

FR-A701 Series

Instruction Manual Supplement

For the FR-A701 series manufactured in August 2009 or later, the following specifications are added. (For how to find the SERIAL number, refer to page 7.)

(1) Output power monitor (with regenerative display) and cumulative regenerative power monitor

The values in the output power monitor (with regenerative display) (Pr.52 = "65") can be accumulated and displayed in the cumulative regenerative power monitor (Pr.52 = "66").

Parameter Number	Name	Initial Value	Setting Range	Description
52	DU/PU main display data selection	0 (output frequency)	0, 5 to 8, 10 to 14, 17 to 20, 22 to 25, 32 to 35, 50 to 57, 65, 66 , 100	Select the monitor to be displayed on the operation panel and parameter unit.
170	Watt-hour meter clear	9999	0	Set "0" to clear the cumulative power monitor.
			2	Set "2" to clear the cumulative regenerative power monitor.
			10	Sets the maximum value for the monitoring from communication to 9999kWh.
			9999	Sets the maximum value for the monitoring from communication to 65535kWh.
891	Cumulative power monitor digit shifted times	9999	0 to 4	Set how many times to shift the monitor digit in the cumulative power monitor or in the cumulative regenerative power monitor. The monitor value is clamped at the maximum value.
			9999	No shift Monitor value is cleared when it exceeds the maximum value.

* The above parameters allow their setting to be changed during the operation in any operation mode even if "0" (initial value) is set to Pr.77 Parameter write selection.

● Monitor description list (Pr.52)

- Set the monitor to be displayed on the operation panel (FR-DU07) and parameter unit (FR-PU04/FR-PU07) in Pr. 52 DU/PU main display data selection.
- Refer to the following table and set the monitor to be displayed. (The monitor marked × cannot be selected.)

Types of Monitor	Unit	Pr.52 Setting		Pr.54 (FM) Pr.158 (AM) Setting	Terminal FM/AM Full-scale Value	Description
		DU LED	PU main monitor			
Output power (with regenerative display)	0.1kW		65	×	Inverter rated power × 2	Displays the regenerative power at the inverter output side.
Cumulative regenerative power	0.01kWh (1kWh for communication)		66	×	—	Accumulated regenerative power is displayed based on the output power (with regenerative display). The value can be cleared by Pr.170.

●Output power (with regenerative display) (*Pr.52 = "65"*)

- Regenerative power at the inverter output side is displayed in the output power monitor (with regenerative display) (*Pr.52 = "65"*).
- Positive value (no sign) is displayed in the output power display on the operation panel during power driving, and negative value is displayed during regenerative driving.

<DU07 display in regenerative driving> <DU07 display in power driving>



Only signs are displayed in the leftmost 7-segment LED

- When the monitored value is 100kW or more, the displayed unit is 1kW. When the power value is 1000kW or more, it is limited at 999kW. When the power value is -1000kW or less, it is limited at -999kW.
- Positive value (no sign) is displayed in the output power display on the communication option and FR-PU07 during power driving and regenerative driving.

REMARKS

- Output power (with regenerative display) (*Pr.52 = "65"*) cannot be assigned to the terminal FM/AM or to the analog output terminal of FR-A7AY.
- Analog output pattern when *Pr.838 DA1 terminal function selection = "65"* is shown below. (*Pr.838 DA1 terminal function selection* is a parameter dedicated to FR-A7AZ. Read and write to this parameter is available only when the option is installed.)
 - During power driving: positive value is output
 - During regenerative driving: negative value is output

●Cumulative regenerative power monitor and clear (*Pr.170, Pr.891*)

- Monitored values are accumulated in the cumulative regenerative power monitor (*Pr.52 = "66"*), and the displayed value on the cumulative power monitor is updated every 1h.
- Display increments and display ranges of the operation panel (FR-DU07), parameter unit (FR-PU04/FR-PU07) and communication (RS-485 communication and communication option) are as indicated below.

Operation panel *1		Parameter unit *2		Communication		
Range	Unit	Range	Unit	Range		Unit
				<i>Pr.170 =10</i>	<i>Pr.170 =9999</i>	
0 to 99.99kWh	0.01kWh	0 to 999.99kWh	0.01kWh	0 to 9999kWh	0 to 65535kWh (Initial setting)	1kWh
100.0 to 999.9kWh	0.1kWh	1000.0 to 9999.9kWh	0.1kWh			
1000 to 9999kWh	1kWh	10000 to 99999kWh	1kWh			

*1 Power is measured in the range of 0 to 9999.99kWh, and displayed in four digits.

When the monitor value exceeds "99.99", a carry occurs, e.g. "100.0", so the value is displayed in 0.1kWh increments.

*2 Power is measured in the range of 0 to 99999.99kWh, and displayed in five digits.

When the monitor value exceeds "999.99", a carry occurs, e.g. "1000.0", so the value is displayed in 0.1kWh increments.

- The monitor data digit can be shifted to the right by the number of *Pr.891*.
For example, if the cumulative power value is 1278.56kWh when *Pr.891 = "2"*, the PU/DU display is 12.78 (display in 100kWh increments) and the communication data is 12.
- If the maximum value is exceeded at *Pr.891 = "0 to 4"*, the energy is clamped at the maximum value, indicating that a digit shift is necessary. If the maximum value is exceeded at *Pr.891 = "9999"*, the monitor value returns to 0, and the counting starts again.
- Writing "2" to *Pr.170* clears the cumulative regenerative power amount.

REMARKS

- If "2" is written to *Pr.170*, and *Pr.170* is read again, "9999" or "10" is displayed.
- Cumulative regenerative power (*Pr.52 = "66"*) cannot be assigned to the terminal FM/AM or the analog output terminal of FR-A7AY, or neither to *Pr.838 DA1 terminal function selection*.

●Mitsubishi inverter protocol (computer link communication)

[Special monitor selection No.]

Data	Description	Increments
H41	Output power (with regenerative display)	0.1kW
H42	Cumulative regenerative power	1kWh

●Modbus RTU communication specification

[Real time monitor]

Register	Description	Unit
40263	Output power (with regenerative display)	0.1kW
40266	Cumulative regenerative power	1kWh

(2) Password function (Pr.296, Pr.297)

Registering a 4-digit password can restrict parameter reading/writing.

Parameter Number	Name	Initial Value	Setting Range	Description	Instruction Code		
					Read	Write	Expansion
296	Password lock level	9999	0 to 6, 99, 100 to 106, 199	Select restriction level of parameter reading/writing when a password is registered.	68	E8	2
			9999	No password lock			
297	Password lock/unlock	9999	1000 to 9998	Register a 4-digit password	69	E9	2
			(0 to 5)*	Displays password unlock error count. (Reading only) (Valid when Pr. 296 = "100 to 106")			
			9999*	No password lock			

The above parameters can be set when Pr. 160 User group read selection = "0". When Pr. 296 ≠ "9999" (with password lock), note that Pr. 297 is always available for setting regardless of Pr. 160 setting.

* "0 or 9999" can be set to Pr.297 at any time although the displayed value does not change (set value is not displayed).

1) Parameter reading/writing restriction level (Pr.296)

•Level of reading/writing restriction by PU/NET mode operation command can be selected by Pr. 296.

Pr.296 Setting	PU Mode		NET Mode Operation Command *4			
	Operation Command *3		RS-485 communication		Communication option	
	Read *1	Write *2	Read	Write *2	Read	Write *2
9999	○	○	○	○	○	○
0, 100 *6	×	×	×	×	×	×
1, 101	○	×	○	×	○	×
2, 102	○	×	○	○	○	○
3, 103	○	○	○	×	○	×
4, 104	×	×	×	×	○	×
5, 105	×	×	○	○	○	○
6, 106	○	○	×	×	○	×
99, 199	Only the parameters registered in the user group can be read/written.*5 (For the parameters not registered in the user group, same restriction level as "4, 104" applies.)					

○: enabled, ×: restricted

*1 If the parameter reading is restricted by the Pr. 160 setting, those parameters are unavailable for reading even when "○" is indicated.

*2 If the parameter writing is restricted by the Pr. 77 setting, those parameters are unavailable for writing even when "○" is indicated.

*3 Parameter access from the unit where parameter is written in PU operation mode (initially set to operation panel, parameter unit) is restricted. (For how to select the PU mode command source, refer to Pr.551 PU mode operation command source selection.)

*4 This restricts parameter access from the command source that can write a parameter under Network operation mode (initially RS-485 communication from PU connector or a communication option). (For how to select the NET mode command source, refer to Pr.551 PU mode operation command source selection.)

*5 Read/write is enabled only in the simple mode parameters registered in the user group when Pr.160 User group read selection = "9999".

Pr.296 and Pr.297 are always read/write enabled whether registered to a user group or not.

*6 If a communication option is installed, option fault (E.OPT) occurs, and inverter trips. (Refer below)

•Option fault (E.OPT)

Operation panel indication	E.OPT	<i>E.OPT</i>	FR-PU04 FR-PU07	Option Fault
Name	Option fault			
Description	<ul style="list-style-type: none"> •Appears when the plug-in option is set to be the torque command source by <i>Pr.804 Torque command source selection</i> setting, but the plug-in option is not connected. •Appears when a switch on the plug-in option, which is for manufacturer setting, is changed. •Appears when a communication option is installed during password lock (<i>Pr. 296 = "0, 100"</i>). 			
Checkpoint	<ul style="list-style-type: none"> •Check if the plug-in option that sends torque command is connected. •Check if password lock is activated by setting <i>Pr. 296 = "0, 100"</i> 			
Corrective action	<ul style="list-style-type: none"> •Check the connection of the plug-in option. Check the setting of <i>Pr.804 Torque command source selection</i>. •Set the switch on the plug-in option, which is for manufacturer setting, back to the initial setting. (Refer to the Instruction Manual of each option.) •To apply the password lock when installing a communication option, set <i>Pr.296 ≠ "0, 100."</i> •If the problem still persists after taking the above measure, please contact your sales representative. 			

2) Password lock/unlock (*Pr.296, Pr.297*)

<Lock>

- Set parameter reading/writing restriction level. (*Pr.296 ≠ 9999*)

<i>Pr.296 Setting</i>	Restriction of Password Unlock Error	<i>Pr.297 Display</i>
0 to 6, 99	No restriction	Always 0
100 to 106, 199	Restricted at fifth error	Displays error count (0 to 5)

* During *Pr. 296 = any of "100 to 106, 199"*, if password unlock error has occurred 5 times, correct password will not unlock the restriction. Parameter all clear can unlock the restriction. (In this case, parameter settings are cleared.)

- Write a four-digit number (1000 to 9998) in *Pr. 297* as a password. (When *Pr. 296 = "9999"*, cannot be written.)
When a password is registered, parameter reading/writing is restricted with the restriction level set in *Pr. 296* until unlocking.

REMARKS

- After registering a password, a read value of *Pr. 297* is always one of "0" to "5".
- When a password restricted parameter is read/written, *LOd* is displayed.
- Even if a password is registered, the parameters, which the inverter itself writes, such as inverter parts life are overwritten as needed.
- Even if a password is registered, *Pr. 991 PU contrast adjustment* can be read/written when a parameter unit (FR-PU04/FR-PU07) is connected.

- Password locked(LOCd)

Operation panel indication	LOCd	LOCd
Name	Password locked	
Description	Password function is active. Display and setting of parameter is restricted.	
Check point	—	
Corrective action	Enter the password in <i>Pr. 297 Password lock/unlock</i> to unlock the password function before operating.	

<Unlock>

There are two ways of unlocking the password.

- Enter the password in *Pr. 297*.

Unlocked when the password is correct. If the password is incorrect, an error occurs and not unlocked.

During *Pr. 296* =any of "100 to 106, 199", if password unlock error has occurred 5 times, correct password will not unlock the restriction. (During password lock)

- Perform parameter all clear.

CAUTION

- If the password has been forgotten, perform parameter all clear to unlock the parameter restriction. In that case, other parameters are also cleared.
- All parameter clear cannot be performed during the operation.
- Do not use FR Configurator when parameter read is restricted (*Pr. 296* = any of "0, 4, 5, 99, 100, 104, 105, 199"). FR Configurator may not function properly.

REMARKS

- The password unlock method is different for operation panel/FR-PU07, RS-485 communication, and communication option.

	Operation panel/ FR-PU07	RS-485 communication	Communication option
All parameter clear (data format H9966, H55AA)	○	○	○
Parameter clear (data format H9696, H5A5A)	×	×	○

3) Parameter operation during password lock/unlock

Parameter operation	Unlocked		Password registered	Locked
	<i>Pr.296</i> =9999 <i>Pr.297</i> =9999	<i>Pr.296</i> ≠9999 <i>Pr.297</i> =9999	<i>Pr.296</i> ≠9999 <i>Pr.297</i> =0 to 4 (Read value)	<i>Pr.296</i> =100 to 106, 199 <i>Pr.297</i> =5 (Read value)
<i>Pr.296</i>	Read	○ *1	○	○
	Write	○ *1	×	×
<i>Pr.297</i>	Read	○ *1	○	○
	Write	×	○	○ *3
Performing parameter clear	○	○	×	×
Performing all parameter clear	○	○	○ *2	○ *2
Performing parameter copy	○	○	×	×

○:enabled, ×:restricted

*1 Reading/writing is unavailable when there is restriction to reading by the *Pr. 160* setting. (Reading is available in NET mode regardless of *Pr. 160* setting.)

*2 Unavailable during the operation.

*3 Correct password will not unlock the restriction.

*4 Parameter clear is available only from the communication option.

REMARKS

- When *Pr.296* ="4, 5, 104, 105" (password lock), the setting screen for PU JOG frequency is not displayed in the parameter unit (FR-PU04 or FR-PU07).
- During password lock, parameter copy of the parameter unit (FR-PU07) cannot be performed.

(3) SERIAL (Serial No.)

The changes apply to the August 2009 production or later.

Check the serial number printed on the rating plate or on package of the inverter.

- How to read the SERIAL number

For the location of rating plate, refer to Instruction Manual of the inverter.

Rating plate example

<u>□</u>	<u>9</u>	<u>8</u>	<u>○○○○○○</u>
Symbol	Year	Month	Control number

SERIAL (Serial No.)

The SERIAL consists of 1 version symbol, 2 numeric characters or 1 numeric character and 1 alphabet letter indicating year and month, and 6 numeric characters indicating control number.

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

Instructions for compliance with the EU Directives (for only 400V class)

The EU Directives are issued to standardize different national regulations of the EU Member States and to facilitate free movement of the equipment, whose safety is ensured, in the EU territory.

Since 1996, compliance with the EMC Directive that is one of the EU Directives has been legally required. Since 1997, compliance with the Low Voltage Directive, another EU Directive, has been also legally required. When a manufacturer confirms its equipment to be compliant with the EMC Directive and the Low Voltage Directive, the manufacturer must declare the conformity and affix the CE marking.

- The authorized representative in the EU

The authorized representative in the EU is shown below.

Name: Mitsubishi Electric Europe BV

Address: Gothaer strasse 8, 40880 Ratingen, Germany

- Note

We declare that this inverter, when equipped with the dedicated EMC filter, conforms with the EMC Directive in industrial environments and affix the CE marking on the inverter. When using the inverter in a residential area, take appropriate measures and ensure the conformity of the inverter used in the residential area.

(1) EMC Directive

We declare that this inverter (400V class), when equipped with the EMC Directive compliant EMC filter, conforms with the EMC Directive and affix the CE marking on the inverter (400V class).

- EMC Directive: 2004/108/EC

- Standard(s): EN61800-3:2004 (Second environment / PDS Category "C3")

NOTE: First environment

Environment including residential buildings. Includes building directly connected without a transformer to the low voltage power supply network which supplies power to residential buildings.

Second environment

Environment including all buildings except buildings directly connected without a transformer to the lower voltage power supply network which supplies power to residential buildings.

- NOTE

- *Set the EMC Directive compliant EMC filter to the inverter. Insert line noise filters and ferrite cores to the power and control cables as required.

- *Connect the inverter to an earthed power supply.

- *Install a motor, EU Directive compliant EMC filter, and a control cable according to the instruction written in the EMC Installation Guidelines (BCN-A21041-204).

- *The cable length between the inverter and the motor is 20m maximum.

- *Confirm that the final integrated system with the inverter conforms with the EMC Directive.