domestic and industrial automation

«F&F»®

Products catalogue 2019

F&F Filipowski sp. j.
Konstantynowska 79/81
95-200 Pabianice
POLAND

The F&F company was established in 1992 based on a commercial and service company active in the electronic sector. The previous marketing and technical experience (mainly in terms of electronics and electrical engineering) enabled its owners to established a manufacturing company offers a wide range of electronic appliances for both domestic and industrial applications.

Today, cooperation between the company's research and development department and the scientific community as well as customers leads to a dynamic development of the offer and allows to create solutions with an increasingly advanced level of technology, as exemplified by F&Home intelligent home systems and telemetry systems.

Nowadays, the F&F brand has been widely known in Poland. The company delivers its products to customers in Russia, Ukraine, Belarus, Lithuania, Latvia, Slovakia, Romania, Czech Republic, Hungary, Germany, Portugal, Spain, France, Ireland, Sweden, Norway, Finland, Chile and the United States.

Our motto is to create innovative solutions for our partners.

F&F Board of Directors

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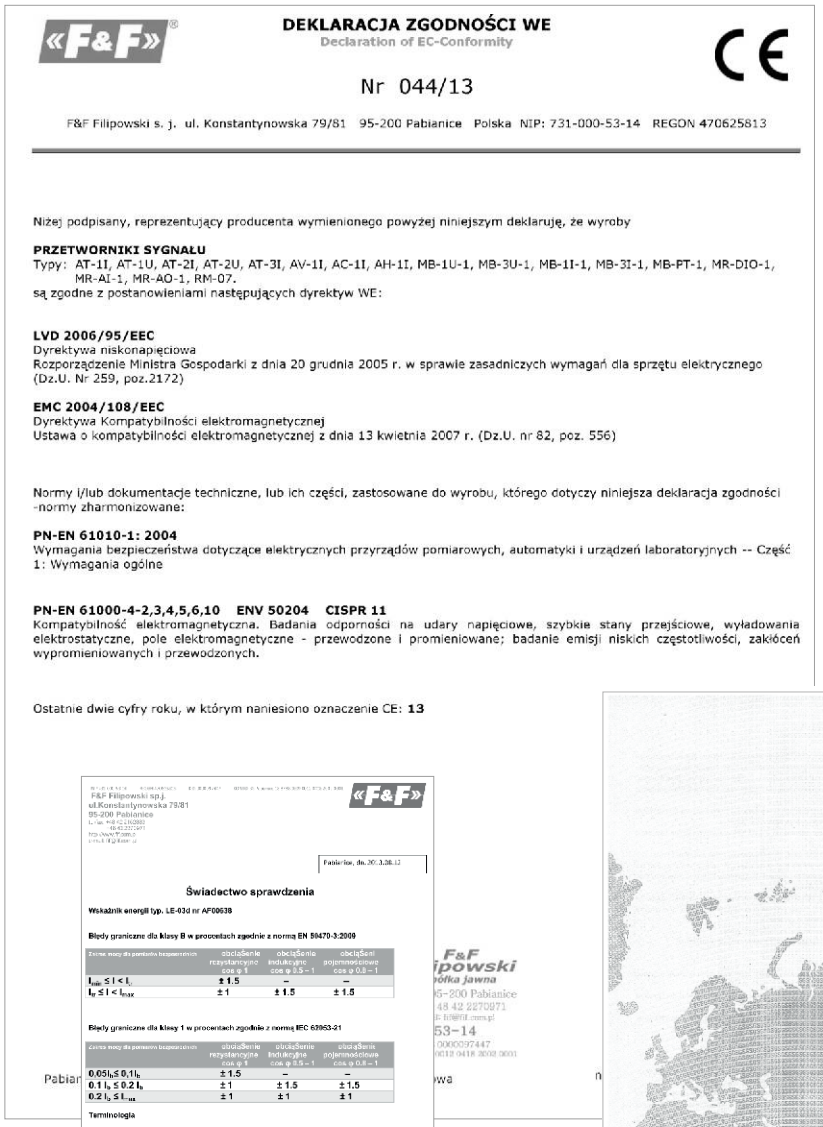


DEKLARACJA ZGODNOŚCI WE
Declaration of EC-Conformity

Nr 044/13

F&F Filipowski s. j. ul. Konstantynowska 79/81 95-200 Pabianice Polska NIP: 731-000-53-14 REGON 470625813

Niżej podpisany, reprezentujący producenta wymienionego powyżej niniejszym deklaruję, że wyroby

PRZETWORNIKI SYGNAŁU
Typy: AT-1I, AT-1U, AT-2I, AT-2U, AT-3I, AV-1I, AC-1I, AH-1I, MB-1U-1, MB-3U-1, MB-1I-1, MB-3I-1, MB-PT-1, MR-DIO-1, MR-AI-1, MR-AO-1, RM-07.
są zgodne z postanowieniami następujących dyrektyw WE:

LVD 2006/95/EEC
Dyrektywa niskonapięciowa
Rozporządzenie Ministra Gospodarki z dnia 20 grudnia 2005 r. w sprawie zasadniczych wymagań dla sprzętu elektrycznego (Dz.U. Nr 259, poz.2172)

EMC 2004/108/EEC
Dyrektywa Kompatybilności elektromagnetycznej
Ustawa o kompatybilności elektromagnetycznej z dnia 13 kwietnia 2007 r. (Dz.U. nr 82, poz. 556)

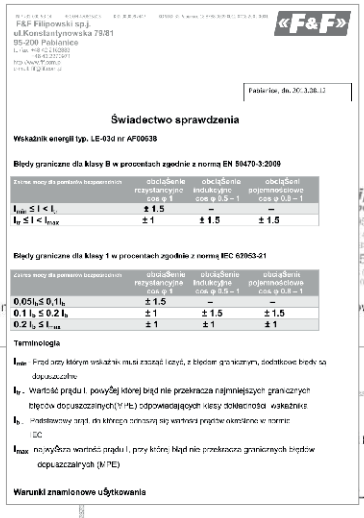
Normy i/lub dokumentacje techniczne, lub ich części, zastosowane do wyrobu, którego dotyczy niniejsza deklaracja zgodności -normy zharmonizowane:

PN-EN 61010-1: 2004
Wymagania bezpieczeństwa dotyczące elektrycznych przyrządów pomiarowych, automatyki i urządzeń laboratoryjnych -- Część 1: Wymagania ogólne

PN-EN 61000-4-2,3,4,5,6,10 ENV 50204 CISPR 11
Kompatybilność elektromagnetyczna. Badania odporności na udary napięciowe, szybkie stany przejściowe, wyładowania elektrostatyczne, pole elektromagnetyczne - przewodzone i promieniowane; badanie emisji niskich częstotliwości, zakłóceń wypromieniowanych i przewodzonych.

Ostatnie dwie cyfry roku, w którym naniesiono oznaczenie CE: **13**

All concerned parties may receive the copies of conformity certificates CE and others concerning our products via mail or fax. Printable versions of these documents may also be found in our internet site: www.fif.com.pl



Świadectwo sprawdzenia

Wskaźnik energii typ. LE-03 nr AF00638

Błędy graniczne dla klasy B w procentach zgodnie z normą EN 50470-3:2000

Zakres mocy dla pomiaru bezpośredniego	obciążenie rezystancyjne cos φ 1	obciążenie indukcyjne cos φ 0,5 – 1	obciążenie pojemnościowe cos φ 0,8 – 1
$I_{min} \le I < I_t$	± 1.5	–	–
$I_t \le I < I_{max}$	± 1	± 1.5	± 1.5

Błędy graniczne dla klasy 1 w procentach zgodnie z normą IEC 62053-21

Zakres mocy dla pomiaru bezpośredniego	obciążenie rezystancyjne cos φ 1	obciążenie indukcyjne cos φ 0,5 – 1	obciążenie pojemnościowe cos φ 0,8 – 1
$0.05I_b \le 0,1I_b$	± 1.5	–	–
$0.1\ I_b \le 0.2\ I_b$	± 1	± 1.5	± 1.5
$0.2\ I_b \le I_{max}$	± 1	± 1	± 1

Terminologia

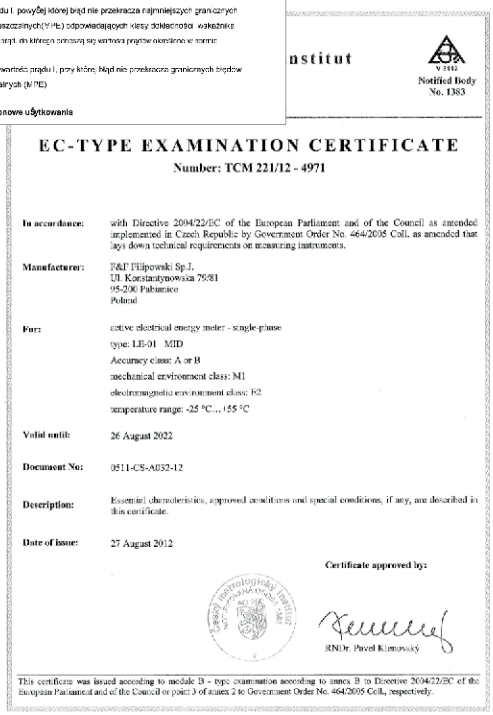
I_{min} - Prąd przy którym wskaźnik musi zacząć liczyć, z błędem granicznym, podanym przez producenta

I_t - Wartość prądu I, powyżej której błąd nie przekracza najmniejszych granicznych błędów dopuszczalnych (MPE) odpowiadających klasy dokładności wskaźnika

I_b - Podstawowy prąd, do którego odnoszą się wartości pozostałe określone w normie IEC

I_{max} - największa wartość prądu I, przy której błąd nie przekracza granicznych błędów dopuszczalnych (MPE)

Warunki znamionowe użytkowania



EC-TYPE EXAMINATION CERTIFICATE
Number: TCM 221/12 - 4971

In accordance: with Directive 2004/22/EC of the European Parliament and of the Council as amended implemented in Czech Republic by Government Order No. 464/2005 Coll. as amended that lays down technical requirements on measuring instruments.

Manufacturer: F&F Filipowski Sp.J.
Ul. Konstantynowska 79/81
95-200 Pabianice
Poland

For: active electrical energy meter - single-phase
type: LE-01 MID
Accuracy class: A or B
mechanical environment class: M1
electromagnetic environment class: E2
temperature range: -25 °C…+55 °C

Valid until: 26 August 2022

Document No: 0511-CS-A032-12

Description: Essential characteristics, approved conditions and special conditions, if any, are described in this certificate.

Date of issue: 27 August 2012

Certificate approved by:

RNDr. Pavel Klenovský

This certificate was issued according to module B - type examination according to annex B to Directive 2004/22/EC of the European Parliament and of the Council or point 3 of annex 2 to Government Order No. 464/2005 Coll., respectively.

EC Type Examination Certificate Number: **0120/ SGS0119**

F&F Filipowski sp.j.
ul. Konstantynowska 79/81
pabalince
Poland
95-200

Instrument Identification:
LE-03 MID
Poly Phase, Active Import/Export, Electricity Meter

Instrument Traceable Number
0120/ SGS0119
has been assessed and certified as meeting the requirements of

EC Directive 2004/22/EC
on Measuring Instruments Annex B

It is certified that the manufacturer's technical design and specimen for the above instrument has been examined and, based on the evidence submitted, it is considered that the instrument conforms to the requirements of MI-003 of EC Directive 2004/22/EC

This certificate must be used in conjunction with a certificate covering the product verification as required in Annex D or Annex F.

This certificate is valid from 27th November 2012 until 26th November 2022
Issue 1

Certification is based on report number(s)
SHES1207001819MI issued 27th November 2012

Authorised Signature

Jan Saunders

SGS United Kingdom Limited, Notified Body 0120
Unit 202B Worle Parkway, Weston-super-Mare, BS22 6WA,UK
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EC Type Examination Cert
SGSPAPER
11999733

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ELECTRICITY CONSUMPTION METERS

LE-03MW 3-phase, 2-way, tariff

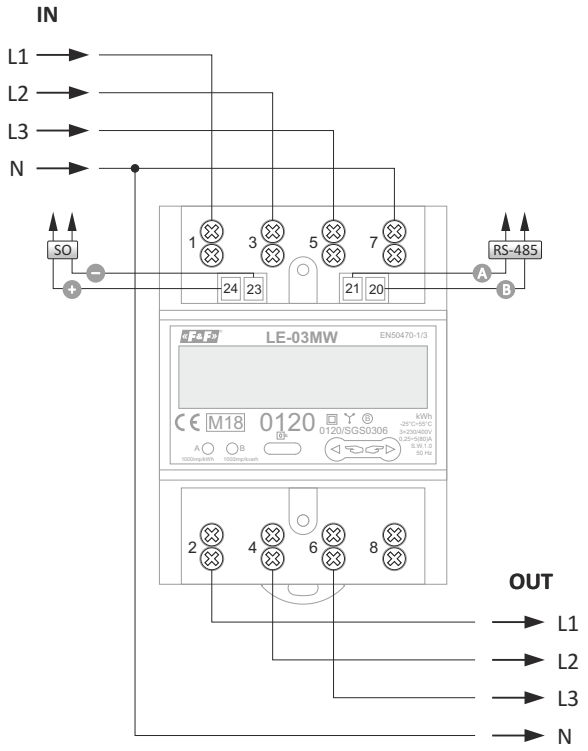
PURPOSE

LE-03MW is an electronic, compliant with the MID Directive, 2-way electricity meter for three-phase electricity, designed for measurement in a direct system. The built-in real time clock allows energy consumption to be measured with different tariff zones.
The device is equipped with communication interfaces: RS-485 with Modbus RTU protocol and optical port compliant with EN62056 (IEC1107) standard for remote reading and configuration of the meter.

FUNCTIONS

* 3-phase, 2-way energy meter;
* direct measurement up to 80 A;
* energy measurement in 4 tariff zones;
* built-in real time clock with battery backup to switch tariff zones;
* registration of total and divided into consumption tariffs:
  – total active and reactive energy;
  – active and reactive energy divided into individual quadrants;
* 8 time schedules dividing the day into tariff zones;
* it can settle energy according to schedules specific for business days and weekends;
* it can divide year into 8 time intervals; in each interval the energy (for weekdays) can be settled according to a different schedule;
* indication of network parameters (voltages, currents, active power, reactive power, apparent power, power factor, frequency);
* calculation of power demand for individual tariffs;
* an additional, resettable energy consumption meter;
* compliance with MID;
* RS-485 port, Modbus RTU protocol;
* optical communication port compliant with EN62056 (IEC1107) standard;
* 2 SO pulse outputs with a programmable number of pulses per kWh / kvarh;
* multifunction LCD display.

reference voltage	3×230/400 V+N
minimum current	0.25 A
base current	5 A
maximum current	80 A
minimum detection current	0.04 A
voltage measuring range	
L-N	100÷289 V AC
L-L	173÷500 V AC
measurement accuracy	B class
rated frequency	50 Hz
instalation	3-phase, 4-wire
overloading	30×Imax/10 ms
insulation	4 kV/1 min.; 6 kV/1 µs
own meter consumption	<10VA; <2W
indication range of the meter	8 digits
read-out signalling	2×LED
puls outputs	
number of outputs	2
outputs type	OC (open collector)
maximum voltage	30 V DC
maximum current	27 mA
pulse constant OUT 1	1; 10; 100; 1000 pulse/kWh
pulse constant OUT 2	1000 pulse/kvar
communication	
port	RS-485
communication protocol	Modbus RTU
transmission speed	1200, 2400, 4800, 9600 bps
parity	EVEN
parity bits	2
optical port	according with EN62056 (IEC1107)
working temperature	-25÷55°C
terminal	25 mm² screw terminals
dimensions	4,5 modules (76 mm)
mounting	on TH-35 rail
protection level	IP51



LE-03MW CT 3-phase, 2-way, tariff, to half indirect measurement

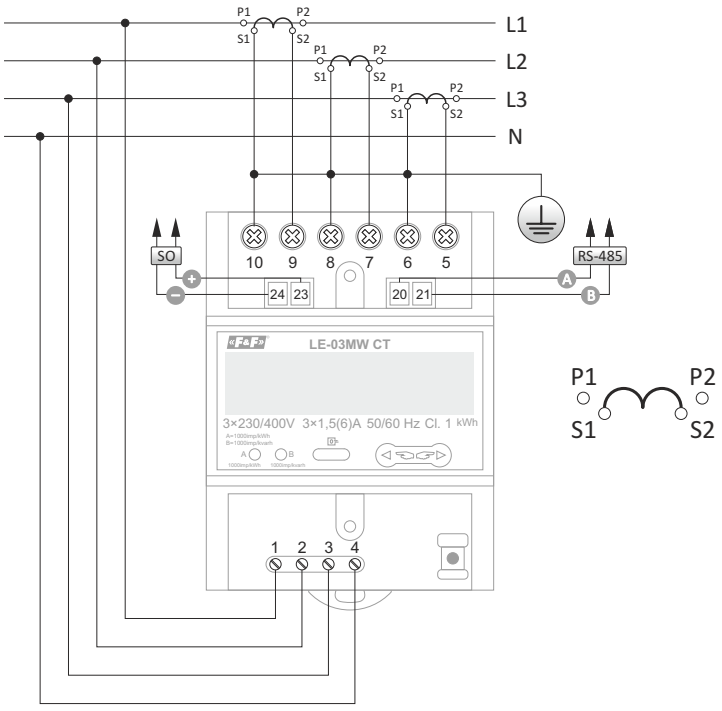
PURPOSE

LE-03MW CT is an electronic, 2-way electricity meter for three-phase electricity, designed for measurement in a half indirect measurement.
The built-in real time clock allows energy consumption to be measured with different tariff zones.
The device is equipped with communication interfaces: RS-485 with Modbus RTU protocol and optical port compliant with EN62056 (IEC1107) standard for remote reading and configuration of the meter.

FUNCTIONS

* 3-phase, 2-way energy meter;
* half indirect measurement (direct measurement up to 5 A);
* energy measurement in 4 tariff zones;
* built-in real time clock with battery backup to switch tariff zones;
* registration of total and divided into consumption tariffs:
  – total active and reactive energy;
  – active and reactive energy divided into individual quadrants;
* 8 time schedules dividing the day into tariff zones;
* it can settle energy according to schedules specific for business days and weekends;
* it can divide year into 8 time intervals; in each interval the energy (for weekdays) can be settled according to a different schedule;
* indication of network parameters (voltages, currents, active power, reactive power, apparent power, power factor, frequency);
* calculation of power demand for individual tariffs;
* additional, resettable energy meter;
* RS-485 port, Modbus RTU protocol;
* optical communication port compliant with EN62056 (IEC1107) standard;
* 2× SO pulse outputs with a programmable number of pulses per kWh/kvarh;
* multifunction LCD display.

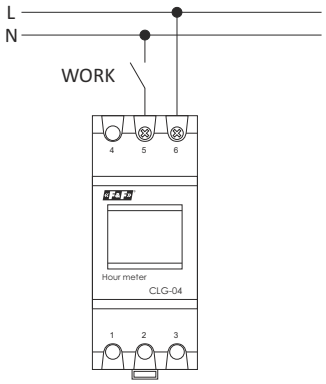
reference voltage	3×230/400 V+N
minimum current	0.25 A
base current	1.5 A
transformer settings	5/5, 40/5, 50/5, 60/5, 75/5, 100/5, 125/5, 150/5, 200/5, 300/5, 400/5, 500/5, 600/5, 800/5, 1000/5, 1250/5, 1500/5, 2000/5, 3000/5, 4000/5, 5000/5, 6000/5, 7500/5
maximum current	6 A
minimum detection current	0.003 A
voltage measuring range	
L-N	100÷289 V AC
L-L	173÷500 V AC
measurement accuracy	B class
rated frequency	50 Hz
instalation	3-phase, 4-wire
overloading	30×Imax/10 ms
insulation	4 kV/1 min.; 6 kV/1 µs
own meter consumption	<10VA; <2W
indication range of the meter	8 digits
read-out signalling	2×LED
puls outputs	
number of outputs	2
outputs type	OC (open collector)
maximum voltage	30 V DC
maximum current	27 mA
pulse constant OUT 1	1; 10; 100; 1000 pulse/kWh
pulse constant OUT 2	1000 pulse/kvar
communication	
port	RS-485
communication protocol	Modbus RTU
transmission speed	1200, 2400, 4800, 9600 bps
parity	EVEN
parity bits	2
optical port	according with EN62056 (IEC1107)
working temperature	-25÷55°C
terminal	25 mm² screw terminals
dimensions	4.5 modules (76 mm)
mounting	on TH-35 rail
protection level	IP51



CLG-04 operating time meter

PURPOSE

The CLG-04 counter is a one-way electric meter with electronic counter that allows you to count working hours in the range from 0 to 999999.99 (6 hourly digits + 2 minute digits after the decimal point). Designed for mounting on a DIN rail. No RESET function resetting meter.

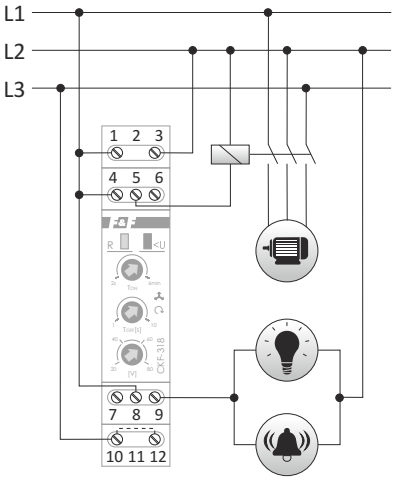


power supply	internal battery (CR14335 – soldered)
battery life	approx. 5 years (depends on the operating conditions)
counting input voltage	100÷240 V AC/DC
display	6+2 characters (backlit during time counting)
accuracy of indications	1 min.
working temperature	-10÷40°C
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
mounting	on TH-35 rail
dimensions	2 modules (36 mm)
protection level	IP20

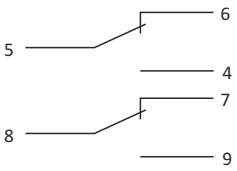
CKF-318 phase loss sensor with lower (<320 V) and upper (>480 V) voltage actuation threshold

PURPOSE

The CKF-318 phase loss and phase sequence sensor without neutral wire is designed to protect electric motor powered from the three-phase network in following cases:
– voltage loss in at least one phase;
– voltage drop in at least one phase below 320 V;
– voltage increase in at least one phase above 480 V;
– voltage asymmetry between phases above the set value;
– incorrect phase sequence.



power supply	3×400 V
contact	separated 2×NO/NC
maximum load current (AC-1)	2×6 A
power control	2×LED
minimum phase voltage	320 V
maximum phase voltage	480 V
effective voltage unbalance	20÷80 V
voltage hysteresis	5 V
switching off delay	1÷10 s
return delay	1÷60 s
power consumption	1.6 W
terminal	
wire	2.5 mm² screw terminals
cable	2.5 mm² screw terminals
tightening torque	0.4 Nm
working temperature	-25÷40°C
dimensions	1 module (18 mm)
mounting	on TH-35 rail
protection level	IP20



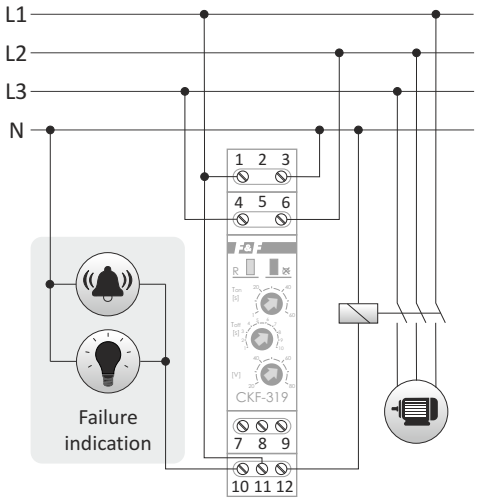
NOTE

Motor will be turnd off also in case of symmetrical drop of interphase voltages in all three phases below 320 V or rise of the voltage above 480 V on any phase.

CKF-319 with adjustable start and return time

PURPOSE

Phase loss and phase sequence sensor is designed to protect electric motor powered from the three-phase network in following cases:
* voltage loss in at least one phase;
* voltage drop in at least one phase below 150 V;
* voltage increase in at least one phase above 280 V;
* voltage asymmetry between phases above the set value;
* incorrect phase sequence

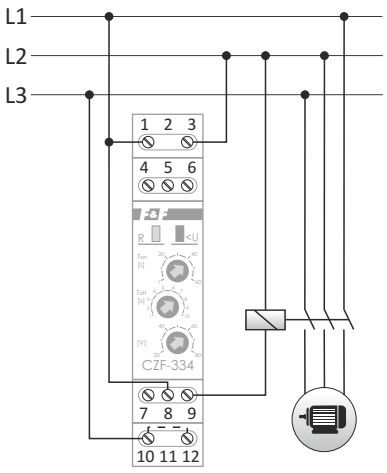


power supply	3×400 V+N
contact	separated 2×NO/NC
maximum load current (AC-1)	2×8 A
power control	2×LED
minimum phase voltage	150 V
maximum phase voltage	280 V
effective voltage unbalance	20÷80 V
return hysteresis	5 V
switching off delay	1÷10 s
return delay	1÷60 s
power consumption	1,6 W
working temperature	-25÷40°C
terminal	
wire	2.5 mm² screw terminals
cable	2.5 mm² screw terminals
tightening torque	0.4 Nm
dimensions	1 module (18 mm)
mounting	on TH-35 rail
protection level	IP20

CZF-334 with 2 separated contacts (2×NO/NC)

PURPOSE

The CZF-334 phase loss sensor without neutral wire is designed to protect electric motor powered from the three-phase network in following cases:
* voltage loss in at least one phase;
* voltage drop in at least one phase below 320 V;
* voltage increase in at least one phase above 480 V;
* voltage asymmetry between phases above the set value.

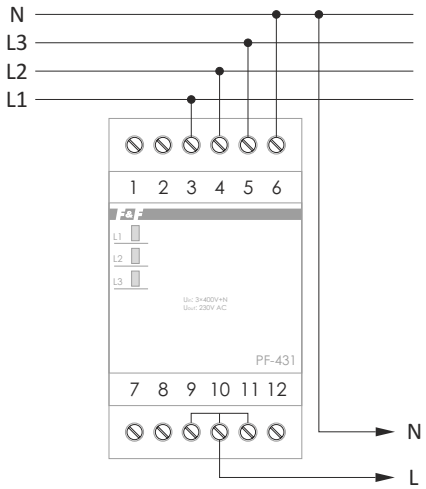


power supply	3×400 V
contact	separated 2×NO/NC
maximum load current (AC-1)	2×6 A
power control	2×LED
minimum phase voltage	320 V
maximum phase voltage	480 V
effective voltage unbalance	20÷80 V
voltage hysteresis	5 V
switching OFF delay	1÷10 s
return delay	1÷60 s
power consumption	1,6 W
terminal	
wire	2.5 mm² screw terminals
cord	2.5 mm² screw terminals
tightening torque	0,4 Nm
working temperature	-25÷40°C
dimensions	1 module (18 mm)
mounting	on TH-35 rail
protection level	IP20

PF-431/PF-431i automatic phase switch with priority phase

FUNCTIONING

A three-phase voltage (3×230V+N) is applied to the input of the switch. The switch output is supplied with single-phase voltage (230 V AC), i.e. phase voltage of one of the phases. The electronic circuit of the switch controls the values of the voltages of the applied phases so that the output voltage is not less than 195 V. The phase with the correct parameters is directed to the switch output. The L1 phase is a priority phase, i.e. if its parameters are correct, then this phase will always be switched on to the output. In case of voltage drop in phase L1 below 190 V or its loss, the electronic system will switch phase L2 to the output (if its parameters are correct). In case of simultaneous lack of correct voltages in phases L1 and L2, the L3 phase will be applied to the output. In case of return of the correct supply voltage in phase L1 (above 195 V), the system will switch on this phase to the output.



input voltage	3×230V+N
output voltage	230V AC
maximum load current (AC-1)*	
PF-431	16A
PF-431i	16A (160A/20ms)
activation threshold (L1,L2)	<195V
activation threshold (L3)	<190V
hysteresis	5V
voltage measurement error	±1%
switching time	0,3s
indication of input voltages	3×LED
working temperature	-25÷50°C
terminal	4.0 mm² screw terminals
tightening torque	0,5Nm
dimensions	3 modules (52,5mm)
mounting	on TH-35 rail
protection level	IP20

* The actual permissible load depends on the nature of the receivers. In the case of powering large appliances, heating or a large number of, for example, LED lamps, it is recommended to use the PF-441 switch with additional contactors.

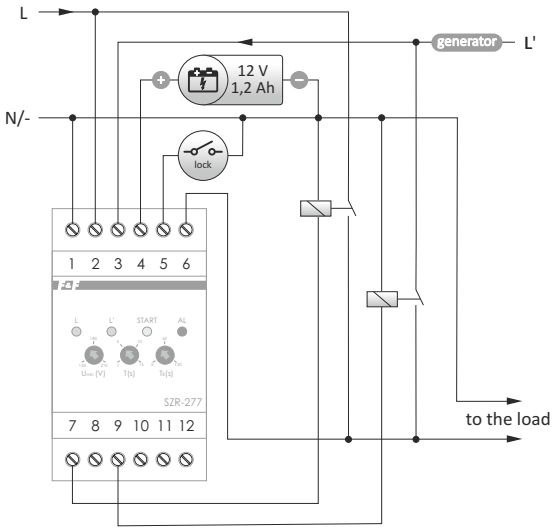
NOTE!

The "i" version of the device is equipped with a contact adapted to work with receivers with a large starting current, such as: LED lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.

SZR-277 single-phase backup switching controller

PURPOSE

The SZR-277 single-phase controller of backup switching is used to control the voltage of the single-phase power supply network and to switch the receiving line to the power supply from the generator in case of incorrect parameters of the main power supply line.



rated supply voltage	
main line and generator (1-3 terminals)	230 V/50 Hz
battery (1-4 terminals)	10÷12 V DC*
maximum permissible voltage (1-2, 1-3 terminals)	400 V AC
maximum switching current of internal contacts	
AC-1	16 A /250 V AC
AC-15	3 A /250 V AC
contacts	3×NO
voltage threshold**	
lower (adjustable)	150÷210 V
upper	270 V
hysteresis	5 V
switch-off time	
lower threshold (adjustable)	1÷15 s
upper threshold	0.3 s
switching time	0.3 s
time to qualify the line as a good	10 s
generator start time (adjustable)	5÷120 s
power consumption	1.5 W
terminal	4.0 mm² screw terminals
tightening torque	0.5 Nm
working temperature	-25÷50°C
dimensions	3 modules (52.5 mm)
mounting	on TH-35 rail
protection level	IP20

* recommended battery type: URLA, voltage 12 V, capacity 1.2 Ah
** at voltage over 300 V, the load is disconnected in no more than 0.1 seconds

FEATURES

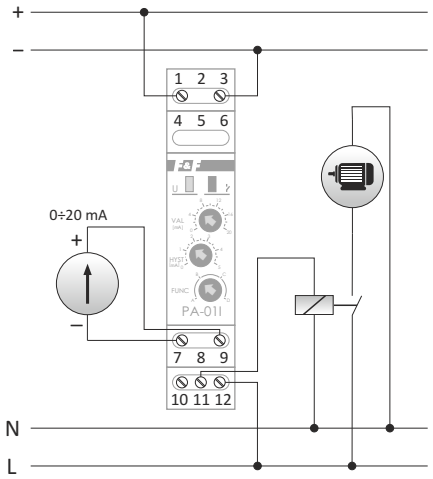
* control of supply line parameters;
* generator start up control;
* emergency, external safety switch;
* protection of receivers against too high or too low voltage;
* backup power supply of the controller from the battery together with the battery charging system
* control of the relay contacts and protection against short-circuit of the generator with the main line;

RELAYS WITH ANALOG INPUT

PA-01I analogue relay with current input

PURPOSE

The PA-01I device is used to convert the analog signal 0÷20 mA/4÷20 mA to the signal controlling the relay output. This allows the use of sensors with an analogue output in automation systems. The measuring path is galvanically isolated from the power supply of the device.

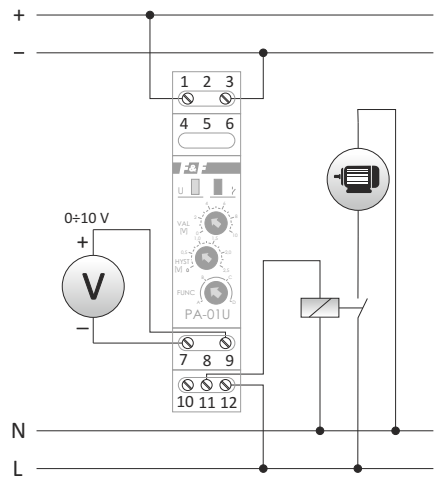


power supply	9÷30V DC
maximum current consumption	100 mA
range of input signals	0÷20 mA
hysteresis setting range	0÷5 mA
input resistance	150 Ω ± 0.1 %
measurement resolution	5 µA
measurement error	1%
hysteresis in the „window” mode	200 µA
contact	separated 1×NO/NC
maximum load current (AC-1)	8 A
terminal	1.5 mm² screw terminals
tightening torque	0.5 Nm
working temperature	-20÷50°C
dimensions	1 module (18mm)
mounting	on TH-35 rail
protection level	IP20

PA-01U analogue relay with voltage input

PURPOSE

The PA-01U device is used to convert the analog signal 0÷10 V to the signal controlling the relay output. This allows the use of sensors with an analogue output in automation systems. The measuring path is galvanically isolated from the power supply of the device.



power supply	9÷30V DC
maximum current consumption	100 mA
range of input signals	0÷10 V
hysteresis setting range	0÷2,5 V
input resistance	69 kΩ ± 0,1 %
measurement resolution	2,5 mV
measurement error	1%
hysteresis in the „window” mode	100 mV
contact	separated 1×NO/NC
maximum load current (AC-1)	8 A
terminal	1.5 mm² screw terminals
tightening torque	0.5 Nm
working temperature	-20÷50°C
dimensions	1 module (18 mm)
mounting	on TH-35 rail
protection level	IP20

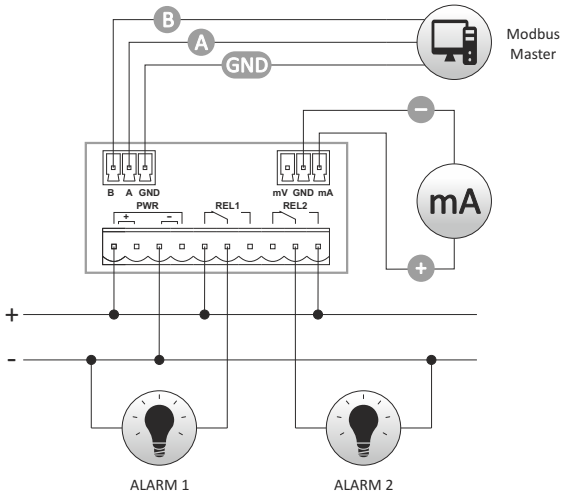
PA-02-MBT panel signal transducer 0÷20 mA/0÷10 V with display

PURPOSE

The PA-02-MBT is a 0÷20 mA/ 0÷10 V panel signal transducer with the possibility of setting two independent alarms that control two relays. The measurement result is shown on the 14 mm display. The device is equipped with Modbus RTU bus that allows to remotely configure and read the measured parameters.

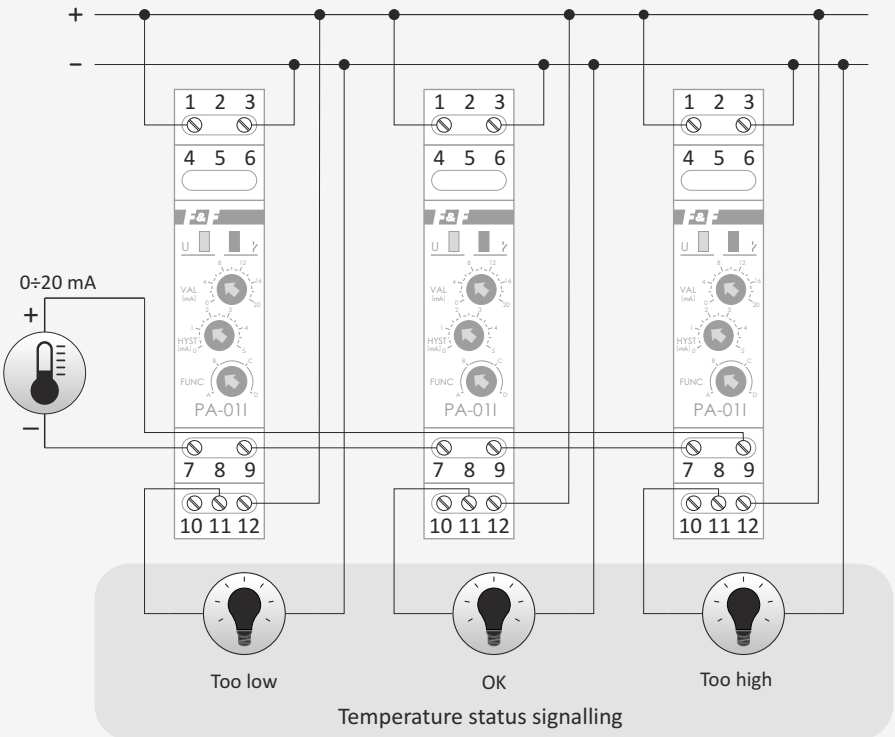
SELECTED FEATURES

* 2 independent alarms controlling two outputs;
* measurement of 0÷10 V voltage and 0÷20 mA current;
* galvanic separation between power supply and measuring path;
* the ability to scale the displayed value



power supply	9÷30 V DC
contacts	separated 2×NO/NC
maximum load current (AC-1)	2×6 A
measurement input	separated 0÷10 V/0÷20 mA
measurement accuracy	1%
alarm hysteresis	0÷20%
lower alarm threshold	0÷100%
upper alarm threshold	0÷100%
alarm delay	0÷180 s
communication parameters	
speed (adjustable)	1200÷115200 bit/s
data bits	8
stop bits	1 or 2
parity bits	EVEN/ODD/NONE
address	1÷247
power consumption	2 W
working temperature	-10÷40°C
terminal	2.5 mm² disconnectable terminals
dimensions	
housing	(S)72×(W)36×(D)72 mm
mounting hole	67.5×32.5 mm
display height	14 mm
mounting	panel
protection level	IP20

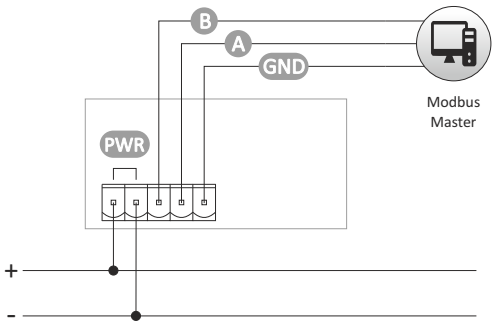
Example of temperature control system



MR-LED-T panel display with buttons and Modbus RTU communication

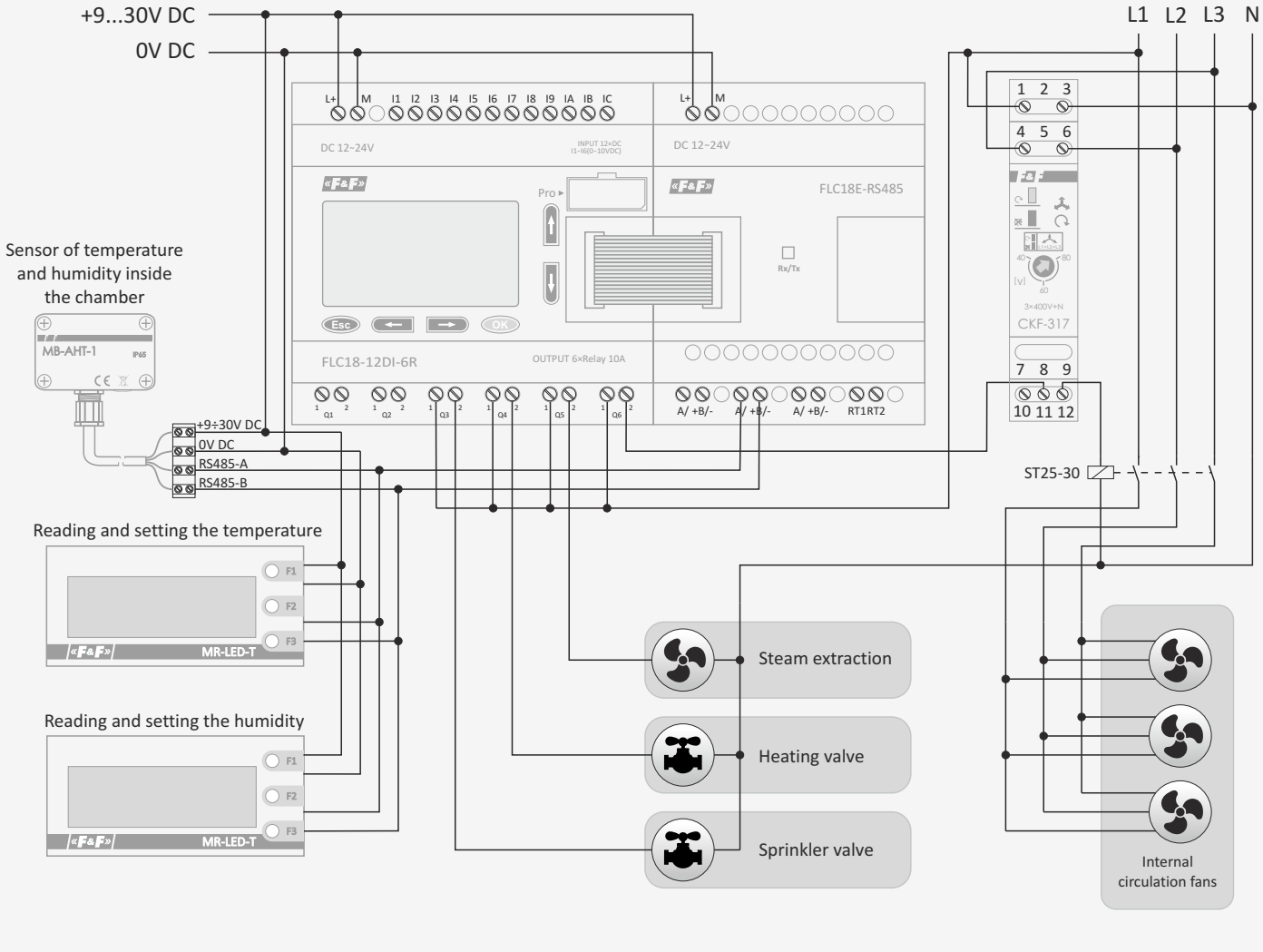
PURPOSE

MR-LED-T is a user panel for systems with Modbus RTU communication. It allows you to display the value read in the system and provides 3 buttons that can be used as inputs. The module is enclosed in a 36×72 mm panel housing with a 14 mm display in the front part.



power supply	9÷30 V DC
communication parameters	
speed (adjustable)	1200÷115200 bit/s
data bits	8
stop bits	1 or 2
parity bits	EVEN/ODD/NONE
address	1÷247
power consumption	2 W
working temperature	-10÷40°C
terminal	2.5 mm² disconnectable terminals
dimensions	
housing	72×36×72 mm
mounting hole	67.5×32.5 mm
display heigh	14 mm
mounting	panel
protection level	IP20

An exemplary control system for a wood drying room



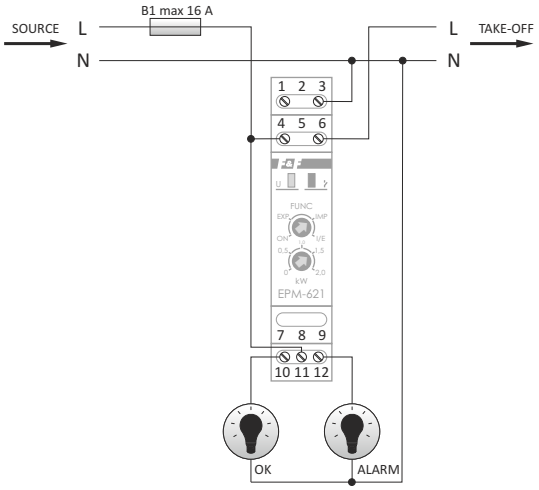
EPM-621 electronic power relay

PURPOSE

EPM-621 is a relay designed to work in single-phase networks and indicates the exceeding of the set level of active power drawn, returned to the network or both.

FUNCTIONS

* two-way energy meter;
* direct measurement in a single-phase system;
* indication of exceeding the set active power level:
  – drawn from the network (energy returned to the network is not indicated);
  – returned to the grid (energy drawn from the network is not indicated);
  – drawn or returned (regardless of the direction of energy flow);
* range of measured power: 0÷2 kW;
* response delay: 1 s;
* maximum current in the 16 A measurement circuit;
* signalling: 16 A relay, changeover contact.



power supply	85÷265 V AC
measuring range	0÷2 kW
hysteresis	5%
maximum load current (AC-1)	16 A
activation delay	1 s
return time	1 s
power consumption	<0.8 W
working temperature	-15÷50°C
	(vapour non-condensing)
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
mounting	1 module (18 mm)
protection level	IP20

ROLLER BLIND CONTROL SYSTEMS

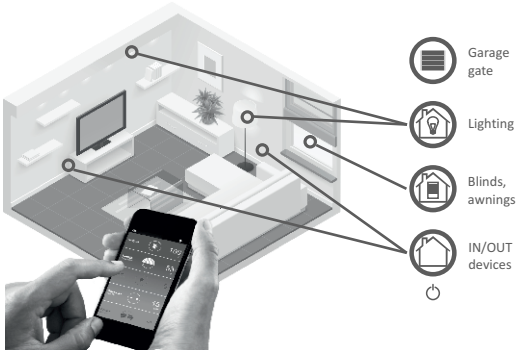
F&Wave

Wireless control system

www.fhome.pl

PROXI

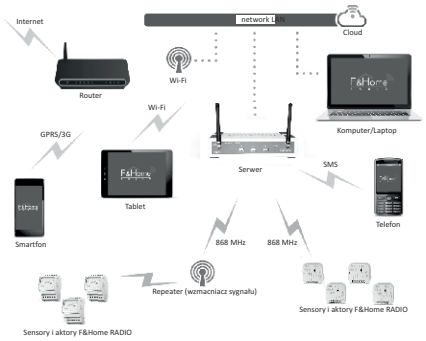
Bluetooth Smart remote control system



www.getproxi.com

F&Home / F&HomeRADIO

Smart home system



www.fhome.pl

PANEL VOLTAGE INDICATORS

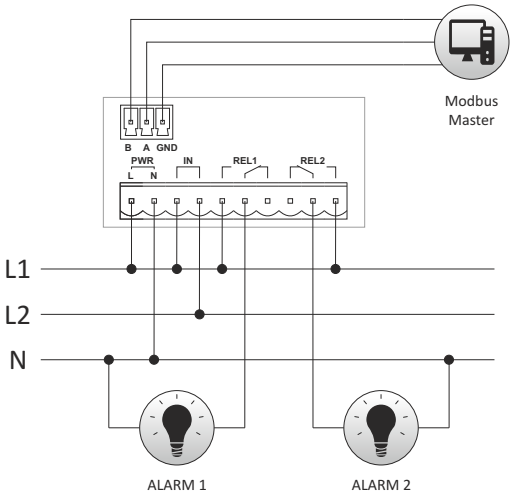
DMV-1AC-MBT AC panel voltage indicator

PURPOSE

panel meter is used for measurement of AC voltage effective value (RMS) in the range of 10÷480 V AC.
The result of the measurement is shown on a numerical LED display with a digit height of 14 mm.
The measuring channel is galvanically isolated and allows measurement on an independent circuit.

FUNCTIONS

* 2 independent alarms controlling 2 outputs;
* voltage measurement 0÷400 V AC;
* galvanic separation between power supply and measuring path;
* True RMS value measurement.



power supply	80÷230 V AC
contact	separated 2×NO/NC
maximum load current (AC-1)	2×6 A
measuring input	separated 0÷400 V AC
measurement accuracy	1%
alarm hysteresis	1 V÷150 V
lower alarm threshold	10 V÷399 V
upper alarm threshold	11 V÷400 V
alarm delay	0÷180 s
communication parameters	
speed (adjustable)	1200÷115200 bit/s
data bits	8
stop bits	1 or 2
parity bits	EVEN/ODD/NONE
address	1÷247
power consumption	2 W
working temperature	-10÷40°C
terminal	2.5 mm² disconnectable terminals
tightening torque	0,4 Nm
dimensions	
housing	72×36×72 mm
mounting hole	67.5×32.5 mm
display height	14 mm
mounting	panel
protection level	IP20

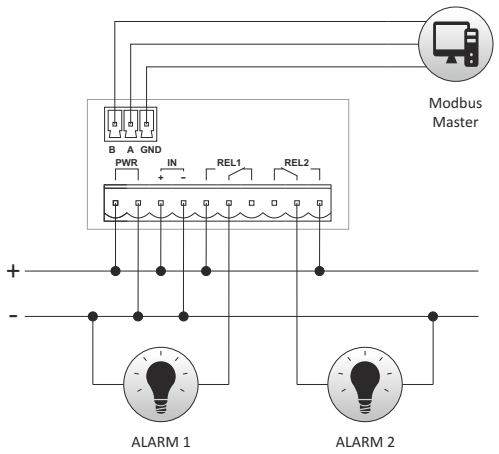
DMV-1DC-MBT DC (0÷60 V) panel voltage indicator

PURPOSE

Panel meter is used for measurement of DC voltage effective value (RMS) in the range of 0÷60 V DC.
The result of the measurement is shown on a numerical LED display with a digit height of 14 mm.
The measuring channel is galvanically isolated and allows measurement on an independent circuit.

FUNCTIONS

* 2 independent alarms controlling 2 outputs;
* voltage measurement 0÷60 V DC;
* galvanic separation between power supply and measuring path



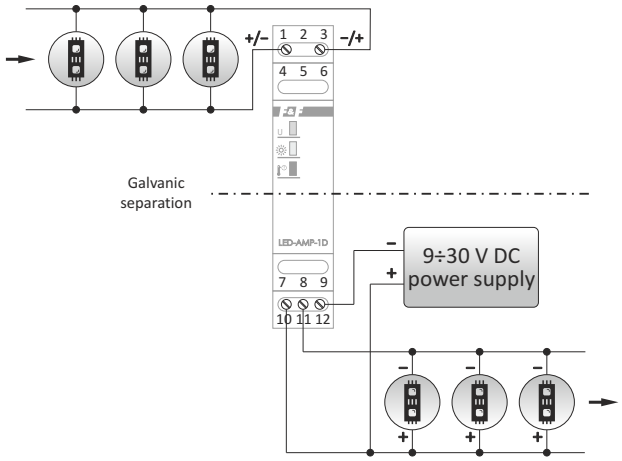
power supply	9÷30 V DC
contact	separated 2×NO/NC
maximum load current (AC-1)	2×6 A
measuring input	0÷60 V DC
measurement accuracy	1%
alarm hysteresis	1 V÷30 V
lower alarm threshold	0 V÷59 V
upper alarm threshold	1 V÷60 V
alarm delay	0÷180 s
communication parameters	
speed (adjustable)	1200÷115200 bit/s
data bits	8
stop bits	1 or 2
parity bits	EVEN/ODD/NONE
address	1÷247
power consumption	2 W
working temperature	-10÷40°C
terminal	2.5 mm² disconnectable terminals
tightening torque	0,4 Nm
dimensions	
housing	72×36×72 mm
mounting hole	67.5×32.5 mm
display height	14 mm
mounting	panel
protection level	IP20

POWER SIGNAL AMPLIFIERS

LED-AMP-1D signal amplifier for LED lighting, DIN rail

PURPOSE

The LED-AMP-1P controller is a signal amplifier for LED 12/24 V DC lighting. The principle of operation is the reproduction of the PWM control signal connected to the input of the system at the output of the amplifier. The energy to power the next lighting segment is drawn from the power supply connected to the amplifier. Galvanic isolation between the input and output of the amplifier allows for unlimited expansion of the lighting chain, without the risk of problems with power supply from different phases or long ground loops.

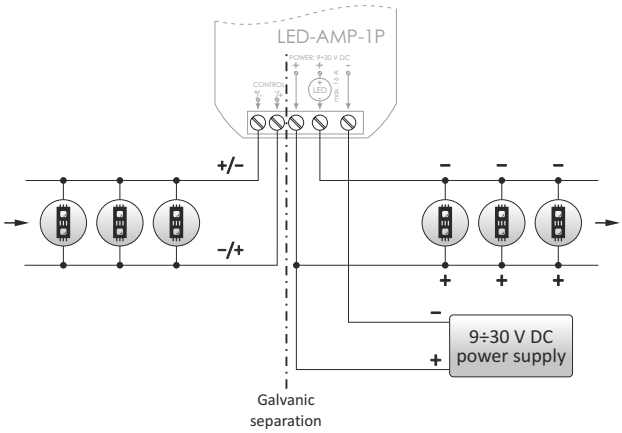


power supply	9÷30 V DC
input	
voltage	6÷30 V DC
current	5 mA
control signal	PWM
output	
voltage	as the power supply voltage
current (max)	16 A
actuator	transistor
separation between the output and the input	
type	galvanic
level	2.5 kV
power consumption	
Iout= 0 A	<0.05 W
Iout= 16 A	<1.2 W
working temperature (without condensation)	-15÷50°C
temperature protection	65°C
indication	power supply, brightness level, exceeding the temperature
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
mounting	on TH-35 rail mm
dimensions	1 module (18 mm)
protection level	IP20

LED-AMP-1P signal amplifier for LED lighting, flush-mounted box Ø60

PURPOSE

The LED-AMP-1P controller is a signal amplifier for LED 12/24 V DC lighting. The principle of operation is the reproduction of the PWM control signal connected to the input of the system at the output of the amplifier. The energy to power the next lighting segment is drawn from the power supply connected to the amplifier. Galvanic isolation between the input and output of the amplifier allows for unlimited expansion of the lighting chain, without the risk of problems with power supply from different phases or long ground loops.



power supply	9÷30 V DC
input	
voltage	6÷30 V DC
current	5 mA
control signal	PWM
output	
voltage	as the power supply voltage
current (max)	16 A
actuator	transistor
separation between the output and the input	
type	galvanic
level	2.5 kV
power consumption	
Iout= 0 A	<0.05 W
Iout= 16 A	<1.2 W
working temperature (without condensation)	-15÷50°C
temperature protection	65°C
indication	power supply, brightness level, exceeding the temperature
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
mounting	flush-mounted box Ø60
dimensions	48×43×20 mm
protection level	IP20

GLASS BUTTONS

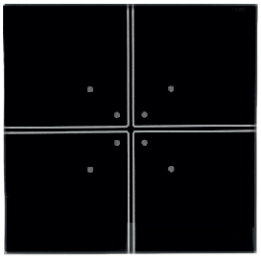
PURPOSE

The family of GS quadruple glass buttons is designed to be mounted in 60 mm diameter installation boxes and can be a very elegant and functional part of any home. The external white spot backlight gently brightens to indicate the location of the sensors when you move your hand closer. Selection of a given button is indicated by switching on an amber spot backlight. The backlight level can be adjusted to individual preferences.

COMMON FEATURES

* made of high quality polished glass in black or white;
* 4 independent touch buttons;
* external dimnesions: 81×81×12 mm;
* simple assembly in a standard flush-mounted box;
* can be manufactured in a special version (with inscriptions and infographics on buttons) according to the customer's recommendations

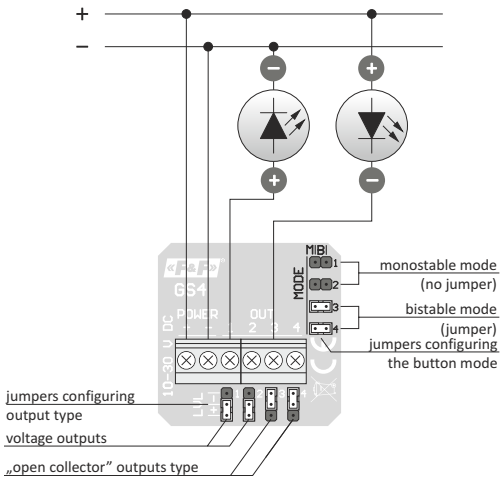





GS-4DC quadruple glass button for low-voltage home automation

PURPOSE

Button designed for integration with any home automation system powered by low DC voltage. The operating mode: bistable or monostable and the type of output control signal: voltage or potential-free output (open collector) can be selected independently for each button.

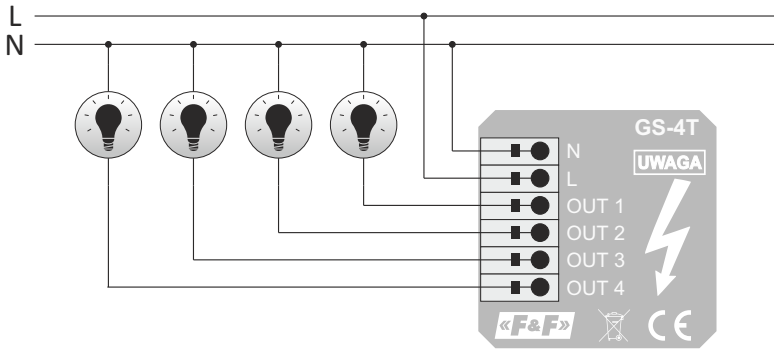


power supply	9÷30 V DC
work mode	monostable or bistable
actuator	transistor
control	
voltage	voltage as the supply voltage
potential-free	open collector
load capacity	30 mA/channel
power consumption	
standby	<0.1 W
on	0.5 W
working temperature	-25÷50°C
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
dimensions	81×81×12 mm
mounting	flush-mounted box Ø60
protection level	
front	IP50
back	IP20

GS-4T quadruple glass button integrated with a 4-channel bistable relay

PURPOSE

The GS-4T is a quadruple glass button, integrated with a 4-channel bistable controller designed for the control of low power circuits supplied with 230 V AC voltage (for example LED lighting). Each of the buttons switches on/off one output channel of the controller.

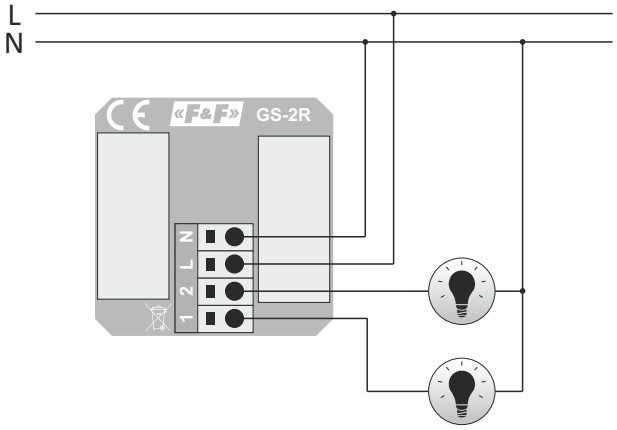


power supply	85÷265 V AC
work mode	bistable
actuator	symistor
load capacity (AC-1)	
single channel	100 W/250 V AC
total (4 channels)	250 W/250 V AC
power consumption	
standby	<0.15 W
on	0.5 W
working temperature	-25÷50°C
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
dimensions	81×81×12 mm
mounting	flush-mounted box Ø60
protection level	
front	IP50
back	IP10

GS-2R quadruple glass button integrated with a 2-channel bistable relay

PURPOSE

The GS-2R is a quadruple glass button integrated with a 2-channel bistable relay for direct control of 230 V receivers with a load of up to 16 A (AC-1). Buttons have the following functions: switch on/off channel 1, switch on/off channel 2, switch on all, switch off all.



power supply	85÷265 V AC
work mode	bistable
actuator	relay
load capacity (AC-1)	
single channel	16 A/250 V AC
total (2 channels)	20 A/250 V AC
power consumption	
standby	<0.15 W
on	0.8 W
working temperature	-25÷50°C
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
dimensions	81×81×12 mm
mounting	flush-mounted box Ø60
protection level	
front	IP50
back	IP10

Touch wall-mounted remote control transmitter for Ø60 flush-mounted box

F&Wave Radio control

FW-GS-24-W / FW-GS-230-W white
FW-GS-24-B / FW-GS-230-B black

black

white

More details (page 21)

power supply	
FW-GS-24-W / FW-GS-24-B	9÷30 V DC
FW-GS-230-W / FW-GS-230-B	80÷265 V AC
power consumption	
standby	0.25 W
on	<0.6 W
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
mounting	flush-mounted box Ø60
dimensions	81×81×12 mm
protection level	
front	IP50
back	IP10

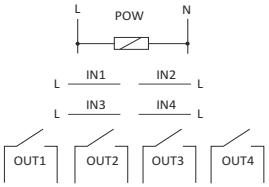
TIME CONTROLLERS

PCS-534

Sequential controller pulse-time, 4-channel

PURPOSE

The PCS-534 controller is designed for automation systems in which it is necessary to simultaneously control a group of receivers in a fixed ON/OFF combination forced by successive pulses fed manually or automatically to a control input or in accordance with the time intervals between successive switchings.



power supply	160÷260V AC/DC
output load current	8 A
contact	4×NO
input voltage tolerance	160÷260 V AC/DC
time settings t_1, t_2, t_3, t_4	1s÷99h59min59s
time setting accuracy	1s
number of cycle repetitions	1÷999999 in an infinite loop
communication port	miniUSB
power consumption	1.3 W
terminal	2.5mm² screw terminals
tightening torque	0,4 Nm
working temperature	-20÷50°C
dimensions	5 modules (87,5mm)
mounting	on TH-35 rail
ingress protection	IP20

FUNCTIONING

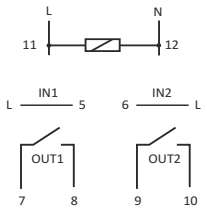
The sequential relay has 4 separate outputs OUT1-4 and 4 independent signal inputs IN1-4. The closed/open contact setup is set sequentially in accordance with the preset program. Switching the contacts into the next state occurs after the next impulse at the control input or automatically, in accordance to the time schedule.
The sequence of contacts, time schedule and operating options are set using the PC configuration program. Connection to the controller via a USB cable.
Operating modes:
Pulse – programmed contact sequences are executed after successive pulses of the IN1 control input. The first pulse switches from sequence 0 to sequence 1 and next ones after next pulses. After the last sequence has been executed, the relay executes the program from sequence 0 or 1 for the autostart option;
Time – contact switching is carried out automatically according to the time schedule. The pulse at input IN1 switches from sequence 0 to sequence 1 and continues to switch automatically after the set time. After the last sequence has been executed, the relay returns to sequence 0 and waits for the control pulse at input IN1 or continues the program from sequence 1 (autostart option).
Sequence 0 – contact output status (0000) after switching-on the power supply (permanent option, not changed by the user).
Additional options:
Autostart – automatic start option. In pulse mode, it is an automatic transition to sequence 1 after switching on the power supply. In time mode, it is an automatic start of work according to the time schedule.
Functions of inputs:
IN1 – "start":
– pulse: impulse injection switches the contacts to the next state.
– temporary: impulse delivery triggers the time schedule.
IN2 – "pause"
– pulse: blocks switching to the next sequence despite subsequent pulses on IN1.
– time: stop the countdown time to switch to the next state.
IN3 – "continuation"
– pulse: restores the reaction to IN1 input pulses.
– time: continuation of the countdown in the stopped sequence.
IN4 – "reset"
– pulse: immediate stop of the program being executed and return to sequence 0 and waiting for restarting. In the autostart option, the program runs from sequence 1.
– time: immediate stop of the program being executed and return to sequence 0 and waiting for the start signal on IN1. In the autostart option, the program runs from sequence 1.

GSM REMOTE CONTROL

SIMply MAX P05 PULSE AND OPERATING TIME COUNTER + SWITCH ON/OFF/ALARM

The MAX P05 relay with built-in GSM communicator is used as a pulse or operating time counter with the ability of remote management of the connected device via a mobile phone. It performs simple functions of notifying about exceeding the threshold values of pulses or operating time and allows user to control the connected additional device on the ON/OFF basis. User phone numbers, counting options, alarms and other features are set using the PC configuration program. Connected to the relay via a USB cable.


antenna



power supply	230 V AC
inputs	
number	2
voltage tolerance	160÷260V AC
minimum length of input pulse	1s
relay outputs	
number	2
type	2×NO
nominal voltage	230V AC
maximum load current (AC-1)	8A
ports	SIM, miniUSB
power consumption	
standby	1,3W
during GSM communication	3W
working temperature	-10÷50°C
terminal	4.0 mm² screw terminals
tightening torque	0.5 Nm
dimenions	3 modules (52.5mm)
mounting	on TH-35 rail
ingress protection	IP20

GSM antenna

SMA connector	
antenna dimensions	20×100m
length	2.5m
mounting	adhesive tape

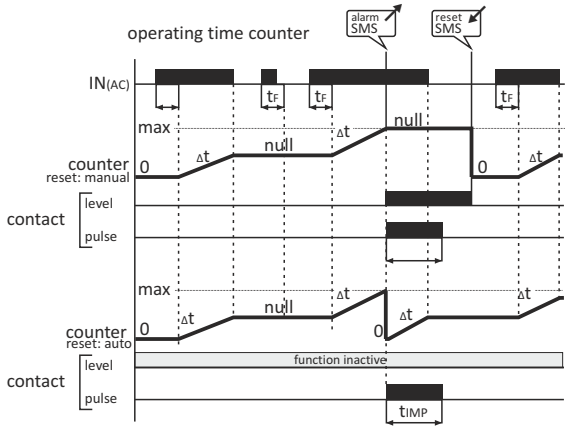
FEATURES

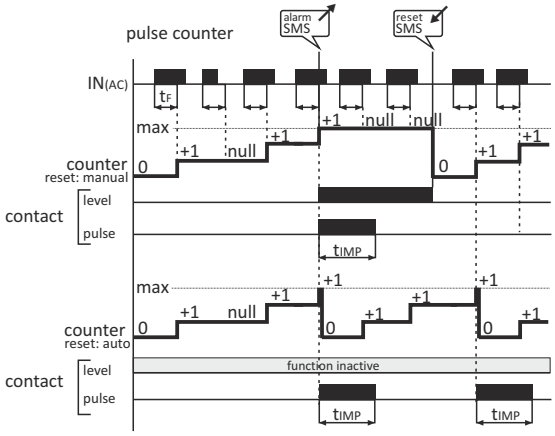
1. System
   * access password for SMS input commands;
   * output status memory;
   * readout of the current value of pulses and operating time;
   * ADMIN administrator function – restoring factory settings and unblocking access in case of a forgotten access password.
2. Counting pulses/operating time
   * individual operating mode for each input: pulse counter/operating time counter
   * counting 160÷260 V AC high voltage signals;
   * time filters for input signals;
   * SMS alerts for set thresholds of pulses and operating time for up to 5 phone numbers.
3. Output OUT
   * output control – two separate operating modes: SMS/ALARM:

   SMS: – output controlled directly via SMS commands;
   – redefinition of the output name, for example OUT1 = PUMP;
   – ON/OFF control and time switching-on of the output;

   ALARM: – contact assigned to temperature alarms - threshold crossing enforces contact actions: ON/pulse;
   – ON option: contact activated above the alarm threshold, the contact opens after a drop below hysteresis;
   – pulse option: contact activated temporarily for the set number of seconds after exceeding the threshold;
   – on/pulse options set separately for the minimum and maximum alarms
6. Input IN
   * redefinition of the input name, for example IN1 = NAPAD;
   * selection of the SMS triggering option:

   ON – signal appears;
   OFF – signal loss;
   ON/OFF – appearance and loss of the signal;
   * notifications of input activation are sent to 5 telephone numbers.





RADIO CONTROL SYSTEM

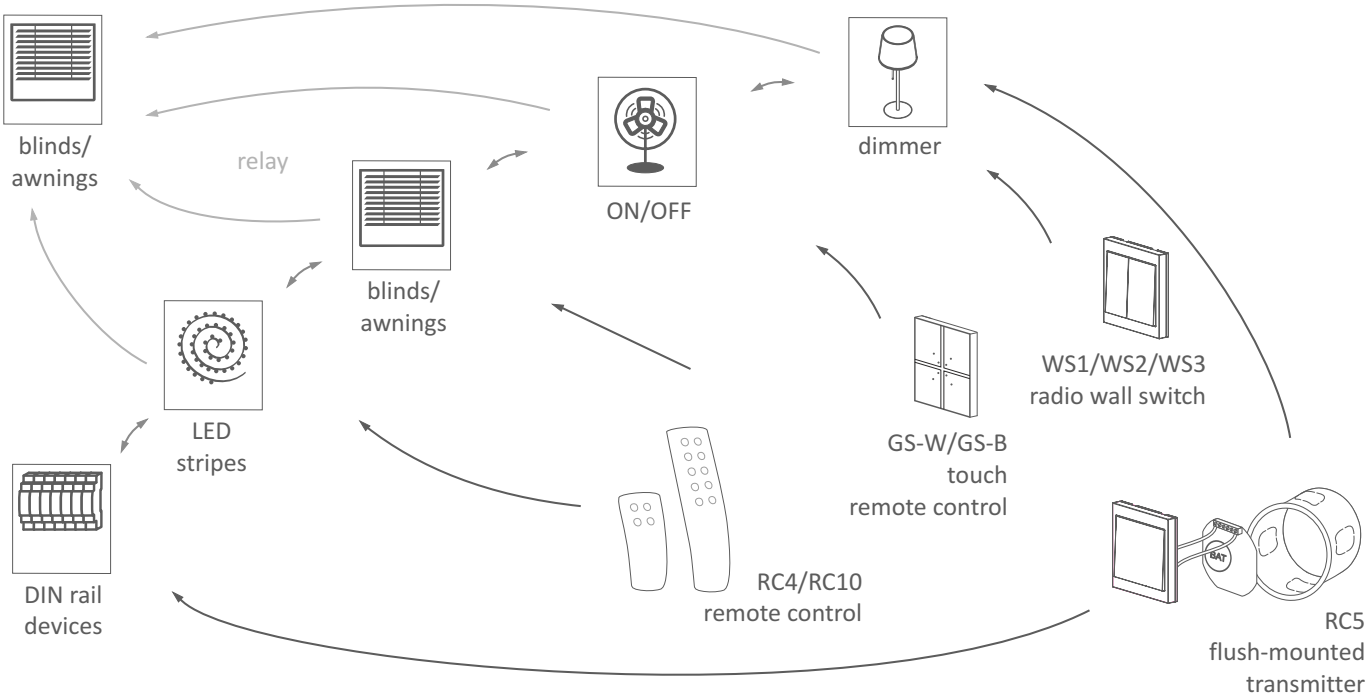
F&Wave

PURPOSE

The F&Wave wireless radio control is intended for direct control of electrical devices in homes and apartments. The system consists of dedicated transmitters and receivers. You can associate multiple transmitters with a single receiver and a single transmitter with multiple receivers.

SYSTEM FUNCTIONS

* Control different receivers in one system: single and dual relay, dimmer 230 V, dimmer LED, roller blinds controller;
* Receivers designed for mounting it under plaster in Ø60 flush-mounted box or on a DIN rail;
* Transmitters in the form of 4- and 10-button remote controls or for mounting under plaster in Ø60 flush-mounted box;
* The ability to control from up to 8 transmitters;
* Retransmission of commands from the transmitter - the ability to increase the range of the remote control;
* Range of up to 100 meters in open space without any interfering factors. In building conditions and in the presence of interference sources (power lines, transmitters, etc.) the actual range may be smaller. The range can be improved by direct retransmission of modules located in mutual coverage area.

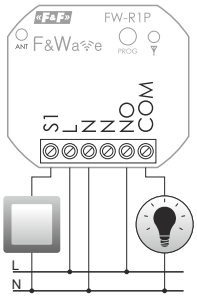


BISTABLE RELAYS ON/OFF

The group of bistable relays is used for direct control of the connected receiver on an on/off basis. Pressing the wall switch connected directly to the relay (local control) or paired radio transmitter button (remote control: remote, battery wall switch or flush transmitter) changes the contact position to the opposite one.
Central control is also available, which means switching on or off the group of relays associated with one central button of selected transmitters.

FW-R1P-P single multifunction relay

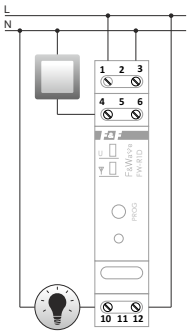
* 1-channel multifunction relay:
  – bistable (ON/OFF)
  – monostable (pulse)
  – time (from 1 s to 48 h)
  – always ON
  – always OFF
* each button/transmitter (local and remote) can perform a different function
* controller can be linked with 32 transmitters
* separated output contact



power supply	85÷265V AC/DC
control	triggered with L or N level
control pulse current	<1mA
power consumption	
on	0.6W
standby	0.25W
output load (AC-1)	8A/250V
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
mounting	Ø60 flush-mounted box
dimensions	43×48×20mm
ingress protection	IP20

FW-R1D-P single multifunction relay

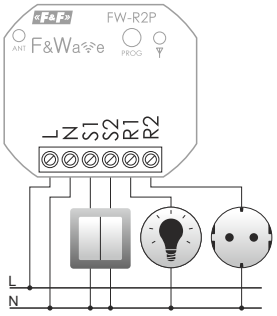
* 1-channel multifunction relay:
  – bistable (ON/OFF)
  – monostable (pulse)
  – time (from 1 s to 48 h)
  – always ON
  – always OFF
* each button/transmitter (local and remote) can perform a different function
* controller can be linked with 32 transmitters
* separated output contact



power supply	85÷265V AC/DC
control	triggered with L or N level
control pulse current	<1mA
power consumption	
on	0.6W
standby	0.25W
output load (AC-1)	16A/250V
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
mounting	on TH-35 rail
dimensions	1 module (18mm)
ingress protection	IP20

FW-R2P-P double multifunction relay

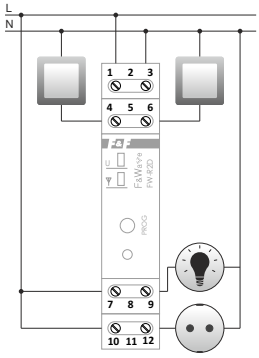
* 2-channel multifunction relay:
  – bistable (ON/OFF)
  – monostable (pulse)
  – time (from 1 s to 48 h)
  – always ON
  – always OFF
* each button/transmitter (local and remote) can perform a different function
* controller can be linked with 32 transmitters



power supply	85÷265V AC/DC
control	triggered with L or N level
control pulse current	<1mA
power consumption	
on (2 relays)	1W
standby	0.25W
output load (AC-1)	2×8A/250V
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
mounting	Ø60 flush-mounted box
dimensions	43×48×20mm
ingress protection	IP20

FW-R2D-P double multifunction relay

* 2-channel multifunction relay:
  – bistable (ON/OFF)
  – monostable (pulse)
  – time (from 1 s to 48 h)
  – always ON
  – always OFF
* each button/transmitter (local and remote) can perform a different function
* controller can be linked with 32 transmitters
* 2 independent output contacts



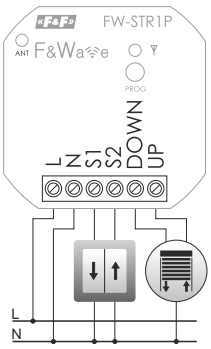
power supply	85÷265V AC/DC
control	triggered with L or N level
control pulse current	<1mA
power consumption	
on (2 relays)	1W
standby	0.25W
output load (AC-1)	2×16A/250V
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
mounting	on TH-35 rail
dimensions	1 module (18mm)
ingress protection	IP20

ROLLER-BLIND CONTROLLERS

The group of roller-blind receivers is used for direct control of connected roller-blind drives in the "up/down/stop" function. Pressing a wall switch connected directly to the relay (local control) or a paired radio transmitter button (remote control: remote, battery wall switch or flush-mounted transmitter) forces the roller-blind to move in the selected direction. Pressing the button again while the roller-blind is in motion stops it in the current position.
There is also an option of central control, which means the ability to lower or raise a group of controllers associated with one central button of selected transmitters.

FW-STR1P-P 230V AC multifunction roller-blind controller

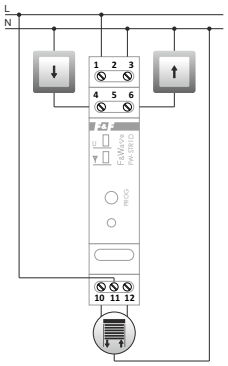
* 230V drive controller
* local and remote control:
  – 1-button
  – 2-buttons
  – 2-buttons central
* lock function, preventing power from being applied to both motor windings
* each button/transmitter (local and remote) can perform a different function
* controller can be linked with 32 transmitters



power supply	85÷265V AC/DC
control	triggered with L or N level
power consumption	
on	1W
standby	0.25W
output load	
AC-1	3A
AC-3	0.6A
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
mounting	Ø60 flush-mounted box
dimensions	43×48×25mm
ingress protection	IP20

FW-STR1D-P 230V AC multifunction roller-blind controller

* 230V drive controller
* local and remote control:
  – 1-button
  – 2-buttons
  – 2-buttons central
* lock function, preventing power from being applied to both motor windings
* each button/transmitter (local and remote) can perform a different function
* controller can be linked with 32 transmitters



power supply	85÷265V AC/DC
control	triggered with L or N level
power consumption	
on	1W
standby	0.25W
output load	
AC-1	8A
AC-3	1.5A
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
mounting	on TH-35 rail
dimensions	1 module (18mm)
ingress protection	IP20

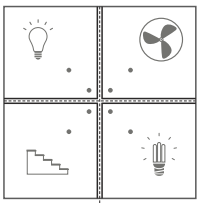
Touch wall-mounted remote control transmitter for Ø60 flush-mounted box

FW-GS-24-W / FW-GS-230-W white
FW-GS-24-B / FW-GS-230-B black

Remote control transmitter, designed to cooperate with all receivers of the F&Wave system.
Front panel made of glass. It operates on a contactless and touch basis. 230 V AC or 24 V DC local power supply. The transmitter has 4 touch zones, which are intended to local control SWITCH and central control ON/OFF (switches on/off and/or raises/lowers the paired receivers). Features of inputs are assigned in accordance with the selected operating program.

Mode \ Input	S1	S2	S3	S4
A	SWITCH	SWITCH	SWITCH	SWITCH
B	**ON**	SWITCH	SWITCH	SWITCH
C	SWITCH	**OFF**	SWITCH	SWITCH
D	**ON**	**OFF**	SWITCH	SWITCH

power supply	
FW-GS-24-W / FW-GS-24-B	9÷30 V AC/DC
FW-GS-230-W / FW-GS-230-B	80÷265 V AC/DC
power consumption	
on	0.6 W
standby	0.25 W
radio frequency	868 MHz
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
mounting	Ø60 flush-mounted box
dimensions	81×81×12 mm
ingress protection	IP20

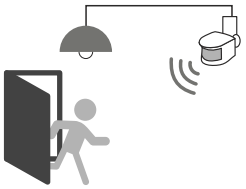


At the customer's special request, it is possible to make pictograms describing the touch zones according to their intended purpose.

MOTION SENSORS

PURPOSE

Motion sensors are used for automatic, time switching of lighting in the event of a person or other object appearing in such places as: corridors, courtyards, approaches and driveways, garages, etc. Using motion sensors for automatic switching of lighting makes it more convenient and cheaper to use.

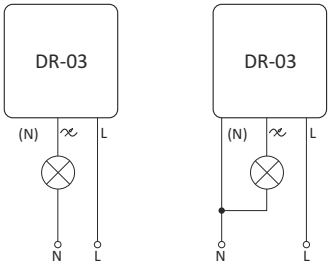


PIR (infrared)

FUNCTIONING

The sensor detects sources of infrared radiation. It analyzes such parameters as: the size of the object, the amount of emitted heat and the speed of movement between sectors of detection. Movement in the detection field automatically switches on the lighting for the time set by the user. After this time, the lighting will be switched off automatically. The motion sensor is equipped with an automatic dusk to dawn light control, preventing the controlled lighting from switching on during the day.
DR sensors can operate inside and outside in places where they are not exposed to direct rain or snow and where there is no risk of splashing the sensor housing and its electrical connection points with water or other liquid.

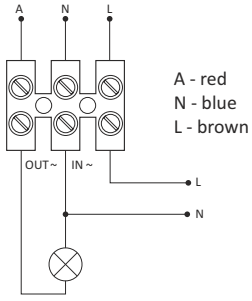
DR-03 WHITE



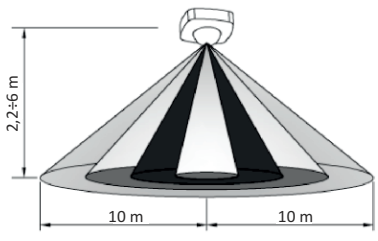
power supply	230 V AC
maximum load current (AC-1)	3 A
twilight activation threshold	3÷2000 lx
motion detection	0.6÷1.5 m/s
off time	10s(±3s)÷7min.(±2min.)
vertical detection field	160°
maximum detection distance (T<24°C)	9m
sensor mounting height	1.0÷1.8m
power consumption	0.5W
terminal	1.5mm² screw terminals
tightening torque	0.3 Nm
working temperature	-10÷40°C
dimensions	
external	80×80×62mm
groove	Ø60mm, depth= 32mm
mounting hole	Ø60mm
screw spacing	58mm
mounting	surface mounting or in Ø60 flush-mounted box
ingress protection	IP20

The DR-03 sensor can operate in 2-wire and 3-wire installations.

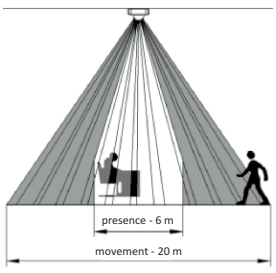
DR-09 ceiling



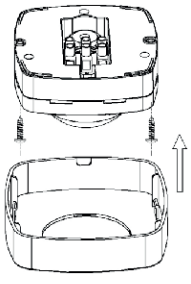
power supply	230 V AC
maximum load current (AC-1)	10 A
twilight activation threshold	3÷2000 lx
motion detection	0,6÷1.5 m/s
off time	3s÷9min.(±2min.)
vertical detection field	360°
maximum detection distance (T<24°C)	20m
sensor mounting height	h=2.2÷6.0m
power consumption	0.5W
terminal	1.5mm² screw terminals
working temperature	-20÷40°C
dimensions	102×102mm, h= 55mm
mounting	surface mounting
ingress protection	IP20



Detection field

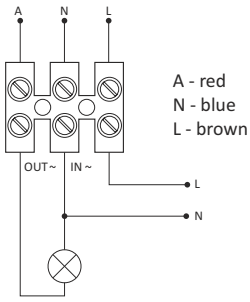


Direction of movement in the detection field



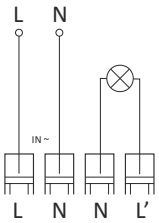
Mounting

DRM-07

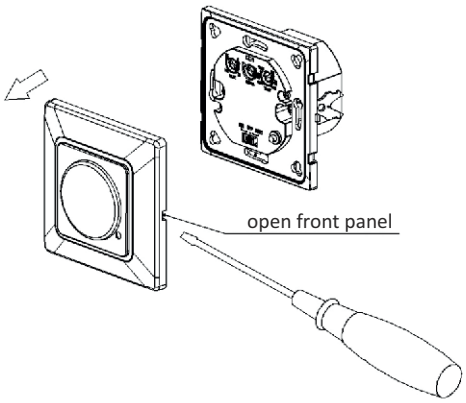


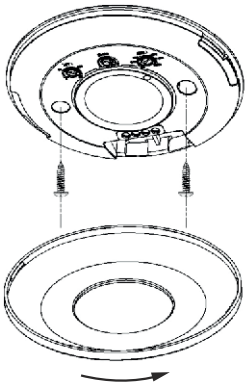
power supply	230V AC
maximum load current (AC-1)	6A
frequency of microwave radiation	5.8GHz
power of radiation	<0,2mW
motion detection	0.6÷1.5m/s
detection field	180°
detection radius - adjustable (for h=1±1.8m)	5÷50m
activation threshold - adjustable	3÷2000lx
receiver activation time - adjustable	10±3s÷12±1min.
activation delay	<1s
power consumption	0.9W
terminal	1.0mm² screw terminals
working temperature	-25÷50°C
dimensions	
external	80×80×48mm
groove	Ø=55mm, h=33mm
mounting hole	Ø60mm
screw spacing	58mm
mounting	in Ø60 flush-mounted box
ingress protection	IP20

DRM-08



power supply	230 V AC
maximum load current (AC-1)	10A
frequency of microwave radiation	5.8GHz
power of radiation	<10mW
motion detection	0.6÷1.5m/s
detection field	360°
detection radius - adjustable	1÷8m
activation threshold - adjustable	3÷2000lx
receiver activation time - adjustable	10±3s÷12±1min.
activation delay	<1s
power consumption	0.9W
terminal	1.0mm² screw terminals
working temperature	-25÷50°C
dimensions	Ø115; h=24mm
mounting	surface mounting
ingress protection	IP20





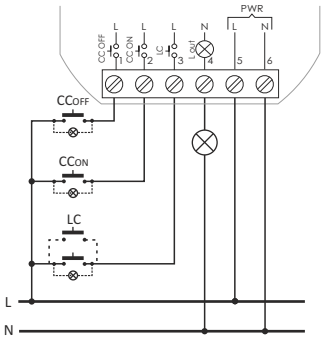
ELECTRONIC BISTABLE PULSE RELAYS

GROUP (HOTEL) with control inputs „SWITCHING EVERYTHING ON” and „SWITCHING EVERYTHING OFF”

PURPOSE

The relays are designed for group operation. A single relay allows you to switch on and off the controlled receiver after each current pulse caused by pressing the momentary (bell) button of the local control. The group system allows you to switch off or on all receivers connected to individual relays using the central control buttons.

BIS-412P for Ø60 flush-mounted box



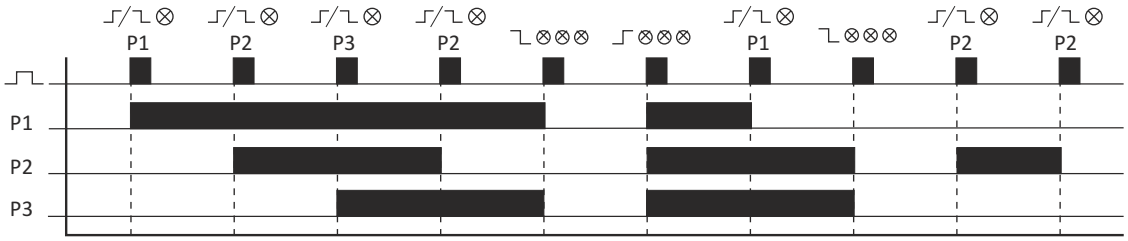
power supply	165÷265V AC
contact	1×NO
load current max (AC-1)	16 A
control pulse current	<1 mA
maximum current of control buttons backlight	5mA
activation delay	0.1÷0.2s
power indication	green LED
power consumption	
standby	0.15W
ON	0.7W
working temperature	-15÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
dimensions	Ø54 (48×43mm), h=25mm
mounting	flush-mounted box Ø60
ingress protection	IP20

WARNING!

i - a variant with a contact adapted for receivers with a large starting current, such as: LED lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.
M - a variant of relays with "memory" of the contact position, so that after switching on the power supply, the state of the relay that was in the moment of switching off the power will be restored.
Relays powered by 230 V can cooperate with backlit buttons.

FUNCTIONING

Local control
The receiver is switched on after the current pulse caused by pressing one, any momentary button from the local control group. The relay contact will switch on. After the next impulse, the contact will switch off.
Central control
SWITCH EVERYTHING OFF - after the current pulse caused by pressing the momentary button, all receivers individually controlled by relays will be switched off (regardless of their state - switched off or on).
SWITCH EVERYTHING ON - after the current pulse caused by pressing the momentary push-button, all receivers individually controlled by relays will be switched on (regardless of their state - switched off or on).

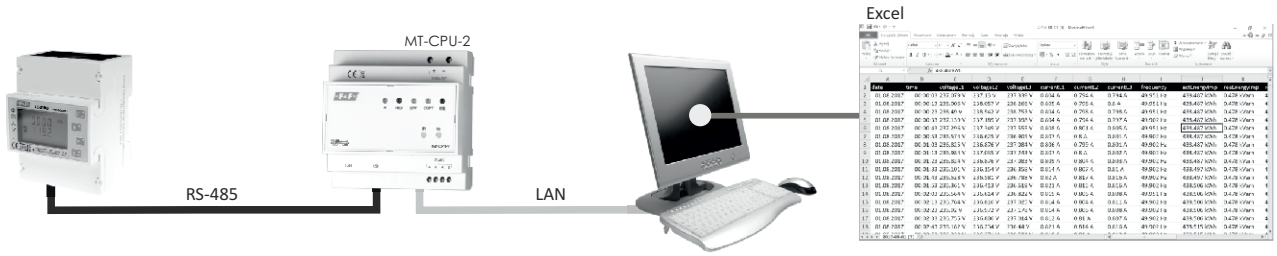


REMOTE READING AND REGISTRATION SYSTEM

MeternetLITE

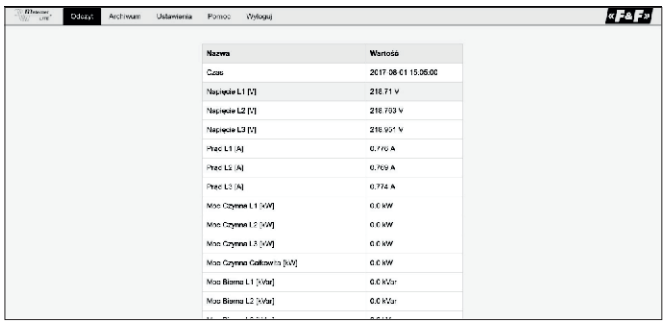
PURPOSE

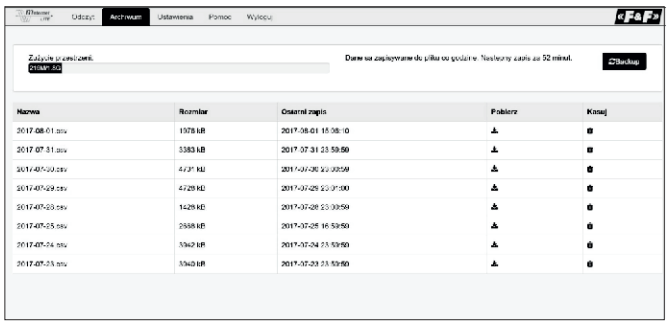
The MeternetLITE program is used for remote reading and recording of the indication values of a single F&F measuring device. The program along with the database is installed on a special server MT-CPU-2, which works in the local network. The software user interface is a web application (website). The program can be accessed via any web browser. The archive is available in the form of .csv files (opened for example in Excel).

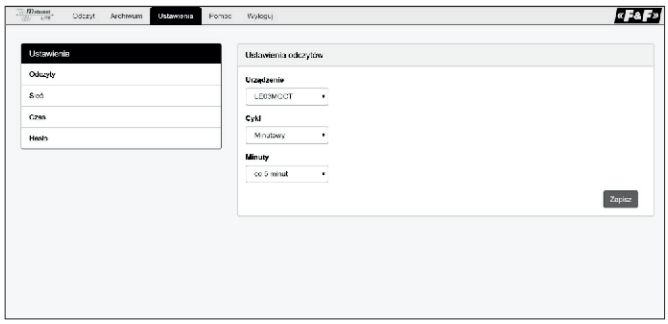


The MT-CPU-2 server is the central unit of the system. The server is a LAN network device. It can be accessed from LAN via any web browser. It communicates with the selected measuring device via the built-in port and the RS-485 wired bus. In the case of a LAN with a router and a public IP address, it is possible to read and import data via the Internet.

The server send queries to the measurement device and records the results to the internal memory in accordance with the designated interval. Registration is started automatically after each server startup and after making changes to the readout configuration and saving them. Every hour the data from the internal memory is added to the current archive file. Archive files are created separately for each day. Files can be imported to a computer as .csv files. The data can be freely shaped according to the program functions of Excel or other database program. In the absence of physical computer network communication with the server, it is possible to copy registration files to external flash memory (pendrive).







MEASURING DEVICES

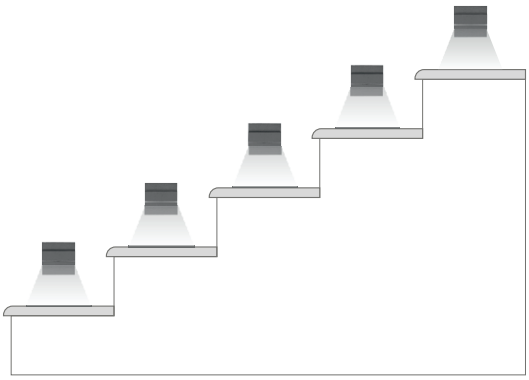
The system works with the following devices:

LE-01MP	1-phase 100A
LE-01MR	1-phase 100A
LE-03MP	3-phase 60A
LE-01MQ	1-phase 100A 2-way
LE-03MQ	3-phase 100A 2-way
LE-03MQ-CT	3-phase 5A transformer; 2-way

LED STAR LIGHTS

PURPOSE

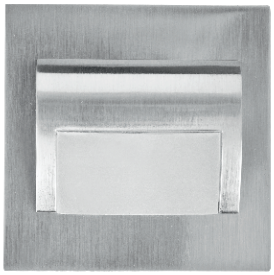
LED stair lights are parts of functional and decorative lighting in such places as: stairs, corridors, public buildings, etc. The use of LED stair lights makes lighting more convenient and cheaper to use.



FUNCTIONING

LED stair lights are equipped with a dimming feature - changing the supply voltage changes the brightness of the lighting. Combined with dedicated control automation, including AS-225 stair sequential controller or selected F&Wave radio control units you can adjust the brightness as well as achieve a smooth lightening and dimming effect.

INGA with dimming feature



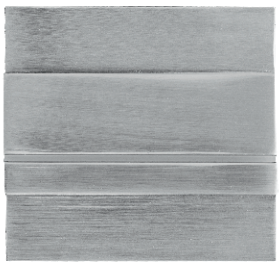
satin

white

anthracite

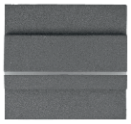
power supply	12 V DC
power consumption	1.2 W
color temperature	
warm	3000 K
cold	6000 K
luminous flux	100 lm
number of switchings	>40.000
time of illumination to 100%	<0.5s
working temperature	0÷40°C
dimensions	
external	74×74×12mm
feather	Ø60mm, depth >40mm
mounting hole	Ø60mm
screw spacing	58mm
mounting	Ø60 flush-mounted box
ingress protection	IP20

LINA with dimming feature



satin

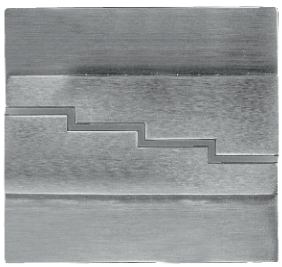
white



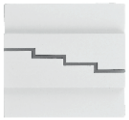
anthracite

power supply	12 V DC
power consumption	1.2 W
color temperature	
warm	3000 K
cold	6000 K
luminous flux	100 lm
number of switchings	>40.000
time of illumination to 100%	<0.5s
working temperature	0÷40°C
dimensions	
external	85×75×6mm
feather	Ø60mm, depth >40mm
mounting hole	Ø60mm
screw spacing	58mm
mounting	Ø60 flush-mounted box
ingress protection	IP20

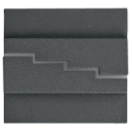
MAYA with dimming feature



satin



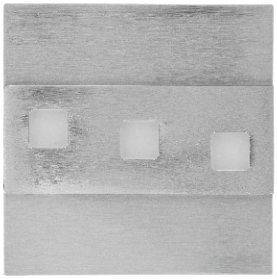
white



anthracite

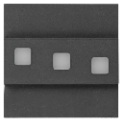
power supply	12 V DC
power consumption	1.2 W
color temperature	
warm	3000 K
cold	6000 K
luminous flux	100 lm
number of switchings	>40.000
time of illumination to 100%	<0.5s
working temperature	0÷40°C
dimensions	
external	85×75×6mm
feather	Ø60mm, depth >40mm
mounting hole	Ø60mm
screw spacing	58mm
mounting	Ø60 flush-mounted box
ingress protection	IP20

VIKA with dimming feature



satin

white



anthracite

power supply	12 V DC
power consumption	1.2 W
color temperature	
warm	3000 K
cold	6000 K
luminous flux	100 lm
number of switchings	>40.000
time of illumination to 100%	<0.5s
working temperature	0÷40°C
dimensions	
external	75×75×4mm
feather	Ø60mm, depth >40mm
mounting hole	Ø60mm
screw spacing	58mm
mounting	Ø60 flush-mounted box
ingress protection	IP20

Product symbols overview

Product name	Inga						Lina						Maya						Vika					
Casing color	satin		white		anthracite		satin		white		anthracite		satin		white		anthracite		satin		white		anthracite	
Color temperature	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm	cold	warm
LS-ISC	◆																							
LS-ISW		◆																						
LS-IWC			◆																					
LS-IWW				◆																				
LS-IAC					◆																			
LS-IAW						◆																		
LS-LSC							◆																	
LS-LSW								◆																
LS-LWC									◆															
LS-LWW										◆														
LS-LAC											◆													
LS-LAW												◆												
LS-MSC													◆											
LS-MSW														◆										
LS-MWC															◆									
LS-MWW																◆								
LS-MAC																	◆							
LS-MAW																		◆						
LS-VSC																			◆					
LS-VSW																				◆				
LS-VWC																					◆			
LS-VWW																						◆		
LS-VAC																							◆	
LS-VAW																								◆

Legend (example markings):
LS-ISC: LS - staircase lamp, I - Inga (product name), S - satyna (casing color), C - cold (color temperature)
LS-VAW: LS - staircase lamp, V - Vika (product name), A - anthracite (casing color), W - warm (color temperature)
cold color temperature (cold) => approx. 6000 K,
warm color temperature (warm) => approx. 3000 K

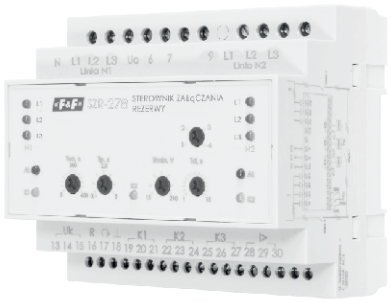
AUTOMATIC TRANSFER SWITCHING EQUIPMENT

PURPOSE

Automatic transfer switching equipment is used to control the work performance and accuracy of power lines and automatic switching power supply facility sources in the event of power line parameters decrease or total loss of voltage on the line.

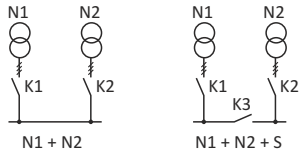
SZR-278

The SZR-278 is designed for automatic switching of power sources operating in the N1 + N2 or N1 + N2 + S configuration.



controlled lines	3×400V+N
supply voltage	24÷264V AC
maximum voltage	450V AC
frequency	45÷55Hz
number of controlled lines	2
number of relay outputs	4×NO/NC
maximum coil current of contactor	2A
lower voltage threshold	150÷210V AC
upper voltage threshold	270V AC
lower switch off time	1÷15s
upper switch off time	0.3s
line switching time	0.1÷5s
voltage asymmetry	80V
switch-off time at voltage drop	0.1s
power consumption	4W
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
dimensions	6 modules (105mm)
mounting	on TH-35 rail
ingress protection	IP20

OPERATING MODES

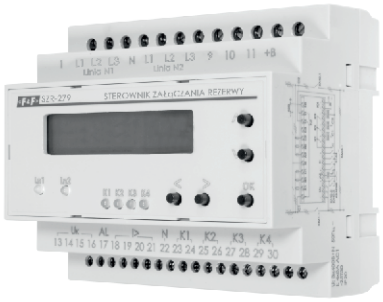


FEATURES OF THE CONTROLER

* Phase presence control;
* Phase sequence control;
* Phase asymmetry control;
* Monitoring of the minimum and maximum phase voltage;
* Control of contactors or switches with motor drive;
* Monitoring of contactors condition;
* Monitoring of the operation of circuit breakers;
* Can operate from an external power source;
* Operation in voltage range from 24 to 450 V;
* Can be used in 1-phase circuits;
* Automatic switching of reserve power in accordance with the specified algorithm;
* Protection of receivers from voltage above 400 V;
* Setting the operation time of the reserve switching system after switching off and restoring the main power supply;
* Manual control of actuators;
* Indication of the presence and correctness of input voltages;
* Status indicators (on/off/failure) of actuators;
* Software block against simultaneous switching on contactors;

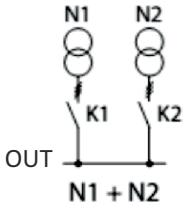
SZR-279

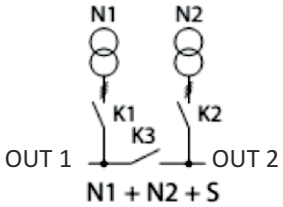
The SZR-279 reserve switching controller is designed for automatic switching of power sources in system of one or two power supply lines with the additional feature of controlling an emergency generator.

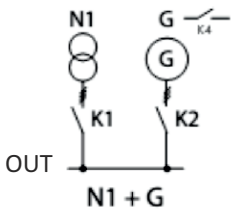


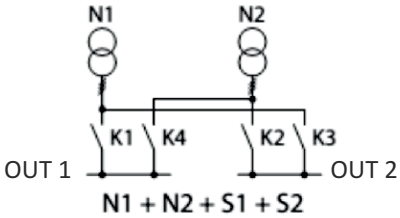
controlled lines	3×400V+N
supply voltage	24÷264V AC
maximum voltage	450V AC
frequency	45÷55Hz
number of controlled lines	2
number of relay outputs	4×NO/NC, 1×NO
maximum coil current of contactor	2A
lower voltage threshold	150÷210V AC
upper voltage threshold	230÷300V AC
lower switch off time	2÷30s
upper switch off time	0.3÷10s
line switching time	0.3÷30s
voltage asymmetry	20÷100V
generator start-up time	5÷100s
generator shutdown time	10÷200s
switch-off time at voltage drop	4s
power consumption	6W
working temperature	-25÷50°C
terminal	2.5mm² screw terminals
tightening torque	0.4Nm
dimensions	6 modules (105mm)
mounting	on TH-35 rail
ingress protection	IP20

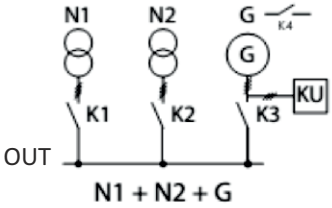
OPERATING MODES

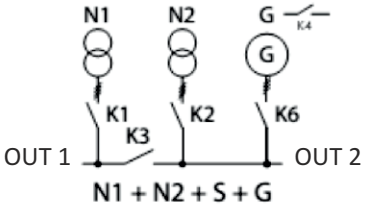












FEATURES OF THE CONTROLLER

* Phase presence control;
* Phase sequence control;
* Phase asymmetry control;
* Monitoring of the minimum and maximum phase voltage;
* Control of contactors or switches with motor drive;
* Monitoring of contactors condition;
* Monitoring of the operation of circuit breakers;
* Generator start signal;
* ALARM output;
* Controller settings locked with a PIN code;
* Can operate from an external power source;
* Operation in voltage range from 24 to 450 V;
* Can be used in 1-phase circuits;
* Automatic switching of reserve power in accordance with the specified algorithm;
* Protection of receivers from voltage above 400 V;
* Setting the operation time of the reserve switching system after switching off and restoring the main power supply;
* Manual control of actuators;
* Indication of the presence and correctness of input voltages;
* Status indicators (on/off/failure) of actuators;
* Indication of operating modes;
* Software block against simultaneous switching on contactors;
* Separated signaling and alarm outputs;
* Monitoring of the backup line from the generator.

FLC PROGRAMMABLE CONTROLLERS

PURPOSE

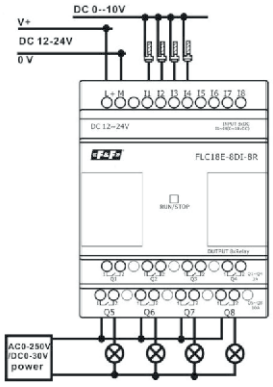
FLC is a universal, programmable logic controller, which can control the elements of domestic and industrial electrical installation (for example lighting control, roller blind control, watering the garden, control of simple machines). With the built-in user panel it does not require combining with costly external panels, while at the same time providing a user with a preview and configuration of the control system parameters. The controller is equipped with advanced communication interfaces and allows for easy connection to professional visualization stations (using the Modbus protocol).

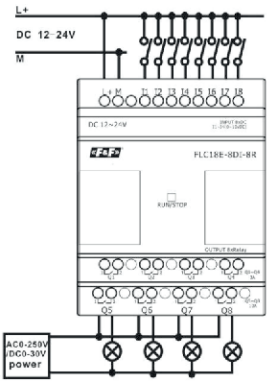
HARDWARE RESOURCES TABLE

Model	FLC12 8DI-4R	FLC18 12DI-6R	FLC18 E-8DI-8TN	FLC18 E4AI-I	FLC18 E3-PT-100	FLC18 E-RS485	FLC18 E-2AQ-VI
Type	CPU		Expansion module				
Power supply	12÷24V DC						
Digital inputs	8	12	8	-	-	RS-485	-
Analog inputs	4	6	4	4	4	-	-
Analog inputs type		voltage (0÷10 V DC)		current (0/4÷20 mA)	PT-100	-	-
Digital outputs	4	6	8	-	-	-	-
Digital outputs type	relay (10A/250 V AC)	transistor (PNP, 3A/60 V DC)	-	-	-	-	-
Analog outputs	-	-	-	-	-	-	2
Analog outputs type	-	-	-	-	-	-	voltage (0÷10 V DC) or current (0/4÷20 mA)
Fast meter	4		-	-	-	-	-
PWM	YES		-	-	-	-	-
RTC	YES		-	-	-	-	-
LCD	YES		-	-	-	-	-

FLC18E 8DI-8R

EXPANSION MODULE OF ANALOG-DIGITAL INPUTS/OUTPUTS





power supply	12÷24 V DC
resistance to temporary power failure	5 ms
starting current	250 mA
power	3.5÷4 W
inputs	
total number of inputs	8 (I1÷I8)
number of digital inputs	8 (I1÷IC)
number of analog inputs	4 (I1÷I4) (0÷10 V DC)
input voltage range	0÷28.8 V DC
input type	resistive
isolation between input and power supply	resistance
isolation between inputs	no
I1÷I4 analog inputs	
measuring range	0÷10 V DC
maximum input voltage	28.8 V DC
input impedance	34÷72 kΩ
resolution	9 Bit
voltage accuracy at 25°C	30 mV
voltage accuracy at 55°C	60 mV
outputs	
number of outputs	8 (Q1÷Q8)
output type	PNP transistor
continuous current, resistive load	300 mA
continuous current, inductive load	2 A
operating voltage (AC)	250 V
operating voltage (DC)	48 V
acceptable power load	300 W
electrical life, resistive load	10^5 cycles
mechanical durability	10^7 cycles
switching speed (mechanical)	10 Hz
short-circuit protection or surge protection	none
other parameters	
cooperation with the CPU modules	YES
working temperature	-25÷50°C
dimensions	71.5×90×58 mm
weight	300 g
terminal	2.5 mm² screw terminals
tightening torque	0.4 Nm
ingress protection	IP20

ELECTRIC SUPPLIERS AND TRANSFORMERS

ZI-15, ZI-16, ZI-17, ZI-20, ZI-21 12W PULSE

Type	Output voltage	Current
ZI-15	15V DC	0.8A
ZI-16	13.5V DC	0.9A
ZI-17	14.5V DC	0.8A
ZI-20	12V DC	1.0A
ZI-21	24V DC	0.5A

input voltage	100÷264V AC
output power	12W
current limit	Imax=110% Iout
working temperature	-10÷40°C
terminal	2.5mm² screw terminals
tightening torque	0.4 Nm
dimensions	1 module (18mm)
weight	80g
mounting	on TH-35 rail
ingress protection	IP20

ZI 10-12P / ZI 20-12P PULSE POWER SUPPLY FOR FLUSH-MOUNTED BOX

Type	Power	Current
ZI-10-12P	10W	0.85A
ZI-20-12P	20W	1.7A

input voltage	185÷265V AC
output voltage	12V DC
efficiency	82%
starting current	4A/20ms
leakage current	1mA
accuracy of output voltage stabilization	3%
overload	140÷160% Iout/10s
thermal protection threshold	70÷80°C
working temperature	-20÷35°C
terminal	2.5mm² screw terminals
tightening torque	0.4 Nm
dimensions	Ø54 (48×43mm), h=25mm
mounting	Ø60 flush-mounted box
ingress protection	IP20

PROTECTION

* Overload – in the case of overload or short circuit, the output voltage is automatically disconnected. The power supply cyclically attempts to switch on the power supply and when the cause of the protection ceases, the rated supply voltage is restored;
* Thermal – cuts off the output voltage. When the temperature drops to a safe value, the output voltage will be restored.

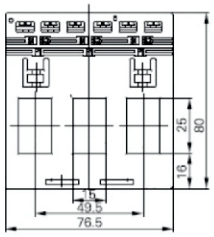
CURRENT TRANSFORMERS

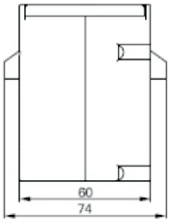
THREE-PHASE

PURPOSE

The 3-phase current transformer (3 in 1) is used for indirect measurements of three-phase currents. Its design allows for mounting directly on the outputs of the power switches (ABB series Isomax, Merlin Gerlin series NS and similar), saving installation time and place in the switchgear.

TP-100 / TP-150 / TP-200

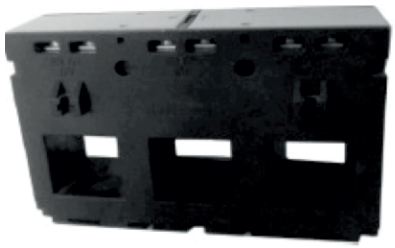




norm number	IEC 60044-1
nominal secondary current Is	5A
rated voltage	720V AC
insulation breakdown voltage	3kV/1min.
frequency	50/60Hz
safety factor	<5
thermal short-circuit current (Ith)	60×In
dynamic short-circuit-current (Idyn)	2,55×Ith
working temperature	-5÷40°C
S1/S2 terminal	4.0 mm² screw terminals
tightening torque	0.5 Nm
mounting	DIN rail/switchboard/wire
position	vertical/horizontal
ingress protection	IP20

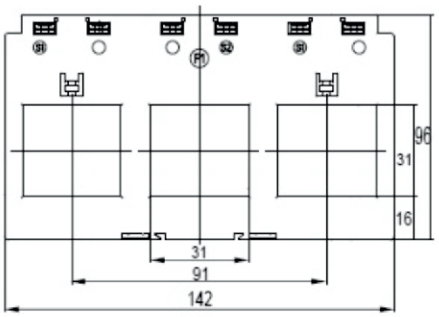
Type	Transformer Ip/Is	Class	Power [VA]	Dimensions of P1/P2 holes [mm]	Dimensions W×H×D [mm]	Weight [kg]
TP-100	100/5	1.0	1.5	15×21	76.5×74×80	0.452
TP-150	150/5	1.0	2.5	15×21	76.5×74×80	0.452
TP-200	200/5	1.0	2.5	15×21	76.5×74×80	0.452

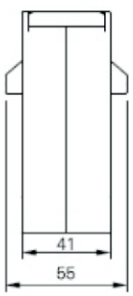
TP-400 / TP-600

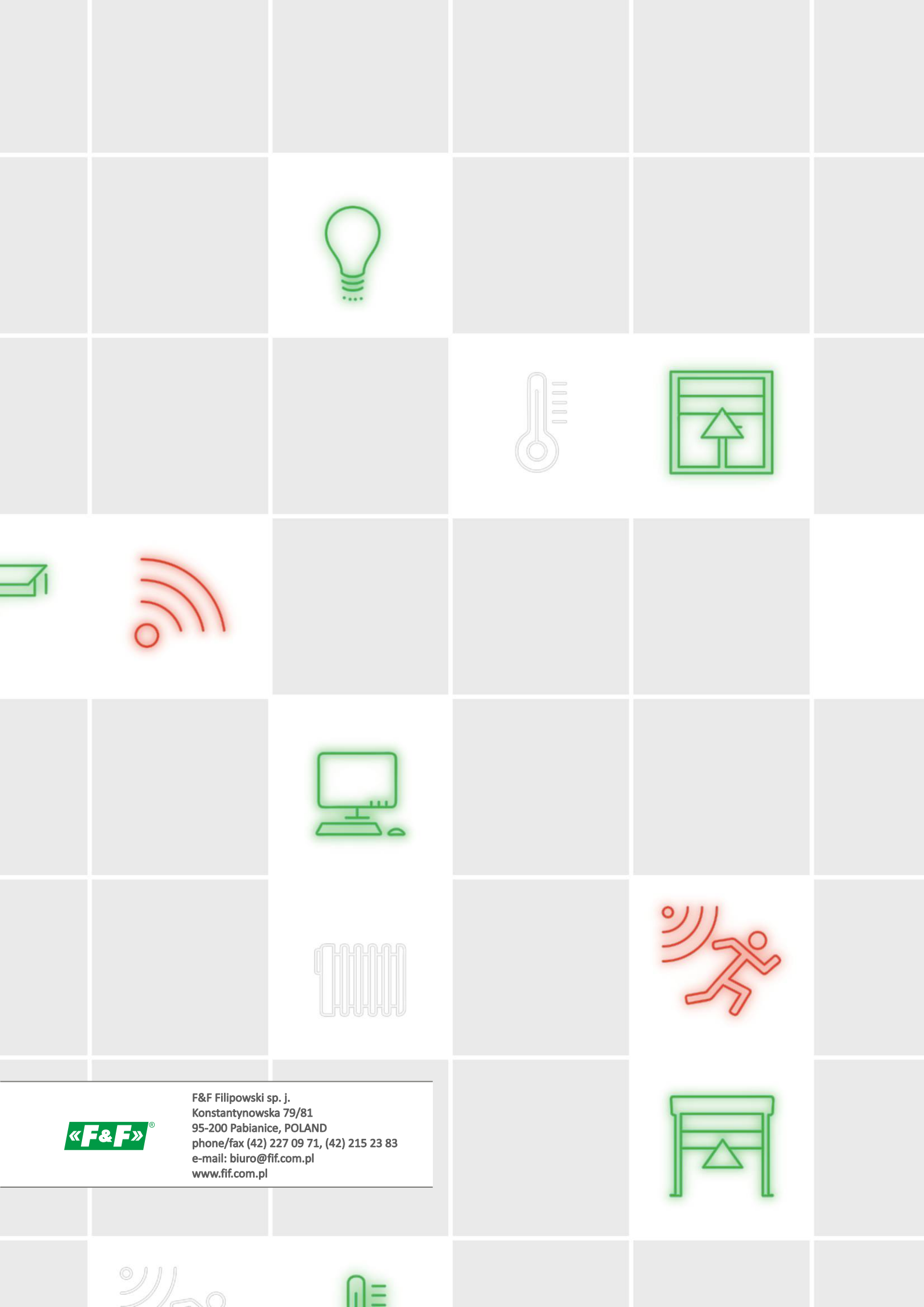


norm number	IEC 60044-1
nominal secondary current Is	5A
rated voltage	720V AC
insulation breakdown voltage	3kV/1min.
frequency	50/60Hz
safety factor	<5
thermal short-circuit current (Ith)	60×In
dynamic short-circuit-current (Idyn)	2,55×Ith
working temperature	-5÷40°C
S1/S2 terminal	4.0 mm² screw terminals
mounting	DIN rail/switchboard/wire
position	vertical/horizontal
ingress protection	IP20

Typ	Transformer Ip/Is	Class	Power [VA]	Dimensions of P1/P2 holes [mm]	Dimensions W×H×D [mm]	Weight [kg]
TP-400	400/5	1,0	3,75	31×31	142×55×96	0,570
TP-600	600/5	1,0	3,75	31×31	142×55×96	0,570







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