



# ID MAX.U1002 (EU: 4292.001.00; FCC: 4293.001.00)

## UHF Vehicle Access Control Reader



## Note

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

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

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- 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.
- This device is not suitable to be used in places where children are present. Prevent children access to the device.
- Equipment is intended for use only in restricted access area.
- 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.

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## 2. Performance Features of ID MAX.U1002

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The vehicle access control reader ID MAX.U1002 is a self-sufficient complete system for vehicle access control. It can handle all kinds of vehicles, e.g. cars, trucks and busses. ID MAX.U1002 can be used in a wide range of applications where different vehicles access shall be granted to a 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 special passive UHF transponders for mounting on metal are available on the market which are predestined for the use e.g. with utility vehicles.

ID MAX.U1002 is able to handle up to 8 900 different vehicles. Additional time restrictions can be assigned to each vehicle. Therefore 15 free configurable time zones are available. Also public holidays and vacation times can be integrated.

With the help of the software myAXXESS Manager user data and access rights can be easily handled via PC. After programming the access rights into the vehicle access control reader via a temporary USB or network connection the reader is working offline as a standalone system.

The Windows software is suitable for network-based vehicle and door access control systems and is based on a SQL database. The software is available in the FEIG download area.

In small applications without any time restrictions for the access rights new transponders could be learned to the reader by a "Teach-in-Mode" without the above-mentioned software.

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** (e.g. entry and exit lane) next to each other. The user and access rights are equal for both lanes. To cover two lanes with different users and time restrictions two vehicle access control readers are necessary.

To ensure a reliable operation of several systems or other UHF applications in one area and to operate the vehicle access control reader 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 reader to start operation. Applicable inductive loop detectors and movement detectors are also available by FEIG ELECTRONIC and can be ordered optional.

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

## 2.1. Available Versions

The following versions of the vehicle access control reader are available:




Table 1: Available Versions


Reader type	Description
ID MAX.U1002-EU	Device version with CE approval e.g. for Europe
ID MAX.U1002-FCC	Device version with FCC and IC approval e.g. for North America

## 2.2. Available Accessories

The following optional accessories are available:

Table 2: Optional Accessories

Accessory	Description
UHF Antenna ID ISC.ANT.U600/270	<p>Powerful UHF Antenna with small 3dB beamwidth of 30° x 65°, perfect for overhead installation in the middle of the lane, e.g. bridges. Allows read ranges of up to 12 m.</p> <p>Art.No. EU: 3198.000.00 Art.No. FCC: 3685.000.00</p> 
UHF Antenna ID ISC.ANT.U270/270	<p>Powerful UHF Antenna, perfect for installation at the edge of a lane, e.g. pole mounting. Allows read ranges of up to 12 m.</p> <p>Art.No. EU: 3199.000.00 Art.No. FCC: 3686.000.00</p> 
UHF Antenna ID ISC.ANT.U170/170	<p>Compact and slim UHF Antenna, perfect for installation in areas with limited space. Allows read ranges of up to 5 m.</p> <p>Art.No. EU: 3200.000.00</p> 
ID ISC.ANT.U600/270-MS Mounting Set Antenna UHF	<p>Pole mounting set for antenna ID ISC.ANT.U600/270, diameter up to 60 mm</p> <p>Art.No.: 3308.000.00.</p>
ID ISC.ANT.U270/270-MS Mounting Set Antenna UHF	<p>Pole mounting set for antenna ID ISC.ANT.U270/270, diameter up to 60 mm</p> <p>Art.No.: 3309.000.00.</p>
ID ISC.ANT.U170/170-MS Mounting Set Antenna UHF	<p>Pole mounting set for antenna ID ISC.ANT.U170/170, diameter up to 60 mm</p> <p>Art.No.: 3310.000.00.</p>

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 NET.24V-B Power Supply Unit	Power Supply Unit for ID MAX.U1002; power cord separately available for EU, GB and US (not included) Art.No.: 2557.000.00
ID CAB.NET.24V-B-EU Cable with European Plug	Power cord for power supply unit ID NET.24V-B with European plug Art.No.: 2558.000.00
ID CAB.NET.24V-B-GB Cable with GB/UK Plug	Power cord for power supply unit ID NET.24V-B with plug for GB/UK Art.No.: 2559.000.00
ID CAB.NET.24V-B-US Cable with US Plug	Power cord for power supply unit ID NET.24V-B with American plug (US) Art.No.: 2560.000.00
ID CTF-U Adhesive UHF Windscreen Tag	Self-adhesive, passive UHF Transponder for installation in the windshield of a vehicle, packing unit: 10 pieces Art.No.: 3271.000.00
ID CPR.USB/OTG - USB Flash Drive + On-The-Go Adapter Cable	4 GB USB Flash Drive incl. USB On-The-Go Adapter Cable (USB-Mini to USB-A) Art.No.: 4104.000.00



### 3. Installation

The Reader is designed for wall-mount, including outdoors. Outdoors the reader should be mounted like shown in the picture below to ensure the watertightness of the device.

Holes for mounting on a wall with countersunk head screws are provided in the housing. The maximum head screw diameter should not exceed 8,0 mm. The thread diameter is 5,3 mm (M5 screws). The screws must have a minimum length of 45 mm depending on the installation situation. It is not necessary to open the reader housing for installation.

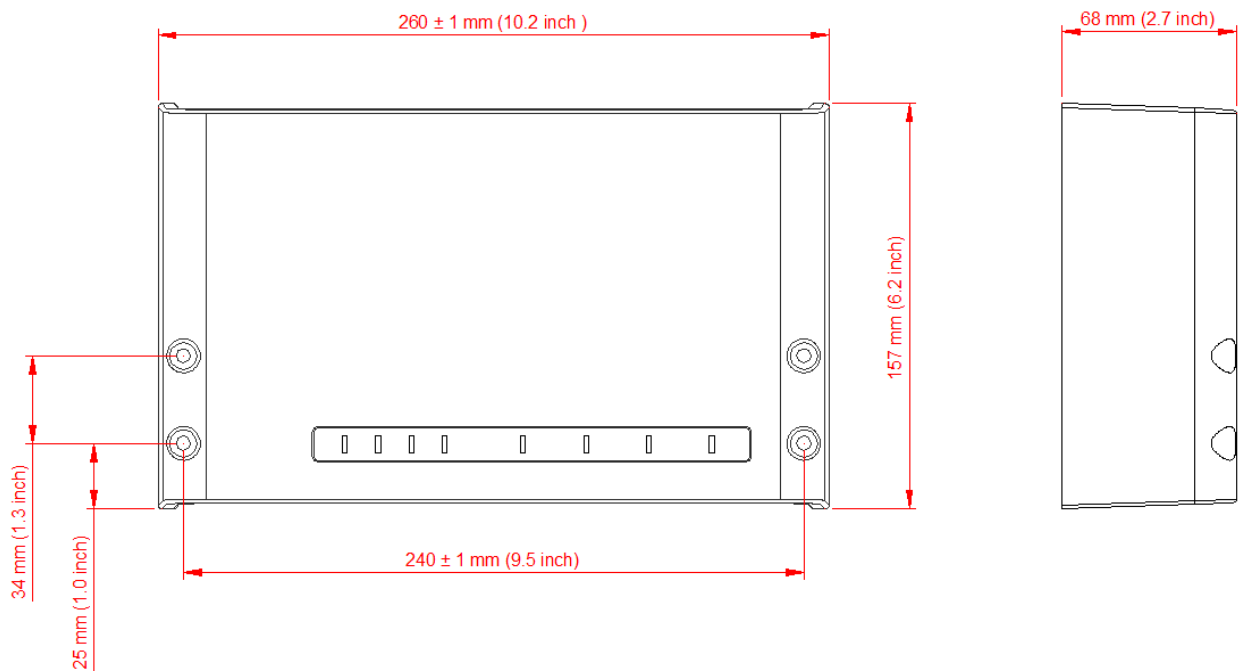


Figure 1: Installation Drawing

Optional a rail mounting set is available (please see 2.2. Available Accessories).

## 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 button.

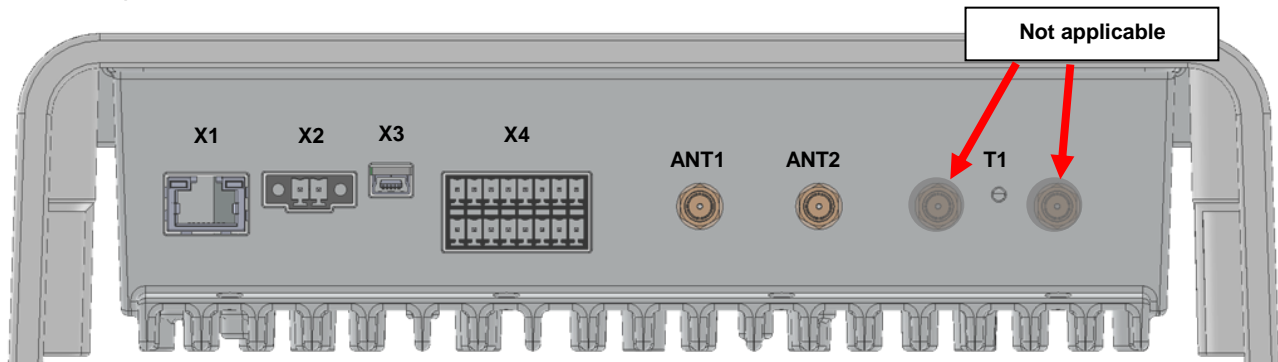


Figure 2: Connection Overview

Table 3: Connection terminals

Connector	Description
ANT1-2	<a href="#">Connection of the external antennas (Impedance 50Ω)</a>
X1	<a href="#">10/100Tbase network connection with RJ-45</a>
X2	<a href="#">Power supply 24VDC +-5%</a>
X3	<a href="#">USB Mini Interface</a>
X4	<a href="#">Digital input, digital outputs, Relais outputs</a>

Table 4: Push button function

Push button	Description
T1	<a href="#">Internal push button for Teach-In-Mode and Configuration Reset</a>

#### 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
ANT1 - 2	Connection for external antennas (input impedance 50Ω)

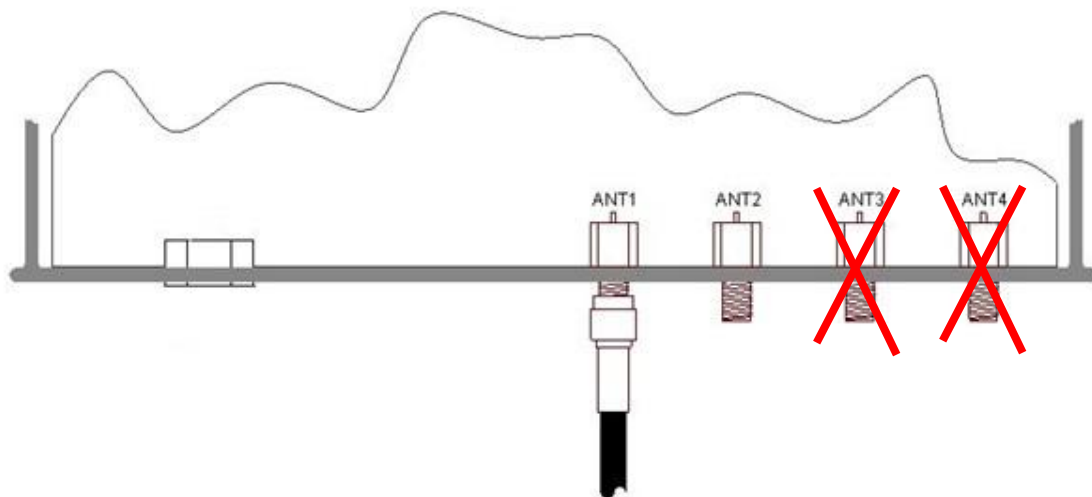


Figure 3: External antenna connection ANT1-2

**NOTE:**

***The vehicle access control reader ID MAX.U1002 supports only the antenna outputs ANT1 and ANT2!***

## 4.2. Power Supply via connector X2

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

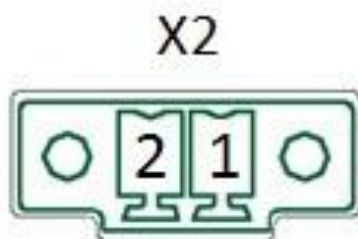


Figure 4: Connector X2 Pin Assignment

Table 6: Pin assignment for power supply

Terminal	Abbreviation	Description
X2 / Pin 1	VDC	Vcc – Supply voltage 24V DC $\pm$ 20%
X2 / Pin 2	GND	GND – Ground

### CAUTION:

**The reader has to be supplied by a limited power supply according EN 62368-1 Chapter Q.1, or with a NEC Class 2/LPS certified power supply.**

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

**Reversing the polarity of the supply voltage on X2 may destroy the device.**

**External wiring for the power supply must fulfil the following norms/validation procedure:**

Conductor Cross-section	Validation procedure
from 0,5 mm <sup>2</sup> or bigger	IEC 60332-1-2 and IEC 60332-1-3
smaller than 0,5 mm <sup>2</sup>	IEC 60332-2-1 and IEC 60332-2-2

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## 4.3. Interfaces

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### 4.3.1. Ethernet Interface on connector X1

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The vehicle access control reader has an integrated network interface with an RJ-45 connector (X1). The interface 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. The following parameters can be easily changed to user-defined settings.

Table 7: Standard factory configuration of the Ethernet Interface

Parameter	Factory default value
IP Address	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.***

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### 4.3.2. USB Mini Interface on connector X3

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The reader is equipped with a USB on-the-go interface. This can either be used to connect the reader temporarily to a PC or by means of a special On-The-Go adapter cables for connection of a USB flash drive to the reader. In both cases the connection is carried out via terminal X3.



Figure 5: USB interface (USB-Mini with On-Tho-Go capability)

A standard shielded USB-cable can be used for connection of the reader to a PC. The data rate is reduced to 12 Mbit (USB full speed).

**NOTE:**

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

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#### 4.3.2.1. USB Flash Drive Service Functions

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Via an optionally available USB On-The-Go adapter cable, the interface can be converted to a USB host interface. The adapter cable allows the connection of a USB memory stick to the reader. By means of the USB stick various service functions can be carried out e.g. the read-out of log and service files and uploading of a configuration file.



Figure 6: USB On-The-Go adapter cable

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#### 4.3.2.2. Reading of Log and Service Data

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After plug-in of the USB flash drive on a running ID MAX.U1002 the reader will generate a subdirectory on the root directory of the USB flash drive. The name of the subdirectory is equal to the Device-ID of the connected reader (see type plate of the reader). Within this subdirectory the reader stores device information like firmware version and IP-address in the file INFO.LOG. If there exist already such a file for the same reader the file will be updated with the information and the current date and time.

Additionally the files ACTION.LOG and SERVICE.LOG will be generated and stored for service purposes on the USB flash drive. The meaning of the CONFIG.INI will be described in the next chapter.

As vehicle access control reader the ID MAX.U1002 stores in the same subdirectory the event table. This table contents the last recorded access control events happened in the reader and is stored as file EVENT.LOG in CSV format. An existing file will be overwritten.

After plug-in of the USB flash drive the green and red status LED of the ID MAX.U1002 are permanently lit as long as the USB flash drive is actively used by the reader. When the USB actions are completed successfully, the red LED is switched off and the green LED starts flashing. The USB flash drive can be removed after the red LED is switched off. If the USB actions failed the red status LED starts flashing until the USB flash drive is removed.

**NOTE:**

***After plug-in of the USB flash drive the status LEDs of the reader shall be monitored.***

***The USB flash drive shall only be removed from the reader if the USB actions have been completed and the flash drive is not in use anymore.***

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#### 4.3.2.3. Storing the reader configuration and access control data on a USB flash drive

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While connecting the USB flash drive on a running reader, the reader will store the configuration file as an editable and readable CSV-file (CONFIG.INI) on the USB flash drive. This file will be stored in the main directory of the USB flash drive for easy copying of the configuration (see 4.3.2.4. Copy the configuration and access control data onto the reader (Config-Cloning)). Additionally the same file will be stored in the subdirectory named after the according Device-ID (see type plate of the reader). Thereby it is possible to store several configuration files on the same USB flash drive.

All not locked configuration pages (CFG pages) including the interface parameter will be copied from the reader onto the USB flash drive. Password protected configuration pages will not be copied.

As vehicle access control reader the ID MAX.U1002 stores while connecting the USB flash drive on the running reader in the main directory of the USB flash drive the access control data (list of access rights, time zone list and holiday table) within the file ACCESS.INI. An existing file will be overwritten.

After plug-in of the USB flash drive the green and red status LED are permanently lit as long as the USB flash drive is actively used by the reader. When the USB actions are completed successfully, the red LED is switched off and the green LED starts flashing. The USB flash drive can be removed after the red LED is switched off. If the USB actions failed the red status LED starts flashing until the USB flash drive is removed.

#### **Note:**

***If there exists already a configuration file CONFIG.INI on the main directory of the USB flash drive, the old file will be overwritten by the new configuration file.***

***Configuration pages which are protected by a password (see CFG0) will not be stored on the USB flash drive. No error message will appear.***

***After connecting the USB flash drive on the reader USB port, the reader LEDs should be observed.***

***The USB flash drive shall only be removed from the reader if the USB actions have been completed and the flash drive is not in use anymore.***

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#### 4.3.2.4. Copy the configuration and access control data onto the reader (Config-Cloning)

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In order to connecting the USB flash drive on the reader USB port and copy the configuration and access control data from the USB flash drive onto the reader, it is necessary to switch off the reader before plug-in the USB flash drive. After switching on the reader the boot process will look for a connected USB flash drive and will copy the existing configuration file and access control data (list of access rights, time zone list and holiday table) onto the reader.

It must be ensured that no configuration page (CFG page) is locked inside the reader. If configuration pages are locked the configuration file will not be copied onto the reader. If single configuration

parameters in the configuration file are out of range and invalid the configuration file will not be copied onto the reader as well.

After the copy process has been finished the green LED will start flashing and the red LED goes off. After the red LED goes off the USB stick can be disconnected. If the USB actions failed the red status LED starts flashing until the USB flash drive is removed.

**Note:**

***Connecting an USB flash drive on a running reader will always overwrite existing files like old configuration data or access control data in the main directory on the USB flash drive (see 4.3.2.3. Storing the reader configuration and access control data on a USB flash drive).***



#### 4.4. Inputs and Outputs on connector X4

##### 4.4.1. 24 V DC voltage on connector X4

A 24 V DC voltage can be received on Pin 4 of connector X4. It can be used e.g. in combination with the inputs and outputs of the reader.

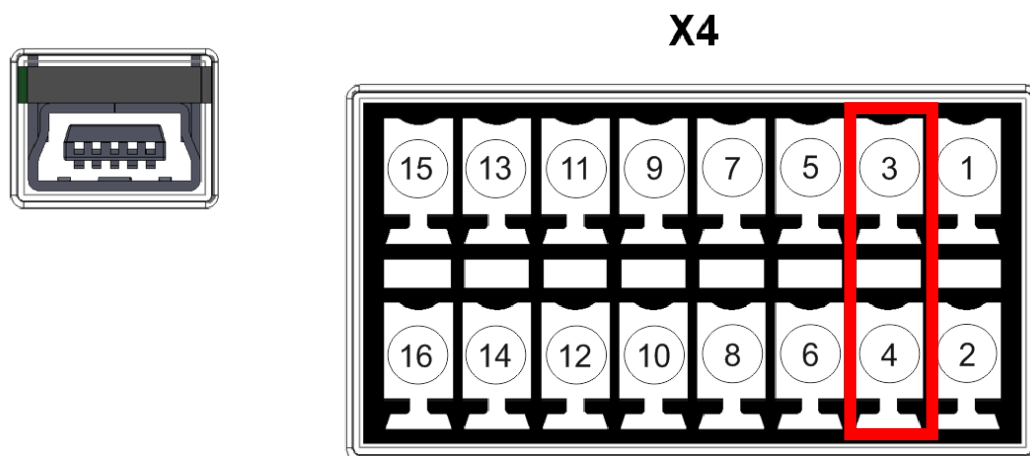


Figure 7: 24 V DC Voltage

Table 8: Pin Assignment 24 V DC Voltage

Pin Number at Connector X4	Pin Assignment
3	GND – Ground
4	24 V DC

**CAUTION:**

*The maximum current is limited to 750 mA.*

#### 4.4.2. Digital Input on connector X4

The digital inputs IN1 and IN2 can be used to start the reading process of the vehicle access control reader (trigger function). If the system should be only active when a vehicle is approaching the reading area an external sensor (e.g. inductive loop detector or motion detector) can be connected to the inputs. The optocoupler on connector X4 is galvanically isolated from the reader electronics and must therefore be externally supplied.

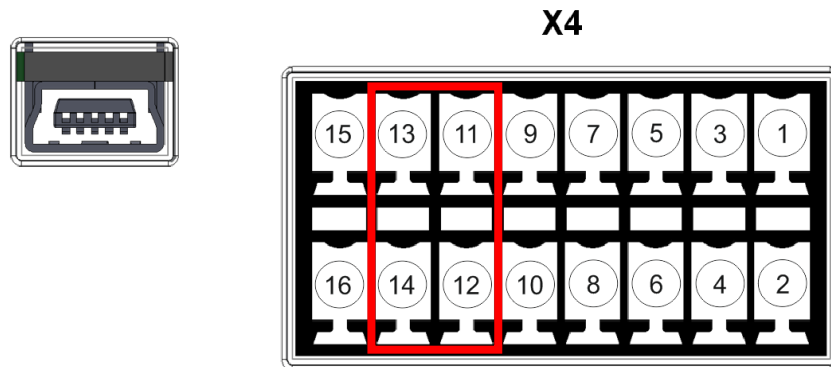


Figure 8: Digital inputs IN1/IN2

Table 9: Pin Assignment digital inputs IN1/IN2

Pin Number at Connector X4	Pin Assignment
11	IN1 -
12	IN1 +
13	IN2 -
14	IN2 +

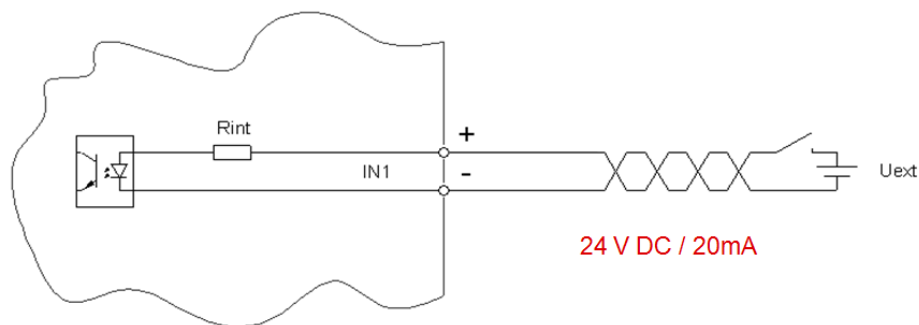


Figure 9: Internal and external wiring of the digital inputs IN1/IN2

#### NOTE:

*The inputs are 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 and the reader is continuously reading. It can be enabled by means of the software myAXXESS Manager.**

**A trigger signal at IN1 or IN2 activates the reading on all selected antennas.**

#### 4.4.3. Digital outputs on connector X4

The digital outputs OUT1 and OUT2 can be used as pulse sensors for door or barrier applications. Each output is linked fixed with an antenna. Reading of a valid transponder on antenna ANT1 will affect output OUT1, a valid reading on antenna ANT2 affects output OUT2.

The optocoupler outputs are galvanically isolated from the reader electronics and are carried to the outside without any internal ancillary circuitry on connector X4. The output must therefore be powered by an external power supply.

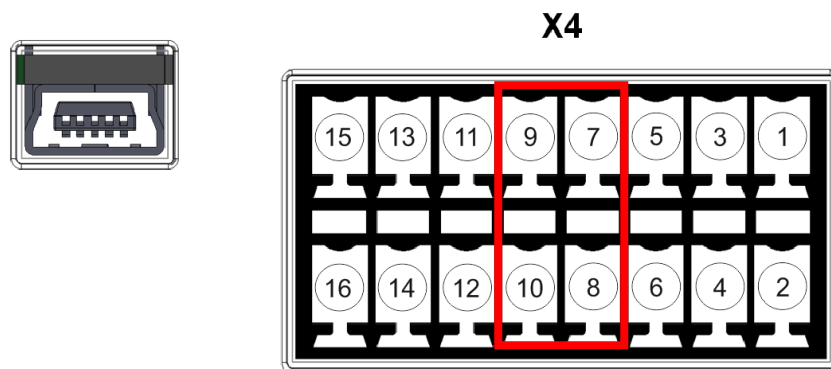


Figure 10: Digital outputs OUT1/OUT2

Table 10: Pin Assignment digital outputs OUT1/OUT2

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

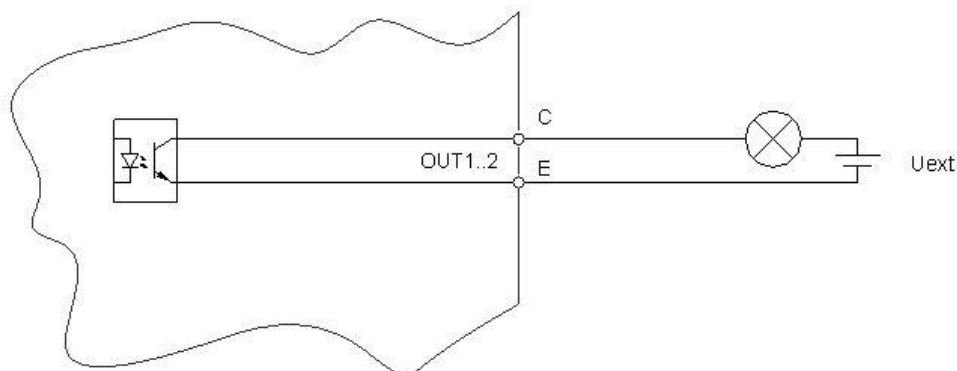


Figure 11: Internal and external wiring of the digital outputs OUT1/OUT2

**CAUTION:**

**The output is configured for max. 24 V DC / 20 mA.**

**Polarity reversal or overload on the output will destroy it.**

**The output is intended for switching resistive loads only.**

#### 4.4.4. Relay output on connector X4

There are 2 relay outputs available on connector X4. The common contact and the normally open contact (NOC) of the relays are available. In addition to the digital outputs the relay outputs can be used as further pulse sensors for door or barrier applications. Each output is linked fixed with an antenna. Reading of a valid transponder on antenna ANT1 will affect relay REL1, a valid reading on antenna ANT2 affects relay REL2.

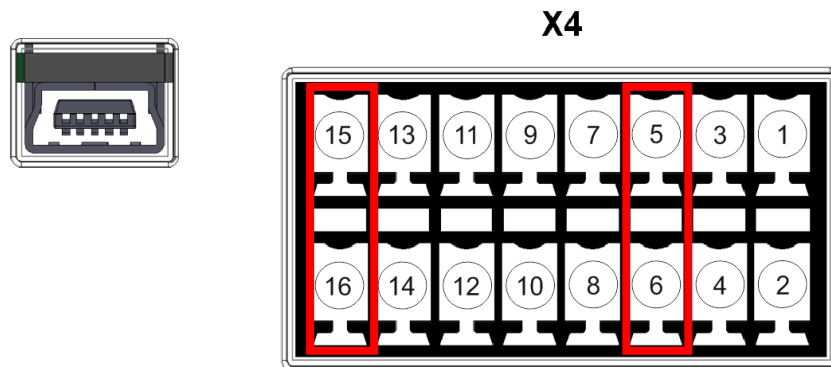


Figure 12: Relay outputs REL1 / REL2

Table 11: Pin Assignment Relay Outputs REL1 / REL2

Pin Number at Connector X4	Pin Assignment
5	REL1-NO
6	REL1-COM
15	REL2-NO
16	REL2-COM

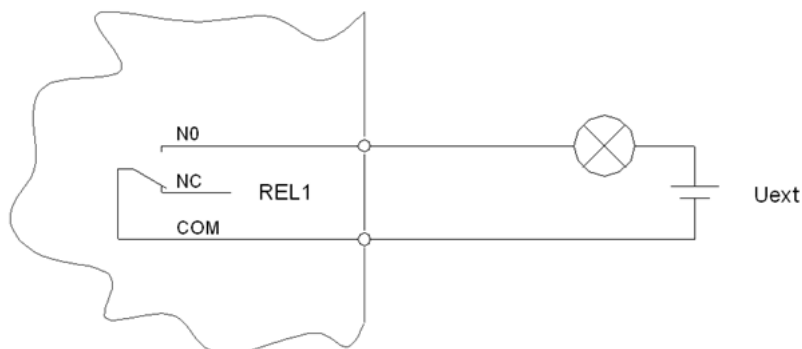


Figure 13: External wiring of the relay outputs

**CAUTION:**

*The relay outputs are configured for max. 24 V DC / 2 A constant load.*

*The switching current should not exceed 1 A.*

*The relay outputs are 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.*

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## 5. Operating and Display Elements

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### 5.1. Push Button T1

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With the push button T1 the teach-in mode can be activated or a complete configuration reset can be performed. Between the antenna outputs ANT3 and ANT4 the push button T1 is positioned. It is located inside the reader housing. To press the push button a paper clip can be used.

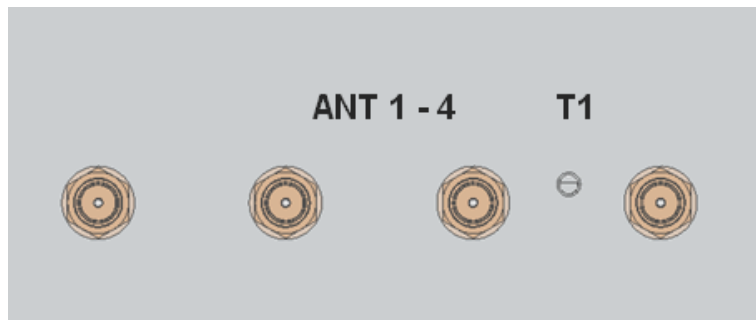


Figure 14: Position of the reset-switch T1

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#### 5.1.1. Teach-in-Mode

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The Teach-In-Mode can be used for an easy learning of new transponders if the configuration software 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 the Teach-In-Mode:

- activate the Teach-In-Mode by pressing the push button T1 twice within short time
- As long as the Teach-In-Mode is active the yellow LED (V4) is switched on. Access will be granted to all transponders which are read and stored in the reader during this time.
- At first the new transponders will be stored temporarily in the reader. If the Teach-In-Mode is disabled by pressing the push button T1 twice within short time again all new transponders will be stored permanently in the reader. These transponders will now have permanent access. Transponders stored permanently in the reader will still be available if the system was powered off. Temporarily stored transponder during the Teach-In-Mode will get lost in case of power down.

#### **NOTE:**

- ***In case of power down during activated Teach-In Mode all temporarily stored transponders which are not yet stored permanently into the reader got lost and have to be read again.***
- ***It is recommended to use the Teach-In-Mode only for small installations where only a manageable number of transponders and users has to be handled.***

**CAUTION:**

- ***In case of power down during deactivation of the Teach-In Mode (after pressing the push button T1 twice within short time the second time) all stored transponders in the reader can get lost. Please take care of a steady power supply!***

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**5.1.2. Configuration Reset**

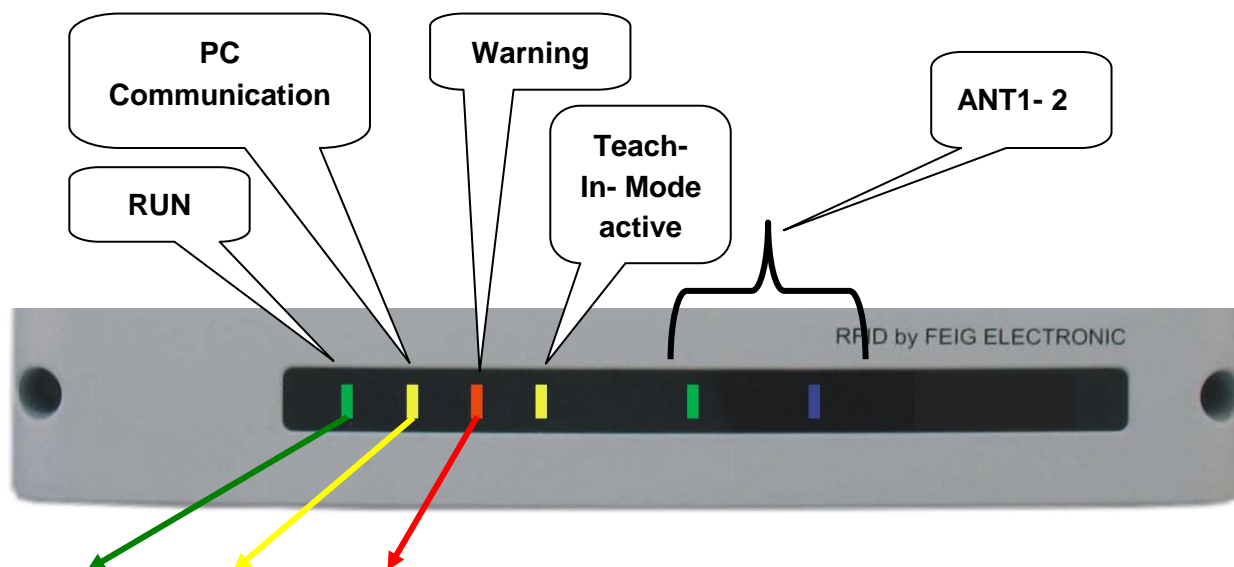
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By means of the push button T1 a complete configuration reset can be performed. For performing a reset you should use a paper clip and push the button T1 for at least 5 s until the 3 status LED's (left side) are switched on continuously. After releasing the push button the reader performs a re-start.

During a complete configuration reset all parameters of the vehicle access control reader will be reset back to factory default and need to be configured again. In the reader stored access control data like transponders and access rights are not affected.

## 5.2. Status LED

Table 12: Configuration of the LED



Green	Yellow	Red	Description
FLASH	-	OFF	Normal Reader operation
-	FLASH	-	Reader receives a valid protocol from a PC
FLASH	-	ON	RF Warning [0x84]
FLASH (alternating)	-	FLASH (alternating)	Hardware Warning; perform Reader Diagnostic [0x6E] for further information
<b>Firmware Update:</b>			
FLASH (light in sequence)	FLASH	FLASH	Firmware transfer from PC to reader (Please do not switch off the reader or disconnect the interface cable)
<b>Configurations Reset:</b>			
FLASH (light in sequence)	FLASH	FLASH	While T1 is pushed and hold for maximal 5 s
ON	ON	ON	After T1 has been pushed and hold for 5 s complete configuration reset has been performed
<b>ANT1-2:</b>			
Green			HF Power switched on
Blue			Valid transponder detected
Violet			Invalid transponder detected
Red			Antenna impedance error (unequal to 50 Ohm)



### 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 where the reader is used.

#### 5.3.1. EU reader according to EN 302 208

According to the standard EN 302 208 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  $P_{\text{out}}$  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.

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

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

For the calculation of the reader output power  $P_{\text{Out}}$  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
<b>Radiated power in dB</b>				<b>29,0 dBm</b>
<b>Output power in mW</b>				<b>786 mW</b>
<b>Configuration in the Reader (CFG3)</b>			<=	<b>0,8 W</b>

\*\* linear antenna = „0“, circular antenna = „1“

Figure 15: Calculation of the output power

In Figure 15 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.

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### 5.3.2. FCC Reader according to FCC 47 Part 15

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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 than 4 W e.i.r.p. Due to these facts the antenna ID ISC.ANT.U600/270-FCC (7,5 dBi) must be used with at least 5,0 m of cable type Belden H155 (0,3 dB/m) or at least 3,0 m of cable type RG58 (0,5 dB/m).

Antenna Type	Permitted Cable
ID ISC.ANT.U600/270-FCC	Min. 5,0 m of cable type Belden H155 (0,3 dB/m) or min. 3,0 m of cable type RG58 (0,5 dB/m)
ID ISC.ANT.U270/270-FCC	-/-

## 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 depends on the kind of vehicles that should be identified.

Table 13: recommended height of installation in different applications

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

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

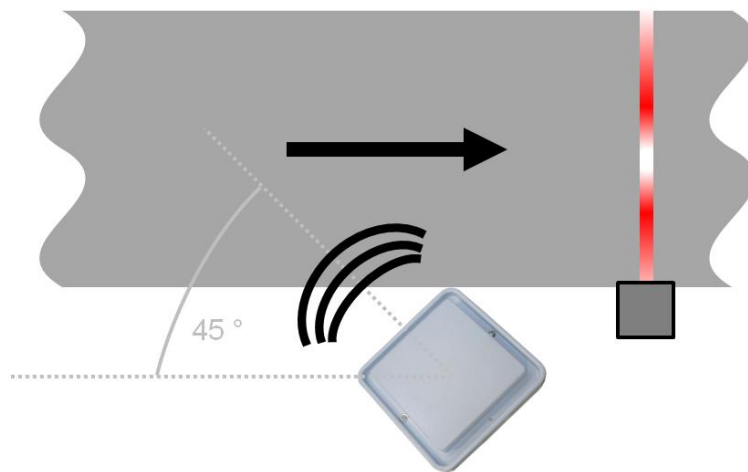


Figure 16: Antenna alignment to the lane

If the vehicle access control reader 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 and connect a second antenna to the reader.



Figure 17: typical vehicle access control application



Figure 18: Positioning of the antenna



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## 7. Mounting of the transponder

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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 a self adhesive label. To mount the transponder the lamination sheet has to be removed from the backside and the transponder has to be placed to the windshield.

Before mounting 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. Additional information and details should be found in the manual of the car. Otherwise the manufacturer of the car can be asked for more information.

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 19: Mounting of the transponder

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## 8. Technical Data

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### MECHANICAL DATA

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Housing	Aluminum powder-coated
Dimension (W x H x D)	260 mm x 157 mm x 68 mm 10.2 inch x 6.2 inch x 2.7 inch
Weight	1,8 kg (4.0 lb)
Protection Class	IP 43 (with protection cap IP64)
Colour	RAL 9003 (Signal White)

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### ELECTRICAL DATA

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Power Supply	24 V DC $\pm$ 20 % (Noise Ripple: max. 150 mV)
Current Consumption	typ. 1,0 A
Operating Frequency	
• EU	865 MHz to 868 MHz (EN 302 208)
• FCC	902 MHz to 928 MHz (FCC47 Part15)
RF-Power	100 mW to max. 2 W configurable (Tolerance: $\pm$ 3 dB)
Antenna Connection	2 x SMA female (50 $\Omega$ ), internal Multiplexer
RF Diagnostic	RF Channel monitoring Antenna SWR monitoring Internal Overheating control*
Outputs	
• 2 x Optocoupler	24 V DC $\overline{\text{---}}$ / 20 mA (galvanically isolated)
• 2 x Relay (NOC)	24 V DC $\overline{\text{---}}$ / 1 A (switching current), (2A constant load)
Inputs	
• 2 x Optocoupler	max.24 V DC $\overline{\text{---}}$ / 20 mA
Interfaces	USB Mini (USB 2.0; Full Speed; On-The-Go) Ethernet (10/100 BASE-T; MDI/MDI-X cross over detection; IPv4)

\* 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.

**FUNCTIONAL PROPERTIES**

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Supported Transponder Types	EPC Class 1 Generation 2 Further transponder types on request possible
Optical Indicators	10 LEDs for operating status and diagnostics
Further Features	Anti collision Support of enciphered transponder communication Secure key memory "Config Cloning" functionality Teach-In-Mode Real-time clock (Battery-buffered)

**AMBIENT CONDITIONS**

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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**

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Radio Regulation	
• Europe	EN 302 208
• USA	FCC 47 CFR Part 15
• Canada	IC RSS-210
EMC	EN 301 489
Safety	
• Low Voltage	EN 62368-1
• Human Exposure	EN 50364

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## 9. Radio Approvals

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### 9.1. Europe (CE)

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Hereby, FEIG ELECTRONIC GmbH declares that the radio equipment type ID MAX.U1002 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address:

<http://www.feig.de/en/downloads-support/declarations-of-conformity.html>



Performance Classification according to ETSI EN 301 489: Class 2



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**9.2. USA (FCC) and Canada (IC)**


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**9.2.1. USA (FCC) and Canada (IC) warning notices**


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<b>Product name:</b>	<b>ID MAX.U1002-FCC</b>
<b>FCC ID: IC:</b>	<b>PJMLRU1002A 6633A-LRU1002A</b>
<b>Notice for USA and Canada</b>	<p>This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada.</p> <p>Operation is subject to the following two conditions.</p> <p>(1) this device may not cause harmful interference, and</p> <p>(2) this device must accept any interference received, including interference that may cause undesired operation.</p> <p>Unauthorized modifications may void the authority granted under Federal communications Commission Rules permitting the operation of this device.</p> <p>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.</p> <p>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 :</p> <p>(1) l'appareil ne doit pas produire de brouillage, et</p> <p>(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.</p>

**Warning:**

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

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### 9.2.2. Label Information

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

<b>Contains FCC ID PJMLRU1002A</b> <b>Contains IC: 6633A-LRU1002A</b>
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### 9.2.3. Installation with FCC / IC Approval

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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.

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### 9.2.4. USA (FCC) and Canada (IC) approved antennas

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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.U270/270-FCC (6,0 dBi)
- ID ISC.ANT.U600/270-FCC (7,5 dBi)