



for a greener tomorrow



FACTORY AUTOMATION

# FR-F800

Power-saving frequency inverters



- Ideal for pump, compressor and fan applications
- High starting torque maximum energy saving
- High savings potential to reduce TCO
- Built in Ethernet interface available at -E2 Version
- Enhanced control due to expanded PID functionality

# The ideal drive solution for pumps and fans



Pump applications, e.g. for building automation operate energy-saving with frequency inverters



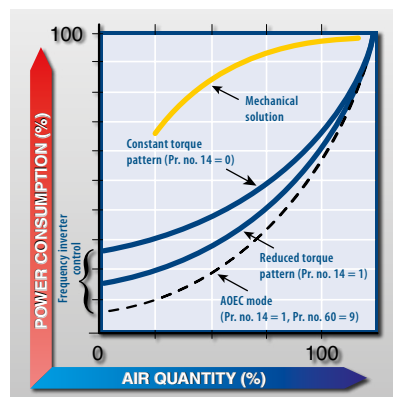
Fan applications benefit from frequency inverter use

## Reduce Energy Costs

It's a fact that industrial and commercial energy users are increasingly burdened by rising energy costs. However, there is a proven way to reduce these high electricity prices by utilising frequency inverter control for pump and fan applications. Thanks to the intelligent functions, like Advanced Optimum Excitation Control or the enhanced PID

controller, these energy consumption and thus energy costs can be reduced very significantly.

The advanced optimum excitation control (AOEC) continuously adjusts the excitation current to an optimum level providing highest motor efficiency. With a small load torque, a substantial energy saving can be achieved. The newly developed AOEC, provides a large starting torque while maintaining the motor efficiency throughout the speed range.



Utilizing the motor capability to the full

This is done without the troublesome adjustment of parameters (acceleration/ deceleration time, torque boost, etc.).

## Powerful features and intelligent functions

### Detection of mechanical faults

With the load characteristics measurement function, 5 speed-torque values of the load can be detected and stored automatically. By comparing the present speed/load status with the stores speed/load characteristics, out-of-range warnings can be accurately measured and quickly acted upon, meaning unnecessary alarms/line stops can be avoided.

Our advanced algorithm means mechanical faults such as pump blockage/dirty impeller or broken belt can be accurately detected.

### Autotuning of IM and PM motors

To ensure that the motor and drive package are perfectly matched to reach highest performance, the F800 features a variety of autotuning methods/algorithms.

### Cleaning of fans and pumps

Foreign matter on the impellers of fans or pumps can be removed by repeating forward/reverse rotation and stopping of the motor. This is avoiding expensive removal of the system.

This function can be also automatically started when the result of load characteristics measurement is out of range (overload).

### Smooth Restart

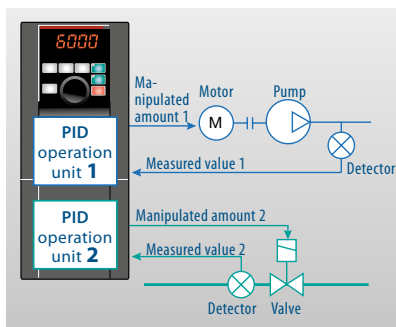
After an instantaneous power failure, the operation is restartable from the coasting motor speed automatically. With the advanced flying start function, the operation can be smoothly started from very low speed.

### Advanced PID control functions

The inverter can perform PID control of the motor operation and control the external equipment at the same time.

During PID control the drive will activate "sleep mode" to avoid energy loss, when deviation is small and output speed is low. As soon deviation becomes bigger again the drive will start up immediately.

- One drive can control multi pumps
- Second PID controller



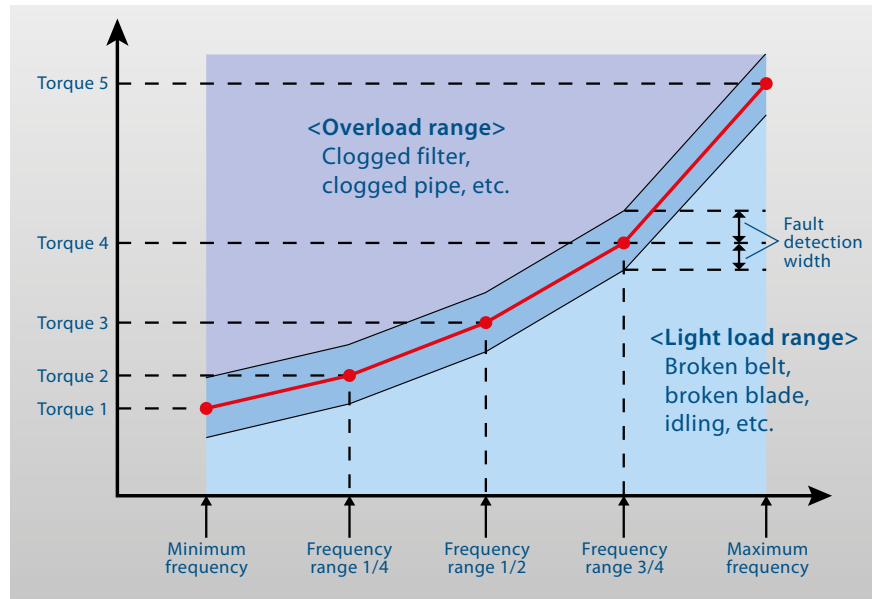
PID multiple loops (two loops)

- Direct access to PID setpoint by Display
- Pump Stir function
- PID output hold (incl. multi pump)
- PID upper/lower limit pre-warning
- Pipe burst detection/Dry run protection
- Digitally selectable PID set points
- Pipe soft fill to prevent water hammer
- PID pre-charge function
- Pre Sleep boost function
- Water Hammer avoidance at stop
- Automatic PID gain tuning

### Easy handling

#### Easy setup

Users can comfortably setup the drives with the Setup-Software FR Configurator2, by direct connection via USB port by or by using FR-F800-E2 version with built in Ethernet connection. Modbus® TCP/IP, BACnet and CC-Link IE Field Basic are supported as standard.



Load characteristics measurement function

### Easy operation

The operation panel with the one touch Digital Dial allows direct access to all important parameters. Select the operation panel ideal for your needs. Choose either a FR-LU08 operation panel with an LCD screen offering enhanced display functionality and a clock function, or a more economical FR-DU08 operation panel with a 5-digit, 12-segment display.



The operation panel allows the direct setting of the PID set point. The setting can be easily changed at hand.

#### Quick reaction to troubles

Clock setting is available in addition to the cumulative energization time. The time and date at a protective function activation are easily identified. The date and time are also saved with the trace data, which makes the fault analysis easier.

By using the real-time clock function with the optional FR-LU08 operation panel, the time is not reset even when the power supply is turned off.

#### Trace function

The F800 includes the ability to record or capture 8 of 72 device values.

This recording can be triggered automatically, meaning intermittent errors are easily investigated. These errors can be time stamped by the real time clock.

#### PLC Function

The integrated PLC function can be utilised to run e.g. stand alone compressor systems. This can be further enhanced by the Plug and Play connectable HMI.

### Future proof technology

#### Fully backward compatible

The FR-F800 is fully backwards compatible with the FR-F700 series. Parameters can be easily copied by the programming package FR Configurator2.

#### Highest quality guaranteed

Mitsubishi is well known for high reliability, because our Ethos is to use only the highest quality components in our products. This means we are able to provide 3 year warranty.

Specifications

TYPE	RATED CURRENT [A]		RATED MOTOR CAPACITY [kW]		WxHxD (mm)
	SLD <sup>①</sup>	LD <sup>①</sup>	SLD <sup>①</sup>	LD <sup>①</sup>	
<b>200 V CLASS</b>					
FR-F820-00046	4.6	4.2	0.75	0.75	110x260x110
FR-F820-00077	7.7	7	1.5	1.5	110x260x125
FR-F820-00105	10.5	9.6	2.2	2.2	150x260x140
FR-F820-00167	16.7	15.2	3.7	3.7	
FR-F820-00250	25	23	5.5	5.5	
FR-F820-00340	34	31	7.5	7.5	
FR-F820-00490	49	45	11	11	220x260x170
FR-F820-00630	63	58	15	15	220x300x190
FR-F820-00770	77	70.5	18.5	18.5	
FR-F820-00930	93	85	22	22	250x400x190
FR-F820-01250	125	114	30	30	
FR-F820-01540	154	140	37	37	325x550x195
FR-F820-01870	187	170	45	45	435x550x250
FR-F820-02330	233	212	55	55	
FR-F820-03160	316	288	75	75	465x700x250
FR-F820-03800	380	346	90/110	90	465x740x360
FR-F820-04750	475	432	132	110	

OPERATING CONDITIONS		SPECIFICATIONS	
Power supply		FR-F820: 3-phase, 200–240 V AC (-15 %, +10 %) at 50/60 Hz; FR-F840: 3-phase, 380–500 V AC (-15 %, +10 %) at 50/60 Hz FR-F842: 3-phase, 380–500 V AC (-15 %, +10 %) at 50/60 Hz	
Ambient temperature		-10 °C to +50 °C (non-freezing) (LD ratings); -10 °C to +40 °C (non-freezing) (SLD ratings)	
Ambient humidity		Compliance to IEC 60721-3-3 class 3C2, maximum 95 % RH (non-condensing)	
Altitude		Maximum 1000 m above sea level	
Protection rating		IP20 up to 22 kW, IP00 from 30 kW	
Vibration resistance		Max. 0.6 G	
Compliant standards		EN50598-2 Class IE2, the new European Eco Design standard, EN50598-2 Class IE3, the combined efficiency of VFD and IE3/IE4 motor, IEC60721-3-3 Class 3C2, Environmental Protection class as standard, EN ISO 13849-1 PLd / Cat.3 / EN 61508, EN61800-5-2 SIL2 for safety standards	

TYPE	RATED CURRENT [A]		RATED MOTOR CAPACITY [kW]		WxHxD (mm)
	SLD <sup>①</sup>	LD <sup>①</sup>	SLD <sup>①</sup>	LD <sup>①</sup>	
<b>400 V CLASS<sup>③</sup></b>					
FR-F840-00023	2.3	2.1	0.75	0.75	150x260x140
FR-F840-00038	3.8	3.5	1.5	1.5	
FR-F840-00052	5.2	4.8	2.2	2.2	
FR-F840-00083	8.3	7.6	3.7	3.7	
FR-F840-00126	12.6	11.5	5.5	5.5	220x260x170
FR-F840-00170	17	16	7.5	7.5	
FR-F840-00250	25	23	11	11	220x300x190
FR-F840-00310	31	29	15	15	
FR-F840-00380	38	35	18.5	18.5	250x400x190
FR-F840-00470	47	43	22	22	
FR-F840-00620	62	57	30	30	325x550x195
FR-F840-00770	77	70	37	37	
FR-F840-00930	93	85	45	45	435x550x250
FR-F840-01160	116	106	55	55	
FR-F840-01800	180	144	90	75	465x620x300
FR-F840-02160	216	180	110	90	
FR-F840-02600	260	216	132	110	465x740x360
FR-F840-03250	325	260	160	132	
FR-F840-03610	361	325	185	160	498x1010x380
FR-F840-04320	432	361	220	185	
FR-F840-04810	481	432	250	220	680x1010x380
FR-F840-05470	547	481	280	250	
FR-F840-06100	610	547	315	280	790x1330x440
FR-F840-06830	683	610	355	315	
FR-F842-07700 <sup>②</sup>	770	683	400	355	995x1580x440
FR-F842-08660 <sup>②</sup>	866	770	450	400	
FR-F842-09620 <sup>②</sup>	962	866	500	450	
FR-F842-10940	1094	962	560	500	
FR-F842-12120	1212	1094	630	560	

- ① SLD= Super light duty (110 % at 60 s, 120 % at 3 s); LD= Light duty (120 % at 60 s, 150 % at 3 s)
- ② The FR-F842 models must be operated in combination with a converter unit FR-CC2, which has to be ordered separately. For more details please refer to the inverter family catalogue.
- ③ The FR-F840-E2 version provides a built in Ethernet port, supporting Modbus<sup>®</sup> TCP, CC-Link IE Field Basic and BACnet TCP.

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