MITSUBISHI

Digital-Analog Converter Module type AJ65BT-64DAV/DAI

User's Manual

A
MELSEC

Mitsubishi Programmable Controller

• 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 instructions 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 instructions.

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.

Observe the precautions of both levels because they are important for personal and system safety.

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

[Design Precautions]

⚠WARNING

- Install a safety circuit external to the programmable controller that keeps the entire system safe even when there are problems with the external power supply or the programmable controller. Otherwise, trouble could result from erroneous output or erroneous operation.
  (1) The status of analog output changes depending on the setting of various functions that control the analog output. Take sufficient caution when setting for those functions.
      For details of analog output status, refer to Section 3.4.5 "Combinations of various functions"
  (2) Normal output may not be obtained due to malfunctions of output elements or the internal circuits. So build an external monitoring circuit that will monitor any single outputs that could cause serious trouble.

⚠ CAUTION

- Do not bunch the control wires or communication cables with the main circuit or power wires, or install them close to each other.
  They should be installed 100mm(3.94inch) 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 module in the environment given in the general specifications of this Manual.
  Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.

- For protection of the switches, do not remove the cushioning material before installation.

- Securely fix the module with a DIN rail or mounting screws. Tighten the screws within the specified torque range.
  Undertightening can cause drop of the screw, short circuit, or malfunction.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

- Do not directly touch the module's conductive parts or electronic components.
  Touching the conductive parts could cause an operation failure or give damage to the module.

[Wiring Precautions]

⚠ CAUTION

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

- Be sure to ground the FG terminals to the protective ground conductor. Not doing so could result in erroneous operation.

- Use applicable solderless terminals and tighten them with the specified torque. If any solderless spade terminal is used, it may be disconnected when the terminal screw comes loose, resulting in failure.

- When wiring in the programmable controller, be sure that it is done correctly by checking the product's rated voltage and the terminal layout.
  Connecting a power supply that is different from the rating or incorrectly wiring the product could result in fire or damage.

- Tighten the terminal screws with the specified torque.
  If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation.
  Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction.

- Be sure there are no foreign substances such as sawdust or wiring debris inside the module.
  Such debris could cause fires, damage, or erroneous operation.

- Do not install the control lines together with the communication cables, or bring them close to each other. Failure to do so may cause malfunctions due to noise.

- When connecting the communication and power supply cables to the module, always run them in conduits or clamp them.
  Not doing so can damage the module and cables due to loose, moved or accidentally pulled cables or can cause a malfunction due to a cable connection fault.

[Wiring Precautions]

⚠ CAUTION

- When disconnecting the communication and power supply cables from the module, do not hold and pull the cable part.
  Disconnect the cables after loosening the screws in the portions connected to the module.
  Pulling the cables connected to the module can damage the module and cables or can cause a malfunction due to a cable connection fault.

[Starting and Maintenance Precautions]

⚠ CAUTION

- 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.

- Do not disassemble or modify the modules.
  Doing so could cause trouble, erroneous operation, injury, 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 could result in damage to the product.

- Do not install/remove the terminal block more than 50 times after the first use of the product.
  (IEC 61131-2 compliant)

- Before touching the module, always touch grounded metal, etc. to discharge static electricity from 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

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Jan., 1997	SH(NA)-3615-A	First printing
Jun., 2000	SH(NA)-3615-B	Addition of Q series types Chapter 2, Section 3.2, Section 3.4.1, Section 3.6.3, Section 4.2, Section 6.2 Partial changes Section 1.1(3), Section 3.1, Section 3.2, Section 3.4.5, Section 4.1, Section 4.6.2, Section 4.7.2, Section 5.2
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Introduction

Thank you for purchasing the Mitsubishi MELSEC-A Series General Purpose Programmable Controller.
Before using the equipment, plese read this manual carefully to develop full familiarity with the functions and performance of the graphic operation terminal you have purchased, so as to ensure correct use.
Please forward a copy of this manual to the end user.

Table of Contents

About this Manual

The following are manuals related to this product.
Request for the manuals as needed according to the chart below.

Related Manuals

Manual Name	Manual No. (Type code)
CC-Link System Master/Local Module Type AJ61BT11/A1SJ61BT11 User's Manual Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the AJ61BT11 and A1SJ61BT11. (Optionally available)	IB-66721 (13J872)
CC-Link System Master/Local Module Type AJ61QBT11/A1SJ61QBT11 User's Manual Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the AJ61QBT11 and A1SJ61QBT11. (Optionally available)	IB-66722 (13J873)
CC-Link System Master/Local Module User's Manual Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the QJ61BT11N. (Optionally available)	SH-080394E (13JR64)
MELSEC-L CC-Link System Master/Local Module User's Manual Describes the system configuration, Performance specifications, functions, handling, wiring and troubleshooting of the L26CPU-BT and LJ61BT11. (Optionally available)	SH-080895ENG (13JZ41)

Compliance with the EMC and Low Voltage Directives

(1) For programmable controller system
To configure a system meeting the requirements of the EMC and Low Voltage Directives when incorporating the Mitsubishi programmable controller (EMC and Low Voltage Directives compliant) into other machinery or equipment, refer to the "EMC AND LOW VOLTAGE DIRECTIVES" chapter of the User's Manual for the CPU module used.
The CE mark, indicating compliance with the EMC and Low Voltage Directives, is printed on the rating plate of the programmable controller.

(2) For the product
For the compliance of this product with the EMC and Low Voltage Directives, refer to the "CC-Link module" section in the "EMC AND LOW VOLTAGE DIRECTIVES" chapter of the User's Manual for the CPU module used.

MEMO

1.   OVERVIEW

1

This user's manual describes the specification and handling of AJ65BT-64DAV digital analog voltage conversion module (abbreviated as AJ65BT-64DAV from here on) and AJ65BT-64DAI digital analog current conversion module (abbreviated as AJ65BT-64DAI from here on), which is used as the remote device station for the CC-Link system.

(1)   AJ65BT-64DAV
This is a module which converts the digital values (16-bit encoded binary value) set in the programmable controller CPU to analog values (-10V to 0V to 10V voltage), and performs an external output to four channels.

(2)   AJ65BT-64DAI
This is a module which converts the digital values (16-bit encoded binary value) set in the programmable controller CPU to analog values (4mA to 20mA current), and performs an external output to four channels.

In this manual, the name which refers to both AJ65BT-64DAV and AJ65BT-64DAI is abbreviated as "AJ65BT-64DAV/DAI."

1.1   Features

The AJ65BT-64DAV/DAI has the following features:

(1)   One module can provide four channels of D/A conversion.
The AJ65BT-64DAV/DAI can produce output of analog values (voltage/current) to four external devices.

(2)   The analog-output enable/prohibit setting is possible for each channel.
The sequence program can specify whether to enable or prohibit analog output to the external devices after the D/A conversion for each channel.
Analog output from the channel where the analog output is prohibited will be 0V or 0mA.

(3)   You can make the analog output hold/clear setting at a programmable controller CPU stop or link error occurrence (all channels batch).
Using the HOLD/CLR terminal, you can select whether to hold or clear the analog output at the instant the programmable controller CPU is set to a STOP status or a link error occurs.

(4)   Offset and gain setting
When a fine I/O conversion characteristic is required, the offset and gain setting of each channel can be set without a volume control, enabling to modify the I/O conversion characteristic as desired.

MEMO

1

2.   SYSTEM CONFIGURATION

(1)   Applicable master modules
      For available master modules, visit the CC-Link Partner Associations (CLPA) website at:
      http://www.cc-link.org/

2

Remark

Check the specifications of the master module before use.

MEMO

2

3. SPECIFICATIONS

The general specifications, performance specifications, and I/O characteristics of the AJ65BT-64DAV/DAI are explained.

3.1 General Specification

The general specifications of the AJ65BT-64DAV/DAI are shown in Table 3.1.

Table 3.1 General specification

Item	Specification				
Usage ambient temperature	0 to 55°C				
Storage ambient temperature	-20 to 75°C				
Usage ambient humidity	10 to 90%RH, no condensation				
Storage ambient humidity	10 to 90%RH, no condensation				
Vibration durability	Conforming to JIS B 3502, IEC 61131-2		Frequency	Acceleration	Amplitude	Number of sweeps
		For intermittent vibration	5 to 9Hz	—	3.5mm (0.14 inches)	10 times in each X, Y, and Z direction
			9 to 150Hz	$9.8 m/s^2$	—	
		For continuous vibration	5 to 9Hz	—	1.75mm (0.069 inches)	—
			9 to 150Hz	$4.9 m/s^2$	—	
Shock durability	Conforming to JIS B 3502, IEC 61131-2 ($147 m/s^2$, 3 times each in XYZ directions)				
Usage environment	No corrosive gas				
Usage height [1]	Less than 2000 m (Less than 6562 ft.)				
Installation area	Within the control board				
Over-voltage category [2]	Less than II				
Pollution rate [3]	Less than 2				

Remark

[1] Do not operate or store the programmable controller in the environment where the pressure applied is equal to greater than the atmospheric pressure at the altitude of 0m.
Doing so may cause a malfunction. Please consult our branch office when the programmable controller is to be operated under pressure.

[2] Indicates the location where the device is connected from the public cable network to the device structure wiring area.
Category II applies to the devices to which the power is supplied from a fixed equipment.
Surge withstand voltage for devices with up to 300V of rated voltage is 2500V.

[3] This is an index which indicates the degree of conductive object generation in the environment where the device is used.   Level 2 is an environment where only nonconductive objects are formed with some chances of temporary conductivity generation due to occasional condensation.

3.2 Performance Specification

The performance specification of the AJ65BT-64DAV/DAI is shown Table 3.2:

Table 3.2 Performance specification

Item	Specification			
	AJ65BT-64DAV		AJ65BT-64DAI	
Digital input value	16-bit encoded binary (valid bit: 12 bits)			
	-2048 to 2047		0 to 4095	
Analog conversion value	Voltage: -10 to 10VDC (External load resistance: $2k\Omega$ to $1M\Omega$)		Current: 4 to 20mADC (External load resistance: 0 to 600Ω)	
I/O characteristics	Digital input value	Analog conversion value	Digital input value	Analog conversion value
	2000	10V	4000	20mA
	1000	5V	2000	12mA
	0	0V	0	4mA
	-1000	-5V		
	-2000	-10V		
Maximum resolution [1]	5mV		$4\mu A$	
Total accuracy [2] (accuracy for the maximum value)	± 1% (± 100mV)		± 1% (±200μA)	
Maximum conversion speed [3]	Max. 1ms per channel (4ms per 4 channels)			
Output short-circuit protection	Yes			
Insulation system	Across output channels: Non-insulated Across external supply power and analog output: Transformer insulated			
Analog output points	4 channels per module			
Offset/gain adjustment	Yes (user setting or factory setting)			
CC-Link station type	Remote device station			
Number of occupied stations	2 stations			
Connector terminal block	27-point terminal block (M3.5 × 7 screws)			
Supported cable size	0.75 to 2.00mm^2			
Supported solderless terminal	RAV 1.25-3.5 (according to JIS C 2805), RAV 2-3.5			
Module installation screw	M4 x 0.7mm x 16mm or larger screw (tightening torque 0.78 to 1.18N·m) Installable with the DIN rail.			
Supported DIN rail	TH35-7.5Fe, TH35-7.5Al,TH35-15Fe (conforming to JIS C 2812)			
External supply power	24V DC (20.4V DC to 26.4V DC)			
	Inrush current: 1.5A, within 0.67ms		Inrush current: 3.2A, within 0.43ms	
	Current consumption:0.18A (at 24VDC)		Current consumption:0.27A (at 24VDC)	
Noise resistance	Noise voltage: 500Vp-p Measured using a noise simulator with 1μs of noise amplitude and 25 to 60Hz of noise frequency.			
Dielectric withstand voltage	Power and communication systems batch-Analog output batch, 500VAC, one minute			
Insulation resistor	Power and communication systems batch-Analog output batch, 500VDC 10MΩ or more at the insulation resistance tester			
Weight	0.4kg		0.4kg	

*1   Maximum resolution of analog value
     The maximum resolution of analog value means the variation of analog value when the digital
     value changes for "1".

*2   Total accuracy
     The total accuracy is the accuracy of the maximum analog output value.
     ①   The overall accuracy of the AJ65BT-64 DAV is the accuracy for 10V.
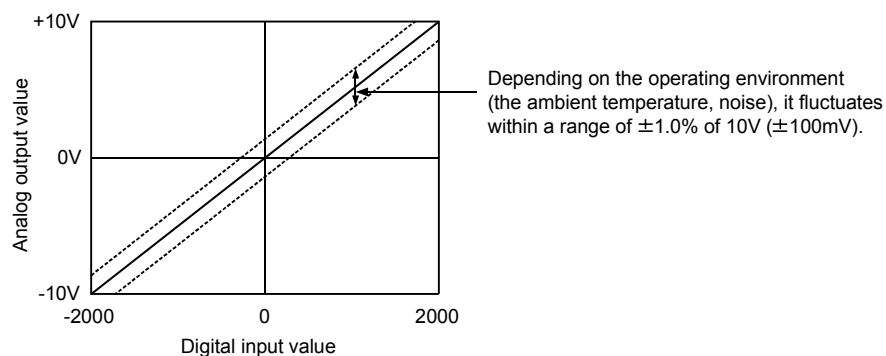
*2   ②   The overall accuracy of the AJ65BT-64 DAI is the accuracy for 20mA.
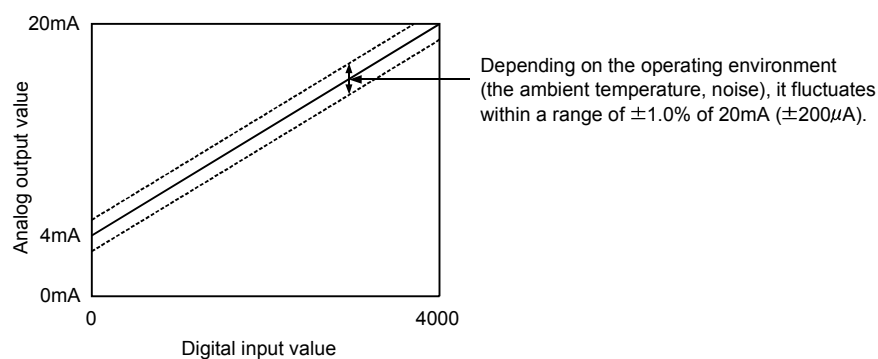
*3   Maximum conversion speed
     The maximum conversion speed means the time required to read the digital value written in the
     buffer memory, execute the D/A conversion, and output the specified analog value.   It takes the
     longest (1ms) to produce the maximum analog output value when the current output is the
     minimum, and to produce the minimum analog output value when the current output is the
     maximum.

3.3   I/O Conversion Characteristics

The I/O conversion characteristics of the AJ65BT-64DAV/DAI are explained.

3.3.1   Offset value and gain value

(1) Offset value
This is an analog value (voltage or current value) produced by the AJ65BT-64DAV/DAI when the digital value set by the programmable controller CPU is "0".

(2) Gain value
This is an analog value (voltage or current value) produced by the AJ65BT-64DAV/DAI when the digital value set by the programmable controller CPU is "2000" for AJ65BT-64DAV, and "4000" for AJ65BT-64DAI.

(3) The factory-set offset and gain values are as follows:

	AJ65BT-64DAV	AJ65BT-64DAI
Offset value	0V	4mA
Gain value	10V	20mA

(4) The offset value and gain value can be set separately for each channel in the test mode.

3.3.2   I/O conversion characteristics

(1) When AJ65BT-64DAV is used:
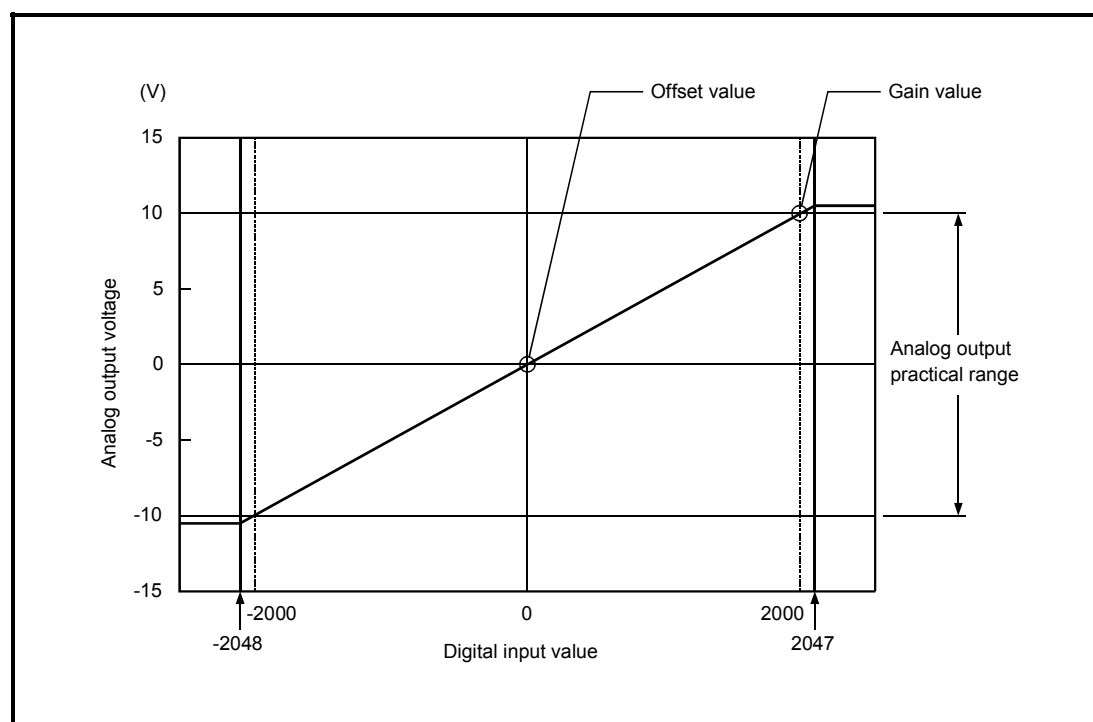
Figure 3.1 I/O conversion characteristics of the AJ65BT-64DAV

① How to calculate the analog output value:
The resolution of AJ65BT-64DAV can be set arbitrarily by modifying the settings of the offset value and gain value.
How to calculate the analog value resolution and the analog output value for a given digital input value when the settings of the offset value and gain value are changed is shown next.

(Analog output) = (Analog resolution) $\times$ (Digital input value) + (Offset value)

$$(\text{Analog resolution}) = \frac{(\text{Gain value}) - (\text{Offset value})}{2000}$$

②   The following graph shows the I/O characteristics when the offset and gain values of the AJ65BT-64DAV are changed:

The I/O conversion characteristics are shown in the graph on the right when the offset value and the gain value are set as in the following table:

Number	Offset value	Gain value
①	0V	10V
②	-10V	10V
③	4V	8V
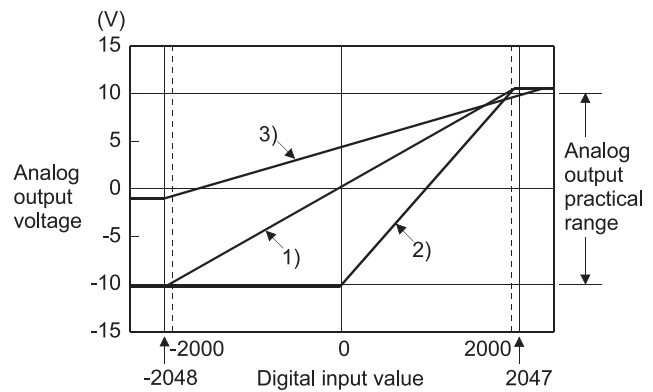
Example

The analog output voltage for the characteristic graphs ① to ③ becomes as below, when the digital input value is at 1000 and 500:

Number	Digital input value	Analog output voltage
①	1000	5.0V
	500	2.5V
②	1000	0V
	500	-5.0V
③	1000	6.0V
	500	5.0V

Figure 3.2 I/O conversion characteristics of AJ65BT-64DAV

(2)   When AJ65BT-64DAI is used:
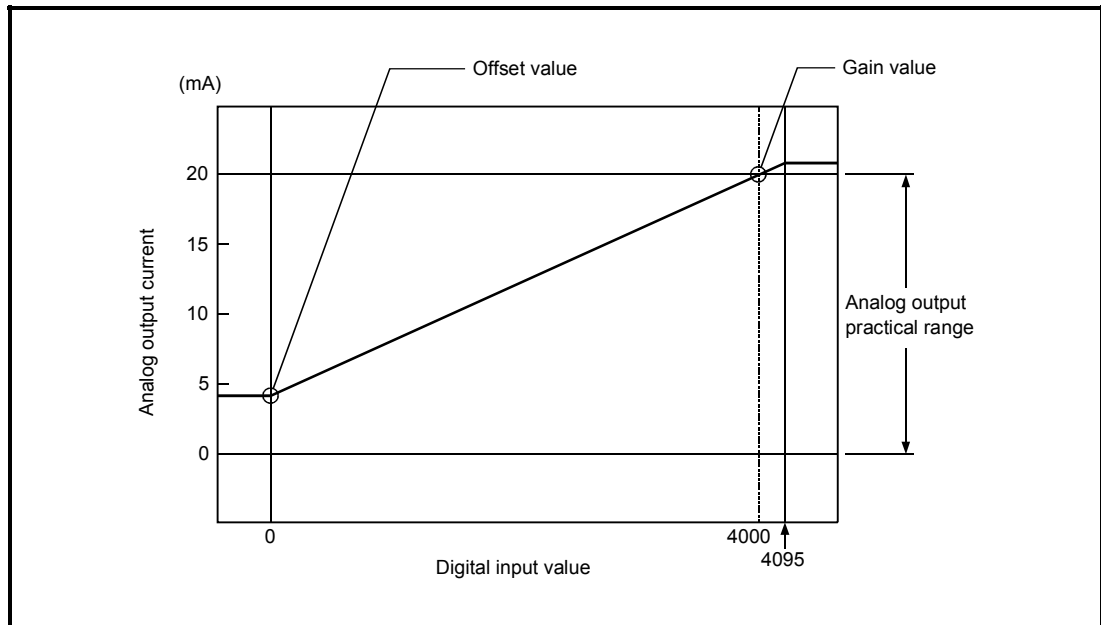
Figure 3.3 I/O conversion characteristics of AJ65BT-64DAI

① How to calculate the analog value
The resolution of AJ65BT-64DAI can be set arbitrarily by modifying the settings of the offset value and gain value.
How to calculate the analog value resolution and the analog output value for a given digital input value when the settings of the offset value and gain value are changed is shown.

(Analog output) = (Analog resolution) $\times$ (Digital input value) + (Offset value)

$$(\text{Analog resolution}) = \frac{(\text{Gain value}) - (\text{Offset value})}{4000}$$

② The following graph shows the I/O characteristic when the offset and gain values of the AJ65BT-64DAI are changed:

The I/O conversion characteristics are shown in the graph on the right when the offset value and the gain value are set as in the following table:

Number	Offset value	Gain value
①	10mA	20mA
②	4mA	20mA
③	6mA	16mA
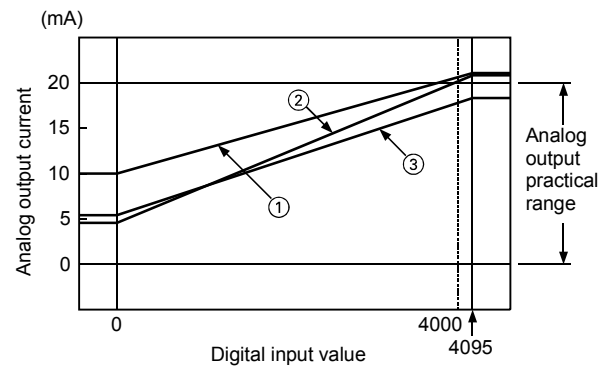
Example

The analog output voltage for the characteristic graphs ① to ③ becomes as below, when the digital input value is at 2000 and 1000:

Number	Digital input value	Analog output voltage
①	2000	15mA
	1000	12.5mA
②	2000	12mA
	1000	8mA
③	2000	11mA
	1000	8.5mA

Figure 3.4 I/O conversion characteristics of AJ65BT-64DAI

3.4   Various Functions to Control the Analog Output

Various functions to control the analog output of the AJ65BT-64DAV/DAI are explained.

3.4.1   Function to specify hold or clear of the analog output when the programmable controller CPU is in the STOP status (HOLD/CLEAR setting)

Using this function, the HLD/CLR terminal on the module front panel can be used to set whether to retain or clear (i.e. to output the offset) the analog output value immediately before the programmable controller CPU enters the STOP status or before the AJ65BT-64DAV/DAI stops the D/A conversion due to an error.   All channels are set simultaneously. (Including a time when link communications are shut off)

3.4.2   Function to specify executing or not executing the D/A conversion processing (Analog output enable/disable flag)

Using this function, whether to output the D/A conversion value or the offset value can be selected for each channel by turning on or off the Analog output enable/disable flag from the programmable controller program.
However, the D/A conversion time (conversion speed) is constant regardless of the setting of the Analog output enable/disable flag.

ON: D/A conversion value   OFF: Offset value

3.4.3   Function to specify enabling or prohibiting of the analog value external output (Analog output enable/prohibit setting)

Using this function, whether to enable or prohibit the external output of the analog signal can be specified for each channel by writing "0" or "1" to the remote register's address from the programmable controller program.

1: 0V/0mA   0: D/A conversion value or offset value

3.4.4   Offset/gain setting

When a fine I/O conversion characteristic is required, the I/O conversion characteristics can be modified arbitrarily by setting the offset and gain of each channel without a volume control, after entering the test mode by short-circuiting the test mode terminal.   When it is not necessary, turning on the RYn4, which is the I/O signal to the master station, selects the factory-configured offset and gain values.

Factory-configured values:
AJ65BT-64DAV........Offset value 0V, Gain value 10V
AJ65BT-64DAI.........Offset value 4mA, Gain value 20mA

3.4.5   Combinations of various functions

By combining the functions explained above, the analog output when the programmable controller CPU is in the RUN status and when a module error occurs can be set as desired, as shown in Table 3.3.
Select each function depending on the analog output status of your choice.

Table 3.3 Analog output status combination list

Setting combination / Execution status	HOLD/CLEAR setting	CLEAR				HOLD	
	Analog output enable signal	Enable (on)		Prohibit (off)		Enable (on)/Prohibit (off)	
	Analog output enable/disable flag	Enable (0)	Prohibit (1)	Enable (0)	Prohibit (1)	Enable (0)	Prohibit (1)
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	0V/0mA	Offset value	0V/0mA	Output of the analog value after D/A conversion from the digital value specified by the programmable controller CPU	0V/0mA
Analog output status when the programmable controller CPU is in the STOP status		Offset value	0V/0mA	Offset value	0V/0mA	Analog value before the programmable controller CPU stop is retained.	0V/0mA
Analog output status when the programmable controller CPU is in the error status		Offset value	0V/0mA	Offset value	0V/0mA	Analog value before the CPU error is retained.	0V/0mA
Analog output status when an error has occurred in the AJ65BT-64DAV/DAI		Output of the maximum or minimum analog value	0V/0mA	Offset value	0V/0mA	Output of the maximum or minimum analog value	0V/0mA
Analog output status when a WDT error (*) has occurred in the AJ65BT-64DAV/DAI		0V/0mA					
Analog output status when the L.RUN LED is turned off (when link communications are shut off)		Offset value	0V/0mA	Offset value	0V/0mA	Analog value before the LINK ERR is retained.	0V/0mA
Analog output status after reset		Output of the analog value after D/A conversion from the digital value specified by the programmable controller CPU	0V/0mA	Offset value	0V/0mA	Output of the analog value after D/A conversion from the digital value specified by the programmable controller CPU	0V/0mA

(*) WDT error .... indicates the abnormal operation time by the programmable controller. The elapsed time for one scan by the program is monitored, and a WDT error results when it does not finish within the scheduled time.

3.5   I/O Signals to the Master Station

Assignment of the I/O signals and function of each signal are explained.

3.5.1   I/O signal list

The AJ65BT-64DAV/DAI uses 32 input points and 32 output points for exchanging signals with the master station.[1] The allocation of the I/O signals and the name of each signal are listed in Table 3.4. An RX device indicates an input signal from the AJ65BT-64DAV/DAI to the master module, and a RY device indicates an output signal from the master module to the AJ65BT-64DAV/DAI.

Table 3.4 I/O signals

Signal direction: AJ65BT-64DAV/DAI→Master		Signal direction: Master→AJ65BT-64DAV/DAI	
Device No.	Signal name	Device No.	Signal name
RXn0	Unusable	RYn0	CH.1 Analog output enable/disable flag
		RYn1	CH.2 Analog output enable/disable flag
		RYn2	CH.3 Analog output enable/disable flag
to		RYn3	CH.4 Analog output enable/disable flag
		RYn4	Offset/gain value selection
RXnF		RYn5 to RYnF	Unusable
RX (n+1) 0 to RX (n+1) 7	Unusable	RY (n+1) 0 to RY (n+1) 7	Unusable
RX (n+1) 8	Initial data processing request flag	RY (n+1) 8	Initial data processing complete flag
RX (n+1) 9	Initial data setting complete flag	RY (n+1) 9	Initial data setting request flag
RX (n+1) A	Error status flag	RY (n+1) A	Error reset request flag
RX (n+1) B	Remote READY	RY (n+1) B to RY (n+3) F	Unusable
RX (n+1) C to RX (n+3) F	Unusable		

n: The address allocated to the master station in the station number setting
*1 Although the number of occupied stations for the AJ65BT-64DAV/DAI is 2, inputs, RX(n+2) 0 to RX(n+3)F, are not used.
However, devices for inputs, RX(n+2) 0 to RX(n+3)F, and outputs, RY(n+2) 0 to RY(n+3) F, are reserved in the master module or CPU module. When creating a program, pay attention to device allocation.

Point
If a device not allowed to use is turned on/off from the sequence program, the function of the AJ65BT-64DAV/DAI is not guaranteed.

3.5.2   Functions of the I/O signals

Functions of the I/O signals of the AJ65BT-64DAV/DAI are shown in Table 3.5.

Table 3.5 Descriptions of the I/O signals

Device number	Signal Name	Description
RX (n+1) 8	Initial data processing request flag	After the power is turned on or after the hardware reset, the initial data processing request flag is turned on by the AJ65BT-64DAV/DAI in order to request the initial data setting. It is turned off when the initial data setting is complete (i.e. initial data processing complete flag RY(n+1)8 is turned on).
RX (n+1) 9	Initial data setting complete flag	When there is an initial data setting request (i.e. RY(n+1)9 is turned on), it is turned on by the initial data setting completion. When the initial data setting request flag is turned off after the initial data setting completion, the initial data setting complete flag is also turned off.
RX (n+1) A	Error status flag	This is turned on when an error other than the WDT error occurs on the AJ65BT-64DAV/DAI.
RX (n+1) B	Remote READY	This is turned on when the initial data setting is complete and the AJ65BT-64DAV/DAI is in the READY status, after the power is turned on or after the hardware reset. It is turned off during the test mode. (This is used to interlock the read and write from the master module.)
RYn0 to RYn3	CH.□ analog output enable/disable flag	These are the analog value output enable signals for channels 1 through 4. The analog output value from the corresponding channel is enabled when turned on. Turn it off to prohibit the output of the analog value.
RYn4	Offset/gain value selection	"User settings" or "factory settings" of the offset and gain values are selected by switching the RYn4. To select the factory setting, keep the RYn4 set to on.
RY (n+1) 8	Initial data processing complete flag	After the power is turned on or after the hardware reset, the initial data processing is executed by the initial data processing request, and this flag is turned on after the processing is completed.
RY (n+1) 9	Initial data processing request flag	Turn this on to set or modify the initial data.
RY (n+1) A	Error reset request flag	When the error reset request flag (RY(n+1)A) is turned on, the error status flag (RX(n+1)A) is turned off and the error code of the remote register write area is cleared (0000H).

The ON and OFF timing of each flag for the initial data processing request, processing complete, setting complete, and the setting request by the AJ65BT-64DAV/DAI:

RX(n+1)8
Initial data processing request flag

RY(n+1)8
Initial data processing completion flag

RX(n+1)9
Initial data setting completion flag

RY(n+1)9
Initial data setting request flag

RX(n+1)B
Remote ready

⟵ : Performed by sequence program
⟵ : Performed by AJ65VBTCU-64DAV/DAI
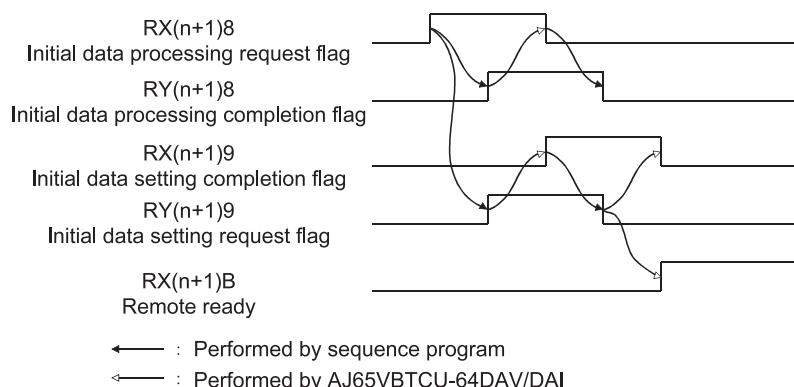
3.6   Remote Register

The AJ65BT-64DAV/DAI has a remote register (does not have backup) for data communication with the master module. The remote register allocation and data structure are described below.

3.6.1   Allocation of the remote register

The allocation of the remote register is shown in Table 3.6.

Table 3.6 Allocation of the remote register

	Address	Description	Initial value	Reference section
Write area (M→R)	RWwm	CH.1 digital value setting	0	Section 3.6.2
	RWwm+1	CH.2 digital value setting	0	
	RWwm+2	CH.3 digital value setting	0	
	RWwm+3	CH.4 digital value setting	0	
	RWwm+4	Analog output enable/disable setting	0	Section 3.6.3
	RWwm+5	Unusable		
	RWwm+6			
	RWwm+7			
Read area (R→M)	RWrn	CH.1 set value check code	0	Section 3.6.4
	RWrn+1	CH.2 set value check code	0	
	RWrn+2	CH.3 set value check code	0	
	RWrn+3	CH.4 set value check code	0	
	RWrn+4	Error code	0	Section 3.6.5
	RWrn+5	Unusable		
	RWrn+6			
	RWrn+7			

m, n: The address set for the master station in the station number setting.

Point
Do not execute read or write to the remote register that is not allowed to use.   When a read or write is executed, the function of the AJ65BT-64DAV/DAI is not guaranteed.

3.6.2 Digital value setting area for channels 1 through 4

(1) This area is used to write the digital value for the D/A conversion from the programmable controller CPU.

(2) The digital values at all channels become "0" in the following conditions:
   (a) After the power is turned on, when the remote READY (RX(n+1)B) is turned on.
   (b) After the reset of the programmable controller CPU, when the remote READY (RX(n+1)B) is turned on.

(3) The digital value can be set as 16-bit signed binary data and within the available setting range of the digital value resolution.
   If a value beyond the range of the digital value resolution is set, the data in Table 3.7 is applied for the D/A conversion.
   In addition, the checking code is stored in the set value checking code storage area (addresses from RWrn to RWrn+3).

Table 3.7 Available setting range of the digital value

Model Name	Available setting range	Digital value for the D/A conversion when the value beyond the range is set
AJ65BT-64DAV	-2048 to 2047 (Practical range: -2000 to 2000)	2048 or higher: 2047 -2049 or lower: -2048
AJ65BT-64DAI	0 to 4095 (Practical range: 0 to 4000)	4096 or higher: 4095 -1 or lower: 0

3.6.3 Analog output enable/prohibit channel

(1) Enable or prohibit of the external output of the analog value from each channel is set in this area.

(2) Output is prohibited at all channels in the following conditions:
   (a) When the power is turned on.
   (b) When the power is reset.
   Note that when initial data processing is finished, (module ready turns on, and) the output is enabled at all channels with the default values of 0.

(3) Enable/prohibit of the external output is set to 0 or 1 for each channel.
   (a) 0 .... Enabled
   (b) 1 .... Prohibited

(4) Configuration of the output enable/prohibit area for each channel is as follows:

Configuration of the output enable/prohibit area for each channel

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
												CH.4	CH.3	CH.2	CH.1

Ignored

3.6.4   Set value checking code storage area for channels 1 through 4

This area is used to check if the digital value is within or out of the setting range.   One of the following checking codes is stored when the digital value lower or higher than the setting range is set.

Check code list

Check code	Description
000F$_H$	A digital value which exceeds the setting range was set.
00F0$_H$	A digital value which is below the setting range was set.
00FF$_H$	Both a digital value below the setting range and digital value exceeding the setting range were set. For example, the 00FF$_H$ check code is stored if a digital value exceeding the valid range is written, and then, without the check code being reset, a digital value that falls short of the valid range is written.

(1)   The check code once stored is not reset even if the set value is set to within the valid setting allowed range.

(2)   The storage area or the set value check code is reset by turning on the error reset request flag (RY (n+1) A).

3.6.5   Error code

(1)   If an error occurs when starting the module or writing data to the AJ65BT-64DAV/DAI (the RUN LED flashes), the following error code is stored in the error code (RWrn+4) in the AJ65BT-64DAV/DAI remote register.

Error code list

Error code	Error description	Processing
11□	The set digital value is outside the setting range. The □ indicates the channel number where the error occurred.	Correct the digital value to within the setting range.
999	The offset/gain setting values stored in E^{2}PROM became faulty.	Power-cycle the AJ65BT-64DAV/DAI again. If this recurs, the module may be faulty. Consult your local servicing company, dealer or our branch office.

The □ indicates the channel number where the error occurred.

(2)   When multiple errors occurred, the error code of the first error is stored, but the other errors are not stored.

(3)   The error code reset is performed by turning on the error reset request flag (RY (n+1) A).
When the error code is "999", however, it cannot be reset because the hardware of the module is faulty.

4.   SETUP AND PREPARATION BEFORE OPERATION

4.1   Precautions When Handling

The precautions when handling the AJ65BT-64DAV/DAI are described below:

⚠CAUTION	● Do not touch any terminal while power is on. Doing so may cause malfunction. ● Be sure there are no foreign substances such as sawdust or wiring debris inside the module. Such debris could cause fires, damage, or erroneous operation. ● Do not disassemble or modify the modules. Doing so may cause failure, malfunction, injury, or a fire. ● Do not directly touch the module's conductive parts or electronic components. Touching the conductive parts could cause an operation failure or give damage to the module. ● Do not drop or apply strong shock to the module. Doing so may damage the module. ● Do not remove the module print board from the case. This may cause breakdowns. ● Tighten the terminal screws with the specified torque. If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. ● When disposing of this product, treat it as industrial waste. ● If the terminal screws are loose, it could result in short circuits, fire, or erroneous operation. Using this programmable controller in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product. ● For protection of the switches, do not remove the cushioning material before installation. ● Securely fix the module with a DIN rail or mounting screws. Tighten the screws within the specified torque range. Undertightening can cause drop of the screw, short circuit, or malfunction. Overtightening can damage the screw and/or module, resulting in drop, short circuit, or malfunction. ● 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 could result in damage to the product. ● Before touching the module, always touch grounded metal, etc. to discharge static electricity from human body. Failure to do so can cause the module to fail or malfunction.

(1)   Tighten the screws such as module installation screws with the following torque :

Screw location	Tightening torque range
Module installation screw (M4 screw)	0.78 to 1.18 N·m
Terminal block terminal screw (M3.5 screw)	0.59 to 0.88 N·m
Terminal block installation screw (M4 screw)	0.78 to 1.18 N·m

(2)   When using the DIN rail adapter, install the DIN rail by making sure of the following:
    (a)   Applicable DIN rail models (conforming to JIS C 2812)
       TH35-7.5Fe
       TH35-7.5Al
       TH35-15Fe
    (b)   DIN rail installation screw interval
       When installing the DIN rail, tighten the screws with less than 200mm (7.87 inch) pitches.

(3)   Refer to the Master Module user's manual for the name, specification, and manufacturers of supported cables for the use with AJ65BT-64DAV/DAI.

4.2   Name of Each Part

The name of each part in the AJ65BT-64DAV/DAI is described.

Number	Name	Description
①	Station number setting switch	$\downarrow\times10$ ─┐ The AJ65BT-64DAV/DAI station number $\downarrow\times1$ ─┘ is set within the range 1 to 63. (Factory shipment setting : 00)
②	B RATE (Transfer baud rate) setup switch	The switch to set the offset/gain values during test mode. | Setting number	Transfer baud rate
---	---
0	156kbps(Factory shipment setting)
1	625kbps
2	2.5Mbps
3	5Mbps
4	10Mbps	 Unused (When a value other than 0 to 4 is set, L ERR. LED turns on, and results in a communication error.)
③	CH. (CHANNEL) selection switch	Select the channel to perform offset adjustment or gain adjustment. (Positions other than 1 to 4 are not processed.)
④	OFFSET/GAIN (Offset/gain) setting switch	The switch to set the offset/gain values during test mode. (1) OFFSET position : Calibration mode for the offset value (2) GAIN position : Calibration mode for gain value (3) SET position : When the switch is set from the OFFSET/GAIN position, which are modes to record offset/gain value to the SET position, to the SET position, the offset/gain value is recorded.
⑤	UP/DOWN switch	The switch to adjust the analog output value for the offset/gain of the specified channel. The analog output value increases/decreases by turning on the UP/DOWN switch.
⑥	RESET switch	Resets the H/W. Initializes the AJ65-BT-64DAV/DAI I/O signals, remote register, and operation processing. When the switch is turned on, AJ65BT-64DAV/DAI initial data processing request flag turns on.

Number	Name	Description		
⑦	Operation status display LED	PW LED	On : When the power is on Off : When the power is shut off	
		RUN LED	Normal mode	On : Normal operation Flashing : Write data error Off : 24VDC power shutoff or watchdog timer error
			Test mode	Flashing : Flashes in 0.5 second intervals when the offset/gain setting switch is at OFFSET or GAIN. Flashes in 0.1 second intervals when exceeding the upper or lower limits of the allowable setting using the UP/DOWN switch. Off : When the offset/gain setting switch is at SET.
		L RUN LED	On : Normal communication Off : Communication interrupted (timeout error)	
		SD LED	On : Data being transferred	
		RD LED	On : Data being received	
		L ERR. LED	On : When the baud rate or the station number setting is out of range. Flashing at regular intervals : 　　　When the baud rate or station number setting is changed after power-on or reset. Flashing at irregular intervals : 　　　When you forgot fitting the termination resistors or the module or CC-Link dedicated cable is affected by noise. Off : Normal communication	
⑧	Terminal block	AJ65BT-64DAV AJ65BT-64DAI HLD/CLR setting terminal 　....HOLD is set by shorting between terminals, and CLEAR is set by releasing. Test mode setting terminal 　....By shorting between terminals, the system enters the test mode		

4.3   Offset/Gain Setting

When changing the I/O conversion characteristics, follow the procedure below.

START

Short the test mode terminal (between 8 to 10).
The "RUN" LED turns off.

Ⓐ

Set the "channel selection switch" to the channel to set the offset/gain.

Confirm that the position is at SET

Change to the channel to be set.

Set the offset/gain selection switch to "OFFSET".

Flashing

Current

Voltage

Set to the voltage the offset value using the "UP/DOWN switch."

For Current

*****Set to the voltage the offset value using the "UP/DOWN switch."

For Voltage

Set the offset/gain selection switch to "SET."

Off

Set the offset/gain selection switch to "GAIN."

Flashing

Voltage

Current

Set to the voltage to be the gain value using the "UP/DOWN switch."

For Voltage

Set to the current to be the gain value using the "UP/DOWN switch."

For Current

Set the offset/gain selection switch to "SET."

Off

Adjust other channels?

YES   Ⓐ

NO

Release the test mode terminal (between 8 to 10).
The "RUN" LED turns on.

END

Point
(1) Set the offset and gain values in the actual usage state.
(2) The offset and gain values are stored in the AJ65BT-64DAV/DAI, and are not erased even the power supply is shut off.
(3) Perform the offset/gain setting when the programmable controller CPU is stopped.   When in the test mode, D/A conversion is stopped for all channels, so use the remote READY signals as an interlock.
(4) Perform the offset/gain setting in the range from DC -10 to +10V or from 4 to +20mA.   When the setting exceeds this range, the maximum resolution or total precision may not be in the range indicated in the performance specification.

4.4   Station Number Setting

By the AJ65BT-64DAV/DAI station number setting, the addresses to store the control I/O signal data and read/write data are determined.
For details, refer to the user's manual of the master module used.

4.5   Facing Direction of the Module Installation
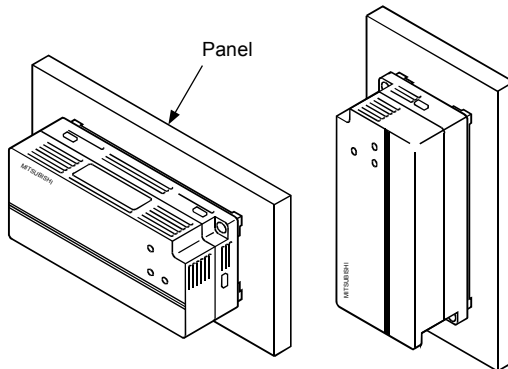
When the module is installed next to the panel   When the module is installed on the panel
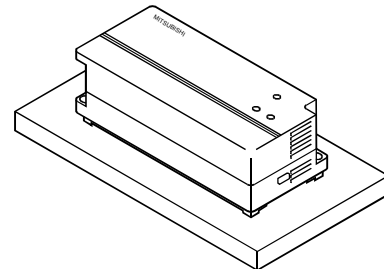
4.6   Data link Cable Wiring

The wiring of the CC-Link dedicated cable which connects the AJ65BT-64DAV/DAI and the master module is described.

4.6.1   CC-Link dedicated cable connections

The CC-Link dedicated cable connections between the AJ65BT-64DAV/DAI and master module are as follows:
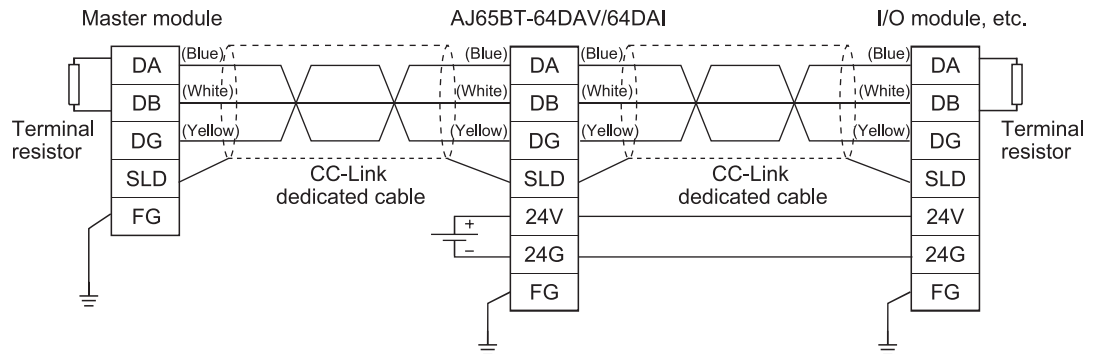
4.7   Wiring

Precautions when wiring the AJ65BT-64DAV/DAI and how to wire to the external devices are explained.

4.7.1   Precautions when wiring

To obtain maximum performance from the functions of AJ65BT-64DAV/DAI and improve the system reliability, an external wiring with high durability against noise is required.
The precautions performing external wiring for the AJ65BT-64DAV/DAI are shown below:
(1)   Use separate cables for the AC and AJ65BT-64DAV/DAI external input signals, in order not to be affected by the AC side surge or conductivity.
(2)   Do not bunch the control wires or load cables from other than the programmable controller with the wires to the module, or install them close to each other. Doing this makes the wiring easy to accept the noise, surge or induction effects.
(3)   Perform a one-point grounding for the shielded line or the shield of the shielded cable.

4.7.2   Wiring between the AJ65BT-64DAV/DAI and external devices

(1)   Wiring example of the AJ65BT-64DAV and external devices is shown in Figure 4.1.
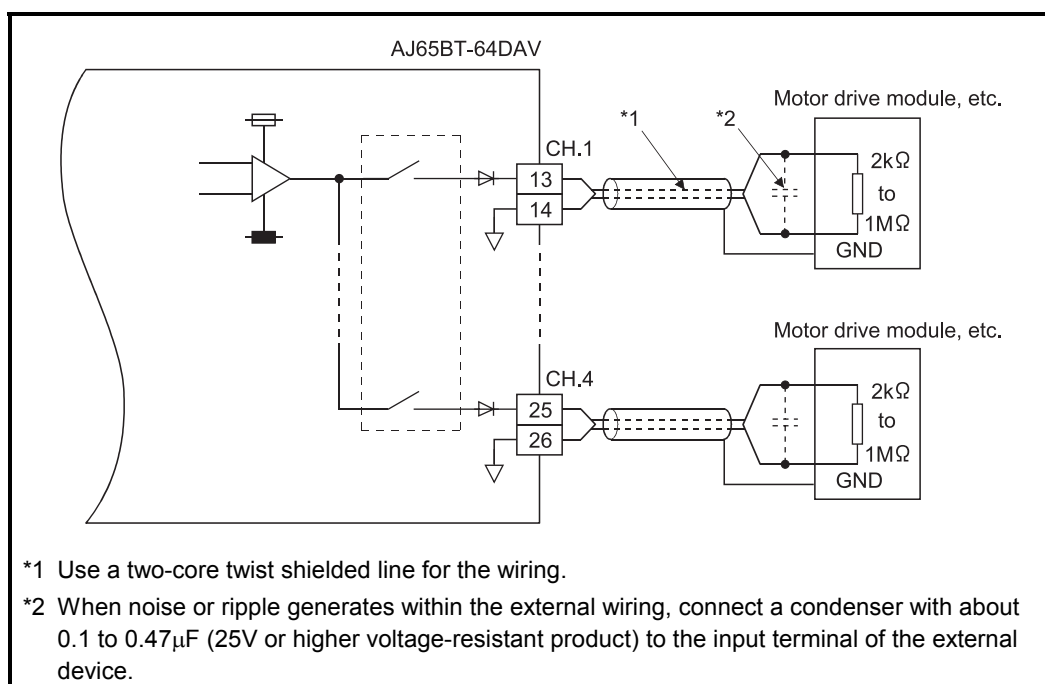
Figure 4.1 Wiring example of the AJ65BT-64DAV and external devices

(2)   Wiring example of the AJ65BT-64DAI and external devices is shown in Figure 4.2.

*1 Use a two-core twist shielded line for the wiring.

*2 When noise or ripple generates within the external wiring, connect a condenser with about
     0.1 to 0.47µF (25V or higher voltage-resistant product) to the input terminal of the external
     device.
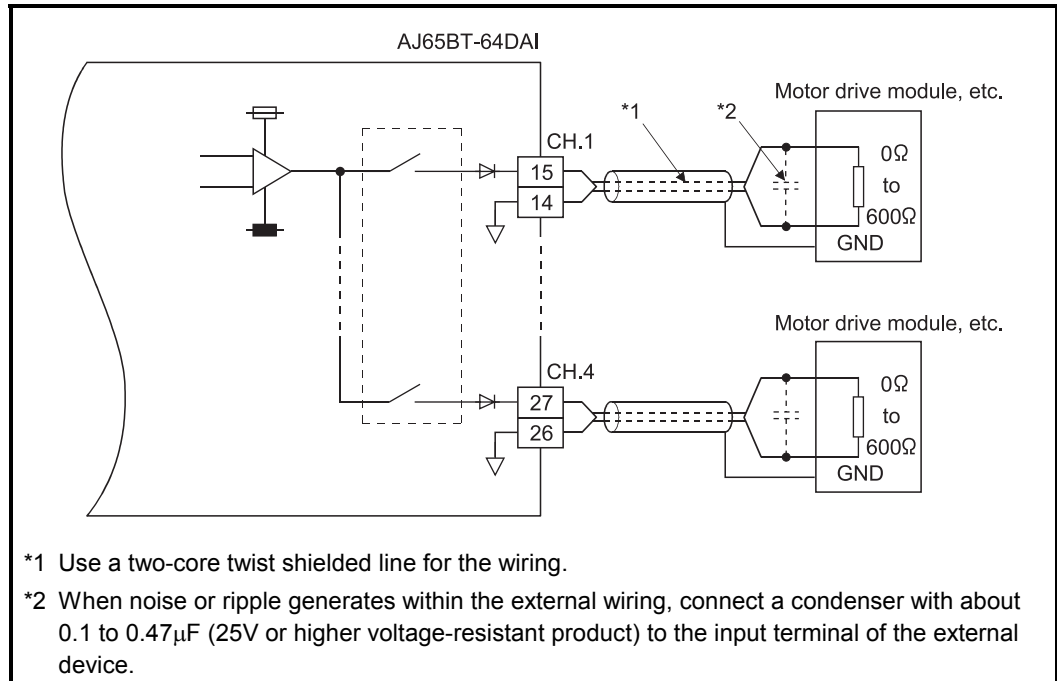
Figure 4.2 Wiring example of the AJ65BT-64DAI and external devices

Remark

Though you can perform the jumper wiring of the common line on the external device side, the
commons are connected also inside this module.
When wiring, be careful of sneak currents on the external device side.

5. PROGRAMMING

The programming procedure, basic read/write programs, and program examples for the AJ65BT-64DAV/DAI are described.
When applying any of the program examples introduced in this chapter to the actual system, verify the applicability and confirm that no problems will occur in the system control.
Refer to the user's manual of the master module used for the master module, to Section 3.6 for the remote registers, and to the AnSHCPU/AnACPU/AnUCPU/QCPU (A mode) Programming Manual (Dedicated Instructions) for details of the dedicated instructions.

5.1   Programming Procedure

Create programs for executing the digital-analog conversion of the AJ65BT-64DAV/DAI in the following procedure.

```
                     ┌─────────────┐
                     │    Start    │
                     └─────────────┘
                            │
                            ▼
              ┌───────────────────────────┐  ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄┐
              │ Select factory-set/user-set│                 ▲
              │ values for the offset and  │                 │
              │ gain                        │                 │
              └───────────────────────────┘       Initial value setting*1
                            │                                │
                            ▼                                │
              ┌───────────────────────────┐  ┄┄┄┄┄┄┄┄┄┄┄┄┄┄┄▼
              │ Set the analog output enable/prohibit │
              └───────────────────────────┘
                            │
                            ▼
              ┌───────────────────────────┐
              │ Set the digital value      │ ┄┄┄┄┄┄┄┄┄┄┄┄┄┄ *2
              └───────────────────────────┘
                            │
                            ▼
              ┌───────────────────────────┐
              │ Set the D/A conversion enable or prohibit │ ┄┄┄┄┄┄┄┄ *3
              └───────────────────────────┘
                            │
                            ▼
                     ┌─────────────┐
                     │ Completion  │
                     └─────────────┘
```
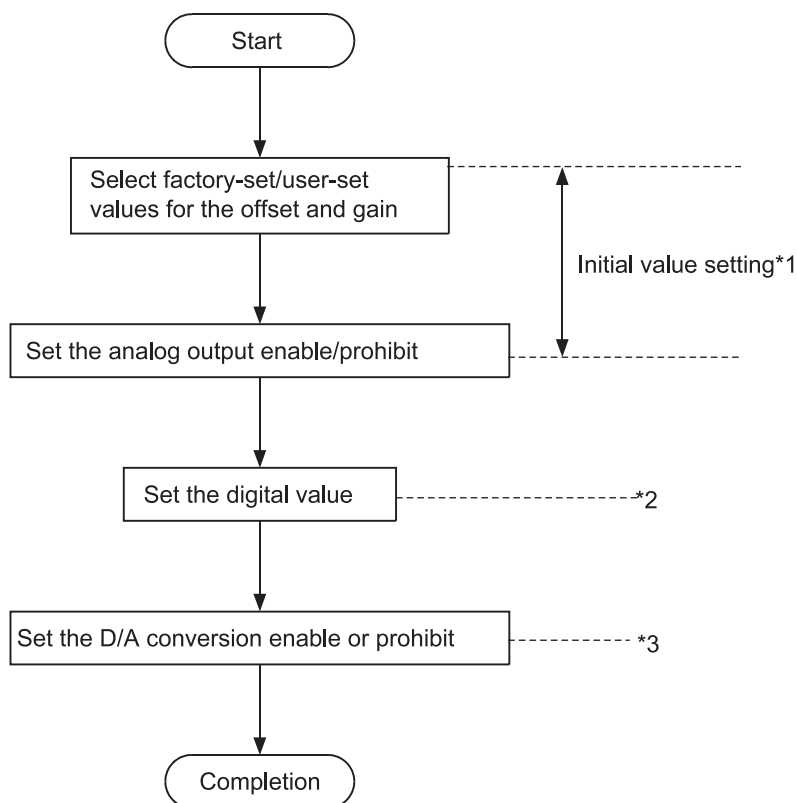
*1   When using the QCPU (Q mode), you can use the remote device station initialization procedure registration function to make settings. When using the ACPU, QCPU (A mode) or QnACPU, use the sequence program to make settings.

*2   The remote device station initialization procedure registration function cannot be used to make settings.
Use the sequence program to make settings.

5.2   Conditions of Program Example

The program examples in this chapter are created under the following conditions.

(1)   System configuration

Programmable controller CPU
Master station
(X0 to X1F/Y0 to Y1F)
I/O (Input 64 points)
I/O (Output 64 points)
(Y60 to Y9F)
AJ65SBT-62DA
(Station number 1)
Terminating resistor
Terminating resistor
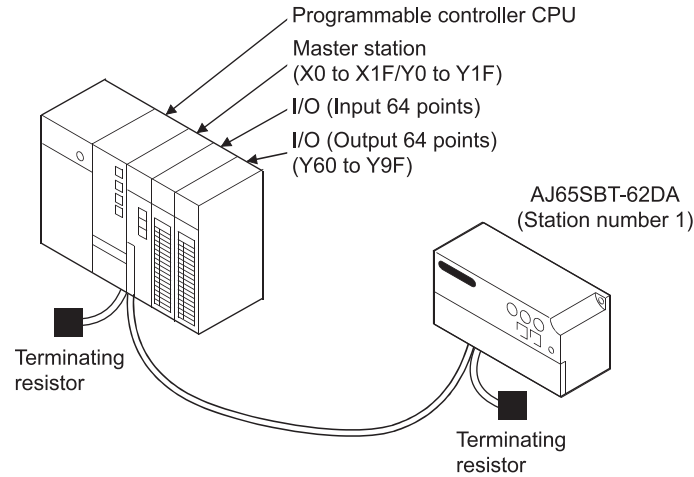
(2)   Relationships between programmable controller CPU, master module and AJ65BT-64DAV

Programmable controller CPU Device X		Master module Address	Remote input (RX)	AJ65BT-64DAV (Station number 1) Remote input (RX)
X400 to X40F		E0H	RX00 to RX0F	RX00 to RX0F
X410 to X41F		E1H	RX10 to RX1F	RX10 to RX1F
X420 to X42F		E2H	RX20 to RX2F	
X430 to X43F		E3H	RX30 to RX3F	

Device Y			Remote output (RY)	Remote output (RY)
Y400 to Y40F		160H	RY00 to RY0F	RY00 to RY0F
Y410 to Y41F		161H	RY10 to RY1F	RY10 to RY1F
X420 to X42F		162H	RY20 to RY2F	
X430 to X43F		163H	RY30 to RY3F	

Device D			Remote register (RWw)	Remote register (RWw)
D200		1E0H	RWw0	RWw CH.1 digital value setting
D201		1E1H	RWw1	RWw1 CH.2 digital value setting
D202		1E2H	RWw2	RWw2 CH.3 digital value setting
D203		1E3H	RWw3	RWw3 CH.4 digital value setting
D204		1E4H	RWw4	RWw4 Analog output enable/disable setting
D205		1E5H	RWw5	RWw5 Reserved
D206		1E6H	RWw6	RWw6 Reserved
D207		1E7H	RWw7	RWw7 Reserved

Device D*			Remote register (RWr)	Remote register (RWr)
D300		2E0H	RWr0	RWr0 CH.1 set value check code
D301		2E1H	RWr1	RWr1 CH.2 set value check code
D302		2E2H	RWr2	RWr2 CH.3 set value check code
D303		2E3H	RWr3	RWr3 CH.4 set value check code
D304		2E4H	RWr4	RWr4 Error code
D305		2E5H	RWr5	RWr5 Reserved
D306		2E6H	RWr6	RWr6 Reserved
D307		2E7H	RWr7	RWr7 Reserved

5

* 1 In the program example (refer to Section 5.5) that uses the RRPA instruction (automatic refresh parameter setting) with the ACPU/QCPU (A mode), RWr0 to RWr3 are assigned to D456 to D459.

* 2 Although RX20 to RX3F and RY20 to RY3F are not used in the AJ65BT-64DAV, devices for them are reserved in a master module or CPU module.

> **POINT**
>
> Some CPU modules may not accept the devices used in the program example in this chapter. For the setting ranges of the devices, refer to the user's manual of the CPU module used.
>
> For the A1SHCPU, for example, devices X100, Y100 and later are unusable. Use such devices as B and M.

(3)   Initial settings

Setting Item	Settings
Offset/gain value selection	Factory setting
Analog output enable/disable setting (RWw4)	Channels 1, 2, 3, 4: enable

(4)   Other settings

Setting Item	Settings
CH.1 digital value setting (RWw0)	50
CH.2 digital value setting (RWw1)	100
CH.3 digital value setting (RWw2)	200
CH.4 digital value setting (RWw3)	3000
CH.1 analog output enable/disable flag (RY00)	Enable
CH.2 analog output enable/disable flag (RY01)	Enable
CH.3 analog output enable/disable flag (RY02)	Enable
CH.4 analog output enable/disable flag (RY03)	Enable

5.3   Program Example for Use of the QCPU (Q mode)

The program examples in this section are created under the following conditions.
GX Developer is used to set the network and automatic refresh parameters.
Using the remote device station initialization procedure registration function facilitates initial settings.

(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 information 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 2	64 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 information setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

(2) Initial setting by remote device station initialization procedure registration

    (a) Setting the target station number

        Set the station number to which initial setting will be made.

        Set the target station number to "1".

Remote device station initial setting: Target station number setting: Module 1

	Target station No.	No. of registered procedures			Target station No.	No. of registered procedures	
1	1	0	Regist procedure	9			Regist procedure
2			Regist procedure	10			Regist procedure

    (b) Setting the procedure registration

        When the initial data processing request flag (RX18) turns on and the remote device station initialization procedure registration (SB0D) is set, the following data are registered to the AJ65BT-64DAV.

Procedure Execution Condition	Execution
Initial data processing request flag (RX18) turns on	Offset/gain value selection (RY04) is turned on (factory setting).
	Analog output enable/disable setting: channels 1, 2, 3, 4: enable (RWw4: 0000H)
	Initial data processing complete flag (RY18) is turned on.
	Initial data setting request flag (RY19) is turned on.
Initial data processing request flag (RX18) turns off	Initial data processing complete flag (RY18) is turned off.
Initial data setting complete flag (RX19) turns on	Initial data setting request flag (RY19) is turned off.

    (c) Setting results

        The setting results are shown below.

Remote device station initial setting: Procedure registration module 1: Target station 1

Input format   DEC.

Execute Flag	Operational condition	Executional condition			Details of execution		
		Condition Device	Device Number	Execute Condition	Write Device	Device Number	Write Data
Execute	Set new	RX	18	ON	RY	04	ON
Execute	Same as prev.set	RX	18	ON	RWw	04	0
Execute	Same as prev.set	RX	18	ON	RY	18	ON
Execute	Same as prev.set	RX	18	ON	RY	19	ON
Execute	Set new	RX	18	OFF	RY	18	OFF
Execute	Set new	RX	19	ON	RY	19	OFF

POINT

(1) If the remote device station initialization procedure registration directive (SB000D) is turned off after the initial processing, all RY signals that were turned on within the initial procedure registration turn off. Hence, turn on the "CH. □ analog output enable/disable flag (RYn0, RYn1, RYn2, RYn3)" in the sequence program.

(2) When the initial setting (analog output enable/disable setting (RWwm+4)) has been changed, the remote device station initialization procedure registration function cannot be used.
Change the initial setting in the sequence program.

(3) For the case where the remote device station initialization procedure registration function is not used but a sequence program is used to make setting, refer to the user's manual of the used master module.

(3) Program example

*Checking of AJ65SBT-64DAV status

0	X0 ⫽ X0F ⊣⊢ X1 ⊣⊢	—[MOV	SW80	K1M0]—	Reads data link status

	M0 ⫽	—[MC	N0	M100]—	AJ65BT-64DAV data link normal

	M0 ⊣⊢	—(Y90)—	AJ65BT-64DAV data link abnormal

N0 ⊢ M100

*1, *2
1)
*Initialization procedure registration

14	SB5F ⊣⊢	—[RST	SB0D]—	Turns off initialization procedure registration directive

17	X418 ⊣⊢	—[SET	SB0D]—	Turns on initialization procedure registration directive

*3
2)
*Changing of Initial settings

19	Initial setting change ⊣↑⊢	—[RST	Y404]—	Off set/gain value selection (RY04)

		—[MOVP	K0	D204]—	Analog output enable/disable setting (RWw4)

		—[SET	Y419]—	Turns on initial data setting request flag (RY19)

25	X419 ⊣⊢	—[RST	Y419]—	Turns off initial data setting request flag (RY19)

*Setting of digital values

27	⊣⊢ X41B ⊣⊢	—[MOVP	K50	D200]—	CH.1 digital value setting (RWw0):50
	Digital value setting	—[MOVP	K100	D201]—	CH.2 digital value setting (RWw1):100
		—[MOVP	K200	D202]—	CH.3 digital value setting (RWw2):200
		—[MOVP	K300	D203]—	CH.4 digital value setting (RWw3):300

*Analog output enable/disable specification

38	⊣⊢ X41B ⊣⊢	—(Y400)—	Turns on CH.1 analog output enable/disable flag (RY00)
	Analog output enable	—(Y401)—	Turns on CH.2 analog output enable/disable flag (RY01)
		—(Y402)—	Turns on CH.3 analog output enable/disable flag (RY02)
		—(Y403)—	Turns on CH.4 analog output enable/disable flag (RY03)

*Processing error occurrence

45	X41A ⊣⊢	—[BMOVP	D300	D500	K4]—	Read CH.□ Check code (RWr0, RWr1, RWr2, RWr3)
		—[MOVP	D304	D504]—	Read error code (RWr4)
	Error reset ⊣⊢	—[SET	Y41A]—	Turns on error reset request flag (RY1A)

55	Y41A ⊣⊢ X41A ⫽	—[RST	Y41A]—	Turns off error reset request flag (RY1A)

58	—[MCR	N0]—

59	—[END]—

*1:   When making remote device station initialization procedure registration to multiple stations, correct the program within the dotted line 1) as shown below.

[System configuration]

```
                   ┌─────────────────┐
                   │  Master station │
                   └────────┬────────┘
                            │
              ┌─────────────┴───────┬──────────────┐
              ▽                     ▽
     ┌─────────────────┐   ┌─────────────────┐
     │  Remote device  │   │  Remote device  │
     │    station1     │   │    station2     │
     └─────────────────┘   └─────────────────┘
          RX(m+1)B             RX(n+1)B
          RX(m+1)8             RX(n+1)8
```

[Corrected program]

```
  SB5F
──┤├──────────────────────────────────────────────[RST    SB0D   ]
 RX(m+1)B  RX(n+1)B
──┤├───────┤├──
 RX(m+1)8
──┤├──────────────────────────────────────────────[SET    SB0D   ]
 RX(n+1)8
──┤├──
```
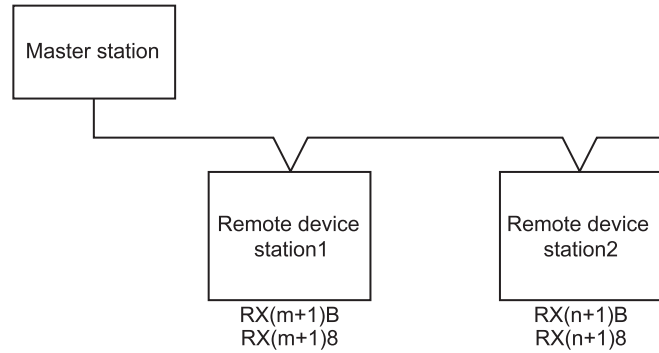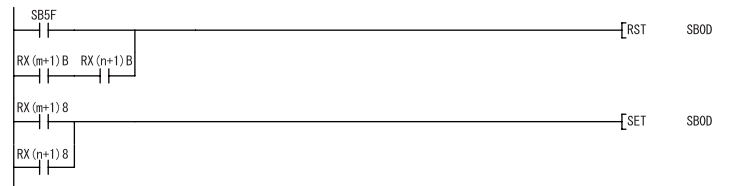
• RX(m+1)B and RX(n+1)B are remote READY.
• RX(m+1)8 and RX(n+1)8 are initial data processing request flags.

Insert the remote READY and initial data processing request flags for all the stations, to which the remote device station initialization procedure registration has been made, into the program.

[Usage in combination with other remote device stations]

(1)   Depending on the remote device stations to be used, the program enclosed by the dotted
       line 1) has two programming patterns as shown in the above and the below figures.
       (To check which pattern can be used, refer to the manual for the remote device to be used.)

[System configuration]

```
                    ┌──────────────┐
                    │              │
                    │ Master station│
                    │              │
                    └──────┬───────┘
                           │
              ┌────────────┴──────┐────────────┐───────
                          ╲╱                  ╲╱
              ┌──────────────┐    ┌──────────────┐
              │              │    │              │
              │ Remote device│    │ Remote device│
              │   station3   │    │   station4   │
              │              │    │              │
              └──────────────┘    └──────────────┘
                 RX(p+1)9              RX(q+1)9
                 RX(p+1)8              RX(q+1)8
```

[Corrected program]

```
 SB5F
──┤├──────────────────────────────────────────────────[RST    SB0D  ]
RX(p+1)9
──┤├──
RX(q+1)9
──┤├──

RX(p+1)8
──┤├──────────────────────────────────────────────────[SET    SB0D  ]
RX(q+1)8
──┤├──
```
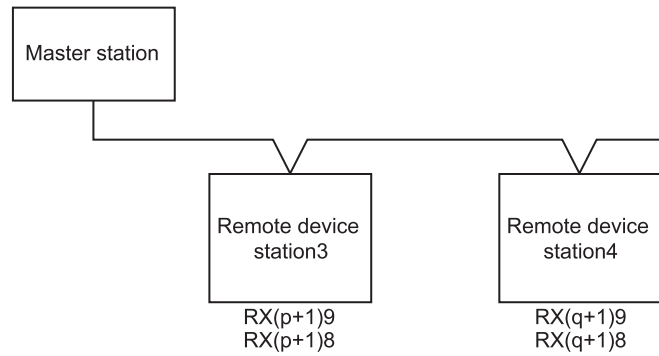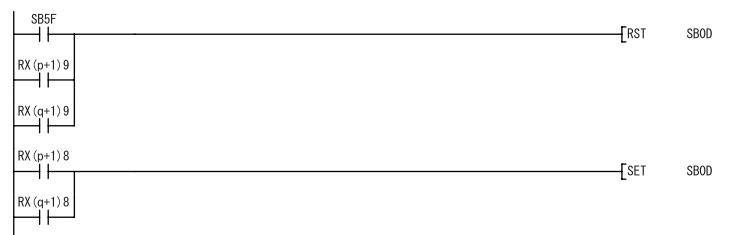
• RX(p+1)9 and RX(q+1)9 are initial data setting completion flags.
• RX(p+1)8 and RX(q+1)8 are initial data processing request flags.

(2)   When using the program enclosed by the dotted line 1) in combination with other remote device stations, correct the program as shown below.

[System configuration]


```
Master
station
   ┌──────────┬──────────┬──────────┬──────────┐
   │          │          │          │          │
 Remote     Remote     Remote     Remote
 device     device     device     device
 station1   station2   station3   station4
RX(m+1)B   RX(n+1)B   RX(p+1)9   RX(q+1)9
RX(m+1)8   RX(n+1)8   RX(p+1)8   RX(q+1)8
```

[Corrected program]


```
 SB5F
──┤├──────────────────────────────────────────[RST    SB0D  ]
RX(m+1)B
──┤├──
RX(n+1)B
──┤├──
RX(p+1)9  RX(q+1)9
──┤├────────┤├──
RX(m+1)8
──┤├──────────────────────────────────────────[SET    SB0D  ]
RX(n+1)8
──┤├──
RX(p+1)8
──┤├──
RX(q+1)8
──┤├──
```
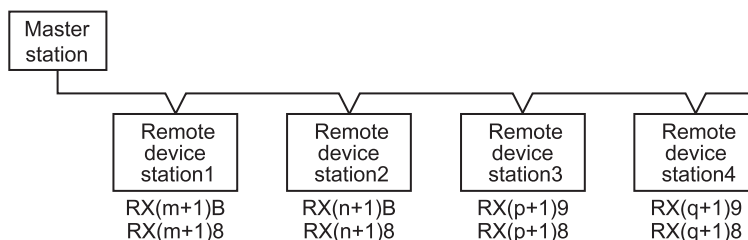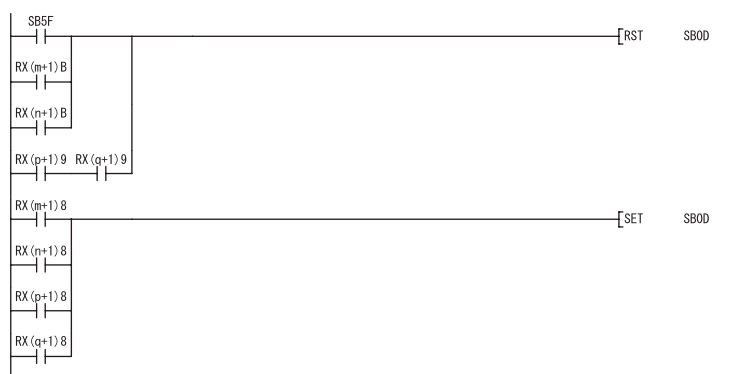
Note that the master module can register the initialization procedure of only the specified station out of the multiple remote device stations.
The master module supporting this function is the QJ61BT11N which serial No's first 5 digits is 08032 or later.
Fro details, refer to the CC-Link System Master/Local Module User's Manual, "CHAPTER 4 FUNCTIONS"

*2:   Before the communication program is executed with remote device stations, the program enclosed by the dotted line 1) enables the initial setting by using the SB0D (remote device station initialization procedure registration instruction) and SB5F (completion status of remote device station initialization procedure). Initialization processing can't be made only by the parameter setting of GX Developer.

*3:   The program enclosed by the dotted line 2) is necessary only when the initial settings are changed.

5.4   Program Example for Use of the QnACPU

GX Developer is used to set the network and automatic refresh parameters.

(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 2	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

POINT

When the QnACPU is used, using "Y" as the remote output (RY) refresh device of the automatic refresh parameter may not hold the analog value even for the HOLD setting.
For the HOLD setting, use "M" or "B" as the remote output (RY) refresh device.

(2) Program example

*Checking of AJ65BT-64DAV status

Step		Instruction	Operands	Comment
0	X0 X0F X1	[MOV	W80 K1M0]	Reads data link status
	M0	[MC	N0 M100]	AJ65BT-64DAV data link normal
	M0	(Y90)		AJ65BT-64DAV data link normal

N0 M100

*Initial settings

14	X418	[SET	Y404]	Offset/gain value selection (RY04)
		[MOVP	K0 D204]	Analog output enable/disable setting (RWw4)
		[SET	Y418]	Turns on initial data procedure completion flag (RY18)
		[SET	Y419]	Turns on initial data setting request flag (RY19)

*1 *Changing of Initial settings

22	Initial setting change	[RST	Y404]	Offset/gain value selection (RY04)
		[MOVP	K0 D204]	Analog output enable/disable setting (RWw4)
		[SET	Y419]	Turns on initial data setting request flag (RY19)

*Processing at initial settings

| 30 | X418 | [RST | Y418] | Turns off initial data procedure completion flag (RY18) |
| 33 | X419 | [RST | Y419] | Turns off initial data setting request flag (RY19) |

*Setting of digital values

35	X41B Digital value setting	[MOVP	K50 D200]	CH.1 digital value setting (RWw0): 50
		[MOVP	K100 D201]	CH.2 digital value setting (RWw1): 100
		[MOVP	K200 D202]	CH.3 digital value setting (RWw2): 200
		[MOVP	K300 D203]	CH.4 digital value setting (RWw3): 300

*Analog output enable/disable specification

50	X41B Analog output enable	(Y400)		Turns on CH.1 analog output enable/disable flag (RY00)
		(Y401)		Turns on CH.2 analog output enable/disable flag (RY01)
		(Y402)		Turns on CH.3 analog output enable/disable flag (RY02)
		(Y403)		Turns on CH.4 analog output enable/disable flag (RY03)

*Processing at error occurence

57	X41A	[BMOVP	D300 D500 K4]	Reads CH.☐ Check code (RWr0, RWr1, RWr2, RWr3)
		[MOVP	D304 D504]	Reads error codes (RWr4)
	Error reset	[SET	Y41A]	Turns on error reset request flag (RY1A)
68	Y41A X41A	[RST	Y41A]	Turns off error reset request flag (RY1A)
71		[MCR	N0]	
72		[END]		

*1: The program enclosed by the dotted line is necessary only when the initial settings are changed.

5.5 Program Example for Use of the ACPU/QCPU (A mode) (dedicated instructions)

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

(1) Program example

*Setting of network parameters using RLPA dedicated instruction

0	X0 ─┤↑├─ X0F ─┤├─		[PLS M0]	
5	M0 ─┤├─		[MOV K0 D0]	Synchronization mode: invalid
			[MOV K1 D1]	Number of connected modules:1
			[MOV H1201 D2]	AJ65BT-64DAV station information (remote device station, 2 stations occupied, station No.1)
			[LEDA RLPA]	Dedicated instruction (RLPA)
			[SUB H0]	Starting I/O number of master module
			[LEDC D0]	Parameter storage starting device
			[LEDC M1]	Device which turns on 1 scan at completion
			[LEDR]	
44	M2 ─┤├─	[FROM H0 H668 D3 K1]		Reads parameter status at abnormal completion

*Setting of automatic refresh parameters using RRPA dedicated instruction

54	X0 ─┤↓├─ X0F ─┤├─ M2 ─┤↓├─		[PLS M3]	

```
     M3
60 ├─┤ ┤──────────────────────────────────────────[MOV    H0      D100  ]  Sets RX starting number
         │
         ├────────────────────────────────────────[MOV    H1      D101  ]  Sets "X"
         │
         ├────────────────────────────────────────[MOV    H400    D102  ]  Sets X400
         │
         ├────────────────────────────────────────[MOV    K32     D103  ]  Sets 32points
         │
         ├────────────────────────────────────────[MOV    H0      D104  ]  Sets RY starting number
         │
         ├────────────────────────────────────────[MOV    H2      D105  ]  Sets "Y"
         │
         ├────────────────────────────────────────[MOV    H400    D106  ]  Sets Y400
         │
         ├────────────────────────────────────────[MOV    K32     D107  ]  Sets 32points
         │
         ├────────────────────────────────────────[MOV    H0      D108  ]  Sets RW starting number
         │
         ├────────────────────────────────────────[MOV    H7      D109  ]  Sets "D"
         │
         ├────────────────────────────────────────[MOV    K200    D110  ]  Sets D200
         │
         ├────────────────────────────────────────[MOV    K264    D111  ]  Sets 264points
         │
         ├────────────────────────────────────────[MOV    H0      D112  ]  Sets SB starting number
         │
         ├────────────────────────────────────────[MOV    H4      D113  ]  Sets "B"
         │
         ├────────────────────────────────────────[MOV    K0      D114  ]  Sets B0
         │
         ├────────────────────────────────────────[MOV    K512    D115  ]  Sets 512points
         │
         ├────────────────────────────────────────[MOV    H0      D116  ]  Sets SW starting number
         │
         ├────────────────────────────────────────[MOV    H8      D117  ]  Sets "W"
         │
         ├────────────────────────────────────────[MOV    H0      D118  ]  Sets W0
         │
         ├────────────────────────────────────────[MOV    K512    D119  ]  Sets 512points
         │
         ├──────────────────────────────────────────────[LEDB    RRPA  ]  Dedicated instruction
         │                                                                (RRPA)
         ├──────────────────────────────────────────────[SUB     H0    ]  Starting I/O number of
         │                                                                master module
         ├──────────────────────────────────────────────[LEDC    D100  ]  Parameter storage
         │                                                                starting device
         └──────────────────────────────────────────────────────[LEDR  ]
```

*Checking of AJ65BT-64DAV status

```
        X0    X0F    X1
181 ────┤/├───┤├────┤├──┬──────────────────────[MOV  W80   K1M4 ]   Reads data link status
                         │
                         │   M4
                         ├──┤/├──────────────────[MC   N0    M100 ]   AJ65BT-64DAV data
                         │                                             link normal
                         │   M4
                         └──┤├────────────────────────────────(Y90 )   AJ65BT-64DAV data
                                                                        link abnormal
N0──M100
  ─┤ ├
```

*Initial settings

```
        X418
199 ────┤├──────┬──────────────────────────────[SET  Y404 ]   Offset/gain value selection
                │                                              (RY04)
                │
                ├──────────────────────────[MOVP  K0   D204 ]   Analog output enable/
                │                                                disable setting (RWw4)
                │
                ├──────────────────────────────[SET  Y418 ]   Turns on initial data
                │                                              processing completion
                │                                              flag (RY18)
                │
                └──────────────────────────────[SET  Y419 ]   Turns on initial data setting
                                                               request flag (RY19)
```

*1 *Changing of initial settings

```
        Initial setting change
208 ────┤├──────────────────────────────────────[PLS  M10 ]
        
        M10
212 ────┤├──────┬──────────────────────────────[RST  Y404 ]   Offset/gain value selection
                │                                              (RY04)
                │
                ├──────────────────────────[MOVP  K0   D204 ]   Analog output enable/
                │                                                disable setting (RWw4)
                │
                └──────────────────────────────[SET  Y419 ]   Turns on initial data setting
                                                               request flag (RY19)
```

*Processing at initial settings

```
        X418
220 ────┤/├──────────────────────────────────────[RST  Y418 ]   Turns off initial data
                                                                 processing completion
                                                                 flag (RY18)
        X419
222 ────┤├──────────────────────────────────────[RST  Y419 ]   Turns off initial data setting
                                                                 request flag (RY19)
```

*Setting of digital values

```
             X41B
224 ────┤├────┤├────┬──────────────────────[MOVP  K50   D200 ]   CH.1 digital value setting
        Digital      │                                            (RWw0): 50
        value        │
        setting      ├──────────────────────[MOVP  K100  D201 ]   CH.2 digital value setting
                     │                                            (RWw1): 100
                     │
                     ├──────────────────────[MOVP  K200  D202 ]   CH.3 digital value setting
                     │                                            (RWw2): 200
                     │
                     └──────────────────────[MOVP  K300  D203 ]   CH.4 digital value setting
                                                                  (RWw3): 300
```

*Analog output enable/disable specification

```
             X41B
246 ────┤├────┤├────┬──────────────────────────────────(Y400 )   Turns on CH.1 analog output
        Analog       │                                             enable/disable flag (RY00)
        output       │
        enable       ├──────────────────────────────────(Y401 )   Turns on CH.2 analog output
                     │                                             enable/disable flag (RY01)
                     │
                     ├──────────────────────────────────(Y402 )   Turns on CH.3 analog output
                     │                                             enable/disable flag (RY02)
                     │
                     └──────────────────────────────────(Y403 )   Turns on CH.4 analog output
                                                                   enable/disable flag (RY03)
```

*1: The program enclosed by the dotted line is necessary only when the initial settings are changed.

*Processing at error occurence

```
         X41A
252     ─┤ ├──────────────────────────────────────────[BMOVP   D456    D500    K4   ]   Reads CH.□Check code
          │                                                                               (RWr0, RWr1, RWr2, RWr3)
          │
          ├──────────────────────────────────────────────[MOVP   D460    D504  ]   Reads error code(RWr4)
          │
          │ Error reset
          └─┤ ├────────────────────────────────────────────────[SET     Y41A  ]   Turns on error reset
                                                                                       request flag (RY1A)
         Y41A    X41A
269     ─┤ ├────┤/├───────────────────────────────────────────[RST     Y41A  ]   Turns off error reset
                                                                                       request flag (RY1A)

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

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

5.6 Program Example for Use of the ACPU/QCPU (A mode) (FROM/TO instructions)

*Network parameter settings

```
        X0      X0F
0   ────╫╫──────┤├──────────────────────────────────────────[PLS    M0    ]

        M0
5   ────┤├────────────────────────────────────────[MOV    K1      D0    ]   Number of connected
        │                                                                    modules:1
        │
        ├──────────────────────────────────────────[MOV    K3      D1    ]   Number of retries: 3
        │
        ├──────────────────────────────────────────[MOV    K1      D2    ]   Number of automatic
        │                                                                    return modules:1
        │
        ├──────────────────────────────[TO    H0      H1      D0     K3   ]   Writes to master station
        │
        │                                                                    Data link status at master
        ├──────────────────────────────────────────[MOV    K1      D3    ]   station programmable
        │                                                                    controller CPU error: continue
        │
        └──────────────────────────────[TO    H0      H6      D3     K1   ]   Writes to master station

        M0                                                                   AJ65BT-64 DAV station
44  ────┤├────────────────────────────────────────[MOV    H1201   D4    ]   information (remote device
        │                                                                    station, 2 stations occupied,
        │                                                                    station No.1)
        └──────────────────────────────[TO    H0      H20     D4     K1   ]   Writes to master station

        M0
59  ────┤├──────────────────────────────────────────────────[SET    Y0    ]   Refresh directive
        │
        └──────────────────────────────────────────────────[SET    Y6    ]   Data link started by buffer
                                                                              memory
        X6                                                                   Turns off start request
62  ────┤├──────────────────────────────────────────────────[RST    Y6    ]   signal at normal
                                                                              completion of start
        X7                                                                   Reads parameter status at
64  ────┤├────────────────────────────[FROM   H0      H668    D100   K1   ]   abnormal completion of start
        │
        │                                                                    Turns off start request
        └──────────────────────────────────────────────────[RST    Y6    ]   signal at abnormal
                                                                              completion of start
```

*Read of remote input signals

```
        X0      X0F     X1
75  ────╫╫──────┤├──────┤├────────────[FROM   H0      H0E0    K4X400 K2   ]   RX00 to RX1F are read to
                                                                              X400 to X41F
```

*Checking of AJ65BT-64DAV status

```
        X0      X0F     X1
87  ────╫╫──────┤├──────┤├─────┬──────[FROM   H0      H680    K1M1   K1   ]   Reads data link status
                              │
                              │   M1
                              ├───╫╫──────────────────────────[MC     N0      M100 ]   AJ65BT-64DAV data link
                              │                                                        normal
                              │   M1
                              └───┤├──────────────────────────────────────(Y90    )   AJ65BT-64DAV data link
                                                                                       abnormal

    N0 ─ M100
       ───┤├──
```

*Initial settings

```
        X418
109─────┤├──────────────────────────────────────────────[SET    Y404  ]    Offset/gain value selection
        │                                                                    (RY04)
        │
        │                                               [MOVP   K0   D204 ]   Analog output enable/disable
        │                                                                     setting (RWw4)
        │
        │                                   [TOP    H0    H1E4   D204   K1 ]   Writes to the master station
        │
        │                                                      [SET    Y418 ]   Turns on initial data procedure
        │                                                                       completion flag (RY18)
        │
        └──────────────────────────────────────────────────[SET    Y419 ]    Turns on initial data setting
                                                                              request flag (RY19)
```

*1 ┌───┐
   │ *Changing of Initial settings   │
   │   Initial setting change   │
   │ 127─────┤├──[PLS   M10]   │
   │   │
   │   M10   │
   │ 131─────┤├──[RST   Y404]   Offset/gain value selection   │
   │   │   (RY04)   │
   │   │   │
   │   │   [MOVP   K0   D204] Analog output enable/   │
   │   │   disable setting (RWw4)   │
   │   │   │
   │   │   [TOP   H0   H1E4   D204   K1] Writes to the master station │
   │   │   │
   │   └──[SET   Y419]   Turns on initial data setting   │
   │   request flag (RY19)   │
   └───┘

*Processing at initial settings

```
        X418
148─────┤/├──────────────────────────────────────────────[RST    Y418 ]    Turns off initial data procedure
                                                                            completion flag (RY18)

        X419
150─────┤├───────────────────────────────────────────────[RST    Y419 ]    Turns off initial data setting
                                                                            request flag (RY19)
```

*Setting of digital values

```
        M901    X41B
152─────┤├──────┤├───────────────────────────────────[MOVP   K50   D200 ]   CH.1 digital value setting
        │                                                                     (RWw0): 50
     Digital
     value                                           [MOVP   K100  D201 ]   CH.2 digital value setting
     setting                                                                 (RWw1): 100

        │                                             [MOVP   K200  D202 ]   CH.3 digital value setting
        │                                                                     (RWw2): 200
        │
        │                                             [MOVP   K300  D203 ]   CH.4 digital value setting
        │                                                                     (RWw3): 300
        │
        └──────────────────────────────[TO     H0    H1E0   D200   K4 ]
```

*Analog output enable/disable specification

```
        M902    X41B
183─────┤├──────┤├───────────────────────────────────────────────(Y400 )   Turns on CH.1 analog output
        │                                                                    enable/disable flag (RY00)
        │
        │                                                         (Y401 )    Turns on CH.2 analog output
        │                                                                    enable/disable flag (RY01)
        │
        │                                                         (Y402 )    Turns on CH.3 analog output
        │                                                                    enable/disable flag (RY02)
        │
        └─────────────────────────────────────────────────────(Y403 )    Turns on CH.4 analog output
                                                                          enable/disable flag (RY03)
```
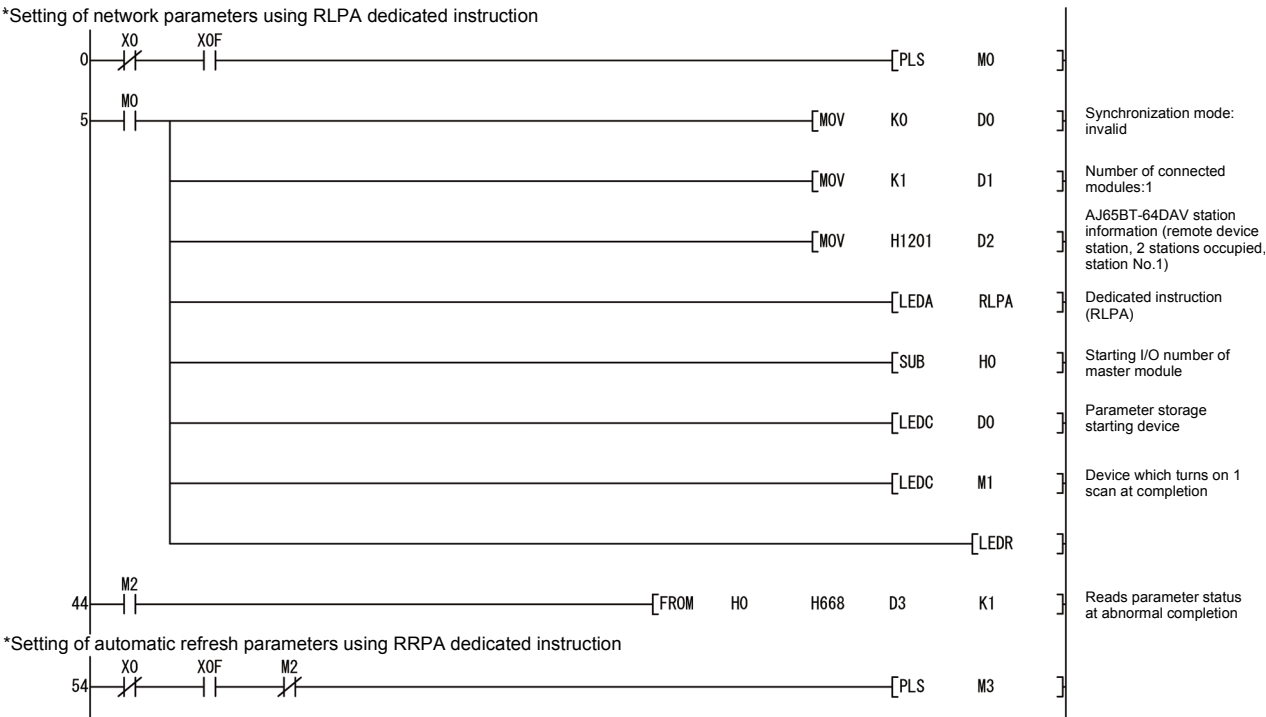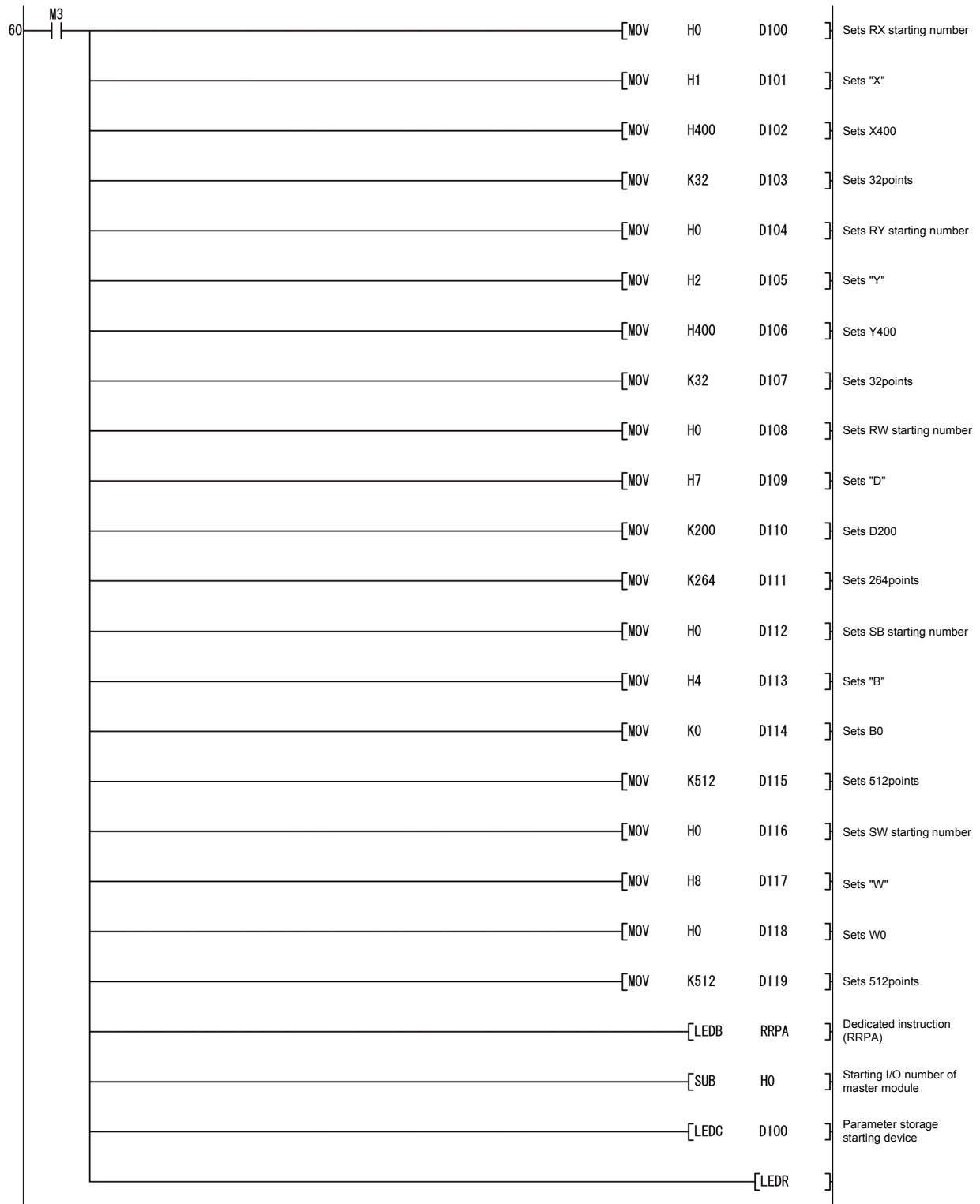
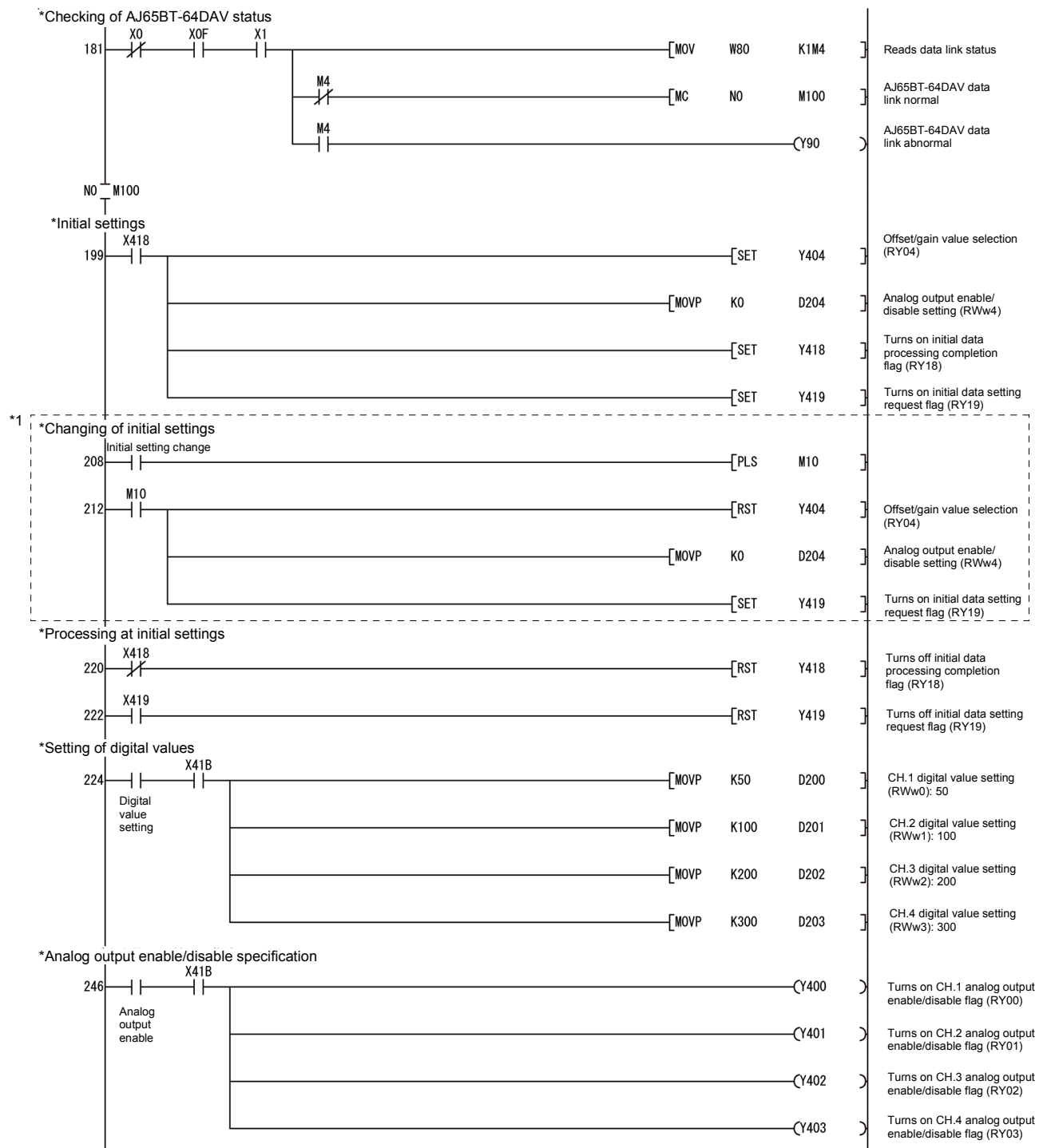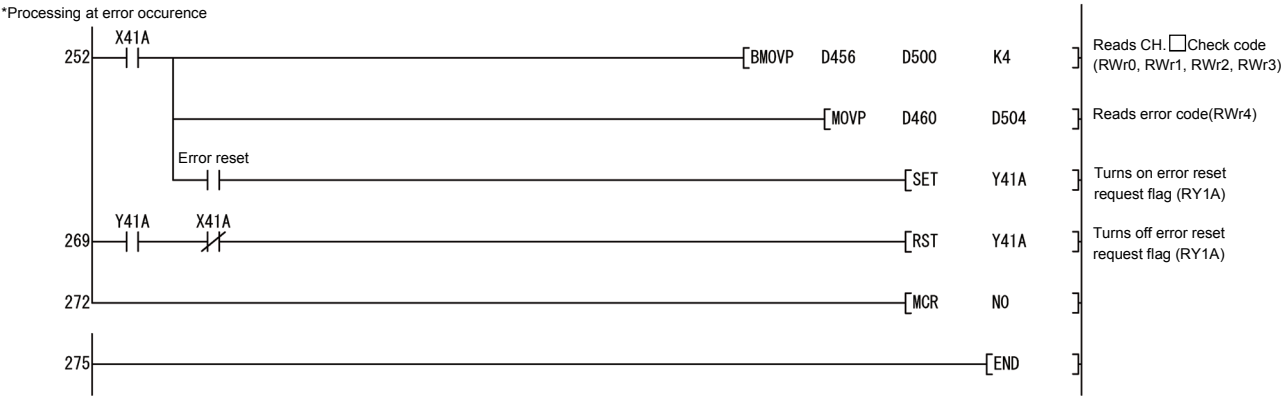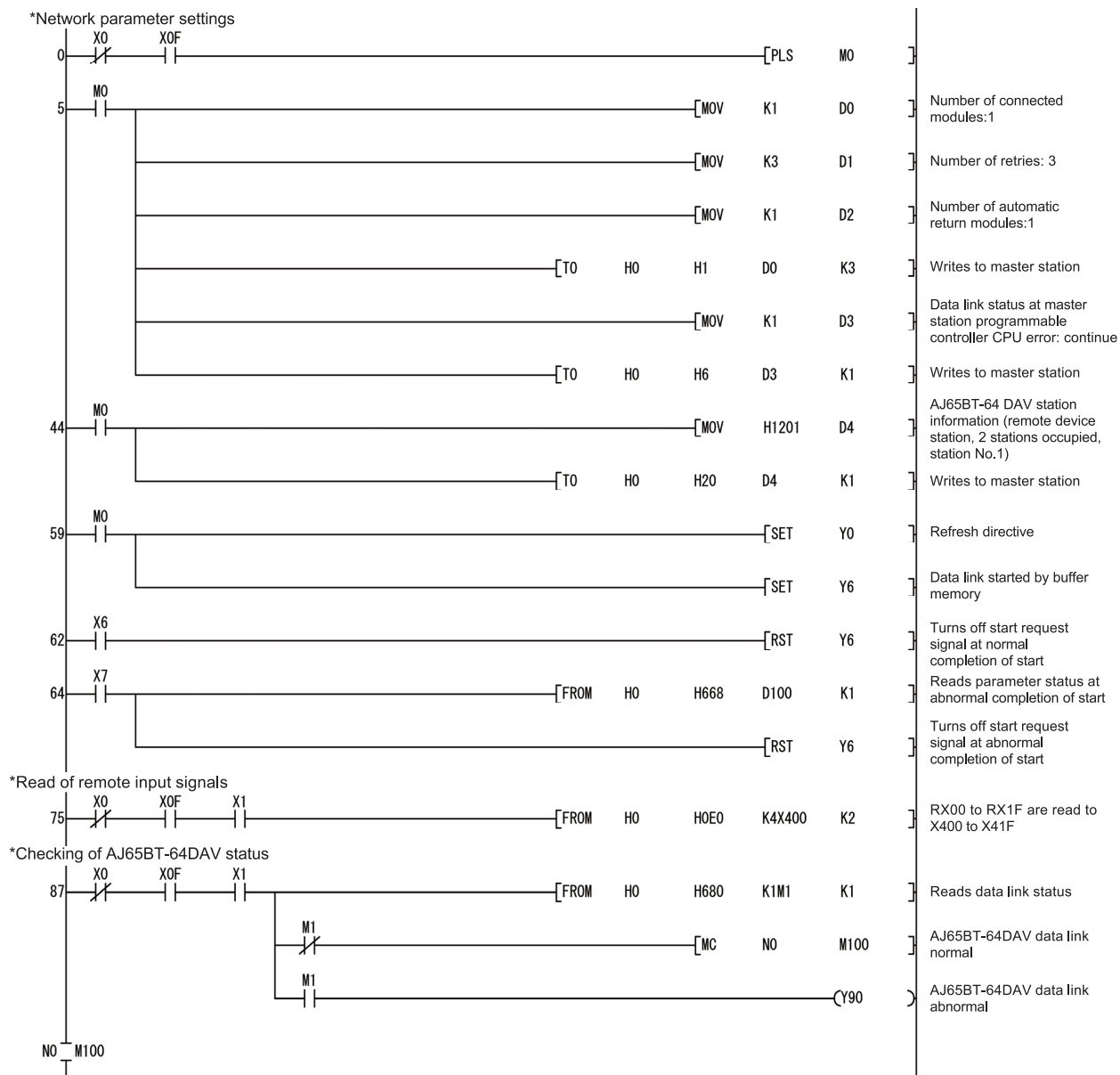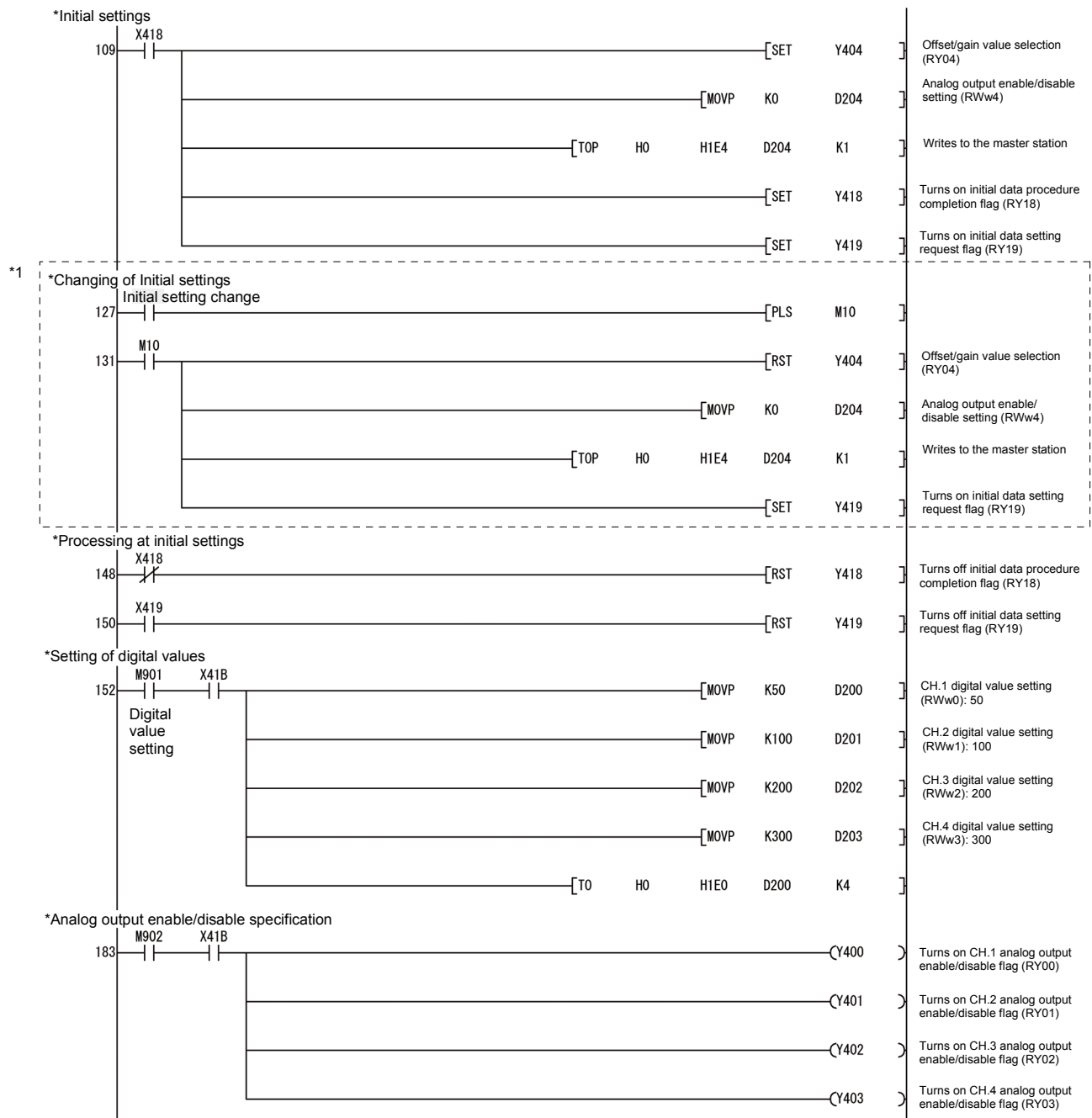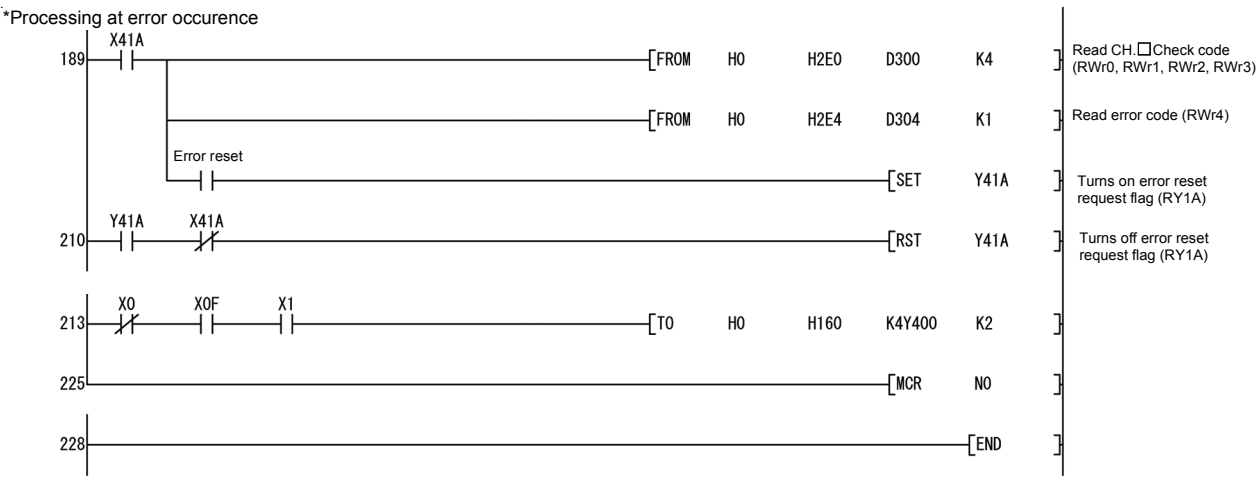*1:The program enclosed by the dotted line is necessary only when the initial settings are changed.

*Processing at error occurence

```
         X41A
189 ─────┤ ├──────┬──────────────────────────────[FROM  H0    H2E0   D300   K4  ]   Read CH.□Check code
         │        │                                                                 (RWr0, RWr1, RWr2, RWr3)
         │        │
         │        ├──────────────────────────────[FROM  H0    H2E4   D304   K1  ]   Read error code (RWr4)
         │        │
         │        │  Error reset
         │        └──────┤ ├────────────────────────────────────────[SET   Y41A ]   Turns on error reset
         │                                                                          request flag (RY1A)
         Y41A    X41A
210 ─────┤ ├─────┤/├──────────────────────────────────────────────[RST   Y41A ]   Turns off error reset
                                                                                    request flag (RY1A)

         X0      X0F     X1
213 ─────┤/├─────┤ ├─────┤ ├───────────────────────[T0    H0    H160  K4Y400  K2  ]

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

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

6.   TROUBLESHOOTING

The details of the errors which may occur when using the AJ65BT-64DAV/DAI and troubleshooting are described.

6.1   Error Code List

When the data is written from the programmable controller CPU to the master module, and an error occurs (AJ65BT-64DAV/DAI RUN LED flashes), the error code is stored to the AJ65BT-64DAV/DAI remote register RWrn+4.
Refer to Section 3.6.5 for the error code.

6.2   Troubleshooting

A simple troubleshooting method for using the AJ65BT-64DAV/DAI is described.
Refer to the programmable controller CPU and Master Module User's Manuals regarding problems related to the programmable controller CPU and master module.

(a)   When the AJ65BT-64DAV/DAI RUN LED is flashing

Check item	Corrective action
There in an error in the write data.	Check the cause of the error using the error code, and correct the sequence program.
Is there a short between the TEST terminals (test mode)?	Release between the TEST terminals after adjusting the offset/gain.
Is it flashing in 0.1s intervals (fast-speed) in test mode?	Change the offset/gain adjustment to within the allowable range.

(b)   When the AJ65BT-64DAV/DAI RUN LED is off

Check item	Corrective action
Is the 24VDC power on?	Check the power. (External power supply)
Is the 24VDC power voltage at the regulated value?	Set the voltage within the range 18 to 30V.
Is there a short between the TEST terminals(test mode)?	Release the TEST terminal after adjusting the offset/gain.

(c)   When the AJ65BT-64DAV/DAI LINK RUN LED turns off
       Refer to the master module troubleshooting section.

(d)   When the AJ65BT-64DAV/DAI LINK ERR LED is flashing

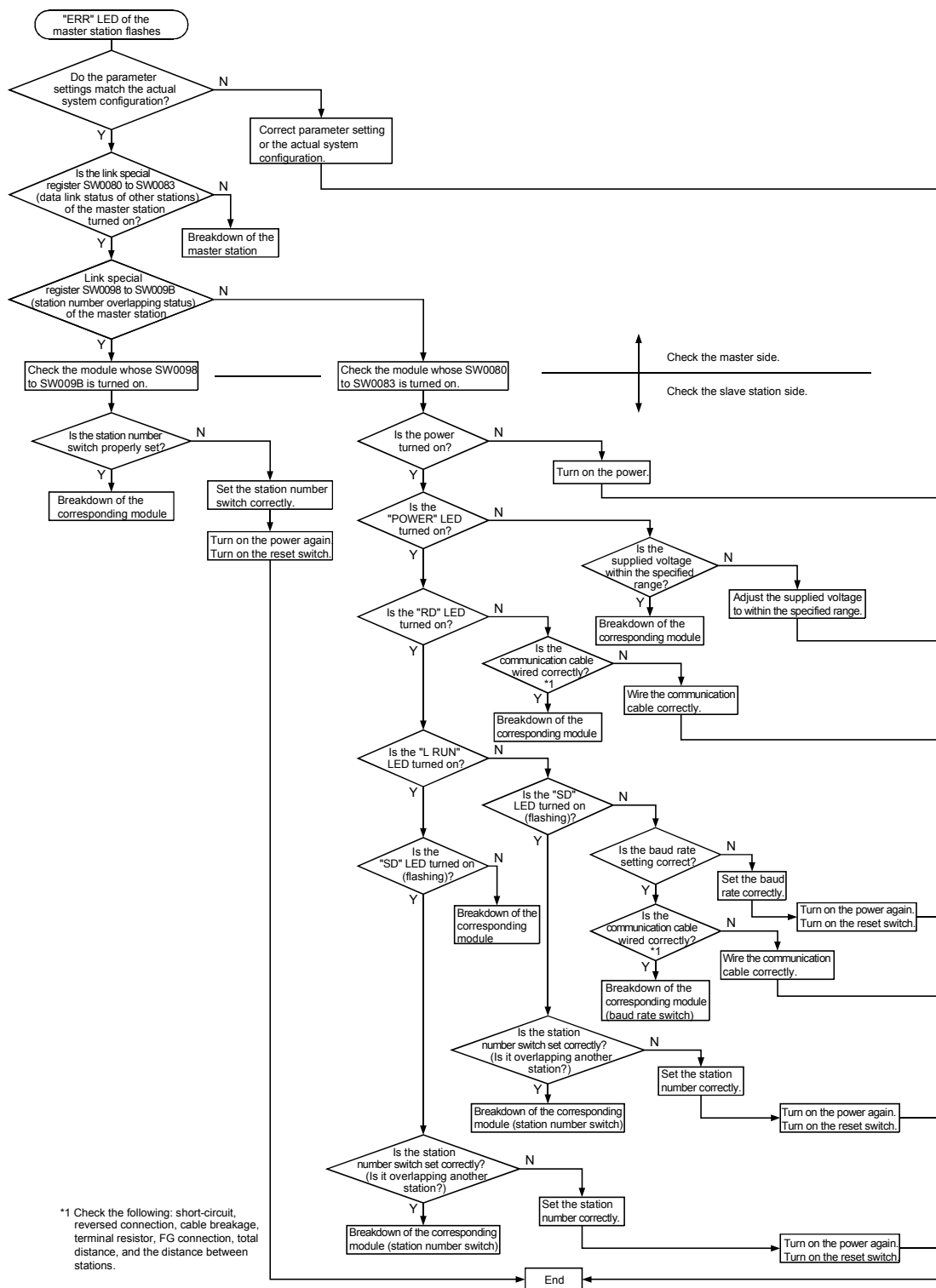| Check item	Corrective action
<Flashing at regular intervals> Was the station number or baud rate switch setting changed during normal operation?	Return to the station number or baud rate used during normal operation.
<Flashing at irregular intervals> • You forgot fitting the termination resistors. • The module or CC-Link dedicated cable is affected by noise.	Check whether the termination resistors are fitted or not. If not, connect them and switch power on again.
	• Earth both ends of the shield wire of the CC-Link dedicated cable to the protective earth conductors via SLD and FG of the corresponding module. • Securely earth the FG terminal of the module to the protective earth conductor. • Securely earth the piping when running the wiring inside piping.

(e)   When the AJ65BT-64DAV/DAI LINK ERR LED is on

Check item	Corrective action
Is the station number of baud rate setting correct?	Set a correct station number or baud rate.

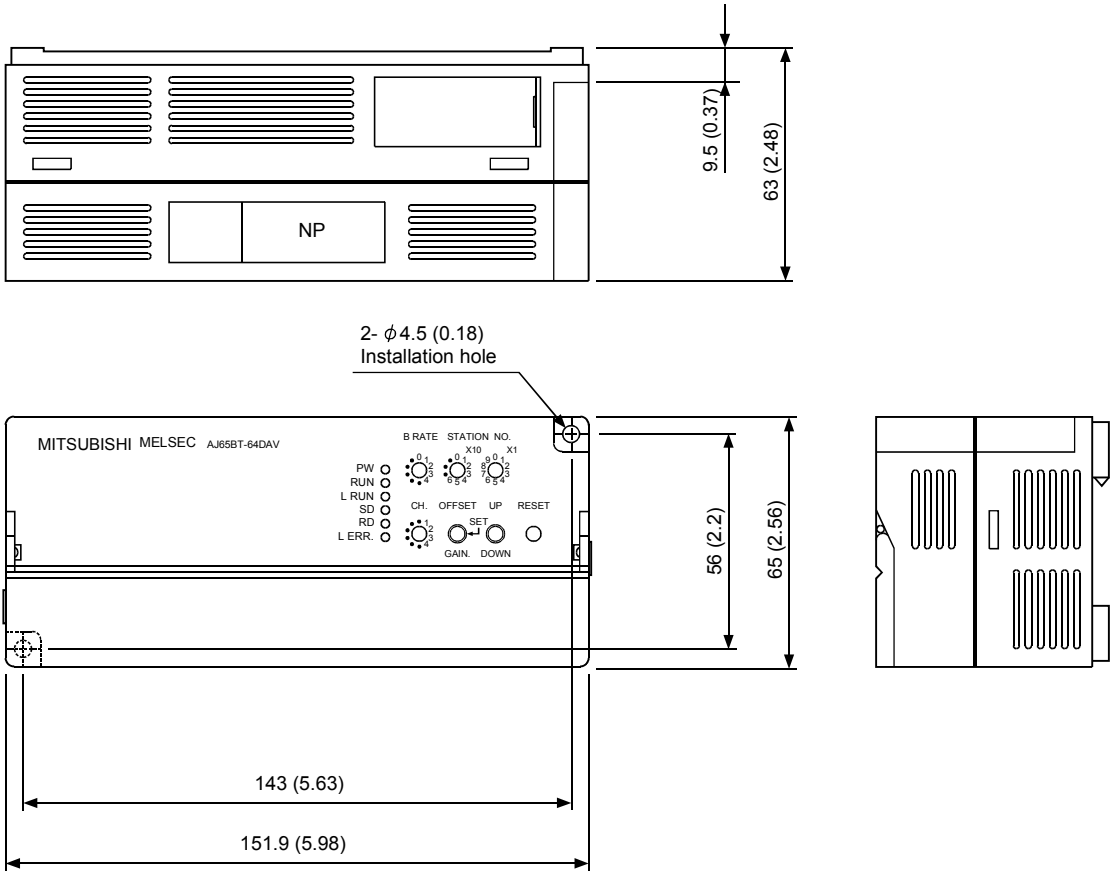### 6.2.1   When a communication fault occurs between the master station and this module

If the station-number-overlapping bit is turned on in the link special resister SW0098 to SW009B (station number overlapping status), check the AJ65BT-64DAV/DAI module of the corresponding station number by following the flow shown below:

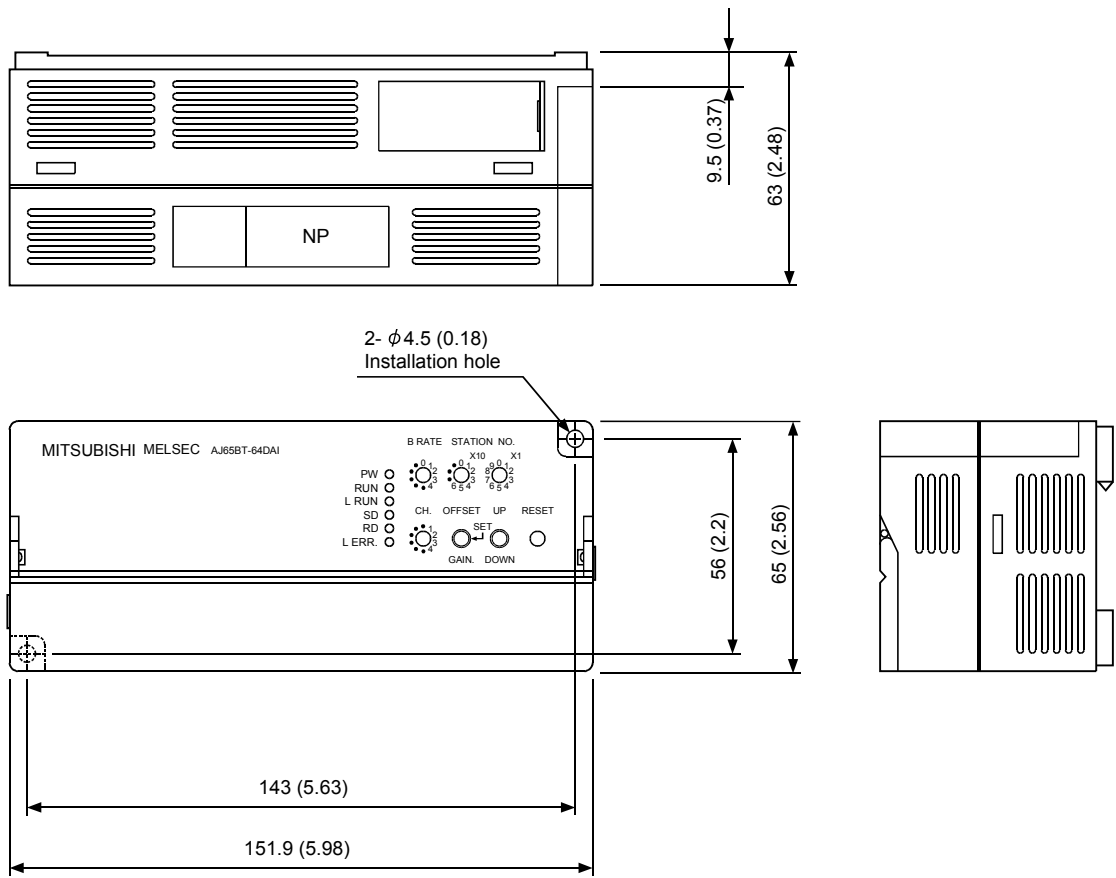Troubleshooting flow when the ERR LED on the master station is flashing

*1 Check the following: short-circuit, reversed connection, cable breakage, terminal resistor, FG connection, total distance, and the distance between stations.

6

APPENDIX

Appendix 1   External Dimensions of the AJ65BT-64DAV

9.5 (0.37)

63 (2.48)

NP

2- φ4.5 (0.18)
Installation hole

MITSUBISHI MELSEC AJ65BT-64DAV

B RATE   STATION NO.
X10   X1

PW
RUN
L RUN
SD
RD
L ERR.

CH.   OFFSET   UP   RESET
SET
GAIN.   DOWN

56 (2.2)

65 (2.56)

143 (5.63)

151.9 (5.98)

Unit: mm (inch)

App

Appendix 2   External Dimensions of the AJ65BT-64DAI

9.5 (0.37)

63 (2.48)

2-φ4.5 (0.18)
Installation hole

MITSUBISHI MELSEC AJ65BT-64DAI

PW
RUN
L RUN
SD
RD
L ERR.

B RATE   STATION NO.
X10   X1

CH.   OFFSET   UP   RESET
SET
GAIN.   DOWN

56 (2.2)

65 (2.56)

143 (5.63)

151.9 (5.98)

Unit: mm (inch)

App

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.

Digital-Analog Converter Module type AJ65BT-64DAV/DAI

User's Manual

MODEL	AJ65BT-64DA-U-S-E
MODEL CODE	13J895
SH(NA)-3615-G(1012)MEE	

▲ MITSUBISHI ELECTRIC CORPORATION

When exported from Japan, this manual does not require application to the
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Specifications subject to change without notice.