Mitsubishi Electric Corporation

A Series CPU Direct Driver

Introduction

This manual describes how to connect the Display and the External Device (target PLC).

In this manual, the connection procedure will be described by following the below sections:

1	System Configuration This section shows the types of External Device which can be connected and SIO type.	☞ "1 System Configuration" (page 3)

2	Selection of External Device Select a model (series) of the External Device to be connected and connection method.	☞ "2 Selection of External Device" (page 5)

3	Example of Communication Settings This section shows setting examples for communicating between the Display and the External Device.	☞ "3 Example of Communication Setting" (page 6)

4	Setup Items This section describes communication setup items on the Display. Set communication settings of the Display with GP-Pro Ex or in off-line mode.	☞ "4 Setup Items" (page 10)

5	Cable Diagram This section shows cables and adapters for connecting the Display and the External Device.	☞ "5 Cable Diagram" (page 15)

Operation

1   System Configuration

The system configuration in the case when the External Device of Mitsubishi Electric Corp. and the Display are connected is shown.
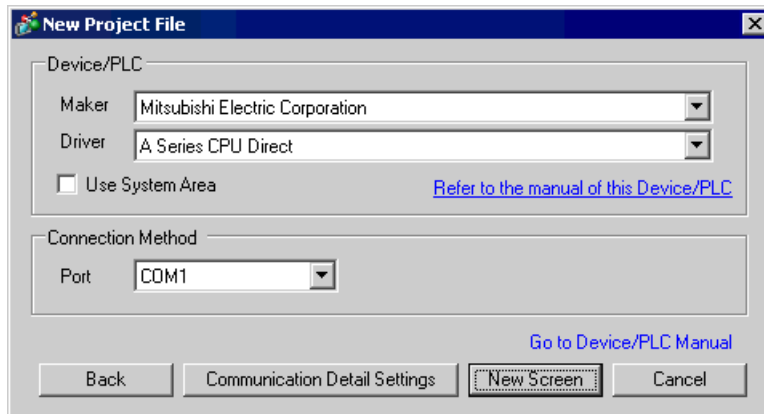
Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
MELSEC AnA Series	A2A A3A A2U A2US A2U-S1 A2US-S1 A2USH-S1 A3U A4U	CPU Direct	RS232C	Setting Example 1 (page 6)	Cable Diagram 1 (page 17)
			RS422 (4wire)	Setting Example 2 (page 8)	Cable Diagram 2 (page 18)
	A2A A3A A2US A2U-S1 A2USH-S1 A4U	2-port adapter II by Pro-face (Model: GP070-MD11)	RS422 (4wire)	Setting Example 3 (page 9)	Cable Diagram 3 (page 19)

Series	CPU	Link I/F	SIO Type	Setting Example	Cable Diagram
MELSEC AnN Series	A2CCPU24 A2CJ-S3 A3H A0J2H A1N A2N	CPU Direct	RS232C	Setting Example 1 (page 6)	Cable Diagram 1 (page 17)
	A3N A1S A1SH A2SH A1SJ		RS422 (4wire)	Setting Example 2 (page 8)	Cable Diagram 2 (page 18)
	A2CJ-S3 A3H A0J2H A2N A3N A2SH A1SH A1S A1SJ	2-port adapter II by Pro-face (Model: GP070-MD11)	RS422 (4wire)	Setting Example 3 (page 9)	Cable Diagram 3 (page 19)
MELSEC Q Series A Mode	Q02CPU-A Q02HCPU-A Q06HCPU-A	CPU Direct	RS232C	Setting Example 1 (page 6)	Cable Diagram 4 (page 21)

2 Selection of External Device

Select External Device to connect to the display.

Setup Items	Setup Description
Maker	Select the maker of the External Device to be connected. Select "Mitsubishi Electric Corporation".
Driver	Select a model (series) of the External Device to be connected and connection method. Select "A Series CPU Direct". Check the External Device which can be connected in "A Series CPU Direct" in system configuration.)☞ "1 System Configuration" (page 3)
Use System Area	Check this option when you synchronize the system data area of Display and the device (memory) of External Device. When synchronized, you can use the ladder program of External Device to switch the display or display the window on the display. 　Cf.　GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)" This can be also set with GP-Pro EX or in off-line mode of Display. 　Cf.　GP-Pro EX Reference Manual " 5.14.6 Setting Guide of [System Setting Window]■[Main Unit Settings] Settings Guide◆System Area Setting" 　Cf.　Maintenance/Troubleshooting "2.14.1 Settings common to all Display models ◆System Area Settings"
Port	Select the Display port to be connected to the External Device.

3 Example of Communication Setting

Examples of communication settings of the Display and the External Device, recommended by Pro-face, are shown.

3.1 Setting Example 1

■ Settings of GP-Pro EX

◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.

◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

NOTE

- Set Series according to your External Device.
- Set [AnA Series] when you use Q Series A Mode.

■ Settings of External Device

There is no setting on the External Device.

3.2　　　Setting Example 2

■ Settings of GP-Pro EX

◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.

◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

| NOTE | • Set Series according to your External Device. |

■ Settings of External Device

There is no setting on the External Device.

3.3 Setting Example 3

■ Settings of GP-Pro EX

◆ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.

◆ Device Setting

To display the setting screen, click ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].

NOTE
• Set Series according to your External Device.

■ Settings of External Device

There is no setting on the External Device.

4 Setup Items

Set communication settings of the Display with GP-Pro EX or in off-line mode of the Display.

The setting of each parameter must be identical to that of External Device.

)"3 Example of Communication Setting" (page 6)

4.1 Setup Items in GP-Pro EX

■ Communication Settings

To display the setting screen, select [Device/PLC Settings] from [System setting window] in workspace.

Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device.
Speed	Select speed between the External Device and the Display.
Data Length	Select data length.
Parity	Select how to check parity.
Stop Bit	Select stop bit length.
Flow Control	Select the communication control method to prevent overflow of transmission and reception data.
Timeout	Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device.

Setup Items	Setup Description
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the Display retransmits the command.
Wait To Send	Use an integer from 0 to 255 to enter standby time (ms) for the Display from receiving packets to transmitting next commands.
Adapter	When using adapter, select either "Direct" or "2 Port". When using 2-port adapter II, select "2 Port".
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type.

■ Device Setting

To display the setting screen, click ▦ ([Setting]) of External Device you want to set from [Device-Specific Settings] of [Device/PLC Settings].
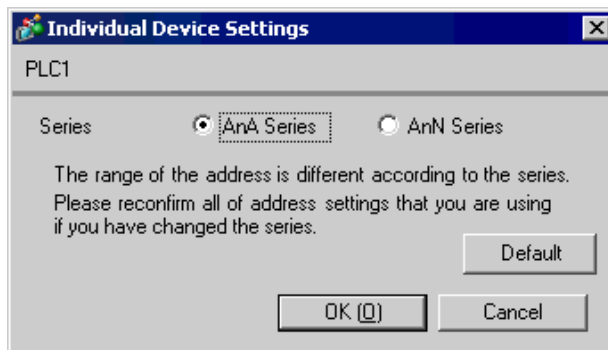
Setup Items	Setup Description
Series	Select either "AnA Series" or "AnN Series" for the driver series name. Set "AnA Series" when you use Q Series A Mode.

4.2 Setup Items in Off-Line Mode

NOTE • Please refer to Maintenance/Troubleshooting for more information on how to enter off-line mode
or about operation.
Cf. Maintenance/Troubleshooting "2.2 Offline Mode"

■ Communication Settings

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings] in off-line mode. Touch the
External Device you want to set from the displayed list.

(Page 1/2)

Comm.	Device			

A Series CPU Direct   [COM1]   Page 1/2

SIO Type   RS232C ▼
Speed   9600
Data Length   8
Parity   ODD
Stop Bit   1
Flow Control   NONE

Timeout(s)   3 ▼ ▲
Retry   2 ▼ ▲
Wait To Send(ms) 0 ▼ ▲

Adapter   2 Port ▼

                                                              ➡

| | Exit | | Back | 2005/09/02 12:25:52 |

Setup Items	Setup Description
SIO Type	Select the SIO type to communicate with the External Device.
Speed	Speed between the External Device and the Display is shown.
Data Length	Data length is displayed.
Parity	The parity check method is displayed.
Stop Bit	Stop bit length is displayed.
Flow Control	The communication control method to prevent overflow of transmission and reception data is displayed.
Timeout	Use an integer from 1 to 127 to enter the time (s) for which the Display waits for the response from the External Device.
Retry	In case of no response from the External Device, use an integer from 0 to 255 to enter how many times the Display retransmits the command.
Wait To Send	Use an integer from 0 to 255 to enter standby time (ms) for the Display from receiving packets to transmitting next commands.
Adapter	When using adapter, select either "Direct" or "2 Port". When using 2-port adapter II, select "2 Port".

(Page 2/2)

Comm.	Device			

A Series CPU Direct   [COM1]   Page 2/2

RI / VCC   ● RI   ○ VCC
In the case of RS232C, if you use the
Digital's RS232C Isolation Unit or CPU
I/F Cable for Mitsubishi PLC A Series
(Digital's:GP430-IP10-0), please
select it to VCC.

←

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Setup Items	Setup Description
RI/VCC	You can switch RI/VCC of the 9th pin when you select RS232C for SIO type.

■ Device Setting

To display the setting screen, touch [Device/PLC Settings] from [Peripheral Settings]. Touch the External Device you want to set from the displayed list, and touch [Device].

Setup Items	Setup Description
Device/PLC Name	Select the External Device for device setting. Device name is a title of External Device set with GP-Pro EX.(Initial value [PLC1])
Series	The driver series name "AnA Series" or "AnN Series" is displayed. You cannot change Series in [Device Setting] in off-line mode.

5   Cable Diagram

The cable diagram shown below may be different from the cable diagram recommended by Mitsubishi Electric Corp. Please be assured there is no operational problem in applying the cable diagram shown in this manual.

• The FG pin of the main body of the External Device must be D-class grounded. Please refer to the manual of the External Device for more details.

• SG and FG are connected inside the Display. When connecting SG to the External Device, design the system not to form short-circuit loop.

• Connect the isolation unit, when communication is not stabilized under the influence of a noise etc..

• When connecting IPC with External Device by RS-232C, the COM port which can be used changes with series. Please refer to the manual of IPC for details.

Usable port

Series	Usable port
PS-2000B	COM1[*1] , COM2, COM3[*1], COM4
PS-3650A, PS-3651A	COM1[*1]
PS-3700A (Pentium®4-M)	COM1[*1], COM2[*1], COM3[*2] , COM4

*1   The RI/5V can be switched. Please switch with the change switch of IPC.

*2   It is necessary to set up the SIO type with the Dip switch.

• When connecting to the COM3 of PS-3700A (Pentium®4-M) with External Device, it is necessary to set up the SIO type of COM3 with a Dip switch. Please refer to the manual of PS-3700A (Pentium®4-M) for details.

Dip switch setting: RS-232C

| Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	OFF	SIO type of COM3: RS-232C
3	OFF	
4	OFF	Output mode of TX data: Always output
5	OFF	Terminal resistance insertion to TX (220Ω): None
6	OFF	Terminal resistance insertion to RX (220Ω): None
7	OFF	Short-circuit of TXA and RXA: Does not Exist
8	OFF	Short-circuit of TXB and RXB: Does not Exist
9	OFF	Auto Detection: Disable
10	OFF	

Dip switch setting: RS-422/485 (4 wire)

Dip switch	Setting	Description
1	OFF	Reserve (always OFF)
2	ON	SIO type of COM3: RS-422/485
3	ON	
4	OFF	Output mode of TX data: Always output
5	OFF	Terminal resistance insertion to TX (220Ω): None
6	OFF	Terminal resistance insertion to RX (220Ω): None
7	OFF	Short-circuit of TXA and RXA: Does not Exist
8	OFF	Short-circuit of TXB and RXB: Does not Exist
9	OFF	Auto Detection: Disable
10	OFF	

Cable Diagram 1

Display (Connection Port)	Cable	Notes
GP (COM1) IPC[*1][*2]	Interface internal cable for Mitsubishi FA equipments by Diatrend Corp. DAFXIH-CABV (3m)	Available to order the length up to 15 m

*1   Usable ports are different by the series.
        Usable port (page 15)

*2   When use the COM3 of PS -3700A (Pentium®4-M) , set the SIO type of COM3 with Dip switch.
        Dip switch setting: RS-232C (page 15)
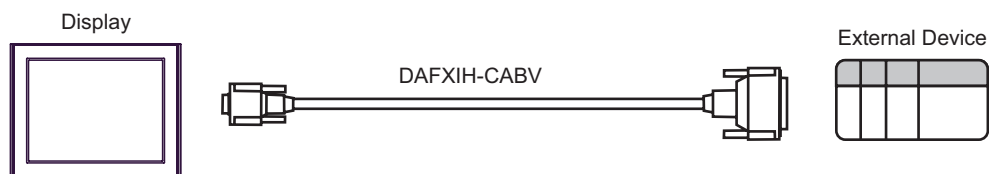
Cable Diagram 2

| Display (Connection Port)		Cable	Notes
GP*1 (COM1) AGP-3302B (COM2) IPC*2 (COM3)	A	Mitsubishi A connection cable by Pro-face CA3-CBLA-01 (5m)	
	B	Your own cable	The cable length must be 5m or less.

*1   All GP models except AGP-3302B

*2   Only COM3 of PS -3700A (Pentium®4-M) can be used. When use the COM3, set the SIO type of COM3 with Dip switch.

Dip switch setting: RS-422/485 (4 wire) (page 16)

A) When using Mitsubishi A connection cable (CA3-CBLA-01) by Pro-face.

Display

External Device

CA3-CBLA-01

B) When using your own cable

External Device
D-sub 25 pin (plug)

D-sub 9 pin (socket)   Shield

Termination resistance 330Ω 1/4W

Display

Pin	Signal name		Pin	Signal name
1	RDA		3	SDA
2	RDB		16	SDB
3	SDA		2	RDA
7	SDB		15	RDB
4	ERA		4	CSA
9	ERB		17	CSB
8	CSA		5	ERA
6	CSB		18	ERB
5	SG		7	SG
Shell	FG		20	
			21	
			Shell	FG

Termination resistance 330Ω 1/4W
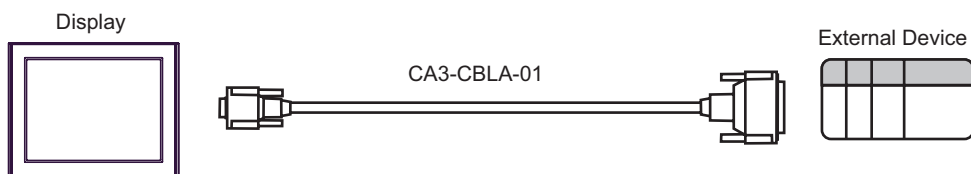
Cable Diagram 3

Display (Connection Port)		Cable	Notes
GP[*1] (COM1) AGP-3302B (COM2) IPC[*2] (COM3)	A	COM port conversion adapter by Pro-face CA3-ADPCOM-01 + 2-port adapter cable for AGP by Pro-face CA3-MDCB11 (5m) + 2-port adapter II by Pro-face GP070-MD11	
	B	Your own cable + 2-port adapter II by Pro-face GP070-MD11	The cable length must be 600m or less.
GP[*3] (COM2)	C	Online adapter by Pro-face CA4-ADPONL-01 + 2-port adapter cable for AGP by Pro-face CA3-MDCB11 (5m) + 2-port adapter II by Pro-face GP070-MD11	
	D	Online adapter by Pro-face CA4-ADPONL-01 + Your own cable + 2-port adapter II by Pro-face GP070-MD11	The cable length must be 600m or less.

*1   All GP models except AGP-3302B

*2   Only COM3 of PS -3700A (Pentium®4-M) can be used. When use the COM3, set the SIO type of COM3 with Dip switch.
        Dip switch setting: RS-422/485 (4 wire) (page 16)

*3   All GP models except GP-3200 series and AGP-3302B

   A)   When using COM port conversion adapter (CA3-ADPCOM-01), 2-port adapter cable for AGP (CA3-MDCB11) by Pro-face and 2-port adapter II (GP070-MD11) by Pro-face.
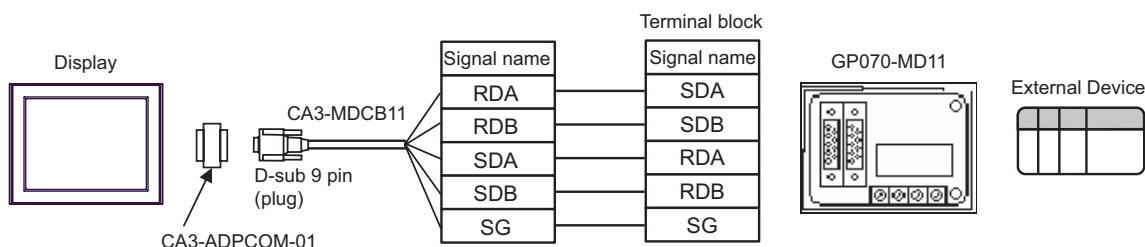
B) When using your own cable and 2-port adapter II (GP070-MD11) by Pro-face.
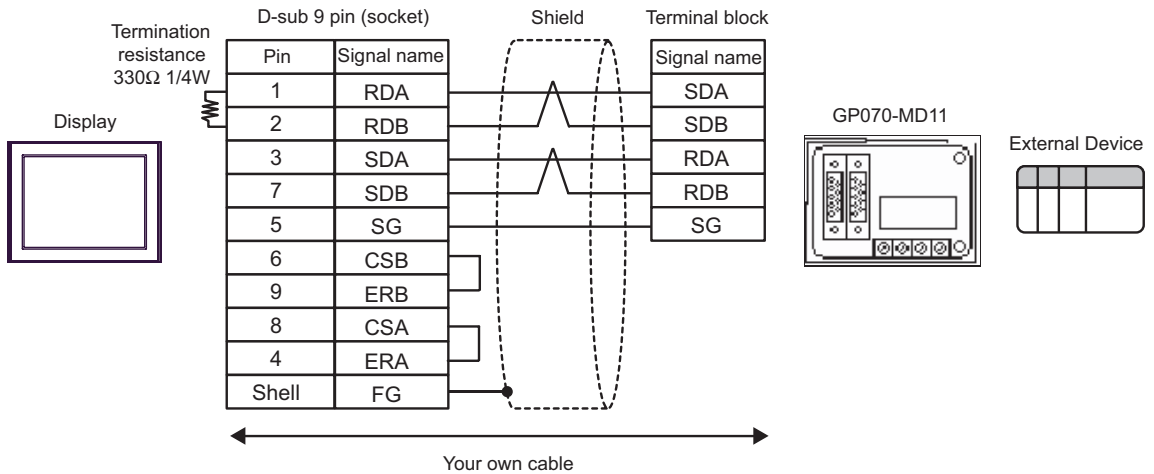
C) When using online adapter (CA4-ADPONL-01), 2-port adapter cable for AGP (CA3-MDCB11) by Pro-face and 2-port adapter II (GP070-MD11) by Pro-face.
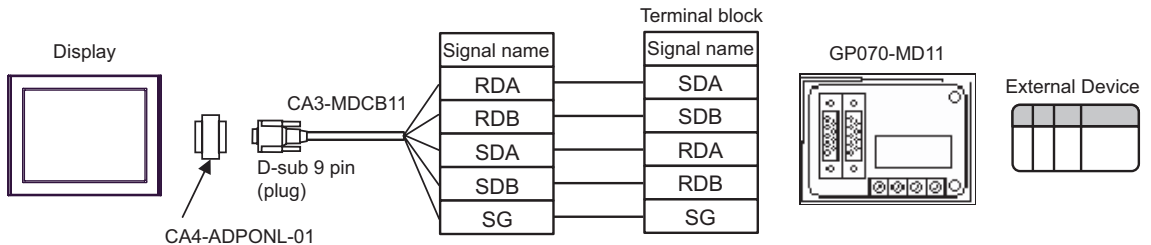
D) When using online adapter (CA4-ADPONL-01) by Pro-face, your own cable and 2-port adapter II (GP070-MD11) by Pro-face.
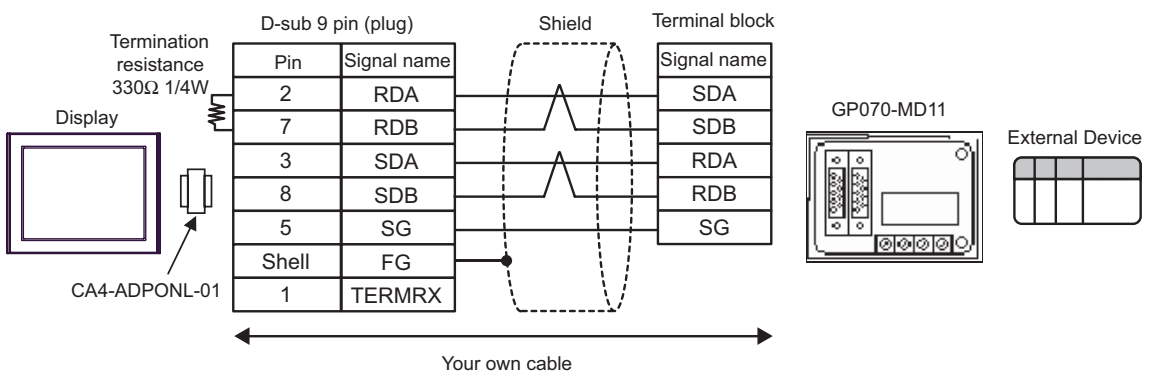
Cable Diagram 4

Display (Connection Port)	Cable	Notes
GP (COM1) IPC[*1][*2]	Mitsubishi Q connection cable by Pro-face CA3-CBLQ-01 (5m) or QC30R2 (3m) by Mitsubishi Electric Corp. or DQCABR2V-H (3m)[*3] by Diatrend Corp.	

*1　Usable ports are different by the series.
　　Usable port (page 15)

*2　When use the COM3 of PS -3700A (Pentium®4-M) , set the SIO type of COM3 with Dip switch.
　　Dip switch setting: RS-232C (page 15)

*3　Specify the cable length with (*m) Please contact Diatrend Corp. for available specified cable length.

CA3-CBLQ-01
or
QC30R2
or
DQCABR2V-H

Display

External Device
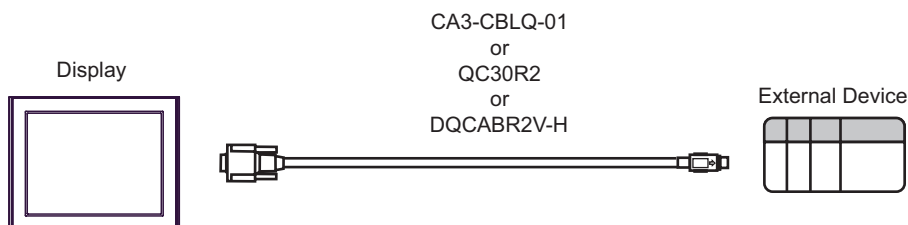
IMPORTANT
- We recommend that ferrite core should be attached to your cable for improving noise tolerance.
- Attach ferrite core to the closest position to the connector on both ends of the cable. Also, wind the cable around ferrite core (1 turn) to expect more noise tolerance as shown below.

D-sub 9 pin (socket)　　　　　　　　　　Mini DIN 6 pin
Display ←　　　　　　　　　　　　→ External Device
Ferrite core　　　Cable tie : Use cable tie to fix ferrite core.
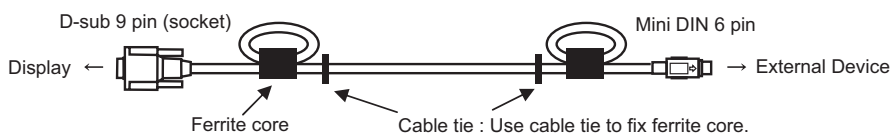
- The cable length must be 15 meters or less.

<Ferrite core recommended>

Maker: Seiwa Electric MFG. Co., Ltd.

Model: E04SR301334


39mm

34mm

13mm　30mm
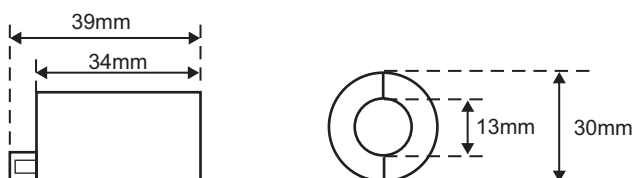
- You can use the ferrite core by other companies if it has same size as shown above.

6   Supported Device

Range of supported device address is shown in the table below. Please note that the actually supported range of the devices varies depending on the External Device to be used. Please check the actual range in the manual of your External Device.

6.1   MELSEC AnA Series, Q Series A Mode

⬚⬚ This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Notes
Input	X0000 - X1FFF	X0000 - X1FF0		⟦***0⟧
Output	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		⟦Bit15⟧
Special Register	------	D9000 - D9255		⟦Bit15⟧
Link Register	------	W0000 - W1FFF		⟦BitF⟧
File Register	------	R0000 - R8191		⟦Bit15⟧ [*1]

*1   When you use the file register in AnA, AnU, AnN and A3H, use the user memory area in the memory cassettes below.

　　·A3NMCA-0　　·A3NMCA-2　　·A3NMCA-4　　·A3NMCA-8　　·A3NMCA-16

　　·A3NMCA-24　　·A3NMCA-40　　·A3NMCA-56　　·A4UMCA-8E

When you set the file register without using the memory cassette, error occurs during communication. Note that you may not use the file register when you set ROM to the ladder program.

NOTE

- Please refer to the GP-Pro EX Reference Manual for system data area.
    - Cf.   GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"
- Please refer to the precautions on manual notation for icons in the table.

    ☞ "Manual Symbols and Terminology"

6.2 MELSEC AnN Series

 This address can be specified as system data area.

Device	Bit Address	Word Address	32 bits	Notes
Input	X0000 - X07FF	X0000 - X07F0		***0
Output	Y0000 - Y07FF	Y0000 - Y07F0		***0 *1
Internal Relay	M0000 - M2047	M0000 - M2032		÷16
Latch Relay	L0000 - L2047	L0000 - L2032		÷16
Special Relay	M9000 - M9255	M9000 - M9240		÷16 *2
Annunciator	F000 - F255	F000 - F240		÷16
Link Relay	B0000 - B03FF	------		
Timer (Contact)	TS000 - TS255	------		
Timer (Coil)	TC000 - TC255	------	L/H	
Counter (Contact)	CS000 - CS255	------		
Counter (Coil)	CC000 - CC255	------		
Timer (Current Value)	------	TN000 - TN255		
Counter (Current Value)	------	CN000 - CN255		
Data Register	------	D0000 - D1023		Bit 15
Link Register	------	W0000 - W03FF		Bit F
File Register	------	R0000 - R8191		Bit 15 *3

*1   In case of using A2C, you cannot set the output relay Y01F0 - Y01FF (word: Y01F0) because they are used on the External Device.

*2   You cannot combine AnN and AJ71C24-S3 for use.

*3   When you use the file register in AnA, AnU, AnN and A3H, use the user memory area in the memory cassettes below.

   ·A3NMCA-0   ·A3NMCA-2   ·A3NMCA-4   ·A3NMCA-8   ·A3NMCA-16

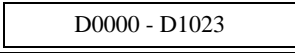   ·A3NMCA-24   ·A3NMCA-40   ·A3NMCA-56   ·A4UMCA-8E

   When you set the file register without using the memory cassette, error occurs during communication. Note that you may not use the file register when you set ROM to the ladder program.

NOTE
• Please refer to the GP-Pro EX Reference Manual for system data area.

   Cf.   GP-Pro EX Reference Manual "Appendix 1.4 LS Area (only for direct access method)"

• Please refer to the precautions on manual notation for icons in the table.

   ☞ "Manual Symbols and Terminology"

7 Device Code and Address Code

Use device code and address code when you select "Device Type & Address" for the address type in data displays.

7.1 MELSEC AnA Series, Q Series A Mode

Device	Device Name	Device Code (HEX)	Address Code
Input	X	0080	Value of word address divided by 16
Output	Y	0081	Value of word address divided by 16
Internal Relay	M	0082	Value of word address divided by 16
Latch Relay	L	0084	Value of word address divided by 16
Special Relay	M	0083	Value of (word address - 9000) divided by 16
Annunciator	F	0085	Value of word address divided by 16
Timer (Current Value)	TN	0060	Word Address
Counter (Current Value)	CN	0061	Word Address
Data Register	D	0000	Word Address
Special Register	D	0001	Value of word address from which 9000 is deducted
Link Register	W	0002	Word Address
File Register	R	000F	Word Address

7.2 MELSEC AnN Series

Device	Device Name	Device Code (HEX)	Address Code
Input	X	0080	Value of word address divided by 16
Output	Y	0081	Value of word address divided by 16
Internal Relay	M	0082	Value of word address divided by 16
Latch Relay	L	0084	Value of word address divided by 16
Special Relay	M	0083	Value of (word address - 9000) divided by 16
Annunciator	F	0085	Value of word address divided by 16
Timer (Current Value)	TN	0060	Word Address
Counter (Current Value)	CN	0061	Word Address
Data Register	D	0000	Word Address
Link Register	W	0002	Word Address
File Register	R	000F	Word Address

8   Error Messages

Error messages are displayed on the Display screen as follows: "No.: Device Name: Error Message (Error Occurrence Area)". Each description is shown below.

Item	Description
No.	Error No.
Device Name	Name of the External Device where error occurs. Device name is a title of the External Device set with GP-Pro EX. (Initial value [PLC1])
Error Message	Displays messages related to the error which occurs.
Error Occurrence Area	Displays IP address or device address of the External Device where error occurs, or error codes received from the External Device.
	NOTE
	• IP address is displayed such as "IP address(Decimal): MAC address(Hex)".
	• Device address is diplayed such as "Address: Device address".
	• Received error codes are displayed such as "Decimal[Hex]".

Display Examples of Error Messages

"RHAA035: PLC1: Error has been responded for device write command (Error Code: 2 [02])"

NOTE
• Please refer to the manual of the External Device for more detail of received error codes.
• Please refer to "When an error message is displayed (Error code list)" of "Maintenance/ Troubleshooting" for a common error message to the driver.