MITSUBISHI ELECTRIC

Changes for the Better

Empowering Industries

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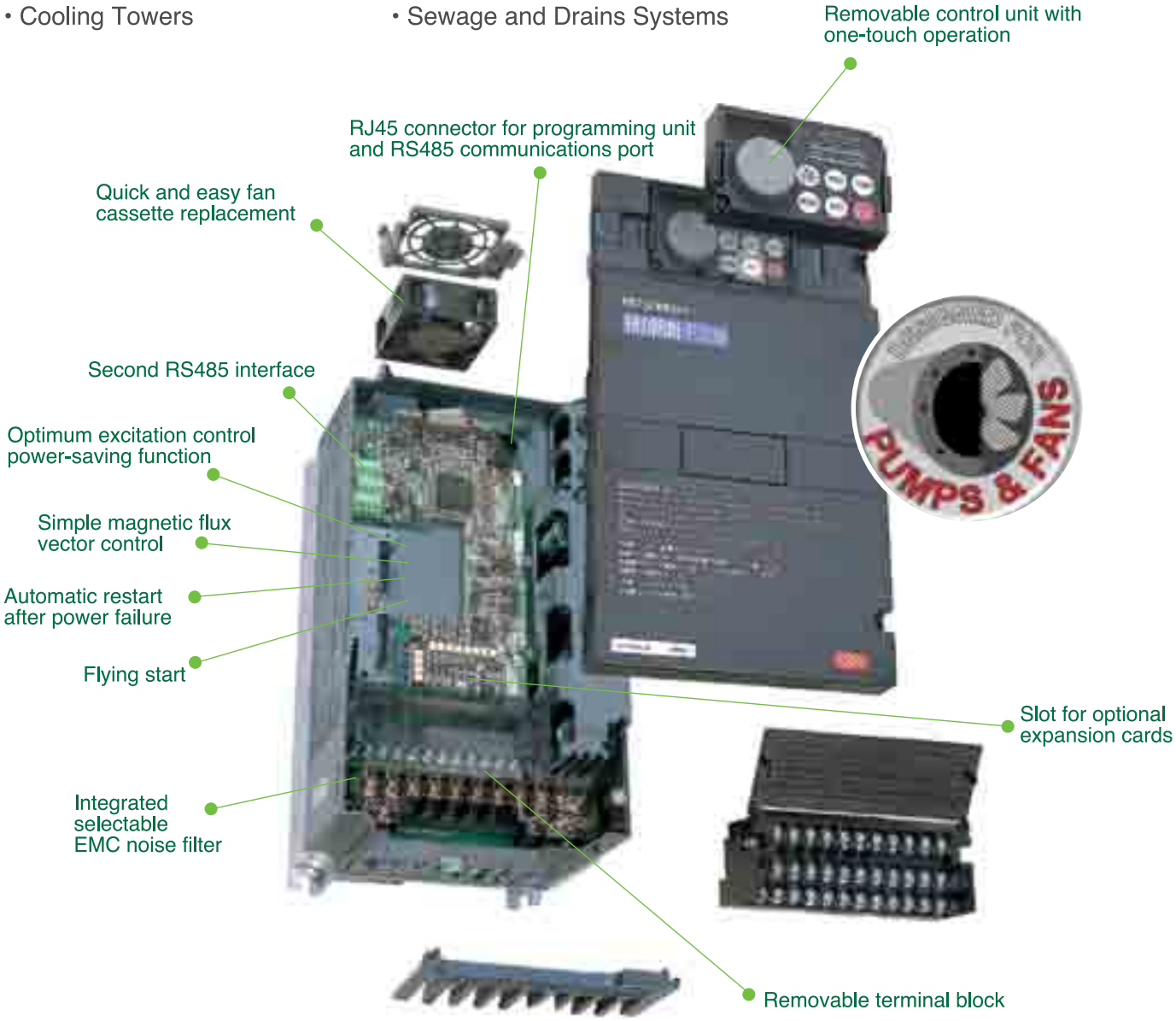
eco Changes

The Frequency Inverters FR-F740 and FR-F746

Mitsubishi Electric's FR-F700 series is a completely new range of frequency inverters with truly exceptional power conservation capabilities. These inverters are ideal for pumps, ventilation fans and applications with reduced overload requirement such as:

- Air Handling Units (AHUs)
- Chilled Water Pumps
- Condenser Water Pumps
- Cooling Towers
- Air Extraction Systems
- Fans and Blowers
- Compressors
- Sewage and Drains Systems



Saving Power with Mitsubishi Frequency Converters

Reducing consumption and optimising the utilisation of our valuable energy resources is one of the greatest global environmental challenges of our age.

Energy-saving mode is a feature of the intelligent control system, which adjusts the voltage to motor requirements, thus minimising losses. **The new OEC (Optimum Excitation Control)** technology developed by Mitsubishi Electric makes it possible to save even more energy. OEC reduces power consumption of asynchronous electric motors by intelligently controlling the magnetic flux applied to them, on the basis of the actual load demands. The savings that can be achieved are particularly high in pump and fan applications, and since these account for around two thirds of all installations the overall reduction in power consumption can be very considerable.

The graph below provides an impressive example of the results of intelligent control in a fan system.

How Do Frequency Inverters Conserve Energy?

Many pump and fan applications use motors running at a fixed speed and the control air and fluid flow with dampers or bypasses. This means that the motor is always operated at high speed, maximising power consumption. Controlling the throughput by varying the motor speed radically changes the energy balance, making it possible to achieve significant power savings compared to damper and bypass solutions.

The illustration below shows a blower system in which the air flow is regulated by a speed variable solution with a frequency inverter instead of with a damper on the exhaust side.

The graph below compares the motor power consumption of the frequency inverter and damper solutions. At a flow rate of 60% the curve shows that the frequency inverter system consumes a full 60% less power than the motor with the damper system.

Potential Savings

In addition to the ecological benefits, frequency inverters can also save a great deal of money by radically cutting power consumption.

Example:

Based on the graph on the left and an electricity price of 25cents per kWh, the following savings can be achieved with a system using a 75kW motor:

- Conventional mechanical solution. At an air throughput of 60% the power consumption is 90%, resulting in the following annual costs:

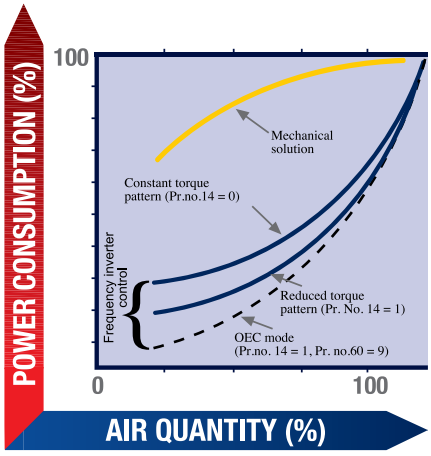
  75kW x 0.9 x $0.25 x 24h x 365 days = $147,825

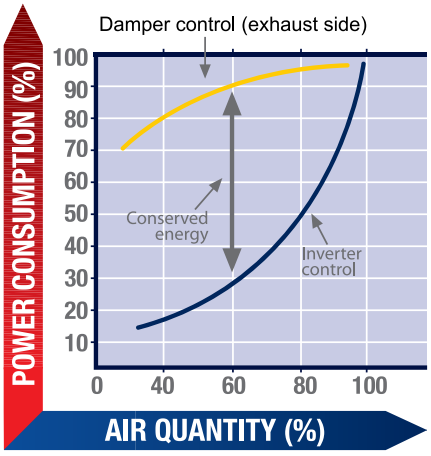
- Frequency inverter solution. At an air throughput of 60% the power consumption is 30%, resulting in the following annual costs:

  75kW x 0.3 x $0.25 x 24h x 365 days = $49,275

  This means that the inverter solution saves $98,550 per year compared to the conventional mechanical system!

Clearly, a frequency inverter will pay for itself in a very short time - and one must also remember that the potential savings increase with the power ratings of the motors used.





Save Power

The FR-F700 drives can radically reduce your power consumption compared to conventional solutions, particularly in pump and fan applications, for which this series have been specially optimized.

Save Time

Packed with intelligent, time-saving features such as simple setup, preset parameters and easy replacement of components like cooling fans and terminal blocks.

Cut Costs

The best of both worlds: Thanks to the Optimum Excitation Control (OEC) technology, which maintains optimum flux to the motor at all times, you can reduce your operating costs while maintaining maximum effectiveness and efficiency.

Full Network Support

The FR-F700 drives support all of the following network protocols:

- RS485 and Modbus RTU*
- Profibus-DP
- DeviceNet
- LonWorks
- CC-Link
- BACnet MS/TP
- Metasys N2
- Siemens FLN

*Built-in

Flexible Configuration

A full range of accessories is available for configuring the drive precisely to the specific needs of your applications, including chokes, brake units, harmonic filters, I/O cards, etc.

Simple Operation

The integrated one-touch direct dial control is more user-friendly than conventional up-down keys, providing much faster access to all drive settings and parameters.

Long Service Life

The FR-F700 drive's exceptional service life of over 10 years is the result of many advanced design features and newly developed components, including the cooling fans and capacitors. Designed and manufactured in Nagoya Works, Japan, the quality of the product is assured to be of the highest standards.

Environmently Friendly

The selectable EMC noise filter, included as standard, easily satisfies the environmental requirements of the EMC directive, (2nd Environment EN61800-3) without any additional equipment or action on your part.

Low Harmonic Drive

The FR-F700 drives also have a low harmonic distortion which is due to an integrated dc link choke. With compliance to IEC/EN 61000-3-12, user can reap the full benefits of using the drive without worrying on pollution to the electrical network.

Rugged Protection

In addition to the IP20 protection ratings, the inverters in the output range up to 55kW are also available with an IP54 rating. The rugged metal chasis units have dust, dirt and water protection, making it possible to install them without an external enclosure.

Flying Start

Gentle restart of a rotating motor (e.g. fan rotated by a draft), also in the opposite direction.

PTC Temperature Sensor Input

The motor's internal PTC temperature sensor can be connected to the inverter directly. In combination with electronic temperature monitoring system this provides effective protection for the motor.

Magnetic Flux Vector Control

The integrated motor flux vector control system makes it possible to achieve high torques, even at low motor speeds.

Active Current Limiting

Tried and tested capabilities like the active current limiting features have been retained. The characteristics of the current limiter have now been further improved to prevent unwanted triggering in response to overcurrents. Transient overcurrents, for example those generated when a motor coasting in reverse is restarted or when an input contactor is closed, will no longer cause unwanted triggering of the current limiter.

Regeneration Avoidance Function

This function can prevent the inverter from being shut down by regenerative overvoltages when strong regenerative loads cause power to be released into the frequency inverter (for example when braking the motor or with loads that actively drive the motor).

The inverter can automatically increase the output frequency or disable the braking ramp when a programmed threshold value is reached. The response sensitivity, dynamics and working range are all adjustable.

For example, this function can prevent a shutdown with an overvoltage error when the speed of a fan controlled by the inverter is increased by the draft from another fan operating in the same ventilation duct. The function then temporarily increases the output frequency above the setpoint value.This function can also be used to brake loads with the DC bus voltage, without using braking modules.

As well as being a world leader in frequency inverter sales, Mitsubishi Electric is a pioneer of core inverter technology.

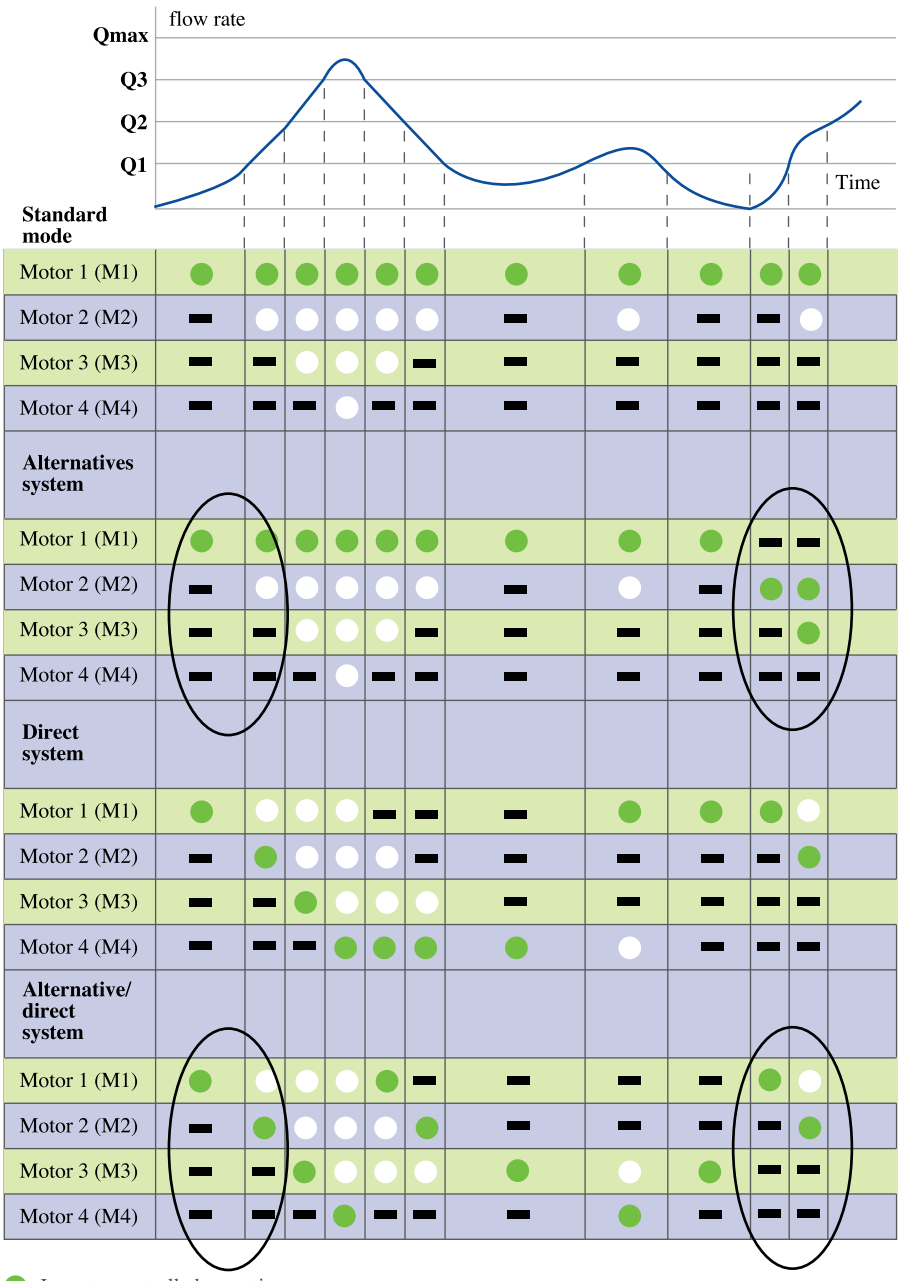
Extended PID Control

The FR-F700 series supports extended PID control. This feature makes it possible to connect the process status signal to the frequency inverter as voltage signal (0-10 V DC) or a current signal (0/4-20 mA DC) and then use the analog input calibration function of the inverter to compensate minor controller-related fluctuations.

In addition to this the frequency inverter can also control up to four motors successively. This function is programmable; for example, you can program it so that only one motor is frequency-controlled and the others are switched on and off under direct mains power as required, or you can alternate between direct mains power and frequency control for all four motors.

The graph on the right illustrates this multi-motor switching function with a typical example.

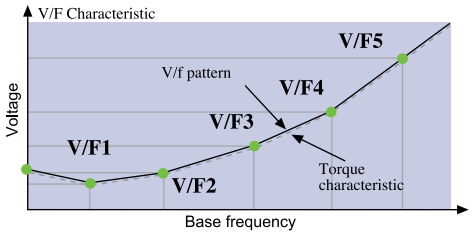
When implementing an application like this you must plan the necessary number of magnetic power contractors and the required number of output signals terminals on the inverter. Care must also be taken to ensure that the mains power is never switched to the inverter output.



Flexible 5-point V/f Curve

The integrated flexible 5-point V/bf curve enables you to match The torque curve perfectly to the characteristics of your machine.

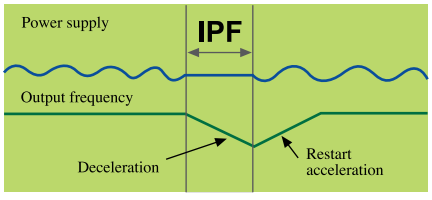
Together, the optimum excitation control feature and the 5-point V/bf curve achieve significantly Increased power savings.



Automatic Restart After Instantaneous Power Failures

In pump and fan applications, normal operation can be continued automatically after brief power failures. The system simply reactivates the coasting motor and automatically accelerates it back up to its Section speed.

The graphic on the right shows how the frequency inverter can respond to a brief power outage. Instead of coasting down completely and stopping, the motor is automatically “caught” by the frequency inverter and re-accelerated back up to its previous speed.



Power Saving Performance Display

The power saving effects can be displayed on the control unit with several different formats and values in kW.

Energy Saving Monitor List

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

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 Environmental).

Practical and Efficient Inverter Setup Software

The Inverter setup software package (runs under Windows® 95, 98, ME, XP, NT and 2000) is a powerful tool for configuring and operating your Mitsubishi frequency inverters. In addition to operating the inverter from a standard personal computer or notebook you can also use Inverter software to configure, operate and monitor multiple inverters in a network system.

The software package includes functions for:

- System configuration and parameter settings
- Display and diagnostics
- Testing
- File management and help

Standard Specifications

• 400V Class

Type FR-F740-□□K (IP20)		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Type FR-F746-□□□□□-EC (IP54)		00023	00038	00052	00083	00126	00170	00250	00310	00380	00470	00620	00770	00930	01160
Applied motor capacity (kW)*1		0.75	1.5	2.2	3.7	5.5	7.5	11	15	18.5	22	30	37	45	55
Output	Rated capacity (kVA)*2	1.6	2.7	3.7	5.8	8.8	12.2	17.5	22.1	26.7	32.8	43.4	53.3	64.8	80.8
	Rated current (A)*3	2.1 (1.8)	3.5 (3.0)	4.8 (4.1)	7.6 (6.4)	11.5 (9.8)	16 (13)	23 (19)	29 (24)	35 (30)	43 (36)	57 (48)	70 (60)	85 (72)	106 (90)
	Overload current rating*4	120% 60s, 150% 3s (inverse time characteristics)													
	Voltage*5	Three-phase 380 to 480V													
Power supply	Rated input AC voltage/frequency	Three-phase 380 to 480V 50Hz/60Hz													
	Permissible AC voltage fluctuation	323 to 528V 50Hz/60Hz													
	Permissible frequency fluctuation	±5%													
	Power supply system capacity (kVA)*6	2.5	4.5	5.5	9	12	17	20	28	34	41	52	66	80	100
Cooling system		Self-cooling			Forced air cooling										
Approx. mass (kg) (IP20)		3.5	3.5	3.5	3.5	3.5	6.5	6.5	7.5	7.5	13	13	23	35	35
Approx. mass (kg) (IP54)		12.5					18.5		21.5		30		27	42	

Type FR-F740-□□K (IP20)		75	90	110	132	160	185	220	250	280	315	355	400	450	500	560
Applied motor capacity (kW)*1		75	90	110	132	160	185	220	250	280	315	355	400	450	500	560
Output	Rated capacity (kVA)*2	110	137	165	198	247	275	329	366	416	464	520	586	659	733	833
	Rated current (A)*3	144 (122)	180 (153)	216 (183)	260 (221)	325 (276)	361 (306)	432 (367)	481 (408)	547 (464)	610 (518)	683 (580)	770 (654)	866 (736)	962 (817)	1094 (929)
	Overload current rating*4	120% 60s, 150% 3s (inverse time characteristics)														
	Voltage*5	Three-phase 380 to 480V														
Power supply	Rated input AC voltage/frequency	Three-phase 380 to 480V 50Hz/60Hz														
	Permissible AC voltage fluctuation	323 to 528V 50Hz/60Hz														
	Permissible frequency fluctuation	±5%														
	Power supply system capacity (kVA)*6	110	137	165	198	247	275	329	366	416	464	520	586	659	733	833
Cooling system		Forced air cooling														
Approx. mass (kg) (IP20)		37	50	57	72	72	110	110	220	220	220	260	260	370	370	370

*1. The applied motor capacity indicated is the maximum capacity applicable for use of the Mitsubishi 4-pole standard motor.

*2. The rated output capacity indicated assumes that the output voltage is 220V for 200V class and 440V for 400V class.

*3. When operating the inverter with the carrier frequency set to 3kHz or more, the carrier frequency automatically decreases if the inverter output current exceeds the value in parenthesis of the rated current. This may cause the motor noise to increase.

*4 The % value of the overload current rating indicated is the ratio of the overload current to the inverter's rated output current. For repeated duty, allow time for the inverter and motor to return to or below the temperatures under 100% load.

*5 The maximum output voltage does not exceed the power supply voltage. The maximum output voltage can be changed within the setting range. However, the pulse voltage value of the inverter output side voltage remains unchanged at about √2 that of the power supply.

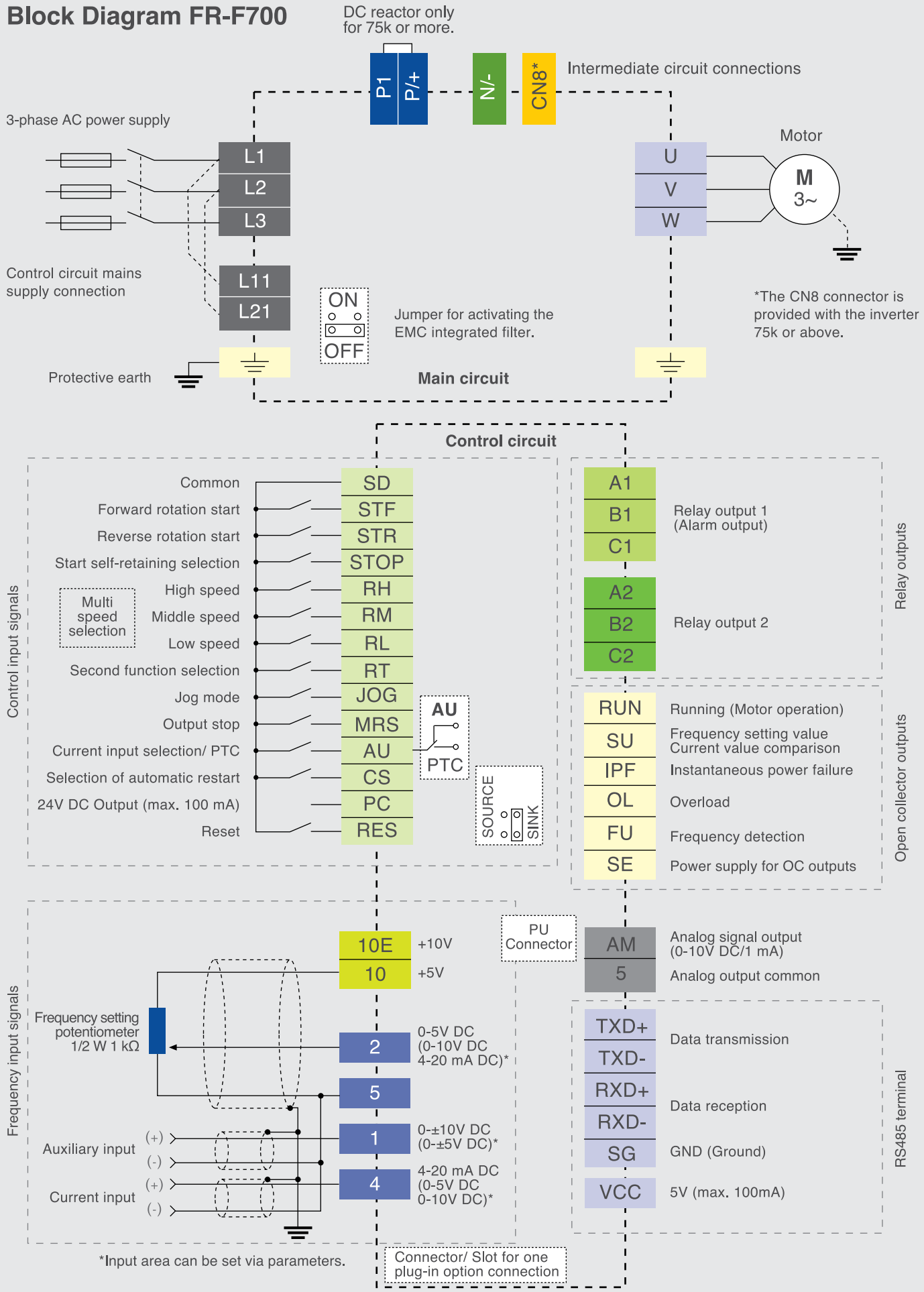
*6 The power supply capacity varies with the value of the power supply side inverter impedance (including those of the input reactor and cables).

Common Specifications

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
			Minimum efficiency: 97% at 100% load, 95% at 50% load
			True Power Factor: At least 0.9 at full load
	Frequency setting resolution	Digital 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/11bit, terminal 1: -10V to +10V/11bit) 0.06Hz/0 to 60Hz (terminal 1: 0 to ±5V/10bit)
		Analog 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 resetting		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 operating level		Operation current level can be set (0 to 150% adjustable), whether to use the function or not can be selected
Operational specifications	Frequency setting signal	Analog input	Terminal 2, 4: 0 to 10V, 0 to 5V Terminal 4: 4 to 20mA 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		Both forward rotation and reverse rotation. Start signal automatic self-holding input (3-wire input) can be selected.
	Input signal		Twelve signals (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 inter lock signal, PID control enable terminal, PU operation, external operation switchover, output stop, start-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, original operation continuation at 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	Operational status	Seven signals (output terminal function selection) from among inverter running, up-to-speed, instantaneous power failure/ undervoltage, overload warning, output frequency detection, second output frequency detection, regeneration brake prealarm*4, 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, fan fault output, heatsink overheat prealarm. inverter running start command on, deceleration at an instantaneous power failure, PID control activated, during retry, during PID output suspension, life alarm, alarm output3 (power-off signal), power saving average value update timing, current average monitor, alarm output2, maintenance timer alarm, remote output, minor failure output, alarm output. Open collector output (5 points), relay output (5 points), relay output (2 points) and alarm code of the inverter can be output (4bit) from the open collector.
		When used with the FR-A7AY, FR-A7AR (option)	Seven signals using (extension output terminal function selection) from among control circuit capacitor life, main circuit capacitor life, cooling fan life, inrush current limit circuit life and the above stated signals. (Only positive logic can be set for terminals of the FR-A7AR)
		Pulse/analog output	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, load meter, reference voltage output, motor load factor, power saving effect, regenerative brake duty*4, PID set value, PID measure 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, frequency setting, running speed, converter output voltage (steady or peak value), electronic thermal relay function load factor, input power, output power, load meter, cumulative energization time, actual operation time, motor load factor, cumulative energization power, power saving effect, cumulative saving power, regenerative brake duty*4, PID set point, PID measure value, PID deviation value, inverter I/O terminal monitor, input terminal option monitor*1, output terminal option*1, option fitting status monitor*2, terminal assignment status*2
		Alarm definition	Alarm definition is displayed when the protection 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, motor 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, operation panel power supply short circuit, 24V DC power output short circuit, output current detection value excess, 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 relay function prealarm, PU stop, maintenance timer alarm*1, brake transistor alarm*4, parameter write error, copy operation error, operation panel lock, parameter copy alarm
Environment	Ambient temperature		-10°C to + 50°C (non-freezing)
	Ambient humidity		95%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 seal level, 5.9m/s2 or less *5 (conforms to JIS C 60068-2-6)

*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.
*4. Only the 75k or more functions.
*5. 2.9m/s^2 or less for the 185K or more.

Block Diagram FR-F700



Assignment of Main Circuit Terminals

Function	Terminal	Designation	Description
Main circuit connection	L1, L2, L3	Mains supply connection	Mains power supply of inverters (380-480V AC, 50/60Hz); (380-500V for FR-F700-01800 and above)
	P/+, N/-	External brake unit connection	An optional external brake resistor can be connected to the terminals P and N or you can connect a optional high power factor converter.
	P1, P/+	DC reactor connection	An optional DC reactor can be connected to the terminals P1 and P/+. The jumper on terminals P1 and P/+ must be removed when this optional choke coil is used on frequency inverter models 01160 and below. The DC reactor supplied with the unit must be installed on frequency inverter models 01800 and above.
	U, V, W	Motor connection	Voltage output of the inverter (3-phase, 0V up to power supply voltage, 0.5-400Hz)
	L11, L21	Control circuit mains supply connection	To use external power for the control circuit connect the mains power to L11/L21 (and remove jumpers L1 and L2).
	CN8	External brake transistor control	Control connection for external brake module (type 01800 and above)
	⏚	PE	Protective earth connection of inverter

Assignment of Signal Terminals

Function	Terminal	Designation	Description
Control connection (programmable)	STF	Forward rotation start	The motor rotates forward, if a signal is applied to terminal STF.
	STR	Reverse rotation start	The motor rotates reverse, if a signal is applied to terminal STR.
	STOP	Start self-retaining selection	The start signals are self-retaining, if a signal is applied to terminal STOP.
	RH, RM, RL	Multi-speed selection	Preset of 15 different output frequencies
	JOG	Jog mode selection	The JOG mode is selected, if a signal is applied to terminal JOG (factory setting). The start signals STF and STR determine the rotation direction.
	RT	Second parameter settings	A second set of parameter settings is selected, if a signal is applied to terminal RT.
	MRS	Output stop	The inverter lock stops the output frequency without regard to the delay time. You can select a make or break signal for the controller inhibit function by changing parameter 17.
	RES	RESET input	An activated protective circuit is reset, if a signal is applied to the terminal RES (t>0,1s).
	AU	Current input selection	The 0/4-20mA signal on terminal 4 is enabled by a signal on the AU terminal.
		PTC input	If you connect a PTC temperature sensor you must assign the PTC signal to the AU terminal and set the slide switch on the control circuit board to the PTC position.
	CS	Automatic restart after instantaneous power failure	The inverter restarts automatically after a power failure, if a signal is applied to the terminal CS.
Common	SD	Reference potential (0V) for the PC terminal (24V)	When “sink” control logic is selected by setting the control signal jumper a specific jumper a specific control function is triggered when the corresponding control terminal is connected to the SD terminal. When “Source” control logic is selected and you are using external 24V power you must connect the 0V of the external power supply to terminal SD. The SD terminal is isolated from the digital electronics with optocouplers.
	PC	24V DC output	Internal power supply 24V DC/0.1 output
Setting value specification	10 E	Voltage output for potentiometer	Output voltage 10V DC Max. output current 10mA Recommended potentiometer: 1kΩ, 2W linear
	10		Output voltage 5V DC Max. output current 10mA Recommended potentiometer: 1kΩ, 2W linear
	2	Input for frequency setting value signal	The setting value 0-10V or 0/4-20mA is applied to this terminal. You can switch between voltage and current setpoint values with parameter 73. The input resistance is 10kΩ
	5	Frequency setting common and analog outputs	Terminal 5 provides the common reference potential (0V) for all analog set point values and for the analog output signals CA (current) and AM (voltage). The terminal is isolated from the digital circuit’s reference potential (SD). This terminal should not be grounded.
	1	Auxiliary input for frequency setting value signal 0-±5(10) V DC	An additional voltage setting value signal of 0-±5 (10) V DC can be applied to terminal 1. The voltage range is preset to 0-±10 V DC. The input resistance is 10kΩ
	4	Input for setting value signal	The setting value 0/4-20mA or 0-10 is applied to this terminal. You can switch between voltage and current setpoint values with parameter 267. The input resistance is 250Ω. The current setting value is enable via terminal function AU.

Assignment of Signal Terminals

Function	Terminal	Designation	Description
Signal output (programmable)	A1, B1, C1	Potential free relay output 1 (Alarm)	The alarm is output via relay contacts. The block diagram shows the normal operation and voltage free status. If the protective function is activated, the relay picks up. The maximum contact load is 200V AC/0.3 A or 30V DC/0.3 A.
	A2, B2, C2	Potential free relay output 2	Any of the available 42 output signals can be used as the output driver. The maximum contact load is 230V AC/0.3 A or 30V DC/0.3 A.
	RUN	Signal output for motor operation	The output is switch low, if the inverter output frequency is equal to or higher than the starting frequency. The output is switched high, if no frequency is output or the DC brake is in operation.
	SU	Signal output for frequency setting value/current value comparison	The SU output supports a monitoring of frequency setting value and frequency current value. The output is switched low, once the frequency current value (output frequency of the inverter) approaches the frequency setting value (determined by the setting value signal) within a preset range of tolerance.
	IPF	Signal output for instantaneous power failure	The output is switched low for a temporary power failure within a range of 15ms ≤ t_{IPF} ≤ 100ms or for under voltage.
	OL	Signal output for overload alarm	The OL is switched low, if the output current of the inverter exceeds the current limit preset in parameter 22 and the stall prevention is activated. If the output current of the inverter falls below the current limit preset in parameter 22, the signal at the OL output is switched high.
	FU	Signal output for monitoring output frequency	The output is switched low once the output frequency exceeds a value preset in parameter 42 (or 43). Otherwise the FU output is switched high.
	SE	Reference potential for signal outputs	The potential that is switched via open collector outputs RUN, SU, OL, IPF and FU is connected to this terminal.
	AM	Analog output 0-10V (1mA)	One of 18 monitoring functions can be selected, e.g. external frequency output. CA and AM output can be used simultaneously. The functions are determined by parameters. A DC voltmeter can be connected. The max. output voltage is 10V.
Interface	-	PU connector (RS485)	Communications via RS485 I/O standard: RS485, Multi-Drop operation, 4,800-38,400 Baud (overall length: 500m)
	-	RS485 terminal (via RS485 terminal)	Communications via RS485 I/O standard: RS485, Multi-Drop operation, 300-38,400 Baud (overall length: 500m)

Parameters List

For simple variable-speed operation of the inverter, the initial setting of the parameters may be used as they are. Set the necessary parameters to meet the load and operational specifications. Parameter setting, change and check can be made from the operation panel (FR-DU07). For details of **full list of available** parameters,refer to the instruction manual.

Simple Mode Parameters

Parameter Number	Name	Range	Increments	Recommended Settings
1	Maximum frequency	0 to 120Hz	0.01Hz	50Hz*3
2	Minimum frequency	0 to 120Hz	0.01Hz	30Hz*3
3	Base frequency	0 to 400Hz	0.01Hz	50Hz
4	Multi-speed setting (high speed)	0 to 400Hz	0.01Hz	50Hz*3
5	Multi-speed setting (middle speed)	0 to 400Hz	0.01Hz	30Hz*3
6	Multi-speed setting (low speed)	0 to 400Hz	0.01Hz	10Hz*3
7	Acceleration time	0 to 3600/360s	0.1/0.01s	30s*3
8	Deceleration time	0 to 3600/360s	0.1/0.01s	30s*3
9	Electronic thermal O/L relay	0 to 500/0 to 3600A*1	0.1/0.01A*1	Motor full load Amps
55	Frequency monitoring range	0 to 400Hz	0.01Hz	50Hz
60	Energy saving control selection	0, 4, 9	1	9 (OEC Mode)
73	Analog input selection	0 to 7, 10 to 17	1	O*3 (0-10 Vdc)
125	Terminal 2 frequency setting gain frequency	0 to 400Hz	0.01Hz	50Hz
126	Terminal 4 frequency setting gain frequency	0 to 400Hz	0.01Hz	50Hz
195	ABC1 terminal function selection	0 to 9999	1	99 (Trip status)
196	ABC2 terminal function selection	0 to 9999	1	0 (Run status)
160	User group read selection	0, 1, 9999	1	9999 (Advance mode)

*1 Differ according to capacities. (55k or less/75k or more)
*2 Differ according to capacities. (0.75k/1.5k to 3.7k/5.5k, 7.5k/11k to 37k/45k, 55k/75k or more)
*3 User defined.

Mitsubishi Electric's F700 Series Inverter has been designed, manufactured, and tested in accordance with the latest applicable standards as follow:

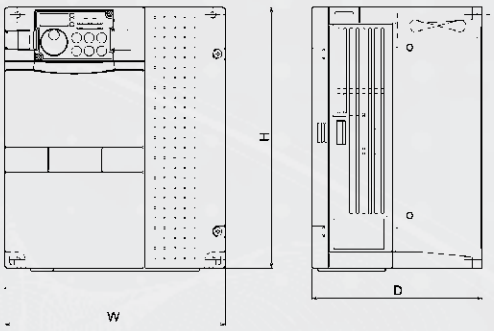
CE	Conformance to the relevant European Directives
CSA 22.2 N14-95	Industrial control equipment
EN 50178	Low Voltage Directive 2006/95/EC
EN 61800-5-1:2003	Low Voltage Directive 2006/95/EC
EN 60204-1	Safety of machinery-electrical equipment of machines. Part 1 – Specification for general requirement
EN 60950	Safety of information technology equipment including electrical business equipment
EN 61010-1	Safety requirement for electrical equipment for measurement, control, and laboratory use, Part 1 – general requirement
EN 61800-3:2004	Electro Magnetic Compliance according to EMC Directive 2004/08/EC
EN 61000-3-12	Limits for harmonic current emissions
UL 508	Industrial control equipment
UL 508C	Power conversion equipment
IEC 664	Insulation coordination for equipment within low-voltage systems
IEC 60068-2-6	Environmental testing – Part 2 – Test Fc: vibration (sinusoidal)
IEC 60068-2-27	Environmental testing. Part 2: Tests. Test Ea and guidance: Shock
IEC 801-4	Electrical Fast Transient (Supplementary Wave)
NEMA ICS6	Industrial control and systems enclosures
NEMA 250	Enclosures for electrical equipment
SEMI F47	Specification for Semiconductor Processing Equipment voltage sag immunity

Manufacturer of the F700 Series Inverter, Nagoya Works, is a certified ISO 9001 and ISO 14000 facility

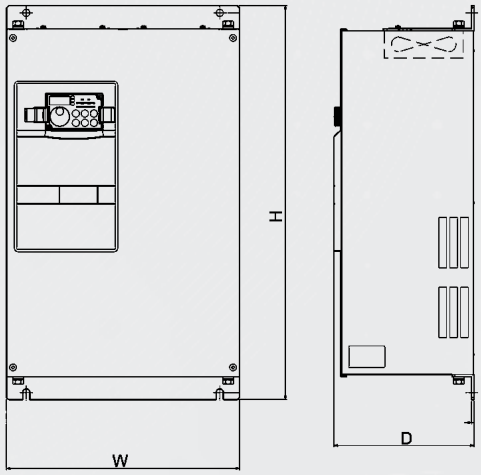
Dimension & Technical Drawings

		Dimensions (mm)		
		Height	Width	Depth
FR-F740-XXK (IP20)	0.75	260	150	140
	1.5			
	2.2			
	3.7			
	5.5			
	7.5	260	220	170
	11			
	15	300	220	190
	18.5			
	22	400	250	190
	30			
	37	550	325	195
	45	550	435	250
	55			
	75	550	435	250
	90	595	465	300
	110	620	465	300
	132	740	465	360
	160			
	185	1010	498	380
	220			
	250	1010	680	380
	280			
	315			
	355	1330	790	440
	400			
	450	1580	995	440
	500			
	560			

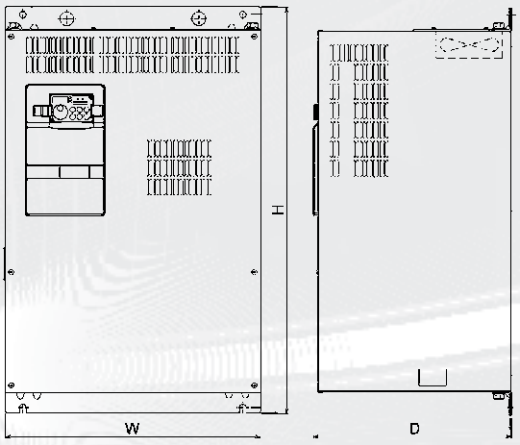
Typical Drawing : 0.75 to 30kw



Typical Drawing : 37 to 110kw

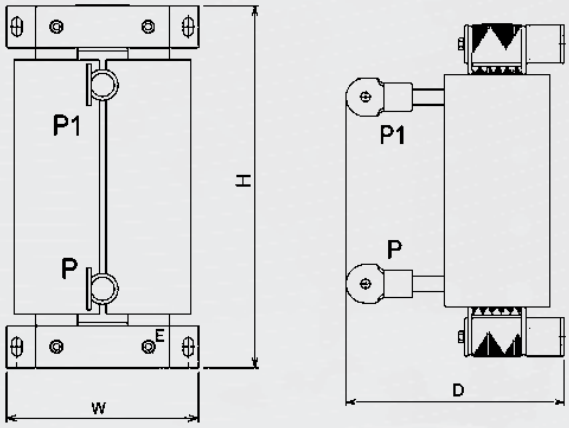


Typical Drawing : 132 to 160kw



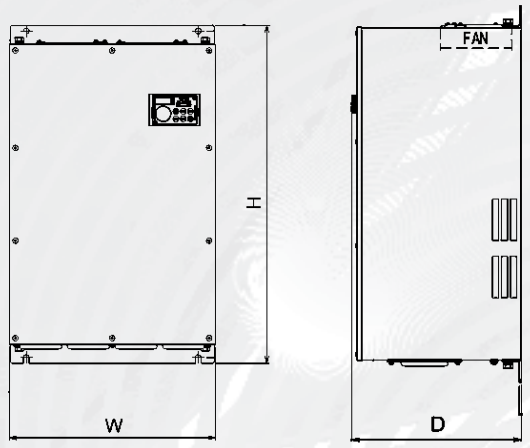
Dimension & Technical Drawings

		Dimensions (mm)		
		Height	Width	Depth
FR-HEL-XXK (DC Reactor)	75	320	140	185
	90	340	150	190
	110	340	150	195
	132	405	175	200
	160	405	175	205
	185	405	175	240
	220	405	175	240
	250	440	190	250
	280	440	190	255
	315	495	210	250
	355	495	210	250
	400	500	235	250
	450	500	240	270
	500	345	245	455
	560	360	245	460



Dimension & Technical Drawings

		Dimensions (mm)		
		Height	Width	Depth
FR-F746-XXXXX-EC (IP54)	00023	395	249	210
	00038			
	00052			
	00083			
	00126			
	00170	395	319	240
	00250			
	00310	445	319	260
	00380			
	00470	560	354	260
	00620			
	00770	590	360	265
	00930	660	471	320
	01160			



Project References

Capital Square

Cerebros Brand's Factory

IOI PFCC

Menara FELDA, Platinum Park

National Sewage Treatment Plant

New Straits Time Press

Project References

Q-Cells

The Heritage

Tropicana Office Tower

University Putra Malaysia (UPM)

VSQ

Western Digital

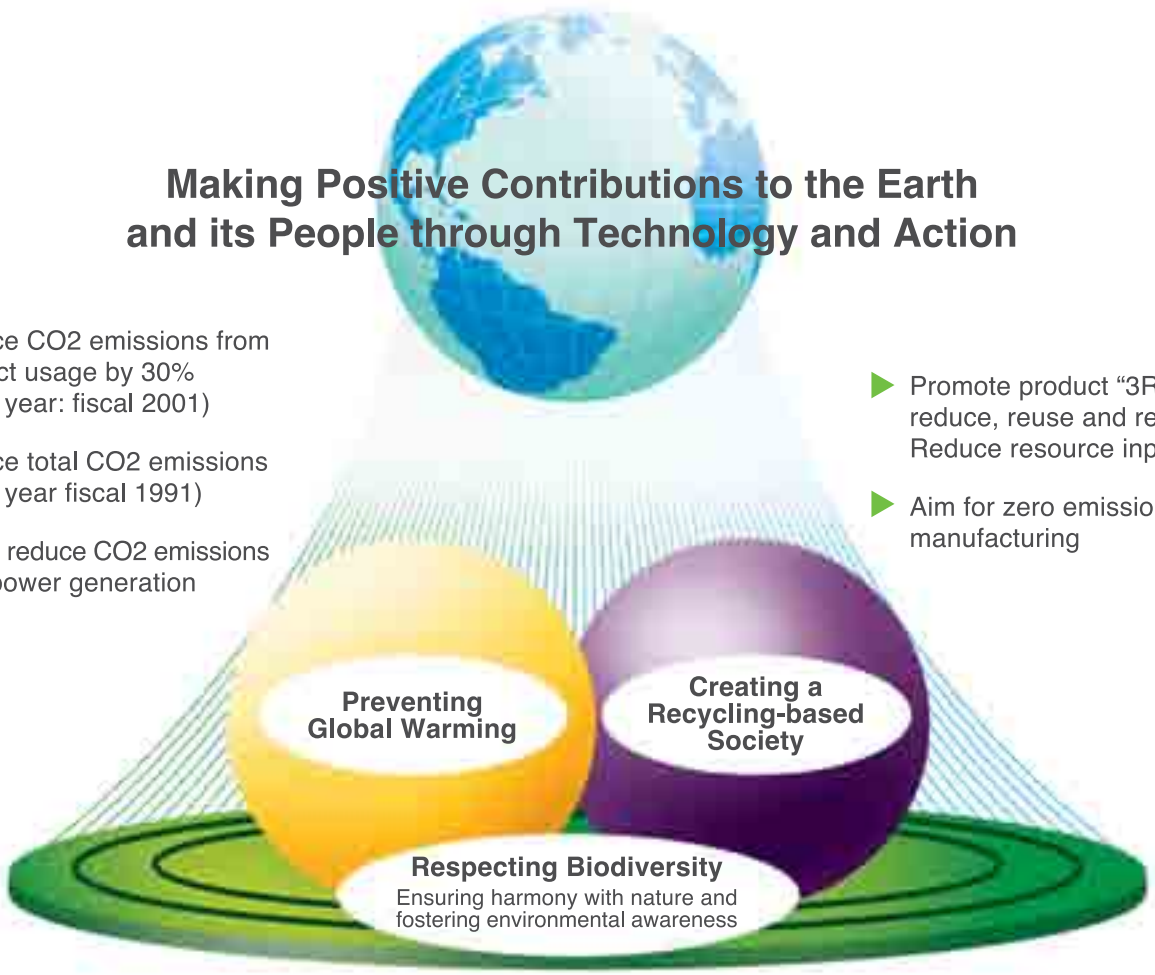
Overview

Announced in October 2007, Environmental Vision 2021 is the long-term environmental management vision of the Mitsubishi Electric Group. It establishes a framework for realizing a sustainable planet, and defines long-term initiatives to prevent global warming and to create a recycling-based society.

The motto, “making positive contributions to the earth and its people through technology and action, “calls for the company to work toward the realization of a sustainable society by utilizing our wide-ranging and sophisticated technologies as well as promoting assertive and persistent actions by our employees. The Vision sets 2021 as the target year, commemorating the 100th anniversary of Mitsubishi Electric’s founding.

Environmental Vision 2021 stands at the core of Mitsubishi Electric’s commitment to the environment, and outlines targets that we aspire toward and that we measure ourselves against.

Using technology and action to make a positive difference by the year 2021, the centennial of the founding of Mitsubishi Electric.



- Mitsubishi Electric Corporation: Base year fiscal 1991;
  Affiliated companies in Japan: Base year fiscal 2001;
  Affiliated companies outside Japan: Base year fiscal 2006.

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MITSUBISHI ELECTRIC

Changes for the Better

eco Changes

for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.

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