

Kemro

FM 260/A

**PROFIBUS Master interface module
Project Engineering Manual V1.00**

Translation of the original instructions

KEBA[®]

Automation by innovation.

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1 Introduction

1.1 Purpose of the document

This document describes the structure of the FM 260/A (PROFIBUS Master interface module).

1.2 Target groups, pre-requirements

This document is intended for the following persons with adequate skill pre-requirements:

Target group	Knowledge and skills pre-requirement
Project engineer	<p>Basic technical training (University of Applied Science/University level, engineering degree or corresponding professional experience).</p> <p>Knowledge in:</p> <ul style="list-style-type: none"> • working mode of a PLC, • safety regulations, • the application.
Operator	<p>Basic technical training (Vocational high school, engineering degree or corresponding professional experience).</p> <p>Knowledge in:</p> <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	<p>Basic technical training (Vocational high school, engineering degree or corresponding professional experience).</p> <p>Knowledge in:</p> <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 FM 260/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 260/A does not conform to the EMC directive with regards to emissions in living areas.

The FM 260/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 FM 260/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 that you also 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.
- The system manual is additionally required for programming of the module.

CAUTION

Improper handling will destroy the module or the control system!

- **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.**
 - **Observe the ESD instructions!**
-

3 Description of the module

The FM 260/A is a PROFIBUS Master interface module with the Profibus functionality according to DPV-1. The connection to the control occurs via K-Bus.

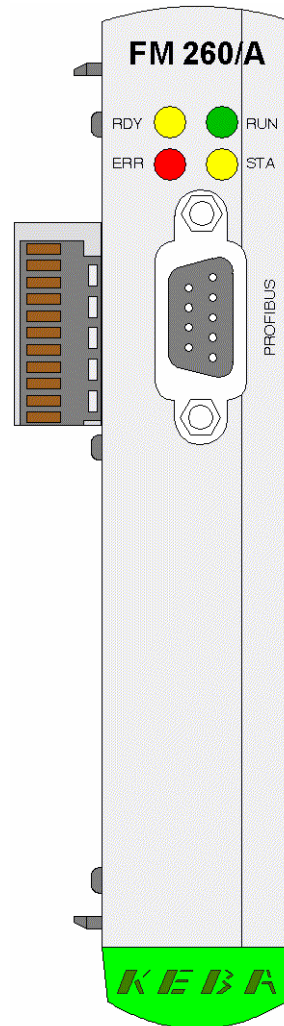


Fig.3-1: Front view FM 260/A

Information

The 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 (STAT)

State	Function
illuminated yellow:	Device holds the PROFIBUS token and can transmit telegrams.
blinking yellow irregularly:	Device is in PROFIBUS ring and shares the token with other PROFIBUS master devices.
Dark:	Device is not configured or has not received the Token and is thus not active in the PROFIBUS network.

4.2 Ready LED (RDY)

State	Function
illuminated yellow:	Device is ready.
Blinking yellow with 5 Hz:	Firmware download being executed.
Blinking yellow with 1 Hz:	Device is in bootstrap-loader mode and is waiting on firmware download.
blinking yellow irregularly:	Severe hardware or system error detected.
Dark:	Supply voltage missing or hardware defect.

4.3 Communication LED (RUN)

State	Function
illuminated green:	Communication running, at least one connection to a configured participant is present.
Blinking green with 5 Hz (ERR-LED off):	No error in the communication, communication stopped.
Blinking green with 5 Hz (ERR-LED illuminated):	Ready for communication but no connection to a participant present.
Blinking green irregularly:	During system start-up: Missing or faulty configuration, start-up required. During the operation: Watchdog time error.
Dark:	No communication.

4.4 Bus error LED (ERR)

State	Function
illuminated red (STA LED off):	Short-circuit detected
illuminated red (STA LED lights up):	Device has a communication problem to at least one PROFIBUS DP slave participant.
Dark:	No error.

5 Connections and wiring

5.1 PROFIBUS interface

The Profibus is connected via the 9-pole D-SUB female connector. The cable to be used must be equipped with a 9-pole D-SUB male connector.

5.1.1 Connecting cable

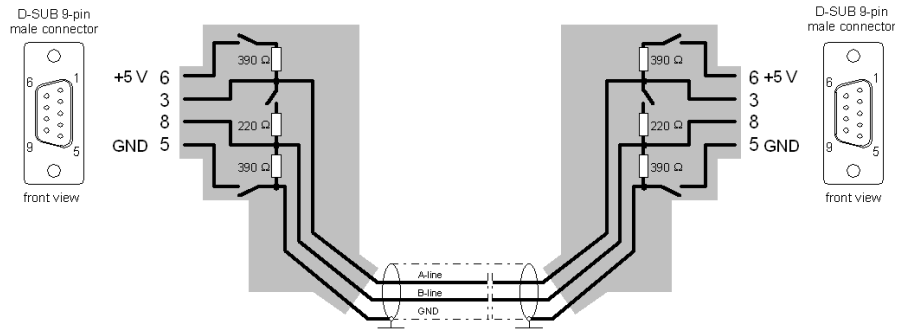


Fig.5-1: Connection cable with connection plug for PROFIBUS-DP

5.1.2 Pin assignment

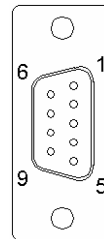


Fig.5-2: PROFIBUS D-SUB male connector, front view

PIN-No.	Designation:	Additional information
3	RS-485-A: B-line	Color: red
5	GND	Galvanic isolation
6	+5 V	Galvanic isolation
8	RS-485-A: A-line	Color: Green

5.1.3 Cable specification

The bus line is specified according to IEC 50170 as cable type A with the following properties:

Type:	Twisted pair cable, shielded
Surge impedance:	135 Ω - 165 Ω
Capacity load:	< 30 pF/m
Loop resistance:	110 Ω/km

Wire dimensions:	0.64 mm
Wire cross section:	>0.35 mm ²

5.1.4 Cable length

The specified line parameters result in the following lengths for the bus segment (max. 32 participants per segment):

Baud rate (kBit/s)	Max. length (m)
9,6	1200
19,2	1200
45,45	1200
93,75	1200
187,5	1000
500	400
1500	200
3000	100
6000	100
12000	100

5.1.5 Plug specification

To establish connection with the plug, the following shielded plug is recommended:

Phoenix plug SUBCON-PLUS-PROFIB/AX/SC

Material number: 2744380

5.1.6 Bus termination

To ensure smooth operations, the profibus bus line must be terminated on either end. When using a plug designed for PROFIBUS the termination can be switched on/off via a switch at the connector shell.

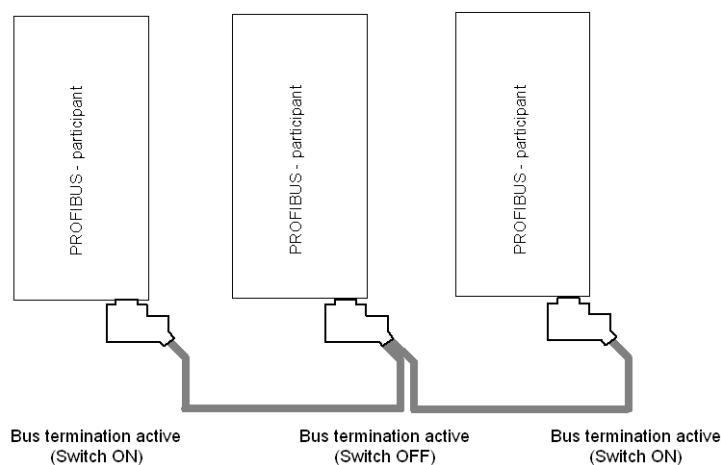


Fig.5-3: PROFIBUS bus termination

Information

Plugs with active bus terminating board must be plugged to modules, because otherwise there would be no 5V-supply for the terminating resistors. The plug must not remain unconnected.

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

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.

The tools included for the creation of configuration data are dependent on the specific system-combination.

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

6.1 Setting the address

Only one FM 260/A may be added to the K-Bus of a CPU module. Therefore, no address setting is required.

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 response

In case of error, the module will transmit telegrams, if it is still able to do so, to the HOST and signals the status via the bus error LED. See [chapter 4 "Displays and operating elements" on page 12](#).

8 Diagnosis

8.1 Possible error at the module:

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 Disposal

9.1 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.

10 Technical data

10.1 In general

Power supply voltage:	24 V DC from K Bus, 5 V DC from K Bus.
Protection class:	III according to EN 61131-2.
Displays on the front panel:	Ready LED (RDY), Communication LED (RUN), Bus error LED (ERR) and Status LED (STAT).
Max. number of FM 260/A to be operated at one CP module:	1
Max. power consumption K Bus 24 V:	1.6 W
Max. power consumption K Bus 5 V:	0 W

10.2 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 IEC 61131-2
Shock resistance:	according to IEC 61131-2

10.3 PROFIBUS-DP Interface

Data transmission rates:	9.6 kBit/s to 12 Mbit/s.
Max. cable length:	100 m (at 12 Mbit/s) up to 1200 m (at 9.6 kBit/s).
Galvanic isolation:	Only inner conductor, not the shield.

10.4 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:	140 g.

11 EC directives and standards

11.1 EC directives

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

11.2 Standards

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

11.2.1 General procedures and safety principles

EN 61131-1:2003	Stored-program controls - 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.

11.2.2 EMC guideline

EN 61131-2:2003	Stored-program controls - Part 2
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11.2.3 Electrical safety and fire protection

EN 61131-2:2003	Stored-program controls - Part 2
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11.2.4 Requirements on environment and ambience conditions

EN 61131-2:2003	Stored-program controls - Part 2
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11.2.5 Profibus guideline

IEC 61158	Digital data communication for measurement and control - Field bus for use in industrial control systems
IEC 61784	Digital data communication for measurement and control - Part 1

11.3 Standards for the American market

11.3.1 UL test for industrial control equipment

UL 508, 2005	Industrial Control Equipment
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12 Declaration of conformity



EC Declaration of Conformity



KEBA AG
Gewerbepark Urfahr
4041 Linz
AUSTRIA

Document No.: **75254/CE**

We declare that the following product(s)

Name of product: **FM 260**

Variants: **FM 260/A**

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 61131-2:2003**

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.

Linz, 02.08.2008


Dipl.-Ing. Gerhard Ensinger
Head of Development Center

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