Annex no. 5

Functional Description / User Manual

INSTALLATION

ID ISC.LRU3000 / ID ISC.LRU3500

UHF Long Range Reader

FEIG
ELECTRONIC

Note

General information's regarding this document

- The sign "☞" indicates extensions or changes of this manual compared with the former issue.

- If bits within one byte are filled with "-", these bit spaces are reserved for future extensions or for internal testing- and manufacturing-functions. These bit spaces must not be changed, as this may cause faulty operation of the reader.

- The following figure formats are used:
  0...9:   for decimal figures
  0x00...0xFF: for hexadecimal figures,
  b0...1   for binary figures.

- The hexadecimal value in brackets "[ ]" marks a control byte (command).

Contents

1. Safety Instructions / Warning - Read before start-up !

- The device may only be used for the intended purpose designed by for the manufacturer.

- The operation manual should be conveniently kept available at all times for each user.

- Unauthorized changes and the use of spare parts and additional devices which have not been sold or recommended by the manufacturer may cause fire, electric shocks or injuries. Such unauthorized measures shall exclude any liability by the manufacturer.

- The liability-prescriptions of the manufacturer in the issue valid at the time of purchase are valid for the device. The manufacturer shall not be held legally responsible for inaccuracies, errors, or omissions in the manual or automatically set parameters for a device or for an incorrect application of a device.

- Repairs may only be executed by the manufacturer.

- Installation, operation, and maintenance procedures should only be carried out by qualified personnel.

- Use of the device and its installation must be in accordance with national legal requirements and local electrical codes .

- When working on devices the valid safety regulations must be observed.

- When installing the device in areas covered under FCC 47 CFR Part 15 a minimum separation of 23 cm (9 inch) between antenna and the human body must be maintained.

- Special advice for carriers of cardiac pacemakers:

  Although this device doesn't exceed the valid limits for electromagnetic fields you should keep a minimum distance of 25 cm between the device and your cardiac pacemaker and not stay in an immediate proximity of the device respective the antenna for some time.

2. Performance Features of Reader Family ID ISC.LRU3000

2.1. Performance features

The Reader has been developed for reading passive data carriers, so-called „Smart Labels", using an operating frequency in the UHF range.

2.2. Available Reader types

The following Readers are available:

Table 1: Available Reader Types

Reader type	Description
ID ISC.LRU3500-EU	Device version for Europe with PoE　　　　(max. 4Watt)
ID ISC.LRU3000-EU	Device version for Europe without PoE　　　(max. 2Watt)
ID ISC.LRU3500-FCC	Device version for USA with PoE　　　　　(max. 4Watt)
ID ISC.LRU3000-FCC	Device version for USA without PoE　　　　(max. 2Watt)

2.3. Available Accessories

The following optional accessories are currently available:

Table 2: Optional Reader Accessories

Reader type	Description
ID ISC.LR.CSC-IP64 Connector Sealing Cap	Protection cap for IP 64 Art.No.: 3558.000.00
ID ISC.LRU3x00-MS Mounting Rail Set	Rail Mounting Set for ID ISC.LRU3000/3500 Art.No.: 3831.000.00

3. Installation

The Reader is designed for wall-mount, including outdoors. Holes for mounting on a wall are provided in the housing.

It is not necessary to open the reader housing mounting.
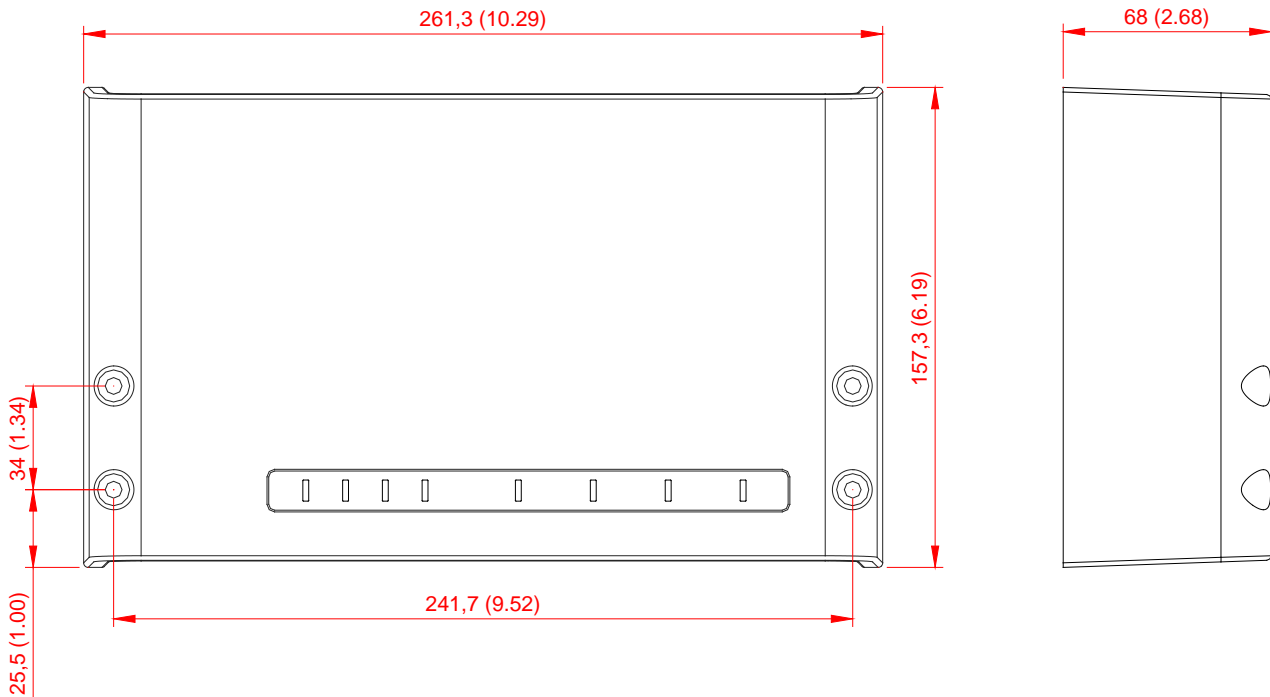
Figure 1: Installation Drawing

4. Terminals

On the lower side of the reader housing the different cable connectors are positioned. Figure 2: Connection Overview shows the arrangement of the connectors and Table 3: Connection terminals shows which connection for the different cables are used for. Table 4: Push button function shows the available push buttons.
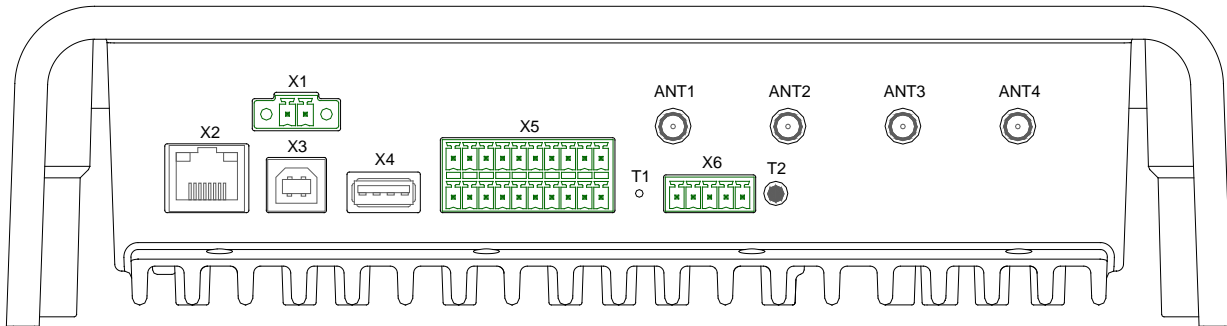
Figure 2: Connection Overview

Table 3: Connection terminals

Connector	Description
ANT 1-4	Connection of the external antennas (Impedance 50Ω)
X1	Power supply 24VDC +-5%
X2	10/100Tbase network connection with RJ-45 (with PoE)
X3	USB interface for host_communication
X4	USB interface for WLAN-Sticks
X5	Digital input and output and relay output
X6	RS232 / 485 interface

Table 4: Push button function

Push button	Description
T1	Internal push button for complete configuration reset
T2	External push button for CPU-Reset

4.1. Antenna Connection

The external SMA antenna connectors are positioned on the lower side of the reader.

The maximum tightening torque for the SMA sockets is 0.45 Nm (4.0 lbf in).

CAUTION:

Exceeding the tightening torque will destroy the plug.

Table 5: External antenna connection

Terminal	Description
ANT 1 - 4	Connection for external antennas (input impedance 50Ω)
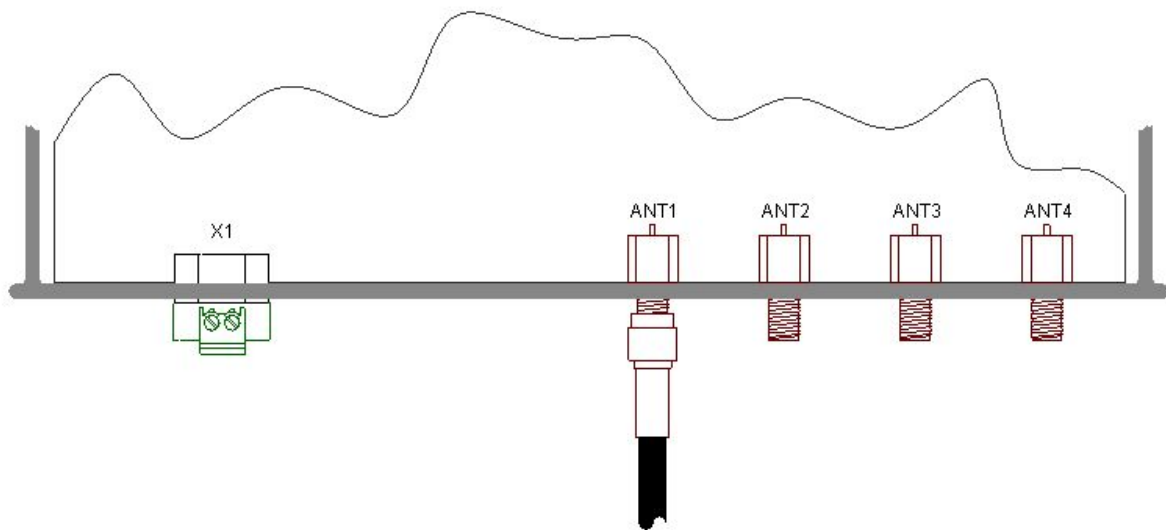
Figure 3: External antenna connection ANT1-4 and X1 for the power supply

CAUTION:

A direct connection of an antenna to an antenna output with activated DC Voltage (24 VDC, 500 mA) may damage the antenna.

4.2. Power Supply

4.2.1. Power Supply via connection X1

The supply voltage of 24 V DC has to be connected to Terminal X1.

Table 6: Pin assignment for power supply

Terminal	Abbreviation	Description
X1 / Pin 1	VDC	Vcc – supply voltage 24VDC +-5%
X1 / Pin 2	GND	Ground – supply voltage
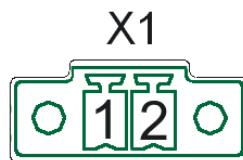
Figure 4: Connection for the power supply

CAUTION:

The reader has to be supplied by a limited power supply (e.g. NEC Class 2/LPS power supply) according IEC EN 60950-1 chapter 2.5, only.

Reversing the polarity of the supply voltage may destroy the device.

Each reader has to be supplied by a separate external power supply.

An operation of an ID ISC.LRU3500 via an external power supply and Power over Ethernet (PoE) at the same time is not recommended and can cause interferences during operation.

4.2.2. Power Supply via Power over Ethernet (PoE)

Optional the reader (only LRU3500) can be powered via the LAN connector on X2 with the use of a PoE „Power over Ethernet" power supply according to IEEE802.3at*, Class4 (30/25,5Watt). The DC supply can be achieved via the free pin's 4,5 and 7,8 (Midspan-Power). Also a "Phantom Powering" (Inline-Power) via the signal pin's 1,2,3,and 6 is possible. Depending on the cable cross-section the following cable distances can be used.

Table 7: Maximum cable length if PoE is used

cable cross-section (CAT5...7)	Maximum cable length for PoE
0,4mm	≈ 30m
0,6mm	≈ 70m

* For detailed technical information regarding the 802.3at standard, please refer to the most recent edition of the corresponding IEEE specification.
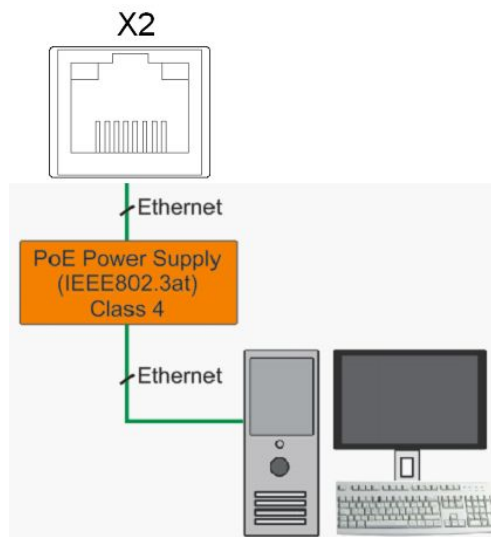
Figure 5: LAN and PoE connection

CAUTION:

Take care if PoE is used the maximum reader output power of the reader must be limited to 1Watt.

It must be ensured that the reader is supplied with 42,5 V DC (48 V DC – cable losses) at least.

This functionality is only available with the reader models ID ISC.LRU3500-EU and ID ISC.LRU3500-FCC.

An operation of an ID ISC.LRU3500 via an external power supply and Power over Ethernet (PoE) at the same time is not recommended and can cause interferences during operation.

If Power over Ethernet is used WLAN is not available.

4.3. Interfaces

4.3.1. Ethernet Interface on connector X2

The Reader has an integrated 10 / 100 base-T network port for an RJ-45. Connection is made on X2 and has an automatic "Crossover Detection" according to the 100BASE-T Standard.

With structured cabling CAT 5 cables should be used. This ensures a reliable operation at 10 Mbps or 100 Mbps.

The prerequisite for using TCP/IP protocol is that each device has a unique address on the network. All Readers have a factory set IP address.

Table 8: Standard factory configuration of the Ethernet connection

Network	Address
IP-Adresse	192.168.10.10
Subnet-Mask	255.255.255.0
Port	10001
DHCP	OFF

NOTE:

The reader is equipped with a DHCP ready Ethernet Interface.

4.3.2. USB Interface on connector X3

The USB socket on the board is terminal X3. The pinout is standardized. The data rate is reduced to 12 Mbit (USB full speed). A standard USB-cable can be used.
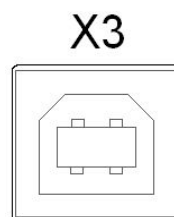
Figure 6: USB-Interface for host communication

NOTE:

The length of the USB-cable can have a max. of 5m (20 inch). It is not allowed to use longer cables.

4.3.3. USB Interface on connector X4 (WLAN)

The USB-Port X4 can be used for a standard WLAN-USB-Stick

X4
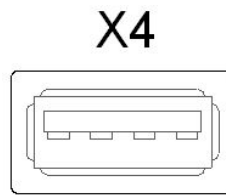
Figure 7: USB-Interface for external WLAN stick

NOTE:

WLAN shall not be used when the reader is powered via Power over Ethernet (PoE)

The following table gives an overview about successfully tested Wireless LAN Sticks

Table 9: Successfully tested WLAN Sticks

Manufacturer	Description	Model
Buffalo	Wireless-N NFiniti High Power	WLI-UC-G300HP
Buffalo	Wireless –N NFiniti	WLI-UC-G300N
Cisco / Linksys	Wireless Network USB Adapter	WUSB100
Netgear	Wireless-G 54 USB Adapter	WG111 v3

4.3.4. RS232 Interface on connector X6

The RS232 interface is connected on X6. The transmission parameters can be configured by means of software protocol.
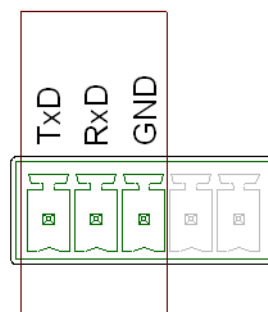
Figure 8: RS232 interface pin-outs on X6

9-pol. D-SUB-Buchse

TxD
RxD
GND

⇒ PC

GND   <−>   Pin 5
RxD   <−>   Pin 3
TxD   <−>   Pin 2
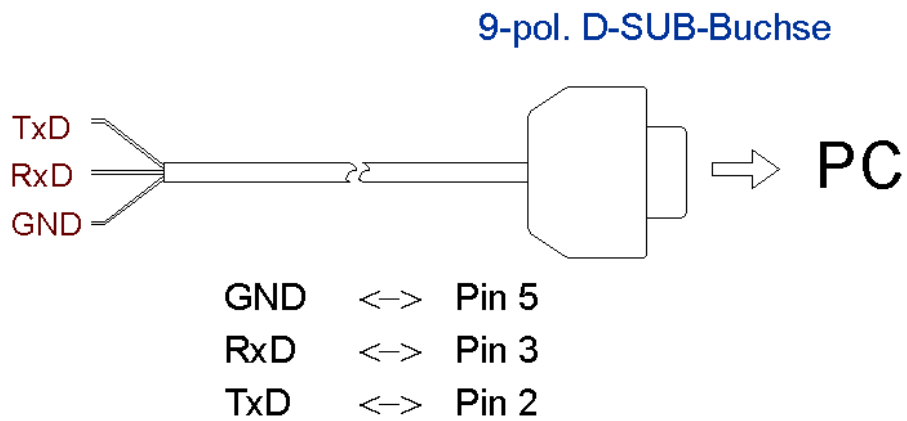
Figure 9: Wiring example for connecting the RS232 interface RS485-Schnittstelle X6

4.3.5. RS485 Interface on connector X6

The connection of the RS485 interface take place via the X6 connector as well. The interface parameter can be configured via software protocols.

GND   A-   B+
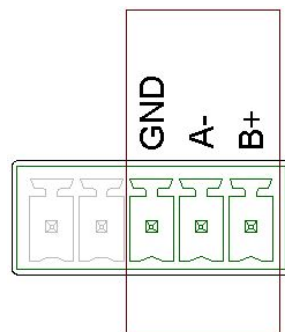
Figure 10: RS485 interface pin-outs on X6 (RS485-Interface):

Table 10: RS485 interface pin-outs

Abbreviation	Description
GND	RS485 – GND
A-	RS485 – (A -)
B+	RS485 – (B +)

4.3.5.1. Address assignment of RS485 for bus operation

For bus operation the Reader can be assigned the required bus address via software.

The address is assigned by the host computer. The software is used to assign addresses "0" through "254" to the Reader.

A potential termination of the interface bus can be configured by the software as well.

NOTE:

Since all Readers are factory set with address „0", they must be connected and configured one after the other.

4.3.6. Data-Clock Interface on connector X5

The connection of the data-clock interface take place via the digital Outputs OUT1 and OUT2 at connector X5. The wire for the clock needs to be connected to connector OUT1-C, the wire for the data needs to be connected to connector OUT2-C.
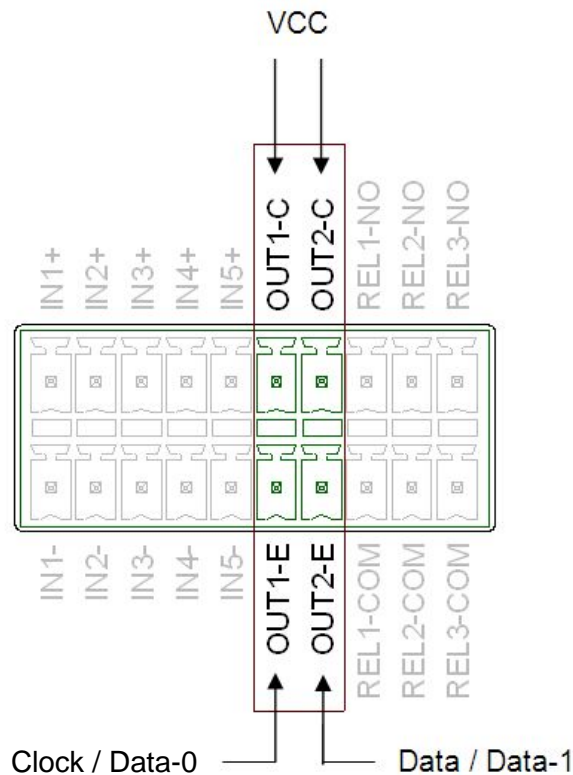
Figure 11: Data-Clock Interface on connector X5

NOTE:

The data-clock interface is only available in Scan-Mode.

The data-clock interface cannot be used to configure the reader.

The digital outputs OUT1 and OUT2 are not available, if the data-clock interface is activated.

The data as well as the clock need to be supplied with an external voltage. **The output is configured for max. 24 V DC / 30 mA.**
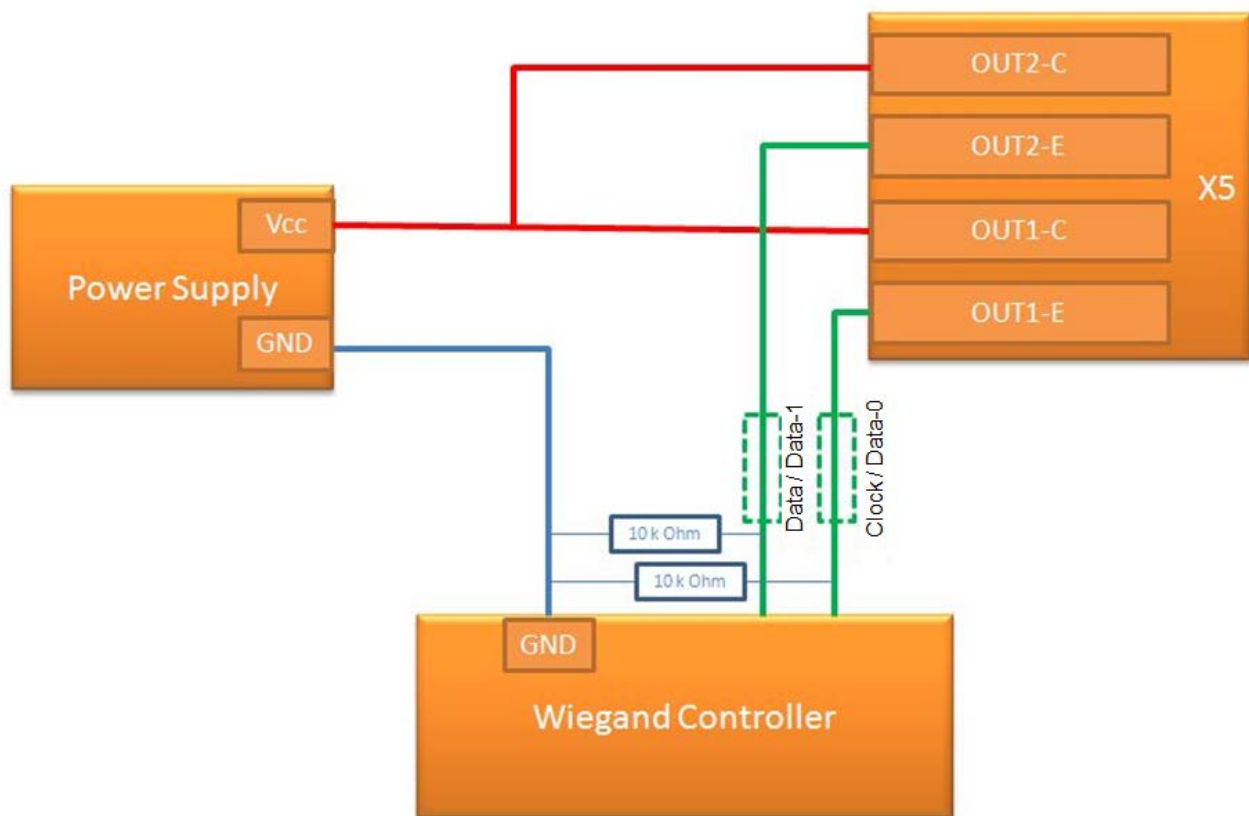
Figure 12: Wiring Example

NOTE:

Please consider possible limitations of the Wiegand Controller regarding the used supply voltage.

In dependency on the inner circuit of the used Wiegand Controller it is necessary to use external serial resistors to limit the current on the data and clock wires.

The necessity of the external pull down resistor is depending on the inner circuit of the used Wiegand Controller

4.4. Digital Inputs on connector X5

The optocouplers on Terminal X5 are galvanically isolated from the Reader electronics and must therefore be externally supplied.
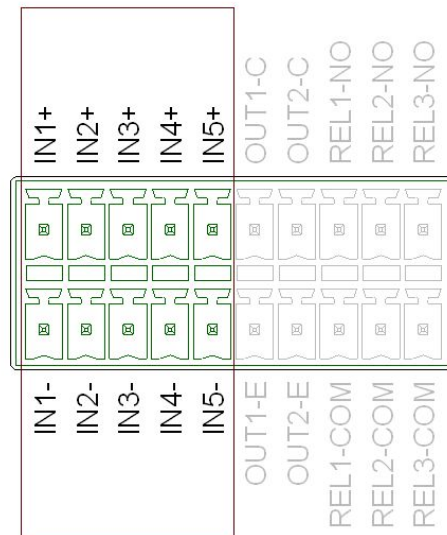
Figure 13: Optocoupler pin-outs IN1 – IN5
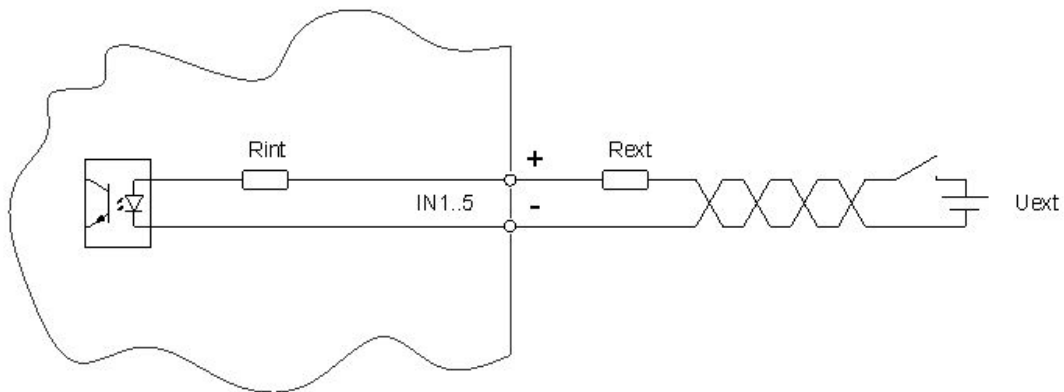
Figure 14: Internal and possible external wiring of the optocoupler inputs

Optocoupler input (X5/1-5):

The input LED associated with the optocoupler is connected internally to a series resistor of 500 Ω. For supply voltages of greater than 10V the input current must be limited to max. 20 mA by means of an additional series resistor (see **Fehler! Verweisquelle konnte nicht gefunden werden.**).

Table 11 shows the necessary external resistors for various external voltages U_{ext}.

Table 11: Required external series resistor Rext

External voltage U_{ext}	Required external series resistor R_{ext}
5 V ... 10 V	---
11 V ... 15 V	270 Ω
16 V ... 20 V	560 Ω
21 V ... 24 V	820 Ω

NOTE:

The input is configured for a maximum input voltage of 5-10 V DC and an input current of max. 20 mA.

Polarity reversal or overload on the input will destroy it.

4.5. Outputs on connector X5

4.5.1. Digital outputs on connector X5

Optocoupler output (X5/1-2):

The transistor connections, collector and emitter, of the optocoupler output are galvanically isolated from the Reader electronics and are carried to the outside without any internal ancillary circuitry on Terminal X5. The output must therefore be powered by an external power supply.
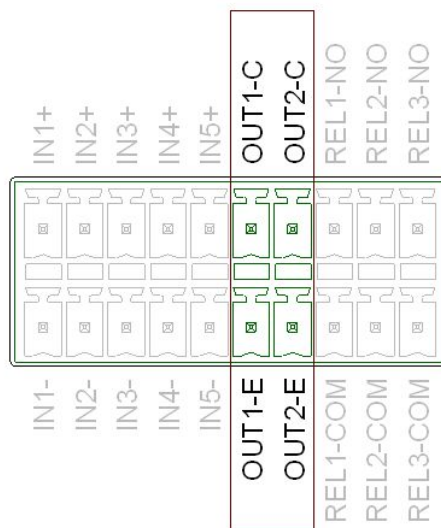
Figure 15: Optocoupler -Outputs OUT1-2
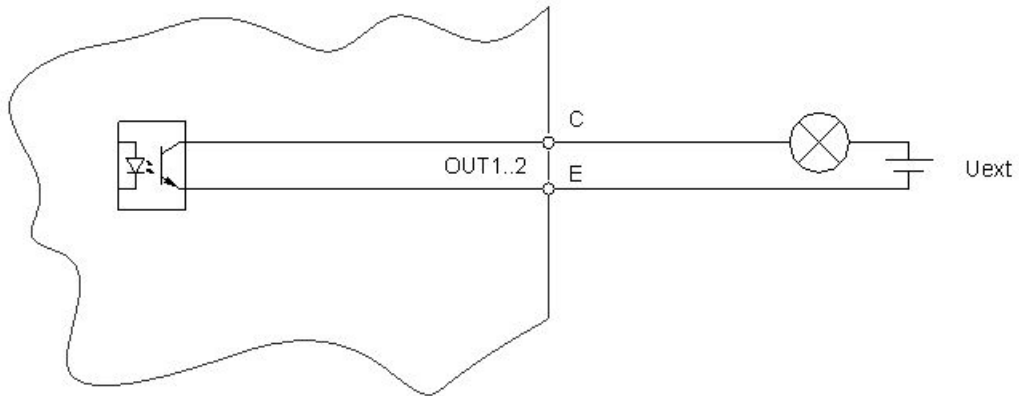
Figure 16: Internal and possible external wiring of the optocoupler-outputs OUT1-2

CAUTION:

The output is configured for max. 24 V DC / 30 mA.

Polarity reversal or overload on the output will destroy it.

The output is intended for switching resistive loads only.

4.5.2. Relay outputs on connector X5

There are 3 relay outputs available on connector X5.
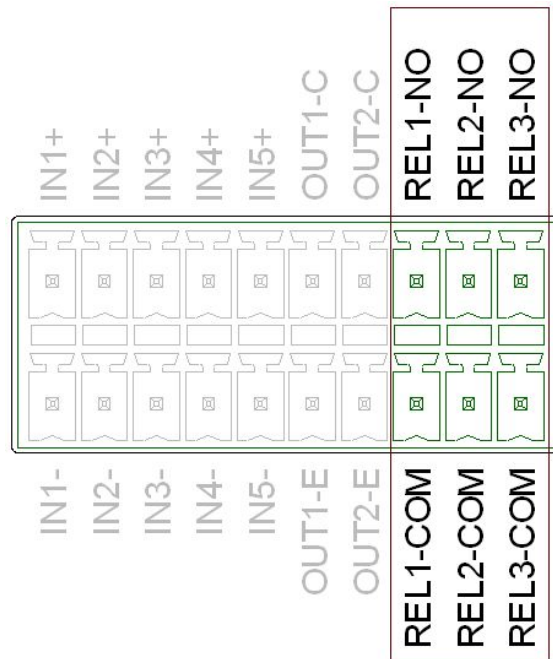
Figure 17: Relay output pin-outs REL1-3

CAUTION:

The relay output is configured for max. 24 V DC / 2 A constant load.

The switching current must not exceed 1A.

The relay output is intended for switching resistive loads only. If an inductive load is connected, the relay contacts must be protected by means of an external protection circuit.
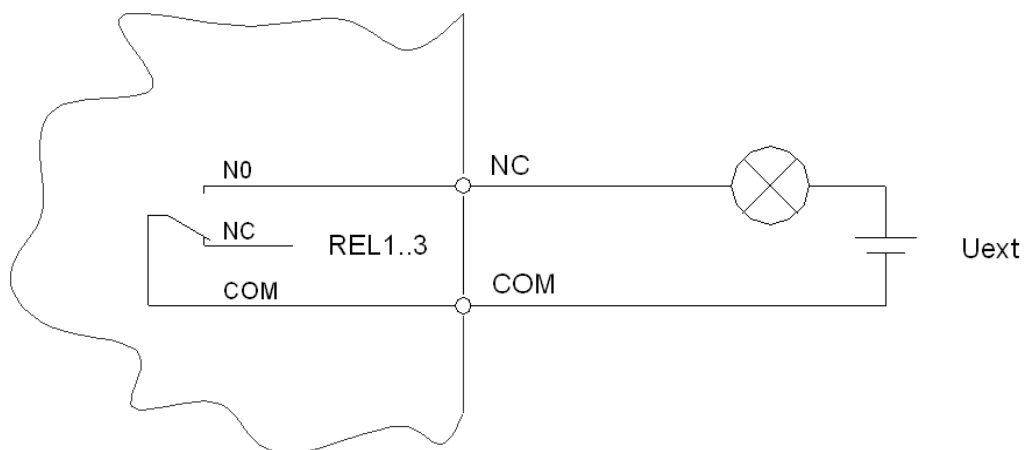
Figure 18: Internal and possible external wiring of the relay output

5. Operating and Display Elements

5.1. Status LEDs

Table 12: Configuration of the LEDs
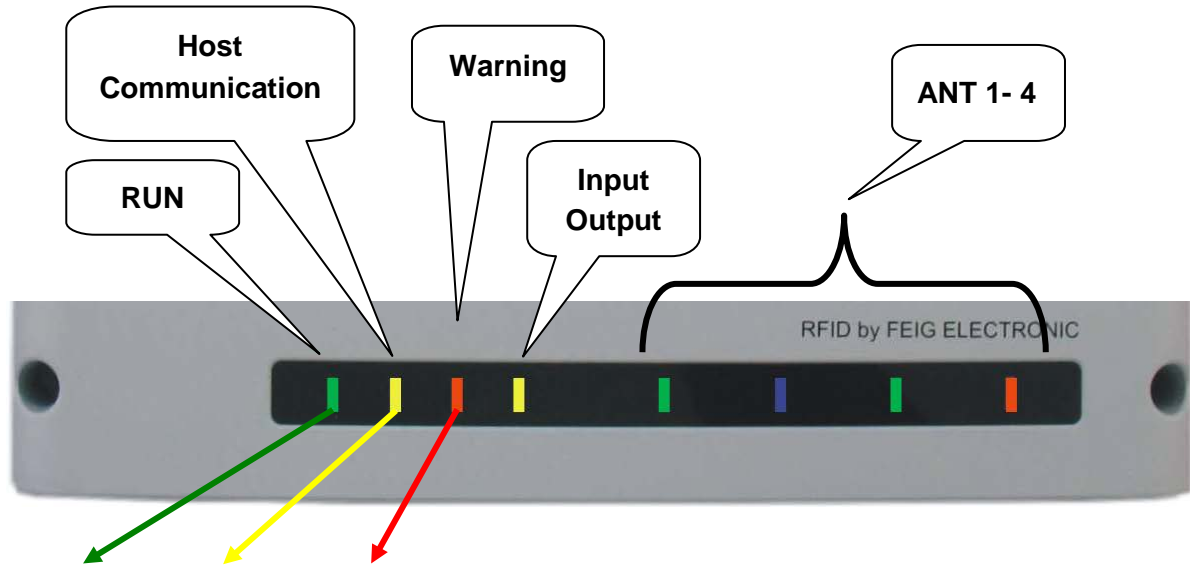
Green	Yellow	Red	Description
ON	OFF	ON	Boot sequence (ca.10s) after power on
FLASH	OFF	OFF	Normal Reader operation (without Host communication)
FLASH	BLINKT	OFF	Reader receives a valid protocol from host
FLASH	OFF	ON	RF Warning [0x84] (without host communication)
FLASH (alternating)	OFF	FLASH (alternating)	Firmware Activation necessary [0x17] / Wrong Firmware [0x18]
FLASH (synchronous)	OFF	FLASH (synchronous)	RFC Hardware Error [0xF1]
OFF	FLASH (synchronous)	FLASH (synchronous)	Hardware Warning (ACC EEPROM Error / RFC not detected)
FLASH	OFF	FLASH (fast)	USB Host Error
Firmware Update:			
FLASH	FLASH	FLASH	Firmware transfer from host to reader
(light in sequence)			**(Please do not switch off the reader or disconnect the interface cable)**
FLASH	FLASH	FLASH	Firmware flash into EEPROM.
synchronous			**(Please do not switch off the reader or disconnect the interface cable)**

Green	Yellow	Red	Description
Configurations-Reset:			
FLASH	FLASH	FLASH	While T1 is pushed and hold for maximal 5s
(light in sequence)			
ON	ON	ON	After T1 has been pushed and hold for 5s. Configuration Reset has been finished.

Input / Output LED (yellow):	
Configurable LED.	Can display the status of a digital input or output

ANT 1 – 4:	
Green	HF Power switched on
Blue	Tag-Detect
Red	Antenna impedance error (> 50Ohm or <50Ohm)

5.2. Reset Push Buttons

Figure 19 shows the position of the reset push button's T1 and T2.

At the right side of the connector X6 the push button T2 is positioned. With this push button a CPU-Reset can be performed.

With the push button T1 within the reader housing on left side of X3 a complete configuration reset can be performed. For performing a reset you should use a paper clip and push the button T1 for at least 5 s until the 3 status LED's (left side) are switched on continuously, see 5.1. Status LEDs

Table 12: Configuration of the LEDs

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Table 12: Configuration of the LEDs
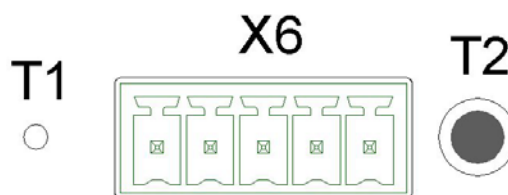
Figure 19: Position of the reset-switches T1 and T2

5.3. Reader Power adjustment

To achieve the optimum reading performance it is necessary to set the reader output power to the highest allowed value. This depends on the used reader type (EU / FCC) and the regulation in the country were the reader is used.

5.3.1. EU-Reader according to EN302 208

According to the standard EN302 208 the maximum radiated power is 2 W e.r.p. (Effective Radiated Power) in countries of the European Union. The in the reader configured output power P_{out} depends on the antenna gain in dBi and the attenuation of the antenna cable. If a circular polarized antenna is used the antenna gain [dBic] can be reduced by 3dB. At a linear polarized antenna the maximum linear antenna gain [dBi] must be used.

$$P_{Out} = P_{erp} - \text{Antenna Gain} + \text{Cable loss} + 2,1dB**$$

** Correction Factor to convert the radiated power from e.r.p to e.i.r.p.

For the calculation of the reader output power P_{Out} an Excel file „Calc-RF-Power.xls" can be used. Available from Feig Electronic GmbH.

Example:

Radiated Power		2,0 W [e.r.p]	<>	33,0 dBm
correction factor ERP-> EIRP	*	1,64	+	2,1 dB
Radiated Power Isotrop	=	3,28 W [e.i.r.p]	=	35,1 dBm
Antenna Gain		11,0 dBic	-	11,0 dBi
Typ of antenna **		1 3	+	3,0 dB
cable losses / 100m		30,7 dB		
cable losses / 1m		0,3 dB		
Length of the antenna cable	*	6 m		
	=	1,8 dB	+	1,8 dB
Radiated power in dB				29,0 dBm
Output power in mW				786 mW
Configuration in the Reader (CFG3)			< =	**0,8 W**

    ** linear antenna = „0", circular antenna = „1"

Figure 20: Calculation of the output power

In Figure 20 the allowed antenna power is shown for the use of the FEIG standard antenna ANT.U600/270 –EU and a 6m long Belden H155 coaxial cable.

5.3.2. FCC-Reader according to FCC 47 Part 15

According to the FCC approval, Title 47, Part15 the maximum output power of the reader is limited to 1 W (30dBm). The maximum radiated power of the antenna should not increase more then 4 W e.i.r.p. Due to these facts two different cases have to be considered:

If a linear polarized antenna is used which gain is less then 6 dBi (factor 4), or if a circular polarized antenna is used which gain is less then 9dBic the reader can always be configured to an output power of 1W.

Antenna Gain < 6dBi   → P_{out} = 1 W

This would be the case if the FEIG standard antennas ANT.U170/170 -FCC (4dBic) or ANT.U270/270 -FCC (8,7dBic) are used.

If an antenna is used which gain is more then 6dBi (9dBic) it is necessary to consider the antenna gain and the attenuation of the antenna cable to calculate the right output power. If a circular polarized antenna is used the antenna gain [G]=dBic can be reduced by 3dB. This is the case if the FEIG standard antenna ANT.U600/270 -FCC is used. In this configuration the maximum output power of the reader can be calculated in the following way.

P_{Out} = 36 dBm (4 W e.i.r.p) – Antenna Gain (in dBi) + Cable Loss (in dB)

P_{Out} = 36 dBm (4 W e.i.r.p) – Antenna Gain (in dBic) – 3 dB + Cable Loss (in dB)

The antenna gain of the circular polarized standard antenna ANT.U600/270 is 10,5 dBic. This could be compared with a gain of 7,5 dBi of a linear polarized antenna (10,5 dBic – 3 dB).

Example 1:

    Antenna ANT.U600/270 and 2 m Belden H155 Coaxial Cable:

        P_{out}= 36 dBm – 10,5 dBic + 3 dB + 0,6 dB

        P_{out}= 36 dBm – 7,5 dBi + 0,6 dB

        P_{out}= 29,1 dBm

        Reader Configuration = 0,8 Watt

Example 2:

    Antenna ANT.U600/270 and 6m Belden H155 Coaxial Cable:

        P_{out}= 36 dBm – 10,5 dBic + 3 dB + 1,8 dB

        P_{out}= 36 dBm – 7,5 dBi + 1,8 dB

        P_{out}= 30,3 dBm

        Reader Configuration = 1,0 Watt

According to Example 2 it will only be necessary to adapt the output power of the reader when the antenna ANT.U600/270 is used if the length of the antenna cable is less then 6m.

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6. Technical Data

MECHANICAL DATA

Housing	Aluminum powder-coated
Dimension (W x H x D)	261,3 mm x 157,3 mm x 68 mm) 10.29 inch x 6.19 inch x 2.68 inch
Weight	2,0 kg (4.4 lb)
Protection Class	IP 53 (with protection cap IP64)
Colour	RAL 9003 (Signal White)

ELECTRICAL DATA

Power Supply

- ID ISC.LRU3000   24 V DC ± 5 % (Noise Ripple: max. 150 mV)
- ID ISC.LRU3500   24 V DC ± 5 % (Noise Ripple: max. 150 mV)
  or Power over Ethernet (min. 42,5 V DC)

Power Consumption	max. 35 W
Operating Frequency	

- EU-Reader   865 MHz to 868 MHz (EN 302208)
- FCC-Reader   902 MHz to 928 MHz (FCC47 Part15)

RF-Power

- ID ISC.LRU3000   300 mW to max. 2 W configurable
- ID ISC.LRU3500   300 mW to max. 4 W configurable
  max. 1 W if powered via Power over Ethernet

Antenna Connection

- ID ISC.LRU3000   4 x SMA female (50 Ω), internal Multiplexer
- ID ISC.LRU3500   4 x SMA female (50 Ω), internal Multiplexer,
  optional a DC voltage of 24 V DC $\overline{}$ / 500 mA
  can be activated at the antenna output

Outputs

- 2 x Optocoupler   24 V DC $\overline{}$ / 30 mA (galvanically isolated)
- 3 x Relay (1 x normal open)   24 V DC $\overline{}$ / 1 A (switching current), (2A constant load)

Inputs

- 5 x Optocoupler   max. 5-10 V DC $---$ / 20 mA

Interfaces   RS232, RS485, USB (full Speed), Ethernet, USB Host, Data-Clock

FUNCTIONAL PROPERTIES

Protocol Modes	FEIG ISO HOST Mode (Advanced Protocol Frame)
	Buffered Read Mode *Automatic Data*
	Scan Mode *Buffering and*
	Notification Mode *Filtering*
Supported Transponder Types	EPC Class 1 Generation 2
	ISO 18000-6-C (Upgrade Code required)
	further transponder types possible on demand
Optical Indicators	8 LEDs for operating status and diagnostics
Operating System	Linux (64 MB RAM, 256 MB Flash)
Further Features	Anticollision
	RSSI
	Real Time Clock
	RF-Channel monitoring
	Antenna SWR monitoring
	Temperature Monitoring*

AMBIENT CONDITIONS

Temperature Range

- Operation   -25 °C to +55 °C
         -25 °C to +50 °C (only LRU3500 with PoE)
- Storage   -25 °C to +85 °C

Humidity   5 % to 95 % non-condensing

* Caution: Overheating of the device may result in performance losses. It is recommended to activate the RF of the reader only if there is a transponder in the detection range of an antenna.

Vibration	EN 60068-2-6
	10 Hz to 150 Hz: 0,075 mm / 1 g
Shock	EN 60068-2-27
	Acceleration 30 g

APPLICABLE STANDARDS

Radio Regulation

- Europe   EN 302 208
- USA   FCC 47 CFR Part 15
- Canada   IC RSS-Gen, RSS-210

EMC   EN 301 489

Safety

- Low Voltage   EN 60950
- Human Exposure   EN 50364

7. Radio Approvals

7.1. Europe (CE)

When properly used this radio equipment conforms to the essential requirements of Article 3 and the other relevant provisions of the R&TTE Directive 1999/5/EC of March 99.

$$C\,E$$

Performance Classification according to ETSI EN 301 489: Class 2

7.2. Declaration of Conformity (Directive 1999/5/EC - R&TTE)

Declaration of Conformity

FEIG ELECTRONIC

in accordance with the
Radio and Telecommunication Terminal Equipment Act (FTEG)
and
Directive 1999/5/EC (R&TTE Directive)

Product Manufacturer : **FEIG ELECTRONIC GmbH**
Lange Strasse 4
D-35781 Weilburg
Germany
Phone: +49 6471 3109 0

Product Designation : **ID ISC.LRU3000**
ID ISC.LRU3500

Product Description : RFID Reader

Radio equipment, Equipment : Class 1
class (R&TTE)

FEIG ELECTRONIC GmbH declares that the radio equipment complies with the essential requirements of §3 and the other relevant provisions of the FTEG (Article 3 of the R&TTE Directive), when used for its intended purpose.

Standards applied :

Health and safety requirements pursuant to FTEG § 3 (1) 1 and R&TTE Article 3(1) a)	EN 60950-1:2006 / AC:2011 EN 50364:2010
Protection requirements concerning electromagnetic compatibility § 3 (1) 2. (Article 3(1) b))	ETSI EN 301 489-1 V1.9.2 ETSI EN 301 489-3 V1.4.1
Measures for the efficient use of the radio frequency spectrum pursuant to § 3 (2) (Article 3(2))	ETSI EN 302 208-1 V1.4.1 ETSI EN 302 208-2 V1.4.1

Weilburg, 03.09.2013
Place & date of issue

Markus Desch
Name and signature

This declaration attests to conformity with the named Directives but does not represent assurance of properties. The safety guidelines in the accompanying product documentation must be observed.

Figure 21: Declaration of Conformity

7.3. USA (FCC) and Canada (IC)

7.3.1. USA (FCC) and Canada (IC) warning notices

Product name:	**ID ISC.LRU3000-FCC** **ID ISC.LRU3500-FCC**
Reader name:	**ID ISC.LRU3000-FCC** **ID ISC.LRU3500-FCC**
FCC ID: IC:	**PJMLRU3000** **6633A-LRU3000**
Notice for USA and Canada	This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions. (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. Unauthorized modifications may void the authority granted under Federal communications Commission Rules permitting the operation of this device. This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense. Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes : (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Warning: Changes or modification made to this equipment not expressly approved by FEIG ELECTRONIC GmbH may void the FCC authorization to operate this equipment.

7.3.2. Label Information

The following information must be placed at the outer side of the housing in which the reader is mounted.

> # Contains FCC ID PJMLRU3000
> # Contains IC: 6633A-LRU3000

7.3.3. Installation with FCC / IC Approval

FCC-/IC-NOTICE: To comply with FCC Part 15 Rules in the United States / with IC Radio Standards in Canada, the system must be professionally installed to ensure compliance with the Part 15 certification / IC certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States / Canada.

7.3.4. USA (FCC) and Canada (IC) approved antennas

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by Industry Canada to operate with the antenna types listed below with maximum permission gain and required antenna impedance for each antenna type indicated. Antenna types, not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device

Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne 'énoncé ci-dessus et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur

Following antennas are approved by FCC according FCC Part 15 and IC Canada according RS210

- ID ISC.ANT.U170/170-FCC (4.0 dBic)
- ID ISC.ANT.U270/270-FCC (9.0 dBic)
- ID ISC.ANT.U600/270-FCC (10,5 dBic)