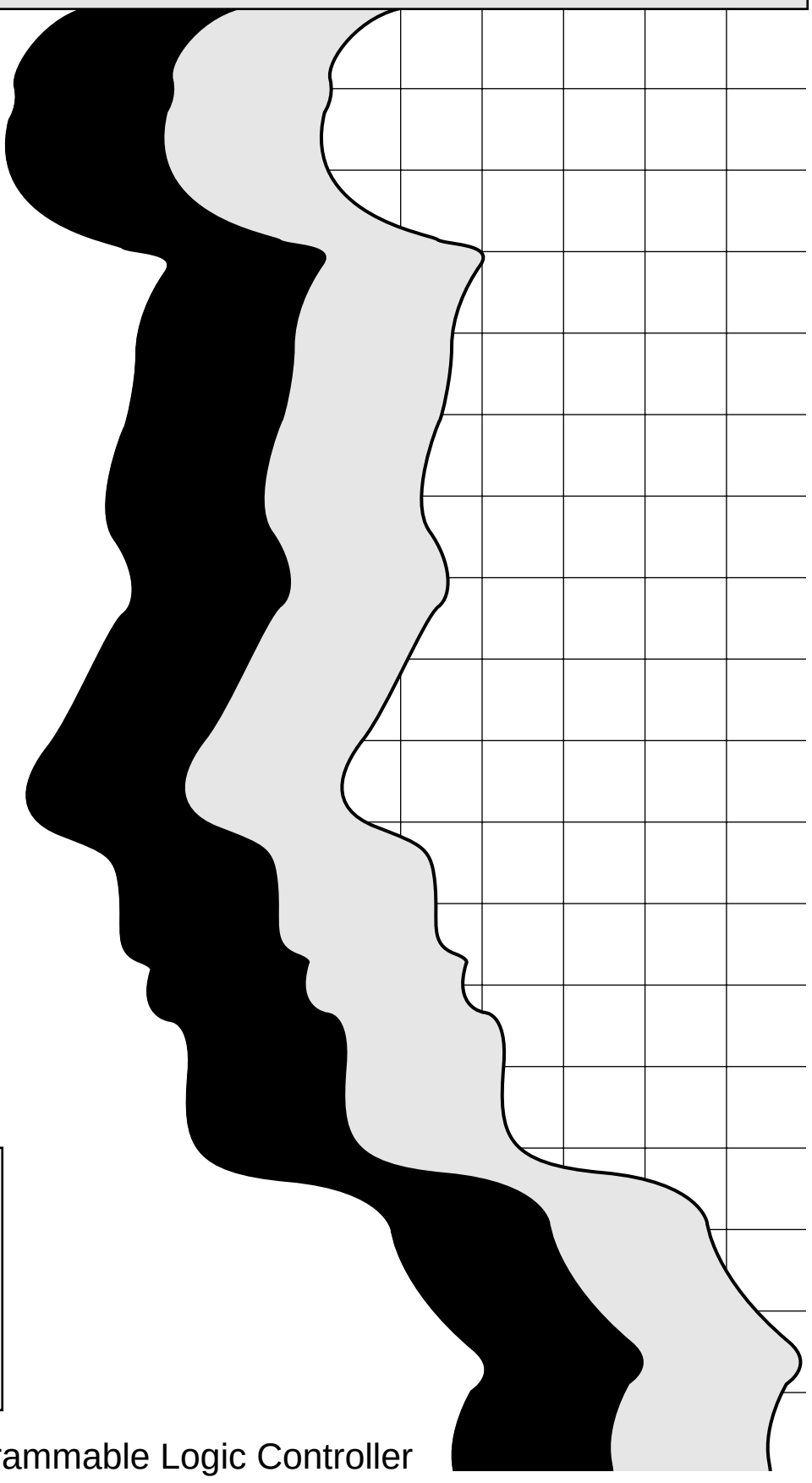
MITSUBISHI

Digital-Analog Converter Module type AJ65SBT-62DA

User's Manual



MELSEC

Mitsubishi Programmable Logic Controller

• SAFETY PRECAUTIONS •

(Always read these precautions before using this equipment.)

Before using this product, please read this manual and the relevant manuals introduced in this manual carefully and pay full attention to safety to handle the product correctly.
The precautions given in this manual are concerned with this product. Refer to the user's manual of the CPU module to use for a description of the PLC system safety precautions.
In this manual, the safety instructions are ranked as "DANGER" and "CAUTION".

⚠ DANGER	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 medium or slight personal injury or physical damage.

Note that the ⚠CAUTION level may lead to a serious consequence according to the circumstances. Always follow the precautions of both levels because they are important to personal safety.

Please save this manual to make it accessible when required and always forward it to the end user.

[Design Precautions]

⚠ DANGER

- Configure a safety circuit so that the safety of the overall system is maintained even when an external power error of PLC error occurs.
  Accident may occur due to output error or malfunctioning.
  (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 3.4.1 "Combinations of functions in each part"
  (2) Normal output may not be obtained due to malfunctions of output elements or the internal circuits.
  Configure a circuit to monitor signals which may lead to a serious accident.

⚠ 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 (3.9inch) or more from each other.
  Not doing so could result in noise that would cause erroneous operation.

[Installation Precautions]

⚠ CAUTION
• Use the PLC in the environment that meets the general specifications contained in this Manual. Using the PLC outside the range of the general specifications may result in electric shock, fire or malfunction, or may damage or degrade the module. • Securely fix the module to a DIN rail or with mounting screws, and securely tighten the mounting screws within the specified torque range. Undertightening can cause a drop or malfunction. Overtightening can cause a drop or malfunction due to damage of the screws or module. • Do not touch the conducted area or electric parts of the module. Doing so may cause module malfunction or breakdowns.

[Wiring Precautions]

⚠ CAUTION
• Always switch power off externally in all phases before starting installation, wiring and other works. Not doing so can cause the product to be damaged or malfunction. • Always earth the FG terminal to the protective earth conductor. Not doing so can cause a malfunction. • Wire the module correctly after confirming the rated voltage and terminal layout of the product. Not doing so can cause a fire or failure. • Tighten the terminal screws within the specified torque range. Undertightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to damage of the screws or module. • Ensure that no foreign matter such as chips and wire-offcuts enter the module. Foreign matter can cause a fire, failure or malfunction.

[Wiring Precautions]

⚠ CAUTION
• 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. • 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 the power is on. Doing so may cause malfunction. • Always start cleaning or terminal screw retightening after switching power off externally in all phases. Not doing so can cause the module to fail or malfunction. Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage of the screws or module. • Never disassemble or modify the module. This may cause breakdowns, malfunction, injury and/or fire. • Do not drop the module or give it hard impact since its case is made of resin. Doing so can damage the module. • Mount or dismount the module to or from an enclosure after switching power off externally in all phases. Not doing so can cause the module to fail or malfunction.

[Disposal Precautions]

⚠ CAUTION
• When disposing of this product, treat it as industrial waste.

REVISIONS

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

Print Date	* Manual Number	Revision
Oct., 2000	SH (NA) 080107-A	First printing

Japanese Manual Version SH-080088-A

INTRODUCTION

Thank you for choosing the Mitsubishi MELSEC-A series general-purpose programmable controller.
Before using the product, please read this manual carefully to use it to its optimum.

CONTENTS

About Manuals

The following manuals are also related to this product.
In necessary, order them by quoting the details in the tables below.

Related Manuals

Manual Name	Manual Number (Model Code)
CC-Link System Master/Local Module User's Manual type AJ61BT11/A1SJ61BT11 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 User's Manual type AJ61QBT11/A1SJ61QBT11 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 type QJ61BT11 Describes the system configuration, performance specifications, functions, handling, wiring and troubleshooting of the QJ61BT11. (Optionally available)	IB-080016 (13JL91)
type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A mode) Programming Manual (Dedicated Instructions) Explains the instructions extended for the AnSHCPU/AnACPU/AnUCPU/ QCPU-A (A mode). (Optionally available)	IB-66251 (13J742)

Conformation to the EMC Directive and Low Voltage Instruction

When complying with EMC Directives and Low-Voltage Directives by assembling a Mitsubishi PLC compatible with EMC Directive and Low-Voltage Directives into the user product, refer to Chapter 3 "EMC Directives and Low-Voltage Directives" in the User's Manual (Hardware) for the CPU module being used.
The CE logo is printed on the rating plate on the main body of the PLC that conforms to the EMC directive and low voltage instruction.

About the Generic Terms and Abbreviations

Unless otherwise specified, the following generic terms and abbreviations are used in this manual to describe Type AJ65SBT-62DA digital-analog conrerter module.

Generic Term/Abbreviation	Description
GPPW	Abbreviation for the SW4D5C-GPPW-E or later GPP function software.
ACPU	Generic term for A0J2CPU, A0J2HCPU, A1CPU, A2CPU, A2CPU-S1, A3CPU, A1SCPU, A1SCPU-S1, A1SCPUC-24-R2, A1SHCPU, A1SJCPU, A1SJCPU-S3, A1SJHCPU, A1NCPU, A2NCPU, A2NCPU-S1, A3NCPU, A3MCPU, A3HCPU, A2SCPU, A2SCPU-S1, A2SHCPU, A2ACPU, A2ACPU-S1, A3ACPU, A2UCPU, A2UCPU-S1, A2ASCPU, A2ASCPU-S1, A2ASCPU-S30, A2USHCPU-S1, A3UCPU, A4UCPU
QnACPU	Generic term for Q2ACPU, Q2ACPU-S1, Q2ASCPU, Q2ASCPU-S1, Q2ASHCPU, Q2ASHCPU-S1, Q3ACPU, Q4ACPU, Q4ARCPU
QCPU (A mode)	Generic term for Q02CPU-A, Q02HCPU-A, Q06HCPU-A
QCPU (Q mode)	Generic term for Q02CPU, Q02HCPU, Q06HCPU, Q12HCPU, Q25HCPU
Master station	Station that controls the data link system. One master station is required for each system.
Local station	Station having a PLC CPU and the ability to communicate with the master and other local stations.
Remote I/O station	Remote station that handles bit unit data only. (Performs input and output with external devices.) (AJ65BTB1-16D, AJ65SBTB1-16D)
Remote device station	Remote station that handles bit unit and word unit data only. (Performs input and output with external devices, and analog data exchange.)
Remote station	Generic term for remote I/O station and remote device station. (Controlled by the master station)
Intelligent device station	Station that can perform transient transmission, such as the AJ65BT-R2 (including local stations).
Master module	Generic term for QJ61BT11, AJ61BT11, A1SJ61BT11, AJ61QBT11, and A1SJ61QBT11 when they are used as master stations.
SB	Link special relay (for CC-Link) Bit unit information that indicates the module operating status and data link status of the master station/local station. (Expressed as SB for convenience)
SW	Link special register (for CC-Link) 16 bit unit information that indicates the module operating status and data link status of the master station/local station. (Expressed as SW for convenience)
RX	Remote input (for CC-Link) Information entered in bit units from the remote station to the master station. (Expressed as RX for convenience)
RY	Remote output (for CC-Link) Information output in bit units from the remote station to the master station. (Expressed as RY for convenience)
RWw	Remote register (Write area for CC-Link) Information output in 16-bit units from the master station to the remote device station. (Expressed as RWw for convenience)
RWr	Remote register (Read area for CC-Link) Information entered in 16-bit units from the master station to the remote device station. (Expressed as RWr for convenience)

Product Components

This product consists of the following.

Product Name	Quantity
Type AJ65SBT-62DA digital - analog converter module	1
Type AJ65SBT-62DA digital - analog converter module user's manual (hardware)	1

MEMO

1 OVERVIEW

This user's manual explains the specifications, handling, programming methods and others of Type AJ65SBT-62DA digital-analog converter module (hereafter abbreviated to the "AJ65SBT-62DA") which is used as a remote device station of a Control & Communication Link (hereafter abbreviated to "CC-Link") system.
The AJ65SBT-62DA is a module designed to convert digital values (16-bit signed BIN data) from outside the PLC into analog values (voltages or currents).

1.1 Features

This section gives the features of the AJ65SBT-62DA.

(1) High accuracy

This module performs D/A conversion at the accuracy of ±0.4% relative to the maximum value of the analog output value at the operating ambient temperature of 0 to 55°C, or at ±0.2% relative to the maximum value of the analog output value at the operating ambient temperature of 25±5°C.

(2) Output range selectable per channel

You can choose the analog output range per channel to change the I/O conversion characteristics.

(3) High resolution of 1/±4000

By changing the output range, you can choose and set the resolution to either 1/4000 or 1/±4000 (when the -10 to +10V range or user range setting 1 is selected) to provide high-resolution analog values.

(4) Setting of analog output hold or clear at STOP of PLC CPU

You can specify whether to hold or clear the analog value which is being output from each channel of the unit when the PLC CPU has entered the STOP mode or the AJ65SBT-62DA has stopped D/A conversion due to error occurrence.

(5) Smaller than the conventional D/A converter module

This module is 60% smaller in installation area and 38% less in volume than the conventional CC-Link D/A converter module (AJ65BT-64DAV/DAI).

(6) Up to 42 modules connectable

You can connect up to 42 AJ65SBT-62DA modules to one master station.

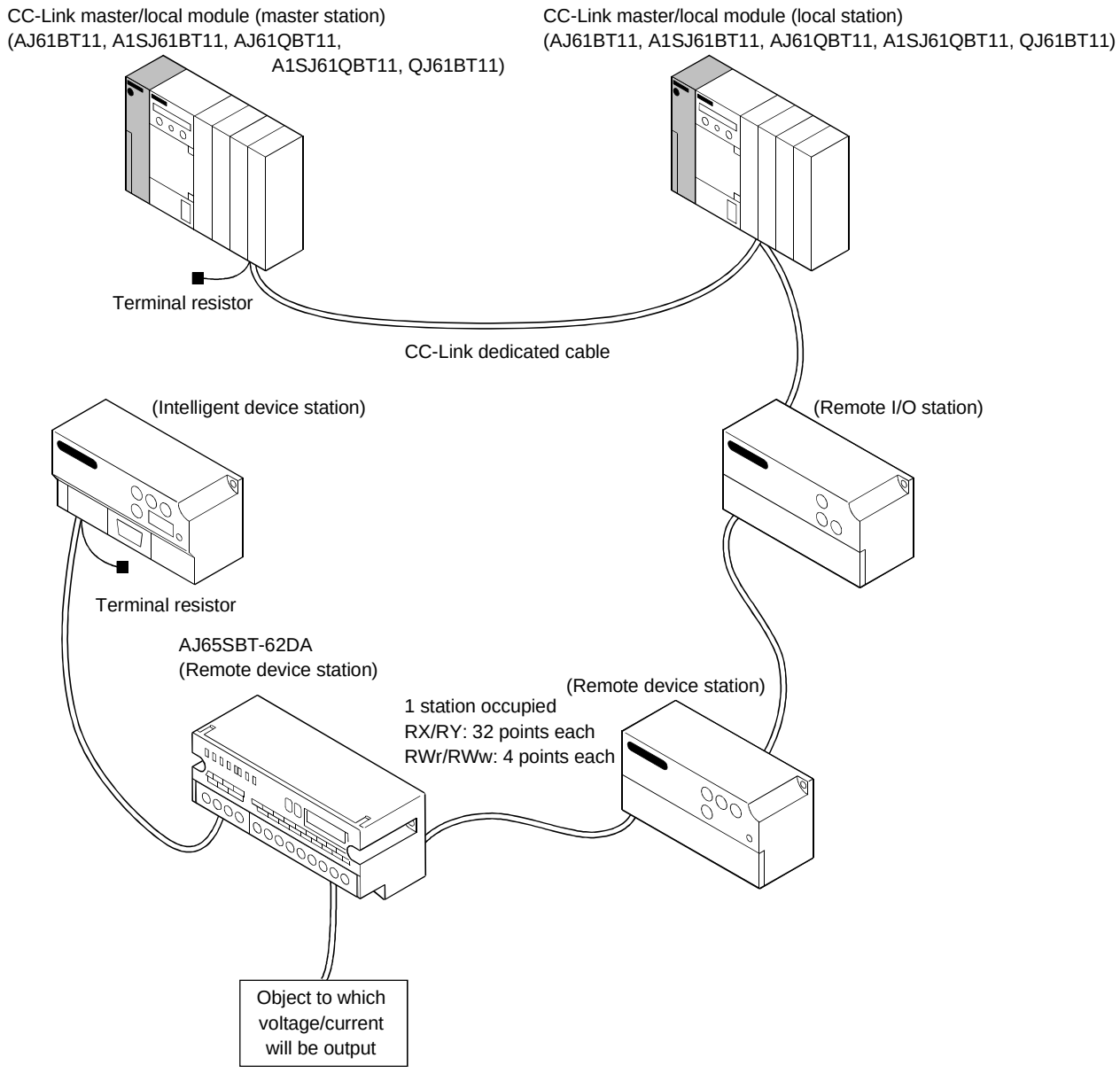
MEMO

2 SYSTEM CONFIGURATION

This chapter describes the system configuration for use of the AJ65SBT-62DA.

2.1 Overall Configuration

The overall configuration for use of the AJ65SBT-62DA is shown below.



2.2 Applicable System

This section explains the applicable system.

(1) Applicable master modules

The following master modules can be used with the AJ65SBT-62DA.

- AJ61BT11
- A1SJ61BT11
- AJ61QBT11
- A1SJ61QBT11
- QJ61BT11

(2) Restrictions on use of CC-Link dedicated instructions

The CC-Link dedicated instructions may not be used depending on the PLC CPU or master module used

For details of the restrictions, refer to the A series master module user's manual.

3 SPECIFICATION

This chapter provides the specifications of the AJ65SBT-62DA.

3.1 General Specification

Table 3.1 indicates the general specifications of the AJ65SBT-62DA.

Table 3.1 General specification

<table>
<tr><th>Item</th><th colspan="5">Specification</th></tr>
<tr><td>Usage ambient temperature</td><td colspan="5">0 to 55°C</td></tr>
<tr><td>Storage ambient temperature</td><td colspan="5">-20 to 75°C</td></tr>
<tr><td>Usage ambient humidity</td><td colspan="5">10 to 90%RH, no condensation</td></tr>
<tr><td>Storage ambient humidity</td><td colspan="5">10 to 90%RH, no condensation</td></tr>
<tr><td rowspan="10">Vibration durability</td><td rowspan="10">Conforming to JIS B 3501, IEC 1131-2</td><td colspan="4">When there is intermittent vibration</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td><td>Sweep count</td></tr>
<tr><td>10 to 57Hz</td><td>—</td><td>0.075mm (0.0030inch)</td><td rowspan="6">10 times in each direction X, Y, Z (80 minutes)</td></tr>
<tr><td>57 to 150Hz</td><td>9.8m/s^2</td><td>—</td></tr>
<tr><td colspan="3">When there is continuous vibration</td></tr>
<tr><td>Frequency</td><td>Acceleration</td><td>Amplitude</td></tr>
<tr><td>10 to 57Hz</td><td>—</td><td>0.035mm (0.0013inch)</td></tr>
<tr><td>57 to 150Hz</td><td>4.9m/s^2</td><td>—</td></tr>
<tr><td>Shock durability</td><td colspan="5">Conforming to JIS B 3501, IEC1131-2 (147m/s2, 3 times each in 3 directions)</td></tr>
<tr><td>Usage environment</td><td colspan="5">No corrosive gas</td></tr>
<tr><td>Usage height</td><td colspan="5">Less than 2000 m (less than 6562 ft.)</td></tr>
<tr><td>Installation area</td><td colspan="5">Within the control board</td></tr>
<tr><td>Over-voltage category *1</td><td colspan="5">Less than II</td></tr>
<tr><td>Pollution level *2</td><td colspan="5">Less than 2</td></tr>
</table>

*1 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.

*2 This is an index which indicates the degree of conductive object generation in the environment Pollution level 2 is when only non-conductive pollution occurs.
A temporary conductivity caused by condensation must be expected occasionally.

3.2 Performance Specification

Table 3.2 indicates the performance specifications of the AJ65SBT-62DA.

Table 3.2 Performance Specifications

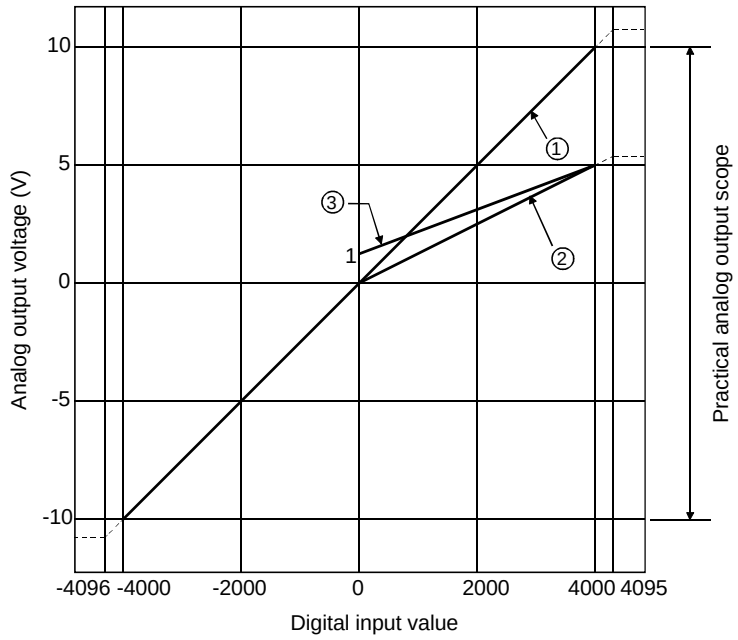
<table>
<tr><td colspan="2">Item</td><td>AJ65SBT-62DA</td></tr>
<tr><td rowspan="2">Digital input</td><td>Voltage</td><td>16-bit signed binary (-4096 to +4095)</td></tr>
<tr><td>Current</td><td>16-bit signed binary (0 to 4095)</td></tr>
<tr><td rowspan="2">Analog output</td><td>Voltage</td><td>-10 to +10VDC (external load resistance: 2kΩ to 1MΩ)</td></tr>
<tr><td>Current</td><td>0 to 20mADC (external load resistance: 0 to 600Ω)</td></tr>
<tr><td>I/O characteristics, maximum resolution, accuracy (accuracy relative to maximum value of analog output value)</td><td colspan="2">
<table>
<tr><th></th><th>Digital Input Value</th><th>Analog Input Range</th><th>Accuracy</th><th></th><th>Max. Resolution</th></tr>
<tr><th></th><th></th><th></th><th>Ambient temperature 0 to 55°C</th><th>Ambient temperature 25±5°C</th><th></th></tr>
<tr><td rowspan="5">Voltage</td><td rowspan="2">-4000 to +4000</td><td>-10 to +10V</td><td rowspan="2">±0.4% (±40mV)</td><td rowspan="2">±0.2% (±20mV)</td><td rowspan="2">2.5mV</td></tr>
<tr><td>User range setting 1 (-10 to +10V)</td></tr>
<tr><td rowspan="3">0 to 4000</td><td>0 to 5V</td><td rowspan="3">±0.4% (±20mV)</td><td rowspan="3">±0.2% (±10mV)</td><td>1.25mV</td></tr>
<tr><td>1 to 5V</td><td rowspan="2">1.0mV</td></tr>
<tr><td>User range setting 2 (0 to 5V)</td></tr>
<tr><td rowspan="3">Current</td><td rowspan="3">0 to 4000</td><td>0 to 20mA</td><td rowspan="3">±0.4% (±80μA)</td><td rowspan="3">±0.2% (±40μA)</td><td>5μA</td></tr>
<tr><td>4 to 20mA</td><td rowspan="2">4μA</td></tr>
<tr><td>User range setting 3 (0 to 20mA)</td></tr>
</table>
Factory setting is -10 to +10V.
</td></tr>
<tr><td colspan="2">Maximum conversion speed</td><td>1ms/1 channel</td></tr>
<tr><td colspan="2">Output short-circuit protection</td><td>Yes</td></tr>
<tr><td colspan="2">Absolute maximum output</td><td>Voltage: ±12V, Current +21mA</td></tr>
<tr><td colspan="2">Number of analog output points</td><td>2 channels/1 module</td></tr>
<tr><td colspan="2">Number of occupied stations</td><td>1 station (RX/RY: 32 points each, RWr/RWw: 4 points each)</td></tr>
<tr><td colspan="2">Connected terminal block</td><td>7-point, 2-piece terminal block (transmission, power supply)
Direct-coupled, 18-point terminal block (analog output section) (M3 screw)</td></tr>
<tr><td colspan="2">Applicable wire size</td><td>0.3 to 0.75mm^2</td></tr>
<tr><td colspan="2">Applicable crimping terminal</td><td>RAV1.25-3.5 (conforming to JIS C2805)</td></tr>
<tr><td colspan="2">Module mounting screw</td><td>M4 screw × 0.7mm × 16mm or more (tightening torque range: 78 to 108N•cm)
Can also be mounted to DIN rail</td></tr>
<tr><td colspan="2">Applicable DIN rail</td><td>TH35-7.5Fe, TH35-7.5Al (conforming to JIS-C2B12)</td></tr>
<tr><td colspan="2">24VDC internal current consumption (A)</td><td>0.16</td></tr>
<tr><td colspan="2" rowspan="2">External power supply</td><td>DC24V (DC20.4V to DC26.4V)</td></tr>
<tr><td>Inrush current: 8.2A, within 2.1ms</td></tr>
<tr><td colspan="2">Noise immunity</td><td>By noise simulator of 500Vp-p noise voltage, 1μs noise width and 25 to 60Hz noise frequency</td></tr>
<tr><td colspan="2">Dielectric withstand voltage</td><td>500VAC for 1 minute across all power supply and communication system terminals and all analog output terminals</td></tr>
<tr><td colspan="2">Isolation system</td><td>Across communication system terminals and all analog output terminals: Photocoupler isolated
Across power supply system terminals and all analog output terminals: Photocoupler isolated
Across channels: Non-isolated</td></tr>
<tr><td colspan="2">Weight (kg)</td><td>0.20</td></tr>
<tr><td colspan="2">Outline dimensions (mm)</td><td>118 (W) × 50 (H) × 40 (D)</td></tr>
</table>

3.3 I/O Conversion Characteristics

An I/O conversion characteristic indicates an inclination of a straight line which connects an offset value and a gain value at the time when a digital value set from the PLC CPU is converted into an analog value (voltage or current output).
The offset value is an analog value (voltage or current) output when the digital value set from the PLC CPU is 0.
The gain value is an analog value (voltage or current) output when the digital value set from the PLC CPU is 4000.

3.3.1 Voltage output characteristics

The voltage output characteristic graph is shown below.



Number	Analog Output Range Setting	Offset Value	Gain Value	Digital Input Value	Maximum Resolution
1)	-10 to +10v	0V	10V	-4000 to +4000	2.5mV
2)	0 to 5V	0V	5V	0 to 4000	1.25mV
3)	1 to 5V	1V	5V		1.0mV
—	User range setting 1 (-10 to +10v)	0V	10V	-4000 to +4000	2.5mV
—	User range setting 2 (0 to 5v)	0V	5V	0 to 4000	1.0mV

Fig. 3.1 Voltage Output Characteristic

POINT

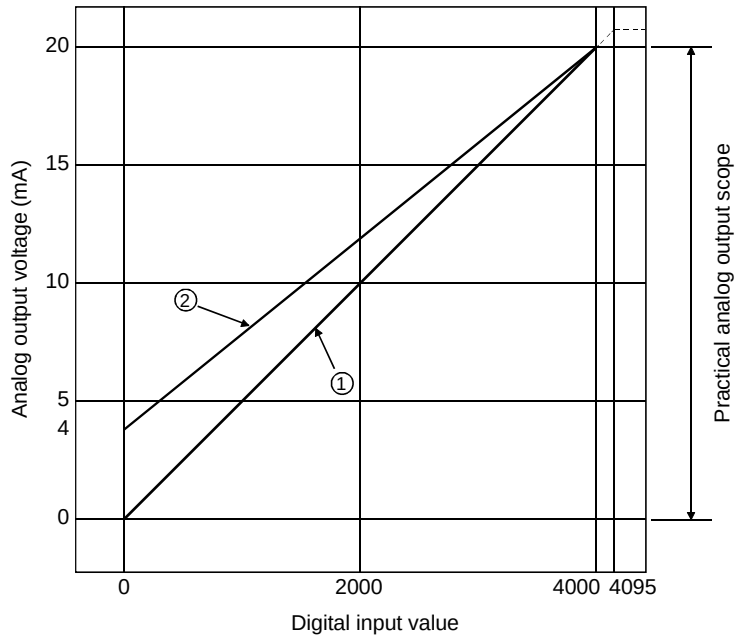
(1) Within the digital input and analog output scopes of each output range, the maximum resolution and accuracy are within the performance specification range. Outside those scopes, however, they may not fall within the performance specification range. (Avoid using the dotted line part in Fig. 3.1.)

(2) Set the offset and gain values of the user range setting within the range satisfying the following conditions.
   (a) Setting range when user range setting 1 is selected: -10 to +10V
   (b) Setting range when user range setting 2 is selected: 0 to 5V
   (c) (Gain value) > (Offset value)

   If you attempt to make setting outside the setting range of (a) or (b), the "RUN" LED flickers at 0.5s intervals.
   Set the values within the setting range.
   If you attempt to make setting outside the setting range of (c), the "RUN" LED flickers at 0.5s intervals.
   Make setting again.

3.3.2 Current output characteristics

The current output characteristic graph is shown below.



Number	Analog Output Range Setting	Offset Value	Gain Value	Digital Input Value	Maximum Resolution
1)	0 to 20mA	0mA	20mA	0 to 4000	5μA
2)	4 to 20mA	4mA	20mA		4μA
—	User range setting 3 (0 to 20mA)	0mA	20mA		

Fig. 3.2 Current Output Characteristic

POINT

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

(2) Set the offset and gain values of the user range setting within the range satisfying the following conditions.
(a) Setting range when user range setting 3 is selected: 0 to 20mA
(b) (Gain value) > (Offset value)

If you attempt to make setting outside the setting range of (a), the "RUN" LED flickers at 0.5s intervals.
Set the values within the setting range.
If you attempt to make setting outside the setting range of (b), the "RUN" LED flickers at 0.5s intervals.
Make setting again.

3.3.3 Relationship between offset/gain setting and analog output value

How to calculate the analog output value:
The resolution of AJ65SBT-62DA can be set arbitrarily by modifying the setting 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.

(1) Resolution

Find the resolution with the following expression.

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

(2) Analog output value

Find the analog output value with the following expression.

(Analog output) = (Analog resolution) × (Digital input value) + (Offset value)

3.3.4 Accuracy

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

(1) Accuracy of voltage output

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

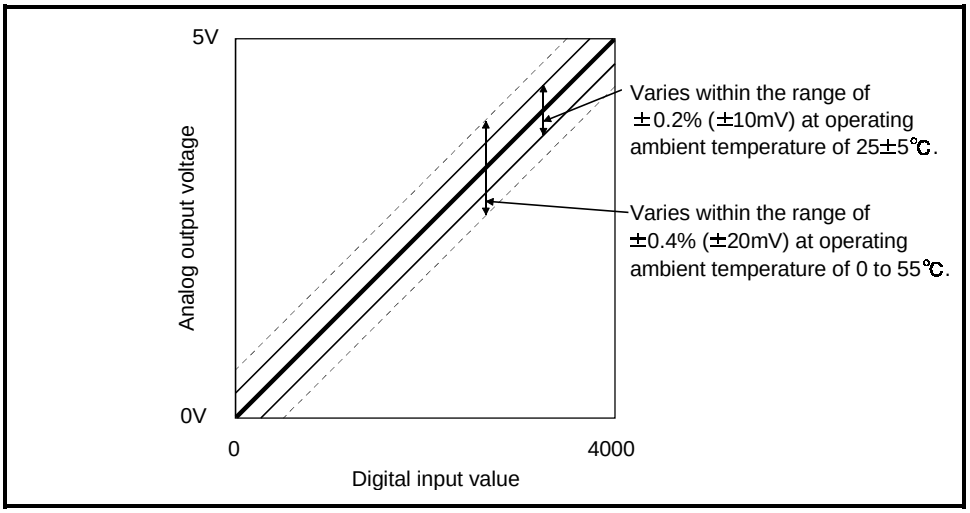


Fig. 3.3 Voltage Output Accuracy (When 0 to 5V Range Is Selected)

(2) Accuracy of current output

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

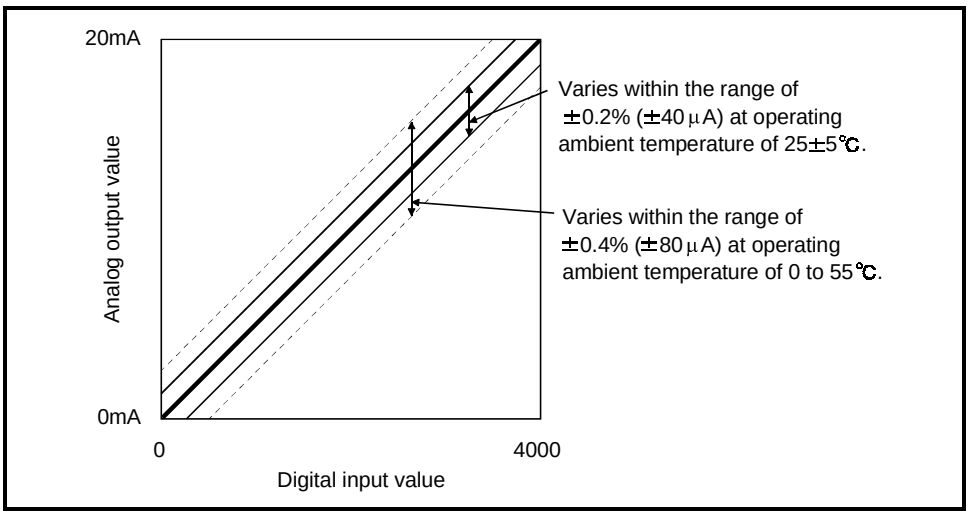


Fig. 3.4 Current Output Accuracy

3.3.5 Conversion speed

Conversion speed indicates time required to read the digital output value written to the buffer memory, perform D/A conversion, and then output the specified analog value.
Conversion speed per channel of the AJ65SBT-62DA is 1ms.
Due to the data link processing time of the CC-Link system, there is a transmission delay until the D/A conversion value is read actually.
For the data link processing time, refer to the user's manual of the master module used.

Example) Data link processing time taken when the master module is the AJ61BT11 or A1SJ61BT11

[Calculation expression]

SM+LS×2+remote device station processing time
SM: Scan time of master station sequence program
LS : Link scan time
Remote device station processing time: (Number of channels used+1*) × 1ms
*: Internal processing time of AJ65SBT-62DA

3.4 Function

Table 3.3 lists the functions of the AJ65SBT-62DA.

Table 3.3 AJ65SBT-62DA Function List

<table>
<tr><th>Item</th><th>Description</th><th>Refer to</th></tr>
<tr><td>D/A output enable/disable function</td><td>Specify whether the D/A conversion value is output or the offset value is output per channel.
Note that the conversion speed is constant independently of the output enable/disable setting.</td><td>Section 3.5.2</td></tr>
<tr><td>D/A conversion enable/disable function</td><td>Specify whether D/A conversion is enabled or disabled per channel.
The sampling cycle can be shortened by setting the unused channel to D/A conversion disable.</td><td>Section 3.6.3</td></tr>
<tr><td>Output range changing function</td><td>You can set the analog output range per channel to change the I/O conversion characteristics.
Select the output range setting from among the following 8 types.
<table>
<tr><th>Output Range</th><th>Set Value</th></tr>
<tr><td>-10 to +10V</td><td>0H</td></tr>
<tr><td>0 to 5V</td><td>1H</td></tr>
<tr><td>1 to 5V</td><td>2H</td></tr>
<tr><td>0 to 20mA</td><td>3H</td></tr>
<tr><td>4 to 20mA</td><td>4H</td></tr>
<tr><td>User range setting 1 (-10 to +10V)</td><td>5H</td></tr>
<tr><td>User range setting 2 (0 to 5V)</td><td>6H</td></tr>
<tr><td>User range setting 3 (0 to 20mA)</td><td>7H</td></tr>
</table></td><td>Section 3.6.4</td></tr>
<tr><td>Function to specify hold or clear of the analog output when the PLC CPU is in the STOP status (HOLD/CLEAR setting)</td><td>Specify per channel whether to hold or clear (output the offset value) the analog value which is being output from each channel when the PLC CPU has entered the STOP status or the AJ65SBT-62DA has stopped D/A conversion due to error occurrence.</td><td>Section 3.6.4</td></tr>
<tr><td>Offset/gain setting</td><td>You can make offset/gain setting per channel without potentiometers to change the I/O conversion characteristics freely.</td><td>Section 4.4</td></tr>
</table>

3.4.1 Combinations of various functions

You can set the analog output as indicated in Table 3.4 by combining the HOLD/CLEAR setting, CH. □ analog output enable/disable flag and Analog output enable/disable setting.
Make setting according to your system application.

Table 3.4 Analog output status combination list

Setting combination / Execution status	Analog output enable/disable setting	Enable (1)			Prohibit (0)
	CH. □ analog output enable/disable flag	Enable (ON)		Prohibit (OFF)	Enable or disable
	HOLD/CLEAR setting	HOLD	CLEAR	HOLD or CLEAR	HOLD or CLEAR
Analog output status when the PLC CPU is in the RUN status		Output of the analog value after D/A conversion from the digital value specified by the PLC CPU		Offset value	0V/0mA
Analog output status when the PLC CPU is in the STOP status		Analog value before the PLC CPU stop is retained	Offset value	Offset value	0V/0mA
Analog output status at PLC CPU stop error		Analog value before the PLC CPU stop is retained	Offset value	Offset value	0V/0mA
Analog output status at occurrence of AJ65SBT-62DA digital value setting error		Output of the maximum or minimum analog value		Offset value	0V/0mA
Analog output status when the "L RUN" LED turns off/"L.ERR" LED turns on		The analog value before the "L RUN" LED turns off is retained.	Offset value	Offset value	0V/0mA
Analog output status when the "L ERR." LED flickers		Output of the analog value after D/A conversion from the digital value specified by the PLC CPU		Offset value	0V/0mA
Analog output status in initial processing completion status after power-reset		Output of the analog value after D/A conversion from the digital value specified by the PLC CPU		Offset value	0V/0mA
Analog output status at occurrence of AJ65SBT-62DA output range setting error		0V/0mA	0V/0mA	0V/0mA	0V/0mA
Analog output status at occurrence of AJ65SBT-62DA watchdog timer error		0V/0mA	0V/0mA	0V/0mA	0V/0mA

3.5 Remote I/O Signals

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

3.5.1 Remote I/O signal list

Remote inputs (RX) mean the input signals from the AJ65SBT-62DA to the master module, and remote outputs (RY) mean the output signals from the master module to the AJ65SBT-62DA.
In communications with the master station, the AJ65SBT-62DA uses 32 points of the remote inputs (RX) and 32 points of the remote outputs (RY). Table 3.5 indicates the assignment and names of the remote I/O signals.

Table 3.5 Remote I/O Signals List

<table>
<tr><th colspan="2">Signal Direction: AJ65SBT-62DA → Master Module</th><th colspan="2">Signal Direction: Master Module → AJ65SBT-62DA</th></tr>
<tr><th>Remote input (RX)</th><th>Name</th><th>Remote output (RY)</th><th>Name</th></tr>
<tr><td>RXn0
to
RXnB</td><td>Reserved</td><td rowspan="4">RYn0</td><td rowspan="4">CH.1 analog output enable/disable flag</td></tr>
<tr><td>RXnC</td><td>E^{2}PROM write error flag</td></tr>
<tr><td>RXnD</td><td rowspan="2">Reserved</td></tr>
<tr><td>RXnE</td></tr>
<tr><td>RXnF</td><td>Test mode flag</td><td>RYn1</td><td>CH.2 analog output enable/disable flag</td></tr>
<tr><td>RX (n+1) 0
to
RX (n+1) 7</td><td>Reserved</td><td>RYn2
to
RY (n+1) 7</td><td>Reserved</td></tr>
<tr><td>RX (n+1) 8</td><td>Initial data processing request flag</td><td>RY (n+1) 8</td><td>Initial data processing complete flag</td></tr>
<tr><td>RX (n+1) 9</td><td>Initial data setting complete flag</td><td>RY (n+1) 9</td><td>Initial data setting request flag</td></tr>
<tr><td>RX (n+1) A</td><td>Error status flag</td><td>RY (n+1) A</td><td>Error reset request flag</td></tr>
<tr><td>RX (n+1) B</td><td>Remote READY</td><td rowspan="2">RY (n+1) B
to
RY (n+1) F</td><td rowspan="2">Reserved</td></tr>
<tr><td>RX (n+1) C
to
RX (n+1) F</td><td>Reserved</td></tr>
</table>

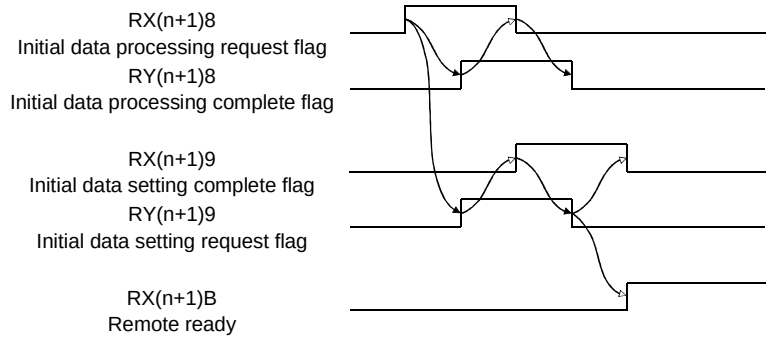
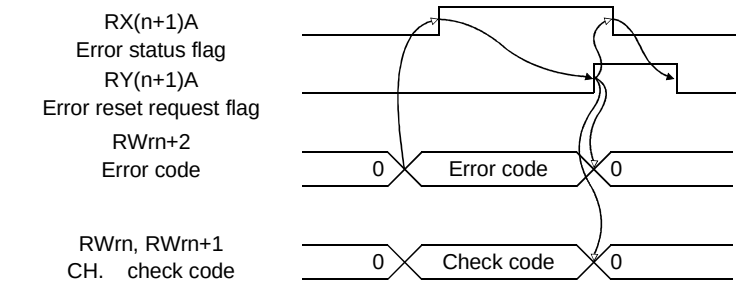
POINT

The reserved devices given in Table 3.5 are used by the system and cannot be used by the user.
If the user has used (turned on/off) any of them, we cannot guarantee the functions of the AJ65SBT-62DA.

3.5.2 Functions of the remote I/O signals

Table 3.6 explains the functions of the remote I/O signals of the AJ65SBT-62DA.

Table 3.6 Remote I/O Signal Details (1/2)

Device No.	Signal Name	Description
RXnC	E^2PROM write error flag	Turns on the number of E^2PROM write times exceeds its limit (1000,000 times per channel). If this flag has turned on, this module itself has failed (hardware fault) and therefore this flag cannot be reset (turned off) by the error reset request flag.
RXnF	Test mode flag	Turns on in the test mode. (Used for interlock to prevent wrong output during offset/gain setting.)
RX (n+1) 8	Initial data processing request flag	After power-on, the initial data processing request flag is turned on by the AJ65SBT-62DA to request the initial data to be set. Also, after the initial data processing is complete (initial data processing complete flag RY (n+1) 8 ON), the flag is turned off.  ⟵ : Performed by sequence ladder ⟵ : Performed by AJ65SBT-62DA
RX (n+1) 9	Initial data setting complete flag	When the initial data setting request (RY (n+1) 9 ON) is made, the flag turns on after the initial data setting completion is done. Also, after the initial data setting is complete, the initial setting complete flag turns off when the initial data setting request flag turns off.
RX (n+1) A	Error status flag	Turns on at occurrence of the output range setting error, digital value setting error or E^2PROM write error (RXnC). Does not turn on at occurrence of the watchdog timer error. (The "RUN" LED goes off.)  ⟵ : Performed by sequence ladder ⟵ : Performed by AJ65SBT-62DA
RX (n+1) B	Remote READY	Turns on when initial data setting is completed after power-on or at termination of the test mode. (Used for interlocking read/write from/to the master module.)

n: Address allocated to the master module by station number setting.

Table 3.6 Remote I/O Signal Details (2/2)

Device No.	Signal Name	Description
RYn0 to RYn1	CH. □ analog output enable/disable flag	D/A conversion value output enable flag for channel 1 or 2. Turn on this flag to enable the D/A conversion value of the corresponding channel to be output. Turn off when you want to disable the output of the D/A conversion value. Processed on the leading edge of ON/OFF.
RY (n+1) 8	Initial data processing complete flag	Turns on after initial data processing completion when initial data processing is requested after power-on or test mode operation.
RY (n+1) 9	Initial data setting request flag	Turns on at the time of initial data setting or changing.
RY (n+1) A	Error reset request flag	Turning on this flag resets (turns off) the error status flag (RX(n+1)A) and also clears (to 0000_H) the error code (RWrn+2) and CH. □ check code (RWrn, RWrn+1) in the remote register. However, since the E^2PROM write error flag (RXnC) cannot be reset, the error status flag remains on, too.

n: Address allocated to the master module by station number setting.

3.6 Remote Register

The AJ65SBT-62DA has a remote resister for data communication with the master module. The remote register allocation and data structures are described below.

3.6.1 Allocation of the remote register

The allocation of the remote register is shown in Table 3.7.

Table 3.7 Allocation of the remote register

Transfer Direction	Address	Description	Default Value	Refer to
Master → Remote	RWwm	CH. 1 digital value setting	0	Section 3.6.2
	RWwm+1	CH. 2 digital value setting	0	
	RWwm+2	Analog output enable/disable setting	0	Section 3.6.3
	RWwm+3	Output range/HOLD/CLEAR setting	0	Section 3.6.4
Remote → Master	RWrn	CH. 1 check code	0	Section 3.6.5
	RWrn+1	CH. 2 check code	0	
	RWrn+2	Error code	0	Section 3.6.6
	RWrn+3	Reserved	0	—

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 functions of the AJ65SBT-62DA is not guaranteed.

3.6.2 CH. □ digital value setting (Addresses RWwm, RWwm+1)

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

(2) The digital value 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.

(3) The digital value that may be set is a 16-bit signed binary within the setting range which matches the output range setting.
If a value beyond the range of the digital value resolution is set, the data in Table 3.8 is applied for the D/A conversion.
In addition, the checking code is stored in the check code storage area (addresses RWrn, RWrn+1).

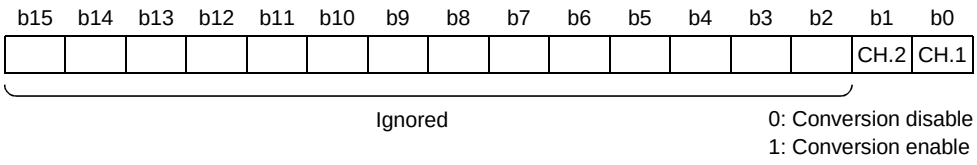
Table 3.8 Available setting range of the digital value

Output Range	Available setting range	Digital value for the D/A conversion when the value beyond the range is set
-10 to +10V User range setting 1	-4096 to +4095 (Practical scope: -4000 to +4000)	4096 or more: 4095 -4097 or less: -4096
0 to 5V 1 to 5V User range setting 2 0 to 20mA 4 to 20mA User range setting 3	-96 to 4095 (Practical scope: 0 to 4000)	4096 or more: 4095 -97 or less: -96

3.6.3 Analog output enable/disable setting (Address RWwm+2)

(1) Set whether D/A conversion is enabled or disabled per channel.

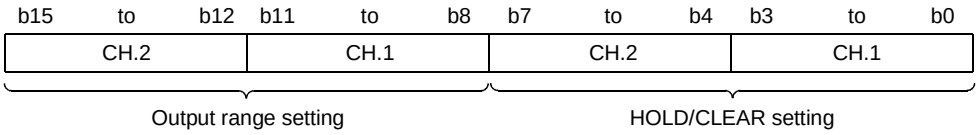
(2) The default setting is conversion disable for all channels.



3.6.4 Output range/HOLD/CLEAR setting (Address RWwm+3)

(1) Make output range setting using the 8 upper bits (b8 to b15) of address RWwm+3. Make HOLD/CLEAR setting using the 8 lower bits (b0 to b7) of address RWwm+3.

(2) The default settings are -10 to +10V and CLEAR.

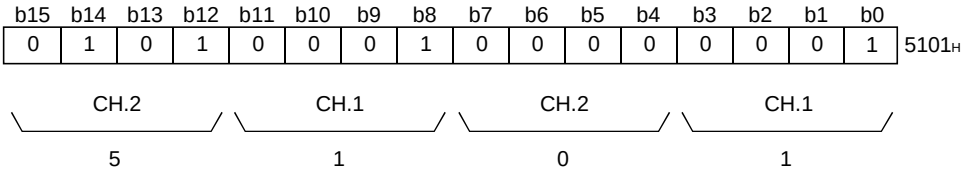


0_H: -10 to +10V
1_H: 0 to 5V
2_H: 1 to 5V
3_H: 0 to 20mA
4_H: 4 to 20mA
5_H: User range setting 1 (-10 to +10V)
6_H: User range setting 2 (0 to 5V)
7_H: User range setting 3 (0 to 20mA)

0_H : CLEAR
1 to F_H: HOLD

Example

Set 5101H when setting channel 1 to "0 to 5V" and "HOLD" and channel 2 to "User range setting 1" and "CLEAR".



3.6.5 CH. □ check code (Addresses RWrn, RWrn+1)

(1) 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	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.
$00FF_H$	The digital value less than the setting range and the digital value more than the setting range were set before the error reset request.

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

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

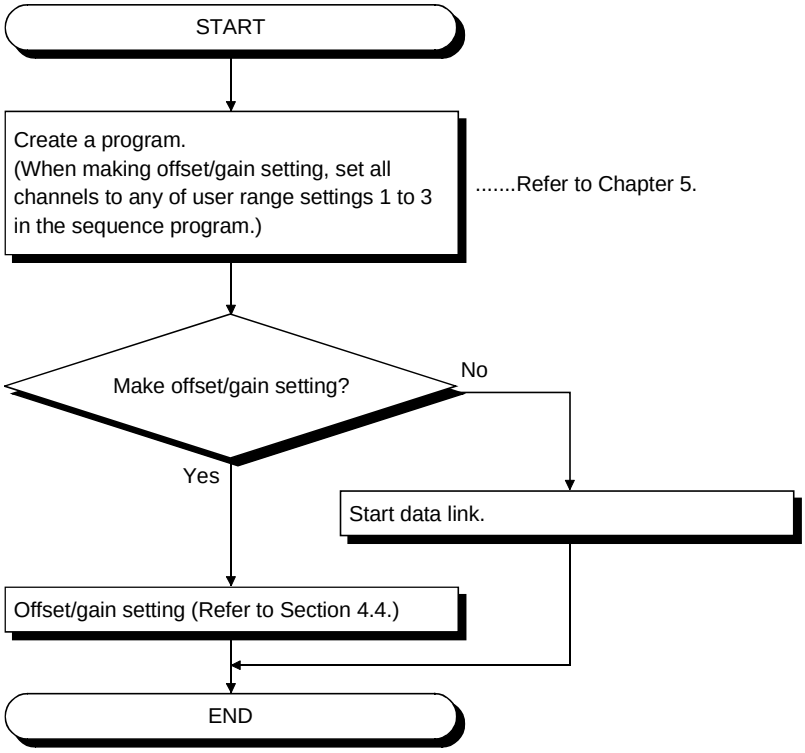
3.6.6 Error code (Address RWrn+2)

If an error occurs (the RUN LED flickers) when data is written to the AJ65SBT-62DA, the corresponding error code is stored into the remote register (address RWrn+2) of the AJ65SBT-62DA.
Refer to Section 6.1 for details of the error codes.

4 SETUP AND PREPARATION BEFORE OPERATION

4.1 Pre-Operation Procedure

This section explains the preparatory procedure for operating the AJ65SBT-62DA.



4.2 Precautions When Handling

The precautions when handling the AJ65SBT-62DA are described below:

⚠CAUTION

- Do not touch the terminals while power is on. Doing so can cause a malfunction.
- Ensure that no foreign matter such as chips and wire-offcuts enter the module. Foreign matter can cause a fire, failure or malfunction.
- Do not disassemble or modify the module. Doing so can cause a failure, malfunction, injury or fire.
- Do not touch the conductive and electronic parts of the module directly. Doing so can cause the module to malfunction or fail.
- Do not drop the module or give it hard impact since its case is made of resin. Doing so can damage the module.
- Do not touch the conductive parts of the module directly. Doing so can cause the module to malfunction or fail.
- Tighten the terminal screws within the specified torque range. Undertightening can cause a short circuit or malfunction. Overtightening can cause a short circuit or malfunction due to damage of the screws or module.

⚠CAUTION

- Dispose of the product as industrial waste.
- Use the module in the environment indicated in the general specifications given in this manual.
  Not doing so can cause an electric shock, fire, malfunction, product damage or deterioration.
- Securely fix the module to a DIN rail or with mounting screws, and securely tighten the mounting screws within the specified torque range.
  Undertightening can cause a drop or malfunction.
  Overtightening can cause a drop or malfunction due to damage of the screws or module.
- Mount or dismount the module to or from an enclosure after switching power off externally in all phases. Not doing so can cause the module to fail or malfunction.

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

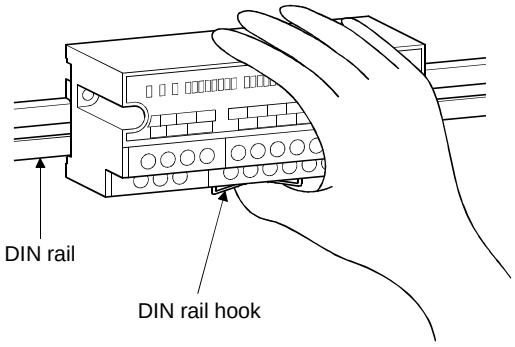
Screw location	Tightening torque range
Module installation screw (M4 screw)	78 to 108N•cm
Terminal block terminal screw (M3 screw)	59 to 88N•cm
Terminal block installation screw (M3.5 screw)	68 to 98N•cm

(2) When using the DIN rail adapter, install the DIN rail by making sure of the following:

(a) Applicable DIN rail models (conforming to the JIS-C2B12)
TH35-7.5Fe
TH35-7.5Al

(b) DIN rail installation screw interval
When installing the DIN rail, tighten the screws with less than 200mm (7.87 inch) pitches.

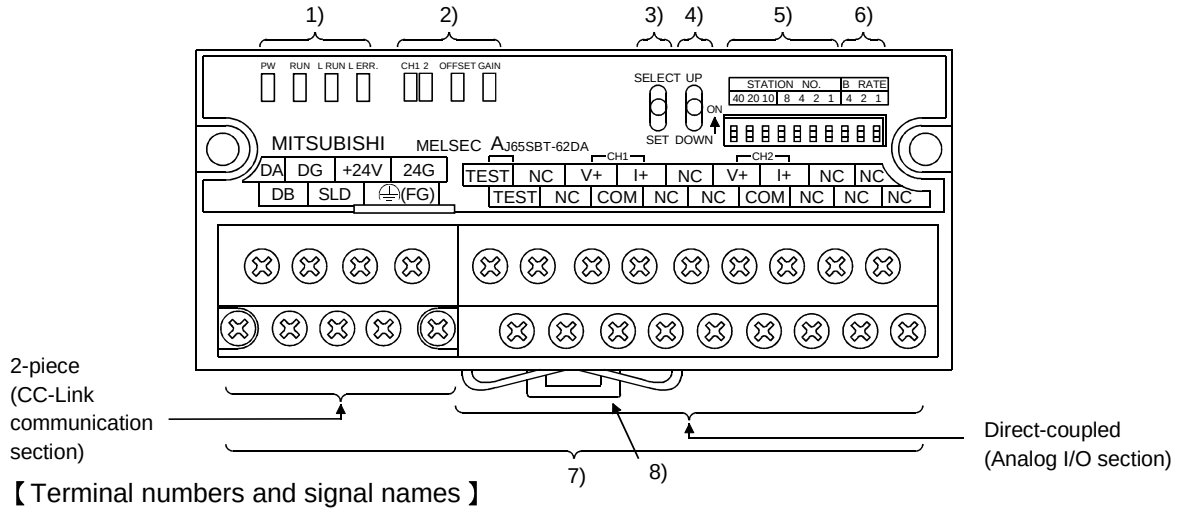
(3) When mounting the AJ65SBT-62DA to the DIN rail, press with your finger the centerline of the DIN rail hook at the bottom of the module until it clicks.



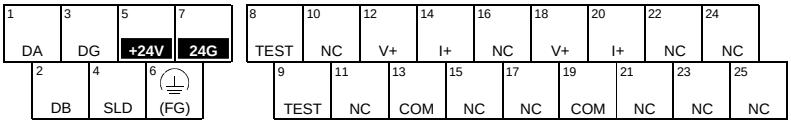
(4) Refer to the Master Module user's manual for the name, specification, and manufacturers of supported cables for the use with AJ65SBT-62DA.

4.3 Name of Each Part

The name of each part in the AJ65SBT-62DA is shown.



【Terminal numbers and signal names】

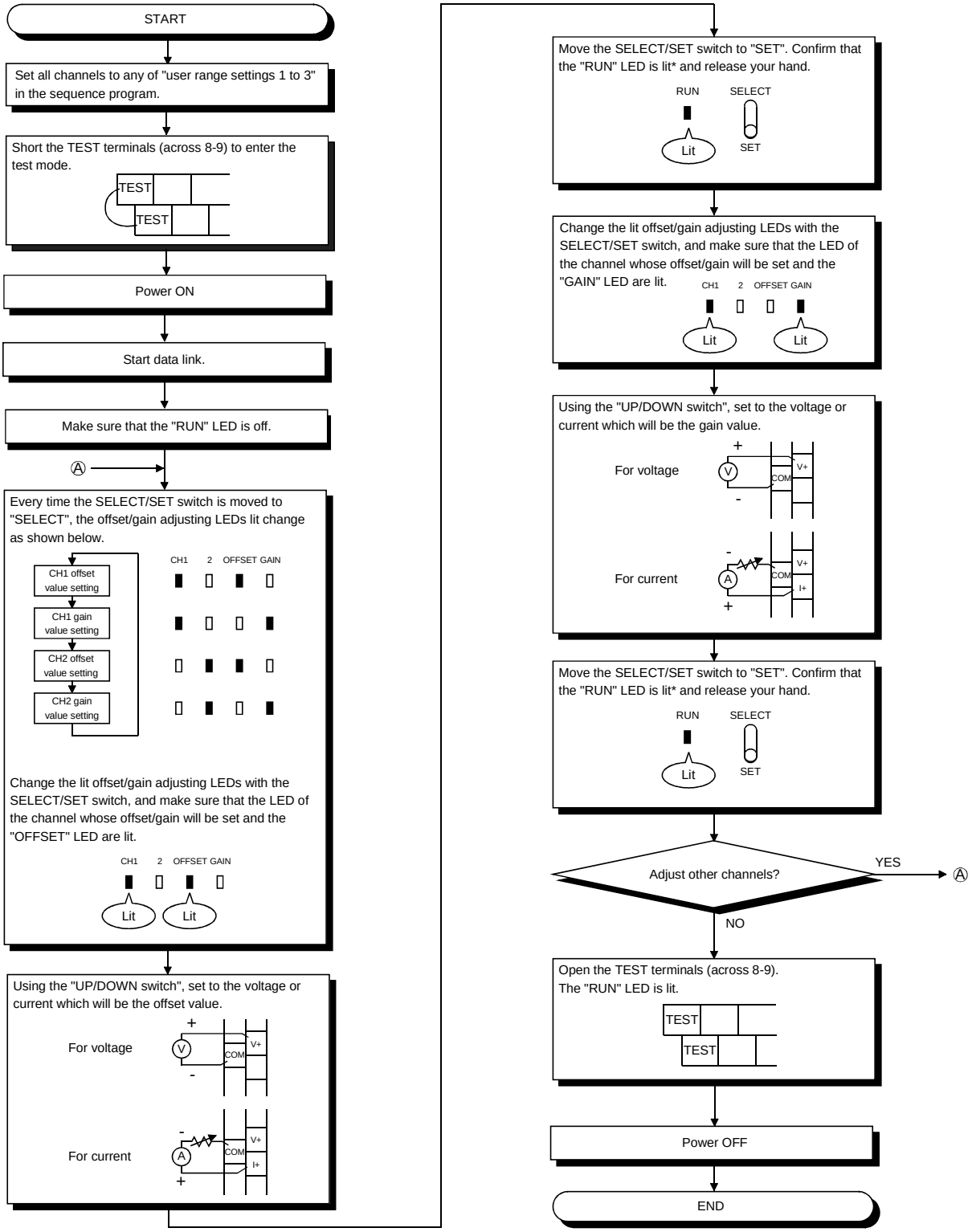


Number	Name and appearance	Description		
1)	Operation status display LED	PW LED	ON: Power supply on OFF: Power supply off	
		RUN LED	Normal mode	On : Normal operation Flashing : 0.1s intervals indicate an output range setting error. 0.5s intervals indicate a digital value setting error. Off : 24VDC power supply shutoff or watchdog timer error occurred.
			Test mode	On : Indicates that the SELECT/SET switch is in the SET position. Flashing : 0.1s intervals indicate that the output range setting is not any of "user range settings 1 to 3". 0.5s intervals indicate that you attempted to make offset/gain setting outside the setting range. Off : Indicates that the SELECT/SET switch is in the SELECT or center position.
		L RUN LED	On : Normal communication Off : Communication cutoff (time expiration error)	
		L ERR. LED	On : Indicates that transmission speed setting or station number setting is outside the range. Flicker at fixed intervals : Indicates that transmission speed setting or station number setting was changed from that at power-on. Flicker at unfixed intervals : Indicates that you forgot fitting the termination resistor or the module or CC-Link dedicated cable is affected by noise. Off : Indicates normal communications.	
2)	Offset/gain adjusting LEDs	CH □ OFFSET GAIN	Normal mode	Normally OFF.
			Test mode	The LEDs lit change every time the SELECT/SET switch is moved to SELECT. (Refer to Section 4.4.)
3)	SELECT/SET switch	Used to make offset/gain setting in the test mode.		

<table>
<tr><th>Number</th><th>Name and appearance</th><th>Description</th></tr>
<tr><td>4)</td><td>UP/DOWN switch</td><td>Used to adjust the offset value and gain value of the channel specified by the SELECT/SET switch.</td></tr>
<tr><td>5)</td><td>Station number setting switches</td><td>Use the switches in STATION NO. "10", "20" and "40" to set the tens of the station number.
Use the switches in STATION NO. "1", "2", "4" and "8" to set the units of the station number.
The switches are all factory-set to OFF.
Always set the station number within the range 1 to 64.
You cannot set the same station number to two or more stations.
Setting any other number than 1 to 64 will result in an error, flickering the "L ERR." LED.
<table>
<tr><th rowspan="2">Station Number</th><th colspan="3">Tens</th><th colspan="4">Units</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>2</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
<tr><td>3</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>ON</td></tr>
<tr><td>4</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>10</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>OFF</td></tr>
<tr><td>11</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td><td>OFF</td><td>ON</td></tr>
<tr><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td><td>:</td></tr>
<tr><td>64</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td><td>OFF</td></tr>
</table>
(Example) To set the station number to "32", set the switches as indicated below.
<table>
<tr><th rowspan="2">Station Number</th><th colspan="3">Tens</th><th colspan="4">Units</th></tr>
<tr><th>40</th><th>20</th><th>10</th><th>8</th><th>4</th><th>2</th><th>1</th></tr>
<tr><td>32</td><td>OFF</td><td>ON</td><td>ON</td><td>OFF</td><td>OFF</td><td>ON</td><td>OFF</td></tr>
</table></td></tr>
<tr><td>6)</td><td>Transmission speed setting switches</td><td>
<table>
<tr><th rowspan="2">Set Value</th><th colspan="3">Setting Switches</th><th rowspan="2">Transmission Speed</th></tr>
<tr><th>4</th><th>2</th><th>1</th></tr>
<tr><td>0</td><td>OFF</td><td>OFF</td><td>OFF</td><td>156kbps</td></tr>
<tr><td>1</td><td>OFF</td><td>OFF</td><td>ON</td><td>625kbps</td></tr>
<tr><td>2</td><td>OFF</td><td>ON</td><td>OFF</td><td>2.5Mbps</td></tr>
<tr><td>3</td><td>OFF</td><td>ON</td><td>ON</td><td>5.0Mbps</td></tr>
<tr><td>4</td><td>ON</td><td>OFF</td><td>OFF</td><td>10Mbps</td></tr>
</table>
Always set the transmission speed within the above range.
The switches are all factory-set to OFF.
Making any other setting than the above will result in an error, flickering the "L ERR." LED.</td></tr>
<tr><td>7)</td><td>Terminal block</td><td>Used to connect the module power supply, transmission and I/O signals.</td></tr>
<tr><td>8)</td><td>DIN rail hook</td><td>Used to mount the module to the DIN rail.</td></tr>
</table>

4.4 Offset/Gain Setting

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



*: If the "RUN" LED is not lit, E^2PROM may have failed. For details, refer to Section 3.5.2

POINT

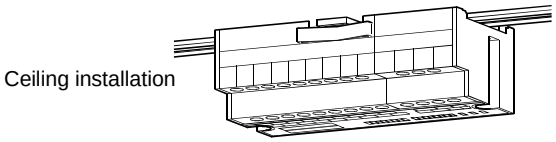
(1) Set the offset and gain values in the actual usage state.
(2) The offset and gain values are stored on E^2PROM in the AJ65SBT-62DA and are not cleared at power-off.
(3) Shorting the TEST terminals to enter the test mode and executing initial settings will start D/A conversion on all channels. To judge the test mode, use the test mode flag as an interlock.
(4) Make offset/gain setting within the range indicated in POINT of Section 3.3.1 and Section 3.3.2. If setting is made outside this range, the maximum resolution/accuracy may not fall within the performance specifications range.
(5) When making offset/gain setting (in the test mode), set all channels to any of "user range settings 1 to 3".
Setting any other range will result in an error and flicker the "RUN" LED at 0.1s intervals.
Refer to Section 3.6.4 for output range setting.

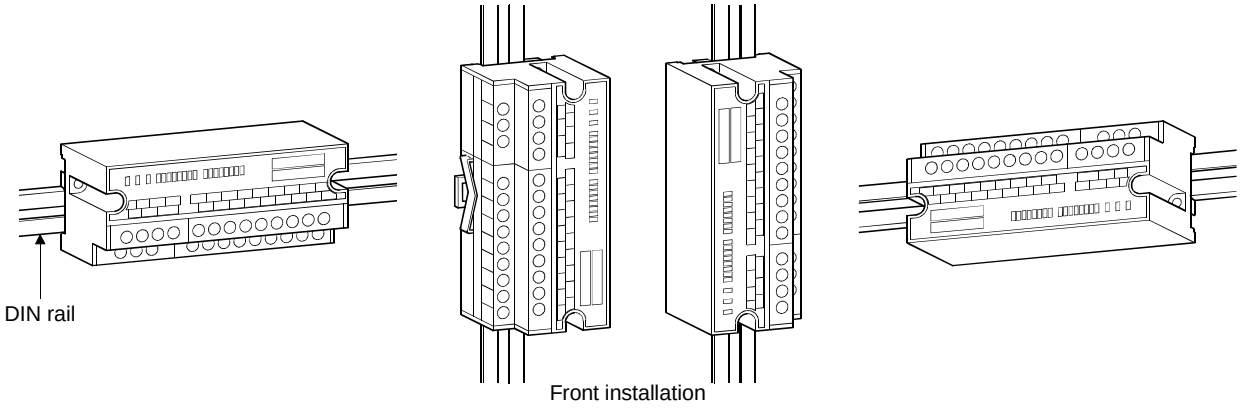
4.5 Section Number Setting

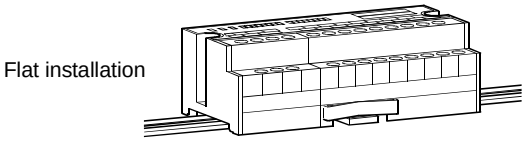
The station number setting of the AJ65SBT-62DA determines the buffer memory addresses of the master module where the remote I/O signals and read/write data are stored.
For details, refer to the user's manual of the master module used.

4.6 Facing Direction of the Module Installation

The AJ65SBT-62DA module may be installed in any of six directions.
(There are no restrictions on the facing directions.)
Also, a DIN rail may be used for installation.







4.7 Data Link Cable Wiring

This section explains the wiring of the CC-Link dedicated cable used for connection of the AJ65SBT-62DA and master module.

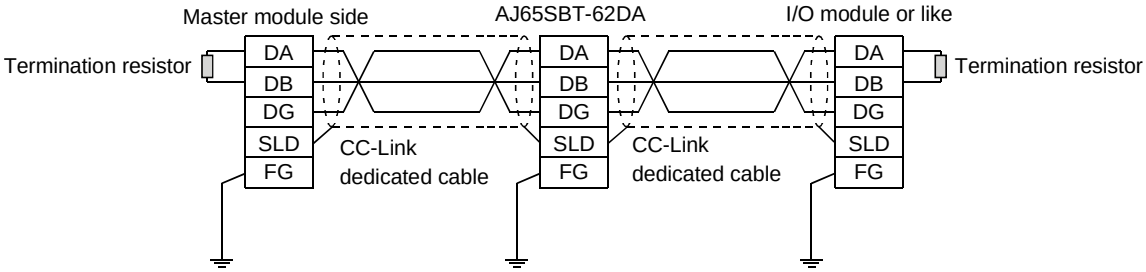
4.7.1 Instructions for handling the CC-Link dedicated cables

Do not handle the CC-Link dedicated cables roughly as described below. Doing so can damage the cables.

- Compact with a sharp object.
- Twist the cable excessively.
- Pull the cable hard. (more than the permitted elasticity.)
- Step on the cable.
- Place an object on the top.
- Scratch the cable's protective layer.

4.7.2 Connection of the CC-Link dedicated cables

Connect the CC-Link dedicated cable between the AJ65SBT-62DA and master module as shown below.



4.8 Wiring

This section provides the instructions for wiring the AJ65SBT-62DA and its wiring with external equipment.

4.8.1 Wiring precautions

To obtain maximum performance from the functions of AJ65SBT-62DA and improve the system reliability, an external wiring with high durability against noise is required. The precautions when performing external wiring are as follows:

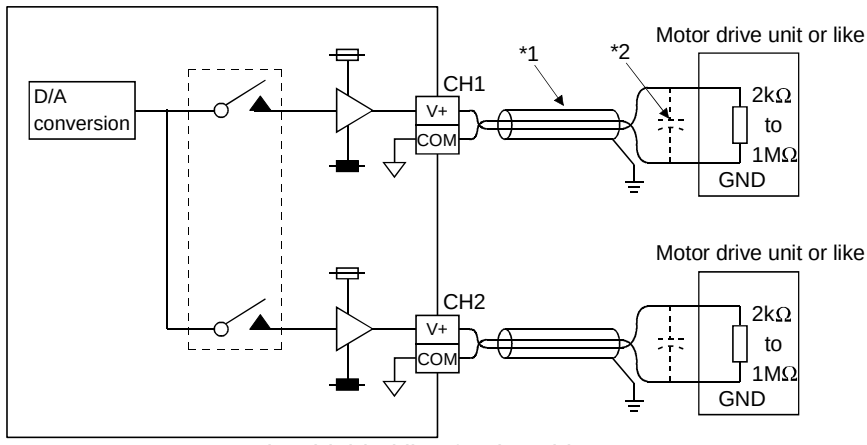
(1) Use separate cables for the AC and AJ65SBT-62DA external input signals, in order not to be affected by the AC side surge or conductivity.

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

(3) Place a one-point grounding on the PLC side for the shielded line or shielded cable.

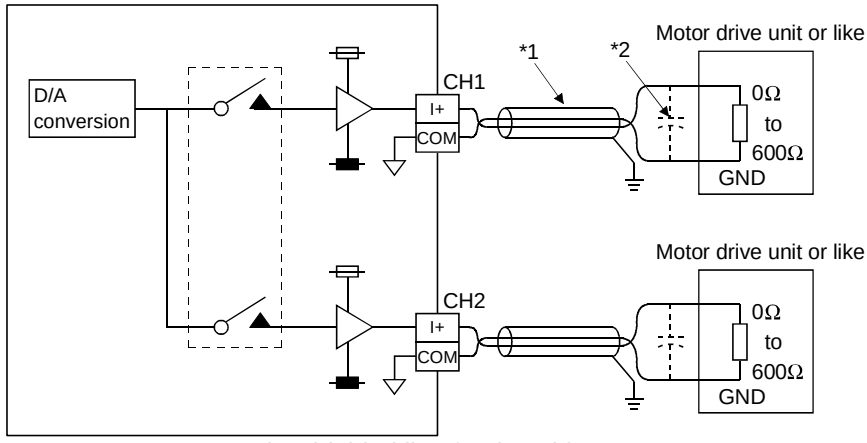
4.8.2 Wiring of module with external equipment

(1) For voltage output



*1.....Use a two-core twist shielded line for the wiring.
*2.....If noise or ripples occur in the external wiring, connect a 0.1 to 0.47µF capacitor (25V or higher voltage-resistant product) to the input terminals of the external device.

(2) For current output



*1.....Use a two-core twist shielded line for the wiring.
*2.....If noise or ripples occur in the external wiring, connect a 0.1 to 0.47µF capacitor (25V or higher voltage-resistant product) to the input terminals of the external device.

POINT
D/A conversion values are fluctuated by self-heating within approx. 30 minutes after power is turned ON.

4.9 Maintenance and Inspection

There are no special inspection items for the AJ65SBT-62DA module, but follow the inspections items describes in the PLC CPU User's Manual so that the system can always be used in the best condition.

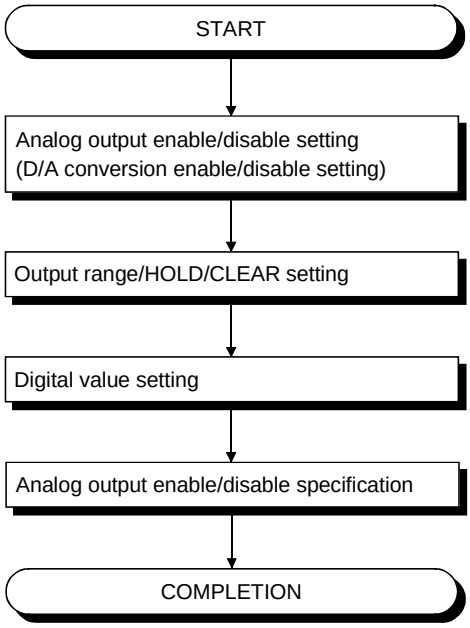
MEMO

5 PROGRAMMING

The programming procedure, basic read/write programs, and program examples for the AJ65SBT-62DA are described.
Refer to Section 3.6 for the remote registers and to the AnSHCPU/AnACPU/AnUCPU programming manual (dedicated instructions) for details of the dedicated instructions.

5.1 Programming Procedure

Create programs for executing the digital-analog conversion of the AJ65SBT-62DA in the following procedure.



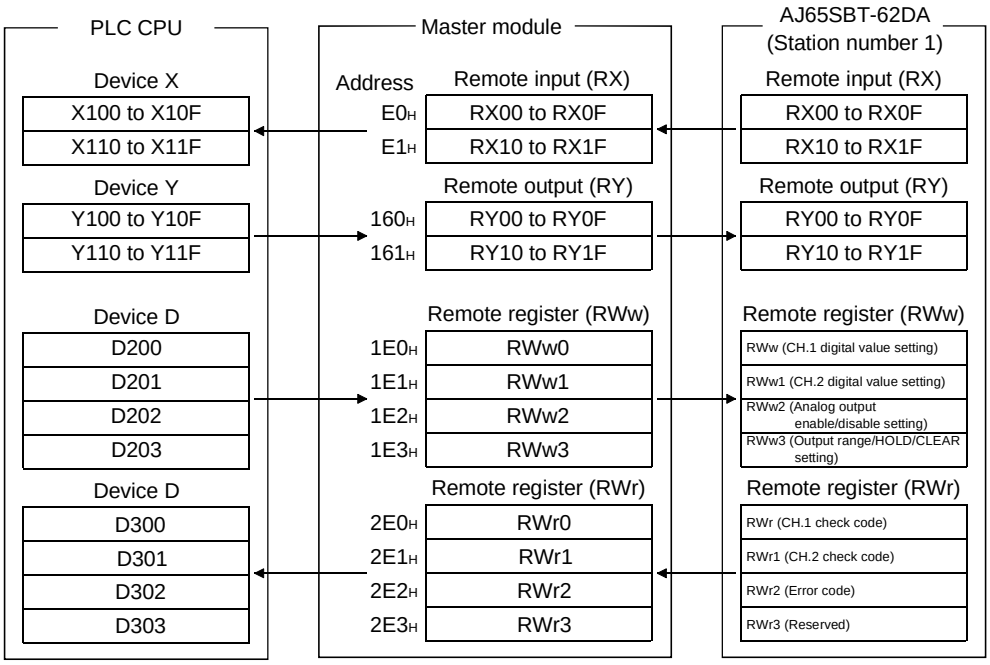
5.2 Program Examples

This section provides the program examples of the AJ65SBT-62DA.

5.2.1 Program examples for use of the ACPU/QCPU (A mode) (FROM/TO instructions)

The program examples in this section are created under the following conditions.
Network parameter setting is made in the sequence program.

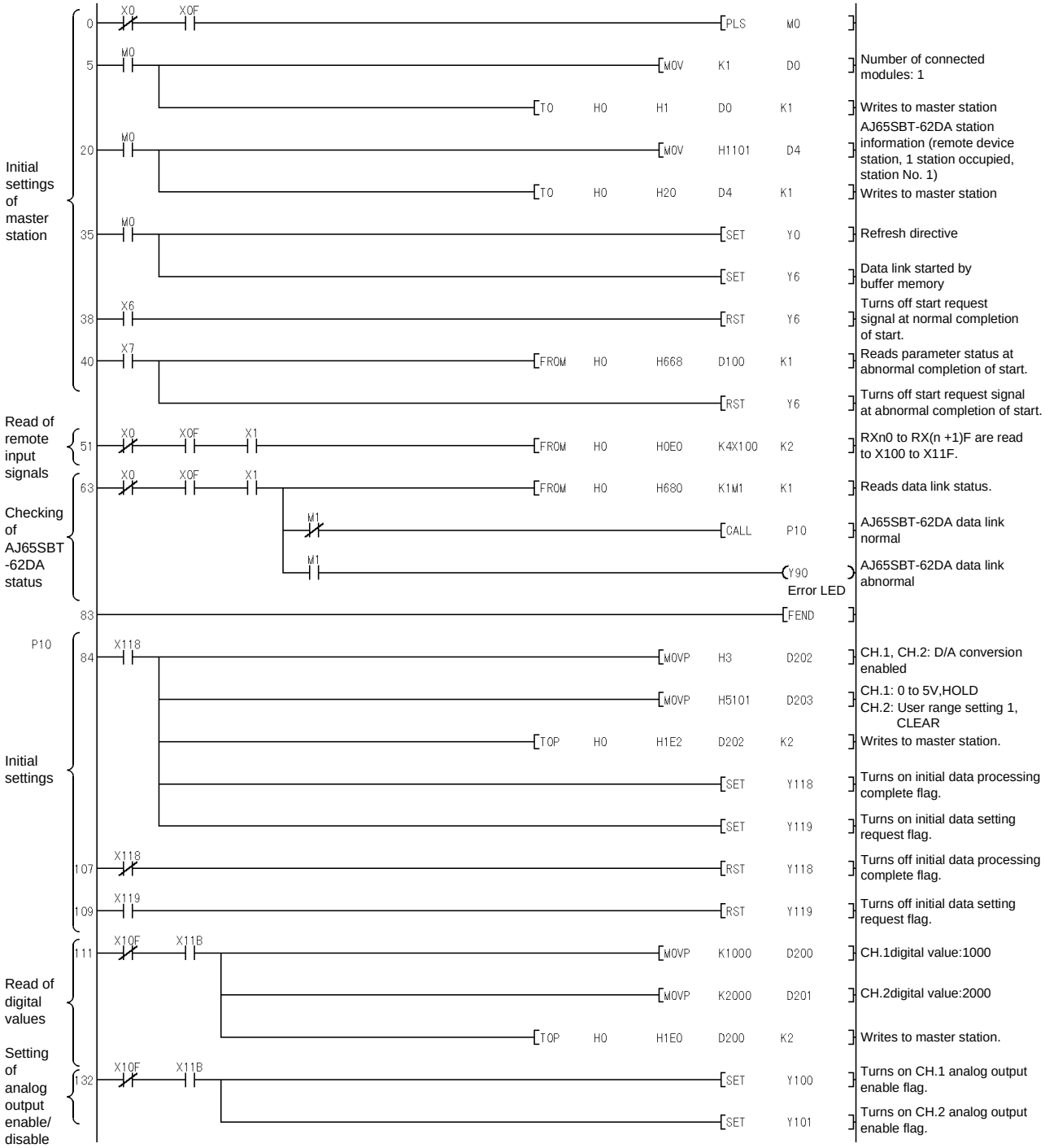
[Relationships between PLC CPU, master module and AJ65SBT-62DA]

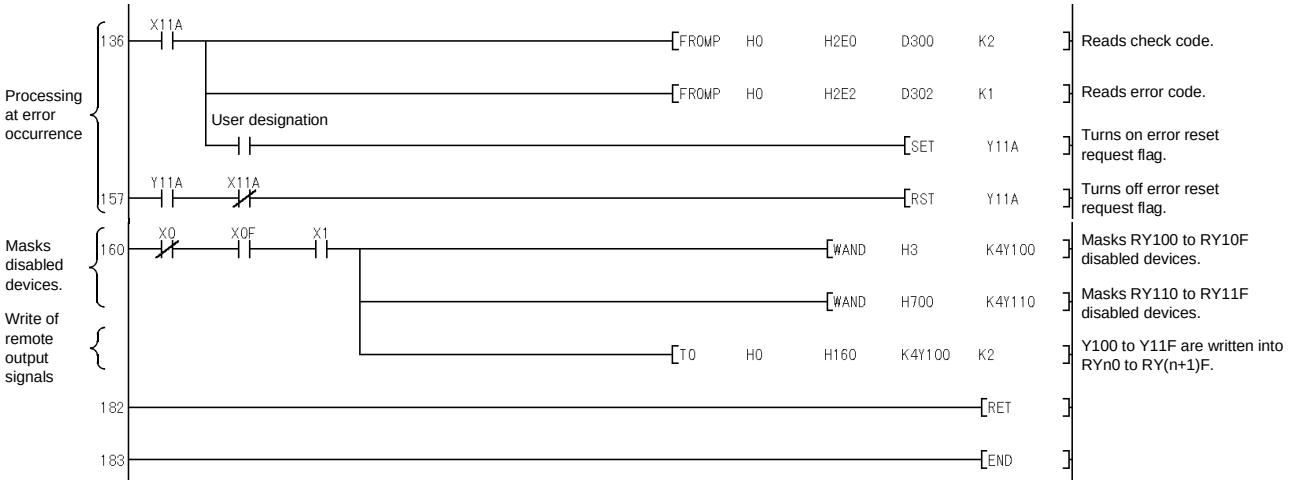


[Initial settings]

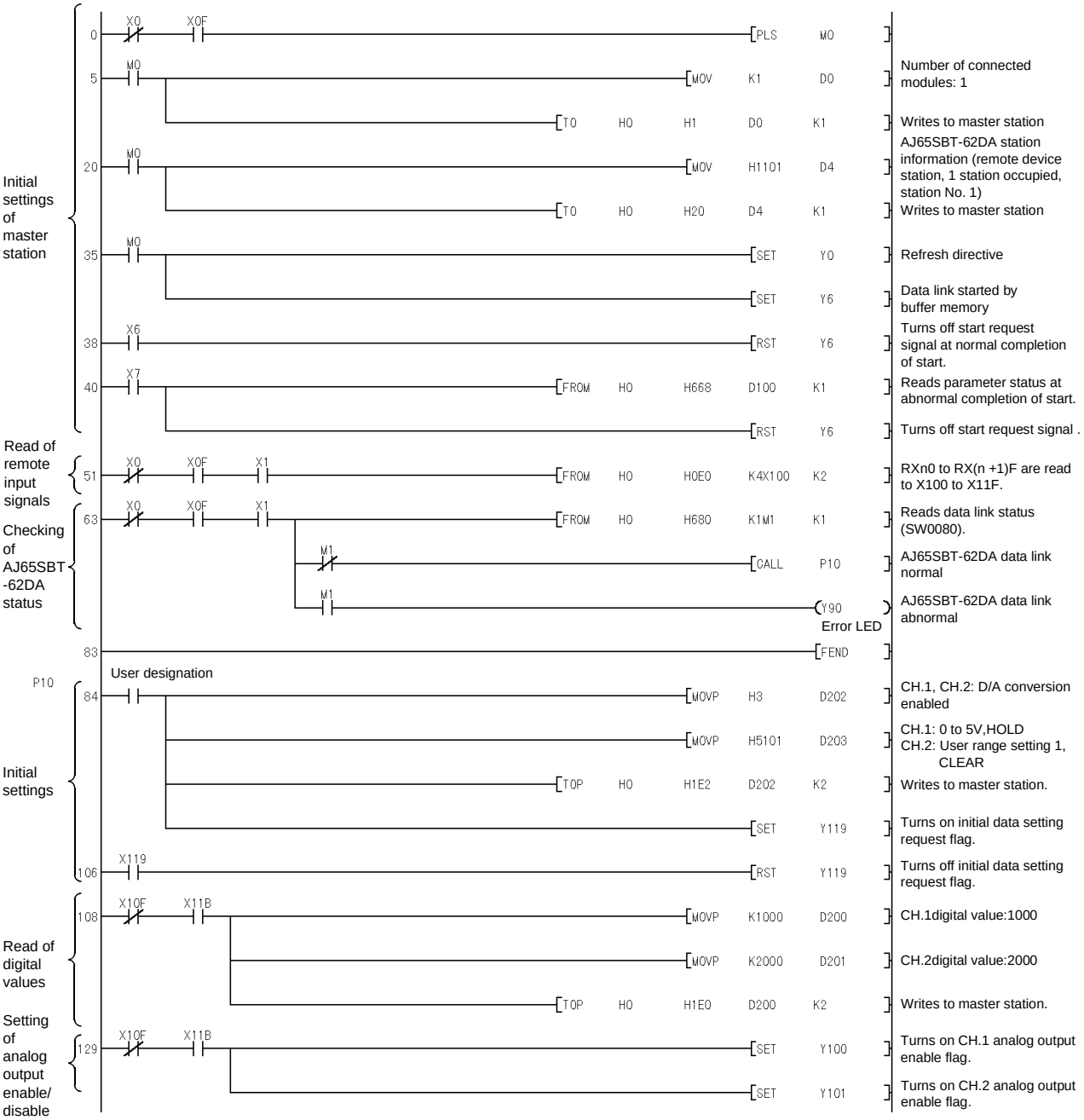
D/A conversion enabled channels ..... Channels 1, 2
Input range setting ..... Channel 1: 0 to 5V
Channel 2: User range setting 1
HOLD/CLEAR setting ..... Channel 1: HOLD
Channel 2: CLEAR
Digital value setting ..... Channel 1: 1000
Channel 2: 2000
Analog output enable channel ..... Channels 1, 2

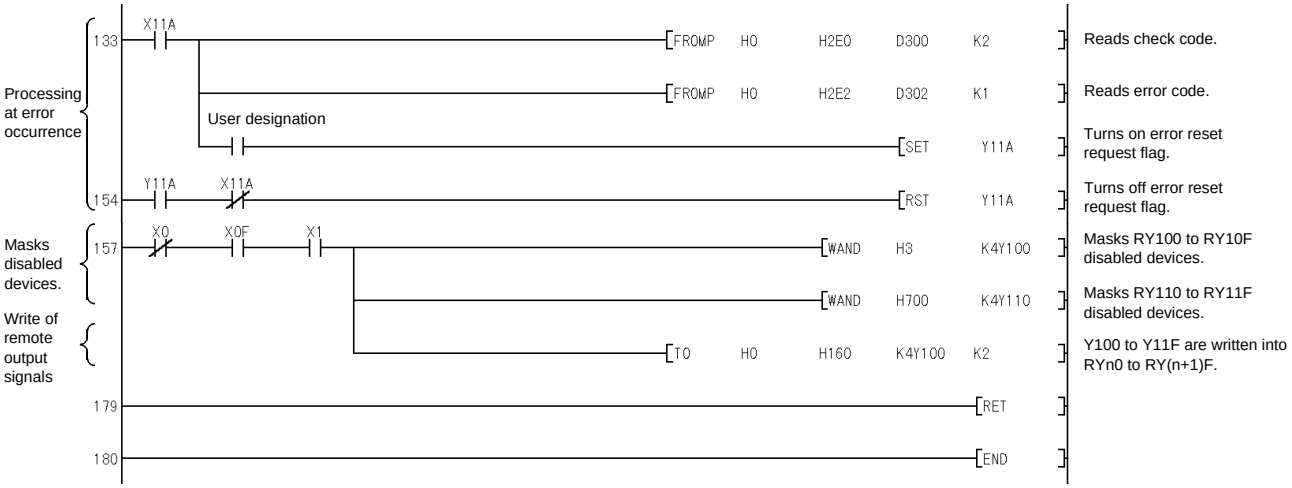
(1) Program example for power-on




Processing at error occurrence
Masks disabled devices.
Write of remote output signals
136
X11A
FROMP H0 H2E0 D300 K2
Reads check code.
FROMP H0 H2E2 D302 K1
Reads error code.
User designation
SET Y11A
Turns on error reset request flag.
157
Y11A X11A
RST Y11A
Turns off error reset request flag.
160
X0 X0F X1
WAND H3 K4Y100
Masks RY100 to RY10F disabled devices.
WAND H700 K4Y110
Masks RY110 to RY11F disabled devices.
TO H0 H160 K4Y100 K2
Y100 to Y11F are written into RYn0 to RY(n+1)F.
182
RET
183
END

(2) Program example for initial data changing

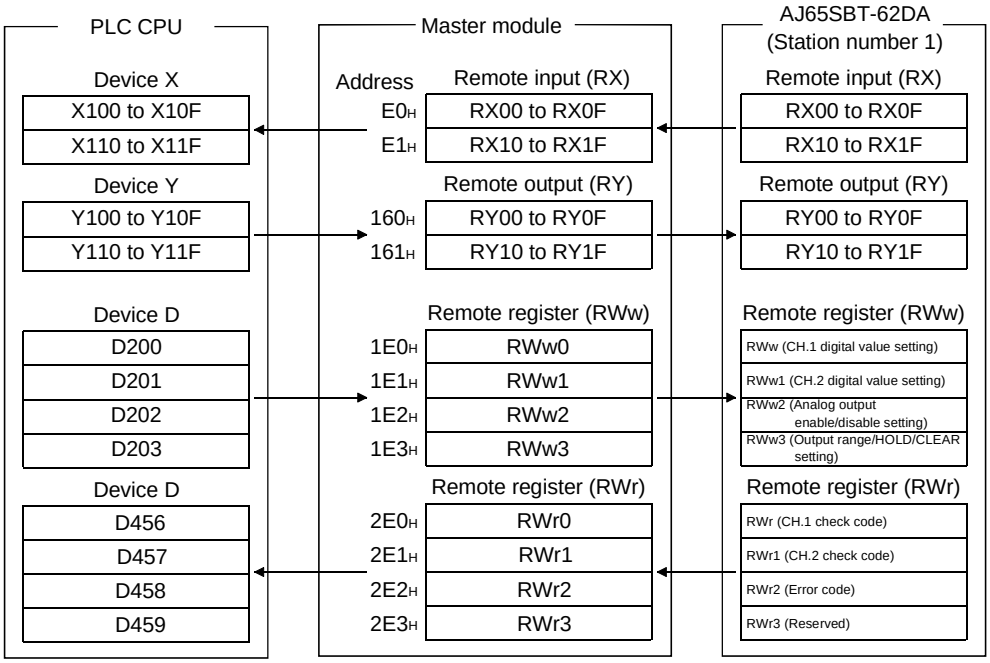



Processing at error occurrence
Masks disabled devices.
Write of remote output signals
133
X11A
FROMP H0 H2E0 D300 K2
Reads check code.
FROMP H0 H2E2 D302 K1
Reads error code.
User designation
SET Y11A
Turns on error reset request flag.
154
Y11A X11A
RST Y11A
Turns off error reset request flag.
157
X0 X0F X1
WAND H3 K4Y100
Masks RY100 to RY10F disabled devices.
WAND H700 K4Y110
Masks RY110 to RY11F disabled devices.
TO H0 H160 K4Y100 K2
Y100 to Y11F are written into RYn0 to RY(n+1)F.
179
RET
180
END

5.2.2 Program examples for use of the ACPU/QCPU (A mode) (dedicated instructions)

The program examples in this section are created under the following conditions.
A sequence program is used to set the network and automatic refresh parameters.

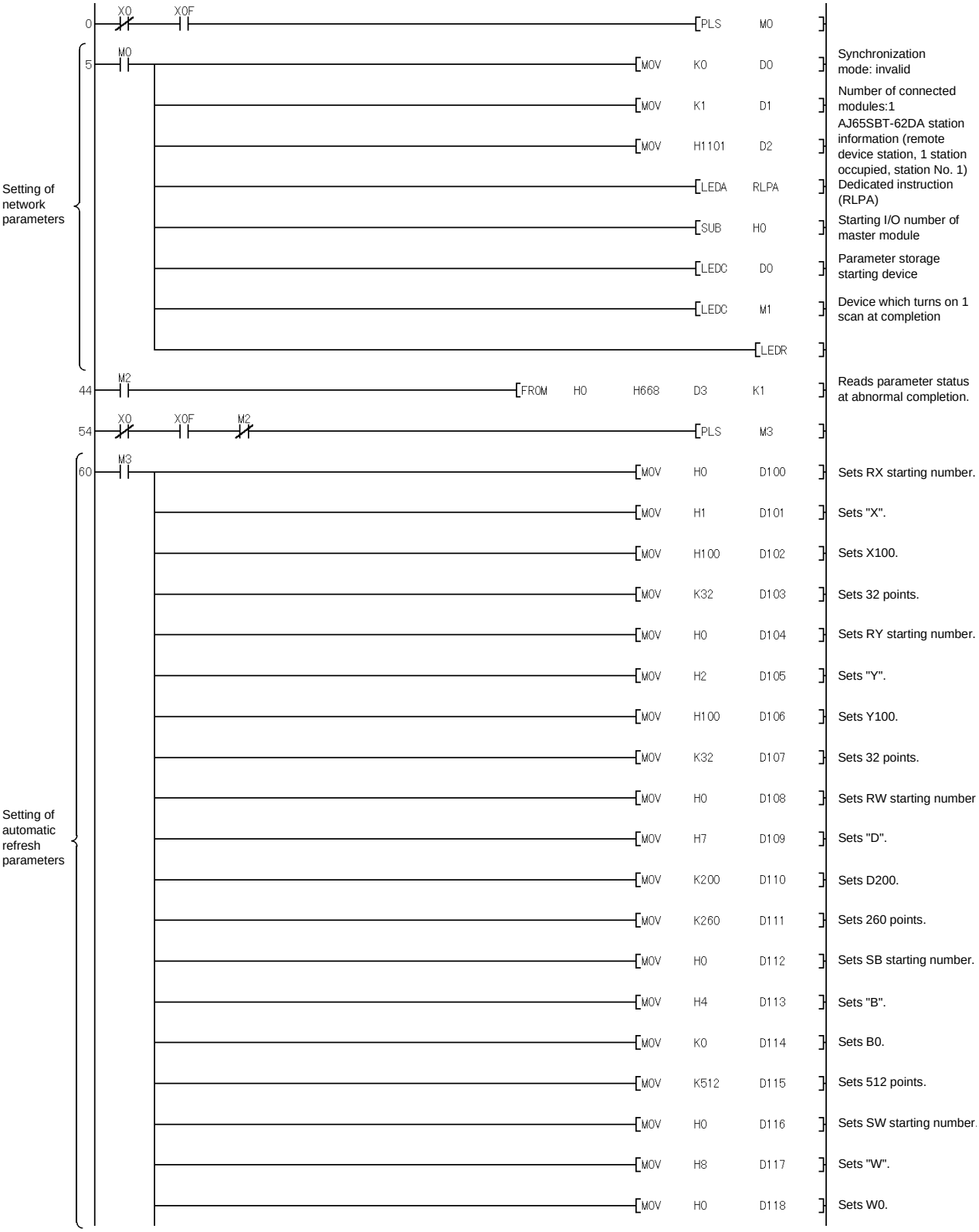
[Relationships between PLC CPU, master module and AJ65SBT-62DA]

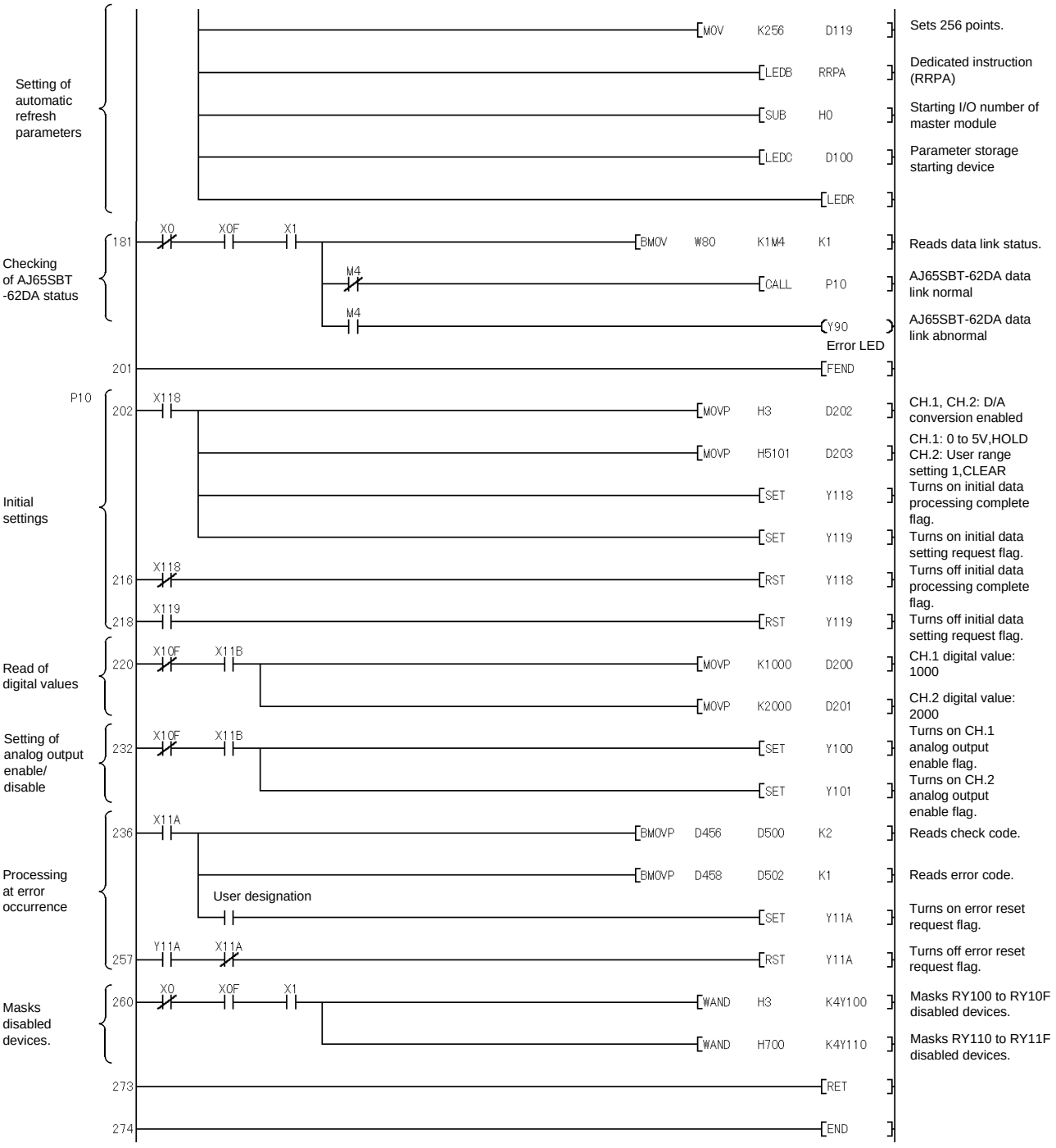


[Initial settings]

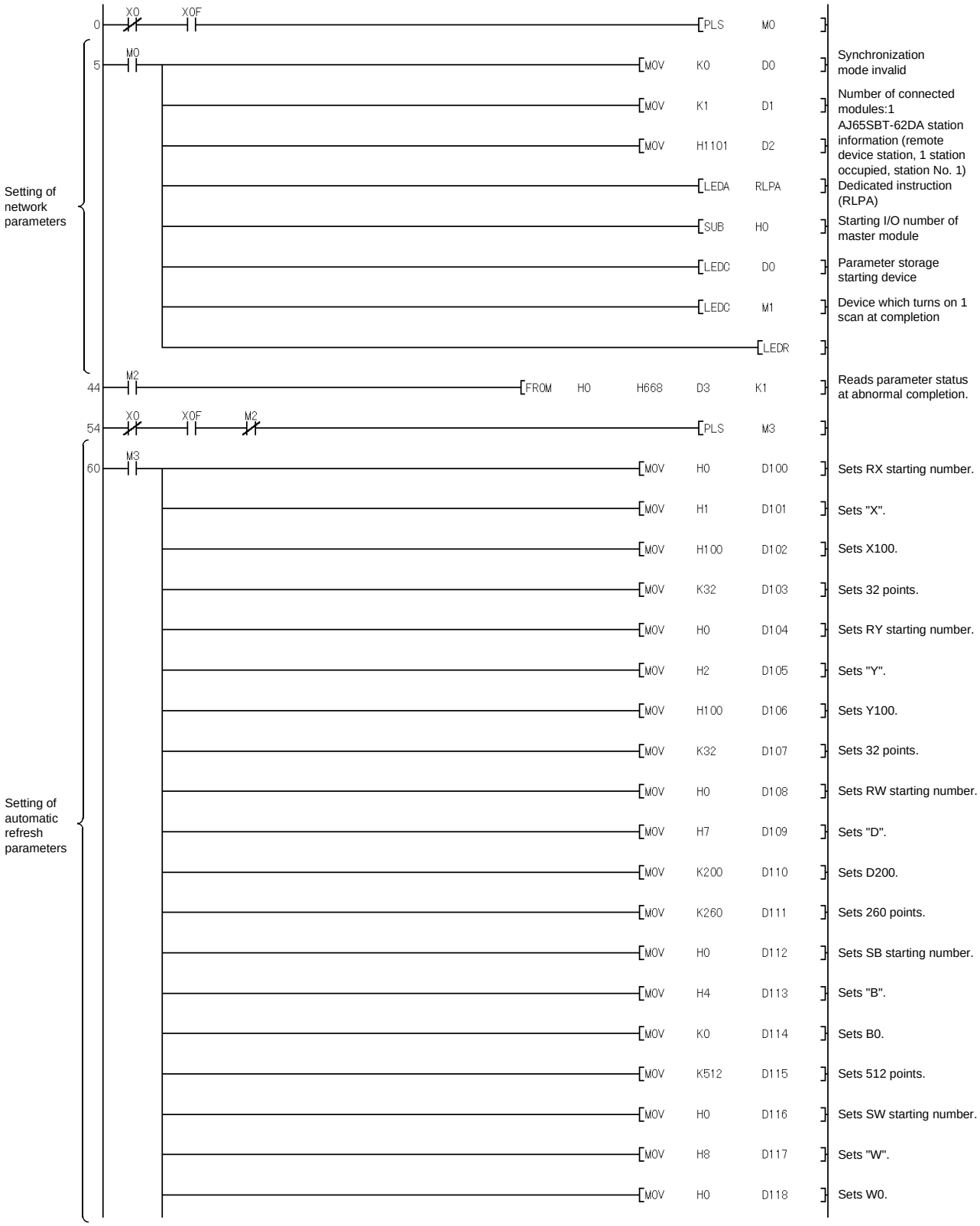
D/A conversion enabled channels ..... Channels 1, 2
Input range setting ..... Channel 1: 0 to 5V
Channel 2: User range setting 1
HOLD/CLEAR setting ..... Channel 1: HOLD
Channel 2: CLEAR
Digital value setting ..... Channel 1: 1000
Channel 2: 2000
Analog output enable channel ..... Channels 1, 2

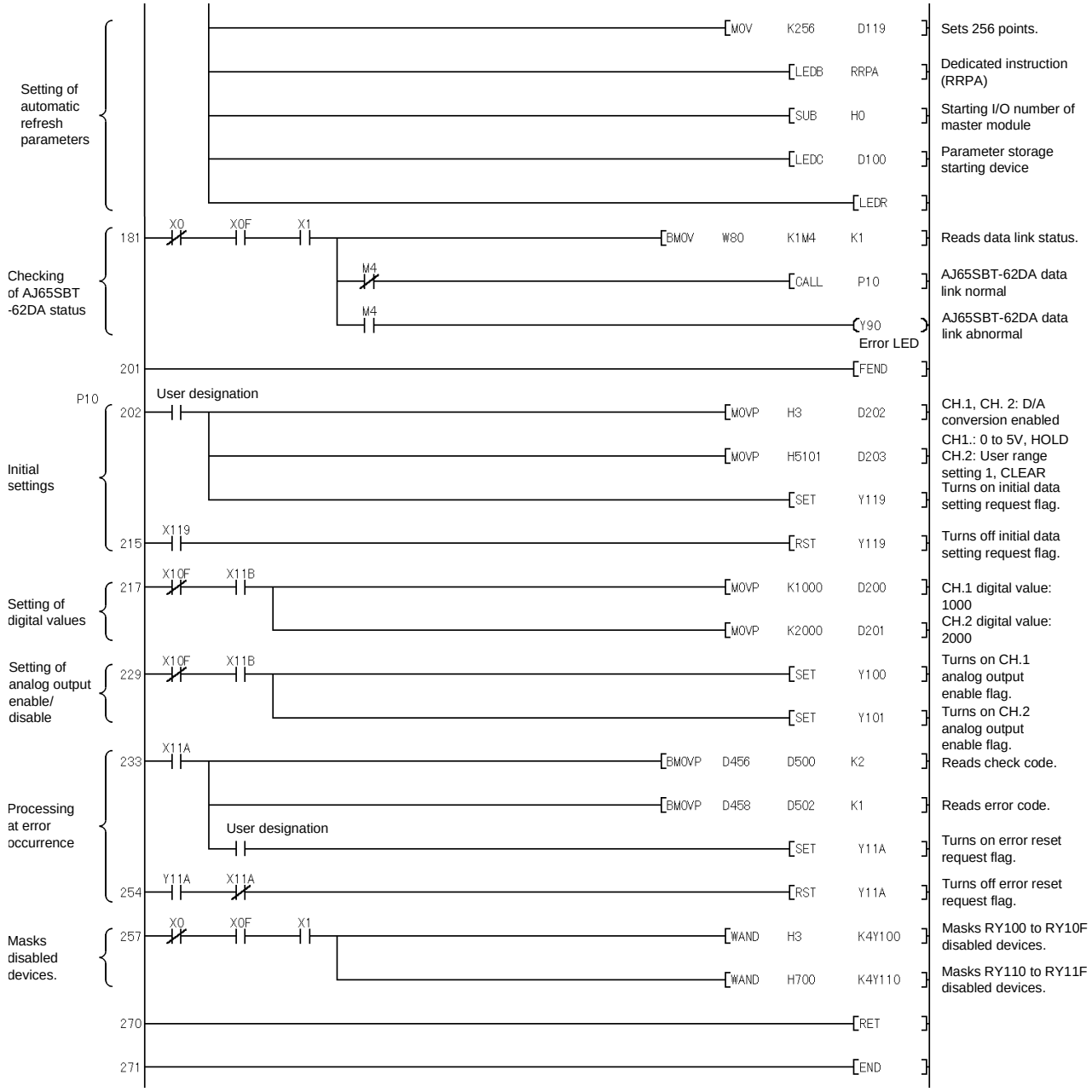
(1) Program example for power-on




Setting of automatic refresh parameters
MOV K256 D119
Sets 256 points.
LEDB RRPA
Dedicated instruction (RRPA)
SUB H0
Starting I/O number of master module
LEDC D100
Parameter storage starting device
LEDR
Checking of AJ65SBT -62DA status
181
X0 X0F X1
BMOV W80 K1M4 K1
Reads data link status.
M4
CALL P10
AJ65SBT-62DA data link normal
M4
Y90
Error LED
AJ65SBT-62DA data link abnormal
201
FEND
P10
Initial settings
202
X118
MOVP H3 D202
CH.1, CH.2: D/A conversion enabled
MOVP H5101 D203
CH.1: 0 to 5V,HOLD
CH.2: User range setting 1,CLEAR
SET Y118
Turns on initial data processing complete flag.
SET Y119
Turns on initial data setting request flag.
216
X118
RST Y118
Turns off initial data processing complete flag.
218
X119
RST Y119
Turns off initial data setting request flag.
Read of digital values
220
X10F X11B
MOVP K1000 D200
CH.1 digital value: 1000
MOVP K2000 D201
CH.2 digital value: 2000
Setting of analog output enable/ disable
232
X10F X11B
SET Y100
Turns on CH.1 analog output enable flag.
SET Y101
Turns on CH.2 analog output enable flag.
Processing at error occurrence
236
X11A
BMOVP D456 D500 K2
Reads check code.
BMOVP D458 D502 K1
Reads error code.
User designation
SET Y11A
Turns on error reset request flag.
257
Y11A X11A
RST Y11A
Turns off error reset request flag.
Masks disabled devices.
260
X0 X0F X1
WAND H3 K4Y100
Masks RY100 to RY10F disabled devices.
WAND H700 K4Y110
Masks RY110 to RY11F disabled devices.
273
RET
274
END

(2) Program example for initial data changing

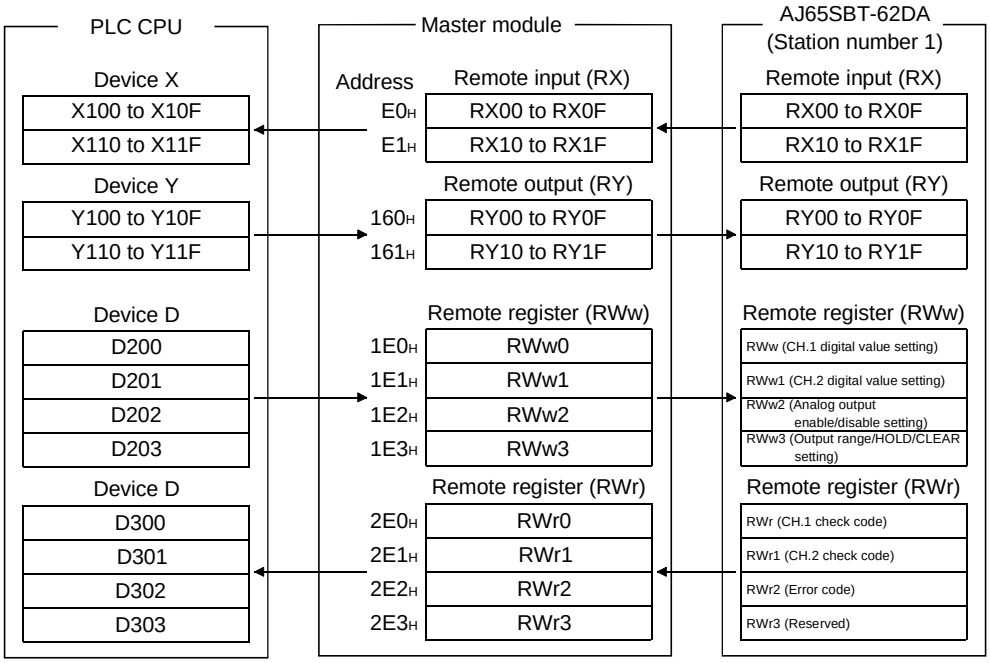



Setting of automatic refresh parameters
MOV K256 D119
Sets 256 points.
LEDB RRPA
Dedicated instruction (RRPA)
SUB H0
Starting I/O number of master module
LEDC D100
Parameter storage starting device
LEDR
Checking of AJ65SBT -62DA status
181
X0 X0F X1
BMOV W80 K1M4 K1
Reads data link status.
M4
CALL P10
AJ65SBT-62DA data link normal
M4
Y90
AJ65SBT-62DA data link abnormal
Error LED
201
FEND
P10
User designation
Initial settings
202
MOVP H3 D202
CH.1, CH. 2: D/A conversion enabled
MOVP H5101 D203
CH1.: 0 to 5V, HOLD
CH.2: User range setting 1, CLEAR
SET Y119
Turns on initial data setting request flag.
215
X119
RST Y119
Turns off initial data setting request flag.
Setting of digital values
217
X10F X11B
MOVP K1000 D200
CH.1 digital value: 1000
MOVP K2000 D201
CH.2 digital value: 2000
Setting of analog output enable/ disable
229
X10F X11B
SET Y100
Turns on CH.1 analog output enable flag.
SET Y101
Turns on CH.2 analog output enable flag.
Processing at error occurrence
233
X11A
BMOVP D456 D500 K2
Reads check code.
BMOVP D458 D502 K1
Reads error code.
User designation
SET Y11A
Turns on error reset request flag.
254
Y11A X11A
RST Y11A
Turns off error reset request flag.
Masks disabled devices.
257
X0 X0F X1
WAND H3 K4Y100
Masks RY100 to RY10F disabled devices.
WAND H700 K4Y110
Masks RY110 to RY11F disabled devices.
270
RET
271
END

5.2.3 Program examples for use of the QnACPU

The program examples in this section are created under the following conditions.
GPPW is used to set the network and automatic refresh parameters.

[Relationships between PLC CPU, master module and AJ65SBT-62DA]



[Initial settings]

D/A conversion enabled channels ..... Channels 1, 2
Input range setting ..... Channel 1: 0 to 5V
Channel 2: User range setting 1
HOLD/CLEAR setting ..... Channel 1: HOLD
Channel 2: CLEAR
Digital value setting ..... Channel 1: 1000
Channel 2: 2000
Analog output enable channel ..... Channels 1, 2

[Network parameter setting]

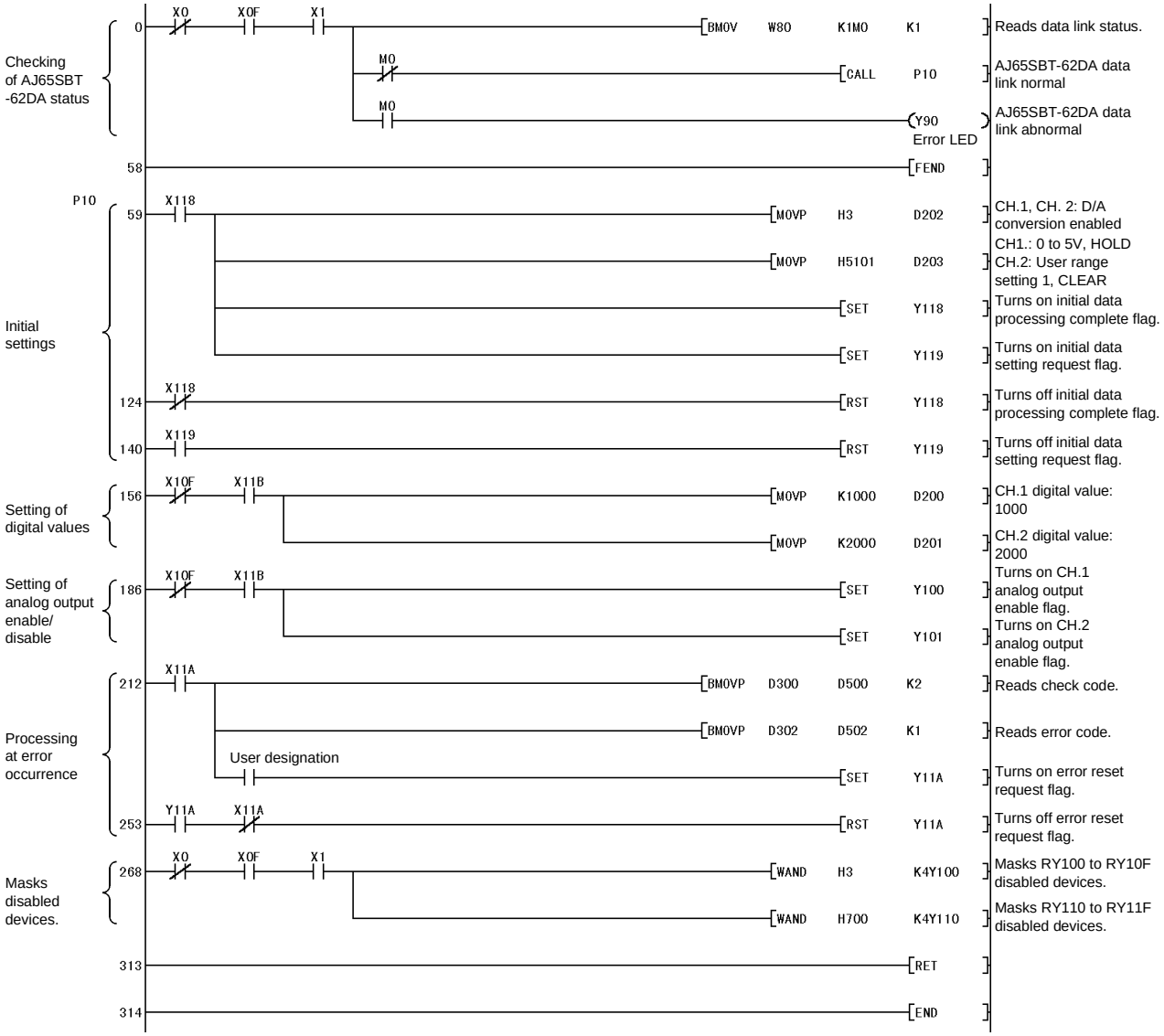
	1
Start I/O No.	0000
Type	Master station
All connect count	1
Remote input(RX)	
Remote output(RY)	
Remote register(RWr)	
Remote register(RWw)	
Special relay(SB)	
Special register(SW)	
Retry count	3
Automatic reconnection station count	1
Wait master station No.	0
PLC down select	Stop
Scan mode setting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

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

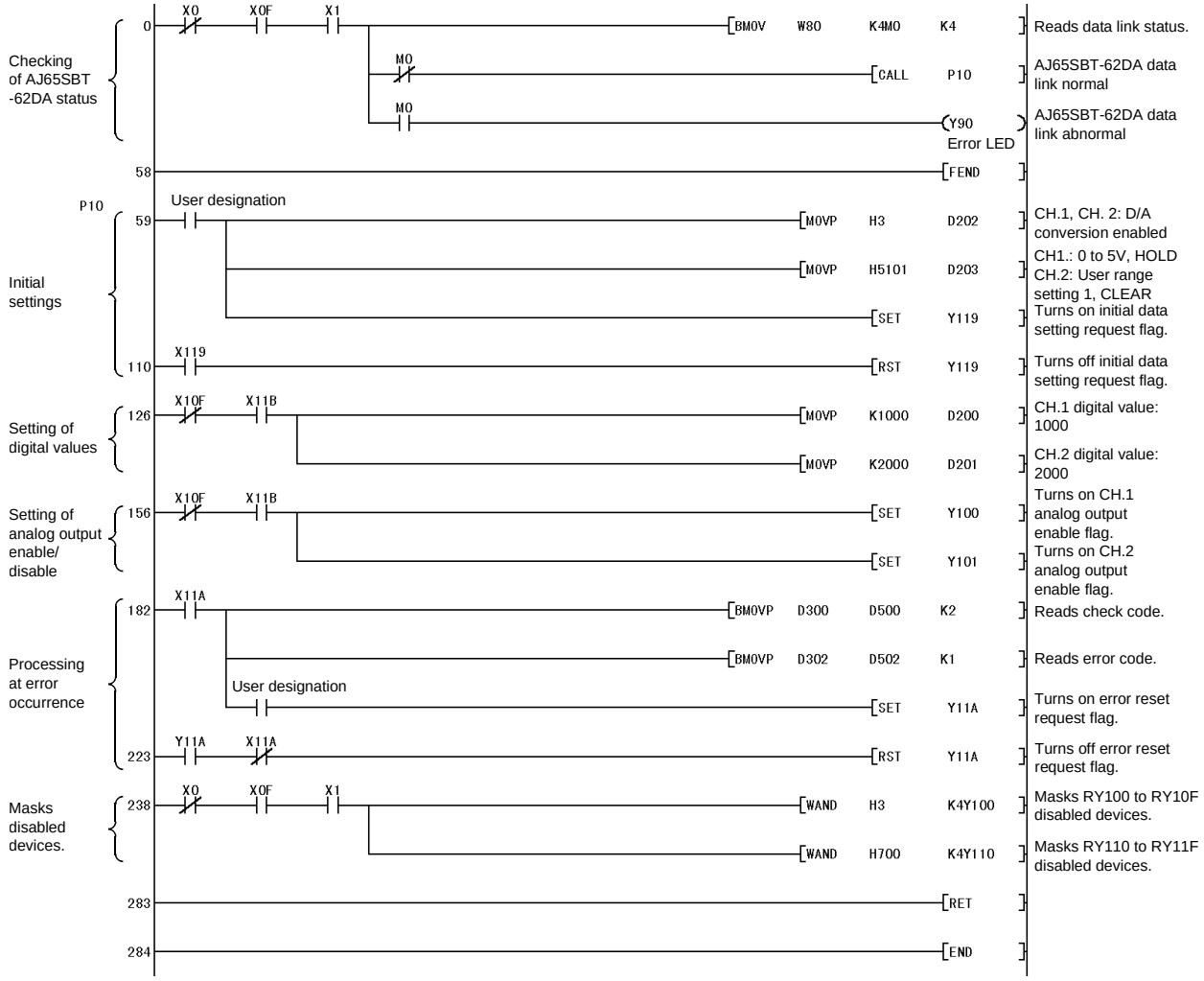
[Automatic refresh parameter setting]

	1
Start I/O No.	0000
Type	Master station
All connect count	1
Remote input(RX)	X100
Remote output(RY)	Y100
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

(1) Program example for power-on



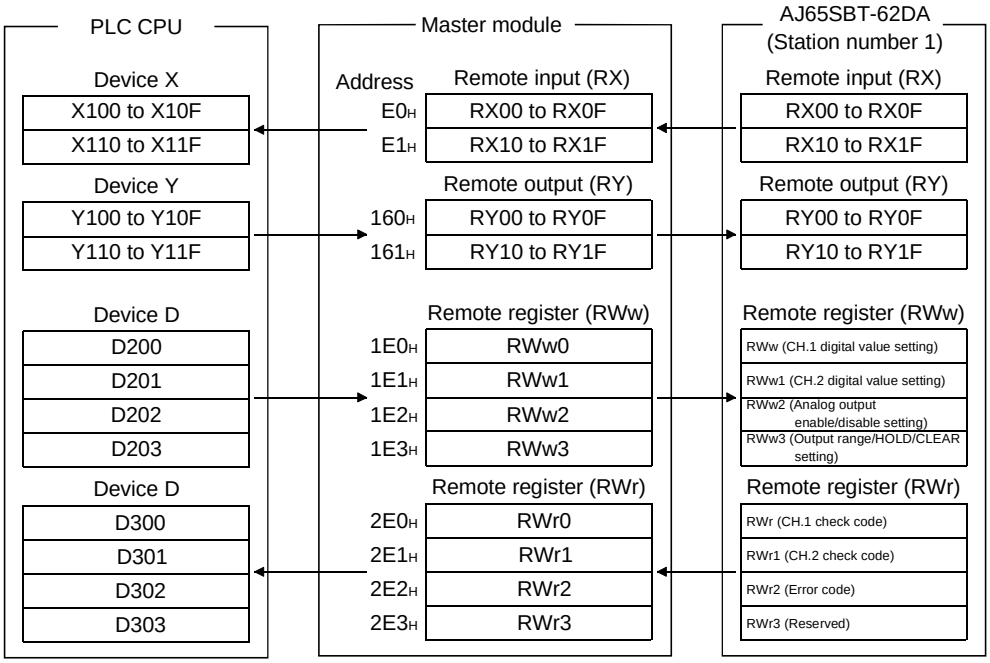
(2) Program example for initial data changing



5.2.4 Program examples for use of the QCPU (Q mode)

The program examples in this section are created under the following conditions.
GPPW is used to set the network and automatic refresh parameters.

[Relationships between PLC CPU, master module and AJ65SBT-62DA]



[Initial settings]

D/A conversion enabled channels ..... Channels 1, 2
Input range setting ..... Channel 1: 0 to 5V
Channel 2: User range setting 1
HOLD/CLEAR setting ..... Channel 1: HOLD
Channel 2: CLEAR
Digital value setting ..... Channel 1: 1000
Channel 2: 2000
Analog output enabled channels ..... Channels 1, 2

[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	Online (Remote net mode)
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
Stand by master station No.	
PLC down select	Stop
Scan mode setting	Asynchronous
Delay infomation setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

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

[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	Online (Remote net mode)
All connect count	1
Remote input(RX)	X100
Remote output(RY)	Y100
Remote register(RWr)	D300
Remote register(RWw)	D200
Special relay(SB)	SB0
Special register(SW)	SW0
Retry count	3
Automatic reconnection station count	1
Stand by master station No.	
PLC down select	Stop
Scan mode setting	Asynchronous
Delay infomation setting	0
Station information setting	Station information
Remote device station initial setting	Initial settings
Interrupt setting	Interrupt settings

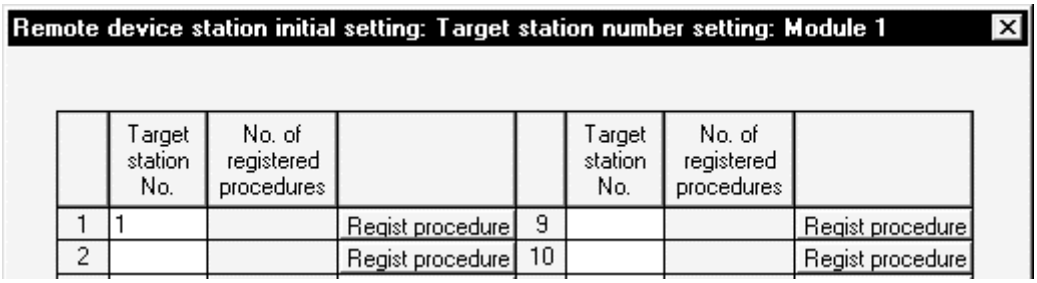
(1) Program for power-on

At power-on, the initial setting of the AJ65SBT-62DA can be made easily using the remote device station initialization procedure registration function.

(a) Setting the target station number

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

Set the target station number to "1".



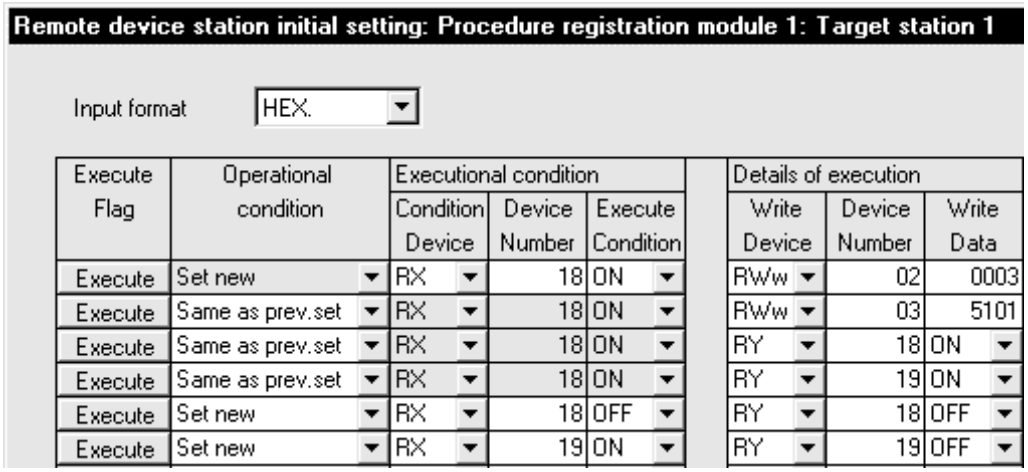
(b) Setting the procedure registration

When the initial data processing request flag (RX (n+1) 8) turns on and the remote device station initialization procedure registration (SB0D) is set, the following data are registered to the AJ65SBT-62DA.

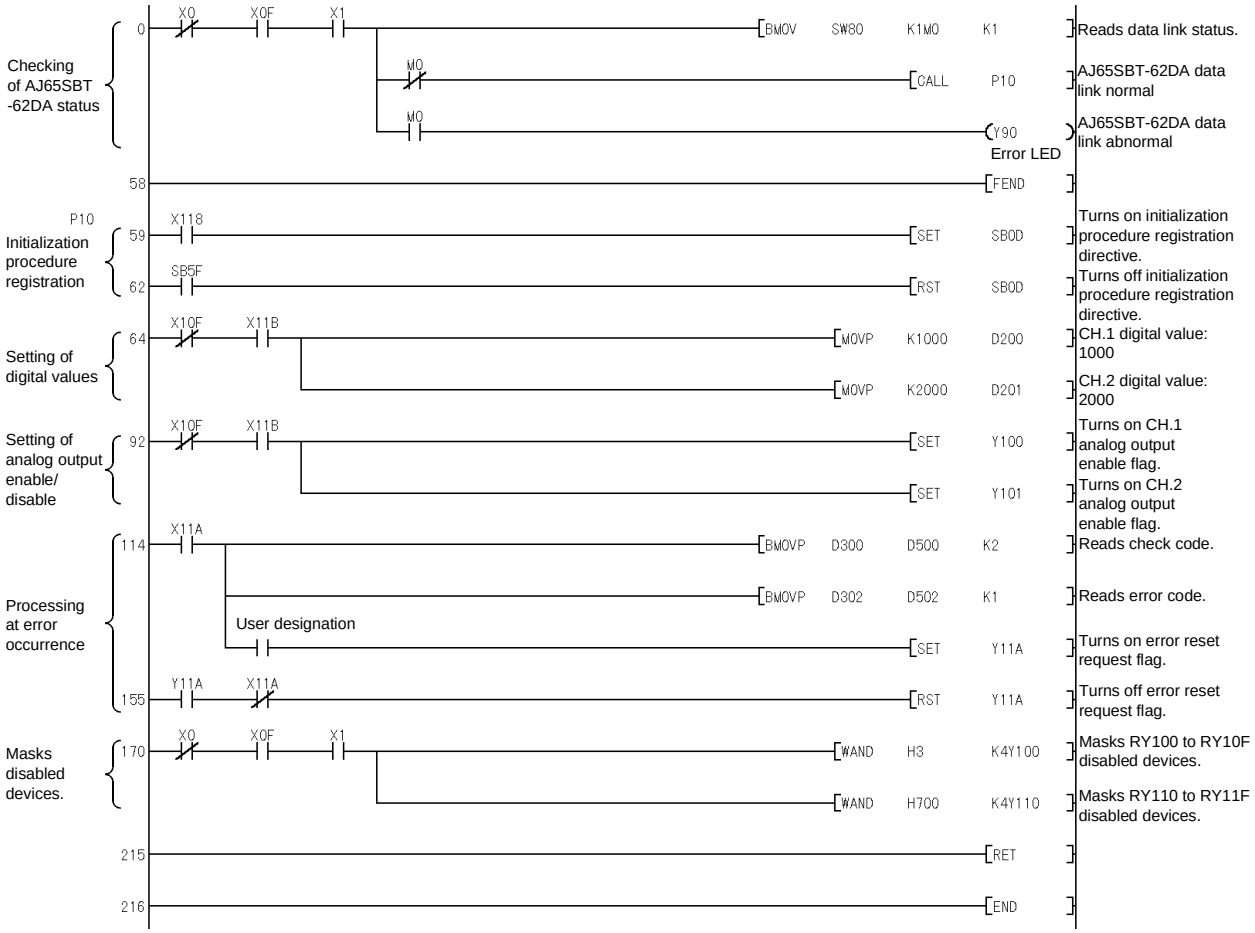
Procedure Execution Condition	Execution	Number
Initial data processing request flag (RX(n+1)8) turns on	Channels 1, 2 are set to D/A conversion enable.	1)
	Output range setting of channel 1 is set to 0 to 5V. Output range setting of channel 2 is set to user range setting 1. HOLD/CLEAR setting of channel 1 is set to HOLD. HOLD/CLEAR setting of channel 2 is set to CLEAR..	2)
	Initial data processing complete flag (RY(n+1)8) is turned on.	3)
	Initial data setting request flag (RY(n+1)9) is turned on.	4)
Initial data processing request flag (RX(n+1)8) turns off	Initial data processing complete flag (RY(n+1)8) is turned off.	5)
Initial data setting complete flag (RX(n+1)9) turns on	Initial data setting request flag (RY(n+1)9) is turned off.	6)

(c) Setting results

The setting results of 1) to 6) are shown below.



(d) Program example

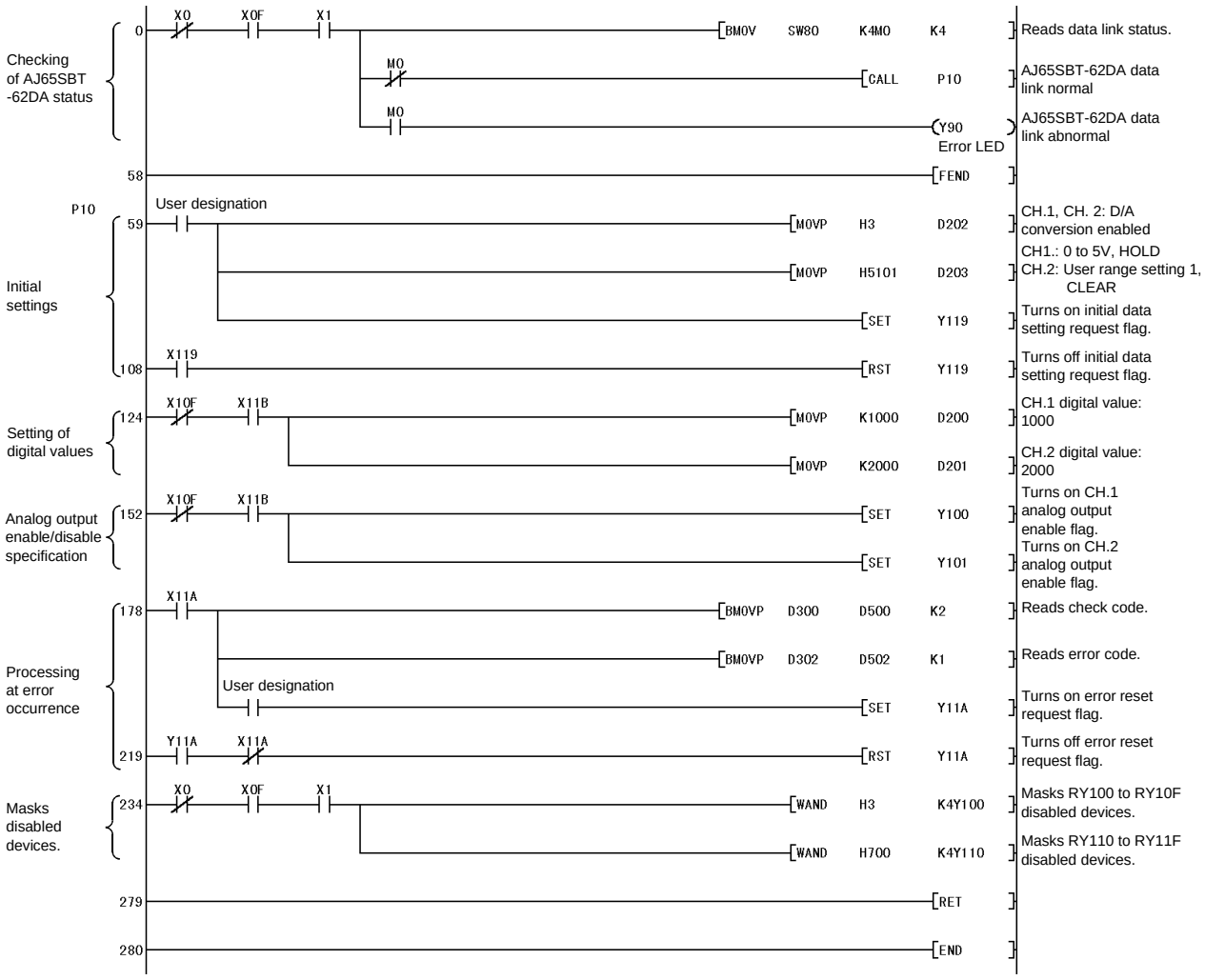


(2) Program for initial data changing

When any initial data (D/A conversion enable/disable channel, output range) is changed, the remote device station initialization procedure registration function is unusable.

Using a sequence program, change the initial data.

The program example for initial data changing is shown below.



6 TROUBLESHOOTING

The details of the errors which may occur when using the AJ65SBT-62DA and troubleshooting are described.

6.1 Error Code List

When the data is written from the PLC CPU to the master module, and an error occurs (AJ65SBT-62DA "RUN" LED flashes), the error code is stored to the AJ65SBT-62DA remote register RWrn+2.

Table 6.1 Error Code List (Errors Detected by AJ65SBT-62DA)

Error Code (Hexadecimal).	Cause	Corrective Action
110 □	The set digital value is outside the setting range.	Correct the digital value to within the setting range.
200 □	The output range setting is outside the setting range.	Correct the output range setting to within the setting range.
	All channels are not set to any of "user range settings 1 to 3" at offset/gain setting (in the test mode).	When making offset/gain setting (in the test mode), set all channels to any of "user range settings 1 to 3".

The □ indicates the channel number where the error occurred.

(1) For the digital value setting error, the "RUN" LED flickers at intervals of 0.5s and D/A conversion is performed using the upper or lower limit value.
For the output range setting error, the "RUN" LED flickers at intervals of 0.1s and D/A conversion is not performed on all channels.

(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).

6.2 Using the LED Indications to Check Errors

This section explains how to check errors using the LED indications of the AJ65SBT-62DA.
Refer to the PLC CPU and master module user's manual for issues regarding the PLC CPU and master module.

(1) When the AJ65SBT-62DA "PW" LED is off

Check Item	Corrective Action
Is 24VDC power on?	Check the external power supply.
Is the voltage of the 24VDC power supply within the specified value?	Set the voltage value to within the range 20.4 to 26.4V.

(2) When the AJ65SBT-62DA "RUN" LED flickers

Check item	Corrective action
Is the LED flickering at 0.1s intervals in the normal mode?	1. Using the error code (RWrn+2), check the channel at which the output range setting error has occurred. 2. Make correction to the sequence program or GPPW setting.
Is the LED flickering at 0.5s intervals in the normal mode?	1. Using the error code (RWrn+2), check the channel at which the digital value setting error has occurred. 2. Check the check code (RWrn, RWrn+1) of the channel at which the error has occurred. 3. Make correction to the sequence program.
Is the LED flickering at 0.1s intervals in the test mode?	Set all channels to any of "user range settings 1 to 3" in output range setting.
Is the LED flickering at 0.5s intervals in the test mode?	Change the offset/gain adjustment to within the available setting range.

(3) When the AJ65SBT-62DA "RUN" LED is off

Check item	Corrective action
Has the watchdog timer error occurred?	Using the link special registers (SW0084 to SW0087) of the master module, check the watchdog timer error and power on the AJ65SBT-62DA again. If the "RUN" LED is not lit after power is switched on again, the possible cause is a hardware fault. Contact your nearest Mitsubishi representative.
Has the TEST terminals (across 8-9) been shorted to enter the test mode?	After making offset/gain adjustment, open the TEST terminals (across 8-9).

(4) When the AJ65SBT-62DA "L RUN" LED is off
Communications are broken.
For details, refer to troubleshooting in the user's manual of the master module used.

(5) When the AJ65SBT-62DA "L ERR." LED flickers at fixed intervals

Check item	Corrective action
Has the station number or transmission speed setting switch position been changed during normal operation?	After correcting the setting switch setting, switch power on again.
Is the station number or transmission speed setting switch faulty?	If the "L ERR." LED has begun flickering though switch setting change was not made during operation, the possible cause is a hardware fault. Contact your nearest Mitsubishi representative.

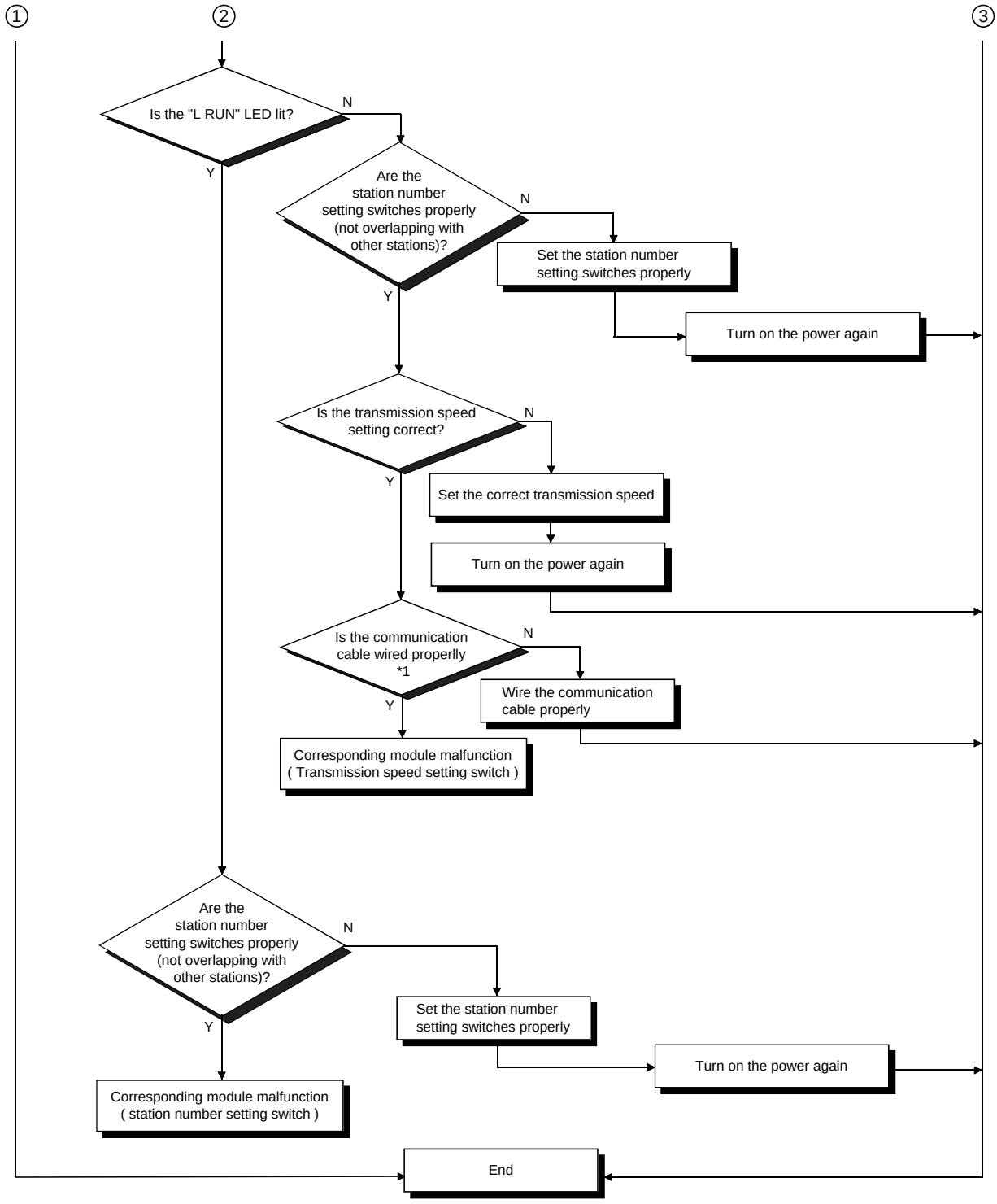
(6) When the AJ65SBT-62DA "L ERR." LED flickers at unfixed intervals

Check item	Corrective action
Have you forgotten fitting the terminal resistor?	Check whether the termination resistor is fitted. If it is not connected, connect it and switch power on again.
Is the module or CC-Link dedicated cable affected by noise?	Earth both ends of the shield wire of the CC-Link dedicated cable to the protective earth conductor via SLD and FG of the corresponding module. Earth the FG terminal of the module without fail. When carrying out wiring in piping, earth the pipe without fail.

(7) When the AJ65SBT-62DA "L ERR." LED is on

Check item	Corrective action
Are the station number and transmission speed correct?	Set the correct station number and transmission speed.

6.3 Troubleshooting for the Case where the "ERR." LED of the Master Station Flickers



*1Check for a short, reversed connection, wire breakage, terminal resistor, FG connection, overall distance and station-to-station distance.

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APPENDIX

Appendix1 Comparison between This Product and Conventional Product

(1) Comparison in performance between this product and conventional product
The following table gives performance comparison between the AJ65SBT-62DA and conventional product (AJ65BT-64DAV/DAI).

Performance Comparison between AJ65SBT-62DA and Conventional Product

<table>
<tr><td rowspan="3">Item</td><td colspan="4">Specifications</td></tr>
<tr><td colspan="2">AJ65SBT-62DA</td><td rowspan="2">AJ65BT-64DAV</td><td rowspan="2">AJ65BT-64DAI</td></tr>
<tr><td>Voltage output</td><td>Current output</td></tr>
<tr><td>Digital input</td><td>-4096 to +4095</td><td>0 to 4095</td><td>-2048 to +2047</td><td>0 to 4095</td></tr>
<tr><td>Analog output</td><td>Voltage: -10 to +10VDC
(external load resistance: 2kΩ to 1MΩ)</td><td>Current: 0 to 20mADC
(external load resistance: 0Ω to 600Ω)</td><td>Voltage: -10 to +10VDC
(external load resistance: 2kΩ to 1MΩ)</td><td>Current: 4 to 20mADC
(external load resistance: 0Ω to 600Ω)</td></tr>
<tr><td>I/O characteristics
Maximum resolution</td><td colspan="2"><table><tr><td></td><td>Digital Input Value</td><td>Output Range</td><td>Max. Resolution</td></tr><tr><td rowspan="4">Voltage</td><td rowspan="2">-4000 to +4000</td><td>-10V to +10V</td><td rowspan="2">2.5mV</td></tr><tr><td>User range setting 1
(-10V to +10V)</td></tr><tr><td rowspan="3">0 to 4000</td><td>0 to 5V</td><td>1.25mV</td></tr><tr><td>1 to 5V
User range setting 2
(0 to 5V)</td><td rowspan="2">1.0mV</td></tr><tr><td rowspan="3">Current</td><td rowspan="3">0 to 4000</td><td>0 to 20mA</td><td>5μA</td></tr><tr><td>4 to 20mA
User range setting 3
(0 to 20mA)</td><td rowspan="2">4μA</td></tr></table></td><td colspan="2"><table><tr><td></td><td>Digital Input Value</td><td>Output Range</td><td>Max. Resolution</td></tr><tr><td>DAV</td><td>-2000 to +2000</td><td>-10V to +10V</td><td>5mA</td></tr><tr><td>DAI</td><td>0 to 4000</td><td>4 to 20mA</td><td>4μA</td></tr></table></td></tr>
<tr><td>Output range changing</td><td colspan="2">Yes</td><td colspan="2">No</td></tr>
<tr><td>Offset/gain setting</td><td colspan="4">Yes</td></tr>
<tr><td rowspan="2">Accuracy</td><td>Ambient temperature 0 to 55°C</td><td colspan="2">±0.4%
(accuracy relative to maximum value of analog output value)</td><td colspan="2">±1.0%
(accuracy relative to maximum value of analog output value)</td></tr>
<tr><td>Ambient temperature 25 ± 5°C</td><td colspan="2">±0.2%
(accuracy relative to maximum value of analog output value)</td><td colspan="2">—</td></tr>
<tr><td>Max. conversion speed</td><td colspan="4">1ms/1 channel</td></tr>
<tr><td>Output short-circuit protection</td><td colspan="4">Yes</td></tr>
<tr><td>Number of analog output points</td><td colspan="2">2 channels/1 module</td><td colspan="2">4 channels/1 module</td></tr>
<tr><td>Number of occupied I/O points</td><td colspan="2">1 station occupied
(RX/RY: 32 points each, RWr/RWw: 4 points each)</td><td colspan="2">2 stations occupied
(RX/RY: 32 points each, RWr/RWw: 8 points each)</td></tr>
<tr><td>Connected terminal block</td><td colspan="2">7-point, 2-piece terminal block
(transmission, power supply)
Direct-coupled, 18-point terminal block
(analog output section) (M3 screw)</td><td colspan="2">27-point terminal block (M3.5 screw)</td></tr>
<tr><td>Applicable wire size</td><td colspan="2">0.3 to 0.75mm^2</td><td colspan="2">0.75 to 2.00 mm^2</td></tr>
<tr><td>Applicable crimping terminal</td><td colspan="2">RAV1.25-3.5</td><td colspan="2">RAV1.25-3.5, RAV2-3.5</td></tr>
<tr><td>24VDC internal current consumption (A)</td><td colspan="2">0.16</td><td>0.18</td><td>0.27</td></tr>
<tr><td>Weight (kg)</td><td colspan="2">0.20</td><td colspan="2">0.4</td></tr>
<tr><td>Outline dimensions (mm)</td><td colspan="2">118(W) × 50(H) × 40(D)</td><td colspan="2">151.9(W) × 65(H) × 63(D)</td></tr>
</table>

APP

(2) Precautions for replacing the conventional product (AJ65BT-64DAV/DAI) with the AJ65SBT-62DA

In the existing system using the conventional product (AJ65BT-64DAV/DAI), the following instructions must be noted when changing the AJ65BT-64DAV/DAI for the AJ65SBT-62DA.

(a) Since the AJ65SBT-62DA occupies one station (the AJ65BT-64DAV/DAI occupies two stations), the station information setting in the network parameters must be changed.

(b) As the remote I/O signals and remote register settings are different between the two models, the program of the conventional model cannot be utilized.

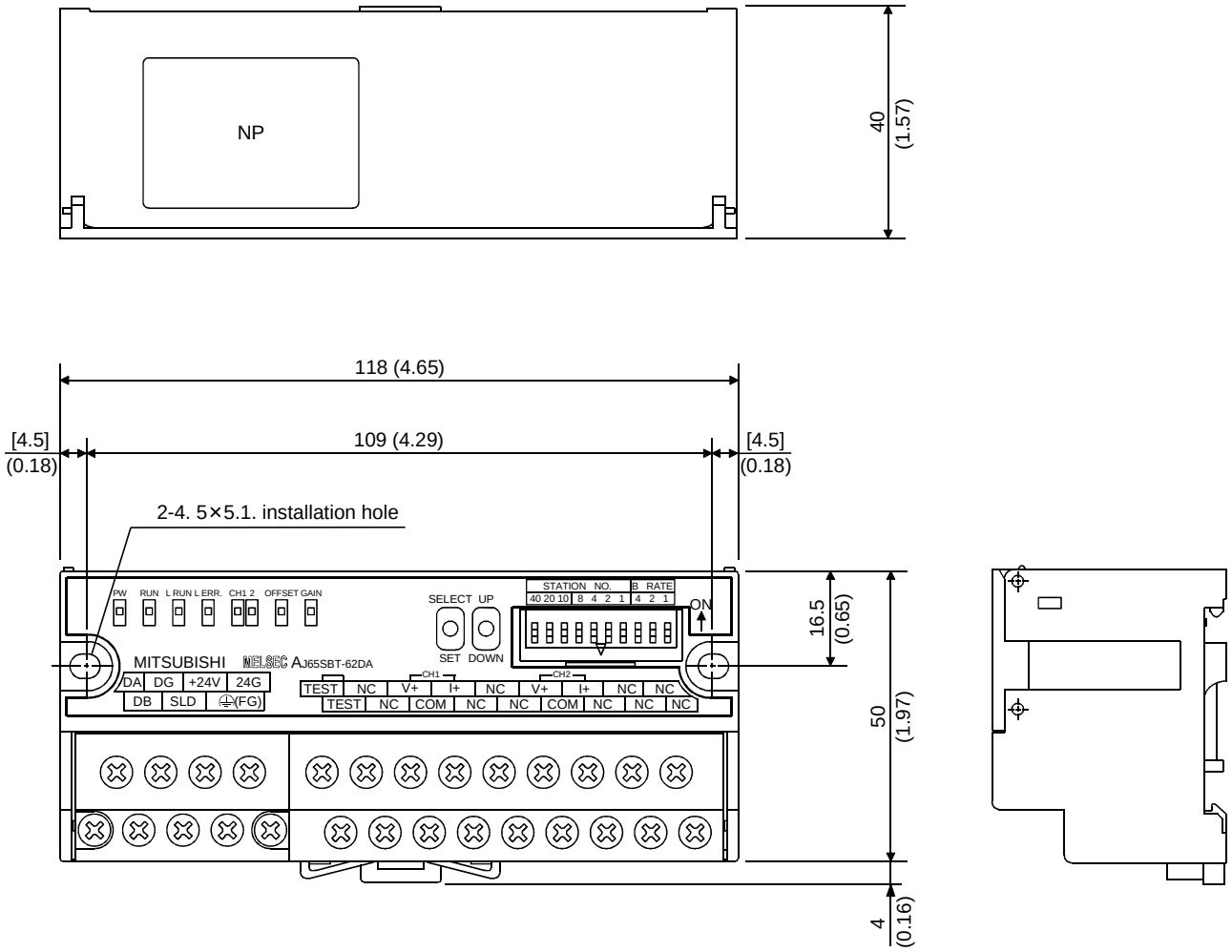
(c) Because of the differences in shape and layout between the terminal blocks, you cannot use the terminal block of the conventional module as it is.

(d) The offset/gain setting method differs. For details, refer to Section 4.4.

(e) The ways to set the station number and transmission speed setting switches are different. For details, refer to Section 4.3.

Appendix2 External dimension diagram

The outline dimension drawing of the AJ65SBT-62DA is shown below.



Unit : mm(inch)

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WARRANTY

Please confirm the following product warranty details before starting use.

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 dealer or Mitsubishi Service Company. Note that if repairs are required at a site overseas, on a detached island or remote place, expenses to dispatch an engineer shall be charged for.

[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 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 possible 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 chance loss and secondary loss from warranty liability

Regardless of the gratis warranty term, Mitsubishi shall not be liable for compensation to damages caused by any cause found not to be the responsibility of Mitsubishi, chance losses, lost profits incurred to the user by Failures of Mitsubishi products, damages and secondary damages caused from special reasons regardless of Mitsubishi's expectations, compensation for accidents, and compensation for damages to products other than Mitsubishi products and other duties.

5. Changes in product specifications

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

6. Product application

(1) In using the Mitsubishi MELSEC programmable logic controller, the usage conditions shall be that the application will not lead to a major accident even if any problem or fault should occur in the programmable logic controller device, and that backup and fail-safe functions are systematically provided outside of the device for any problem or fault.

(2) The Mitsubishi general-purpose programmable logic controller has been designed and manufactured for applications in general industries, etc. Thus, applications in which the public could be affected such as in nuclear power plants and other power plants operated by respective power companies, and applications in which a special quality assurance system is required, such as for Railway companies or National Defense purposes shall be excluded from the programmable logic controller applications.

Note that even with these applications, if the user approves that the application is to be limited and a special quality is not required, application shall be possible.

When considering use in aircraft, medical applications, railways, incineration and fuel devices, manned transport devices, equipment for recreation and amusement, and safety devices, in which human life or assets could be greatly affected and for which a particularly high reliability is required in terms of safety and control system, please consult with Mitsubishi and discuss the required specifications.

Digital-Analog Converter Module type AJ65SBT-62DA

User's Manual

MODEL	AJ65S-62DA-U-S-E
MODEL CODE	13JR19
SH(NA)-080107-A(0010)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : MITSUBISHI DENKI BLDG MARUNOUCHI TOKYO 100-8310 TELEX : J24532 CABLE MELCO TOKYO
NAGOYA WORKS : 1-14 , YADA-MINAMI 5 , HIGASHI-KU, NAGOYA , JAPAN