

*Roger Access Control System*

User manual for  
CPR32-SE v3.0 network controller

*Firmware version: 3.0.5133 or newer*

*Hardware version: 3.0*

*Document version: Rev. A*



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# 1. INTRODUCTION

## 1.1 This manual

This manual contains minimum information that is necessary to properly install CPR32-SE v3.0 network controller within RACS 4 access control system. Full functional description of RACS 4 system and PR Master software is specified in following documents which are available at [www.roger.pl](http://www.roger.pl):

- Functional description of PRxx2 series controllers
- Functional description of PRxx1 series controllers
- PR Master User manual

Due to hardware differences the previous version of CPR i.e. CPR32-SE v2.0 is described in dedicated manual.

## 2. DESCRIPTION AND SPECIFICATION

CPR32-SE is optional network controller used in RACS 4 access control system equipped with PRxx1 series and PRxx2 series controllers. The network controller enables enhancement of RACS 4 access control system with following functionalities:

- events recording in central memory buffer
- configuration of antipassback zones (Global APB) in access control system
- concurrent arming/disarming of access controllers within particular Alarm Zone
- configuration of schedules and calendars (concerns PRxx1 series controllers)

The network controller is equipped with RS485 port which is used for direct communication with access controllers and for communication with computer (PR Master software) using communication interface (e.g. UT-2USB). Events from access control system are stored in internal memory buffer (max. 240 000 events).

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Note: The CPR32-NET v3.0 requires PR Master software in version 4.5.20 or newer.

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<b>Table 1. Specification</b>	
Supply voltage	Nominal 18VAC, min./max. range 17-22VAC Nominal 12VDC, min./max. range 10-15VDC Nominal 24VDC, min./max. range 22-26VDC
Backup battery	13.8V/7Ah, charging current app. 300mA
Average current consumption	100 mA (excluding load points connected to AUX and/or TML outputs)
Inputs	Eight (IN1..IN8) NO/NC inputs, electrically biased to +12V via 15kΩ resistor, triggering level app. 3.5V
Relay outputs	Two (REL1,REL2) relay outputs with single NO/NC contact, 30V/1.5A (REL1) and 230VAC/5A (REL2)
Transistor outputs	Four (IO1,IO2,CLK,DTA) open collector outputs, 15VDC/1A
Power supply outputs	Two power supply outputs: 12VDC/0.2A (TML) and 12VDC/1A (AUX)
Distances	Between CPR and communication interface (RS485): max. 1200m
Environmental class (acc. to EN 50131-1)	Class I, indoor general conditions, temperature: +5°C to +40°C, relative humidity: 10 to 95% (no condensation)
IP code	IP20
Dimensions HxWxD	80 x 115 x 28mm

Weight	approx. 100g
Certificates	CE

### 3. INSTALLATION

#### 3.1 Terminals and connection diagram

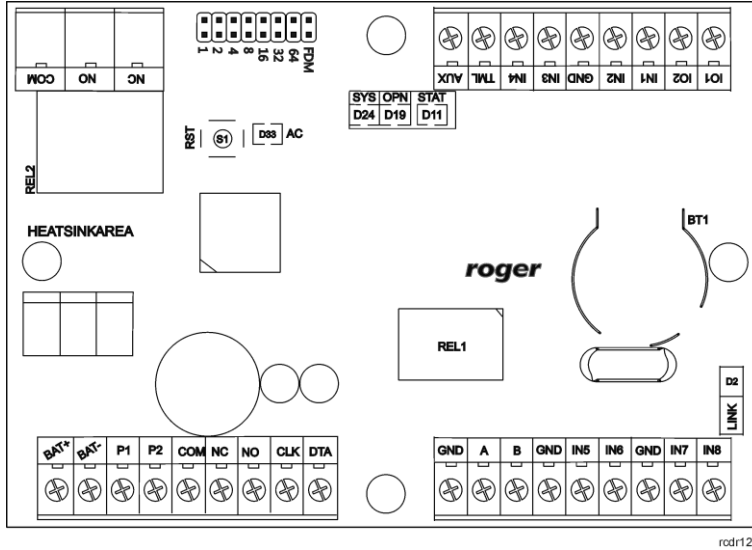


Fig. 1 CPR32-SE v3.0 network controller

Terminal	Description	Terminal	Description
BAT+	Backup battery	GND	Ground
BAT-	Backup battery	IN7	IN7 input line
P1	Power supply for CPR	IN8	IN8 input line
P2	Power supply for CPR	IO1	IO1 output line
COM	REL1 relay common terminal	IO2	IO2 output line
NC	REL1 relay output (NC)	IN1	IN1 input line
NO	REL1 relay output (NO)	IN2	IN2 input line
CLK	CLK output line	GND	Ground
DTA	DTA output line	IN3	IN3 input line
GND	Ground	IN4	IN4 input line
A	RS485 communication bus	TML	Built-in feeder output 12VDC/0.2A
B	RS485 communication bus	AUX	Built-in feeder output 12VDC/1A
GND	Ground	NC	REL2 relay output (NO)
IN5	IN5 input line	NO	REL2 relay output (NC)
IN6	IN6 input line	COM	REL2 relay common terminal

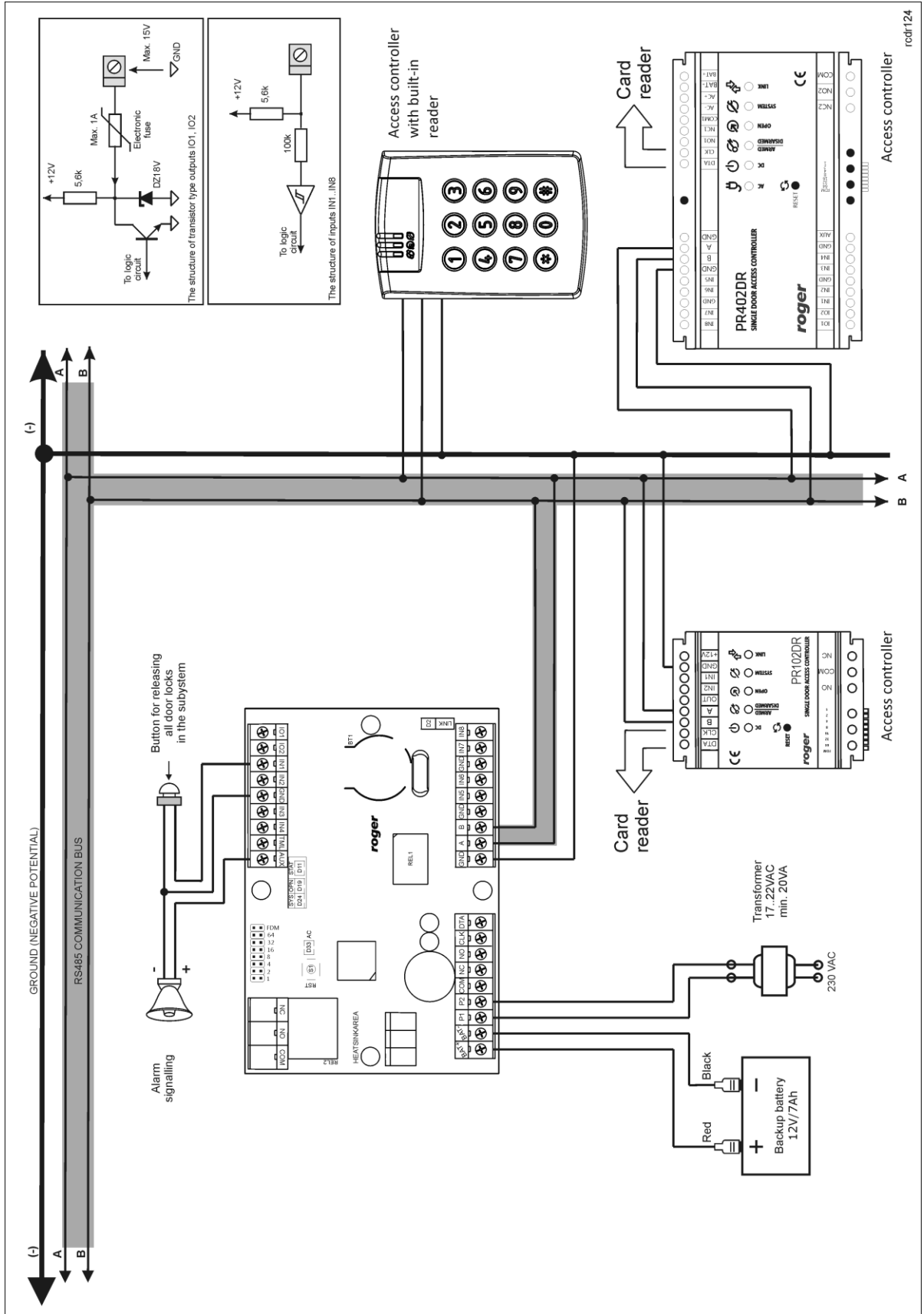


Fig. 2 Typical connection diagram for CPR32-SE v3.0 network controller

### 3.2 LED indicators

According to fig. 3, CPR32-SE v3.0 is equipped with 5 LED indicators and RESET button (S1) on its PCB. RESET button can be used to restart the CPR in the same way as in case of powering device off and then on. The RESET button can also be used during Memory Reset procedure and during firmware update procedure.

AC (D33)	18VAC power supply on
SYS (D24)	steady light – events buffer is full (the oldest events are being overwritten by the latest ones) flashing light – CPR32-SE events buffer is filled in 75%
OPN (D19)	18VAC power supply shortage
STAT (D11)	red light – CPR32-NET is off (by means of PR Master software) green light – low level of backup battery
LINK (D2)	Data transmission on RS485 bus

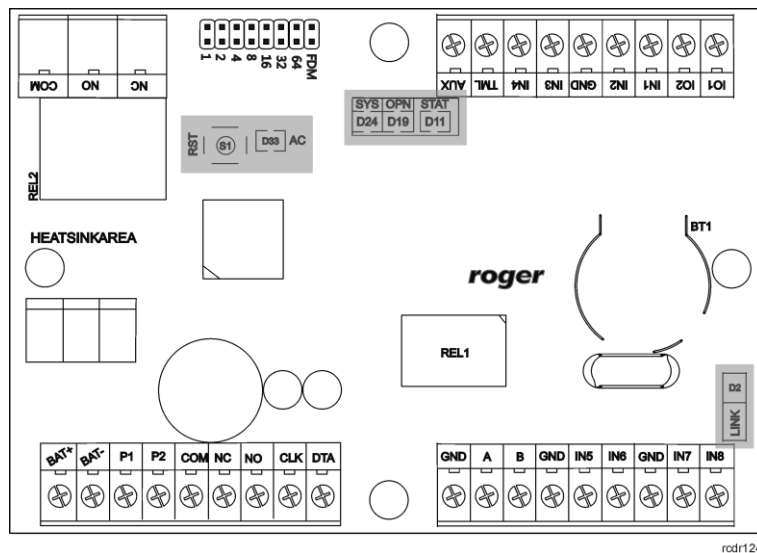


Fig. 3 LED indicators of CPR32-SE v3.0

### 3.3 Power supply

Basically, CPR32-SE v3.0 network controller is designed for power supply from 230VAC/18VAC transformer with minimal power output 25VA, but it can also be supplied with 12VDC. The connection of power supply is shown in fig. 4 and fig. 5.

If CPR is supplied with 18VAC, then 12V backup battery can be connected in order to provide power supply in case of mains supply shortage. The CPR charges backup battery with 300mA stabilized current up to 13.8V. Backup power supply is activated automatically in case of main powers supply shortage. If the voltage at backup battery drops below approx. 10V then the battery is automatically disconnected from CPR and remains disconnected until mains power supply returns. Depending on charging phase of backup battery, the voltage at AUX and TML terminals may vary in range of 11V (initial charging phase) to 13.8V (final charging phase) which is not a symptom of failure but it results from applied concept of battery charging.

In case of 12VDC power supply, backup battery cannot be directly connected to CPR and in such case backup power supply must be provided by 12VDC power supply unit.

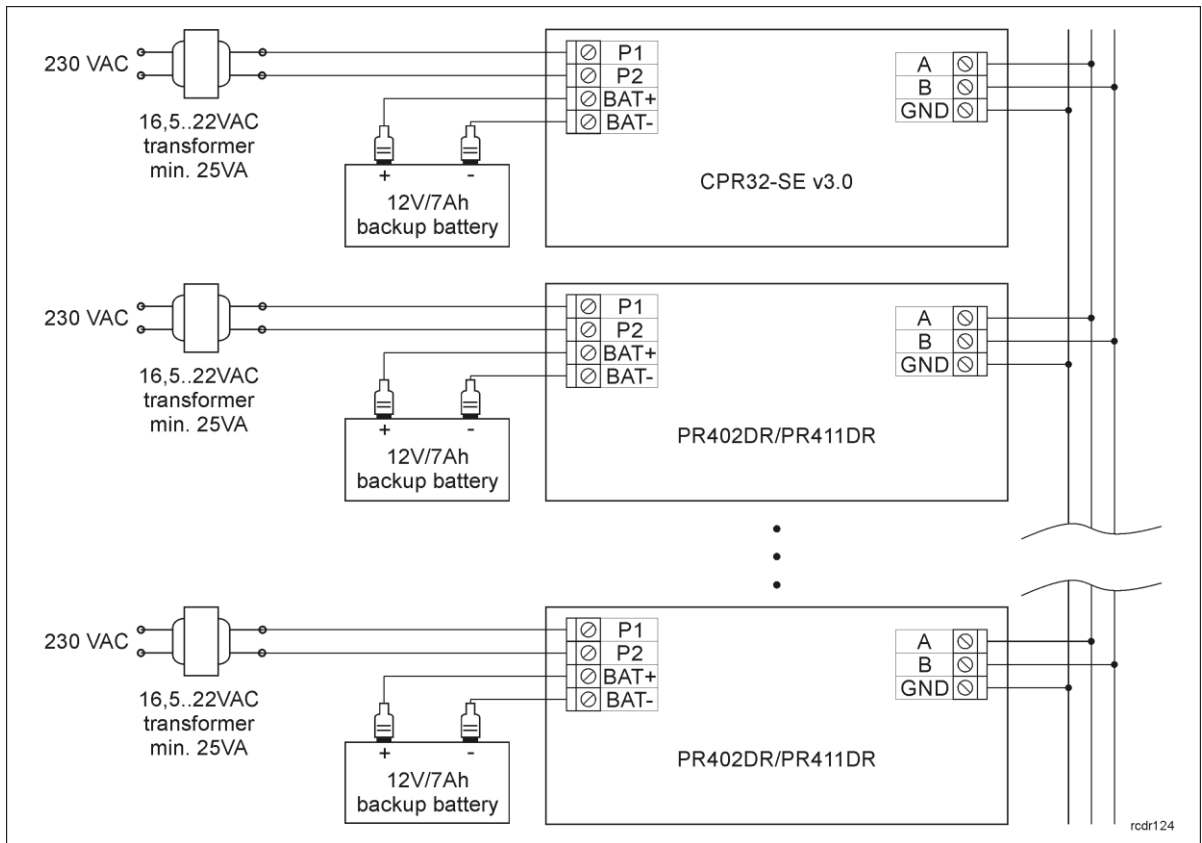


Fig. 4 CPR32-SE v3.0 and PR402DR/PR411DR controllers supplied with 18VAC

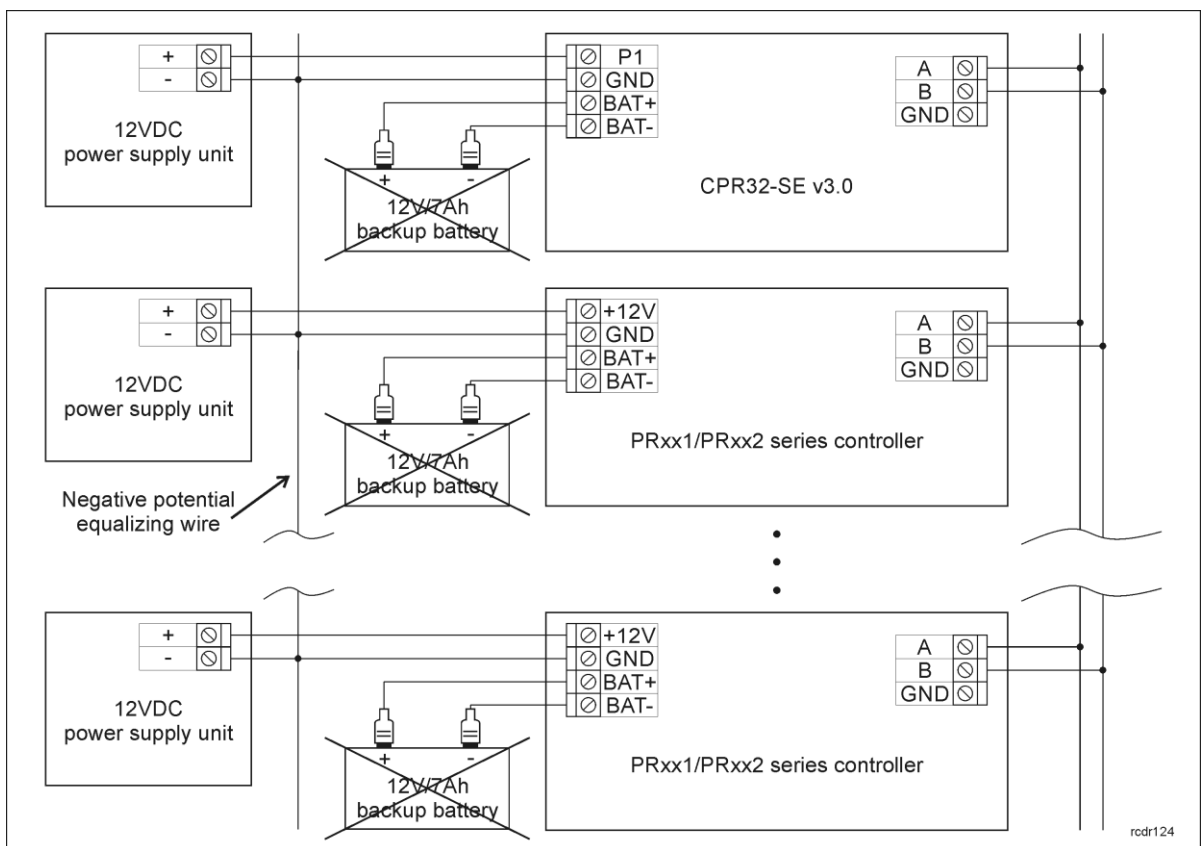


Fig. 5 CPR32-SE v3.0 and PRxx1/PRxx2 series controllers supplied with 12VDC

### General guidelines for 18VAC power supply

- GND terminals of CPR and access controllers must be connected with any wire.
- CPR and access controllers can operate with directly connected backup batteries.
- CPR and access controllers cannot be started using only power supply from backup battery.

### General guidelines for 12VDC power supply

- Negative (GND) potentials of power supply units must be connected with any wire.
- It is not necessary to connect GND terminals of CPR and PR controllers.
- Connect CPR/controller and power supply unit with separate wire. The wire section must be such as to prevent more than 0.5V voltage drop between CPR/controller and unit at maximal load.
- It is recommended to install CPR/controller possibly close to power supply unit, preferably in the same room.
- Backup batteries cannot be connected directly to CPR/controllers thus backup supply must be ensured on power supply unit side.
- CPR/controllers can be supplied from single power supply unit if the output power is sufficient.

## 3.4 Communication with CPR

RS485 bus and UT communication interface (e.g. UT-2USB) are used for communication with CPR32-SE v3.0 network controller. Single RS485 bus creates network (subsystem) including single CPR32-SE v3.0 unit and up to 32 access controllers. For the communication with distant subsystems it is required to use UT-4DR or UT-4 v2.0 communication interface as both enable communication through computer network (LAN or WAN).

The RS485 bus consists of two signal lines A and B. In the RACS 4 system any topology can be used (star, tree or any combination of them, except for loop) in order to connect controllers in network (subsystem). The matching resistors (terminators) connected at the ends of transmitting lines are not required. In most cases communication works with any cable type (standard telephone cable, shielded or unshielded twisted pair etc.) but the recommended cable is unshielded twisted pair (U/UTP cat.5). Shielded cables should be limited to installations subject to strong electromagnetic interferences. The RS485 communication standard used in the RACS 4 system guarantees proper communication in a distance of up to 1200 meters as well as high resistance to interferences.

## 3.5 Input and output lines

Functions are assigned to inputs and outputs by means of PR Master software. Lists of available functions are specified in tables 4 and 5.

### 3.5.1 Inputs

All inputs (IN1..IN8) of CPR have identical electric structure and can be configured as NO or NC lines using PR Master software. The NO input is triggered by shorting it to supply minus (GND) while the NC input must be normally shorted to supply minus (GND) and it becomes triggered when connection with GND is interrupted. Every input is internally connected (pulled up) to the power supply plus (+12V) through a 15kΩ resistor.

### 3.5.2 Relay outputs

CPR offers two relay outputs (REL1, REL2), each with single switching contact. Maximum load for REL1 equals to 30V/1.5A while maximum load for REL2 equals to 230VAC/5A and also 30VDC/5A. In the normal state (relay is off) the NC-COM contacts are shorted. In the triggering state (relay is on) the NO-COM contacts are shorted. In case of power outage both relays remain in the off state.

### 3.5.3 General purpose outputs

CPR offers four transistor outputs (IO1, IO2, CLK, DTA). All outputs are open collector type i.e. in normal (off) state are pulled to supply plus via 15kΩ resistor and when in trigger (on) state they short to supply minus. Maximum load for each output equals to 15VDC/1A. In case of overcurrent, outputs are automatically switched off and CPR automatically restarts.



### 3.6 Installation guidelines

- Install device in such way as to ensure easy access to screw terminals, RST button and FDM jumper.
- All electric connections must be made with power supply switched off.
- All devices connected to the same communication bus (RS485 and RACS CLK/DTA) should be connected to the same negative potential (GND). In order to satisfy this requirement connect the power supply according to section 3.3 Power supply.

## 4. CONFIGURATION

### 4.1 Configuration by means of PR Master software

After installation of access control subsystem with RS485 communication bus including connected access controllers, CPR32-SE network controller and communication interface (e.g. UT-2USB), the installer can proceed with installation and configuration of PR Master software. At first it is necessary to configure subsystem selecting the option **Networks** in the main window of PR Master software and then the button **Add**. In the newly opened window shown in fig. 6 select the option **Network equipped with CPR32-SE or CPR32-NET unit** and communication port from the list. By default the next step consists in detection of controllers on RS485 bus which requires selection of **Controllers** button and then **Add** button in **Networks** window. When all opened windows are closed, CPR32-SE device shall be listed in the main window of PR Master software – see fig. 7

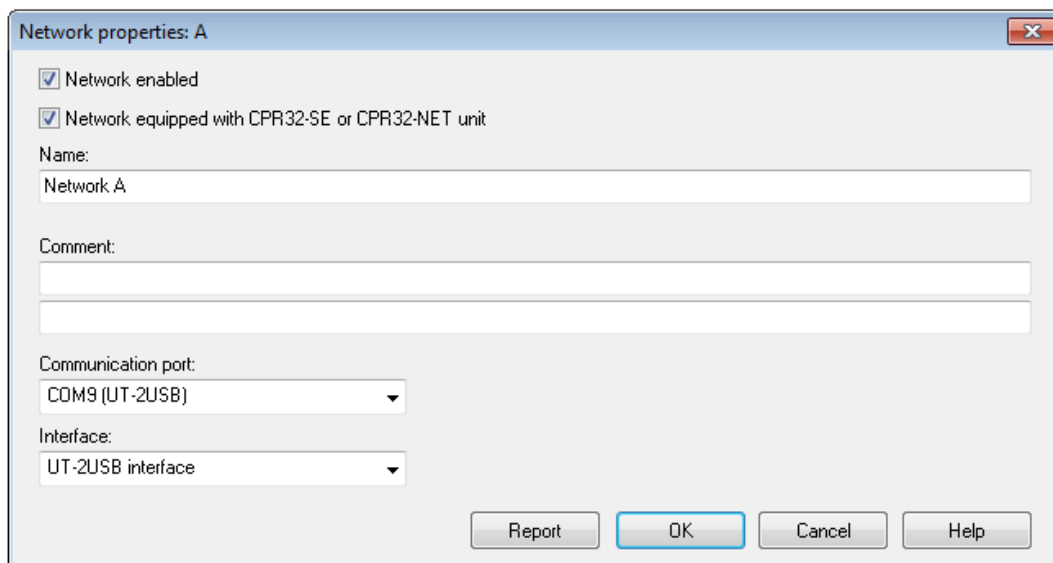


Fig. 6 Network properties window

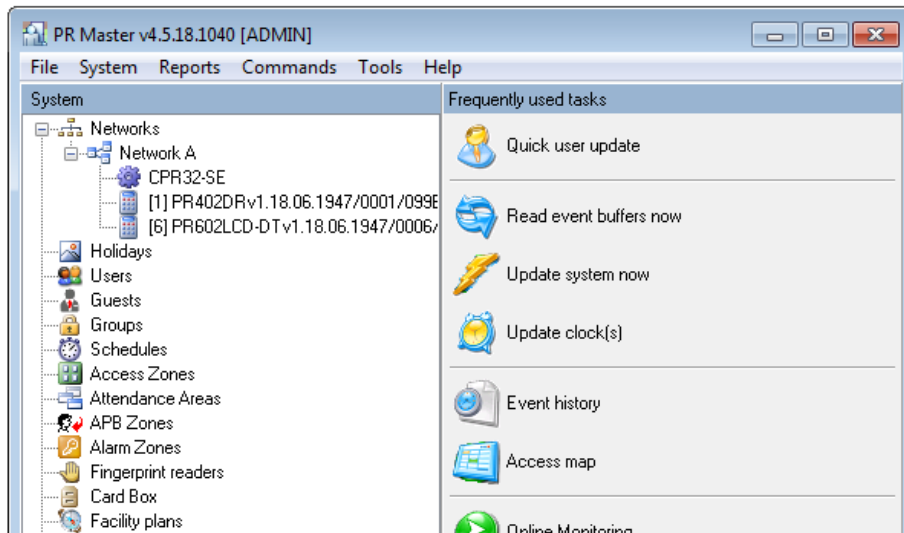


Fig. 7 Main window of PR Master software

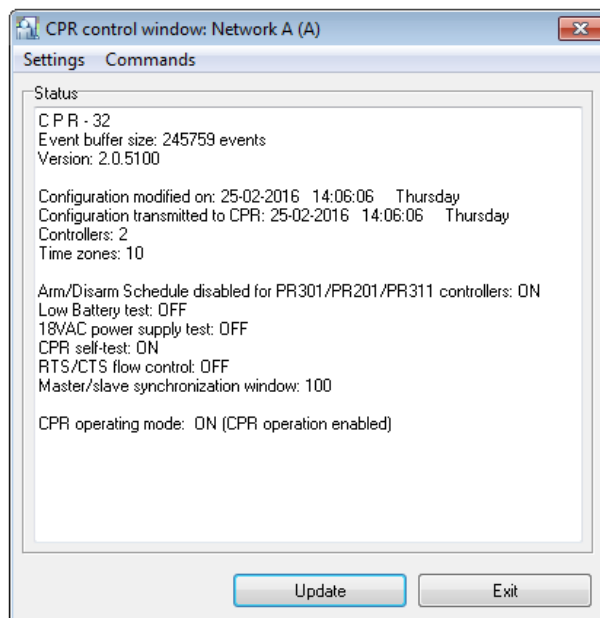


Fig. 8 CPR32-SE options in PR Master

It is possible to configure some additional options by clicking **CPR32-SE** in the main window of PR Master software which results in opening the window shown in fig. 8 including summary of CPR32-NET setup and top menu with following options and commands:

#### **Menu: Settings->Options**

In the window opened by means of this option, the administrator can activate/deactivate power supply tests and internal tests of CPR32-SE unit as well as switch the CPR off and on.

#### **Menu: Settings->Inputs/Outputs**

In the window opened by means of this option it is possible to assign functions to CPR32-SE inputs and outputs. Additionally in case of inputs the administrator can define their NO/NC type and in case of outputs their normal/inverted type. All input functions can be divided into ON/OFF monitored and ON monitored. In case of ON/OFF monitored input functions, CPR32-SE detects the moment of input activation and deactivation. In case of ON monitored input functions, CPR32-NET detects only their activation, thus it is not relevant how long the input is activated and when it is deactivated as only the activation triggers certain actions within the system. The list of available functions is shown in table 4 and table 5.

<b>Table 3 Input functions</b>			
No.	Function	Type	Description
<b>[00]</b>	<b>None</b>	-	Input line is not used.
<b>[01]</b>	<b>Clear all alarms in CPR</b>	ON monitored	When the input is activated then all alarms are cleared in CPR32-NET unit.
<b>[02]</b>	<b>Tamper alarm</b>	ON/OFF monitored	When the input is activated, Tamper alarm is raised and consequently both, the output with dedicated function [81] and LED 1 are activated.
<b>[08]</b>	<b>Set all doors to Normal mode</b>	ON monitored	When the input is activated then Normal Door Mode is activated at all controllers (doors) within subsystem (network).
<b>[09]</b>	<b>Set all doors to Unlocked mode</b>	ON monitored	When the input is activated then Unlocked Door Mode is activated at all controllers (doors) within subsystem (network).
<b>[10]</b>	<b>Set all doors to Cond. Unlocked mode</b>	ON monitored	When the input is activated then Conditional Unlocked Door Mode is activated at all controllers (doors) within subsystem (network).
<b>[11]</b>	<b>Set all doors to Locked mode</b>	ON monitored	When the input is activated then Locked Door Mode is activated at all controllers (doors) within subsystem (network).
<b>[12]</b>	<b>Clear all alarms in subsystem</b>	ON monitored	When the input is activated then all alarms in CPR32-NET and controllers within particular subsystem (network) are cleared. The function [12] operates as a sum of [01] and [13] functions.
<b>[13]</b>	<b>Clear alarms in all controllers</b>	ON monitored	When the input is activated then all alarms in controllers within particular subsystem (network) are cleared.
<b>[14]</b>	<b>Reset APB</b>	ON monitored	When the input is activated then APB Register in subsystem is cleared.
<b>[15]</b>	<b>Set Armed mode</b>	ON monitored	When the input is activated then all alarm zones in subsystem and all controllers (doors) not assigned to alarm zones become armed.
<b>[16]</b>	<b>Set Disarmed mode</b>	ON monitored	When the input is activated then all alarm zones in subsystem and all controllers (doors) not assigned to alarm zones become disarmed.
<b>[17]</b>	<b>Set all doors to Unlocked mode (momentary)</b>	ON/OFF monitored	As long as the input is activated, Unlocked Door Mode is activated at all controllers (doors) within subsystem (network). When the input is deactivated then Normal Door Mode is restored at all controller (doors) within subsystem.

<b>Table 5. Output functions</b>		
No.	Function	Description
<b>[00]</b>	<b>None</b>	Output line is not used.

<b>[65]</b>	<b>External buzzer</b>	<p>The output is dedicated to connection of external speaker in order to signal acoustically following alarms:</p> <ul style="list-style-type: none"> <li>• firmware memory error – infinite, modulated signal (3 sec. of sound /3 sec. of pause)</li> <li>• configuration error – repeated double short acoustic signals</li> <li>• event memory error – repeated three short acoustic signals</li> <li>• RTC error – repeated four short acoustic signals</li> <li>• Tamper alarm or Power supply alarm – the signal is modulated (1 sec. of sound/ 1 sec. of pause) and lasts 3 minutes</li> </ul>
<b>[66]</b>	<b>Data transmitted</b>	The output is activated whenever data is transmitted by CPR on RS485 bus.
<b>[67]</b>	<b>Alarm in CPR - modulated</b>	The output is activated for 3 minutes if Tamper Alarm or Power supply alarm is raised. The function [67] operates as a sum of [81] and [82] functions. The signal is modulated (1 sec. of signal/ 1 sec. of pause).
<b>[71]</b>	<b>Alarm in subsystem (network)</b>	The output is activated for 3 minutes if Tamper Alarm, Power supply alarm or any alarm in one of controllers is raised. The function [71] operates as a sum of [81], [82] and [72] functions.
<b>[72]</b>	<b>Alarm in controllers</b>	The output is activated for 3 minutes if any alarm is raised in one of PR series controllers within the subsystem (network).
<b>[73]</b>	<b>Alarm in CPR</b>	The output is activated for 3 minutes if Tamper Alarm or Power supply alarm is raised. The function [67] operates as a sum of [81] and [82] functions.
<b>[74]</b>	<b>Low battery</b>	The output remains activated as long as charge level of backup battery connected to CPR32-NET unit is low.
<b>[75]</b>	<b>18VAC supply lost</b>	The output is activated after 15 minutes of 18VAC power supply shortage to CPR32-NET unit and remains activated until the power supply is restored.
<b>[76]</b>	<b>Battery failure</b>	The output is activated in case of battery failure (no battery or internal damage of battery). If the output is activated then the battery must be checked by maintenance personnel. The output remains activated until the problem is eliminated.
<b>[77]</b>	<b>CPR on</b>	The output signals that CPR32-NET is switched on by PR Master software.
<b>[78]</b>	<b>CPR off</b>	The output signals that CPR32-NET is switched off by PR Master software.
<b>[79]</b>	<b>Internal failure</b>	The output is activated when internal testing detects RTC failure, firmware memory failure or data memory error. Internal test is performed every 20 minutes. The output is activated until the failure/error is removed.
<b>[80]</b>	<b>Buffer alarm - modulated</b>	The output is activated when the event memory buffer is full and remains activated until the buffer is cleared. The signal is modulated (1 sec. of signal/ 1 sec. of pause).

<b>[81]</b>	<b>Tamper alarm</b>	The output is activated for 3 minutes if anti-sabotage (tamper) alarm is raised. The alarm is raised when the input with function [02] is activated.
<b>[82]</b>	<b>Power supply alarm</b>	The output is activated for 3 minutes if problem with CPR32-NET power supply occurs. The function [82] is a sum of [74], [75] and [76] functions.
<b>[83]</b>	<b>Communication lost</b>	The output is activated as long as the communication with any PR series controller within particular subsystem (network) is lost.
<b>[84]</b>	<b>Buffer alarm</b>	The output is activated when the event memory buffer is full and remains activated until the buffer is cleared.
<b>[85]</b>	<b>Buffer prealarm</b>	The output is activated when the event memory buffer is filled in 75%.
<b>[86]</b>	<b>Internal failure (3 min)</b>	The output is activated for 3 minutes when internal testing detects RTC failure, firmware memory failure or data memory error. Internal test is started every 20 minutes.
<b>[87]</b>	<b>Communication lost (3 min)</b>	The output is activated for 3 minutes if the communication with any PR series controller within particular subsystem (network) is lost.
<b>[88]</b>	<b>Buffer alarm (3 min)</b>	The output is activated for 3 minutes when the event memory buffer is full.
<b>[89]</b>	<b>Buffer prealarm (3 min)</b>	The output is activated for 3 minutes when the event memory buffer is filled in 75%.
<b>[90]</b>	<b>Low battery (3 min)</b>	The output remains activated for 3 minutes if charge level of backup battery connected to CPR32-NET unit is low.
<b>[91]</b>	<b>18VAC supply lost (3 min)</b>	The output is activated for 3 minutes after 15 minutes of 18VAC power supply shortage to CPR32-NET unit.
<b>[92]</b>	<b>Battery failure (3 min)</b>	The output is activated for 3 minutes in case of battery failure (no battery or internal damage of battery). If the output is activated then the battery must be controlled by maintenance personnel.
<b>[93]</b>	<b>Zone Armed</b>	The output is activated as long as associated alarm zone is armed.

## 4.2 Memory Reset

Memory Reset procedure erases current settings and restores default factory settings. After Memory Reset procedure the CPR automatically enters normal working mode.

- Place jumper on 1 pins – see fig. 1
- Reset device (press RST button or switch power off/on)
- Remove jumper from 1 pins
- After a few seconds the CPR shall restart automatically and switch to normal mode

## 4.3 Firmware update

The latest versions of firmware and Roger ISP software are available at [www.roger.pl](http://www.roger.pl). In order to update firmware it is necessary to connect the device by means of RS485 bus to communication interface (UT-2USB or RUD-1) and then connect the interface to PC with installed Roger ISP software. It is not necessary to disconnect the CPR from access control system, it is only required

to place FDM jumper in order to put the device in firmware download mode. Therefore firmware update can be performed by means of RS485 bus of access control system.

#### **Firmware update procedure**

- Place jumper on FDM pins – see fig. 1
- Reset device (press RST button or switch power off/on)
- Start RogerISP software and select communication port (in case of RUD-1 select **USB-RS485 Converter**).
- Press the button **Erase**
- Once more reset the device (place and remove jumper on RST pins or switch power off/on)
- In Firmware window select firmware \*.hex file (can be downloaded from [www.roger.pl](http://www.roger.pl)) and then select the button **Program**
- After firmware upload remove jumper from FDM pins and reset device (press RST button or switch power off/on)

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Note: If the CPR is not responding after firmware update procedure then it is necessary to perform reset – see 4.2 Memory Reset or update the firmware once more.

Note: In case of network system, it is required to upload full configuration to the system after CPR firmware update.

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## **4.4 Problem with erratic jumps of mouse cursor in Windows OS**

Occasionally, when RACS 4 system is equipped with CPR32-SE network controller connected to PC through such serial interfaces as UT-2USB, RUD-1 or UT-4 with virtual serial port then CPR is erroneously detected by Windows as Microsoft Serial Ball Point device. In such case mouse cursor goes crazy (erratically jumps around screen) and PR Master software reports serial port error.

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Note: The problem, which is described above is not caused by CPR32-SE but it results from commonly known Windows fault and it cannot be corrected by Roger engineers.

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#### **Manual disabling of detected device in Device Manager**

- After Windows loading and occurrence of problem with mouse cursor, turn the CPR32-SE off.
- Open Device Manager in Windows operating system.
- In the Device Manager click Mice and other pointing devices.
- Right click Microsoft Serial Ball Point and select Disable from menu.
- Close Device Manager.
- Turn CPR32-SE on.



The method might not resolve the problem permanently. Therefore you may consider to uninstall Microsoft Serial Ball Point device in Device Manager if it does not affect normal use of your PC.

## **5. ORDERING INFORMATION**

<b>Table 7.Ordering information</b>	
CPR32-SE v3.0	Electronic module of network controller.
UT-4DR	Ethernet-RS485 communication interface.
UT-2USB	USB-RS485 communication interface.
RUD-1	Portable USB-RS485 communication interface with 12VDC/0.12A output.

## 6. PRODUCT HISTORY

<b>Table 8. Product history</b>		
Product version	Released	Description
CPR32-SE v.1.0	01/2007	The first commercial version of the product
CPR32-SE v.2.0	11/2009	The next hardware version
CPR32-SE v.3.0	01/2017	New electronic module based on PR402DR

 	<p>This symbol placed on a product or packaging indicates that the product should not be disposed of with other wastes as this may have a negative impact on the environment and health. The user is obliged to deliver equipment to the designated collection points of electric and electronic waste. For detailed information on recycling, contact your local authorities, waste disposal company or point of purchase. Separate collection and recycling of this type of waste contributes to the protection of the natural resources and is safe to health and the environment. Weight of the equipment is specified in the document.</p>
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