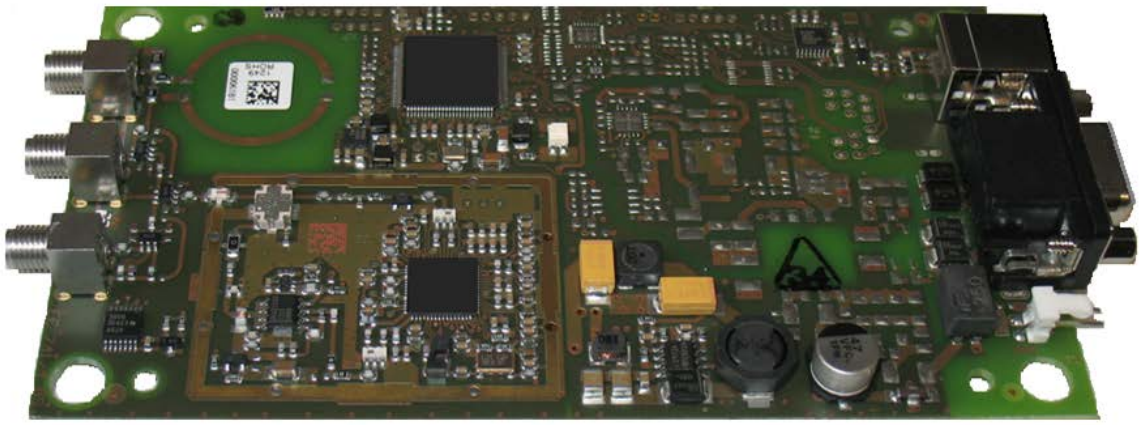
OBID i-scan® UHF

INSTALLATION

ID ISC.MRMU102-A / ID ISC.MRMU102-POE

UHF Mid Range Reader Module



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FEIG ELECTRONIC

Note

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

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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.
- 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 the Reader

The reader modules ID ISC.MRMU102-A and ID ISC.MRMU102-POE are designed for reading of passive data carriers, so-called „Smart Labels“ at an operating frequency in the UHF band between 860 MHz and 960 MHz. Transponders according to EPC Class1 Gen2 are supported. Optional an Upgrade Code for the reading of ISO 18000-6-C transponders is available.

For Host communication ID ISC.MRMU102-A provides an asynchronous RS232 interface and an USB interface. ID ISC.MRMU102-POE is equipped with an Ethernet interface.

The reader module are equipped with 3 SMA connectors for conduction of external antennas (ANT1 – ANT3). Additional an integrated antenna (ANT4) is available. The reader is designed for use in applications with small tag populations. Depending on the type of external antenna and the used transponder read ranges of up to 4 m are possible. The integrated antenna is able to communicate with nearfield as well as farfield transponders. Read ranges of up to 40 cm in combination with a farfield transponder can be realized. Nearfield transponders can be read up to 5 cm.

2.1. Available Reader Types

The following reader types are available:

Table 1: Available Reader Types

Model	Description	Order Number
ID ISC.MRMU102-A	Module version with asynchronous RS232- and USB- Interface, 3 x SMA connectors for external antennas , 50Ohm 1 x integrated antenna	3779.000.00
ID ISC.MRMU102-POE	Module version with Ethernet- Interface, Power over Ethernet 3 x SMA connectors for external antennas , 50Ohm 1 x integrated antenna	4493.000.00
ID ISC.MRU102-A	Housed version with asynchronous RS232- Interface, 3 x SMA connectors for external antennas , 50Ohm 1 x integrated antenna	4495.000.00
ID ISC.MRU102-POE	Housed version with Ethernet- Interface, Power over Ethernet 3 x SMA connectors for external antennas , 50Ohm 1 x integrated antenna	4492.000.00
ID ISC.MRU102-USB	Housed version with USB- Interface, 3 x SMA connectors for external antennas , 50Ohm 1 x integrated antenna	4494.000.00
ID ISC.MRU102-POE-LED	Housed version with Ethernet- Interface, Power over Ethernet 1 x integrated antenna 3 x optical and 1 x acoustic signaler	3888.000.00

3. Assembly and Wiring

The reader has been designed for mounting in other equipment.

NOTE:

Before any installation the intended position of the reader should be tested for its suitability.

3.1. Viewing and Dimensions

3.1.1. Viewing and Dimensions ID ISC.MRMU102-A

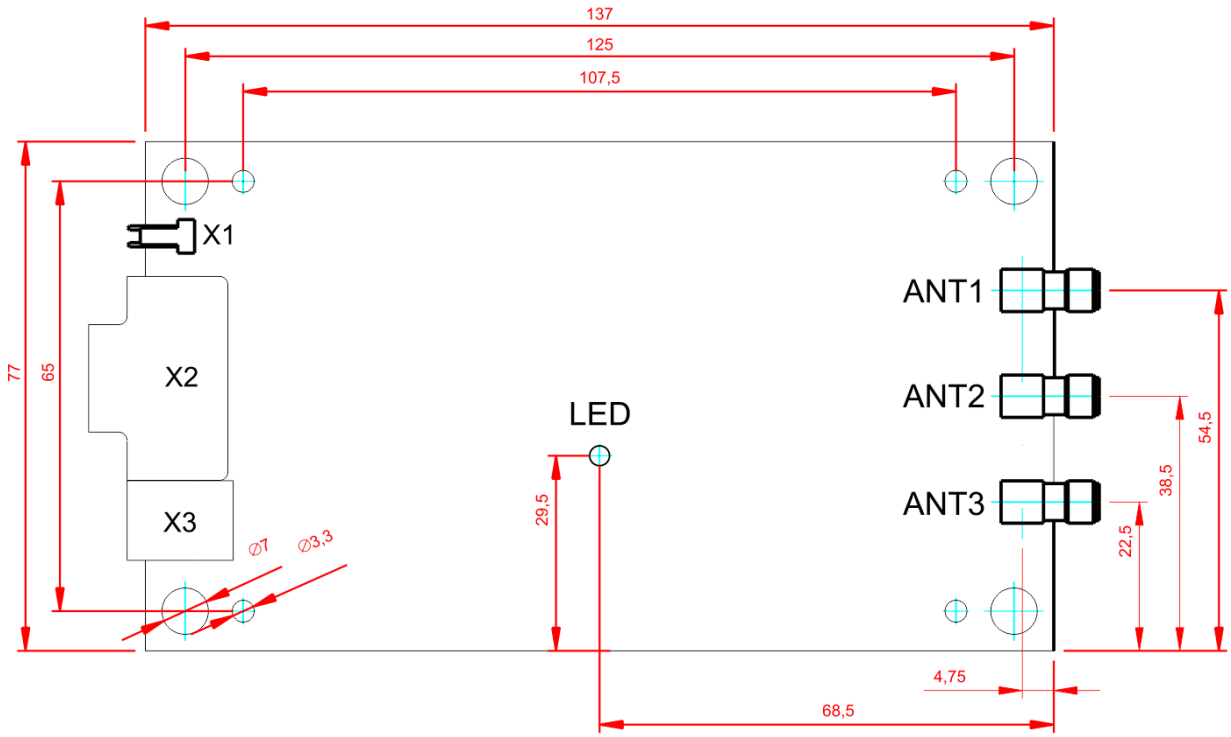


Figure 1: Dimensions ID ISC.MRMU102-A (all dimensions are in mm)

3.1.2. Viewing and Dimensions ID ISC.MRMU102-POE

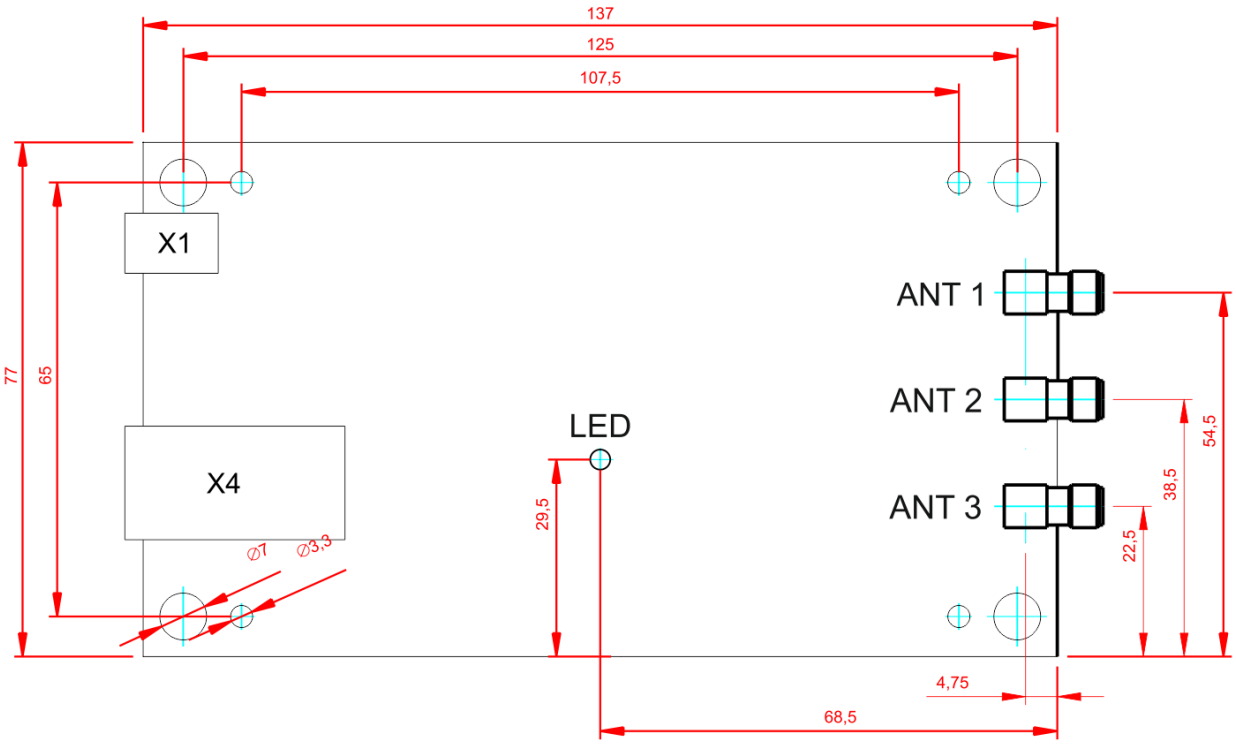


Figure 2: Dimensions ID ISC.MRMU102-POE (all dimensions in mm)

4. Connections

4.1. Connections ID ISC.MRMU102-A

The module version of the reader is equipped with an asynchronous RS232 Interface (X2) and a USB Interface (X3). The Table below shows which connector can be used for the different interface cable.

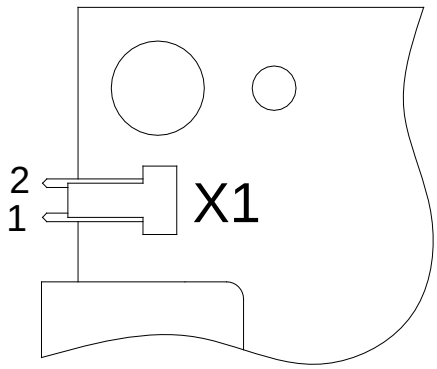
Table 2: Connectors

Connector	Description
ANT 1-3	4.3.1. External Antenna ANT 1 - 3
ANT 4	4.3.2. Internal Antenna ANT 4
X1	4.1.1. Power Supply via Connector X1
X2	4.1.2. RS232 Interface on Connector X2
X3	4.1.3. USB Interface on Connector X3

4.1.1. Power Supply via Connector X1

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.

Connect the 12 V DC to 24 V DC supply voltage to socket X1 on the circuit board.



1 VCC

2 GND

Figure 3: Pin connection of the power supply - Connector X1

For connection of the power supply a special DC-Connector from the manufacturer Molex is required. The necessary components of the DC-Connector are listed in Table 4.

Table 3: Components of the required DC-Connector

Component	Manufacturer	Article ID of Manufacturer
Housing	Molex	22-01-3027
Crimp Contact	Molex	08-50-0114

CAUTION:

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

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

4.1.2. RS232 Interface on Connector X2

For the connection of the asynchronous interface RS232 the reader provides a 9-pin D-Subminiature female connector.

Table 4: Connection assignment of the connector X2

X2	Interface
2	TxD
3	RxD
5	GND
7	GND
1;4;6;8;9	n.c.

For this reader a serial cable is available.

Table 5: Serial Data Cable

Feig Part No.	Description
1690.000.00	ID CAB.RS-A

Interface parameter can be configured via software protocol (e.g. ISOStart). Further information can be found in the System Manual H10410-Xe-ID-B.pdf of the reader.

4.1.3. USB Interface on Connector X3

There is a USB-socket X3 on board for the connection of the USB-Interface. The pinout is standardized. The data rate is reduced to 12 Mbit (USB full speed). A standard USB-cable can be used.

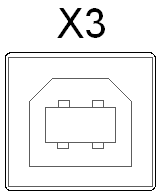


Figure 4: USB interface for host communication

NOTE:

The length of the USB-cable can be a max. of 5 meter. It isn't allowed to use longer cables!

The reader must be powered with a external power supply even if it is connected to a "high powered port".

4.2. Connections ID ISC.MRMU102-POE

The module version of the reader is equipped with an Ethernet Interface (X4). For transponder communication up to 3 external antennas can be connected. In addition an integrated antenna is available. The Table below shows which connector can be used for the different interface cable.

Table 6: Connectors

Connector	Description
ANT 1-3	4.3.1. External Antenna ANT 1 - 3
ANT 4	4.3.2. Internal Antenna ANT 4
X1	4.2.1.1. Power Supply via Connector X1
X4	4.2.2. Ethernet-Interface on Connector X4 (10/100Tbase)

4.2.1. Power Supply

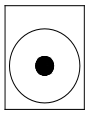
The UHF reader module ID ISC.MRMU102-POE can either be supplied with an external DC voltage of 12 V DC to 24 V DC via connector X1 or via Power over Ethernet.

4.2.1.1. Power Supply via Connector X1

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.

Connect the 12 V DC to 24 V DC supply voltage to socket X1 on the circuit board.

Table 7: Connecting the supply voltage

Terminal	Name	Description	X 1
X1 / inside	Vcc	Vcc – supply voltage (+)	
X1 / outside	GND	Ground – supply voltage (-)	

CAUTION:

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

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

Power supply recommendations:

To take full advantage of the Reader performance, you must use a sufficiently regulated and low-noise power supply. When using a switching power supply, be sure that its internal switching frequency is less than 300 kHz. (See also:ANNEX A - Accessories)

Table 8: Recommended power supply

Part No.	Description.	Feig Article No
ID NET.12V-B-EU	Power Supply 95 - 265V AC Input Voltage, with angular DC Plug 2,5mm*5,5mm Output: 12 V DC/⎓; 700mA Ambient Operating Temperature: 0°C to +40°C	1688.002.00
ID NET.12V-B-GB		3886.000.00
ID NET.12V-B-US		3887.000.00

NOTE:

The power supply is supplied with a DC/⎓ plug 2.5mm x 5.5mm. This is compatible with the readers socket X1.

4.2.1.2. Power Supply via Power over Ethernet (PoE)

Optional the reader (only MRU102-PoE) can be powered via the LAN connector on X4 with the use of a PoE „Power over Ethernet“ power supply according to IEEE802.3af*, Class2 (6,49 Watt). 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.

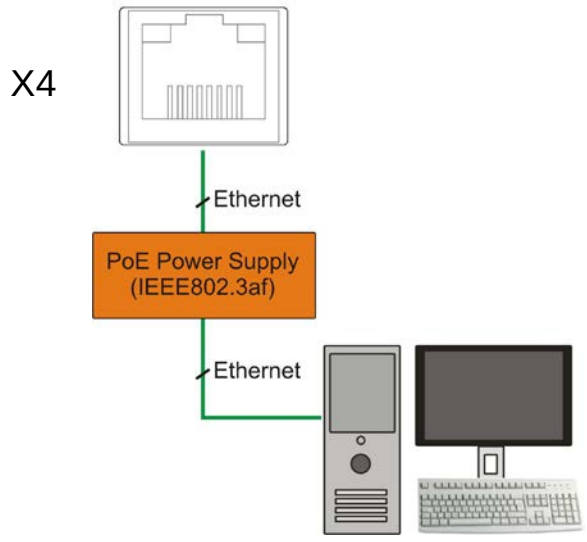


Figure 5: LAN and PoE connection

NOTE:

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.

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

The maximum cable distance for Ethernet is 100m.

It is recommended to use a shielded twisted pair STP CAT5 cable.

* For detailed technical information regarding the 802.3af standard, please refer to the most recent edition of the corresponding IEEE specification.

PoE - power supply recommendations:

Table 9: Recommended PoE Power Supply

Article No.	Name	Description
3842.000.00	ID NET.PoEI13W-A	Power over Ethernet Supply 100-240V AC (Continental European Plug), Output: 48V DC/⎓; 0,5A

4.2.2. Ethernet-Interface on Connector X4 (10/100Tbase)

The Reader has an integrated 10 / 100 base-T network port for an RJ-45. Connection is made on X4 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. Interface parameter can be configured via software protocol (e.g. ISOStart).

Table 10: Standard factory configuration of the Ethernet connection

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

NOTE:

The reader provides a DHCP able TCP/IP interface.

It is recommended to use a shielded twisted pair STP CAT5 cable.

4.3. Antenna Terminals

4.3.1. External Antenna ANT 1 - 3

Three SMA sockets are provided on the circuit board for connecting of the external antennas.

The maximum tightening torque for the SMA socket is 0.45 Nm.

CAUTION:

Higher tightening torque will damage the connector.

Table 11: Connecting an external antenna

Terminal	Description
ANT 1-3	Connecting the external antenna (input impedance 50Ω)

NOTE:

When connecting an antenna, ensure that it does not exceed the permissible limits prescribed by the national regulations for radio frequency devices.

4.3.2. Internal Antenna ANT 4

Additionally the reader is equipped with an internal antenna (ANT4). The internal antenna supports far field transponders as well as near field transponders. The internal antenna is located in the bottom left corner of the housing and is marked with an antenna symbol. The maximum read range of the antenna in combination with a far field transponder is approx. 40 cm. In combination with a near field transponder the maximum read range is approx. 5 cm.

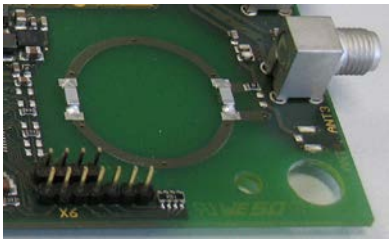


Figure 6: Position of the internal antenna

5. Control and Display Elements

5.1. LED

The Reader's LED can be configured through software.

The following Table 7: Default Configuration of the LEDs shows the default setting.

Table 12: Default Configuration of the LEDs

Abbreviation	Description
LED green	"RUN " - Turns on when the Reader is ready
LED red	„LABEL“ - Turns on when a transponder is detected. - Flashes if RF-Warning (red – green alternating with 8Hz) (Temperature alarm, short circuit on antenna output)

6. Technical Data

MECHANICAL DATA

Housing	-
Dimension (W x H x D)	137 mm x 77 mm x 17 mm
Weight	60 g
Protection Class	-
Color	-

ELECTRICAL DATA

Power Supply	
• MRMU102-A	12 V DC to 24 V DC
• MRMU102-POE	12 V DC to 24 V DC Power over Ethernet (POE)
Power Consumption	max. 7 W
Operating Frequency	860 MHz to 960 MHz
RF-Power	max. 500 mW ± 1,5 dB
Antenna Connector	3 x SMA female(50 Ω) 1 x integrated Antenna (ANT4)
Interfaces	
• MRMU102-A	RS232 USB (Full Speed)
• MRMU102-POE	Ethernet

FUNCTIONAL PROPERTIES

Protocol Modes	FEIG ISO HOST (Advanced Protocol Frame) Buffered Read Mode Scan Mode (MRMU102-A) Notification Mode (MRMU102-POE)
Supported Transponder Types	EPC Class 1 Generation 2 ISO 18000-6-C (Upgrade Code required)
Signaler	1 LED (multi-color, red and green)
Further Features	Anti-collision RSSI Temperature Monitoring*

AMBIENT CONDITIONS

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

APPLICABLE STANDARDS

Radio Regulation	
• Europe	EN 302 208
• USA	FCC 47 CFR Part 15
• Canada	IC RSS-Gen, RSS-210
EMC	EN 301 489
Vibration	EN 60068-2-6 10 Hz to 150 Hz: 0,075 mm / 1 g
Shock	EN 60068-2-27 Acceleration 30 g

* 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.

7. Radio Approvals

7.1. Europe (CE)

When used according to regulation, this radio equipment conforms with the basic requirements of Article 3 and the other relevant provisions of the R&TTE Guideline 1999/E6 dated March 99.

Performance Classification according to ETSI EN 301 489: Class 2

7.2. Declaration of Conformity

Hereby, FEIG ELECTRONIC GmbH declares that the radio equipment type ID ISC.MRMU102 is in compliance with Directive 2014/53/EU.

The full text of the EU declaration of conformity is available at the following internet address: www.feig.de.

7.3. USA (FCC) and Canada (IC)

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

Product name:	**ID ISC.MRMU102-A** **ID ISC.MRMU102-POE**
Reader name:	**ID ISC.MRMU102-A** **ID ISC.MRMU102-POE**
FCC ID: **IC:**	**PJMMRU102** **6633A-MRU102**
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 Reader Module

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

Contains FCC ID PJMMRU102
Contains IC: 6633A-MRU102

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)
- Integrated antenna (- 7dBic)

ANHANG

ANNEX A - Accessories

The following accessories are available for the Reader.

Table 13: Accessories

Article No.	Part No.	Description
1686.000.00	ID CAB.USB-A	USB-cable 2,5m
1690.000.00	ID CAB.RS-A	Serial data cable
1688.002.00	ID NET.12V-B-EU	Power Supply 95 - 265V AC Input Voltage, (Continental European Plug), with angular DC Plug 2,5mm*5,5mm Output: 12 V DC/⎓; 700mA Ambient Operating Temperature: 0°C to +40°C
3886.000.00	ID NET.12V-B-GB	Power Supply 95 - 265V AC Input Voltage, (GB/UK Plug), with angular DC Plug 2,5mm*5,5mm Output: 12 V DC/⎓; 700mA Ambient Operating Temperature: 0°C to +40°C
3887.000.00	ID NET.12V-B-US	Power Supply 95 - 265V AC Input Voltage, (US Plug), with angular DC Plug 2,5mm*5,5mm Output: 12 V DC/⎓; 700mA Ambient Operating Temperature: 0°C to +40°C
3842.000.00	ID NET.PoEI13W-A	Power over Ethernet Supply 100-240V AC (Continental European Plug), Output: 48V DC/⎓; 0,5A
EU: 3198.000.00 FCC: 3685.000.00	ID ISC.ANT.U600/270 UHF Antenna	powerful UHF Antenna with 3dB beamwidth of 30° x 65°
EU: 3199.000.00 FCC: 3686.000.00	ID ISC.ANT.U270/270 UHF Antenna	powerful UHF Antenna with 3dB beamwidth of 65° x 65°
EU: 3200.000.00 FCC: 3687.000.00	ID ISC.ANT.U170/170 UHF Antenna	Flat, compact UHF Antenna with 3dB beamwidth of 85° x 85°
3308.000.00	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
3309.000.00	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
3310.000.00	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

1654.002.00	ID ISC.ANT.C2-A UHF Antenna Cable 2m	Antenna cable, length: 2 m
1654.003.00	ID ISC.ANT.C6-A UHF Antenna Cable 6m	Antenna cable, length: 6 m