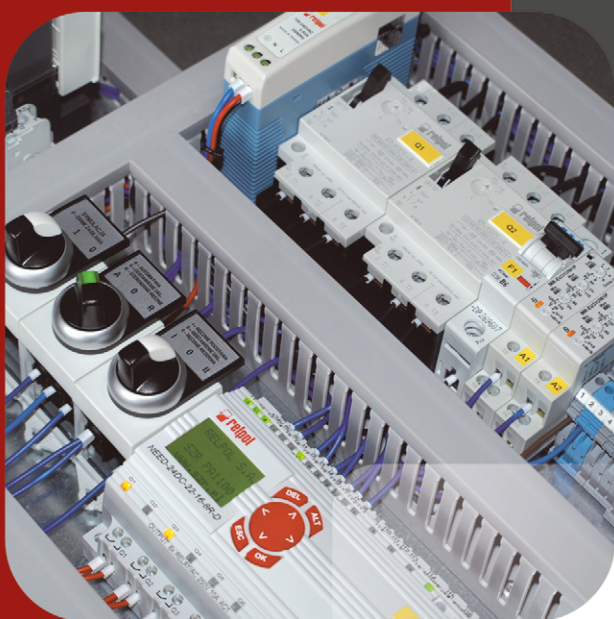


Programmable relays NEED



relay outputs
transistor outputs
communication
modules
NEED-MODBUS



www.relpol.com.pl
2014 - 2015

NEED

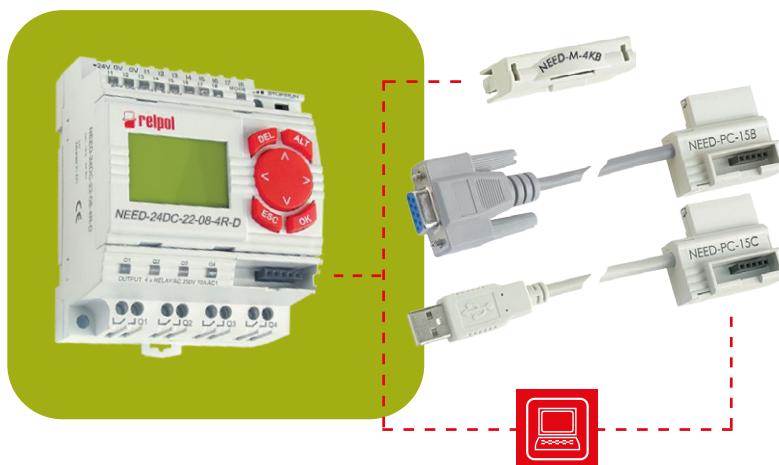
programmable relays

Why is NEED outstanding

- data reading from NEED with the use of **NEED-MODBUS module (NEW)** – availability of values, transmission of control commands, modification of the RTC clock setting,
- **illuminated LCD display** of high contrast (4 lines 12 characters each) and **keyboard**,
- **exceptional simplicity of programming** – program parameters to be set with the keyboard, preview of variables on the display and four user-programmable buttons of the keyboard,
- measurement of voltages 0...255 V AC; 0...12,75 / 0...25,5 V DC; 0...255 V DC and currents 0...25,5 mA / 0...51 mA (depending on the version),
- LED signaling the status of the relay and inputs / outputs,
- possibility of configuration of DC analog-digital inputs as voltage or current ones,
- relay outputs or **transistor outputs (NEW)**,
- possibility of monitoring of three-phase voltage for 230AC-...-16-8R- version (equipment control of asymmetry and phase sequence),
- internal potentiometer, possibility of connecting external potentiometer in versions 12 V DC, 24 V DC,
- real time RTC clock with automatic time change summer / winter,
- possibility of configuration of timers and bidirectional counters from analog inputs,
- fast bidirectional counter / meter of frequency – measurement up to 20 kHz,
- co-operation with the external memory,
- programming in graphic language LAD or text language STL,
- free PC NEED software,
- competitive price,
- **service and technical counseling provided by Relpol S.A.**

System structure

- **NEED-...** - programmable relay (see below),
- **NEED-PC-15B (RS232), NEED-PC-15C (USB)** - cables for programming and diagnostics, for connection to PC computer,
- **NEED-M-4KB, NEED-M-1KB** - external memory cards (NEED-...-22-...-D: 4 kB, NEED-...-11-...-D: 1 kB) ,
- **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 (page 8).



Ordering codes

Programmable relays	Supply voltage	Characteristic			
		version	inputs	outputs	features
NEED-230AC-22-08-4R-D	230 V AC	22	8 inputs	4 relay outputs	LCD display, keyboard
NEED-230AC-11-08-4R	230 V AC	11	8 inputs	4 relay outputs	–
NEED-12DC-22-08-4R-D	12 V DC	22	8 inputs	4 relay outputs	LCD display, keyboard
NEED-12DC-11-08-4R	12 V DC	11	8 inputs	4 relay outputs	–
NEED-24DC-22-08-4R-D	24 V DC	22	8 inputs	4 relay outputs	LCD display, keyboard
NEED-24DC-11-08-4R	24 V DC	11	8 inputs	4 relay outputs	–
NEED-24DC-22-08-4T-D	24 V DC	22	8 inputs	4 transistor outputs	LCD display, keyboard
NEED-24DC-11-08-4T	24 V DC	11	8 inputs	4 transistor outputs	–
NEED-220DC-22-08-4R-D	220 V DC	22	8 inputs	4 relay outputs	LCD display, keyboard
NEED-220DC-11-08-4R	220 V DC	11	8 inputs	4 relay outputs	–
NEED-230AC-22-16-8R-D	230 V AC	22	16 inputs	8 relay outputs	LCD display, keyboard
NEED-230AC-11-16-8R	230 V AC	11	16 inputs	8 relay outputs	–
NEED-12DC-22-16-8R-D	12 V DC	22	16 inputs	8 relay outputs	LCD display, keyboard
NEED-12DC-11-16-8R	12 V DC	11	16 inputs	8 relay outputs	–
NEED-24DC-22-16-8R-D	24 V DC	22	16 inputs	8 relay outputs	LCD display, keyboard
NEED-24DC-11-16-8R	24 V DC	11	16 inputs	8 relay outputs	–
NEED-24DC-22-16-8T-D	24 V DC	22	16 inputs	8 transistor outputs	LCD display, keyboard
NEED-24DC-11-16-8T	24 V DC	11	16 inputs	8 transistor outputs	–
NEED-220DC-22-16-8R-D	220 V DC	22	16 inputs	8 relay outputs	LCD display, keyboard
NEED-220DC-11-16-8R	220 V DC	11	16 inputs	8 relay outputs	–

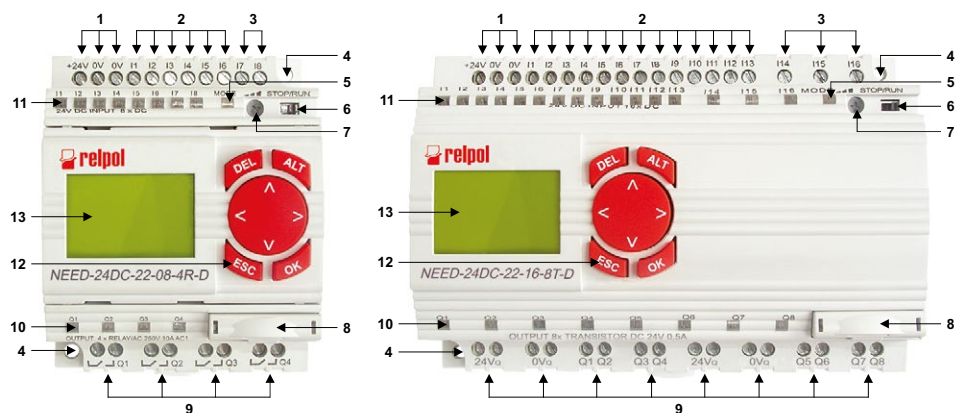
The data in bold type pertain to the standard versions of the relays.

Resources available in the relay

Physical resources	NEED-...-22-08-4.-D	NEED-...11-08-4.	NEED-...-22-16-8.-D	NEED-...-11-16-8.
STOP/RUN mode switch	yes	yes	yes	yes
LCD display, keyboard	yes	no	yes	no
Programmable function buttons	4 (B1 - B4)	no	4 (B1 - B4)	no
LED indicators of: - the relay status - input / output status	LED three-coloured ② LED green / yellow	LED three-coloured ② LED green / yellow	LED three-coloured ② LED green / yellow	LED three-coloured ② LED green / yellow
Inputs	6 digital inputs (I1 - I6) ③ + 2 analog-digital inputs (I7 - I8)	6 digital inputs (I1 - I6) + 2 analog-digital inputs (I7 - I8)	13 digital inputs (I1 - I13) ③ + 3 analog-digital inputs (I14 - I16)	13 digital inputs (I1 - I13) + 3 analog-digital inputs (I14 - I16)
Outputs	4 relay outputs or transistor outputs ④ (Q1 - Q4)	4 relay outputs or transistor outputs ④ (Q1 - Q4)	8 relay outputs or transistor outputs ④ (Q1 - Q8)	8 relay outputs or transistor outputs ④ (Q1 - Q8)
Internal potentiometer ⑤	yes	yes	yes	yes
RTC clock ⑥	yes	yes	yes	yes
Connection with stopper ⑦	yes	yes	yes	yes
Three-phase network equipment control system	no	no	yes ⑧	yes ⑧
Program resources	NEED-...-22-08-4.-D	NEED-...11-08-4.	NEED-...-22-16-8.-D	NEED-...-11-16-8.
Timers ⑨ ⑩	32 (T1 - T32)	8 (T1 - T8)	32 (T1 - T32)	16 (T1 - T16)
Bidirectional counters ⑩	8 (C1 - C8) values 0-65535	8 (C1 - C8) values 0-65535	8 (C1 - C8) values 0-65535	8 (C1 - C8) values 0-65535
Fast bidirectional counter / meter of frequency up to 20 kHz	yes ③	no	yes ③	no
Clocks	8 (H1 - H8)	4 (H1 - H4)	8 (H1 - H8)	4 (H1 - H4)
Comparators of analog values	16 (A1 - A16)	8 (A1 - A8)	16 (A1 - A16)	12 (A1 - A12)
Markers	64 (M1 - M64)	16 (M1 - M16)	64 (M1 - M64)	16 (M1 - M16)
Text markers	8 (MT1 - MT8)	no	8 (MT1 - MT8)	no
Marker of phase sequence	no	no	yes ⑧	yes ⑧

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-coloured ②) 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 ⑦
- 9 Output terminals
- 10 LED indicators (yellow) of output status
- 11 LED indicators (green) of input status
- 12 Keyboard
- 13 LCD display



① The external memory card is not required and is an optional extension of the relay program memory. ② Green: RUN, yellow: STOP, red: ERROR. ③ Digital inputs I4 (NEED-...-08-4.-D) and I11 (NEED-...-16-8.-D) may function as a fast bidirectional counter / meter of frequency. ④ Transistor outputs: only for version 24 V DC. ⑤ For analog value setting. For versions 12 V DC, 24 V DC: possibility of connecting external potentiometer. ⑥ Real time RTC clock with automatic time change summer / winter for various time zones (EU, GB, US, RU). ⑦ Only for version 230 V AC: monitoring of voltage, asymmetry and phase sequence. ⑧ Time range 10 ms...99 h 59 min., resolution 10 ms, accuracy $\pm 1\%$ of the set value $+0...1$ ms. ⑩ Possibility of configuration from analog inputs.

Software PC NEED

A computer program which allows editing, compiling and downloading of a program to the memory of a programmable 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, comparators, etc.

The simplicity and variety of the program 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 RS232 or USB interface 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:

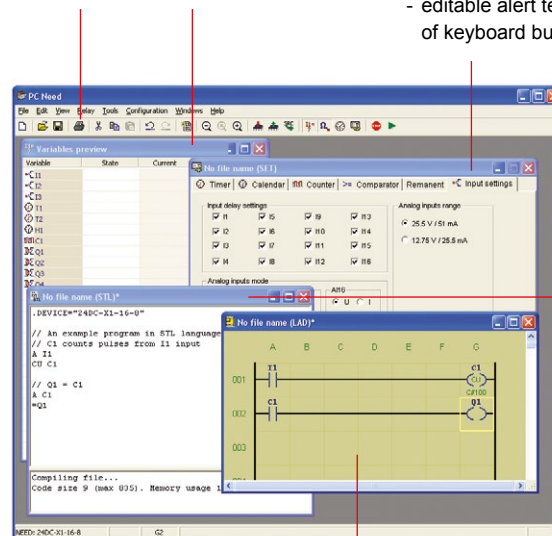
- possibility to monitor the relay's resources.

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.



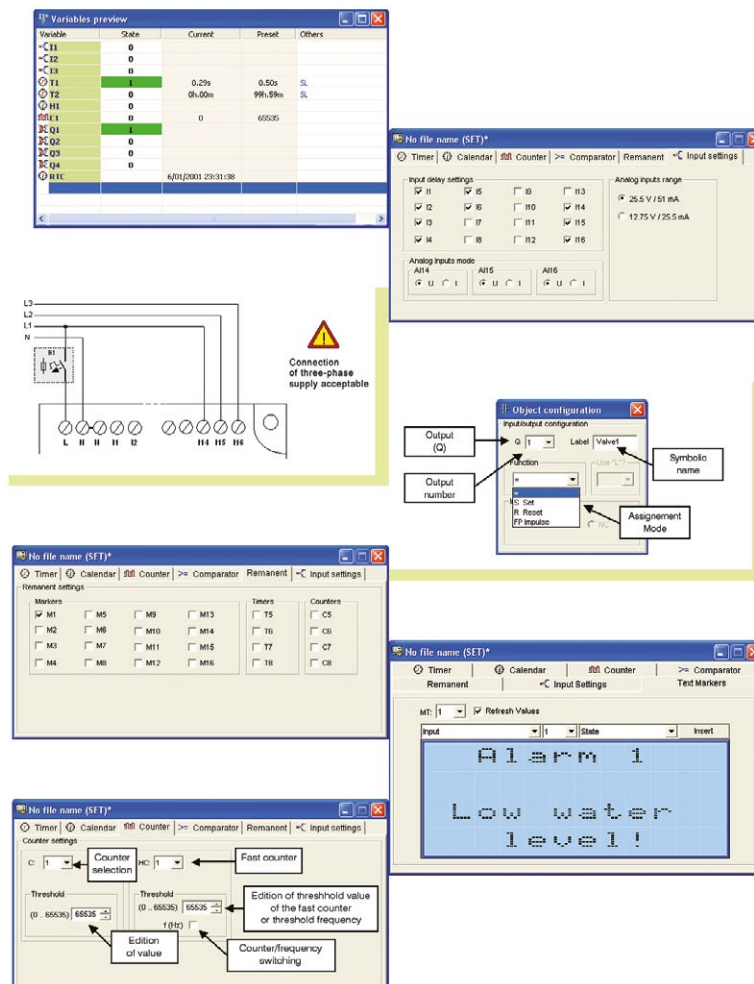
LAD language:

- 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.

Never before – NEED

The **NEED** programmable relay is a product based on the Polish know-how which is perfectly implemented 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 existing 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.





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

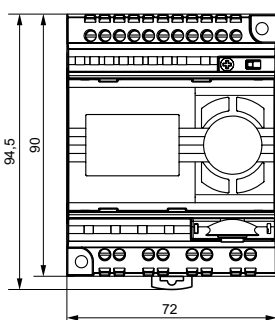
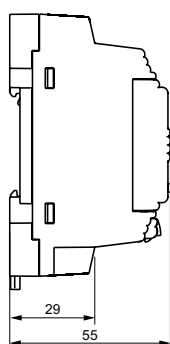
Control of the direction of movement (up and down).

Detection of passengers on the stairway on the basis of the signals from movement detectors.

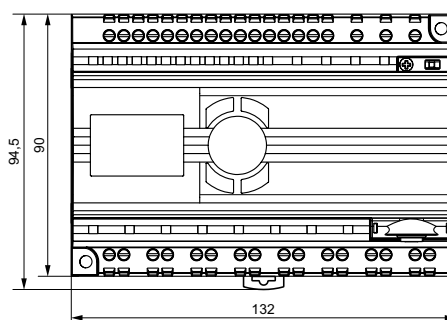
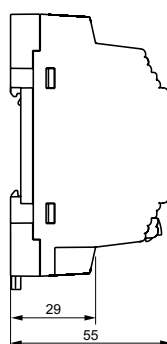


	NEED-230AC-...	NEED-24DC-...	NEED-12DC-...	NEED-220DC-...
Supply voltage				
Rated voltage	230 V AC 50/60 Hz ②	24 V DC	12 V DC	220 V DC
Voltage (operating range)	95...260 V AC	19,6...28,8 V DC	10,2...14,4 V DC	154...242 V DC
Power consumption ①	...-08-4...: < 8 VA ...-16-8...: < 10 VA	< 3 W < 5 W	< 3 W < 5 W	< 3 W < 6 W
Inputs				
Number of digital inputs	6 (I1 - I6) - NEED-...-08-4R(or 4T)-.		13 (I1 - I13) - NEED-...-16-8R(or 8T)-.	
Number of analog-digital inputs	2 (I7 - I8) - NEED-...-08-4R(or 4T)-.		3 (I14 - I16) - NEED-...-16-8R(or 8T)-.	
Types of analog-digital inputs	AC voltage	DC voltage ③		DC voltage
Rated voltage				
• for logic state „1“	85...260 V AC 50 Hz	15...40 V DC	8...26 V DC	80...260 V DC
• for logic state „0“	...-08-4...: 0...40 V AC 50 Hz ...-16-8...: 0...32 V AC 50 Hz	-3...5 V DC	-1,5...4 V DC	0...40 V DC
Input current	...-08-4...:	3,3 mA (I1 - I6)	3,3 mA (I1 - I6)	0,6 mA (I1 - I6)
• for logic state „1“ ①				
	0,6 mA (I1 - I4)			
	8,0 mA (I5 - I6)	2,0 mA (I7 - I8)	1,1 mA (I7 - I8)	1,1 mA (I7 - I8)
	0,9 mA (I7 - I8)			
	0,6 mA (I1 - I11)	3,3 mA (I1 - I13)	3,3 mA (I1 - I13)	0,6 mA (I1 - I13)
	8,0 mA (I12 - I13)			
	1,5 mA (I14 - I16)	2,0 mA (I14 - I16)	1,1 mA (I14 - I16)	1,1 mA (I14 - I16)
Range of analog input signals	0...255 V AC 50 Hz	0...12,75 / 0...25,5 V DC		0...255 V DC
		0...25,5 / 0...51 mA ④		
Outputs				
Number and type	...-08-4...:	4 NO (Q1 - Q4) ⑤	4 NO (Q1 - Q4) ⑤	4 NO (Q1 - Q4) ⑤
of outputs	...-16-8...:	8 NO (Q1 - Q8) ⑤	8 NO (Q1 - Q8) ⑤	8 NO (Q1 - Q8) ⑤
Min. voltage		10 V ⑤	10 V ⑤	10 V ⑤
Max. voltage		30 V DC ⑥		
Rated load	AC1	10 A / 250 V AC ⑤	10 A / 250 V AC ⑤	10 A / 250 V AC ⑤
	DC1	0,5 A / 24 V DC ⑥		
Min. current		10 mA ⑤	10 mA ⑤	10 mA ⑤
Resistance		< 100 mΩ ⑤		
Operating / release time		typical values: 7 ms / 3 ms ⑤		
Electrical life		AC1: > 0,7 x 10 ⁵ 10 A, 250 V AC	L/R = 40 ms: > 10 ⁵ 0,15 A, 220 V DC ⑤	
Mechanical life		cycles: > 3 x 10 ⁷		
General data				
Insulation rated voltage		300 V AC		
Rated surge voltage		inputs - outputs: 2 500 V 1,2 / 50 μs		
Overvoltage category		II PN-EN 60664-1		
Insulation pollution degree		2		
Dielectric strength		inputs - outputs: 2 000 V AC ⑦	contact clearance: 1 000 V AC ⑤ ⑧	
Dimensions (L x W x H) / Weight	...-08-4...:	90 x 72 x 55 mm / 210 g	...-16-8...: 90 x 132 x 55 mm / 370 g	
Ambient temperature		storage: -40...+70 °C	operating: -20...+55 °C	
Cover protection category		IP 20 PN-EN 60529		
Standards, recognitions, certific.		PN-EN 61131-2, PN-EN 50178  		

① At rated voltage U_n. ② Tolerance 47...63 Hz. ③ Relays ...-16-8...: for versions 12 V DC and 24 V DC it is possible to program configuration the type of inputs as voltage or current ones. ④ Relays ...-16-8...: range for current mode in versions DC. ⑤ Versions with unprotected relay outputs. ⑥ Version 24 V DC with protected transistor outputs: max. off-state leakage current < 0,1mA; max. on-state voltage drop on the connection < 2,5 V. ⑦ Type of insulation: reinforced. ⑧ Type of clearance: micro-disconnection.

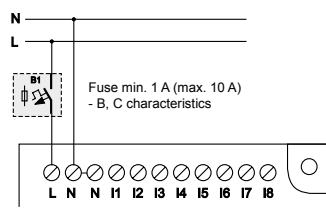


NEED-...-22-08-4-D



NEED-...-22-16-8-D

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-

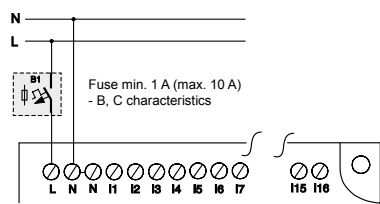
12 V DC (10,2...14,4 V DC), L = +12 V DC, N = 0 V

NEED-24DC...-08-4R-

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



NEED-230AC...-16-8R-

230 V AC 50/60 Hz (95...260 V AC), L = 230 V AC, N = 0 V

NEED-12DC...-16-8R-

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

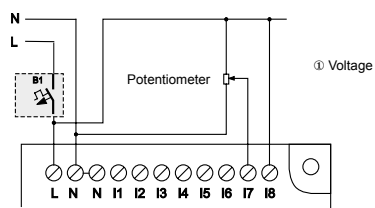
NEED-24DC...-16-8R-

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

NEED-220DC...-16-8R-

220 V DC (150...242 V DC), L = +220 V DC, N = 0 V

Analog-digital inputs



NEED-230AC...-08-4R-

0...255 V AC 50 Hz ① I7 - I8: 0,9 mA

NEED-12DC...-08-4R-

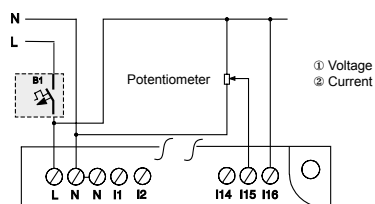
0...12,75 / 0...25,5 V DC ① I7 - I8: 1,1 mA

NEED-24DC...-08-4R-

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



NEED-230AC...-16-8R-

0...255 V AC 50 Hz ① I14 - I16: 1,5 mA

NEED-12DC...-16-8R-

0...12,75 / 0...25,5 V DC ① I14 - I16: 1,1 mA

NEED-24DC...-16-8R-

0...12,75 / 0...25,5 V DC ① I14 - I16: 1,1 mA

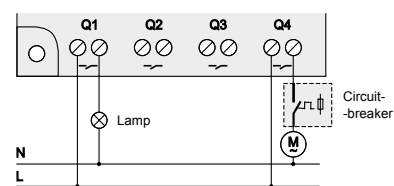
NEED-220DC...-16-8R-

0...255 V DC ① I14 - I16: 2,0 mA

NEED-220DC...-16-8R-

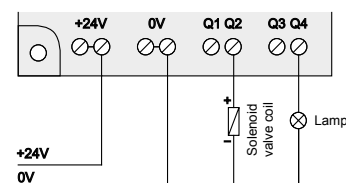
0...255 V DC ① I14 - I16: 1,1 mA

Digital outputs



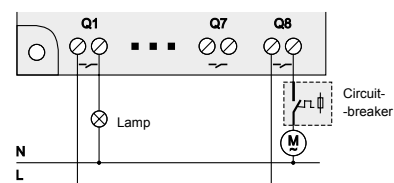
NEED-...-08-4R-

relay outputs Q1 - Q4: 10 A, 250 V AC



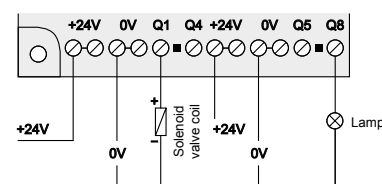
NEED-24DC...-08-4T-

transistor outputs Q1 - Q4: 0,5 A, 24 V DC



NEED-...-16-8R-

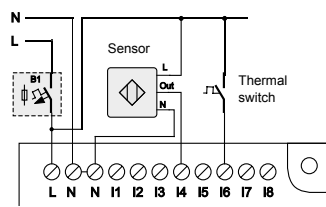
relay outputs Q1 - Q8: 10 A, 250 V AC



NEED-24DC...-16-8T-

transistor outputs Q1 - Q8: 0,5 A, 24 V DC

Digital inputs



NEED-12DC...-08-4R-

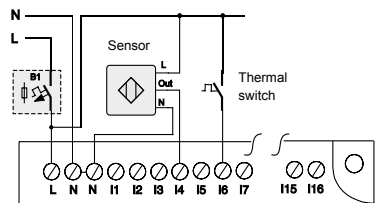
L = +12 V DC, N = 0 V
Logic state „1“: 8...26 V DC
Logic state „0“: -1,5...4 V DC

NEED-24DC...-08-4R-

L = +24 V DC, N = 0 V
Logic state „1“: 15...40 V DC
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
Logic state „0“: 0...40 V DC



NEED-12DC...-16-8R-

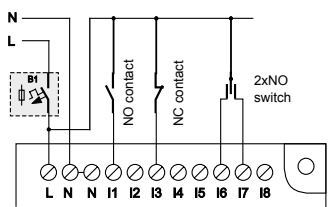
L = +12 V DC, N = 0 V
Logic state „1“: 8...26 V DC
Logic state „0“: -1,5...4 V DC

NEED-24DC...-16-8R-

L = +24 V DC, N = 0 V
Logic state „1“: 15...40 V DC
Logic state „0“: -3...5 V DC

NEED-220DC...-16-8R-

L = +220 V DC, N = 0 V
Logic state „1“: 80...260 V DC
Logic state „0“: 0...40 V DC



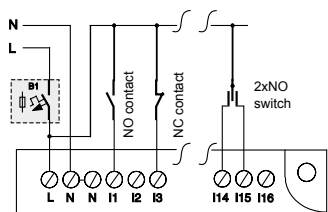
NEED-230AC...-08-4R-

L = 230 V AC, N = 0 V
Logic state „1“: 85...260 V AC 50 Hz

Logic state „0“: 0...40 V AC 50 Hz

I1 - I4: 0,6 mA
I5 - I6: 8,0 mA
I7 - I8: 0,9 mA

Logic state „0“: 0...40 V AC 50 Hz



NEED-230AC...-16-8R-

L = 230 V AC, N = 0 V
Logic state „1“: 85...260 V AC 50 Hz

Logic state „0“: 0...32 V AC 50 Hz

I1 - I11: 0,6 mA
I12 - I13: 8,0 mA
I14 - I16: 1,5 mA

Logic state „0“: 0...32 V AC 50 Hz

NEED
without LCD display

www.need.com.pl

www.relpol.com.pl



NEED-MODBUS

communication modules NEED Master/ModBus RTU Slave

Communication modules NEED-MODBUS

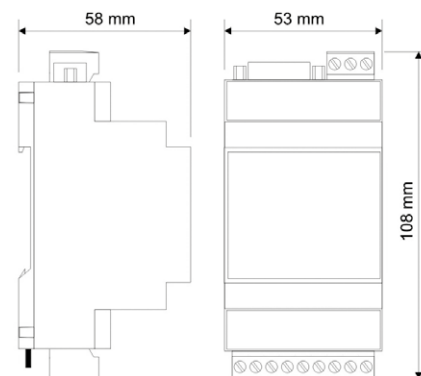
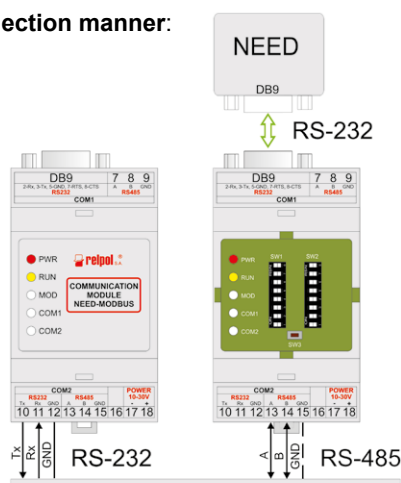
Appropriation:

- data reading from NEED relays and availability of the data values with the **ModBus RTU** protocol,
- transmission of control commands to NEED,
- modification of the real time RTC clock setting,
- operation from **COM1** side as **NEED Master** and from **COM2** side as a device of **ModBus RTU Slave** type.

Options:

- **operation mode change:** STOP/RUN,
- **RTC clock:** current data reading (in the RUN mode) and setting change record (in the STOP mode),
- **current data reading** (in the RUN mode): status, program name and version, digital and analog inputs, digital outputs, phase sequence, timers, counters, fast counter current value, clocks, comparators, markers,
- **setting reading and record** (in the STOP mode): timers, counters, fast counter, comparators.

Connection manner:



Technical data

Supply voltage	
Voltage (operating range)	7...35 V DC; 7...26 V AC 50/60 Hz
Max. power consumption	no load: 2 VA
Data transmission	
Parameter memory	EEPROM
Introduction of the basic parameter transmission	with the use of DIP SWITCH
RS232	standard EIA/TIA-574
• max. length of line	15 m
RS485	standard EIA/TIA-485
• max. length of line	1200 m
• max. number of devices on the line	32
• port protection	100 mA / 600 W ⑨
• port line terminator	yes
Connections	
• RS232 (COM1)	SUB-D 9M connection
• RS485/RS232 (COM2)	N/O connectors ⑩
EMC electromagnet compatibility	according to EN-61000-6-1/2/3/4
General data	
Cover	ABS
Mounting	on 35 mm rail mount PN-EN 60715
Insulation rated voltage	COM1 - supply, COM2: 1 kV DC
Dimensions with connectors / Weight	108 x 53 x 58 mm / 116 g
Ambient temperature	storage: -30...70 °C operating: -30...60 °C
Protection category	cover: IP 43; terminals: IP 20
Relative humidity	20...95%

⑨ Surge and short circuit protection.

⑩ Max. cross section of the cables: 1 x 0,22...2,5 mm² (1 x 24...14 AWG).



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