Kemro

FX 271/A, FX 271/B
SERCOS III Master Module (Standard-PCI)
Project engineering manual V1.07

Translation of the original instructions

KEBA®
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Record of Revision

Version	Date	Change in chapter	Description	changed by
1.00	08-2008		Newly created	sam
1.01	09-2008	Declaration of conformity	added	sam
1.02	10-2008	Technical data	Chapter "Technical data" -> Interface to CP 25x/x: Voltage and power consumption for 3.3 VDC added and galvanic isolation mentioned.	sam
1.03	02-2010		extended for CP24x/x	ba
1.04	08-2010	Savety notes, Technical data, Declaration of conformity	updated, Power consumption	hasl
1.05	08-2011	Introduction	Hint "not for end customers" added, various minor updates.	fstl
1.06	08-2011	Introduction	Hint "not for end customers" added, various minor updates.	fstl
1.07	01-2015	Several	updated, new variant FX 271/B	swb, ekr

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1 Introduction

1.1 Purpose of the document

This document describes the structure of the FX 271/x (SERCOS III Master 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 Intended use

The FX 271/x was developed for control applications in industrial machines. The typical applications areas include injection molding machines, robots, presses, machine tools and similar.

The FX 271/x may only be used for the types of use described in the technical descriptions and in compliance with described technical general conditions. The FX 271/x may only be used in conjunction with recommended/approved third-party equipment/installations.

The FX 271/x has been developed, manufactured, tested and documented in accordance with the appropriate guidelines and 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 are properly observed.

1.3 Preconditions

This document contains information for persons with the following skills:

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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: ● working mode of a PLC, ● current valid safety regulations, ● the application.
Electrician	Specialized training in the electro-technical field (in accordance with industrial training guidelines). Knowledge in: ● current valid safety regulations, ● wiring guidelines, ● circuit diagrams, ● correct installation of electrical connections according to national and international regulations.
Start-up technician	Basic technical training (Vocational high school, engineering degree or corresponding professional experience). Knowledge in: ● current valid 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: ● working mode of a PLC, ● current valid safety regulations, ● working mode of machine or plant, ● diagnosis possibilities, ● systematic error analysis and rectification.

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 Content of the document

- General information on SERCOS III
- Description of the module FX 271/x
- Description of the configuration
- Technical data

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1.4.2 Not contained in this document

- Detailed description of the SERCOS III bus system

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

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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.**

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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.**

When removed from it's casing this module is sensitive to electrostatic discharge. Before handling the modules touch a grounded metal object in order to discharge any static electricity from your body.

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3 Description of the module

The FX 271/x is a PCI plug-in module with a SERCOS III master for the use in CPU modules. The module has a SERCOS III interface with 2 ports and 2 additional Ethernet interfaces.

The FX 271/x can be used within the following CPU modules:

Variant FX 271/A: CP 25x/x

Variant FX 271/B: CP 24x/x or CP 26x/x

Information

The module's functionality is only guaranteed if used within the appropriate mentioned CPU modules. The module is not designed for connection with foreign modules.

3.1 Front view

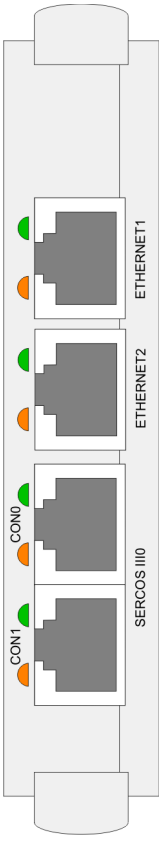

Fig.3-1: FX 271/x front view

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3.2 Essential features of SERCOS III

- Synchronization of up to 250 participants can be configured on the bus
- Network topology in ring and line structure
- Non-real-time (NRT) channel for transmitting standardized or prioritized IP protocols
- Error tolerance against cable break through media redundancy
- Direct connection of service notebooks to SERCOS III slaves
- Cost-effective and simple networking through the elimination of switches or hubs

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4 Displays and operating elements

4.1 SERCOS III status LEDs

The module has two status LEDs (Line and Activity) per SERCOS III interface.

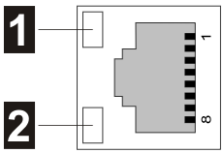

Fig.4-1: Position of the status LEDs

LED	Meaning
1 ... Activity (yellow, left)	Lights up when sending and receiving data.
2 ... Line (green, right)	Lights up as soon as a connection is alive.

4.2 Ethernet status LEDs

The Ethernet-socket (RJ-45) offers a Link-Status-LED and an Activity-LED.

Display	Significance
Link-Status-LED (green)	Lights up as soon as an Ethernet connection is available.
Activity-LED	Lights up when sending and receiving data.

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5 Installation instructions

The module has been designed for operation with a CPU module, where it is inserted in the PCI slot.

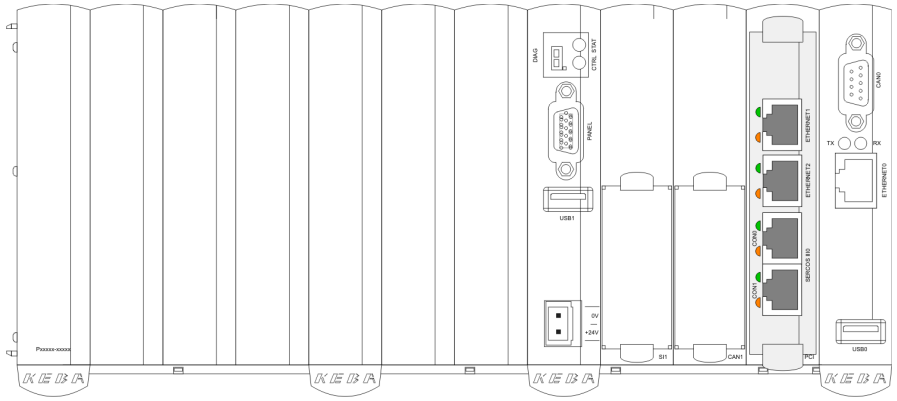

Fig.5-1: FX 271/x inserted in CPU module

The FX 271/x can be used within the following CPU modules:

Variant FX 271/A: CP 25x/x

Variant FX 271/B: CP 24x/x or CP 26x/x

Information

The module's functionality is only guaranteed if used within the appropriate mentioned CPU modules. The module is not designed for connection with foreign modules.

Inserting an option module into slot

1) Turn off power supply
2) Remove dummy module
3) Insert module in the correct position (labelling right side) into the right-hand slot

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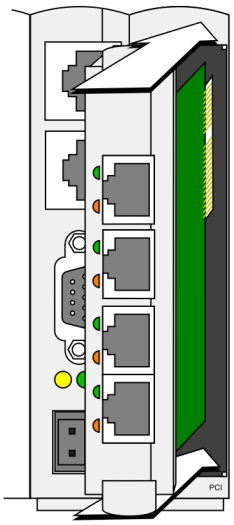

Fig.5-2: Inserting the FX 271/x

Removing an option module

1) Turn off power supply
2) Pull module out of the slot
3) Insert dummy module

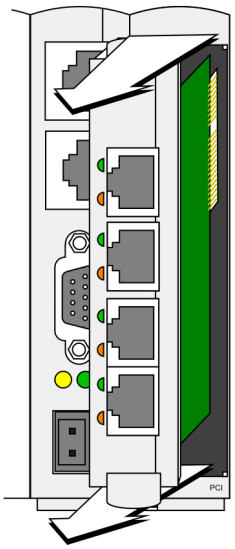

Fig.5-3: Removing the FX 271/x

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6 Connections and wiring

6.1 SERCOS III interface

sercos III is the third generation sercos interface series according to IEC/EN 61491 based on standard Ethernet IEEE 802.3.

6.1.1 Connection example

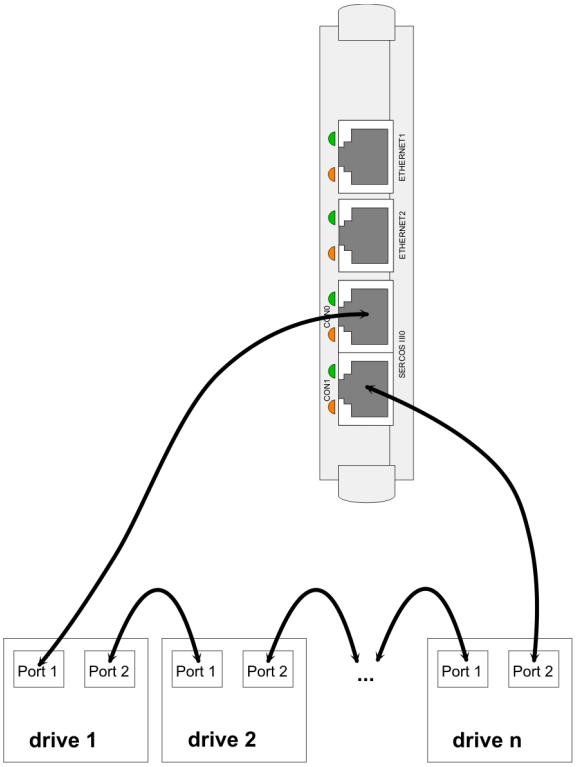

Fig.6-1: Bus topology SERCOS III in ring structure

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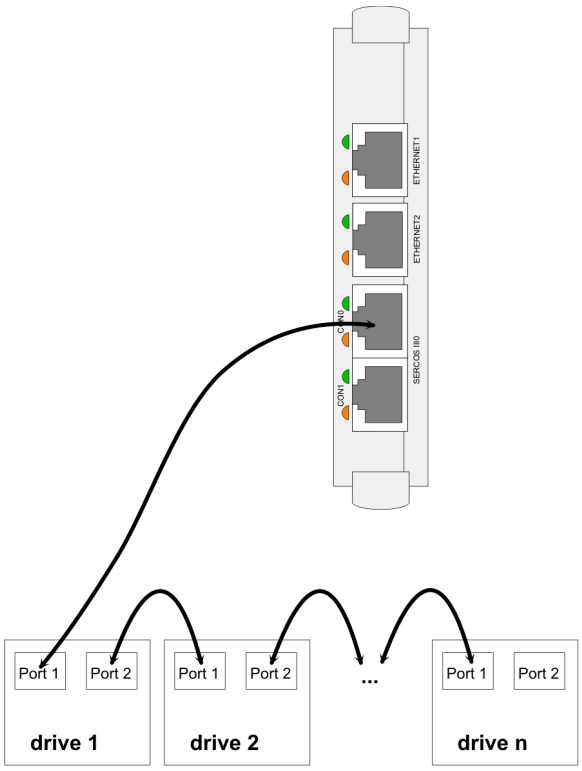

Fig.6-2: Bus topology SERCOS III in line structure

6.1.2 Pin assignment

PIN no.	Designation
01	Transmit data+ (pair 1)
02	Transmit data- (pair 1)
03	Transmit data+ (pair 2)
04	n.c.
05	n.c.
06	Receive data- (pair 2)
07	n.c.
08	n.c.

6.1.3 Cable and plug specification

Further information: See system manual.

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6.2 Ethernet interface

6.2.1 Pin assignment

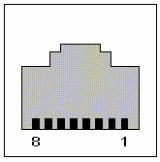

Fig.6-3: RJ45 plug socket

Pin no.	Signal designation		Input / Output
1	Tr. Data +	Transmit Data +	Output
2	Tr. Data -	Transmit Data -	Output
3	Re. Data +	Receive Data +	Input
4	n.c.	n.c.	---
5	n.c.	n.c.	---
6	Re. Data-	Receive Data -	Input
7	n.c.	n.c.	---
8	n.c.	n.c.	---

6.2.2 Cable and plug specification

Further information: See system manual.

6.3 EMC and wiring guidelines

Pay attention from the outset to careful wiring and shielding.

Further information: See system manual.

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7 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.

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8 Operating behavior

8.1 Start-up after Power-On

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

8.2 Reset

The module can be reset by the HOST without the HOST itself having to be reset.

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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.

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10 Technical data

10.1 Interface to the CPU module

Interface type:	PCI
Supply voltage over bus:	5 VDC / 3,3 VDC
Power consumption:	2W / 2.6 W
Module recognition:	YES (no type identification)

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 EN 61131-2:2007
Shock resistance:	according to EN 61131-2:2007

10.3 SERCOS III interface

• Number:	1
• Data transmission rate:	100 Mbit/s
• Galvanic isolation:	Yes, signaling lines
• Connection:	Modular plug, 8-pin (RJ45 plug)

10.4 Ethernet interface

• Number:	2
• Data transmission rate:	100 Mbit/s
• Galvanic isolation:	Yes, signaling lines
• Connection:	Modular plug, 8-pin (RJ45 plug)

10.5 Mechanical properties

Structure:	No casing; only front plate mounted on print
Protection class:	When the module is plugged into the CPU module, the CPU module conforms to IP 20
Weight:	83 g

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11 EC directives and standards

11.1 EC directives

Guideline 2004/108/EG	EC guideline on electromagnetic compatibility
Guideline 2011/65/EU	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	Programmable controllers - Part 1

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 61131-2:2007	Programmable controllers - Part 2

11.2.3 Electrical safety and fire protection

EN 61131-2:2007	Programmable controllers - Part 2

11.2.4 Environmental and surrounding conditions

Operation with compact flash card or SSD

EN 61131-2:2007	Programmable controllers - Part 2

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

We declare that the following product(s) is/are in conformity with the essential requirements of the following European Council Directive(s).

Conformity to the directive(s) is/are assured by the compliance with the applicable parts of the described harmonized European standards.

Product group	Product	RL 2004/108/EC	EN 61131-2:2007	RL 2006/42/EC	EN ISO 13850:2008	EN 60204-1:2006	EN ISO 13849-1:2008	RL 1999/5/EC	RL 2011/65/EU
Modules	AI 240/x	X	X						X
	AM 28x/x	X	X						X
	AO 240/x	X	X						X
	BL 210/x	X	X						X
	BL 250/x	X	X						X
	BL 27x/x	X	X						X
	BX 25x/x	X	X						X
	DI 2x0/x	X	X						X
	DM 27x/x	X	X						X
	DO 2x2/x	X	X						X
	FM 2xx/x	X	X						X
	FX 2xx/x	X	X						X
	MM 2x0/x	X	X						X
	NX 25x/x	X	X						X
	SM 2xx/x	X	X						X
	SX 2x0/x	X	X						X
	TE 220/x	X	X						X
	TM 2xx/x	X	X						X

x ... variant suffix

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Important notes:

This document is only an overview and not the original declaration of conformity. The original declarations of conformity can be requested from KEBA.

Any modification on the product(s), that is performed without KEBA's consent will render this declaration invalid. The safety instructions contained in the documentation supplied with the product(s) must implicitly be followed!

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