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F700 Series

Variable Frequency Drives



DELIVERING DEPENDABILITY WHEN YOU NEED IT MOST

Empowering Industries

MITSUBISHI ELECTRIC

F700 VFD

The New Energy Saving Inverter

The truly fantastic specifications of the F700 make this VFD from Mitsubishi Electric an absolute must for your drive systems.

Features

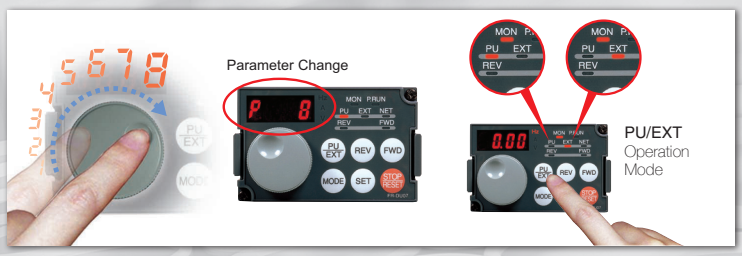
UL Type 1, Plenum Rated, Enclosure Designs (NEMA 1): Drive can be mounted as a stand-alone unit.

BACnet MS/TP protocol built in: Support for other popular BMS systems, including Metasys N2, Siemens FLN, and LonWorks is available.

Built in PLC: Uses GX Developer for programming, 4K steps of memory

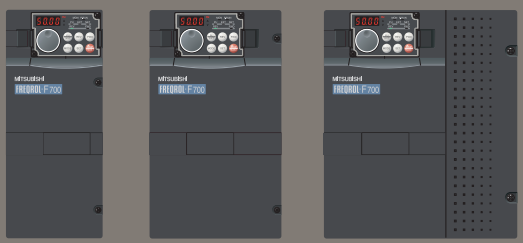
Single Phase Input: UL/cUL Listed for use with Single Phase Input supply.

Ease of Programming: Taken to higher levels with the new DU07 programming dial and FR-Configurator programming software.



- The popular setting dial makes operation easy
- The dial's "clicking" sensation and notch helps make settings with confidence
- Make settings quickly or slowly depending on how fast the dial is turned
- Detachable keypad can be panel mounted. (Cable and adaptor required)
- Hand/Auto indication available with optional FR-PU07-01 keypad
- Dial/key operation lock function is available

F700 LINEUP





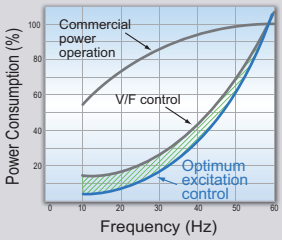
The F700 inverter is built to optimize 3-phase motor control, saving energy for virtually all general purpose applications.

Evolution of the inverter for fan and pump applications, providing energy savings for buildings and factories as a whole.

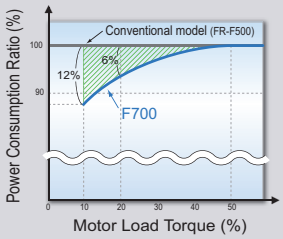
Windmill Start: F700 measures residual motor slot ripple to determine both the speed and direction of rotation of a coasting motor and can swiftly and smoothly bring it under control when required – whichever way it's spinning.

Enhanced Energy Savings: An improved version of Mitsubishi Electric's famous energy-optimization software boosts motor efficiency to unprecedented levels and intelligently maximizes energy savings.

Ex. of Blower Operation Characteristics



Ratio of Motor Power Consumption during Acc./Dec



- F700 achieves a higher level of energy savings both during acc./dec. and constant speed operation.

Energy Saving Signal: F700 will calculate and display your energy savings, either as dollars or kW/h.

Power Savings Monitor Display

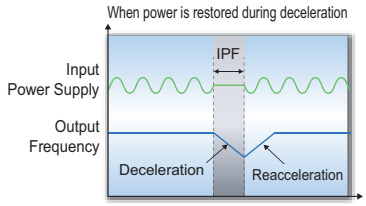


Energy Saving Monitor List

Power saving monitor (kW)
Power saving rate (%)
Power saving amount (kWh)
Power saving amount charge ($)
Power saving average value (kW)
Power saving rate average value (%)
Power saving charge average value ($)
Annual power saving amount (kWh)
Annual power saving amount charge ($)

- Energy savings results can be confirmed using the operation panel, output terminal (CA, AM terminal) and via networks with the newly developed energy saving monitor.

Power Dip Ride-Through: Allows the inverter to continue to run during short power supply interruptions – reducing nuisance tripping.

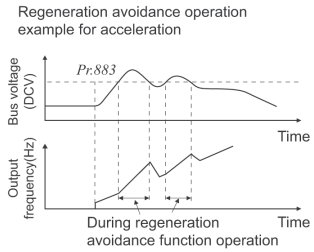


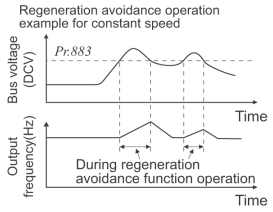
- Operation continues without the motor coasting when an instantaneous power failure occurs in fan and blower applications.

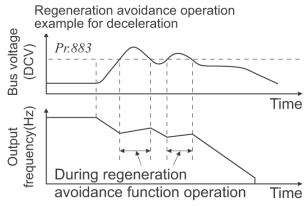


F700 VFD

Overvoltage Avoidance: The F700 measures DC bus levels when decelerating and controls drive speed to eliminate nuisance tripping.







Advanced PID Mode: Now includes 'sleep mode' as well as pump scheduling feature to allow the intelligent control of up to 4 motors at once.

Remote I/O Capability: Drive I/O can be configured over a network to work independently of the drive, reducing cost and making more efficient use of the available network nodes.

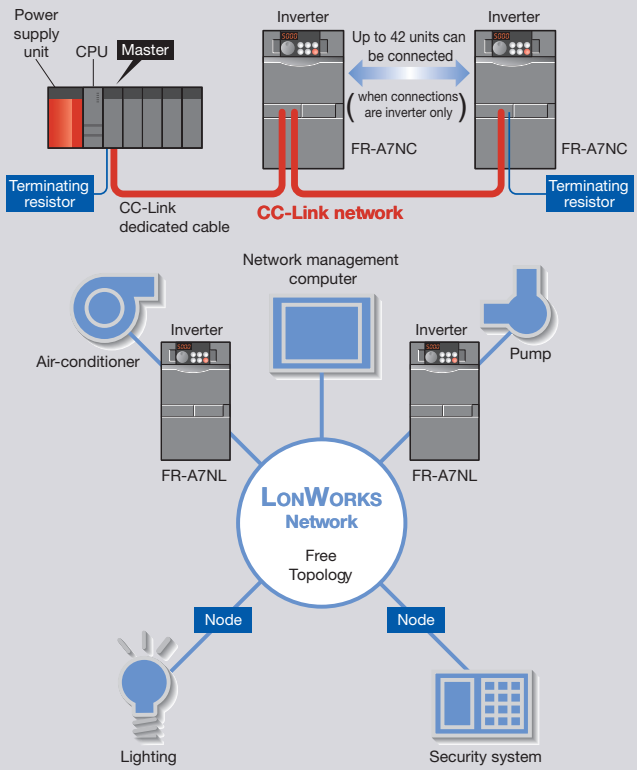
Pre-Charge Function: Before PID control takes over, this function can be used to ensure consistent fill.

Programmable Timer: Generates a signal dependent on drive operating time — useful to plan scheduled machine maintenance.

Independent RS-485 Connections: Allow serial communications and keypad operation at the same time with no options needed. F700 supports Modbus RTU as well as the standard Mitsubishi Electric protocol.

Complies with Global Standards: UL, cUL, GOST, JEM, and CE marked for use in Europe. A radio filter is included in the drive as standard to meet European EMC levels (2nd Enviromental).

Improved Field Bus Capability: In addition to popular BMS protocols inlcuding Lon Works, Metasys N2 and Siemens FLN, F700 now supports Ethernet I/P, Profibus DP, and DeviceNet. BACnet MS/TP is built-in.





Standard Specifications

F700 Ratings 240V Class

Input: 1 Phase / 3 Phase • Output Voltage: 3 Phase 200-240V at 60Hz Voltage Tolerance: 170-264V at 60Hz • Available Braking Torque: 15% Torque Continuous							
SLD (40°C)		LD		Model Number (*3)	Frame Size	Cooling Method	Protective Rating
110% OL / 1min		120% OL / 1min					
120% OL / 3 sec		150% OL / 3 sec					
Hp (*1)	FLA	Hp (*1)	FLA				
1	4.6	1	4.2	FR-F720-00046-NA	A	Self Cooling	UL Type 1 – Plenum Rated
2	7.7	2	7	FR-F720-00077-NA	B		
3	10.5	3	9.6	FR-F720-00105-NA	C	Forced Air Cooled	
5	16.7	5	15.2	FR-F720-00167-NA	C		
7.5	25	7.5	23	FR-F720-00250-NA	C		
10	34	10	31	FR-F720-00340-NA	D		
15	49	15	45	FR-F720-00490-NA	D		
20	63	20	58	FR-F720-00630-NA	E		
25	77	25	70	FR-F720-00770-NA	F		
30	93	30	85	FR-F720-00930-NA	F		
40	125	40	114	FR-F720-01250-NA	F		IP00 (*2)
50/60	154	50	140	FR-F720-01540-NA	G		
60	187	60	170	FR-F720-01870-NA	H		
75	233	75	212	FR-F720-02330-NA	H		
40	125	40	114	FR-F720-01250-NAN1	F		NEMA 1
50/60	154	50	140	FR-F720-01540-NAN1	G		
60	187	60	170	FR-F720-01870-NAN1	H		
75	233	75	212	FR-F720-02330-NAN1	H		
100/125	316	100	288	FR-F720-03160-NA	K		IP00 (*2)
150	380	125	346	FR-F720-03800-NA	K		
200	475	150	432	FR-F720-04750-NA	K		

F700 Ratings 480V Class

Input: 1 Phase / 3 Phase • Output Voltage: 3 Phase 380-480V at 50/60Hz Voltage Tolerance: 323-528V at 50/60Hz • Available Braking Torque: 15% Torque Continuous							
SLD (40°C)		LD		Model Number (*3)	Frame Size	Cooling Method	Protective Rating
110% OL / 1min		120% OL / 1min					
120% OL / 3 sec		150% OL / 3 sec					
Hp (*1)	FLA	Hp (*1)	FLA				
1	2.3	1	2.1	FR-F740-00023-NA	C	Self Cooling	UL Type 1 – Plenum rated
2	3.8	2	3.5	FR-F740-00038-NA	C		
3	5.2	3	4.8	FR-F740-00052-NA	C		
5	8.3	5	7.6	FR-F740-00083-NA	C		
7.5	12.6	7.5	11.5	FR-F740-00126-NA	C		
10	17	10	16	FR-F740-00170-NA	D	Forced Air Cooled	
15	25	15	23	FR-F740-00250-NA	D		
20	31	20	29	FR-F740-00310-NA	E		
25	38	25	35	FR-F740-00380-NA	E		
30	47	30	43	FR-F740-00470-NA	F		
40	62	40	57	FR-F740-00620-NA	F		
50/60	77	50	70	FR-F740-00770-NA	G		IP00 (*2)
60	93	60	85	FR-F740-00930-NA	H		
75	116	75	106	FR-F740-01160-NA	H		
50/60	77	50	70	FR-F740-00770-NAN1	G		NEMA 1
60	93	60	85	FR-F740-00930-NAN1	H		
75	116	75	106	FR-F740-01160-NAN1	H		

DIMENSIONS

Frame Size	Dimensions inches (mm)		
	Height	Width	Depth
A	10.2 (260)	4.3 (110)	4.3 (110)
B	10.2 (260)	4.3 (110)	4.9 (125)
C	10.2 (260)	5.9 (150)	5.5 (140)
D	10.2 (260)	8.7 (220)	6.7 (170)
E	11.8 (300)	8.7 (220)	7.5 (190)
F	15.8 (400)	9.8 (250)	7.5 (190)
G	21.7 (550)	12.8 (325)	7.7 (195)

Frame Size	Dimensions inches (mm)		
	Height	Width	Depth
H	21.7 (550)	17.1 (435)	9.8 (250)
J	27.6 (700)	18.3 (465)	9.8 (250)
K	29.1 (740)	18.3 (465)	14.2 (360)
L	39.8 (1010)	19.6 (498)	15 (380)
M	39.8 (1010)	26.8 (680)	15 (380)
N	52.4 (1330)	31.1 (790)	17.3 (440)
P	62.2 (1580)	39.2 (995)	17.3 (440)

F700 VFD

F700 Ratings 480V Class (continued)

Input: 1 Phase / 3 Phase • Output Voltage: 3 Phase 380-480V at 50/60Hz • Voltage Tolerance: 323-550V at 50/60Hz Available Braking Torque: 15% Torque Continuous • DC Link Choke is included with the VFD							
SLD (40°C)		LD		Model Number (*3)	Frame Size	Cooling Method	Protective Rating
110% OL / 1min		120% OL / 1min					
120% OL / 3 sec		150% OL / 3 sec					
Hp (*1)	FLA	Hp (*1)	FLA				
100/150	180	100	144	FR-F740-01800-NA	H	Forced Air Cooled	IP00 (*2)
150	216	150	180	FR-F740-02160-NA	J		
200	260	150	216	FR-F740-02600-NA	J		
250	325	200	260	FR-F740-03250-NA	K		
300	361	250	325	FR-F740-03610-NA	K		
350	432	300	361	FR-F740-04320-NA	L		
400	481	350	432	FR-F740-04810-NA	L		
450	547	400	481	FR-F740-05470-NA	M		
500	610	450	547	FR-F740-06100-NA	M		
550	683	500	610	FR-F740-06830-NA	M		
650	770	550	683	FR-F740-07700-NA	N		IP00
700	866	650	770	FR-F740-08660-NA	N		
800	962	700	866	FR-F740-09620-NA	P		
900	1094	800	962	FR-F740-10940-NA	P		
1000	1212	900	1094	FR-F740-12120-NA	P		

Notes: 1. Motor ratings shown are intended as guidelines only – based on 4 pole standard induction motors. **2.** NEMA 1 conduit adapter option required. **3.** For single phase input, derate output current by 40% (Models up to F720-03800-NA, F740-04810-NA.)

Factory Supplied DC Link Chokes

Std with VFD	Dimensions inches (mm)			Approx. Wt. lb (kg)
FR-F700 Series	Height	Width	Depth	
FR-F740-01800-NA	13.4 (340)	5.9 (150)	7.5 (190)	20 (44)
FR-F740-02160-NA	13.4 (340)	5.9 (150)	7.7 (195)	22 (48)
FR-F740-02600-NA	15.9 (405)	6.9 (175)	7.9 (200)	26 (57)
FR-F740-03250-NA	15.9 (405)	6.9 (175)	8 (205)	28 (62)
FR-F740-03610-NA	15.9 (405)	6.9 (175)	9.4 (240)	29 (64)
FR-F740-04320-NA	15.9 (405)	6.9 (175)	9.4 (240)	30 (66)
FR-F740-04810-NA	17.3 (440)	7.5 (190)	9.8 (250)	35 (77)
FR-F740-05470-NA	17.3 (440)	7.5 (190)	10 (255)	38 (84)
FR-F740-06100-NA	19.5 (495)	8.3 (210)	9.8 (250)	42 (92)
FR-F740-06830-NA	19.5 (495)	8.3 (210)	9.8 (250)	46 (101)
FR-F740-07700-NA	19.7 (500)	8.7 (220)	9.8 (250)	50 (110)
FR-F740-08660-NA	19.7 (500)	8.7 (220)	10.6 (270)	57 (125)
FR-F740-09620-NA	17.8 (455)	8.5 (215)	13.6 (345)	67 (1147)
FR-F740-10940-NA	18.1 (460)	8.5 (215)	14.2 (360)	85 (187)
FR-F740-12120-NA	18.1 (460)	8.5 (215)	14.2 (360)	95 (209)

Building Management Options

Network Type / Model		FR-A7N-ETH (*1,*2)	FR-A7N-XLT (*1,*2)	ETH-1000 (*3,*4)	XLTR-1000 (*3,*4)
Gateway Communication	BACnet/IP	X	-	X	-
	EtherNet/IP	X	-	X	-
	Modbus TCP	X	-	X	-
	PROFINET IO	X	-	X	-
	BACnet MS/TP (*5)	-	X	X	X
	Metasys N2	-	X	X	X
	Siemens FLN	-	X	-	-

Notes:
For additional information, visit www.iccdesigns.com
1. Physically mounts within VFD and powered by VFD
2. FR-E7TR option recommended. (PU connector not available for use)
3. Communication to multiple VFD's is possible
4. Mounted and powered external to VFD
5. BACnet MS/TP is built in to F700. Gateway required for pre August 2010 production.

Option Cards

		Model No.
Function (two are permissible)	Relay Output	FR-A7AR
	12 Bit Digital Input	FR-A7AX
	Digital Output	FR-A7AY
	Ext. Analog Output	
	BiPolar Analog Input	FR-A7AZ
	High Res Analog Input	
	Motor Thermistor	
Communication	CC-Link	FR-A7NC
	DeviceNet	FR-A7ND
	LonWorks	FR-A7NL
	Profibus DP	FR-A7NP

Conduit Attachments

Model Number	Drive Model		Length (in) (*4)	Weight (lbs)
	F720 (*1)	F740 (*1)		
FR-A7FN05 (*3)	01250	-	5.9"	5
FR-A7FN06 (*3)	01540	00770	6.2"	5
FR-A7FN07 (*3)	01870, 02330	00930, 01160	9"	15
FR-A7FN-10 (*2)	-	01800	24"	37
FR-A7FN-11 (*2)	-	02160, 02600	24"	41
FR-A7FN-12 (*2)	03160, 03800, 04750	03250, 03610	24"	45
FR-A7FN-13 (*2)	-	04320, 04810	26"	50
FR-A7FN-14 (*2)	-	05470, 06100, 06830	26"	64

Notes:
1. For FR-F700s smaller than listed above, they are UL Type 1, and conduit attachment is standard.
2. Mounting hardware included for standard DC chokes which ship with VFD. Kits are powder coated similar to VFD, charcoal gray.
3. Kits are coated zinc clear.
4. Width and depth of kit match the asscociated VFD.

OPTIONS & ACCESSORIES

FR-PU07-01: 24-button keypad, alphanumeric LCD display, upload/download parameter sets, store up to 3 sets of drive data, battery option allows data transfer without powering up drive

FR-ADP Adaptor: Connects DU07 keypad to FR-CB20 cables VFD Setup Software (serial port)

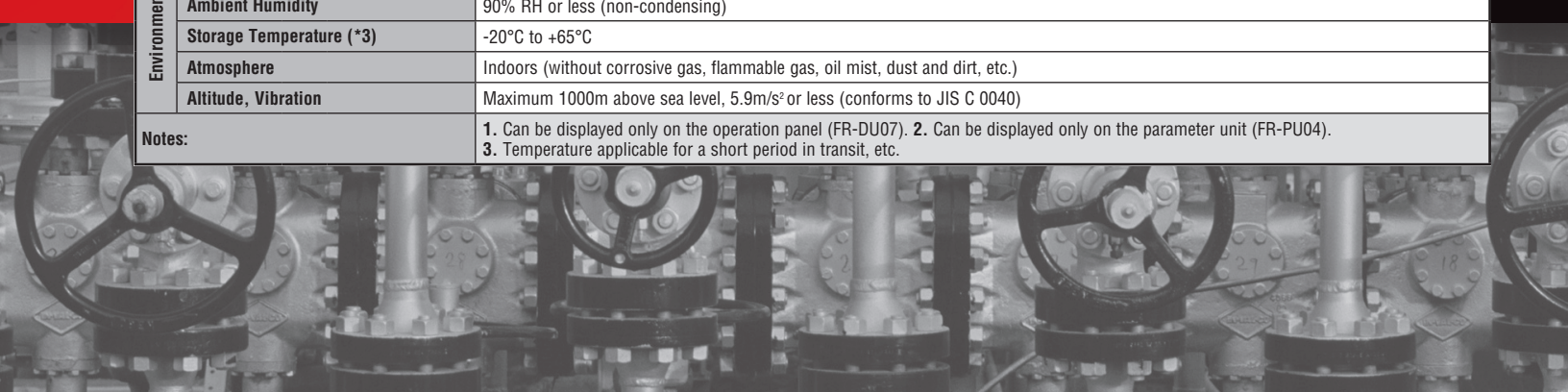
VFD Setup Software: Programming and diagnostic software

SC-FRPC Adaptor Cable: Connects PC to inverter for VFD Setup Software (serial port)

UFS and FR-BU: Dynamic brake units

FR-CB201, 03, 05: RJ45 connector cables

Control Specifications	Control System		High carrier frequency PWM control (V/F control)/optimum excitation control/simple magnetic flux vector control
	Output Frequency Range		0.5 to 400Hz
	Frequency Setting Resolution	Analog Input	0.015Hz/0 to 60Hz (terminal 2, 4: 0 to 10V/12bit); 0.03Hz/0 to 60Hz (terminal 2, 4: 0 to 5V/11bit, 0 to 20mA/approx. 11bit, terminal 1: -10V to +10V/11bit); 0.06Hz/0 to 60Hz (terminal 1: 0 to ±5V/10bit)
		Digital Input	0.01Hz
	Frequency Accuracy	Analog Input	Within ±0.2% of the max. output frequency (25°C ± 10°C)
		Digital Input	Within 0.01% of the set output frequency
	Voltage/Frequency Characteristics		Base frequency can be set from 0 to 400Hz. Constant torque/variable torque pattern or adjustable 5 points V/F can be selected.
	Starting Torque		120% (3Hz) when set to simple magnetic flux vector control and slip compensation
	Acceleration/Deceleration Time Setting		0 to 3600s (acceleration and deceleration can be set individually), linear or S-pattern acceleration/deceleration mode can be selected
	DC Injection Brake		Operation frequency (0 to 120Hz), operation time (0 to 10s), operation voltage (0 to 30%) variable
	Stall Prevention Operation Level		Operation current level can be set (0 to 150% adjustable), whether to use the function or not can be selected
Operation Specifications	Frequency Setting Signal	Analog Input	Terminal 2, 4: 0 to 10V, 0 to 5V, 4 to 20mA can be selected. Terminal 1: -10 to +10V, -5 to 5V can be selected.
		Digital Input	Four-digit BCD or 16-bit binary using the setting dial of the operation panel (when used with the option FR-A7AX)
	Start Signal		Available individually for forward and reverse rotation. Start signal automatic self-holding input (3-wire input) can be selected.
	Input Signals		Select any twelve signals using Pr.178 to Pr.189 (input terminal function selection) from among multi-speed selection, second function selection, terminal 4 input selection, JOG operation selection, selection of automatic restart after instantaneous power failure, external thermal relay input, HC connection (inverter operation enable signal), HC connection (instantaneous power failure detection), PU operation/ external interlock signal , PID control enable terminal, PU operation, external operation switchover, output stop, start self-holding selection, forward rotation command, reverse rotation command, inverter reset, PTC thermistor input, PID forward reverse operation switchover, PU-NET operation switchover, NET-external operation switchover, command source switchover.
	Operational Functions		Maximum and minimum frequency settings, frequency jump operation, external thermal relay input selection, polarity reversible operation, automatic restart after instantaneous power failure operation, continuous operation at an instantaneous power failure, commercial power supply-inverter switchover operation, forward/reverse rotation prevention, operation mode selection, PID control, computer link operation (RS-485).
	Output Signals	Operating Status	Select any seven signals using Pr.190 to Pr.196 (output terminal function selection) from among inverter running, up-to-speed, instantaneous power failure/undervoltage, overload warning, output frequency detection, second output frequency detection, electronic thermal relay function pre-alarm, PU operation mode, inverter operation ready, output current detection, zero current detection, PID lower limit, PID upper limit, PID forward rotation reverse rotation output, commercial power supply-inverter switchover MC1, commercial power supply-inverter switchover MC2, commercial power supply-inverter switchover MC3, fan fault output, heatsink overheat pre-alarm, inverter running start command on, deceleration at an instantaneous power failure, PID control activated, during retry, during PID output suspension, life alarm, input MC stop signal, power savings average value update timing, current average monitor, alarm output 2, maintenance timer alarm, remote output, minor failure output, alarm output. Open collector output (5 points), relay output (2 points) and alarm code of the inverter can be output (4 bit) from the open collector.
		When Used with the FR-A7AY (Option)	Select any seven signals using Pr. 313 to Pr. 319 (extension output terminal function selection) from among control circuit capacitor life, main circuit capacitor life, cooling fan life, inrush current limit circuit life.
	Pulse/Analog Output		Select from output frequency, motor current (steady or peak value), output voltage, frequency setting value, running speed, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, reference voltage output, motor load factor, energy saving effect, PID set value, PID process value using Pr. 54 “FM terminal function selection (pulse train output)” and Pr. 158 “AM terminal function selection (analog output)”.
Display	PU (FR-DU07/ FR-PU04)	Operating Status	Output frequency, motor current (steady or peak value), output voltage, alarm indication, frequency setting, running speed, converter output voltage (steady or peak value), electronic thermal load factor, input voltage, output voltage, road meter, cumulative energization time, actual operation time, motor load factor, cumulative energization power, power saving effect, cumulative saving power, PID set point, PID process value, PID deviation value, inverter I/O terminal monitor, input terminal option monitor (*1), output terminal option monitor (*1), option fitting status monitor (*2), terminal assignment status (*2)
		Alarm Definition	Alarm definition is displayed when the protective function is activated, the output voltage/current/frequency/cumulative energization time right before the protection function was activated and the past 8 alarm definitions are stored.
		Interactive Guidance	Operation guide/trouble shooting with a help function (*2)
Protective/Warning Function			Overcurrent during acceleration, overcurrent during constant speed, overcurrent during deceleration, overvoltage during acceleration, overvoltage during constant speed, overvoltage during deceleration, inverter protection thermal operation, heatsink overheat, instantaneous power failure occurrence, undervoltage, input phase failure, motor overload, output side earth (ground) fault overcurrent, output phase failure, external thermal relay operation, PTC thermistor operation, option alarm, parameter error, PU disconnection, retry count excess, CPU alarm, power supply short for operation panel, 24VDC power output short, output current detection value over, inrush resistance overheat, communication alarm (inverter), analog input alarm, internal circuit alarm (15V power supply), fan fault, overcurrent stall prevention, overvoltage stall prevention, electronic thermal prealarm, PU stop, maintenance timer alarm (*1), parameter write error, copy operation error, operation panel lock.
Environment	Ambient Temperature		-10°C to +50°C (non-freezing)
	Ambient Humidity		90% RH or less (non-condensing)
	Storage Temperature (*3)		-20°C to +65°C
	Atmosphere		Indoors (without corrosive gas, flammable gas, oil mist, dust and dirt, etc.)
	Altitude, Vibration		Maximum 1000m above sea level, 5.9m/s^2 or less (conforms to JIS C 0040)
Notes:			**1.** Can be displayed only on the operation panel (FR-DU07). **2.** Can be displayed only on the parameter unit (FR-PU04). **3.** Temperature applicable for a short period in transit, etc.



Mitsubishi Electric Automation, Inc.
500 Corporate Woods Parkway
Vernon Hills, IL 60061
Phn: (847) 478-2100
Fax: (847) 478-2253

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