

Frequency  
Inverters  
FR-F 700



**FR-F 700**  
The  
productivity  
drives  
for your  
fans and  
pumps



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**The Intelligent Way to Save  
Power, Time and Money**



# The new FR-F700 - it's the sum of its parts that

**Quick and easy fan cassette replacement**

**Second RS485 interface**

**Optimum Excitation Control power-saving function**

**Simple Magnetic Flux Vector Control**

**Automatic restart after power failure**

**Flying start**

**Integrated selectable EMC noise filter**

**Removable terminal block**

**RJ45 connector for programming unit and RS485 communications port**

**Removable control unit with one-touch operation**

**Slot for optional expansion cards**

**DESIGNED FOR PUMP & FAN**

**DANGER** Risk of injury and electric shock  
Δ Read the manual and follow the safety instructions before use.  
Δ Disconnect from supply and wait 10 minutes before removing the cover.  
Δ Ensure proper earth connection.

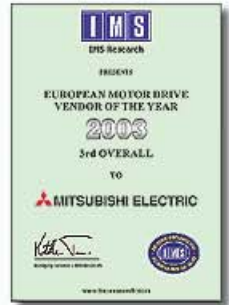
**CAUTION** Risk of fire  
Δ Mount the inverter on a non-combustible surface.

MITSUBISHI  
**F700**  
400V

REF F700-0001W-EC 04/2011



# It puts it ahead of the rest



*Mitsubishi's outstanding performance in drive technology was confirmed once again by the 2003 customer satisfaction survey by IMS:*

- *First place for product reliability*
  - *First place for product technology*
  - *Third place overall*
- For the second time running!*

*The new FR-F 700 is a truly international product. It conforms to all relevant international standards such as CE, UL, cUL, Gost and CCC, and can easily be configured for national requirements without additional equipment or certifications.*



## **Save power**

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



## **Save time**

Packed with intelligent, time-saving features, including simple setup, preset parameters, fast and direct parameter settings and easy replacement of components like 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 costs while maintaining maximum effectiveness and efficiency.



## **Full network support**

The FR-F700 supports all the following network systems: CC-Link, LON Works, Profibus/DP, DeviceNet, RS485 and Modbus RTU



## **Flexible configuration**

A full range of accessories is available for configuring your inverter precisely to the specific needs of your or your customer's application, including choke coils, brake units, I/O cards etc.



## **Simple operation**

The integrated one-touch Digital Dial control is more efficient than conventional keys, providing much faster access to all drive settings and parameters.



## **Long service life**

The FR-F700'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.



## **Environmentally friendly**

The selectable EMC noise filter, included as standard, easily satisfies the environmental requirements of the EMC Directive, without any additional equipment or action on your part.

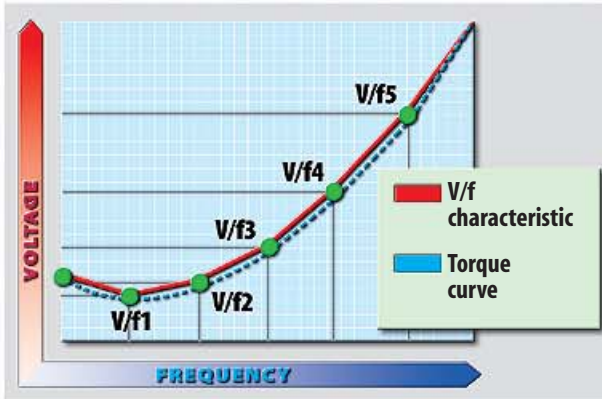


## **Stand-alone operation**

The inverter's advanced intelligent functions make it possible to configure stand-alone applications without any need for additional external controllers.



## FR-F700: Exceptional performance for pump and fan applications



The new FR-F 700 frequency inverter has enormous potential for power savings and is particularly well suited for pumps, fans and all applications with reduced overloads, including:

- Air conditioning systems in building management and industry
- Air extraction and ventilation systems
- Hydraulics systems and compressors
- Sewage systems, ground water pumps and heat pumps
- Drives with a high percentage of idling operation
- Spinning and knitting machines and looms
- Machine tools
- Conveyor belts and worm conveyors

The FR-F700 offers a range of features that benefit most motor applications. These features also make the FR-F700 ideal for fan and pump applications.

### Getting freewheeling fans and pumps under control

Freewheeling occurs when external pressures turn a nonpowered motor in either direction, for example static head pressure forces a pump to rotate. Starting a motor in this state could cause a motor to trip under an overload condition. The FR-F700 virtually eliminates this problem.

When the FR-F700 is started it can automatically sense direction and speed of the motor, bringing it under control immediately - often called a flying start.

With an automatic restart after a brief power outage, the Inverter automatically "catches" the motor while it is coasting and accelerates it to its preset speed providing immediate recovery and minimal loss of control.

### Integrated flexible 5-point V/f curve

For the best performance under difficult load conditions a 5-point V/f torque curve can be set to match systems characteristics.

### Bringing overhauling loads under control

Sometimes a powered motor can be overdriven by its load, the motor then acts as a generator and can create high voltages within the drive. The FR-F700 can increase its output frequency to avoid tripping.

### Protection for your motor

Optimum motor protection can be achieved by connecting the motor's PTC temperature sensor to the drive's temperature monitoring system.

### Controlling multiple fan or pump motors

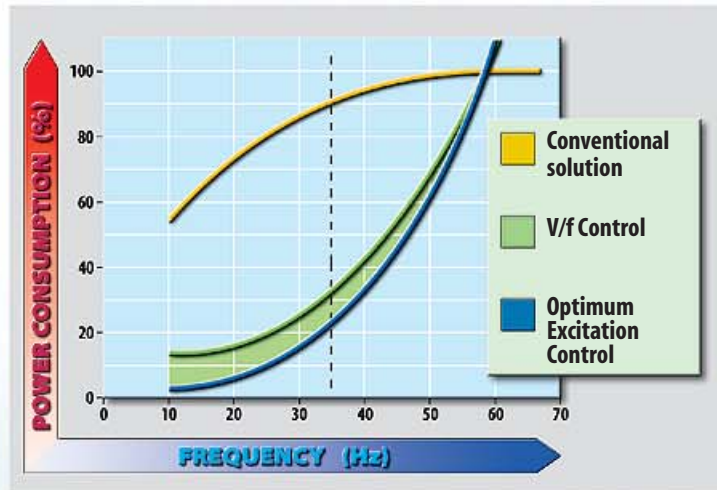
The FR-F700 can automatically operate up to four load-controlled motors from a single inverter. As each motor is brought up to speed it is then switched 'direct on line' allowing the next motor to be controlled. Slowing, is a reverse of the same process.

### Local PID Control and Networking options

The FR-F700 easily handles HVAC applications that require local PID control or can act as part of a larger building network such as LON Works.



# Intelligent technology – Radical power savings for many, many years



Fan curve

## Cut power consumption by up 60%

The FR-F700 can achieve particularly impressive power savings in the low speed range and during the acceleration and braking phases. For example, at a frequency of 35Hz it uses 57% less power than conventional solutions. And the pioneering OEC (Optimum Excitation Control) function cuts consumption by another 10%. OEC ensures that the motor always gets the optimum magnetic flux, for maximum motor effectiveness and efficiency.

## Long service life and simplified maintenance

A combination of many intelligent design features and newly developed components (including the fans and capacitors) have increased the service life of the FR-F700 to over 10 years. An automatic warning is displayed when the end of the service life is approaching, so that you can avoid unexpected failures. Setup is fast and maintenance is simple, thanks to preconfigured parameters, fast and easy parameter configuration and easy replacement of components like fans and terminal blocks when necessary.

## Calculate what the FR-F700 can earn for you:

Assuming an application with a 75 kW motors, an electricity price of ¥0.14 per kWh, the cost calculations are as follows:

### Conventional mechanical solution

Air volume 60%, power consumption 90%\*:  
 $75\text{kW} \times 0.9 \times ¥0.14 \times 24\text{h} \times 365\text{days} = ¥82,782$

### FR-F700 frequency inverter solution

Air volume 60%, power consumption 33%\*:  
 $75\text{kW} \times 0.33 \times ¥0.14 \times 24\text{h} \times 365\text{days} = ¥30,353$

### Result:

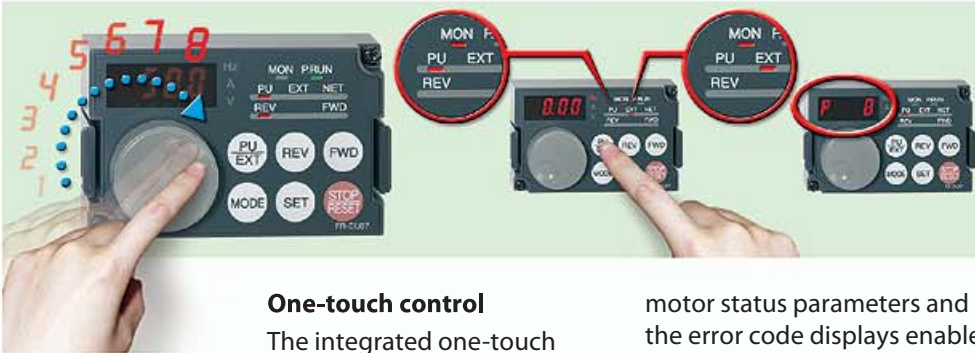
This means that FR-F700 generates

**Savings of ¥52,429 per year!**

\* see graph



## User-friendly control unit with fast one-touch operation



The power savings achieved can be displayed on the control unit in a number of different ways:

- Current value in kWh, % or money units
- Average value in kWh, % or money units
- Annual value kWh or money units

### One-touch control

The integrated one-touch Digital Dial gives you much faster access to all the important parameters than would be possible using conventional control keys.

### Flexible control unit

The removable FR-DU07 control unit makes operating the inverter simple and intuitive. A 4-digit LED display enables you to check and edit settings, and it is also used for monitoring operating status and displaying alarms. You can monitor all inverter and

motor status parameters and the error code displays enable rapid troubleshooting. The control unit can also be used to adjust the speed of the connected motor continuously and directly, and to copy sets of configuration parameters from one frequency inverter to another. The unit can be connected with a cable and installed remotely, for example in an external cabinet.

### Advanced control unit

The optional FR-PU04 features a backlit, long-life LCD



screen, a user interface selectable in one of eight different languages and a numeric keypad for direct entry of settings and operating parameters. It is connected to the FR-F700 with a cable, also allowing remote installation in a cabinet.

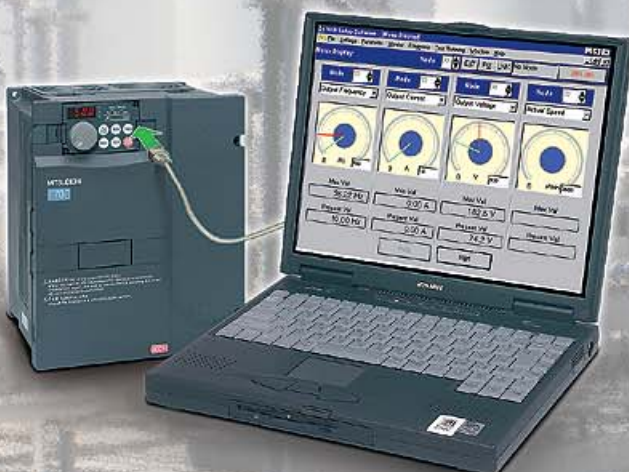
## Practical and efficient VFD setup software

The VFD 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 VFD 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



## Power and performance for all applications

The frequency inverters of the FR-F700 series are available with outputs from 0.75 to 630kW. They are specially designed for the needs of pump and fan applications but they are also an excellent choice for standard applications with a maximum overload of 150%. All units in the series are configured for connection to 3-phase 380 to 480/500V (50/60Hz) mains power supplies.

The output frequency range is from 0.5 to 400Hz.



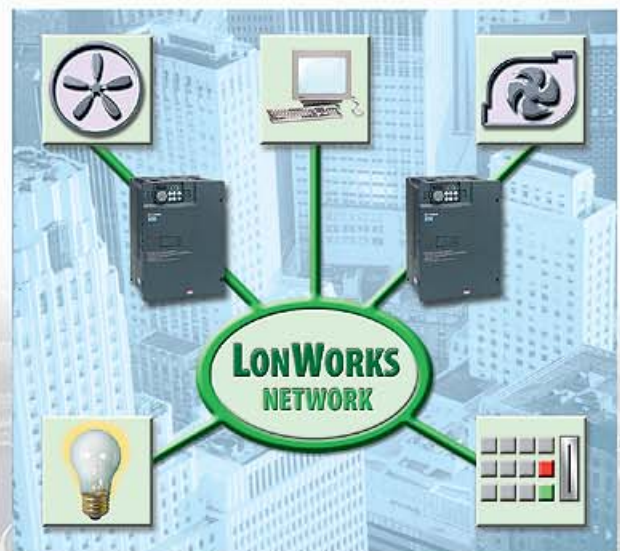
## Comprehensive communications options

The FR-F700 inverters are fitted with two serial ports as standard for integration in automation networks. A network cable can be connected to the PU interface with a standard RJ45 plug and there are RS485 terminals inside the inverter for connection to a multidrop network, enabling inexpensive network connection of up to 32 nodes.

In addition to the Mitsubishi network protocol you can also set Modbus-RTU (binary) as the standard protocol. The inverters can be connected to all the following networks:

- CC-Link\*
- LON Works\*
- Profibus/DP\*
- DeviceNet\*
- Modbus RTU
- RS485

*\* optional*



# Three applications demonstrating the power-saving potential of the FR-F700



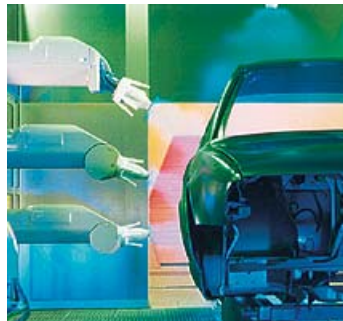
*Mitsubishi Electric is a truly international company, with 106 subsidiaries and 63 manufacturing facilities worldwide. All around the globe state-of-the-art automation technology from Mitsubishi Electric helps to power both technological progress and business success. Our experience and expertise have made us one of the world's biggest suppliers of automation technology. Every day over 7 million Mitsubishi frequency inverters demonstrate their outstanding performance and reliability in demanding industrial applications. Our latest generation of frequency inverters sets new standards of quality and functionality.*



## Impressive energy savings in swimming pools

Clean water, pleasant air temperatures and ideal humidity at all times, despite constantly-changing environmental conditions: In pump and fan applications for swimming pools you need variable-speed drive systems that are able to respond with great flexibility, like the FR-F700

with its intelligent motor control functions. The greatest power savings are achieved when the pumps and fans are running under partial load - for example, if the motor can be operated at half speed it only consumes one eighth of the energy required for full speed operation!



## Significant cost reductions in spray-painting plants

The ventilation systems used in spray-painting plants often need very powerful motors. The intelligent motor control functions of the FR-F700 reduce the start-up currents and thus also the peak load power costs. These inverters

also significantly reduce power costs in low-load operation, and their ability to perform gentle flying starts for motors already rotating in duct drafts also increases the system's service life.



## Enormous flexibility in multiple-pump systems

Water utility companies must be able to respond quickly and flexibly to sudden increases in demand, for example in the early morning hours. With its multi-motor function a single FR-F700 can integrate up to 4 motors in a

single pump system. One motor at time is frequency-controlled by the FR-F700 while the others are successively connected to or disconnected from the mains power. That is effective motor management.

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