Article for Electro-Installer

Subject : Time-Control Modular Devices

Electrical systems require the general usage of electronic master devices, controlling automated technology systems such as: manufacturing processes, lightings, heating, ventilation etc. Especially wide use of this devices can be found in installations of so called "intelligent buildings". In this year's Trade Fairs „ENERGETAB" 2002 in Bielsko-Biała - ETI Polam from Pułtusk introduced the new family of time-controlled modular devices. These devices are intended to be assembled in switch boxes on the mounting rail TH 35 or in the isolating box with installation switch. They have many operating functions and the possibility of very precise operating time settings.

The present article introduces technical properties and parameters of the new family of time-control devices, such as:

- Staircase light control device
- automatic twilight devices
- multifunction time-delayed device
- cyclical asymmetric relay
- impulse transmitters with memory
- multifunction impulse relay (for assembly in the installation box)
- impulse light de-creaser (for assembly in the installation box)
- digital time relay - the master clock

1. Staircase light control device CRM – 4

Foto
(z logo ETI)

Automatic CRM - 4 fulfils the function time-delayed switching off eg. lightings on the staircase. The device is adapted to smooth setting of the time delay within the range from1 second up to 10 minutes by use of potentiometer placed on his frontal plate. **It have protection** function against the stable switch on in case of the blocking the main light switch, what often happens on staircases in the buildings. By means of three-stages micro-connector the device can work according to: disposed time - AUTO, on the stable disconnection - OFF and on the stable switch on - ON. Installation switches control the lighting by means of device CRM - 4, they can be equipped with neon-indicators (highlighted), without necessaries of compensatory devices usage. Contact has current load capacity of 16 A, what lets on the steering with connected receivers about total power approx. 4 kVA (AC1). The detailed arrangement of connections is shown on the lateral face of the device.

Wiring system (Fig. 1, page 10 – ELKO)

2. Staircase light control device DIM – 2 (with dim function)

Foto DIM - 2

The staircase light automatic control device DIM -2 similarly like earlier described CRM-4 serves to time delayed switching off eg. lightings on the staircase. However, it have additional function consisting in smooth reducing of the light level in the regulated time intervals between 0 - 70 s, when the moment of his disconnection arrives. From the practice we know, that this time is more than once necessary for finding door key or the nearest light switch. This device has also the possibility of smooth brightening up the lighting after switch on, in the regulated time intervals from 0 - 45 s and the possibility of the light level regulation within range from 0 -100 %. These regulations take place with use of four potentiometers, situated on the device frontal plate. These regulators serve to control:

- P1 - the lighting level from 0 - 100 %
- P2 - the time of light brightening from 0 - 45 s
- P3 - the time of light level decreasing from 0 - 70 s
- P4 - the time, whereby light dimming take place

These functions are shown on the graph (Fig. 1)
Besides, the automatic device DIM -2 is equipped with the protection against a stable switch on. It can be switched on by the push button (A1-T1) or by the switch (A2 - T2)

Fig. Description of the potentiometers
Fig. 1 page 20 ELKO.

Function T1 and T2

Fig. 2 page 20 ELKO

Fig. 3 page 20 ELKO

Wiring diagram

3. Automatic twilight device SOU – 1 with sensor

Photo SOU-1

Automatic twilight device SOU -1 serves to the automatic on and off switching of the lighting during dusk or sunrise or when the local lighting level in the installation place of the sensor will exceed the given value. The sensor has two light- sensitivity operation modes: 200 - 10000 lx and 5 - 500 lx, which are controlled by micro-switch, situated on the device frontal plate (Fig. 2). Second micro-switch serves for constant lighting (TEST). Connector connected between clamps A1 - S serves to switching off the illumination in the moment, when the transmitter is active eg. during diagnostic activities, when light is switched on (Fig. 3). Potentiometer P1 serves for smooth light sensitivity settings in min – max ranges, while

potentiometer P2 serves for smooth settings time- delay of the disconnection or switch on of the lighting, when light level exceeds the given light level. This time-delay is necessary to avoid light disconnections through the accidental light signal eg. lamps of the transmigratory car. The SOU -1 automatic device is available in two voltage versions- for rated voltage AC 230 V, and for universal rated voltage AC /DC 12 - 240 V. (UNI)

Fig. 1 page 22 ELKO

Wiring system

Fig. 2 page 22 ELKO

Description of the potentiometers

Fig. 3 page 22 ELKO

Functions

4. Multifunction time relays CRM-91H, CRM-93H

Foto
91H, lub 93H

Multifunction time-controlled relays are intended to work with 10 time functions, whereof 5 functions is controlled through supply voltage Un and 5 functions is controlled by control impulse through the push button S. The time scale setting values ranges from 0, 1 s up to 10 days in 10 regulated intervals by use of potentiometers situated on the device frontal plate. The CRM-91H unit is equipped with one pair of contact points switching the admissible current with load capacity of 16 A (AC1), while CRM-93H unit is equipped with three pairs of contact points with the max load-capacity of 8A (AC1) each. Internal connections systems of relays are showed on drawings below.

Fig. 1. CRM –91H (Page 6 ELKO)
Connections systems

Fig. 2. CRM –93H (Str. 6 ELKO

There is also the possibility of turning on the signaling function between connectors S - A2 (Fig.) without disturb unit operation.

Fig. 3. Schema page 6 ELKO

CRM unit can work with following time functions chosen by the knob

a) Time-delayed start

After turning on the supply voltage Un, measuring of the disposed time t begins. After the period of time t the transmitter automatically starts working and stays in operation mode to the moment, when the supply voltage Un is switched off.

b) Accelerated shut down

Schema 2 page 7

After switching on the supply voltage Un, device is automatically switched on and start to measure the disposed time t. After the period of time t, device is turned off..

c) Cycling operation of the device stars after a pause

Schema 3 page 7

After switching on the supply voltage Un, device starts measure the disposed time t. After the period of time t, device automatically turns on and another measurement of time t takes place. After the period of time t, unit is turned off and operating cycle begins. Turning on and off times are the same. Cycling operation of the device lasts until the supply voltage is turned off.

d) Cycling operation of the device begins at the same time, when device is started

Schemat 4 str.7

After turning on the supply voltage Un, device is turned on and measurement of disposed time t begins. After the period of time t, device is turned off and another measurement of time t takes place. After the period of time t, device is turned on and another cycle begins. Turning on and off times are the same. Cycling operation of the device lasts until the supply voltage is turned off.

e) Time-delayed switch off
Control function through the Adaper S

Supply voltage Un is still active on the device clamps.

Schemat 5 str.7

After turning on the steering adapter S, the device is automatically turned on. After turning off the steering adapter S, the measurement of time t begins. After the period of time t, device is turned off. If steering adapter S is turned on again before time t lasts, another turning off procedure causes another measurement of disposed time t.

f) Disposed time measurement control function through steering adapter S.

Schema 6 page7

Supply voltage Un on the device clamps is still active. After turning on the steering adapter S, device is automatically turned on and disposed time t measurement begins. After the period of time t, device is automatically switched off, even when control impulse lasts longer than disposed time t.

g) Disposed time measurement after the control impulse is turned off Control function trough steering adapter S.

Schema 7 page 7

Supply voltage on the device clamps is still active. After the steering adapter S is turned on, the device is not automatically turned on. Time t measurement does not take place. Only when the steering adapter S is turned on, the device is automatically turned on and measurement of disposed time t begins. During the time t measurement, adapter S can be turned on and off without disturb the work of the device.

h) Disposed time measurement after control impulse is turned on and when is turned off. Control function through the steering adapter S

Schema 8 page 7

Supply voltage Un on the device clamps is still active. When the steering adapter S is turned on, measurement of the disposed time t begins. After the period of time t, device is automatically turned on again and another disposed time t measurement begins. After the period of time t, device is turned off. When control impulse lasts longer than disposed period of time t, device is turned off after the time t. Turning on and off times of the device after impulse decay are same.

i) Impulse relay. Control function through steering adapter S

Schema 9 page.7

Turning on and off procedures are done through single control impulses.

j) Pulsing device switched off for the period of 0,5 s.

Schema 10 page 7

When the supply voltage is turned on, measurement of disposed time t begins. After the period of time t, device is turned on for the period of 0,5 s.

5. Cyclical asymmetric relay CRM-2H

Photo CRM-2H

Cyclical asymmetric relay CRM -2H is responsible for cyclical switching on and off connections points (15, 16, 18) according to disposed times. When the supply voltage Un is turned on, the device automatically starts working and measurement of time t1 begins. After the period of time t1, device is turned off and measurement of time t2 begins. After the period of time t2, working cycle is repeated until the supply voltage Un is completely decayed (dumped). The relay have 2 kinds of the cyclical work modes in the dependence from the arrangement of his connection (Fig. ....)- cyclical work starting when device is turned on (a), and the cyclical work starting when operation is paused (b). Both operating times t1 and the pause time t2 are regulated through potentiometers in the range from 0, 1 s up to 100 days in 10 different time settings.

Fig 1. Page. 8 catalog ELKO Connections system	Fig. 2. Descriptions of potentiometers page 8 ELKO	Fig. 3 page 8 Description of the functions

6. Impulse relays with memory MR-41, MR-42

Foto MR-41

Impulse-relays MR with a memory function are designed to control electric circuits by means of single master impulses being descended from mono-stable connectors. The MR-41 relay has one pair of switching connectors (11, 12, 14), while MR-42 relay has two pairs of switching connectors (11, 12, 14 and 21, 22, 24) which work simultaneously, when clamps connectors B1 - B2 are wired. Operating program of relays is shown on the Figure. ... Characteristic feature of this relays is, when supply voltage Un is dumped, the device remembers the position of connections points and when the supply voltage is turned on again, continues to work with connections points situated in such position, when they were before supply voltage was dumped.

Fig. 1 and 2 page 19 ELKO Connections system	Fig 3 page 19 ELKO Functions

7. Multifunction impulse relays and dimmer (for mounting In installation box) SMR-T, SMR-H, SMR-S.

Foto SMR

Connections system with switch placed in the box, (SMR-T)
Fig. 4 page 11 loose page

Multifunction impulse-relays SMR and dim device tend to be assembled in the under plaster installation box with the switch in the existing electric wiring without configuration changes of the whole installation system.(Fig. ...) They are equipped with the built-in fuse cutout 5x20 1A. The SMR-T relay is intended to 2-line installation (N, L), while SMR-H to the 3-line installation (the necessity of N connecting).
They have 8 time functions chosen by the switch (Fig...) situated on the front side of device. The second switch serves for temporary settings of 6 ranges. Rotator potentiometer serves for precise time settings .

Fig 1 page 12 loose page.

Time ranges.. (Fig. 2) and page 12

This have following time functions:

1. Measuring disposed time values after the control voltage Is switched on. — sch. 1. str. 12
2. Measuring disposed time values after the control voltage is switched on. Device starts working, when control voltage Is switched on. — sch. 2. str. 12
3. Measuring disposed time values, when control voltage is switched off. Works only when control voltage is switched off. — sch. 3. str. 12
4. Cycling operation – powering on and off regarding disposed time. Equals off and on times. nastawionego czasu. Równy czas załączenia i wyłączenia. — sch. 4. str. 12
5. Time t delayed switching on and off. If time is shorter than t t value, relay does not start to work. — sch. 5. str. 12
6. Time t delayed switching on. Switching off only after supply — Schema 6. page 12

voltage is turned off

7. Impulse relay. Single impulse switching on and off From on or several places.

Schema 7. page 12

8. Impulse relay. Single impulse switching on and off from one or several places. When the time between subsequent impulses is longer than time t, relay is switched off.

Schema 8. page12

Electric diagrams 4 page 12

Dim device SMR-S (dimmer)

Dim device SRM-S is a relay controlled by single impulses used for switching off and on the lighting, if the impulse is shorter than 0, 5 s. When turning on impulses are longer than 0, 5 s, lighting dim-out takes place, and when the turning off impulses are longer than 0, 5 s, lighting brighten up takes place. Light level settings of the lighting become remembered and all impulses shorter than 0, 5s cause only turning on or off the relay. The load capacity of the relay is - 300W. Fig... shows the work sequence of the dim device SMR-S. Fig.... shows the way, how to connect dim device to the installation box with the connector.

Fig. 4 page 11

Fig. 3 page 12

8. Digital time relay SHT - 2 – master control clock

Photo SHT-2

Digital time relay SHT - 2 is intended to the control two double connections points of switching (the channel 1 and the channel 2) with load capacity of 16 A each (AC 1) according to the daily, weekly, monthly and yearly (up to year 2099). Device is adapted for supply voltage AC 230 V or for the universal version AC /DC 12 - 240 V (UNI). The liquid crystal display situated on the frontal plate of the relay displays the up to date current time, date, day of week and the current state of the channel 1 and 2. Daylight Saving Time on winter- and vice versa takes place automatically. Programming functions, as well as time and date stetting, are done through the programming push buttons situated under the main display. Each programming steps are signaled by sound alarm. The relay has the built-in alkaline battery, which preserves reserve- power supply for the period of 50 hours.

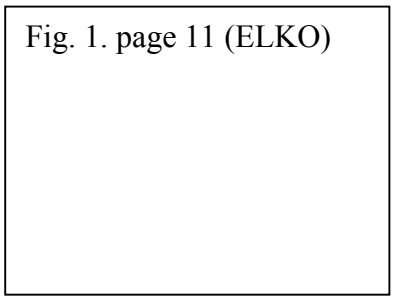


Fig. 1. page 11 (ELKO)

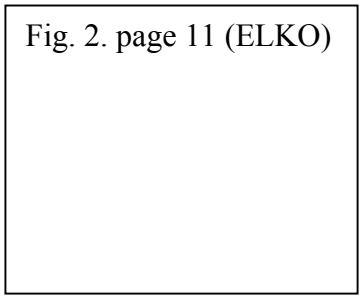
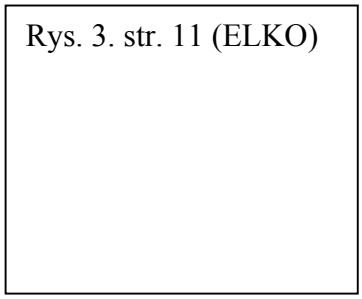


Fig. 2. page 11 (ELKO)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