



INVERTER

Plug-in option

FR-A7AD

INSTRUCTION MANUAL

High-speed analog output function

Digital output function

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Thank you for choosing this Mitsubishi Inverter plug-in 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. Please forward this manual to the end user.

This section is specifically about safety matters

Do not attempt to install, operate, maintain or inspect this product until you have read through this Instruction Manual and appended documents carefully and can use the equipment correctly. Do not use this product until you have a full knowledge of the equipment, safety information and instructions.

In this Instruction Manual, the safety instruction levels are classified into "WARNING" and "CAUTION".



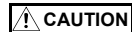
WARNING

Incorrect handling may cause hazardous conditions, resulting in death or severe injury.



CAUTION

Incorrect handling may cause hazardous conditions, resulting in medium or slight injury, or may cause only material damage.



The **CAUTION** level may even lead to a serious consequence according to conditions. Both instruction levels must be followed because these are important to personal safety.

SAFETY INSTRUCTIONS

1. Electric Shock Prevention



WARNING

- While power is ON or when the inverter is running, do not open the front cover. 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.
- Even if power is OFF, do not remove the front cover except for wiring or periodic inspection. You may accidentally touch the charged inverter circuits and get an electric shock.
- Before wiring or inspection, power must be switched OFF. To confirm that, LED indication of the operation panel must be checked. (It must be OFF.) Any person who is involved in wiring or inspection shall 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 wiring or inspection of this equipment shall be fully competent to do the work.
- The plug-in option must be installed before wiring. Otherwise, you may get an electric shock or be injured.
- Do not touch the plug-in option or handle the cables 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

CAUTION

- The voltage applied to each terminal must be the ones specified in the Instruction Manual. Otherwise burst, damage, etc. may occur.
- The cables must be connected to the correct terminals. Otherwise burst, damage, etc. may occur.
- Polarity must be correct. Otherwise burst, damage, etc. 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 the following points must be noted to prevent an accidental failure, injury, electric shock, etc.

1) Transportation and mounting

CAUTION

- Do not install or operate the plug-in option if it is damaged or has parts missing.
- Do not stand or rest heavy objects on the product.
- The mounting orientation must be correct.
- Foreign conductive objects must be prevented from entering the inverter. That includes screws and metal fragments or other flammable substances such as oil.

2) Trial run

CAUTION

- Before starting operation, each parameter must be confirmed and adjusted. A failure to do so may cause some machines to make unexpected motions.

3) Usage

WARNING

- 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 inverter.

CAUTION

- When parameter clear or all parameter clear is performed, the required parameters must be set again before starting operations because all parameters return to the initial value.
- Static electricity in your body must be discharged before you touch the product. Otherwise the product may be damaged.

4) Maintenance, inspection and parts replacement

CAUTION

- Do not test the equipment with a megger (measure insulation resistance).

5) Disposal

CAUTION

- This inverter plug-in option must be treated as industrial waste.

6) General instruction

Many of the diagrams and drawings in this Instruction Manual show the inverter without a cover or partially open for explanation. Never operate the inverter in this manner. The cover must be reinstalled and Instruction manual of the inverter must be followed when operating the inverter.

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1 PRE-OPERATION INSTRUCTIONS

1.1 Inverter Model

The inverter model numbers of 55K and 75K stated in this Instruction Manual differ according to -NA, -EC, -CH(T) versions. Refer to the following correspondence table for each inverter model. (*Refer to the Instruction Manual of each inverter for the inverter model.*)

For example, "for the 75K or higher" indicates "for the FR-A740-01440-NA or higher" in the case of FR-A740 of NA version.

| | NA | EC | CH |
|-------------|--|------------------|-----------------|
| FR-A720-55K | FR-A720-02150-NA | — | — |
| FR-A720-75K | FR-A720-02880-NA | — | — |
| FR-A740-55K | FR-A740-01100-NA (FR-A760-00840-NA) | FR-A740-01800-EC | FR-A740-55K-CHT |
| FR-A740-75K | FR-A740-01440-NA (FR-A760-01040-NA) | FR-A740-02160-EC | FR-A740-75K-CHT |

1.2 Unpacking and Product Confirmation

Take the plug-in option out of the package, check the product name, and confirm that the product is as you ordered and intact.

This product is a plug-in option for the FR-A700 series manufactured in December 2011 or later.

Check the SERIAL number specified on the inverter rating plate or package.

● SERIAL number check

Refer to *Instruction manual of the inverter* for the location of the rating plate.

Rating plate example




□ 1 Z ○○○○○○] SERIAL
 Symbol Year Month Control number

The SERIAL consists of one symbol, two characters indicating production year and month, and six characters indicating control number.

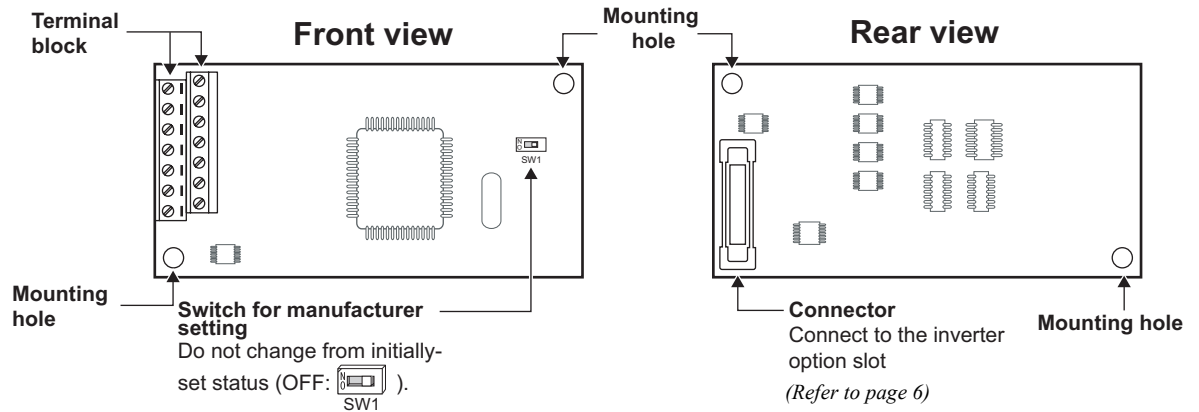
The last digit of the production year is indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).

1.2.1 Product confirmation

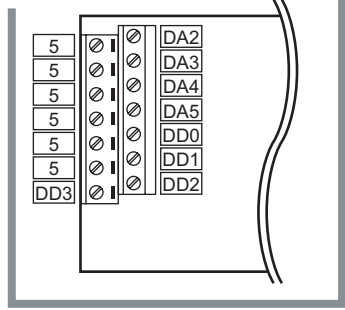
Check the enclosed items.

| | | |
|---|---|--|
| <p>Plug-in option 1</p>  | <p>Mounting screw (M3 × 6mm) 2 (Refer to page 6.)</p>  | <p>Hex-head screw for option mounting (5.5mm) 1 (Refer to page 6.)</p>  |
|---|---|--|

1.3 Parts



Terminal layout



1.4 Specifications

(1) Output signals

High-speed analog output (across the terminal 5's and the terminals DA2 to DA5), 0VDC to ± 10 VDC (12-bit output resolution)

Digital output (across the terminal 5's and the terminals DD0 to DD3), 3V to 6V for HI, 0V to 2V for LOW

(2) Output accuracy (reference value)

$\pm 10\%$ of the full-scale output value.

Depends on the output signal type.

(3) Meters used

DC voltmeter Full-scale ± 10 V (internal impedance 10k Ω or more)



Wiring length Maximum 30m

2 **INSTALLATION AND WIRING**

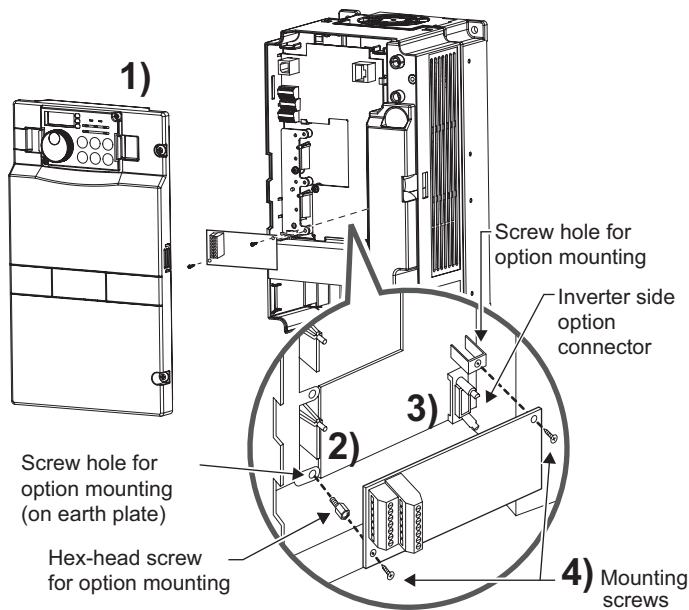
2.1 Pre-Installation Instructions

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

CAUTION

-  **With input power on, do not install or remove the plug-in option. Otherwise, the inverter and plug-in option may be damaged.**
-  **Static electricity in your body must be discharged before you touch the product. Otherwise the product may be damaged.**

2.2 Installation Procedure



- 1) Remove the inverter front cover.
- 2) Mount the hex-head screw for option mounting into the inverter screw hole (on earth plate). (size 5.5mm, tightening torque 0.56N·m to 0.75N·m)
- 3) Securely fit the connector of the plug-in option to the inverter connector along the guides.
- 4) Securely fix the both right and left sides of the plug-in option to the inverter with the accessory mounting screws. (Tightening torque 0.33N·m to 0.40N·m) If the screw holes do not line-up, the connector may not have been plugged snugly. Check for loose plugging.

REMARKS

- Remove a plug-in option after removing two screws on both left and right sides. (When the plug-in option is mounted in the connector 3, it is easier to remove the plug-in option after removing a control circuit terminal block.)



CAUTION

- Only one type of option per inverter may be used. When two or more options are mounted, priority is in order of inverter option connectors 1, 2 and 3, the options having lower priority are inoperative.
- When the inverter cannot recognize that the option is mounted due to improper installation, etc., "E. 1 to E. 3" (option alarm) are displayed. The errors shown differ according to the mounting positions (connectors 1, 2, 3).

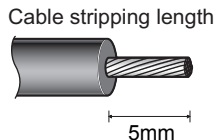
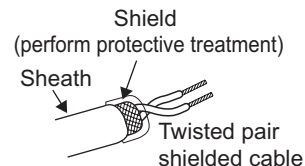
| Mounting Position | Error Display |
|-------------------|---------------|
| Connector 1 | E. 1 |
| Connector 2 | E. 2 |
| Connector 3 | E. 3 |

- Take caution not to drop a hex-head screw for option mounting or mounting screw during mounting and removal.
- Pull the option straight out when removing. Otherwise, the connector may be damaged.

2.3 Wiring

- (1) Untwist the twisted pair shielded cables after stripping its sheath. Also, perform protective treatment of the shield to ensure that it will not make contact with the conductive area.

Strip off the sheath about the size as in the below figure. 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. (Do not solder it.)



Use a bar type terminal as required.

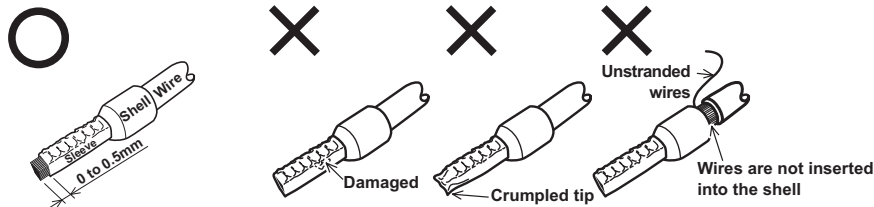
REMARKS

- Information on blade terminals
Commercially available product examples (as of Jan. 2010)

| Terminal Screw Size | Wire Size (mm ²) | Blade Terminal Model | | Manufacturer |
|---------------------|------------------------------|------------------------|---------------------------|--------------------------|
| | | With insulation sleeve | Without insulation sleeve | |
| M2 | 0.3, 0.5 | AI 0,5-6WH | A 0,5-6 | Phoenix Contact Co.,Ltd. |

Blade terminal crimping tool: CRIMPFOX 6T-F/6 (Phoenix Contact Co., Ltd.)

Insert wires to a blade terminal, and check that the wires come out for about 0 to 0.5 mm from a sleeve. Check the condition of the blade terminal after crimping. Do not use a blade terminal of which the crimping is inappropriate, or the face is damaged.



- Loosen the terminal screw and insert the cable into the terminal.

| Screw Size | Tightening Torque | Cable Size | Screwdriver |
|------------|--------------------|---|--|
| M2 | 0.22N·m to 0.25N·m | 0.3mm ² to 0.75mm ² | Small ⊖ flat-blade screwdriver (Tip thickness: 0.4mm/tip width: 2.5mm) |

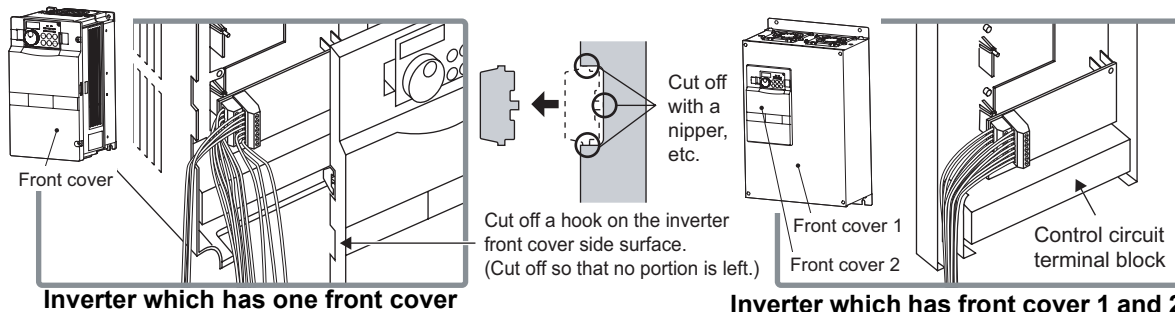
CAUTION

- Undertightening can cause cable disconnection or malfunction. Overtightening can cause a short circuit or malfunction due to damage to the screw or unit.

7 INSTALLATION AND WIRING

- (3) For wiring of the inverter which has one front cover, route wires between the control circuit terminal block and front cover. If cables can not be routed between the control circuit terminal block and front cover due to the increased number of cables, remove a hook of the front cover and use a space become available.

For wiring of the inverter which has front cover 1 and 2, use the space on the left side of the control circuit terminal block.



REMARKS

- When the hook of the inverter front cover is cut off for wiring, the protective structure (JEM1030) changes to open type (IP00).

⚠ CAUTION

- ⚠ When performing wiring using the space between the inverter front cover and control circuit terminal block, take care not to subject the cable to stress.
- ⚠ After wiring, wire offcuts must not be left in the inverter. They may cause a fault, failure or malfunction.

3 PARAMETER LIST

When the FR-A7AD is mounted on the inverter, the following parameters are extended.

| | Parameter Number | Name | Setting Range | Minimum Setting Increments | Initial Value | Refer to Page |
|--------------------------|-----------------------------|----------------------|---|----------------------------|---------------|---------------|
| High-speed analog output | 525 | DA2 output selection | 1 to 3, 5 to 14, 17 to 18, 21, 24, 32 to 34, 36, 46, 50, 52, 53, 201 to 211, 230 to 232, 235 to 238, 255 | 1 | 255 | 17 |
| | 527 | DA3 output selection | | | | |
| | 529 | DA4 output selection | | | | |
| | 531 | DA5 output selection | | | | |
| | 526 | DA2 scale | 1 to 400% | 1% | 100% | 21 |
| | 528 | DA3 scale | | | | |
| | 530 | DA4 scale | | | | |
| | 532 | DA5 scale | | | | |
| 537 | High-speed DA output filter | 0 to 8888, 9999 | 1 | 9999 | 21 | |
| Digital output | 533 | DD0 output selection | 0 to 8, 10 to 20, 25 to 28, 30 to 36, 39, 41 to 47, 55, 64, 70, 83 to 95, 97 to 99, 100 to 111, 120 to 136, 255 | 1 | 255 | 24 |
| | 534 | DD1 output selection | | | | |
| | 535 | DD2 output selection | | | | |
| | 536 | DD3 output selection | | | | |

4 HIGH-SPEED ANALOG OUTPUT

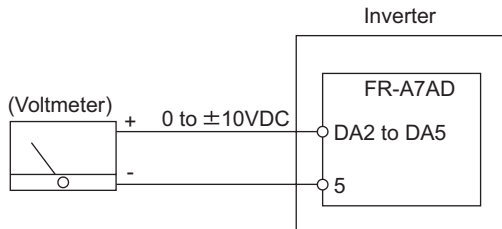
4.1 Wiring Example

Use *Pr. 525 to Pr. 532* and *Pr. 537* to output analog signals, such as output frequency and output current, from the voltage output terminals (DA2 to DA5).

The voltage output terminals are updated more frequently than the terminals FM/AM/CA* of the inverter. Thus, high-speed monitoring is available with these terminals. (Refer to *page 19* for high-speed monitoring.)

* Terminals provided differ according to the inverter.

Connect the voltmeter as shown below:

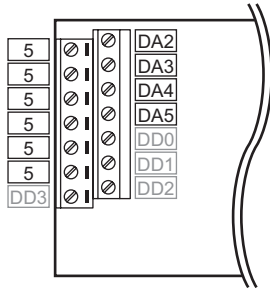


CAUTION

- The wiring length between the FR-A7AD and the voltmeter should be 30m maximum.



4.2 Terminals



| Terminal Symbol | Terminal Name | Description |
|-----------------|--|--|
| DA2 | Voltage output terminal | Connect a DC voltmeter ($\pm 10\text{VDC}$). |
| DA3 | | |
| DA4 | | |
| DA5 | | |
| 5 | | |
| DD0 | Used for digital output function. (Refer to page 23) | |
| DD1 | | |
| DD2 | | |
| DD3 | | |

4.3 Calibration procedure

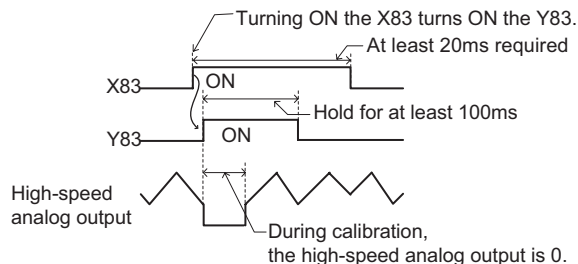
4.3.1 Calibration of voltmeter

If a voltmeter is deviated, it can be calibrated at 0V or full-scale voltage (10V) output of the terminals DA2 to DA5.

(1) Calibration at 0V output

In the initial status, 0V calibration is performed at power OFF → ON and at inverter reset.

To perform 0V calibration after the power has been turned ON, turn ON the X83 signal. To use the X83 signal, assign the 0V calibration request signal (X83) to an input terminal beforehand. While the 0V calibration is performed, the during 0V calibration signal (Y83) is ON.



* To input the X83 signal, set "83" in one of *Pr.178 to Pr.189 (input terminal function selection)* to assign the function to a terminal.

To output the Y83 signal, set "83 (positive logic)" or "183 (negative logic)" in one of *Pr.190 to Pr.196 or Pr.533 to Pr.536 (output terminal function selection)* to assign the function to a terminal. To output the LF signal, set "98 (positive logic) or 198 (negative logic)" to assign the function.

REMARKS

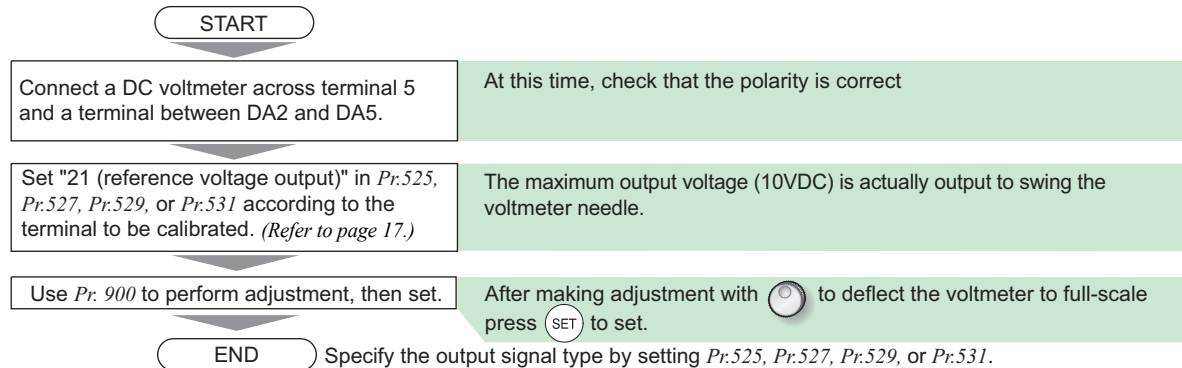
- The alarm signal (LF) turns ON if 0V calibration fails.
- Output signals are undetermined while the Y83 signal is ON. The Y83 signal does not turn ON while the power is ON or during inverter reset.

CAUTION

- Keep the X83 signal ON for 20ms or longer. Otherwise, calibration may not be performed.
 - When the X83 signal is assigned, 0V calibration is not performed at power ON and at inverter reset. If power is turned OFF while the X83 is assigned, a 0V-calibrated value returns back to the logical value because the inverter does not save such calibrated values.
 - **Changing a terminal assignment using Pr.178 to Pr.189 (input terminal function selection) and Pr.190 to Pr.196 or Pr.533 to Pr.536 (output terminal function selection) may affect other functions. Set parameters after confirming the function of each terminal.**
-
-

7 HIGH-SPEED ANALOG OUTPUT

(2) Calibration at full-scale voltage output



CAUTION

- If calibration is made without "21 (reference voltage output)" set in *Pr.525*, *Pr.527*, *Pr.529*, or *Pr.531*, the terminal FM or CA* of the inverter is calibrated. To calibrate the high-speed analog output, always set "21". (* Terminals provided differ according to the inverter.)
- If "21" is set in several parameters of *Pr.525*, *Pr.527*, *Pr.529*, and *Pr.531*, the terminal that has the highest priority is calibrated with *Pr.900*. (Terminal priority: DA2>DA3>DA4>DA5)
- Calibration priority with *Pr.900* is as follow when using FR-A7AY or FR-A7AZ in combination with FR-A7AD and "21" is set in *Pr.310 Analog meter voltage output selection (FR-A7AY)*, *Pr.838 DA1 terminal function selection (FR-A7AZ)*, *Pr.525*, *Pr.527*, *Pr.529*, and *Pr.531*.
FR-A7AY>FR-A7AZ>FR-A7AD
- During 10V calibration, scale settings of *Pr.526*, *Pr.528*, *Pr.530*, and *Pr.532* are invalid (always set to 100%).
- If FR-A7AD is remounted on another inverter, calibrate again.



4.3.2 Monitor setting

To output a monitored result as an analog output, set the values shown below in *Pr.525* (terminal DA2), *Pr.527* (terminal DA3), *Pr.529* (terminal DA4), or *Pr.531* (terminal DA5). For details about the monitored items selected with the setting values "1 to 53", refer to the description of *Pr.54 FM/CA terminal function selection* and *Pr.158 AM terminal function selection* in the *Instruction Manual of the inverter*.

| Setting | Types of Monitor | Increments | Full Scale Value |
|---------|---|----------------|---|
| 1*1 | Output frequency | 0.01Hz | <i>Pr.55</i> |
| 2 | Output current | 0.01A/0.1A*2 | <i>Pr.56</i> |
| 3 | Output voltage | 0.1V | 400V/800V |
| 5 | Frequency setting value | 0.01Hz | <i>Pr.55</i> |
| 6*1 | Running speed | 1(r/min) | The value converted with the <i>Pr. 37</i> value from <i>Pr. 55</i> . |
| 7*3 | Motor torque | 0.1% | <i>Pr.866</i> |
| 8 | Converter output voltage | 0.1V | 400V/800V |
| 9 | Regenerative brake duty | 0.1% | <i>Pr.70</i> |
| 10 | Electric thermal relay function load factor | 0.1% | 100% |
| 11 | Output current peak value | 0.01A/0.1A*2 | <i>Pr.56</i> |
| 12 | Converter output voltage peak value | 0.1V | 400V/800V |
| 13 | Input power | 0.01kW/0.1kW*2 | Rated inverter power × 2 |
| 14 | Output power | 0.01kW/0.1kW*2 | Rated inverter power × 2 |
| 17*3 | Load meter | 0.1% | <i>Pr.866</i> |
| 18 | Motor excitation current | 0.01A/0.1A*2 | <i>Pr.56</i> |
| 21 | Reference voltage output | — | — |

| Setting | Types of Monitor | Increments | Full Scale Value |
|---------|--|--|---------------------|
| 24 | Motor load factor | 0.1% | 200% |
| 32*3 | Torque command | 0.1% | Pr.866 |
| 33*3 | Torque current command | 0.1% | Pr.866 |
| 34*4 | Motor output | 0.01kW/0.1kW*2 | Rated motor current |
| 36*4 | Torque monitor (power driving/ regeneration switchover) | — | Pr.866 |
| 46*5 | Motor temperature | 1°C | Pr.751 |
| 50 | Energy saving effect | Changeable by parameter setting. | Inverter capacity |
| 52 | PID set point | 0.1% | 100% |
| 53 | PID measured value | 0.1% | 100% |

- *1 Outputs 0V to +10V during forward rotation, and 0V to -10V during reverse rotation.
- *2 Differs according to capacities. (55K or lower/75K or higher)
The inverter model numbers of 55K and 75K differ according to -NA and -EC versions. (Refer to page 1.)
- *3 Positive voltage is output during forward driving/reverse regeneration, and negative voltage is output during reverse driving/forward regeneration.
- *4 Positive voltage is output during power driving, and negative voltage is output during regeneration.
- *5 Monitoring is available when FR-A7AZ is mounted.



| Setting | Types of Monitor | Increments | Full Scale Value | Description |
|----------------|--------------------------------|--------------|---|--|
| 201*8 | Output frequency | 0.01Hz | <i>Pr.55</i> | Displays the inverter output frequency. |
| 202*8, *9 | U-phase output current | 0.01A/0.1A*6 | $Pr.56 \times \sqrt{2}$ | Displays the U-phase output current. |
| 203*8, *9 | V-phase output current | 0.01A/0.1A*6 | $Pr.56 \times \sqrt{2}$ | Displays the V-phase output current. |
| 204*8, *9 | W-phase output current | 0.01A/0.1A*6 | $Pr.56 \times \sqrt{2}$ | Displays the W-phase output current. |
| 205*8 | Converter output voltage | 0.1V | 200V class: 400V 400V class: 800V | Displays the DC bus voltage. |
| 206*8 | Output current of three phases | 0.01A/0.1A*6 | $Pr.56 \times \sqrt{2}$ | Displays the maximum output current among the absolute currents in the U, V, and W phases. |
| 207*8, *9, *10 | Excitation current | 0.01A/0.1A*6 | V/F control, Advanced magnetic flux vector control: <i>Pr.56</i> Other than above: 300% | Displays the excitation current |
| 208*8, *9, *10 | Torque current | 0.01A/0.1A*6 | V/F control, Advanced magnetic flux vector control: <i>Pr.56</i> Other than above: <i>Pr.866</i> | Displays the torque current. |
| 209 | Terminal 2 | 0.1% | 100% | Displays the input voltage to the terminal 2 (displays 100% for 10V (fixed)) |
| 210 | Terminal 4 | 0.1% | 100% | Displays the input voltage to the terminal 4 (displays 100% for 10V (fixed)) |

| Setting | Types of Monitor | Increments | Full Scale Value | Description |
|--------------------|----------------------------|------------|----------------------------|---|
| 211*9 | Terminal 1 | 0.1% | 100% | Displays the input voltage to the terminal 1 (displays 100% for 10V (fixed)) |
| 230*7, *8, *9 | Output frequency | 0.01Hz | Pr.55 | Displays the inverter output frequency (0V to +10V during forward rotation, 0V to -10V during reverse rotation) |
| 231*7, *8, *9 | Motor speed | 1r/min | Pr.55 (converted to r/min) | Displays the motor speed (0V to +10V during forward rotation, 0V to -10V during reverse rotation) |
| 232*7, *8, *9 | Speed command | 1r/min | Pr.55 | Displays the speed command (0V to +10V during forward rotation, 0V to -10V during reverse rotation) |
| 235*7, *8, *9 | Torque command | 0.1% | Pr.866 | Displays the torque command. |
| 236*7, *8, *9, *10 | Motor torque | 0.1% | Pr.866 | Displays the motor torque in percentage on the assumption that the rated motor torque is 100%. |
| 237*7, *8, *9 | Excitation current command | 0.1% | 300% | Displays the excitation current command. |
| 238*7, *8, *9 | Torque current command | 0.1% | Pr.866 | Displays the commanded current for the torque. |
| 255 | No monitor | — | — | — |

*6 Differs according to capacities. (55K or lower/75K or higher)

The inverter model numbers of 55K and 75K differ according to -NA and -EC versions. (Refer to page 1.)

*7 The output is "0" under V/F control and Advanced magnetic flux vector control.

*8 High-speed monitor.

*9 Monitor with a plus/minus sign.

*10 The output is "0" under DC injection brake and magnetic flux decay output shutoff.

4.3.3 Scale setting

The scale of output voltage can be adjusted with *Pr.526* (terminal DA2), *Pr.528* (terminal DA3), *Pr.530* (terminal DA4), and *Pr.532* (terminal DA5). (Setting range: 1% to 400%)

Use this function when you need to change the scale of the monitor because the full scale value is not changeable. Output voltages from the terminals DA2 to DA5 are output according to the scale ratios (*Pr.526*, *Pr.528*, *Pr.530*, *Pr.532*).

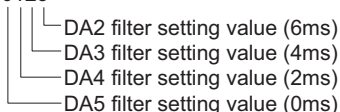
$$\text{Output voltage} = 10\text{V} \times \frac{\text{Monitor value}}{\text{Full scale value}} \times \frac{100\%}{\text{Scale ratio}}$$

4.3.4 High-speed analog output filter setting

Set a value between "0 and 8" in each digit of *Pr.537* to activate filters for the high-speed analog output terminals DA2 to DA5. Adjust the filter setting when a terminal output is unstable.

Example)

Pr.537 = 0123




| Filter Setting | Time Constant |
|-----------------------|-----------------------------|
| 0 | 0ms |
| 1 | 2ms |
| 2 | 4ms |
| 3 | 6ms |
| 4 | 8ms |
| 5 | 10ms |
| 6 | 12ms |
| 7 | 14ms |
| 8 | 16ms |
| 9999 (initial value)* | No filter for all terminals |

* Setting "9" to only one digit of *Pr.537* is not possible. The setting value "9" must be set to all four digits.

4.4 Instructions

- (1) A voltmeter having smaller internal impedance than the value indicated in the Specifications (*page 4*) may not deflect to full-scale and may not be calibrated.
- (2) To calibrate a voltmeter, of which full scale is less than 10VDC, disconnect the voltmeter first. Then, set terminal DA2 to DA5 outputs to the smallest values (set scale ratios to *Pr.526*, *Pr.528*, *Pr.530*, and *Pr.532*) according the voltmeter, and reconnect the voltmeter.

| |
|--|
|  CAUTION |
|--|

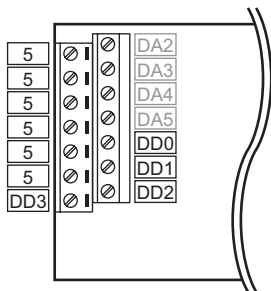
| |
|--|
|  At the time of shipping, full-scale output is set to 10VDC. If a voltmeter, of which full scale is less than 10VDC, is calibrated with the default setting, the voltmeter may be damaged. Make sure to set the scale ratios according to the voltmeter. |
|--|

- (3) When an option error (\mathcal{E}_1 to \mathcal{E}_3) occurs, all outputs are off.

5 DIGITAL OUTPUT

5.1 Terminals

Use *Pr.533 to Pr.536* to output the signals (RUN, SU, etc.), which are provided in the inverter as standard, as digital signals (0V, 5V).



| Terminal Symbol | Terminal Name | Description |
|-----------------|--|--|
| DD0 | Digital output terminals | Use <i>Pr. 533</i> to assign functions. |
| DD1 | | Use <i>Pr. 534</i> to assign functions. |
| DD2 | | Use <i>Pr. 535</i> to assign functions. |
| DD3 | | Use <i>Pr. 536</i> to assign functions. |
| 5 | Common terminal | Common terminals for DD0 to DD3 and DA2 to DA5. These terminal 5's are connected with the terminal 5 of the inverter. |
| DA2 | Used for analog output function. (<i>Refer to page 12</i>) | |
| DA3 | | |
| DA4 | | |
| DA5 | | |

5.2 Output Signal List

Use Pr.533 (terminal DD0), Pr. 534 (terminal DD1), Pr. 535 (terminal DD2), and Pr. 536 (terminal DD3) to output different signals as digital signals. For details of signal definitions, refer to Pr. 190 to Pr. 196 (*Output terminal function selection*) of *Instruction manual of the inverter*.

| Setting | Signal Name | Function |
|---------|-------------|---|
| 0 | RUN | Inverter running |
| 1 | SU | Up to frequency |
| 2 | IPF | Instantaneous power failure/undervoltage |
| 3 | OL | Overload alarm |
| 4 | FU | Output frequency detection |
| 5 | FU2 | Second output frequency detection |
| 6 | FU3 | Third output frequency detection |
| 7 | RBP | Regenerative brake pre-alarm |
| 8 | THP | Electronic thermal relay function pre-alarm |
| 10 | PU | PU operation mode |
| 11 | RY | Inverter operation ready |
| 12 | Y12 | Output current detection |
| 13 | Y13 | Zero current detection |
| 14 | FDN | PID lower limit |
| 15 | FUP | PID upper limit |
| 16 | RL | PID forward/reverse rotation output |
| 17 | MC1 | Commercial power-supply switchover MC1 |
| 18 | MC2 | Commercial power-supply switchover MC2 |
| 19 | MC3 | Commercial power-supply switchover MC3 |
| 20 | BOF | Brake opening request |
| 25 | FAN | Fan fault output |
| 26 | FIN | Heatsink overheat pre-alarm |
| 27 | ORA | Orientation in-position |
| 28 | ORM | Orientation error |

| Setting | Signal Name | Function |
|---------|-------------|---|
| 30 | Y30 | Forward rotation output |
| 31 | Y31 | Reverse rotation output |
| 32 | Y32 | Regenerative status output |
| 33 | RY2 | Operation ready 2 |
| 34 | LS | Low speed output |
| 35 | TU | Torque detection |
| 36 | Y36 | In-position |
| 39 | Y39 | Start time tuning completion |
| 41 | FB | Speed detection |
| 42 | FB2 | Second speed detection |
| 43 | FB3 | Third speed detection |
| 44 | RUN2 | Inverter running 2 |
| 45 | RUN3 | Inverter running and start command is on |
| 46 | Y46 | During deceleration due to instantaneous power failure (retained until release) |
| 47 | PID | During PID control activated |
| 55 | Y55 | Motor temperature detection |
| 64 | Y64 | During retry |
| 70 | SLEEP | During PID output suspension |
| 83 | Y83 | During 0V calibration |
| 84 | RDY | Position control preparation ready |
| 85 | Y85 | DC current feeding |
| 86 | Y86 | Control circuit capacitor life |
| 87 | Y87 | Main circuit capacitor life |



| Setting | Signal Name | Function |
|---------|-------------|--|
| 88 | Y88 | Cooling fan life |
| 89 | Y89 | Inrush current limit circuit life |
| 90 | Y90 | Life alarm |
| 91 | Y91 | Fault output 3 (power off signal) |
| 92 | Y92 | Energy saving average value updated timing |
| 93 | Y93 | Current average monitor signal |
| 94 | ALM2 | Fault output 2 |
| 95 | Y95 | Maintenance timer signal |
| 97 | ER | Alarm output 2 |
| 98 | LF | Alarm output |
| 99 | ALM | Fault output |

| Setting | Terminal Name | Function |
|---------|---------------|--|
| 100 | STF | Outputs the different input terminal statuses of the inverter. (Refer to the <i>Instruction Manual of the inverter</i> for the details of the terminals.) |
| 101 | STR | |
| 102 | RL | |
| 103 | RM | |
| 104 | RH | |
| 105 | RT | |
| 106 | AU | |
| 107 | JOG | |
| 108 | CS | |
| 109 | MRS | |
| 110 | STOP | |
| 111 | RES | |

| Setting | Terminal Name | Function |
|---------|---------------|--|
| 120 | X0 | Outputs the different terminal statuses of FR-A7AX. (Refer to the <i>Instruction Manual of FR-A7AX</i> for the details of the terminals.) |
| 121 | X1 | |
| 122 | X2 | |
| 123 | X3 | |
| 124 | X4 | |
| 125 | X5 | |
| 126 | X6 | |
| 127 | X7 | |
| 128 | X8 | |
| 129 | X9 | |
| 130 | X10 | |
| 131 | X11 | |
| 132 | X12 | |
| 133 | X13 | |
| 134 | X14 | |
| 135 | X15 | |
| 136 | DY | |
| 255 | — | No function |

REMARKS

- When an option error (E. 1 to E. 3) occurs, all outputs are tuned off.

MEMO

MEMO

REVISIONS

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

| Print Date | *Manual Number | Revision |
|-------------------|-----------------------|-----------------|
| Nov. 2011 | IB(NA)-0600475ENG-A | First edition |
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