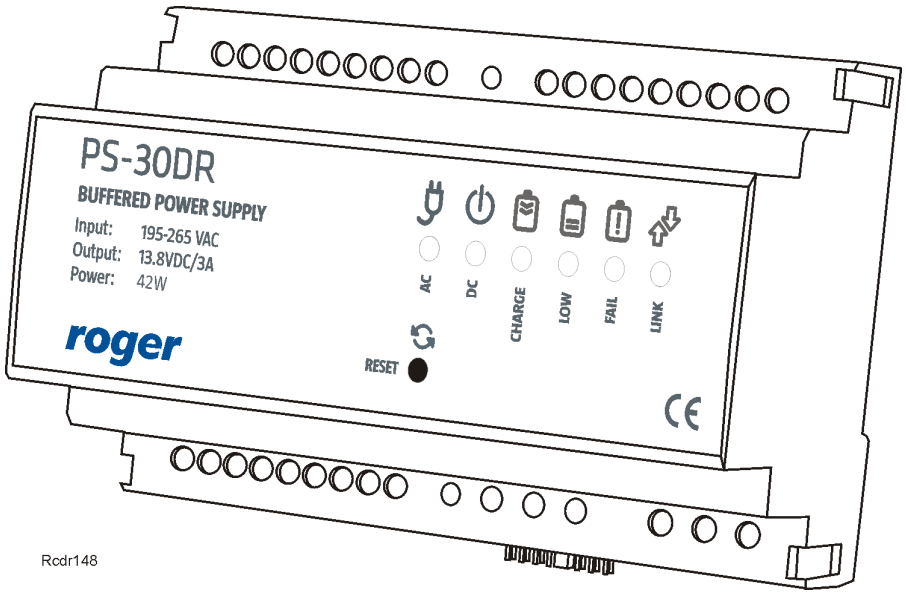
Roger Access Control System

Buffered Power Supply PS-30DR v1.0

Document version: Rev. C

Firmware: 1.0.4

CE



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1. PRODUCT DESCRIPTION

The PS-30DR is dedicated for electronic equipment which require 12VDC buffered supply source. At nominal ambient condition PS-30DR can provide up to 3A output current with no time limit. Power supply has been equipped with intelligent supervisor system, it's well suited for electronic systems that require a remote or local management, input voltage presence, output voltage measurements, battery fail, charge status or overload conduction can be provided by PS-30DR integrated supervisor system.
Although the PS-30DR was designed and tested for Roger Access Control System (RACS), anyway it can be used with other applications requiring buffered supply source, in such cases an integrator or installer must verify that PS-30DR will operate satisfactory in given application.

2. CONSTRUCTION

PS-30DR is a switching mode power supply that can provide better efficiency then regular linear regulators. Also, due to lack of power transformer, it offers lower weight and size.
Device enclosure is made from fire retardant polycarbonate plastic which protects user from high voltages existed inside the case and separates internal electronic module from unintentional penetration. For device and user safety electronic circuit employs overvoltage, overcurrent and thermal protection. Device contains screw type terminal blocs, front panel with LED indicators and RESET button. PS-30DR enclosure is adapted for DIN 35mm (T35) standard rail and should be powered directly from 230VAC/50Hz AC line.

2.1 Output current

PS-30DR maximal output current is ambient temperature dependent. For nominal ambient temperature range of +5°C to +30°C device can deliver up to 3A with no time limit. At higher temperatures maximal output current decreases according to tradeoff characteristic as presented in Fig.1. For the highest allowed temperature +40°C device can provide 2.1A only.

Note: In case of overload power supply switches off and remains in this state as long as overload exists. In such a case entire load current is sourced from the reserve battery (if connected). If the overload is continued for long time enough it can lead to discharge of battery and total lack of supply on AUX output.

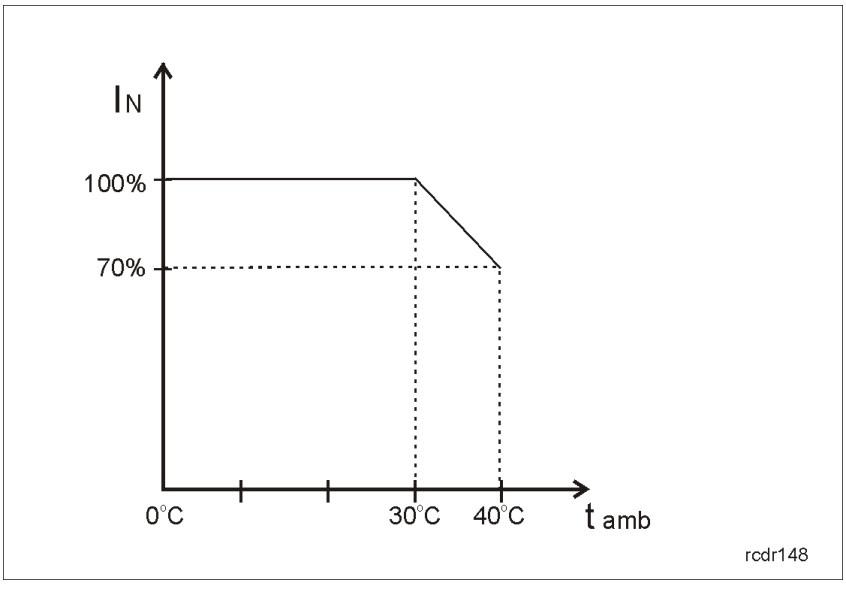


Fig.1 Tradeoff characteristic between nominal output current (I_N) and ambient temperature (t_{amb})

3. BATTERY MANAGEMENT

PS-30DR was designed to operate with a sealed lead-acid (SLA or AGM) 12V reserve battery. The reserve battery is connected to output terminals trough an ultra low-resistance MOS transistor. PS-30DR charge battery with *constant current-constant voltage* method, initial charging current can be set to 0.3A, 0.6A, 0.9A or 1.2A. Device charges battery with initial current until the output voltage reaches 13.8V threshold, subsequently the output voltage will remain constant, whereas charge current will decrease spontaneously. This method of charging guaranties relatively quick and safe charging process.
Depending on battery charging phase the output voltage of PS-30DR may vary from ~11.5V up to 13.8V level. When battery voltage drops below ~10.0V level internal circuit disconnect it from output, battery is automatically reconnected when AC supply returns. Battery cut off circuit protects battery from deep discharge and the equipment connected to it from operation below 10.0V level which, in many cases can lead to undefined system behavior. Battery is protected with 4A resettable fuse which reduce maximum output current sourced from battery in case of battery reverse connection or output overload.

Note: When battery is charged the max output current available on AUX terminals is reduced by value equal to actual battery charging current.

4. PROTECTIONS

PS-30DR has been equipped with following protections for user and device safety:

Main protection (MP): 230VAC input is protected with glass slow blow fuse that disconnects electronic module in case when excessive current is drawn from AC line. This element isn't available for replacement and usually indicates very serious technical problem of the device.

Overcurrent (OCP) and short-circuit (SCP) protection: when output current rises above its nominal max value, device switches off and remains in this state as long as overload exists. PS-30DR resumes its operation as soon as overload disappears.

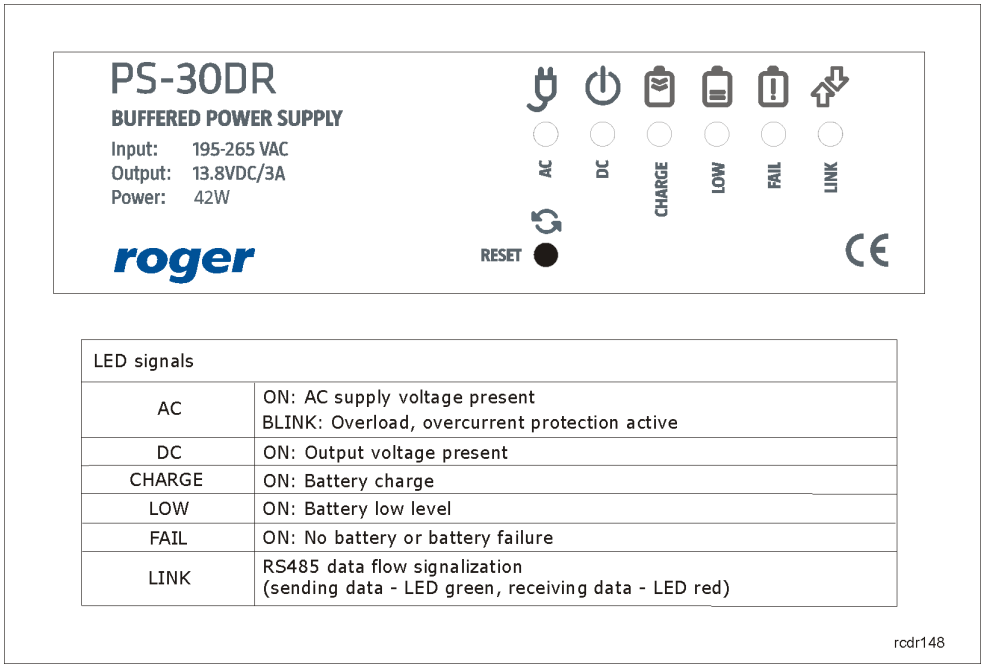
Overvoltage protection (UVP): the AUX outputs are protected with electronic components which are intended to protect device from overvoltage spikes.

Overheating protection (OHP): if temperature of the electronic module increases beyond safe limits devices switches off and remains in this state until devices is cooled.

Battery protection (BP): battery input is protected with resettable fuse which limits maximum output current sourced from battery in case of reverse polarity connection or output overload. Once the resettable fuse is triggered it is necessary to remove entire load from the battery before fuse restores.

5. FRONT PANEL

PS-30DR front panel is equipped with RESET button and LED indicators described in Fig.2.



LED signals	
AC	ON: AC supply voltage present BLINK: Overload, overcurrent protection active
DC	ON: Output voltage present
CHARGE	ON: Battery charge
LOW	ON: Battery low level
FAIL	ON: No battery or battery failure
LINK	RS485 data flow signalization (sending data - LED green, receiving data - LED red)

Fig.2 Front panel LED indicators

Note: AC indicator contrary to ACL output indicates AC supply lost immediately without time delay.

6. HARDWARE CONFIGURATION

PS-30DR has been equipped with six configuration jumpers described in Fig.3. All jumpers except C1 and C2 are considered at startup, any configuration change will be recognized only after PS-30DR power up cycle or after push button RESET.

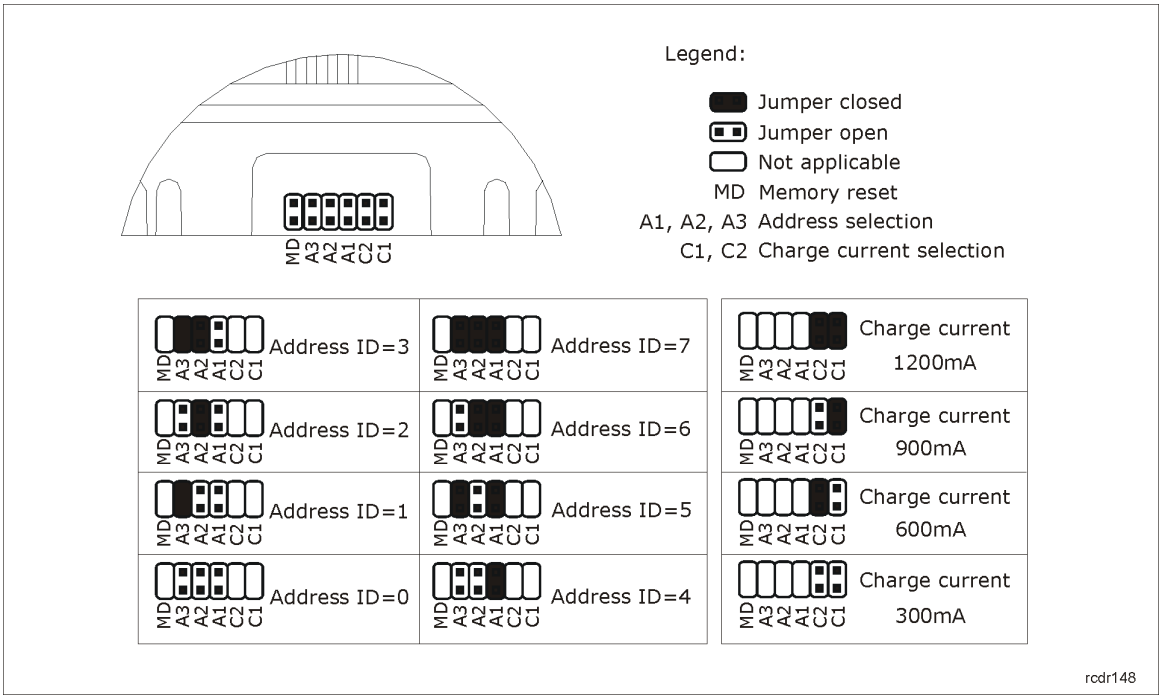


Fig.3 Jumper configuration rules

7. ALARM OUTPUTS

PS-30DR contains three transistor outputs marked as ACL, LB and BF dedicated for device alarm state signalization. All outputs have the same electrical structure and are capable to sink up to 0.1A/15V. Normally, each transistor output remains in high impedance state, when triggered it shorts connected signal to supply minus.

ACL Output (AC Lost) this output goes low in case of AC supply lack and AC line part overload. ACL output function can be changed from PC application, it is possible to signalize one selected alarm state or both at the common ACL output.
By default there is a 10 minutes time delay before ACL output will be triggered after AC supply lack, time delay can be changed from PC application.
Overload situation is always signalized without time delay.

Note: overload signalization is only possible with reserve battery connected.

LB Output (Low Battery) this output goes low when reserve battery voltage falls below 11.5V threshold, the alarm disappear when battery voltage returns above this level.

BF Output (Battery Failure) this output goes low when reserve battery operational wear prevents from system proper operation or battery wasn't connected.

Note: alarm events are signalized simultaneously on LED indicators located on the front panel. AC indicator turns on and off without time delay for AC supply lack and is blinking for overload situation.

8. RS485 COMMUNICATION BUS

PS-30DR is a slave device and handles Roger's EPSO network protocol over half-duplex RS-485 communication bus, alarm notifications and voltage measurements can be provided for remote application. EPSO protocol is used for RogerVDM configuration and RACS 4 access control communication.

9. SOFTWARE CONFIGURATION ROGERVDM

Some device parameters can be changed from RogerVDM (OS Windows) application over serial RS485 interface, for connection use Roger UT-2USB, RUD-1 or RCI1 interface. Run RogerVDM, click tab *„Device"* then select *„New".* Choose PS-30DR device and adequate communication interface port, confirm with *„Connect"* button.

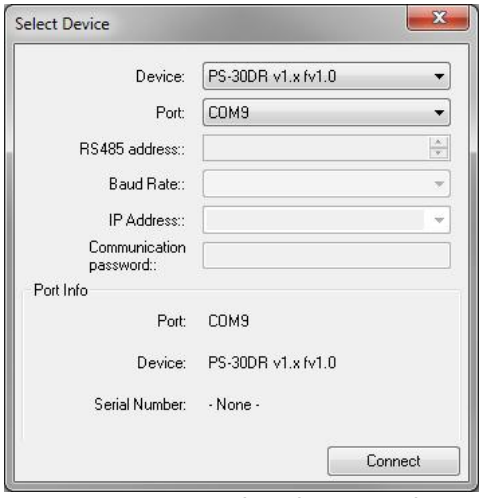


Fig.4 RogerVDM select device window

Configuration window is presented in Fig.5.

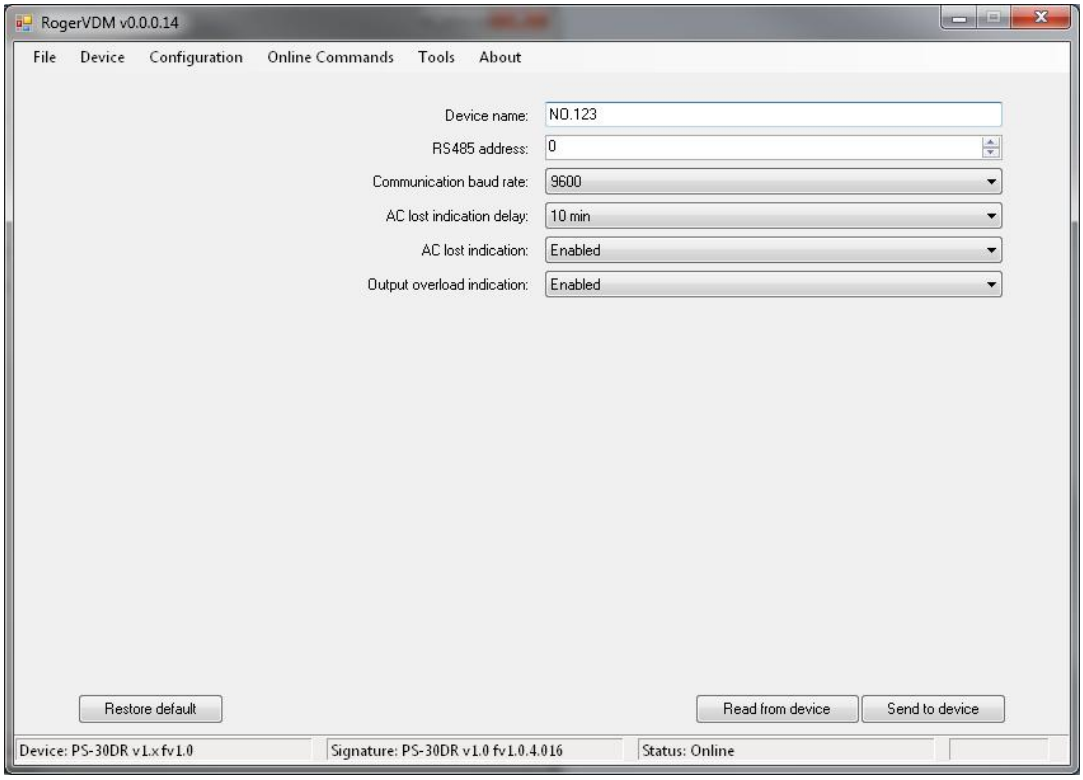


Fig.5 RogerVDM configuration window

Device name: Device friendly name can be assigned (max. 14 letters) for easy remote identification. This windows stays blank if friendly name isn't required.

RS485 address: Remote address for EPSO communication protocol, hardware jumpers A1, A2, A3 must be removed for software address configuration.

Communication baud rate: Default RS485 communication speed is set to 9600bps and can be changed if required.

AC Lost indication delay: Time delay for ACL output activation after AC supply lack (0…254 minutes). Default parameter is 10 minutes, 0 value disables the time delay.

AC Lost indication: Enable or disable AC supply lack signalization on ACL output.

Output overload indication: Enable or disable overload signalization on ACL output.

All changes should be confirmed with „*Send to device*" button.

10. MEMORY RESET

In order to reset memory you must perform following procedure:

- turn off the power supply
- put the jumper on MD contacts
- turn on the power supply
- remove jumper from MD contacts

Memory reset procedure will erase device configuration memory and restore factory defaults.

11. INSTALLATION

PS-30DR have to be mounted on DIN 35mm rail and in a vertical position as presented on Fig.6.

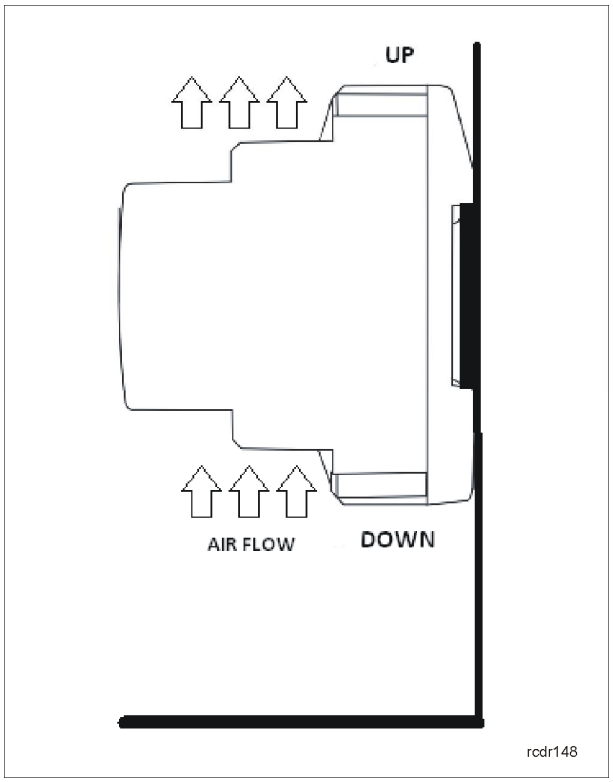


Fig.6 General installation principle

Power supply should be installed far enough from heat and moisture sources, device ventilation holes shall not be obstructed and free air convection or forced air flow must be provided to ensure proper exploitation. Without air circulation the power supply temperature can increase beyond permitted limits, device can overheat and will turn itself off.
All electrical connection should be carried out with AC supply off. The AC supply double coated cable should be fixed to 230VAC input terminals.
Output voltage is available on two paralleled terminals AUX1 and AUX2 supported by common overcurrent and overvoltage protection.

Note: PS-30DR won't start operation on reserve battery, the AC supply must exists in order to begin power supply activity.

12. SAFETY PRECAUTIONS

The electric installation must be carried out by qualified person. For safety precautions make wiring so that the mains power supply switch and safety fuse are placed between PS-30DR and AC source and will be available for user (i.e. designate for that purpose a standalone automatic circuit breaker inside local distribution box).

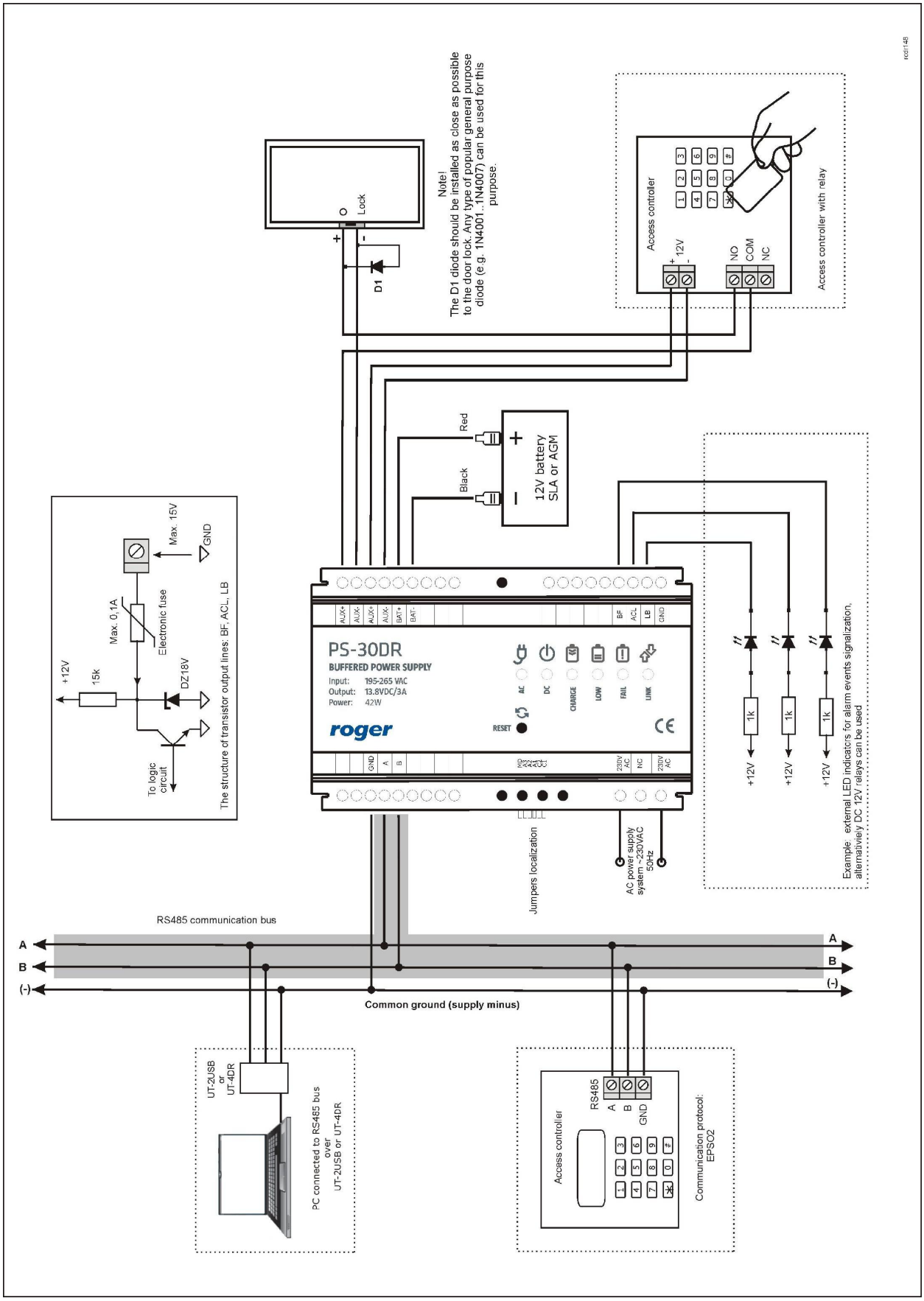


Fig.7 Access control application example

13. TERMINAL DESCRIPTION

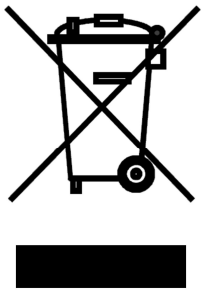
Terminal	Function
230VAC	230VAC line inputs, terminal N (NEUTRAL) and L (LINE)
BAT+	Battery positive terminal
BAT-	Battery negative terminal
AUX1+	Power supply AUX1 positive terminal
AUX1 -	Power supply AUX1 negative terminal
AUX2+	Power supply AUX2 positive terminal
AUX2 -	Power supply AUX2 negative terminal
BF	Battery failure transistor output
ACL	AC lost and/or overload transistor output
LB	Low battery transistor output
A	RS485 communication bus line A
B	RS485 communication bus line B
GND	RS485 communication bus ground

14. TECHNICAL DATA

Parameter	Value/Description
Supply voltage	Nominal 230VAC, permitted 195..265VAC, root mean square value (RMS)
Supply current	0.25A, root mean square value (RMS)
Supply line frequency	50Hz
Environmental class (wg EN 50131-1)	Class I, indoor general conditions, temperature. +5°C - +40°C, relative humidity: 10..95% (no condensation)
Output voltage	13.8VDC, depending on battery charging phase, may vary from ~11.5V up to 13.8V level
Max. output current (without battery)	3A, maximum output current is guaranteed for unlimited time for ambient temp. range of +5°C to +30°C. For temperatures between +30°C to +40°C output current must be externally limited according tradeoff characteristic from Fig.1. During battery charging process output current will be reduced by value equal to battery charge current
Max. battery output current (momentary)	~4A
Initial battery charging current	Configurable: ~0.3A, ~0.6A, ~0.9A or ~1.2A
Battery cut off voltage	~10.0V, battery will be reconnected when AC supply returns
Battery type	12V sealed lead-acid battery (SLA or AGM)
Enclosure material	Polycarbonate plastic, UL94V0 flammability class
Dimensions W x S x G	85 x 124 x 73mm
Weight	~300g
Certificate	CE

15. PRODUCT HISTORY

Name	Date o publication	Description
PS-30DR v1.0	01/2013	First commercial release

	Such symbol on the product or its package means that the product should not be disposed together with other wastes, because it may cause negative effects to environment and humans health. User is responsible for delivering used equipment to the allotted locations for gathering used electrical and electronic devices. Detailed information on recycling can be found at relevant local authorities, in a disposing company or in a place, where the product was bought. Separate gathering and recycling of such wastes contributes to natural resources protection and is safe for humans health and for natural environment. The equipment's weight is shown in the guide.

Contact
Roger sp. z o. o. sp. k.
82-400 Sztum
Gosciszewo 59
Tel.: +48 55 272 01 32 Fax: +48 55 272 01 33
Technical support PSTN: +48 55 267 01 26
e-mail: biuro@roger.pl
Web: www.roger.pl