Kemro K2

XE 020 RFID-Module

Internal Technical Documentation V 1.0

KEBA®

Automation by innovation.

List of changes

Version changed from / to	Date	Description	Modified by
1.0	07-2007	Created	
1.1	April, 11th 2008	Additional correction	hsm

Contents

1 Introduction

1.1 Purpose of the document

This planning manual describes the RFID XE 020/A module and the XE 020/ANT antenna module, which are already permanently installed in different KEBA operating panels. The application and functionality of the RFID module is the same for each operating panel.

1.2 Audience and prerequisites

The planning manual is geared towards those who are using or intend to deploy an operating panel with RFID module.

Only electrical technicians who are qualified to the VDE 1000-10 standard are permitted to install and maintain the operating panel.

This means personnel who:

- can evaluate the work to be carried out and recognise the possible hazards based on their technical training, knowledge and experience plus their expertise in the applicable standards.
- have a level of knowledge equivalent to that obtained through professional training as a result of several years experience working in a similar field.

1.3 Intended use

The intended use of the XE 020 RFID module includes deployment in KEBA operating panels. The module can also be installed in third party devices provided chapter "Minimum XE 020/ANT antenna module clearance" is taken into consideration.

The XE 020/A RFID (Radio Frequency Identification) module is used in conjunction with an RFID card for contactless logon and logoff (as per ISO 15693) and is employed for user identification. This replaces the login of a user with username and password.

The RFID module may not be used to fulfil protection requirements in the area of personal safety to prevent a malfunction compromising personal safety.

1.4 Notes on this document

1.4.1 Contents of document

- RFID module description
- Assembly and installation notes
- Description of the connections and wiring including EMC measures
- Description of the configuration
- Description of the status display
- Maintenance notes
- Accessories
- Technical specification

1.4.2 Not contained in this document

- Operating panel description

1.5 Documentation for further reading

The following is a listing of the planning manuals for an operating panel, equipped with an RFID module:

Doc. No.:	Planning manual	Description
1000520	OP 350/A-0013	Describes the installation, assembly, connection and operation of the operating panel. Each planning manual also contains programming and maintenance notes.
- in preparation -	OP 350-LD/C-0114	
- in preparation -	OP 360-LD/A-0013	
- in preparation -	OP 362-LD/C-0114	

2 Safety notes

2.1 Representation

At various points in this manual you will see notes and precautionary warnings regarding possible hazards. The symbols used have the following meaning:

DANGER!

- **indicates an imminently hazardous situation which, if noch avoided, will result in death or serious injury.**

WARNING!

- **indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury..**

CAUTION!

- **means that if the corresponding safety measures are not taken a potentially hazardous situation can occur which, if not avoided, may result in property damage or slight bodily injury.**

NOTICE

- **NOTICE used without the safety alert symbol indicates a potentially hazardous situation which, if noch avoided, may result in property damage.**

- **This symbol reminds you of the possible consequences of touching electrostatically sensitive components.**

Information
Informations on use of equipment and useful practical tips are identified by the symbol "Information". "Information" do not contain any information that draws attention to potentially dangerous or harmful functions.

3 Product overview

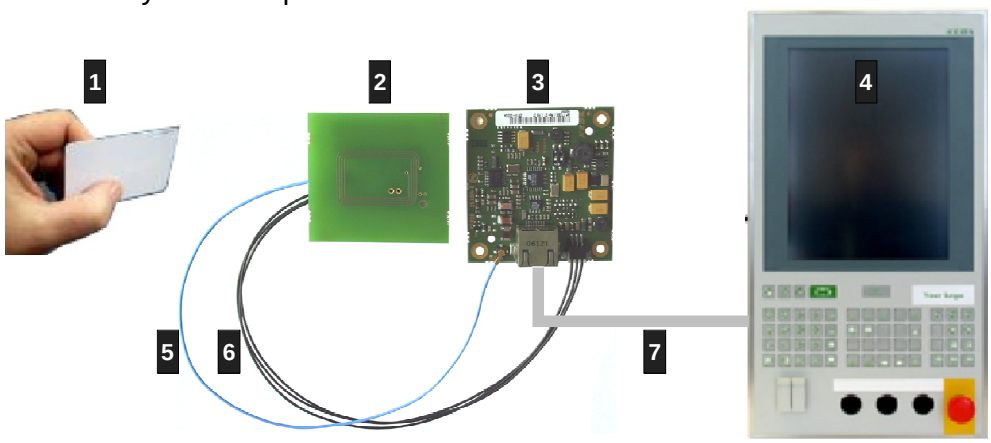
3.1 Summary

The RFID card user must hold the RFID card close to the RFID antenna on the front of the operating panel for identification.
If the user's RFID card was recognised, the LED on the front panel turns green.

The RFID module can also supply the data captured from the RFID card, e.g. so that it can be further processed by the kemro.view.standard program on the KEBA control.

Contactless user identification with an RFID card (e.g. operating panel)

An RFID system comprises:



1..... RFID card
2..... XE 020/ANT antenna module
3..... XE 020/A RFID module (evaluation unit)
4..... Operating panel
5..... Coaxial antenna cable (max. 300 mm)
6..... Connector cable for RFID status LED
7..... Connector cable for RFID module / OP 3xx (max. 1 m)

RFID system components

3.1.1 Range and detection

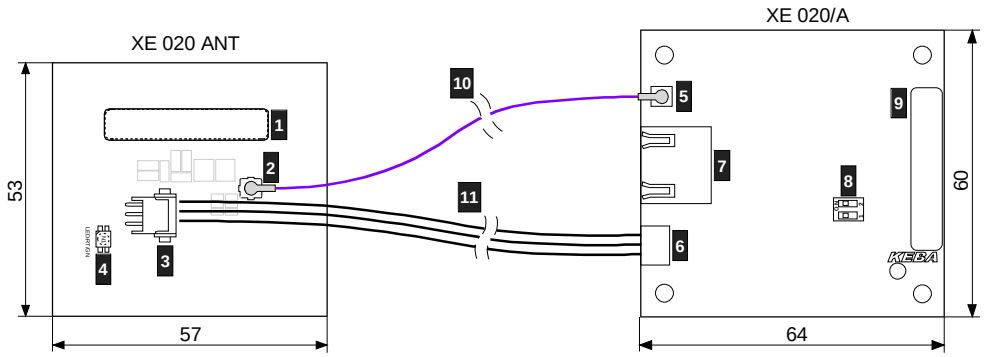
The typical range for RFID card to XE 020/ANT antenna module is 40 mm for the recommended RI-I02112A-03 RFID card (assuming an aluminium front panel).

The card is recognised when the RFID LED on the front of the operating panel turns green (for 3 secs) (refer to chapter “RFID status LED“).

There is no provision to detect multiple cards at the same time. If several RFID cards are within range, either only one will be detected or this will cause a detection error, in which case the RFID status LED will turn red.

3.2 RFID module before installation

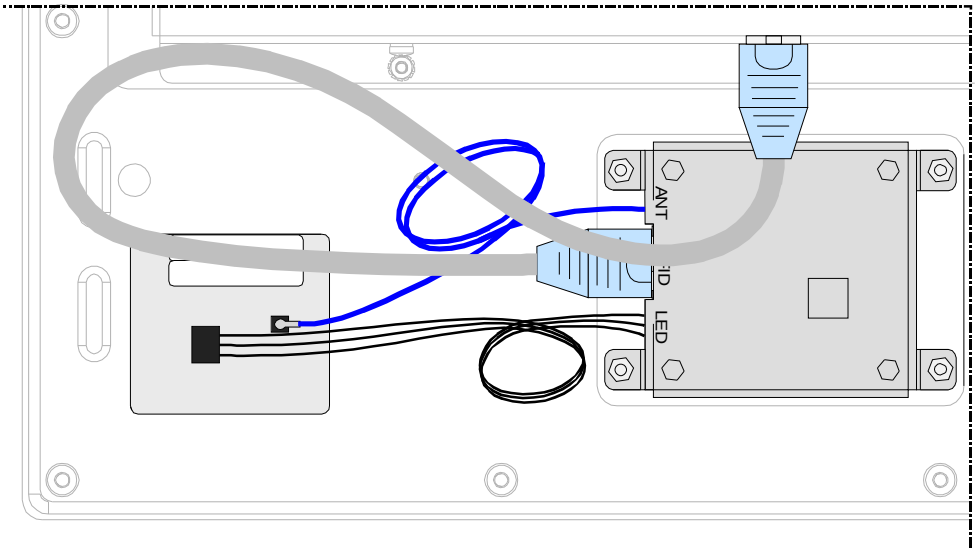
The RFID module consists of the following components:



020XE 020/ANT antenna module 1..... Model identification label 2..... Connector for coaxial antenna cable 3..... Connector for LED cable 4..... RFID status LED **Cables** 10..... Coaxial antenna cable (max. 300 mm) 11..... Connector cable for RFID status LED	**XE 020/A RFID module** 5 ..... Connector for coaxial antenna cable 6 ..... Connector for LED cable 7 ..... RJ45 socket for shielded connection cable (max. 1 m) between RFID module and OP 3xx 8 ..... DIP switch for address settings 9 ..... Model identification label

RFID module before installation

3.3 RFID module after installation

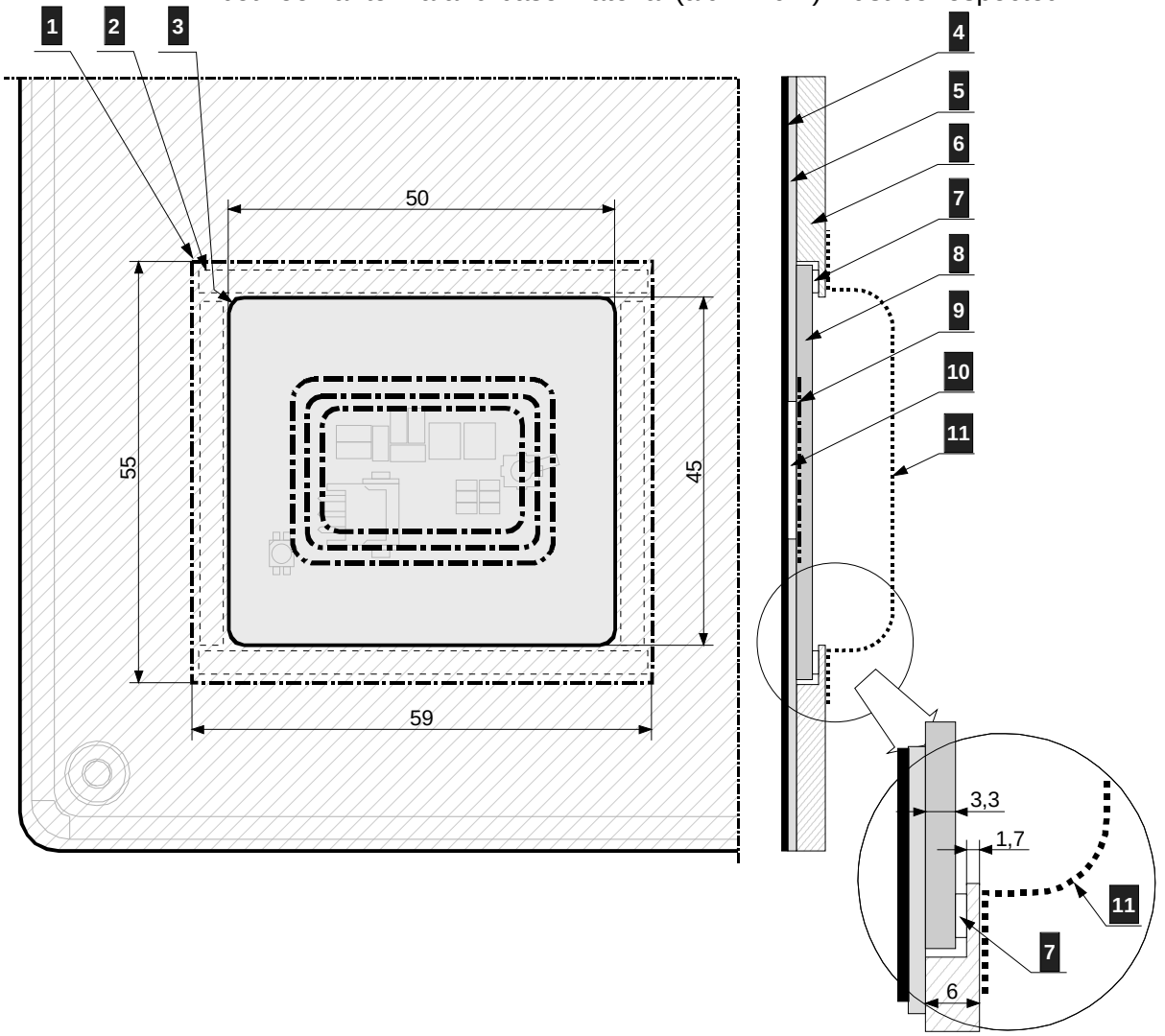


RFID module after installation

4 Assembly and installation notes

4.1 Minimum XE 020/ANT antenna module clearance

To guarantee the specified antenna range the following minimum clearance between antenna and base material (aluminium) must be respected.



1, 8 .. XE 020/ANT antenna module 2, 7 .. Adhesive strip between antenna module and front plate 3..... Front plate cutout	4 ..... Front foil 5 ..... Spacer foil 6 ..... Front plate (aluminium) 7 ..... refer to 2) 8 ..... refer to 1) 9 ..... Antenna 10 ..... Insertable strip 11 ..... Cover

Minimum clearance for the integrated RFID module

Suitable precautions must be taken to prevent any cables located behind the antenna from causing antenna detuning, e.g. providing a cover.

5 Connections and wiring

5.1 EMC and wiring guidelines

5.1.1 Personal safety

Safety extra-low voltage

All operating panels are powered by safety extra-low voltage.

5.1.2 Why EMC-aware wiring?

The immunity of an electrical system depends essentially on wiring and shielding that is designed to overcome any EMC problems. Servicing experience has shown that inadequate wiring and shielding is a common cause of system interference and failure.

Electromagnetic interference is far more troublesome than "conventional" faults:

- It is not normally recognised as such from the symptoms displayed and can often be mistaken for a fault in an assembly, which is basically sound.
- They mainly occur sporadically and are difficult to duplicate.

As a consequence fault-finding is time-consuming and expensive.

Therefore ensure from the start that the wiring and shielding conforms to the guidelines documented below.

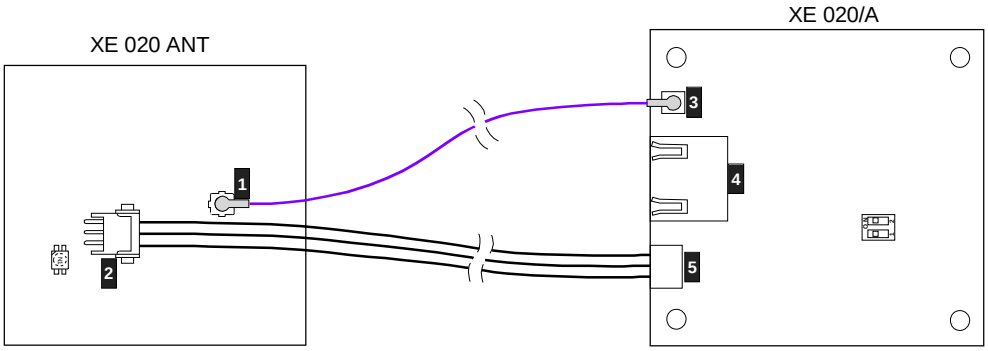
5.1.3 Which EMC measures must be taken?

The EMC measures for the RFID module concentrate on shielding the coaxial and connecting cable of the RFID module <-> OP 3xx.

5.2 Power supply

The power to the RFID module is supplied via the operating panel (refer to chapter “XE 020/A module RJ45 socket“).

5.3 XE 020/A and XE 020/ANT module interfaces



XE 020/ANT antenna module	**XE 020/A RFID module**
1..... Connector for coaxial antenna cable 2..... Connector for LED cable	3 ..... Connector for coaxial antenna cable 4 ..... RJ45 socket for shielded connection cable (max. 1 m) between RFID module and OP 3xx 5 ..... Connector for LED cable

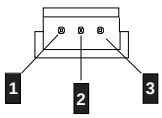
RFID module interface locations

5.3.1 Connector for coaxial antenna cable (1 and 3)

The XE 020 ANT antenna module and the XE 020/A RFID module both have connectors for the coaxial antenna cable.

5.3.2 Connector for status LED (2 and 5)

The pin assignment is defined for the status LED connector as follows:



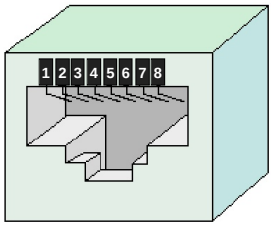
1...LED red
2...GND
3...LED green

Status LED connector on the XE 020/A and XE 020/ANT module: pin assignment

5.3.3 XE 020/A module RJ45 socket (4)

The RJ45 socket on the XE 020/A module is the counterpart to the "EXT0 external interface" on the operating panel. The interface comprises the serial signals and the power for the XE 020/A module supplied by the operating panel.

1…n.c.
2…n.c.
3…n.c.
4…Data-
5…Data+
6…n.c.
7…+12V
8… GND



RJ45 socket on the XE 020/A module: pin assignment

Plug specification

Refer to the KEBA manual, "RJ45 cable connections, General Guidelines".

5.4 Cables

5.4.1 Coaxial antenna cable

The maximum permitted length of the coaxial antenna cable is 300 mm.

5.4.2 Connector cable for RFID status LED

Three unshielded cores are sufficient for the RFID status LED connection cable.

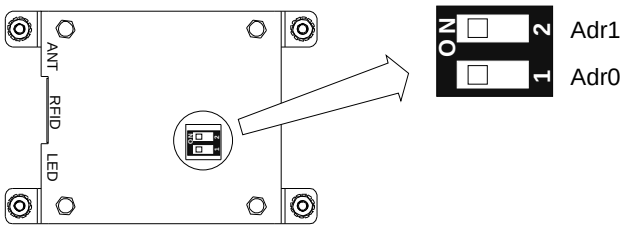
5.4.3 Connector cable for RFID module / OP 3xx

The connection cable for the RFID module / OP 3xx must be shielded and no longer than 1 m.

6 Configuration

6.1 RFID module DIP switch

If the overall system contains multiple RFID modules, the HW addressing must be configured using the DIP switch.
The required DIP switch is located directly on the RFID module. A maximum of 4 addresses can be configured (factory setting: 14H):



DIP switch location and factory setting

DIP switch		Address
Adr0	Adr1	
0	0	17H
0	1	16H
1	0	15H
1	1	14H

7 Status display

7.1 RFID status LED

The RFID status LED is located on the front of the operating panel and indicates the status of RFID card recognition:

RFID status LED	Meaning	Cause of fault / solution
red	RFID card not recognised or no authorisation	▪ RFID card is defective ▪ Wrong information recorded on RFID card
green for ca. 3 sec.	RFID card has been recognised	-
permanent red	No firmware, hardware does not boot	▪ Contact the manufacturer
permanent orange	Not connected to the control	▪ Check the wiring
LED off	Connection is OK	-

7.1.1 Boot-time behaviour

If a connection is established, the status LED is red for a short interval and then becomes permanent orange. The firmware has failed to boot if the LED does not change to the permanent orange state and indicates there is a firmware fault. After connecting successfully the LED goes out.

8 Maintenance and repair notes

8.1 Maintenance

This device does not require regular maintenance.

8.2 Repair

Only KEBA technicians may repair faulty devices, otherwise the warranty becomes void.

8.2.1 Packaging and shipping

The module is placed in protective packing for shipping. Please return the packaging since KEBA tries to reuse it to minimise the environmental impact.
This protective packaging is not transport packaging and as such it is unsuitable for transport by carrier or air. Suitable, extra transport packaging must be used for this purpose.

8.3 Waste disposal

Comply with your national regulations for the disposal of electronic components!

9 Accessories and spares

Component	Order number
XE 020/A RFID module (evaluation unit)	70894
XE 020/ANT antenna module	71110
Coaxial antenna cable 300 mm	71352
Connector cable for RFID module / OP 3xx	58033
Connector cable for RFID status LED	73149
RFID card type RI-I02112A-03	-tba-

10 Technical specification

General

Reading distance:	4 cm from the front panel
Antenna installation:	permanently installed in the front panel
Positioning of XE 020/A RFID module:	evaluation unit can be located up to 30 cm from antenna
Communication protocol:	according to ISO 15693 or ISO 18000-3, and suitable for Euromap 65
Evaluation unit protection class:	IP 20
XE 020/A RFID module contact protection:	metal case
XE 020/ANT antenna module contact protection:	Plastic case
Signalling:	3-colour LED on the printed antenna

Interfaces

Data interface:	serial
Supply voltage:	12 V DC (+/- 5%)
Connector plug:	RJ45

RF signal

Frequency response:	13.56 MHz
Transmission power:	200 mW (max. 250 mW)
Sampling rate:	configurable (default: 10 samples / sec)

Dimensions

Printed antenna	width:	57 mm
	length:	53 mm
Evaluation unit	width:	88 mm (with casing)
	length:	64 mm (with casing)
	height:	21 mm (with casing)

Environmental conditions

Operating temperature:	+5 °C to +55 °C
Storage temperature:	-30 °C to +70 °C
Relative humidity:	5 to 95% (non-condensing)
Vibration resistance:	as per IEC 61131
Shock resistance:	as per IEC 61131

11 Relevant EC directives and applicable standards

11.1 EC directives

99/5/EG	R&TTE directive

11.2 Standards

The following non-legally binding European standards are used to validate the RFID module's conformance to the directives.

11.2.1 Validating conformance to the R&TTE directive

Personal safety:	EN 50364:2001
Radio sector:	EN 300330-2 V1.3.1, Class 3 receiver Class 1 as per 2000/299/EG
EMC sector:	EN 301489-3 V1.4.1
Electrical safety:	EN 60950-1:2001+A11:2004

11.2.2 Other standards

In addition the following non-legally binding standards provide advice in some areas:

Environmental conditions

EN 61131-2:2003	Programmable logic controller - part 2 Equipment requirements and tests

11.2.3 USA standards

FCC Part 15	Radio Frequency Devices

The device complies with Part 15 of the FCC Rules. Operation in 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.

This device is labelled 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.

e.g.

"Contains FCC ID: U870001"
(KEBA Product XE020/A; XE020/B)

Information
- No other antennas except the one provided by KEBA shall be used.
- Changes or modifications not expressly approved by KEBA could void the user's authority to operate the equipment.