NEED-...-08-4...
programmable relays

NEED-...-22-...-D NEED-...-11-...

- Programmable relays with LCD display or without display, exceptional simplicity of programming in language LAD and STL - page 5
- 8 inputs: AC or DC voltages • 4 outputs: relay or transistor
- LED signaling the status of the relay and inputs/outputs • Cooperation with communication modules NEED-MODBUS • Mounting on 35 mm rail mount or on panel mounting • Control of applications - page 6
- Compliance with standards EN 61131-2, EN 50178
- Recognitions, certifications, directives: RoHS, $C\epsilon$ EHL

Supply voltage

Rated supply voltage	50/60 Hz AC	230 V	
	DC	12, 24, 220 V	
Operating range of supply voltage		230 V AC: 95...260 V AC	12 V DC: 10,2...14,4 V DC
		24 V DC: 19,6...28,8 V DC	220 V DC: 154...242 V DC
Rated power consumption	AC	< 8,0 VA	
	DC	< 3,0 W	
Range of supply frequency	AC	47...63 Hz	

Inputs

Number of digital inputs		6 (I1 - I6)	
Number and type of analog-digital inputs		2 (I7 - I8) AC or DC voltage	
Rated voltage	• for logic state "1"	230 V AC: 85...260 V AC 50 Hz	12 V DC: 8...26 V DC
		24 V DC: 15...40 V DC	220 V DC: 80...260 V DC
	• for logic state "0"	230 V AC: 0...40 V AC 50 Hz	12 V DC: -1,5...4 V DC
		24 V DC: -3...5 V DC	220 V DC: 0...40 V DC
Input current for logic state "1" ❶		230 V AC: 0,6 mA (I1 - I4) 8,0 mA (I5 - I6) 0,9 mA (I7 - I8)	
		12 V DC: 3,3 mA (I1 - I6) 1,1 mA (I7 - I8)	
		24 V DC: 3,3 mA (I1 - I6) 2,0 mA (I7 - I8)	
		220 V DC: 0,6 mA (I1 - I6) 1,1 mA (I7 - I8)	
Range of analog input signals		230 V AC: 0...255 V AC 50 Hz	
		12 V DC, 24 V DC: 0...12,75 / 0...25,5 V DC	
		220 V DC: 0...255 V DC	

Outputs

Number and type of outputs		relay: 4 NO (Q1 - Q4) ❷	
		transistor: 4 NO (Q1 - Q4) ❸	
Max. voltage		250 V AC ❷, 30 V DC ❸	
Min. voltage		10 V ❷	
Rated load	AC1	10 A / 250 V AC ❷	
	DC1	0,5 A / 24 V DC ❸	
Min. current		10 mA ❷ 1 mA ❸	
Resistance		≤ 100 mΩ ❷	

Insulation according to EN 60664-1

Insulation rated voltage	300 V AC	
Rated surge voltage • inputs - outputs	2 500 V 1,2 / 50 µs	
Overvoltage category	II	
Insulation pollution degree	2	
Dielectric strength • inputs - outputs	2 000 V AC	type of insulation: reinforced
• contact clearance	1 000 V AC	type of clearance: micro-disconnection ❷

General data

Operating / release time (typical values)	7 ms / 3 ms ❷	
Electrical life • resistive AC1	> 0,7 x 10⁵	10 A, 250 V AC ❷
• DC L/R=40 ms	> 10⁵	0,15 A, 220 V DC ❷
Mechanical life (cycles)	> 3 x 10⁷	
Dimensions (L x W x H)	90 x 72 x 55 mm	
Weight	max. 250 g	
Ambient temperature • storage	-40...+70 °C	
(non-condensation and/or icing) • operating	-20...+55 °C	
Cover protection category	IP 20	EN 60529

❶ At rated voltage U_n.   ❷ Versions with unprotected relay outputs.   ❸ Version 24 V DC with protected transistor outputs: max. off-state leakage current < 0,1 mA; max. on-state voltage drop on the connection < 2,5 V.

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Physical resources

Mode switch	STOP/RUN
LCD display ❹	preview of variables, illuminated, of high contrast (4 lines 12 characters each)
Keyboard ❹	set of program parameters
Programmable function buttons ❹	4 (B1 - B4)
LED indicators	three-colour LED - relay status (green: RUN, yellow: STOP, red: ERROR) yellow LEDs - output status green LEDs - input status
Internal potentiometer ❺	for analog value setting
Real time RTC clock	with automatic time change summer / winter for various time zones (EU, GB, US, RU)
Connection with stopper	for relay programming and external memory card connection

Program resources

Timers ❻	NEED-...-22-...-D: 32 (T1 - T32) NEED-...-11-...: 8 (T1 - T8) time range 10 ms...99 h 59 min., resolution 10 ms, accuracy ±1% of the set value +0...1 ms
Bidirectional counters ❻	8 (C1 - C8), values 0-65535
Fast bidirectional counter / meter ❹	measurement of frequency up to 20 kHz (digital input I4)
Clocks	NEED-...-22-...-D: 8 (H1 - H8) NEED-...-11-...: 4 (H1 - H4)
Comparators of analog values	NEED-...-22-...-D: 16 (A1 - A16) NEED-...-11-...: 8 (A1 - A8)
Markers	NEED-...-22-...-D: 64 (M1 - M64) NEED-...-11-...: 16 (M1 - M16)
Text markers ❹	8 (MT1 - MT8)

System structure

NEED-...	programmable relay (see "Table of codes")
NEED-PC-15B (RS-232) NEED-PC-15C (USB)	cables for programming and diagnostics, for connection to PC computer
NEED-M-4KB (NEED-...-22-...-D) NEED-M-1KB (NEED-...-11-...)	external memory cards (4 kB or 1 kB) ❼
PC NEED	software for editing, compiling, programming of the relay and the external memory card (language: graphic LAD and text STL), user's manual: www.need.com.pl
NEED-MODBUS	communication module NEED Master / ModBus RTU Slave

❹ Only for NEED-...-22-...-D   ❺ For versions 12 V DC, 24 V DC: possibility of connecting external potentiometer.   ❻ Possibility of configuration from analog inputs.   ❼ The external memory card is not required and is an optional extension of the relay program memory.
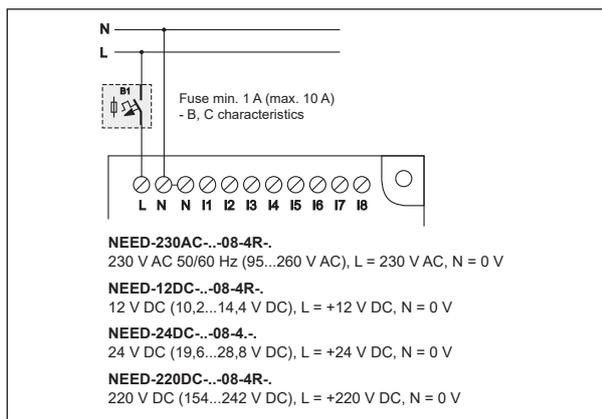
Front panel description
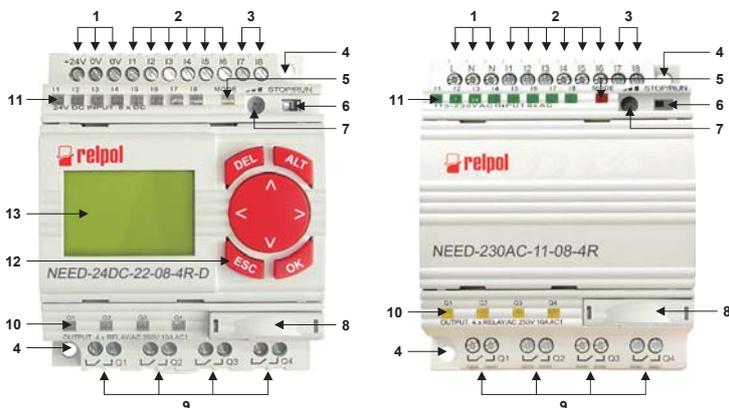
1 Supply terminals
2 Digital input terminals
3 Analog-digital input terminals
4 Openings of 5,5 mm diameter for panel mounting with two M4 screws
5 LED indicator (three-colour) of the relay status
6 STOP/RUN mode switch
7 Potentiometer for analog value setting
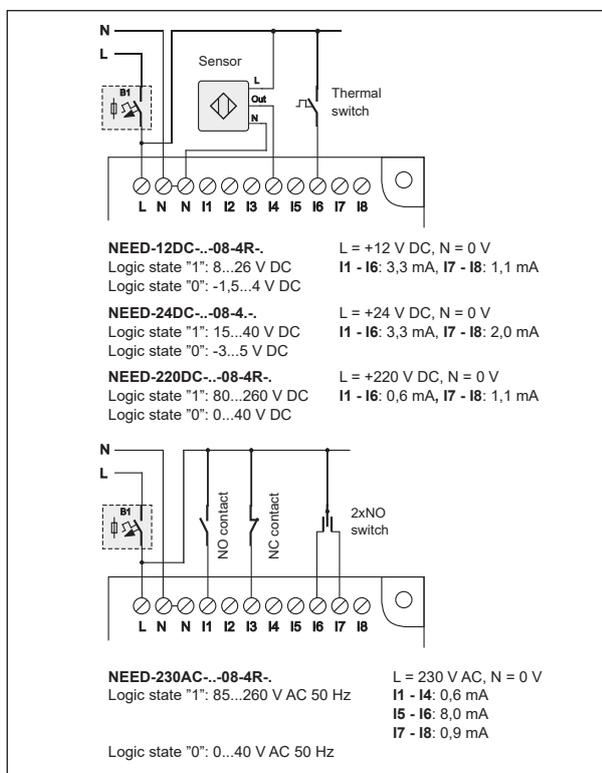**8** Relay programming and external memory card connection, secured by stopper
9 Output terminals
10 LED indicators (yellow) of output status
11 LED indicators (green) of input status
12 Keyboard
13 LCD display

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Connection diagram - supply connection

NEED-230AC-..-08-4R-.
230 V AC 50/60 Hz (95...260 V AC), L = 230 V AC, N = 0 V

NEED-12DC-..-08-4R-.
12 V DC (10,2...14,4 V DC), L = +12 V DC, N = 0 V

NEED-24DC-..-08-4.-.
24 V DC (19,6...28,8 V DC), L = +24 V DC, N = 0 V

NEED-220DC-..-08-4R-.
220 V DC (154...242 V DC), L = +220 V DC, N = 0 V

Connection diagrams - digital inputs

NEED-12DC-..-08-4R-.	L = +12 V DC, N = 0 V
Logic state "1": 8...26 V DC	**I1 - I6**: 3,3 mA, **I7 - I8**: 1,1 mA
Logic state "0": -1,5...4 V DC	
NEED-24DC-..-08-4.-.	L = +24 V DC, N = 0 V
Logic state "1": 15...40 V DC	**I1 - I6**: 3,3 mA, **I7 - I8**: 2,0 mA
Logic state "0": -3...5 V DC	
NEED-220DC-..-08-4R-.	L = +220 V DC, N = 0 V
Logic state "1": 80...260 V DC	**I1 - I6**: 0,6 mA, **I7 - I8**: 1,1 mA
Logic state "0": 0...40 V DC	

NEED-230AC-..-08-4R-.
Logic state "1": 85...260 V AC 50 Hz

L = 230 V AC, N = 0 V
I1 - I4: 0,6 mA
I5 - I6: 8,0 mA
I7 - I8: 0,9 mA

Logic state "0": 0...40 V AC 50 Hz

Connection diagram - analog-digital inputs

① Voltage

NEED-230AC-..-08-4R-.
0...255 V AC 50 Hz ①   **I7 - I8**: 0,9 mA

NEED-12DC-..-08-4R-.
0...12,75 / 0...25,5 V DC ①   **I7 - I8**: 1,1 mA

NEED-24DC-..-08-4.-.
0...12,75 / 0...25,5 V DC ①   **I7 - I8**: 2,0 mA

NEED-220DC-..-08-4R-.
0...255 V DC ①   **I7 - I8**: 1,1 mA
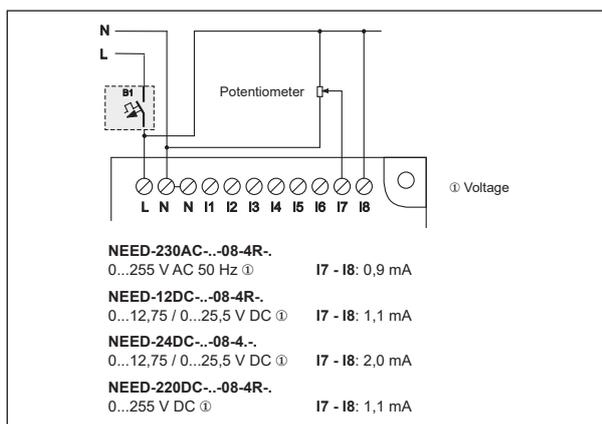
Connection diagrams - digital outputs

NEED-...-08-4R-.
relay outputs Q1 - Q4: 10 A, 250 V AC

NEED-24DC-..-08-4T-.
transistor outputs Q1 - Q4: 0,5 A, 24 V DC

Mechanical mounting

Mounting

Sub-assemblies
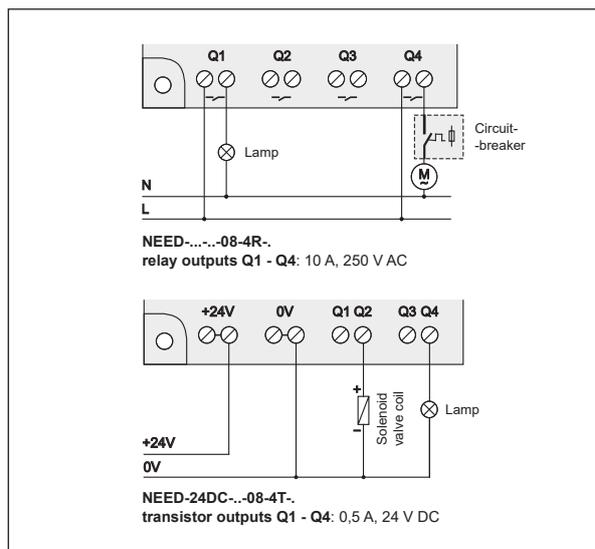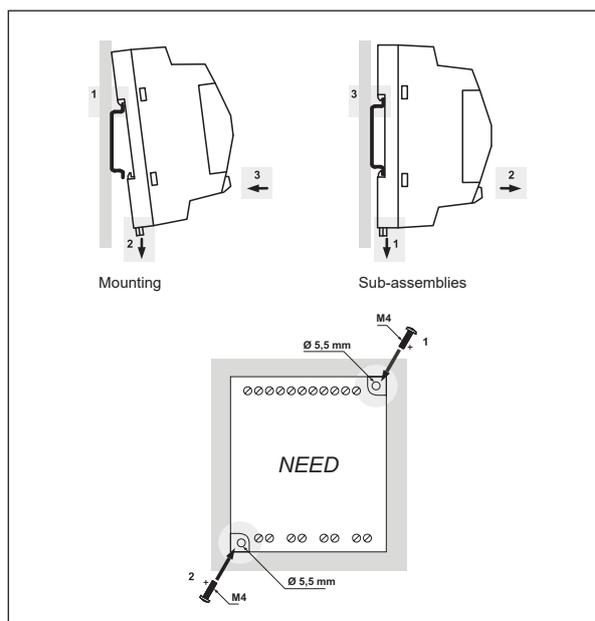
Any operation position - mounting distances for walls with terminals

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Dimensions

NEED-…-22-…-D **NEED-…-11-…**
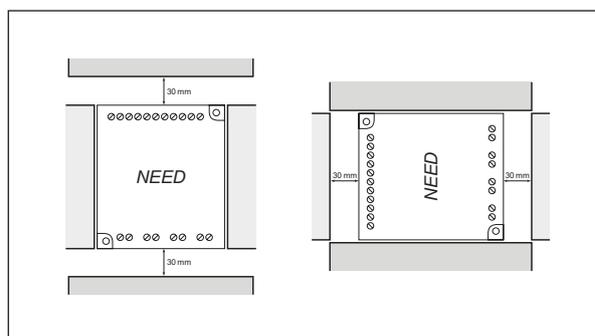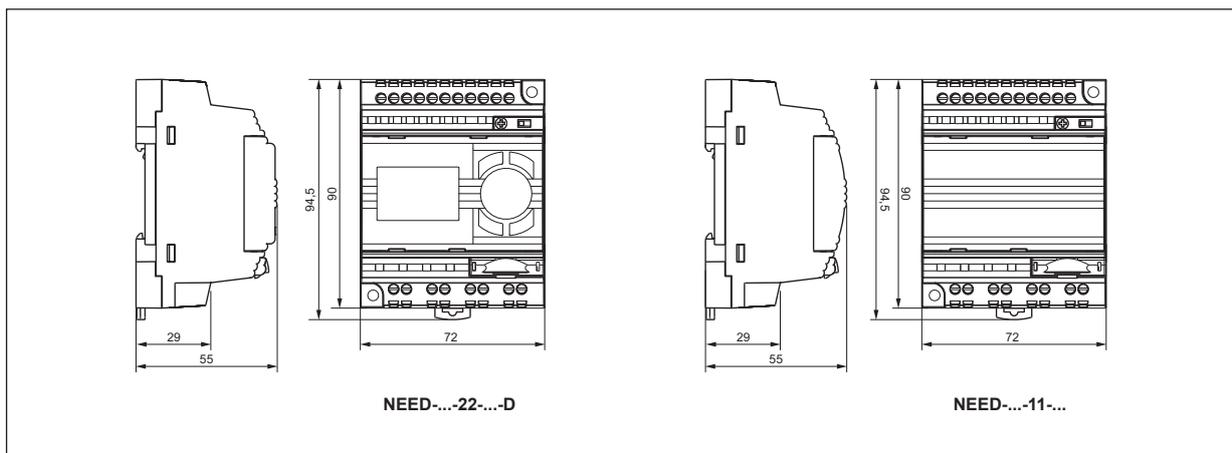
Mounting, connection to PC computer

Relays **NEED-…-08-4…** are designed for direct mounting on 35 mm rail mount acc. to EN 60715 or on panel mounting with two M4 screws). Operational position - any. **Connections:** max. cross section of the cables:1 x 2,5 mm^2 / 2 x 1,0 mm^2 (1 x 14 / 2 x 17 AWG), cables to PC computer: **NEED-PC-15B** (RS-232), **NEED-PC-15C** (USB).

Table of codes
Table 1

Programmable relay code	Supply voltage	Version	Number of inputs	Number and type of outputs	Equipment
NEED-230AC-22-08-4R-D	230 V AC	22	8	4 relay	LCD display, keyboard
NEED-230AC-11-08-4R	230 V AC	11	8	4 relay	–
NEED-12DC-22-08-4R-D	12 V DC	22	8	4 relay	LCD display, keyboard
NEED-12DC-11-08-4R	12 V DC	11	8	4 relay	–
NEED-24DC-22-08-4R-D	**24 V DC**	**22**	**8**	**4 relay**	**LCD display, keyboard**
NEED-24DC-11-08-4R	**24 V DC**	**11**	**8**	**4 relay**	**–**
NEED-24DC-22-08-4T-D	24 V DC	22	8	4 transistor	LCD display, keyboard
NEED-24DC-11-08-4T	24 V DC	11	8	4 transistor	–
NEED-220DC-22-08-4R-D	220 V DC	22	8	4 relay	LCD display, keyboard
NEED-220DC-11-08-4R	220 V DC	11	8	4 relay	–

The data in bold type relate to the standard versions of the relays.

PRECAUTIONS:
1. Ensure that the parameters of the product described in its specification provide a safety margin for the appropriate operation of the device or system and never use the product in circumstances which exceed the parameters of the product. **2.** Never touch any live parts of the device. **3.** Ensure that the product has been connected correctly. An incorrect connection may cause malfunction, excessive heating or risk of fire. **4.** In case of any risk of any serious material loss or death or injuries of humans or animals, the devices or systems shall be designed so to equip them with double safety system to guarantee their reliable operation.

Exceptional simplicity of programming

Software PC NEED

A computer program which allows editing, compiling and downloading of a program to the memory of a program-mable relay.

The resources of the relay may be monitored in course of operation, owing to which the user may be currently informed about the status of the inputs, outputs, timers, counters, clocks, com-parators, etc.

The simplicity and variety of the pro-gram edition (text or graphics) make the PC NEED a very convenient tool, owing to which even complex applications are made very quickly, and their start-up time is short.

Hardware requirements: any computer of PC class with RS-232 or USB inter-face and VGA graphic card, operating system – Windows 2000®, Windows XP®, Windows Vista®, Windows 7®, Windows 8®.

Program printout:
- LAD or STL,
- configuration parameters.

Preview of variables:
- possibility to monitor the relay's resources.

Resources settings:
- possibility to set the parameters of timers, counters, clocks, comparators, etc.,
- simple operation and understandable menu,
- editable alert texts and definitions of keyboard buttons.

STL language:
- possibility of conversion from LAD to text language,
- possibility of programming in text editor and further copying of the application,
- the language syntax highlighted,
- setting customized colors and fonts.
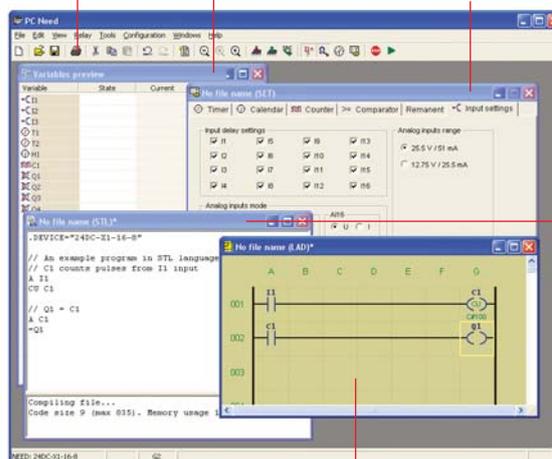
LAD language:
- simplicity of programming which allows quick application designing,
- symbolic labels of individual elements,
- easy creation of applications based upon an electrical chart,
- possibility of inserting comments, color and font configurations,
- ladder preview to facilitate the start of the software.
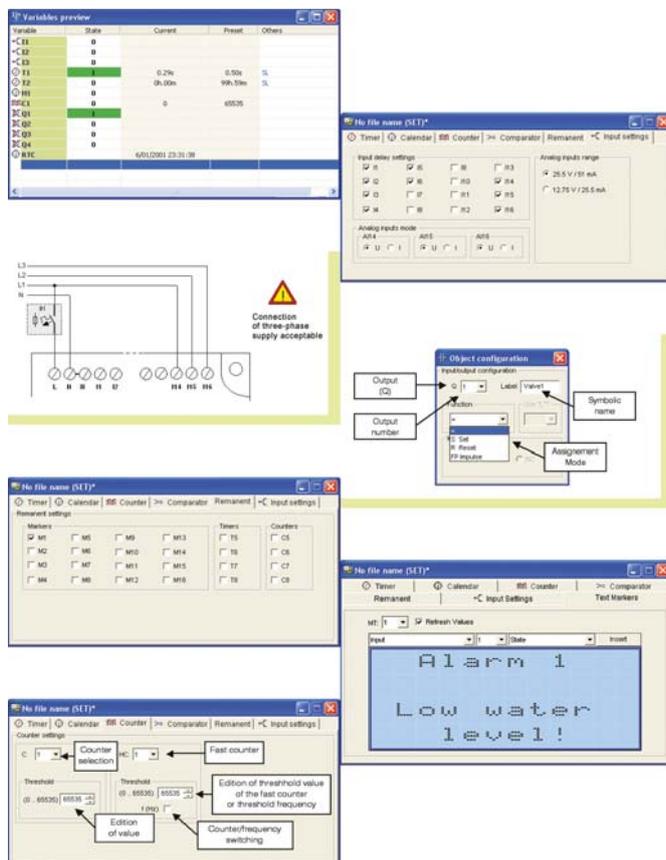
Functions of NEED relay

The NEED programmable relay is a product based on the Polish know-how which is perfectly imple-mented in applications of industrial automatics. The relay is an interesting alternative for similar solutions offered by other manufacturers due to its numerous outstanding advantages.

1) Preview of variables as a tool for monitoring all the resources in the relay.

2) A wide range of analog-digital inputs and possibility of configuration of DC inputs as voltage or current ones.

3) The mode of monitoring three-phase voltage for the 230AC-…-16-8R-. version.

4) Possibility to read the program structure exi-sting in the relay, including the symbolic names assigned to individual elements.

5) Remanence mode - possibility of identifying some resources of the relay, which might be maintained when the supply voltage is off.

6) Fast bidirectional counter / meter of frequency - measurement up to 20 kHz.

7) Edition of texts of alerts shown on the display, which include the variables of the relay.

8) Four keys of the keyboard to be used in LAD or STL languages.

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Control of applications

Management of a parking lot with limited number of places

The parking lot may operate in timing mode (from ... to ...) or in permanent mode. The sensors at the entrance and exit help to define the number of cars in the parking lot and to compare the number with the preset number of places. When the maximum number of vehicles are parked, the information "NO PLACES AVAILABLE" is lit at the entrance. Additionally, the entrance gate remains closed as long as a vehicle leaves the parking lot.

Controller of two pumps – direct start-up

Alternate operation of pumps - automatic or manual. Sequence control of the pumps - two levels of switching on, one level of switching off. Automatic start-up of the second pump in case of a failure of the first one. Protection against dry operation. Outlets to the external alarm signaling (failure of the pump).

Control of a machine for wire mesh production

Control of the squashing unit which bends the end parts of the wires of the mesh so to avoid injuries. The design of the unit is based on two pneumatic servo-motors connected to the compressed air supply source. The control system protects also against failures in course of production.

Segregation of details in production process

Segregation of details on stroke feed according to their height. Two height sensors of the appropriate range.

Control of lighting and drives of ventilators

Voltage central switching on and off - manual or automatic switching according to timing schedule. Possibility of flexible shaping of the function of lighting for each room.

Control of moving stairways

Control of the direction of movement (up and down). Detection of passengers on the stairway on the basis of the signals from movement detectors.

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