

### 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) Position control (Vector control)

Position control is used to rotate the motor by outputting a speed command, which is calculated to eliminate the difference between position command and current position.

Point tables are created by setting positioning parameters such as the number of pulses (position) and acceleration/deceleration time in advance (point table method). Positioning operation is performed by selecting point tables.

For details, refer to the FR-E800 Instruction Manual.

##### 1) Control mode

Position control can be selected in the control method selection. The following setting values will be added.

Pr. (Pr. group)	Name	Details
800 (G200)	Control method selection	The following setting values will be added: "3" (position control), "4" (speed control / position control switchover), and "5" (position control / torque control switchover).

##### 2) Induction motor

Position control (Vector control) will be available for induction motors. The following parameters will be added.

	Additional parameter	
	Pr. group	Pr.
Simple positioning function by point tables	P.B020 to P.B034, P.B120, P.B121, P.B123 to P.B125, P.B127 to P.B129, P.B131 to P.B133, P.B135 to P.B137, P.B139 to P.B141, P.B143 to P.B145, P.B147, P.B180, P.B181, P.B183, P.B184, P.B187, P.B188, P.B190, P.B191, P.B197	Pr.464 to Pr.478, Pr.511, Pr.1222, Pr.1223, Pr.1225 to Pr.1227, Pr.1229 to Pr.1231, Pr.1233 to Pr.1235, Pr.1237 to Pr.1239, Pr.1241 to Pr.1243, Pr.1245 to Pr.1247, Pr.1249, Pr.1282, Pr.1283, Pr.1285, Pr.1286, Pr.1289, Pr.1290, Pr.1292, Pr.1293
Electronic gear settings	P.B001, P.B002	Pr.420, Pr.421
Position adjustment parameter settings	P.B007, P.B008, P.B192 to P.B196	Pr.426, Pr.427, Pr.510, Pr.1294 to Pr.1297
Position control gain adjustment	P.B003, P.B004, P.B006, P.B012, P.G219, P.G220, P.G224, P.C114	Pr.422, Pr.423, Pr.425, Pr.446, Pr.698, Pr.828, Pr.877, Pr.880
Current position retention function	P.B015	Pr.538
Pulse monitor selection	P.B011	Pr.430

Date of issue	Title	
December 2020	Firmware Upgrade for the FR-E800 Series General-Purpose Inverters	Mitsubishi Electric Corp., Nagoya Works 5-1-14 Yada-minami, Higashi-ku, Nagoya 461-8670 Tel.: +81 (52) 721-2111 Main line

## 3) I/O terminal assignment

Signals for position control will be added. The following setting values will be added.

Pr. (Pr. group)	Name	Details																														
178, 179 (T700, T701)	STF/DI0 or STR/DI1 terminal function selection	The following setting values will be added. <table border="1"> <thead> <tr> <th>Setting value</th> <th>Signal name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>76</td> <td>X76</td> <td>Proximity dog</td> </tr> <tr> <td>87</td> <td>X87</td> <td>Sudden stop</td> </tr> <tr> <td>88</td> <td>LSP</td> <td>Forward stroke end</td> </tr> <tr> <td>89</td> <td>LSN</td> <td>Reverse stroke end</td> </tr> </tbody> </table>	Setting value	Signal name	Description	76	X76	Proximity dog	87	X87	Sudden stop	88	LSP	Forward stroke end	89	LSN	Reverse stroke end															
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180 to 184 (T702 to T704, T709, T711)	RL/RM/RH/MRS/RES terminal function selection																															
185 to 189 (T751 to T755)	NET X1 to X5 input selection																															
190 to 192 (M400, M404, M405)	RUN/FU/ABC terminal function selection																															
193 to 196 (M451 to M454)	NET Y1 to Y4 output selection	The following setting values will be added. <table border="1"> <thead> <tr> <th>Setting value (Positive/negative logic)</th> <th>Signal name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>24/124</td> <td>LP</td> <td>Stroke limit warning</td> </tr> <tr> <td>36/136</td> <td>Y36</td> <td>In-position</td> </tr> <tr> <td>38/138</td> <td>MEND</td> <td>Travel completed</td> </tr> <tr> <td>56/156</td> <td>ZA</td> <td>Home position return failure</td> </tr> <tr> <td>60/160</td> <td>FP</td> <td>Position detected</td> </tr> <tr> <td>61/161</td> <td>PBSY</td> <td>During position command operation</td> </tr> <tr> <td>62/162</td> <td>CPO</td> <td>Rough match</td> </tr> <tr> <td>63/163</td> <td>ZP</td> <td>Home position return completed</td> </tr> <tr> <td>84/184</td> <td>RDY</td> <td>Position control preparation ready</td> </tr> </tbody> </table>	Setting value (Positive/negative logic)	Signal name	Description	24/124	LP	Stroke limit warning	36/136	Y36	In-position	38/138	MEND	Travel completed	56/156	ZA	Home position return failure	60/160	FP	Position detected	61/161	PBSY	During position command operation	62/162	CPO	Rough match	63/163	ZP	Home position return completed	84/184	RDY	Position control preparation ready
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313 to 319 (M410 to M416)	DO0 to DO6 output selection																															
320 to 322 (M420 to M422)	RA1 to RA3 output selection	The following setting values will be added. <table border="1"> <thead> <tr> <th>Setting value (Positive logic)</th> <th>Signal name</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>24</td> <td>LP</td> <td>Stroke limit warning</td> </tr> <tr> <td>36</td> <td>Y36</td> <td>In-position</td> </tr> <tr> <td>38</td> <td>MEND</td> <td>Travel completed</td> </tr> <tr> <td>56</td> <td>ZA</td> <td>Home position return failure</td> </tr> <tr> <td>60</td> <td>FP</td> <td>Position detected</td> </tr> <tr> <td>61</td> <td>PBSY</td> <td>During position command operation</td> </tr> <tr> <td>62</td> <td>CPO</td> <td>Rough match</td> </tr> <tr> <td>63</td> <td>ZP</td> <td>Home position return completed</td> </tr> <tr> <td>84</td> <td>RDY</td> <td>Position control preparation ready</td> </tr> </tbody> </table>	Setting value (Positive logic)	Signal name	Description	24	LP	Stroke limit warning	36	Y36	In-position	38	MEND	Travel completed	56	ZA	Home position return failure	60	FP	Position detected	61	PBSY	During position command operation	62	CPO	Rough match	63	ZP	Home position return completed	84	RDY	Position control preparation ready
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## 4) Multifunction monitor

Monitor items for position control will be available. The following setting values will be added.

Pr. (Pr. group)	Name	Details
52 (M100)	Operation panel main monitor selection	The following setting values will be added: "26" (position command (lower)), "27" (position command (upper)), "28" (current position (lower)), "29" (current position (upper)), "30" (droop pulse (lower)), "31" (droop pulse (upper)), and "65" (ideal speed command).
774 to 776 (M101 to M103)	Operation panel monitor selection 1 to 3	
992 (M104)	Operation panel setting dial push monitor selection	
54 (M300)	FM terminal function selection	Setting value "65" (ideal speed command) will be added.
158 (M301)	AM terminal function selection	
1027 to 1034 (A910 to A917)	Analog source selection (1ch) to (8ch)	The following setting values will be added: "65" (ideal speed command), "222" (position command (lower)), "223" (position command (upper)), "224" (current position (lower)), "225" (current position (upper)), "226" (droop pulse (lower)), "227" (droop pulse (upper)), and "229" (ideal speed command).

## 5) Warning

The following warnings will be added: LP (Stroke limit warning), HP1 (Home position return setting error), and HP2 (Home position return uncompleted).

## 6) Fault

E.OD (Excessive position fault) will be added.

The inverter output is shut off when the difference between the position command and position feedback exceeds the setting of Pr.427 Excessive level error during position control.

## (2) Specifications for CC-Link IE TSN communication

The user defined cyclic communication data selection function will be available. For related parameters, refer to the table in 1) in (11) Others.

The following setting values will be added for CC-Link extended setting. Data to be sent/received can be selected using the parameters.

Pr. (Pr. group)	Name	Details
544 (N103)	CC-Link extended setting	The following setting values will be added: "38" (compatible with the octuple setting of CC-Link Ver.2, user defined cyclic communication data selected) and "138" (compatible with the octuple setting of CC-Link Ver.2, user defined cyclic communication data selected (PLC function)).

## (3) Specifications for EtherNet/IP communication

The user defined cyclic communication data selection function will be available. For related parameters, refer to the table in 1) in (11) Others.

Instances 100 (Configurable Output) and 150 (Configurable Input) will be available in the Assembly Object (04h) for Class 1 communication (I/O Message communication). Data to be sent/received can be selected using the parameters.

## (4) Specifications for PROFINET communication

The user defined cyclic communication data selection function will be available. For related parameters, refer to the table in 1) in (11) Others.

Telegram 102 (Custom) will be available for Process Data (Cyclic Data Exchange). Data to be sent/received can be selected using the parameters.

## (5) Specifications for MODBUS/TCP communication

CiA402 drive profile (24642 to 24644, 24646, 24648, 24649, and 26623) will be added for MODBUS registers.

## (6) PTC thermistor

A motor can be protected from overheating by inputting outputs from the motor's built-in PTC thermistor to the inverter.

It is recommended that a PTC thermistor whose resistance increases most rapidly around the rated activating temperature is used.

## 1) PTC thermistor protection

The following parameters will be added.

	Additional parameter	
	Pr. group	Pr.
PTC thermistor protection level	P.H020	Pr.561
PTC thermistor protection detection time	P.H021	Pr.1016

## 2) Multifunction monitor

The following setting values will be added.

Pr. (Pr. group)	Name	Details
52 (M100)	Operation panel main monitor selection	Setting value "64" (PTC thermistor resistance) will be added.
774 to 776 (M101 to M103)	Operation panel monitor selection 1 to 3	
992 (M104)	Operation panel setting dial push monitor selection	
1027 to 1034 (A910 to A917)	Analog source selection (1ch) to (8ch)	

## 3) Fault

E.PTC (PTC thermistor operation) will be added.

The inverter output is shut off if resistance of the PTC thermistor connected between the terminal 2 and terminal 10 is equal to or higher than the Pr.561 PTC thermistor protection level setting for a continuous time equal to or longer than the setting value in Pr.1016 PTC thermistor protection detection time.

## (7) Backup/restoration function

Inverter parameters and the data used in the PLC function of inverter can be backed up and restored.

"RD" is displayed during backup and "WR" is displayed during restore on the operation panel.

## (8) Increased magnetic excitation deceleration

This function increases the loss in the motor by increasing the magnetic flux during deceleration. The deceleration time can be reduced by suppressing the stall prevention (overvoltage) (oL). The deceleration time can be shortened without using a brake resistor. (When a brake resistor is used, the duty can be reduced.)

The following parameters will be added.

	Additional parameter	
	Pr. group	Pr.
Increased magnetic excitation deceleration operation selection	P.G130	Pr.660
Magnetic excitation increase rate	P.G131	Pr.661
Increased magnetic excitation current level	P.G132	Pr.662

## (9) Optimum excitation control

The control can be enabled under Advanced magnetic flux vector control, improving the motor efficiency and starting torque.

## (10) PLC function

The structured text (ST) language will be supported to enable writing programs in text.

Pointer devices and program branch instructions will be available.

## (11) Others

## 1) Parameters

The following parameters will be added.

	Additional parameter	
	Pr. group	Pr.
Faulty acceleration rate detection level	P.H801	Pr.375
User defined cyclic communication input/output data selection parameters	P.N800, P.N801, P.N810 to P.N819, P.N850 to P.N863	Pr.1318, Pr.1319, Pr.1320 to Pr.1329, Pr.1330 to Pr.1343

## 2) Fault

E.OA (Acceleration error) will be added.

The inverter output is shut off due to the acceleration error (E.OA) when the acceleration rate of the motor rotation speed has exceeded the faulty acceleration rate detection level (Pr.375).

3. Date of Change

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

All 11K to 22K models (released in December 2020) support the above functions.

For other models, products with or without the above functions 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).