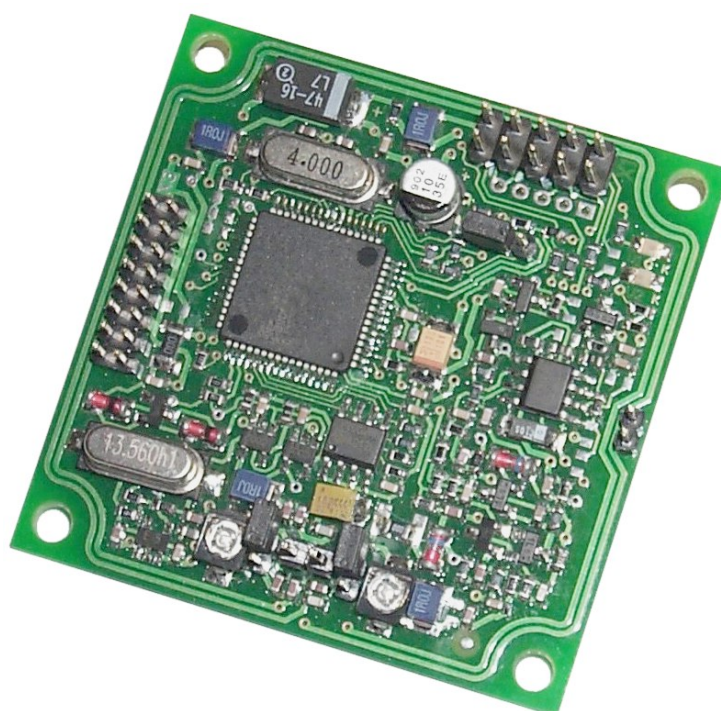


ID ISC.M02



(English)

Note

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Content

ID ISC.M02	1
1 Safety Instructions / Warning - Read before start-up !	5
2 Performance Characteristics of the ID ISC.M02 Reader Module	6
2.1 Performance Characteristics.....	6
2.2 Available module and antenna types.....	7
2.3 Scope of delivery	7
2.4 Optional available	7
3 Installation and wiring	8
3.1 Dimensions.....	8
3.2 Wiring.....	9
3.2.1 Supply voltage.....	10
3.2.2 RS232 interface (TTL).....	11
3.2.3 Data/Clock interface	12
3.2.4 Optional Security Module ID SAM.M02	13
3.3 Display elements.....	14
3.4 Operating elements.....	15
3.4.1 Operating/Programming Mode: Jumper J1	15
3.4.2 Internal/External antenna: Terminal X2, Jumpers J2 and J3.....	16
3.4.3 Retuning the internal antenna: Trim capacitor C65.....	17
3.5 Installation notes.....	19
3.5.1 Metallic surroundings	19
3.5.2 EMC effects on cables	19
3.5.3 EMC effects from magnetic fields.....	20
4 Radio Approvals	21
4.1 Europe (CE)	21
4.2 Declaration of Conformity	22
4.3 USA (FCC) and Canada (IC).....	23
4.3.1 USA (FCC) approved antennas.....	24

4.3.2 Canada (IC) approved antennas 24

4.4 Label Information Reader ID ISC.M02-B 25

5 Technical Data 26

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

- The device may only be used for the purpose intended by the manufacturer.
- The operation manual should be kept readily 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 the manufacturer from any liability.
- 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 undertaken 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.
- Before touching the device, the power supply must always be interrupted. Make sure that the device is without voltage by measuring. The fading of an operation control (LED) is no indicator for an interrupted power supply or the device being out of voltage!
- Special advice for wearers 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 the immediate proximity of the device's antenna for any length of time.

2 Performance Characteristics of the ID ISC.M02 Reader Module

2.1 Performance Characteristics

The ID ISC.M02 Reader Module is designed for reading and writing passive transponders, so-called “Smart Labels”, with an operating frequency of 13.56 MHz. It is suitable for any application in which short read ranges and small reader dimensions are required.

The module has an integrated antenna which eliminates the need for additional external antenna components.

Depending on the requirements, an external 50Ω antenna may also be optionally connected.

2.2 Available module and antenna types

The following module types are currently available:

Module type	Description
ID ISC.M02-B	Reader Module with integrated antenna, RS232-TTL and data/clock interface, for a supply voltage of 5 V DC

The following antenna types are currently available:

Antenna	Description
ID ISC.ANT100/100-A	PCB-Antenna, 50Ω, 100mm x 100mm (3,94inch x 3,94inch)
ID ISC.ANT40/30-A	PCB-Antenna, 50Ω, 40mm x 30mm (1,57inch x 1,57inch)

2.3 Scope of delivery

The following components are included:

Module type	Included
ID ISC.M02-B	1 x Reader Module ID ISC.M02-B

2.4 Optional available

The following components are optional available. This parts are necessary if the reader ID ISC.M02 should be connect to a PC COM-Port.

Module type	Order number
ID CAB.A-A Cable for Adaption	2259.000.00.00
ID CAB.RS-A Cable for RS232/485 and Power supply	1690.000.00.00
RS232-TTL Converter	1962.000.00
ID Net.5V	1689.000.00
ID ISC.ANT100/100-A HF Antenna	1968.000.00
ID ISC.ANT40/30-A HF Antenna	1967.000.00

3 Installation and wiring

3.1 Dimensions

Fig. 1 shows the dimensions of the ID ISC.M02 Reader Module in mm.

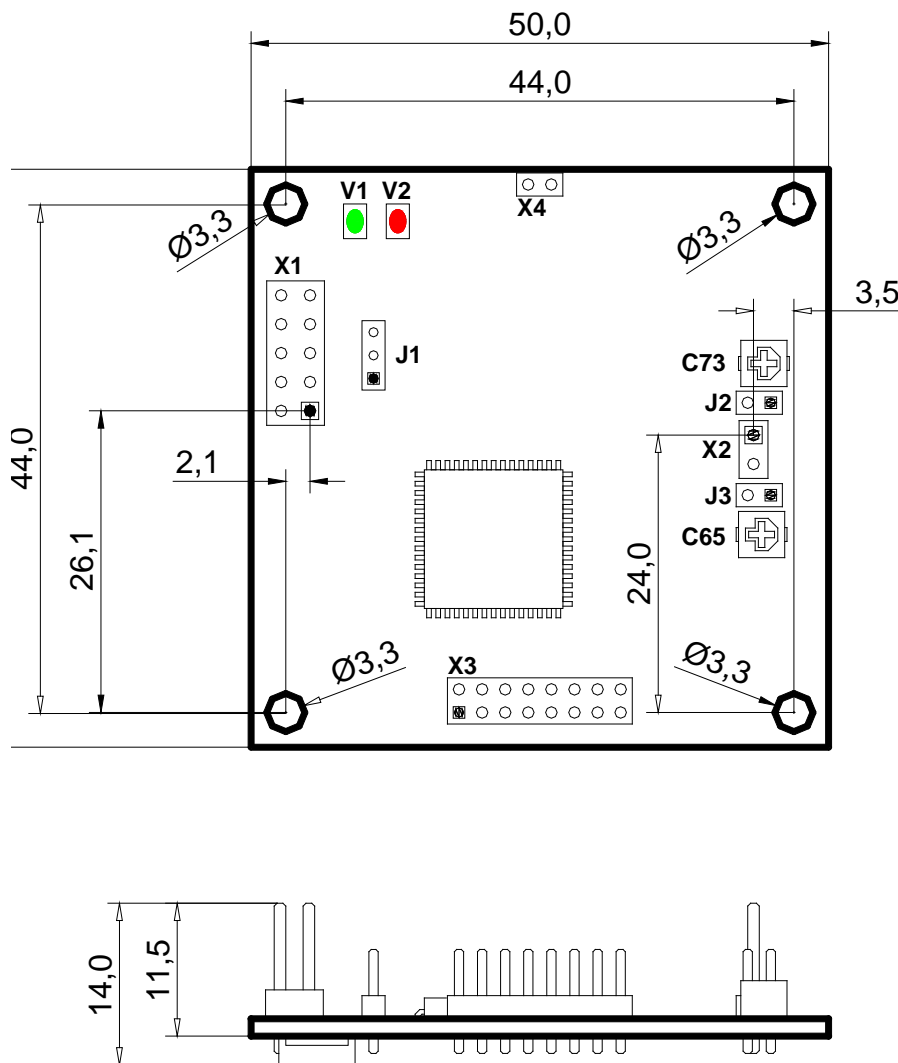


Fig. 1: Dimensions of the ID ISC.M02 Reader Module in mm

3.2 Wiring

Fig. 2 and Table 1 show the pin assignments for Terminal X1. The pin connector is designed for flat cable connection using an IDC multipoint socket connector with 2.54 mm pin spacing.

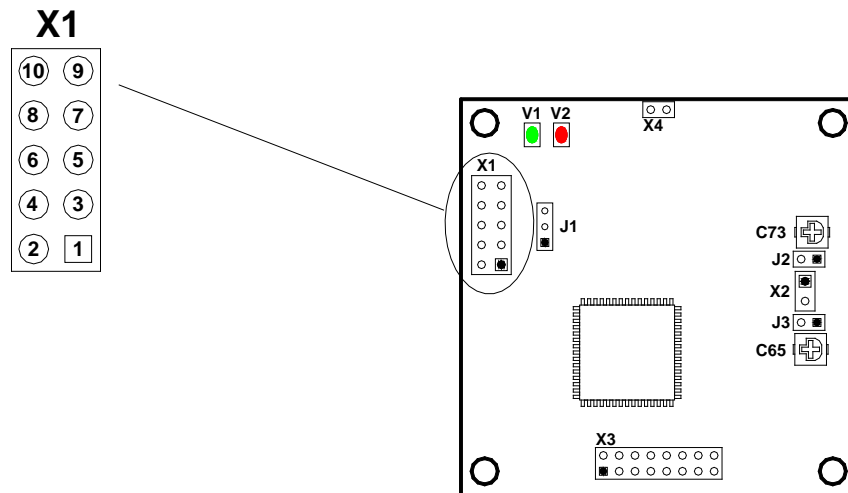


Fig. 2: Pin assignments for Terminal X1

X1 Pin no.	Function	Description
		ID ISC.M02-B
1	DAT	Data line for the data/clock interface
2	CLK	Clock line for the data/clock interface
3	TxD	RS232-TTL – Transmit Data
4	GND **	GND
5	RxD	RS232-TTL – Receive Data
6	---	not connected
7	CLS	CLS line for the data/clock interface
8	VCC	+ 5 V DC *
9	GND **	GND
10	---	not connected
* Use only regulated DC power supplies ! ** GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

Table 1: Pin assignments for Terminal X1

3.2.1 Supply voltage

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

The ID ISC.M02-B must be supplied only by a regulated power supply.

If switching power supplies are used with the module, be sure that there is adequate filtering.

Noise from the power supply can result in a reduction of the read/write range of the module.

The cable length from the power supply should be as short as possible, and should in any case not exceed 3 m.

X1 Pin no.	Function	Description
		ID ISC.M02-B
8	VCC *	+ 5 V DC \pm 5%
9, 4	GND **	GND
* Use only regulated power supplies ! ** GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

Table 2: Pin assignments for X1

NOTE:

- **Reversing the polarity of the supply voltage may destroy the device.**
- **Supply voltages outside the specifications may destroy the device.**

3.2.2 RS232 interface (TTL)

The length of the cable to the RS232 interface should be kept as short as possible, and must in any case not exceed 3 m.

X1 Pin no.	Function	Description
		ID ISC.M02-B
3	TxD *	RS232-TTL - Transmit Data
4, 9	GND **	GND
5	RxD *	RS232-TTL - Receive Data
* Signal names as seen by the Reader Module. ** GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

Table 3: Pin assignments for the RS232 interface on X1

The transmission parameters for the interface can be software-configured. Table 4 shows the standard parameters for the RS232 interface.

Parameter	Standard setting
Baud rate	38400
No. of data bits	8
Parity	Even
No. of stop bits	1

Table 4: Standard parameters of the RS232 interface.

Note:

- *If there is an USB/RS232 converter used on the PC/Notebook side, we recommend to increase the „Char Timeout Multiplier“ parameter in the COM-Port settings from „1“ to about „5“.*
- *IF there is a RS232 to TTL converter used without external power supply it may be necessary to switch on the COM Port parameter “RTS” and “DTR” manually.*

3.2.3 Data/Clock interface

The length of the cable to the data/clock interface should be kept as short as possible. It must not exceed 3 m.

X1 Pin no.	Function	Description
		ID ISC.M02-B
1	DAT	Data line for the data/clock interface
2	CLK	Clock line for the data/clock interface
7	CLS	CLS line for the data/clock interface
4, 9	GND *	GND
* GND-Pins 4 and 9 are to be connected directly to each other on the Reader Module		

Table 5: Pin configuration for the RS232 interface on Terminal X1

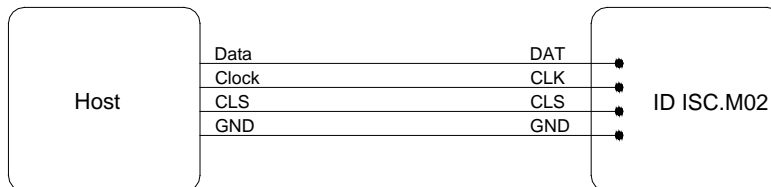


Fig. 3: Connecting the data/clock-interface

3.2.4 Optional Security Module ID SAM.M02

If needed, the optional ID SAM.M02 Security Module can be connected to terminals X3 and X4.

The ID SAM.M02 Security Module provided additional security by using cryptographic data transmission between the reader and transponder by using of corresponding transponder types.

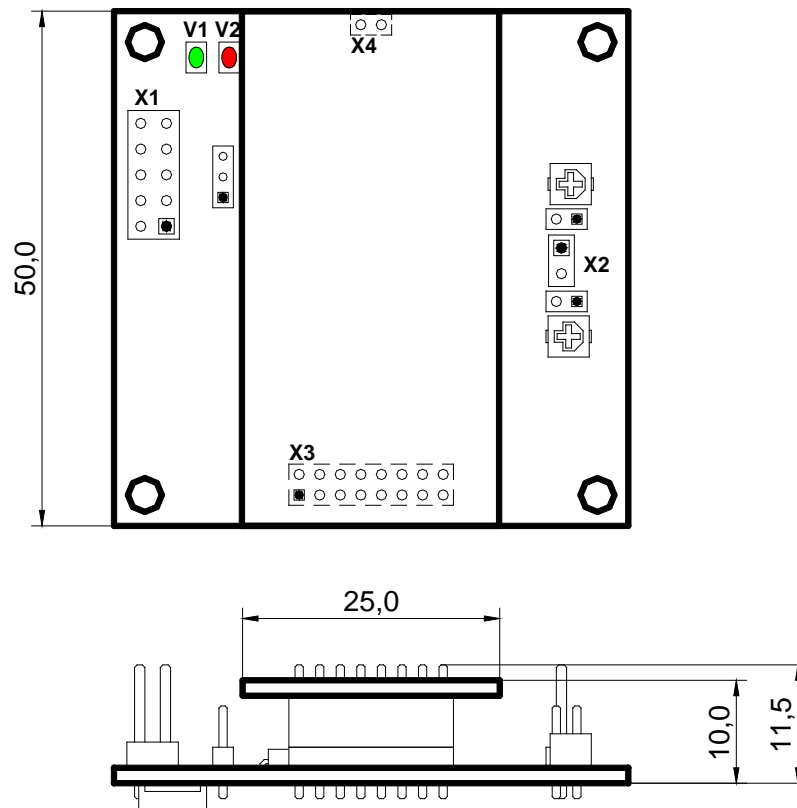


Fig. 4: Dimensions of ID ISC.M02 with ID SAM.M02 in mm

3.3 Display elements

The ID ISC.M02 Reader Module has a green LED (V1) and a red LED (V2) which are used as display elements (Fig. 5).

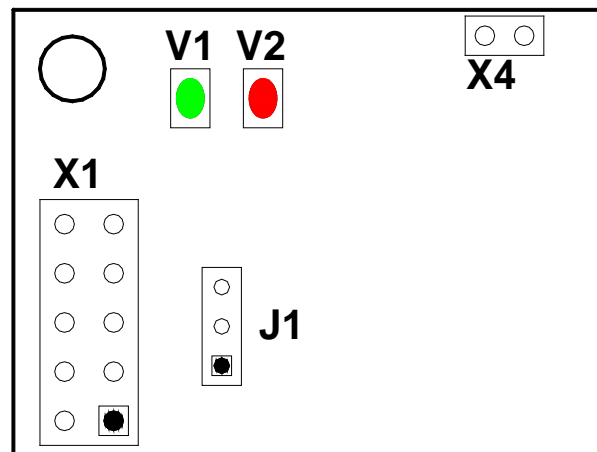


Fig. 5: Position of LEDs V1 and V2

The functions of both LEDs can be configured using software protocol. It is also possible to control both LEDs directly using an additional software protocol.

Table 3.3-1 shows the standard setting for V1 and V2.

LED	Color	Standard setting
V1	Green	<ul style="list-style-type: none"> Flashes 4x after a reset. Flashes continuously at a frequency of 2 Hz.
V2	Red	<ul style="list-style-type: none"> Flashes 4x after a reset. Comes on for 1 second after successful communication with a transponder.

Table 6: Standard setting for the LEDs

3.4 Operating elements

3.4.1 Operating/Programming Mode: Jumper J1

Jumper J1 is used to configure the operating and programming mode of the ID ISC.M02.

In standard operation the jumper is set to Position 1-2 (see Fig. 4.3.1-1). The reader is then in normal operating mode.

If the jumper is set to Position 2-3, the integrated hardware bootloader starts after a reset. Since the reader’s firmware however also has a software bootloader, the hardware bootloader option should be used only for installing the software bootloader.

For additional information about programming the reader, see the corresponding Application Note “N21101-xe-ID-B” „Firmware Update“.

Jumper position	Mode
1 - 2	Standard setting : The reader is in normal operating mode.
2 - 3	Activation of the hardware bootloader: After a reset the reader’s CPU starts its hardware bootloader, which can then be used for new programming.

Table 7: Jumper J1

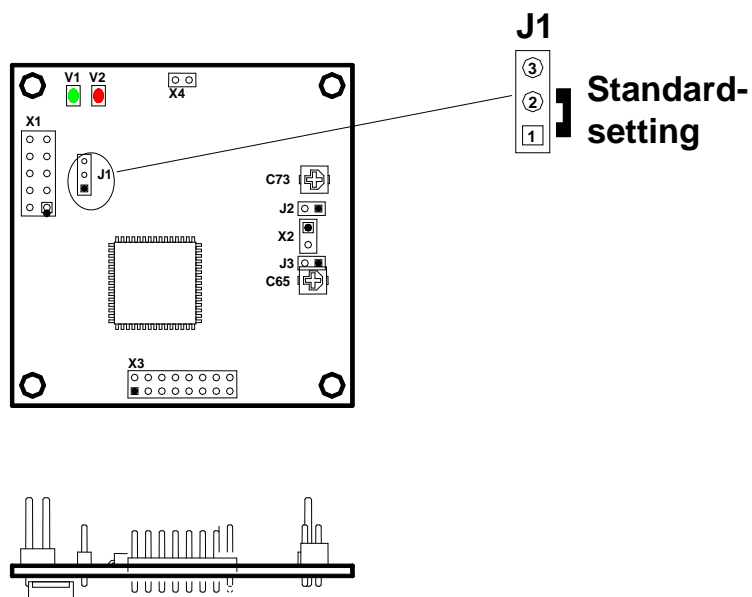


Fig. 6: Jumper J1

3.4.2 Internal/External antenna: Terminal X2, Jumpers J2 and J3

Terminal X2 is used to connect an external 50Ω antenna to the ID ISC.M02. This is a standard pin connector with 2.54 mm spacing. Table 8 shows the pin assignments for Terminal X2.

Pin no.	Function	Description
1	Signal	50Ω signal output
2	GND	GND connection

Table 8: Pin assignments of Terminal X2

Jumpers J2 and J3 connect the internal antenna to the driver circuit of the reader. To connect an external antenna, both jumpers J2 and J3 must therefore be removed.

Jumpers J2 and J3	Description
in	Internal antenna connected
out	External antenna connected

Table 9: Configuration of Jumper J2 und J3

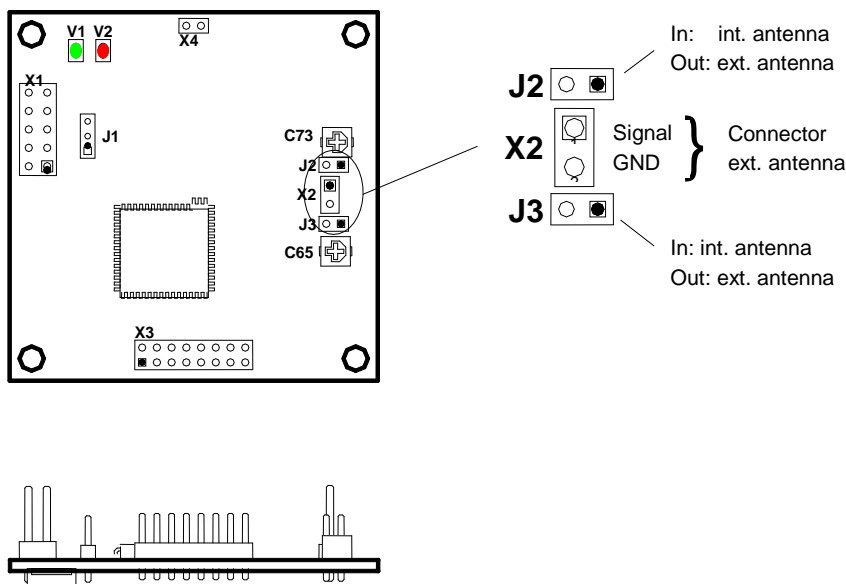


Fig. 7 Connecting and configuring internal/external antenna

NOTE:

- ***If both jumpers J2 and J3 are not removed after connecting an external antenna, the reader's transmitter will be loaded by both antennas. This could result in permanent damage to the transmitter!***

3.4.3 Retuning the internal antenna: Trim capacitor C65

The antenna of the ID ISC.M02 can be detuned as a result of various ambient conditions such as nearby metal objects (see 8.5.1. Metallic surroundings). This detuning can be compensated to some degree using the trim capacitor C65.

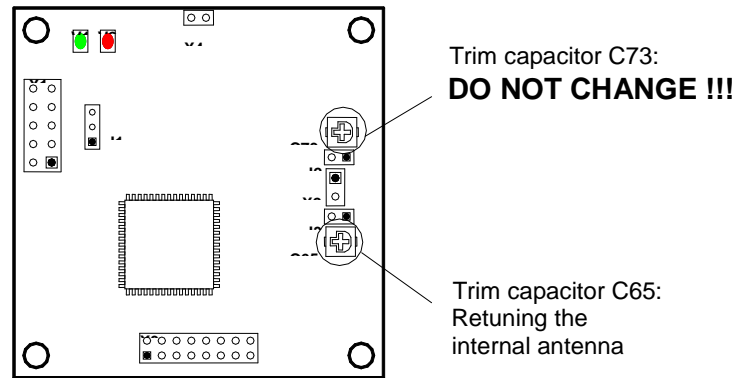


Fig. 8: Trim capacitor for retuning the antenna

The integrated antenna can be retuned with the aid of an oscilloscope (bandwidth ≥ 20 MHz). To do this, short the GND terminal of the oscilloscope probe with the probe point and hold it over the circuit board of the ID ISC.M02. The probe then forms a measuring loop for the radiated magnetic field of the ID ISC.M02. The distance between the oscilloscope probe and the ID ISC.M02 should be between 0 and 3 cm.

Use the software command „RF-ON“ (0x6A) to turn on the HF field of the ID ISC.M02. A 13.56 MHz signal should be visible on the oscilloscope screen.

To tune the internal antenna, now set the signal amplitude of the 13.56 MHz signal to maximum using trim capacitor C65.

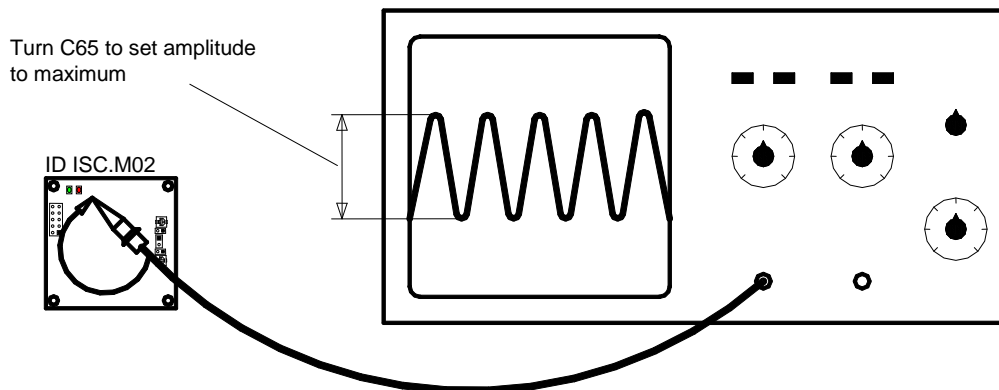


Fig. 9: Configuration for tuning the internal antenna

Use caution when the maximum value of the signal amplitude is reached at the minimum or maximum position of the trim capacitor (Fig. 10). This usually means the antenna is too severely detuned by the surroundings and can no longer be fully compensated by the trim capacitor.

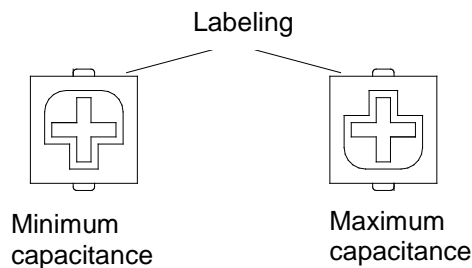


Fig. 10: Minimum and maximum position of the trim capacitor C65

After the antenna has been tuned, check it again for maximum range and any communication gaps.

NOTE:

- ***Notwithstanding the possibility of retuning the antenna as described here, the distance between the reader and the surrounding metal surfaces must be at least 3 cm. Note that even other circuit boards may act like metal objects depending on how much copper they contain.***

3.5 Installation notes

Be aware of the following possible environmental factors when installing an ID ISC.M02 into another device :

- Effects from nearby metal objects
 - ⇒ Detuning of the integrated antenna
 - ⇒ Impaired propagation of the antenna's magnetic field
- EMC effects on cables
 - ⇒ Impaired communication between reader and transponder
- EMC effects from magnetic fields
 - ⇒ Impaired communication between reader and transponder

3.5.1 Metallic surroundings

When installing an ID ISC.M02 into another device, be sure that there are no metal surfaces or objects in the direct vicinity of the reader if possible. These can detune the antenna and thus reduce the magnetic field of the integrated antenna. This will in turn result in reduced read distances for the reader.

The distance between the reader and a metal surface should be at least 3 cm. Note that even other circuit boards may act like metal objects depending on how much copper they contain.

If a metallic surrounding cannot be avoided, stable function should at least be ensured by keeping the distance as great as possible.

The area between the antenna and transponder as well as the area on the other side of the transponder should also be kept clear of metal parts.

Since any change in the metallic environment will result in detuning of the integrated antenna and therefore to impaired function, no moving metal parts, such as metallic fans, should be allowed in the vicinity of the reader.

3.5.2 EMC effects on cables

In spite of the internal EMC filters inside the reader, high levels of noise on the supply voltage can result in impairment of the communication between the reader and transponder.

When installing an ID ISC.M02 into another device, be sure therefore that a clean, noise-free power supply is used.

3.5.3 EMC effects from magnetic fields

Since in this type of RFID-Technology the communication between the reader and transponder takes place by modulation of a magnetic field, alternating magnetic fields in the vicinity of the antenna can have a negative impact on its function.

Sources of such magnetic interference fields include coils within a primary or secondary switching power supply.

When determining the position of the reader and antenna within a device, check the device for any possible sources of interference as described above. If necessary, use shielding to suppress such interference.

4 Radio Approvals

4.1 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.



Equipment Classification gemäß ETSI EN 300 330: Class 2

4.2 Declaration of Conformity

Declaration of Conformity

in accordance with the
Directive 1999/5/EC (R&TTE Directive)
 &
Directive 2011/65/EU (RoHS Directive)

FEIG
ELECTRONIC

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

Product Designation : **ID ISC.M02**

Product Description : RFID Reader

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

FEIG ELECTRONIC GmbH declares that the radio equipment complies with the RoHS Directive 2011/65/EU and the essential requirements of Article 3 of the R&TTE Directive 1999/5/EC, when used for its intended purpose.

Standards applied :

Health and safety requirements pursuant to R&TTE Article 3(1)(a)	EN 60950-1:2006 / AC:2011 EN 50364:2010
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Protection requirements concerning electromagnetic compatibility R&TTE 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 R&TTE Article 3(2)	ETSI EN 300 330-2 V1.5.1
---	--------------------------

Weilburg, 25.06.2014

Place & date of issue

Markus Desch

Name and signature



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

4.3 USA (FCC) and Canada (IC)

Product name:	ID ISC.M02
Reader name:	ID ISC.M02-B
FCC ID: IC:	PJMISCM02 6633A-ISCM02
Notice for USA and Canada	<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.

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.

4.3.1 USA (FCC) approved antennas

This radio transmitter (identify the device by certification number, or model number if Category II) has been approved by FCC 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

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

- Internal antenna (magnetic antenna)
- ID ISC.ANT100100 (magnetic antenna)
- ID ISC.ANT4030 (magnetic antenna)

4.3.2 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

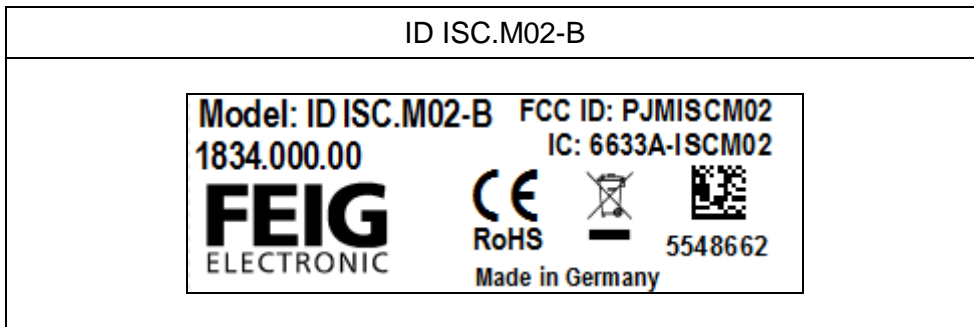
Le présent émetteur radio (identifier le dispositif par son numéro de certification ou son numéro de modèle s'il fait partie du matériel de catégorie I) a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énoncé ci-dessus et ayant un gain admissible maximal et l'impédance requise 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 IC Canada according RS210

- Internal antenna (magnetic antenna)

4.4 Label Information Reader ID ISC.M02-B

The following label is positioned on the backside of the reader.



5 Technical Data

Mechanical Data

- **Housing** without housing
- **Dimensions (W x H x D)** 50 x 50 x 14 mm (1,97 x 1,97 x 0,55 inch)
- **Weight** 14g (0,03lb)
- **Connector** 10 Pin-Connector, spacing 2.54mm (0,1inch)

Electrical Data

- **Supply voltage**
ID ISC.M02-B 5 V DC \pm 5%
- **Current draw** max. 200mA
- **Power consumption** max. 1 Watt
- **Operating frequency** 13,56 MHz
- **Transmitting power** 90 mW \pm 2 dB
- **Antenna connection** Internal Antenna, 48 x 48mm (1,89 x 1,89 inch)
Optional: external Antenna
- **Interfaces** RS232 – Level TTL, Data /Clock-Interface

Functional Properties

- **Protocol Modes**
 - FEIG ISO HOST
 - Scan Mode
- **Supported transponders**
 - ISO15693, ISO18000-3-Mode1 (EM HF ISO Chips, Fujitsu HF ISO Chips, KSW Sensor Chips, Infineon my-d, NXP I-Code, STM LRI ISO Chips, TI Tag-it)
 - NXP I Code 1
 - Code UID, I Code EPC (with separate firmware and Upgrade Code)
 - ISO18000-3M3 (with separate firmware and Upgrade Code)
- **EEPROM (for parameters)**
 - 1 kB
 - (10.000 write cycles)
- **FLASH**
 - 64 kB (for Parameter)
 - (firmware update via interface possible)
- **Visual indicators**
 - 2 LED (red / green)

Ambient Conditions

- **Temperature range**
 - Operation -20°C to +70°C (-4°F to 158°F)
 - Storage -40°C to +85°C (-40°F to 185°F)
- **Humidity**
 - 5 – 95% non condensing

Applicable Norms

- **Radio approval**
 - Europe EN 300 330
 - USA FCC 47 CFR Part 15
 - Canada RSS 210
- **EMC**
 - EN 300 489
- **Safety**
 - EN 60950