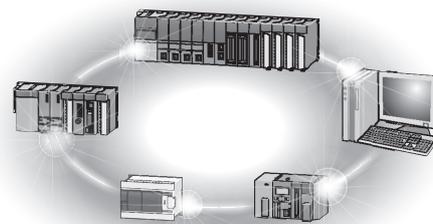# MITSUBISHI ELECTRIC

Digital-Analog Converter Module
User's Manual

-CL2DA2-B

CC-*Link*/*LT*

• SAFETY PRECAUTIONS •

(Read these precautions before using this product.)

Before using this product, please read this manual and the relevant manuals carefully and pay full attention to safety to handle the product correctly.

The precautions given in this manual are concerned with this product. Refer to the user's manual of the CPU module to use for a description of the programmable controller system safety precautions.

In this manual, the safety precautions are classified into two levels: "⚠ WARNING" and "⚠ CAUTION".

⚠ WARNING	Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.
⚠ CAUTION	Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

Under some circumstances, failure to observe the precautions given under "⚠ CAUTION" may lead to serious consequences.

Make sure that the end users read this manual and then keep the manual in a safe place for future reference.

[Design Precautions]

⚠ WARNING

• When there are communication problems with the data link, the data for the master module will be held.
Configure an interlocking circuit in a sequence program so that the safety of the overall system is always maintained.
Otherwise, erroneous output and malfunction may result in accidents.

⚠ CAUTION

• Do not bunch the control wires or communication cables with the main circuit or power wires, and do not install them close to each other.
Keep a distance of 100mm (3.9inch) or more from each other.
Not doing so could result in noise that would cause erroneous operation.
• At power ON/OFF, voltage or current may instantaneously be output from the output terminal of this module.
In such case, wait until the analog output becomes stable to start controlling the external device.

[Installation Precautions]

⚠ CAUTION

- Use the programmable controller in the environment that meets the general specifications contained in this manual.
  Using the programmable controller outside the range of the general specifications may result in electric shock, fire or malfunction, or may damage or degrade the module.
- Do not directly touch any conductive part of the module.
  Doing so can cause malfunction or failure of the module.
- Securely fix the module to a DIN rail or with mounting screws, and securely tighten the mounting screws within the specified torque range.
  Undertightening can cause a drop or malfunction.
  Overtightening can cause a drop or malfunction due to damage of the screws or module.

[Wiring Precautions]

⚠ WARNING

- Shut off the external power supply for the system in all phases before wiring. Failure to do so may result in electric shock or damage to the product.

⚠ CAUTION

- Terminal screws which are not to be used must be tightened always.
  Otherwise there will be a danger of short circuit against the bare solderless terminals.
- Wire the module correctly after confirming the rated voltage and terminal layout of the product.
  Not doing so can cause a fire or failure.
- Tighten the terminal screws within the specified torque range.
  Undertightening can cause a short circuit or malfunction.
  Overtightening can cause a short circuit or malfunction due to damage of the screws or module.
- Ensure that no foreign matter such as chips and wire-offcuts enter the module.
  Foreign matter can cause a fire, failure or malfunction.

- Do not install the control lines or communication cables together with the main circuit lines or power cables. Failure to do so may result in malfunction due to noise.

[Starting and Maintenance Precautions]

⚠ WARNING

- Do not touch the terminals while power is on.
  Doing so may cause malfunctioning.
- Be sure to shut off all phases of the external power supply used by the system before cleaning
  or retightening the terminal screws.
  Not doing so can cause the module to fail or malfunction.

⚠ CAUTION

- Never disassemble or modify the module.
  This may cause breakdowns, malfunctioning, injury and/or fire.
- Do not drop or apply strong shock to the module. Doing so may damage the module.
- Be sure to shut off all phases of the external power supply used by the system before mounting
  or dismounting the module to or from the panel.
  Not doing so can cause the module to fail or malfunction.
- Before handling the module, always touch grounded metal, etc. to discharge static electricity
  from the human body.
  Failure to do so can cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION

- When disposing of this product, treat it as industrial waste.

• CONDITIONS OF USE FOR THE PRODUCT •

(1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;

　　i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and

　　ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.

(2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

　　MITSUBISHI SHALL HAVE NO RESPONSIBILITY OR LIABILITY (INCLUDING, BUT NOT LIMITED TO ANY AND ALL RESPONSIBILITY OR LIABILITY BASED ON CONTRACT, WARRANTY, TORT, PRODUCT LIABILITY) FOR ANY INJURY OR DEATH TO PERSONS OR LOSS OR DAMAGE TO PROPERTY CAUSED BY the PRODUCT THAT ARE OPERATED OR USED IN APPLICATION NOT INTENDED OR EXCLUDED BY INSTRUCTIONS, PRECAUTIONS, OR WARNING CONTAINED IN MITSUBISHI'S USER, INSTRUCTION AND/OR SAFETY MANUALS, TECHNICAL BULLETINS AND GUIDELINES FOR the PRODUCT.

　　("Prohibited Application")

　　Prohibited Applications include, but not limited to, the use of the PRODUCT in;

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.

- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.

- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

　　Notwithstanding the above, restrictions Mitsubishi may in its sole discretion, authorize use of the PRODUCT in one or more of the Prohibited Applications, provided that the usage of the PRODUCT is limited only for the specific applications agreed to by Mitsubishi and provided further that no special quality assurance or fail-safe, redundant or other safety features which exceed the general specifications of the PRODUCTs are required. For details, please contact the Mitsubishi representative in your region.

REVISIONS

* The manual number is given on the bottom left of the back cover.

Print Date	* Manual Number	Revision
Jan., 2005	SH(NA)-080418E-A	First edition
Nov., 2010	SH(NA)-080418E-B	Correction "PLC" was changed to "programmable controller", SAFETY PRECAUTIONS, Compliance with the EMC and the Low Voltage Directives, About the Generic Terms and Abbreviations, Section 2.2, 3.1, 3.2, 4.2, 4.7.2 Addition CONDITIONS OF USE FOR THE PRODUCT
Oct., 2014	SH(NA)-080418E-C	Correction About Manuals, Compliance with the EMC and the Low Voltage Directives, About the Generic Terms and Abbreviations, Section 2.2, 2.3, 3.1, 3.2, 3.5.1, 5.3.1, 5.3.3, 5.3.4, 6.1
Sep., 2015	SH(NA)-080418E-D	Correction Section 4.3

Japanese Manual Version SH-080416-D

INTRODUCTION

Thank you for purchasing the CC-Link/LT system remote module.
Before using the equipment, please read this manual carefully to develop full familiarity with the functions
and performance of the CC-Link/LT system remote module you have purchased, so as to ensure correct use.

CONTENTS

5. PROGRAMMING

6. TROUBLESHOOTING

APPENDIX

INDEX

About Manuals

The following manuals are related to this product.
Referring to this list, please request the necessary manuals.

Relevant Manuals

Manual Name	Manual Number (Model Code)
CC-Link/LT Master Module User's Manual QJ61CL12 Explains the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the QJ61CL12. (Sold separately)	SH-080351E (13JR62)
MELSEC-L CC-Link/LT Master Module User's Manual Explains the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the LJ61CL12. (Sold separately)	SH-081012ENG (13JZ65)
CC-Link - CC-Link/LT Bridge Module Type AJ65SBT-CLB User's Manual Explains the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the AJ65SBT-CLB. (Sold separately)	SH-080362E (13JR63)

Compliance with the EMC and the Low Voltage Directives

(1) Method of ensuring compliance
To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.
• User's manual for the CPU module or head module used
• Safety Guidelines
(This manual is included with the CPU module, base unit, or head module.)
The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures
To ensure that this product maintains EMC and Low Voltage Directives, please refer to one of the manuals listed under (1).

About the Generic Terms and Abbreviations

Unless otherwise specified, the following generic terms and abbreviations are used in this manual to describe Type CL2DA2-B digital-analog converter module.

Generic Term/Abbreviation	Description
CL2DA2-B	Abbreviation for type CL2DA2-B digital-analog converter module.
QJ61CL12	Abbreviation for type QJ61CL12 CC-Link/LT master module.
AJ65SBT-CLB	Abbreviation for type AJ65SBT-CLB CC-Link - CC-Link/LT bridge module.
CC-Link/LT master module	Generic term for QJ61CL12 and LJ61CL12 when they are used as a master station.
CC-Link master module	Generic term for modules that can be used as the master station.
Remote I/O station	Remote station that handles bit information only. (inputs/outputs data to/from external devices.)
Remote device station	Remote station that handles bit unit and word unit data only. (Performs input and output with external devices, and analog data exchange.)
Remote station	Generic term for remote I/O station and remote device station.
Remote I/O module	Remote module that handles bit unit data only. (Performs input and output with external devices.)
Remote device module	Remote module that handles bit unit and word unit data only. (Performs input and output with external devices, and analog data exchange.)
Remote module	Generic term for remote I/O module and remote device module.
QCPU (Q mode)	Generic term for Q00JCPU, Q00UJCPU, Q00CPU, Q00UCPU, Q01CPU, Q01UCPU, Q02CPU, Q02HCPU, Q02PHCPU, Q02UCPU, Q03UDCPU, Q03UDECPU, Q03UDVCPU, Q04UDHCPU, Q04UDEHCPU, Q04UDVCPU, Q06HCPU, Q06PHCPU, Q06UDHCPU, Q06UDEHCPU, Q06UDVCPU, Q10UDHCPU, Q10UDEHCPU, Q12HCPU, Q12PHCPU, Q12PRHCPU, Q13UDHCPU, Q13UDEHCPU, Q13UDVCPU, Q20UDHCPU, Q20UDEHCPU, Q25HCPU, Q25PHCPU, Q25PRHCPU, Q26UDHCPU, Q26UDEHCPU, Q26UDVCPU, Q50UDEHCPU, Q100UDEHCPU.
QCPU (A mode)	Generic term for Q02CPU-A, Q02HCPU-A, Q06HCPU-A.
LCPU	Generic term for L02SCPU, L02SCPU-P, L02CPU, L02CPU-P, L06CPU, L06CPU-P, L26CPU, L26CPU-P, L26CPU-BT, L26CPU-PBT.
GX Developer	Product name of the software package for the MELSEC programmable controllers.
GX Works2	
Dedicated power supply	Module connected for power supply to CC-Link/LT system.
Power supply adapter	At least one power supply adapter is required for a system.

Packing List

The following gives the packing list of the CL2DA2-B.

Product name	Quantity
CL2DA2-B	1

1 OVERVIEW

1

This user's manual explains the specifications, handling, programming methods and others of Type CL2DA2-B digital-analog converter module (hereafter abbreviated to the "CL2DA2-B") which is used as a remote device station of a CC-Link/LT system. The CL2DA2-B is a module designed to convert digital values (15-bit signed BIN data) into analog values (voltages or currents).

1.1 Features

This section gives the features of the CL2DA2-B.

(1) Smaller than CC-Link D/A converter module
Being the same size as the terminal block type CC-Link/LT remote I/O module (CL2X8-D1B2, CL2Y8-TP1B2), the CL2DA2-B is 55.7% less in volume than the CC-Link D/A converter module (AJ65SBT-62DA).

(2) Output range selectable per channel
You can choose the analog output range per channel to change the I/O conversion characteristics.

(3) Analog output hold/clear setting for communication cutoff
It can be specified whether the analog value output from each channel immediately before D/A conversion stops due to the cutoff of communication with the CC-Link/LT master module or AJ65SBT-CLB will be held or cleared.

(4) Number of occupied I/O points (number of occupied stations) changeable
The number of occupied I/O points (number of occupied stations) can be saved since it changes depending on the last conversion-enabled channel.
When only Channel 1 is enabled for conversion, the number of occupied I/O points is 16 points (one station occupied).

(5) Improved operability and maintainability
The station number setting switches, HOLD/CLEAR setting switch and analog output setting switches are placed on the module front to improve operability and maintainability.

(6) Simple dustproof shape for improved reliability
Without radiating fins, etc., the casing has a simple dustproof shape to prevent the ingress of wire cuttings, dust and others into the module, improving reliability.

(7) Six facing directions available for module installation
The CL2DA2-B can be installed in any of six different orientations using a DIN rail or module installation screws.
(There are no restrictions on the facing directions. refer to section 4.5.)

MEMO

2 SYSTEM CONFIGURATION

This chapter describes the system configuration for use of the CL2DA2-B.

2.1 Overall Configuration

The overall configuration for use of the CL2DA2-B is shown below.

(1) When connected to the CC-Link/LT master module

CC-Link/LT master module

Terminating resistor

Power supply adapter

General power supply

24V DC

Terminating resistor

Partner company's product

CC-Link/LT remote I/O module

CL2DA2-B

.
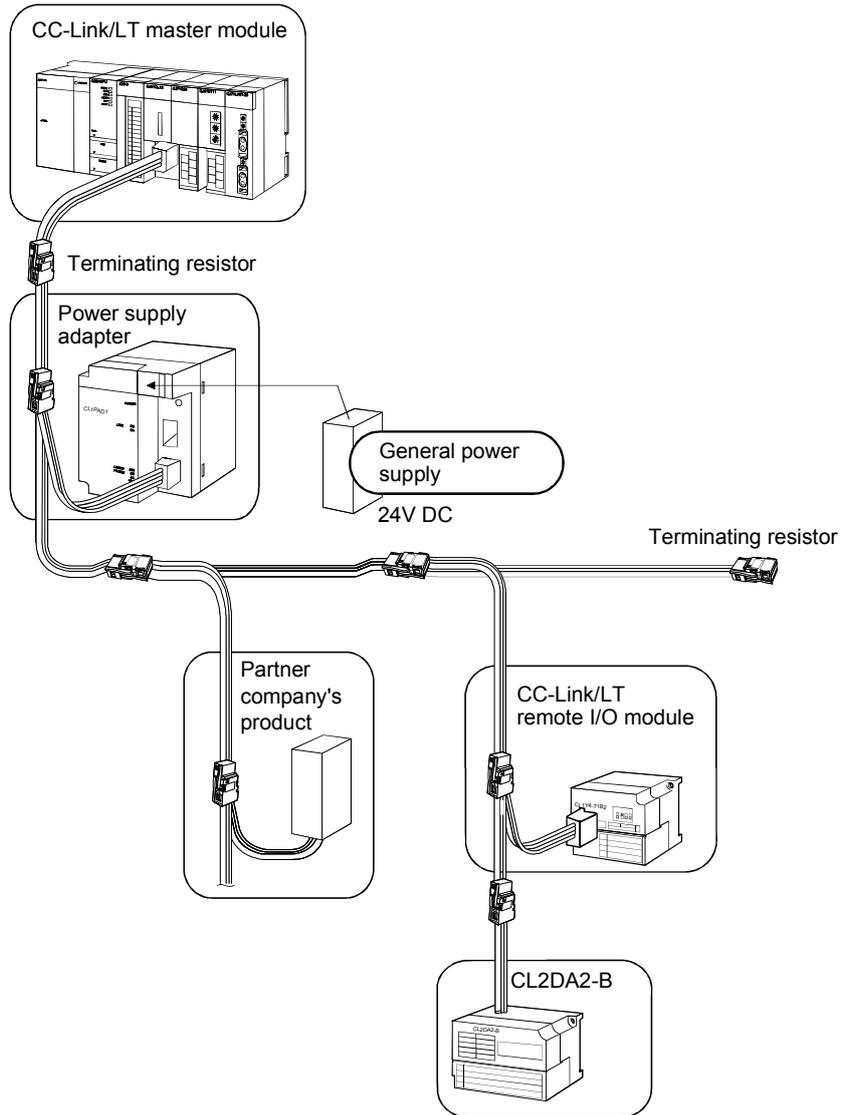
(2) When connected to the AJ65SBT-CLB

CC-Link master module

AJ65SBT-CLB

CC-Link remote I/O module

CC-Link remote I/O module

Terminating resistor

CC-Link side

CC-Link/LT side

General power supply

Power supply adapter

24V DC

Terminating resistor

Partner company's product

CC-Link/LT remote I/O module

CL2DA2-B
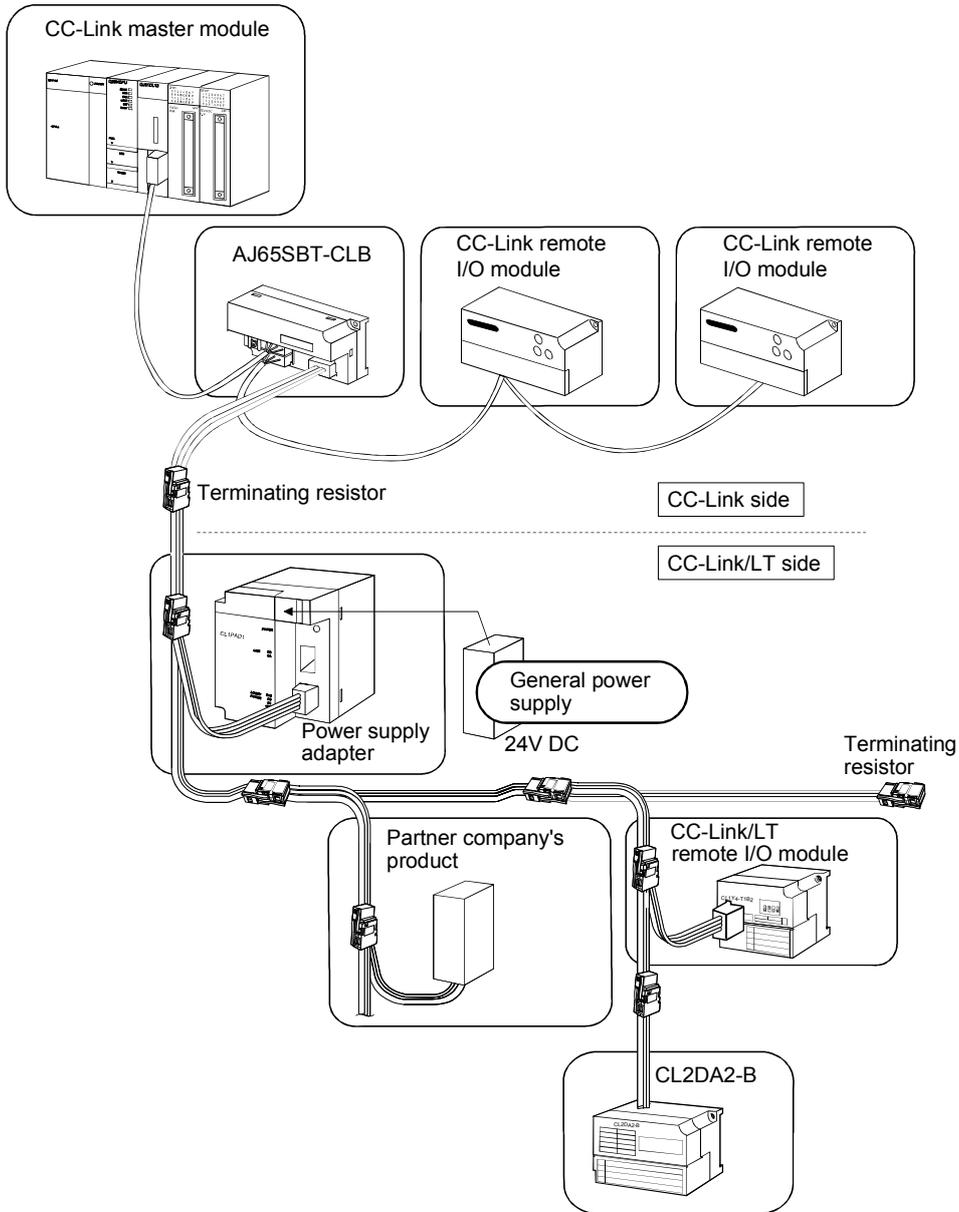
2.2 Applicable Module

For available master modules, visit the CC-Link Partner Association (CLPA) website at:

www.cc-link.org

REMARK

Check the specifications of the master module before use.

2.3 Notes on the System Configuration

This section explains the notes on the system configuration for use of the CL2DA2-B.

(1) Point mode setting

Set the point mode of the CC-Link/LT master module or AJ65SBT-CLB to the 16-point mode.
Any other mode setting will result in an error, causing the CC-Link/LT master module or AJ65SBT-CLB to turn on (flash if all stations are faulty) the "L ERR." LED, and the CL2DA2-B to turn off the "L RUN" LED and turn on the "L ERR." LED.

Using a remote module of less than 16 occupied I/O points in the 16-point mode will produce unassigned points.
For the concept of the point mode setting and occupied I/O point setting, refer to the user's manual of the used CC-Link/LT master module or AJ65SBT-CLB.

(2) Maximum number of connected stations

The CL2DA2-B can be connected within the occupied I/O point range of the CC-Link/LT master module or AJ65SBT-CLB.
The maximum number of connected modules varies depending on the number of occupied I/O points (number of occupied stations) of the CL2DA2-B.
Refer to Section 3.4 for the number of occupied I/O points (number of occupied stations).

(a) Maximum number of modules when connected to CC-Link/LT master module

Number of occupied I/O points of CC-Link/LT master module		16 points	32 points	48 points	64 points	128 points	256 points	512 points	1024 points
Number of occupied I/O points of CL2DA2-B (Number of occupied stations)	16 points (Occupies 1 station)	1	2	3	4	8	16	32	64
	32 points (Occupies 2 stations)	—	1	1	2	4	8	16	32

(b) Maximum number of modules when connected to AJ65SBT-CLB

Number of occupied I/O points of AJ65SBT-CLB		48 points	112 points	224 points
Number of occupied I/O points of CL2DA2-B (Number of occupied stations)	16 points (Occupies 1 station)	3	7	14
	32 points (Occupies 2 stations)	1	3	7

> POINT
>
> The maximum number of connected modules changes depending on the capacity of the dedicated power supply or power supply adapter.
> For details, refer to the user's manual for the dedicated power supply (CL1PSU-2A) or power supply adapter (CL1PAD1).

3 SPECIFICATIONS

This chapter provides the specifications of the CL2DA2-B.

3.1 General Specifications

Table 3.1 indicates general specifications of the CL2DA2-B.

Table 3.1 General Specifications

Item	Specifications					
Operating ambient temperature	0 to 55°C					
Storage ambient temperature	-25 to 75°C					
Operating ambient humidity	5 to 95%RH, non-condensing					
Storage ambient humidity						
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2		Frequency	Acceleration	Amplitude	Sweep count
		Under intermittent vibration	5 to 8.4Hz	———	3.5mm	10 times each in X, Y, and Z directions
			8.4 to 150Hz	$9.8 m/s^2$	———	
		Under continuous vibration	5 to 8.4Hz	———	1.75mm	———
			8.4 to 150Hz	$4.9 m/s^2$	———	
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 ($147 m/s^2$, 3 times each in X, Y, and Z directions)					
Operating atmosphere	No corrosive gases					
Operating altitude [1]	0 to 2000m					
Installation location	Inside a control panel [2]					
Overvoltage category [3]	II or less					
Pollution degree [4]	2 or less					

∗1: Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0m.
　　Doing so may cause malfunction. When using the programmable controller under pressure, please consult your local Mitsubishi
　　representative.

∗2: The programmable controller can also be used in an environment other than on a control panel if the conditions such as operating
　　ambient temperature and humidity are satisfied.

∗3: This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power
　　distribution network and the machinery within premises.
　　Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to
　　the rated voltage of 300V is 2500V.

∗4: This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.
　　Pollution degree 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected
　　occasionally.

3.2 Performance Specifications

Table 3.2 indicates performance specifications of the CL2DA2-B.

Table 3.2 Performance Specifications

Item		Specification					
Digital input	Voltage	15-bit signed binary (-4096 to 4095)					
	Current	15-bit signed binary (-96 to 4095)					
Analog output	Voltage	-10 to 10V DC (input resistance: 1kΩ to 1MΩ)					
	Current	0 to 20mA DC (external load resistance: 0 to 600Ω)					
I/O characteristics, maximum resolution, accuracy (accuracy relative to maximum value of analog output value) [1]			Analog output range	Digital input value	Accuracy		Temperature coefficient [3]	Max. resolution
					Ambient temperature 25±5°C [2]	Ambient temperature 0 to 55°C		
		Voltage	-10 to 10V	-4000 to 4000	±0.2% (±20mV)	±0.4% (±40mV)	±80ppm/°C (±0.0080%/°C)	2.5mV
			0 to 10V	0 to 4000				
			0 to 5V		±0.2% (±10mV)	±0.4% (±20mV)		1.25mV
			1 to 5V					1.0mV
		Current	0 to 20mA	0 to 4000	±0.2% (±40μA)	±0.4% (±80μA)		5μA
			4 to 20mA					4μA
Conversion speed		200μs/2 channels					
Output short-circuit protection		Yes					
Absolute maximum output		Voltage : ±12 V, current : +21mA					
Number of analog output channels		2 channels/1 module					
CC-Link/LT station type		Remote device station					
Number of occupied stations		2 stations in 16-point mode [4]					
Isolation specifications		Specific isolated area	Isolation method	Dielectric withstand voltage	Insulation resistance		
		Between communication system and analog outputs	Photocoupler isolation Transformer isolation	500V AC for 1 minute	500V DC 10MΩ or more		
		Between power supply system and analog outputs					
		Between communication system and power supply line					
		Between channels	No insulation	—	—		
External interface		Direct type 14-point terminal block (M3 screw)					
Applicable wire size		0.3 to 1.25mm²					
Applicable crimping terminal		RAV1.25-3 (in conformance with JIS C 2805), V1.25-3 (Japan Solderless Terminal Mfg. Co., Ltd.), 1.25-3, TG1.25-3(NICHIFU TERMINAL INDUSTRIES Co., Ltd.)					
Module installation method		DIN rail installation, mounted by screws of type M4 × 0.7 mm × 16 mm or larger Can be installed in six directions					
Applicable DIN rail		TH35-7.5Fe, TH35-7.5Al, (in conformance with IEC 60715)					
Module power supply [5]	Voltage	24V DC (20.4V DC to 28.8V DC, ripple ratio: within 5%)					
	Current consumption	170mA					
	Current on startup	470mA					
Protection class		IP2X					
Weight		0.15kg					

＊1: For the details of the I/O conversion characteristic, refer to Section 3.3.

＊2: Reference accuracy. (Refer to section 3.3.3)

＊3: Accuracy per temperature change of 1°C. (Refer to section 3.3.3)

＊4: The number of occupied I/O points (number of occupied stations) changes depending on the last channel enabled for conversion. (Refer to section 3.4)

＊5: Module power is supplied via the dedicated power supply/power supply adapter.
Use the dedicated power supply (CL1PSU-2A) or power supply adapter (CL1PAD1).

3.3 I/O Conversion Characteristics

An I/O conversion characteristic indicates an inclination of a straight line which connects an offset value and a gain value at the time when a digital value set from the programmable controller CPU is converted into an analog value (voltage or current output).

The offset value is an analog value (voltage or current) output when the digital value set from the programmable controller CPU is 0.

The gain value is an analog value (voltage or current) output when the digital value set from the programmable controller CPU is 4000.

3.3.1 Voltage output characteristics

The voltage output characteristic graph is shown below.

Number	Analog Output Range Setting	Offset Value	Gain Value	Digital Input Value	Maximum Resolution
1)	-10 to 10V	0V	10V	-4000 to 4000	2.5mV
	0 to 10V				
2)	0 to 5V	0V	5V	0 to 4000	1.25mV
3)	1 to 5V	1V	5V		1.0mV
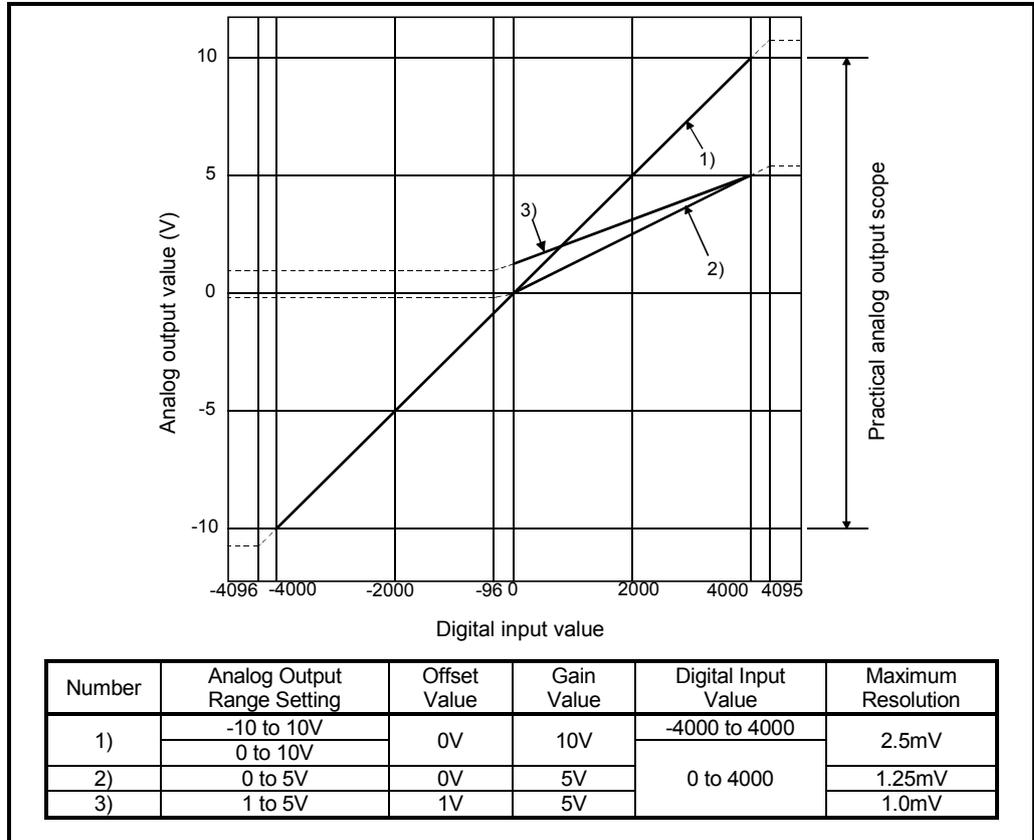
Fig. 3.1 Voltage Output Characteristic

POINT

Within the digital input and analog output scopes of each output range, the maximum resolution and accuracy are within the performance specification range. Outside those scopes, however, they may not fall within the performance specification range. (Avoid using the dotted line part in Fig. 3.1.)

3.3.2 Current output characteristics

The current output characteristic graph is shown below.

Number	Analog Output Range Setting	Offset Value	Gain Value	Digital Input Value	Maximum Resolution
1)	0 to 20mA	0mA	20mA	0 to 4000	5μA
2)	4 to 20mA	4mA	20mA		4μA
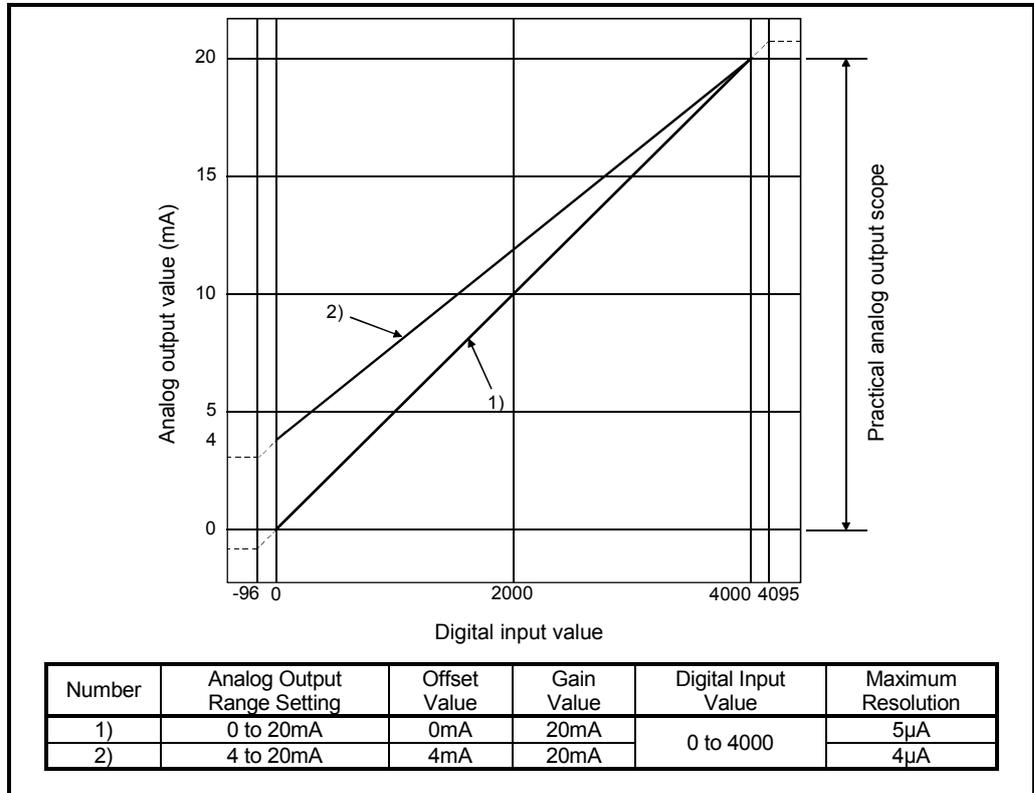
Fig. 3.2 Current Output Characteristic

POINT

Within the digital input and analog output scopes of each output range, the maximum resolution and accuracy are within the performance specification range. Outside those scopes, however, they may not fall within the performance specification range. (Avoid using the dotted line part in Fig. 3.2.)

3.3.3 Accuracy

Accuracy is relative to the maximum value of the analog output value.
If you change the output range to change the output characteristic, accuracy does not change and is held within the range indicated in the performance specifications.

Calculate the accuracy in the following method.
(Accuracy) = (Reference accuracy) + (Temperature coefficient)
             $\times$ (Operating ambient temperature change)
Reference accuracy:
        Accuracy when the operating ambient temperature is 25±5°C(±0.2%)
Temperature coefficient:
        Accuracy for every 1°C change in temperature (±80ppm/°C (±0.0080%/°C))
Operating ambient temperature change:
        Difference between the operating ambient temperature outside the range
        25±5°C and the minimum/maximum range value

Example) Accuracy when the operating ambient temperature is 35°C
        (±0.2%) + (±0.0080%/°C) $\times$ (35°C-30°C) = ±0.24%

(1)   Accuracy of voltage output
      For voltage output, the maximum value of the analog output value changes with the range.
      For example, accuracy is relative to 5V when the 0 to 5V range is selected.
      Analog output is provided at the accuracy of within ±0.2% (±10mV) when the operating ambient temperature is 25±5°C, or within ±0.4% (±20mA) when the operating ambient temperature is 0 to 55°C.
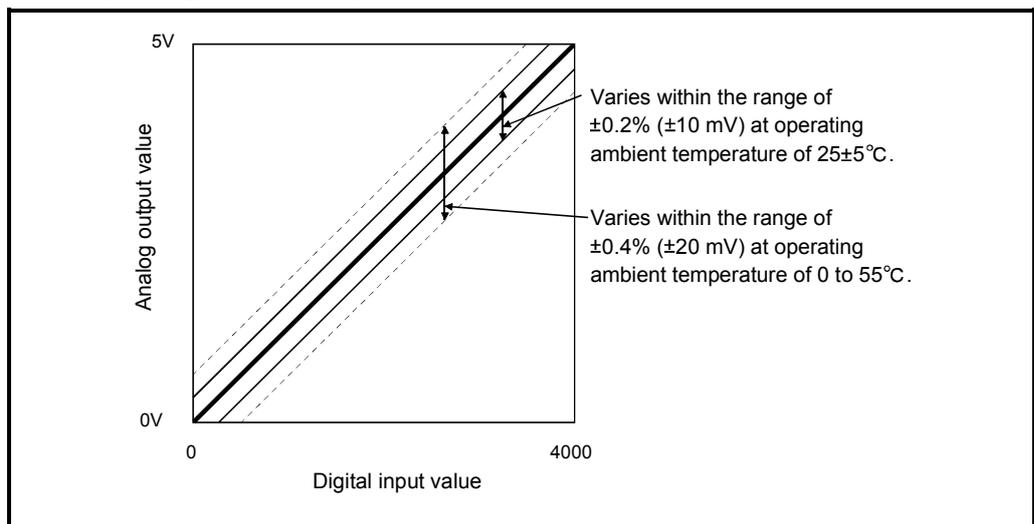
Fig. 3.3 Voltage Output Accuracy (When 0 to 5V Range Is Selected)

(2)   Accuracy of current output
For current output, accuracy is relative to 20mA.
Analog output is provided at the accuracy of within ±0.2% (±40µA) when the
operating ambient temperature is 25±5°C, or within ±0.4% (±80µA) when the
operating ambient temperature is 0 to 55°C.
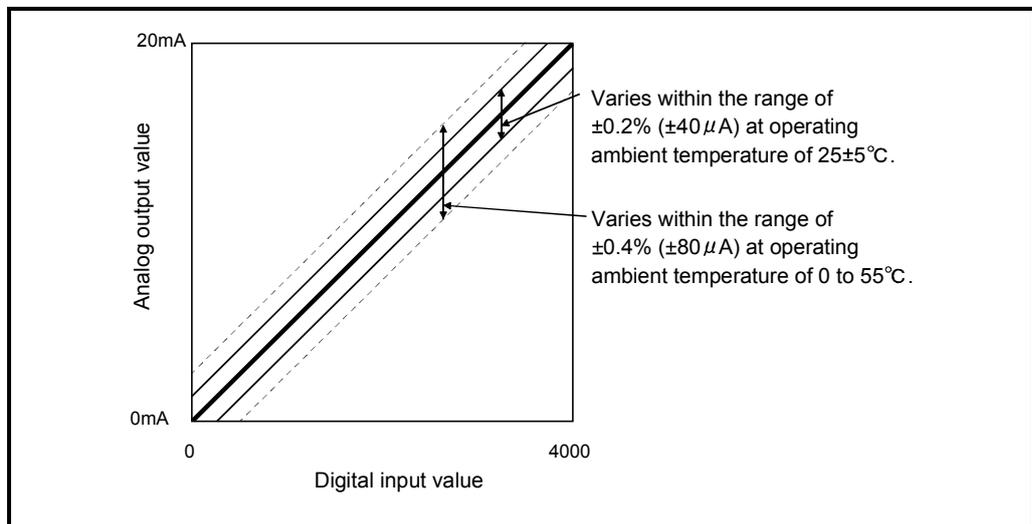
Fig. 3.4 Current Output Accuracy

3.3.4 Conversion speed

The conversion speed of the CL2DA2-B is fixed to 200µs independently of the number of conversion-enabled channels.

3.3.5 Output response time of remote station

This section explains the remote station output response time of the CL2DA2-B.
The remote station output response time is used in the calculation of the transmission delay time.
The remote station output response time of the CL2DA2-B is 0.4ms including the internal processing time.

> 0.2ms (conversion speed) $\times$ 2 = 0.4ms

[Transmission delay time]
The transmission delay time is the time from when the set digital value written to the device (Y) of the programmable controller CPU is read until an analog value is output after digital-to-analog conversion.
For how to calculate the link scan time, refer to the user's manual of the CC-Link/LT master module or AJ65SBT-CLB.

> SM +LS $\times$ 2 + Output response time of remote station [ms]
>   SM : Sequence program scan time of master station
>   LS : Link scan time

Example) When the module is connected to the QJ61CL12, the transmission speed is 625kbps, the last station No. is 10, the sequence scan time of the master station is 5ms, the link scan time is 1.2ms, and the output response time of the remote station is 0.4ms

> =5 + 1.2 $\times$ 2 + 0.4
> =7.8ms

3.4 Function

The CL2DA2-B function list is shown in table 3.3.

Table 3.3 CL2DA2-B Function List

Item	Description	Reference Section
D/A conversion enable/disable function	(1) Specifies whether to enable or disable the D/A conversion for each channel. (2) The number of occupied I/O points (number of occupied stations) changes depending on the last channel enabled for conversion. For example, when only Channel 2 is enabled for conversion, the number of occupied I/O points is 32 points (occupies 2 stations). (3) Set this function using the analog output setting switches. (Refer to section 4.3)	—
D/A output enable/disable function	(1) Whether the output of the D/A conversion value is enabled or disabled can be specified for each channel. (2) Set this function using the CH□ output enable/disable flag (YnF). (Refer to section 3.5.2)	—
Output range changing function	(1) Can set the analog output range per channel to change the I/O conversion characteristics. (2) Set this function using the analog output setting switches. (Refer to section 4.3)	—
Communication cutoff-time analog output hold/clear function (HOLD/CLEAR setting)	(1) It can be specified whether the analog value output from each channel immediately before D/A conversion stops due to the cutoff of communication with the CC-Link/LT master module or AJ65SBT-CLB will be held or cleared. (2) Set this function for all channels at once using the HOLD/CLEAR setting switch. (Refer to section 4.3)	Section 3.4.1

3.4.1 Combinations of various functions

The analog output can be set as indicated in Table 3.4 and Table 3.5 by the combination of the D/A conversion enable/disable setting (analog output setting switches), CH☐ output enable/disable flag (YnF) and HOLD/CLEAR setting (HOLD/CLEAR setting switch).
Make setting according to your application.

Table 3.4 List of Analog Output Status by Combinations in Case of CC-Link/LT Master Module Connection

Setting combination / Execution status	D/A conversion enable/disable setting	Enable			Disable
	CH☐ output enable/disable flag	Enable (ON)		Disable (OFF)	Enable or disable
	HOLD/CLEAR setting	HOLD	CLEAR	HOLD or CLEAR	HOLD or CLEAR
Analog output status when the programmable controller CPU is in the RUN status		Output of the analog value after D/A conversion from the digital value specified by the programmable controller CPU		Offset value	0V/0mA
Analog output status when the programmable controller CPU is in the STOP status		Offset value (Not held)		Offset value	0V/0mA
Analog output status at programmable controller CPU stop error		The analog value before the "L RUN" LED turns OFF is held.	Offset value	Offset value	0V/0mA
Analog output status when a digital value setting error occurred		Output of the maximum or minimum analog value		Offset value	0V/0mA
Analog output status when a timeout error occurred		The analog value before the "L RUN" LED turns OFF is held.	Offset value	Offset value	0V/0mA
Analog output status when a communication data error occurred		The analog value converted from the digital value set from the programmable controller CPU during normal communication is output.		Offset value	0V/0mA
Analog output status when a setting switch error (station number setting, analog output setting switches) or point mode setting error occurred		0V/0mA	0V/0mA	0V/0mA	0V/0mA
Analog output status when "L ERR." LED flickers at fixed intervals (0.4s intervals)		Output of the analog value after D/A conversion from the digital value specified by the programmable controller CPU		Offset value	0V/0mA
Analog output status when a watchdog timer error occurred		0V/0mA	0V/0mA	0V/0mA	0V/0mA

Table 3.5 List of Analog Output Status by Combinations in Case of AJ65SBT-CLB Connection

Setting combination / Execution status	D/A conversion enable/disable setting	Enable			Disable
	CH□ output enable/disable flag	Enable (ON)		Disable (OFF)	Enable or disable
	HOLD/CLEAR setting	HOLD	CLEAR	HOLD or CLEAR	HOLD or CLEAR
When a communication error occurs between the CC-Link master station and AJ65SBT-CLB		The analog value before the "L RUN" LED turns OFF is held.	Offset value	Offset value	0V/0mA
When a communication error occurs between the AJ65SBT-CLB and CL2DA2-B		The analog value before the "L RUN" LED turns OFF is held.	Offset value	Offset value	0V/0mA

3.5 Remote I/O Signal

This section describes the assignment and functions of the remote I/O signals.

3.5.1 Remote I/O signal list

The remote input (X) means the input signal from the CL2DA2-B to the CC-link/LT master module or AJ65SBT-CLB, and the remote output (Y) means the output signal from the CC-link/LT master module or AJ65SBT-CLB to the CL2DA2-B.

The numbers of remote input (X) and remote output (Y) points change depending on the number of occupied CL2DA2-B stations.
   When occupies 1 station   : X00 to X0F, Y00 to Y0F
   When occupies 2 stations   : X00 to X1F, Y00 to Y1F

The remote I/O numbers (X/Y) change depending on the following conditions.
   When connected to CC-Link/LT master module
      • Start I/O numbers of CC-Link/LT master module
      • Station number of CL2DA2-B
   When connected to AJ65SBT-CLB
      • Station number of AJ65SBT-CLB
      • Station number of CL2DA2-B

The remote I/O numbers (X/Y) in this chapter and later are indicated under the following conditions.
      • Start I/O number of CC-Link/LT master module: 0
      • Station number of CL2DA2-B: 1

Table 3.6 indicates the assignment and names of the remote I/O signals.

Table 3.6 Remote I/O Signals List

Signal direction: CL2DA2-B → CC-Link/LT master module/AJ65SBT-CLB		Signal direction: CC-Link/LT master module/ AJ65SBT-CLB → CL2DA2-B		Remote I/O point
Remote input(X)	Signal name	Remote output(Y)	Signal name	
X00 to X1F	Use prohibited	Y00 to Y0E	CH1 digital value setting	16 points (Occupies 1 station)
		Y0F	CH1 output enable/disable flag	
		Y10 to Y1E	CH2 digital value setting	32 points (Occupies 2 stations)
		Y1F	CH2 output enable/disable flag	

POINT

The reserved devices given in Table 3.6 are used by the system and cannot be used by the user.

REMARK

When the CL2DA2-B is connected to the QJ61CL12, the following information is stored in the detailed remote station information area (buffer memory address 32 to 95: Un\G32 to Un\G95).

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
0	0	0	0	0	0	0	0/1	0	0/1	1	1	1	1	0	0

Vacant

→ I/O points: 16pts.
→ Output flag[1]: Output identified
→ Input flag[1]: Input identified
→ Remote device station flag: Remote device station
→ First station flag[2]
0: Not first station
1: First station
→ Input filter setting: No setting
→ Clear of output / hold setting[3]
0: Clear
1: Hold
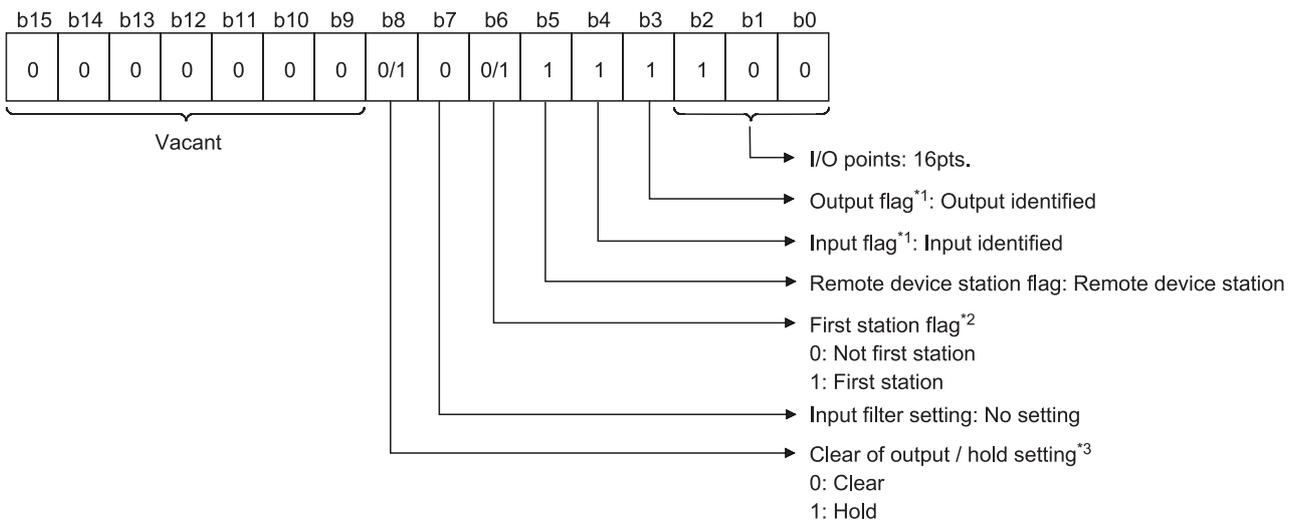
*1 In the case of the CL2DA2-B, 11 are stored to be, b4.
*2 For a module that has 2 occupied stations, only the bit of the first station will turn on.
*3 This depends on the setting of the HOLD/CLEAR setting switch on the CL2DA2-B.

3.5.2 Functions of the remote I/O signals

Table 3.7 explains the functions of the remote I/O signals of the CL2DA2-B.
"n" in the table is determined by the channel, starting I/O number and station number.

Table 3.7 Remote I/O Signal Details

Device No.	Signal Name	Description
Yn0 to YnE	CH□ digital value setting	(1) This area is used to write digital values for performing D/A conversion from the programmable controller CPU as 15-bit signed binary code. YnF YnE YnD YnC YnB YnA Yn9 Yn8 Yn7 Yn6 Yn5 Yn4 Yn3 Yn2 Yn1 Yn0 CH□ digital value setting CH□ output enable/disable flag (2) When the digital value setting is outside the valid range, D/A conversion will be performed as described below. Output range setting / Valid range (practical range) / Digital value that is set when a value outside the valid range is written -10 to 10V : -4096 to 4095 (practical range: -4000 to 4000) : 4096 or larger: 4095 / -4097 or smaller: -4096 4 to 20mA / 0 to 20mA / 1 to 5V / 0 to 5V / 0 to 10V : -96 to 4095 (practical range: 0 to 4000) : 4096 or larger: 4095 / -97 or smaller: -96
XnF	CH□ output enable/disable flag	(1) Set whether the output of the D/A conversion value is enabled or disabled for each channel. ON: output enable OFF: output disable
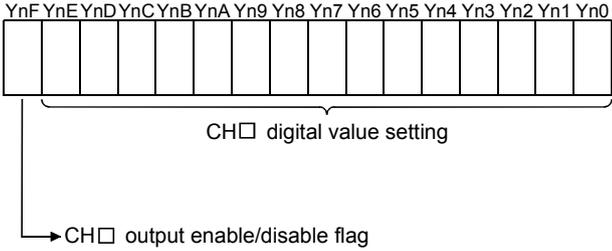
4 SETUP AND PROCEDURES BEFORE OPERATION

4.1 Pre-operation Procedure

This section explains the preparatory procedure for operating the CL2DA2-B.

```
                          ┌─────────────────┐
                          │      START      │
                          └────────┬────────┘
                                   │
          ┌────────────────────────▼────────────────────────┐
          │ Switch setting (Refer to section 4.3)           │
          │  · Set the station number setting switches.     │
          │  · Set the HOLD/CLEAR setting switch.           │
          │  · Set the analog output setting switches.      │
          └────────────────────────┬────────────────────────┘
                                   │
          ┌────────────────────────▼────────────────────────┐
          │ Wiring                                          │
          │  · Wiring of connection cable (Refer to section 4.6) │
          │  · Wiring of module with external equipment      │
          │    (Refer to section 4.7)                       │
          └────────────────────────┬────────────────────────┘
                                   │
          ┌────────────────────────▼────────────────────────┐
          │ Create a program (Refer to Chapter 5)           │
          └────────────────────────┬────────────────────────┘
                                   │
          ┌────────────────────────▼────────────────────────┐
          │ Start data link                                 │
          └────────────────────────┬────────────────────────┘
                                   │
                          ┌────────▼────────┐
                          │       END       │
                          └─────────────────┘
```
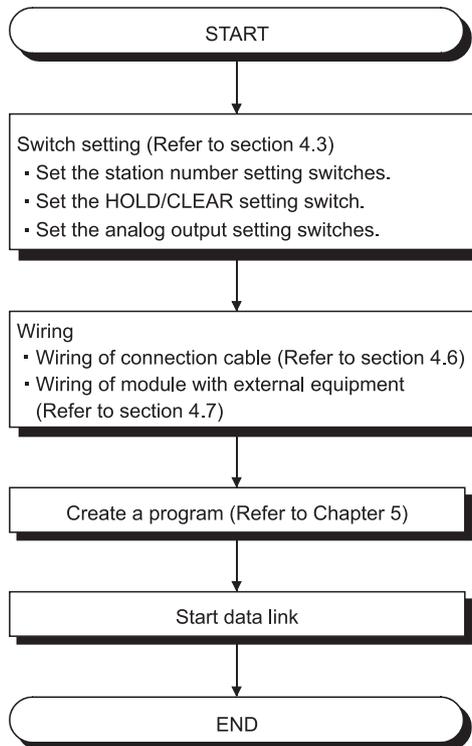
4.2 Precautions when Handling

The precautions when handling the CL2DA2-B are described below:

⚠ WARNING	• Shut off the external power supply for the system in all phases before wiring. Failure to do so may result in electric shock or damage to the product.
	• Do not touch the terminals while power is on. Doing so may cause malfunctioning.
	• Be sure to shut off all phases of the external power supply used by the system before cleaning or retightening the terminal screws. Not doing so can cause the module to fail or malfunction.

⚠ CAUTION	• Ensure that no foreign matter such as chips and wire-offcuts enter the module. Foreign matter can cause a fire, failure or malfunction.
	• Never disassemble or modify the module. This may cause breakdowns, malfunctioning, injury and/or fire.
	• Do not directly touch any conductive part of the module. Doing so can cause malfunction or failure of the module.

⚠ CAUTION	• When disposing of this product, treat it as industrial waste. • Use the programmable controller in the environment that meets the general specifications contained in this Manual. Using the programmable controller outside the range of the general specifications may result in electric shock, fire or malfunction, or may damage or degrade the module. • Securely fix the module to a DIN rail or with mounting screws, and securely tighten the mounting screws within the specified torque range. Undertightening can cause a drop or malfunction. Overtightening can cause a drop or malfunction due to damage of the screws or module. • Be sure to shut off all phases of the external power supply used by the system before mounting or dismounting the module to or from the panel. Not doing so can cause the module to fail or malfunction. • Before handling the module, always touch grounded metal, etc. to discharge static electricity from the human body. Failure to do so can cause the module to fail or malfunction.

4

(1) Tighten the screws such as module fixing screws within the following ranges.

Screw location	Clamping torque range
Module mounting screw (M4 screw)	0.78 to 1.08 N・m
Terminal block terminal screw (M3 screw)	0.42 to 0.58 N・m

(2) When using a DIN rail, attach the DIN rail after taking the following items into consideration:
   (a) Applicable DIN rail types (conform to IEC 60715)
      TH35-7.5Fe
      TH35-7.5Al

   (b) Interval between the DIN rail's installation screws
      Tighten the screws using a pitch of 200mm (7.87in.) or less when attaching a DIN rail.

(3) To attach the CL2DA2-B to the DIN rail, press the centerline area of the DIN rail hook beneath the module until a click is heard.

(4) Maintain some distance between the module and other components and parts, 10 mm (0.39in.) from the top and 60 mm (2.36in.) from the bottom of the module, in order to improve ventilation and to make replacement of the module easy if a CL2DA2-B is installed on a board.

(5) Install the CL2DA2-B on a level surface.
   If the surface is uneven, unnecessary force is applied to the printed circuit board, causing malfunctions.

4.3 Part Identification Nomenclature

The name of each part in the CL2DA2-B is listed below.

* A connector is not supplied.
  Prepare a dedicated flat cable connector.

[Terminal numbers and signal names]

1	3	5	7 CH1 V+	9 CH1 I+	11 CH2 V+	13 CH2 I+
2 ⏚ (FG)	4	6	8 COM	10	12 COM	14

Number	Name		Description
1)	Operation status display LED	PW LED	ON : Power supply on OFF : The power supply is turned off 　　　The voltage drop is too large
		RUN LED	ON : Normal operation Flickering : When the set digital value is outside the valid range 　　　When the analog output setting switches are set to disable the conversion of all channels 　　　When the analog output setting switch or HOLD/CLEAR setting switch setting was changed during operation 　　　When the NC switch is ON OFF : Watchdog timer error 　　　Fault in hardware
		L RUN LED	ON : Normal communication OFF : Communication cut off (timeout error)
		L ERR. LED	ON : When a communication data error occurred 　　　When the station number setting switch setting is outside the valid range 　　　When other than the 16-point mode is set 　　　Communication cut off (timeout error) 　　　When the analog output setting switches are set to disable the conversion of all channels Flickering at fixed intervals (0.4s intervals): 　　　When the station number setting switch setting was changed from the power-on setting. Flickering at unfixed intervals: 　　　When the terminating resistor was not installed 　　　When the module or connection cable is affected by noise OFF : Indicates normal communications

Number	Name	Description
2)	Station number setting switch	Select "10", "20" or "40" to set the ten's place of the station number. Select "1", "2", "4" or "8" to set the one's place of the station number. Always set the station number within the range of 1 to 64. Setting of other than 1 to 64 will result in an error, turning ON the "L ERR." LED. The same station number cannot be used more than once. (Factory default: All OFF)
3)	HOLD/CLEAR setting switch	Set whether the analog value is to be held or cleared in the event of communication cutoff (one setting for all channels). OFF: Clear ON: Hold (Factory default: OFF(Clear))
4)	Analog output setting switch	Set the D/A conversion enable/disable and output range to each channel. Set the unused channel to conversion disable. (Factory default: All OFF (4 to 20mA))
5)	NC	Must not be used. (Used by the system and unavailable for the user. Keep this switch OFF. If it is turned ON, the RUN LED flickers.)
6)	Terminal block	Terminal block for connection of the I/O signals.

For 2) Station number setting switch:

Station number	Ten's place			One's place			
	40	20	10	8	4	2	1
1	OFF	OFF	OFF	OFF	OFF	OFF	ON
2	OFF	OFF	OFF	OFF	OFF	ON	OFF
3	OFF	OFF	OFF	OFF	OFF	ON	ON
4	OFF	OFF	OFF	OFF	ON	OFF	OFF
:	:	:	:	:	:	:	:
10	OFF	OFF	ON	OFF	OFF	OFF	OFF
11	OFF	OFF	ON	OFF	OFF	OFF	ON
:	:	:	:	:	:	:	:
64	ON	ON	OFF	OFF	ON	OFF	OFF

(Example) Set the switches as below when setting the station number to 32:

Station number	Ten's place			One's place			
	40	20	10	8	4	2	1
32	OFF	ON	ON	OFF	OFF	ON	OFF

For 4) Analog output setting switch:

Output range		Setting switches		
		0	1	2
Conversion enable	4 to 20mA	OFF	OFF	OFF
	0 to 20mA	OFF	OFF	ON
	1 to 5V	OFF	ON	OFF
	0 to 5V	OFF	ON	ON
	-10 to 10V	ON	OFF	OFF
	0 to 10V	ON	OFF	ON
Conversion disable		ON	ON	OFF
		ON	ON	ON

Number	Name	Description
7)	DIN rail hook	Used to mount the module to the DIN rail.
8)	Cable guide	Guide used when wiring the CC-Link/LT dedicated flat cable of the CL2DA2-B downward. (Refer to section 4.6)
9)	CC-Link/LT interface connector	Connector for connection of the CC-Link/LT communication line or module power supply (Sold separately).

4.4 Station Number Setting

The remote I/O signals (X/Y) are determined by the station number setting of the CL2DA2-B.
For details, refer to the user's manual of the used CC-Link/LT master module or AJ65SBT-CLB.

4.5 Facing Direction of the Module Installation

The CL2DA2-B may be installed in any of six directions.
(There are no restrictions on the facing directions.)

Front mounting   Front mounting

Flat mounting

Roof mounting
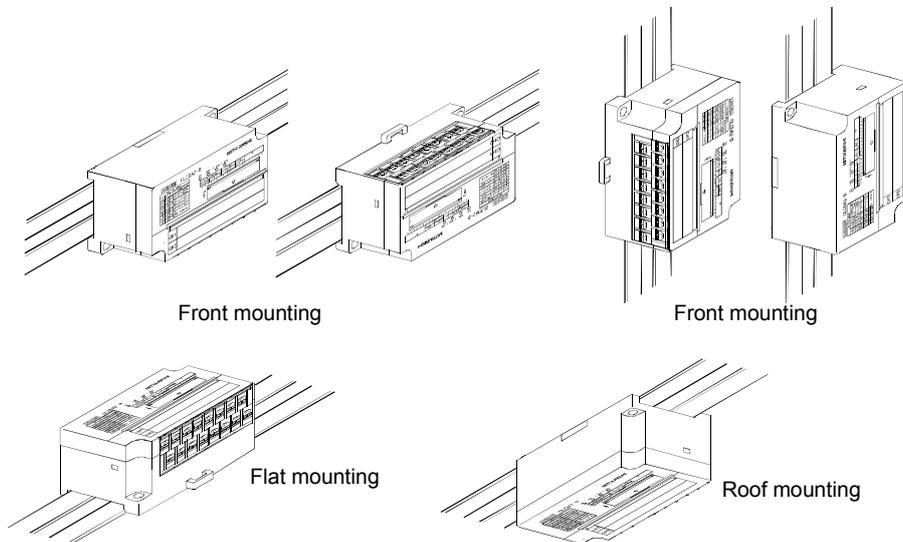
4.6 Wiring of Connection Cable

For the wiring of the connection cable for connection of the CL2DA2-B and CC-Link/LT master module/AJ65SBT-CLB, refer to the user's manual of the used CC-Link/LT master module or AJ65SBT-CLB.

(1)   When the CL2DA2-B is connected to the drop line of the VCTF or high flexible cable, the CC-Link/LT dedicated flat cable of the CL2DA2-B must be fabricated to 20cm (7.87in.) or less.

(2)   The CC-Link/LT dedicated flat cable of the CL2DA2-B can be wired downward by use of the cable guide.
The permissible bending radius (r) of the CC-Link/LT dedicated flat cable of the CL2DA2-B is 15mm (0.59in.).

Permissible bending radius (r) of cable: 15mm (0.59in.)

Slide the cable sideways to install.
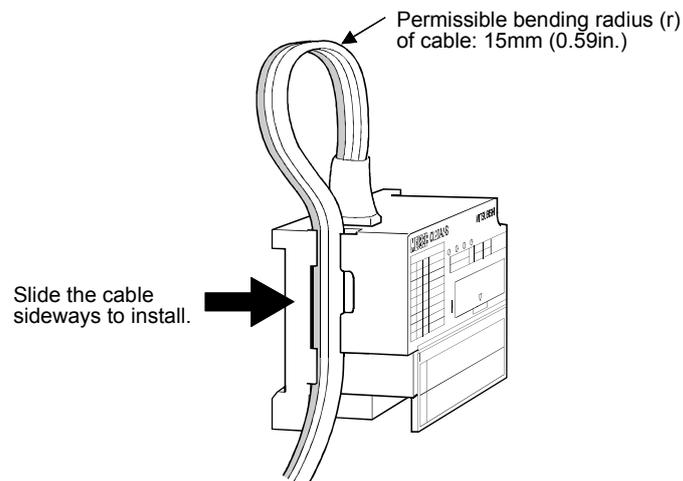
4.7 Wiring

This section provides the precautions for wiring the CL2DA2-B and its wiring with external equipment.

4.7.1 Wiring precautions

To obtain maximum performance from the functions of CL2DA2-B and improve the system reliability, an external wiring with high durability against noise is required. The precautions when performing external wiring are as follows:

(1) Use separate cables for the AC and CL2DA2-B external output signals, in order not to be affected by the AC side surge or conductivity.

(2) Do not bundle or place with load carrying wires other than the main circuit line, high voltage line or programmable controller.
Noises, surges, or conductivity may affect the system.

(3) Ground the shield wires or shield cables at one end on the external device side.

4.7.2 Wiring of module with external equipment

(1)   For voltage output
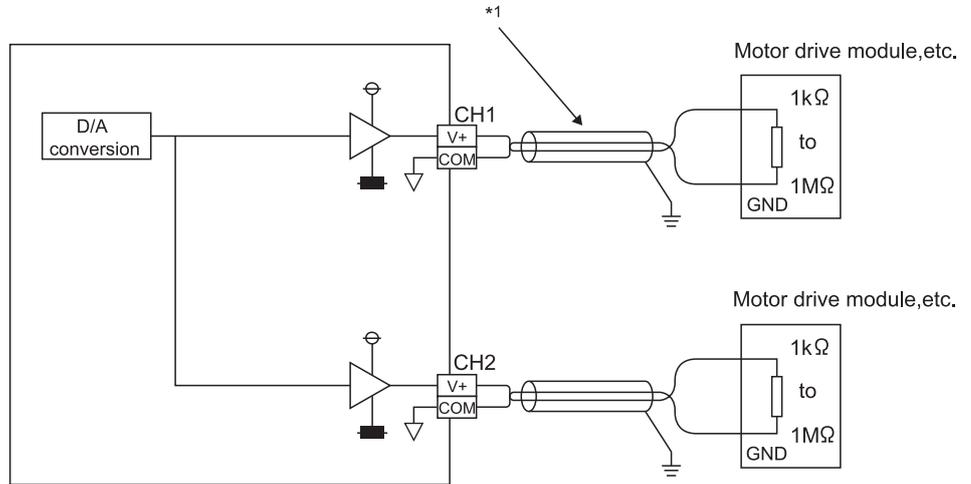
*1 Use a two-core twisted shield line for the power cable.

(2)   For current output
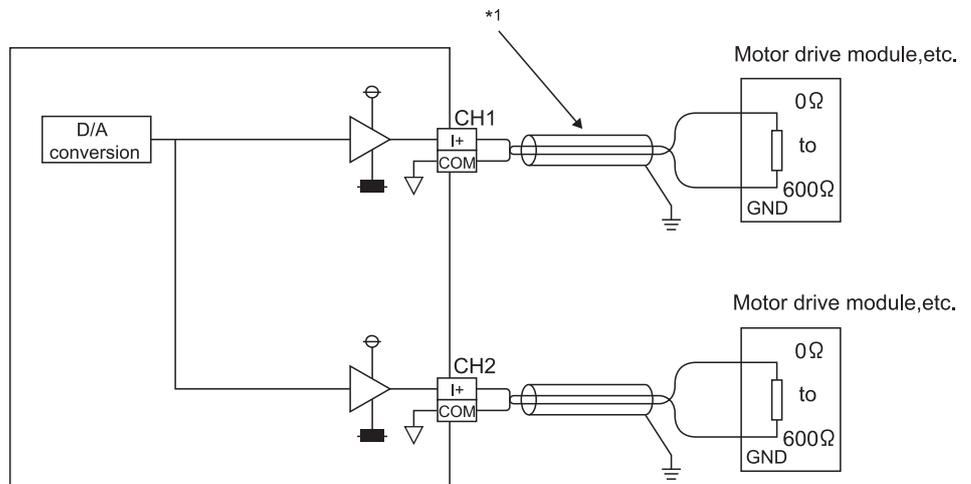
*1 Use a two-core twisted shield line for the power cable.

4.8 Check of Wiring

Using the program in Chapter 5, check the wiring.

4.9 Maintenance and Inspection

There are no special inspection items for the CL2DA2-B module, but follow the
inspections items describes in the programmable controller CPU User's Manual so that
the system can always be used in the best condition.

5 PROGRAMMING

This chapter describes the programming of the CL2DA2-B.
When applying any of the program examples introduced in this chapter to the actual system, make sure to examine the applicability and confirm that no problems will occur in the system control.
Refer to the user's manual of the used CC-Link/LT master module or AJ65SBT-CLB for the CC-Link/LT master module/AJ65SBT-CLB, and refer to the AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) Programming Manual (Dedicated Instructions) for details of the dedicated instructions.

5.1 Precautions on Programming

The following explains precautions on the creation of a program:

(1) CH☐ digital value setting and CH☐ output enable/disable flag setting
For the CH☐ digital value setting (Yn0 to YnE) and CH☐ output enable/disable flag (YnF), create a sequence program so that the setting is stored into the word devices once and then finally written to the Y signal areas.
If a program in which these data are directly written to the Y signal areas (sequence program as shown in Fig. 5.1), the Y signal (YnF) may turn OFF instantaneously.
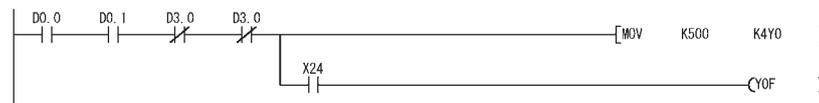
Fig. 5.1

In the following program example, the CH☐ digital value setting (Yn0 to YnE) and CH☐ output enable/disable flag (YnF) setting are stored into the "digital value setting, output enable/disable flag storing data registers (D11, D12)" and then are written to the Y signal areas.
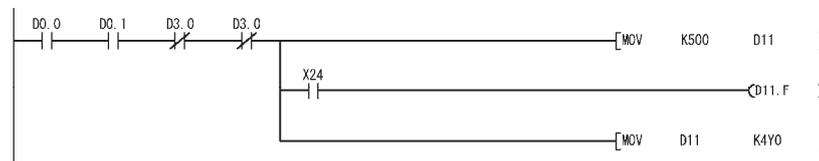
Fig. 5.2

5.2 Conditions of Program Examples (when connected to QJ61CL12)

The program example of Section 5.2.1 is created under the following conditions.
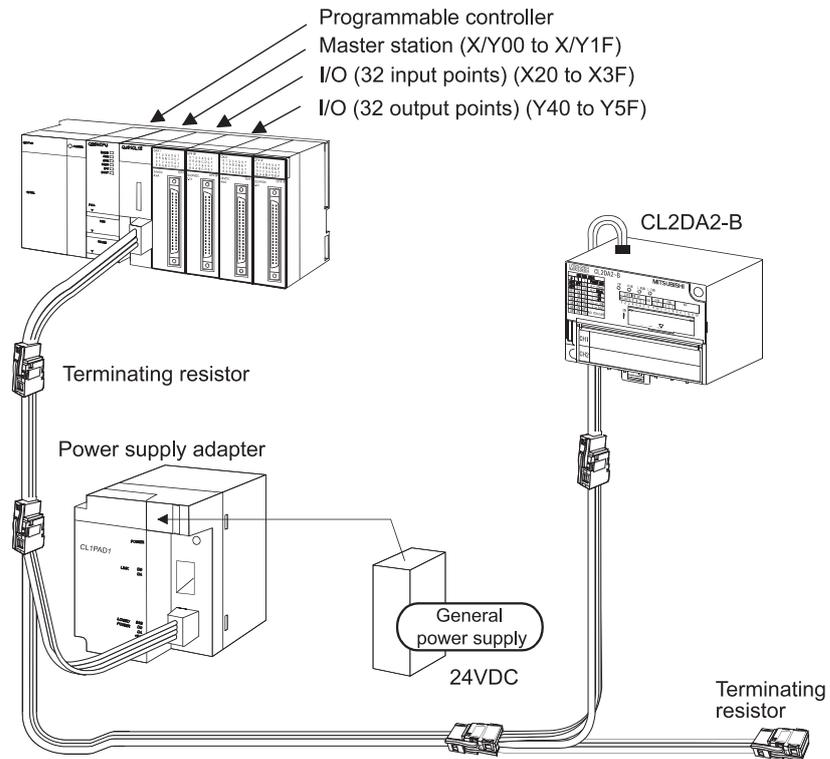
(1)   System configuration

Programmable controller
Master station (X/Y00 to X/Y1F)
I/O (32 input points) (X20 to X3F)
I/O (32 output points) (Y40 to Y5F)

CL2DA2-B

Terminating resistor

Power supply adapter

CL1PAD1

General power supply
24VDC

Terminating resistor

(a)   Master station settings

Item	Settings
Number of occupied I/O points setting	32 points (X/Y00 to X/Y1F)
Transmission rate setting	2.5Mbps
Point mode setting	16-point mode
Last station number setting	2

(b)   CL2DA2-B settings

Item	Settings
Station number setting	Station number 1
Number of occupied stations setting	Occupies 2 stations
CH1 output range setting	0 to 5V
CH2 output range setting	4 to 20mA
HOLD/CLEAR setting	HOLD

(2) Device assignment to program examples

The devices used in the program example of Section 5.2.1 are shown below.

(a) Remote I/O (X/Y)

Station No.	Model Name	Input		Output		Station No.	Model Name	Input		Output	
1	CL2DA2-B (Occupies 2 stations)	X 00	Use prohibited	Y 00	CH1 digital value setting	3		X 20		Y 20	
		X 01		Y 01				X 21		Y 21	
		X 02		Y 02				X 22		Y 22	
		X 03		Y 03				X 23		Y 23	
		X 04		Y 04				X 24		Y 24	
		X 05		Y 05				X 25		Y 25	
		X 06		Y 06				X 26		Y 26	
		X 07		Y 07				X 27		Y 27	
		X 08		Y 08				X 28		Y 28	
		X 09		Y 09				X 29		Y 29	
		X 0A		Y 0A				X 2A		Y 2A	
		X 0B		Y 0B				X 2B		Y 2B	
		X 0C		Y 0C				X 2C		Y 2C	
		X 0D		Y 0D				X 2D		Y 2D	
		X 0E		Y 0E				X 2E		Y 2E	
		X 0F		Y 0F	CH1 output enable/ disable flag			X 2F		Y 2F	
2	CL2DA2-B (Occupies 2 stations)	X 10	Use prohibited	Y 10	CH2 digital value setting	4		X 30		Y 30	
		X 11		Y 11				X 31		Y 31	
		X 12		Y 12				X 32		Y 32	
		X 13		Y 13				X 33		Y 33	
		X 14		Y 14				X 34		Y 34	
		X 15		Y 15				X 35		Y 35	
		X 16		Y 16				X 36		Y 36	
		X 17		Y 17				X 37		Y 37	
		X 18		Y 18				X 38		Y 38	
		X 19		Y 19				X 39		Y 39	
		X 1A		Y 1A				X 3A		Y 3A	
		X 1B		Y 1B				X 3B		Y 3B	
		X 1C		Y 1C				X 3C		Y 3C	
		X 1D		Y 1D				X 3D		Y 3D	
		X 1E		Y 1E				X 3E		Y 3E	
		X 1F		Y 1F	CH2 output enable/ disable flag			X 3F		Y 3F	

(b) Device used by user

Device	Application	Device	Application
X20	CC-Link/LT control start signal	X24	CH1 output enable signal
X21	Data link stop instruction signal	X25	CH2 output enable signal
X22	Data link restart instruction signal	—	
Y40	Data link error confirmation signal	Y42	Remote I/O error confirmation signal
Y41	All station fault confirmation signal	Y43	Remote station error confirmation signal
M2	Control start flag	—	
D0	Data register for reading information of operating status	D11	CH1 digital value setting, output enable/disable flag storing data register
D1	Data register for reading information of remote station connection	D12	CH2 digital value setting, output enable/disable flag storing data register
D2	Data register for reading detailed error information	D13	CH1 digital value setting monitoring data register
D3	Data register for reading information of faulty station	D14	CH2 digital value setting monitoring data register

(3) Program example

CC-Link/LT data link status confirmation

```
  X20                                              U0\
──┤├──────────────────────────────────────[MOV  G18    D0  ]    Reading information of operating
                                                                status

  D0.1                                             U0\
──┤├──────────────┬───────────────────────[MOV  G0     D1  ]    Reading detailed remote
                  │                                             station information

                  │                               U0\
                  ├───────────────────────[MOV  G16    D2  ]    Reading detailed error information

                  │
                  ├──[◇    D1    H3  ]──────────────────(Y43 )   Checking for remote station
                  │                                             connection error

                  └──[=    D1    H3  ]──────────[MC   N1    M2 ]  Control starts when remote
                                                                 station connection status is normal.

N1┬─M2
  │
```

CC-Link/LT error confirmation

```
  D2.0
──┤├──────────────────────────────────────────────────(Y40 )   Checking for data link error

  D2.1
──┤├──────────────────────────────────────────────────(Y41 )   Checking if all stations
                                                                are faulty or not

  D2.2
──┤├──────────────────────────────────────────────────(Y42 )   Checking for remote I/O error

  D0.0   D0.1                                       U0\
──┤├─────┤├────────────────────────────────[MOV  G4     D3  ]   Reading information of
                                                                faulty station
```

Setting digital values, specification of output enable/disable

```
  D0.0   D0.1   D3.0   D3.1
──┤├─────┤├─────┤/├────┤/├──┬───────────────[MOV  K500   D11 ]   CH1 digital value setting
                           │
                           ├───────────────[MOV  D11    D13 ]   Storing CH1 digital value setting
                           │                                    in the data register for monitoring.
                           │   X24
                           ├───┤├────────────────────────(D11.F)  CH1 output enable
                           │
                           ├───────────────[MOV  K1000  D12 ]   CH2 digital value setting
                           │
                           ├───────────────[MOV  D12    D14 ]   Storing CH2 digital value setting
                           │                                    in the data register for monitoring.
                           │   X25
                           ├───┤├────────────────────────(D12.F)  CH2 output enable
                           │
                           ├───────────────[MOV  D11    K4Y0 ]  ┐
                           │                                    ├ Writing the setting to CL2DA2-B.
                           └───────────────[MOV  D12    K4Y10]  ┘

──────────────────────────────────────────────────[MCR  N1 ]

  X21   X22   D0.0                                  U0\
──┤├────┤/├───┤├────────────────────────────[MOV  H1     G19 ]   instructing data link stop

  X22   X21   D0.0                                  U0\
──┤├────┤/├───┤/├────────────────────────────[MOV  H8000  G19 ]   instructing data link restart

──────────────────────────────────────────────────[END ]
```

5.3 Conditions of Program Examples (when connected to AJ65SBT-CLB)

The program examples of Sections 5.3.1 to 5.3.4 are created under the following conditions.
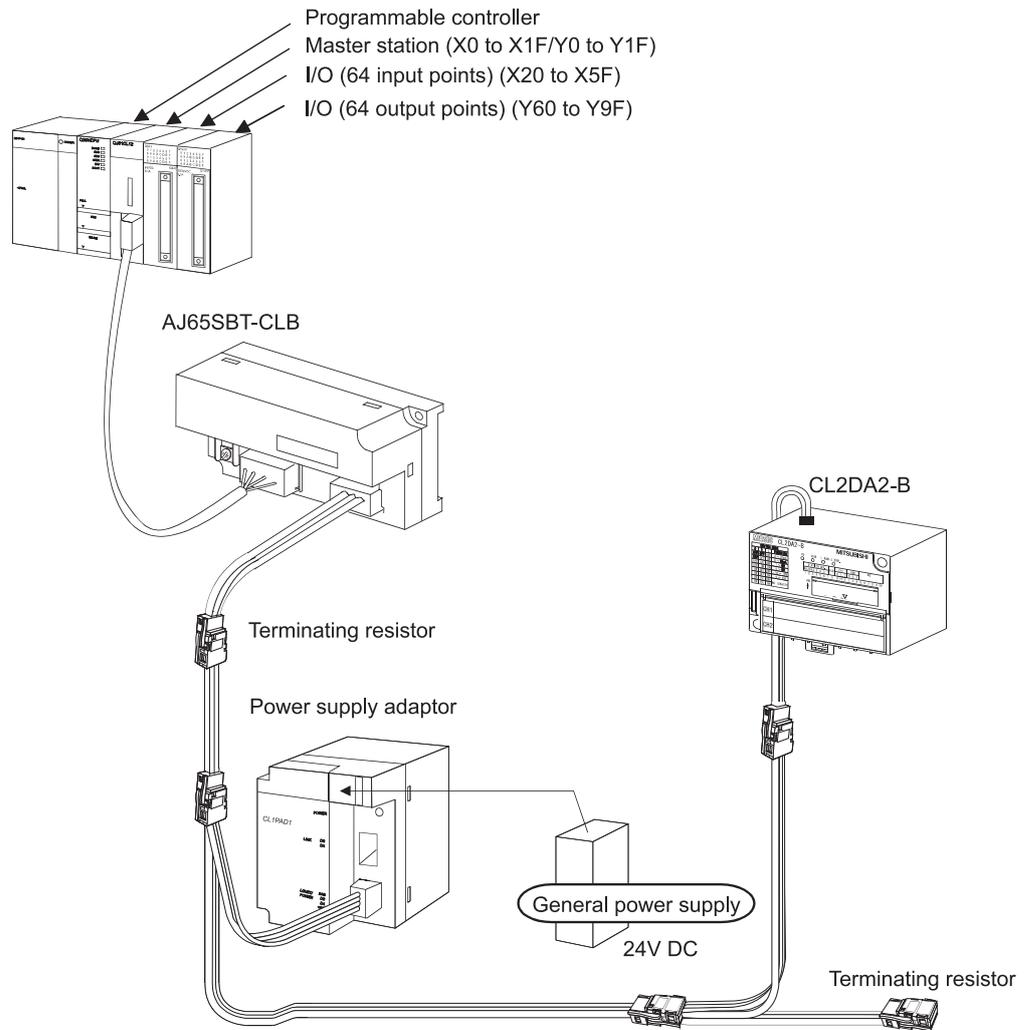
(1) System configuration

Programmable controller
Master station (X0 to X1F/Y0 to Y1F)
I/O (64 input points) (X20 to X5F)
I/O (64 output points) (Y60 to Y9F)

AJ65SBT-CLB

CL2DA2-B

Terminating resistor

Power supply adaptor

General power supply
24V DC

Terminating resistor

(a) Master station settings

Item	Settings
Number of occupied I/O points setting	32 points (X/Y00 to X/Y1F)
Transmission rate setting	156 kbps

(b) AJ65SBT-CLB settings

Item	Settings
Station number setting (CC-Link side)	Station number 1
Number of occupied stations setting (CC-Link side)	Occupies 4 stations
Transmission rate setting (CC-Link side)	156 kbps
Point mode setting (CC-Link/LT side)	16-point mode
Transmission rate setting (CC-Link/LT side)	156 kbps
Last station number setting (CC-Link/LT side)	2

(c) CL2DA2-B settings

Item	Settings
Station number setting	Station number 1
Number of occupied stations setting	Occupies 2 stations
CH1 output range setting	0 to 5V
CH2 output range setting	4 to 20mA
HOLD/CLEAR setting	HOLD

(2)   Device assignment to program examples
      The devices used in the program example of Section 5.3.1 to 5.3.4 are shown
      below.

(a)   Remote I/O (X/Y)

Station No.	Model Name	Input		Output		Station No.	Model Name	Input		Output	
1	CL2DA2-B (Occupies 2 stations)	X 400	Use prohibited	Y 400	CH1 digital value setting	3		X 420		Y 420	
		X 401		Y 401				X 421		Y 421	
		X 402		Y 402				X 422		Y 422	
		X 403		Y 403				X 423		Y 423	
		X 404		Y 404				X 424		Y 424	
		X 405		Y 405				X 425		Y 425	
		X 406		Y 406				X 426		Y 426	
		X 407		Y 407				X 427		Y 427	
		X 408		Y 408				X 428		Y 428	
		X 409		Y 409				X 429		Y 429	
		X 40A		Y 40A				X 42A		Y 42A	
		X 40B		Y 40B				X 42B		Y 42B	
		X 40C		Y 40C				X 42C		Y 42C	
		X 40D		Y 40D				X 42D		Y 42D	
		X 40E		Y 40E				X 42E		Y 42E	
		X 40F		Y 40F	CH1 output enable/ disable flag			X 42F		Y 42F	
2	CL2DA2-B (Occupies 2 stations)	X 410	Use prohibited	Y 410	CH2 digital value setting	4		X 430		Y 430	
		X 411		Y 411				X 431		Y 431	
		X 412		Y 412				X 432		Y 432	
		X 413		Y 413				X 433		Y 433	
		X 414		Y 414				X 434		Y 434	
		X 415		Y 415				X 435		Y 435	
		X 416		Y 416				X 436		Y 436	
		X 417		Y 417				X 437		Y 437	
		X 418		Y 418				X 438		Y 438	
		X 419		Y 419				X 439		Y 439	
		X 41A		Y 41A				X 43A		Y 43A	
		X 41B		Y 41B				X 43B		Y 43B	
		X 41C		Y 41C				X 43C		Y 43C	
		X 41D		Y 41D				X 43D		Y 43D	
		X 41E		Y 41E				X 43E		Y 43E	
		X 41F		Y 41F	CH2 output enable/ disable flag			X 43F		Y 43F	

(b) Remote register (RWw)

Device		Remote register (RWw)	Device		Remote register (RWw)
D200	RWw0	Last station number setting	D202	RWw2	Error status flag clear
D201	RWw1	Data link stop/restart instructions		—	

(c) Remote register (RWr)

Device*		Remote register (RWr)	Device*		Remote register (RWr)
D300(D456)	RWr0	Information of operating status	D305(D461)	RWr5	Data of remote station connection
D301(D457)	RWr1	Information of faulty station: station number 1 to 28	D306(D462)	RWr6	
D302(D458)	RWr2		D307(D463)	RWr7	Setting data
D303(D459)	RWr3	Remote input error information: station number 1 to 28		—	
D304(D460)	RWr4				

∗In the program example (refer to Section 5.3.3) that uses the RRPA instruction (automatic refresh parameter setting) with the ACPU/QCPU (A mode), RWr0 to RWr7 are assigned to D456 to D463.

(d) Devices used by user

Device	Application	Device	Application
X21	Data link stop instruction signal	X24	CH1 output enable signal
X22	Data link restart instruction signal	X25	CH2 output enable signal
Y90	CC-Link side data link error confirmation signal	Y93	CC-Link/LT side all station fault confirmation signal
Y91	CC-Link/LT side remote station connection error confirmation signal	Y94	CC-Link/LT side remote I/O error confirmation signal
Y92	CC-Link/LT side data link error confirmation signal		—
M0	CC-Link side data link status read flag	M100	CC-Link side data link normal flag
M10	RLPA instruction execution flag	M101	Control start flag
M11	RLPA instruction normally completed flag	M200 to M215	Reading information of operating status flag
M12	RLPA instruction abnormally completed flag	M250 to M253	Reading information of faulty station flag
M13	RRPA instruction execution flag	M300	Instructing data link stop flag
M20	Network parameter setting flag	M315	Instructing data link restart flag
D11	CH1 digital value setting, output enable/disable flag storing data register	D13	CH1 digital value setting monitoring data register
D12	CH2 digital value setting, output enable/disable flag storing data register	D14	CH2 digital value setting monitoring data register

(3) Relation between programmable controller CPU, CC-Link master station, AJ65SBT-CLB and CL2DA2-B

Programmable controller		CC-Link master station			AJ65SBT-CLB		CL2DA2-B (Station No.1)	
Device X		Address	Remote input (RX)		Remote input (RX)		Input	
X400 to X40F		E0H	RX00 to RX0F		RX00 to RX0F		X400 to X40F	
X410 to X41F		E1H	RX10 to RX1F		RX10 to RX1F		X410 to X41F	
X420 to X42F		E2H	RX20 to RX2F		RX20 to RX2F			
X430 to X43F		E3H	RX30 to RX3F		RX30 to RX3F			
X440 to X44F		E4H	RX40 to RX4F		RX40 to RX4F			
X450 to X45F		E5H	RX50 to RX5F		RX50 to RX5F			
X460 to X46F		E6H	RX60 to RX6F		RX60 to RX6F			
X470 to X47F		E7H	RX70 to RX7F	System area	RX70 to RX7F			

Device Y		Address	Remote output (RY)		Remote output (RY)		Output	
Y400 to Y40F		160H	RY00 to RY0F		RY00 to RY0F		Y400 to Y40F	
Y410 to Y41F		161H	RY10 to RY1F		RY10 to RY1F		Y410 to Y41F	
Y420 to Y42F		162H	RY20 to RY2F		RY20 to RY2F			
Y430 to Y43F		163H	RY30 to RY3F		RY30 to RY3F			
Y440 to Y44F		164H	RY40 to RY4F		RY40 to RY4F			
Y450 to Y45F		165H	RY50 to RY5F		RY50 to RY5F			
Y460 to Y46F		166H	RY60 to RY6F		RY60 to RY6F			
Y470 to Y47F		167H	RY70 to RY7F	System area	RY70 to RY7F			

Device D		Address	Remote register (RWw)		Remote register (RWw)	
D200		1E0H	RWw0		RWw0	Last station number setting
D201		1E1H	RWw1		RWw1	Data link stop/restart instructions
D202		1E2H	RWw2		RWw2	Error status flag clear
D203		1E3H	RWw3		RWw3	Use prohibited
D204		1E4H	RWw4		RWw4	Use prohibited
D205		1E5H	RWw5		RWw5	Use prohibited
to		to	to		to	
D215		1EFH	RWwF		RWwF	Use prohibited

Device D *		Address	Remote register (RWr)		Remote register (RWr)	
D300		2E0H	RWr0		RWr0	Information of operating status
D301		2E1H	RWr1		RWr1	Information of faulty station
D302		2E2H	RWr2		RWr2	Information of faulty station
D303		2E3H	RWr3		RWr3	Remote I/O error information
D304		2E4H	RWr4		RWr4	Remote I/O error information
D305		2E5H	RWr5		RWr5	Data of remote station connection
D306		2E6H	RWr6		RWr6	Data of remote station connection
D307		2E7H	RWr7		RWr7	Setting data
D308		2E8H	RWr8		RWr8	Use prohibited
to		to	to		to	
D315		2EFH	RWrF		RWrF	Use prohibited

∗ In the program example (refer to Section 5.3.3) that uses the RRPA instruction (automatic refresh parameter setting) with the ACPU/QCPU (A mode), RWr0 to RWr7 are assigned to D456 to D463.

> **POINT**
>
> Depending on the CPU module, the devices used in the program examples of this chapter may be unusable. For the valid ranges of the devices, refer to the users' manual of the CPU module.
> For example, when the A1SCPU is used, devices of X100, Y100 and later cannot be used. Use the devices such as B and M.

5.3.1 Program example for use of QCPU (Q Mode)

The network parameters and automatic refresh parameters are set using GX Developer.

(1) Parameter setting

(a) Network parameter setting

	1
Start I/O No	0000
Operational setting	Operational settings
Type	Master station
Master station data link type	PLC parameter auto start
Mode	Remote net(Ver.1 mode)
All connect count	1
Remote input(RX)	
Remote output(RY)	
Remote register(RWr)	
Remote register(RWw)	
Ver.2 Remote input(RX)	
Ver.2 Remote output(RY)	
Ver.2 Remote register(RWr)	
Ver.2 Remote register(RWw)	
Special relay(SB)	
Special register(SW)	
Retry count	3
Automatic reconnection station count	1
Stand by master station No.	
PLC down select	Stop
Scan mode setting	Asynchronous
Delay infomation setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

Station No.	Station type	Expanded cyclic setting	Exclusive station count	Remote station points	Reserve/invalid station select	Intelligent buffer select(word)		
						Send	Receive	Automatic
1/1	Remote device station	single	Exclusive station 4	128 points	No setting			

(b) Automatic refresh parameter setting

	1
Start I/O No	0000
Operational setting	Operational settings
Type	Master station
Master station data link type	PLC parameter auto start
Mode	Remote net(Ver.1 mode)
All connect count	1
Remote input(RX)	X400
Remote output(RY)	Y400
Remote register(RWr)	D300
Remote register(RWw)	D200
Ver.2 Remote input(RX)	
Ver.2 Remote output(RY)	
Ver.2 Remote register(RWr)	
Ver.2 Remote register(RWw)	
Special relay(SB)	SB0
Special register(SW)	SW0
Retry count	3
Automatic reconnection station count	1
Stand by master station No.	
PLC down select	Stop
Scan mode setting	Asynchronous
Delay infomation setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

(2) Program example

CC-Link side data link status confirmation

```
      X0    X0F
──────╫─────┤├──────────────────────────────────────────[MOV    SW80    K1M0  ]   Data link status read

                  M0
                  ┤├──────────────────────────────────────────(Y90   )   AJ65SBT-CLB data link abnormal

                  X1    M0
                  ┤├────╫┤───────────────────────────[MC     N0     M100  ]   AJ65SBT-CLB data link normal

  N0   M100
──┬──┤├
```

CC-Link/LT side data link status confirmation

```
     D300.1
─────┤├──────────[◇    D305    H3    ]────────────────────(Y91   )   Checking for remote station
                                                                     connection error

                  [=    D305    H3    ]────────[MC     N1     M101  ]   Control starts when remote station
                                                                     connection status is normal

  N1   M101
──┬──┤├
```

CC-Link/LT side error confirmation

```
     D300.8
─────┤├──────────────────────────────────────────────────(Y92   )   Checking for data link error

     D300.9
─────┤├──────────────────────────────────────────────────(Y93   )   Checking if all stations
                                                                     are faulty or not

     D300.A
─────┤├──────────────────────────────────────────────────(Y94   )   Checking for remote I/O error
```

Setting of digital values, specification of output enable/disable

```
   D300.0  D300.1  D301.0  D301.1
───┤├─────┤├──────╫┤─────╫┤───────────────────[MOV    K500    D11   ]   CH1 digital value setting

                                               [MOV    D11     D13   ]   Storing CH1 digital value setting
                                                                         in the data register for monitoring.

                               X24
                               ┤├──────────────────────────(D11.F )   CH1 output enable

                                               [MOV    K1000   D12   ]   CH2 digital value setting

                                               [MOV    D12     D14   ]   Storing CH2 digital value setting
                                                                         in the data register for monitoring.

                               X25
                               ┤├──────────────────────────(D12.F )   CH2 output enable

                                               [DMOV   D11     K8Y400]   Writing the setting to CL2DA2-B.

                                               [MCR    N1     ]

                                               [MCR    N0     ]

     X21    X22    D300.0
─────┤├────╫┤─────┤├──────────────────────────────────────(D201.0)   Instructing data link stop

     X22    X21    D300.0
─────┤├────╫┤─────╫┤──────────────────────────────────────(D201.F)   Instructing data link restart

                                               [END    ]
```

5.3.2 Program example for use of QnACPU

The network parameters and automatic refresh parameters are set using GX Developer.

(1) Parameter setting

(a) Network parameter setting

	1
Start I/O No.	0000
Type	Master station ▼
All connect count	1
Remote input(RX)	
Remote output(RY)	
Remote register(RWr)	
Remote register(RWw)	
Special relay(SB)	
Special register(SW)	
Retry count	3
Automatic reconnection station count	1
Wait master station No.	0
PLC down select	Stop ▼
Scan mode setting	Asynchronously ▼
Delay information setting	0
Station information setting	Station information

StationNo.	Station type	Exclusive station count	Reserve/invalid station select	Intelligent buffer select(word)			▲
				Send	Receive	Automatic	
1/ 1	Remote device station ▼	Exclusive station 4 ▼	No setting ▼				▼

(b) Automatic refresh parameter setting

	1
Start I/O No.	0000
Type	Master station ▼
All connect count	1
Remote input(RX)	X400
Remote output(RY)	Y400
Remote register(RWr)	D300
Remote register(RWw)	D200
Special relay(SB)	B0
Special register(SW)	W0
Retry count	3
Automatic reconnection station count	1
Wait master station No.	0
PLC down select	Stop ▼
Scan mode setting	Asynchronously ▼
Delay information setting	0
Station information setting	Station information

(2) Program example

CC-Link side data link status confirmation

```
       X0    X0F
      ─┤/├──┤├──────────────────────────────────[MOV    W80    K1M0 ]   Data link status read

                  M0
                 ─┤├────────────────────────────────────────(Y90 )     AJ65SBT-CLB data link abnormal

                  X1     M0
                 ─┤├────┤/├─────────────────────────[MC    N0     M100 ]   AJ65SBT-CLB data link normal

  N0 ┬ M100
    ─┤├
```

CC-Link/LT side data link status confirmation

```
      D300
     ─┤├────┬──[◇    D305    H3 ]────────────────────────(Y91 )     Checking for remote station
            │                                                        connection error
            └──[=    D305    H3 ]─────────────────[MC    N1     M101 ]   Control starts when remote
                                                                    station connection status
                                                                    is normal

  N1 ┬ M101
    ─┤├
```

CC-Link/LT side error confirmation

```
     D300.8
    ─┤├──────────────────────────────────────────────(Y92 )     Checking for data link error

     D300.9
    ─┤├──────────────────────────────────────────────(Y93 )     Checking if all stations are
                                                                 faulty or not
     D300.A
    ─┤├──────────────────────────────────────────────(Y94 )     Checking for remote I/O error
```

Setting of digital values, specification of output enable/disable

```
   D300.0  D300.1  D301.0  D301.1
  ──┤├─────┤├─────┤/├─────┤/├──┬───────────[MOV    K500    D11 ]   CH1 digital value setting
                              │
                              ├───────────[MOV    D11     D13 ]   Storing CH1 digital value setting
                              │                                   in the data register for monitoring.
                              │    X24
                              ├───┤├────────────────────(D11.F )  CH1 output enable
                              │
                              ├───────────[MOV    K1000   D12 ]   CH2 digital value setting
                              │
                              ├───────────[MOV    D12     D14 ]   Storing CH2 digital value setting
                              │                                   in the data register for monitoring.
                              │    X25
                              ├───┤├────────────────────(D12.F )  CH2 output enable
                              │
                              └───────────[DMOV   D11    K8Y400]   Writing the setting to CL2DA2-B.

  ─────────────────────────────────────────────────[MCR    N1 ]

  ─────────────────────────────────────────────────[MCR    N0 ]

    X21    X22   D300.0
   ─┤├────┤/├────┤/├──────────────────────────────────(D201.0 )   Instructing data link stop

    X22    X21   D300.0
   ─┤├────┤/├────┤/├──────────────────────────────────(D201.F )   Instructing data link restart

  ─────────────────────────────────────────────────[END ]
```

5.3.3 Program example for use of ACPU/QCPU (A Mode) (dedicated instructions)

A sequence program is used to set the network and automatic refresh parameters.

(1) Program example

Network parameter setting with dedicated instruction RLPA

Ladder	Comment
X0 X0F —[PLS M10]	
M10 —[MOV K0 D0]	Synchronous mode disable
—[MOV K1 D1]	Number of connected modules: 1
—[MOV H1401 D2]	Station data of AJ65SBT-CLB (remote device station, occupies 4 stations , Station No. 1)
—[LEDA RLPA]	Dedicated instruction (RLPA)
—[SUB H0]	Start I/O number of master module
—[LEDC D0]	Parameter storage head device
—[LEDC M11]	Device that turns on one scan at completion
—[LEDR]	
M12 —[FROM H0 H668 D3 K1]	Parameter status read at abnormal completion

Automatic refresh parameter setting with dedicated instruction RRPA

Ladder	Comment
X0 X0F M12 —[PLS M13]	
M13 —[MOV H0 D100]	Setting of RX head number
—[MOV H1 D101]	Setting of "X"
—[MOV H400 D102]	Setting of X400
—[MOV K64 D103]	Setting of 64 points
—[MOV H0 D104]	Setting of RY head number
—[MOV H2 D105]	Setting of "Y"
—[MOV H400 D106]	Setting of Y400
—[MOV K64 D107]	Setting of 64 points
—[MOV H0 D108]	Setting of RW head number
—[MOV H7 D109]	Setting of "D"
—[MOV K200 D110]	Setting of D200
—[MOV K272 D111]	Setting of 272 points

```
                                              ─[MOV    H0      D112 ]  Setting of SB head
                                                                      number

                                              ─[MOV    H4      D113 ]  Setting of "B"

                                              ─[MOV    K0      D114 ]  Setting of B0

                                              ─[MOV    K512    D115 ]  Setting of 512 points

                                              ─[MOV    H0      D116 ]  Setting of SW head
                                                                      number

                                              ─[MOV    H8      D117 ]  Setting of "W"

                                              ─[MOV    H0      D118 ]  Setting of W0

                                              ─[MOV    K512    D119 ]  Setting of 512 points

                                              ─[LEDA   RRPA ]          Dedicated instruction
                                                                      (RRPA)

                                              ─[SUB    H0 ]            Start I/O number of
                                                                      master module

                                              ─[LEDC   D100 ]          Parameter storage
                                                                      head device

                                              ─[LEDR ]
```

CC-Link side data link status confirmation

```
   X0    X0F
───┤╱├───┤├─────────────────────────────────[MOV    W80     K1M0 ]  Data link status read

         M0
        ─┤├──────────────────────────────────────────────(Y90 )     AJ65SBT-CLB data link abnormal

         X1    M0
        ─┤├───┤╱├───────────────────────────[MC     N0      M100 ]  AJ65SBT-CLB data link normal

N0  M100
───┤ ├
```

CC-Link/LT side data link status confirmation

```
   M9036
───┤ ├──────────────────────────────────────[MOV    D456    K4M200 ]  Reading information of operating
                                                                      status

        ─────────────────────────────────────[MOV    D457    K1M250 ]  Reading information of faulty
                                                                      station

   M201
───┤ ├────[◇    D461    H3 ]──────────────────────────────(Y91 )     Checking for remote station
                                                                     connection error

          [=    D461    H3 ]──────────────[MC     N1      M101 ]     Control starts when remote
                                                                     station connection status is normal

N1  M101
───┤ ├
```

CC-Link/LT side error confirmation

```
   M208
───┤ ├──────────────────────────────────────────────────(Y92 )     Checking for data link error

   M209
───┤ ├──────────────────────────────────────────────────(Y93 )     Checking if all stations are
                                                                    faulty or not

   M210
───┤ ├──────────────────────────────────────────────────(Y94 )     Checking for remote I/O error
```

Setting of digital values, specification of output enable/disable

```
M200  M201  M250  M251
 ┤├────┤├────┤/├────┤/├───────────────────────────────[MOV    K500    D11   ]  CH1 digital value setting

                                                        [MOV    D11     D13   ]  Storing CH1 digital value setting
                                                                                 in the data register for monitoring.
             X24
              ┤├────────────────────────────────────[WOR    H8000   D11   ]  CH1 output enable

             X24
              ┤/├───────────────────────────────────[WAND   H7FFF   D11   ]  CH1 output is not allowed when
                                                                                 the CH1 output enable signal is OFF.

                                                        [MOV    K1000   D12   ]  CH2 digital value setting

                                                        [MOV    D12     D14   ]  Storing CH2 digital value setting
                                                                                 in the data register for monitoring.
             X25
              ┤├────────────────────────────────────[WOR    H8000   D12   ]  CH2 output enable

             X25
              ┤/├───────────────────────────────────[WAND   H7FFF   D12   ]  CH2 output is not allowed when
                                                                                 the CH2 output enable signal is OFF.

                                                        [DMOV   D11    K8Y400 ]  Writing the setting to CL2DA2-B.

                                                        [MCR    N1            ]

                                                        [MCR    N0            ]

 X21   X22   M200
 ┤├────┤/├────┤├───────────────────────────────────────────────────(M300   )  Instructing data link stop

 X22   X21   M200
 ┤├────┤/├────┤/├───────────────────────────────────────────────────(M315   )  Instructing data link restart

 M9036
 ┤├──────────────────────────────────────────────────[MOV    K4M300  D201  ]  Data link stop/restart
                                                                                 instruction write

                                                        [END                 ]
```
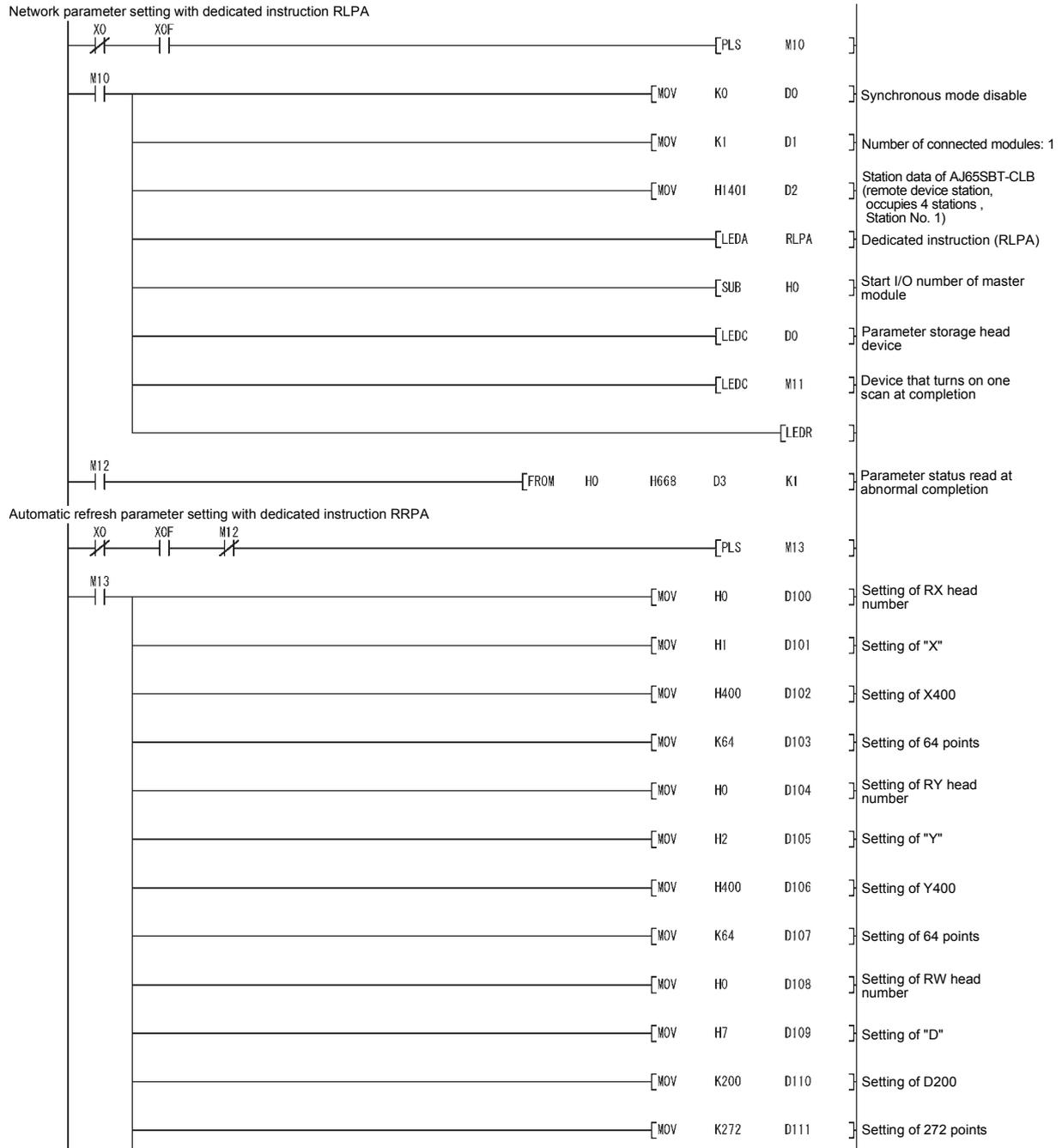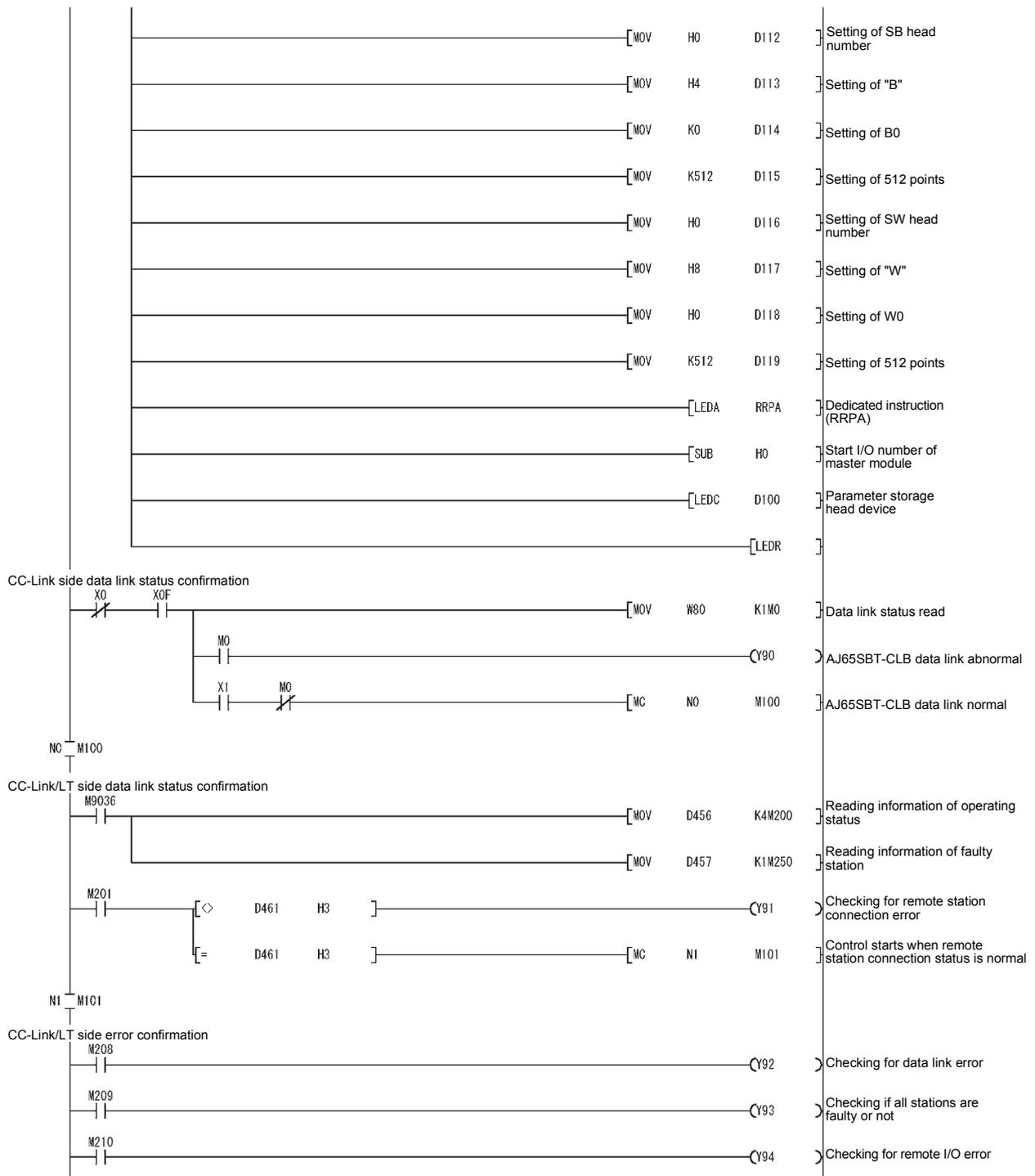
5.3.4 Program example for use of ACPU/QCPU (A Mode) (FROM/TO instructions)

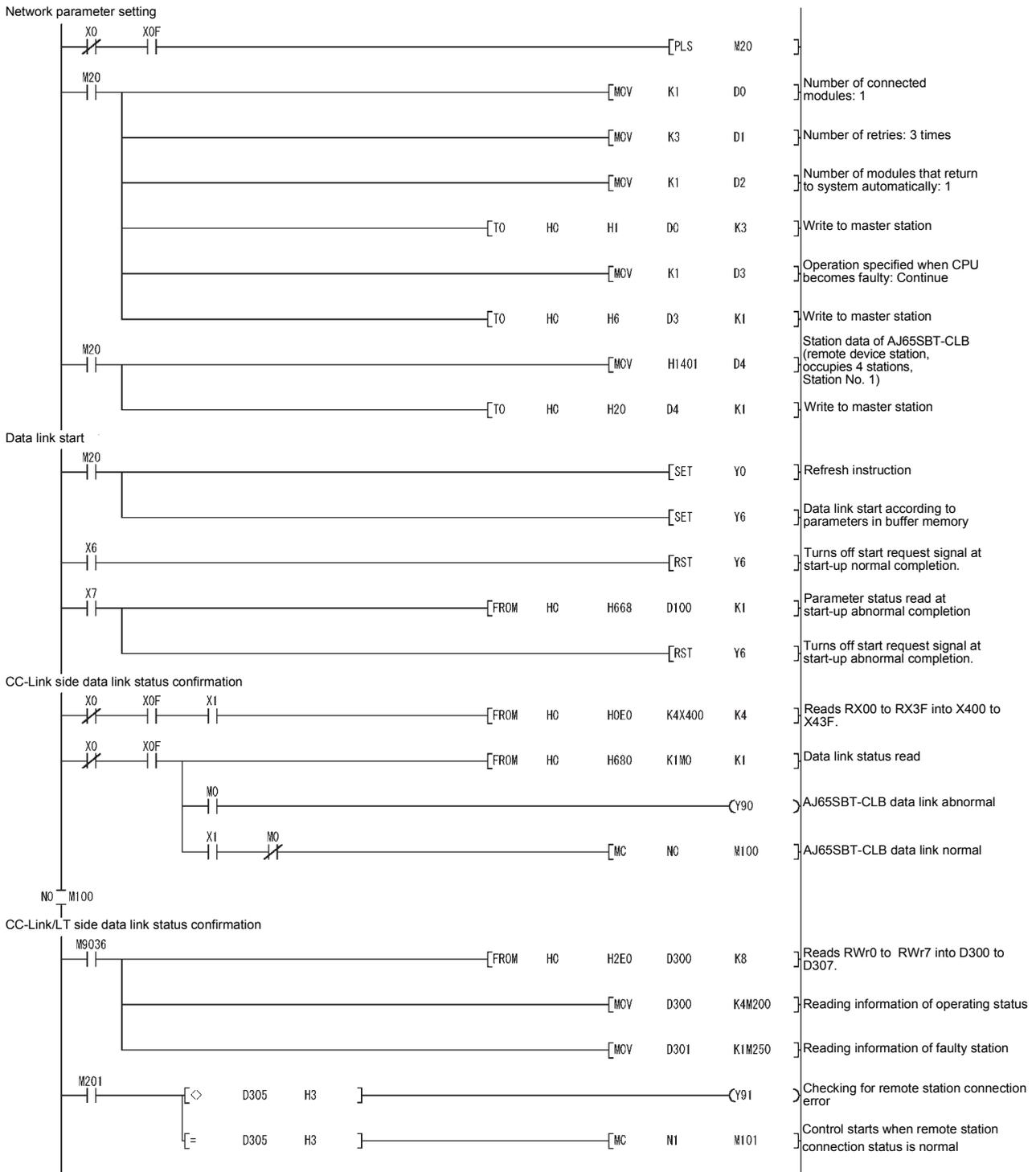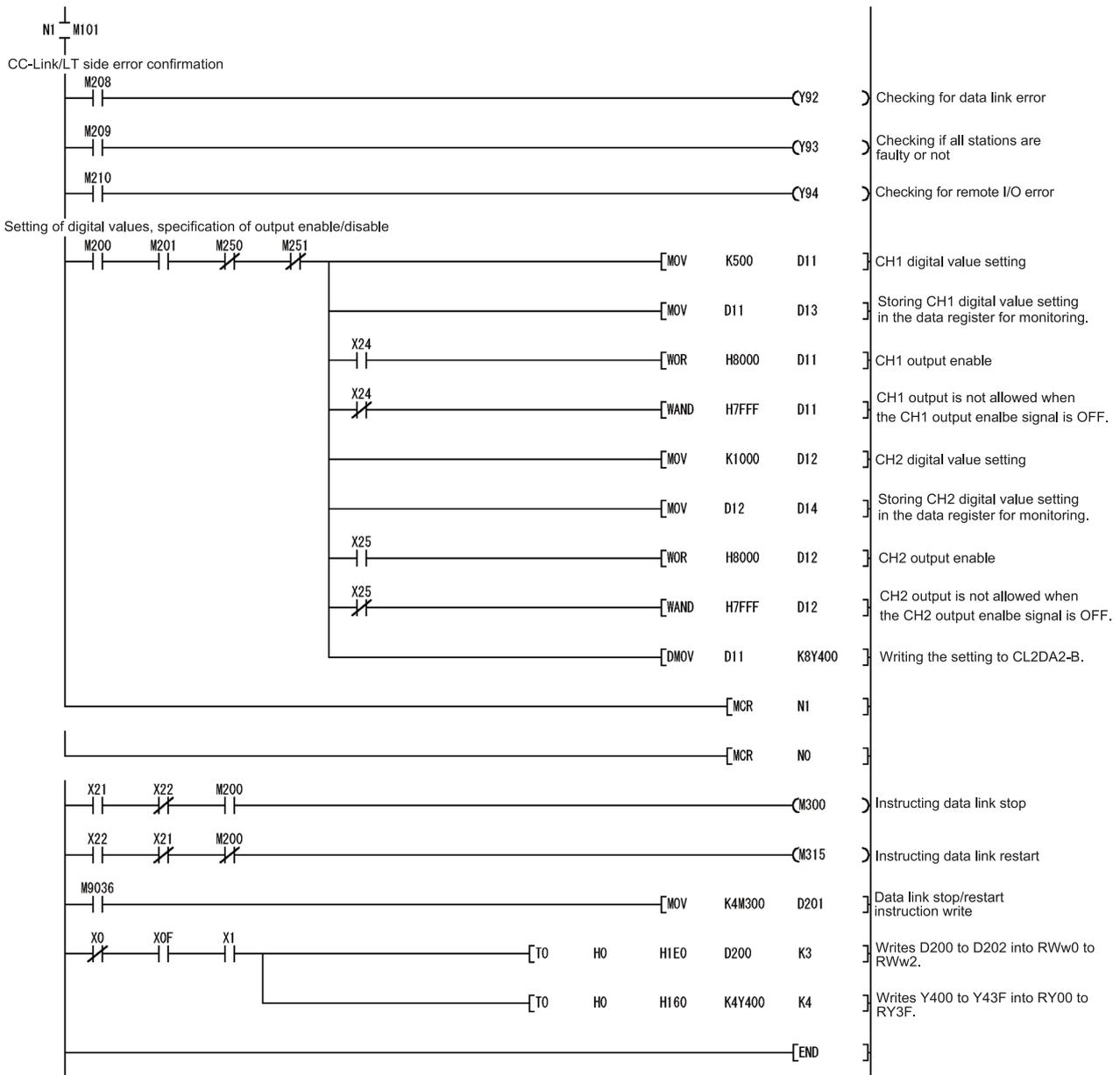A sequence program is used to set the network parameters.

(1) Program example

Network parameter setting

```
    X0    X0F
    ─┤/├───┤ ├──────────────────────────────────[PLS    M20    ]

    M20
    ─┤ ├────┬─────────────────────────────[MOV    K1     D0     ]   Number of connected
            │                                                        modules: 1
            │
            ├─────────────────────────────[MOV    K3     D1     ]   Number of retries: 3 times
            │
            │
            ├─────────────────────────────[MOV    K1     D2     ]   Number of modules that return
            │                                                        to system automatically: 1
            │
            ├──────────────────────[TO    H0    H1    D0    K3  ]   Write to master station
            │
            ├─────────────────────────────[MOV    K1     D3     ]   Operation specified when CPU
            │                                                        becomes faulty: Continue
            │
            └──────────────────────[TO    H0    H6    D3    K1  ]   Write to master station

    M20                                                             Station data of AJ65SBT-CLB
    ─┤ ├────┬─────────────────────────────[MOV    H1401  D4     ]   (remote device station,
            │                                                        occupies 4 stations,
            │                                                        Station No. 1)
            └──────────────────────[TO    H0    H20   D4    K1  ]   Write to master station
```

Data link start

```
    M20
    ─┤ ├────┬───────────────────────────────────[SET    Y0     ]   Refresh instruction
            │
            └───────────────────────────────────[SET    Y6     ]   Data link start according to
                                                                    parameters in buffer memory
    X6
    ─┤ ├────────────────────────────────────────[RST    Y6     ]   Turns off start request signal at
                                                                    start-up normal completion.
    X7
    ─┤ ├────┬──────────────────────[FROM   H0   H668  D100  K1 ]   Parameter status read at
            │                                                        start-up abnormal completion
            │
            └───────────────────────────────────[RST    Y6     ]   Turns off start request signal at
                                                                    start-up abnormal completion.
```

CC-Link side data link status confirmation

```
    X0    X0F    X1
    ─┤/├───┤ ├───┤ ├───────────────[FROM   H0   H0E0  K4X400 K4]   Reads RX00 to RX3F into X400 to
                                                                    X43F.
    X0    X0F
    ─┤/├───┤ ├──┬─────────────────[FROM   H0   H680  K1M0   K1 ]   Data link status read
                │
                │    M0
                ├───┤ ├────────────────────────────────────(Y90 )  AJ65SBT-CLB data link abnormal
                │
                │    X1    M0
                └───┤ ├───┤/├───────────────────[MC    N0    M100 ] AJ65SBT-CLB data link normal

  N0  M100
  ──┬──┤ ├
```

CC-Link/LT side data link status confirmation

```
    M9036
    ─┤ ├────┬──────────────────────[FROM   H0   H2E0  D300  K8 ]   Reads RWr0 to RWr7 into D300 to
            │                                                        D307.
            │
            ├─────────────────────────────[MOV    D300   K4M200 ]  Reading information of operating status
            │
            └─────────────────────────────[MOV    D301   K1M250 ]  Reading information of faulty station

    M201
    ─┤ ├────┬───[<>    D305   H3   ]───────────────────────(Y91 )  Checking for remote station connection
            │                                                        error
            │
            └───[=     D305   H3   ]────────────[MC    N1    M101 ] Control starts when remote station
                                                                    connection status is normal
```

```
 N1 ┬ M101
    ┴

CC-Link/LT side error confirmation
    M208
    ─┤├──────────────────────────────────────────────────(Y92 )  Checking for data link error

    M209
    ─┤├──────────────────────────────────────────────────(Y93 )  Checking if all stations are
                                                                  faulty or not
    M210
    ─┤├──────────────────────────────────────────────────(Y94 )  Checking for remote I/O error

Setting of digital values, specification of output enable/disable
   M200  M201  M250  M251
   ─┤├───┤├───┤/├───┤/├─┬──────────────────[MOV   K500   D11 ]  CH1 digital value setting
                        │
                        ├──────────────────[MOV   D11    D13 ]  Storing CH1 digital value setting
                        │                                       in the data register for monitoring.
                        │   X24
                        ├──┤├───────────────[WOR   H8000  D11 ]  CH1 output enable
                        │
                        │   X24                                 CH1 output is not allowed when
                        ├──┤/├───────────────[WAND  H7FFF  D11 ]  the CH1 output enalbe signal is OFF.
                        │
                        ├──────────────────[MOV   K1000  D12 ]  CH2 digital value setting
                        │
                        ├──────────────────[MOV   D12    D14 ]  Storing CH2 digital value setting
                        │                                       in the data register for monitoring.
                        │   X25
                        ├──┤├───────────────[WOR   H8000  D12 ]  CH2 output enable
                        │
                        │   X25                                 CH2 output is not allowed when
                        ├──┤/├───────────────[WAND  H7FFF  D12 ]  the CH2 output enalbe signal is OFF.
                        │
                        └──────────────────[DMOV  D11  K8Y400]  Writing the setting to CL2DA2-B.

    ────────────────────────────────────────[MCR   N1 ]
    ────────────────────────────────────────[MCR   N0 ]

    X21   X22   M200
   ─┤├───┤/├───┤/├──────────────────────────────────────(M300 )  Instructing data link stop

    X22   X21   M200
   ─┤├───┤/├───┤/├──────────────────────────────────────(M315 )  Instructing data link restart

    M9036
   ─┤├───────────────────────────────────[MOV   K4M300  D201]  Data link stop/restart
                                                                instruction write
    X0    X0F   X1
   ─┤/├──┤├───┤├─┬──────────[TO   H0   H1E0   D200   K3 ]  Writes D200 to D202 into RWw0 to
                 │                                          RWw2.
                 │
                 └──────────[TO   H0   H160   K4Y400  K4 ]  Writes Y400 to Y43F into RY00 to
                                                            RY3F.
    ────────────────────────────────────────[END ]
```

6 TROUBLESHOOTING

The details of the errors which may occur when using the CL2DA2-B and trouble shooting measures are described in this chapter.
When a problem has occurred, first check the CC-Link/LT master module and AJ65SBT-CLB for any error.
When no error is identified in either of them, refer to Sections 6.1 and 6.2.
The module may be faulty if no analog value is output after corrective actions have been taken according to the check items of this chapter. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

6.1 Using the LED Indications to Check Errors

This section explains how to check errors using the LED indications of the CL2DA2-B. Check in due order, starting with (1).

(1) When the CL2DA2-B "PW" LED is off

Check item	Corrective action
Is the wiring correct?	Check the wiring.
Is the supply voltage within the specified range?	Make the supply voltage within the specified range.

(2) When the CL2DA2-B "RUN" LED is flickering

Check item	Corrective action
Is the digital value setting outside the setting range?	Correct the sequence program.
Was the analog output setting switch or HOLD/CLEAR setting switch setting changed during operation?	Return the switch setting to the power-on setting.
Are the analog output setting switches set to disable the conversion of all channels?	Check the analog output setting switch setting.
Is the NC switch ON?	After powering OFF the whole system (master and remote stations), turn OFF the NC switch and power ON the whole system again.

(3) When the CL2DA2-B "RUN" LED is off

Check item	Corrective action
Is the bit corresponding to the remote I/O error information of the CC-Link/LT master module or AJ65SBT-CLB ON?	Power ON the CL2DA2-B again. If the "RUN" LED does not turn ON after the CL2AD4-B has been powered ON again, the hardware may be faulty. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

(4) When the CL2DA2-B "L RUN" LED is off

Check item	Corrective action
Was the transmission rate setting of the CC-Link/LT master module or AJ65SBT-CLB changed after data link communication?	Power OFF and then ON the whole system (master and remote stations).
Any line problem? *1	Correct communication cable wiring.
Is the station number within the controllable range of the CC-Link/LT master module or AJ65SBT-CLB? *2	Set the station number to within the controllable range of the CC-Link/LT master module or AJ65SBT-CLB. *3
Is the point mode setting correct?	Check the point mode setting.

*1: Check for a short, reversed connection, insulation displacement status, mixed cables, terminating resistors, overall distance, drop line distance (overall drop line length, maximum drop line length) and peripheral environment (noise, etc).

*2: Note the following points.
   - The station number setting switches are not mistaken for analog output setting switches.
   - Last station number setting of CC-Link/LT master module/AJ65SBT-CLB
   - All station numbers occupied by the local module are within the controllable range of the CC-Link/LT master module or AJ65SBT-CLB.

[Example of station number outside controllable range]
Master module: QJ61CL12
        Start I/O number: X/Y00
        Number of occupied I/O points setting: 32 points
        16-points mode
Station number 1: Remote I/O module
        Remote I/O point: 16 points (Occupies 1 station)
Station number 2: CL2DA2-B
        Remote I/O point: 32 points (Occupies 2 stations)
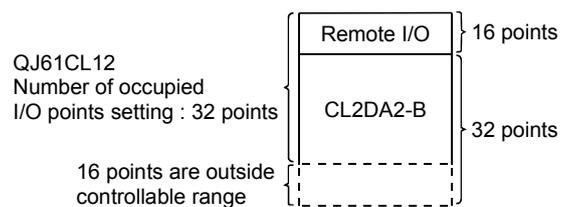
*3: After changing the station number setting, power OFF and then ON the whole system (master and remote stations).

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(5) When the CL2DA2-B "L ERR." LED flickers at fixed intervals (0.4s intervals)

Check item	Corrective action
Was the station number setting switch setting changed during normal operation?	Correct the switch setting.
Are the station number setting switches faulty?	If the "L ERR." LED starts flickering at fixed intervals (0.4s intervals) although the switch setting has not been changed during operation, the hardware may be faulty. Please consult your local Mitsubishi representative, explaining a detailed description of the problem.

(6) When the CL2DA2-B "L ERR." flickers at unfixed intervals

Check item	Corrective action
Have you forgotten fitting terminating resistor?	Check whether the terminating resistor is fitted. If it is not connected, connect it and switch power on again.
Is the module or connection cable affected by noise?	Move the connection cable away from the noise source. When carrying out wiring in piping, earth the pipe without fail.

(7) When the CL2DA2-B "L ERR." is on

Check item	Corrective action
Are the station number and point mode set correctly?	Take action as described in (4)
Any line problem?	
Are the analog output setting switches set to disable the conversion of all channels?	Take action as described in (2)

6.2 When an Analog Output Value Is Not Output

Check item	Corrective action
Is the "PW" LED off?	Take action as described in Section 6.1 (1)
Is the "RUN" flickering or off?	Take action as described in Section 6.1 (2),(3)
Is the "L RUN" LED off?	Take action as described in Section 6.1 (4)
Is the "L ERR." LED on?	Take action as described in Section 6.1 (7)
Is the output enable/disable flag for the channel to be output set to disable?	Verify ON/OFF for the output enable/disable flags (YnF) in GX Developer monitor. (Refer to section 3.5.2) Review the sequence program if the output enable/disable flag (YnF) is OFF.
Is there any fault with the analog signal lines such as broken or disconnected line?	Check for any abnormality on the signal lines by doing a visual check and performing a continuity check.
Is the output setting range correct?	Check the analog output setting switches. (Refer to section 4.3) If the output range setting is incorrect, change the analog output setting switch setting and then power OFF and then ON the whole system (master and remote stations).
Are the station numbers overlapping?	Check that the station number is not the same as those of the other remote stations.

APPENDIX

Appendix1 External Dimensions

The external dimension of the CL2DA2-B is shown below.

Cable length : 500mm (19.69inch)

2Φ 4.5mounting hole
(M4 mounting screw)

MELSEC CL2DA2-B   MITSUBISHI

Unit : mm (inch)

APP

MEMO

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MEMO

WARRANTY

Please confirm the following product warranty details before using this product.

1. Gratis Warranty Term and Gratis Warranty Range

If any faults or defects (hereinafter "Failure") found to be the responsibility of Mitsubishi occurs during use of the product within the gratis warranty term, the product shall be repaired at no cost via the sales representative or Mitsubishi Service Company.

However, if repairs are required onsite at domestic or overseas location, expenses to send an engineer will be solely at the customer's discretion. Mitsubishi shall not be held responsible for any re-commissioning, maintenance, or testing on-site that involves replacement of the failed module.

[Gratis Warranty Term]

The gratis warranty term of the product shall be for one year after the date of purchase or delivery to a designated place.

Note that after manufacture and shipment from Mitsubishi, the maximum distribution period shall be six (6) months, and the longest gratis warranty term after manufacturing shall be eighteen (18) months. The gratis warranty term of repair parts shall not exceed the gratis warranty term before repairs.

[Gratis Warranty Range]

(1) The range shall be limited to normal use within the usage state, usage methods and usage environment, etc., which follow the conditions and precautions, etc., given in the instruction manual, user's manual and caution labels on the product.

(2) Even within the gratis warranty term, repairs shall be charged for in the following cases.

1. Failure occurring from inappropriate storage or handling, carelessness or negligence by the user. Failure caused by the user's hardware or software design.
2. Failure caused by unapproved modifications, etc., to the product by the user.
3. When the Mitsubishi product is assembled into a user's device, Failure that could have been avoided if functions or structures, judged as necessary in the legal safety measures the user's device is subject to or as necessary by industry standards, had been provided.
4. Failure that could have been avoided if consumable parts (battery, backlight, fuse, etc.) designated in the instruction manual had been correctly serviced or replaced.
5. Failure caused by external irresistible forces such as fires or abnormal voltages, and Failure caused by force majeure such as earthquakes, lightning, wind and water damage.
6. Failure caused by reasons unpredictable by scientific technology standards at time of shipment from Mitsubishi.
7. Any other failure found not to be the responsibility of Mitsubishi or that admitted not to be so by the user.

2. Onerous repair term after discontinuation of production

(1) Mitsubishi shall accept onerous product repairs for seven (7) years after production of the product is discontinued. Discontinuation of production shall be notified with Mitsubishi Technical Bulletins, etc.

(2) Product supply (including repair parts) is not available after production is discontinued.

3. Overseas service

Overseas, repairs shall be accepted by Mitsubishi's local overseas FA Center. Note that the repair conditions at each FA Center may differ.

4. Exclusion of loss in opportunity and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation of damages caused by any cause found not to be the responsibility of Mitsubishi, loss in opportunity, lost profits incurred to the user by Failures of Mitsubishi products, special damages and secondary damages whether foreseeable or not , compensation for accidents, and compensation for damages to products other than Mitsubishi products, replacement by the user, maintenance of on-site equipment, start-up test run and other tasks.

5. Changes in product specifications

The specifications given in the catalogs, manuals or technical documents are subject to change without prior notice.

MITSUBISHI ELECTRIC CORPORATION

When exported from Japan, this manual does not require application to the
Ministry of Economy, Trade and Industry for service transaction permission.

Specifications subject to change without notice.