

Kemro K2

**SANMOTION C FM 299/A GA1060 Field bus
master module
Project Engineering Manual V 1.1**



Automation by innovation.

Notes on This Manual

At various points in this manual you will see notes and precautionary warnings regarding possible hazards. The meaning of the symbols used is explained below.

DANGER

- **DANGER** indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.

WARNING

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

CAUTION

- **CAUTION** indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

CAUTION

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



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

Note

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

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History

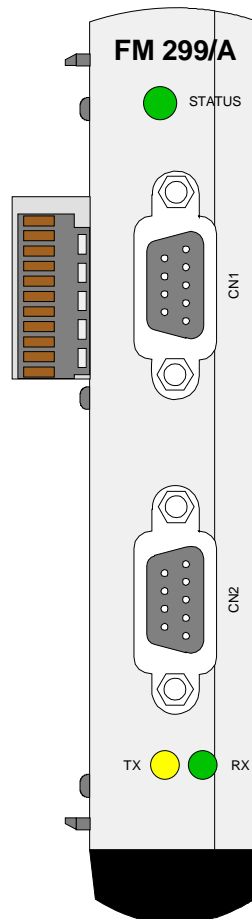
Modification from / to	Date	Modified pages	Description	Author
V1.0 /	100106			meis
V1.0 / V1.1	030806	10, 11	Changes to chapter "Creation of cfg-file"	meis

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1 Brief description

The FM 299/A module is a K2-200 field bus master module for the Sanyo Denki drive bus.



Front view FM 299/A module

Two FM 299/A modules can be operated on one control CPU.

2 General safety instructions

- The device is defined as an "open type equipment" so that it must be installed in a control cabinet.
- The safety instructions in the project engineering handbook "K2-200 automation system" are to be complied with.

CAUTION

- **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 Configuration

Only a name has to be assigned for the configuration of the FM 299/A. In addition, the GA1060 bus must be configured, also with its name and the cycle time.

The FM 299/A can be configured at the CPU module in two different ways:

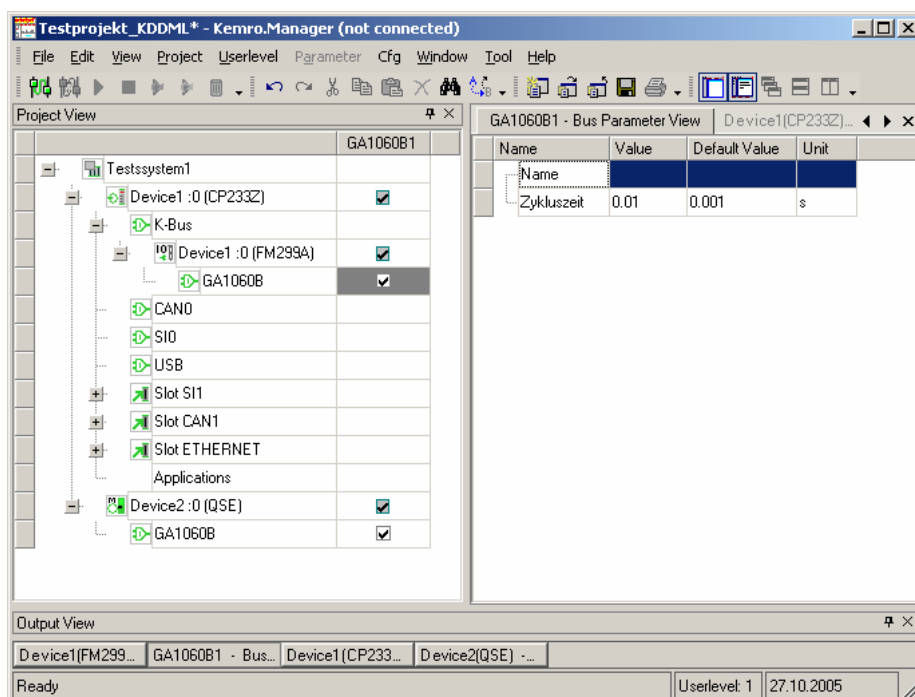
- Via Kemro.manager
- through the creation of cfg-files with a text editor

Two FM 299/A modules can be operated on one CPU.

Configuration with the KEMRO.Manager

The Kemro.managers can be used to configure all modules of a systems as well as the Sanyo Denki converters of the QSE series.

At selection of the FM 299/A one column is automatically created for the bus connection, which is then used to connect the drives.



Once all modules have been specified in the system and after all parameters have been adjusted the Kemro.manager creates the necessary cfg-files.

Creation of cfg-file

The FM 299/A and the GA1060 bus do not have any special parameters except for their name and cycle time.

The configuration file is used to configure also the drives operated at the GA1060 – see the following example.

Example:

```
[IO.ONBOARD.KBUS:0]
name = "Kbus"
cycleTime = 0.001
traceWord = 0

[IO.ONBOARD.KBUS:0.FM299:0]
name = "FM299_Interface"
traceWord = 0

[IO.ONBOARD.KBUS:0.FM299:0.GA1060B:0]
name = "GA1060B_Bus"
cycleTime = 0.002
traceWord = 0
```

The following information describes the configuration of one of SDC's QSE-drive controller. Please refer to the relevant drive documentation for a description of the parameters and additional information.

```
[IO.ONBOARD.KBUS:0.FM299:0.GA1060B:0.QSE:0]
name = "Axis_0"
address = 0
MOCODE = 16#1017
ENCODER = 16#800B
ENTYPE = 16#8300

driverMode = 3
positionMode = 1

maxPositionExponent = 32

positionOffset = 0.0
posUnitsToIncrements = 16.00
velUnitsToRpm = 11.777
torqueUnitsToPercent = 13.66

comBank = 16 // default = 17
resBank = 65 // default = 66

periodNum = 10
periodDenom = 200

traceWord = -1

[IO.ONBOARD.KBUS:0.FM299:0.GA1060B:0.QSE:0.BANK1]
DAT2 = 16#0001
DAT3 = 16#0001
DAT4 = 16#0005
DAT5 = 16#0000
DAT6 = 16#0032
DAT7 = 16#0090
```

```
DAT8 = 16#0000
DAT9 = 16#0000
```

```
[IO.ONBOARD.KBUS:0.FM299:0.GA1060B:0.QSE:0.BANK8]
```

```
DAT2 = 16#0030
DAT3 = 16#1000
DAT4 = 16#0000
DAT5 = 16#0050
DAT6 = 16#0020
DAT7 = 16#0100
DAT8 = 16#0000
DAT9 = 16#0000
```

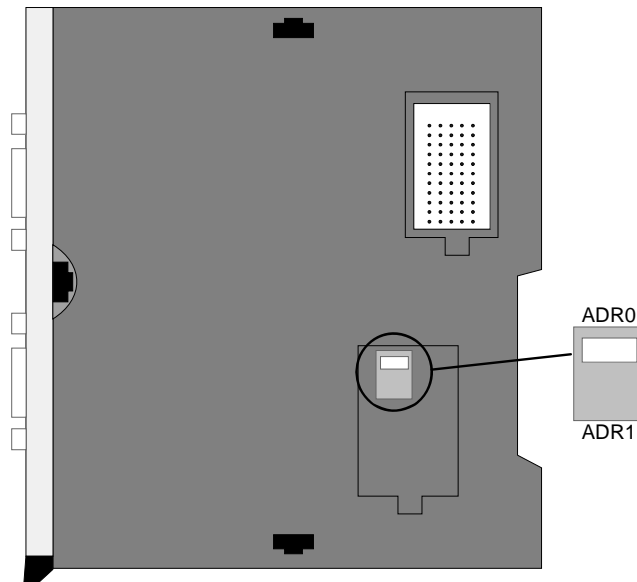
For user with a higher userlevel the following configuration entry is available:

```
[IO.ONBOARD.KBUS:0.FM299A:0]
optional=0           / optional configuration:
                    / 0 ... when the module is not available
                    / an "Error" occurs
                    / 1 ... when the module is not available
                    / a "Warning" occurs
```

Setting the K-Bus address

The modules are addressed via the address switch. A maximum of two FM 299/A modules can be operated on one K2-200 control CPU.

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



Position of the address switch

On leaving the factory the FM 299/A module is set to address 0 and both covers are closed.

4 Connections, wiring

SDC Bus interface

General information

To ensure adequate stability the GA1060 drive bus must be built as fully shielded interface. Consequently the entire bus periphery must be provided with an uninterrupted shield connection.

Connector

9-pole D-SUB socket connector with completely conductive shell. The cable shielding must be connected plane with the shield cover of the plug. An additional connection of the shield and the ground is not necessary.

Pin assignment:

Pin	Meaning
Pin1	GA1060 Bus +
Pin2	GA1060 Bus -
Pin3 – 8	GND
Pin9	n.c.

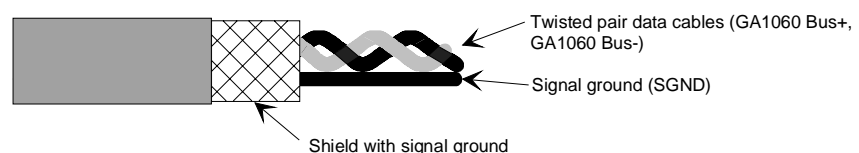
Cable

Cable type

Shielded, twisted pair data cables with a characteristic impedance of 100 – 120 Ω .

Structure

Twisted pair, shielded with signal ground.



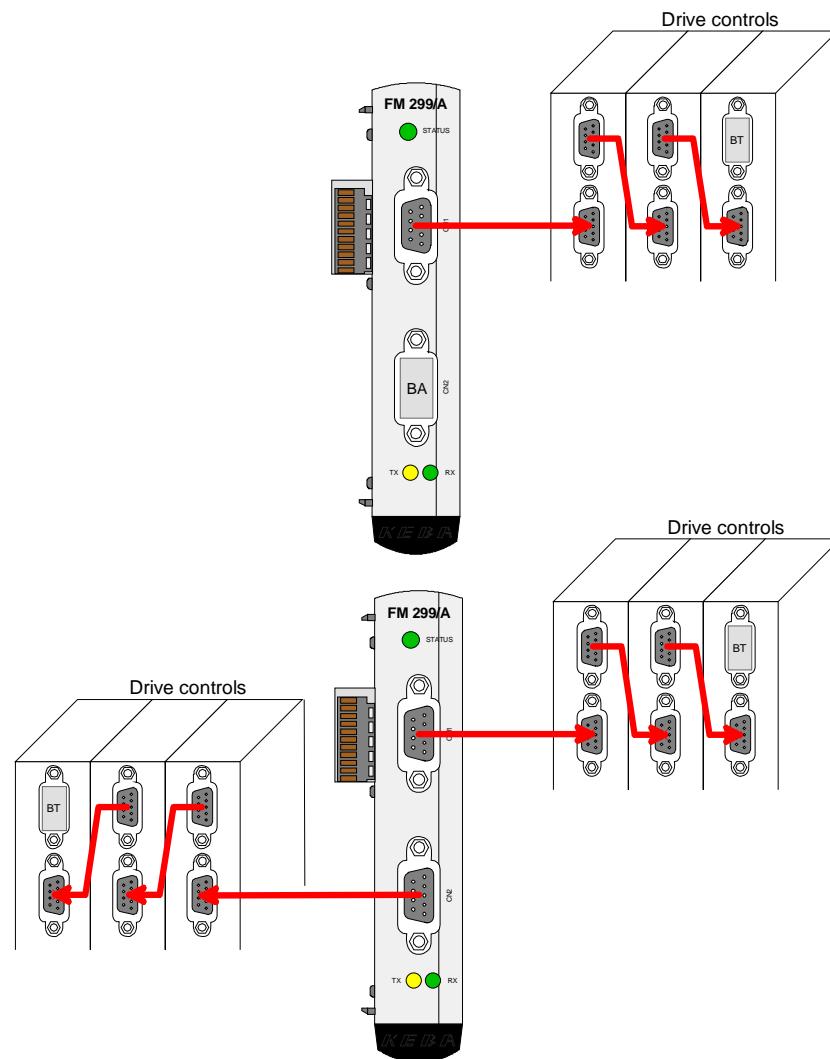
A multi-core twisted cable can also be used. Attention must be paid that the GA1060 Bus+ and the GA1060 bus-lines are guided in a common twisted pair of wires.

Cable routing

Signal and data lines that are foreign to the system and not connected to the Kemro-control must not be routed in the same cable as the system's own signal and data lines. All shielded signal, data and low voltage supply lines with contacted shields on either side can be routed parallel to one another and parallel to the energy supply lines.

Bus topology

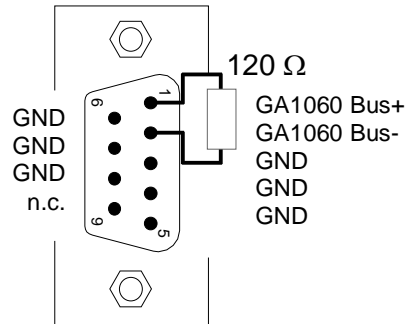
- The GA1060 drive bus is a bus system that must be closed on either end with a bus terminating board.
- The FM 299/A can be operated at the end of the bus line or at any section of the bus line. CN1 and CN2 can be located anywhere
- The total bus length must not exceed 10 meters, whereby the gaps between the individual participants can be freely selected.



BT ... bus terminating board

Schematic diagram of the bus topology bus terminating board

If the FM 299/A is connected at one bus terminating board of a GA1060 drive bus, a terminating board must be connected to the free plug. This is done by soldering a resistance with $120\ \Omega$ in between the Pins 1 and 2 (GA1060 Bus).



GA1060-Bus interface with activated bus terminating board

5 Operation and displays

Status LED

LED color	Function
orange	System start-up
green	Communication alive, no error
red	After switch-on -> module faulty In cyclical mode -> Communication error, no communication possible

GA1060 Bus Status LEDs

LED color	Labeling	Function
yellow	TX	Indicates transmission activity
green	RX	Indicates receiving activity

6 Technical data

General information

Logic supply	5V via K-Bus
Power consumption:	Max. 1.0 W
Safety class:	III according to EN 61131-2
Displays on the front panel:	LEDs for transmission and receipt and for the status display
Max. number of modules at one CPU module	2

GA1060 Interface

Data transmission rates	10 Mbit/s
Max. cable length	10 m (between first and last participant)

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:	130 g

Standards:

The module conforms to the following standards:

General information	
UL 508	UL – listed
Product standard for programmable controllers:	
IEC 61131-1:2003	General information
IEC 61131-2:2003	Hardware