

**Kemro**

**FM 200/A**

**CAN interface module**

**Project engineering manual V1.05**

**Translation of the original instructions**

**KEBA<sup>®</sup>**

Automation by innovation.

Document : V1.05 / article no.: 1000577  
Filename : fm200apjen.pdf  
Pages : 22

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## Record of Revision

Version	Date	Change in chapter	Description	changed by
1.00	05-2007		newly created	meis
1.01	11-2007	Technical data	detailed power consumption	meis
1.02	06-2008	Front view, address configuration	added Info to the electronic type plate.	meis
1.03	08-2010	EC directives and standards, Declaration of conformity	updated	hasl
1.04	08-2011	Introduction	Hint "not for end customers" added, various minor updates.	fstl
1.05	02-2012		Adding some text variables	swb



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# 1 Introduction

## 1.1 Purpose of the document

This document describes the structure of the FM 200/A (CAN-module).

### **Information**

*This manual is not addressed to end customers! Necessary safety notes for the end customer have to be taken into the customer manual in the respective national language by the machine builders and system providers.*

## 1.2 Preconditions

This document contains information for persons with the following skills:

Target group	Knowledge and skills pre-requirement
Project engineer	Basic technical training (University of Applied Science/University level, engineering degree or corresponding professional experience). Knowledge in: <ul style="list-style-type: none"> <li>● working mode of a PLC,</li> <li>● current valid safety regulations,</li> <li>● the application.</li> </ul>
Electrician	Specialized training in the electro-technical field (in accordance with industrial training guidelines). Knowledge in: <ul style="list-style-type: none"> <li>● current valid safety regulations,</li> <li>● wiring guidelines,</li> <li>● circuit diagrams,</li> <li>● correct installation of electrical connections according to national and international regulations.</li> </ul>

Target group	Knowledge and skills pre-requirement
Start-up technician	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: <ul style="list-style-type: none"> <li>• current valid safety regulations,</li> <li>• working mode of machine or plant,</li> <li>• principal functions of the application,</li> <li>• system analysis and troubleshooting,</li> <li>• setting options at the operating installations.</li> </ul>
Service technician	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: <ul style="list-style-type: none"> <li>• working mode of a PLC,</li> <li>• current valid safety regulations,</li> <li>• working mode of machine or plant,</li> <li>• diagnosis possibilities,</li> <li>• systematic error analysis and rectification.</li> </ul>

### 1.3 Intended use

The FM 200/A was developed for control applications in industrial machines. The typical applications areas include injection molding machines, robots, presses, machine tools and similar.

The FM 200/A does not conform to the EMC directive with regards to emissions in living areas.

The FM 200/A has been developed, manufactured, tested and documented in accordance with the appropriate safety standards. Therefore, the products do not pose any danger to the health of persons or a risk of damage to other property or equipment under normal circumstances, provided that the instructions and safety precautions relating to the intended use are properly observed.

### 1.4 Notes on this document

This manual is an integral part of the product. It is to be retained over the entire life cycle of the product and should be forwarded to any subsequent owners or users of the product.

#### 1.4.1 Contents of the document

- Description of the FM 200/A
- Description of wiring (including EMC guidelines)
- Technical data



## 1.5 Documentation for further reading

The following documents are to be observed depending on the system solution used:

If you are using the KeStudio U2 tool suite:

Doc.No.	Name	Target group
DE: 65352 EN: 65353	K2-200 automation system manual	<ul style="list-style-type: none"> <li>• Project engineer</li> <li>• Electrician</li> <li>• Programmer</li> <li>• Commissioning foreman</li> <li>• Service technician</li> </ul>

If you are using the KeStudio U3 tool suite:

Doc.No.	Name	Target group
DE: 1000868 EN: 1000869	System manual Kemro automation system	<ul style="list-style-type: none"> <li>• Project engineer</li> <li>• Electrician</li> <li>• Programmer</li> <li>• Commissioning foreman</li> <li>• Service technician</li> </ul>

## 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:



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**DANGER!**

- indicates an imminently hazardous situation which will result in death or serious bodily injury if the corresponding precautions are not taken.
- 



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**WARNING!**

- indicates a potentially hazardous situation which can result in death or serious bodily injury if the corresponding precautions are not taken.
- 



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**CAUTION!**

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

---

**CAUTION**

- CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in damage to property.
- 



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

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**Information**

*Useful practical tips and information on the use of equipment are identified by the "Information" symbol. They do not contain any information that warns about potentially dangerous or harmful functions.*

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### 2.2 General safety instructions



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**WARNING!**

- It is absolutely essential to observe the safety instructions in the system manual.
  - The module is defined as "open type equipment" (UL508) or as "offenes Betriebsmittel" (EN 61131-2) and must therefore be installed in a control cabinet.
-

---

**CAUTION**

Improper use of the assembly or the control system leads to irreparable damage!

- Turn off the power supply before inserting or removing the module. Otherwise, the module can be destroyed or undefined signal states can lead to damage of the control system.
-

### 3 Description of the module

The FM 200/A is a CANOpen interface module. It offers two independent CAN-interfaces.

#### 3.1 Front view

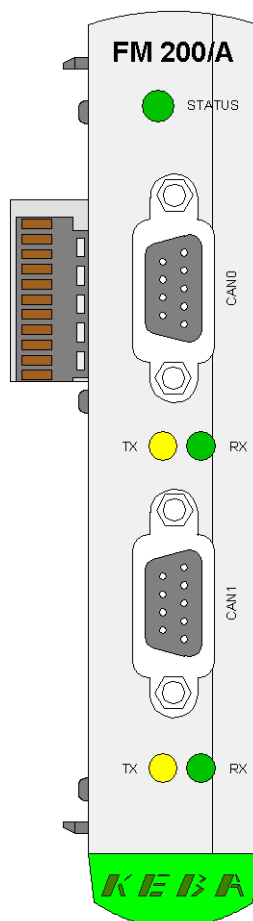


Fig.3-1: FM 200/A Front view

#### **Information**

*The electronic type plate is stored on the module in an EEPROM and can be read out by the application.*

## 4 Displays and operating elements

### 4.1 Status-LED

LED-color	Function
Orange	System startup
Green	Communication running, no errors
Red	Modul error

### 4.2 CAN Status LEDs

The module has two CAN Status LEDs (RX- and TX-LEDs) per CAN interface, which are activated from the Microcontroller.

Display	Significance
RX-LED (green)	briefly lights up on receipt of a CAN-message.
TX-LED (yellow)	briefly lights up on transmission of a CAN-message.

## 5 Connections and wiring

### 5.1 CAN interface

The module offers 2 CAN-interfaces (CAN0, CAN1) at the front side.

#### 5.1.1 Pin assignment, connection example

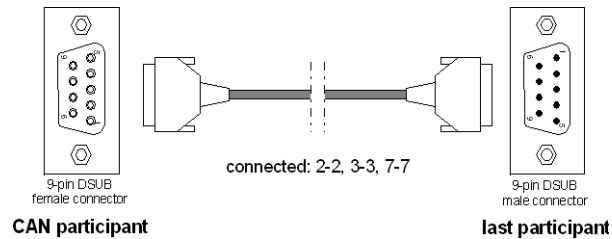


Fig.5-1: CAN connection at the module: 9-pole D-SUB male connector

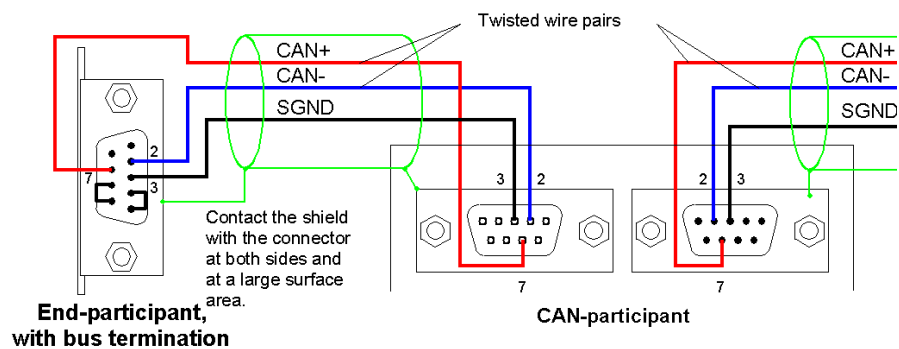


Fig.5-2: Connection example for CAN circuit

#### **Information**

*Both SGND (Signal Ground) and GND (optional ground) connections are connected internally. The designation was selected to correspond with the standard CiA (CAN in Automation).*

Further information: See system manual.

#### 5.1.2 CAN bus termination

To activate the bus termination at the first and last participant, both the pins 4 and 5 (TERM1) must be connected as well as the pins 8 and 9 (TERM2).

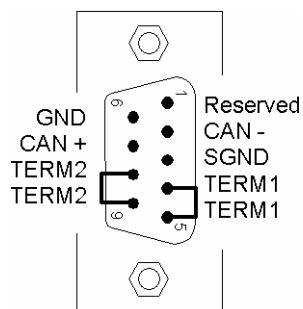


Fig.5-3: CAN interface with activated bus termination

### 5.1.3 Cable and plug specification

Further information: See system manual.

## 5.2 EMC and wiring guidelines

Pay attention from the outset to careful wiring and shielding.

Further information: See system manual.

## 6 Configuration

### General information for configure devices

A Kemro automation system needs data for the configuration of system performance, its I/O-devices and interfaces. The system reads this data during the start-up operation and allocates them to its components and devices.

Configuration data is created by included configuration tools or by editing configuration files.

For further information about the configuration see the documentation of the included configuration tool.

For further information to the configuration see the documentation of the included configuration tool.

### 6.1 Setting the K-Bus address

The module is addressed via the address switch. A maximum of 12 modules of the same type can be distinguished on one line.

The address switch is located on the right side underneath the lower cover (the K-Bus plug is located underneath the upper cover).

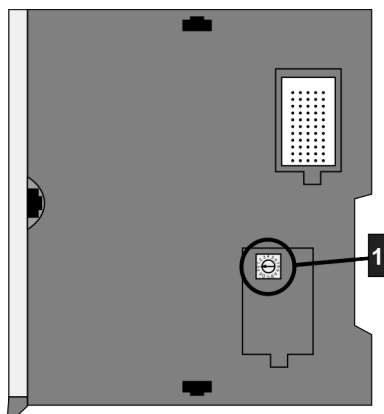


Fig.6-1: Position of the address switch

**1** ... Address switch

On leaving the factory all modules are set to address 0 and both covers are closed.

#### **Information**

*Modules of the same type that are installed within the same line must have different address switch positions. Different modules (e.g. analog and digital modules) may have the same address switch positions.*



The two covers for the K-Bus plug and the address switch must remain locked at the last module in the line (to protect against dirt and damage through electrostatic discharge on contact).

## 7 Operating behavior

### 7.1 Start-up after Power-On

The module is passive and is configured and activated through the HOST.

### 7.2 Error handling

A module error gets indicated by the Status LED (red).

## 8 Diagnose

The module has a Status LED for displaying states of the module. Possible error causes can be:

Possible causes	Debugging
After the switching-on: Invalid address switch position.	Check the address switch position. The address set in the configuration and the address set on the module must match.
After the switching-on: Module defective.	Send module to KEBA.
In cyclical mode: Communication error at one of the two channels.	Check cabling and connected participants.

## 9 Technical data

### 9.1 In general

Power supply:	24 V DC from K-Bus, 5 V from K-Bus.
Equipment class:	III according to EN 61131-2
Indicators at the front:	LEDs displaying sending and receipt.
Max. number of accessible FM 200/A modules at a CP module:	2
Power consumption K-Bus 24 V:	0 W
Power consumption K-Bus 5 V:	0,8 W

### 9.2 Environmental conditions

Operating temperature:	+5 °C to +55 °C
Storage temperature:	-40 °C to +70 °C
Relative humidity of air:	10 % to 95 % (non condensing)
Vibration resistance:	according to EN 61131-2:2007
Shock resistance:	according to EN 61131-2:2007

### 9.3 CAN interface

• Number:	2
• Data transmission rate:	To set via software (125 kBit/s to 1Mbit/s)
• Terminating resistor:	YES, can be bridged in plug
• Galvanic isolation:	NO
• Connection:	DSUB 9-pin pin plug
• Transmission medium:	shilded cable

### 9.4 Dimensions, Weight

Height:	120 mm
Width (with / without K-Bus plug):	32.5 mm / 22.5 mm
Depth:	100 mm
Weight:	140 g

## 10 EC directives and standards

### 10.1 EC directives

Guideline 2004/108/EG	EC guideline on electromagnetic compatibility
Guideline 2011/65/EU	RoHS guideline

### 10.2 Standards

To check the conformity of the system with the directives, the following non-binding legal European standards were applied:

#### 10.2.1 General procedures and safety principles

EN 61131-1:2003	Programmable controllers - Part 1
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##### **Information**

*This product was developed for the use in industrial areas and can cause radio interference when used in residential areas.*

#### 10.2.2 EMC guideline

EN 61131-2:2007	Programmable controllers - Part 2
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#### 10.2.3 Electrical safety and fire protection

EN 61131-2:2007	Programmable controllers - Part 2
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#### 10.2.4 Environmental and surrounding conditions

##### **Operation with compact flash card or SSD**

EN 61131-2:2007	Programmable controllers - Part 2
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### 10.3 Standards for the American market

#### 10.3.1 UL test for industrial control equipment

UL 508, 2005	Industrial Control Equipment
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## 11 Declaration of conformity

The declaration of conformity of this product is available on request from KEBA.