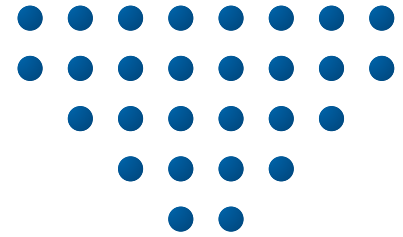
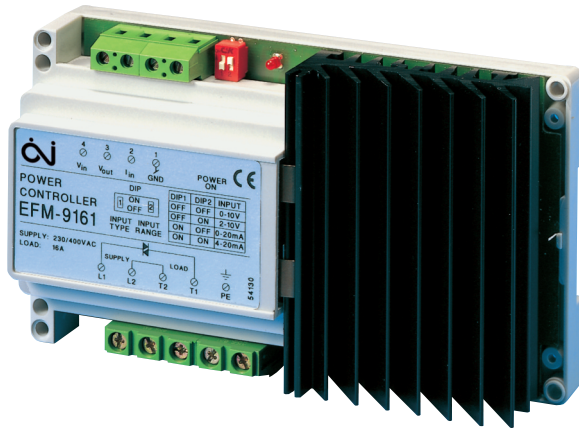


Controller

EFM

HVAC CONTROLS AND POWER

Single/Two Phase Power Controller

The EFM is a series of power controllers for controlling small heating cables, electric heater batteries and radiators.

The EFM is engineered to replace solid-state relays in a large range of applications, providing a more accurate and noiseless control.

The EFM has been successfully installed in many residential and commercial buildings. It is primarily used within the HVAC industry for the control of electrical batteries in air handling units ensuring the precise control of the heating. It can also be applied for ceilings, floors and radiant heating etc.

The EFM series has been developed to give our customers an advantageous combination of high quality, accurate control of any heat requirement and low life cycle costs.

EFM FUNCTIONS

Easy Installation

With the built-in signal converter, the wiring required to install the EFM has been reduced. All that is required is to connect the load and a 0-10 V DC signal from a temperature controller like the EFRP and ERZ controllers.

No Electrical Noise

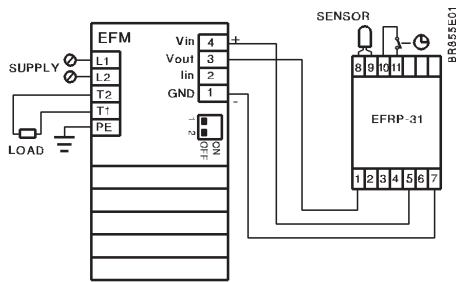
Due to the use of zero transition triggering, there is no electrical noise from the EFM. And as an additional advantage, the mains cables to the EFM can be dimensioned for the current supplied to the heating elements with a low installation factor.

No Excessive Temperatures

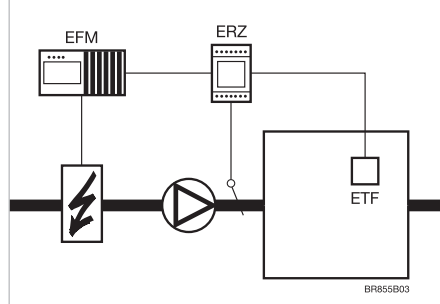
Due to the modulation on the output, which the triac of the EFM provides, it is now possible to avoid the excessive temperatures, which are unavoidable, when using solid-state relays.

Low Life Cycle Cost

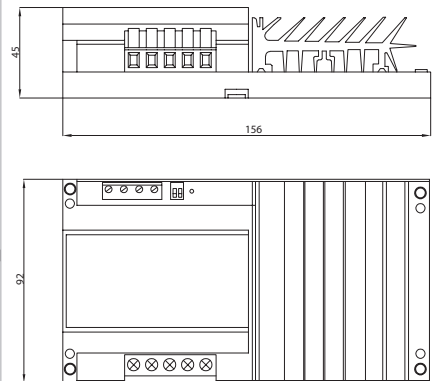
With the built-in thermal protection and the galvanic isolation between controls and power, the life expectancy of the EFM power controller is much longer than that of a traditional solid-state relay.



Wiring diagram



Application example



Dimensions

BR855803

EFM FUNCTIONS

Pulse Width Modulated Control

It is possible to control the EFM by ON/OFF signal, i.e. a PWM signal. The voltage should be in the range 24-400 V AC. For more information visit www.ojelectroncis.com.

Power-Doubling Relay

To decrease the installation cost, the EFM can be connected to the power-doubling relay ETT-1 for doubling the output of the controller. Simply connect 50% of the load to the relay and this load will be turned on, when there is a need for more than 50% heating.

A Complete Solution

With a matching range of temperature controllers and sensors, OJ Electronics can offer a complete solution for your single and two phased installations.

TECHNICAL DATA

SUPPLY VOLTAGE	VOLTAGE INPUT	CURRENT INPUT
1x230/400 V AC $\pm 10\%$ 50/60 Hz	0/2-10 V DC, 100 Ω	0/4-20 mA (< 3.3 V DC voltage loss)
THERMAL FUSE	COS PHI	HEAT OUTPUT
85 $^{\circ}$ C	0.98	EFM-9161 3.7 / 6.4 kW EFM-9251 5.7 / 10 kW
LOAD FORM	MINIMUM OUTPUT LOAD	INSULATION VOLTAGE
ohmic	500 W	2500 V RMS
SUPLY OUTPUT	PERIOD TIME	RECOMMENDED PREFUSE (TYPE G)
+14 V DC/15 mA	Approx. 45 secs.	EFM-9161 16 A EFM-9251 25 A
AMBIENT TEMPERATURE	POWER CONSUMPTION	HOUSING
-10/+40 $^{\circ}$ C	5 VA	IP20
DIMENSIONS (W X D X H)	WEIGHT	
156 x 45 x 92 mm	530 g	

CE MARKING

The EFM meets the requirements of the below standards.

EMC DIRECTIVE	LOW VOLTAGE DIRECTIVE
EN 50081-2 EN 50082-2	EN 60730-1

MOUNTING

Mounting of the Controller

The EFM range is mounted on a DIN-rail inside an enclosure with a suitable enclosure rating.

Mounting of the Control Cable

The control cable from the external controller can be up to 50 m. The control signal cables must not be placed in parallel with any mains carrying cables, as voltage signals may occur which could interrupt the function of the controller.

It is not always necessary to use a screened cable to the controller, however the immunity of the controller to noise will be improved. The screen is connected with a bracket to the back plate of a metal enclosure or to the PE-terminal. The enclosure must be grounded to a ground potential equal to that of the controller.

APPLICATION EXAMPLES

For application examples visit www.oj.dk and learn more about our complete range of power and step controllers.

PRODUCT PROGRAM

TYPE	PRODUCT
EFM-9161	Power controller 16 A, 230 V / 3.7 kW, 400 V / 6.4 kW
EFM-9251	Power controller 25 A, 230 V / 5.7 kW, 400 V / 10 kW

CONTROL EQUIPMENT & ACCESSORIES

ERZ	Temperature controller for Din rail with limit sensor
EFRP-31	Temperature controller for DIN-rail
EFRP-91	Temperature controller for wall mounting
EFRP-900	Manual setting potentiometer for wall mounting (0-100 %)
ETT-1	Power doubling relay
ETT-6	Step controller with 6 steps