



Reader Post

IRP-01

CERTIFICATE AND OPERATION MANUAL

CE EAC



PERCo-Web system

Reader Post

IRP-01

Certificate and Operation Manual



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CONTENTS

1	General information	3
2	Technical specifications	4
3	Delivery set.....	4
4	Product description.....	5
4.1	Design	5
4.2	Operating principle	6
4.3	Data transmitting via Wiegand interface	7
5	Configuration	9
5.1	Operation of reader in RS-485 mode.....	9
5.1.1	Selection of reader number.....	9
5.1.2	Indication	9
5.2	Operation of reader in Wiegand mode.....	10
5.2.1	Indication setting	10
5.2.2	Changing the format of output data.....	11
6	Safety requirements	12
6.1	Safe installation	12
6.2	Safe operation	12
7	Installation procedure	13
7.1	Features of installation	13
7.2	Tools and equipment required for installation.....	13
7.3	Required cables.....	13
7.4	Assembly sequence	14
8	Troubleshooting.....	17
9	Perco warranty	18
	WARRANTY CARD	21

1 GENERAL INFORMATION

IRP-01 reader post is designed for reading and interpretation of proximity card identifier and for transferring of identifier to ACS controller. The reader post is made in the form of stainless steel cylindrical post equipped with proximity card reader and LCD indicating operation modes of ACS controller.

IRP-01 reader post is designed as an up-market model to fit the highest requirements for design and comfort (governmental offices, banks, administrative buildings, sport centers, airports, etc.).

The reader post, with regard to resistance to environmental exposure, conforms to category NF4 (operation in premises with climate control) according to GOST 15150-69.

Operation of the reader is allowed at ambient air temperature from +1°C to +40°C and at relative air humidity of up to 80% at +25°C.

The reader has the marking on the inner side of the housing. The marking contains the product name, the model abbreviation, the date of manufacture, the serial number.

The reader is packed in a cardboard box that protects it from being damaged during transportation and storage.

Overall dimensions of the box (L × W × H). 112×14×13 cm
Weight of the box..... max. 7 kg

The reader in the original package should be transported in closed freight containers or other closed type cargo transport units.

Storage of the reader is allowed in dry indoor facilities at the ambient air temperature from +1°C to +40°C and relative air humidity of up to 80% at +25°C.

During storage and transportation the boxes can be stacked no more than 5 layers high.

After transportation or storage at temperatures below zero or at high air humidity, prior to installation the reader must be kept in the original package for no less than 24 hours indoors under normal climate conditions prior to installation.

Due to continuous improvement of products the Manufacturer reserves the right to modify, without notice, the product design not aggravating its technical specifications.

2 TECHNICAL SPECIFICATIONS

Rated operating voltage ¹	12 VDC
Operating voltage limits	10.8–14 VDC
Consumption current	max. 150 mA
Power consumption	max. 2 W
Card reading distance at the rated operating voltage for different card types:	
HID ProxCard II cards	min. 6 cm
EM-Marin cards	min. 7 cm
Controller connection interface ²	<i>RS-485, Wiegand</i>
Distance between reader and controller	max. 40 m
Ingress protection rating	IP41 (EN 60529)
Electric shock protection class	III (IEC 61140)
Mean lifetime	8 years
Reader post dimensions (see Fig. 1)	1025×107×107 mm
Reader post weight	max. 5 kg

3 DELIVERY SET

Reader post	1
Mounting base	1
S2 allen key	1
Package	1
Certificate and Operation Manual	1

Additional mounting tools:

The following equipment can be supplied optionally on request:

PFG IR 8-20 anchor («SORMAT», Finland)	4
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¹ As a power supply it is recommended to use DC source with linear voltage stabilization and output pulsation amplitude max. 50 mV.

² Depends on position of switch №1 SA1.

4 PRODUCT DESCRIPTION

4.1 Design

Reader post consists of stainless steel tube with reader board and LCD. Delivery set also contains mounting base that the reader post housing is attached to.

The reader is equipped with integrated sound indicator. Code reading is confirmed by a short sound signal.

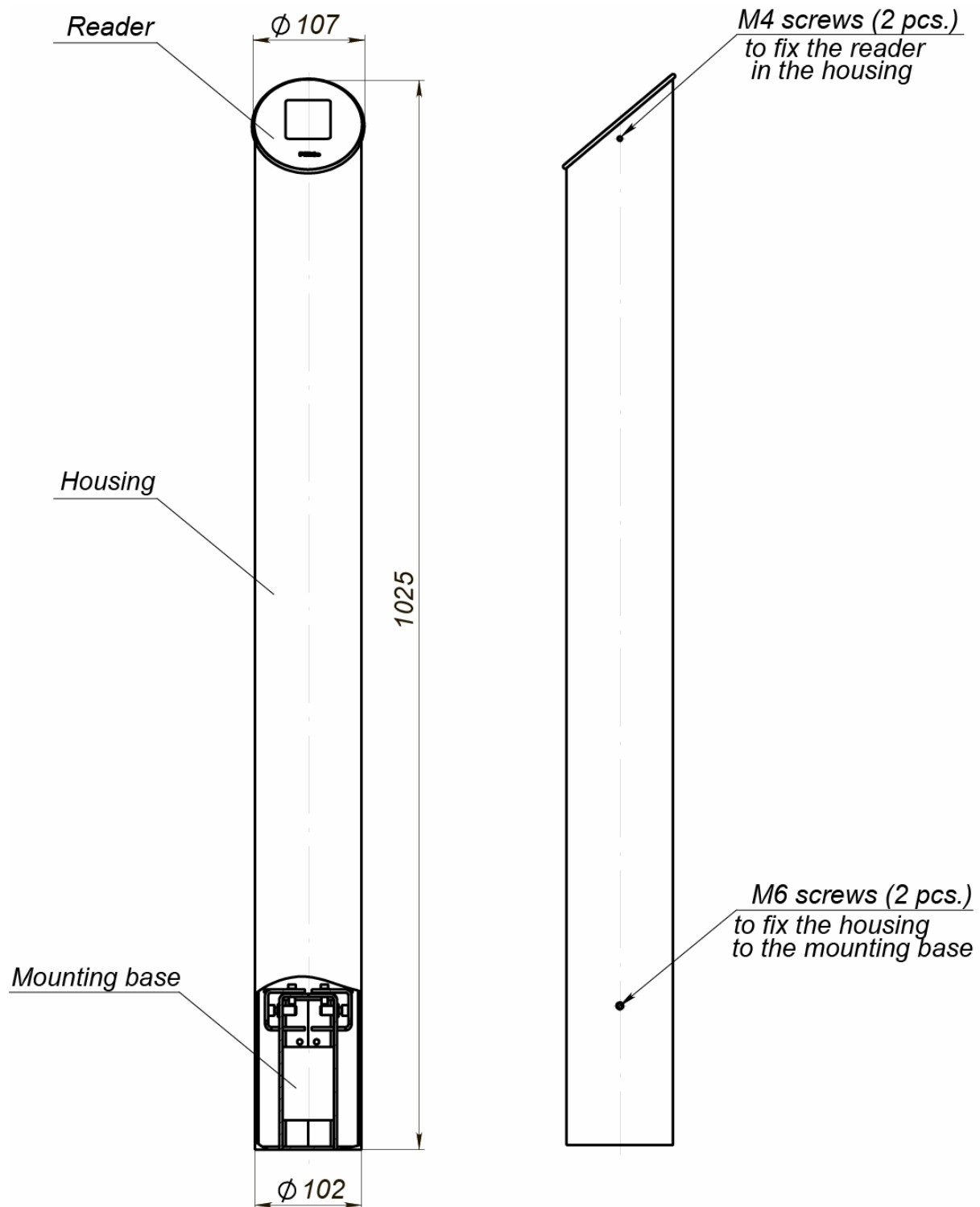


Figure 1. IRP-01 overall view and dimensions

The board of the reader is shown on Fig. 2.

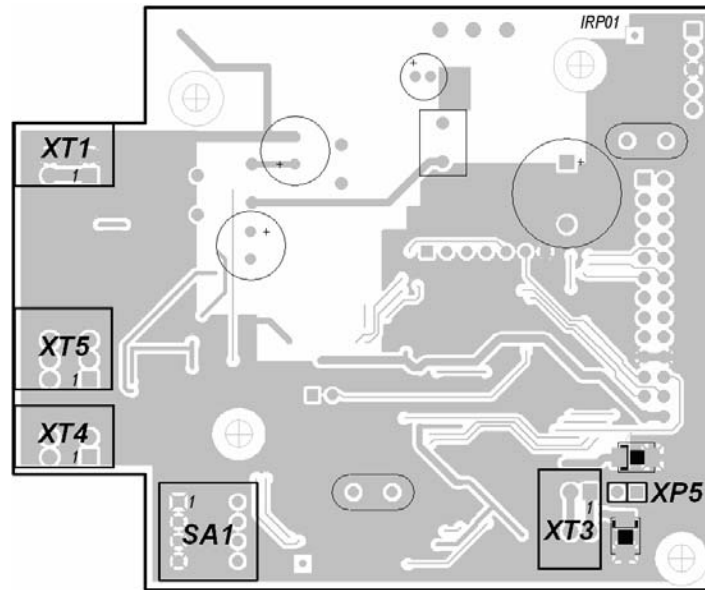


Figure 2. The board of the reader

The board contains:

- XT1** – connectors for power cables.
- XT3** – connector for connection via *RS-485* interface.
- XT4** and **XT5** – connectors for connection via *Wiegand* interface.
- XP5** – “disconnection of EOL resistor” connector for *RS-485*.
- SA1** – DIP-switch for reader setting.

4.2 Operating principle

Readers provide code reading from Proximity identifiers with operation frequency 125 kHz (hereinafter – the identifier) produced by HID Corporation, type: ProxCard II, ISOProx II (standard formats HID: 26 bit (H10301), 37 bit (H10302, H10304)), and also *IL-05ELR* and *EM4100/4102* identifiers produced by EM-Microelectronic-Marin SA.

Code reading is performed when the identifier is presented to the reader. Maximum operating distance between the identifier and the reader depends on the type of the identifier. The identifier can be placed inside pocket, wallet or any other radio transparent container (cover).

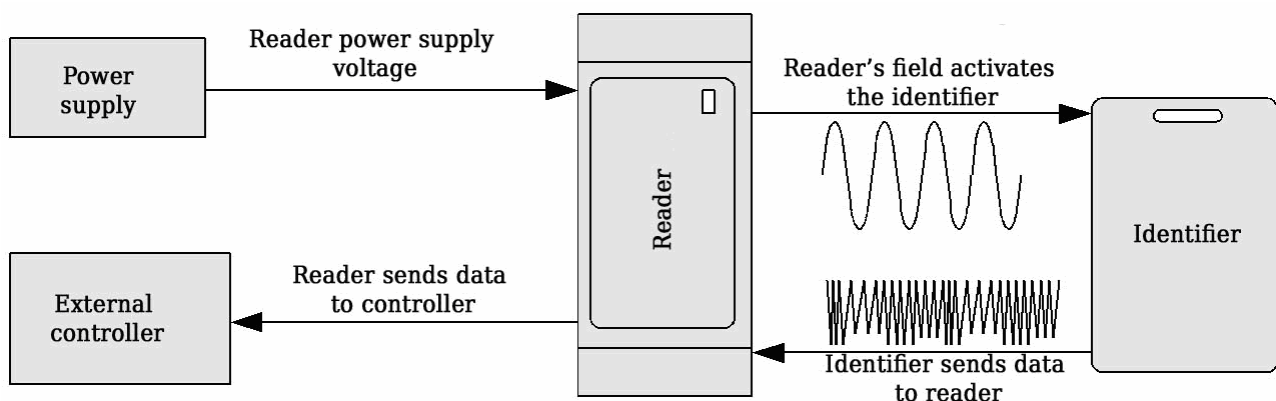


Figure 3. Reader operation

When switched on the reader radiates low frequency (125 kHz) electromagnetic field. Caught in this field the identifier is activated and starts transmitting individual encoded signal that is received by the reader.

Reader transforms the received signal in accordance with an external device interface and sends it to controller of external device via *RS-485* or *Wiegand* interfaces.

Data is transmitted to the external controller at one time, asynchronously, at the moment of first positive signal receipt from identifier. Repeated data transfer is possible not earlier than 200 ms after identifier leaves stable reception zone.

4.3 Data transmitting via Wiegand interface

Two wires are used for transmission: «data 0» and «data 1». When logic level «0» occurs on one of the wires it signals the presence of bit with appropriate value in coded mark.

Time response characteristics of output data format:

Duration of data pulse	100 mcs
Pulse-time	1 ms

All bytes are transmitted with high-order bits forward.

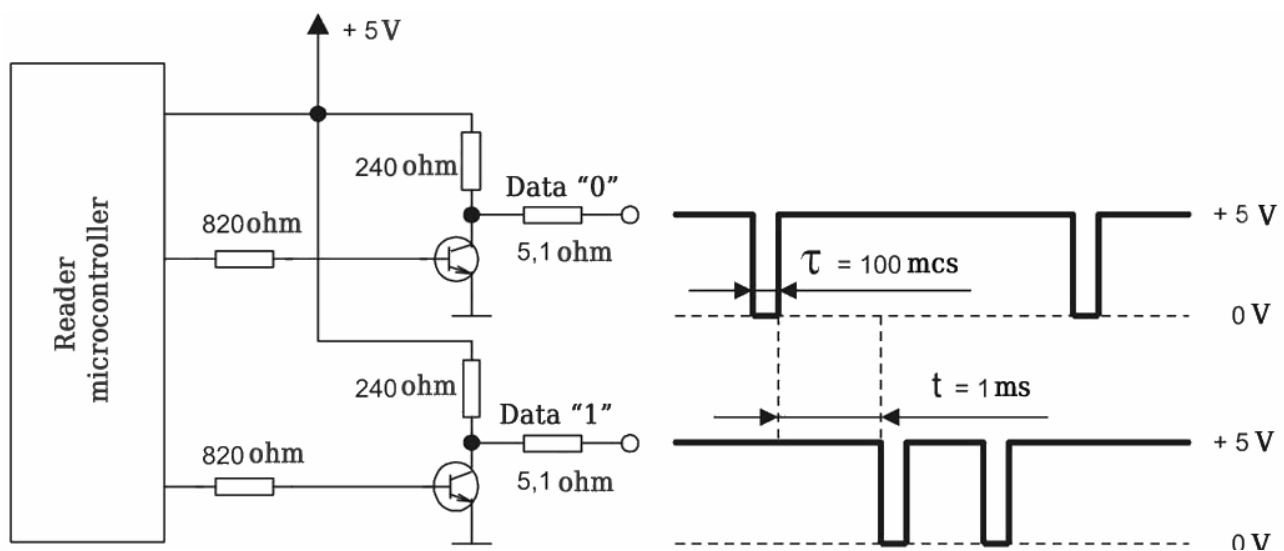


Figure 4. Formation of output reader signals and their diagrams

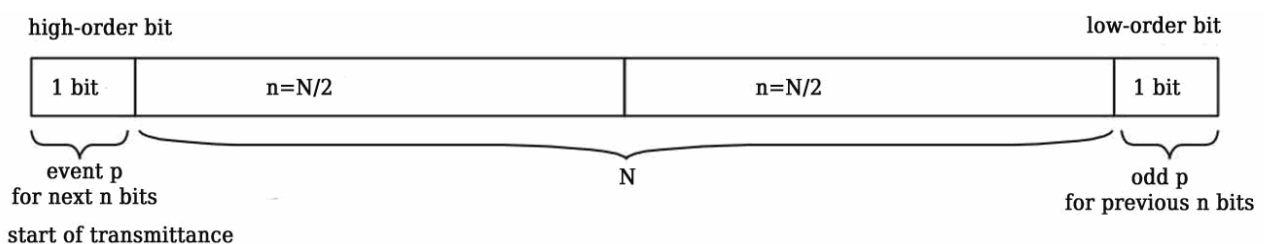
The length of the coded mark depends on the output data format set at assembly and can be either fixed or specified by data dimension received from identifier.

Following rules are applied when there is difference between coded mark received from identifier and the output coded mark:

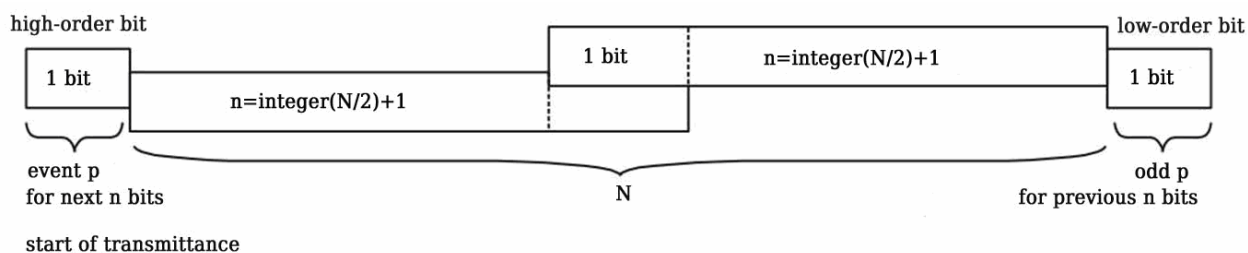
- If the input coded mark from identifier is longer than output mark the excessive high-order bits are truncated.
- If the input coded mark from identifier is shorter than output mark the missing high-order bits are padded with zeros.

The structure of coded mark and order of parities in it for fixed length formats are presented in the following Figures:

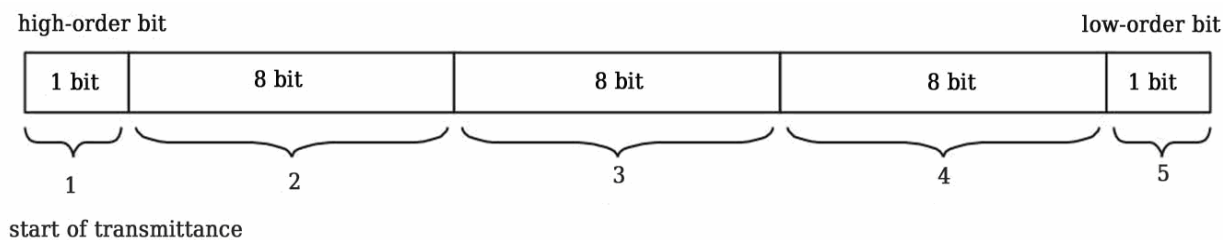
- The identifier encoded signal includes the even number of bits ($N/2 - \text{integer}$):



- The identifier encoded signal includes the uneven number of bits ($N/2 - \text{non integer}$):



The structure of output coded mark in Wiegand 26 (H10301) format is presented in Figure:



- 1 – Control bit (corresponds with the even parity for the next 12 bit data)
- 2 – Byte code
- 3 – High-order byte of card number
- 4 – Low-order byte of card number
- 5 – Control bit (corresponds with the odd parity for the previous 12 bit data).

5 CONFIGURATION

The interface of the reader is chosen with the use of switch №1 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2):

- *ON* – connection to *RS-485* interface,
- *OFF* – connection *Wiegand* interface.

5.1 Operation of reader in RS-485 mode

To operate the reader in *RS-485* mode the switch №1 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2), shall be set in *ON* position. When the reader is connected via *RS-485* interface, it can be used as an external reader for **PERCo Web** controllers.

5.1.1 Selection of reader number

When readers are connected to *RS-485* interface, they need to have different numbers (switch 2) to determine the direction of passage. Binding of reader number to passage direction is made by computer software.

The number is selected with the use of switch 2 of DIP-switch **SA1**, located on the board of controller (see Fig. 2), in such case switch 1 shall be set in *ON* position. Number of reader is determined according to Table 1.

Table 1. Setting of reader number on DIP-switch SA1

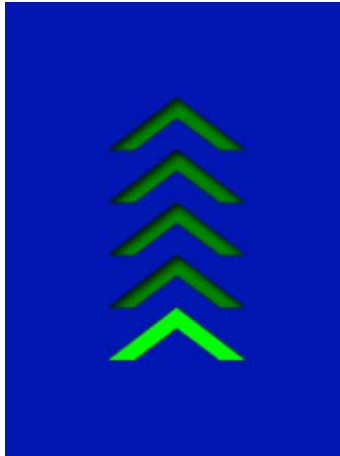
Reader number	Switch	
	1	2
Reader 1	ON	ON
Reader 2	ON	OFF

5.1.2 Indication

When operated with **PERCo Web** controllers, LCD of the reader show the following indication of controller operation modes:



“*Control*” mode indication – general background and an appearing hand with a card, showing that it is necessary to present a card



“*Open*” mode indication, and also the response to the presentation of authorized card – moving green arrow.



“*Closed*” mode indication, and also the response to the presentation of non-authorized card – STOP inscription with changing color of letters.



Indication of waiting for verification – hourglass.

5.2 Operation of reader in Wiegand mode

To operate the reader in *Wiegand* mode the switch 1 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2), shall be set in *OFF* position. If the reader is connected to *Wiegand* interface, it can be used an external reader for ACS controllers.

5.2.1 Indication setting

During the operation of ACS controllers LCD shows the same indication as depicted in Section 5.1.2. There are two possible options to control indication: «*single line*» and «*double line*». The option is selected with the use of switch 2 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2), in such case switch 1 shall be set in *OFF* position. Indication control option is determined according to Table 2.

Table 2. Indication setting on DIP-switch SA1

Indication option	Option	
	1	2
«double line»	OFF	ON
«single line»	OFF	OFF

Control signals in case of «single line» mode are transmitted via the line that is connected to *Led R* contact (see Fig. 7) of *XT5* connector on the reader board (see Fig. 2). In case of «double line» mode control signals are transmitted via two lines connected to *Led R*, *Led G* contacts of *XT5* connector on the reader board. To control sound indication of the reader with ACS controller it is necessary to connect the wire that is connected to *Beep* contact of *XT5* connector with the negative terminal of power supply unit. Indication of reader is given in 3 according to control signals received by the reader.

Table 3. Indication of reader

Signal level on control line		Indication of reader	
<i>Led R</i>	<i>Led G</i>	«double line»	«single line»
0	0	Waiting for card presentation (hand with card)	Access granted (moving green arrow)
0	HZ	Access granted (moving green arrow)	
HZ	0	Access restricted (STOP inscription)	Access restricted (STOP inscription)
HZ	HZ	Waiting for card presentation (hand with card)	

0 – control line is connected to negative terminal of power supply unit;

HZ – high resistance on the control line (the line is not connected to negative terminal of power supply unit)

5.2.2 Changing the format of output data



Attention!

Switching over the reader into Wiegand formats does not prevent it from reading cards of other formats and delivering read code to an output of a reader in the set format.

Wiegand output data format is selected with the use of switches 3 and 4 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2), in such case switch 1 shall be set in *OFF* position. *Wiegand* format of the reader is determined according to Table 4.

Table 4. Selection of output data format of the reader on DIP-switch SA1

Output data format	Switch		
	1	3	4
Wiegand 26	OFF	ON	ON
Wiegand 37	OFF	ON	OFF
Wiegand 42	OFF	OFF	ON
Wiegand	OFF	OFF	OFF

6 SAFETY REQUIREMENTS

6.1 Safe installation



Attention!

- All work should be carried out only when the power is off and power supply is disconnected from the mains.
- Study the Operation manual thoroughly before beginning the installation work.
- Reader installation must be carried out by a professional circuit installer.
- Only serviceable tools should be used.
- Observe general safety requirements for use of electrical equipment when laying cables.

6.2 Safe operation



It is forbidden!

- To use the reader post if the supply voltage differs from the one given in Section “*Technical specifications*” of the Operation manual.
- To use the reader post operation in conditions that don't conform to those given in Section “*General information*”.
- To use substances for cleaning of the device that may cause mechanical damage or corrosion of the surfaces.
- To hit any elements of the device so as to prevent their mechanical deformation.

7 INSTALLATION PROCEDURE

7.1 Features of installation

The following factors must be considered:

- Readers shall be installed close to the operating device;
- Close electric interference sources shorten card reading distance, therefore reader must be installed at min. 1 m whilst its cable laid at min. 30 cm distance from computer monitors, electric generators and motors, ac relays, thyristor light regulators, ac lines, computer and telephone signals;
- The reader shall be provided with reliable electrical grounding;
- Distance between two readers should be min. 30 cm.

It is recommended:

- to mount the device on steady and level concrete (grade 400 or higher, strength class B22,5), stone or similar foundations at least 150 mm thick;
- to apply reinforcing elements (300×300×150 mm) for installation on less steady foundation;
- to control vertical and flatness alignment of the device with a level during installation; maximum allowable flatness deviation is 1,5 mm;
- to use anchors produced by «SORMAT» for installation.

7.2 Tools and equipment required for installation

- 1.2÷1.5kW hammer drill;
- Ø16 mm hard-alloy drill bits;
- Ø14 mm hard-alloy drill bits;
- S6 allen key;
- S5 allen key;
- S2 allen key (included in the delivery set);
- hobby knife;
- level;
- 2 m measuring tape.

7.3 Required cables

The reader is connected to a controller via *RS-485* interface with a twisted pair cable (type F/UTP2-Cat5e); A and B signal lines shall be in the same pair.

The reader is connected to a controller via *Wiegand* interface with a shielded cable (type CABS8/EC, 8C.SEC-SC, cross-section 24AWG – 18AWG (0,2 - 0,8 mm²)). Do not use twisted pair cables.

Power source unit is connected to the reader with PVC-insulated cable 2×0,75.



Note:

Maximum distance between the reader and the controller depends on the cross-section of the cable you use. In case of use of standard cables given here the flawless operation of the reader is guaranteed at the maximum distance of 40 m.

7.4 Assembly sequence

Follow this sequence during installation of the reader:

1. Unpack the box with equipment, check carefully the delivery set.
2. Choose the place for installation in accordance with recommendations given in Section 7.1.
3. Mark the mounting holes in the floor as per 5, and also mark electrical conduit for the cable from ACS controller to the reader post.



Note:

Material, section shape, dimensions, laying method (on surface, under surface, combined), location at the entrance and other specifications of the electrical conduit are defined **by the user** according to features of the entrance, equipment location and other factors.

4. Prepare electrical conduit and mounting holes for the reader post. Insert anchors, so that their shells would not obtrude out of the floor surface.
5. Remove carefully “glass-LCD-board” unit. To do this use S2 allen key (included in the delivery set), unscrew two countersunk screws located on the upper part of the housing that fix “glass-LCD-board” unit to the metal tube of the housing (see Fig. 1).
6. Select reader interface with the use of switch №1 of the DIP-switch **SA1**, located on the board of the reader (see Fig. 2). ON position – RS-485 interface, OFF position – *Wiegand* interface.
 - 6.1. **RS-485 interface.**
 - Set the reader number with the use of switch №2 DIP-switch **SA1**, located on the board of the reader (see Fig. 2). ON position – reader №1, OFF position – reader №2 (see Section 5.1.1).
 - If there are several devices connected to the controller the communication line is connected to all devices consistently. If the reader is not used as a final device on the line, it is necessary to disconnect the end-of-line resistor – to do it remove the jumper from *XP5* connector block on the board (see Fig. 2). Please note that in this case it will be necessary to connect end-of-line resistors on the ends of communication line of *RS-485* interface.
 - 6.2. **Wiegand interface.**
 - Set the indication control variant with the use of switch №2 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2). ON position – «*double line*», OFF position - «*single line*» (see Section 5.2.1).
 - Select the output data format with the use of switches №3 and №4 of DIP-switch **SA1**, located on the board of the reader (see Fig. 2). The position of switches is determined in accordance with Table 4 (see Section 5.2.2).
7. Disassemble the mounting base from the post housing. To do so use S5 allen key turn two screws **clockwise** that fix the mounting base to the post housing. The screws are accessed through the holes located in the lower part of the housing (see Fig. 1).
8. Drag the cable through the central hole in the mounting base with 16 mm diameter (see Fig. 5).
9. Fix the mounting base on the installation surface with anchor bolts. Control vertical alignment with the level during the installation. (Use S6 allen key to fix the mounting base in case you are using PFG IR 8-20 anchor bolts produced by «SORMAT»).
10. Lay the connecting cable in the electrical conduit and inside the reader post.

11. Install the reader post on the mounting base and fix it. To do so use S5 allen key turn two screws **counterclockwise** that fix the mounting base to the metal tube of the post (see Fig. 1). The screws are accessed through the holes located in the lower part of the housing.
12. Lay the cable inside the reader post, fix it and connect it to the board of the reader according to connection layouts shown on Fig. 6 or Fig. 7.
13. Install carefully “glass-LCD-board” unit back and fix it with two M4 screws, located in the upper part of the housing (see Fig. 1). S2 allen key is included in the delivery set, screws shall be screwed inside so that they would not protrude out of the housing.
14. Connect the cable to the PERCo Web controller or ACS according to layout given on Fig. 6 or Fig. 7.

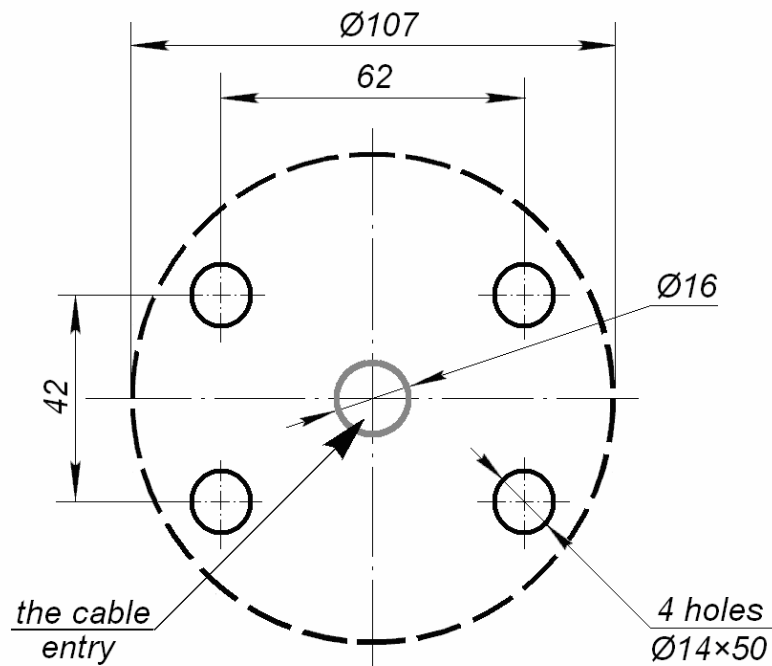


Figure 5. Mounting hole pattern for IRP-01 installation

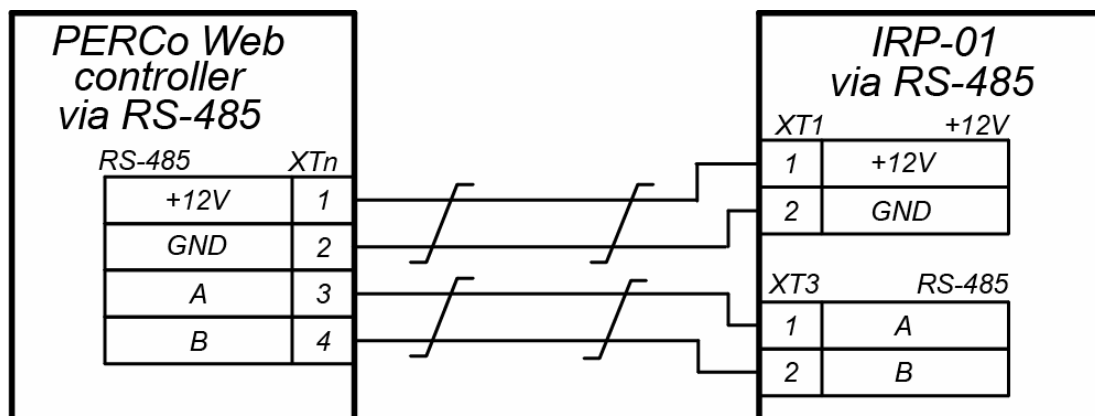


Figure 6. Connection layout for RS-485 interface of PERCo Web controller

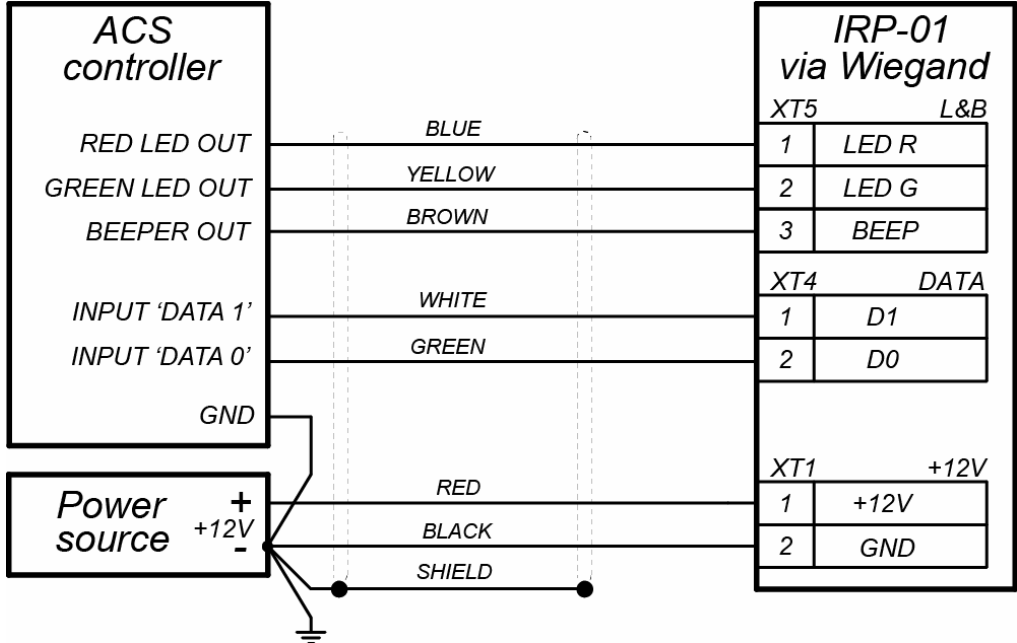


Figure 7. Connection layout for Wiegand interface of ACS

8 TROUBLESHOOTING

Possible faults to be corrected by the user themselves are listed in Table 5:

Table 5. Troubleshooting guide

Fault	Most plausible cause	Remedy
When powered-up, the reader does not respond to a presented card	No supply voltage on the reader	Check connection of the reader to the power source
The reader responds to the presented card, but there are no events and indication on this reader	No connection with the controller via <i>RS-485</i> or <i>Wiegand</i>	Check connection and distribution of <i>RS-485</i>

In an unlikely event of other faults please consult the PERCo Technical Support Department.

9 PERCO WARRANTY

PERCo (the Manufacturer) warrants that the **IRP-01 reader post** complies with applicable statutory safety requirements and electromagnetic compatibility provided that the instructions on storage, installation and operation, given in the Certificate & Operation Manual, are observed.

The warranty period is **5 (five) years** commencing from the date of sale. Should there be no date of sale on the warranty card, the warranty period shall commence from the date of manufacture specified in the Certificate and on the Product label.

In the post-warranty period the replacement parts/components are warranted to be free from defects in material or workmanship for a period of 3 (three) months from the date of shipment of the repaired/replaced Product to the Customer.

All claims with regard to quantity, completeness and defects to appearance of the Product delivered are accepted by the Manufacturer in writing within no more than 5 (five) working days after the products are received by the Customer. In case of failure to meet the abovementioned deadline no claims are accepted.

The Warranty does not cover:

- products, parts and components with:
 - external mechanical damages resulting in the Product's fault;
 - defects resulting from Customer's improper testing, operation, installation, maintenance, modification, alteration, or adjustment;
 - damages due to force majeure circumstances (natural disasters, vandalism etc.) or defects as a result of external circumstances (power surges, electric discharge, etc);
- fuses, accumulators, galvanic elements and other components, replacement of which is performed by the Customer in accordance with the Product's in-line documentation.

To the maximum extent permitted by the acting law, the Manufacturer does not incur a liability for any direct or indirect losses of the Customer, including but not limited to loss of profit or data, losses caused by idle period, missed profit, and etc related to use or impossibility to use products and software, including possible software errors and failures.

Within the warranty period the products are repaired free of charge at the Manufacturer's site. The Manufacturer reserves the right to repair failed product or replace it with an operational one. Time of repair is specified at the moment the Product is accepted for repair. Transportation cost to and back from the place of repair shall be borne by the Customer.

In order to shorten the repair time the Customer must inform the Manufacturer's Technical Support Department (the TSD) of the problem with the Product's operation and/or about the origin of the fault by submitting a filled-in Technical Support Form by e-mail, fax or via the Manufacturer's website or communicate directly a specialist of the TSD.

The Manufacturer reserves the right not to accept the Product for repair from the Customer who failed to submit the Technical Support Form.

The Manufacturer's warranty obligations don't cover attendance by the experts of a Customer and maintenance of any Product on site

If in the course of the examination taken by the Manufacturer of the Product or its parts/components believed to be faulty, no faults have been detected, the Customer is responsible for compensation of the Manufacturer's expenses related to the examination.

Apart from the warranties mentioned above the Manufacturer does not provide any other warranties with regard to compatibility of a Product purchased with software or products produced by other manufacturers as well as any warranties that this Product will fit for the purposes not stipulated in the Product's in-line documentation.

The warranty does not provide for any claims with regard to the technical specifications of the Product in case they are in compliance with those stated by the Manufacturer. The Manufacturer does not guarantee that the Product purchased will meet Customer's requirements and expectations.

**PLEASE NOTE THAT PERCo PRODUCES TECHNICALLY
SOPHISTICATED PRODUCTS THAT, IF NOT FAULTY,
CANNOT BE RETURNED BACK IF BY SOME REASON
THE CUSTOMER DEEMS THEM UNSATISFACTORY**



WARRANTY CARD



IRP-01 reader post

Serial number	5	1	7				
---------------	---	---	---	--	--	--	--

Date of manufacture _____ 201__

Quality control seal _____

Date of sale « » _____ 201__

(signature, seal)



Cutting line



Warranty repair coupon



IRP-01 reader post

Serial number	5	1	7				
---------------	---	---	---	--	--	--	--

Date of manufacture _____ 201__

Quality control seal _____

Date of sale « » _____ 201__

(signature, seal)

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