F700 Series

Variable Frequency Drives

DELIVERING DEPENDABILITY WHEN YOU NEED IT MOST

MITSUBISHI ELECTRIC AUTOMATION, INC.

Discover the Many Facets of Mitsubishi Electric.
The Power in Automation Solutions.

F700 VFD

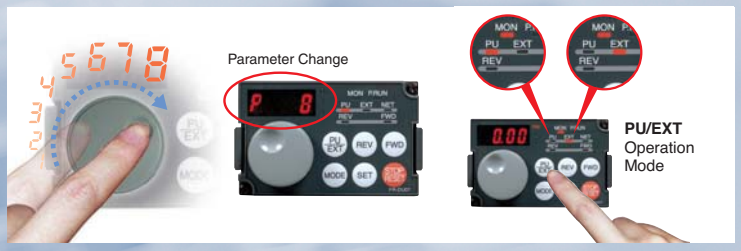
The New Energy Saving Inverter

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

Features

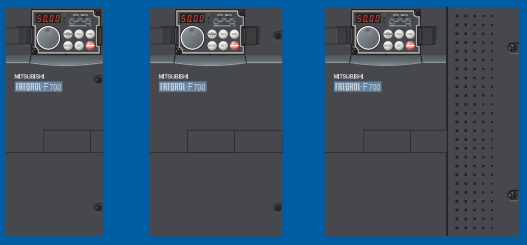
NEMA 1 UL Type 1 Enclosure Designs: Drive can be mounted as a stand-alone unit.

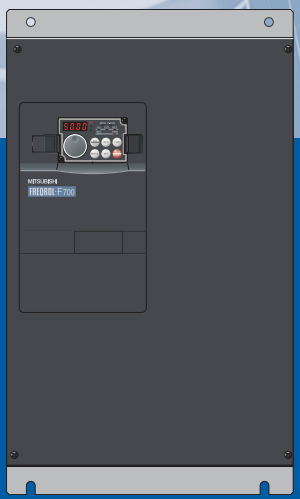
Ease of Programming: Taken to higher levels with the new DU07 programming dial and FR-Configurator programming software.



- The popular setting dial makes operation easy.
- The dial's "clicking" sensation and notch helps make settings with confidence.
- Set frequency and parameters without frustration.
- Make settings quickly or slowly depending on how fast the dial is turned.
- Detachable keypad can be panel mounted. (Cable and adaptor required.)
- PU/EXT (operation mode) switchover key is available.
- Dial/key operation lock function is available.

F700 LINEUP





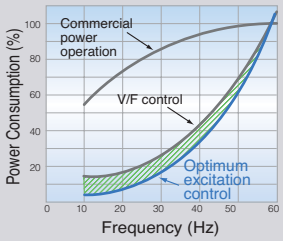
The F700 inverter is built to optimize 3-phase motor control, saving energy for virtually all general purpose applications.

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

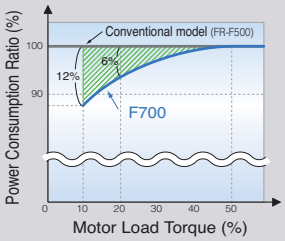
Windmill Start: F700 measures residual motor slot ripple to determine both the speed and direction of rotation of a coasting motor and can swiftly and smoothly bring it under control when required – whichever way it's spinning.

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 during acc./dec. to say nothing of during constant speed.

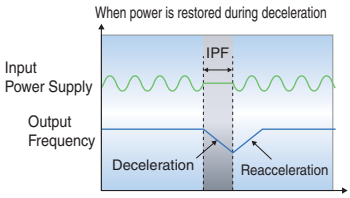
Energy Saving Signal: F700 will calculate and display your energy savings, either as dollars or kW/h.

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.

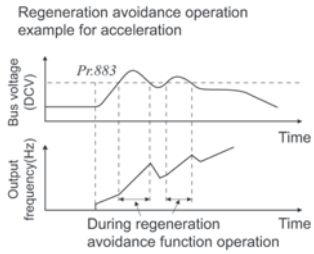
Power Dip Ride-Through: Allows the inverter to continue to run during short power supply interruptions – reducing nuisance tripping.

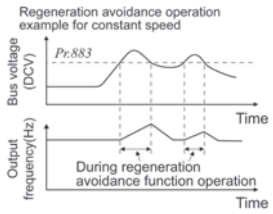


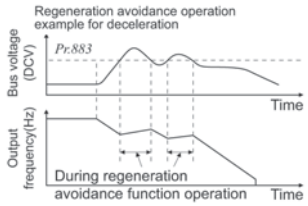
- Operation continues without the motor coasting when an instantaneous power failure occurs in fan and blower applications.

F700 VFD

Overvoltage Avoidance: The F700 measures d.c. 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.

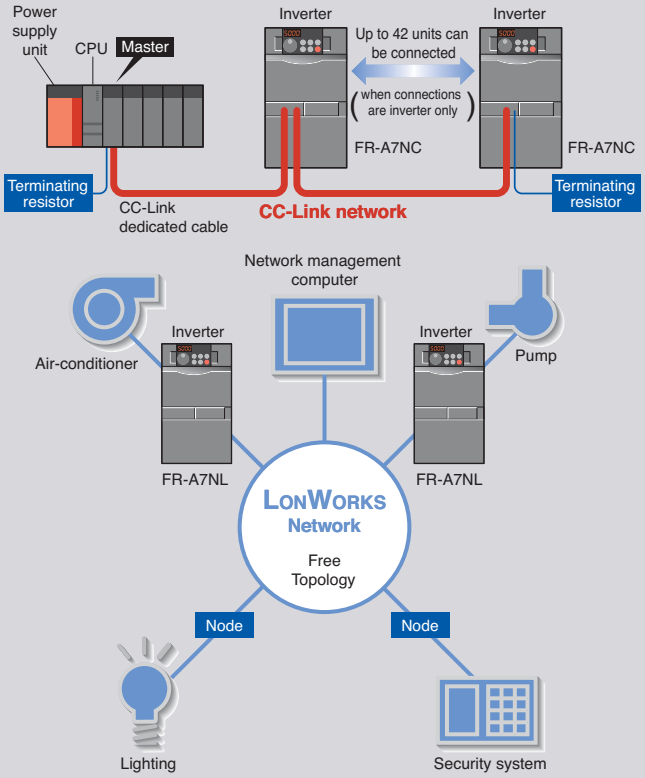
Remote I/O Capability: Drive I/O can be configured over a network to work independently of the drive, reducing cost and making more efficient use of the available network nodes.

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: Now includes Profibus DP, Lon Works, CC-Link, DeviceNet and Metasys N2.



Standard Specifications

Ratings 240 Volt Class

Type	FR-F720- □ □ □ □ □ -NA													
	00046	00077	00105	00167	00250	00340	00490	00630	00770	00930	01250	01540	01870	02330
Typical Applicable Motor HP (*1)	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75
Typical Applicable Motor kW (*1)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated Capacity (kVA)	1.6	2.7	3.7	5.8	8.8	11.8	17.1	22.1	26.7	32.4	43.4	53.3	64.8	80.8
Continuous Current (A) – SLD	4.6	7.7	10.5	16.7	25	34	49	63	77	93	125	154	187	233
Continuous Current (A) – LD	4.2	7	9.6	15.2	23	31	45	58	70	85	114	140	170	212
Overload Capacity – SLD	110% for 60 secs, 40° C Ambient at 2 kHz switching frequency													
Overload Capacity – LD	120% for 60 secs, 50° C Ambient at 2 kHz switching frequency													
Output Voltage	3 Phase 200 – 240V at 60Hz													
Available Braking Torque	15% torque – continuous													
Three Phase Input Voltage Tolerance	170 – 264V 60Hz													
Supply kVA	2.5	4.5	5.5	9	12	17	20	28	34	41	52	65	79	99
Protective Structure	NEMA 1 – UL 1 Plenum Rated (*2)													
IP Rating	IP20										IP00			
Cooling Method	Self Cooling		Force Cooling											
Frame Size	A	B	C			D		E	F			G	H	
Approx. Weight lbs (kg)	4.1 (1.9)	5 (2.3)	7.9 (3.6)			14.5 (6.6)		16.7 (7.6)	28.6 (13)		30.8 (14)	50.5 (23)	77 (35)	

Ratings 480 Volt Class

Type	FR-F740- □ □ □ □ □ -NA													
	00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160
Typical Applicable Motor HP (*1)	1	2	3	5	7.5	10	15	20	25	30	40	50	60	75
Typical Applicable Motor kW (*1)	0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Rated Capacity (kVA)	1.8	2.7	3.7	5.8	8.8	12.2	17.5	22.1	26.7	32.8	41.4	53.3	64.8	80.8
Continuous Current (A) – SLD	2.3	3.8	5.2	8.3	12.6	17	25	31	38	47	62	77	93	116
Continuous Current (A) – LD	2.1	3.5	4.8	7.6	11.5	16	23	29	35	43	57	70	85	106
Overload Capacity – SLD	110% for 60 secs., 40° C Ambient at 2 kHz switching frequency													
Overload Capacity – LD	120% for 60 secs., 50° C Ambient at 2 kHz switching frequency													
Output Voltage	380 – 480V at 60Hz													
Available Braking Torque	15% torque – continuous													
Three Phase Input Voltage Tolerance	323 – 528V 50 / 60Hz													
Supply kVA	2.5	4.5	5.5	9	12	17	20	28	34	41	52	66	80	100
Protective Structure	NEMA 1 - UL Type 1 Plenum Rated (*3)													
IP Rating	IP20											IP00		
Cooling Method	Self Cooling		Force Cooling											
Frame Size	C					D		E		F		G	H	
Approx. Weight lbs (kg)	7.7 (3.5)					14.3 (6.5)		16.7 (7.5)		28.7 (13)		51 (23)	77 (35)	

Notes:
1. Motor rating shown are intended as guidelines only – based on 4 pole standard induction motors.
2. Conduit adaptor option required for types 01250 – 02330.
3. Conduit adaptor option required for types 00770 – 01160.

Dimensions – 240V and 480V Drives

Frame Size	Dimensions in 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 in inches (mm)		
	Height	Width	Depth
H	21.7 (550)	17.1 (435)	9.8 (250)
J	24.4 (620)	18.3 (465)	11.8 (300)
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
Standard Specifications

Ratings 480 Volt Class continued

Type	FR-F740-□□□□□□-NA														
	01800	02160	02600	03250	03610	04320	04810	05470	06100	06830	07700	08660	09620	10940	12120
Typical Applicable Motor HP (*1)	100	175	200	250	300	350	400	450	500	550	600	650	700	750	800
Typical Applicable Motor kW (*1)	75	132	150	185	220	250	300	335	375	400	450	485	500	560	600
Rated Capacity (kVA)	110	137	165	198	248	274	329	367	417	462	521	587	660	733	834
Continuous Current (A) – SLD	180	216	260	325	361	432	481	547	610	683	770	866	962	1094	1212
Continuous Current (A) – LD	144	180	216	260	325	361	432	481	547	610	683	770	866	962	1094
Overload Capacity – SLD	110% for 60 secs., 40° C Ambient at 2 kHz switching frequency														
Overload Capacity – LD	120% for 60 secs., 50° C Ambient at 2 kHz switching frequency														
Output Voltage	380 - 500V at 60 Hz														
Available Braking Torque	15% torque – continuous														
Three Phase Input Voltage Tolerance	323 - 550V 50 / 60 Hz														
Supply kVA	137	165	198	248	274	329	367	417	462	521	567	660	733	834	924
Protective Structure	NEMA 1 Open Type														
IP Rating	IP00														
Cooling Method	Force Cooling														
Frame Size	H	J		K		L		M			N		P		
Approx. Weight lbs (kg)	81.4 (37)	110 (50)	125 (57)	158 (72)		242 (110)		484 (220)			572 (260)		814 (370)		

Note:
1. Motor rating shown are intended as guidelines only – based on 4 pole standard induction motors.

Details of Factory Supplied DC Link Chokes

FR-F740-□□□□□-NA	Dimensions in inches (mm)			Approx. Weight lbs (kg)
	Height	Width	Depth	
01800	13.4 (340)	5.9 (150)	7.5 (190)	44 (20)
02160	13.4 (340)	5.9 (150)	7.7 (195)	48 (22)
02600	15.9 (405)	6.9 (175)	7.9 (200)	57 (26)
03250	15.9 (405)	6.9 (175)	8 (205)	62 (28)
03610	15.9 (405)	6.9 (175)	9.4 (240)	64 (29)
04320	15.9 (405)	6.9 (175)	9.4 (240)	66 (30)
04810	17.3 (440)	7.5 (190)	9.8 (250)	77 (35)
05470	17.3 (440)	7.5 (190)	10 (255)	84 (38)
06100	19.5 (495)	8.3 (210)	9.8 (250)	92 (42)
06830	19.5 (495)	8.3 (210)	9.8 (250)	101 (46)
07700	19.7 (500)	8.7 (220)	9.8 (250)	110 (50)
08660	19.7 (500)	8.7 (220)	10.6 (270)	125 (57)
09620	17.9 (455)	8.5 (215)	13.6 (345)	147 (67)
10940	18.1 (460)	8.5 (215)	14.2 (360)	187 (85)
12120	18.1 (460)	8.5 (215)	14.2 (360)	209 (95)

Option Cards (select one)

		A7AX	A7AY	A7AR	A7NP	A7ND	A7NC	A7NL
Communication	12 Bit Digital Input	●						
	Digital Output		●					
	Ext. Analog Output		●					
	Relay Output			●				
	Profibus DP				●			
	DeviceNet					●		
	CC-Link						●	
	Lonworks							●

Communication Gateways

RS-485		Ethernet	
XLTR 200	Mitsubishi Modbus RTU Metasys N2 Siemens FLN* BAC Net*	ETH 200	Modbus TCP/IP Ethernet IP

*Coming soon

OPTIONS & ACCESSORIES

FR-PU04: 10-button programming keypad (use in conjunction with FR-CB20□ cables). Allows display in English, Japanese, German, French, Spanish, Italian, Swedish and Finnish.

FR-CB201, 03, 05: RJ45 connector cables

FR-ADP Adaptor: Connects DU07 keypad to FR-CB20□ cables

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

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.

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Changes for the Better

Automation Platforms™ • Industrial Computers • Programmable Logic Controllers • Human Machine Interfaces • Software
Servo Systems • Motion Control • Variable Frequency Drives • Computerized Numerical Controls • PC Based Control • Robots