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Programmable Safety Systems PSS-Range

PSS(1) CANopen
Hardware Manual
Item No. 19 883



The spirit of safety.

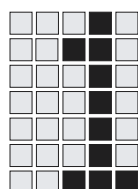
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While every effort has been made to ensure that the information in this manual is accurate, no responsibility can be accepted for errors or omissions contained within it.

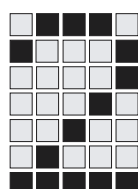
We reserve the right to amend specifications without prior notice. We are grateful for any feedback on the contents of this manual.

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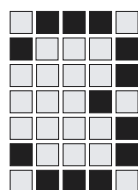
Contents



Introduction	1-1
Differences in modules	1-2
Range	1-2
Definition of symbols	1-3
Terminology	1-4
Overview of manual	1-4

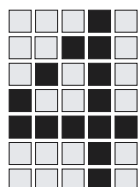


Function Description	2-1
Operator elements on the module	2-2
Module address	2-2
Bit rate	2-2
Error and status indicators	2-2
Error indicators	2-2
Status indicators	2-2
Module interfaces	2-3
CANopen interface	2-3
RS 232 interface	2-3

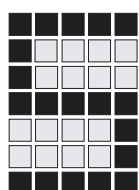


Safety	3-1
Safety guidelines	3-1
Use of qualified personnel	3-1
Unit-specific safety regulations	3-2
Installation and the module's environment	3-2
Cable material and laying the cables	3-2
Measures to protect against interference	3-3
Installing and connecting the module	3-3
Warranty and liability	3-4
Intended use	3-5

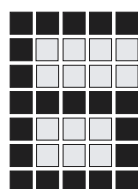
Contents



Module	4-1
Elements on the module	4-1
Cables and interfaces	4-2
CANopen interface	4-2
CANopen connection cable	4-2
RS 232 interface	4-3
Connection cable for the RS 232 interface	4-3
Operator elements	4-4
Rotary switch for setting the bit rate	4-4
Rotary switch for setting the Node-ID	4-5
Coding pin „CAN TERM.“	4-6
Coding pin BOOT SWITCH“	4-6
Status LEDs	4-7
Operating conditions for the module	4-7
Operating conditions for the bus system	4-7
Error LEDs	4-8
Module error messages	4-8
Bus system error messages	4-8



Installation and Configuration	5-1
Installing the module into the module rack	5-1
Configuration	5-2
Configuration for CANopen operation	5-2
Setting the Node-ID	5-2
Setting the bit rate	5-2
Communication via the CANopen interface	5-2
Terminating resistors	5-3
Parameter configuration	5-3
Parameter configuration via the RS 232 interface	5-4



Commissioning and Operation

6-1

Initial commissioning

6-1

Testing the components

6-1

Preparing the PSS

6-1

Quick start

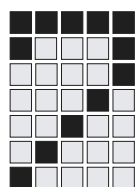
6-2

Fault diagnostics

6-3

Operation

6-3



Terminal Functions and Firmware Updates

7-1

Interface

7-1

Making the connection

7-1

Transfer parameters for the interface

7-1

Assigning parameters for the terminal interface

7-1

Assigning parameters for the PC interface

7-2

Using Hyperterminal

7-2

Terminal functions

7-4

Command sequence

7-4

Implemented terminal commands

7-5

Overview

7-5

Online help

7-5

Command: CAN Default (CD)

7-6

Command: Set the bit rate (SB)

7-6

Command: Display bit rate (DB)

7-8

Command: Establishing the Node-ID (MN)

7-9

Error: Set Wakeup Time (WU)

7-9

Command: Save Config (CS)

7-10

Command: RESET Module (RS)

7-10

Commands: Set Memory (SM and SW)

7-11

Command: Display Memory (DM and DW)

7-12

Firmware updates

7-14

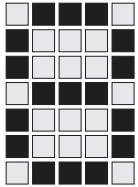
Connecting the module to a PC

7-14

Procedure

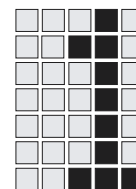
7-14

Contents



Technical Details

8-1



Introduction

This manual describes the hardware for the communications module PSS(1) CANopen. It is used to connect a PSS programmable safety system to the CANopen bus system. The PSS, together with the module and the appropriate software package, operates as a CANopen –Slave. A separate manual is available for managing the software: “ST SB CANopen Software Manual”.

Pilz PSS programmable safety systems have been designed for use in plant and machinery safety circuits. They consist of a failsafe (FS) section and a standard (ST) section.

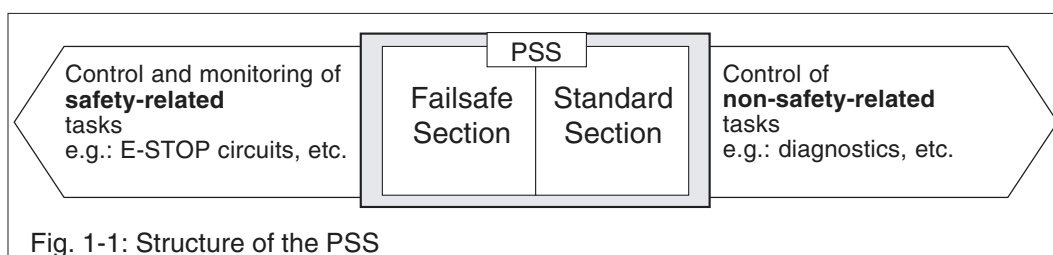


Fig. 1-1: Structure of the PSS

This manual contains all the information required for the intended use of the module in a modular PSS programmable safety system. The module is designed for use on the standard bus of a modular PSS safety system. Knowledge of the safety regulations for the particular area of application is assumed.

To fully understand this manual you will need to be conversant with the information found in the general documentation for the PSS-range of programmable safety systems (System Handbook with Safety Manual, ST System Description etc., Installation Manual for the modular PSS and Programming Manual).

Introduction

Differences in modules

There are individual modules for the PSS 3000 and PSS 3100.

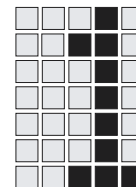
- The PSS CANopen module may only be used on the standard bus of the PSS 3000.
- The PSS1 CANopen module may only be used on the standard bus of the PSS 3100.

There is no difference in the functionality of the two modules.

Range

The hardware package consists of:

- one module
 - PSS CANopen or
 - PSS1 CANopen
- One operating manual
PSS(1) CANopen Hardware Manual



Definition of symbols

Information in this manual that is of particular importance can be identified as follows:



DANGER!

This warning must be heeded! It warns of a **hazardous situation that poses an immediate threat of serious injury and death**, and indicates preventive measures that can be taken.



WARNING!

This warning must be heeded! It warns of a **hazardous situation that could lead to serious injury and death** and indicates preventive measures that can be taken.



CAUTION!

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



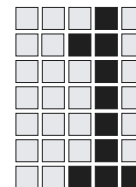
NOTICE

This describes a situation in which the product or devices in its immediate environment could be damaged. It also provides information on preventive measures that can be taken.



INFORMATION

This gives advice on applications and provides information on special features, as well as highlighting areas within the text that are of particular importance.



Introduction

Terminology

- Throughout this manual the designation “Module” or “ PSS(1) CANopen” will be used when the description is valid for all modules.
If the description relates to a specific module, then the product name for that module will be used (e.g. PSS CANopen or PSS1 CANopen).
- Throughout this manual the description “PSS” will be used as the generic term for both the PSS 3000 and PSS 3100 modular safety systems. If the description relates to a specific system, then the product name for that particular system will be used (e.g. PSS 3000).

Overview of manual

The manual is divided into 8 chapters:

Chapter 1 provides an overview of the manual.

Chapter 2 contains a general function description of the module.



Chapter 3 must be read as it contains important information on safety and intended use.

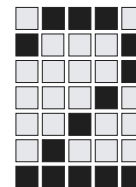
Chapter 4 provides information on installing and wiring the module.

Chapter 5 shows you how to install and configure the module.

Chapter 6 provides support during commissioning and operation.

Chapter 7 contains information on the terminal functions for the module and guides you through installing firmware updates.

Chapter 8 contains a table of technical details.



Function Description

A modular PSS can be connected to CANopen using this module. The module was designed for use in a **non-safety-related** environment. The module is a passive subscriber (slave) on the bus system. It is essential you use the relevant software package for both commissioning and operating the module.

The module is part of the freely-programmable word modules (XW-access) of the PSS. The required address range is 1024 words.

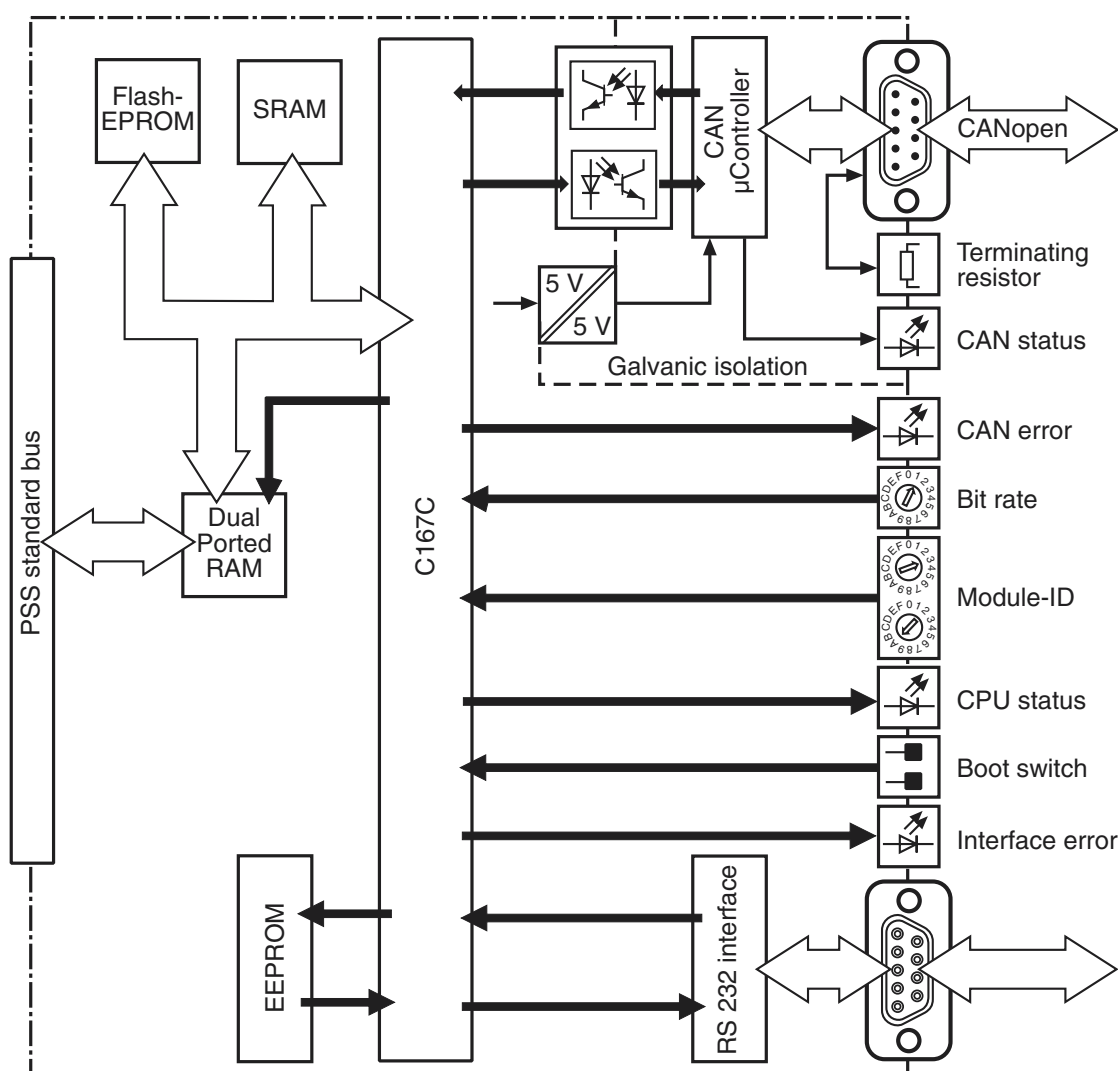


Fig. 2-1: Module block diagram

Function Description

Operator elements on the module

To ensure the module functions correctly you will need to make various configurations.

Module address

The module must have an address which can be used to identify it on the bus (Node-ID). There are two switches for setting the module address. They are marked with "MODUL ID".

Bit rate

The module must be set to suit the data transfer rate for CANopen. There is a rotary switch available to set the bit rate. It is marked "BITRATE".

Error and status indicators

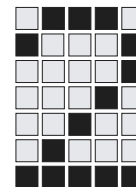
Errors and operating conditions are displayed via the LEDs on the module.

Error indicators

The LED marked "INTERFACE ERROR" displays communication errors between the module and the PSS.
The LED marked "CAN ERROR" displays communication errors between the module and CANopen.

Status indicators

Operating conditions and node guarding will be displayed via the two status LEDs on the module. The LED "CPU STATUS" displays the module's operating condition. The LED "CAN STATUS" signals the current state of data exchange of the module via CANopen (see chapter 3).



Module interfaces

The module has a CANopen interface and an additional RS 232 interface. The functionality of both interfaces can be established using a coding pin. If the coding pin is pulled out the module is in its operating condition. Data exchange can be carried out via CANopen (CANopen interface) as well as changing module parameters (RS 232 interface).

If the coding pin is in, data exchange is not possible via CANopen. This mode is used exclusively for loading firmware updates into the module's flash-EPROM. You can load the firmware updates using the RS 232 interface.

CANopen interface

A male 9-pin D-SUB connector is provided for connecting the module to CANopen. The D-Sub connector is marked "CANopen"

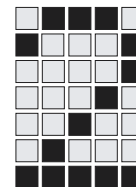
If the module is at the beginning or end of the bus line, bus termination must be active. This is achieved via a coding pin. It is marked "CAN TERM". If the coding pin is in, a terminating resistor is connected between both signal lines (CAN_L and CAN_H).

RS 232 interface

The RS 232 interface is used for making changes to module parameters and for firmware updates. The female 9-pin D-SUB connector is marked "RS 232".

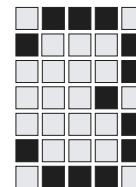
A terminal or PC with a free RS 232 interface and a terminal program is required to make any amendments to the module parameters.

The module is supplied with the Flash-EPROM already loaded with the current firmware. Additional firmware updates can be installed automatically by the user via the RS 232 interface. A PC with a free RS 232 interface is required to install any updates.



Function Description

Notes



Safety

Safety guidelines

These safety guidelines are an important part of this manual. Failure to keep to these guidelines will render all warranty and liability claims invalid.

All health and safety / accident prevention regulations for the particular area of application must also be observed. In particular, VDE and all local regulations regarding safety measures should also be taken into account.

Use of qualified personnel

The module may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned by qualified personnel who, because they are

- Qualified electrical engineers or
- Have received training from qualified electrical engineers

are suitably experienced to operate devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the company's responsibility only to employ personnel who:

- Are familiar with the basic regulations concerning health and safety / accident prevention
- Have read and understood the safety guidelines given in the manual.

Safety

Unit-specific safety regulations

Before you install or commission the system, you should refer to any guidelines laid down by the plant manufacturer or operator.

Installation and the module's environment

- Before installing or commissioning the module you must read the “Safety Manual” in the “System Handbook” and the “Installation guidelines” in the “Installation Manual for the modular PSS”.
- Keep as large a distance as possible between PSS and any electromagnetic fields (particularly frequency converters) or screen possible sources of interference using appropriate measures.
- Electrostatic discharge can damage components. Ensure against discharge before touching the module, e.g. by wearing an earthed armband.
- You should also protect the module from electrostatic discharge (ESD) during operation.
- Ensure the maximum ambient and operating temperatures are not exceeded.
- Avoid the build-up of heat
- Protect the system from direct sunlight and dust
- Ensure that liquids or objects cannot enter the system
- Do not use chemicals close to the system
- Do not position the system close to flammable materials

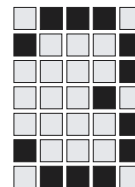
Cable material and laying the cables



NOTICE

Only use screened cable

Requirements of CANopen must be followed



Measures to protect against interference



NOTICE

Connect the cable screening of the CANopen connection cable to Pin 5 of the 9-pin D-SUB connector of the the CANopen interface (see also chapter 4 in the section „Cables and interfaces“).

Requirements of CANopen must be followed

Installing and connecting the module

- Always install the module when the supply voltage is switched off
- Always connect any cabling when the supply voltage is switched off.
- Information given in “Technical Details“ must be followed .

Safety

Warranty and liability



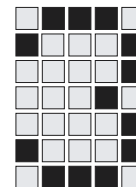
INFORMATION

- Specific data is given in the chapter entitled “Technical Details”. Use of the device outside the specifications given here will be deemed as improper use.
- Any component, technical or electrical modifications carried out will be deemed as improper use.
- Intended use includes following the information in this manual.

All claims to warranty and liability will be rendered invalid if:

The module was used contrary to the purpose for which it was intended

- Damage can be attributed to not having followed the guidelines in the manual
- Operating personnel are not suitably qualified.
- The housing was opened
- Changes have been made to the PCB boards (e.g. exchanging components or soldering work etc.).



Intended use

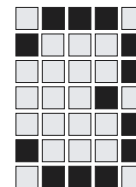
The PSS CANopen and PSS1 CANopen communications module supports data transfer in accordance with the requirements of CANopen Communication Profile (CiA DS 301 V3.0). It is intended for use as a CANopen communications module on the standard bus of the relevant modular PSS safety system.

The **PSS CANopen** module is for use exclusively on the standard bus in the module rack of a PSS 3000.

The **PSS1 CANopen** module is for use exclusively on the standard bus in the module rack of a PSS 3100.

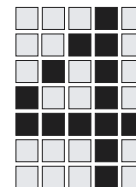
The module may only be used with the corresponding software package from Pilz.

The module is designed for use in an industrial environment only. Use in a domestic environment may lead to interference.



Safety

Notes



Module

Elements on the module

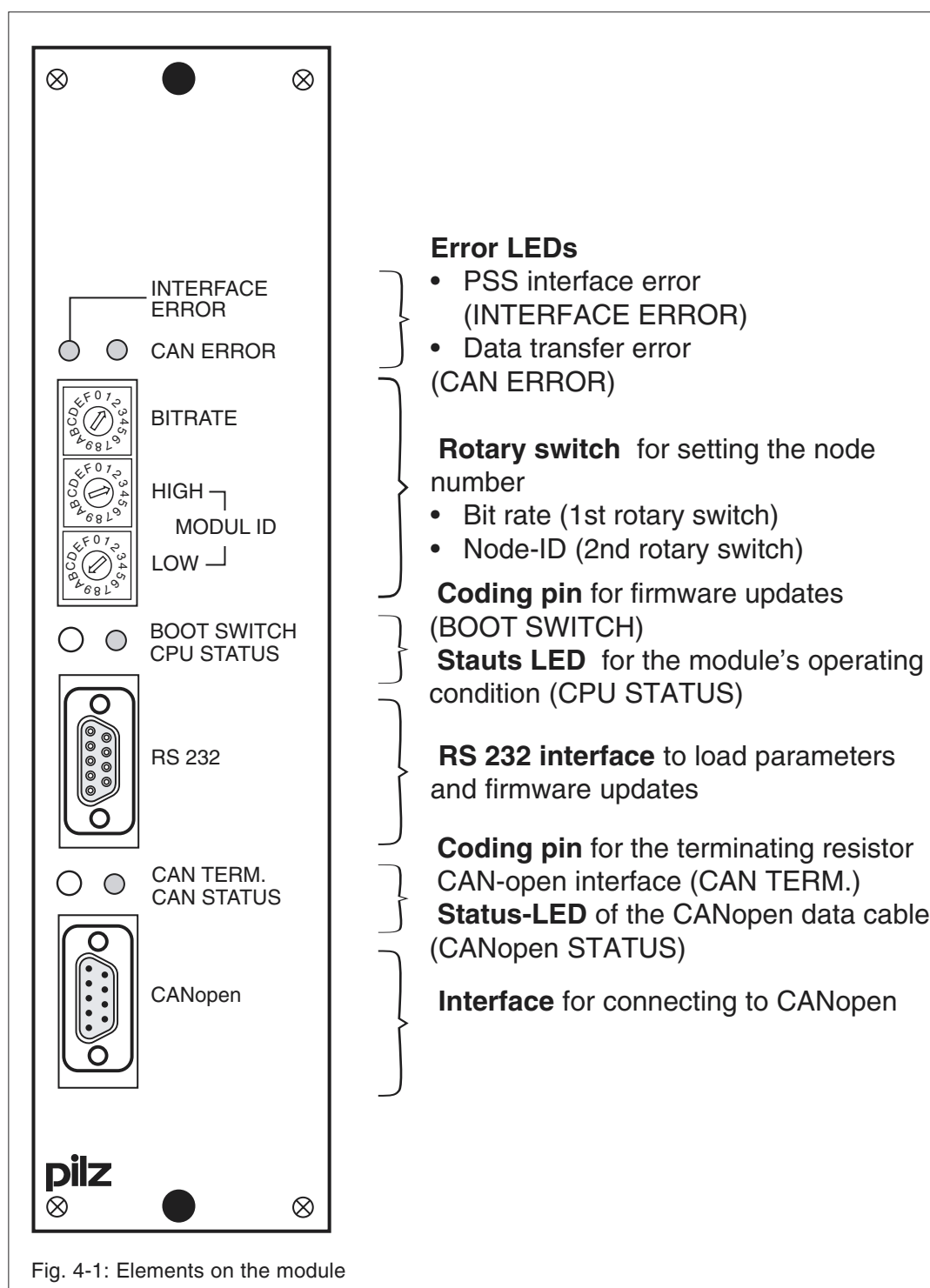
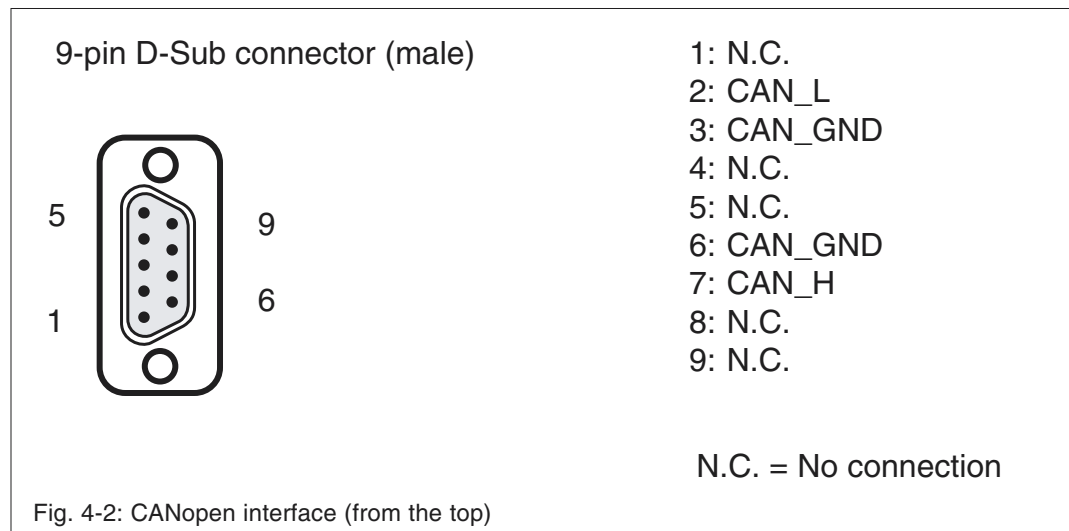


Fig. 4-1: Elements on the module

Module

Cables and interfaces

CANopen interface

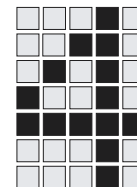


CANopen connection cable

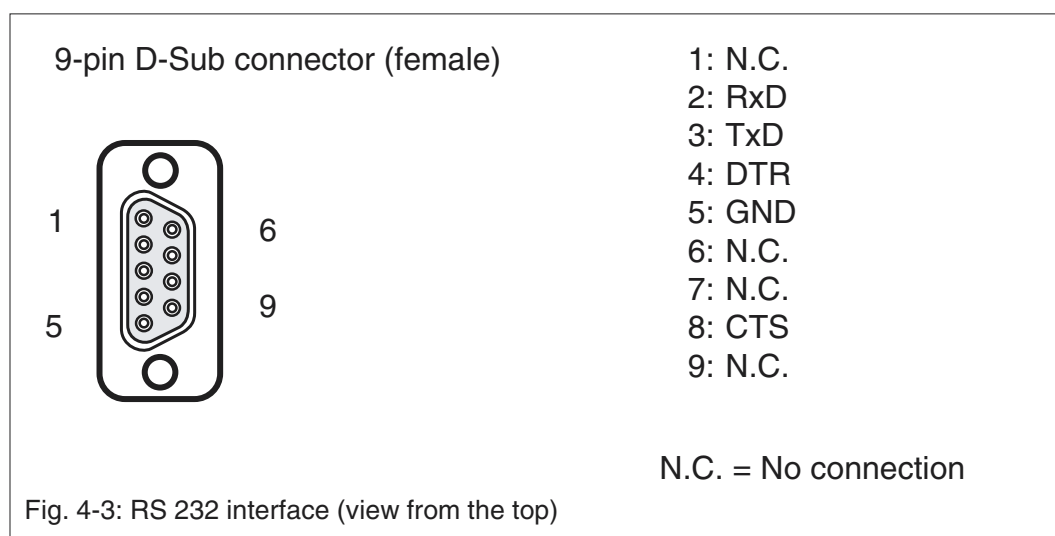


NOTICE

- The connection cable must conform to the requirements of CiA DS 102 V2.0.
- Only use screened cable as CANopen connection cable.
- Connect the cable screening of the CANopen connection cable to Pin 5 of the 9-pin D-SUB connector of the the CANopen interface (see Fig. 4-2).
- The relationship between cable lengths and bit rates must be observed at all times.



RS 232 interface

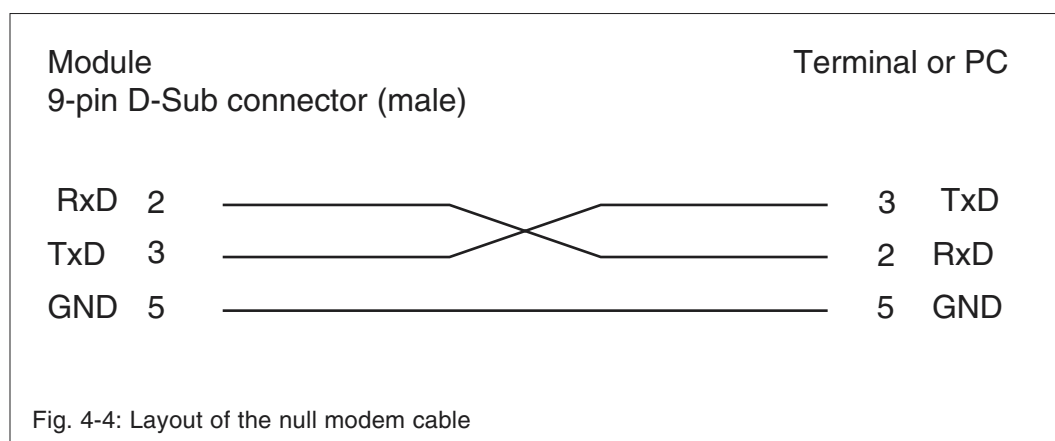


Connection cable for the RS 232 interface



INFORMATION

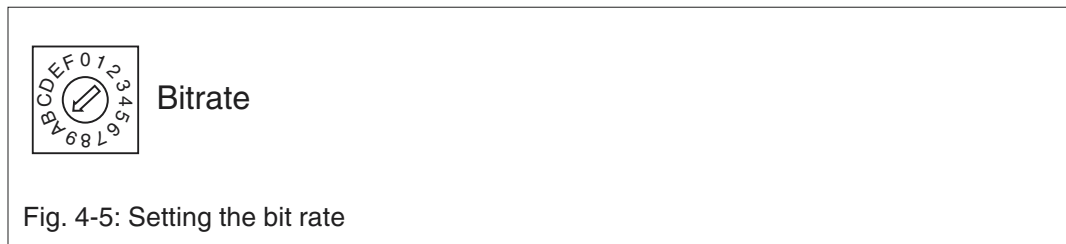
Use a null modem cable as your connection cable.



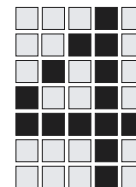
Module

Operator elements

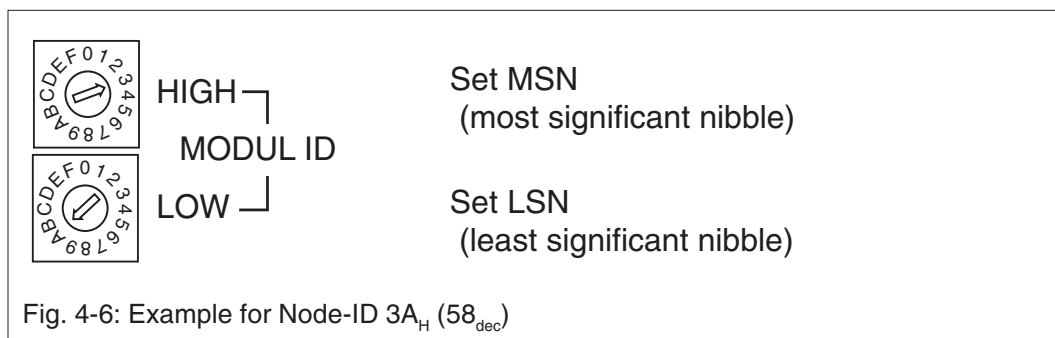
Rotary switch for setting the bit rate



Switch setting	Bit rate in kBit/s	Average cable length in m	
		$l_{\max}$	$l_{\min}$
0	1 000	37	20
1	666	80	65
2	500	130	110
3	333	180	160
4	250	270	250
5	166	420	400
6	125	570	550
7	100	710	700
8	66	1 000	980
9	50	1 400	1 400
A	33	2 000	2 000
B	20	3 600	3 600
C	12,5	5 400	5 400
D	10	7 300	7 300
E	6	10 000	10 000



Rotary switch for setting the Node-ID



Valid values for the Node-ID are 1 ... 127_{dec} (1 ... 7F_H).



INFORMATION

Set the bit rate and the Node-ID during boot up in the “Pre-Operational” mode

- The node-ID is valid when it is $\neq 0$ and present for a minimum of 2 s before the Bus-Master sends the START command.
- Settings for the bit rate and the Node-ID will only be transferred after the START command from the Bus-Master (with valid Node-IDs).

Once the system has booted up, any change to the bit rate will not be recognised.

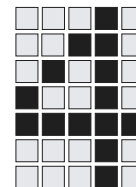
Module

Coding pin „CAN TERM.“

Coding pin	Key
in	Terminating resistor activated
out	Module without terminating resistor

Coding pin BOOT SWITCH“

Coding pin	Key
out	CANopen interface for data exchange activated Amendments to the module parameters can be made via the RS 232 interface.
in	RS 232 interface for firmware updates activated No data exchange via CANopen



Status LEDs

Operating conditions for the module

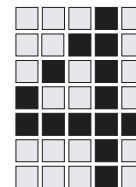
The dual-coloured LED “CPU STATUS” displays the module’s operating condition. Operating condition is displayed via the LED-Colour, either being lit continuously or flashing.

Module status	Description
LED off	No supply voltage to the module
LED green	Module is in the operating condition “Operational” and uses the saved parameter from the Flash-EPROM.
LED flashes in sequence: red (short)-green (long)	Module is in the operating condition sequence: “Operational”, parameters used were not stored
LED flashes in sequence: red-green-off	Module is in the operating condition “Pre-Operational”
LED red/green flashes	Update program is running.

Operating conditions for the bus system

The LED “CAN STATUS” displays the bus system’s operating condition.

CAN Status	Description
LED off	No data transfer
LED green	Data transfer active (transmit or receive)



Module

Error LEDs

Module error messages

The red LED “INTERFACE ERROR” displays the STOP/RUN status of the module.

LED status	Key
LED flashes slowly (800 ms red/200 ms off)	PSS is in STOP mode, the module is not active
LED flashes quickly (200 ms red/800 ms off)	PSS is in RUN mode, however Driver Timeout for the module

Bus system error messages

The red LED “CAN ERROR ” indicates error messages which have been detected by the module’s CPU during communication via CANopen.

LED status	Key
LED flashes quickly (50 ms red/50 ms off)	CANopen is OFF e.g. bit rate is incorrect
LED flashes slowly (400 ms red/100 ms off)	CANopen Warning e.g. no additional CANopen subscribers connected or CANopen terminating resistor is missing



Installation and Configuration

Installing the module into the module rack

Install the module as described in the “Installation guidelines” in the “Modular PSS Installation Manual”.



CAUTION!

Electrostatic discharge can damage components on the module. Ensure against discharge before touching the module, e.g. by touching an earthed, conductive surface or by wearing an earthed armband.

You should also protect the module from electrostatic discharge (ESD) during operation.

Installation and Configuration

Configuration



INFORMATION

Make the following settings when the PSS is switched off (no voltage applied). Settings are **only** transferred when the module boots up. If settings are made while the PSS is in a STOP condition and then the PSS is switched to RUN condition, the settings are **not** transferred.

Any changes made to the settings while the PSS is in RUN will have **no** effect.

Configuration for CANopen operation

Setting the Node-ID

Set the NODE-ID using both rotary switches “MODUL-ID (see chapter 3). **Ensure** that each Node-ID appears only once on CANopen.

Setting the bit rate

Set the bit rate for the module using the rotary switch “BITRATE” (see chapter 3). **Ensure** that the bit rate for the module matches that for CANopen.

Communication via the CANopen interface

Check the coding pin “BOOT SWITCH”. **Please note** that the coding pin for data exchange via the CANopen interface must **not** be pushed in.



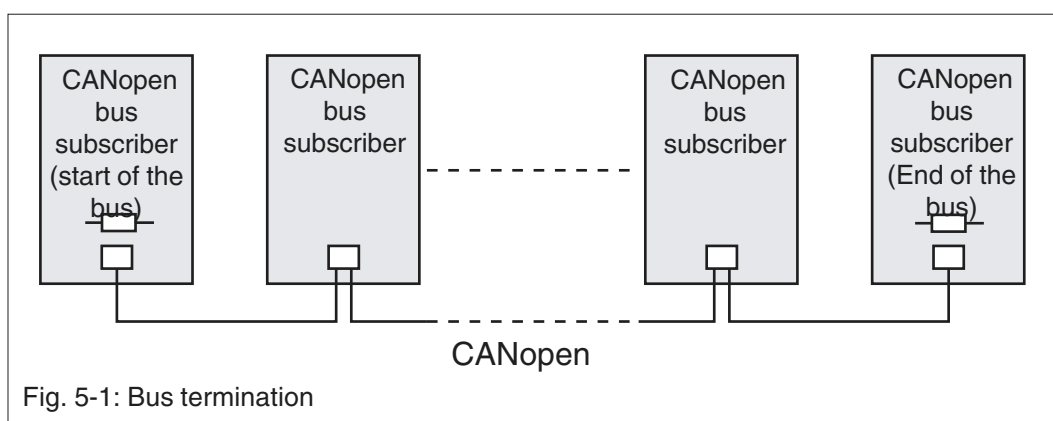
Terminating resistors



INFORMATION

If the module is at the start or the end of the CANopen line, the module's terminating resistor must be activated. You can activate the terminating resistor via the coding pin "CAN TERM". The coding pin must be pushed in for the resistor to be activated.

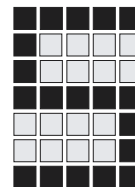
Specification: 120 Ohm, 5%, 1/4 Watt



Parameter configuration

Assigning parameters for the module is only necessary if the default settings are not suitable for your particular application. Any amended module parameters can be stored (non-volatile) in the module's Flash-EPROM.

There are module parameters which can be changed via the RS 232 interface. A terminal or a PC with a terminal program is required if you want to change parameters via the RS 232 interface (see chapter 7). In addition changes can be made in the communications profile (device object dictionary) of the module. A description of parameter settings can be found in the "PSS(1) CANopen Software Manual".

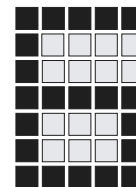


Installation and Configuration

Parameter configuration via the RS 232 interface

Check the coding pin “BOOT SWITCH”.

Please note that the coding pin for changing the module’s parameters via the RS 232 interface must **not** be pushed in.



Commissioning and Operation

Initial commissioning

Testing the components

Before operating the module, ensure that the following points have been met:

- The module must be inserted in a slot on the module rack for PSS standard modules. For installation details please refer to the description in the “Installation guidelines” (Modular PSS Installation Manual).
- The bus structure must be designed correctly (bus termination, exclude cable breaks...).
- If the module is located at the start or the end of the bus line, bus termination must be activated. Check the coding pin “CAN TERM”. The coding pin must be in for bus termination to be activated.
- The CANopen interface must be activated for data exchange. Check the coding pin “BOOT SWITCH” on the module. The coding pin for data exchange via the CANopen interface must be out.

Preparing the PSS

- Switch on the PSS.
- Transfer your user program to the PSS.
- Switch off the PSS.

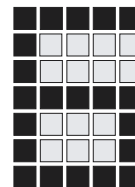
Commissioning and Operation

Quick start

Once the above conditions have been met, the module can be set into operation. The ex-works default settings can be used to perform a quick start. Follow the steps below:

- Set the bit rate on the module.
The bit rate must match the bit rate for the bus system.
- Set the Node-ID on the module.
- Switch on the PSS
 - The module will be in the RESET condition for approximately 30 s. In this operating condition the LEDs “INTERFACE ERROR” and “CAN ERROR” are red.
They will then go out.
 - The module switches to the operating condition “Pre-Operational”. In this condition the dual-coloured LED “CPU STATUS” flashes in the sequence: red/green/off ...
- Send the START command via the Master (refer to the “ST SB CANopen Software Manual”).
 - If the bit rate is set correctly and the Node-ID is valid, the current Node-ID will be used. All parameters are set to the values preset ex-works (default) and the module changes from the operating condition “Pre-operational” to “Operational”.
The LED “CPU STATUS” can be in any one of the following conditions:
 - The LED “CPU STATUS” is green:
The module is using the secured parameters (Flash-EPROM).
 - The LED „CPU STATUS“ flashes in sequence red (quick)/green (slow)/off ...
The module is using unsecured parameters.
 - The LED “CPU STATUS” flashes periodically in the sequence red/green ...
The Flash-EPROM is defective.

If “Operational” condition is achieved, the device is ready for operation (refer to the “ST SB CANopen Software Manual”).



Fault diagnostics

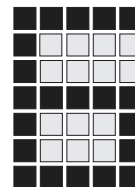
If the module does not achieve the “Operational “ condition”, error diagnostics can be performed using the status and error LEDs. There is a key in chapter 4 to explain the LEDs.

More detailed information can be found in the separate manual “ST SB CANopen Software Manual”

Operation

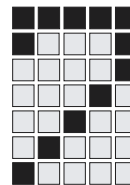
The module operates on CANopen using a software package from Pilz. The standard function block SB 237 contained within the package is run in the standard section of the PSS. It is used for communication (transmit/ receive data) between the PSS and other CANopen subscribers.

Specific information on SB 237 is available in a separate manual: “ST SB CANopen Software Manual” and is supplied with the software package.



Commissioning and Operation

Notes



Terminal Functions and Firmware Updates

The module has an RS 232 interface. Specific configurations can be made via this interface and can also be used for transferring firmware updates to the module.

Interface

Making the connection

Assigning the RS 232 interface on the module used for operating at a terminal or PC is described in chapter 3.

Assign parameters for the RS 232 interface for changing the module parameters or for firmware updates.

- Switch off the PSS.
- Coding pin “BOOT SWITCH”
 - For changes to the module parameters: remove the coding pin
 - For firmware updates: push in the coding pin as far as possible
- Switch on the PSS.

The relevant coding will be detected during the module's boot-up process.

Transfer parameters for the interface

The following transfer parameters are fixed for the RS 232 interface on the module.

- 19 200 Bit/s
- 8 data bits
- 1 stop bit
- No parity

Assigning parameters for the terminal interface

Set the terminal interface with the transfer parameters stated in the section entitled “Transfer parameters for the interface”.

The exact procedure for assigning parameters for the interface can be found in the description for your terminal.

Terminal Functions and Firmware Updates

Assigning parameters for the PC interface

If you are using a PC we recommend you use the “Hyperterminal” function. This terminal software is supplied with both the WINDOWS NT and WINDOWS 95 operating systems. Other terminal programs can also be used.

Please note: the connection must have been made between the module and your PC before you use the “Hyperterminal” function.

Using Hyperterminal

Follow the instructions below for setting the transfer parameters under WINDOWS NT 4.x and WINDOWS 95:

- From “Start”/”Programs”, click on the “Accessories” menu.
- Click on “Hyperterminal” to start the program.
- You will be asked to establish a new connection. Enter a name for your connection.

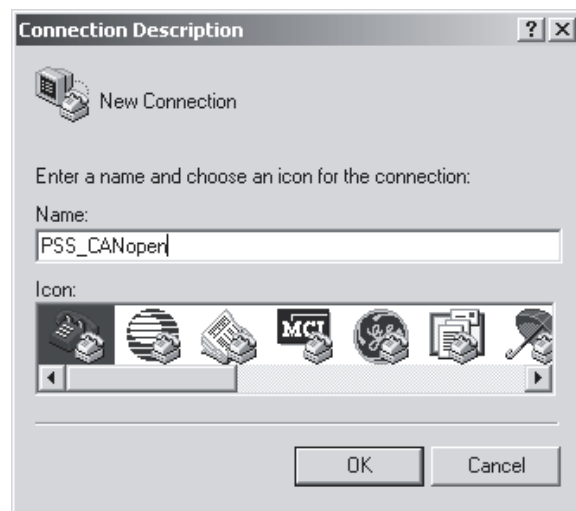
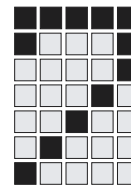


Fig. 7-1: Enter connection name in Hyperterminal (example)



- From the menu “File”\”Properties”, select the serial interface which is connected to the module (e.g. COM1).
- Clicking on “Configuration” will display an input field for setting the transfer parameters for the serial interface.
 - Enter the transfer parameters.
 - Where possible you should select “No protocol” in the protocol input field. If this is not available, select the protocol “XON/XOFF” instead.

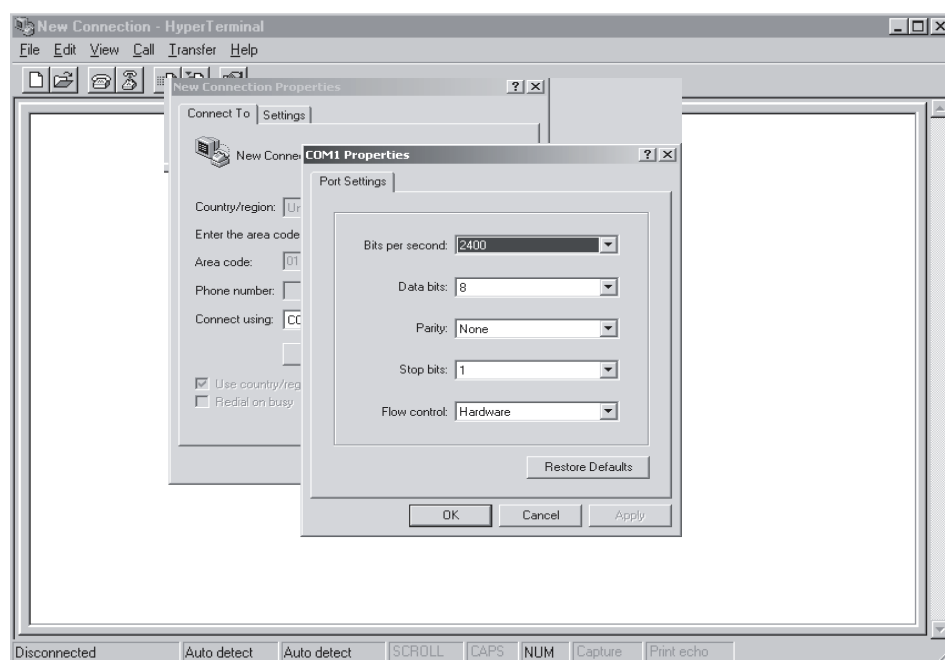


Fig. 7-2: Set the serial interface using the PC software “Hyperterminal”.

Terminal Functions and Firmware Updates

Terminal functions

Command sequence

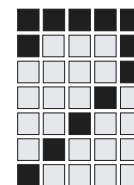
Follow the instructions below to configure the module using a terminal:

Step	Command	Note
1	CD (CAN Default)	Selecting the default parameters will always guarantee defined start conditions.
2	SB (Set bit rate)	Only select this if a different bit rate is required than that set on the rotary switches.
3	FL (set flags)	Refer to the section entitled "Terminal commands"
4	MN (module no.)	Only select this if a different Node-ID is required to the one set at the rotary switch.
5	WU (Wakeup Timer)	Only select this, if a start delay 500 ms is required
6	CS (Server Config)	Store all settings in the EEPROM
7	RS (Reset Module)	Any new parameters are stored once reset has been triggered



INFORMATION

More detailed information on commands can be found in the section "Implemented terminal commands".



Implemented terminal commands

Overview

Syntax	Function
CD	CAN Default
SB	Set bit rate
DB	Display bit rate
MN	Module number
WU	Wakeup Time
CS	Save Config
RS	Reset Module
SM	Set Memory [1]
SW	Set Word [1]
DM	Display Memory [1]
DW	Display Word [1]

[1] These commands are used exclusively for service and diagnostic purposes.

Online help

An overview of command parameters is available by entering the command followed by a "?". If additional input parameters are required for the command, you will receive a list of all possible parameters.

Example: SB ?

Terminal Functions and Firmware Updates

Command: CAN Default (CD)

The command CD will reset the module to the preset parameters (ex-works default values).

Syntax: CD



INFORMATION

The setting will only be effective once the command is triggered

- CS (save configuration) and then
- RS (reset module)

The command contains no additional parameters.

Command: Set the bit rate (SB)

The module's bit rate for communication via CANopen (CAN-Controller) can be set using the SB command.

Syntax: **SB** >*bit index*< or alternatively
SB >*regvalue*<

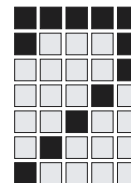


INFORMATION

The setting will only be effective once the command is triggered

- CS (save configuration) and then
- RS (Reset Module)

The command contains the additional parameters >*bitindex*< or >*regvalue*<. The following tables give the permitted entries for these parameters.



>bit index<	Bit rate in kBit/s	>regvalue< (Bit-Timing-Register)	Average cable length in m	
			$I_{\max}$	$I_{\min}$
0	1 000	1600 _H	37	20
1	666	1B00 _H	80	65
2	500	2F00 _H	130	110
3	333	1B01 _H	180	160
4	250	2F01 _H	270	250
5	166	2F02 _H	420	400
6	125	1C04 _H	570	550
7	100	2F04 _H	710	700
8	66	1B09 _H	1 000	980
9	50	2F09 _H	1 400	1 400
A	33	2F0E _H	2 000	2 000
B	20	2F18 _H	3 600	3 600
C	12,5	2F27 _H	5 400	5 400
D	10	2F31 _H	7 300	7 300
E	6	7F7F _H	10 000	10 000

Example:

Set the bit rate to 500 kBit/s

SB 2 [Return]

CS [Return]

RS [Return]

or alternatively

SB 2F00 [Return]

CS [Return]

RS [Return]

Terminal Functions and Firmware Updates

Command: Display bit rate (DB)

Using the command DB, you can call up the stored bit rate of the module used for communication via CANopen (CAN-Controller).

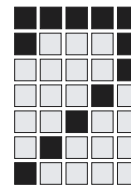
Syntax: DB

The display of the enable parameter will depend on the parameters used previously when the bit rate was stored.

Example:

DB [Return]

- Enable if you are using SB>*bitindex*<
 "2"
- Enable if you are using SB >*regvalue*<
 "2F00"



Command: Establishing the Node-ID (MN)

The command MN enables you to set a new Node-ID using the terminal. This can be stored using the command CS.



INFORMATION

This command may only be used for test purposes. If you use this command the Node-ID set at the rotary switch will no longer match the Node-ID stored.

The node-ID set on the coding switch when the module is supplied is a valid Node-ID (default value).

Syntax: MN >Node-ID<

Parameters	Value range	Key
Node-ID	00 _H	The Node-ID on the coding switch is valid
	01 _H ... FF _H	The Node-ID set in the parameters using the terminal is valid

Error: Set Wakeup Time (WU)

This command is only relevant if the module is defined as the master. The module, however, can only be used as a CANopen-Slave.

As a CANopen slave the module will start without a Wakeup Time once the START command has been received via the bus.

Terminal Functions and Firmware Updates

Command: Save Config (CS)

The command CS stores all parameters including the bit rate setting in the local non-volatile EEPROM memory. Parameter settings will only remain after a CS if a RESET is triggered or the module is restarted.

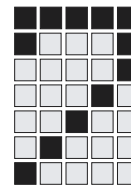
Syntax: CS

Once the settings have been stored successfully, an “OK” prompt appears in the terminal’s screen. If the “OK” prompt does not appear, the save process must be repeated.

Command: RESET Module (RS)

A reset is triggered to the module using this command. The module’s parameters are reset to the last stored values. Parameters stored using the CS command will be retained.

Syntax: RS



Commands: Set Memory (SM and SW)



INFORMATION

The commands are used exclusively for control and service tasks. These commands should be used with **extreme caution**.

The commands SM and SW can be used to overwrite a selected memory cell with data.

- SM: Write a data byte in a selected memory cell.
- SW: Write a data word at the selected point in memory.

Syntax: **SM** *<address> <byte value>*
 SW *<address> <word value>*

Parameters	Key
<address>	Byte address in the memory range of the module valid byte values are: 0 _H ... FF FFFF _H valid word values are: 0 _H ... FF FFFF _H (even addresses only)
<byte value>	Value of the data byte to be written at the selected point in the memory.

Terminal Functions and Firmware Updates

Command: Display Memory (DM and DW)

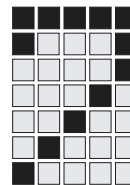
Commands DM and DW show the contents of the memory on the terminal display.

- DM: Output is displayed in lines, each line up to 16 successive bytes.
- DW: Output is displayed in lines, each line up to 8 successive words.

Syntax: DM or
DM< address or
DM <address> <lines>

DW or
DW< address or
DW <address> <lines>

Parameters	Key
<address>	Start address of the lines displayed; valid values for DM are: 0 _H ... FF FFFF _H valid values for DW: 0 _H ... FF FFFF _H (even addresses only) No address entry: Displays memory contents of the successive memory addresses from the last address displayed Address entry: Displays the memory contents of the given address
<lines>	Number of lines to be displayed; The first point of each line displays the start address and then the contents of either a line of • 16 successive bytes (DM) or • 8 successive words (DW) (hexadecimal). No line entry: The previous entry remains valid. Line entry: Displays from the stated start address with the stated number of lines



Example for output with DM:

<address 0> <bytevalue0 08_H> <bytevalue0 18_H> ... <bytevalue0 0F_H>
<address 1> <bytevalue1 08_H> <bytevalue1 18_H> ... <bytevalue1 0F_H>
:
<address N> <bytevalueN 08_H> <bytevalueN 18_H> ... <bytevalueN 0F_H>

Example for output with DW:

<address 0> <bytevalue0 08_H> <bytevalue0 18_H> ... <bytevalue0 07_H>
<address 1> <bytevalue1 08_H> <bytevalue1 18_H> ... <bytevalue1 07_H>
:
<address N> <bytevalueN 08_H> <bytevalueN 18_H> ... <bytevalueN 07_H>

Parameter description:

address Start address of the line

byte value Data byte

Value corresponds to the entry stated under<lines>

Terminal Functions and Firmware Updates

Firmware updates

The module's firmware is stored in a Flash-EPROM memory. When the module is supplied, the Flash-EPROM contains the current version of the firmware.

Firmware updates can be carried out automatically by the user. The firmware update is available on floppy disk in the S-Record Format together with an installation program.

A PC with a free serial interface is required to install any updates.

Connecting the module to a PC

More detailed information on connecting the module to a PC can be found in the section "Interface/Making the connection".

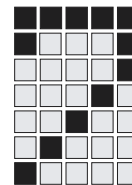
Transfer parameters for the serial interface are specific to the module. The serial interface of the PC is set automatically to the correct parameters.

Procedure

Before you start installing the update files, connect the module (RS 232 interface) to a free serial interface on your PC. Connect the coding pin "BOOT SWITCH" to set the parameters for the RS 232 interface for any firmware updates.

- Start the PSS.
 - The module boots up and activates the RS 232 interface in the mode for firmware updates.
 - You should be aware of the LED signals. Boot up was carried out successfully if the following LEDs signal:

CPU STATUS:	off
INTERFACE ERROR:	on
CAN ERROR:	on
- Switch on the PC
- Create a directory on your PC for the update files (e.g. C:\CPSS).
- Go to the directory you have created.
- Copy **all** the files from the update disk into the directory.

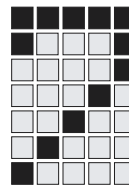


- Call up the interactive update program "UPDATE.EXE".
- Call up one of the following programs. What you select will depend on the selected wserial PC-Port (COM1 or COM2):
 - If the module is at COM1, call up:
>UPDATE 1<
 - If the module is at COM2, call up:
>UPDATE 2<
- The update program runs automatically. It is interactive.
 - Acknowledge your agreement using „Y“ or a different key.
 - Acknowledge using "N" for a negative answer.
- "OK" will appear on screen if the update has been carried out successfully.
- Release the coding pin from "BOOT SWITCH".
- Switch off the PSS.
- Perform a boot up by switching on the PSS again.



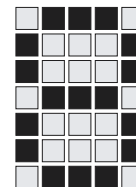
INFORMATION

An update may contain data extensions that are stored in the EEPROM. This could possibly overwrite parameter settings. In this case you will need to assign new parameters for the module.



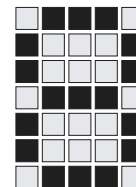
Terminal Functions and Firmware Updates

Notes



Technical Details

Technical details	PSS CANopen	PSS1 CANopen
Function	CANopen-interface in accordance with CiA DS 301 V3.0 und CiA DS 102 V2.0	
Application area	Non-safety-related applications	
Electrical data		
Current consumption	Aver. 380 mA	Aver. 380 mA
Interface(s)(galvamically isolated)	CANopen RS232	
Bus interface	9-pin male D-Sub connector	
Configuration interface	9-pin female D-Sub connector	
CANopen		
Device type	Slave	
Status indicators	LED	
fault indicators	LED	
Bit rate	6, 10, 12,5, 20, 33, 50, 66, 100, 125, 233, 500, 666, 1000 kBit/s Set via rotary switches	
Station address	Set via rotary switches in the range of 1...7F _H (1 ... 127 _D)	
Max. data length	512 words	
Input data	256 words	
Output data	256 words	
Data transfer	Word-by-word	
Operating data		
Terminating resistors	Selectable	
Communication structure	Using standard function block	
Module code	BD20 _H	
XW-range standard bus	1024 words	
Mechanical data		
Space requirement	1 slot	
Mounting position	Vertical in module rack	
Weight	1000 g	600 g



Technical Details

Environmental data	PSS CANopen	PSS1 CANopen
Protection type (EN 60 529, 10/91)	IP 20 (installed on a module rack)	
Ambient temperature (DIN IEC 68-2-14, 06/87)	0 ... +60 °C	
Storage temperature (EN 60068-2-1/-2, 03/93)	-25 ... +70 °C	
Climatic suitability (DIN IEC 68-2-30, 09/86)	max. 95% r.h.	
Condensation	Not permitted	
Vibration (EN 60068-2-6, 04/95)	Frequency range: 10 ... 100 Hz Amplitude: 0.1 mm, max. 5g	
Shock (DIN IEC 68-2-29)	30 g, 11 ms/10 g, 16 ms	
EMC	EN 50082-2, 03/95 EN 55011 A, 08/96	