Relay for Energy Flow EFR3000

Optimization of consumption of own energy
Zero Export Device, measuring transducer for power

EFR3000

Part number: **S225760**

Relays for energy flow EFR3000 monitor the current flow between public power grid and generating plant / consumer.
When the own power plant generates more power than actually is consumed it often is more economical to consume the excess energy self. This is especially reasonable when the difference is high between the price you pay to the grid provider and the price the provider pays for fed in energy.

Functions:
- Shift own consumption into times with high generation of energy
- Switch on consumers when you have overflow of energy
- Increase the share of consumed own energy
- intelligent control of consumers

The EFR measures the energy flow in all 3 phases and calculates the mean value.
Is sufficient own power left, the EFR3000 switches on up to three consumers and ensures that the power is consumed in the house. Potential consumers are e.g. air conditioners, boilers or battery chargers but also washing machines, dryers, etc ... .

This is relatively simple if a PV system feeds uniformly under a clear sky and consumers with constant power consumption, such as heat pumps or heating elements, are connected. Particularly suitable are consumers that consume a lot of energy and can be switched frequently, for example boilers.

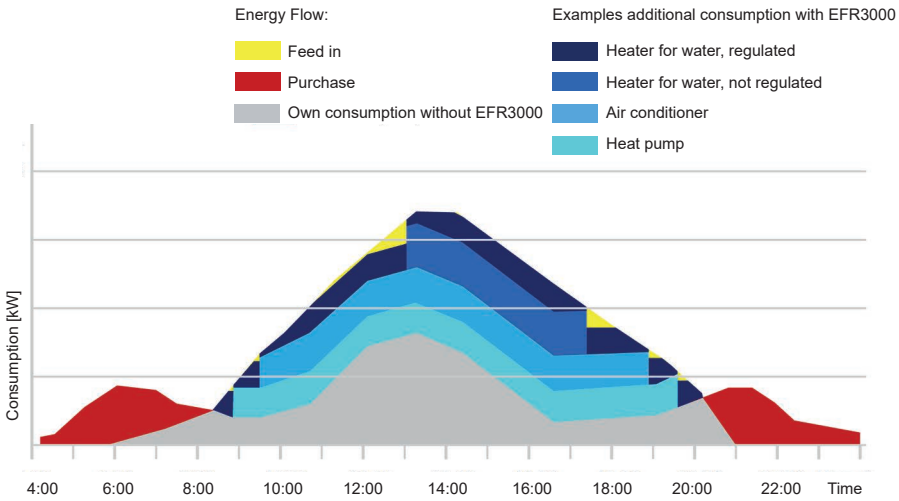
It becomes more complicated when the generation varies because of clouds before the sun and consumers do not continuously draw current as washers, dryers, irons or stoves.

The analog output can regulate a consumer stepless and thus achieve a yet higher rate of own consumption. When using phase angle controls the specifications of the grid providers have to be obeyed.

Energy flow is always evaluated and displayed, as seen from a power meter for purchasing energy: purchase from public grid is positive, fed in energy reduces the bill and is therefore negative (- sign).

The EFR3000 can optimize the consumption of own energy even under difficult conditions.

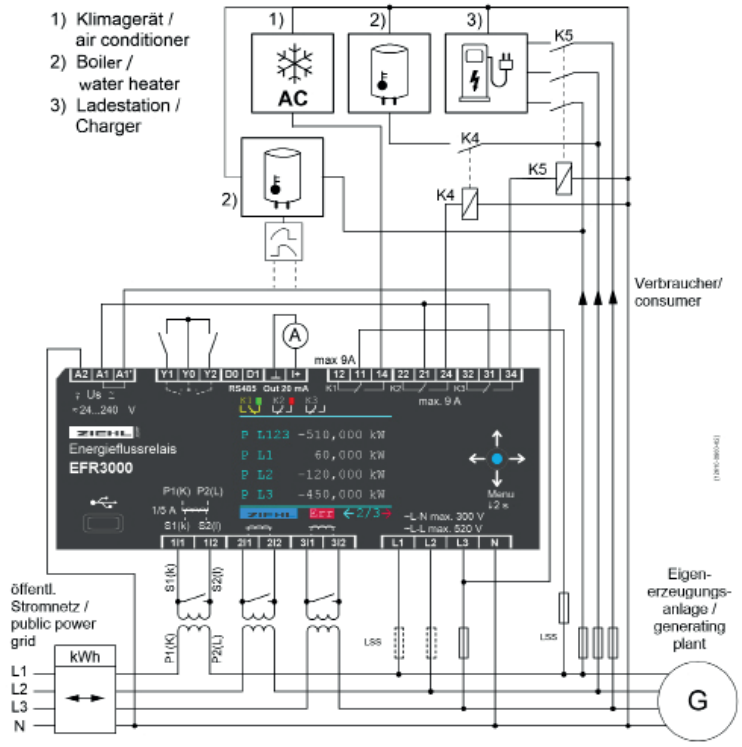
To achieve this the following parameters can be set
- Switching of up to 3 consumers: the largest consumer, ranked 1-2-3 or combination of 3 consumers (7 levels)
- Power consumption of the connected consumers
- Switch on points. At which energy flow consumers are switched on
- Switch on delay of consumers. Short lowering in consumption (by clocking consumers) or peaks in the feed does not immediately cause turn on of additional consumer
- Minimum on time. Heat pumps may not be switched on and off permanently, washing machines should be able to complete a cycle.
- Switch off delay. Short consumption peaks or reduction of the generated energy does not immediately switch off a load.
- Switch off point. At which energy flow consumers are switched off again. In practice, this value is usually slightly on the purchase side.
- Inputs for blinding out consumers when these are not available, for example when boiler has reached maximum temperature.



Cheap equipment costs ensure a short payback period:
Save € 312 * a year with the EFR3000 by switching on
- **at 200 days a year**
- **for an average 3 hours**
- **consumers with 4 kW**

in times you have a surplus of own energy.

Equipment costs (EFR 3000, 3x current transformer, if necessary contactors) are returned within less than 2 years*.
Longer / shorter switch on times and larger / smaller consumption shorten / extend the period. In addition, in the long term rising purchase prices for energy can be expected.
* Feed 12 Ct / kWh, electricity purchase price 25 Ct / kWh



Features:

- Measuring of active power
- Measuring inputs isolated from electronics
- Colored LCD display
- Intuitive handling with joystick
- 3 inputs for customary current transformers with secondary 1 or 5 A. Ratio programmable
- 3 relay outputs, 2 kW directly, higher loads with contactors
- 2 digital inputs Y1/Y2 for control signals
- Analog output for stepless regulation of a consumer
- Measuring transducer with analog output 0/4-20 mA for power L1, L2, L3 or L1+L2+L3. Measuring range can be scaled
- Micro-USB port for configuration and update
- Interface RS 485 (Modbus RTU)
- Housing 140 mm wide
- Zero Export Device. Switch off within <500 ms at inadmissible feed in that is contrary to contract

Part numbers:

S225760	**EFR3000**

Suitable current transformer (split core):

S225770	**KBR 18S**, 60/1A, Klasse 3 0,4 VA

Suitable mini current transformer:

S225780	**CTM7**, 64/1A, Klasse 1 0,5 VA

Technical Data

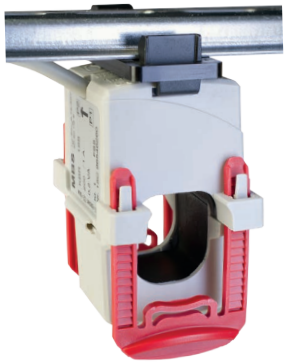
Rated supply voltage	DC/AC 24 – 240 V 0/50/60 Hz, <3 W, <9 VA DC 20,4 - 297 V AC 20 - 264 V
Relay outputs K1, K2, K3	3 x 1 change-over contact
Switching voltage	max. AC 300 V, DC 300 V
Conventionel thermal current Ith	max. 9 A
Switching power max cos φ=1	2000 VA
Contact service life, electr. cos φ=1	10^5 operations at 300 V / 9 A
Rated operational current	AC-15 Ie = 6 A Ue = 250 V
Measurement of voltage (RMS)	L1 / L2 / L3 towards N
Voltage phase-N	AC 35,0 … 330,0 V, 50/60 Hz
Max. error of measurement	± 0,5% of fullscale, ±1 digit
Measurement of current	Primary current max. 1.000 A
Nominal currents / resolution	AC 1/5 A / 1 mA
Max. error of measurement	± 0,5% of fullscale ±1 digit
Overload capacity	8 A continously, 25 A max. 1 s
Resistance of input	25 mΩ
Measurement of active power	± 1.000 kW, resolution 1 W
Max. error of measurement	± 1 % of fullscale ±1 digit
Analog output (GND (⊥), I+)	DC 0/4 – 20 mA for active power ± 1.000 kW, scaleable
Max. error	± 0,3 % of fullscale + error of measurement active power
Temperature factor	< 0,015 % / K
Load	≤ 500 Ω
Test conditions	see "general technical information"
Operating temperature	-20 °C ... +55 °C
Dimensions (B x H x T)	140 x 90 x 58 mm, mounting height 55 mm
Protection housing/terminals	IP 30 / IP20
Attachment	on 35 mm DIN rail or with screws M4
Weight	app. 300 g

Current transformers for Relay for Energy Flow EFR3000 and EFR4000IP

Split core current transformer KBR18S, 60/1 A, class 3, 0,4 VA

Compact current transformer CTM7, 64/1 A, class 1, 0,5 VA

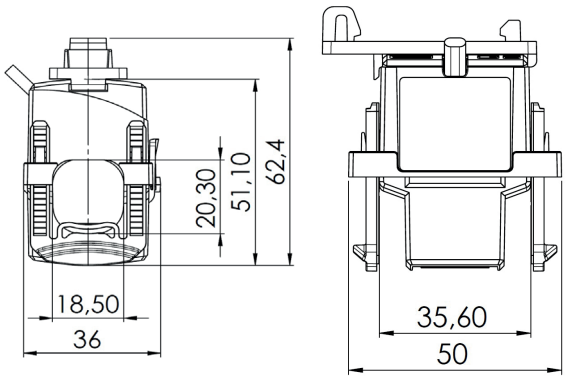
KBR18S



Part number: **S225770**

The split core current transformer KBR18S is especially suitable for being subsequently mounted in existing facilities. With its primary 60 A it matches perfectly the 63 A with which domestic connections are usually fused.
The secondary 1 A are connected to EFR. The inputs of the EFR are preset for this value.
A clip for mounting on DIN-rail is included.

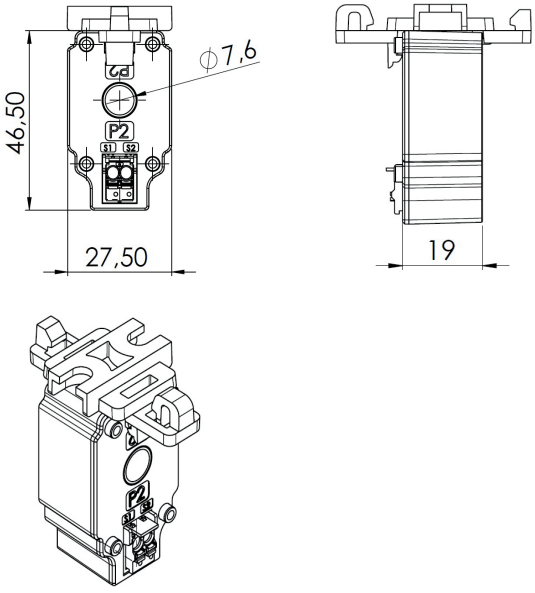
For EFR three current transformers are required.



CTM7

Part number: **S225780**

The compact current transformer is especially suitable for use in tight space conditions. With its primary 64 A it matches perfectly the 63 A with which domestic connections are usually fused.
The secondary 1 A are connected to EFR. The inputs of the EFR are preset for primary currents 60 A, changing is simple.
A clip for mounting on DIN-rail is included. The transformers can be clicked together for saving space.
For EFR three current transformers are required.



Technical Data

	KBR18S	CTM7
Applied standards	EN 61869-1, EN 61869-2 und IEC 61010-1	EN 61869-1, EN 61869-2 und IEC 61010-1
Primary nominal current	60 A	64 A
Secondary nominal current	1 A	1 A
Accuracy class	3	1
Rated power	0,4 VA	0,5 VA
Operating temperature	-5...+40 °C	-5...+50 °C
Dimensions (w x h x d)	36,0 x 50 x 51,1 mm	27,5 x 19 x 46,5 mm
Diameter of cable	max. 18,5 mm (isolated wire only)	max. 7,5 mm (isolated wire only)
Connection	cable 2,5 m 0,5 mm^2	Terminals 0,2...1,5 mm
Attachment	on 35 mm DIN rail or with screws	on 35 mm DIN rail or with screws
Weight	ca. 180 g	ca. 47 g