MITSUBISHI ELECTRIC Inverter
Sales and Service

No. 677E

Firmware Upgrade for the FR-E800 Series General-Purpose Inverters

Thank you for your continued patronage of Mitsubishi Electric drive control products.
The firmware of the FR-E800 series general-purpose inverters will be upgraded to improve functionality.

1. Products Affected

FR-E800 series

2. Details of Change

(1) Supporting PM motors (MM-GKR 0.4kW and 0.75kW, and EM-A 5.5kW and 7.5kW)

1) Applied motor

The parameter setting values for the Mitsubishi Electric PM motors will be added as shown in the following table.

Pr. (Pr. group)	Name	Change
71 (C100)	Applied motor	"540" (MM-GKR motor)*1 and "1140" (EM-A motor)*2 will be added.
450 (C200)	Second applied motor	

*1 The value is valid only when the FR-E820-0080(1.5K) or lower or the FR-E820S-0080(1.5K) or lower is used and Pr.80 (Pr.453) = 0.4 or 0.75 kW. Under other conditions, "SE" (Incorrect parameter setting) is displayed when the start command is turned ON.

*2 The value is valid only when the FR-E820-0470(11K) or lower is used and Pr.80 (Pr.453) = 5.5 or 7.5 kW. Under other conditions, "SE" (Incorrect parameter setting) is displayed when the start command is turned ON.

2) PM parameter initialization

Parameter initial setting values required to drive a PM motor will be added as shown in the following table.

Pr. (Pr. group)	Name	Change
998 (E430)	PM parameter initialization	The following values will be added: "3024" (Parameter setting (in rotations per minute) for an MM-GKR motor)*3, "3044" (Parameter setting (in rotations per minute) for an EM-A motor)*4, "3124" (Parameter setting (in frequencies) for an MM-GKR motor)*3, "3144" (Parameter setting (in frequencies) for an EM-A motor)*4.

*3 The value can be set in either of the following conditions:
The FR-E820-0080(1.5K) or lower or the FR-E820S-0080(1.5K) or lower is used and Pr.80 (Pr.453) = 0.4 or 0.75 kW.
The FR-E820-0030(0.4K), FR-E820-0050(0.75K), FR-E820S-0030(0.4K), or FR-E820S-0050(0.75K) is used and Pr.80 (Pr.453) = "9999".

*4 The value can be set in either of the following conditions:
The FR-E820-0470(11K) or lower is used and Pr.80 (Pr.453) = 5.5 or 7.5 kW.
The FR-E820-0240(5.5K) or FR-E820-0330(7.5K) is used and Pr.80 (Pr.453) = "9999".

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3) Position control (PM sensorless vector control) for a PM motor (MM-GKR or EM-A)

Position control (PM sensorless vector control) will be added to the control method selection.

Pr. (Pr. group)	Name	Change
451 (G300)	Second motor control method selection	"13" (position control) and "14" (speed control / position control switchover) will be added.
800 (G200)	Control method selection	

(2) Supporting orientation control (when FR-A8AP E kit installed)

The inverter can adjust the stop position (Orientation control) using a position detector (encoder) attached to a place such as the main shaft of the machine.

1) Parameters

Name	Added parameter		Name	Added parameter	
	Pr. Group	Pr.		Pr. Group	Pr.
Stop position command selection	P.A510	Pr.350	Orientation position loop gain	P.A520	Pr.362
Orientation speed	P.A526	Pr.351	Completion signal output delay time	P.A521	Pr.363
Creep speed	P.A527	Pr.352	Encoder stop check time	P.A522	Pr.364
Creep switchover position	P.A528	Pr.353	Orientation limit	P.A523	Pr.365
Position loop switchover position	P.A529	Pr.354	Recheck time	P.A524	Pr.366
DC injection brake start position	P.A530	Pr.355	Orientation selection	P.A525	Pr.393
Internal stop position command	P.A531	Pr.356	Orientation speed gain (P term)	P.A542	Pr.396
Orientation in-position zone	P.A532	Pr.357	Orientation speed integral time	P.A543	Pr.397
Servo torque selection	P.A533	Pr.358	Orientation speed gain (D term)	P.A544	Pr.398
Position shift	P.A512	Pr.361	Orientation deceleration ratio	P.A545	Pr.399

2) Setting values

<table>
<tr><th>Pr. (Pr. group)</th><th>Name</th><th>Change</th></tr>
<tr><td>178, 179
(T700, T701)</td><td>STF/DI0 or STR/DI1 terminal function selection</td><td rowspan="3">The following setting value will be added.<table><tr><th>Setting value</th><th>Signal name</th><th>Description</th></tr><tr><td>22</td><td>X22</td><td>Orientation command
(for Vector control compatible options)</td></tr></table></td></tr>
<tr><td>180 to 184
(T702 to T704, T709, T711)</td><td>RL/RM/RH/MRS/RES terminal function selection</td></tr>
<tr><td>185 to 189
(T751 to T755)</td><td>NET X1 to X5 input selection</td></tr>
<tr><td>190 to 192
(M400, M404, M405)</td><td>RUN/FU/ABC terminal function selection</td><td rowspan="3">The following setting values will be added.<table><tr><th>Setting value (Positive/negative logic)</th><th>Signal name</th><th>Description</th></tr><tr><td>27/127</td><td>ORA</td><td>Orientation complete
(for Vector control compatible options)</td></tr><tr><td>28/128</td><td>ORM</td><td>Orientation fault
(for Vector control compatible options)</td></tr></table></td></tr>
<tr><td>193 to 196
(M451 to M454)</td><td>NET Y1 to Y4 output selection</td></tr>
<tr><td>313 to 319
(M410 to M416)</td><td>DO0 to DO6 output selection</td></tr>
<tr><td>320 to 322
(M420 to M422)</td><td>RA1 to RA3 output selection</td><td>The following setting values will be added.<table><tr><th>Setting value (Positive logic)</th><th>Signal name</th><th>Description</th></tr><tr><td>27</td><td>ORA</td><td>Orientation complete
(for Vector control compatible options)</td></tr><tr><td>28</td><td>ORM</td><td>Orientation fault
(for Vector control compatible options)</td></tr></table></td></tr>
<tr><td>52 (M100)</td><td>Operation panel main monitor selection</td><td rowspan="4">The setting value "22" (Orientation status) will be added.</td></tr>
<tr><td>774 to 776
(M101 to M103)</td><td>Operation panel monitor selection 1 to 3</td></tr>
<tr><td>992 (M104)</td><td>Operation panel setting dial push monitor selection</td></tr>
<tr><td>1027 to 1034
(A910 to A917)</td><td>Analog source selection (1ch) to (8ch)</td></tr>
</table>

(3) Supporting emergency drive function (Standard model / Ethernet model)

The inverter can continue driving the motor in case of emergency such as a fire, since protective functions are not activated even if the inverter detects a fault. Using this function may damage the motor or inverter because driving the motor is given the highest priority. Use this function for emergency operation only. The operation can be switched to the commercial power supply operation at the occurrence of a fault which may cause damage of the inverter.

1) Parameters

Name	Added parameter	
	Pr. Group	Pr.
MC switchover interlock time	P.A001	Pr.136
Automatic switchover frequency from inverter to bypass operation	P.A004	Pr.139
Emergency drive dedicated waiting time	P.H324	Pr.514
Emergency drive dedicated retry count	P.H322	Pr.515
Emergency drive mode selection	P.H320	Pr.523
Emergency drive running speed	P.H321	Pr.524
Emergency drive running speed after retry reset	P.H323	Pr.1013

2) Setting values

<table>
<tr><th>Pr. (Pr. group)</th><th>Name</th><th>Change</th></tr>
<tr><td>178, 179
(T700, T701)</td><td>STF/DI0 or STR/DI1 terminal function selection</td><td rowspan="3">The following setting value will be added.<table><tr><th>Setting value</th><th>Signal name</th><th>Description</th></tr><tr><td>84</td><td>X84</td><td>Emergency drive execution command</td></tr></table></td></tr>
<tr><td>180 to 184
(T702 to T704, T709, T711)</td><td>RL/RM/RH/MRS/RES terminal function selection</td></tr>
<tr><td>185 to 189
(T751 to T755)</td><td>NET X1 to X5 input selection</td></tr>
<tr><td>190 to 192
(M400, M404, M405)</td><td>RUN/FU/ABC terminal function selection</td><td rowspan="3">The following setting values will be added.<table><tr><th>Setting value (Positive/negative logic)</th><th>Signal name</th><th>Description</th></tr><tr><td>18/-</td><td>MC2</td><td>Electronic bypass MC2</td></tr><tr><td>19/-</td><td>MC3</td><td>Electronic bypass MC3</td></tr><tr><td>65/165</td><td>Y65</td><td>Emergency drive in operation</td></tr><tr><td>66/166</td><td>ALM3</td><td>Fault output during emergency drive</td></tr></table></td></tr>
<tr><td>193 to 196
(M451 to M454)</td><td>NET Y1 to Y4 output selection</td></tr>
<tr><td>313 to 319
(M410 to M416)</td><td>DO0 to DO6 output selection</td></tr>
<tr><td>320 to 322
(M420 to M422)</td><td>RA1 to RA3 output selection</td><td>The following setting values will be added.<table><tr><th>Setting value (Positive logic)</th><th>Signal name</th><th>Description</th></tr><tr><td>18</td><td>MC2</td><td>Electronic bypass MC2</td></tr><tr><td>19</td><td>MC3</td><td>Electronic bypass MC3</td></tr><tr><td>65</td><td>Y65</td><td>Emergency drive in operation</td></tr><tr><td>66</td><td>ALM3</td><td>Fault output during emergency drive</td></tr></table></td></tr>
<tr><td>52 (M100)</td><td>Operation panel main monitor selection</td><td rowspan="4">The setting value "68" (Emergency drive status) will be added.</td></tr>
<tr><td>774 to 776
(M101 to M103)</td><td>Operation panel monitor selection 1 to 3</td></tr>
<tr><td>992 (M104)</td><td>Operation panel setting dial push monitor selection</td></tr>
<tr><td>1027 to 1034
(A910 to A917)</td><td>Analog source selection (1ch) to (8ch)</td></tr>
</table>

3) Warning

The ED (Emergency drive) warning will be added.

"ED" is displayed on the operation panel during emergency drive operation.

(4) Addition of Ethernet communication specification (Ethernet model / Safety communication model)

◆ Supporting simple positioning using CiA402 drive profile

By performing simple positioning by direct commands, position data (target position, maximum speed, and acceleration/deceleration time) and settings for the home position return operation are directly input from the CiA402 drive profile.

Reading and writing according to the CiA402 drive profile are available.

1) Parameters

Name	Added parameter	
	Pr. Group	Pr.
Direct command mode selection	P.B100	Pr.1220

2) Setting values

Pr. (Pr. group)	Name	Change
1320 to 1329 (N810 to N819)	User Defined Cyclic Communication Input 1 to 10 Mapping*1	The setting values "24672, 24689, 24698, 24703, 24705, 24707, 24708, 24719, 24721, 24728 to 24730" will be added.
1330 to 1343 (N850 to N863)	User Defined Cyclic Communication Output 1 to 14 Mapping*1	The setting values "20992, 24639, 24643, 24644, 24673 to 24676, 24692, 24695, 24820, 24826, 24828, 25858" will be added.

*1 The setting values differ depending on the model. For details, refer to the Instruction Manual.

◆ Addition of specifications of the user defined cyclic communication data selection function

The following parameters will be added to specify the subindex of the specified index number.

Name	Added parameter	
	Pr. Group	Pr.
User Defined Cyclic Communication Input Sub 1 and 2 Mapping to User Defined Cyclic Communication Input Sub 9 and 10 Mapping	-	Pr.1389 to Pr.1393
User Defined Cyclic Communication Input Sub 1 to 10 Mapping	P.N830 to P.N839	
User Defined Cyclic Communication Output Sub 1 and 2 Mapping to User Defined Cyclic Communication Output Sub 9 and 10 Mapping	-	Pr.1394 to Pr.1398
User Defined Cyclic Communication Output Sub 1 and 10 Mapping	P.N870 to P.N879	

◆ Supporting Ethernet relay operation at reset selection (FR-E800-(SC)EPA, FR-E800-(SC)EPB)

The following parameter will be added to select the relay operation for packets addressed to the other stations for resetting the inverter connected in line topology.

Name	Added parameter	
	Pr. Group	Pr.
Ethernet relay operation at reset selection	P.N652	Pr.1386

◆ Operation status LEDs for PROFINET communication (FR-E800-(SC)EPB)

The LED status when connections are established with the master differs depending on whether the master is in the stop or run state.

LED name	Description	LED status	Remarks	
			After	Before
NS	Communication status	Blinking green	No connections established with the master / Connections established with the master (The master is in the stop state.)	No connections established with the master
		Solid green	Connections established with the master (The master is in the run state.)	Connections established with the master

(5) Other

The following parameters added for the second functions.

Name	Added parameter	
	Pr. Group	Pr.
Second position control gain	P.B013	Pr.1298
Second pre-excitation selection	P.G108	Pr.1299

(6) Addition of EtherCAT communication specifications (FR-E800-EPC*1)

The following parameter will be added to support EtherCAT communication.

Name	Added parameter	
	Pr. Group	Pr.
EtherCAT node address setting	P.N690	Pr.1305

*1 The E800-EPC models will be added. (New Product RELEASE No.21-1E will be provided on Mitsubishi Electric FA Global Website.)

3. Date of Change

Country of origin	Date of Change
MADE IN JAPAN	The change will be sequentially applied to the May 2021 production or later.
MADE IN CHINA	The change will be sequentially applied to the June 2021 production or later.

Products with or without the latest firmware may coexist in the market depending on the inventory and distribution conditions.

4. Product Identification

The SERIAL (determined by date of production) can be checked on the product's rating plate.

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Symbol Year Month Control number

SERIAL

The SERIAL consists of two symbols, three characters indicating the production year and month, and six characters indicating the control number.
The last two digits of the production year are indicated as the Year, and the Month is indicated by 1 to 9, X (October), Y (November), or Z (December).