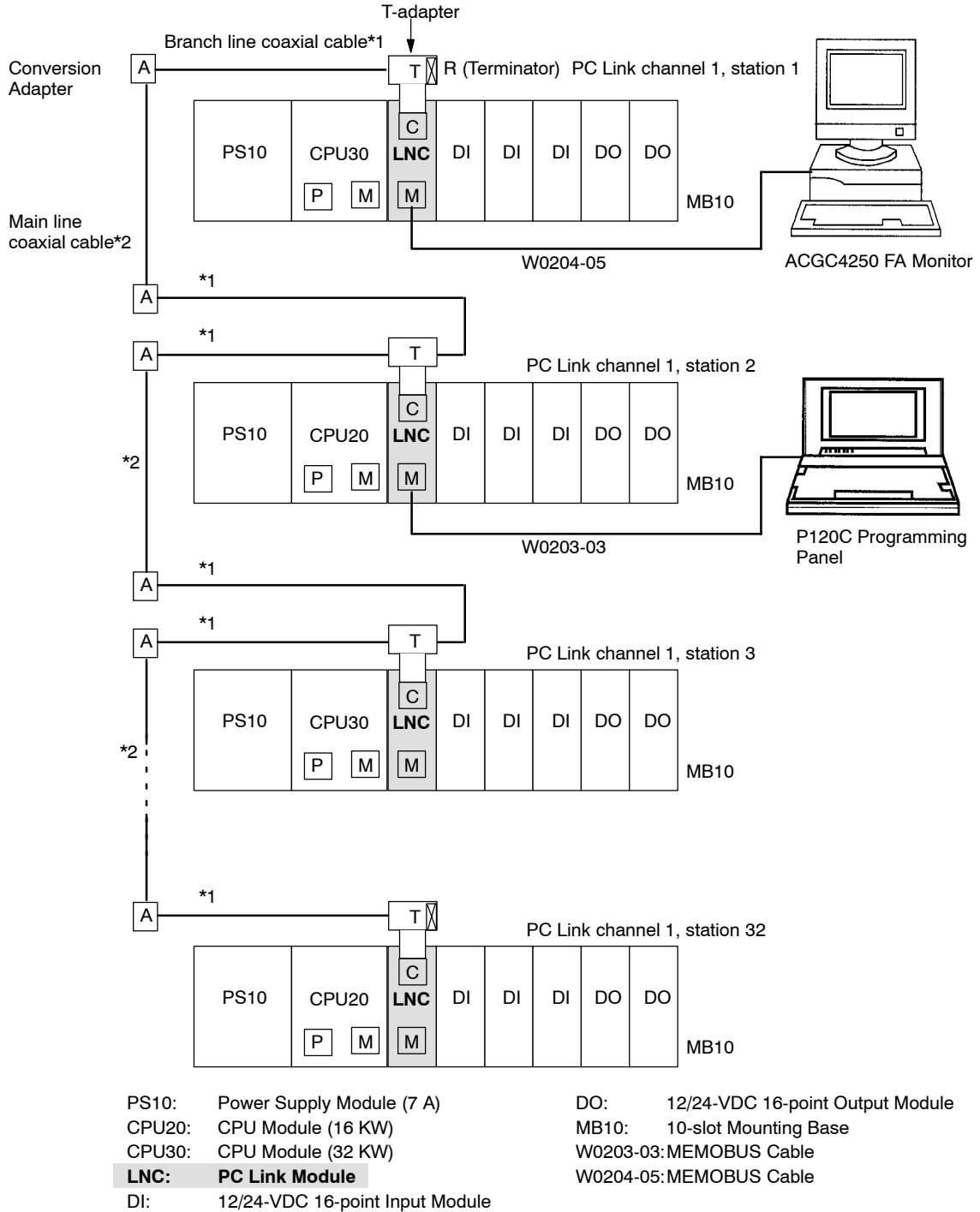


Figure 4.41 Connecting ACGC4250 FA Monitor and P120 Programming Panel

- e) A D-sub connector (9-pin, female) is used to connect the MEMOBUS port. The connector pin arrangements and the signal names are shown in the following table

Table 4.64 Pin Arrangement and Signal Names of MEMOBUS Port

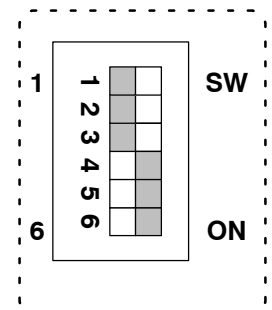
Pin No.	Symbol	Signal Name
1	FG	Protective ground
2	TXD	Transmission data
3	RXD	Reception data
4	RTS	Request to send
5	CTS	Clear to send
6	DSR	Data set ready
7	GND	Signal ground
8	-	Not used.
9	DTR	Data terminal ready

f) COM Instructions (COMM, COMR)

- Note**
- (1) COM Instructions (COMM, COMR) cannot be used for the MEMOBUS port of a PC Link Module.
 - (2) The COMM instruction can be used for the MEMOBUS port of the following two communications Modules.
 - MEMOBUS Module (RS-232): Model JAMSC-120NOM26100
 - MEMOBUS Module (RS-422): Model JAMSC-120NOM27100
 - (3) The COMR instruction can be used only for the MEMOBUS ports of the Remote I/O Receiver Module.

5) DIP Switch

- a) DIP switch is composed of 6 pins. The pins are numbered from 1 to 6 as shown in the diagram at the right.
- b) Each pin is turned ON when pressed to the right.
- c) The setting of each pin is effective (read) at the following times:



- (1) When the reset switch is pressed.
- (2) When the power is turned ON to the Power Supply Module of the CPU Rack.

d) Each pin's function is shown in the following table.

Table 4.65 Function of DIP Switch

Pin No.	Settings	Function		
1	ON	Sets Module to self diagnosis mode.		
	OFF	Sets Modules to PC Link mode.		
2	ON OFF	Not used. It does not matter whether this pin is ON or OFF.		
3	ON	Sets Modules to channel 2 station.		
	OFF	Sets Modules to channel 1 station.		
4	ON	Sets Modules to hold mode. This will hold the contents of data transmitted from a malfunctioning station to the contents it had just immediately before the malfunction occurred.		
	OFF	Sets Modules to clear mode. This will set the contents of data transmitted from a malfunctioning station to OFF or to all zeros.		
5	Set the baud rate of PC Link System according to the table on the right.	Pin 5	Pin 6	Baud rate
6		ON	ON	4 Mbps
		ON	OFF	2 Mbps
		OFF	ON	1 Mbps
		OFF	OFF	0.5 Mbps

Note Set the same baud rate for all the PC Link Modules on the same channel. If baud rate of all the Modules is not the same, communications will not run.

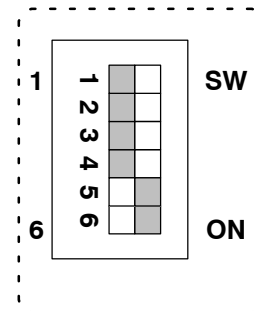
e) Examples of setting the DIP switch are shown below:

EXAMPLE

Example 1

When the DIP switch is set as shown in the diagram on the right, the PC Link Module is set as follows:

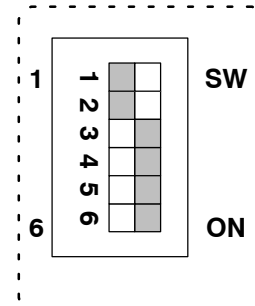
- PC Link mode
- Channel 1
- Clear mode
- 4 Mbps



Example 2

When the DIP switch is set as shown in the diagram on the right, the PC Link Module is set as follows:

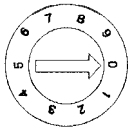
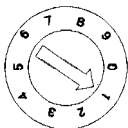
- PC Link mode
- Channel 2
- Hold mode
- 4 Mbps



6) Rotary Switch

- a) The rotary switch is used to set the station addresses of PC Link Modules.
- b) There are two rotary switches. The top rotary switch is rotary switch 1 and the bottom switch is rotary switch 2. Each switch has positions from 0 to 9.
- c) The setting of the rotary switches is effective when the reset switch is pressed, or when the power is turned ON to Power Supply Module of the Rack where the PC Link Module is mounted.
- d) The station address is set to between 1 and 32. The following table shows how to set the station address.
- e) The station address will be used as the slave address of the MEMOBUS port.

Table 4.66 Setting the Station Address

Example Settings of Station Address 1		Station Address	Rotary Switch 1	Rotary Switch 2
Rotary switch 1  × 10	1 to 9	0	1 to 9	
	10 to 19	1	0 to 9	
	20 to 29	2	0 to 9	
Rotary switch 2  × 1	30 to 32	3	0 to 2	
	0 or 33 to 99	Not permitted.		

- Note**
- (1) Set the station address to between 1 and 32. If the address is set to 0 or, 33 to 99, normal communications will not be possible.
 - (2) Do not use the same address for more than one station within the same channel. If this occurs, stations with the same address will not be able to communicate normally.

7) Reset Switch

a) Press the reset switch in the following cases:

- (1) When you have changed the setting of the DIP switch.
- (2) When you have changed the setting of the rotary switches.
- (3) When errors have occurred.

b) When the reset switch is pressed, communications between the PC Link Module and other PC Link Modules are interrupted. Communications restart when the switch is released.

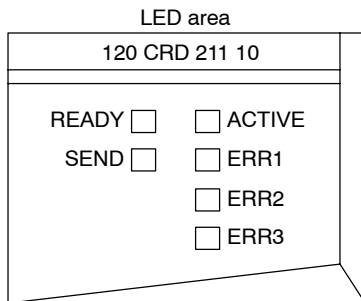
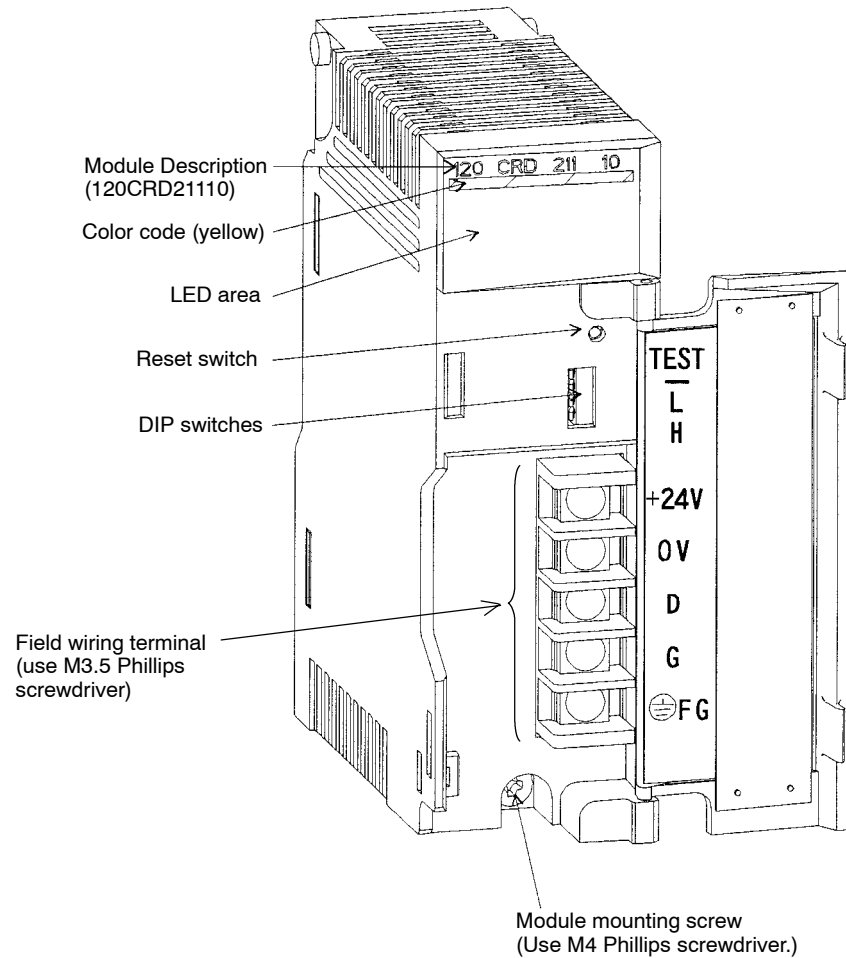
8) Related Manuals

Before operating your PC Link Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 PC Link Module User's Manual (SIEZ-C825-70.4)

4.4.8 Uniwire Interface Module

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is being serviced by CPU Module.
SEND	Green	Module is performing transmission on Uniwire System. (Light flashes.)
ERR1	Red	<ul style="list-style-type: none"> An error has occurred either in the Module or in the Uniwire System. See the following table.
ERR2	Red	
ERR3	Red	

Figure 4.42 Appearance of Uniwire Interface Module

If an error occurs either in the Module or in the Uniwire System, the READY, ERR1, ERR2 and ERR3 indicators will operate as follows:

Type	Error	READY	ERR1	ERR2	ERR3	Remarks
Module error	ROM error	Not lit	Lit	Not lit	Not lit	Checked when power is turned ON.
	RAM error	Not lit	Not lit	Lit	Not lit	
	Internal watchdog timer error	Not lit	Not lit	Not lit	Lit	Checked all the time.
	Switch setting error	Lit	Lit	Lit	Not lit	Checked when power is turned ON.
UNWIRE system error	D and V24 short-circuited.	Lit	Lit	Not lit	Not lit	Checked all the time.
	D and G short-circuited, or D and G connection reversed.	Lit	Not lit	Lit	Not lit	
	End Unit error or D line disconnected	Lit	Not lit	Not lit	Lit	

4

2. Function

A Uniwire Interface Module functions as the master station of a Uniwire System.

3. Specifications

1) Hardware Specifications

The following table shows the hardware specifications of the Uniwire Interface Module.

Table 4.67 Hardware Specifications of Uniwire Interface Module

Items	Specifications
Model Name	UNIWIRES I/F
Model No.	JAMSC-120CRD21110
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Approximate Mass	300g
Internal Current Consumption	200 mA
Maximum Heating Value	8.2 W
Hot Swapping (Removal/Insertion Under Power)	Permitted
Mounting Location	Any slot of any Rack.
External Power Supply	The following regulated DC power supply is necessary to operate the Module. <ul style="list-style-type: none"> ● 22.8 to 26.4 VDC; ripple: 0.5V_{P-P} ● 0.2 A (power supply to Uniwire System devices not included.)

2) Performance Specifications

The following table shows the performance specifications of the Uniwire Interface Module.

Table 4.68 Performance Specifications of Uniwire Interface Module

Items	Specifications
Communications Method	Interactive time-sharing multiplex
Synchronization Method	Bit synchronous
Protocol	Uniwire protocol
Transmission Medium	Twisted pair cable (0.5 mm ² min.)
Baud Rate	Select either 14.3 kbps or 28.5 kbps
Transmission Distance	At 28.5 kbps: Maximum transmission distance is 200 m. At 14.3 kbps: Maximum transmission distance is 500 m.
Number of Stations	20 stations max. Up to 20 Address Units or One-piece Address I/O Units can be connected.
Maximum Transmission Points	256 points. One register is 16 points.
Maximum Allocation Points	1) 272 points. One register is 16 points. 2) Sixteen input relays or an input register is used to monitor the status of Uniwire Interface Module and Uniwire System.
Refresh Time	With 256 transmission points and baud rate of 28.5 kbps, the refresh time is approximately 26 ms.
Watchdog Timer	210 ms. Communications will be interrupted for timeout errors.

4. Using the Uniwire Interface Module

1) Number of Modules

- a) A Uniwire Interface Module runs communications with Uniwire System devices using I/O references such as input relays, output coils, input registers and output registers. For this reason, I/O allocation is necessary for the slot to which Uniwire Interface Module is mounted.
- b) The following rules apply for I/O allocation for the Uniwire Interface Module.
 - (1) Either digital references such as input relays and output coils, or register references such as input registers and output registers are allocated. You cannot allocate digital references and register references mixed together.
 - (2) Allocation of Digital References
 - Allocate input relays and output coils 16 points at a time. The maximum 272 points can be allocated as the total number of input relays and the output coils.
 - Consecutive 16 points of input relays are needed for monitoring the status of the Uniwire Interface Module and the Uniwire System. Among the allocated input relays, the leading 16 input relays are used for monitoring the status.

(3) Allocation of Register References

- Allocate registers one at a time. The maximum 17 registers can be allocated as the total number of the input registers and the output registers.
- One input register is needed for monitoring the status of the Uniwire Interface Module and the Uniwire System. Among the allocated input registers, the leading register is used for monitoring the status.

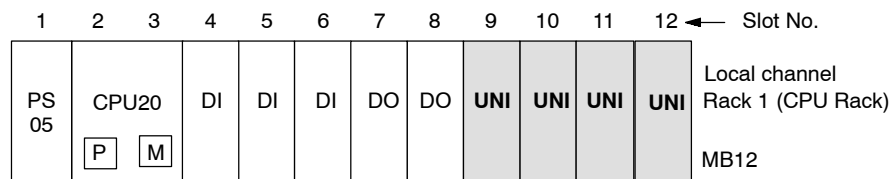
Note The number of Uniwire Interface Modules that can be used depends on the number of digital references or register references that can be allocated according to the above rules.

2) Installation Locations

- A Uniwire Interface Module can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.
- The following diagram shows where to mount a Uniwire Interface Module.

◀EXAMPLE▶

Example



PS05:	Power Supply Module (3 A)	DI:	12/24-VDC 16-point Input Module
CPU20:	CPU Module (16 KW)	DO:	12/24-VDC 16-point Output Module
UNI:	Uniwire Interface Module	MB12:	12-slot Mounting Base

Figure 4.43 Mounting Uniwire Interface Modules

3) Example of System Configuration

EXAMPLE

The following diagram shows an example of the system configuration when a Uniwire Interface Module is used in 200 m mode.

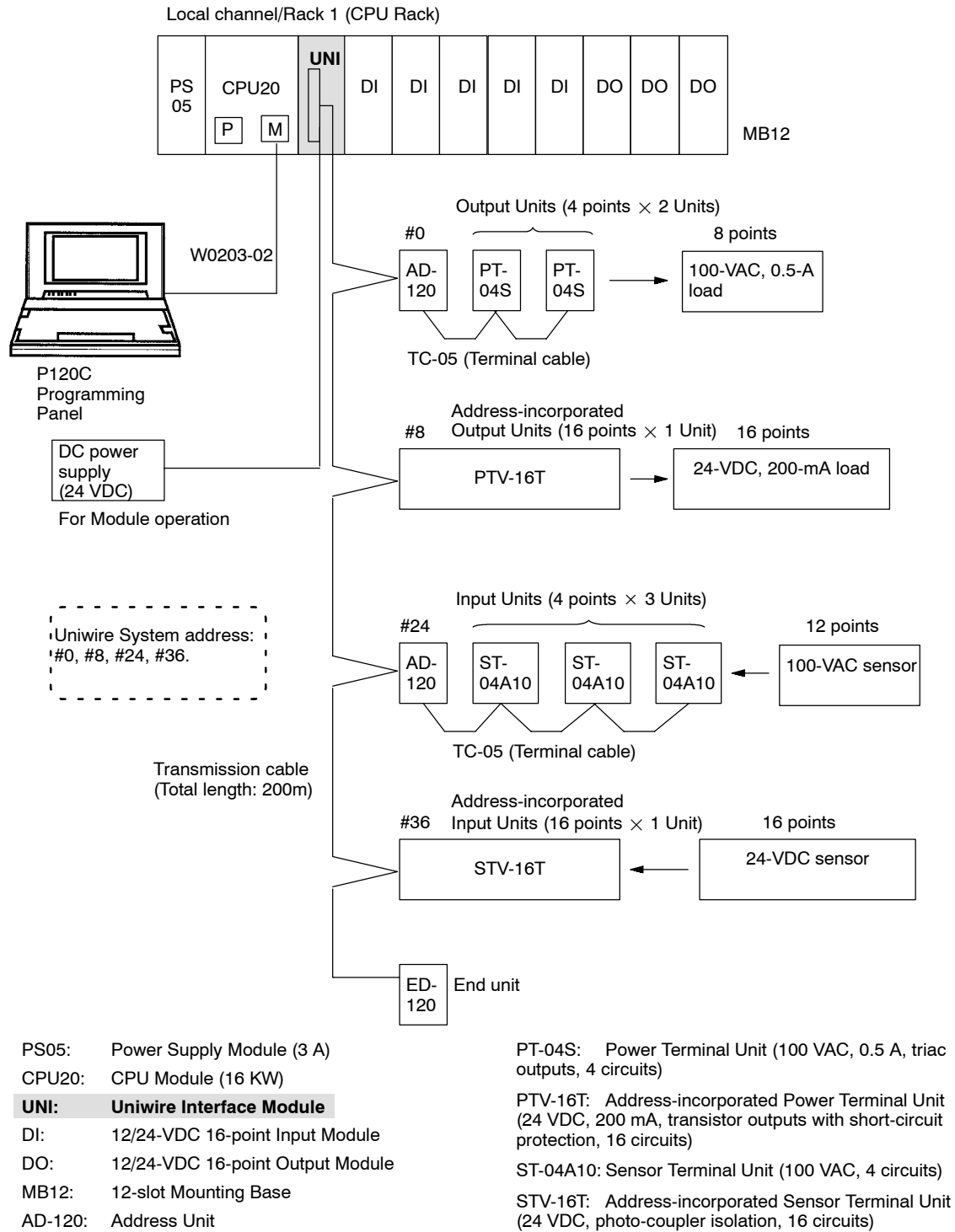


Figure 4.44 System Configuration Example for Uniwire Interface Modules

4) DIP Switch

- a) The DIP switch is composed of 4 pins. The pins are numbered from 1 to 4 as shown in the diagram at the right.
- b) Each pin is turned ON when pressed to the left.
- c) Each pin is effective (read) at the following times:
 - (1) When the reset switch is pressed.
 - (2) When power is turned ON to the Power Supply Module of the Rack to which the Uniwire Interface Module is mounted.
- d) Each pin's function is shown in the table below.

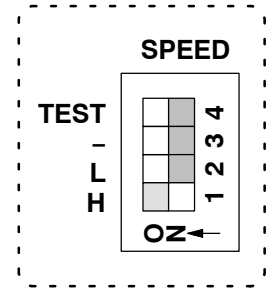


Table 4.69 Function of DIP Switch

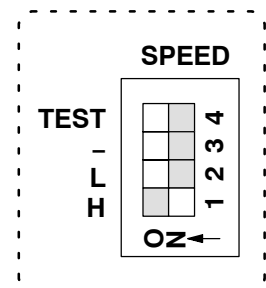
Pin No.	Settings		Function		
			Pin 2	Pin 1	Mode
1 2	Set the mode of the Uniwire Interface Module according to the table on the right.		OFF	ON	Sets Module to 200-m mode. Baud rate: 28.5 kbps Transmission distance: 200 m max.
			ON	OFF	Sets Module to 500-m mode. Baud rate: 14.3 kbps Transmission distance: 500 m max.
3	OFF	Use prohibited. Always set this pin to OFF.			
4	OFF	Reserved for manufacturer's testing purposes. Always set this pin to OFF.			

- Note**
- (1) Never set both pins 1 and 2 simultaneously to ON or simultaneously to OFF. If you set both switches either to ON or OFF by mistake, it will cause a switch setting error.
 - (2) Always leave pins 3 and 4 set to OFF. Setting these pins to ON by mistake may result in incorrect outputs.
- e) An example of how to set the DIP switch is shown below:

◀EXAMPLE▶

Example

Setting the DIP switch as shown in the diagram on the right, the Uniwire Interface Module is set to 200 m mode (baud rate: 28.5 kbps)



5) Reset Switch

- a) Press the reset switch at the following times:
 - (1) When you have changed the setting of the DIP switch.
 - (2) When errors have occurred.
- b) When the reset switch is pressed, communications between the local Uniwire Interface Module and the Uniwire System devices will be interrupted. The communications will restart when the switch is released.

6) Related Manuals

Before operating a Uniwire Interface Module, read the following manual carefully and be sure that you fully understand the information on specifications, application methods, safety precautions, etc.

- *MEMOCON GL120, GL130 Uniwire Interface Module User's Manual*
(SIEZ-C825-20.26)

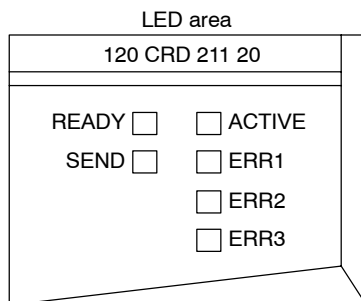
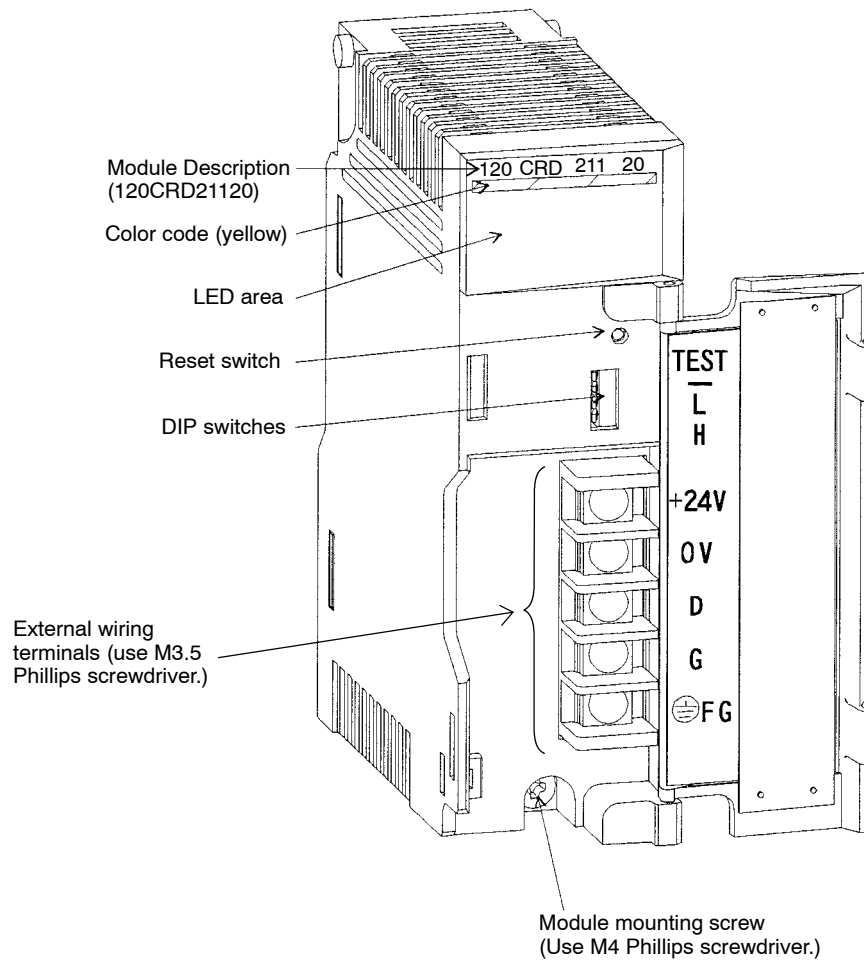
7) Uniwire System

The Uniwire System is a product of NKE Pty Ltd. For detailed information on Uniwire Systems, please read the technical documents and materials issued by NKE Pty Ltd. Yaskawa also markets products for Uniwire Systems. Please contact the following office for details:

Tokyo Office, Yaskawa Control Co., Ltd.
Phone: 03-3907-3171

4.4.9 Uniwire H-system Interface Module

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is being communicated by CPU Module.
SEND	Green	Module is communicating by Uniwire System. (Light flashes.)
ERR1	Red	<ul style="list-style-type: none"> An error has occurred either in the Module or in the Uniwire System. See the following table.
ERR2	Red	
ERR3	Red	

Figure 4.45 Appearance of Uniwire (H) I/F Module

If an error occurs either in the Module or in the Uniwire System, the READY, ERR1, ERR2 and ERR3 indicators will operate as follows:

Type	Error	READY	ERR1	ERR2	ERR3	Remarks
Module error	ROM error	Not lit	Lit	Not lit	Not lit	Checked when power is turned ON.
	RAM error	Not lit	Not lit	Lit	Not lit	
	Internal watchdog timer error	Not lit	Not lit	Not lit	Lit	Checked all the time.
	Switch setting error	Lit	Lit	Lit	Not lit	Checked when power is turned ON.
Unwire system error	D and V24 short-circuited.	Lit	Lit	Not lit	Not lit	Checked all the time.
	D and G short-circuited, or D and G connection reversed.	Lit	Not lit	Lit	Not lit	
	End Unit error or D line disconnected	Lit	Not lit	Not lit	Lit	
	H-System error	Lit	Lit	Not lit	Lit	

2. Function

1) The Uniwire (H) I/F is an interface module compatible with the Uniwire System manufactured by the NKE Corporation to reduce wiring. The Uniwire (H) I/F has the following main functions.

- Communications with Uniwire System I/O Terminal Units
- Address detection of I/O Terminal Units with errors (for H-System)
- Notification to the CPU Module of information on I/O Terminal Units for which errors have been detected (for H-System)

2) Interface Function

The Uniwire (H) I/F can be set for either a Normal System or a H-System. Both Normal System and H-System I/O Terminal Units are available. Contact the NKE Corporation for details on I/O Terminal Units.

3. Specifications

1) Hardware Specifications

The following table shows the hardware specifications of the Uniwire (H) I/F.

Table 4.70 Hardware Specifications

Items	Specifications
Name	Uniwire H-System Interface Module
Model Name	UNIWIRE (H) I/F
Model No.	JAMSC-120CRD21120
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Approximate Mass	300 g
Internal Current Consumption	200 mA max. at 5 VDC
Maximum Heating Value	8.2 W
Hot Swapping (Removal/Insertion under Power)	Permitted (But, an external power supply switch must be installed.)
External Power Supply	For Uniwire transmission: <ul style="list-style-type: none"> ● 22.8 to 26.4 VDC; ripple: 0.5V_{p-p} ● 200 mA (Power supply to Uniwire System devices not included.) <p>Note The H-System broken line detection function will not function if the power supply for Uniwire transmissions is turned OFF when an error occurs.</p>
External Connections	Terminal block with M3.5 screw terminal
Mounting Location	Any slot of any Rack.

4

2) Performance Specifications

The following table shows the communications specifications of the Uniwire (H) I/F.

Table 4.71 Communications Specifications

Item	Specifications	
	H-System	Normal System
Communications Method	Interactive time-sharing multiplex	
Synchronization Method	Bit synchronous	
Protocol	H-System Protocol	Uniwire Protocol
Transmission Medium	Twisted-pair cable: 0.5 mm ² min.	
Transmission Distance	Set on DIP switch 500 m mode: 500 m max. 200 m mode: 200 m max.	Set on DIP switch 500 m mode: 500 m max. 200 m mode: 200 m max.
Baud Rate	Depends on transmission distance mode 500 m mode: 14.7 kbps 200 m mode: 29.4 kbps	Depends on transmission distance mode 500 m mode: 14.3 kbps 200 m mode: 28.5 kbps
Refresh Time	9.3 ms for 256 transmission points in transmission distance 200 m mode	9.3 ms for 256 transmission points in transmission distance 200 m mode
ID Bit Length	8 bits	No ID bits
Number of Stations	50 max. Up to 50 Address Units or Address-incorporated I/O Units can be connected.	
Maximum Number of Transmission Points	256 points, 1 register is 16 points.	
Maximum Number of Allocated Points	368 points, 1 register is 16 points. This is the total of the transmission points and items 1 and 2, below. 1. An input register and 16 input relays are used to monitor the Uniwire (H) I/F and Uniwire System status. 2. For the H-System, six input registers are used to monitor error information on I/O Units.	272 points, 1 register is 16 points. This is the total of the transmission points and item 1, below. 1. An input register and 16 input relays are used to monitor the Uniwire (H) I/F and Uniwire System status. Note The Normal System does not support a function to monitor error information on I/O Units.

Caution Transmitting Numerical or Coded Data

The Uniwire System detects transmission errors by rechecking bit status. For this reason, bits for which errors are detected are not changed and the status that is transferred may be incorrect. Check or retransfer data when a transmission error occurs.

4. Using Uniwire H-system Interface Module

1) Number of Modules

a) A Uniwire (H) I/F runs communications with Uniwire System devices using I/O references, such as input relays, output coils, input registers, and output registers. For this reason, I/O allocation is necessary for the slot to which Uniwire (H) I/F is mounted.

(1) Digital references (input relays and output coils) and register references (input registers and output registers) are allocated. Both digital and register references can be allocated together.

(2) The number of points allocated to the Uniwire (H) I/F depends on whether it is used for a Normal System or a H-System.

- H-System

The maximum number of allocated points is the points used for Uniwire status and the points used for H-System status added to the number of transmission points.

- Normal System

The maximum number of allocated points is the points used for Uniwire status added to the number of transmission points.

b) The number of Uniwire (H) I/F that can be used depends on how many digital and register references are allocated according to the above stipulations.

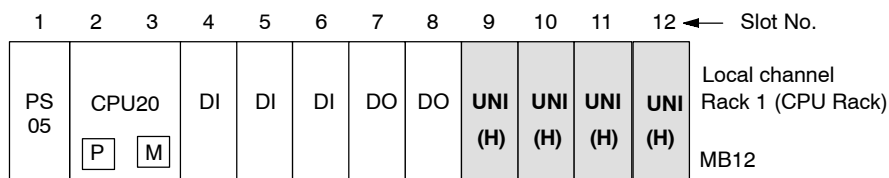
2) Installation Locations

a) A Uniwire (H) I/F can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.

b) The following diagram shows where to mount a Uniwire (H) I/F.

◀EXAMPLE▶

Example



PS05: AC Input Power Supply Module (3 A)

CPU20: CPU Module (16 KW)

UNI(H): Uniwire H-System Interface Module

DI: 12/24-VDC 16-point Input Module

DO: 12/24-VDC 16-point Output Module

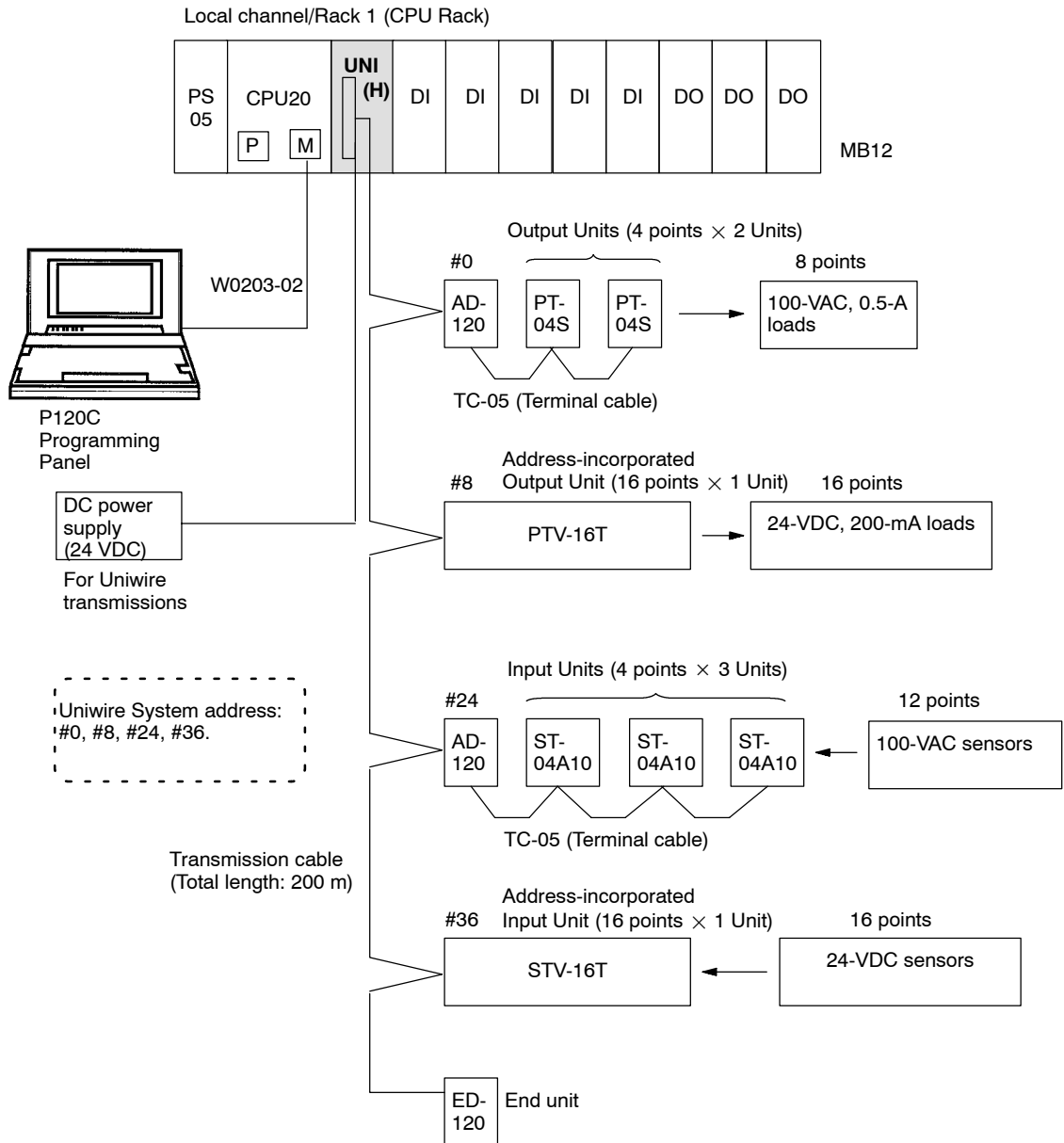
MB12: 12-slot Mounting Base

Figure 4.46 Mounting Uniwire (H) I/F

3) Example of Normal System Configuration



The following diagram shows an example of the system configuration when a Uniwire (H) I/F is used in Normal System 200-m mode.



- PS05: AC Input Power Supply Module (3 A)
- CPU20: CPU Module (16 KW)
- UNI(H): Uniwire H-System Interface Module**
- DI: 12/24-VDC 16-point Input Module
- DO: 12/24-VDC 16-point Output Module
- MB12: 12-slot Mounting Base
- AD-120: Address Unit

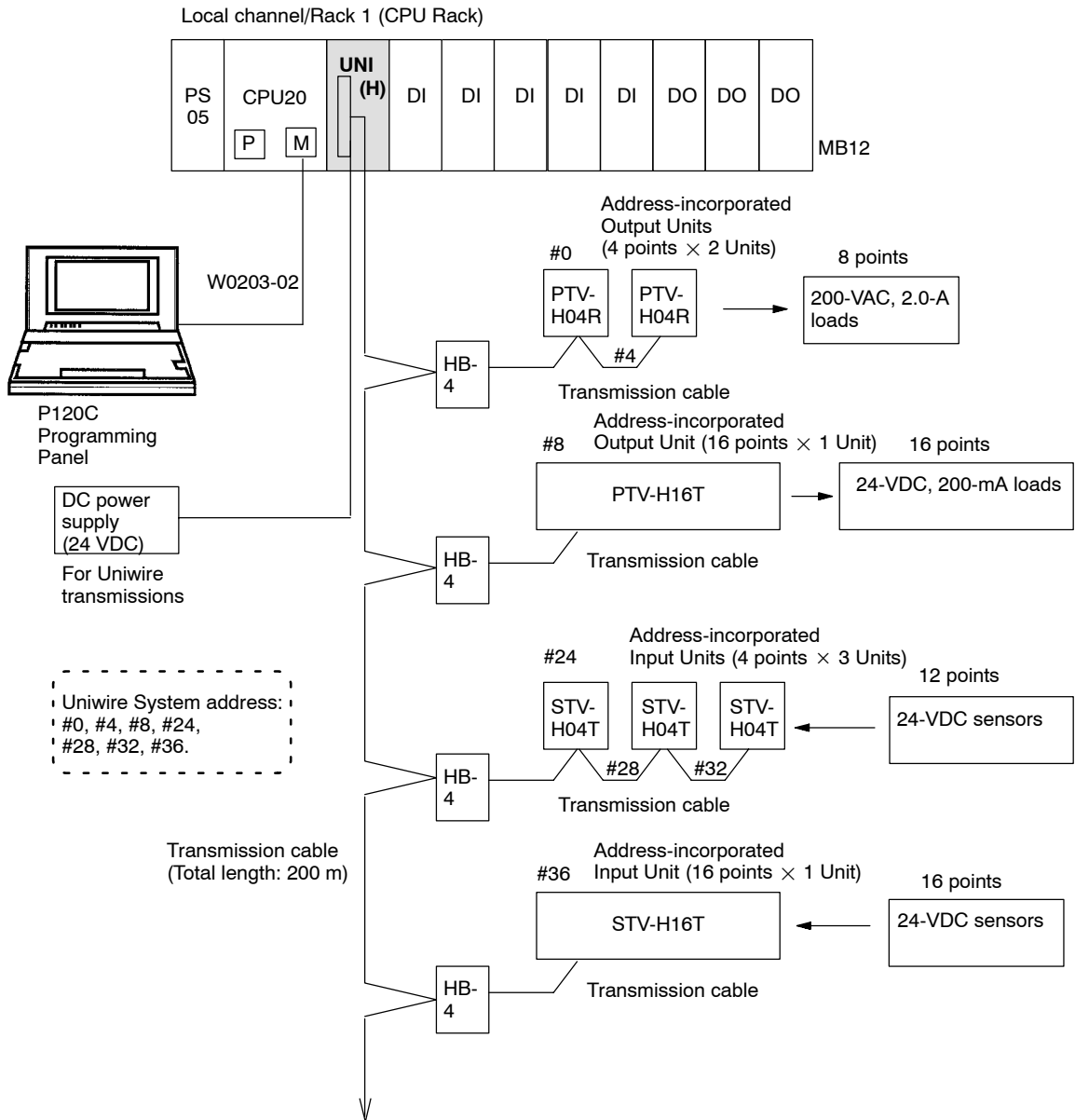
- PT-04S: Power Terminal Unit (100 VAC, 0.5 A, triac outputs, 4 circuits)
- PTV-16T: Address-incorporated Power Terminal Unit (24 VDC, 200 mA, transistor outputs with short-circuit protection, 16 circuits)
- ST-04A10: Sensor Terminal Unit (100 VAC, 4 circuits)
- STV-16T: Address-incorporated Sensor Terminal Unit (24 VDC, photocoupler isolation, 16 circuits)

Figure 4.47 Normal System Configuration Example

4) Example of H-System Configuration

EXAMPLE

The following diagram shows an example of the system configuration when a Uniwire (H) I/F is used in H-System 200 m mode.



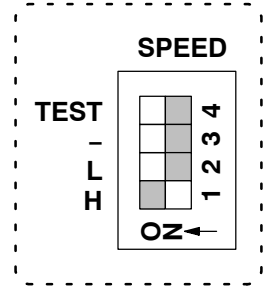
- PS05: AC Input Power Supply Module (3 A)
- CPU20: CPU Module (16 KW)
- UNI(H): Uniwire H-System Interface Module**
- DI: 12/24-VDC 16-point Input Module
- DO: 12/24-VDC 16-point Output Module
- MB12: 12-slot Mounting Base
- HB-4: Branching Unit

- PTV-H04R: Address-incorporated Power Terminal Unit (200 VAC, 2.0 A, relay contact outputs, 4 circuits)
- PTV-H16T: Address-incorporated Power Terminal Unit (24 VDC, 200 mA, transistor outputs with short-circuit protection, 16 circuits)
- STV-H04T: Address-incorporated Sensor Terminal Unit (24 VDC, photocoupler isolation, 4 circuits)
- STV-H16T: Address-incorporated Sensor Terminal Unit (24 VDC, photocoupler isolation, 16 circuits)

Figure 4.48 H-System Configuration Example

5) DIP Switch

- a) The DIP switch is composed of 4 pins. The pins are numbered from 1 to 4 as shown in the diagram at the right.
- b) Each pin is turned ON when pressed to the left.
- c) Each pin is effective (read) at the following timings:



- (1) When the reset switch is pressed.
 - (2) When power is turned ON to the Power Supply Module of the Rack to which the Uniwire (H) I/F is mounted.
- d) Each pin's function is shown in the table below.

Table 4.72 Function of DIP Switch

Pin No.	Settings		Function		
	Pin 2	Pin 1	Mode		
4	OFF	Reserved for manufacturer's testing purposes. Always set this pin to OFF.			
3	OFF	Use prohibited. Always set this pin to OFF.			
2	Set the mode of the Uniwire (H) I/F according to the table on the right.		Pin 2	Pin 1	Mode
1			OFF	ON	Sets Module to 200-m mode. Transmission distance: 200 m max. The baud rate depends on the combination of the transmission distance mode and the interface mode. Baud rate: H-System 29.4 kbps Normal System 28.5 kbps
			ON	OFF	Sets Module to 500-m mode. Transmission distance: 500 m max. The baud rate depends on the combination of the transmission distance mode and the interface mode. Baud rate: H-System 14.7 kbps Normal Sywtem 14.3 kbps

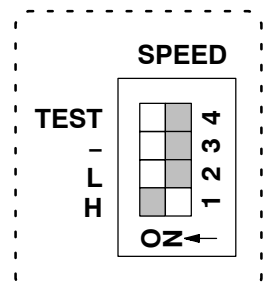
- Note**
- (1) Never set both pins 1 and 2 simultaneously to ON or simultaneously to OFF. If you set both pins either to ON or OFF by mistake, it will cause a pin setting error.
 - (2) Always leave pins 3 and 4 set to OFF. Setting these pins to ON by mistake may result in incorrect outputs.

An example of setting the DIP switch

◀EXAMPLE▶

Example

Setting the DIP switch as shown in the diagram on the right, the Uniwire (H) I/F is set to 200-m mode (baud rate: 29.4 or 28.5 kbps).



6) Reset Switch

- a) Press the reset switch at the following times:
- (1) When you have changed the setting of the DIP switch.
 - (2) When errors have occurred.
- b) When the reset switch is pressed, communications between the Uniwire (H) I/F and the Uniwire System devices will be interrupted. The communications will restart when the switch is released.

7) Related Manuals

Before operating a Uniwire Interface Module, read the following manual carefully and be sure that you fully understand the information on specifications, application methods, safety precautions, etc.

- *MEMOCON GL120, GL130 Uniwire Interface Module User's Manual*
(SIEZ-C825-20.26)

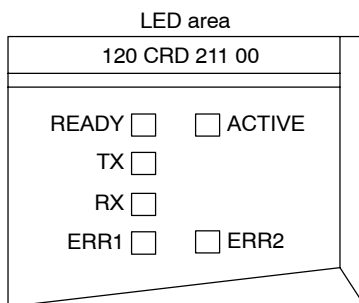
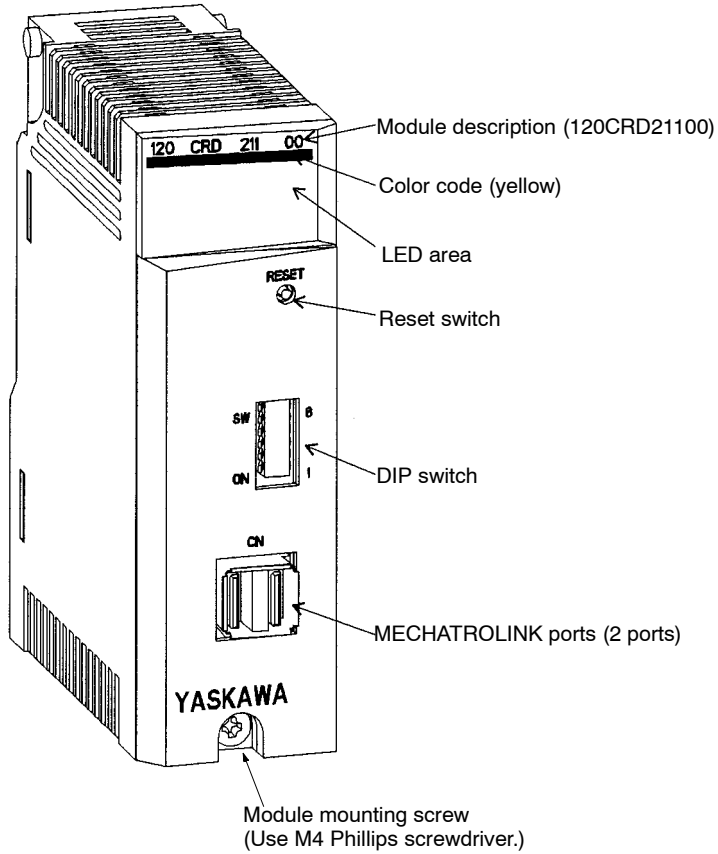
8) Uniwire System

The Uniwire System is a product of NKE Pty Ltd. For detailed information on Uniwire Systems, please read the technical documents and materials issued by NKE Pty Ltd. Yaskawa also markets products for Uniwire Systems. Please contact the following office for details:

Tokyo Office, Yaskawa Control Co., Ltd.
Phone: 03-3907-3171

4.4.10 Distributed I/O Driver Module

1. Appearance



LED	Color	Indication when ON
READY	Green	Distributed I/O Driver Module is normal.
TX	Green	Distributed I/O Driver Module is sending data.
RX	Green	Distributed I/O Driver Module is receiving data.
ACTIVE	Green	Distributed I/O Driver Module is communicating with the CPU Module.
ERR1	Red	An error has occurred in communications.
ERR2	Red	An internal operation error has occurred in the Distributed I/O Driver Module.

Figure 4.49 Appearance of Distributed I/O Driver Module

When a status error occurs, the READY indicator is not lit and the ERR 2 indicator displays according to the following table.

Details on indicator displays when an allocation error occurs are also shown in the following table.

Error	READY Status	ERR2 Status	ERR2 Indication
ROM error	Not lit	Flashing	ERR 2 repeats a cycle of flashing once, and being not lit for 1 s.
RAM error	Not lit	Flashing	ERR 2 repeats a cycle of flashing twice, and being not lit for 1 s.
Watchdog timer error	Not lit	Flashing	ERR 2 repeats a cycle of flashing three times, and being not lit for 1 s.
Allocation error	Lit	Lit	---

2. Function

The Distributed I/O Driver Module functions as a station of a VINUS I/O System.


3. Specifications

The specifications of the Distributed I/O Driver Module are shown in the following table.

Table 4.73 Specification of Distributed I/O Driver Module

Item	Specifications
Model Name	VIOD
Model No.	JAMSC-120CRD21100
External Dimensions	40.3 x 130 x 103.9 mm (W x H x D)
Approximate Mass	300 g
Internal Current Consumption	200 mA
Maximum Heating Value	1.5 W
Hot Swapping (Removal/Insertion Under Power)	Permitted
Mounting Location	Any slot of any Rack of local channel.

Item	Specifications	
MECHATROLINK Port Specifications	Topology	Bus
	Media Access Control Method	Multi-drop (1: n communications)
	Media (Transmission Media)	Shielded twisted-pair cable (120 Ω)
	Protocol	MECHATROLINK
	Synchronization	Frame synchronization
	Communications Format	Conforms to HDLC
	Baud Rate	4 Mbps
	Transmission Distance	200 m max.
	No. of I/O Modules	30 max.
	No. of I/O Points/Stations (Input Points + Output Points)	128 input points, 128 output points Registers: 16 points each
	Max. No. of Allocated Points (For one Distributed I/O Driver Module)	1) 480 input points, 512 output points Registers: 16 points each 2) Two input registers are used to monitor distributed I/O status.
	Refresh Time	The refresh time depends on the number of slave stations as follows: 15 or less: 2 ms 16 or more: 4 ms (Baud rate: 4 Mbps)
	Watchdog Timer	45 ms Communications are stopped when a timeout occurs.

 **Caution** The VINUS I/O System can be set to a redundant check mode for input data. When “Recheck Verification” is set, data is rechecked in bit units to detect transmission errors. For this reason, signals that are ON for only one refresh period will not be refreshed and data transmission errors may occur for short signals.

4. Using Distributed I/O Driver Modules

1) Number of Modules

- a) A Distributed I/O Driver Module runs communications with VINUS I/O System devices using I/O references such as input relays, output coils, input registers and output registers. For this reason, I/O allocation is necessary for the slot to which the Distributed I/O Driver Module is mounted.
- b) The maximum numbers of points that can be allocated for each Distributed I/O Driver module are as follows. Input references and output references can be allocated together.

Input references: Digital input points + register input points ≤ 480 points
(One register is 16 points)

Output references: Digital output points + register output points ≤ 512 points
(One register is 16 points)

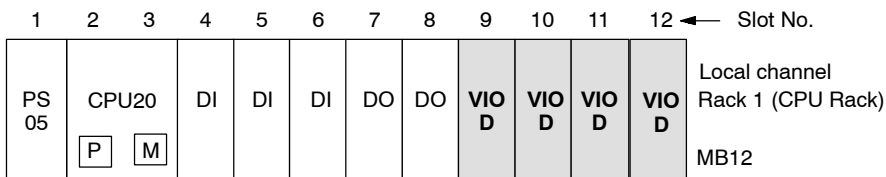
- c) The number of Distributed I/O Driver Modules that can be used depends on the number of the above I/O references that can be allocated by the CPU module.

2) Installation Locations

- a) A Distributed I/O Driver Module can be mounted to any slot on any rack on the Mounting Base of the local channel. It will occupy 1 slot of the rack.
- b) The following diagram shows where to mount a Distributed I/O Driver Module.

EXAMPLE

Example

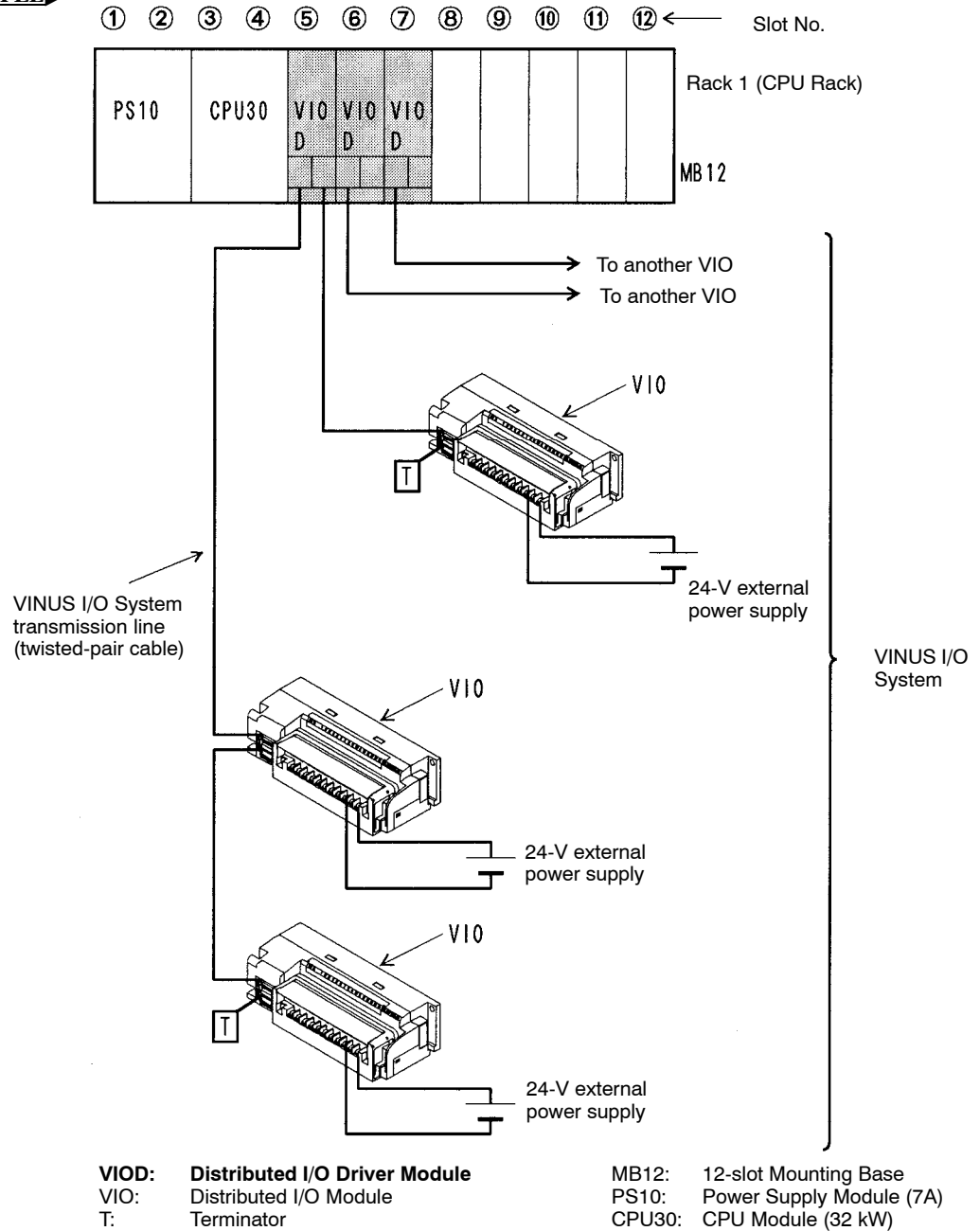


- PS05: Power Supply Module (3 A)
- CPU20: CPU Module (16 KW)
- VIOD: Distributed I/O Driver**
- DI: 12/24-VDC 16-point Input Module
- DO: 12/24-VDC 16-point Output Module
- MB12: 12-slot Mounting Base

Figure 4.50 Mounting Distributed I/O Driver Modules

3) System Configuration

◀EXAMPLE▶



4

Figure 4.51 VINUS System Configuration Example

4) MECHATROLINK Port

A Distributed I/O Driver Module connected to the MECHATROLINK port can perform high-speed communications at a baud rate of 4 Mbps with up to 30 Distributed I/O Modules (slaves) over a transmission distance of up to 200 m.

5) DIP Switch

- a) The DIP switch consists of 6 pins. The pins are numbered from 1 to 6 as shown in the diagram.
- b) Each pin is turned ON when pressed to the left.
- c) Each pin becomes effective at the following times.
 - (1) When the reset switch is pressed.
 - (2) When power is supplied to the Power Supply Module on the rack on which the Distributed I/O Driver Module is mounted.
- d) The function of each pin is shown in the following table.

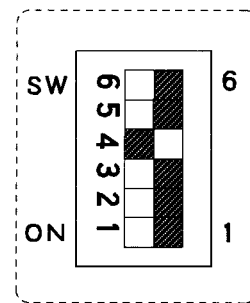


Table 4.74 Function of DIP Switch

Pin	Setting	Function		
1	ON	Internal terminator (terminating resistor) is connected.		
	OFF	Internal terminator (terminating resistor) is not connected.		
2	ON	For future use. Set this pin to OFF.		
	OFF			
3	ON	Sets Module to Self-diagnosis Mode.		
	OFF	Sets Module to RUN Mode.		
4	ON	Input data is held when a communications error occurs.		
	OFF	Input data is cleared to 0 when a communications error occurs.		
5	Sets the baud rate of the VINUS I/O System as shown at the right.	Pin 5	Pin 6	Baud rate
		OFF	OFF	4 Mbps
ON		OFF	For future use.	
6		OFF	ON	For future use.
	ON	ON	For future use.	

Note Always set DIP switch pin 3 to OFF. If the Module is used while pin 3 is ON, it may cause an output error.

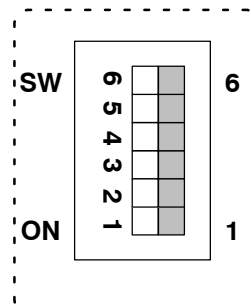
- e) Examples of setting the DIP switch are shown below:

◀EXAMPLE▶

Example 1

When the DIP switch is set as shown in the diagram on the right, the Distributed I/O Driver Module is set as follows:

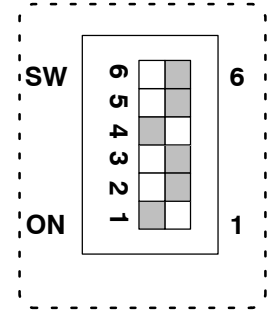
- Internal terminator is not connected.
- Normal RUN mode
- Clear mode
- 4 Mbps



Example 2

When the DIP switch is set as shown in the diagram on the right, the Distributed I/O Driver Module is set as follows:

- Internal terminator is not connected.
- Normal RUN mode
- Hold mode
- 4 Mbps

**6) Reset Switch**

a) Press the reset switch in the following cases:

- (1) When you have changed the setting of the DIP switch.
- (2) When errors have occurred.

b) When the reset switch is pressed, communications between the Distributed I/O Driver Module and other Distributed I/O Slave Modules are interrupted. Communications restart when the switch is released.

7) CPU Module Versions

The CPU Module and MEMOSOFT versions that are required to use a 2000-Series Remote I/O Driver Module are shown in the following table.

Table 4.75 Versions Supporting the Distributed I/O Driver Module

Name	Model Name	Model No.	Version Number	Location of Version Number
CPU Module (8 kW)	CPU10	DDSCR-120CPU14200	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
CPU Module (16 kW)	CPU20	DDSCR-120CPU34100	<input type="checkbox"/> <input type="checkbox"/> B05 onwards	
	CPU21	DDSCR-120CPU34110	<input type="checkbox"/> <input type="checkbox"/> A02 onwards	
CPU Module (32 kW)	CPU30	DDSCR-130CPU54100	<input type="checkbox"/> <input type="checkbox"/> B05 onwards	
CPU Module (40 kW)	CPU35	DDSCR-130CPU54110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	
Remote I/O Receiver Module	RIOR COAX	JAMSC-120CRR13100	<input type="checkbox"/> <input type="checkbox"/> A09 onwards	
MEMOSOFT		FMSGGL-AT3 (for English DOS)	1.40 <input type="checkbox"/> onwards	In the middle at the bottom of the MEMOSOFT startup screen.
		FMSGGL-PP3E (for P120 English version)		

Note The nameplate is on the right side of the Module.

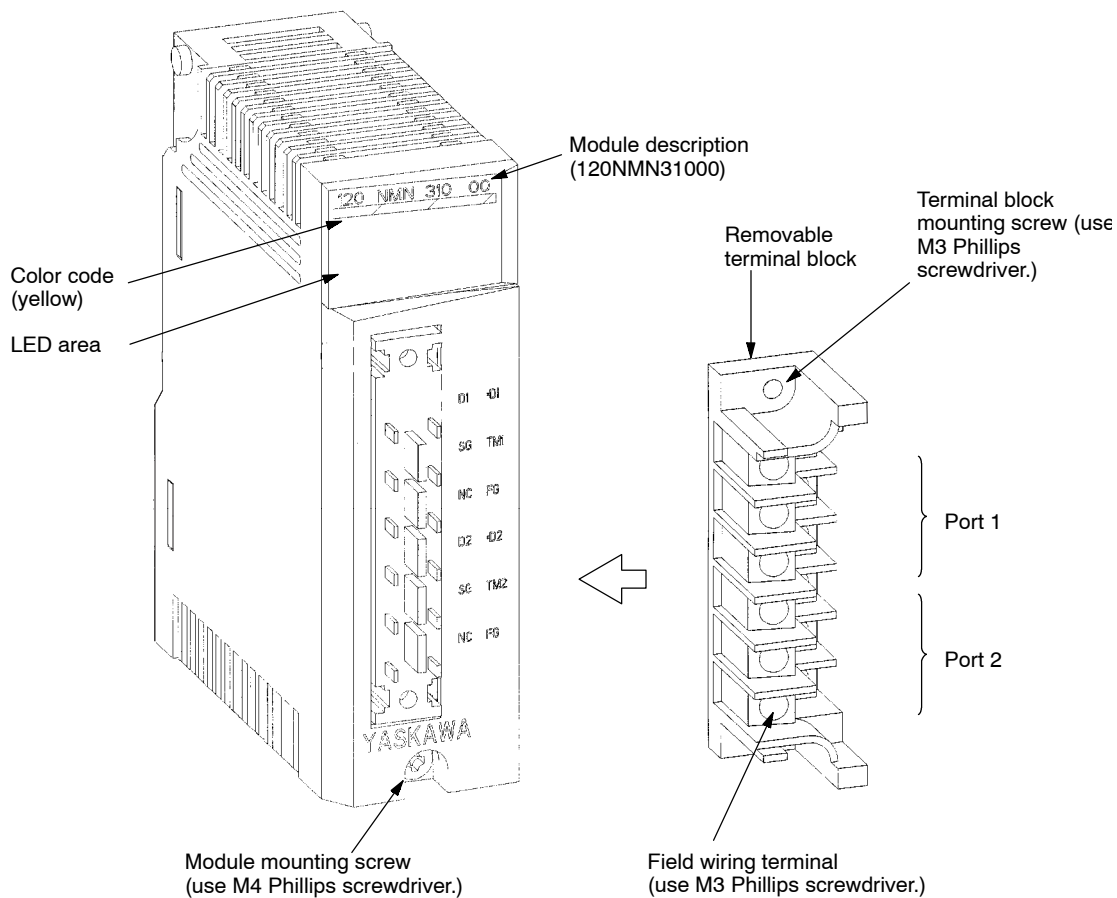
8) Related Manuals

Before operating your Distributed I/O Driver Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

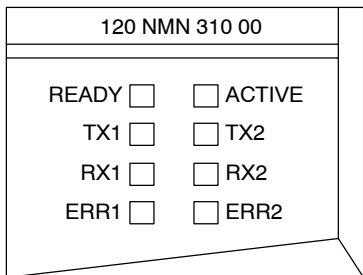
MEMOCON GL120, GL130 Distributed I/O Driver Module User's Manual (SIEZ-C825-70.29)

4.4.11 M-NET Module

1. Appearance



LED Area
120 NMN 310 00



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is being serviced by CPU Module.
TX1	Green	Module is sending data from port 1.
RX1	Green	Module is receiving data from port 1.
ERR1	Red	An error has occurred in the Module transmission from port 1.
TX2	Green	Module is sending data from port 2.
RX2	Green	Module is receiving data from port 2.
ERR2	Red	An error has occurred in the Module transmission from port 2.

Figure 4.52 Appearance of M-NET Module

2. Function

The M-NET Module functions as a station of an M-NET System.

3. Specifications

The specifications of the M-NET Module are shown in the following table.

Table 4.76 Specification of M-NET Module

Item	Specifications
Name	M-NET Module
Model Name	M-NET
Model No.	JAMSC-120NMN31000
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm (Depth is 143.35 mm including connector terminals.)
Approximate Mass	300 g
Internal Current Consumption	300 mA
Maximum Heating Value	1.5 W
Hot Swapping (Removal/Insertion Under Power)	Permitted
Mounting Location	Any slot of any Rack.

Item	Specification		
Communications Ports Specifications	Number of Ports	2	
	Communications Method	Half-duplex, start-stop synchronization	
	Transmission Level	Conforms to RS-422	
	Media (Transmission Medium)	JKEV-SB 0.75 mm ² x 2P: Polyethylene-insulated cable with copper braid shield Note JKEV-SB conforms to the specifications of the Japanese Electric Wire and Cable Makers' Association.	
	Baud Rate	9.6, 19.2, 38.4, or 57.6 Kbps	
	Number of Stations	15 Slaves max.	
	Station Address	1 to 15 Note 1 to 7 when B1086 and B2806 are used as Slaves	
	Transmission Distance	Up to 1 km (total length)	
	Data Format	Transmission between Master and Slave is in the following data format: 1) Start bits: 1 2) Data bit length: 7 3) Parity check: Yes 4) Parity: Even 5) Stop bits: 1	
	Transmission Error Detection	Detects vertical parity (even parity) Detects horizontal parity (even parity)	
	Transmission Mode	T Mode	Y Mode
	Number of Digital Transmission Points	Input points: 256 Output points: 256	Input points: 256 Output points: 256
	Number of Register Transmission Points	Input registers: 0 Output registers: 0	Input registers: 15 Output registers: 15
	Error Measures (RAS)	Automatic removal and recovery function for error stations: None	Automatic removal and recovery function for error stations: Yes
Insulation Method	Photocoupler		
External Connection	Removable terminal block with M3 screw terminals		

4. Using M-NET Modules

1) Number of Modules

- a) Communications between M-NET Modules are performed using I/O references, such as input relays, output coils, input registers, and output registers. Therefore, I/O must be allocated for the slot to which the M-NET Module is mounted according to the following rules.

- b) The maximum numbers of points and registers that can be allocated for the M-NET Module master (total of ports 1 and 2) are as follows:
- (1) The maximum numbers of I/O points and registers that can be allocated for the M-NET Module master (total of ports 1 and 2) are 64 input bytes and 64 output bytes.
 - (2) Digital references (input relays) and register references (input registers) are allocated to the master station in Y mode as input references. Input relays and input registers can be allocated together.
 - Digital input references (input relays) ≤ 256 points
 - Register input references (input registers) ≤ 15 registers
 - (3) Digital references (input relays) are allocated to the master station in T mode as input references. Input registers cannot be allocated.
 - Digital input references (input relays) ≤ 256 points
 - (4) Digital references (output coils) and register references (output registers) are allocated to the master station in Y mode as output references. The allocation of output coils and output registers can be mixed.
 - Digital output references (output coils) ≤ 256 points
 - Register output references (output registers) ≤ 15 registers
 - (5) Digital references (output coils) are allocated to the master station in T mode as output references. Output registers cannot be allocated.
 - Digital output references (output coils) ≤ 256 points
- c) The number of M-NET Modules that can be connected depends on the number of the above I/O references that can be allocated by the CPU Module.

2) Installation Locations

- a) An M-NET Module can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.
- b) The following diagram shows where to mount an M-NET Module.

◀EXAMPLE▶

Example

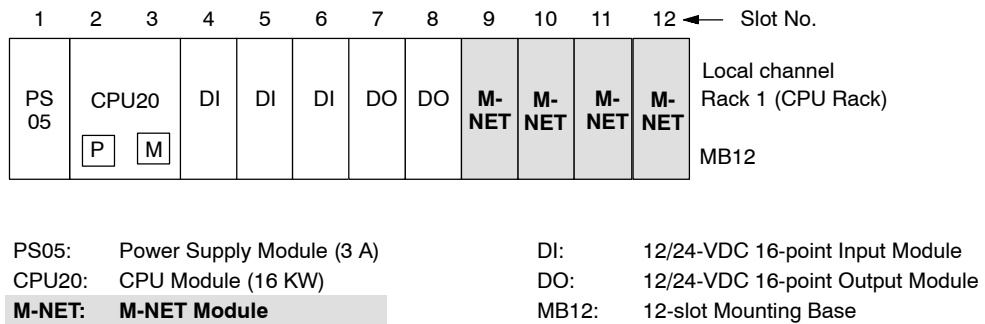


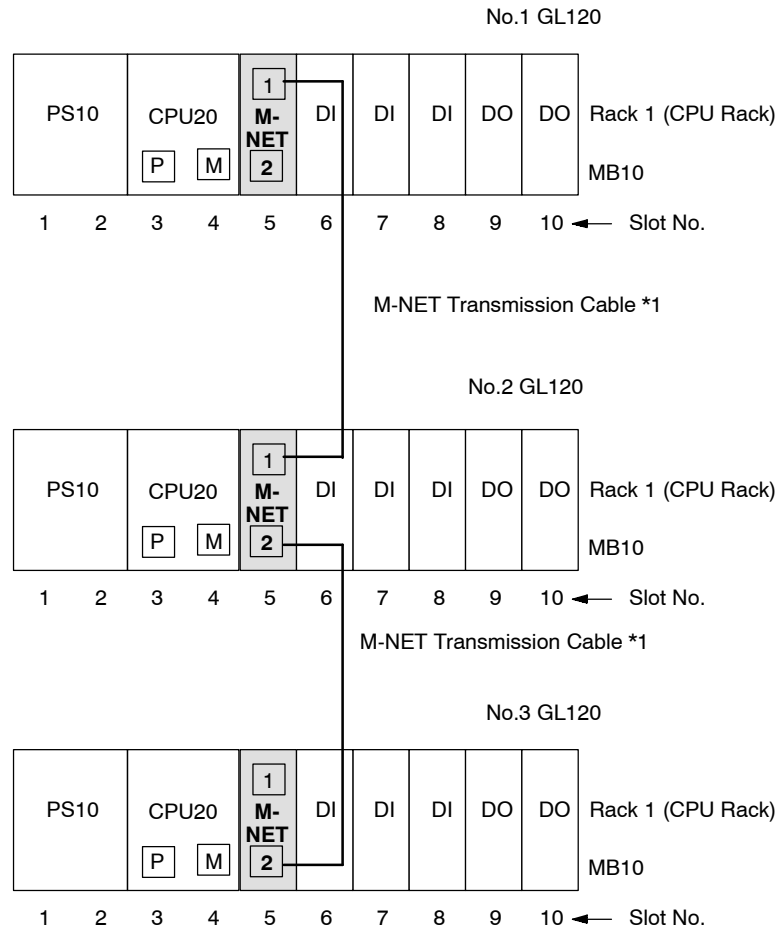
Figure 4.53 Mounting M-NET Modules

3) M-NET Communication Port

- a) An M-NET Module runs, via the M-NET communication ports, high-speed communications (57.6 kbps) with up to 15 M-NET Modules. Transmission is possible for up to 1 km maximum (total extended distance).
- b) A connection example of M-NET Modules is shown on the next page.

◀ **EXAMPLE** ▶

Example
Connection of M-NET Module



PS10: Power Supply Module (7 A)
 CPU20: CPU Module (16 KW)
 MB10: 10-slot Mounting Base
 DI: 12/24-VDC 16-point Input Module
 DO: 12/24-VDC 16-point Output Module

M-NET: M-NET Module

M-NET Transmission Cable:
 JKEV-SB 0.75 mm² x 2P (polyethylene-insulated cable with copper braid shield)

Figure 4.54 Connection of M-NET Module

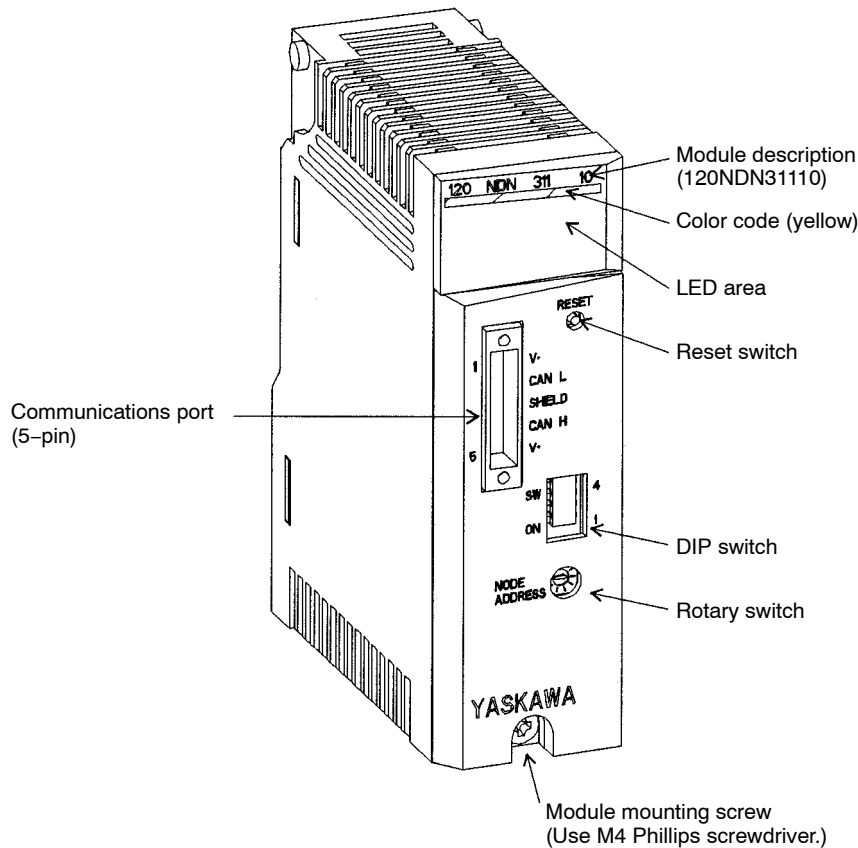
4) Related Manuals

Before operating your M-NET Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

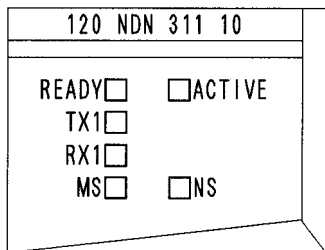
MEMOCON GL120, GL130 M-NET Module User's Manual (SIEZ-C825-70.12)

4.4.12 YENET 1600-D Module

1. Appearance



LED Area



LED	Color	Indication when ON
READY	Green	Module is operating normally.
ACTIVE	Green	Module is processing I/O.
TX1	Green	Module is sending data along the communications line.
RX1	Green	Module is receiving data from the communications line.
MS	Green	Module is operating normally.
	Red	Error has occurred in Module
NS	Green	Network is operating normally.
	Red	Error has occurred in Network.

Figure 4.55 Appearance of YENET 1600-D Module

2. Function

The YENET 1600-D Module functions as station of a YENET 1600-D System.

3. Specifications

1) Module Specifications

Table 4.77 Specifications of YENET 1600-D Module

Item		Specifications			
Name		YENET 1600-D Module			
Model Name		YENET 1600-D			
Model No.		JAMSC-120NDN31110			
External dimensions		Width: 40.3 mm Height: 130 mm Depth: 103.9 mm			
Approximate Mass		300 g			
Internal Current Consumption		250 mA			
Maximum Heating Value		1.9 W			
Hot Swapping (Removal/Insertion Under Power)		Permitted			
External Power Supply Voltage		For communication: 24 VDC, 25 mA			
External Connections		Removable terminal block for field connections (5-pin with flange, made by Phoenix Contact Co, model number MSTB2.5/5-STF-5.08)			
Mounting Location		Any slot of any Rack			
Communications Port Specifications	Connection Method	Multi-drop, T-branch (1:N)			
	Baud Rate	500, 250, or 125 Kbps (selectable)			
	Transmission Medium	Special 5-wire cable (2 signal lines, 2 power lines, 1 shield), or 3-wire cable (separate power cable required)			
	Transmission Distance	Baud Rate	Network Length (Max.)	Drop Line Length (Max.)	Total Drop Line Length (Max.)
		500 Kbps	100 m	6 m	39 m
		250 Kbps	250 m	6 m	78 m
		125 Kbps	500 m	6 m	156 m
	Node Address	0 to 15			
	Number of Units Connected	63 max.			
Status Information	Can be monitored in Monitor Mode				
Transmission Error Detection	CRC errors, duplicate node address check				

2) I/O Specification

The YENET 1600-D Module operates in Master Mode or Slave Mode according to settings made from the MEMOSOFT.

1) Master Mode

Table 4.78 I/O Specifications in Master Mode

Item	Specification
I/O Point Allocations	Inputs: 512 points, Outputs: 512 points (total of both digital and register allocations)
Unit of I/O Allocation per Slave	4 points for both inputs and outputs
I/O Allocation per Slave	Inputs: 256 max. Outputs: 256 max.
Number of Slaves Connected	63 max.
Connectable Slaves	Slaves conforming to DeviceNet

2) Slave Mode

Table 4.79 I/O Specifications in Slave Mode

Item	Specification
I/O Point Allocations	Inputs: 64 max. Outputs: 64 max.
Unit of I/O Allocation	4 points for both inputs and outputs

4. Using YENET 1600-D Modules

1) Number of Modules (in Master Mode)

- a) The YENET 1600-D master uses I/O references, such as input relays, output coils, input registers, and output registers, to communicate with YENET 1600-D slaves and other slave devices that conform to the DeviceNet protocol. Therefore, I/O must be allocated to the slot where the YENET 1600-D master is mounted, according to the following rules.
 - (1) Either digital references (input relays) or register references (input registers) are allocated as input references. Input relays and input registers cannot be allocated together.
 - Input references: Digital inputs or register inputs \leq 512 points
(One register is 16 points)
 - (2) Either digital references (output coils) or register references (output registers) are allocated as output references. Output coils and output registers cannot be allocated together.
- b) The maximum number of I/O points that can be allocated to each YENET 1600-D Module (master) is as follows:

- Output references: Digital outputs or register outputs ≤ 512 points
(One register is 16 points)
- (3) Digital references can be allocated as input references and register references can be allocated as output references. Also, register references can be allocated as input references and digital references can be allocated as output references.
- c) The number of YENET 1600-D masters that can be connected depends on the number of the above I/O references that can be allocated by the CPU Module.

2) Number of Modules (in Slave Mode)

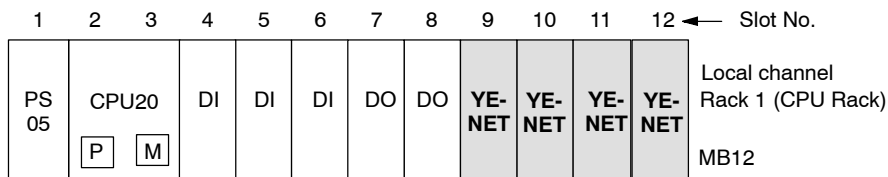
- a) The YENET 1600-D slaves use I/O references, such as input relays, output coils, input registers, and output registers, for communicating with the YENET 1600-D master and other master devices that conform to the DeviceNet protocol. Therefore, I/O must be allocated to the slot where the YENET 1600-D slaves are mounted, according to the following regulations.
- b) The maximum number of I/O points that can be allocated to each YENET 1600-D slave is as follows:
- (1) Either digital references (input relays) or register references (input registers) are allocated as input references. Input relays and input registers cannot be allocated together.
- Input references: Digital inputs or register inputs ≤ 64 points
(One register is 16 points)
- (2) Either digital references (output coils) or register references (output registers) are allocated as output references. Output coils and output registers cannot be allocated together.
- Output references: Digital outputs or register outputs ≤ 64 points
(One register is 16 points)
- (3) Digital references can be allocated as input references and register references can be allocated as output references. Also, register references can be allocated as input references and digital references can be allocated as output references.
- c) The number of YENET 1600-D Modules (slaves) that can be connected depends on the number of the above I/O references that can be allocated by the CPU Module.

3) Installation Location

- a) A YENET 1600-D Module can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.
- b) The following diagram shows where to mount a YENET 1600-D Module.

EXAMPLE

Example



- PS05: Power Supply Module (3 A)
- CPU20: CPU Module (16 KW)
- YENET: YENET 1600-D Module**
- DI: 12/24-VDC 16-point Input Module
- DO: 12/24-VDC 16-point Output Module
- MB12: 12-slot Mounting Base

Figure 4.56 Mounting YENET 1600-D Modules

4) Communications Port

A YENET 1600-D master can use the communications port to communicate with up to 63 YENET 1600-D slaves or other slave devices conforming to DeviceNet at a baud rate of 500 kbps. The transmission distance depends on the baud rate used. If, for example, the baud rate is 500 kbps, it is possible to transmit up to 100 m.

5) System Configuration Examples

a) Master Mode

The following illustration shows the system configuration when using the YENET 1600-D Module in Master Mode.

(1) Multidrop Connections

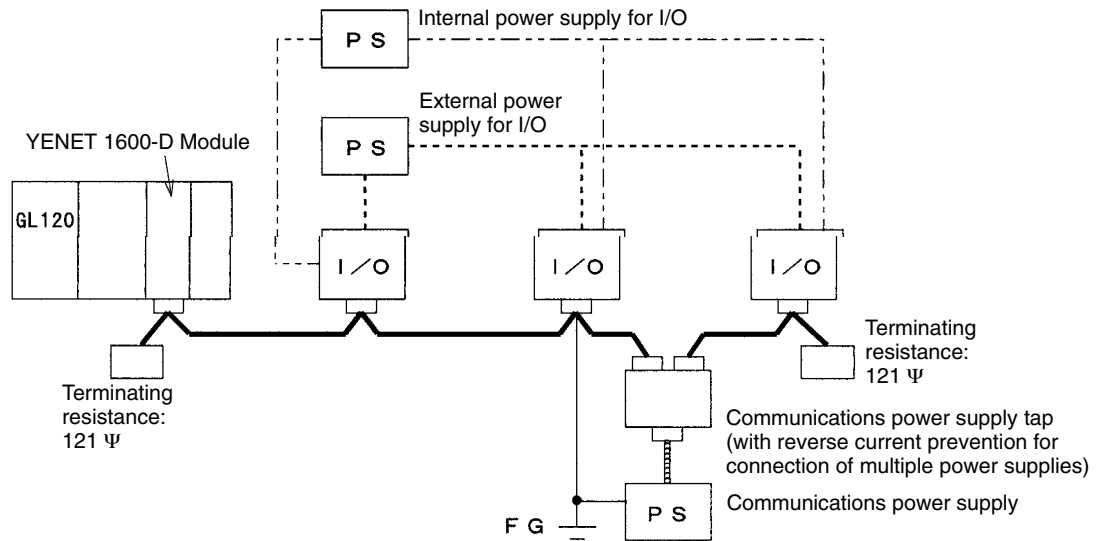


Figure 4.57 System Configuration Example in Master Mode with Multidrop Connections

(2) T-branch, Multi-branch, and Branch Line Branching Connections

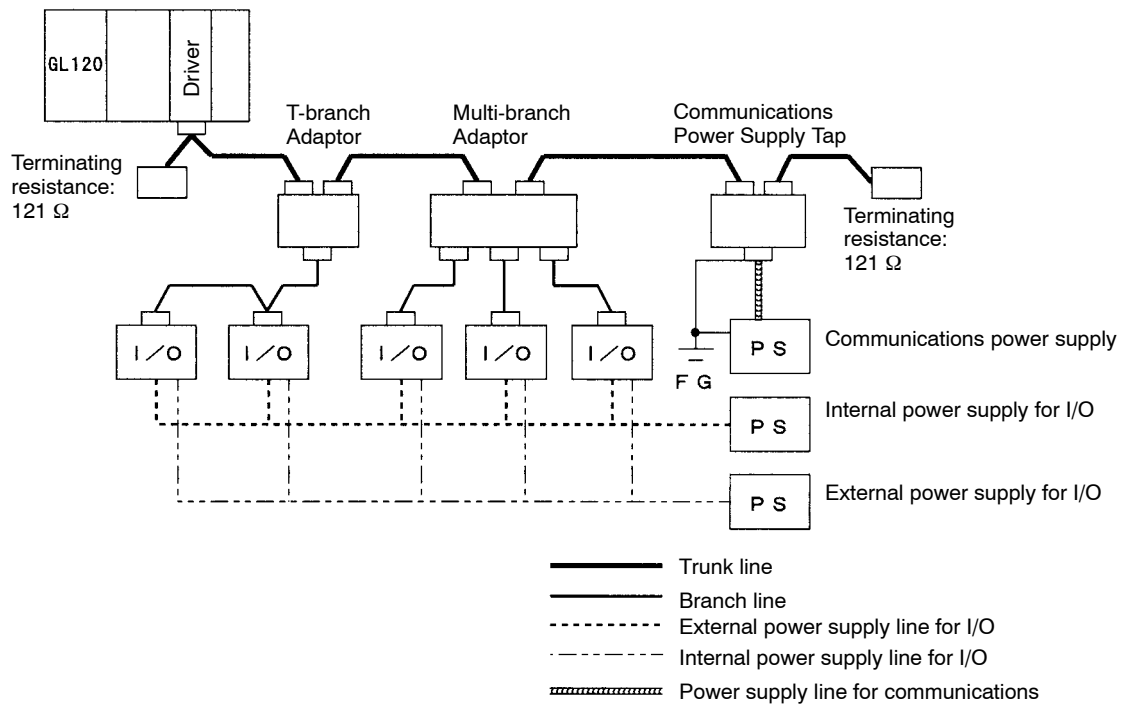


Figure 4.58 System Configuration Example in Master Mode with T-branch, Multi-branch, and Branch Line Branching Connections

4

b) Slave Mode

The following illustration shows the system configuration when using the YENET 1600-D Module in Slave Mode.

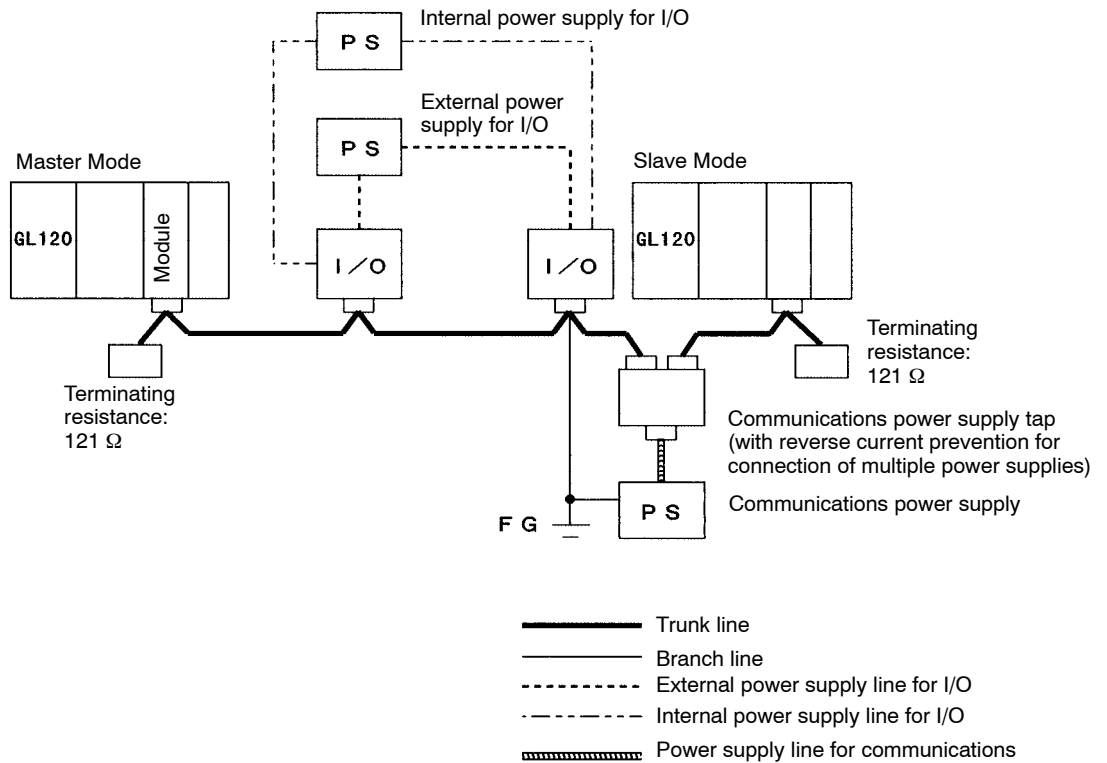
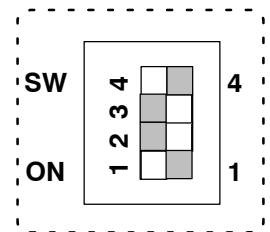


Figure 4.59 System Configuration Example in Slave Mode

6) DIP Switch

a) DIP switch is composed of 4 pins. The pins are numbered from 1 to 4 as shown in the diagram at the right.



b) Each pin is turned ON when pressed to the left.

c) The setting of each pin is effective (read) at the following times:

- (1) When the reset switch is pressed.
- (2) When the power is turned ON to the Power Supply Module of the Rack where the YENET 1600-D Module is mounted.

d) Each pin's function is shown in the following table.

Table 4.80 Function of DIP Switch

Pin No.	Settings	Function		
1 2	Set the baud rate of the YENET 1600-D according to the table on the right.	Pin 2	Pin 1	Baud rate
		ON	ON	Not used
		ON	OFF	500 kbps
		OFF	ON	250 kbps
		OFF	OFF	125 kbps
3	ON	Sets Modules to automatic recovery mode. This will automatically recover data when normal operation is restored after a malfunction has occurred in the communications power supply or in communications.		
	OFF	Sets Modules to manual recovery mode. This allows manual recovery of data after normal operation is restored when a malfunction has occurred in the communications power supply or communications.		
4	ON	Reserved for testing by the manufacturer. This pin must be set to OFF.		
	OFF			

Note Always use MONITOR Mode when manual recovery mode is selected. If MONITOR Mode is set to OFF and a communications error occurs, recovery will not be possible except by resetting the Module.

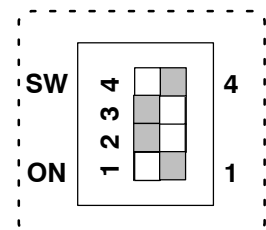
e) Examples of setting the DIP switch are shown below:

EXAMPLE

Example 1

When the DIP switch is set as shown in the diagram on the right, the YENET 1600-D Module is set as follows:

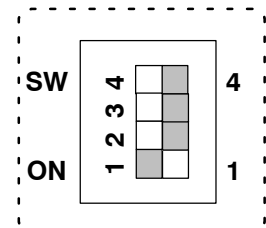
- Automatic recovery mode
- 500 kbps



Example 2

When the DIP switch is set as shown in the diagram on the right, the YENET 1600-D Module is set as follows:

- Manual recovery mode
- 125 kbps

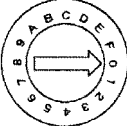


7) Rotary Switch

- The rotary switch is used to set the node addresses of YENET 1600-D Modules.
- There is one rotary switch. The rotary switch has positions from 0 to 9 (Hex).

- c) The setting of the rotary switches is effective when the reset switch is pressed, or when the power is turned ON to Power Supply Module of the Rack where the YENET 1600-D Module is mounted.
- d) The node address is set to between 0 and 15 (0 and F in hexadecimal). The following table shows how to set the node address.

Table 4.81 Setting the Node Address

Example Settings of Node Address	Node Address	Rotary Switch
Rotary switch  NODE ADDRESS	1 to 15	0 to F

- Note**
- (1) Do not use the same node address for more than one node within the same communications circuit. If this occurs, nodes with the same address will not be able to communicate normally.
 - (2) The rotary switch settings will become effective by pressing the reset switch, or turning ON the power to the Power Supply Module of the Rack to which the YENET 1600-D Module is mounted.

8) Reset Switch

- a) Press the reset switch in the following cases:
 - (1) When you have changed the setting of the DIP switch.
 - (2) When you have changed the setting of the rotary switches.
 - (3) When errors have occurred.
- b) When the reset switch is pressed, communications between the YENET 1600-D Module and other YENET 1600-D Modules are interrupted. Communications restart when the switch is released.

9) CPU Module Versions

The CPU Module and MEMOSOFT versions that are required to use the YENET 1600-D Module are shown in the following table.

Table 4.82 Versions Supporting the YENET 1600-D Module

Name	Model Name	Model No.	Version Number	Location of Version Number
CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	□□ A01 onwards	Module nameplate
CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	□□ B05 onwards	
	CPU21	DDSCR-120CPU34110	□□ A01 onwards	
CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	□□ B05 onwards	
CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	□□ A01 onwards	
MEMOSOFT		FMSG-L-AT3 (for English DOS)	1.50□ onwards	In the middle at the bottom of the MEMOSOFT startup screen.
		FMSG-L-PP3E (for P120 English version)		

Note The nameplate is on the right side of the Module.

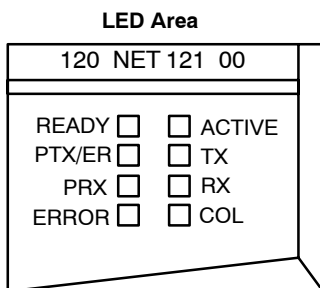
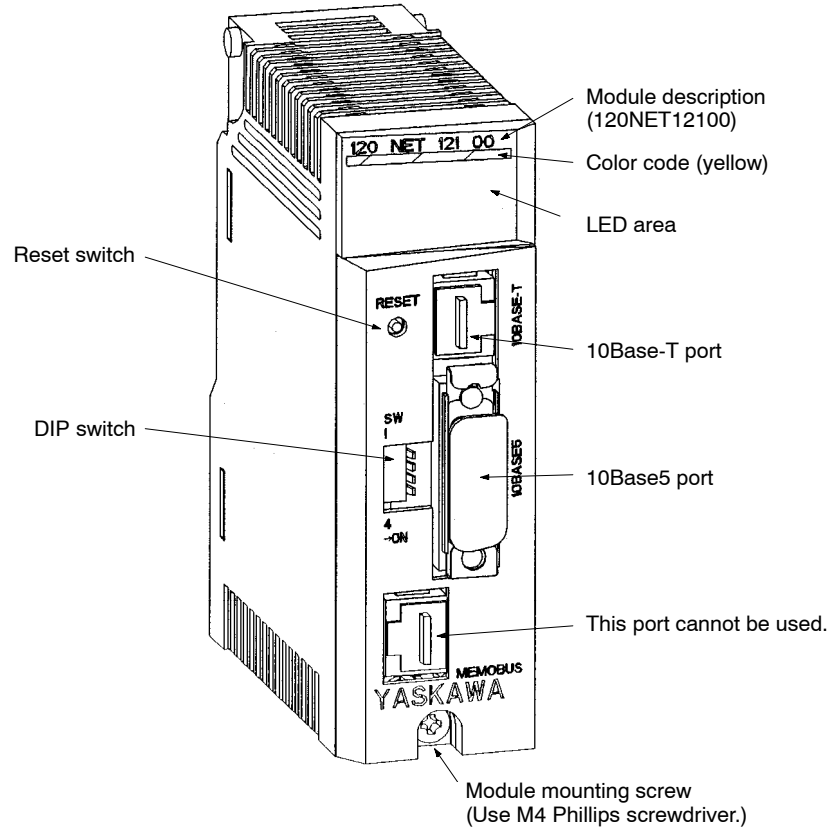
10) Related Manuals

Before operating your YENET 1600-D Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 YENET 1600-D Module User's Manual (SIEZ-C825-70.20)

4.4.13 Ethernet Interface Module

1. Appearance



LED	Color	Indication when ON
READY	Green	Module is normal.
ACTIVE	Green	Module is communicating with the CPU Module.
TX	Green	Module is sending data to the Ethernet network.
RX	Green	Module is receiving data from the Ethernet network.
COL	Red	A data collision occurred during Ethernet transmissions.
PTX/ER	Green	For future use.
	Red	For future use.
PRX	Green	For future use.
ERROR	Red	A transmission error occurred in the Module.

Figure 4.60 Appearance of Ethernet Interface Module

If an error occurs, the READY indicator will go OFF and the ERROR indicator will light or flash as described in the following table.

Type of Error	ERROR Indicator Status
ROM error	The ERROR indicator will flash one time, go OFF for 1 s, and then repeat the cycle.
RAM error	The ERROR indicator will flash two times, go OFF for 1 s, and then repeat the cycle.
DPM error	The ERROR indicator will flash six times, go OFF for 1 s, and then repeat the cycle.
Watchdog timer error	The ERROR indicator will flash seven times, go OFF for 1 s, and then repeat the cycle.
Other error	The ERROR indicator will flash eight times, go OFF for 1 s, and then repeat the cycle.

2. Function

The Ethernet Interface Module functions as an interface for connecting to GL120 and GL130 Ethernet Network Systems.

3. Specifications

The specifications of the Ethernet Interface Module are shown in the following table.

Table 4.83 Specification of Ethernet Interface Module

Item		Specifications	
Name		Ethernet Interface Module	
Model Name		EIF	
Model No.		JAMSC-120NET12100	
External Dimensions		Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	
Approximate Mass		300 g	
Internal Current Consumption		10Base5: 1.5 A 10Base-T: 1.0 A Note Power is supplied to the AUI (Attachment Unit Interface) from the GL120/GL130 Power Module through the Ethernet Interface Unit.	
Maximum Heating Value		7.5 W	
Hot Swapping (Removal/Insertion Under Power)		Permitted.	
Mounting Location		Any slot of the CPU Rack of the local channel	
Applicable CPU Modules		CPU20 (16 kW) (DDSCR-120CPU34100) CPU30 (32 kW) (DDSCR-130CPU54100) CPU35 (40 kW) (DDSCR-130CPU54110)	
Ethernet Port Specifications	Port Name	10Base5	10Base-T
	Media Access Control Method	CSMA/CD	
	Baud Rate	10 Mbps	
	Modulation Method	Baseband	
	Segment Length	500 m max.	100 m max. (Between hub (repeater) and node)
	Number of Nodes	100 per segment (Within a coaxial segment)	2 per segment (Within a 10Base-T segment)
	Transmission Medium	Transceiver cable	Twisted-pair cable
	Protocol	TCP/IP or UDP/IP	
	Data Type	ASCII or binary	
	External Connections	AUI connector (with slide lock)	RJ-45 connector

Note The Ethernet Interface Module cannot be used with a CPU10 or CPU21.

4. Using Ethernet Interface Modules

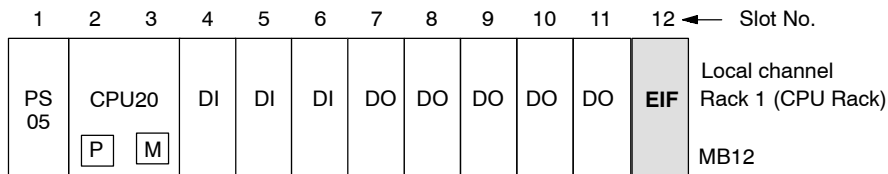
1) Number of Modules

One Ethernet Interface Module can be used.

2) Installation Location

- a) An Ethernet Interface Module can be mounted to any slot on the Mounting Base of Rack 1 (CPU Rack) of the local channel. It will occupy one slot.
- b) A mounting example of Ethernet Interface Modules is shown below.

EXAMPLE

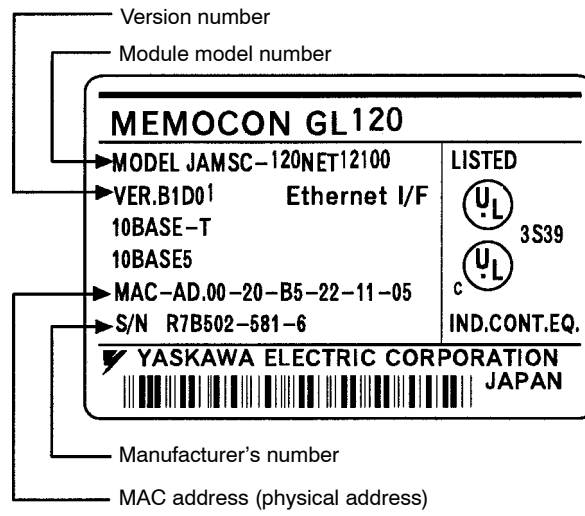


- PS05: Power Supply Module (3 A)
- CPU20: CPU Module (16 KW)
- EIF: Ethernet Interface Unit**
- DI: 12/24-VDC 16-point Input Module
- DO: 12/24-VDC 16-point Output Module
- MB12: 12-slot Mounting Base

Figure 4.61 Connection Example of Ethernet Interface Unit

3) Nameplate

- 1) The nameplate on the Ethernet Interface Module shows the model number, manufacturer's number, version number, and **MAC address (physical address)**.
- 2) The nameplate is attached to the right side of the Module.
- 3) An example of a nameplate is illustrated below.



4) 10Base5 Port

- a) The Ethernet Interface Module can communicate by connecting to a transceiver (MAU) on the Ethernet network system via a 10Base5 port. One Ethernet Interface Module can be connected to and communicate with up to 19 devices.
- b) A connection example for 10Base5 ports is shown on page 4-205.
- c) For details on 10Base5 port transmission specifications, refer to *Table 4.83*.



MAC address (physical address)

The MAC address is the hardware address of each device that becomes a node on a LAN. The MAC address is allocated to the Ethernet Interface Board inside the Module during manufacturing.

Although the IP address is used to designate the final destination, the MAC address is used to designate the network devices that must be passed through in order to reach the final destination.

- d) A 10Base5 port uses a D-sub connector (15-pin, female). The connector pin arrangement and signal names are shown in the following table.

Table 4.84 Pin Arrangement and Names of Signals for 10Base5 Ports

Pin No.	Symbol	Signal Name
1	CI-S	Control input circuit shield
2	CI-A	Control input circuit A
3	DO-A	Data output circuit A
4	DI-S	Data input circuit shield
5	DI-A	Data input circuit A
6	VC	Power supply common
7	Blank	Control output circuit A
8	CO-S	Control output circuit shield
9	CI-B	Control input circuit B
10	DO-B	Data output circuit B
11	DO-S	Data output circuit shield
12	DI-B	Data input circuit B
13	VP	Power supply positive
14	VS	Power supply shield
15	Blank	Control output circuit B
Shell	PG	Protective ground

5) 10Base-T Port

- a) The Ethernet Interface Module can communicate by connecting to a hub (10 Mbps) on the Ethernet network system via a 10Base-T port. One Ethernet Interface Module can be connected to and communicate with up to 19 devices.
- b) Connection examples for 10Base-T port are shown on page 4-205.
- c) For details on 10Base-T port transmission specifications, refer to Table 4.83.
- d) A 10Base-T port uses an RJ-45 connector. The connector pin arrangement and signal names are shown in the following table.

Table 4.85 Pin Arrangement and Names of Signals for 10Base-T Ports

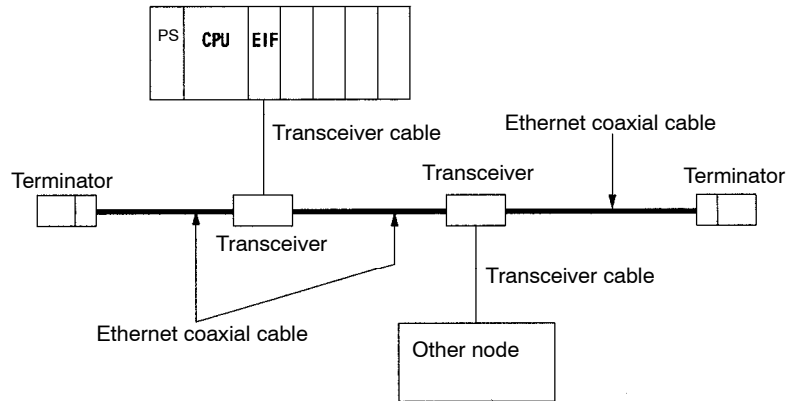
Pin No.	Symbol	Signal Name
1	TXD+	Transmission data+
2	TXD-	Transmission data-
3	RXD+	Reception data+
4	-	Not used.
5	-	Not used.
6	RXD-	Reception data-
7	-	Not used.
8	-	Not used.

Note Ethernet is not recommended for transferring control signals of applications that require real-time capability. For these applications, we recommended either the PC Link or MEMOBUS PLUS network systems manufactured by Yaskawa.

◀ **EXAMPLE** ▶

Example 1
10Base5 Connections

The following diagram shows Ethernet connections using the 10Base5 interface.



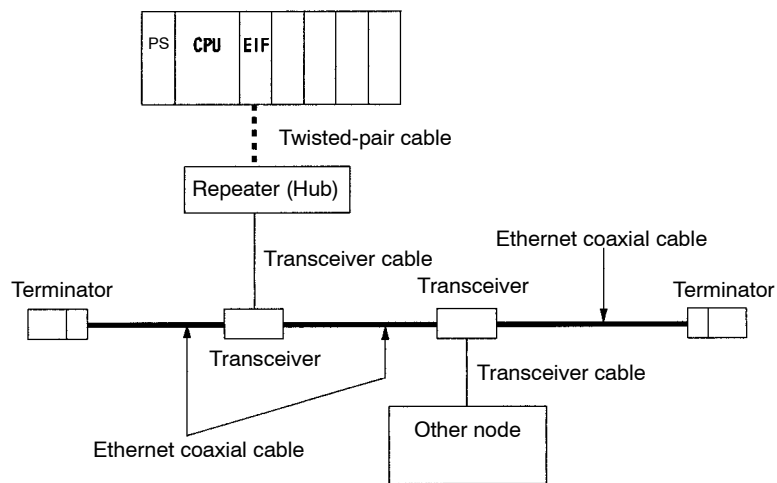
PS: Power Supply Module
EIF: Ethernet Interface Module
CPU: CPU20, CPU30, or CPU35 Module

(Three models of CPU Module are compatible with the Ethernet Interface Module: CPU20, CPU30, and CPU35.)

◀ **EXAMPLE** ▶

Example 2
10Base-T Connections

The following diagram shows Ethernet connections using the 10Base-T interface.



PS: Power Supply Module
EIF: Ethernet Interface Module
CPU: CPU20, CPU30, CPU35 Modules

(Three models of CPU Module are compatible with the Ethernet Interface Module: CPU20, CPU30, and CPU35.)

6) DIP Switch

- a) The DIP switch is composed of 4 pins. The pins are numbered from 1 to 4 as shown in the diagram at the right.
- b) Each pin is turned ON when pressed to the right.
- c) The setting of each pin is effective (read) at the following times:
 - (1) When the reset switch is pressed.
 - (2) When the power is turned ON to the Power Supply Module of the CPU Rack.
- d) Each pin's function is shown in the following table.

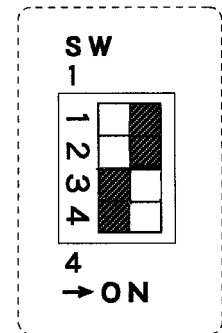


Table 4.86 Function of DIP Switch

Pin	Settings	Function
1	ON	Sets Module to Self-diagnosis mode. (Not normally used.)
	OFF	Sets Module to RUN mode.
2	ON	Selects the 10Base5 port.
	OFF	Selects the 10Base-T port.
3	ON	For future use. (Leave set to OFF.)
	OFF	
4	ON	For future use. (Leave set to OFF.)
	OFF	

Note The 10Base5 port and 10Base-T port cannot be used at the same time. Using the ports at the same time may damage the Ethernet Interface Module or cause malfunctions.

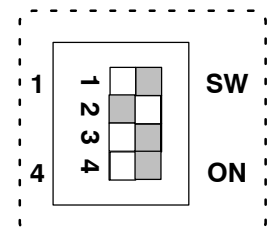
- e) Examples of setting the DIP switch are shown below:

◀EXAMPLE▶

Example 1

When the DIP switch is set as shown in the diagram on the right, the Ethernet Interface Module is set as follows:

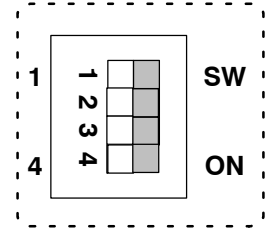
- RUN mode
- 10Base5



Example 2

When the DIP switch is set as shown in the diagram on the right, the Ethernet Interface Module is set as follows:

- RUN mode
- 10Base-T

**7) Reset Switch**

a) Press the reset switch in the following cases:

- (1) When you have changed the setting of the DIP switch.
- (2) When you have changed the transmission parameters of the Module.
- (3) When errors have occurred.

b) When the reset switch is pressed, communications between the Ethernet Interface Module and other Ethernet Interface Modules are interrupted. Communications restart when the switch is released.

8) CPU Module and MEMOSOFT Versions Supporting Ethernet Interface Modules

- a) The Ethernet Interface Module cannot be used with a CPU10 or CPU21.
- b) The CPU Module and MEMOSOFT versions that are required to use an Ethernet Interface Module are shown in the following table.

Table 4.87 Versions Supporting Ethernet Interface Modules

Name	Model Name	Model No.	Version Number	Location of Version Number
CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	Not supported.	---
CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	Not supported.	---
	CPU20	DDSCR-120CPU34100	<input type="checkbox"/> B09 onwards	Module nameplate
CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	<input type="checkbox"/> C03 onwards	
CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	<input type="checkbox"/> A04 onwards	
MEMOSOFT		FMSGGL-AT3 (for English DOS)	1.41 <input type="checkbox"/> onwards	In the middle at the bottom of the MEMOSOFT startup screen.
		FMSGGL-PP3E (for P120 English version)		

Note The nameplate is on the right side of the Module.

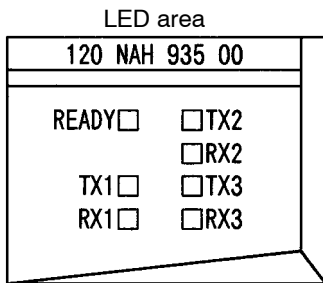
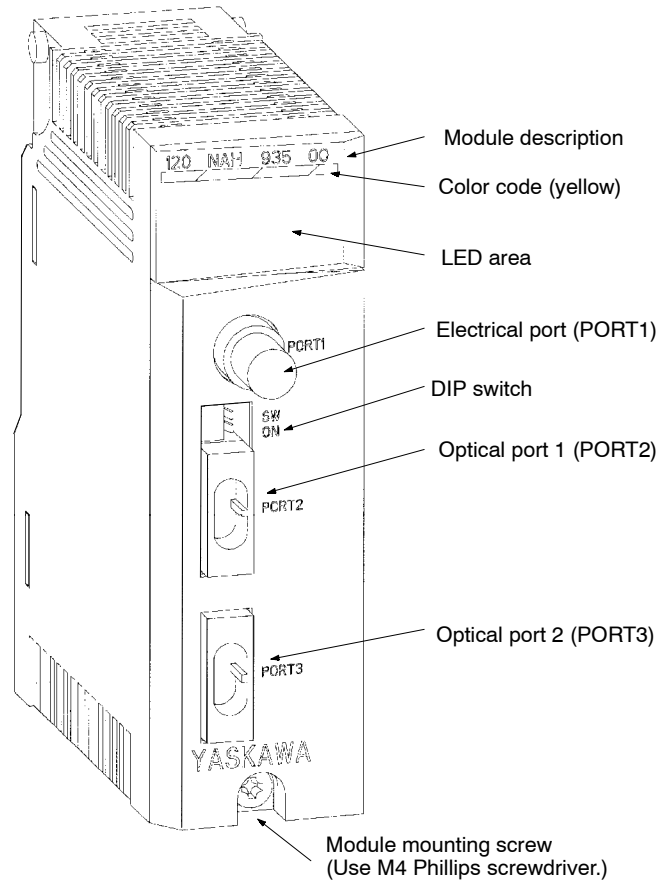
9) Related Manuals

Before operating your Ethernet Interface Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 Ethernet Interface Module User's Manual
(SIEZ-C825-70.21)

4.4.14 Optical/Electrical Conversion Module

1. Appearance



LED	Color	Meaning when ON
READY	Green	Module is operating normally.
TX1	Green	Module is sending data from electrical port.
RX1	Green	Module is receiving data from electrical port.
TX2	Green	Module is transmitting data from optical port 1.
RX2	Green	Module is receiving data from optical port 1.
TX3	Green	Module is transmitting data from optical port 2.
RX3	Green	Module is receiving data from optical port 2.

Note The Module is not sending or receiving data normally if the LEDs TX1 to TX3 and RX1 to RX3 are all OFF.

Figure 4.62 Appearance of Optical/Electrical Conversion Module

Module descriptions on the Module as follows:

Model No.	Model description
JAMSC-120NAH93500	120NAH93500
JAMSC-120NAH93510	120NAH93510
JAMSC-120NAH93520	120NAH93520
JAMSC-120NAH93530	120NAH93530

2. Function

Optical/Electrical Conversion Modules are used in combination with PC Link Modules, Remote I/O Driver Modules, and Remote I/O Receiver Modules to form Optical PC Link systems and Optical Remote I/O systems. They can also be used for duplex communications paths.

3. Specifications

The specifications of the Optical/Electrical Conversion Module are shown in the following table.

4

Table 4.88 Specification of Optical/Electrical Conversion Module

Items	Specifications	
Model Name	O/E CONVERT	
Model No.	JAMSC-120NAH93500 (cascade connections with H-PCF cable) JAMSC-120NAH93510 (cascade connections with quartz optical fiber cable) JAMSC-120NAH93520 (duplex connections with H-PCF cable) JAMSC-120NAH93530 (duplex connections with quartz optical fiber cable)	
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	
Approximate Mass	300 g	
Internal Current Consumption	430 mA	
Maximum Heating Value	2.5 W	
Hot Swapping (Removal/Insertion Under Power)	Permitted	
Mounting Location	Any slot of any Rack.	
Electrical Port Specifications	Relay Method	Half duplex
	Topology (Communications Network)	Bus
	Media (Transmission Medium)	Coaxial cable (75 Ω)
	Encoding Method	Manchester code
	Baud Rate	Choose from 0.5, 1, 2, and 4 Mbps
	Transmission Distance	Transmission distance varies according to the baud rate and specifications of coaxial cable. If, for example, the baud rate is 4 Mbps and 12C-5AF Coaxial Cable is used, it is possible to transmit up to 1 km max.
	Number of Stations	32 stations max. A maximum of 32 PC Link or Remote I/O Driver and Receiver Modules can be connected (including the local station). The electrical port of the Optical/Electrical Conversion Module should be the end station.
	Communications Format	Conforms to HDLC
	Maximum Packet Length	256 words (16-bit words)
	Max. Preamble Loss	3.5 bits per station
	Max. Transmission Delay	3.5 bits per station
	Insulation Method	Pulse transformer
	Connector	BNC connector Model: BNC-P-3-Ni-CAu (description: BNC-P-3)
Terminator	Built-in (75 Ω)	

Items	Specifications		
Optical Port Specifications	Relay Method	Half duplex	
	Topology (Communications Network)	JAMSC-120NAH93500	Simplex cascade
		JAMSC-120NAH93510	Simplex star
	Media (Transmission Medium)	JAMSC-120NAH93520	Duplex cascade
		JAMSC-120NAH93530	Simplex star Duplex star
	Encoding Method	JAMSC-120NAH93500	H-PCF cable (SI-200/250)
		JAMSC-120NAH93520	Quartz optical fiber cable (GI-50/125)
	Encoding Method	Manchester code	
	Baud Rate	Choose from 0.5, 1, 2, or 4 Mbps	
	Transmission Distance	JAMSC-120NAH93500	Between stations: 1 km
		JAMSC-120NAH93520	Total distance: 12 km
	Transmission Levels	JAMSC-120NAH93510	Between stations: 2 km
		JAMSC-120NAH93530	Total distance: 12 km
	Optical Connectors	JAMSC-120NAH93500	Transmission: -17 to -14 dbm (peak)
		JAMSC-120NAH93520	Reception: -29 to -14 dbm (peak) (Checked with Hitachi's DC9104L)
Optical Connectors	JAMSC-120NAH93510	Transmission: -20 to -15 dbm (peak)	
	JAMSC-120NAH93530	Reception: -30 to -15 dbm (peak) (Checked with Hitachi's DC9104S)	
Optical Connectors	JAMSC-120NAH93500	Sumitomo Electric Industries' two-core DL-72 (Conforms to JIS C 5977 F08)	
	JAMSC-120NAH93520	Hitachi's two-core CA9003S or equivalent (Conforms to JIS C 5977 F08)	
Communications Format	Conforms to HDLC		
Maximum Packet Length	256 words (16-bit words)		
Max. Preamble Loss	3.5 bits per station		
Max. transmission delay	3.5 bits per station		

4

4. Using Optical/Electrical Conversion Modules

1) Number of Modules

Optical/Electrical Conversion Modules are used in combination with the following Modules. Restrictions do not apply to the number of Optical/Electrical Conversion Modules that can be used independently.

- a) Optical/Electrical Conversion Modules can be combined with PC Link Modules to form Optical PC Link systems.
- b) Optical/Electrical Conversion Modules can be combined with Remote I/O Driver Modules and Remote I/O Receiver Modules to form Optical Remote I/O systems.

2) Installation Location

An Optical/Electrical Conversion Module can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.

3) Electrical Ports

- a) With PC Link Modules
Optical/Electrical Conversion Modules used in combination with PC Link Modules enable high-speed communications via electrical ports at a baud rate of 4 Mbps with up to 31 Optical/Electrical Conversion Modules. The transmission distance depends on the baud rate and coaxial cable used. If, for example, the baud rate is set to 4 Mbps and 12C-5AF communications cables are used, it is possible to transmit up to 1 km.
- b) With Remote I/O Modules
Optical/Electrical Conversion Modules used in combination with Remote I/O Driver Modules and Remote I/O Receiver Modules enable high-speed communications via electrical ports at a baud rate of 4 Mbps with up to 15 Optical/Electrical Conversion Modules. The transmission distance depends on the baud rate and coaxial cable used. If, for example, the baud rate is set to 4 Mbps and 12C-5AF communications cables are used, it is possible to transmit up to 1 km.

4) Optical Ports

- a) With PC Link Modules
Optical/Electrical Conversion Modules used in combination with PC Link Modules enable high-speed communications via optical ports at a baud rate of 4 Mbps with up to 31 Optical/Electrical Conversion Modules. The transmission distance depends on the connection method and the optical fiber cable used. If, for example, the baud rate is set to 4 Mbps and quartz crystal cables are used, it is possible to transmit up to 12 km in total (2 km between stations).
- b) With Remote I/O Modules
Optical/Electrical Conversion Modules used in combination with Remote I/O Driver

Modules and Remote I/O Receiver Modules enable high-speed communications via optical ports at a baud rate of 4 Mbps with up to 15 Optical/Electrical Conversion Modules. The transmission distance depends on the connection method and the optical fiber cable used. Transmission distance depends on the connection method and the optical fiber cable used. If, for example, the baud rate is set to 4 Mbps and quartz crystal cables are used, it is possible to transmit up to 12 km in total (2 km between stations).

- c) A connection example of an Optical/Electrical Conversion Module is shown in the following diagram.

EXAMPLE

Example
Connecting Optical/Electrical Conversion Modules to PC Link Modules

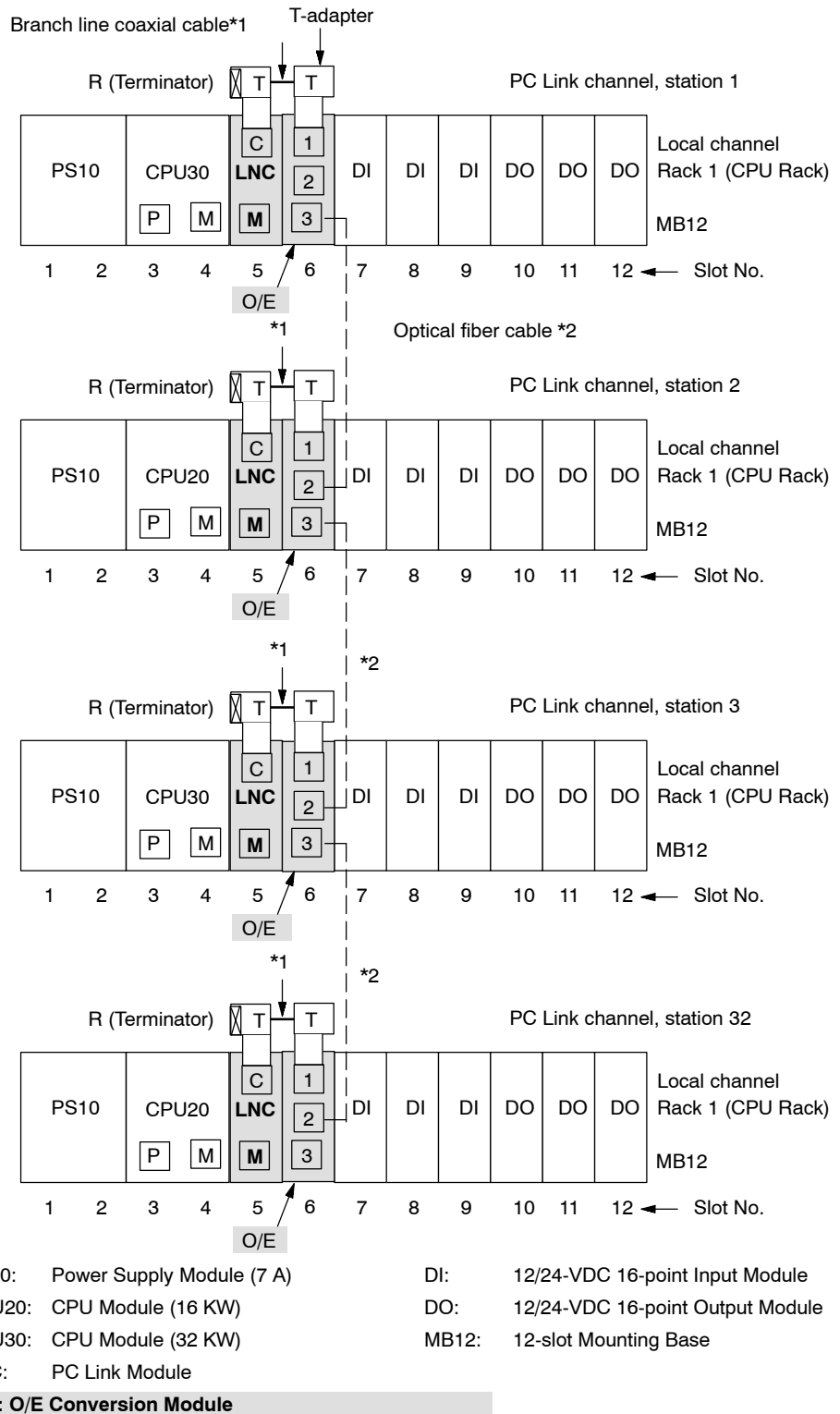


Figure 4.63 Connection Example of O/E Conversion Module

EXAMPLE

Example

Connecting Optical/Electrical Conversion Modules to Remote I/O Driver Modules and Remote I/O Receiver Modules

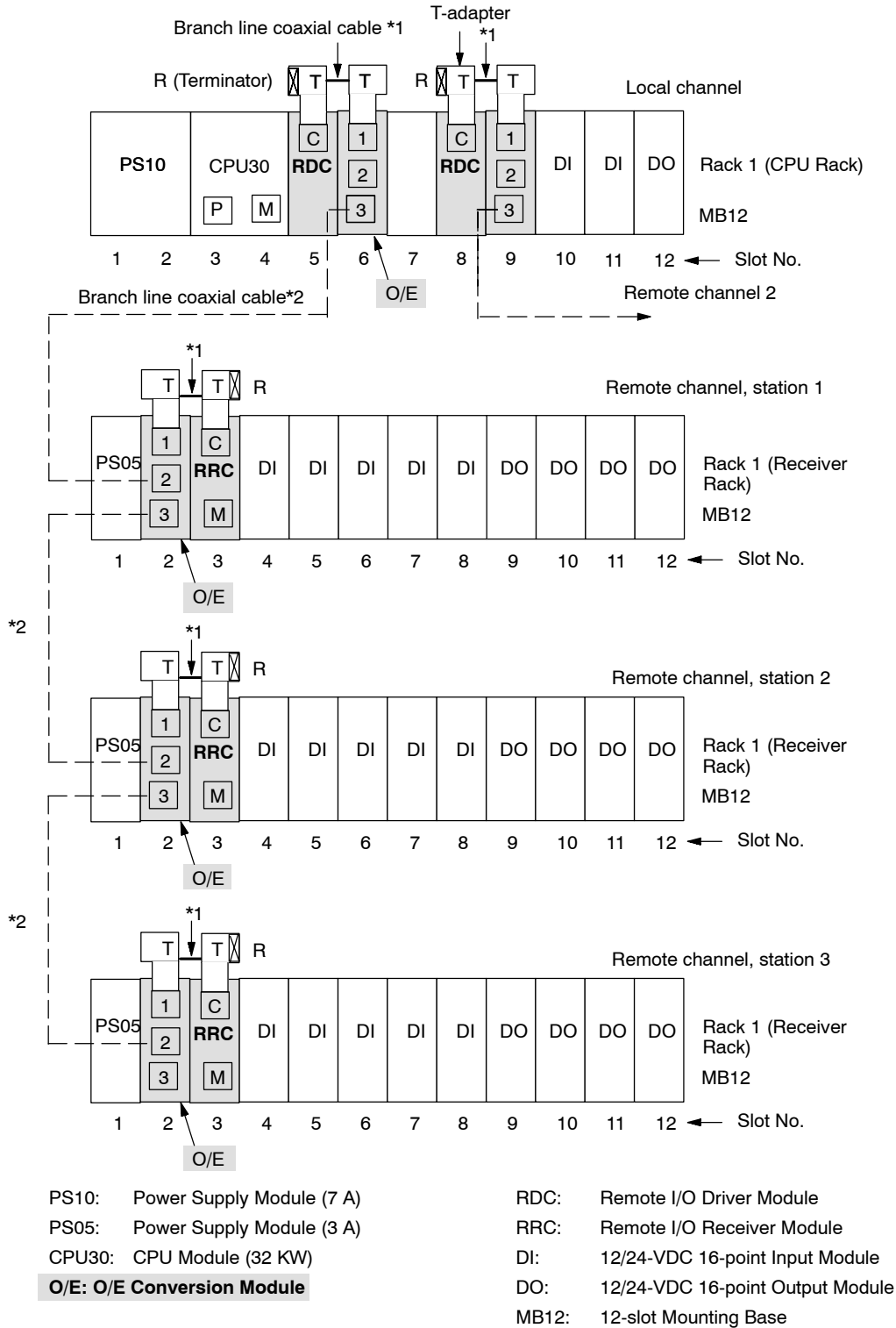
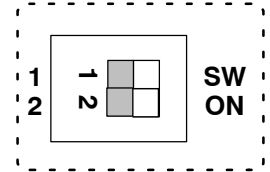


Figure 4.64 Connection Example of O/E Conversion Module

5) DIP Switch

- a) DIP switch is composed of 2 pins. The pins are numbered 1 and 2 as shown in the diagram at the right.



- b) Each pin is turned ON when pressed to the right.
- c) The setting of each pin is effective (read) at the following times:

(1) When the power is turned ON to the Power Supply Module of the CPU Rack.

- d) Each pin's function is shown in the following table.

Table 4.89 Function of DIP Switch

Pin No.	Settings		Function	
1	Set the baud rate of the Optical/Electrical Conversion Module according to the table on the right.	Pin 1	Pin 2	Baud Rate
2		ON	ON	4 Mbps
		ON	OFF	2 Mbps
		OFF	ON	1 Mbps
		OFF	OFF	0.5 Mbps

Note Set the same baud rate for all the Optical/Electrical Conversion Modules on the same channel. If baud rate of all the Modules is not the same, communications will not run.

6) Related Manuals

Before operating your Optical/Electrical Conversion Module, read the following manual carefully and be sure that you fully understand the information on specifications, applications methods, safety precautions, etc.

MEMOCON GL120, GL130 Optical/Electrical Conversion Module User's Manual (SIEZ-C825-70.18)

4.5 I/O Modules

■ This section provides a summary of the I/O Modules.

4.5.1	Models of I/O Modules	4-218
4.5.2	Appearance of I/O Modules	4-220
4.5.3	Functions and Specifications of I/O Modules	4-223
4.5.4	Using I/O Modules	4-229

4.5.1 Models of I/O Modules

There are twenty models of I/O Modules.

Table 4.90 Models of I/O Module

Product	Name	Model Name	Model No.	Features	Number of Slots Required
Digital Input Modules	100-VAC 16-point Input Module	AC100IN-16P	JAMSC-120DAI54300	1) Used to input digital signals. 2) 100 VAC, 16 points, 7 mA (50 Hz)	1
	200-VAC 16-point Input Module	AC200IN-16P	JAMSC-120DAI74300	1) Used to input digital signals. 2) 200 VAC, 16 points, 7 mA (50 Hz)	1
	12/24-VDC 16-point Input Module	DC24IN-16P	JAMSC-120DDI34300	1) Used to input digital signals. 2) 12/24 VDC, 16 points, 4 mA (12 VDC), 8 mA (24 VDC)	1
	12/24-VDC 32-point Input Module	DC24IN-32P	JAMSC-120DDI35400	1) Used to input digital signals. 2) 12/24 VDC, 32 points, 2 mA (12 VDC), 4 mA (24 VDC)	1
	12/24-VDC 64-point Input Module	DC24IN-64P	JAMSC-120DDI36400	1) Used to input digital signals. 2) 12/24 VDC, 64 points, 2 mA (12 VDC), 4 mA (24 VDC)	1
Analog Input Modules	Analog Input Module (± 10 V, 4 channels)	A/D-VOL-4CH	JAMSC-120AVI02000	1) Used to input analog signals. 2) -10 to +10 V, 4 channels	1
	Analog Input Module (0 to 10 V, 4 channels)	A/D 0-10V 4CH	JAMSC-120AVI02100	1) Used to input analog signals. 2) 0 to +10 V, 4 channels	1
	Analog Input Module (4 to 20 mA, 4 channels)	A/D-CUR-4CH	JAMSC-120ACI02000	1) Used to input analog signals. 2) 4 to 20 mA, 1 to 5 V, 4 channels	1

Product	Name	Model Name	Model No.	Features	Number of Slots Required
Digital Output Modules	100/200-VAC 8-point Output Module	ACOUT-8P	JAMSC-120DAO83000	1) Used to output digital signals. 2) 100/200 VAC, 8 points, 1.0 A/point	1
	100/200-VAC 16-point Output Module	ACOUT-16P	JAMSC-120DAO84300	1) Used to output digital signals. 2) 100/200 VAC, 16 points, 0.3 A/point	1
	12/24-VDC 8-point Output Module	DC24OUT-8P	JAMSC-120DDO33000	1) Used to output digital signals. 2) 12/24 VDC, 8 points, sourcing/sinking outputs, 2.0 A/point	1
	12/24-VDC 16-point Output Module (sinking outputs)	DC24OUT-16PSN	JAMSC-120DDO34310	1) Used to output digital signals. 2) 12/24 VDC, 16 points, sinking outputs, 0.5A/point, 1.0 A/4 points	1
	12/24-VDC 16-point Output Module (sourcing)	DC24OUT-16PSR	JAMSC-120DDO34320	1) Used to output digital signals. 2) 12/24 VDC, 16 points, sourcing outputs, 0.5A/point, 1.0 A/4 points	1
	12/24-VDC 32-point Output Module (sinking outputs)	DC24OUT-32PSN	JAMSC-120DDO35410	1) Used to output digital signals. 2) 12/24 VDC, 32 points, sinking outputs, 0.3 A/point, 0.4 A/4 points	1
	12/24-VDC 64-point Output Module (sinking outputs)	DC24OUT-64PSN	JAMSC-120DDO36410	1) Used to output digital signals. 2) 12/24 VDC, 64 points, sinking outputs, 0.1 A/point	1
	Relay Contact 16-point Output Module	RELAY-16P	JAMSC-120DRA84300	1) Used to output digital signals. 2) Relay contacts, 16 points, 1.0 A/point	1

Product	Name	Model Name	Model No.	Features	Number of Slots Required
Analog Output Modules	Analog Output Module (± 10 V, 2 channels)	D/A-VOL-2CH	JAMSC-120AVO01000	1) Used to output analog signals. 2) -10 to $+10$ V, 2 channels	1
	Analog Output Module (0 to 10 V, 2 channels)	D/A 0-10V 2CH	JAMSC-120AVO01100	1) Used to output analog signals. 2) 0 to $+10$ V, 2 channels	1
	Analog Output Module (0 to 5 V, 2 channels)	D/A 0-5V 2CH	JAMSC-120AVO01200	1) Used to output analog signals. 2) 0 to $+5$ V, 2 channels	1
	Analog Output Module (4 to 20 mA, 2 channels)	D/A-CUR-2CH	JAMSC-120ACO01000	1) Used to output analog signals. 2) 4 to 20 mA, 2 channels	1

Note The CPU Module, Remote I/O Receiver Module, and MEMOSOFT versions that support 64-point Input Modules or 64-point Output Modules are listed in the following table. For details, refer to Table 4.95 in 4.5.4. Using I/O Modules.

Refer to the following manual for details on the I/O Modules.
MEMOCON GL120, GL130 120-series I/O Modules User's Manual (SIEZ-C825-20.22)

4.5.2 Appearance of I/O Modules

1. Appearance of I/O Modules with Terminal Blocks for Field Connections

- 1) Terminal blocks for field connections are used to externally connect all I/O Modules except the following:
 - a) 12/24-VDC 32-point Input Module (JAMSC-120DDI35400)
 - b) 12/24-VDC 32-point Output Module (JAMSC-120DDO35410)
 - c) 12/24-VDC 64-point Input Module (JAMSC-120DDI36400)
 - d) 12/24-VDC 64-point Output Module (JAMSC-120DDO36410)

2) The following figure shows the appearance of a 100-VAC, 16-point Input Module.

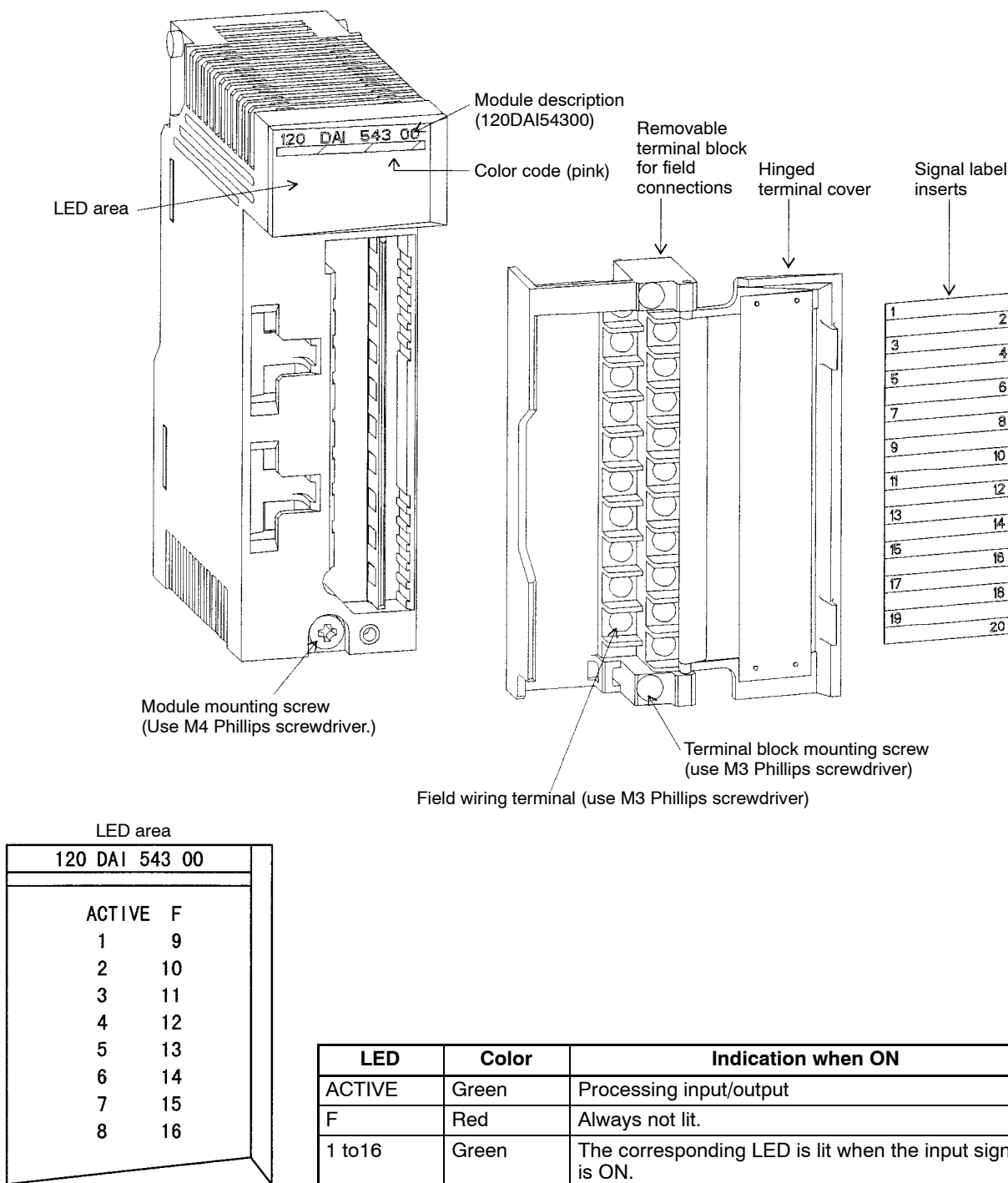


Figure 4.65 Appearance of 100-VAC 16-point Input Module

2. Appearance of I/O Modules with Connectors

- 1) Connectors are used to externally connect the following I/O Modules:
 - a) 12/24-VDC 32-point Input Module (JAMSC-120DDI35400)
 - b) 12/24-VDC 32-point Output Module (JAMSC-120DDO35410)
 - c) 12/24-VDC 64-point Input Module (JAMSC-120DDI36400)
 - d) 12/24-VDC 64-point Output Module (JAMSC-120DDO36410)
- 2) The following figure shows the appearance of a 12/24-VDC, 32-point Output Module.

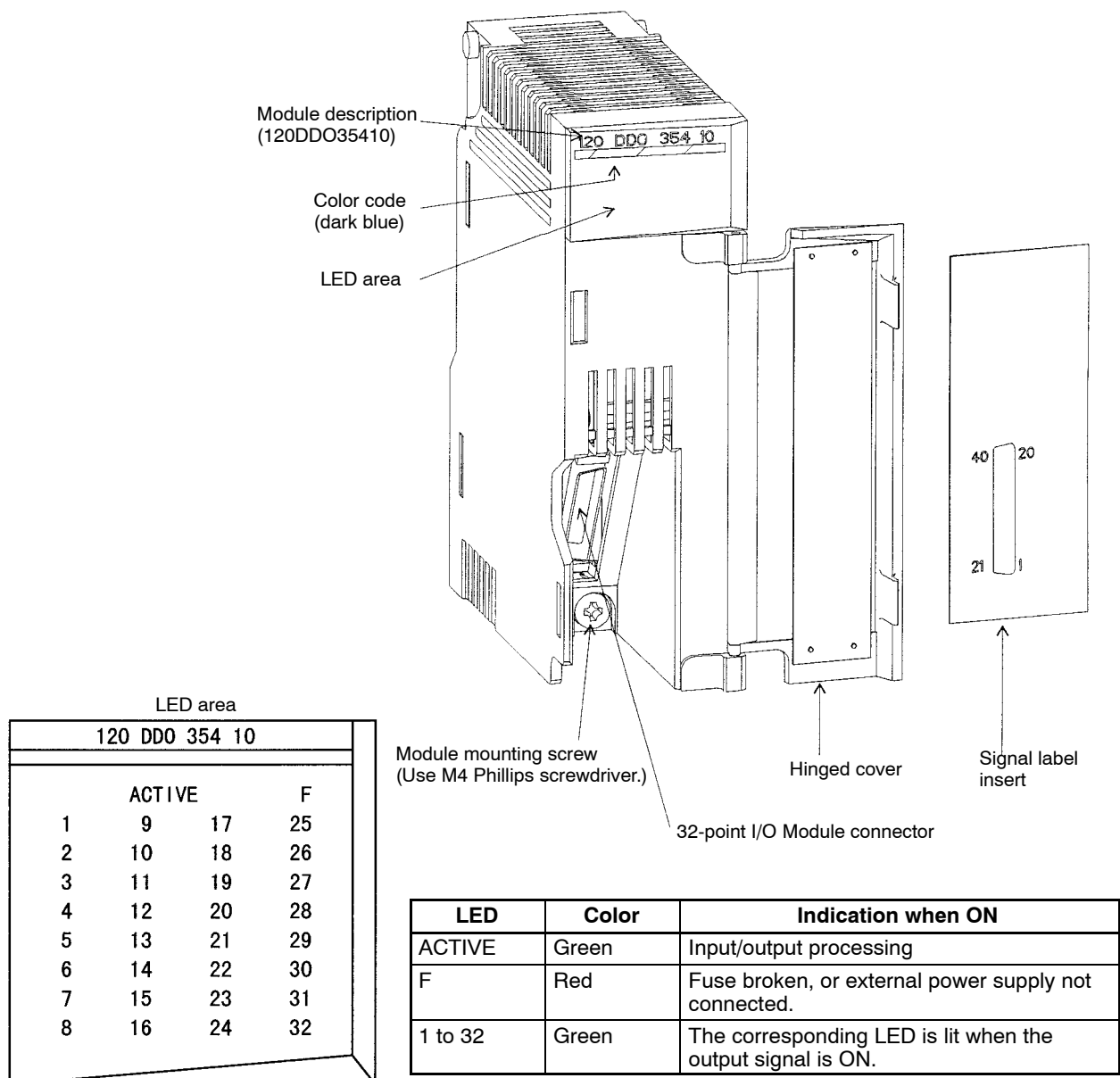


Figure 4.66 Appearance of 12/24-VDC 32-point Output Module

3) The following figure shows the appearance of a 12/24-VDC, 64-point Input Module.

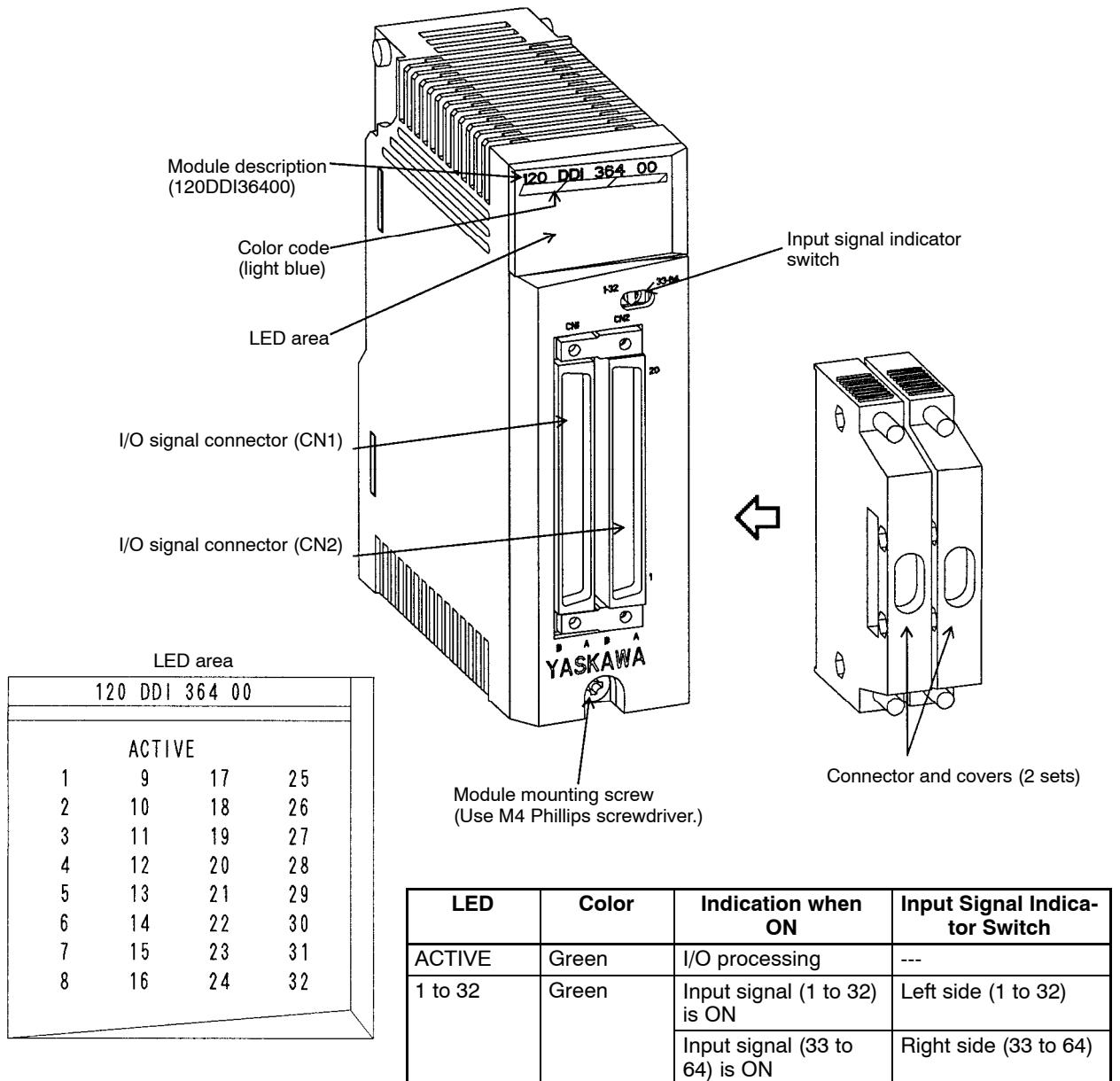


Figure 4.67 Appearance of 12/24-VDC 64-point Input Module

4.5.3 Functions and Specifications of I/O Modules

1. Digital Input Modules

1) Function

A Digital Input Module converts the digital signals coming from pushbutton switches, limit switches, and digital switches into signals of appropriate voltage for PLC internal proces-

sing. The converted digital signals are stored by the CPU Module as input relays and input registers in state memory.

2) Specifications

The following table shows the main specifications of Digital Input Modules.

Table 4.91 Main Specifications of Digital Input Modules

Name	Model Name	Model No.	Rated Voltage	Rated Current	Input Impedance	Input Delay Times	Number of inputs	Internal Current Consumption	Maximum Heating Value	Hot Swapping
100-VAC 16-point Input Module	AC100IN-16P	JAMSC-12 0DAI54300	100 VAC	7 mA (50Hz)	14.3 kΩ (50 Hz) 12.5 kΩ (60 Hz)	OFF→ON: Max. 20 ms ON→OFF: Max. 35 ms	16	With all points ON: 90 mA	2.0 W	Permitted
200-VAC 16-point Input Module	AC200IN-16P	JAMSC-12 0DAI74300	200 VAC	7 mA (50Hz)	28.6 kΩ (50 Hz) 23.1 kΩ (60 Hz)	OFF→ON: Max. 20 ms ON→OFF: Max. 35 ms	16	With all points ON: 90 mA	3.5 W	Permitted
12/24-VDC 16-point Input Module	DC24IN-16P	JAMSC-12 0DDI34300	12/24 VDC	4 mA (12 VDC) 8 mA (24 VDC)	3.0 kΩ	OFF→ON: Max. 5 ms ON→OFF: Max. 5 ms	16	With all points ON: 100 mA	3.7 W	Permitted
12/24-VDC 32-point Input Module	DC24IN-32P	JAMSC-12 0DDI35400	12/24 VDC	2 mA (12 VDC) 4 mA (24 VDC)	5.6 kΩ	OFF→ON: Max. 5 ms ON→OFF: Max. 5 ms	32	With all points ON: 80 mA	3.6 W	Permitted
12/24-VDC 64-point Input Module	DC24IN-64P	JAMSC-12 0DDI36400	12/24 VDC	2 mA (12 VDC) 4 mA (24 VDC)	5.6 kΩ	OFF→ON: Max. 5 ms ON→OFF: Max. 5 ms	64	With all points ON: 100 mA	7.0 W	Permitted

Other specifications

- 1) Slots required: 1
- 2) Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
- 3) Approx. mass
 16-point Input Module: 250 g
 32-point Input Module: 250 g
 64-point Input Module: 300 g
- 4) Field connections
 16-point Input Module: terminal block
 32-point Input Module: connector
 64-point Input Module: connector
- 5) Number of points per common
 16-point Input Module: 8 points per common
 32-point Input Module: 16 points per common
 64-point Input Module: 16 points per common

4

2. Analog Input Modules

1) Function

An Analog Input Module converts the analog signals coming from weight sensors, temperature sensors, etc., into numeric data appropriate for PLC internal processing. The converted numeric data is stored by the CPU Module as the input registers in state memory.

2) Specifications

The following table shows the main specifications of the Analog Input Modules.

Table 4.92 Main Specifications of Analog Input Modules

Name	Model Name	Model No.	Input Signal Range	Overall Accuracy	Resolution and Data Types	Input Impedance	Number of Channels	Internal Current Consumption	Maximum Heating Value	Hot Swapping
Analog Input Module (± 10 V, 4 channels)	A/D-VOL-4CH	JAMSC-120AVI02000	-10 to +10 V	$\pm 0.5\%$ F.S. (25°C) $\pm 1.0\%$ F.S. (0 to 60°C)	0 to 4000 mode: 12 bits, binary between 0 and 4000 ± 2000 mode: 12 bits, 2's complement between -2000 and +2000	1 M Ω min.	4	450 mA	2.3 W	Permitted
Analog Input Module (0 to 10 V, 4 channels)	A/D 0-10V 4CH	JAMSC-120AVI02100	0 to +10 V	$\pm 0.5\%$ F.S. (25°C) $\pm 1.0\%$ F.S. (0 to 60°C)	12 bits, binary between 0 and 4000	1 M Ω min.	4	450 mA	2.3 W	Permitted
Analog Input Module (4 to 20 mA, 4 channels)	A/D-CUR-4CH	JAMSC-120ACI02000	Current input: 4 to 20 mA Voltage input: 1 to 5 V	$\pm 0.5\%$ F.S. (25°C) $\pm 1.0\%$ F.S. (0 to 60°C)	12 bits, binary between 0 and 4000	Current input: 250 Ω voltage input: 1 M Ω min.	4	450 mA	2.3 W	Permitted
Other specifications										
1) Slots required: 1										
2) Approx. mass: 300 g										
3) Width: 40.3 mm Height: 130 mm Depth: 103.9 mm										
4) Field connections: Terminal block										

3. Digital Output Modules

1) Function

A Digital Output Module converts the numeric data stored in output registers or the ON/OFF state of the output coil in the state memory of the CPU Module into digital signals for control of indicators, electromagnetic switches, relays, solenoid valves, numeric indicators, etc.

2) Specifications

The following table shows the main specifications of Digital Output Modules.

Table 4.93 Main Specifications of Digital Output Modules

Name	Model Name	Model No.	Rated Voltage	Load Current	Remarks	Output Delay Times	Number of Outputs	Internal Current Consumption	Maximum Heating Value	Hot Swapping
100/200-VAC 8-point Output Module	ACOUT-8P	JAMSC-120 DAO83000	100/200 VAC	1.0 A/ point	Unprotected outputs	OFF→ON: Max. 5 ms ON→OFF: 1/2 cycle + 5 ms max.	8	With all points ON: 150 mA	9.0 W	Permitted
100/200-VAC 16-point Output Module	ACOUT-16P	JAMSC-120 DAO84300	100/200 VAC	0.6 A/ point	Unprotected outputs	OFF→ON: Max. 5 ms ON→OFF: 1/2 cycle + 5 ms max.	16	With all points ON: 300 mA	5.5 W	Permitted
12/24-VDC 8-point Output Module	DC24OU T-8P	JAMSC-120 DDO33000	12/24 VDC	2.0 A/ point	Short-circuit protection Sourcing/sinking outputs	OFF→ON: Max. 3 ms ON→OFF: Max. 5 ms	8	With all points ON: 220 mA	1.6 W	Permitted
12/24-VDC 16-point Output Module (sinking)	DC24OU T-16PSN	JAMSC-120 DDO34310	12/24 VDC	0.5 A/ point, 1.0 A/ 4 points	Unprotected outputs Sinking outputs	OFF→ON: Max. 1 ms ON→OFF: Max. 1 ms	16	With all points ON: 220 mA	7.1 W	Permitted
12/24-VDC 16-point Output Module (sourcing)	DC24OU T-16PSR	JAMSC-120 DDO34320	12/24 VDC	0.5 A/ point, 1.0 A/ 4 points	Unprotected outputs Sourcing outputs	OFF→ON: Max. 1 ms ON→OFF: Max. 1 ms	16	With all points ON: 300 mA	7.5 W	Permitted
12/24-VDC 32-point Output Module (sinking)	DC24OU T-32PSN	JAMSC-120 DDO35410	12/24 VDC	0.3 A/ point, 0.4 A/ 4 points	Unprotected outputs Sinking outputs	OFF→ON: Max. 1 ms ON→OFF: Max. 1 ms	32	With all points ON: 330 mA	6.5 W	Permitted
12/24-VDC 64-point Output Module (sinking)	DC24OU T-64PSN	JAMSC-120 DDO36410	12/24 VDC	0.1 A/ point	Unprotected output Sinking outputs	OFF→ON: Max. 1 ms ON→OFF: Max. 1 ms	64	With all points ON: 650 mA	13.0 W	Permitted
Relay contact 16-point Output Module	RELAY-16P	JAMSC-120 DRA84300	Relay contact	1.0 A/ point	Unprotected outputs	OFF→ON: Max. 10 ms ON→OFF: Max. 15 ms	16	With all points ON: 610 mA	3.1 W	Permitted

Name	Model Name	Model No.	Rated Voltage	Load Current	Re- marks	Output Delay Times	Num- ber of Out- puts	Internal Current Consumption	Maxi- mum Heating Value	Hot Swap- ping
Other specifications										
<p>1) Slots required: 1</p> <p>2) Width: 40.3 mm Height: 130 mm Depth: 103.9 mm</p> <p>3) Approx. mass AC Output Module: 300 g DC Output Module (8-point, 16-point, 32-point): 250 g DC Output Module (64-point): 300 g Relay Contact Output Module: 300 g</p> <p>4) Field connections 8-point Output Module: terminal block 16-point Output Module: terminal block 32-point Output Module: connector 64-point Output Module: connector Relay Contact Output Module: terminal block</p> <p>5) Number of points per common 8-point Output Module: Independent outputs 16-point Output Module: 8 points per common 32-point Output Module: 16 points per common 64-point Output Module: 16 points per common Relay Contact Output Module: 8 points per common</p>										

4. Analog Output Module

1) Function

An Analog Output Module converts the numeric data stored in output registers in the state memory of the CPU Module into analog signals for control of heaters, pumps, PID adjusters, inverters, etc.

2) Specifications

The following table shows the main specifications of the Analog Output Modules.

Table 4.94 Main Specifications of Analog Output Modules

Name	Model Name	Model No.	Output Signal Range	Overall Accuracy	Resolution and Data Types	Maximum Permissible Load Current	Number of Channels	Internal Current Consumption	Maximum Heating Value	Hot Swapping
Analog Output Module (± 10 V, 2 channels)	D/A-VOL-2CH	JAMSC-120AVO01000	-10 to +10 V	$\pm 0.2\%$ F.S. (25°C) $\pm 0.5\%$ F.S. (0 to 60°C)	0 to 4000 mode: 12 bits, binary between 0 and 4000 ± 2000 mode: 12 bits, 2's complements between -2000 and +2000	± 5 mA, 2 k Ω min.	2	400 mA	2.0 W	Permitted
Analog Output Module (0 to 10 V, 2 channels)	D/A 0-10V 2CH	JAMSC-120AVO01100	0 to +10 V	$\pm 0.2\%$ F.S. (25°C) $\pm 0.5\%$ F.S. (0 to 60°C)	12 bits, binary between 0 and 4000	5 mA, 2 k Ω min.	2	400 mA	2.0 W	Permitted
Analog Output Module (0 to 5 V, 2 channels)	D/A 0-5V 2CH	JAMSC-120AVO01200	0 to +5 V	$\pm 0.2\%$ F.S. (25°C) $\pm 0.5\%$ F.S. (0 to 60°C)	12 bits, binary between 0 and 4000	2.5 mA, 2 k Ω min.	2	400 mA	2.0 W	Permitted
Analog Output Module (4 to 20 mA, 2 channels)	D/A-CUR-2CH	JAMSC-120ACO01000	4 to 20 mA	$\pm 0.2\%$ F.S. (25°C) $\pm 0.5\%$ F.S. (0 to 60°C)	12 bits, binary between 0 and 4000	550 Ω max.	2	500 mA	2.5 W	Permitted
Other specifications										
1) Slots required: 1										
2) Approx. mass : 350 g										
3) Width: 40.3 mm Height: 130 mm Depth: 103.9 mm										
4) Field connection: Terminal block										

4.5.4 Using I/O Modules

1) Installation Location of I/O Modules

- I/O Modules can be mounted to any slot of the Mounting Base of any Rack. Each I/O Module occupies one slot.
- The following diagram shows an example on where to mount I/O Modules.

◀EXAMPLE▶

Example

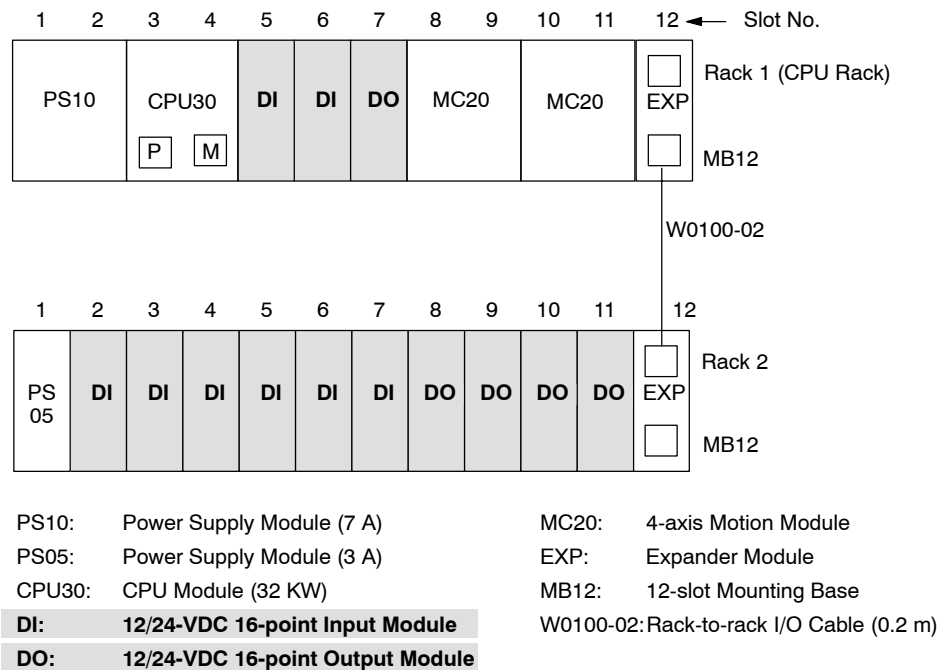


Figure 4.68 Example of Mounting I/O Modules

2) Versions Supporting 64-point I/O Modules

The following CPU Modules, Remote I/O Receiver Modules, and MEMOSOFT versions are required to use 64-point I/O Modules.

Table 4.95 Versions Supporting 64-point I/O Modules

Name	Model Name	Model No.	Version Number	Location of Version Number
CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	<input type="checkbox"/> <input type="checkbox"/> B05 onwards	Module nameplate
CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
CPU Module (32 KW)	CPU30	DDSCR-120CPU54100	<input type="checkbox"/> <input type="checkbox"/> B05 onwards	Module nameplate
CPU Module (40 KW)	CPU35	DDSCR-120CPU54110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	<input type="checkbox"/> <input type="checkbox"/> A10 onwards	Module nameplate
MEMOSOFT		FMSGL-AT3 (for English DOS) FMSGL-PP3E (for P120 English version)	1.21 <input type="checkbox"/> onwards	In the middle at the bottom of the MEMOSOFT startup screen.

* The nameplate is on the right side of the Module.

3) Related Manuals

Before operating your I/O Module, read the following manual carefully and be sure that you fully understand the information on specifications, the circuit structure, terminal connection methods, safety precautions, etc.

MEMOCON GL120, GL130 120-series I/O Module User's Manual (SIEZ-C825-20.22)

4.6 Special Purpose Modules

This section provides a summary of the Special Purpose Modules.

4.6.1	Models of Special Purpose Modules	4-231
4.6.2	High-speed Counter Module	4-233
4.6.3	Pulse Catch Module	4-239

4.6.1 Models of Special Purpose Modules

There are two models of Special Purpose Modules.

Table 4.96 Models of Special Purpose Modules

Name	Model Name	Model No.	Features
High-speed Counter Module	COUNTER-1CH	JAMSC-120EHC 21110	1) Used for counting high-speed pulse count. 2) Equipped with 1 built-in high-speed pulse counting circuit. 3) Usable for both A-phase and B-phase and for sign+pulse systems. 4) Used for counting high-speed pulses Countable frequencies: A/B-phases: 200 Kpps (1X) 400 Kpps (2X) 800 Kpps (4X) Sign + pulse : 200 Kpps (1X) 5) Notch point outputs: 4 points
Pulse Catch Module	COUNTER-16CH	JAMSC-120RDI 34400	1) Equipped with pulse catch and counter functions. 2) The pulse catch function is used to read input signals that are ON for less than one scan time of the CPU Module. ON signal width: 1 ms min. (8 channels) 2 ms min. (16 channels) 3) Equipped with 16 built-in pulse catch circuits. 4) The following frequencies can be counted: 8 channels: 500 Hz 16 channels: 250 Hz

Refer to the following manuals for details on the Special Purpose Modules.

- *MEMOCON GL120, GL130 120-series High-speed Counter Module User's Manual (SIEZ-C825-20.24)*
- *MEMOCON GL120, GL130 Pulse Catch and Counter Module User's Manual (SIEZ-C825-20.28)*

4.6.2 High-speed Counter Module

1. Appearance

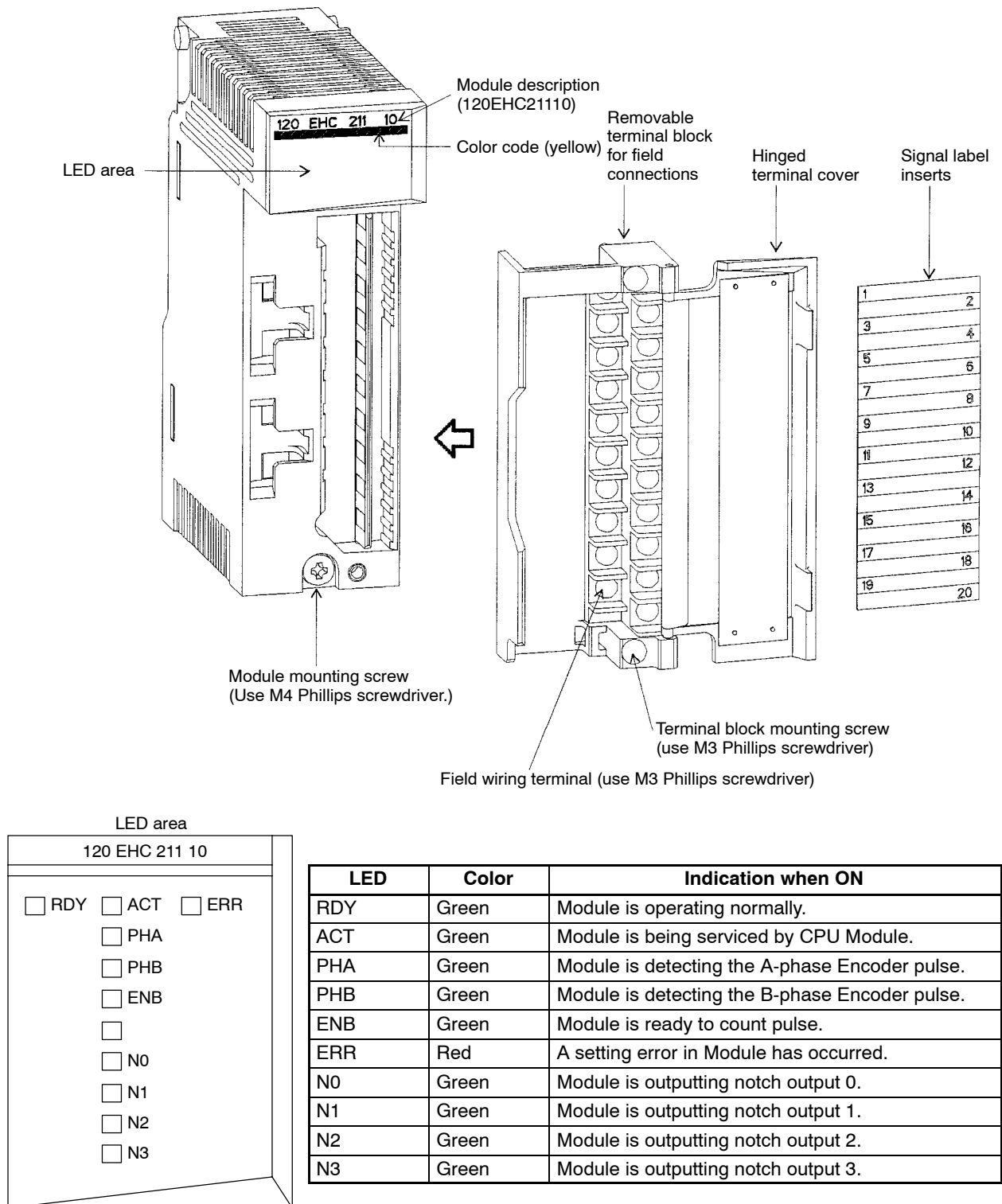


Figure 4.69 Appearance of High-speed Counter Module

2. Functions

1) High-speed Pulse Counting

A High-speed Counter Module counts high-speed pulses from pulse generators such as rotary encoders. The pulse count is stored in input registers in the CPU Module.

2) Notch Signal Output

A High-speed Counter Module compares the pulse count with a preset notch point set values and outputs digital signals called notch signals to external devices such as relays.

3. Specifications

1) Hardware Specifications

The following table shows the hardware specifications of the High-speed Counter Module.

Table 4.97 Hardware Specifications of High-speed Counter Module

Items	Specifications
Model Name	COUNTER-1CH
Model No.	JAMSC-120EHC21110
Internal Current Consumption	350 mA
Maximum Heating Value	1.8 W
Hot Swapping (Removal/Insertion Under Power)	Permitted.
Approximate Mass	300 g
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Mounting Location	Any slot of any Rack.

2) Performance Specifications

The following table shows the performance specifications of the High-speed Counter Module.

Table 4.98 Performance Specifications of High-speed Counter Module

Items		Specifications
Number of Counter Circuits		1
Pulse Count Specifications	Pulse Input System	<ul style="list-style-type: none"> • There are four different types of pulse input systems: <ol style="list-style-type: none"> 1) Sign + pulse, 1X 2) A- and B-phase pulses, 1X 3) A- and B-phase pulses, 2X 4) A- and B-phase pulses, 4X • Using the ladder program, set the initial setting of the pulse input method as the “pulse input mode.”
	Maximum Count Speed	<ol style="list-style-type: none"> 1) 1X: 200 Kpps 2) 2X: 400 Kpps 3) 4X: 800 Kpps
	Count Width	<ol style="list-style-type: none"> 1) Using the ladder program, set the initial setting of the pulse count range as the “count width.” 2) The setting range is between 0 and 16,777,215 (decimal).
	Pulse Input Voltage	<ol style="list-style-type: none"> 1) Use any of the following pulse input voltages: 3, 5, 12 and 24 VDC. 2) The connection methods of the encoder cable to field wiring terminals differ according to the pulse input voltage.
	Pulse Transfer Circuit	<ol style="list-style-type: none"> 1) Use any of the following pulse types: open collector output, TTL output, differential voltage output. 2) For an open-collector output, external power (5/12/24 VDC, 10/20 mA) must be supplied.
	Internal Control Signal	<p>The following signals can be output to the High-speed Counter Module from the ladder program.</p> <ol style="list-style-type: none"> 1) Count enable: The High-speed Counter Module can count pulses while this signal and the external count enable signal are both ON. 2) Current position reset: The current position of High-speed Counter Module can be reset by turning ON this signal.
	External Control Signal	<ul style="list-style-type: none"> • The following signals can be input to the High-speed Counter Module from limit switches or other external devices. <ol style="list-style-type: none"> 1) External count enable : The High-speed Counter Module can count pulses while this signal and the count enable signal are both ON. 2) External current position reset: The current position of High-speed Counter Module can be reset by turning ON this signal. • Input circuit specifications: 12/24 VDC, photocoupler isolation, 2.5 mA/5 mA.

Items		Specifications
Notch Signal Output Specifications for	Number of Output Signals	Four notch signal points can be output to external devices such as relays.
	Notch Output Mode	<ol style="list-style-type: none"> 1) Set the initial setting of the output mode of each notch signal either to state mode or to latch mode from the ladder program. 2) The notch signals set in state mode will be ON if the current position of counter is within the range of set notch point. 3) The notch signals set in latch mode will turn ON when the current position of counter reaches the set notch point. To turn these signals OFF, turn the latch reset signal ON from the ladder program.
	Notch Point Set Value	<ol style="list-style-type: none"> 1) Set the initial setting of the ON/OFF timing of the notch signal at each notch point from the ladder program. 2) Notch point set value in state mode: 2 points Notch point set value in latch mode: 1 point
	Forced Outputs Function	Each notch signal can be forced ON or OFF from the ladder program.
	External Outputs Circuit	Specifications of the output circuit of each notch signal: Open collector output, 12/24 VDC, 100 mA
Internal Control Signal	<p>The following signals can be output to the High-speed Counter Module from the ladder program.</p> <ol style="list-style-type: none"> 1) Notch output enable: The High-speed Counter Module can output notch signals while this signal is ON. 2) Latch reset: The notch signals that turned ON in latch mode can be turned OFF by turning this signal ON. 	
Status when ACTIVE is OFF	<p>Set the initial setting of the status mode when ACTIVE is OFF from the ladder program.</p> <ol style="list-style-type: none"> 1) Count continue mode: In this mode, the High-speed Counter Module will count the pulses even when ACTIVE is OFF. 2) Count stop mode: In this mode, the High-speed Counter Module will not count the pulses when ACTIVE is OFF. 	
Monitor Functions	<p>The following signal can be monitored from the ladder program.</p> <ol style="list-style-type: none"> 1) READY: High-speed Counter Module is normal and ON. 2) ACK: The High-speed Counter Module has been successfully set and it is ON. 3) ERROR: ON when a setting error has occurred. 4) NOTCH OUTPUT 0: ON when notch output 0 is ON. 5) NOTCH OUTPUT 1: ON when notch output 1 is ON. 6) NOTCH OUTPUT 2: ON when notch output 2 is ON. 7) NOTCH OUTPUT 3: ON when notch output 3 is ON. 8) CARRY: ON for one scan when the pulse count is incremented over the count width and has changed to 0 . 9) BORROW: ON for one scan when the pulse count has been decremented past 0 and has changed to the count width value. 	

4

4. Using High-speed Counter Modules

1) Number of Modules

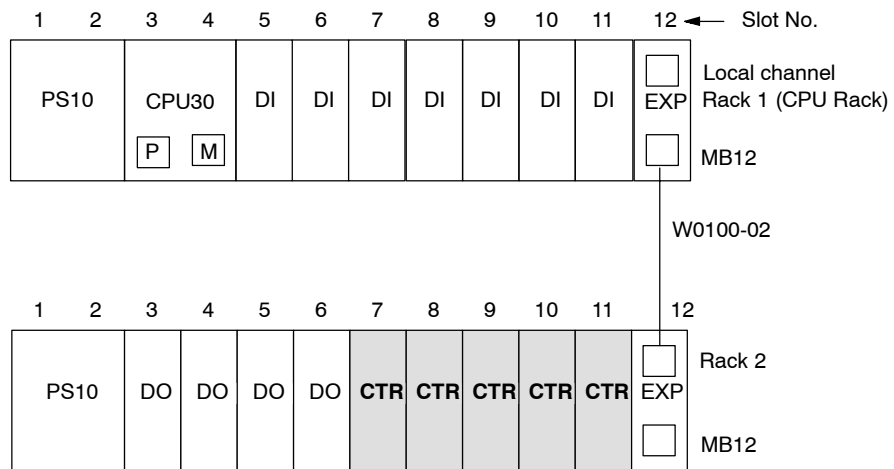
- a) The following I/O references are necessary in the CPU Module for each High-speed Counter Module.
- 16 consecutive input relays
 - 16 consecutive output coils
 - 4 consecutive input registers
 - 4 consecutive output registers
- b) Therefore, the number of High-speed Counter Modules that can be used is determined by how many of the above I/O references are available in the CPU Module.

2) Installation Locations

- a) A High-speed Counter Module can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.

EXAMPLE

- b) The following diagram shows where to mount a High-speed Counter Module.



PS10:	Power Supply Module (7 A)	CTR:	High-speed Counter Module
CPU30:	CPU Module (32 KW)	EXP:	Expander Module
DI:	12/24-VDC 16-point Input Module	MB12:	12-slot Mounting Base
DO:	12/24-VDC 16-point Output Module	W0100-02:	Rack-to-rack I/O Cable (0.2 m)

Figure 4.70 Mounting High-speed Counter Modules

3) Example of System Configuration

EXAMPLE

The following diagram shows an example of a system configuration where a High-speed Counter Module is applied to a high-speed pulse counting from a rotary encoder.

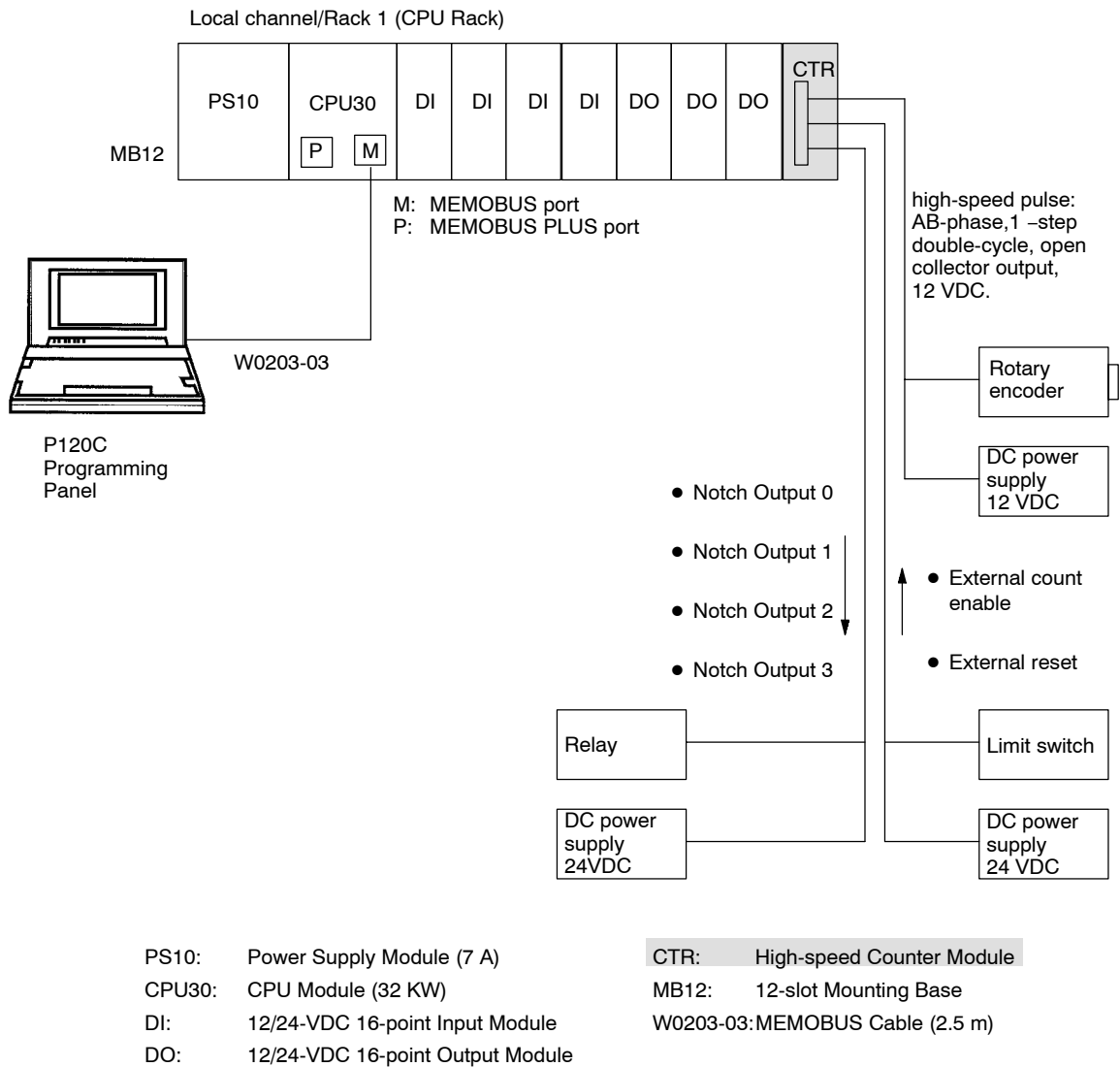


Figure 4.71 Using High-speed Counter Modules

4) Related Manuals

Before operating the High-speed Counter Module, please read the following manual carefully and be sure that you fully understand the information provided.

MEMOCON GL120, GL130 120-series High-speed Counter Module User's Manual (SIEZ-C825-20.24)

4.6.3 Pulse Catch Module

1. Appearance

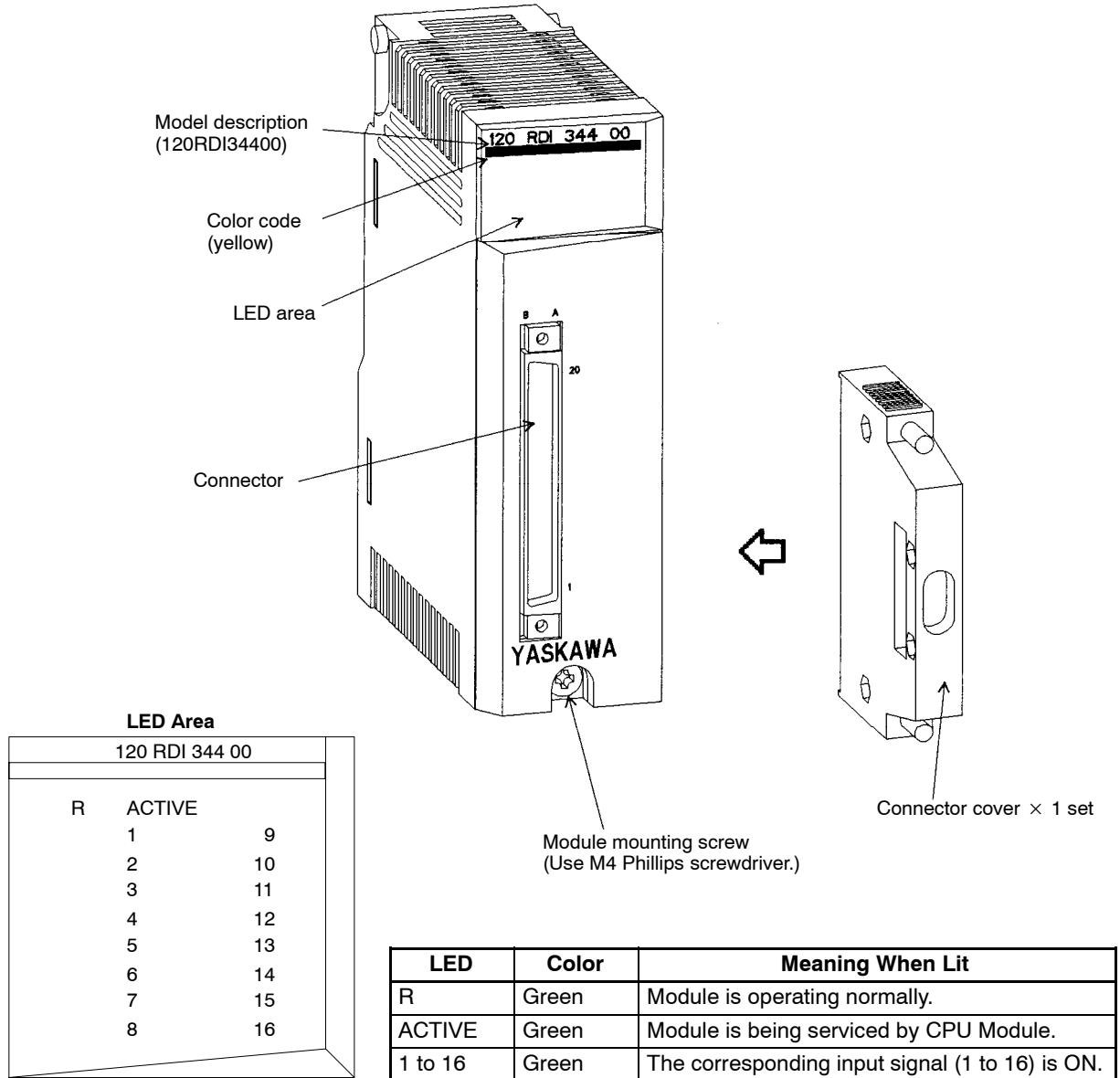


Figure 4.72 Appearance of Pulse Catch Module

2. Functions

1) Pulse Catch Function

The Pulse Catch and Counter Module can hold an input ON signal that is shorter than the CPU Module scan time until the CPU Module is ready to read the signal. The input state is stored in an input relay in the CPU Module.

- a) Number of inputs: 16
- b) Minimum ON signal width
 - 1 ms (with 8 Count Mode channels)
 - 2 ms (with 16 Count Mode channels)

2) Counter Function

The Pulse Catch and Counter Module is able to count the number of input ON signal pulses. It can also store the count and a carry in input registers in the CPU Module.

- a) Number of input channels: 16 channels max., switch between 8 and 16 channels.
- b) Maximum input signal frequency:
 - 500 Hz (with 8 Count Mode channels)
 - 250 Hz (with 16 Count Mode channels)
- c) Count Modes:
 - Absolute: Counts from 0 to FFFF(h) and outputs a carry above FFFF(h).
 - Incremental: Counts the number of input pulses in a CPU Module scan.



- 1) The pulse catch and counter functions can be used simultaneously if both are set to "Used."
- 2) The pulse catch and counter functions can be used for the same external input circuit.

3. Specifications

1) Hardware Specifications

The following table shows the hardware specifications of the Pulse Catch Module.

Table 4.99 Hardware Specifications of Pulse Catch Module

Item	Specifications	
	Voltage Used	
	12 VDC	24 VDC
Name	Pulse Catch and Counter Module	
Module Name	COUNTER-16CH	
Model No.	JAMSC-120RDI34400	
Rated Voltage	12/24 VDC	
Maximum Permissible Voltage	30 VDC	
Input Type	Sourcing/sinking	
Rated Current	5.0 mA	10.5 mA
Input Impedance	2.2 kΩ	
Standard Operating Range	Minimum ON Voltage: 9 VDC Maximum OFF Voltage: 5 VDC	
Input Type	Does not conform to JIS B 3501.	DC type 2 according to JIS B 3501.
Number of Commons	1	
Input Points per Common	16 points per common	
External Connections	40-pin connector: 1 Connector model: FCN-365P040 (made by Fujitsu Ltd.)	
Input Points	16 points (when using pulse catch and counter functions together)	
Input Signal Indicators	Light for each point that is ON, internal logic	
Isolation Method	Photocoupler isolation	
External Power Supply	For signals: 12 VDC	For signals: 24 VDC
Derating Conditions	None	
Internal Current Consumption	5 VDC, 200 mA (when all points are ON)	
Maximum Heating Value	6 W	
Hot Swapping	Permitted.	
Approximate Mass	300 g	
External Dimensions	40.3 × 130.0 × 103.9 mm (W x H x D)	

2) Performance Specifications

The following table shows the performance specifications of the Pulse Catch Module.

Table 4.100 Performance Specifications of Pulse Catch Module

Items		Specifications
Pulse Catch Function	No. of Input Circuits	16
	Minimum ON Signal Width	1) With 8 Count Mode channels: 1 ms 2) With 16 Count Mode channels: 2 ms Sixteen points can be used to catch pulses when either 8 or 16 Count Mode channels are specified.
	Internal Control Signals	The following signals can be output to the Pulse Catch and Counter Module from the ladder logic program. RUN enable: External input is enabled on the Pulse Catch and Counter Module while this signal is ON. A signal can be set for every external input circuit.
Counter Function	No. of Input Channels	16 channels (max.) 1) With 8 Count Mode channels: 8 channels max. 2) With 16 Count Mode channels: 16 channels max.
	Maximum Input Signal Frequency	1) With 8 Count Mode channels: 500 Hz 2) With 16 Count Mode channels: 250 Hz
	Internal Control Signals	The following signals can be output to the Pulse Catch and Counter Module from the ladder logic program. 1) Counter enable: External input is enabled on the Pulse Catch and Counter Module while this signal is ON. A signal can be set for every external input circuit. 2) Clear: The count from the counter function will be cleared when this signal turns ON.
	Monitor Function	The following signal can be monitored from the ladder logic program. Carry: This signal stays ON for only a few scans after the count passes FFFF(h) and returns to 0 if the counter function is in Absolute Mode.

4. Using Pulse Catch Modules

1) Number of Modules

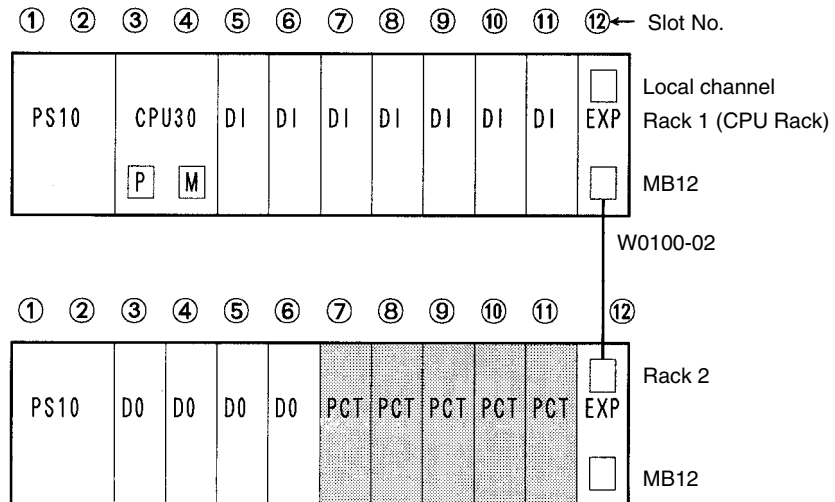
- a) The following I/O references are necessary in the CPU Module for each Pulse Catch and Counter Module.
- 16 consecutive input relays (Not needed if the pulse catch function is not used.)
 - 17 consecutive input registers (Not needed if the counter function is not used.)
 - 2 consecutive output registers (One set if count clear is not used.)
- b) Therefore, the number of Pulse Catch and Counter Modules that can be used is determined by how many of the above I/O references are available in the CPU Module.

2) Installation Locations

- a) A Pulse Catch Module can be mounted to any slot of the Mounting Base of any Rack. It will occupy one slot.

EXAMPLE

- b) The following diagram shows where to mount a Pulse Catch Module.



PS10:	Power Supply Module (7 A)	PCT:	Pulse Catch and Counter Module
CPU30:	CPU Module (32 KW)	EXP:	Expander Module
DI:	12/24-VDC 16-point Input Module	MB12:	12-slot Mounting Base
DO:	12/24-VDC 16-point Output Module	W0100-02:	Rack-to-rack I/O Cable (0.2 m)

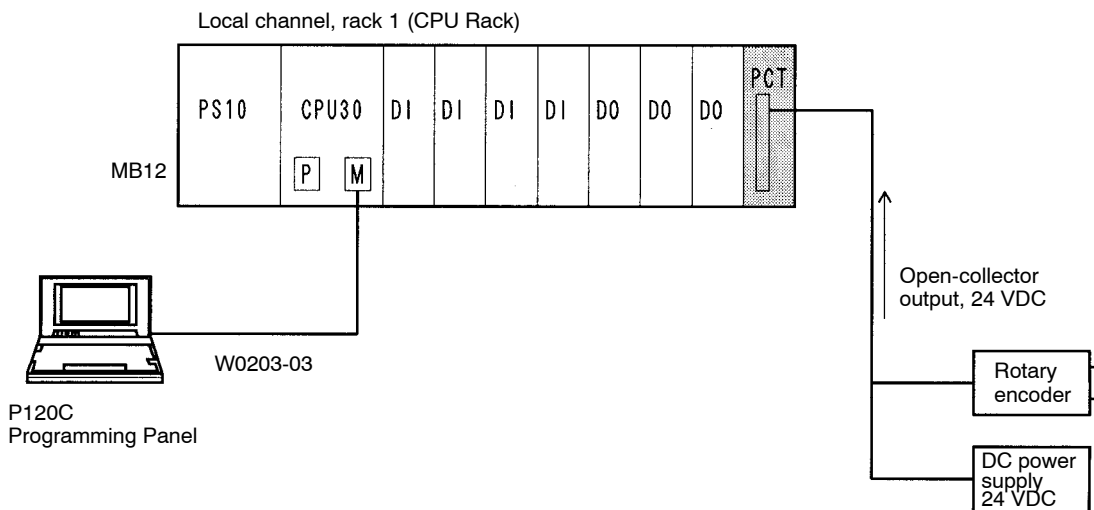
Note The Pulse Catch and Counter Module can be mounted in any slot of any rack although there may be some system configuration restrictions. Refer to the related documentation for more details on the restrictions.

Figure 4.73 Mounting Pulse Catch Modules

3) Example of System Configuration

EXAMPLE

The following diagram shows an example of a system configuration where a Pulse Catch and Counter Module is used for counting.



- | | | | |
|--------|----------------------------------|-----------|--------------------------------|
| PS10: | Power Supply Module (7 A) | PCT: | Pulse Catch and Counter Module |
| CPU30: | CPU Module (32 KW) | MB12: | 12-slot Mounting Base |
| DI: | 12/24-VDC 16-point Input Module | W0203-03: | MEMOBUS Cable (2.5 m) |
| DO: | 12/24-VDC 16-point Output Module | | |

Figure 4.74 Using Pulse Catch Modules

4) Related Manuals

Before operating a Pulse Catch Module, read the following manual carefully and be sure that you fully understand the information on specifications, application methods, safety precautions, etc.

MEMOCON GL120, GL130 Pulse Catch and Counter Module User's Manual (SIEZ-C825-20.24)

4.7 Motion Modules

■ This section provides a summary of the Motion Modules.

4.7.1	Models of Motion Modules	4-245
4.7.2	Four-axis Motion Module	4-246
4.7.3	One-axis Motion Module	4-257
4.7.4	Two-axis Motion Module	4-265

4.7.1 Models of Motion Modules

There are three models of Motion Modules.

Table 4.101 Models of Motion Modules

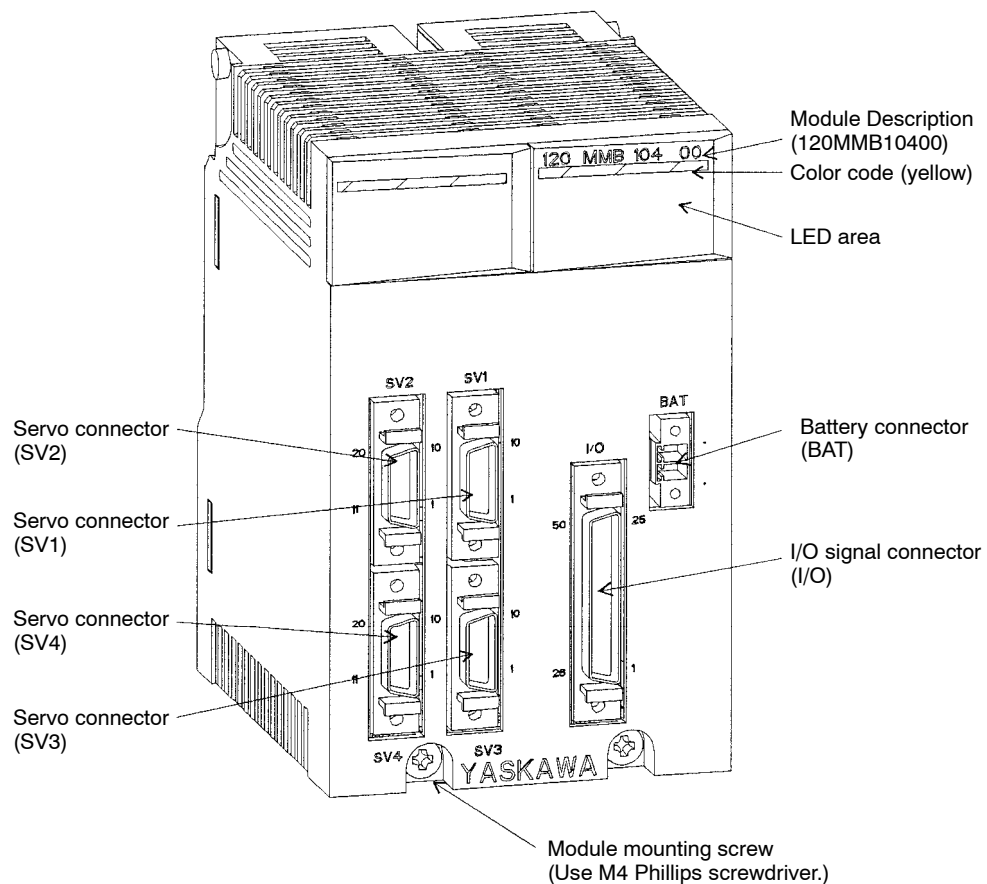
Name	Model Name	Model No.	Features	Number of Slots Required
Four-axis Motion Module	MC20	JAMSC-120MM B10400	1) Used for 4-axis motion control. 2) Analog commands. 3) Compatible with both absolute and incremental encoders. 4) Simultaneous 4-axis positioning and linear interpolation. Simultaneous 3-axis helical interpolation. Simultaneous 2-axis circular interpolation. Independent control of each axis. 5) Two 4-axis Modules can be used.	1
One-axis Motion Module	MC10	JAMSC-120MM B10100	1) Used for One-axis motion control. 2) Analog commands. 3) Compatible with both absolute and incremental encoders. 4) Single stage speed operation. Multi-stage (1 to 16 stages) operation. Through-point outputs. External positioning.	1
Two-axis Motion Module	MC15	JAMSC-120MM B20200	1) Used for two-axis motion control. 2) Uses pulse reference mode. 3) Can be used for both absolute and incremental encoders. 4) One-point positioning. Consecutive point positioning. Through-point output. External positioning.	1

Refer to the following manuals for details on Motion Modules.

- MEMOCON GL120, GL130 Motion Module MC20 Hardware User's Manual (SIEZ-C825-20.51)
- MEMOCON GL120, GL130 Motion Module MC20 Software User's Manual (SIEZ-C825-20.52)
- MEMOCON GL120, GL130 Teach Pendant TB120 for Motion Module MC20 User's Manual (SIEZ-C825-60.3)
- MEMOCON GL120, GL130 Motion Module MC10 User's Manual (SIEZ-C825-20.41)
- MEMOCON GL120, GL130 Motion Module MC15 User's Manual (SIEZ-C825-20.43)

4.7.2 Four-axis Motion Module

1. Appearance



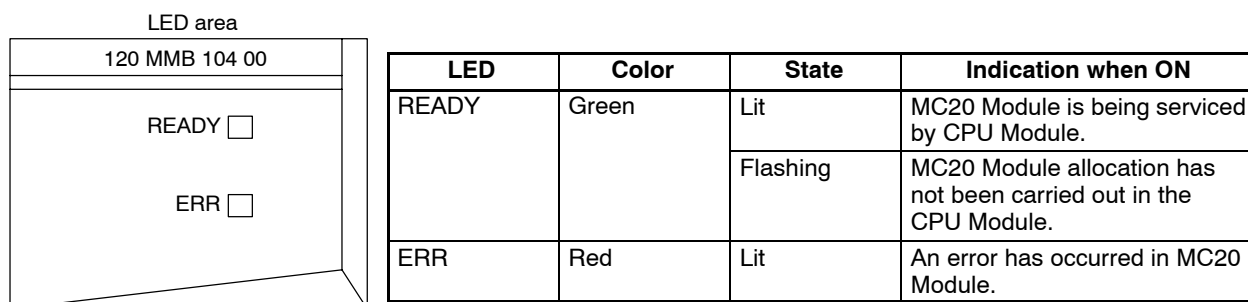


Figure 4.75 Appearance of Four-axis Motion Module

2. Function

A 4-axis Motion Module is a Module incorporating various functions to control servomotors. With Module, 4-axis motion control is possible.

3. Specifications

1) Hardware Specifications

The following table shows the hardware specifications of 4-axis Motion Module.

Table 4.102 Hardware Specifications of 4-axis Motion Module

Items	Specifications
Model Name	MC20
Model No.	JAMSC-120MMB10400
Internal Current Consumption	1,650 mA
Maximum Heating Value	12.8 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	500 g
External Dimensions	Width: 81 mm Height: 130 mm Depth: 105.2 mm
CPUs	1) Main CPU: NG80386SX-16 (32-bit, 16-MHz) 2) Servo CPU: μ PD70236GD-16 (16-bit, 16-MHz)
Memory	1) Memory1 ROM: 512 Kbytes RAM: 256 Kbytes (battery backup) 2) Memory 2 ROM: 128 Kbytes RAM: 64 Kbytes (battery backup)

Items	Specifications
Servo Interface Signals	<p>The following signals can be input/output from/to up to four servo amps via the servo connectors (SV1 to SV4) on the front panel of the Module.</p> <ol style="list-style-type: none"> 1) Input signals <ol style="list-style-type: none"> a) Feedback Input 5-V differential line receiver. AB-phase. Maximum frequency: 1 Mpps (1X). Line breakage detection. b) Servo Alarm Input 24 VDC, 5 mA, photocoupler isolation. 2) Output signals <ol style="list-style-type: none"> a) Speed Reference Outputs Analog speed reference outputs. 0 to ± 10 VDC. b) Battery Output Connect to the battery input of absolute SERVOPACK. c) SEN Signal Output Connect to the SEN input of absolute SERVOPACK. 5 VDC, 5 mA. d) Servo ON Output 24 VDC, 15 mA, photocoupler isolation, open-collector output (sinking output). e) Servo Reset Output: Same as above f) PCON Signal Output: Same as above* * New step-2 command
External I/O Signals	<p>The following signals can be input/output from/to external devices via the I/O signal collector on the front panel of the Module.</p> <ol style="list-style-type: none"> 1) Input Signals <ol style="list-style-type: none"> a) Number of Signals: 17 b) Signal Names: Positive overtravel (axes 1 to 4) Negative overtravel (axes 1 to 4) Zero signal (axes 1 to 4) Deceleration signal (axes 1 to 4) Skip input c) Input Circuit Specifications 24 VDC, 5 mA, photocoupler isolation, sinking/sourcing inputs. 2) Output Signals <ol style="list-style-type: none"> a) Number of Signals: 4 b) Signal Names Brake outputs (axes 1 to 4) c) Output Signal Specifications 24 VDC, 50 mA, photocoupler isolation, open-collector outputs (sinking outputs).

Items	Specifications
Battery Backup	<p>1) Memory Backup Circuit</p> <p>a) Parameter, the motion program, and point table data is maintained by memory backup circuits during power interruptions.</p> <p>b) Backup Power Supplies</p> <p>(1) Lithium Battery in CPU Module Battery life: 5 yrs (at 25°C) Memory backup time without power supply: 1 yr. (at 25°C)</p> <p>(2) Large-capacity Capacitor in 4-axis Motion Module Maximum backup time of 3 days on full charge.</p> <p>2) Absolute Encoder Backup Circuits</p> <p>a) Rotation data for absolute encoder application is backed up during power interruptions by the absolute encoder backup circuits.</p> <p>b) Backup Power Supplies</p> <p>(1) Battery Module (JRMSP-120XCP96000) Rotation data for up to 8 absolute encoders can be backed up with one Battery Module. The memory backup time without power supply when 8 absolute encoders are connected is 1 yr., but this time will be shortened if the encoders are operated when power is not being supplied.</p> <p>(2) Large-capacity Capacitor in Absolute Encoder Maximum backup time of 3 days on full charge.</p> <p>c) A battery voltage drop detection circuit is built into the Battery Module and an alarm output for voltage drop can be read with a Digital Input Module.</p>
External Power Supply	The following external power supply is required as power for the external I/O signals: 24 VDC, 2 A

2) Performance Specifications

The following table shows the performance specifications of 4-axis Motion Modules.

Table 4.103 Performance Specifications of 4-axis Motion Modules

Items	Specifications
1) Number of Control Axis	<p>4 axes</p> <ul style="list-style-type: none"> ● 4 axes simultaneously: Positioning and linear interpolation ● 3 axes simultaneously: Helical interpolation ● 2 axes simultaneously: Circular interpolation
2) Independent Axis Operation	Possible with a sequence command from the CPU Module
3) Coordinate Setting Unit	<p>Linear axis: 0.001 mm min.</p> <p>Circular axis: 0.001 degree min.</p>

Items	Specifications
4) Maximum Command Value	± 99,999,999. Circular positioning and linear axis positioning are possible with no length limit.
5) Rapid Traverse Speed and Interpolation Feed Speed	60 m per min max. at the rate of 0.001 mm per pulse 600 m per min at the rate of 0.01 mm per pulse
6) Automatic Acceleration and Deceleration	<p>Interpolation: Single-step linear acceleration and deceleration; double-step linear acceleration and deceleration; asymmetric acceleration and deceleration; exponential acceleration and deceleration; moving average acceleration and deceleration; S-curve acceleration and deceleration</p> <p>Positioning } Stepping operation } Jogging operation } Independent axis operation }</p> <p>Single-step linear acceleration and deceleration; double-step linear acceleration and deceleration; asymmetric acceleration and deceleration; exponential functional acceleration and deceleration; moving average acceleration and deceleration; S-curve acceleration and deceleration</p> <p>Home return: Single-step linear acceleration and deceleration</p>
7) Override	<p>a) MC control coils: Positioning: 0% to 100% (16 stages) Jogging: 0% to 100% (16 stages) Interpolation: 0% to 200% (16 stages)</p> <p>b) MC link registers: Positioning: 0.0% to 3276.7% (setting units: 0.1%) Jogging: 0.0% to 3276.7 (setting units: 0.1%) Interpolation: 0.0% to 3276.7 (setting units: 0.1%)</p> <p>Note: The override setting (setting units: 0.1%) is available only for 4-axis Motion Module versions B08 onwards. If this function is required, use a Module with an appropriate version number (refer to page 4-253).</p>
8) Manual Jogging	4 axes simultaneously
9) Manual Stepping	4 axes simultaneously
10) Positioning Control	Possible to set to a value between 0 and 10,000 command resolutions
11) Stored Stroke Limit	Upper- and lower-limits for each axis independently
12) Current Value Change	Possible
13) Backlash Compensation	0 to 32,767 pulses.

Items	Specifications
14) Operation Mode	<p>Any of the following modes can be selected with a sequence command from the CPU Module.</p> <p>a) Edit mode: Used to load programs from the programming device to the MC20 Module to save the programs.</p> <p>b) Automatic mode: Used to enable the MC20 Module to operate automatically using any one of the programs registered with the MC20 Module.</p> <p>c) Manual mode: Used to enable the MC20 Module to perform JOG, STEP, or HOME RETURN.</p> <p>d) On-line edit mode: Used to write programs by teaching the MC20 Module the current value block by block from the programming device.</p>
15) Programming Method	Interpreter method in dedicated motion language
16) Motion Commands	<p>POSITIONING (MOV), LINEAR INTERPOLATION (MVS), CIRCULAR INTERPOLATION (MCW, MCC), HELICAL INTERPOLATION (MCW, MCC), HOME RETURN (ZRN), ABSOLUTE PROGRAMMING MODE (ABS), INCREMENTAL PROGRAMMING MODE (INC), CURRENT POSITION SET (POS), MOVE ON MACHINE COORDINATES (MVM), DWELL TIME (TIM), PROGRAM STOP (STP), PROGRAM END (END), IN-POSITION CHECK (PFN), SECOND IN-POSITION RANGE SETTING (INP), SET EXTERNAL OUTPUT (SET), PASS NOTCH SIGNAL OUTPUT (PNT), IGNORE SINGLE-BLOCK SIGNAL (SNG), I/O WAIT (IOW), SUB-PROGRAM CALL (GSB), RETURN (RET), PCON SIGNAL OUTPUT (PCN)*, VOLTAGE OUTPUT (VCC)*, EXTERNAL POSITIONING (EXM)*, RATIO OPERATION (PGS)*, RATIO OPERATION CANCEL (PGR)*, TRAILING SYNCHRONOUS OPERATION (TSS)*, TRAILING SYNCHRONOUS OPERATION CANCEL (TSR)*, ARITHMETIC COMMANDS (=,+,-,*,/), BRANCH CONTROL COMMANDS (IF...GO TO...), REPEAT CONTROL COMMANDS (WHILE...DO...), and VARIABLES (# nnn,# nnnn, Hn)</p> <p>* New step-2 commands.</p>
17) Position Command Using Point Table	<p>MOV #E...;</p> <p>Enables the MC20 Module to decide the position designated by #E in the space made with the four-axis (X, Y, Z and S) data stored by the MC20 Module. A maximum of 500 points can be stored.</p>
18) Pallet Command	<p>PMV P..C...;</p> <p>Enables the MC20 Module to decide the position on the grid number designated by C on pallet P.</p> <p>Max. pallet no.: 199.</p> <p>Max. grid no.: 999 x 999.</p>
19) SKIP	<p>SKP X...Y...Z...S...F...;</p> <p>When an external SKIP signal is ON while the above is enabling the MC20 Module to execute axis travelling, the MC20 Module will stop the axis travelling, cancel the remaining travel amount of the current block, and go to the next block.</p>

Items	Specifications
20) Program Registration	Programs with program numbers between 01 and 99 and sequence numbers between N001 and N999 can be registered and stored.
21) Program Execution	<ul style="list-style-type: none"> a) A program number and block number can be designated from the CPU Module to enable the MC20 Module in automatic mode to execute the program from the designated block. b) A single block can be designated from the CPU Module to enable the MC20 Module in automatic mode to execute the block. c) A program can be designated from the programming device to enable the MC20 Module in online edit mode to execute the program.
22) Program Execution Method	While the MC20 Module is executing positioning or servomotor control command for interpolation in a block, the commands not involving servomotor control in the next block will be executed simultaneously.
23) Machine Lock	The MC20 Module can check the motion programs of the MC20 Module without executing axis control.
24) I/O Variable	The MC20 Module makes it possible to monitor the coil status of the CPU Module from the motion programs stored in the MC20 Module or output the coil status to the relay.
25) Link I/O Variables	Data can be exchanged between the MC link registers of the ladder logic programs of the CPU Module and the variables of the motion programs of the MC20 Module.
26) Home Position Return	All axes return home simultaneously. It is possible to designate axes to return home with a program. Axes return home with a command from the CPU Module or a motion program.
27) Monitor	<p>The following status can be monitored from the programming device.</p> <ul style="list-style-type: none"> a) Current positions, I/O status with the CPU Module, and program step being executed b) Position errors and alarm contents
28) Utility Command	A variety of commands can be executed with sequence commands of the CPU Module, such as mode selection, servo ON and OFF, program run, programmed independent axis operation, home return, jogging operation, single block operation, resetting alarms, machine reset, resetting Modules, stepping operation, machine lock operation, status of emergency stop and data monitor, and parameter change commands, setting present value, setting H variables, setting point tables, and setting home (zero point).

4

Note The CPU Module, 4-axis Motion Module, and MEMOSOFT versions that support the new step-2 functions for 4-axis Motion Modules are listed in the following table.

Table 4.104 Versions Supporting New Step-2 Functions

Name	Module Name	Model No.	Version Number	Location of Version Number
CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	<input type="checkbox"/> <input type="checkbox"/> A08 onwards	Module nameplate
CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	<input type="checkbox"/> <input type="checkbox"/> A07 onwards	Module nameplate
CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
Four-axis Motion Module	MC20	JAMSC-120MMB10400	<input type="checkbox"/> <input type="checkbox"/> B01 onwards	Module nameplate
MEMOSOFT		FMSG-L-AT3 (for English DOS)	1.20 <input type="checkbox"/> onwards	In the middle at the bottom of the MEMOSOFT startup screen.
		FMSG-L-PP3E (for P120 English version)		

* The nameplate is on the right side of the Module.

Note The CPU Module, 4-axis Motion Module, and MEMOSOFT versions that support the new functions added to 4-axis Motion Module versions B08 onwards are shown in the following table.

Table 4.105 Versions Supporting New Functions on Versions B08 Onwards

Name	Module Name	Model No.	Version Number	Location of Version Number
CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	<input type="checkbox"/> <input type="checkbox"/> B05 onwards	Module nameplate
CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	<input type="checkbox"/> <input type="checkbox"/> B05 onwards	Module nameplate
CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	<input type="checkbox"/> <input type="checkbox"/> A01 onwards	Module nameplate
4-axis Motion Module	MC20	JAMSC-120MMB10400	<input type="checkbox"/> <input type="checkbox"/> B08 onwards	Module nameplate
MEMOSOFT		FMSG-L-AT3 (for English DOS)	1.40 <input type="checkbox"/> onwards (see note)	In the middle at the bottom of the MEMOSOFT Startup Screen.
		FMSG-L-PP3E (for P120 English version)		

* The nameplate is on the right side of the Module.

Note It is not possible to set the override function from MEMOSOFT version 1.40. The override function must be set from the ladder program using the PMR instruction.

4. Using 4-axis Motion Modules

1) Number of Modules

Up to two 4-axis Motion Modules can be used.

2) Installation Location

a) A 4-axis Motion Module can be mounted to any slot of the Mounting Base of Rack 1 (CPU Rack) of the local channel.

EXAMPLE

b) The following diagram shows an example of where to mount a 4-axis Motion Module.

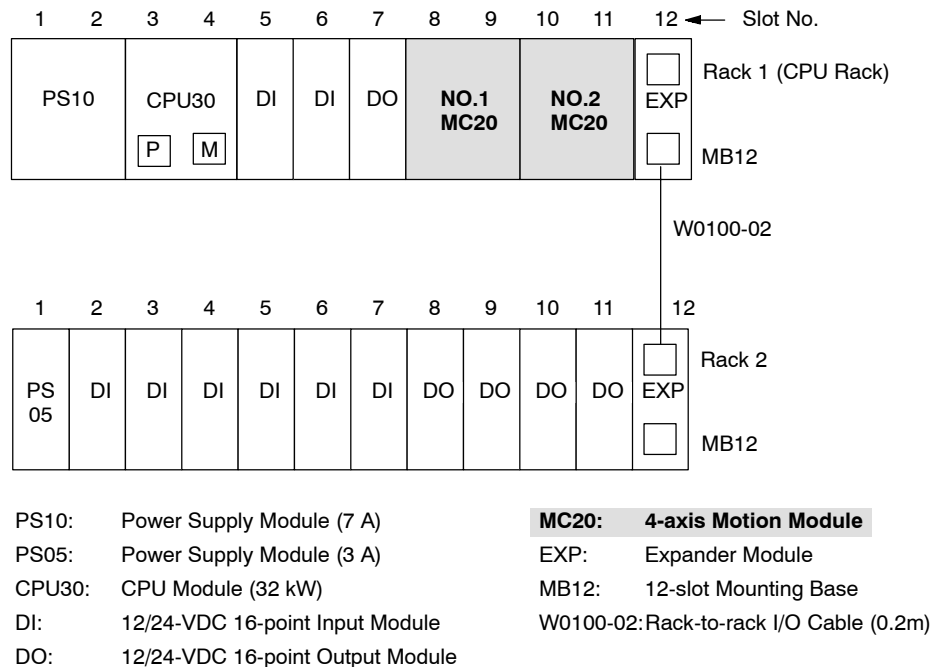


Figure 4.76 Mounting a 4-axis Motion Module

Note Allocate the right slot number for the 4-axis Motion Module. If the left slot number is incorrectly allocated, the Motion Module will not operate. In the example shown above, allocations for No.1 MC20 are performed for slot 9 while allocations for No. 2 MC20 are performed for slot 11.

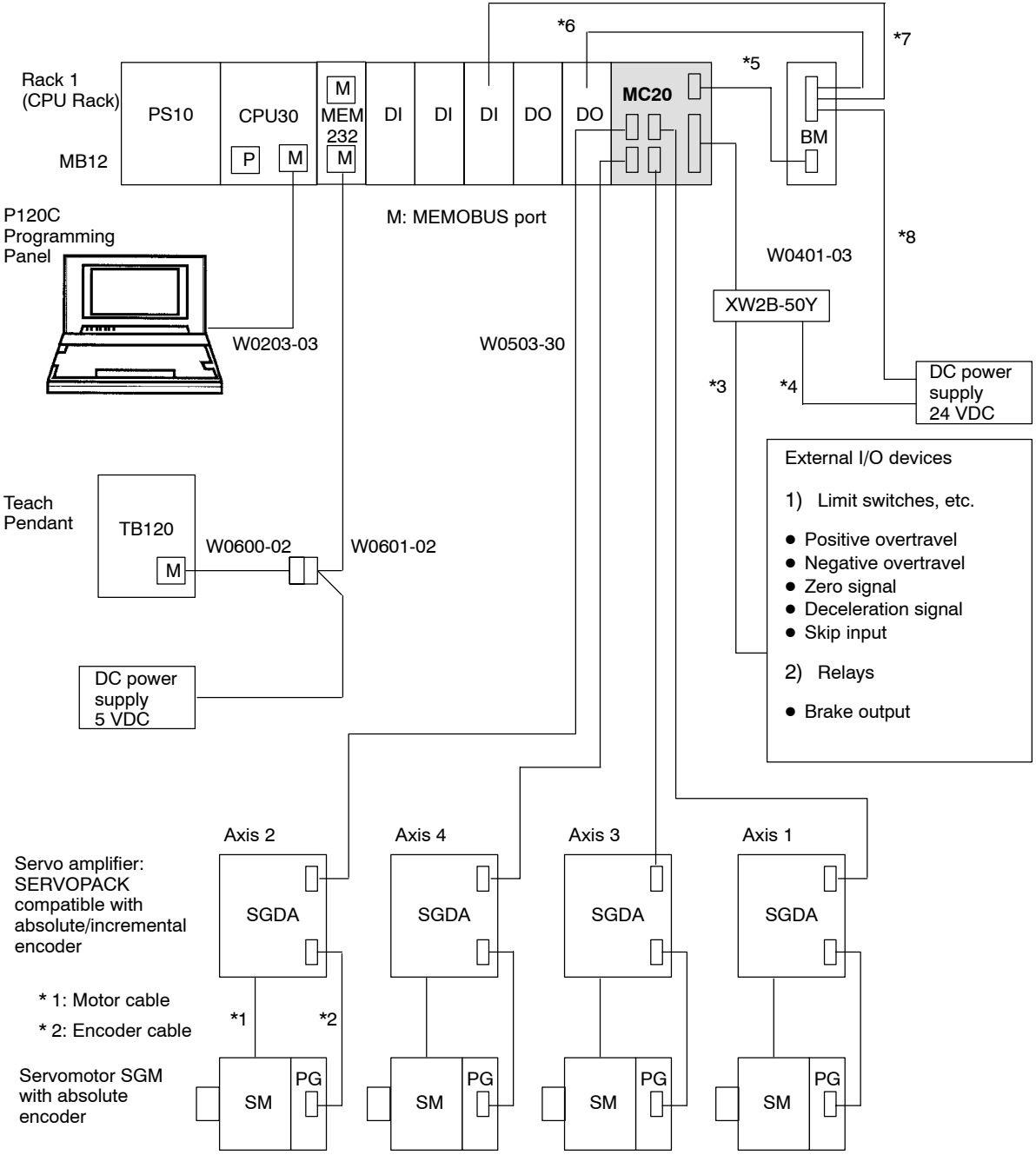
3) Example of System Configuration

EXAMPLE

a) The following page illustrates an example of system configuration of a 4-axis Motion Module applied to controlling a servomotor with an absolute encoder.

b) When a 4-axis Motion Module is used to control a servomotor with an incremental encoder, the Battery Module (Model No.: JRMS-120XCP96000) is not required.

Example
 System Configuration with a 4-axis Motion Module Controlling a Servomotor with an Absolute Encoder



- | | | | |
|--------------|------------------------------------|-----------|--|
| PS10: | Power Supply Module (7 A) | W0503-30: | Servo cable (3.0 m) |
| CPU30: | CPU Module (32 KW) | W0401-03: | Motion Module I/O Cable (3.0 m) |
| MEM232 | MEMOBUS Module (RS-232) | W0203-03: | MEMOBUS Cable (2.5 m) |
| DI: | 12/24-VDC 16-point Input Module | W0600-02: | Teaching Pendant Cable (2.0 m) |
| DO: | 12/24-VDC 16-point Output Module | W0601-02: | Teaching Pendant Cable (2.0 m) |
| MC20: | 4-axis Motion Module | *1, *2: | See the technical documents on SERVOPACK. |
| MB12: | 12-slot Mounting Base | *3 to *8: | To be prepared by user |
| BM: | Battery Module (JRMSP-120XCP96000) | XW2B-50Y: | Terminal block connector (manufactured by OMRON) |

Figure 4.77 A 4-axis Motion Module Controlling Servomotor with Absolute Encoder

4) Applicable Servo Amplifiers

Be sure to use a servo amplifier for speed control that supports analog voltage speed commands. The following Yaskawa servo amplifiers may be used.

Table 4.106 Applicable Yaskawa Servo Amplifiers

AC Servo Series	Model Number
Σ Series	SGD□-□□□
Σ Series	DR□-□□□□
Σ-II Series	SGDM-□□□
Σ-II Series	SGDH-□□□
M, F, G, D, S, R, P Series	CACR-SR□□□□
VS-866	CIMR-SVJ-□A□

IMPORTANT

5) Battery Module

When using a 4-axis Motion Module to control a Servomotor with an Absolute Encoder, use a Battery Module (JRMSP-120XCP96000) to supply power to Absolute Encoder backup circuits. Rotation data for up to 8 absolute encoders can be backed up with one Battery Module in the event of a power interruption.

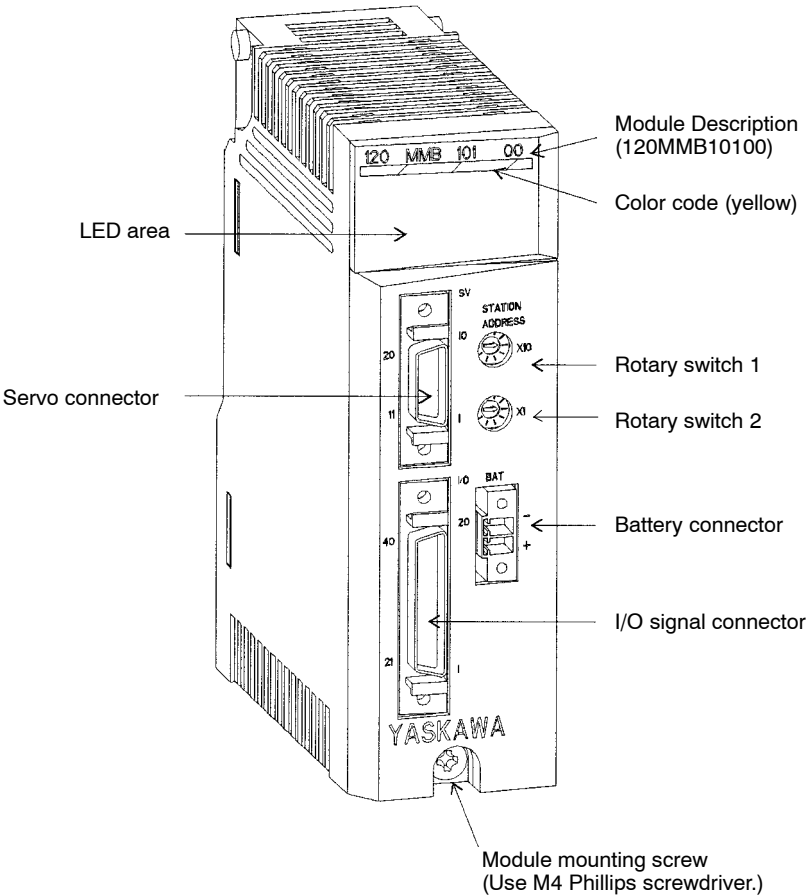
6) Related Manuals

Before operating the 4-axis Motion Module, please read the following manuals carefully and be sure that you fully understand the information provided.

- *MEMOCON GL120, GL130 Motion Module MC20 Hardware User's Manual (SIEZ-C825-20.51)*
- *MEMOCON GL120, GL130 Motion Module MC20 Software User's Manual (SIEZ-C825-20.52)*
- *MEMOCON GL120, GL130 Teach Pendant TB120 for Motion Module MC20 User's Manual (SIEZ-C825-60.3)*

4.7.3 One-axis Motion Module

1. Appearance



LED area	
120 MMB 101 00	
READY <input type="checkbox"/>	ACTIVE <input type="checkbox"/>
RUN/E1 <input type="checkbox"/>	COIN/E4 <input type="checkbox"/>
FWD/E2 <input type="checkbox"/>	PHA/E5 <input type="checkbox"/>
RVS/E3 <input type="checkbox"/>	PHB/E6 <input type="checkbox"/>

LED	Indication when ON
READY	Module has completed initialization and is ready.
ACTIVE	Module ladder instruction in CPU Module is ready to control the Module.
RUN/E1	Module has completed initialization and is ready. (Same meaning as READY).
FWD/E2	Module is outputting forward run command to servomotor.
RVS/E3	Module is outputting reverse run command to servomotor.
COIN/E4	Current position is in the positioning completed range.
PHA/E5	Module is detecting A-phase pulse of encoder.
PHB/E6	Module is detecting B-phase pulse of encoder.

Figure 4.78 Appearance of One-axis Motion Module

The Module system status will be show as follows:

Module Status	LED		
	READY	RUN/E1	FWD/E2
Running normally	Green lit	Green lit	Any
A system error has occurred.	Not lit	Red lit	Any
Alarm has occurred.	Green lit	Not lit	Red light goes on and flashes, then repeats cycle.

When an alarm is occurring for the Module, a 2-digit decimal alarm code will be displayed as follows: (See other manuals for the meaning of alarm codes.)

FWD/E2: When red light goes on, LEDs RVS/E3 to PHB/E6 will show a 1s digit of the alarm code; when red light flashes, LEDs RVS/E3 to PHB/E6 will show the 10s digit of the alarm code.

RVS/E3 to PHB/E6: Alternately show the 1s and 10s digits of the alarm code.

2. Function

A One-axis Motion Module is Module incorporating various functions to control servomotor. With one Module, One-axis motion control is possible.

3. Specifications

1) Hardware Specifications

The following table shows the Hardware specifications of the One-axis Motion Module.

Table 4.107 Hardware Specifications of a One-axis Motion Module

Items	Specifications
Model Name	MC10
Model No.	JAMSC-120MMB10100
Internal Current Consumption	1050 mA
Maximum Heating Value	8.7 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	300 g
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm

Items	Specifications
Servo Interface Signals	<p>The following signals can be input/output via the servo connector on the front of the Module with one servo amplifier.</p> <ul style="list-style-type: none"> ● Input signals: <ol style="list-style-type: none"> 1) Feedback input: 5 V differential line receiver or +12 V open-collector, AB-phase method. Countable frequency: 1 Mpps (1X) Equipped with disconnection detection function. 2) Servo alarm input: 24 VDC, 5 mA, photocoupler isolation. ● Output signals: <ol style="list-style-type: none"> 1) Speed command output: analog command output, 0 to ± 10 VDC. 2) Battery output: Connect to the battery input of absolute SERVOPACK. 3) SEN signal output: Connect to the SEN input of absolute SERVOPACK. 5 VDC, 5 mA. 4) Servo ON-output: 24 VDC, 15 mA, photocoupler isolation, open-collector output (sinking output). 5) Servo reset output: Same as above
External I/O Signals	<p>The following signals can be input/output via the I/O signal collector on the front of the Module with external devices.</p> <ul style="list-style-type: none"> ● Input signals: <ol style="list-style-type: none"> 1) Signals: 7 points 2) Names of signals: <ul style="list-style-type: none"> Positive overtravel Negative overtravel Zero signal Deceleration signal External positioning External start External stop 3) Input circuit specifications: 24 VDC, 5 mA, photocoupler isolation, combined sinking/sourcing inputs ● Output signals: <ol style="list-style-type: none"> 1) Signals: 2 points 2) Names of signals: <ul style="list-style-type: none"> Brake output Notch output 3) Output circuit specifications: 24 VDC, 50 mA, photocoupler isolation, open-collector output (sinking outputs).

Items	Specifications
Absolute Encoder Backup Circuit	<ul style="list-style-type: none"> ● Absolute encoder backup circuit will backup revolution data during power interruptions while absolute encoders are being used. ● The following are used for backup power supply: <ol style="list-style-type: none"> 1) Battery Module (Model No.: JRMSP-120XCP96000): One Battery Module enables the backup of revolution data of up to 8 absolute encoders. When Battery Module is connected to 8 absolute encoders, it can backup data for 1 year max. However, if encoder is rotated during this period, the backup period will be less than 1 year. 2) Large-capacity capacitor in absolute encoder After full recharge, can backup up to 3 days. ● Battery Module has a built-in battery voltage low-level detection circuit. The alarm output caused by a low voltage level can be read using a Digital Input Module.
External Supply Power	The following external supply power is needed for external I/O signal power: 24 VDC, 1 A

2) Performance Specifications

The following table shows the performance specifications of a One-axis Motion Module.

Table 4.108 Performance Specifications of One-axis Motion Module

Items	Specifications
Number of Controlled Axes	1 axis
Coordinate Setting Unit	Linear axis: 0.001 mm min. Rotary axis: 0.001 degree min.
Maximum Command Value	± 99,999,999
Maximum Command Speed	240 m/min
Automatic Acceleration and Deceleration	1-step linear acceleration/deceleration, Asymmetric linear acceleration/deceleration, S-curve acceleration/deceleration
Override	0% to 100% in 1% increments Enables variable-speed operation.
Positioning Function	<ol style="list-style-type: none"> 1) 1-step speed operation 2) Multi-stage speed operation (1 to 16 stages) 3) Through-point output 4) External positioning
Manual Jogging	Possible
Manual Stepping	Possible
Home Position Return	4 types of home position returns are possible with the combination of deceleration LS, C-phase pulse, and zero signal.
Stored Stroke Limits	Upper and lower limits: Enabled or disabled with parameters.

Items	Specifications
Backlash Compensation	0 to 32,767 pulses: Enabled or disabled with parameters.
Electronic Gear Function	Possible
Servodriver Control	Analog command SERVOPACK. Compatible with both absolute and incremental encoders.
Monitor	The following can be monitored from programming devices: <ul style="list-style-type: none"> 1) Command values 2) Current positions 3) Position errors 4) Current speeds 5) Command speeds 6) Error codes 7) No. of errors 8) No. of received steps for multi-step speed operation data 9) ROM version 10) Control status of One-axis Motion Module 11) I/O signal status of One-axis Motion Module
Parameter Setting and Reading	You can set and read the parameters of the One-axis Motion Module from the CPU Module.

4. Using a One-axis Motion Module

1) Number of Modules

- a) The CPU Module will need the following references for each One-axis Motion Module:
- (1) 32 consecutive input relays
 - (2) 32 consecutive output coils
 - (3) 14 consecutive input registers
 - (4) 14 consecutive output registers
- b) Therefore, how many One-axis Motion Modules can be used will depend on how many of the above references are available in the CPU Module.

2) Installation Locations

- a) One-axis Motion Modules can be mounted to any slot on the Mounting Base of any Rack. It will occupy one slot.

EXAMPLE

- b) The following diagram shows where to mount a One-axis Motion Module.

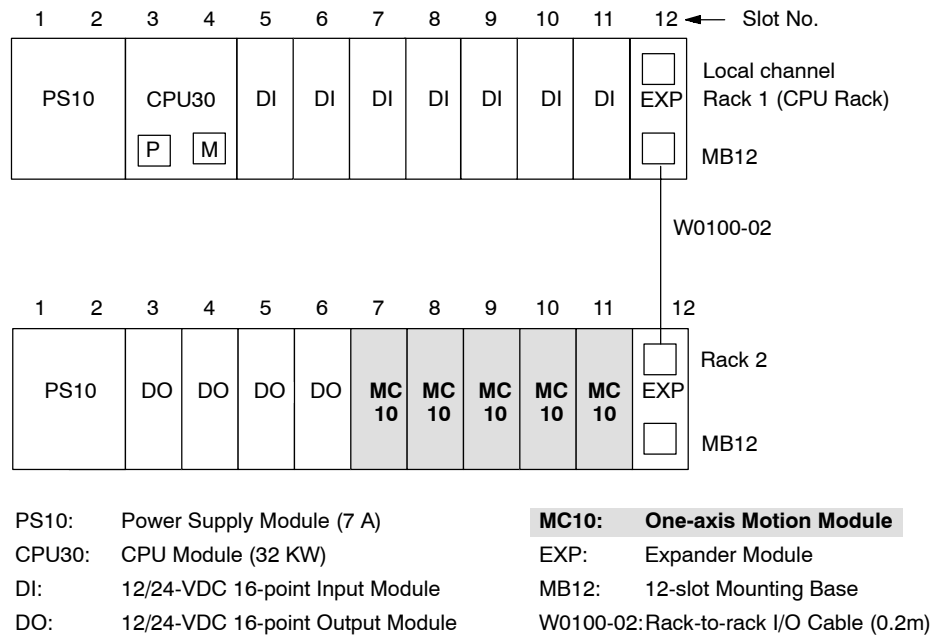


Figure 4.79 Mounting a One-axis Motion Module

3) Example System Configuration

EXAMPLE

- a) The following page illustrates an example of a system configuration with a One-axis Motion Module applied for controlling a servomotor with an absolute encoder.
- b) When a One-axis Motion Module is used to control a servomotor with an incremental encoder, the Battery Module (Model JRMS-120XCP96000) is not required.

Example

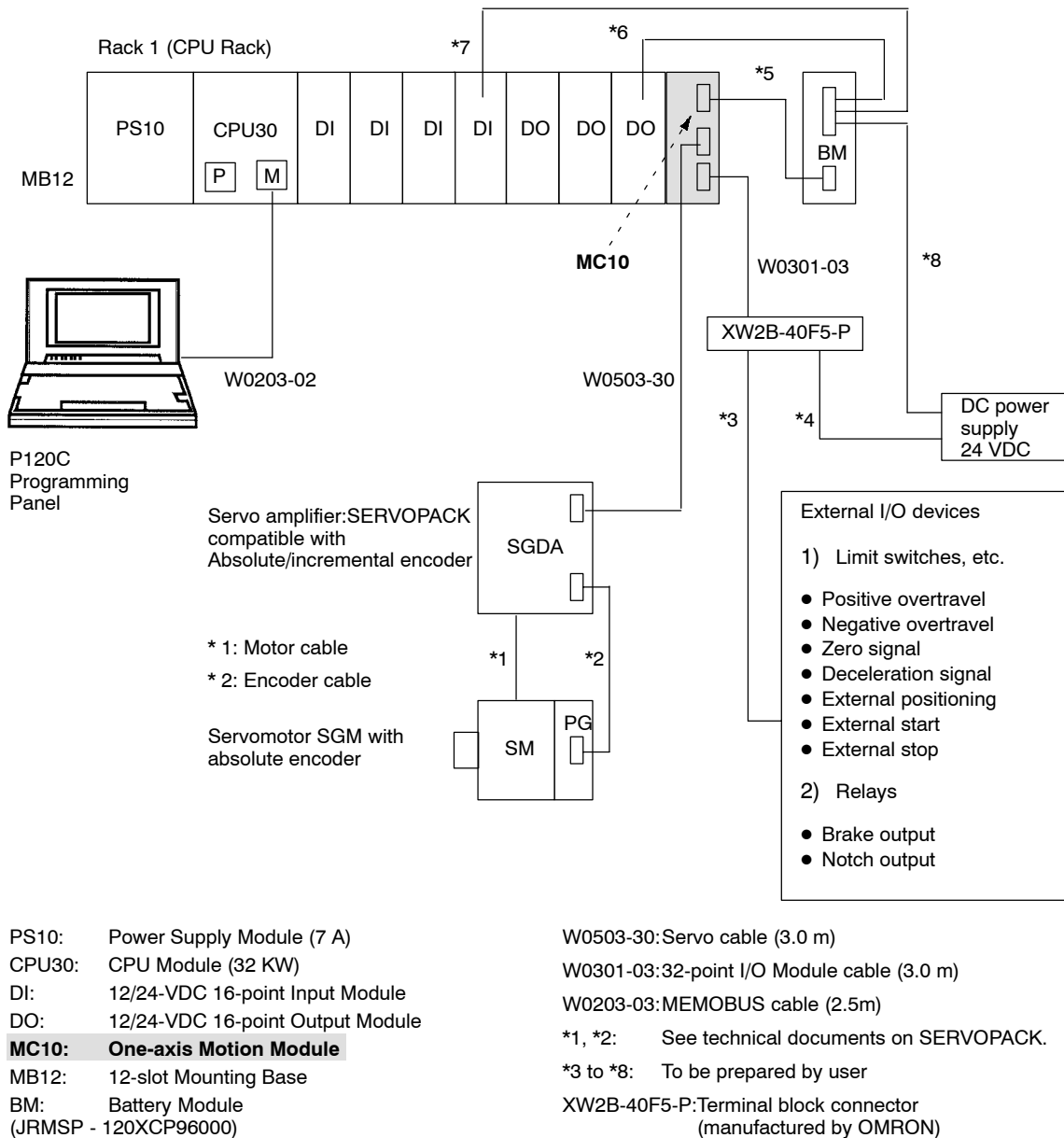


Figure 4.80 One-axis Motion Module for Controlling Servomotor with Absolute Encoder

4) Applicable Servo Amplifiers

Be sure to use a servo amplifier for speed control that supports analog speed commands. The following Yaskawa servo amplifiers may be used:

Table 4.109 Applicable Yaskawa Servo Amplifiers

AC Servo Series	Model Number
Σ Series	SGD□-□□□
Σ Series	DR□-□□□□
Σ-II Series	SGDM-□□□
Σ-II Series	SGDH-□□□
M, F, G, D, S, R, P Series	CACR-SR□□□□
VS-866	CIMR-SVJ-□A□

5) Rotary Switches

- a) The rotary switches are used to set the Module number of the One-axis Motion Module.
- b) There are two rotary switches. The top switch is rotary switch 1 and the bottom switch is rotary switch 2. Each switch has positions numbered from 0 to 9.
- c) The setting of the rotary switches is effective (read) when the current is turned ON to the Power Supply Module of the Rack on which the One-axis Motion Module is mounted.
- d) The Module number may be set from 1 to 99. The following table shows how to set it:

Table 4.110 Setting the Module Number

Example: Settings of Module No. 1		Module No.	Rotary switch 1	Rotary switch 2
	1 to 9	0	1 to 9	
	10 to 19	1	0 to 9	
	20 to 29	2	0 to 9	
	30 to 39	3	0 to 9	
	40 to 49	4	0 to 9	
	50 to 59	5	0 to 9	
	60 to 69	6	0 to 9	
	70 to 79	7	0 to 9	
	80 to 89	8	0 to 9	
	90 to 99	9	0 to 9	
	0	Do not use.		

Note The same Module number must not be used more than once. If the same Module number is used more than once, programming devices cannot set parameters and therefore cannot monitor the parameters of the Modules whose numbers are the same.

6) Battery Module

When using a One-axis Motion Module to control a Servomotor with an Absolute Encoder, use a Battery Module (JRMSP-120XCP96000) to supply power to Absolute Encoder backup circuits. Rotation data for up to 8 absolute encoders can be backed up with one Battery Module in the event of a power interruption.

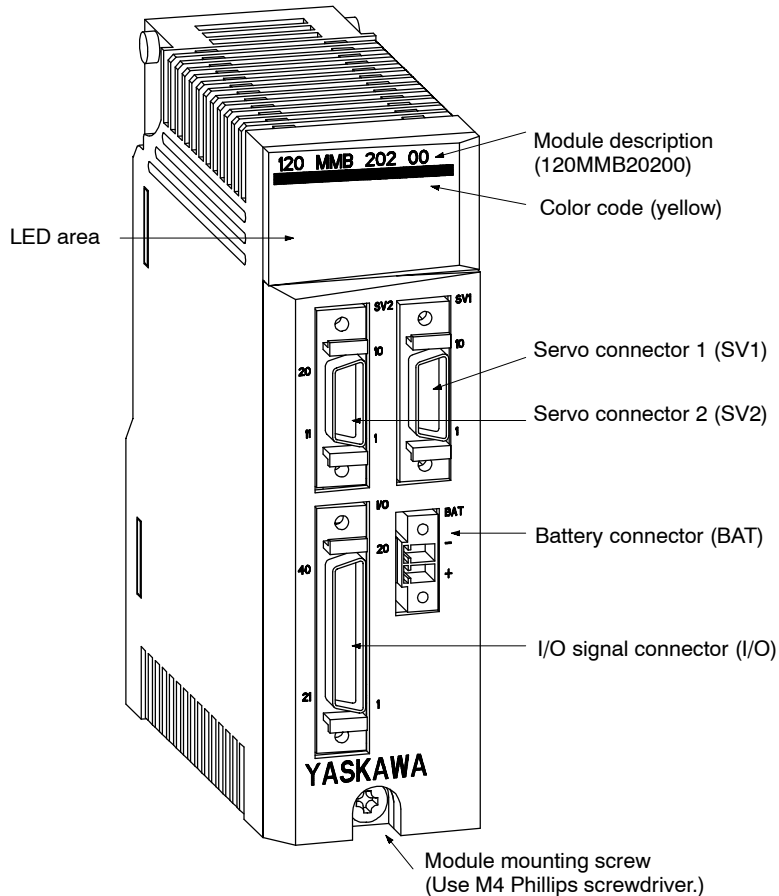
7) Related Manuals

Before operating the One-axis Motion Module, please read the following manual carefully and be sure that you fully understand the information provided.

- MEMOCON GL120, GL130 Motion Module MC10 User's Manual (SIEZ-C825-20.41)

4.7.4 Two-axis Motion Module

1. Appearance



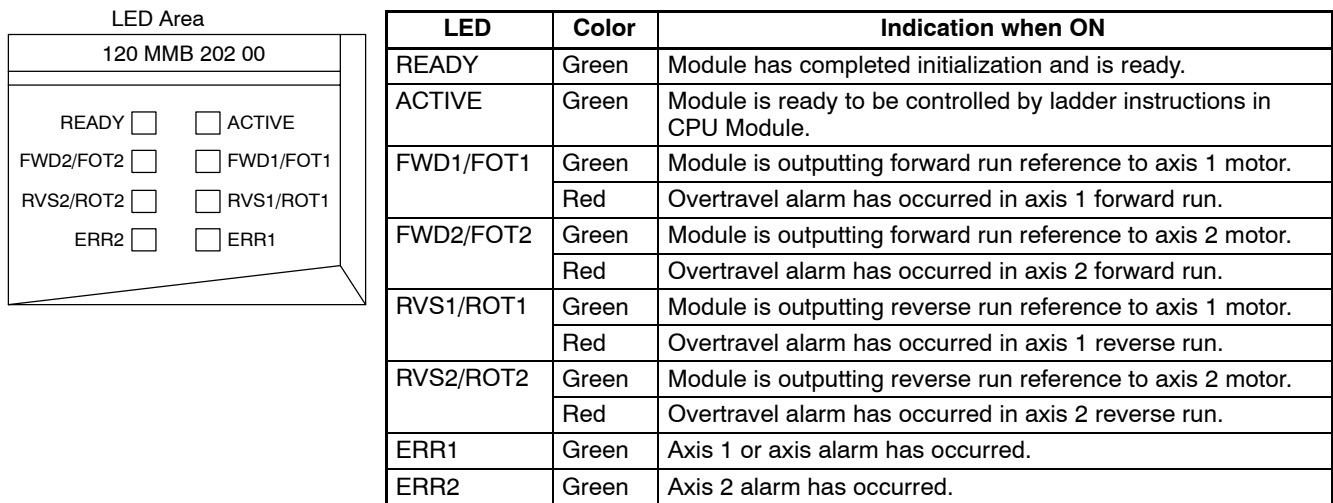


Figure 4.81 Appearance of Two-axis Motion Module

2. Function

A Two-axis Motion Module is Module incorporating various functions to control servomotor. With one Module, Two-axis motion control is possible.

3. Specifications

1) Hardware Specifications

The following table shows the Hardware specifications of the Two-axis Motion Module.

Table 4.111 Hardware Specifications of a Two-axis Motion Module


Item	Specifications
Name	Two-axis Motion Module
Model Name	MC15
Model No.	JAMSC-120MMB20200
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.9 mm
Approximate Mass	300 g
Internal Current Consumption	750 mA
Maximum Heating Value	9.0 W
Hot Swapping (Removal/Insertion under Power)	Not permitted

Item	Specifications
Mounting Location	Not using absolute encoder: Any slot of any rack. Using absolute encoder: Any slot of CPU Rack.
Supported CPU Modules	CPU20 (16 KW), CPU21 (16 KW), CPU30 (32 KW), CPU35 (40 KW)
Servo Interface Signals	<p>The following signals can be input from or output to a servo amp via the servo connectors on the front panel of the Module.</p> <p>1) Input Signals</p> <ul style="list-style-type: none"> a) Feedback Input 5-V differential line driver or 5-V open collector output, phase A/B/C/S, maximum frequency: 1 Mpps (1X). Line breakage detection: None. b) Servo Alarm Input Source input, 24 VDC, 5 mA, photocoupler isolation. <p>2) Output Signals</p> <ul style="list-style-type: none"> a) Position Reference Output (CW and CCW) Sign + pulse mode or CCW + CW mode. Pulse output speed: 0 to 500 kpps Pulse output format: Open-collector output b) Battery Output Connect to battery input on absolute SERVOPACK. c) SEN Signal Output Connect to SEN input on absolute SERVOPACK. 5 VDC, 5 mA. d) Servo ON Output 24 VDC, 15 mA, photocoupler isolation, open-collector output (sinking output). e) Servo Alarm Reset Output 24 VDC, 15 mA, photocoupler isolation, open-collector output (sinking output). f) Error Counter Clear Output 24 VDC, 15 mA, photocoupler isolation, open-collector output (sinking output).
Stepping Motor Interface Signals	<p>The following signals can be input and output with one Stepping Motor Driver per servo connector via the Servo Connectors on the front panel of the Module.</p> <p>1) Input Signals</p> <ul style="list-style-type: none"> a) Overheating Input 5 VDC, 5 mA, photocoupler isolation. <p>2) Output Signals</p> <ul style="list-style-type: none"> a) Position Reference Output (CW and CCW) Sign + pulse mode or CCW + CW mode. Pulse output speed: 0 to 500 kpps Pulse output format: Open-collector output b) Output Voltage OFF Output 5 VDC, 15 mA, photocoupler isolation, open-collector output (sinking output).

Item	Specifications
External I/O Signals	<p>The following signals can be input from and output to external devices via the external I/O signal connector on the front panel of the Module.</p> <p>1) Input Signals</p> <p>a) Number of Signals: 8 x 2 axes</p> <p>b) Signal Names:</p> <ul style="list-style-type: none"> • Positive Overtravel • Negative Overtravel • Zero Signal • Deceleration Signal • External Positioning • External Start • External Stop • External Emergency Stop <p>c) Input Circuit Specifications: 24 VDC, 5 mA, photocoupler isolation, sourcing inputs</p> <p>2) Output Signals</p> <p>a) Number of Signals: 6 x 2 axes</p> <p>b) Signal Names:</p> <ul style="list-style-type: none"> • Brake Output • Notch Output A • Notch Output B • Error Output • COIN Output • Output Current OFF Output <p>c) Output Circuit Specifications: 24 VDC, 50 mA, photocoupler isolation, open-collector outputs (sinking outputs)</p>

4

Item	Specifications
Absolute Encoder Backup Circuits	<p>1) Rotation data for absolute encoder application is backed up during power interruptions by the absolute encoder backup circuits.</p> <p>2) Backup Power Supplies</p> <p>a) Using SGDA, SGDB, SGD, or DR2</p> <p>(1) Battery Module (Model No.: JRMSP-120XCP96000)</p> <ul style="list-style-type: none"> • Rotation data for up to 8 absolute encoders can be backed up with one Battery Module. • The battery backup time without power supply when 8 absolute encoders are connected is one year, but this time will be shortened if the encoders are operated when power is not being supplied. <p>(2) Large-Capacity Capacitor in Absolute Encoder</p> <ul style="list-style-type: none"> • Maximum backup time of 3 days on full charge. <p>b) Using SGDM or SGDH</p> <p>(1) Connect a Battery Module to the MC15 Module, or add a lithium backup battery to the SERVOPACK.</p> <ul style="list-style-type: none"> • Battery Module (Model No.: JRMSP-120XCP96000) explanation is the same as 2) a) (1) above. <p>(2) SERVOPACK Lithium Battery</p> <ul style="list-style-type: none"> • Lithium Battery Model No.: JZSP-BA01 (with battery and connector). Battery Model: Toshiba ER3V, 3.6 V, 1000 mA h Refer to the <i>SERVOPACK (SGDM, SGDH) User's Manual</i> for battery handling instructions. <p>3) A battery voltage drop detection circuit is built into the Battery Module and an alarm output for voltage drop can be read with a Digital Input Module.</p>
External Power Supply	A 24-VDC, 1-A or 5-VDC, 1-A external power supply is required as power for the external I/O signals.

 **WARNING** If using an SGDM or SGDH SERVOPACK, use one of the following as the backup power supply for the absolute encoder rotation data.

- Connect a Battery Module to the MC15 Module.
- Connect a lithium battery to the SERVOPACK.

Do not use both of the backup methods; there is a risk that unwanted current will flow between the batteries, resulting in a short-circuit or damage to the element.

2) Performance Specifications

The following table shows the performance specifications of a Two-axis Motion Module.

Table 4.112 Performance Specifications of Two-axis Motion Module

Items	Specifications
No. of Controlled Axes	2 axes
Coordinate Setting Unit	Linear axis: 0.001 mm min. Rotary axis: 0.001 degree min.

Items	Specifications
Maximum Command Value	±99999999
Maximum Command Speed	120 m/min.
Automatic Acceleration and Deceleration	General straight-line acceleration/deceleration, asymmetric acceleration/deceleration, S-curve acceleration/deceleration, exponential acceleration/deceleration
Override	0% to 1000% (in increments of 1%). Can also be used in variable-speed operation.
Positioning Functions	1) One-point positioning (positioning, linear interpolation) 2) Continuous point positioning (positioning, linear interpolation, and multi-step speed operation) 3) External positioning
Signal Outputs for Positioning	Can be set by transit time or range, 2 points per axis.
Point Tables	Specify positions and speeds, 4,000 points per axis.
Manual Jogging	Possible
Manual Stepping	Possible
Manual Handling	Possible (If using the counter as a manual handle.)
Home Position Return	Six types of home position return operation are available by combining deceleration LS, phase-C pulse, and zero signal.
Stored Stroke Limit	Upper and lower limits
Backlash Compensation	0 to 32767 pulses
Machin Lock	Possible
Electronic Gear Function	Possible
Servodrive Control	Drives a Position Control SERVOPACK or a Stepping Motor Driver. If using a SERVOPACK, Servodrive Control can be used with either absolute or incremental encoders.

4

Items	Specifications
Monitor	<p>The following parameters can be monitored on a Programming Device screen.</p> <ol style="list-style-type: none"> 1) Reference position 2) Reference speed 3) Machine coordinate system position 4) Current position 5) Current speed 6) Position error 7) Alarm code 8) ROM version 9) Number of point currently being executed 10) Parameters 11) Point table data 12) Control status of the Motion Control Module 13) I/O signal status of the Motion Control Module
Parameter Setting and Reading	Parameters can be set or read from the ladder program or the Programming Device.
Point Table Setting and Reading	Point tables can be set or read from the ladder program or the Programming Device.

4. Using a Two-axis Motion Module

1) Number of Modules

- a) For each Two-axis Motion Module the following I/O references are required in the CPU Module.
 - (1) 80 consecutive input relays
 - (2) 48 consecutive output coils
 - (3) 16 consecutive input registers
 - (4) 16 consecutive output registers
- b) The number of devices that the Two-axis Motion Module can use is determined by the number of available I/O references at the CPU Module.

- c) Based on the limits to the number of I/O references above, the maximum number of Two-axis Motion Modules that can be used depends on the CPU Module, as shown below.

Maximum Number of Two-axis Motion Modules that Can Be Used

CPU Module	Input Relays and Output Coils	Input Registers and Output Registers	Max. No. of MC15 Modules	Remarks
CPU20 CPU21	1,024	512	8	<ul style="list-style-type: none"> All input relays and output coils will be used for the MC15 Modules. There will be 64 unused I/O registers
CPU30 CPU35	4,096	512	16	<ul style="list-style-type: none"> There will be 2,944 unused input relays and output coils. There will be 8 unused I/O registers.

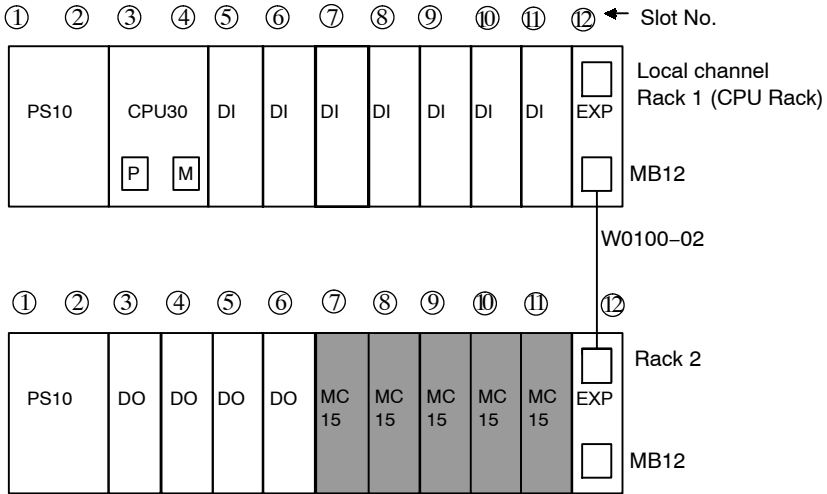
- Note**
- (1) When using Remote Stations, the limit is 8 Modules for the CPU20 and CPU21 and 12 Modules for the CPU30 and CPU35
 - (2) When using a PS10 or PS11 Power Supply Module, a single Two-axis Motion Module uses 750 mA of the 7 A current available, so a maximum of 9 Modules can be used per Rack.

2) Installation Locations

- a) The Two-axis Motion Module requires one slot and can be mounted as shown below.
- (1) If not using the absolute position detecting function, the Module can be mounted to any slot on any Rack.
 - (2) If using the absolute position detecting function, the Module can be mounted to any slot on the Mounting Base of the CPU Rack.

◀EXAMPLE▶

b) The following diagram shows an example of mounting Two-axis Motion Modules.



- | | |
|--------------------------------------|---|
| PS10: Power Supply Module (7 A) | MC15: 2-axis Motion Module |
| CPU30: CPU Module (32 KW) | EXP: Expander Module |
| DI: 12/24 VDC 16-point Input Module | MB12: 12-slot Mounting Base |
| DO: 12/24 VDC 16-point Output Module | W0100-02: Rack-to-rack I/O Cable (0.2m) |

3) Example System Configuration

◀EXAMPLE▶

- a) The following page illustrates an example of a system configuration with a Two-axis Motion Module applied for controlling a servomotor with an absolute encoder.
- b) When a Two-axis Motion Module is used to control a servomotor with an incremental encoder, the Battery Module (Model JRMSP-120XCP96000) is not required.

Example

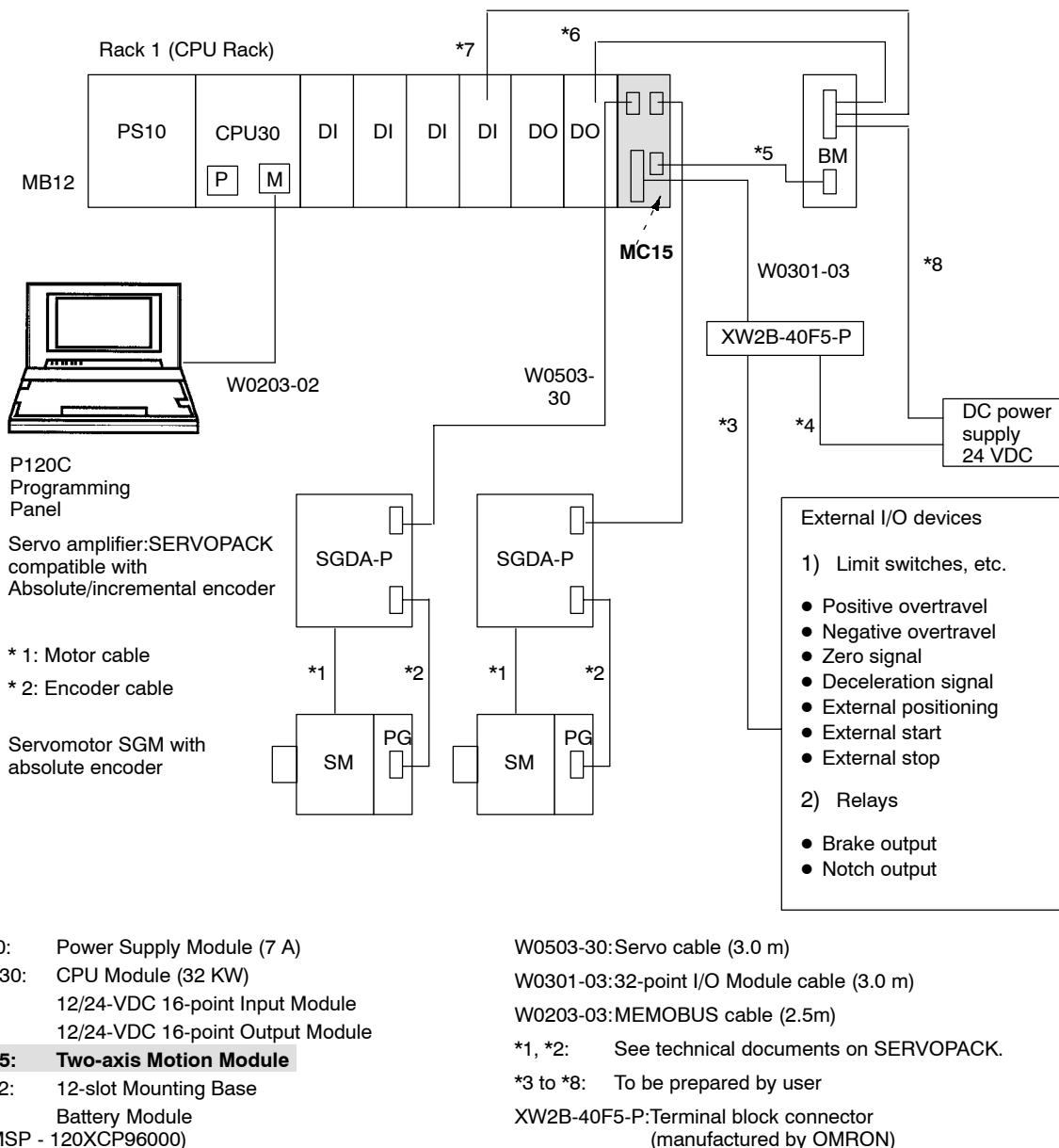


Figure 4.82 Two-axis Motion Module for Controlling Servomotor with Absolute Encoder

4) Applicable Servo Amplifiers

Be sure to use a servo amplifier for position control that supports pulse-train references. The following Yaskawa servo amplifiers may be used:

Table 4.113 Applicable Yaskawa Servo Amplifiers

AC Servo Series	Model No.
Σ Series	SGDA-□□□P SGDB-□□□D DR□-□□□□
Σ-II Series	SGDM-□□□D SGDH-□□□E SGDP-□□□P SGDF-□□□P SGDJ-□□□P

5) Battery Module

When using the Two-axis Motion Module to control a Servomotor with absolute encoder, always use a Battery Module (JRMSP-120XCP96000) as a backup power supply circuit for the absolute encoder. A single Battery Module can be used as a power failure backup for cyclic data of up to eight absolute encoders.

6) Versions Supporting MC15 Motion Modules

- a) MC15 Motion Modules cannot be used with CPU10.
- (1) The CPU Module and MEMOSOFT versions required to use MC15 Motion Modules are shown in the following table.

Table 4.114 Versions Supporting MC15 Motion Modules

Name	Model Name	Model No.	Version Number	Location of Version Number
CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	Not permitted.	Module nameplate
CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	□□B09 onwards	Module nameplate
CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	□□A08 onwards	Module nameplate
CPU Module (32 KW)	CPU30	DDSCR-120CPU54100	□□CO4 onwards	Module nameplate
CPU Module (40 KW)	CPU35	DDSCR-120CPU54110	□□A05 onwards	Module nameplate
Remote I/O Driver Module	RIOD-COAX	JAMSC-120CRD13100	□□A10 onwards	Module nameplate
Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	□□A14 onwards	Module nameplate
MEMOSOFT		FMSGGL-AT3 (for English DOS) FMSGGL-PP3E (for P120 English version)	1.52□ onwards	In the middle at the bottom of the MEMOSOFT startup screen.

Note The nameplate is on the right side of the Module.

7) Related Manuals

Before operating the Two-axis Motion Module, please read the following manual carefully and be sure that you fully understand the information provided.

- *MEMOCON GL120, GL130 Motion Module MC15 User's Manual (SIEZ-C825-20.43)*

4.8 Other Module

This section describes the appearance, functions, specifications, and application of the Expander Module and the Battery Module.

4.8.1	Expander Module	4-277
4.8.2	Battery Module	4-283

4.8.1 Expander Module

1. Appearance

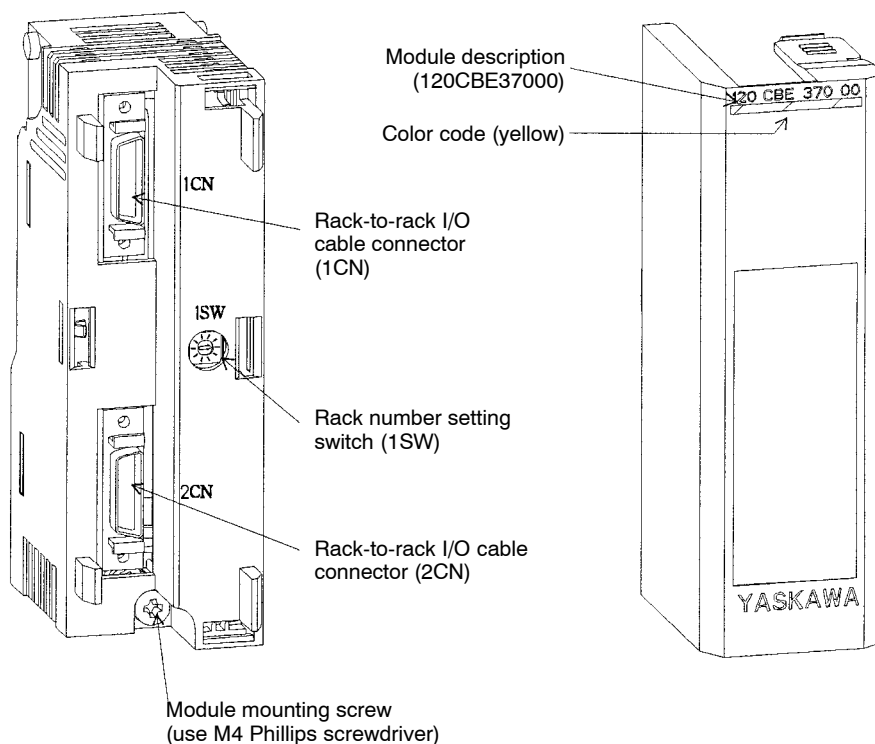


Figure 4.83 Appearance with Cover Removed and the Cover

2. Function

The Expander Module is used to increase the number of Racks in the I/O section. The number of Racks can be increased up to a total of 4 Racks at each station of local and remote channels by using Expander Modules.

1) Specifications

The specifications of the Expander Module are shown in the table below.

Table 4.115 Specifications of Expander Module

Items	Specifications
Model Name	EXPANDER
Model No.	JAMSC-120CBE37000
Slots Required	1
Internal Current Consumption	390 mA
Maximum Heating Value	2.0 W
Hot Swapping (Removal/Insertion Under Power)	Not permitted.
Approximate Mass	200 g
External Dimensions	Width: 40.3 mm Height: 130 mm Depth: 103.8 mm

4

2) Using Expander Modules

a) Number of Modules

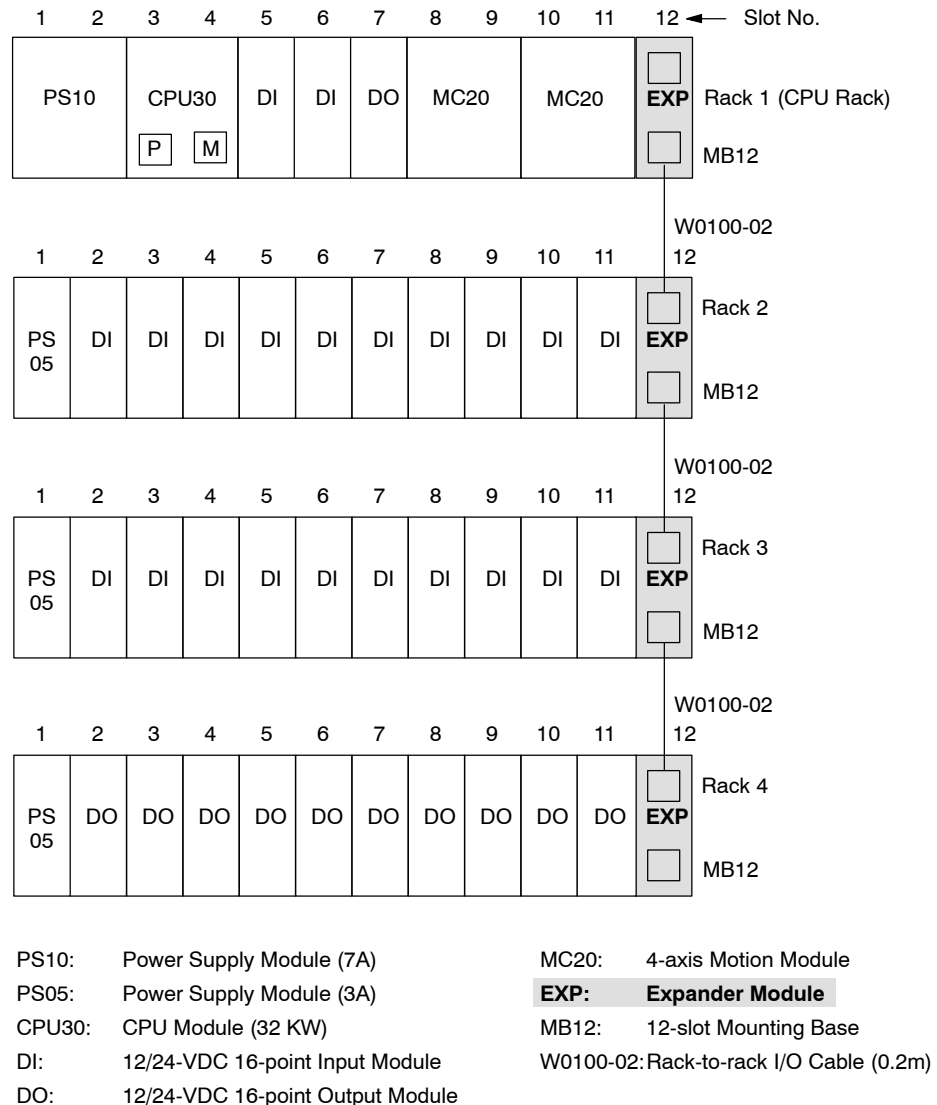
One Expander Module can be mounted to a Mounting Base. No more than one Expander Module can be mounted to the same Mounting Base.

b) Installation Location

- (1) The Expander Module can be mounted to any slot of the mounting base of any Rack. It will occupy one slot.

EXAMPLE

- (2) Normally, the Expander Module is mounted to the right end of the Mounting Base, as shown in the following example:

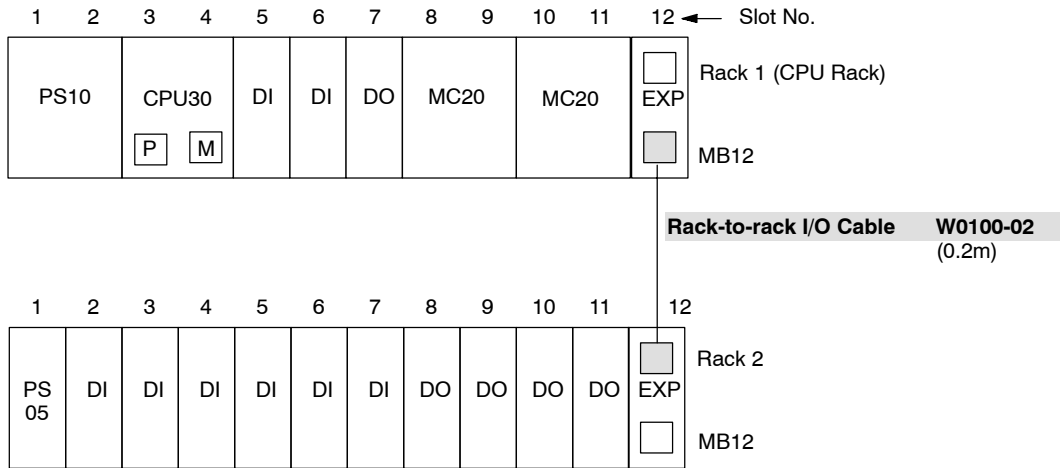
Example**Figure 4.84 Mounting Expander Modules****c) Rack-to-rack I/O Cable Connectors**

- (1) Rack-to-rack I/O cable connectors are used to connect two adjacent Expander Modules using Rack-to-rack I/O Cable. There are 2 connectors: 1CN and 2CN, and they have the same functions. There is no distinction between input and output.

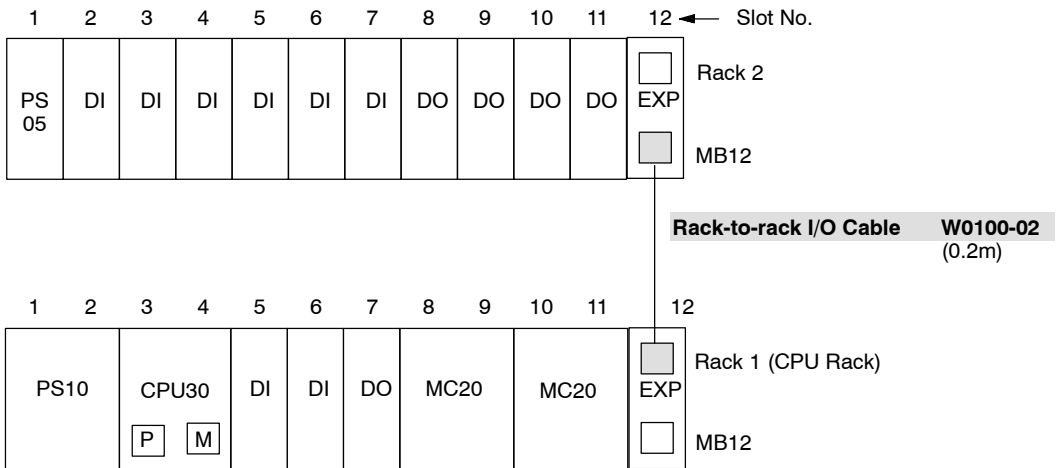
EXAMPLE

(2) The following example shows how to use Rack-to-rack I/O cable connectors and an Rack-to-rack I/O Cable.

Example 1



Example 2



- | | | | |
|--------|---------------------------|-------|----------------------------------|
| PS10: | Power Supply Module (7 A) | DI: | 12/24-VDC 16-point Input Module |
| PS05: | Power Supply Module (3 A) | DO: | 12/24-VDC 16-point Output Module |
| CPU30: | CPU Module (32 KW) | EXP: | Expander Module |
| MC20: | 4-axis Motion Module | MB12: | 12-slot Mounting Base |

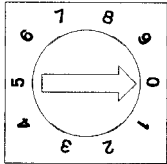
Figure 4.85 Using Rack-to-rack I/O Cables and Cable Connectors

d) Rack Number Setting Switch

(1) The Rack number setting switch is a rotary switch with positions 0 to 9. It is used to set the Rack No.

(2) The rack number is set from 1 to 4. The following table shows how to set it.

Table 4.116 Setting the Rack Number

Example	Rotary Switch Setting	Rack No.	Remarks
Set the rotary switch to 0 in order to set Rack No. 1. 	0	1	Always set the Rack to which the CPU Module and Remote I/O Receiver Modules are mounted to Rack No.1.
	1	2	
	2	3	
	3	4	
	4 to 9	*	Do not use.

(3) The setting of the rack number setting switch is effective (read) when the power is turned ON to the Power Supply Module of the Rack to which the Expander Module is mounted.

Caution Always set the rack number using the following rules.

If you set the rack number without following these rules, the PLC System will not operate correctly, i.e., the CPU Module may stop, and communications errors, I/O process errors, and other error may occur.

- Set the rack number to from 1 to 4.
- The Rack on which the CPU Module and Remote I/O Receiver Modules are mounted must always be set to rack number 1 by setting the rotary switch to 0.
- Do not use the same rack number more than once at the same station.

EXAMPLE e) A rack number setting example is shown in the following figure.

Example
Rack No. Setting Example

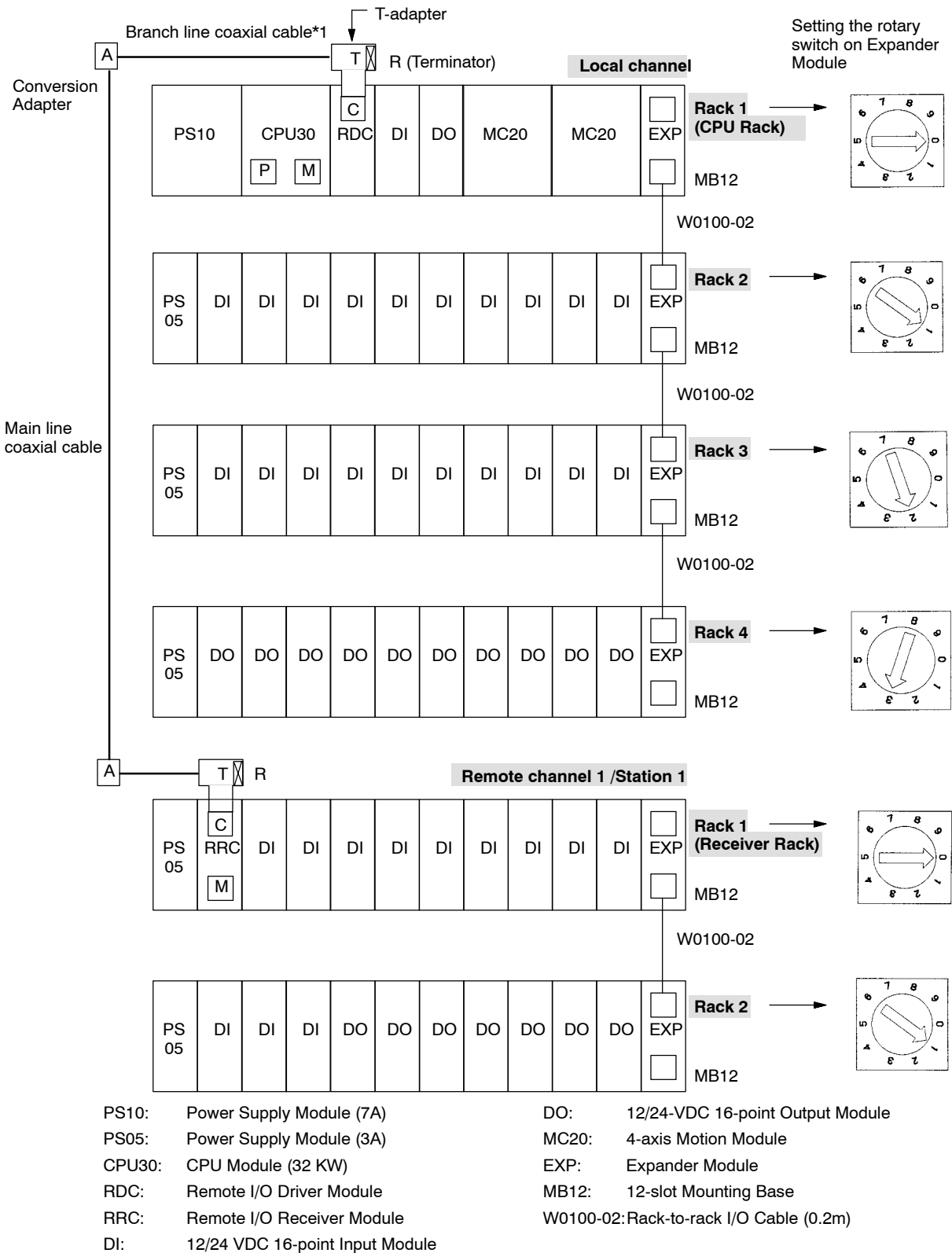


Figure 4.86 Rack No. Setting Example

4.8.2 Battery Module

1. Appearance

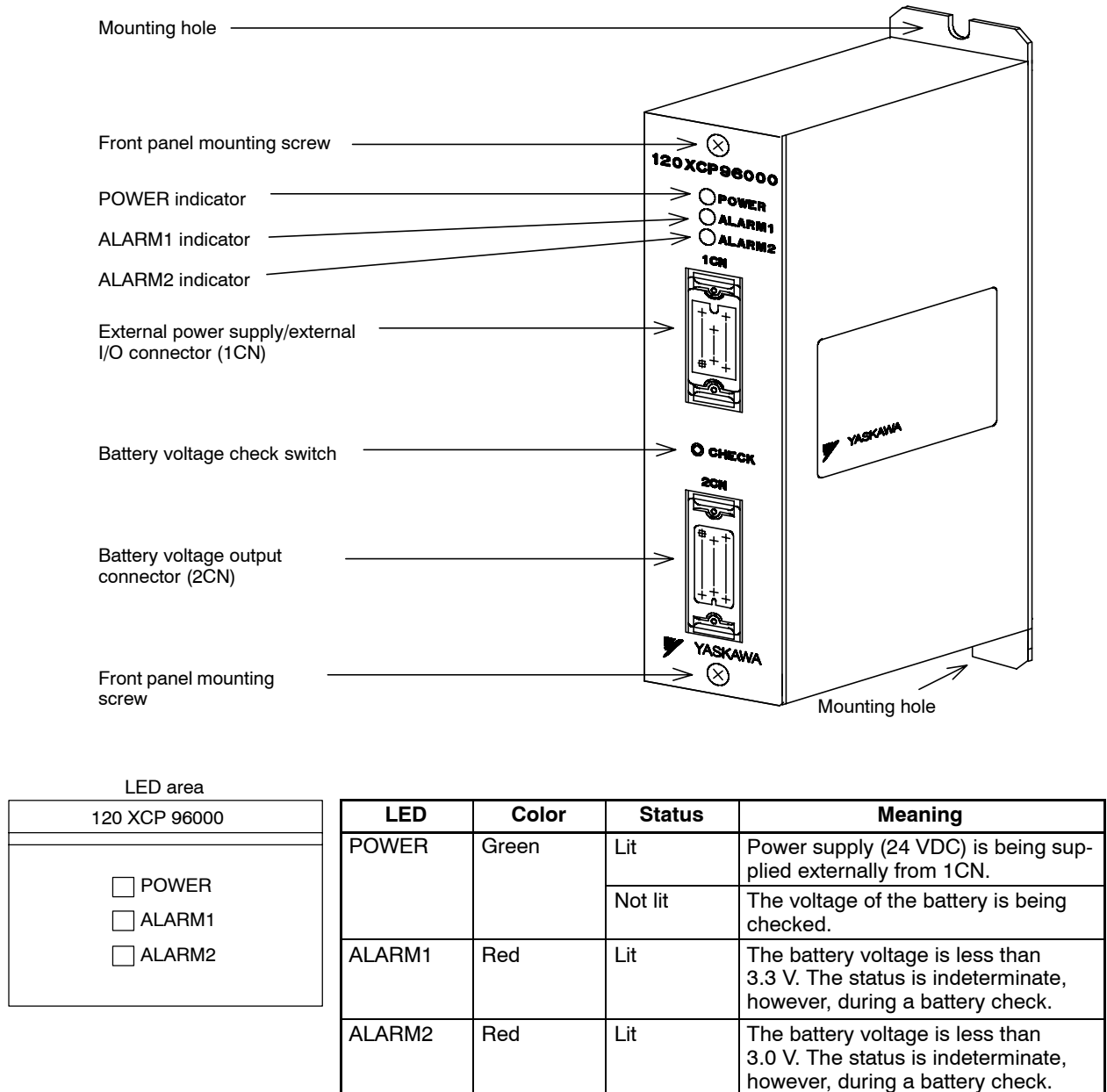


Figure 4.87 Appearance of the Battery Module

Note If the BAT Module's ALARM1 indicator lights, be sure to replace the battery with an ER6VC3N replacement battery within one week.

Delay in replacing the battery may result in loss of memory content (rotation data) in the absolute encoder.

2. Functions

1) Absolute Encoder Backup

The Battery Module uses a large-capacity capacitor and lithium battery to supply backup power to the absolute encoders to back up rotation data. When the power supply to the MEMOCON GL120 or GL130 turns OFF, the rotation data in the absolute encoders is backed up by the large-capacity capacitors in the Battery Module. When the voltage of the capacitor drops below that of the lithium battery, the rotation data in the absolute encoders is backed up by the lithium battery.

Note The motion program, parameter, and point table data in the MC20 Module and the parameter data in the MC10 Module are not backed up by the Battery Module.

2) Maximum of 8-axis Absolute Encoder Backup

The Battery Module is connected to the BAT connector of the MEMOCON GL120, GL130 Motion Module to back up the rotation data for absolute encoders for up to 8 axes.

- a) Each MC20 Module supports absolute encoders for up to 4 axes, so one Battery Module can be connected to up to two MC20 Modules.
- b) Each MC15 Module supports one absolute encoders for up to axes, so one Battery Module can be connected to up to four MC15 Modules.
- c) Each MC10 Module supports one absolute encoder for 1 axis, so one Battery Module can be connected to up to eight MC10 Modules.

3) Backup Time

Backup is possible for up to one year without any power supply when the Battery Module is connected to the absolute encoders for 8 axes. If the encoders are rotated when power is not supplied, however, the greater power consumption cause by the rotation will reduce the backup time.

4) Lithium Battery Voltage Drop Check

The voltage of the lithium battery in the Battery Module can be checked and the results display on indicators and output via an external signals. The battery voltage is checked at the following times.

- a) When power to the Battery Module is turned ON.
- b) When the battery voltage check switch on the Battery Module is pressed.
- c) When the battery voltage check signal (CHK) turns ON.

Note (a) Although the lithium battery voltage check sequence is executed and the results output when the external power supply (24 VDC) is turned ON, the battery voltage check is not automatically executed while power is ON and will not be executed while power is ON unless specifically designated. There will be no indication given externally even if the voltage of the battery drops while power is ON. It is therefore recommended that the battery voltage check signal (CHK) be used to periodically to check the voltage of the lithium battery in 24-hour operating systems. The voltage check, however, will reduce the capacity of the battery and we therefore recommend that the battery check be performed no more than once a day.

(b) The status of the lithium battery can also be checked while power is ON by pressing the battery voltage check switch on the Battery Module. Press this switch with the end of a fine-point precision screwdriver or similar device.

5) Alarm Display and Output

When a voltage drop is detected for the lithium battery in the Battery Module, external alarms are generated via both indicators and outputs. The relationships among the status of the lithium battery, the indicators, and the outputs are shown in the following table.

Table 4.117 Lithium Battery Status, Indicators, and Outputs

Battery Status	Indicators	Outputs	Conditions
Sufficient capacity	"ALARM1" Not lit	"ALM1" ON	Battery voltage > 3.3 V
	"ALARM2" Not lit	"ALM2" ON	
Battery needs to be replaced	"ALARM1" Lit	"ALM1" OFF	3.0 V < Battery voltage ≤ 3.3 V
	"ALARM2" Not lit	"ALM2" ON	
Absolute encoder data may not be preserved	"ALARM1" Lit	"ALM1" OFF	Battery voltage ≤ 3.0 V
	"ALARM2" Lit	"ALM2" OFF	

Note (a) Lithium batteries, by their nature, quickly lose capacity once the voltage begins to drop. Always replace the lithium battery as soon as possible, preferably within one week after the ALARM1 indicator light.

(b) The status of the indicators and outputs signals of the Battery Module are preserved when power turns OFF or until the next time the voltage is checked.

6) Lithium Battery Voltage Measurements

The status of the indicators and output signals can be used to determine when the lithium battery voltage check is being performed. The relationships among the operating status, indicators, and output signals are shown in the following table.

Table 4.118 Lithium Battery Status, Indicators, and Outputs

Operating Status	Indicators	Outputs	Remarks
External power supply ON	"POWER" Lit	"PON" ON	–
External power supply OFF or battery voltage being checked	"POWER" Not lit	"PON" OFF	The status of the ALARM1 and ALARM2 indicators and the ALM1 and ALM2 output signals is indeterminate.

- Note**
- (1) The voltage of the lithium battery is checked when the power supply is turned ON, when the battery voltage check signal (CHK) is turned ON for 1 ms or longer, or when the battery voltage check switch is pressed.
 - (2) If the battery voltage check signal (CHK) remains ON or if the battery voltage check switch is pressed continuously, the POWER indicator will remain unlit and the PON output signal will remain OFF. Use a pulse signal for the battery voltage check signal (CHK) and do not press the battery voltage check switch continuously.

3. Hardware Specifications

Item		Specifications
Name		Battery Module
Model Name		BAT
Model No.		JRMSP-120XCP96000
Number of Axes Supplied Power		8 axes max.
Status Indication		POWER: Lit when external power is supplied from 1CN. Not lit when the battery voltage check is being performed. ALARM1: Lit when battery voltage is 3.3 V or less. ALARM2: Lit when battery voltage is 3.0 V or less.
Built-in Battery		Model No.: ER6VC3N with connector (special specifications) Voltage: 3.6 V Current capacity: 2,000 mAh
Allowable Days between Voltage Drop Detection and Battery Replacement		Replace within one week after ALARM1 indicator lights (battery voltage of 3.3 V or less) The above specification assumes that all 8 axes are connected, that no power is being supplied to the Motion Module or servo amps, and that the motors are not turned by any force, external or otherwise.
Protective Circuits		Battery charge-prevention diode
Input Circuit Specifications	Signal Name	Battery voltage check reference (CHK): When the CHK signal turns ON, a battery voltage check is performed.
	Rated Voltage	24 VDC
	Maximum Allowable Voltage	30 VDC
	Input Form	Sourcing input (sinking input)
	Rated Current	5 mA (24 VDC)
	Input Impedance	4.7 kΩ
	Standard Operating Range	Minimum ON voltage: 9 VDC Maximum OFF voltage: 5 VDC
	Insulation Method	Photocoupler

Item		Specifications
Output Circuit Specifications	Signal Name	Power ON (PON): ON when external power is supplied from 1CN. OFF when CHK is ON. Alarm 1 (ALM1): OFF when battery voltage is 3.3 V or less Alarm 2 (ALM2): OFF when battery voltage is 3.0 V or less
	Rated Voltage	24 VDC
	Allowable Voltage Range	20.4 to 28.8 VDC (peak: 35 VDC)
	Output Form	Sinking output (open-collector)
	Maximum Load Current	50 mA
	Output Voltage Drop	1.5 V max. (50 mA)
	Output Delay Time	Between power supply and ALM1/ALM2 output:100 ms max. Between CHK signal input and ALM1/ALM2 output:10 ms max.
	OFF leakage current	1 mA max. (24 VDC)
	Output Type	Transistor Output
	Insulation Method	Photocoupler
External Power Supply		20.4 to 28.8 VDC, 200 mA or less
Approximate Mass		500 g
External Dimensions		35 x 160 x 73 mm (W x H x D)

4. External I/O Connector Terminals (1CN)

1) Connector Pin Arrangements and Signal Names

External power source (24 VDC), alarm outputs, a battery voltage check reference input, etc., are connected to the external power supply/external I/O connector (1CN). The connector pin arrangement is shown in the following illustration.

Connector: MR-16F (Honda Communication Industries Co., Ltd., soldered)

Pin No.	Signal names	Pin No.	Signal names	Pin No.	Signal names
6	024V External power input (0 V)			16	+24V External power input (+24 V)
5	024V External power input (0 V)	10	Not connected	15	+24V External power input (+24 V)
4	PONG Power ON GND	9	Not connected	14	PON Power ON output
3	ALM2G Voltage drop 2 GND	8	Not connected	13	ALM2 Voltage drop 2 output
2	ALM1G Voltage drop 1 GND	7	Not connected	12	ALM1 Voltage drop 1 output
1	CHKG Battery voltage check GND			11	CHK Battery voltage check input

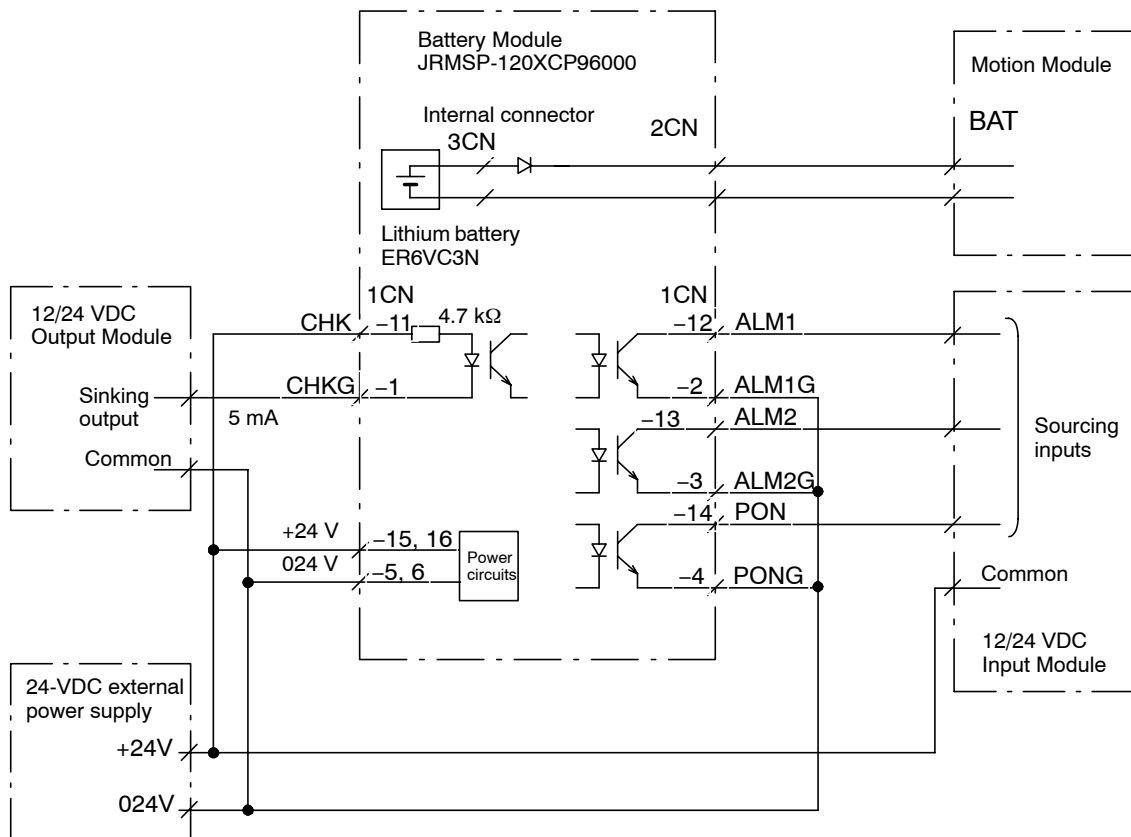
Connector Name	Pins	Connector Model No.		Manufacturer
		On Module	On Cable	
External power supply/external I/O connector (1CN)	16	MR-16RMA4	MR-16F MR-16L	Honda Communication Industries Co., Ltd.

Note (1) The model number on the top line for cable connectors is for the body (soldered) and the bottom line is for the hood.

(2) Cable connectors are provided with the Module.

2) Connection Example

A connection example of external power supply/external I/O connector (1CN) is shown in the following diagram.



5. Battery Voltage Output Connector Terminals (2CN)

1) Connector Pin Arrangements and Signal Names

Backup voltage is supplied from the battery voltage output connector (2CN) through the Motion Module to the absolute encoder. The connector pin arrangement is shown in the following illustration.

Connector Pin Arrangements at BAT Module

Connector: MR—20M (Honda Communication Industries Co., Ltd., soldered)

Pin No.	Signal names		Pin No.	Signal names		Pin No.	Signal names	
1	BATG	Battery voltage GND	8	Not connected		14	BAT	Battery voltage output
2	BATG	Battery voltage GND	9	Not connected		15	BAT	Battery voltage output
3	BATG	Battery voltage GND	10	Not connected		16	BAT	Battery voltage output
4	BATG	Battery voltage GND	11	Not connected		17	BAT	Battery voltage output
5	BATG	Battery voltage GND	12	Not connected		18	BAT	Battery voltage output
6	BATG	Battery voltage GND	13	Not connected		19	BAT	Battery voltage output
7	BATG	Battery voltage GND				20	BAT	Battery voltage output

Connector Name	Pins	Connector Model No.		Manufacturer
		On Module	On Cable	
Battery voltage output connector (2CN)	20	MR-20RFA4	MR-20M MR-20L	Honda Communication Industries Co., Ltd.

Note (1) The model number on the top line for cable connectors is for the body (soldered) and the bottom line is for the hood.

(2) Cable connectors are provided with the BAT Module.

Battery Connector (BAT) Pin Arrangement

A terminal block connector (MiniCOMBICON made by Phoenix Contact Co.) with screw terminals is provided as the battery connector (BAT) on the Motion Module. The battery connector (BAT) pin arrangement is shown in the following table.

Pin No.	Signal Name	
1	+	Battery voltage input
2	-	Battery voltage GND

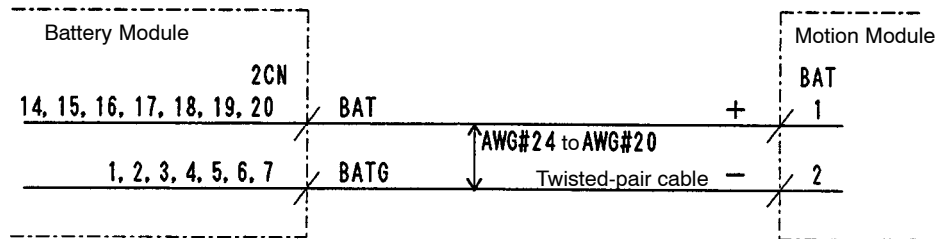
Connector: MC1.5/2-STF-3.81-AU (made by Phoenix Contact Co., screw terminals)

Connector Name	Pins	Connector Model No.		Manufacturer
		On Module	On Cable	
Battery connector (BAT)	2	MC1.5/2-GF-3.81-AU	MC1.5/2-STF-3.81AU (screw terminals)	Phoenix Contact Co., Ltd.

Note A cable connector is provided with the Motion Module.

2) Connecting the Motion Module

The following outlines typical connection between the battery voltage output connector (2CN) and the Motion Module.

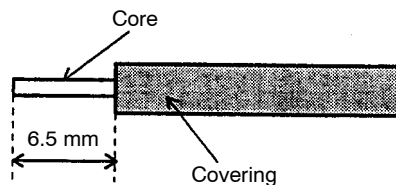


Note Although there is a charge-prevention diode for the lithium battery in the battery voltage output section of the BAT Module to prevent reverse voltage, be very careful to connect the terminals correctly.

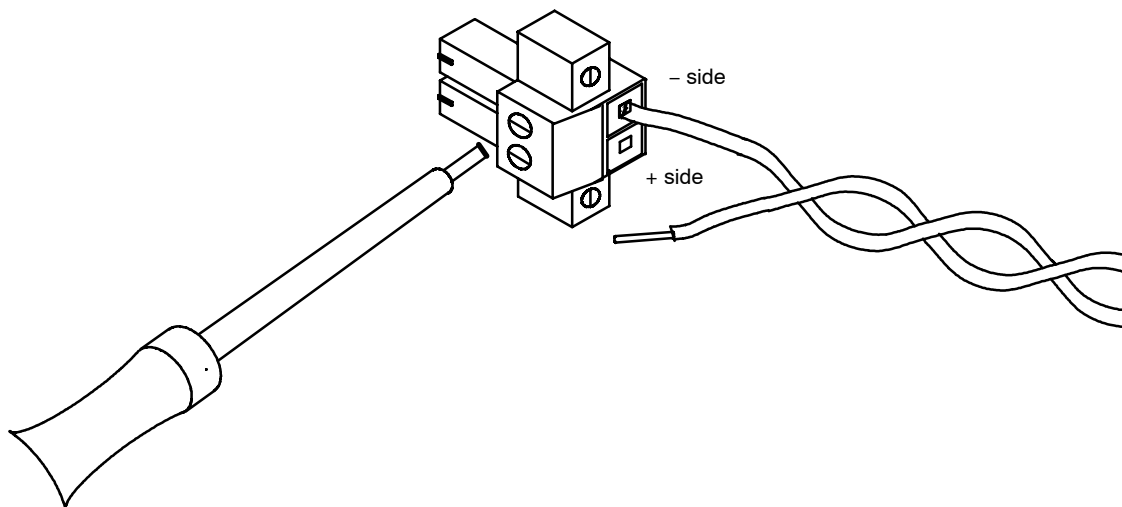
3) Procedure for Cable Preparations

Prepare the cables as described next.

- a) Remove the covering of the wires for approximately 6.5 mm from the end of the wires



- b) Secure the ends of the wires by pressing the core firmly to the back of the plug and tightening the screws to a tightening torque of between approximately 0.3 and 0.4 Nm.



Note Although the above step is possible with a precision flat-blade screwdriver (tip size: 0.4 x 2.5 mm), we recommend the following special screwdriver to ensure sufficient tightening torque: SZN/K (made by Phoenix Contact Co.)

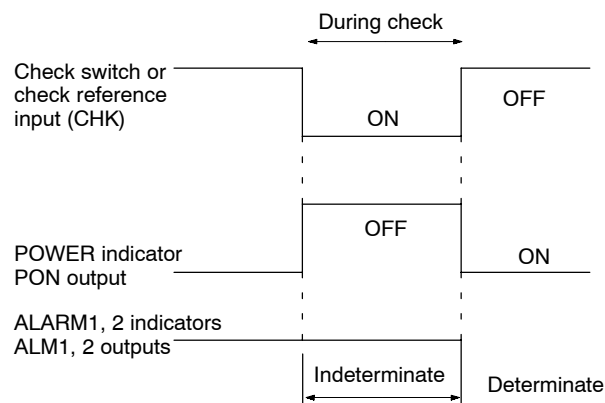
6. Battery Voltage Check Switch

- 1) The battery voltage check switch can be used to check the voltage of the battery, and to output the result using indicators and output signals. To perform a battery voltage check, press the battery voltage check switch using a precision screwdriver with a fine tip.
- 2) A battery voltage check is performed at the following times.
 - When the external power supply is turned ON.
 - When the battery voltage check switch is pressed.
 - When the battery voltage check reference input (CHK) turns ON.

The battery voltage check switch and the battery voltage check reference input (CHK) perform the same function.

- 3) The status of indicators and output signals during battery voltage check is as follows.
 - a) During battery voltage check, the ALARM1 and ALARM2 indicators and the ALM1 and ALM2 outputs will maintain the status of the previous check and do not reflect the result of the present check. Only use the ALARM1 and ALARM2 indicators and the ALM1 and ALM2 outputs after turning OFF the battery voltage check switch and the battery voltage check reference input (CHK).

The timing of the battery voltage check is shown in the following diagram.



b) The status of the indicators during the battery voltage check is as follows.

- POWER indicator: Not lit
- ALARM1 indicator: Indeterminate
- ALARM2 indicator: Indeterminate

c) The status of the output signals during the battery voltage check is as follows.

- PON output: OFF
- ALM1 output: Indeterminate
- ALM2 output: Indeterminate

7. **Built-in Battery**

- 1) The BAT Module is equipped with one replaceable battery. This battery provides backup for data stored in the absolute encoder. The battery backup prevents the rotation amount data from being lost when the power supply to the BAT Module is turned off.

The CPU Module's built-in battery cannot be used as a power supply for the absolute encoder's backup circuit.

- 2) The built-in battery has enough power to back up the rotation amount data through a total of one year of power interruptions when 8 axes of absolute encoders are connected. However, the backup time is shortened since more power is consumed if the absolute encoder is rotated during a power loss, although this lifetime varies with the ambient temperature and usage conditions.
- 3) When the BAT Module's "ALARM1" indicator lights, be sure to replace the battery with an ER6VC3N replacement battery within one week. Delay in replacing the battery may result in the memory content loss of the rotation data in the absolute encoder.

8. **Battery Replacement**

The battery-replacement procedure is described below.

a) Preliminary Steps

- (1) Charging the SUPER-CAPACITOR for the memory backup.

Turn ON the BAT Module external power supply for approx. 10 minutes before replacing the battery. This is to charge the SUPER-CAPACITOR of the BAT Module.

(2) Acquiring the Replacement Battery

Acquire an ER6VC3N replacement battery. This battery is not commercially available; it must be ordered from Yaskawa. The battery has special specifications and is equipped with a connector. It is manufactured by TOSHIBA.

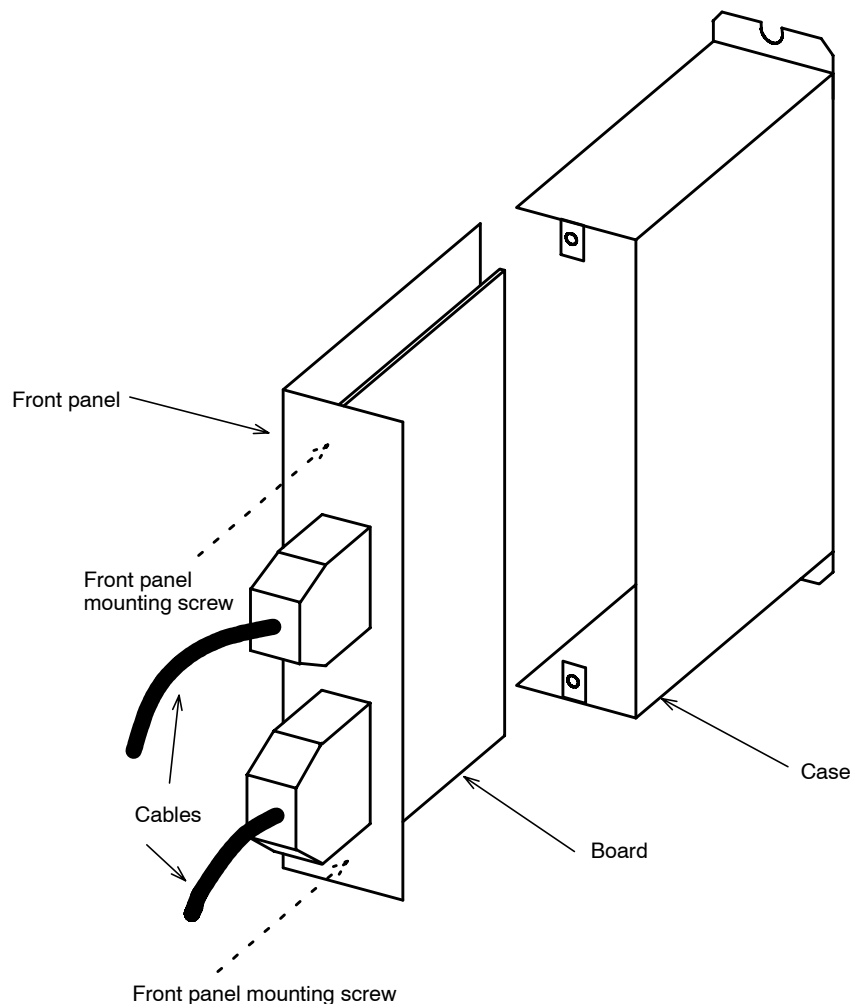
! Caution Do not charge the lithium battery into the Module.

The lithium battery may erupt if charged.

b) Battery Replacement Procedure

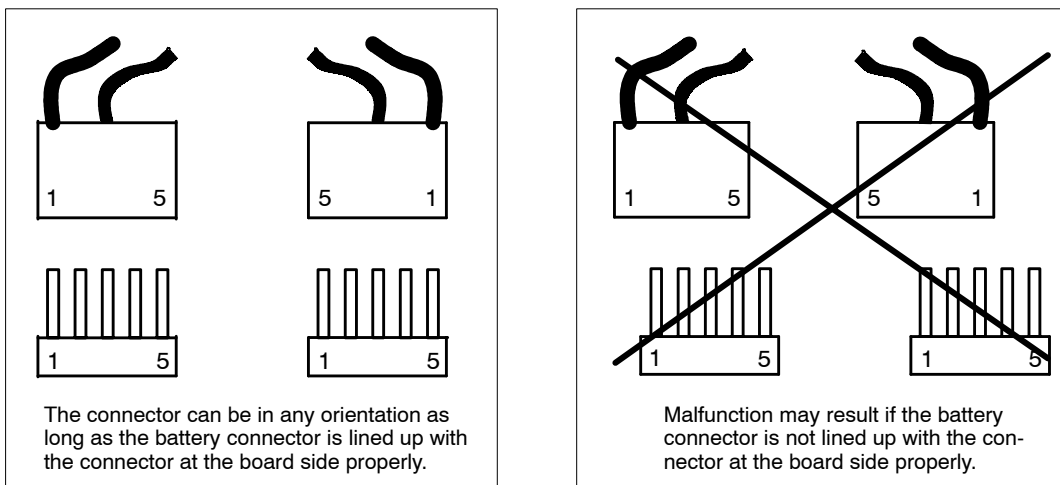
Use the following procedure to replace the battery.

- (1) Turn OFF the external power supply (24 VDC) to the BAT Module. Once the power supply to the BAT Module has been turned OFF, it does not matter whether or not power is supplied to the system (to the SERVOPACKs).
- (2) Remove the mounting screws from the front panel. There are two screws, one at the top and one at the bottom.
- (3) Pull the front panel out from the case with the cables still connected to 1CN and 2CN.

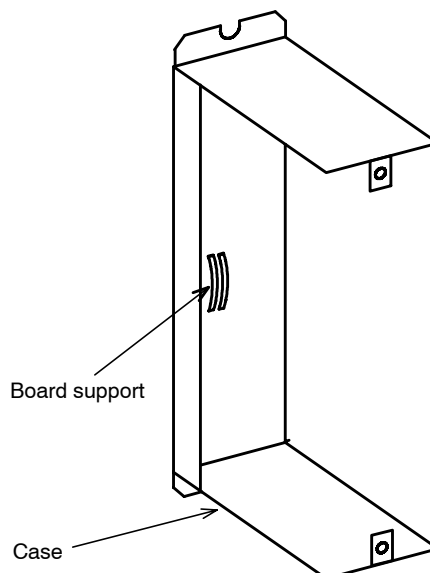


- Note**
- (1) Be very careful not to damage the board when pulling out the front panel.
 - (2) Do not apply unnecessary force to the case.
 - (4) Remove the connector at the end of the battery's lead from the connector at the board side, and remove the battery from the battery holder.
 - (5) Put the replacement battery in the battery holder, and connect the connector at the end of the battery's lead to the connector (i.e., to the connector pins) at the board side.

The orientation of the connector makes no differences as long as the battery connector is lined up with the connector at the board side. Failure to line up these connectors may result in malfunction.



- (6) Attach the front panel by pressing the board into the case so that the board fits into the board support at the back of the case.



- (7) Attach and tighten the mounting screws for the front panel.
- (8) Confirm that the cables are connected to 1CN and 2CN, and then turn ON the external power supply to the BAT Module.
- (9) Check the operation of the indicators and output signals as follows:

- **Indicators**

The POWER indicator should be lit and the ALARM1 and ALARM2 indicators should not be lit.


- **Output Signals**

The ALM1 and ALM2 signals ON when the PON signal turns ON.

Note If the POWER indicator is not lit or either one of or both of the ALARM1 and ALARM2 indicators are lit, an error has occurred. Repeat the procedure from the beginning of the battery replacement procedure.

Possible Errors: Either 1) the lithium battery is not connected properly, or 2) the external power supply/external I/O connector (1CN) is not connected properly or has a broken wire.

- (10) As long as no errors have occurred, this completes the battery replacement procedure. Turn ON the power supply to the system.

 **Caution** Do not charge the lithium battery into the Module.

The lithium battery may erupt if charged.

- Note**
- (1) Supply power to the BAT Module and absolute encoders for approx. 10 min before replacing the battery so that the SUPER-CAPACITOR of the absolute encoder can be charged.
 - (2) Do not touch the board circuits with your fingers or screwdriver.
 - (3) Be sure that the battery connector is properly lined up with the connector at the board side. If the pins are not lined up properly, problems can occur with the battery.
 - (4) If problems occur with the absolute encoders, refer to the methods for setting up the absolute encoders described in the SERVOPACK technical sheet. Set up the absolute encoders in accordance with the absolute encoder setup instructions.

4.9 Mounting Base

This section describes the appearance, application, models, and specifications of the Mounting Bases.

1. Appearance

1) Appearance of MB06 Mounting Base (Model:JRMSI-120XBP00600)

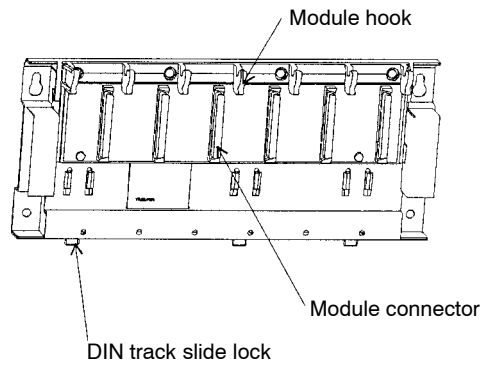


Figure 4.88 Appearance of 6-Slot Mounting Base

2) Appearance of MB08 Mounting Base (Model:JRMSI-120XBP00800)

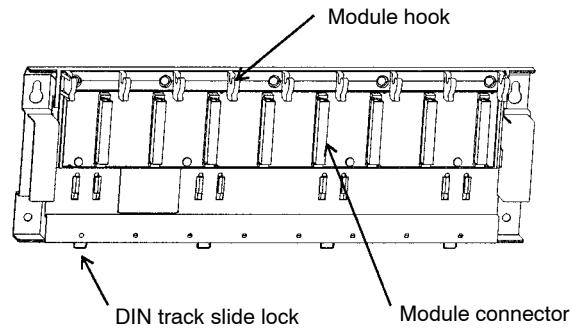


Figure 4.89 Appearance of 8-Slot Mounting Base

3) Appearance of MB10 Mounting Base (Model:JRMSI-120XBP01000)

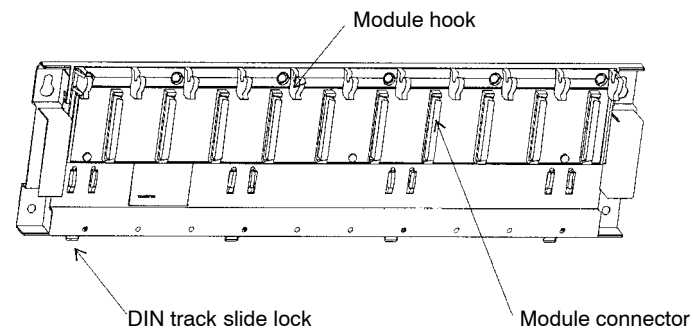
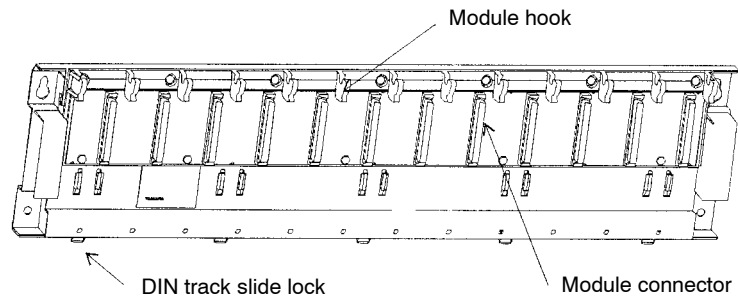
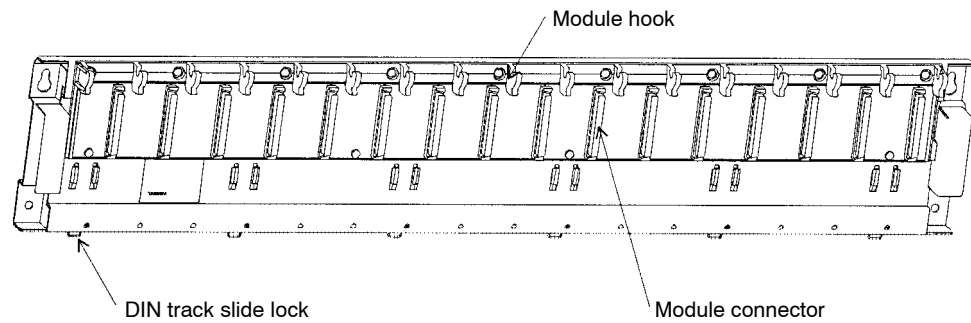


Figure 4.90 Appearance of 10-Slot Mounting Base

4) Appearance of MB12 Mounting Base (Model:JRMSI-120XBP01200)**Figure 4.91 Appearance of 12-Slot Mounting Base****5) Appearance of MB16 Mounting Base (Model:JRMSI-120XBP01600)****Figure 4.92 Appearance of 16-Slot Mounting Base**

2. Application

A Mounting Base is used to install various Modules including CPU Modules.

3. Models and Specifications

There are 5 models of mounting bases as shown in the following table:

Table 4.119 Models and Specifications of Mounting Base

Item		Specifications				
Name		6-slot Mounting Base	8-slot Mounting Base	10-slot Mounting Base	12-slot Mounting Base	16-slot Mounting Base
Model Name		MB06	MB08	MB10	MB12	MB16
Model No.		JRMSI-120 XBP00600	JRMSI-120 XBP00800	JRMSI-120 XBP01000	JRMSI-120 XBP01200	JRMSI-120 XBP01600
Number of Slots		6	8	10	12	16
Mounting Dimensions		280 mm	360 mm	440 mm	520 mm	690 mm
Dimensions	Width	300 mm	380 mm	460 mm	540 mm	710 mm
	Height	130 mm				
	Depth	41 mm				
Approx. Mass		600 g	800 g	900 g	1110 g	1500 g

4. Using Mounting Bases

1) Number of Mounting Bases

Up to 4 Mounting Bases can be used at each station of local and remote channels.

2) Connections

- a) When a station consists of more than one Mounting Base, the Mounting Bases are connected to each other by using Expander Modules and Rack-to-rack I/O Cables.

EXAMPLE

(1) An example of connecting Mounting Bases is shown in the following diagram:

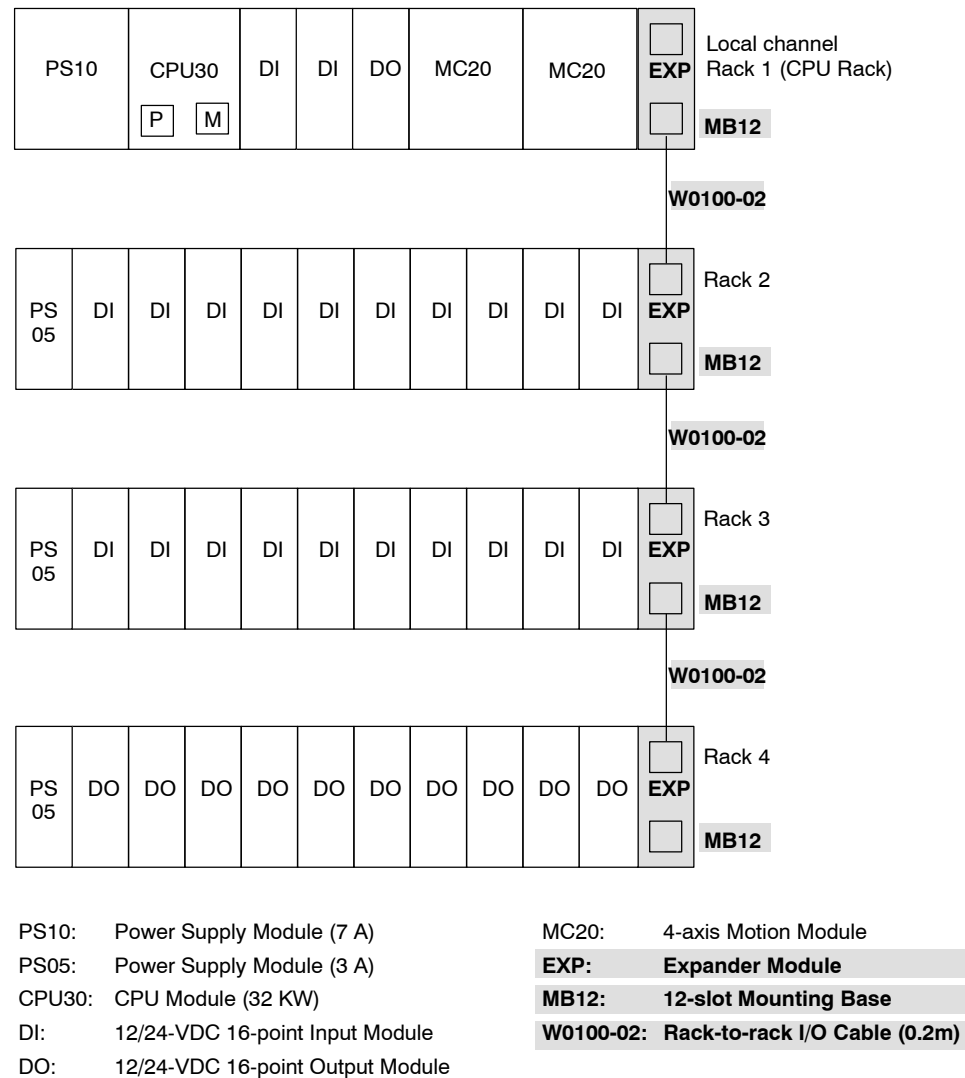


Figure 4.93 Connecting Mounting Bases

b) Mounting Position

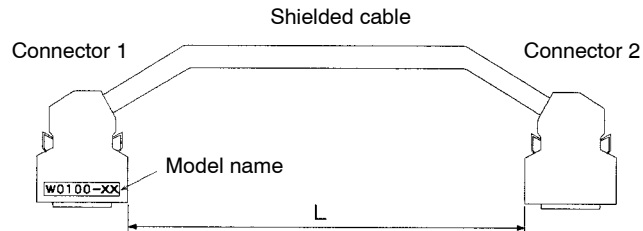
Mounting Bases can be mounted on either one of the followings: For further details, refer to *5.2.1 Installing Mounting Bases*.

- (1) On the surface of a control panel or operation panel (metal sheet)
- (2) To DIN track

4.10 Rack-to-rack I/O Cables

This section describes the appearance, application, models and specifications of the Rack-to-rack I/O Cables.

1) Appearance



2) Applications

Rack-to-rack I/O Cables are used to connect two Expander Modules between two adjacent Racks.

3) Models and Specifications

The models and specifications of the Rack-to-rack I/O Cables are shown in the following table.

Table 4.120 Models and Specifications of Rack-to-rack I/O Cable

Item	Specifications			
Model Name	W0100-02	W0100-05	W0100-10	W0100-50
Model No.	JZMSZ-120W0 100-02	JZMSZ-120W0 100-05	JZMSZ-120W0 100-10	JZMSZ-120W0 100-50
Length (L)	0.2 m	0.5 m	1.0 m	5.0 m
Approx. Mass	80 g	100 g	150 g	450 g
Cable Specifications	26-core shielded cable, equivalent to UL20276, 0.08 mm ² (AWG 28).			
Connector Specifications	10126-6000EL + 10326-A500-00 (3M) Connector 1 and connector 2 have the same specifications.			

4) Application

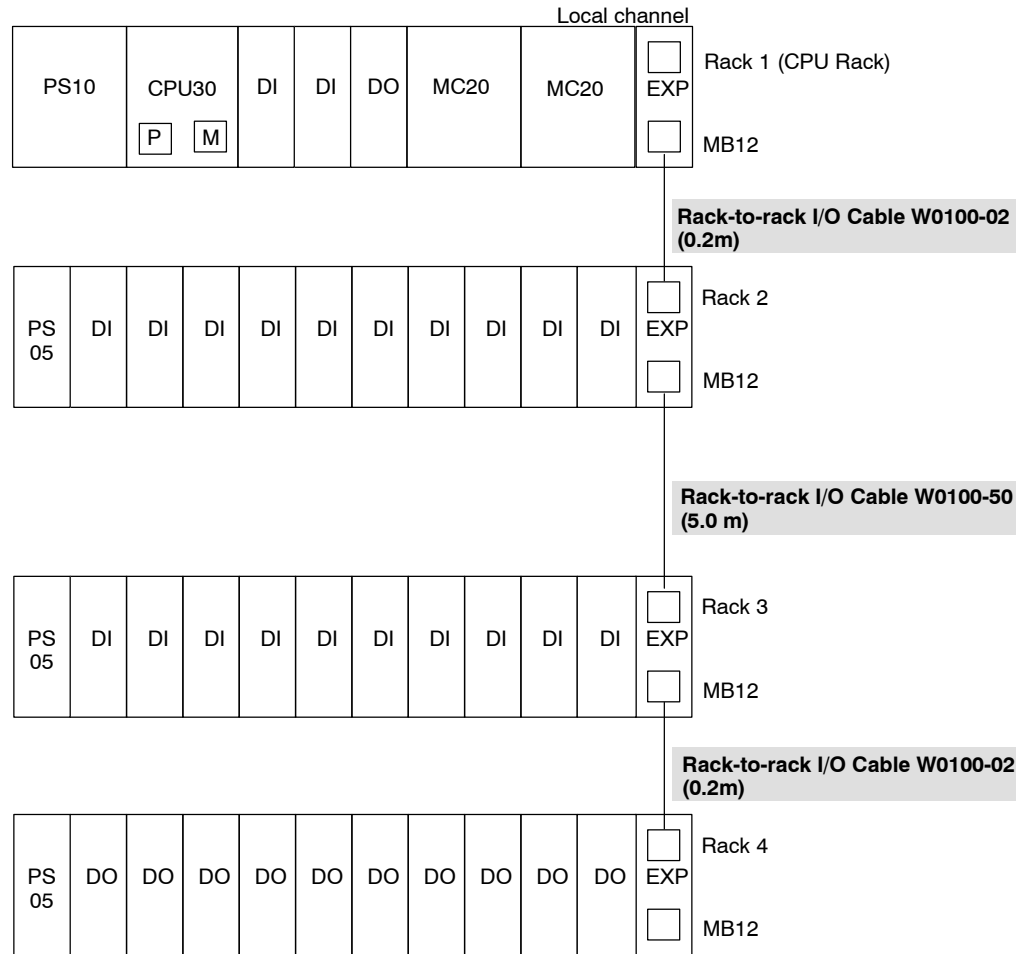
a) More than one Rack-to-rack I/O Cable can be used at the same station; however, the following conditions must be met:

- (1) A maximum of 3 can be used.
- (2) The total length of cables must not exceed 6.0 m.

b) The following example shows how to use Rack-to-rack I/O Cables.

EXAMPLE

Example
Using Rack-to-rack I/O Cables



- | | | | |
|--------|---------------------------------|-------|----------------------------------|
| PS10: | Power Supply Module (7A) | DO: | 12/24-VDC 16-point Output Module |
| PS05: | Power Supply Module (3A) | MC20: | 4-axis Motion Module |
| CPU30: | CPU Module (32 KW) | EXP: | Expander Module |
| DI: | 12/24-VDC 16-point Input Module | MB12: | 12-slot Mounting Base |

Figure 4.94 Using Rack-to-rack I/O Cable

Note When the total length of cables exceeds 6.0 m, it may cause operational errors at the station. Make sure that the total length of cables is always 6.0 m or less.

Installation and Wiring

5

5.1	Designing the Control Panel	5-2
5.1.1	Structure of Control Panel	5-2
5.1.2	Cooling the Control Panel	5-2
5.1.3	Preventing Electrical Noise	5-3
5.1.4	Approximate Masses of Modules and Mounting Bases .	5-5
5.1.5	Maximum Heating Value by Modules	5-7
5.1.6	Mounting Base Layout	5-8
5.1.7	Module Mounting Dimensions	5-12
5.2	Installing Mounting Bases and Modules	5-16
5.2.1	Installing Mounting Bases	5-16
5.2.2	Installing Modules	5-20
5.2.3	Installing the CPU and the Power Supply Module	5-25
5.2.4	Installing the Terminal Block for Field Connection Module	5-29
5.2.5	Connector for Field Connections Module	5-35
5.2.6	Installing the Communications Modules	5-39
5.2.7	Installing the Motion Module	5-44
5.2.8	Installing Rack-to-Rack I/O Cables	5-49
5.3	Panel Wiring	5-51
5.3.1	Separation of Power Supply Systems	5-51
5.3.2	Wiring the Power Supply Module	5-51
5.3.3	Wiring Digital I/O Modules	5-55
5.3.4	Wiring Other Modules	5-68
5.3.5	Grounding	5-70
5.3.6	Hot Swapping	5-76
5.4	External Wiring	5-80

5.1 Designing the Control Panel

This section describes the items to be considered and observed when designing a control panel for housing GL120 or GL130 components.

5.1.1	Structure of Control Panel	5-2
5.1.2	Cooling the Control Panel	5-2
5.1.3	Preventing Electrical Noise	5-3
5.1.4	Approximate Masses of Modules and Mounting Bases	5-5
5.1.5	Maximum Heating Value by Modules	5-7
5.1.6	Mounting Base Layout	5-8
5.1.7	Module Mounting Dimensions	5-12

5.1.1 Structure of Control Panel

- 1) Yaskawa recommends the following control panel structure:
 - a) Dustproof or dust resistant structure
 - b) Enclosed steel housing and self-standing structure (or wall-mounted)
- 2) *Table 5.1* shows the approximate mass of each Module and Mounting Base for the GL120 and GL130. Use this information to calculate the mechanical strength of the control panel.

5.1.2 Cooling the Control Panel

Note If the temperature inside the control panel is likely to exceed the maximum allowable ambient temperature of each device to be mounted in the control panel, install a cooling fan on the ceiling of the control panel or use some other cooling method. If a cooling fan is to be used, install the fan so that it discharges air from inside the control panel.

- 1) The allowable ambient temperature range of each GL120/GL130 component is shown below.
 - a) Allowable ambient temperature range: 0 to 60°C
 - (1) Power Supply Modules
 - (2) CPU Module
 - (3) Communications Modules
 - (4) I/O Modules

- (5) Special Purpose Modules
 - (6) Motion Modules
 - (7) Expander Modules
 - (8) Battery Modules
 - (9) MEMOBUS PLUS Hub Modules
 - (10) Mounting Bases
- b) Allowable ambient temperature range: 0 to 55°C
- 2000-series Modem Modules
- c) Allowable ambient temperature range: 0 to 50°C
- TB120 Teaching Pendant
- d) Allowable ambient temperature range: 0 to 45°C
- P120 Programming Panel
- 2) *Table 5.2* shows the maximum heat generated by each Module of the GL120 and GL130. Use this information to calculate control panel cooling capacity.

5.1.3 Preventing Electrical Noise

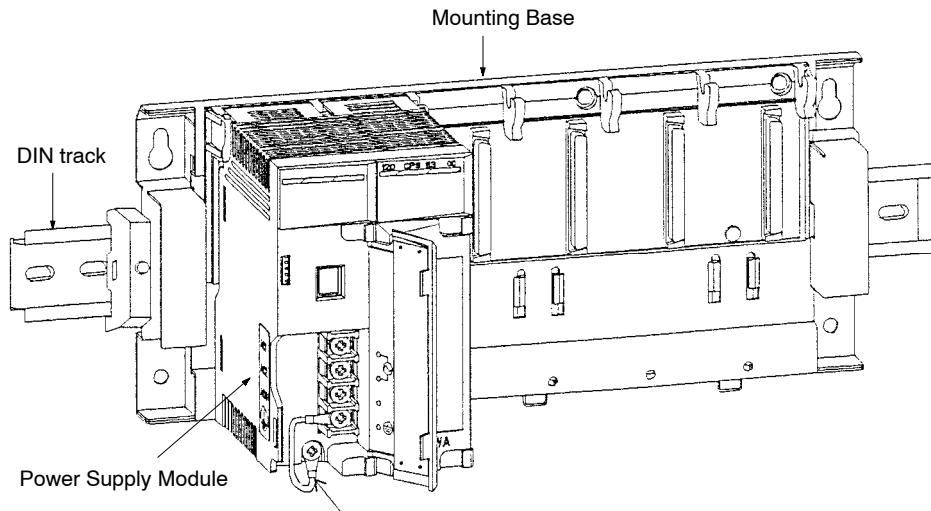
This section describes how to prevent electrical noise from being generated in the GL120 or GL130. Always observe the items described in this section to improve the noise immunity of the GL120 or GL130.

- Note**
- (1) Avoid installing the GL120 or GL130 components in the same control panel as a high-voltage or high-amperage circuits. A high-voltage or high-amperage circuit is a circuit in which the voltage exceeds 600 VAC (750 VDC) or the amperage exceeds 800 A.
 - (2) If the GL120 or GL130 components are to be installed in the same control panel as a low-voltage main circuit, keep the GL120 or GL130 components and their cables as far from the low-voltage main circuit devices and cables as possible. The recommended distance between them is at least 200 mm. A low-voltage main circuit is a circuit in which the voltage is 600 VAC (750 VDC) or less and the amperage exceeds 20 A.
 - (3) Do not bundle the GL120 or GL130 cables with control circuit cables. A control circuit is a circuit in which the voltage is 600 VAC (750 VDC) or less and the amperage is 20 A or less.
 - (4) Note the following when installing the Mounting Base on a device mounting steel plate:

- (a) The device mounting steel plate on which the Mounting Base is to be installed must have integral (one-piece) structure.
- (b) If the device mounting steel plate is coated, always peel off the coating round each mounting bolt hole before installing the Mounting Base. Also pay attention to mounting screws to ensure conductivity between the Mounting Base and the device mounting steel plate.

(5) Note the following when installing the Mounting Base on a DIN track.

- When installing the Power Supply Module on the Mounting Base, connect the protective ground terminal (FG) of the Power Supply Module to the module mounting screw with a 2.0 mm² wire.



Connect the protective ground terminal (FG) to the module mounting screw with a 2.0 mm² wire.

5

5.1.4 Approximate Masses of Modules and Mounting Bases

Table 5.1 shows the approximate mass of each Module and Mounting Base. Use this information to calculate the mechanical strength of the control panel.

Table 5.1 Approximate Mass of Modules and Mounting Bases

Product	Name	Model Name	Model No.	Approximate Mass (g)
Power Supply Modules	AC Power Supply Module (7 A)	PS10	JRMSP-120CPS11300	600
	AC Power Supply Module (3 A)	PS05	JRMSP-120CPS11100	350
	DC Power Supply Module (7 A)	PS11	JRMSP-120CPS21300	600
	DC Power Supply Module (3 A)	PS06	JRMSP-120CPS21100	350
CPU Modules	CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	400
	CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	500
	CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	500
	CPU Module (32 KW)	CPU30	DDSCR-120CPU54100	500
	CPU Module (40 KW)	CPU35	DDSCR-120CPU54110	500
Communications Modules	Remote I/O Driver Module	RIOD-COAX	JAMSC-120CRD13100	300
	Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	300
	2000-Series Remote I/O Driver Module	RIOD-2000	JAMSC-120CRD13110	300
	MEMOBUS Module (RS-232)	MEMOBUS-RS232	JAMSC-120NOM26100	300
	MEMOBUS Module (RS-422)	MEMOBUS-RS422	JAMSC-120NOM27100	300
	PC Link Module	PCLINK-COAX	JAMSC-120NFB23100	300
	Uniwire Interface Module	UNIWIRES I/F	JAMSC-120CRD21110	300
	Uniwire H-system Interface Module	UNIWIRES (H) I/F	JAMSC-120CRD21120	300
	Distributed I/O Driver Module	VIOD	JAMSC-120CRD21100	300
	M-NET Module	M-NET	JAMSC-120NMN31000	300
	YENET 1600-D Module	YENET1600-D	JAMSC-120NDN31110	300
	Ethernet Interface Module	EIF	JAMSC-120NET12100	300
	Optical/Electrical Conversion Module	O/E CONVERT	JAMSC-120NAH93500 and 3 other models	300
	Digital Input Modules	100-VAC 16-point Input Module	AC100IN-16P	JAMSC-120DAI54300
200-VAC 16-point Input Module		AC200IN-16P	JAMSC-120DAI74300	250
12/24-VDC 16-point Input Module		DC24IN-16P	JAMSC-120DDI34300	250
12/24-VDC 32-point Input Module		DC24IN-32P	JAMSC-120DDI35400	250
12/24-VDC 64-point Input Module		DC24IN-64P	JAMSC-120DDI36400	300
Analog Input Modules	Analog Input Module (± 10 V, 4 channels)	A/D-VOL-4CH	JAMSC-120AVI02000	300
	Analog Input Module (0 to 10 V, 4 channels)	A/D 0-10V 4CH	JAMSC-120AVI02100	300
	Analog Input Module (4 to 20 mA, 4 channels)	A/D-CUR-4CH	JAMSC-120ACI02000	300

Installation and Wiring

5.1.4 Approximate Masses of Modules and Mounting Bases cont.

Product	Name	Model Name	Model No.	Approximate Mass (g)
Digital Output Modules	100/200-VAC 8-point Output Module	ACOUT-8P	JAMSC-120DAO83000	300
	100/200-VAC 16-point Output Module	ACOUT-16P	JAMSC-120DAO84300	300
	12/24-VDC 8-point Output Module	DC24OUT-8P	JAMSC-120DDO33000	250
	12/24-VDC 16-point Output Module (sinking)	DC24OUT-16PSN	JAMSC-120DDO34310	250
	12/24-VDC 16-point Output Module (sourcing)	DC24OUT-16PSR	JAMSC-120DDO34320	250
	12/24-VDC 32-point Output Module (sinking)	DC24OUT-32PSN	JAMSC-120DDO35410	250
	12/24-VDC 64-point Output Module (sinking)	DC24OUT-64PSN	JAMSC-120DDO36410	300
	Relay Contact 16-point Output Module	RELAY-16P	JAMSC-120DRA84300	300
Analog Output Modules	Analog Output Module (± 10 V, 2 channels)	D/A-VOL-2CH	JAMSC-120AVO01000	350
	Analog Output Module (0 to 10 V, 2 channels)	D/A 0-10V 2CH	JAMSC-120AVO01100	350
	Analog Output Module (0 to 5 V, 2 channels)	D/A 0-5V 2CH	JAMSC-120AVO01200	350
	Analog Output Module (4 to 20 mA, 2 channels)	D/A-CUR-2CH	JAMSC-120ACO01000	350
Special Purpose Modules	High-speed Counter Module (1 channel)	COUNTER-1CH	JAMSC-120EHC21110	300
	Pulse Catch Module	COUNTER-16CH	JAMSC-120RD134400	300
	Register Input Module	REGISTER-IN	JAMSC-120RDI34410	300
	Register Output Module	REGISTER-OUT	JAMSC-120RDO34410	300
Motion Modules	One-axis Motion Module	MC10	JAMSC-120MMB10100	300
	Four-axis Motion Module	MC20	JAMSC-120MMB10400	500
	Two-axis Motion Module	MC15	JAMSC-120MMB20200	500
Other Modules	Expander Module	EXPANDER	JAMSC-120CBE37000	200
	Battery Module	BATTERY	JRMSP-120XCP96000	500
	MEMOBUS PLUS Hub Module	MEMOPLUS-HUB	JAMSC-120XCA39300	250
	2000 Series Modem Module	J2078	DISCT-J2078	600
Mounting Bases	6-slot Mounting Base	MB06	JRMSI-120XBP00600	600
	8-slot Mounting Base	MB08	JRMSI-120XBP00800	800
	10-slot Mounting Base	MB10	JRMSI-120XBP01000	900
	12-slot Mounting Base	MB12	JRMSI-120XBP01200	1,100
	16-slot Mounting Base	MB16	JRMSI-120XBP01600	1,500

5.1.5 Maximum Heating Value by Modules

Table 5.2 shows the maximum heat generated by each Module. Use this information to calculate control panel cooling capacity.

Table 5.2 Maximum Heating Value by each Module

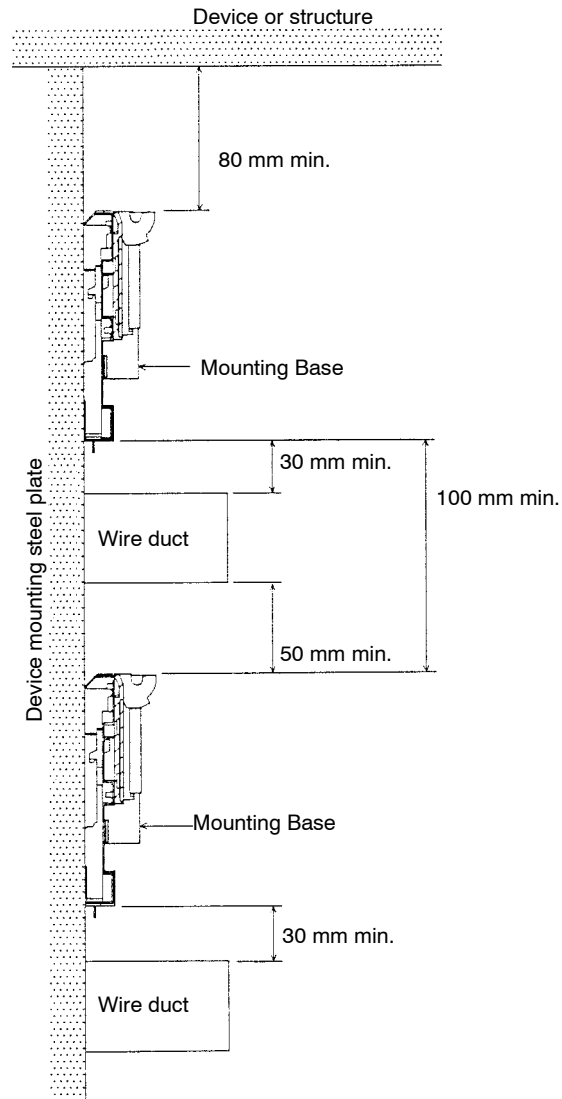
Product	Name	Model Name	Model No.	Maximum Heating Value (W)
Power Supply Modules	AC Power Supply Module (7 A)	PS10	JRMSP-120CPS11300	20
	AC Power Supply Module (3 A)	PS05	JRMSP-120CPS11100	10
	DC Power Supply Module (7 A)	PS11	JRMSP-120CPS21300	20
	DC Power Supply Module (3 A)	PS06	JRMSP-120CPS21100	10
CPU Modules	CPU Module (8 KW)	CPU10	DDSCR-120CPU14200	2.5
	CPU Module (16 KW)	CPU20	DDSCR-120CPU34100	4.7
	CPU Module (16 KW)	CPU21	DDSCR-120CPU34110	4.75
	CPU Module (32 KW)	CPU30	DDSCR-130CPU54100	5.7
	CPU Module (40 KW)	CPU35	DDSCR-130CPU54110	5.7
Communications Modules	Remote I/O Driver Module	RIOD-COAX	JAMSC-120CRD13100	4.0
	Remote I/O Receiver Module	RIOR-COAX	JAMSC-120CRR13100	4.0
	2000-Series Remote I/O Driver Module	RIOD-2000	JAMSC-120CRD13110	4.0
	MEMOBUS Module (RS-232)	MEMOBUS-RS232	JAMSC-120NOM26100	3.0
	MEMOBUS Module (RS-422)	MEMOBUS-RS422	JAMSC-120NOM27100	3.0
	PC Link Module	PCLINK-COAX	JAMSC-120NFB23100	4.0
	Uniwire Interface Module	UNIWIRES I/F	JAMSC-120CRD21110	8.2
	Uniwire H-System Interface Module	UNIWIRES (H) I/F	JAMSC-120CRD21120	8.2
	Distributed I/O Driver Module	VIOD	JAMSC-120CRD21100	1.5
	M-NET Module	M-NET	JAMSC-120NMN31000	1.5
	YENET 1600-D Module	YENET1600-D	JAMSC-120NDN31110	1.9
	Ethernet Interface Module	EIF	JAMSC-120NET12100	7.5
	Optical/Electrical Conversion Module	O/E CONVERT	JAMSC-120NAH93500 and 3 other models	2.5
Digital Input Modules	100-VAC 16-point Input Module	AC100IN-16P	JAMSC-120DAI54300	2.0
	200-VAC 16-point Input Module	AC200IN-16P	JAMSC-120DAI74300	3.5
	12/24-VDC 16-point Input Module	DC24IN-16P	JAMSC-120DDI34300	3.7
	12/24-VDC 32-point Input Module	DC24IN-32P	JAMSC-120DDI35400	3.6
	12/24-VDC 64-point Input Module	DC24IN-64P	JAMSC-120DDI36400	7.0
Analog Input Modules	Analog Input Module (± 10 V, 4 channels)	A/D-VOL-4CH	JAMSC-120AVI02000	2.3
	Analog Input Module (0 to 10 V, 4 channels)	A/D 0-10V 4CH	JAMSC-120AVI02100	2.3
	Analog Input Module (4 to 20 mA, 4 channels)	A/D-CUR-4CH	JAMSC-120ACI02000	2.3

Product	Name	Model Name	Model No.	Maximum Heating Value (W)
Digital Output Modules	100/200-VAC 8-point Output Module	ACOUT-8P	JAMSC-120DAO83000	9.0
	100/200-VAC 16-point Output Module	ACOUT-16P	JAMSC-120DAO84300	5.5
	12/24-VDC 8-point Output Module	DC24OUT-8P	JAMSC-120DDO33000	1.6
	12/24-VDC 16-point Output Module (sinking)	DC24OUT-16PSN	JAMSC-120DDO34310	7.1
	12/24-VDC 16-point Output Module (sourcing)	DC24OUT-16PSR	JAMSC-120DDO34320	7.5
	12/24-VDC 32-point Output Module (sinking)	DC24OUT-32PSN	JAMSC-120DDO35410	6.5
	12/24-VDC 64-point Output Module (sinking)	DC24OUT-64PSN	JAMSC-120DDO36410	13.0
	Relay Contact 16-point Output Module	RELAY-16P	JAMSC-120DRA84300	3.1
Analog Output Modules	Analog Output Module (± 10 V, 2 channels)	D/A-VOL-2CH	JAMSC-120AVO01000	2.0
	Analog Output Module (0 to 10 V, 2 channels)	D/A 0–10V 2CH	JAMSC-120AVO01100	2.0
	Analog Output Module (0 to 5 V, 2 channels)	D/A 0–5V 2CH	JAMSC-120AVO01200	2.0
	Analog Output Module (4 to 20 mA, 2 channels)	D/A-CUR-2CH	JAMSC-120ACO01000	2.5
Special Purpose Modules	High-speed Counter Module (1 channel)	COUNTER-1CH	JAMSC-120EHC21110	1.8
	Pulse Catch Module	COUNTER-16CH	JAMSC-120RD134400	6.0
	Register Input Module	REGISTER-IN	JAMSC-120RDI34410	3.6
	Register Output Module	REGISTER-OUT	JAMSC-120RDO34410	3.0
Motion Modules	One-axis Motion Module	MC10	JAMSC-120MMB10100	8.7
	Four-axis Motion Module	MC20	JAMSC-120MMB10400	12.8
	Two-axis Motion Module	MC15	JAMSC-120MMB20200	9.0
Other Modules	Expander Module	EXPANDER	JAMSC-120CBE37000	2.0

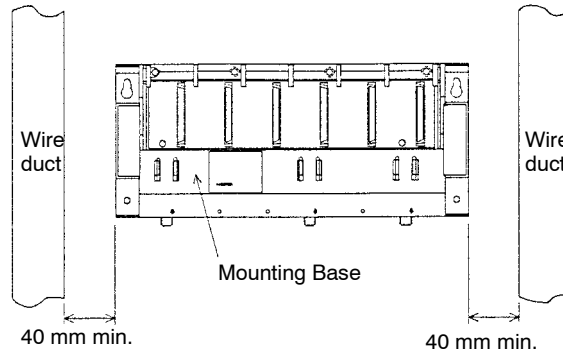
5.1.6 Mounting Base Layout

- 1) Determine the Mounting Base layout as described in this section to ensure efficient heat dissipation from the Module and facilitate installation and removal of the Module and Mounting Base.
 - a) The distance between the uppermost Mounting Base and devices (such as a molded-case circuit breakers, electromagnetic switches, or relays) above the Mounting Base or the control panel structure must be at least 80 mm.

- b) The distance between Mounting Bases must be at least 100 mm.
- c) The distance between a Mounting Base and the wire duct above the Mounting Base must be at least 50 mm.
- d) The distance between a Mounting Base and the wire duct below the Mounting Base must be at least 30 mm.



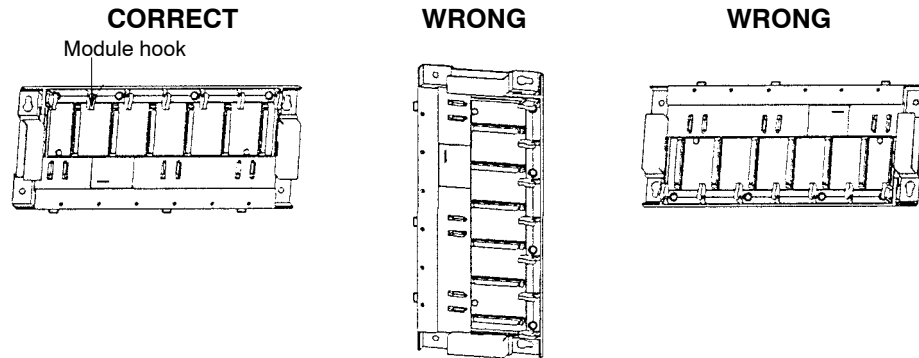
- e) Provide sufficient space on both sides of a Mounting Base so that you can hold the Mounting Base when installing or removing it.



- f) Always install a Mounting Base with its module hook facing upwards as shown in the figure below.

WARNING Mount the Mounting Base correctly. Incorrect installation may cause the Mounting Base to fall off the wall, fail, or malfunction.

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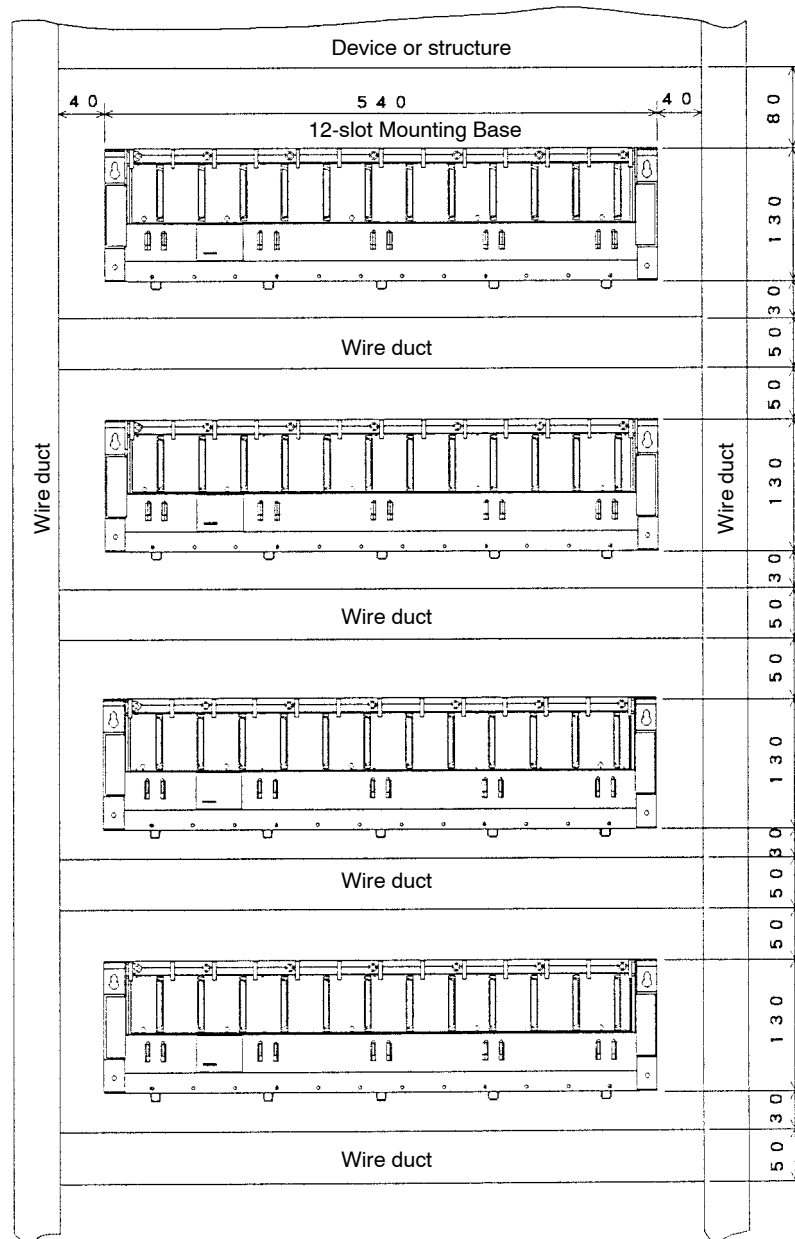
2) Example of Mounting Base Layout

The following example shows four 12-slot Mounting Bases (MB12) mounted on a device mounting steel plate. See A.2 *Drilling Plan* for the hole sizes for mounting a Mounting Base on the device mounting steel plate.

◀EXAMPLE▶

Example of Mounting Base Layout

Unit: mm



5.1.7 Module Mounting Dimensions

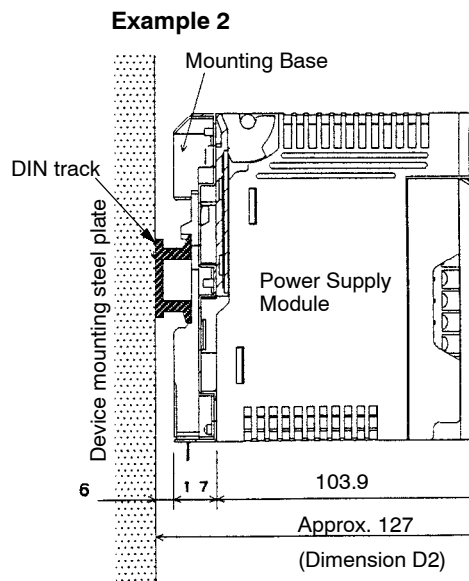
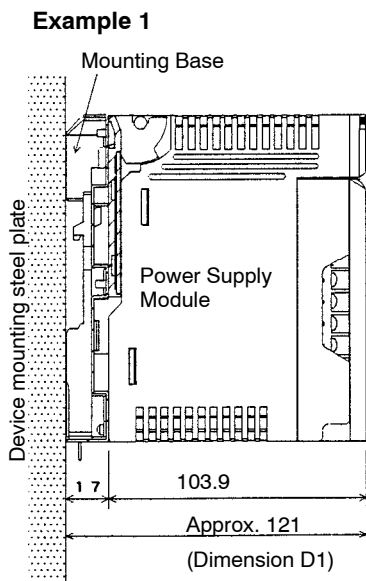
1) When the Modules shown in *Table 5.3* are installed in a control panel, the depth of the control panel necessary to mount a Module (dimension D) is as follows:

a) D for a Mounting Base mounted to a device mounting steel plate (dimension D1):
 Dimension D1 = (depth of the Module) + 17 mm
 Refer to *Table 5.3* and *Example 1*.

b) D for a Mounting Base mounted to DIN track (Dimension D2):
 Dimension D2 = (depth of the module) + 17 + 6 mm
 Refer to *Table 5.3* and *Example 2*.

Table 5.3 Module Mounting Depths

Name	Depth of Module (mm)	Module Mounting Depth	
		Dimension D1 (mm)	Dimension D2 (mm)
Power Supply Modules	103.9	Approx. 121	Approx. 127
CPU Modules	103.9	Approx. 121	Approx. 127
MEMOBUS Modules	103.9	Approx. 121	Approx. 127
I/O Modules with Terminal Blocks 32-point I/O Modules	103.9	Approx. 121	Approx. 127
Counter Modules Uniwire Interface Modules Uniwire H-System Interface Modules	103.9	Approx. 121	Approx. 127
Expander Modules	103.9	Approx. 121	Approx. 127



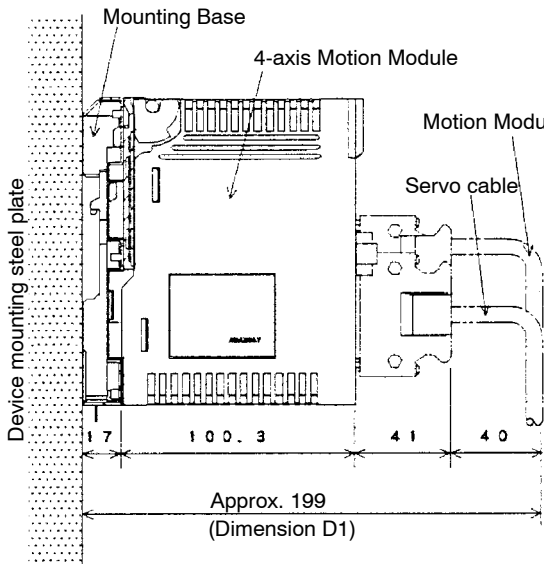
- 2) When the Modules shown in *Table 5.4* are installed in a control panel, the depth of the control panel necessary to mount a Module (dimension D) is as follows:
- a) D for a Mounting Base mounted to a device mounting steel plate (dimension D1):
Dimension D1 = (depth of the Module) + (cable connection length) + 17 mm
Refer to *Table 5.4* and *Example 3*.
 - b) D for Mounting Base mounted to a DIN track (Dimension D2):
Dimension D2 = (depth of the Module) + (cable connection length) + 17 + 6 mm
Refer to *Table 5.4* and *Example 4*.

Table 5.4 Module Mounting Depths

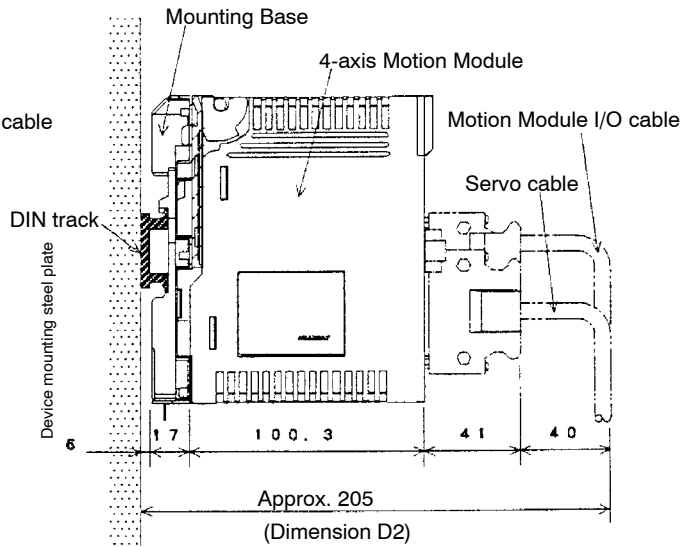
Name	Depth of Module (mm)	Depth for Connection Cable (mm)	Module Mounting Depth	
			Dimension D1 (mm)	Dimension D2 (mm)
Remote I/O Driver Module	103.9	36.9	Approx. 158	Approx. 164
Remote I/O Receiver Module	103.9	36.9	Approx. 158	Approx. 164
2000-Series Remote I/O Driver Module	103.9	36.9	Approx. 158	Approx. 164
PC Link Module	103.9	37.0	Approx. 158	Approx. 164
M-NET Module	103.9	39.5	Approx. 161	Approx. 167
YENET 1600-D Module	103.9	11.0	Approx. 132	Approx. 138
Optical/Electrical Conversion Module	103.9	Determined according to the type of optical cable used.		
One-axis Motion Module MC10	103.9	80.2	Approx. 202	Approx. 208
Four-axis Motion Module MC20	100.3	81.0	Approx. 199	Approx. 205
Two-axis Motion Module MC15	100.3	81.0	Approx. 199	Approx. 205
64-point I/O Module	103.9	87.0	Approx. 208	Approx. 214
Pulse Catch Module	103.9	87.0	Approx. 208	Approx. 214

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Example 3



Example 4



- 3) When the Modules shown in *Table 5.5* are installed in a control panel, the depth of the control panel necessary to mount a Module (dimension D) is as follows:

Dimension D = (depth dimensions of the module) + (cable connection length) mm
Refer to *Table 5.5* and examples beginning on page B-16.

Table 5.5 Module Mounting Depth

Name	Depth of Module (mm)	Depth for Connection Cable (mm)	Module Mounting Depth (mm)
Battery Module	63	85	Approx. 148
MEMOBUS PLUS Hub Module	45	146.9	Approx. 192
2000-series Modem Module	94	75	Approx. 175 ^{*1}

*1: Includes the length of metal fittings (6 mm).

5.2 Installing Mounting Bases and Modules

This section describes how to install a Mounting Base and Modules in the control panel and connect Rack-to-rack I/O Cables.

5.2.1	Installing Mounting Bases	5-16
5.2.2	Installing Modules	5-20
5.2.3	Installing the CPU and the Power Supply Module	5-25
5.2.4	Installing the Terminal Block for Field Connection Module	5-29
5.2.5	Connector for Field Connections Module	5-35
5.2.6	Installing the Communications Modules	5-39
5.2.7	Installing the Motion Module	5-44
5.2.8	Installing Rack-to-Rack I/O Cables	5-49

5.2.1 Installing Mounting Bases

Install a Mounting Base on the device mounting steel plate or DIN track inside the control panel as described in this section.

WARNING If the control panel in which the GL120 or GL130 is mounted is to be used in a place subject to excessive vibration or is to be exported or transported over long distances, avoid installing the Mounting Base on a DIN track. Instead, install it on a device mounting steel plate.

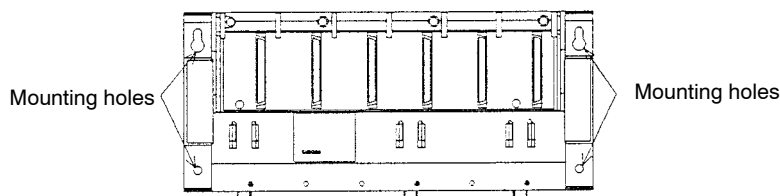
If a Mounting Base is installed on a DIN track, the Mounting Base may fall off the DIN track when strong vibration or shock is applied to the control panel.

WARNING Each module connector on the Mounting Base has a connector cover. When installing the Mounting Base, leave the connector covers attached to prevent foreign matter from entering the module connectors.

If foreign matter enters the module connectors, the GL120 or GL130 may malfunction.

1) Installing a Mounting Base on Device Mounting Steel Plate

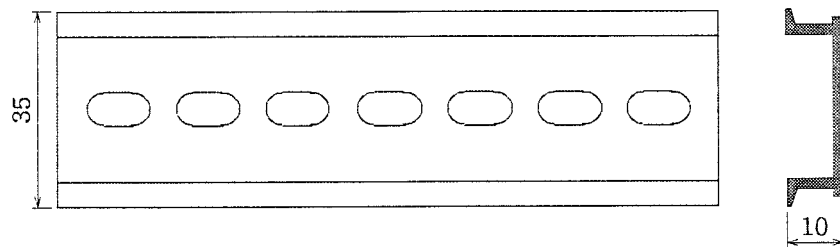
- a) Determine the Mounting Base layout as described in *5.1.6 Mounting Base Layout*.
- b) Open four Mounting Base mounting holes in the device mounting steel plate according to the dimensional drawing of a Mounting Base shown in *B.8 Mounting Bases. A.2 Drilling Plan* shows an example.
- c) The Mounting Base has four mounting holes. Use four M5 screws to secure the Mounting Base to the device mounting steel plate.



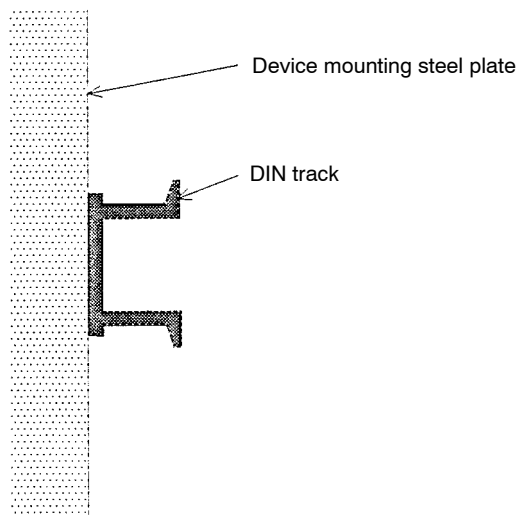
- Note**
- (1) The device mounting steel plate to which the Mounting Base is to be installed must have an integral (one-piece) structure.
 - (2) If the device mounting steel plate is coated, always peel off the coating around each mounting bolt hole before installing the Mounting Base. This improves the noise immunity of the GL120 or GL130. Also, pay attention to mounting screws to ensure conductivity between the Mounting Base and the device mounting steel plate. If conductivity between the Mounting Base and the device mounting steel plate is insufficient, the GL120 or GL130 may malfunction.

2) Installing Mounting Bases on DIN track

- a) Use DIN track with a width of 35 mm and a height of 10 mm.

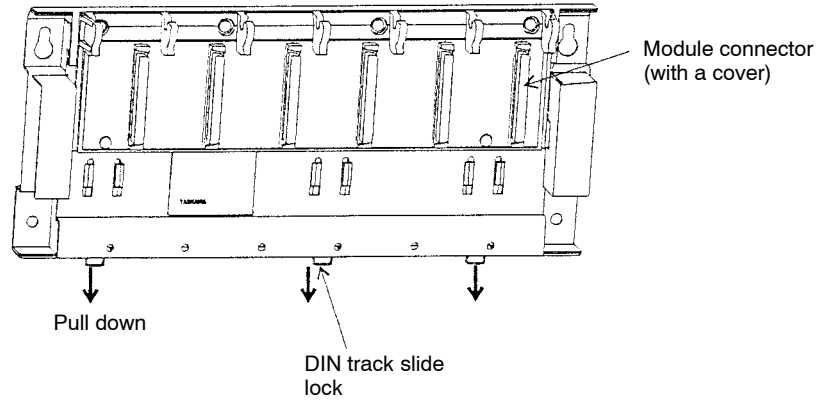


- b) Determine the Mounting Base layout as described in 5.1.6 *Mounting Base Layout*.
- c) Open DIN track mounting holes in the device mounting steel plate according to the dimensional drawing of Mounting Bases shown in B.8 *Mounting Bases*. A.2 *Drilling Plan* shows an example.
- d) Install the DIN track on the device mounting steel plate as shown below.

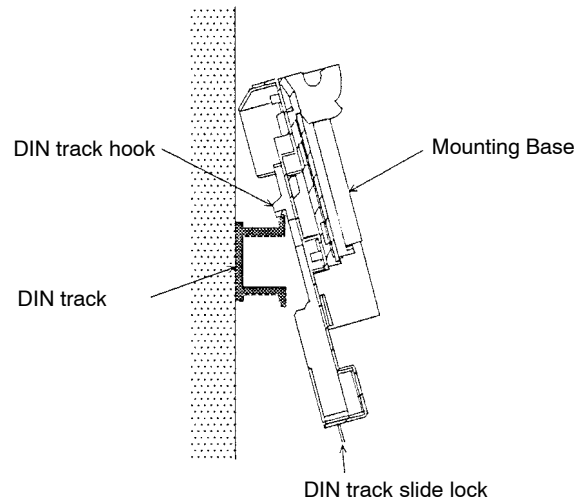


e) Install the Mounting Base on the DIN track according to the following procedure:

(1) Pull down the DIN track slide locks on the Mounting Base to release these locks.

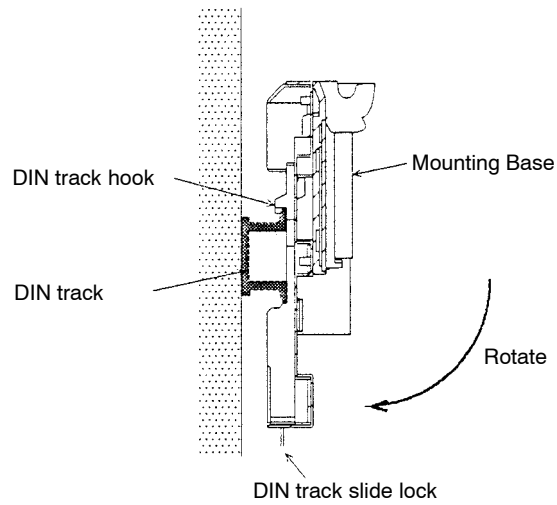


(2) Hook the DIN track hook of the Mounting Base on the upper edge on the DIN track.

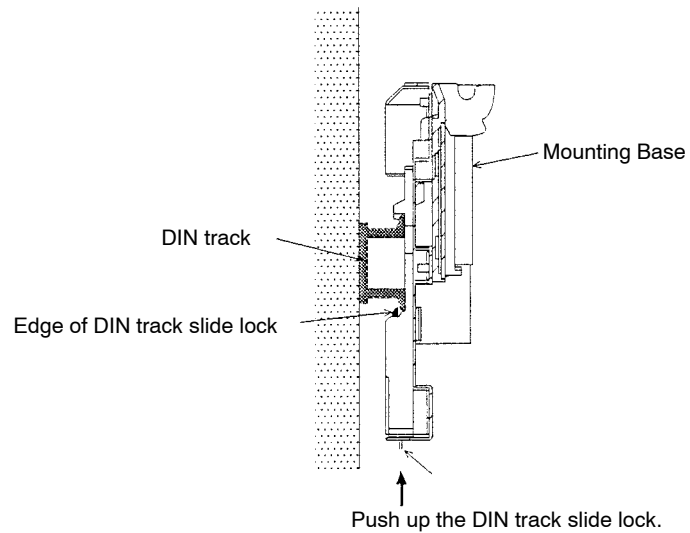


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- (3) Rotate the Mounting Base until it comes into contact with the DIN track, then press the Mounting Base against the DIN track.

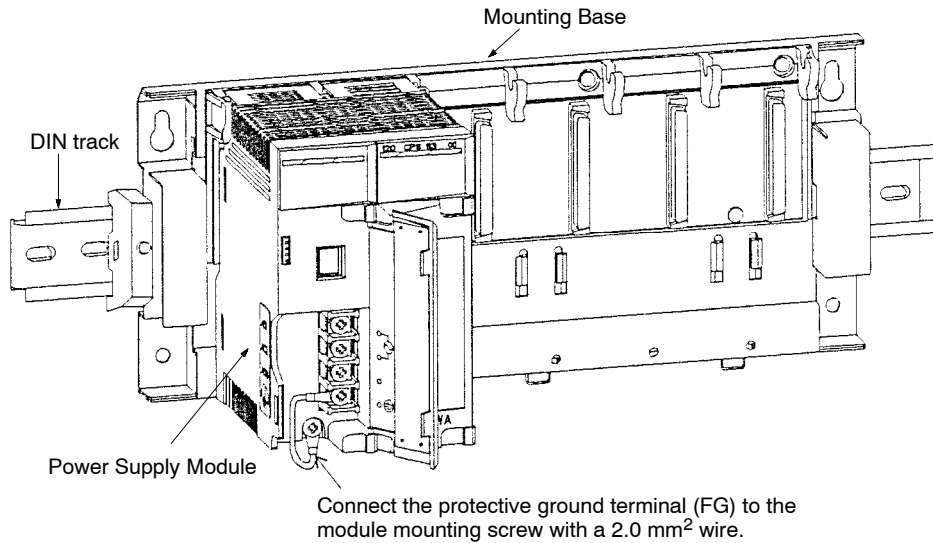


- (4) Push up the DIN track slide lock to secure the Mounting Base to the DIN track.



f) Improving Noise Immunity of the GL120 or GL130

Note To improve the noise immunity of the GL120 or GL130, connect the protective ground terminal (FG) of the Power Supply Module to the module mounting screw with a 2.0 mm² wire when installing the Power Supply Module on the Mounting Base.



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5.2.2 Installing Modules

1) Module Installation Location

- a) Install the following Modules on a Mounting Base. The procedures for installing these Modules on the Mounting Base are described in 5.2.3 to 5.2.7 in this section.
 - (1) Power Supply Modules
 - (2) CPU Modules
 - (3) Communication Modules
 - (4) I/O Modules
 - (5) Special Purpose Modules
 - (6) Motion Modules
 - (7) Expander Modules

- b) Install the following Modules directly on the device mounting steel plate. Before installing a Module, open mounting holes in the device mounting steel plate as described in *items 2) to 4) of B.7 Other Modules*. A Mounting Clamp (Model No.: DF8305869) is required to install a 2000-series Modem Module.

- (1) Battery Modules
- (2) MEMOBUS PLUS Hub Modules
- (3) 2000-series Modem Modules

2) Installation Location for the Mounting Base

The following table shows the location of the modules installing to the mounting base.

Table 5.6 Module Installation Location

Product	Name	Model Number	Installation Location
Power Supply Module	AC Power Supply Module (7 A)	JRMSP-120CPS11300	One module for each rack.
	AC Power Supply Module (3 A)	JRMSP-120CPS11100	Can be installed any slot.
	DC Power Supply Module (7 A)	JRMSP-120CPS21300	
	DC Power Supply Module (3 A)	JRMSP-120CPS21100	
CPU Module	CPU Module (8 KW) CUP10	DDSCR-120CPU14200	One module for GL120, GL130 systems.
	CPU Module (16 KW) CPU20	DDSCR-120CPU34100	
	CPU Module (16 KW) CPU21	DDSCR-120CPU34110	
	CPU Module (32 KW) CPU30	DDSCR-130CPU54100	
	CPU Module (40 KW) CPU35	DDSCR-130CPU54110	
Communications Modules	Remote I/O Driver Module	JAMSC-120CRD13100	CPU Rack
	Remote I/O Receiver Module	JAMSC-120CRD13110	Remote Station
	2000 Series Remote I/O Driver Module	JAMSC-120CRR13100	CPU Rack
	MEMOBUS Module (RS-232)	JAMSC-120NOM26100	Can be installed any rack in the local channel.
	MEMOBUS Module (RS-422)	JAMSC-120NOM27100	
	PC Link Module	JAMSC-120NFB23100	CPU Rack
	Uniwire Interface Module	JAMSC-120CRD21110	Can be installed any rack.
	Uniwire H-System Interface Module	JAMSC-120CRD21120	Can be installed any rack.
	Distributed I/O Driver Module	JAMSC-120CRD21100	Can be installed any rack in the local channel.
	M-NET Module	JAMSC-120NMN31000	Can be installed any rack.
	YENET 1600-D Module	JAMSC-120NDN31110	Can be installed any rack.
	Ethernet Interface Module	JAMSC-120NET12100	CPU Rack
	Optical/Electrical Conversion Module	JAMSC-120NAH93500 and 3 other models	Can be installed any rack.
Digital Input Modules	100-VAC 16-point Input Module	JAMSC-120DAI54300	Can be installed any rack.
	200-VAC 16-point Input Module	JAMSC-120DAI74300	
	12/24-VDC 16-point Input Module	JAMSC-120DDI34300	
	12/24-VDC 32-point Input Module	JAMSC-120DDI35400	
	12/24-VDC 64-point Input Module	JAMSC-120DDI36400	
Analog Input Modules	Analog Input Modules (± 10 V, 4 channels)	JAMSC-120AVI02000	Can be installed any rack.
	Analog Input Modules (0 to 10 V, 4 channels)	JAMSC-120AVI02100	
	Analog Input Modules (4 to 20 mA, 4 channels)	JAMSC-120ACI02000	

Product	Name	Model Number	Installation Location
Digital Output Module	100/200-VAC 8-point Output Module	JAMSC-120DAO83000	Can be installed any rack.
	100/200-VAC 16-point Output Module	JAMSC-120DAO84300	
	12/24-VDC 8-point Output Module	JAMSC-120DDO33000	
	12/24-VDC 16-point Output Module (sinking)	JAMSC-120DDO34310	
	12/24-VDC 16-point Output Module (sourcing)	JAMSC-120DDO34320	
	12/24-VDC 32-point Output Module (sinking)	JAMSC-120DDO35410	
	12/24-VDC 64-point Output Module (sinking)	JAMSC-120DDO36410	
	Relay Contact 16-point Output Module	JAMSC-120DRA84300	
Analog Output Modules	Analog Output Modules (± 10 V, 2 channels)	JAMSC-120AVO01000	Can be installed any rack.
	Analog Output Modules (0 to 10 V, 2 channels)	JAMSC-120AVO01100	
	Analog Output Modules (0 to 5 V, 2 channels)	JAMSC-120AVO01200	
	Analog Output Modules (4 to 20 mA, 2 channels)	JAMSC-120ACO01000	
Special Purpose Modules	High-speed Counter Module (1 channel)	JAMSC-120EHC21110	Can be installed any rack.
	Pulse Catch Module	JAMSC-120RD134400	Can be installed any rack. *
	Register Input Module	JAMSC-120RDI34410	Can be installed any rack.
	Register Output Module	JAMSC-120RDO34410	CPU Rack
Motion Modules	One-axis Motion Module	JAMSC-120MMB10100	1) Do not use absolute position detecting function: can be installed any rack. 2) Use absolute position detecting function: can be installed the CPU Rack.
	Four-axis Motion Module	JAMSC-120MMB10400	
	Two-axis Motion Module	JAMSC-120MMB20200	
Other Modules	Expander Module	JAMSC-120CBE37000	One module for each rack. Can be installed any slot.

Note The Pulse Catch and Counter Module can be mounted in any slot of any rack although there may be some system configuration restrictions. Refer to the related documentation for more details on the restrictions.

5

3) Installing the Module

The following table shows how to install or remove the modules to and from the mounting base.

Table 5.7 Installing and Removing the Modules

Product	Name	Model Number	Installation Location
Power Supply Module	AC Power Supply Module (7 A)	JRMSP-120CPS11300	See 5.2.3 <i>Installing the CPU and the Power Supply Module.</i>
	AC Power Supply Module (3 A)	JRMSP-120CPS11100	
	DC Power Supply Module (7 A)	JRMSP-120CPS21300	
	DC Power Supply Module (3 A)	JRMSP-120CPS21100	
CPU Module	CPU Module (8 KW) CUP10	DDSCR-120CPU14200	See 5.2.3 <i>Installing the CPU and the Power Supply Module.</i>
	CPU Module (16 KW) CPU20	DDSCR-120CPU34100	
	CPU Module (16 KW) CPU21	DDSCR-120CPU34110	
	CPU Module (32 KW) CPU30	DDSCR-130CPU54100	
	CPU Module (40 KW) CPU35	DDSCR-130CPU54110	
Communications Modules	Remote I/O Driver Module	JAMSC-120CRD13100	See 5.2.6 <i>Installing the Communications Modules.</i>
	Remote I/O Receiver Module	JAMSC-120CRD13110	
	2000 Series Remote I/O Driver Module	JAMSC-120CRR13100	
	MEMOBUS Module (RS-232)	JAMSC-120NOM26100	
	MEMOBUS Module (RS-422)	JAMSC-120NOM27100	
	PC Link Module	JAMSC-120NFB23100	
	Uniwire Interface Module	JAMSC-120CRD21110	
	Uniwire H-System Interface Module	JAMSC-120CRD21120	
	Distributed I/O Driver Module	JAMSC-120CRD21100	
	M-NET Module	JAMSC-120NMN31000	
	YENET 1600-D Module	JAMSC-120NDN31110	
	Ethernet Interface Module	JAMSC-120NET12100	
	Optical/Electrical Conversion Module	JAMSC-120NAH93500 and 3 other models	
	Digital Input Modules	100-VAC 16-point Input Module	
200-VAC 16-point Input Module		JAMSC-120DAI74300	
12/24-VDC 16-point Input Module		JAMSC-120DDI34300	See 5.2.5 <i>Connector for Field Connections Module.</i>
12/24-VDC 32-point Input Module		JAMSC-120DDI35400	
12/24-VDC 64-point Input Module		JAMSC-120DDI36400	
Analog Input Modules	Analog Input Modules (± 10 V, 4 channels)	JAMSC-120AVI02000	See 5.2.4 <i>Installing the Terminal Blocks for Field Connections Module.</i>
	Analog Input Modules (0 to 10 V, 4 channels)	JAMSC-120AVI02100	
	Analog Input Modules (4 to 20 mA, 4 channels)	JAMSC-120ACI02000	

Product	Name	Model Number	Installation Location
Digital Output Module	100/200-VAC 8-point Output Module	JAMSC-120DAO83000	See 5.2.4 <i>Installing the Terminal Blocks for Field Connections Module.</i>
	100/200-VAC 16-point Output Module	JAMSC-120DAO84300	
	12/24-VDC 8-point Output Module	JAMSC-120DDO33000	
	12/24-VDC 16-point Output Module (sinking)	JAMSC-120DDO34310	
	12/24-VDC 16-point Output Module (sourcing)	JAMSC-120DDO34320	
	12/24-VDC 32-point Output Module (sinking)	JAMSC-120DDO35410	
	12/24-VDC 64-point Output Module (sinking)	JAMSC-120DDO36410	
	Relay Contact 16-point Output Module	JAMSC-120DRA84300	
Analog Output Modules	Analog Output Modules (± 10 V, 2 channels)	JAMSC-120AVO01000	See 5.2.4 <i>Installing the Terminal Blocks for Field Connections Module.</i>
	Analog Output Modules (0 to 10 V, 2 channels)	JAMSC-120AVO01100	
	Analog Output Modules (0 to 5 V, 2 channels)	JAMSC-120AVO01200	
	Analog Output Modules (4 to 20 mA, 2 channels)	JAMSC-120ACO01000	
Special Purpose Modules	High-speed Counter Module (1 channel)	JAMSC-120EHC21110	See 5.2.4 <i>Installing the Terminal Blocks for Field Connections Module.</i>
	Pulse Catch Module	JAMSC-120RD134400	See 5.2.5 <i>Connector for Field Connections Module.</i>
	Register Input Module	JAMSC-120RDI34410	
	Register Output Module	JAMSC-120RDO34410	
Motion Modules	One-axis Motion Module	JAMSC-120MMB10100	See 5.2.7 <i>Installing the Motion Module.</i>
	Four-axis Motion Module	JAMSC-120MMB10400	
	Two-axis Motion Module	JAMSC-120MMB20200	
Other Modules	Expander Module	JAMSC-120CBE37000	See 5.2.3 <i>Installing the CPU and the Power Supply Module.</i>


5

5.2.3 Installing the CPU and the Power Supply Module


1) This section shows how to install or remove the following Module.

- (1) CPU Module (8 kW) CPU10
- (2) CPU Module (16 kW) CPU20
- (3) CPU Module (16 kW) CPU21
- (4) CPU Module (32 kW) CPU30
- (5) CPU Module (40 kW) CPU35
- (6) AC Power Supply Module (7 A) PS10
- (7) AC Power Supply Module (7 A) PS05
- (8) AC Power Supply Module (7 A) PS11
- (9) AC Power Supply Module (7 A) PS06
- (10) Expander Module


2) Installing Modules

 **Caution** When installing the Power Supply Module, turn OFF the power supply to the field wiring terminals.


Installing the Power Supply Module while power is being supplied may damage the Module or cause malfunction of the GL120 and GL130.

 **Caution** When installing the CPU or the Expander Module, turn OFF the power supply to all Power Supply Modules.

Installing the CPU or Expander Module while power is being supplied to Power Supply Modules may damage the Module or cause malfunction of the GL120 and GL130.

 **Caution** Do not remove the connector covers from the Module connectors on the Mounting Base slots where no Modules are installed.

The GL120 and GL130 may malfunction if any foreign matter enters a Module connector.

 **Caution** Make sure that all mounting screws for the Modules are securely tightened.

Make sure that all mounting screws for the Modules are securely tightened so that they do not become loose. Loose screws may cause malfunction of the GL120 and GL130.

 **Caution** Do not mount more than one Power Supply Modules on a single Mounting Base.

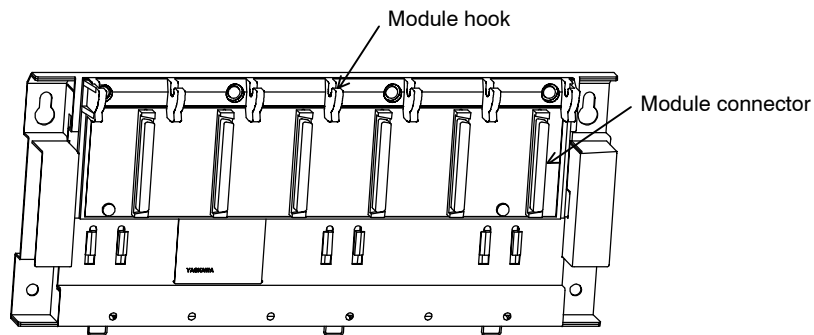
Mounting more than one Power Supply Module on a single Mounting Base may damage the Power Supply Module and cause malfunction of the GL120 and GL130.

Caution Do not mount more than one CPU Module and Expander Modules on a single Mounting Base.

Mounting more than one CPU Modules and Expander Module on a single Mounting Base may damage the CPU Modules and Expander Module or cause malfunction of the GL120 and GL130.

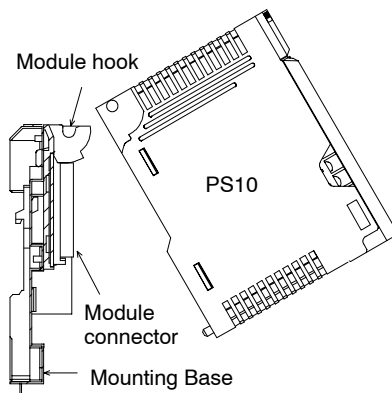
Use the following procedures to install the Power Supply Module, CPU Module and the Expander Module on the Mounting Base.

- a) Turn OFF the power to the Power Supply Modules.
- b) Remove the cover from the Module connector on the Mounting Base.



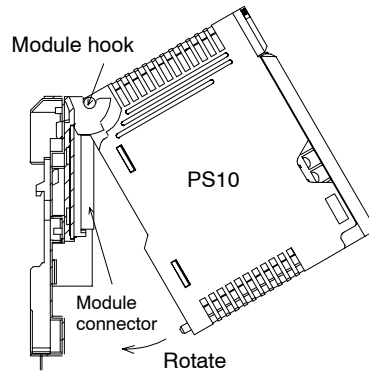
- c) Install the Module on the Mounting Base as shown below.

- (1) Hook the Module to the Module hook on the Mounting Base.

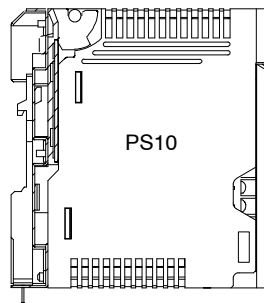


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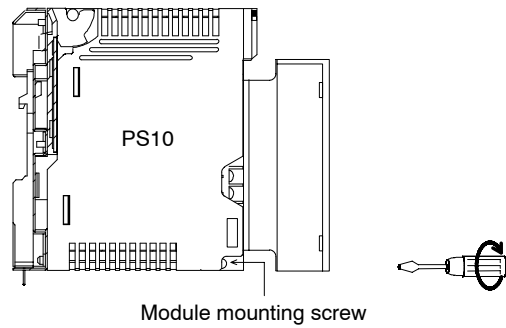
- (2) Rotate the Module until it comes into contact with the Mounting Base.



- (3) Fit the Module into the Mounting Base to make an electrical connection with the module connector.



- (4) Tighten the Module mounting screw on the PS10 Module.



3) Removing Module

Caution Always turn OFF the power to field wiring terminals before removing the Power Supply Module.

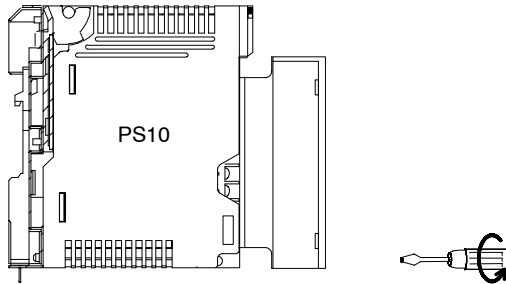
Removing the Power Supply Module while power is supplied to field wiring terminals may damage the Power Supply Module or cause malfunction of the GL120 and GL130.

Caution Always turn OFF the power to Power Supply Modules before removing the CPU or Expander Module.

Removing the CPU or Expander Module while power is supplied to Power Supply Modules may damage the CPU or Expander Module or cause malfunction of the GL120 and GL130.

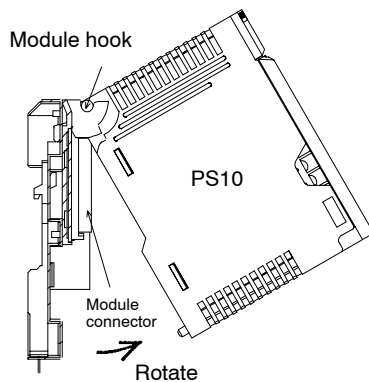
Use the following procedures to remove the Power Supply Module the CPU Module, and the Expander Module from the Mounting Base.

- 1) Turn OFF the power to the Power Supply Modules.
- 2) Remove the Power Supply Module, CPU Module, and Expander Module from the Mounting Base as shown below.
 - a) Loosen the Module mounting screw on the Module.

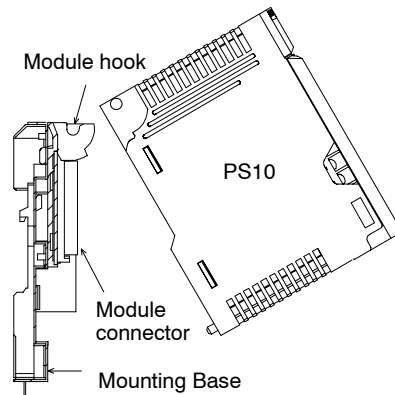


Module mounting screw (M4, Phillips)

- b) Rotate the Module until it disconnects from the Mounting Base.



- c) Remove the Module from the Module hook on the Mounting Base.



5.2.4 Installing the Terminal Block for Field Connection Module

- 1) This section shows how to install or remove the following Module.

- (1) I/O Module with the terminal block for field connection
- (2) Special Purpose Module with the terminal block for field connection
- (3) M-NET Module

2) Installing the Module

Caution Do not remove the connector covers from the Module connectors on the Mounting Base slots where no Modules are installed.

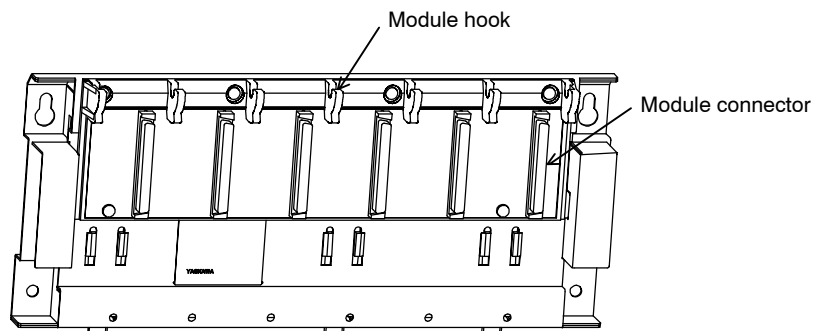
The GL120 and GL130 may malfunction if any foreign matter enters a Module connector.

Caution Make sure that all mounting screws for the Modules are securely tightened.

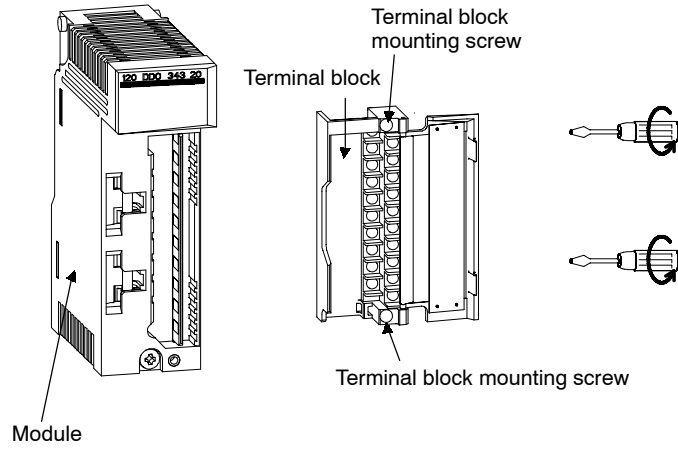
Make sure that all mounting screws for the Modules are securely tightened so that they do not become loose. Loose screws may cause malfunction of the GL120 and GL130.

Install the Terminal Block for the Module on the Mounting Base.
Use the following procedures to install the Module.

- 1) Remove the cover from the Module connector on the Mounting Base.

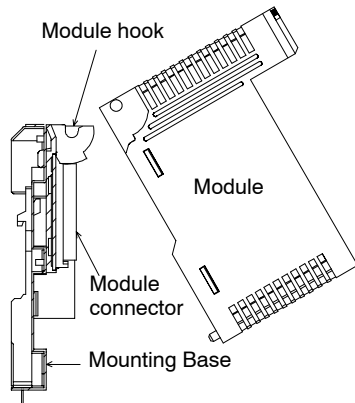


- 2) Loosen the terminal block mounting screws as shown below, and then remove the terminal block from the Module.

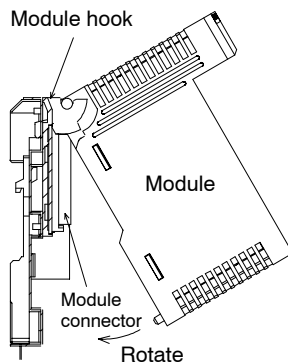


- 3) Install the Module on the Mounting Base as shown below.

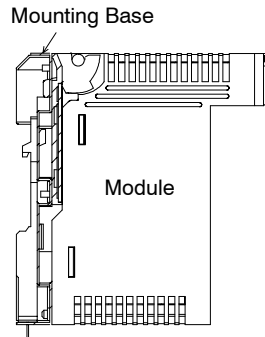
- a) Hook the Module to the Module hook on the Mounting Base.



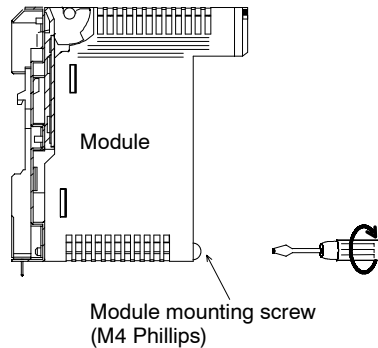
- b) Rotate the Module until it comes into contact with the Mounting Base.



- c) Fit the Module into the Mounting Base to make an electrical connection with the Module connector.



- d) Tighten the Module mounting screw on the Module.



3) Installing the terminal block

Caution When installing the terminal block for the AC I/O Modules, turn OFF the AC power supply to the AC I/O Modules for input signal or driving loads.

Installing a terminal block with AC power to the external power supply terminal of the AC I/O Modules may cause an electric shock at touching the power supply terminals.

Caution Make sure that all mounting screws for the terminal block are securely tightened.

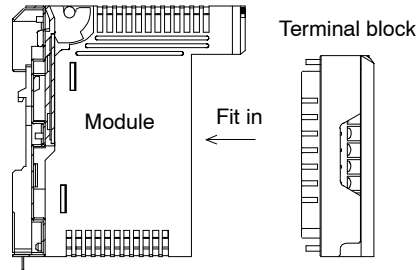
Make sure that all mounting screws for the terminal block are securely tightened so that they do not become loose. Loose screws may cause malfunctioning of the GL120 and GL130.

Use the following procedures to install the terminal block for the Module.

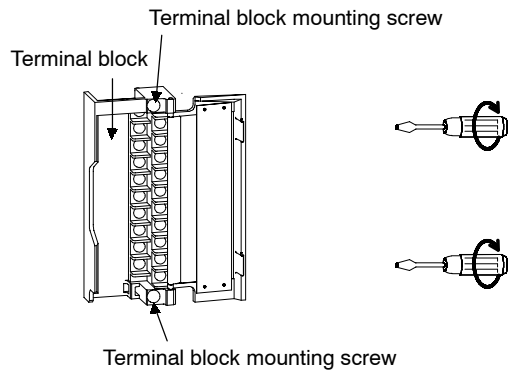
- 1) Be sure that the Module has been installed on the Mounting Base.
- 2) Turn OFF the AC power supply to the Module for input signal or driving loads.

3) Install the appropriate terminal block on the Module as shown below.

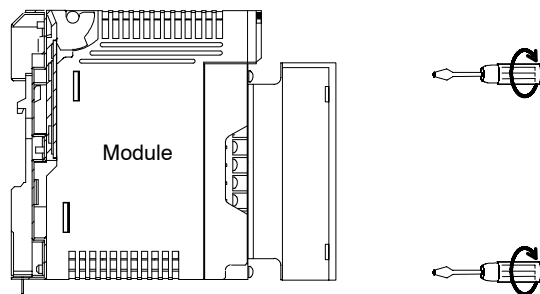
a) Fit the terminal block onto the Module.



b) Tighten the two terminal block mounting screws alternately.



c) Tighten the terminal block mounting screws until the terminal block closely attaches to the Module as shown in the following figure.



d) Close the terminal block cover.

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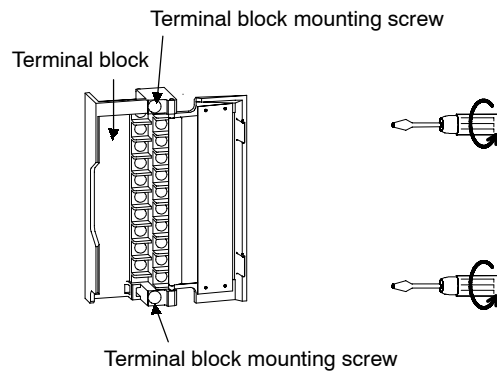
4) Removing the terminal block

Caution Always turn OFF the AC power supply to the AC I/O Modules for input signal or for driving loads before removing the terminal block for the AC Modules.

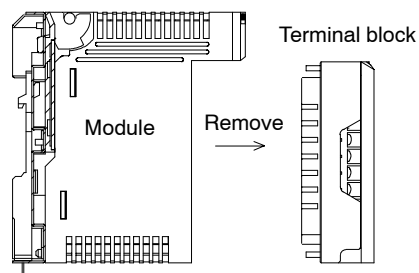
Removing the terminal block with AC power to the external power supply terminal of the AC Modules may cause an electric shock at touching the power supply terminals.

Use the following procedures to remove the terminal block from the Module.

- 1) Turn OFF the power supply to the Module.
- 2) Remove the terminal block from the Module as shown below.
 - a) Loosen the two terminal block mounting screws alternately.



- b) Remove the terminal block from the Module.



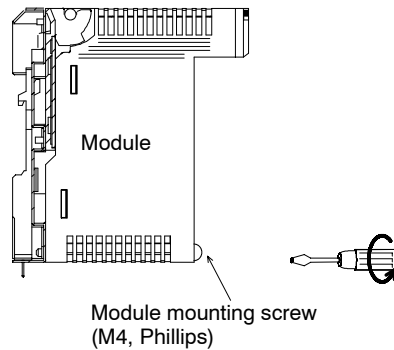
5) Removing Modules

! Caution When inserting or removing an AC I/O Module while the AC power supply is turned ON, install a safety switch for each Module and always turn this safety switch OFF to turn OFF the AC power supply to the Module.

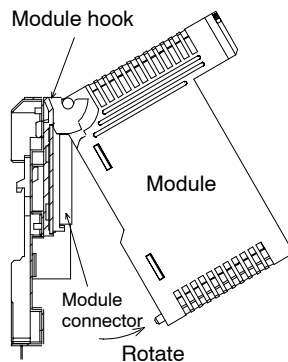
Inserting or removing an AC I/O Module while AC power is being supplied may result in electric shock at touching the power supply terminals.

Use the following procedures to remove the Module from the Mounting Base.

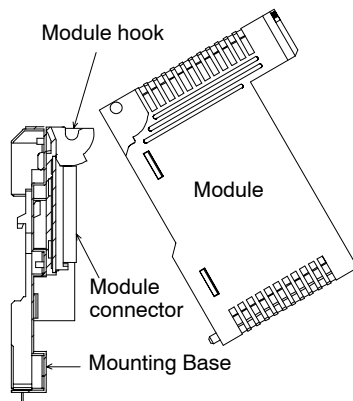
- 1) Be sure that the terminal block has been removed from the Module.
- 2) Remove the Module from the Mounting Base as shown below.
 - a) Loosen the Module mounting screws on the Module.



- b) Rotate the Module until it disconnects from the Mounting Base.



- c) Remove the Module from the Module hook on the Mounting Base.



5.2.5 Connector for Field Connections Module

1) This section shows how to install and remove the following Module.

- (1) 12/24 VDC 32 points I/O Module
- (2) 12/24 VDC 64 points I/O Module
- (3) Special Purpose Module with the connector for field connection

2) Installing Modules

! Caution Do not remove the connector covers from the Module connectors on the Mounting Base slots where no Modules are installed.

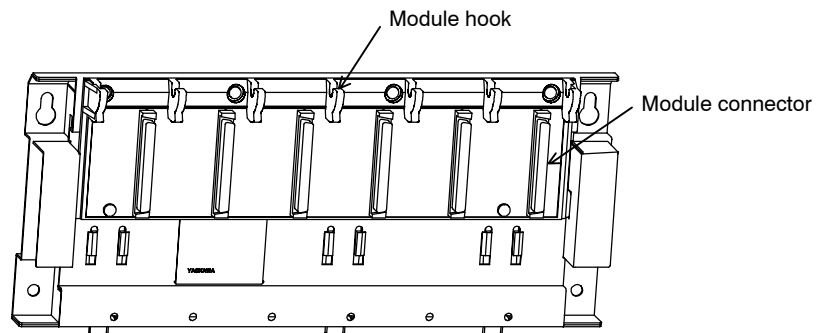
The GL120 and GL130 may malfunction if any foreign matter enters a Module connector.

! Caution Make sure that all mounting screws for the Modules are securely tightened.

Make sure that all mounting screws for the Modules are securely tightened so that they do not become loose. Loose screws may cause malfunction of the GL120 and GL130.

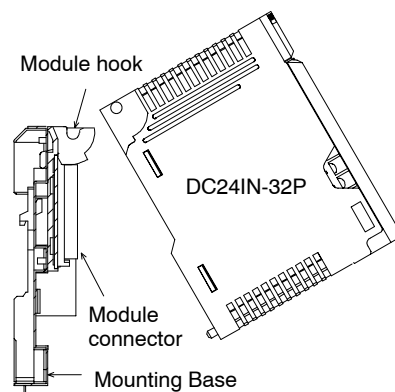
Install the connector for Field Connection Module on the Mounting Base. Use the following procedures to install the Module.

1) Remove the cover from the Module connector on the Mounting Base.

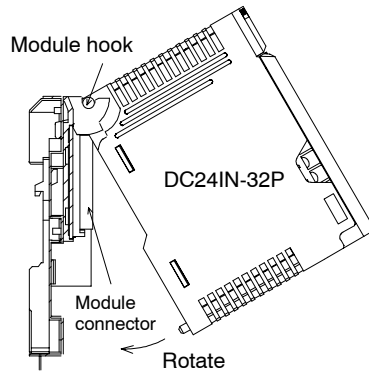


2) Install the Module on the Mounting Base as shown below.

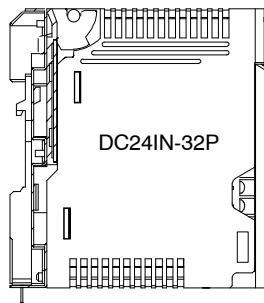
a) Hook the PS10 Module to the Module hook on the Mounting Base.



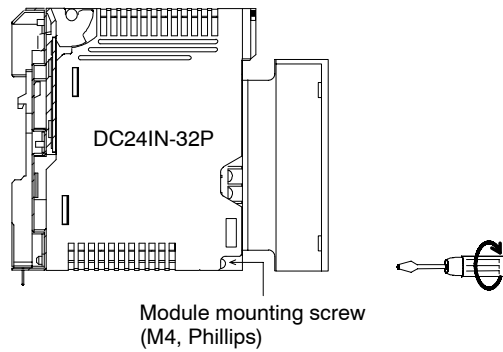
- b) Rotate the PS10 Module until it comes into contact with the Mounting Base.



- c) Fit the PS10 Module into the Mounting Base to make an electrical connection with the Module connector.



- d) Tighten the Module mounting screw on the PS10 Module.



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3) Connecting the cable

Caution Make sure that all cable connectors for the Module are securely inserted and tightened.

Insufficient insertion and/or looseness may cause malfunction of the GL120 and GL130.

The following shows the cable connection to the connector type module.

- a) Check that the Module is installed on the Module Base.
- b) Fit the cable to the Module connector.
- c) Tighten the Connector fixing screw on the connector.

4) Removing the cable

The following shows how to remove the connector type module.

- a) Loosen the connector fixing screw on the connector.
- b) Remove the connector from the Module.

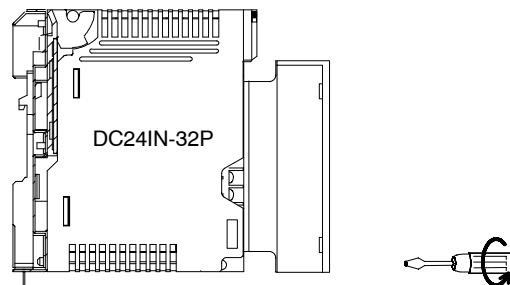
Note When hot swapping, it may cause input signal or output signal chatter when inserting or removing a cable connector to or from the Module. If this is a problem, then setup a chatter prevention switch for each Module and always turn this switch OFF to cut off the DC power supply before hot swapping.

5) Removing modules

Use the following procedures to remove the connecting type Module from the Mounting Base.

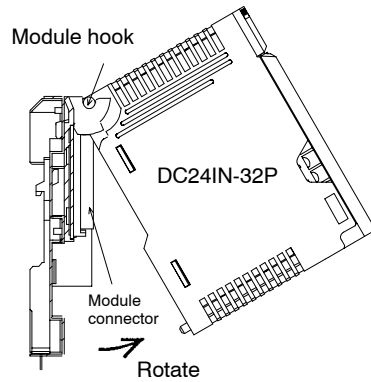
Remove the Module from the Mounting Base as shown below.

- a) Loosen the Module mounting screw on the Module.

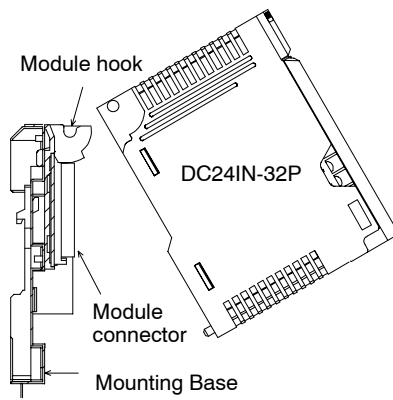


Module mounting screw
(M4, Phillips)

b) Rotate the Module until it disconnects from the Mounting Base.



c) Remove the Module from the Module hook on the Mounting Base.



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5.2.6 Installing the Communications Modules

1) This section shows how to install and remove the following Communications Module.

- (1) Remote I/O Drive Module
- (2) Remote I/O Receiver Module
- (3) 2000-Series Remote I/O Driver Module
- (4) MEMOBUS Module (RS-232)
- (5) MEMOBUS Module (RS-422)
- (6) PC Link Module
- (7) Uniwire Interface Module
- (8) Uniwire H-System Interface Module
- (9) Distributed I/O Driver Module
- (10) YENET 1600-D Module
- (11) Ethernet Interface Module
- (12) Optical/Electrical Conversion Module

Note See 5.2.4 *Installing the Terminal Block Field Connection Module* for M-NET Modules installing and removing.

2) Installing modules

 **Caution** Mount the Modules mentioned in the table below on CPU racks (racks with CPU Modules).


Mounting these Modules on any other racks may damage the Modules or cause a malfunction of the GL120 and GL130.

Modules to be Mounted on CPU Rack	Model No.
Remote I/O Driver Module	JAMSC-120CDR13100
2000-series Remote I/O Driver Module	JAMSC-120CDR13110
PC Link Module	JAMSC-120NFB23100
Ethernet Interface Module	JAMSC-120NET12100

 **Caution** Mount the Modules mentioned in the table below on local channel racks.

Mounting these Modules on remote channel racks may damage the Modules or cause a malfunction of the GL120 and GL130.

Modules to be Mounted on Local Channel Rack	Model No.
MEMOBUS Module (RS-232)	JAMSC-120NOM13100
MEMOBUS Module(RS-422)	JAMSC-120NOM13110

 **Caution** When installing the Modules that do not support hot swapping, turn OFF the power supply to Power Supply Modules.

Installing the Modules that do not support hot swapping while the power is being supplied to Power Supply Modules may damage the Module or cause malfunction of the GL120 and GL130.

Modules that Do Not Support Hot Swapping	Model No.
Remote I/O Driver Module	JAMSC-120CDR13100
2000-series Remote I/O Driver Module	JAMSC-120CDR13110

Caution When connecting the cables connected to the Ethernet Interface Modules, turn OFF the power supply to the Power Supply Modules on the racks where the Ethernet Interface Modules are mounted.

Connecting the cables while power is being supplied to the Power Supply Modules may damage the Ethernet Interface Module or cause a malfunction of the GL120 and GL130.

Caution Do not remove the connector covers from the Module connectors on the Mounting Base slots where no Modules are installed.

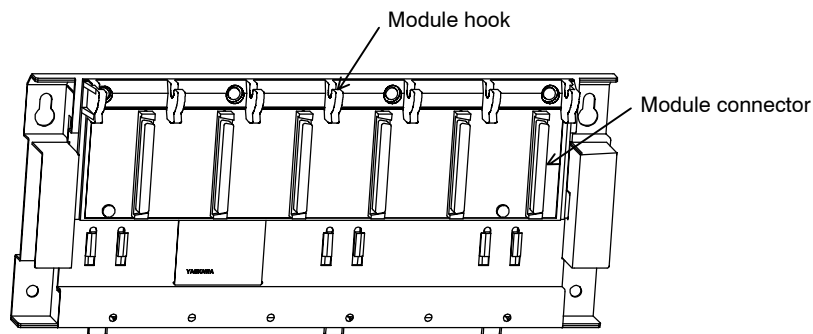
The GL120 and GL130 may malfunction if any foreign matter enters a Modules connector.

Caution Make sure that all mounting screws for the Module are securely tightened.

Make sure that all mounting screws for the Modules are securely tightened so that they do not become loose. Loose screws may cause malfunction of the GL120 and GL130.

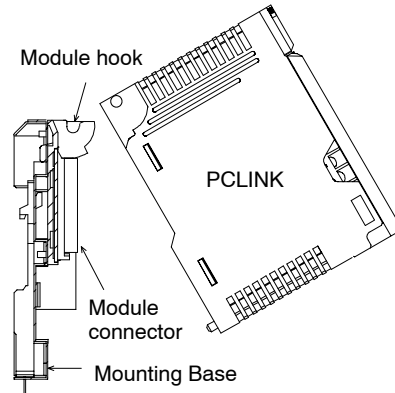
Install the Communications Module on the Mounting Base. Use the following procedures to install the Module.

- 1) Remove the cover from the Module connector on the Mounting Base.

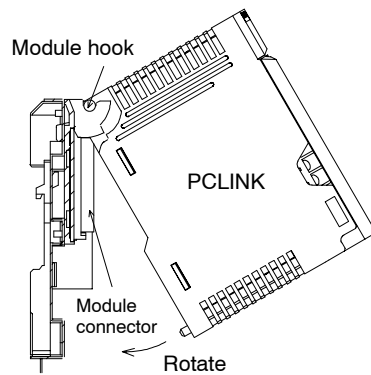


2) Install the Module on the Mounting Base as shown below.

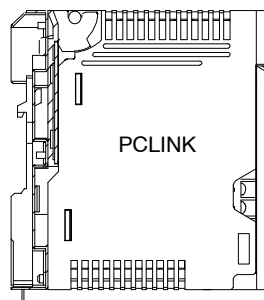
a) Hook the Module to the Module hook on the Mounting Base.



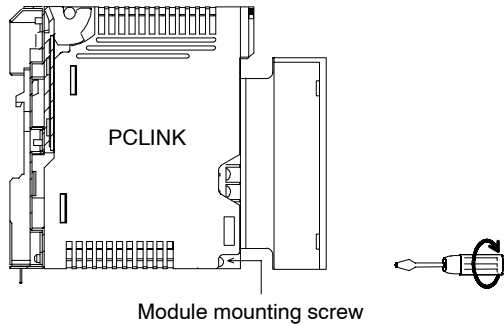
b) Rotate the Module until it comes into contact with the Mounting Base.



c) Fit the Module into the Mounting Base to make an electrical connection with the Module connector.



d) Tighten the Module mounting screw on the Module.



Module mounting screw

3) Removing modules

Caution Always turn OFF the power to the Power Supply Module before removing the Modules that do not support hot swapping.

Removing the Modules that do not support hot swapping while the power is being supplied to the Power Supply Module may damage the Modules or cause a malfunction of the GL120 and GL130.

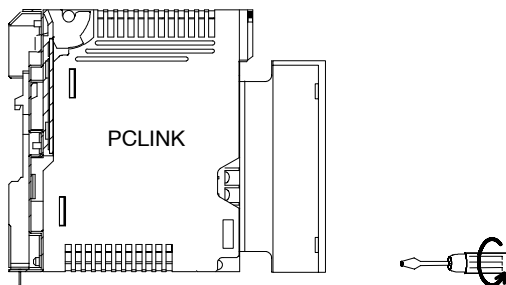
Modules that Do Not Support Hot Swapping	Model No.
Remote I/O Driver Module	JAMSC-120CDR13100
2000-series Remote I/O Driver Module	JAMSC-120CDR13110

Caution Always turn OFF the power to Power Supply Modules on the rack having the Ethernet I/F Module Mounted, before removing the cables connected to the Ethernet I/F Module.

Removing cables connected to the Ethernet I/F Module while power is being supplied to Power Supply Module may damage the Modules or cause malfunction of the GL120 and GL130.

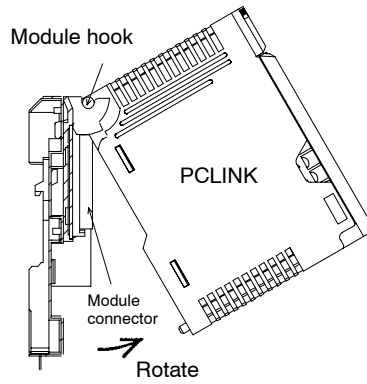
Use the following procedures to remove the Communications Module from the Mounting Base.

a) Loosen the Module mounting screw on the PS10 Module.

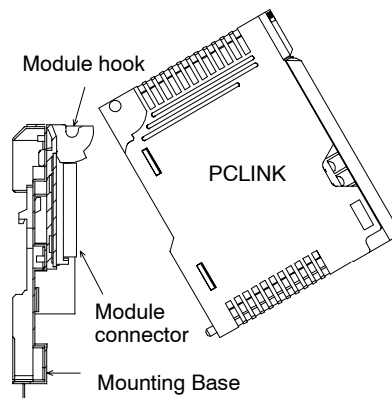


Module mounting screw (M4, Phillips)

b) Rotate the Module until it disconnects from the Mounting Base.



c) Remove the Module from the Module hook on the Mounting Base.



5.2.7 Installing the Motion Module

1) This section shows how to install and remove the following Motion Modules.

- (1) One-axis Motion Module MC10
- (2) Two-axis Motion Module MC15
- (3) Four-axis Motion Module MC20

2) Installing modules

Caution Install the MC20 Module on the CPU Rack (a rack with CPU Module).

Installing the MC20 Module on any other rack may damage the MC20 Module or cause malfunction of the GL120 and GL130.

Caution When using absolute position detecting function with the MC15 Module, it must be mounted on the CPU Rack (a rack with CPU Module).

Installing the MC15 Module on any other rack may damage the MC15 Module or cause malfunction of the GL120 and GL130.

Caution When installing the Motion Module, turn OFF the power to the Power Supply Module on the rack with the Motion Module mounted.

Installing the Motion Module while power is being supplied to the Power Supply Module may damage the Module or cause malfunction of the GL120 and GL130.

Caution Do not remove the connector covers from the Module connectors on the Mounting Base slots where no Modules are installed.

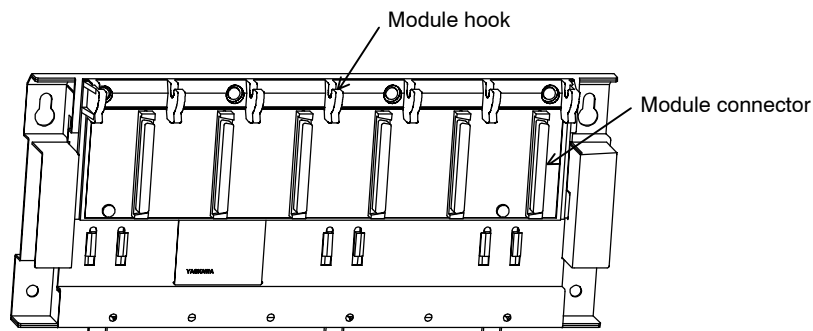
The GL120 and GL130 may malfunction if any foreign matter enters a Module connector.

Caution Make sure that all mounting screws are securely tightened.

Make sure that all mounting screws for the Modules are securely tightened so that they do not become loose. Loose screws may cause malfunction of the GL120 and GL130.

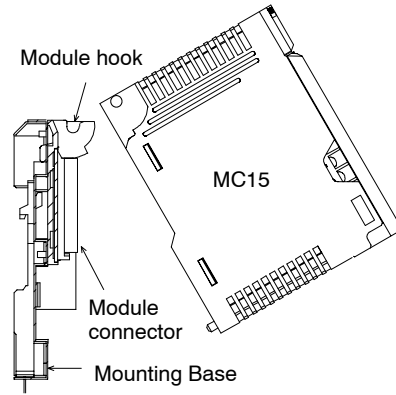
Install the Motion Module on the Mounting Base, use the following procedures to install the Motion Module.

- 1) Turn OFF the power to Power Supply Modules.
- 2) Remove the cover from the Module connector on the Mounting Base.

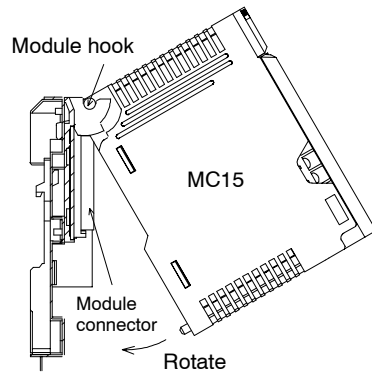


3) Install the Motion Module on the Mounting Base as shown below.

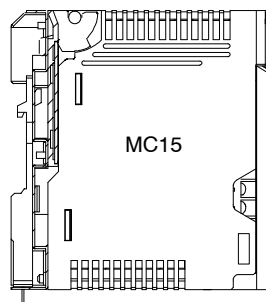
a) Hook the Motion Module to the Module hook on the Mounting Base.



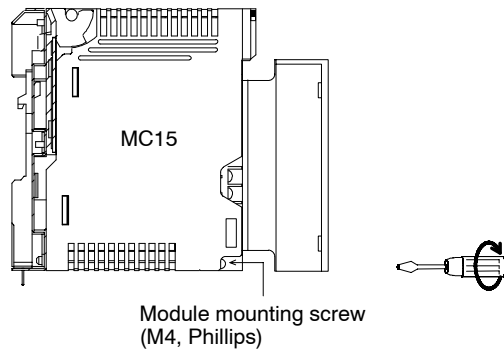
b) Rotate the Module until it comes into contact with the Mounting Base.



c) Fit the Module into the Mounting Base to make an electrical connection with the Module connector.



- d) Tighten the Module mounting screw on the MC15 Module.



3) Connecting the cables

Caution When connecting the cables to the Motion Module, turn OFF the Power Supply Module on the rack having the Motion Module mounted.

Connecting the cables to the Motion Module while power is being supplied to the Power Supply Module may damage the Module or cause malfunction of the GL120 and GL130.

Caution Make sure that all cable connectors for the Motion Module are securely inserted and tightened.

Make sure that all cable connectors for Modules are securely inserted and tightened so that they do not become loose. Loose connectors may cause malfunction of the GL120 and GL130.

The following shows the cable connection to the Motion Module.

- a) Check that the Module is installed on the Mounting Base.
- b) Turn OFF the power to the Power Supply Module mounted on the rack having Motion Module mounted.
- c) Insert the cable to the Module connector.
- d) Tighten the connector fixing screw on the connector.

4) Removing the cable

Caution Always turn OFF the power to Power Supply Module on the rack having the Motion Module mounted, control power of Servo Amp, and power supply for external I/O devices before disconnecting the Motion Module cables.

Disconnecting the Motion Module cables while the power is being supplied to these devices may damage the Motion Module or cause malfunction of the GL120 and GL130.

The following shows how to remove the Motion Module.

- a) Check that the Motion Module is mounted on the Mounting Base.
- b) Turn OFF the power supply to Power Supply Module on the rack having the Motion Module mounted.
- c) Loosen the connector fixing screw on the connector.
- d) Remove the connector from the Module.

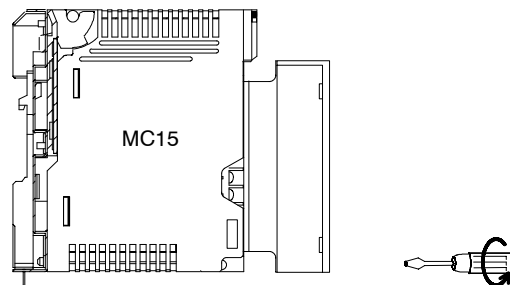
5) Removing modules

Caution Always turn OFF the power to Power Supply Module on the rack having the Motion Module mounted, control power of Servo Amp and power supply for external I/O devices before removing the Motion Module.

Removing the Motion Module while power is supplied to these device may damage the Motion Module or cause malfunction of the GL120 and GL130.

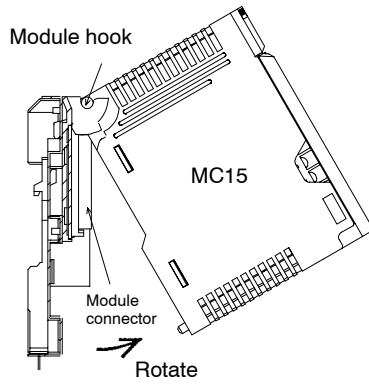
Use the following procedures to remove the Motion Module from the Mounting Base.

- 1) Turn OFF the power to the control power of Servo Amp, and power supply for external I/O device.
- 2) Turn OFF the power supply to the Power Supply Module on rack having the Motion Module mounted.
- 3) Remove all cables connected to the Motion Module.
- 4) Remove the Motion Module from the Mounting Base as shown below.
 - a) Loosen the Module mounting screw on the Module.

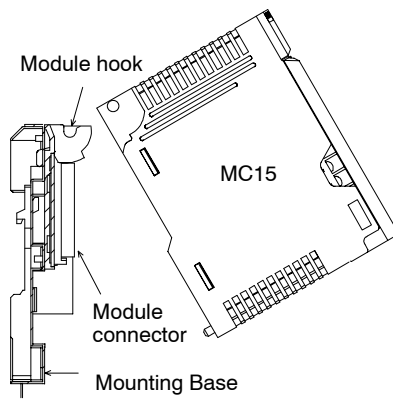


Module mounting screw
(M4, Phillips)

b) Rotate the Module until it disconnects from the Mounting Base.



c) Remove the Module from the Module hook on the Mounting Base.



5

5.2.8 Installing Rack-to-Rack I/O Cables

1) Connecting the cable

Caution When connecting the Rack-to-rack I/O cables to the Motion Module, turn OFF the power supply to all Power Supply Modules.

Connecting the cables while the power is being supplied to the Power Supply Module may damage the Module or cause a malfunction of the GL120 and GL130.

Caution The total length of the rack-to-rack I/O cable for each station is always 6.0 m or less.

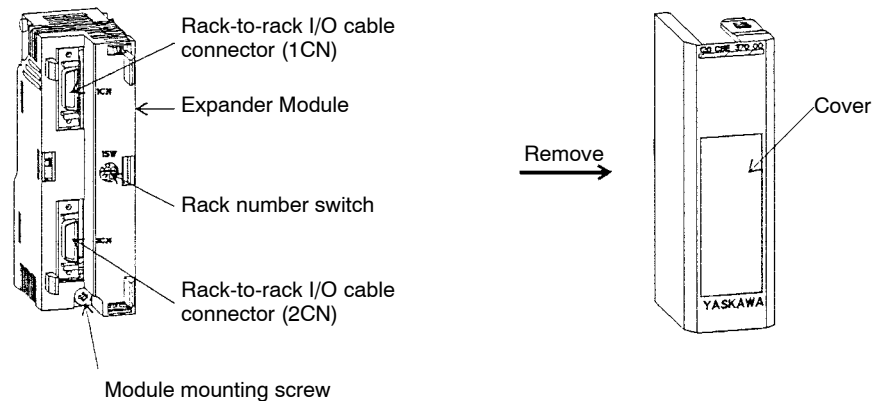
If the total length of the cables exceeds 6.0 m, operational errors may occur at the station.

Caution Make sure that all cable connectors for the Module are securely inserted and tightened.

Insufficient insertion and/or looseness may cause malfunction of the GL120 and GL130.

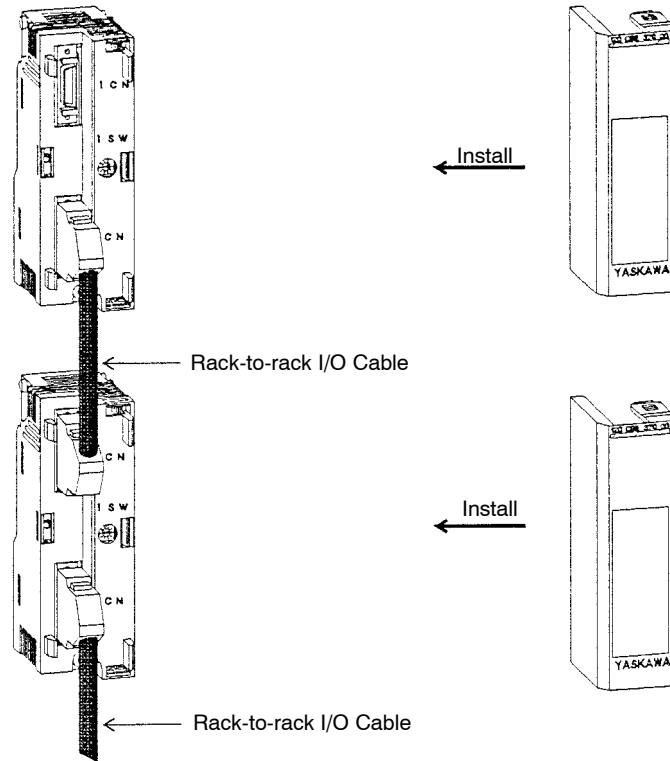
Rack-to-rack I/O Cables are used to connect Expander Modules mounted on adjacent Racks. This section describes how to connect Rack-to-rack I/O Cables towards the Expander Module.

- 1) Remove the cover from the Expander Module, then install the Expander Module on the Mounting Base.



- 2) Turn OFF the power supply to all Power Supply Module.
- 3) Use the rack number switch on the Expander Module to set the rack number. See *Table 4.115* on page 4-278 for how to set the rack number.

- 4) Connect the Rack-to-rack I/O Cable to the rack-to-rack I/O cable connector on the Expander Module. Be sure to insert the cable until it snaps in place, and make sure that it is locked properly. The two connectors (1CN and 2CN) on the Expander Module have identical functions. Therefore, both connectors can be used as either input or output connectors.



- 5) After the Rack-to-rack I/O Cables have been connected, reinstall the cover on the Expander Module.

2) Removing the cable

Caution Always turn OFF the power to the Power Supply Module before removing the Rack-to-rack I/O cables connected to the Expander Module.

Removing the cables connected to the Expander Module while power is supplied to Power Supply Modules may damage the Expander Module or cause a malfunction of the GL120 and GL130.

Use the following procedures to remove the Rack-to-rack I/O cable for the Expander Module.

- 1) Turn OFF the power to the Power Supply Modules.
- 2) Remove the cover from the Expander Module.
- 3) Remove the connector of the Rack-to-rack I/O cable from the Expander Module.

5.3 Panel Wiring

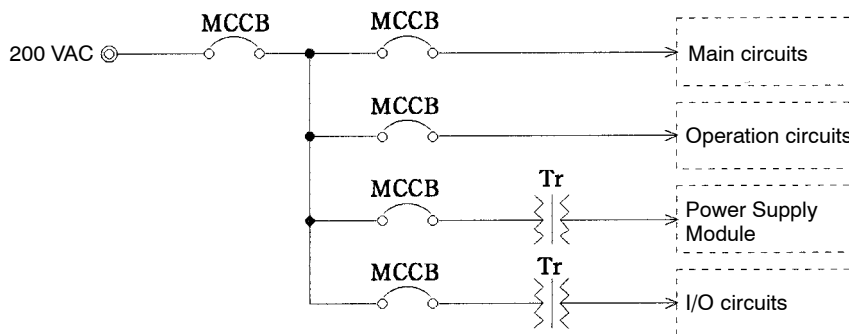
This section explains basic wiring procedures and precautions for Power Supply Modules and I/O Modules. It also explains grounding, and hot swapping (removal/insertion under power) of Modules.

5.3.1	Separation of Power Supply Systems	5-51
5.3.2	Wiring the Power Supply Module	5-51
5.3.3	Wiring Digital I/O Modules	5-55
5.3.4	Wiring Other Modules	5-68
5.3.5	Grounding	5-70
5.3.6	Hot Swapping	5-76

5.3.1 Separation of Power Supply Systems

- 1) The power supply circuits for the GL120 and GL130 can be divided into the following four systems:
 - a) Power supply for the Power Supply Module
 - b) Power supply for I/O circuits
 - c) Power supply for operation circuits
 - d) Power supply for main circuits
- 2) Please wire these circuits independently from each other as shown in the figure below:

Example



MCCB : Wiring circuit-breaker Tr : Insulation transformer

5.3.2 Wiring the Power Supply Module

Connect the power supply cable and ground cable to the Power Supply Module. Connecting the power supply cable to the Power Supply Module is described in this section. Connecting the ground cable is described in item 2. *Grounding the Power Supply Module* under 5.3.5 *Grounding*.

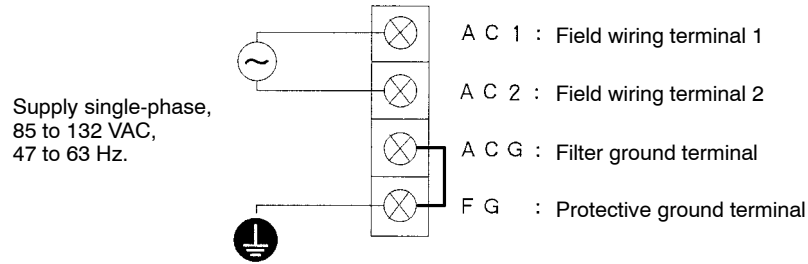
1. Power Supply Specifications

1) AC Power Supply Modules

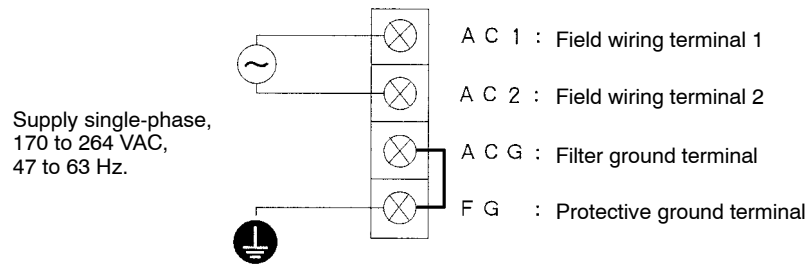
Supply AC power (either 100 VAC or 200 VAC) to the field wiring terminals (AC1, AC2) of

the AC Power Supply Module. The voltage that is supplied must be set on the input voltage selector switch.

a) When the input voltage selector switch is set to the top, supply 100 VAC as follows:



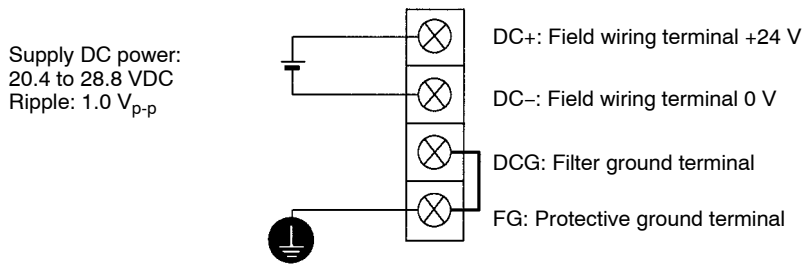
b) When the input voltage selector switch is set to the bottom, supply 200 VAC as follows:



5

2) DC Power Supply Modules

Supply DC power to the field wiring terminals (DC+, DC-) of the DC Power Supply Module.



3) Refer to Tables 4.3 to 4.6 in 4.2.3 Specifications of Power Supply Modules for details on the input conditions for Power Supply Modules.

4) Use a low-noise AC power supply for AC Power Supply Modules. If noise is a problem, use an insulation transformer or a noise filter.

2. Power Supply Cable



Caution

Do not accidentally leave foreign matter such as wire chips on the Mounting Base or in the Module when wiring. This may cause fires, failures, and malfunctions.

1) Use power supply cable of 1.5 mm² (AWG 16) to 2.5 mm² (AWG 13) to connect field wiring terminals, and always make sure to twist the wires together.

- 2) M4 Phillips screws are used in the field wiring terminals. Accordingly, solderless terminals for M4 Phillips screws may be used for terminals on the Power Supply Module end of power supply cable.
- 3) When using an insulation transformer, always make sure to separate the primary and the secondary coils. When using a noise filter, also be sure to separate the primary and the secondary coils.

3. Input Voltage Selector Switch (AC Power Supply Modules Only)



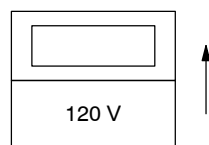
Caution

Always make sure that the power supply has been turned OFF to the field wiring terminals (AC1, AC2) before changing the setting of the input voltage selector switch.

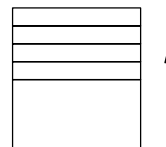
Operating the input voltage selector switch of AC Power Supply Module while power is being supplied to field wiring terminals may result in damage to the Power Supply Module.

- 1) Set the switch to the top, as shown in the figure below, to supply 85 to 132 VAC:

1) PS10 selector switch

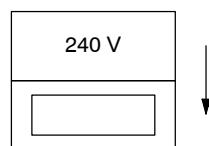


2) PS05 selector switch

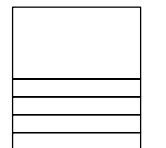


- 2) Set the switch to the bottom, as shown in the figure below, to supply 170 to 264 VAC:

1) PS10 selector switch



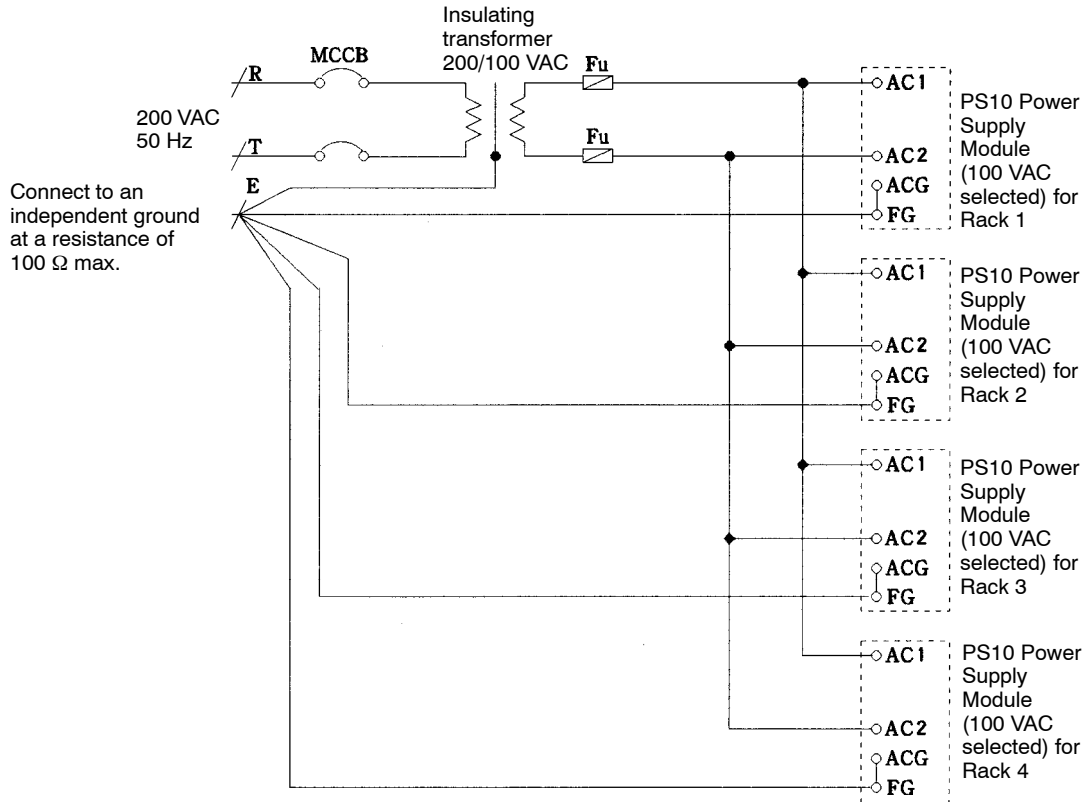
2) PS05 selector switch



4. Wiring Example

1) AC Power Supply Module

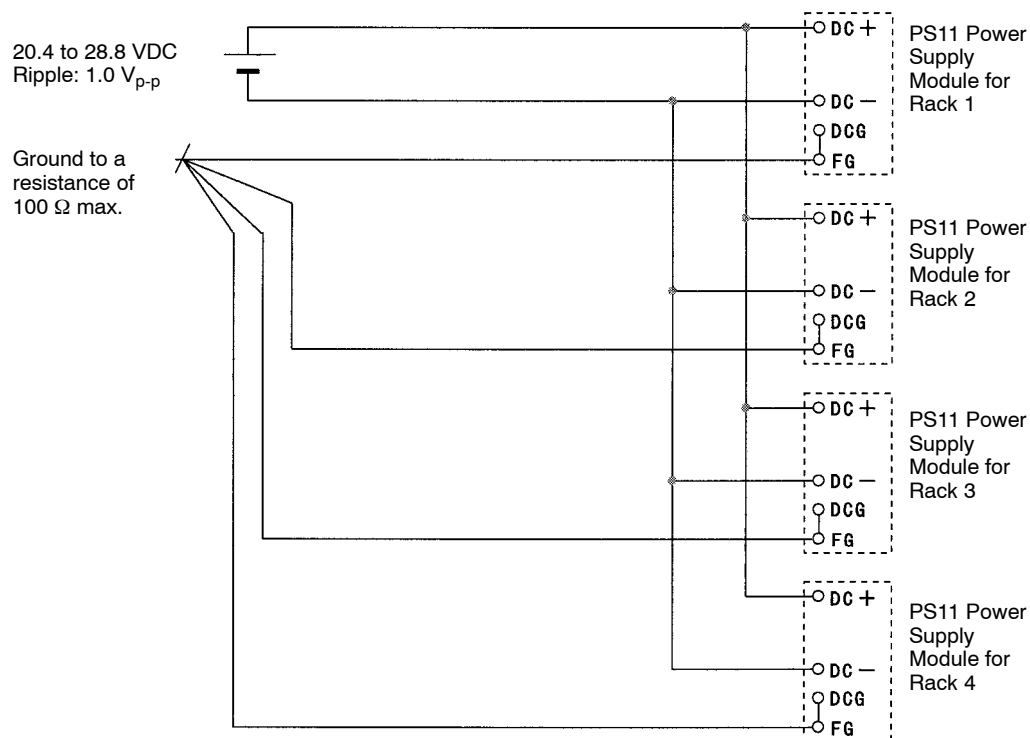
The following diagram shows an example of wiring when four PS10 Power Supply Modules are used for the local channel. For wiring the protective ground terminals (FG), refer to item 2. *Grounding the Power Supply Module* under 5.3.5 *Grounding*.



5

2) DC Power Supply Module

The following diagram shows an example of wiring when four PS11 Power Supply Modules are used for the local channel. For wiring the protective ground terminals (FG), refer to item 2. *Grounding the Power Supply Module* under 5.3.5 *Grounding*.



5.3.3 Wiring Digital I/O Modules

Connect I/O signal cables to a Digital I/O Module. The connection procedures for I/O signal cables is described in this section. For further details, refer to the following related manual:

MEMOCON GL120, GL130 120-series I/O Modules User's Manual
(SIEZ-C825-20.22)

1. Power Supply Specifications


A. AC Power Supply Specifications

- 1) As shown in Examples 1 and 2 later in this section, it is necessary to supply external single-phase AC power (100 or 200 VAC) to the I/O Modules listed in the following table to power input signals and drive loads:

Table 5.8 Digital I/O Modules Requiring External AC Power Supply


Name	Model No.	External Power Supply Specifications	
		Rated Voltage	Rated Frequency
100-VAC 16-point Input Module	JAMSC-120DAI54300	100 VAC	50/60 Hz
200-VAC 16-point Input Module	JAMSC-120DAI74300	200 VAC	
100/200-VAC 8-point Output Module	JAMSC-120DAO83000	100/200 VAC	
100/200-VAC 16-point Output Module	JAMSC-120DAO84300	100/200 VAC	
Relay Contact 16-point Output Module (AC loads)	JAMSC-120DRA84300	100/200 VAC	

- 2) Use a low-noise AC power supply. If noise is a problem, use an insulation transformer or a noise filter.
- 3) Heed the following precautions when supplying AC power.

 **Caution** Connect power supplies to the same phase to common 1 and common 2 of the AC I/O Module.

If power supplies of different phases are connected, overheating or fire may occur.

- 4) Please heed the following precautions when mounting or removing Modules with power supply. Refer to 5.3.6 *Hot Swapping* for a description of hot swapping and for an example of safety switch settings.

 **Caution** When installing or removing an AC I/O Module while the AC power supply is turned ON, install a safety switch for each Module and always turn this safety switch OFF to turn OFF the AC power supply to the Module.

Installing or removing AC I/O Module while AC power supply is being supplied may result in an electric shock at touching the power supply terminals.

Example 1: Input Signal Power Supply for 100-VAC 16-point Input Module

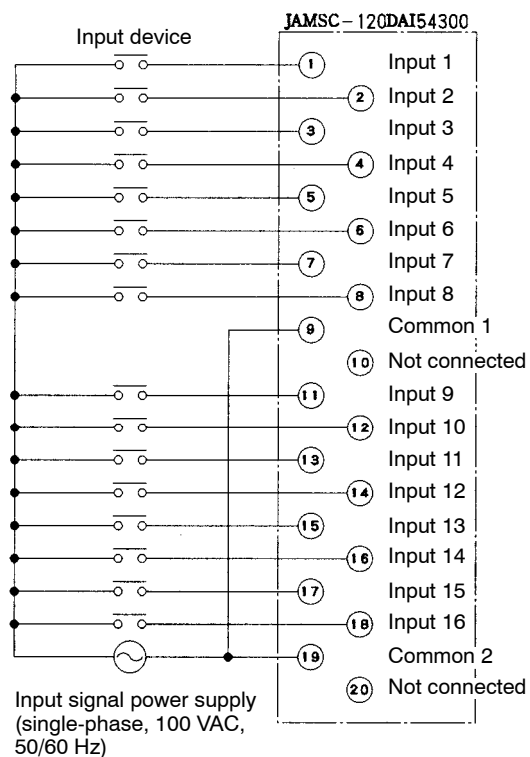


Figure 5.1 Input Signal Power Supply

Example 2: Load Driving Power Supply for 100/200 VAC 16-point Output Module

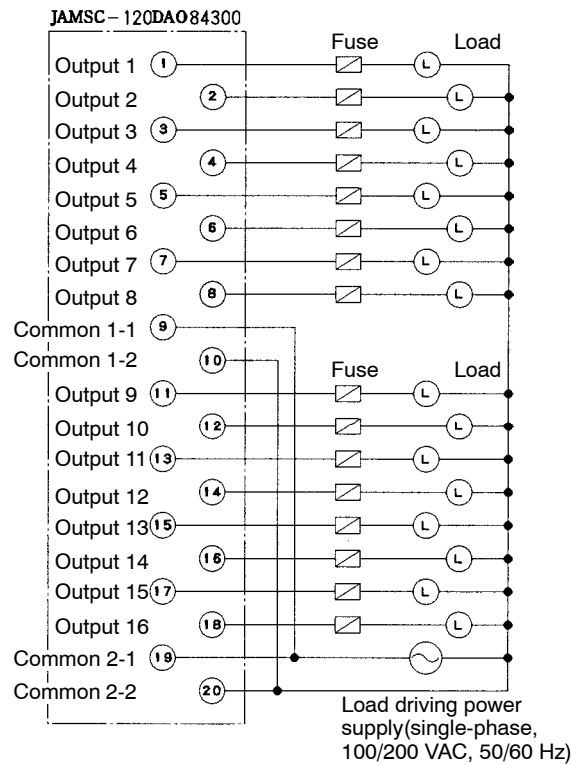


Figure 5.2 Load Driving Power Supply

B. DC Power Supply Specifications

- 1) As shown in Examples 1 and 2 later in this section, it is necessary to supply external DC power (12/24 VDC) to the I/O Modules listed in the following table to power input signals and drive loads:

Table 5.9 Digital I/O Modules Requiring External DC Power Supply

Name	Model No.	External Power Supply Specifications
12/24-VDC 16-point Input Module	JAMSC-120DDI34300	Rated voltage: 12/24 VDC
12/24-VDC 32-point Input Module	JAMSC-120DDI35400	Maximum permissible voltage: 30 VDC
12/24-VDC 64-point Input Module	JAMSC-120DDI36400	Standard operating range:
		Minimum ON voltage: 9 VDC
		Maximum OFF voltage: 5 VDC

Name	Model No.	External Power Supply Specifications
12/24-VDC 8-point Output Module	JAMSC-120DDO33000	Rated voltage: 12/24 VDC Permissible voltage range: 10.2 to 30.0 VDC
12/24-VDC 16-point Output Module (sinking)	JAMSC-120DDO34310	
12/24-VDC 16-point Output Module (sourcing)	JAMSC-120DDO34320	
12/24-VDC 32-point Output Module (sinking)	JAMSC-120DDO35410	
12/24-VDC 64-point Output Module (sinking)	JAMSC-120DDO36410	
Relay Contact 16-point Output Module (DC loads)	JAMSC-120DRA84300	Rated voltage: 24 VDC Maximum switching voltage: 125 VDC Minimum switching voltage: 100 mVDC

2) Use a regulated DC power supply for DC power. When a simple direct current such as full wave rectification must be used, attach a smoothing capacitor to reduce ripple as much as possible and heed the following:

a) Instantaneous output voltage including ripple must always be within the following ranges:

- DC Input Modules: 9 to 30 VDC
- DC Output Modules: 10.2 to 30 VDC
- Relay Output Modules: 100 m to 125 VDC

b) Output voltage must not exceed the following voltages, even momentarily, including when the power is turned ON or OFF.

- DC Input Modules: 30 VDC
- DC Output Modules: 30 VDC
- Relay Output Modules: 125 VDC

c) Attach a noise filter in front of the rectifying element to prevent surge voltage from rushing inside.

d) When connecting electromagnetic contactors to the output of full wave rectifier circuits, prevent surge voltage by attaching a surge suppressor between the output on the I/O Module side of the electromagnetic contactors.

Example 1: Input Signal Power Supply for 12/24-VDC 16-point Input Module

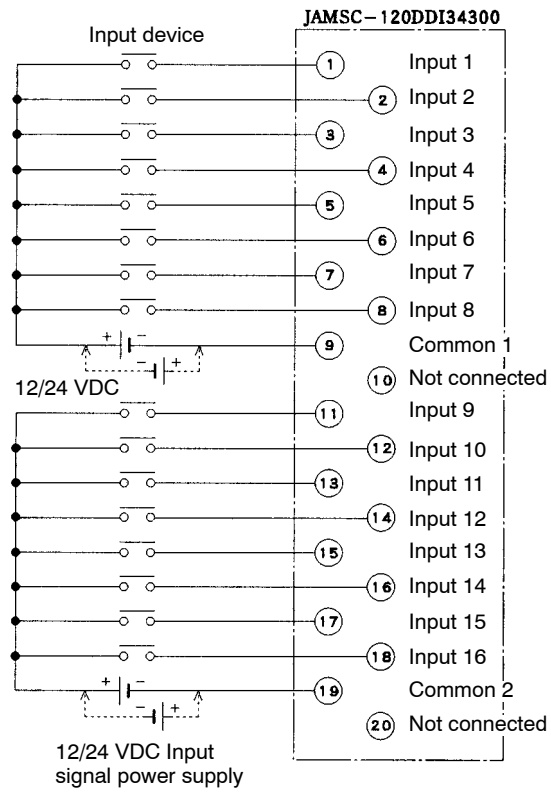


Figure 5.3 Input Signal Power Supply

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Example 2: Load Driving Power Supply for 12/24-VDC 16-point Output Module (sink)

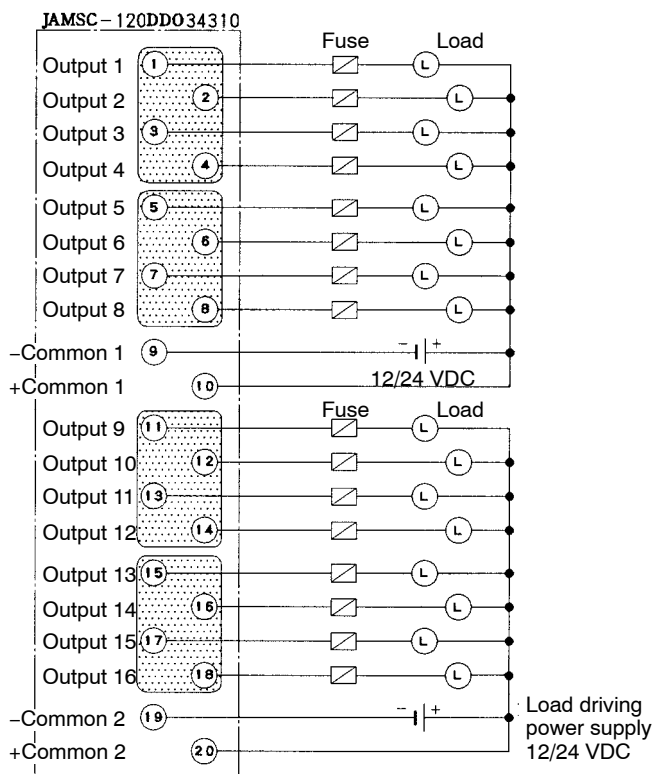


Figure 5.4 Load Driving Power Supply

2. I/O Signal Cables



Caution

Do not accidentally leave foreign matter such as wire chips on the Mounting Base or in the Module when wiring. This may cause fires, failures, and malfunctions.

A. Digital I/O Modules with Terminal Blocks

- 1) There are 9 Digital I/O Modules with terminal blocks for external connections. (see *Table 5.10*.)
- 2) To connect to these Digital I/O Modules, use I/O signal cable of the size listed in *Table 5.10*. The cables differ in their permissible current capacity depending on the conditions of use, such as the ambient operating temperature, so check the conditions of use and select a cable of appropriate size.

Table 5.10 I/O Signal Cable Size

Name	Model No.	I/O Signal Cable Size
100-VAC 16-point Input Module	JAMSC-120DAI54300	0.5 mm ² (AWG20) to 1.3 mm ² (AWG16)
200-VAC 16-point Input Module	JAMSC-120DAI74300	
12/24-VDC 16-point Input Module	JAMSC-120DDI34300	0.2 mm ² (AWG24) to 0.8 mm ² (AWG18)
100/200-VAC 8-point Output Module	JAMSC-120DAO83000	0.5 mm ² (AWG20) to 1.3 mm ² (AWG16)
100/200-VAC 16-point Output Module	JAMSC-120DAO84300	0.5 mm ² (AWG20) to 1.3 mm ² (AWG16) Common cable: 1.3 mm ² (AWG 16) or larger
12/24-VDC 8-point Output Module	JAMSC-120DDO33000	0.2 mm ² (AWG24) to 0.8 mm ² (AWG18)
12/24-VDC 16-point Output Module (sinking)	JAMSC-120DDO34310	
12/24-VDC 16-point Output Module (sourcing)	JAMSC-120DDO34320	
Relay Contact 16-point Output Module	JAMSC-120DRA84300	1) AC loads 0.5 mm ² (AWG20) to 1.3 mm ² (AWG16) Common cable: 1.3 mm ² (AWG 16) or larger 2) DC loads 0.2 mm ² (AWG24) to 0.8 mm ² (AWG18)

- 3) M3 Phillips screws are used in the external connection terminals. Accordingly, solderless terminals for M3 Phillips screws may be used for terminals on the I/O Module end of I/O signal cable.
- 4) When using an insulation transformer, always make sure to separate the primary and the secondary coils. When using a noise filter, also be sure to separate the primary and the secondary coils.

B. 32-point Digital I/O Module

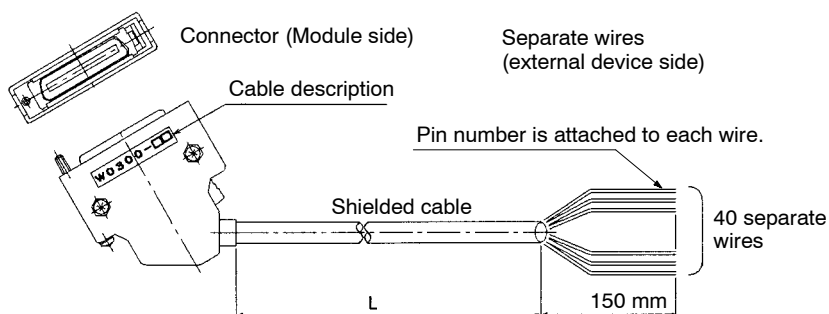
- 1) There are 2 32-point Digital I/O Modules with connectors for external connections.
 - a) 12/24-VDC 32-point Input Module (Model No.: JAMSC-120DDI34300)
 - b) 12/24-VDC 32-point Output Module (Model No.: JAMSC-120DDO34310)
- 2) To connect to these Digital I/O Modules, use of the following I/O signal cables.
 - a) I/O Module cables manufactured by the user
 - b) Yaskawa W0300 32-point I/O Module Cables

- c) Yaskawa W0302 32-point I/O Module Cables
 - d) Yaskawa W0301 32-point I/O Module Cables
- 3) If I/O signal cables are manufactured by the user, use the following electric cables and connectors:
- a) Cable size: 0.08 mm² (AWG28)
 - b) Module connector: 10140-6000EL + 10340-55S0-008-F (3M)
- 4) When an W0300 32-point I/O Module Cable is used, select the appropriate cable from the 3 cables shown in the following table:

Table 5.11 W0300 32-point I/O Module Cables

Item		Specifications		
Name		W0300 Cable		
Model Name		W0300-01	W0300-03	W0300-05
Model No.		JZMSZ-120W0300-01	JZMSZ-120W0300-03	JZMSZ-120W0300-05
Length (L)		1.0 m	3.0 m	5.0 m
Cable Specifications		Shielded cable of 40 conductors, corresponding to UL20276, AWG28 (0.08 mm ²)		
Terminals	Module Side	Connector: 10140-6000EL + 10340-55S0-008-F (3M)		
	External Device Side	Loose wires; Cable length: 150 mm, pin number labeled on each wire		

As shown in the figure below, the external device side of the W0300 cable is divided into individual wires. The cable size is 0.08 mm².

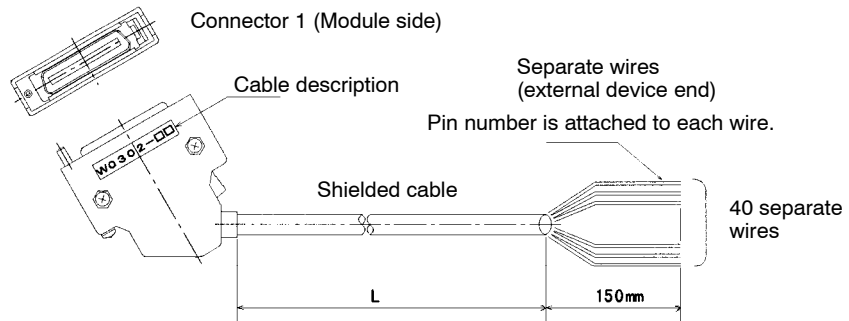


- 5) When a W0302 32-point I/O Module cable is used, select the appropriate cable from the 3 cables shown in the following table:

Table 5.12 W0302 32-point I/O Module Cables

Item		Specifications		
Name		W0302 Cable		
Model Name		W0302-01	W0302-03	W0302-05
Model No.		JZMSZ-120W0302-01	JZMSZ-120W0302-03	JZMSZ-120W0302-05
Length (L)		1.0 m	3.0 m	5.0 m
Cable Specifications		Shielded cable of 40 conductors, corresponding to UL20276, AWG28 (0.2 mm ²)		
Terminals	Module Side	Connector: 10140-6000EL + 10640-5500-008 (3M)		
	External Device Side	Loose wires; Cable length: 150 mm, pin number labeled on each wire		

As shown in the figure below, the external device end of the W0302 cable is divided into individual wires. The cable size is 0.2 mm².

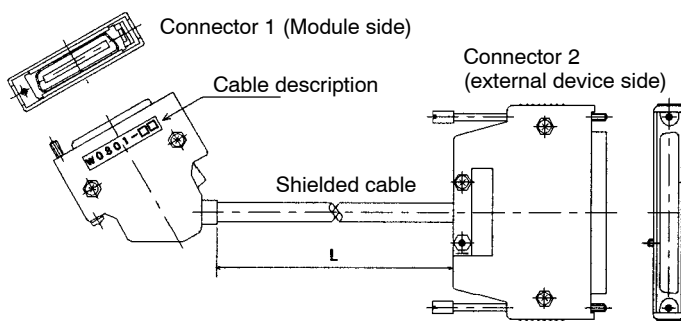


6) When a W0301 32-point I/O Module cable is used, select the appropriate cable from the 3 cables shown in the following table:

Table 5.13 W0301 32-point I/O Module Cables

Item		Specifications		
Name		W0301 Cable		
Model Name		W0301-01	W0301-03	W0301-05
Model No.		JZMSZ-120W0301-01	JZMSZ-120W0301-03	JZMSZ-120W0301-05
Length (L)		1.0 m	3.0 m	5.0 m
Cable Specifications		Shielded cable of 40 conductors, corresponding to UL20276, AWG28 (0.08 mm ²)		
Terminals	Module Side	Connector: 10140-6000EL + 10640-5500-008 (3M)		
	External Device Side	Connector: FCN-361J040-AU + FCN-360C040-E (Fujitsu)		

As shown in the following figure, the device side of W0301 cable has is equipped with a connector.



As shown in *Figure 5.5* page, W0301 may be connected to a Connector Terminal Block. One of the Connector Terminal Blocks that can be used is the OMRON XW2B-40F5-P. The following table shows the specifications of the XW2B-40F5-P:

Table 5.14 Specifications of XW2B-40F5-P

Item	Specifications
Model No.	XW2B-40F5-P
Connector	FCN-364J040-AV (Fujitsu)
External Connection	Screw terminal block, M3.5
Type	Wall mounting type
Approximate Mass	200 g
External Dimensions	Width: 216.5 mm; Height: 45 mm; Depth: 43 mm

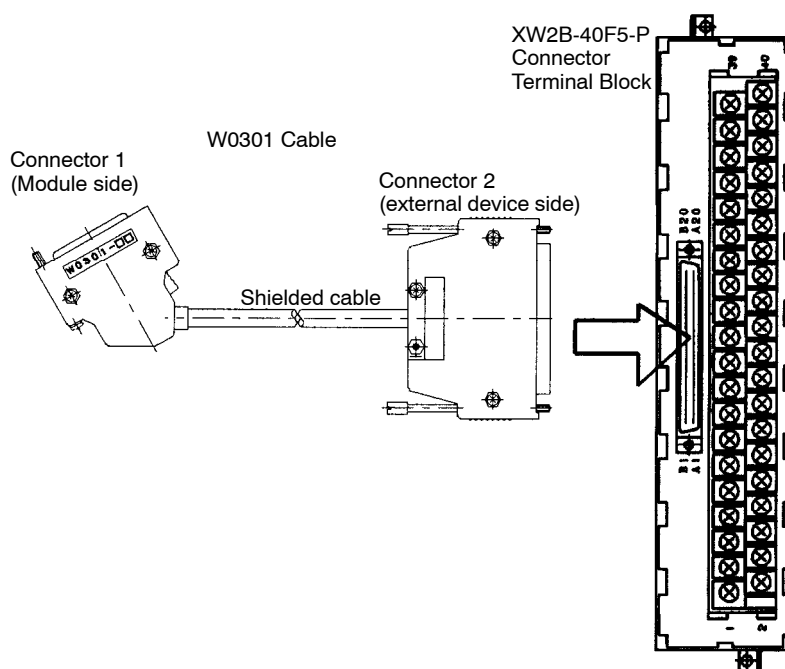


Figure 5.5 Connecting W0301 Cable to XW2B-40F5-P Connector Terminal Block

- 7) When using an insulation transformer for the primary side of DC voltage stabilizing power supply, always make sure to separate the primary and the secondary coils. When using a noise filter, also be sure to separate the primary and the secondary coils.

C. 64-point Digital I/O Module

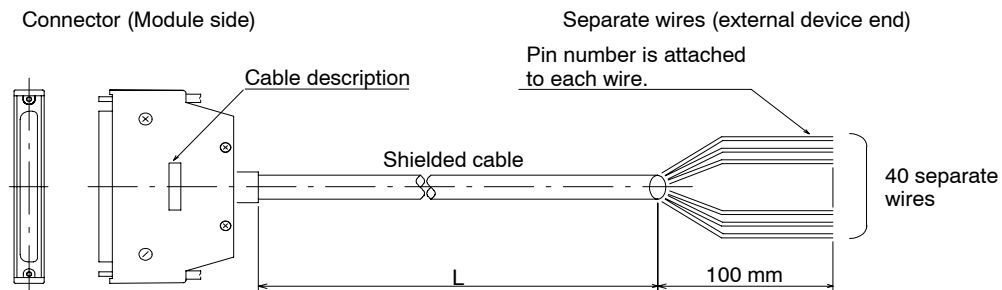
- 1) There are 2 64-point Digital I/O Modules with connectors for external connections.
 - a) 12/24-VDC 64-point Input Module (Model No.: JAMSC-120DDI36400)
 - b) 12/24-VDC 64-point Output Module (Model No.: JAMSC-120DDO36410)
- 2) Use the following cables for the I/O signal wire to connect to the I/O Modules.
 - a) I/O signal cables manufactured by the customer
 - b) 64-point I/O Module cables W5410 manufactured by Yaskawa
- 3) Use the following electric cables and connectors to manufacture I/O signal cables to connect to these Digital I/O Modules.
 - a) Cable size: 0.26 mm² (AWG23)
 - b) Module connector (provided as accessory)
 - Connector: FCN-361J040-AU (soldered) (Fujitsu)
 - Cover: FCN-360C040-B (Fujitsu)
- 4) When an W5410 64-point I/O Module Cable is used, select the appropriate cable from the 4 cables shown in the following table:

Table 5.15 W5410 64-point I/O Module Cables

Item		Specifications		
Name		W5410 Cable		
Model Name		W5410-05	W5410-10	W5410-30
Model No.		JEPMC-W5410-05	JEPMC-W5410-10	JEPMC-W5410-30
Length (L)		0.5 m	1.0 m	3.0 m
Cable Specifications		Shielded cable of 40 conductors, corresponding to AWG24 (0.20 mm ²)		
Terminals	Module side	Connector fitted: FCN-363J-040 (FUJITSU LTD.) FCN-360C040-B (FUJITSU LTD.) FCN-363J-AU/R (FUJITSU LTD.)		
	External device side	Loose wires: Wire length 100 mm with pin number label on each wire.		

As shown in the figure below, the external device end of the W5410 cable is divided into individual wires.

The Cable size is 0.2 mm^2 .



3. Protective Fuse



WARNING

When using one of the following Output Modules, connect an external fuse corresponding to the specifications of load and in series with load.

100/200-VAC 8-point Output Module (Model No.: JAMSC-120DAO83000)

100/200-VAC 16-point Output Module (Model No.: JAMSC-120DAO84300)

12/24-VDC 16-point Output Module (sinking) (Model No.: JAMSC-120DDO34310)

12/24-VDC 16-point Output Module (sourcing) (Model No.: JAMSC-120DDO34320)

12/24-VDC 32-point Output Module (sinking) (Model No.: JAMSC-120DDO35410)

12/24-VDC 64-point Output Module (sinking) (Model No.: JAMSC-120DDO36410)

Relay Contact 16-point Output Module (Model: JAMSC-120DRA84300)

Not connecting an external fuse may result in fire, damages to the device, and damages to output circuits due to overload or a short-circuit at the load.

5.3.4 Wiring Other Modules

Refer to the related Manuals shown in the following table to wire Modules other than Power Supply Modules and Digital I/O Modules

Table 5.16 Wiring of Other Modules

Product	Name	Connection Cable	Related Manuals
CPU Modules	CPU Module (8 KW) CPU10	● MEMOBUS cable (RS-232C)	● MEMOBUS User's Manual (SIEZ-C825-70.13)
	CPU Module (16 KW) CPU20	● MEMOBUS cable (RS-232C)	1) MEMOBUS User's Manual (SIEZ-C825-70.13)
	CPU Module (16 KW) CPU21	● MEMOBUS PLUS cable	
	CPU Module (32 KW) CPU30		2) MEMOBUS PLUS User's Manual (SIEZ-C825-70.5)
	CPU Module (40 KW) CPU35		
Communications Modules	Remote I/O Driver Module	Coaxial cable	Coaxial Remote I/O System User's Manual (SIEZ-C825-70.8)
	Remote I/O Receiver Module	● Coaxial cable ● MEMOBUS cable (RS-232C)	
	2000-Series Remote I/O Driver Module	● Coaxial cable	1000/2000-Series Coaxial Remote I/O System User's Manual (SIEZ-C825-70.9)
	MEMOBUS Module (RS-232)	MEMOBUS cable (RS-232C)	COM Instructions User's Manual (SIEZ-C825-70.14)
	MEMOBUS Module (RS-422)	MEMOBUS cable (RS-422)	
	PC Link Module	● Coaxial cable ● MEMOBUS cable (RS-232C)	PC Link Module User's Manual (SIEZ-C825-70.4)
	Uniwire Interface Module	● Power supply cable ● Uniwire system transmission cable	Uniwire Interface Module User's Manual (SIEZ-C825-20.26)
	Uniwire H-system Interface Module	● Power supply cable ● Uniwire system transmission cable	Uniwire H-system Interface Module User's Manual (SIEZC82052100)
	Distributed I/O Driver Module	● VINUS I/O transmission cable	Distributed I/O Driver Module User's Manual (SIEZ-C825-20.29)
	M-NET Module	● M-NET transmission cable	M-NET Module User's Manual (SIEZ-C825-70.12)

Product	Name	Connection Cable	Related Manuals
Communications Modules	YENET 1600-D Module	<ul style="list-style-type: none"> • YENET 1600-D transmission cable 	YENET 1600-D Module User's Manual (SIEZ-C825-70.20)
	Ethernet Interface Module	<ul style="list-style-type: none"> • Ethernet transmission cable 	Ethernet Interface Module User's Manual (SIEZ-C825-70.21)
	Optical/Electrical Conversion Module	<ul style="list-style-type: none"> • Coaxial cable • Optical Fiber Cable 	Optical/Electrical Conversion Module User's Manual (SIEZ-C825-70.18)
Analog Input Modules	Analog Input Module (± 10 V, 4 channels)	Analog signal I/O cable	120-series I/O Modules User's Manual (SIEZ-C825-20.22)
	Analog Input Module (0 to 10 V, 4 channels)		
	Analog Input Module (4 to 20 mA, 4 channels)		
Analog Output Modules	Analog Output Module (± 10 V, 2 channels)		
	Analog Output Module (0 to 10 V, 2 channels)		
	Analog Output Module (0 to 5 V, 2 channels)		
	Analog Output Module (4 to 20 mA, 2 channels)		
Special Purpose Modules	High-speed Counter Module (1 channel)	<ul style="list-style-type: none"> • High-speed pulse input cable • Control signal input cable • Notch signal output cable 	120 Series High-speed Counter Module User's Manual (SIEZ-C825.20.24)
	Pulse Catch Module	<ul style="list-style-type: none"> • Digital signal input cable 	Pulse Catch and Counter Module User's Manual (SIEZ-C825-20.28)
Motion Modules	One-axis Motion Module MC10	<ul style="list-style-type: none"> • Servo cable • 32-point I/O Module cable • Battery Module cable 	Motion Module MC10 User's Manual (SIEZ-C825-20.41)
	Two-axis Motion Module MC15	<ul style="list-style-type: none"> • Servo cable • 32-point I/O Module cable • Battery Module cable 	Motion Module MC15 User's Manual (SIEZ-C825-20.43)
	Four-axis Motion Module MC20	<ul style="list-style-type: none"> • Servo cable • 32-point I/O Module cable • Battery Module cable 	Motion Module MC20 Hardware User's Manual (SIEZ-C825-20.51)

Product	Name	Connection Cable	Related Manuals
Other Modules	Battery Module	MC10 connection cable	Motion Module MC10 User's Manual (SIEZ-C825-20.41)
		MC15 connection cable	Motion Module MC15 User's Manual (SIEZ-C825-20.43)
		MC20 connection cable	Motion Module MC20 Hardware User's Manual (SIEZ-C825-20.51)
	MEMOBUS PLUS Hub Module	MEMOBUS PLUS cable	MEMOBUS PLUS Hardware User's Manual (SIEZ-C825-70.5)
2000-series Modem Module	<ul style="list-style-type: none"> ● MEMOBUS cable (RS-232C) ● Modem-to-modem Connection Cable 	MEMOBUS User's Manual (SIEZ-C825-70.13)	

5.3.5 Grounding

1. Summary of Grounding Methods

The following table provides a summary of grounding methods for GL120/GL130 Modules. The grounding methods for the Power Supply Module are described in the next item. For details on grounding methods for other devices, please refer to the related manuals shown in the following table:

Table 5.17 Grounding Methods for Modules Requiring Grounding

Product	Name	Grounding Methods	Related Manuals
Power Supply Module	AC Power Supply Module (7 A)	Ground the FG terminal of Module.	See <i>item 2.</i> in this section.
	AC Power Supply Module (3 A)		
	DC Power Supply Module (7 A)		
	DC Power Supply Module (3 A)		

Product	Name	Grounding Methods	Related Manuals
Communications Modules	Remote I/O Driver Module	When shielded coaxial cable is used as main line, ground the cable shield at one point on the transmission passage.	Coaxial Remote I/O System User's Manual (SIEZ-C825-70.8) 1000/2000 Series Coaxial Remote I/O System User's Manual (SIEZ-C825-70.9)
	Remote I/O Receiver Module		
	2000-Series Remote I/O Driver Module		
	PC Link Module	When shielded coaxial cable is used as main line, ground the cable shield at one point on the transmission passage.	PC Link Module User's Manual (SIEZ-C825-70.4)
	Uniwire Interface Module	<ol style="list-style-type: none"> 1) Ground the FG terminal of the Module. 2) When using shielded twisted pair cable, connect the shield of cable to the FG terminal of the Module. 	Uniwire Interface Module User's Manual (SIEZ-C825-20.26)
	Uniwire H-system Interface Module	<ol style="list-style-type: none"> 1) Ground the FG terminal of the Module. 2) When using shielded twisted pair cable, connect the shield of cable to the FG terminal of the Module. 	Uniwire H-system Interface Module User's Manual (SIEZC82052100)
MEMOBUS Module (RS-232)	When using a J2078 Modem, connect the shield of modem connecting cable to the shield terminal of the modem on the receiving end.	MEMOBUS User's Manual (SIEZ-C825-70.13)	

Product	Name	Grounding Methods	Related Manuals
Communications Modules	MEMOBUS Module (RS-422)	<ol style="list-style-type: none"> 1) Connect the shield of the cable connecting the Module to an external device to the signal ground (PGND) pin of the communications port of the Module. 2) If the communications port of the external device is equipped with a signal ground pin, connect this to the signal ground (SGND) pin of the communication port of the Module. 	COM Instructions User's Manual (SIEZ-C825-70.14)
	M-NET Module	<ol style="list-style-type: none"> 1) Ground the FG terminal of the Module. 2) Connect the shield of the transmission cable to the ground terminal of the Module at one point. 	M-NET Module User's Manual (SIEZ-C825-70.12)
	YENET 1600-D Module	<ol style="list-style-type: none"> 1) Connect the shield of the transmission cable to the ground terminal of the Communications Power Supply at one point, and to the network at one point. 	YENET 1600-D Module User's Manual (SIE-C825-70.20)
Analog Input Modules	Analog Input Module (± 10 V, 4 channels)	<ol style="list-style-type: none"> 1) Ground the FG terminal of the Module. 2) Connect the shield of analog signal input cable to the shield terminal of the Module. 	120-series I/O Modules User's Manual (SIEZ-C825-20.22)
	Analog Input Module (0 to 10 V, 4 channels)		
	Analog Input Module (4 to 20 mA, 4 channels)		
Analog Output Modules	Analog Output Module (± 10 V, 2 channels)	Ground the shield of analog signal output cable on the external device end.	
	Analog Output Module (0 to 10 V, 2 channels)		
	Analog Output Module (0 to 5 V, 2 channels)		
	Analog Output Module (4 to 20 mA, 2 channels)		

5

Product	Name	Grounding Methods	Related Manuals
Special Purpose Modules	High-speed Counter Module (1 channel)	<ol style="list-style-type: none">1) Ground the shield of the high-speed pulse input cable on the Module end.2) Ground the shield of control signal input cable on the Module end.	120 Series High-speed Counter Module User's Manual (SIEZ-C825-20.24)
Other Modules	2000-series Modem Module	<ol style="list-style-type: none">1) Ground the FG terminal of the Module.2) Connect the shield of modem connecting cable to the shield terminal of the Module on the receiving end.	MEMOBUS User's Manual (SIEZ-C825-70.13)

2. Grounding the Power Supply Module

A. Protective Ground Terminal (FG)

Caution Ground the protective ground terminal to the resistance of 100 Ω max.

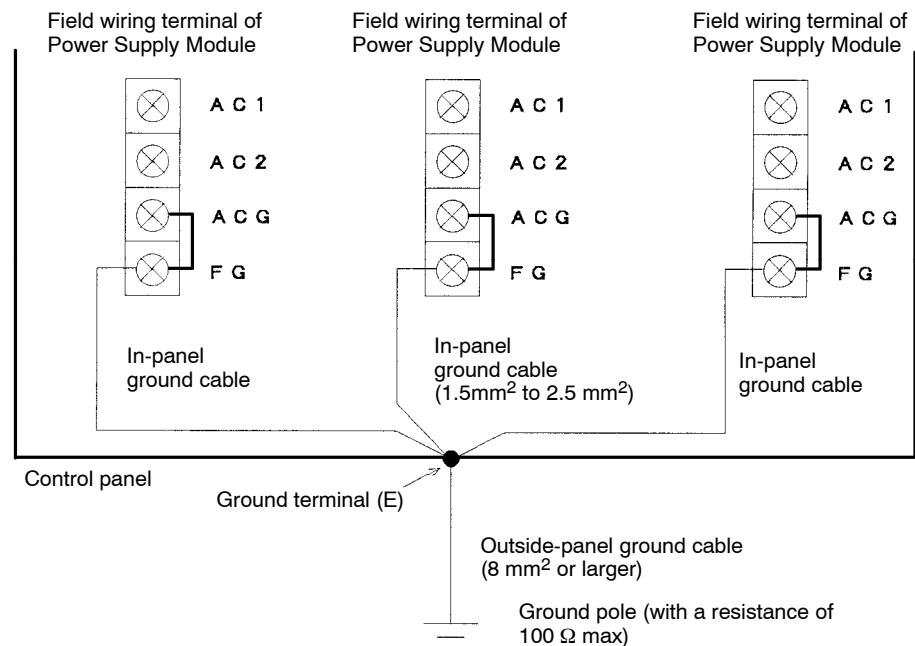
Not grounding the protective ground terminal may result in electrical shock and malfunction.

- 1) Connect the protective ground terminal (FG) and the ground terminal of control panel (E) with an electric cable (internal panel ground cable) of 1.5 mm² (AWG 16) to 2.5 mm² (AWG 13). M4 Phillips screws are used for the protective ground terminals.
- 2) When more than one Power Supply Module is used, do not cross-wire between the protective ground terminals. Connect the protective ground terminal of each Power Supply Module to the ground terminal of the control panel separately, as shown in the following figure.
- 3) Connect the ground terminal of the control panel and the ground pole with a cable (outside-panel ground cable) of 8 mm² (AWG 8) or larger. Make sure that the length of this ground cable is as short as possible.
- 4) Use a ground pole with a resistance of 100 Ω max. Do not use it together with the ground cables or ground poles of high-voltage electrical devices.

5

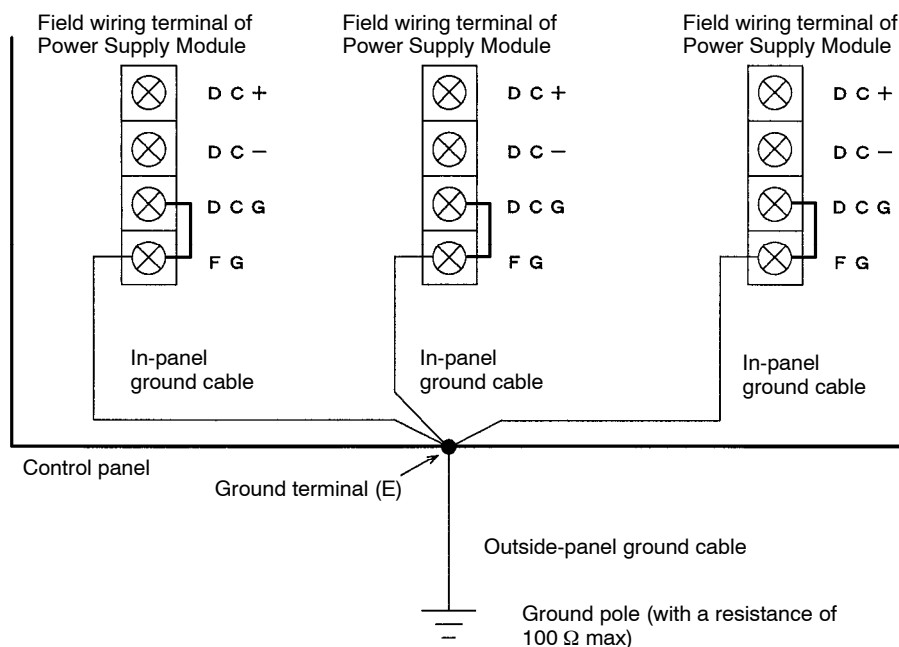
EXAMPLE

a) AC Power Supply Module



◀EXAMPLE▶

b) DC Power Supply Module

**B. Filter Ground Terminal (AC Modules: ACG; DC Modules: DCG)**

This is the terminal for grounding the input line filter built inside the Power Supply Module. This terminal is short-circuited with the protective ground terminal (FG) and a short piece when the Module is shipped. In normal operation, use as it is.

Note If current leaks from the filter ground terminal and this causes problems, remove the short piece from between the filter ground terminal and the protective ground terminal. The input line filter inside the Power Supply Module will be rendered ineffective. Make sure to insert either a noise filter or an insulation transformer in the power supply circuit to the Power Supply Module in order to increase noise resistance.

3. Grounding**A. Independent Ground**

As a rule, the Modules forming the GL120 or GL130 should be grounded to an independent ground pole at a ground resistance of 100 Ω or less.

B. Common Ground Pole

The Modules forming the GL120 or GL130 and devices related to general control circuits can share a common ground pole. Do not, however, share the same ground pole between GL120/GL130 Modules and power devices.

C. Common Ground Line

The Modules Forming the GL120 or GL130 and devices related to general control circuits cannot share a common outside-panel ground cable.

5.3.6 Hot Swapping

1. Meaning of Hot Swapping

- 1) Mounting or removing an I/O and other Modules while the external power supply is turned ON to the Power Supply Module will allow the CPU Module to continue working normally. This function is called “hot swapping” (removal/insertion under power).
- 2) Hot swapping allows replacement of I/O and other Modules without stopping the operation of CPU Module.
- 3) If a Module is hot swapped, it will take several scan cycles or a few seconds for the new Module to run normal I/O and communications processing as shown below.

a) Digital/Analog I/O Modules

Module will start normal I/O processing several scan cycles after being mounted to the slot.

b) Special Purpose Modules

Module will start normal I/O processing several scan cycles after being mounted to the slot.

c) MEMOBUS Modules

Module will start normal communications processing several scan cycles after being mounted to the slot.

d) Remote I/O Receiver Modules

Module will start normal communications processing a few seconds after being mounted to the slot.

e) PC Link Modules

Module will start normal communications processing after the following time has passed after being mounted to the slot:

Several scan cycles + station search time

The factory set station search time is 1 s. This search time can be set from between 100 to 25,500 ms (unit: 100ms) by using the PC Link Map screen of the MEMOSOFT.

- 4) Use hot swapping effectively, remembering that some Modules cannot be mounted or removed while power is being supplied. Also be sure to consider the impact on the overall control system before removing a Module.

2. Modules that Support Hot Swapping

The following table shows the Modules which support hot swapping.

Table 5.18 Modules that Support Hot Swapping

Product	Name	Model No.	Permitted/ Not permitted	Safety Switch Required
Power Supply Modules	AC Power Supply Module (7 A)	JRMSP-120CPS11300	Not permitted	
	AC Power Supply Module (3 A)	JRMSP-120CPS11100	Not permitted	
	DC Power Supply Module (7 A)	JRMSP-120CPS21300	Not permitted	
	DC Power Supply Module (3 A)	JRMSP-120CPS21100	Not permitted	
CPU Modules	CPU Module (8 KW) CPU10	DDSCR-120CPU14200	Not permitted	
	CPU Module (16 KW) CPU20	DDSCR-120CPU34100	Not permitted	
	CPU Module (16 KW) CPU21	DDSCR-120CPU34110	Not permitted	
	CPU Module (32 KW) CPU30	DDSCR-130CPU54100	Not permitted	
	CPU Module (40 KW) CPU35	DDSCR-130CPU54110	Not permitted	
Communications Modules	Remote I/O Driver Module	JAMSC-120CRD13100	Not permitted	
	Remote I/O Receiver Module	JAMSC-120CRD13110	Permitted	
	2000 Series Remote I/O Driver Module	JAMSC-120CRR13100	Not Permitted	
	MEMOBUS Module (RS-232)	JAMSC-120NOM26100	Permitted	
	MEMOBUS Module (RS-422)	JAMSC-120NOM27100	Permitted	
	PC Link Module	JAMSC-120NFB23100	Permitted	
	Uniwire Interface Module	JAMSC-120CRD21110	Permitted	Yes
	Uniwire H-system Interface Module	JAMSC-120CRD21120	Permitted	Yes
	Distributed I/O Driver Module	JAMSC-120CRD21100	Permitted	
	M-NET Module	JAMSC-120NMN31000	Permitted	
	YENET 1600-D Module	JAMSC-120NDN31110	Permitted	
	Ethernet Interface Module	JAMSC-120NET12100	Permitted	
Optical/Electrical Conversion Module	JAMSC-120NAH93500 and 3 other models	Permitted		

Product	Name	Model No.	Permitted/ Not permitted	Safety Switch Required
Digital Input Modules	100-VAC 16-point Input Module	JAMSC-120DAI54300	Permitted	Yes
	200-VAC 16-point Input Module	JAMSC-120DAI74300	Permitted	Yes
	12/24-VDC 16-point Input Module	JAMSC-120DDI34300	Permitted	
	12/24-VDC 32-point Input Module	JAMSC-120DDI35400	Permitted	
	12/24-VDC 64-point Input Module	JAMSC-120DDI36400	Permitted	
Analog Input Modules	Analog Input Modules (± 10 V, 4 channels)	JAMSC-120AVI02000	Permitted	
	Analog Input Modules (0 to 10 V, 4 channels)	JAMSC-120AVI02100	Permitted	
	Analog Input Modules (4 to 20 mA, 4 channels)	JAMSC-120ACI02000	Permitted	
Digital Output Module	100/200-VAC 8-point Output Module	JAMSC-120DAO83000	Permitted	Yes
	100/200-VAC 16-point Output Module	JAMSC-120DAO84300	Permitted	Yes
	12/24-VDC 8-point Output Module	JAMSC-120DDO33000	Permitted	
	12/24-VDC 16-point Output Module (sinking)	JAMSC-120DDO34310	Permitted	
	12/24-VDC 16-point Output Module (sourcing)	JAMSC-120DDO34320	Permitted	
	12/24-VDC 32-point Output Module (sinking)	JAMSC-120DDO35410	Permitted	
	12/24-VDC 64-point Output Module (sinking)	JAMSC-120DDO36410	Permitted	
	Relay Contact 16-point Output Module	JAMSC-120DRA84300	Permitted	AC loads: Yes DC loads: NO
Analog Output Modules	Analog Output Modules (± 10 V, 2 channels)	JAMSC-120AVO01000	Permitted	
	Analog Output Modules (0 to 10 V, 2 channels)	JAMSC-120AVO01100	Permitted	
	Analog Output Modules (0 to 5 V, 2 channels)	JAMSC-120AVO01200	Permitted	
	Analog Output Modules (4 to 20 mA, 2 channels)	JAMSC-120ACO01000	Permitted	
Special Purpose Modules	High-speed Counter Module (1 channel)	JAMSC-120EHC21110	Permitted	
	Pulse Catch Module	JAMSC-120RD134400	Permitted	
	Register Input Module	JAMSC-120RDI34410	Permitted	
	Register Output Module	JAMSC-120RDO34410	Permitted	
Motion Modules	One-axis Motion Module	JAMSC-120MMB10100	Not permitted	
	Four-axis Motion Module	JAMSC-120MMB10400	Not permitted	
	Two-axis Motion Module	JAMSC-120MMB20200	Not Permitted	
Other Modules	Expander Module	JAMSC-120CBE37000	Not permitted	

3. Precautions When Hot Swapping

Heed the following precautions when hot swapping (removal/insertion under power).



WARNING

When installing or removing an AC/IO Module while the AC power supply is turned ON, install a safety switch for each Module and always turn this safety switch OFF to turn OFF to cut off AC power supply.

Installing or removing an AC/IO Module while AC power is being supplied may result in an electrical shock at touching the power supply terminals.

- 1) Inserting or removing a Module which does not permit live mounting and removal may cause the CPU Module to stop.
- 2) Heed the following precautions when performing hot swapping on an I/O Module which is being supplied AC power as I/O power supply.
- 3) When hot swapping on an I/O Module which supply DC power as I/O power supply, there is no need to setup safety switches. However, it may cause I/O signal chatter when inserting or removing a terminal block or a connector to or from the Module. If this is a problem, then setup a chatter prevention switch for each Module and make sure to turn this switch OFF to cut off DC power supply.
- 4) When hot swapping on a Uniwire Interface Module which is being supplied DC power as I/O power supply, install a safety switch for each Module and make sure to switch OFF this switch to cut off DC power supply. Inserting or removing the Module while DC power is being supplied may result in short-circuits when removing or attaching the power supply cable.
- 5) When hot swapping, never short-circuit the terminal block or the connectors of the Module.

5.4 External Wiring

This section explains the basic external wiring procedure for Digital I/O Modules. Refer to the related manuals listed in on *Table 5.15* in *5.3.4 Wiring Other Modules* for the external wiring procedures for other Modules.

External Wiring for Digital I/O Modules

1) Selection and Separation of Digital I/O Signal Cables

The digital I/O signal cable used for external wiring for Digital I/O Modules must be selected according to the operating environment, including the mechanical strength, effects of electric noise, voltage used, etc. Use the table below to select and separate appropriate I/O signal cables.

Table 5.19 Wiring Procedures for Digital I/O Signal Cables

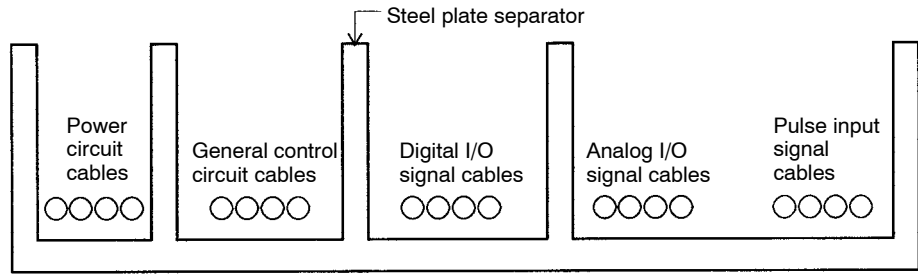
Wiring Length	Procedures
30 m or less	<ol style="list-style-type: none"> 1) A DC output signal line, a DC input signal line, an AC output signal line, and an AC input signal line may be housed in the same cable. 2) DC I/O signal lines and AC I/O signal lines must be housed in separate cables.
30 to 300 m	<ol style="list-style-type: none"> 1) Each DC output signal line, DC input signal line, AC output signal line, and AC input signal line must be housed in a separate cable. 2) If the induction voltage is large, attach either dummy resistance, or use a separate fully shielded cable and ground the shield on the GL120 or GL130 end.
300 m or longer	<ol style="list-style-type: none"> 1) Considering the inrush current to Output Module, the length of cable ought to be 300 m or less. 2) When the wiring length is more than 300 m, install a junction relay in between so that the length between the junction relay and the control panel is not more than 30 m.

2) Laying Digital I/O Signal Cables

I/O signal cables connected to Digital I/O Modules must be separated from general control circuit cables and power circuit cables as much as possible.

Leave 10 cm or more between digital I/O signal cables and a general control circuit cables, and 20 cm or more between digital I/O signal cables and power circuit cables. If separation is not possible, then use fully shielded cables, or as shown in the following figure, take measures such as separating them by way of iron plate separators.

Example





6.1	Power Supply Modules	6-2
6.1.1	Models of Power Supply Modules	6-2
6.1.2	Appearance of Power Supply Modules	6-3
6.1.3	Functions and Specifications of Power Supply Modules	6-5
6.1.4	Using Power Supply Modules	6-6
6.2	I/O Modules	6-11
6.2.1	Models of I/O Modules	6-11
6.2.2	Appearance of I/O Modules	6-12
6.2.3	EN Standard for I/O Module	6-14
6.2.4	Specifications of the I/O Module	6-16

6.1 Power Supply Modules

This section describes the Power Supply Module conforming to the Low Voltage Directives.

6.1.1	Models of Power Supply Modules	6-2
6.1.2	Appearance of Power Supply Modules	6-3
6.1.3	Functions and Specifications of Power Supply Modules	6-5
6.1.4	Using Power Supply Modules	6-6

6.1.1 Models of Power Supply Modules

Table 6.1 shows the overview of Power Supply Module conforming to the Low Voltage Directives.

Table 6.1 Models of Power Supply Modules

Product	Name	Model Name	Model Number	Features
Power Supply Module	AC Power Supply Module (7 A)	PS10	JRMSP-120CPS11309	1) Supplies DC power to operate Modules including CPU Module. 2) One AC Power Supply Module is required for each Mounting Base.
	AC Power Supply Module (3 A)	PS05	JRMSP-120CPS11109	3) PS10: 100 to 120 VAC or 200 to 240 VAC (switchable), 7 A 4) PS05: 100 to 120 VAC or 200 to 240 VAC (switchable), 3 A

6

6.1.2 Appearance of Power Supply Modules

1. Appearance of PS10 (Model No. JRMSP-120CPS11309)

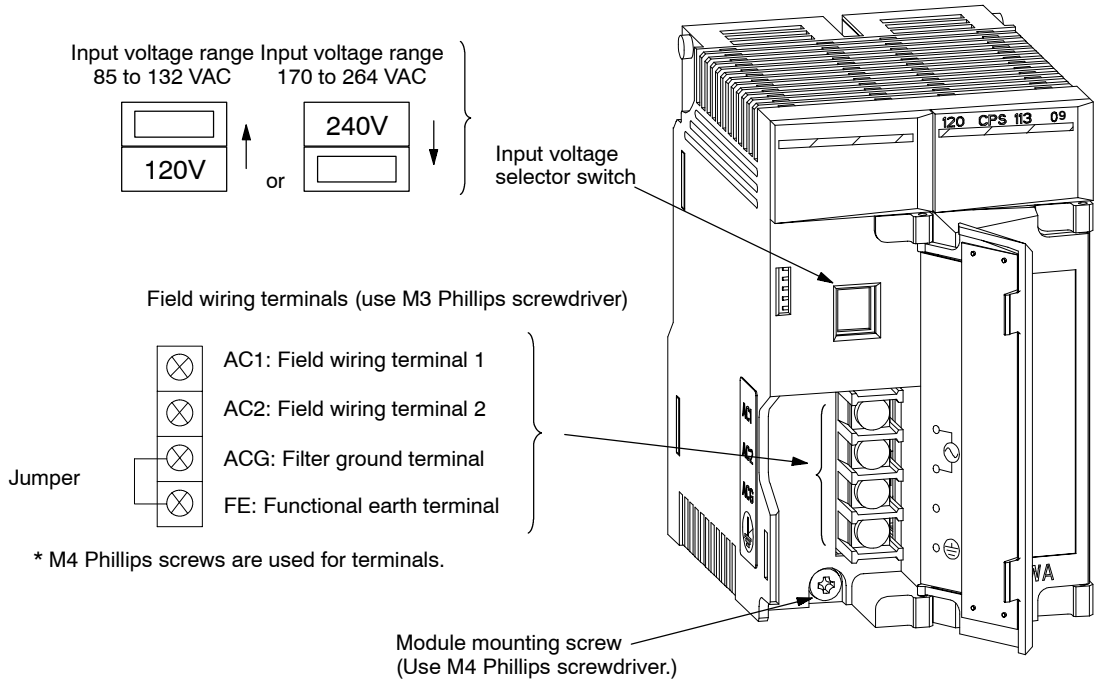
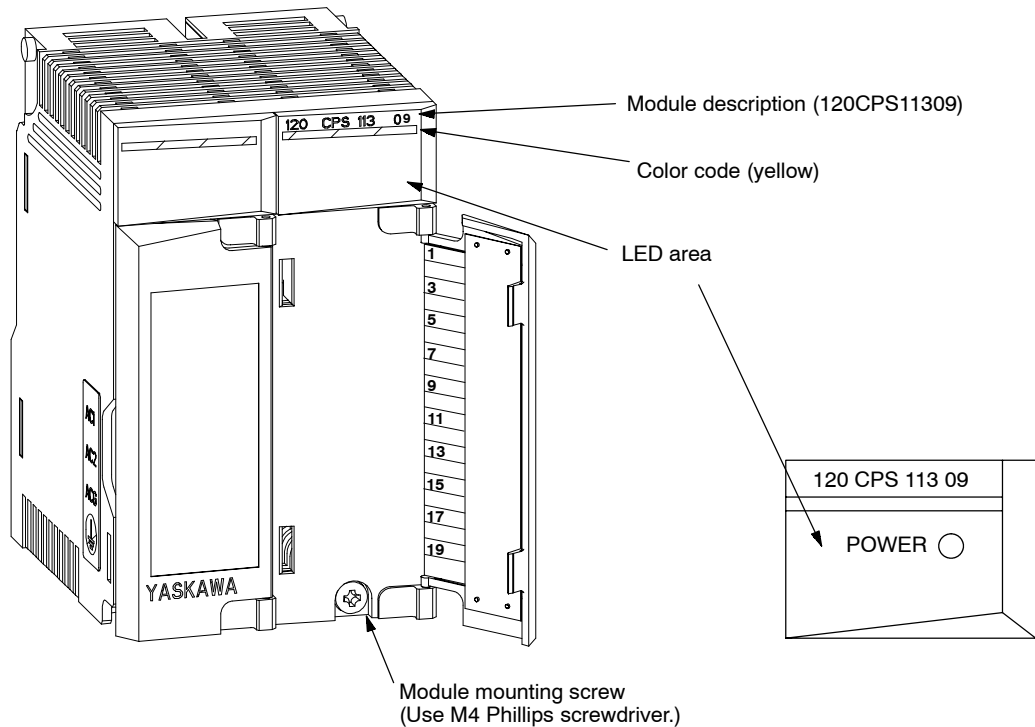


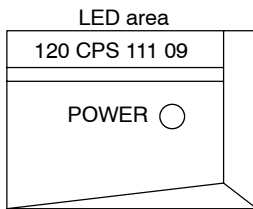
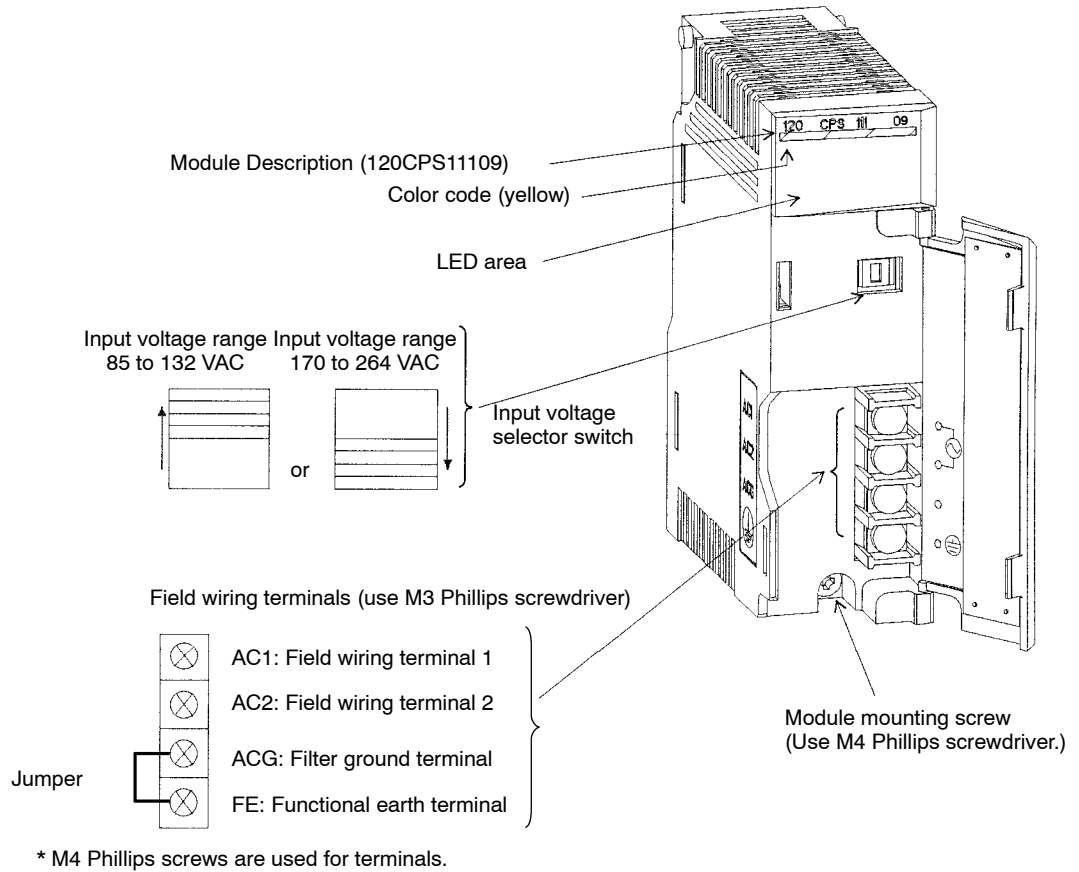
Figure 6.1 Appearance with Left Cover Open



LED	Color	Indication when ON
POWER	Green	Power Supply Module is operating normally.

Figure 6.2 Appearance with Right Cover Open

2. Appearance of PS05 (Model No. JRMSP-120CPS11109)



LED	Color	Indication when ON
POWER	Green	Power Supply Module is operating normally.

Figure 6.3 Appearance with Cover Open

6

6.1.3 Functions and Specifications of Power Supply Modules

Low Voltage Directives PS05 and PS10 specifications are shown in the following table.

Table 6.2 Specifications of PS05 and PS10

Item		Specifications	
Model Name		PS05	PS10
Model No.		JRMSP-120CPS11109	JRMSP-120CPS11309
Input	Rated Voltage	100 to 120 VAC or 200 to 240 VAC (Selectable)	
	Permissible Voltage Range	85 to 132 VAC or 170 to 264 VAC	
	Rated Frequency	50/60 Hz	
	Permissible Frequency Range	47 to 63 Hz	
	Permissible Momentary Power Interruption Time	Less than one cycle. Momentary power interruption intervals must be 1 s.	
	Wave Distortion Factor	10% or less	
	Power Consumption	1) At 100 VAC: 60 VA max. 2) At 200 VAC: 75 VA max.	1) At 100 VAC: 100 VA max. 2) At 200 VAC: 120 VA max.
	Current Leakage	1) At 132 VAC: 1.4 mA max. 2) At 264 VAC: 2.8 mA max.	
	Inrush Current	1) At 132 VAC, cold start: 25 A max. 2) At 264 VAC, cold start: 50 A max.	
	No. of Phases	Single-phase	
Output Characteristics	Rated Voltage	5.1 VDC	
	Rated Current	3.0 A	7.0 A
Fuse		Standard fusing glass tube fuse (250 VAC, 2.0 A)	Standard fusing glass tube fuse (250 VAC, 3.15 A)
Field Wiring Terminals		1) Equipped with three types of terminals, field wiring terminals (AC1, AC2), filter ground terminal (ACG), and functional earth terminal (FE). 2) M4 Phillips screws are used for the terminals. 3) Use wire size 1.5 mm ² (AWG16) to 2.5 mm ² (AWG13) to connect to the terminals.	
Hot Swapping (Removal/Insertion Under Power)		Not permitted.	
Maximum Heating Value		10 W	20 W
Approximate Mass		350 g	600 g
External Dimensions		Width: 40.3 mm Height: 130 mm Depth: 103.9 mm	Width: 81 mm Height: 130 mm Depth: 103.9 mm

6.1.4 Using Power Supply Modules

1. Number of Modules and Installation Location

A. Number of Modules

Only one Power Supply Module may be mounted to one Mounting Base. More than one Power Supply Module may not be used on the same Mounting Base.

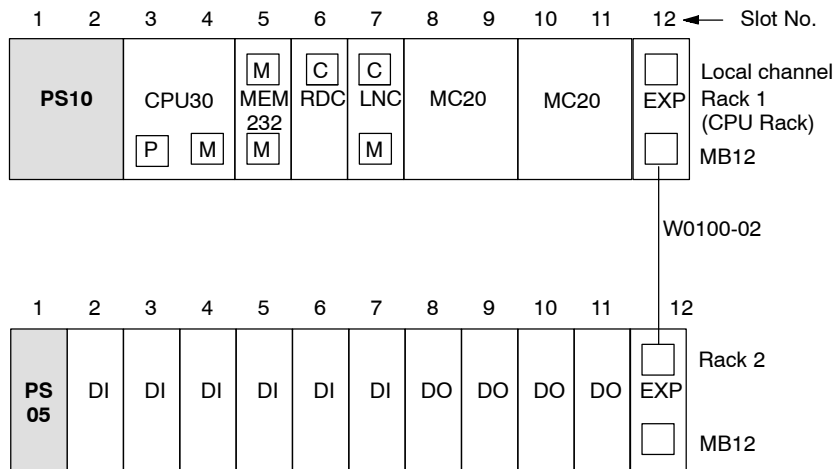
B. Installation Location

- 1) The Power Supply Module may be mounted to any slot on the Mounting Base. PS10 or PS11 will occupy 2 slots while PS05 or PS06 will occupy one slot.

EXAMPLE

- 2) The Power Supply Module is normally mounted to the left end slot of the Mounting Base to maximize its heat radiation efficiency, as shown in the following example:

Example



PS10: Power Supply Module (7 A)

PS05: Power Supply Module (3 A)

CPU30: CPU Module (32 KW)

MEM232: MEMOBUS Module (RS-232)

RDC: Remote I/O Driver Module

LNC: PC Link Module

DI: 12/24-VDC 16-point Input Module

DO: 12/24-VDC 16-point Output Module

MC20: 4-axis Motion Module

EXP: Expander Module

MB12: 12-slot Mounting Base

W0100-02: Rack-to-rack I/O Cable (0.2 m)

Figure 6.4 Example of Mounting Power Supply Modules

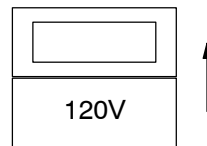
C. Input Voltage Selector Switch (AC Power Supply Modules Only)

Set the Input Voltage Selector Switch according to the range of voltage of AC power needed supplied to the exterior power terminals (AC1, AC2), as shown in the following diagrams.

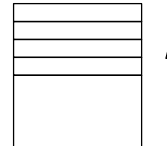
- 1) When the range of voltage of AC power supply is 85 to 132 VAC:

Set the input voltage selector switch to the top as shown below.

- 1) PS10 selector switch



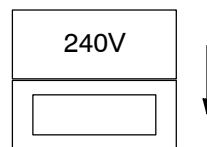
- 2) PS05 selector switch



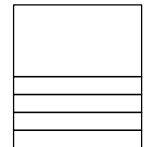
- 2) When the range of voltage of AC power supply is 170 to 264 VAC:

Set the input voltage selector switch to the bottom as shown below.

- 1) PS10 selector switch



- 2) PS05 selector switch



Caution Always make sure that there is no power being supplied to the field wiring terminals (AC1, AC2) before you operate the input voltage selector switch.

Operating the input voltage selector switch of AC Power Supply Module while power is being supplied to the field wiring terminals may result in damages to the AC Power Supply Module.

D. Field Wiring Terminals for AC Power Supply Modules (AC1, AC2)

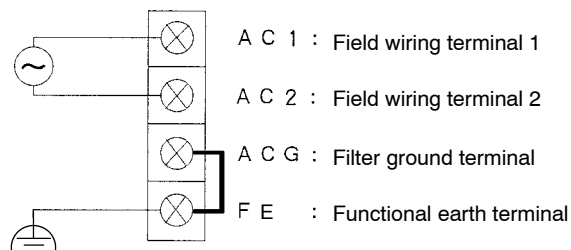
Caution Connect the correct power supply for the required ratings.

Connecting Unsuitable power supply may result in fires.

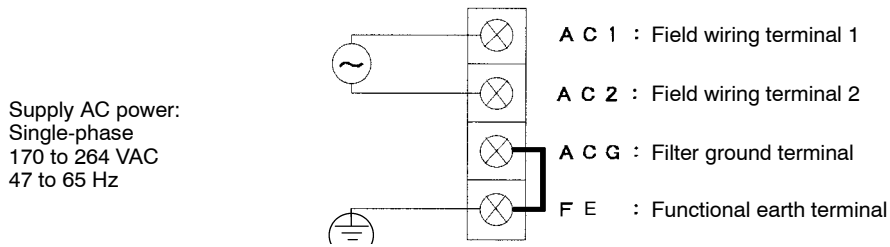
- 1) As shown in the following diagram, supply AC power (100 to 120 VAC or 200 to 240 VAC) to the field wiring terminals according to the setup of the input voltage selector switch.

- a) When the input voltage selector switch is set to the top

Supply AC power:
Single-phase
85 to 132 VAC
47 to 65 Hz



b) When the input voltage selector switch is set to the bottom:



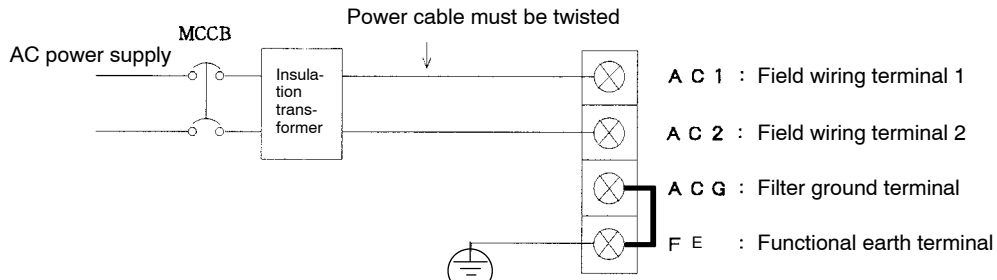
- 2) Using the AC power supply with the minimum amount of the noise when supplying for the Power Supply Module. Use an isolation transformer or a noise filter to prevent the noise from penetrating into the product.
- 3) For the details of the input condition for the Power Supply Module, see 6.1.3 Functions and Specifications of Power Supply Module.

E. Connecting Power Supply Wire

Caution Do not allow foreign matter such as cable chips into the Modules.

Foreign matter in the Modules may cause fire, failures and/or malfunctions.

- 1) Use power supply wires of 1.5 mm² (AWG16) to 2.5 mm² (AWG13) to connect to the field wiring terminals and make sure they are twisted.
- 2) M4 Phillips screws are used on the field wiring terminals. Accordingly, use solderless terminals for M4 Phillips screws for the cable ends.
- 3) When using an insulation transformer for the AC power supply, always separate the primary and secondary coils. When using a noise filter, also make sure to separate the primary and the secondary coils.



F. Functional Earth Terminal (FE)

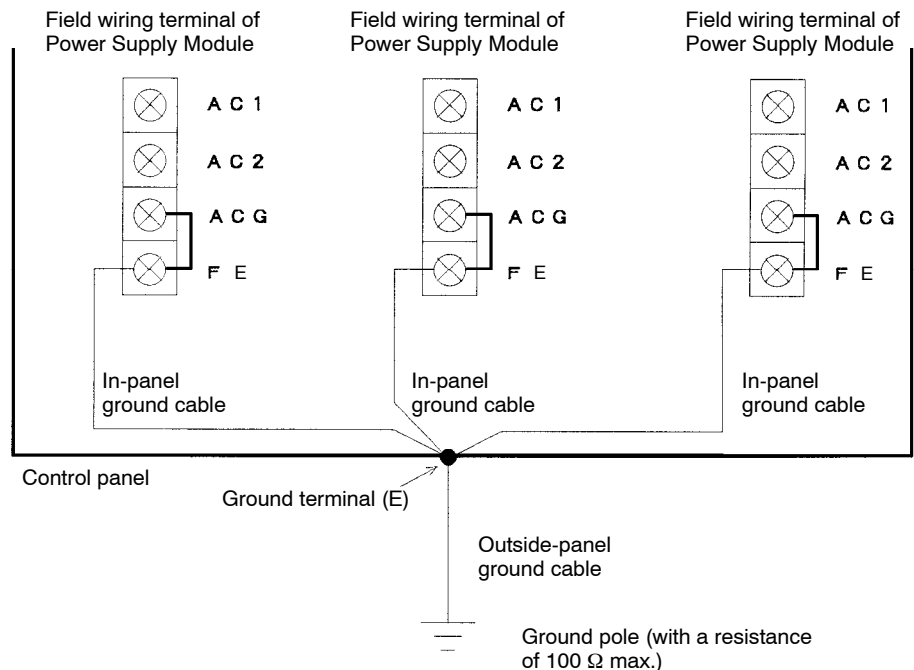
Caution Ground the functional earth terminal to a resistance of 100 Ω max.

Not grounding the functional earth terminal may result in electrical shock or malfunction.

- 1) Connect the functional earth terminal (FE) and the ground terminal of the control panel with 1.5 mm² (AWG16) to 2.5 mm² (AWG13) wire (in-panel ground cable).
- 2) If more than one Power Supply Module is used, do not cross-wire between the functional earth terminals. Connect the functional earth terminal of each Power Supply Module to the ground terminal of the control panel separately.
- 3) M4 Phillips screws are used on the functional earth terminals. Accordingly, use solderless terminals for M4 Phillips screws for the in-panel grounding wire ends.


G. Grounding Control Panel

- 1) Connect the ground terminal of the control panel to a ground pole with a wire (outside-panel ground cable) of 8 mm² (AWG 8) or larger. Make sure that the length of this ground cable is as short as possible.
- 2) Use a ground pole with a resistance of 100 Ω max. Do not use the same ground cable and/or ground pole with other strong electrical equipment.




H. Filter Ground Terminal (ACG)

The filter ground terminal is used to ground the input line filter built inside Power Supply Module. This terminal is short-circuited with functional earth terminal when the Power Supply Module is shipped.

 **Caution** Make sure not to remove the short piece from between the filter ground terminal (ACG) and the functional earth terminal (FE).

I. Built-in Fuse

- 1) The fuse inside a Power Supply Module is to prevent the Power Supply Module from damage which may occur in the following causes:
 - a) External causes: For example, when an over-voltage is applied to the field wiring terminals of Power Supply Module.
 - b) Internal causes: For example, when foreign matter such as chips happen to be present inside a Power Supply Module, thereby short-circuiting internal circuits.
- 2) When the built-in fuse burns out, the “POWER” indicator of Power Supply Module will go out. If the fuse burns out, eliminate the cause of fuse breakage and replace it with a spare Power Supply Module.

 **Caution** Do not replace the built-in fuses of the Power Supply Modules.

If the built-in fuses are replaced by anyone other than a Yaskawa-approved technician, a failure or malfunction may occur in the Power Supply Modules.

6.2 I/O Modules

■ This section describes the I/O Modules conforming to the Low Voltage Directives.

6.2.1	Models of I/O Modules	6-11
6.2.2	Appearance of I/O Modules	6-12
6.2.3	EN Standard for I/O Module	6-14
6.2.4	Specifications of the I/O Module	6-16

6.2.1 Models of I/O Modules

There are five models of I/O Modules conforming to the Low Voltage Directive.

Table 6.3 Models of I/O Module

Product	Name	Model Name	Model No.	Features	Number of Slots Required
Digital Input Modules	100- to 120-VAC 16-point Input Module	AC100IN-16P	JAMSC-120DAI54309	1) Used to input digital signals. 2) 100 to 120 VAC, 16 points, 7 mA (50 Hz)	1
	200- to 240-VAC 16-point Input Module	AC200IN-16P	JAMSC-120DAI74309	1) Used to input digital signals. 2) 200 to 240 VAC, 16 points, 7 mA (50 Hz)	1
Digital Output Modules	100- to 120-VAC or 200- to 240-VAC 8-point Output Module	ACOUT-8P	JAMSC-120DAO83009	1) Used to output digital signals. 2) 100 to 120/200 to 240 VAC, 8 points, 1.0 A/point	1
	100- to 120-VAC or 200- to 240-VAC 16-point Output Module	ACOUT-16P	JAMSC-120DAO84309	1) Used to output digital signals. 2) 100 to 120/200 to 240 VAC, 16 points, 0.3 A/point	1
	Relay Contact 16-point Output Module	RELAY-16P	JAMSC-120DRA84309	1) Used to output digital signals. 2) Relay contacts, 16 points, 1.0A point	1

Refer to the following manual for details on the I/O Modules.

MEMOCON GL120, GL130 120-series I/O Modules User's Manual (SIEZ-C825-20.22)

6.2.2 Appearance of I/O Modules

1. Appearance of I/O Modules with Terminal Blocks for Field Connections

- 1) The following figure shows the appearance of Input Module:
 100-to 120-VAC, 16-point Input Module (JAMSC-120DAI54309)
 200-to 240-VAC, 16-point Input Module (JAMSC-120DAI74309)

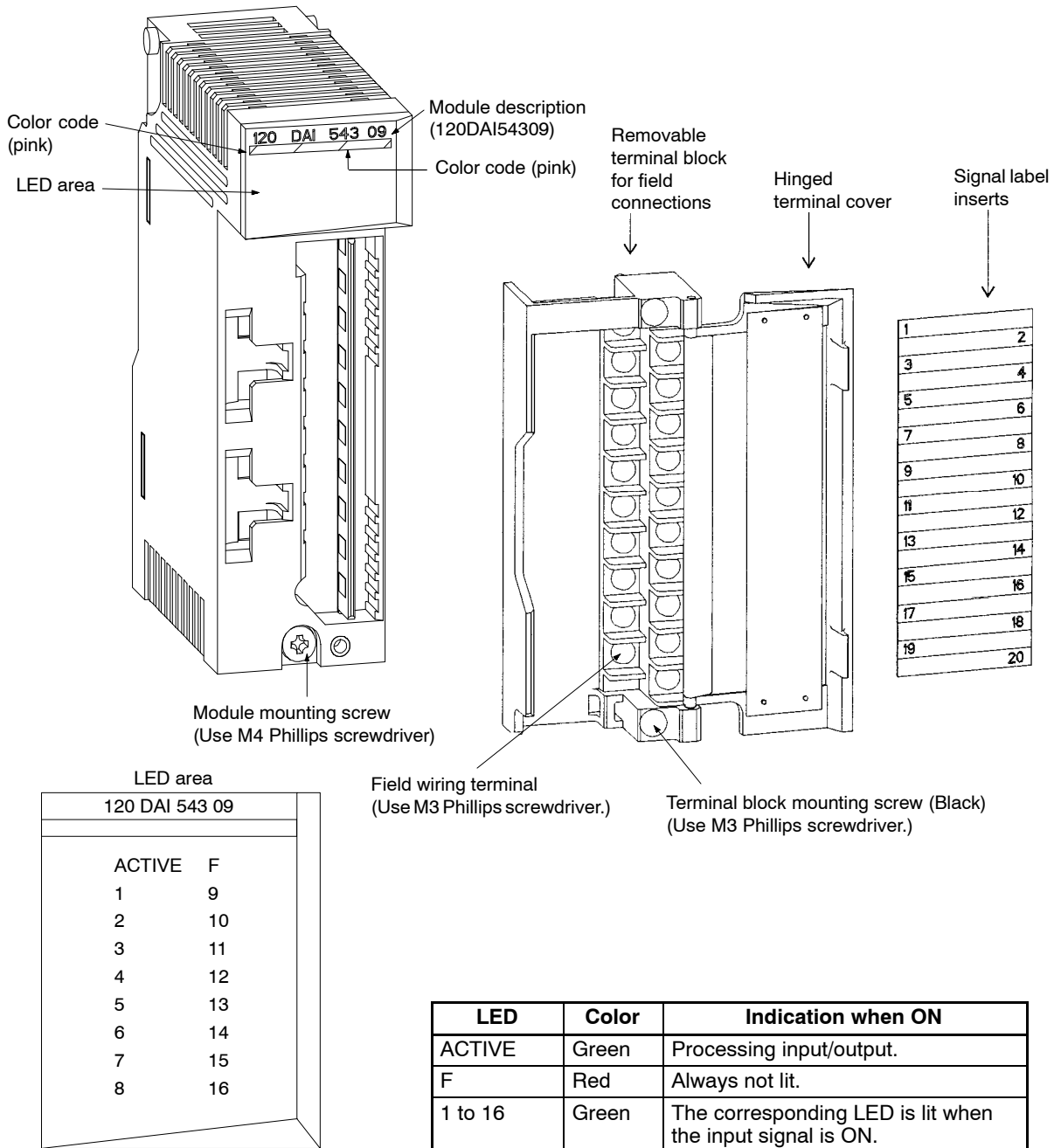


Figure 6.5 Appearance of 100-to 120-VAC 16-point Input Module

Note Module description are different depending on the Modules as follows.

Model No.	Module description
JAMSC-120DAI54309	120DAI54309
JAMSC-120DAI74309	120DAI74309

- 2) The following figure shows the appearance of the next three types of Output Modules:
 -100-to 120-VAC or 200-to 240-VAC, 16-point Output Module (JAMSC-120DAO84309)
 -100-to 120-VAC or 200-to 240-VAC, 8-point Output Module (JAMSC-120DAO83009)
 -Relay Contact 16-point Output Module (JAMSC-120DRA84309)

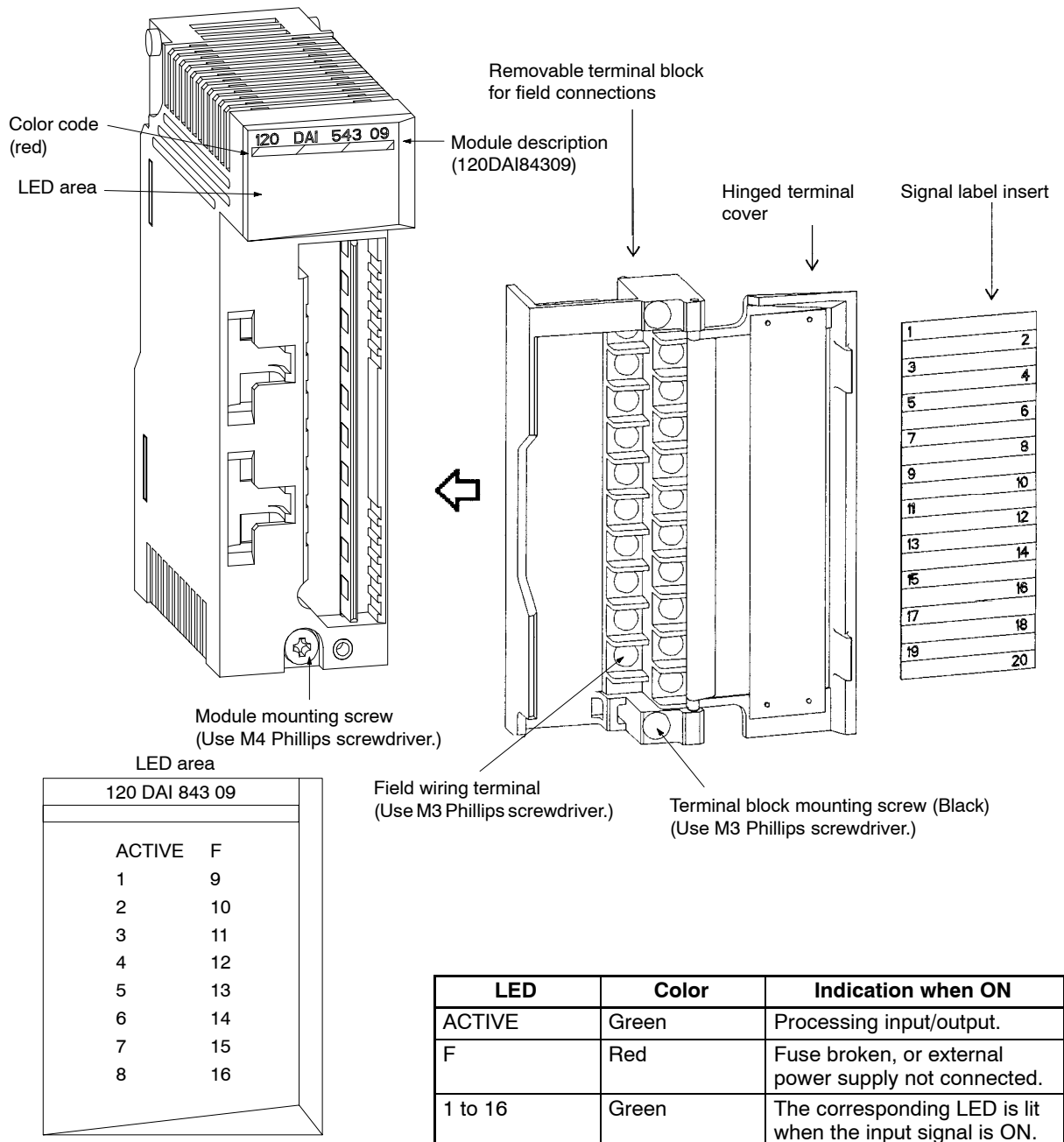


Figure 6.6 Appearance of 100-to 120-VAC 16-point Output Module

Note Module description are different depending on the Modules as follows.

Model No.	Module description	“F” fuse LED
JAMSC-120DAO84309	120DAO84309	Required
JAMSC-120DAO83009	120DAO83009	Not Required
JAMSC-120DRA84309	120DRA84309	Not Required

6.2.3 EN Standard for I/O Module

1. Correspond to the Standards

The module that complies with the requirements of the EN61131-1 and EN61131-2 Standards.

However, because this product is a built-in type, reconfirmation is required after being installed in the final product.

2. Difference from Standard Module

This module uses a different removable terminal block than the standard module.

3. Conditions for Low Voltage Directive

The following conditions must be satisfied for the module to conform to the Low Voltage Directives EN61131-1 and EN61131-2.

1) Terminal Block

Make sure to use terminal blocks that are certified as conforming to the Low Voltage Directive.

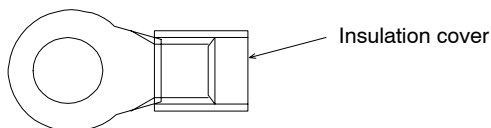
The shape of the field wiring terminals and the color of the screws differ between the terminal blocks for the standard module and the other modules.

Different colors are used differentiate between the two types of terminal blocks.

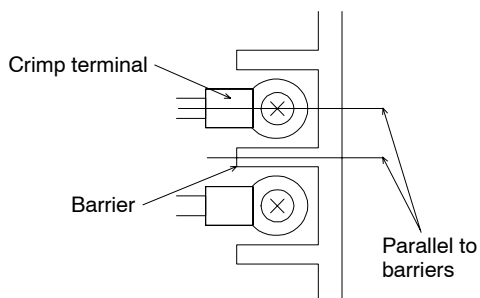
Model	Standard	Conforming to the Low Voltage Directive
Shape of field wiring terminals	With square washer	With round washer
Color of screws	Silver (nickel plated)	Black

2) Connecting to Field Wiring Terminals

Make sure to use M3 crimp terminals (round type) that are appropriate for the size of the wire. Put insulation covers at each crimp when connecting to the field wiring terminals as shown in the figure below.



Make sure that the minimum clearance for air circulation is provided on both sides of each crimp terminal by checking that the terminals are parallel to the barriers between the terminals.



Caution When wiring to terminal blocks, always use crimp terminals on the cable ends. Using bare wires may result in an electric shock or a short circuit if the wires become loose.

3) Protective Fuse

When using the Output Module, connect the fuse to the circuit to protect the output circuit. Use a fuse with a current rating of 2a or less, which meets the specifications described in IEC1272, Sheet2.

Recommended fuse: 217000 Series (made by Littlefuse)

6.2.4 Specifications of the I/O Module

The following table shows the specifications of the I/O Module conforming to the Low Voltage Directive.

1) 100-to 120-VAC 16-point Input Module

Table 6.4 Specifications of the 100-to 120-VAC 16-point Input Module

Item	Specification
Name	100- to 120-VAC 16-point Input Module
Model Name	AC100IN-16P
Model No.	JAMSC-120DAI54309 (EN standards)
Rated Voltage	100 to 120 VAC
Maximum Allowable Voltage	132 VAC
Rated Frequency	50/60 Hz
Allowable Frequency Range	47 to 63 Hz
Inrush Current	160 mA
Rated Current	7 mA (at 100 VAC, 50 Hz)
Input Impedance	14.3 k Ω (at 100 VAC, 50 Hz) 12.5 k Ω (at 100 VAC, 60 Hz)
Standard Operating Ranges	ON voltage range: 74 to 132 VAC OFF voltage range: 30 VAC max.
Input Type	AC type 2 (according to IEC1131-2)
Input Delay Times	OFF to ON: 20 ms max. ON to OFF: 35 ms max.
Number of Commons	2
Number of Inputs per Common	8 points/common
Input Power Supply per Common	Different power supply phases cannot be connected for each common.
External Connections	Removable terminal block with M3 Phillips screw terminals
Number of Inputs	16
Input Signal Indication	Indicator for each point; lit when input is ON. Status saved in internal logic.
Status Indication	ACTIVE: Lits during input processing
Insulation Method	Photocoupler
Dielectric Strength	1,500 VAC for 1 min or 1,800 VAC for 1 s between input terminals and ground (via 500-VDC insulation resistance meter)
Insulation Resistance	100 M Ω min. at room temperature and humidity between input terminals and ground (via 500-VDC insulation resistance meter)
External Power Supply	100 to 120 VAC supplied to signals
Derating Conditions	None
Internal Current Consumption	90 mA max. at 5 VDC (with all points ON)
Maximum Heating Value	2.0 W
Hot Swapping (Removal/Insertion under Power)	Permitted
Approximate Mass	250 g
External Dimensions	40.3 x 130 x 103.9 mm (W x H x D)

6

2) 200-to 240-VAC 16-point Input Module

Table 6.5 Specifications of the 200-to 120-VAC 16-point Input Module

Item	Specification
Name	200- to 240-VAC 16-point Input Module
Model Name	AC200IN-16P
Model No.	JAMSC-120DAI74309 (EN standards)
Rated Voltage	200 to 240 VAC
Maximum Allowable Voltage	264 VAC
Rated Frequency	50/60 Hz
Allowable Frequency Range	47 to 63 Hz
Inrush Current	320 mA
Rated Current	7 mA (at 200 VAC, 50 Hz)
Input Impedance	28.6 k Ω (at 200 VAC, 50 Hz) 23.1 k Ω (at 200 VAC, 60 Hz)
Standard Operating Ranges	ON voltage range: 159 to 264 VAC OFF voltage range: 40 VAC max.
Input Type	AC type 2 (according to IEC1131-2)
Input Delay Times	OFF to ON: 20 ms max. ON to OFF: 35 ms max.
Number of Commons	2
Number of Inputs per Common	8 points/common
Input Power Supply per Common	Different power supply phases cannot be connected for each common.
External Connections	Removable terminal block with M3 screw terminals
Number of Inputs	16
Input Signal Indication	Indicator for each point; lit when input is ON. Status saved in internal logic.
Status Indication	ACTIVE: Lits during input processing
Insulation Method	Photocoupler
Dielectric Strength	1,500 VAC for 1 min or 1,800 VAC for 1 s between input terminals and internal circuits and between all input commons
Insulation Resistance	100 M Ω min. (room temperature and humidity) between input terminals and ground (via 500-VDC insulation resistance meter)
External Power Supply	200 to 240 VAC supplied to signals
Derating Conditions	None
Internal Current Consumption	90 mA max. at 5 VDC (with all points ON)
Maximum Heating Value	3.5 W
Hot Swapping (Removal/Insertion under Power)	Permitted
Approximate Mass	250 g
External Dimensions	40.3 x 130 x 103.9 mm (W x H x D)

3) 100-to 120-VAC or 200-to 240-VAC 16-point Output Module

Table 6.6 Specifications of the 100-to 120-VAC or 200-to 240-VAC 16-point Output Module

Item	Specification
Name	100- to 120-VAC or 200- to 240-VAC 16-point Output Module
Model Name	ACOUT-16P
Model No.	JAMSC-120DAO84309 (EN Standards)
Rated Voltage	100 to 120 VAC or 200 to 240 VAC
Allowable Voltage Range	80 to 264 VAC
Rated Frequency	50/60 Hz
Allowable Frequency Range	47 to 63 Hz
Maximum Load Current	0.6 A rms/point, 2.4 A/common
Output Voltage Drop	1.0 V rms
Output Delay Times	OFF to ON: 5 ms max. ON to OFF: 1/2 cycle + 5 ms max.
OFF Leakage Current	3 mA max. at 240 VAC, 50 Hz
Minimum Load Current	7 mA rms
Output Type	Triac outputs
Number of Commons	2
Number of Outputs per Common	8 points/common
Output Power Supply per Common	Different power supply phase cannot be connected to the commons.
External Connections	Removable terminal block with M3 screw terminals
Output Protection Type	Unprotected outputs (according to IEC 1131-2)
Built-in Fuse	Two, 5-A fuses (one per common) (Burnout time: 2 min max. at 200% of rated current)
Surge Suppressor	Varistor
Other Output Protection	None
Number of Outputs	16
Output Signal Indication	Indicator for each point; lit when output is ON. Status saved in internal logic.
Status Indication	ACTIVE: Lit during output processing F: Lits when fuse is burnt out or output power supply is not connected
Insulation Method	Phototriac
Dielectric Strength	1,500 VAC for 1 min or 1,800 VAC for 1 s between output terminals and internal circuits and between all output commons
Insulation Resistance	100 MΩ min. (room temperature and humidity) between output terminals and ground (via 500-VDC insulation resistance meter)
External Power Supply	100 to 120 VAC or 200 to 240 VAC supplied to drive loads
Derating Conditions	None
Internal Current Consumption	300 mA at 5 VDC (with all points ON)
Hot Swapping (Removal/Insertion Under Power)	Permitted
Maximum Heating Value	5.5W
Approximate Mass	300 g
External Dimensions	40.3 x 130 x 103.9 mm (W x H x D)

6

4) 100-to 120-VAC or 200-to 240-VAC 8-point Output Module

Table 6.7 Specifications of the 100-to 120-VAC or 200-to 240-VAC 8-point Output Module

Item	Specification
Name	100- to 120-VAC or 200- to 240-VAC 8-point Output Module
Model Name	ACOUT-8P
Model No.	JAMSC-120DAO83009 (EN Standards)
Rated Voltage	100 to 120 VAC or 200 to 240 VAC
Allowable Voltage Range	80 to 264 VAC
Rated Frequency	50/60 Hz
Allowable Frequency Range	47 to 63 Hz
Maximum Load Current	1.0 A rms/point
Output Voltage Drop	1.0 V rms
Output Delay Times	OFF to ON: 5 ms max. ON to OFF: 1/2 cycle + 5 ms max.
OFF Leakage Current	3 mA max. at 240 VAC, 50 Hz
Minimum Load Current	10 mA rms
Output Type	Triac outputs
Number of Commons	8 (Each output circuit is independent.)
Output Power Supply per Common	Possible to connect different power supply phases to the commons.
External Connections	Removable terminal block with M3 screw terminals
Output Protection Type	Unprotected outputs (according to IEC 1131-2)
Built-in Fuse	None
Surge Suppressor	Varistor
Other Output Protection	None
Number of Outputs	8
Output Signal Indication	Indicator for each point; lit when output is ON. Status saved in internal logic.
Status Indication	ACTIVE: Lights during output processing
Insulation Method	Phototriac
Dielectric Strength	1,500 VAC for 1 min or 1,800 VAC for 1 s between output terminals and internal circuits and between all output circuit.
Insulation Resistance	100 M Ω min. (room temperature and humidity) between output terminals and ground (via 500-VDC insulation resistance meter)
External Power Supply	100 to 120 VAC or 200 to 240 VAC supplied to drive loads
Derating Conditions	None
Internal Current Consumption	150 mA at 5 VDC (with all points ON)
Maximum Heating Value	9.0 W
Hot Swapping (Removal/Insertion Under Power)	Permitted
Approximate Mass	300 g
External Dimensions	40.3 x 130 x 103.9 mm (W x H x D)

5) Relay Contact 16-point Output Module

Table 6.8 Specifications of the Relay Contact 16-point Output Module

Item		Specification
Name		Relay Contact 16-point Output Module
Model Name		RELAY-16P
Model No.		JAMSC-120DRA84309 (EN Standards)
Contact specifications		240 VAC, 1 A, resistive load
Rated Voltage/Current		24 VDC, 1 A, resistive load
Maximum Load Power		750 VA (AC loads) 90 W (DC loads)
Maximum Load Voltage		264 VAC/125 VDC
Minimum Load Voltage/Current		100 m VDC, 0.1 mA
Contact Resistance		100 mΩ max.
Contact Life	Electrical	3 A at 30 VDC, resistive load: 100,000 operations min.
		1 A at 30 VDC, resistive load: 300,000 operations min. τ = 7 ms: 150,000 operations min. τ = 40 ms: 40,000 operations min.
		1 A at 120 VAC, cosφ = 1.0: 400,000 operations min. cosφ = 0.4: 250,000 operations min.
		1 A at 240 VAC, cosφ = 1.0: 300,000 operations min. cosφ = 0.4: 200,000 operations min.
	Mechanical	20 million operations min.
Output Delay Times		OFF to ON: 10 ms max. ON to OFF: 15 ms max.
Output Type		Relay contact outputs
Number of Commons		2
Number of Outputs per Common		8 points/common
Output Power Supply per Common		Connect Power supplies to the same phases to each common for 100 to 120 VAC or 200 to 240 VAC. Do not connect both an AC power supply and a DC power supply to one module at the same time.
External Connections		Removable terminal block with M3 screw terminals
Output Protection Type		Unprotected outputs (according to IEC 1131-2)
Built-in Fuse		None
Surge Suppressor		None
Other Output Protection		None
Number of Outputs		16
Output Signal Indication		Indicator for each point; lits when output is ON. Status saved in internal logic.
Status Indication		ACTIVE: Lits during output processing.
Insulation Method		Relay
Dielectric Strength		1,500 VAC for 1 min or 1,800 VAC for 1 s between output terminals and internal circuits and between all output commons.
Insulation Resistance		100 MΩ min. (room temperature and humidity) between output terminals and ground (via 500-VDC insulation resistance meter)
External Power Supply		100 to 120 VAC or 200 to 240 VAC or 24 VDC supplied to drive loads

6

Item	Specification
Derating Conditions	None
Internal Current Consumption	610 mA at 5 VDC (with all points ON)
Maximum Heating Value	3.1 W
Hot Swapping (removal/insertion under power)	Permitted
Approximate Mass	300 g
External Dimensions	40.3 x 130 x 103.9 mm (W x H x D)

Appendix **A**

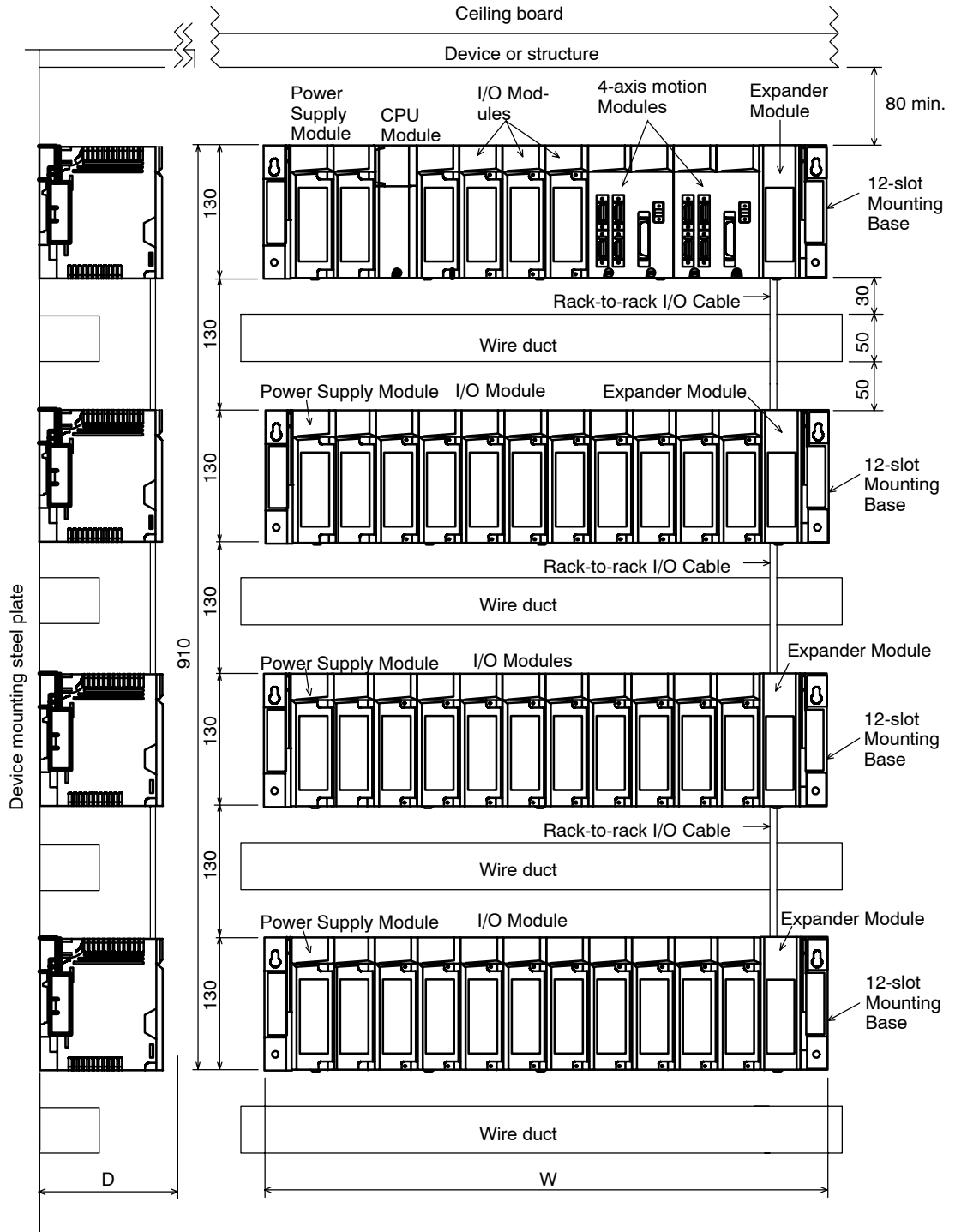
Examples of Panel Layout and Hole Dimensions

A

A.1 Panel Layout	A-2
A.2 Drilling Plan	A-4

A.1 Panel Layout

Shown below is an example of a panel layout for the configuration components of the GL120/GL130. (Unit: mm)

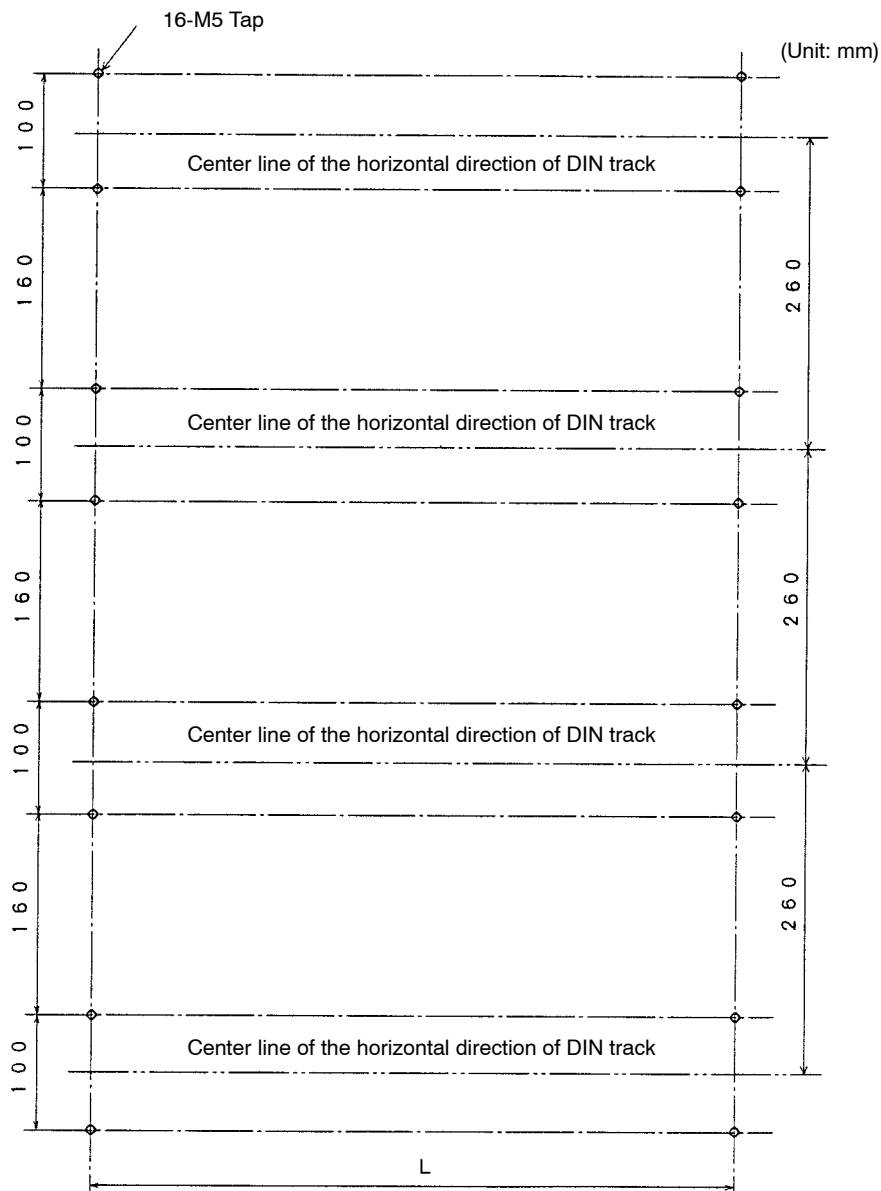


- Note**
- 1) Dimension W varies with the Mounting Base. The relation between Mounting Bases and dimension W is shown at the right.
 - 2) See 5.1.7 *Module Mounting Dimensions* for dimension D.

Base	Dimension W	Base	Dimension W
MB06	300	MB12	540
MB08	380	MB16	710
MB10	460		

A.2 Drilling Plan

An example drilling plan for mounting four 12-slot Mounting Bases to a device mounting steel plate is shown in the following figure. The following plan corresponds to the device layout shown in example layout on the previous page. When the Mounting Bases are mounted to DIN track, mount the DIN track so that the center line of the horizontal direction of the DIN track is located in positions shown by 2-dot chain lines in the following diagram.



Note Dimension L varies with the Mounting Base. The relation between the Mounting Base and dimension L is shown at the right.

Base	Dimension L	Base	Dimension L
MB06	280	MB12	520
MB08	360	MB16	690
MB10	440		

Appendix **B**

Dimensions

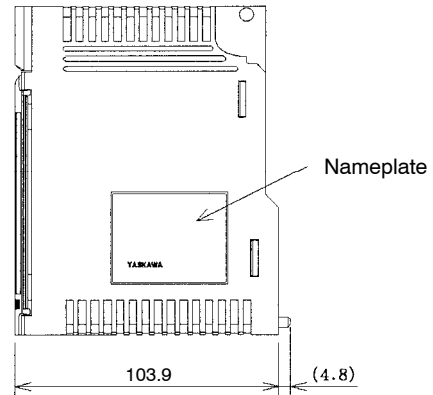
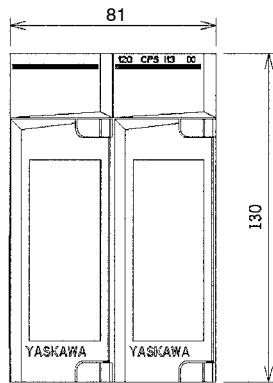
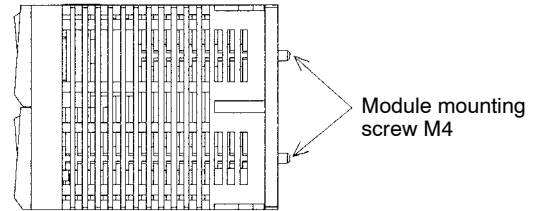
B

B.1	Power Supply Modules	B-2
B.2	CPU Modules	B-3
B.3	Communications Modules	B-5
B.4	I/O Modules	B-10
B.5	Special Purpose Modules	B-13
B.6	Motion Modules	B-14
B.7	Other Modules	B-16
B.8	Mounting Bases	B-19
B.9	Cables	B-22

B.1 Power Supply Modules

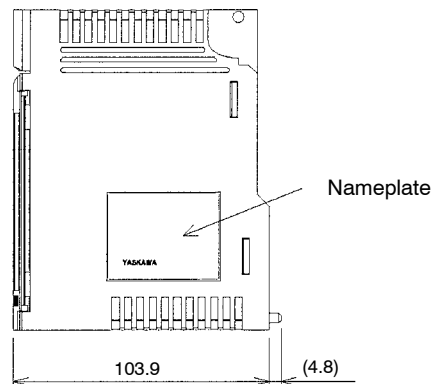
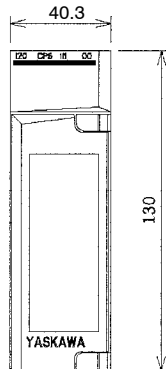
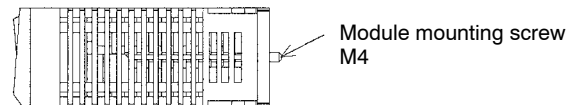
- 1) AC Power Supply Module PS10 (7A) Model No. JRMSP-120CPS11300
 DC Power Supply Module PS11 (7A) Model No. JRMSP-120CPS21300

Unit: mm
 Approx. mass: 600 g



- 2) AC Power Supply Module PS05 (3A) Model No. JRMSP-120CPS11100
 DC Power Supply Module PS06 (3A) Model No. JRMSP-120CPS21100

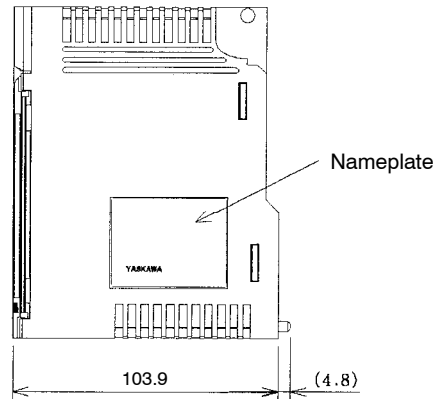
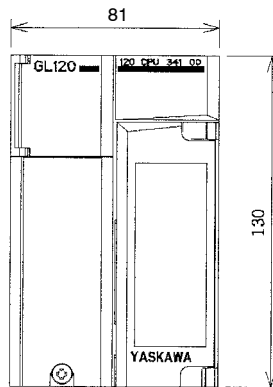
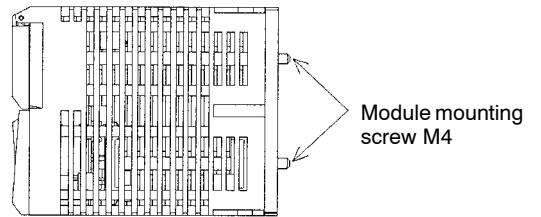
Unit: mm
 Approx. mass: 350 g



B.2 CPU Modules

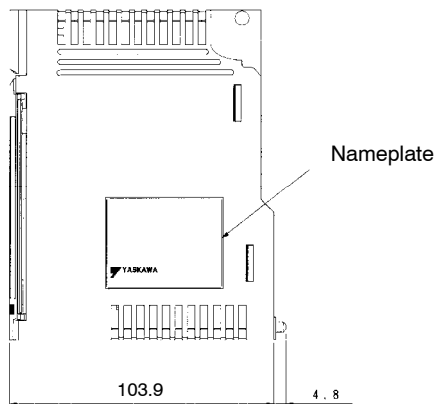
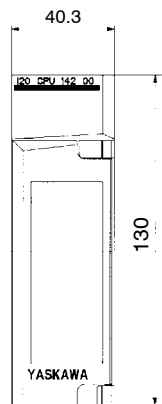
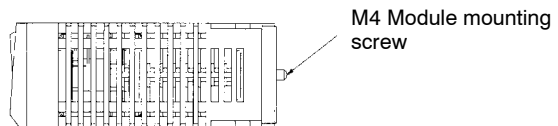
- 1) CPU Module CPU20 (16 KW) Model No. DDSCR-120CPU34100
- CPU Module CPU30 (32 KW) Model No. DDSCR-130CPU54100
- CPU Module CPU35 (40 KW) Model No. DDSCR-130CPU54110

Unit: mm
Approx. mass: 500 g



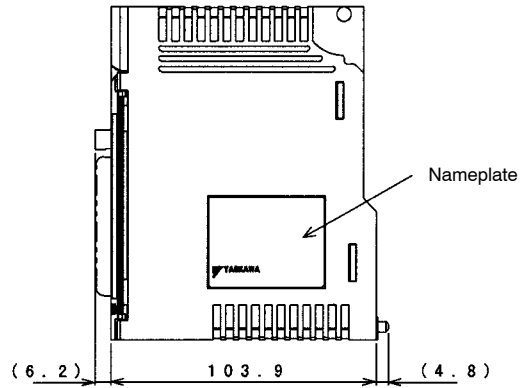
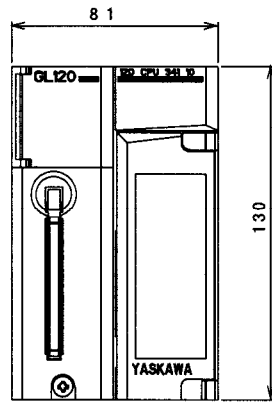
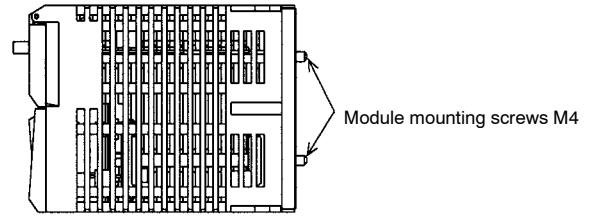
- 2) CPU Module CPU10 (8 KW) Model No. DDSCR-120CPU14200

Unit: mm
Approx. mass: 400 g



3) CPU Module CPU21 (16 KW) Model No. DDSCR-120CPU34110

Unit: mm
Approx. mass: 500 g



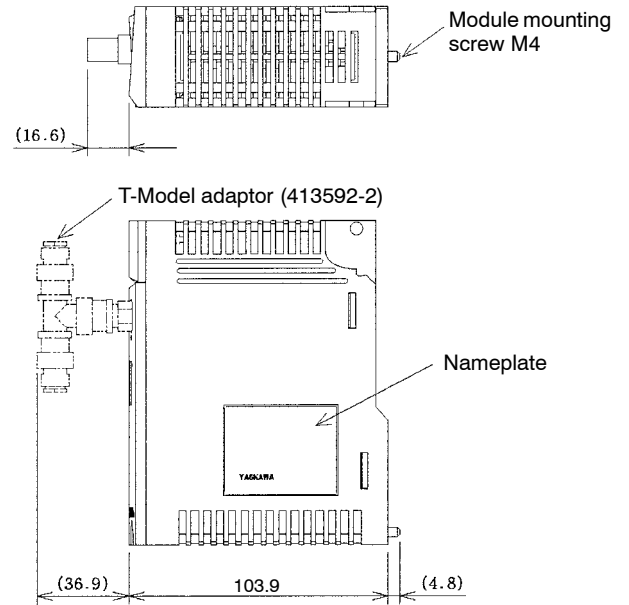
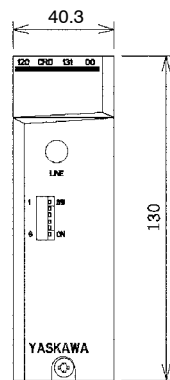
B

B.3 Communications Modules

1) Remote I/O Driver Module 2000-Series Remote I/O Driver Module

Model No. JAMSC-120CRD13100
Model No. JAMSC-120CRD13110

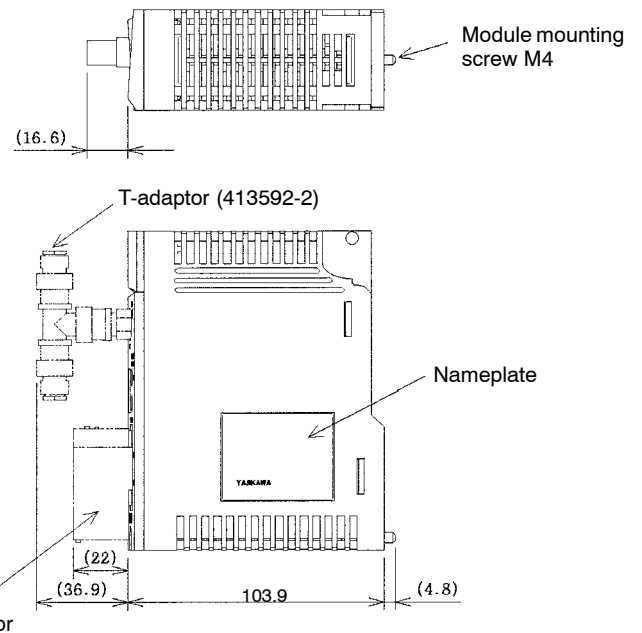
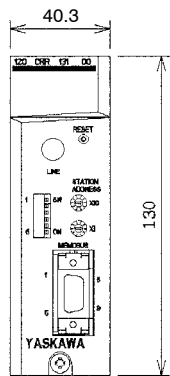
Unit: mm
Approx. mass: 300 g



2) Remote I/O Receiver Module

Model No. JAMSC-120CRR13100

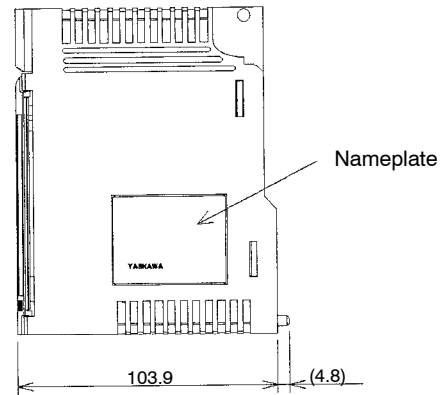
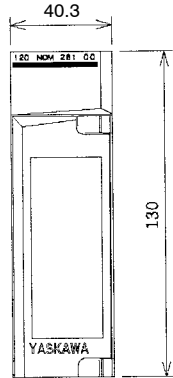
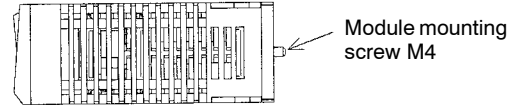
Unit: mm
Approx. mass: 300 g



3) MEMOBUS Module (RS-232)
MEMOBUS Module (RS-422)

Model No. JAMSC-120NOM26100
Model No. JAMSC-120NOM27100

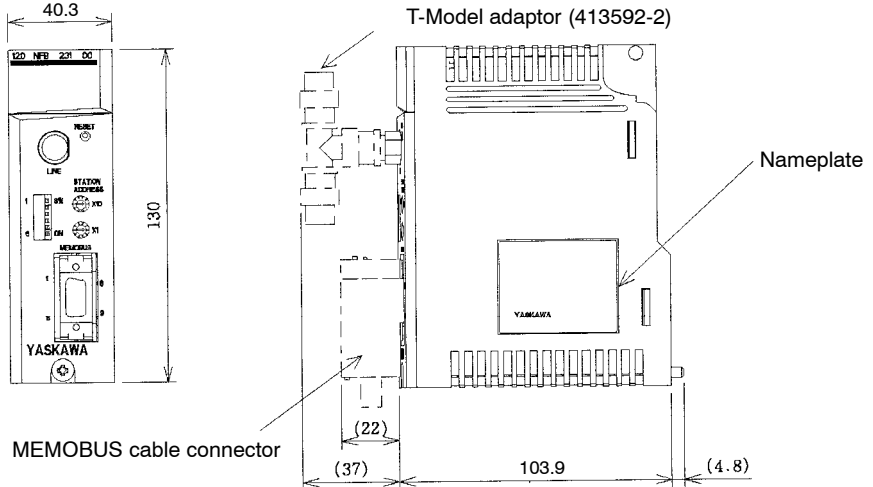
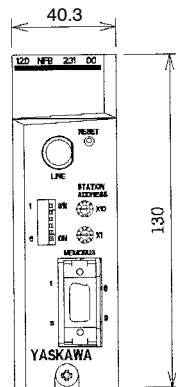
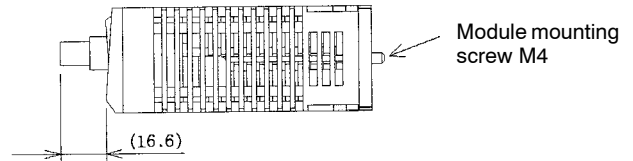
Unit: mm
Approx. mass: 300 g



4) PC Link Module

Model No. JAMSC-120NFB23100

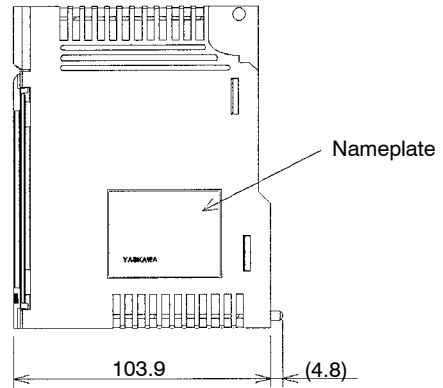
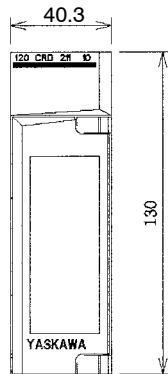
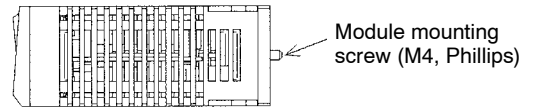
Unit: mm
Approx. mass: 300 g



5) Uniwire Interface Module
Uniwire H-system Interface Module

Model No. JAMSC-120CRD21110
Model No. JAMSC-120CRD21120

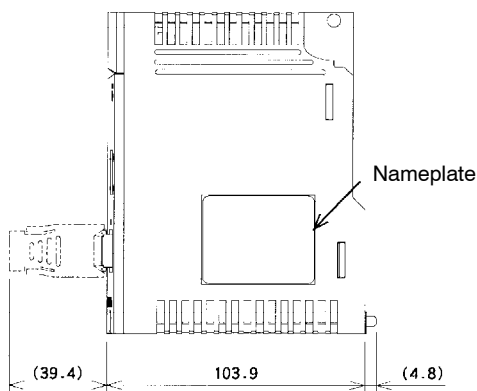
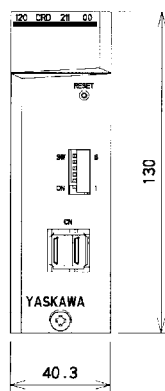
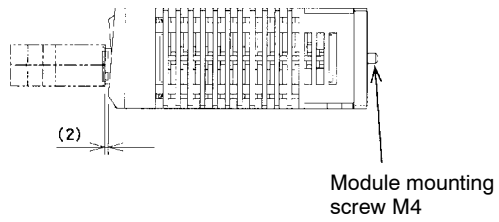
Unit: mm
Approx. mass: 300 g



6) Distributed I/O Driver Module

Model No. JAMSC-120CRD21100

Unit: mm
Approx. mass: 300 g

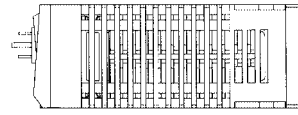


B

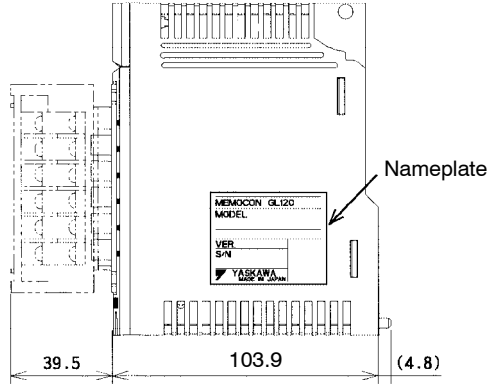
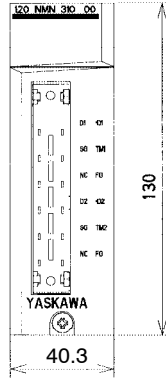
7) M-NET Module

Model No. JAMSC-120NMN31000

Unit: mm
Approx. Mass: 300 g



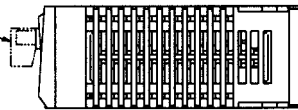
Module mounting screw (M4, Phillips)



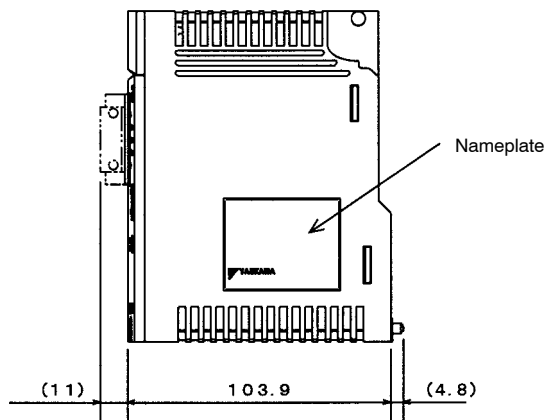
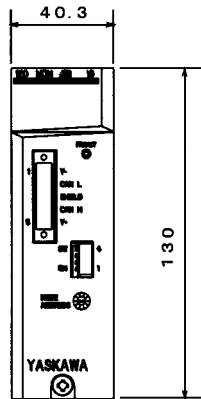
8) YENET 1600-D Module

Model No. JAMSC-120NDN31110

5-terminal terminal block (Phoenix Contact) with flange (MSTB2.5/5-STF-5.08AU)



Module mounting screw M4

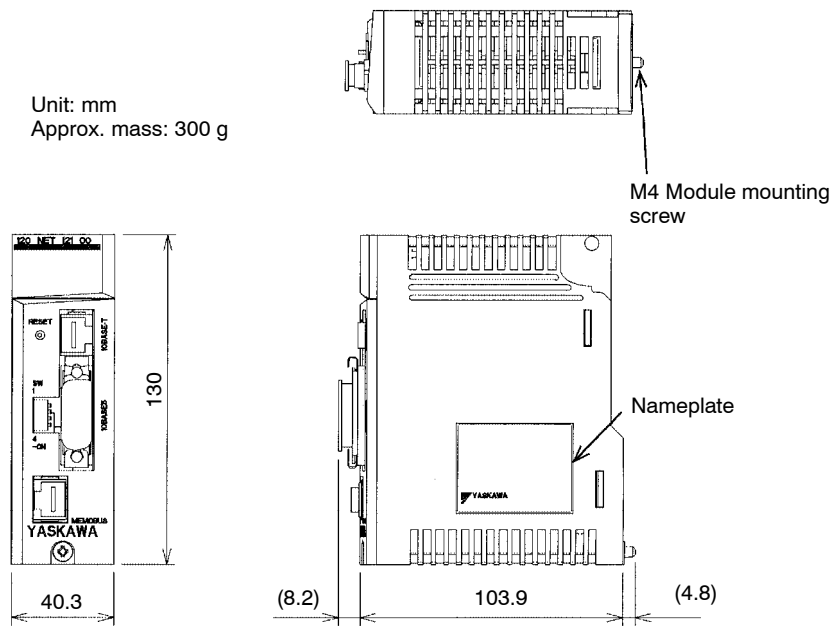


B

9) Ethernet Interface Module

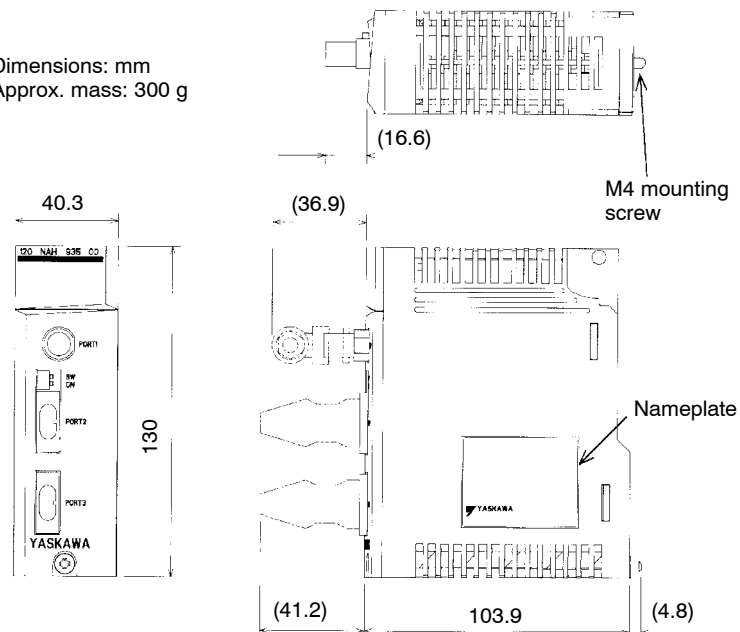
Model No. JAMSC-120NET12100

Unit: mm
Approx. mass: 300 g



10) Optical/Electrical Conversion Module Model No. JAMSC-120NAH93500
Model No. JAMSC-120NAH93510
Model No. JAMSC-120NAH93520
Model No. JAMSC-120NAH93530

Dimensions: mm
Approx. mass: 300 g



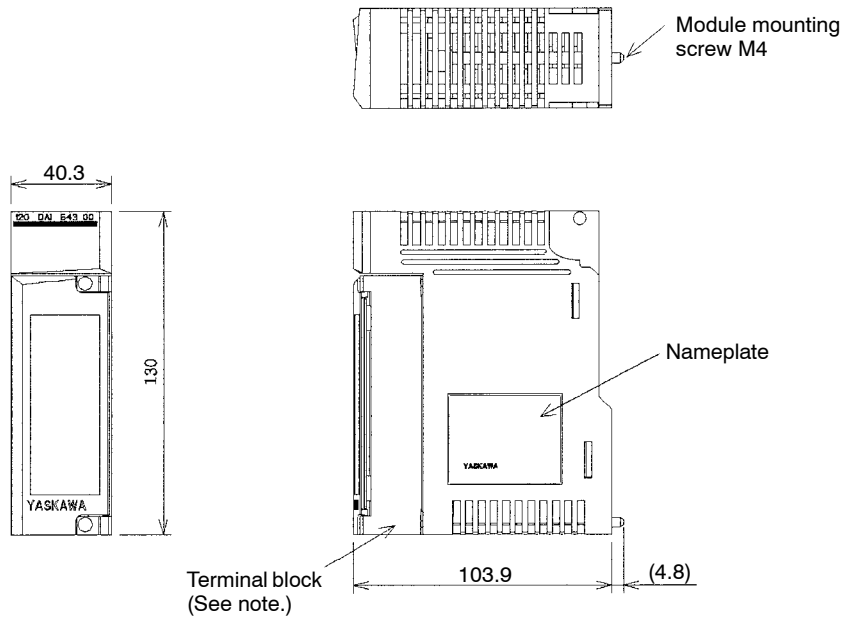
B

B.4 I/O Modules

	Approx. Mass (g)	External Connection
1) Digital Input Modules		
● 100-VAC 16-point Input Module (Model No.: JAMSC-120DAI54300)	250	Terminal block
● 200-VAC 16-point Input Module (Model No.: JAMSC-120DAI74300)	250	Terminal block
● 12/24-VDC 16-point Input Module (Model No.: JAMSC-120DDI34300)	250	Terminal block
● 12/24-VDC 32-point Input Module (Model No.: JAMSC-120DDI35400)	250	Connector
● 12/24-VDC 64-point Input Module (Model No.: JAMSC-120DDI36400)	300	Connector
2) Analog Input Modules		
● Analog Input Module (± 10 V, 4 channels) (Model No.: JAMSC-120AVI02000)	300	Terminal block
● Analog Input Module (0 to 10 V, 4 channels) (Model No.: JAMSC-120AVI02100)	300	Terminal block
● Analog Input Module (4 to 20 mA, 4 channels) (Model No.: JAMSC-120ACI02000)	300	Terminal block
3) Digital Output Modules		
● 100/200-VAC 8-point Output Module (Model No.: JAMSC-120DAO83000)	300	Terminal block
● 100/200-VAC 16-point Output Module (Model No.: JAMSC-120DAO84300)	300	Terminal block
● 12/24-VDC 8-point Output Module (Model No.: JAMSC-120DDO33000)	250	Terminal block
● 12/24-VDC 16-point Output Module (sinking) (Model No.: JAMSC-120DDO34310)	250	Terminal block
● 12/24-VDC 16-point Output Module (sourcing) (Model No.: JAMSC-120DDO34320)	250	Terminal block
● 12/24-VDC 32-point Output Module (sinking) (Model No.: JAMSC-120DDO35410)	250	Connector
● 12/24-VDC 64-point Output Module (sinking) (Model No.: JAMSC-120DDO36410)	300	Connector
● Relay Contact 16-point Output Module (Model No.: JAMSC-120DRA84300)	300	Terminal block
4) Analog Output Module		
● Analog Output Module (± 10 V, 2 channels) (Model No.: JAMSC-120AVO01000)	350	Terminal block
● Analog Output Module (0 to 10 V, 2 channels) (Model No.: JAMSC-120AVO01100)	350	Terminal block
● Analog Output Module (0 to 5 V, 2 channels) (Model No.: JAMSC-120AVO01200)	350	Terminal block
● Analog Output Module (4 to 20mA, 2 channels) (Model No.: JAMSC-120ACO01000)	350	Terminal block

1) I/O Modules with Terminal Blocks

Unit: mm

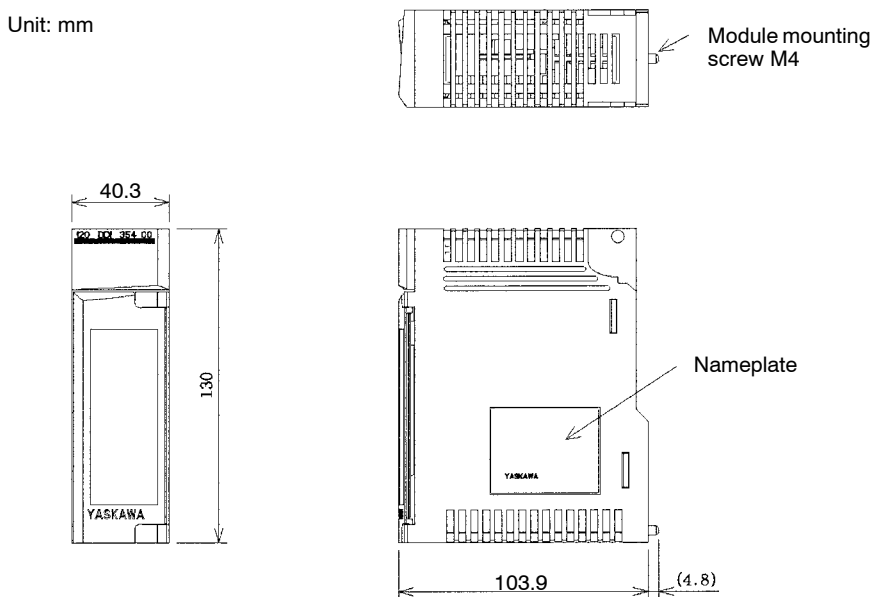


Note Terminal block comes as accessory.

2) I/O Modules with Connectors

a) 32-point Digital I/O Modules

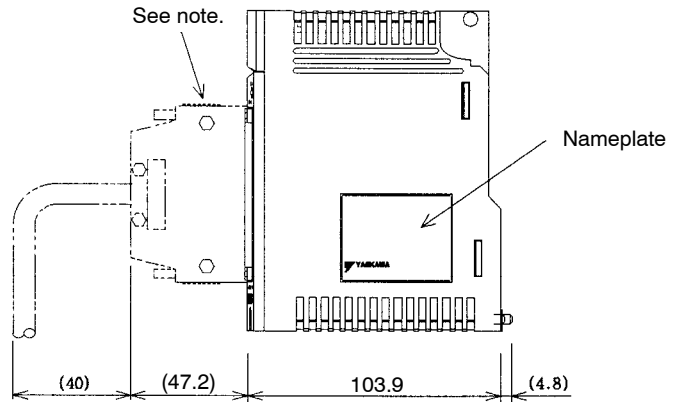
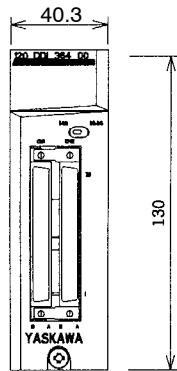
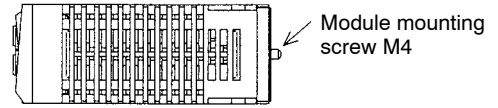
Unit: mm



B

b) 64-point Digital I/O Modules

Unit: mm
Mass: approx. 300 g



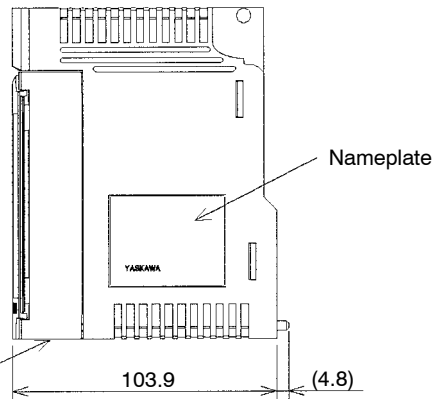
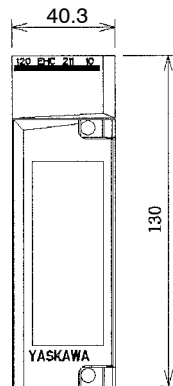
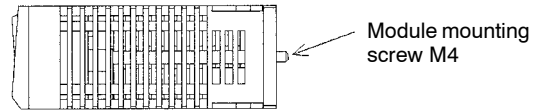
Note Connector and cover come as accessory.
Connector: FCN-361J040-AU (Fujitsu)
Cover: FCN-360C040-B (Fujitsu)

B

B.5 Special Purpose Modules

1) High-speed Counter Module (1 Channel) Model No. JAMSC-120EHC21110

Unit: mm
Approx. mass: 300 g



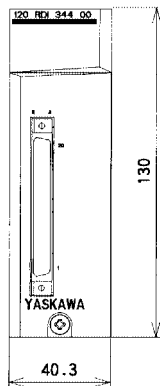
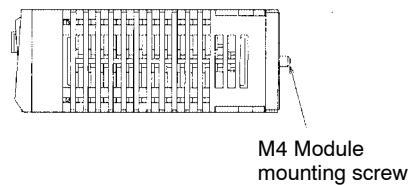
Terminal block
(See note.)

Note Terminal block comes as accessory.

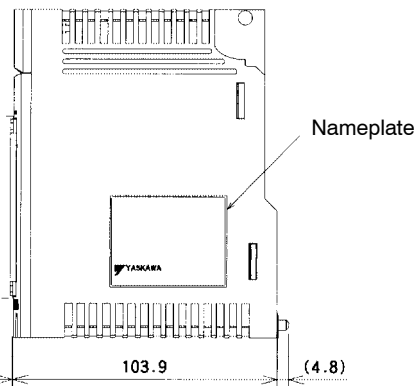
2) Pulse Catch and Counter Module Register Input Module Register Output Module

Model No. JAMSC-120RDI34400
Model No. JAMSC-120RDI34410
Model No. JAMSC-120RDO34410

Unit: mm
Mass: Approx. 300 g



Connector
(See note.)



Note The connector is supplied with the Module.

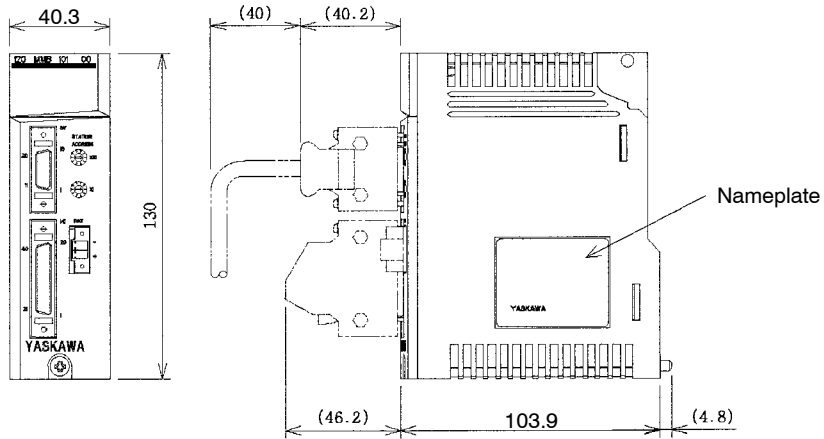
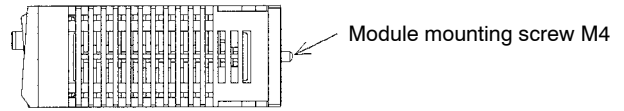
B

B.6 Motion Modules

1) One-axis Motion Module

Model No. JAMSC-120MMB10100

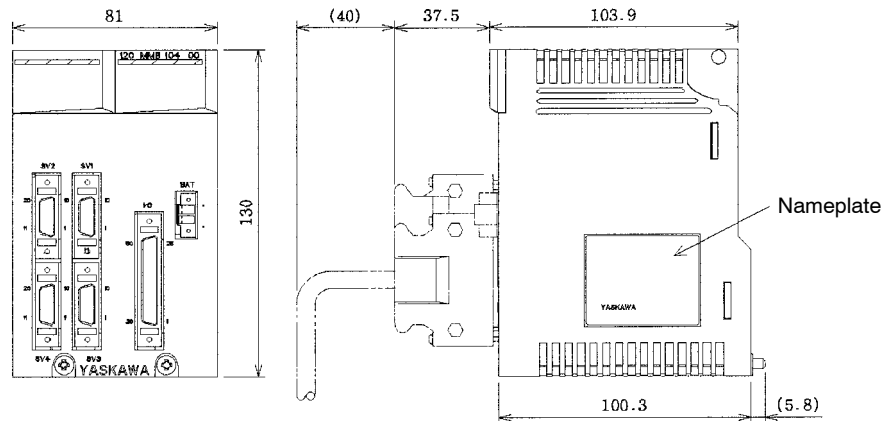
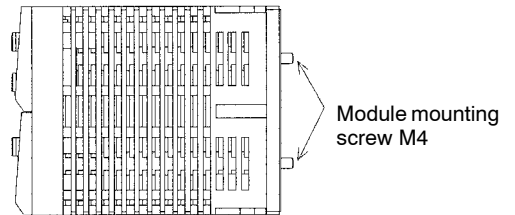
Unit: mm
Approx. mass: 300 g



2) Four-axis Motion Module

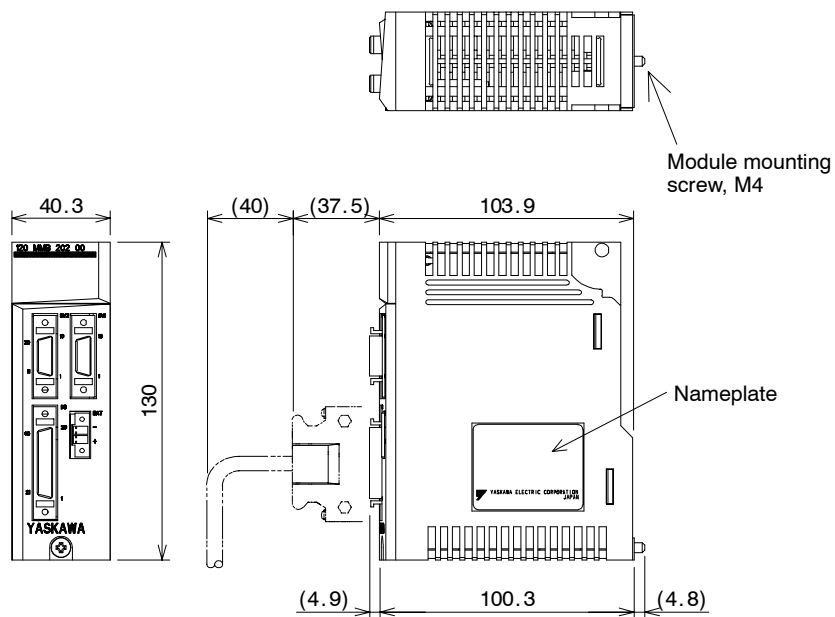
Model No. JAMSC-120MMB10400

Unit: mm
Approx. mass: 500 g



3) Two-axis Motion Module

Model No. JAMSC-120MMB20200

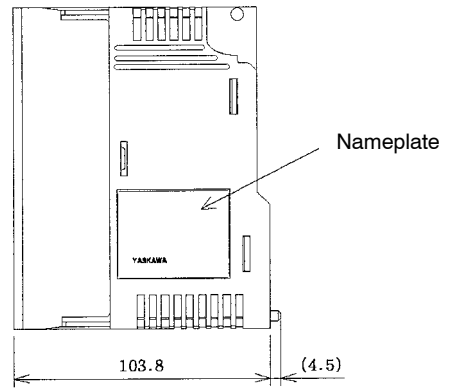
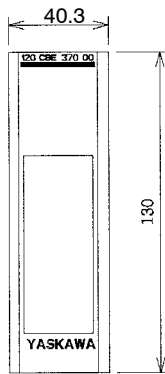
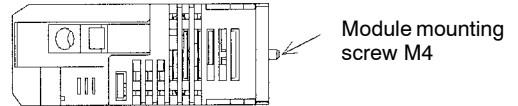


B

B.7 Other Modules

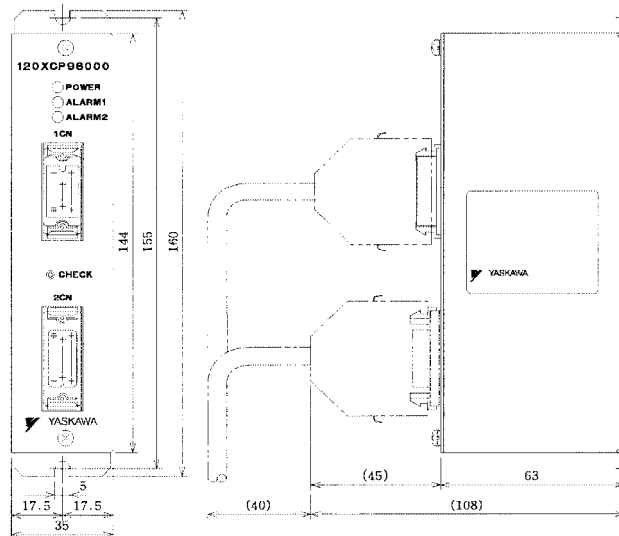
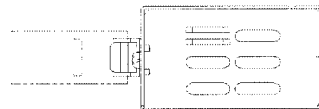
1) Expander Module Model No. JAMSC-120CBE37000

Unit: mm
Approx. mass: 200 g

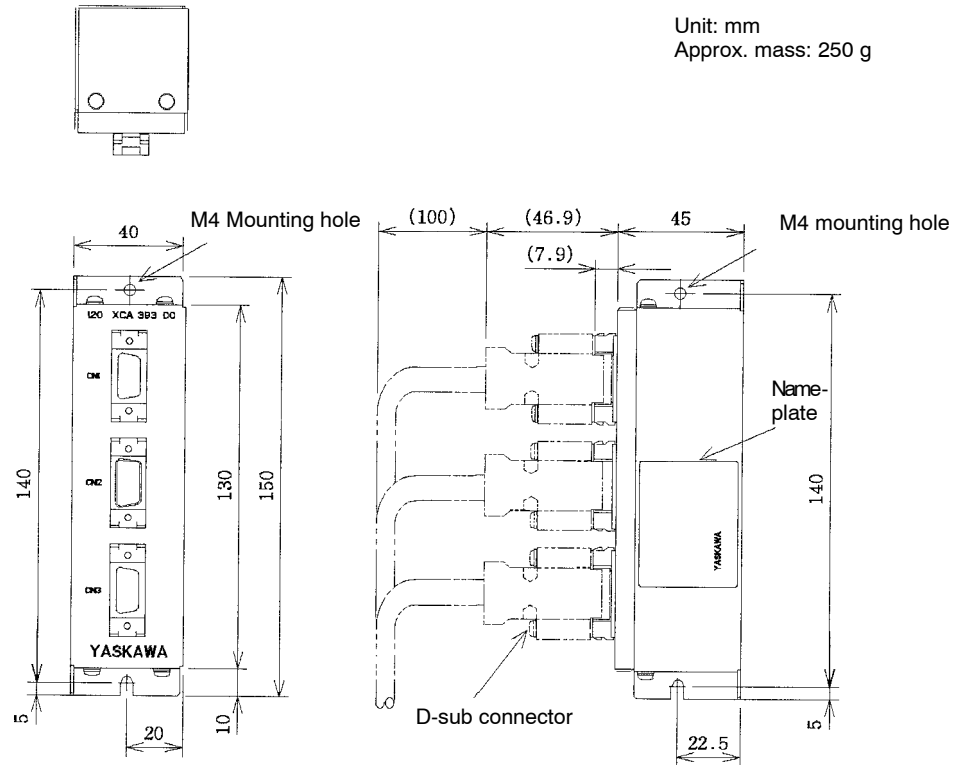


2) Battery Module Model No. JRMS-120XCP96000

Unit: mm
Approx. mass: 500 g

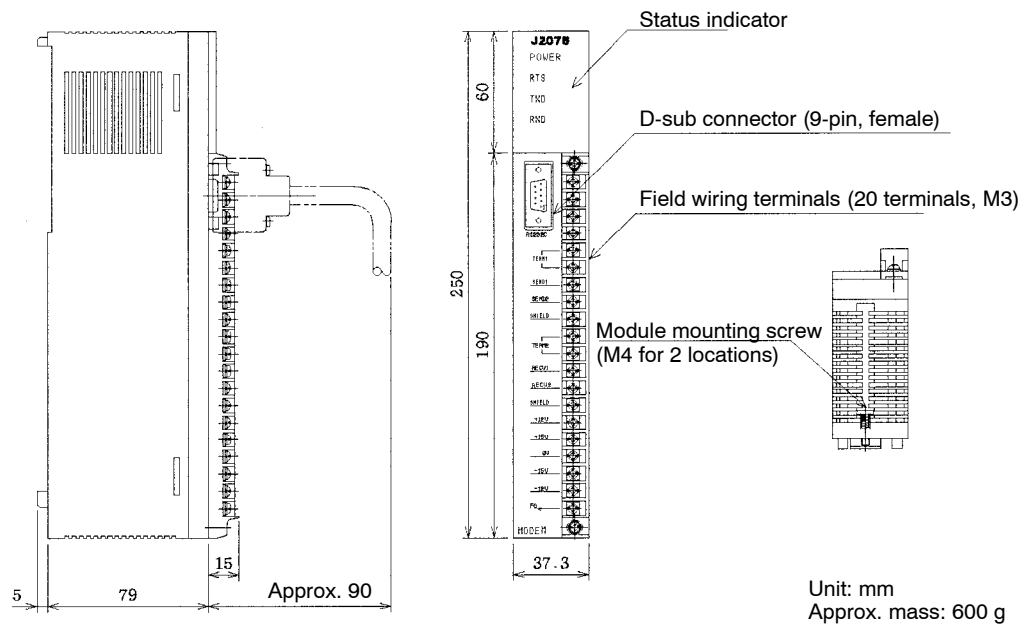


3) MEMOBUS PLUS Hub Module Model No. JAMSC-120XCA39300



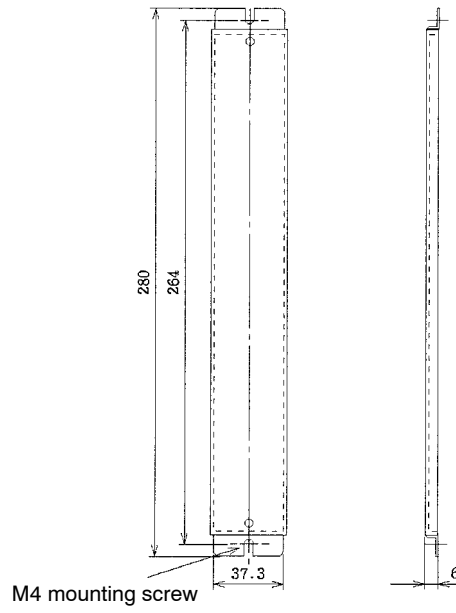
B

4) 2000-Series Modem Module Model No. DISCT-J2078



5) 2000-Series Modem Module Mounting Bracket

Model No. DF8305869

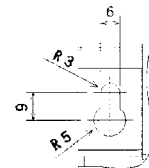
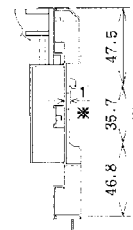
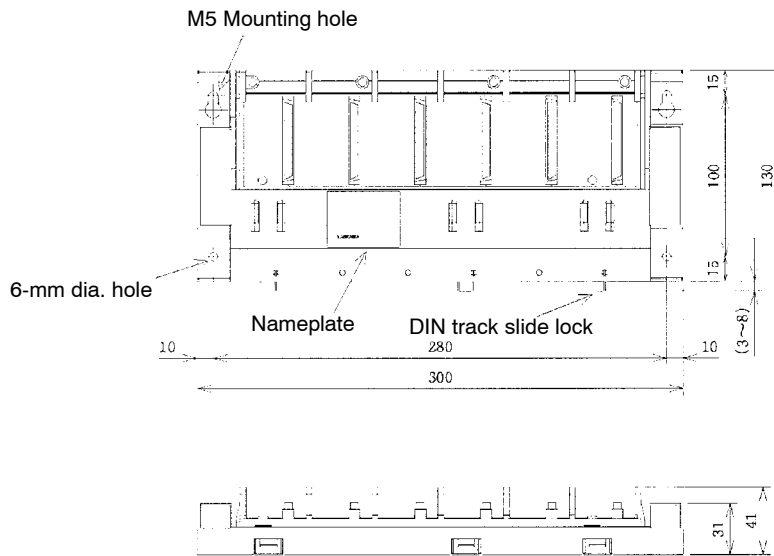


Unit: mm
Approx. mass: 150 g

B

B.8 Mounting Bases

1) 6-slot Mounting Base Model No. JRMSI-120XBP00600

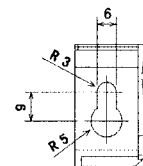
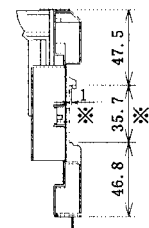
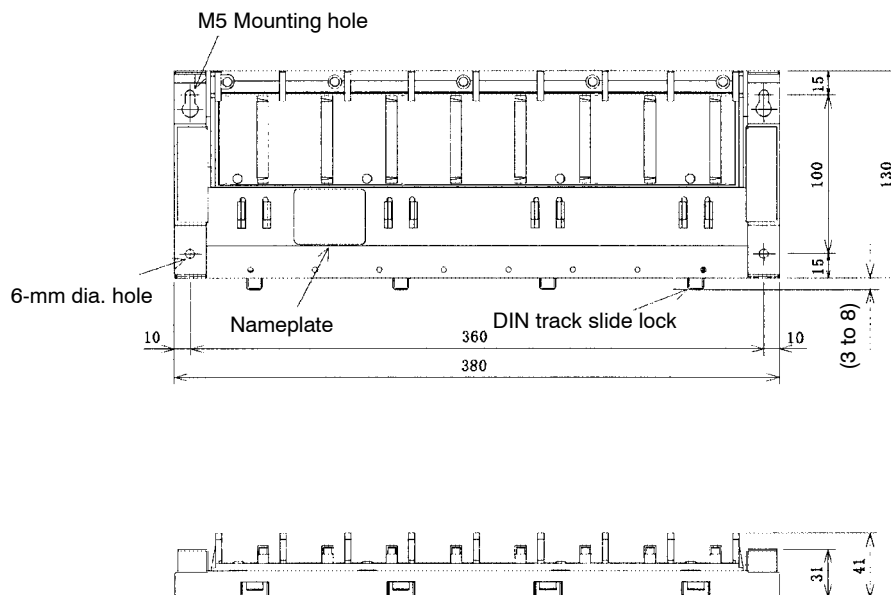


Details of M5 mounting hole

Note Dimension marked with asterisks (*) are DIN track mounting dimensions. Refer to 6) *DIN Track Mounting Dimensions* later in this section.

Unit: mm
Approx. mass: 600 g

2) 8-slot Mounting Base Model No. JRMSI-120XBP00800



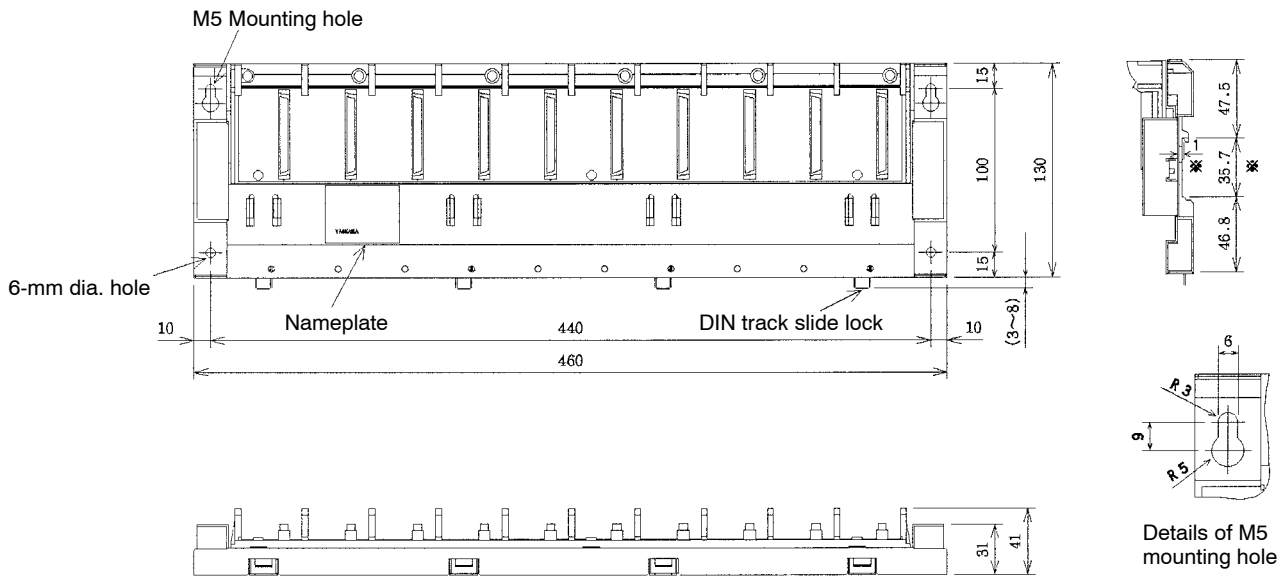
Details of M5 mounting hole

Note Dimension marked with asterisks (*) are DIN track mounting dimensions. Refer to 6) *DIN Track Mounting Dimensions* later in this section.

Unit: mm
Approx. mass: 800 g

B

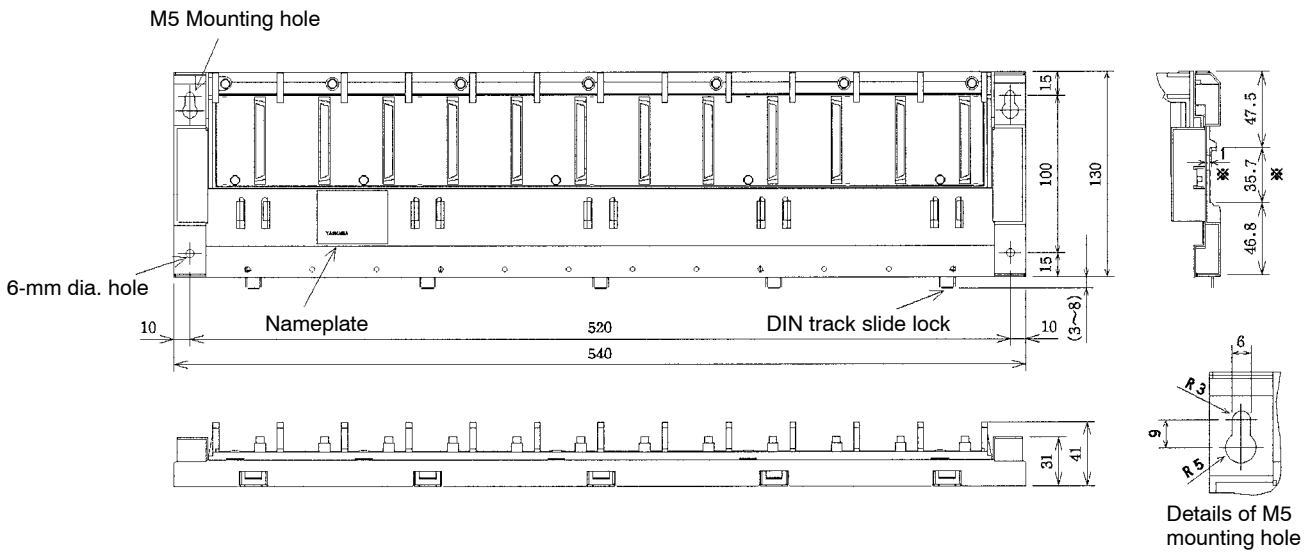
3) 10-slot Mounting Base Model No. JRMSI-120XBP01000



Note Dimension marked with asterisks (*) are DIN track mounting dimensions. Refer to 6) *DIN Track Mounting Dimensions* later in this section.

Unit: mm
Approx. mass: 900 g

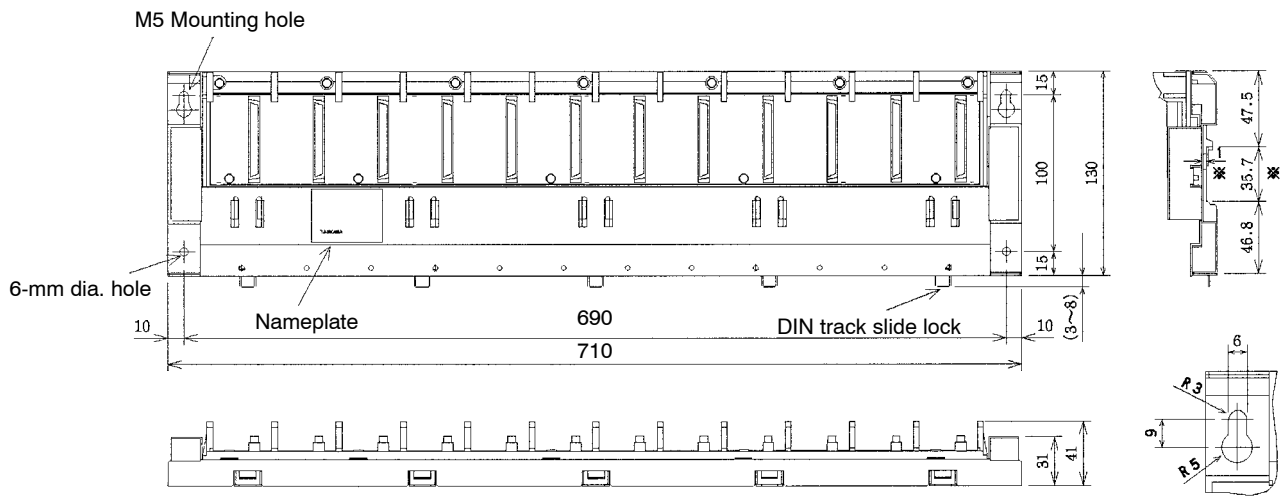
4) 12-slot Mounting Base Model No. JRMSI-120XBP01200



Note Dimension marked with asterisks (*) are DIN track mounting dimensions. Refer to 6) *DIN Track Mounting Dimensions* later in this section.

Unit: mm
Approx. mass: 1110 g

5) 16-slot Mounting Base Model No. JRMSI-120XBP01600

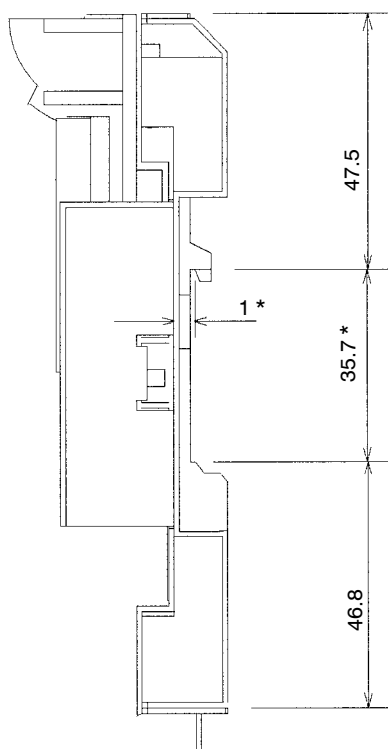


Note Dimension marked with asterisks (*) are DIN track mounting dimensions. Refer to 6) *DIN Track Mounting Dimensions* later in this section.

Unit: mm
Approx. mass: 1500 g

6) DIN Track Mounting Dimensions

The mounting dimensions of DIN track are shown below, indicated with asterisks (*).



B.9 Cables

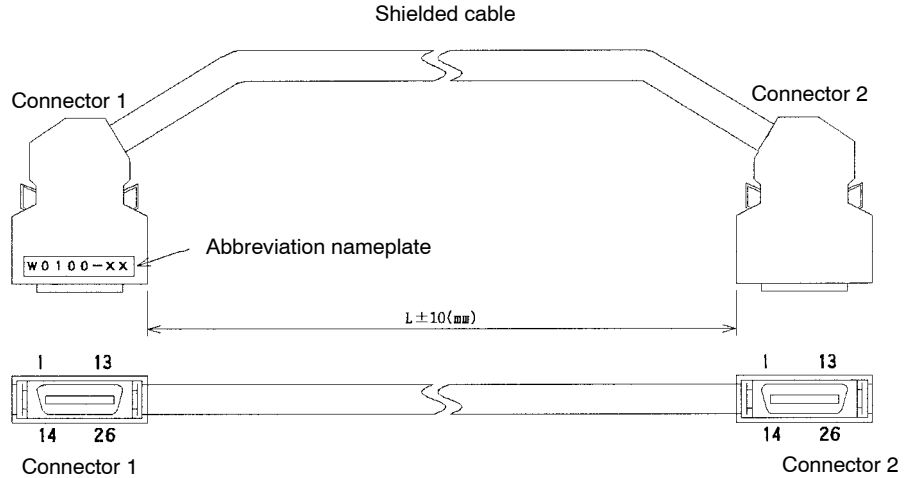
1) Rack-to-rack I/O Cables

Model No. JZMSZ-120W0100-02

Model No. JZMSZ-120W0100-05

Model No. JZMSZ-120W0100-10

Model No. JZMSZ-120W0100-50



Item	Specifications			
	W0100-02	W0100-05	W0100-10	W0100-50
Model Name	W0100-02	W0100-05	W0100-10	W0100-50
Model Number	JZMSZ-120W0100-02	JZMSZ-120W0100-05	JZMSZ-120W0100-10	JZMSZ-120W0100-50
Length L	0.2 m	0.5 m	1.0 m	5.0 m
Approximate Mass	Approx. 80 g	Approx. 100 g	Approx. 150 g	Approx. 450 g
Cable	Shielded, 26-core, equivalent to UL20276 0.08 mm ² (AWG28)			
Connector	10126-6000EL + 10326-A500-00 (3M) Specifications are the same for connectors 1 and 2.			

2) Other Cables

Refer to the *Related Manuals* shown in the following list for external dimensions of cables other than I/O Cables for rack-to-rack connection.

Name	Model Name	Model No.	Related Manual
32-point I/O Module Cables	W0300 Cable	JZMSZ-120W0300-□□	MEMOCON GL120, GL130 120-series I/O Module User's Manual
	W0301 Cable	JZMSZ-120W0301-□□	
	W0302 Cable	JZMSZ-120W0302-□□	
64-point I/O Module Cables	W5410 Cable	JEPMC-W5410-□□	MEMOCON GL120, GL130 120-series I/O Module User's Manual
Motion Module I/O Cables	W0400 Cable	JZMSZ-120W0400-□□	MEMOCON GL120, GL130 Motion Module MC20 Hardware User's Manual
	W0401 Cable	JZMSZ-120W0401-□□	
	W0402 Cable	JZMSZ-120W0402-□□	
Servo Cables	W0500 Cable	JZMSZ-120W0500-□□	MEMOCON GL120, GL130 Motion Module MC20 Hardware User's Manual
	W0501 Cable	JZMSZ-120W0501-□□	
	W0502 Cable	JZMSZ-120W0502-□□	
	W0503 Cable	JZMSZ-120W0503-□□	
	W0504 Cable	JZMSZ-120W0504-□□	
	W0505 Cable	JZMSZ-120W0505-□□	
Teach Pendant Cables	W0600 Cable	JZMSZ-120W0600-□□	MEMOCON GL120, GL130 Teach Pendant TB120 for Motion Module MC20 User's Manual
	W0601 Cable	JZMSZ-120W0601-□□	
	W0602 Cable	JZMSZ-120W0602-□□	
MEMOBUS Cables	W0200 Cable	JZMSZ-120W0200-□□	MEMOCON GL120, GL130 MEMOBUS User's Manual
	W0201 Cable	JZMSZ-120W0201-□□	
	W0202 Cable	JZMSZ-120W0202-□□	
	W0203 Cable	JZMSZ-120W0203-□□	
	W0204 Cable	JZMSZ-120W0204-□□	
	W0205 Cable	JZMSZ-120W0205-□□	
	W0206 Cable	JZMSZ-120W0206-□□	
	W0207 Cable	JZMSZ-120W0207-□□	
	W0208 Cable	JZMSZ-120W0208-□□	
	W0220 Cable	JZMSZ-120W0220-□□	
	W0221 Cable	JZMSZ-120W0221-□□	
	W0222 Cable	JZMSZ-120W0222-□□	
	W0240 Cable	JZMSZ-120W0240-□□	
	W0241 Cable	JZMSZ-120W0241-□□	
	W0260 Cable	JZMSZ-120W0260-□□	
MEMOBUS PLUS Cables	W0800 Cable	JZMSZ-120W0800-□□	MEMOCON GL120, GL130 MEMOBUS PLUS User's Manual
	W0801 Cable	JZMSZ-120W0801-□□	
	W0802 Cable	JZMSZ-120W0802-□□	
	W0803 Cable	JZMSZ-120W0803-□□	
Coaxial Cables	W60 Cable	JZMSZ-W60-□	MEMOCON GL120, GL130 Coaxial Remote I/O System User's Manual
	W61 Cable	JZMSZ-W61-□	
	W1000 Cable	JZMSZ-120W1000-□	

INDEX

Numbers

- 200 m mode, 4-163, 4-164, 4-173
- 2000 series Modem Module, 3-12
- 2000-series Modem Module
 - dimensions, B-17
 - grounding, 5-73
 - installing, 5-21
 - mounting depth, 5-15
 - wiring, 5-70
- 2000-Series Remote I/O Driver Module, mounting depth, 5-14
- 32-point I/O Module Cables, 3-13
 - W0300, 5-63
 - W0301, 5-64
- 32-point Input Module, 3-8
- 32-point Output Module, 3-9
- 3-wire cable, 4-189
- 500-m mode, 4-173
- 5-wire cable, 4-189
- 64-point I/O Module Cables, 3-13
- 64-point Input Module, 3-8
- 64-point Output Module, 3-9

A

- ACTIVE, 4-166
- AD-120, 4-171
- address unit, 4-171
- Ambient Operating Temperature, 4-3
- Analog Input Modules. *See* I/O Modules
- Analog Output Module, grounding, 5-72
- Analog Output Modules. *See* I/O Modules
- approximate mass, 4-168
- automatic RUN operation, 4-73

B

- Battery, 3-22
- Battery Backup
 - Four-axis Motion Module, 4-249
 - One-axis Motion Module, 4-260
 - Two-axis Motion Module, 4-269

- Battery Module, 3-12
 - dimensions, B-16
 - in Four-axis Motion Module, 4-249
 - in One-axis Motion Module, 4-260
 - in Two-axis Motion Module, 4-269
 - installing, 5-21
 - mounting depth, 5-15
- baud rate, 4-169
- Branching Unit, 4-172
- bridge mode, 4-73, 4-81

C

- Coaxial Cables, 3-18
- color code, 4-166
- communications method, 4-169
- Communications Modules
 - dimensions, B-5
 - installing, 5-39
 - models, 4-100
- communications specifications, 4-169
- Connector Terminal Block, 5-65
- control panel
 - cooling, 5-2
 - designing, 5-2
 - structure, 5-2
- Conversion Adapter, 3-22
- Counter Modules, mounting depth, 5-12
- CPU Modules, 4-24
 - appearance
 - CPU10, 4-29
 - CPU20, 4-24
 - CPU21, 4-28
 - CPU30, 4-26
 - CPU35, 4-27
 - built-in battery, 4-78, 4-99
 - dimensions, B-3
 - functions, 4-30
 - installing, 5-25
 - models, 4-30
 - mounting depth, 5-12
 - node address settings, 4-78
 - specifications
 - CPU10, 4-59
 - CPU20, 4-35
 - CPU21, 4-53
 - CPU30, 4-41
 - CPU35, 4-47
 - specifications summary, 2-5

INDEX

Usage

- DIP Switch, 4-73, 4-94
- installation location, 4-65
- Key Switch, 4-71
- MEMOBUS PLUS Port, 4-68
- MEMOBUS Port, 4-66, 4-89
- Rotary Switches, 4-77
- wiring, 5-68

CRC errors, 4-189

D

Digital Input Modules. *See* I/O Modules

Digital Output Modules. *See* I/O Modules

DIN Track, installing Mounting Bases, 5-17

DIN track, dimensions, B-21

DIN track installations, 5-16

DIP switch, 4-164, 4-166, 4-173, 4-175, 4-195
an example of setting the DIP switch, 4-173
function, 4-173

Distributed I/O Driver Module, 4-175

- appearance, 4-175
- dimensions, B-7
- function, 4-176
- grounding, 5-70
- MECHATROLINK port, 4-179
- panel wiring, 5-68
- specifications, 4-176
- system configuration, 4-179
- Usage, 4-177
 - DIP Switch, 4-180
 - installation location, 4-178
 - number of Modules, 4-177
 - related manuals, 4-182
 - Reset Switch, 4-181

drop lines, 4-189

- total length (max.), 4-189

duplicate node address check, 4-189

E

ED-120, 4-171

electrical noise, preventing, 5-3

electrical ports, 4-209

- specifications, 4-210, 4-211

end unit, 4-171

ERR1, 4-166

ERR2, 4-166

ERR3, 4-166

error display, 4-175

Ethernet Interface Module, 4-199

- appearance, 4-199
- dimensions, B-9
- function, 4-200
- specifications, 4-201
- Usage, 4-202

- DIP Switch, 4-206
- installation location, 4-202
- number of Modules, 4-202
- related manuals, 4-208
- Reset Switch, 4-207

Expander Module, 3-12, 4-277

- appearance, 4-277
- dimensions, B-16
- function, 4-277
- installing, 5-25
- mounting depth, 5-12
- specifications, 4-278
- usage, 4-278
 - installation location, 4-278
 - number of modules, 4-278
 - Rack number setting switch, 4-280
 - Rack-to-rack I/O cable connectors, 4-279

external connections, 4-168

external dimensions, 4-168

external power supply, 4-168

external wiring, 5-80

external wiring terminals, 4-166

F

FA Monitor, 3-19

Four-axis Motion Module, 4-246

- appearance, 4-246
- dimensions, B-14
- function, 4-247
- mounting depth, 5-14
- specifications, 4-247
- usage, 4-254
 - example system configuration, 4-254
 - installation location, 4-254
 - number of Modules, 4-254
 - related manuals, 4-256
 - servo amplifiers, 4-256
- wiring, 5-69

G

general specifications, 4-3

GL120, GL130

- main Modules, 2-3
- Overview, 2-2
- system configurations, 2-8

grounding, 5-70

- summary of grounding methods, 5-70

H

- H-System, example of H-System configuration, 4-172
- hardware specifications, 4-168
- HB-4, 4-172
- heating value, 4-176
- High-speed Counter Module, 4-233
 - appearance, 4-233
 - dimensions, B-13
 - functions, 4-234
 - grounding, 5-73
 - installing, 5-22
 - specifications, 4-234
 - usage, 4-237
 - example system configuration, 4-238
 - installation location, 4-237
 - number of Modules, 4-237
 - related manuals, 4-238
 - wiring, 5-69
- hot swapping, 4-168, 4-189, 5-76

I

- I/O Modules, 4-218
 - appearance
 - connector type, 4-222
 - terminal-block type, 4-220
 - available models, 4-218
 - connector type, installing, 5-20
 - dimensions, B-10
 - external wiring, 5-80
 - function and specifications
 - Analog Input Modules, 4-218, 4-225
 - Analog Output Modules, 4-220, 4-228
 - Digital Input Modules, 4-218, 4-223
 - Digital Output Modules, 4-219, 4-226
 - grounding, 5-70, 5-72
 - I/O signal cables, 5-61
 - panel wiring, 5-55
 - power supply specifications, 5-55
 - protective fuse, 5-67
 - terminal-block type, installing, 5-29
 - usage, 4-229
 - mounting location, 4-229
 - related manuals, 4-230
 - wiring, 5-69
- I/O Modules conforming to the Low Directives, 6-11
 - appearance, 6-12
 - EN Standard, 6-14
 - models, 6-11
 - specifications, 6-16
- I/O Modules with Terminal Blocks 32-point I/O Modules, mounting depth, 5-12
- ID bits, 4-169

- indication when ON, 4-166
- indicators
 - area, 4-188
 - color, 4-188
 - meaning when ON, 4-188
 - names, 4-188
- input units, 4-171, 4-172
- installation locations, 4-170
- Installation the Modules
 - Communications Modules, 5-39
 - Connector for Field Connections Module, 5-35
 - CPU and the Power Supply Module, 5-25
 - Installing the Terminal Block for Field Connection Module, 5-29
 - Motion Module, 5-44
- internal current consumption, 4-168, 4-176, 4-211

L

- LED, 4-166, 4-175
- LED area, 4-166
- LED indicators, 4-209

M

- M-Net Module, 4-182
 - appearance, 4-182
 - dimensions, B-8
 - function, 4-183
 - grounding, 5-72
 - mounting depth, 5-14
 - specifications, 4-183
 - Usage, 4-184
 - related manuals, 4-187
 - usage, installation locations, 4-185
- mass, 4-176
- Maximum Heating Value, 5-7
- maximum heating value, 4-168
- Maximum Heating Value by Modules, 5-7
- maximum network line length, 4-189
- maximum number of allocated points, 4-169
- maximum number of transmission points, 4-169
- MECHATROLINK port, 4-175
- MEMOBUS Module, installing, 5-21
- MEMOBUS Modules
 - dimensions, B-6
 - grounding, 5-71
 - installing, 5-20
 - mounting depth, 5-12
 - wiring, 5-68

INDEX

MEMOBUS Modules (RS-232), 4-127
 appearance, 4-127
 functions, 4-128
 specifications, 4-128
 Usage, 4-129
 DIP Switch, 4-132
 installation location, 4-129
 MEMOBUS Ports, 4-129
 number of Modules, 4-129
 related manuals, 4-134
 Reset Switch, 4-134

MEMOBUS Modules (RS-422), 4-135
 appearance, 4-135
 functions, 4-136
 specifications, 4-137
 Usage, 4-137
 DIP Switch, 4-143
 installation location, 4-137
 MEMOBUS Ports, 4-138
 number of Modules, 4-137
 related manuals, 4-146
 Reset Switch, 4-146

MEMOBUS PLUS Cables, 3-17

MEMOBUS PLUS Hub Module, 3-12
 dimensions, B-17
 example application
 bridge mode, 4-76, 4-84
 IBM PC/AT, 4-70
 P120CN, 4-69
 installing, 5-21
 mounting depth, 5-15
 wiring, 5-70

MEMOCON GL120, GL130
 main Modules, 2-3
 Overview, 2-2
 system configurations, 2-8

Memory Protection, 4-72

MEMOSOFT, 3-20
 model, 4-189
 model name, 4-168
 model no., 4-168

Models of Motion Modules, 4-245
 module appearance, 4-166
 module description, 4-166
 module mounting depths, 5-14
 module mounting screw, 4-166
 module number setting, 4-264

Motion Module I/O Cables, 3-13, B-23

Motion Modules
 dimensions, B-14
 Four-axis Motion Module, 4-246
 installing, 5-24
 models, 4-245
 One-axis Motion Module, 4-257

Two-axis Motion Module, 4-265

Mounting Base, 4-296
 appearance
 MB06, 4-296
 MB08, 4-296
 MB10, 4-296
 MB12, 4-297
 MB16, 4-297
 application, 4-298
 dimensions, B-19
 installing, 5-16
 layout, 5-8
 models and specifications, 4-298
 usage
 connections, 4-298
 mounting position, 4-299
 number of Bases, 4-298

mounting depths, 5-14

mounting location, 4-168

multi-drop, 4-189

N

name, 4-168, 4-189

network lines, 4-189

node address settings, 4-78

noise, preventing electrical noise, 5-3

Normal System, example of Normal System configuration, 4-171

number of modules, 4-170

O

One-axis Motion Module, 4-257
 appearance, 4-257
 dimensions, B-14
 function, 4-258
 mounting depth, 5-14
 specifications, 4-258
 usage, 4-261
 example system configuration, 4-262
 installation locations, 4-262
 number of Modules, 4-261
 related manuals, 4-265
 Rotary Switches, 4-264
 servo amplifiers, 4-263
 wiring, 5-69

optical ports, 4-209
 specifications, 4-212

Optical/Electrical Conversion Module, 4-209
 appearance, 4-209
 dimensions, B-9
 function, 4-210
 mounting depth, 5-14
 specifications, 4-210

INDEX

Usage, 4-213
 DIP Switch, 4-217
 related manuals, 4-217
output units, 4-171

P

panel wiring, 5-51
PC Link Module, 4-147
 appearance, 4-147
 dimensions, B-6
 function, 4-148
 grounding, 5-71
 installing, 5-20, 5-21
 mounting depth, 5-14
 specifications, 4-148
 Usage, 4-150
 DIP Switch, 4-155
 installation location, 4-150
 MEMOBUS Port, 4-152
 number of Modules, 4-150
 PC Link Port, 4-150
 related manuals, 4-158
 Reset Switch, 4-158
 Rotary Switch, 4-157
 wiring, 5-68
Power Supply Modules
 grounding, 5-70
 wiring, 5-51
Power Supply Module conforming to the Low Voltage Directives,
 6-2
Power Supply Modules, 4-4
 appearance
 PS05, 4-6
 PS06, 4-8
 PS10, 4-4
 PS11, 4-7
 dimensions, B-2
 functions, 4-9
 installing, 5-12
 models, 4-9
 mounting depth, 5-12
 selecting, 4-14
 specifications
 PS05, 4-11
 PS06, 4-13
 PS10, 4-10
 PS11, 4-12
 Usage, 4-18
 built-in fuse, 4-23
 field wiring terminals, 4-19
 filter ground terminal (ACG), 4-23
 ground terminal (FG), 4-21
 Input Voltage Selector Switch, 4-19
 installation location, 4-18
 number of Modules, 4-18
Power Supply Modules conforming to the Low Directives
 appearance, 6-3

 built-in fuse, 6-10
 functional earth terminal, 6-9
 functions and specifications, 6-5
 grounding control panel, 6-9
 input voltage selector switch, 6-7
 installation location, 6-6
 models, 6-2
 number of modules, 6-6
 using, 6-6
power supply systems, separating power systems, 5-51
Power Terminal, 4-171, 4-172
protocol, 4-169
Pulse Catch Module, 4-239
 appearance, 4-239
 dimensions, B-13
 functions, 4-240
 mounting depth, 5-14
 specifications, 4-241
 usage, 4-243
 example system configuration, 4-244
 installation location, 4-243
 number of Modules, 4-243
 related manuals, 4-244

R

rack number setting, Expander Module, 4-281
Rack-to-rack I/O Cables, connecting, 5-49
Rack-to-rack I/O Cables, 4-300
 appearance, 4-300
 applications, 4-300
 dimensions and specifications, B-22
 models and specifications, 4-300
recheck verification, 4-177
rechecking, 4-169
refresh time, 4-169, 4-177
RELAY-16P, 6-20
Remote I/O Driver Module, 4-105, 4-121
 appearance, 4-105
 dimensions, B-5
 function, 4-106
 grounding, 5-71
 installing, 5-21
 mounting depth, 5-14
 specifications, 4-106
 Usage, 4-107
 DIP Switch, 4-109
 installation location, 4-107
 number of Units, 4-107
 related manuals, 4-110
 Remote I/O Port, 4-107
 wiring, 5-68
Remote I/O Driver Module for 2000 I/O
 appearance, 4-121
 function, 4-122
 specifications, 4-122

INDEX

Usage, 4-123
 DIP Switch, 4-125
 installation location, 4-123
 number of Units, 4-123
 related manuals, 4-126
 Remote I/O Port, 4-123

Remote I/O Receiver Module, 4-111
 appearance, 4-111
 dimensions, B-5
 function, 4-112
 grounding, 5-71
 installing, 5-21
 mounting depth, 5-14
 specifications, 4-112
 Usage, 4-113
 DIP Switch, 4-117
 installation location, 4-113
 MEMOBUS Port, 4-115
 number of Modules, 4-113
 related manuals, 4-120
 Remote I/O Port, 4-113
 Reset Switch, 4-120
 Rotary Switches, 4-119
 wiring, 5-68

reset switch, 4-166, 4-174, 4-175, 4-188

RUN Operation function, 4-72

S

Sensor Terminal, 4-171, 4-172

servo amplifiers
 for Four-axis Motion Module, 4-256
 for One-axis Motion Module, 4-263
 for Two-axis Motion Module, 4-274

Servo Cables, 3-14

Special Purpose Modules, 4-231
 dimensions, B-13
 models, 4-231

specifications, general specifications, 4-3

SPEED, 4-173

Start Mode, 4-77, 4-85, 4-98

station address settings
 PC Link Module, 4-157
 Remote I/O Receiver Module, 4-119

stations, 4-169

synchronization method, 4-169

system components summary, 3-2

T

T-adapter, 3-22

T-branch (1:N), 4-189

Teach Pendant, 3-19

Teach Pendant Cables, 3-15

temperature
 allowable temperature range, 5-2
 operating temperature, 4-3

Terminator, 3-22

Terminators, 4-211

total drop line length, 4-189

transmission distance, 4-169

transmission medium, 4-169

Two-axis Motion Module, 4-265
 appearance, 4-265
 dimensions, B-15
 function, 4-266
 mounting depth, 5-14
 specifications, 4-266
 usage, 4-271
 example system configuration, 4-273
 installation locations, 4-272
 number of Modules, 4-271
 related manuals, 4-276
 servo amplifiers, 4-274

U

Uniwire H-system Interface Module, 4-166
 appearance, 4-166
 dimensions, B-7
 function, 4-167
 grounding, 5-70
 installing, 5-21
 installing modules, 5-39
 panel wiring, 5-68
 specifications, 4-168
 using, 4-170
 DIP switch, 4-173
 installation locations, 4-170
 number of modules, 4-170
 related manuals, 4-174
 reset switch, 4-174
 system configuration, 4-171, 4-172
 uniwire system, 4-174

Uniwire Interface Module, 4-159
 appearance, 4-159
 dimensions, B-7
 function, 4-160
 grounding, 5-71
 installing, 5-21
 mounting depth, 5-12
 panel wiring, 5-68
 specifications, 4-160

INDEX

usage, 4-161

DIP Switch, 4-164

example system configuration, 4-163

installation locations, 4-162

number of modules, 4-161

rated manuals, 4-165

Reset Switch, 4-165

Uniwire System, 4-165

wiring, 5-68

W

wiring modules, 5-68

Y

YENET 1600-D Module, 4-188

appearance, 4-188

dimensions, B-8

function, 4-189

grounding, 5-72

mounting depth, 5-14

specifications, 4-189

Usage, 4-190

Communications Port, 4-192

DIP Switch, 4-195

installation location, 4-192

related manuals, 4-198

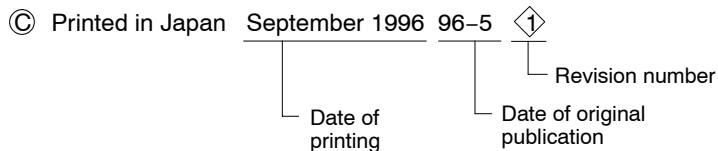
Reset Switch, 4-197

Rotary Switch, 4-196

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