



**MITSUBISHI  
ELECTRIC**

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# **CC-Link System Low Profile Waterproof Type Repeater Hub Module**

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User's Manual

## **AJ65FBTA-RPH**

Thank you for buying the general-purpose programmable controller MELSEC-A series.

Prior to use, please read both this manual and Related manual thoroughly and familiarize yourself with the product.



MODEL	AJ65FBT-RPH-U
MODEL CODE	13JP55
IB(NA)-0800288-G(1612)MEE	



## ●SAFETY PRECAUTIONS●

(Read these precautions before using.)

When using Mitsubishi equipment, thoroughly read this manual and the associated manuals introduced in this manual. Also pay careful attention to safety and handle the module properly.

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

In this manual, the safety precautions are classified into two levels:


" WARNING" and " CAUTION".

 **WARNING**

Indicates that incorrect handling may cause hazardous conditions, resulting in death or severe injury.

 **CAUTION**

Indicates that incorrect handling may cause hazardous conditions, resulting in minor or moderate injury or property damage.

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

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

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

## [Design Precautions]

### **WARNING**

- Input/output could be switched on or off when a problem occurs in the repeater module.  
So build an external monitoring circuit that will monitor any input/output signals that could cause a serious accident.

### **CAUTION**

- Use the module in an environment that meets the general specifications contained in this manual. Using this module in an environment outside the range of the general specifications could result in electric shock, fire, erroneous operation, and damage to or deterioration of the product.
- Do not install the control wires or communication cables together with the main circuit or power wires.  
Keep a distance of 100mm (3.94inch) or more between them.  
Not doing so could result in malfunctions due to noise.

## [Installation Precautions]

### **CAUTION**

- Do not directly touch the module's conductive parts.  
Doing so may cause malfunctions or failure of the module.
- Fix the module securely with screws. Tighten the screws securely within the specified torque range.  
Undertightening can cause a drop, short circuit or malfunction. Overtightening can cause a drop, short circuit or malfunction due to damage to the screw or module.

## [Wiring Precautions]

### **WARNING**

- Perform installation and wiring after disconnecting the externally supplied power used in the system at all phases externally.  
If the power is not disconnected at all phases an electric shock or product damage may result.

### **CAUTION**

- Always earth the FG terminal to the protective earth conductor. Otherwise there will be an electric shock or misoperation.
- Perform correct wiring for the module according to the product's rated voltage and terminal arrangement. Connecting to a power supply different from rating or miss-wiring may cause fire and/or product failure.
- Carry out tightening of the waterproof cap and communications adapter installation screws within the specified tightening torque range.  
If the screws are loose, it could cause fire or malfunction.  
If the screws are overtightened, they could be damaged, and this could cause a short circuit or malfunction.
- Ensure that no foreign matter such as chips and wire-offcuts enter the module. Foreign matter can cause a fire, failure or malfunction.
- The IP67 is satisfactory only when all the waterproof plugs, waterproof caps and communications adapters are installed.
- The communication connector is identical with the power connector in shape. Do not plug the power cable into the communication connector. Doing so may cause failure of the module.
- Be sure to fix the wires or cables by ducts or clamps when connecting them to the module.  
Failure to do so may cause damage of the module or the cables due to accidental pull or unintentional shifting of the cables, or malfunctions due to poor contact of the cable.
- Do not install the control lines together with the communication cables, or bring them close to each other. Failure to do so may cause malfunctions due to noise.

## [Wiring Precautions]

### CAUTION

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

## [Starting and Maintenance Precautions]

### CAUTION

- Do not disassemble or modify the modules.  
Doing so could cause failure, erroneous operation, injury, or fire.
- Be sure to shut down all the phases of the externally supplied power used in the system before cleaning the module, retightening the module fixing screws, and attaching/removing the module.  
Not doing so can cause the module to fail or malfunction.
- Before handling the module, make sure to touch a grounded metal object to discharge the static electricity from the human body.  
Failure to do so can cause a failure or malfunctions of the module.

## [Disposal Precautions]

### CAUTION

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

## ● CONDITIONS OF USE FOR THE PRODUCT ●

- (1) Mitsubishi programmable controller ("the PRODUCT") shall be used in conditions;
- i) where any problem, fault or failure occurring in the PRODUCT, if any, shall not lead to any major or serious accident; and
  - ii) where the backup and fail-safe function are systematically or automatically provided outside of the PRODUCT for the case of any problem, fault or failure occurring in the PRODUCT.
- (2) The PRODUCT has been designed and manufactured for the purpose of being used in general industries.

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

("Prohibited Application")

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

- Nuclear Power Plants and any other power plants operated by Power companies, and/or any other cases in which the public could be affected if any problem or fault occurs in the PRODUCT.
- Railway companies or Public service purposes, and/or any other cases in which establishment of a special quality assurance system is required by the Purchaser or End User.
- Aircraft or Aerospace, Medical applications, Train equipment, transport equipment such as Elevator and Escalator, Incineration and Fuel devices, Vehicles, Manned transportation, Equipment for Recreation and Amusement, and Safety devices, handling of Nuclear or Hazardous Materials or Chemicals, Mining and Drilling, and/or other applications where there is a significant risk of injury to the public or property.

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## REVISIONS

\* The manual number is given on the bottom right of the cover.

Print Date	*Manual Number	Revision
Oct., 2004	IB(NA)-0800288-A	First edition
Dec., 2004	IB(NA)-0800288-B	<div style="border: 1px solid black; padding: 2px;">Addition</div> "Compliance with the EMC and Low Voltage Directives"
June, 2005	IB(NA)-0800288-C	<div style="border: 1px solid black; padding: 2px;">Correction</div> SATETY PRECAUTIONS
Dec., 2006	IB(NA)-0800288-D	<div style="border: 1px solid black; padding: 2px;">Correction</div> About the Manuals, Abbreviated names, generic names and terms, Section 2.2, 2.3, 3.1, 3.2, 3.4, 4.2.1, 4.4
Jul., 2007	IB(NA)-0800288-E	<div style="border: 1px solid black; padding: 2px;">Correction</div> Chapter 6
Dec., 2011	IB(NA)-0800288-F	<div style="border: 1px solid black; padding: 2px;">Addition</div> SAFETY PRECAUTIONS (Chinese), CONDITIONS OF USE FOR THE PRODUCT  <div style="border: 1px solid black; padding: 2px;">Correction</div> SAFETY PRECAUTIONS, ABOUT MANUALS, Compliance with the EMC and Low Voltage Directives, Abbreviated names, generic names and terms, Chapter 1, Section 2.1, 2.3, 3.1, 3.5, 4.1, 4.2.1, 4.3 to 4.5



Print Date	*Manual Number	Revision
Dec., 2016	IB(NA)-0800288-G	<div data-bbox="511 110 630 147" style="border: 1px solid black; padding: 2px;">Addition</div> SAFETY PRECAUTIONS (French) <div data-bbox="511 200 638 237" style="border: 1px solid black; padding: 2px; margin-top: 10px;">Correction</div> Section 3.2, 4.3, Chapter 6

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## **ABOUT MANUALS**

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

### Related Manual

Manual name	Manual No. (Model code)
CC-Link System Spring Clamp Terminal Block Type Repeater Hub Module User's Manual AJ65BTS-RPH	IB-0800346 (13JP97)
CC-Link System Repeater (T-junction) Module User's Manual AJ65SBT-RPT	IB-0800078 (13JQ81)
CC-Link System Optical Repeater Module User's Manual	IB-0800089 (13JQ85)
CC-Link System Space Optical Repeater Module User's Manual AJ65BT-RPI-10A/AJ65BT-RPI-10B	IB-0800090 (13JQ86)

## **COMPLIANCE WITH EMC AND LOW VOLTAGE DIRECTIVES**

(1) Method of ensuring compliance

To ensure that Mitsubishi programmable controllers maintain EMC and Low Voltage Directives when incorporated into other machinery or equipment, certain measures may be necessary. Please refer to one of the following manuals.

- User's manual for the CPU module or head module used
- Safety Guidelines

(this manual is included with the CPU module, base unit, or head module)

The CE mark on the side of the programmable controller indicates compliance with EMC and Low Voltage Directives.

(2) Additional measures

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

## Abbreviated names, generic names and terms

Abbreviated names, generic names and terms	Description
AJ65FBTA-RPH	Abbreviation of AJ65FBTA-RPH type CC-Link system low profile waterproof type repeater hub module.
AJ65BTS-RPH	Abbreviation of AJ65BTS-RPH type CC-Link system spring clamp terminal block type repeater hub module.
AJ65SBT-RPT	Abbreviation of AJ65SBT-RPT type CC-Link system repeater (T-junction) module.
AJ65SBT-RPS/RPG	Abbreviation of AJ65SBT-RPS/AJ65SBT-RPG type CC-Link system optical repeater module.
AJ65BT-RPI-10A/10B	Abbreviation of AJ65BT-RPI-10A/AJ65BT-RPI-10B type CC-Link system space optical repeater module.
AJ65SBT-CLB	Abbreviation of AJ65SBT-CLB CC-Link - CC-Link/LT bridge module.
Segment	System between terminating resistors connected to each other through cross-over cables. The conventional CC-Link system can be said to be configured with one segment.
Master station	Station to control the data link system. One station is required for each system.
Local station	Station which has a sequencer CPU and can communicate with the master station and the other local stations.
Remote I/O station	Remote station processing only information in unit of bit. (AJ65BTB1-16D, AJ65SBTB1-16D, etc.)
Remote device station	Remote station processing only information in unit of bit and in unit of word. (AJ65BT-64AD, AJ65BT-64DAV, AJ65BT-64DAI, etc.)
Remote station	Generic name of remote I/O station and remote device station. Controlled by the master station.
Intelligent device station	Station allowing transient transmission such as AJ65BT-R2. (Including local stations)
Repeater	Module for expanding the CC-Link system by connecting the segments to each other.
Standby master station	Backup station which inherits data link control when the master station comes off parallel due to error.
Slave station	Generic term of remote I/O station, remote device station, local station, intelligent device station, and standby master station.
Master local module	Generic name of QJ61BT11N, QJ61BT11, AJ61BT11, A1SJ61BT11, AJ61QBT11 and A1SJ61QBT11.
Master module	Generic term for modules that can be used as the master station.
Local module	Generic term for modules that can be used as the local station.

Abbreviated names, generic names and terms	Description
Intelligent device module	Module allowing transient transmission such as AJ65BT-R2.

### Product structure

The product structure of AJ65FBTA-RPH is as shown below.

Product name	Quantity
AJ65FBTA-RPH module	1
Terminating resistor 110Ω 1/2W (Brown, Brown, Brown)	8

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# 1. OVERVIEW

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This user's manual describes the specifications, names of parts, and settings of the AJ65FBTA-RPH CC-Link system low profile waterproof type repeater hub module (hereafter abbreviated as AJ65FBTA-RPH) used in the CC-Link system.

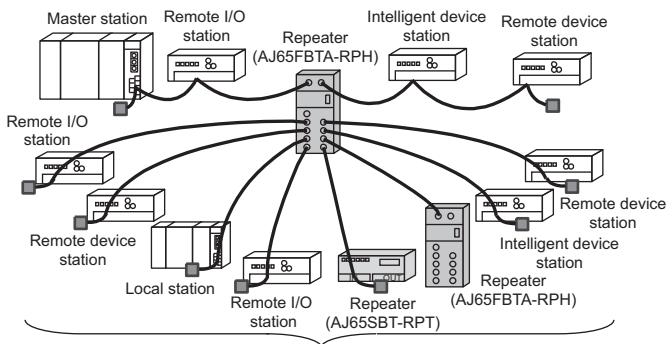
## 1.1 Features

The AJ65FBTA-RPH is the module designed for improving flexibility in cable wiring of the CC-Link system.

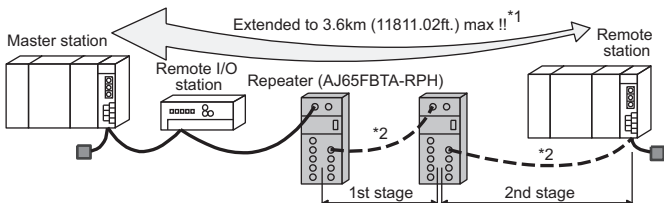
Using the AJ65FBTA-RPH allows the extension of the transmission distance and star-topology wiring (with 8 branch lines) in the CC-Link system.

- (1) Star-topology wiring (T-branch) with 8 branch lines (segments) available in CC-Link system

By placing the AJ65FBTA-RPH between modules of the CC-Link system, star-topology wiring (T-branch) with up to 8 branch lines (segments) can be used in the CC-Link system of all transmission rates (10Mbps, 5Mbps, 2.5Mbps, 625kbps, and 156kbps).



- (2) Extended transmission distance in CC-Link system  
 Use of AJ65FBTA-RPH enables the transmission distance of the CC-Link system to be extended.  
 In addition, use of multiple modules enables the transmission distance of the CC-Link system to be extended up to 2 stages.



\*1 Max. transmission distance at a transmission speed of 156kbps.

\*2 Though it is not shown here, the other remote stations can be connected between the repeaters.

- (3) Mountable outside panel because of water-proof structure (compliant with IP67)  
 Because a protection structure compliant with IP67 is adapted to the AJ65FBTA-RPH, it can be used at ease even at a wet work site.
- (4) Improved maintainability by system separation  
 By using the AJ65FBTA-RPH, any of the systems can be separated and error location can be identified quickly.  
 This prevents the whole system from being seriously affected by an error.

POINT
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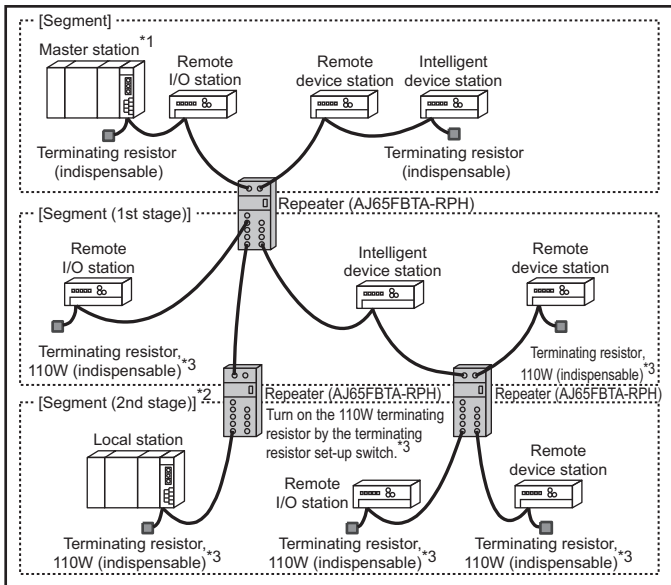
POINT	Branch lines with no error can send/receive data normally, not influenced by each other.
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## 2. SYSTEM CONFIGURATION

### 2.1 Total configuration

The total configuration employed when the AJ65FBTA-RPH is used is as shown below.



<sup>\*1</sup> The transmission speed of each segment must be matched with that of the master station.

<sup>\*2</sup> 2 stages of segments max. are allowed to be used.

<sup>\*3</sup> The 130Ω terminating resistor is not usable for a segment connected on the branch line side of the AJ65FBTA-RPH.

Use the 110Ω terminating resistor.

## 2.2 Applicable system

This section describes usable modules and cables.

### (1) Modules connectable on the branch line side

The types of the modules connectable on the branch line side of the AJ65FBTA-RPH are shown below.

Category	Module types
Slave station	Remote I/O station
	Remote device station
	Intelligent device station
	Local station
Repeater	AJ65FBTA-RPH
	AJ65BTS-RPH
	AJ65SBT-RPT
	AJ65SBT-RPS/RPG
	AJ65BT-RPI-10A/10B
Bridge	AJ65SBT-CLB

### (2) Applicable communication cables

The communication cables connectable to the AJ65FBTA-RPH are shown below.

Connector name	Applicable cable		Terminal resistance
	CC-Link version	Name	
Trunk line side	Ver.1.00	CC-Link dedicated high-performance cable	130Ω
		CC-Link dedicated cable	110Ω
Branch line side	Ver.1.10	CC-Link dedicated cable	
	Ver.1.00	CC-Link dedicated cable	
	Ver.1.10	CC-Link dedicated cable	

#### POINT

The master station and stand by master station can not be connected to the branch line side.

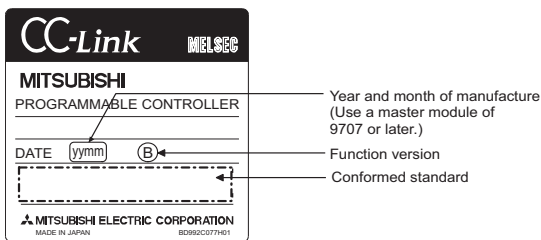
## 2.3 Cautions on system configuration

### (1) Conditions of usable master module

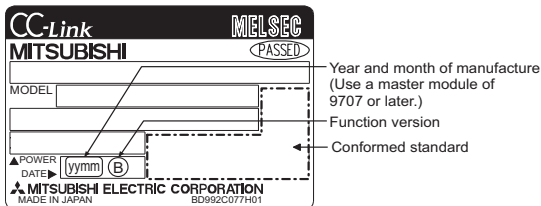
When the AJ61BT11, A1SJ61BT11, AJ61QBT11 and A1SJ61QBT11 modules are used, those of the functional version B or later must be employed. Use the master module bearing the version 9707 B or later in the DATE column of the name plate as shown in the figure below.

When the QJ61BT11N, QJ61BT11 module are used, any module can be used irrespective of the version.

#### (a) Rating plate of AJ61BT11 or AJ61QBT11



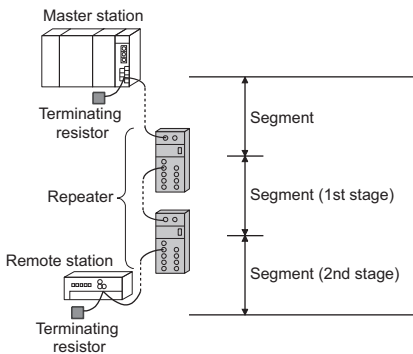
#### (b) Rating plate of A1SJ61BT11 or A1SJ61QBT11



- (2) Max. number of modules connected to configure CC-Link system  
Up to 64 modules of repeaters can be connected in one segment.  
In the CC-Link system where repeaters are used, also the number of remote stations capable of being controlled by one master station is the same as in the other systems.

For details, refer to the User's Manual of the applicable master module.

- (3) Max. number of stages connected to configure segment  
Use of AJ65FBTA-RPH enables communication between the master station located in a segment and a remote station located in a segment apart by 2 stages max. from the segment where the master station exists.



- (4) Instructions for using different models of repeaters in combination  
 Note that when combining the repeaters of different models, there are the following restrictions on the number of connectable repeaters and the number of connected stages.

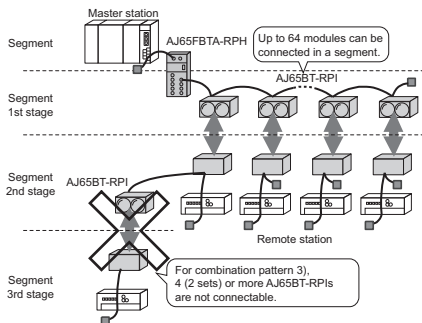
Combination pattern	Max. number of repeaters						Max. number of stages
	AJ65BTS-RPH	AJ65FBTA-RPH	AJ65SBT-RPT	AJ65SBT-RPS	AJ65SBT-RPG	AJ65BT-RPI-10A/10B	
1)	1	—	2	—	—	—	3
	—	1	2	—	—	—	
2)	1	—	—	2(1set)	-	—	2
	1	—	—	—	2(1set)	—	
	—	1	—	2(1set)	—	—	
	—	1	—	—	2(1set)	—	
3)	1	—	—	—	—	2(1set)	3
	—	1	—	—	—	2(1set)	
4)	—	—	2	4(2set)	—	—	4
5)	—	—	2	—	2(1set)	—	3
6)	—	—	2	—	—	2(1set)	
7)	—	—	—	2(1set)	2(1set)	—	2
8)	—	—	—	2(1set)	—	2(1set)	
	—	—	—	—	2(1set)	2(1set)	
9)	1	1	—	—	—	—	

#### POINT

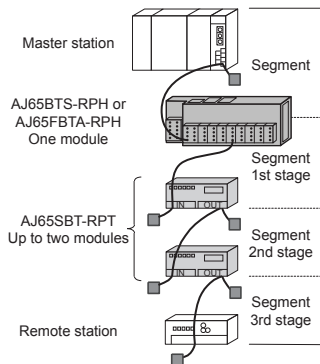
- For the CC-Link system, up to 2 repeater types can be used in combination. Using 3 models or more is not allowed.
- When repeaters are connected in the same segment by link wiring, up to 64 modules can be connected.

For details, refer to the user's manual of the master module used.

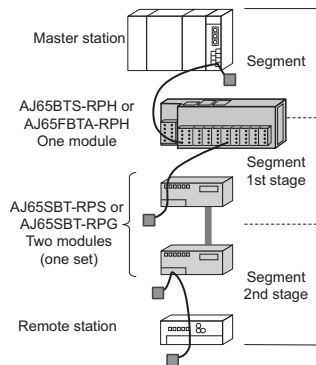
Ex.) A CC-Link system with combination pattern 3) is built



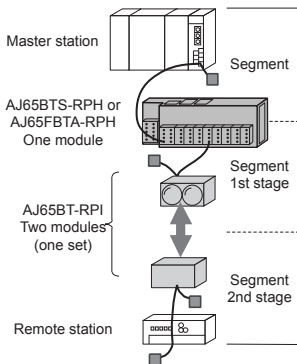
(a) Combination pattern 1)



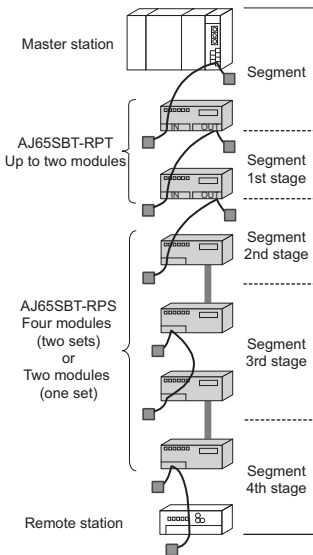
(b) Combination pattern 2)



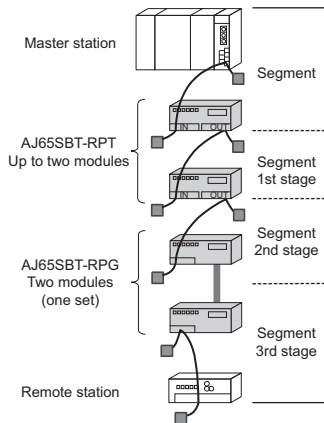
(c) Combination pattern 3)



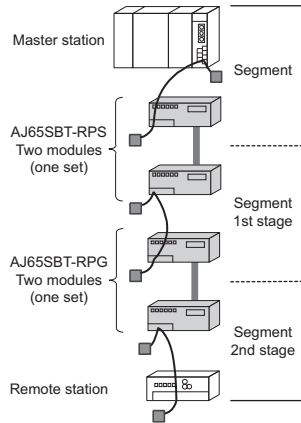
(d) Combination pattern 4)



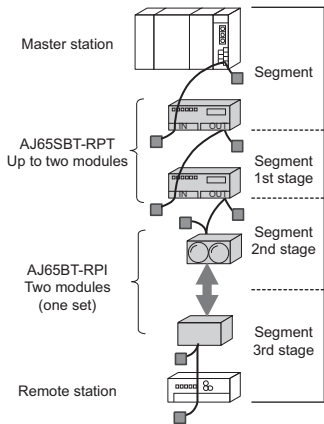
(e) Combination pattern 5)



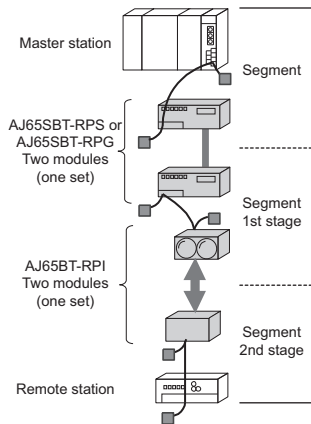
(g) Combination pattern 7)



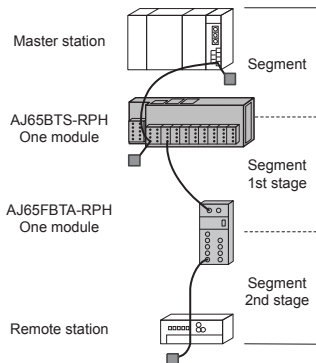
(f) Combination pattern 6)



(h) Combination pattern 8)



(i) Combination pattern 9)





## 3. SPECIFICATION

### 3.1 General specifications

The General specifications of the AJ65FBTA-RPH are shown below.

Item	Specifications					
Operating ambient temperature <i>Température ambiante de fonctionnement</i>	0 to 45°C <i>0 à 40 °C</i>					
Storage ambient temperature	-20 to 75°C					
Operating ambient humidity	10 to 90%RH, non-condensing or compliant with IP67 <sup>*1</sup>					
Storage ambient humidity	10 to 90%RH, non-condensing					
Vibration resistance	Compliant with JIS B 3502 and IEC 61131-2	Under intermittent vibration	Frequency	Constant acceleration	Half amplitude	Sweep count
			5 to 8.4Hz	-	3.5mm	10 times each in X, Y, Z directions
		8.4 to 150Hz	9.8m/s <sup>2</sup>	-	-	
		Under continuous vibration	5 to 8.4Hz	-		1.75mm
8.4 to 150Hz	4.9m/s <sup>2</sup>	-				
Shock resistance	Compliant with JIS B 3502 and IEC 61131-2 (147 m/s <sup>2</sup> , 3 times each in 3 directions X, Y, Z)					
Operating atmosphere	No corrosive gases					
Operating altitude <sup>*5</sup>	0 to 2000m					
Installation location	Outside control panel <sup>*2</sup>					
Overvoltage category <sup>*3</sup>	II or less					
Pollution degree <sup>*4</sup>	2 or less					

- \*1 Applicable only when all waterproof connectors are being used, or when waterproof caps are installed on unused waterproof connectors or feed-through tubes.
- \*2 It can also be used in an environment other than on the control panel if the conditions such as usage ambient temperature and humidity are satisfied.
- \*3 This indicates the section of the power supply to which the equipment is assumed to be connected between the public electrical power distribution network and the machinery within premises.  
Category II applies to equipment for which electrical power is supplied from fixed facilities. The surge voltage withstand level for up to the rated voltage of 300V is 2500V.
- \*4 This index indicates the degree to which conductive material is generated in terms of the environment in which the equipment is used.  
Pollution level 2 is when only non-conductive pollution occurs. A temporary conductivity caused by condensing must be expected occasionally.
- \*5 Do not use or store the programmable controller under pressure higher than the atmospheric pressure of altitude 0m. Doing so may cause malfunction. When using the programmable controller under pressure, please consult your local Mitsubishi Electric representative.

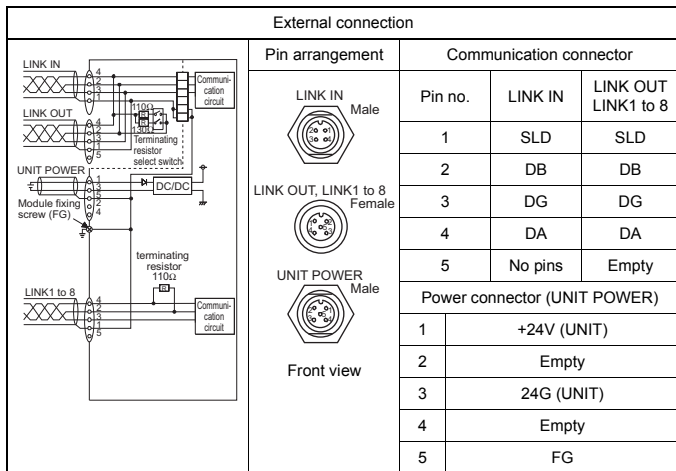
### 3.2 Performance specifications

The performance specifications of the AJ65FBTA-RPH module are shown below.

Item	Specifications	
Station number	— (none)	
CC-Link station type	— (none)	
Number of occupied stations	0 (none)	
Transmission rate	Can select from 156kbps / 625kbps / 2.5Mbps / 5Mbps / 10Mbps	
No. of connectable slave stations	The total number of modules connected to a trunk line and branch line shall conform to the maximum number of connectable modules of the master module used. For details, refer to the user's manual of the master modules used.	
Max. No. of modules connected to the trunk line	64 (Refer to Section 2.3 (2))	
Connection position	Trunk line side	No restriction (compliant with the CC-Link specifications)
	Branch line side	Connect to the end of the branch line (segment end)
Max. number of stages connected to configure segment	AJ65FBTA-RPH only (Refer to Section 2.3 (3))	2nd stage
	Combination of AJ65FBTA-RPH and AJ65SBT-RPT (Refer to Section 2.3 (4))	3rd stage
	Combination of AJ65FBTA-RPH and one of AJ65SBT-RPS/RPG, AJ65BT-RPI, or AJ65BTS-RPH. (Refer to Section 2.3 (4))	2nd stage
Max. transmission distance of each segment	Varies according to transmission rate (Refer to Section 3.5).	
Terminating resistor (built-in)	Trunk line side	No resistor, 110Ω, or 130Ω can be selected.
	Branch line side	110Ω fixed
Connection connector	M12 waterproof connector (IEC947-5-2)	
Mounting orientation	No restriction (mountable in six orientations)	
Module fixing screw	M4 mounting screw, 2-4.5x6 slot M4 mounting screw	
Power supply	Voltage	24V DC (ripple within ±5%) (allowable voltage range 20.4 to 26.4V)
	Current	0.30A (TYP. 24V DC)
Noise durability	Simulator noise of 500 Vp-p, obtained by a noise simulator using noise width of 1 μs and noise frequency of 25 to 60 Hz	
Maximum voltage	500V AC for 1 minute between all DC external terminals and ground	
Insulation resistance	10MΩ or higher, measured with a 500V DC insulation resistance tester	
External dimensions	60mm (2.36in.) (W) × 200mm (7.87in.) (H) × 48mm (1.89in.) (D)	

Item	Specifications
Weight	0.31kg

### 3.3 Connector specifications



### 3.4 Specifications of connection cable

Use the CC-Link dedicated cable for the CC-Link system. If a cable other than the CC-Link dedicated cable is used, the performance of the CC-Link system cannot be guaranteed.

For the CC-Link cable specifications and any other inquiries, refer to the following:

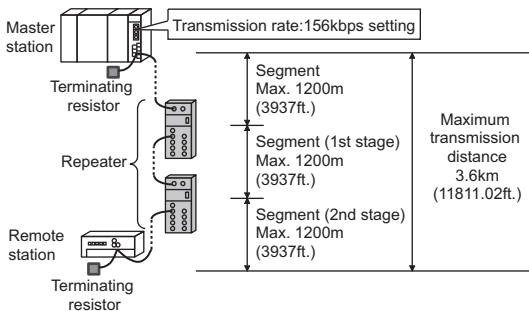
CC-Link Partner Association website: [www.cc-link.org](http://www.cc-link.org)

#### REMARK

For details, refer to the CC-Link cable wiring manual issued by the CC-Link Partner Association.

### 3.5 Maximum transmission distance

The maximum transmission distance varies depending on the setting of transmission rate and the number of connected segments (stages).



Condition	Description
Transmission rate	Maximum transmission distance in each segment is the same as that of the normal CC-Link system (the system with one segment only). It varies depending on the transmission rate. For details, refer to the user's manual of the master module used. (The station-to-station cable length for the repeater is the same as that for the remote I/O station.)
No. of stages for segment connection	Maximum transmission distance for one segment is added for each additional stage connection.

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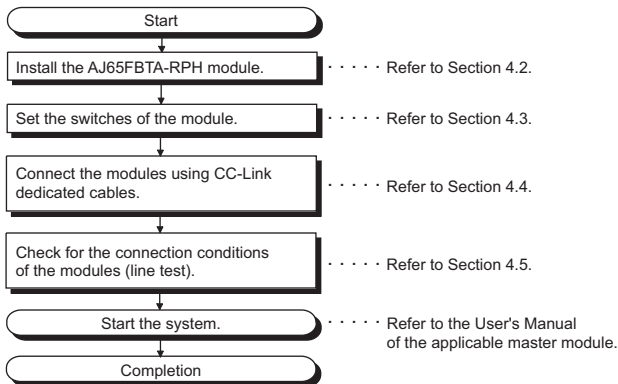
## 4. PROCEDURE UP TO START OF DATA LINK

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### 4.1 Procedure up to start of data link

The procedure ranging from the installation of the AJ65FBTA-RPH module to the start of data link is described below.



<b>POINT</b>
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<p>The procedure described here is for the AJ65FBTA-RPH module only. In order to understand the procedure of the entire CC-Link system, refer to the User's Manual of the applicable master module.</p>
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## 4.2 Mounting and installation

### 4.2.1 Cautions on handling

Cautions on handling the AJ65FBTA-RPH module are described below.

- (1) Tighten screws (such as a module fixing screw) within the tightening torque range specified in the table below.

Do not over-tighten these screws. The screws and module case may be damaged.

Screw location	Specified torque range
Communication adapter fixing screw (M4 screws)	0.42 to 0.58N•m
Module fixing screw (M4 screws)	0.78 to 1.18N•m
Waterproof cap (A6CAP-WP2)	0.29 to 0.34N•m

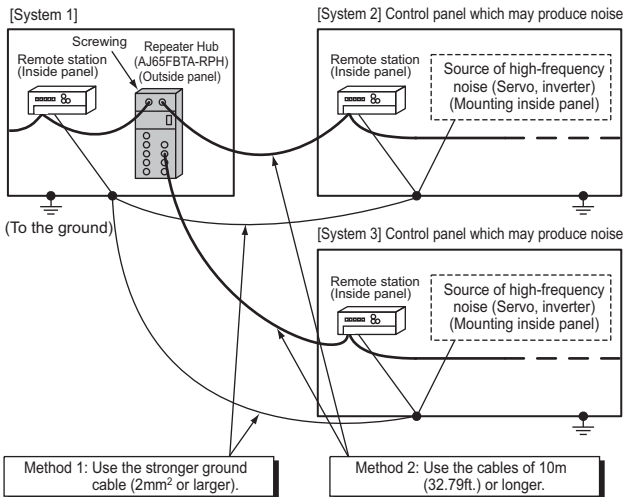
- (2) Install the AJ65FBTA-RPH module on a flat smooth surface.  
If there are irregularities on the installation surface, undue force may be applied to the printed circuit boards, and the boards may be damaged.



- (3) Depending on the grounding condition of the system, a high-frequency noise may occur between the systems. When these systems are connected through CC-Link communication cables, a communication error may occur by the mixing of noise into the repeaters. If the high-frequency noise occurs between the systems connected through the cables of 10 m (32.79ft.) or shorter, take either of the measures specified below.

Method1: Connect the systems through cables of 2 mm<sup>2</sup> or larger (across FG terminals of the remote station in each system, or across grounds of the control panel to which the remote station is grounded).

Method2: Use CC-Link cables of 10 m (32.79ft.) or longer between the systems.



#### (4) Handling of waterproof cap

##### (a) Applicable waterproof cap

The waterproof cap applied to the AJ65FBTA-RPH is shown below.

Product name	Model code	Remark
Waterproof cap (20 pieces, sold separately)	A6CAP-WP2	For LINK OUT connector or LINK1 to 8 connectors

##### POINT

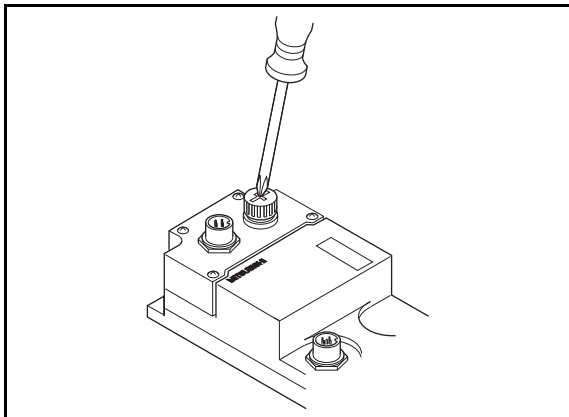
The waterproof cap of the conventional type (A6CAP-WP1) cannot be used.

##### (b) Waterproof plug attachment procedure

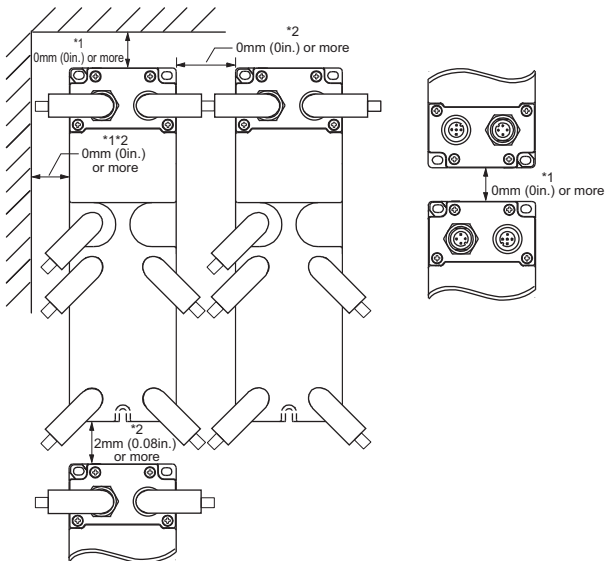
In order to prevent water from entering, attach waterproof caps onto unused LINK OUT and LINK1 to 8 connectors as shown below.

Insert the waterproof cap in the unused connector on the main module, then tighten it.

(Tightening torque range: 0.29 to 0.34N•m)



- (5) When installing the AJ65FBTA-RPH provide the space shown in the figure below between the top and bottom of the module and other structures or parts so that good ventilation can be secured and that interference and application of load on the waterproof connector can be prevented.



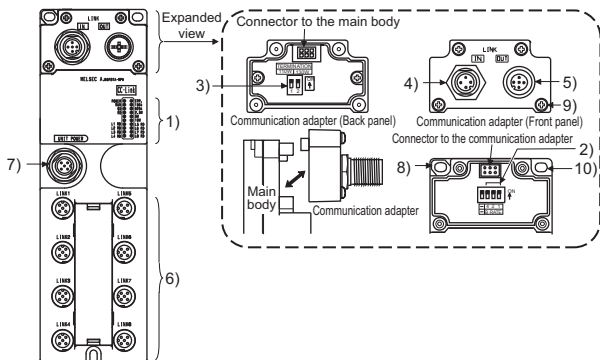
- \*1 When inserting or removing the communication adapter, provide a space to operate a screwdriver and so on.  
 \*2 When using a right-angle type waterproof plug or Y-branch line connector, provide a distance so that no load will be applied to the cable.

#### 4.2.2 Installation environment

For installation environment, refer to Section 3.1.

### 4.3 Names and settings of parts

The names of parts of the AJ65FBTA-RPH module, indication statuses of LEDs, and settings of switches are described below.



No.	Name	Application		
1)	Operation status display LED	Check for the module condition by observing the state of lighting of the LED.		
		LED Name	Application	
		POWER	ON : Power supply on OFF : Power supply off	
		RUN	ON : Module is operating normally OFF : Module is not operating normally	
		SD	ON : Data are being sent to the LINK IN or LINK OUT of the trunk line OFF : Data are not being sent to the LINK IN or LINK OUT of the trunk line	
		RD	ON : Data are being received from the LINK IN or LINK OUT of the trunk line OFF : Data are not being received from the LINK IN or LINK OUT of the trunk line	
		ERR.	ON : Transmission rate setting out-of-range error or communication error occurred Flickering : Indicates that you forgot fitting the terminating resistor or the module or CC-Link dedicated cable is affected by noise. OFF : Module is operating normally	
		156k, 625k, 2.5M, 5M, 10M	The LED of transmission rate, set by the transmission rate setting switch, is lit.	
		L1 RD to L8 RD	ON : Data are being received from the LINK1 to 8 of the branch line. OFF : Data are not being received from the LINK1 to 8 of the branch line.	

No.	Name	Application				
2)	Transmission rate setting switch	Set the transmission rate of the module (set to 0 at the time of delivery). Ensure to set the transmission rate at a speed specified below. Transmission rate of the trunk line side is identical with that of the branch line side.				
		Setting value	Setting switch status			Transmission rate (bps)
			4	2	1	
		0	OFF	OFF	OFF	156k
		1	OFF	OFF	ON	625k
		2	OFF	ON	OFF	2.5M
		3	OFF	ON	ON	5M
		4	ON	OFF	OFF	10M
5 to 7	Cannot be set. If set to 5 to 7, the ERR. LED is turned on and data are not transferred.					
3)	Terminating resistor select switch*1	Set whether or not to use the terminating resistors incorporated in the trunk line side of the module. (Settings at shipment: all OFF)				
		Setting switch status		Application		
		2	1			
		OFF	OFF	No terminating resistor		
		OFF	ON	110Ω terminating resistor ON		
		ON	OFF	130Ω terminating resistor ON		
		ON	ON	Cannot be set. If the switches are set to ON, normal data transfer is not guaranteed.		

\*1 When the AJ65FBTA-RPH is located at either of the ends of the trunk line, turn on the terminating resistor in accordance with the type of the cable connected to LINK IN. For details, refer to section 2.2. The incorporated 110Ω terminating resistor is used on the branch line side. (Switch setup is not needed.)

No.	Name	Application	
		Connector name	Application
4)	Waterproof connector for transmission line <sup>*2</sup>	LINK IN	Connector for connecting the transmission line of the trunk line IN side (master station side) (male 4-pin).
5)		LINK OUT	Connector for connecting the transmission line of the trunk line OUT side (female 5-pin). If LINK OUT is not used outside the panel, be sure to attach the accessory waterproof cap. (Tightening torque range: 0.29 to 0.34N•m)
6)		LINK1 to 8	Connector for connecting the transmission line of the branch line (female 5-pin). If LINK1 to 8 are not used outside the panel, be sure to attach the waterproof cap. (Prepare the waterproof cap separately.) (Tightening torque range: 0.29 to 0.34N•m)
7)	Waterproof connector for power line <sup>*2</sup>	UNIT POWER	Connector for supplying power to the module (male 5-pin).
8)	FG metal fitting	For module FG terminal (Tightening torque range: 0.78 to 1.18N•m)	
9)	Communication adapter fixing screw	When replacing the main body online or changing switch settings, attach/remove the communication adapter with this screw. (Tightening torque range: 0.42 to 0.58N•m)	
10)	Module fixing hole <sup>*3</sup>	Screw hole for fixing the module. (Tightening torque range: 0.78 to 1.18N•m)	

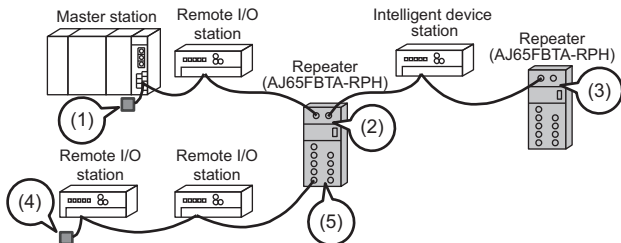
\*2 For the specifications of the connector, refer to section 3.2.

\*3 For the specifications of the module fixing screw, refer to section 3.2.

POINT	
Set the same transmission rate as that of the master station.	

#### 4.4 Connection of module through CC-Link dedicated cable

The method of connecting the AJ65FBTA-RPH module to the CC-Link system through the CC-Link dedicated cable is shown below.



For (1) to (5) shown in the above, read the following cautions on connections.

- (1) For the segment connected to the trunk line side of the AJ65FBTA-RPH, connect a terminating resistor to the module connected at the end.  
Select a type for terminating resistor in accordance with the type of the connected communication cable.  
For details, refer to the manual of the module connected.
- (2) When connecting the trunk line side of AJ65FBTA-RPH to any other than the segment termination, turn off the terminating resistor.  
In addition, connect the shielding wire of the CC-Link dedicated cable to "SLD" of each module, and ground both ends via "FG" The interval between SLD and FG is connected in the module in advance.
- (3) When connecting the trunk line side of the AJ65FBTA-RPH to the end of the segment, turn on the terminating resistor.  
Select a type for terminating resistor in accordance with the type of the connected communication cable.  
For details, refer to Section 2.2.  
In addition, connect the shielding wire of the CC-Link dedicated cable to "SLD" of each module, and ground both ends via "FG" The interval between SLD and FG is connected in the module in advance.



- (4) Connect the included  $110\Omega$  terminating resistor to the module located at the end of a segment when the branch line side of the AJ65FBTA-RPH is connected to the segment.  
For the connection of terminating resistor, refer to the manual of the module connected.
- (5) For the branch line side of the AJ65FBTA-RPH, use the incorporated  $110\Omega$  terminating resistor. (Switch settings are not necessary.)  
In addition, connect the shielding wire of the CC-Link dedicated cable to "SLD" of each module, and ground both ends via "FG".  
Note that SLD and FG are connected to each other in the module.

#### 4.5 Check for state of connection (line test)

Connect all modules including the AJ65FBTA-RPH module through the CC-Link dedicated cable. Then, check that the CC-Link system is in the state capable of performing a data link normally.

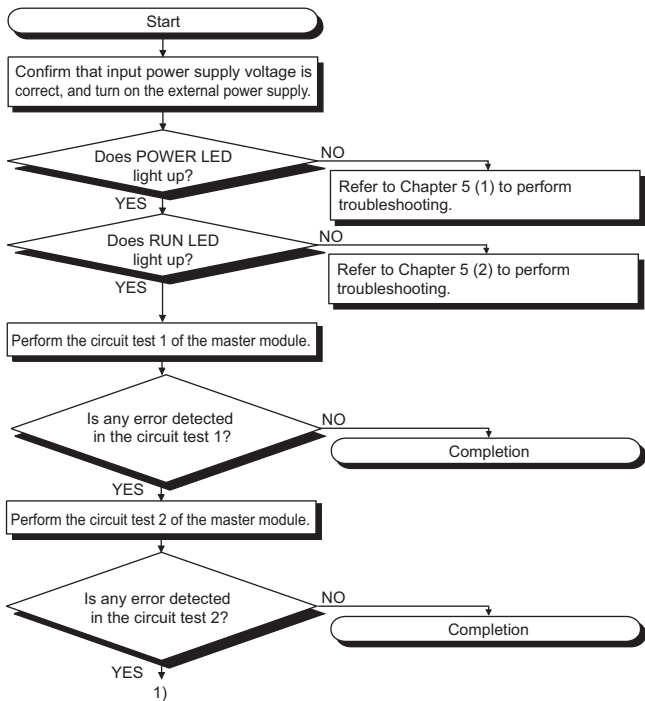
Because whether or not a master station can establish a data link with a particular slave station can be checked by the connection status check (circuit test), an error module can be identified.

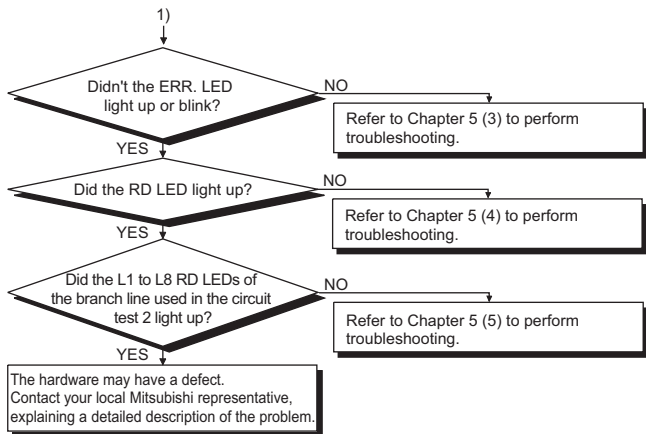
For the connection status check (circuit test), perform the circuit test 1 of the master module. If an error is detected, perform the circuit test 2 of the master module.

For the details of circuit tests 1 and 2, refer to the user's manual of the master module used.

Perform the test following the steps shown below.

POINT
<p>Perform the circuit test 2 of the master module by selecting the target stations as described in (1) to (3) below.</p> <ol style="list-style-type: none"> <li>(1) In the segment including the master module, select slave stations in order from the nearest to the master module to the farthest.</li> <li>(2) In the segment (1st stage), select slave stations in order from the nearest to the AJ65FBTA-RPH to the farthest.</li> <li>(3) In the segment (2nd stage), select slave stations in order from the nearest to the AJ65FBTA-RPH to the farthest.</li> </ol>





## 5. TROUBLESHOOTING

This section describes the measures when a trouble occurred in the AJ65FBTA-RPH.

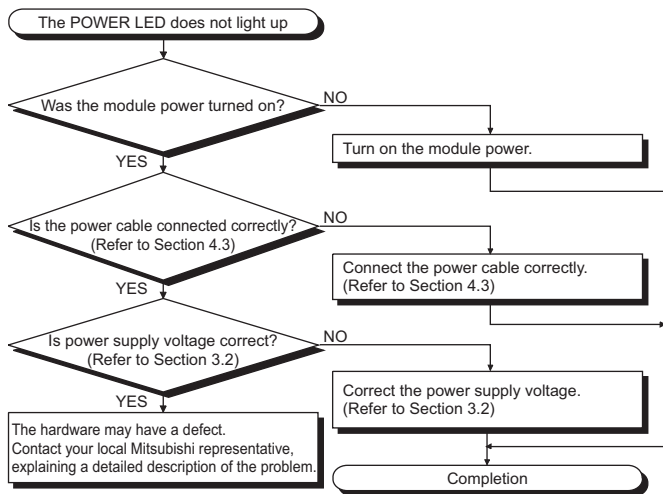
Perform the troubleshooting indicated in the reference section.

No.*1	Problem	Reference section
1	The POWER LED is not lit while the module power is ON.	(1) in this chapter
2	The RUN LED is not lit while the module power is ON.	(2) in this chapter
3	The ERR. LED lighted up or blinked.	(3) in this chapter
4	The RD LED does not light up during data link.	(4) in this chapter
5	The L1 to L8 RD LEDs corresponding to the data linking branch lines do not light up.	(5) in this chapter

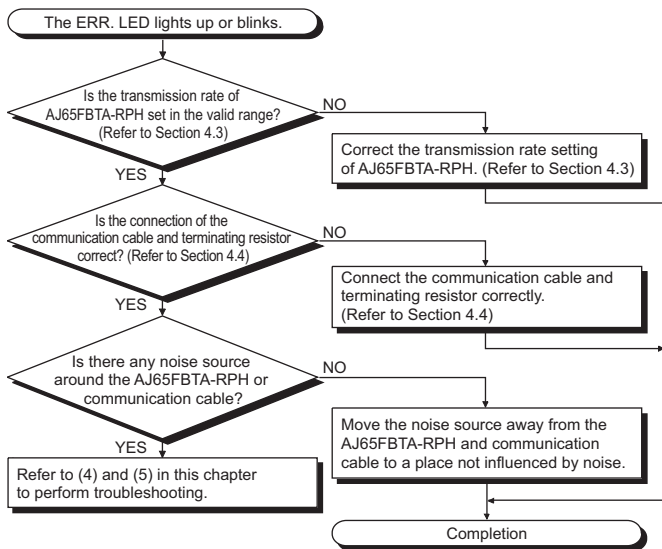
\*1 If more than one problem occurred simultaneously, perform the troubleshooting in order of the item numbers.

(1) The POWER LED is not lit while the module power is ON

Troubleshooting is shown below for the case that the POWER LED is not lit while the module power is ON.

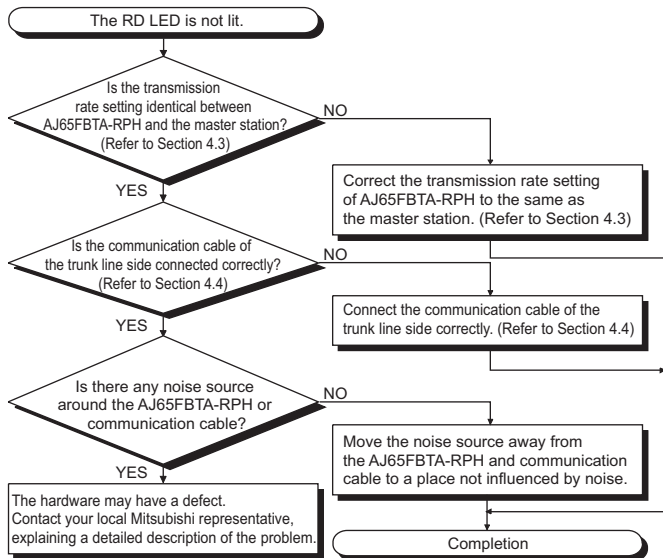


- (2) The RUN LED is not lit while the module power is ON.  
 If the RUN LED is not lit while the module power is ON, turn off and on the module again.  
 If the RUN LED is not lit after the module power is reapplied, the hardware may be faulty. Please contact your local Mitsubishi representative.
- (3) The ERR. LED lights up or blinks.  
 Troubleshooting is shown below for the case that the ERR. LED lights up or blinks.



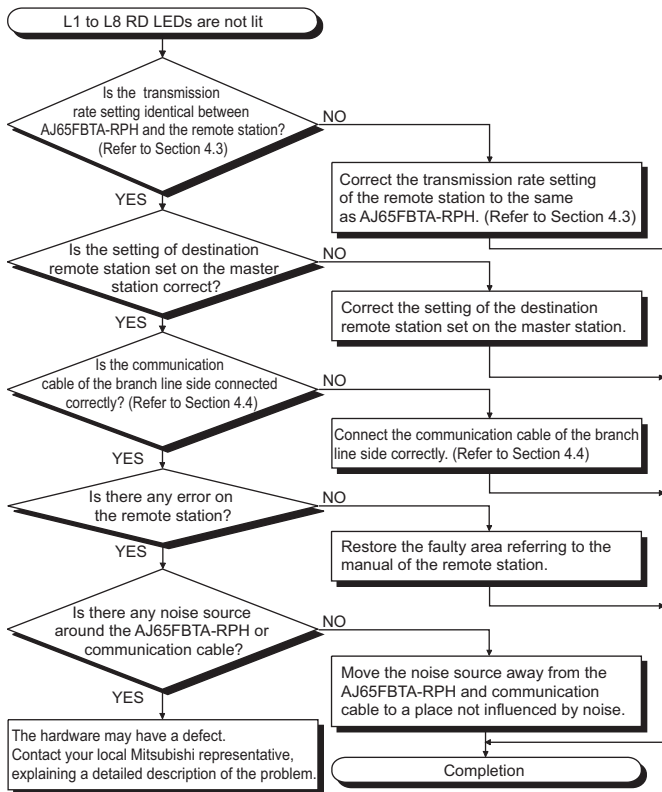
(4) The RD LED is not lit during data link.

This section describes troubleshooting for the case that the RD LED is not lit.



(5) The L1 to L8 RD LEDs corresponding to the data linking branch lines are not lit.

This section describes troubleshooting when the L1 to L8 RD LEDs corresponding to the data linking branch lines are not lit.









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