INSTALLATION

ID MAX.U1002

UHF Vehicle Access Control Reader

final – public (B)
2014-11-14 – M40711-2e-ID-B

Note

FEIG ELECTRONIC GmbH
Lange Strasse 4
D-35781 Weilburg
Tel.: +49 6471 3109-0
http://www.feig.de

With the edition of this document, all previous editions become void. Indications made in this manual may be changed without previous notice.

Composition of the information in this document has been done to the best of our knowledge. FEIG ELECTRONIC GmbH does not guarantee the correctness and completeness of the details given in this manual and may not be held liable for damages ensuing from incorrect or incomplete information. Since, despite all our efforts, errors may not be completely avoided, we are always grateful for your useful tips.

The instructions given in this manual are based on advantageous boundary conditions. FEIG ELECTRONIC GmbH does not give any guarantee promise for perfect function in cross environments and does not give any guaranty for the functionality of the complete system which incorporates the subject of this document.

FEIG ELECTRONIC call explicit attention that devices which are subject of this document are not designed with components and testing methods for a level of reliability suitable for use in or in connection with surgical implants or as critical components in any life support systems whose failure to perform can reasonably be expected to cause significant injury to a human. To avoid damage, injury, or death, the user or application designer must take reasonably prudent steps to protect against system failures.

Use Exclusion in Transportation Market: Devices which are subject of this document may NOT be sold, used, leased, offer for sale, or otherwise transferred, exported, and imported by anyone in the Transportation Market. “Transportation Market” means (i) Electronic Toll and Traffic Management (ETTM), (ii) Public Sector Vehicle Registration, Inspection and Licensing Programs, (iii) Railroad Locomotive and Wagon tracking, (iv) airport based ground transportation management systems (GTMS) and taxi dispatch, (v) revenue based parking, and (vi) vehicle initiated mobile payment applications, where the RFID sticker/tag is initially attached to the vehicle but not incorporated at the point of vehicle manufacture.

FEIG ELECTRONIC GmbH assumes no responsibility for the use of any information contained in this document and makes no representation that they free of patent infringement. FEIG ELECTRONIC GmbH does not convey any license under its patent rights nor the rights of others.

OBID® and OBID i-*scan*® are registered trademarks of FEIG ELECTRONIC GmbH.

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.
- 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 ID MAX.U1002

The vehicle access control system ID MAX.U1002 is an self sufficient complete system for vehicle access control. It can handle vehicles of all kind, e.g. cars, trucks and busses. ID MAX.U1002 can be used in a large number of applications where different vehicles access shall be granted to an restricted area for a longer time. This could be the case in parking areas of companies, agencies or car pools.

In this system passive UHF Transponders (without battery) are used for vehicle identification. These transponders can be placed e.g. in the middle of the windshield next to the inside mirror. Furthermore passive UHF Mount on Metal Transponders are available which are predestined for the use with utility vehicles.

ID MAX.U1002 is able to handle up to 1000 different vehicles and users. Additional time restrictions can be assigned to each users. Therefore 15 free configurable time zones are available. Also public holidays and vacation times can be integrated.

The scope of delivery includes the Windows Software OBID myAXXESS® Manager. This software can be used to handle the user data and time restrictions in an easy way via PC. After programming the user data into the vehicle access control station ID MAX.U1002 via a temporary network connection the system is working offline as a standalone system.

The Windows Software is suitable for network based access control systems and is based on a SQL database. The open source project is available free of charge in the FEIG download area.

In small applications without any restrictions of the access new transponders could be learned to the system by a so called teach in mode.

To ensure a reliable operation even under difficult environmental conditions **up to two antennas** can be connected to ID MAX.U1002.As an alternative the connected antennas could also be used to cover **two lanes** next to each other. It is not possible to assign different users and time restrictions to different lanes covered by one system. One transponder that is registered in the database will have the same rights on each lane.

To ensure an reliable operation of several systems or other UHF applications in one area and to operate the vehicle access control system in an economical and energy saving way it is recommended to use the trigger feature. E.g. inductive loop detectors or movement detectors can be connected to a digital input of the system to start operation. Applicable inductive loop detectors and movement detectors are also developed and manufactured by FEIG ELECTRONIC and can be ordered optional.

For connection to ID MAX.U1002 several antennas are available which allow an optimum adaption to the individual requirements of each application. All antennas available from FEIG are circular polarized. Through the circular polarization an identification of transponders is possible in three different orientations.

2.1. Available Reader types

The following Readers are available:

Table 1: Available Reader Types

Reader type	Description
ID MAX.U1002-EU	Device version for Europe
ID MAX.U1002-FCC	Device version for USA

2.2. Available Accessories

The following optional accessories are currently available:

Table 2: Optional Reader Accessories

Reader type	Description
UHF Antenna ID ISC.ANT.U600/270	powerful UHF Antenna with small 3dB beamwidth of 30°, perfect for overhead installation in the middle of the lane, e.g. bridges. Allows read ranges of up to 8 m. Art.No. EU: 3198.000.00 Art.No. FCC: 3685.000.00 
UHF Antenna ID ISC.ANT.U270/270	powerful UHF Antenna, perfect for installation at the edge of a lane, e.g. pole mounting. Allows read ranges of up to 8 m. Art.No. EU: 3199.000.00 Art.No. FCC: 3686.000.00 
UHF Antenna ID ISC.ANT.U170/170	Compact and slim UHF Antenna , perfect for installation in areas with limited space Ermöglicht Lesereichweiten von bis zu 5 m. Art.No. EU: 3200.000.00 Art.No. FCC: 3687.000.00 
ID ISC.ANT.U600/270-MS Mounting Set Antenna UHF	Pole mounting set for antenna ID ISC.ANT.U600/270, diameter up to 60 mm Art.No.: 3308.000.00.
ID ISC.ANT.U270/270-MS Mounting Set Antenna UHF	Pole mounting set for antenna ID ISC.ANT.U270/270, diameter up to 60 mm Art.No.: 3309.000.00.

ID ISC.ANT.U170/170-MS Mounting Set Antenna UHF	Pole mounting set for antenna ID ISC.ANT.U170/170, diameter up to 60 mm Art.No.: 3310.000.00.
ID ISC.ANT.C2-A UHF Antenna Cable 2m	Antenna cable,length: 2 m Art.No.: 1654.002.00
ID ISC.ANT.C6-A UHF Antenna Cable 6m	Antenna cable, length: 6 m Art.No.: 1654.003.00
ID ISC.LRU3x00-MS Mounting Rail Set	Rail mounting set for ID ISC.LRU1002 and ID ISC.LRU3000/3500 Art.No.: 3831.000.00
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.LRU1002 and ID ISC.LRU3000/3500 Art.No.: 3831.000.00
ID CTF-U Adhesive UHF Windscreen Tag	Self-adhesive, passive UHF Transponder for installation in the windshield of a vehicle. Art.-No.: 3271.000.00

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 for mounting.

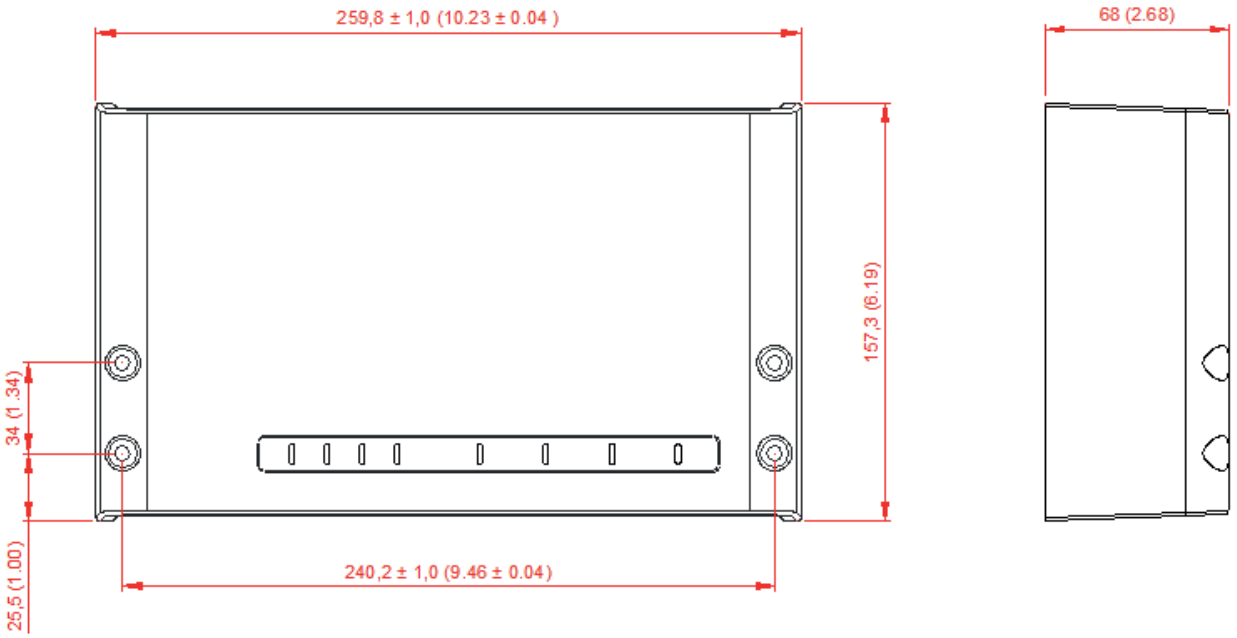


Figure 1: Installation Drawing

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. Table 4: Push button function shows the available push buttons.

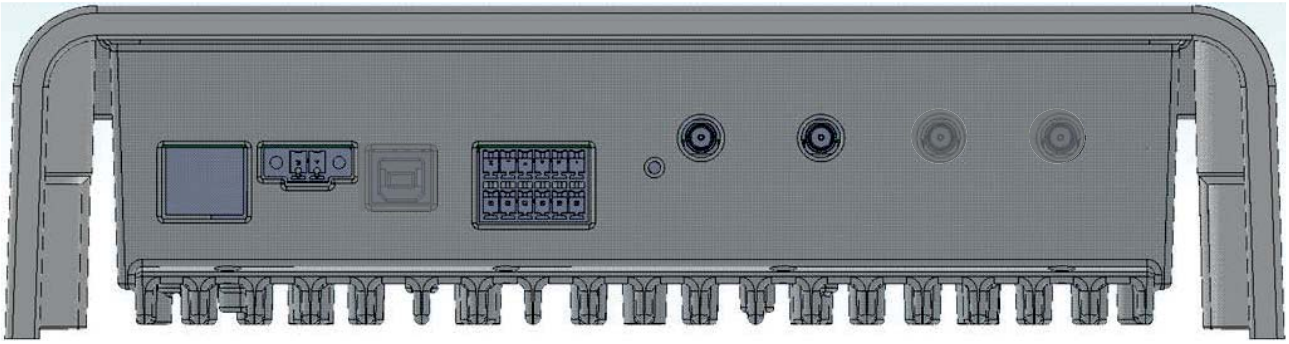


Figure 2: Connection Overview

Table 3: Connection terminals

Connector	Description
ANT 1-4	Connection of the external antennas (Impedance 50Ω)
X1	10/100Tbase network connection with RJ-45
X2	Power supply 24VDC +-5%
X4	Digital input, digital output

Table 4: Push button function

Push button	Description
T1	Internal push button

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)

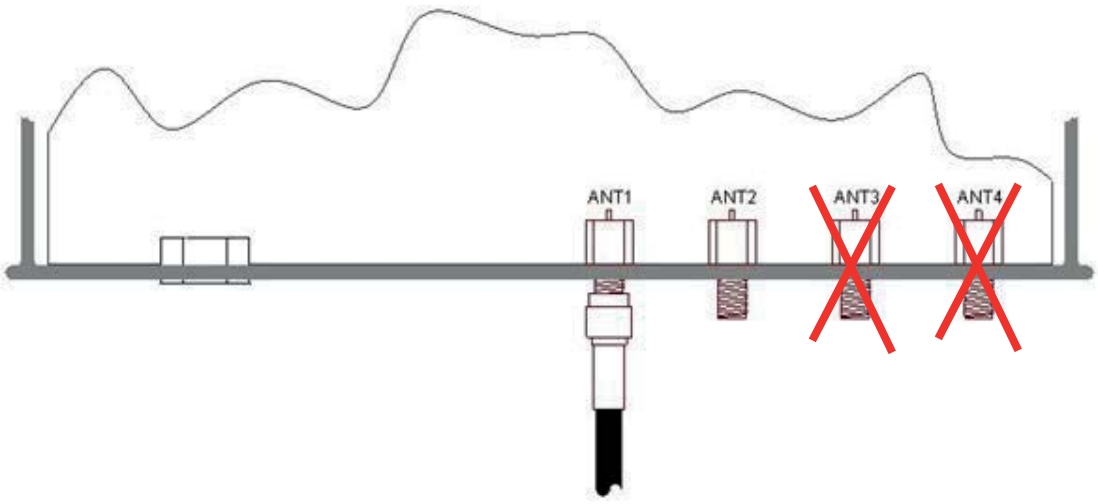


Figure 3: External antenna connection ANT1-4

NOTE:

ID MAX.U1002 supports only the antenna output ANT1 and ANT2

4.2. Power Supply

4.2.1. Power Supply via connection X2

The supply voltage of 24 V DC has to be connected to Terminal X2.

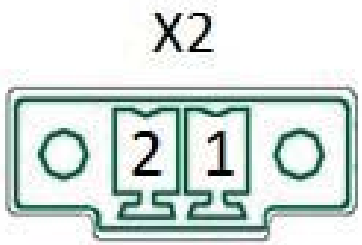


Figure 4: Connector X2 Pin Assignment

Table 6: Pin assignment for power supply

Terminal	Abbreviation	Description
X2 / Pin 1	VDC	Vcc – supply voltage 24 V DC ±5%
X2 / Pin 2	GND	Ground – supply voltage

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.

4.3. Interfaces

4.3.1. Ethernet Interface on connector X1

The Reader has an integrated 10 / 100 base-T network port for an RJ-45. Connection is made on X1 and has an automatic “Crossover Detection” according to the 100BASE-T Standard.

With structured cabling STP 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 7: Standard factory configuration of the Ethernet connection

Network	Address
IP-Adresse	192.168.10.10
Subnet-Mask	255.255.0.0
Port	10001
DHCP	OFF

NOTE:

The reader is equipped with a DHCP ready Ethernet Interface.

4.4. Digital Input on connector X4

The optocoupler on Terminal X4 is galvanically isolated from the Reader electronics and must therefore be externally supplied.

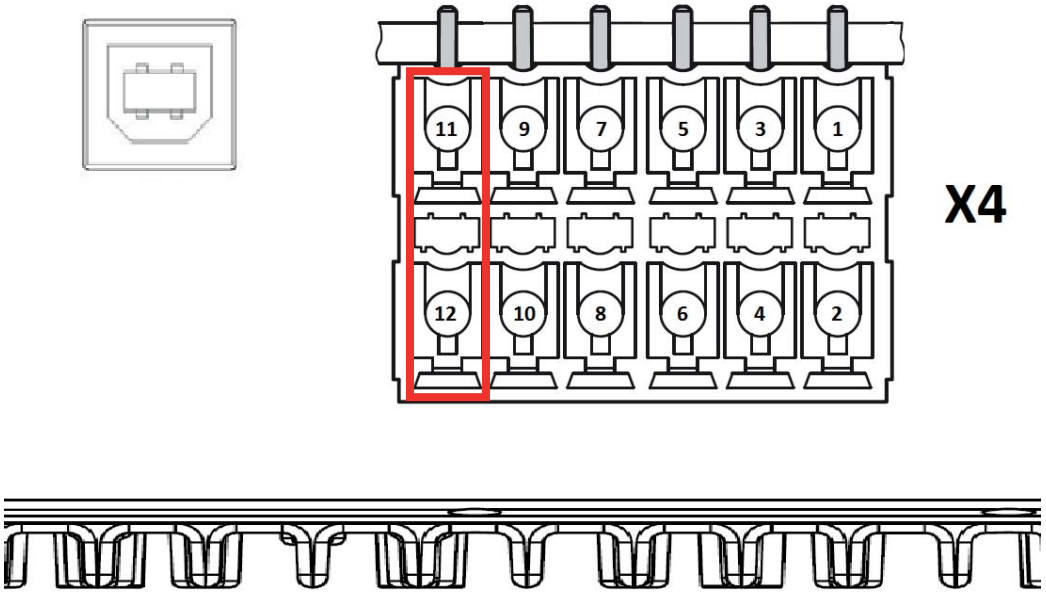


Figure 5: Optocoupler pin-outs IN1

Table 8: Pin Assignment digital Input IN1

Pin Number at Connector X4	Pin Assignment
11	IN1 -
12	IN1 +

NOTE:

The input is configured for a maximum input voltage of 24 V DC and an input current of max. 20 mA.

Polarity reversal or overload on the input will destroy it.

By default the trigger function is disabled. It can be enabled by means of the software OBID myAXXESS® Manager.

A trigger signal at Input 1 activates the reading on all selected antennas.

4.5. Outputs on connector X4

4.5.1. Digital outputs on connector X4

Optocoupler output:

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 X4. The output must therefore be powered by an external power supply. Each output is linked fixed with an antenna. Reading of a valid transponder on antenna 1 will affect output 1, a valid reading on antenna 2 affects output 2

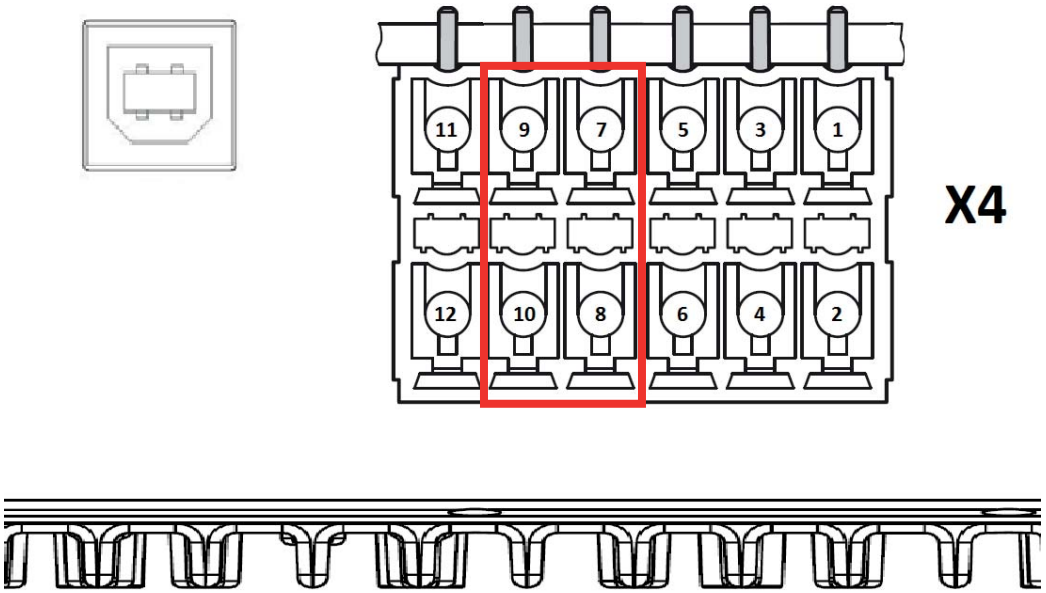


Figure 6: Optocoupler -Outputs OUT1-2

Table 9: Pin Assignment digital Output OUT1 / OUT2

Pin Number at Connector X4	Pinbelegung
7	OUT1-E
8	OUT1-C
9	OUT2-E
10	OUT2-C

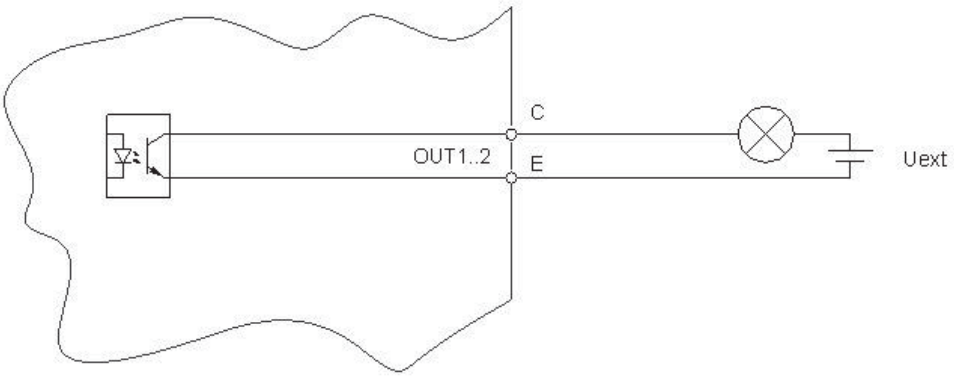


Figure 7: Internal and possible external wiring of the optocoupler-outputs OUT1-2

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.

5. Operating and Display Elements

5.1. Reset Push Button T1

With the push button T1 the teach-in mode can be activated or a complete configuration reset can be performed.At the right side of the connector X4 the push button T1 is positioned. It is located inside the reader housing. To press the push button a paper clip can be used.

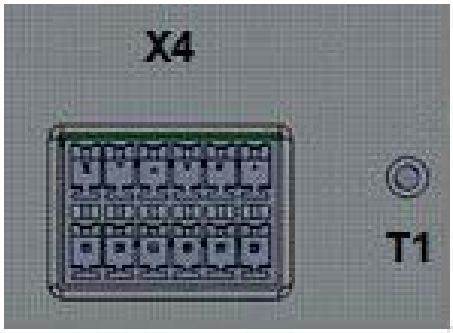


Figure 8: Position of the reset-switch T1

5.1.1. Teach-in mode

The Teach-In Mode can be used for an easy learning of new transponders if the configuration software OBID myAXXESS® Manager shall not or cannot be used. In Teach-In Mode it is not possible to configure time restrictions for the different users.

Activation of Teach-In Mode:

- activate the teach-in mode by pressing the reset button T1 twice within short time
- As long as the teach in mode is active the yellow LED V4 is switched on. Access is granted to all transponders which are read during this time.
- The data are stored temporarily into the RAM of the system. If the teach-in mode is disabled by pressing the button T1 twice within short time again all datasets will be transferred from the RAM to the EEPROM. These transponders will have now permanent access. Datasets stored in the EEPROM will still be available if the system was powered off. Datasets which are only stored into the RAM will be lost in case of power down.

Caution:

- ***In case of power down during activated Teach-In Mode all datasets which are not yet stored into the EEPROM of the system got lost and have to be learned again.***
- ***It is recommended to used the Teach-In Mode only in exceptional cases or for small installations where only a small number of transponders has to be handled.***

5.1.2. Hardware Configuration Reset

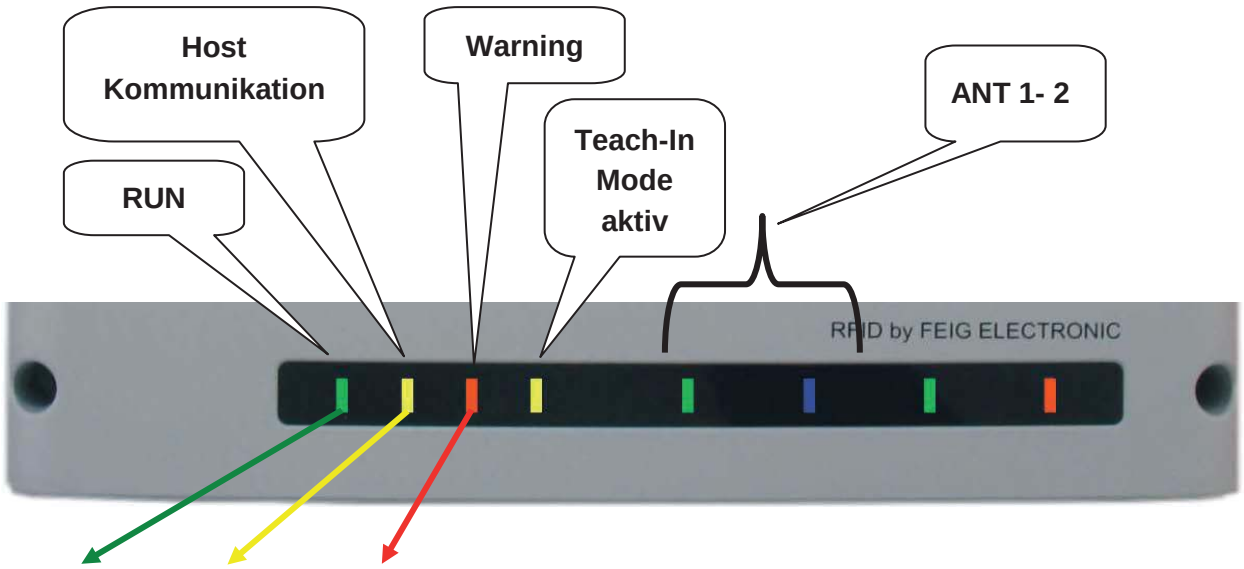
By means of the push button T1 a complete configuration reset can be performed. For performing a reset you should use a paper clip and push the button T1 for at least 5 s until the 3 status LED's (left side) are switched on continuously. Afterwards the green LED and the red LED are flashing alternating.

To finish the hardware configuration reset a reboot of the reader is mandatory. Therefore plug off and plug in the power supply.

During a hardware configuration reset all parameters of ID MAX.U1002 will be reset back to factory default and need to be programmed again. In the database stored transponders and access rights are not affected.

5.2. Status LEDs

Table 10: 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	FLASH	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 (EEPROM Error / RFC not detected)
Firmware Update:			
FLASH (light in sequence)	FLASH	FLASH	Firmware transfer from host to reader **(Please do not switch off the reader or disconnect the interface cable)**
Configurations-Reset:			
FLASH (light in sequence)	FLASH	FLASH	While T1 is pushed and hold for maximal 5s
ON	ON	ON	After T1 has been pushed and hold for 5s. Configuration Reset has been finished.

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

6. Positioning of the antenna

The antenna shall be mounted on a pole at the edge of the roadway. The height in which the antenna shall be mounted is depending on the kind of vehicles that should be identified.

Type of vehicle	Recommended mounting high
only cars	approx. 2 m
only trucks and busses	approx. 2,5 m
mixed cars, trucks & busses	approx. 2,0 m

Table 3-1: recommended height of installation in different applications

The antenna shall be mounted in an angle 45° towards the roadway.

Note:

Depending on the surrounding environment it can be possible that other angles or heights for installation are required.

If ID MAX.U1002 is used to control a barrier the antenna shall be mounted in an adequate distance in front of the barrier. The distance is depending on the allowed / preferred speed of the vehicle. In this way it is possible to ensure a reliable and instantaneous access of vehicles to an area.

In the case that an entry is possible from two different directions or if there is a critical environment at the point of installation it is possible to install further antennas. Up to 2 antennas can be installed for one lane and connected to the same ID MAX.U1002.

Figure 9: typical vehicle access control application

Figure 10: Positioning of the antenna

7. Mounting of the transponder

Passive UHF transponders operating at a frequency of 865 MHz - 928 MHz are used for identification of vehicles with ID MAX.U1002. To ensure a reliable identification of the transponder and to reduce interfering environmental effects like the influence of metal, it is recommended to mount the transponder label in the middle of the windshield behind the interior mirror. The optional from FEIG ELECTRONIC available transponder is an self adhesive label. To mount the transponder the lamination sheet has to be removed from the backside and the transponder has to be sticked to the windshield.

Before sticking the transponder the windshield should be cleaned carefully to ensure an optimum adhesion of the label.

At vehicles with integrated windshield heating a special mounting of the tag is necessary. In this case the transponder should be mounted in an area of the windshield where no wire of the windshield heating are.

At vehicles with coloured or metallised windshields there can be problems with the identification of the transponders. These vehicles usually have an area in the windshield which are not coloured or metallised. If possible the transponder should be mounted in one of these places. Where these places are located must be checked in the manual of the car or asked from the manufacturer of the car.

Figure 11: Mounting of the transponder

8. Technical Data

MECHANICAL DATA

Housing	Aluminum powder-coated
Dimension (W x H x D)	259,8 mm x 157,3 mm x 68 mm 10.23 inch x 6.19 inch x 2.68 inch
Weight	1,8 kg (4.0 lb)
Protection Class	IP 53 (with protection cap IP64)
Colour	RAL 9003 (Signal White)

ELECTRICAL DATA

Power Supply	24 V DC ± 5 % (Noise Ripple: max. 150 mV)
Power Consumption	max. 18 W
Operating Frequency	
• EU-Reader	865 MHz to 868 MHz (EN 302208)
• FCC-Reader	902 MHz to 928 MHz (FCC47 Part15)
RF-Power	
• EU-Reader	max. 2 Watt E.R.P.
• FCC-Reader	max. 4 Watt E.I.R.P.
Antenna Connection	2 x SMA female (50 Ω), internal Multiplexer
Outputs	
• 2 x Optocoupler	24 V DC ⎓ / 30 mA (galvanically isolated)
Inputs	
• 1 x Optocoupler	max.24 V DC ⎓ / 20 mA
Interfaces	Ethernet

FUNCTIONAL PROPERTIES

Supported Transponder Types	EPC Class 1 Generation 2 ISO 18000-6-C (Upgrade Code required)
Optical Indicators	16 LEDs for operating status and diagnostics
Further Features	RF-Channel monitoring Antenna SWR monitoring Temperature Monitoring*

AMBIENT CONDITIONS

Temperature Range	
• Operation	-25 °C to +55 °C
• Storage	-25 °C to +85 °C
Humidity	5 % to 95 % non-condensing
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

9. Radio Approvals

9.1. 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.

CE

Performance Classification according to ETSI EN 301 489: Class 2

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

Declaration of Conformity

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.LRU1002** **ID MAX.U1002**
Product Description	:	RFID Reader
Radio equipment, Equipment class (R&TTE)	:	Class 1

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 V1.6.1
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, 09.07.2014 — Markus Desch

Place & date of issue — 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 12: Declaration of Conformity

9.3. USA (FCC) and Canada (IC)

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

Product name:	**ID MAX.U1002-FCC**
Reader name:	**ID MAX.U1002-FCC**
FCC ID: **IC:**	**PJMLRU1002** **6633A-LRU1002**
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.

9.3.2. Label Information

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

Contains FCC ID PJMLRU1002
Contains IC: 6633A-LRU1002

9.3.3. 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.

9.3.4. 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

The antennas used for this transmitter must be installed to provide a separation distance of at least 23 cm from all persons and must not be located or operating in conjunction with any other antenna or transmitter, except as listed for this product's certification.

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

Les antennes utilisées pour cet émetteur doit être installé pour fournir une distance de séparation d'au moins 23 cm de toutes les personnes et ne doit pas être situé ou opérant en conjonction avec une autre antenne ou un autre émetteur, sauf dans les cas énumérés à la certification de ce produit.

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)