

Kemro

SM 220/A

Serial interface module

Project engineering manual V1.05

Translation of the original instructions

KEBA[®]

Automation by innovation.

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1.01	04-2007		Change of the permitted Baud rates	meis
1.02	07-2007		New structuring of the project engineering manual	meis
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1.04	08-2010	Safety notes, Declaration of conformity	updated	hasl
1.05	08-2011	Introduction	Hint "not for end customers" added, various minor updates.	fstl

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1 Introduction

1.1 Purpose of the document

This document describes the structure of the SM 220/A (serial interface module).

Information

This manual is not addressed to end costumers! Necessary safety notes for the end costumer have to be taken into the costumer 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"> • working mode of a PLC, • safety regulations, • the application.
Operator	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: <ul style="list-style-type: none"> • safety regulations, • working mode of machine or plant, • principal functions of the application, • system analysis and troubleshooting, • setting options at the operating installations.
Service technician	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: <ul style="list-style-type: none"> • working mode of a PLC, • safety regulations, • working mode of machine or plant, • diagnosis possibilities, • systematic error analysis and rectification.

1.3 Intended use

The SM 220/A was developed for control applications in industrial machines. The typical applications areas include injection molding machines, robots, presses, machine tools and similar.

The SM 220/A may only be used for the types of use described in the technical descriptions and only in conjunction with recommended/approved third-party equipment/installations.

The SM 220/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 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 SM 220/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"> • Project engineer • Electrician • Programmer • Commissioning foreman • Service technician

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">• Project engineer• Electrician• Programmer• Commissioning foreman• Service technician

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 will result in death or serious bodily injury if the corresponding precautions are not taken.
-



WARNING!

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



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.
-

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.

2.2 General safety instructions



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 SM 220/A is a serial interface module, which makes available one interface of type Current Loop (20 mA) Sender/Receiver with up to 9600 Baud.

3.1 Front view

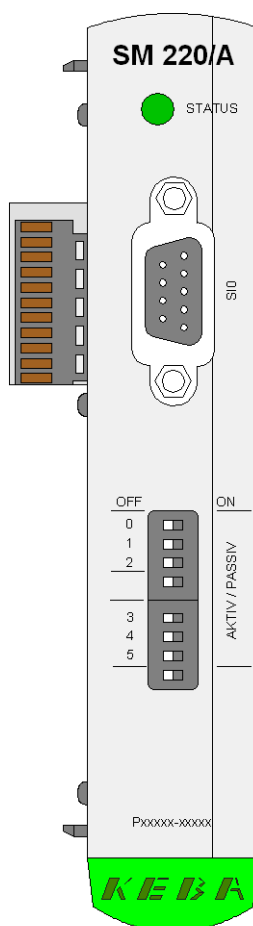


Fig.3-1: SM 220/A front view

Information

The serial interface module SM 220/A is not designed for drive control.

4 Operating elements and displays

4.1 Status LED (STATUS)

Color	Significance	Comment ON: LED is lit)
Green	OK	ON: Ready for operation
orange	Initialization	ON: Start-up
Red	Switch on	ON: Switch on
Red	Module errors	ON: Wrong address switch position (0x04 – 0x0F)

5 Connections and wiring

5.1 General information on wiring and shielding

This section covers issues that concern in particular the serial interface connections.

The following is valid for all serial interfaces:

- Use shielded cables
- Contact shield directly at metallic interface plug casing

	Required cable (must be shielded in all cases)	Take account of cable termination
Current loop	Twisted paired wiring	No
RS 232 C	Twisted pair, with signal ground	No
RS-422-A <small>unidirectional</small>	Twisted pair, with signal ground	Yes
RS-422-A <small>bidirectional</small>	2x twisted pair line with 1 signal ground	Yes
RS-485-A	Twisted pair, with signal ground	Yes

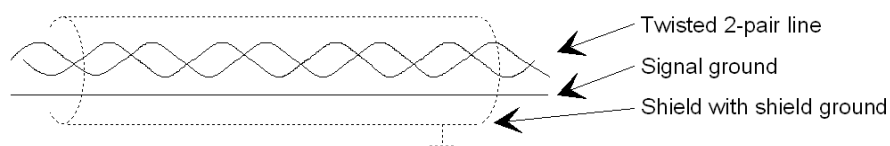


Fig.5-1: Structure of a shielded twisted pair line with signal ground

5.2 Current loop interface

5.2.1 Connection example

The following connection examples show three possible configurations of the interface module SM 220/A.

Example 1: Configuration with active sender and passive receiver.

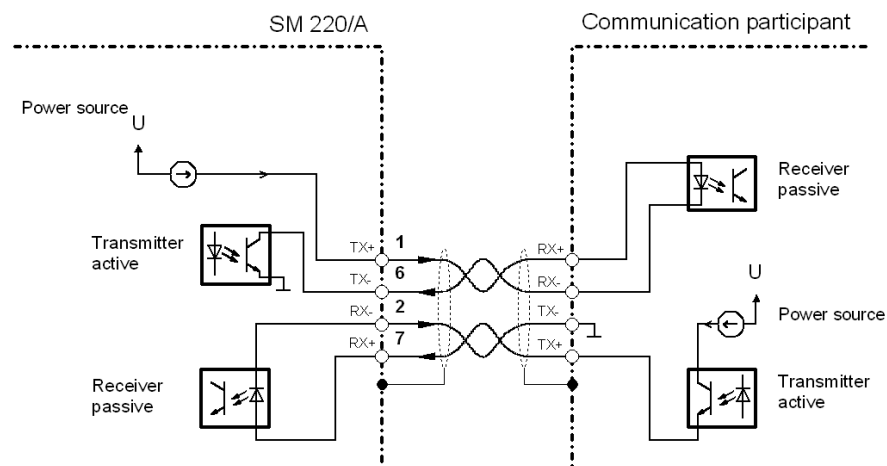


Fig.5-2: Example 1: SENDER ACTIVE and RECEIVER PASSIVE

Example 2: Configuration with passive sender and active receiver

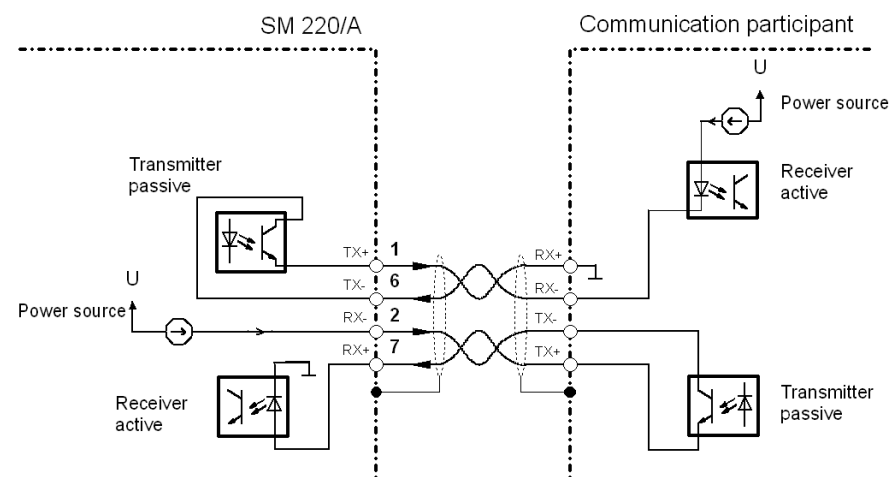


Fig.5-3: Example 2: SENDER PASSIVE and RECEIVER ACTIVE

Example 3: Configuration with active sender and passive receiver with a 2-wire interface

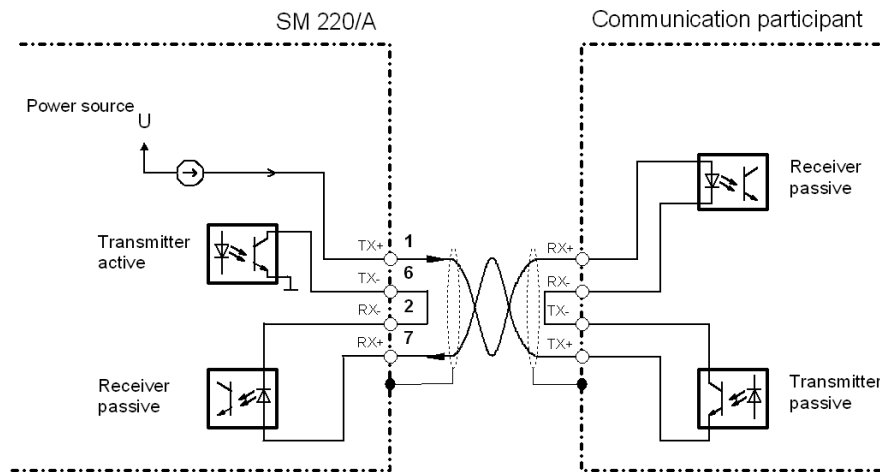


Fig.5-4: Example 3: SENDER ACTIVE and RECEIVER PASSIVE with 2-wire interface

5.2.2 Pin assignment

The module is connected to the bus with a 9-pole DSUP male connector.

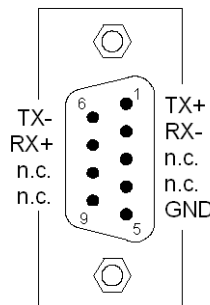


Fig.5-5: Assignment CL interface, DSUB-plug connection seen from front

Pin no.	Signal designation		Power source / sink
1	TX+	Sender	Source (active and passive)
6	TX-	Sender	Sink (active and passive)
2	RX+	Receiver	Source (active and passive)
7	RX-	Receiver	Sink (active and passive)
5	GND	ground	---

5.2.3 Loop currents and voltages

Loop current at	"0"	0 mA
	"1"	20 mA

Loop voltage	in operating mode "active"	max. 17 V
Voltage drop	per receiver	≤ 3 V
	per sender	≤ 2 V

5.2.4 Operating modes "active" and "passive"

Sender and receiver of the SM 220/A can be configured "active" or "passive":

TX active:	An active sender module feeds currency and interrupts this currency according to the digital transmission. Only one module per currency loop may be configured "active".
RX active:	An active receiver module feeds currency, which is interrupted by sender module that is configured as "passive" according to the digital transmission.
TX passive:	A passive sender module acts as switch, which interrupts the currency circuit according to the digital transmission. The currency is feed by a receiver module that is configured as "active".
RX passive:	A passive receiver module detect currency flow or currency interruption in the transmission loop.

5.2.5 DIP switch position

The configuration of the SM 220/A to active or passive status is done via the DIP-switch.



Fig.5-6: Position of the DIP switch and DIP switch position at the SM 220/A

5.2.6 Cable and plug specification

See System manual.

5.3 EMC and wiring guidelines

Pay attention from the outset to careful wiring and shielding.

Further information: See system manual.

6 Configuration

General information

A Kemro 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 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).

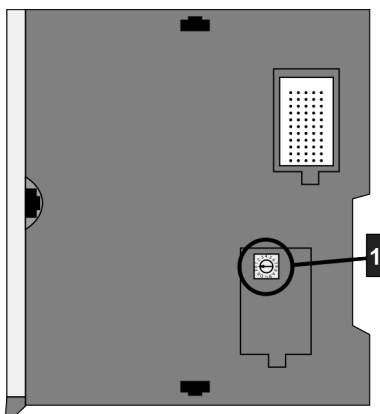


Fig.6-1: Position of the address switch

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 Disposal

7.1 Disposal of the module

CAUTION

Please observe the regulations regarding disposal of electric appliances and electronic devices!



- The symbol with the crossed-out waste container means that electrical and electronic devices including their accessories must not be disposed of in the household garbage.
- The materials are recyclable in accordance with their labeling. You can make an important contribution to protecting our environment by reusing, renewing and recycling materials and old appliances.

8 Technical data

8.1 In general

Supply voltage logic:	24 V DC from K Bus 5 V DC from K Bus
Addressing at K-Bus:	Via 16-digit address switch, on the side Max. 4 modules possible (address switch position 4-F invalid)
Max. power consumption K Bus 24 V:	0 W
Max. power consumption K Bus 5 V:	1.5 W

8.2 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

8.3 Interface

Interface type	Current loop, 9-pole male connector
Transmission media	Cable, shielded, 120 Ω
Galvanic isolation	No
Current loop Baud rates	Adjustable via software, Permitted Baud rates: 1200, 2400, 4800 and 9600 Baud
Max. cable length	1,000 m at 9600 Baud

8.4 Dimensions

Footprint:	
• Module height	120 mm
• Mounting depth:	100 mm
• Front panel width	22.5 mm
• Module width (incl. K-Bus plug)	32.5 mm
Weight:	132 g

9 EC directives and standards

9.1 EC directives

Guideline 2004/108/EG	EC guideline on electromagnetic compatibility
Guideline 2002/95/EG	RoHS guideline

9.2 Standards

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

9.2.1 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.

9.2.2 EMC guideline

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

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

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

9.3.1 UL test for industrial control equipment

UL 508, 2005	Industrial Control Equipment
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10 Declaration of conformity



EC Declaration of Conformity



KEBA AG
Gewerbepark Urfahr
4041 Linz
AUSTRIA

Document No.: 69252/CE

We declare that the following product(s)

Name of product: **SM 2xx**
 Variants: **SM 210/A, SM 220/A, SM 230/A, SM 250/A**
 From: **revision 02 (Mat.Nr. 75194), revision 02 (Mat.Nr. 74203)**
revision 02 (Mat.Nr. 76790), revision 02 (Mat.Nr. 76791)
revision 02 (Mat.Nr. 76792), revision 01 (Mat.Nr. 81639)
revision 03 (Mat.Nr. 69251), revision 03 (Mat.Nr. 69252)
revision 03 (Mat.Nr. 69253), revision 02 (Mat.Nr. 73550)
revision 03 (Mat.Nr. 71251), revision 03 (Mat.Nr. 71252)

is/are in conformity with the essential requirements of the following European Council Directive(s):

∞ **EC-Directive relating to electromagnetic compatibility 2004/108/EC**

Conformity to the directive 2004/108/EC is assured by the compliance with the applicable parts of the following harmonized european standards:

∞ **EN 61131-2:2007**

Important notes:

Any modification on the product(s), that is performed without KEBA's consent will render this declaration invalid.

This declaration certifies the conformity with the directives mentioned, but does not imply any warranty of the features of the product(s).

The safety instructions contained in the documentation supplied with the product(s) must be followed.

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