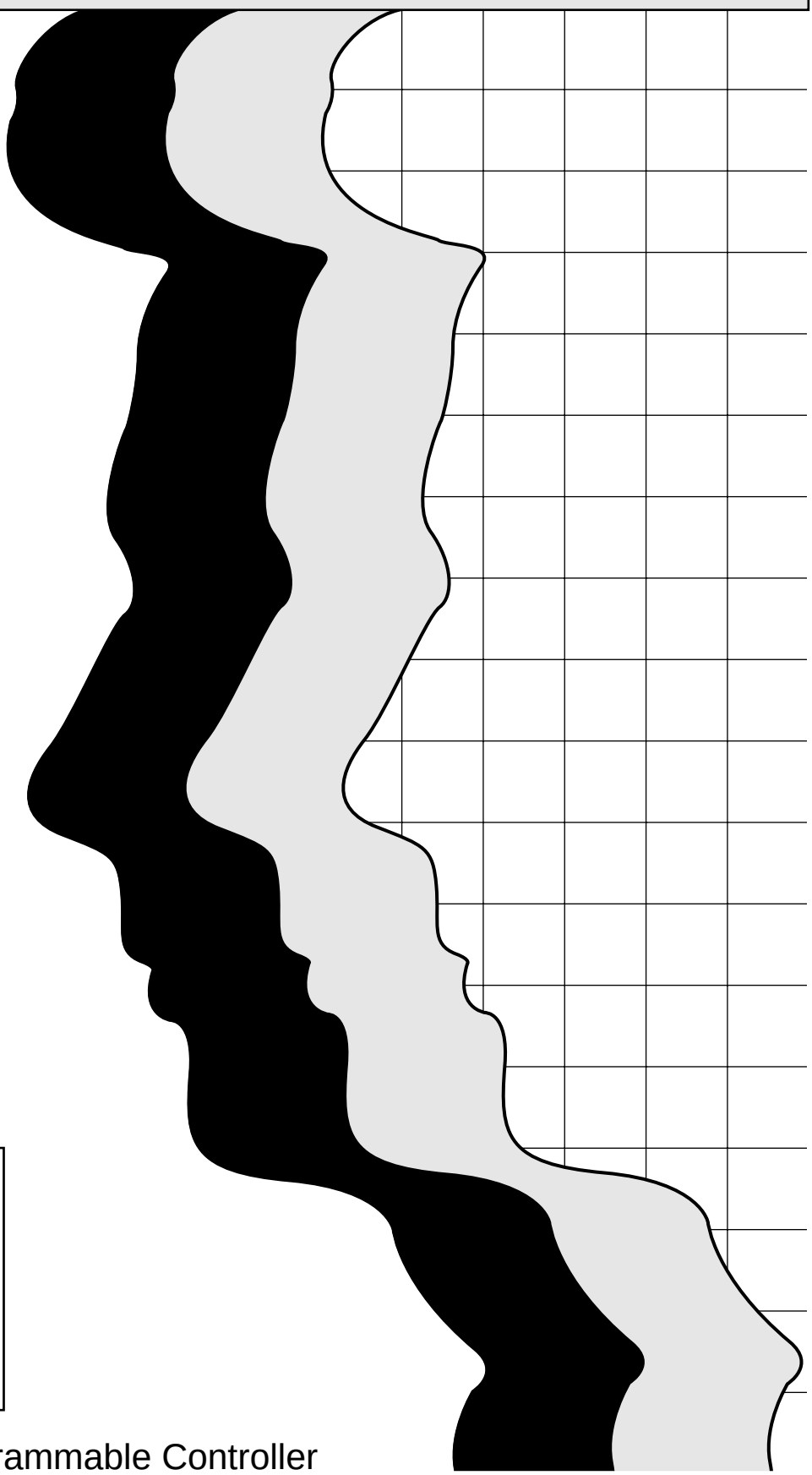
MITSUBISHI

Digital-Analog Converter Module type AJ65VBTCU-68DAV

User's Manual



MELSEC

Mitsubishi Programmable 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 securely fix it with the CC-Link connector type metal installation fitting.
  Not doing so can cause a drop or malfunction.
- 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 ground the FG pin to the protective ground conductor.
  Not doing so can cause a malfunction.
- Wire the module correctly after confirming the rated voltage and pin layout of the product.
  Not doing so can cause a fire or failure.
- 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 insert the one-touch connector plug for I/O of the one-touch connector type/connector type compact remote I/O unit into the one-touch connector for analog I/O accidentally.
  Doing so can cause the module to be damaged.
- Always fit a non-wired, one-touch connector plug to the open one-touch connector for power supply/FG.
  Not doing so can cause a failure or malfunction.
- 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 pin while the power is on. Doing so may cause malfunction. • Always start cleaning after switching power off externally in all phases. Not doing so can cause the module to fail or malfunction. • Never disassemble or modify the module. This may cause breakdowns, malfunctioning, 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.

A - 3

REVISIONS

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

Print Date	* Manual Number	Revision
Jul., 2001	SH (NA)-080182-A	First Printing
Oct., 2001	SH (NA)-080182-B	Correction Section 2.3, Section 3.2, Appendix 2

Japanese Manual Version SH-080184-A

INTRODUCTION

Thank you for choosing a Mitsubishi MELSEC-A Series General Purpose Programmable Controller. Before using your new PLC, please read this manual thoroughly to gain an understanding of its functions so you can use it properly.

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)
Control & Communication 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)
Control & Communication 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)
Control & Communication 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)	SH-080016 (13JL91)
Programming Manual type AnSHCPU/AnACPU/AnUCPU/QCPU-A (A Mode) (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.

To conform this product to the EMC Directive and Low Voltage Directive, refer to the Section of "CC-Link Modules" in Chapter 3 "EMC Directive and Low Voltage Directive" of the User's Manual (Hardware) of the CPU module used.

About the Generic Terms and Abbreviations

Unless otherwise specified, the following generic terms and abbreviations are used in this manual to describe Type AJ65VBTCU-68DAV analog-digital converter module.

Generic Term/Abbreviation	Description
GX Developer	Generic product name of the product types SWnD5C-GPPW-E, SWnD5C-GPPW-EA ,SWnD5C-GPPW-EV and SWnD5C-GPPW-EVA (n in the type indicates 4 or more.)
ACPU	Generic term for A0J2CPU, A0J2HCPU, 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, A2SHCPU-S1, 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 Q00JCPU, Q00CPU, Q01CPU, 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 master station to the remote 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 remote device station to the master station. (Expressed as RWr for convenience)

Product components

This product consists of the following.

Product Name	Quantity
Type AJ65VBTCU-68DAV digital-analog converter module	1
Type AJ65VBTCU-68DAV digital-analog converter module user's manual (hardware)	1

A - 9

1 OVERVIEW

This user's manual explains the specifications, handling, programming methods and others of Type AJ65VBTCU-68DAV digital-analog converter module (hereafter abbreviated to the " AJ65VBTCU-68DAV ") which is used as a remote device station of a Control & Communication Link (hereafter abbreviated to "CC-Link") system.
The AJ65VBTCU-68DAV is a module designed to convert digital values (16-bit signed BIN data) from outside the PLC into analog values (voltages or currents).
This module is a voltage output-dedicated model.

1.1 Features

This section gives the features of the AJ65VBTCU-68DAV.

(1) High accuracy

This module performs D/A conversion at the accuracy of ±0.3% 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

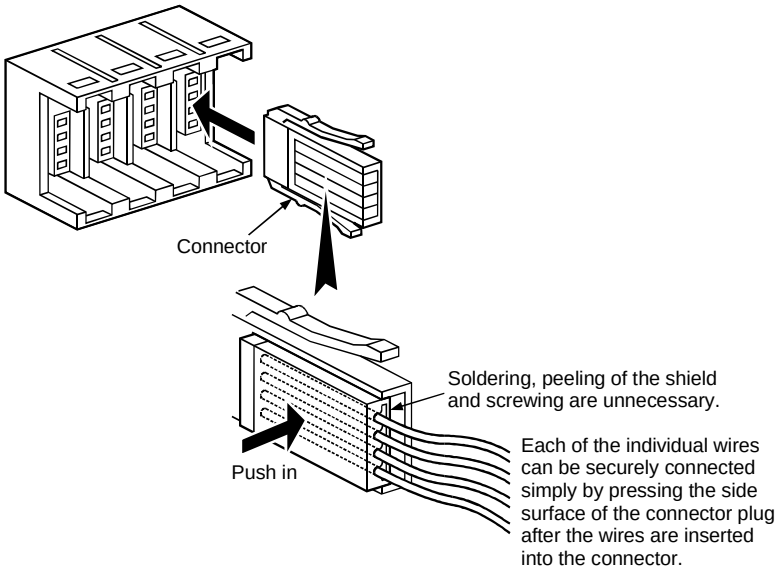
You can specify whether to hold or clear the analog value which is being output from each channel of the unit when the PLC CPU has entered the STOP mode or the AJ65VBTCU-68DAV has stopped D/A conversion due to error occurrence.

(5) More channels than those of the conventional D/A converter modules

The number of channels is four times greater than that of the conventional CC-Link A/D converter module (AJ65SBT-62DA).

(6) Sharply reducible wiring man-hours

Wiring man-hours can be reduced sharply by adopting individual wire insulation displacement termination type one-touch connectors (no need for soldering, shield peeling and screwing) to connect the communication and power supply cables.



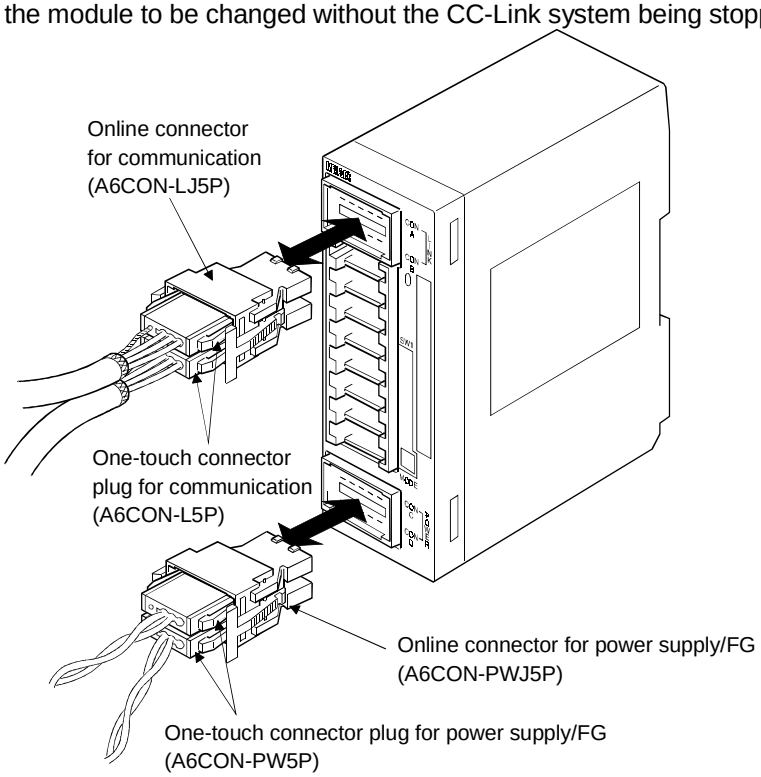
(7) Significant improvement of wiring performance

The above one-touch connectors for IN and OUT sides are plugged individually, greatly improving the performance of jumper wiring especially in an enclosure. (Mixed jumper wiring of the power supply cables with the I/O modules is not allowed.)

1 - 2

(8) Replacement of module without stopping CC-Link system

The use of the online connectors (for communication, for power supply) allows the module to be changed without the CC-Link system being stopped.



(9) Improved wiring workability

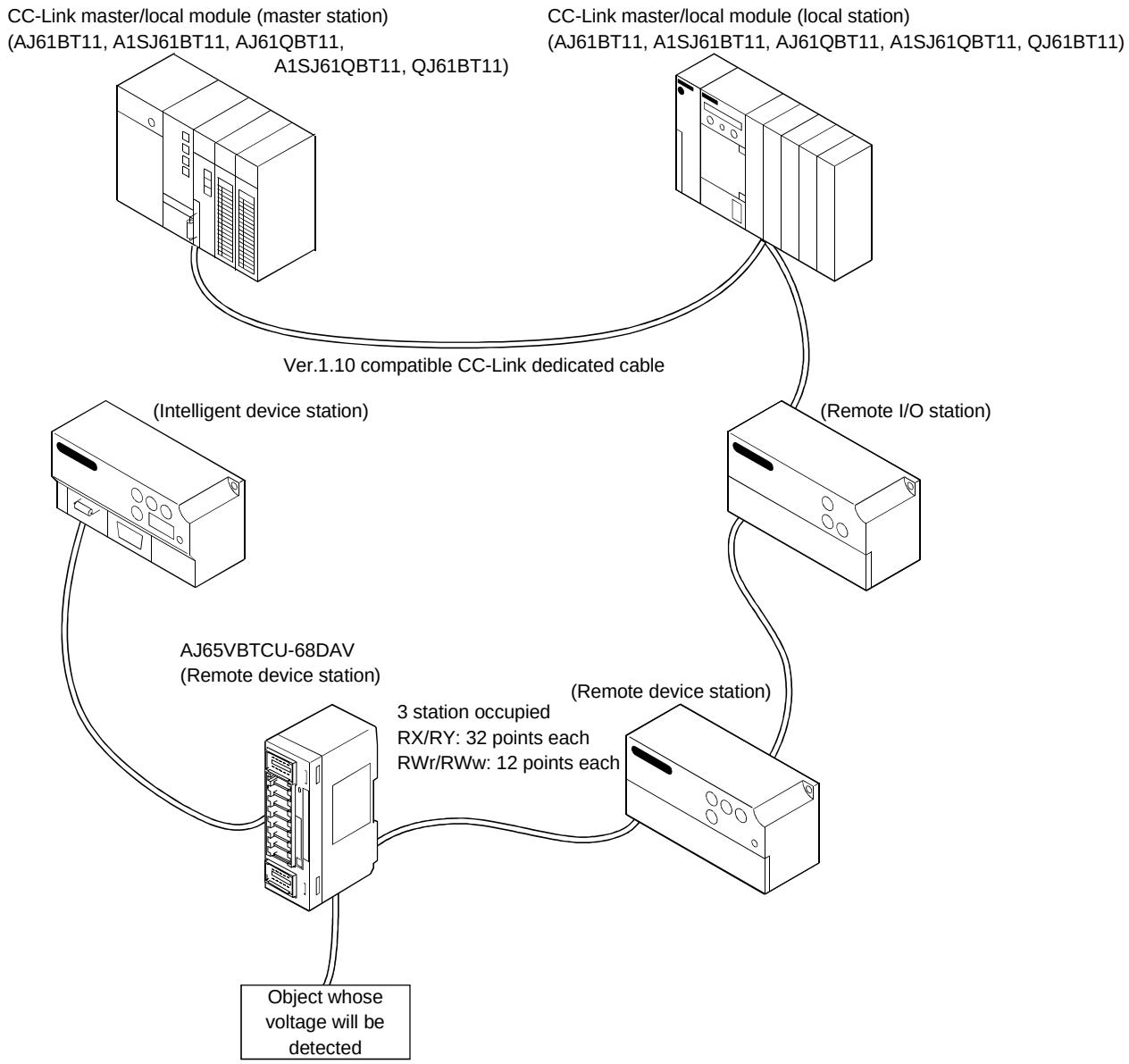
The connectors and setting switches are all front-mounted.
This enables connections to be made only by front wiring, improving wiring workability. It also allows setting to be made after installation to an enclosure.

2 SYSTEM CONFIGURATION

This chapter describes the system configuration for use of the AJ65VBTCU-68DAV.

2.1 Overall Configuration

The overall configuration for use of the AJ65VBTCU-68DAV is shown below.



2 - 1

2.2 Applicable System

This section explains the applicable system.

(1) Applicable master modules

The following master modules can be used with the AJ65VBTCU-68DAV.

- AJ61BT11
- A1SJ61BT11
- AJ61QBT11
- A1SJ61QBT11
- QJ61BT11

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

The CC-Link dedicated instructions may not be used depending on the PLC CPU and master module used.
For details of the restrictions, refer to the A series master module user's manual, and the Programing Manual type AnSHCPU/AnACPU/AnUCPU/QCPU (A mode) (Dedicated Instructions).
This module does not allow the use of the dedicated instructions other than RLPA and RRPA.
Refer to Section 5.5 for a program example using the dedicated instructions (RLPA, RRPA).

2.3 Precautions for System Configuration

Before powering off or changing this module, stop the control of the mating equipment.

2.4 Parts Sold Separately

The plugs for AJ65VBTCU-68DAV are sold separately.
Please purchase them as necessary.

	Mitsubishi model name	Part model name (manufacturer)	Specifications			Color of the cover
			Applicable cable core size (mm^2)	Applicable cable outer diameter (mm)	Maximum rated current (A)	
Plug for one-touch connector ∗1, ∗4	A6CON-P214	33104-6000FL (3M)	0.14 to 0.2 (AWG#26 to 24)	ϕ 1.0 to 1.4	2	Transparent
	A6CON-P220	33104-6100FL (3M)		ϕ 1.4 to 2.0		Yellow
	A6CON-P514	33104-6200FL (3M)	0.3 to 0.5 (AWG#22 to 20)	ϕ 1.0 to 1.4	3	Red
	A6CON-P520	33104-6300FL (3M)		ϕ 1.4 to 2.0		Blue
One-touch connector plug for communication ∗2, ∗4	A6CON-L5P	35505-6000-BOM GF (3M)	communication line 0.5 (AWG#20)	ϕ 2.2 to 3.0		Red
			shielded cable (drain wire) 0.5 (AWG#20)			
One-touch connector for power supply/FG ∗2, ∗4	A6CON-PW5P	35505-6080-A00 GF (3M)	0.75 (0.66 to 0.98) (AWG#18) wire diameter 0.16 mm or more	ϕ 2.2 to 3.0	7	Gray
Online connector for communication ∗3	A6CON-LJ5P	35720-L200-B00 AK (3M)	—	—	—	—
Online connector for power supply/FG ∗3	A6CON-PWJ5P	35720-L200-A00 AK (3M)	—	—	—	—
One-touch connector plug with terminating resistor (including 1)	A6CON-TR11	—	One-touch connector plug with terminating resister attached for communication (110Ω)	—	—	—

∗1 Mitsubishi's A6CON-P□□□ includes 20 plugs.
∗2 Mitsubishi's A6CON-□5P includes 10 plugs.
∗3 Mitsubishi's A6CON-□J5P includes 5 plugs.
∗4 Once insulation-displaced, the one-touch connector plugs cannot be reused.

REMARK

The following table indicates the connectors of this module with which the above plugs/connectors are compatible.

Connector of This Module	Compatible Optional Parts
One-touch connector for communication	• One-touch connector plug for communication • Online connector for communication • One-touch connector plug with terminating resistor
One-touch connector for power supply/FG	• One-touch connector plug for power supply/FG • Online connector for power supply/FG
One-touch connector for analog I/O	• Plug for one-touch connector

3 SPECIFICATION

This chapter provides the specifications of the AJ65VBTCU-68DAV.

3.1 General Specification

Table 3.1 indicates the general specifications of the AJ65VBTCU-68DAV.

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 61131-2</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, IEC61131-2 (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 AJ65VBTCU-68DAV.

Table 3.2 Performance Specifications

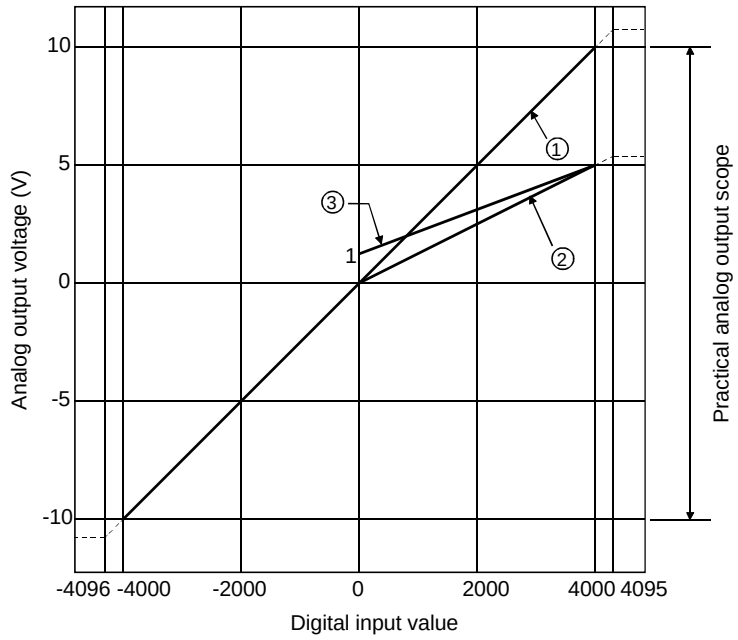
<table>
<tr><th colspan="2">Item</th><th>AJ65VBTCU-68DAV</th></tr>
<tr><td colspan="2">Protection class</td><td>IP1XB</td></tr>
<tr><td colspan="2">Digital input</td><td>16-bit signed binary (-4096 to +4095)</td></tr>
<tr><td colspan="2">Analog output</td><td>-10 to +10VDC (external load resistance: 2kΩ to 1MΩ)</td></tr>
<tr><td colspan="2">I/O characteristics, maximum resolution, accuracy (accuracy relative to maximum value of analog output value)</td><td>
<table>
<tr><th rowspan="2"></th><th rowspan="2">Digital Input Value</th><th rowspan="2">Analog Output Range</th><th colspan="2">Accuracy</th><th rowspan="2">Max. Resolution</th></tr>
<tr><th>Ambient temperature 0 to 55°C</th><th>Ambient temperature 25±5°C</th></tr>
<tr><td rowspan="5">Voltage</td><td rowspan="2">-4000 to +4000</td><td>-10 to +10V</td><td rowspan="2">±0.3% (±30mV)</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">±0.3% (±15mV)</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>
</table>
</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>Provided</td></tr>
<tr><td colspan="2">Absolute maximum output</td><td>±12V</td></tr>
<tr><td colspan="2">Number of analog output points</td><td>8 channels/1 module</td></tr>
<tr><td colspan="2">CC-Link station type</td><td>Remote device station</td></tr>
<tr><td colspan="2">Number of occupied stations</td><td>3 station (RX/RY: 32 points each, RWr/RWw: 12 points each)</td></tr>
<tr><td colspan="2">Communication cable</td><td>Ver. 1.10 compatible CC-Link dedicated cable FANC-110SBH,
FA-CBL200PSBH, CS-110</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">Insulation method</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">Noise durability</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">External wiring system</td><td>One-touch connector for communication [Transmission circuit]
(5 pins pressure welding type, the plug for the connector is sold separately)
One-touch connector for power supply and FG [Unit power supply and FG]
(5 pins pressure welding type, the plug for the connector is sold separately)
One-touch connector for analog I/O
(4 pins pressure welding type, the plug for the connector is sold separately)
<Sold separately>
Online connector for communication : A6CON-LJ5P
Online connector for power supply : A6CON-PWJ5P</td></tr>
<tr><td rowspan="3">Applicable wire size</td><td>One-touch connector for communication</td><td>Communication line : Ver. 1.10 compatible CC-Link dedicated cable
0.5mm^2 (AWG#20) [ϕ2.2 to 3.0], shielded wire 0.5mm^2 (AWG#20)</td></tr>
<tr><td>One-touch connector for power supply/FG</td><td>0.66 to 0.98 mm^2 (AWG#18) [ϕ2.2 to 3.0]
Wire diameter 0.08 mm^2 or more</td></tr>
<tr><td>One-touch connector for analog I/O</td><td>ϕ1.0 to 1.4 (A6CON-P214), ϕ1.4 to 2.0 (A6CON-P220)
[Applicable cable : 0.14 to 0.2 mm^2]
ϕ1.0 to 1.4 (A6CON-P514), ϕ1.4 to 2.0 (A6CON-P520)
[Applicable cable : 0.3 to 0.5 mm^2]</td></tr>
<tr><td colspan="2" rowspan="2">Applicable DIN rail</td><td>TH35-7.5Fe, TH35-7.5Al (conforming to JIS C 2812)</td></tr>
<tr><td>CC-Link connector type metal installation fitting : A6PLT-J65V1</td></tr>
<tr><td colspan="2" rowspan="3">External supply power</td><td>DC24V (DC20.4V to DC26.4V, ripple factor within 5%)</td></tr>
<tr><td>Inrush current : 4.3A, within 1.2ms</td></tr>
<tr><td>Current consumption 0.15A</td></tr>
<tr><td colspan="2">Weight</td><td>0.16kg</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) output when the digital value set from the PLC CPU is 0.
The gain value is an analog value (voltage) 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 Relationship between offset/gain setting and analog output value

How to calculate the analog output value:
The resolution of AJ65VBTCU-68DAV 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)

3.3.3 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 ±0.3% (±15mA) when the operating ambient temperature is 0 to 55°C.

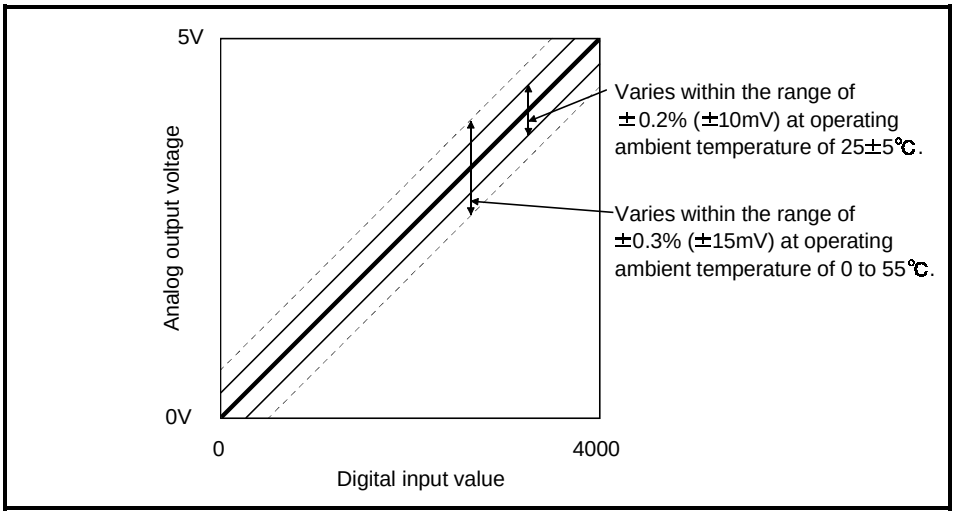


Fig. 3.2 Voltage Output Accuracy (When 0 to 5V Range Is Selected)

3.3.4 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 AJ65VBTCU-68DAV 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 in the asynchronous mode when the master module is the QJ61BT11 (normal value)

[Calculation expression]

SM+LS×1+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 AJ65VBTCU-68DAV

3.4 Function

Table 3.3 lists the functions of the AJ65VBTCU-68DAV.

Table 3.3 AJ65VBTCU-68DAV 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>0_H</td></tr>
<tr><td>0 to 5V</td><td>1_H</td></tr>
<tr><td>1 to 5V</td><td>2_H</td></tr>
<tr><td>User range setting 1 (-10 to +10V)</td><td>3_H</td></tr>
<tr><td>User range setting 2 (0 to 5V)</td><td>4_H</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 AJ65VBTCU-68DAV has stopped D/A conversion due to error occurrence.</td><td>Section 3.6.5</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 Analog output enable/disable setting (RWwm+8), CH. □ analog output enable/disable flag (RYn0 to RYn7) and HOLD/CLEAR setting (RWwm+B).
Make setting according to your system application.

Table 3.4 Analog output status combination list

Setting combination / Execution status	Analog output enable/disable setting (RWwm+8)	Enable (1)			Prohibit (0)
	CH. □ analog output enable/disable flag (RYn0 to RYn7)	Enable (ON)		Prohibit (OFF)	Enable or disable
	HOLD/CLEAR setting (RWwm+B)	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
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
Analog output status at PLC CPU stop error		Analog value before the PLC CPU stop is retained	Offset value	Offset value	0V
Analog output status at occurrence of AJ65VBTCU-68DAV digital value setting error		Output of the maximum or minimum analog value		Offset value	0V
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
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
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
Analog output status at occurrence of AJ65VBTCU-68DAV output range setting error		0V	0V	0V	0V
Analog output status at occurrence of AJ65VBTCU-68DAV watchdog timer error		0V	0V	0V	0V

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.

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 AJ65VBTCU-68DAV to the master module, and remote outputs (RY) mean the output signals from the master module to the AJ65VBTCU-68DAV.
In communications with the master station, the AJ65VBTCU-68DAV uses 32 points of the remote inputs (RX) and 32 points of the remote outputs (RY).
This module occupies three stations but do not use the latter 64 points.
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: AJ65VBTCU-68DAV → Master Module</th><th colspan="2">Signal Direction: Master Module → AJ65VBTCU-68DAV</th></tr>
<tr><th>Remote input (RX)</th><th>Name</th><th>Remote output (RY)</th><th>Name</th></tr>
<tr><td rowspan="9">RXn0
to
RXnB</td><td rowspan="9">Reserved</td><td>RYn0</td><td>CH.1 analog output enable/disable flag</td></tr>
<tr><td>RYn1</td><td>CH.2 analog output enable/disable flag</td></tr>
<tr><td>RYn2</td><td>CH.3 analog output enable/disable flag</td></tr>
<tr><td>RYn3</td><td>CH.4 analog output enable/disable flag</td></tr>
<tr><td>RYn4</td><td>CH.5 analog output enable/disable flag</td></tr>
<tr><td>RYn5</td><td>CH.6 analog output enable/disable flag</td></tr>
<tr><td>RYn6</td><td>CH.7 analog output enable/disable flag</td></tr>
<tr><td>RYn7</td><td>CH.8 analog output enable/disable flag</td></tr>
<tr><td>RXnC</td><td>E^{2}PROM write error flag</td><td rowspan="2">RYn8
to
RY (n+1) 7</td><td rowspan="2">Reserved</td></tr>
<tr><td>RXnD
to
RX (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>

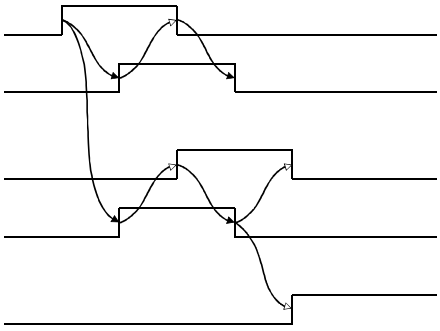
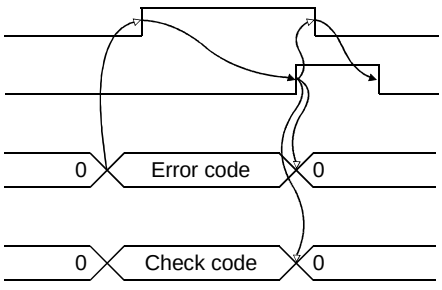
POINT

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 AJ65VBTCU-68DAV.

3.5.2 Functions of the remote I/O signals

Table 3.6 explains the functions of the remote I/O signals of the AJ65VBTCU-68DAV.

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. At occurrence of this error, power on the AJ65VBTCU-68DAV again. If this flag turns on after the power is switched on again, it is a hardware fault. Contact your nearest Mitsubishi representative.
RX (n+1) 8	Initial data processing request flag	After power-on, the initial data processing request flag is turned on by the AJ65VBTCU-68DAV 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. 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)B Remote ready  ◄—— : Performed by sequence ladder ◄—— : Performed by AJ65VBTCU-68DAV
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.) RX(n+1)A Error status flag RY(n+1)A Error reset request flag RWrn+8 Error code RWrn to RWrn+7 CH.□check code  ◄—— : Performed by sequence ladder ◄—— : Performed by AJ65VBTCU-68DAV
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 RYn7	CH. □ analog output enable/disable flag	D/A conversion value output enable flag for channel 1 to 8. 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+8) and CH. □ check code (RWrn to RWrn+7) 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 - 11

3.6 Remote Register

The AJ65VBTCU-68DAV 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	CH. 3 digital value setting	0	
	RWwm+3	CH. 4 digital value setting	0	
	RWwm+4	CH. 5 digital value setting	0	
	RWwm+5	CH. 6 digital value setting	0	
	RWwm+6	CH. 7 digital value setting	0	
	RWwm+7	CH. 8 digital value setting	0	
	RWwm+8	Analog output enable/disable setting	0	Section 3.6.3
	RWwm+9	CH. 1 to 4 output range setting	0	Section 3.6.4
	RWwm+A	CH. 5 to 8 output range setting	0	
	RWwm+B	HOLD/CLEAR setting	0	Section 3.6.5
Remote → Master	RWrn	CH. 1 check code	0	Section 3.6.5
	RWrn+1	CH. 2 check code	0	
	RWrn+2	CH. 3 check code	0	
	RWrn+3	CH. 4 check code	0	
	RWrn+4	CH. 5 check code	0	
	RWrn+5	CH. 6 check code	0	
	RWrn+6	CH. 7 check code	0	
	RWrn+7	CH. 8 check code	0	
	RWrn+8	Error code	0	Section 3.6.7
	RWrn+9 to RWrn+B	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 AJ65VBTCU-68DAV is not guaranteed.

3.6.2 CH. □ digital value setting (Addresses RWwm to RWwm+7)

(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 to RWrn+7).

Table 3.8 Available setting range of the digital value

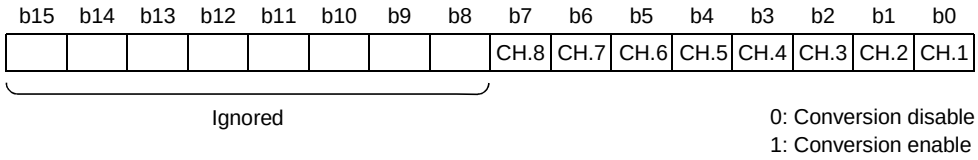
Output Range	Available setting range	Digital value for the D/A conversion when the value beyond the range is set
-10 to +10V User range setting 1	-4096 to +4095 (Practical scope: -4000 to +4000)	4096 or more: 4095 -4097 or less: -4096
0 to 5V 1 to 5V User range setting 2	-96 to 4095 (Practical scope: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

3.6.3 Analog output enable/disable setting (Address RWwm+8)

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

(2) Operation is performed according to the setting made for the leading edges of initial data setting request flag (RY(n+9)).

(3) The default setting is conversion enable for all channels.



3.6.4 CH. □ output range setting (Address RWwm+9, RWwm+A)

(1) Set the analog output range per channel.

(2) Operation is performed according to the setting made for the leading edges of initial data setting request flag (RY(n+9)).

(3) The default settings are -10 to +10V for all channels.

	b15 to b12	b11 to b8	b7 to b4	b3 to b0
RWwm+9	CH.4	CH.3	CH.2	CH.1
RWwm+A	CH.8	CH.7	CH.6	CH.5

Output range	Seting value
-10 to +10V	0_H
0 to 5V	1_H
1 to 5V	2_H
User range setting 1 (-10 to +10V)	3_H
User range setting 2 (0 to 5V)	4_H

POINT

If the set value is outside the setting range, error "20□*" occurs, the "RUN" LED flickers at intervals of 0.1s, and all channels do not make D/A conversion.

* □ indicates the channel No. where the error occurred.

3.6.5 HOLD/CLEAR setting (Address RWwm+9, RWwm+B)

(1) Set HOLD/CLEAR to each channel.

(2) Operation is performed according to the setting made for the leading edges of initial data setting request flag (RY(n+9)).

(3) The default settings are CLERA for all channels.

b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0
								CH.8	CH.7	CH.6	CH.5	CH.4	CH.3	CH.2	CH.1

Ignored

0: CLEAR
1: HOLD

3.6.6 CH.□ check code (Addresses RWrn to RWrn+7)

(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).

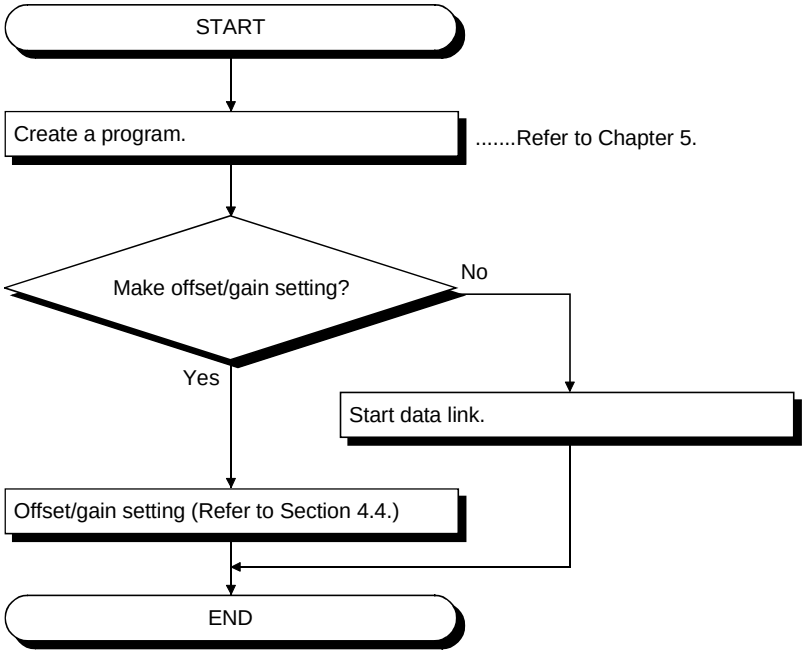
3.6.7 Error code (Address RWrn+8)

If an error occurs (the RUN LED flickers) when data is written to the AJ65VBTCU-68DAV, the corresponding error code is stored into the remote register (address RWrn+8) of the AJ65VBTCU-68DAV.
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 AJ65VBTCU-68DAV.



4.2 Precautions When Handling

The precautions when handling the AJ65VBTCU-68DAV are described below:

⚠CAUTION

- Do not touch the pins 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.

⚠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 securely fix it with the CC-Link connector type fitting.
  Not doing so can cause a drop or malfunction.
- 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) 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 C 2812)
    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.

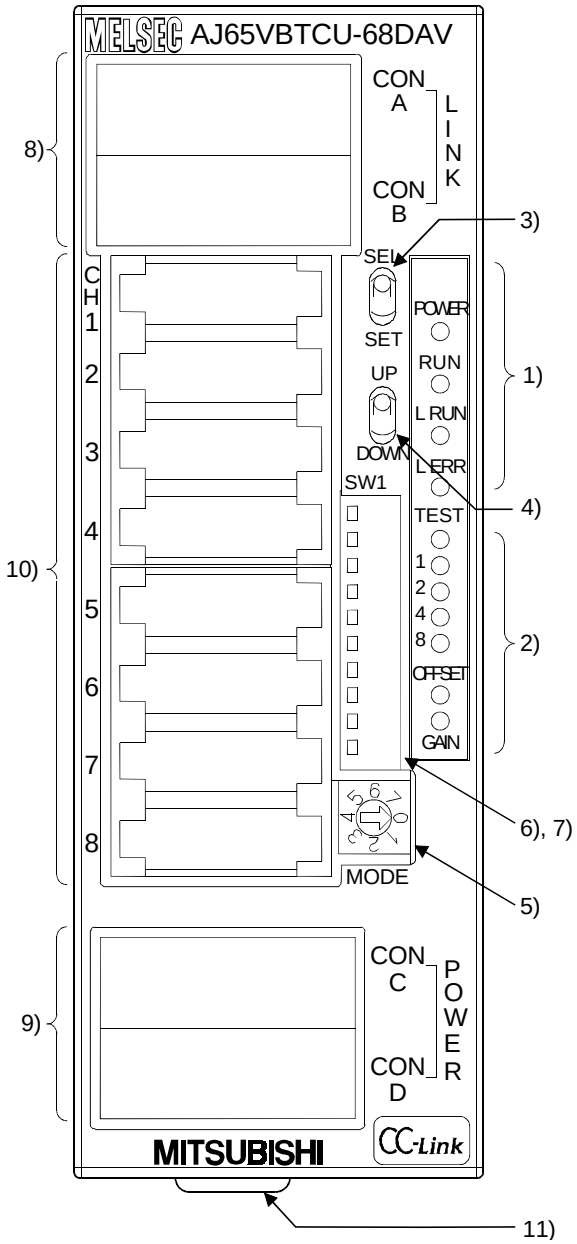
(2) As the CC-Link connector type metal installation fitting, use the narrow-width type (width 41)-dedicated fitting.
  (a) CC-Link connector type metal installation fitting model
    A6PLT-J65V1

(3) Refer to the Master Module user's manual for the name, specification, and manufacturers of supported cables for the use with AJ65VBTCU-68DAV.

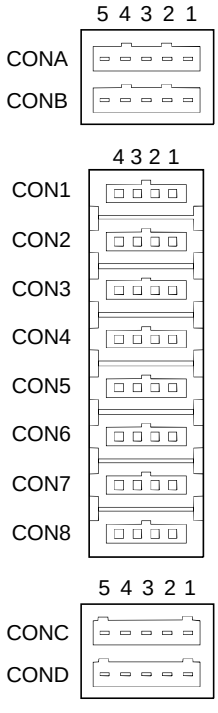
4 - 2

4.3 Name of Each Part

The name of each part in the AJ65VBTCU-68DAV is shown.

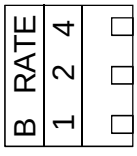


[Pin layout and signals name]

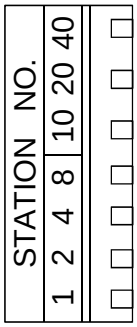


A module view from the top

Pin arrangement	Pin No.		Signal name
	CONA, B	1	DA
		2	DB
		3	DG
		4	NC
		5	SLD
	CON1	1	CH1 V+
		2	NC
		3	CH1 COM
		4	NC
	CON2	1	CH2 V+
		2	NC
		3	CH2 COM
		4	NC
	CON3	1	CH3 V+
		2	NC
		3	CH3 COM
		4	NC
	CON4	1	CH4 V+
		2	NC
		3	CH4 COM
		4	NC
	CON5	1	CH5 V+
		2	NC
		3	CH5 COM
		4	NC
	CON6	1	CH6 V+
		2	NC
		3	CH6 COM
		4	NC
	CON7	1	CH7 V+
		2	NC
		3	CH7 COM
		4	NC
	CON8	1	CH8 V+
		2	NC
		3	CH8 COM
		4	NC
	CONC, D	1	FG
		2	+24V(UNIT)
		3	24G(UNIT)
		4	NC
		5	NC

<table>
<tr><th>Number</th><th>Name and appearance</th><th colspan="4">Description</th></tr>
<tr><td rowspan="5">1)</td><td rowspan="5">Operation status display LED</td><td>POWER LED</td><td colspan="3">ON : Power supply on
OFF : Power supply off</td></tr>
<tr><td rowspan="2">RUN LED</td><td>Normal mode</td><td colspan="2">On : Normal operation
Flashing : 0.1s intervals indicate an output range setting error, mode select switch setting error.
0.5s intervals indicate a digital value setting error.
Off :24VDC power supply shutoff or watchdog timer error occurred.</td></tr>
<tr><td>Test mode</td><td colspan="2">On : Indicate that the SELECT/SET switch is in the SET position.
Flashing : 0.5s intervals: An attempt was made to make setting outside the setting range at the time of offset/gain setting.
Off : Indicates that the SELECT/SET switch is in the SELECT or center position.</td></tr>
<tr><td>L RUN LED</td><td colspan="3">On : Normal communication
Off : Communication cutoff (time expiration error)</td></tr>
<tr><td>L ERR. LED</td><td colspan="3">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 terminating resistor or the module or CC-Link dedicated cable is affected by noise.
Off : Indicates normal communications.</td></tr>
<tr><td rowspan="2">2)</td><td rowspan="2">Offset/gain adjusting LEDs</td><td rowspan="2">TEST
CH☐
OFFSET
GAIN</td><td>Normal mode</td><td colspan="2">Normally OFF.</td></tr>
<tr><td>Test mode</td><td colspan="2">TEST : ON
The OFFSET/GAIN/ CH☐ LEDs lit change every time the SELECT/SET switch is moved to SELECT. (Refer to section 4.4)</td></tr>
<tr><td>3)</td><td>SELECT/SET switch</td><td colspan="4">Used to make offset/gain setting in the test mode.</td></tr>
<tr><td>4)</td><td>UP/DOWN switch</td><td colspan="4">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>Mode select switch</td><td colspan="4">0: Normal mode
1: Test mode (user range setting 1)
2: Test mode (user range setting 2)
3 to 7: Must not be used</td></tr>
<tr><td>6)</td><td>Transmission speed setting switches
  </td><td colspan="4">
<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.
Confirm the transmission speed setting switch numbers on the seal located on the side face of the connector for analog I/O.</td></tr>
</table>

4 - 4

<table>
<tr><th>Number</th><th>Name and appearance</th><th>Description</th></tr>
<tr><td>7)</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>
Confirm the station number setting switch numbers on the seal located on the side face of the connector for analog I/O.
</td></tr>
<tr><td>8)</td><td>One-touch connector for communication</td><td>A one-touch connector for connection of the communication line
When carrying out wiring, connect two optional one-touch connector plugs for communication at top and bottom.</td></tr>
<tr><td>9)</td><td>One-touch connector for power supply and FG</td><td>A one-touch connector for connection of the module power supply line and FG
When carrying out jumper wiring, connect two optional one-touch connector plugs for power supply/FG at top and bottom.</td></tr>
<tr><td>10)</td><td>One-touch connector for analog I/O</td><td>One-touch connector for analog I/O
Connect a one-touch connector plug when wiring.</td></tr>
<tr><td>11)</td><td>DIN rail hook</td><td>Used to mount the module to the DIN rail.</td></tr>
</table>

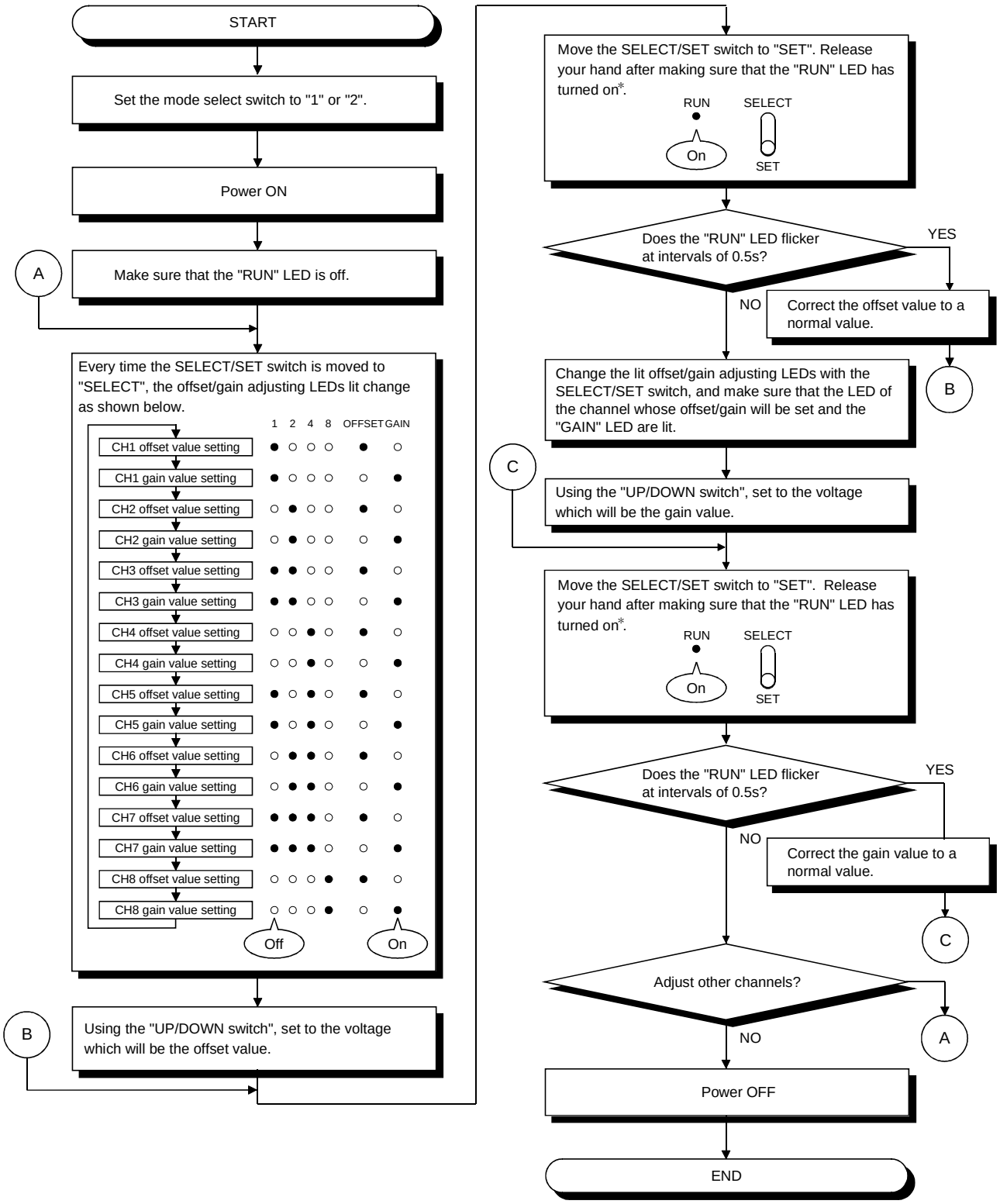
POINT

After power-on, do not change the mode select switch setting.If you change it midway during operation, the setting at power-on is valid.

4 - 5

4.4 Offset/Gain Setting

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



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

POINT

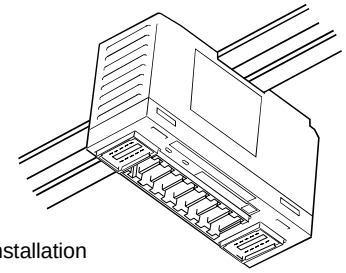
(1) Set the offset and gain values in the actual usage state.
(2) The offset and gain values are stored on E^2PROM in the AJ65VBTCU-68DAV and are not cleared at power-off.
(3) Make offset/gain setting within the range indicated in POINT of Section 3.3.1 and Section 3.3.2. If setting is made outside this range, the maximum resolution/accuracy may not fall within the performance specifications range.
(4) When making offset/gain setting (in the test mode), set the mode select switch to ”1” or ”2”.
If the switch has been set to any unusable number, an error occurs and the "RUN" LED flickers at intervals of 0.1s.

4.5 Section Number Setting

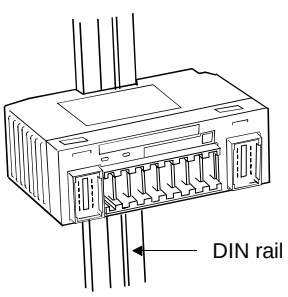
The station number setting of the AJ65VBTCU-68DAV determines the buffer memory addresses of the master module where the remote I/O signals and read/write data are stored.
For details, refer to the user's manual of the master module used.

4.6 Facing Direction of the Module Installation

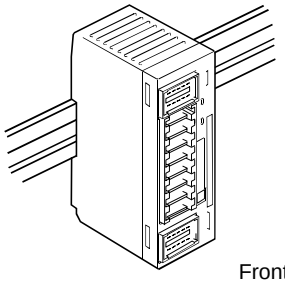
The AJ65VBTCU-68DAV module may be installed in any of six orientations using a DIN rail or CC-Link connector type fitting.
(There are no restrictions on the facing directions.)

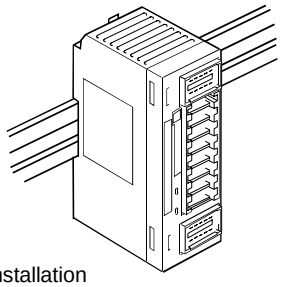


Ceilling installation

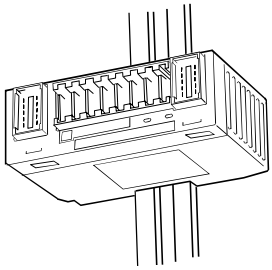


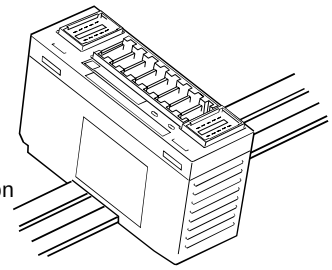
DIN rail





Front installation





Flat installation

4 - 8

4.7 Data Link Cable Wiring

This section explains the wiring of the CC-Link dedicated cable used for connection of the AJ65VBTCU-68DAV and master module.

4.7.1 Instructions for handling the CC-Link dedicated cables

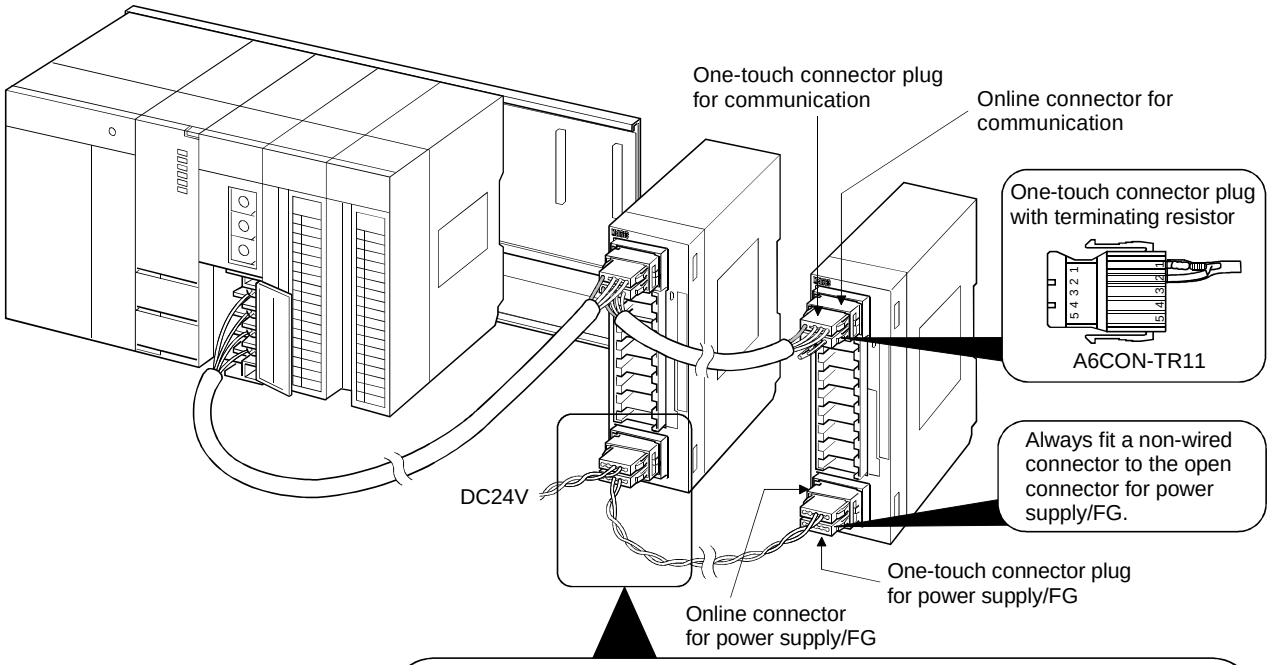
Do not handle the CC-Link dedicated cables roughly as described below. Doing so can damage the cables.

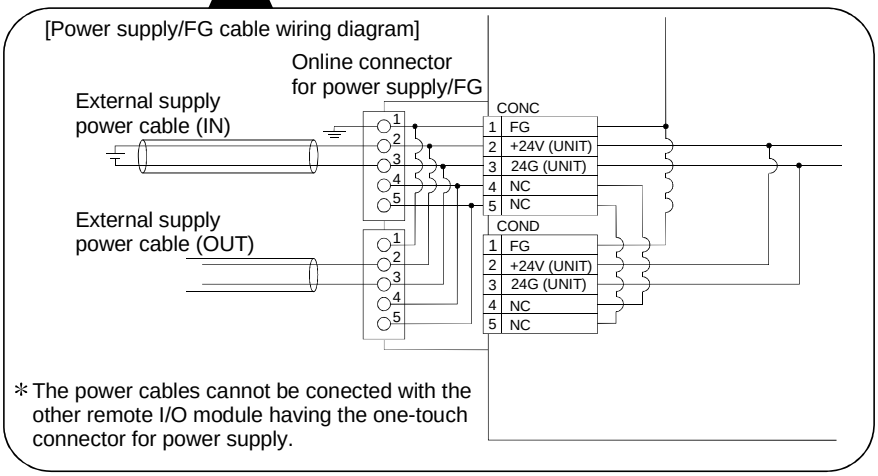
- Compact with a sharp object.
- Twist the cable excessively.
- Pull the cable hard. (more than the permitted elasticity.)
- Step on the cable.
- Place an object on the top.
- Scratch the cable's protective layer.

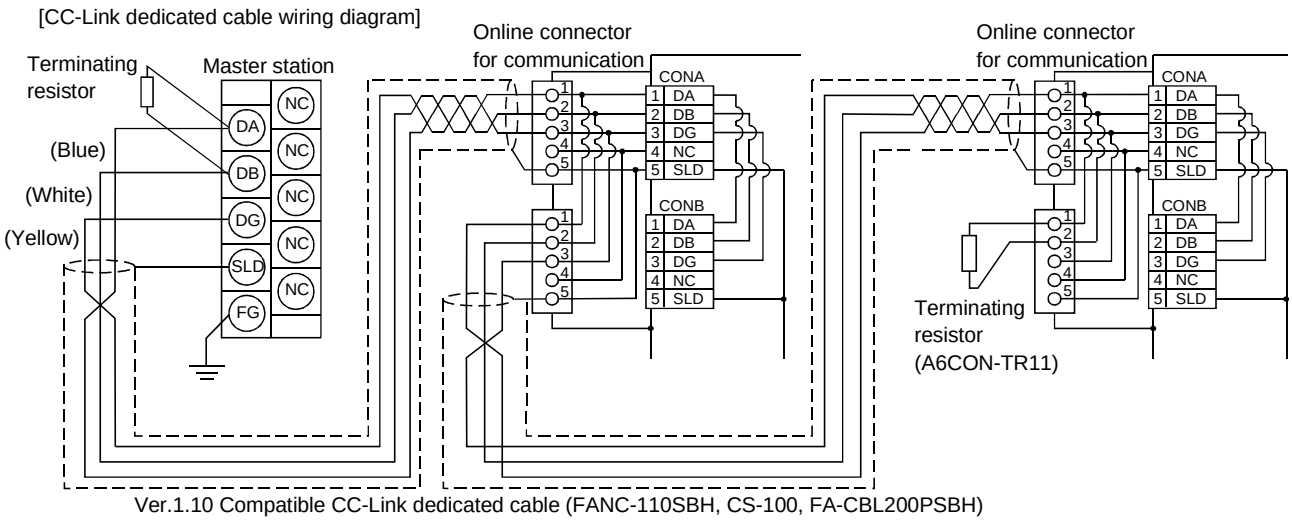
4 - 9

4.7.2 Connection of the CC-Link dedicated cables

Connect the CC-Link dedicated cable between the AJ65VBTCU-68DAV and master module as shown below.







Ver.1.10 Compatible CC-Link dedicated cable (FANC-110SBH, CS-100, FA-CBL200PSBH)

POINT
• On this unit, use the Ver. 1.10-compatible CC-Link dedicated cable (FANC-110SBH, CS-110, FA-CBL200PSBH). You cannot use the Ver. 1.10-compatible CC-Link dedicated cables of other than the above types, CC-Link dedicated cables and CC-Link dedicated, high-performance cables. • The shield cable of the CC-Link dedicated cable should be connected to "SLD" in each module, and both ends should be grounded through "FG". SLD and FG are connected inside the module.

4.8 Wiring

This section provides the instructions for wiring the AJ65VBTCU-68DAV and its wiring with external equipment.

4.8.1 Wiring precautions

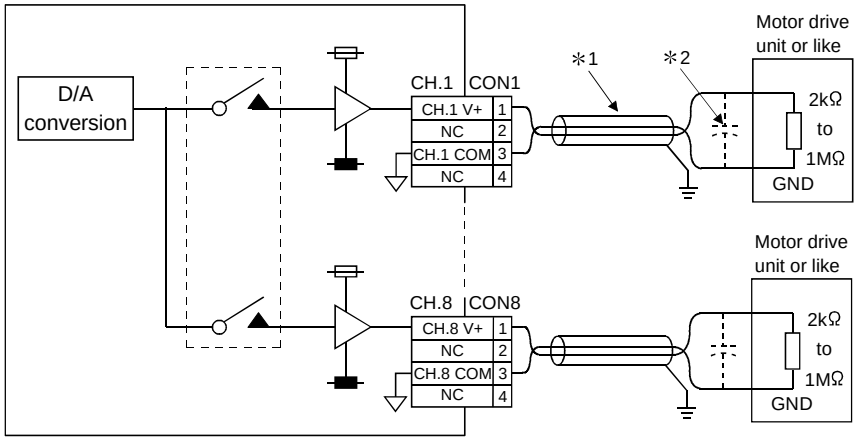
To obtain maximum performance from the functions of AJ65VBTCU-68DAV and improve the system reliability, an external wiring with high durability against noise is required.
The precautions when performing external wiring are as follows:

(1) Use separate cables for the AC and AJ65VBTCU-68DAV 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 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

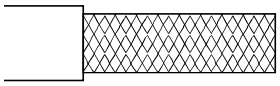
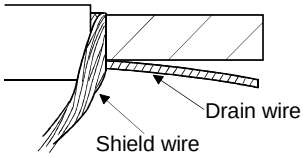
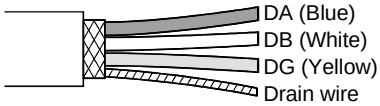
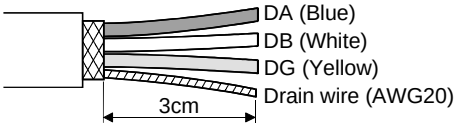
- D/A conversion values are fluctuated by self-heating within approx. 30 minutes after power is turned ON.
- Do not insert the one-touch connector plug for I/O of the one-touch connector type/connector type compact remote I/O unit into the one-touch connector for analog I/O accidentally.
  Doing so can cause the module to be damaged.

4.9 How to Wire the One-Touch Connector Plug

This section describes the way to wire the one-touch connector plug.
Refer to section 2.4 for more information on the types and specifications of the one-touch connector plugs which conform to the AJ65VBTCU-68DAV.

(1) Cable termination work

Do the following work on the cable terminations of the communication and analog input cables that are inserted into the one-touch connector plugs.

<table>
<tr><th colspan="2">Communication Cable Termination Work</th></tr>
<tr><td>1. Cut the sheath.
  </td><td>2. Separate the shield and drain wire and cut the shield.
 
</td></tr>
<tr><td>3. Cut the aluminum tape and intervening cord.
 
</td><td>4. Straighten out the drain wire and twist it from the root.
(3cm seven or more times)
 
</td></tr>
</table>

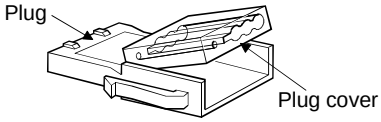
POINT

- Where possible, round the tip that was cut with nippers or like.
  If the section of the cable to be inserted is not round, the cable may be caught at any point and not go far enough.
- Do insulation work as necessary on the area of the shield that will not be inserted into the one-touch connector plug.

4 - 13

(2) Checking the plug cover

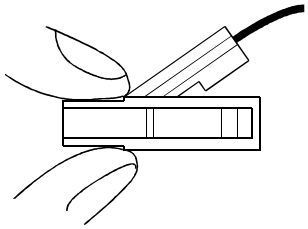
Check whether the plug cover is installed in the plug.



Caution: Before inserting the cable, do not push the plug cover into the plug. Once insulation-displaced, the plug cannot be reused.

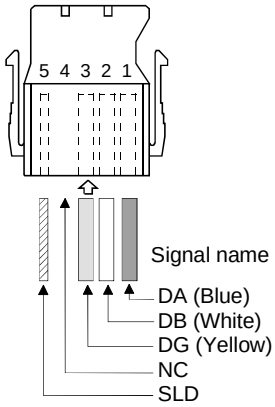
(3) Inserting the cable

Lift the back of the plug cover and insert the cable until it makes contact with the plug.

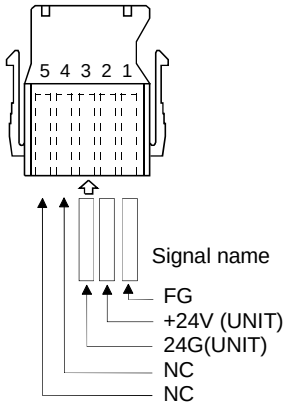


Insert the signal cables into the one-touch connector plug as shown below.

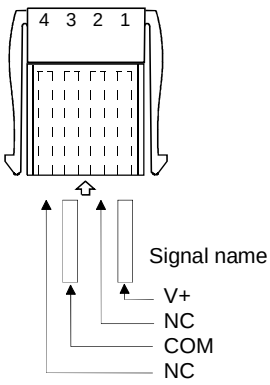
<For communication>



<For power supply/FG>



<For analog input>



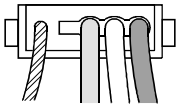
POINT

- Insert the cables far enough.
  Not doing so can cause an insulation displacement fault.
- The cable inserted may come out of the cover front.
  At this time, pull it back until the cable tip goes back into the plug cover.

4 - 14

(4) Insulation displacement of plug cover

Using pliers or like, push the plug cover into the plug to insulation-displace it. After insulation displacement, make sure that the plug cover is securely installed in the plug as shown below.



POINT
• The plug cover and plug latches may not engage at the time of insulation displacement, raising the cover. Since the plug cover has not been insulation-displaced sufficiently in this state, push the cover into the plug until it is installed securely.

4.10 Maintenance and Inspection

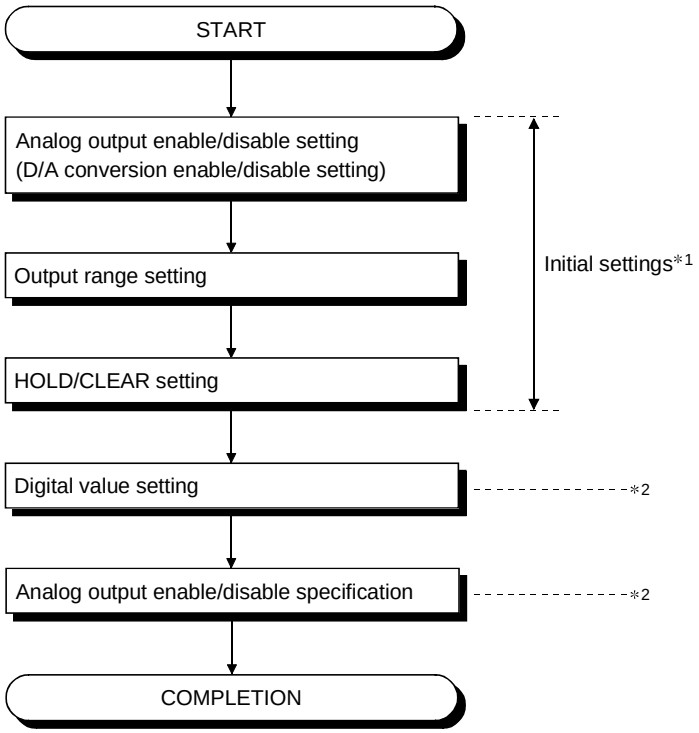
There are no special inspection items for the AJ65VBTCU-68DAV module, but follow the inspections items describes in the PLC CPU User's Manual so that the system can always be used in the best condition.

5 PROGRAMMING

The programming procedure, basic read/write programs, and program examples for the AJ65VBTCU-68DAV are described.
When utilizing the program example introduced in this chapter for an actual system, fully verify that there are no problems in controllability in the target system.
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 Programming Manual (Dedicated Instructions) for details of the dedicated instructions.

5.1 Programming Procedure

Create programs for executing the digital-analog conversion of the AJ65VBTCU-68DAV in the following procedure.

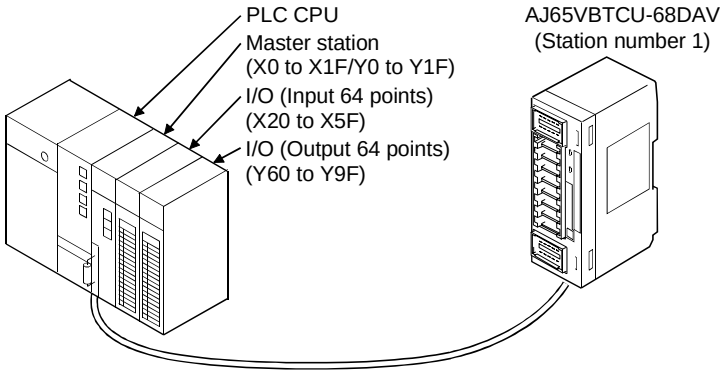


*1 When using the QCPU (Q mode), you can use the remote device station initialization procedure registration function to make settings. When using the ACPU, QCPU (A mode) or QnACPU, use the sequence program to make settings.
*2 The remote device station initialization procedure registration function cannot be used to make settings.
Use the sequence program to make settings.

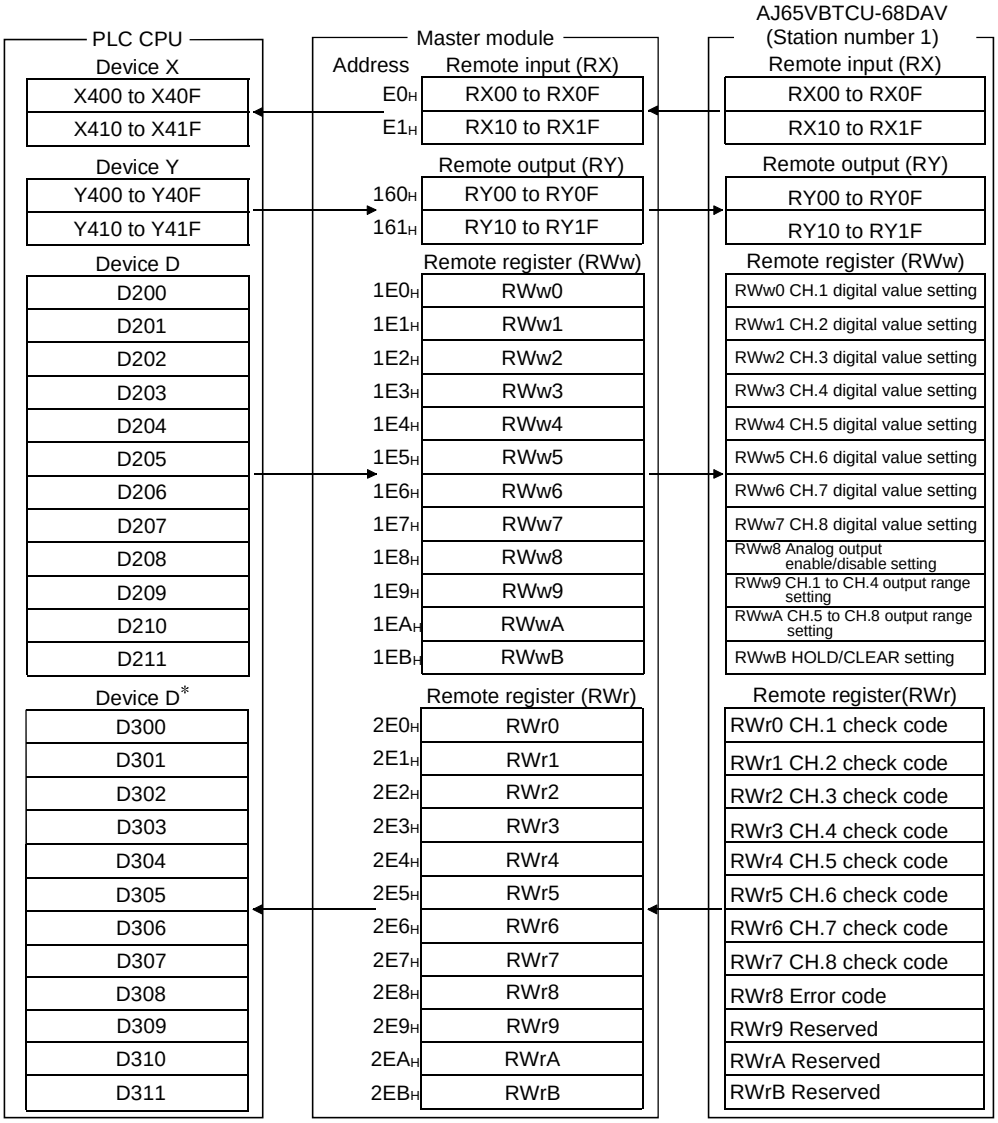
5.2 Conditions of Program Example

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

(1) System configuration



(2) Relationships between PLC CPU, master module and AJ65VBTCU-68DAV



*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 RWr8 are assigned to D456 to D464.

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 A1SCPU, for example, devices X100, Y100 and later are unusable. Use such devices as B and M.

(3) Initial settings

Setting Item	Settings
Analog output enable/disable setting (RWw2)	Channels 1, 2: enable
CH. 1 to CH. 4 output range setting (RWw9)	Channel 1: 0 to 5V Channel 2: user range setting 1
HOLD/CLEAR setting (RWwB)	Channels 1, 2: CLEAR

(3) Other settings

Setting Item	Settings
CH.1 digital value (RWw0)	500
CH.2 digital value (RWw1)	1000
CH.1 analog output enable/disable frag (RY00)	Enable
CH.2 analog output enable/disable frag (RY01)	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	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 3	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	Online (Remote net mode)
All connect count	1
Remote input(RX)	X400
Remote output(RY)	Y400
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

(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		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 AJ65VBTCU-68DAV.

Procedure Execution Condition	Execution
Initial data processing request flag (RX18) turns on	Analog output enable/disable setting: channenls 1, 2: enable (RWw8 :00FCH)
	CH.1 to CH.4 output range setting : channel 1: 0 to 5V : channel 2: user range setting 1 (RWw9: 0031H)
	HOLD/CLEAR setting: channenls 1, 2: CLEAR (RWwB: 0 H)
	Initial data processing completion 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 completion flag (RY18) is turned off.
Initial data setting completion flag (RX19) turns on	Initial data setting request flag (RY19) is turned 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 to RYn7)" in the sequence program.

(2) When the initial setting (analog output enable/disable setting (RWwm+8), CH. □ output range setting (RWwm+9, RWwm+A) or HOLD/CLEAR setting (RWwm+B) has been changed, the remote device station initialization procedure registration function cannot be used.
Change the initial setting in the sequence program.

(c) Setting results

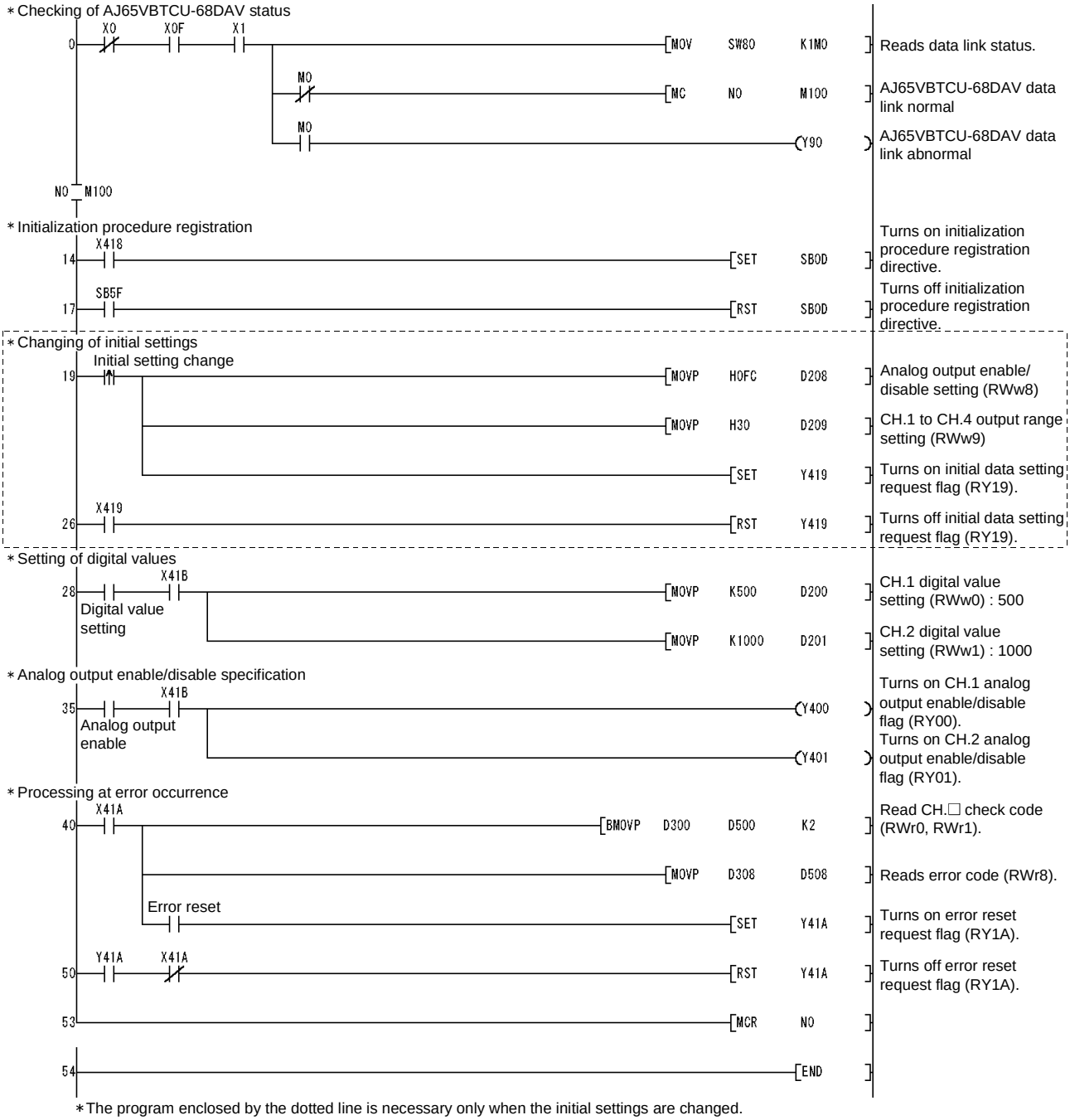
The setting results are shown below.

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

Input format: HEX.

Execute Flag	Operational condition	Executional condition: Condition Device	Device Number	Execute Condition	Details of execution: Write Device	Device Number	Write Data
Execute	Set new	RX	18	ON	RWw	08	00FC
Execute	Same as prev.set	RX	18	ON	RWw	09	0031
Execute	Same as prev.set	RX	18	ON	RWw	0B	0000
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

(3) Program example



*The program enclosed by the dotted line 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 3	No setting			

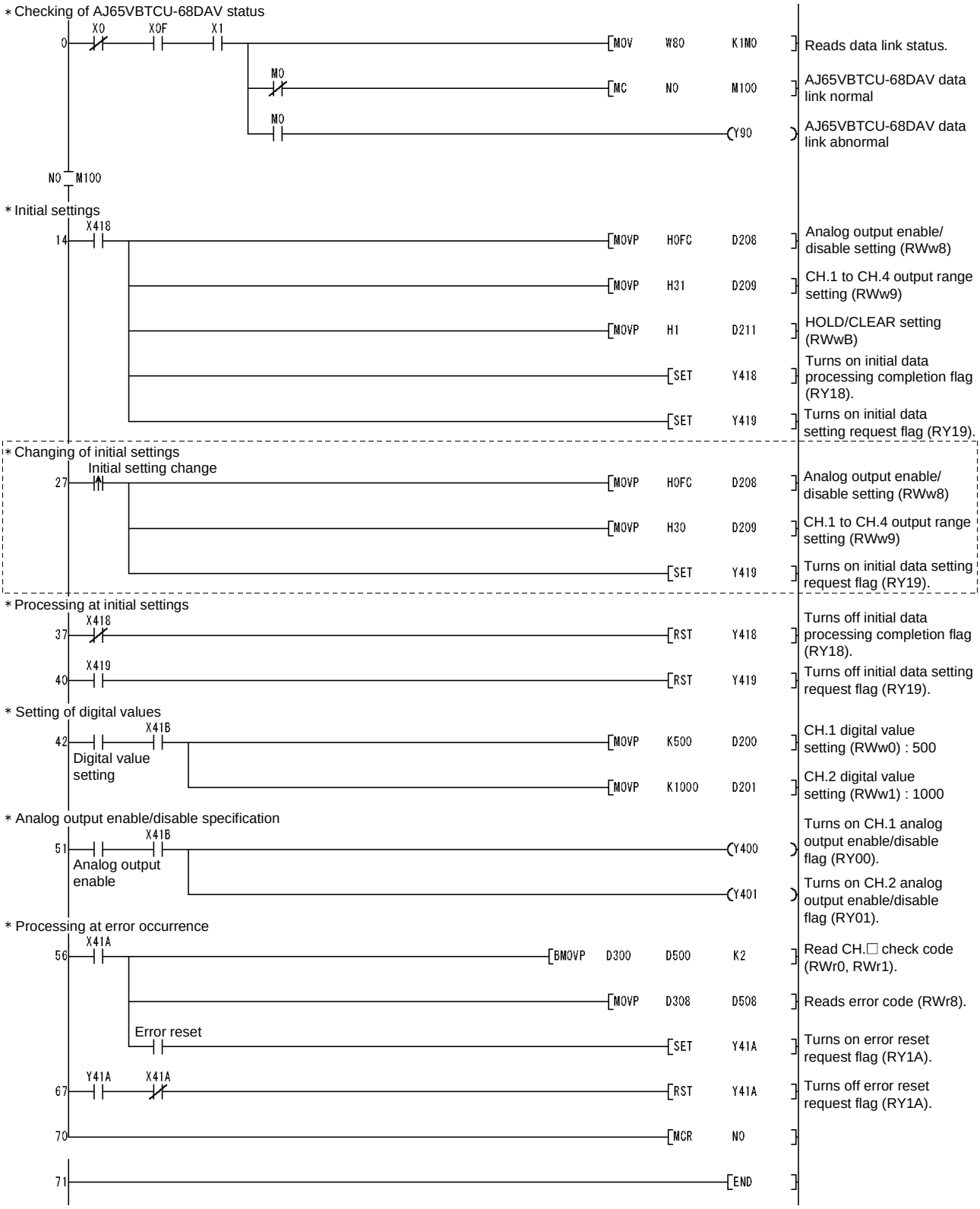
(b) Automatic refresh parameter setting

	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

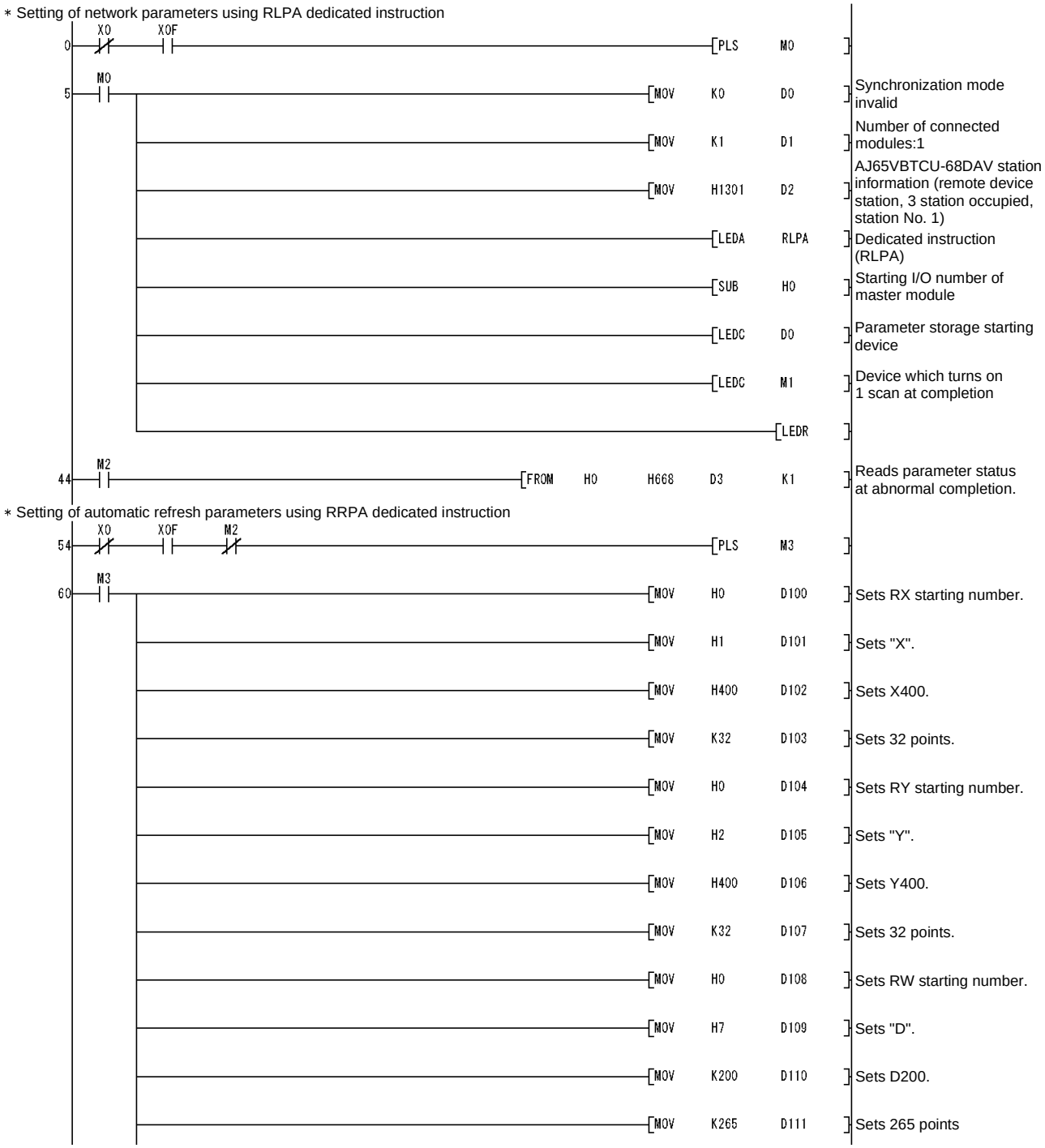


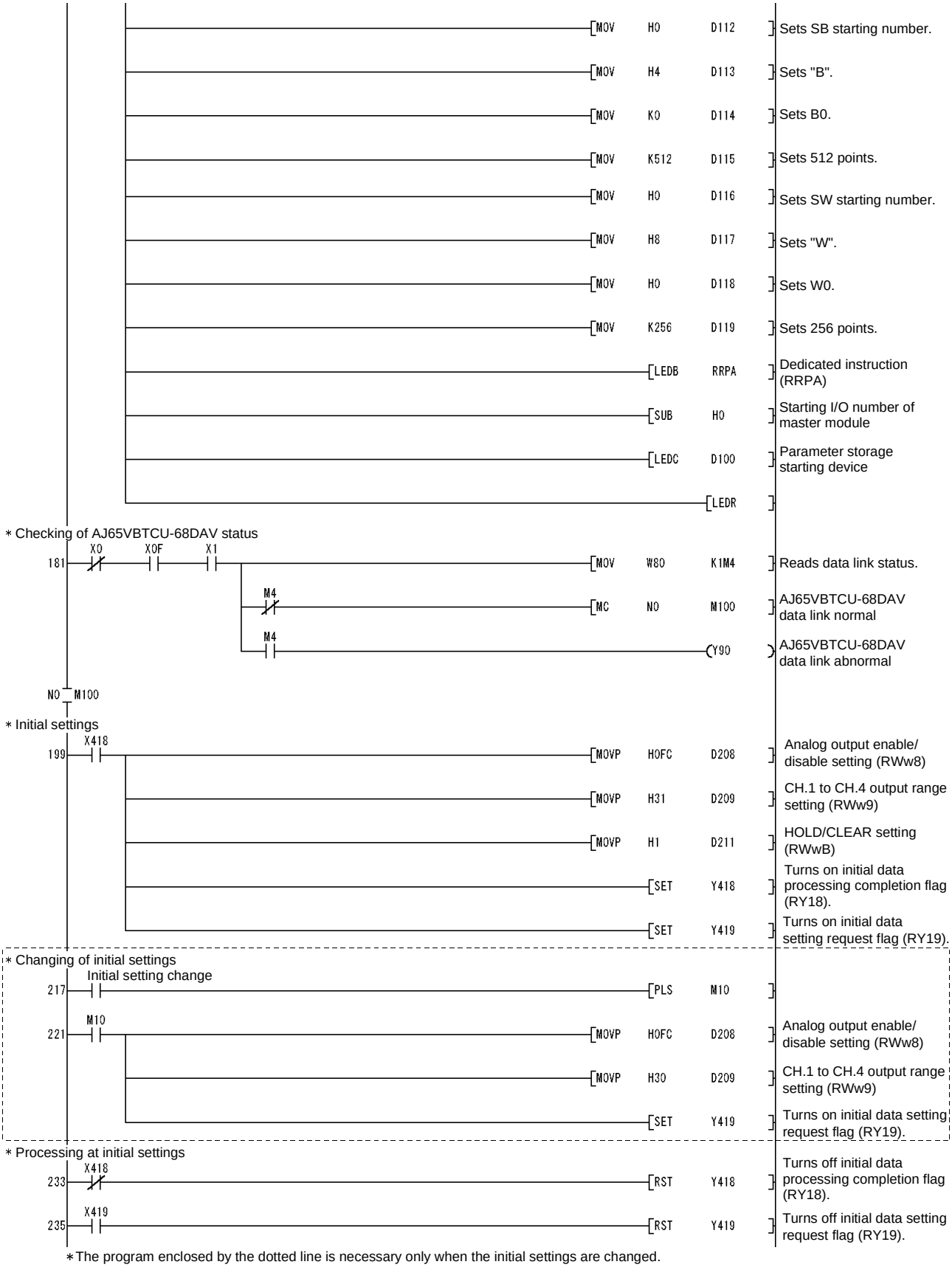
*The program enclosed by the dotted line is necessary only when the initial settings are changed.

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

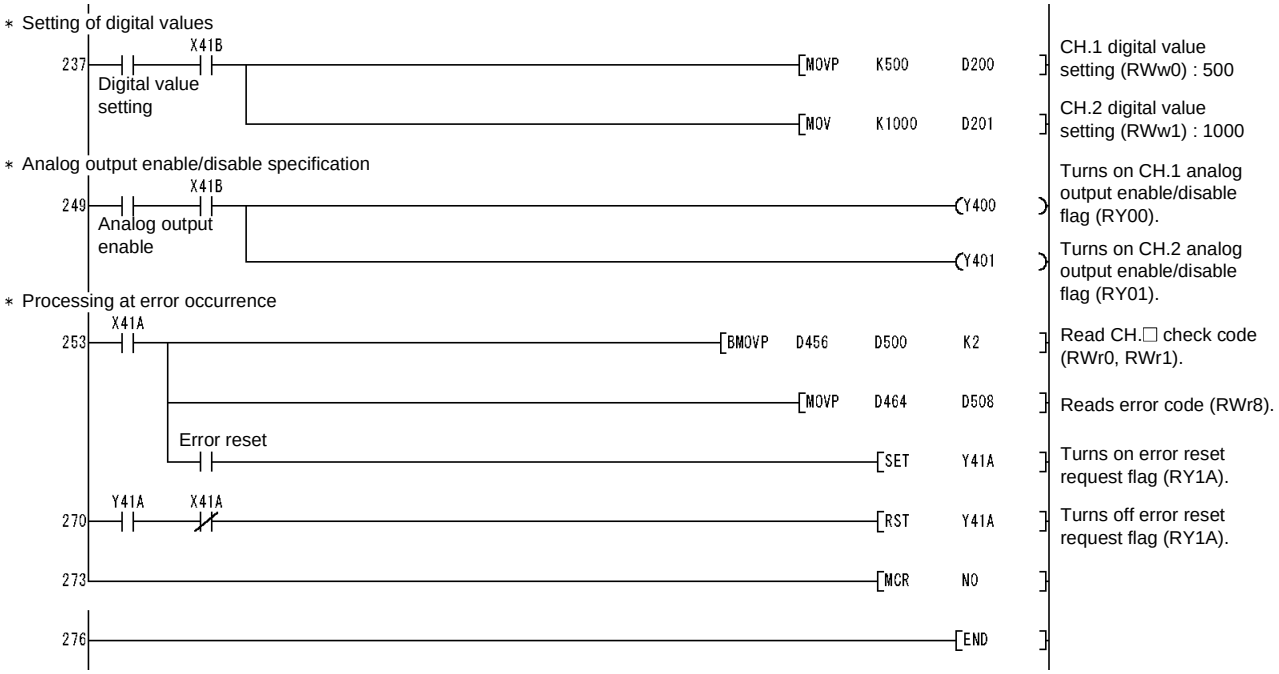
A sequence program is used to set the network and automatic refresh parameters.

(1) Program example





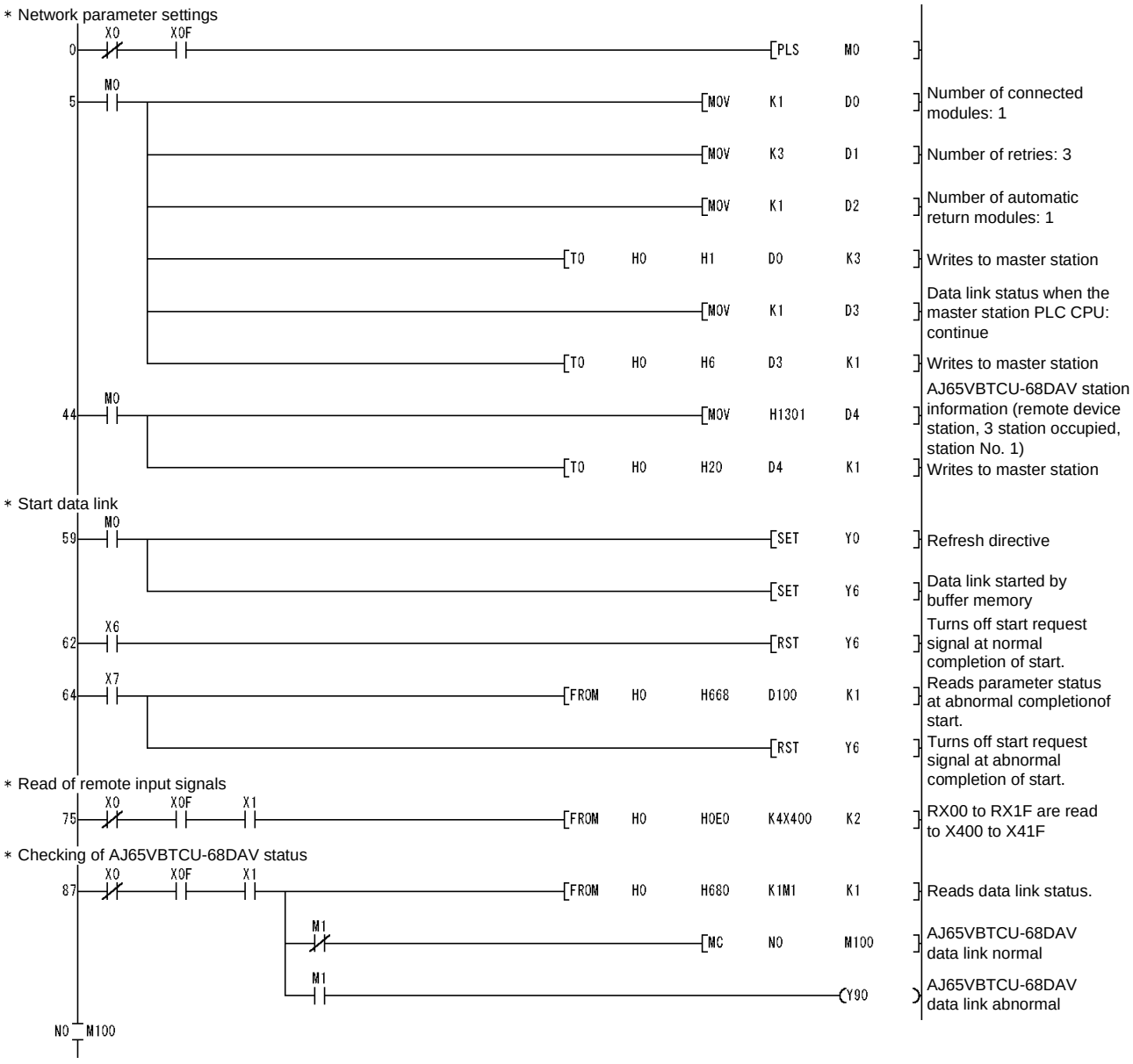
* The program enclosed by the dotted line is necessary only when the initial settings are changed.

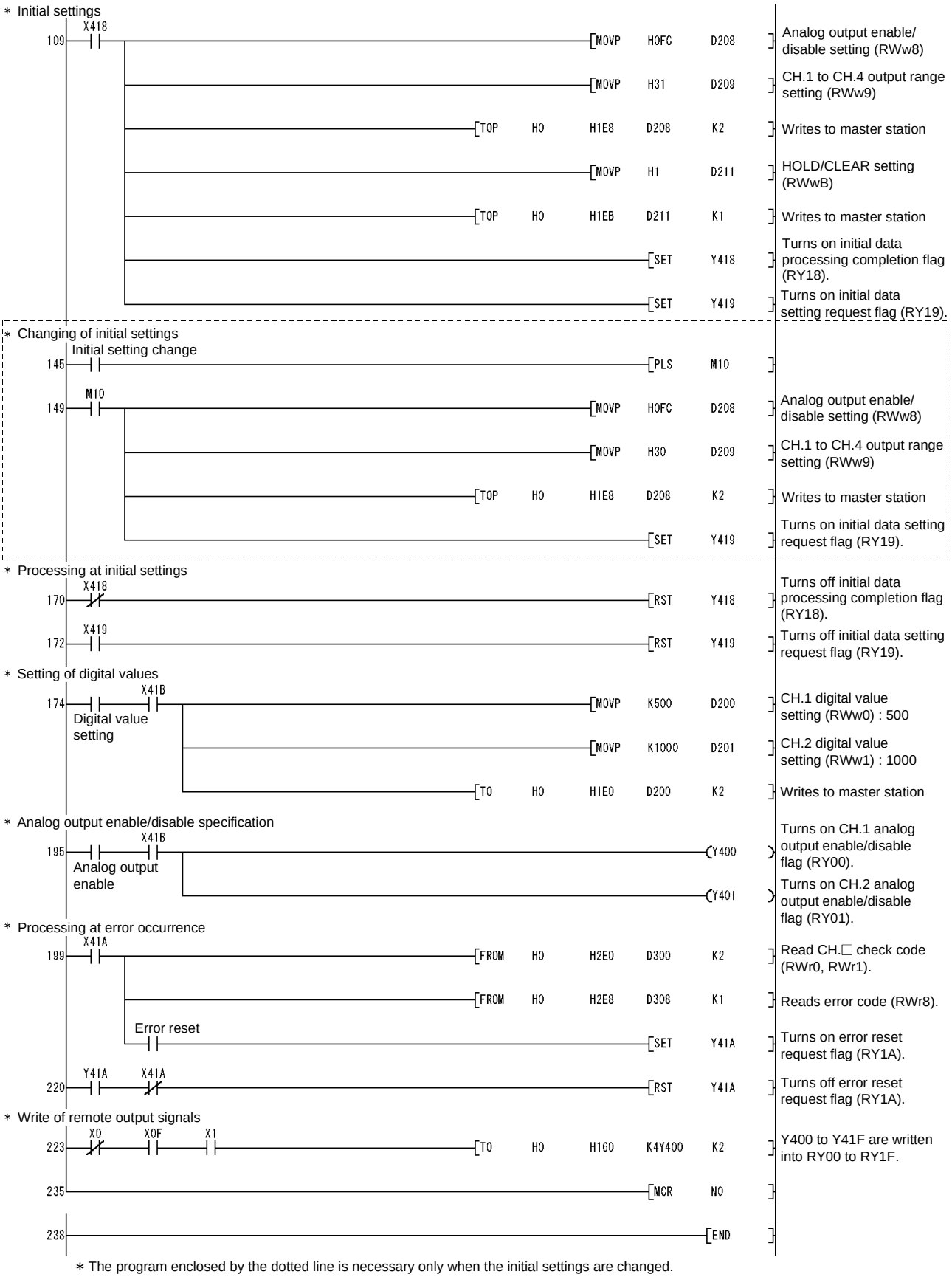

∗ Setting of digital values
X41B
237
Digital value setting
MOVP K500 D200
MOV K1000 D201
CH.1 digital value setting (RWw0) : 500
CH.2 digital value setting (RWw1) : 1000
∗ Analog output enable/disable specification
X41B
249
Analog output enable
Y400
Y401
Turns on CH.1 analog output enable/disable flag (RY00).
Turns on CH.2 analog output enable/disable flag (RY01).
∗ Processing at error occurrence
X41A
253
BMOVP D456 D500 K2
MOVP D464 D508
Error reset
SET Y41A
Y41A X41A
270
RST Y41A
273
MCR NO
276
END
Read CH.□ check code (RWr0, RWr1).
Reads error code (RWr8).
Turns on error reset request flag (RY1A).
Turns off error reset request flag (RY1A).

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

A sequence program is used to set the network parameters.

(1) Program example





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

6 TROUBLESHOOTING

The details of the errors which may occur when using the AJ65VBTCU-68DAV 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 (AJ65VBTCU-68DAV "RUN" LED flashes), the error code is stored to the AJ65VBTCU-68DAV remote register RWrn+8.

Table 6.1 Error Code List (Errors Detected by AJ65VBTCU-68DAV)

Error Code (Hexadecimal).	Cause	Corrective Action
11□	The set digital value is outside the setting range.	Correct the digital value to within the setting range.
20□	The output range setting is outside the setting range.	Correct the output range setting to within the setting range.

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 AJ65VBTCU-68DAV.
Refer to the PLC CPU and master module user's manual for issues regarding the PLC CPU and master module.

(1) When the AJ65VBTCU-68DAV "POWER" 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 AJ65VBTCU-68DAV "RUN" LED flickers

Check item	Corrective action
Is the LED flickering at 0.1s intervals in the normal mode?	1. Check that the mode select switch is in the position other than 0. 2. Using the error code (RWrn+8), check the channel at which the output range setting error has occurred. 3. Make correction to the sequence program or GX Developer setting.
Is the LED flickering at 0.5s intervals in the normal mode?	1. Using the error code (RWrn+8), check the channel at which the digital value setting error has occurred. 2. Check the check code (RWrn to RWrn+7) of the channel at which the error has occurred. 3. Make correction to the sequence program.
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 AJ65VBTCU-68DAV "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 AJ65VBTCU-68DAV 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.

(4) When the AJ65VBTCU-68DAV "L RUN" LED is off
Communications are broken.
For details, refer to troubleshooting in the user's manual of the master module used.

6 - 2

(5) When the AJ65VBTCU-68DAV "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.

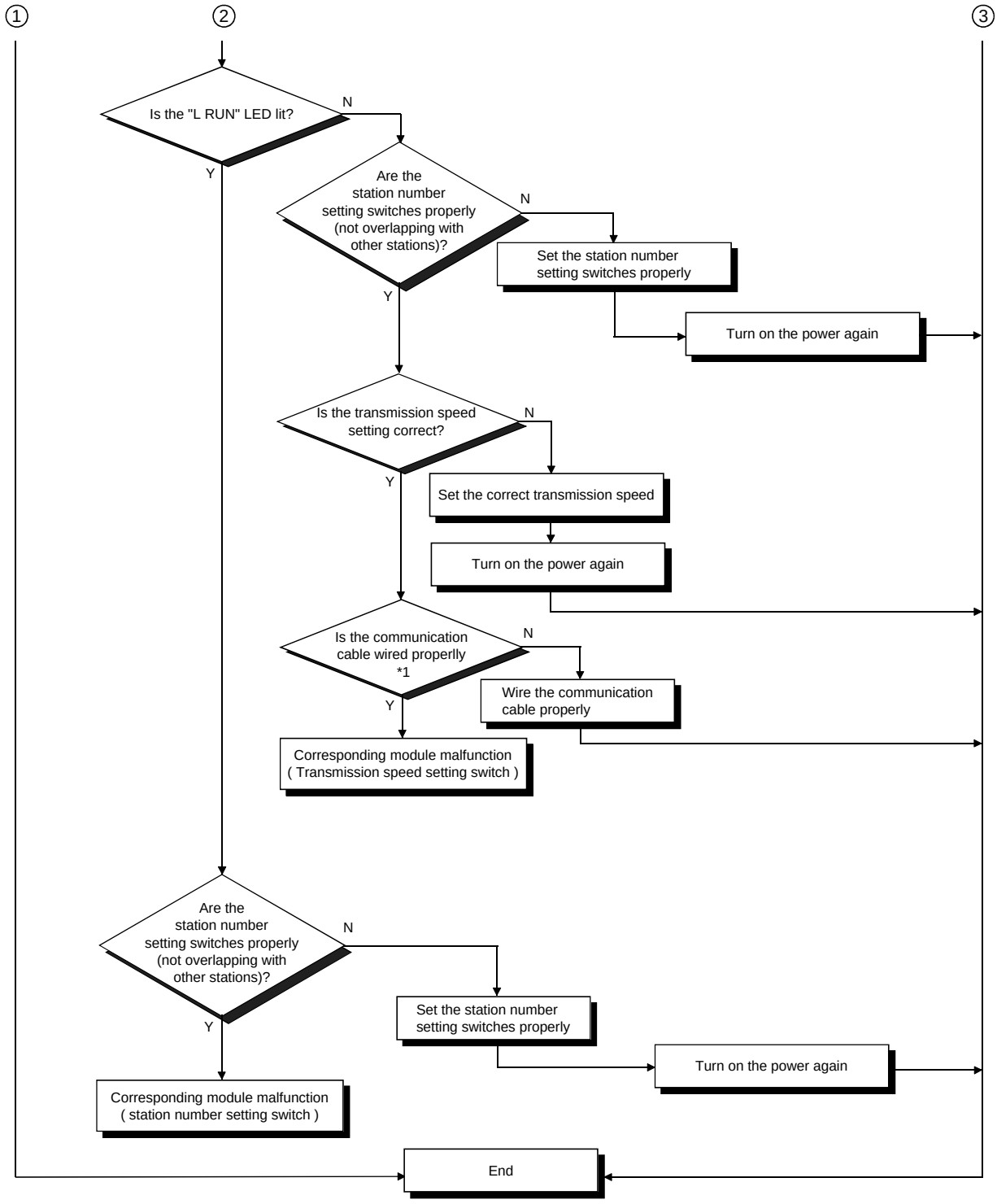
(6) When the AJ65VBTCU-68DAV "L ERR." LED flickers at unfixed intervals

Check item	Corrective action
Have you forgotten fitting the terminating resistor?	Check whether the terminating resistor is fitted. If it is not connected, connect it and switch power on again.
Is the module or 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 AJ65VBTCU-68DAV "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.

APPENDIX

Appendix1 Comparison between This Product and AJ65SBT-62DA

(1) Comparison in performance between this product and conventional product
The following table gives performance comparison between the AJ65VBTCU-68DAV and AJ65SBT-62DA.

Performance Comparison between AJ65VBTCU-68DAV and AJ65SBT-62DA

<table>
<tr><td rowspan="3" colspan="2">Item</td><td colspan="3">Specifications</td></tr>
<tr><td rowspan="2">AJ65VBTCU-68DAV</td><td colspan="2">AJ65SBT-62DA</td></tr>
<tr><td>Voltage output</td><td>Current output</td></tr>
<tr><td colspan="2">Digital input</td><td>-4096 to +4095</td><td>-4096 to +4095</td><td>0 to 4095</td></tr>
<tr><td colspan="2">Analog output</td><td>Voltage: -10 to +10VDC
(external load resistance: 2kΩ to 1MΩ)</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></tr>
<tr><td colspan="2">I/O characteristics
Maximum resolution</td><td colspan="3"><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="2">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>1.0mV</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 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="2">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>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></tr>
<tr><td colspan="2">Output range changing</td><td colspan="3">Yes</td></tr>
<tr><td colspan="2">Offset/gain setting</td><td colspan="3">Yes</td></tr>
<tr><td rowspan="2">Accuracy</td><td>Ambient temperature 0 to 55°C</td><td>±0.3%
(accuracy relative to maximum value of analog output value)</td><td colspan="2">±0.4%
(accuracy relative to maximum value of analog output value)</td></tr>
<tr><td>Ambient temperature 25 ± 5°C</td><td>±0.2%
(accuracy relative to maximum value of analog output value)</td><td colspan="2">±0.2%
(accuracy relative to maximum value of analog output value)</td></tr>
<tr><td colspan="2">Max. conversion speed</td><td colspan="3">1ms/1 channel</td></tr>
<tr><td colspan="2">Output short-circuit protection</td><td colspan="3">Yes</td></tr>
<tr><td colspan="2">Number of analog output points</td><td>8 channels/1 module</td><td colspan="2">2 channels/1 module</td></tr>
<tr><td colspan="2">Number of occupied I/O points</td><td>3 station occupied
(RX/RY: 32 points each, RWr/RWw: 12 points each)</td><td colspan="2">1 station occupied
(RX/RY: 32 points each, RWr/RWw: 4 points each)</td></tr>
<tr><td colspan="2">External wiring system</td><td>Dedicated one-touch connector</td><td colspan="2">Terminal block</td></tr>
<tr><td colspan="2">24VDC internal current consumption (A)</td><td>0.15</td><td colspan="2">0.16</td></tr>
<tr><td colspan="2">Weight (kg)</td><td>0.16</td><td colspan="2">0.20</td></tr>
<tr><td colspan="2">Outline dimensions (mm)</td><td>41(W) × 115(H) × 63(D)</td><td colspan="2">118(W) × 50(H) × 40(D)</td></tr>
</table>

App

App - 1

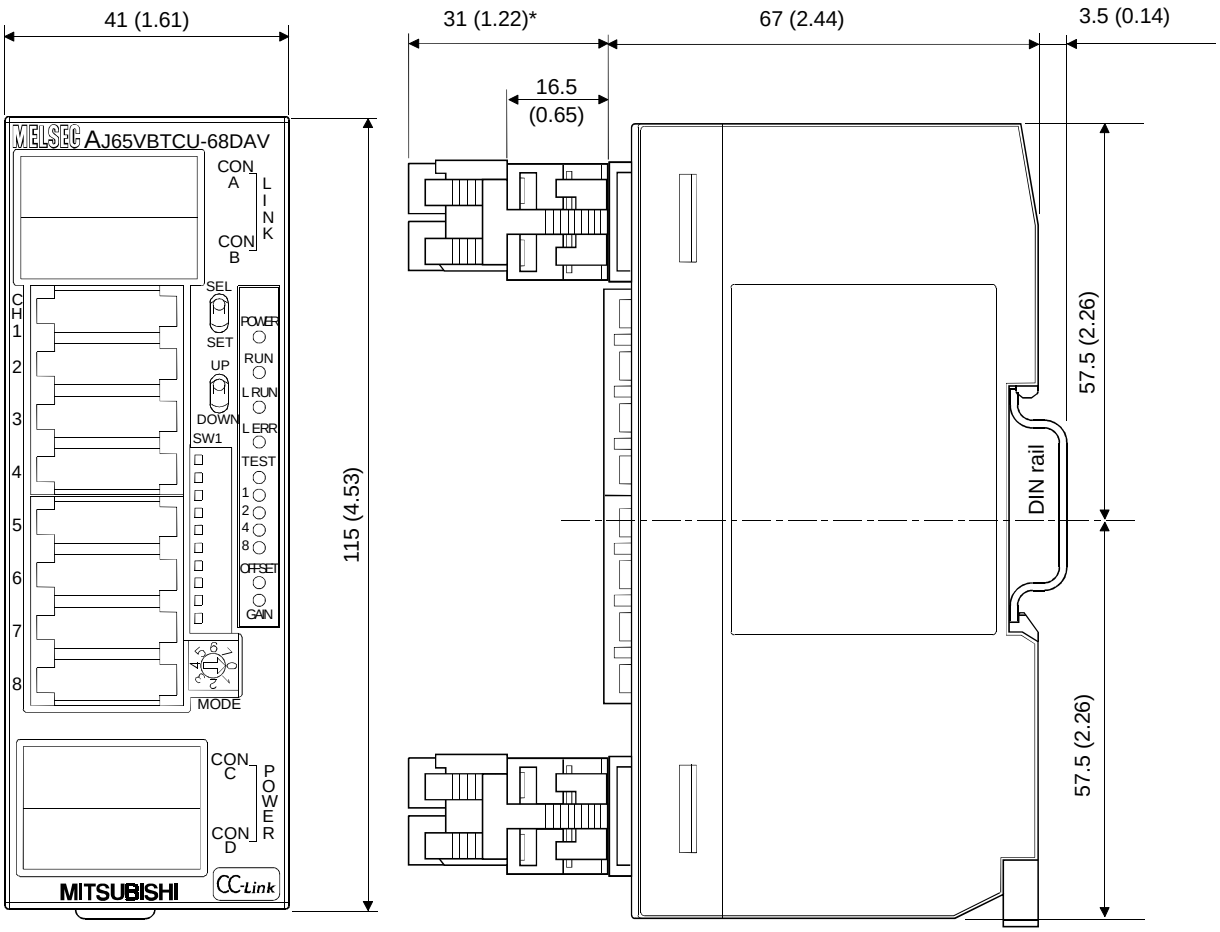
(2) Differences between AJ65VBTCU-68DAV and AJ65SBT-62DA

- Since the remote I/O signals, remote registers and so on differ, replacement cannot be made.
- The AJ65VBTCU-68DAV is a voltage output-dedicated model and cannot provide current outputs.

App - 2

Appendix2 External dimension diagram

The outline dimension drawing of the AJ65VBTCU-68DAV is shown below.



* :This section should be 14.5mm (0.57inch) when an online connector is not installed.

Unit : mm (inch)

App - 3

INDEX

Index - 1

Index - 2

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 AJ65VBTCU-68DAV

User's Manual

MODEL	AJ65V-68DA-U-SY-E
MODEL CODE	13JR42
SH(NA)-080182-B(0110)MEE	

MITSUBISHI ELECTRIC CORPORATION

HEAD OFFICE : 1-8-12, OFFICE TOWER Z 14F HARUMI CHUO-KU 104-6212,JAPAN
NAGOYA WORKS : 1-14 , YADA-MINAMI 5 , HIGASHI-KU, NAGOYA , JAPAN