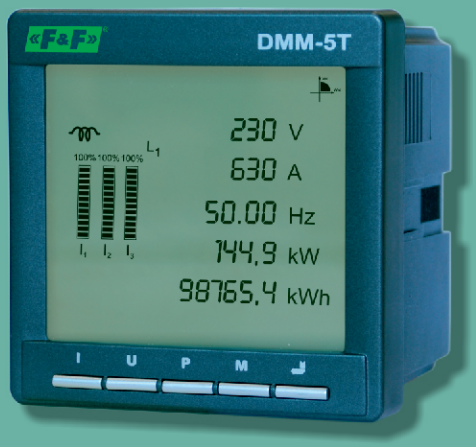
domestic and industrial automation

«F&F»®

Products catalogue

2015



proxi PLC MAX meternet PRO elFF F&Home F&Home RADIO

NEWS NEWS NEWS

2015 edition

2015 edition

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. The work of F&F's Research and Development department in cooperation with the scientific society and customers leads to expand and offer and allows to create devices on higher technological advancement level, exemplified by the series of programmable controllers and PLC MAX intelligent home system F&Home.

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.

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sales division: handlowy@fif.com.pl

technical division: dztech@fif.com.pl

DEKLARACJA ZGODNOŚCI WE
Declaration of EC-Conformity

CE

Nr 044/14

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

Niżej podpisany, reprezentujący producenta wymienionego powyżej niniejszym deklaruję, że wyrób
The undersigned, representing the manufacturer listed above hereby declare that the goods

Przetwornik sygnału
Signal transmitter
Typ: 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.

jest zgodny z postanowieniami następujących dyrektyw WE:
are compatible with the following directive EC:

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)
Low Voltage Directive
Regulation of the Minister of Economy of 20 December 2005 on essential requirements for electrical equipment (OJ No. 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)
Electromagnetic Compatibility Directive
The EMC Act of 13 April 2007 (OJ No 82, item. 556)

Normy i/lub dokumentacje techniczne, lub ich części, zastosowane do wyrobu, którego dotyczy niniejsza deklaracja zgodności
Standards and / or technical documentation, or portions thereof, applied to the product covered by this declaration of conformity

-normy zharmonizowane:
- harmonized standards:

PN-EN 61010-1: 2004

PN-EN 61000-4-2:06.2011
PN-EN 61000-4-6:08.2009
PN-EN 61000-4-3:12.2007
PN-EN 61000-4-4:06.2013
PN-EN 61000-4-5:05.2010
PN-EN 61000-4-11:07.2007
PN-EN 55022: 2011

Ostatnie dwie cyfry roku, w którym naniesiono oznaczenie CE: **14**
The last two digits of the year in which the CE marking was affixed: **14**

Pabianice 2

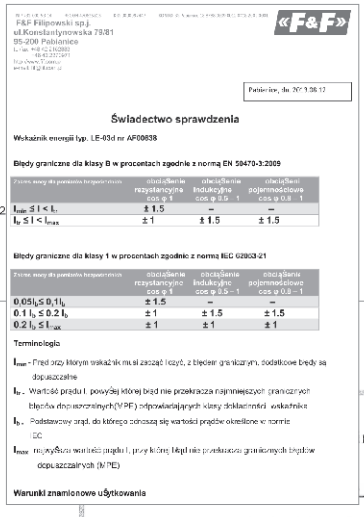
Sław

Dy

nazwisk
name a

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



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

«F&F»

Pabianice, dn. 20[illegible].06.12

Świadectwo sprawdzenia

Wskaźnik energii typ. LE-03d nr AF00838

Błędy graniczne dla klasy B w procentach zgodnie z normą EN 50470-3:2009

Punkty pracy dla pomiaru bezpośredniego	obciążenie rezystancyjne cos φ 1	obciążenie indukcyjne cos φ 0,5 – 1	obciążenie pojemnościowe cos φ 0,8 – 1
$I_{min} \leq I < I_t$	± 1,5	–	–
$I_t \leq I < I_{max}$	± 1	± 1,5	± 1,5

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

Punkty pracy dla pomiaru bezpośredniego	obciążenie rezystancyjne cos φ 1	obciążenie indukcyjne cos φ 0,5 – 1	obciążenie pojemnościowe cos φ 0,8 – 1
$0.05 I_b \leq 0,1 I_b$	± 1,5	–	–
$0.1 I_b \leq 0.2 I_b$	± 1	± 1,5	± 1,5
$0.2 I_b \leq I_{max}$	± 1	± 1	± 1

Terminologia

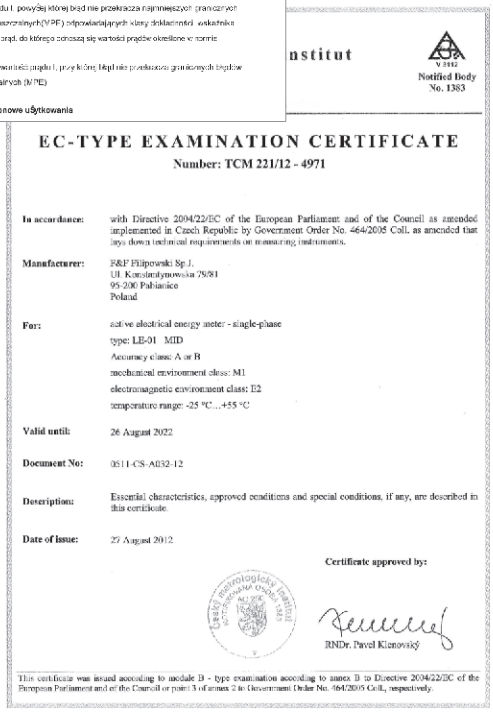
I_{min} - Prąd przy którym wskaźnik musi zacząć liczyć, z błędem granicznym, dodatkowe błędy są dopuszczalne

I_b - 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 prądów określone w normie IEC

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

Warunki znamionowe użytkowania



nstitut

V 3002
Notified Body
No. 1383

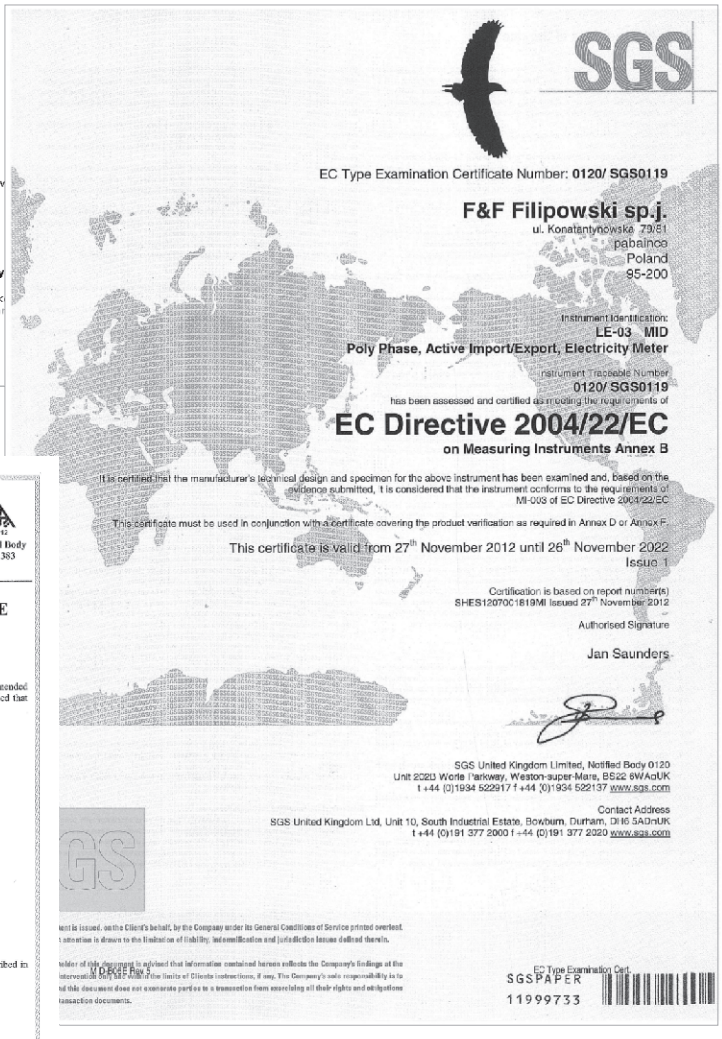
EC-TYPE EXAMINATION CERTIFICATE
Number: TCM 221/12 - 4971

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.



SGS

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

F&F Filipowski sp.j.
ul. Konstantynowska 79/81
pabianice
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 2203 Worle Parkway, Weston-super-Mare, BS22 6WA,UK
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t +44 (0)191 377 2000 f +44 (0)191 377 2020 www.sgs.com

SGS

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EC Type Examination Cert
SGSPAPER
11999733

PRODUCTION OFFER

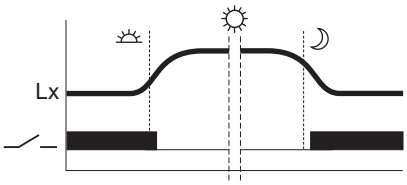
1. LIGHT DEPENDENT RELAYS

PURPOSE

Light dependent relay serves to switch-ON the lighting of streets, squares, shop windows, neon lamps etc., at twilight and to switch-OFF afore mentioned lighting at dawn.

FUNCTIONING

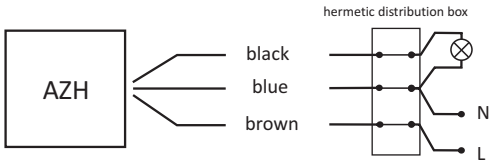
The relay should be situated at place with permanent access to day light, which, due to its changes of intensity, will cause switching ON and OFF the lighting. The exact time of switching the lighting can be set by potentiometer by the user . Turn in the direction of „half moon" will delay switching-ON, turning in the direction of „sun" will advance switching-ON. The relay is equipped with a delay system, which delays switching ON and OFF the lighting, thus eliminating the influence of accidental disturbances like thunder lightings on the relay functioning.



WITH INTERNAL LIGHT DEPENDENT SENSOR

AZH

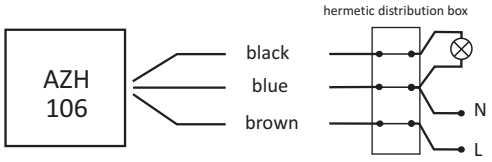
10A. Hermetic.



supply	230V AC
current load	<10A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	<5sec
switching OFF delay	<5sec
power consumption	0,56W
connection cable	OMY 3×0,75mm²; l=0,8m
working temperature	-25÷50°C
dimensions	50×67×26mm
fixing	2 screws to substrate
protection level	IP65

AZH-106

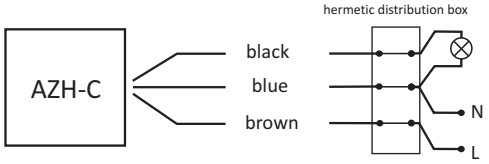
16A. Hermetic.



supply	230V AC
current load	<16A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	< 5sec
switching OFF delay	<5sec
power consumption	0,56W
connection cable	OMY 3×1mm²; l=0,8m
working temperature	-25÷50°C
dimensions	50×67×26mm
fixing	two screws to substrate
protection level	IP65

AZH-C

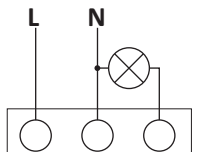
10A. Miniature. Hermetic.

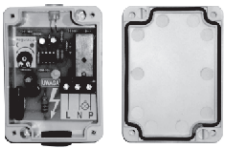


supply	230V AC
current load	<16A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	<5sec
switching OFF delay	<5sec
power consumption	0,56W
connection cable	OMY 3×0,75mm²; l=0,5m
working temperature	-25÷50°C
dimensions	81×33×25mm
fixing	two screws to substrate
protection level	IP65

AWZ 16A. Hermetic. With internal connection.
AWZ-30 30A. Hermetic. With internal connection.

Light dependent relay in box with special sealing flange, fastened to the substrate by two screws, closed by a cover with silicongasket and tightened by 4 screws.

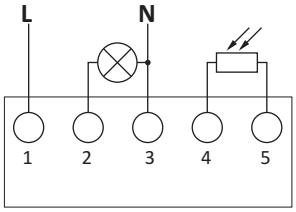




supply	230V AC
current load AWZ	<16A
AWZ-30	<30A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	<5sec
switching OFF delay	<5sec
power consumption	0,8W
connection AWZ	2,5mm² screw terminals
AWZ-30	4,0mm² screw terminals
working temperature	-25÷50°C
dimensions	60×85×35mm
fixing	two screws to substrate
protection level	IP65

WITH EXTERNAL HERMETIC PROBE

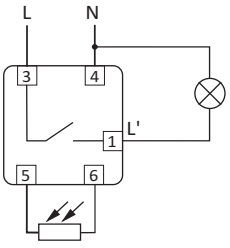
AZH-S / AZH-S PLUS



supply	230V AC
current load	<16A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	<5sec
switching OFF delay	<5sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	50×67×26mm
fixing	two screws to substrate
protection level	IP20

External hermetic probe Ø10 or PLUS including with automatic twilight sensor.

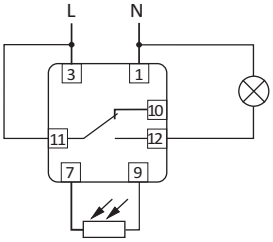
AZ-B / AZ-B PLUS
AZ-B UNI / AZ-B PLUS UNI



supply AZ-B / AZ-B PLUS	230V AC
AZ-B UNI / AZ-B PLUS UNI	12÷264V AC/DC
current load	<16A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	<5sec
switching OFF delay	<5sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
fixing	on rail TH-35
protection level	IP20

External hermetic probe Ø10 or PLUS including with automatic twilight sensor.

AZ-112 / AZ-112 PLUS



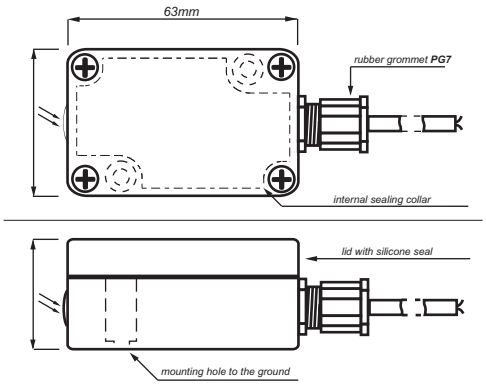
supply	230V AC
contact	1N/O
current load	<16A
switching threshold (setting range)	2÷1000Lx
switching threshold (factory setting)	approx. 7Lx
histeresis	approx. 15Lx
switching ON delay	<5sec
switching OFF delay	<5sec
power consumption	0,8W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
fixing	on rail TH-35
protection level	IP20

External hermetic probe Ø10 or PLUS including with automatic twilight sensor.

Hermetic external probe

PLUS

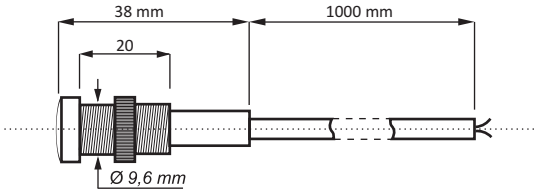
Applied in sets: **AZH-S PLUS, AZ-B PLUS, AZ-B PLUS UNI, AZ-112 PLUS.**
Available separately.



Optical sensor in convenient low dimensioned casing, to be connected by rubber grommet PG7 with round cable max. Ø7 mm, (for ex. 2× 0,5mm²) of length acc to necessity. Box with special sealing flange, fastened to the substrate by two screws, closed by a cover with silicon gasket and tightened by 4 screws.

Ø10

Applied in sets: **AZH-S, AZ-B, AZ-B UNI, AZ-112**.
Available separately.

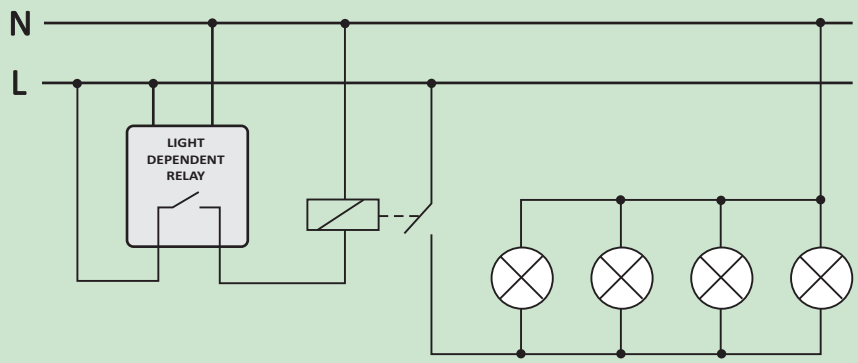


Little, easy to mount light dependent sensor with 1 meter cable with posibility to extend (connection of leads should be made in hermetic distribution box or at a place free from atmospheric influence.

ATTENTION!

The external probe should be situated at place with permanent access to day light, which due to its changes of intensity, will cause switching ON and OFF the lighting.
When length of connecting cable of external probe exceeds 10m it should not be laid in vicinity of a parallel conductor under mains voltage, or conducting great currents. In any case always connect correctly phase and neutral leads to the light dependent relay.

PRACTICAL SOLUTIONS



Control system for contactor-actuating receivers of total power consumption exceeding the maximum allowable load of a photo-sensitive switch.

ATTENTION!

Automatic twilight sensors for other voltages than specified in the technical data table are also available on special request (24V, 48V and 110V AC/DC and other).

2. STAIRCASE TIMERS

PURPOSE

Staircase timer serves to keep switched-ON lighting of staircase, corridor or any other object for the set time and to switch-OFF this lighting automatically, upon elapse of this set time.

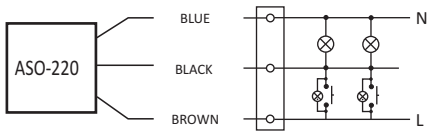
FUNCTIONING

Turned ON staircase timer supports the lighting during set time by potentiometer (from 0,5 min. to 10 min.). After passage of set time timer will switch OFF the lighting automatically. After switching OFF the lighting there is possibility to switch it ON again.

STANDARD TYPE

ASO-220 / ASO-110 / ASO-24

10A. With cable connection.

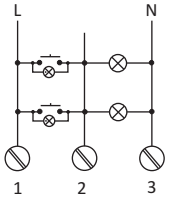


supply ASO-220	230V AC
ASO-110	110V AC
ASO-24	24V AC
current load	<10A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	0,56W
connection cable	OMY 3×0,75mm²; l=0,45m
working temperature	-25÷50°C
dimensions	50×67×26mm
fixing	two screws to substrate
protection level	IP65

ASO-220 is adapted to co-operate with pushbuttons equipped with neon lamp.

ASO-201 / ASO-204

16A. With screw terminals.

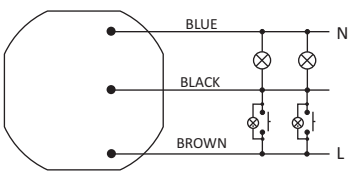


supply ASO-201	230V AC
ASO-204	24V AC
current load	<16A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	50×67×26mm
fixing	two screws to substrate
protection level	IP20

ASO-201 is adapted to co-operate with pushbuttons equipped with neon lamp.

ASO-205

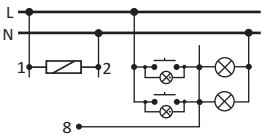
10A. To under plaster box.



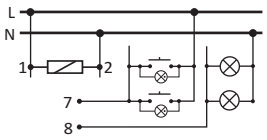
supply	230V AC
current load	<10A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	0,4W
connection	3×1mm²; l=10cm
working temperature	-25÷50°C
dimensions	Ø55, h=13mm
fixing	to under plaster box Ø60
protection level	IP20

ASO-205 is adapted to co-operate with pushbuttons equipped with neon lamp.

AS-B 220 / AS-B 110 / AS-B 24



4 wires connection

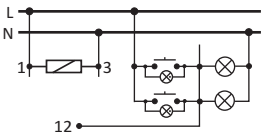


3 wires connection

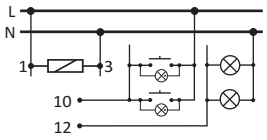
supply AS-B 220	230V AC
AS-B 110	110V AC
AS-B 24	24V AC
current load	<16A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	1,2W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
fixing	on rail TH-35
protection level	IP20

AS-B 220 is adapted to co-operate with pushbuttons equipped with neon lamp.

AS-212 / AS-214



4 wires connection



3 wires connection

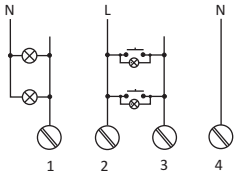
supply AS-212	230V AC
AS-214	24V AC
current load	<16A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
fixing	on rail TH-35
protection level	IP20

AS-212 is adapted to co-operate with pushbuttons equipped with neon lamp.

WITH ADDITIONAL FUNCTION OF COUNTER-BLOCKADE

Function of counter blockade does not allow to keep the light-ON in case of staircase switch blocking (after blocking the pushbutton, for example by match, the timer will count the set time and switch OFF the lighting). Next switching ON can be after removing the blockade.

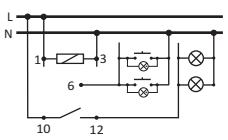
ASO-202 / ASO-203



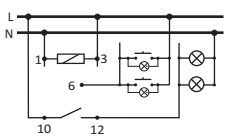
supply ASO-202	230V AC
ASO-203	24V AC
current load	<16A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	50×67×26mm
fixing	two screws to substrate
protection level	IP20

ASO-202 is adapted to co-operate with pushbuttons equipped with neon lamp.

AS-223 / AS-224



starting impuls: N



starting impuls: L

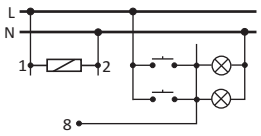
supply AS-223	230V AC
AS-224	24V AC
current load	<16A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
fixing	on rail TH-35
protection level	IP20

AS-223 is adapted to co-operate with pushbuttons equipped with neon lamp.

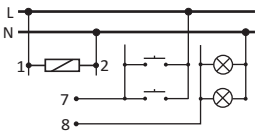
WITH FUNCTION OF SIGNALISATION OF LIGHTING SWITCHING OFF

AS-221T

Turned ON staircase timer supports the lighting during set time by potentiometer (from 0,5 min. to 10 min.) and upon elapse of this set time a reduction by half of lighting brightness follows for about 30 seconds, after that OFF follows (thus an occurrence of a sudden darkness is avoided, enabling safe approach to the switch). After switching OFF the lighting there is possibility to switch it ON again.



4 wires connection



3 wires connection

supply	230V AC
current load	<10A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
time of reduced brightness	30sec
power consumption	0,8W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
fixing	on rail TH-35
protection level	IP20

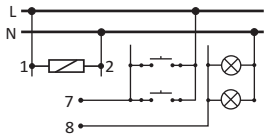
ATTENTION!

The AS-221T is not compatible with LED lamps, glow-discharge tubes, compact fluorescent lamps and other lighting devices including electric starters.

AS-222T

WITH COUNTER BLOCKADE

Turned ON staircase timer supports the lighting during set time by potentiometer (from 0,5 min. to 10 min.) and upon elapse of this set time a reduction by half of lighting brightness follows for about 30 seconds, after that OFF follows (thus an occurrence of a sudden darkness is avoided, enabling safe approach to the switch). After switching OFF the lighting there is possibility to switch it ON again. Function of counter blockade does not allow to keep the light-ON in case of staircase switch blocking (after blocking the pushbutton, for example by match, the timer will count the set time and switch OFF the lighting). Next switching ON can be after removing the blockade.



supply	230V AC
current load	<10A
switching OFF delay (to set)	0,5÷10min.
switching ON delay	<1sec
time of reduced brightness	30sec
power consumption	0,8W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
fixing	on rail TH-35
protection level	IP20

ATTENTION!

The AS-222T is not compatible with LED lamps, glow-discharge tubes, compact fluorescent lamps and other lighting devices including electric starters.

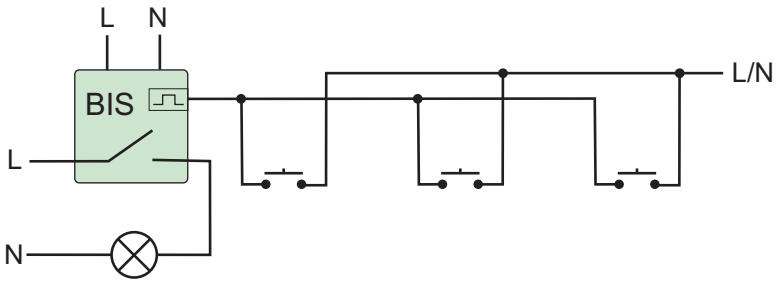
ATTENTION!

Automatic staircase switches for other voltages than specified in the technical data table are also available on special request (12V, 48V and 110V AC/DC and other). The offer does not include the AS-221T and AS-222T models.

3. ELECTRONIC BISTABLE PULSE RELAYS

PURPOSE

Electronic bi-stable pulse relays enables the user to actuate lighting or other devices from various locations by means of control buttons in parallel connection.



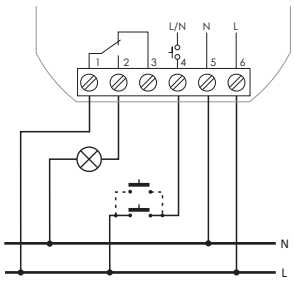
SWITCH ON - SWITCH OFF TYPE

FUNCTIONING

The receiver is actuated by means of a current pulse triggered by pushing any bell push connected to the relay. The receiver is deactivated by another pulse or after a preset time.

The relay does not “memorize” the position of the relay contact, i.e. in case of supply voltage decay and the subsequent return of supply voltage, the relay contact will be set in the off position. Such a solution prevents the automatic actuation of the receivers controlled that might occur without proper supervision after a long-lasting decay of supply voltage.

BIS-402



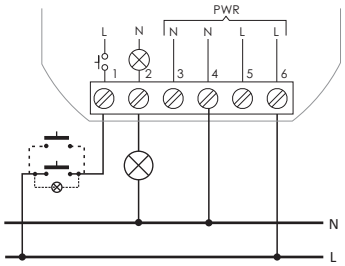
supply	230V AC
current load AC-1	<10A
L/N current control pulse	<1mA
activation delay	0,1÷0,2sec
power consumption	0,4W
working temperature	-25÷50°C
connection	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

ATTENTION!

The BIS-402 is not compatible with bell pushes equipped with fluorescent lamps.

BIS-408 / BIS-408i

NEW !



supply BIS-408(i)	100÷265V AC
contact / load current AC-1	
BIS-408	1Z / <16A
BIS-408i	1Z / <16A (160A/20ms)
current control pulse L	<5mA
response delay	0,1÷0,2sec
supply signalling	green LED
power consumption	
standby	0,15W
on	0,7W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=25mm
mounting	to under plaster box Ø60
protection level	IP20

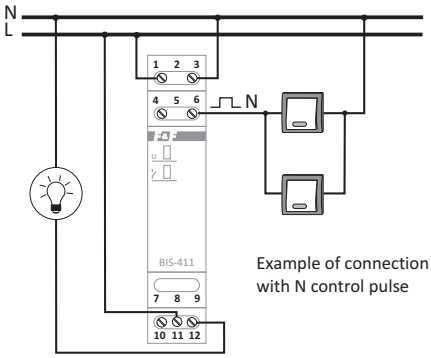
ATTENTION!

Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.

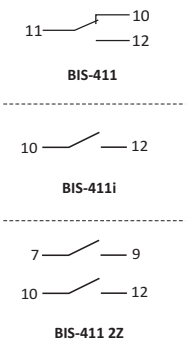
The BIS-408 and BIS-408i can be used with backlit buttons.

BIS-411 / BIS-411i / BIS-411 2Z

NEW !



Example of connection with N control pulse



supply BIS-411 (i/2Z) 230V	100÷265V AC
BIS-411 (i/2Z) 24V	24V AC/DC
contact / load current AC-1	
BIS-411	1P separated / <16A
BIS-411i	1P separated / <16A (160A/20ms)
BIS-411 2Z	2Z separated / 2×[<8A]
current N control pulse	<5mA
response delay	0,1÷0,2sec
supply signalling	green LED
signalling activation	red LED
power consumption	
standby	0,15W
on	0,6W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

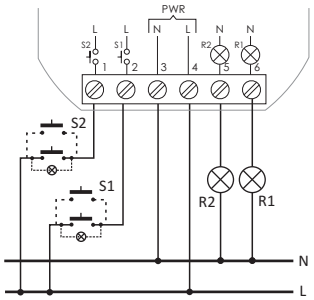
ATTENTION!

Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.
Power relay 230V versions can work with illuminated buttons.

BIS-416 2 INDEPENDENTLY CONTROLLED CIRCUITS

The relay has two independently controlled channels. Control is carried out by means of two separate signal inputs. Pulse on S1 input controls the R1 output. S2 input and R2 output operate on the same basis.

NEW !

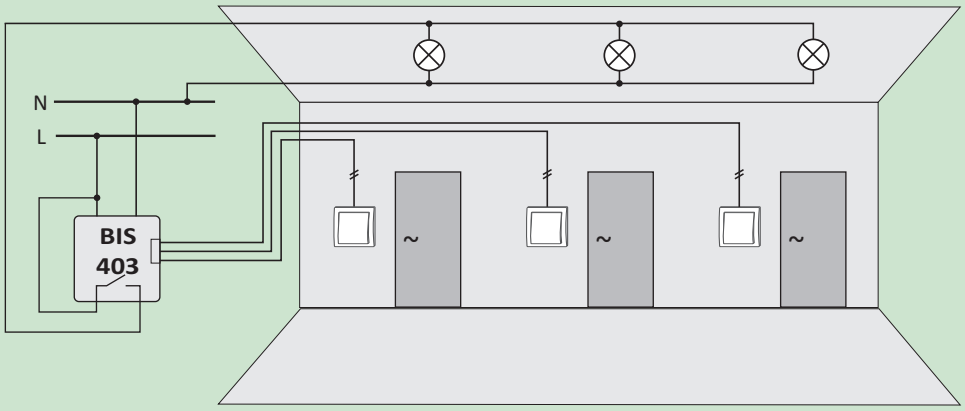


supply	100÷265V AC
contact / load current AC-1	2×1Z / 2×[<8A]
current control L pulse	<5mA
response delay	0,1÷0,2sec
supply signalling	green LED
power consumption	
standby	0,15W
on	0,6W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

ATTENTION!

BIS-416 can work with illuminated buttons.

PRACTICAL SOLUTIONS

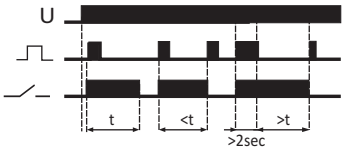


Example of control system for three-point hall lighting.

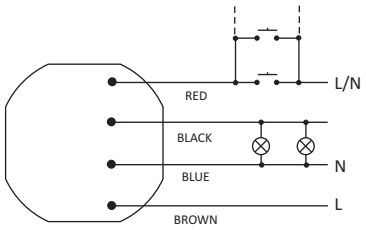
WITH TIMING SWITCH

FUNCTIONING

The receiver is actuated by means of a current pulse triggered by pushing any bell push connected to the relay. The receiver is deactivated by another pulse or after a preset time.
Press and hold the control button longer then 2 sec, that will effect the activate lighting permanently until the next pulse which will turn off the relay.
The relay does not “memorize” the position of the relay contact, i.e. in case of supply voltage decay and the subsequent return of supply voltage, the relay contact will be set in the off position. Such a solution prevents the automatic actuation of the receivers controlled that might occur without proper supervision after a long-lasting decay of supply voltage.



BIS-403



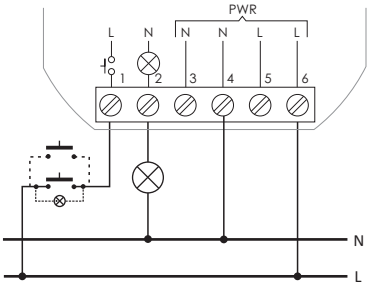
supply	230V AC
current load AC-1	<10A
controlling current	<1mA
activation delay	0,1÷0,2sec
switching OFF delay (to set)	1÷12min.
power consumption	0,8W
connection	4× DY 1mm², l=10cm
working temperature	-25÷50˚C
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

ATTENTION!

The BIS-403 is not compatible with bell pushes equipped with fluorescent lamps.

BIS-410 / BIS-410i

NEW !

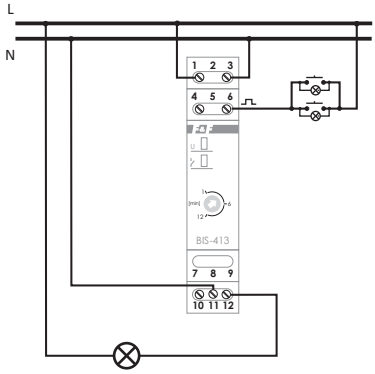


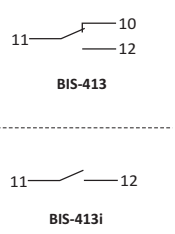
supply BIS-410 (i)	100÷265V AC
contact / load current AC-1	
BIS-410	1Z / <16A
BIS-410i	1Z / <16A (160A/20ms)
current control pulse L	<5mA
response delay	0,1÷0,2sec
off time	1÷15min.
supply signalling	green LED
power consumption	
standby	0,15W
on	0,7W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=25mm
mounting	to under plaster box Ø60
protection level	IP20

ATTENTION!

Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.

BIS-413 / BIS-413i





supply BIS-413(i) 230V	100÷265V AC
BIS-413 24V	24V AC/DC
contact / load current AC-1	
BIS-413	1P / <16A
BIS-413i	1P / <16A (160A/20ms)
L/N for current control pulse	<5mA
response delay	0,1÷0,2sec
off time	1÷12min.
supply signalling	green LED
signalling activation	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

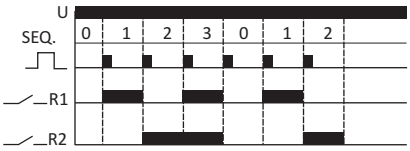
ATTENTION!

Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.
Power relay 230V versions can work with illuminated buttons.

SEQUENCE-TYPE

Sequential relay has two separate outputs: R1 and R2. Contact status (closed/open) is forced sequentially in accordance with a predetermined program. Contacts switch to another state after subsequent pulse from control button.

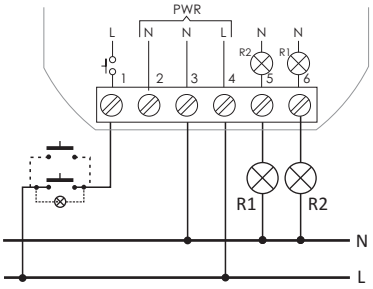
SINGLE FUNCTION



Sequence	Status of the contacts
0	Sections R1 and R2 disabled
1	Only section R1 enabled
2	Only section R2 enabled
3	Sections R1 and R2 enabled

Next pressing the repeat sequence 0-3.

BIS-404

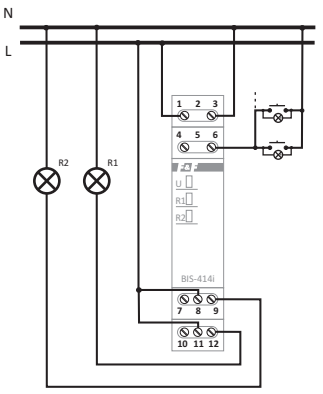


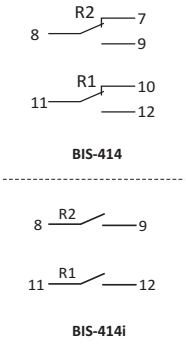
supply	100÷265V AC
contact / load current AC-1	2×1Z / 2×[<8A]
current control L pulse	<5mA
delay of response	0,1÷0,2sec
signalling of supply	green LED
power consumption	
standby	0,15W
on	0,6W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

BIS-404 can work with illuminated buttons.

BIS-414 / BIS-414i

NEW !



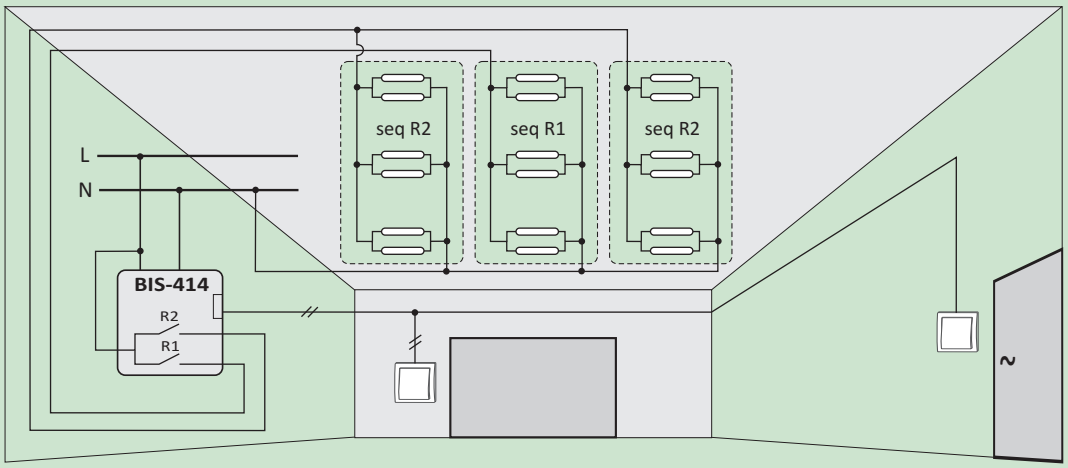


supply	BIS-414(i) 230V	100÷265V AC
	BIS-414(i) 24V	24V AC/DC
contact / load current AC-1		
BIS-414		separated 2×1P / 2×16A
BIS-414i		separated 2×1Z / 2×16 (160A/20ms)
current control pulse		<5mA
delay of response		0,1÷0,2sec
signalling of supply		green LED
signalling activation		2× red LED
power consumption		
standby		0,15W
on		0,9W
working temperature		-25÷50°C
terminal		2,5mm² screw terminals
dimensions		1 module (18mm)
mounting		on TH-35
protection level		IP20

ATTENTION!

Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.
Power relay 230V versions can work with illuminated buttons.

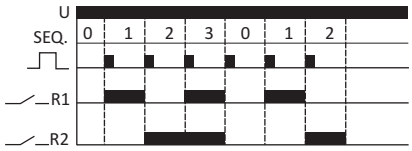
PRACTICAL SOLUTIONS



Example of lighting system, which allows control of light intensity by actuating one of the sections R1 and R2 from any location in the room.

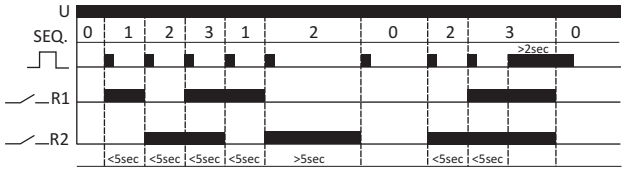
4-FUNCTION

A mode



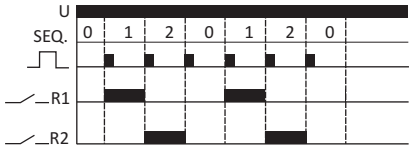
* Next pressing the repeat sequence 0-3.

B mode



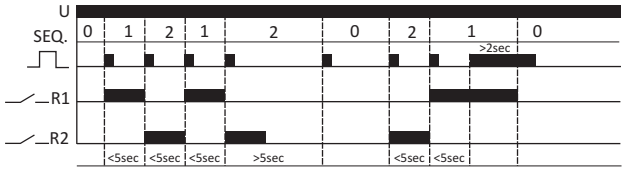
* Pressing in less than 5 seconds, repeating sequences 1-3.
* Pressing after more than 5 seconds, disconnect both contacts (sequence 0).
* Long press - in any sequence - disconnects both contacts (sequence 0).
* If you turn off both relays pressing the button again restores the state before power (memory state). Does not apply to the case of a power failure relay.

C mode



* Next pressing the repeat sequence 0-3.

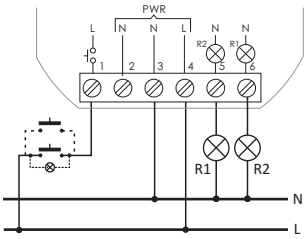
D mode



* Pressing in less than 5 seconds, repeating sequences 1-3.
* Pressing after more than 5 seconds, disconnect both contacts (sequence 0).
* Long press - in any sequence - disconnects both contacts (sequence 0).
* If you turn off both relays pressing the button again restores the state before power (memory state). Does not apply to the case of a power failure relay.

BIS-409

NEW !

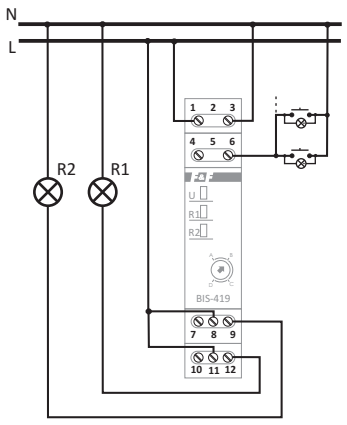


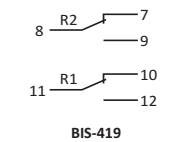
supply	100÷265V AC
contact / load current AC-1	2×1Z / 2×[<8A]
current control L pulse	<5mA
delay of response	0,1÷0,2sec
signalling of supply	green LED
power consumption	
standby	0,15W
on	0,6W
working temperature	-25÷50°C
terminal	2,5mm² screw terminal
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

BIS-409 can work with illuminated buttons.

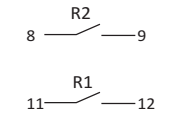
BIS-419 / BIS-419i

NEW !





BIS-419



BIS-419i

supply BIS-419(i) 230V	100÷265V AC
BIS-419(i) 24V	24V AC/DC
contact / load current AC-1	
BIS-419	separated 2×1P / 2×16
BIS-419i	separated 2×1Z / 2×16 (160A/20ms)
current control N pulse	<5mA
delay of response	0,1÷0,2sec
signalling of supply	green LED
signalling activation	2× red LED
power consumption	
standby	0,15W
on	0,9W
working temperature	-25÷50°C
terminal	2,5mm² screw terminal
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

ATTENTION!

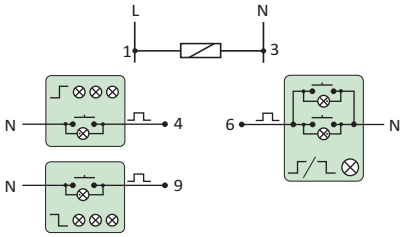
Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.
Power relay 230V versions can work with illuminated buttons.

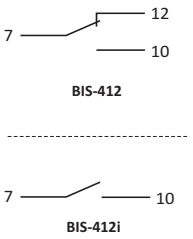
GROUP-TYPE (HOTEL-TYPE)

BIS-412 / BIS-412i WITH CONTROLLING INPUTS „ACTIVATE ALL" I „DEACTIVATE ALL"

PURPOSE

BIS- 412 electronic bi-stable pulse relay is designed for operation in a group configuration. A single relay enables the activation and deactivation of the receiver controlled after each current pulse triggered by pushing a local control momentary push-button (bell-push). The group configuration enables the deactivation or activation of all receivers connected to individual relays by means of the central control push-buttons.





supply BIS-412(i) 230V	100÷265V AC
BIS-412(i) 24V	24V AC/DC
contact / load current AC-1	
BIS-412	separated 1P / <16
BIS-412i	separated 1P / <16 (160A/20ms)
current control N pulse	<5mA
delay of response	0,1÷0,2sec
signalling of supply	green LED
signalling activation	red LED
power consumption	
standby	0,15W
on	0,6W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

FUNCTIONING

Local control

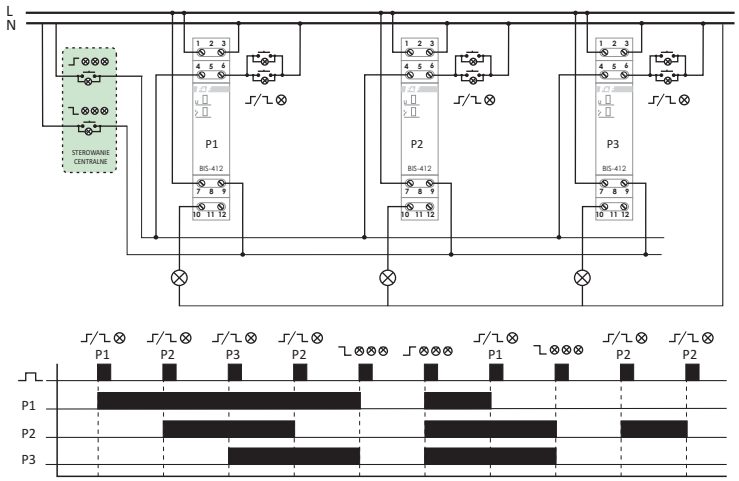
The receiver is activated after a current pulse that is triggered by pushing one optional momentary push-button ⎍/⎏⊗ belonging to the local control group. The contact of the relay is switched to the 7-10 position. After a next current pulse, the receiver will be deactivated (the contact of the relay returns to the 7-12 position).

Central control

DEACTIVATE ALL - after a current pulse triggered by pushing the momentary push-button ⎏⊗⊗⊗, all receivers will be deactivated (regardless of their status, i.e. deactivation or activation) that are controlled separately by individual relays. The contact in each relay will be switched to the 7-12 position.

ACTIVATE ALL - after a current pulse triggered by pushing the momentary push-button ⎍⊗⊗⊗, all receivers will be activated (regardless of their status, i.e. deactivation or activation) that are controlled separately by individual relays. The contact in each relay will be switched to the 7-10 position.

Group system diagram

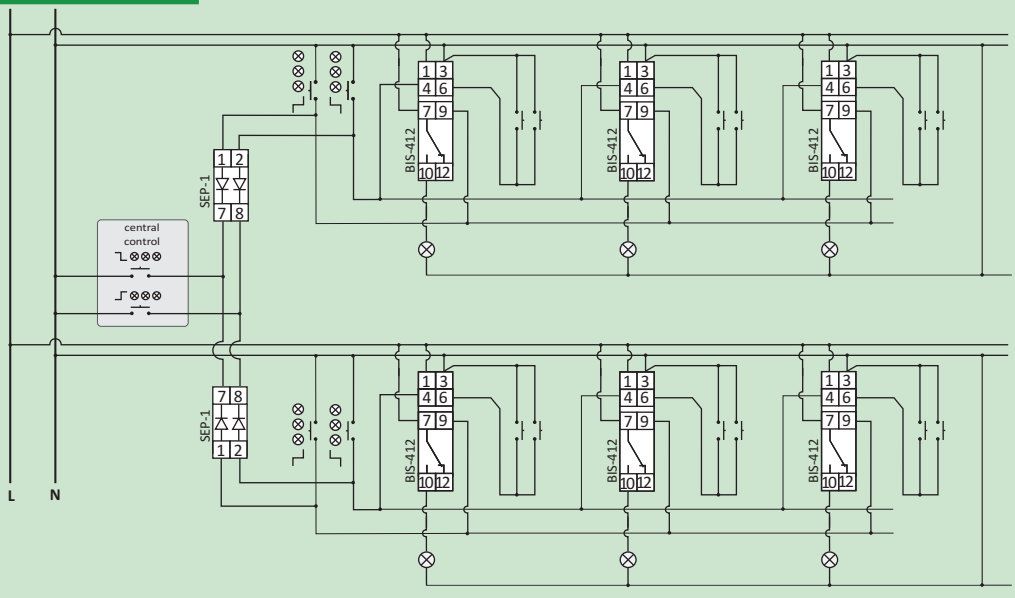


ATTENTION!

Relay version "i" is to pin adapted to cooperate with the receivers with high starting current, such as LED fluorescent lamps, ESL fluorescent lamps, electronic transformers, discharge lamps, etc.

Power relay 230V versions can work with illuminated buttons.

PRACTICAL SOLUTIONS



Example of division into subgroups using SEP-01 incoming signal separators (see chapter 28)

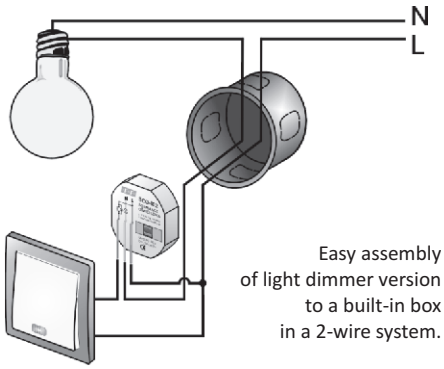
4. LIGHT DIMMERS

PURPOSE

The dimmer is used for switching on and off lighting and offers the option of light intensity adjustment by means of any impulse switch (buzzer).

FUNCTIONING

Lighting is turned on by a current pulse sent after pressing an impulse switch (buzzer) connected to a relay. Another pulse switches the lighting off. Pressing and holding the switch for more than 1 second allows the user to adjust light intensity (continuous loop adjustments in the following sequence: BRIGHTER→DARKER→BRIGHTER).
Light intensity may be controlled by means of numerous switches in a parallel connection, distributed in several locations within a room.
SCO are adapted to co-operate with pushbuttons equipped with neon lamp.



Easy assembly
of light dimmer version
to a built-in box
in a 2-wire system.

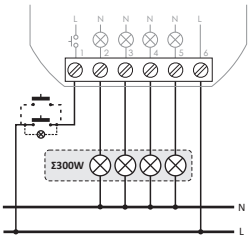
SUITABLE FOR INCANDESCENT AND HALOGEN LAMPS

Including those powered with electronic or transformer-based feeders adapted to dimmers.

NO „STORAGE" OF LIGHT INTENSITY SETTINGS ENABLED

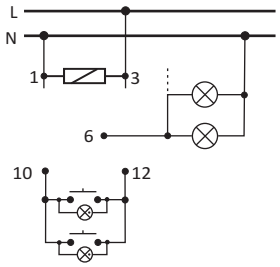
The lighting returns to its maximum intensity after each activation.

SCO-801 300W



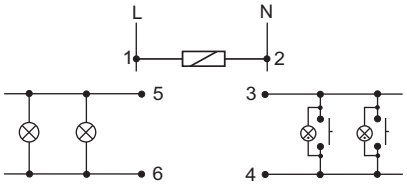
supply	230V AC
current load	<1,3A
max. power connected lamps	300W
current pulse	<1sec
power consumption	0,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

SCO-811 350W



supply	230V AC
current load	<1,5A
max. power connected lamps	350W
current pulse	<1sec
power consumption	0,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

SCO-813 1000W

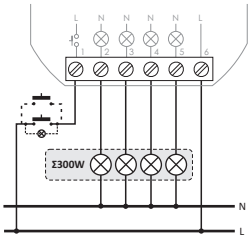


supply	230V AC
current load	<4,5A
max. power connected lamps	1000W
current pulse	<1sec
power consumption	0,3W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

A FUNCTION OF LIGHT INTENSITY SETTING „STORAGE” ALLOWED

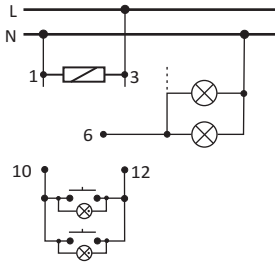
The lighting returns to the preset intensity after each activation.

SCO-802 300W



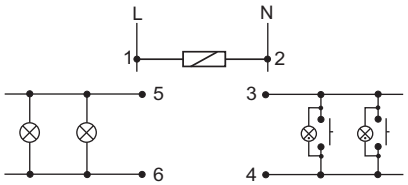
supply	230V AC
current load	<1,3A
max. power connected lamps	300W
current pulse	<1sec
power consumption	0,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

SCO-812 350W



supply	230V AC
current load	<1,5A
max. power connected lamps	350W
current pulse	<1sec
power consumption	0,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

SCO-814 1000W

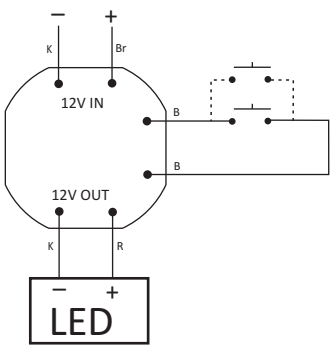


supply	230V AC
current load	<4,5A
max. power connected lamps	1000W
current pulse	<1sec
power consumption	0,3W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

LIGHTING DIMMERS LED 12V

with „storage”of light intensity settings enabled

SCO-803 36W

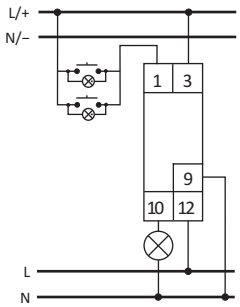


supply	12V DC
max. power of connected LED	<36W
current pulse duration	<1sec
power consumption	0,1W
working temperature	-25÷50°C
connection	6×LY 0,75mm, l=10cm
dimensions	Ø55, h=13mm
fixing	to under plaster box Ø60
protection level	IP20

LIGHT DIMMER

Used for incandescent lamps, halogen lamps, LED lamps, compact fluorescent lamps with the dimming possibility

SCO-815



supply		230V AC
max. power of connected lamps		
	(R)	500W
	(L)	500W
	(C)	500W
	(ESL)	100W
	(LED)	100W
control voltage		8÷230V AC/DC
current pulse duration		<1sec
power consumption		0,1W
tworking temperature		-20÷50°C
connection		2,5mm² screw terminals
dimensions		1 module (18mm)
fixing		on rail TH-35
protection level		IP20

PURPOSE

Universal lighting dimmer enables to adjusts the brightness of light the following light sources:
- Incandescent lamps and halogen main series (resistive load R)
- Lamps powered by a toroidal supplier (inductive load L)
- Lamps powered by electronic transformer (capacitive load C)
- Energy-saving compact fluorescent lamps (ESL) with dimming function
- LED lamps powered 230V with dimmable function

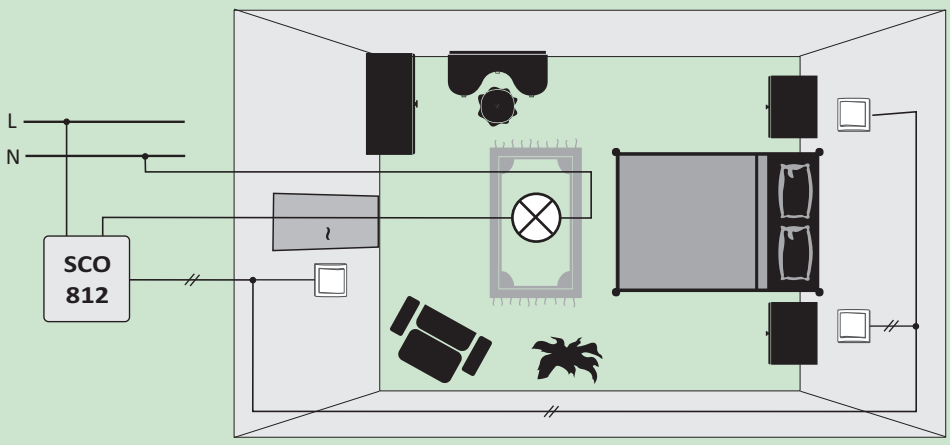
FUNCTIONING

The inclusion of light followed by a current pulse caused by a momentary push button (bell) connected to the relay. Lighting can be controlled through a number of buttons arranged in parallel at different points in the building. Disabling lighting will be after the next impulse. Holding down the button >1sec enables to set the desired light intensity (continuously adjustable lighting in the loop (Lighter / Darker / Lighter).

FUNCTIONS

- Automatic detection of the nature of the load L+R and R+C. The use of ESL lamps requires manual settings for nature of the load with dimmer knob on the forehead.
- Speed setting for brightness adjustment.
- „Memory" light intensity settings - after each inclusion lighting returns to the desired brightness.
- Function „SOFT START" - holding the button >1sec. at switch on lights causes the smoothly illumination from „zero" (dark / bright).
- Setting a minimum level of light-controlled lamps (particularly important for ESL lamps, requiring a minimum current of ignition and sustain).
- ON mode - switching to the maximum brightness of lighting without dimming.
- Control input galvanically isolated from the network with a wide range of input voltage 8÷230V AC / DC.
- Continuously adjustable lighting up and down in order to prolong the life of controlled lamp.

PRACTICAL SOLUTIONS



Example of lighting control system from three locations within a room.

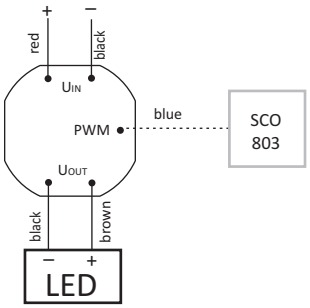
5. LIGHTING CONTROLLERS

DC POWER SUPPLY POWER LED (POWER LED DRIVER)

PLD-01 350 / 750

PURPOSE

LED power supply requires a suitable source of supply. In the case of current exceeding a specified value followed by a deterioration of work performance LED. PLD-01 is used to stabilize the output current of power diodes.



input voltage	5÷40V DC
max. current output stabilized	
PLD-01 350 [for LED 1W]	350mA
PLD-01 750 [for LED 3W]	750mA
power of conected LED	
PLD-01 350 [for LED 1W]	14W
PLD-01 750 [for LED 3W]	30W
power consumption	0,1W
working temperature	-20÷50°C
terminal	5×LY 0,75mm² , l=10cm
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

ATTENTION!

PLD-01 cooperate with dimmer LED SCO-803 (see page 17).

„SOFT START" FOR HALOGEN LAMP

PURPOSE

MST is used to reduce the starting current of halogen lamps. This prevents over-connected lamps, in effect extending their service life.

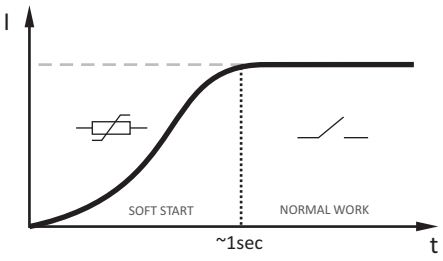
FUNCTIONING

At the time of switching on the controller does not allow for immediate switch ON of light to full power. Initially the lamp system is powered by internal thermistor which limiting current circuit. After a time of 1sec, system switches to permanent contact, through which passes a full load of receivers.

ATTENTION!

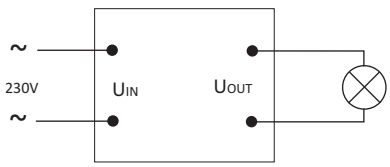
No effect gradually illuminating of lamps.

MST-01



input voltage	230V AC
output voltage	230V AC
contact	1Z
current load	8A
rise time	1sec
power consumption of detection sensor	0,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
fixing	on rail TH-35
protection level	IP20

MST-02

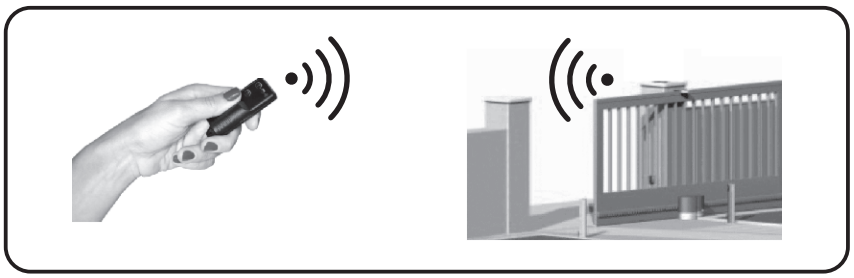


input voltage	230V AC
output voltage	230V AC
contact	1Z
current load	8A
rise time	1sec
power consumption of detection sensor	0,1W
working temperature	-25÷50°C
connection	2,5mm² screw terminals
dimensions	50×67×26mm
fixing	two screws to substrate
protection level	IP20

6. RADIO CONTROL RELAYS

PURPOSE

Electronic relays are used for radio remote control of gates, shutters, lighting, arming alarm systems etc. The remote control system consisting of a transmitter (remote) and receiver (relay). There is a possibility of cooperation between many transmitters to one receiver and one transmitter to multiple receivers.



FUNCTIONING

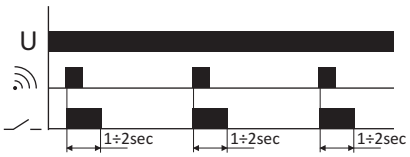
The impulse caused by the push of a button on the remote control to send a coded signal to the receiver. Remote control is protected against break transmission after releasing the button. Thanks to this, even the shortest activation function is the full frame of data transmissions. Data transmission from the remote control is indicated by flashing of red LED on the remote. The range of the system is up to 100m (range depends on many factors, among others on: the weather (humidity), terrain characteristics (reflection), placement of the receiver and transmitter and all kinds of obstacles such as walls).

RECEIVERS

Receivers are designed for under plaster box montage. In receiver's non-volatile memory can be store up to 32 transmitters.
Radio receivers RS-407 B i RS-407 M cooperate with dedicated production units F&F: transmitter RS-N and RS-P.

RS-407 M MONOSTABLE TYPE

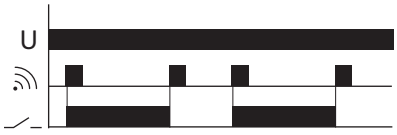
The push transmiter's button will effect of closes the receiver's contact of X1-X2 at time 1 ~ 2 sec (pulse).

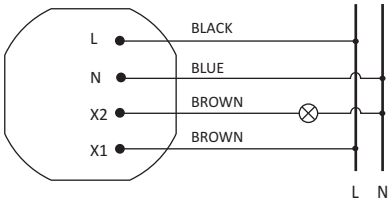


supply	230V AC
current load	<5A
contact	separated 1Z
signalling of recieiving/programming	red LED
state of contact	green LED
power consumption	0,8W
connection	4×LY 1mm²; l=10cm
working temperature	-25÷50°C
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

RS-407 B BISTABLE TYPE

The push transmiter's button will effect of closes the receiver's contact on the opposite interface (ON/OFF).

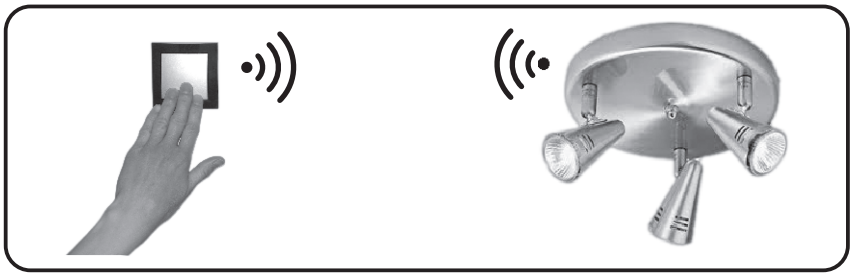




TRANSMITERS

The impulse caused by the push of a button on the remote control to send a coded signal to the receiver. Remote control is protected against break transmission after releasing the button. Thanks to this, even the shortest activation function is the full frame of data transmissions.
Data transmission from the remote control is indicated by flashing of red LED on the remote.
Radio transmitters cooperate with dedicated production units F&F: monostable receiver RS-407 M monostable and bistable receiver RS-407 B.

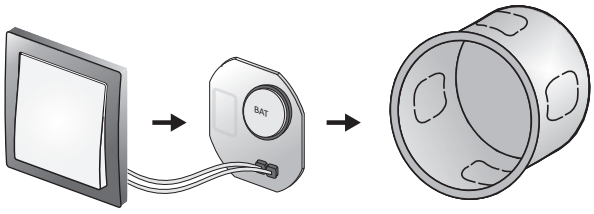
RS-N... TO UNDER PLASTER BOX TRANSMITER



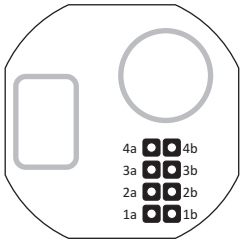
The transmitter for installation in inder plaster box. It has a stand-alone battery powered, which eliminates the need for a power cable at the mounting location of buttons. For the control we can use the monostable (instantaneous) buttons of any series wiring accessories.

Type	Function
RS-N1	one-button
RS-N2	two-button
RS-N3	three-button
RS-N4	four-button

supply	3V
battery type	CR2032
transmission	dynamic, variable code
frequency	868Mhz
coding	Keelog®
working temperature	-25÷50°C
connection	LGY 0,5mm²
dimensions	Ø52, h=11mm
fixing	to under plaster box Ø60



fixing to under plaster box



channels conections

RS-P... REMOTE CONTROL

The small remote as a pendant.

Type	Function
RS-P1	one-button
RS-P2	two-button
RS-P3	three-button
RS-P4	four-button

supply	12V
battery type	A23
transmission	dynamic, variable code
frequency	868Mhz
coding	Keelog®
working temperature	-25÷50°C
color	black
dimensions	30×68×14mm

7. REMOTE CONTROL SYSTEM BLUETOOTH SMART

getproxi.com

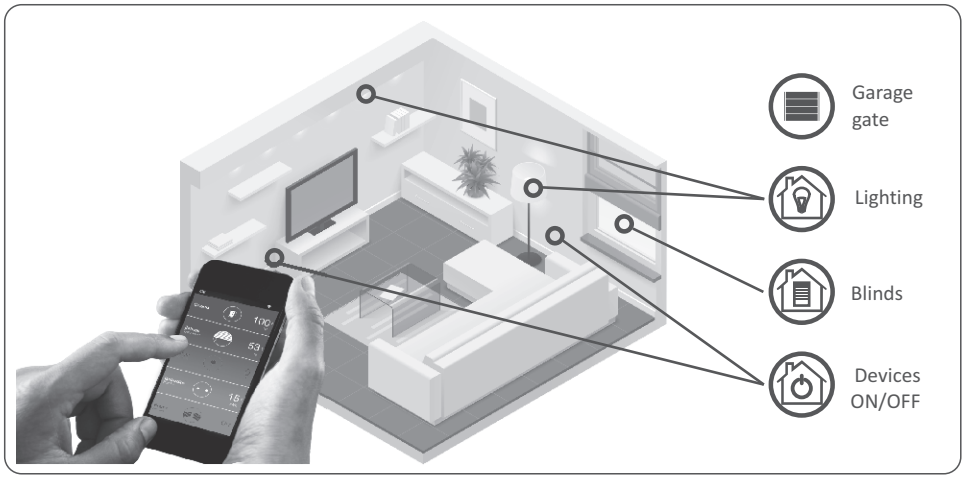
NEW !

proxi

Controlling:
BluetoothSMART

PURPOSE

Proxi is an innovative wireless control system for electrical equipment in homes and apartments. The control is carried out via Bluetooth Smart Technology. The system consists of dedicated relays and free software application for both smartphones and tablets running Android or iOS (Apple). Installed relays are automatically added to the app list of devices and immediately ready to control.



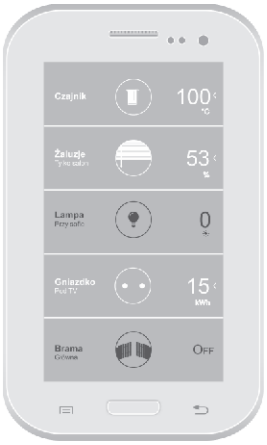
Aplication available on:

Android

iOS

SYSTEM FEATURES:

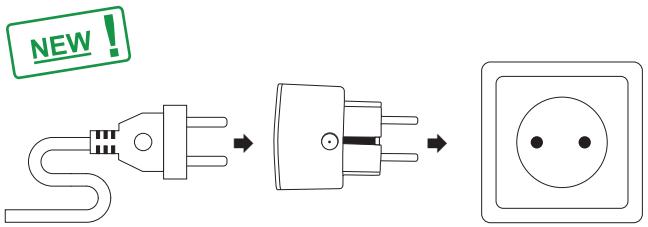
* **Remote control**
  Control a wide range of devices without central stations, controllers, Wi-Fi routers.
* **Wireless communication**
  Two-way transmission of commands, confirmations and other information between your phone and the device.
* **Easy to install**
  Easy to connect to an existing installation.
* **Ease of use**
  No programming, easy to use application with a friendly interface.
* **Safety**
  Secure communication and the ability to manage access rights to the devices.
* **Notification support**
  Presentation of equipment operating status, activity, alerts and diagnostic information.
* **NFC contactless features**
  Automatic control of the devices in proximity, recognizing the presence of the user, Apple iBeacon.
* **Access Management**
  Device configuration in public and private modes, sharing devices, privacy protection.
* **Settings personalization**
  Editing devices and premises, individual layout.
* **Scenarios**
  Simultaneous control of the devices within established groups.
* **The prevalence of control devices**
  Phones and tablets running iOS7 and Android 4.3+ and equipped with Bluetooth SMART Low Energy.



Proxi Plug

PLUG

Relay module in the form of an adapter for a power socket designed to control the on-off 230 V receive. Plug is controlled using a mobile application and manually with the button on the unit. LED located in the button indicates the operating status and load (LED color change depending on the load).

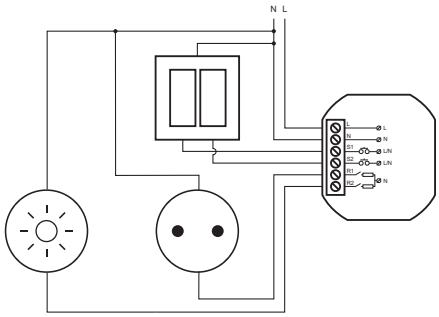


supply	230V AC
output	contact 1Z (13A 250V AC)
power of connected receiver	3000W
socket type	E EEC 7/4
	schuko F EEC 7/5
Bluetooth transmission	
frequency	2,4GHz
signal power	1mW
transmission	two directional
coded	AES
range	30m
power consumption	0,2÷0,8W
working temperature	0÷65°C
thermal protection	YES
dimensions	44×44×70mm

Proxi Power

rB–R2S2 relay on / off

Relay module designed to control any two devices or electrical circuits. Easy installation in the boxof a power socket allows you to install the module without the need for invasive and costly renovations.

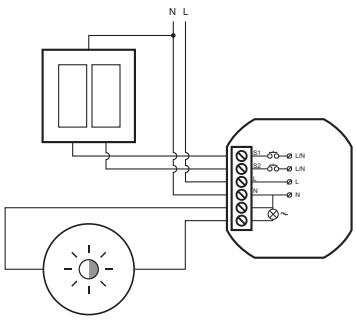


supply	230V AC
L/N input control	×2
L/N pulse current	<1mA
outputs	contact 2×1Z (4A 250VAC)
Bluetooth transmission	
frequency	2,4GHz
signal power	1mW
transmission	two directional
coded	AES
range	30m
power consumption	1W
working temperature	0÷45°C
thermal protection	YES
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

Proxi Light

rB–D1S2 lighting dimmer

The module is designed to control a variety of light sources with smoothly adjustable light intensity. The module can be installed in classical electrical box and allows you to connect the receiver and one or two switches. Light can be remotely controlled directly from your phone and with buttons.



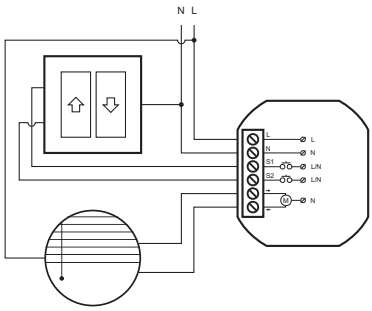
supply	230V AC
L/N input control	×2
L/N pulse current	<1mA
outputs	
resistive load	150W
inductive load	100W
Bluetooth transmission	
frequency	2,4GHz
signal power	1mW
transmission	two directional
coded	AES
range	30m
power consumption	0,4W
working temperature	0÷45°C
thermal protection	YES
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=20mm
mounting	to under plaster box Ø60
protection level	IP20

Proxi Shade

rB–TSR1S2 blind controller

The radio module is designed to control the drives of roller shutters, blinds, screens, awnings and curtains offered by different manufacturers. The module can be installed in an electrical box and connected to the two-keys switch (used in traditional solutions) or installed directly on/in unit.

NEW !



supply	230V AC
L/N input control	×2
L/N pulse current	<1mA
outputs	0,6A AC-3 /230V
Bluetooth transmission	
frequency	2,4GHz
signal power	1mW
transmission	bi-directional
coded	AES
range	30m
power consumption	1W
working temperature	0÷45°C
thermal protection	YES
terminal	2,5mm² screw terminals
dimensions	Ø54 (□48×43mm), h=25mm
mounting	to under plaster box Ø60
protection level	IP20

Proxi Gate

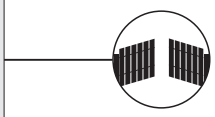
rB–TO2S2 gate controller

Radio module designed to control automatic gates and garage doors offered by different manufacturers. It can be installed in the gate controller along with other radio modules. This solution allows you to utilize all the phone attributes to remotely control opening and closing of the gates. At the same time it leaves the possibility of using traditional remote controls.

NEW !

antenna

1	PWR +/-
2	PWR +/-
3	OUT 1 -
4	OUT 1 +
5	OUT 2 -
6	OUT 2 +
7	IN 1
8	IN 1
9	IN 2
10	IN 2



PWR - supply
OUT1 - button OPEN
OUT2 - button CLOSE
IN - limit switch

supply	9÷24V AC/DC
outputs	×2
load current	20mA 50V DC
Bluetooth transmission	
frequency	2,4GHz
signal power	1mW
transmission	bi-directional
coded	AES
range	30m
power consumption	0,4W
working temperature	-30÷55°C
thermal protection	YES
terminal	2,5mm² screw terminals
dimensions	42×98×30mm
mounting	two screws to the substrate
protection level	IP65

8. MOTION SENSOR SWITCH

PURPOSE

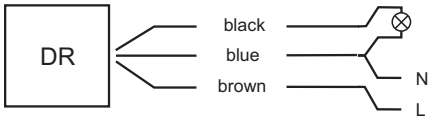
Motion sensors are used for automatic attached temporary lighting in the event of a person or other object in such areas as hallways, courtyards, approach and access roads, garages, etc. The use of motion sensors to automatically accompany the lighting makes use of the lighting is more convenient and cheaper in operation.

INFRARED

FUNCTIONING

The sensor detects infrared radiation source. It's analysing parameters as the size of the object, the amount of heat emitted, and the speed of movement between the various sectors of detection. Detector head is moving in two dimensions, which allows for precise setting of the matched field detection to the individual requirements of the user. Movement detection in the box will automatically attach to the lighting time set by the user. After that time, the lighting is switched off automatically. Motion sensor is equipped with an automatic control include preventing crepuscular lighting during the day. DR's can work indoors and outdoors in places where it is not exposed to rain or snow, and the possibility of flooding water or other liquid sensor housing and electrical connection points.

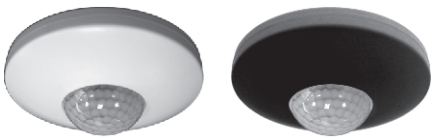
DR-05 W / DR-05 B WHITE / BLACK

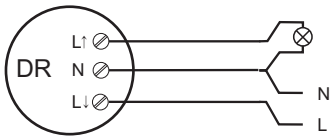


supply	230V AC
twilight activation threshold	3÷2000Lx
motion of detection	0,6÷1,5m/sec
switch-off time	10sec±3sec ÷ 7min±2min
horizontal detection area	0°÷180°
vertical detection area	0°÷45°
max. radius of detection (for <24°C)	5÷12m
head rotation range - V/H	180°/90°
height of the sensor assembly	1,8÷2,5m
power consumption	0,5W
terminal	1,5mm² screw terminals
working temperature	-20÷40°C
dimensions	
spread head vertically	W95×H205×G45mm
complex head horizontally	W95×H104×G105mm
mounting	two screws to the substrate
protection level	IP44

Sensor can't work with LED lamps.

DR-06 W / DR-06 B WHITE / BLACK

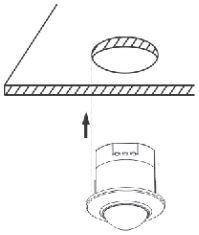


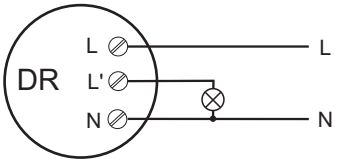


supply	230V AC
current load	<4A
connection power	
incandescent lamps	800W
fluorescent lamps	400W
twilight activation threshold	10÷2000Lx
motion detection	0,6÷1,5m/s
switch-off time	3s÷12min.(±3min.)
area of vertical detection	360°
max. radius of detection (for h= 2,3÷3,5m, T<24°C)	r= 5m
sensor mounting height	h= 2,5÷3,5m
power consumption	
standby	0,10W
on	0,45W
terminal	1,0mm² terminals
operation temperature	-10÷40°C
dimensions	Ø=115mm, h= 47mm
installation	two screws to the base
protection level	IP20

Sensor can't work with LED lamps.

DR-07 CEILING

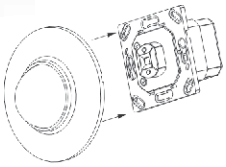


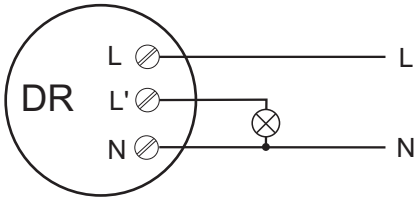


supply	230V AC
current load	1,5A
twilight activation threshold	10÷2000Lx
motion of detection	0,6÷1,5m/sec
switch-off time	3sec ÷ 9min±2min
vertical detection area	360°
max. radius of detection (for h=2,3÷3,5m, T<24°C)	r=4m
height of the sensor assembly	h=2,5÷3,5m
power consumption	
standby	0,10W
on	0,45W
terminal	1,0mm² screw terminals
working temperature	-10÷40°C
dimensions	
external	Ø=50mm, h=52mm
groove	Ø=39mm, h=35mm
mounting hole	Ø=40mm
screw spacing	33mm
mounting	two screws to the substrate
protection level	IP20

DR-08 to under plaster box

NEW !





supply	230V AC
current load	<5A
twilight activation threshold	3÷2000Lx
motion of detection	0,6÷1,5m/sec
switch-off time	3sec ÷ 9min±2min
vertical detection area	360°
max. radius of detection (for h=2,3÷3,0m, T<24°C)	r=2m
height of the sensor assembly	h=2,5÷3,0m
power consumption	
standby	0,10W
on	0,45W
terminal	1,0mm² screw terminals
working temperature	-10÷40°C
dimensions	
external	Ø=105mm, h=71,5mm
groove	Ø=50mm, h=43mm
mounting hole	Ø=51mm
screw spacing	79mm
mounting	two screws to the substrate or to under plaster box Ø60
protection level	IP20

MICROWAVE WITH PRESENCE SENSOR FUNCTION

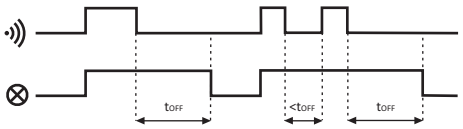
PURPOSE

Microwave sensor allows for motion detection by wooden boards, plasterboard panels, glass and plastics.

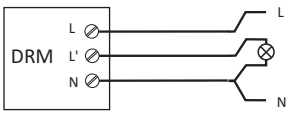
FUNCTIONING

DRM sensor emits and bounces high-frequency 5.8GHz electromagnetic waves. The sensor detects changes in the reflected waves caused by movement of the object in the area of detection. The sensor detects movement of an object to and from the sensor. Movement in the range of detection will automatically attach the lighting for time set by the user. After this time the lights will be turned off automatically. The motion sensor is equipped with light dependent relay able to attaching lighting during the day. Detection status and standby to attach lights are activated only after dusk. Sensor activation time might be adjust by the user. In addition, there is a possibility of adjustment of the detection area in range and the receiver actuation time. The sensor allows for motion detection by wooden boards, plasterboard panels, glass and plastics. Temperature changes do not affect on motion detection.

The power of microwave radiation is relatively low and is completely safe for humans and animals. Its value is less than 10mW. By comparison, microwaves and cell phones radiate about 1000mW of power (100 times harder).



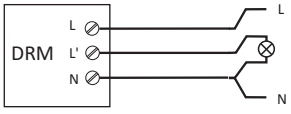
DRM-01 / DRM-01 24V BUILD-IN



supply DRM-01	180÷253V AC
DRM-01 24V	24V AC
current load	<5A
frequency of the microwaves radiation	5,8GHz
power of radiation	<10mW
detection area	360°
radius of detection - adjustable (for h=2,5m)	1÷10m
activation threshold - adjustable	2÷2000Lx
switch-on time of receiver - adjustable	5sec÷12min.
delay of response	1sec
power consumption	0,9W
terminal	1mm² screw terminal
working temperature	-25÷50°C
dimensions	46×93×42mm
mounting	two screws to the substrate
protection level	IP20

Sensor can work with LED lamps.

DRM-02 CEILING



supply	180÷253V AC
current load	<5A
frequency of the microwaves radiation	5,8GHz
power of radiation	<10mW
detection area	360°
radius of detection - adjustable (for h=2,5m)	1÷10m
activation threshold - adjustable	2÷2000Lx
switch-on time of receiver - adjustable	5sec÷12min.
delay of response	1sec
power consumption	0,9W
terminal	1mm² screw terminals
working temperature	-25÷50°C
dimensions	Ø103 h=44mm
mounting	two screw to the substrate
protection level	IP20

Sensor can work with LED lamps.

PLAFONS WITH HIDDEN SENSOR

DRM-03 E27 60W
DRM-L WITHOUT SENSOR

supply	230V AC
type of light bulb/power	E27 / 60W
frequency of the microwaves radiation	5,8GHz
power of radiation	<10mW
detection area	360°
radius of detection - adjustable	2÷10m
activation threshold - adjustable	2÷2000Lx
switch-on time of receiver - adjustable	5sec÷12min.
delay of response	1sec
power consumption	0,9W
terminal	1,5mm² screw terminals
working temperature	-25÷50°C
dimensions	Ø285 h=110mm
mounting	three screws to the substrate
lampshade	glass, white-milk
protection level	IP40

DRM-04 LED (×96) 15W

supply	230V AC
light source	96×LED
light color	6000K
light flux	1030Lm
electric LED power	15W
frequency of the microwaves radiation	5,8GHz
power of radiation	<10mW
detection area	360°
radius of detection - adjustable	1÷8m
activation threshold - adjustable	2÷2000Lx
switch-on time of receiver - adjustable	5sec÷15min.
delay of response	<1sec
power consumption	0,9W
terminal	1,5mm² screw terminals
working temperature	-25÷50°C
dimensions	Ø295 h=100mm
mounting	four screws to the substrate
lampshade	HDPE, white-milk
protection level	IP40

DRM-05 E27 25W

supply	230V AC
type of light bulb/power	E27 / 25W
frequency of the microwaves radiation	5,8GHz
power of radiation	<10mW
detection area	360°
radius of detection - adjustable	2÷10m
activation threshold - adjustable	2÷2000Lx
switch-on time of receiver - adjustable	5sec÷12min.
delay of response	1sec
power consumption	0,9W
terminal	1,5mm² screw terminals
working temperature	-25÷50°C
dimensions	Ø285 h=110mm
mounting	three screws to the substrate
lampshade	HDPE, white-milk
protection level	IP40

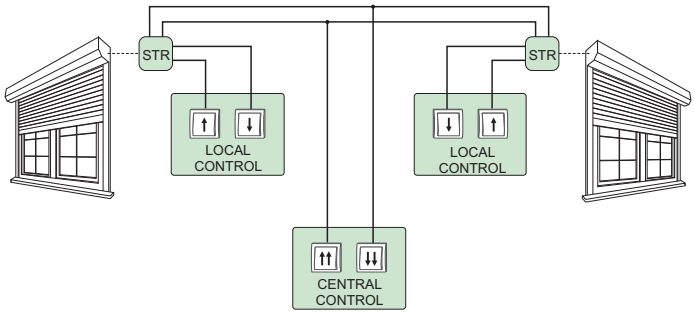
DRM-06 LED (×160) 10W

supply	230V AC
light source	160×LED
light color	6000K
light flux	970Lm
electric LED power	10W
frequency of the microwaves radiation	5,8GHz
power of radiation	<0,2mW
detection area	360°
radius of detection - adjustable	1÷8m
activation threshold - adjustable	2÷2000Lx
switch-on time of receiver - adjustable	5sec÷15min.
delay of response	<1sec
power consumption	0,9W
terminal	1,5mm² screw terminals
working temperature	-25÷50°C
dimensions	Ø260 h=90mm
mounting	three screws to the substrate
lampshade	HDPE, white-milk
protection level	IP40

9. ROLLER BLIND CONTROLLERS

PURPOSE

The roller blind controllers are designed for controlling roller blinds (up and down movement) or other devices (for example: gates) that are driven by a single-phase AC electric motor and operated by means of momentary switches (for example: bell-pushes). The controller can operate as an independent unit (designated for opening/closing one roller blind) as well as the controllers can be combined into groups that enable the central controlling of many roller blinds.



FUNCTIONING

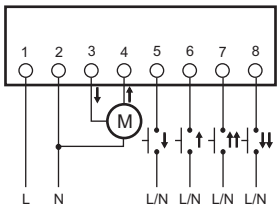
The roller blind motor is activated by the momentary switching of a current pulse (L or N) to one of the control inputs. The motor is activated at a time programmed previously by the user. The activation time programmed enables the complete lifting or lowering of the roller blind. Also, there is a possibility of stopping the rolled blind activated at a level selected by the user (non-complete opening or closing of the roller blind).

DOUBLE-BUTTON TYPE

Local control - a group of push-buttons that controls one roller blind. ↑-upwards (opening); ↓- downwards (closing). Pressing the local control push-button activates the movement of the roller blind in a selected direction. If the roller blind is already moving, pressing the local control push-button will stop the roller blind.

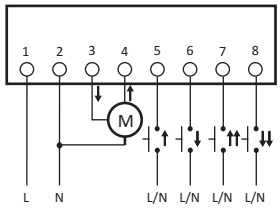
Central control - a common group of push-buttons for many controllers (minimum two controllers) that controls all roller blinds included in the central control system. ↑↑ - all upwards; ↓↓ - all downwards.Pressing the central control push-button activates the movement of the roller blinds in a selected direction. If one of the roller blinds is already moving in the same direction, its movement will be continued. If one of the roller blinds is moving in the opposite direction, this roller blind will be first stopped and then its movement will be activated in the direction in accordance with the command sent to the central input. The central control enables only activating the movement of the roller blinds in a selected direction. The roller blind will be stopped after the programmed movement time or when any of the local control push-buttons is pressed.

STR-1



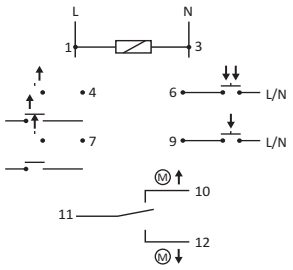
supply	230V AC
current load AC-3	<1,5A
control pulse current for L/N	<1mA
actuation time - programmable	0sec÷10min.
indication of power supply/programming	green LED
power consumption	1W
working temperature	-25÷50°C
terminal	signal 4×DY 1mm², l=10cm
	supply 4×DY 1,5mm², l=10cm
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

STR-21



supply	230V AC
current load AC-3	<1,5A
control pulse current for L/N	<1mA
actuation time - programmable	0sec÷10min.
indication of power supply/programming	green LED
power consumption	1W
working temperature	-25÷50°C
terminal	screw terminals 2,5mm²
dimensions	50×67×26mm
mounting	two screws to the base
protection level	IP20

STR-421



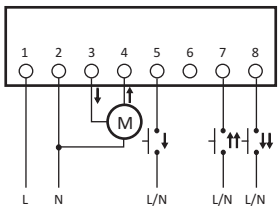
supply STR-421 230V	230V AC
STR-421 24V	24V AC/DC
current load AC-3	<1,5A
control pulse current for L/N	<1mA
switch-on time - programmable	0sec÷10min.
signalling of supply / programming	green LED
signalling activation	2× red LED
power consumption	1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

ONE-BUTTON TYPE

Local control - a group of push-buttons that controls one roller blind. ↑↓ -upwards (opening) / downwards (closing). Pressing the local control push-button activates the movement of the roller blind in a direction opposite to the direction of a previously performed movement (after connecting the controller to the power supply, the first movement closes the roller blind). If the roller blind is already moving, pressing the local control push-button will stop the roller blind movement. When the local control push-button is pressed again, the movement of the roller blind in the opposite direction is activated.

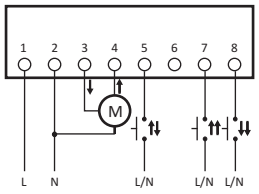
Central control - a common group of push-buttons for many controllers (minimum two controllers) that controls all roller blinds included in the central control system. ↑↑- all upwards; ↓↓ - all downwards. Pressing the central control push-button activates the movement of the roller blinds in a selected direction. If one of the roller blinds is already moving in the same direction, its movement will be continued. If one of the roller blinds is moving in the opposite direction, this roller blind will be first stopped and then its movement will be activated in the direction in accordance with the command sent to the central input. The central control enables only activating the movement of the roller blinds in a selected direction. The roller blind will be stopped after the programmed movement time or when any of the local control push-buttons is pressed.

STR-2



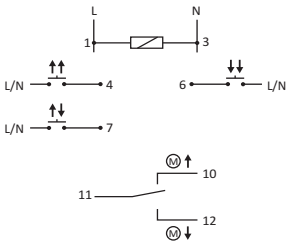
supply	230V AC
load current AC-3	<1,5A
control pulse current for L/N	<1mA
switch-on time - programmable	0sec÷10min.
signalling of supply / programming	green LED
power consumption	1W
working temperature	-25÷50°C
terminal	signal 4×DY 1mm², l=10cm
	supply 4×DY 1,5mm², l=10cm
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

STR-22



supply	230V AC
load current AC-3	<1,5A
control pulse current for L/N	<1mA
switch-on time - programmable	0sec÷10min.
signalling of supply / programming	green LED
power consumption	1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	50×67×26mm
mounting	two screws to the base
protection level	IP20

STR-422



supply STR-422 230V	230V AC
STR-422 24V	24V AC/DC
load current AC-3	<1,5A
control pulse current for L/N	<1mA
switch-on time - programmable	0sec÷10min.
signalling of supply / programming	green LED
signalling activation	2× red LED
power consumption	1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

UNIVERSAL

FEATURES

* local and central control;
* universal single or two-button control;
* lock function - lasting signal at the Central Down input cuts off all control keys until the signal is switched off;
* cooperation with external rain and wind sensors and with alarm central;
* direction memory for local and central control. If the controller executes Central Up command, next pressing of the local key will move the roller blind down;
* asynchronous start - the time of roller blind activation in central control is randomly delayed (up to 1s) to minimize the current surge in the mains if multiple motors run simultaneously.

FUNCTIONING

LOCAL CONTROL

Depending on how you connect the controller, it can operate in one or two local keys mode.

TWO LOCAL KEYS

Each direction of MOVEMENT has its own local key. Short press (<0.5s) switches on the roller blind to move in a given direction for the programmed period of time. Pressing the key when the roller blind is already in motion causes the roller blind to stop.

Long press (> 0.5s) switches on the roller blind to move in a given direction for as long as the key is pressed (this allows for example to adjust the tilt of slats).

ONE LOCAL KEY

Local control input Down is connected permanently to the N line. Local control input Up is connected to a key that alternately switches the roller blind to move up or down. Short press (<0.5s) switches on the blind for a programmed time. Pressing the key when the roller blind is already in motion causes the roller blind to stop. Long press (> 0.5s) switches on the roller blind for as long as the key is pressed. Each time you press the key the roller blind will move in the direction opposite to the previous one.

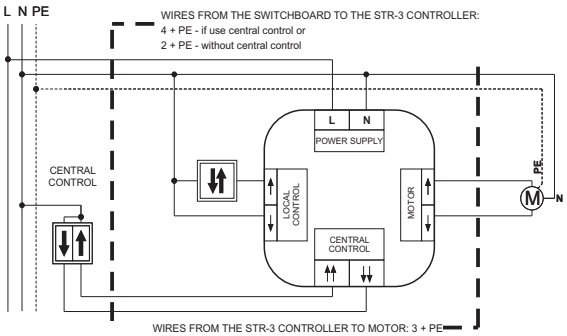
CENTRAL CONTROL

The controller always works with two central control inputs. Central control allows the roller blinds to move only in the desired direction. Roller blind will stop only after a preset time or by pressing any of the local control keys.

Central key - Down can also close and lock the roller blind in the closed position. If the Central key - Down key is pressed and left in the ON position, the controller will close the roller blind and will not allow for its opening until the Central key - Down is released (other inputs will then be locked). This function allows you to lock the roller blinds e.g. when the alarm is armed or when the rainfall (if the additional STR-R rain sensor is used) or too strong wind (if the additional STR-W wind sensor is used) is detected.

STR-3P for engines 230V AC
STR-4P for engines 12/24V DC

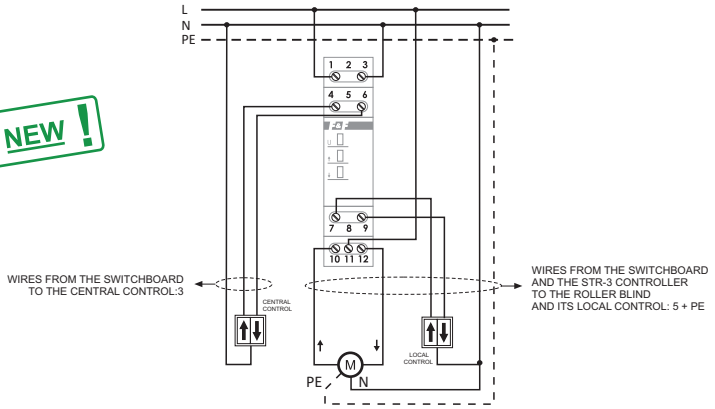
NEW !



supply STR-3P	100÷265V AC
STR-4P	10÷27V DC
contact AC-1	8A
max. load (AC-3)	320W (1.5A)
power consumption	
standby	<0.15W
on	<0.6W
control	neutral line N level
switch-on time (programmable)	from 1sec to 15min.
working temperature	-15÷50°C
terminal	2,5mm² screw terminals
local control terminal	2×DY 1mm² / l=10mm
dimensions	43×48×20mm
mounting	to under plaster box Ø60mm
protection level	IP20

STR-3D for engines 230V AC
STR-4D for engines 12/24V DC

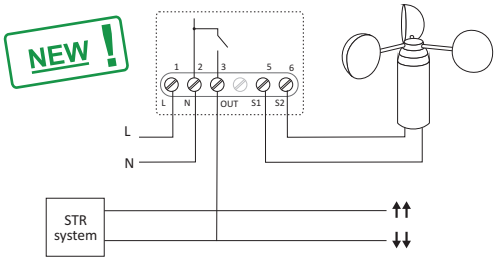
NEW !



supply STR-3D	100÷265V AC
STR-4D	10÷27V DC
contact AC-1	8A
max. load (AC-3)	320W (1.5A)
power consumption	
standby	<0.15W
on	<0.6W
switch-on time (programmable)	from 1sec to 15min.
working temperature	-15÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

STR-W wind sensor

The STR-W controller with an external wind sensor monitors the current wind speed. If the wind speed exceeds a predetermined threshold value will be activated for internal relay. The controller operates in two modes: **Continuous -** if the wind speed exceeds a given threshold value, the internal contact relay closes and remains closed for the entire duration of wind gusts. Combined with STR-3 and STR-4 roller blind controllers, the continuous mode ensures closing of roller blinds at a time of strong wind and locks them in closed position until the wind ceases. **Pulse -** if the wind speed exceeds a given threshold value, the internal contact relay closes for approx. 1.5 second, passing to the roller blind controllers a single command of closing. Combined with STR-3 and STR-4 roller blind controllers, the pulse mode ensures closing of roller blinds at the time of strong wind, but then the user has the ability to raise the roller blinds at any time.



supply	100÷265V AC
power consumption standby/on	<0.2W/<0.6W
working temperature	-15÷50°C
terminal	2,5mm² screw terminals
dimensions	67x50x26mm
mounting	two screws to the base
protection level	IP20

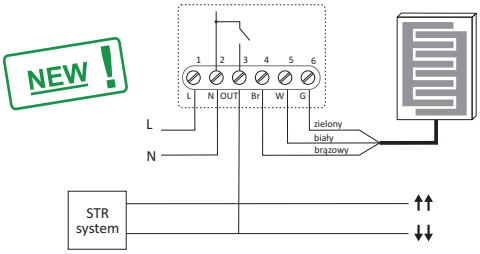
propeller

dimensions	Ø80×85W mm
cable	2×0,25 mm²/l=5m
mounting screw	N6
mounting bracket	flat steel (L profile) 150×70×3mm
protection level	IP65

STR-R rain sensor

STR-R controller along with external rainfall sensor is designed to detect rainfall. Combined with STR-3 or STR-4 roller blind controller it allows to build a system that in the case of rain closes window roller blinds or retracts awnings. The controller operates in two modes: **Continuous -** if the wind speed exceeds a given threshold value, the internal contact relay closes and remains closed for the entire duration of wind gusts. Combined with STR-3 and STR-4 roller blind controllers, the continuous mode ensures closing of roller blinds at a time of strong wind and locks them in closed position until the wind ceases. **Pulse -** if the wind speed exceeds a given threshold value, the internal contact relay closes for approx. 1.5 second, passing to the roller blind controllers a single command of closing. Combined with STR-3 and STR-4 roller blind controllers, the pulse mode ensures closing of roller blinds at the time of strong wind, but then the user has the ability to raise the roller blinds at any time.

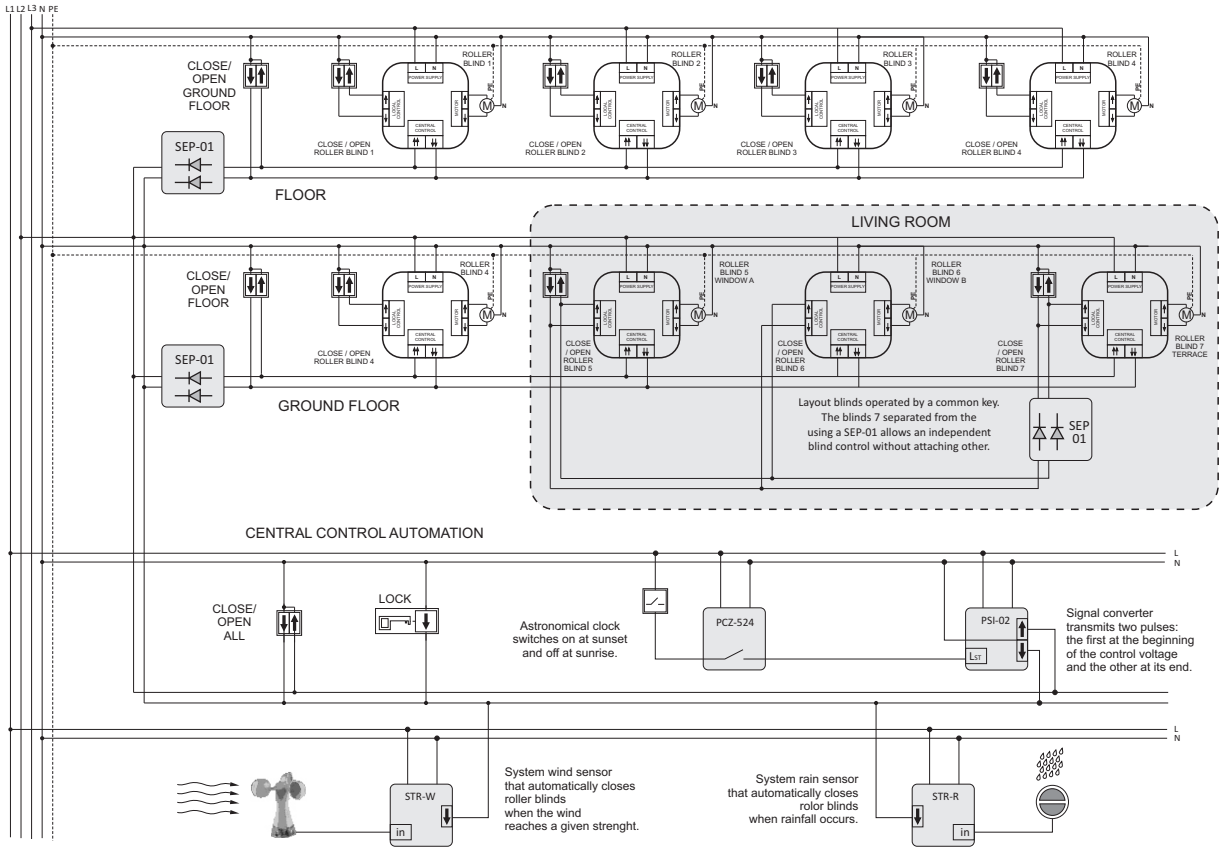
external probe



supply	100÷265V AC
power consumption standby/on	<0.2W/<0.6W
working temperature	-15÷50°C
terminal	2,5mm² screw terminals
dimensions	67x50x26mm
mounting	two screws to the base
protection level	IP20

rain sensor

dimensions	55×50×13 mm
cable	3×0,25 mm²/l=5m
mounting	screw hole Ø3/adhesive tape
protection level	IP65

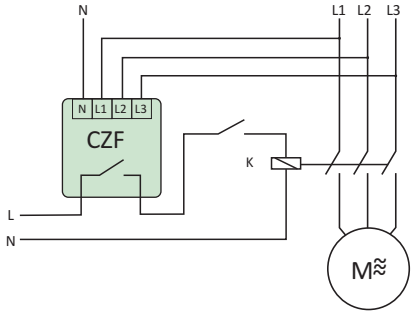


10. PHASE CONTROL RELAYS

10.1 THREE-PHASE MONITORS

PURPOSE

Three phase monitors serve to protect the three-phase electric motors supplied from three-phase mains, against phase collapse in at least one phase or against phase-to-phase voltage asymmetry, threatening to damage the motor.

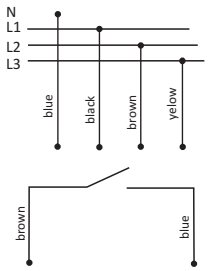


WITH FIXED ACTUATION THRESHOLD VOLTAGE ASYMMETRY

FUNCTIONING

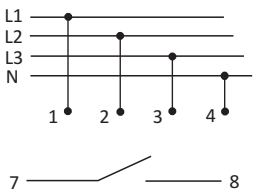
Phase collapse in at least one phase or voltage unbalance between phases above fixed actuation threshold causes switching-OFF the motor. The motor switching-OFF occurs with delay, which prevents any accidental motor disconnecting at temporary voltage drop. The reconnection will occur automatically at voltage increase of 5V above activation voltage (i.e. of value of voltage hysteresis). At occurrence of these disturbances, it is not possible to set a motor in motion.

CZF



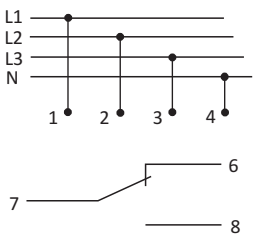
supply	3x400/230V+N
contact	separated 1Z
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	45V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	4×1mm^2, 2×0,75mm^2; l=0,5m
working temperature	-25÷40°C
dimensions	50x67x26 mm
mounting	two screws to the base
protection level	IP20

CZF-B



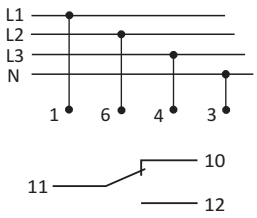
supply	3x400/230V+N
contact	separated 1Z
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	55V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm^2 screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

CZF-BS



supply	3x400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	45V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm^2 screw terminals
working temperature	-25÷40°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

CZF-310



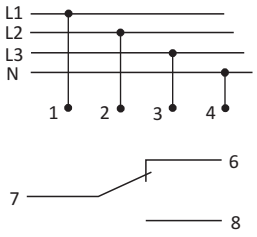
supply	3x400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	55V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷40°C
dimensions	1 modules (18mm)
mounting	on rail TH-35
protection level	IP20

WITH ADJUSTABLE ACTUATION THRESHOLD AT VOLTAGE ASYMMETRY

FUNCTIONING

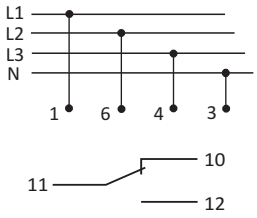
Phase collapse in at least one phase or voltage unbalance between phases above set value causes switching-OFF the motor. The motor switching-OFF occurs with 4 sec delay, which prevents any accidental motor disconnecting at temporary voltage drop. The reconnection will occur automatically at voltage increase of 5V above activation voltage (i.e. of value of voltage hysteresis). At occurrence of these disturbances, it is not possible to set a motor in motion.

CZF-BR



supply	3×400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

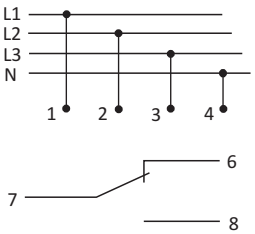
CZF-311



supply	3×400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷40°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

CZF-BT

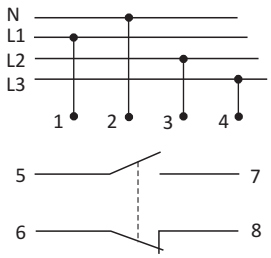
WITH ADJUSTABLE ACTUATION TIME 0,5÷15sec



supply	3×400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	3× LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	0,5÷15sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

CZF-312 MONITOR

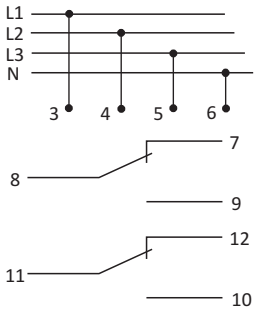
WITHOUT ACTION DELAY 0,2 SEC



supply	3×400/230V+N
contact	separated 1Z 1R
current load	2×[<5A]
signalling of supply	3×LED
activation voltage asymmetry	40÷55V~
histeresis	5V~
switching-OFF delay	0,2sec
power consumption	0,8W
connection	2,5mm^2 screw terminals
working temperature	-25÷40°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

CZF-331

WITH TWO SEPARATED 2P CONTACTS

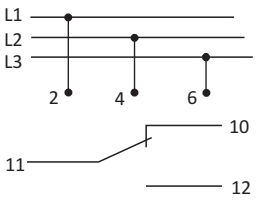


supply	3×230/400V+N
contact	separated 2P
current load	2×[<8A]
signalling of supply	3×LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,2W
connection	2,5mm^{2}screw terminals
working temperature	-25÷40°C
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

CZF-333

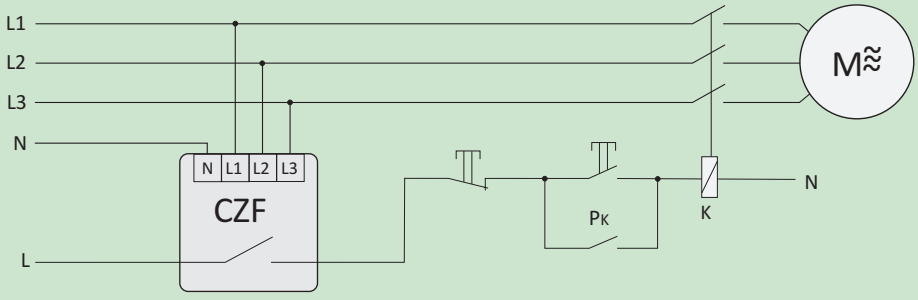
WITHOUT NEUTRAL LEAD
PREVENTS AGAINST SYMMETRICAL AND ASYMETRICAL VOLTAGE DROP

In case the voltage asymmetry above set value between phases causes the switching-OFF the motor. The switching-OFF the motor also occurs in case of phase-to-phase voltage drop below 320V. The motor switching-OFF occurs with 4 sec delay, which prevents any accidental motor disconnecting at temporary voltage drop. The reconnection will occur automatically at voltage increase of 5V above activation voltage (i.e. of value of voltage hysteresis). At occurrence of these disturbances, it is not possible to set a motor in motion.



supply	3×400V
contact	separated 1P
current load	<10A
signalling of supply	3×LED
activation voltage asymmetry	20÷50V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm^2 screw terminals
working temperature	-25÷40°C
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

PRACTICAL SOLUTIONS



Example of connection example of control that prevents automatic return of the power of the motor.

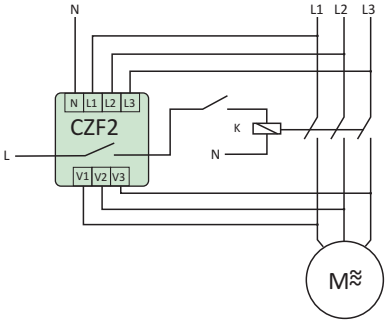
10.2 THREE-PHASE MONITORS
WITH CHECKING STATE OF CONTACTOR CONTACTS

PURPOSE

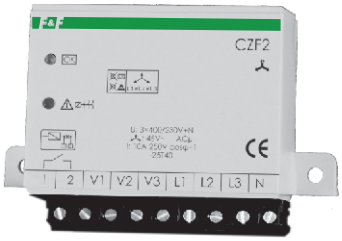
Three phase monitor serves to protect the three-phase electric motors supplied from three-phase mains, against phase collapse in at least one phase or against phase-to-phase voltage asymmetry or against damage of contacts threatening to damage the motor.

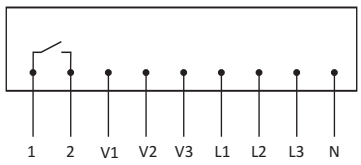
FUNCTIONING

Phase collapse in at least one, optional phase or voltage unbalance between phase fixed actuation threshold causes switching-OFF the motor. The motor switching-OFF occurs with 4 sec delay, which prevents any accidental motor disconnecting at temporary voltage drop. The reconnection will occur automatically at voltage increase of 5V above activation voltage (i.e. of value of voltage hysteresis). At occurrence of these disturbances, it is not possible to set a motor in motion. Shining of red diode LED along with simultaneous disconnecting the apparatus permanently, indicates contactor contacts damage. Reactivation of the apparatus is possible (after contact repair), after disconnecting from supply all three phases (fuses) and then, after switching-ON anew.



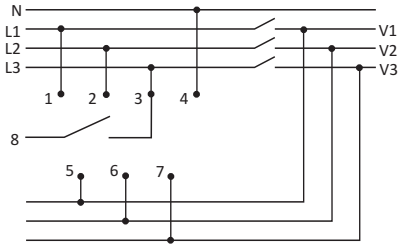
CZF2





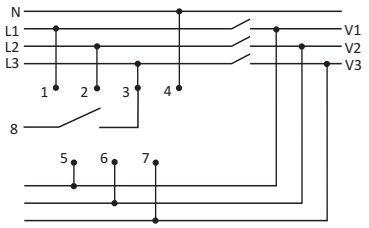
supply	3×400/230V+N
contact	separated 1Z
current load	<10A
signalling of supply	2× LED
activation voltage asymmetry	45V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷40°C
dimensions	95×60×25 mm
mounting	two screws to the base
protection level	IP20

CZF2-B WITH 1Z CONTACT CONNECTED TO POWER SUPPLY VOLTAGE



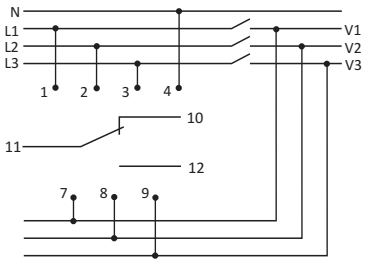
supply	3×400/230V+N
contact	1Z
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	55V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

CZF2-BR WITH 1Z CONTACT CONNECTED TO POWER SUPPLY VOLTAGE



supply	3x400/230V+N
contact	1Z
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷40°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

CZF-332 WITH 1P SEPARATED CONTACT

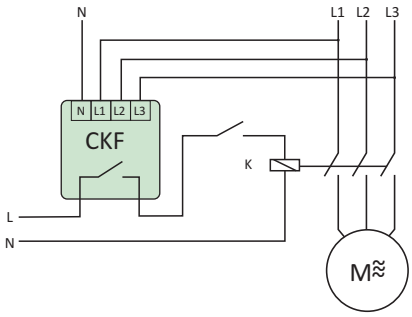


supply	3x400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷40°C
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

10.3 THREE-PHASE ASYMMETRY AND SEQUENCE MONITORS

PURPOSE

Three phase and sequence monitor is designed to protect tree-phase electric motors against voltage drop in at least one phase or voltage asymmetry between phases, which could damage the motor, with additional protection of motor rotation direction in case of phase change before the monitor.

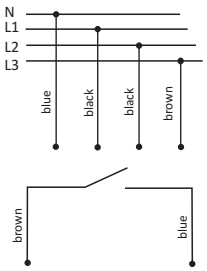


WITH FIXED ACTUATION THRESHOLD VOLTAGE ASYMMETRY

FUNCTIONING

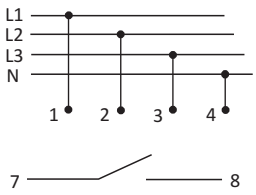
Voltage collapse in any phase or voltage asymmetry between phases above fixed actuation threshold causes switching-OFF the motor. The motor switching-OFF occurs after delay of 4 sec, which prevents accidental motor switching-OFF caused by instantaneous voltage drop. Switching the motor ON anew occurs automatically when the voltage increases of 5V~ above activation voltage (i.e. about value of voltage hysteresis). At occurrence of these disturbances, it is not possible to set motor in motion. In case of change of phase sequence, before the monitor, which causes change of motor rotation direction (in relation to that primarily set) is signaled by shining red diode LED along with impossibility of switching-ON the motor. The reconnection is possible after the return to correct phase sequence.

CKF



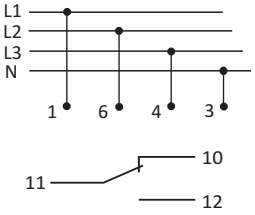
supply	3×400/230V+N
contact	separated 1Z
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	45V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	OMY 4×1mm^2, 2×0,75mm^2; l=0,45m
working temperature	-25÷40°C
dimensions	50×67×26 mm
mounting	two screws to the base
protection level	IP20

CKF-B



supply	3×400/230V+N
contact	separated 1Z
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	55V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm^2 screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

CKF-316



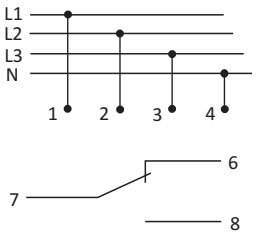
supply	3×400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	55V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm^2 screw terminals
working temperature	-25÷40°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

WITH ADJUSTABLE ACTUATION THRESHOLD VOLTAGE ASYMMETRY

FUNCTIONING

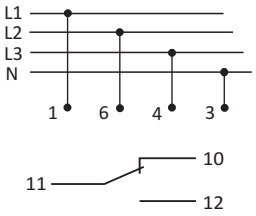
Voltage collapse in any phase or voltage asymmetry between phases above set value causes switching-OFF the motor. The motor switching-OFF occurs after delay of 4 sec, which prevents accidental motor switching-OFF caused by instantaneous voltage drop. Switching the motor ON anew occurs automatically when the voltage increases about 5V~ above activation voltage. At occurrence of these disturbances, it is not possible to set a motor in motion. In case of change of phase sequence, before the monitor, which causes change of motor rotation direction (in relation to that primarily set) along with impossibility of switching-ON the motor. The switching-ON is possible after the return to correct phase sequence.

CKF-BR



supply	3×400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² terminal screws
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

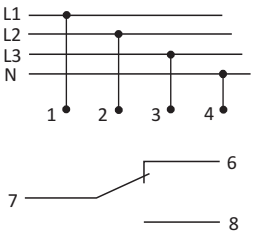
CKF-317



supply	3x400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	0,56W
connection	2,5mm² screws terminal
working temperature	-25÷40°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

CKF-BT

WITH ADJUSTABLE ACTUATION TIME 0,5÷15sec



supply	3×400/230V+N
contact	separated 1P
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	40÷80V~
histeresis	5V~
switching-OFF delay	0,5÷15sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

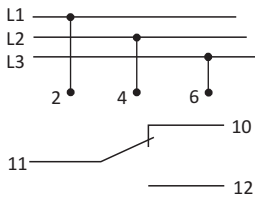
CKF-337

WITHOUT NEUTRAL LEAD

PREVENTS AGAINST SYMMETRICAL AND ASYMETRICAL VOLTAGE DROP

In case of voltage asymmetry above set value between phases causes the switching-OFF the motor. The switching-OFF the motor also occurs in case of phase-to-phase voltage drop below 320V. The motor switching-OFF occurs with 4 sec delay, which prevents any accidental motor disconnecting at temporary voltage drop. The reconnection will occur automatically at voltage increase of 5V above activation voltage (i.e. of value of voltage hysteresis). At occurrence of these disturbances, it is not possible to put a motor to motion.

Change of phase sequence, before the monitor, which causes change of motor rotation direction (in relation to that primarily set) along with impossibility of switching-ON the motor.

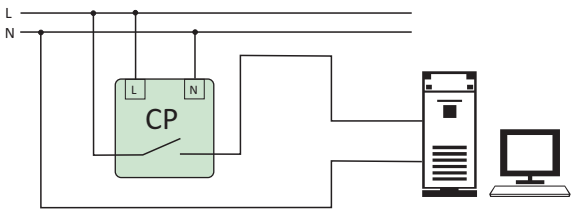


supply	3×400V
contact	separated 1P
current load	<10A
signalling of supply	2×LED
activation voltage asymmetry	40÷80V~
activation voltage	<320V~
histeresis	5V~
switching-OFF delay	4sec
power consumption	1,6W
connection	2,5mm² screw terminals
working temperature	-25÷40°C
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

11. VOLTAGE RELAYS

PURPOSE

Voltage relays serves to voltage control in single or three phase mains and to protect receiver against the effects of voltage collapse or increase beyond set values.

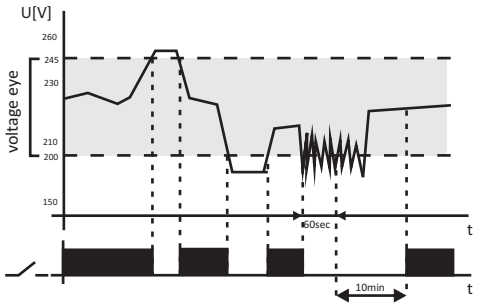


ATTENTION!

All types of CP can be supplied with a voltage up to 450V~. This ensures the effective protection of the receiver even in case of a voltage increase beyond allowable standards. Also, in case of supply polarity exchange or when „zero" is switched off (for three-phase types) the relay will not be destroyed („burned").

FUNCTIONING

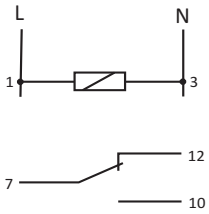
Lower voltage value (U1) and upper voltage value (U2) are set by means of potentiometers. It is so called eye of voltage, in limits of which can occur changes of phases voltages that do not cause activation of relay. Change of phase voltage on one of phases above or below set voltage tresholds will cause activation of relay. Reactivation follows automatically return of correct voltage value.



ONE-PHASE TYPE

CP-709 WITHOUT TIME-BLOCKADE

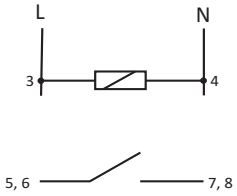
CP-710 WITH TIME-BLOCKADE



supply	50÷450V AC
current load	<16A
contacts	separated 1P
signalling of supply	4×LED
voltage value	
lower U1	150÷210V
upper U2	230÷260V
hysteresis	
for U1	5V
for U2	5V
activation lag delay functions	
for U1	1,5sec
for U2	0,1sec
recovery time	
for U1	1,5sec
for U2	1,5sec
power consumption	0,8W
terminal	2,5mm^2 screw terminals
working temperature	-25÷50°C
dimension	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

CP-710: Because of unstable voltage in mains and frequent changes of supply voltage beyond the set thresholds of „eye of voltage" (at least 10 times per 1 minute), relay blocks itself for 10 minutes. This prevents against too frequent, cyclic switching-ON and OFF of the connected receiver.

CP-721 PROGRAMMABLE



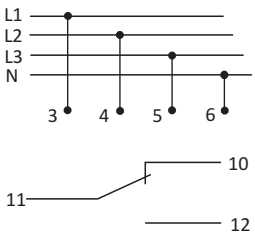
supply	150÷450V AC
current load AC1	2×[<8A]
contact	separate 1P (1NO)
voltage activation threshold / skip	
down UL	150÷210V / 5V
up UH	230÷260V / 5V
hysteresis voltage return to UL/UH	5V
activation time / skip	
to threshold UL	2÷10sec / 1sec
to threshold UH	0,1÷1sec / 0,1sec
return time to UL/UH	2sec÷9,5min.
setting precission	1V
measure precission	±1V
display	3×segment LED 5×9mm
indication of contact closure	yellow LED
power consumption	0,8W
terminal	2,5mm^2 screw terminals
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on the rail TH-35
protection level	IP20

FUNCTIONS:

- setting voltage window (thresholds U1 and U2)
- separate setting response times for exceeding the limits U1 and U2
- setting the time to return
- continuous indication of the voltage
- indication of the correct voltage and contact closure

THREE-PHASES TYPE

CP-730 WITH TIME-BLOCKADE



Because of unstable voltage in mains and frequent changes of supply voltage beyond the set thresholds of „eye of voltage" (at least 10 times per 1 minute), relay blocks itself for 10 minutes. This prevents against too frequent, cyclic switching-ON and OFF of the connected receiver.

supply	3×(50÷450V)+N
current load	<10A
contact	separated 1P
signalling of supply	4×LED
voltage value	
lower U1	150÷210V
upper U2	230÷260V
hysteresis	
for U1	5V
for U2	5V
activation lag delay functions	
for U1 - adjustable	0,5÷10sec
for U2	0,1sec
recovery time	
for U1	1,5sec
for U2	1,5sec
power consumption	0,4W
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimension	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

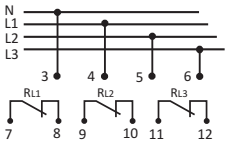
UNDER VOLTAGE

CP-733 3×1R CONTACTS

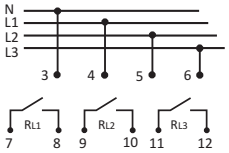
CP-734 3×1Z CONTACTS

CP-733: A voltage relay is used to control voltage in a 3-phase network and secure a receiver against voltage drops below a preset value. Voltage decay in a phase or its drop below a preset activation threshold results in the shortage of the relay contact for this phase. The contact will be automatically released after the voltage in the phase is reinstated or its increase is 5V over the preset threshold (i.e. the voltage hysteresis value).

CP-734: A voltage relay is used to control voltage in a 3-phase network and secure a receiver against voltage drops below a preset value. Voltage decay in a phase or its drop below a preset activation threshold results in the opened of the relay contact for this phase. The contact will be automatically released after the voltage in the phase is reinstated or its increase is 5V over the preset threshold (i.e. the voltage hysteresis value).



CP-733



CP-734

supply	3×(50÷450V)+N
current load	3×(<8A)
contact CP-733	separated 3×1Z
CP-734	separated 3×1R
signalling of supply	4×LED
switching delay - adjustable	170÷210V
histeresis	5V
operation time	0,5sec
power supply return	1,5sec
power consumption	0,8W
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

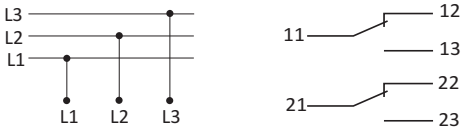
CP-500 POWER SUPPLY 3×500V. WITHOUT NEUTRAL

PROTECTING FEATURES

- protection against phase collapse
- protection against of phase change order
- protection against phase asymmetry
- protection against crossing over voltage 580V
- protection against decline below voltage 420V

FUNCTIONING

With the correct network voltage contacts remain closed. Operation of any security opens the sensor's contacts. Closure of the contacts will automatically after return the correct network parameters.



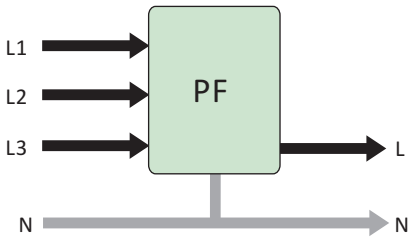
supply	3×500V
current load	2×[<8A]
contact	separated 2P
status indication	4×LED
activation asymmetry - adjustable	20÷80V
activation time - adjustable	1÷10sec
threshold voltage / activation time	
upper	580V / 0,5sec
lower	420V / 5sec
return voltage histeresis	5V
time to return - adjustable	1÷15sec
power consumption	0,7W
terminal contacts 1 and 2	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	4 modules (70mm)
weight	250g
mounting	on rail TH-35
protection level	IP20

12. AUTOMATIC PHASE SWITCHES

PURPOSE

Automatic phase switches serve to maintain continuity of power supply to single-phase receivers in the event of power phase decay or a drop in its parameters below standard values.

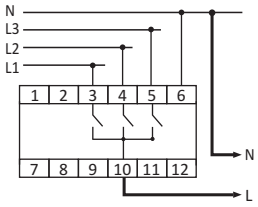
They are exemplify one-phase automatic switching system. They are especially suitable where is required the continuity of correct power supply parameters, for example: refrigeration, airconditioning, computer networks and telecommunications, cable television, alarm systems, etc.



PF-431 WITH „PRIORITY" PHASE

FUNCTIONING

Three-phase voltage (3×230V+N) is supplied to the input of the switch. Single-phase voltage (230V AC), i.e. the phase voltage of one of the phases, is supplied to the output of the switch. The electronic system of the switch controls voltage values of the phases supplied in such a way as to ensure that output voltage is not lower than 195V. The phase that has correct parameters is directed to the output of the switch. The L1 phase is the priority phase, i.e. if its parameters are correct, this phase will be always switched to the output. If the voltage parameters of the L1 phase are not correct or if voltage decay occurs in this phase, the electronic system will switch the L2 phase to the output (provided that its parameters are correct). In case of a simultaneous lack of correct voltages in the L1 and L2 phases, the L3 phase will be switched to the output. When the correct supply voltage returns to the L1 phase, the electronic system will switch this phase to the output.

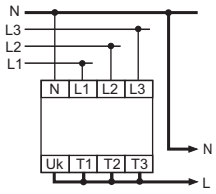


supply	3×230+N
output	230V AC
current load	<16A
activation threshold	
L1, L2	<195V
L3	<190V
hysteresis	5V
voltage measurement error	±1%
switching time	0,3sec
signalling input voltage	3×LED
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

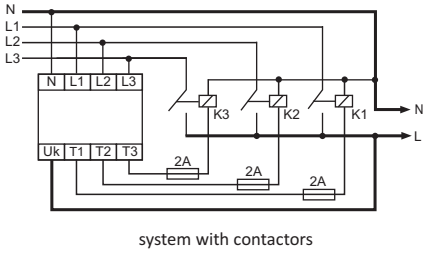
PF-441 FOR CO-OPERATING WITH CONTACTORS. WITH „PRIORITY" PHASE. WITH LOWER (195V) AND HIGHER (250V) ACTIVATION THRESHOLD.

FUNCTIONING

The directly connected switch is used for supplying the single-phase circuit whose current-load does not exceed 16A. For the circuits that have a current-load higher that 16A, a configuration is used that consists of a switch and three contactors that have a properly selected current-carrying capacity. Three-phase voltage (3×230V+N) is supplied to the input of the switch (L1, L2, L3, N). Single-phase voltage (230V AC), i.e. the phase voltage of one of the phases, is directed to the output of the switch (T1, T2, T3). The electronic system of the switch controls voltage values of the phases supplied. The phase that has correct parameters is switched to the output of the switch. The L1 phase is the priority phase, i.e. if its parameters are correct, this phase will be always switched to the output. If the voltage parameters of the L1 phase are not correct or if voltage decay occurs in this phase, the electronic system will switch the L2 phase to the output (provided that its parameters are correct). In case of a simultaneous lack of correct voltages in the L1 and L2 phases, the L3 phase will be switched to the output. When the correct supply voltage returns to the L1 phase, the electronic system will switch this phase to the output. The switch-over time (required for voltage to occur at the output) after the decay of a currently activated phase is from 0.5 to 0.8 sec. (during this time the receivers are not supplied). Uk input is used for controlling the voltages activated. The system enables the activation of only one phase. In this way the simultaneous switching of voltages of two phases to the output is prevented. Such simultaneous switching of voltages might lead to a phase-to-phase fault. Also, the defect of the contactor (for example, a break in the coil circuit, suspending or burning out of the working contactor) will cause the switching of the receiver to another phase despite the fact that the voltage in a given phase is correct. If the contacts of the contactor are permanently closed, the system will not switch to another contactor despite the fact that the voltage in this phase is incorrect. After the activation of supply voltage (at least one phase), the system examines the correctness of voltages supplied for 2 seconds and only after that time the system switches the phase to the output.



direct system connection



system with contactors

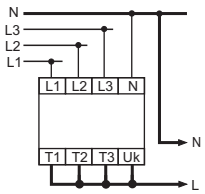
supply	3×230+N
output	230V AC
current load	
without contactors	<16A
with contactors	up to max. capacity of the contacts
activation threshold	
lower	195V
upper - adjustable	250V
hysteresis	5V
voltage measurement error	±1%
switching time	0,5÷0,8sec
working temperature	-25÷50°C
signalling of supply	green LED
signalling selected phase	3× yellow LED
terminal	
for L1, L2, L3, N pin	2,5mm² screw terminals
for T1, T2, T3, Uk pin	1,5mm² screw terminals
dimensions	4 modules (70mm)
mounting	on rail TH-35
protection level	IP20

PF-451

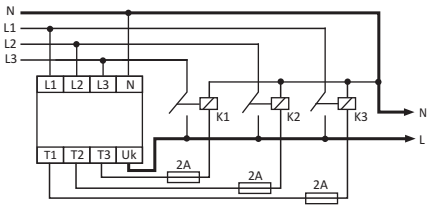
FOR CO-OPERATING WITH CONTACTORS. WITHOUT „PRIORITY" PHASE. WITH ADJUSTABLE LOWER (150÷210V) AND HIGHER (230÷260V) ACTIVATION THRESHOLD.

FUNCTIONING

The directly connected switch is used for supplying the single-phase circuit whose current-load does not exceed 16A. For the circuits that have a current-load higher that 16A, a configuration is used that consists of a switch and three contactors that have a properly selected current-carrying capacity. Three-phase voltage (3×230V+N) is supplied to the input of the switch (L1, L2, L3, N). Single-phase voltage (230V AC), i.e. the phase voltage of one of the phases, is directed to the output of the switch (T1, T2, T3). The electronic system of the switch controls voltage values of the phases supplied. The phase that has correct parameters is switched to the output of the switch. Phase switching sequence is not specified the phase that has the best parameters is always switched to the output. Switching to another phase that has correct parameters occurs only after a drop in values of parameters of the currently used phase. The switch-over time (required for voltage to occur at the output) after the decay of a currently activated phase is from 0.5 to 0.8 sec (during this time the receivers are not supplied). Uk input is used for controlling the voltages activated. The system enables the activation of only one phase. In this way the simultaneous switching of voltages of two phases to the output is prevented. Such simultaneous switching of voltages might lead to a phase-to-phase fault. Also, the defect of the contactor (for example: a break in the coil circuit, suspending or burning out of the working contactor) will cause the switching of the receiver to another phase despite the fact that the voltage in a given phase is correct. If the contacts of the contactor are permanently closed, the system will not switch to another contactor despite the fact that the voltage in this phase is incorrect. After the activation of supply voltage (at least one phase), the system examines the correctness of voltages supplied for 2 seconds and only after that time the system switches the phase to the output.



direct system connection



system with contactors

supply	3×230V+N
output voltage	230V AC
current load	
direct system connection	<16A
system with contactors	up to max. capacity of the contacts
activation threshold	
lower - adjustable	150÷210V
higher - adjustable	230÷260V
hysteresis	5V
voltage measurement error	±1%
switching time	0,5÷0,8sec
working temperature	-25÷50°C
signalling of supply	green LED
signalling selected phase	3× yellow LED
terminal	2,5mm² screw terminals
dimensions	5 modules (85mm)
mounting	on rail TH-35
protection level	IP20

PF-452

OUTPUT VOLTAGE PHASE. WITH ADJUSTABLE LOWER (150÷210V) AND HIGHER (230÷260V) ACTIVATION THRESHOLD AND ACTIVATION TIME (2÷10sec).

FUNCTIONING

Three-phase voltage (3 × 230V + N) is supplied at the input of the switch (L1, L2, L3, N). Two-phase voltage is directed to the output of the switch (R1, R2). The electronic system of the switch controls voltage values of the supplied phases. The two phases with the correct parameters are directed to the outputs. Phase switching order is not specified – phases with the best parameters are always directed to the outputs. If the parameters of one phase start to decrease, system will switch to the next good phase.

Function A (no PP jumper): If only one phase of the supply voltage will have good parameters, it will be connected to both the R1 and R2 outputs.

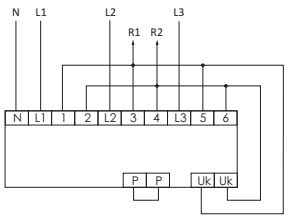
Function B (PP jumper): If only one phase of the supply voltage will have good parameters, it will be connected only to the R1 output.

The switch can be used, for example, in the following cases:

* 400 V AC single-phase power supply (Function A) is required - receiver connected between R1 and R2 terminals;
* priority controller (Function B) – if, due to the load, it is not possible to simultaneously connect all devices to one phase, then single-phase receivers with a key role will be connected to the R1 output and powered if at least one phase is operational. Secondary receivers will be connected to the R2 output and will work only with at least two good power supply phases.

The switching time (voltage at the output) after the loss of a currently activated phase ranges from 0.5 to 0.8 sec (during this time the receivers are not powered). Uk input is used for control the applied voltages. System allows to activate only one phase to the outputs to prevent from simultaneous supplying voltages of two phases to the output which might lead to interphase short-circuit.

NEW !



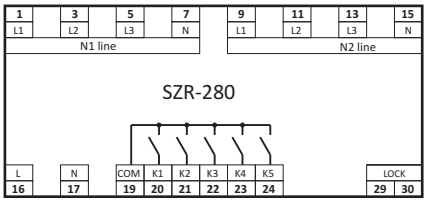
supply	3×[50÷450V]+N
output voltage	
A function	400V AC
B function	2×230V+N
current load	16A
activation threshold	
lower - adjustable	150÷210V
higher - adjustable	230÷270V
hysteresis	5V
activation time - adjustable	2÷10sec
voltage measurement error	±1%
switching time	0,5÷0,8sec
working temperature	-25÷50°C
signalling of supply	green LED
signalling selected phase	3×yellow LED
signalling outputs	2×red LED
terminal	2,5mm² screw terminals
dimensions	5 modules (85mm)
mounting	on rail TH-35
protection level	IP20

13. 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-280 / SZR-280 12V

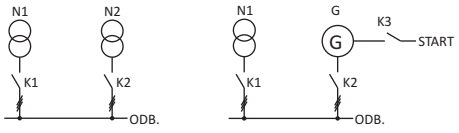


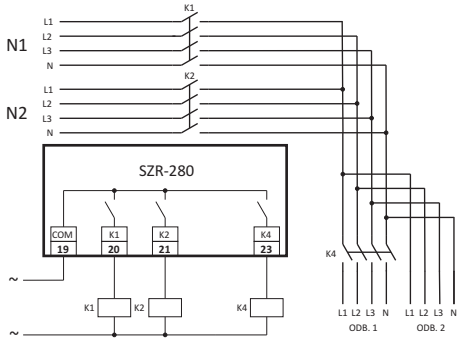
network	3-f 4-wired
controller power supply	
voltage	
SZR-280	85÷264V AC
SZR-280 12V	12V AC/DC
power consumption	<5VA
measured input voltage	
rated voltage	230V
measuring range	80÷300V
frequency	45÷50Hz
accuracy	1% full scale + 1 digit
relay outputs	
contacts	5×1Z
load	<8A
states indication	7×LED
working temperature	10÷50°C
terminal	2,5mm² screw terminals
dimensions [mm]	W=100, H=75 D=110
mounting	on rail TH-35
protection level	IP20

FUNCTIONS

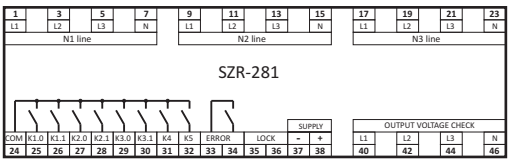
* Simultaneous control of two power lines
* Measured values TrueRMS
* Galvanic separation of measuring inputs supply lines
* Contactors control
* Support for an emergency generator exhaust
* Working in automatic mode, with the possibility of determining the priority line
* Power Dump is achieved through separation of the receiving line into two parts, with possibility to freely define of the power dump cases
* An independent determination of voltage range for each of the line for which line qualified as good, and the voltage hysteresis determination of the line qualifications
* The definition of eligibility as a good line, and the time of qualification as a bad line.
* Accelerated classification as a bad line in case of total loss of voltage on the line
* The definition of time-controlled switching on and off contactors
* Ability to connect to an external safety circuit lock the controller work
* Configure the driver through a PC using a dedicated application
* Events registration with the possibility of export of the registration file to your PC

WORK MODES



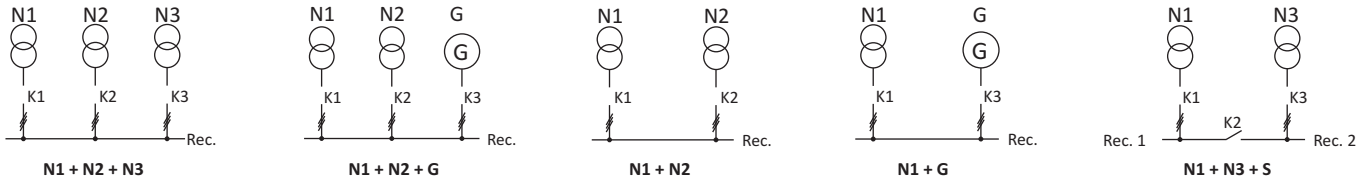


SZR-281



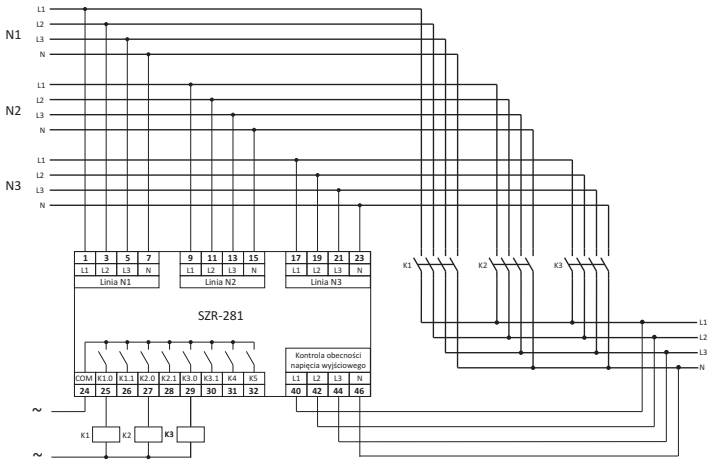
network	3-f 4-wired
controller power supply	
voltage	85÷264V AC
reserve voltage	16÷27V DC
power consumption (main/reserve)	<5VA / <10W
measured input voltage	
rated voltage	230V
measuring range	80÷300V
frequency	45÷50Hz
accuracy	1% full scale + 1 digit
relay outputs	
contacts	8×1Z + 1×1Z(ALARM)
load	<8A / <2A(ALARM)
states indication	4×LED
working temperature	10÷50°C
terminal	2,5mm² screw terminals
dimensions [mm]	W=150 H=75 D=110
fixing	on rail TH-35
protection level	IP20

WORK MODES



FUNCTIONS

* Simultaneous control of three power lines
* Measured TrueRMS value
* Galvanic separation of measuring inputs lines supply
* Control voltage presence on the receiving line
* Controlling contactors or motorized connectors
* Support for an emergency exhaust generator
* Working in automatic mode, with the possibility of determining the priority line
* Power Dump is achieved through separation of the receiving line into two parts, with possibility to freely define of the power dump cases
* An independent determination of voltage range for each of the line for which line qualified as good, and the voltage hysteresis determination of the line qualifications
* The definition of eligibility as a good line, and the time of qualification as a bad line.
* Accelerated classification as a bad line in case of total loss of voltage on the line
* The definition of time-controlled switching on and off contactors / motor connector



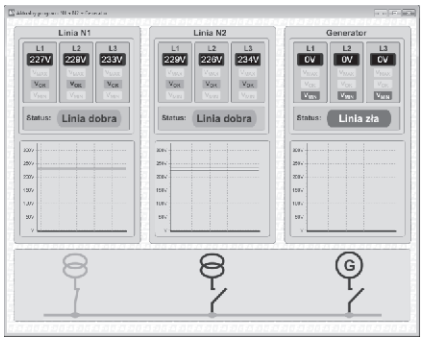
Connection scheme for N1 + N2 + N3

* Ability to connect to an external safety circuit lock the controller work
* Setting and monitoring of the driver through the front panel controller with LCD display and keypad
* Setting and monitoring of the controller through a PC using a dedicated application
* Event registration with the possibility of export of the registration file to your PC
* Signalling errors achieved through contact and buzzer alarm
* Ability to controller supplying by reserve voltage 24V DC
* Settings controller access lock by a PIN code

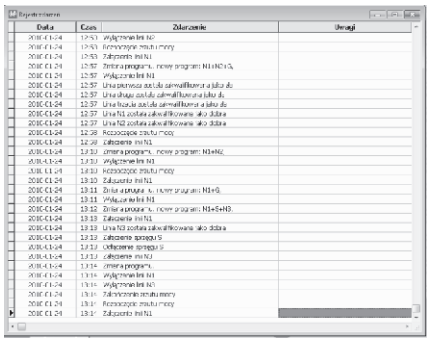
APPLICATION

Application support controller ATSE works in Windows 2000/XP/Vista/7 system and meets the minimum hardware requirements for these systems + monitor resolution min. 1024x768 points.

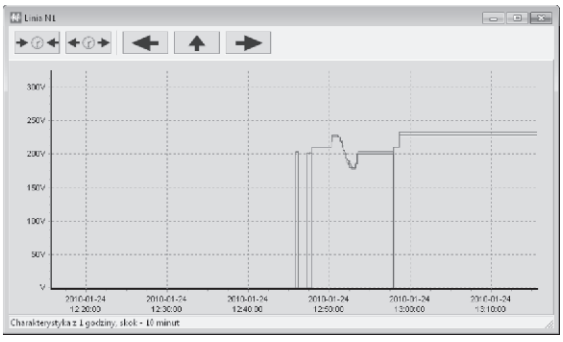
MAIN PROGRAM FUNCTION



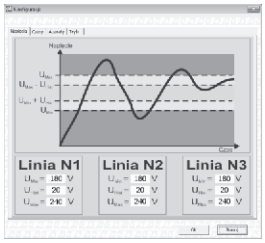
Program. Display information window with the currently executed program.



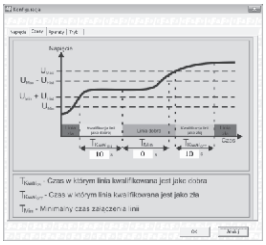
Register. Display windos registry events.



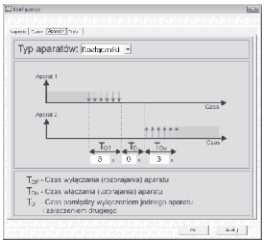
Monitor. Current voltage values on the inputs lines of the controller and browsing history.



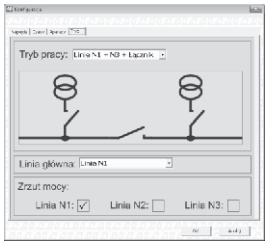
Configuration: Voltage
Setting of the parameters defining the limits of voltage minimum and maximum on each power supply lines, and the width of the hysteresis zone.



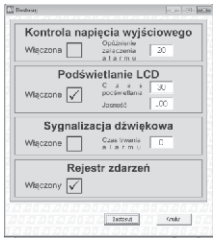
Configuration: Time
Setting of the duration of the qualification as a line of good and bad, and the minimum time for which the power line is attached.



Configuration: Devices
Setting the parameters associated with the types and characteristics of the devices connected to the controller (motor contactors or switches), sometimes switching on and off the devices, and the time interval between one except the device and attaching a second one.



Configuration: Working mode
Working mode program controller selection, choice of main line, and the line selection, which is implemented power dump.



System configuration:
- output voltage control
- the LCD backlight
- the sound of the siren
- activation of the log registration

14. TIMING RELAYS

PURPOSE

Timing relays are devised to time the control of industrial and domestic automatic control engineering systems (e.g. ventilation, heating, lighting, signalling, etc.).

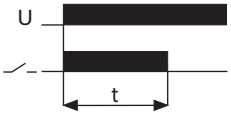
Operation mode: LAGGED DEACTIVATION

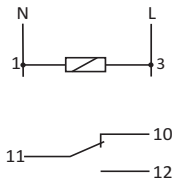
PCA-512

PCA-514

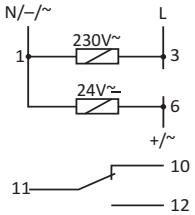
FUNCTIONING

Until the relay is activated, the contact remains in the 11-10 position. After the power voltage is supplied, contact is shifted to position 11-12 and the countdown of the preset value „t" is commenced. After the preset time „t" has been counted down, contact returns to position 11-10. The working sequence of the relay may be repeated after turning the power supply off and on.





PCA-512



PCA-514

supply	
PCA-512 230V	230V AC
PCA-512 24V	24V AC/DC
PCA-512 UNI	12÷264V AC/DC
PCA-514 DUO	230V AC / 24V AC/DC
current load	<10A
contact	separated 1P
operation time - adjustable	0,1sec÷576h
activation lag	<50msec
power supply indicator	green LED
operation mode indicator	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

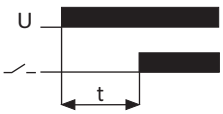
Operation mode: LAGGED ACTIVATION

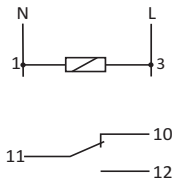
PCR-513

PCR-515

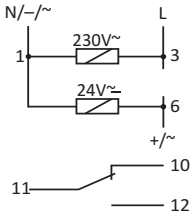
FUNCTIONING

After the power voltage is supplied, the contact remains in position 11-10 and the timing of the preset value „t" is commenced. After the preset time „t" has been counted down, the contact is shifted to position 11-12. The working sequence of the relay may be repeated after turning the power supply off and on.





PCR-513

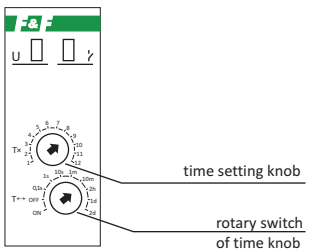


PCR-515

supply	
PCR-513 230V	230V AC
PCR-513 24V	24V AC/DC
PCR-513 UNI	12÷264V AC/DC
PCR-515 DUO	230V AC / 24V AC/DC
current load	<10A
contact	separated 1P
operation time	0,1sec÷576h
power supply indicator	green LED
operation mode indicator	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

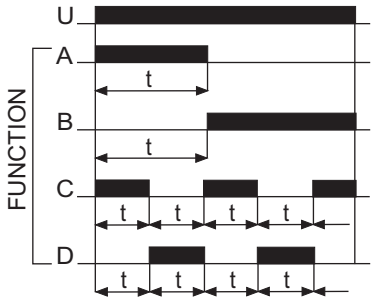
ATTENTION!

* Setting the time range knob regulator in the:
  ON - position with power supply activated results in the permanent closure of the contact.
  OFF - position (power supply activated) causes the contact to be permanently opened.
* With the power supply on, the system does not respond to time range setting modifications.
* The newly set time range is active after the power supply has been turned off and on.
* With the power supply on, it is possible to regulate the preset time freely within the selected time range.



UNIVERSAL

FUNCTIONING



***Delayed deactivation (A)**

Contacts remain in the 11-10 (and 8-7 for PCU-510) position until the relay is activated. After powering up, contacts are shifted to position 11-12 (and 8-9 for PCU-510) and the preset work time „t" starts running. When the designated time „t" is up, contacts return to the 11-10 (and 8-7 for PCU-510) position. To start next working sequence of the relay, power supply must be disconnected and reinstated.

***Delayed activation (B)**

Before and after supplying the power, contacts remain in the 11-10 (and 8-7 for PCU-510) position and the preset work time „t" starts running. When the designated time „t" is up, contacts return to the 11-12 (and 8-9 for PCU-510) position. To start next working sequence of the relay, power supply must be disconnected and reinstated.

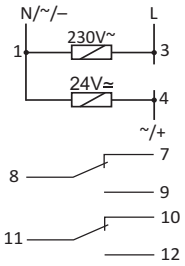
* **Delayed deactivation - cyclic (C)**

Delayed deactivation work mode is carried out cyclically in equal intervals of preset work and break time.

* **Delayed activation - cyclic (D)**

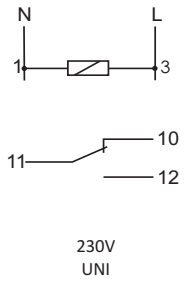
Delayed activation work mode is carried out cyclically in equal intervals of preset work and break time.

PCU-510 2P contact

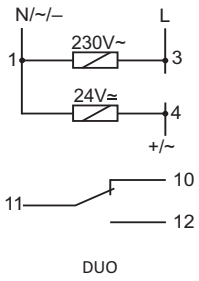


supply PCU-510 DUO	230V AC / 24V AC/DC
current load	2×[<8A]
contact	separated 2P
operation time - adjustable	0,1sec÷576h
delay of response - aversive functions	<50msec
signalling of supply	green LED
contact status indication	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

PCU-511 1P contact



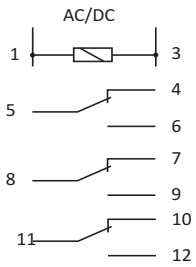
230V
UNI



DUO

supply	PCU-511 230V	230V AC
	PCU-511 DUO	230V AC / 24V AC/DC
	PCU-511 UNI	12÷264V AC/DC
current load		<8A
contact		separated 1P
operation time - adjustable		0,1sec÷576h
delay of response - aversive functions		<50msec
signalling of supply		green LED
contact status indication		red LED
power consumption		0,8W
working temperature		-25÷50°C
terminal		2,5mm² screw terminals
dimensions		1 module (18mm)
mounting		on rail TH-35
protection level		IP20

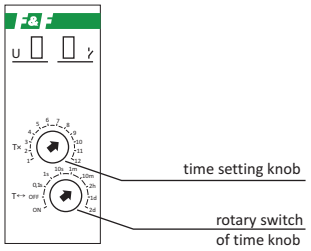
PCU-530 3P contact



supply	100÷264 AC/DC
current load AC-1	3×[<8A]
contact	separated 3P
operation time	0,1sec÷576h (24 days)
delay of response - aversive functions	<50msec
signalling of supply	green LED
contact status indication	red LED
power consumption	0,15W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

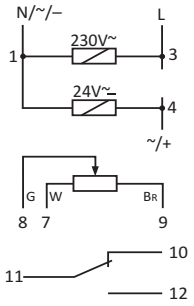
ATTENTION!

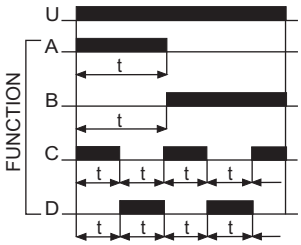
* Setting the time range knob regulator in the:
  ON - position with power supply activated results in the permanent closure of the contact.
  OFF - position (power supply activated) causes the contact to be permanently opened.
* With the power supply on, the system does not respond to time range setting modifications.
* The newly set time range is active after the power supply has been turned off and on.
* With the power supply on, it is possible to regulate the preset time freely within the selected time range.



WITH EXTERNAL TIME SETTING KNOB

PCU-518





supply PCU-518 DUO	230V AC / 24V AC/DC
current load	<8A
contact	separated 1P
operation time - adjustable	0,1sec÷576h
delay of response - aversive functions	<50msec
signalling of supply	green LED
contact status indication	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

potentiometer

dimensions	63×42×30mm
terminal	3×0,34mm²; l=70cm
mounting hole	Ø10

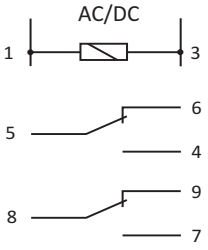
ATTENTION!

* Setting the time range knob regulator in the:
  ON - position with power supply activated results in the permanent closure of the contact.
  OFF - position (power supply activated) causes the contact to be permanently opened.
* With the power supply on, the system does not respond to time range setting modifications.
* The newly set time range is active after the power supply has been turned off and on.
* With the power supply on, it is possible to regulate the preset time freely within the selected time range.

WITH BACKUP IN CASE OF A POWER FAILURE

PCU-504

NEW !



supply	12÷264V AC/DC
current load	2×8A
contact	separated 2P
operation time - adjustable	0,1sec÷10min.
opóźnienie zadziałania - funkcje awersyjne	<50msec
signalling of supply	green LED
contact status indication	red LED
power consumption	0,56W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

FUNCTIONING

The relay has an internal condenser system for maintaining and switching contact after a power failure. The maximum backup time up to 10 minutes.

FEATURES

A

Closing contacts after switching on the power voltage. In case of a power failure, contacts state is maintained for a set period of time.

B

The delayed activation.
The backup feature is not implemented.

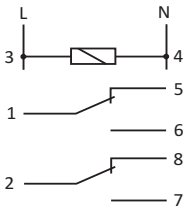
C

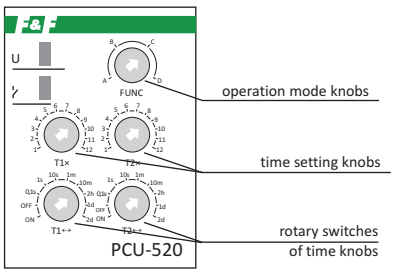
After switching on the power voltage, contacts are activated after a preset time (delayed activation). In case of a power failure, contacts state is maintained for a set period of time.

TWO-TIME TYPE

SETTING OF TWO INDEPENDENT TIME VALUES T1 (work time) AND T2 (interruption time).

PCU-520 4-FUNCTION





supply PCU-520 230V	230V AC
PCU-520 24V	24V AC/DC
PCU-520 UNI	12÷264V AC/DC
current load	2×(<8A)
contact	separated 2P
operation time - adjustable	0,1sec÷576h
out time - adjustable	0,1sec÷576h
delay of response - aversive functions	<50msec
power supply indicator	green LED
operation mode indicator	red LED
power consumption	1,2W
working temperature	-25÷50°C
connection	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

Operation mode:

***LAGGED ACTIVATION (IR)**

Until the relay is activated, the contact remains in the 1-5 and 2-8 position. After the power voltage is supplied (the green „U" LED lights up), the contact is shifted to 1-6 and 2-7 position and the countdown of the preset value „t" is commenced (the red LED lights up). After the preset time „t" has been counted down, the contact returns to position 1-5 and 2-8. The working sequence of the relay may be repeated after turning the power supply off and on.

***LAGGED DEACTIVATION (IA)**

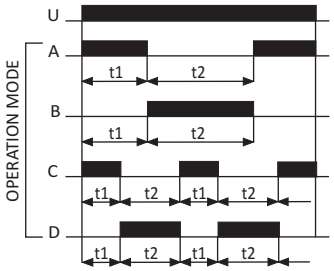
Until the relay is activated, the contact remains in the 1-5 and 2-8 position. After the power voltage is supplied (the green „U" LED lights up), the contact is shifted to position 1-6 and 2-7 and the countdown of the preset value „t" is commenced (the red LED lights up). The working sequence of the relay may be repeated after turning the power voltage off and on.

***LAGGED ACTIVATION - CYCLIC (CR)**

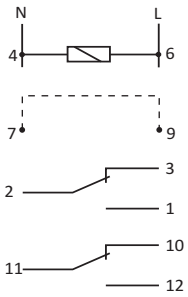
The LA operational mode is triggered in equal interruption/work cycles according to preset time values.

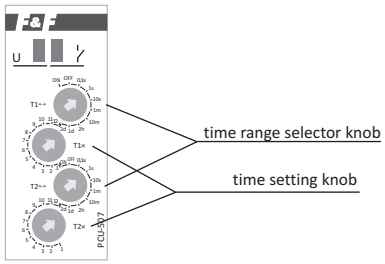
***LAGGED DEACTIVATION - CYCLIC (CA)**

The LD operational mode is triggered in equal interruption/work cycles according to preset time values.



PCU-507 2-FUNCTION





supply PCU-507 230V	230V AC
PCU-507 24V	24V AC/DC
current load	2×[<8A]
contact	separated 2P
work time - adjustable	0,1sec÷576h
interval time - adjustable	0,1sec÷576h
delay of response - aversive functions	<50msec
power supply indicator	green LED
contact status indication	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

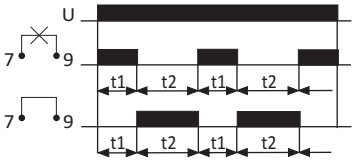
Functions:

- DELAYED ON - CYCLIC: 

When the power supply is given then joints remain in the positions 2-3 and 11-10 for the time t1. After the preset time t1 switches the joints in position 2-1 and 11-12 at the time t2. After time t2 the relay joints return to the positions 2-3 and 11-10. The sequence of these switches is carried out periodically.

- DELAYED OFF - CYCLIC: 

To time of switching the relay, the joints remain in the positions 2-3 and 11-10. After the power supply is given then joints are switched to position 2-1 and 11-12 at the time t1. After the preset time t1 joints return to the positions 2-3 and 11-10 for the time t2. The sequence of these switches is carried out periodically.

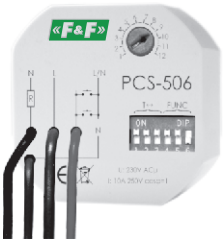


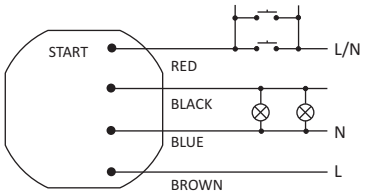
Selection of a particular function is make by jumper on terminals 7-9.

* Setting the time range knob regulator in the:
ON - position with power supply activated results in the permanent closure of the contact in position 1-6 and 2-7.
OFF - position (power supply activated) causes the contact to be permanently closed in the 1-5 and 2-7 position.
* With the power supply on, the system does not respond to time range setting modifications.
* The newly set time range is active after the power supply has been turned off and on.
* With the power supply on, it is possible to regulate the preset time freely within the selected time range.

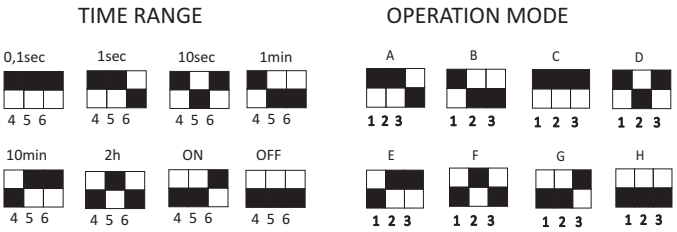
MULTI-FUNCTION; MULTI-RANGE

PCS-506 8-FUNCTION





The required time range and the operation mode of the relay is selected by choosing the proper combination of the switches (black field in the diagram stands for the switch position).



Setting the wheel regulator in the:

***ON** position with power supply activated causes the contact to be permanently closed.

***OFF** position with power supply activated causes the contact to be permanently opened.

*With the power supply on, the system does not respond to time range setting modifications.

*The newly set time range is active after the power supply has been turned off and on.

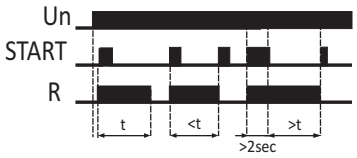
*With the power supply on, it is possible to regulate the preset time freely within the selected time range.

supply	230V AC
current load	<10A
contact	1 Z
operation time	0,1sec÷24h
activation lag delay function	<50msec
power supply indicator	green LED
operation mode indicator	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	4×DY1mm²; l=10cm
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

(A)

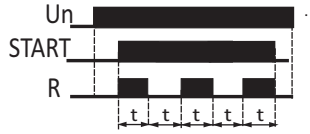
Presence simulator. When the START signal is being applied, the system turns the relay on and off at random for a period of 20 sec up to 20 min. The sequence in question is initiated by activation of the relay. After the START signal is discontinued, the system turns the relay off. The device does not respond to time range settings.

(B)



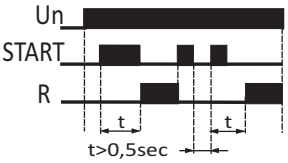
Bistable relay with step automatic module. A single pressing of the START button results in activating the relay for the preset time. A further START impulse generated during the countdown will deactivate the relay. Pressing and holding the button START for longer than 2sec will result in the permanent activation of the relay. The following impulse turns the relay off.

(C)



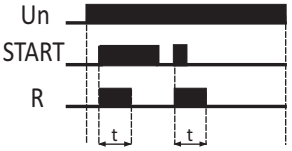
Generator with a pulse duty factor of 50% which initiates its working sequence from the moment of activation. It is active as long as START voltage is applied. Once the START signal is disconnected, the connection is broken and the device is deactivated.

(D)



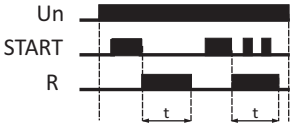
Lagged activation of the relay with the START signal. When the relay is active, another START impulse will turn it off. The following START impulse causes a repetition of the time countdown sequence and activation of the relay. The interval between the trailing edge of the reset signal and the leading edge of the START signal, which re-initiates the countdown sequence, should be at least 0,5 sec.

(E)



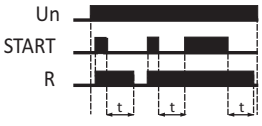
Generation of a single impulse of „t" time by the START signal trailing edge. During preset time countdown, the system does not respond to START impulses.

(F)



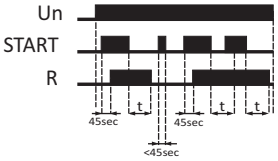
Generation of a single impulse of „t" time by the START signal trailing edge. During preset time countdown, the system does not respond to START impulses.

(G)



Lag in deactivation with support function enabled. The leading edge of the START signal results in relay activation, whereas the trailing edge of the same signal triggers the time countdown. The supply of the START signal during countdown results in an extension of the cycle by another „t" time value along the trailing edge.

(H)



Deactivation and activation lags with support function enabled. If the START voltage is supplied for less than 45sec, it is ignored by the system, however if it is longer, the relay is activated after the 45sec and the preset time value is counted down with the trailing edge of the START signal. If another START impulse is applied during the countdown, then the trailing edge of this signal will result in the repeated countdown sequence (e.g. for ventilation purposes: short activation of the lighting does not turn the fan on, but if the lilting lighting is activated for longer than the 45sec, the fan will start).

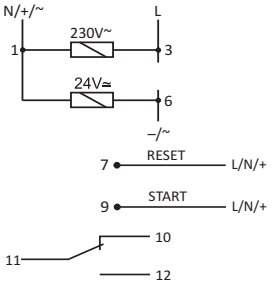
PCU-516
PCU-519 10-FUNCTION

with START i RESET control inputs

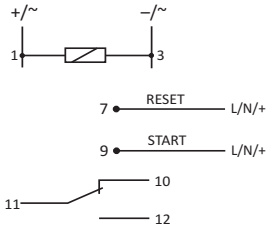
Using operation mode knob set the one of the functions.

If the RESET voltage is applied during the execution of:
*A, B, C, D, F functions the 'selected operation' mode is restarted
*F, G, H, I functions the relay returns to the initial condition and awaits the START signal;
*K function the relay's contact is closed permanently in the 3-7 position.

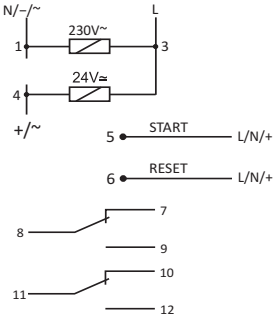
*Setting the time range knob regulator in the:
ON - causes pernament activation of contacts
OFF - causes pernament deactivation of contacts



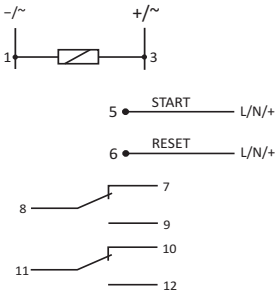
PCS-516 DUO



PCS-516 UNI



PCS-519 DUO



PCS-519 12V

power supply	PCS-516 DUO	230V AC / 24V AC/DC
	PCS-516 UNI	12÷264V AC/DC
	PCS-519 DUO	230V AC / 24V AC/DC
	PCS-519 12V	12V AC/DC
current load	PCS-516	<8A
	PCS-519	2×[<8A]
contact	PCS-516	separated 1P
	PCS-519	separated 2P
current control pulse		<1mA
working time - adjustable		0,1s ÷576h
activation lag delay function		< 50msec
signalling power		green LED
signalling contact status		red LED
power consumption		0,8W
working temperature		-25÷50°C
terminal		2,5mm² screw terminals
dimensions		1 module (17,5 mm)
mounting		on rail TH-35
protection level		IP20

A

LAGGED ACTIVATION
After the power voltage is supplied, the contact remains in position 3-5 and the timing of the preset value t is commenced. After the preset time „t" has been counted down, the contact is shifted to position 3-7. The working sequence of the relay may be repeated after turning the power supply off and on.

B

LAGGED DEACTIVATION
Until the relay is activated, the contact remains in the 3-5 position. After the power voltage is supplied, the contact is shifted to position 3-7 and the countdown of the preset value „t" is commenced. The working sequence of the relay may be repeated after turning the power voltage off and on.

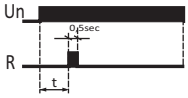
C

LAGGED ACTIVATION - CYCLIC
The LA operational mode is triggered in equal interruption/work cycles according to preset time values.

D

LAGGED DEACTIVATION - CYCLIC
The LD operational mode is triggered in equal interruption/work cycles according to preset time values.

E

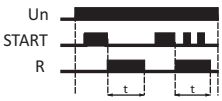


0,5 sec impulse generation after preset time „t".

F

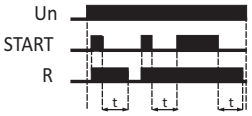
Generation of a single impulse of „t" time by the START signal eading edge. During preset time countdown, the system does not respond to START impulses.

G



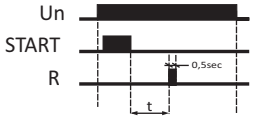
Generation of a single impulse of „t" time by the START signal trailing edge. During preset time countdown, the system does not respond to START impulses.

H



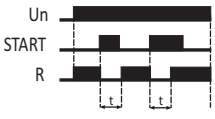
Lag in deactivation with support function enabled. The leading edge of the START signal results in relay activation, whereas the trailing edge of the same signal triggers the time countdown. The supply of the START signal during countdown results in an extension of the cycle by another „t" time value along the trailing edge.

I



The generate a single pulse 0.5 sec after time „t" activated by the trailing edge of the START signal.

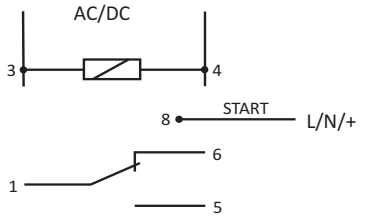
K



The brake on „t" time in activation of the contact is activating of the rising edge of the START signal.

PCS-517

18-FUNCTION



ATTENTION!

Wide range of time adjustment positions (0.25 sec - 99 hrs 59mins 59secs) enables the user to preset an extremely accurate contact actuation time, e.g. 2hrs - 13mins - 27sec.

supply	24÷264V AC/DC
current load	<16A
contact	seprated 1C/O
control pulse current	<1mA
operation time	0,25sec÷99h59min59sec
activation lag delay function	500msec
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm^2 screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protectional level	IP20

P00 IDLE MODE

P01

After supply voltage has been applied, the contact remains in 1-6 position and countdown of the preset delay time „t" is commenced. After this time is counted down, the contact is switched to position 1-5 (actuation). The next run of the relay's working sequence is operable when the supply voltage is reinstated after cut-off.

P02

Until the supply voltage is applied, the contact remains in 1-6 position. Once the voltage is applied, the contact is switched to position 1-5 (actuation) and countdown of the preset delay time „t" is commenced. The next run of the relay's working sequence is operable when the supply voltage is reinstated after cut-off.

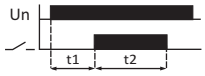
P03

Delayed actuation work mode is realised in cycles with the following preset time interruptions: „t1" interruption and „t2" work (actuation).

P04

Delayed deactivation work mode is realised in cycles with the following preset time interruptions: „t1" actuation and „t2" interruption.

P05



After supply voltage has been applied, the contact remains in position 1-6 and countdown of the preset delay time „t" is commenced. After this time is counted down, the contact is switched to position 1-5 (actuation) for time „t2". The next run of the relay's working sequence is operable when the supply voltage is reinstated after cut-off.

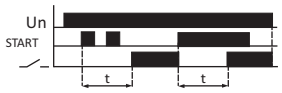
P06

Once the START signal is applied, the contact is switched to position 1-5 (actuation). After the signal's decay, the contact is held in the position for the preset „t" time. When time „t" is counted down, the contact does not respond to the next pulses of the START signal.

P07

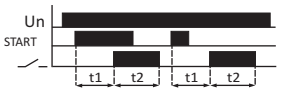
Once the START signal is applied, the contact is switched to position 1-5 (actuation). After the signal's decay, the contact is held in the position for the preset time „t". Another application of the START signal during countdown time „t" results in the countdown interruption, with the contact still actuated (pos. 1-5). Another decay of the START signal triggers off time „t" countdown and the contact support in that position.

P08



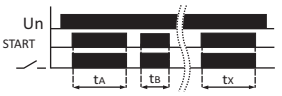
Contact actuation (pos. 1-5) for time „t" by the leading edge of the START signal.

P09



Delay time „t1" (pos. 1-6) is triggered off by the leading edge of the START signal. After the „t1" time has been counted down, the contact is actuated (pos. 1-6) for the „t2" time.

P10



tA+tB+...+tx=t

Contact actuation (pos. 1-5) during the countdown of time t from value set as „zero" only during the application of the START signal. The signal's decay stops the countdown. Another application of the START signal results in the continuation of the countdown for the remaining time „t". The decay of the supply voltage results in the remaining time „t" being reset. After the supply voltage and START signal are reinstated, the countdown of time „t" from the preset value will be restarted.

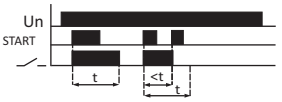
P11

Contact actuation (pos. 1-5) for time „t" with the trailing edge of the START signal. When time „t" is counted down, the contact does not respond to the next pulses of the START signal.

P12

Contact actuation (pos. 1-5) for time „t" with the trailing edge of the START signal. Another application of the START signal, as well as its decay during time „t" countdown triggers off the countdown from the beginning.

P13

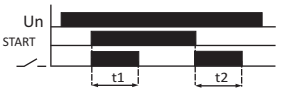


Contact actuation (pos. 1-5) for time „t" by the leading edge of the START signal. Another application of the START signal during time „t" countdown results in the countdown's interruption and the contact's deactivation (pos. 1-6).

P14

Contact actuation (pos. 1-5) for time „t" by the leading edge of the START signal. Another application of the START signal during time „t" countdown triggers off the countdown from the beginning.

P15



Contact actuation (pos. 1-5) for „t1" time by the leading edge of the START signal and another actuation for time „t2" with the trailing edge of the START signal.

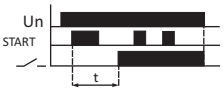
P16

Contact actuation (pos. 1-5) for time „t1" by the leading edge of the START signal. When time „t" is counted down, the contact does not respond to the next pulses of the START signal.

P17

Delayed contact actuation after the lapse of time „t", with the countdown triggered off by the leading edge of the START signal. Another application of the signal deactivates the contact (pos. 1-6) for time „t". A further application of the START signal during time „t" countdown triggers off the countdown from the beginning.

P18



Delayed contact actuation after the lapse of time „t", with the countdown triggered off by the leading edge of the START signal. When time „t" is counted down, the contact does not respond to the next pulses of the START signal. The contact is deactivated (pos. 1-6) on the decay of the supply voltage. The next run of the relay's working sequence is operable after the supply voltage is cut off and reinstated.

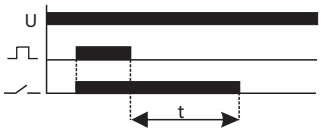
LAGGED-PULSE TIME RELAYS

PURPOSE

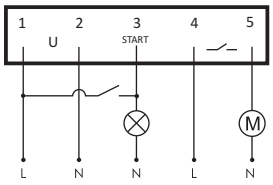
Lagged-pulse time relays are devised to support the power supply of the controlled receiver for a specified period of time after decay of the control voltage, e.g. in bathroom ventilation systems in which the upkeep of the fan operation (activated along with the lighting) is required for a specified period of time after turning off the accompanying lighting.

FUNCTIONING

The application of control voltage S to the relay causes its activation and the resulting supply of voltage R to the controlled receiver. After decay of the control voltage, the operation of the receiving device is kept for the support time „t" (preset with the potentiometer). After the „t" time has been counted down, the controlled receiver is turned off automatically. If control voltage S is re-supplied before the lapse of the preset time, the relay will repeat its operational sequence.



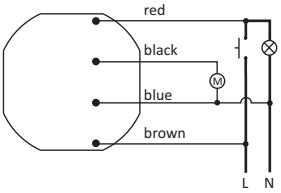
PO-405



Ⓜ - controlled receiver

supply PO-405 230V	230V AC
PO-405 24V	24V AC/DC
current load	<10A
contact	1 Z
current control pulse	<5mA
operation time	1÷15min.
power supply indicator	green LED
operation mode indicator	red LED
power consumption	0,56W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	50×67×26mm
mounting	two screws to substrate
protection level	IP20

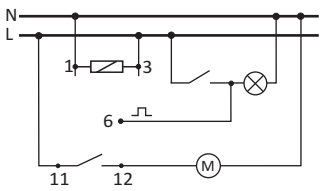
PO-406



Ⓜ - controlled receiver

supply	230V AC
current load	<10A
contact	1 Z
current control pulse	<5mA
operation time	1÷15min.
power consumption	0,56W
working temperature	-25÷50°C
connection	4×DY 1mm²; l=10cm
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

PO-415



Ⓜ - controlled receiver

supply PO-415 230V	230V AC
PO-415 24V	24V AC/DC
current load	<10A
contact	separated 1 P
current control pulse	<5mA
operation time	1÷15min.
power supply indicator	green LED
operation mode indicator	red LED
power consumption	0,56W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (17,5mm)
mounting	on rail TH-35
protection level	IP20

15. TIME CONTROLLERS

PROGRAMMABLE CONTROLLER (LEFT/RIGHT activation mode)

With four time settings available and a programmable number of repetitions or infinite work sequence in the „loop mode”

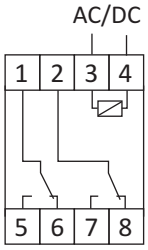
STP-541

PURPOSE

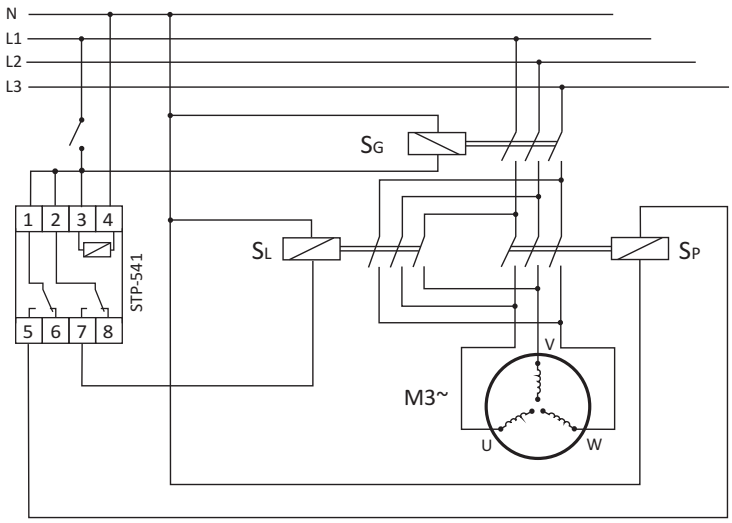
Programmable controller is used for control of technological processes in industrial automation systems that require temporary, cyclical, alternating activation of receivers with forced and timed intervals between successive activations.

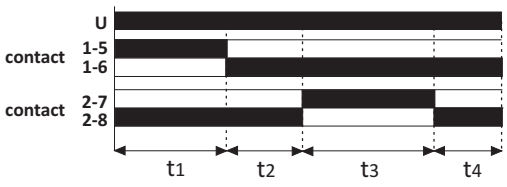
FUNCTIONING

The controller performs its tasks in accordance with the program of four times and the number of cycles. The cycle is a sequence of four consecutive contacts closing. After powering, the controller automatically executes the program. Contact is switched to position 1-5 for the time t1. When time t1 is up, contact returns to position 1-6 for the time t2. Only after time t2 the second contact is switched to position 2-7 for the time t3. When time t3 is up, contact is switched to position 2-8 for the time t4. After time t4, the controller will start from the beginning of the program cycle (from the time t1).
The cycle is repeated according to the programmed number of repetitions or infinitely in the “loop” work mode. Power failure> 1 sec. will stop the execution of the controller program. When the power is back, the controller will begin to execute the program from the beginning, including the programmed number of repetitions of cycles.



supply	24÷264V AC/DC
current load	2×(<16A)
contact	2×1P
time settings t1, t2, t3, t4	1sec÷99h59min59sec
time settings accuracy	1sec
number of cycle repetitions	1÷999999
	or infinite in the „loop mode”
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20





SG - main contactor
SP - „RIGHT” contactor
SL - „LEFT” contactor

Diagram of the LEFT-RIGHT contactor based switching system

STAR-DELTA SWITCH

PCG-417 To control the STAR-DELTA contactor connections system

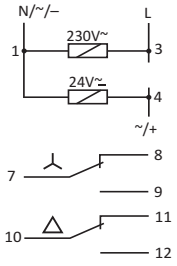
PURPOSE

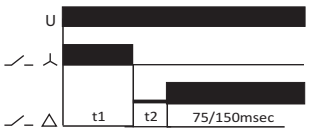
Motor starters with STAR-DELTA switch are used when the electric network does not allow short-term high current load, or when the start-up time is long. Induction motors with DELTA-connected windings draws very high current during start-up, up to 8 times the rated current. Using STAR-connected windings at start-up reduces current and boot time 3-fold. Lower power motors are switched using mechanical switches, and higher power motors require a contactor switch. Contactors are controlled with time switches. These are usually reversing relays (delayed actuation) with 1P electromagnetic relay (changeover contact). However, they are not "safe". Quick switch does not ensure that the STAR-system contactor has time to "bounce" before actuation of DELTA contactor or that electric arcs at the contacts of the STAR-system contactor will be suppressed. This causes a short circuit. To prevent this you should use the PCG-417 time relay.

FUNCTIONING

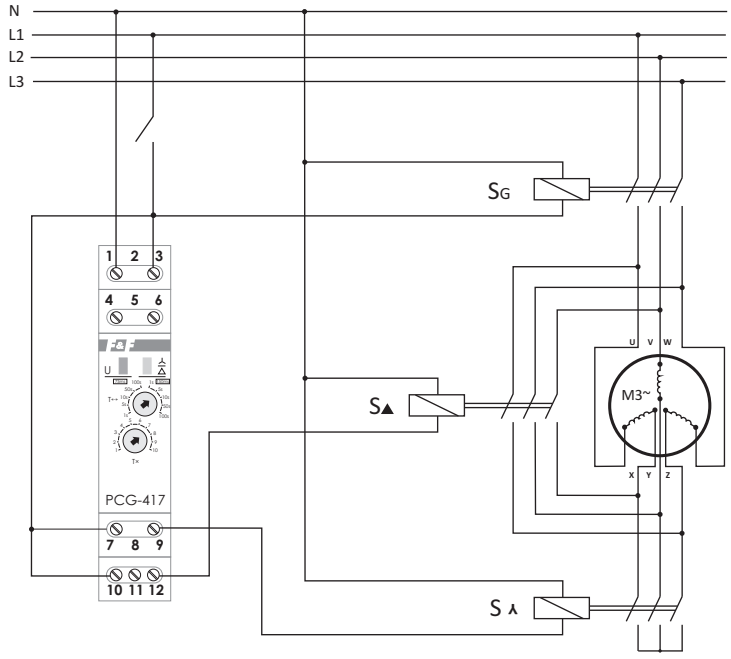
The PCG-417 relay has a special system of two electromagnetic relays, which eliminates the risk of activating two contactors at the same time. Each relay controls a suitable contactor. At the moment of switching from the STAR to DELTA system the STAR contactor disconnects, followed by a forced interval, and then a second relay activates DELTA contactor.
After applying power, the STAR contact is switched to position 7-9 for the set start-up time t1. Contact DELTA remains in position 10-11. After start-up time t1, the STAR contact is switched to position 7-8 (DELTA contact remains in position 10-11), followed by a break in switching at the preselected time t2. After the time t2, the DELTA contact is switched to position 10-12 and remains in this state until the disconnection of supply voltage (the STAR contact remains in position 7-8).

STAR = ⅄ DELTA = △





supply	230V AC / 24V AC/DC
current load	2×[<8A]
contact	2×1Z
start-up time ⅄	1÷1000sec
switching time	75msec / 150msec
signalling of supply	green LED
signalling ⅄△	red LED
power consumption	0,8W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20



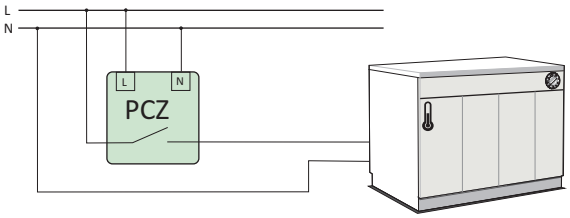
SG - main contactor
Sr - contactor „DELTA”
S ⅄ - contactor „STAR”

Diagram of the STAR-DELTA contactor connection system

16. PROGRAMMABLE CONTROL TIMERS

PURPOSE

Programmable control timer is used to time control the devices in home or industrial automation systems by an individual time program set by the user.



ON-OFF TYPE WEEKLY

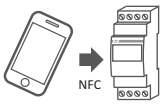
FUNCTIONING

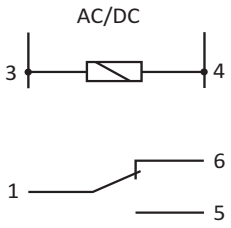
The timers activates and deactivates a given device at preset hours in the following cycles: 24-hour, weekly, working day (Mon-Fri) or weekend (Sat-Sun).

PCZ-521.3 SINGLE CHANNEL

* 500 memory cells
* relay state memory
* battery indicator
* LCD brightness adjustment
* NFC wireless communication
* PCZ Konfigurator app

NEW !





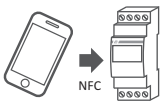
power input	24÷264V AC/DC
current load	<16A
contact	separated 1P
up time of the clock	6 years*
battery type	2032 (lithium)
up time of the display operation	no info
accuracy of the clock	1sec
time error	±1sec/24h
precision of program time setting	1min.
program memory cell	500
	250 pairs of OFF/ON COMMANDS
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

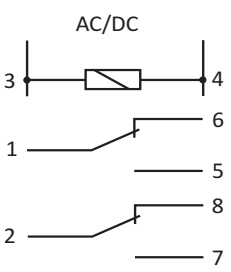
* battery life addicted to weather conditions and frequency of mains failure

PCZ-522.3 DUAL CHANNEL Two independently programmable channels

* 500 memory cells
* relay state memory
* battery indicator
* LCD brightness adjustment
* NFC wireless communication
* PCZ Konfigurator app

NEW !





power input	24÷264V AC/DC
current load	2×[<16A]
contact	2× separated 1P
up time of the clock	6 years*
battery type	2032 (lithium)
up time of the display operation	no info
accuracy of the clock	1sec
time error	±1sec/24h
precision of program time setting	1min.
program memory cell	500
	2× (125 pairs ON-OFF COMMANDS/CHANNEL)
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

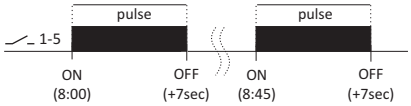
* battery life addicted to weather conditions and frequency of mains failure

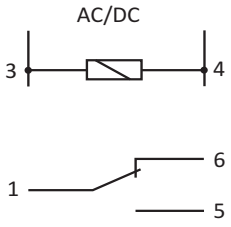
PULSE TYPE (SCHOOL)

PCZ-523.2 One-way type with two programme lines

FUNCTIONING

The PCZ-523 activates a given device at a preset time and deactivates it after preset time (by pulse) in the following cycles: 24-hour, weekly, working day (Mon-Fri) or weekend (Sat-Sun). Pulse range: 1 sec ÷ 99 min. 59 sec. The relay has been equipped with two independent switch able programme lines to control an connected receiver.





power input	24÷264V AC/DC
current load	<16A
contact	separated 1P
up time of the clock	6 years*
battery type	lithium
up time of the display operation	no info
accuracy of the clock	1s
time error	±1s/24h
precision of program time setting	1min.
hold accurate time setting	1sec
hold time setting range	1sec÷99min.59sec
program memory cell	250
	2× (60 ON/HOLD COMMANDS/ PROGRAM)
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

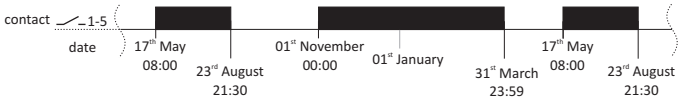
* battery life addicted to weather conditions and frequency of mains failure

YEARLY

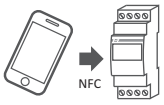
PCZ-529.3 SINGLE CHANNEL

FUNCTIONING

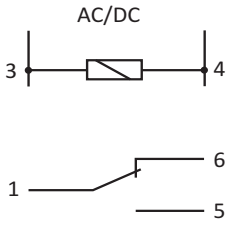
Timer allows to set overriding seasonality in the automation system. Timer activates and deactivates the device or electrical circuit on the programmed dates and hours in a yearly cycle. User can set activation for only one selected day of the year. In addition, user can set the start and stop time, which means specifying a particular hour and minute for the preset date.



* 500 memory cells
* relay state memory
* battery indicator
* LCD brightness adjustment
* NFC wireless communication
* PCZ Konfigurator app



NEW !

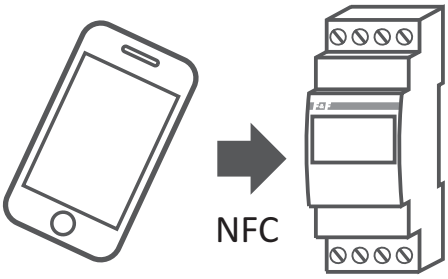


power input	24÷264V AC/DC
current load	<16A
contact	separated 1P
up time of the clock	6 years*
battery type	2032 (lithium)
up time of the display operation	no info
accuracy of the clock	1sec
time error	±1s/24h
precision of program time setting	1 day
program memory cell	500 (250 pairs ON/OFF COMMANDS)
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

* battery life addicted to weather conditions and frequency of mains failure

NEW FEATURES CLOCKS Series 3 [PCZ-521.3, PCZ-522.3, PCZ-529.3]

NFC WIRELESS COMMUNICATION – possibility wireless read and write timer configuration from an Android phone equipped with the NFC module.



PCZ KONFIGURATOR APP – free application for Android mobile phones and tablets equipped with the NFC module for wireless communication.

Features:
* timer configuration in Offline mode (without the connection with the PCZ-xxx timer)
* read and write the configuration of the controller
* quick programming of multiple controllers using a single configuration
* read and write the configuration from and to a file
* sharing the configuration via e-mail, Bluetooth, network drives
* unequivocal identification of the connected timer and the ability to name individual devices
*automatic backups of the configuration. Along with a unique identifier for each timer, user can easily restore previous configuration
* set the time and date according to the clock in mobile phone

Aplikacja dostępna na

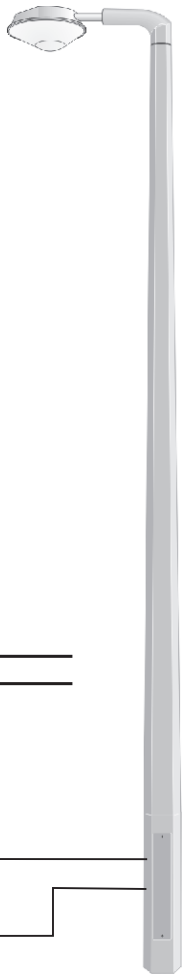
Google play

https://play.google.com/store/apps/details?id=pl.com.fif.clockprogramer

ASTRONOMICAL TYPE

PURPOSE

Astronomical clock is used for turning on and off lights and other electrical receivers according to the daily, astronomical points of sunrise and sunset.



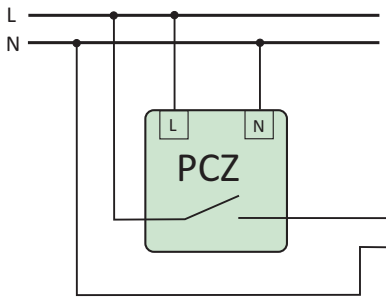
FUNCTIONING

On the grounds of information about the current date, geographical coordinates of the installation (location) and hourly shift relative to Universal Time (Greenwich UT), the astronomical clock automatically sets daily, temporary points of closing and opening of clock contact in accordance with astronomical times of sunrise and sunset. Temporary points of switching can be configured by the user with the hourly shift and time correction, which means that user can accelerate or delay the preset program points of start and stop (switch-on and switch-off points separately) in relation to sunrise and sunset.

ATTENTION!

For more precise switching settings of the clock working in areas with different geographic coordinates, user can set the latitude and longitude or select the specific code, which contain the automatic setting of geographic coordinates for a given city in Poland (the complete list of cities and corresponding codes is in the manual and on the F&F website).

CITY CODE	°N	°E
1. Albania Tiranë	41:20:00 °N	019:49:00 °E
2. Austria Salzburg	47:54:00 °N	013:03:00 °E
3. Austria Vienna	48:13:00 °N	016:22:00 °E
4. Belgium Brussels	50:50:00 °N	004:21:00 °E
• • •		
21.France Brest	48:23:00 °N	004:30:00 °W
22.France Lyon	45:46:00 °N	004:50:00 °E
23.France Marseille	43:18:00 °N	005:22:00 °E
24.France Nantes	47:14:00 °N	001:35:00 °W
25.France Paris	48:52:00 °N	002:20:00 °E
26.France Strasbourg	48:35:00 °N	007:45:00 °E
27.Germany Berlin	52:30:00 °N	013:26:00 °E
28.Germany Frankfurt	50:06:00 °N	008:41:00 °E
29.Germany Hamburg	53:33:00 °N	010:00:00 °E
30.Germany Köln	50:53:00 °N	007:00:00 °E
31.Germany München	48:08:00 °N	011:35:00 °E
32.Germany Osnabruck	52:16:00 °N	008:02:00 °E
33.Greece Athens	38:00:00 °N	023:44:00 °E
34.Greece Iraklion	35:20:00 °N	25:09:00 °E
35.Greece Patra	38:14:40 °N	21:44:4 °E
• • •		

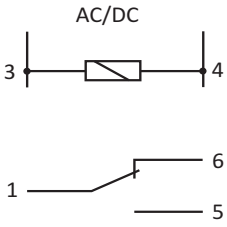


ATTENTION!

Automatic change function! (concerns all types)

Time change from winter to summer occurs automatically at 2 a.m., on the last Sunday of March by adding one hour to the current time. Time change from summer to winter occurs automatically at 3 a.m., on the last Sunday of October by taking away one hour from the current time.
ATTENTION! It is possibilities to switch-OFF of automatic change function.

PCZ-524 SINGLE CHANNEL



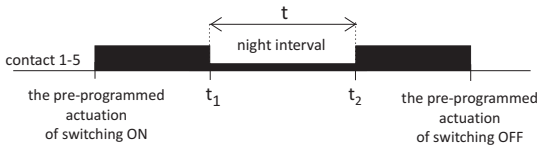
supply	24÷264V AC/DC
current load	<16A
contact	separated 1P
up time of the clock	6 years*
battery type	lithium
up time of the display operation	no info
accuracy of the clock	1sec
time error	±1s/24h
precision of program time setting	1min.
ON/OFF time correction	±0÷99min.
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm^2 screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

* battery life addicted to weather conditions and frequency of mains failure

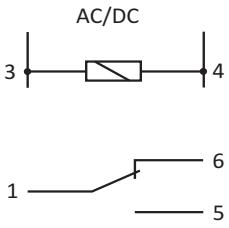
WITH PROGRAMMEABLE NIGHT INTERVAL

FUNCTIONING

Like PCZ-524.2. Another feature enables the user to set the so-called night interval between the pre-programmed actuation times, i.e. turning off the controlled receiver for a given period „t" [e.g. from 11 p.m. (t1) to 04.00 a.m. (t2)].



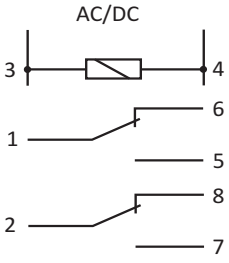
PCZ-525 ONE-WAY TYPE



supply	24÷264V AC/DC
current load	<16A
contact	separated 1P
backup time clock operation	6 years*
battery type	lithium
backup time display operation	none
accuracy of the clock	1sec
time error	±1sec/24h
accurate time setting	1min.
activation/deactivation time correction	±0÷99min.
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

* battery life addicted to weather conditions and frequency of mains failure

PCZ-526 TWO-WAY TYPE Night break programmable for each channel



supply	24÷264V AC/DC
current load	2×<16A
contact	separated 2×1P
backup time clock operation	6 years*
battery type	lithium
backup time display operation	none
accuracy of the clock	1sec
time error	±1sec/24h
accurate time setting	1min.
activation/deactivation time correction	±0÷99min.
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

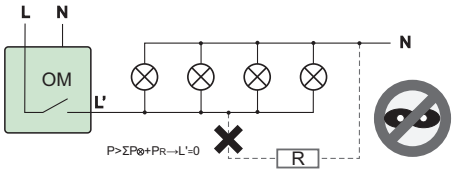
* battery life addicted to weather conditions and frequency of mains failure

Table of sample points of starts and stops for Warsaw at 22.06.2006 Depending on the settings in the SETUP				
Astronomical point	Sunset	19:59		
	Sunrise	3:16		
Correction time	On	+20 min.		
	Off	-15 min.		
Shift hourly		+01	00	-02
Scheduled points	On	21:19	20:19	18:19
	Off	4:01	3:01	1:19

17. POWER CONSUMPTIONS LIMITERS

PURPOSE

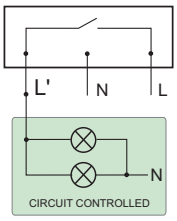
Power consumption limiters are devised for the automatic disconnection of power from the circuit of single-phase wiring systems once the rated power consumption of the receivers incorporated into the system is exceeded.



FUNCTIONING

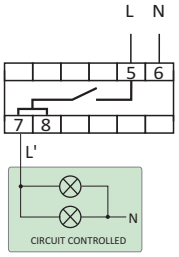
The limiter enables the user to supply power to the circuit if the total consumed power applied to the receivers constituting the system is lower than the preset value on the limiter's scale. Once the rated power consumption threshold in the controlled circuit is exceeded, the element is automatically disconnected from the power source. The supply is reinstated automatically once the preset time lapses. If the value of power consumption remains over the rated input, the power supply to the circuit is cut off again.

OM-1 / OM-2



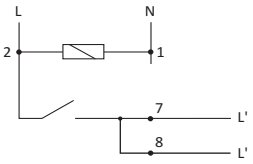
supply	230V AC
current load	<16A
power limit	200÷2000VA
delay of response	1,5÷2sec
hysteresis power return	2%
time power return	
for OM-1 constant	30sec
for OM-2 adjustable	4÷150sec
terminal	2,5mm² screw terminal
power consumption	0,8W
working temperature	-25÷50°C
dimensions	50×67×26mm
mounting	two screws to the base
protection level	IP20

OM-631

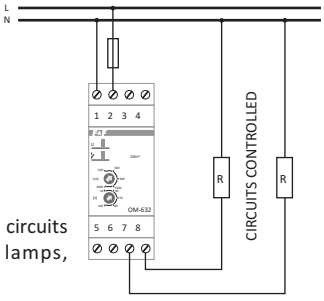


supply	230V AC
current load	<16A
power limit	200÷1000VA
delay of response	1.5÷2sec
hysteresis power return	2%
time power return	30sec
terminal	2,5mm² screw terminals
power consumption	0,8W
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

OM-632 FOR CIRCUITS WITH CONVERTERS

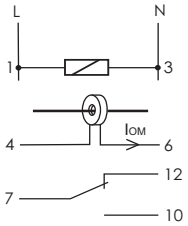


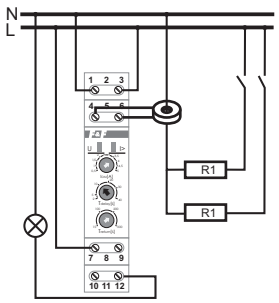
Limiter adapted for the protection of circuits with converters, e.g. fluorescent lamps, transformers.



supply	230V AC
contact	1Z
current load	
for cosϕ=1	<16A
for cosϕ≠1	<4A
power limit	200÷2000VA
delay of response	1÷2sec
hysteresis power return	2%
time power return	10÷100sec
terminal	2,5mm² screw terminals
power consumption	0,8W
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

OM-611 TO WORK WITH A CURRENT TRANSFORMER

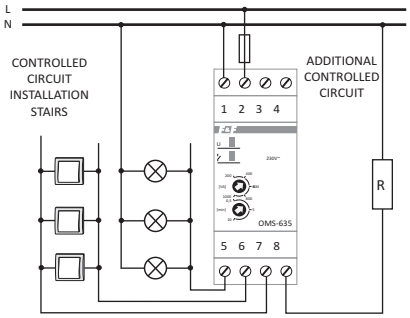




supply	230V AC
current load	<8A
contact	separated 1P
activation threshold - adjustable	0,5÷5A
delay of response - adjustable	2÷40sec
hysteresis power return	2%
time power return - adjustable	15÷300sec
terminal	2,5mm² screw terminals
power consumption	0,8W
working temperature	-25÷50°C
dimensions	1 module (18mm)
mounting	na szynie TH-35
protection level	IP20

The relay is adapted to cooperate with current transformer whose primary circuit is connected to the circuit to be measured, and output terminals for measuring the OM, which allows for control circuits of any load and the actual setting of the relay activation threshold higher than 5A (I_{OM}). Range of measured current dependence on the transmission transformer for example, from 5A to 50A with the transmission ratio of 10:1 for the transformer 50/5A.

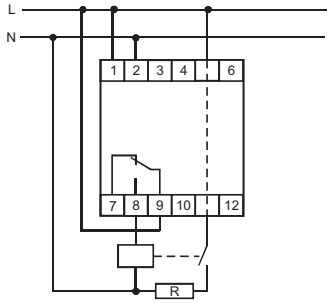
OMS-635 WITH STAIRCASE TIMER



supply	230V AC
current load	<16A
power limit	200÷1000VA
delay of response	1,5÷2sec
hysteresis power return	2%
time power return	30sec
switch-on time lighting - adjustable	0,5÷10min.
terminal	2,5mm² screw terminals
power consumption	0,8W
working temperature	-25÷50°C
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

The OMS-635 power consumption limiter allows the user to maintain lighting in halls, staircases or other places active for a specified time when it will then turn off automatically. The user may also preset the automatic disconnection of power supply to a single-phase wiring system if the rated power input to the receivers in a given circuit is exceeded.

OM-633 WITH FUNCTION VOLTAGE RELAY



supply	230V AC
current load	<16A
contact	separated 1P
POWER	
power activation threshold - adjustable	1÷10kW
response time -adjustable	1÷300sec
return time - adjustable	4÷600sec
VOLTAGE	
activation threshold	
lower UL	150÷210V
higher UH	230÷260V
response time	
lower	5sec
higher	0,3sec
diameter hole	5mm
working temperature	-25÷50ºC
dimensions	3 modules (52mm)
mounting	on rail TH-35
protection level	IP20

FEATURES

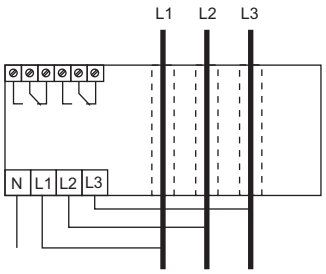
* regulated power threshold 1÷10 kW
* protection against supply voltage reduction UL (150÷210 V)
* protection against supply voltage increase UH (230÷260 V)
* switching counter with automatic power-off of the system after exceeding a fixed number of actuations
* automatic power lock of the system for 10 min. if power level is exceeded 5 times
* automatic power-off when the power consumption is 8-fold higher than the set threshold
* automatic power-off when the power consumption is greater than 16 kW
* adjustable response time (1 sec ÷ 3 min.)
* adjustable restart time (4 sec ÷ 6 min.)

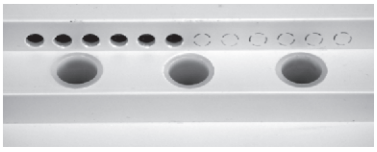
OM-630 THREE-PHASE direct measurement up to 50kW

FEATURES

* measurement of three-phase active power
* three variants of calculation power (for different types of load)
* control of asymmetry, phase sequence and the presence of circuit protection
* function relay priority
* a function of three-phase voltage relay
* time lock limiter due to frequent exceedances of the threshold set
* alarm limit value is exceeded capacity
* regulation of activation and return time

supply	3×[50÷450V+N]
current load	2×8A
contact	separated 2×1P
POWER	
activation threshold - adjustable	5÷50kW
precision setting	0,5kW
activation time Toff - adjustable	1÷240sec
return time Ton - adjustable	2÷3600sec
VOLTAGE	
activation threshold	
lower	<160V
higher	>260V
activation time	
lower	5sec
higher	0,1sec
measurement accuracy	
voltage 50÷300V	<2%
current 3÷100V	<3%
hole diameter transformer	10mm
power consumption	≤1,5V
working temperature	-25÷50°C
dimensions	6 modules (105mm)
mounting	on rail TH-35
protection level	IP20





internal circuits of current transformers

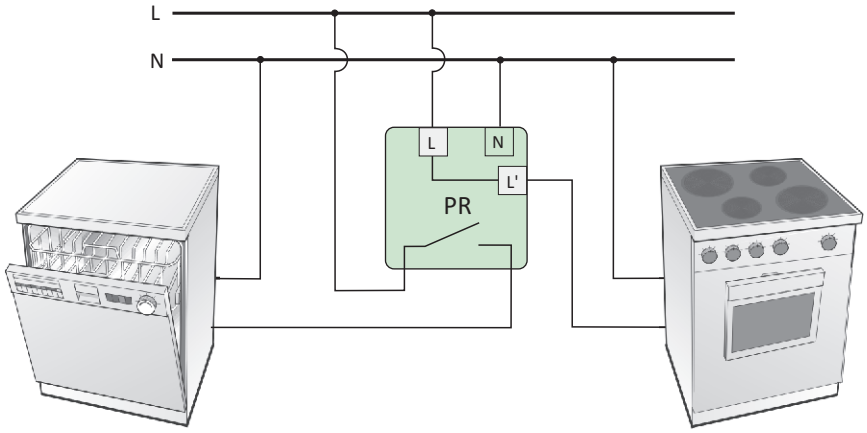
18. PRIORITY RELAYS

PURPOSE

Priority relays are designed to control the value of current drawn by electric receivers and their control units in cases where their simultaneous work could result in circuit overload or current overload protection activation.

FUNCTIONING

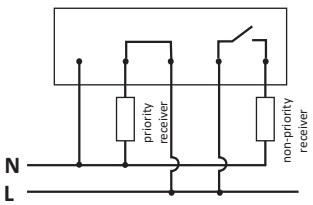
The potentiometer sets the value of drawn current (from 2A to 15A; for PR-615: from 4A to 30A) in the priority circuit, above which the receiver cuts off the non-primary circuit. A drop in current consumption in the priority circuit below the set threshold value will result in an automatic activation of the non-priority circuit. In cases where the priority receiver is already activated, the priority relay will prevent the activation of the non-priority receiver.



ATTENTION!

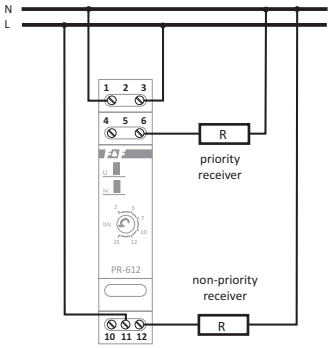
Circuits equipped with master relays require over-current security devices with increased actuation time, in order to prevent them operating before actuation of the relay.

PR-602 SETTING RANGE: 2÷15A



supply	230V AC
non-priority receivers current or higher with the use of a contactor	<16A
priority receivers current	<15A
contact	separated 1Z
switching current	2÷15A
recovery hysteresis	10%
switching delay	0,1sec
return delay	0,1sec
power consumption	0,4W
working temperature	-25÷50°C
dimensions	50×67×26mm
terminal	2,5mm² screw terminals
mounting	2 screws to substrate
protection level	IP20

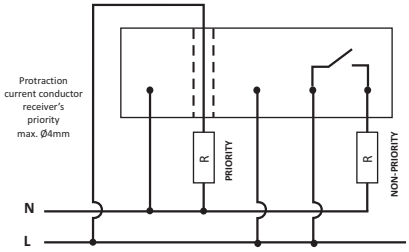
PR-612 SETTING RANGE: 2÷15A



supply	230V AC
non-priority receivers current or higher with the use of a contactor	<16A
priority receivers current	<15A
contact	separated 1P
switching current	2÷15A
recovery hysteresis	10%
switching delay	0,1sec
return delay	0,1sec
power consumption	0,4W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
protection level	IP20

WITH THE RECEIVER'S CURRENT CORD SECTION

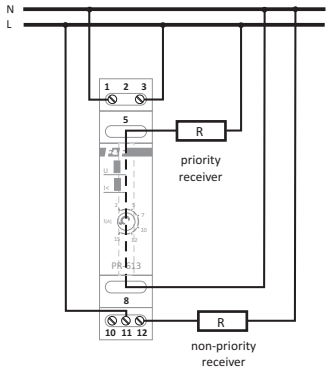
PR-603 SETTING RANGE: 2÷15A



supply	230V AC
non-priority receivers current or higher with the use of a contactor	<16A
priority receiver current limited cross-section threaded wire (max. Ø4mm)	
contact	separated 1Z
switching current	2÷15A
recovery hysteresis	10%
switching delay	0,1sec
return delay	0,1sec
power consumption	0,4W
working temperature	-25÷50°C
dimensions	50×67×26mm
terminal	2,5mm² screw terminals
mounting	2 screws to substrate
protection level	IP20

PR-613 SETTING RANGE: 2÷15A

PR-615 SETTING RANGE: 4÷30A



supply	230V AC
non-priority receivers current or higher with the use of a contactor	<16A
priority receiver current limited cross-section threaded wire (max. Ø4mm)	
contact	separated 1P
switching current	
PR-613	2÷15A
PR-615	4÷30A
recovery hysteresis	10%
switching delay	0,1sec
return delay	0,1sec
working temperature	-25÷50°C
power consumption	0,4W
terminal	2,5mm² screw terminals
dimensions	1 modules (18mm)
mounting	on rail TH-35
protection level	IP20

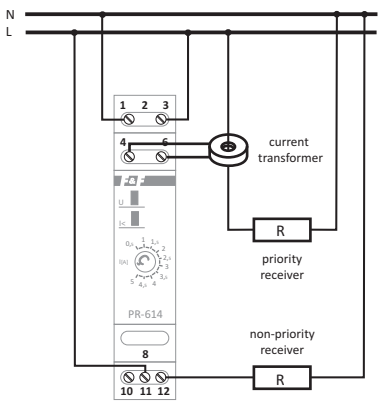
NOTE!

Priority receiver current can be higher than 15A. It is only restricted by the receiver's current cord section (galvanic separated from the measurement system) revved through the relay's throughway channel.

TO CO-OPERATION WITH A CURRENT TRANSFORMER

PR-614

The relay is designed to work with the current transformer with secondary current 5A. Transformer primary circuit is included in the priority receiver circuit, and secondary to the measurement relay terminals.
Example: For the receiver a priority for a maximum load of 140A we use the parameters of current transformer 150/5A. Torque is 30 at setting values on a scale equal to 2A relay will work with the actual value of current equal to 60A (2A×30=60A).



supply	230V AC
non-priority receivers current or higher with the use of a contactor	<16A
measurement input current 4-6	<5A
contact	separated 1P
switching current	0,5÷5A
recovery hysteresis	10%
switching delay	0,1sec
return delay	0,1sec
working temperature	-25÷50°C
power consumption	0,4W
terminal	2,5mm² screw terminals
dimensions	1 modules (18mm)
mounting	on rail TH-35
protection level	IP20

19. CURRENT RELAYS

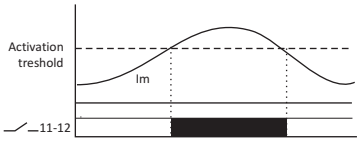
PURPOSE

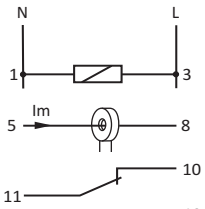
Current relays are used to control the flow of current in the circuit measured with the function switch contact in case of exceeding the value of current intensity above set thresholds.

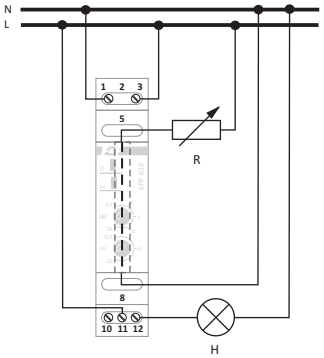
EPP-619 WITH RECEIVER'S CURRENT CORD SECTION

FUNCTIONING

Adjustable potentiometer value is the measured intensity of the current circuit, above which the contact is closed (pos. 11-12). Intensity of the current decline in value below the set threshold will automatically open contact (item 11-10).





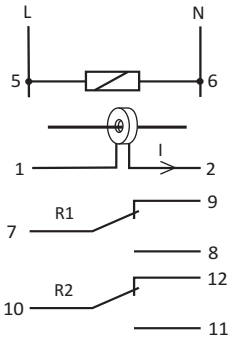


supply	230V AC
contact	separated 1P
current load	<16A
circuit current measured limited cross-section of the cable (max. Ø=4mm)	
switching current - adjustable	0,6÷16A
return histeresis	10%
activation time - adjustable	0,5÷10sec
return time	0,5sec
power consumption	0,4W
working temperature	-25÷50°C
connection	2,5mm² screw terminal
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

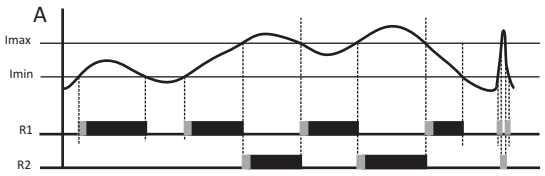
EPP-620 FOUR FUNCTIONS. WITH ADJUSTABLE LOWER AND UPPER ACTUATION THRESHOLD.

FUNCTIONING

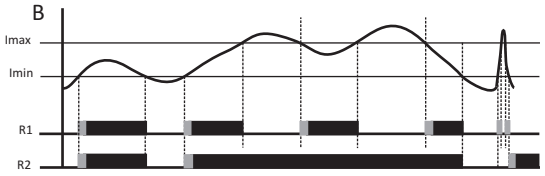
The relay is designed to work with the current transformer with secondary current 5A. Transformer's primary circuit is included in the circuit being measured, and secondary to the terminals of the measuring relay. Potentiometers are set thresholds for current - the lower Imin and upper Imax. Excess over the measured intensity of the current closes the appropriate contacts in accordance with the desired work function. Contact closure is delayed setting potentiometers T1 (for contact R1) and T2 (for contact R2).



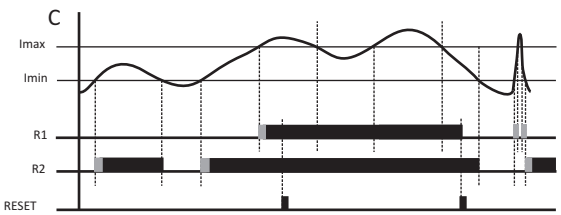
supply	230V AC
contact	2×separated 1P
current load R1 and R2	2×[<16A]
input current measurement 1-2	<5A
switching current - adjustable	
Imin	0,02÷1A
Imax	0,5÷5A
return histeresis	10%
activation time T1 i T2 - adjustable	0÷20sec
return time	0,5sec
power consumption	0,4W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
fixing	on rail TH-35
protection level	IP20



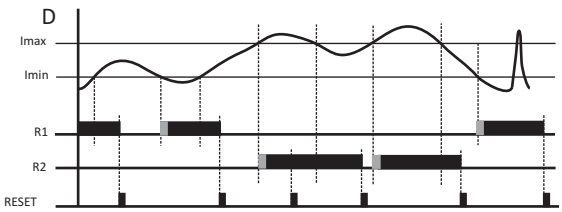
After crossing the Imin, contact R1 will close. After crossing the threshold of Imax contact R2 will close and R1 contact will be opened.



After crossing the Imin contacts R1 and R2 will close. After crossing the threshold of Imax R1 contact will open and R2 contact is closed.



After crossing the Imin the R2 contact will be closed. After crossing the threshold of Imax the R1 contact will be closed. Contact R1 is locked until you press the RESET button. If value exceeding Imax, the R1 contact doesn't react to the RESET button.



After crossing the Imin the R1 contact will be closed. After crossing the threshold of Imax the R2 contact will be and R1 contact is opened. Contact R1 and R2 are locked until you press the RESET button. If a value exceeding Imax, the contact R2 doesn't react to RESET.

20. FUSE MODULES

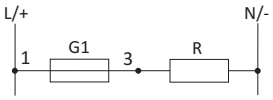
PURPOSE

Fuse modules serve as a security device for electric receivers against current increase over the nominal current value for the secured receiver.

FUNCTIONING

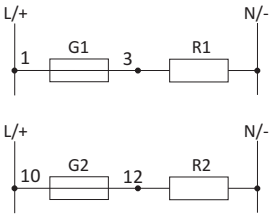
Fuse actuation (blowing of fuse link) is signalled by a red LED.

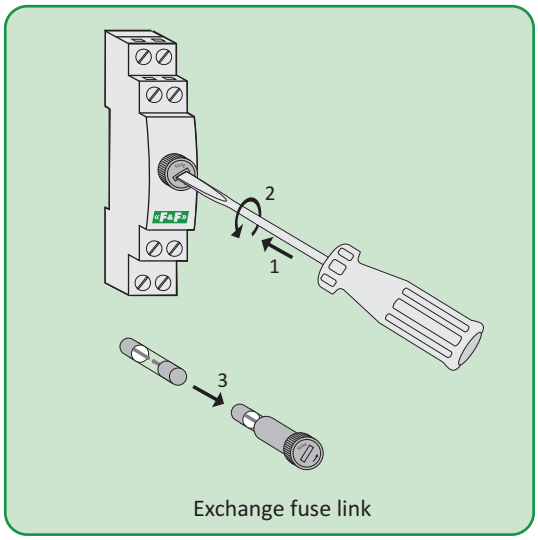
BZ-1 One-socket



Fuse link
Ø5×20

BZ-2 Two-socket

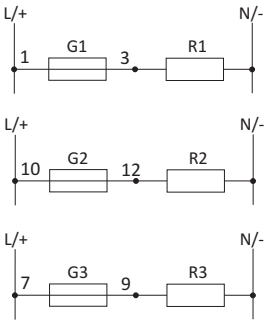




Exchange fuse link

BZ-3

Three-socket

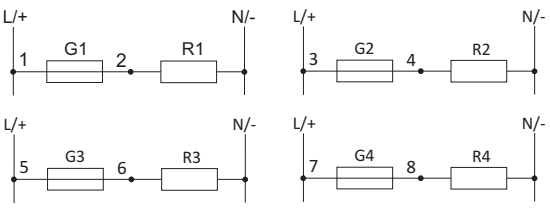


ATTENTION!

The product range of F&F fuses are fast (S) and delayed (T) with values in the field of 0.1A ÷ 6.3A.

BZ-4

Four-socket



fuse	fuse link Ø5×20mm
voltage	250V AC
current	<6,3A
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions BZ-1, BZ-2, BZ-3	1 module (18mm)
BZ-4	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

21. MICROPROCESSOR-BASED RELAYS FOR ELECTRIC ENGINES

EPS

APPLICATION

The EPS is intended as a safety device for 3-phase electric motors. It is extremely efficient for expensive applications where reliability is essential, like for elevators, transporters, hoists, fans, centrifuges, compressors, etc.

FUNCTIONING

The relay controls loads for all phases. Based on the values preset by the user, as well as the actual current consumed by the motor, the operation of the motor is analysed by the relay's CPU. By comparing the operation of the motor in question with model characteristics stored in the CPU, the device detects all defects very quickly and accurately, and immediately switches off the motor.

SECURITY FEATURES

* thermal protection
* protection against mechanical overload
* protection against fan stall
* protection against frequent restarts
* protection against phase collapse
* protection against load unbalance
* protection against earth fault

ADDITIONAL FEATURES

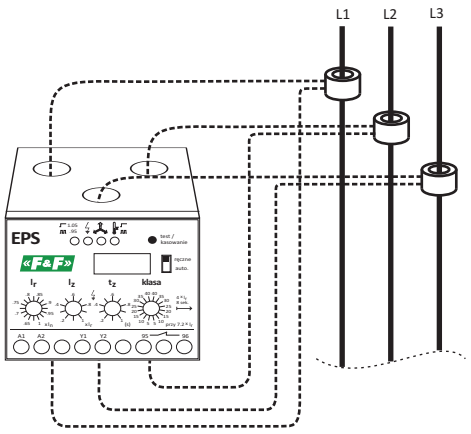
* nitial light signalling of engine overload
* selective signalling of trip cause
* remote relay motor control directly from industrial controllers
* motor's thermal memory

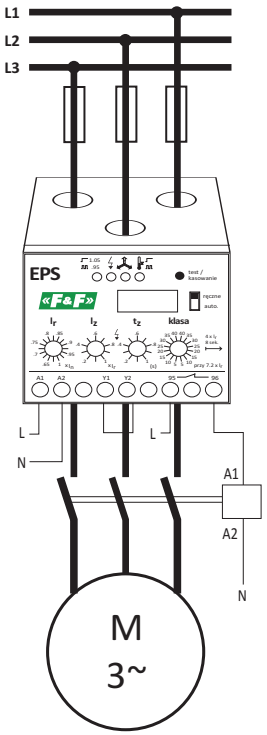
EPS SELECTION

The EPS is available in seven current versions: 5A, 10A, 16A, 25A, 45A, 63A, and 100A. The actual working current set value range for each version is from 62 to 100% of the relay's rated current (0.625÷1×In). Therefore, the selection of a proper relay depends on the power of the engine to be protected and its rated current. For engines with power between several hundred watts and 55 kW, the EPS with a proper set current range can be used, whereas more powerful units require the 5A EPS version with additional external current transformers.

EPS Version	Setting range
5A	3,125÷5A
10A	6,25÷10A
16A	10÷16A
25A	15,625÷25A
40A	25÷40A
63A	39,375÷63A
100A	62,5÷100A

to cooperating with current transformer





power supply	160÷242V 50/60 Hz
main circuits' insulation voltage	690V~
current load of contact	2A AC-15
effective current unbalance	>30%
delay at phase decay and unbalance	4sec
max. cable diameter	Ø14
terminal	2,5 mm² screw terminals
dimensions	72×59×88 mm
weight	385g
mounting	on rail TH-35
protection level	IP20

EPS-D

APPLICATION

The EPS-D is intended as a safety device for 3-phase electric motors. It is extremely efficient for expensive applications where reliability is essential, like for pumps, hydrophores, elevators, transporters, hoists, fans, centrifuges, compressors, etc.

FUNCTIONING

The relay controls loads for all phases. Based on the values preset by the user, as well as the actual current consumed by the motor, the operation of the motor is analysed by the relay's CPU. By comparing the operation of the motor in question with model characteristics stored in the CPU, the device detects all defects very quickly and accurately, and immediately switches off the motor.

SECURITY FEATURES

* thermal protection
* protection against idle operation and dry run (undercurrent protection)
* protection against mechanical overload
* protection against fan stall
* protection against frequent restarts
* protection against phase collapse
* protection against phase sequence switch
* protection against load unbalance
* protection against earth fault

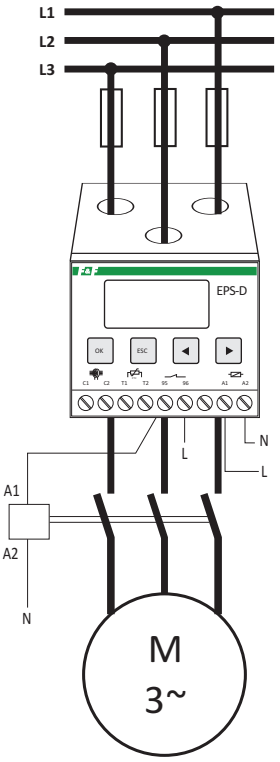
OPTIONAL SECURITY FEATURES

AGAINST SHOCK (an additional Ferranti transformer enables efficient protection within the range of 30 mA 500 mA. Response time: approx. 100 ms).

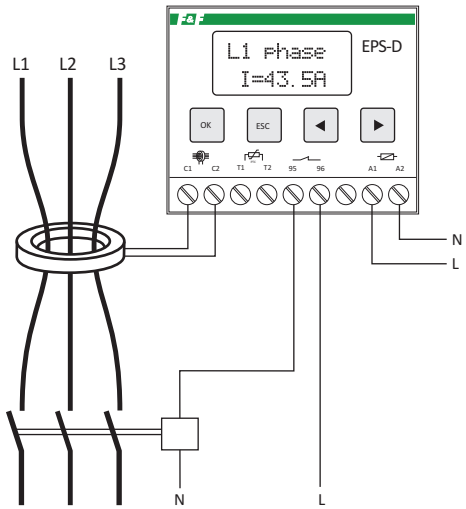
ADDITIONAL FEATURES

* motor load preview
* message concerning the cause of protection activation
* motor's thermal memory

The relay's LCD screen shows an actual current value for a single, selected phase. This is available in absolute (A) or relative (%) values in relation to the set current value In. additionally, the device displays the scope of the measured current by means of characters (I > 105% In), (I < 95% In), (95% In I 105% In). The relay measures the real current value up to and including the 7th harmonic. The measurement accuracy is 1%.



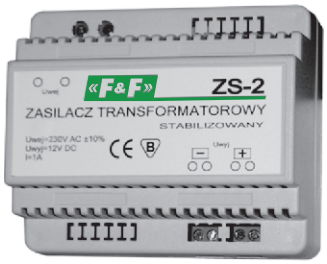
Version	Setting range	
20A	1÷5A	to cooperating with current transformer
20A	5÷25A	
100A	20÷100A	



power supply	160÷242V 50-60 Hz
main circuits' insulation voltage	690V~
current load of contact	2A AC-15
effective current unbalance	>30%
delay at phase decay and unbalance	4sec
max. cable diameter	Ø14
terminal	2,5 mm² screw terminals
measurements	72×59×88 mm
weight	385g
mounting	on rail TH-35
protection level	IP20

22. ELECTRIC SUPPLIERS AND TRANSFORMERS

ZS 1÷6 TRANSFORMER-BASED 12W



Type	Output voltage	Current output
ZS-1	5V DC	2A
ZS-2	12V DC	1A
ZS-3	18V DC	0,66A
ZS-4	24V DC	0,5A
ZS-5	15V DC	0,8A
ZS-6	48V DC	0,25A

input voltage	230V ± 10% AC
output power	12W
ripple	<3mV RMS
working temperature	-10÷40°C
terminal	2,5mm² screw terminal
dimensions	6 modules (105mm)
weight	550g
mounting	on rail TH-35
protection level	IP20

With long-term overload a power failure will occur at the output due to the triggering of thermal fuse inside the stabilizer. After cooling, the power unit will automatically resume working.

ZI-20-21 PULSE 12W

Type	Output voltage	Current output
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
minimum load	0%
keying frequency	70kHz
working temperature	-10÷40°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
weight	80g
mounting	on rail TH-35
protection level	IP20

ZI-22-24 PULSE 30W

Type	Output voltage	Current output
ZI-22	12V DC	2,5A
ZI-24	24V DC	1,25A

input voltage	100÷264V AC
output power	30W
current limit	Imax=110%Iout
minimum load	0%
keying frequency	70kHz
working temperature	-10÷40°C
terminal	2,5mm² screw terminals
dimensions	3 module (52,5mm)
weight	190g
mounting	on rail TH-35
protection level	IP20

ZI 1÷6 PULSE 50W

Type	Output voltage	Current output
ZI-1	5V DC	10A
ZI-2	12V DC	4A
ZI-3	18V DC	3A
ZI-4	24V DC	2A
ZI-5	15V DC	3,3A
ZI-6	48V DC	1A

input voltage	85÷264V AC
output power	50W
current limit	Imax=110%Iout
minimum load	0%
keying frequency	70kHz
working temperature	-10÷40°C
terminal	2,5mm² screw terminals
dimensions	6 modules (105mm)
weight	190g
mounting	on rail TH-35
protection level	IP20

ZT 1÷4 TRANSFORMER-BASED WITH PULSE STABILIZER

Type	Output voltage	Current output
ZT-1	5V DC	3A
ZT-2	12V DC	2A
ZT-4	24V DC	1A

input voltage	180÷264V AC
output power	25W
current limit	110% I
minimum load	0%
keying frequency	52kHz
working temperature	-10÷40°C
terminal	2,5mm² screw terminals
dimensions	6 modules (105mm)
weight	742g
mounting	on rail TH-35
protection level	IP20

ZI 11÷14 PULSE STABILIZER

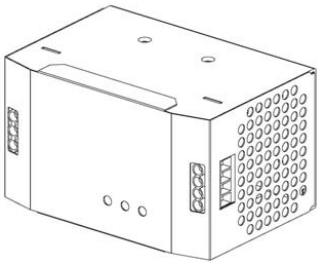
Type	Input voltage	Output voltage	Current output
ZI-11	8÷28V AC / 12÷37V DC	5V DC	3A
ZI-12	12÷28V AC / 16÷37V DC	12V DC	3A
ZI-13	18÷28V AC / 22÷37V DC	18V DC	3A
ZI14	24÷28V AC / 28÷37V DC	24V DC	3A

input voltage	10÷28V AC
output power	3A
current limit	Imax=110%Iout
minimum load	0%
keying frequency	52kHz
working temperature	-10÷40°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
weight	150g
mounting	on rail TH-35
protection level	IP20

ZI-60-24 / ZI-120-24 / ZI-240-24 PULS POWER INDUSTRY

supply	90÷264V AC/120÷370V DC
output power	24V DC
frequency	47÷63Hz
minimum load	0%
keying frequency	
breakdown voltage IN/OUT	3kV
overload	105%I/3min.
cooling	air gravity
security	short circuit / overload overvoltage / temperature
signalling of supply	green LED
signalling overload / overvoltage	red LED
working tmeperature	-10÷70°C
mounting	on rail TH-35
protection level	IP20

Type	Power [W]	Current [A]	Regulation out. [V]	Efficiency [%]	Dimensions [mm]	Weight [g]
ZI-60-24	60	2,5	22÷27V	84	130×50×90	485
ZI-120-24	120	5,0	22÷28V	87	130×75×90	630
ZI-240-24	240	10,0	22÷28V	86	130×110×90	1040



TR-08 / TR-12 / TR-24 MAINS TRANSFORMER

PURPOSE

Application: power supply of electrical and electronic devices which do not require a stable and properly filtered supply voltage, regardless of mains voltage fluctuations.

Type	Output voltage	Current	Power
TR-08	8V	1A	8VA
TR-12	12V	0,66A	8VA
TR-24	24V	0,5A	12VA

input voltage	230V AC
efficiency	85%
working temperature	-10÷40°C
terminal	2,5mm² screw terminals
dimensions	
TR-08	2 modules (35mm)
TR-12	3 modules (52,5mm)
TR-24	3 modules (52,5mm)
weight	
TR-08	271g
TR-12	325g
TR-24	433g
mounting	on rail TH-35
protection level	IP20

ATTENTION!

The transformer system is enabled PTC thermistor overcurrent protection.

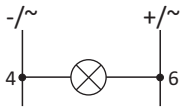
23. POWER SUPPLY INDICATORS

SIGNAL LAMPS

LK-712 ONE PHASE.

PURPOSE

Designed to optically signal the presence of voltage in a electrical circuit.



Type	Colours of LED
LK-712 G	1× green
LK-712 Y	1× yellow
LK-712 R	1× red
LK-712 B	1× blue

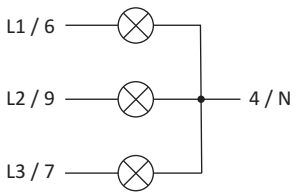
supply (made in one range only)	5÷10V AC/DC
	10÷30V AC/DC
	30÷130V AC/DC
	130÷260V AC/DC
voltage indicator	1×LED Ø5
power consumption	0,8W
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

Order labelling method: LK-712 B 30÷130V — supply voltage — colour of LED

LK-713 THREE PHASES.

PURPOSE

Designed to optically signal the presence of voltage in the three-phase electrical network.
The presence of voltage in a phase is signalled by the green LED in the circuit of each phase.



Type	Colours of LED
LK-713 G	3× green LED
LK-713 Y	3× yellow LED
LK-713 R	3× red LED
LK-713 K	yellow-red-green LEDs

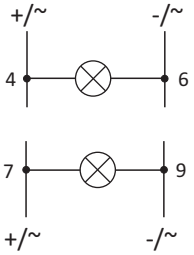
supply	3×230V+N
voltage indicator	1,7mA
power consumption	1,1W
signaling voltage volume	3×LED Ø5
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

Order labelling method: LK-713 K — colour of LEDs

LK-714 TWO ABILITY TYPE.

PURPOSE

Designed to optically signal the ability of receivers, for example: work - break, opened - closed, ect. It has two separated signal circuit: green LED and red LED.



supply (made in one range only)	5÷10V AC/DC
	10÷30V AC/DC
	30÷130V AC/DC
	13÷260V AC/DC
indicator	1× green LED Ø5
	1× red LED Ø5
power consumption	0,8W
connection	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

Order labelling method: LK-714 130÷260V — supply voltage

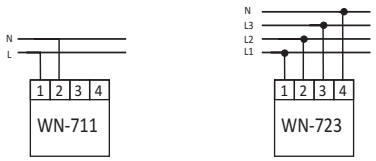
VOLTAGE INDICATORS

PURPOSE

Voltage indicators are devised to continually measure the value of the voltage in a single-phase or three-phase network.

LED LINE TYPE

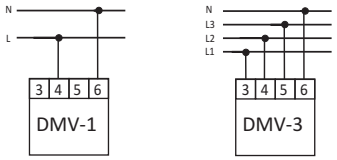
WN-711 ONE PHASE INDICATOR.
WN-723 THREE PHASE INDICATOR.



supply	WN-711	230V AC
	WN-723	3×400V+N
voltage indicator	WN-711	11×LED
	WN-723	3×(11xLED)
indication range		205÷245V
scale		5V
indication precision		2,5V
power consumption		0,8W
terminal		2,5mm² screw terminals
working temperature		-25÷50°C
dimensions	WN-711	1 module (17,5mm)
	WN-723	2 modules (35mm)
mounting		on rail TH-35
protection level		IP20

DIGITAL

DMV-1 **DMV-1 TrueRMS** ONE PHASE INDICATOR.
DMV-3 **DMV-3 TrueRMS** THREE PHASE INDICATOR.

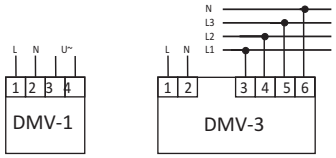


supply	100÷300V AC
frequency	45÷55Hz
indication range	100÷300V
indication precision	
DMV-1; DMV-3	1%
DMV-1 True RMS; DMV-3 True RMS	0,5%
display for one phase	3×segment LED 10×6mm
power consumption	4W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

* phase voltage measurement
* measuring circuit is also a device supplying circuit
* indicators with True RMS marking, equipped with RMS value converter, give proper voltage value for deflected runs

DIGITAL

DMV-1T ONE PHASE INDICATOR.
DMV-3T THREE PHASE INDICATOR.



supply		230V AC
indication range	DMV-1T	12÷600V
	DMV-3T	3×12÷400V
indication precision		1%
display		
DMV-1T		4×segment LED 14×8mm
DMV-3T		3×(4×segment LED 14×8mm)
power consumption		3VA
working temperature		-5÷50°C
terminal		2,5mm² screw terminals
dimensions		
DMV-1T		72×72×92mm
DMV-3T		96×96×92mm
mounting hole		
DMV-1T		66×66mm
DMV-3T		92×92mm
protection level		IP20

CURRENT INTENSITY INDICATORS

PURPOSE

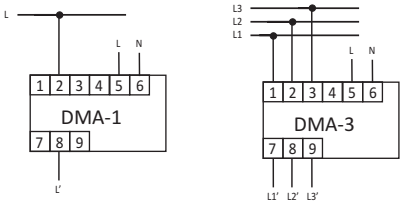
Current intensity indicators are devised to continually measure the value of the current in a circuits of single-phase or three-phase network.

DIGITAL

DMA-1 **DMA-1 True RMS** **ONE PHASE INDICATOR.**

DMA-3 **DMA-3 True RMS** **THREE PHASE INDICATOR.**

* independent current measurement for each phase
* indicators with True RMS marking, equipped with RMS value converter, give proper voltage value for deflected runs



supply	100÷300V AC
frequency	45÷55Hz
max. current direct measurement	20A
indirect measurement	5A
max. temporary overloading of current	40A (<1sec)
indication precision	
DMV-1; DMV-3	1%
DMV-1 True RMS; DMV-3 True RMS	0,5%
display for one phase	3×segment LED 10×6mm
power consumption	4W
working temperature	-25÷50°C
connection	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

DMA indicators are intended for current transformers with a rated secondary current of 5A. The current range for these transformers is from 25 to 1000/5 A. The primary value of the transformer's current specifies the maximum measured current and the actual current value displayed by the indicator.
The DMA-20A and DMA-3 20A are intended for direct measurements (without transformers applied) within the range of 0÷20 A.

Order labelling method:

INDIRECT MEASUREMENT (with transformers applied)

DMA- [X] [Y] /5A [Z]

- [Z]: True RMS
- [Y]: primary value of the transformer's current : 25, 30, 40, 50, 70, 75, 80, 100, 120, 125, 150, 160, 200, 250, 300, 400, 500, 600, 700, 750, 800, 900, 1000.
- [X]: onephase: 1, threephase: 3

Example:
* DMA-150/5A a one-phase device for 50/5A transformer, measurement range at 0÷50A, no TrueRMS;
*DMA-3150/5 A TrueRMS a three-phase for 3×150/5A transformers, measurement range at 3 ×0÷150 A, incl. TrueRMS.

DIRECT MEASUREMENT (without transformers)

DMA- [X] 20A [Z]

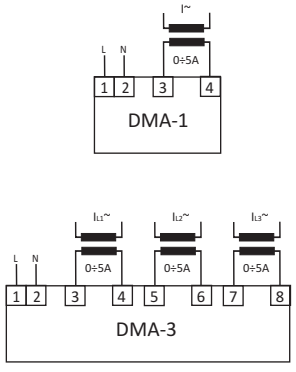
- [Z]: True RMS
- [X]: one-phase: 1, three-phase: 3

Example:
* DMA-1 20A - one-phase up to 20A, measurement range 0÷20A, without TrueRMS
* DMA-3 20A TrueRMS - three-phase up to 20A, measurement range 3x0÷20A, with TrueRMS

DMA-1T **ONE PHASE INDICATOR.**

DMA-3T **THREE PHASE INDICATOR.**

* direct measurement 0÷5A
* indirect measurement using current transformers
* setting indicator to proper current transformer values using three buttons on the indicator's front
* indirect measurement using current transformers in standard current work with 1÷9000/5A range.



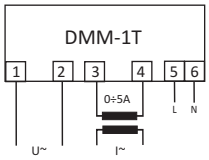
supply	230V AC
max. current of direct measure for single phase	5A
max. current of indirect measure	depended on applyed current transformer
possible type of current transformer to conect	1÷9000/5A
indication precision	1%
display	
DMA-1T	4×segment LED 14×8mm
DMA-3T	3×(4×segment LED 14×8mm)
power consumption	3VA
working temperature	-5÷50°C
terminal	2,5mm² screw terminals
dimensions	
DMA-1T	72×72×92mm
DMA-3T	96×96×92mm
mounting hole	
DMV-1T	66×66mm
DMV-3T	92×92mm
protection level	IP20

MULTIMETERS

PURPOSE

Multimeters are intended for monitoring parameters of three-phase electrical network.

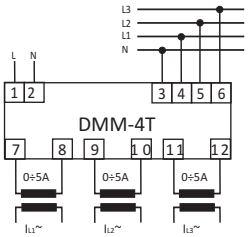
DMM-1T ONE-PHASE TYPE



supply	230V AC
max. current of direct measure for single phase	5A
max. current of indirect measure	depended on applyed current transformer
possible type of current transformer to conect	1÷9000/5A
measured voltage range	12÷400V AC
measured frequency range	10÷100Hz
indication precision	1%±1 digit
display	3×(4×segment LED 8×14mm)
power consumption	3VA
working temperature	-5÷50°C
terminal	1,5mm² screw terminals
dimensions	96×96×92mm
mounting hole	92×92mm
protection level	IP20

* independent current measurement for each phase
* direct measurement 0÷5A
* indirect measurement using current transformers in standard current work with 1÷9000/5A range
* setting indicator to proper current transformer values using three buttons on the indicator's front
* phase voltage and phase to phase voltage measurement
* phase frequency measurement

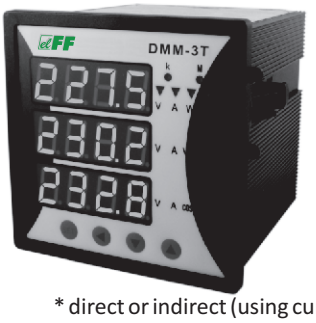
DMM-4T THREE-PHASE TYPE

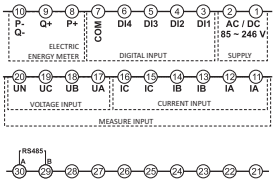


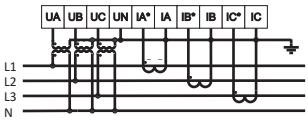
supply	230V AC
max. current of direct measure for single phase	5A
max. current of indirect measure	depended on applyed current transformer
possible type of current transformer to conect	1÷9000/5A
measured voltage range	12÷400V AC
measured frequency range	10÷100Hz
indication precision	1%±1 digit
display	4×segment LED 5×9mm
power consumption	3VA
working temperature	-5÷50°C
terminal	1,5mm² screw terminals
dimensions	96×96×92mm
mounting hole	92×92mm
protection level	IP20

* independent current measurement for each phase
* direct measurement 0÷5A
* indirect measurement using current transformers in standard current work with 1÷9000/5A range
* setting indicator to proper current transformer values using three buttons on the indicator's front
* phase voltage and phase to phase voltage measurement
* phase frequency measurement
* selection of indicated voltage and frequency values for a single phase using button on indicator's front

DMM-3T THREE-PHASE NETWORK ANALYZER MODBUS RTU communication







supply	85÷264V AC/DC
power consumption	<5VA
frequency	45÷65Hz
operation temperature	-10÷50°C
dimension	96×96×105mm
mounting hole	92×92mm
network	three phase three-wire or four-wire
measuring accuracy	
voltage/current	±(0,5%FS + 1 digit)
power	±(0,5%FS + 1 digit)
frequency	±0,1Hz
power factor	±0,01
active electric energy	±0,5%
reactive electric energy	±2%
digital output	
ways	4
signal	non current type
electric energy meter	
output mode	two-channel open collector optical pulse output
puls constant - active	10000pulse/kWh
- reactive	10000pulses/kVARh
communication protocol	
output mode	RS 485
protocol	MODBUS RTU
speed of transmission	9600bps
protection level	IP20

* direct or indirect (using current transformer) measurement of phase currents.
* direct or indirect (using current transformer) measurement of phase voltage and phase to phase voltage.
* frequency measurement
* active, wattless and apparent power measurement
* power factor measurement
* four-quadrant measurement of input and output energy
* constant or periodical display of one of eight measured values, automatic switching between the displayed values
* digital inputs
* OC type pulse output (open collector)
* communication with peripheral devices using RS485 interface and MODBUS RTU protocol (up to 32 devices)

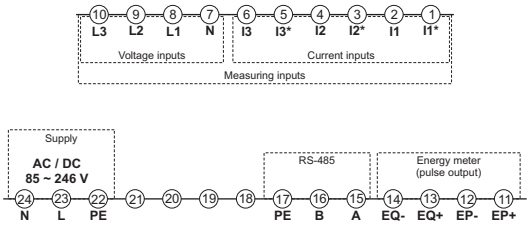
DMM-5T

THREE-PHASE NETWORK ANALYZER with MODBUS RTU communication
FOUR-QUADRANT ELECTRICITY MEASUREMENT

PURPOSE

DMM-5T is a multipurpose, microprocessor multimeter designed to monitor the parameters of the three-phase electrical network. Multimeter can perform high accuracy measurements of all basic mains parameters, such as voltage and phase currents, wire voltage, frequency, active power, reactive power, apparent power and power factor. In addition, the device features a full, four-quadrant energy measurement (both drawn from the mains and returned back into it). Monitoring of the measured values and device configuration is done via multi-function display. Due to built-in RS485 interface and implemented MODBUS RTU communication protocol, the device can communicate with a wide range of other devices and industrial programs.

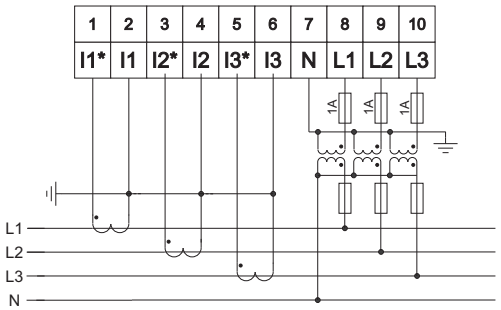
NEW !



supply	85÷264V AC/DC
voltage measurement	
rated voltage	400V AC (L-N); 693V AC (L-L)
frequency	45÷55Hz
network	three-phase, 3- or 4-wires
measuring range	3÷120% Un
current measurement	
rated current	5A
measuring range	0,5÷120% In
communication protocol	
interface	RS-485
protocole	MODBUS RTU
speed	2400/4800/9600/19200/38400bps
display	monochrome LCD
power consumption	<8VA
working temperature	-20÷60°C
terminals	1,5mm² screw terminals
dimensions	S95×W95×G85mm
mounting hole	90×90mm
protection level	IP20

FEATURES

* Direct or indirect measurement of the phase currents
* Direct or indirect (>230/400V) measurement of phase and interphase voltages
* Frequency measurement.
* Measurement of active, reactive and apparent power
* Minimum and maximum values
* Measurement of the power factors
* Four-quadrant measurement of both drawn and returned energy
* Measurement of electric energy in 4 tariffs
* Monthly energy settlement
* Pulse output of OC (open collector) type for energy indicators
* Communication with external devices via RS-485 port and MODBUS RTU protocol



ELECTRICAL ENERGY METERS WITH NETWORK ANALYSIS

LE-01MP / LE -01MQ

SINGLE-PHASE

Measured value:
Active power - AE+ [kWh]
Reactive energy - RE+ [kvarh]
Phase voltage - U [V]
Phase current - I [A]
Frequency - F [Hz]
Active power - P[kW]
Reactive power - Q[kvar]
Meter system temperature - T [°C]

LE-03MP

THREE-PHASE

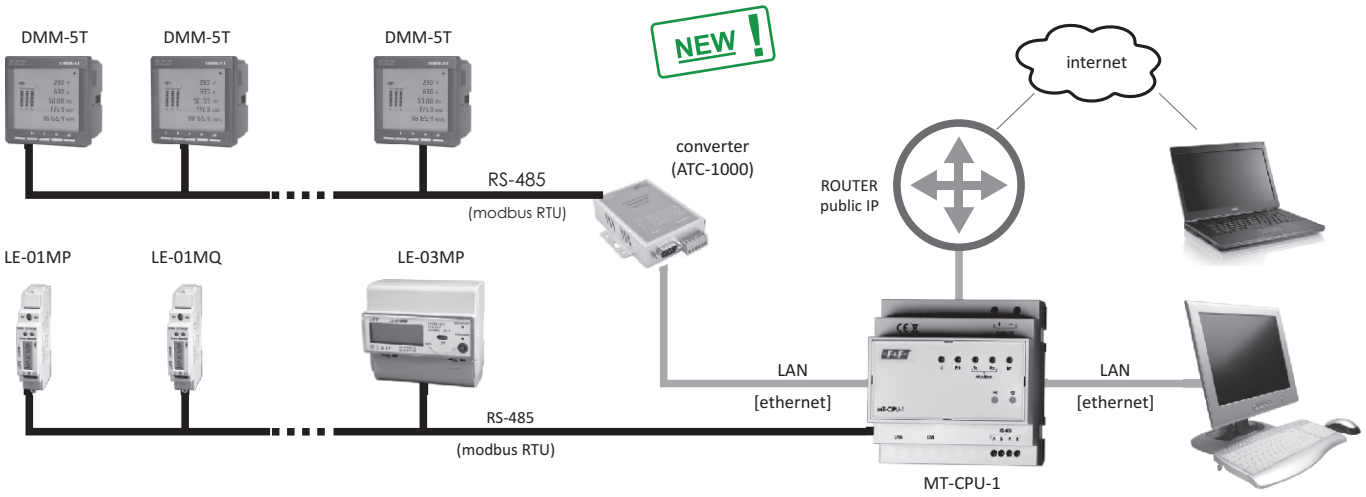
Measured value:
Active power - AE+ [kWh]
Reactive energy - RE+ [kvarh]
Phase voltage - U1, U2, U3 [V]
Phase current - I1, I2, I3 [A]
Frequency - F [Hz]
Active power L1 phase - P1 [W]
Active power L2 phase - P2 [W]
Active power L3 phase - P3 [W]
Active power system L1+L2+L3 - P [W]
L1 phase power factor - cosφ1
L2 phase power factor - cosφ2
L3 phase power factor - cosφ3

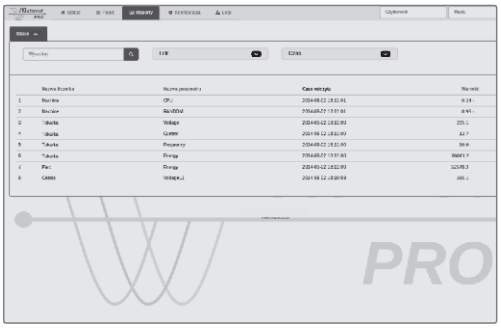
More information in chapter 24 (see page 76).

METERNET PRO The remote reading, recording and control system

PURPOSE

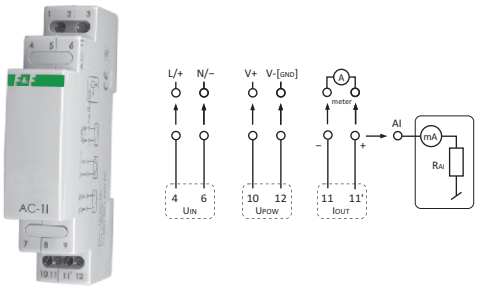
The MeternetPRO application allows remotely reading of the states and the indications of meters, multimeters, measuring transducers, input/output expansion modules and other measuring devices that communicate via Modbus RTU protocol. The exchange of data between devices and the application is carried out through RS485 network or local area network (LAN). The application and its database can be installed on a PC or on a special MT-CPU-1 server running in the local network. Interface is a web application (website). User can access the application via any web browser. In case of a LAN with a public IP address, it is possible to configure the application and read data over the Internet. User can access the application through the IP address or the created domain.

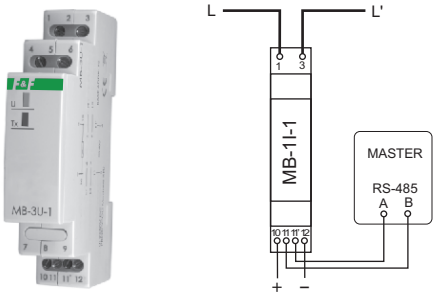




More information in chapter 31 (see page 118).

MEASURING CONVERTERS WITH ANALOGUE OUTPUT AND WITH MODBUS RTU OUTPUT





* AV-1I - analogue converter of single-phase AC/DC voltage (4-20 mA)
* AV-1I - analogue converter of single-phase AC/DC current strength (4-20 mA)
* MB-1U-1 - measuring converter of single-phase AC/DC voltage Modbus RTU
* MB-3U-1 - measuring converter of three-phase AC/DC voltage with Modbus RTU
* MB-1I-1 - measuring converter of single-phase AC/DC current strength with Modbus RTU
* MB-3I-1 - measuring converter of three-phase AC/DC current strength with Modbus RTU

More information in chapter 29 (see page 100).

NETWORK PARAMETERS REGISTRATIONS SETS OPERATION

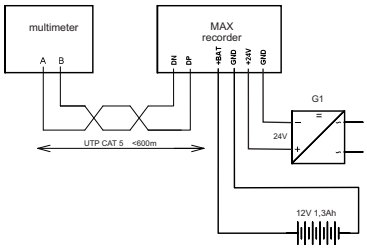
PLC MAX

OPERATION

MAX controller and multimeter driver communicates via the RS485 port using a Modbas RTU communication protocol. The controller cyclically registers the network parameters and stores them in the internal memory. Recording is periodically transferred from the internal memory to a text file on the SD card or transferred via GSM network (GPRS) to the external database.

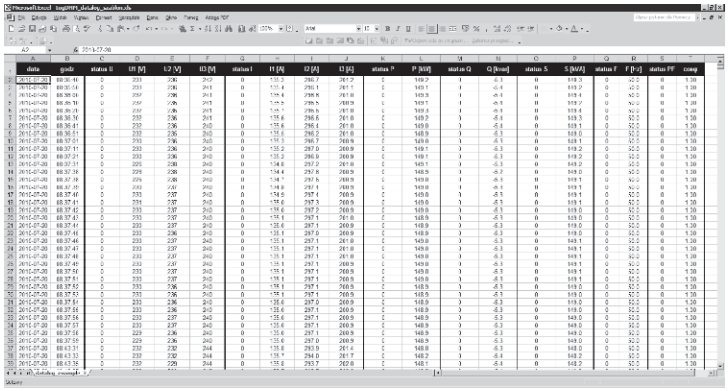
Recorded parameters:

- datE [YYYY-MM-DD]
- time [hh: mm : ss]
- voltage (U1, U2, U3)
- currents (I1, I2, I3)
- frequency
- active power (P)
- reactive power (Q)
- apparent power (S)
- power factor
- active positive energy (+Wh)
- active negative energy (-Wh)
- reactive positive energy (+varh)
- reactive negative energy (-varh)



LOCAL DATA BACKUP ON THE SD MEMORY CARD

Registered data is stored in the internal memory of the controller and are periodically transferred to the SD card. Cycle of registers reading and writing to the internal memory and the write cycle [backup] on the SD card are set by the user. The minimum time of the reading cycle is 1 sec.



Registration data after import to Excel

SD 2G

CD soft

ACU 12V 1,3Ah

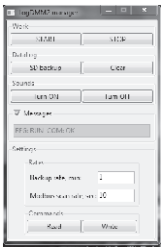
USB cable

LogDMM2 voltage transformer with configuration software for PC

Package includes: MAX S02 controller, DMM-3T 5-9000A multimeter, 2GB SD memory card, USB cable, software + manual. User can configure cycles, dates, hours and backup settings via special configuration software for PC.

DMM-3T

MAX S02

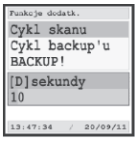


LogDMM-D voltage transformer with LCD monitor

Package includes: H03 MAX controller, DMM-3T 5-9000A multimeter, 1,3 Ah/12V gel battery, 2GB SD memory card, software + manual. User can configure cycles, dates, times and backup settings on the screen using a special menu.

DMM-3T

MAX H03



LogMQ1 single-phase with configuration software for PC

Package includes: MAX S02 controller, LE- 01MQ 100A meter, 2GB SD memory card, USB cable, software + manual. User can configure cycles, dates, times and backup settings using special configuration software on the PC.

LE-01MQ

MAX S02

LogMP3 three-phase with configuration software for PC

Package includes: MAX S02 controller, LE-03MP 60A meter, 2GB SD memory card, USB cable, software + manual. User can configure cycles, dates, times and backup settings using special configuration software on the PC.

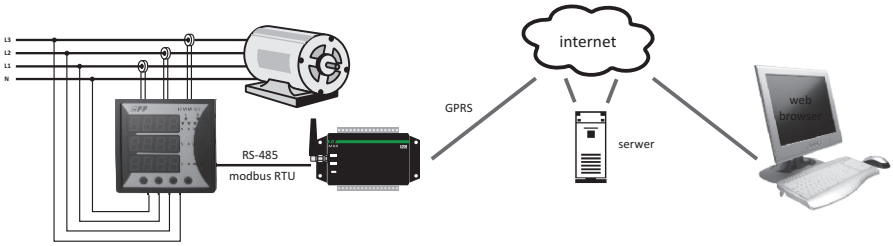
LE-03MP

MAX S02

REMOTE DATA TO DATABASE BACKUP [GSM / GPRS COMMUNICATION]

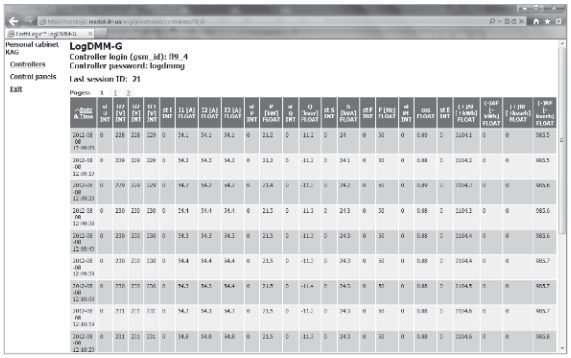
PURPOSE

This set is used for reading and recording the network parameters and transferring data to MySQL database via GPRS communication.



OPERATION

Recorded data from the internal memory is periodically sent to MySQL database server installed on a special base server. Data in the form of a table is accessible to user via any web browser. The data can be deleted or imported to your computer as a txt or xls file. There is also the ability to directly access data from a MySQL database through other systems or programs (this requires building a separate program mechanism) . Cycle of registers reading and writing to the internal memory and the write cycle [backup] on the SD card are set by the user. The minimum time of the reading cycle is 1 sec.



Data in web browser

The system requires a SIM card with telemetric tariff from any operator and purchasing a hosting service or maintaining a database on an external F&F. F&F company maintains its own base server and provides a dedicated hosting services for a set of registration.

LogDMM-G voltage transformer with configuration software for PC

Package includes: MAX H03 controller, DMM-3T 5-9000A multimeter, 1,3 Ah/12 V gel battery, USB cable, software + manual. User can configure cycles, dates, times and backup settings using special configuration software on the PC.

DMM-3T

MAX H02

LogMQ1-G single-phase with configuration software for PC

Package includes: MAX H02 controller, LE- 01MQ 100A meter, 1,3 Ah/12V gel battery, USB cable, software + manual. User can configure cycles, dates, times and backup settings using special configuration software on the PC.

LE-01MQ

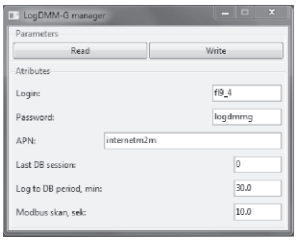
MAX H02

LogMP3-G three-phase with configuration software for PC

Package includes: H02 MAX controller, LE-03MP 60A meter, 1,3 Ah/12 V meter, USB cable, software + manual. User can configure cycles, dates, times and backup settings using special configuration software on the PC.

LE-03MP

MAX H02



LogDMM-G program menu on PC

ACU 12V 1,3Ah

CD soft

kabel USB

24. ELECTRIC ENERGY METERS

ELECTRIC ENERGY METERS

According to directive

MID

PURPOSE

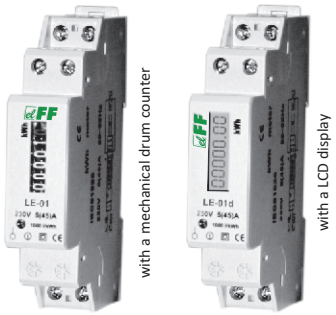
LE are a static (electronic) rated electric energy meters which are to serves as an auxiliary meters to measure the energy consumption in a direct system.

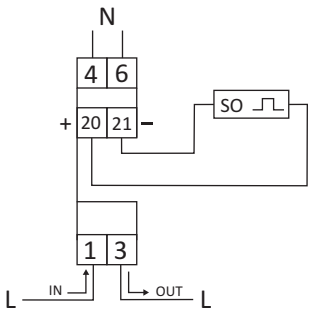
FUNCTIONING

The meter is equipped with a special electronic circuit which generates pulses proportionally to electric energy consumption in a given phase by means of the current flow and voltage applied. The sum of the pulses from „t" is signalled by blinking of an LED, calculated in phase into the electric energy consumed in the system, and finally its total value is indicated by a counter.

DIRECT MEASUREMENT TYPE

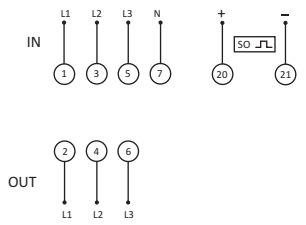
LE-01 / LE-01d SINGLE-PHASE





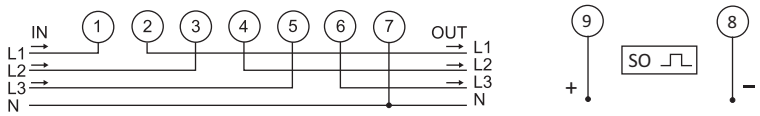
reference voltage		230V AC ±30%
basic current		5A
maximum current		45A
minimum current		0,02A
measurement accuracy per IEC61036		class 1
counter's own power consumption		<8VA; <0,4W
drum counter indication range		
LE-01		0÷99999.9 kWh
LE-01d		0÷99999.99 kWh
constant of a meter	(1Wh/pulse)	1000 pulses/kWh
current consumption signal		1×red LED
pulse output SO+ SO-		open collector
connection voltage SO+ SO-		<27V DC
connection current SO+ SO-		<27mA
constant SO+ SO-	(1Wh/pulse)	1000 pulses/kWh
pulse time SO+ SO-		70msec
working temperature	LE-01	-20÷65°C
	LE-01d	-20÷50°C
connection		6mm² screw terminals
measurement		1 modules (18 mm)
fixing		on rail TH-35
protection level		IP20

LE-02d THREE-PHASE



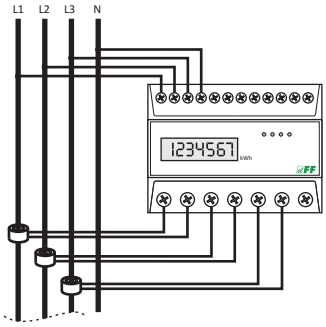
reference voltage		3×230/400V+N
basic current		5A
maximum current		63A
minimum current		0,04A
measurement accuracy per IEC61036		class 1
counter's own power consumption		<10VA; <2W
drum counter indication range		0÷999999,99 kWh
constant of a meter	(1,25 Wh/pulse)	800 pulses/kWh
current consumption signal		3×red LEDs
read-out status signal		red LED
pulse output SO+ SO-		open collector
connection voltage SO+ SO-		<30V DC
connection current SO+ SO-		<27mA
constant SO+ SO-	(1.25 Wh/pulse)	800 pulses/kWh
pulse time		35msec
working temperature		-20÷55°C
connection		16mm² screw terminals
measurement		4,5 modules (75 mm)
fixing		on rail TH-35
protection level		IP20

LE-03 / LE-03d THREE-PHASE TYPE



reference voltage		3×230/400V+N
basic current		10A
maximum current		100A
minimum current		0,04A
measurement accuracy per IEC61036		class 1
counter's own power consumption		<10VA; <2W
drum counter indication range		0÷999999,9 kWh
constant of a meter	(1,25 Wh/pulse)	1000 pulses/kWh
current consumption signal		3×red LED
read-out status signal		red LED
pulse output SO+ SO-		open collector
connection voltage SO+ SO-		<30V DC
connection current SO+ SO-		<27mA
constant SO+ SO-	(1.25 Wh/pulse)	800 pulses/kWh
pulse time		34÷80msec
working temperature	LE-03	-20÷65°C
	LE-03d	-20÷50°C
connection		25mm² screw terminals
measurement		7 modules (122 mm)
fixing		on rail TH-35
protection level		IP20

TO CO-OPERATION WITH A CURRENT TRANSFORMERS



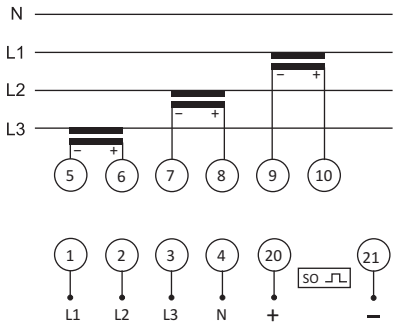
PURPOSE

These meters are intended for current transformers with a secondary current of 5A. Maximum measured current of the system is specified by the value of the primary current while using the current transformer.

Current transformers - (see page 129)

WITH PROGRAMMABLE CURRENT TRANSDUCER RATIO

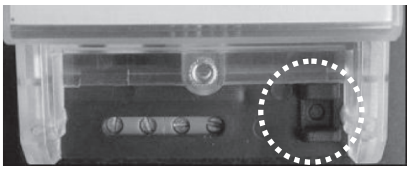
LE-02d CT THREE-PHASE TYPE



reference voltage	3×230/400V+N
basic current	3×1,5A
max current	3×6A
secondary current	5A
min current	0,04A
measure precision with IEC61036	class 1
meter's own power consumption	<10VA; <2W
number of LCD signs	8
range of display reports	dependent on transmission
constant of the meter	dependent on transmission
current consumption signal	3× red LED
meter signal	red LED
impulse output SO+ SO-	open collector
connection voltage SO+ SO-	<30V DC
connection current SO+ SO-	<27mA
constant SO+ SO-	dependent on transmission
pulse time	35msec
working temperature	-20÷55°C
connection	25mm^2 screw terminals
dimensions	4,5 modules (75mm)
fixing	on the rail TH-35
protection level	IP20

FUNCTIONING

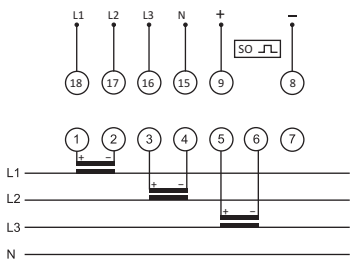
The user has the ability to set the index value used gear ratio, which allows you to indicate the actual value taken by the electricity system.
In the memory of indicator are preserved values of primary currents Ip transformers feasible. Choosing the appropriate value in accordance to the values of the connected transformers automatically sets the appropriate factor, according to which computes the actual value of the electricity taken. The LCD displays the actual value of the energy collected in a format depending on the selected gear.
CT currents Ip inscribed in memory of the indicator:
5, 20, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1250, 1500, 2000, 2500, 3000, 4000, 5000, 6000.



programming button

TO CO-OPERATION WITH A DEDICATED CURRENT TRANSFORMERS

LE-03d CT200 / LE-03d CT400 THREE-PHASE TYPE



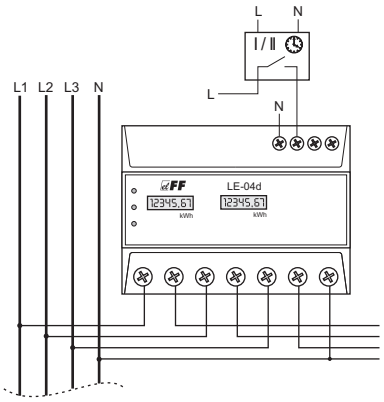
In the case of transformers with dedicated operating parameters, the meters display the actual value of the power consumed by the system.

type of transformer	LE-03d CT200	200/5A
	LE-03d CT400	400/5A
reference voltage		3×230/400V+N
basic current		3×1,5 A
maximum current		3×5A
minimum current		0,04A
measurement accuracy per IEC61036		class 1
counter's own power consumption		<10VA; <2W
drum counter indication range		0÷999999,9 kWh
constant of a meter	(3,33Wh/imp)	300imp/kWh
current consumption signal		3×red LED
read-out status signal		red LED
pulse output SO+ SO-		open collector
connection voltage SO+ SO-		<30V DC
connection current SO+ SO-		<27mA
constant SO+ SO-	(3,33Wh/imp)	300imp/kWh
pulse time SO+ SO-		35msec
working temperature		-20÷50°C
connection		25mm² screw terminals
measurement		7 modules (122 mm)
fixing		on rail TH-35
protection level		IP20

LE-04d TWO-TARIFFS TYPE

PURPOSE

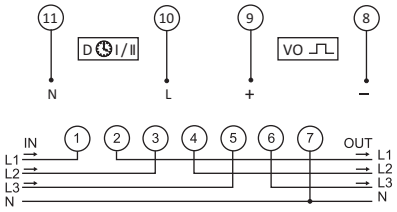
The indicator is designed to measure electricity tariff system. The values indicated in the power tariffs are separate displays T0 and T1.



reference voltage		3×230/400V+N
basic current		10A
max current		100A
min current		0,04A
measure precision with IEC61036		class 1
range of display reports T0 i T1		0÷99999,99kWh
constant of the meter	(1,25Wh/imp)	800imp/kWh
current consumption signal		4×red LED
meter signal T0 i T1		2×red LED
impulse output VO		open collector
connection voltageVO		<24V DC
connection current SO+ SO-		<30mA
constant SO	(1,25Wh/imp)	800imp/kWh
pulse time SO+ SO-		30msec
working temperature		-20÷55°C
connection		25mm² screw terminals
dimensions		7 modules (122mm)
mounting		on the rail TH-35
protection level		IP20

FUNCTIONING

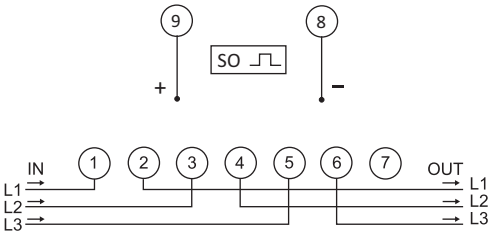
The counter is equipped to measure the electricity in two tariff system. The values indicated in the power tariffs are separate displays T0 and T1. Switching between the tariffs is fed to the input control voltage meter D (joints 10-11). This can be used for controlling the external clock. Counter T0 read energy input in the absence of voltage control at the entry to the T1 D. Meter read energy input from the control voltage appears at the entrance to the D decay. Operation of the meter is indicated by shine the corresponding LED.



LE-05d THREE-PHASE 3×400V WITHOUT NEUTRAL LINE. Measurement in the Aron system.

FUNCTIONING

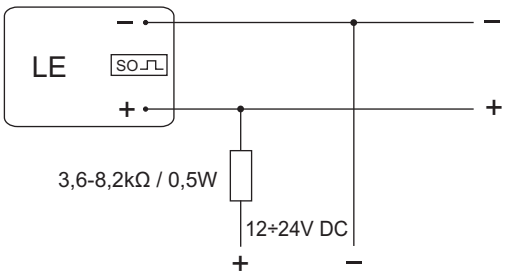
The electronic system by the influence of the flowing current and the applied voltage generates pulses in proportion to the electricity consumed. Energy measurement system takes place in Aron system. Indicators have pulse output SO+ - SO-. Indicators are sealable terminal covers input and output bypass to prevent making the index.



reference voltage		3×400V
basic current		3×10A
max current		3×100A
min current		0,04A
accuracy in accordance with the IEC61036		class 1
own power meter		<10VA; <2W
meter display range		999999,9kWh
meter constant	(1,25Wh/imp)	800imp/kWh
indication of the current consumption		2×red LED
signal read-out		red LED
pulse output SO+ SO-		open collector
voltage connection SO+ SO-		<30V DC
current connection SO+ SO-		<27mA
constant SO+ SO-	(1,25Wh/imp)	800imp/kWh
working temperature		-20÷50°C
connections		25mm² screw terminals
dimension		7 modules (122mm)
fixing		on the rail TH-35
protection level		IP20

PULSE OUTPUT SUPPLY SYSTEM WITH CONNECTED EXTERNAL COUNTING MACHINE

In order to connect to electricity energy meter counting device has to be connected in parallel to the system power supply 12÷24V DC through resistor 3.6 ÷ 8.2 kOhm / 0,5 W current limiting. Maximum load counting circuit is 27mA .
Changing the polarization of power can damage the meter pulse output.
In the absence of connecting an external counting device is not allowed to connected to the output pulse power system.



WITH RS-485 PORT AND MODBUS RTU COMMUNICATION PROTOCOL

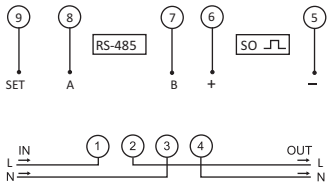
PURPOSE

Energy meters M series are used for reading and recording taken of electricity with possibility of remote readings of energy meters registers group via wired network in RS-485 standard.

FUNCTIONING

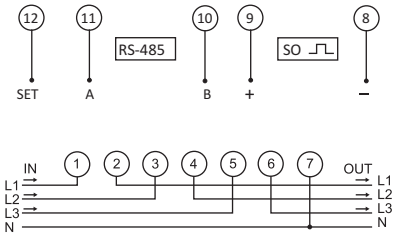
Communication with energy meters as a slave device is in compliance with the standard Modbus RTU via RS-485.
The indication is written in the form of consecutive bytes of hex. When converted to decimal form we obtain the result in kWh consistent with the indications on the display counter.

LE-01M SINGLE-PHASE TYPE for direct measurement



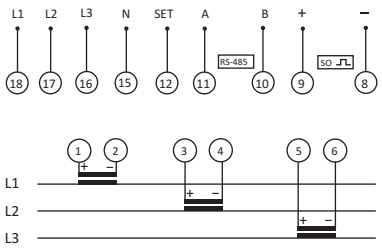
reference voltage		230V AC ±30%
basic current		10A
maximum current		100A
minimum current		0,04A
measurement accuracy per IEC61036		class 1
counter's own power consumption		<10VA; <2W
drum counter indication range		0÷99999,99 kWh
constant of a meter	(0,625Wh/pulse)	1600 pulses/kWh
read-out status signal		red LED
pulse output SO+ SO-		open collector
connection voltage SO+ SO-		<27V DC
connection current SO+ SO-		<27mA
constant SO+ SO-	(0,625 Wh/pulse)	1600 pulses/kWh
pulse time SO+ SO-		34÷80msec
port		RS-485
communication protocol		MODBUS RTU
working temperature		-20÷55°C
connection		25mm² screw terminals
measurement		4,5 modules (75 mm)
fixing		on rail TH-35
protection level		IP20

LE-03M THREE-PHASE TYPE for direct measurement



reference voltage		3×230/400V+N
basic current		10A
maximum current		100A
minimum current		0,04A
measurement accuracy per IEC61036		class 1
counter's own power consumption		<10VA; <2W
drum counter indication range		0÷999999,9 kWh
constant of a meter	(1,25Wh/pulse)	800 pulses/kWh
read-out status signal		red LED
pulse output SO+ SO-		open collector
connection voltage SO+ SO-		<30V DC
connection current SO+ SO-		<27mA
constant SO+ SO-	(1,25Wh/pulse)	800 pulses/kWh
pulse time SO+ SO-		34÷80msec
port		RS-485
communication protocol		MODBUS RTU
working temperature		-20÷55°C
connection		25mm² screw terminals
measurement		7 modules (122mm)
fixing		on rail TH-35
protection level		IP20

LE-03M CT WITH PROGRAMMABLE CURRRENT TRANSDUCER RATIO



reference voltage		3×230/400V+N
basic current		3×1,5A
max current		3×5A
min current		0,04A
measure precision with IEC61036		class 1
meter's own power consumption		<10VA; <2W
number of characters LCD		7
range of the meter		dependent on transform
constant of the meter		dependent on transform
reading signalling		red LED
pulse output SO+ SO-		open colector
connection voltage SO+ SO-		<30V DC
connection current SO+ SO-		<27mA
constant SO+ SO-		dependent on transform
pulse time SO+ SO-		35msec
port		RS-485
comunnication protocol		MODBUS RTU
working temperature		-20÷55°C
connection		25mm² screw terminals
dimensions		7 modules (122mm)
fixing		on the rail TH-35
protection level		IP20

In the memory index values are preserved primary currents Ip transformers feasible. Choosing the appropriate value in accordance with the values of the connected transformers automatically sets the appropriate factor, according to which computes the actual value of the electricity taken. This value is projected on the LCD display format depending on the selected gear.

CT ratio as a suitable value of registry is programmable using the Modbus RTU protocol command. CT currents Ip inscribed in memory of the indicator: 5, 20, 30, 40, 50, 60, 75, 80, 100, 120, 150, 200, 250, 300, 400, 500, 600, 750, 800, 1000, 1200, 1250, 1500, 2000, 2500, 3000, 4000, 5000, 6000.

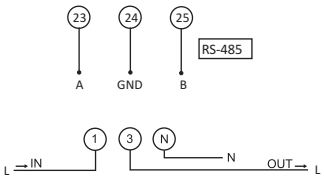
WITH RS-485 PORT AND MODBUS RTU COMMUNICATION PROTOCOL WITH NETWORK PARAMETERS ANALYSIS

FUNCTIONING

They are used for indications and recordings taken of electricity and mains parameters. Measured by the meter network's parameters are indicated cyclically on the LCD display. Remote reading all indications is possible via a wired RS-485 communication network standard.

LE-01MP / LE -01MQ SINGLE-PHASE TYPE for direct measurement

NEW !



reference voltage	230V AC ±20%
basic current	5 A
maximum current	100A
minimum current	0,02A
measurement accuracy per IEC61036	class 1
counter's own power consumption	<8VA; <0,4W
counter indication range	0÷99999,99 kWh
constant of a meter (1,0Wh/imp)	1000 imp/kWh
read-out status signal	red LED
port	RS-485
comunication protokol	MODBUS RTU
working temperature	-20÷65°C
connection	25mm² screw terminals
measurements	1 module (19,5 mm)
fixing	on rail TH-35
protection level	IP20

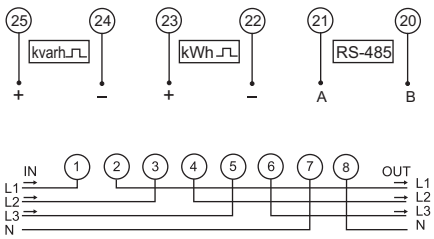
MEASURED VALUE

LE-01MP:
Active energy - AE+ [kWh]
Voltage - U [V]
Current - I [A]
Frequency - F [Hz]
Temperature of meter - T [°C]

LE-01MQ:
Active energy - AE+ [kWh]
Reactive energy - RE+ [kvarh]
Voltage - U [V]
Current - I [A]
Frequency - F [Hz]
Temperature of meter - T [°C]
Active power - P[W]
Reactive power - Q[var]
Apparent power - P[VA]
Power factor - cosϕ

LE-03MP THREE-PHASE TYPE for direct measurement

with PREPAID function and overcurrent protection



reference voltage	3×400V+N
basic current	5A
maximum current	60A
minimum current	0,02A
measurement accuracy per IEC61036	class 1
counter's own power consumption	<10VA; <1,5W
drum counter indication range	0÷999999,99 kWh
kWh constant of a meter (1,25Wh/imp)	800 imp/kWh
kvarh constant of a meter (1,25varh/imp)	800 imp/kvarh
read-out status signal	2× red LED
pulse output kWh/kvarh	open collector
connection voltage kWh/kvarh	<30V DC
connection current kWh/kvarh	<27mA
constant kWh/kvarh (1,25W/varh/imp)	800 imp/kWh/kvarh
pulse time kWh/kvarh	10msec
port	RS-485
communication protocol	MODBUS RTU
working temperature	-20÷55°C
connection	16mm² screw terminals
measurement	7 modules (122mm)
fixing	on rail TH-35
protection level	IP20

MEASURED VALUE

Active energy - AE+ [kWh]
Reactive energy - RE+ [kvarh]
Voltage of three phases - U1, U2, U3 [V]
Current of three phases - I1, I2, I3 [A]
Frequency - F [Hz]
Active power L1 - P1 [W]
Active power L2 - P2 [W]
Active power L3 - P3 [W]
Active power L1+L2+L3 - P [W]
Power factor L1 - cosφ1
Power factor L2 - cosφ2
Power factor L3 - cosφ3

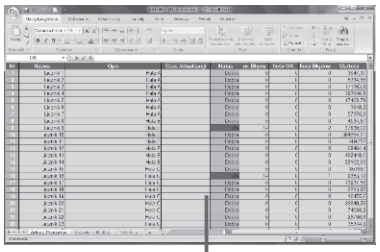
FUNCTIONS

* The internal relay switching circuits L1, L2, L3
* Manual relay control
* Overcurrent protection - setting the limit load
* Prepaid energy (prepayment) - the value of active energy at which meter disconnects the internal relay.
* Automatic mode - automatic relay auto-off after overcurrent treshold increased and when the set overcurrent and set ON prepaid functions.
* Status - current status of the relay [on/off]

Reading of all measured values and set function parameters is done by using the Modbus RTU protocol .

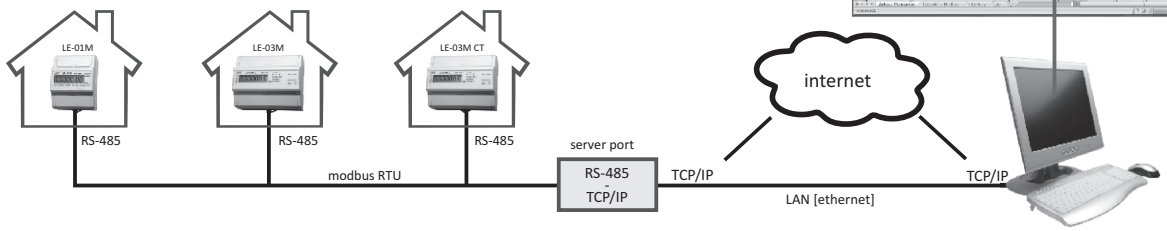
SYSTEMS FOR REMOTE READING OF ELECTRICITY CONSUMPTION

METERNET READ UP TO 1000 METERS



PURPOSE

METERNET application allows remote reading of indications of up to 1000 LE01-M, LE-03M and LE03-M CT energy meters. Data exchange between the meters and the application is made via standard RS485<->USB converter or port server on the LAN (Ethernet). For LAN router with a static IP address you can access data through the Internet.



OPERATION

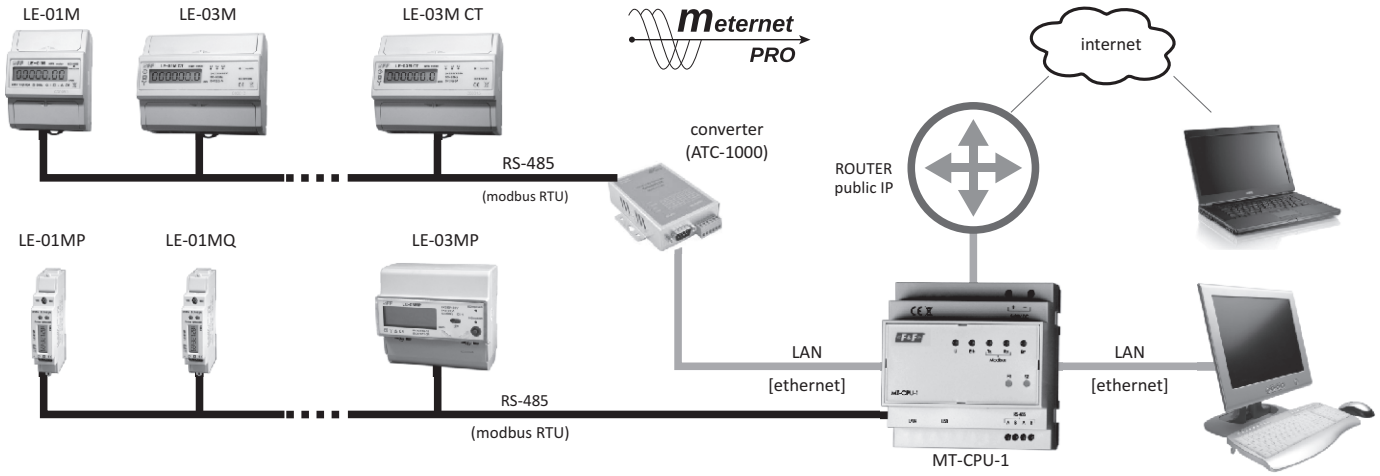
The application is an integral part of Excel application. Data are presented in the form of a table and can be freely shaped in accordance with the software features a spreadsheet. METERNET workbook contains five worksheets:

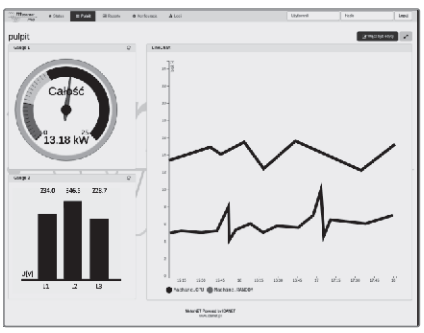
1) Measurement worksheet – a table with a lists of active meters and their current energy indications.
2) Modbus Settings – selection of meters types, their name and description, setting of connection type.
3) Interfaces - communication parameters setting (IP address, COM, name)
4) Logs - registration and description of communication errors
5) CSV - configuration of logging to CSV (spreadsheet activated after buying a license) and panels for program options and meters parametrization.

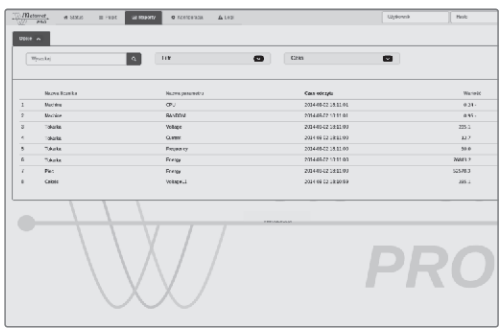
METERNET PRO READ UP TO 1000 METERS

PURPOSE

MeternetPRO program allows remote reading of indications of **LE-01M, LE-03M, LE-03M CT, LE-01MP, LE-01MQ** and **LE-03MP** energy meters. Data exchange between the meters and the application is made via RS-485 network or LAN. The application and its database can be installed on your PC or on a special MT-CPU-1 server, which works in a local network. User can access the application through any web browser. For LAN router with a static IP address you can access and configure data through the Internet.

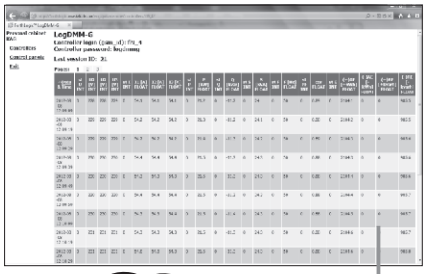






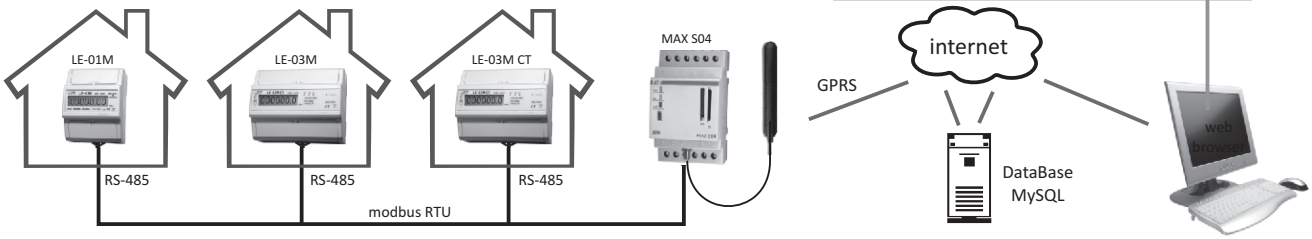
More information in chapter 31 (see page 118).

LEMAX READ UP TO 128 METERS. GPRS DATA TRANSMISSION.



PURPOSE

LEMAX application with PLC MAX S04 controller allows remote reading of indications of up to 128 LE01-M, LE-03M, LE03-M energy meters.

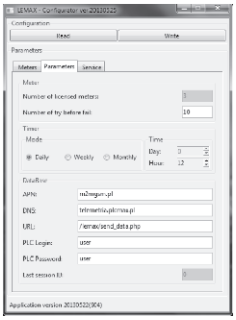


OPERATION

MAX S04 controller communicates with the LE meters via RS-485 network using Modbus RTU communication protocol. The controller periodically reads the values of the meters and sends through GPRS mode to a MySQL database installed on a special base server. User can access the data in the form of a table through any web browser. The data can be deleted or imported to the user's PC as a text file. There is also the ability to directly access the data from a MySQL database through other systems or applications. Access to the base data is protected by a username and password.

LEMAX Configurator - PC software. This application is used for setting the general parameters of the controller (backup and registration cycle, GPRS communication parameters, table of results).

MAX S04 controller
with GPRS communicator



INFRASTRUCTURE

MAX controller works in GSM 900/1800 mobile communication network of any polish operator (SIM card is unlocked). One of the basic conditions for the use of controller GPRS transmission is the existence of adequate infrastructure.

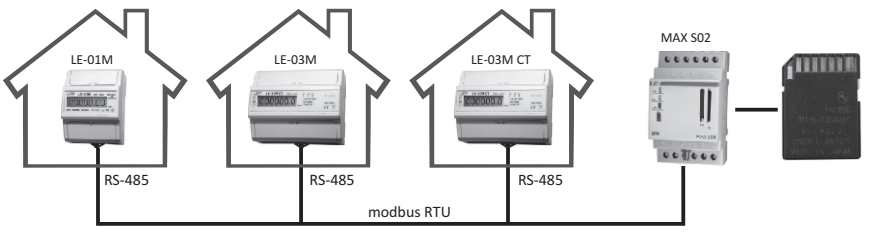
The system requires a SIM card with telemetric tariff from any operator and purchasing a hosting service, which means maintaining a database on your own or external server. F&F company maintains its own base server and provides a dedicated hosting services for LE meters reading.

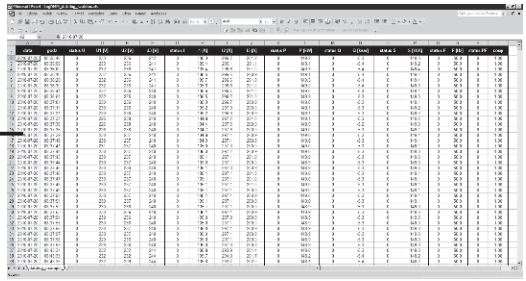
LEMAX-SD READ UP TO 128 METERS, SAVE ON SD CARD.

NEW !

PURPOSE

LEMAX-SD application with PLC MAX S02 controller allows remote reading and registering of indications of up to 128 LE-01M, LE-03M, LE-03M energy meters.





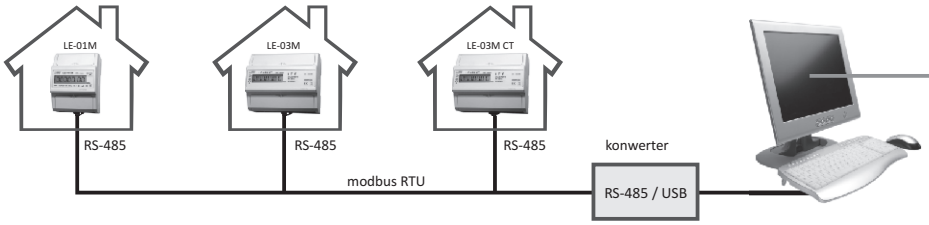
OPERATION

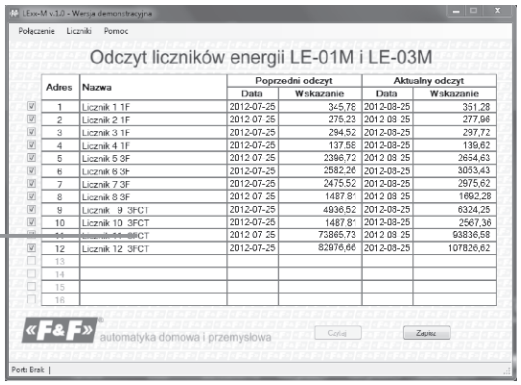
MAX S02 controller communicates with meters via RS485 network using Modbus RTU communication protocol. The controller periodically reads the values of the meters and saves them on SD card. Data are stored in a text file. Text file can be imported into Excel. The data can be freely shaped in accordance with the software features of the spreadsheet.

LExx-M READ UP TO 16 METERS

PURPOSE

LExx-M application allows remote reading of indications of up to 16 LE-01M, LE-03M, LE-03M CT energy meters. Data exchange between the meters and the application is made via standard RS-485<->USB converter.

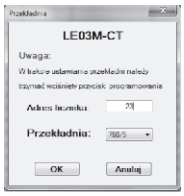


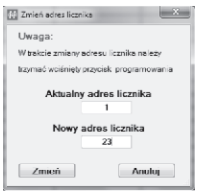


OPERATION

The central part of the program is a worksheet with a list of active energy meters and their current and previous indications of energy. Configuration of the meters and establishing connection with them is carried out through commands in the menu. Buttons at the bottom of the screen allow

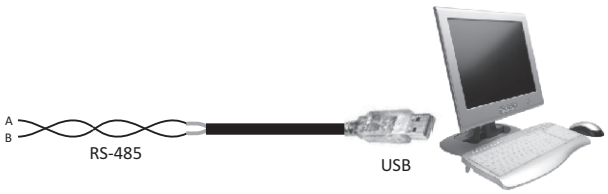
reading of the current meter indications and recording the reading results as a text file (*.txt) or an Excel spreadsheet (*.xls). Table of setup allows you to easily (check box) configure the system, that is to select meters, set parameters of the meters, define a utility name and description.





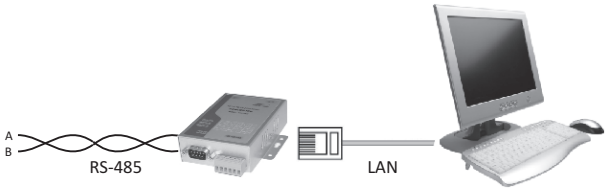
CONVERTERS

WE1800BT RS-485>USB



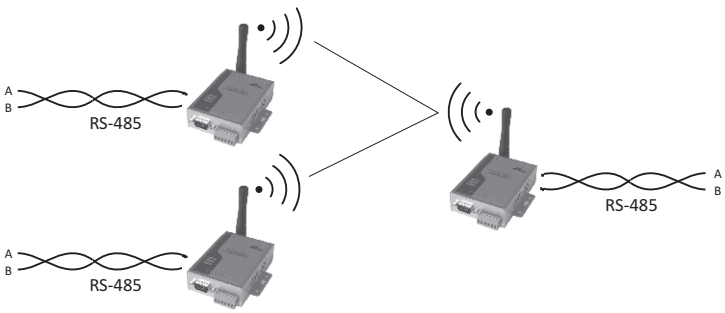
cable length	1,8m
RS-485 connector	2×0,34mm²

ATC-1000 RS-485>TCP/IP



supply	9÷24V DC
RS-485 connector	1,0mm²
TCP connector	RJ-45 slot
dimensions	86×100×26
mounting	two screws to the base
power supply	9VDC included

ATC-871 RS-485->RADIO (point-multipoint)



supply	9÷24V DC
frequency	868MHz
reach	
open area	500m
obstacles	80m
RS-485 connector	1,0mm²
dimensions	86×100×26
mounting	two screws to the base
power supply	9VDC included
angle antenna	included

25. PULSE AND WORKING TIME METERS

PULSE METER

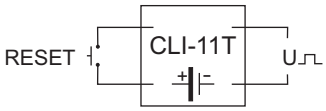
PURPOSE

Pulse meters are intended for counting AC/DC voltage signals, generated by additional peripheral devices in order to determine the number of carried out working cycles in automatics systems, e.g. in order to control the number of press strokes, the number of revolutions of a rotating device, the number of components leaving the production line, etc.

CLI-11T PANEL

FUNCTIONING

CLI-11T meter is a one-way meter, enabling the counting of pulses from 0 to 99999999 range (eight digits). It is equipped with RESET input for the connection of an external button, enabling the resetting of the meter state for any value.



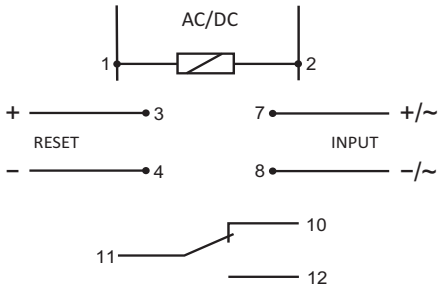
supply	(non-voltage type) internal battery
battery life	10 years*
input voltage	
CLI-11T 230V	110÷240V AC/DC
CLI-11T 24V	4÷30V DC
max. counting frequency	200Hz
display	8 characters / h=6,7mm
precision	1%±1digit
working temperature	-10÷40°C
terminal	1,5mm² screw terminal
dimensions	48×24×52mm
mounting hole	45×23mm
protection level	IP20

* battery life addicted to weather conditions

CLI-01 / CLI-02 PROGRAMMABLE

FUNCTIONING

CLI-01 / CLI-02 is a programmable, one-way type electronic meter enabling the counting of external pulses in 0 to 99 999 999 range. Pulses are counted from 0 to value set by the user. After reaching the limiting value, the meter will stop to count. Meter will count from 0 again after reset.



supply	24÷264V AC/DC
INPUT: voltage - low state	0÷5VAC/DC
voltage - high state	10÷264VAC/DC
frequency for DC signal	<5kHz
frequency for AC signal	<50Hz
RESET: voltage	24÷264V AC/DC
load current 1P contact	8A
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

FUNCTIONS

* control panel, enabling programming and the monitoring of device operation
* T input, adapted for operation with AC/DC signal, 10 to 264V amplitude and 50 Hz frequency for AC and 5kHz for DC signals
* possibility to set THRESHOLD parameter (1÷99 999 999 range), specifying the limiting number of pulses counted in a single operation cycle
* external RESET input
* relay output signaling the preset meter state (contact 1Z 8A)
* local counter, reset using the external reset input or using RESET button
* total counter for all impulses (loop mode 0 → 99 999 999 → 0 → ... or reset using the meter configuration menu)
* digital filter, enabling the limiting of maximum frequency of the counted pulses (in order to reduce interferences on meter input)
* local and total meter state memory after supply failure
* program menu in three languages: Polish, English or Russian

ADDITIONAL FEATURES METER CLI-02

* countdown mode from the preset value, with the signaling of reaching zero (e.g. 9999→0)
* selection of input signal edge (leading or trailing), which the meter will react for
* ability to automatically reset the local meter (work in the loop) with the option of setting the relay action
* selection of relay action: pulse of a given length of time; ON→ OFF or OFF →ON status change
* scaling od recorded values of pulses according to the specified multiplier or divider
* access lock to programming menu using the PIN code
* selecting the display backlight mode

WORKING TIME METERS

PURPOSE

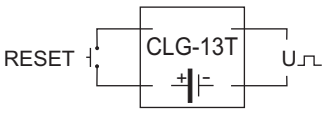
Working time meters are intended for counting the number of working hours in automatic production processes or the number of device working hours, which, due to safety requirements and operation efficiency have limited overhaul life, i.e operational capacity that may not be exceeded (e.g. advanced power units, special radioactive lamps, etc.).

CLG-13T PANEL with button RESET

CLG-14T PANEL without button RESET

FUNCTIONING

CLG-13T and CLG-14T meters are an electronic, one-way meters, enabling the counting of working hours in 0 to 99999,9 range (five digits + one decimal). It is equipped with RESET input for the connection of external button and (only CLG-13T) RESET button in front (with locking), enabling counter state reset for any value.



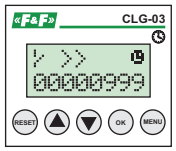
supply		(non-voltage type) internal battery
battery life		10 years*
input voltage	CLG-13T 230V	110÷240V AC/DC
	CLG-13T 24V	4÷30V DC
	CLG-14T 230V	110÷240V AC/DC
display		
CLG-13T		6 characters / h=6,7mm
CLG-14T		8 characters / h=6,7mm
precision		
CLG-13T		0,1h (6min.)
CLG-14T		1min.
working temperature		-10÷40°C
terminal		1,5mm² screw terminals
dimensions		48×24×52mm
mounting hole		45×23mm
protection level		IP20

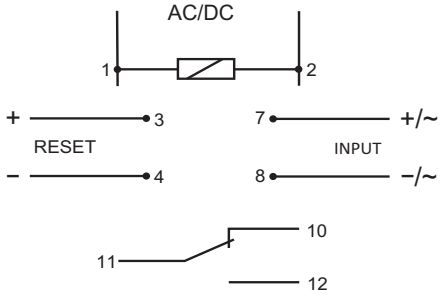
* battery life addicted to weather conditions

CLG-03 PROGRAMMABLE

FUNCTIONING

CLG-03 is a programmable, multi-function electronic meter, enabling the counting of working hours of the connected devices or systems in 1 to 999 999 range, corresponding to 114 years of operation. Working time is counted according to an individual program, set by the user. After reaching the limiting value, the meter will configure itself according to individual user's needs.





supply	24÷264V AC/DC
INPUT: voltage	10÷264V AC/DC
RESET: voltage	10÷264V AC/DC
load current	8A
power consumption	1,5W
working temperature	-20÷50°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

FEATURES

* control panel, enabling programming and the monitoring of device operation
* T input for DC signal and AC signal 50 Hz
* counting time upwards without threshold value
*
* „downward" counting mode to the selected value with zero value signalling (e.g. 9999 → 0)
* counting working time with high state (constant voltage) at the T input
* counting working time between two pulses given at the T input
* counting time upwards to the selected threshold value
* external RESET input
* relay output signaling the preset meter state (contact 1P 8A)
* relay action selection: pulse with set time length; ON → OFF or OFF → ON state change
* local and total meter state memory after supply failure
* limiting access to program menu using PIN code
* setting display illumination mode
* program menu in three languages: Polish, English or Russian

PULSE AND WORKTIME METER WITH MODBUS RTU OUTPUT

* MB-LI-4 Pulse meter 4-channel
* MB-LG-4 Worktime meter 4-channel

More information chapter 29 (see page 100).

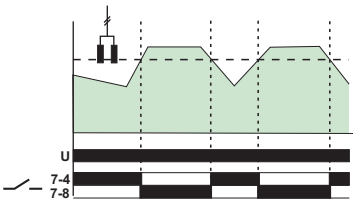
26. FLUID LEVEL CONTROL RELAYS

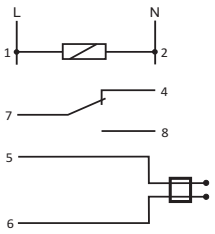
PURPOSE

Fluid level control relays are used to detect the presence of fluid conductive the current on the level of mounted flooding sensors

ONE-POSITION
PZ-828
PZ-828 RC

ADJUSTABLE SENSITIVITY



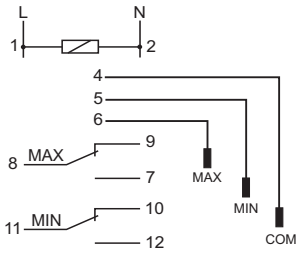


supply	230V AC
current load	<16A
contact	separated 1P
sensitivity - adjustable for PZ-828 RC	1÷100kΩ
output voltage measurement	<6V
power indication	green LED
working status indication	red LED
power consumption	1,1W
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
probe flooding type	1×PZ
contacts 5-6	galvanic separated
protection level	IP20

In dry conditions, the relay's contact remains in the 7-4 position. Once the sensor becomes flooded with liquid, the red LED indicator lights up, and the contact is shifted to the 7-8 position. After the level of the conductive liquid decreases (and the electrodes of the flooding sensor depart), the contact returns to position 7-4.

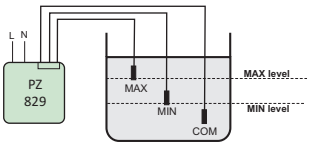
TWO-POSITION
PZ-829
PZ-829 RC

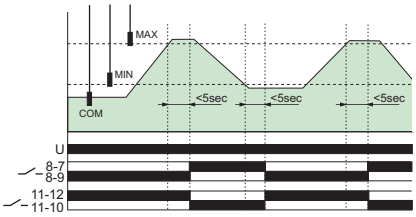
ADJUSTABLE SENSITIVITY



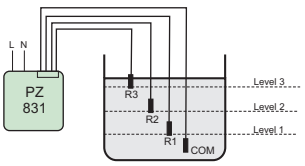
supply	230V AC
current load	2×[<16A]
contact	separated 2×1P
sensitivity - regulated for PZ-828 RC	1÷100kΩ
contact switching delay	
MIN point	1÷2sec
MAX point	<5sec
output voltage measurement	<6V
signalling of supply	green LED
working status indication	2×red LED
power consumption	1,1W
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
probe flooding type	3×PZ2
contacts 4-5-6	galvanic separated
protection level	IP20

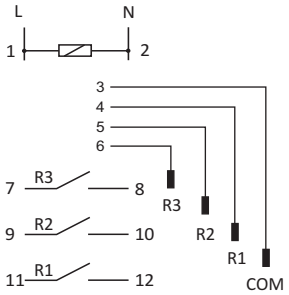
After the liquid level decreases to MIN (i.e. electrodes MIN and COM spaced), the MIN joint is switched to position 11-12, whereas the MAX joint remains in position 8-9. On the other hand, when the MAX liquid level is reached (MAX and COM electrodes shorted), the relay's MIN joint will be switched to position 11-10, whereas the MAX into position 8-7.





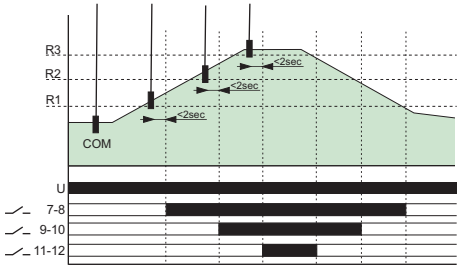
THREE-POSITION
PZ-831 RC





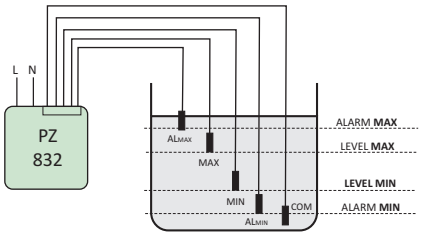
supply	230V AC
current load	3×[<8A]
contact	3×1Z
sensitivity - regulated	1÷180kΩ
contact switching delay	<2sec
output voltage measurement	<6V
signalling of supply	green LED
working status indication	3×red LED
power consumption	1,1W
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
probe flooding type	4×PZ2
contacts 3-4-5-6	galvanic separated
protection level	IP20

In dry condition (all probes open), all the transformer's contacts are also open. If the base probe COM and the next level probe are closed due to a liquid presence, the contact for a given probe will close, e.g. once the first R1 level probe (the COM base probe and the R1 level probe closed) is submerged, the 11-12 contact will close. The same procedure applies to the R2 and R3 level probes. On the other hand, once the liquid level drops below the probe level (the COM probe and the level probe open), the contact for a given probe will open as well.

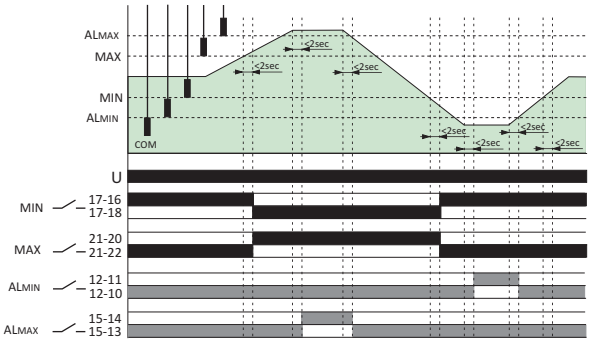


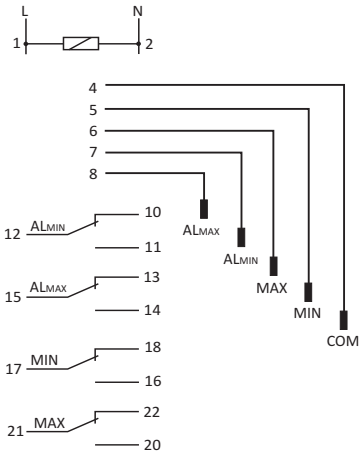
TWO-POSITION WITH EMERGENCY STATES MIN I MAX

PZ-832 RC



supply	230V AC
contact	separated 4×(1P)
current load MIN and MAX	2×(<16A)
current load ALmin and ALmax	2×(<8A)
sensitivity - adjustable	1÷100KΩ
switching delay	1÷2sec
voltage of measured outputs	<6V
signalling of supply	green LED
signalling of working	yellow LED
signalling MIN and MAX state	2×green LED
signalling alarm state	2×red LED
power consumption	1,1W
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
contacts 4-5-6 -7-8	galvanic separated
protection level	IP20





Relay control MAX and MIN statues set by user of controlled fluid. After the liquid level decreases to MIN (i.e. electrodes MIN and COM spaced), the MIN joint is switched to position 17-16 (FILLING), whereas the MAX joint remains in position 21-22. On the other hand, when the MAX liquid level is reached (MAX and COM electrodes shorted), the relay's MIN joint will be switched to position 17-18 (EMPTYING), whereas the MAX into position 21-20.
Emergency state: **AL_{min}** (dry running) - after the liquid level decreases to **AL_{min}** (i.e. electrodes MIN and COM spaced), the AL_{min} joint is switched to position 12-11; **AL_{max}** (overflow) after level is reached **AL_{max}** (AL_{max} and COM electrodes shorted), the relay's **AL_{max}** joint will be switched to position 15-14.

PROBE PZ

flooding probe	electrode
dimension of probe/length of cable	30×25×5mm/1,5m
length/pitch of electrodes	30mm / 5mm
probe voltage	<6V~
probe current	<0,13mA
lenght of conection wire	<100m
dedicated	PZ-828, PZ-828 RC

PROBE PZ2

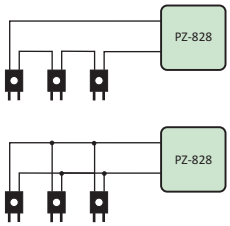
flooding probe	acid-resistant steel electrode in + plastic box for electrode + gland PG9
dimension of probe	Ø15, l=9,5cm
probe voltage	<6V~
probe current	<0,13mA
connection cable	e.g. DY 1mm²
lenght of conection wire	<100m
dedicated	PZ-829, PZ-829 RC, PZ-831 RC, PZ-832 RC

How to connect the probe

The design of the probe makes it possible to install the probe on a flat horizontal base, for example on the floor in a room where hydro-valves and flow pipes are installed or in a laundry room. Thanks to such a design of the probe, any failure or flooding of a room with a liquid can be quickly detected as well as electric circuits can be simultaneously switched off or the sound or light signalling system (alarm system) can be actuated. The probe cable can be extended to 100 m.

A maximum of 10 probes can be connected in parallel connection or in series connection to 5-6 output:
* series connection - for a dependant system that controls the level of liquid in many points a simultaneous short-circuit of all sensors connected must occur in order to activate the relay.
* parallel connection - for an alternative system that controls the level of liquid in many points - a short-circuit of at least one of the sensors connected must occur.

In case of a series connection, the sensitivity of the sensors is reduced (conductivity is reduced).



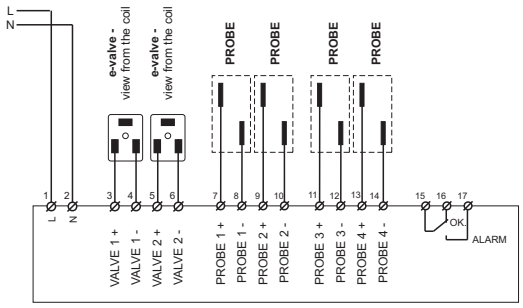
AUTOMATIC ANTI-FLOOD SYSTEM

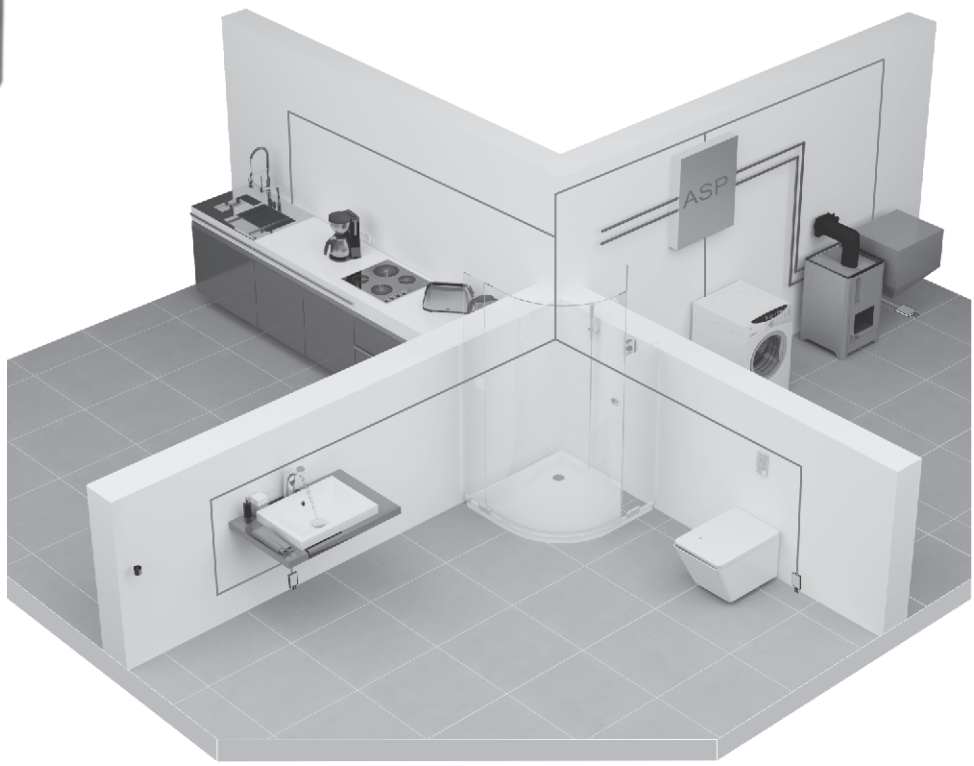
ASP

PURPOSE

ASP automatic anti-Flood system is an autonomous system to prevent flooding of residential, single-family and multifamily buildings. It is used for comprehensive protection of property from the effects of flooding.

NEW !





FEATURES

* detection of leaks and spills
* cutting off water supply to the property
* notifying the user about this situation
* reducing pressure drops
* improving the efficiency of fire-fighting installations
* bistable solenoid valve remains closed after power loss
* solenoid coil is not constantly powered (power at the time of switching)
* own emergency power supply

COMPONENTS OF THE SYSTEM

1) Distribution box containing: SAM-01 central controller, electrical circuits protection and backup battery for short power outages.
2) 1", 2", 3/4"or 5/4" solenoid valve - 1 pc.
3) SON-K boiler room flooding probe - 1 pc.
4) SON-M living areas flooding probe - 2 pcs.

SAM-1
multi-purpose ASP system controller

solenoid valve for cutting off water supply to the facility (1", 2", 3/4"or 5/4")

SON-K
boiler room flooding probe

SON-M
living areas flooding probe

option to integrate with alarm systems and fire alarm systems

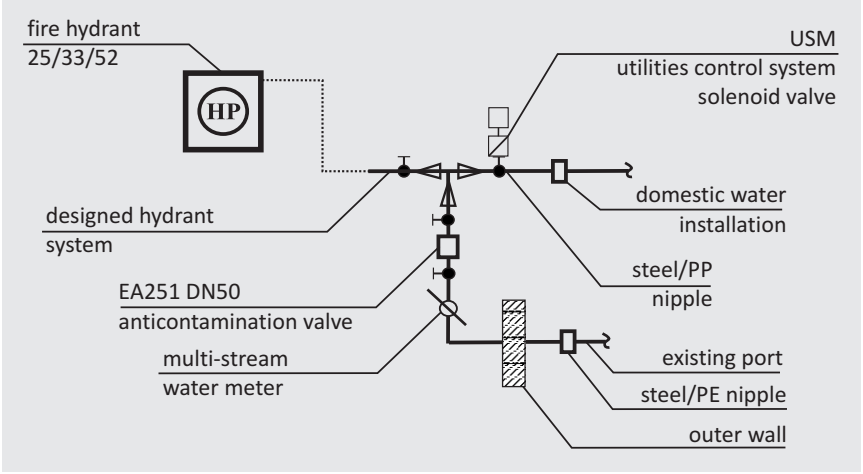
UTILITIES CONTROL SYSTEM

USM

NEW !

PURPOSE

USM system is used to cut-off all water receivers in case of fire or failure of water installation, with the exception of fire-fighting devices.



An example of water distribution in a building with USM system in case of fire.
Support of hydrant system by cutting off the domestic water.

FEATURES

* reduces pressure drops and improves the efficiency fire-fighting installations by cutting off the domestic water;
* can be installed in any building without certification from CBNOP and ITB
* own power reserve system
* manual control or monitoring (works with wireless systems)
* self-test once a month
* can be controlled via the Internet, Ethernet, GSM, etc.
* product ready for assembly (can be tailored to the needs of the users and requirements of the building)

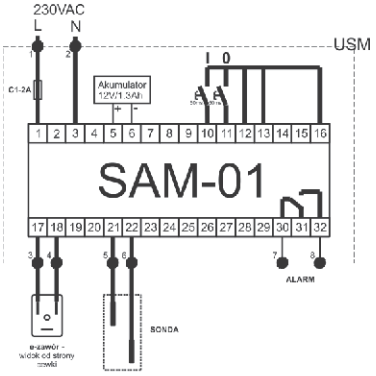
VERSIONS

USM H - for detection of emergencies and cutting off power to water and central heating installations.
USM O - for supporting the hydrant systems by cutting off domestic water supply in order to secure an efficiency of hydrant installation in the building. Can be combine with USM H.
USM I – for machinery and equipment.

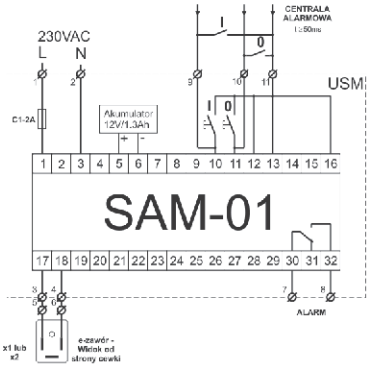
COMPONENTS OF THE SYSTEM

* SAM-1 controller
* flooding probes (installed in bathrooms, kitchens, baths, boiler rooms, etc.).
* solenoid valve EZ to 2" for 12 V DC voltage with GW or with additional flanges
* ROP-type switch or tension switch
* solenoid valve filter and fittings with appropriate size 12 V 1.3 Ah battery
* C 1A to 2A circuit breaker
* pressure switch (in central heating installation)
* double button (switching the solenoid valve on and off)

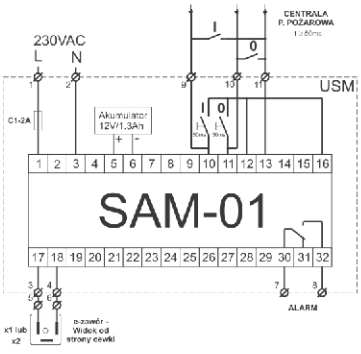
An example of USM applications



USM H 1
application for free-standing houses or semi-detached houses with probes.



USM H 2
application for free-standing houses or semi-detached houses without probes. Cooperation with Alarm Control Panel.

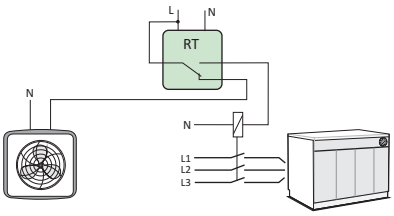


USM O 1
application for buildings with the hydrant installation without probes. Cooperation with the Fire Alarm Control Panel. Reference will be tailored for the needs of specific objects.

27. TEMPERATURE REGULATORS

PURPOSE

Temperature regulators may be used for equipment control in anti-freeze systems which prevent the freezing of gutters, the accumulation of ice on stairs, vehicles, etc.



RT-820 temperature setting range: 4÷30°C

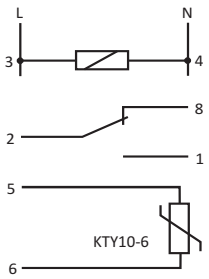
RT-821 temperature setting range: -4÷5°C for anti-icing heating systems

RT-822 temperature setting range: 30÷60°C

RT-823 temperature setting range: 60÷95°C

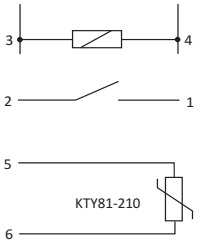
FUNCTIONING

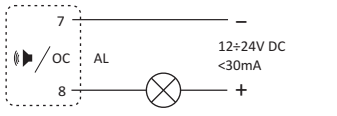
The power supply to the generator is indicated by the green LED. Until the required ambient temperature is achieved, the contact of the regulator remains in position 2-1 and the heating device is active. Once the set value is achieved, the contact shifts into position 2-8 and the heating or ventilation device is turned off. Any drop in temperature by the hysteresis value will activate the heating device again (contacts 2-1 closed) until the set temperature value is achieved.



supply	230V AC
current load	<16A
contact	separated 1P
temperature setting range	
RT-820	4÷30°C
RT-821	-4÷5°C
RT-822	30÷60°C
RT-823	60÷95°C
hysteresis setting range	0,5÷3°C
setting accuracy	1°C
measurement accuracy	±1°C
temperature probe type	RT/RT2
power supply indicator	green LED
operation mode indicator	red LED
power consumption	1,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
mounting	on rail TH-35
protection level	IP20

RT-826 DIGITAL temperature setting range: -25÷130°C





7-8 AL output light signalling alarm output open collector type

supply	230V AC
current load	<16A
contact	1 Z
temperature setting range	-25÷130°C
hysteresis setting range	1÷30°C
adjusting precision	1°C
measure precision	±1°C
sound signalling	buzzer DAP12
resonant frequency	2,4kHz
volume	80dB
visual alarm output	open collector (OC)
connection voltage	12÷24V DC
current	<30mA
display	3×segment LED 5×9mm
switching signalling contact	red LED
temperature probe type	RT / RT2
power consumption	1,1W
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	2 modules (35mm)
fixing	on rail TH-35
protection level	IP20

* working mode: HEATING / COOLING
* indication correction ±9°C
* audible indication of alarm status when the temperature exceeded ±5°C oriented (internal piezoelectric hooter)
* projection of the currently measured temperature

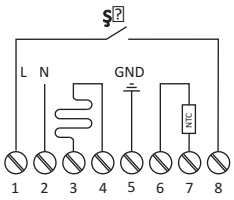
PROBE RT

temperature sensor	KTY 81-210
measurement range	-50÷130°C
working temperature	-50÷65°C
dimansion	Ø5; h=20mm
isolation of sensor	heat shrink
cable	OMY 2×0,34mm²; l=2,5m

PROBE RT2

temperature sensor	KTY 81-210
measurement range	-50÷130°C
working temperature	-50÷65°C
dimansion	Ø8; h=40mm
isolation of sensor	brass muff
cable	heatresist SIHF 2×0,5mm²; l=2,5m

RT-824 temperature range: 5÷35°C

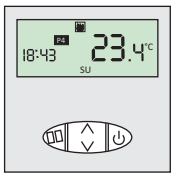


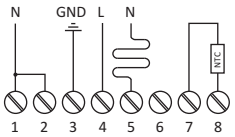
supply	230V AC
current load	<16A
contact	1Z
temperature setting range	5÷35°C
hysteresis setting range	3°C
set value accuracy	1°C
measurement accuracy	±1°C
internal temperature sensor	NTC
power consumption	0,8W
working temperature	-5÷50°C
terminal	1,5mm² screw terminals
dimensions	
front	83,5×83,5mm; D 22mm
back	Ø50; D 27,5mm
fixing	to under plaster box Ø60mm
protection level	IP20

FUNCTIONS

* possibility of programming 1 required temperature
* the knob located on the front panel enables setting a required temperature
* the breaker switch located on the front panel enables switching off the power supply of the whole heating system
* the input for connecting a control clock
* signalling of the heating system activation
* 2 temperature sensors: an internal one and an external one
* 3 operation modes of the regulator: operation with the internal temperature sensor; operation with the external temperature sensor; operation with two temperature sensors
* in the mode of operation with the internal temperature sensor: in case of the failure of the temperature sensor the regulator will shift to the so-called safe automatic model and will try to maintain the temperature set
* automatic switching over to the mode of operation with the internal temperature sensor in case of a failure of the external sensor
* in the mode of operation with two temperature sensors, the external sensor is the limiting one and it does not permit the temperature of 27°C to be exceeded regardless of the temperature set by means of the temperature adjusting knob
* in the mode of operation with two temperature sensors: if both temperature sensors fail, the regulator will shift to the so-called safe automatic model. Working with interruptions, the regulator will try to maintain the temperature at the level of 80% of the set temperature.

RT-825 temperature range: 5÷60°C





supply	230V AC
current load	<16A
contact	1Z
temperature setting range	15÷60°C
antifrost temperature range	0÷10°C
hysteresis setting range	1°C
set value accuracy	1°C
measurement accuracy	±1°C
reading-out accuracy	0,1°C
backup time clock operation	<1h
internal temperature sensor	NTC
power consumption	0,8W
working temperature	-10÷50°C
terminal	1,5mm² screw terminals
dimensions	
front	83,5×83,5mm; D 22mm
back	Ø50; D 27,5mm
fixing	to under plaster box Ø60mm
protection level	IP20

FUNCTIONS

* the control panel enables programming and monitoring the device operation
* the breaker switch located on the front panel enables switching off the power supply of the whole heating system
* maintaining a preset temperature in accordance with programmed hours and days of the week
* possibility of programming 4 intervals of a required temperature per 24 hours
* 12 program entries: 4 entries concerning the required temperature for working days (Pn-Pt: Monday through Friday); 4 entries concerning the required temperature for Saturday (So: Saturday) and 4 entries concerning the required temperature for Sunday (Nd: Sunday)
* possibility of a quick, manual correction of the currently maintained temperature
* adjustable hysteresis
* 2 temperature sensors: an internal one and an external one
* 3 operation modes of the regulator: operation with the internal temperature sensor; operation with the external temperature sensor; operation with two temperature sensors
* in the mode of operation with two temperature sensors, the external sensor is the limiting one with an adjustable temperature within the range of 15÷50°C

PROBE RT-45

dedicated	RT-824, RT-825
temperature sensor	NTC
working temperature	-50÷65°C
dimension	Ø7; h=25mm
isolation of sensor	PC muff
cable	PC 2×0,34mm²; l=3m

DIGITAL PROGRAMMABLE

PURPOSE

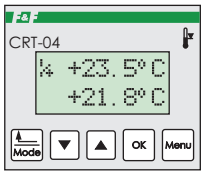
The CRT controllers are multi-function, programmable electronic devices which enable control of heating or cooling devices in order to maintain a stable room temperature, as well as to control ambient and substance temperatures in industrial conditions, with the option of supervising technological processes.

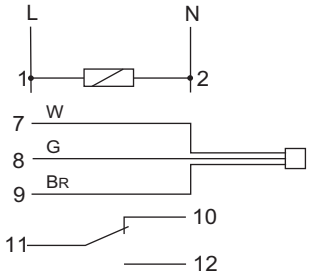
WITH PROGRAMMABLE CLOCK CONTROL

CRT-04 temperature range: 0÷60°C

FUNCTIONING

The operation time and required temperature are achieved according to the individual program set by the user. The CRT controllers are equipped with a calendar and a real time clock which enable switching the controlled device on and off at preset hours within the following cycles: 24-hour, weekly, business-day (Mon. Fri.) or weekend (Sat., Sun.).





supply	230V AC
current load	<16A
contact	separated 1P
battery life	3 years*
temperature setting range	0÷60°C
hysteresis setting range	0÷10°C
set value accuracy	0,1°C
model correction	±5°C
type of temperature sensor	RT4
lagged switching - regulated	1÷15min.
power consumption	1,5W
working temperature	-20÷40°C
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

* battery life addicted to weather conditions and frequency of mains failure

FEATURES

* control panel for programming and monitoring;
* operation modes: HEATING and COOLING to maintain a preset temperature according to programmed hours and days;
* CONTINUOUS operating mode to maintain a single preset temperature value while ignoring other program entries;
* MEASUREMENT operating mode display of an actual temperature value without controlling a connected machine;
* 50 program entries;
* INTERVAL this feature enables the user to program up to 8 required temperature values (3 in the MY1, MY2 and MY3 modes, and an additional 5 in modes called MORNING, WORK, DINNER, DAY, and NIGHT for everyday time windows related to the users' lifestyle;
* DELAY programmable time of response delay while exceeding limit temperature values;
* CORRECTION related to the temperature read-out error against the model thermometer;
* SENSORS visual signalisation of the temperature sensor failure;
* DST automatic DST time implementation with programmable shift to manual mode;
* LIGHT selection of display illumination mode.
* LANGUAGE program menu in three languages: Polish, English or Russian

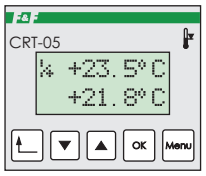
RT-4 PROBE

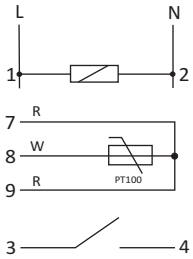
dedicated	CRT-04
temperature sensor	DS18S20
measuring range	-55÷125°C
working temperature	-30÷65°C
dimensions	Ø5; h=30mm
isolation of sensor	heat shrink
cable	LiYY 3×0,34mm² l=2,5m

RT-56 PROBE

dedicated	CRT-05, CRT-06
temperature sensor	PT100
measuring range	-100÷400°C
dimensions	Ø4; h=85mm
isolation of sensor	steel sleeve
cable	PC 3×0,34mm²; l=1,5m
	in braided metal

CRT-05 2-FUNCTION temperature range -100÷400°C



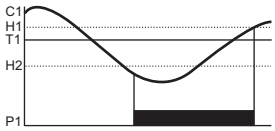


supply	230V AC
current load	<16A
contact	separated 1P
temperature setting range	-100÷400°C
hysteresis setting range	0÷10°C
set value accuracy	1°C
model correction	±20°C
gradient	4°C/1sec
type of temperature sensor	RT-56 (PT-100)
working temperature	-20÷40°C
power consumption	1,5W
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

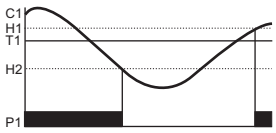
CONTROLLER'S FEATURES:

* control panel for programming and monitoring;
* 2 operations modes: HEATING and COOLING
* 2 regulated HYSTERESIS values lower and upper limits;
* AUTOMATIC mode operation with one selected function;
* MANUAL mode permanent closing or opening of the contact without a temperature measurement.
* CORRECTION related to the temperature read-out error against the model thermometer;
* WARNING - visual signalisation of the temperature sensor failure, range exceed and speed riasing or falling temperature exceed
* limiting access to program menu using PIN code
* LIGHT selection of display illumination mode.
* LANGUAGE program menu in three languages: Polish, English or Russian

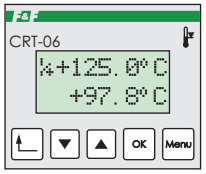
HEATING

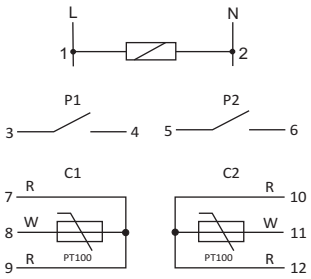


COOLING



CRT-06 10-FUNCTIONS temperature range -100÷400°C





supply	230V AC
current load	2×(<16A)
contact	separated 2×1Z
temperature setting range	-100÷400°C
hysteresis setting range	0÷100°C
set value accuracy	1°C
model correction	±20°C
switching time delay - regulated	0÷45min.
gradient - regulated	4°C/1sec÷6°C/1min.
sampling frequency - regulated	1÷120samples/1min.
type of temperature sensor	RT-56 (PT-100)
working temperature	-20÷40°C
power consumption	1,5W
terminal	2,5mm² screw terminals
dimensions	3 modules (52,5mm)
mounting	on rail TH-35
protection level	IP20

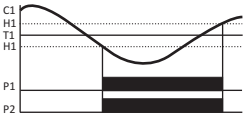
CONTROLLER'S FEATURES:

* control panel for programming and monitoring
* 10 operation functions
* 2 independent temperature sensors
* two independent temperature values may be set
* 2 x 1P contacts applied to the temperature sensors
* 2 hysteresis set values, one for each sensor
* AUTOMATIC mode - operation with one selected function
* MANUAL mode permanent closing or opening of the contact without a temperature measurement. Separate temperature drops for the P1 and P2 contacts
* memory feature for maximum and minimum temperature values registered, independent for the C1 and C2 sensors
* CORRECTION related to the temperature read-out error against the model thermometer
* WARNING - visual signalisation of the temperature sensor failure, range exceed and speed riasing or falling temperature exceed
* limiting access to program menu using PIN code
* LIGHT selection of display illumination mode
* LANGUAGE program menu in three languages: Polish, English or Russian

OPERATIONAL FUNCTIONS OF THE CRT-06

HEATING mode. The P1 and P2 contacts depend on the C1 sensor.

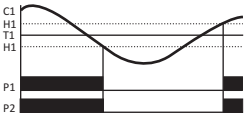
PROG 1



-1 sensor: C1
- P1 and P2 work in parallel
-1 temperature set value: T1
- 1 hysteresis set value: H1 (upper and lower limit)

COOLING mode. The P1 and P2 contacts depend on the C1 sensor.

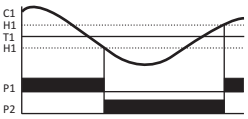
PROG 2



-1 sensor: C1
- P1 and P2 work in parallel
-1 temperature set value: T1
- 1 hysteresis set value: H1 (upper and lower limit)

HEATING / COOLING modes. The P1 and P2 contacts depend on the C1 sensor.

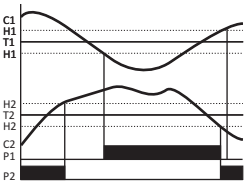
PROG 3



-1 sensor: C1
- contacts work in alternate manner:
P1 - cooling
P2 - heating
- 1 temperature set value: T1
- 1 hysteresis set value: H1 (upper and lower limit)

For contacts P1 and P2. The P1 contact dependent on the C1 sensor; the P2 on the C2 sensor.

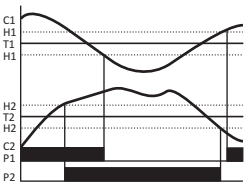
PROG 4



-2 sensors: C1 and C2
-contacts work independently:
P1 - heating
P2 - heating
-2 temperature set values: T1 and T2
-2 hysteresis values:
H1 upper and lower limit for T1
H2 upper and lower limit for T2

COOLING mode for the P1 and P2 contacts. The P1 contact depends on the C1 sensor; the P2 on the C2 sensor.

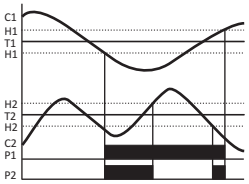
PROG 5



-2 sensors: C1 and C2
- contacts work independently:
P1 - cooling
P2 - cooling
-2 temperature set values: T1 and T2
-2 hysteresis set values:
H1 - upper and lower limit for T1
H2 - upper and lower limit for T2

HEATING mode for the contacts P1 and P2. The P1 contact depends on the C1 sensor, and the P2 on the C2 and C1 (activated only with the P1 contact closed).

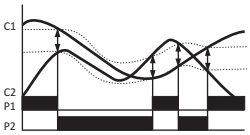
PROG 6



-2 sensors: C1 and C2
- the contacts interdependent:
P1 - heating
P2 heating with the P1 closed
-2 temperature set values: T1 and T2
-2 hysteresis set values:
H1 upper and lower limit for T1
H2 upper and lower limit for T2

DIFFERENTIAL mode. The P1 contact closed with the temperature difference exceeding the set value. The P2 contact activated in the reversed conditions in comparison to the P1 , i.e. with the temperature difference lower than the set value.

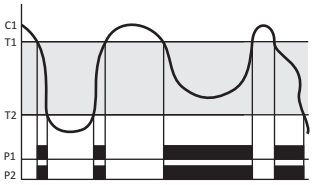
PROG 7



- 2 sensors: C1 and C2;
- contacts work in alternate manner:
P1 heating
P2 heating with the P1 closed
- 2 temperature set values: T1 and T2
- no hysteresis set values H1 and H2

WINDOW mode. The P1 and P2 contacts closed when the C1 sensor temperature is between the preset temperature values of T1 and T2.

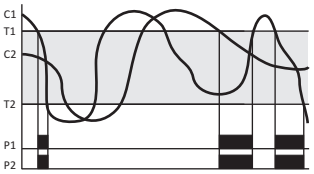
PROG 8



-1 sensor: C1
-contacts work in alternate manner:
P1 and P2
-2 temperature set values: T1 and T2
-no hysteresis set value H1 and H2

WINDOW mode. The P1 and P2 contacts closed when the C1 and C2 sensors temperature is between the preset temperature values of T1 and T2.

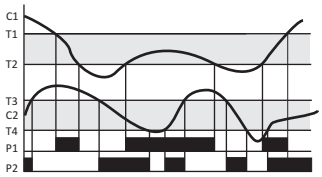
PROG 9



-2 sensors: C1 and C2
-contacts work in alternate manner:
P1 and P2
-2 temperature set values: T1 and T2
-no hysteresis set value H1 and H2

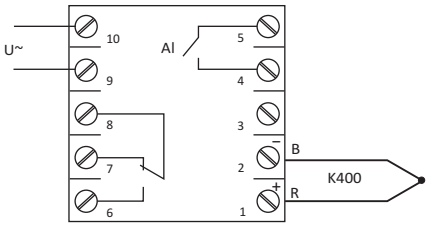
WINDOW mode independent for the P1 and P2 contacts. The P1 contact closed when the C1 sensor temperature is between the preset temperature values of T1 and T2. The P2 contact closed when the C2 sensor temperature is between the preset temperature values of T3 and T4.

PROG 10



- two sensors: C1 and C2
-contacts work independently: P1 and P2
-4 temperature set values:
T1 and T2 for the P1 and
T3 and T4 for the P2 contact
-no hysteresis set value H1 and H2

CRT-15T temperature range 0÷400°C



supply	100÷240V AC
current load	<3A
contact	separated 1P
current load output alarm	<1A
output alarm contact	separated 1Z
temperature range - adjustable	0÷400°
PID setting	
proportional part P	0÷100
integral part I	0÷255
derivative part D	0÷255
accurate setting	0,5°C±1digit
model correction	±15°C
working temperature	-10÷40°C
power consumption	1W
terminal	2,5mm² screw terminals
dimensions	48×48×86
mounting hole	45×45mm
protection level	IP20

CONTROLLER'S FEATURES

* control panel for programming and monitoring of device operation;
* PID controller (a proportional-integral-derivative controller);
* automatic tuning of the PID regulator;
* ALARM programmable temperature limit to trigger off the alarm feature;
* preset temperature indications;
* current temperature indications;
* 1P output contact;
* additional ALARM output: 1Z contact
* model correction

K400 PROBE

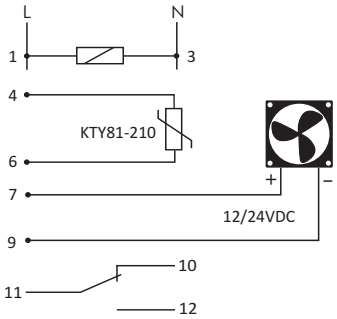
dedicated temperature sensor	CRT-15T K400
dimensions	thread M6; h=15mm
isolation of sensor	steel
cable	2×0,34mm²; l=1,0m in braided metal

RT-833 WITH ADJUSTABLE FAN SPEED

PURPOSE

This regulator is designed for direct control of 12/24 V DC fans speed in control cabinets (or similar installations) as a function of temperature.

NEW !



supply	12÷24V DC
current load DC (7-9)	<6A
contact (load)	separated 1P (10A)
temperature range - adjustable	
Tmin	25÷60 °C
ΔT	5÷30 °C
measurement accuracy	±1°C
start speed setting	0÷80%
temperature probe type	RT / RT2
signalling of supply	green LED
signalling operating status	red LED
power consumption	
standby	0,05W
on	0,6W
working temperature	-15÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

FUNCTIONING

If the temperature exceeds the preset Tmin value, fan will be activated and its speed will be proportional to the measured temperature and regulator settings:
- for temperature Tmin speed will be equal to the preset minimum speed.
- for temperature Tmin + Delta speed is 100%.
- for temperatures between Tmin < > Tmin + Delta speed will be proportionally mapped in a range from the preset minimum to 100% speed.

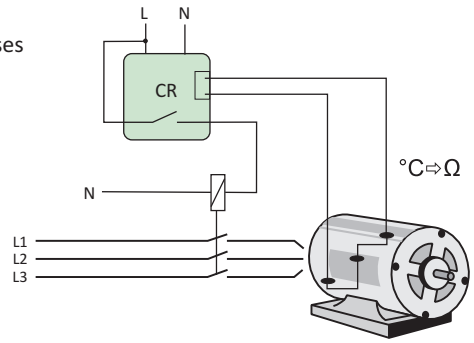
The regulator is equipped with a relay output to signal too high temperature or damage (power loss) of the controller. During normal operation, contact is closed (position 11-12). If the measured temperature is higher for three minutes than the maximum value (Tmin + Delta), then contact is opened (position 10-11). When the regulator is damaged or the power supply to regulator is disconnected, contacts 10-11 contacts can be used to indicate the error.

RESISTANCE RELAY

CR-810 DUO TO CO-OPERATION WITH THE PTC THERMISTOR-EQUIPPED TEMPERATURE SENSORS

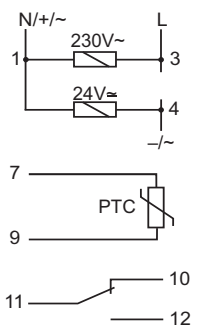
PURPOSE

The resistance relay protects electrical equipment against any undesirable temperature increases by means of PTC resistors in serial connection (1-6 pieces).



FUNCTIONING

Correct operation (closed contacts 3-7) is indicated by the green LED (correct power voltage, temperature of the controlled device, working circuit of connected PTC sensors). The increase in temperature of at least one sensor over the rated value results in an increase in its resistance over 3000W. The relay is then activated (contacts 3-7 open). The system is activated automatically if the resistance of the PTC sensor loop decreases below the threshold of 1800W (drop in temperature of the controlled device). The contact of the executive relay also opens in the event of the resistance dropping to 15W (e.g. during a short circuit between cables) or with the power voltage turned off .



supply	230V AC / 24V AC/DC
current load	<16A
contact	separated 1P
resistance of the contact opening	R>3000Ω, R<70Ω
resistance of the contact closing	110Ω<R<1800Ω
resistance sensor loop (cold state)	R=1500Ω
power indication	green LED
failure signalling	2× red LED
power consumption	0,8W
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

28. CONTROL SYSTEM COMPONENTS

ELECTROMAGNETIC RELAYS

PURPOSE

Electromagnetic relay in single-module casing intended for direct assembly on the TH-35 bus bar.

FUNCTIONING

Application of the power supply voltage to the relay's coil results in a shift of the contact. After the decay of the voltage in question, the contact returns to the initial position.

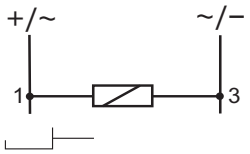
PK-1P Contact 1C/O (16A).

PK-2P Contacts 2C/O (2×8A).

PK-3P Contacts 3C/O (3×8A).

PK-4PZ Contacts 2C/O (2×8A) + 2NO (2×8A).

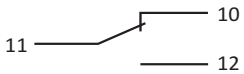
PK-4PR Contacts 2C/O (2×8A) + 2NC (2×8A).



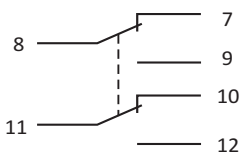
appl. standard no.	IEC 61095
power supply	
PK-xP 230V	230V AC
PK-xP 110V	110V AC/DC
PK-xP 48V	48V AC/DC
PK-xP 24V	24V AC/DC
PK-xP 12V	12V AC/DC
connection current	
PK-1P	<16A
PK-2P	2×(<8A)
PK-3P	3×(<8A)
PK-4PZ	2×(<8A), 2×(<8A)
PK-4PR	2×(<8A), 2×(<8A)
usage category	AC-7a
insulation voltage	400V
voltage surge resistor	contact pair coil, 6 kV
separate current circuits	3.6 kV
contact gap	1.2 kV
pollution level	3
overvoltage capacity	3kV
safety label	B
operating time	max. 40msec
turn-off time	max. 20msec
mechanical life	min. 5 x 10^5 cycles
current consumption	25mA
voltage indicator	LED
terminal	2.5 mm^2 screw terminals
working temperature	-25÷50°C
dimensions	1 module (18 mm)
fixing	on rail TH-35
protection level	IP20

Order labelling method: PK-2P 48V — supply voltage

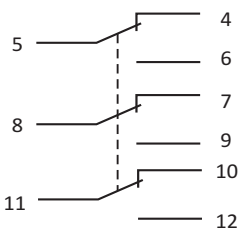
PK-1P



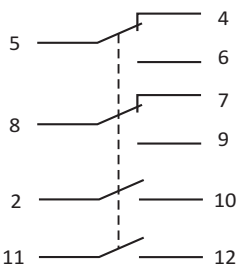
PK-2P



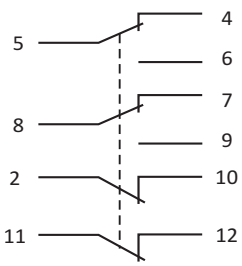
PK-3P



PK-4PZ



PK-4PR



Loadability for contacts of relays

						ALTERNATING CURRENT			DIRECT CURRENT
						AC-1	**AC-3**	**AC-15**	**DC-1** 24V/230V
	BULBS HALOGEN LIGHTS	INCOMPENSATED FLUORESCENT LIGHTS	COMPENSATED OF FLUORESCENT LIGHTS	FLUORESCENT LIGHTS COMPENSATED IN PARALLEL	ECONOMIC FLUORESCENT LIGHT	non-inductive or low-inductive loads resistive furnance	squirerel-cage motor, switching motors in operation	controlling of alternative electro-magnetic loads	non-inductive orlow-inductive, resistive furnances
5A	600W	300W	300W	200W	240W	1800VA	0,30KW	280VA	5A/012A
8A	1100W	550W	550W	350W	300W	2200VA	0,45KW	325VA	8A/0,18A
10A	1500W	650W	650W	500W	350W	2500VA	0,6KW	500VA	10A/0,25A
16A	2300W	1000W	1000W	800W	550W	4200VA	1,0KW	750VA	16A/0,35A
30A	4000W	1900W	1900W	1500W	1000W	7500VA	1,7KW	1400VA	30A/0,7A

MODULAR CONTACTORS

PURPOSE

Electromagnetic contactors in modular case for direct mounting on rail 35mm.

FUNCTIONING

Connect the voltage on the contactor's coil will switch the contact. Contactor's status is indicated by blinking red marker in the box. After a loss of power the contacts return to their original position.

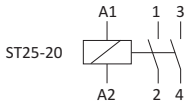
ST-25

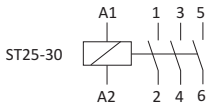
ST-40

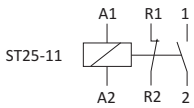
ST-63

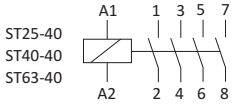
Type	Contacts	Current AC-1 Cat.	Connect. power AC-1 Cat. [230V]	Connectors power	Coil supply voltage	Power consumption	Module	Weight	Screw terminals
ST25-20	2NO	25A	4kW	1,3kW	230V AC	2,2W	1	106g	4mm²
ST25-20/24	2NO	25A	4kW	1,3kW	24V AC	2,2W	1	106g	4mm²
ST25-11	1NO+1NC	25A	4kW	1,3kW	230V AC	2,2W	1	106g	4mm²
ST25-30	3NO	25A	9kW	2,2kW	230V AC	4,0W	2	168g	6mm²
ST25-31	3NO+1NC	25A	9kW	2,2kW	230V AC	4,0W	2	168g	6mm²
ST25-31/24	3NO+1NC	25A	9kW	2,2kW	24V AC	4,0W	2	168g	6mm²
ST25-40	4NO	25A	9kW	2,2kW	230V AC	4,0W	2	168g	6mm²
ST25-40/24	4NO	25A	9kW	2,2kW	24V AC	4,0W	2	168g	6mm²
ST25-04	4NC	25A	9kW	2,2kW	230V AC	4,0W	2	168g	6mm²
ST25-22	2NO+2NC	25A	9kW	2,2kW	230V AC	4,0W	2	168g	6mm²
ST40-40	4NO	40A	16kW	5,5kW	230V AC	6,4W	3	241g	16mm²
ST40-40/24	4NO	40A	16kW	5,5kW	24V AC	6,4W	3	241g	16mm²
ST40-31	3NO+1NC	40A	16kW	5,5kW	230V AC	6,4W	3	241g	16mm²
ST63-40	4NO	63A	24kW	8,5kW	230V AC	6,4W	3	241g	16mm²
ST63-40/24	4NO	63A	24kW	8,5kW	24V AC	6,4W	3	241g	16mm²
ST63-31	3NO+1NC	63A	24kW	8,5kW	230V AC	6,4W	3	241g	16mm²

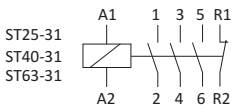
standard number	IEC 61095
electrical switching durability	1×10^5
mechanical switching durability	1×10^6
insulation voltage	4,0kV
working temperature	-25÷50°C
mounting	on rail TH-35
protection level	IP20

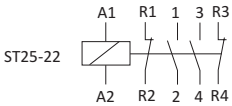


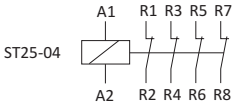




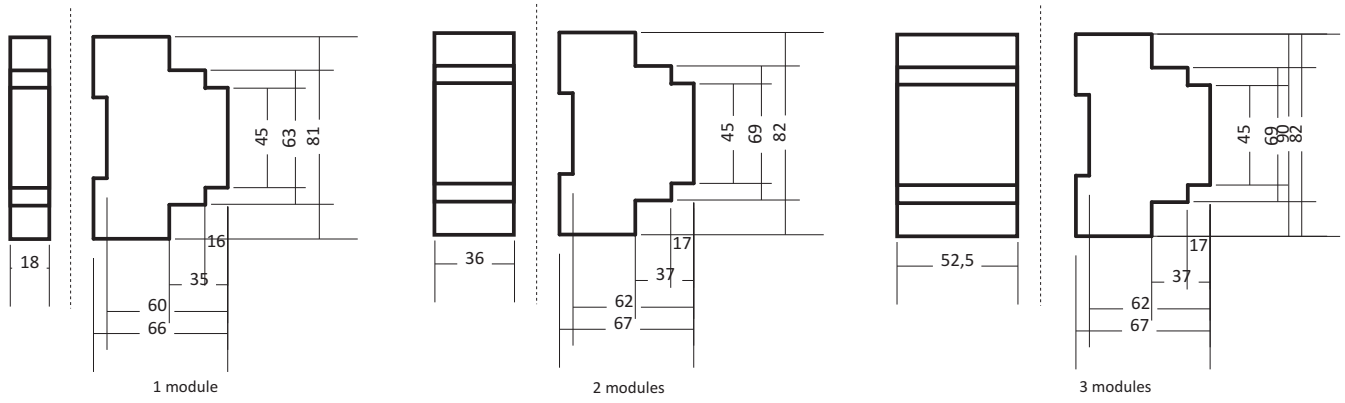








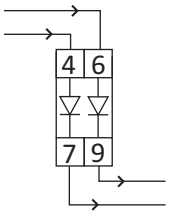
DIMENSIONS

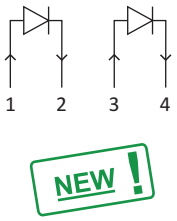


SUPPORTING COMPONENTS OF AUTOMATION SYSTEMS

SEP-01 / SEP-02 CONTROL SIGNAL SEPARATOR

SEP-01 is used for the separation of control signals in automation systems with separate control subgroups and central control. The control signal is passed in one direction and blocked in the opposite direction.
EXAMPLE USES: group control system created on BIS-412 bistable relays (see page 15); group control system of roller (see page 31).

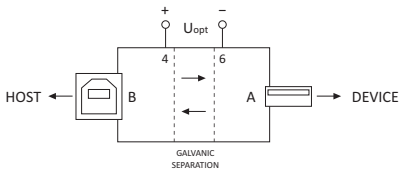




current load	<1A 1000V
working temperature	-25÷40°C
SEP-01:	
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20
SEP-02:	
terminal	2,5mm² screw terminals
dimensions	Ø55, h=13mm
mounting	to under plaster box Ø60
protection level	IP20

SEP-03 USB AMPLIFIER/USB LINE SEPARATOR

SEP-03 is used for galvanic separation of devices connected via a USB cable. Provides surge protection for HOST-type devices (e.g. PC) from external devices that are connected directly to the power grid, industrial power supply systems or high voltage measurement networks. If you connect an external power supply, the SEP-03 USB is used as a signal amplifier and increases the efficiency of current to 1A for the connected devices system.

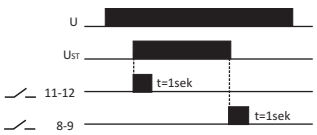


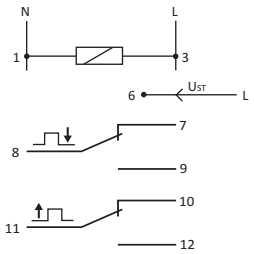
supply	
USB	5V DC
Uopt	12÷30V DC
current load	
USB	<400mA
Uopt	<1A
USB standard	1.1 / 2.0
speeds	Low speed 1,5Mbps / Full speed 12Mbps
connectors type	1×A / 1×B
galvanic separation	
tracks A -> B	5kV RMS
U_{USB} -> A/B tracks	1kV DC
U_{opt} -> A/B tracks	none
working temperature	-25÷40°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

PSI-02 "CONTINUOUS ➔ PULSE" SIGNAL CONVERTER

OPERATION

PSI-02 is used to convert a continuous control signal to a single control pulses required for the automation control systems. Upon receiving the control signal at the UST input (leading edge), the converter generates a pulse at the output 12 (contact 11-12 will be closed for 1 sec.). After the disappearance of the control signal (trailing edge), the converter generates a second pulse at the output 9 (contact 8-9 will be closed for 1 sec.). EXAMPLE USES: group control system of roller blinds (see page 31).



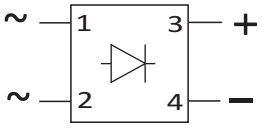


supply PSI-02 230V	230V AC
PSI-02 24V	24V AC/DC
current load	2×[<8A]
contact	separated 2×1Z
input signal PSI-02 230V	230V AC
PSI-02 24V	24V AC/DC
time output signals	1sec
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

MPG-03 FULL-WAVE BRIDGE RECTIFIER (in GRAETZ circuit)

PURPOSE

The MPG-03 changes alternating current into unidirectional direct current.

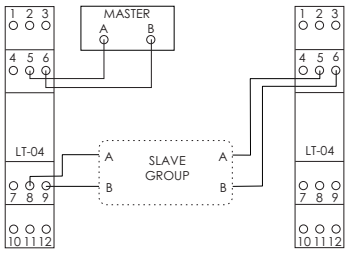


supply (only one range)	110÷264V AC
	12÷48V AC
current load	<2A
signallisation of supply	green LED
working temperature	-25÷40°C
terminal	2,5mm² screw terminals
dimensions	1 module (17,5mm)
mounting	on rail TH-35
protection level	IP20

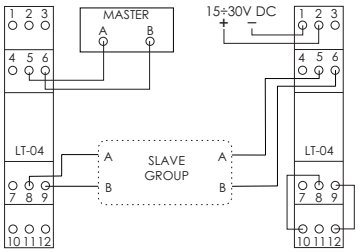
LT-04 TERMINATION / POLARISATION / ENHANCEMENT MODULE NETWORK RS-485

PURPOSE

LT module is used to termination of signal line (UTP cable) between devices exchange data according to the standard MODBUS protocol on the network RS-485.



Network termination system



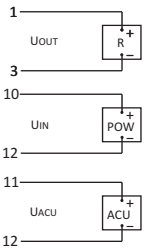
A signal amplification system (including termination)

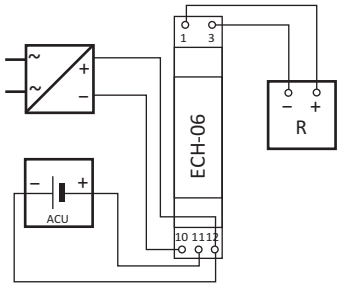
supply	15÷30V DC
current	<10mA
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

ECH-06 RESERVE DC POWER MODULE (with battery charger 1.3 ÷ 7.2 Ah)

FUNCTIONING

Power module and charging battery of ECH allows you to implement flexible power scheme to ensure continuity of the device after the main power failure. With the external acid battery (gel) of a nominal voltage 12V is battery reserve system.
The module performs the continuous surveillance of the battery and recharges it automatically when the presence of the main supply voltage. In the case of main power failure or a decline in its value below the battery voltage of the receiver is powered from the battery.



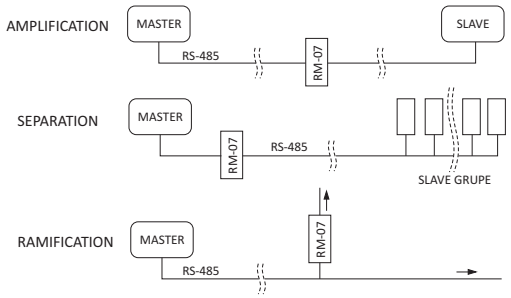


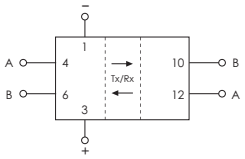
supply / charging Uin	15÷30V DC
out voltage Uout	9÷30V DC
	(Uin-0,5V DC / Uacu-0,5V DC)
current load out Uout	<3A
supported battery capacity	1,3÷7,2Ah
max. battery voltage	13,8V DC
charging current	<0,5 A
power consumption	< 1W
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

RM-07 RS-485 ISOLATED REPEATER / AMPLYFIER

PURPOSE

Device allow to extend the range of RS-485 bus and to connect more devices to the one line. Furthermore RM-07 allows to create separated branch which can be used when RS-485 star topology network is needed. Due to fact that device is using optical separation it can be used to protect sensitive and expensive devices against electrostatic discharges.



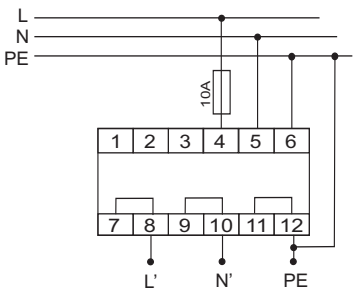


supply	9÷30V DC
baudrate	1200÷115200bps
current consumption	<25mA
galvanic separation	1kV
working temperature	-25÷50°C
terminal	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

OP-230 OVERVOLTAGE PROTECTOR type 3 (early D-class) with a triple interference filter

PURPOSE

Protection of electronic devices, i.e. computers, PLCs, microprocessor systems, etc. against electromagnetic disturbance and overvoltage in the electrical system.



standard no.	IEC 61643-1:2001
protection class	III
rated voltage	230V AC
rated current	10A
max. stable working voltage	255V
overvoltage protection level L⟶N measured	<1kV
operating time	<25ns
additional protection	10A gL/gG lub C10A
inductans	1mH/track
leakage current	0.5mA
capacitance L⟶N	880nF
capacitance L(N)⟶PE	2.2nF
electromagnetic interference damping capacity	>85dB
terminal	2,5mm² screw terminals
working temperature	-25÷50°C
dimensions	3 modules (52,5mm)
weight	170g
mounting	on rail TH-35
protection level	IP20

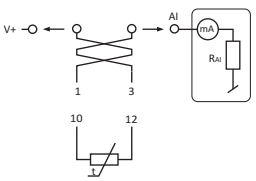
29. SIGNAL TRANSDUCERS

ANALOG TRANSDUCERS

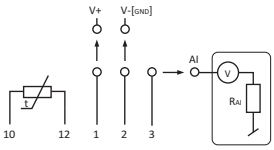
The analog transducers dedicated for measuring physical values with an external or internal sensor and converting the measured features to the standard analog current signal output 4-20mA or voltage 0 to 10V.

TEMPERATURE TRANSDUCERS

AT-1I / AT-1U — to cooperate with temperature sensor KTY



AT-1I

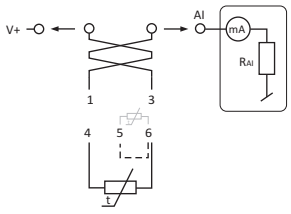


AT-1U

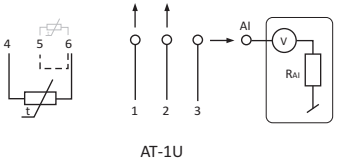
supply	9÷30V DC
measure range	-50°C÷+100°C
mistake precision	±1,5°C
output signal	4÷20mA/0÷10V
processing error	±0.5%
lenght of signal wire I / U	300m/20m
temperature probe	RT/RT2
power consumption	0,8W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
fixing	on the rail TH-35
protection level	IP20

The module works with resistance-type temperature sensor KTY81-210 (or similar).
A dedicated temperature probe of F&F production: RT probe or RT2 probe (see page 90).

AT-2I / AT-2U — with internal temperature sensor KTY



AT-1I

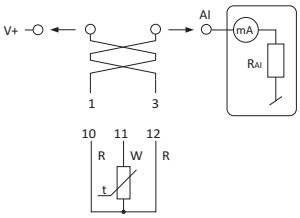


AT-1U

supply	9÷30V DC
measure range	-50°C÷100°C
mistake precision	±1,5°C
output signal I/U	4÷20mA/0÷10V
processing error	±0.5%
lenght of signal wire I/U	300m/20m
internal temperature sensor	KTY81-210
temperature probe	RT / RT2
power consumption	0,8W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	Ø55, h=13mm
fixing	to under plaster box Ø60mm
protection level	IP20

The module works in one of two options - with the internal sensor or external probe.
The module works with resistance-type temperature sensor KTY81-210 (or similar).
A dedicated temperature probe of F&F production: RT probe or RT2 probe (see page 90).

AT-3I — to cooperate with temperature sensor PT-100

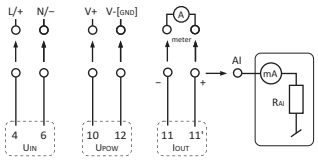


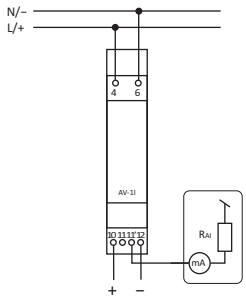
supply	9÷30V DC
measure range	-100°C÷100°C
mistake precision	±1°C
max. current load	4÷20mA
processing error	±0.5%
lenght of signaling cable	300m
temperature sensor	PT-100
working temperature	-20°C÷50°C
power consumption	0,8W
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
assembly	on the rail TH-35
protection level	IP20

The module works with resistance-type temperature sensor PT-100 (or similar).
A dedicated temperature probe of F&F production: RT-56 (see page 92).

TRANSDUCERS OF MEASUREMENT VOLTAGE

AV-1I one-phase 230V AC / 400V DC





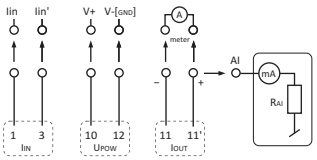
supply	9÷30V DC
measure range TrueRMS	
AC	0÷285V
DC	0÷400V
max. instantaneous voltage	320V AC / 450V DC
max. measurement mistake	±0,5V
max. current load	4÷20mA
lenght of signal cable	300m
breakdown voltage IN->OU	3kV
processing error	±0,5%
power consumption	0,8W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

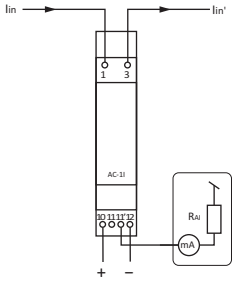
The transducer measures the rms value voltage TrueRMS, which ensures high measurement accuracy even with distorted waveforms.

CURRENT TRANSDUCER

AC-1I 5A one-phase 5A AC

AC-1I 15A one-phase 15A AC / 20A DC



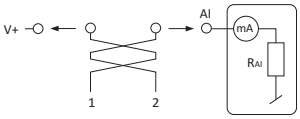


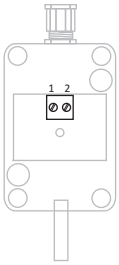
supply	9÷30V DC
range of measuer TrueRMS / max. voltage	
AC-1I 5A	0÷5A/285V
AC-1I 15A	0÷15A/285VAC
	0÷20A/400VDC
permissible overload	100A/100msec
max. measure error	±0,2A
output signal	4÷20mA
lenght of signal cable	300m
breakdown voltage IN->OUT	2,1KV
processing error	±0,5%
power consumption	0,8W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
fixing	on the rail TH-35
protection level	IP20

The transducer measures the rms current TrueRMS, which ensures high measurement accuracy even with distorted waveforms.

HUMIDITY TRANSDUCER

AH-1I hermetic IP65





supply	9÷30V DC
range of measure	0÷100%RH
accuracy (dla 25ºC)	±3,5RH
inertia	5sec
output signal	4÷20mA
lenght of signal cable	300m
breakdown voltage IN->OUT	2,1KV
processing mistake	±0,5%
power consumption	0,8W
working temperature	-40°C÷70°C
relative humidity	100%
connection	1,5mm² screw terminals
dimensions	42×98×30mm
fixing	on the rail TH-35
protection level	IP65

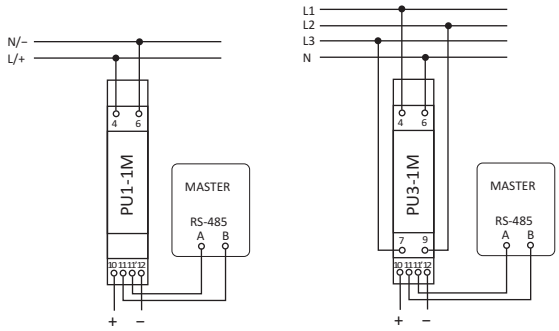
Converter mounted in the place of the measurement. The design of the converter allows for condensation of moisture on the moisture sensor and housing.

TRANSDUCERS WITH MODBUS RTU OUTPUT

Transducers for measuring physical values with an external or internal sensor with the possibility of reading data from the internal registers using Modbus RTU protocol.

TRANSDUCERS OF MEASUREMENT VOLTAGE

MB-1U-1 single-phase / MB-3U-1 three-phase

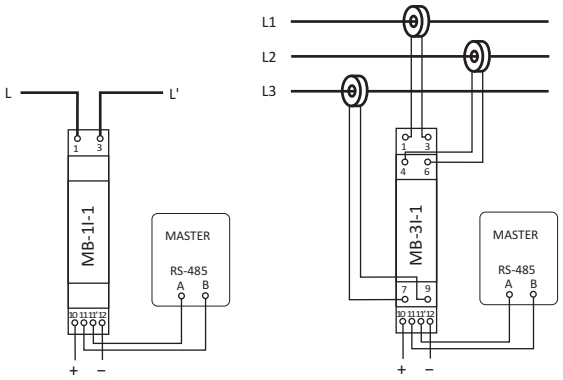


supply	9÷30V DC
max. current load	50mA
measure TrueRMS range	
AC	0÷285V
DC	0÷400V
measure error	0,5%
reading registry precision	1V
breakdown voltage IN->OUT	3kV
precision error	±0,5%
samplied frequency	10Hz
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/2
parity bits	EVEN/ODD/NONE
adress	1÷247
working temperature	-20°C÷50°C
relative humidity	85% for +30°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

The transducer measures the rms value voltage TrueRMS, which ensures high measurement accuracy even with distorted waveforms.

CURRENT TRANSDUCER

MB-1I-1 5A / MB-1I-1 15A single-phase
MB-3I-1 5A / MB-3I-1 15A three-phase



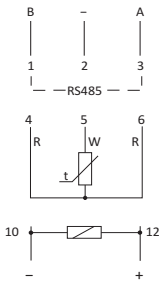
supply	9÷30V DC
max. current load	50mA
measure TrueRMS range/max. voltage	
AC-1I 5A	0÷5A/285V
AC-1I 15A	0÷15A/285VAC
	0÷20A/400VDC
precision error	±0,5%
reading registry precision	0,1A
samplied frequency	10Hz
breakdown voltage IN->OUT	2,1kV
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/2
parity bits	EVEN/ODD/NONE
adress	1÷247
working temperature	-20°C÷50°C
relative humidity	85% for +30°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

The transducer measures the rms current TrueRMS, which ensures high measurement accuracy even with distorted waveforms.

TEMPERATURE TRANSDUCERS

MB-PT-100 to cooperate with temperature sensor PT-100

Recorded values: current temperature and recorded minimum and maximum temperature. Settings of the measuring parameters of the converter: the averaging time of the temperature measurement result and temperature model correction.



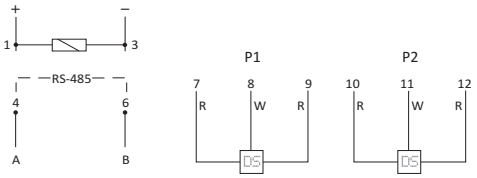
supply	9÷30V DC
measure range	-100°C÷400°C
mistake precision	±1°C
breakdown voltage IN->OUT	2,1kV
temperature sensor type	PT-100
reading registry precision	1°C
samplied frequency	10Hz
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,3W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

The module works with resistance-type temperature sensor PT-100 (or similar).
A dedicated temperature probe of F&F production: RT-56 (see page 92).

MB-DS-2 to cooperate with the DS digital temperature sensor

The converter has two independent measuring circuits. Recorded values: current temperature, maximum and minimum recorded temperatures. Measuring parameters of the converter that can be adjusted: averaging time of temperature measuring and model temperature correction.

NEW !

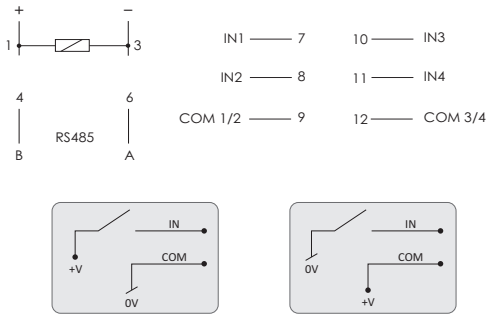


supply	9÷30V DC
max. current load	40mA
measure range	-25÷130°C
max. measure error	±1°C
temperature sensor type	DS
samplied frequency	10Hz
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,3W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

Dedicated temperature probe produced by F&F: RT4 probe (see page 92).

MB-LI-4 Lo / MB-LI-4 Hi 4-channel pulse meter

NEW !



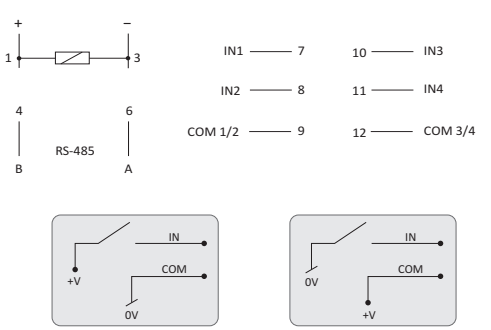
supply	9÷30V DC
number of DI inputs	4
counting input voltage	
Hi	6÷30V AC/DC
Lo	160÷265V AC/DC
counting frequency	
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,3W
working temperature	-20°C÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

FEATURES

* four independent counters
* selecting a mode of state 1 trigger: high or low voltage
* counter input designed to work with AC/DC signals
* factor adjustment (a floating-point value)
* rescaled value (number of pulses × factor)
* frequency filter that allows you to limit the maximum frequency of counted pulses (to eliminate interferences on the input of the counter)
* memory of counter status after power failure
* selecting an input pulse edge (leading or trailing)

MB-LG-4 Lo / MB-LG-4 Hi 4-channel wortime meter

NEW !



supply	9÷30V DC
number of DI inputs	4
counting input voltage	
Lo	6÷30V AC/DC
Hi	160÷265V AC/DC
min. counting time	
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,3W
working temperature	-20°C÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

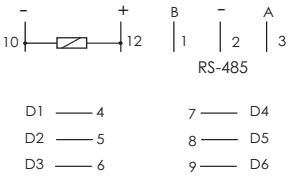
FEATURES

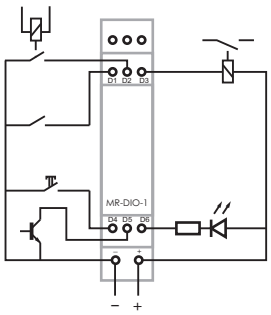
* four independent meters
* INT score values (total): seconds, minutes, hours, days (4 records per meter)
* selecting option for activation 1: with high or low voltage.
* meter input, adapted for operation with AC/DC signals
* counting with level 1 or 0
* time filter - setting the minimum time for counting signal, eliminating the counting of short signals (interferences)
* meter state memory after power failure

EXTENSION MODULES with RS-485 port and MODBUS RTU protocol

MR module is dedicated as an external I/O expansion device for PLC controllers or other devices where data exchange is via the RS-485 port in accordance with MODBUS RTU.

MR-DIO-1 DIGITAL I/O EXTENSION MODULE (DI/DO)



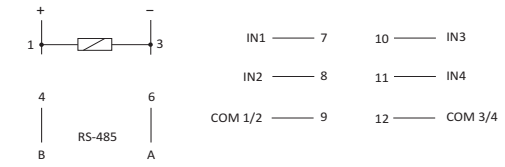


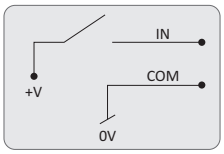
supply	9÷30V DC
max. current load	25mA
contact number DI/DO	6
voltage contact	<50V
work current contact	
constant	100mA
pulse (20%)	200mA
port	RS-485
communication protocol	Modbus RTU
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,5W
working temperature	-20÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

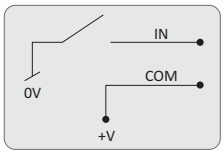
Module MR-DIO-1 has six universal contacts. Each of the contacts depending on how the connection can be a digital input or output.
The module has a recording of output function in non-volatile local memory. After each power-output module will revert to a saved state.

MR-DI-4 Lo / MR-DI-4 Hi digital inputs module (DI)

NEW !







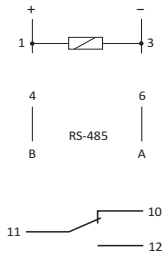
supply	9÷30V DC
number of DI inputs	4
counting input voltage	
Hi	6÷30V AC/DC
Lo	160÷265V AC/DC
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,3W
working temperature	-20°C÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

FEATURES

* selecting option for activation 1: high or low voltage
* digital input designed to work with AC/DC signals
* frequency filter that allows to limit the maximum frequency of counted pulses (elimination of distortions at the input)

MR-RO-1 relay outputs module (RO), 1P contact

NEW !

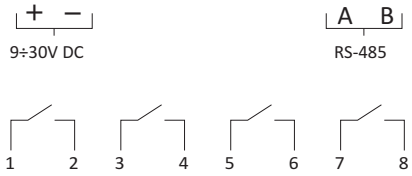


supply	9÷30V DC
contact	separated 1P
current load	16A AC-1
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	0,4W
working temperature	-20°C÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

The module with state memory, which means that contact automatically returns to the position from before the power shutdown. There is also an option of forced state after reboot, which means setting an appropriate contact position after re-powering.

MR-RO-4 output relay module (RO) 4×1Z contact

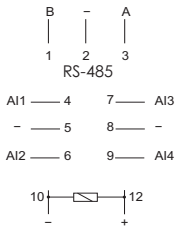
NEW !

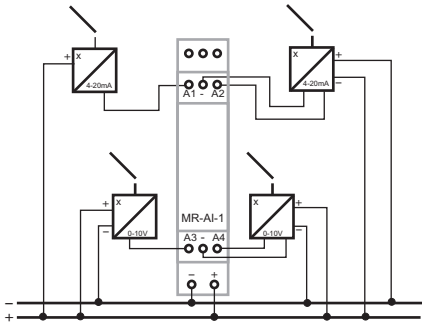


supply	9÷30V DC
contact	separated 4×1Z
current load	16A AC-1
port	RS-485
communication protocol	Modbus RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/1.5/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	1W
working temperature	-20°C÷50°C
connection	2,5mm² screw terminals
dimensions	4 modules (70mm)
mounting	on rail TH-35
protection level	IP20

The module has a memory of state feature, which means the contacts will automatically return to the position from before the power shutdown. It can also force the state after a reboot, which means it will set the respective contact position when the power is back on.

MR-AI-1 analog input extension module (AI)

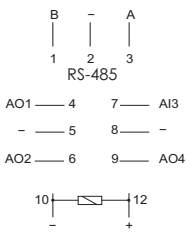


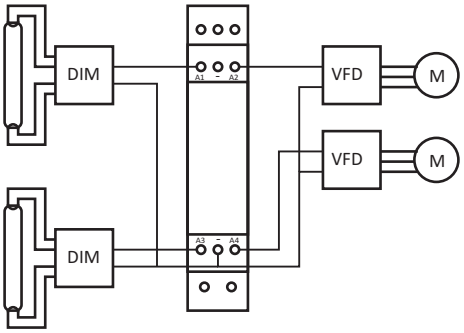


supply	9÷30V DC
max. current consumption	30mA
number inputs	4
type of inputs / range	
current	0÷20mA
voltage	0÷10V
input resistance	
napięciowego	110kΩ
prądowego	47kΩ
error precision	0,5%
port	RS-485
communication protocol	MODBUS RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	
working temperature	-20°C÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

The module has 4 universal analog inputs. Input type compatible 0-10V (voltage U) or 4-20mA (current I) is determined using internal jumpers. The module measures the value of input current and voltage on all inputs regardless of the hardware configurations of input types (location of jumpers). However, they will be properly measured input values for which this entry is configured.

MR-AO-1 analog output extension module (AO)





supply	9÷30V DC
max. current consumption	40mA
number inputs	4
output signal	0÷10V
precision output signal	0,1V
output signal error	±0,02V
min. output resistance	2kΩ
short-circuit current	40mA
port	RS-485
communication protocol	MODBUS RTU
work mode	SLAVE
communication parameters	
speed - adjustable	1200÷115200bit/sec
data bits	8
stop bits	1/2
parity bits	EVEN/ODD/NONE
adress	1÷247
power consumption	
working temperature	-20°C÷50°C
connection	1,5mm² screw terminals
dimensions	1 module (18mm)
mounting	on rail TH-35
protection level	IP20

The module has 4 analog voltage outputs 0-10V. The values of the outputs volages can be set or read via RS-485, using MODBUS RTU protocol. The module has the function of recording the output voltage non-volatile memory in the local area. Each time you power up the module output value will be restored to the saved state.

30. INVERTERS & SOFTSTARTS

PURPOSE

Inverters are electronic group of frequency converters are designed for smooth speed control of asynchronous three-phase motors.

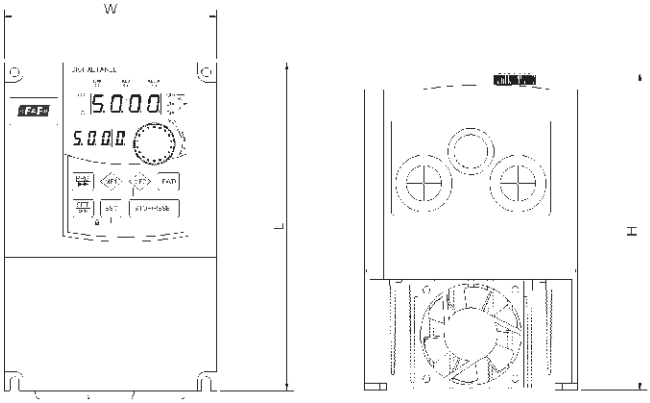
FA-1L... / FA-3H...

KEY FUNCTIONS

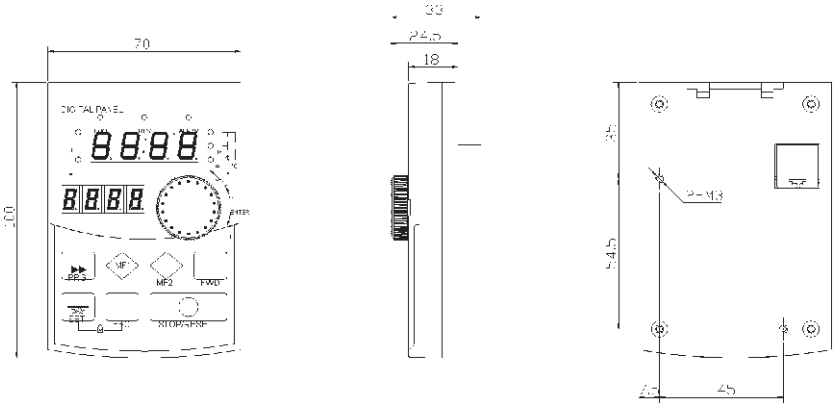
* The design of efficient inverter-based 32-bit DSP processor ensures fast and effective implementation of advanced control algorithms, asynchronous three-phase motor
* Ability to work in speed control mode or torque control mode
* Motor control based on vector control (both sensorless and with speed-feedback loop), and control based on the freely programmable V / F.
* Automatic slip compensation, and a large starting torque (up to 180% at a frequency of 0.25Hz).
* Multi-function control panel connected to the inverter on a "hot-plug" with the possibility of simultaneous storage of up to four sets of parameter settings and feature an easy transfer settings from one inverter to another
* Mode PLC - programmable up to seven steps performed once or periodically by the inverter. For each step, you can determine the speed, acceleration and duration.
* Large programming freedom inverter inputs and outputs, both analog and digital.
* Built-in RS-485 Modbus RTU protocol support allows plugging the inverter to fieldbus and remote control, monitoring and configuration of the inverter

TYPES

Inverter type	Input voltage V	Input current A	Output voltage V	Output current A	Max. motor power kW	Lenght L mm	Width W mm	Height H mm
FA-1L007	1×230V	9A	3×230V	4A	0.75kW	185	120	168.5
FA-1L015	1×230V	17.5A	3×230V	7A	1.5kW	185	120	168.5
FA-1L022	1×230V	24A	3×230V	10A	2.2kW	220	150	185.5
FA-1L040	1×230V	36A	3×230V	16A	4.0kW	220	150	185.5
FA-3H007	3×400V	3.3A	3×400V	2.5A	0.75kW	185	120	168.5
FA-3H015	3×400V	5A	3×400V	3.7A	1.5kW	185	120	168.5
FA-3H022	3×400V	7A	3×400V	5A	2.2kW	185	120	168.5
FA-3H040	3×400V	11A	3×400V	8.5A	4.0kW	220	150	185.5
FA-3H055	3×400V	16.5A	3×400V	13A	5.5kW	220	150	185.5
FA-3H075	3×400V	20A	3×400V	16A	7.5kW	285	180	200
FA-3H110	3×400V	28A	3×400V	25A	11kW	285	180	200

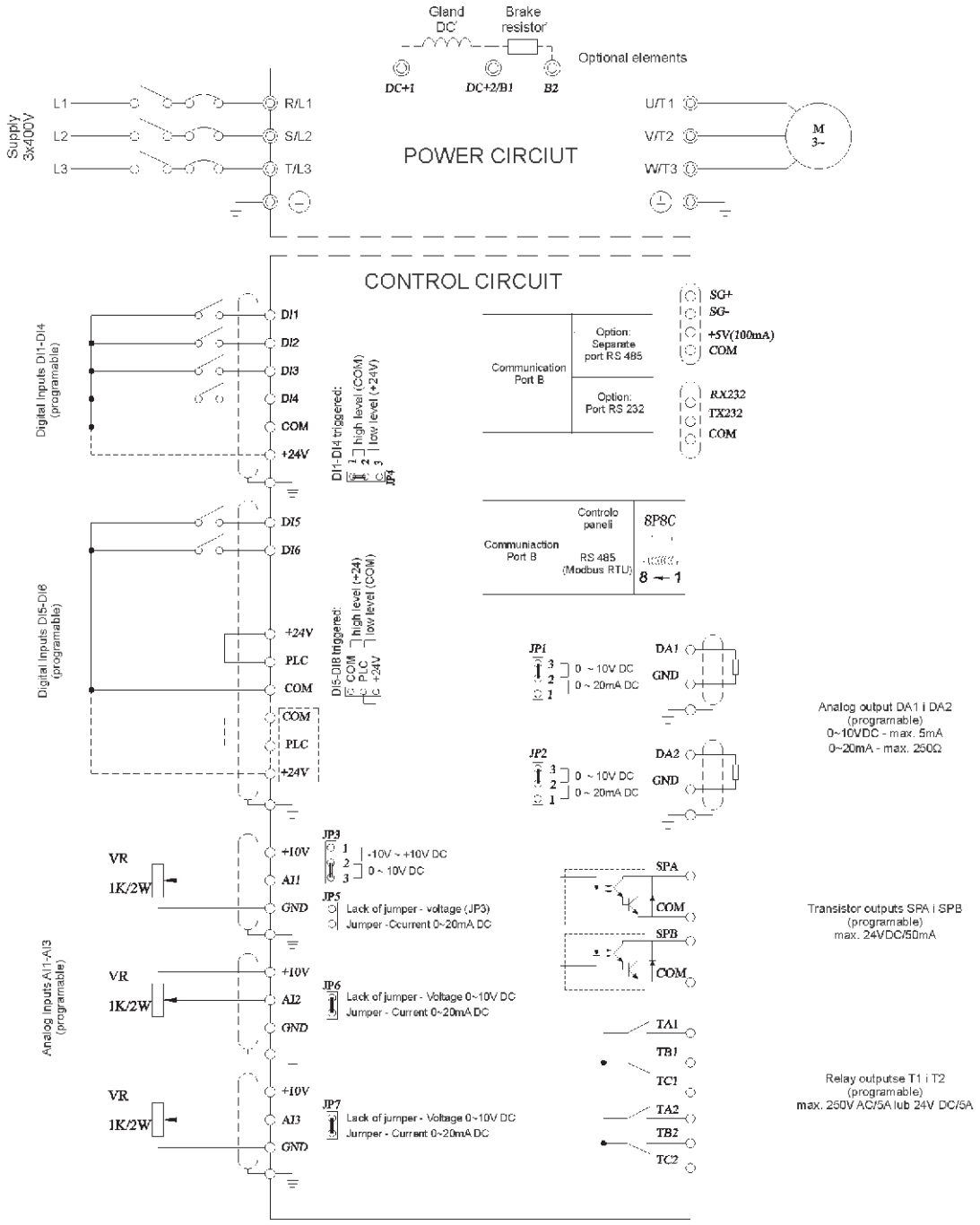


CONTROL PANEL



Control panel is detachable from the main body of the inverter. This allows for external mounting on the cabinet door for quick access to settings and adjust the parameters of the inverter.

INPUTS/OUTPUTS DESCRIPTION



SPECIFICATIONS

Items		Specifications		
Supply	Supply and frequency	1× 230V 3× 380 V ÷ 415 V (±15%), 50/60 Hz (±5%)		
	Output voltage	3× 230 V (to supply 230 V) 3× 380 ÷ 400 V (to supply 400 V)		
	Output frequency	0.00÷320.0 Hz		
	Control Characteristics V/F	1) Constant torque characteristics 2) Characteristics of the reduced torque (3 types) 3) Characteristics of the torque set by the user (8 points) 4) Vector control (sensorless or closed-loop)		
		Control V/F	Sensorless vector control	Vector control with feedback
	Starting torque	18.0% for 0.50 Hz	18.0% for 0.50 Hz	18.0% for 0.50 Hz
	The dynamics of speed control	1: 100	1: 200	1: 2000
	The stability of the output speed	±0.5%	±0.2%	±0.02%
	Torque boost	In this mode V/F control - automatic or user definied		
	Acceleration / deceleration	Linear or by programmed curve S Maximum acceleration and braking - 3200S		
	Frequency / Accuracy	Digital frequency reference: 0.01 Hz (f≤100Hz), 0.1 Hz (>100 Hz); Analog frequency reference 1% of maximum frequency		
	Overload	1) 150% the rated current for 1 minute 2) 200% rated current for 0.1 sec		
	Motor slip compensation	In this mode V/F control can automatically compensate for the slip		
Security	Security of inverter	1) Before too high or too low supply voltage 2) Prior to exceeding the maximum current 3) Before the load is too high 4) Before losing speed and stall 5) Within the current to ground 6) Prior to excessive overheating inverter 7) In addition, the inverter is protected against communication errors or incorrect feedback signal		
	Safety switch	Can be programmed as input or button on the safety switch causing immediate image voltage of the inverter output		
	Security settings	Possibility to secure the set the inverter to use a PIN		
	Deleting mistakes	You can set both automatic and manual reset errors		
Braking	DC braking and using an external braking resistor			
IO	6 digital inputs	1) Trigger inputs for both low level (COM) and high (+24V) 2) A large freedom of programming functions - it is possilble to assign to the terminals 68 different functions. Among other things, running back and forth, trying to run back and forth, safety switch, reset, multi-speed control, motor potentiometer, change of acceleration and deceleration, pulse input and more.		
	3 analog inputs	1) They can workboth as input voltage (0÷10 V) and input current 0÷20mA (software, you can set the range of 4÷20 mA) 2) The analog inputs can be used to ask frequency and time, and to cooperate with PID controller		
	2 analog outputs	1) They can workboth as a voltage output (0÷10 V) and output current 0÷20mA 2) Analog outputs can be programmed to indicate: a. Set point and actual frequency b. Voltage and output current c. DC voltage on the track d. Temperatures IGBT power amplifier e. Power output f. Engine speeds g. Torque drive		
	2 transistor outputs	1) Fast pulse outputs (max. frequency 50 kH) Possible signalling: a. desired frequency b. Actual frequency c. The current values d. Output Voltages e. DC voltage on the track f. Temperatures power amplifier g. Output power 2) Overload of transistor - max. 20 mA/27V		

	Two relays outputs	1) Overload of joint 5 A/250 V AC or 5A/ 30 V DC 2) Extensive programming output function (signalling 34 different states of the inverter)
Communica-tion	Bulit-in RS-485 communication port running Modbus RTU standard (constant speed of 19 200 bps). Optional with additional interface RS-485	
Control panel	Multi-function operator panel: 1) Connected to the inverter via a standard RJ45 socket (according to EIA T568A standard) - easy to connect the inverter such as outside the control cabinet 2) Two displays and eight LEDs provide simultaneous transmission of multiple diagnostic information, and facilitate the programming of the inverter 3) Built-in potentiometer for min. easily change the speed of the motor 4) The standard buttons for start, stop and change the direction of motor rotation. 5) Two freely programmable buttons MF1 and MF2 which can be assigned to one of 18 functions. 6) Extended error diagnostics - with information about the type of error, the time of its occurrence and the inverter parameters when an error occurs 7) Can be stored in the operator panel set four sets of inverters with the ability to easily transfer settings from one inverter to another.	
Speed control	1) Wide range speed refernce, including taking into account different combinations of digital inputs, analog inputs, potentiometer and buttons on the control panel, pulse inputs and motor potentiometer 2) Multi-speed - the possibility of 16 different speed and eight times the acceleration/deceleration 3) PLC mode - can define a sequence of seven steps that will be performed by the inverter. For each step, you can determine the motor speed, acceleration/deceleration and duration step. You can also specify whether the sequence is executed only once, or will be repeated in a loop.	
PID	Bulit-in PID increases the ability of the drive to match process requirements. Both the reference and the feedback signal may be placed in one of the following sources: 1) control panel (buttons or potentiometer 2) RS-485 interface 3) analog inputs 4) digital inputs 5) input pulse	
Motor	1) Ability to define parameters for two independent motors 2) The motor parameters defined by the user: a. frequency b. voltage and rated current c. number of poles d. rated speed 3) Three methods for identification of motor parameters: a. based on the parameters entered by the user b. measurement of the rotor motor is stopped c. measurement engine with rotating rotor	
Environmental conditions	Working temperature	-10°C ÷ 50°C. If the temperature exceeds 40°C, the maximum output current is reduced by 1% with each additional °C
	Storage	-40°C ÷ 70°C.
	Humidity	5 ÷ 95%, without moisture condensation
	Height	0 ÷ 2000 m
	Assembly	Installation in a vertical position inside the cabinet with good ventilation to the mounting plate made of non-combustible material. Mounting must also protect the inverter from direct sunlight, dust moisture and corrosive or explosive gases.
	Assembly	Cooling by natural and forced air.

FA-1L...P

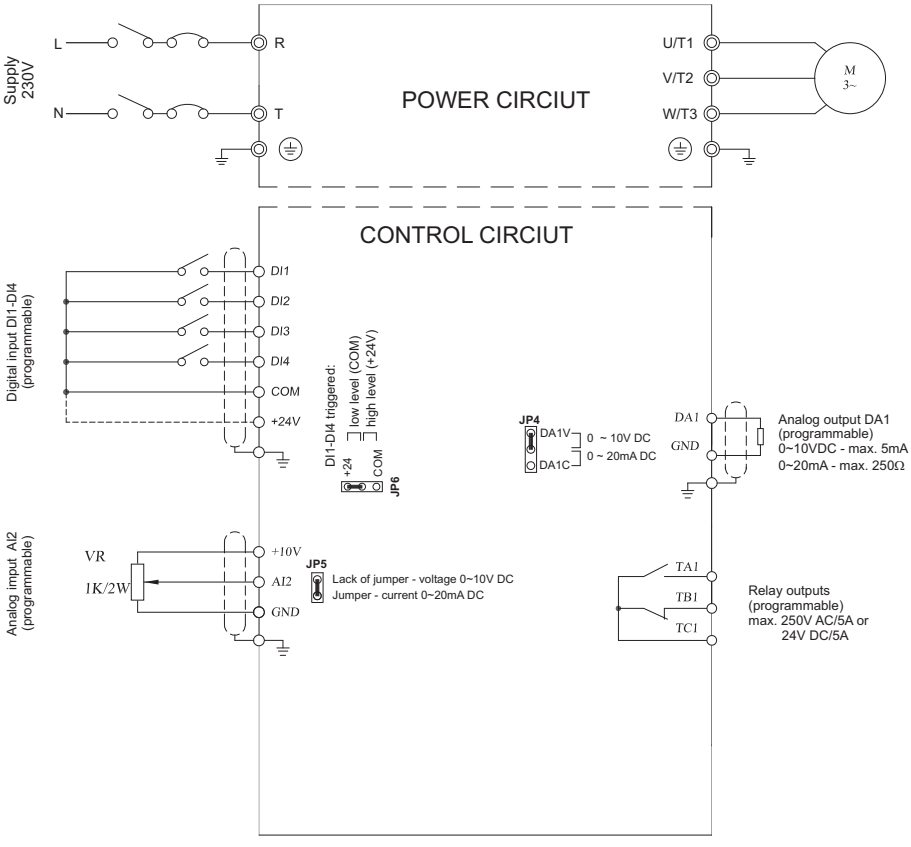
NEW !

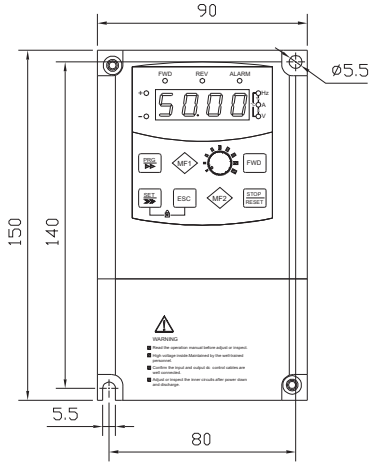
KEY FUNCTIONS

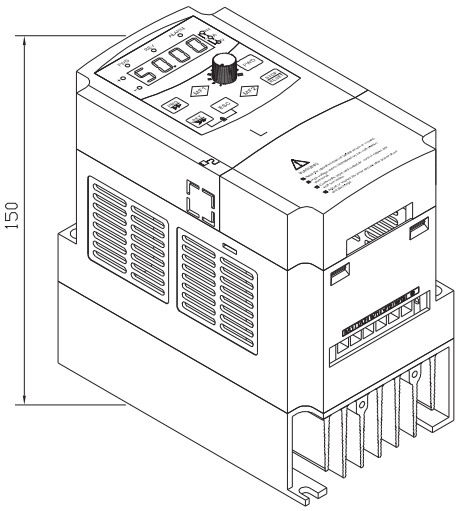
* The design of efficient inverter-based 32-bit DSP processor ensures fast and effective implementation of advanced control algorithms, asynchronous three-phase motor
* Ability to work in speed control mode or torque control mode
* Motor control based on vector control (both sensorless and with speed-feedback loop), and control based on the freely programmable V / F.
* Automatic slip compensation, and a large starting torque (up to 180% at a frequency of 0.25Hz).
* Multi-function control panel
* Mode PLC - programmable up to seven steps performed once or periodically by the inverter. For each step, you can determine the speed, acceleration and duration.
* Large programming freedom inverter inputs and outputs, both analog and digital.

TYPES

Type	Input voltage V	Input current A	Output voltage V	Output current A	Max. motor power kW
FA-1L007P	1×230V	9A	3×230V	4A	0.75kW
FA-1L015P	1×230V	17.5A	3×230V	7A	1.5kW







SPECIFICATIONS

Items		Specifications	
Supply	Supply and frequency	1×230V, 50/60 Hz	
	Output voltage	3×230V (to supply 230V)	
	Output frequency	0.00÷32.0 Hz	
	Control Characteristics V/F	1) Constant torque characteristics 2) Characteristics of the reduced torque (3 types) 3) Characteristics of the torque set by the user (8 points) 4) Vector control (sensorless or closed-loop)	
		Control V/F	Sensorless vector control
	Starting torque	18.0% for 0.50 Hz	18.0% for 0.50 Hz
	The dynamics of speed control	1: 100	1: 200
	The stability of the output speed	±0.5%	±0.2%
	Torque boost	In this mode V/F control - automatic or user definied	
	Acceleration / deceleration	Linear or by programmed curve S Maximum acceleration and braking - 3200S	
	Frequency / Accuracy	Digital frequency reference: 0.01 Hz (f≤100Hz), 0.1 Hz (>100 Hz); Analog frequency reference 1% of maximum frequency	
	Overload	1) 150% the rated current for 1 minute 2) 200% rated current for 0.1 sec	
	Motor slip compensation	In this mode V/F control can automatically compensate for the slip	
Security	Security of inverter	1) Before too high or too low supply voltage 2) Prior to exceeding the maximum current 3) Before the load is too high 4) Before losing speed and stall 5) Within the current to ground 6) Prior to excessive overheating inverter 7) In addition, the inverter is protected against communication errors or incorrect feedback signal	
	Safety switch	Can be programmed as input or button on the safety switch causing immediate image voltage of the inverter output	
	Security settings	Possibility to secure the set the inverter to use a PIN	
	Deleting mistakes	You can set both automatic and manual reset errors	
Braking	DC braking		
IO	4 digital inputs	1) Trigger inputs for both low level (COM) and high (+24V) 2) A large freedom of programming functions - it is possilble to assign to the terminals 68 different functions. Among other things, running back and forth, trying to run back and forth, safety switch, reset, multi-speed control, motor potentiometer, change of acceleration and deceleration, pulse input and more.	
	1 analog inputs	1) They can workboth as input voltage (0÷10 V) and input current 0÷20mA (software, you can set the range of 4÷20 mA) 2) The analog inputs can be used to ask frequency and time, and to cooperate with PID controller	
	1 analog outputs	1) They can workboth as a voltage output (0÷10 V) and output current 0÷20mA 2) Analog outputs can be programmed to indicate: a. Set point and actual frequency b. Voltage and output current c. DC voltage and output current d. Temperatures IGBT power amplifier e. Power output f. Engine speeds g. Torque drive	
	2 relay outputs	1) Overload of joint 5 A/250 V AC or 5 A/30 V DC 2) Extensive programming output function (signalling 34 different states of the inverter)	

FA-3X...

NEW !

KEY FUNCTIONS

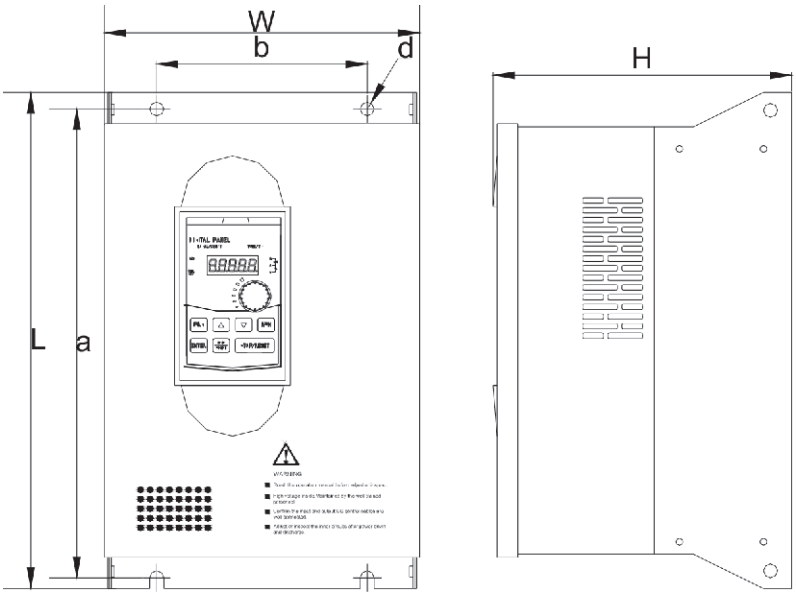
* The design of the inverter is based on a powerful 32-bit DSP processor for fast and effective implementation of advanced control algorithms for asynchronous three-phase motor.
* Option to work in speed control mode or driving torque control mode.
* Motor control based on the sensorless vector control and control by freely programmable V/F characteristic.
* Automatic slip compensation and a large starting driving torque (even up to 180% at a frequency of 0.5 Hz).
* PLC mode – option to program up to sixteen steps carried out once or periodically by the inverter.

For each of the steps, you can determine the speed, acceleration time and duration.

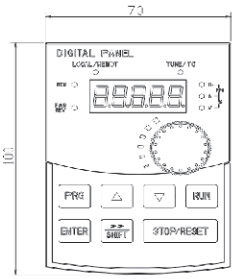
* High programming freedom for inverter inputs and outputs, both analog and digital.

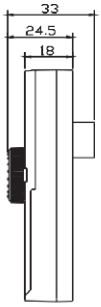
TYPES

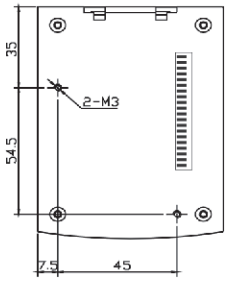
Inverter type	Input voltage	Input current	Output voltage	Output current	Max. motor power	Length	Width	Heigth
	V	A	V	A	kW	mm	mm	mm
FA-3X110	3×400V	26A	3×400V	25A	11kW	360	220	210
FA-3X150	3×400V	35A	3×400V	32A	15kW	360	220	210
FA-3X220	3×400V	47A	3×400V	45A	22kW	435	225	242



CONTROL PANEL

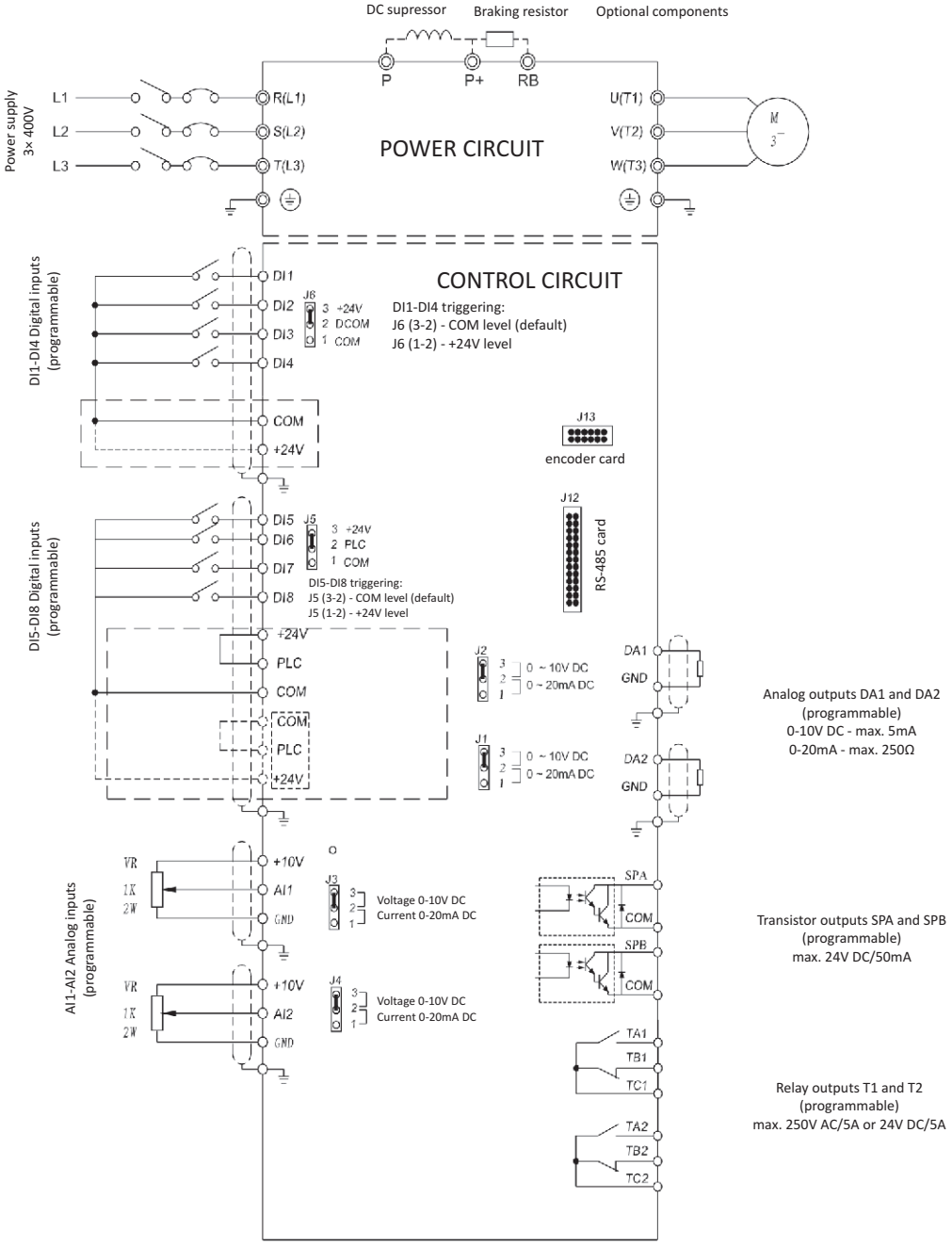






Control panel is detachable from the main body of the inverter. This allows for external mounting on the cabinet door for quick access to settings and adjust the parameters of the inverter.

INPUTS/OUTPUTS DESCRIPTION



SPECIFICATIONS

Items		Specifications
Power supply	Voltage and frequency	3× 380~415V (±10%), 50/60Hz (±5%)
	Output voltage	3× 380~400V (for 400V power supply)
	Output frequency	0.00 - 3200 Hz (U/f control) 0.00 - 300 Hz (vector control)
	V/F control characteristic	1) Constant torque characteristics 2) Reduced torque characteristics 3) Torque characteristics set by the user 4) Vector control (sensor and sensorless)
	Starting torque	180% for 0.50 Hz
	Speed control dynamics	1: 100
	Output speed stability	±0.5%
	Torque boost	In V/F control mode – automatic or defined by the user
	Acceleration/deceleration	Linear characteristic or in accordance to program curve S. Maximum acceleration and deceleration: 6500 s.
	Frequency accuracy	Digital frequency reference: 0.01Hz (f≤100Hz), 0.1Hz (>100Hz); Analog frequency reference: 1% of maximum frequency
	Overload	1) 150% of rating current for 1 minute 2) 200% of rating current for 0.1 s
	Motor slip compensation	In V/F control mode, motor slip can be compensated automatically
Protection	Inverter protection	1) Against too high and too low power voltage 2) Against exceeding the maximum current 3) Against too high load 4) Against the loss of speed and motor stall 5) Against current outflow to ground 6) Against inverter overheating 7) Inverter is additionally protected against communication errors and incorrect feedback signal
	Safety switch	Input or button can be programmed as a safety switch that will immediately cut off the voltage from the outputs of the inverter
	Settings protection	Inverter settings can be protected with PIN number
	Error clearing	Errors can be cleared both manually and automatically
Braking	Deceleration using DC and the external braking resistor	
IO	8 digital inputs	1) Inputs activation with both low (COM) and high level (+24 V) 2) High programming freedom of various functions: forward and backward gear, trial forward and backward gear, safety switch, reset, multi-speed control, motopotentiometer, acceleration and deceleration time change, pulse input and other
	3 analog inputs	1) They can work both as voltage inputs (0÷10 V) and current inputs (0÷20 mA) (4÷20 mA range can also be programmed) 2) Analog inputs can be used for, among other things, frequency and torque setting and working with PID regulator.
	2 analog outputs	1) They can work both as voltage inputs (0÷10 V) and current inputs (0÷20 mA) 2) Analog outputs can be programmed to indicate: a. preset and current frequency b. output voltage c. voltage on DC bus d. temperature of IGBT terminal power e. output power f. motor rotational speed g. torque

	Two transistor outputs	1) Fast pulse outputs (max frequency: 100 kH). Indications: a. preset frequency b. current frequency c. electric current value d. output voltage e. voltage on DC bus f. temperature of terminal power g. output power h. motor rotational speed i. torque 2) Transistor load – max 20 mA/27 V
	One relay output	1) Contact load 5 A/250 V AC or 5 A/30 V DC 2) High freedom of output functions programming (indication of 34 different inverter states)
Speed adjustment	1) Wide range of speed settings, including combinations of digital inputs, analog inputs, potentiometer and keys on control panel, pulse inputs and motopotentiometer 2) Multi-speed – user can set 16 different speeds and eight times of acceleration/deceleration 3) PLC mode – user can define sequences of up to eight steps that will be automatically executed by the inverter. For each step user can define motor speed, acceleration/deceleration time and the duration of the step, as well as whether the sequence is to be executed once or in a loop.	
PID	Built-in PID regulator increases the ability to match the drive operation to the requirements of the technological process. Preset value and feedback signal can be entered from one of the following sources: 1) Control panel (keys or potentiometer) 2) Analog input 3) Digital input 4) Pulse input	
Environmental conditions	Working temperature	-10°C ÷ 40°C. If the temperature exceeds 40°C, then maximum output current is reduced by 1% with each additional °C
	Storage	-20÷165°C
	Humidity	Below 90%, without condensation
	Height	0÷1000 m
	Installation	Installation in a vertical position inside the control cabinet with good ventilation and on the mounting plate made of non-combustible material. Mounting method must also protect the inverter from direct sunlight, dust, humidity and corrosive or explosive gases.
	Installation	Cooling by natural and forced air flow

SOFT STARTERS

PURPOSE

SF soft starters are used for performing a safe boot of three-phase asynchronous squirrel-cage motors. The use of soft starter allows to eliminate a star-delta systems, while drastically reducing the peak current during start-up that occurs when booting even heavily-loaded motors (e.g. mills and crushers).

SF-...

THE MOST IMPORTANT FEATURES

* full three-phase control
* six types of boot characteristics
* control of torque, current and power - both during start-up and operation
* electronic protection against motor overload
* motor protection against underload
* overvoltage and undervoltage protection
* control panel with keypad and LED display
* analog output of current control
* programmable relay outputs
* memory of errors
* ability to automatically restart the engine

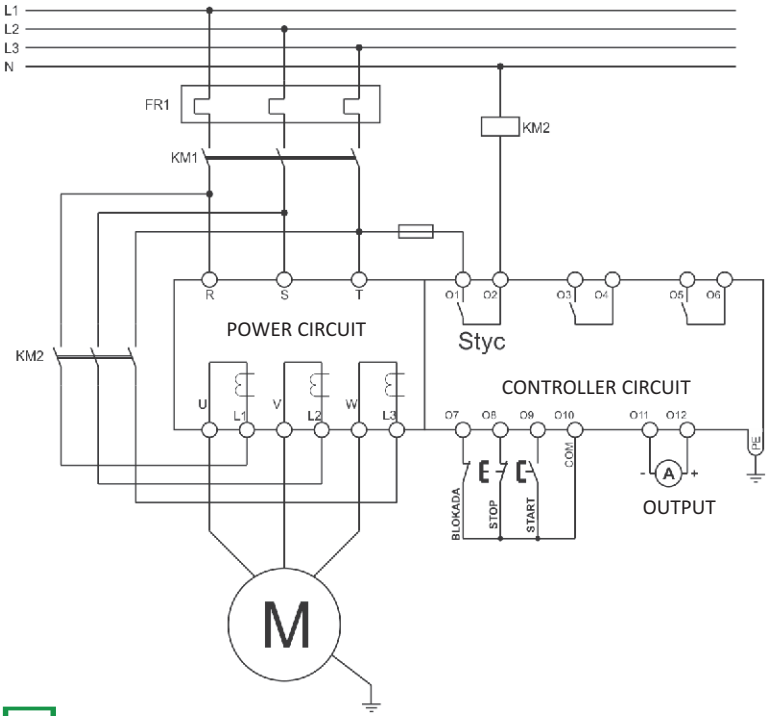
NEW !

OPERATION

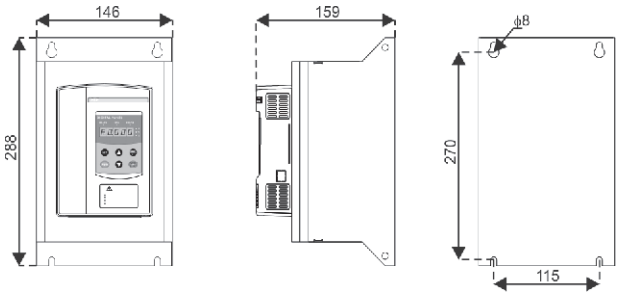
Start-up of the motor is performed on all three phases of the power supply, which prevents asymmetry in network load and uneven load of motor windings. Advanced protection features implemented in the soft starter protect the motor during start-up, operation and deceleration.

TYPES

Type	Input voltage V	Output current A	Maximum motor power kW
SF-110	3× 400V	22A	11kW
SF-150	3× 400V	30A	15kW
SF-180	3× 400V	37A	18kW
SF-220	3× 400V	44A	22kW
SF-300	3× 400V	60A	30kW
SF-370	3× 400V	74A	37kW
SF-450	3× 400V	90A	45kW
SF-550	3× 400V	110A	55kW



Control panel is detachable from the main body of the inverter.
This allows for external mounting on switchgear door for quick access to settings and parameters of the soft starter.



SPECIFICATION

Power supply	Three-phase, 3× 400V (±15%), frequency 50 Hz	
Motor	Three-phase, asynchronous motor (windings 400V)	
Motor control	Start-up and deceleration – control of all three output phases Operation - external bypass contactor required	
Start-up	1) With the maximum current limitation. 2) Linear increase in voltage. 3) Rapid start and then with maximum current limitation. 4) Rapid start and then with a linear increase in voltage. 5) Linear increase in current. 6) Dual control of voltage and current.	
Deceleration	1) Soft braking 2) Braking with freewheel	
Protection	1) Temperature protection of soft starter 2) Loss of phase voltage 3) Thermal protection of motor 4) Overvoltage and undervoltage 5) Short-circuit protection 6) Against too low load	
Additional features	1) Automatic motor start-up 2) Automatic restart in case of an error 3) Multiple automatic start-up	
Inputs	Control without potentiometer in relation to COM level 1) Start 2) Stop 3) Lock	
Relay outputs	1) Bypass contactor power supply 2) Error indication 3) Programmable – available functions: - operational readiness - motor start - bypass contractor activation - deceleration - motor stop - error – drive lock - operation - operational readiness - motor start-up - bypass contractor activation	
Analog output	The current signal (0-20 mA) proportional to the value of the motor current.	
Control panel	1) four-digit LCD display and LED indicators for: - soft starter programming - status signaling - showing the current, power and motor overload - showing error messages 2) Keyboard to control and configure the soft starter 3) Option to lock or restrict the change of settings	
Working conditions	Operating environment	- Free from dirt and dust (especially conductive) - Ensure proper ventilation of the device - Protected against unauthorized access
	Temperature	-25… +40˚C
	Humidity	Below 90% (without condensation)
	Vibrations	Below 0.5G
	Operating height	Below 3000 m above sea level

31. TELEMETRY AND GSM REMOTE CONTROL

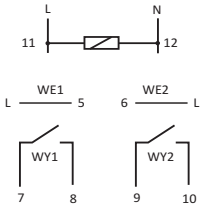
GSM REMOTE CONTROL RELAYS

PLC MAX

SIMply MAX P01 ON / OFF / INFORM

PURPOSE

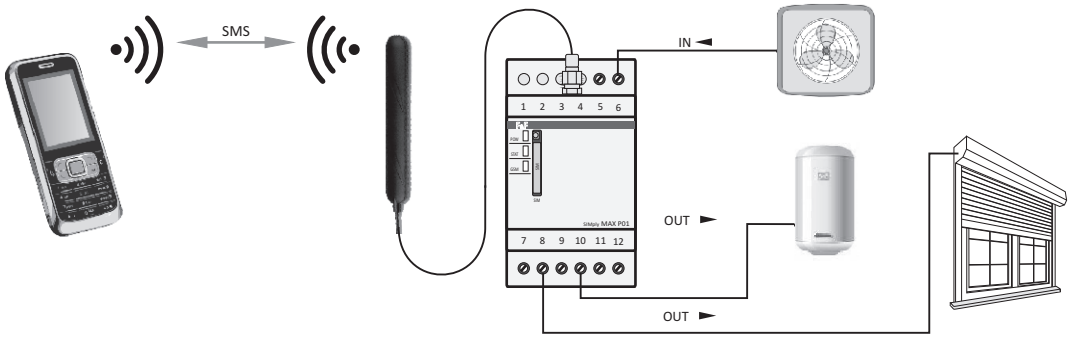
P01 relay with built-in GSM communicator is used to remote control using a mobile phone. Enables you to easily manage and control the state of the outputs of devices connected to the controller inputs.



supply	230V AC
inputs	
number	2
voltage tolerance	160÷260V AC
relay outputs	
number	2
type	1NO
nominal voltage	230V AC
current load	<8A
ports	SIM
power consumption	
standby mode	1,3W
with GSM comunnication	<3W
working temperature	-10÷50°C
connection	2,5mm² screw terminals
dimensions	3 modules (52mm)
fixing	on the rail TH-35
GSM antenna connector SMA	dim.20x100m
lenght	2,5m
protection level	IP20

FUNCTIONING

The relay operates in the mobile communications network GSM 900/1800 any local GSM operator (no simlock). To be able to make calls and perform the desired function must have a valid SIM card. The relay has two relay outputs which are implemented by functions start and stop controlled receivers and two high voltage inputs, which are implemented through notification of activation functions controlled devices. Commands and notification specified SMS texts exchanged between the controller and user phone.



FEATURES

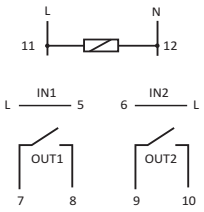
* Switching the outputs on and off. Example: WY1ON - switching output 1 on; WY2OFF - switching output 2 off.
* Temporary output switching. Example: WY1ON S 30 – temporary switching output 1 for 30 seconds (Interval 1 ÷ 300 sec); WY1ON M 10 – temporary switching output 1 for 10 min (Interval 1 ÷ 600 min)
* SMS notifications on the user's phone about input activation. Example: WE1 ON – high state (1) at input 1; WE2 OFF - low state (0) at input 2.
* Query about input or output state. Example: WE1? – query about input 1 state -> answer: WE1 ON/WE1 OFF; WY1? - query about output 1 state -> answer: WY1 ON/WY1 OFF.
* Access password (4 to 8 digits). When working with a password, command must be preceded by a password, for example: 1234 WY1ON. Configuration via SMS commands: PASSWORD ON – activation of password feature; PASSWORD OFF – deactivation of password feature; PASSWORD ON xxxxxxxx - password change, for example: PASSWORD ON 12345678
* Inputs configuration: set the phone number for the text message and the condition the message is to be sent:
  WE1! +48123456789 ON - notification for a set number about high state at the input 1.
  WE1! +48123456789 OFF - notification for a set number about low state at the input 1.
  WE1! +48123456789 NF - notification for a set number about low and high state at the input 1.
* Queries about the status of the inputs and outputs. Example: WE1? - query about the status of input 1 -> answer: WE1 ON/OFF; WY1? – query about the state of output 1 -> answer: WY1 ON/WY1 OFF
* Automatic answer (as an option). ODP word after major commands, for example: WY2ON ODP. Reply: OK.
* Automatic restore of outputs state after re-powering (memory of the outputs state).
  Option to configure with MEMORY ON command. MEMORY OFF command deactivates this option.

SIMply MAX P02 WITH CLIP FUNCTION

NO-COST GSM CONTROL GATE, WICKET, BARRIER

PURPOSE

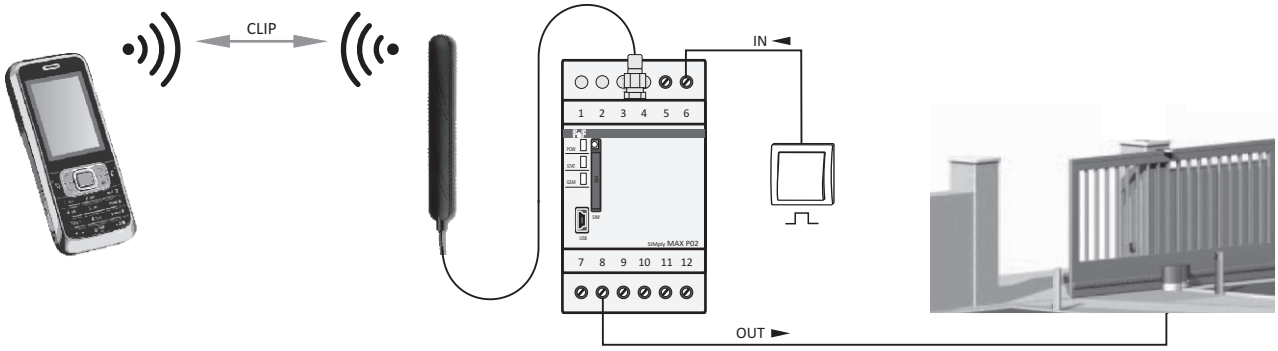
MAX P02 relay with built-in GSM communicator is used to remotely open the automatic gates, garage doors, barriers and gates with your mobile phone. It is used for objects with protected access and a large number of users with permission to enter, such as housing, garages, car parks and public company, etc. It eliminates the traditional control of the radio transmitters and the cost associated with the purchase of a large number of users.



supply	230V AC
inputs	
number	2
voltage tolerance	160÷260V AC
relay outputs	
number	2
type	1NO
nominal voltage	230V AC
current load	<8A
ports	SIM
power consumption	
standby mode	1,3W
with GSM comunnication	<3W
working temperature	-10÷50°C
connection	2,5mm² screw terminals
dimensions	3 modules (52mm)
fixing	on the rail TH-35
GSM antenna connector SMA	dim. 20x100m
lenght	2,5m
protection level	IP20

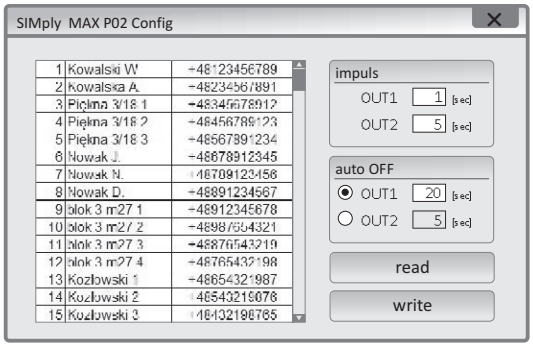
FUNCTIONING

The relay operates in the mobile communications network GSM 900/1800 any local GSM operator (no simlock). To be able to make calls and perform the desired function must have a valid SIM card. The relay has two control pins, which are actuated by the driver pulse gate or lock the gate. Both outputs are run in parallel, but with any fixed contact closure times (pulse). Self control is done no cost. The user initiates a connection to the number of standard controller. The controller automatically identifies the number and refuses to connect at the same time activating the output (dialup CLIP function). In addition, it is possible to drive the output using the control buttons are connected to the inputs of the relay. The relay has a working range of options: manual or automatic closing. In automatic mode, the relay output is activated by the user activates itself again after a certain time in order to close the gate.
The phone numbers of users and pulse times and automatic shutdown are determined by the configuration program on your PC. The connection to the relay via USB cable.



FUNCTIONS

* Costless control for users (dialup function CLIP)
* Two parallel relay outputs
* Ability to set different output activation time for each output separately (eg. simultaneous control gate and gate)
* Two pulse inputs allowing for manual activation outputs connected via external buttons
* Auto shutdown after a certain time
* User authentication 500 numbers
* PC configuration program



Configuration program

COSTS

Given the current rate of GSM operators for pre-paid tariff type of SIM cards cost of the controller can reach up to 5EUR per year.

PROGRAMMABLE CONTROLLERS WITH GSM COMMUNICATOR

PLC MAX

PURPOSE

PLC MAX is one of the few controllers to enable the connection and use the elements without programming. Through CONFIGURATOR can use it, anyone who does not want to learn languages and complicated procedures PLC programming.

FUNCTIONING

The task notification alert you to implement one of the six members whose phones number are stored in the relevant sections of the configuration menus, when there is a logical tripped on one of the inputs. The analog input is a fixed threshold value is exceeded for a given input. Notification shall be implemented as a text message. The job output control allows you to:
- Remotely control the digital output driver by commands sent as plain text SMS;
- To perform a simple controller based on the physical value of any of the analog input and digital output.

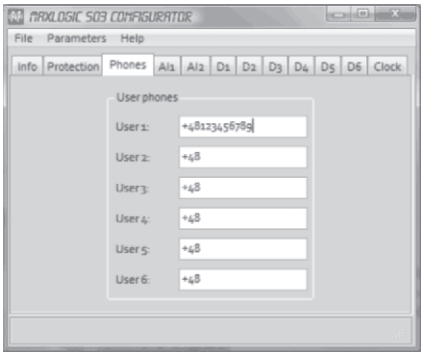
Automatic control of one of the digital outputs in the ordinary course of physical values of the control lies in the fact that the measured value exceeds the threshold set for the digital output is switched active.

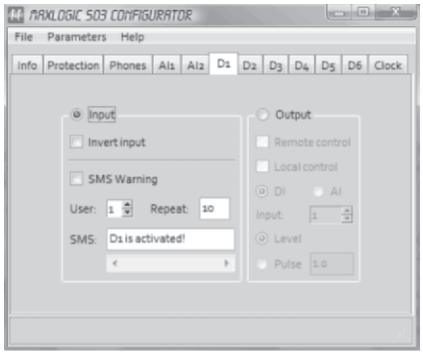
Controllers with SMS functions

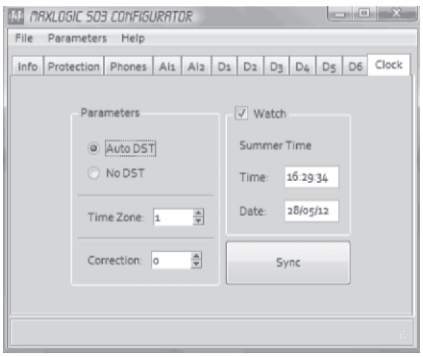
FUNCTIONS

* Record numbers of users that will be implemented notification and remote control
* Authorization of phone numbers of incoming calls
* Setting password. Password precedes the content of SMS commands
* Output control by SMS commands
* Ask about the status of inputs and outputs SMS commands
* SMS messages to the mobile user for actuation of digital inputs
* SMS messages to the mobile user to the pre-determined threshold on the analog input
* The definition of the content of the SMS message output (up to 160 characters)
* Optional set number of minutes, after which the SMS message will be repeated in the case of the continuous maintenance of the entrance
* Control output depending on the assigned input: LEVEL option - mapping of (EC 1 -> O 1, EC 0 -> O 0); PULSE - time, output set time after activation of the input.
* Function digital controller based on the definitions of scale analog input, and assigned him to the threshold of the output
* Scaling the actual values measured by the analog input range
* Setting the PIN code for the SIM card (if required)
* Selecting signal (high state 1 or low state 0) at the input trigger an SMS message
* DST (Daylight Saving Time) - synchronize the system time of the controller with a time of a connected computer, set the time zone and daylight saving time automatic summer-winter

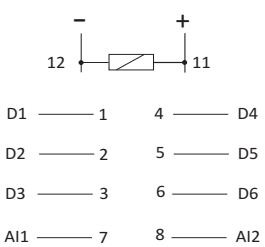
PC Configurator





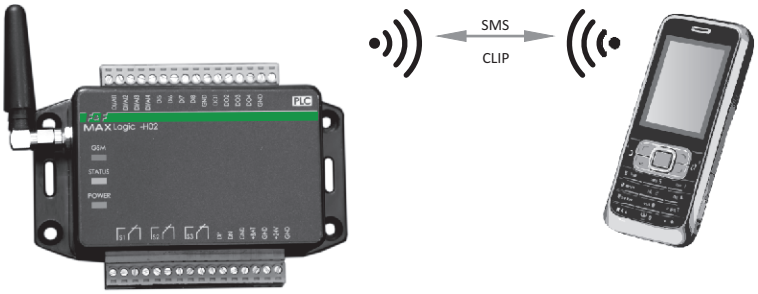


MAX S03



supply	9÷30V DC
IN/OUT digital DIO (30V; 0,2A)	6
analog inputs 0/4÷20mA / 10 bitów	2
working temperature	-20÷50°C
power consumption	8W
connections	1,5mm² screw terminals
dimensions	3 modules (52mm)
fixing	on the rail TH-35
protection level	IP20

MAX H02

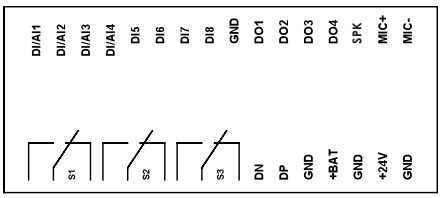


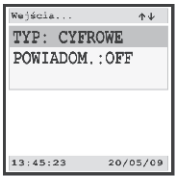
MAX H02 / MAX H04

program system cycle	10msec
supply	9÷30V DC
digital inputs	4 (30V; 0,2A)
analog/digital inputs	4 (0/4÷20mA/0÷10V)
digital outputs	4 (50V; 0,2A)
relay outputs N/C	3×[<5A]
ports	SD, microUSB, SIM, RS485
communication port	MODBUS RTU
register internal memory	1,3MB
working temperature	-10÷50°C
power consumption	<7W
connection	1,5mm² screw terminals
dimensions	110×79×40mm
fixing	to the base or on the rail TH-35
protection level	IP20

MAX H04 with HMI (LCD + buttons) + grafic MENU

MAX H02 / MAX H04



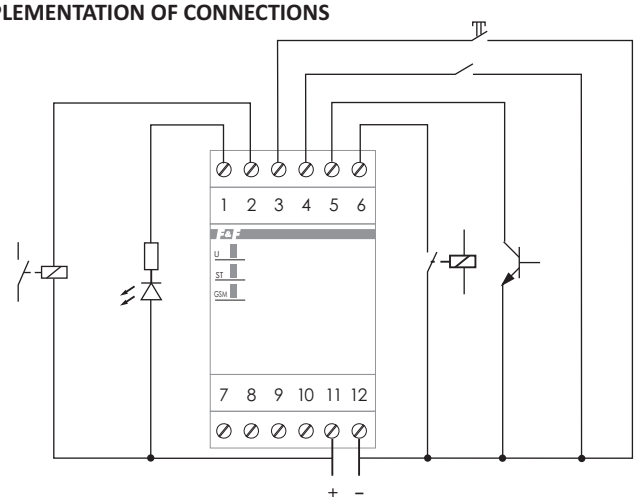


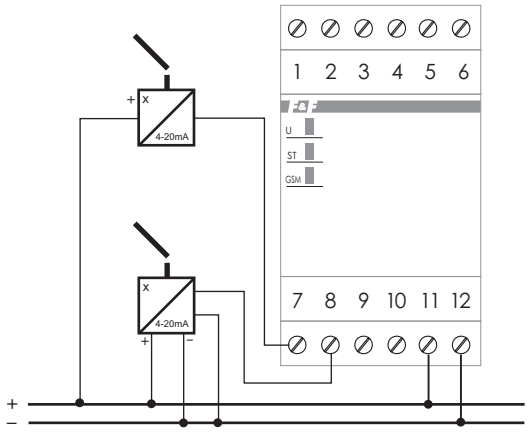
CONFIGURATION MENU
GUI menu allows to configure controller functions, set inputs type and define functions of outputs. Additionally controller allows to enter phone number of SMS notification receivers, set up access lock and configure parameters of specific tasks.

IVR - VOICE MENU (playing sound files of type. wav)
Allows to remote control using voice connation with DTMF functions. (Sellection is available by pressing buttons on user phone).

DATALOGGER
The built-in datalogger controller algorithm works independently of the controller and the whole set through the configuration menu. Datalogger allows you to save your data in one of 3 modes:
- interval - the data are equally reading fixed intervals;
- event - the data are recorded only when the existence of any change in the logical inputs / outputs
- user - data are recorded in accordance with the format specified in the application's language ForthLogic
During the registration data are stored in internal memory or on SD card (selection on the menu configuration).
The data is stored as text:
13:04:39|19/03|18.4 13.8|353 0000 0000 0000 | 01010100|0100|110

IMPLEMENTATION OF CONNECTIONS



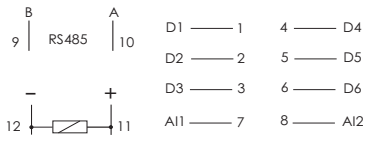


DIGITAL INPUTS AND OUTPUTS
Wiring diagram depending on the selected function digital D.Digital outputs (DO): D1 digital D2.Digital inputs (DI): D3, D4, D5, D6. The tripping logic of digital input is closed the circuit between this input and ground (GND) [boolean 1].

ANALOG INPUTS
A schematic diagram of connecting analog sensors of different types.

REMOTE READING TECHNOLOGIES, OF REGISTRATION, MONITORING AND CONTROL

based on the work of the PLC MAX S04 with the GPRS communication function



FUNCTION

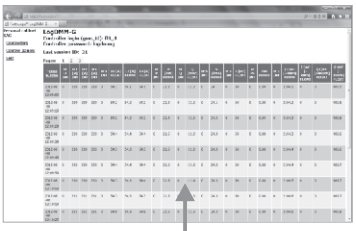
data packet transmission GPRS
integer math operations
floating-point math operations
bit logical operations
register data formatting
input and output SMS
definition of the content of SMS messages
Modbus RTU master

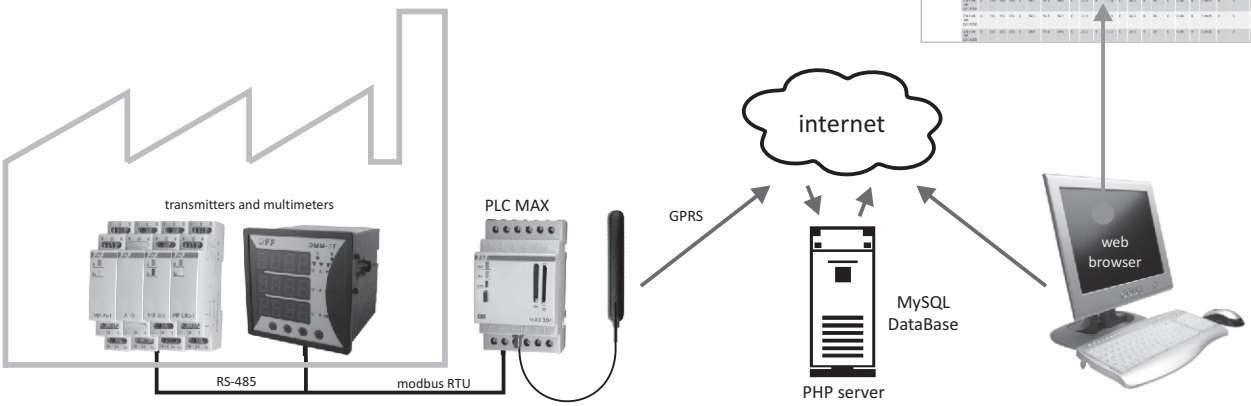
Technical data -> see page 127

DataBase [MySQL]

PURPOSE

DataBase technology allows obtain data process of controller and storage them in the universal database format for the MySQL.



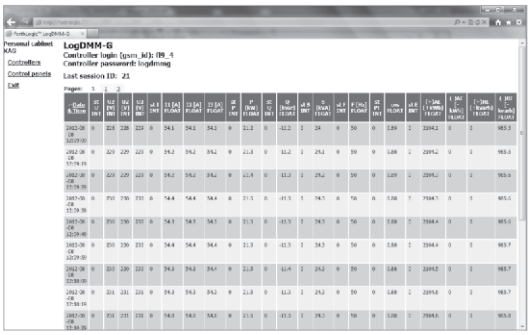


FUNCTIONING

Controller cyclical records variable data process and stores them in the internal memory. Recording from the internal memory is periodically sent to the MySQL database installed on a special base server. User access to data in a table is available through any web browser, or you can directly read data from a MySQL database from other systems or programs (this requires a suitable mechanism to build the program).

Company F&F has a special set of files MAX_php_MySQL_set allow to communicate MAX controller with the built, own database. The software is free and is available for download on the website www.plcmax.pl.

The system requires a SIM card with tariff telemetry from any operator and maintain a database on your own or an external server [hosting].

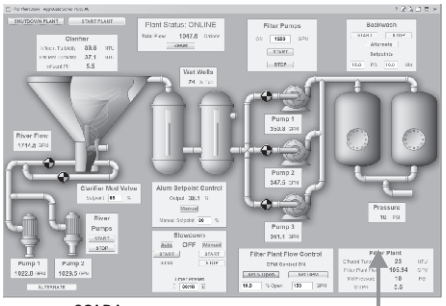


Example of data in the Internet browser

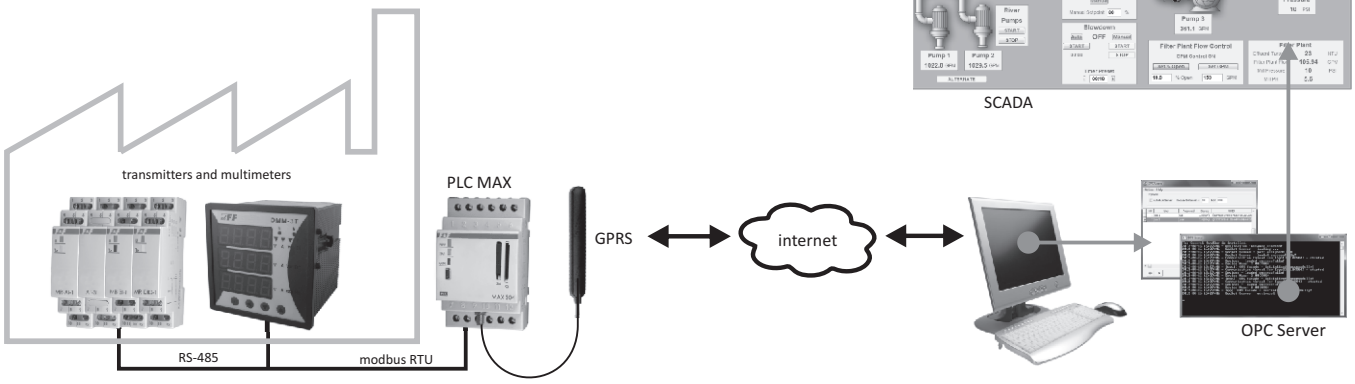
OPC Server

PURPOSE

Technology OPC Server is a software tool for the PC, allowing the controller to obtain process data and make them available for other programs, data logging, visualization and monitoring of work conditions and controlled automation system (SCADA). OPC Server for S04 MAX controller allows you to communicated with him and exchange data with other universal applications running on the PC.



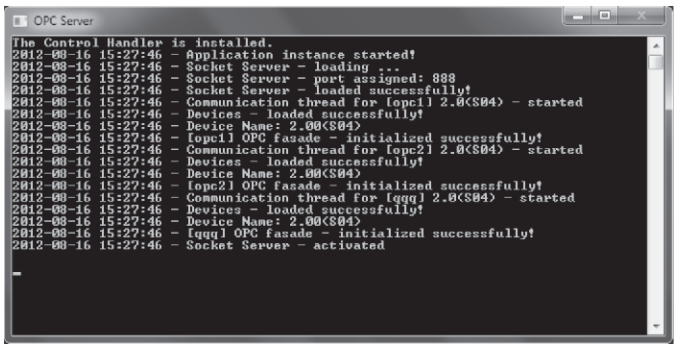
SCADA



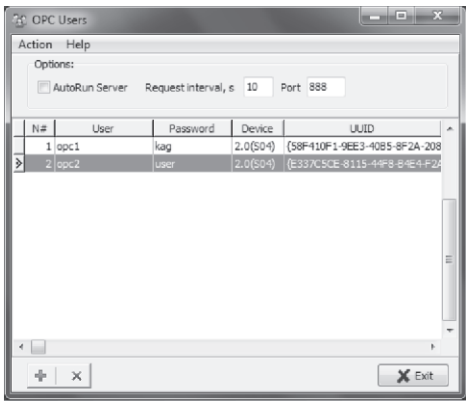
FUNCTIONING

OPC Server of F&F is compliant with the OPC / DA v1 and v2. The computer on which the software is installed must have access to the Internet. A computer or router that is the connection must be assigned a static IP address. The controller connects to the OPC Server for GPRS communication channel and acts as a "client". For safety communication system for compliance is established names and passwords. These parameters and a series of questions, ie the exchange of data are set by the user via the OPC interface Users forming part of OPC development environment. One OPC server can be connected to multiple drivers, creating a multilocation, distributed monitoring and control system.
OPC Server works with 32I64 - bit operating systems Windows 2000, Windows NT, Windows XP, Windows Vista, Windows 7.

OPC Server software is free and is available for download on the website: www.plcmax.pl.
The system requires a SIM card with telemetry tariff from any operator.



Window of OPC Server



Interface OPC Users

Meternet PRO

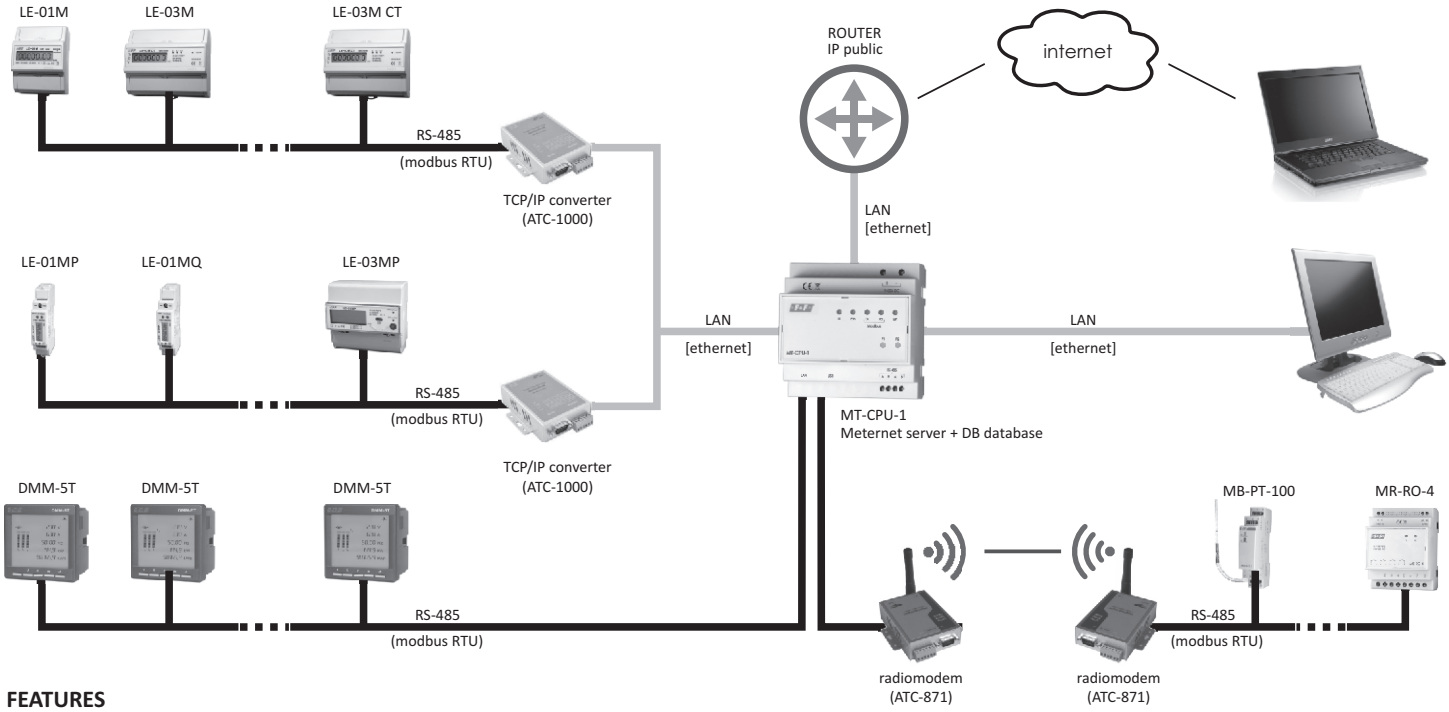
The remote reading, recording and control system.

NEW !

Meternet PRO

PURPOSE

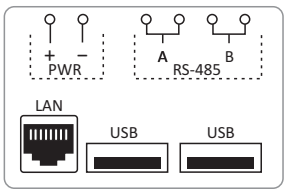
The MeternetPRO application allows remote reading of the states and the indications of meters, multimeters, measuring transducers, input/output expansion modules and other measuring devices that communicate via Modbus RTU protocol. The exchange of data between devices and the application is carried out through RS485 network or local area network (LAN). The application and its database can be installed on a PC or on a special MT-CPU-1 server running in the local network. Interface is a web application (website). User can access the application via any web browser. In case of a LAN with a public IP address, it is possible to configure the application and read data over the Internet. User can access the application through the IP address or the created domain.



FEATURES

* locally [Ethernet] and globally [Internet] remote access
* does not require installation of any software on the user's PC
* login - access control, user options: admin / guest
* status - preview panel of system productivity
* desktop- window with indicators and control panels
* dashboards - graphic indicators assigned to the recorded values (pointers, bar charts, trends)
* configuration - a simple system settings without any programming skills, the definition of the names of devices, system settings
* reports – preview of the current and archived recorded values (table of results, graphs), report filters, time ranges
* data export - direct saving to a .csv file, transfer via LAN, data import as a .csv file to your computer
* system settings - recording time (1 sec minimum), Modbus and TCP communication parameters
* "mathematics" software module - algebraic transformations of values
* "prepaid" software module - support for LE-03MP prepaid meters
* "energy" software module - subscription of electricity consumption (monthly reports)
* "camping" software module – charging the electricity consumption in the START/STOP mode

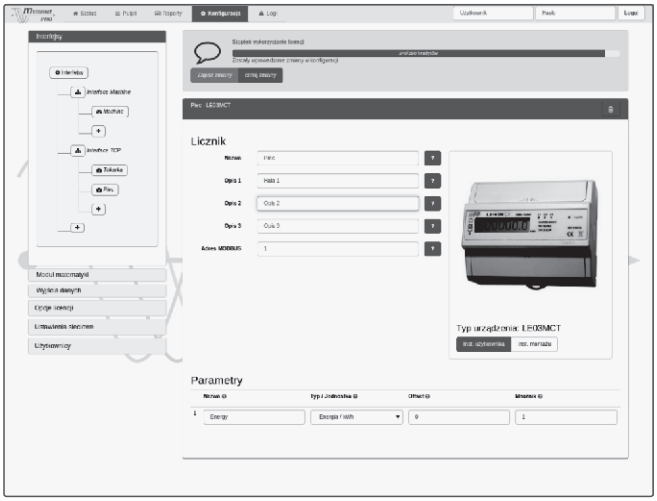
MT-CPU-1 program server + DB database

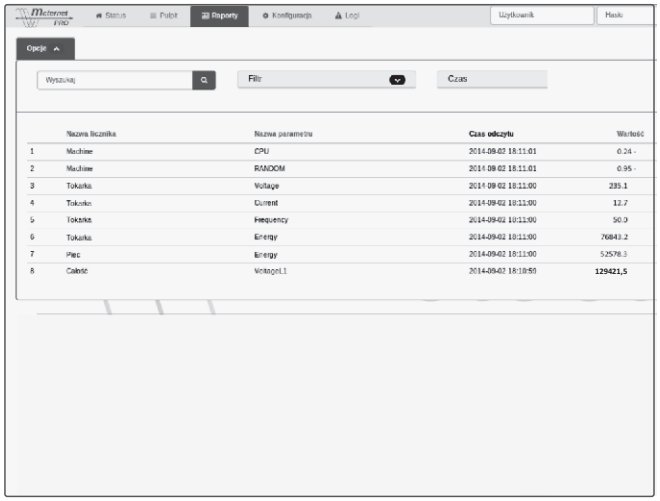


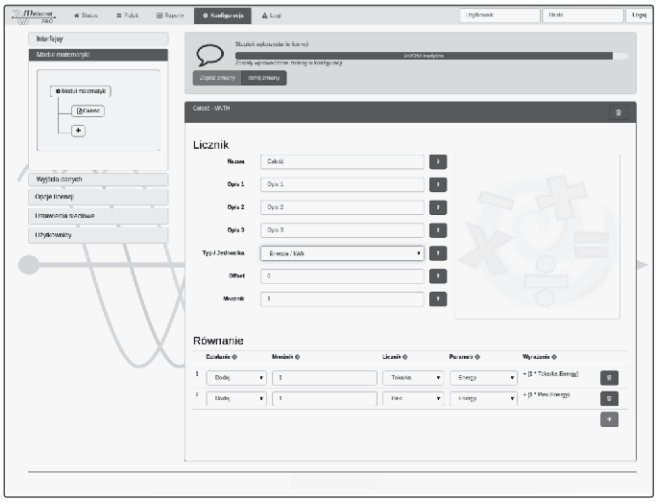
supply		9÷30V DC
ports	LAN	RJ45
	USB	2.0
	RS-485	Modbus RTU
communication parameters		
	speed - adjustable	1200÷115200 bit/sec
	data bits	8
	stop bits	1 / 1.5 / 2
	parity bits	EVEN / ODD / NONE
	address	1÷247
internal memory		5GB
RTC clock		YES
battery life		6 years*
battery type		2032 (lithium)
working temperature		-25÷50°C
signallisation work state		5×LED
terminal		1,5mm² screw terminals
dimensions		5 modules (85mm)
mounting		on rail TH-35
protection level		IP20

* battery life addicted to weather conditions and frequency of mains failure

PROGRAM INTERFACE







SYSTEM COMPONENTS

Registers of devices from outside of the F&F offer can also be read. This requires individual configuration of the application in accordance with the requirements of user.

32. PLC - PROGRAMMABLE LOGIC CONTROLLER

www.plcmax.pl

PLC MAX

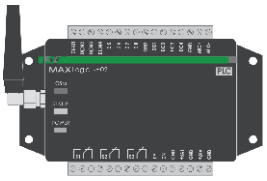
PURPOSE

PLC MAX controllers are designed to solve a wide range of tasks of management and technological processes and data exchange. It is used in home and industrial automation on low and medium level of technological advancement. Group of controllers with GSM communicator is designed for management of technological processes and data exchange via the mobile network GSM 900/1800 in SMS, GPRS mode and voice call (using a DTMF and CLIP).

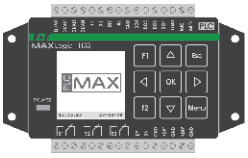
H series

PURPOSE

Are used in home automation and industrial low and medium level of technological advancement. Made in a compact case designed for mounting directly on a flat surface (wall, table) as well as switchboards (35mm rail).



H02



H03

H04

H02 with GSM communicator (SMS, CLIP)

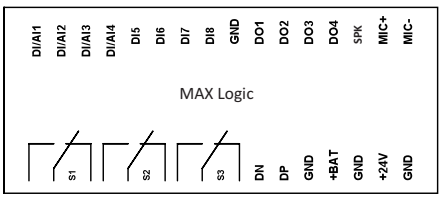
H03 with front panel (LCD display + keyboard)

H04 with GSM communicator (SMS, CLIP, IVR+DTMF), with front panel (LCD display + keyboard), GUI

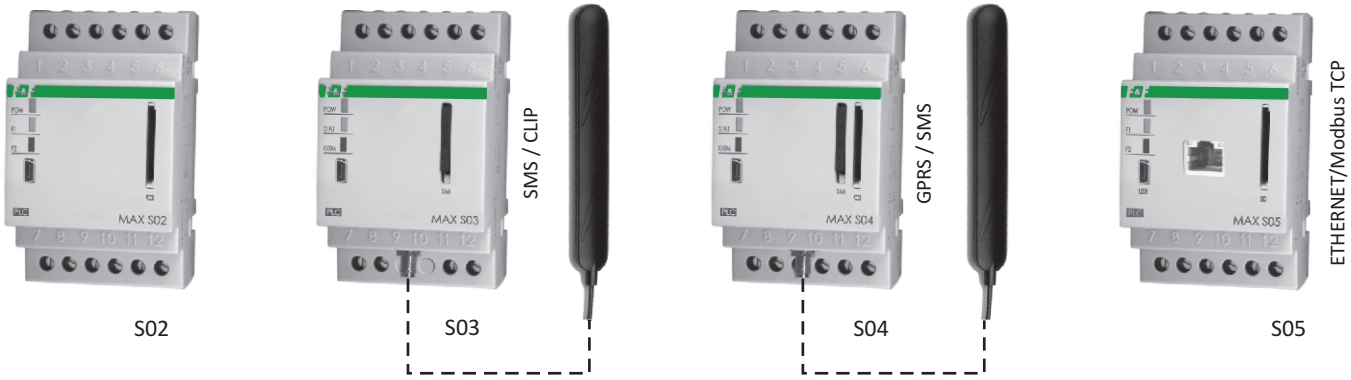
MAX Logic H02 and H04 is one of the few drivers to enable connection and use it without the elements of programming. Using menu configurator, anyone can utilize who does not want to know the language and the complicated procedures of PLC programming.

program system cycle	10msec
supply	9÷30V DC
digital inputs	4 (30V; 0,2A)
analog/digital inputs	4 (0/4÷20mA/0÷10V)
digital outputs	4 (50V; 0,2A)
relay outputs N/C	3×[<5A]
ports	SD, microUSB, SIM, RS485
communication port	MODBUS RTU
register internal memory	1,3MB
working temperature	-10÷50°C
power consumption	1W
connection	1,5mm² screw terminals
dimensions	110×79×40mm
fixing	to the base or on the rail TH-35
protection level	IP20

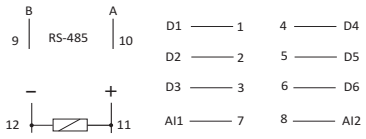
For more information on the remote control and notification of GSM (see page 118)



S series

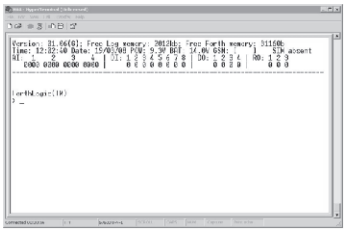


type	S02	S03	S04	S05
program system cycle	1msec			
supply	9÷30V DC			
digital input/output DIO (30V; 0,2A)	6			
analog inputs 0/4÷20mA / 10 bits	2			
SD port	yes	-	yes	yes
microUSB port	yes			
SIM port	–	yes	yes	-
RS-485 + MODBUS RTU port	yes	–	yes	yes
work mode MODBUS	Master	–	Master	Master
GSM module	–	YES	YES	-
function	–	SMS/CLIP	SMS/GPRS/CLIP	Ethernet
recorder	yes	–	yes	yes
internal memory	2 MB	-	2 MB	2 MB
RTC clock	yes			
sound signalling events	yes			
working temperature	-20÷50°C			
power consumption	0,8 W			
terminal	1,5mm² screw terminals			
dimensions	3 modules (52mm)			
mounting	on rail TH-35			
protection level	IP20	IP20	IP20	IP20



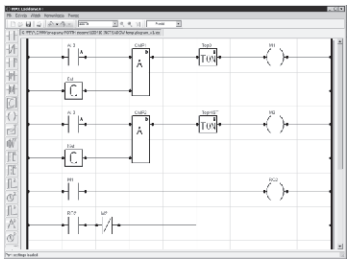
SOFTWARE TOOLS

For carrying out and interpreting program in **ForthLogic** responsible programming and hardware system called the forth-system. Computational model underlying the language ForthLogic consists of stacks, global variables, the dictionary, the input and output buffer. ForthLogic language allows to describe the processes running in parallel and operates in a multitasking environment.



HyperTerminal

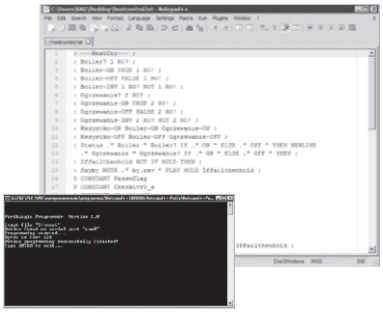
Interactive programming environment and creating applications for controllers MAX in ForthLogic consists of a text editor **Notpade++**, terminal program **PuTTY** and the program **ForthLogic Programmer** providing two-way communication between PC and controller MAX. Your environment, you can create scripts ForthLogic, program MAX controllers and communicate with the controller in terminal mode.



MAX-LadderSOFT

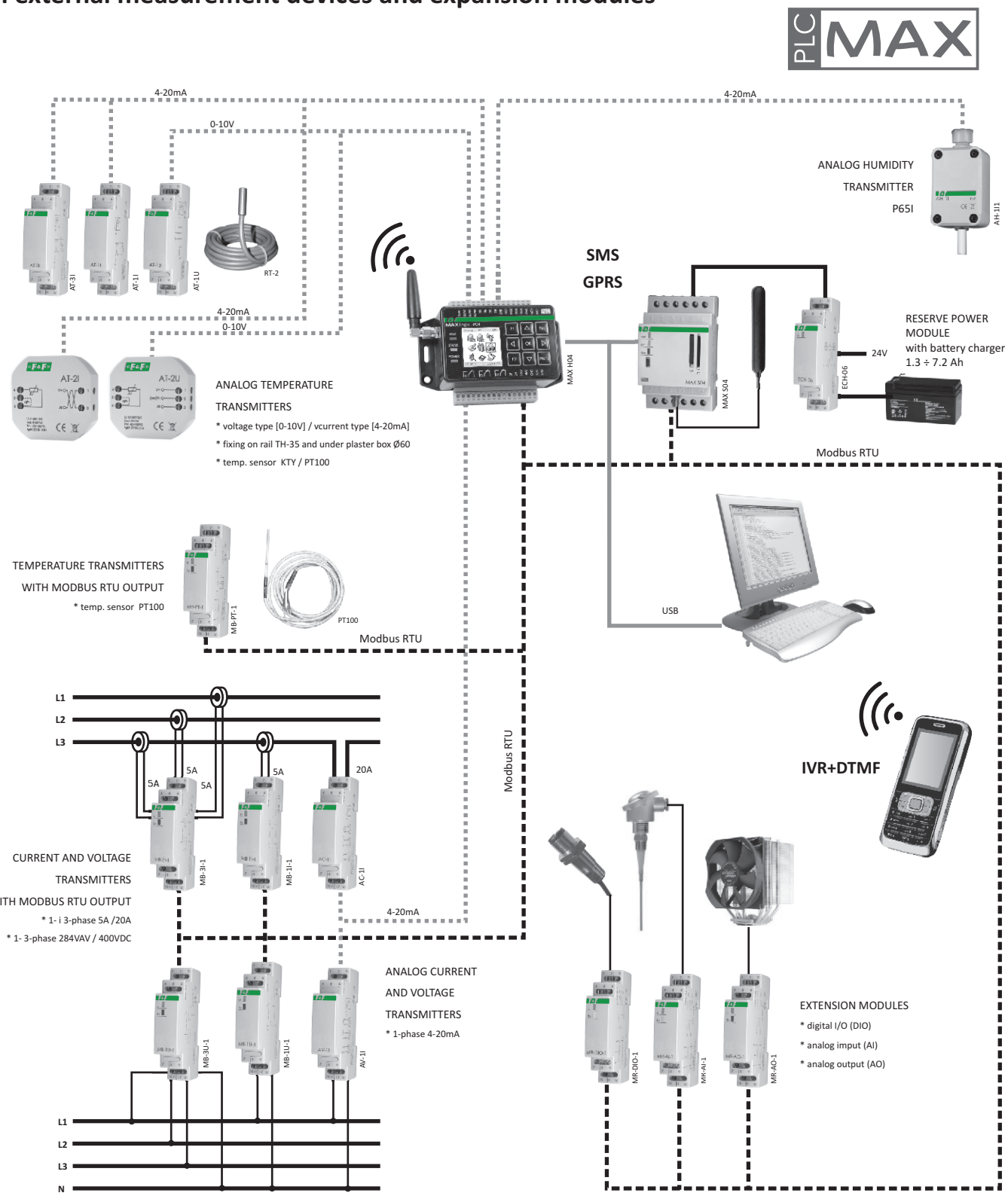
MAXLadderSOFT program provides an easy way to convert schema "relay" at programming language of controller. The program allows creating and editing applications using ladder diagram language [LAD], checking the correctness of the construction schedule, the directly communication controller with a computer, upload the application to the PLC.

Direct work with the system controller called a **box mode**. There are two types of work box: terminal and remote. **Terminal mode** is working with a program like **HIPERTERMINAL** (MAX-PC connection USB cable). Terminal Mode primarily use for learning programming, solving programming tasks or solving existing problems in the operation of the controller. **Remote mode** - only for controllers with GSM module - this controller work with the phone via SMS. In this mode the phone screen fulfills a similar function as a terminal window on your computer monitor. Remote mode is clearly to use remote control devices connected to the controller.



Notepad++ PuTTY
ForthLogic Programer

AN IDEOLOGICAL DIAGRAM OF COMMUNICATION BETWEEN PLC MAX CONTROLLERS with external measurement devices and expansion modules



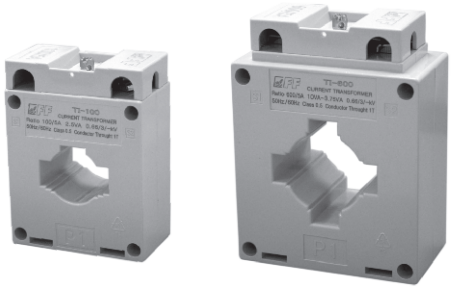
RESERVE POWER MODULE DC (see page 86)
TEMPERATURE PROBE (see page 90)
SIGNAL TRANSMITTERS (see page 100):
- analog transmiters
- transmitters with MODBUS RTU output
- extension modules
CURRENT TRANSFORMER (see page 129)

33. CURRENT TRANSFORMERS

PURPOSE

Current transformer is used for the proportional changes of large currents to lower values, adapted to ranges of control and measuring devices.

TI-100 ÷ TI-600



assembling accessories

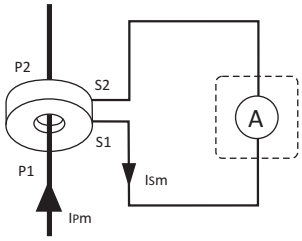
no. of norm	IEC 60044-1
nominal second current Is	5A
rated voltage	0,66kV AC
insulation breakdown voltage	3kV/1min.
frequency	50/60Hz
working temperature	-5÷40°C
fixing S1/S2	4mm² screw terminals
assembly	board / busbar
position	vertical / horizontal
protection level	IP20

FUNCTIONING

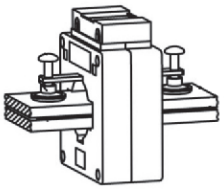
The cable with the measured current passes through the main hole of transformer (P1/P2), which is equivalent to one coil of primary winding. Terminals of secondary winding S1 and S2 are connected to the terminals of the circuit of the measuring control device or measuring.
Ratio of intensities of currents in both windings is constant and is called the current gear: IPn/ISn = N, where IPn - rated primary current; ISn - rated secondary current, N - the value of the transmission. With the current flowing through the secondary winding can be determined the value of current flowing through the primary winding: ISm * N = IPm, where the ISm - measured primary current; IPm - measured secondary current.

ATTENTION!

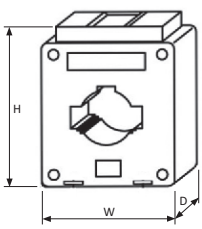
Recommended connection of the secondary system by wire with a diameter of not less than 2,5 mm ².
Recommended grounding terminal S2.
Prohibition of disconnection of the secondary system during operation of the transformer (the possibility of high voltage resulting electric shock to person or damage of equipment).



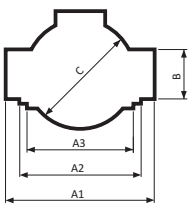
Type	Transsision Ip/Is	Class	Power [VA]	Hole dimensions P1/P2 A1/A2/A3×B; C [mm]	Dimensions W×H×D [mm]	Weight [kg]
TI-100	100/5	0,5	2,5	30/25/20×10; Ø10	61×81×34	0,235
TI-150	150/5	0,5	2,5	30/25/20×10; Ø10	61×81×34	0,235
TI-200	200/5	0,5	5,0	30/25/20×10; Ø10	61×81×34	0,235
TI-250	250/5	0,5	5,0	30/25/20×10; Ø10	61×81×34	0,235
TI-300	300/5	0,5	5,0	30/25/20×10; Ø10	61×81×34	0,235
TI-400	400/5	0,5	10,0	40/30/ - ×10; Ø30	75×99×40	0,305
TI-600	600/5	0,5	10,0	40/30/ - ×10; Ø30	75×99×40	0,305



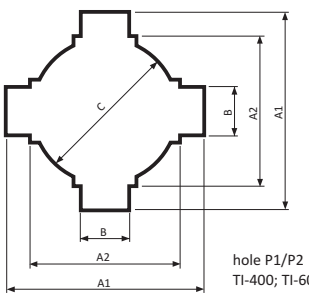
busbar assembly



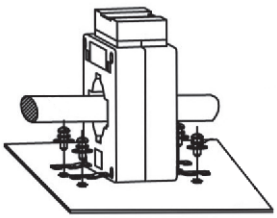
dimensions



hole P1/P2
TI-100; TI-150; TI-200; TI-250; TI-300



hole P1/P2
TI-400; TI-600



baseplate assembly

34. VIDEO INTERCOM SETS

MONITORS

MK-01

* speakerphone
* work with two cameras (gate stations)
* volume control, brightness and color
* plastic + aluminum panel
* black
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 × H160 × D18

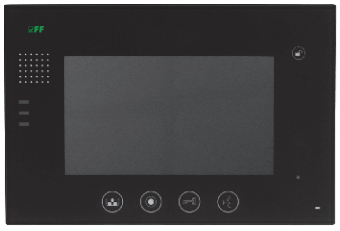
MK-02

* speakerphone
* work with two cameras (gate stations)
* volume control, brightness and color
* plastic + aluminum panel
* white
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 × H160 × D18

MK-03

* speakerphone
* work with two cameras (gate stations)
* illuminated touch keyboard
* volume control, brightness and color
* LED signalization
* plastic panel
* black
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 × H160 × D23

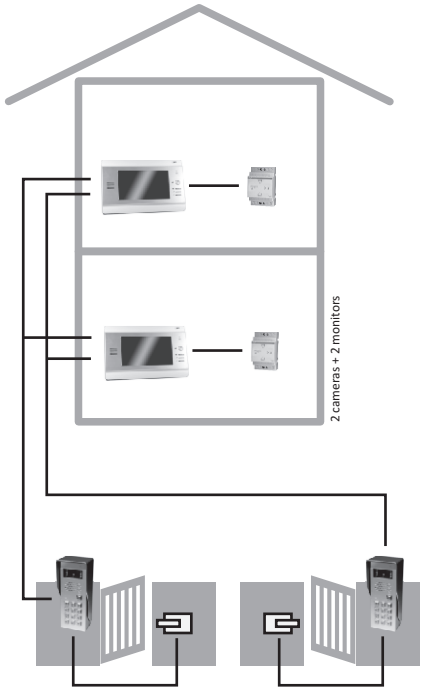
MK-03G



* speakerphone
* work with two cameras (gate stations)
* additional control gate
* illuminated touch keyboard
* volume control, brightness and color
* plastic panel
* black
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 × H160 × D23

MK-03W

* speakerphone
* work with two cameras (gate stations)
* additional control gate
* touch keyboard
* volume control, brightness and color
* plastic panel
* white
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 × H160 × D23



Work configuration:
1 camera + 1 monitor
1 camera + 2 monitors
2 cameras + 1 monitor
2 cameras + 2 monitors

INSTALLATION

Installation 4 wire + 2 wires to the electric opener. When using low-current electric lock 12V DC max. 300mA possible 4-wire installation (can use video intercom power supply). For installations use cables up to 30m with a minimum diameter of 0.5 mm², 30m above the min. 0.7 mm². For the best image quality in video and audio line is recommended to use 75 ohm coaxial cables.

supply	14,5V DC
power consumption	7W
display	7'' TFT LCD
working temperature	-10÷55°C
dimension	5 modules (85mm)

MK-04W

* speakerphone
* work with two cameras (gate stations)
* additional control gate
* volume control, brightness and color
* plastic + aluminum panel
* white
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 H160 D18

MK-08B

* speakerphone
* work with two cameras (gate stations)
* additional control gate
* volume control, brightness and color
* plastic panel
* black
* automatic saving images or video sequences 10s
* 2000 photo memory
* calendar and alarm clock
* memory card slot up to 2 GB
* mini USB slot
* expandability up to 2 monitors
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W220 H160 D24

MK-08F

* speakerphone
* work with two cameras (gate stations)
* additional control gate
* touch panel
* volume control, brightness and color
* plastic panel
* white
* automatic saving images
* 35mm rail power supply included
* wall mounting
* dimensions (mm) W245 H160 D23

UNIFONS

MU-01
headset

* electromagnetic control
* support two door stations
* adjust the ringer volume
* cooperation with monitors: all
* supply: 14,5V DC
* warranty: 24 months
* dimensions: 100x200x45mm

MU-02
speakerphone

* hands without headset
* electromagnetic control
* 4-wire installation
* support two door stations
* adjusting intercom
* (call volume, tone)
* power supply: DC/14,5 V
* (external power supply)
* dimensions: 160x120x42mm

APPLICATION

Intercoms cooperate with all types of monitors.

GATE STATIONS

KK-01
surface

dimensions:
58×135×39 [mm]

KK-03
surface with keypad

dimensions:
78×185×60 [mm]

KK-04
flat webbed

dimensions:
150×203×55 [mm]

KK-05
flat webbed
with keypad

dimensions:
120×250×51 [mm]

KK-08
2-abonents
webbed with keypad

dimensions:
110×240×46 [mm]

KK-08K
2-abonents
webbed

dimensions:
120×250×51 [mm]

KK-09
4-abonents
webbed

dimensions:
150×355×55 [mm]

KK-10
6 or 8-abonents
webbed

dimensions:
150×355×55 [mm]

APPLICATION

All gate stations can be used interchangeably with any monitor.

supply	12V DC
power consumption	1,5W
angle of view	70°
opening time - programs.	1÷99s
converter	1/3 CCD
working temperature	-25÷55°C
minimum illumination	0,05 Lux
backlight	LED
protection level	IP55

KEYPAD

KS-01

* lock with proximity card reader RFID
* vandal-proof metal housing
* built-in RFID proximity card reader
* 2 service areas (eg. open the gate and wicket)
* ringing function (alternatively 2 zones)
* memory capacity: zone 1 - 1000 user codes and cards; division 2 - 10 user codes and cards
* backlit keyboard
* power supply: 12÷24V DC, AC 9-18
* set the relay opening time: 0-99s (0s is unstable mode)
* the possibility of connecting additional switches the input opening
* open door sensor input, shortened to a minimum shutter electrocatch
* tamper switch
* power consumption: rest <40mA, while the <70mA
* operating temperature range from -20°C to 50°C.
* protection level IP65
* dimensions (mm) 76x120x22

ATTACHMENTS

KB-01 RFID pendant

APPLICATION

Works with door station KK-08K and keypad KS-01

KB-02 RFID card

APPLICATION

Works with door station KK-08K and keypad KS-01

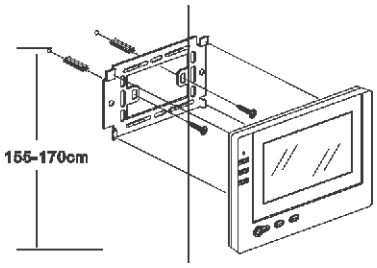
Electroswitch (EZ-02 and EZ-03)

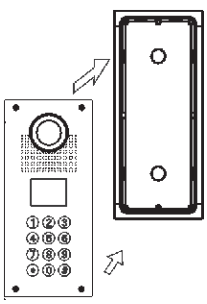
Option 1 (EZ-02)
low current U - 12V DC
I - 260mA
Option 2 (EZ-03)
low current with memory and switch-off
U - 12V DC
I - 260mA

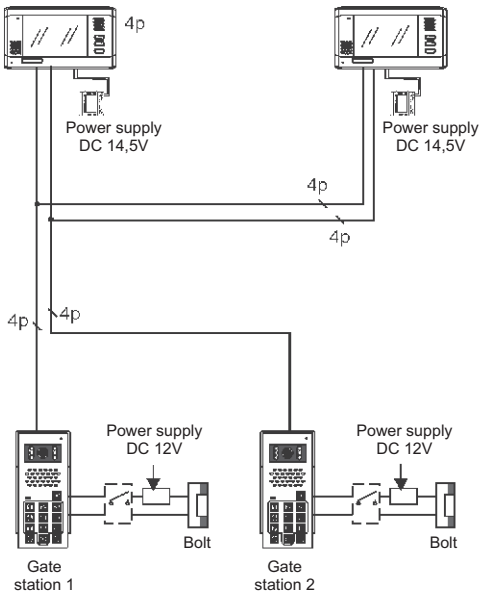
APPLICATION

* mounting to the gates
* compatible with all monitors power supplies

MOUNTING







35. SMART HOME RADIO SYSTEM

www.fhome.pl

F&Home RADIO

STANDARD OF THE FUTURE IN OUR HOUSE

The F&Home RADIO is an innovative and comprehensive solution for the design and setup of the installation and for remote control of the network of devices fitted in a building or being its integral part. Through the use of universal radio and sensory actuators that control the operation of each device, the system wirelessly integrates various and until now separated components: lighting, heating, air conditioning, ventilation, access control, monitoring, audio-video systems and garden automation.

SYSTEM ARCHITECTURE

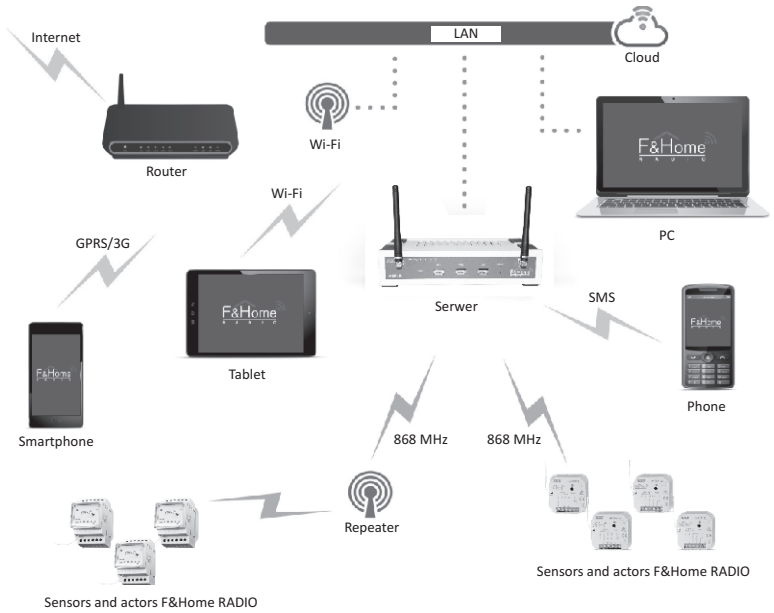
The F&Home RADIO system is built on the basis of a central server that controls all its functions. The server is based on Embedded Linux operating system and characterized by high performance and reliability at a very low power consumption (4W). The server communicates by radio in the 868 MHz band with sensory elements - the so-called sensors (for example: switches, motion detectors, temperature probes, humidity probes and other sensors) and actuators - the so-called actors (relays, dimmers, LED control modules, electric motors controllers, pumps, water and heating valves and other actuators). By using two radio modules operating simultaneously in two independent channels, the system has a very high resistance to external interference. Radio coverage, typically amounting to several dozen of meters, can be extended through the use of repeaters (signal amplifier units).

Both sensors and actors in the F&Home RADIO system are universal. For example, when household members are not at home, the motion sensor can serve as an alarm sensor. With disarmed alarm, it can switch the light or change the settings of the ventilation system, depending on the activity of the household members. Similarly, the power controller can control the intensity of the light or speed of the bathroom fan. This approach means that the available range of sensory and actuator elements in no way limits the functionality of the system, on the contrary - it extends it significantly!

Signal processing in the F&Home RADIO system takes place in real time (guaranteed response time to any events and their combinations is less than 30 ms). The F&Home Radio server cooperates with local area network (LAN) and communicates with a wide variety of mobile devices (phones, smartphones and tablets). This configuration allows you to manage, control and monitor the system from any device without external servers. The system also has direct support for text message-based communication through a standard USB modem equipped with a SIM card.

WIRELESS SYSTEM BENEFITS

* Reduction of wired connections.
* Non-invasive installation of radio system components through the use of: in-wall transmitters and controllers, alternative modules mounted on DIN rail and battery powered sensors.
* Quick and easy installation of systems in new buildings and modernization of existing installations without absorbing and expensive repairs.
* Easy reconfiguration of system components in case of a house or apartment expansion, growing requirements or change of preferences of household members.
* Option to connect and control the operation of already installed devices fitted in a building or being its integral part (e.g. the elements of lighting, automatic doors and windows, shutters/roller blinds, heaters, solenoids valves, circulating pumps, lawn sprinklers, watering plants equipment etc.), that do not have a remote control function.
* Much wider range of flexibility, performance and functionality relative to a wired solutions that can be adapted or fully integrated.



DISTINCTIVE FEATURES OF THE SYSTEM

* Server-based architecture allows for unmatched functionality using a relatively narrow range of universal actuator and sensory modules.
* Integration of independently working devices and installations.
* Flexible expansion and scaling of the system.
* Small size modules to facilitate and speed up the installation, designed to work with equipment from other manufacturers.
* The use of a wide range of mobile devices (phones, smartphones and tablets) as a universal remote controls or fixed or portable control panels.
* Integration of systems using radio and wired communication solutions (selected systems only!).
* Limiting the number of system components by simultaneous use of their features (reduction of installation costs).
* Built-in algorithms to prolong the life of the components (e.g. preheating for incandescent lighting).
* The use of information from websites to manage the physical components of the system (e.g. heating systems with high inertia or watering plants systems based on the weather forecast).
* Built-in astronomical clock (in conjunction with weather forecast tools it allows you to resign from twilight sensors which reduces cost of installation).
* Unique tools for design and configuration of installation.

REMOTE CONTROL

One of the basic assumptions on which the F&Home RADIO system is based is the ability to remotely manage an individual or group operation of separate appliances within the defined scenarios using SMS text messages and dedicated mobile applications. A wide range of increasingly popular smartphones, tablets and a portable or desktop PC's is compatible with our system:
* devices based on an Apple iOS (iPhone, iPhone 3G, 3GS, iPhone 4, 4S, iPad, iPad 2, iPad 3 and subsequent versions);
* devices based on Google Android system (such as smartphones and tablets made by Samsung, HTC, Sony, Motorola, Asus and others);
* devices with web browsers (laptops, notebooks, netbooks, laptops and PC's of different manufacturers).

Applications for mobile devices, as an integral element of the F&Home Radio system, have been designed in such a way so that user can remotely and instantly access status control, directly regulate home appliances and control their work within the smart scenarios, defined according to the personal preferences of the household members.

iPhone

iPad

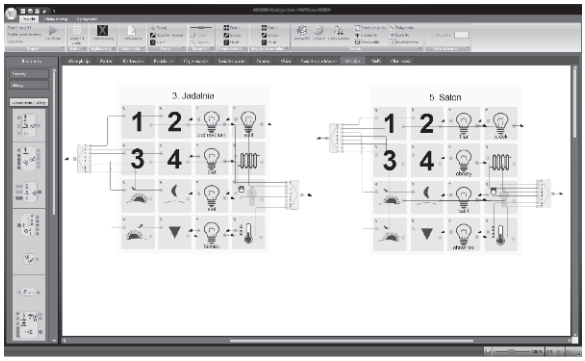
While working on the user interface, we focused primarily on providing simplicity and convenience comparable with the qualities of classic TV remote control, without dealing with the overflow of unnecessary windows and complicated settings. Clear presentation of the desired information and plain indication of the status of each device provides the user with an easy and intuitive operation.

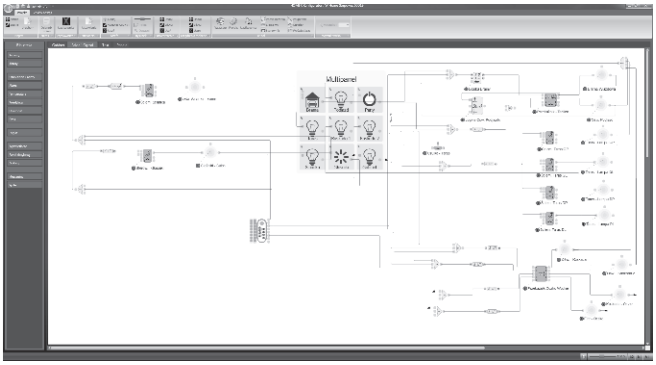
AUTONOMOUS OPERATION

Architecture and the various components of the F&Home RADIO system are designed to not only allow the user to remotely control individual components but above all, wherever possible, to relieve him by autonomous management and intelligent control of devices. Depending on the type and configuration of the installed automated equipment in the building, system can control its operation after detecting of the specific activity of the household members, for example the user sleeps, wakes up, leaves the house, is away from home, comes home, enters, stays at home, goes to bed - or other types of events such as: guests visiting, watching a movie, party, barbecue in the garden, etc.

Below is an example of autonomous execution of the function for one of the example activities:
User arrives at home - the system identifies the activity (e.g. text message sent by the user) and automatically:
* adjusts temperature (heats or cools the selected room or zone)
* raises the roller blinds to the desired position (according to your settings)
* switches on the lights in selected rooms and zones (e.g. a driveway, garden, garage) and adjusts its intensity to external conditions (time of day, weather conditions, personal preferences)
* airs selected rooms (tilts windows or turn on the ventilation system), taking into account information from the sensors (e.g. detection of rainfall, wind strength and direction)
* starts the hot water circulation in advance of a planned return time (switching on the circulation pump)
* sets the roller blinds, drapes, curtains in preferred positions, taking into account information from the sensors (e.g. temperature control, angle of the sunrays)
* prepares audio-video systems for media playback in selected zones or rooms
* starts, controls work or prepare for work the other devices

CONFIGURATION TOOL FOR FITTERS





An integral part of the F&Home RADIO system is a tool support in the form of the configuration software dedicated mainly for fitters, architects, developers, engineers, but also users - hobbyists. This software is a unique solution in the following areas: design and construction of smart home installation and configuration and management of the server of the building automation based on the F&Home RADIO technology. With a virtual representation of the physical sensory and actuator elements and an extensive library of software objects implementing the logic of interaction between these elements, it is possible to freely create virtually any configuration of operational scenarios for individual devices, installation and entire systems.
Other advantages of this approach include:
* Saving time and increasing work comfort of the fitter
* Ability to perform most of the configuration work outside the place of assembly
* Simplifying and minimizing installation work at the customer's home
* Fast copying installation projects for a larger number of similar objects (multi-family buildings, twin buildings, single family houses)
* Easy installation reconfiguration in the event of system expansion or change of user preferences
* Ability to remotely configure and manage

EXAMPLES OF SYSTEM FUNCTIONALITIES FOR SELECTED INSTALLATIONS

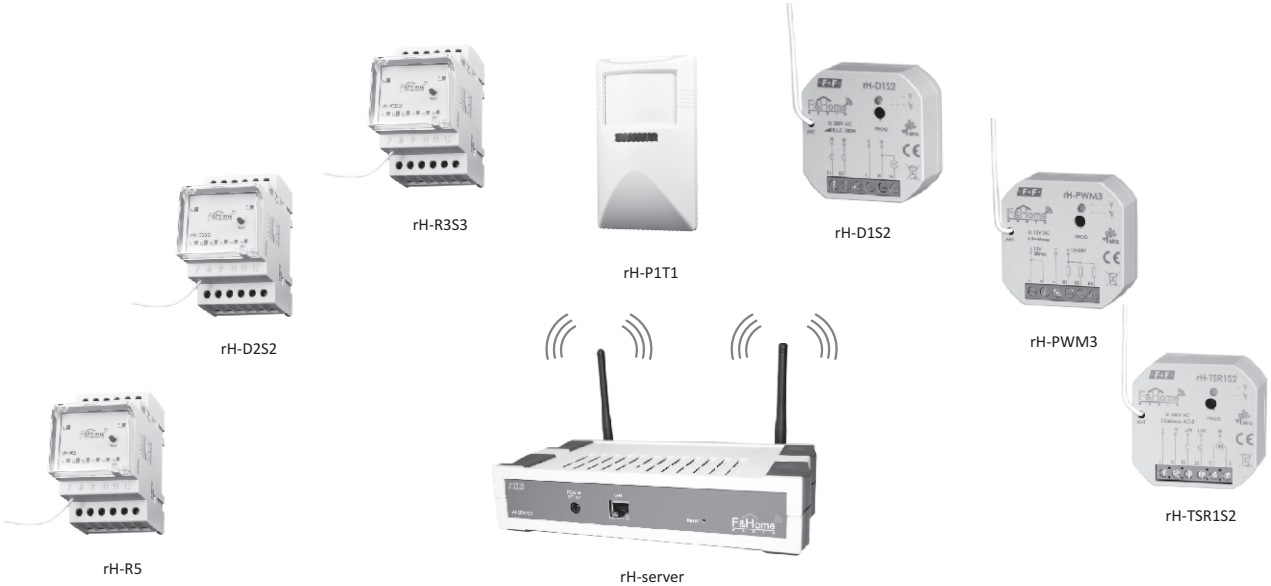
Lighting:
* Free configuration of the points of light, the place of physical switches installation and features and appearance of mobile applications control panels
* Remote control of the time and the intensity of illumination of individual points, defined sections and whole circuits
* Create any color compositions for RGB LED lighting
* The composition of different light scenes defined by the user, according to his preferences
* Sequential operation (e.g. control of different light scenes using only one switch)
* Freedom to combine light scenes with the work of other systems within the defined scenarios (e.g. Integration with audio-video systems)
* Intelligent operation depending on the time of day or night, motion detecting, traffic and other events (e.g. the gradual lighting up the rooms in night mode)
* Configuration of lightning for simulating the presence of family members at home during their actual absence

Heating, Air Conditioning, Ventilation:

* The direct or indirect control of the heating system components (using controllers of furnaces, electric valves, circulation pumps, ventilation systems, etc.)
* The use of temperature sensors embedded in the components of the system
* Local management of temperature and ventilation in individual rooms or zones
* Remote control of temperature and work of ventilation equipment at selected locations
* Freedom to define scenarios modes for specific activities (e.g. summer mode, winter mode, holiday mode, short absence, coming back to house, etc.).
* Configuration mode for each user preferences
* Intelligent operation depending on the time of day and night, household activities and other events (e.g. temperature adjustment to the presence and traffic in the room)
* Sync work with websites
* Control and remote control using SMS gate (e.g. remote management of operation of the heating system in the holiday home without access to the Internet)

COMPONENTS OF THE SYSTEM

rH-D1S2	In-wall module of single-channel dimmer with two-channel transmitter
rH-D2S2	Two-channel module with two-channel transmitter mounted on DIN rail
rH-PWM3	In-wall module of three-channel PWM low voltage controller (LED RGB)
rH-PWM2S2	In-wall module of two-channel PWM low voltage controller with two-channel transmitter
rH-TSR1S2	In-wall module of roller blinds relay with two-channel transmitter
rH-R1S1	In-wall module of single-channel relay with single-channel transmitter
rH-R2S2	In-wall module of two-channel relay with two-channel transmitter
rH-R3S3	Three-channel relay module with three-channel transmitter mounted on DIN rail
rH-R5	Five-channel relay module mounted on DIN rail
rH-S2	In-wall module of two-channel transmitter. Battery powered
rH-S4	In-wall module of four-channel transmitter. Battery powered
rH-S4T	In-wall module of four-channel transmitter with temperature probe. Battery powered
rH-S4Tes	In-wall module of four-channel transmitter with external temperature probe. Battery powered
rH-S4TesAC	In-wall module of four-channel transmitter with external temperature probe. Mains supply
rH-T1X1	Temperature sensor and illumination sensor (insolation). Battery powered
rH-T1X1es	Temperature sensor (external probe) and illumination sensor (insolation). Battery powered
rH-S6	Six-channel transmitter module mounted on DIN rail
rH-P1	Motion detector module. Battery powered
rH-P1T1	Motion detector module with temperature probe. Battery powered
rH-E2	Signal amplifier module
rH-IR1	Infrared remote control module (in preparation)
rH- AC16S4R4	Cooperation with the control panel module
rH-SERVER	System control and management server



LONG RANGE

A new generation of modules marked with LR sign (e.g. rH-R1S1 LR) have significantly increased range of operation of up to 350 meters in the open area. Installation based on LONG RANGE server and LONG RANGE modules does not require the use of signal amplifiers (rH-E2).

36. SMART HOME SYSTEM F&HOME

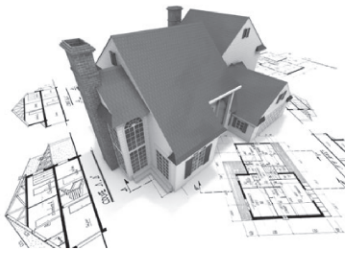
www.fhome.pl

F&Home

STANDARD OF THE FUTURE IN OUR HOUSE

F&Home is a dedicated system for the automation of flats, houses and business premises. It provides all the basic functionality of the building automation, such as:
- management and control of heating, cooling and ventilation
- lighting (dimmers, lighting scenes, RGB)
- control of roller shutters, gates and other elements of the motor
- ON / OFF various circuits and receivers (including outlets), external lighting, sprinklers, electrical appliances
- wireless control of Wi-Fi and a remote control and monitoring of GSM
- a complete alarm system with surveillance

Thanks to the "unfolding" of the system into separate subsystems (modules) performing specific functions individually, each can adjust the system to their individual needs and budget.

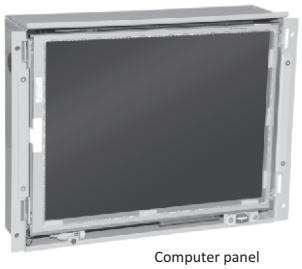


GENERAL

The smart homes system integrate F&Home operating systems regardless of the standard solutions. The integration offers new opportunities and simplifies the control of a vast installation. F&Home is a wired system, lighting, blinds, heating, air conditioning and other equipment powered from any voltage. Communication takes place UTP cables coming down to the main switching station (star system). Because of the distinctive way to control and position wiring system is dedicated to the newly constructed or extensively refurbished buildings. An important feature of the system is free to use equipment. It is permissible to use the buttons, switches and sockets from any manufacturer.

CENTRAL UNIT

The central element of system is a computer with touch panel 12 "or 15". Is mounted outside the switchboard in wall using a steel mount casing. Powered from 230V and requires a separate connection to the main switchboard. Communicates with the system through a CAN line. You can self-screen menu, color settings and upload your own favorite images and photos as a screen saver.
Features:
- Introductory Programming (layout of the floor plan)
- Programmable dimmer settings (hysteresis)
- Set the device programmer (on an annual basis every 15 minutes)
- Setting up programmer for heating and cooling
- Setting the hysteresis motor devices (blinds, shutters)
- Defining the scenes (may include a light, blinds, temperature, switching on some receivers)
- Set the color of the interface (fit to your needs)
- Uploading images to the screen (electronic box)
- Setting up the GSM and Ethernet
- Update software (via USB stick)



Computer panel
with montage cover

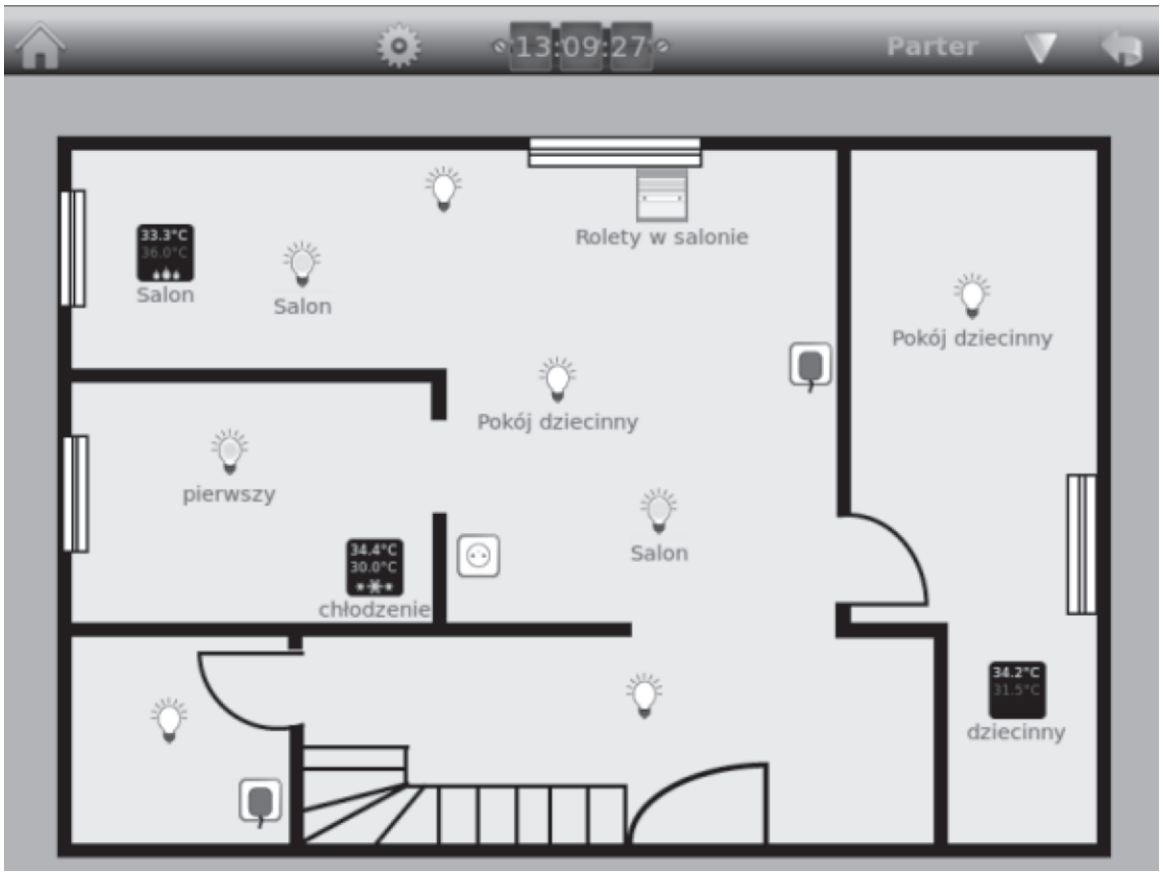
Taking care of the aesthetics of the interior of the customer can choose a steel frame with masking patterns among the 12 available colors. Easy to install frame and color palette of colors is a guarantee of fit into any decor.

steel
frame

as digit
frame

GRAPHICAL INTERFACE - USER MENU

The clear and intuitive menu structure allows for central control of entire devices in the system. Attractive visualization are an additional decorative element. Additionally, you can self-screen menu, color settings and upload your own favorite images and photos as a screen saver. Visualization of a house or apartment rooms - based on plans supplied by the customer - is done free of charge by our programmers.



User interface on touch panel

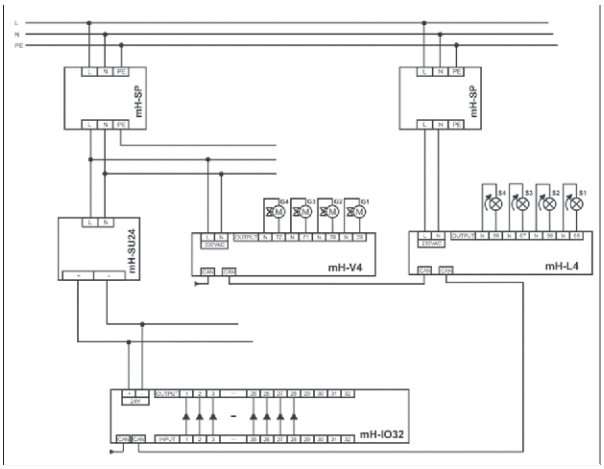
REMOTE CONTROL GSM and WI-FI

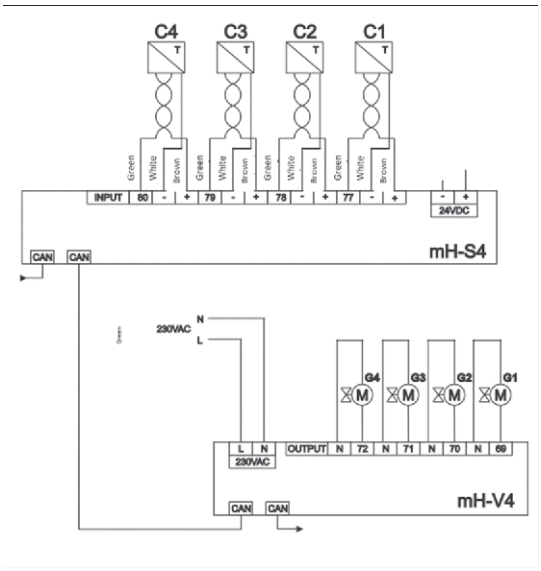
Optionally, the system F&Home has the ability to connect wirelessly to a home Wi-Fi router and through our special website, you can remotely monitor the system from any computer in the world. GSM features to easily allow you to remotely control the system via SMS text messages. By sending a special SMS message can include / exclude any receiver in the building, check that the specified circuit is on, read the temperature of the room, or run a specific stage (eg. raise the temperature, open the gate, illuminate the driveway, etc.).

The function of an extended pilot house meets Tablet 7" Samsung Galaxy Tab P1010 with the application F&Home Phones to control the system via WiFi. Application allows you to control the defined scenes and make changes to the settings of these scenes.

SWITCHBOARD, HARDWARE AND CABLES

The system operates in a star, it means that all control cables and power of individual receivers converge at a switchboard. Due to the large number of cables should be used with large switching (96 modules or more) or free-standing cabinet. It is also permissible to use two switching, for example on the ground floor and first floor. In this case, section switchboards should be placed between the CAN bus line. The position requires a large amount of wiring, so installation should be performed before applying the plaster. During installation, together with plasterers (fill switching computers and enclosures) and plumbers (control solenoid). The focal point of the system is switching and going off all the wires (star system). For switchboard to bring the signal from the UTP cable controls such devices as ON-OFF (lights, sockets and other). For the control system can use any type of accessories (buttons, switches, sockets) available on the market.





INSTALLATION COST AND SAVINGS

The cost of building an intelligent system is certainly a higher initial expense. But the economic effect is not determined by only one-time cost incurred in the investment, but also the subsequent maintenance and operation costs. By installing F&Home must be aware that an investment in the future. With time, save on costs associated with heating and lighting and operation of facilities TV. High initial cost to purchase the system components. The cost of building a wired installation F&Home marginally above the cost of a standard cable. Installers, electricians work is comparable with the location of a computer system or alarm. The whole system is the cost and so 3-4-fold lower than that of other known systems of this type.

Integration with central heating with system, F&Home allows you to reduce heating costs by up to 40%. This effect is achieved thanks to the possibility of valve control circuit for central heating and individual temperature control program, depending on time of day, and the presence and activity of the household. There has also been savings - up to 15% - achieved by controlling the light as a function of time and place, such as the setting of illumination depending on time of day. Additional savings can be achieved with proper control of the other receivers, such as electronics devices, when leaving the house when using the feature „Disable All" these receivers from standby.

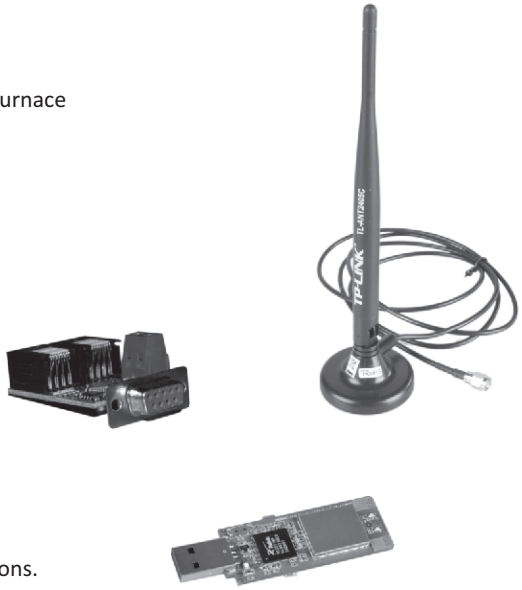
Approximate cost of the system components (according to the rates in September 2010):
apartment of about 70m² - price around 9.000 PLN*
house / apartment approximately 120m ² - price around 12.000 PLN*
house 150-200m² - price around 15.000 PLN*

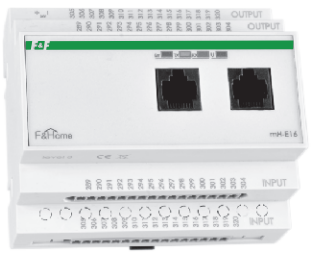
SYSTEM INSTALLATION

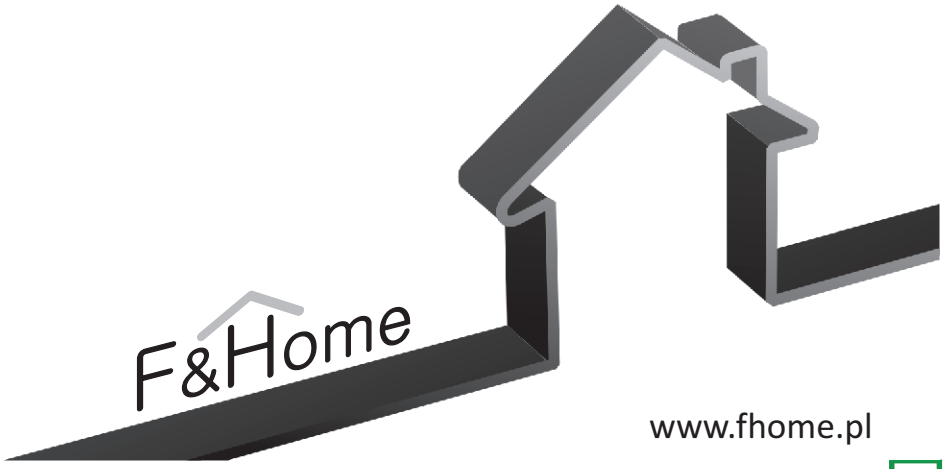
Installation of F&Home can make a qualified installer, who received training in the field of installation, operation and configuration. In the case of self-assembly or by an unauthorized installer company F&F can refuse free technical support and to express terms of warranty on parts and installation of the system.
Authorized installer's business is personalized card with your name and authorization number.

COMPONENTS

mH-IO32	input-output module control 28 devices on-off.
mH-IO12E6	mixed module IO12E6 control 12 devices on-off and six motor equipment.
mH-E16	engine control module 16 motor units of type blinds, awnings, doors, roof windows with the drive
mH-L4	executive module four dimmers (4x350W)
mH-S4	four-channel sensor module (sensors included)
mH-S8	eight-channel sensor module (sensors included)
mH-V4	four-valve module executive (executive element-semiconductor)
mH-V8	eight-module executive (executive element-semiconductor)
mH-V7+	executive seven-valve module and pump control central heating or furnace
mH-R2x16	relay module (2 pcs 16A)
mH-R8x8	relay module (8 pcs 8A)
mH-SP	module with surge protectors surge module
mH-SU24	power supply 30W
mH-SU50	power supply 50W
mH-Kh	cables-house
mH-Kf	cables-apartament
mH-ETH	ethernet module (connection of internet by WIFI)
mH-Mrg	GSM module
mH-Mb	master module(built-in computer)
mH-TS12	computer 12" with touch panel
mH-TS12s	steel frame of computer 12"
mH-TS15	computer 15" with touch panel
mH-TS15s	steel frame of computer 15"
mH-RGB	control module LED RGB
mH-MS	module scenes (16 inputs). It allows you to trigger scenes using buttons.
mH-MK	light module (16 channels). It allows the visualization of states on the screen on / off, open / closed (max 16).







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37. ENCLOSURE DIMENSIONS

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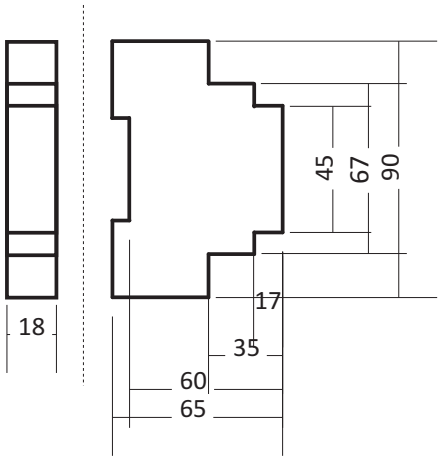
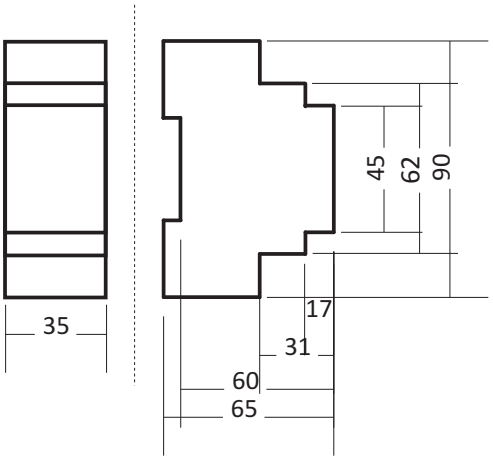
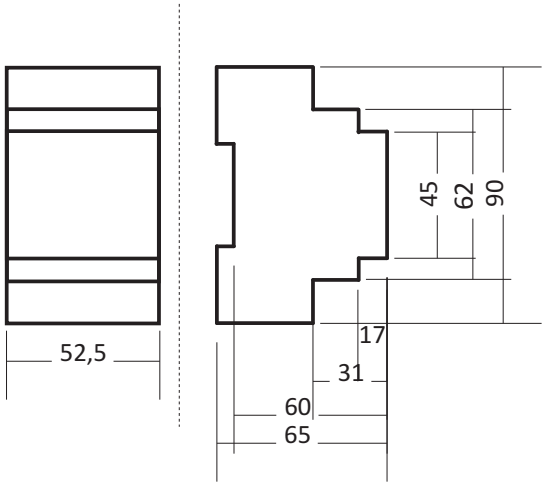


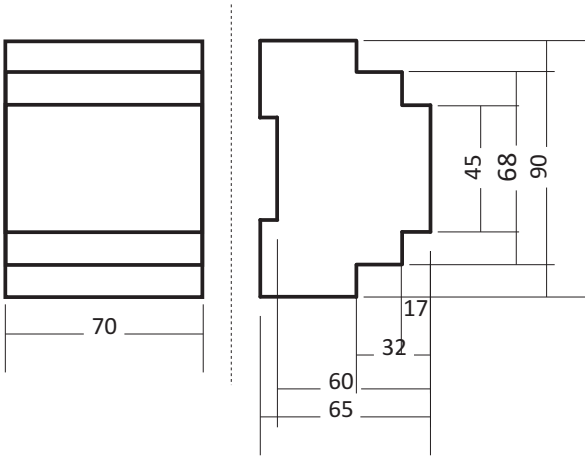
1 module



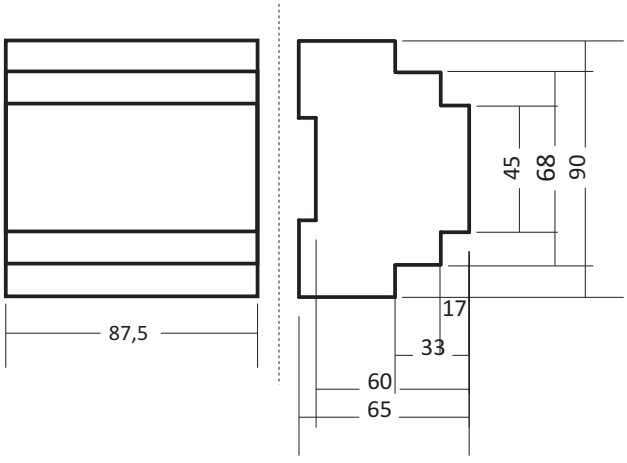
2 modules



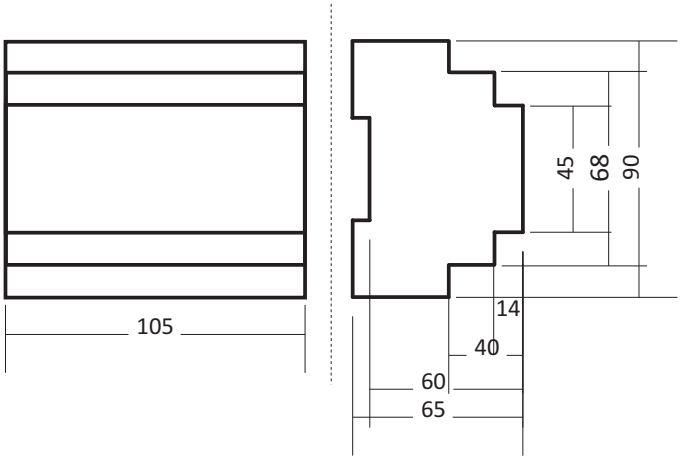
3 modules



4 modules

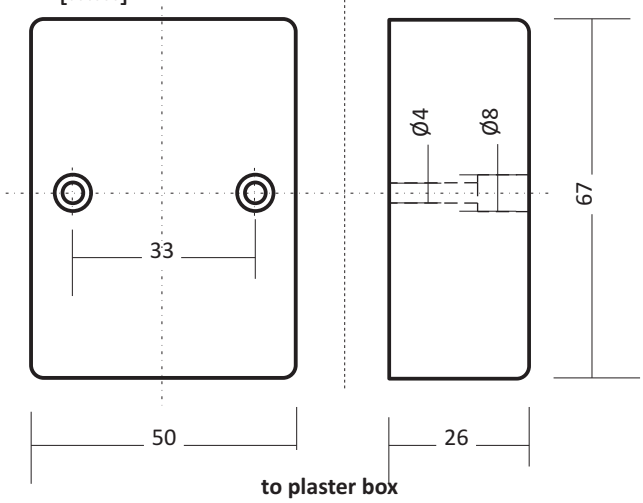


5 modules

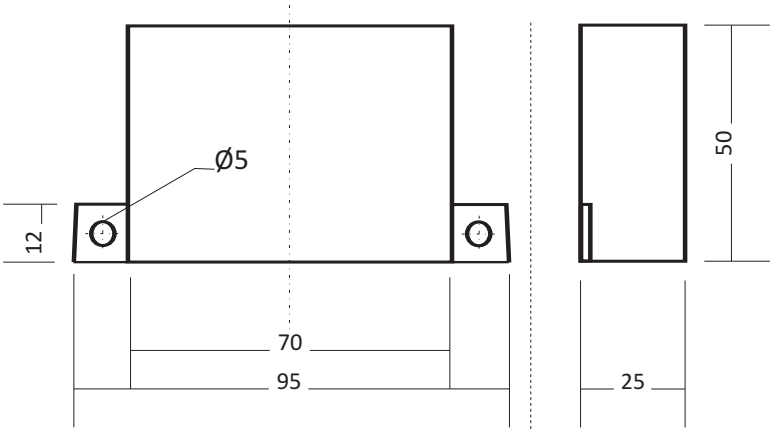


6 modules

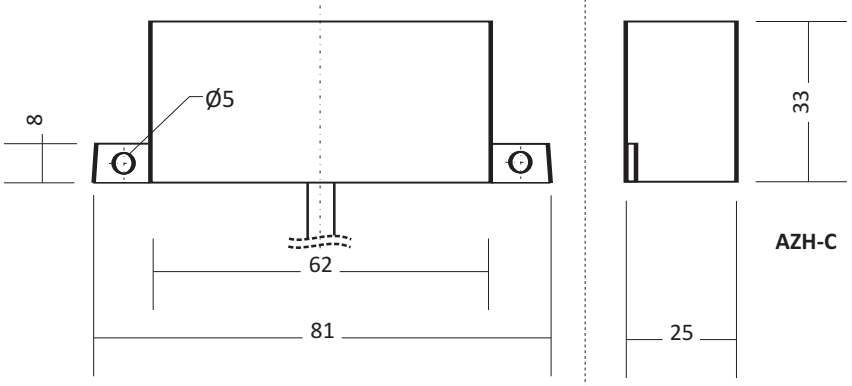
[mm]



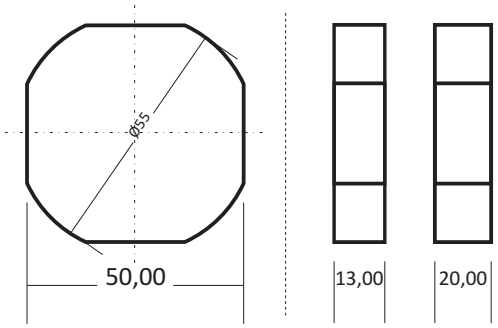
to plaster box



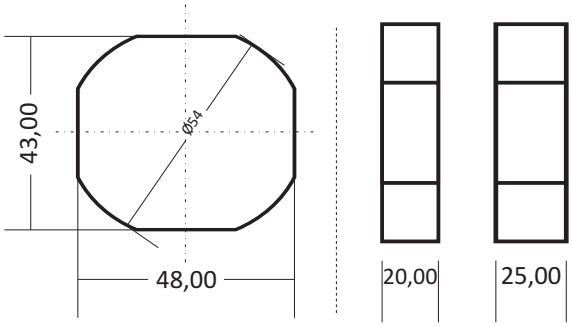
CZF2 PO-405



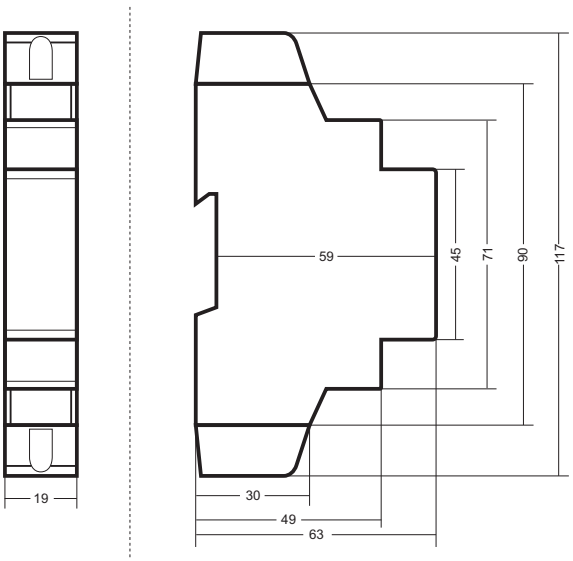
AZH-C



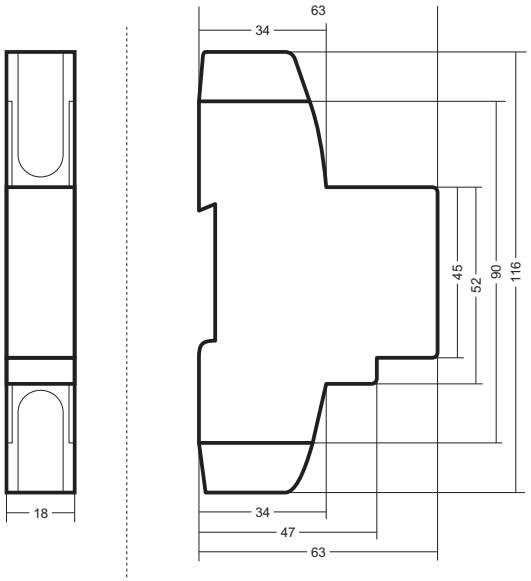
to under plaster box (PDT)



to under plaster box (PDTN)

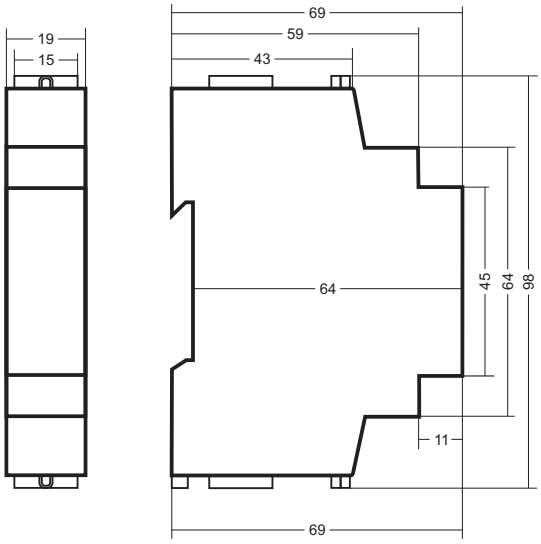


LE-01

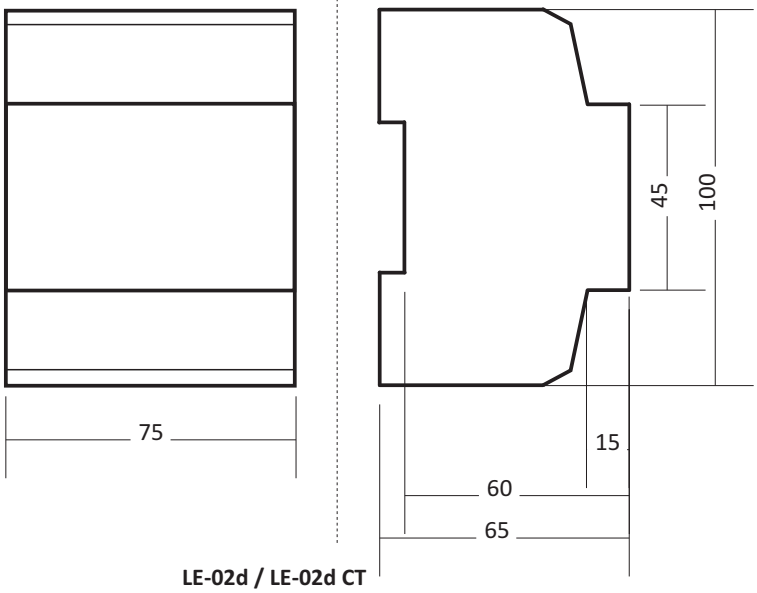


LE-01d

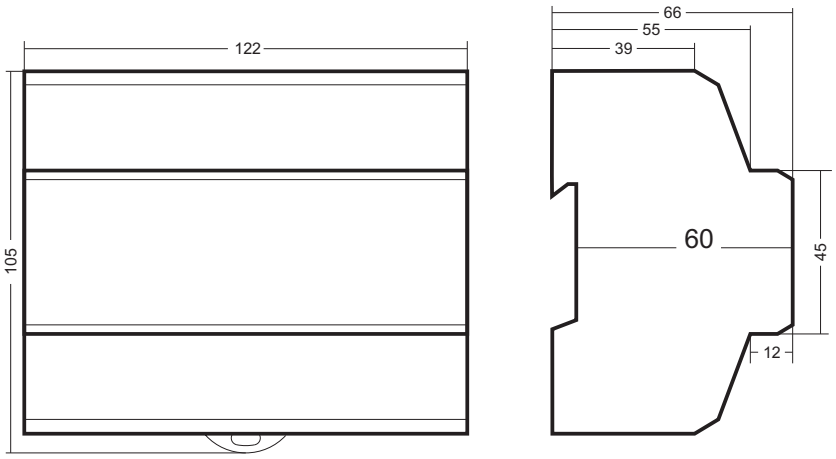
[mm]



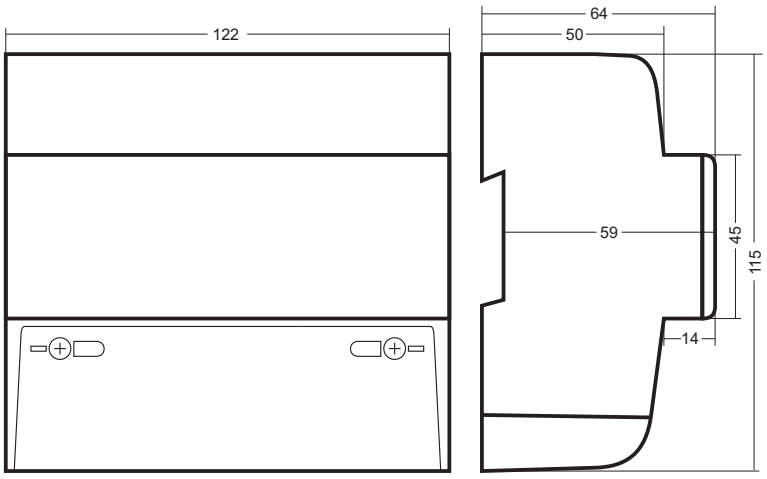
LE-01MP



LE-02d / LE-02d CT



LE-03 / LE-03d / LE-03d CT200 / LE-03d CT400 / LE-03M / LE-03M CT



LE-03MP

NOTES


«F&F»