

**User Manual** 

comX

**Communication Modules for Real-Time-Ethernet and Fieldbus** 



Hilscher Gesellschaft für Systemautomation mbH www.hilscher.com DOC100903UM04EN | Revision 4 | English | 2013-12 | Released | Public

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# 1 Introduction

# 1.1 About this Manual

This manual contains a description of the communication modules of the comX product family from Hilscher based on the communication controllers netX.

The comX product family consists of the comX Real-Time Ethernet modules, with electrical (RE types) or optical Ethernet interface (REFO types) and comX Fieldbus Master-modules (into which also a slave firmware of the matching communication system may be downloaded).

This manual contains information about the installation, configuration, commissioning and use of the modules.

The comX communication modules for Real-Time Ethernet and Fieldbus have been designed as part ("Embedded System") of an electronic device or system. This electronic device is denominated as target system or host system of the comX communication system within the scope of this document.

However, the integration of the comX modules (as *embedded systems*) into their target system (*"Host"*) is not topic of this manual. It is described in detail in a separate manual, namely the *comX Design Guide*, for details see section "*Documentation Overview comX*" on page 15.

### 1.1.1 Mandatory read Manual



#### Important!

Read and understand all instructions before installation of the communication module to avoid injury. First read the **Safety** chapter.

# 1.1.2 List of Revisions

Index	Date	Chapter	Revision
3	2012-06-04	12.1.9	Added typical current consumption of COMX50CA-REFO and all COMX10 in Technical Data
		8.3.3	Update of EtherCAT Slave LED descriptions
		12.3	Update of technical data of CANopen Slave, EtherNet/IP Adapter and Sercos Slave V3.
4	2013-12-18	1.1.3	Firmware names for COMX 51CA-RE added.
		1.2.1	Names of device description files for COMX 51CA-RE added.
		1.2.1	Table 5 and Table 6 added.
		1.2.3	Section Important Changes updated.
		3.2.3	Section on long-term contact reliability of host-side connector added.
		3.4.1	System requirements for SYCON.net updated.
		7.1.2	Figure 4: Pinning of Ethernet Interface of COMX 100CA-RE updated.
		7.3.2	Denomination of AVAGO transceiver chip corrected.
		7.4	Section COMX 51CA-RE added.
		8.2.3	Section LEDs PROFIBUS-DP Slave updated.
		8.2.7	Section LEDs CANopen Slave updated.
		8.2.8	Section LEDs DeviceNet Master updated.
		8.2.9	Section LEDs DeviceNet Slave updated.
		8.3.11	Section LEDs Sercos-Slave updated.
		11.1	Table 60: Firmware Versions with Support for Diagnostic Interface updated.
		11.3	Table 61: First Hardware Version with new USB Interface updated.
		12.1.1	Temperature range of COMX-CA-RE Rev. 8
		12.1.10	Technical data concerning COMX 51CA-RE added.
		12.3.2	Section EtherCAT Slave updated.
		12.3.3	Section EtherNet/IP-Scanner (Master) updated.
		12.3.4	Section EtherNet/IP-Adapter (Slave) updated.
		12.3.9	Section PROFINET IO Device (V3.5) added.
		12.3.10	Section Sercos-Master updated.
		12.3.11	Section Sercos-Slave updated.
		12.3.14	Section CANopen Slave updated.
		12.3.18	Section PROFIBUS DP Master updated.

### 1.1.3 Reference to Hardware, Software and Firmware

# $\rightarrow$

**Remark concerning Software Update:** The hardware revisions mentioned in this section and the versions of firmware, driver and configuration software belong together functionally. The firmware, the driver and the configuration software must be updated according to the specifications of this section at present hardware installation.

An overview on firmware update issues is given in section *Updating* the Firmware on page 110.

### <u>Hardware</u>

Module	Revision			
Real-Time Ethernet Modules (Master/Slave) with netX 100 Processor				
COMX 100CA-RE	Revision 8			
COMX 100CN-RE	Revision 2			
Real-Time Ethernet Modules (Slave) with netX 51 Processor				
COMX 51CA-RE	Revision 1			
Real-Time Ethernet Modules (Slave) with netX 50 Processor/Fibe	er Optic			
COMX 50CA-REFO	Revision 2			
Fieldbus Master/Slave Modules with netX 100 Processor				
COMX 100CA-CO	Revision 4			
COMX 100CA-DN	Revision 4			
COMX 100CA-DP	Revision 4			
COMX 100CN-CO	Revision 3			
COMX 100CN-DN	Revision 3			
COMX 100CN-DP	Revision 3			
Fieldbus Slave-Modules with netX 10 Processor				
COMX 10CA-CCS	Revision 2			
COMX 10CN-CCS	Revision 2			
COMX 10CA-COS	Revision 2			
COMX 10CN-COS	Revision 1			
COMX 10CA-DNS	Revision 2			
COMX 10CN-DNS	Revision 1			
COMX 10CA-DPS	Revision 2			
COMX 10CN-DPS	Revision 1			

Table 1: Reference to Hardware

### <u>Software</u>

Software	Software Version
SYCON.net	V 1.360.x.x
cifX Device Driver	V 1.2.x.x
Toolkit	V 1.1.x.x

Table 2: Reference to Software

#### **Firmware**

Firmware	Protocol	Firmware Version	For Hardware
Real-Time Etherne	t		
comXecm.nxf	EtherCAT Master	3.0.x.x	COMX 100CA-RE,
comXecs.nxf	EtherCAT Slave	2.5.34.x	COMX 100CN-RE
comXecs.nxf	EtherCAT Slave V4	4.2.11.x	
comXeim.nxf	EtherNet/IP Scanner	2.6.x.x	
comXeis.nxf	EtherNet/IP Adapter	2.7.x.x	
comXomb.nxf	Open Modbus/TCP	2.5.x.x	
comXpls.nxf	POWERLINK Controlled Node	2.1.x.x	
comXpnm.nxf	PROFINET IO Controller	2.6.x.x	
comXpns.nxf	PROFINET IO Device V3	3.4.x.x	
comXpns.nxf	PROFINET IO Device V3.5	3.5.x.x	
comXs3m.nxf	Sercos Master	2.1.x.x	
comXs3s.nxf	Sercos Slave	3.1.x.x	
comXvrs.nxf	VARAN Client	1.0.x.x	
cx50pns.nxf	PROFINET IO Device V3 Fiber Optics	3.4.x.x	COMX 50CA-REFO
cx50pns.nxf	PROFINET IO Device V3.5 Fiber Optics	3.5.x.x	
M060F000.nxf	EtherCAT Slave V4	4.2.11.x	COMX 51CA-RE
M060H000.nxf	EtherNet/IP Adapter	2.7.13.x	
M060L000.nxf	Open Modbus/TCP	2.5.11.x	
cx51pns.nxf	PROFINET IO Device V3.5	3.5.26.x	
M060J000.nxf	Sercos Slave	3.1.19.x	
Fieldbus			I
comXcom.nxf	CANopen Master	2.11.x.x	COMX 100CA-CO.
	•		COMX 100CN-CO
comXcos.nxf	CANopen Slave	3.6.x.x	COMX 100CA-CO, COMX 100CN-CO
comXdnm.nxf	DeviceNet Master	2.3.x.x	COMX 100CA-DN COMX 100CN-DN
comXdns.nxf	DeviceNet Slave	2.3.x.x	COMX 100CA-DN COMX 100CN-DN
comXdpm.nxf	PROFIBUS DP Master	2.6.x.x	COMX 100CA-DP, COMX 100CN-DP
comXdps.nxf	PROFIBUS DP Slave	2.7.x.x	COMX 100CA-DP, COMX 100CN-DP
M0203000.nxf	PROFIBUS MPI	2.4.x.x	COMX 100CA-DP, COMX 100CN-DP
M0505000.nxf	CANopen Slave	3.6.x.x	COMX 10CA-CO, COMX 10CN-CO
M0509000.nxf	CC-Link Slave	2.9.x.x	COMX 10CA-CC COMX 10CN-CC
M0507000.nxf	DeviceNet Slave	2.3.x.x	COMX 10CA-DN COMX 10CN-DN
M0502000.nxf	PROFIBUS DP Slave	2.7.x.x	COMX 10CA-DP, COMX 10CN-DP

Table 3: Reference to Firmware

The following firmware is still available for legacy applications but development of this firmware has been discontinued. For new developments use version 3.4 instead.

Firmware	Protocol	Firmware Version	For Hardware
comXpns.nxf	PROFINET IO Device V2	2.1.45.x	COMX 100CA-RE, COMX 100CN-RE

Table 4: Reference to old Firmware still available for Legacy Applications

# 1.1.4 Conventions in this Manual

Operation instructions, a result of an operation step or notes are marked as follows:

### **Operation Instructions:**

<instruction>

or

- 1. <instruction>
- 2. <instruction>

### Results:

२ <result>

#### Notes:



Important: <important note>



Note: <note>



<note, where to find further information>

# **1.2 Contents of Product DVD**

The **Communication Solutions DVD** for the comX communication modules contains installation information, the required configuration software, drivers, documentation and further tools for your comX communication module.

### **1.2.1** Device Description Files

The cifX DVD **EDS** directory includes the device description files for the following kinds of comX Real-Time Ethernet Slave modules :

Real-Time Ethernet	Name / Extension		
COMX 100CA-RE, COMX 100CN-RE			
EtherCAT Slave (V2)	Hilscher COMX 100XX RE ECS V2.2.X.xml		
EtherCAT Slave (V4)	Hilscher COMX 100XX RE ECS V4.2.X.xml		
EtherNet/IP Adapter (Slave)	HILSCHER COMX 100XX-RE EIS V1.1.EDS		
Powerlink Controlled Node / Slave	00000044_COMX 100XX RE PLS.xdd		
PROFINET IO-RT-Device (V3.4)	GSDML-V2.3-HILSCHER-COMX 100XX-RE PNS-20130225.xml		
PROFINET IO-RT-Device (V3.5) netX 100	GSDML-V2.3-HILSCHER-COMX 100XX-RE PNS-20130301.xml		
PROFINET IO-RT-Device (V2) (on request, only for legacy applications)	GSDML-V2.1-HILSCHER-COMX RE PNS- 20081210.xml		
Sercos Slave (V3)	Hilscher COMX RE S3S FixCFG FSPIO Default.xml (see note below)		
COMX 51CA-RE			
EtherCAT Slave (V4)	Hilscher COMX 51XX RE ECS V4.2.X.xml		
EtherNet/IP Adapter (Slave)	HILSCHER COMX 51XX-RE EIS V1.1.EDS		
PROFINET IO-RT-Device (V3.5) netX 51	GSDML-V2.3-HILSCHER-COMX 51XX-RE PNS-20131010.xml		
Sercos Slave (V3)	Hilscher COMX51XX RE S3S FixCFG FSPIO Default.xml (see note below)		
COMX 50CA-REFO			
PROFINET IO-RT-Device (V3.4) Fiber Optic	GSDML-V2.3-HILSCHER-COMX 50XX-REFO PNS-20130225.xml		
PROFINET IO-RT-Device (V3.5) netX 50 Fiber Optic	GSDML-V2.3-HILSCHER-COMX 50XX-REFO PNS-20130301.xml		

**Device Description Files comX Modules Real-Time Ethernet (Slave)** 

Table 5: Device Description Files comX Modules Real-Time Ethernet (Slave)

 $\rightarrow$ 

**Note:** If you use a sercos Master which is using SDDML files for configuration, and one of the defaults for vendor code, device ID, input data size or output data size was changed, then you have to export a new updated SDDML file from SYCON.net and import this SDDML file into the configuration software for the sercos Master.

The device description file is required to configure the used Real-Time Ethernet Master:

• EtherCAT Master

- EtherNet/IP Scanner,
- POWERLINK Managing Node,
- PROFINET IO Controller,
- Sercos Master.
- VARAN Client

### **Device Description Files for comX Modules Fieldbus (Slave)**

Fieldbus	Name / Extension
CC-Link Slave	For COMX 50:
	<pre>comx50xx-ccs_1.csp comx50xx-ccs_2.csp comx50xx-ccs_3.csp comx50xx-ccs_4.csp comx50xx-ccs-io_1.csp</pre>
	For COMX 10:
	<pre>comx10xx-ccs_1.csp comx10xx-ccs_2.csp comx10xx-ccs_3.csp comx10xx-ccs_4.csp comx10xx-ccs-io_1.csp</pre>
CANopen Slave	For COMX 10: COMX 10XX-COS COS.eds
	For COMX 100: COMX 100XX-CO COS.eds
DeviceNet Slave	For COMX 10: COMX_10XX-DNS_DNS.EDS
	For COMX 100: COMX_100XX-DN_DNS.EDS
PROFIBUS DP Slave	For COMX 10: HIL_0D82.GSD
	For COMX 100: HIL_0COF.GSD

Table 6:Device Description Files comX Modules Fieldbus (Slave)

The device description file is required to configure the used

- CC-Link Master
- CANopen Master
- DeviceNet Master
- PROFIBUS-DP Master

#### **Device Description Files comX Modules Real-Time Ethernet (Master)**

Furthermore, for the following comX communication modules Real-Time Ethernet (Master) there are device description files available on the COMX-DVD within the EDS directory:

Real-Time Ethernet	Name / Extension
EtherNet/IP Scanner (Master)	HILSCHER COMX 100XX-RE EIM V1.0.eds

Table 7: Device Description Files comX Modules Real-Time Ethernet (Master)

These device description files for EtherNet/IP-Master devices are required if an additional Ethernet/IP Master device shall communicate with a Hilscher-Ethernet/IP Master device via Ethernet/IP.

The Real-Time Ethernet system Open Modbus/TCP does not use device description files.

## 1.2.2 Documentation Overview comX

The following documentation overview gives information, for which items you can find further information in which manual.



All these documents are available on the Communication Solutions DVD delivered with the device underneath the directory **Documentation**, in Adobe Acrobat<sup>®</sup> Reader format (PDF). You can also use the latest edition of a manual, which is available on the website <u>www.hilscher.com</u> under **Support** > **Downloads** > **Manuals** or under **Products** directly with the information about your product.

### 1.2.3 Important Changes

### 1.2.3.1 **PROFINET IO-Device Firmware Versions 3.4 and 3.5**

The PROFINET IO Device firmware was revised and completed and is available in version 3.5 since the third quarter 2013.

Use the PROFINET IO Device firmware in version 3.5 for a new installation, when you create or develop your application program for the first time.

If you want to change in an existing system from the PROFINET IO Device firmware version 3.4 to the version 3.5, note the following guidelines:

1. Customize your application program according to the Migration Guide **PROFINET IO Device, Migration from V3.4 to V3.5**.



If you want to change to V3.5, please check in the Migration Guide **PROFINET IO Device, Migration from V3.4 to V3.5** which changes are necessary in the application program in order to use version 3.5.

- Adjust the configuration of your PROFINET IO Controller device. Use the new GSDML files in the configuration software of the PROFINET IO Controller for this:
  - GSDML-V2.3-HILSCHER-COMX 50XX-REFO PNS-20130301.xml,
  - GSDML-V2.3-HILSCHER-COMX 100XX-RE PNS-20130301.xml or
  - GSDML-V2.3-HILSCHER-COMX 51XX-RE PNS-20131010.xml
- 3. Update the PROFINET IO Device firmware in your device to version 3.5.

Note also:

- SYCON.net V1.360.x.x can configure the PROFINET IO Device firmware V3.4 as well as V3.5
- netX Configuration Tool V1.0510.x.x can configure the PROFINET IO Device firmware V3.4 as well as V3.5.
- The development of the PROFINET IO Device firmware V3.4 will not be continued, but this firmware version will be delivered furthermore.

On the Communication Solutions DVD, software and manuals relating to both firmware versions V3.4 and V3.5 are available:

	PROFINET IO-Device V3.4 Directory on the DVD \ File:	PROFINET IO-Device V3.5 Directory on the DVD \ File:	
Firmware	Firmware\COMX\comxpns.nxf	Firmware\COMX\PNS V3.5.X\comxpns.nxf	
		For comX51: Firmware\COMX\PNS V3.5.X\cx51pns.nxf	
Header	Examples and API\0. Header\Firmware\PROFINET IO Device V3.4.X	Examples and API\0. Header\Firmware\PROFINET IO Device V3.5.X	
GSDML	EDS\PROFINET\V3.4.X\GSDML-V2.3-HILSCHER-COMX 50XX-REFO PNS-20130225.xml	EDS\PROFINET\V3.5.X\GSDML-V2.3-HILSCHER- COMX 50XX-REFO PNS-20130301.xml	
	EDS\PROFINET\V3.4.X\GSDML-V2.3-HILSCHER-COMX 100XX-RE PNS-20130225.xml	EDS\PROFINET\V3.5.X\GSDML-V2.3-HILSCHER- COMX 100XX-RE PNS-20130301.xml	
	-	EDS\PROFINET\V3.5.X\ GSDML-V2.3-HILSCHER- COMX 51XX-RE PNS-20131010.xml	

Protocol API	Documentation\7. Programming Manuals\EN\3. Protocol API\PROFINET IO Device V3.4\PROFINET IO Device Protocol API 14 EN.pdf	Documentation\7. Programming Manuals\EN\3. Protocol API\PROFINET IO Device V3.5\PROFINET IO Device V3.5 Protocol API 07 EN.pdf
	TCP IP - Packet Interface API 13 EN.pdf	PROFINET IO Device - Migration from Version 3.4 to 3.5 MG 05 EN.pdf

Table 8: PROFINET IO-Device Firmware Version 3.4 and 3.5, Header, GSDML and Protocol API Manual

### 1.2.3.2 EtherCAT Slave Firmware Versions 2.5 and 4.2

The EtherCAT Slave firmware was revised and completed and is available in version 4.2 since the third quarter 2013.

Use the EtherCAT Slave firmware in version 4.2 for a new installation, when you create or develop your application program for the first time.

If you want to change in an existing system from the EtherCAT Slave firmware version 2.5 to the version 4.2, note the following guidelines:

1. Customize your application program according to the Migration Guide EtherCAT Slave, Migration from V2.5 to V4.2.



If you want to change to V4.2, please check in the Migration Guide **EtherCAT Slave, Migration from V2.5 to V4.2** which changes are necessary in the application program in order to use version 4.2.

- 2. Adjust the configuration of your EtherCAT Master device. Use the new XML file in the configuration software of the EtherCAT Master for this: *Hilscher COMX 100XX RE ECS V4.2.X.xml.*
- 3. Update the EtherCAT Slave firmware in your device to version 4.2.

Note also:

- SYCON.net V1.360.x.x can configure the EtherCAT Slave firmware V2.5 as well as V4.2.10.0 and higher.
- netX Configuration Tool V1.0510.x.x can configure the EtherCAT Slave firmware V2.5 as well as V4.2.
- The development of the EtherCAT Slave firmware V2.5 will not be continued, but this firmware version will be delivered furthermore.

On the Communication Solutions DVD, software and manuals relating to both firmware versions V2.5 and V4.2 are available:

	EtherCAT-Slave V2.5 Directory on the DVD \ File:	EtherCAT-Slave V4.2 Directory on the DVD \ File:	
Firmware	Firmware\COMX\comxecs.nxf	Firmware\COMX\ECS V4.X\comxecs.nxf	
		For comX51: Firmware\COMX\ECS V4.X\M060F000.nxf	
Header	Examples and API\0. Header\Firmware\EtherCAT Slave V2.5.X	Examples and API\0. Header\Firmware\EtherCAT Slave V4.2.X	
XML	EDS\EtherCAT\Slave\V2.X\Hilscher COMX 100XX RE ECS V2.2.X.xml	EDS\EtherCAT\Slave\V4.X\Hilscher COMX 100XX RE ECS V4.2.X.xml	
		For comX51: EDS\EtherCAT\Slave\V4.X\Hilscher COMX 51XX RE ECS V4.2.X.xml	
Protocol API	Documentation\7. Programming Manuals\EN\3. Protocol API\EtherCAT Slave V2\EtherCAT Slave Protocol API 21 EN.pdf	Documentation\7. Programming Manuals\EN\3. Protocol API\EtherCAT Slave V4\EtherCAT Slave V4 Protocol API 03 EN.pdf	
		EtherCAT Slave - Migration from Version 2.5 to 4.2 MG 02 EN.pdf	
		Object Dictionary V3 03 API EN.pdf	

Table 9: EtherCAT-Slave Firmware Version 2.5 and 4.2, Header, XML and Protocol API Manual

# **1.3 Ensuring Access Security**

The firmware of the protocols

- EtherNet/IP Scanner
- EtherNet/IP Adapter
- Open Modbus/TCP
- PROFINET IO Device
- sercos Slave

include an integrated web server. The access to the device by the integrated web server via Internet and Intranet brings with it the danger of misuse. You should therefore always protect the access to the device with passwords. Beyond this also restrict access to your network with suitable security mechanisms.



**Important:** In any case change the default password, otherwise you allow everyone the right to execute functions without authorization.

To protect the device from unauthorized access, you can restrict access to authorized users. How you set up an own user authentication is described in manual "Application Note, Functions of the Integrated WebServer" in chapter User Authentication.

# 1.4 Legal Notes

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- in life support systems;
- in systems in which failures in the software could lead to personal injury or injuries leading to death.

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CANopen<sup>®</sup> is a registered trademark of CAN in AUTOMATION - International Users and Manufacturers Group e.V. (CiA), Nuremberg.

CC-Link<sup>®</sup> is a registered trademark of Mitsubishi Electric Corporation, Tokyo, Japan.

DeviceNet<sup>®</sup> and EtherNet/IP<sup>®</sup> are trademarks of ODVA (Open DeviceNet Vendor Association, Inc).

 $\mathsf{EtherCAT}^{\$}$  is a registered trademark and a patented technology of Beckhoff Automation GmbH, Verl, Germany, formerly Elektro Beckhoff GmbH.

Modbus<sup>®</sup> is a registered trademark of Schneider Electric.

Powerlink<sup>®</sup> is a registered trademark of B&R, Bernecker + Rainer Industrie-Elektronik Ges.m.b.H, Eggelsberg, Austria

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## 1.4.7 EtherCAT Disclaimer

EtherCAT<sup>®</sup> is registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.



To get details and restrictions regarding using the EtherCAT technology refer to the following documents:

- "EtherCAT Marking rules"
- "EtherCAT Conformance Test Policy"
- "EtherCAT Vendor ID Policy"

These documents are available at the ETG homepage <u>www.ethercat.org</u> or directly over <u>info@ethercat.org</u>.

# 1.5 Licenses

If a comX Communication Module is used as a Slave, neither for the firmware nor for the configuration software SYCON.net a license is required.

Licenses are required, if the comX Communication Module is used with a firmware with master functionality\*.

\* The master license includes the comX Communication Module operating as master and the license for the configuration software SYCON.net for the respective comX.

# 2 Safety

# 2.1 General Note

The user manual, the accompanying texts and the documentation are written for the use of the products by educated personnel. When using the products, all Safety Instructions, Property Damage Messages and all valid legal regulations have to be obeyed. Technical knowledge is presumed. The user has to assure that all legal regulations are obeyed.

# 2.2 Intended Use

### 2.2.1 Intended Use of comX Communication Modules

The comX Communication Modules described in this user manual provide an interface from the device into which the module is integrated ("Target system") to one of the networks mentioned below. Depending from the chosen model and the loaded firmware, the Real-Time Ethernet or Fieldbus systems listed in the following table can be realized using the respective comX Communication Modules.

- EtherCAT Master with COMX 100CA-RE/COMX 100CN-RE
- EtherCAT Slave with COMX 100CA-RE/COMX 100CN-RE/ COMX 51CA-RE
- EtherNet/IP Scanner (Master) with COMX 100CA-RE/COMX 100CN-RE
- EtherNet/IP Adapter (Slave) with COMX 100CA-RE/COMX 100CN-RE/ COMX 51CA-RE
- Open Modbus/TCP (Server) with COMX 100CA-RE/COMX 100CN-RE/ COMX 51CA-RE
- Powerlink Controlled Node/Slave with COMX 100CA-RE/COMX 100CN-RE
- PROFINET IO-RT-Controller (Master) with COMX 100CA-RE/COMX 100CN-RE
- PROFINET IO-RT-IRT-Device (Slave) with COMX 100CA-RE/COMX 100CN-RE/COMX 50CA-REFO/ COMX 51CA-RE
- Sercos-Master with COMX 100CA-RE/COMX 100CN-RE
- Sercos-Slave with COMX 100CA-RE/COMX 100CN-RE/ COMX 51CA-RE
- VARAN Client (Slave) with COMX 100CA-RE/COMX 100CN-RE
- CANopen Master with COMX 100CA-CO/COMX 100CN-CO
- CANopen Slave with COMX 100CA-CO/COMX 100CN- CO/ COMX 10CA-CO/COMX 10CN- CO
- CC-Link Slave with COMX 10CA-CCS/COMX 10CN-CCS
- DeviceNet Master with COMX 100CA-DN/COMX 100CN-DN
- DeviceNet Slave with COMX 100CA-DN/COMX 100 CN- DN/ COMX 10CA-DN/COMX 10 CN- DN
- PROFIBUS DP Master with COMX 100CA-DP/COMX 100CN-DP

- PROFIBUS DP Slave with COMX 100CA-DP/COMX 100CN-DP/ COMX 10CA-DP/COMX 10CN-DP
- PROFIBUS MPI with COMX 100CA-DP/COMX 100CN-DP

The comX Communication Module may only be operated as part of a communication system as described in this document and in the comX Design Guide. It has been exclusively designed for creating connections to such networks. Typically, the comX communication module is integrated within a device.

# 2.3 Personnel Qualification

The comX Communication Module must only be installed, configured and removed by qualified personnel. Job-specific technical skills for people professionally working with electricity must be present concerning the following topics:

- Safety and health at work
- Mounting and connecting of electrical equipment
- Measurement and Analysis of electrical functions and systems
- Evaluation of the safety of electrical systems and equipment
- Installing and Configuring IT systems

# 2.4 Commitment to read and understand the Manual



### Important!

- To avoid personal injury and to avoid property damage to your system or to your communication module, you must read and understand all instructions in the booklet and all accompanying texts to your communication module, before installing and operating your communication module.
- First read the safety chapter.

# 2.5 Safety Instructions

To ensure your own personal safety and to avoid personal injury, you necessarily must read, understand and follow the following and all other safety instructions in this manual, before you install and operate your communication module.

## 2.5.1 Electrical Shock Hazard

The danger of a lethal electrical shock caused by parts with more than 50V may occur, if you open the device to install the comX communication module.

- Hazardous Voltage may be present inside the device, into which the comX communication module is integrated.
- Strictly obey to all safety rules provided by the device's manufacturer in the documentation!
- First disconnect the power plug of the device.
- Make sure, that the power supply is off at the device.
- Open the housing and install or remove the comX Communication Module only after disconnecting power.

An electrical shock is the result of a current flowing through the human body. The resulting effect depends on the intensity and duration of the current and on its path through the body. Currents in the range of approximately ½ mA can cause effects in persons with good health, and indirectly cause injuries resulting from startle responses. Higher currents can cause more direct effects, such as burns, muscle spasms, or ventricular fibrillation.

In dry conditions permanent voltages up to approximately 42.4 V peak or 60 V DC are not considered as dangerous, if the contact area is equivalent to a human hand.

Reference Safety [S2]

# 2.6 Safety Instructions to avoid Property Damage

To avoid property damage respectively device destruction to the comX communication module and to the system into which the comX is integrated, you necessarily must read, understand and follow the following and all other property damage messages in this manual, before you install and operate your communication module.

### 2.6.1 Device Destruction by exceeding allowed Supply Voltage

For all comX Communication Modules described in this manual adhere to the instruction hereafter:

The comX Communication Module must not be operated with a supply voltage of 5V! Exclusively use the mandatory supply voltage of 3,3 V ± 5 % as specified. Operation of the comX Communication Module at a voltage above the allowed range (i.e. more than 3,3 V + 5 %) can cause either severe damage to the comX module or even device destruction.

• The comX Communication Module must only be operated with the specified supply voltage. Take care of not exceeding the limits of the allowed voltage range for the supply voltage.

A supply voltage below the allowed range may cause malfunction of the comX module. The allowed range is given by the tolerances specified in the manual.

The specifications for the mandatory supply voltage for the comX modules described in this manual can be found in chapter *Technical Data of COMX Modules* beginning on page 130 and in Table 13: Supply Voltage and Signaling Voltage for comX Communication Modules beginning on page 35. For each type of device the necessary and allowed supply voltage, including the tolerance.

### 2.6.2 Device Destruction by exceeding allowed Signal Voltage

For all comX communication modules described in this manual, take care of the following notice:

- All I/O signal pins at the comX communication module tolerate only the specified signal voltage.
- Operation of the comX communication module at signal voltages significantly exceeding the specified maximum signal voltage of 3.3 V ± 5 % may cause severe damage or device destruction.

The specifications for the maximum signal voltage of the comX modules described in this manual can be found in *Table 12: Supply Voltage and Signaling Voltage for comX Communication Modules* beginning on page 34. The signal voltage is equal to the supply voltage.

### 2.6.3 Electro-statically sensitive Devices

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge.

This equipment is sensitive to electrostatic discharge, which cause internal damage and affect normal operation. Follow guidelines when you handle this equipment:

- Touch a grounded object to discharge potential static.
- Wear an approved grounding wrist strap.
- Do not touch connectors or pins on the cifX Communication Interface.
- Do not touch circuit components inside the equipment.
- If available, use a static-safe workstation.

When not in use, store the equipment in appropriate static-safe packaging. Reference Safety [2]

# 2.7 Labeling of Safety Messages

- The **Section Safety Messages** at the beginning of a chapter are pinpointed particularly. They are highlighted with a specific safety symbol and a signal word according to the degree of endangerment. Inside the safety message the danger is exactly named.
- The **Integrated Safety Messages** within an instruction description are highlighted with a signal word according to the degree of endangerment and possibly by a principle symbol. Inside the safety message the danger is exactly named.

Safety Symbol	USA	Sort of Warning or Principle
		Warning of Personal Injury and Property Damage Message
		USA: Warning of Personal Injury
		As in the scope of the ANSI Z535 Standard (for USA) instructions to a property damage message may not contain a warning triangle, this property damage messages are listed separately for the USA.
	Ż	Warning of Lethal Electrical Shock
		Warning of Damages by Electrostatic Discharge
		Principle: Disconnect the Power Plug

Table 10: Safety	Symbols and Sort of	of Warning or Principle
------------------	---	-------------------------

Signal Word	Meaning	Meaning (USA)
A DANGER	Indicates a direct hazard with high risk, which will have as consequence death or grievous bodily harm if it isn't avoided.	Indicates a Hazardous Situation Which if not Avoided, will Result in Death or Serious Injury.
<b>WARNING</b>	Indicates a possible hazard with medium risk, which will have as consequence death or (grievous) bodily harm if it isn't avoided.	Indicates a Hazardous Situation Which if not Avoided, could Result in Death or Serious Injury.
<b>A</b> CAUTION	Indicates a minor hazard with medium risk, which could have as consequence simple battery if it isn't avoided.	Indicates a Hazardous Situation Which if not Avoided, may Result in Minor or Moderate Injury.
NOTICE	Indicates a Property Damage Message.	Indicates a Property Damage Message.
Note	Indicates an important note in the manual.	Indicates an Important Note in the Manual.

Table 11: Signal Words

In this document all Safety Instructions and Safety Messages are designed according both to the international used safety conventions as well as to the ANSI Z535 standard, refer to reference safety [S1].

### 2.7.1 References Safety

- [S1] ANSI Z535.6-2006 American National Standard for Product Safety Information in Product Manuals, Instructions, and Other Collateral Materials
- [S2] IEC 60950-1, Information technology equipment Safety Part 1: General requirements, (IEC 60950-1:2005, modified); German Edition EN 60950-1:2006
- [S3] EN 61340-5-1 and EN 61340-5-2 as well as IEC 61340-5-1 and IEC 61340-5-2

# **3** Descriptions and Requirements

# 3.1 Description

The products of the comX family are communication modules for Real-Time Ethernet and Fieldbus for the integration into host systems.

 $\operatorname{com} X$  communication modules provide I/O data to the host in a dual-port memory.

Each Real-Time Ethernet protocol has special requirements to the communication technology, such as switch or hub functionality, for instance. The comX communication module covers these requirements for the respective protocols.

*Table 3: Reference to Firmware* on page 11 explains for any comX communication module which protocols are applicable.

### Highlights

- 2-Port Ethernet with switch and hub for line topology
- System-/Status-/Link- and Activity-LEDs
- Host Interface with 8- or 16-Bit data width
- USB- and UART diagnostic interface
- Direct access onto the process data within the Dual-Port Memory
- SYCON.net (based on FDT/DTM standard) available as configurator
- comX 10: Address and baudrate switches
- comX 50 CA-REFO: Fiber optic interface according to AIDA
- If used as embedded system, SYCON.net can be used if at least one of the interfaces USB and UART is connected to outside of the system.
- For all other cases, a PC adapter card is available for firmware update, configuration and diagnosis, see section *"Updating the Firmware"* on page 110.

### 3.1.1 Block Diagrams

In the following, the block diagram for the Real-Time Ethernet module COMX 100CA-RE is depicted:



Figure 1: Block Diagram of Real-Time Ethernet Module



Here the corresponding block diagram for the comX Fieldbus Modules:



Figure 2: Block Diagram of a Fieldbus Module

For a sensible application of the communication modules of the comX family, the following conditions must be fulfilled:

At the target system:

- Mechanical connection: 50 pin SMT connector (male, grid distance 1,27 mm, for instance type SAMTEC TFM 125 02 S D A or TFC 125 02 F D A, see www.samtec.com)
- 2. Electrical connection: Pin assignment as described in section Connector X1 in the comX Design Guide.
- 3. Communication via Dual-Port Memory. Access using the cifX Device Driver or based on a toolkit.
- 4. Power supply: Via pins in connector X1, see comX Design Guide. The applied supply voltage must always be in the range between 3,3 V  $\pm$  5 %.

At the communication system connected to the comX module (i.e. either Real-Time Ethernet or. Fieldbus):

- 5. A Master of the communication system fitting to the respective type of comX module and the loaded firmware, if a Slave firmware has been loaded.
- 6. A Slave of the communication system fitting to the respective type of comX module and the loaded firmware, if a Master firmware has been loaded.

Concerning topics 2 and 4 also see the pin assignments provided by the comX Design Guide in chapter 3.

# 3.2 Prerequisites for the Operation of the comX Communication Modules

### 3.2.1 Prerequisites for the Operation as Embedded System

The following prerequisites must be fulfilled for the operation of the comX communication modules as Embedded System .

- 1. The comX communication modules must be mounted correctly in the 50 pin SMT connector of the host system (when using comX modules of the CN series: this is additionally valid for the 30 pin SMT connector of the host system). The connector must be connected according to the specifications given in the comX Design Guide.
- 2. A suitable supply voltage in the voltage range 3.3 V  $\pm$  5% must be connected.
- 3. The module must be loaded with the correct firmware for the communication system/ protocol to be applied on the module.
- 4. Please find out the correct firmware for the applied system to be installed on your communication module using the reference table (*Table 3: Reference to Firmware* on page 11 within section 1.1.3 "*Reference to Hardware, Software and Firmware*").
- 5. The comX communication module must have been configured correctly,, for instance with the system configurator SYCON.net which is delivered with the comX modules (for more information, see SYCON.net documentation).
- 6. For the communication with the comX module, either the **cifX Device Driver** or the toolkit must have been installed correctly (at least V1.0.5.x).
- 7. In order to avoid thermal damage, the allowed temperature range needs to be obeyed. See specifications in section *"Technical Data of COMX Modules"* on page 132.

### 3.2.2 Prerequisites for the Operation with PC Adapter Card

The following prerequisites must be fulfilled for the operation of the comX communication modules with PC Adapter Card *CIF50-DB-COM-CA*.

- 1. On the PC Microsoft Windows<sup>®</sup> must have been installed (Windows® XP Service Pack 3, Windows® Vista (32 bit), Windows® 7 Service Pack 1 (32 bit) or Windows® 7 Service Pack 1 (64 bit)).
- 2. The PCI carrier board CIF50-CB-COM-ABC must have been mounted correctly into the PC. Check for good contact and correct fitting of the PCI carrier board in the PC slot connector.
- 3. The PC adapter board CIF50-DB-COM-CA must be solidly mounted within the slot of the PCI carrier board. Again, check for good contact and correct fitting of the PC adapter card in the slot of the PCI carrier board.
- 4. The comX communication module must be mounted correctly in the 50 pin SMT connector of the PC Adapter Card CIF50-DB-COM-CA (when using comX modules of the CN series: this is additionally valid for the 30 pin SMT connector of the host system). The connector must be connected according to the specifications given in the comX Design Guide.
- 5. The module must be loaded with the correct firmware for the communication system/ protocol to be applied on the module.
- 6. Please find out the correct firmware for the applied system to be installed on your communication module using the reference table (*Table 3: Reference to Firmware* on page 11 within section 1.1.3 "*Reference to Hardware, Software and Firmware*").
- 7. The comX communication module must have been configured correctly, for instance with the system configurator SYCON.net which is delivered with the comX modules (for more information, see SYCON.net documentation).
- 8. For the communication with the comX module, the **cifX Device Driver** must have been installed correctly (at least V1.0.5.x).

### 3.2.3 Remarks on Storage Stability and Contact Reliability of Hostside Connector

For the host-side connectors used in the comX communication modules (Samtec Types SFC-115-T2-L-D-A-K-TR and SFC-125-T2-L-D-A-K-TR), the following applies concerning storage stability and long-term immunity against contact failure:

- Hilscher only uses highly reliable connectors in the comX modules. The supplier of the connector warrants a minimum expected storage time of 5 years without any loss of spring tension when the connectors have been mounted. According to its general terms and conditions, Hilscher assures this warranted storage time to you.
- 2. In order to preserve the spring tension and to improve the immunity against contact failure of the host-side connectors, the following storage conditions are recommended:
  - Storage in dry package such as ESD bags which additionally can be heat-sealed.
  - Alternatively: Controlled storage at a temperature of max. 25°C and 50% relative humidity.

# 3.3 Supply Voltage and Signaling Voltage

The following table provides the required and permissible supply voltage for each of the devices as well as the required or tolerated signaling voltage for the I/O signal pins:

comX	Supply Voltage	Signaling Voltage
All types	+3.3 V DC ±5 %	+3.3 V DC ±5 %

Table 12: Supply Voltage and Signaling Voltage for comX Communication Modules

The typical current depends on the type of comX module, for detailed values on current consumption see section "*Technical Data of COMX Modules*".

# **3.4 Prerequisites for the Software Installation**

### 3.4.1 Prerequisites for the System Configurator SYCON.net

- PC with 1 GHz processor or higher
- Windows<sup>®</sup> XP SP3, Windows<sup>®</sup> Vista (32 bit) SP2, Windows<sup>®</sup> 7 (32 bit) SP1, Windows<sup>®</sup> 7 (64 bit) SP1, Windows<sup>®</sup> 8 (32 bit) or Windows<sup>®</sup> 8 (64 bit)
- Administrator privilege required for installation
- Internet Explorer 5.5 or higher
- Free disk space: min. 400 MByte
- DVD ROM drive
- RAM: min. 512 MByte, recommended 1024 MByte
- Graphic resolution: min. 1024 x 768 pixel
- Keyboard and Mouse
- USB, serial or Ethernet interface



**Note:** If the project file is saved and opened again or if it is used on another PC, the system requirements must match. Particularly the DTM must be installed on the used PC.

### Restriction

Touch screen is not supported.

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# 4 Getting Started comX Communication Modules

# 4.1 Hardware Installation as Embedded System (Master and Slave)

The following table describes the steps on how to install a comX Communication Module (Master and Slave) as it is typical for many cases.

#	Step	Description	For detailed information see section	Page
1	Preparation	Take all necessary safety precautions for the installation of the comX:		
	Take safety precautions	Carefully read the documentation of the device into which the comX is to be mounted. Especially, obey precisely to the safety rules demanded by the device's manufacturer In any case, take care of the following:	Electrical Shock Hazard	26
		Lethal Electrical Shock caused by parts with more than 50V! Disconnect the power plug of the connecting device. Make sure, that the power supply is off at the connecting device.		
2	Installation Hardware	-	Hardware Installation, Deinstallation and Replacement	
	Open housing	Now open the housing of the host system if present. Take care of the host system being not connected to its supply voltage.	Installing the comX Communication Module in its Target Environment	
	Install comX	Plug in and mount the comX within the host system.		
		If necessary, connect diagnostic connection cable from comX to Diagnosis PC (either via USB- or serial connection).		
	Close housing	Close the housing of the host system if any is present.		
	Plug the connecting cable to the Master or Slave	Plug in the connecting cable from the comX to the Master or Slave.  Important! When using Ethernet TCP/UDP-IP, EtherNet/IP or Modbus TCP exclusively use switches or 10/100 MBit/s dual speed hubs and ensure, that the network is operated at a speed of 100 MBit/s or in full duplex mode.	Failure in 10 MBit/s Half Duplex Mode and Workaround	178
		Note! Use the RJ45 Connector only for LAN connections but not for telecommunication connections!	Ethernet Interface of COMX 100CA-RE	53

#	Step	Description	For detailed information see section	Page
		When using PROFINET IO-Controller take care of the following:	See according User Manual at <i>Documentation</i>	15
		Important hint for cabling!	Overview comX	
		Only connect ports with different cross-over settings with each other. Otherwise no connection will be established between the devices. If the port settings of the comX PROFINET IO-Controller have not been set to AUTO, then port 0 will be set to uncrossed and port 1 to crossed.		
	Plug target system to supply voltage	Plug the target system to its supply voltage and switch it on.		
		If a PC has been connected for diagnostic purposes, do the same for the PC.		

Table 13: Steps for the Hardware Installation of a comX Communication Module (Master und Slave)
# 4.2 Configuration of the comX Communication Module (Slave)

The following table describes the steps on how to configure a comX Communication Module (Slave) as it is typical for many cases. The comX Communication Module (Slave) can be configured using the **cifX Test Application**. In many cases, the corresponding DTM in the configuration software **SYCON.net** can be used alternatively.

#	Step	Description For detailed information see section		Page
1	Driver Installation	Install the required driver(s) (cifX Device Driver, USB Driver). For a serial connection no special driver is required.	See separate manual "Software Installation and Documentation Overview "	
2 (a)	Download Firmware and Configuration	(a) with the cifX Test Application The cifX Test Application is delivered and installed with the cifX Device Driver .	Updating the Firmware using an Adapter Card and a PC	112
2.1 (a)	cifX Test Application	If not already happened in Step 1, install the		
2.2 (a)	Configuration steps comX (Slave)	In the cifX Test Application. - select and download the firmware - adjust the device parameters for comX Communication Module (Slave)	Updating the Firmware using an Adapter Card and a PC	112
2 (b)	OR Download Firmware and Configuration, Diagnosis, I/O Data	(b) using SYCON.net Possibly use the corresponding DTM in the configuration software SYCON.net.		
2.1 (b)	Installing SYCON.net	Run the SYCON.net-Setup and follow to the instructions of the installation wizard.	See separate manual "Software Installation and Documentation Overview "	
2.2 (b)	Firmware Download	<ul> <li>Start configuration software SYCON.net,</li> <li>Create new project /Open existing project,</li> <li>Insert Slave into configuration,</li> <li>Select driver and assign device.</li> <li>Select and download the firmware.</li> </ul>	Update the Firmware with SYCON.net Also see corresponding user manual under Documentation Overview	116 15
2.3 (b)	Configuration comX (Slave)	- Configure the comX Communication Module (Slave)	comX Device Names in	42
2.4 (b)	Download Configuration	- Download the configuration to the comX (Slave) *. (*EtherCAT-Slave, EtherNet/IP-Adapter (Slave), Open-Modbus/TCP (Slave), Powerlink-Controlled-Node/Slave, PROFINET IO-Device (Slave), Sercos-Slave, PROFIBUS DP-Slave, CANopen-Slave, DeviceNet-Slave,)	SYCON.net	
2.5 (b)	Diagnosis	<ul> <li>Right click on device symbol.</li> <li>Select context menu entry Diagnosis,</li> <li>then select Diagnosis &gt; General or</li> <li>Firmware Diagnosis,</li> <li>or select Diagnosis &gt; Extended Diagnosis.</li> </ul>		

2.6 (b)	I/O Monitor	<ul> <li>Right click on device symbol.</li> <li>Select context menu entry Diagnosis,</li> <li>then Tools &gt; IO Monitor.</li> <li>Check the input or output data.</li> </ul>		
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Table 14: Configuration Steps for the comX Communication Module (Slave)



**Important:** SYCON.net cannot be used for the configuration of the CC-Link Slave communication module COMX 50CA-CC.

# 4.3 Configuration of the comX Communication Module (Master)

The following table describes the steps on how to configure a comX Communication Module (Master) as it is typical for many cases. The comX Communication Module (Master) can be configured using the configuration software **SYCON.net**.

#	Step	Description	For detailed information see section	Page
1	Driver Installation	Install the required driver(s) (cifX Device Driver, USB Driver). For a serial connection no special driver is required.	See separate manual "Software Installation and Documentation Overview "	
2	Download Firmware and Configuration, Diagnosis, I/O Data	using SYCON.net Possibly use the corresponding DTM in the configuration software SYCON.net		
		(Alternatively, for this purpose also the usage of the cifX Test Application is possible.)		
2.1	Installing SYCON.net	Run the SYCON.net-Setup and follow to the instructions of the installation wizard.	See separate manual "Software Installation and Documentation Overview "	
2.2	Firmware Download	<ul> <li>Start configuration software SYCON.net,</li> <li>Create new project /Open existing project,</li> <li>Insert Master into configuration,</li> <li>Select driver and assign device.</li> <li>Select and download the firmware.</li> </ul>	Update the Firmware with SYCON.net Also see corresponding user manual under Documentation Overview	116 15
2.3	Configuration comX (Master)	- Configure the comX (Master).	comX Device Names in	42
2.4	Download Configuration	- Download the configuration to the comX (Master) * (*EtherCAT-Master, EtherNet/IP-Scanner (Master), PROFINET IO-Controller (Master), Sercos- Master, PROFIBUS DP-Master, CANopen-Master, DeviceNet-Master)	SYCON.net	
2.5	Diagnostic	<ul> <li>Right click on device symbol.</li> <li>Select context menu entry Diagnosis,</li> <li>then select Diagnosis &gt; General, Firmware or Master Diagnosis,</li> <li>or select Diagnosis &gt; Extended Diagnosis.</li> </ul>		
2.6	I/O Monitor	<ul> <li>Right click on device symbol.</li> <li>Select context menu entry <b>Diagnosis</b>,</li> <li>then <b>Tools &gt; IO Monitor</b>.</li> <li>Check the input or output data.</li> </ul>		

Table 15: Configuration Steps for the comX Communication Module (Master)

## 4.4 Notes for the Configuration of the Master Device

To configure the Master, a device description file is required. Please take into account the following notes during the configuration of the Master Device:

Real-Time Ethernet-System	Notes
EtherCAT Slave	To configure the Master, an XML file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Vendor ID, Product Code, Serial Number, Revision Number, Output/Input Data Bytes
	If the XML file Hilscher COMX RE ECS V2.2.X.xml is use/updated, the firmware with the version 2.2.x must be use/updated.
	The loadable firmware supports for the number of cyclic input data and for cyclic output data in total up to 400 bytes. If more than 200 bytes for input data or for output data should be exchanged via EtherCAT, then a customer specific XML file is necessary. Additionally the following formula applies: (number of input bytes + 3)/4 + (number of output bytes + 3)/4 must be less or equal to 100.
EtherNet/IP- Adapter	To configure the Scanner/Master, an EDS file (device description file) is required. The settings in the used Scanner/Master must comply with the settings in the Adapter/Slave to establish communication. Important parameters are: Input, Output Data Bytes, Vendor ID, Product Type, Product Code, Major Rev, Minor Rev, IP Address and Netmask.
Powerlink- Controlled- Node/Slave	To configure the Managing Node/Master, an XDD file (device description file) is required. The settings in the used Managing Node/Master must comply with the settings in the Controlled Node/Slave, to establish communication. Important parameters are: Vendor ID, Product Code, Serial Number, Revision Number, Node ID, Output and Input length.
PROFINET IO- Device	To configure the Controller, a GSDML file (device description file) is required. The settings in the used Controller must comply with the settings in the Device to establish communication. Important parameters are: Station Name, Vendor ID, Device ID, Input and Output Data Bytes.
	Under <b>Name of Station</b> , the name must be typed which was also used in the configuration file of the master of this device. If no name chosen freely is used in the configuration file, then the name from the GSDML file is used.
sercos Slave	The sercos Master uses the sercos address to communicate with the slave. Some Masters verify Device ID, Vendor Code, Input Data Size and Output Data Size and do further communication to the slave only if all these values match. Therefore the master reads these parameters from the slave and compares them with the configuration stored in the master.
	The parameters Device ID, Vendor Code, Input Data Size and Output Data Size are part of the SDDML device description file. If for the configuration of the sercos Master SDDML files are used and a default value of one of these parameters was changed, then a SDDML file must be created in the configuration software via Export SDDML and then used in the configuration of the SERCOS Master.

Fieldbus-System	Notes
PROFIBUS DP Slave	To configure the Master, a GSD file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Station Address, Ident Number, Baudrate and Config Data (the configuration data for the output and input length).
CANopen Slave	To configure the Master, an EDS file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Node Address and Baudrate.
DeviceNet Slave	To configure the Master, an EDS file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: MAC ID, Baudrate, Produced Size, Consumed Size, Vendor ID, Product Type, Product Code, Major Rev, Minor Rev.
CC-Link Slave	To configure the Master, a CSP file (device description file) is required. The settings in the used Master must comply with the settings in the Slave to establish communication. Important parameters are: Slave Station Address, Baudrate, Station Type and Vendor Code.

Table 16: Notes for the Configuration of the Master Device



Further information to the device description files can be found under section *Device Description Files* on page 13.

## 4.5 Device Names in SYCON.net

The following table contains the device names displayed for the single communication protocols in the configuration software SYCON.net.

The table shows the card type of the comX Communication Interface and which protocol can be used. Furthermore, the table shows, for which protocol which device must be selected from the device catalog to configure the comX Communication Module with SYCON.net.

comX (Module Type)	Protocol	DTM Specific Group	Device Name in SYCON.net
Real-time Ethernet	EtherCAT Master	Master	COMX 100XX-RE/ECM
	EtherCAT Slave	Gateway/Stand- Alone Slave	COMX 100XX-RE/ECS
	EtherNet/IP Scanner (Master)	Master	COMX 100XX-RE/EIM
	EtherNet/IP Adapter (Slave)	Gateway/Stand- Alone Slave	COMX 100XX-RE/EIS
	Open-Modbus/TCP	Gateway/Stand- Alone Slave	COMX 100XX-RE/OMB
	Powerlink- Controlled- Node/Slave	Gateway/Stand- Alone Slave	COMX 100XX-RE/PLS
	PROFINET IO-RT- Controller	Master	COMX 100XX-RE/PNM
	PROFINET IO-RT- Device	Gateway/Stand- Alone Slave	COMX 100XX-RE/PNS
	Sercos-Master	Master	COMX 100XX-RE/S3M
	Sercos-Slave	Gateway/Stand- Alone Slave	COMX 100XX-RE/S3S
Real-time Ethernet	EtherCAT Slave	Gateway/Stand- Alone Slave	COMX 51XX-RE/ECS
	EtherNet/IP Adapter (Slave)	Gateway/Stand- Alone Slave	COMX 51XX-RE/EIS
	Open-Modbus/TCP	Gateway/Stand- Alone Slave	COMX 51XX-RE/OMB
	PROFINET IO-RT- Device	Gateway/Stand- Alone Slave	COMX 51XX-RE/PNS
	Sercos-Slave	Gateway/Stand- Alone Slave	COMX 51XX-RE/S3S
	PROFINET IO-RT- Device	Gateway/Stand- Alone Slave	COMX 50XX- REFO/PNS
CANopen	CANopen Master	Master	COMX 100XX-CO/COM
	CANopen Slave	Gateway/Stand- Alone Slave	COMX 100XX-CO/COS COMX 10XX-COS/COS
DeviceNet	DeviceNet Master	Master	COMX 100XX-DN/DNM
	DoviceNet Slove	Gateway/Stand-	COMX 100XX-DN/DNS
	Deviceiver Slave	Alone Slave	COMX 10XX-DNS/DNS
PROFIBUS-DP	PROFIBUS DP Master	Master	COMX 100XX-DP/DPM
	PROFIBUS DP Slave	Gateway/Stand- Alone Slave	COMX 100XX-DP/DPS

			COMX 10XX-DPS/DPS
CC-Link	CC-Link Slave	Gateway/Stand- Alone Slave	COMX 10XX-CCS/CCS
XX means CA or CN			

Table 17: Device Names in SYCON.net by Communication Protocol

# 4.6 Exchange of comX Communication modules (Master and Slave)

## 4.6.1 Steps for Exchange of Hardware

In the following table the steps for the exchange (in the replacement case) of a comX communication module (Master oder Slave) are described, as they are typical for many cases of application.

#	Step	Description	For detailed information see section	Page
1	Hardware Installation	Deinstall comX communication module to be replaced.	Decommissioning	50
		Take the required safety precautions.		
		Take all necessary safety precautions for the installation of the comX:		
2	Take safety precautions	Carefully read the documentation of the device into which the comX is to be mounted. Especially, obey precisely to the safety rules demanded by the device's manufacturer	Electrical Shock Hazard	26
		In any case, take care of the following:		
		<b>WARNING</b>		
		Lethal Electrical Shock caused by parts with more than 50V!		
		Disconnect the power plug of the connecting device.		
		Make sure, that the power supply is off at the connecting device.		
3	Open housing	Now open the housing of the host system if present.		
		Take care of the host system being not connected to its supply voltage as long as the case is open.		
4	Remove screws fixing the comX	First remove both screws used for fixing the comX at the front panel of the device.		
5	Remove comX	Then pull the comX communication module to be exchanged carefully out of the connector(s).	Decommissioning	
6	Plug-in replacement comX	Now carefully plug the replacement comX communication module into the connector(s). Take care of good fitting and contact.		
7	Fix replacement comX	Fix the replacement comX at the front panel of the device using the 2 screws.		
8	Close housing	Close the housing of the host system if any is present.		50
9	Plug target system to supply voltage	Plug the target system to its supply voltage and switch it on.		

Table 18: Steps how to replace the comX Communication modules (Master and Slave)

# 4.6.2 Load Firmware & Configuration into Replacement Module comX (Slave)

**Note:** For comX communication module s <u>without</u> **Rotary Switch Slot Number (Module ID)** in terms of a device exchange service (replacement case) you must manually download the same firmware and configuration into the replacement cifX, as into the preceding cifX Communication Interface.

The following table describes the steps on how to download the firmware and the configuration of a comX communication module (Slave) exchange service (replacement case) as it is typical for many cases. The download can be performed for the Slave using the **cifX Test Application** or alternatively the configuration software **SYCON.net** can be used.

#	Step	Description	For detailed information see section	Page
1 (a)	Download Firmware and Configuration	(a) With the cifX Test Application The cifX Test Application is delivered and installed together with the cifX Device Driver.	Updating the Firmware using an Adapter Card and a PC	112
1.1 (a)	Configuration steps comX (Slave)	In the <b>cifX Test Application</b> - select and download the firmware - adjust the device parameters for comX communication module (Slave)	See above	
1 (b)	OR Download Firmware and Configuration	(b) using SYCON.net		
1.1 (b)	Firmware Download	<ul> <li>Start configuration software SYCON.net,</li> <li>open existing project,</li> <li>if so, select driver,</li> <li>assign device.</li> <li>Select and download the firmware.</li> </ul>	Update the Firmware with SYCON.net See corresponding user manual under Documentation and	116 15
1.2 (b)	Download Configuration	- Download the configuration to the comX (Slave) *. (*EtherCAT-Slave, EtherNet/IP-Adapter (Slave), Open-Modbus/TCP (Slave), Powerlink-Controlled-Node/Slave, PROFINET IO-Device (Slave), Sercos-Slave, PROFIBUS DP-Slave, CANopen-Slave, DeviceNet-Slave,)	Device Names in SYCON.net	42

Table 19: Firmware and Configuration Download Steps comX Communication modules (Slave) at Module Exchange (Replacement Case)

# 4.6.3 Load Firmware & Configuration into Replacement Module comX (Master)

The following table describes the steps on how to download the firmware and the configuration of a comX Communication Module (Master) exchange service (replacement case) as it is typical for many cases. The download can be performed for the Master using the configuration software **SYCON.net** 

#	Step	Description	For detailed information see section	Page
1	Download Firmware and Configuration	using SYCON.net		
1.1	Firmware Download	<ul> <li>Start configuration software SYCON.net,</li> <li>open existing project,</li> <li>if so, select driver,</li> <li>assign device.</li> <li>Select and download the firmware.</li> </ul>	Update the Firmware with SYCON.net See corresponding user manual under Documentation	116 15
1.2	Download Configuration	- Download the configuration to the replacement comX (Master)* (*EtherCAT-Master, EtherNet/IP-Scanner (Master), PROFINET IO-Controller (Master), Sercos- Master, PROFIBUS DP-Master, CANopen-Master, DeviceNet-Master)		

Table 20: Steps Firmware and Configuration Download Steps comX Communication modules (Master) at Module Exchange (Replacement Case)

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**Note:** As a prerequisite for the software update, the project files, the configuration files and firmware files have to be saved.

At existing hardware installation the firmware, the driver and the configuration software must be updated according to the versions given in section *"Reference to Hardware, Software and Firmware"* on page 10.

This is illustrated by the following graphic:



For detailed information about firmware update also see chapter *Updating the Firmware* on page 110.

# 5 Hardware Installation, Replacement

# Deinstallation

```
and
```

# 5.1 Warning Messages on Personal Injury

Obey to the following safety advices, when installing, deinstalling or replacing the comX Communication Modules described in this manual.

## 5.1.1 Electrical Shock Hazard



### **WARNING**

#### Lethal Electrical Shock caused by parts with more than 50V!

- HAZARDOUS VOLTAGE may be present inside the device, into which the comX communication module is integrated.
- Strictly obey to all safety rules provided by the device's manufacturer in the documentation!
- Therefore first disconnect the power plug of the device.
- Make sure, that the power supply is off at the device.
- Open the housing and install or remove the comX Communication Module only after disconnecting power.
- Strictly obey to all safety rules given in the documentation supplied by the manufacturers of this device.!

## 5.2 Property Damage Messages

Obey to the following property damage messages, when installing, deinstalling or replacing the comX Communication Module.

### 5.2.1 Device Destruction by exceeding allowed Supply Voltage

Adhere for all comX Communication Modules described in this manual the instruction hereafter:



#### NOTICE

#### **Device Destruction!**

- Use only the mandatory supply voltage to operate the comX Communication Module.
- Operating the comX with a supply voltage above of the specified range leads to device destruction.

#### USA:

#### NOTICE

#### **Device Destruction!**

- Use only the mandatory supply voltage to operate the comX Communication Module.
- Operating the comX with a supply voltage above of the specified range

## 5.2.2 Device Destruction by exceeding allowed Signaling Voltage

Adhere for all comX Communication Modules described in this manual the instruction hereafter:



#### Device Destruction!

NOTICE

- All I/O signal pins at the comX Communication Module tolerate only a specified signaling voltage!
- Operation the comX with a signaling voltage other than the specified signaling voltage may lead to severe damage to the comX Communication Module!

#### USA:



#### **Device Destruction!**

- All I/O signal pins at the comX Communication Module tolerate only a specified signaling voltage!
- Operation the comX with a signaling voltage other than the specified signaling voltage may lead to severe damage to the comX Communication Module!

For detailed information on the supply and signaling voltage of the comX Communication Modules described in this manual, refer to section "Supply Voltage and Signaling Voltage" on page 33.

#### 5.2.3 Electro-statically sensitive Devices

Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge.



#### NOTICE

#### **Electro-statically sensitive Devices**

• To prevent damage to the device and the comX Communication Module, make sure, that the comX is grounded via the endplate and the PC and make sure, that you are discharged when you install/ deinstall the comX Communication Module.

## 5.3 Installing the comX Communication Module in its Target Environment

For the installation of the comX communication module into the device into which the comX module is to be integrated (also denominated as "host system" or "target environment"), proceed as follows:

#### **WARNING**

- Hazardous Voltage may be present inside the device, into which the comX communication module is integrated.
- Strictly obey to all safety rules given in the documentation supplied by the manufacturers of this device!
- Plug off the device into which the comX module is to be integrated!
- Make sure, that this device is separated from the supply voltage and free of current, before you continue.

#### NOTICE

- Adhere to the necessary safety precautions for components that are vulnerable with electrostatic discharge described in section 5.2.3"Electro-statically sensitive Devices" on page 49
- Step 1: If necessary, remove the housing of this device. In all cases, strictly adhere to the manuals of this device.
- > **Step 2**: Definitely avoid touching open contacts or ends of wires.
- Step 3: Plug in the comX communication module carefully but solidly in to its connector (50 pin SMT connector, male, grid width 1,27 mm, at COMX-CN modules additionally 30 pin SMT connector, male, grid width 1,27 mm).
- Step 4: If you had opened the housing of the device in step 1, then close it now. Again strictly adhere to the manuals of this device anyway.
- Step 5: Connect the device with its supply voltage and switch it on again. Check, whether the device behaves normally.
- Step 6: If this is the case, connect the device to the corresponding communication partner (Master in case of Slave Module, Slave in case of Master-Module) via Ethernet- or Fieldbus (depending on the type of comX communication module).

## 5.4 Decommissioning

In order to avoid personal injury, material and environmental damage strictly obey the rules on putting the comX modules out of service and on disposal given in section "*Decommissioning, Replacement and Disposal*" on page 170.

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# Installing the Software

The installation of the software delivered with the device on the Communication Solutions DVD (Configuration software, drivers, tools) is subject of a separate manual "*comX*", which is also contained on that DVD, see there.

There you will find descriptions of the installation of the following software under Windows XP, 7 and 8:

- cifX Device Driver
- SYCON.net
- netX Configuration Tool
- USB-Driver

- 7 Device Photos (Position of Switches, LEDs and Interfaces)
- 7.1 Real-Time Ethernet Communication Module COMX 100CA-RE
- 7.1.1 COMX 100CA-RE



Figure 3: Photo of Communication Module COMX 100CA-RE with Cooler

#### LED Displays of COMX 100CA-RE



SMT-Connectors of the COMX 100CA-RE (Connection to Host)



System Interface

#### Connectors of the COMX 100CA-RE (connected to outside)



Ethernet Interface Channel 0

Ethernet Interface Channel 1

## 7.1.2 Ethernet Interface of COMX 100CA-RE



Figure 4: Pinning of Ethernet Interface of COMX 100CA-RE

Pin	Signal	Description	
1	TX+	Transmit data positive	
2	TX–	Transmit data negative	
3	RX+	Receive data positive	
4	TERM	Connected and terminated	
5	TERM	to PE via RC combination*	
6	RX –	Receive data negative	
7	TERM	Connected and terminated	
8	TERM	to PE via RC combination*	
		* Bob Smith Termination	

Table 21: Pinning of Ethernet Connector at Channel 0 and Channel 1

The Ethernet interfaces of the comX communication modules provide the Auto-Crossover feature.

For a schematic diagram of the Ethernet Interface of COMX 100CA-RE refer to the comX Design Guide.

# 7.2 Real-Time Ethernet Communication Module COMX 100CN-RE

### 7.2.1 COMX 100CN-RE



Figure 5: Photo of Communication Module COMX 100CN-RE



**Note:** Please take care of the following: The figure above shows the COMX 100CN-RE communication module without the metal blocks required for mounting!

#### SMT-Connectors of the COMX 100CN-RE (Connection to Host)



System Interface

Ethernet Interface

### 7.2.2 Ethernet Interface of COMX 100CN-RE

The pin assignment of the Ethernet interface of the COMX 100CN-RE is described in the comX Design Guide within subsection 3.2.4.

# 7.3 Real-Time Ethernet Communication Module COMX 50CA-REFO with Fiber Optic

## 7.3.1 COMX 50CA-REFO

The COMX 50CA-REFO communication modules conform with the AIDA specifications.



Figure 6: Photo COMX 50CA-REFO

#### LED Displays of COMX 100CA-RE



SMT-Connectors of the COMX 100CA-RE (Connection to Host)



System Interface

#### **Optical Connectors of the COMX 50CA-REFO (connected to outside)**



Ethernet Interface Channel 0 (Fiber Optic)

Ethernet Interface Channel 1 (Fiber Optic)

## 7.3.2 Optical Ethernet Interface of COMX 50CA-REFO

The COMX 50CA-REFO has 2 optical Ethernet interfaces with Transceivers of type Avago QFBR-5978.

# 7.4 Real-Time Ethernet Communication Module COMX51CA-RE

7.4.1 COMX51CA-RE



Figure 7: Photo of Communication Module COMX51CA-RE with Cooler

#### LED Displays of COMX51CA-RE



#### SMT-Connectors of the COMX51CA-RE (Connection to Host)



System Interface

#### Connectors of the COMX51CA-RE (connected to outside)



Ethernet Interface Channel 0

Ethernet Interface Channel 1

## 7.4.2 Ethernet Interface of COMX51CA-RE

See section Ethernet Interface of COMX 100CA-RE on page 53.

## 7.5 CANopen Communication Module COMX 100CA-CO

## 7.5.1 COMX 100CA-CO



Figure 8: Photo of Communication Module COMX100 CA-CO

#### LED Displays of COMX 100CA-CO



SMT-Connectors of the COMX 100CA-CO (Connection to Host)



System Interface

Fieldbus connector of COMX 100CA-CO (connected to outside)



CANopen Interface

## 7.5.2 CANopen Interface of COMX 100CA-CO

The following figure shows the CANopen interface (D-Sub plug, male, 9 pin)



Figure 9: CANopen-Interface (D-Sub-plug, 9-pin) of the COMX 100CA-CO

Connection with D-Sub-Plug	Signal	Description
2	CAN_L	CAN-Low bus line
3	CAN_GND	CAN reference potential
7	CAN_H	CAN-High bus line

Figure 10: Pinning of CANopen Interface of the COMX 100CA-CO

## 7.6 CANopen Communication Module COMX 100CN-CO

## 7.6.1 COMX 100CN-CO



Figure 11: Photo of Communication Module COMX100 CN-CO

#### SMT-Connectors of the COMX 100CN-CO (Connection to Host)



System Interface

**CANopen Interface** 

## 7.6.2 CANopen Interface of COMX 100CN-CO

The pin assignment of the CANopen interface of the COMX 100CN-CO is described in the comX Design Guide within subsection 3.2.1.

## 7.7 DeviceNet Communication Module COMX 100CA-DN

## 7.7.1 COMX 100CA- DN



Figure 12: Photo of Communication Module COMX 100CA-DN



**Note:** Please take care of the following: The figure above shows the COMX 100CA-DN communication module without the metal blocks required for mounting!

#### LED Displays of COMX 100CA-DN



SMT-Connectors of the COMX 100CA-DN (Connection to Host)



System Interface

Fieldbus connector COMX 100CA-DN (connected to outside)



**DeviceNet Interface** 

### 7.7.2 DeviceNet Interface of COMX 100CA-DN

The following figure shows the DeviceNet interface of the COMX 100CA-DN (Combicon plug, 5 pin):



Figure 13: DeviceNet Interface (CombiCon-Plug, 5 pin) of the COMX 100CA-DN

Connection with CombiCon plug	Signal	Color	Description
1	V-	Black	Data reference potential of the DeviceNet power supply
2	CAN_L	Blue	CAN Low signal
3	Drain		Shield
4	CAN_H	White	CAN High signal
5	V+	Red	+24 V DeviceNet supply voltage

Table 22: Pinning of the DeviceNet-Interface of the COMX 100CA-DN

## 7.8 DeviceNet Communication Module COMX 100CN-DN

## 7.8.1 COMX 100CN-DN



Figure 14: Photo of Communication Module COMX 100CN-DN

#### SMT-Connectors of the COMX 100CN-DN (Connection to Host)



System Interface

DeviceNet -Interface

### 7.8.2 DeviceNet Interface of COMX 100CN-DN

The pin assignment of the DeviceNet interface of the COMX 100CN-DN is described in the comX Design Guide within subsection 3.2.2.

## 7.9 PROFIBUS-DP Communication Module COMX 100CA-DP

### 7.9.1 COMX 100CA-DP



Figure 15: Photo of Communication Module COMX 100CA-DP



**Note:** Please take care of the following: The figure above shows the COMX 100CA-DP communication module without the metal blocks required for mounting!

LED Displays of COMX 100CA-DP



COM-LED

SMT-Connector of the COMX 100CA-DP (Connection to Host)



System Interface

Fieldbus connector COMX 100CA-DP (connected to outside)



**PROFIBUS-DP-Interface** 

## 7.9.2 PROFIBUS-DP Interface of COMX 100CA-DP

The following figure shows the PROFIBUS-DP interface (D-Sub plug, female, 9 pin)



Figure 16: PROFIBUS-DP-Interface(D-Sub plug, female, 9 pin) of the COMX 100CA-DP

Connection with D-Sub-Plug	Signal	Description
3	RxD/TxD-P	Receive-/Send data-P (Line B at plug)
5	DGND	Data reference potential
6	VP	Power supply (positive)
8	RxD/TxD-N	Receive-/Send dataN (Line A at plug)

Table 23: Pinning of the PROFIBUS-DP Interface of the COMX 100CA-DP

## 7.10 PROFIBUS-DP Communication Module COMX 100CN-DP

## 7.10.1 COMX 100CN-DP



Figure 17: Photo of Communication Module COMX 100CN-DP

#### SMT-Connectors of the COMX 100CN-DP (Connection to Host)



System Interface

**PROFIBUS-DP-Interface** 

## 7.10.2 PROFIBUS-DP Interface of COMX 100CN-DP

The pin assignment of the PROFIBUS-DP interface of the COMX 100CN-DP is described in the comX Design Guide within subsection 3.2.3.

## 7.11 CC-Link Communication Module COMX 10CA-CCS

## 7.11.1 COMX 10CA-CCS



Figure 18: Photo of Communication Module COMX 10CA-CCS

#### LED Displays of COMX 10CA-CCS



Address and Baudrate Switches of the COMX 10CA-CCS



Address Switch 1 for CC-Link Slave Address (x10)



Address Switch 2 for CC-Link Slave Address (x1)



Baudrate Switch

#### SMT-Connectors of the COMX 10CA-CCS (Connection to Host)



System Interface

#### Fieldbus connector of COMX 10CA-CCS (connected to outside)



**CC-Link Interface** 

#### 7.11.2 Description of the Address and Baudrate Switches

The address and baudrate switches of the COMX 10CA-CCS are described in the comX Design Guide.

## 7.11.3 CC-Link Interface of COMX 10CA-CCS

The following drawing shows the CC-Link interface (D-Sub-male connector, 9-pole) of the COMX 10CA-CCS:

Isolated RS-485 interface:

°1	°2	°3	°4	° 5
0	0	0	$\bigcirc$	0

Figure 19: CC-Link Interface (Screw terminal connector, 5 pin)

Connection with Screw terminal Connector	Signal	Description
1	DA	Data A
2	DB	Data B
3	DG	Data Ground
4	SLD	Shield
5	FG	Field Ground

Table 24: CC-Link -Interface of COMX 10CA-CCS

## 7.12 CC-Link Communication Module COMX 10CN-CCS

## 7.12.1 COMX 10CN-CCS



Figure 20: Photo of Communication Module COMX 10CN-CCS

#### SMT-Connectors of the COMX 10CN-CCS (Connection to Host)



System Interface

**CC-Link Interface** 

#### Address and Baudrate Switches of the COMX 10CN-CCS



Address Switch 1 (Address x 10)

Address Switch 2 (Address x 1)

Baudrate Switch

### 7.12.2 Description of the Address and Baudrate Switches

The address and baudrate switches of the COMX 10CN-CCS are described in the comX Design Guide.

### 7.12.3 CC-Link Interface of COMX 10CN-CCS

The pin assignment of the CC-Link interface of the COMX 10CN-CCS is described in the comX Design Guide within subsection 3.2.1.

# 7.13 CANopen Communication Module COMX 10CA-COS

## 7.13.1 COMX 10CA-COS



Figure 21: Photo of Communication Module COMX10 CA-COS

#### LED Displays of COMX 10CA-COS



SMT-Connectors of the COMX 10CA-COS (Connection to Host)



System Interface

Fieldbus Connector of COMX 10CA-COS (connected to outside)



CANopen Interface

Address Switches of COMX 10CA-COS



Address Switch 1

Address Switch 2

### 7.13.2 Description of the Address Switches

The address and baudrate switches of the COMX 10CA-COS are described in the comX Design Guide.

## 7.13.3 CANopen Interface of COMX 10CA-COS

The following figure shows the CANopen interface (D-Sub plug, male, 9 pin)



Figure 22: CANopen-Interface (D-Sub-plug, 9-pin) of the COMX 10CA-COS

Connection with D-Sub-Plug	Signal	Description
2	CAN_L	CAN-Low bus line
3	CAN_GND	CAN reference potential
7	CAN_H	CAN-High bus line

Figure 23: Pinning of CANopen Interface of the COMX 10CA-COS
# 7.14 CANopen Communication Module COMX 10CN-COS

# 7.14.1 COMX 10CN-COS



Figure 24: Photo of Communication Module COMX 10CN-COS

#### LED Displays of COMX 10CN-COS



#### SMT-Connectors of the COMX 10CN-COS (Connection to Host)



System Interface

CANopen -Interface

#### Address Switches of COMX 10CN-COS



Address Switch 1

Address Switch 2

## 7.14.2 Description of the Address Switches

The address switches of the COMX 10CN-COS are described in the comX Design Guide.

# 7.14.3 CANopen Interface of COMX 10CN-COS

The pin assignment of the CANopen interface of the COMX 10CN-COS is described in the comX Design Guide within subsection 3.2.2.

# 7.15 DeviceNet Communication Module COMX 10CA-DNS

### 7.15.1 COMX 10CA-DNS



Figure 25: Photo of Communication Module COMX 10CA-DNS

#### LED Displays of COMX 10CA-DNS



SMT-Connectors of the COMX 10CA-DNS (Connection to Host)



System Interface

Fieldbus connector COMX 10CA-DNS (connected to outside)



DeviceNet Interface

Address switches of COMX 10CA-DNS



Address Switch 1

Address Switch 2

### 7.15.2 Description of the Address Switches

The address switches of the COMX 10CA-DNS are described in the comX Design Guide.

# 7.15.3 DeviceNet Interface of COMX 10CA-DNS

The following figure shows the DeviceNet interface of the COMX 10CA-DNS (Combicon plug, 5 pin):



Figure 26: DeviceNet Interface (CombiCon- Pug, 5 pin) of the COMX 10CA-DNS

Connection with CombiCon plug	Signal	Color	Description
1	V-	Black	Data reference potential of the DeviceNet power supply
2	CAN_L	Blue	CAN Low signal
3	Drain		Shield
4	CAN_H	White	CAN High signal
5	V+	Red	+24 V DeviceNet supply voltage

Table 25: Pinning of the DeviceNet-Interface of the COMX 10CA-DNS

# 7.16 DeviceNet Communication Module COMX 10CN-DNS

# 7.16.1 COMX 10CN-DNS



Figure 27: Photo of Communication Module COMX 10CN-DNS

#### LED Displays of COMX 10CN-DNS



#### SMT-Connectors of the COMX 10CN-DNS (Connection to Host)



System Interface



DeviceNet Interface

### Address Switches of COMX 10CN-DNS



Address switch 1

Address switch 2

### 7.16.2 Description of the Address Switches

The address switches of the COMX 10 CN-DNS are described in the comX Design Guide.

### 7.16.3 DeviceNet Interface of COMX 10CN-DNS

The pin assignment of the DeviceNet interface of the COMX 10CN-DNS is described in the comX Design Guide within subsection 3.2.3.

# 7.17 PROFIBUS-DP Communication Module COMX 10CA-DPS

# 7.17.1 COMX 10CA-DPS



Figure 28: Photo of Communication Module COMX 10CA-DPS

#### LED Displays of COMX 10CA-DPS



SMT-Connector of the COMX 10CA-DPS (Connection to Host)



System Interface

Fieldbus connector COMX 10CA-DPS (connected to outside)



**PROFIBUS-DP-Interface** 

Address Switches of COMX 10CA-DPS



Address switch 1

Address switch 2

# 7.17.2 Description of the Address Switches

The address switches of the COMX 10 CA-DPS are described in the comX Design Guide.

# 7.17.3 PROFIBUS-DP Interface of COMX 10CA-DPS

The following figure shows the PROFIBUS-DP interface (D-Sub plug, female, 9 pin)



Figure 29: PROFIBUS-DP-Interface (D-Sub plug, female, 9 pin) of the COMX 10CA-DPS

Connection with D-Sub-Plug	Signal	Description
3	RxD/TxD-P	Receive-/Send data-P (Line B at plug)
5	DGND	Data reference potential
6	VP	Power supply (positive)
8	RxD/TxD-N	Receive-/Send dataN (Line A at plug)

Table 26: Pinning of the PROFIBUS-DP Interface of the COMX 10CA-DPS

# 7.18 PROFIBUS-DP Communication Module COMX 10CN-DPS

#### 7.18.1 COMX 10CN-DPS



Figure 30: Photo of Communication Module COMX 10CN-DPS

#### LED Displays of COMX 10CN-DPS



#### SMT-Connectors of the COMX 10CN-DPS (Connection to Host)



System Interface



**PROFIBUS-DP-Interface** 

# Address Switches of COMX 10CN-DPS



Address switch 1



Address switch 2

### 7.18.2 Description of the Address Switches

The address switches of the COMX 10 CN-DPS are described in the comX Design Guide.

### 7.18.3 PROFIBUS-DP Interface of COMX 10CN-DPS

The pin assignment of the PROFIBUS-DP interface of the COMX 10CN-DPS is described in the comX Design Guide within subsection 3.2.3.

# 7.19 PCI Carrier Board CIF50-CB-COM-ABC

The PCI carrier board CIF50-CB-COM-ABC easily allows testing and diagnosis of comX communication modules within a PC running Microsoft Windows<sup>®</sup>. It can be simply plugged into a free PCI slot of a PC.

It has a slot for plugging in an adapter board from outside of the PC. This adapter board itself has the necessary connector(s) for testing and analyzing a comX communication module.

The following picture shows the PCI carrier board CIF50-CB-COM-ABC:



Figure 31: Photo of Carrier Board CIF50-CB-COM-ABC

#### **Connector for Adapter Boards**



Connector for Adapter Boards

PCI-Connectors of the CIF50-CB-COM-ABC (Connection to PCI slot of PC)



**PCI** Interface

#### Switches of CIF50-CB-COM-ABC



Switch S1 for Byte (8 Bit, COM mode) and Word (16 bit, comX mode) Access



#### Important!

In any case, switch S1 at the upper edge of the CIF50-CB-COM-ABC must always be in position *"Word"* as shown in the figure below.

- Put the switch S1 to position **Word**. Only this position is designed for testing and diagnosis of comX communication modules!
- Position Byte of switch S1 has only been designed for testing and diagnosis of COM communication modules and not for comX!
- The PCI carrier board CIF50-CB-COM-ABC requires the **cifX Device Driver**, if the switch S1 is in position **Word** and the **CIF Device Driver**, if the switch S1 is in position Byte.
- In all cases, after any change of position of switch S1 the PC must be started again.



Figure 32: Switch S1 of CIF50-CB-COM-ABC in correct Position "Word" for comX communication modules

# 7.20 Adapter Board CIF50-DB-COM-CA

The adapter board CIF50-DB-COM-CA is designed

- to host a comX communication module and
- to be plugged into slot C1 of the PCI carrier board CIF50-CB-COM-ABC which is accessible through the slot plate of the PCI carrier board even if this is built in within a PC.

The following picture shows the adapter board CIF50-DB-COM-CA without mounted comX communication module.:



Figure 33: Photo of Adapter Board CIF50-DB-COM-CA

#### SMT-Connectors of the CIF50-DB-COM-CA (Connection to Host)



Connector for plugging in a comX communication module.



Connector to PCI carrier board

#### DSub connector of the CIF50-DB-COM-CA



Serial diagnosis connector (RS232)

The following picture shows the adapter board CIF50-DB-COM-CA with mounted comX communication module (namely a PROFIBUS-DP module COMX 100CA-DP):



Figure 34: Photo of Adapter board CIF50-DB-COM-CA with mounted COMX 100CA-DP

# 7.21 Install Carrier Board and Adapter Board into PC

The combination of PCI carrier board and adapter board with mounted comX communication module looks like:



Figure 35: Combination of Carrier Board CIF50-CB-COM-ABC and Adapter Board CIF50-DB-COM-CA

This is all hardware required to operate a comX communication module in a PC.

In all cases, strictly adhere to the following safety instruction:



### **WARNING**

#### Lethal Electrical Shock caused by parts with more than 50V!

 HAZARDOUS VOLTAGE may be present inside the PC, into which the PCI carrier board is integrated.



- Strictly obey to all safety rules given in the documentation supplied by the manufacturer of the PC!
- Plug off the PC into which the comX module is to be integrated!
- Make sure, that this PC is separated from the supply voltage and free of current, before you continue.
- Open the housing and install the PCI carrier board only after disconnecting power.

USA:



# **WARNING**

#### Lethal Electrical Shock caused by parts with more than 50V!

- HAZARDOUS VOLTAGE may be present inside the PC, into which the PCI carrier board is integrated.
- Strictly obey to all safety rules given in the documentation supplied by the manufacturer of the PC!
- Plug off the PC into which the comX module is to be integrated!
- Make sure, that this PC is separated from the supply voltage and free of current, before you continue.
- Open the housing and install the PCI carrier board only after disconnecting power.

In all cases, avoid to touch any contacts or ends of lines.

In order to install the carrier and adapter board, proceed as follows:

- 1. Put switch S1 of PCI carrier board to position **Word**! See *Figure 32: Switch S1 of CIF50-CB-COM-ABC in correct Position "Word"*.
- 2. Plug off the power supply cable of the PC and obey to the safety instructions given above.
- 3. Open the PC cabinet. Strictly obey to the safety instructions given in the documentation of the PC for opening the PC cabinet.
- 4. At first, only the PCI carrier board is installed within the PC. Carefully plug the PCI carrier board into a free PCI slot of the PC.
- 5. Screw the PCI carrier board in order to achieve good fitting and contact.
- 6. Carefully plug the comX communication module onto connector X1 of the adapter card.
- 7. Plug the adapter card through the hole in the panel of the PCI carrier board until it fits well and has good contact (like in the photo above).
- 8. Now close the PC cabinet according to the PC manufacturer's documentation.
- 9. Plug data and diagnosis lines according to your needs.

10. Finally, switch on the PC.

If you have installed this combination successfully at your PC, a new entry *"NXSB-PCA"* will appear in the Device Manager of Microsoft Windows<sup>®</sup>: This looks like:

cifX Communication Interface
 NXSB-PCA Adapter

Figure 36: Entry "NXSB-PCA"

# 8 LEDs

# 8.1 SYS-LED

The following table describes the meaning of the system LED.

LED	Color	State	Meaning		
SYS	Duo LED yellow/green				
	(green)	On	Operating System running		
	(green/yellow)	Blinking green/yellow	Second Stage Boot loader is waiting for firmware		
	(yellow)	On	Second Stage Boot loader missing; contact technical support		
	-	Off	Power supply for the device is missing or hardware defect		

Table 27: System LED

The SYS-LED is located at the left edge of the COMX 100CA-RE on the left hand side of the netX Processor and is denominated as "L1" within the context of the preceding section.

At the COMX 100CN-RE there are no LEDs at the communication module itself but the LED signals are connected outside by connector X2.

# 8.2 LEDs Fieldbus-Systems

# 8.2.1 LED Names of individual Fieldbus Systems

LED		PROFIBUS DP-	CANopen		CC-Link	DeviceNet
SYS ( <sup>()</sup> (yellow)/ <sup>()</sup> (green	n))	SYS	SYS	SY	S	SYS
COM ( ( (red)/ ) (green))	СОМ	CAN	LR LE	UN/ RR	MNS	
LED	e			Mea	ning	

LED	Name	Meaning
System Status	SYS	System
	СОМ	Communication Status
Communication Status	CAN	CANopen Status
Communication Status	LRUN/LERR	Run/Error
	MNS	Module Network Status

### 8.2.2 LEDs PROFIBUS-DP Master

The subsequent table describes the meaning of the LEDs for the comX PROFIBUS-DP Master communication modules (COMX 100CA-DP/ COMX 100CN-DP) when the firmware of the PROFIBUS DP Master protocol is loaded to the comX communication module.

LED	Color	State	Meaning	
СОМ	Duo LED	Juo LED red/green		
	(green)	Flashing acyclic	No configuration or stack error	
	(green)	Flashing cyclic	Profibus is configured, but bus communication is not yet released from the application	
	(green)	On	Communication to all Slaves is established	
	(red)	Flashing cyclic	Communication to at least one Slave is disconnected	
	(red)	On	Communication to one/all Slaves is disconnected	

Table 28: LEDs PROFIBUS DP Master

# 8.2.3 LEDs PROFIBUS-DP Slave

The subsequent table describes the meaning of the LEDs for the comX PROFIBUS-DP Slave communication modules (COMX CA-DP/ COMX CN-DP) when the firmware of the PROFIBUS DP Slave protocol is loaded to the comX communication module.

LED	Color	State	Meaning
СОМ	Duo LED red/green		
	🥥 (green)	On	RUN, cyclic communication
	(red)	On	Wrong configuration at PROFIBUS DP slave.
	🥌 (red)	Flashing cyclic	STOP, no communication, connection error
	🥌 (red)	Flashing acyclic	not configured

Table 29: LEDs PROFIBUS DP Slave

# 8.2.4 LEDs PROFIBUS MPI

The subsequent table describes the meaning of the LEDs for the comX communication module when the firmware of the PROFIBUS MPI protocol is loaded to the device.

LED	Color	State	Meaning
СОМ	Duo LED	) red/green	
	(green)	On	Status The device currently holds the PROFIBUS token and is able to transfer telegrams of data.
	) (green)	Blinking (regularly) 5 Hz	Status The device is configured to be a part of the PROFIBUS ring, but it must share the PROFIBUS token with other PROFIBUS-Master devices present on the PROFIBUS ring.
	(green)	Blinking (regularly) 0.5 Hz	Status Automatic baudrate detection is running
	(red)	On	Error Communication error at the PROFIBUS.
	(off)	Off	Status/Error The device has not been integrated into the PROFIBUS ring, i.e. it has not been configured correctly or has a wrong configuration or has not received the PROFIBUS token.

Table 30: LEDs PROFIBUS MPI

# 8.2.5 LEDs CC-Link Slave

The subsequent table describes the meaning of the LEDs for the comX CC-Link Slave communication modules (COMX 100CA-CCS/ COMX 100CN-CCS) when the firmware of the CC-Link Slave protocol is loaded to the comX communication module.

LED	Color	State	Meaning	
L RUN	LED gre	en		
	(off)	Off	<ol> <li>Before participating in the network</li> <li>Unable to detect carrier</li> <li>Timeout</li> <li>Resetting hardware</li> </ol>	
	) (green)	On	Receive both refresh and polling signals or just the refresh signal normally, after participating in the network.	
L ERR	LED red			
	(off)	Off	<ol> <li>Normal communication</li> <li>Resetting hardware</li> </ol>	
	(red)	Blinking	The switch setting has been changed from the setting at the reset cancellation (blinks for 0.4 sec.).	
	(red)	On	<ol> <li>CRC error</li> <li>Address parameter error (0, 65 or greater is set including the number of occupied stations)</li> <li>Baud rate switch setting error during cancellation of reset (5 or greater)</li> </ol>	

Table 31: LEDs CC-Link Slave

# 8.2.6 LEDs CANopen Master

The subsequent table describes the meaning of the LEDs for the comX CANopen Master communication modules (COMX-CA-CO/ COMX-CN-COM) when the firmware of the CANopen Master protocol is loaded to the comX communication module.

LED	Color	State	Meaning		
CAN	Duo LED re	Duo LED red/green			
	-	Off	The device is executing a reset		
	) (green)	Single flash	<b>STOPPED:</b> The Device is in STOPPED state		
	) (green)	Blinking	PREOPERATIONAL: The Device is in the PREOPERATIONAL state		
	) (green)	On	<b>OPERATIONAL:</b> The Device is in the OPERATIONAL state		
	(red)	Single flash	<b>Warning Limit reached:</b> At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).		
	(red)	Double flash	<b>Error Control Event:</b> A guard event (NMT Slave or NMT- master) or a heartbeat event (Heartbeat consumer) has occurred.		
	(red)	On	Bus Off: The CAN controller is bus off		

Table 32: LEDs CANopen Master

#### LED State Definition for CANopen Master for the CAN LED

Indicator state	Definition	
On	The indicator is constantly on.	
Off	The indicator is constantly off.	
Blinking	The indicator turns on and off with a frequency of 2,5 Hz: on for 200 ms, followed by off for 200 ms.	
Single Flash	The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms).	
Double Flash	The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).	

Table 33: LED State Definition for CANopen Master for the CAN LED

# 8.2.7 LEDs CANopen Slave

The subsequent table describes the meaning of the LEDs for the comX CANopen Slave communication modules (COMX-CA-CO/ COMX-CN-COS) when the firmware of the CANopen Slave protocol is loaded to the comX communication module.

LED	Color	State	Meaning			
comX						
CAN	Duo LED re	Duo LED red/green				
	(off)	Off	<b>RESET:</b> The device is executing a reset			
	🥥 (green)	Single flash	STOPPED: The device is in STOPPED state			
	) (green)	Blinking	<b>PREOPERATIONAL:</b> The device is in the PREOPERATIONAL state			
	) (green)	On	<b>OPERATIONAL:</b> The device is in the OPERATIONAL state			
	(red/green)	Flickering (alternatively red / green)	Auto Baud Rate Detection active: The Device is in the Auto Baud Rate Detection mode			
	(red)	Single flash	<b>Warning Limit reached:</b> At least one of the error counters of the CAN controller has reached or exceeded the warning level (too many error frames).			
	(red)	Double flash	Error Control Event: A guard event (NMT Slave or NMT-master) or a heartbeat event (Heartbeat consumer) has occurred.			
	(red)	On	Bus Off: The CAN controller is bus off			

Table 34: LEDs CANopen Slave – 1 Communication Status LED (current Hardware Revision)

#### LED State Definition for CANopen Slave for the CAN LED

Indicator state	Definition			
On	The indicator is constantly on.			
Off	he indicator is constantly off.			
Flickering	The indicator turns on and off with a frequency of 10 Hz: on for 50 ms, followed by off for 50 ms.			
Blinking	The indicator turns on and off with a frequency of 2,5 Hz: on for 200 ms, followed by off for 200 ms.			
Single Flash	The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms).			
Double Flash	The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).			

Table 35: LED State Definition for CANopen Slave for the CAN LED

# 8.2.8 LEDs DeviceNet Master

The subsequent table describes the meaning of the LEDs for the fieldbus when the firmware of the DeviceNet Master protocol is loaded to the device.

LED	Color	State	Meaning
MNS	Duo LED red/g	reen	
	igreen)	On	Device Operational AND On-line, Connected
			Device is online and has established all connections with all Slaves.
	igreen)	Flashing (1 Hz)	Device Operational AND On-line
			Device is online and has established no connection in the established state.
			- Configuration missing, incomplete or incorrect.
	(green/red/off)	Flashing Green/Red/Off	Selftest after power on: Green on for 250 ms, then red on for 250 ms, then off.
	(red)	Flashing (1 Hz)	Minor Fault and/or Connection Time-Out
			Device is online and has established one or more connections in the established state. It has data exchange with at least one of the configured Slaves.
			Minor or recoverable fault: No data exchange with one of the configured Slaves. One or more Slaves are not connected.
			Connection timeout
	(red)	On	Critical Fault or Critical Link Failure
	( )		Critical connection failure; device has detected a network error: duplicate MAC-ID or severe error in CAN network (CAN-bus off).
	(off)	Off	Device is not powered
	(011)		- The device may not be powered.
			Device is not on-line and/or No Network Power
			<ul> <li>The device has not completed the Dup_MAC_ID test yet.</li> <li>The device is powered, but the network power is missing.</li> </ul>

Table 36: LEDs DeviceNet Master

#### LED State Definition for DeviceNet Master for the MNS LED

Indicator state	Definition			
On	The indicator is constantly on.			
Off	The indicator is constantly off.			
Flashing (1 Hz) green	The indicator turns on and off with a frequency of appr. 1 Hz: on for appr. 500 ms, followed by off for appr. 500 ms.			
Flashing (1 Hz) redThe indicator turns on and off with a frequency of appr. 1 Hz: on for appr. 500 ms, followed by off for appr. 500 ms.				

Table 37: LED State Definition for DeviceNet Master for the MNS LED

# 8.2.9 LEDs DeviceNet Slave

The subsequent table describes the meaning of the LEDs for the fieldbus when the firmware of the DeviceNet Slave protocol is loaded to the device.

LED	Color	State	Meaning
MNS	Duo LED red/gr	reen	
	igreen)	On	Device Operational AND On-line, Connected
			Device is online and has established all connections with all Slaves.
	) (green)	Flashing (1 Hz)	Device Operational AND On-line
			Device is online and has established no connection in the established state.
			- Configuration missing, incomplete or incorrect.
	(green/red/off)	Flashing Green/Red/Off	Selftest after power on: Green on for 250 ms, then red on for 250 ms, then off.
	(red)	Flashing (1 Hz)	Minor Fault and/or Connection Time-Out
			Device is online and has established one or more connections in the established state. It has data exchange with at least one of the configured Slaves.
			Minor or recoverable fault: No data exchange with one of the configured Slaves. One or more Slaves are not connected.
			Connection timeout
	(red)	On	Critical Fault or Critical Link Failure
	、 <i>,</i>		Critical connection failure; device has detected a network error: duplicate MAC-ID or severe error in CAN network (CAN-bus off).
	(off)	Off	Device is not powered
			- The device may not be powered.
			Device is not on-line and/or No Network Power
			<ul> <li>The device has not completed the Dup_MAC_ID test yet.</li> <li>The device is powered, but the network power is missing.</li> </ul>

Table 38: LEDs DeviceNet Slave

#### LED State Definition for DeviceNet Slave for the MNS LED

Indicator state	Definition			
On	The indicator is constantly on.			
Off	The indicator is constantly off.			
Flashing (1 Hz) green	The indicator turns on and off with a frequency of appr. 1 Hz: on for appr. 500 ms, followed by off for appr. 500 ms.			
Flashing (1 Hz) red	The indicator turns on and off with a frequency of appr. 1 Hz: on for appr. 500 ms, followed by off for appr. 500 ms.			

Table 39: LED State Definition for DeviceNet Slave for the MNS LED

# 8.3 LEDs Real-Time Ethernet Systems

# 8.3.1 LED Names of individual Real-Time Ethernet Systems



**Note:** Depending on the loaded COMX 100CA-RE/COMX 100CN-RE firmware the LEDs of the COMX 100CA-RE/COMX 100CN-RE communication modules are configured as follows.

comX	Color of LED	EtherCAT Master	EtherCAT Slave	EtherNet/IP Scanner/ Adapter	Powerlink Controlled Node	Open Modbus/TCP	PROFINET IO Controller/ Device	Sercos Master	Sercos Slave	VARAN Client
[2]	) (green)	RUN	RUN	MS	BS	RUN	-	STA	S3	RUN
(red/ green Duo- LED)	(red)	-	-	MS	-	-	BF	-	S3	-
L3	(green)	-	-	NS	-	-	-	-	-	-
(red/ green Duo- LED)	(red)	ERR	ERR	NS	BE	ERR	BF	ERR	-	ERR
<b>C1</b>	(green)	LINK	L/A IN	LINK	L/A	LINK	LINK	L/A	L/A	LINK
(Ethernet Connectors)	) (yellow)	ACT	-	ACT	-	ACT	RXTX	-	-	ACT
<b>C</b> 2	(green)	-	L/A OUT	LINK	L/A	LINK	LINK	L/A	L/A	LINK
(Ethernet Connectors)	) (yellow)	-	-	ACT	-	ACT	RXTX	-	-	ACT

LED	Name	Meaning
	RUN	Run
	ERR	Error
	STA	Status
	SF	System Error
Communication Status	BF	Bus Error
	MS	Module Status
	NS	Network Status
	BS	Bus Status
	BE	Bus Error
	LINK, L	Link
	ACT, A	Activity
RJ45	L/A	Link/Activity
	L/A IN	Link/Activity Input
	L/A OUT	Link/Activity Output

Table 40: LED Names of individual Real-Time Ethernet Systems

### 8.3.2 LEDs EtherCAT-Master

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX 100CA-RE/ COMX 100CN-RE) when the firmware of the EtherCAT Master protocol is loaded to the comX communication module.

LED	Color	State	Meaning	
RUN	Duo LED r	) red/green		
Name in	(off)	Off	<b>INIT</b> : The device is in state INIT	
device drawing:	(green)	Blinking	PRE-OPERATIONAL: The device is in PRE- OPERATIONAL state	
	(green)	Flickering	<b>BOOT</b> : Device is in BOOT state	
9	(green)	Single Flash	SAFE-OPERATIONAL: The device is in SAFE- OPERATIONAL state	
	(green)	On	<b>OPERATIONAL:</b> The device is in OPERATIONAL state	
ERR	Duo LED red/green			
Name in the	(off)	Off	Master has no errors	
device drawing: COM 1	🥮 (red)	On	Master has detected a communication error. The error is indicated in the DPM	
<b>LINK</b> / RJ45	LED green			
Ch0	(green)	On	A link is established	
	(off)	Off	No link established	
ACT/	LED yellow			
RJ45 Ch0	) (yellow)	Flashing	The device sends/receives Ethernet frames	

Table 41: LEDs EtherCAT Master

#### LED State Definition for EtherCAT Master for the RUN and ERR LEDs

Indicator state	Definition
On	The indicator is constantly on.
Off	The indicator is constantly off.
Blinking	The indicator turns on and off with a frequency of 2,5 Hz: on for 200 ms, followed by off for 200 ms.
Flickering	The indicator turns on and off with a frequency of approximately 10 Hz: on for approximately 50 ms, followed by off for 50 ms.
Single Flash	The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms).
Double Flash	The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).

Table 42: LED State Definition for EtherCAT Master for the RUN and ERR LEDs

# 8.3.3 LEDs EtherCAT-Slave

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX 100CA-RE/ COMX 100CN-RE) when the firmware of the EtherCAT Slave protocol is loaded to the comX communication module.

LED	Color	State Meaning		
RUN	Duo LED r	red/green		
Name in the device drawing:	(off)	Off	INIT: The device is in state INIT	
	(green)	Blinking	<b>PRE-OPERATIONAL</b> : The device is in state PRE- OPERATIONAL	
	(green)	Single Flash	SAFE-OPERATIONAL: The device is in state SAFE- OPERATIONAL	
9	(green)	On	<b>OPERATIONAL:</b> The device is in state OPERATIONAL	
ERR	Duo LED r	red/green		
Name in the	(off)	Off	<b>No error</b> : The EtherCAT communication of the device is in working condition	
device drawing:	(red)	Blinking	Invalid Configuration: General Configuration Error	
COM 1	· · ·		Possible reason: State change commanded by master is impossible due to register or object settings.	
L3	) (red)	Single Flash	<b>Local Error</b> : Slave device application has changed the EtherCAT state autonomously.	
			Possible reason 1: A host watchdog timeout has occurred.	
			Possible reason 2: Synchronization Error, device enters Safe-Operational automatically.	
	(red)	Double Flash	Application Watchdog Timeout: An application watchdog timeout has occurred.	
			Possible reason: Sync Manager Watchdog timeout.	
L/A IN/	LED green			
RJ45 Ch0	) (green)	On	A link is established	
L/A OUT/ R 145	(green)	Flashing	The device sends/receives Ethernet frames	
Ch1	(off)	Off	No link established	
RJ45	LED yellow	N	·	
Ch0 RJ45 Ch1	) (yellow)	-	-	

Table 43: LEDs EtherCAT Slave

#### LED State Definition for EtherCAT Slave for the RUN and ERR LEDs

Indicator state	Definition
On	The indicator is constantly on.
Off	The indicator is constantly off.
Blinking	The indicator turns on and off with a frequency of 2,5 Hz: on for 200 ms, followed by off for 200 ms.
Single Flash	The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms).
Double Flash	The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).

Table 44: LED State Definition for EtherCAT Slave for the RUN and ERR LEDs

# 8.3.4 LEDs EtherNet/IP-Scanner (Master)

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX-CA-RE/ COMX-CN-RE) when the firmware of the EtherNet/IP Scanner (Master) protocol is loaded to the comX communication module.

LED	Color	State	Meaning		
MS	Duo LED red/green				
Name in the device	(green)	On	<b>Device operational</b> : If the device is operating correctly, the module status indicator shall be steady green.		
COM 0	(green)	Flashing	<b>Standby</b> : If the device has not been configured, the module status indicator shall be flashing green.		
L2	(red)	On	<b>Major fault</b> : If the device has detected a non-recoverable major fault, the module status indicator shall be steady red.		
	(red)	Flashing	<b>Minor fault</b> : If the device has detected a recoverable minor fault, the module status indicator shall be flashing red. NOTE: An incorrect or inconsistent configuration would be considered a minor fault.		
	(red/green)	Flashing	<b>Self-test</b> : While the device is performing its power up testing, the module status indicator shall be flashing green/red.		
	-	Off	<b>No power</b> : If no power is supplied to the device, the module status indicator shall be steady off.		
NS	Duo LED red	l/green			
Name in the device drawing:	(green)	On	<b>Connected</b> : If the device has at least one established connection (even to the Message Router), the network status indicator shall be steady green.		
	(green)	Flashing	<b>No connections</b> : If the device has no established connections, but has obtained an IP address, the network status indicator shall be flashing green.		
	(red)	On	<b>Duplicate IP</b> : If the device has detected that its IP address is already in use, the network status indicator shall be steady red.		
	(red)	Flashing	<b>Connection timeout</b> : If one or more of the connections in which this device is the target has timed out, the network status indicator shall be flashing red. This shall be left only if all timed out connections are reestablished or if the device is reset.		
	(red/green)	Flashing	<b>Self-test</b> : While the device is performing its power up testing, the network status indicator shall be flashing green/red.		
	-	Off	<b>Not powered, no IP address</b> : If the device does not have an IP address (or is powered off), the network status indicator shall be steady off.		
LINK/RJ45	LED green				
Ch0 & Ch1	(green)	On	A connection to the Ethernet exists		
	-	Off	The device has no connection to the Ethernet		
ACT/RJ45	LED yellow				
Ch0 & Ch1	) (yellow)	Flashing	The device sends/receives Ethernet frames		

Table 45: LEDs EtherNet/IP Scanner (Master)

# 8.3.5 LEDs EtherNet/IP-Adapter (Slave)

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX-CA-RE/ COMX-CN-RE) when the firmware of the EtherNet/IP Adapter (Slave) protocol is loaded to the comX communication module.

LED	Color	State	Meaning		
MS	Duo LED red/green				
the device drawing: COM 0	(green)	On	<b>Device operational</b> : If the device is operating correctly, the module status indicator shall be steady green.		
	(green)	Flashing	<b>Standby</b> : If the device has not been configured, the module status indicator shall be flashing green.		
6	(red)	On	<b>Major fault</b> : If the device has detected a non-recoverable major fault, the module status indicator shall be steady red.		
	(red)	Flashing	<b>Minor fault</b> : If the device has detected a recoverable minor fault, the module status indicator shall be flashing red. NOTE: An incorrect or inconsistent configuration would be considered a minor fault.		
	(red/green)	Flashing	<b>Self-test</b> : While the device is performing its power up testing, the module status indicator shall be flashing green/red.		
	-	Off	<b>No power</b> : If no power is supplied to the device, the module status indicator shall be steady off.		
NS	Duo LED red	l/green			
Name in the device drawing: COM 1	ogreen)	On	<b>Connected</b> : If the device has at least one established connection (even to the Message Router), the network status indicator shall be steady green.		
	(green)	Flashing	<b>No connections</b> : If the device has no established connections, but has obtained an IP address, the network status indicator shall be flashing green.		
	(red)	On	<b>Duplicate IP</b> : If the device has detected that its IP address is already in use, the network status indicator shall be steady red.		
	(red)	Flashing	<b>Connection timeout</b> : If one or more of the connections in which this device is the target has timed out, the network status indicator shall be flashing red. This shall be left only if all timed out connections are reestablished or if the device is reset.		
	(red/green)	Flashing	<b>Self-test</b> : While the device is performing its power up testing, the network status indicator shall be flashing green/red.		
	-	Off	<b>Not powered, no IP address</b> : If the device does not have an IP address (or is powered off), the network status indicator shall be steady off.		
LINK/RJ45	LED green				
Ch0 & Ch1	(green)	On	A connection to the Ethernet exists		
	-	Off	The device has no connection to the Ethernet		
ACT/RJ45	LED yellow				
Ch0 & Ch1	) (yellow)	Flashing	The device sends/receives Ethernet frames		

Table 46: LEDs EtherNet/IP Adapter (Slave)

### 8.3.6 LEDs Open Modbus/TCP

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX 100CA-RE/ COMX 100CN-RE) when the firmware of the Open Modbus/TCP protocol is loaded to the comX communication module.

LED	Color	State	Meaning			
RUN	Duo LED r	ed/green				
Name in the	(off)	Off	Not Ready OMB task is not ready			
device drawing: COM 0	oreen)	Flashing cyclic with 1Hz	Ready, not configured yet OMB task is ready and not configured yet			
(12)	(green)	Flashing cyclic with 5Hz	Waiting for Communication: OMB task is configured			
	) (green)	On	<b>Connected:</b> OMB task has communication – at least one TCP connection is established			
ERR	Duo LED r	Duo LED red/green				
Name in the	(off)	Off	No communication error			
device drawing: COM 1	e (red)	Flashing cyclic with 2Hz (On/Off Ratio = 25 %)	System error			
L3	(red)	(red) On Communication error active				
LINK/RJ	LED green					
45 Ch0 & Ch1	(green)	On	A connection to the Ethernet exists			
	(off)	Off	The device has no connection to the Ethernet			
ACT/RJ	LED yellov	N				
45 Ch0 & Ch1	(yellow)	Flashing	The device sends/receives Ethernet frames			

Table 47: LEDs Open Modbus/TCP

# 8.3.7 LEDs POWERLINK Controlled Node/Slave

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX 100CA-RE/ COMX 100CN-RE) when the firmware of the Powerlink Controlled Node/Slave protocol is loaded to the comX communication module.

LED	Color	State	Meaning			
BS	Duo LED	red/green				
Name in	(off) Off		Slave initializing			
drawing:	0	Flickering	Slave is in Basic Ethernet state			
СОМ	(green)	Single Flash	Slave is in Pre-Operational 1			
0		Double Flash	Slave is in Pre-Operational 2			
		Triple Flash	Slave is in ReadyToOperate			
		On	Slave is Operational			
		Blinking	Slave is Stopped			
BE	Duo LED red/green					
Name in the device	(off)	Off	Slave has no error			
drawing: COM 1	(red)	On	Slave has detected an error			
L/A/	LED green					
RJ45 Ch0 & Ch1	(green)	On	Link: A connection to the Ethernet exists			
	(green)	Flashing	Activity: The device sends/receives Ethernet frames			
	(off)	Off	The device has no connection to the Ethernet			
RJ45	LED yello	w				
Ch0 & Ch1	-	-	This LED is not used.			

Table 48: LEDs Powerlink Controlled Node/Slave

# LED State Definition for Powerlink Controlled Node/Slave for the BS/BE LEDs

Indicator state	Definition
On	The indicator is constantly on.
Off	The indicator is constantly off.
Blinking	The indicator turns on and off with a frequency of approximately 2,5 Hz: on for approximately 200 ms, followed by off for 200 ms. Red and green LEDs shall be on alternately.
Flickering	The indicator turns on and off with a frequency of approximately 10 Hz: on for approximately 50 ms, followed by off for 50 ms. Red and green LEDs shall be on alternately.
Single Flash	The indicator shows one short flash (approximately 200 ms) followed by a long off phase (approximately 1,000 ms).
Double Flash	The indicator shows a sequence of two short flashes (each approximately 200 ms), separated by a short off phase (approximately 200 ms). The sequence is finished by a long off phase (approximately 1,000 ms).
Triple Flash	The indicator shows a sequence of three short flashes (each

approximately 200 ms), separated by a short off phase (approximately 200 ms). The sequence is finished by a long off phase (approximately 1,000 ms).

Table 49: LED State Definition for Powerlink Controlled Node/Slave for the BS/BE LEDs

# 8.3.8 LEDs PROFINET IO-RT-Controller

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX 100CA-RE/ COMX 100CN-RE) when the firmware of the PROFINET IO-RT Controller protocol is loaded to the comX communication module.

LED	Color	State	Meaning		
SF	Duo LED red/green				
Name in the	(red)	On	(together with BF "red ON")		
device	· · ·		No valid Master license		
COM 0	🥌 (red)	Flashing cyclic at 2 Hz	System error: Invalid configuration, Watchdog error or internal error		
	(off)	Off	No error		
BF	Duo LED	red/green			
Name in the	(red)	On	No Connection: No Link.		
device	~ /		or (together with SF "red ON")		
drawing: COM 1			No valid Master license		
	🔴 (red)	Flashing cyclic at 2 Hz	<b>Configuration fault:</b> not all configured IO-Devices are connected.		
	) (off)	Off	No error		
LINK/RJ45	LED green				
Ch0 & Ch1	(green)	On	A connection to the Ethernet exists		
	) (off)	Off	The device has no connection to the Ethernet		
<b>RX/TX</b> /RJ45 Ch0 & Ch1	LED yello	w			
	) (yellow)	Flashing	The device sends/receives Ethernet frames		

Table 50: LEDs PROFINET IO-RT Controller

# 8.3.9 LEDs PROFINET IO-RT-IRT-Device

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX-CA-RE/ COMX-CN-RE) when the firmware of the PROFINET IO-RT-Device protocol is loaded to the comX communication module.

LED	Color	State	Meaning			
SF	Duo LED	red/green				
Name in the device	(red)	On	Watchdog timeout; channel, generic or extended diagnosis present; system error			
drawing: COM 0	e (red)	Flashing cyclic at 2 Hz (for 3 sec.)	DCP signal service is initiated via the bus			
	(off)	Off	No error			
BF	Duo LED red/green					
Name in the device	(red)	On	No configuration; or low speed physical link; or no physical link			
drawing: COM 1	(red)	Flashing cyclic at 2 Hz	No data exchange			
	(off)	Off	No error			
LINK/RJ45	LED green					
Ch0 & Ch1	) (green)	On	A connection to the Ethernet exists			
	(off)	Off	The device has no connection to the Ethernet			
<b>RX/TX</b> /RJ45 Ch0 & Ch1	LED yellow					
	) (yellow)	Flashing	The device sends/receives Ethernet frames			

Table 51: LEDs PROFINET IO-RT-Device

### 8.3.10 LEDs Sercos-Master

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX-CA-RE/ COMX-CN-RE) when the firmware of the Sercos Master protocol is loaded to the comX communication module.

LED	Color	State	Meaning	
STA	Duo LED red/green			
Name in the device	(green)	Blinking	<b>CP0:</b> Communication phase 0	
drawing: COM 0	(green)	Flickering	Master isn't configured and is in NRT. After a status change this isn't indicated again	
<b>L</b> 2	(green)	Single Flash	CP1: Communication phase 1	
	(green)	Double Flash	CP2: Communication phase 2	
	(green)	Triple Flash	CP3: Communication phase 3	
	(green)	On	CP4: Communication phase 4	
	(off)	Off	NRT: Non Real-time Mode	
ERR	Duo LED	red/green		
Name in	e (red)	Blinking	Error in the configuration database.	
drawing:	e (red)	Flickering	Boot-up was stopped due to an error.	
	(red)	Single Flickering	Channel Init was executed at the Master.	
	🔴 (red)	Quadruple Flash	No Master license present in the device	
	(red)	Triple Flash	DPM Watchdog has expired.	
	(red)	Double Flash	Internal Stop of the bus cycle	
	(red)	Single Flash	Bus Sync Error Threshold	
	(off)	Off	No error	
<b>L/A/</b> RJ45	LED gree	n		
Ch0 & Ch1	(green)	On	Link: A connection to the Ethernet exists	
	(green)	Flashing	Activity: The device sends/receives Ethernet frames	
	(off)	Off	The device has no connection to the Ethernet	
RJ45	LED yello	w		
Ch0 & Ch1	-	-	This LED is not used.	

Table 52: LEDs Sercos Master

	State	Definition	for S	Sarcos	Mastor	for the	STA	and	FRR	l FDe
LEV	Slale	Deminion	101 3		iviastei	ior the	SIA	anu		LEDS

Indicator state	Definition
Off	The indicator is constantly off.
Blinking	The indicator turns on and off with a frequency of 2,5 Hz: on for 200 ms, followed by off for 200 ms.
Single Flickering	The indicator turns on and off with a frequency of approximately 10 Hz: on for approximately 50 ms, followed by off for 50 ms.
Flickering	The indicator turns on and off once: on for approximately 50 ms, followed by off for 50 ms.
Single Flash	The indicator shows one short flash (200 ms) followed by a long off phase (1,000 ms).
Double Flash	The indicator shows a sequence of two short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).
Triple Flash	The indicator shows a sequence of three short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).
Quadruple Flash	The indicator shows a sequence of four short flashes (each 200 ms), separated by a short off phase (200 ms). The sequence is finished by a long off phase (1,000 ms).

Table 53: LED State Definition for Sercos Master for the STA and ERR LEDs

# 8.3.11 LEDs Sercos-Slave

The subsequent table describes the meaning of the LEDs for the comX Real-Time Ethernet communication modules (COMX-CA-RE/ COMX-CN-RE) when the firmware of the sercos Slave protocol is loaded to the comX communication module.

LED	Color	State Meaning					
STA	Duo LED red/green/orange (orange = red/green simultaneously)						
Name in the device	) (off)	Off	NRT-Mode: No sercos Communication				
drawing: COM 0	(green)	On	<b>CP4</b> : Communication phase 4, Normal operation, no error				
	(green)	Flashing (4 Hz)	<b>Loopback</b> : The network state has changed from "fast- forward" to "loopback".				
	(green/ orange)	Flashing (4 Hz)	<b>CP1 CP3</b> : Communication phase 1 to Communication phase 3, Flashing green once for CP1, twice for CP2 and three times for CP3.				
	(orange/g reen)	Flashing (4 Hz)	<b>HP0 HP2</b> : Hot-plug modes (not yet implemented); flashing orange permanently for HP0, once for HP1 and twice for HP2.				
	(orange)	On	CP0: Communication phase 0				
	(orange)	Flashing (4 Hz)	<b>Identification</b> : Corresponds to C-DEV.Bit 15 in the Slave's Device Control indicating remote address allocation or configuration errors between Master and Slaves (for details refer to sercos Slave V3 Protocol API Manual).				
	(green/ red)	Flashing (4 Hz), The LED flashes at least for 2 seconds from green to red.	MST losses ≥ (S-0-1003/2): Depends on IDN S-0-1003 (for details refer to sercos Slave Protocol API manual). Corresponds to S-DEV.Bit 15 in the Device Status indicating a communication warning (Master SYNC telegrams have not been received)				
	(red (red /orange)	Flashing (4 Hz)	Application error (C1D): See GDP & FSP Status codes class error. See sercos Slave V3 Protocol API Manual.				
	(red)	Flashing (4 Hz)	Watchdog error: Application is not running (not yet implemented)				
	(red)	On	<b>Communication Error (C1D)</b> : Error detected according to sercos Class 1 Diagnosis, see SCP Status codes class error. See sercos Slave V3 Protocol API Manual.				
Name in	Duo LED red/green						
the device drawing: COM 1	-	-	This LED is not used.				
L/A/RJ45	LED greer	ı					
Ch0 & Ch1	(green)	On	Link: A connection to the Ethernet exists				
	(green)	Flashing	Activity: The device sends/receives Ethernet frames				
	(off)	Off	The device has no connection to the Ethernet				
RJ45	LED yello	w					
Ch0 & Ch1	-	-	This LED is not used.				

Table 54: LEDs sercos Slave

Indicator state	Definition
On	The indicator is constantly on.
Off	The indicator is constantly off.
Flashing (4 Hz)	The indicator turns on and off with a frequency of 4 Hz: on for appr. 125 ms, followed by off for appr. 125 ms.

#### LED State Definition for sercos Slave for the S3 LED

Table 55: LED State Definition for sercos Slave for the S3 LED

## 8.3.12 LEDs VARAN Client

The subsequent table describes the meaning of the LEDs for the comX communication module when the firmware of the VARAN Client protocol is loaded into the device.

LED	Color	State	Meaning		
RUN	Duo LED red/green				
Name in the device	(off)	Off	Not configured.		
drawing: COM 0	(green)	Blinking	Configured and communication is inactive.		
	(green)	On	Configured and communication is active.		
ERR	Duo LED	red/green			
Name in the device	(off)	Off	Configured.		
drawing:	(red)	Blinking	Not configured.		
COMIT	e (red)	On	Communication error occurred.		
LINK	LED green				
RJ45 Ch0 & Ch1	(green)	On	A connection to the Ethernet exists		
	(off)	Off	The device has no connection to the Ethernet		
ACT	LED yello	w			
RJ45 Ch0 & Ch1	(yellow)	Flashing	The device sends/receives Ethernet frames		

Table 56: LEDs VARAN Client

#### LED State Definition for VARAN Client for the RUN and ERR LEDs

Indicator state	Definition
On	The indicator is constantly on.
Off	The indicator is constantly off.
Blinking	The indicator turns on and off with a frequency of 5 Hz: on for 100 ms, followed by off for 100 ms.

Table 57: LED State Definition for VARAN Client for the RUN and ERR LEDs
## 9 Troubleshooting

In case of any error, please follow the hints given here in order to solve the problem:

#### <u>General</u>

Check, whether the requirements for comX communication module operation are fulfilled:



**Important:** In any case, update older versions of the **cifX Device Driver** to the current version, see *Table 2: Reference to Software..* 

Further information on this topic you can find in section "*Prerequisites for the Operation of the comX Communication* Modules" on page 32.

#### SYS-LED

Check the status of the SYS LED. A solid green SYS LED indicates that the firmware of the comX communication module is operational.

#### LINK-LED

- Check using the LINK LED status, whether a connection to the Ethernet has been established successfully. Depending on the environment of the comX communication module proceed as follows:
- If the comX communication module is mounted in its target environment: Check signals LINK0 at pin 1 for channel 0 and LINK1 at pin 3 for channel 1, respectively.

#### Mounting

Check that the comX communication module is mounted correctly in the socket.

#### **Configuration**

Check the configuration in the master and the slave device. The configuration has to match.

## **10 Updating the Firmware**

## 10.1 Possibilities of Firmware Update

This section introduces the various possibilities of firmware update for the COMX-C communication modules and explains, when which possibility should be considered.

During the construction of the device it must be taken into account, that at least one of the two diagnostic interfaces which are suited for firmware update must be accessible, i.e. connected to the outside.

This not only enables an easy way for the firmware update, but also provides extensive diagnosis possibilities via the configuration software SYCON.net (see sections *"Diagnosis"* and *"Extended Diagnosis"* of the SYCON.net DTM manuals) being a sophisticated and powerful diagnostic tool or alternatively via the cifX test application as a lean and compact diagnostic tool which is easy to use.

If neither the serial nor the USB interface is connected to the outside of the device, a firmware update can only be performed by removing the comX communication module from the device and connecting it to a PC using a PCI carrier board (*CIF50-CB-COM-ABC*, Hilscher part number 1059.000, revision number must be at least 5 for using comX100 and 7 for using comX50) and an additional adapter board (*CIF50-DB-COM-CA*, Hilscher part number 1059.010)

In the following illustrations the yellow marked elements show on which way the transfer of the firmware to the comX communication module happens at the various update possibilities.

#### **10.1.1** Update the comX-Firmware in built-in State(Embedded System)

For firmware update in built-in state (i.e. as embedded system, the following two solutions are available:

#### 10.1.1.1 Set-up A1: Updating the Firmware with SYCON.net via the USB-Interface

This set-up is used for updating the firmware of an embedded system via the USB interface from an external PC.



#### **Necessary preconditions:**

- 1. The USB interface of the comX communication module must be leaded through and connected to the outside of the device into which the comX communication module has been built in.
- 2. SYCON.net has been installed at the PC.







**Note:** Read in section *Update the Firmware with SYCON.net* on page 116 how you can update the firmware of a comX communication module with SYCON.net.

# 10.1.1.2 Set-up A2: Updating the Firmware with SYCON.net via the Serial Interface

This set-up is used for updating the firmware of an embedded system via the serial interface from an external PC.



#### Necessary preconditions:

- 1. The serial interface of the comX communication module must be leaded through and connected to the outside of the device into which the comX communication module has been built in.
- 2. SYCON.net has been installed at the PC.



Figure 38: Set-up A2: Updating the Firmware with SYCON.net via the Serial Interface

**Note:** Read in section *Update the Firmware with SYCON.net* on page 116 how you can update the firmware of a comX communication module with SYCON.net.

#### **10.1.2** Updating the Firmware using an Adapter Card and a PC

For firmware update of comX communication modules connected to a PC via the above mentioned PCI carrier boards and adapter boards, the following three solutions are available:

# 10.1.2.1 Set-up B1: Updating the Firmware with SYCON.net via the cifX Device Driver

This set-up is used for updating the firmware of a comX communication modules connected to a PC via PCI carrier board and adapter board (see above) using SYCON.net.



#### **Necessary preconditions:**

- 1. Carrier board *CIF50-CB-COM-ABC* has been mounted into the PC. Obey safety guidelines for mounting PC cards!
- 2. Adapter board *CIF50-DB-COM-CA* has been plugged into the slot of the PCI carrier board *CIF50-CB-COM-ABC*.
- 3. comX communication module is plugged into the module socket of the adapter board *CIF50-DB-COM-CA*.
- 4. SYCON.net has been installed at the PC.



Figure 39: Set-up B1: Firmware Update with SYCON.net via the cifX Device Driver using Carrier and Adapter Board



**Note:** Read in section "*Update the Firmware with SYCON.net*" on page 116 how you can update the firmware of a comX module with SYCON.net.

# 10.1.2.2 Set-up B2: Updating the Firmware with SYCON.net via the Serial Interface

This set-up is used for updating the firmware of a comX communication modules connected to a PC via PCI carrier board and adapter board (see above) using SYCON.net via the Serial Interface.



#### **Necessary preconditions:**

- 1. Carrier board *CIF50-CB-COM-ABC* has been mounted into the PC. Obey safety guidelines for mounting PC cards!
- 2. Adapter board *CIF50-DB-COM-CA* has been plugged into the slot of the PCI carrier board *CIF50-CB-COM-ABC*.
- 3. comX communication module is plugged into the module socket of the adapter board *CIF50-DB-COM-CA*.
- 4. Serial connection exists between adapter card and (external) PC.
- 5. SYCON.net has been installed at the PC.



Figure 40: Set-up B2: Firmware Update with SYCON.net via the Serial Interface using Carrier and Adapter Board



**Note:** Read in section *Update the Firmware with SYCON.net* on page 116 how you can update the firmware of a comX communication module with SYCON.net.

# 10.1.2.3 Set-up B3: Updating the Firmware with cifX Test Application via the cifX Device Driver

This set-up is used for updating the firmware of a comX communication modules connected to a PC via PCI carrier board and adapter board (see above) using the cifX Device Driver and the cifX test application.



#### **Necessary preconditions:**

- 1. Carrie©r board *CIF50-CB-COM-ABC* has been mounted into the PC. Obey safety guidelines for mounting PC cards!
- 2. Adapter board *CIF50-DB-COM-CA* has been plugged into the slot of the PCI carrier board *CIF50-CB-COM-ABC*.
- 3. comX communication module is plugged into the module socket of the adapter board *CIF50-DB-COM-CA*.
- 4. cifX Device Driver (including the cifX test application) has been installed at the PC.



Figure 41: Set-up B3: Updating the Firmware with cifX Test Application via the cifX Device Driver



**Note:** Read in section *Update the Firmware with the cifX Test Application* on page 126 how you can update the firmware of a comX communication module with SYCON.net.

#### **10.2 Update the Firmware with SYCON.net**

For comX communication modules which are used as embedded systems and already mounted into their target environment, this is the only possibility to perform a firmware update. In order to access the comX module, SYCON.net has to be used in conjunction with the netX driver.

This can be accomplished both via a USB connection and via a serial connection. This complies with the update possibilities described in sections Set-up A1: Updating the Firmware with SYCON.net via the USB-Interface and Set-up A2: Updating the Firmware with SYCON.net via the Serial Interface.

A firmware update with SYCON.net is also possible, if the comX communication module is mounted onto an adapter card CIF50-DB-COM-CA or CIF50-DB-COMX-C, respectively, which itself is plugged into a PCI carrier board CIF 50-CB-COM-ABC mounted within a PC. In this case, the update possibility described in section *Set-up B1: Updating the Firmware with SYCON.net via the cifX Device Driver* applies. Here the access from SYCON.net to the Dual-Port Memory is accomplished via the cifX Device Driver.

Finally, a firmware update can also be performed via the serial interface at a comX communication module connected to a PC via an adapter card. This complies with the update possibilities described in section Set-up B2: Updating the Firmware with SYCON.net via the Serial Interface. In this case SYCON.net has to be applied in conjunction with the netX Driver.

In order to start the System Configurator SYCON.net select the following entry in the Windows starting menu.

#### Programs > SYCON.net System Configurator > SYCON.net

♣ The System Configurator SYCON.net is opened.

You can find a detailed description of the update process in the manual of the DTM of the Fieldbus or Real-Time Ethernet communication system of your choice, see table on page below topic *User Manual SYCON.net*.

In order to update the firmware of the comX communication module with SYCON.net, the following three steps are necessary, which have to be performed exactly in the given order:

- 1. Creation project
- 2. Device assignment (Create connection to the comX communication module). This includes the:
  - Selection of the correct driver
  - and the selection of the comX communication module to be used.
- 3. Performing the main part of the firmware update

The selection of the driver must be done taking into account the update method to be applied, as described above.

- For the update method described in section Set-up A1: Updating the Firmware with SYCON.net via the USB-Interface and "Set-up A2: Updating the Firmware with SYCON.net via the Serial Interface " the access from SYCON.net to the Dual-Port-Memory is done via the cifX Device Driver,
- In this case select the cifX Device Driver by checking the option "cifX Device Driver".



#### Note:

This is described in section 3.2.1 "*Selecting the Driver*" of the corresponding SYCON.net DTM Manual.

More valuable information concerning this topic can also be found in section 3.2.3 "*cifX Device Driver*" of the SYCON.net DTM Manual.

😽 netDevice - Configuratio	n CO	MX DP/DPS[COMX DP/DPS]<2>			
IO Device: COM	X DP/D her Gm	iPS bH		Device ID: 0x0C0F Vendor ID: -	FDT
Navigation Area					
		Driver	Version	ID	
		CIEX Device Driver	1.0.3.2	{368BEC5B-0E92-4C0E-B4A9-64E62AE7AAEA}	
Device Assignment	n i	35Gateway Driver for netX (V3.x)	0.9.1.2	{787CD3A9-4CF6-4259-8E4D-109B6A6BEA91}	
Firmware Download	E.	netX Driver	1.101.1.5347	{B54C8CC7-F333-4135-8405-6E12FC88EE62}	
Configuration	-			,	
General					
Modules					
Parameters					
Groups					
Extensions					
OPVI Oddress Table					
Device Settings					
Device					
GSD					
	_				
	_				
	_				
				OK Cancel Apply	Help
\$)⊳ Disconnected 🚺 Data Set					

#### Figure 42: Selection of cifX Device Driver



**Note:** The driver selection list is available under the menu entry **Settings > Driver**.

- For the update method described in the sections Set-up A1: Updating the Firmware with SYCON.net via the USB-Interface and Set-up A2: Updating the Firmware with SYCON.net via the Serial Interface the access from SYCON.net to the comX communication module is done via the netX driver.
- In these cases, select the "netX Driver" by checking the according checkbox for "netX Driver".



**Note:** This is described in section 3.2.1 "*Selecting the Driver*" of the corresponding SYCON.net DTM Manual.

More valuable information concerning this topic can be found in section 3.2.4 "*netX Driver*" of the SYCON.net DTM-Manual. The necessary adjustment of interfacing parameters is explained in section 3.2.4.2 "*Driver parameters for netX Driver - USB/RS232 Connection*".

RetDevice - Configuration CO	MX DP/DPS[COMX DP/DPS]<2>				
IO Device: COMX DP/D Vendor: Hilscher Gm	)PS IbH		Device ID: Vendor ID:	0x0C0F -	FDT
Navigation Area 📃					
Settings	[ Delver	Lunder			
Driver	Driver	version	U		
	CIFX Device Driver	1.0.3.2	{368BEC5B-0E92-4	COE-B4A9-64F62AE7AAFA	}
	35Gateway Driver for netX (V3.x)	0.9.1.2	{787CD3A9-4CF6-	4259-8E4D-10986A6BEA91	}
	netx Driver	1.101.1.5347	{B54C8CC7-F333-4	+135-84U5-6E12FC88EE62}	
General					
Modules					
Parameters					
Groups					
Extensions					
DPV1					
Device Settings					
Device					
GSD					
			OK Can	cel Apply	Help
치다 Disconnected 🕦 Data Set 🖌					

Figure 43: Selection of netX Driver



#### Note:

The selection of the device can be done as explained in section *"Device Assignment*" of the according SYCON.net DTM manual.

- We recommend only to display the suitable devices when performing the following steps. Select *"Suitable only"* in the combo box *"Device selection"*.
- In order to start the search process for suitable devices, click at the button "Search"(see Figure 44: Starting the Search Process for Devices and Selection of Device on page 119, at the red arrow right on top).
- For the selection of the device check the checkbox of the comX communication module whose firmware is to be updated (also see Figure 44: Starting the Search Process for Devices and Selection of Device on page 119, at the red arrow in the center part of the figure).

#### Updating the Firmware

#### 119/183

😽 netDevice - Configurat	ion C(	DMX DP/DPS[	COMX DP/DPS]<2	>				
IO Device: CO	MX DP/ scher Gi	'DPS mbH				Device ID: Vendor ID:	0x0C0F -	FÓT
Navigation Area 📃					Device As			
Settings Control Contr	Scan D <u>e</u> vi	progress: 4/4 Do	evices (Current device	:: -) •				<u>S</u> can
		Device	Hardware Port 0/	Slot	Serial n	Driver	Channel Protocol	Access path
General		CIFX 50-DP	-/-/PROFIBUS/-	n/a	20019	CIFX Device D	Undefined Undefined	\cifX3_SYS
General Modules Parameters Groups Extensions DPV1 Address Table Device Settings Device Description Device GSD		COMX-CA-DP	-/-/PROFIBUS/-	n/a	20082	CIFX Device D	PROFIBUS-DP Slave	\cifX0_Ch0
	Acce	ss <u>p</u> ath:	{368BEC5B-0E92	-4C0E-B4A	9-64F62AE7/	AAFA}\cifX0_Ch0		
OK Cancel Apply Help								
🖓 🖟 Disconnected 🛛 🚺 Data Se	:t	1						11

Figure 44: Starting the Search Process for Devices and Selection of Device

The main part of the firmware update is described in section 3.4 *"Firmware Download*" of the respective SYCON.net DTM Manual. Proceed as follows:

- > In the navigation area, select **Settings>Firmware Download**.
- Open a file selection dialog by clicking at the button "Select" (Figure 45: Firmware Download with SYCON.net (after Selection of the Firmware), see 1 right at the top).
- > In this dialog select the firmware file to be loaded.
- <sup>™</sup> Then, the screen should look like this:



Figure 45: Firmware Download with SYCON.net (after Selection of the Firmware)

 In order to start the firmware update process, click at "Load" (Figure 45: Firmware Download with SYCON.net (after Selection of the Firmware) see 2).



**Important:** Take care of the warning message issued within the window. A reconstruction of the state prior to starting the firmware update might be impossible.

### 10.2.1 Troubleshooting

The following table lists some known error situations, explains their causes and shows possible ways to solve the respective problem.

Problem	The error message		
	Error		
	Error while establishing connection: Error = 0x8004C755		
	appears		
Explanation 1	The leaded file does not contain firmware for any Hilscher device (neither for		
	comX nor for any other Hilscher device).		
Action 1	Load a correct firmware file, see <i>Table 3: Reference to Firmware</i> on page 11!		
Explanation 2	At update possibility B1: the adapter card has either only bad contact to the PCI carrier board or no contact at all.		
Action 2	Check whether the adapter card is mounted correctly.		
Explanation 3	At update possibility B1: the comX communication module has either bad contact to the adapter card or no contact at all.		
Action 3	Check whether the comX communication module is mounted correctly.		

Problem	The error message
	Error INITIAL STREET IN THE STADISHING CONNECTION: Error opening device connection OK appears.
Explanation 1	The connection to the comX communication module has been lost due to contact problems.
Action 1	Check whether the comX communication module and in case of update possibility B1 the adapter card is mounted correctly.
Explanation 2	At update possibility A1, A2 and B2:
	The connection to the comX communication module has been lost due to contact problems at the serial or USB connection.
Action 2	At update possibility A1, A2 and B2: Check whether the serial cable or the USB cable has correct contact.

Problem	The error message
	Error
	Error while establishing connection: Error opening device connection
	appears.
Explanation	The connection to the comX communication module has been lost due to contact problems.
Action 1	Check whether the comX communication module and in case of update possibility B1 the adapter card is mounted correctly.
Explanation 2	At update possibility A1, A2 and B2:
	The connection to the comX communication module has been lost due to contact problems at the serial or USB connection.
Action 2	At update possibility A1, A2 and B2: Check whether the serial cable or the USB cable has correct contact.

Problem	The error message
	Select Firmware File
	Invalid Firmware for the assigned device! The device classes do not match. Required: COMX (0x0004) Firmware file: CIFX (0x0003) Shall the firmware file nevertheless be applied for the download? <u>Ja</u> <u>Nein</u>
	appears.
Explanation	The device classes do not match. The selected firmware file contains a Hilscher firmware which is not suited for the comX communication module but for another Hilscher product (in this case for instance a cifX card).
Action	Select a firmware suitable for the comX communication module by clicking at <i>Select</i> and selecting the firmware within the subsequent file selection dialog. See <i>Table 3: Reference to Firmware</i> on page 11. Finally, load this firmware into the comX communication module by clicking at <i>Download</i> .

Problem	The error message
	Select Firmware File
	Invalid Firmware for the assigned device! The communication classes do not match. Required: Scanner Firmware file: Adapter Shall the firmware file nevertheless be applied for the download? <u>Ja</u> <u>Nein</u>
	appears.
Explanation	The communication classes do not match. Either the firmware file to be loaded is suited for a Master/Scanner/Controller and the installed comX communication module requires a Slave/ Adapter/ Device firmware or firmware file to be loaded is suited for a Slave/ Adapter/ Device and the installed comX communication module requires a Master/Scanner/Controller firmware.
	If a change from Master to Slave or vice versa is intended and a Master license is present, then click at Yes to perform the intended change. In all other cases click at <i>No</i> .
Action	Use a firmware of the correct type for your comX communication module, i.e. a Master firmware for a Master module and a Slave firmware for a Slave module.
Problem	The error message
	Select Firmware File         Invalid Firmware for the assigned device!         The protocol classes do not match.         Required: EtherNet/IP         Firmware file: SERCOS III         The communication classes do not match.         Required: Scanner         Firmware file: Master         Shall the firmware file nevertheless be applied for the download?         Ja         Mein
Explanation	The protocol classes do not match. The selected firmware does not support any protocol suited for the selected comX communication module. This error situation mostly occurs in conjunction with the two error situations discussed directly above, see the illustration.
Action	Use a suitable firmware for a protocol that is supported by your comX communication module.
	If a change of the Real-Time Ethernet System is intended and you use a comX Real-Time Ethernet Module (such as COMX 100CA-RE, COMX 100CN-RE), click at Yes in order to perform the intended change. In all other cases click at <i>No</i> .

Problem	The error message
	Select Firmware File
	Invalid Firmware for the assigned device! The protocol classes do not match. Required: EtherNet/IP Firmware file: SERCOS III The communication classes do not match. Required: Scanner Firmware file: Master Shall the firmware file nevertheless be applied for the download? <u>Ja</u> <u>Nein</u>
Explanation	The protocol classes do not match. The selected firmware does not support any protocol suited for the selected comX communication module. This error situation mostly occurs in conjunction with the two error situations discussed directly above, see the illustration.
Action	Use a suitable firmware for a protocol that is supported by your comX communication module.
	If a change of the Real-Time Ethernet System is intended and you use a comX Real-Time Ethernet Module (such as COMX 100CA-RE, COMX 100CN-RE), click at Yes in order to perform the intended change. In all other cases click at <i>No</i> .

Problem	The error message "Invalid Firmware for the assigned device. The hardware options do not match" appears.
Explanation	The hardware options do not match, i.e. either you use a Real-Time Ethernet- firmware in conjunction with a Fieldbus communication module, or vice versa, a Fieldbus firmware in conjunction with a Real-Time Ethernet communication module.
Action	Click at <i>No</i> and use a firmware suitable for a protocol that is supported by your comX communication module.
	If the option Yes is clicked at, a non-conforming firmware is loaded and the module will not operate correctly.

Problem	The button <i>Download</i> in screen <i>Firmware Download</i> is grayed out and thus deactivated.
Explanation	There is a (not necessarily permanent) contact problem.
Action	Check whether the comX communication module and the adapter card are mounted correctly and have good electrical contact. Then, click the button <i>Select</i> and again select the firmware file to be loaded using the subsequent file selection dialog. Afterwards, the button <i>Download</i> should not be grayed out anymore.

Problem	The error message
	Error
	Message timed out
	appears.
Explanation	A message timeout has occurred. The connection to the comX communication module has been lost due to contact problems, while the button <i>Select</i> has been clicked
Action	Check whether the comX communication module and in case of update possibility B1 the adapter card has been mounted correctly.

Problem	The error message	
	Error	
	Firmware download finished with error!	
	appears.	
Explanation	At update possibility A1, A2 and B2: The firmware download has been finished with an error due to the serial or USB connection to the comX communication module having been lost during the firmware download.	
Action	At update possibility A1, A2 and B2: Check whether the serial cable or the USB cable has correct contact.	

Table 58: Possible Causes of Errors, their Consequences and necessary Actions for their Removal at Firmware Update with SYCON.net

If problems should occur at the firmware download, you should also check the following additional topics:

- If you intend to load a Master firmware: is a Master license present and loaded. If not, a Master license has to be purchased at Hilscher and must be loaded.
- Is the switch *Byte/Word* of the PCI carrier board CIF 50-CB-COM-ABC in position *"Word"*? If necessary, switch to *"Word"*!
- Especially for update possibility B1: Check the revision number of the PCI carrier board CIF 50-CB-COM-ABC. This revision number must be greater or equal to 5. Revisions 1 to 4 of the PCI carrier board are not capable for connecting comX modules.
- Has the System Configurator SYCON.net been installed correctly
- Is the correct device selected within SYCON.net?

#### **10.3 Update the Firmware with the cifX Test Application**

A firmware update with the cifX Test Application provided by the cifX Device Driver is only possible in case of the comX communication module being mounted at an adapter card of type CIF50-DB-COM-CA which itself is plugged into a PCI carrier board of type CIF 50-CB-COM-ABC mounted in a PC.

The update possibility described in section *"Set-up B3: Updating the Firmware with cifX Test Application via the cifX Device Driver"* applies in this case. The access from SYCON.net to the Dual-Port-Memory is then accomplished via the cifX Device Driver.

The cifX Test Application can be launched within the Microsoft Windows<sup>®</sup> control panel. Proceed as follows in order to update the firmware using the cifX Test Application:

> Open the control panel of Microsoft Windows<sup>®</sup>.

The start menu entry to be used to accomplish this depends from the version of Microsoft Windows  $^{\mbox{\tiny B}}$  that you use:

• For Windows 7 and Vista:

#### Start > Control Panel > All Control Panel Elements

• For Windows XP:

#### Start > Settings > Control Panel

> The cifX Test Icon (see below) allows to open the cifX Test Application.



- <sup>™</sup> The cifX Test Application is opened. At first, the window remains empty.
- > In the cifX Test Application select menu entry Device>Open.
- ♣ The dialog *"Channel Selection"* appears:

Channel Selection		$\mathbf{X}$
cifX1 - cifX2 - cifX3 ⊡ cifX0 - <mark>Channel0</mark>	Selection Information Property Physical Address Interrupt Device Number Serial Number DPM Size Firmware Name Firmware Version Firmware Date	Value           0xFCEAC000           0           1531410           20082           16384           PROFIBUS DP Slave           2.3.32.0 (Build 32)           10/28/2010
	[	Open Cancel

Figure 46: Dialog "Channel Selection" within the cifX Test Application

Here, select the comX communication module to be updated, and click at **Open**. (The window should still remain empty.)

**Note:** In the left part of the dialog cifX cards and comX communication modules which are accessible for the driver are displayed. You can distinguish comX communication modules from cifX cards in this display by their device number. For comX communication modules, the device number always begins with "1531" or "1561"! Both values are not used by cifX cards.

> Now select menu entry **Device > Download**.

The cifX Test Application allows some other kinds of downloads beside firmware downloads. Therefore, the kind of download to be applied must be adjusted first with the combo box *Download Mode*.

- To determine the kind of download to be applied, select option Firmware Download with the combo box Download Mode.
- $\Rightarrow$  Now the screen should look like:

🔤 cifX Test App	lication - cifX0	
<u>File D</u> evice Inform	mation Data <u>I</u> ransfer <u>?</u>	
Download Test – Download Mod <u>C</u> hannel: <u>F</u> ilename:	e: Firmware Download Configuration Download File Download Firmware Download License Download	
Download		
Progress:		
Last Error:		
)river was successful	lu openedi	
mver was successio	ily opened:	

Figure 47: cifX Test Application – Display after Device>Download

- Channel selection: As next step select the intended channel to be used at comX communication modules supporting more than a single channel. At comX communication modules supporting only a single channel specify the value 0 here.
- Selection of firmware file: In the input field "Filename" specify the filename of the firmware file to be loaded into the comX communication module, or select it, respectively (see Figure 48: cifX Test Application – Selection of Firmware File to be used on page 128).

Öffnen					? 🛛
<u>S</u> uchen in:	🚞 comX		•	🖻 💣 🎟 •	
💋 Recent	comxdps.nxf				
Desktop					
igene Dateien					
<b>Arbeitsplatz</b>					
Naturadumaak	Datei <u>n</u> ame:	st Firmusra Filas (* nuf * nu	m <sup>×</sup> mod)	-	Ö <u>f</u> fnen Abbrechen
ung		Schreibgeschützt öffnen	m, iniodj		

Figure 48: cifX Test Application - Selection of Firmware File to be used



**Note:** You can find suitable firmware files on the Communication Solutions DVD and on <u>http://www.hilscher.com</u> in the download area (below comX).



**Note:** The rule system of file names for the various supported Fieldbus- or. Real-Time Ethernet systems is explained in *Table 3: Reference to Firmware* on page 11.

> After you have finished making your specifications, click at "Download".

🔤 cifX Test Application - cifX0		×
<u> File D</u> evice Information Data Iransfer <u>?</u>		
Download Test		
Download Mode: Firmware Download		
Channel:		
Eilename: O:\PROFIBUS\Slave\V2.3.32.0 released\Firmware\comX\comxdps.nxf		
Progress:	-	
Last Error:		
priver was successfully opened!		

Figure 49: cifX Test Application – Display during Firmware Download Process

✤ The Firmware Download starts. This is indicated by the progress bar (below "Progress").

## 10.3.1 Troubleshooting

The following table lists some known error situations and explains their causes and possible ways to solve the problem:

Problem	Explanation	Action
Error message (below Last error) 0x800C0011 – Device not ready (ready flag failed)	Adapter card has bad contact or misses at all.	Plug adapter card including plugged module again. Check contacts.
	comX communication module has poor contact or misses at all.	Plug comX communication module again. Check contacts.
Error message (below Last error) 0x000061A3	The loaded firmware file does not contain a firmware suited for comX, but a firmware suited for another Hilscher device.	Load a correct comX firmware file!
Error message (below Last error) 0x800A000F – Invalid file type	The loaded firmware file does neither contain a comX firmware nor a firmware suited for any other Hilscher device.	Load a correct comX firmware file!

Table 59: Possible Causes of Errors, their Consequences and necessary Actions for their Removal at Firmware Update with SYCON.net

If problems should occur during the firmware download, please also check the following topics:

- If you intend to load a Master firmware: check whether a Master license present and loaded. If not, a Master license has to be purchased at Hilscher and must be loaded.
- Is the switch Byte/Word of the PCI carrier board CIF 50-CB-COM-ABC in position "Word"? If necessary, switch to "Word"!
- Check the revision number of the PCI carrier board CIF 50-CB-COM-ABC. This revision number must be greater or equal to 5. In case of working with a comX50 communication module this revision number must be greater or equal to 7. Revisions 1 to 4 of the PCI carrier board are not capable for connecting comX modules.
- Check whether the cifX Device Driver has been installed correctly.

## **11 Diagnostic Interfaces**

In general, as Diagnostic Interfaces USB and serial interface are available.

## **11.1 Support of Diagnostic Interfaces by comX Firmware**

The following table indicates from which firmware version on the firmware supports the diagnostic interface.

Firmware file name	Fieldbus system	Minimum allowed version number of firmware for use of USB or serial interface
COMXCOM.NXF	CANopen Master	From V2.2.5.0
COMXCOS.NXF	CANopen Slave	From V2.4.4.0
M0505000.NXF	CANopen Slave comX10	From V3.0.3.0
M0509000.NXF	CC-Link Slave comX10	From V2.6.1.0
COMXDNS.NXF	DeviceNet Master	From V2.2.7.0
COMXDNS.NXF	DeviceNet Slave	From V2.2.7.0
M0507000.NXF	DeviceNet Slave comX10	From V2.3.5.0
COMXECM.NXF	EtherCAT Master	From V2.4.4.0
COMXECS.NXF	EtherCAT Slave	From V2.5.13.0
M060F000.nxf	EtherCAT Slave V4 comX51	From V 4.2.11.x
COMXEIM.NXF	EtherNet/IP Scanner	From V2.2.4.1
COMXEIS.NXF	EtherNet/IP Adapter	From V2.3.4.1
M060H000.nxf	EtherNet/IP Adapter comX51	From V 2.7.13.x
COMXOMB.NXF	Open Modbus/TCP	From V2.3.2.1
M060L000.nxf	Open Modbus/TCP comX51	From V 2.5.11.x
COMXPLS.NXF	POWERLINK Controlled Node	From V2.1.22.0
COMXDPM.NXF	PROFIBUS-DP Master	From V2.3.22.0
COMXDPS.NXF	PROFIBUS-DP Slave	From V2.3.31.0
M0502000.nxf	PROFIBUS DP Slave comX10	From V2.4.1.0
M0203000.nxf	PROFIBUS MPI	From V2.4.2.0
COMXPNM.NXF	PROFINET IO Controller	From V2.4.10.0
COMXPNS.NXF	PROFINET IO Device	From V3.4.9.0
cx51pns.nxf	PROFINET IO Device comX51	From V3.5.26.x
COMXS3M.NXF	Sercos Master	From V2.0.14.0
COMXS3S.NXF	Sercos Slave	From V3.0.13.0
M060J000.nxf	Sercos Slave	From V3.1.19.x

Table 60: Firmware Versions with Support for Diagnostic Interface

The following firmwares do not provide any support of diagnostic interfaces (USB or serial interface):

- CC-Link Slave
- PROFINET IO Device V2 (however, PROFINET IO Device from V3.4.9.0 contains the required support)

## 11.2 Hint concerning the Usage of the Software

The USB interface, the serial interface as well as the cifX Device Driver may only be used exclusively by **one** software, that is

- the SYCON.net configuration software (with integrated ODM V3) or
- the netX Configuration Tool or
- the cifX Test Application or
- the cifX Driver Setup Utility or
- the application program



**Important:** Never use the listed software simultaneously, otherwise this will result in communication problems with the device.

If the SYCON.net configuration software was used on the PC, then stop the ODMV3 service before you use one of the other software listed above.

Therefore, select Service > Stop from the context menu of the ODMV3 system tray icon.

# 11.3 Hardware Modification of comX Module for Recognition of comX-Reset at a connected Windows<sup>®-</sup>Diagnosis PC

The following table indicates at which hardware revision of the comX module the electronic circuit of the USB interface has been changed:

Communication module	Hardware Revision
COMX 100CA-CO	4
COMX 100CN-CO	3
COMX 100CA-DN	4
COMX 100CN-DN	3
COMX 100CA-DP	4
COMX 100CN-DP	3
COMX 50CA-CCS (firmware does not support USB)	3
COMX 51CA-RE	1
COMX 100CA-RE	7
COMX 100CN-RE	2

Table 61: First Hardware Version with new USB Interface

This modification was necessary in order to enable recognition of a comX reset by a Diagnosis PC running Microsoft Windows<sup>®</sup>. Windows<sup>®</sup> closes the USB driver and automatically restarts it, when the comX executes a reset and is then again ready to communicate over USB.



**Note:** If you use a comX communication module of a former hardware revision, it is necessary to pull away the USB cable from the USB connector and then plug it again after a reset of the comX communication module (which, for instance occurs <u>after</u> a firmware download)

## **12 Technical Data**



**Note:** All technical data in this section are subject to change without any further notice.

## 12.1 Technical Data of COMX Modules

## 12.1.1 COMX 100CA-RE

COMX 100CA-RE	Part number	1531.100
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
Ethernet Communication	Ethernet-Standard/ Frame type	IEEE 802.3/ Ethernet II
	Supported Real-Time Ethernet communication standard/ firmware	Determined by loaded firmware.: EtherCAT Master/Slave, EtherNet/IP Scanner (Master)/ Adapter(Slave), Open Modbus/TCP, Powerlink Controlled Node (Slave), PROFINET_IO-Controller (Master)/ Device (Slave), Sercos Master/ Slave, TCP/IP, VARAN Client (Slave)
Ethernet interface	Hardware	2 * RJ45 socket, potential free
	Transmission rate	100 MBit/s, 10 MBit/s (depending on the firmware)
	Interface Type	100 BASE-TX, isolated, 10 BASE-T (depending on the loaded firmware)
	Half duplex/full duplex	supported (at 100 MBit/s)
	Auto-Negotiation/Auto-Crossover	(depending on the loaded firmware)
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		COM0, COM1 Communication Status (both green or red, depending on loaded firmware)
		TX/RX0, TX/RX1 Ethernet activity status (yellow)
		LINK0, LINK1 Ethernet link status (green)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 700750 mA / 2.5 W
Environment	Ambient temperature range (Rev. 8)	Operation: 0°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 62: Technical Data COMX 100CA-RE

#### 12.1.2 COMX 100CN-RE



**Important:** All data specified here apply for the COMX 100CN-RE, Revision 2.

COMY 400CN DE	Dant number	4524 404
COMA TOUCH-RE		1531.101
Communication Controller		netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
Ethernet Communication	Ethernet-Standard/ Frame type	IEEE 802.3/ Ethernet II
	Supported Real-Time Ethernet communication standard/ firmware	Determined by loaded firmware.: EtherCAT Master/Slave, EtherNet/IP Scanner (Master)/ Adapter(Slave), Open Modbus/TCP, Powerlink Controlled_Node (Slave),PROFINET_IO-Controller (Master)/ Device (Slave), Sercos Master/ Slave, TCP/IP, VARAN Client (Slave)
Ethernet interface	Hardware	30 Pin SMT connector, female, Grid 1.27 mm, see COMX Design Guide. Fitting to a RJ45-Module with Transformer, LED and termination, such as ERNI 203313 or Pulse J0864D628ANL
	Transmission rate	100 MBit/s, 10 MBit/s (depending on the loaded firmware)
	Interface Type	100 BASE-TX, isolated, 10 BASE-T (depending on the loaded firmware)
	Half duplex/full duplex	supported (at 100 MBit/s)
	Auto-Negotiation/Auto-Crossover	(depending on the loaded firmware)
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	Signals for external LEDs (only	SYS System Status
	available at pins)	COM0, COM1 Communication Status
		TX/RX0, TX/RX1 Ethernet activity status
		LINK0, LINK1 Ethernet link status
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 700750 mA / 2.5 W
Environment	Ambient temperature range	Operation: -20°C+60°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 63: Technical Data COMX 100CN-RE

## 12.1.3 COMX 100CA-CO

COMX 100CA-CO	Part number	1531.500
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
CANopen communication	Supported communication standard	CANopen
CANopen interface	Interface type	Potential-free ISO-11898-interface. According to CANopen specification EN 50325/4.
	Connector	DSub plug, male, 9-pin
	Transmission rates	10 kBit/s, 20 kBit/s, 50 kBit/s, 100 kBit/s, 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 MBit/s
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		CAN Communication status (green: STA, red: ERR)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 450480 mA / 1.51.6 W
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 64: Technical Data COMX 100CA-CO



**Important**: The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 100CA-CO, Revision 2.

## 12.1.4 COMX 100CN-CO

COMX 100CN-CO	Part number	1532.500
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
CANopen communication	Supported communication standard	CANopen
CANopen interface	Interface type	Potential-free ISO-11898-interface. According to CANopen specification EN 50325/4.
	Connector	30 Pin SMT connector, female, pin grid 1.27 mm, see COMX Design Guide.
	Transmission rates	10 kBit/s, 20 kBit/s, 50 kBit/s, 100 kBit/s, 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 MBit/s
	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Diagnosis	LED Display	SYS System Status (green: RUN, yellow: RDY)
Display		CAN Communication status (green: STA, red: ERR)
	Supply voltage	+3,3 V ± 5 % DC
Power supply /Current	Typical current/ power at 3,3 V	Approx. 450480 mA / 1.51.6 W
consumption	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
Environment	Humidity range	10 95 % relative humidity (non-condensing)
	Dimensions (L x W x H)	70 x 30 x 21.5 mm
Device	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
	CE Sign	yes
CE Sign	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
	System configurator	SYCON.net
Configuration software		

Table 65: Technical Data COMX 100CN-CO



**Important**: The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 100CN-CO, Revision 1.

## 12.1.5 COMX 100CA-DN

COMX 100CA-DN	Part number	1531.510
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
<b>DeviceNet</b> -Communication	Supported communication standard	DeviceNet
DeviceNet interface	Interface type	Potential-free ISO-11898-interface according to DeviceNet specification
	Connector	CombiCon connector, 5-pin
	Transmission rate	125 kBit/s, 250 kBit/s, 500 kBit/s,
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		MNS Module Network Status (green: MS, red: NS)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 440470 mA / 1.51.6 W
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 66: Technical Data COMX 100CA-DN



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 100CA-DN, Revision 2.

### 12.1.6 COMX 100CN-DN

		-
COMX 100CA-DN	Part number	1532.510
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
DeviceNet -Communication	Supported communication standard	DeviceNet
DeviceNet interface	Interface type	Potential-free ISO-11898-interface according to DeviceNet specification
	Connector	30 Pin SMT connector, female, pin grid 1.27 mm, see COMX Design Guide.
	Transmission rate	125 kBit/s, 250 kBit/s, 500 kBit/s,
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	Signals for external LEDs (only available at pins)	SYS System Status
		MNS Module Network Status
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 440470 mA / 1.51.6 W
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 67: Technical Data COMX 100CN-DN



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 100CN-DN, Revision 1.

## 12.1.7 COMX 100CA-DP

COMX 100CA-DP	Part number	1531.410
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
PROFIBUS Communication	Supported Communication Standard/Firmware	PROFIBUS DP
PROFIBUS Interface	Interface type	Potential free RS-485 Interface
	Connector	DSub connector, female, 9-pin
	Transmission rate	9,6 kBit/s, 19,2 kBit/s, 31,25 kBit/s, 45,45 kBit/s, 93,75 kBit/s, 187,5 kBit/s, 500 kBit/s, 1,5 MBit/s, 3 MBit/s, 6 MBit/s,12 MBit/s
	Auto-Detection	yes
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		COM Communication status (green: STA, red: ERR)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 430460 mA / 1.51.6 W
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 68: Technical Data COMX 100CA-DP

### 12.1.8 COMX 100CN-DP

COMX 100CN-DP	Part number	1532.410
Communication Controller	Туре	netX 100/500 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
PROFIBUS Communication	Supported Communication Standard/Firmware	PROFIBUS DP
PROFIBUS Interface	Interface type	Potential free RS-485 Interface
	Connector	30-pin SMT connector, female, grid distance 1.27 mm, see COMX Design Guide.
	Transmission rate	9,6 kBit/s, 19,2 kBit/s, 31,25 kBit/s, 45,45 kBit/s, 93,75 kBit/s, 187,5 kBit/s, 500 kBit/s, 1,5 MBit/s, 3 MBit/s, 6 MBit/s,12 MBit/s
	Auto-Detection	yes
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	Signals for external LEDs (only	SYS System Status
	available at pins)	COM Communication Status
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 430460 mA / 1.51.6 W
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 69: Technical Data COMX 100CN-DP



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 100CN-DP, Revision 1.

## 12.1.9 COMX 50CA-REFO

COMX 50CA-REFO	Part number	1551.110
Communication Controller	Туре	netX 50 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
Ethernet Communication	Ethernet-Standard/ Frame type	IEEE 802.3/ Ethernet II
	Supported Real-Time Ethernet communication standard/ firmware	PROFINET IO- Device (Slave))
Optical Ethernet interface	Hardware	2 x fiber optical transceiver Avago AFBR-5978Z with SC-RJ connector.
	Transmission rate	100 MBit/s
	Half duplex/full duplex	supported (at 100 MBit/s)
	Conforms to AIDA standard	yes
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		COM0, COM1 Communication Status (both green or red,)
		TX/RX0, TX/RX1 Ethernet activity status (yellow)
		LINK0, LINK1 Ethernet link status (green)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx 950. mA / 3,14 W (at 3,3 V)
Environment	Ambient temperature range	Operation: -20°C+55°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 70: Technical Data COMX 50CA-REFO

## 12.1.10 COMX 51CA-RE

COMX 100CA-RE	Part number	1571.100
Communication Controller	Туре	netX 51 Processor
Integrated Memory	RAM/ FLASH	8 MB SDRAM, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB
	Width for DPM data access	8/16 Bit
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
SPI interface	SPI Mode	SPI Slave, Mode 3
	CPOL	1
	СРНА	1
Ethernet Communication	Ethernet-Standard/ Frame type	IEEE 802.3/ Ethernet II
	Supported Real-Time Ethernet communication standard/ firmware	Determined by loaded firmware.: EtherCAT Master/Slave, EtherNet/IP Scanner (Master)/ Adapter(Slave), Open Modbus/TCP, PROFINET_IO-Controller (Master)/ Device (Slave), Sercos Master/ Slave, TCP/IP
Ethernet interface	Hardware	2 * RJ45 socket, potential free
	Transmission rate	100 MBit/s, 10 MBit/s (depending on the firmware)
	Interface Type	100 BASE-TX, isolated, 10 BASE-T (depending on the loaded firmware)
	Half duplex/full duplex	supported (at 100 MBit/s)
	Auto-Negotiation/Auto-Crossover	(depending on the loaded firmware)
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		COM0, COM1 Communication Status (both green or red, depending on loaded firmware)
		TX/RX0, TX/RX1 Ethernet activity status (yellow)
		LINK0, LINK1 Ethernet link status (green)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Maximum current/ power at 3,3 V	Approx. 700 mA / 2.3 W
Environment	Ambient temperature range (Rev. 1)	Operation: 0°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Long and supplies of	Assertion to IEC/ENI C1000 4:100E and holow
	Immunity	According to IEC/EN 61000-4:1995, see below

Table 71: Technical Data COMX 51CA-RE

## 12.1.11 COMX 10CA-CCS



**Important:** All data specified here apply for the COMX 10CA-CCS, Revision 1.

	-	
COMX 10CA-CCS	Part number	1561.740
Communication Controller	Туре	netX 10 Processor
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Width for DPM data access	8/16 Bit (switchable)
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
CC-Link Communication	Supported communication standard	CC-Link Version 2.0 and 1.1 according to CC-Link Standard V.2.00 BAP-05025-J
CC-Link Interface	Interface type	Potential-free RS-485 interface
	Connector	5-pole screw connector (RIACON Type 166)
	Transmission rates	156 kBit/s, 625 kBit/s, 2500 kBit/s, 5 MBit/s, 10 MBit/s
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		L RUN/L ERR Communication Status (green: L RUN, red: L ERR)
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address and 1 Rotary Switch for Baudrate
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 225 mA / 0,75 W (at 3,3 V)
Environment	Ambient temperature range	Operation: 0°C +55°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 72: Technical Data COMX 10CA-CCS

#### 12.1.12 COMX 10CN-CCS



**Important:** All data specified here apply for the COMX 10CN-CCS, Revision 1.

COMX 10CN-CCS	Part number	1562.740
Communication Controller	Туре	netX 10 Processor
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Width for DPM data access	8/16 Bit (switchable)
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
CC-Link Communication	Supported communication standard	CC-Link Version 2.0 and 1.1 according to CC-Link Standard V.2.00 BAP-05025-J
CC-Link Interface	Interface type	Potential-free RS-485 interface
	Connector	30-pin SMT connector, female, grid distance 1.27 mm, see COMX Design Guide.
	Transmission rates	156 kBit/s, 625 kBit/s, 2500 kBit/s, 5 MBit/s, 10 MBit/s
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		L RUN/L ERR Communication Status (green: L RUN, red: L ERR)
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address and 1 Rotary Switch for Baudrate
	Туре	Decimal (0-9)
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx. 225 mA / 0,75 W (at 3,3 V)
Environment	Ambient temperature range	Operation: 0°C +55°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 73: Technical Data COMX 10CN-CCS

## 12.1.13 COMX 10CA-COS



**Important:** All data specified here apply for the COMX 10CA-COS, Revision 2.

COMX 10CA-COS	Part number	1561.540
Communication Controller	Туре	netX 10 Processor
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Width for DPM data access	8/16 Bit (switchable)
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
CANopen Communication	Supported communication standard	CANopen
CANopen Interface	Interface type	Potential-free ISO-11898-interface. According to CANopen specification EN 50325/4.
	Connector	DSub plug, male, 9-pin
	Transmission rates	10 kBit/s, 20 kBit/s, 50 kBit/s, 100 kBit/s, 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 MBit/s
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		CAN Communication status (green: STA, red: ERR)
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx 250 mA / 0.825 W (at 3,3 V)
Environment	Ambient temperature range	Operation: -20°C+70°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 74: Technical Data COMX 10CA-COS



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 10CA-COS, Revision 1.
#### 12.1.14 COMX 10CN-COS



**Important:** All data specified here apply for the COMX 10CN-COS, Revision 1.

	Dent work or	4500 540
COMX 10CN-COS	Part number	1562.540
Communication Controller	Туре	netX 10 Processor
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Width for DPM data access	8/16 Bit (switchable)
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
CANopen Communication	Supported communication standard	CANopen
CANopen Interface	Interface type	Potential-free ISO-11898-interface. According to CANopen specification EN 50325/4.
	Connector	30-pin SMT connector, female, grid distance 1.27 mm, see COMX Design Guide.
	Transmission rates	10 kBit/s, 20 kBit/s, 50 kBit/s, 100 kBit/s, 125 kBit/s, 250 kBit/s, 500 kBit/s, 800 kBit/s, 1 MBit/s
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status
		CAN Communication Status
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx 250 mA / 0.825 W (at 3,3 V)
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 75: Technical Data COMX 10CN-COS

#### 12.1.15 COMX 10CA-DNS



**Important:** All data specified here apply for the COMX 10CA-DNS, Revision 2.

COMX 10CA-DNS	Part number	1561.520
Communication Controller	Туре	netX 10 Processor
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Width for DPM data access	8/16 Bit (switchable)
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
DeviceNet Communication	Supported communication standard	DeviceNet
DeviceNet Interface	Interface type	Potential-free ISO-11898-interface according to DeviceNet specification
	Connector	CombiCon connector, 5-pin
	Transmission rates	125 kBit/s, 250 kBit/s, 500 kBit/s,
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		MNS Module Network Status (green: MS, red: NS)
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx 250 mA / 0.825 W (at 3,3 V)
Environment	Ambient temperature range	Operation: -20°C+70°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 76: Technical Data COMX 10CA-DNS



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 10CA-DNS, Revision 1.

#### 12.1.16 COMX 10CN-DNS



**Important:** All data specified here apply for the COMX 10CN-DNS, Revision 1.

COMX 10CN-DNS	Part number	1562.520
Communication Controller	Туре	netX 10 Processor
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)
	Width for DPM data access	8/16 Bit (switchable)
	Туре	50 Pin SMT Connector, female
	Pin distance (Grid)	1.27 mm
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A
DeviceNet Communication	Supported communication standard	DeviceNet
DeviceNet Interface	Interface type	Potential-free ISO-11898-interface according to DeviceNet specification
	Connector	30-pin SMT connector, female, grid distance 1.27 mm, see COMX Design Guide.
	Transmission rates	125 kBit/s, 250 kBit/s, 500 kBit/s,
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)
		MNS Module Network Status (green: MS, red: NS)
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC
consumption	Typical current/ power at 3,3 V	Approx 250 mA / 0.825 W (at 3,3 V)
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C
	Humidity range	10 95 % relative humidity (non-condensing)
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm
	Weight	approx. 35-40 g
	Mounting/Installation	According to comX Design-Guide
	RoHS	yes
CE Sign	CE Sign	yes
	Emission	EN55011:2009 Class A; CISPR 11. Class A
	Immunity	According to IEC/EN 61000-4:1995, see below
Configuration software	System configurator	SYCON.net

Table 77: Technical Data COMX 10CN-DNS



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 10CN-DNS, Revision 1.

#### 12.1.17 COMX 10CA-DPS



**Important:** All data specified here apply for the COMX 10CA-DPS, Revision 2.

COMX 10CA-DPS	Part number	1561,420	
Communication Controller		netX 10 Processor	
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM	
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)	
	Width for DPM data access	8/16 Bit (switchable)	
	Туре	50 Pin SMT Connector, female	
	Pin distance (Grid)	1.27 mm	
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A	
PROFIBUS Communication	Supported communication standard	PROFIBUS DP	
PROFIBUS Interface	Interface type	Potential free RS-485 Interface	
	Connector	DSub connector, female, 9-pin	
	Transmission rates	9,6 kBit/s, 19,2 kBit/s, 31,25 kBit/s, 45,45 kBit/s, 93,75 kBit/s, 187,5 kBit/s, 500 kBit/s, 1,5 MBit/s, 3 MBit/s, 6 MBit/s,12 MBit/s	
	Auto-Detection	yes	
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)	
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)	
		COM Communication status (green: STA, red: ERR)	
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address	
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC	
consumption	Typical current/ power at 3,3 V	Approx. 200 mA / 0,66 W (at 3,3 V)	
Environment	Ambient temperature range	Operation: -20°C +70°C Storage: -40°C +85 °C	
	Humidity range	10 95 % relative humidity (non-condensing)	
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm	
	Weight	approx. 35-40 g	
	Mounting/Installation	According to comX Design-Guide	
	RoHS	yes	
CE Sign	CE Sign	yes	
	Emission	EN55011:2009 Class A; CISPR 11. Class A	
	Immunity	According to IEC/EN 61000-4:1995, see below	
Configuration software	System configurator	SYCON.net	

Table 78: Technical Data COMX 10CA-DPS



The data mentioned under *"Electrical Immunity to Interference and Radio Frequency"* apply for the communication module COMX 10CA-DPS, Revision 1.

#### 12.1.18 COMX 10CN-DPS



**Important:** All data specified here apply for the COMX 10CN-DPS, Revision 1.

COMX 10CN-DPS	Part number	1562.420	
Communication Controller	Туре	netX 10 Processor	
Integrated Memory	RAM/ FLASH	- /, 4 MB SPI-Flash-EPROM	
System interface	Size of Dual-Port-Memory	16 KB (14 address lines), where 8 KB used by firmware (13 address lines, lowest 8 KB)	
	Width for DPM data access	8/16 Bit (switchable)	
	Туре	50 Pin SMT Connector, female	
	Pin distance (Grid)	1.27 mm	
	Corresponding male connector	SAMTEC TFM - 125 - 02 - S - D – A or TFC - 125 - 02 - F - D – A	
PROFIBUS Communication	Supported communication standard	PROFIBUS DP	
PROFIBUS Interface	Interface type	Potential free RS-485 Interface	
	Connector	30-pin SMT connector, female, grid distance 1.27 mm, see COMX Design Guide.	
	Transmission rates	9,6 kBit/s, 19,2 kBit/s, 31,25 kBit/s, 45,45 kBit/s, 93,75 kBit/s, 187,5 kBit/s, 500 kBit/s, 1,5 MBit/s, 3 MBit/s, 6 MBit/s,12 MBit/s	
	Auto-Detection	yes	
Diagnosis	Diagnostic interfaces/ signals	UART (RXD, TXD), USB (RX0, TX0, USB+, USB-)	
Display	LED Display	SYS System Status (green: RUN, yellow: RDY)	
		COM Communication status (green: STA, red: ERR)	
Rotary Switch	Adjustment of Address and Baudrate	2 Rotary Switches for Address	
Power supply /Current	Supply voltage	+3,3 V ± 5 % DC	
consumption	Typical current/ power at 3,3 V	Approx. 200 mA / 0,66 W (at 3,3 V)	
		max- 1005 mA at bus short circuit	
Environment	Ambient temperature range	Operation: -20°C+65°C, Storage: -40°C+85 °C	
	Humidity range	10 95 % relative humidity (non-condensing)	
Device	Dimensions (L x W x H)	70 x 30 x 21.5 mm	
	Weight	approx. 35-40 g	
	Mounting/Installation	According to comX Design-Guide	
	RoHS	yes	
CE Sign	CE Sign	yes	
	Emission	EN55011:2009 Class A; CISPR 11. Class A	
	Immunity	According to IEC/EN 61000-4:1995, see below	
Configuration software	System configurator	SYCON.net	

Table 79: Technical Data COMX 10CN-DPS

# 12.2 Electrical Immunity to Interference and Radio Frequency

Test	Electrostatic discharge (ESD) according to IEC/EN 61000-4-2:1995		Fast transient interferences (Burst), according to IEC/EN 61000-4- 4:1995	Surge voltage, according to IEC/EN 61000-4- 5:1995
Method Module/Revision	Air discharge method	Contact discharge method	Communication and data lines	Communication and data lines
COMX 100CA-RE Rev. 3	8 kV Criterion B	4 kV Criterion B	2 kV Criterion B	1 kV Criterion A
COMX 100CN-RE Rev. 1	8 kV Criterion A	4 kV Criterion B	2 kV Criterion B	1 kV Criterion B
COMX 100CA-CO Rev.2	10 kV Criterion A	6 kV Criterion A	2 kV Criterion A	1 kV Criterion A
COMX 100CN-CO Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion A	1 kV Criterion A
COMX 100CA-DN Rev.2	8 kV Criterion B	4 kV Criterion B	2 kV Criterion B	0.6 kV Criterion B
COMX 100CN-DN Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion B	0.5 kV Criterion B
COMX 100CA-DP Rev.2	10 kV Criterion A	6 kV Criterion A	2 kV Criterion A	1 kV Criterion A
COMX 100CN-DP Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion A	1 kV Criterion A
COMX 50CA-REFO Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion B	-
COMX 51CA-RE Rev.1	8 kV Criterion A	6 kV Criterion B	2.2 kV Criterion B	1 kV Criterion A
COMX 10CA-CCS Rev.1	8 kV Criterion B	6 kV Criterion B	2.5 kV Criterion B	1 kV Criterion A
COMX 10CN-CCS Rev.1	8 kV Criterion B	6 kV Criterion B	2.5 kV Criterion B	1 kV Criterion A
COMX 10CA-COS Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion B	1 kV Criterion A
COMX 10CN-COS Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion B	1 kV Criterion A
COMX 10CA-DNS Rev.1	8 kV Criterion B	4 kV Criterion B	2 kV Criterion B	0.5 kV Criterion B
COMX 10CN-DNS Rev.1	10 kV Criterion B	6 kV Criterion B	2 kV Criterion B	1 kV Criterion A
COMX 10CA-DPS Rev.1	8 kV Criterion B	6 kV Criterion B	2.2 kV Criterion B	1 kV Criterion B
COMX 10CN- DPS Rev.1	10 kV Criterion B	6 kV Criterion B	2.5 kV Criterion A	1 kV Criterion A

Table 80: Electrical Immunity to Interference and Radio Frequency COMX Modules

The criteria are specified according to the definition given in EN 61131-2:2007.

# 12.3 Technical Data of Communication Protocols

#### 12.3.1 EtherCAT Master

Parameter	Description
Maximum number of EtherCAT slaves	Maximum 200 Slaves. The number of usable slaves depends on the available memory for the configuration file. See 'configuration file' below.
Maximum number of cyclic input data	5760 bytes
Maximum number of cyclic output data	5760 bytes
Minimum bus cycle time	205 $\mu s,$ depending on the used number of slaves and the used number of cyclic input data and output data. Recommended is a cycle time of 1 ms and higher.
Acyclic communication	CoE (CANopen over EtherCAT)
	CoE-Upload, CoE-Download
	Maximum 1500 bytes
Functions	Get OD List
	Get object description
	Get entry description
	Emergency
	Slave diagnostics
Bus Scan	Supported
Redundancy	Supported, but not at the same time with Distributed Clocks
Distributed Clocks	Supported, but not at the same time with Redundancy
Topology	Line or ring
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Configuration File (ethercat.xml or config.nxd)	COMX 10CA-RE, COMX 100CN-RE: Maximum 2 MByte
Limitations	The size of the bus configuration file is limited by the size of the RAM Disk (1 MByte) or FLASH disk (2 MByte).
	All CoE Uploads, Downloads and information services must fit in one TLR-Packet. Fragmentation is not supported
	Distributed Clock and Redundancy cannot be used at the same time.
Reference to firmware/stack version	V3.0.x.x

Table 81: Technical Data EtherCAT Master Protocol

## 12.3.2 EtherCAT Slave

Parameter	Description	Description
	COMX 51XX-RE	COMX 100XX-RE
Maximum number of cyclic input data	1024 bytes	256* bytes
Maximum number of cyclic output data	1024 bytes	256* bytes
Acyclic communication	SDO	SDO
	SDO Master-Slave	SDO Master-Slave
	SDO Slave-Slave (depending on Master capability)	SDO Slave-Slave (depending on Master capability)
Туре	Complex Slave	Complex Slave
Functions	Emergency	Emergency
FMMUs	8	3
SYNC Manager	4	4
Distributed Clocks (DC)	Supported, 32 Bit	Supported, 32 Bit
Baud rate	100 MBit/s	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3	Ethernet II, IEEE 802.3
Limitation	LRW is not supported	LRW is not supported
Reference to firmware/stack version	V4.2.x.x	V2.5.x.x and V4.2.x.x

Table 82: Technical Data EtherCAT Slave Protocol



**Note for COMX 100XX-RE:** \* The loadable firmware supports for the number of cyclic input data and for cyclic output data in total up to 512 bytes. If more than 256 bytes for input data or for output data shall be exchanged via EtherCAT, then a customer specific XML file is necessary. Additionally the following formula applies: The sum of the input data length and the ouput data length may not exceed 512 bytes, where each length has to be rounded up to the next multiple of 4 for this calculation.

# 12.3.3 EtherNet/IP-Scanner (Master)

Parameter	Description
Maximum number of EtherNet/IP connections	64 connections for implicit and explicit
Maximum number of total cyclic input data	5712 bytes
Maximum number of total cyclic output data	5760 bytes
Maximum number of cyclic input data	504 bytes per slave per telegram
Maximum number of cyclic output data	504 bytes per slave per telegram
IO Connection type	Cyclic, minimum 1 ms (depending on used number of connections and used number of input and output data)
Maximum number of unscheduled data	1400 bytes per telegram
UCMM, Class 3	Supported
Explicit Messages, Client and Server Services	Get_Attribute_Single/All
	Set_Attribute_Single/All
Quick connect	Supported
Predefined standard objects	Identity Object
	Message Route Object
	Assembly Object
	Connection Manager
	Ethernet Link Object
	TCP/IP Object
	DLR Object
	QoS Object
Maximal number of user specific objects	20
Topology	Tree, Line, Ring
DLR (Device Level Ring)	Beacon based 'Ring Node'
ACD (Address Conflict Detection)	Supported
DHCP	Supported
BOOTP	Supported
Baud rates	10 and 100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Switch function	Integrated
Limitations	CIP Sync Services are not implemented
	TAGs are not supported
Reference to firmware/stack version	V2.6.x.x

Table 83: Technical Data EtherNet/IP Scanner (Master) Protocol

## 12.3.4 EtherNet/IP-Adapter (Slave)

Parameter	Description
Maximum number of input data	504 bytes
Maximum number of output data	504 bytes
IO connection types (implicit)	1 exclusive owner, 1 listen only, 1 input only
IO Connection trigger types	Cyclic, minimum 1 ms*
	Application Triggered, minimum 1 ms*
	Change Of State, minimum 1 ms*
	* depending on number of connections and number of input and output data
Explicit Messages	Connected and unconnected
Maximum number of connections	8, explicit and implicit connections
Unconnected Message Manager (UCMM)	Supported
Quick connect	Supported
Predefined standard objects	Identity Object
	Message Route Object
	Assembly Object
	Connection Manager
	DLR Object
	QoS Object
	TCP/IP Object
	Ethernet Link Object
Reset services	Identity Object Reset Service of Type 0 and 1
Maximum number of user specific objects	20
DLR V2 (ring topology)	Supported
ACD (Address Conflict Detection)	Supported
DHCP	Supported
BOOTP	Supported
Baud rates	10 and 100 MBit/s
Duplex modes	Half duplex, Full duplex, Auto negotiation
MDI modes	MDI, MDI-X, Auto-MDIX
Data transport layer	Ethernet II, IEEE 802.3
Switch function	Integrated
Limitations	CIP Sync Services are not implemented
	TAGs are not supported
Reference to firmware/stack version	V2.7.x.x

Table 84: Technical Data EtherNet/IP Adapter (Slave) Protocol

### 12.3.5 Open Modbus/TCP

Parameter	Description
Maximum number of input data	2880 Registers
Maximum number of output data	2880 Registers
Acyclic communication	Read/Write Register: - Maximum 125 Registers per Read Telegram (FC 3, 4, 23), - Maximum 121 Registers per Write Telegram (FC 23), - Maximum 123 Registers per Write Telegram (FC 16)
	Read/Write Coil: - Maximum 2000 Coils per Read Telegram (FC 1, 2), - Maximum 1968 Coils per Write Telegram (FC 15)
Modbus Function Codes	1, 2, 3, 4, 5, 6, 7, 15, 16, 23* * Function Code 23 can be used via the packet API, but not with the Command Table.
Protocol Mode	Message Mode (Client Mode): - Client (using the Command Table: The data is stored in the I/O process data image) - Client (using the packet API: The I/O process data image is not used) - Server (using the packet API: The I/O process data image is not used) I/O Mode (Server Mode): - Server (only) (The data is stored in the I/O process data image)
Baud rates	10 and 100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Reference to firmware/stack version	V2.5.x.x

Table 85: Technical Data Open Modbus/TCP Protocol

#### 12.3.6 Powerlink Controlled Node/Slave

Parameter	Description
Maximum number of cyclic input data	1490 bytes
Maximum number of cyclic output data	1490 bytes
Acyclic data transfer	SDO Upload/Download
Functions	SDO over ASND and UDP
Baud rate	100 MBit/s, half-duplex
Data transport layer	Ethernet II, IEEE 802.3
Ethernet POWERLINK version	V 2
Limitation	No slave to slave communication
Reference to firmware/stack version	V2.1.x.x

Table 86: Technical Data POWERLINK Controlled Node (Slave) Protocol

## 12.3.7 PROFINET IO-RT-Controller (Master)

Parameter	Description
Maximum number of PROFINET IO Devices	128
Maximum number of total cyclic input data	5712 bytes (including IOxS status bytes)
Maximum number of total cyclic output data	5760 bytes (including IOxS status bytes)
Maximum number of cyclic input data	1440 bytes per device (= IOCR data length including IOxS status bytes)
Maximum number of cyclic output data	1440 bytes per device (= IOCR data length including IOxS status bytes)
Acyclic communication	Read/Write Record
	Limited to 1392 bytes per telegram
	Limited to 4096 bytes per request
Alarm processing	yes, but requires handling in host application program
Diagnostic data	One 200 byte buffer per IO device
DCP functions via API	Name Assignment IO-Devices (DCP SET NameOfStation)
	Set IO-Devices IP (DCP SET IP)
	Signal IO-Device (DCP SET SIGNAL)
	Reset IO-Device to factory settings (DCP Reset FactorySettings)
	Bus scan (DCP IDENTIFY ALL)
Supported Protocols	RTC – Real Time Cyclic Protocol, Class 1
	RTA – Real Time Acyclic Protocol
	DCP – Discovery and configuration Protocol
	CL-RPC – Connectionless Remote Procedure Call
Context management by CL-RPC	Supported
Minimum cycle time	1 ms
	Different IO-Devices can be configured with different cycle times
Functions	Fast Startup of PROFINET IO Devices supported
Baud rate	100 MBit/s
	Full-Duplex mode
Data transport layer	Ethernet II, IEEE 802.3
Configuration file	Maximum 1 MByte
Limitations	RT over UDP not supported
	Multicast communication not supported
	DHCP is not supported (neither for PROFINET IO-Controller nor for the IO-Devices)
	Only one IOCR per IO Device
	NameOfStation of IO Controller CANNOT be set using the DCP SET NameOfStation service but only at start-up while configuring the IO Controller
	The buffer for IO-Device diagnosis data will be overwritten in case of multiple diagnostic events. Only one (the last) event is stored at the same time. If a single event produces more than 200 bytes of diagnosis data, only the first 200 bytes will be taken care of.
	The usable (minimum) cycle time depends on the number of used IO Devices, the number of used input and output data. The cycle-time, the number of configured IO Devices and the amount of IO data depend on each other. For example it is not possible due to performance reasons to have 128 IO Devices communication with cycle-time 1ms.
	The size of the bus configuration file is limited by the size of the RAM Disk (1 MByte)
	WriteMultiple-Record service is not supported

Parameter	Description
Reference to firmware/stack version	V2.6.x.x

Table 87: Technical Data PROFINET IO RT Controller

## 12.3.8 **PROFINET IO Device (V3.4)**

Parameter	Description
Maximum number of cyclic input data	1024 bytes
Maximum number of cyclic output data	1024 bytes
Acyclic communication	Read/Write Record, max. 1024 bytes per telegram
Alarm Types	Process Alarm, Diagnostic Alarm, Return of SubModule Alarm Plug Alarm (implicit), Pull Alarm (implicit)
Supported protocols	RTC – Real Time Cyclic Protocol, Class 1 and 2 (unsynchronized), Class 3 (synchronized)
	RTA – Real Time Acyclic Protocol
	DCP – Discovery and configuration Protocol
	CL-RPC – Connectionless Remote Procedure Call
	LLDP – Link Layer Discovery Protocol
	SNMP – Simple Network Management Protocol
	MRP – MRP Client
Used Protocols (subset)	UDP, IP, ARP, ICMP (Ping)
Topology recognition	LLDP, SNMP V1, MIB2, physical device
VLAN- and priority tagging	yes
Context Management by CL-RPC	Supported
Identification & Maintenance	Read and write of I&M1-4
Minimum cycle time	1 ms for RTC1 and RTC2
	250 μs for RTC3
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Limitations	RT over UDP not supported
	Multicast communication not supported
	Only one device instance is supported
	DHCP is not supported
	IRT "flex" (synchronized RT Class 2) is not supported
	FastStartUp is not supported.
	Media Redundancy (except MRP client) is not supported
	Access to the submodule granular status bytes (IOCS) is not supported.
	The amount of configured IO-data influences the minimum cycle time that can be reached.
	Supervisor-AR is not supported, Supervisor-DA-AR is supported
	Only 1 Input-CR and 1 Output-CR are supported
	Multiple WriteRequests are not supported
	Using little endian (LSB-MSB) byte order for cyclic process data instead of default big endian (MSB-LSB) byte order may have an negative impact on minimum reachable cycle time
Reference to firmware/stack version	V3.4.x.x

Table 88: Technical Data PROFINET IO RT IRT Device Protocol

# 12.3.9 PROFINET IO Device (V3.5)

Parameter	Description
Maximum number of cyclic input data	1440 bytes
Maximum number of cyclic output data	1440 bytes
Maximum number of submodules	255 submodules per Application Relation at the same time, 1000 submodules can be configured
Multiple Application Relations (AR)	The Stack can handle up to 2 IO-ARs, one Supervisor AR and one Supervisor-DA AR at the same time
Acyclic communication	Read/Write Record, max. 1024 bytes per telegram
Alarm types	Process Alarm, Diagnostic Alarm, Return of SubModule Alarm, Plug Alarm (implicit), Pull Alarm (implicit)
Supported protocols	RTC – Real Time Cyclic Protocol class 1 (unsynchronized), class 3 (synchronized)
	RTA – Real Time Acyclic Protocol
	DCP – Discovery and configuration Protocol
	CL-RPC – Connectionless Remote Procedure Call
	LLDP – Link Layer Discovery Protocol
	SNMP – Simple Network Management Protocol
	MRP – MRP Client
Topology recognition	LLDP, SNMP V1, MIB2, physical device
Identification & Maintenance	Read and write of I&M1-4
Minimum cycle time	1 ms for RT_CLASS_1
	1 ms for RT_CLASS_3 (COMX 50XX-RE)
	500 µs for RT_CLASS_3 (COMX 51XX-RE)
	250 μs for RT_CLASS_3 (COMX 100XX-RE)
IRT Support	RT_CLASS_3
Media Redundancy	MRP client is supported
Additional features	DCP, VLAN- and priority tagging, Shared Device
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
PROFINET IO specification	V2.2 (legacy startup) and V2.3 (but advanced startup only for RT) are supported
Limitations	RT over UDP not supported
	Multicast communication not supported
	Only one device instance is supported
	DHCP is not supported
	FastStartUp is not supported
	The amount of configured IO-data influences the minimum cycle time that can be reached.
	Only 1 Input-CR and 1 Output-CR are supported
	Using little endian (LSB-MSB) byte order for cyclic process data instead of default big endian (MSB-LSB) byte order may have an negative impact on minimum reachable cycle time
	System Redundancy (SR-AR) and Configuration-in-Run (CiR) are not supported
	Max. 255 submodules can be used simultaneously within one specific Application Relation
	Advanced Startup according Profinet specification V2.3 is NOT yet supported for IRT
	As there is no official certification available for Profinet IO specification V2.3 at the time of release of the stack there is no guarantee that this implementation will pass such a certification once it is available

Parameter	Description
Reference to firmware/stack version	V3.5.26.x

Table 89: Technical Data PROFINET IO RT IRT Device Protocol

#### 12.3.10 Sercos-Master

Parameter	Description
Maximum number of cyclic input data	5760 bytes (including Connection Control per Connection)
Maximum number of cyclic output data	5760 bytes (including Connection Control per Connection)
Maximum number of configured slave devices	511
Minimum cycle time	250 µs
Acyclic communication	Service channel: Read/Write/Commands
Functions	Bus Scan
Communication phases	NRT, CP0, CP1, CP2, CP3, CP4
Topology	Line and double ring
Redundancy	supported
Hot-Plug	supported
Cross Communication	supported, but only if the master is configured by the host application program by packets.
Baud rate	100 MBit/s, full duplex
Data transport layer	Ethernet II, IEEE 802.3
Auto crossover	supported
Supported sercos version	Communication Specification Version 1.3
TCP/IP stack	integrated
Limitation	NRT channel not usable via the API.
Reference to firmware/stack version	V2.1.x.x

Table 90: Technical Data sercos Master Protocol

### 12.3.11 Sercos-Slave

Parameter	Description
COMX 51XX-RE: Maximum number of cyclic input data (Tx) of all slaves	254 bytes (including Connection Control and IO Status)
COMX 51XX-RE: Maximum number of cyclic output data (Rx) of all slaves	254 bytes (including Connection Control and IO Status)
COMX 100XX-RE: Maximum number of cyclic input data (Tx) of all slaves	128 bytes (including Connection Control and IO Status)
COMX 100XX-RE: Maximum number of cyclic output data (Rx) of all slaves	128 bytes (including Connection Control and IO Status)
Maximum number of slave devices	8
Maximum number of applicable sercos addresses	1 511
Minimum cycle time	250 μs
Topology	Line and ring
Communication phases	NRT, CP0, CP1, CP2, CP3, CP4
Acyclic Communication (Service Channel)	Read/Write/Standard Commands
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
Supported sercos version	sercos in the third generation
	Communication Specification Version 1.1.2
Supported sercos Communication Profiles	SCP_FixCFG Version 1.1.1
	SCP_VarCFG Version 1.1.1
	SCP_VarCFG Version 1.1.3
Supported User SCP Profiles	SCP_WD Version 1.1.1
	SCP_Diag Version 1.1.1
	SCP_RTB Version 1.1.1
	SCP_Mux Version 1.1.1
	SCP_Sig Version 1.1.1
	SCP_ExtMuX Version 1.1.2
	SCP_RTBListProd Version 1.3
	SCP_RTBListCons Version 1.3
	SCP_RTBWordProd Version 1.3
	SCP_RTBWordCons Version 1.3
	SCP_OvSBasic Version 1.3
	SCP_WDCon Version 1.3
Supported FSP profiles	FSP_IO
	FSP_Drive
SCP Sync	Supported
S/IP	Supported
Identification LED	Supported
Storage location of object dictionary	mixed mode
Limitations	Max. 2 connections: 1 for consumer and 1 for producer
	Modifications of the Service-Channel Object Dictionary will be volatile after reset (if it resides on device)
	Hot plug is not supported yet
	Cross communication not supported yet
	NRT Channel only forwarding
Reference to firmware/stack version	V3.1.x.x

Table 91: Technical Data sercos Slave Protocol

## 12.3.12 VARAN Client

Parameter	Description
Maximum number of cyclic input data	128 bytes
Maximum number of cyclic output data	128 bytes
Memory Area	Read Memory Area 1,
	Write Memory Area 1
Functions	Memory Read
	Memory Write
Integrated 2 port splitter for daisy chain topology	Supported
Baud rate	100 MBit/s
Data transport layer	Ethernet II, IEEE 802.3
VARAN protocol version	1.1.1.0
Limitations	Integrated EMAC for IP data exchange with client application not supported
	SPI single commands (optional feature) not supported
	Memory area 2 is not supported.
Reference to firmware/stack version	V1.0.x.x

Table 92: Technical Data VARAN Client Protocol

### 12.3.13 CANopen Master

Parameter	Description
Maximum number of CANopen nodes	126
Maximum number of cyclic input data	3584 bytes
Maximum number of cyclic output data	3584 bytes
Maximum number of receive PDOs	512
Maximum number of transmit PDOs	512
Exchange of process data	Via PDO transfer: - synchronized, - remotely requested and - event driven (change of date)
Acyclic communication	SDO Upload/Download, max. 512 bytes per request
Functions	Emergency message (consumer and producer)
	Node guarding / life guarding, heartbeat
	PDO mapping
	NMT Master
	SYNC protocol (producer)
	Simple boot-up process, reading object 1000H for identification
Baud rates	10 kBits/s, 20 kBits/s, 50 kBits/s, 100 kBits/s, 125 kBits/s, 250 kBits/s, 500 kBits/s, 800 kBits/s, 1 MBits/s
CAN layer 2 access	Send/receive via API supported (11 bit/29 bit)
Data transport layer	CAN Frames
CAN Frame type for CANopen	11 Bit
Reference to version	V2.11.x.x

Table 93: Technical Data CANopen Master Protocol

#### 12.3.14 CANopen Slave

#### 12.3.14.1 CANopen Slave COMX 100

Parameter	Description
Maximum number of cyclic input data	512 bytes
Maximum number of cyclic output data	512 bytes
Maximum number of receive PDOs	64
Maximum number of transmit PDOs	64
Exchange of process data	Via PDO transfer - synchronized, - remotely requested and - event driven (change of date, event timer)
	On request of the host application program by packet
Acyclic communication	SDO upload/download (server only)
	Emergency message (producer)
Foresting	l'imestamp (producer/consumer)
Functions	Node guarding / life guarding
	Heartbeat: 1 producer, max. 64 consumer
	PDO mapping
	NMT Slave
	SYNC protocol (consumer)
	Error behaviour (configurable): - in state operational: change to state pre-operational - in any state: no state change - in state operational or pre-operational: change to state stopped
Baud rates	10 kBits/s, 20 kBits/s, 50 kBits/s, 100 kBits/s, 125 kBits/s, 250 kBits/s, 500 kBits/s, 800 kBits/s, 1 MBits/s
	Auto baudrate detection is supported
CAN layer 2 access	Send/receive via API supported (11 bit/29 bit)
Data transport layer	CAN Frames
CAN Frame type for CANopen	11 Bit
Reference to firmware/stack version	V3.6.x.x

Table 94: Technical Data CANopen Slave Protocol

#### 12.3.14.2 CANopen Slave COMX 10

Parameter	Description
Maximum number of cyclic input data	64 bytes
Maximum number of cyclic output data	64 bytes
Maximum number of receive PDOs	8
Maximum number of transmit PDOs	8
Exchange of process data	Via PDO transfer - synchronized, - remotely requested and - event driven (change of date, event timer)
	On request of the host application program by packet
Acyclic communication	SDO upload/download (server only)
	Emergency message (producer)
	l imestamp (producer/consumer)
Functions	Node guarding / life guarding
	Heartbeat: 1 producer, max. 4 consumer
	PDO mapping
	NMT Slave
	SYNC protocol (consumer)
	Error behaviour (configurable): - in state operational: change to state pre-operational - in any state: no state change - in state operational or pre-operational: change to state stopped
Baud rates	10 kBits/s, 20 kBits/s, 50 kBits/s, 100 kBits/s, 125 kBits/s, 250 kBits/s, 500 kBits/s, 800 kBits/s, 1 MBits/s
	Sand/reasive via ADI supported (44 bit/20 bit)
CAIN layer 2 access	
Reterence to firmware/stack version	V3.6.X.X

Table 95: Technical Data CANopen Slave Protocol

### 12.3.15 CC-Link Slave

Parameter	Description	
Firmware works according to CC-Link Version 2.0:		
Station Types	Remote Device Station (up to 4 occupied stations)	
Maximum input data	368 bytes	
Maximum output data	368 bytes	
Input data remote device station	112 bytes (RY) and 256 bytes (RWw)	
Output data remote device station	112 bytes (RX) and 256 bytes (RWr)	
Extension cycles	1, 2, 4, 8	
Baud rates	156 kBit/s, 625 kBit/s, 2500 kBit/s, 5 MBit/s, 10 MBit/s	
Limitation	Intelligent Device Station not supported	
Firmware works according to CC-Link Version 1.11:		
Station Types	Remote I/O station, Remote device station' (up to 4 occupied stations)	
Maximum input data	48 bytes	
Maximum output data	48 bytes	
Input data remote I/O station	4 bytes (RY)	
Output data remote I/O station	4 bytes (RX)	
Input data remote device station	4 bytes (RY) and 8 bytes (RWw) per occupied station	
Output data remote device station	4 bytes (RX) and 8 bytes (RWr) per occupied station	
Baud rates	156 kBit/s, 625 kBit/s, 2500 kBit/s, 5 MBit/s, 10 MBit/s	
Firmware		
Reference to firmware/stack version	V2.9.x.x	

Table 96: Technical Data CC-Link-Slave Protocol

#### 12.3.16 DeviceNet Master

Parameter	Description
Maximum number of DeviceNet slaves	63
Maximum number of total cyclic input data	3584 bytes
Maximum number of total cyclic output data	3584 bytes
Maximum number of cyclic input data	255 bytes/connection
Maximum number of cyclic output data	255 bytes/connection
Maximum Configuration data	1000 bytes/slave
Acyclic communication	Explicit connection
	All service codes are supported
Connections	Bit Strobe
	Change of State
	Cyclic
	Poll
	Explicit Peer-to-Peer Messaging
Function	Quick Connect
Fragmentation	Explicit and I/O
UCMM	Supported
Objects	Identity Object (Class Code 0x01)
	Message Router Object (Class Code 0x02)
	DeviceNet Object (Class Code 0x03)
	Connection Object (Class Code 0x05)
	Acknowledge Handler Object (Class Code 0x06)
Baud rates	125 kBits/s,
	250 kBit/s, 500 kBit/s
	Auto baudrate detection is not supported
Data transport laver	CAN frames
Reference to firmware/stack version	V2.3.x.x

Table 97: Technical Data DeviceNet Master Protocol

### 12.3.17 DeviceNet Slave

Parameter	Description
Maximum number of cyclic input data	255 bytes
Maximum number of cyclic output data	255 bytes
Acyclic communication	Get_Attribute_Single/All
	Max. 240 bytes per request
	Set_Attribute_Single/All
	Max. 240 bytes per request
Connections	Poll
	Change-of-state
	Cyclic
	Bit-strobe
Explicit messaging	Supported
Fragmentation	Explicit and I/O
UCMM	Not supported
Baud rates	125 kBits/s, 250 kBit/c
	500 kBit/s
	Auto baudrate detection is not supported
Data transport layer	CAN frames
Reference to firmware/stack version	V2.3.x.x

Table 98: Technical Data DeviceNet Slave Protocol

# 12.3.18 PROFIBUS DP Master

Parameter	Description
Maximum number of PROFIBUS DP slaves	125 (DPV0/DPV1)
Maximum number of total cyclic input data	5712 bytes
Maximum number of total cyclic output data	5760 bytes
Maximum number of cyclic input data	244 bytes per slave
Maximum number of cyclic output data	244 bytes per slave
Configuration data	Max. 244 bytes per slave
Parameterization data per slave	7 bytes standard parameter per slave
	Max. 237 bytes application specific parameters per slave
Acyclic communication	DPV1 class 1 read, write
	DPV1 class 1 alarm
	DPV1 class 2 initiate, read, write, data transport, abort
Maximum number of acyclic read/write	240 bytes per slave and telegram
Functions	Configuration in Run (CiR), requires host application program support
	Timestamp (Master functionality)
Redundancy	Supported, requires host application program support
Baud rate	9,6 kBits/s, 19,2 kBits/s, 31,25 kBits/s, 45,45 kBits/s 93,75 kBits/s, 187,5 kBits/s, 500 kBits/s, 1, 5 MBits/s, 3 MBits/s, 6 MBits/s, 12 MBit/s
Data transport lavor	
Limitations	DPV2 isochronous mode and slave slave communication are not supported.
	The redundancy function can not be used, if the master is configured by the host application program by packets.
Reference to firmware/stack version	V2.6.x.x

Table 99: Technical Data PROFIBUS DP Master Protocol

### 12.3.19 PROFIBUS DP Slave

Parameter	Description
Maximum number of cyclic input data	244 bytes
Maximum number of cyclic output data	244 bytes
Maximum number of acyclic data (read/write)	240 bytes/telegram
Maximum number of modules	24
Configuration data	Max. 244 bytes
Parameter data	237 bytes application specific parameters
Acyclic communication	DP V1 Class 1 Read/Write
	DP V1 Class 1 Alarm
	DP V1 Class 2 Read/Write/Data Transport
Baud rate	9,6 kBits/s, 19,2 kBits/s, 31,25 kBits/s, 45,45 kBits/s, 93,75 kBits/s, 187,5 kBits/s, 500 kBits/s, 1, 5 MBits/s, 3 MBits/s, 6 MBits/s, 12 MBit/s
	Auto baudrate detection is supported
Data transport layer	PROFIBUS FDL
Limitations	SSCY1S – Slave to slave communication state machine not implemented
	Data exchange broadcast not implemented
	I&M LR services other than Call-REQ/RES are not supported yet
Reference to firmware/stack version	V2.7.x.x

Table 100: Technical Data PROFIBUS DP Slave Protocol

# 12.3.20 PROFIBUS MPI

Parameter	Description
Maximum number of MPI connections	126
Maximum number of write data	216 bytes
Maximum number of read data	222 bytes
Functions	MPI Read/Write DB (data block), M (marker), Q (output), C (Counter), T (Timer)
	MPI Read I (Input)
	Data type bit to access to DB (data block), M (marker), Q (output) and I (Input, read only)
	MPI Connect (automatically when first read/write function is used)
	MPI Disconnect, MPI Disconnect All
	MPI Get OP Status
	MPI transparent (expert use only)
Baud rate	Fixed values ranging from 9,6 kBits/s to 12 MBit/s
	Auto-detection mode is supported
Data transport layer	PROFIBUS FDL
Reference to firmware/stack version	2.4.x.x

Table 101: Technical Data PROFIBUS-MPI Protocol

# 13 Decommissioning, Replacement and Disposal

## **13.1** Put the Device out of Operation

For the deinstallation of the comX communication module from the device into which the comX module had been integrated (also called "host system" or "target environment"), proceed as follows:

#### **WARNING**

#### Lethal Electrical Shock caused by parts with more than 50V!

- Hazardous Voltage may be present inside the device, into which the comX communication module is integrated.
- Strictly obey to all safety rules given in the documentation supplied by the manufacturers of this device.!
- Therefore first disconnect the power plug of the device into which the comX module had been integrated.
- Make sure, that this device is separated from the supply voltage and free of current, before you continue.

#### **WARNING**

#### **Consequences of Removal of Device**

In order to avoid personal and material damage do not remove this device from a production line without having ensured a secure operation of the production line during and after the removal of the device.

Now you are ready to either remove or replace the comX communication module.

- Step 1: If necessary, remove the housing of this device. In all cases, strictly adhere to all rules given in the manuals of this device.
- > Step 2: Definitely avoid touching open contacts or ends of wires.
- > Step 3: Disconnect the communication cables from the device.
- Step 4: Remove the comX communication module carefully from its connector (50 pin SMT connector, male, grid width 1,27 mm, at COMX-CN additionally 30 pin SMT connector, male, grid width 1,27 mm) onto which it had been plugged during mounting.
- Step 5: If the comX communication module needs be replaced by another one, then replace it and reconnect the communication cables to the device.
- Step 6: If you had opened the housing of the device in step 1, then close it now. Again strictly adhere to all rules given in the manuals of this device anyway.
- Step 7: Connect the device with its supply voltage and switch it on again. Adhere of the commissioning rules of the supplier of the device. Check, whether the device behaves normally.

Obey to the subsequent disposal rules.

## **13.2 Disposal of Waste Electronic Equipment**

According to the European Directive 2002/96/EG "Waste Electrical and Electronic Equipment (WEEE)", waste electronic equipment may not be disposed of as household waste. As a consumer, you are legally obliged to dispose of all waste electronic equipment according to national and local regulations.



#### Waste Electronic Equipment

- This product must not be treated as household waste.
- This product must be disposed of at a designated waste electronic equipment collecting point.

# 14 Glossary

•	
AIDA	
	Automatisierungs-Initiative deutscher Automobilhersteller
	AIDA is a joined initiative of the German automotive industry founded by Audi, BMW, Daimler-Chrysler and Volkswagen. AIDA conforming products are based on PROFINET.
Auto-Crossover	
	Auto-Crossover is a feature of an interface: An interface with Auto-Crossover capability will automatically detect and correct if the data lines have been exchanged vice versa.
Auto-Negotiation	
	Auto-Negotiation is a feature of an interface: An interface with Auto-Negotiation will automatically determine a set of correct communication parameters.
Baud rate	
	Data transmission speed of a communication channel or interface.
CRC	
	Cyclic Redundancy Check
	A mathematic procedure for calculating checksums based on polynomial division in order to detect data transmission errors. For a more detailed description see the Wikipedia article
	(http://en.wikipedia.org/wiki/Cyclic redundancy check).
DDF	
	Device_Description_File.
Device Description F	ile
	A file containing configuration information about a device being a part of a network that can be read out by masters for system configuration. Device Description Files use various formats which depend on the communication system. Often these formats are based on <u>XML</u> such as <u>EDS files</u> or <u>GSDML files</u> . Contains configuration information
EDS file	
	A special kind of Device Description File used by Ethernet.
EtherCAT	
	A communication system for industrial Ethernet designed and developed by Beckhoff Automation GmbH.
Ethernet	
	A networking technology used both for office and industrial communication via electrical or optical connections. It has been developed and specified by the Intel, DEC and XEROX. It provides data transmission with collision control and allows various protocols. As Ethernet is not necessarily capable

	for real-time application, various real-time extensions have been developed, see <u>Real-Time Ethernet</u> .
EtherNet/IP	
	A communication system for industrial Ethernet designed and developed by Rockwell. It partly uses the CIP (Common Industrial Protocol).
Ethernet Powerlink	
	A communication system for industrial Ethernet designed and developed by B&R. It partly uses CANopen technologies.
Full duplex	
	Full duplex denominates a telecommunication system between two communication partners which allows simultaneous communication in both directions is called a full-duplex telecommunication system. At such a system, it is possible to transmit data even if currently data are received. Full-duplex is the opposite of <u>Half_duplex</u> .
Function code	
	A function code (in the meaning defined by Modbus terminology) is a standardized method to access (i.e. read or write) coils or registers via Modbus.
GSD file	
	A special kind of Device Description File used by PROFIBUS (GSD = General Station Description).
GSDML file	
	A special kind of XML-based Device Description File used by <u>PROFINET</u> . (GSDML = General Station Description Markup Language).
Half duplex	
	Half duplex denominates a telecommunication system between two communication partners which does not allow simultaneous, but alternating, communication in both directions is called a half-duplex telecommunication system. At such a system, receiving data inhibits the transmission of data. Half-duplex is the opposite of <u>Full duplex</u> .
Hub	
	A network component connecting multiple communication partners with each other. A hub does not provide own intelligence, thus it does not
Industrial Ethernet	
	See Real-Time Ethernet
netX	
	networX on chip, next generation of communication controllers.
Object Dictionary	
	An object dictionary is a storage area for device parameter data structures. It is accessed in standardized manner.

Open Modbus/TCP	
	A communication system for Industrial Ethernet designed and developed by Schneider Automation and maintained by the Modbus-IDA organization based on the Modbus protocols for serial communication.
PROFINET	
	A communication system for Industrial Ethernet designed and developed by PROFIBUS International. It uses some mechanisms similar to those of the PROFIBUS field bus.
Real-Time Ethernet	
	Real-Time Ethernet (Industrial Ethernet) is an extension of the Ethernet networking technology for industrial purposes with very good Real-Time features and performance. There is a variety of different Real-Time Ethernet systems on the market which are incompatible with each other. The most important systems of these are
	EtherCAT
	EtherNet/IP
	Ethernet Powerlink
	Open Modbus/TCP
	PROFINET
	Sercos
	• VARAN
Register	
	A register (in the meaning defined by Modbus terminology) is a 16-bit wide storage area for data which can be accessed and addressed as a unit by some of the Modbus Function Codes.
RJ45	
	A connector type often used for <u>Ethernet</u> connection. It has been standardized by the Federal Communications Commission of the USA (FCC).
RoHS	
	Restriction of Hazardous Substances
	This abbreviation denominates the directive of the European Union on the use of 6 hazardous substances in electronic products. It is titled <i>"Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC",</i> adopted in 2003 and was getting effective on 1 July 2006.
RS232	
	An interfacing standard for serial communication on data lines defined by EIA (Electronic Industries Alliance) in ANSI/EIA/TIA-232-F-1997.
RS485	
	An interfacing standard for differential serial communication on data lines defined by EIA (Electronic Industries Alliance) in ANSI/TIA/EIA-485-A-1998

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Sercos	
	A communication system for <u>Industrial Ethernet</u> designed and developed by Bosch-Rexroth GmbH and supported by Sercos International.
Switch	
	A network component connecting multiple communication partners (or even entire branches of a network) with each other. A switch is an intelligent network component which analyzes network traffic in order to decide on its own. For the connected communication partners a switch behaves transparently.
UART	
	UART means Universal Asynchronous Receiver Transmitter. It is a special kind of electronic circuit which is used for transmitting data serially with a fixed frame consisting of one start bit, five to nine data bits, an optional parity bit for the detection of transmission errors and one stop bit. Working asynchronously, it does not use an explicit clock signal.
VARAN	
	Versatile Automation Random Access Network
	A communication system for industrial Ethernet designed and developed by the Austrian automation company SIGMATEK.
XDD file	
	A special kind of Device Description file used by Ethernet Powerlink
XML	
	XML means Extended Markup Language. It is a symbolic language for structuring data systematically. XML is standard maintained by the W3C (World-wide web consortium). Device Description Files often use XML-based formats for storing the device-related data appropriately.

# **15 Appendix**

# 15.1 Matrix Label

A matrix label is glued on the device. It contains 3 items:

- 1. Part number
- 2. Hardware Revision
- 3. Serial number

The figure shows part number 1250.100, hardware revision 3 and serial number 23456.



Figure 50: Matrix Label

# **15.2 Wiring Instructions for Fieldbus Systems**

You can find detailed instructions for wiring of Fieldbus Systems such as CANopen. CC-Link, DeviceNet and PROFIBUS-DP, for instance concerning termination and requirements on the cables, within a separate manual *"Wiring Instructions"* (Hilscher-document DOC120208UM01EN).

## 15.3 EtherNet/IP Adapter/Slave – Instance ID of I/O Data

I/O Data	Instance ID	Remark
Consumed I/O Data	100	I/O Data: EtherNet/IP Scanner/Master → EtherNet/IP Adapter/Slave.
Produced I/O Data	101	I/O Data: EtherNet/IP Adapter/Slave → EtherNet/IP Scanner/Master.

Table 102: EtherNet/IP Adapter/Slave – Instance ID of I/O Data

## 15.4 Use of VARAN Client

In order to use the comX communication module with VARAN, you need a license which you can acquire at the VNO (VARAN Bus-Nutzerorganisation, Bürmooser Straße 10, A-5112 Lamprechtshausen, info@varan-bus.net) after getting a member of VON.

The license as well as the Vendor ID and the Device ID can be adjusted with the SYCON.net configuration software or with the netX Configuration Tool.

### 15.5 Failure in 10 MBit/s Half Duplex Mode and Workaround



**Important:** The failure described here only affects older **COMX 100CA-RE** modules with serial numbers up to **21557** and **COMX 100CN-RE** with serial numbers up to **20529**.

#### Affected Hardware

Hardware with the communication controller netX 50, netX 100 or netX 500; netX/Internal PHYs.

#### When can this Failure occur?

When using standard Ethernet communication with 10 MBit/s half duplex mode, the PHY gets stuck in case of network collisions. Then no further network communication is possible. Only device power cycling allows Ethernet communication again.

This problem can only occur with Ethernet TCP/UDP IP, EtherNet/IP or Modbus TCP protocols when using hubs at 10 MBit/s. The issue described above is not applicable for protocols which use 100 MBit/s or full duplex mode.

#### Solution / Workaround:

Do not use 10 MBit/s-only hubs. Use either switches or 10/100 MBit/s Dual Speed hubs, to make sure the netX Ethernet ports are connected with 100 MBit/s or in full duplex mode.

This erratum is fixed with all components of the 'Y' charge (9 digit charge number shows 'Y' at position 5 (nnnnYnnnn).

#### Reference

"Summary of 10BT problem on EthernetPHY", RenesasElectronics Europe, April 27, 2010

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