Pro-face





Device/PLC Connection Manuals



About the Device/PLC Connection Manuals

Prior to reading these manuals and setting up your device, be sure to read the "Important: Prior to reading the Device/PLC Connection manual" information. Also, be sure to download the "Preface for Trademark Rights, List of Units Supported, How to Read Manuals and Documentation Conventions" PDF file. Furthermore, be sure to keep all manual-related data in a safe, easy-to-find location.

5.1 Mitsubishi Electric

5.1.1 System Structure

The following describes the system structure for connecting the GP to Mitsubishi Electric PLCs.

Reference

The Cable Diagrams mentioned in the following tables are listed in the section titled "5.1.2 Cable Diagrams".

MELSEC-A	Series	(using	Link L	/F)
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CPU	Link I/F	Cable Diagram	GP
	Computer Link Unit	•	
A2A	AJ71C24-S6	(Cable Diagram 1)	
A3A	AJ71C24-S8		
A4U	AJ71UC24		GP Series
A2US	A1SJ71C24-R4		
	A1SJ71UC24-R4		
A2USH-S1	A1SJ71UC24-R4		

■ MELSEC-N Series (Link I/F)

CPU	Link I/F	Cable Diagram	GP
	Computer Link Unit	•	
A1N	AJ71C24		
A2N	AJ71C24-S3		
A3N	AJ71C24-S6		
	AJ71C24-S8		
	AJ71UC24	(Cable Diagram 1)	GP Series
A0J2,A0J2H	A0J2-C214-S1		
A1S	A1SJ71C24-R4		
A1SJ,A2SH,A1SH	A1SJ71UC24-R4		
A2CCPU24	Link I/F on CPU unit		

CPU	Adapter	Cable Diagram	Target Machine
	Expansion board	<→	
FX _{2N} *2	FX _{2N} -485-BD	RS-422	GP/GLC/ST Series
FX _{3UC}	FX _{3U} -485-BD	<cable 2="" diagram=""></cable>	ST400/ST403

■ MELSEC-FX Series (using Link I/F)^{*1}

- *1 Choose Mitsubishi's MELSEC-FX2(Link) as the GP-PRO/PBIII project file's PLC type.
- *2 The PLC's system version should be at least 1.06 or later. Check the PLC's version by reading out the data from the register (D8001). For detailed information refer to the Mitsubishi's FX 2N Series Micro Sequencer manuals.

■ MELSEC-QnA Series (using Link I/F)

CPU	Link I/F	Cable Diagram	GP
	Serial Communicaiton Unit / Computer Link Unit		
Q2A,Q2A-S1,Q4A	AJ71QC24 (serial	RS-422	
	communication unit) *1	(Cable Diagram 1)	
	AJ71UC24 (computer link unit)		
	AJ71QC24N-R4	RS-422	
		(Cable Diagram 1) for CN-1	
Q2AS	A1SJ71QC24N(serial	RS-422	
	communication unit) *2	(Cable Diagram 1)	
	A1SJ71UC24(computer link		GP Series
	unit)		
Q2AS-S1	A1SJ71QC24N	RS-422	
	A1SJ71UC24-R4	(Cable Diagram 1)	
	A1SJ71QC24N1	RS-422	
		(Cable Diagram 3)	
Q4AR	AJ71QC24N	RS-422	
		(Cable Diagram1)	

*1 ROM : must be higher than 7179B.

*2 ROM : must be higher than 7179M.

MELSEC-Q Series

CPU	Link I/F	Cable Diagram	GP
	Serial Communication Unit / Computer Link Unit	• •	
Q02CPU-A	A1SJ71UC24-R4	RS-422	GP/GLC Series
Q02HCPU-A Q06HCPU-A		(Cable Diagram 1)	ST400/ST403
Q02CPU Q02HCPU Q06HCPU Q12HCPU	QJ71C24 QJ71C24N QJ71C24N-R4	RS-422 (Cable Diagram 1)	GP/GLC Series
Q25HCPU Q00CPU Q01CPU Q00JCPU			ST400/ST403

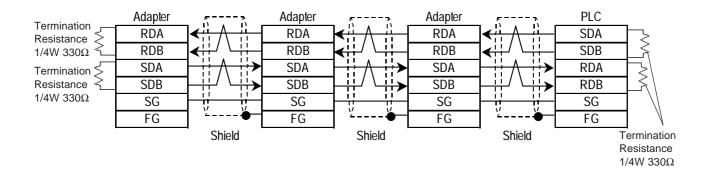
5.1.2 Cable Diagrams

The cable doagrams illustrated below and the cable diagrams recommended by Mitsubishi Electric Corp. may differ, however, using these cables for your PLC operations will not cause any problems.

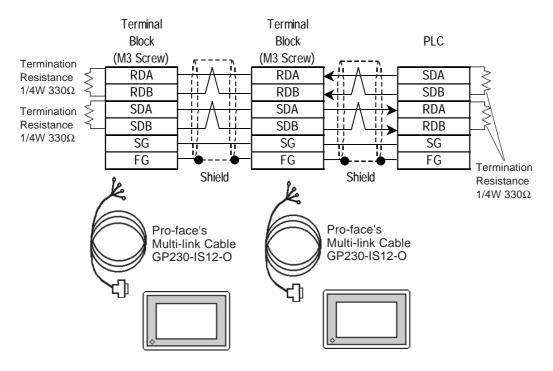
Cable Diagram 1

GP/GLC Series Units

• When using Pro-face's RS-422 connector terminal adapter GP070-CN10-O



• When using Pro-face's Multi-link Cable, GP230-IS12-O

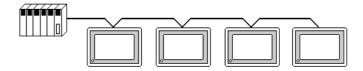




Ground your PLC's FG terminal according to your country's applicable standard. For details, refer to the corresponding PLC manual.



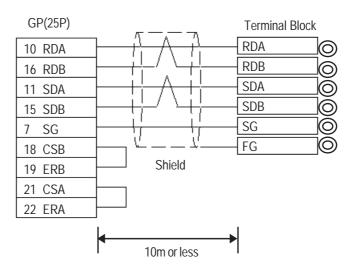
- Pull out the Transfer Cable Shield cover and shape it into a wire and connect it to the PLC's FG terminal.
- GP230-IS12-O Cable FG terminal is not connected to GP's FG.
- If the PLC is equipped with a Termination Resistor switch, turn it ON.
 If the PLC has no switch, then set up the appropriate termination resistance on the PLC.
- Fot the RS-422 connection, use a cable length less than 500m.
- As a general rule, connect the PLC at either end of the circuit, not in the middle.

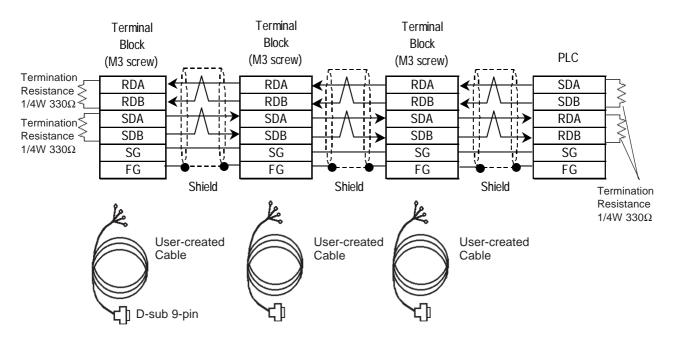




When making your own cable, Mitsubishi's SPEV (SB)-MPC-0.2*3P cable is recommended as the connection cable.

The cable connection lines are as illustrated below and should be less than 10m.

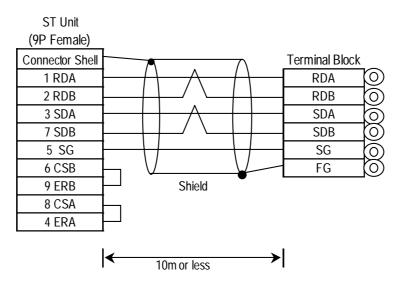




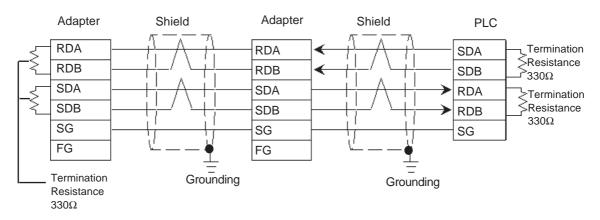
ST400/ST403 Series Units

Note:

The User-created Cable connection lines are as illustrated below and should be less than 10m.

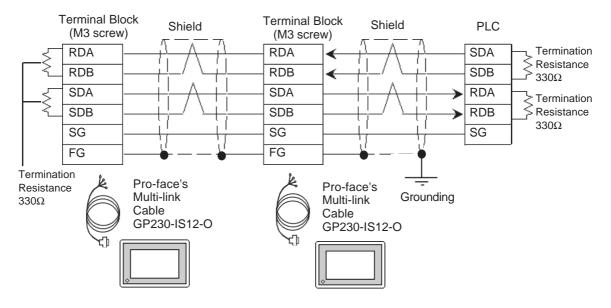


Cable Diagram 2 GP/GLC Series Units



• When using Pro-face's RS-422 connector terminal adapter GP070-CN10-O

• When using Pro-face's GP230-IS12-O(Multi Link Cable)





Ground your PLC's FG terminal according to your country's applicable standard. For details refer to your PLC's manual.



 Pull out a small amount of the Transfer Cable's shield, make a wire out of it and connect it to the PLC's FG terminal.

- The GP230-IS12-O cable's FG terminal is not connected to the GP's FG line.
- Connect a terminating resistor to both ends of the cable.
- When using FX2N-485-BD or FX3U-485-BD, be sure the cable is less than 50 m.
- As a general rule, connect the PLC at the end of the circuit's wiring (see below).

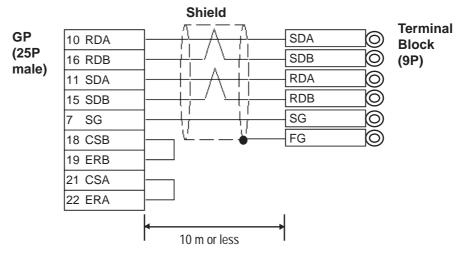


 When using the FX3UC, the unit's termination resistance is built in to the FX3U-485-BD expansion board. When using a 4-wire system, be sure to change the unit's dip switch to 330Ω.

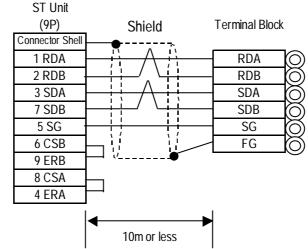


- When processing cable, GP230-IS12-O, the Mitsubishi SPEV (SB)-MPC-0.2x3P is recommended.
- The cable connection lines are as shown below. The cables used between the GP and the terminals should be less than 10m.

GP/GLC Series Units

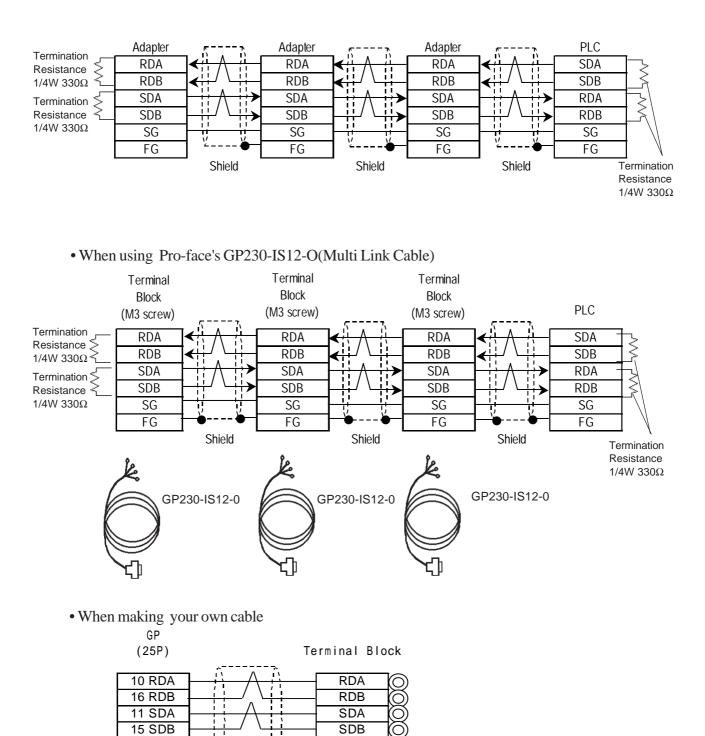


ST400/ST403 Unit



GP-PRO/PBIII for Windows Device/PLC Connection Manual

Cable Diagram 3



SG

FG

• When using Pro-face's RS-422 connector terminal adapter GP070-CN10-O

GP-PRO/PBIII for Windows Device/PLC Connection Manual

Shield

10m or less

í

7 SG

18 CSB

19 ERB

21 CSA 22 ERA 1

5.1.3 Supported Devices

The following describes the range of devices supported by the GP.

MELSEC-A Series (AnA/ AnU/ A2US/ A2USH-S1)

Setup System Area or Communication Information's Storing Address here.

Device	Bit Address	Word Address	Particulars
Input Relay	X0000 ~ X1FFF	X0000 ~ X1FF0	[<u>xxx</u> O]
Output Relay	Y0000 ~ Y1FFF	Y0000 ~ Y1FF0	[<u>xxx</u> O]
Internal Relay	M0000 ~ M8191	M0000 ~ M8176	<u>=16</u>
Latch Relay	L0000 ~ L8191	L0000 ~ L8176	<u>=16</u>
Special Relay	M9000 ~ M9255	M9000 ~ M9240	<u>:16</u>
Annuniciator	F0000 ~ F2047	F0000 ~ F2032	<u> </u>
Link Relay	B0000 ~ B1FFF		
Timer (contact)	TS0000 ~ TS2047		
Timer (coil)	TC 0000 ~ TC 2047		L/H
Counter (contact)	CS0000 ~ CS1023		
Counter (coil)	CC0000 ~ CC1023		
Timer (current value)		TN 0000 ~ TN 2047	
Counter (current value)		CN0000 ~ CN1023	
Data Register		D0000 ~ D8191	Bit [5]
Special Register		D9000 ~ D9255	Bit [5]
Link Register		W0000 ~ W1FFF	<u>Bit</u> F
File Register		R0000 ~ R8191	Bit] 5] *1

*1 When using the File Register and the AnA or AnU, use the User's memory area in the memory cassettes.

When the File Register is setup when the memory cassette is not in use, an error will develop when communicating.

here.			U
Device	Bit Address	Word Address	Particulars
Input Relay	X0000 ~ X07FF	X0000 ~ X07F0	[<u>xxx</u> O]
Output Relay	Y0000 ~ Y07FF	Y0000 ~ Y07F0	<u>xxx</u> O] *1
Internal Relay	M0000 ~ M2047	M0000 ~ M2032	[÷]6]
Latch Relay	L0000 ~ L2047		
Special Relay	M9000 ~ M9255	M9000 ~ M9240	<u>÷16</u> *2
Annuniciator	F0000 ~ F255	F000 ~ F240	<u>[÷]6</u>]
Link Relay	B0000 ~ B03FF		
Timer (contact)	TS000 ~ TS255		L UH
Timer (coil)	TC000 ~ TC255		
Counter (contact)	CS000 ~ CS255		
Counter (coil)	CC000 ~ CC255		
Timer (current value)		TN000 ~ TN255	
Counter (current value)		CN000 ~ CN255	
Data Register		D0000 ~ D1023	Bit] 5]
Link Register		W0000 ~ W03FF	
File Register		R0000 ~ R8191	Bit 151 *3

MELSEC-N Series (AnN/ A2C/ A1S/ A1SJ/A2SH)

Setup System Area or Communication Information's Storing Address here.

*1 The Output Relays Y01F0-Y01FF (word Y01F0) are used by the PLC, and cannot be set.. (only for A2C)

*2 A MELSEC-AnN and AJ71C24-S3 (or AJ71C24) cannot be matched and used.

*3 When using the File Register and the AnN, use the User's memory area in the memory cassettes.

When the File Register is setup when the memory cassette is not in use, an error will develop when communicating.

Device	Bit Address	Word Address	Remarks	
Input Relay	X0000 - X0377	X0000 - X0360	OCT 8 *** 0	
Output Relay	Y0000 - Y0377	Y0000 - Y0360	OCT 8 *** 0	
Auxilary Relay	M0000 - M7679	M0000 - M7664	÷16	
State	S0000 - S4095	S0000 - S4080	÷16)	
Special Auxilary relay	M8000 - M8511	M8000 - M8496	÷16) *1	
Timer (contact)	TS000 - TS511			L/H
Counter (contact)	CS000 - CS255			
Timer (current)		TN000 - TN511		
Counter (current)		CN000 - CN255	*	2
Data Register		D0000 - D7999	в і t 15	3
Special Data Register		D8000 - D8511	в i t 15 *1 *	3
Extended Register		R00000 - R32767	<u>ві</u> t 15 */	

Setup System Area here.

MELSEC-FX Series

*1 The Special Auxilary Relay and the Special Data Register are divided into three areas. These are the Exclusive Reading Area, the Exclusive Writing Area and the System Area. For details, refer to your PLC's manual.

- *2 Word addresses CN200 to CN255 are 32 bit counters.
- *3 When designating data register addresses, be sure that they do not overlap with the special register area.

For example, do not perform a write of two or more words, starting from "D7999". When a write of two or more words is done starting from "D7999", a "Host Communication" error (02:FA) occurs.

*4 With only FX3UC units.

*5 Address ranges will vary depending on the CPU model used.

MELSEC-QnA Series

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Setup System Area or Communication Information's Storing Address here.

Device	Bit Address	Word Address	Particulars	
Input Relay	X0000 ~ X1FFF	X0000 ~ X1FF0	***0]	
Output Relay	Y0000 ~ Y1FFF	Y0000 ~ Y1FF0	***0]	
Internal Relay	M00000 ~ M32767	M00000 ~ M32752	÷ 16)	
Special Relay	SM0000 ~ SM2047	SM0000 ~ SM2032	÷ 16)	
Latch Relay	L00000 ~ L32767	L00000 ~ L32752	÷16)	
Annunciator	F00000 ~ F32767	F00000 ~ F32752	÷ 16)	
Edge Relay	V00000 ~ V32767	V00000 ~ V32752	÷16)	
Step Relay	S0000 ~ S8191	S0000 ~ S8176	÷16)	
Link Relay	B0000 ~ B7FFF	B0000 ~ B7FF0	***0	
Special Relay	SB000 ~ SB7FF	SB000 ~ SB7F0	***0]	
Timer (contact)	TS00000 ~ TS23087			
Timer (coil)	TC00000 ~ TC23087			
Aggregation Timer (contact)	SS00000 ~ SS23087			L/H
Aggregation Timer (coil)	SC00000 ~ SC23087			
Counter (contact)	CS00000 ~ CS23087			
Counter (coil)	CC00000 ~ CC23087			
Timer (current value)		TN00000 ~ TN23087		
Aggregation Timer (current value)		SN00000 ~ SN23087		
Counter (current value)		CN00000 ~ CN23087		
Data Register		D00000 ~ D25983	<u>віt</u> 15	
Special Register		SD0000 ~ SD2047	Bit	
Link Register		W0000 ~ W657F	Bit F	
Special Link Register		SW000 ~ SW7FF	<u>віt</u> 15	
File Register (nomal)		R00000 ~ R32767	<u>ві t15</u> *1	
File Register (serial)		0R0000 ~ 0R7FFF 1R0000 ~ 1R7FFF	<u>ві</u> т F] *1	

*1 When using the File Register, a Memory Card is necessary. Depending on the Memory Card being used, the File Register's device range differs.



• The device ranges given here are based on the maximum values possible for parameter settings. Depending on your CPU, usable device types and range may differ. Before using, refer to your CPU user manual.

■ MELSEC-Q Series (A Mode CPU)

Setup System Area or Communication Information's Storing Address here.

Device	Bit Address	Word Address	Particulars	
Input Relay	X0000 ~ X1FFF	X0000 ~ X1FF0	<u>***</u> 0]	
Output Relay	Y0000 ~ Y1FFF	Y0000 ~ Y1FF0	***0	
Internal Relay	M0000 ~ M8191	M0000 ~ M8176	÷ 16	
Latch Relay	L0000 ~ L8191	L0000 ~ L8176	÷16	
Special Relay	M9000 ~ M9255	M9000 ~ M9240	÷16	
Annunciator	F0000 ~ F2047	F0000 ~ F2032	÷16	
Link Relay	B0000 ~ B1FFF			
Timer (Contact)	TS0000 ~ TS2047			
Timer (Coil)	TC0000 ~ TC2047			L/H
Counter (Contact)	CS0000 ~ CS1023			
Counter (Coil)	CC0000 ~ CC1023			
Timer (Current Value)		TN0000 ~ TN2047		
Counter (Current Value)		CN0000 ~ CN1023		
Data Register		D0000 ~ D8191	<u>віt</u> 15	
Spcial Register		D9000 ~ D9255	<u>ві</u> t 15	
Link Register		W0000 ~ W1FFF	Bit	
File Register		R0000 ~ R8191	<u>віt15</u> *1	

*1 The amount of space available when using the File Register will vary, depending on the amount of CPU ROM/RAM available, or the amount of memory available on the memory card.

■ MELSEC-Q Series (Q Mode CPU)

Setup System Area or Communication Information's Storing Address

bere Device	Bit Address	Word Address	Particulars	
Input Relay	X0000 ~ X1FFF	X0000 ~ X1FF0	*** 0]	
Output Relay	Y0000 ~ Y1FFF	Y0000 ~ Y1FF0	*** 0]	
Internal Relay	M00000 ~ M32767	M00000 ~ M32752	÷ 16)	
Special Relay	SM0000 ~ SM2047	SM0000 ~ SM2032	<u> </u>	
Latch Relay	L00000 ~ L32767	L00000 ~ L32752	<u> </u>	
Annunciator	F00000 ~ F32767	F00000 ~ F32752	(÷16)	
Edge Relay	V00000 ~ V32767	V00000 ~ V32752	<u>+ 16</u>	
Step Relay	S0000 ~ S8191	S0000 ~ S8176	÷16	
Link Relay	B0000 ~ B7FFF	B0000 ~ B7FF0	***0	
Special Relay	SB000 ~ SB7FF	SB000 ~ SB7F0	<u>***</u> 0]	
Timer (contact)	TS00000 ~ TS23087			
Timer (coil)	TC00000 ~ TC23087			
Aggregation Timer (contact)	SS00000 ~ SS23087			L/H
Aggregation Timer (coil)	SC00000 ~ SC23087			
Counter (contact)	CS00000 ~ CS23087			
Counter (coil)	CC00000 ~ CC23087			
Timer (current value)		TN00000 ~ TN23087		
Aggregation Timer (current value)		SN00000 ~ SN23087		
Counter (current value)		CN00000 ~ CN23087		
Data Register		D00000 ~ D25983	в і t 15	
Special Register		SD0000 ~ SD2047	<u>ві</u> 15	
Link Register		W0000 ~ W657F	Bit F	
Special Link Register		SW000 ~ SW7FF	Bit F	
File Register (nomal)		R00000 ~ R32767	<u>віt</u> 15 *1	
		0R0000 ~ 0R7FFF	B i t F *1	
File Register (serial)		1R0000 ~ 1R7FFF	Bit F *1	
	:	:	:	
		31R0000 ~ 31R67FF	Bit F *1	

- *1 The amount of space available when using the File Register will vary, depending on the amount of CPU ROM/RAM available, or the amount of memory available on the memory card.
- Note:
- The device ranges given here are based on the maximum values possible for parameter settings. Depending on your CPU, usable device types and range may differ. Before using, refer to your CPU user manual.

5.1.4 Environment Setup

The following lists Digital's recommended PLC and GP communication settings.

GP Setup		PLC (Data Registe	PLC (Data Register) Setup	
Baud Rate	19200 bps	Baud Rate	19200	
Data Length	7 bit	Data Length	7 bit	
Stop Bit	2 bit	Stop Bit	2 bit	
Parity Bit	Even	Parity Check Parity setting even/odd	Yes Even	
Data Flow Control	ER Control			
Communicaiton Format	4-wire type	C hannel setup	RS-422	
		Mode Setup	8 (Format 4 protocol)	
		Write during RUN	Yes	
		Sumcheck	Yes	
		Transmission area terminal resistance	e Present	
		Receiving area terminal resistance	Present	
Unit No.	0	Station No.	0	

■ MELSEC-A Series (When using Computer Link I/F)

■ MELSEC-FX Series (FX_{2N})

GP Setup		PLC (D	PLC (Data Register) Setup	
Baud Rate	19200 bps	Baud Rate	19200	
Data Length	7	Data Length	7	
Stop Bit	2	Stop Bit	2	
Parity Bit	Even	Parity Bit	Even	
Data Flow Control	ER Control		• 	
Communication Format	4-wire type	Н/W Туре	RS485(RS422) I/F	
Station No.	0	Station No.	0	
		Use Comm. Settings	Yes	
		Sumcheck	Yes	
		Protocol	Yes	
		Mode	Format 4 protocol	
		Header	No	
		Terminator	No	



• PLC's Station NO. data must be written in data register D8121 and other settings must be written in data register D8120. For details refer to Mitsubishi's "FX Communication Users Manual".

GP Settings		PLC (Da	PLC (Data Register) Settings	
Baud Rate	19200 bps	Baud Rate	19200	
Data Length	7	Data Length	7	
Stop Bit	2	Stop Bit	2	
Parity Bit	Even	Parity Bit	Even	
Data Flow Control	ER Control		ER Control	
Communication Format	4-wire type	Computer Link	RS485(RS422) I/F ^{*1}	
Station No.	0	Station No.*2	00h	
		СН	CH1	
		Protocol	Yes	
		Mode	Format 4 protocol	
		Sumcheck	Added	
		Comm. Settings	Use checking	
		Header	No	
		Terminator	No	

■ MELSEC-FX Series (FX_{3UC})

*1 The termination resistance will vary depending on if a 4-wire or a 2-wire connection is used. Termination resistance is built into the FX3U-485-BD expansion board.

When using a 4-wire line, use the dip switch to change the setting to 300Ω .

*2 Even though PLC station numbers are set using 00h to 0Fh, the GP Series units use only 0 to 15.



It is possible to enter PLC settings via the ladder software's PC system settings or to write data directly to data registers D8120 and D8121. For details, refer to Mitsubishi's "FX Communication User Manual".

GP Setup		PLC (Data F	PLC (Data Register) Setup	
Baud Rate	19200 bps *1	Baud Rate	19200	
Data Length	7 bit	Data Length	7 bit	
Stop Bit	2 bit	Stop Bit	2 bit	
Parity Bit	Even	Parity Check Parity setting even/odd	Yes Even	
Data Flow Control	ER Control			
Communicaiton Format	4-wire type	Mode Setup	4 (Format 4 protocol)	
		Sumcheck	Yes	
		Transmission area terminal resistance	Present	
		Receiving area terminal resistance	Present	
Unit No.	0	Station No.	0	

MELSEC-QnA Series

*1 AJ71QC24N-R4, A1SJ71QC24N, AJ71QC24N can use a baud rate of 115.2kbps.



- CH1 and CH2 of a serial communication unit can communicate at the same time, given any of the following conditions.
- Refer to the MELSEC A Series table when using environment with MELSEC QnA and Computer Link I/F AJ71UC24 together.

Condition 1 : The sticker on the top of the communication unit indicates the version is AB or later.

Condition 2 : The date shown on the side of the communication unit indicates it was produced in September 1996 (9609) or later.

Condition 3 : The communication ROM version is 7179M or later.

■ MELSEC-QnA Series(using Serial Communication Unit A1SJ71QC24N1)

GP Setup		Serial Communication Unit Settings ^{*1}	
Baud Rate	19200 bps	Baud Rate	19200 bps
Data Length	7 bits	Data Length	7 bits
Stop Bit	2 bits	Stop Bit	2 bits
Parity Bit	Even	Parity bit Even/Odd parity	Even
Control system	ER Control		
Communication method (RS-232C is used.)	RS-232C		
Communication method (RS-422 is used.)	4-wire type		
		Sum check code	Enabled
Unit No.	0	Node number	0
		Setting change	Permit
		Writing during RUN	Permit
		Operation setting	Independent
		Communication protocol setting	MC protocol (form 4)

*1 The setting is made by Mitsubishi's GPP function software.

GP Setup		Computer Lin	Computer Link Unit Settings	
Baud Rate	19200 bps (fix ed)	Baud Rate	19200 bps	
Data Length	7 bits (fixed)	Data Length	7 bits	
Stop Bit	2 bits (fix ed)	Stop Bit	2 bits	
Parity Bit	Even	Parity Check Parity setting even/odd	Yes Even	
Data Flow Control	ER Control		•	
Communicaiton Format (RS-422)	4-wire type	Mode Setup (RS-422)	8 (Format 4 Protocol Mode)	
		Write possible in RUN mode	Possible	
		Sumcheck	Yes	
Unit No.	0 (fix ed)	Station No.	0	

■ MELSEC-Q Series (using A Mode CPU Computer Link Unit)

■ MELSEC-Q Series (Q Mode CPU Serial Communication Unit)

GP Setup		Serial Communication Unit Settings *1	
Baud Rate	19200 bps	Baud Rate	19200 bps
Data Length	7 bits	Data Length	7 bits
Stop Bit	2 bits	Stop Bit	2 bits
Parity Bit	Even	Parity Check Parity setting even/odd	Yes Even
Data Flow Control	ER Control		
Communicaiton Format (RS-422)	4-wire type	Mode Setup (RS-422)	4 (Format 4 Protocol Mode)
		Sumcheck	Yes
Unit No.	0	Station No.	0

*1 The setting is made by Mitsubishi's GPP function software.