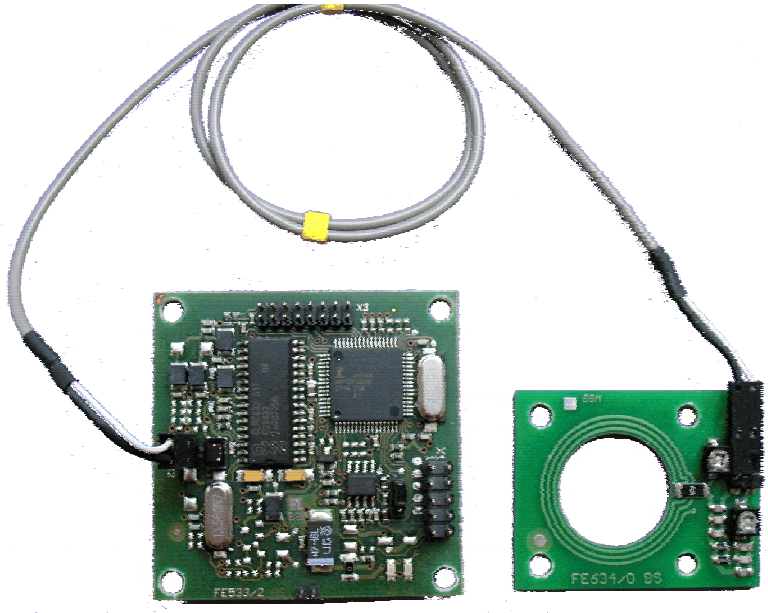
ID CPR.M02/ANT19



ID CPR.M02.VP/AB-CA with ID ICS.ANT19

(english)

Note

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Edition: bs/07/10/30 - manual-m21001-3de-id-b.doc
With the edition of this manual, all previous editions become void. Indications made in this manual may be changed without previous notice.

Composition of the information in this manual 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 installation 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.

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Contents

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

- The device has to be used only for the purpose designed by the manufacturer.
- The operation manual has to be stored available at any time and has to be handed over to 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 measures will lead to exclusion of 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 is not legally responsible for incorrect, unsuitable manual or automatical setting of parameters for a device or the incorrect application of a device.
- Repairs can only be executed by the manufacturer.
- Installation-, operation- and maintenance procedures should only be carried out by qualified personnel.
- Before opening the device, the power supply must always be interrupted. Make sure that the device is without voltage by measuring. CAUTION! The fading of an operation control (LED) is no indicator for an interrupted power supply or the device being without voltage!
- Works at the device and its installation have to be executed according to the national legal requirements and local prescriptions.
- When working on devices the valid safety regulations must be observed.

2. Performance Characteristics of the ID CPR.M02 Reader

2.1. Performance Characteristics

The ID CPR.M02 Reader Module is designed for reading and writing passive transponders having an operating frequency of 13.56 MHz. It is suitable for any application in which short read ranges and small reader dimensions are required.

2.2. Available module and antenna types

The following module types are currently available:

Modul Type	Power Supply	Antenna	RS232-TTL Interface	Data-/Clock Interface
ID CPR.M02.VP/AB-C	5 V DC	internal	4.800, 9.600, 19.200, 38.400, 57.600, 115.200, 230.400 Baud	Mag. Stripe Wiegand
ID CPR.M02.VP/AB-CA		external		

The following antenna types are currently available:

Antenna	Description
ID ISC.ANT19	PCB- Antenna, 50Ω, Ø 19mm

2.3. Scope of delivery

The following components are included:

Modul Type	Included
ID CPR.M02.VP/AB-C	1 x Reader Module ID CPR.M02.VP/AB-C
ID CPR.M02.VP/AB-CA	1 x Reader Module ID CPR.M02.VP/AB-CA

3. Installation and wiring

3.1. Dimensions

Fig. 3.1-1 shows the dimensions of the ID CPR.M02 Reader Module

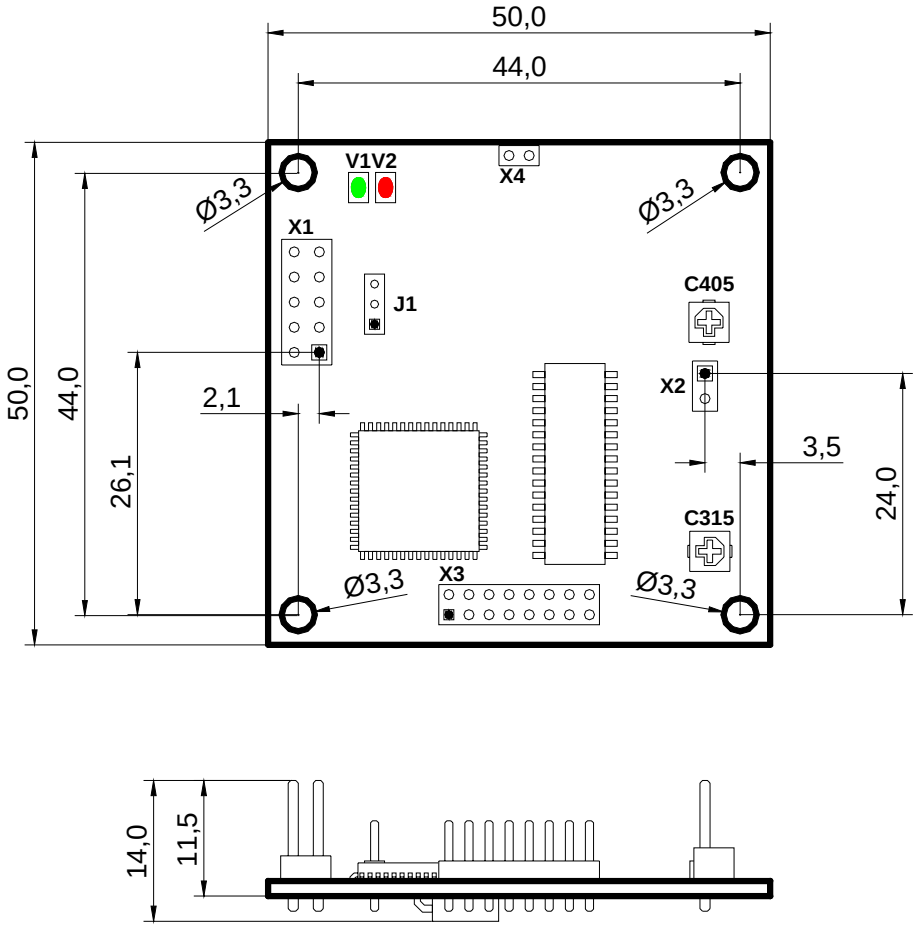


Fig. 3.1-1: Dimensions of the ID CPR.M02 Reader Module

3.2. Wiring

Fig. 3.2-1 and Table 3.2-1 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.

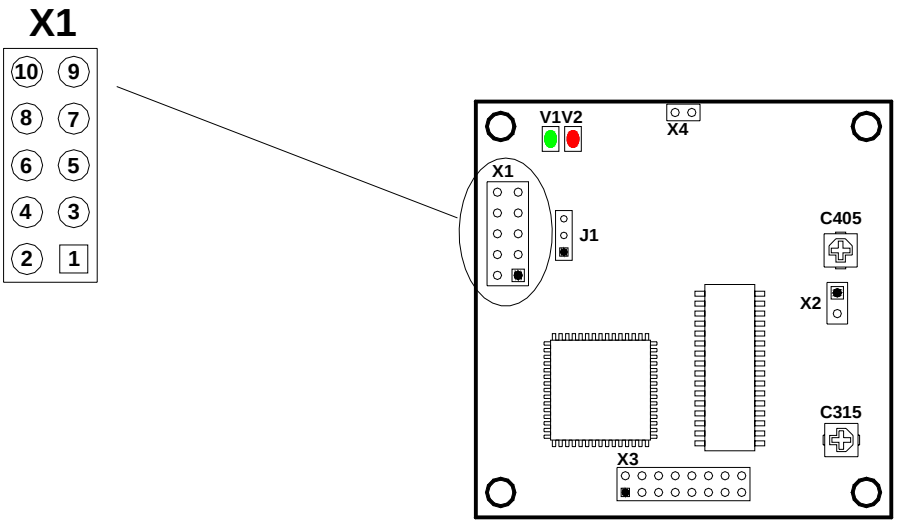


Fig. 3.2-1: Pin assignments for Terminal X1

X1 Pin no.	Function	Description ID CPR.M02
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 3.2-1: Pin assignments for Terminal X1

3.2.1. Supply voltage

The ID CPR.M02 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 CPR.M02
8	VCC *	+ 5 V DC ± 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 3.2.1-1: 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

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 CPR.M02
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 3.2.2-1: Pin assignments for the RS232 interface on X1

The transmission parameters for the interface can be software-configured. Table 3.2.2-2 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 3.2.2-2: Standard parameters of the RS232 interface.

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 CPR.M02
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 3.2.3-1: Pin configuration for the RS232 interface on Terminal X1

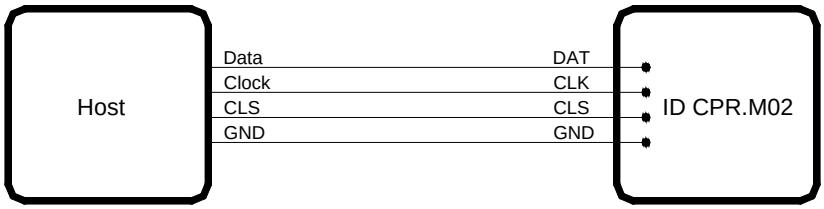


Fig. 3.2.3-1: Connecting the data/clock interface

3.2.4. Connection of an external Antenna (ID ISC.ANT19)

The ID CPR.M02.VP/AB-CA are intended for the connection of an external 50Ω-Antenna.

The use of the integrated antenna is not possible with this version.

Fig. 3.2.4-1 and Table 3.2.4-1 shows the pin assignments for Terminal X2 for the connection of the external antenna. The pin connector has a pin spacing of 2.54mm.

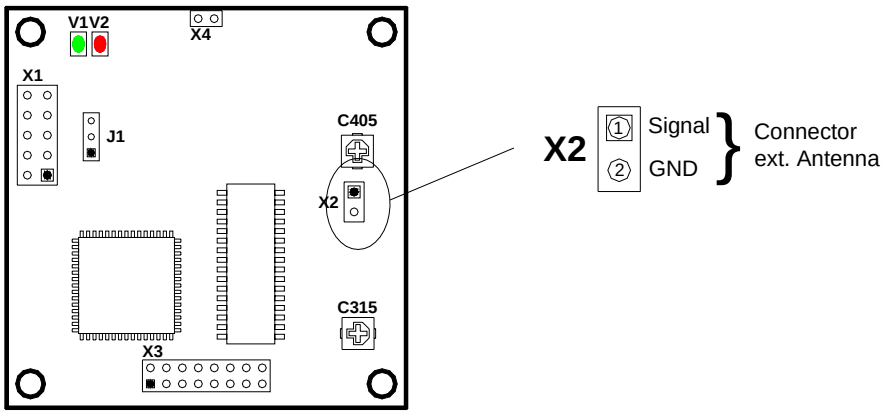


Fig. 3.2.4-1: Pin assignment of Terminal X2

X2 Pin no.	Function	Description
		ID CPR.M02.VP/AB--CA
1	Signal	Signal pin of the external 50Ω-Antenna
2	GND	GND pin of the external 50Ω-Antenna

Table 3.2.4-1: Pin assignment of Terminal X2

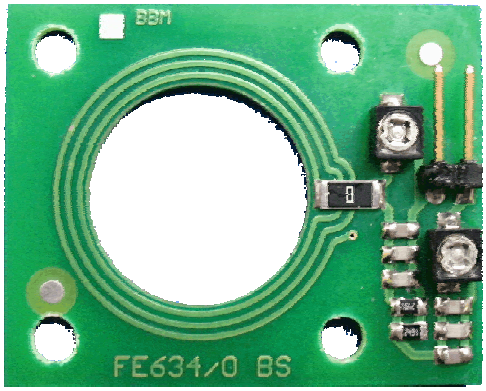


Fig. 3.2.4-2: Ext. 50Ω antenna ID ISC.ANT19

3.2.5. Optional Module ID SAM.M02

If needed, the optional device ID SAM.M02 can be connected to terminals X3 and X4. The ID SAM.M02 is a module for connecting and driving an additional SAM and provides security by using cryptographic data transmission between the reader and transponder.

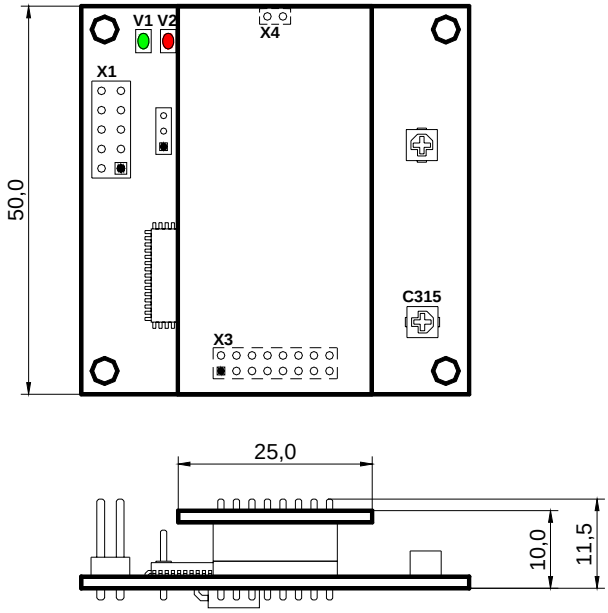


Fig. 3.2.4-1: Dimensions of ID CPR.M02 with ID SAM.M02

3.3. Display elements

The ID CPR.M02 Reader Module has a green LED (V1) and a red LED (V2) which are used as display elements (Fig. 3.3-1).

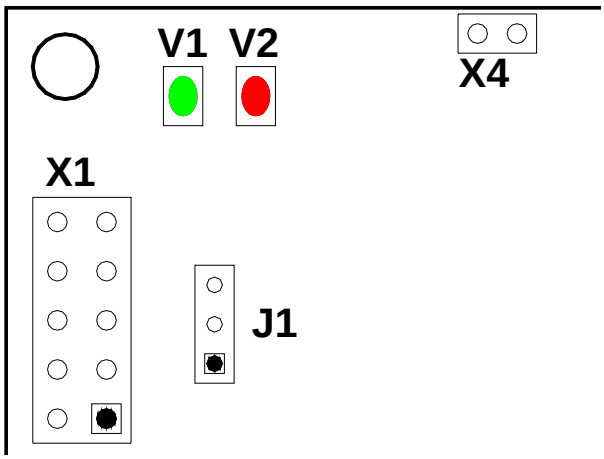


Fig. 3.3-1: Position of LEDs V1 and V2

LED	Color	Standard setting
V1	Green	• Flashes 4x after a reset. • Flashes continuously at a frequency of 2 Hz.
V2	Red	• Flashes 4x after a reset. • Comes on for 1 second after successful communication with a transponder.

Table 3.3-1: Standard setting for the LEDs

NOTE:
Up from Firmware-Version 1.08 the function of the red LED is connected to X1, Pin7 (CLS).
For current limitation an additional resistor with 470 Ω is required.

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 CPR.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 if necessary.

For additional information about programming the reader, see the corresponding Application Note „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 3.4.1-1: Jumper J1

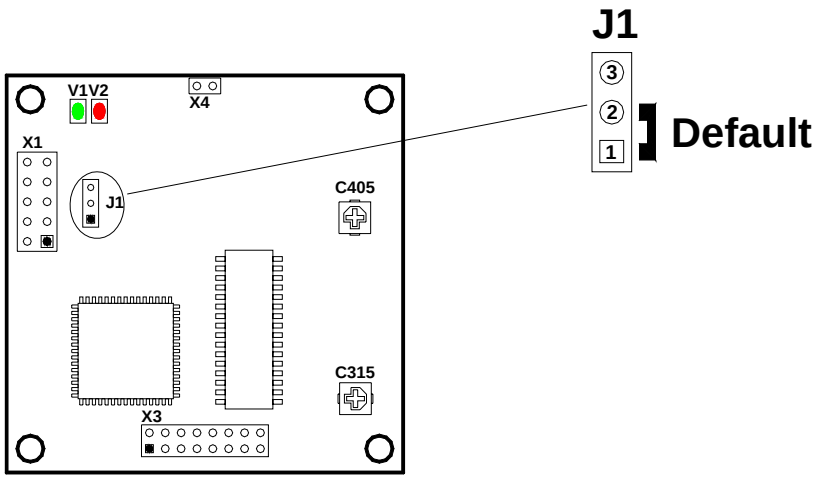


Fig. 3.4.1-1: Jumper J1

3.4.2. Retuning the internal antenna (ID CPR.M02.VP/AB-C)

The antenna of the ID CPR.M02.VP/AB-C can be detuned as a result of various ambient conditions such as nearby metal objects (see Section 8.5). This detuning can be compensated to some degree using the trim capacitor C315.

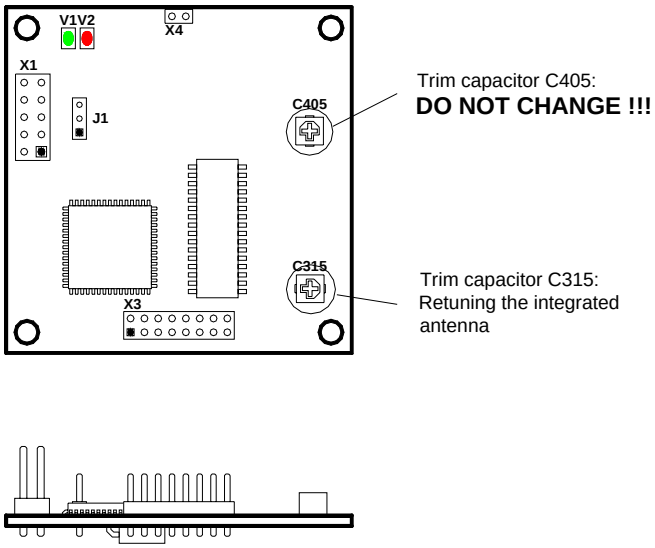


Fig. 3.4.3-1: Trim capacitor for retuning the antenna

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 CPR.M02. The probe then forms a measuring loop for the radiated magnetic field of the ID CPR.M02. The distance between the oscilloscope probe and the ID CPR.M02 should be between 0 and 3 cm.

Use the software command „RF-ON“ (0x6A) to turn on the HF field of the ID CPR.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 C315.

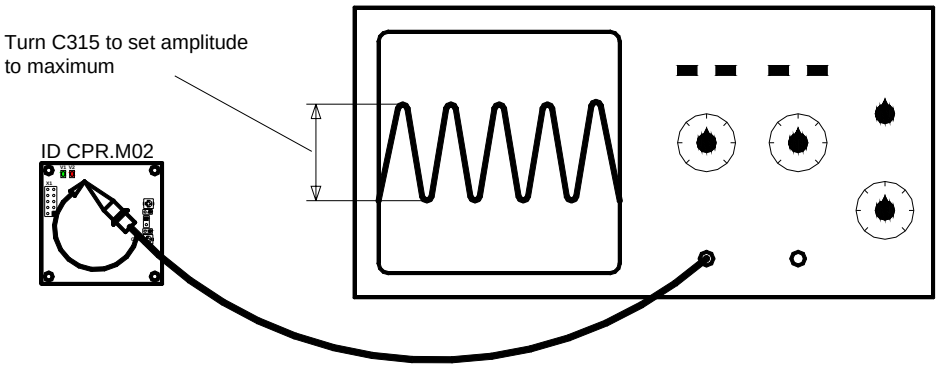


Fig. 3.4.3-2: Configuration for tuning the internal antenna

Use caution when the maximum value of the signal amplitude is reached at the minimum or maximum position of the trim capacitor (Fig. 3.4.3-3). This usually means the antenna is too severely detuned by the surroundings and can no longer be fully compensated by the trim capacitor.

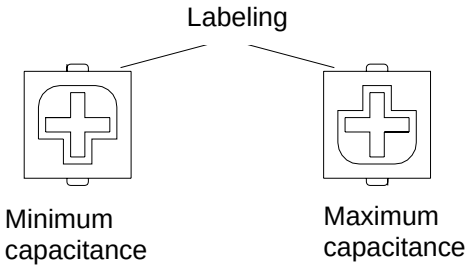


Fig. 3.4.3-3: Minimum and maximum position of the trim capacitor C315

After the antenna has bee 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 CPR.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 CPR.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 line 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 CPR.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.

CE

Equipment Classification according ETSI EN 300 330: Class 2

4.2. USA (FCC)

FCC ID PJMCPRM02-ANT19

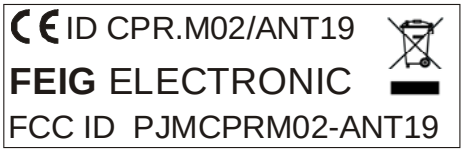
This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:
(1) this device may not cause harmful interference, and
(2) this device must accept any interference received, including interference that may cause undesired operation.

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device is labeled with an FCC ID number.
If this label is not visible when installed in an end device, the outside of the device MUST also display a label referring to the enclosed module.
Wording on the label similar to the following shall be used:
This device contains transmitter module FCC ID PJMCPRM02-ANT19

At the time of this printing, the antennas listed below were the only antennas approved for use with the ID CPR.M02 module. Use of other antennas must be approved by FEIG ELECTRONIC GmbH.
Antennas approved: ID ISC.ANT19

The FCC sticker is glued at the package.



5. Technical Data

• **Dimensions (W x H x D)**		50 mm x 50 mm x 14 mm
• **Connector**		10 pol. Pin-Connector (grid dim. 2,54 mm)
• **Supply voltage**		5 V DC ± 5% ripple 0...250 kHz < 10 mVpp ab 250 kHz < 0,1 mVpp
• **Power Consumption**		max. 1,5 W
• **Operating Frequency**		13.56 MHz
• **RF Transmitting Power**		250 mW ± 2 dB
• **Antenna: ID CPR.M02.VP/AB-CA**		External (separate 2 pol. Pin-Connector)
• **RS232-TTL Interface:** **ID CPR.M02.VP/AB-C / -CA**		4.800 to 230.400 Baud
• **Daten-/Takt Interface**		• Magnet Stripe Emulation • Wiegand Emulation
• **EEPROM (for parameters)**		1 kB (10,000 write cycles)
• **FLASH**		64 kB (software update on interface possible)
• **Supported Transponders read and write**		• ISO14443-A compatible (e. g. mifare, mifare Ultra Light, my-d proximity) • ISO14443-B compatible • ISO15693 compatible (e. g. I•Code SLI, Tag-It HFI, my-d vicinity, STM LRI512) • I•Code 1 (optional)
• **Security Function (optional)**		SAM (Security Access Module), e.g. for my-d vicinity and my-d proximity
• **Optical Indicators**		LED green: running; LED red: Transponder detected
• **Temperature Range**	**Operating** **Storage**	-20°C to +70°C -40°C to +85°C
• **Radio Approval**	**Europe** **USA**	EN 300 330 FCC 47 CFR Part 15
• **EMC**		EN 301 489
• **Safety**		EN 60950