

MITSUBISHI

AJ71QC24-R2

Serial Communications Module

User's Manual (Hardware)

Thank you for choosing the Mitsubishi MELSEC-QnA Series of General Purpose Programmable Controllers. To ensure correct use of this equipment, please read this manual carefully before operating it.



© 1996 MITSUBISHI ELECTRIC CORPORATION

IB(NA) 66610-A (9603) MEE

Related Manuals

The following manuals are available for this equipment. Refer to the table given below to choose suitable manuals.

Manual Name	Manual No (Type Code)
Guide Book for the AJ71QC24 Serial Communications Module	IB-66622
User's Manual for the AJ71QC24(-R2/R4) Serial Communications Module	IB-66612

● Safety Precautions ●

Before using this equipment, please read this and related manuals thoroughly. Also pay special attention to safe and correct use of the equipment.

The safety precautions given in this section relate to this equipment only. For precautions regarding the programmable controller system, refer to the User's Manual for the CPU module.

The following two safety precaution categories are used in this manual:

- ⚠ **DANGER:** Describes precautions that should be observed to prevent the danger of serious injury or death to the user in case of incorrect use of the equipment.
- ⚠ **CAUTION:** Describes precautions that should be observed to prevent the danger of medium or light injury to the user or physical damage to the equipment in case of incorrect use of the equipment.

However, note that incorrect use denoted by "⚠ CAUTION" may result in serious accident in some cases. Make sure that all the precautions given in this section are strictly observed.

Keep the manual in a safe place so that it can be referred to whenever necessary. Also make sure that this manual is forwarded to the final user.

[Precautions regarding system design]

⚠ CAUTION

- Never place the control cables and communication cables near the main circuit and power cables. Never bind them with the main circuit and power cables. Make sure that they are placed at least 100 mm away from the main circuit and power cables. Failure to observe this may result in malfunction of the equipment due to noise.

[Precautions regarding installation]

⚠ CAUTION

- Make sure that the equipment is used in the operating environment specified in this manual, otherwise electric shock, fire, malfunction, damage or deterioration of the equipment may result.
- When installing the equipment, make sure that the fixing projections provided at the base of the equipment are inserted into the holes on the base unit properly. If they are not properly inserted, a malfunction, breakdown or fail of the equipment may result.

[Precautions regarding wiring]

⚠ CAUTION

- Before connecting the cables, check the type of interface to be connected. If the cables are connected to an incorrect interface, damage to the equipment or external device may result.
- Take care not to allow any foreign matter, such as cutting refuse or wire bits, to enter the equipment. If they enter, fire, breakdown or malfunction may result.

[Precautions regarding set-up and maintenance]

⚠ DANGER

- Before cleaning the equipment, make sure the power is turned OFF. If cleaning is carried out while the power is ON, breakdown or malfunction of the equipment may result.

⚠ CAUTION

- Never attempt to disassemble or modify the equipment, otherwise breakdown, malfunction, injury or fire may result.
- Before installing or removing the equipment, make sure that the power is turned OFF. If the equipment is installed or removed while the power is ON, breakdown or malfunction of the equipment may result.

[Precautions regarding disposal]

⚠ CAUTION

- When disposing of the equipment, treat it as industrial waste.

1. General Description

This manual describes specifications and names of each part of the AJ71QC24-R2 serial communications module, which is used in conjunction with the MELSEC-QnA series programmable controller CPU

When unpacking the equipment, check that the unit listed in the table below is present

Product Name	Qty.
AJ71QC24-R2 serial communications module	1

2. System Configuration

2.1 Applicable System (Applicable CPU module and allowable number of modules)

The following table shows programmable controller CPU module and network module (for remote station) which can be used with the equipment. The allowable number of modules to be installed is also given

Applicable Module		Allowable Number	Remarks
CPU module	Q2A (S1)	Not limited	The allowable number of modules is determined according to the number of available input/output signals of the CPU module and remote station
	Q3A		
	Q4A		
Network module	AJ72QLP25		
	AJ72QBR15		

3. Specifications

3.1 Communications

The communications specifications of the equipment is given below

Item	Specifications			
	CH1	CH2		
Interface.	RS-232C			
Communications method.	Full-duplex/Half-duplex (selectable)			
Synchronization.	Start-stop system			
Baud rate:	300 to 19200 BPS (CH1 and CH2 in total)			
Data format	Start bit.	1		
	Data bit.	7/8		
	Parity bit.	1 (yes) / 0 (no)		
	Stop bit.	1/2		
Error detection.	Parity check.	Yes (odd/even) / No		
	Sum check code.	Yes / No		
Control method.	DTR/DSR.	Yes / No		
	DC code.	Yes (DC1/DC3, DC2/DC4) / No		
Writing to EEPROM.	100,000 times for the same area (Max.)			
Network connection:	Independent mode	Dedicated protocol	1 1	1 1
		Modeless protocol		
		Bidirectional protocol		
	Interlock mode	Dedicated protocol	Interlock operation disabled	
		Modeless protocol		
		Bidirectional protocol		
Allowable communications distance.	15 m or less			
Power consumption.	5 VDC, 0.2A			
Number of I/O points.	32 points			
Weight.	0.37 kg			

3.2 RS-232C Interface

3.2.1 Connector Pin Assignment

Pin No	Signal Name	Signal Code	Signal Direction
			(AJ71QC24-R2 ↔ External Device)
1	Frame ground	FG	↔
2	Sent data	SD (TXD)	→
3	Received data	RD (RXD)	←
4	Request to send	RS (RTS)	→
5	Clear to send	CS (CTS)	←
6	Data set ready	DSR (DR)	←
7	Signal ground	SG	↔
8	Carrier detection	CD	←
20	Data terminal ready	DTR (ER)	→

The following type of the RS-232C connector is used. The counter connector must match this connector

25-pin D-sub (female) screw type
17LE-13250-22-D2AC (DDK ELECTRONICS LTD)

3.2.2 RS-232C Interface Cable

The RS-232C interface cable must be of 15 m or shorter and conform to the RS-232C standard

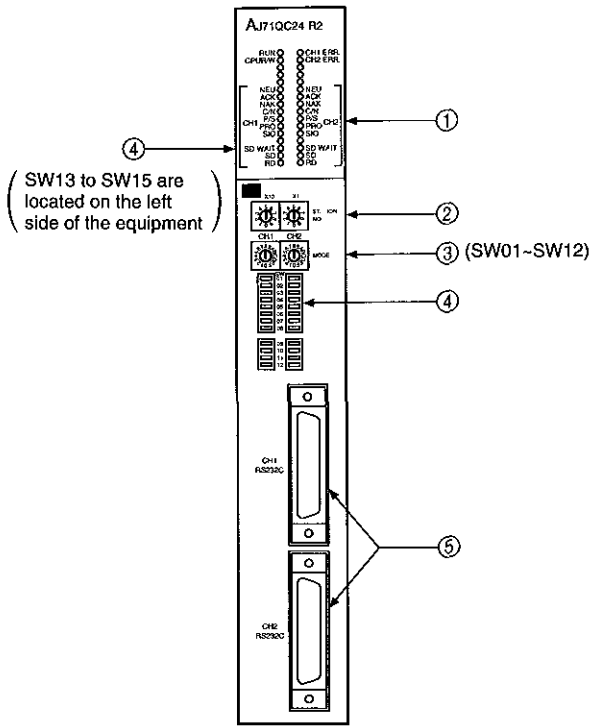
(Recommended cable)

7/0 127! :P HRV-SV

Number of twisted wires
In the case of 13 twisted wires (7/0 127 13P HRV-SV)

4. Name of Each Part

Description for each part of the equipment is given below



No.	Name	Description
①	<div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <p>RUN CPUR/W</p> <p>NEU ACK NAK C/N P/S CH1 PRO SIO SD WAIT SD RD</p> </div> <div style="text-align: center;"> <p>CH1 ERR CH2 ERR</p> <p>NEU ACK NAK C/N P/S CH2 PRO SIO SD WAIT SD RD</p> </div> </div>	<p>RUN Operation state ON Normal OFF Abnormal</p> <p>CPUR/W Communications state with PC ON Communications is in progress OFF. Communications is in halt.</p> <p>NEU Neutral state (CH1/2) ON Transmission sequence is initialized OFF Reception of ENQ is complete</p> <p>ACK ACK transmission state (CH1/2) ON When ACK is transmitted OFF. When NAK is transmitted</p> <p>NAK NAK transmission state (CH1/2) ON NAK is transmitted OFF. ACK is transmitted</p> <p>C/N Communications state between CH1/2 and programmable controller CPU ON Abnormal OFF. Normal</p> <p>P/S Parity/sum check error (CH1/2) ON Error OFF Normal</p> <p>PRO Protocol error (CH1/2) ON Error OFF. Normal</p> <p>SIO SIO error (CH1/2) ON Received data is disposed of due to overrun, framing error or OS receive area full OFF Normal</p> <p>SD WAIT Wait state ON Awaiting data transmission OFF Transmission is started.</p> <p>SD Transmission state (CH1/2) Blink Data transmission is in progress</p> <p>RD Reception state (CH1/2) Blink. Data reception is in progress</p> <p>CH1/2 ERR Error (CH1/2) ON Switch setting error, mode switch error, transmission error, reception error, on-demand error OFF Normal</p>

②	<p>Station No setting switch</p> <p>Used to set the station No <Setting range> 0 to 31 x10 Used to set the tens digit of the station No x1 Used to set the units digit of the station No.</p>																																														
③	<p>Mode setting switch</p> <table border="1"> <thead> <tr> <th>Mode</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>Setting disabled</td> </tr> <tr> <td>1</td> <td rowspan="4">ASCII mode</td> </tr> <tr> <td>2</td> <td>Format 1</td> </tr> <tr> <td>3</td> <td>Format 2</td> </tr> <tr> <td>4</td> <td>Format 3</td> </tr> <tr> <td>4</td> <td>Dedicated protocol</td> </tr> <tr> <td>5</td> <td>Binary mode</td> </tr> <tr> <td>6</td> <td>Modeless protocol</td> </tr> <tr> <td>7</td> <td>Bidirectional protocol</td> </tr> <tr> <td>8</td> <td>Setting disabled</td> </tr> <tr> <td>D</td> <td></td> </tr> <tr> <td>E</td> <td>ROM/RAM/switch test</td> </tr> <tr> <td>F</td> <td>Wrap test</td> </tr> </tbody> </table> <p>Used to set mode.</p>	Mode	Description	0	Setting disabled	1	ASCII mode	2	Format 1	3	Format 2	4	Format 3	4	Dedicated protocol	5	Binary mode	6	Modeless protocol	7	Bidirectional protocol	8	Setting disabled	D		E	ROM/RAM/switch test	F	Wrap test																		
Mode	Description																																														
0	Setting disabled																																														
1	ASCII mode																																														
2		Format 1																																													
3		Format 2																																													
4		Format 3																																													
4	Dedicated protocol																																														
5	Binary mode																																														
6	Modeless protocol																																														
7	Bidirectional protocol																																														
8	Setting disabled																																														
D																																															
E	ROM/RAM/switch test																																														
F	Wrap test																																														
④	<p>Communications parameter setting switch</p> <table border="1"> <thead> <tr> <th rowspan="2">Switch No.</th> <th rowspan="2">Description</th> <th colspan="2">State</th> </tr> <tr> <th>OFF</th> <th>ON</th> </tr> </thead> <tbody> <tr> <td>SW01</td> <td>Operation mode</td> <td>Independent</td> <td>Setting disabled</td> </tr> <tr> <td>SW02</td> <td>Data bit</td> <td>7 bits</td> <td>8 bits</td> </tr> <tr> <td>SW03</td> <td>Parity bit</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>SW04</td> <td>Parity (even/odd)</td> <td>Odd</td> <td>Even</td> </tr> <tr> <td>SW05</td> <td>Stop bit</td> <td>1 bit</td> <td>2 bits</td> </tr> <tr> <td>SW06</td> <td>Sum check</td> <td>No</td> <td>Yes</td> </tr> <tr> <td>SW07</td> <td>Writing during operation</td> <td>Disabled</td> <td>Enabled</td> </tr> <tr> <td>SW08</td> <td>Setting change</td> <td>Disabled</td> <td>Enabled</td> </tr> <tr> <td>SW09 to SW12</td> <td>Baud rate</td> <td colspan="2">Refer to *1</td> </tr> <tr> <td>SW13 to SW15</td> <td></td> <td colspan="2">(Set all the switches to OFF)</td> </tr> </tbody> </table> <p>Used to set the following communications parameters</p>	Switch No.	Description	State		OFF	ON	SW01	Operation mode	Independent	Setting disabled	SW02	Data bit	7 bits	8 bits	SW03	Parity bit	No	Yes	SW04	Parity (even/odd)	Odd	Even	SW05	Stop bit	1 bit	2 bits	SW06	Sum check	No	Yes	SW07	Writing during operation	Disabled	Enabled	SW08	Setting change	Disabled	Enabled	SW09 to SW12	Baud rate	Refer to *1		SW13 to SW15		(Set all the switches to OFF)	
Switch No.	Description			State																																											
		OFF	ON																																												
SW01	Operation mode	Independent	Setting disabled																																												
SW02	Data bit	7 bits	8 bits																																												
SW03	Parity bit	No	Yes																																												
SW04	Parity (even/odd)	Odd	Even																																												
SW05	Stop bit	1 bit	2 bits																																												
SW06	Sum check	No	Yes																																												
SW07	Writing during operation	Disabled	Enabled																																												
SW08	Setting change	Disabled	Enabled																																												
SW09 to SW12	Baud rate	Refer to *1																																													
SW13 to SW15		(Set all the switches to OFF)																																													

*1 Baud rate

Baud rate (BPS)	300	600	1200	2400	4800	9600	19200
SW09	OFF	ON	OFF	ON	OFF	ON	OFF
SW10	OFF	OFF	ON	ON	OFF	OFF	ON
SW11	OFF	OFF	OFF	OFF	ON	ON	ON
SW12	OFF	OFF	OFF	OFF	OFF	OFF	OFF

No.	Name	Description
⑤	RS-232C interface	Used to connect the equipment to external device.

5. Handling Precautions

The equipment must be secured using screws. Allowable tightening torque range for the screws is given below

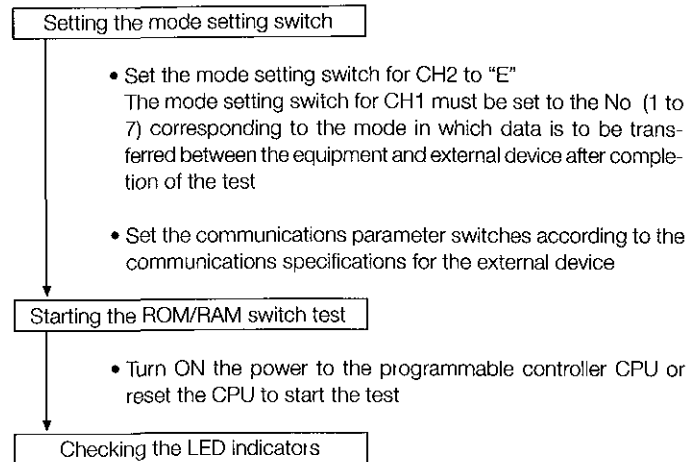
Screw	Tightening Torque
Unit fixing screws (M4)	78 to 117 N cm (8 to 12 kg cm)

6.2 Self-Test

The following functions are provided to check whether the equipment can operate correctly, without being connected to an external device

Make sure that the test is carried out with the programmable controller CPU in stop state. Also make sure that the power is turned OFF before connecting the cables and setting the switches

6.2.1 ROM/RAM/Switch Test



Check Item		LED Name	Normal	Abnormal
(Test end)		SD WAIT *1		ON
ROM check		CH1 ERR	OFF	ON
RAM check		CH2 ERR	OFF	ON
Switch check	Station No	Located just below CH2 ERR	OFF	ON
	Mode	C/N *2	OFF	ON
	Communications parameter	P/S *2	OFF	ON
Interlock setting check	Mode	CH1-PRO	OFF	ON
	Communications parameter	CH1-SIO	OFF	ON

*1 LED for both CH1 and CH2

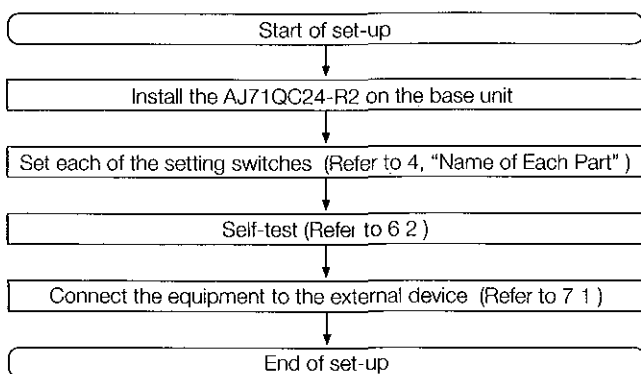
*2 LED for the interface where the setting error is occurring

6. Starting up the Equipment

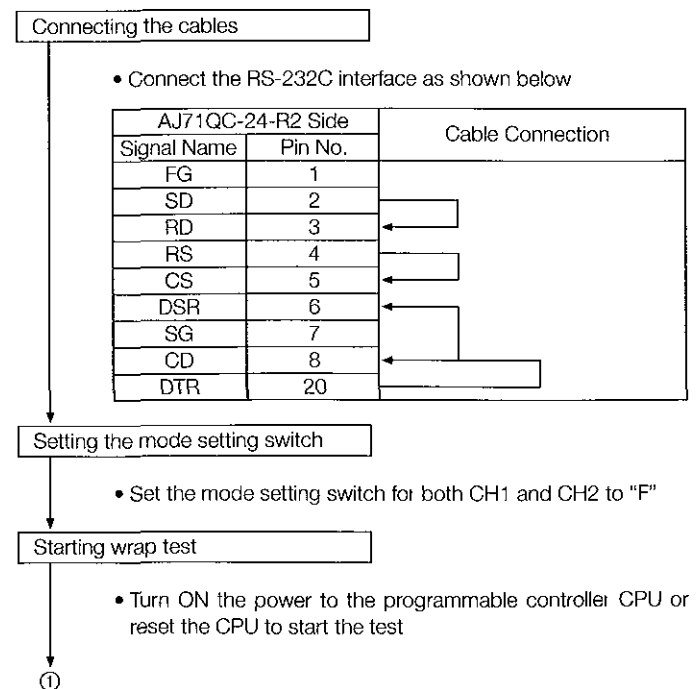
6.1 Set-up Procedure

This section describes how to start up the equipment

For a detail description, refer to the User's Manual for the AJ71QC24(-R2/R4) Serial Communications Module



6.2.2 Wrap Test



7. External Wiring

7.1 Connecting the RS-232C Interface

Typical connecting method for the RS-232C interface is described below

(1) An example of connecting to an external device which is capable of turning ON/OFF the CD signal (pin 8)

AJ71QC24-R2 Side		Connection and Signal Direction (Example)	External Device
Signal Name	Pin No		Signal Name
FG	1	←→	FG
SD (TXD)	2	←→	SD (TXD)
RD (RXD)	3	←→	RD (RXD)
RS	4	←→	RS
CS (CTS)	5	←→	CS (CTS)
DSR (DR)	6	←→	DSR (DR)
SG	7	←→	SG
CD	8	←→	CD
DTR (ER)	20	←→	DTR (ER)

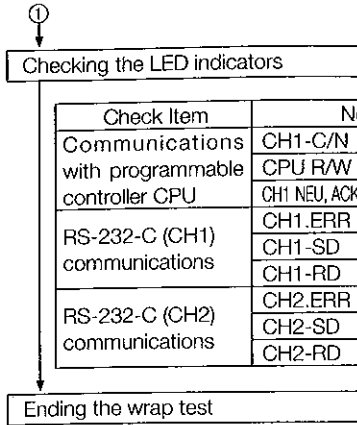
(2) An example of connecting to an external device which is not capable of turning ON/OFF the CD signal (pin 8)

(a) An example for DC code control or DTR/DSR control

AJ71QC24-R2 Side		Connection and Signal Direction (Example)	External Device
Signal Name	Pin No		Signal Name
FG	1	←→	FG
SD (TXD)	2	←→	SD (TXD)
RD (RXD)	3	←→	RD (RXD)
RS	4	←→	RS
CS (CTS)	5	←→	CS (CTS)
DSR (DR)	6	←→	DSR (DR)
SG	7	←→	SG
CD	8	←→	CD
DTR (ER)	20	←→	DTR (ER)

(b) An example for DC code control

AJ71QC24-R2 Side		Connection and Signal Direction (Example)	External Device
Signal Name	Pin No		Signal Name
FG	1	←→	FG
SD (TXD)	2	←→	SD (TXD)
RD (RXD)	3	←→	RD (RXD)
RS	4	←→	RS
CS (CTS)	5	←→	CS (CTS)
DSR (DR)	6	←→	DSR (DR)
SG	7	←→	SG
CD	8	←→	CD
DTR (ER)	20	←→	DTR (ER)



- Turn OFF the power

After the test is complete, change the mode setting switch to enable data transfer with the external device

(Make sure that the mode setting switch for the interface via which data transfer is not to be carried out is set to one of 1 to 7)

8. Outside Dimension

