



MICRO-EHV (Option board) Safety Precautions

Thank you for purchasing a Hitachi Programmable Logic Controller. To operate it safely, please read these safety precautions and all the user manuals carefully. Please be sure to use the latest versions of the user manuals and keep them at hand of end users for future reference.

Caution

1. It is not allowed to reprint any part of this manual without permission.
2. The content of this manual may be changed without notice.
3. While efforts have been made on this manual to be accurate, please contact us if any mistakes or unclear part is found.

Warranty period and coverage

The warranty period is either 18 months after manufacturing date (MFG NO) or 12 months after installation. Examination and repair within the warranty period is covered. However within the warranty period, the warranty will be void if the fault is due to;

- (1) Incorrect use as directed in this manual and the application manual.
- (2) Malfunction or failure of external other devices than this unit.
- (3) Attempted repair by unauthorized personnel.
- (4) Natural disasters.

The warranty is for the PLC only, any damage caused to third party equipment by malfunction of the PLC is not covered by the warranty.

Repair

Any examination or repair after the warranty period is not covered. And within the warranty period any repair and examination which results in information showing the fault was caused by any of the items mentioned above, the repair and examination cost are not covered. If you have any questions regarding the warranty or repair cost, please contact your supplier or the local Hitachi Distributor. (Depending on failure part, repair might be impossible.)

Reference Manual

Read the following application manual carefully to use the PLC safely and properly. Be sure to keep the latest version.

Manual name	Manual number
MICRO-EHV HARDWARE MANUAL	NJI-589*(X)
MICRO-EHV PROGRAMMING MANUAL	NJI-590*(X)
MICRO-EHV USERS MANUAL	NJI-591*(X)
Ladder Programming Software Control Editor INTSTRUCTION MANUAL	NJI-537*(X)

The postfix of the publication number is subject to change for revision.

General cautions

Definitions and Symbols

- DANGER** Indicates a potentially hazardous situation which, if not avoided, can result in serious injury or death.
- CAUTION** Indicates a potentially hazardous situation which, if not avoided, can result in minor to moderate injury, or serious damage of product.
- : Indicates prohibition
- : Indicates compulsion

DANGER

- Do not touch terminals during power ON. Failure to observe this caution may cause personal injury.
- Be sure to install external safety devices outside of the PLC like emergency stop circuit or interlock circuit.

CAUTION

- Always use the rated power voltage according to the module specifications. Using other voltages may damage the equipment or cause personal injury or fire.
- Only qualified personnel shall carry out wiring work. Failure to observe this caution may damage the equipment or cause personal injury or fire.

COMPULSION

- Be sure to ground the unit. Failure to do so may cause malfunction.

PROHIBITION

- Do not attempt to disassemble, repair or modify any part of the PLC. There is a danger of breakdown and/or injury and/or fire.

Mounting

- This equipment must be placed within a suitable enclosure such as a cabinet (key or tool entry) .
- Mount the PLC on a metal plate and install in a cabinet as follows.
- Be sure to ground the cabinet and the metal plate, otherwise there is a risk of malfunction.
- Install the PLC as described in user manual.
- Take appropriate measures when installing systems in locations :
 - Subject to static electricity or other forms of noise.
 - Subject to strong electromagnetic field.
 - Close to power supplies.
- Be sure to tighten mounting screws, terminal screws and connector screws.
- Check if devices with lock mechanism, such as an expansion cable and terminal blocks, are locked properly.

Note

- Do not turn on the power supply to a broken PLC.
- Be sure to check all wiring before applying the power. Incorrect wiring may damage the equipment or cause fire.
- Do not attempt to disassemble, repair or modify any part of the PLC.
- Do not pull on cables or bend cables beyond their natural limit. The lines may break.
- Check carefully your PLC program before using.
- Keep PLC modules in their boxes during storage and transport.

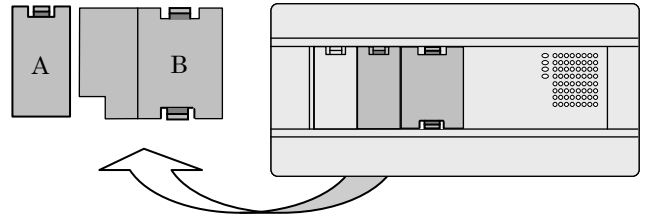
Installation



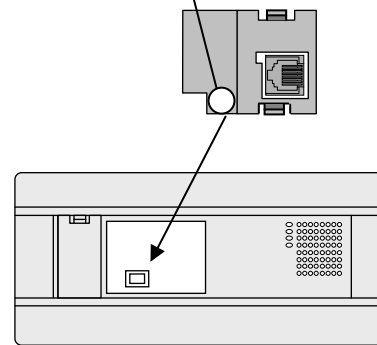
CAUTION

- Do not attach or detach an option board with power applied to MICRO-EHV, otherwise this could result in damaging module or malfunction.

- (1) Remove the cover A and B.



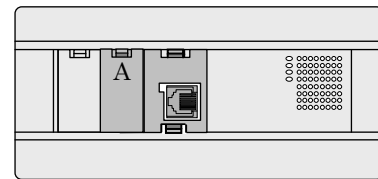
- (2) Insert an option board to a basic unit as below picture. Insert pressing down the connector area case of an option board.

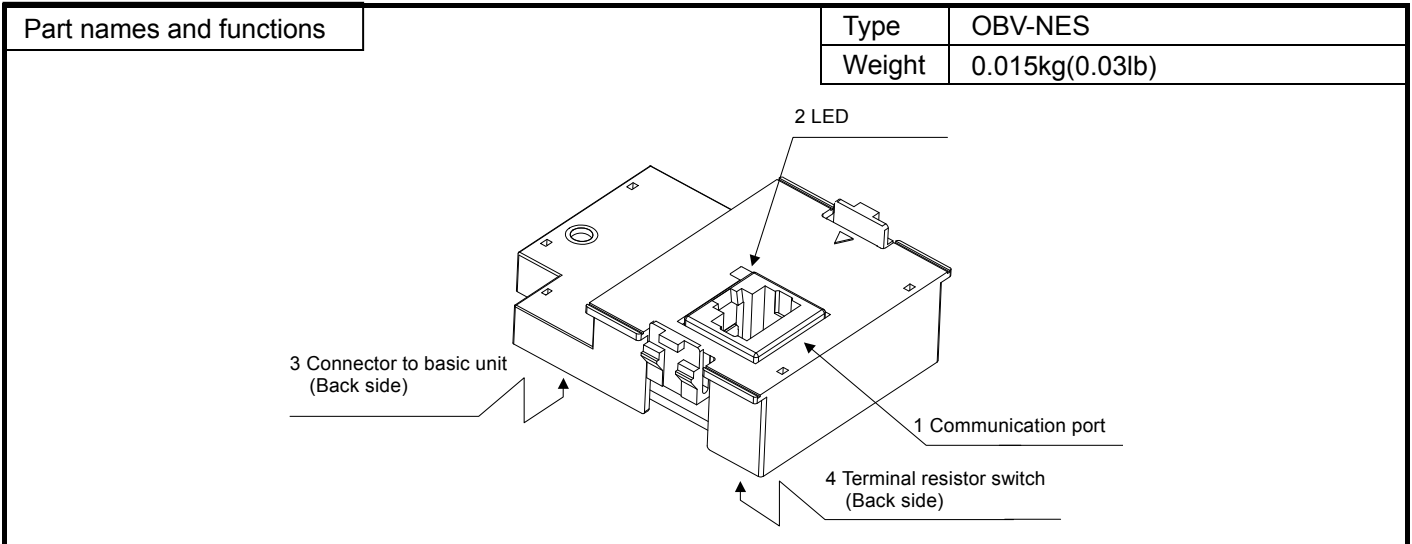


- (3) Attach the cover

The cover A can be attached.

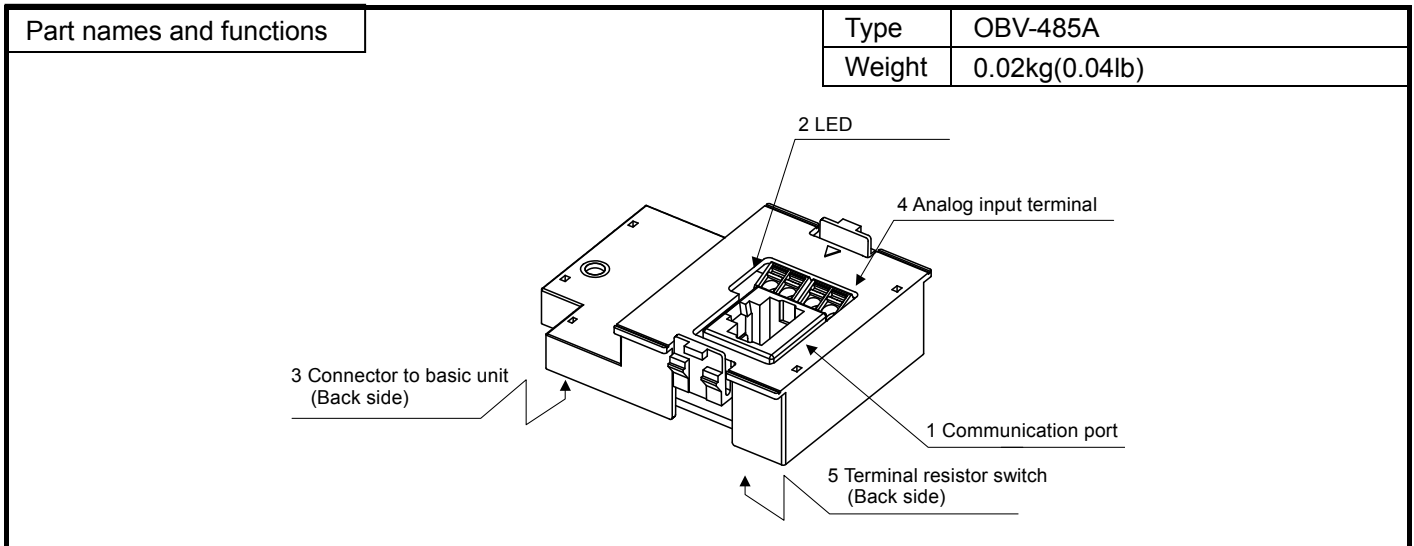
Since the cover B becomes unnecessary, please keep it.





No.	Name	Details
1	Communication port	supports dedicated protocol, general purpose and Modbus-RTU functions. [Programming] Communication with HMI or programmig software etc. [General purpose] Communication with external equipments controlled by user program. [Modbus-RTU] Communication with external equipments supporting Modbus-RTU protocol. Use shielded twisted pair cable.
2	LED	blinks when data is being sent or received.
3	Connector to basic unit	A connector is located at the back side to connect basic unit.
4	Termination resistor switch	Termination resistor 120Ω can be enabled by this switch located at the back side. [ON] The termination resistor is enabled. [OFF] The termination resistor is disabled.

Terminal layout	No.	Signal	Meaning	Internal circuit
 Socket connector (Top view)	1	NC	No connection	
	2	NC	No connection	
	3	NC	No connection	
	4	SG	Signal Ground	
	5	SP	Send and Receive Data Positive	
	6	SN	Send and Receive Data Negative	
	7	NC	No connection	
	8	NC	No connection	



No.	Name	Details
1	Communication port	<p>supports dedicated protocol, general purpose and Modbus-RTU functions.</p> <p>[Programming] Communication with HMI or programmig software etc.</p> <p>[General purpose] Communication with external equipments controlled by user program.</p> <p>[Modbus-RTU] Communication with external equipments supporting Modbus-RTU protocol.</p> <p>Use shielded twisted pair cable.</p>
2	LED	blinks when data is being sent or received.
3	Connector to basic unit	A connector is located at the back side to connect basic unit.
4	Analog input terminal	<p>4 terminals to connect analog voltage signals</p> <p>Cable diameter : Single wire : 0.2 mm² to 1.5 mm²</p> <p>Strand wire : 0.2 mm² to 1.0 mm²</p>
5	Termination resistor switch	<p>Termination resistor 120Ω can be enabled by this switch located at the back side.</p> <p>[ON] The termination resistor is enabled.</p> <p>[OFF] The termination resistor is disabled.</p>

Terminal layout	No.	Signal	Meaning	Internal circuit
 Socket connector (Top view)	1	SG	Signal Ground	
	2	VCC	5V DC output	
	3	NC	No connection	
	4	SDP	Send Data Positive	
	5	SDN	Send Data Negative	
	6	RDN	Receive Data Negative	
	7	RDP	Receive Data Positive	
	8	TERM	Termination resistor	

Part names and functions	Type	OBV-485TAI/485TAO/AIO
	Weight	0.02kg(0.04lb)

No	Type	Name	Details
1	OBV-485TAI/485TAO	Communication port	supports dedicated protocol, general purpose and Modbus-RTU functions. [Programming] Communication with HMI or programmig software etc. [General purpose] Communication with external equipments controlled by user program. [Modbus-RTU] Communication with external equipments supporting Modbus-RTU protocol. Use shielded twisted pair cable.
	OBV-AIO	Analog Input terminal	Terminals to connect analog voltage signals Cable diameter : Single wire : 0.2 mm ² to 1.5 mm ² Strand wire : 0.2 mm ² to 1.0 mm ²
2	OBV-485TAI	Analog Output terminal	
	OBV-485TAO	Analog Input terminal	
3	OBV-485TAI/485TAO	LED	SD : blinks when data is sent RD : blinks when data is sent or received.
	OBV-AIO	-	There is no LED
4	Common	Connector to basic unit	A connector is located at the back side to connect basic unit.

Communication port signal and internal circuit

Terminal layout	No.	Signal	Meaning	Internal circuit
 Terminal (Top view)	1	SDP	Data +	
	2	SDN	Data -	
	3	TERM	Termination resistor	
	4	SG	Signal Ground	

Analog Input signal and internal circuit(each “-” signal connected internally)

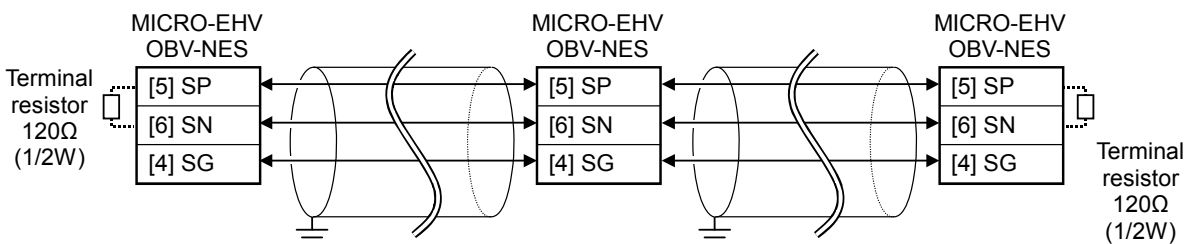
Terminal layout	No.	Signal	Meaning	Internal circuit
 Terminal (Top view)	1	IN1+	CH1+	
	2	IN1-	CH1-	
	3	IN2+	CH2+	
	4	IN2-	CH2-	

Analog Output signal and internal circuit(each “-” signal connected internally)

Terminal layout	No.	Signal	Meaning	Internal circuit
 Terminal (Top view)	1	OUT1+	CH1+	
	2	OUT1-	CH1-	
	3	OUT2+	CH2+	
	4	OUT2-	CH2-	

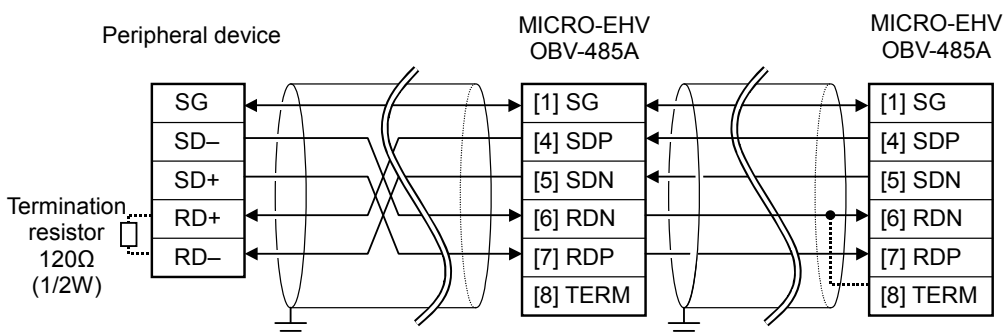
■ Example of Cable connection of OBV-NES

The example of the cable connection of RS-485 I/F is shown below.
Be sure to use shielded twisted pair cable.

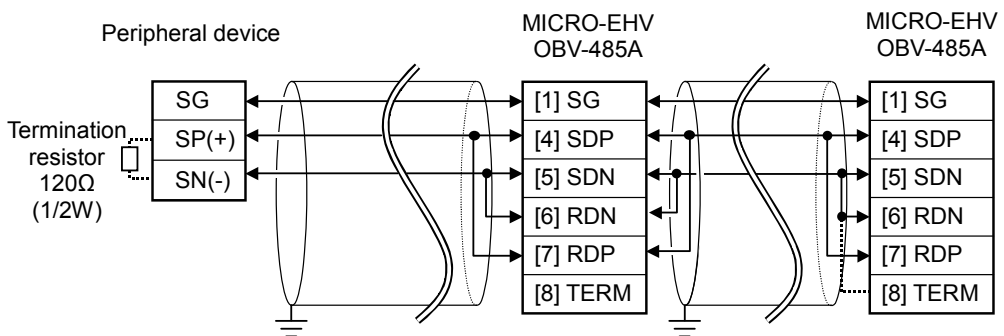


■ Example of Cable connection of OBV-485A

The example of the cable connection of RS-422 I/F is shown below.
Be sure to use shielded twisted pair cable.

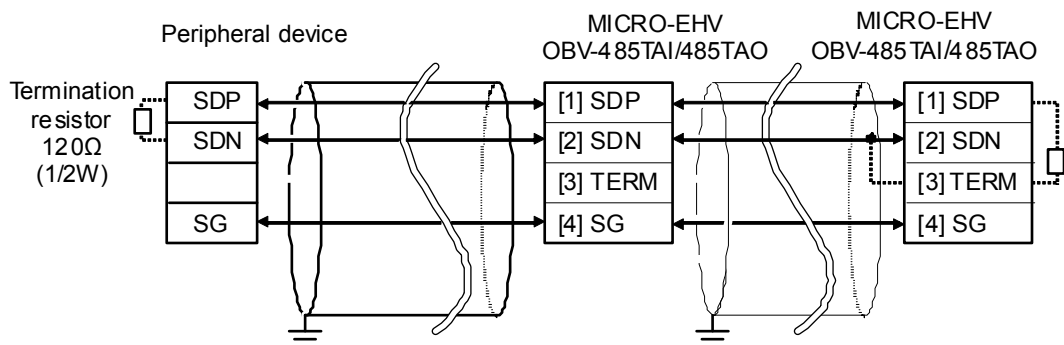


The example of the cable connection of RS-485 I/F is shown below.
Be sure to use shielded twisted pair cable.



■ Example of Cable connection of OBV-485TAI/485TAO

The example of the cable connection of RS-485 I/F is shown below.
Be sure to use shielded twisted pair cable.



Use the built-in termination resistor (120Ω) in OBV-NES / 485A / 485TAI / 485TAO depending on the usage environment and communication cable.

If the communication is unstable, please take following actions.

- (1) Instead of the built-in terminal resistor, use an external terminal resistors at the both ends of the communication cable. The resistance value depends on the characteristic impedance of the cable.
- (2) Remove SG (Signal Ground) of each equipment.
- (3) Change to lower communication speed.
- (4) Use a ferrite core with communication cable when using under severe noise environment.

■ OBV-485A/485TAI/AIO Analog input Specification

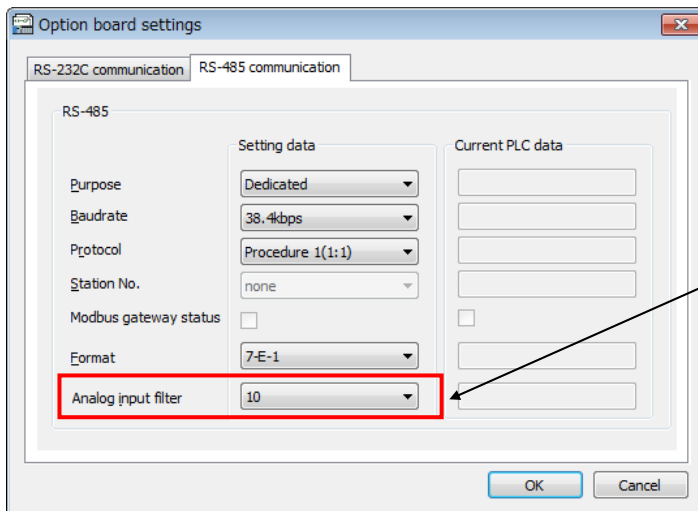
Item		Specifications
		OBV-485A/485TAI/AIO
No. of input		2 Channel
Internal output registers (CH1, CH2)		WRF03E, WRF03F
Input range		0 to 10V (10.24V max.)
Accuracy		1 % or less (of full-scale value)
Resolution		10 bits
AD conversion time		8ms / 2 Channel
External wiring		2-core shield cable (3 m or less)
Input impedance		Approx. 100 kΩ
Isolation	Channel and Internal circuit	Not isolated
	Between channels	Not isolated

Analog input values could be unstable depending on environmental conditions.

This can be decreased by using analog input filter set with Control Editor.

Moving averaged values based on the number of analog input filter will be stored in WRF03E and WRF03F.

The setting range is from 1 to 40. (default value :10)



Setting of analog input filter

■ OBV-485TAO/AIO Analog output Specification

Item		Specifications
		OBV-485TAO/AIO
No. of output		2 Channel
Internal output registers (CH1, CH2)		WRF03C, WRF03D
Output range		0 to 10V (10.24V max.)
Accuracy		1 % or less (of full-scale value)
Resolution		10 bits
AD conversion time		8ms / 2 Channel
External wiring		2-core shield cable (3 m or less)
Load impedance		More than 100 kΩ
Isolation	Channel and Internal circuit	Not isolated
	Between channels	Not isolated

■ NOTE

▪ **Basic unit version**

Be sure to use basic units with software version *104 or higher to use OBV-NES.
Basic units with older version than *104 do not support OBV-NES.

Be sure to use basic units with software version *105 or higher to use OBV-485A.
Basic units with older version than *105 do not support OBV-485A.

Be sure to use basic units with software version *109 or higher to use OBV-485TAI/485TAO/AIO.
Basic units with older version than version *109 do not support OBV-485TAI/485TAO/AIO.

▪ **Control Editor**

Be sure to use Control Editor Ver. 4.06 or higher to use OBV-485A.
If Control Editor Ver.4.02 to Ver.4.05 is used, be noted that default value of analog input filter is 1.

Be sure to use Control Editor Ver. 4.13 or higher to use OBV-485TAI/485TAO/AIO.
Control Editor with older version than Ver. 4.13 do not support OBV-485TAI/485TAO/AIO.

Configure setting parameters of option board in [Tool] - [CPU Settings] – [Option board settings] and [Modbus-TCP /RTU settings] with Control Editor.

▪ **Mounting, Dismounting**

Power to the PLC must be turned off when removing or installing option board.
Otherwise, there is a danger of breakdown and/or malfunction.