INVERTER
Control terminal option
FR-E7TR
INSTRUCTION MANUAL

RS-485 2 port terminal block

PRE-OPERATION INSTRUCTIONS
INSTALLATION
WIRING
COMMUNICATION OPERATION FROM RS-485 TERMINALS
Thank you for choosing this Mitsubishi Inverter control terminal option. This instruction manual gives handling information and precautions for use of this equipment. Incorrect handling might cause an unexpected fault. Before using the equipment, please read this manual carefully to use the equipment to its optimum performance. Please forward this manual to the end user.

### Safety Precautions

#### 1. Electric Shock Prevention

| **WARNING** | Assumes that incorrect handling may cause hazardous conditions, resulting in death or severe injury. |
| **CAUTION** | Assumes that incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause physical damage only. |

Note that even the **CAUTION** level may lead to a serious consequence according to conditions. Please follow the instructions of both levels because they are important to personnel safety.

- While power is on or when the inverter is running, do not open the front cover. Otherwise, you may get an electric shock.
- Do not run the inverter with the front cover or wiring cover removed. Otherwise, you may access the exposed high-voltage terminals and charging part and get an electric shock.
- If power is off, do not remove the front cover except for wiring or periodic inspection. You may access the charged inverter circuits and get an electric shock.
- Before starting wiring or inspection, check to make sure that the indication of the inverter operation panel is off, wait for at least 10 minutes after the power supply has been switched off, and check that there are no residual voltage using a tester or the like. The capacitor is charged with high voltage for some time after power off and it is dangerous.
- Any person who is involved in the wiring or inspection of this equipment should be fully competent to do the work.
- Always install the control terminal option before wiring. Otherwise, you may get an electric shock or be injured.
- Do not touch the control terminal option with wet hands. Otherwise, you may get an electric shock.
- Do not subject the cables to scratches, excessive stress, heavy loads or pinching. Otherwise you may get an electric shock.
2. Injury Prevention

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>
| • Apply only the voltage specified in the instruction manual to each terminal. Otherwise, burst, damage, etc. may occur.  
• Ensure that the cables are connected to the correct terminals. Otherwise, burst, damage, etc. may occur.  
• Always make sure that polarity is correct to prevent damage, etc. Otherwise, burst, damage may occur.  
• While power is on or for some time after power-off, do not touch the inverter as they will be extremely hot. Doing so can cause burns.

3. Additional Instructions

Also note the following points to prevent an accidental failure, injury, electric shock, etc.

(1) Transportation and mounting

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>
| • Do not install or operate the terminal block option unit if it is damaged or has parts missing.  
• Do not stand or rest heavy objects on the product.  
• Check that the mounting orientation is correct.  
• Prevent other conductive bodies such as screws and metal fragments or other flammable substance such as oil from entering the inverter.

(2) Trial run

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>
| • Before starting operation, confirm and adjust the parameters. A failure to do so may cause some machines to make unexpected motions.

(3) Usage

<table>
<thead>
<tr>
<th>WARNING</th>
</tr>
</thead>
</table>
| • Do not modify the equipment.  
• Do not perform parts removal which is not instructed in this manual. Doing so may lead to fault or damage of the product.

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>
| • When parameter clear or all parameter clear is performed, reset the required parameters before starting operations. Each parameter returns to the initial value.  
• For prevention of damage due to static electricity, touch nearby metal before touching this product to eliminate static electricity from your body.

(4) Maintenance, inspection and parts replacement

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>
| • Do not test the equipment with a megger (measure insulation resistance).

(5) Disposal

<table>
<thead>
<tr>
<th>CAUTION</th>
</tr>
</thead>
</table>
| • Treat as industrial waste.

(6) General instruction

All illustrations given in this manual may have been drawn with covers or safety guards removed to provide in-depth description. Before starting operation of the product, always return the covers and guards into original positions as specified and operate the equipment in accordance with the inverter manual.
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1 PRE-OPERATION INSTRUCTIONS

1.1 Unpacking and Product Confirmation

Take the control terminal option out of the package, check the product name on the reverse side, and confirm that the product is as you ordered and intact.

This product is a control terminal option unit dedicated for the FR-E700 series.

1.1.1 Packing Confirmation

Check the enclosed items.

<table>
<thead>
<tr>
<th>Control terminal option</th>
<th>Instruction manual</th>
<th>Control terminal change notice sticker</th>
</tr>
</thead>
<tbody>
<tr>
<td>.................................................................1</td>
<td>.................................................................1</td>
<td>.................................................................Two stickers (refer to page 16)</td>
</tr>
</tbody>
</table>
1.1.2 Parts

Voltage/current input switch
Either voltage input (0 to 5V, 0 to 10V) or current input (4 to 20mA) can be selected for terminals 4 used for analog input.
Change the input specifications to change Pr. 267 and voltage/current input switch.
(Refer to the inverter manual for details.)

Terminal 2/SG switch
Set terminal 2/SG switch to the right position (ON) to pass a shielded wire across terminal SG. As a result, terminal 2 changes to terminal SG.
(Note that analog input of terminal 2 is made invalid)

Terminating resistor switch
Factory-set to "OPEN".
Set only the terminating resistor switch of the remotest inverter to the "100Ω" position.

Control logic switchover jumper connector
Control logic (sink logic, source logic) can be switched.
The input signals are set to sink logic (SINK) when shipped from the factory.
(Refer to the inverter manual for details.)
1.1.3 **Terminal layout**
1.2 Terminal connection diagram

Terminal functions vary with the input terminal assignment (Pr. 190, Pr. 191)

Control input signals (No voltage input allowed)
- Forward rotation start
- Reverse rotation start
- Multi-speed selection
- High speed
- Middle speed
- Low speed
- Output stop
- Reset

Contact input common
24VDC power supply
(Common for external power supply transistor)

Frequency setting signals (Analog)
- Frequency setting potentiometer 1/2W1kΩ
- Terminal 4 input (Current input)

Output stop
Relay output
- Relay output (Alarm output)

Relay output common
Open collector output
- Open collector output common
- Sink/source common
- Indicator (Frequency meter, etc.)
- Moving-coil type
1mA full-scale

Frequency detection

From the computer or previous inverter
EIA-485 (RS-485) communication signal
Terminating resistor switch

Voltage/current input switch
0 to 5VDC (0 to 10VDC)
HI energy input switch
4 to 20mADC

24VDC power supply
(Common for external power supply transistor)

STR
STF
SE
FM
SD
RDL
RHM
RUN
FU
FIN
PC
RES
RM
RL
RH
A
B
C

Terminal functions vary with the output terminal assignment (Pr. 190, Pr. 191)

Control input signals (No voltage input allowed)
- Forward rotation start
- Reverse rotation start
- Multi-speed selection
- High speed
- Middle speed
- Low speed
- Output stop
- Reset

Contact input common
24VDC power supply
(Common for external power supply transistor)

Frequency setting signals (Analog)
- Frequency setting potentiometer 1/2W1kΩ
- Terminal 4 input (Current input)

Output stop
Relay output
- Relay output (Alarm output)

Relay output common
Open collector output
- Open collector output common
- Sink/source common
- Indicator (Frequency meter, etc.)
- Moving-coil type
1mA full-scale

Frequency detection

From the computer or previous inverter
EIA-485 (RS-485) communication signal
Terminating resistor switch

Voltage/current input switch
0 to 5VDC (0 to 10VDC)
HI energy input switch
4 to 20mADC

24VDC power supply
(Common for external power supply transistor)
*1 When using terminals PC-SD as a 24VDC power supply, take care not to short across terminals PC-SD.

*2 Terminal input specifications can be changed by analog input specifications switchover (Pr. 73).

*3 Terminal input specifications can be changed by analog input specifications switchover (Pr. 267).
Set the voltage/current input switch in the "V" position to select voltage input (0 to 5V/0 to10V) and "I" (initial value) to select current input (4 to 20mA).

*4 It is recommended to use 2W1kΩ when the frequency setting signal is changed frequently.

*5 It is not necessary when calibrating the indicator from the operation panel.

*6 Set the switch to the right (ON) position to pass a shielded wire across terminal SG.

*7 Set only the terminating resistor switch of the remotest inverter to the "100Ω" position.
### PRE-OPERATION INSTRUCTIONS

#### 1.3 Control terminal specifications

**(1) RS-485 communication**

<table>
<thead>
<tr>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SDA (2 points)</td>
<td>Inverter send+</td>
<td>Sending signal output terminal from the inverter.</td>
</tr>
<tr>
<td>SDB (2 points)</td>
<td>Inverter send-</td>
<td>Inverse sending signal output terminal from the inverter.</td>
</tr>
<tr>
<td>RDA (2 points)</td>
<td>Inverter receive+</td>
<td>Receive signal input terminal of the inverter. Changing the terminating resistor switch to “100Ω” side connects the inverter to the 100Ω terminating resistor.</td>
</tr>
<tr>
<td>RDB (2 points)</td>
<td>Inverter receive-</td>
<td>Receive signal input terminal of the inverter. Changing the terminating resistor switch to “100Ω” side connects the inverter to the 100Ω terminating resistor.</td>
</tr>
<tr>
<td>SG</td>
<td>RS-485 communication common, Analog common</td>
<td>Common terminal of RS-485 communication and frequency setting signal (terminal 2 or terminal 4). Do not earth (ground).</td>
</tr>
</tbody>
</table>
## (2) Frequency setting

<table>
<thead>
<tr>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
<th>Rated Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Frequency setting power supply</td>
<td>Used as power supply when connecting potentiometer for frequency setting (speed setting) from outside of the inverter.</td>
<td>5.2VDC ± 0.2V Permissible load current 10mA</td>
</tr>
<tr>
<td>2</td>
<td>Frequency setting (voltage)/ Common terminal</td>
<td>Inputting 0 to 5VDC (or 0 to 10V) provides the maximum output frequency at 5V (10V) and makes input and output proportional. Use Pr. 73 to switch between input 0 to 5VDC (initial setting) and 0 to 10VDC input. Set terminal 2/SG switch (refer to page 2) to the right position (ON) to change terminal 2 to terminal SG to pass a shielded wire across terminal SG during RS-485 communication. In this case, voltage at terminal 2 is 0V input.</td>
<td>Voltage input: Input resistance 10kΩ ± 1kΩ Permissible maximum voltage 20VDC SG selection: Common terminal Terminal 2 (Initial status) Terminal SG</td>
</tr>
<tr>
<td>4</td>
<td>Frequency setting (current)</td>
<td>Inputting 4 to 20mA DC (or 0 to 5V, 0 to 10V) provides the maximum output frequency at 20mA and makes input and output proportional. This input signal of terminal 4 is valid only when the AU signal is on (terminal 2 input is invalid). Use Pr. 267 to switch from among input 4 to 20mA (initial setting), 0 to 5VDC and 0 to 10VDC. Set the voltage/current input switch in the &quot;V&quot; position to select voltage input (0 to 5V/0 to 10V).</td>
<td>Current input: Input resistance 233Ω ± 5Ω Maximum permissible current 30mA Voltage input: Input resistance 10kΩ ± 1kΩ Permissible maximum voltage 20VDC</td>
</tr>
</tbody>
</table>

* Refer to the inverter manual for details of Pr. 73 and Pr. 267.
(3) Contact input

<table>
<thead>
<tr>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
<th>Rated Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>STF*</td>
<td>Forward rotation</td>
<td>Turn on the STF signal to start forward rotation and turn it off to stop.</td>
<td>Voltage at opening 21 to 26VDC When contacts are short-circuited 4 to 6mADC</td>
</tr>
<tr>
<td>STR*</td>
<td>Reverse rotation</td>
<td>Turn on the STR signal to start reverse rotation and turn it off to stop.</td>
<td>Voltage at opening 21 to 26VDC When contacts are short-circuited 4 to 6mADC</td>
</tr>
<tr>
<td>RH,RM,RL*</td>
<td>Multi-speed selection</td>
<td>Multi-speed can be selected according to the combination of RH, RM and RL signals.</td>
<td>Input resistance 4.7kΩ Voltage at opening 21 to 26VDC When contacts are short-circuited 4 to 6mADC</td>
</tr>
<tr>
<td>MRS*</td>
<td>Output stop</td>
<td>Turn on the MRS signal (20ms or more) to stop the inverter output. Use to shut off the inverter output when stopping the motor by electromagnetic brake.</td>
<td></td>
</tr>
<tr>
<td>RES*</td>
<td>Reset</td>
<td>Used to reset fault output provided when fault occurs. Turn on the RES signal for more than 0.1s, then turn it off. By setting Pr. 75, reset can be set to enabled only at an inverter alarm occurrence. Recover about 1s after reset is cancelled. Refer to the inverter manual for details of Pr. 75.</td>
<td>Refer to the inverter manual for details of Pr. 75.</td>
</tr>
</tbody>
</table>

* Input signal functions can be selected using Pr.178 to Pr.184 (input terminal function selection). Refer to the inverter manual for details of Pr. 178 to Pr.184 .
## Pre-Operation Instructions

<table>
<thead>
<tr>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
<th>Rated Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>SD</td>
<td>Contact input common (sink) (initial setting)</td>
<td>Common terminal for contact input terminal (sink logic) and terminal FM.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>External transistor common (source)</td>
<td>When connecting the transistor output (open collector output), such as a programmable controller (PLC), when source logic is selected, connect the external power supply common for transistor output to this terminal to prevent a malfunction caused by undesirable currents.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24VDC power supply common</td>
<td>Common output terminal for 24VDC 0.1A power supply (PC terminal). Isolated from terminals SG and SE.</td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>External transistor common (sink) (initial setting)</td>
<td>When connecting the transistor output (open collector output), such as a programmable controller (PLC), when sink logic is selected, connect the external power supply common for transistor output to this terminal to prevent a malfunction caused by undesirable currents.</td>
<td>Power supply voltage range 22 to 26VDC Permissible load current 100mA</td>
</tr>
<tr>
<td></td>
<td>Contact input common (source)</td>
<td>Common terminal for contact input terminal (source logic)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>24VDC power supply</td>
<td>Can be used as 24VDC 0.1A power supply.</td>
<td></td>
</tr>
</tbody>
</table>
## PRE-OPERATION INSTRUCTIONS

### (4) Output signal

<table>
<thead>
<tr>
<th>Type</th>
<th>Terminal Symbol</th>
<th>Terminal Name</th>
<th>Description</th>
<th>Rated Specifications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Relay</td>
<td>A, B, C</td>
<td>Relay output (fault output)</td>
<td>1 changeover contact output indicates that the inverter protective function has activated and the output stopped. Alarm: discontinuity across B-C (continuity across A-C), Normal: continuity across B-C (discontinuity across A-C)</td>
<td>Contact capacity: 230VAC 0.3A (power factor = 0.4) 30VDC 0.3A</td>
</tr>
<tr>
<td>Open collector</td>
<td>RUN *1</td>
<td>Inverter running</td>
<td>Switched low when the inverter output frequency is equal to or higher than the starting frequency (initial value 0.5Hz), Switched high during stop or DC injection brake operation. *2</td>
<td>Permissible load 24VDC (27VDC maximum) 0.1A (maximum voltage drop when the signal is on 3.4V)</td>
</tr>
<tr>
<td>Open collector</td>
<td>FU *1</td>
<td>Frequency detection</td>
<td>Switched low when the inverter output frequency is equal to or higher than the preset detected frequency and high when less than the preset detected frequency. *2</td>
<td>—</td>
</tr>
<tr>
<td>SE</td>
<td>Open collector output common</td>
<td>Common terminal of terminal RUN and FU.</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Pulse</td>
<td>FM</td>
<td>For meter</td>
<td>Select one e.g. output frequency from monitor items. *3 The output signal is proportional to the magnitude of the corresponding monitoring item.</td>
<td>Output item: Output frequency (initial setting) Permissible load current 1mA 1440 pulses/s at 60Hz</td>
</tr>
</tbody>
</table>

*1 Output signal function can be selected using Pr 190 to Pr 192 (output terminal function selection) Refer to the inverter manual for details of Pr 190 to Pr 192.

*2 Low indicates that the open collector output transistor is on (conducts). High indicates that the transistor is off (does not conduct).

*3 Not output during inverter reset.
PRE-OPERATION INSTRUCTIONS

CAUTION

- Terminals SD, SG and SE are common terminals for I/O signal. (All common terminals are isolated from each other.) Do not earth them.
  Do not connect terminal SD-SG and terminal SE-SG.
- Terminal SD is a common terminal for the contact input terminals (STF, STR, RH, RM, RL, MRS, RES) and frequency output signal (FM). The open collector circuit is isolated from the internal control circuit by photocoupler.
- Terminal SG is a common terminal for the frequency setting signals (terminal 2 or 4) and RS-485 communication. It should be protected from external noise using a shielded or twisted cable.
- Terminal SE is a common terminal for the open collector output terminal (RUN, FU). The contact input circuit is isolated from the internal control circuit by photocoupler.
### 1.4 Communication

<table>
<thead>
<tr>
<th>Item</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication protocol</td>
<td>Mitsubishi inverter protocol (computer link communication), Modbus-RTU protocol</td>
</tr>
<tr>
<td>Conforming standard</td>
<td>EIA-485 (RS-485)</td>
</tr>
<tr>
<td>Number of connectable devices</td>
<td>32 units maximum</td>
</tr>
<tr>
<td>Communication speed</td>
<td>4800/9600/19200/38400 bps</td>
</tr>
<tr>
<td>Communication method</td>
<td>Half-duplex system, full-duplex system</td>
</tr>
<tr>
<td>Terminating resistor</td>
<td>100Ω (valid/invalid can be changed with a terminating resistor switch)</td>
</tr>
</tbody>
</table>
2 INSTALLATION

2.1 Pre-Installation Instructions

Make sure that the input power of the inverter is off.

⚠️ CAUTION

⚠️ Do not install or remove a control terminal option with the input power supply is on. Otherwise, the inverter and option may be damaged.
2.2 Installation procedure

(1) Remove the inverter front cover.
(Refer to the inverter instruction manual for removing the front cover.)

(2) Remove the installation screws of the standard control circuit terminal.
Pull the control circuit terminal downward.
(3) Using care not to bend the pins of the inverter's control circuit connector, reinstall the control terminal option and fix it with the mounting screws.
(Tightening torque 0.56N·m to 0.75N·m)
**INSTALLATION**

(4) Install the inverter front cover.
(Refer to the inverter instruction manual for installing the front cover.)
Attach a supplied control terminal change notice sticker to the next to the model name on the front cover so that the control terminal has been replaced with the FR-E7TR. (Two control terminal change notice stickers are supplied and one of them is an extra.)
**3.1 RS-485 terminals system configuration**

- **Connection of a computer to the inverter (1:1 connection)**

*Set the terminating resistor switch to the "100Ω" position.*
**WIRING**

- Combination of computer and multiple inverters (1:n connection)

- Computer
  - RS-232C connector
  - Maximum 15m
  - Converter
  - Twisted pair cable

- Inverter
  - RS-485 terminals

- Station 0
  - Inverter RS-485 terminals

- Station 1
  - Inverter RS-485 terminals

- Station n
  - Inverter RS-485 terminals

- Set only the terminating resistor switch of the remotest inverter to the "100Ω" position.

- Set only the terminating resistor switch of the remotest inverter to the "10Ω" position.
3.2 Wiring method of RS-485 terminals

(1) Four-wire type connection

- Wiring of one RS-485 computer and n inverters (several inverters)

*1 Make connections in accordance with the manual of the computer used.
  Fully check the terminal numbers of the computer since they vary with the model.

*2 For the inverter farthest from the computer, set the terminating resistor switch to ON (100Ω side).
To connect 100Ω terminating resistor, set the switch to "100Ω".

Set terminal 2/SG switch to the right position (ON) to change terminal 2 to terminal SG to pass a shielded wire across terminal SG. (Note that analog input of terminal 2 is made invalid.)

To connect to 100Ω terminating resistor, set the switch to "100Ω".

Set terminal 2/SG switch to the right position (ON) to change terminal 2 to terminal SG to pass a shielded wire across terminal SG. (Note that analog input of terminal 2 is made invalid.)

To the computer or previous inverter

To the next inverter

To the computer or previous inverter

Set terminal 2/SG switch to the right position (ON) to change terminal 2 to terminal SG to pass a shielded wire across terminal SG. (Note that analog input of terminal 2 is made invalid.)
(2) Two-wire type connection

If the computer is 2-wire type, a connection from the inverter can be changed to 2-wire type by passing wires across reception terminals and transmission terminals of the RS-485 terminals.

*1 Make connections in accordance with the manual of the computer used.
   Fully check the terminal numbers of the computer since they vary with the model.

*2 For the inverter farthest from the computer, set the terminating resistor switch to ON (100Ω side).
WIRING

REMARKS

- Refer to the figure below for branch wiring in the case of half-duplex system.

- In the case of half duplex system, perform branch wiring. (across SDA-RDA, across SDB-RDB)

- A program should be created so that transmission is disabled (receiving state) when the computer is not sending and reception is disabled (sending state) during sending to prevent the computer from receiving its own data.

- To connect to 100Ω terminating resistor, set the switch to "100Ω".

- Set terminal 2/SG switch to the right position (ON) to change terminal 2 to terminal SG to pass a shielded wire across terminal SG. (Note that analog input of terminal 2 is made invalid.)
3.3 Wiring

(1) Strip off the sheath of the cable to wire.
Strip off the sheath about the size below. If the length of the sheath peeled is too long, a short circuit may occur among neighboring wires. If the length is too short, wires might come off.

Wire the stripped cable after twisting it to prevent it from becoming loose. In addition, do not solder it. Use a bar terminal as necessary.

<table>
<thead>
<tr>
<th>Terminal</th>
<th>L(mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A, B, C</td>
<td>6</td>
</tr>
<tr>
<td>Other than the above</td>
<td>5</td>
</tr>
</tbody>
</table>

REMARKS
Information on bar terminals
Commercially available product examples (as of Sep., 2006)

<table>
<thead>
<tr>
<th>Terminal Screw Size</th>
<th>Wire Size (mm²)</th>
<th>Bar Terminal Model with insulation sleeve</th>
<th>Bar Terminal Model without insulation sleeve</th>
<th>Maker</th>
</tr>
</thead>
<tbody>
<tr>
<td>M3 (terminal A, B, C)</td>
<td>0.3 to 0.5</td>
<td>Al 0.5-6WH</td>
<td>A 0.5-6</td>
<td>Phoenix Contact Co., Ltd.</td>
</tr>
<tr>
<td>M2 (Other than the above)</td>
<td>0.5 to 0.75</td>
<td>Al 0.75-6GY</td>
<td>A 0.75-6</td>
<td></td>
</tr>
<tr>
<td>M2 (Other than the above)</td>
<td>0.3 to 0.5</td>
<td>Al 0.5-6WH</td>
<td>A 0.5-6</td>
<td></td>
</tr>
</tbody>
</table>

- Bar terminal crimping tool: CRIMPFOX ZA3 (Phoenix Contact Co., Ltd.)

When using the bar terminal (without insulation sleeve), use care so that the twisted wires do not come out.
(2) Loosen the terminal screw and insert the cable into the terminal.
(3) Tighten the screw to the specified torque.
   Undertightening can cause cable disconnection or malfunction. Overtightening can cause a short
circuit or malfunction due to damage to the screw or unit.
   Tightening torque: 0.5N·m to 0.6N·m (A, B, C terminals)
   0.22N·m to 0.25N·m (other than the above)
* Screwdriver: Small flathead screwdriver (Tip thickness: 0.4mm/tip width: 2.5mm)
4 COMMUNICATION OPERATION FROM RS-485 TERMINALS

Mounting a control terminal option FR-E7TR allows RS-485 communication from RS-485 terminals in place of PU connector on the standard control circuit terminal.
Set the same parameter (refer to page 26) as when performing RS-485 communication from PU connector.
For details of initial setting and specifications when performing RS-485 communication with RS-485 terminals, refer to explanations of "RS-485 communication from PU connector" of the inverter manual.

In addition, RS-485 communication from RS-485 terminals allows communication operation and parameter setting with Mitsubishi inverter protocol (computer link communication) and Modbus-RTU communication protocol selected as same as when RS-485 communication from PU connector with a standard control circuit terminal block mounted.
For details of communication specifications and initial setting of Mitsubishi inverter protocol (computer link communication) and Modbus-RTU communication protocol, refer to "Each protocol of communication operation from PU connector" of the inverter manual.

CAUTION
Always reset the inverter after making the initial settings of the parameters. After you have changed the communication-related parameters, communication cannot be made until the inverter is reset.
COMMUNICATION OPERATION FROM RS-485 TERMINALS

4.1 RS-485 communication related parameter

For details of parameter, refer to explanations of “RS-485 communication from PU connector” and “Each protocol of communication operation from PU connector” of the inverter manual.

(1) Operation command source and speed command source during communication operation

(Pr. 338, Pr. 339, Pr. 550, Pr. 551)

<table>
<thead>
<tr>
<th>Parameter Number</th>
<th>Name</th>
<th>Initial Value</th>
<th>Setting Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>338</td>
<td>Communication operation command source</td>
<td>0</td>
<td>0</td>
<td>Operation command source communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Operation command source external</td>
</tr>
<tr>
<td>339</td>
<td>Communication speed command source</td>
<td>0</td>
<td>0</td>
<td>Speed command source communication</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>1</td>
<td>Speed command source external (Frequency setting from communication is invalid, terminal 2 setting from external is valid)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Speed command source external (Frequency setting from communication is valid, terminal 2 setting from external is invalid)</td>
</tr>
<tr>
<td>550</td>
<td>NET mode operation command source selection</td>
<td>9999</td>
<td>0</td>
<td>Selects the communication option as NET operation mode command source.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>2</td>
<td>Selects RS-485 terminals as the NET operation mode command source.</td>
</tr>
</tbody>
</table>

Automatic communication option recognition: Normally, the RS-485 terminals are valid. When a communication option is mounted, the communication option is valid.
## COMMUNICATION OPERATION FROM RS-485 TERMINALS

The above parameters can be set when Pr. 160 User group read selection = "0". However, the parameters can be set whenever the communication option is connected.

* Pr. 550 and Pr. 551 are always write-enabled.

<table>
<thead>
<tr>
<th>Parameter Number</th>
<th>Name</th>
<th>Initial Value</th>
<th>Setting Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>551 *</td>
<td>PU mode operation command source selection</td>
<td>9999</td>
<td>2</td>
<td>Selects RS-485 terminals as the NET operation mode command source.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>3</td>
<td>Selects the USB connector as the PU operation mode command source.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>4</td>
<td>Selects the operation panel as the PU operation mode command source.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9999</td>
<td></td>
<td>USB automatic recognition Normally, operation panel is the command source. When USB is connected, USB is the command source.</td>
</tr>
</tbody>
</table>
**COMMUNICATION OPERATION FROM RS-485 TERMINALS**

(2) Initial settings and specifications of RS-485 communication *(Pr. 117 to Pr. 120, Pr. 123, Pr. 124, Pr. 549)*

<table>
<thead>
<tr>
<th>Parameter Number</th>
<th>Name</th>
<th>Initial Value</th>
<th>Setting Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>117</td>
<td>PU communication station number</td>
<td>0</td>
<td>0 to 31</td>
<td>Inverter station number specification Set the inverter station numbers when two or more inverters are connected to one personal computer.</td>
</tr>
<tr>
<td>118</td>
<td>PU communication speed</td>
<td>192</td>
<td>48, 96, 192, 384</td>
<td>Communication speed The setting value × 100 equals the communication speed. Example) 19200bps if 192</td>
</tr>
<tr>
<td>119</td>
<td>PU communication stop bit length</td>
<td>1</td>
<td>0, 1, 2</td>
<td>Stop bit length Stop bit length Data length</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10, 11</td>
<td>Stop bit length Stop bit length Data length</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8bit Stop bit length Stop bit length Data length</td>
</tr>
<tr>
<td>120</td>
<td>PU communication parity check</td>
<td>2</td>
<td>0, 1, 2</td>
<td>Without parity check With odd parity check With even parity check</td>
</tr>
<tr>
<td>123</td>
<td>PU communication waiting time setting</td>
<td>9999</td>
<td>0 to 150ms</td>
<td>Set the waiting time between data transmission to the inverter and response.</td>
</tr>
<tr>
<td>124</td>
<td>PU communication CR/LF selection</td>
<td>1</td>
<td>0, 1, 2</td>
<td>Without CR/LF With CR With CR/LF</td>
</tr>
<tr>
<td>549</td>
<td>Protocol selection</td>
<td>0</td>
<td>0, 1</td>
<td>Protocol selection Protocol selection</td>
</tr>
</tbody>
</table>

The above parameters can be set when Pr. 160 User group read selection = "0".

* When "1" (Modbus-RTU protocol) is set in Pr. 549, the setting range within parenthesis is applied.
### COMMUNICATION OPERATION FROM RS-485 TERMINALS

#### (3) Operation selection at communication error occurrence (Pr.121, Pr.122, Pr.502)

<table>
<thead>
<tr>
<th>Parameter Number</th>
<th>Name</th>
<th>Initial Value</th>
<th>Setting Range</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>121</td>
<td>Number of PU communication retries</td>
<td>1</td>
<td>0 to 10</td>
<td>Number of retries at data receive error occurrence. If the number of</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>consecutive errors exceeds the permissible value, the inverter will</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>come to trip (depends on Pr. 502). Valid only Mitsubishi inverter</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(computer link operation) protocol.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9999</td>
<td></td>
<td>If a communication error occurs, the inverter will not come to trip.</td>
</tr>
<tr>
<td>122</td>
<td>PU communication check time interval</td>
<td>0</td>
<td>0.1 to 999.8s</td>
<td>RS-485 communication can be made. Note that a communication fault (E.PUE)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>occurs as soon as the inverter is switched to the operation mode with</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>control source.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0</td>
<td></td>
<td>Communication check (signal loss detection) time interval If a no-</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>communication state persists for longer than the permissible time, the</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>inverter will come to trip (depends on Pr.502).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>9999</td>
<td></td>
<td>No communication check (signal loss detection)</td>
</tr>
<tr>
<td>502</td>
<td>Stop mode selection at communication error</td>
<td>0</td>
<td>0, 3</td>
<td>At Alarm Occurrence</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Coasts to stop</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Decelerates to stop</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Decelerates to stop</td>
</tr>
</tbody>
</table>

The above parameters can be set when Pr. 160 User group read selection = "0". However, the parameters can be set whenever the communication option is connected.
MEMO
REVISIONS

*The manual number is given on the bottom left of the back cover.

<table>
<thead>
<tr>
<th>Print Date</th>
<th>*Manual Number</th>
<th>Revision</th>
</tr>
</thead>
</table>