Rexroth
Bosch Group

SyConDN
System Configurator for DeviceNet

Application Manual

SYSTEM200

DOK-CONTRL-SYCON****DN-AW02-EN-P

Title
SyConDN
System Configurator for DeviceNet

Type of Documentation
Application Manual

Document Typecode
DOK-CONTRL-SYCON****DN-AW02-EN-P

Internal File Reference
Document Number, 120-0400-B356-02/EN

Purpose of Documentation
This documentation describes the features of the fieldbus configurator SyConDN in combination with the programming software WinPCL in System 200 of Bosch Rexroth.

Record of Revisions

Description	Release Date	Notes
120-0400-B356-02/EN	02/03	First issue

Published by
Bosch Rexroth AG
Bgm.-Dr.-Nebel-Str. 2 • D-97816 Lohr a. Main
Telephone +49 (0)93 52/40-0 • Tx 68 94 21 • Fax +49 (0)93 52/40-48 85
http://www.boschrexroth.com/
Dept. BRC/EPY (NH)

Note
This document has been printed on chlorine-free bleached paper.

Contents

1 Introduction 1-1

1.1 Preface ... 1-1
1.2 Overview ... 1-1

2 Important Directions for Use 2-1

2.1 Appropriate Use ... 2-1
Introduction ... 2-1
Areas of Use and Application ... 2-2
2.2 Inappropriate Use ... 2-2
2.3 Delivery Stipulations for Computer Programs ... 2-3

3 Safety Instructions for Electric Drives and Controls 3-1

3.1 Introduction ... 3-1
3.2 Explanations ... 3-1
3.3 Hazards by Improper Use ... 3-2
3.4 General Information ... 3-3
3.5 Protection Against Contact with Electrical Parts ... 3-4
3.6 Protection Against Electric Shock by Protective Low Voltage (PELV) ... 3-5
3.7 Protection Against Dangerous Movements ... 3-5
3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting ... 3-7
3.9 Protection Against Contact with Hot Parts ... 3-8
3.10 Protection During Handling and Mounting ... 3-8
3.11 Battery Safety ... 3-9
3.12 Protection Against Pressurized Systems ... 3-9

4 Installation and Licensing 4-1

4.1 System Requirements ... 4-1
4.2 Software Installation ... 4-1
4.3 Installation of the System Configurator SyConDN ... 4-2

5 Configuration Sequence 5-1

5.1 Hardware Configuration ... 5-1
5.2 Configuration Hilscher DeviceNet Master to any DeviceNet Device (Slave) ... 5-2
5.3 Configuration Hilscher DeviceNet Master to Hilscher DeviceNet Slave ... 5-3

6 DeviceNet Configuration with SyConDN 6-1

6.1 Setting up the DeviceNet Configuration ... 6-1
6.2 EDS Files (Electronic Data Sheet Files) ... 6-1
Introduction ... 6-1
EDS Files and SyConDN ... 6-2
6.3 Master ... 6-3
Insert Master ... 6-3
Automatic Network Scan ... 6-4
6.4 Device (Slave) ... 6-7
Insert Device (Slave) ... 6-7
Device Configuration ... 6-8

7 Settings 7-1

7.1 Device Assignment ... 7-1
CIF Serial Driver ... 7-2
7.2 Bus Parameter ... 7-4
7.3 DeviceNet Master ... 7-5
DeviceNet Master Settings ... 7-5
Auto Addressing ... 7-6
Addressing Mode ... 7-7
7.4 Device (Slave) ... 7-9
Device Configuration ... 7-9
DeviceNet Settings (Slave Settings) ... 7-9
7.5 Project Information ... 7-10
7.6 Path ... 7-11
7.7 Language ... 7-11
7.8 Start Options ... 7-12

8 Online Functions 8-1

8.1 Online to the CIF ... 8-1
Downloading the Configuration ... 8-1
Firmware Download ... 8-2
Firmware / Reset ... 8-2
Device Info ... 8-3
8.2 Start/Stop Communication ... 8-3
8.3 Diagnostic Functions ... 8-4
Live List ... 8-4
Debug Mode ... 8-5
Device Diagnostic ... 8-6
Global State Field ... 8-7
Extended Device Diagnostic ... 8-9
8.4 User Data ... 8-24
I/O Monitor ... 8-24
I/O Watch ... 8-25

8.5 DeviceNet Services ... 8-27
Get Device Attribute ... 8-27
Set Device Attribute ... 8-27
8.6 Message Monitor ... 8-28
Message Monitor for Testing the Explicit Messaging of DeviceNet ... 8-30

9 File, Print, Export and View 9-1
9.1 File ... 9-1
Open ... 9-1
Save and Save As ... 9-1
Close ... 9-1
9.2 Print ... 9-2
9.3 Export Functions ... 9-3
DBM Export ... 9-3
CSV Export ... 9-3
9.4 View of the Configuration ... 9-3
Device Table ... 9-3
Address Table ... 9-4

10 Error Numbers 10-1
10.1 CIF Device Driver (Dual-Port Memory) – Error Numbers (-1 ..-49) ... 10-1
10.2 CIF Serial Driver – Error Numbers (-20 .. -71) ... 10-5
10.3 RCS – Error Numbers (4 .. 93) ... 10-7
10.4 Database Access – Error Numbers (100 .. 130) ... 10-9
10.5 Online Data Manager – Error Numbers ... 10-10
Online Data Manager – Error Numbers (1000 .. 1018) ... 10-10
Message Handler – Error Numbers (2010 .. 2027) ... 10-10
Driver Functions – Error Numbers (2501 .. 2512) ... 10-11
Online Data Manager Subfunctions – Error Numbers (8001 .. 8035) ... 10-11
10.6 Database – Error Numbers (4000 .. 4098) ... 10-12
10.7 Converting Functions – Error Numbers (5001 .. 5008) ... 10-16

11 Description of the Dual-Port Memory DPM 11-1
11.1 General Information ... 11-1
11.2 Memory Distribution DPM ... 11-1

12 List of Figures 12-1

13 Service & Support 13-1
13.1 Helpdesk ... 13-1
13.2 Service-Hotline ... 13-1
13.3 Internet ... 13-1
13.4 Vor der Kontaktaufnahme... - Before contacting us ... 13-1
13.5 Kundenbetreuungsstellen - Sales & Service Facilities ... 13-2

1 Introduction

1.1 Preface

The fieldbus configurator SyConDN is mainly based on the universal fieldbus configurator SyConDN of

Hilscher Gesellschaft für Systemautomation mbH
Rheinstraße 78
D-65795 Hattersheim

Parts of this manual are extracted from the manual of Hilscher and describe the functionality of SyConDN in combination with the programming software WinPCL in System 200 of Bosch Rexroth. The original tool of Hilscher possibly offers more features that cannot be used in combination with System 200.

The original software was not adapted to the system and/or company specifications.

The Bosch Rexroth AG assumes the responsibility and the support for SyConDN and this manual.

1.2 Overview

SyConDN is a Global Fieldbus Configurator.

You configure all devices with one tool. SyConDN checks the dependencies between the devices. SyConDN only allows configurations that make sense. In case of doubt SyConDN will give you a warning.

As for Hilscher devices, the configuration data are downloaded. For other devices, export functions or documentation possibilities are available.

SyConDN Documents Your Fieldbus System.

After the configuration you can print out a detailed documentation of your fieldbus network. The details can be switched on/off. You can print a documentation with details between the bus topology and the utmost detail of one device.

SyConDN Uses Standardized Configuration Files.

SyConDN uses for the configuration standardized files containing information about all features and limitations of the slave.

SyConDN is a Diagnostic Tool.

After the configuration you can switch SyConDN into the diagnostic mode. You can watch all status information of Hilscher devices. Furthermore, you can see protocol-independent information. If a slave does not operate correctly, it will be displayed in a different color.

2 Important Directions for Use

2.1 Appropriate Use

Introduction

Bosch Rexroth products represent state-of-the-art developments and manufacturing. They are tested prior to delivery to ensure operating safety and reliability.

The products may only be used in the manner that is defined as appropriate. If they are used in an inappropriate manner, then situations can develop that may lead to property damage or injury to personnel.

Note: Bosch Rexroth, as manufacturer, is not liable for any damages resulting from inappropriate use. In such cases, the guarantee and the right to payment of damages resulting from inappropriate use are forfeited. The user alone carries all responsibility of the risks.

Before using Rexroth products, make sure that all the pre-requisites for appropriate use of the products are satisfied:

- Personnel that in any way, shape or form uses our products must first read and understand the relevant safety instructions and be familiar with appropriate use.
- If the product takes the form of hardware, then they must remain in their original state, in other words, no structural changes are permitted. It is not permitted to decompile software products or alter source codes.
- Do not mount damaged or faulty products or use them in operation.
- Make sure that the products have been installed in the manner described in the relevant documentation.

Areas of Use and Application

SyConDN is a global fieldbus configurator, that can be used in combination with the programming software WinPCL in the system 200. SyConDN is designed for use in the following application cases:

- Commissioning of DN devices
- Diagnostic

Note: The fieldbus configurator SyConDN may only be used with the accessories and parts specified in this document. If a component has not been specifically named, then it may not be either mounted or connected. The same applies to cables and lines.

Operation is only permitted in the specified configurations and combinations of components using the software and firmware as specified in the relevant function descriptions.

2.2 Inappropriate Use

Using the fieldbus configurator SyConDN outside of the above-referenced areas of application or under operating conditions other than described in the document and the technical data specified is defined as "inappropriate use".

The fieldbus configurator SyConDN may not be used

- if it is subject to operating conditions that do not meet the above specified ambient conditions,
- for applications that Bosch Rexroth has not specifically released for the intended purpose. Please note the specifications outlined in the general Safety Instructions!

2.3 Delivery Stipulations for Computer Programs

The copyrights, present and future commercial proprietary rights of all kinds, as well as all the rights of exploitation to delivered computer programs -- in equipment or separate from it -- belong exclusively to the Supplier.

A computer program may only be used in one single piece of equipment. Exceptions are commissioning software, which are marked with the designation -COPY at the end. These can be copied freely within the context of regular product usage by the customer.

Every act exceeding the minimum use outlined in the proprietary rights requires the consent of the Supplier. If a computer program delivered by the Supplier is not protected by proprietary rights, then the minimum use stated in the proprietary rights laws is declared as agreed upon.

If the Orderer transfers a computer program then he must completely surrender the program carrier and all copies in their entirety to the Acquiring Party, or these must be erased. A limitation of use corresponding to these stipulations (1 through 6) must be agreed upon with the Acquiring Party.

The Supplier will eliminate any fault in the computer program either by a circumvention of the fault, which is agreeable to the Orderer, or by delivering a new program.

All documents and information needed to reconstruct a fault must accompany the notification of a fault in the computer program.

Otherwise, the general delivery stipulations outlined by Bosch Rexroth apply.

3 Safety Instructions for Electric Drives and Controls

3.1 Introduction

Read these instructions before the initial startup of the equipment in order to eliminate the risk of bodily harm or material damage. Follow these safety instructions at all times.

Do not attempt to install or start up this equipment without first reading all documentation provided with the product. Read and understand these safety instructions and all user documentation of the equipment prior to working with the equipment at any time. If you do not have the user documentation for your equipment, contact your local Bosch Rexroth representative to send this documentation immediately to the person or persons responsible for the safe operation of this equipment.

If the equipment is resold, rented or transferred or passed on to others, then these safety instructions must be delivered with the equipment.

WARNING

Improper use of this equipment, failure to follow the safety instructions in this document or tampering with the product, including disabling of safety devices, may result in material damage, bodily harm, electric shock or even death!

3.2 Explanations

The safety instructions describe the following degrees of hazard seriousness in compliance with ANSI Z535. The degree of hazard seriousness informs about the consequences resulting from non-compliance with the safety instructions.

Warning symbol with signal word	Degree of hazard seriousness according to ANSI
 **DANGER**	Death or severe bodily harm will occur.
 **WARNING**	Death or severe bodily harm may occur.
 **CAUTION**	Bodily harm or material damage may occur.

Fig. 3-1: Hazard classification (according to ANSI Z535)

3.3 Hazards by Improper Use

DANGER

High voltage and high discharge current! Danger to life or severe bodily harm by electric shock!

DANGER

Dangerous movements! Danger to life, severe bodily harm or material damage by unintentional motor movements!

WARNING

High electrical voltage due to wrong connections! Danger to life or bodily harm by electric shock!

WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

CAUTION

Surface of machine housing could be extremely hot! Danger of injury! Danger of burns!

CAUTION

Risk of injury due to improper handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock or incorrect handling of pressurized systems!

CAUTION

Risk of injury due to incorrect handling of batteries!

3.4 General Information

- The Bosch Rexroth AG is not liable for damages resulting from failure to observe the warnings provided in this documentation.
- Read the operating, maintenance and safety instructions in your language before starting up the machine. If you find that you cannot completely understand the documentation for your product, please ask your supplier to clarify.
- Proper and correct transport, storage, assembly and installation as well as care in operation and maintenance are prerequisites for optimal and safe operation of this equipment.
- Only persons who are trained and qualified for the use and operation of the equipment may work on this equipment or within its proximity.
- The persons are qualified if they have sufficient knowledge of the assembly, installation and operation of the equipment as well as an understanding of all warnings and precautionary measures noted in these instructions.
- Furthermore, they must be trained, instructed and qualified to switch electrical circuits and equipment on and off in accordance with technical safety regulations, to ground them and to mark them according to the requirements of safe work practices. They must have adequate safety equipment and be trained in first aid.
- Only use spare parts and accessories approved by the manufacturer.
- Follow all safety regulations and requirements for the specific application as practiced in the country of use.
- The equipment is designed for installation in industrial machinery.
- The ambient conditions given in the product documentation must be observed.
- Use only safety features and applications that are clearly and explicitly approved in the Project Planning Manual.
For example, the following areas of use are not permitted: construction cranes, elevators used for people or freight, devices and vehicles to transport people, medical applications, refinery plants, transport of hazardous goods, nuclear applications, applications sensitive to high frequency, mining, food processing, control of protection equipment (also in a machine).
- The information given in the documentation of the product with regard to the use of the delivered components contains only examples of applications and suggestions.
The machine and installation manufacturer must
- make sure that the delivered components are suited for his individual application and check the information given in this documentation with regard to the use of the components,
- make sure that his application complies with the applicable safety regulations and standards and carry out the required measures, modifications and complements.
- Startup of the delivered components is only permitted once it is sure that the machine or installation in which they are installed complies with the national regulations, safety specifications and standards of the application.
- Technical data, connections and operational conditions are specified in the product documentation and must be followed at all times.

- Operation is only permitted if the national EMC regulations for the application are met.

The instructions for installation in accordance with EMC requirements can be found in the documentation "EMC in Drive and Control Systems".
The machine or installation manufacturer is responsible for compliance with the limiting values as prescribed in the national regulations.

3.5 Protection Against Contact with Electrical Parts

Note: This section refers to equipment and drive components with voltages above 50 Volts.

Touching live parts with voltages of 50 Volts and more with bare hands or conductive tools or touching ungrounded housings can be dangerous and cause electric shock. In order to operate electrical equipment, certain parts must unavoidably have dangerous voltages applied to them.

DANGER

High electrical voltage! Danger to life, severe bodily harm by electric shock!

⇒ Only those trained and qualified to work with or on electrical equipment are permitted to operate, maintain or repair this equipment.

⇒ Follow general construction and safety regulations when working on high voltage installations.

⇒ Before switching on power the ground wire must be permanently connected to all electrical units according to the connection diagram.

⇒ Do not operate electrical equipment at any time, even for brief measurements or tests, if the ground wire is not permanently connected to the points of the components provided for this purpose.

⇒ Before working with electrical parts with voltage higher than 50 V, the equipment must be disconnected from the mains voltage or power supply. Make sure the equipment cannot be switched on again unintended.

⇒ The following should be observed with electrical drive and filter components:

⇒ Wait five (5) minutes after switching off power to allow capacitors to discharge before beginning to work. Measure the voltage on the capacitors before beginning to work to make sure that the equipment is safe to touch.

⇒ Never touch the electrical connection points of a component while power is turned on.

⇒ Install the covers and guards provided with the equipment properly before switching the equipment on. Prevent contact with live parts at any time.

⇒ A residual-current-operated protective device (RCD) must not be used on electric drives! Indirect contact must be prevented by other means, for example, by an overcurrent protective device.

⇒ Electrical components with exposed live parts and uncovered high voltage terminals must be installed in a protective housing, for example, in a control cabinet.

To be observed with electrical drive and filter components:

DANGER

High electrical voltage on the housing!
High leakage current! Danger to life, danger of injury by electric shock!

⇒ Connect the electrical equipment, the housings of all electrical units and motors permanently with the safety conductor at the ground points before power is switched on. Look at the connection diagram. This is even necessary for brief tests.

⇒ Connect the safety conductor of the electrical equipment always permanently and firmly to the supply mains. Leakage current exceeds 3.5 mA in normal operation.

⇒ Use a copper conductor with at least 10 mm² cross section over its entire course for this safety conductor connection!

⇒ Prior to startups, even for brief tests, always connect the protective conductor or connect with ground wire. Otherwise, high voltages can occur on the housing that lead to electric shock.

3.6 Protection Against Electric Shock by Protective Low Voltage (PELV)

All connections and terminals with voltages between 0 and 50 Volts on Rexroth products are protective low voltages designed in accordance with international standards on electrical safety.

WARNING

High electrical voltage due to wrong connections! Danger to life, bodily harm by electric shock!

⇒ Only connect equipment, electrical components and cables of the protective low voltage type (PELV = Protective Extra Low Voltage) to all terminals and clamps with voltages of 0 to 50 Volts.

⇒ Only electrical circuits may be connected which are safely isolated against high voltage circuits. Safe isolation is achieved, for example, with an isolating transformer, an opto-electronic coupler or when battery-operated.

3.7 Protection Against Dangerous Movements

Dangerous movements can be caused by faulty control of the connected motors. Some common examples are:

- improper or wrong wiring of cable connections
- incorrect operation of the equipment components
- wrong input of parameters before operation
- malfunction of sensors, encoders and monitoring devices

- defective components
- software or firmware errors

Dangerous movements can occur immediately after equipment is switched on or even after an unspecified time of trouble-free operation.

The monitoring in the drive components will normally be sufficient to avoid faulty operation in the connected drives. Regarding personal safety, especially the danger of bodily injury and material damage, this alone cannot be relied upon to ensure complete safety. Until the integrated monitoring functions become effective, it must be assumed in any case that faulty drive movements will occur. The extent of faulty drive movements depends upon the type of control and the state of operation.

DANGER

Dangerous movements! Danger to life, risk of injury, severe bodily harm or material damage!

⇒ Ensure personal safety by means of qualified and tested higher-level monitoring devices or measures integrated in the installation. Unintended machine motion is possible if monitoring devices are disabled, bypassed or not activated.

⇒ Pay attention to unintended machine motion or other malfunction in any mode of operation.

⇒ Keep free and clear of the machine's range of motion and moving parts. Possible measures to prevent people from accidentally entering the machine's range of motion:

- use safety fences
- use safety guards
- use protective coverings
- install light curtains or light barriers

⇒ Fences and coverings must be strong enough to resist maximum possible momentum, especially if there is a possibility of loose parts flying off.

⇒ Mount the emergency stop switch in the immediate reach of the operator. Verify that the emergency stop works before startup. Don't operate the machine if the emergency stop is not working.

⇒ Isolate the drive power connection by means of an emergency stop circuit or use a starting lockout to prevent unintentional start.

⇒ Make sure that the drives are brought to a safe standstill before accessing or entering the danger zone. Safe standstill can be achieved by switching off the power supply contactor or by safe mechanical locking of moving parts.

⇒ Secure vertical axes against falling or dropping after switching off the motor power by, for example:

- mechanically securing the vertical axes
- adding an external braking/ arrester/ clamping mechanism
- ensuring sufficient equilibration of the vertical axes

The standard equipment motor brake or an external brake controlled directly by the drive controller are not sufficient to guarantee personal safety!

⇒ Disconnect electrical power to the equipment using a master switch and secure the switch against reconnection for:
- maintenance and repair work
- cleaning of equipment
- long periods of discontinued equipment use

⇒ Prevent the operation of high-frequency, remote control and radio equipment near electronics circuits and supply leads. If the use of such equipment cannot be avoided, verify the system and the installation for possible malfunctions in all possible positions of normal use before initial startup. If necessary, perform a special electromagnetic compatibility (EMC) test on the installation.

3.8 Protection Against Magnetic and Electromagnetic Fields During Operation and Mounting

Magnetic and electromagnetic fields generated near current-carrying conductors and permanent magnets in motors represent a serious health hazard to persons with heart pacemakers, metal implants and hearing aids.

WARNING

Health hazard for persons with heart pacemakers, metal implants and hearing aids in proximity to electrical equipment!

⇒ Persons with heart pacemakers, hearing aids and metal implants are not permitted to enter the following areas:
- Areas in which electrical equipment and parts are mounted, being operated or started up.
- Areas in which parts of motors with permanent magnets are being stored, operated, repaired or mounted.

⇒ If it is necessary for a person with a heart pacemaker to enter such an area, then a doctor must be consulted prior to doing so. Heart pacemakers that are already implanted or will be implanted in the future, have a considerable variation in their electrical noise immunity. Therefore there are no rules with general validity.

⇒ Persons with hearing aids, metal implants or metal pieces must consult a doctor before they enter the areas described above. Otherwise, health hazards will occur.

3.9 Protection Against Contact with Hot Parts

CAUTION

Housing surfaces could be extremely hot! Danger of injury! Danger of burns!

⇒ Do not touch housing surfaces near sources of heat! Danger of burns!

⇒ After switching the equipment off, wait at least ten (10) minutes to allow it to cool down before touching it.

⇒ Do not touch hot parts of the equipment, such as housings with integrated heat sinks and resistors. Danger of burns!

3.10 Protection During Handling and Mounting

Under certain conditions, incorrect handling and mounting of parts and components may cause injuries.

CAUTION

Risk of injury by incorrect handling! Bodily harm caused by crushing, shearing, cutting and mechanical shock!

⇒ Observe general installation and safety instructions with regard to handling and mounting.

⇒ Use appropriate mounting and transport equipment.

⇒ Take precautions to avoid pinching and crushing.

⇒ Use only appropriate tools. If specified by the product documentation, special tools must be used.

⇒ Use lifting devices and tools correctly and safely.

⇒ For safe protection wear appropriate protective clothing, e.g. safety glasses, safety shoes and safety gloves.

⇒ Never stand under suspended loads.

⇒ Clean up liquids from the floor immediately to prevent slipping.

3.11 Battery Safety

Batteries contain reactive chemicals in a solid housing. Inappropriate handling may result in injuries or material damage.

CAUTION

Risk of injury by incorrect handling!

⇒ Do not attempt to reactivate discharged batteries by heating or other methods (danger of explosion and cauterization).

⇒ Never charge non-chargeable batteries (danger of leakage and explosion).

⇒ Never throw batteries into a fire.

⇒ Do not dismantle batteries.

⇒ Do not damage electrical components installed in the equipment.

Note: Be aware of environmental protection and disposal! The batteries contained in the product should be considered as hazardous material for land, air and sea transport in the sense of the legal requirements (danger of explosion). Dispose batteries separately from other waste. Observe the legal requirements in the country of installation.

3.12 Protection Against Pressurized Systems

Certain motors and drive controllers, corresponding to the information in the respective Project Planning Manual, must be provided with pressurized media, such as compressed air, hydraulic oil, cooling fluid and cooling lubricant supplied by external systems. Incorrect handling of the supply and connections of pressurized systems can lead to injuries or accidents. In these cases, improper handling of external supply systems, supply lines or connections can cause injuries or material damage.

CAUTION

Danger of injury by incorrect handling of pressurized systems !

⇒ Do not attempt to disassemble, to open or to cut a pressurized system (danger of explosion).

⇒ Observe the operation instructions of the respective manufacturer.

⇒ Before disassembling pressurized systems, release pressure and drain off the fluid or gas.

⇒ Use suitable protective clothing (for example safety glasses, safety shoes and safety gloves)

⇒ Remove any fluid that has leaked out onto the floor immediately.

Note: Environmental protection and disposal! The media used in the operation of the pressurized system equipment may not be environmentally compatible. Media that are damaging the environment must be disposed separately from normal waste. Observe the legal requirements in the country of installation.

Notes

4 Installation and Licensing

4.1 System Requirements

- PC with 486-, Pentium processor or higher
- Windows 95, Windows 98, Windows NT 4.0
- Free disk space: 30-80 mbytes
- CD ROM drive
- RAM: min. 16 mbytes
- Graphic solution: min. 640 x 480 pixels
- Windows 95: Service Pack 1
- Windows NT: Service Pack 3
- Keyboard and mouse

4.2 Software Installation

Close all application programs on the system.

Insert the CD in the local CD ROM drive. The installation program will start by itself (Autostart enabled). Otherwise change into the root directory on the CD and start Autorun.exe (Autostart disabled).

Note: Administrator privileges are required on Windows NT systems for installation!

The installation program asks for the components you want to install. Answer these questions with **Yes** or **No**.

It will install

- system configurator SyConDN (configuration and diagnostic tool) and
- CIF Device Driver (Device Driver for access to the CIF).

4.3 Installation of the System Configurator SyConDN

Follow the instructions of the installation program by selecting the fieldbus system to be installed and answer all questions with **OK** or **NEXT**.

The installation program offers the following selections:

Selection	Default settings	Meaning
Directory	C:\Programs\Hilscher\SyCon	Installation directory of SyConDN and its components
DeviceNet	Selected	Program DLL and components of the corresponding fieldbus system or protocol
INTERBUS	Selected	
PROFIBUS	Selected	
CIF Device Driver	Selected C:\Programme\CIF Device Driver	CIF Device Driver
Program Menu	SyConDN system configurator	Folder under Start > Programs

Fig. 4-1: Selection during installation

The installation program copies the program files, i.e. GSD or EDS files, and bitmaps to the PC. Finally,

- system DLLs,
- the application,
- OLE controls

are entered into the registry.

5 Configuration Sequence

5.1 Hardware Configuration

Before you can start-up the DNM_PC104 or DNS_PC104, you must check if the configured memory areas and interrupts are not assigned to other devices. When using WindowsNT check this under "Programs/Management/WindowsNT-Diagnostics/Resources“ to recognize and eliminate errors of this kind.

Select from the following table the communication type that you want to use. The configuration steps are described in the given chapter.

Communication	Device	Device	Described in chapter	Page
DeviceNet	Hilscher DeviceNet Master	Any DeviceNet Device (Slave)	Configuration Hilscher DeviceNet Master to any DeviceNet Device	5-2
	Hilscher DeviceNet Master	Hilscher DeviceNet Slave	Configuration Hilscher DeviceNet Master to Hilscher DeviceNet Slave	5-3

Fig. 5-1: Overview – Communication

5.2 Configuration Hilscher DeviceNet Master to any DeviceNet Device (Slave)

The following table describes the steps to configure a Hilscher DeviceNet master to any DeviceNet device (slave) as it is common for many application cases.

#	Action	Menu in the system configurator	Detail information in chapter	Page
1	Create a new project	**File > New > DeviceNet**	Setting up the DeviceNet Configuration	6-1
2	Copy EDS file of the device (slave), if the device is not in the selection list	**File > Copy EDS**	EDS Files	6-1
3	Select Hilscher DeviceNet master and provide MAC ID address	**Insert > Master**	Insert	6-3
4	Select DeviceNet device (slave) and provide MAC ID address	**Insert > Device**	Insert Device (slave)	6-7
5	Assign the input and output modules	Mark the device (left mouse click), then **Settings > Device Configuration**	Device Configuration	6-8
6	Assign the offset addresses			
7	Assign the parameter data of the device, if the device needs parameter data	Mark the device (left mouse click), then **Settings > Device Configuration > Parameter Data**	Parameter Data	6-12
8	Set the bus parameter	Mark the master (left mouse click), then **Settings > Bus parameter**	Bus Parameter	7-4
9	Set the device assignment, if no automatic assignment has occurred	Mark the master (left mouse click), then **Settings > Device Assignment**	Device Assignment	7-1
10	Save project	**File > Save**	Save and Save As	9-1
11	Download	Mark the master (left mouse click), then **Online > Download**	Downloading the Configuration	8-1
12	Live list	Mark the master (left mouse click), then **Online > Live List**	Diagnostic Functions Live List	8-4
13	Start debugger	Mark the master (left mouse click), then **Online > Start Debug Mode**	Debug Mode	8-5
14	Device diagnostic	Mark the slave (left mouse click), then **Online > Device Diagnostic**	Device Diagnostic	8-6
15	Stop debugger	**Online > Stop Debug Mode**	Debug Mode	8-5
16	Global diagnostic	Mark the master (left mouse click), then **Online > Global Status Field**	Global Status Field	8-7
17	Transfer user data: Write outputs, read inputs	Mark the master (left mouse click), then **Online > I/O Monitor**	I/O Monitor Or: I/O Watch	8-24 8-25

Fig. 5-2: Steps for configuration of the Hilscher DeviceNet master to any DeviceNet device (slave)

5.3 Configuration Hilscher DeviceNet Master to Hilscher DeviceNet Slave

The following table describes the steps to configure a Hilscher DeviceNet master to a Hilscher DeviceNet slave as it is typical for many application cases.

#	Action	Menu in the system configurator	Detail information in chapter	Page
1	Create a new project	**File > New > DeviceNet**	Setting up the DeviceNet Configuration	6-1
2	Select Hilscher DeviceNet master and provide MAC ID-address	**Insert > Master**	Insert	6-3
3	Select Hilscher DeviceNet device (Slave) and provide MAC ID address	**Insert > Device**	Insert Device (Slave)	6-7
4	Assign input and output modules	Mark the device (left mouse click), then **Settings > Device Configuration**	Device Configuration	6-8
5	Assign the offset addresses (*1)			
6	Assign the bus parameter	Mark the master (left mouse click), then **Settings > Bus Parameter**	Bus Parameter	7-4
7	Set device assignment for the master, if no automatic assignment has occurred (master)	Mark the master (left mouse click), then **Settings > Device Assignment**	Device Assignment	7-1
8	Set device assignment, if no automatic assignment has occurred (slave)	Mark the device (left mouse click), then **Settings > Device Assignment**	Device Assignment	7-1
9	Save project	**File > Save**	Save and Save As	9-1
10	Download (master)	Mark the master (left mouse click), then **Online > Download**	Downloading the Configuration	8-1
11	Download (slave)	Mark the device (left mouse click), then **Online > Download**	Downloading the Configuration	8-1
12	Live list	Mark the master (left mouse click), then **Online > Live List**	Diagnostic Function Live List	8-4
13	Start debugger	Mark the master (left mouse click), then **Online > Start Debug Mode**	Debug Mode	8-5
14	Device diagnostic	Mark the slave (left mouse click), then **Online > Device Diagnostic**	Device Diagnostic	8-6
15	Stop debugger	**Online > Stop Debug Mode**	Debug Mode	8-5
16	Global diagnostic	Mark the master (left mouse click), then **Online > Global Status Field**	Global Status Field	8-7
17	Transfer user data: Write outputs, read inputs	Mark the master (left mouse click), then **Online > I/O Monitor**	I/O Monitor Or: I/O Watch	8-24 8-25

Fig. 5-3: Steps for the configuration of the Hilscher DeviceNet master to Hilscher DeviceNet slave

Remark (*1): The offset addresses assigned in the slave configuration are always related to the Hilscher DeviceNet master and have no meaning here.

Remark (*2): Alternatively, the CIF Device Driver Test Program can be used for the test. After Board Select: Data Transfer > I/O Data > DevExchangeIO.

6 DeviceNet Configuration with SyConDN

6.1 Setting up the DeviceNet Configuration

To create a new configuration, select the **File > New** menu. This will offer a selection list of fieldbus systems. Choose **DeviceNet**. If only the fieldbus DeviceNet was installed, the configuration window will open directly.

The name of the configuration file can be allocated when the configuration is terminated or with **File > Save As**.

6.2 EDS Files (Electronic Data Sheet Files)

Introduction

An Electronic Data Sheet (EDS) provides information necessary to access and change the configurable parameters of a device. An EDS is an external file that contains information about configurable attributes for the device, including object addresses of each parameter.

The application objects in a device represent the destination addresses for the configuration data. These addresses are encoded in the EDS.

The figure below shows a general block diagram of an EDS file.

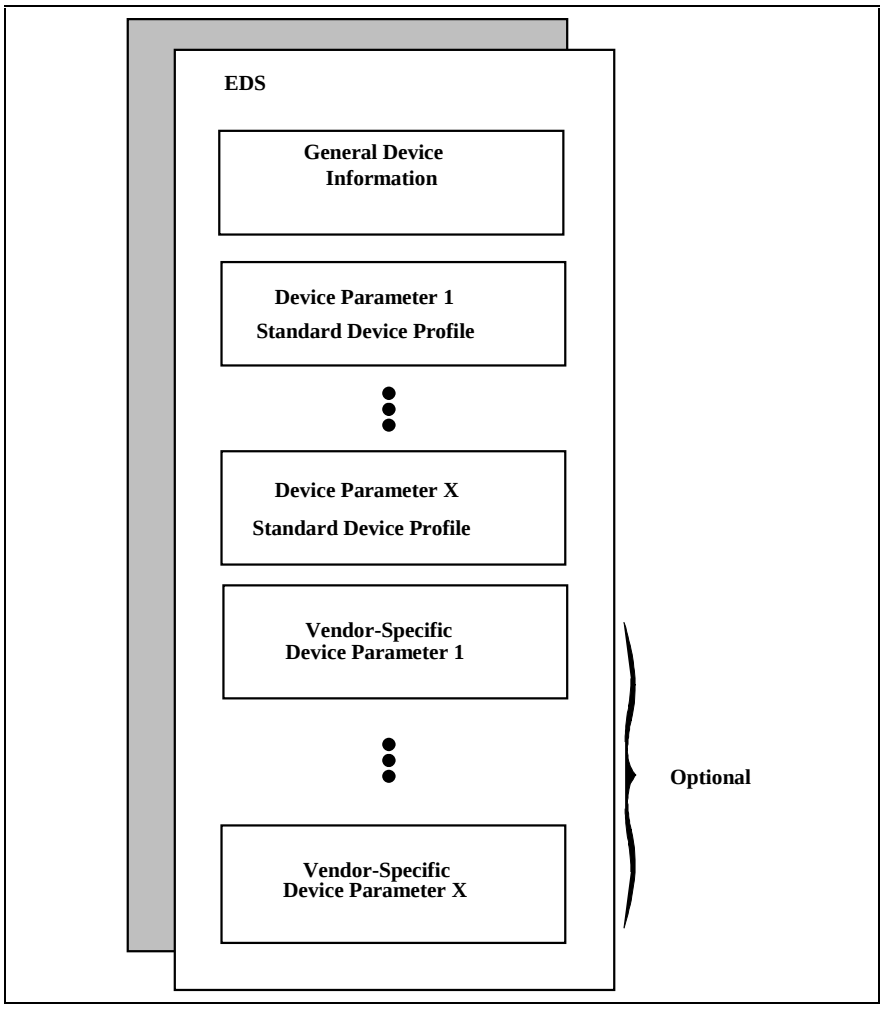


Fig. 6-1: General block diagram of an EDS file

EDS Files and SyConDN

When the system configurator is started, it automatically retrieves all EDS files stored in the EDS directory. The device names are placed into an internal list. During the configuration, the device-specific data is retrieved directly from the EDS files.

If a DeviceNet device does not appear in the selection list (Insert Master or Insert Device), then the corresponding EDS file can be copied into the EDS directory with **File > Copy EDS**. Another possibility is to copy the EDS file into the SyConDN EDS directory with Windows Explorer and then retrieve the EDS files into the EDS directory with **Settings > Path** and **OK**.

- **Hilscher devices:** The EDS files for Hilscher devices are already included in the scope of delivery of the system configurator and are installed with the system configurator.
- **Other devices:** For other devices the respective device manufacturer provides the EDS files.

The EDS files of some vendors are available on the Open DeviceNet Vendor Association (ODVA) homepage:

http://www.odva.org

or visit the homepage of the manufacturer.

The EDS directory is adjustable. In order to change the directory from a previous setting in another directory, use the menu **Settings > Path**. All EDS files must be placed in this directory.

6.3 Master

Insert Master

To insert a (Hilscher) master into the configuration, select the **Insert > Master** menu, in order to open the selection window, or click on the symbol:

The mouse pointer automatically changes into the Insert Master pointer. Click on the position where the master is to be inserted. The dialog box, from which one or more masters can be chosen, opens.

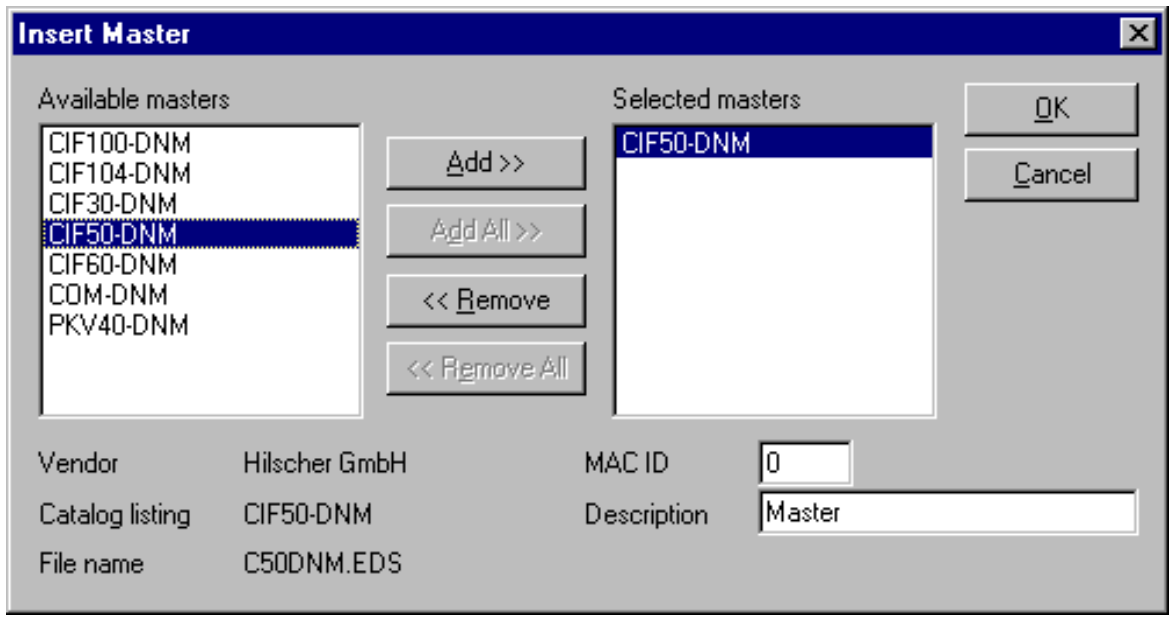


Fig. 6-2: Insert > Master

The **MAC ID** of the master can be changed here.

The **Description** field will accept up to 32 characters of text. This text will appear later in the main configuration window.

The chosen master is automatically placed at the first position in the main configuration window, if the selection was confirmed with the **OK** button.

If a master is already placed, SyConDN will ask for a replacement confirmation. Already inserted devices are not influenced by this procedure and remain configured.

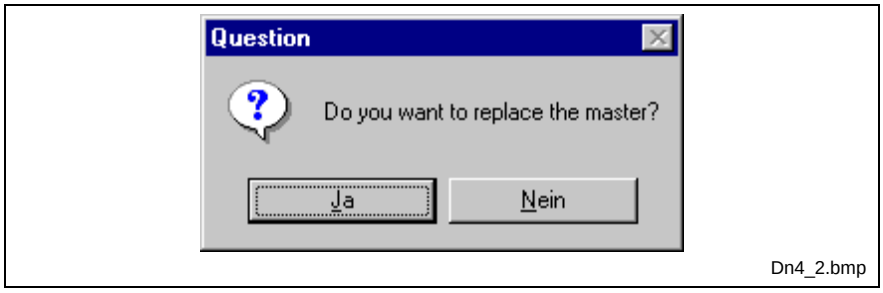


Fig. 6-3: Question in case of master replacement

Automatic Network Scan

After the master device is configured, it is possible to scan the DeviceNet network for other devices (automatic network scan), whereby other devices are automatically searched. This allows a very fast configuration, and you also have the possibility to change detailed parameters for these devices later.

To start an automatic network scan, please proceed as follows:

1. Insert a master device.
2. Click on **Settings > Bus parameters** and select the baudrate and the MAC ID from the master (explained in chapter Bus Parameter on page 7-3).
3. Select **Online > Download** to load these settings into the DeviceNet master.
4. Click on the master with the left mouse button and choose **Online > Automatic Network Scan.**
5. A new window is displayed, where you see the current status of the network scan and the devices, which were already found in your DeviceNet network:

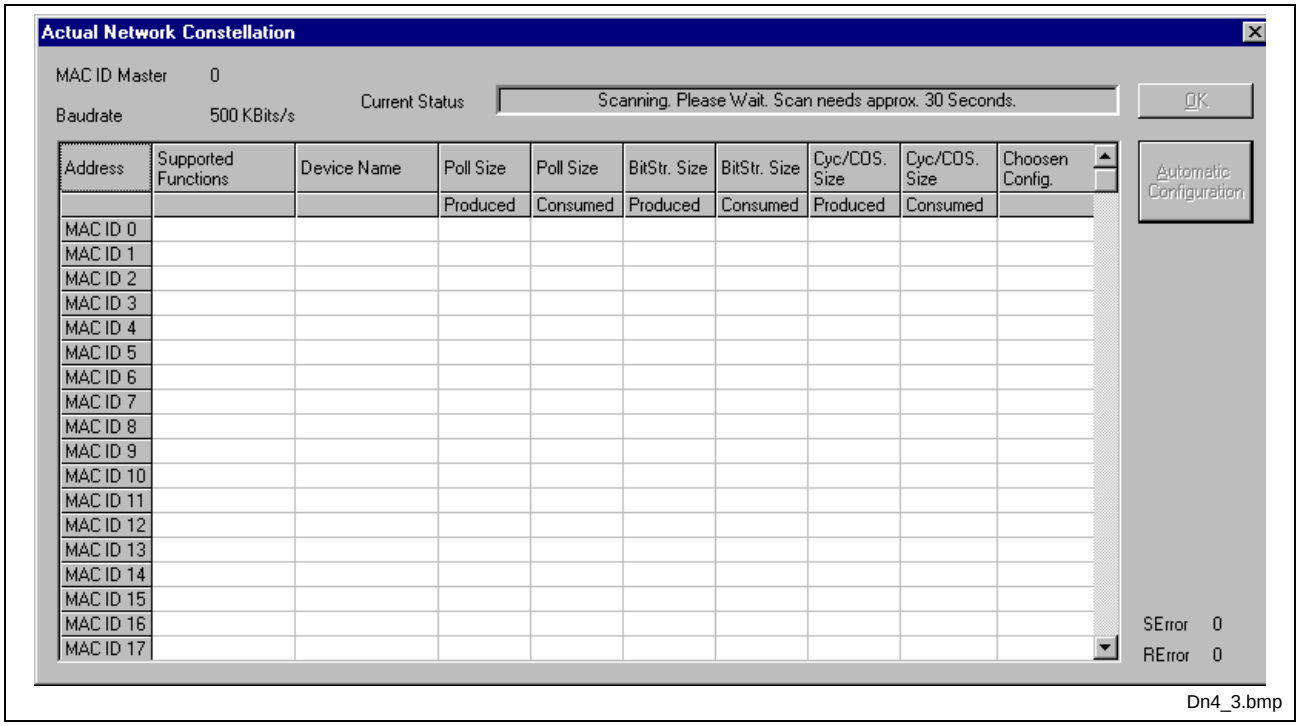
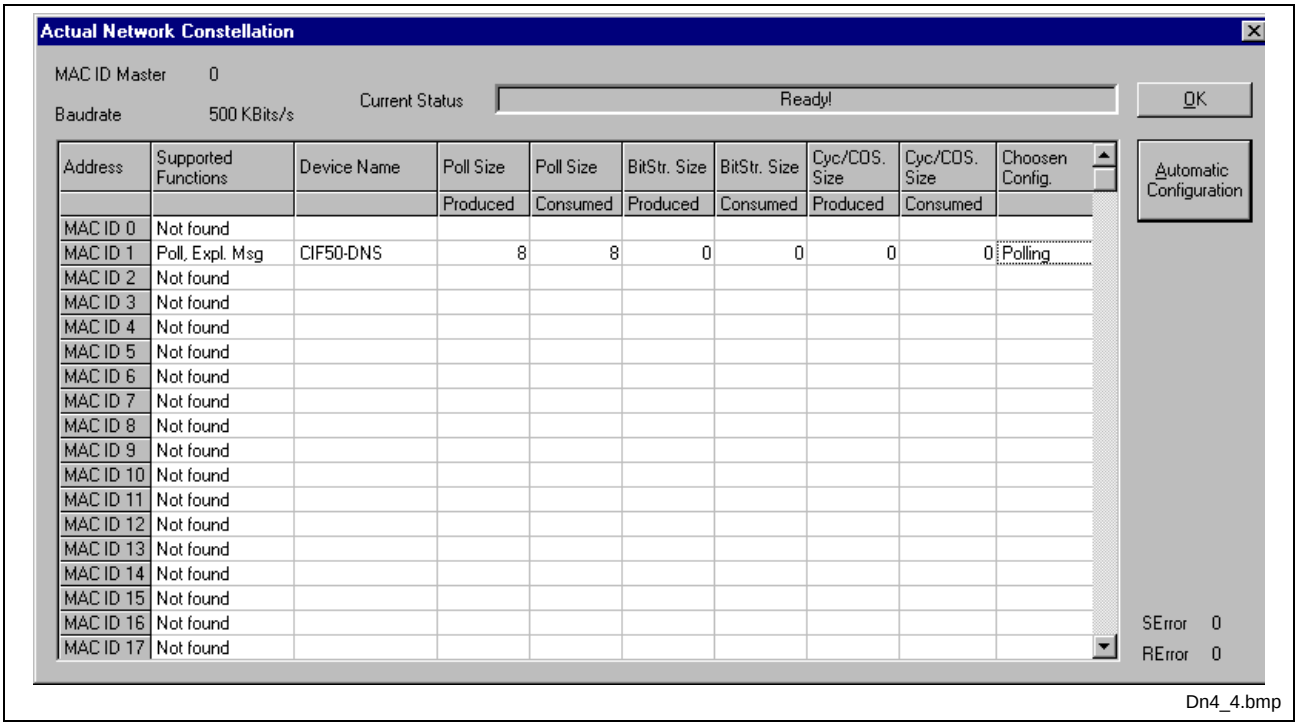


Fig. 6-4: Online > Automatic network scan (during scanning)

The network scan will take approx. 30 seconds. The network scan is still in progress and could not be interrupted until the status, shown in the field "Current Status", changes to "Ready!". When the scan is done, you see the devices that were found at the corresponding MAC ID address in the table.

Example:



Address	Supported Functions	Device Name	Poll Size Produced	Poll Size Consumed	BitStr. Size Produced	BitStr. Size Consumed	Cyc/COS. Size Produced	Cyc/COS. Size Consumed	Choosen Config.
MAC ID 0	Not found								
MAC ID 1	Poll, Expl. Msg	CIF50-DNS	8	8	0	0	0	0	Polling
MAC ID 2	Not found								
MAC ID 3	Not found								
MAC ID 4	Not found								
MAC ID 5	Not found								
MAC ID 6	Not found								
MAC ID 7	Not found								
MAC ID 8	Not found								
MAC ID 9	Not found								
MAC ID 10	Not found								
MAC ID 11	Not found								
MAC ID 12	Not found								
MAC ID 13	Not found								
MAC ID 14	Not found								
MAC ID 15	Not found								
MAC ID 16	Not found								
MAC ID 17	Not found								

Fig. 6-5: Online > Automatic network scan (after scanning)

In our example in the figure above the automatic network scan detected a Hilscher device at MAC ID 1.

Here is an explanation of the different columns:

Variables	Meaning
Supported functions	Functions supported by the device, could be polled, bit strobe or cyclic/change of state (explained in chapter Actual selected I/O Connection starting on page 6-9)
Device name	Name of the device, result from network scan
Poll size produced	Number of data for poll connection (inputs)
Poll size consumed	Number of data for poll connection (outputs)
BitStr. size produced	Number of data for bit strobe connection (inputs)
BitStr. size consumed	Number of data for bit strobe connection (outputs)
Cyc/COS size produced	Number of data for cyclic/COS connection (inputs)
Cyc/COS size consumed	Number of data for cyclic/COS connection (outputs)
Selected config.	Configuration chosen by the user, could be Change of State, Cyclic, Polling, Bit strobed or explicit only and depends on the functions supported by the device. Click on the cell to change the configuration.

Fig. 6-6: Explanations to Fig. 6-5 "Online > Automatic network scan (after scanning)"

A double-click on the first or second column of the corresponding row of the device shows detailed information of the device:

Fig. 6-7: Information on a device in the automatic scan window

If you want to use this configuration as your configuration, click on **Automatic Configuration** and select **Yes** when prompted. Afterwards you can close the Automatic Configuration Window by clicking on **OK**. If you do not want the devices that were found in your configuration, just click **OK**.

If you want to insert your devices manually, please go on with section "Insert Device (Slave)" starting on page 6-7.

6.4 Device (Slave)

Insert Device (Slave)

To insert new DeviceNet devices in the configuration select the **Insert > Device** menu to open the selection window or click onto the following icon:

Insert > Device	Insert Device Mouse Pointer
	

The mouse cursor changes automatically to the insert device pointer. Click on the position where you want to insert the new device. A dialogue box appears where you can select now one or more devices for insertion.

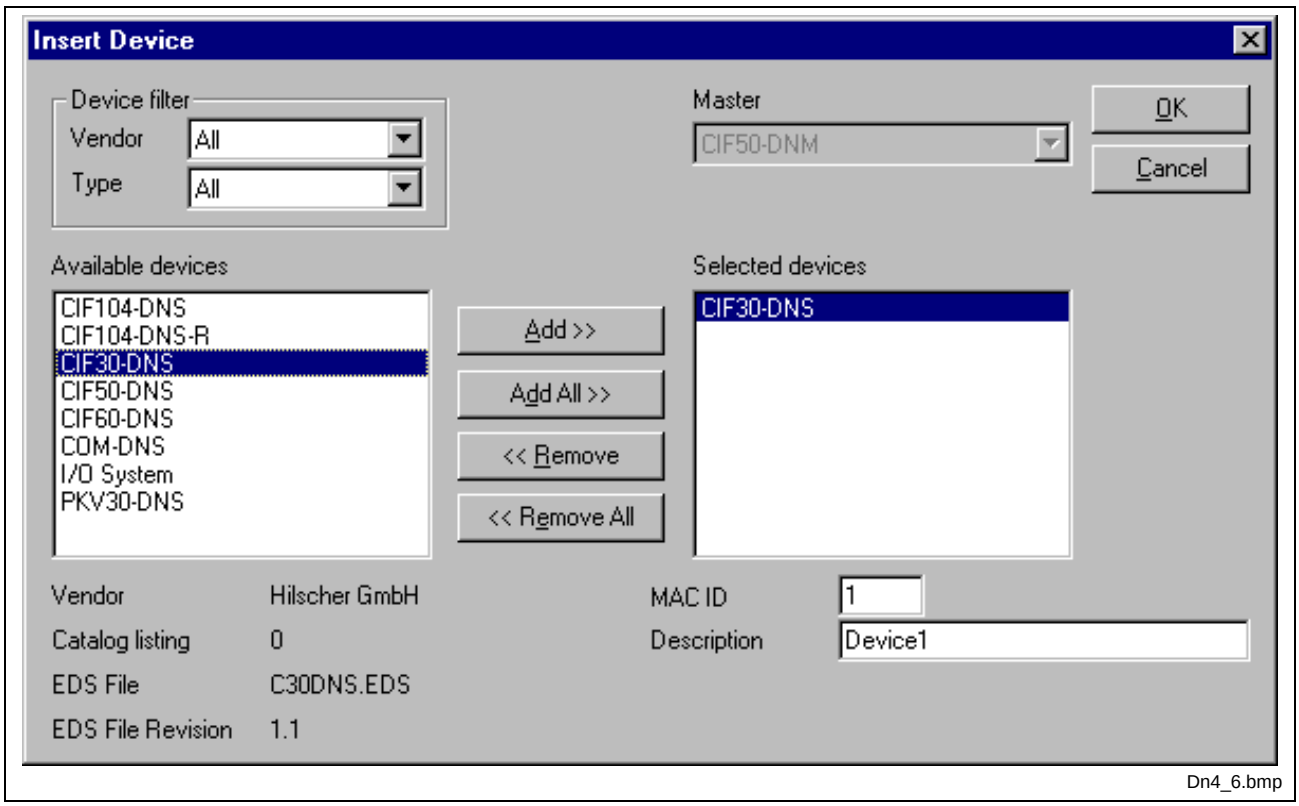


Fig. 6-8: Insert > Device (Slave)

The left list box is listing all available devices, whose EDS files are present in the EDS directory. You can use a filter to reduce the selection possibilities via **Type** and **Vendor**. If one device is selected, you can see some additional information about that device below the list box (**Available devices**). With a double click or with the button **Add**, the device appears in the right list box. All devices in the right list are assigned to the current **Master,** which is also displayed in this window. If you select bit by bit every device in the right list (one mouse click), you can assign one **Mac ID** as well as a name to each slave in the input box **Description**. The description field will accept up to 32 characters of text.

For each device registered in the right list the MAC ID is automatically increased one digit. However, it can be overwritten by the user in the input box.

Note: It is allowed to select one device several times. However, each device needs its own (unique) MAC ID, so that it can be recognized in the network.

Device Configuration

To enter the **Device Configuration** set the focus on the device (left mouse click) and select the menu **Settings > Device Configuration** or set the focus on the device (left mouse click) and use the right mouse button at the device or simply double-click on the device.

This window is used to execute the device-specific configuration. In the device configuration you have to assign the device's I/O to logical addresses in the process data image of the master. Please consider that these addresses have to correspond to the addresses of the PC application.

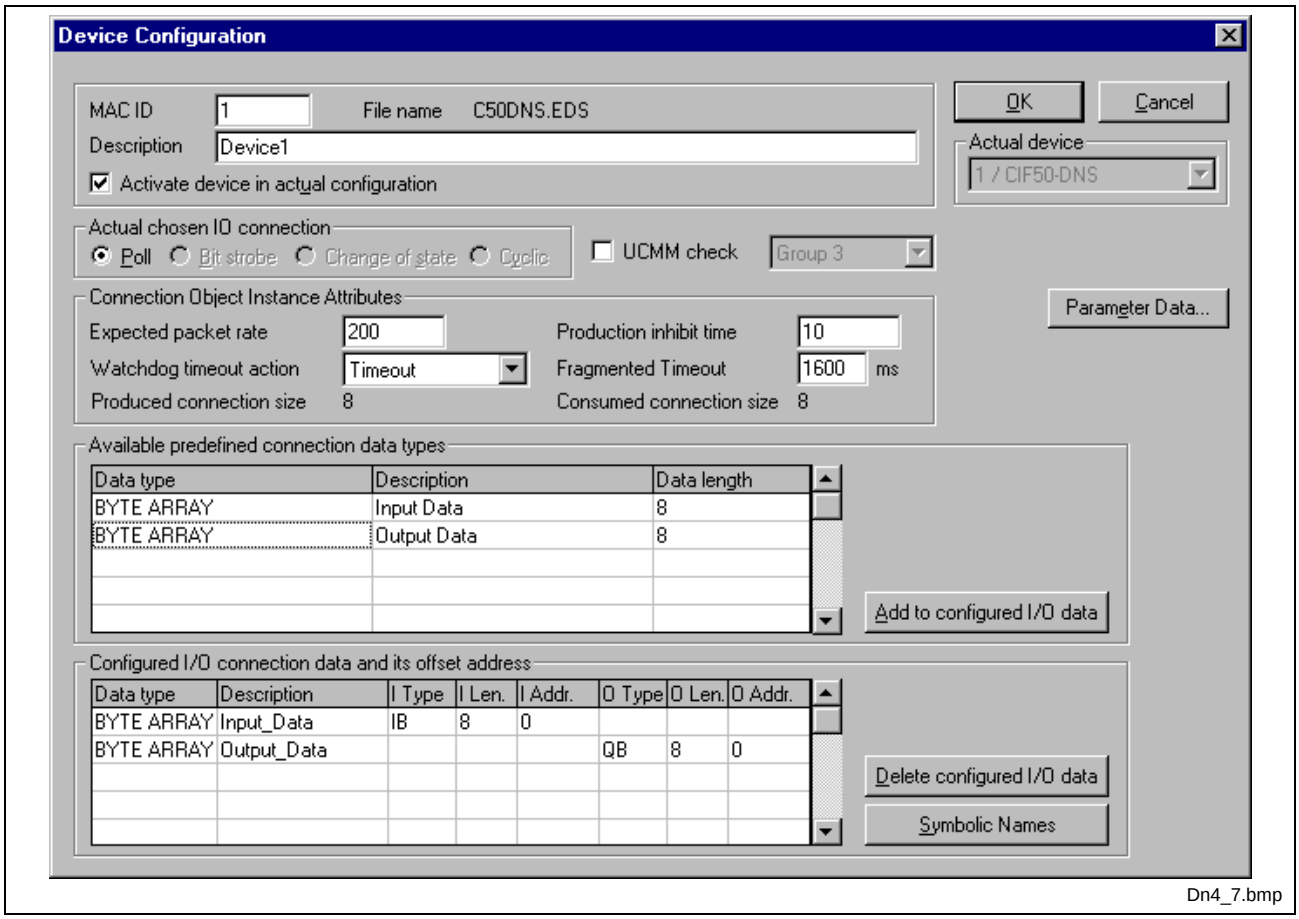


Fig. 6-9: Device configuration

Note 1: The offset addresses set in this window are for the addressing of the input data and output data in the master! These address settings (offsets) are not the settings in the DeviceNet device (slave). The DeviceNet device (slave) organizes its data itself.

Note 2: The input data and the output data from the bus are transferred directly to the Dual-Port Memory in the Hilscher DeviceNet slave. These offset addresses are related to the master.

The EDS file which this device is using is displayed next to **File Name**.

The **Description** and **MAC ID** fields displays the entries made during the selection phase of the slave device. Both entries can be set/changed here.

The checkbox **Activate Device in actual configuration** decides, if the master tries to establish the communication to the device or not. Disabling this button makes sense for example, if a device is physically not present in the network, but will be present in future. This suppresses unnecessary requests of the master to non existing devices, but the device insertion itself reserves process data in the process data image of the master.

MAC ID (Device Network Address)

The network address of a device serves to distinguish itself on a DeviceNet fieldbus system from any other device or slave on this network. This should be a unique number for each device. A valid MAC-ID address is within a range of 0 to 63 and can be reentered and changed in the **MAC-ID** box in the **Device Configuration** dialog.

Actual selected I/O Connection

DeviceNet allows to establish several kinds of I/O connections between devices. Please note that a device has not to support all types of IO connections.

I/O connection
Poll
Bit Strobe
Change of State
Cyclic

Fig. 6-10: Overview I/O connections

Here is an explanation of the different connections types.

- **Polled I/O Connection** - One poll command from the master sends a number of output data to a single, specific device (point-to-point). The device receives (consumes) the poll command and processes the output data. If it has input data configured for this poll connection, it reacts by sending (producing) back a number of input data and/or status information to the master. Before a polled I/O connection is initiated by the master, it reads the **Consumed** and **Produced Connection Size** of the data from the slave first and compares each value with the internally configured one. If the master detects differences, the connection cannot be established. Sending a poll command can happen at any time the master wants to and has timer or event dependencies. A device has to respond, if it has consumed and understood the poll command request of the master, even if it has no input data. Else the master will report a timeout error. Polling data to many devices has the disadvantage that the network traffic rate is very high and most data which is transferred has not changed since the last transmission. Furthermore, the higher the bus load the more communication errors can occur, if the bus is disturbed by external influences.
- **Bit Strobe I/O Connection** - Bit strobe command and response messages rapidly move small amounts of I/O data between the master device and one/some/all slave devices. The bit strobe message contains a bit string of 64 bits of output data, one output bit per possible device. Each bit in there is assigned to one device address in the network. Herewith, this service has broadcast functionality that means more than one slave device can be addressed by one command. Because all addressed slave devices get this command at the same time, this command is normally used to synchronize data transfer to several slave devices. A slave device can take its corresponding output bit as a real output information to give it to the peripheral connections (e.g. an LED) and/or use the bit as a trigger to send back its input data with a poll response message. The data that can be send back from each slave after a bit strobe command was received is limited to 8 bytes in length. Bit strobe usage causes therefore a reduced bus loading than poll connections.
- **Change of State/Cyclic I/O Connection** - The master device sends a number of output data to a single, specific device (point-to-point). Data production is triggered by either a determined changed value in the output data or the cyclic timer expiration. Depending on how the slave behavior is configured, the slave can send back an acknowledge message, containing a number of input data and/or status information. The slave device sends a number of input data to the master, if the data is either changed or the cyclic timer has expired. The master itself can acknowledge this message with output data if configured.

  A data production only with "Change of state/Cyclic" holds down the bus load as small as possible, while data than can be transmitted as fast as possible by each device, because bus conflicts are less possible. So you can get high performance data transmission with in comparison low baud rates.

Connection Object Instance Attributes

The **Production Inhibit Time**, one for each connection, configures the minimum delay time between new data production in multiples of a millisecond. The timer is reloaded each time new data production through the established connection occurs. While the timer is running, the device suppresses new data production until the timer has expired. This method prevents that the device is overloaded with to fast incoming requests.

The value 0 defines no inhibit time and data production can and will be done as fast as possible. If, for example, in polled mode a **Production Inhibit Time** of 1000dec is configured, then the poll request message to the device will be sent every second.

The **Expected Packet Rate**, one for each connection, is always transferred to the device before starting and doing the I/O transfer. The value is used by the device later to reload its 'Transmission Trigger' and 'Watchdog Timer'. The 'Transmission Trigger Timer' is used in a 'cyclic' I/O connection to control the time, when the data shall be produced. Expiration of this timer then is an indication that the associated connection must transmit the corresponding I/O message. In 'change of state' connections the timer is used to avoid the watchdog timeout in this connection, when a production has not occurred since the timer was activated or reloaded.

Note: The **Production Inhibit Time** is verified against the **Expected Packet Rate**. If the Expected Packet Rate value is unequal zero, but less than the Production Inhibit Time value, then an error window is opened, when pressing the OK button or changing to a wrong value.

The **Watchdog Timeout Action** defines the device behavior, when the watchdog timer in the device expires. The following values are defined and their functionality is closer described in the DeviceNet specification.

- **Transition to Timed Out**: The connection transitions to a Timed Out state and remains in this state until it is Reset or Deleted.
- **Auto Delete**: The connection class automatically deletes the connection, if it experiences an Inactivity/Watchdog timeout.
- **Auto Reset**: The connection remains in the established state and immediately restarts the Inactivity/Watchdog timer.

UCMM Check

The UCMM Check box is used for modules that require the use of UCMM messaging format. Class 1, 2, and 3 are supported. Check the documentation for your slave device to identify, if this box must be checked.

Fragmented Timeout (Expl. Message Timeout)

If a transmission of I/O data or explicit message is greater than 8 bytes in length, it must be transmitted on DeviceNet in a fragmented manner. The maximum time the master will wait until a slave has to respond during the fragmented transmissions is the fragmented timeout.

Parameter Data

The button **Parameter Data** can be selected in the Device Configuration window to edit the parameter data.

If default parameters are configured in the EDS file for this device, they are inserted automatically, when the menu is chosen the first time.

Some of the devices need some further parameterization data to change for example a measurement limitation or a value range. These data is device-specific and their functionality can not be explained at this point.

This window below shows an example of parameter data of a device.

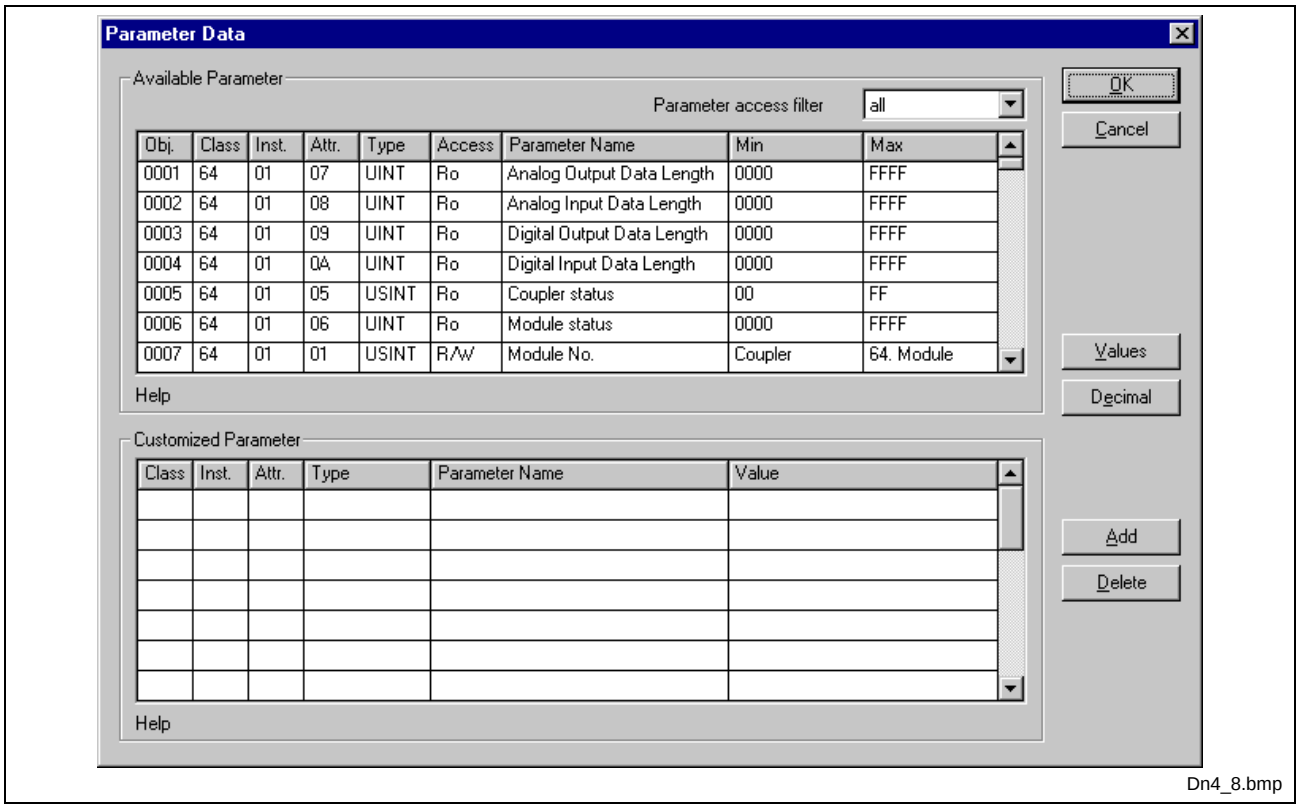


Fig. 6-11: Parameter data

Two tables are available: one table with all available parameters and one table for customized parameters. These parameters can be selected from the available parameters to that table.

Process Data Configuration

- **Fixed I/O data transfer**

  DeviceNet handles I/O data transparently as a byte string without defining any data type in the transferred data. To be operative it defines only the number of bytes in consumed and produced direction that shall be transferred across a connection, nothing else. But SyConDN and the firmware now allows to assign modular each byte or a bunch of bytes of the transparent string to different data types. A list of the supported data types of the connection can be found in the middle table of the window (see Fig. 6-11) called **Available Predefined Connection Data Types**. These available predefined data types are registered in the EDS file of the respective device. If there are no data types available, SyCon specifies data types: Byte Array Input Data and Byte Array Output Data.

  The following data types are supported:

- **Bit, Byte, Word, Dword, Byte Array**

  By selecting one of the available predefined connection data types and by clicking on **Add** or double-clicking on the predefined connection data type this data type is entered in the lower table containing the **Configured I/O connection data types and their offset addresses**.

  If the data type **Byte Array** is chosen, the number of bytes that shall be reserved for this data type can be entered in the **Data Count** column in the lower table. Any other data type has its fixed length that can not be changed. The data types are distinguished in process output and process input data in the view of the master device.

  A double-click on a predefined data type or a click in the **Add to configured I/O data** button will insert the chosen data type in the lower table called **Configured I/O connection data**. This table contains all data that shall be really transferred across the connection. SyConDN will add separately the number of used bytes of each configured I/O data and forms the values **Consumed** and **Produced Connection Size** automatically. Both values indicates the sum of bytes which shall be sent by the master as outputs (**Consumed** by the device) and received by the master as inputs (**Produced** by the device).

- **Assigning the process data offset addresses**

  The I/O offset addresses of each placed data type in the connection data table can be freely configured in a range of 0 to 3583 or they are set automatically by SyConDN. To enable or disable free configuration use the flag **Auto Addressing** in the menu **Settings - Auto Addressing**. If enabled SyConDN will place all configured I/O data spaceless in physical order one to each other based on the rising MAC-ID order. This is done during the download procedure. The assigned addresses can be checked then in the overview **Address Table** of the menu **View**. If the addresses are entered manually the default address 0 in the **input address** respectively the **output address** must be overwritten. Depending on the **Addressing mode** in the **DNM Master Settings** the addresses are byte addresses or word addresses. This is described in the chapter.

In case of manual addressing (that means auto addressing is deactivated) the configuration window looks like:

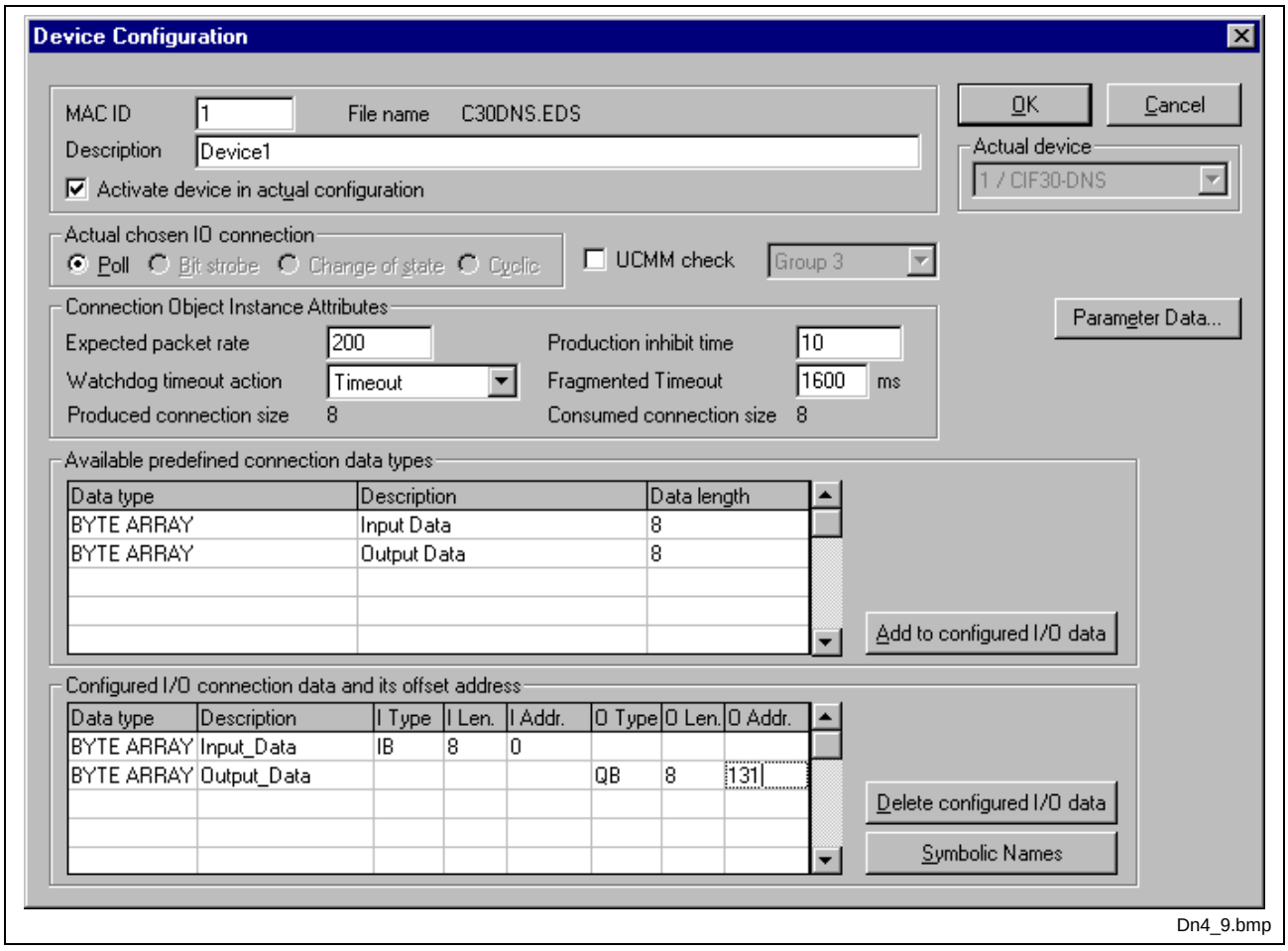


Fig. 6-12: Device configuration for manual addressing

In the column **I Addr** and **O Addr** you have to assign the addresses, where to locate the data in the process image. Remember that these addresses correspond to your application on the HOST side.

If you deactivate a device in the actual configuration the device is shown like this:

Fig. 6-13: Display when device is deactivated

To activate or deactivate a device in a configuration can be very useful for such devices which don't exist in the real physical network, but for which the I/O offset addresses shall be reserved or simply a symbolic 'missing device' wanted to be inserted as long as the device is not connected.

7 Settings

7.1 Device Assignment

The device assignment setting determines, how the system configurator communicates with the device. This is set in the device arrangement via the menu **Settings > Device Assignment**. The following possibilities are available:

CIF Device Driver	CIF Serial Driver

CIF Device Driver:

- CIF Device Driver: The system configurator communicates with the Hilscher device over the Dual-Port Memory of the device.
- This communication is utilized, when the system configurator is used on the same PC on which the Hilscher device (CIF) is installed.
- The CIF Device Driver must have been installed.

CIF Serial Driver:

- CIF Serial Driver: The system configurator communicates with the Hilscher device via a serial connection. Thereby, a COM interface of the PC must be connected via a diagnostic cable with the diagnostic interface of the Hilscher device.
- This communication is utilized when the system configurator is to access the device over the diagnostic interface of the Hilscher device. The following two application cases are possible:
- Application case 1: The system configurator is installed on another PC (e.g. a notebook) than the Hilscher device.
- Application case 2: The system configurator is installed on the same PC, on which the Hilscher device is situated. Then the application can use the Dual-Port Memory to access the Hilscher device and the diagnostic interface can be used at the same time to communicate with the device (diagnostic data).

CIF Serial Driver

The serial driver supports COM1 to COM4, in order to communicate over the diagnostic interface with the device.

The Device is selected via **Settings > Device Assignment.**

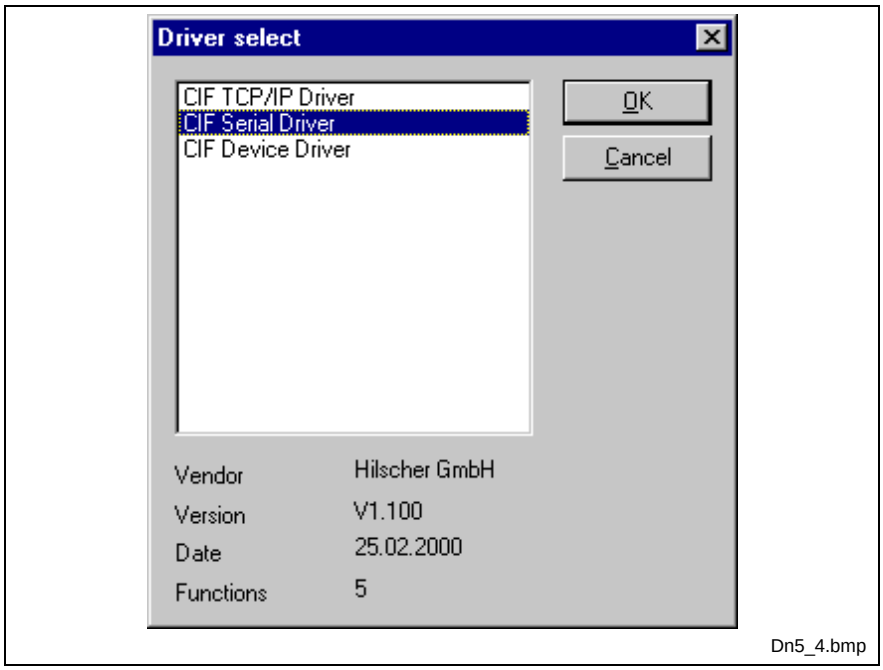


Fig. 7-1: Driver selection – CIF Serial Driver

Choose the item **CIF Serial Driver** and then **OK**, in order to select the CIF Serial Driver.

The connection must first be established using the switching surface **Connect COM1** or **Connect COM2** or **Connect COM3** or **Connect COM4**. They can be used depending on which COM interfaces are installed and free on the PC.

The system configurator sends a request to the corresponding COM interface and polls the firmware of the device. A display of the firmware will indicate, when a device is connected. In the other case, a Timeout error (-51) appears, which will state that no device is connected.

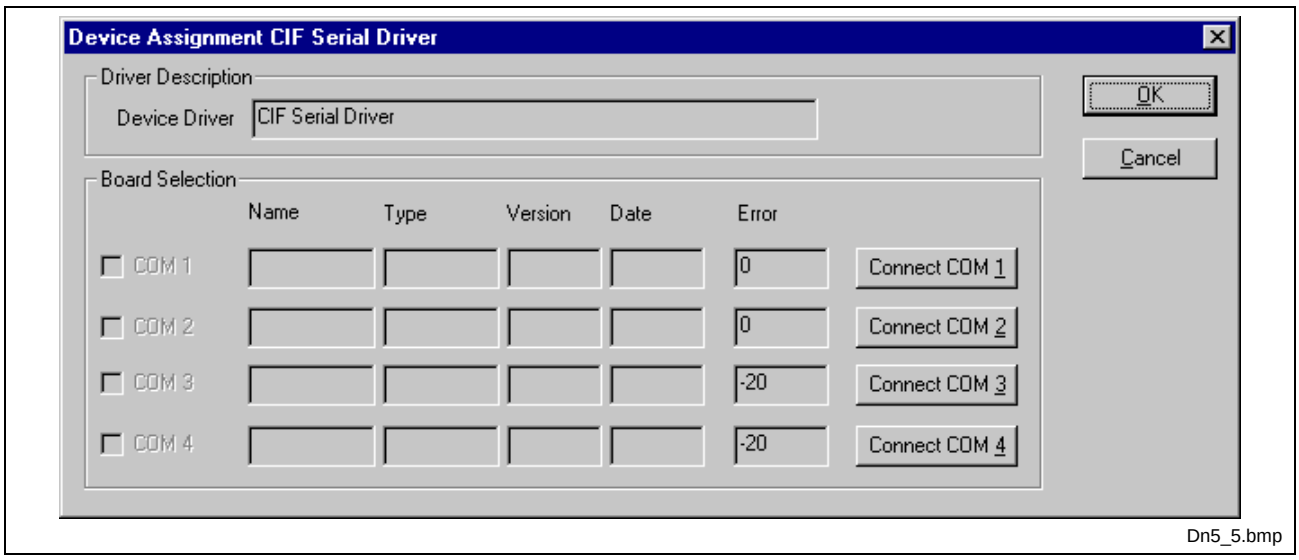


Fig. 7-2: CIF Serial Driver – Device assignment

The error number –20 indicates that this COM interface is not available or not free.

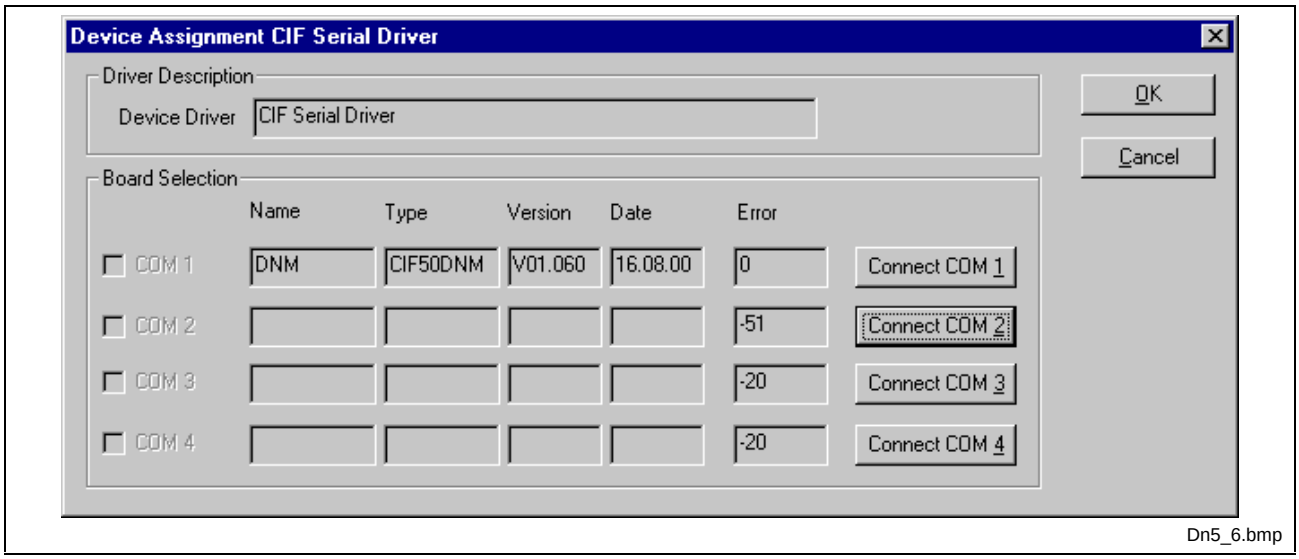


Fig. 7-3: CIF Serial Driver – Device assignment

7.2 Bus Parameter

In this window the basic settings for the DeviceNet network must be done.

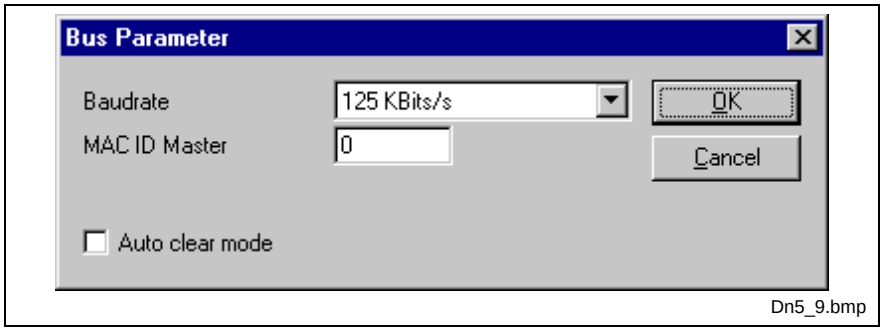


Fig. 7-4: Settings > Bus parameters

Mainly, this concerns the determination of the **Baudrate**. The DeviceNet board supports the baudrates 125kbit/s, 250kbit/s and 500kbit/s. Normally, DeviceNet components use the autobaud detection to get the baudrate automatically one-time.

The **Auto Clear mode** feature defines the behavior of the master, if the communication breaks down or is interrupted to a device. If the flag **Auto clear mode ON** is activated, the master will also stop the communication to all further devices which were still responding and active. If the flag Auto clear mode is not activated, then a lost communication contact to one device has no influence on the communication channel of the still present ones. For all the error effected devices the master remains in the state to try the reestablishment of the communication again.

7.3 DeviceNet Master

DeviceNet Master Settings

To enter the DeviceNet master settings set the focus on the master (left mouse click) and select the menu **Settings > Master Settings** or set the focus on the master (left mouse click) and use the right mouse button at the DeviceNet master device or simply double-click on the DeviceNet master device.

The DeviceNet master settings contain parameters defining the behavior of the device as well as of its user interface which is not a part of the DeviceNet configuration directly. This menu is only valid for Hilscher devices, and is downloaded with the DeviceNet configuration.

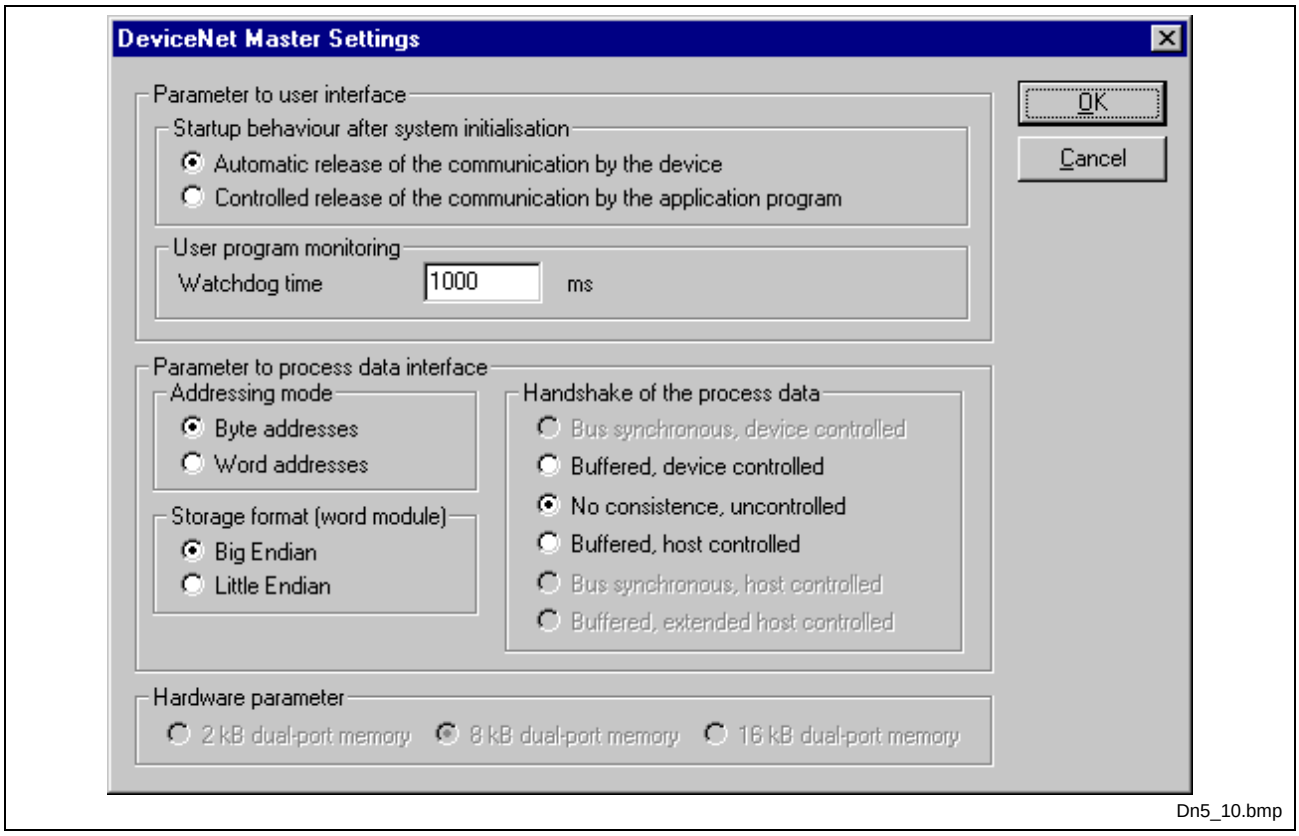


Fig. 7-5: DeviceNet master settings

- **Startup behavior after system initialization**

  If **Automatic release of the communication by the device** is selected, the master starts with the data transfer on the bus when initialization is finished. If **Controlled release of the communication by the application program** is selected, the user has to start the data transfer on the bus, by a defined release procedure.

- **User program monitoring**

  The watchdog time appointed defines, how long the device will wait for a user trigger of the software watchdog if started once, until it resets all outputs of the device to zero. This procedure must be activated by the user application and is not started automatically.

Note: This is no special DeviceNet function.

  This function is, for example, used by a soft PLC.

- **Addressing mode**

  The addressing mode of the process data defines, how to interpret the addresses of the process image. Possibilities are **Byte addresses** or **Word addresses**. See details on the next page.

- **Storage format (word module)**

  The storage format fixes the format, how the data words are placed and interpreted in the process images. For the data type word the **Little Endian** format and **Big Endian** format can be selected.

- **Handshake of the process data**

  With these different modes the handshake of the process data is selected for the master. The selection of this mode is important for the correct data exchange between the application and the device.

- **Hardware parameter**

  With this parameter you select the size of the Dual-Port Memory of the hardware. The parameter will enlarge or reduce the possible value ranges for the I/O offsets.

Auto Addressing

If this option is activated, the system configurator allocates the process data addresses in physical order itself. If this option is deactivated, the process data have to be manually addressed. Please, see also chapter Process Data Configuration on page 6-13.

Addressing Mode

The addresses in the configuration of the devices define the starting point of the data in the process depiction. This can work in a word- or byte-oriented method by means of the **Addressing mode** parameter.

Byte addresses The process depiction has a byte structure and each byte has its own address.

Word addresses The process depiction has a word structure and each word has its own address.

This has nothing to do with the physical size of the Dual-Port Memory – this is always byte-oriented! When the application makes a word access, it is automatically divided by the PC into two sequential byte accesses.

The following table shows the different storing of the various data types in the byte- or word-oriented process image:

IEC address in byte mode	**IEC address in word mode**	**Offset address in the Dual-Port Memory**		**Data in the process image** Output to an I/O module
QB 0	QB 0	0	**0000 0000**	
QB 1		1	**0000 0000**	
QB 2	QB 1	2	**1110 0010**	Output of QB2 / QB1 to a single byte module: D7 D6 D5 D4 D3 D2 D1 D0 **1 1 1 0 0 0 1 0**
QB 3		3	**0000 0000**	
QB 4 QB 5	QB 2	4 5	**1111 1000** **0000 0111**	Output of two bytes beginning from QB4 / QB2 to a module that is defined as a byte module with the data count 2 (no differentiation between the two memory formats as the data are of byte type): D7 D6 D5 D4 D3 D2 D1 D0 D7 D6 D5 D4 D3 D2 D1 D0 **1 1 1 1 1 0 0 0 0 0 0 0 0 1 1 1**
QW 6	QW 3	6 7	**1111 1111** **0100 0100**	Output of QW6 / QW3 in the data format lower/higher value byte: D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0 **0 1 0 0 0 1 0 0 0 1 1 1 1 1 1 1** Output of QW6 / QW3 in the data format higher/lower value byte: D15 D14 D13 D12 D11 D10 D9 D8 D7 D6 D5 D4 D3 D2 D1 D0 **1 1 1 1 1 1 1 1 0 1 0 0 0 1 0 0**

Fig. 7-6: Storing of the different data types

The following table is meant to clarify the method of addressing:

Byte addressing		
Byte 0	IB 0	IW 0
Byte 1	IB 1	
Byte 2	IB 2	IW 1
Byte 3	IB 3	
Byte 4	IB 4	IW 4
Byte 5	IB 5	

Word addressing		
Word 0	IB 0	IW 0
	-	
Word 1	IB 1	IW 1
	-	
Word 2	IB 2	IW 2
	-	

Fig. 7-7: Image of the method of addressing for input

Byte addressing		
Byte 0	QB 0	QW 0
Byte 1	QB 1	
Byte 2	QB 2	QW 2
Byte 3	QB 3	
Byte 4	QB 4	QW 4
Byte 5	QB 5	

Word addressing		
Word 0	QB 0	QW 0
	-	
Word 1	QB 1	QW 1
	-	
Word 2	QB 2	QW 2
	-	

Fig. 7-8: Image of the method of addressing for output

7.4 Device (Slave)

Device Configuration

A double-click on the device icon will open the **Device Configuration** window. The same happens, if you set the focus on the device (left mouse click) and enter the menu **Settings > Device Configuration**. Chapter Device Configuration on page 6-8 describes this configuration.

DeviceNet Settings (Slave Settings)

The DeviceNet slave settings contain parameters defining the behavior of the slave device on its user interface, which is not a part of the DeviceNet configuration. This menu is only valid for Hilscher devices, which can be directly downloaded with the DeviceNet configuration.

To enter the DeviceNet slave settings set the focus on the slave and open the window with the menu **Settings > Device Settings.**

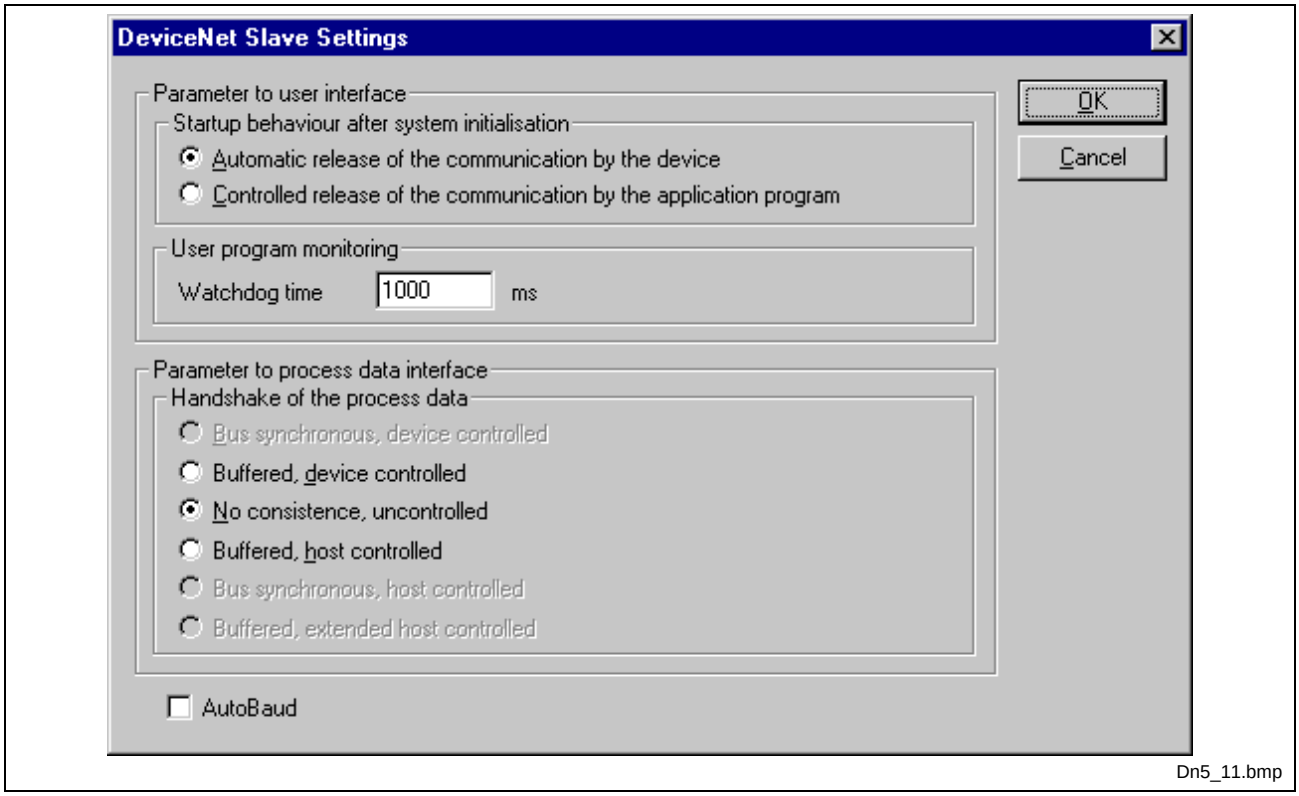


Fig. 7-9: DeviceNet slave settings

- **Startup behavior after system initialization**

  If **Automatic release of the communication by the device** is selected, the slave is ready to communicate with the master when started. If **Controlled release of the communication by the application program** is selected, the user has to release communication by a defined release procedure.

- **User program monitoring**

  This function is not supported by the DeviceNet slave.

Note: This is no special DeviceNet function.

This function is, for example, used by a soft PLC.

- **Handshake of the process data**

  With this different modes the handshake of the process data is selected for the slave. The selection of this mode is important for the correct data exchange between the application and the device. Please refer to the tool kit or the device driver manual for the detailed description of these modes.

- **Autobaud On**

  Activates or deactivates the automatic baudrate detection of the Hilscher DeviceNet slave.

7.5 Project Information

If the user creates his own project, the project information can be written into the **Settings > Project Information** menu. Anybody can then read this entry when this menu is called up.

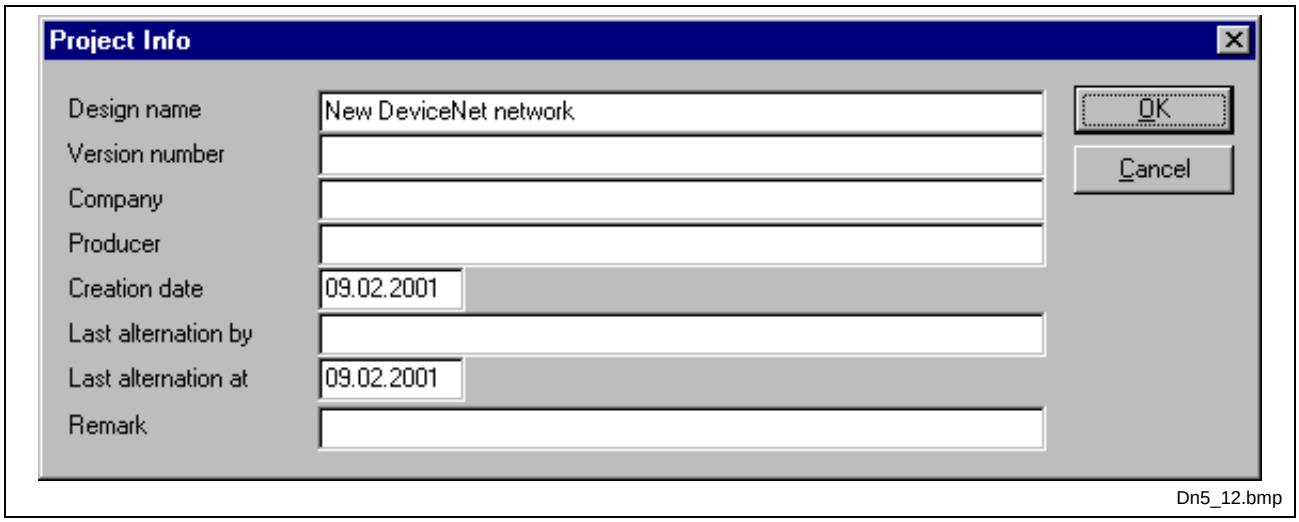


Fig. 7-10: Settings > Project information

7.6 Path

In the menu **Settings - Path** the path directory of the EDS files is shown (EDS File directory). The default value is C:\Programme\Hilscher\SyCon\Fieldbus\DEVNet\EDS

The path for project directory defines the path where the project specific files are stored.

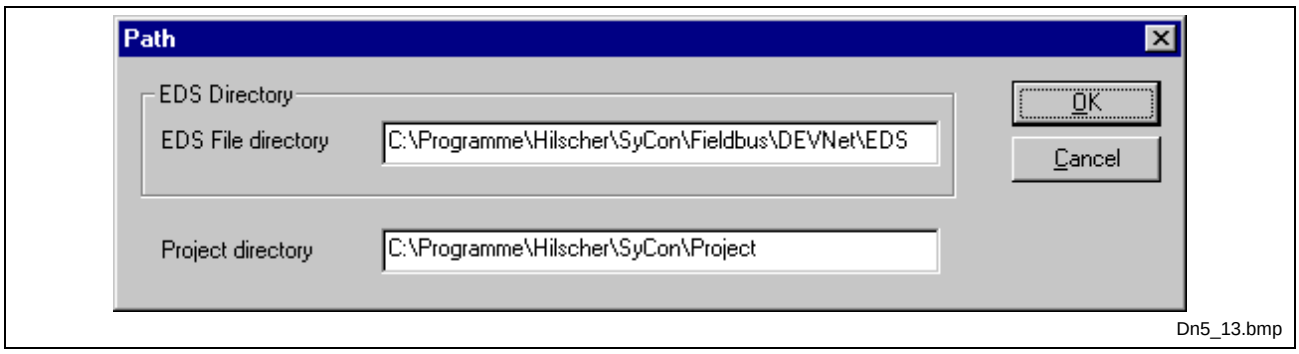


Fig. 7-11: Settings > Path

7.7 Language

Choose the **Settings > Language** menu and the following window opens:

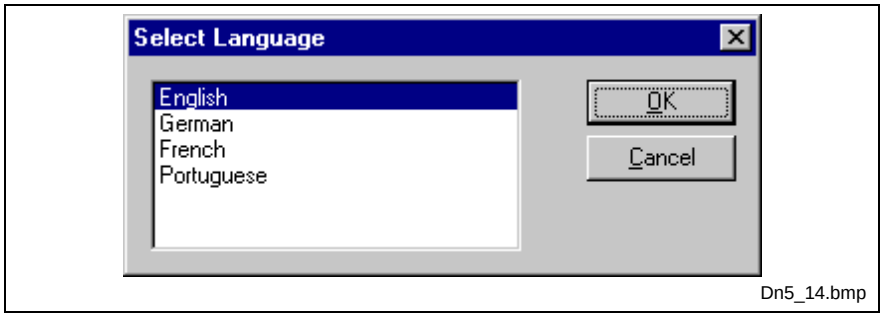


Fig. 7-12: Settings > Language

Here one is in a position of setting the language of the system configurator. Select the desired language and confirm the entry with the **OK** button.

A message appears that the system configurator must be started again in order to activate the selected language. Please carry this out.

After restarting the system configurator, the language will have changed to the one selected.

Note: Up to now, not all languages are available for all fieldbuses!

7.8 Start Options

After activating the **Settings > Start Options** menu point in the network mode (you can change to the network mode by choosing **Window > Logical Network View**), the dialog illustrated below will appear.

Here it is possible to set the various starting options or modes. Some are of importance only for the OPC-Server operation.

The important ones are given below.

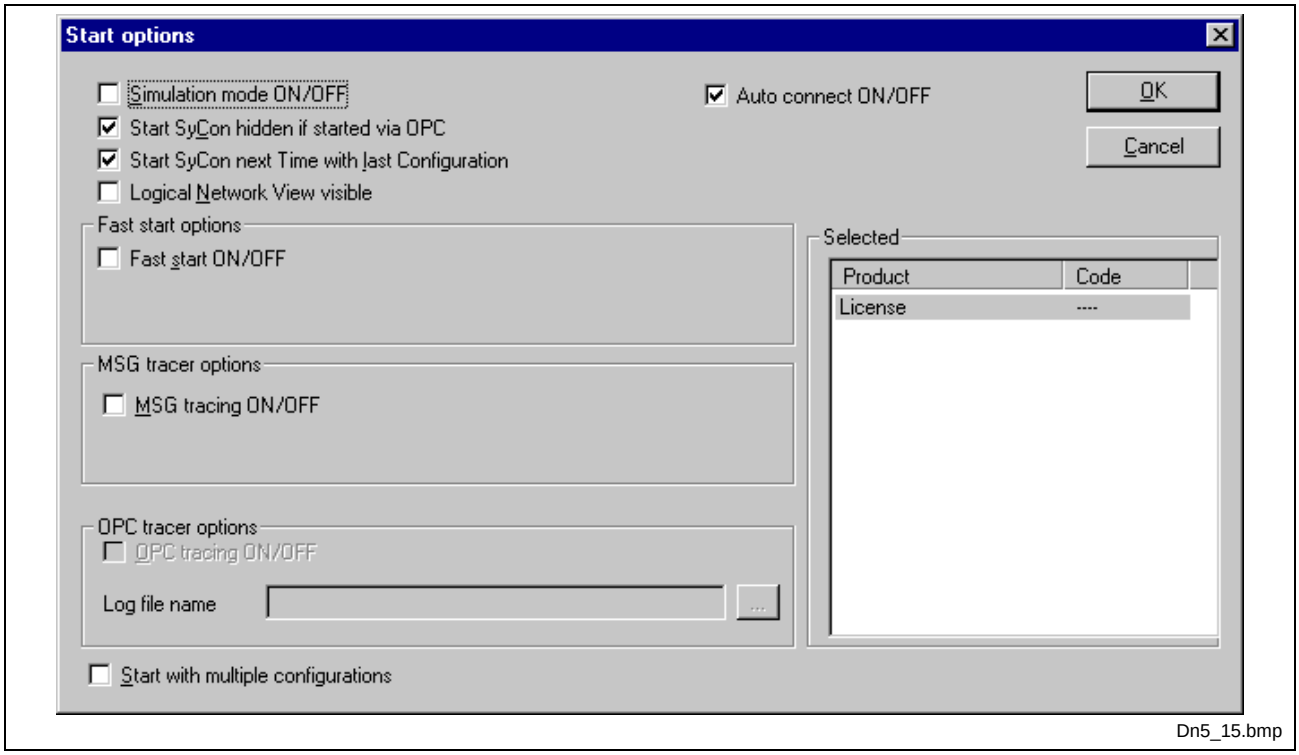


Fig. 7-13: Settings > Start options

- **Simulation mode ON/OFF**

  Only valid for the OPC Server.
- **Start SyConDN hidden if started via OPC**

  Only valid for the OPC Server.
- **Start SyConDN next time with last Configuration**

  When this item is selected the last saved configuration in the SyConDN is automatically loaded, when the SyConDN is started again.
- **Logic Network View visible**

  When this is selected possibility of diverting to the network mode without having to install the SyConDN with OPC. It is also possible to use the Watch List from the network mode.
- **Fast start ON/OFF**

  Only valid for the OPC Server.
- **TAG tracing ON/OFF**

  Only valid for the OPC Server.
- **OPC tracing ON/OFF**

  Only valid for the OPC Server.

8 Online Functions

In this section all the functions are described that directly affect the Hilscher DeviceNet device.

Please note that this will also permit interruption of a running communication or that outputs can be switched On or Off.

8.1 Online to the CIF

Downloading the Configuration

First, chose the desired device for downloading with a left mouse click on the symbol of the device.

In order to release the configuration and network access, a transfer (Download) to the master devices must be carried out on the **Online > Download** menu. A warning will appear, that the communication on the DeviceNet will be interrupted. This warning must be confirmed.

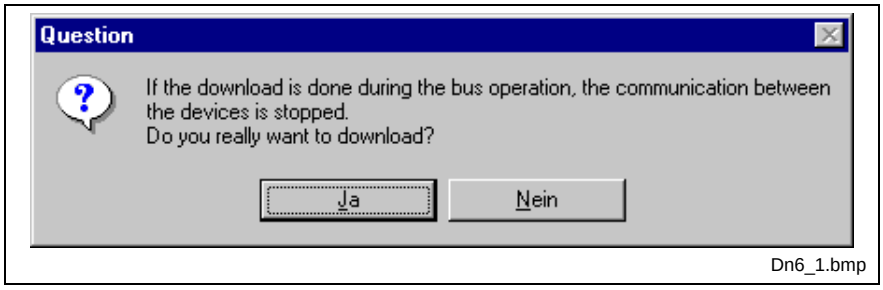


Fig. 8-1: Security prompt before downloading

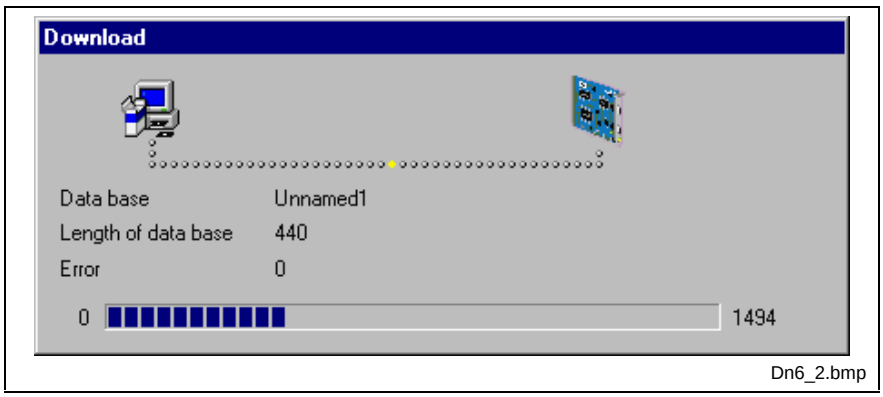


Fig. 8-2: Online > Download

Before the download is carried out, the configuration is tested by the configurator. The most common error cause is overlapping of addresses in the process data image. This can be checked by calling up the address table with the **View > Address Table** menu point.

If the issue of addresses in the process data image is carried out automatically, then the **Auto addressing** button in the **Master Configuration** window must be activated.

The configuration is transferred into the selected device and is stored there in FLASH memory in a zero voltage manner, so that the configuration is available, when the voltage supply is switched off and on again.

After the download, the device carries out an internal restart and begins with the communication, if in **DeviceNet Master Settings** the **Automatic Release of Communication by the Device** menu point has been set.

Firmware Download

If a firmware download is to be carried out, proceed as follows: first, chose the desired device for firmware downloading with a left mouse click on the symbol of the device. Then, call up the **Online > Firmware Download** menu. Select the new firmware and click then on the button **Download**. The firmware is now downloaded into the device.

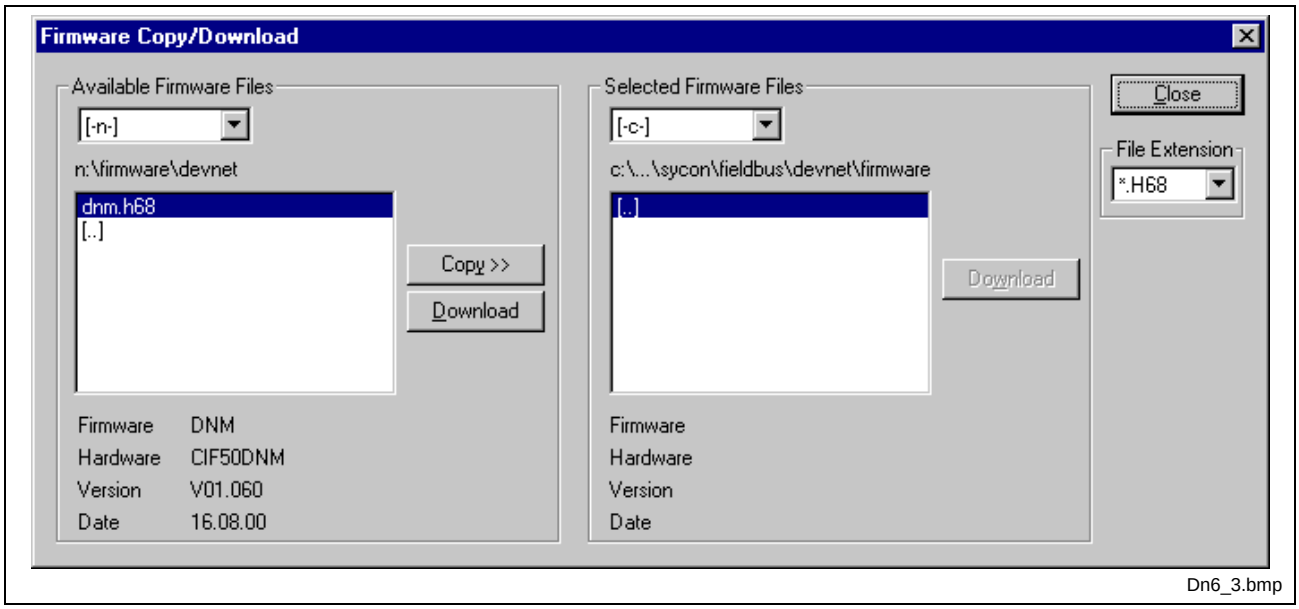


Fig. 8-3 Online > Firmware download

Firmware / Reset

First, chose the desired device with a left mouse click on the symbol of the device. Then, call up the **Online > Firmware / Reset** menu. Now, name and version of the firmware are displayed.

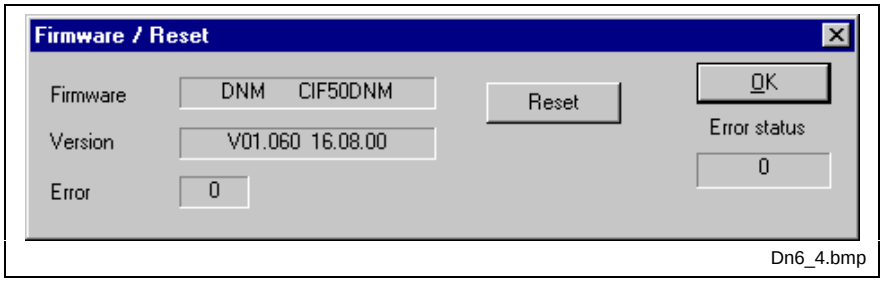


Fig. 8-4: Online > Firmware / Reset

Device Info

First, chose the desired device with a left mouse click on the symbol of the device. Then, select the **Online > Device Info** menu, in order to obtain further information on the selected device.

The manufacturer date, the device number and the serial number of the device is retrieved and shown.

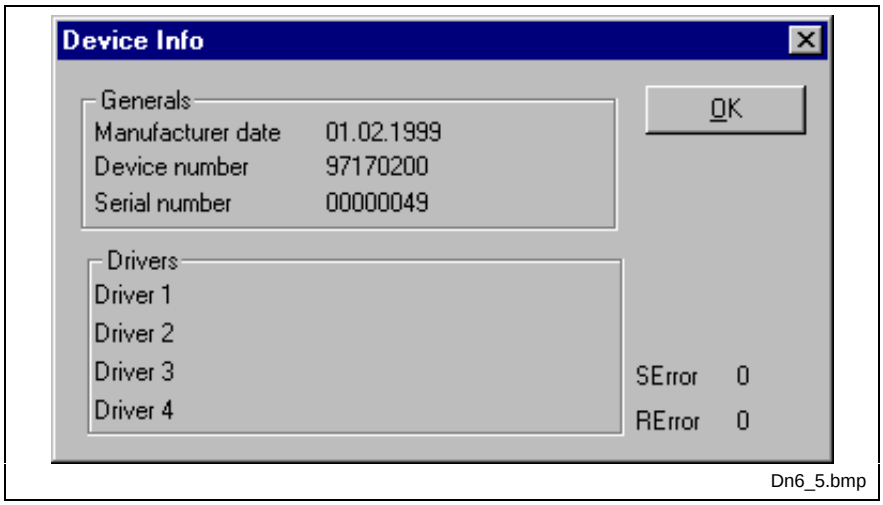


Fig. 8-5: Online > Device info

8.2 Start/Stop Communication

First, chose the desired device with a left mouse click on the symbol of the device. Then, select the menu item **Online > Start Communication** or **Online > Stop Communication** to start or stop the communication between a DeviceNet Master and DeviceNet Slave manually.

8.3 Diagnostic Functions

Live List

If you select the menu **Online > Live List**, you will get an overview of all devices physically present in the actual network constellation. Present devices are displayed in black, all other non-present devices are displayed in grey. The live list works online. If you connect or disconnect one station, you will see the result as soon as SyConDN collects the latest live list from the master board. Remember that all devices on DeviceNet have to proceed the autobaud detection phase first to get wholly run. This can take up to some milliseconds.

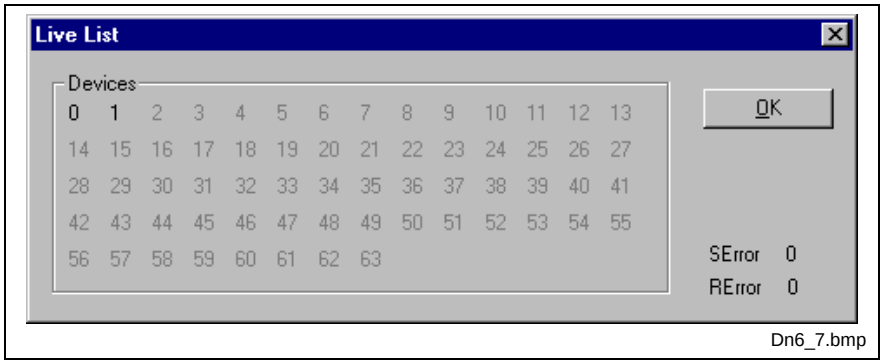


Fig. 8-6: Online > Live list

Debug Mode

First, chose the desired master device with a left mouse click on the symbol of the master. Then, click on menu item **Online > Start Debug Mode**. The system configurator cyclically interrogates the status of the network communication on the CIF, COM or PKV and the individual condition of the devices.

To end the Debug Mode select the menu **Online > Stop Debug Mode**.

The Debug Window

When started the debug session the configuration window changes into the debug window. The devices and the line between them are displayed in green or red color depending on the established network communication.

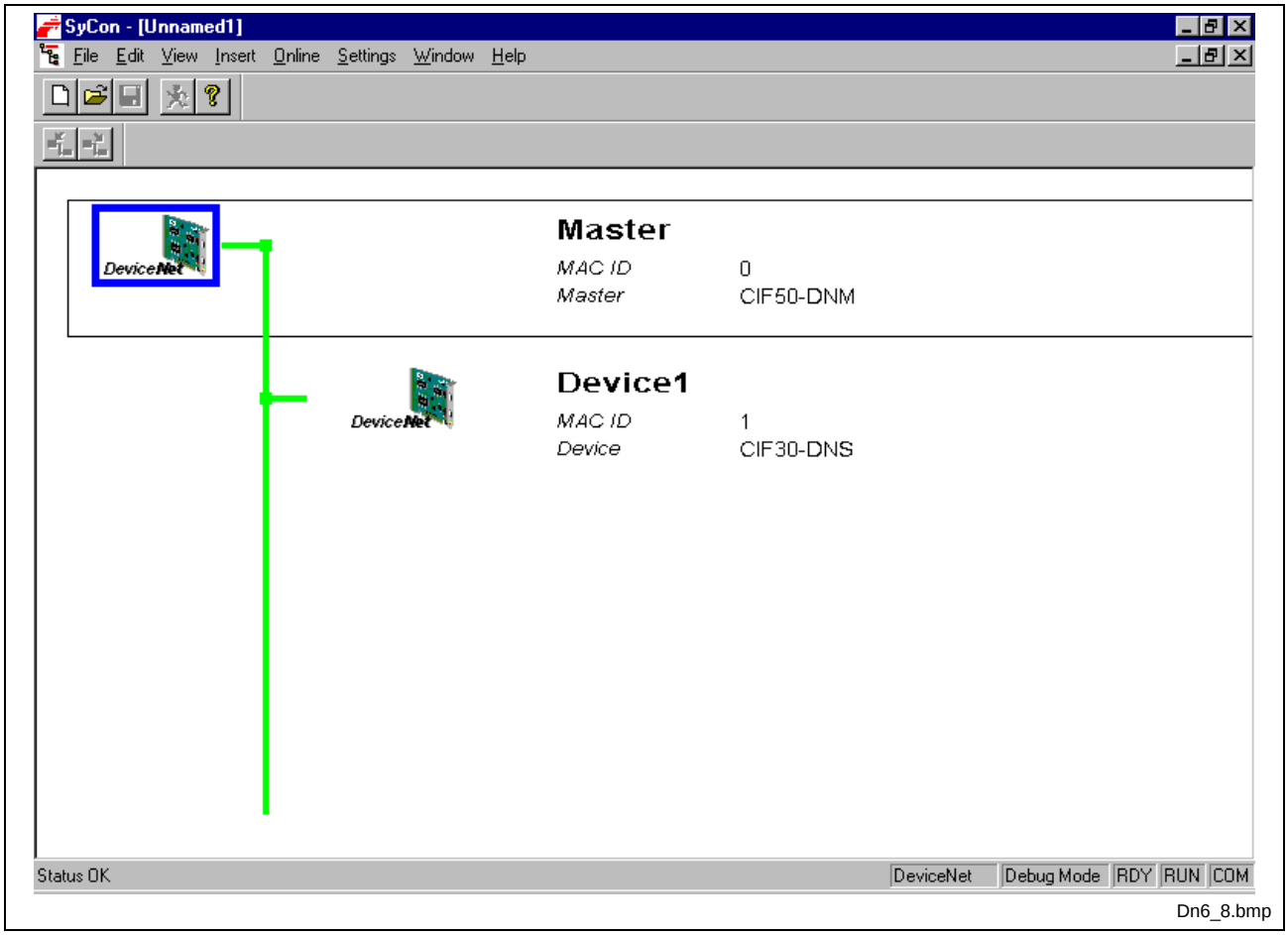


Fig. 8-7: Debug window

If a diagnostic information is available for a specific device, the text **Diag** next to the device icon appears in red. To get further device-pecific diagnostic information, double-click on the device itself or set the focus to the device and select **Online > Device Diagnostic**.

Device Diagnostic

After starting the debugger the SyConDN requests the status of all devices from the master. If there is an error on a device, the bus line to this slave is displayed in red color otherwise in green color. SyConDN also displays the letters **Diag**, if the device signals a diagnostic information. You will receive further diagnostic information, if you double-click on this device in debug mode.

To activate the debug mode, select the menu **Online > Start Debug Mode**. The menu **Online > Device Diagnostic** activates the DeviceNet device diagnostic. To end the Debug Mode, select the menu **Online > Stop Debug Mode**.

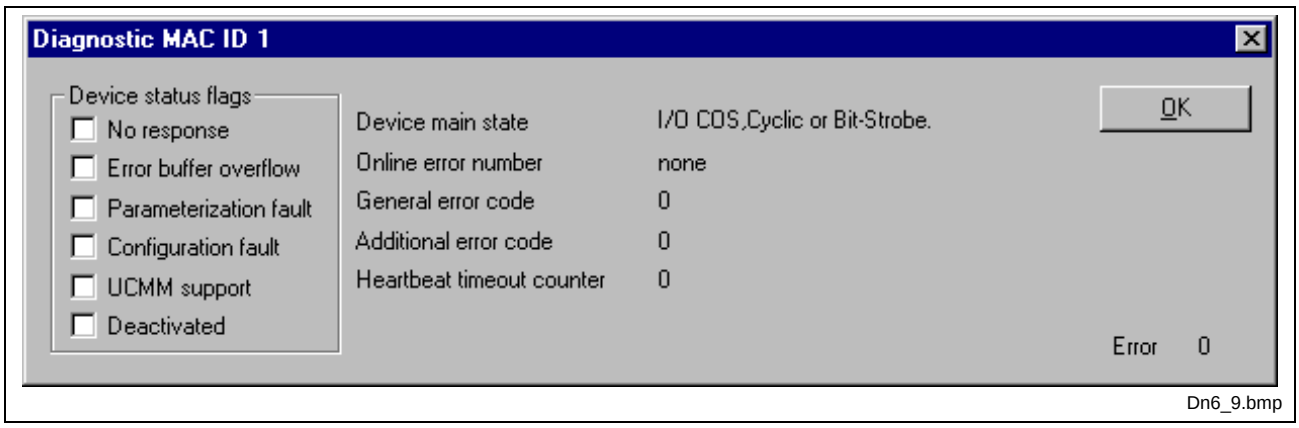


Fig. 8-8: Online > Device diagnostic

The **Device Diagnostic** and its meaning:

- **No response**

  The device is configured, but is not present in the network. Please check the physical connection between the master and this device. Check also the chosen baudrate, and if this baudrate is supported by this device.

- **Error buffer overflow**

  DeviceNet defines a special reserved error channel for each slave with high priority to allow each device to report emergency messages triggered by the occurrence of a device internal fatal error situation. The emergency messages of each device are collected in an internal buffer of limited size. In this case, the buffer overflow event is reported.

- **Parameterization fault**

  The master compares the configured **Device Profile** and the corresponding **Device Type** value of the **Device Configuration** window with the real physically present ones in the slave by retrieving one slave configuration object from the device. If the master detects differences between the values, it will report the parameterization fault.

- **Configuration fault**

  A configuration fault will occur, if a difference is seen between the configured produced/consumed data size and the actual slave produced/consumed data size.

- **UCMM support**

  The box will be checked, if the slave device requires UCMM support.

- **Deactivated**

  This bit is set by the master automatically, if the device state was configured to **Deactivate Device in actual configuration** in the **Device Configuration** window.

Global State Field

First, select the master device by clicking on the corresponding icon with the left mouse button. Select the menu **Online > Global State Field** to see details about the global state field. A window opens, in which status messages about the bus state and the connected devices are displayed.

The first row shows the online master main state e.g. **OPERATE, STOP**.

The next row shows single bus errors. A detected error is displayed in a red field. The meaning of the short cuts is listed below:

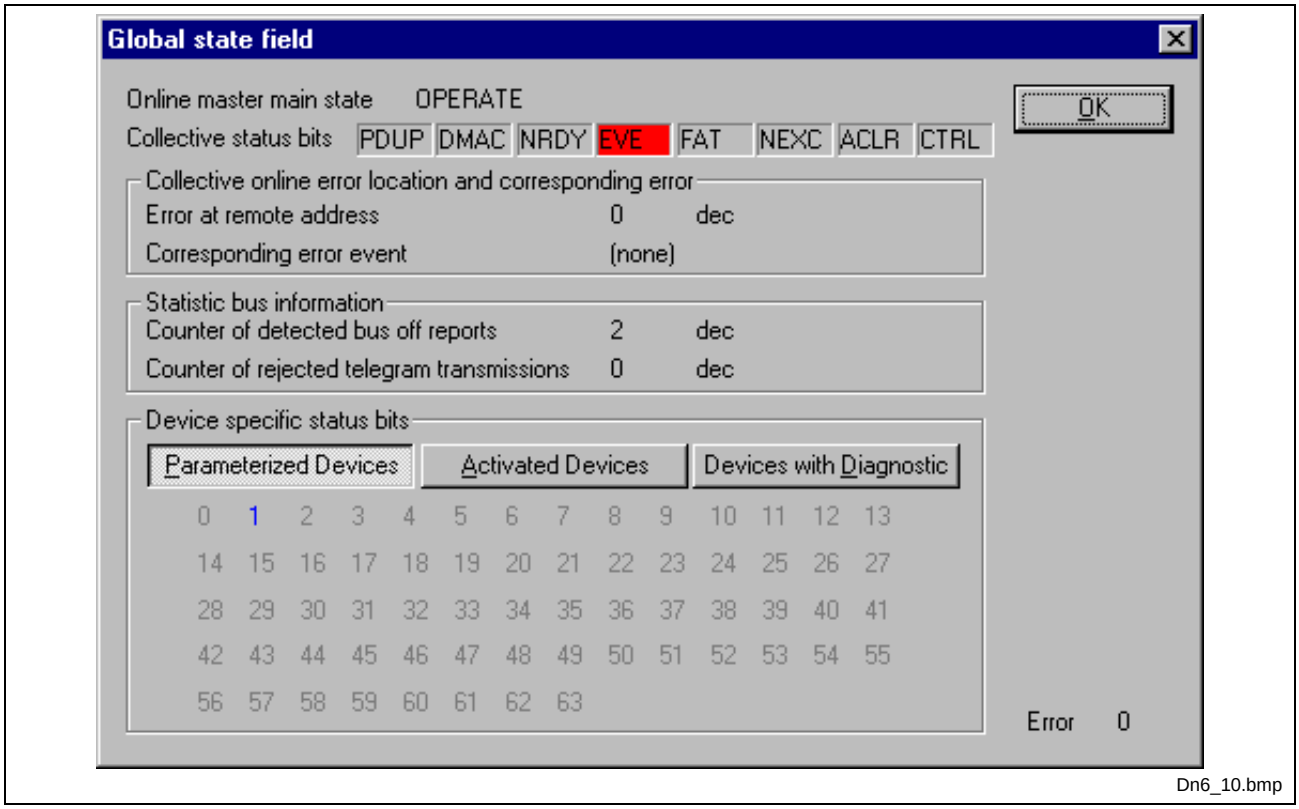


Fig. 8-9: Online > Global state field

Collective status bits

PDUP: DUPLICATE-MAC-ID check
The device is involved in the duplicate MAC-ID check procedure, to check if other devices with the same address are connected to the network. The duplicate MAC-ID check will be finished, if at least one DeviceNet device could have been found connected to the network.

DMAC: Duplicate MAC-ID detected
The DEVICE has stopped the duplicate MAC-ID check procedure and found an other device having the same MAC-ID address. Change the DEVICE address to avoid this failure.

NRDY: HOST-NOT-READY-NOTIFICATION
indicates, if the host program has set its state to operative or not. If this bit is set, the host program is not ready to communicate.

EVE: EVENT-ERROR
The used CAN chip has detected transmission errors. The number of detected events is counted in the Bus Off Reports and the Error Warning Limit Counter. The bit will be set, when the first event was detected and will not be deleted any more.

FAT: FATAL-ERROR
Because of several bus errors, no further bus communication is possible.

NEXC: NON-EXCHANGE-ERROR
At least one device has not reached the data exchange state and no process data is exchanged with it.

ACLR: AUTO-CLEAR-ERROR
The device stopped the communication to all other devices and has reached the auto-clear end state.

CTRL: CONTROL-ERROR
Master parameterization error detected.

Further information:

Collective online error location and corresponding error

Statistical bus information

Device specific status bits: **Parameterized Devices, Activated Devices** and **Devices with Diagnostic** are shown, if you click on this button. The activated addresses are displayed in another color.

If you have chosen **Devices with diagnostic**, some devices are displayed in another color. If you click on the device addresses of this devices, you can see the device diagnostic of this special device.

All information is cyclically updated.

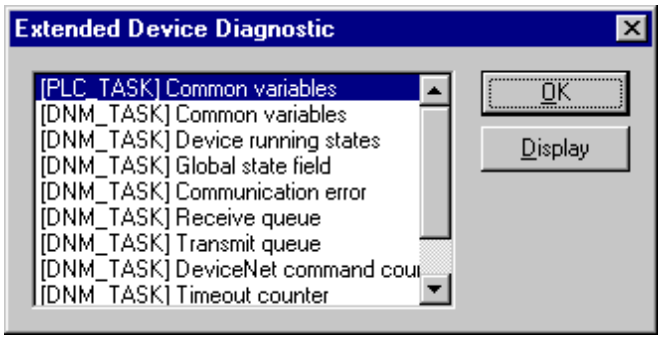
Extended Device Diagnostic

Master

The extended device diagnostic assists in finding bus and configuration errors when the SyConDN menu functions are of no further help.

First, chose the desired device with a left mouse click on the symbol of the device. Then, select the **Online > Extended Device Diagnostic** menu.

This menu opens a list of diagnostic structures. These contain parameters and counters which can be retrieved now:



Dn6_11.bmp

Fig. 8-10: Extended device diagnostic

The task states available for the Hilscher DeviceNet master are:

[PLC_TASK] Common variables

[DNM_TASK] Common variables

[DNM_TASK] Device running states

[DNM_TASK] Global state field

[DNM_TASK] Communication error

[DNM_TASK] Receive queue

[DNM_TASK] Transmit queue

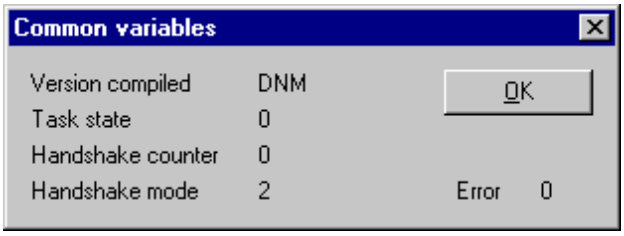
[DNM_TASK] DeviceNet command counters

[DNM_TASK] Timeout counter

[DNM_TASK] Init counter

They are explained on the following pages:

PLC_TASK Common variables



Dn6_12.bmp

Fig. 8-11: PLC_TASK Common variables

Variable	Meaning
Version compiled	Hardware
Task state	Task state
Handshake counter	Counter for the performed process data handshakes
Handshake mode	This value represents the actual handshake mode between application and CIF. 0 = Bus synchronous, Device controlled 1 = Buffered, Device controlled 2 = No consistence, Uncontrolled 3 = Buffered, Host controlled 4 = Bus synchronous, Host controlled 5 = Buffered, Extended host controlled

DNM_TASK Common variables

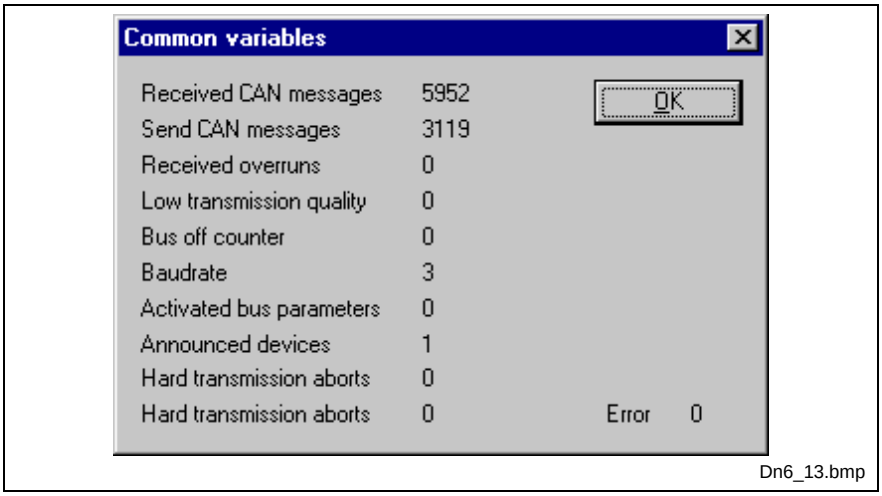
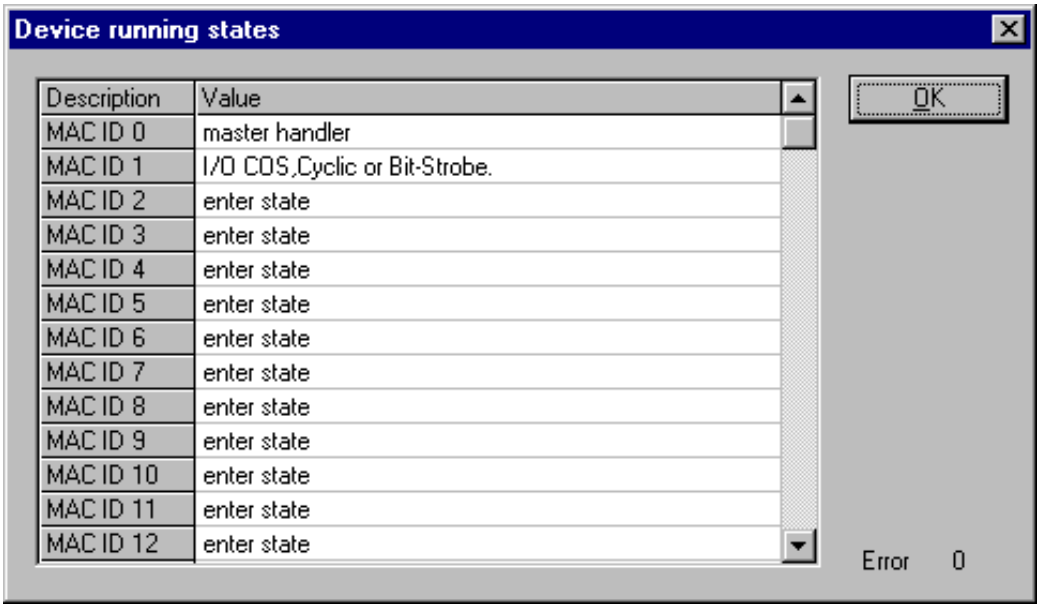


Fig. 8-12: DNM_TASK Common variables

Variable	Meaning
Received messages	Number of received CAN-messages
Sent messages	Number of sent CAN-messages
Receive overruns	This counter is incrementing, when to many incoming CAN messages overload the master. An incremented counter will always cause lost CAN message data, so it should normally contain the value 0.
Received overruns	Our Hilscher DeviceNet controller has two internal error frame counters for detection.
Low transmission quality	If the internal DeviceNet controller error frame counter oversteps a defined limit.
Bus off counter	This number will increment, when the bus is off or not powered during bus cycles.
Baudrate	This numeric value shows the actual baudrate the master is working with (1 = 500kBaud, 2 = 250Kbaud, 3 = 125kBaud).
Activated bus parameters	Value 0, the master has found a configuration data base coming from SyConDN, value 1, the master device isn't configured and need to be configured via SyConDN.
Announced devices	This value represents the number of found device data sets in the download database.
Wrong parameters	This value indicates, if the master has detected errors in a device data set, which was a containment of the actual downloaded database. For each slave device having a wrong entry the counter is incremented by 1.
Hard transmission aborts	This value indicates transmission aborts by the master.

Device running states



Dn6_14.bmp

Fig. 8-13: Device running states

To handle the slave devices in their different states, the master device has a slave device handler running, where each slave device has its own actual running state. SyConDN interprets the actual state of each slave and enters these states on the screen in textual form.

Communication error

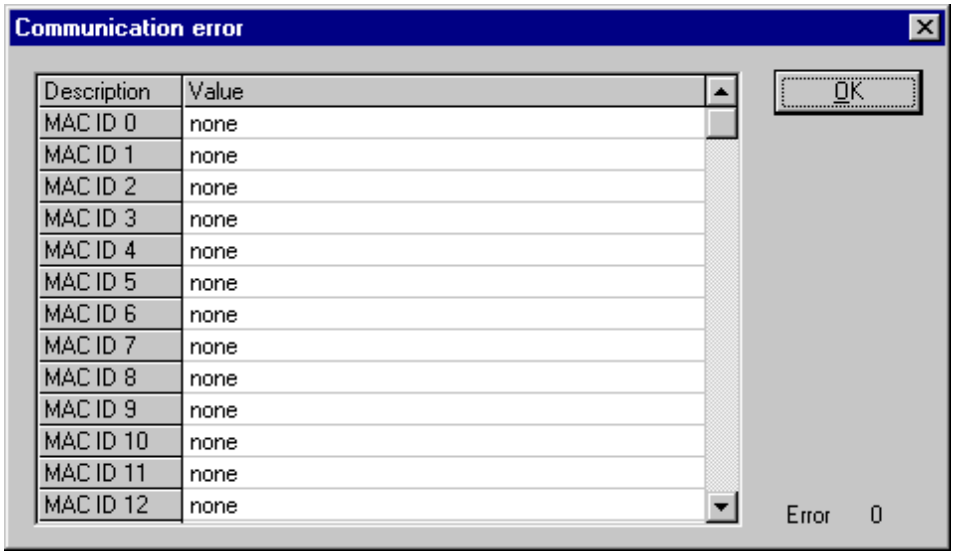


Fig. 8-14: Communication error

For each slave device the master has an internal online error buffer. SyConDN interprets the actual error state and prints it on the screen in textual form.

Receive queue

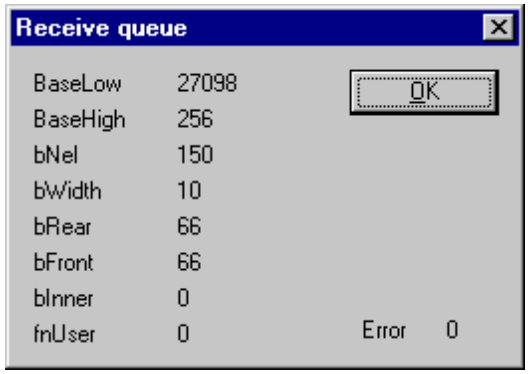


Fig. 8-15: Receive queue

The Receive Queue is used to monitor the Receive Transmission Queue of the internal CAN controller.

Variable	Meaning
bRear	A pointer to where the next message will be dequeued from the queue body.
bFront	A pointer to where the next message will be stored.
bInner	The actual number of stored messages.

Transmit queue

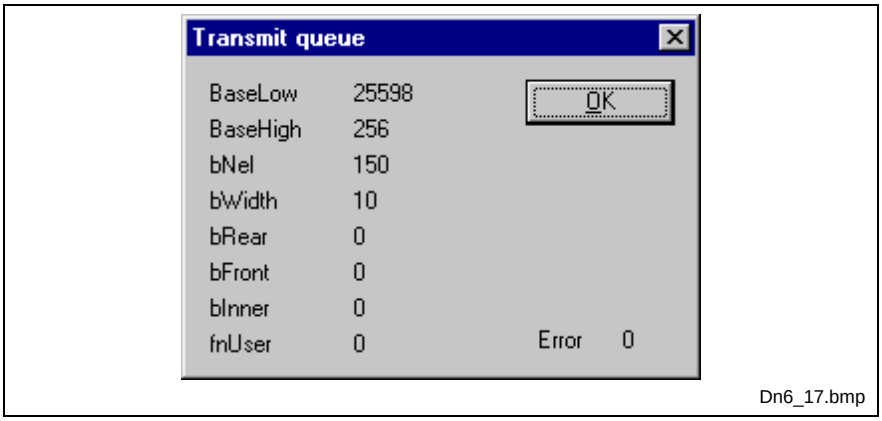


Fig. 8-16: Transmit queue

The Transmit Queue is used to monitor the Transmit Transmission Queue of the internal CAN controller.

Variable	Meaning
bRear	A pointer to where the next message will be dequeued from the queue body.
bFront	A pointer to where the next message will be stored.
bInner	The actual number of stored messages.

DeviceNet command counters

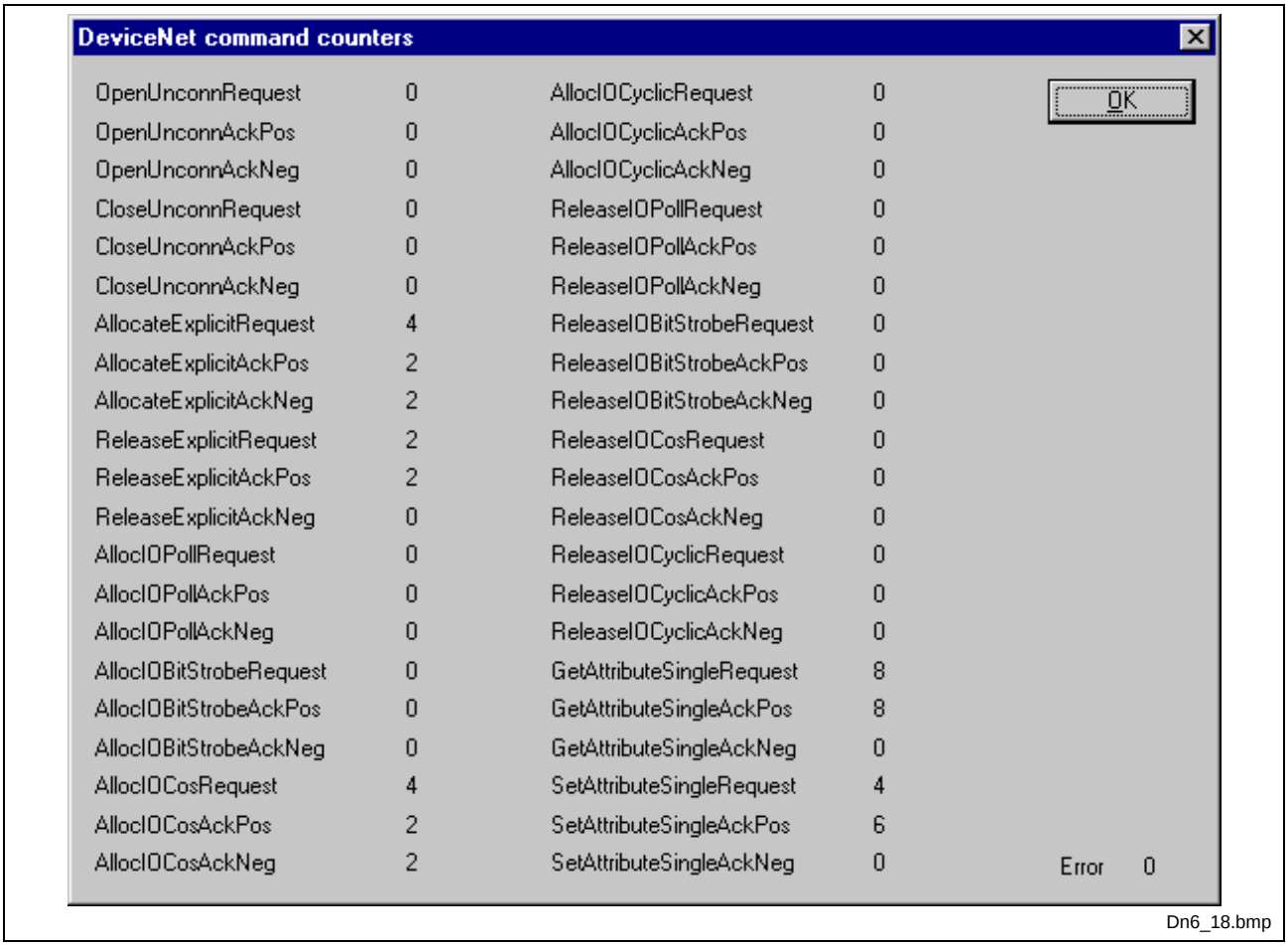


Fig. 8-17: DeviceNet command counters

The DeviceNet Command Counters dialog box shows a listing of the DeviceNet-specific commands used by the controller and there associated usage count.

Timeout counter

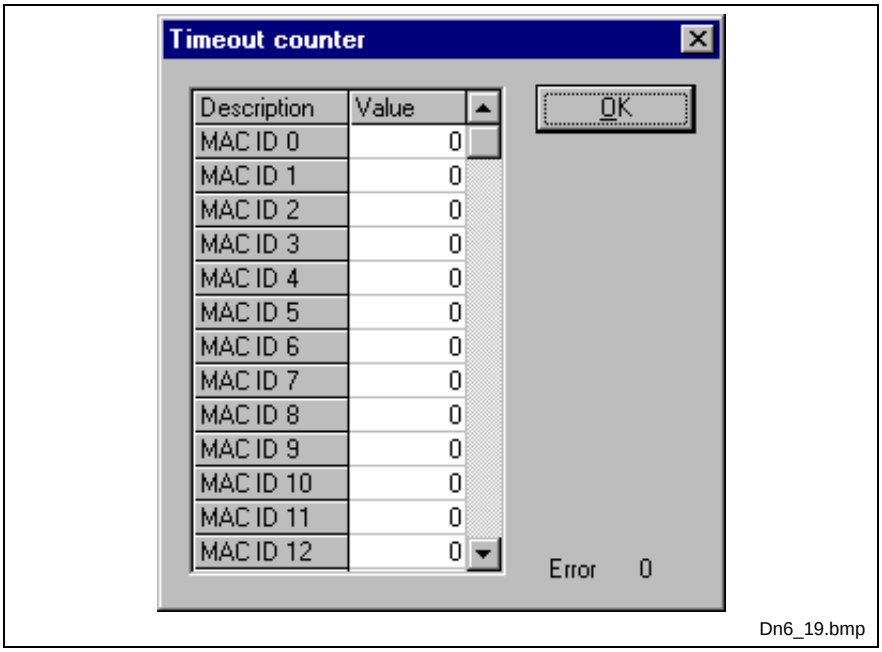


Fig. 8-18: Timeout counter

The Timeout Counter shows the number of timeouts for each slave device configured in the DeviceNet bus system.

Init counter

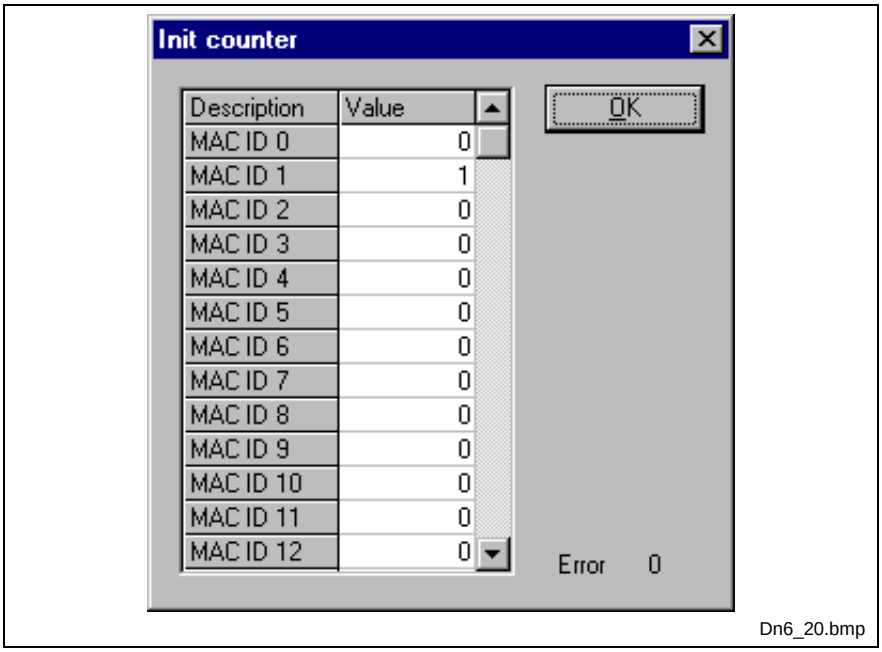


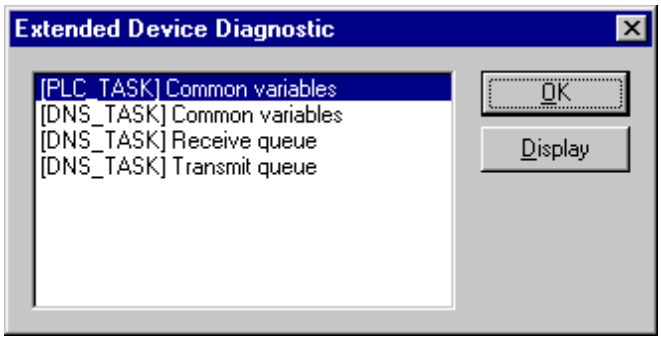
Fig. 8-19: Init counter

The Device Init Counter is always incremented, when the slave device is initialized. Normally, the counter must show value 1 for each configured slave, but if a slave is detected as inactive during the diagnostic procedure, the master tries to reinitialize the slave again. If this happens, the slave init counter is incremented by a value of 1. So, values larger then 1 are an indication for communication errors to the corresponding slave.

Device (Slave)

The extended device diagnostic helps to find possible bus and configuration faults, if SyConDN does not offer further support.

To activate the extended device diagnostic for Hilscher DeviceNet Slaves, click with the right mouse button to the Slave and select the menu **Select as actual slave**. Then, select the menu **Online >Extended Device Diagnostic** (left mouse click). This menu item activates a list of available diagnostic structures which contain parameters and counters to be retrieved now.



Dn6_21.bmp

Fig. 8-20: Extended device diagnostic for Hilscher DeviceNet slave

The task states that are available for the DeviceNet master are:

- PLC_TASK] Common variables
- [DNS_TASK] Common variables
- [DNS_TASK] Receive queue
- [DNS_TASK] Transmit queue

They are explained on the following pages:

PLC_Task Common variables

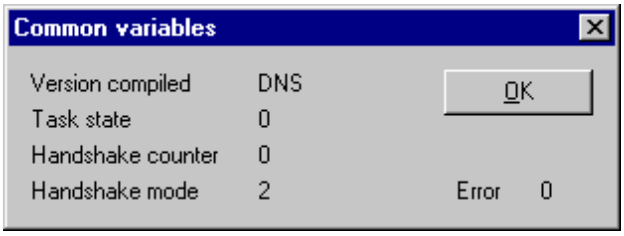


Fig. 8-21: PLC_Task Common variables

Variable	Meaning
Version compiled	Hardware
Task state	Task state
Handshake counter	Counter for the performed process data handshakes
Handshake mode	This value represents the actual handshake mode between application and CIF. 0 = Bus synchronous, Device controlled 1 = Buffered, Device controlled 2 = No consistence, Uncontrolled 3 = Buffered, Host controlled 4 = Bus synchronous, Host controlled 5 = Buffered, Extended host controlled

DNS_Task Common variables

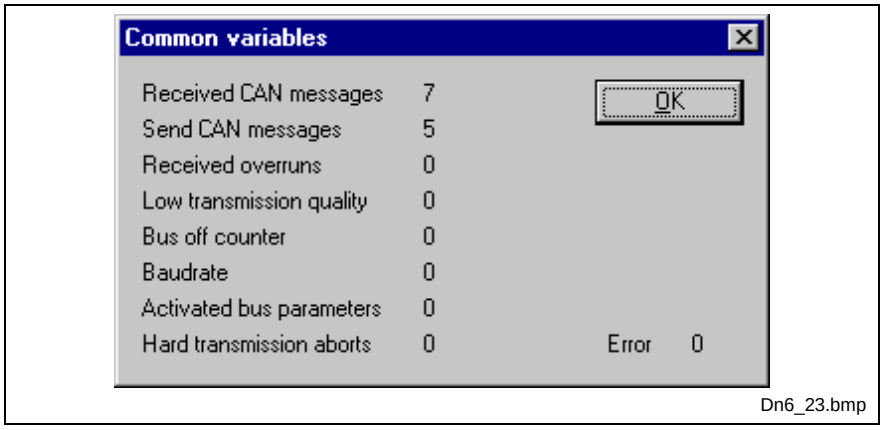


Fig. 8-22: DNS_Task Common variables

Variable	Meaning
Received messages	Number of received CAN-messages.
Sent messages	Number of sent CAN-messages.
Received overruns	Our DeviceNet controller has two internal error frame counters for detection.
Low transmission quality	If the internal DeviceNet Slave error frame counter oversteps a defined limit.
Bus off counter	This number will increment, when the bus is off or not powered during bus cycles.
Baudrate	This numeric value shows the actual baudrate the master is working with (255 = Auto, 0 = 500kBaud, 1 = 250Kbaud, 2 = 125kBaud).
Activated bus parameters	Value 0, the master has found a configuration data base coming from SyConDN, value 1, the master device isn't configured and needs to be configured via SyConDN.
Hard transmission aborts	This value indicates transmission aborts by the slave.

Receive queue

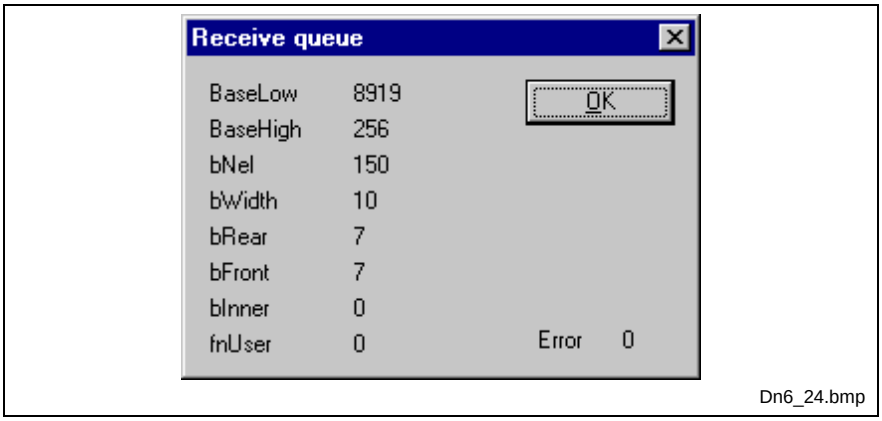


Fig. 8-23: Receive queue

The Receive Queue is used to monitor the Receive Transmission Queue of the internal CAN controller.

Variable	Meaning
BaseLow	Undocumented.
BaseHigh	Undocumented.
bNel	Undocumented.
bWidth	Undocumented.
bRear	A pointer to where the next message will be dequeued from the queue body.
bFront	A pointer to where the next message will be stored.
bInner	The actual number of stored messages.
fnUser	Undocumented.

Transmit queue

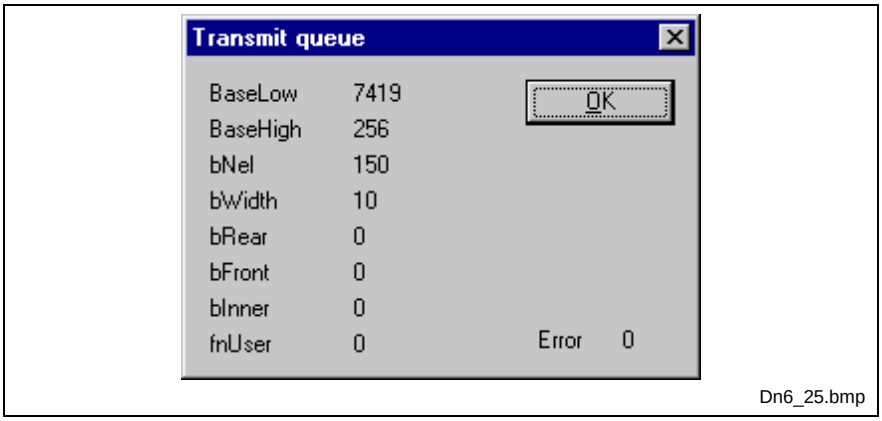


Fig. 8-24: Transmit queue

The Transmit Queue is used to monitor the Transmit Transmission Queue of the internal CAN controller.

Variable	Meaning
BaseLow	Undocumented.
BaseHigh	Undocumented.
bNel	Undocumented.
bWidth	Undocumented.
bRear	A pointer to where the next message will be dequeued from the queue body.
bFront	A pointer to where the next message will be stored.
bInner	The actual number of stored messages.
fnUser	Undocumented.

8.4 User Data

I/O Monitor

This is an easy way of viewing and changing the first 32 bytes of the process data image.

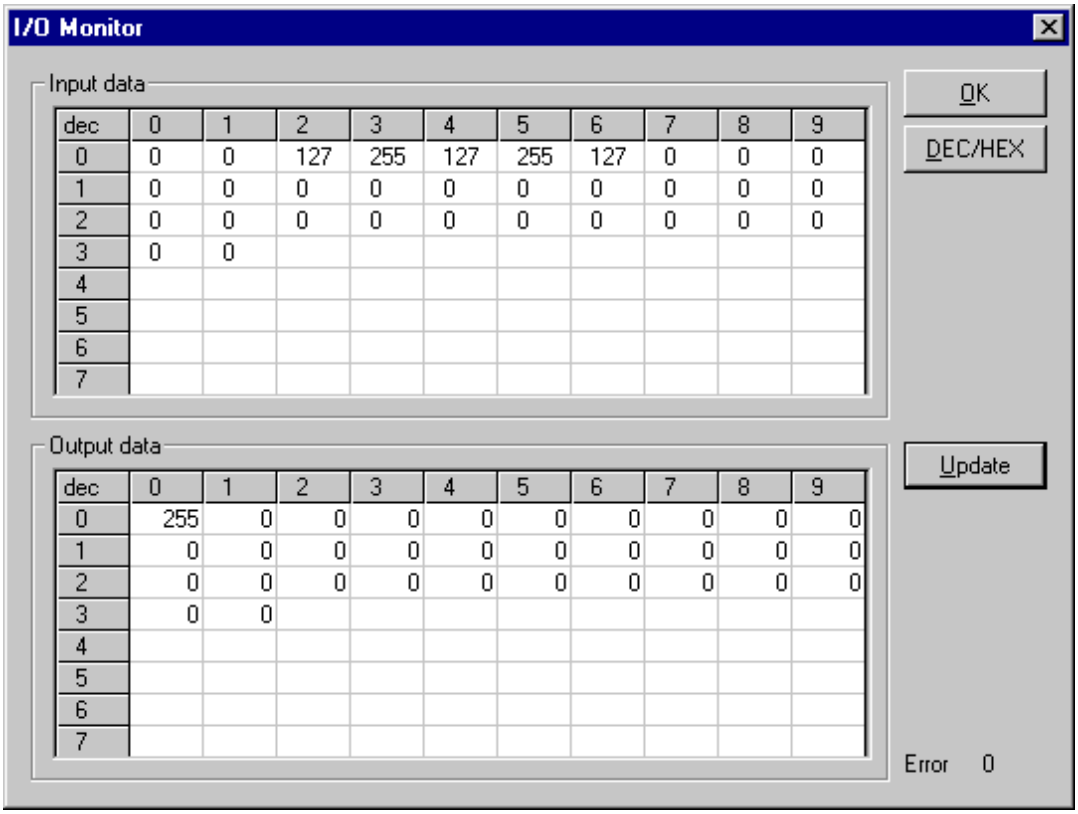


Fig. 8-25: Online > I/O monitor

DEC/HEX converts the display of the input data. The output data are always in decimal form.

Enter the output value and then press **Update**.

Always the first 32 input and output bytes of the process description are shown, also when these bytes have not been occupied by the configuration.

The display is always in a byte manner.

The I/O Watch Monitor described in the next section allows a more comfortable display.

I/O Watch

The I/O Watch monitor can be used in place of the I/O Monitor and offers further features:

- Various data formats: Hex, Unsigned Decimal, Signed Decimal, Bit Pattern
- The I/O Watch monitor works symbol-oriented.
- It is not necessary to know the offset addresses.

The following table lists the typical steps to use the I/O Watch monitor.

Preconditions:

- The project/configuration already exists, containing a DeviceNet Master and the DeviceNet devices, as described in chapter Configuration Sequence starting on page 5-1,
- The Configuration has been downloaded into the DeviceNet Master using **Online > Download**,
- The bus system is running.

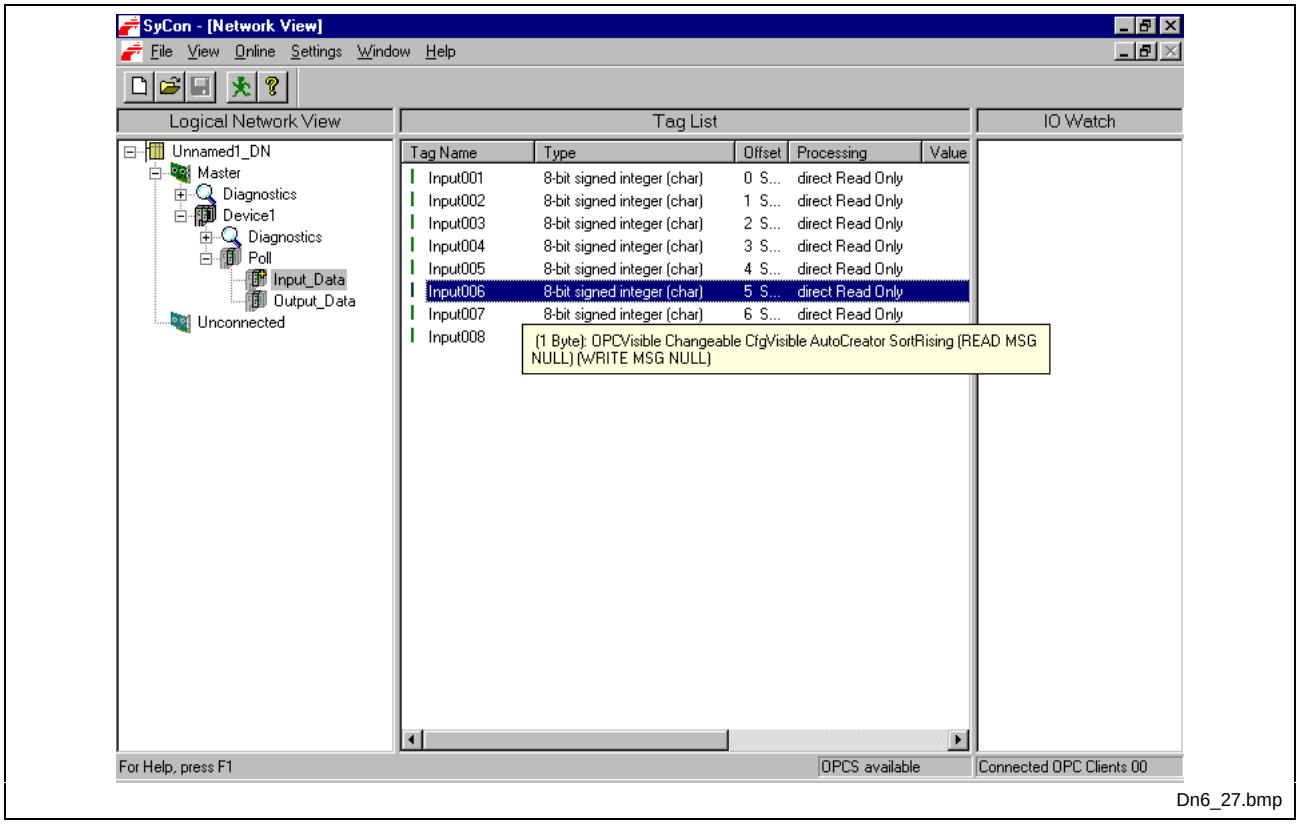
Proceed as follows:

1. Open the existing project using **File > Open**.
2. Open the Windows dropdown menu and select **Window > Logical Network View** to change the window. A window with three sections opens:

Left window	Center window	Right window
Project Tree structure	Tag / Symbol	IO Watch

3. Open the tree structure in the left window to reach the I/O module of the desired device:

   Project > Master > Device > Connection Type > Data Type



Dn6_27.bmp

Fig. 8-26: Logical network view and I/O watch

4. If you select the desired module, the tags/symbols will be displayed in the center window of the **Logical Network View**.
5. Select with the left mouse button the tag/symbol desired and drag and drop it in the right window of the Logical Network View (IO Watch).
6. Select in the right window the desired tag by clicking on the left mouse button and open then a menu with the right mouse button. Then, select **Start** from the context menu. A new window called I/O Watch appears.
7. A table shows the Device, Symbolic Name, IEC Address (Offset), Data Type, Representation and Value. Select the line with the desired information. Click on **Hex** under Representation and select the way the values are to be displayed. Choices are Hex, Decimal Unsigned, Decimal Signed, Bit Pattern.
8. Input data are displayed and can't be changed. Output data can be entered into the value column.

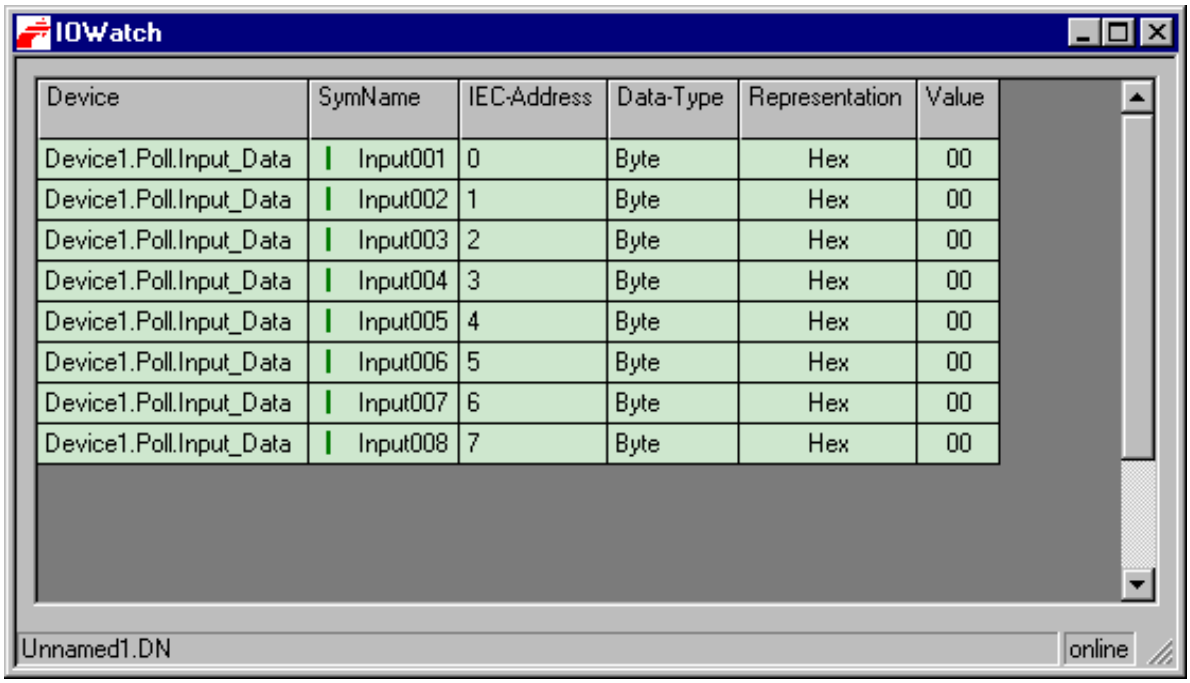


Fig. 8-27: I/O watch

To close this windows use Alt-F4 or click the icon in the upper left corner of the window select Exit.

8.5 DeviceNet Services

Get Device Attribute

This menu selection enables the user to get/receive attribute-related information from a slave device. The user should be familiar with the supported Class, Instance, and Attribute entries for the slave device. These entries should be available within the suppliers data sheet for the slave product. The return value will be represented in Hexadecimal. Clicking the **ASCII** button will change this value to ASCII text. The Hexadecimal code can be resorted by clicking now the **Hex** button. Clicking the **Get** button will receive the **Value** from the device.

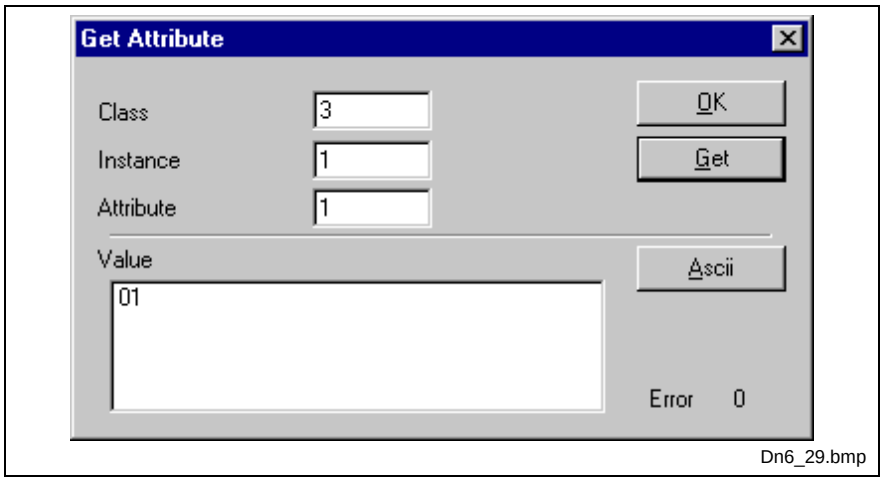


Fig. 8-28: Get device attribute

Set Device Attribute

This menu selection enables the user to set attribute-related information to a slave device. The user should be familiar with the supported Class, Instance, and Attribute entries for the slave device. These entries should be available within the suppliers data sheet for the slave product. The **Value** will be represented in Hexadecimal. Clicking the **Set** button will send the information to the slave device.

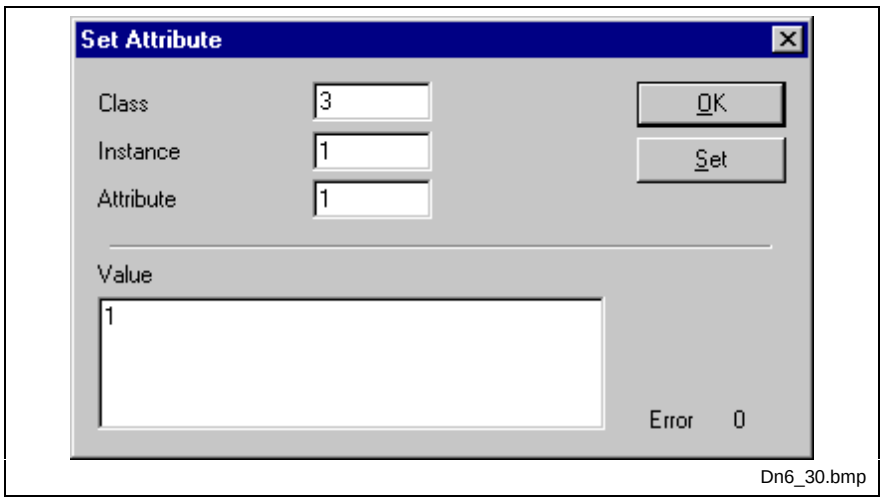


Fig. 8-29: Set device attribute

8.6 Message Monitor

The Message Monitor permits access to the mailbox of the CIF. The usage of the Message Monitor assumes advanced knowledge from the user about the DeviceNet protocol.

First, chose the Hilscher device with a left mouse click on the symbol of the Hilscher device. Then, call up the **Online > Message Monitor** menu.

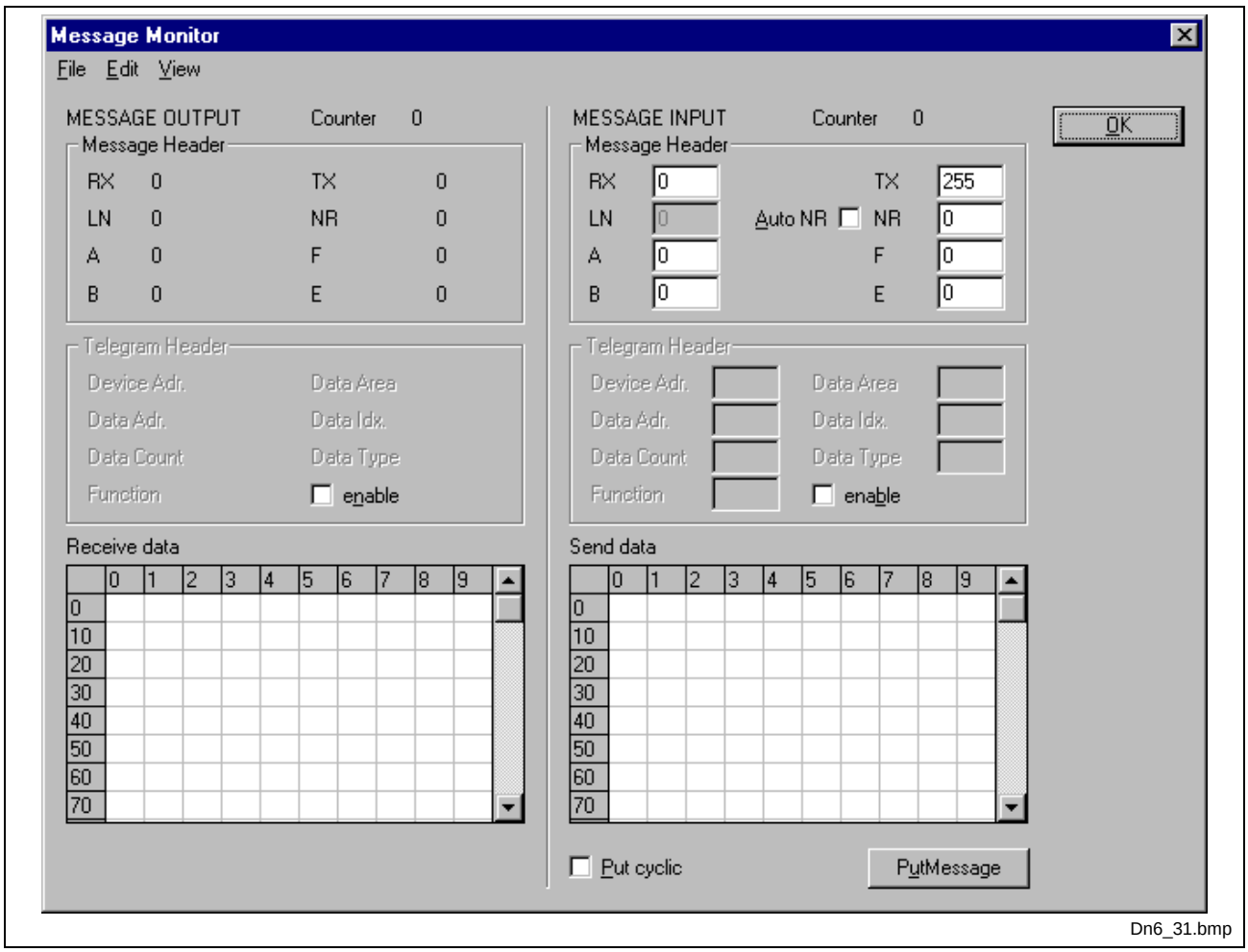


Fig. 8-30: Online > Message monitor

A message can be saved and retrieved and has the file suffix *.MSG.

File > New opens a new window.

File > Open opens an already saved message.

File > Save or **File > Save as** saves a message.

File > Exit ends the Message Monitor and returns to the SyConDN.

Edit > Create answer creates an answer message.

Edit > Reset counter resets all inputs.

View > Review the received data: all received data is shown.

View > Review the send data: all send data is shown.

View > Number of receipt errors: the number of the receipt errors are shown.

View > Decimal/Hexadecimal: switches the display format.

It is recommended to create a sub-directory MSG and to store the messages there.

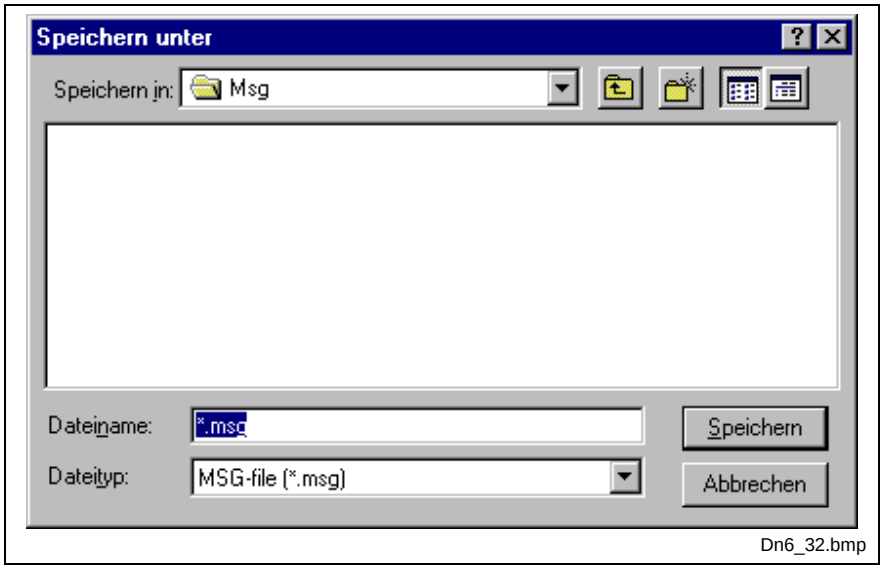


Fig. 8-31: Save as

Message Monitor for Testing the Explicit Messaging of DeviceNet

The following section describes the Message Monitor for getting data from and setting data to the master via DeviceNet.

The following must be entered in the Message Monitor, in order to get data form or set data to a device via DeviceNet:

Message header		
Rx = 3 (always)	Tx = 255	
Ln = (is calculated)	Nr = 0 .. 255	
A = 0	F = 0	
B = 17	E = 0	
Telegram header	Meaning for DeviceNet	Value range
Device adr.	MAC ID of the device	0 .. 63
Data area	Class ID	
Data address	Instance ID	
Data index	Attribute ID	
Data count	Data count Unused in read access Length of attribute data in write access	 0 1 – 240
Data type	Data type, unused	0
Function	Read Write	1 2

Fig. 8-32: Message Monitor – Example DeviceNet

9 File, Print, Export and View

9.1 File

Open

An existing project can be opened with **File > Open**.

Save and Save As

When the file name is known, then the configuration can be saved under the **File > Save** menu, otherwise the **File > Save As** menu must be selected.

Close

The current project can be closed with **File > Close**.

9.2 Print

After the current printer has been selected in the **File > Printer Setup** menu, the configuration can be printed out under the **File > Print** menu. For a page view, select the **File > Page View** menu.

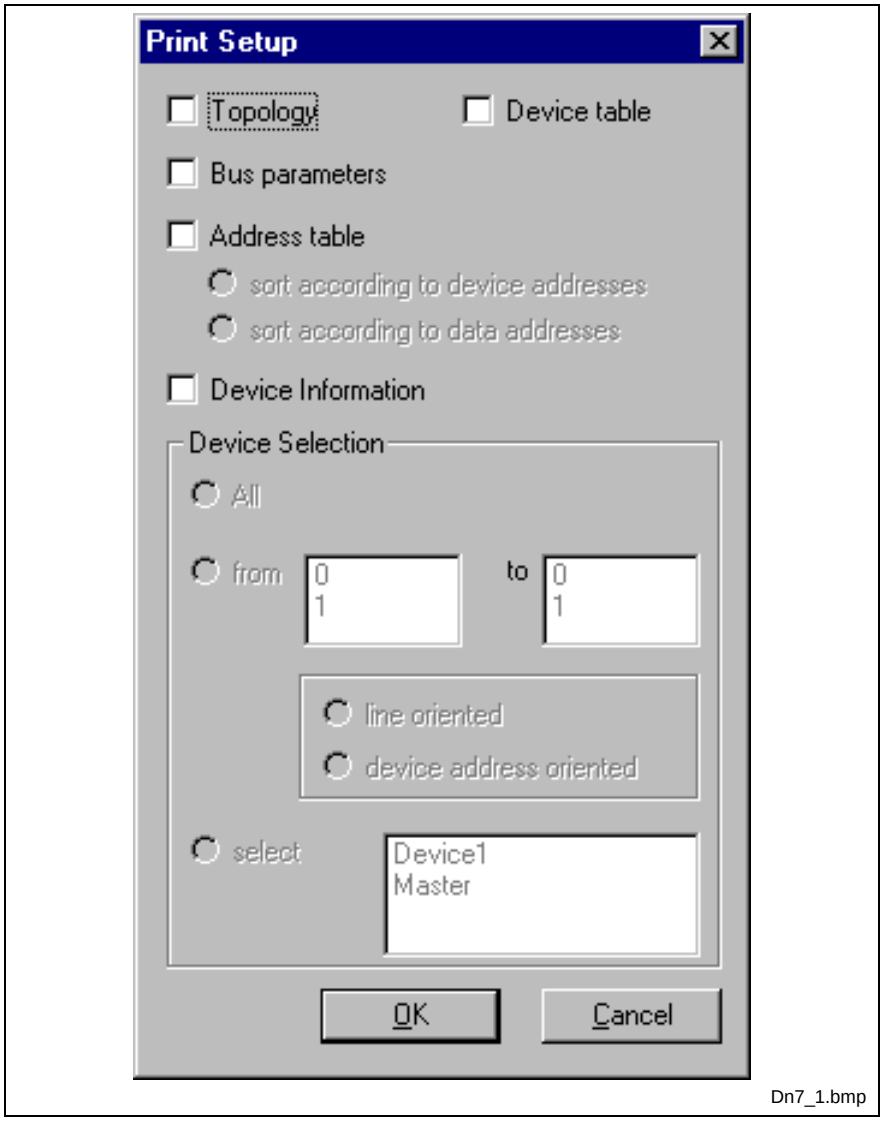


Fig. 9-1: File > Print

When you select the initial setting, the basic information for one device is printed on one sheet. If you select

- **Topology** the basic information as well as the topology of the bus system is printed,
- **Bus parameters** also the bus parameters of the bus system are printed,
- **Address table** also the address table of the master is printed,
- **Device table** also the device table is printed.

The scope can be specified with the **Device selection** menu point. The following options can be selected:

- All,
- From Station address to Station address,
- Selection of a device by means of its description.

9.3 Export Functions

DBM Export

Select the **File > Export > DBM menu** in order to save the previously saved project file (*.DN Microsoft Access Format) as a DBM file (Hilscher binary format). This DBM file can be retrieved in the DOS Compro program. The configuration is stored in the project directory in the path of the SyConDN installation with the name >your project name>.DBM.

CSV Export

Select the **File > Export > CSV menu** in order to save the previously saved project file (*.DN Microsoft Access Format) in a CSV file. This CSV file can be edited with e.g. Excel. The configuration is stored in the project directory in the path of the SyConDN installation with the name >your project name>.DBM.

9.4 View of the Configuration

Device Table

The **View > Device Table** menu shows the list of all devices that have been inserted.

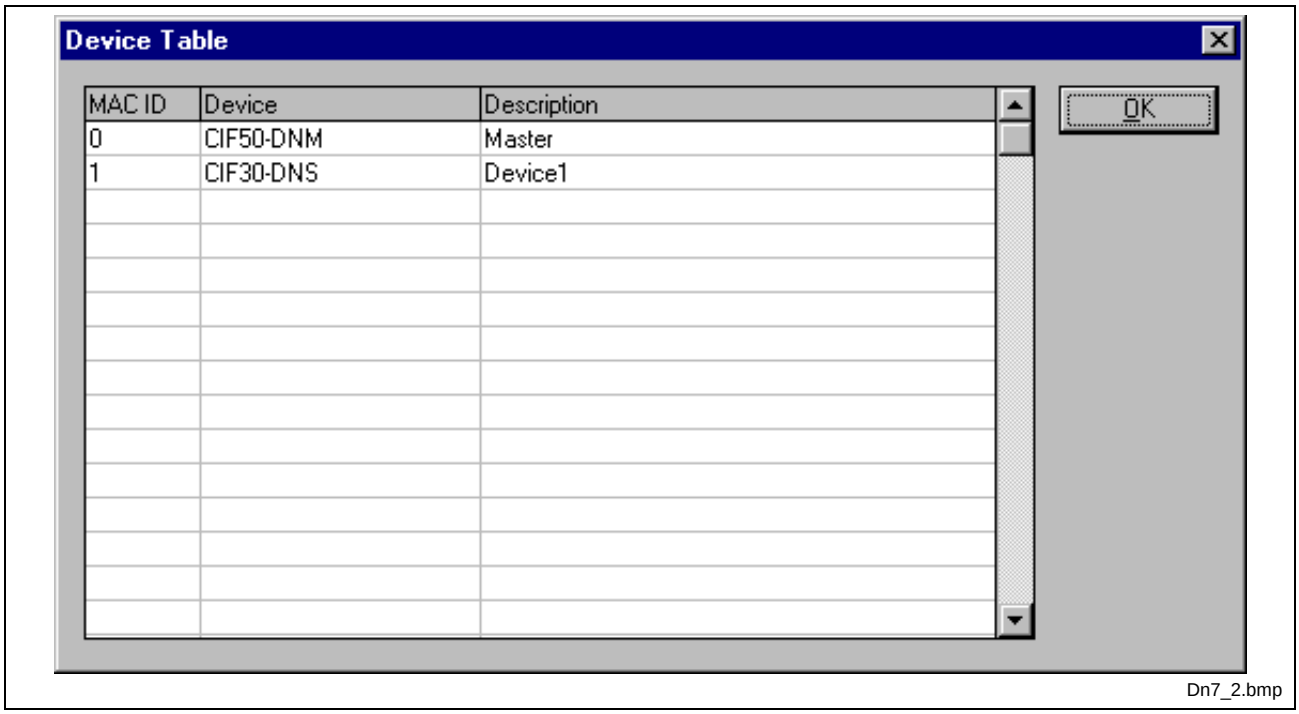


Fig. 9-2: View > Device table

Address Table

A list of all addresses used in the process depiction is displayed in the **View > Address Table** menu. For this purpose, the current master for which the table is to be displayed must be chosen.

Addresses refer to the Master.

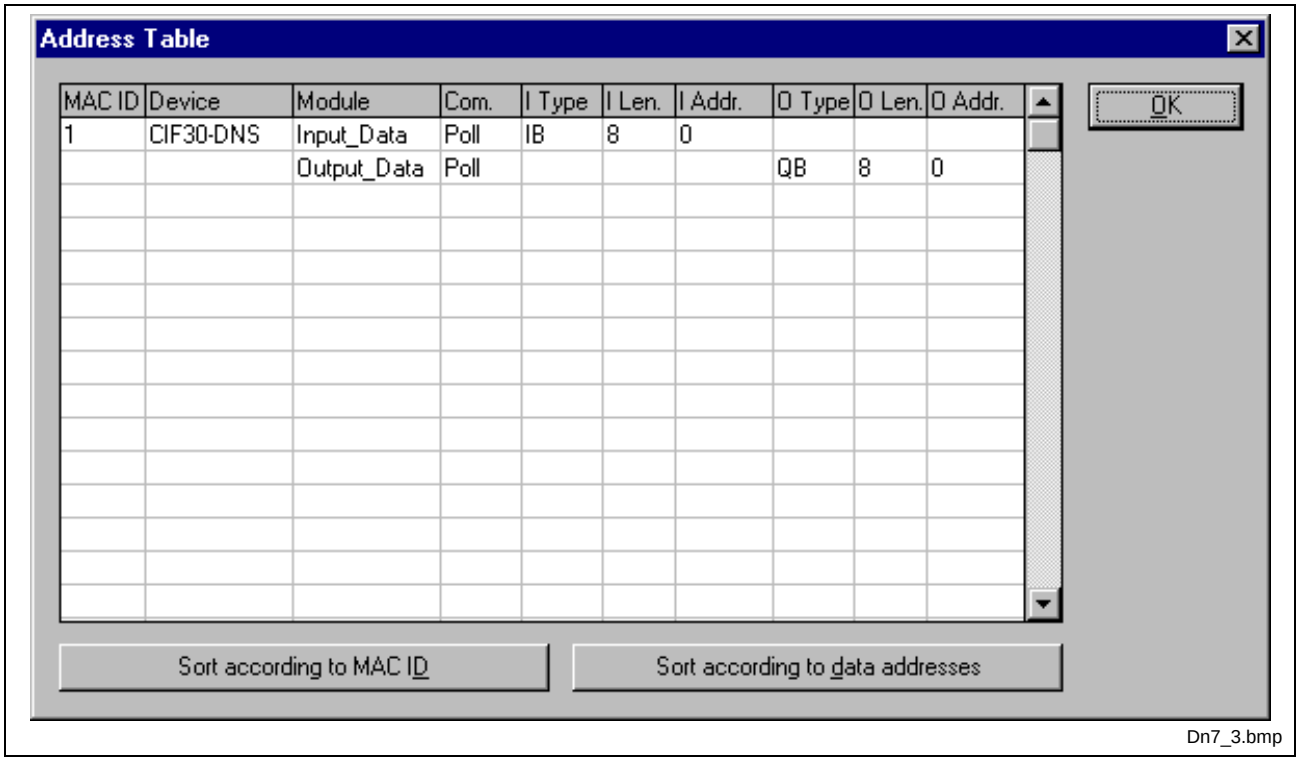


Fig. 9-3: View > Address table

10 Error Numbers

10.1 CIF Device Driver (Dual-Port Memory) – Error Numbers (-1 ..-49)

This is the list of error numbers of Dual-Port Memory access using the CIF Device Driver.

Error number	Description
-1	Driver: Board not initialized The communication board is not initialized by the driver. No or wrong configuration found for the given board. Check the driver configuration. Driver function used without calling DevOpenDriver() first..
-2	Driver: Error in internal ‘Init state‘
-3	Driver: Error in internal ‘Read state‘
-4	Driver: Command on this channel is active
-5	Driver: Unknown parameter in function occurred
-6	Driver: Version is incompatible The device driver version does not correspond to the driver DLL version. From version V1.200 the internal command structure between DLL and driver has changed. Make sure to use the same version of the device driver and the driver DLL.
-10	Device: Dual-Port Memory RAM not accessible (board not found) Dual-ported RAM (DPM) not accessible / no hardware found. This error occurs, when the driver is not able to read or write to the Dual-Port Memory. Check if the BIOS setting of the PC Memory address are in conflict with other PC components. Try another memory address. Check the driver configuration for this board. Check the jumper settings for this board.
-11	Device: Not ready (RDY flag=Ready flag failed) Board is not ready. This could be a hardware malfunction or another program writes inadmissible to the Dual-Port Memory.
-12	Device: Not running (RUN flag=Running flag failed) The board is ready, but not all tasks are running, because of an initialization error. No data base is loaded into the device or a wrong parameter can cause that a task can't initialize.

Fig. 10-1: Table of CIF Device Driver – Error numbers

Error Number	Description
-13	Device: Watch dog test failed
-14	Device: Signals wrong operating system version No license code found on the communication board. Device has no license for the used operating system or customer software. No firmware or no database on the device is loaded.
-15	Device: Error in Dual-Port Memory flags
-16	Device: Send mailbox is full
-17	Device: Function PutMessage timeout No message could be send during the timeout period given in the DevPutMessage() function. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same! Device internal segment buffer full and therefore PutMessage() function is not possible, because all segments on the device are in use. This error occurs, when only PutMessage() is used but not GetMessage HOST flag is not set for the device. No messages are taken by the device. Use DevSetHostState() to signal a board an application is available.
-18	Device: Function GetMessage timeout No message received during the timeout period given in the DevGetMessage() function. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same! The used protocol on the device needs longer than the timeout period given in the DevGetMessage() function.
-19	Device: No message available

Fig. 10-2: Table of CIF Device Driver – Error numbers

Error number	Description
-20	Device: Reset command timeout The board is ready, but not all tasks are running, because of an initialization error. No data base is loaded into the device or a wrong parameter can cause that a task can't initialize. The device needs longer than the timeout period given in the DevReset() function. Using device interrupts. The timeout period can differ between fieldbus protocols. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same!
-21	Device: COM flag not set The device can not reach communication state. Device not connected to the fieldbus. No station found on the fieldbus. Wrong configuration on the device.
-22	Device: IO data exchange failed
-23	Device: IO data exchange timeout The device needs longer than the timeout period given in the DevExchangeIO() function. If you use an interrupt, then check the interrupt on the device and in driver setup. These settings have to be the same! Is an interrupt on the board set? Is the right interrupt set? The interrupt could already be used by another PC component, also if the operating system reports it as unused. If you use polling mode, then make sure that no interrupt is set on the board and that polling is set in the driver setup. These settings have to be the same!
-24	Device: IO data mode unknown
-25	Device: Function call failed
-26	Device: Dual-Port Memory size differs from configuration
-27	Device: State mode unknown

Fig. 10-3: Table of CIF Device Driver – Error numbers

Error number	Description
-30	User: Driver not opened (device driver not loaded) The device driver could not be opened. Device driver not installed. Wrong parameters in the driver configuration. If the driver finds invalid parameters for a communication board and no other boards with valid parameters are available, the driver will not be loaded.
-31	User: Can't connect with device board
-32	User: Board not initialized (DevInitBoard not called)
-33	User: IOCTRL function failed A driver function could not be called. This is an internal error between the device driver and the DLL. Make sure to use a device driver and a DLL with the same version. An incompatible old driver DLL is used.
-34	User: Parameter DeviceNumber invalid
-35	User: Parameter InfoArea unknown
-36	User: Parameter Number invalid
-37	User: Parameter Mode invalid
-38	User: NULL pointer assignment
-39	User: Messagebuffer too short
-40	User: Size parameter invalid
-42	User: Size parameter with zero length
-43	User: Size parameter too long
-44	User: Device address null pointer
-45	User: Pointer to buffer is a null pointer
-46	User: SendSize parameter too long
-47	User: ReceiveSize parameter too long
-48	User: Pointer to send buffer is a null pointer
-49	User: Pointer to receive buffer is a null pointer

Fig. 10-4: Table of CIF Device Driver – Error number

1.000	If the operating system of the device reports an initialization error, then a value of 1000 will be add to the error number and shown to the user.

10.2 CIF Serial Driver – Error Numbers (-20 .. -71)

These is the list of error numbers using the serial driver.

Error number	Description
-20	Driver: No COM port found or COM port already in use.
-21	Driver: COM port already opened
-22	Driver: Function call into driver has failed
-23	Driver: Internal driver error
-24	Driver: Could not create read thread
-25	Driver: Could not create read event
-26	Driver: Could not create write event
-27	Driver: Could not create timer event
-28	Driver: Error by writing data
-29	Driver: Wrong COM state
-30	Driver: COM state error is set
-31	Driver: COM buffer setup failed
-32	Driver: COM set timeout failed
-33	Driver: Receive buffer overrun
-34	Driver: Receive buffer full
-35	Driver: Send busy
-36	Driver: Error during close driver
-40	User: COM port not opened
-41	User: Invalid handle value
-42	User: Invalid COM number
-43	User: Size parameter invalid
-44	User: Size parameter zero
-45	User: Buffer pointer is NULL
-46	User: Buffer too short
-47	User: Setup error

Fig. 10-5: Table of CIF Serial Driver – Error numbers

Error number	Description
-50	User: Send message, timeout error
-51	User: Could not send a message Cable not connected. Wrong cable. Device does not respond.
-52	User: Send message, no device connected
-53	User: Error by send message, message receiving
-54	User: Telegram collision
-55	User: Telegram, no acknowledgement received
-56	User: Telegram, noise
-57	User: Telegram, data overrun
-58	User: Telegram, parity error
-59	User: Telegram, framing error
-60	User: Telegram, unknown error
-70	User: Timeout by receiving a message
-71	User: No message received

Fig. 10-6: Table of CIF Serial Driver – Error numbers

10.3 RCS – Error Numbers (4 .. 93)

This is the list of error numbers returned by the RCS (Realtime Communication System), that is the operating system of Hilscher devices. The error number is returned in an answer message. Command messages and answer messages are used to communicate between the application software (e.g. the system configurator) and the Hilscher device. An example of this communication is the download of a configuration.

Error number	Description
4	Task does not exist
5	Task is not initialized
6	The MCL is locked
7	The MCL rejects a send command because of an error
20	The user will download a database into the device that is not valid for this device type
21	Database segment not configured or not existent
22	Number for message wrong during download
23	Received number of data during download does not match to that in the command message
24	Sequence identifier wrong during download
25	Checksum after download and checksum in command message do not match
26	Write/Read access of data base segment
27	Download/Upload or erase of configured data base type is not allowed
28	The state of the data base segment indicated an error. Upload not possible
29	The access to the data base segment needs the bootstraploader. The bootstraploader is not present
30	Trace buffer overflow
31	Entry into trace buffer too long
37	No or wrong license. The OEM license of the system configurator allows only communication to devices that have the same license inside
38	The data base created by the system configurator and the data base expected by the firmware is not compatible
39	DBM module missing

Fig. 10-7: Table of RCS (answer message) – Error numbers

Error number	Description
40	No command free
41	Command unknown
42	Command mode unknown
43	Wrong parameter in the command
44	Message length does not match to the parameters of the command
45	Only a MCL is allowed to transfer this command to the RCS
50	FLASH occupied at the moment
51	Error deleting the FLASH
52	Error writing the FLASH
53	FLASH not configured
54	FLASH timeout error
55	Access protection error while deleting the FLASH
56	FLASH size does not match or not enough FLASH memory
60	Wrong structure type when accessing a task structure
61	Wrong structure length when accessing a structure
62	Structure does not exist
70	No clock on the device
80	Wrong handle for the table (table does not exist)
81	Data length does not match the structure of this table
82	The data set of this number does not exist
83	This table name does not exist
84	Table full. No more entries allowed
85	Other error from DBM
90	The device info (serial number, device number and date) does already exist
91	License code invalid
92	License code does already exist
93	All memory locations for license codes already in use

Fig. 10-8: Table of RCS (answer message) – Error numbers

10.4 Database Access – Error Numbers (100 .. 130)

The following table lists the error numbers of the database access errors.

Error number	Description
100	Database already opened
101	Data set could not be opened
103	Error while opening database occurred
104	No valid path name
105	No connection to data base. Call function DbOpen().
106	Error in parameter
107	Error during opening a table
108	Inadmissible nullpointer occurred
109	Table not opened. Call function OpenTable() first.
110	The first data set is reached
111	The last data set is reached
112	Unknown type in the data set found
113	Data has to be truncated
114	No access driver installed on the system
115	Exception received
116	This table is set to read only
117	There is no data set in the table
118	The requested table can not be edited
119	An operation could not be completed
120	User gives an unexpected length in WritsDs().
121	An assertion failed
122	DLL not found
123	DLL couldn't be freed
124	Specified function not found in the DLL
125	ODBC Function returns an error number
126	Count of data bytes in the data set exceeds 1938 bytes
127	DBM32 DLL is not loaded
128	Field with the given index was not found
129	This table contains no data set
130	Invalid character (' ') found in a table or column

Fig. 10-9: Database access – Error numbers

10.5 Online Data Manager – Error Numbers

Online Data Manager – Error Numbers (1000 .. 1018)

The following table lists the error numbers of the Online Data Manager.

Error number	Description
1000	Driver OnlineDataManager not opened
1001	Initialization of the OnlineDataManager has failed
1002	No DriverObject found. OnlineDataManager Sub DLL not found.
1003	No DeviveObject found. Device not found.
1004	Application not found
1010	Application has requested an unknown event
1011	Application has requested an unknown function mode, operating mode. Known function modes, operating modes are Reset, Download, Register Server, Unregister Server.
1012	Application has requested an unknown command.
1013	Message Server already exists
1014	Message Server not registered
1015	Device already in use
1016	Device not assigned
1017	Device has changed
1018	Command already active

Fig. 10-10: Table of the Online Data Manager – Error numbers

Message Handler – Error Numbers (2010 .. 2027)

The following table lists the error numbers of the message handler of the Online Data Manager.

Error Number	Description
2010	Message Handler: Message buffer empty
2011	Message Handler: Message buffer full
2021	Message Handler: Invalid Message ID (msg.nr)
2022	Message Handler: No entry
2023	Message Handler: Message already active
2024	Message Handler: Wrong Application
2025	Message Handler: Message Timeout
2026	Message Handler: Wait for Delete
2027	Message Handler: No cyclic message

Fig. 10-11: Table of Message Handler – Error numbers of the Online Data Manager

Driver Functions – Error Numbers (2501 .. 2512)

The following table lists the error numbers of the driver functions of the Online Data Manager.

Error number	Description
2501	OnlineDataManager Sub-DLL not found
2502	Function missing
2503	'Read Thread' not created
2504	'Write Thread' not created
2505	'IO Thread' not created
2510	Function failed
2512	Assignment reports error. Return neither OK nor cancel.

Fig. 10-12: Table of driver functions – Error numbers of the Online Data Managers

Online Data Manager Subfunctions – Error Numbers (8001 .. 8035)

The following table lists the error numbers of the subfunctions of the Online Data Manager.

Error number	Description
8001	Driver not opened. E.g. CIF Devive Driver
8002	Application has requested an unknown event
8003	Application has requested an unknown command
8004	Command has failed
8005	Command active
8006	Device invalid
8010	No device was assigned
8011	Device was already assigned
8020	Driver not connected
8021	Driver already connected
8030	Faulty 'GetState'
8031	Send error (PutMessage returns error)
8032	Send active (PutMessage active)
8033	Receive error (GetMessage returns error)
8034	Receive active (GetMessage active)
8035	IO Error (ExchangeIO returns error)

Fig. 10-13: Table of the subfunctions – Error numbers of the Online Data Managers

10.6 Database – Error Numbers (4000 .. 4098)

The following table lists the error numbers of the converting functions.

Error number	Description
4000	File does not exist
4001	Success in packing
4002	Data set does not exist
4003	Last respectively first entry reached
4004	Not enough memory
4005	File directory full
4006	Max. number of entries reached
4007	No writing to this table possible, because the table is located in the FLASH
4008	Table name does already exist
4009	File name does not exist
4010	Free RAM length from RCS_CNF.P86 is smaller than E_F_INDEX * 2
4011	Parameter ‘next’ wrong
4012	Not enough free space to copy data set
4013	Set is deleted
4014	Value for index is wrong
4015	Access not allowed
4016	open_file used before init_file
4017	Drive is not ready or available
4018	Not enough drive memory
4019	File name or path does not exist
4020	Cannot create path
4021	Wrong path
4022	Wrong flag
4023	The delete path is the root path
4024	Path or file name exists
4025	Write error during writing a file
4026	Error during creating a file
4027	Error during closing a file
4028	No DBM file
4029	Length of the read data is unequal of the file length

Fig. 10-14: Table database – Error numbers

Error number	Description
4030	Path too long
4031	Directory changed
4032	Directory created
4034	Length of converting stream is 0
4035	Non-equal data set found
4036	Not allowed to write set 0
4037	No entry in this file
4038	Data set has length 0
4039	The function DbmInit has assigned a zero pointer during RCS initialization
4040	Printer not ready
4041	The data base is used from an other function
4042	New length of data base is smaller than used
4043	Unknown access mode
4044	Old data base has to be converted
4045	Error while converting. Function not known
4046	Unknown type in set 0 found
4047	No float-function available
4048	Function not in RCS module
4049	Check failed
4050	Checksum check failed
4051	More segments are existing in file, than entries in the structure FILE_INFO_T in wMax
4052	SegLen in structure FILE_INFO_T is smaller then the length in the file. Return of function dbm_restore_data
4053	The header file holds another information for a length than in the segment itself
4054	Not enough memory for allocation on the PC
4055	No index for file handle in structure FLASH_DIR of RCS found
4056	
4057	File type 2 can not be printed, because of too many definitions
4058	The definitions need too many lines to display them, than in the program available
4059	An unknown format for the parameter. Valid is U, H, or S
4060	Unknown parameter type

Fig. 10-15: Table database – Error number

Error number	Description
4061	The data base was transmitted into the FLASH
4062	Set 0 contains no structure definition
4063	Set 0 can not be deleted
4064	Error during execution of an ODBC data base access
4065	Initializing of DBM through RCS had no success
4066	Passed data length incorrect
4067	Sorting function not linked
4068	Error in function parameter
4069	Error from ODBC table
4070	No free handle available. Too many data base links are already opened
4071	Unknown data type found in the table
4072	Structure of table GLOBAL not correct or no such table existing
4073	No name of an ACCESS data base
4074	Download window can’t be created
4075	Download not fully performable

Fig. 10-16: Table database – Error numbers

Error number	Description
4082	More than 32 tables should be created
4083	No entry in element szSourceFile
4084	ODBC connection initialization not possible. This could happen when in file ODBCINST.INI in section [Microsoft Access Driver (*.mdb)] is no valid path to ODBCJT16/32.DLL.
4085	Error in structure in the ACCESS data base that is in DBM format.
4086	Error in structure in the ACCESS data base that is in DBM format.
4087	No database in a ODBC table
4088	No entry
4089	ODBC set length not valid
4090	Not enough data sets in ODBC table
4091	Table CreateTab not found
4092	Error in structure of table CreateTab
4093	No entry in element szSourceTable
4094	No entry in element szDestTable
4095	Entry in iSourceType of table CreateTab is wrong
4096	Entry in iTranslate of table CreateTab is wrong
4097	Function SQLAllocStmt reports an error
4098	ODBC source table not found
4099	ODBC data truncated
4100	Download timeout
4101	Library load error
4102	Library function error
4103	Error in description ’toggle’
4104	Error in description ’KB’
4105	Column does not exist
4106	ODBC structure different
4107	ODBC address error
4108	No CRC sum exists (table GLOBAL exists or old)
4109	Table GLOBAL is old
4110	Calculated CRC different to CRC in table GLOBAL
4199	Programming error

Fig. 10-17: Table of database – Error numbers

10.7 Converting Functions – Error Numbers (5001 .. 5008)

The following table lists the error numbers of converting functions.

Error number	Description
5000	Function PackLongToByteShort: Not enough space in pvD (Number of elements greater than reserved memory)
5001	Function PackLongToByteShort: Not enough space in pvD. Detected during converting of pvS
5002	Function PackLongToByteShort: Not enough space in pvD
5003	Function StringToByte: Not enough space in pvD
5004	Function IntToByte: Not enough space in pvD
5005	Function LongToShort: Not enough space in pvD
5006	Function PackStringDumpToByteArray: Not enough space in pvD
5007	Function PackStringBumpToByteArray: A character was found, which is not convertible into a HEX value
5008	Function PackStringDumpToByteArray: Number of character odd
5009	Function PackStringDumpToByteArray: Not enough space in pvD
5010	Function PackStringDumpToByteArray: The current data set needs to be appended the previous one
5011	Function PackStringDumpToByteArray: No corresponding function to the given number exist
5012	Converting error

Fig. 10-18: Table of the converting functions – Error numbers

11 Description of the Dual-Port Memory DPM

11.1 General Information

For data exchange between the PLC and the DeviceNet connection a **D**ual-**P**ort **M**emory DPM of size 8 kbyte is available on the controller board. It is divided up as follows:

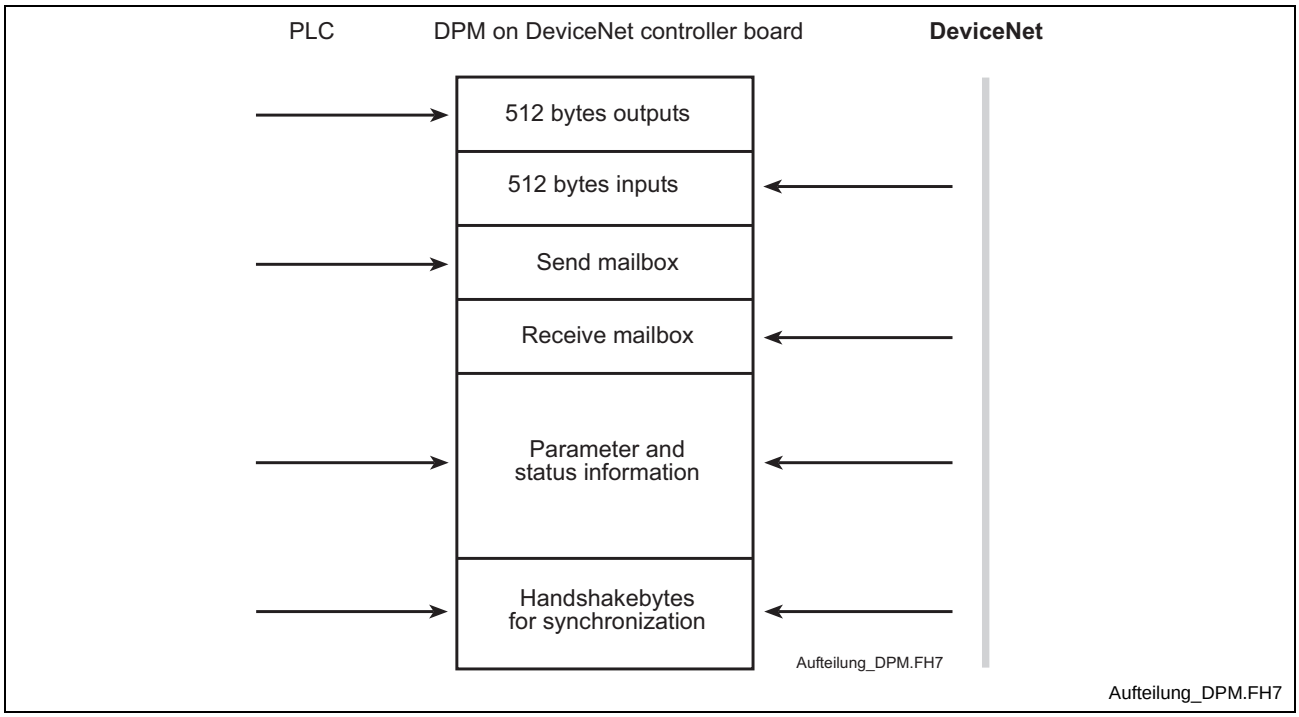


Fig. 11-1: Overview Dual-Port Memory

11.2 Memory Distribution DPM

In the PLC programming interface there is the possibility to access all memory areas via absolute addressing. The corresponding variables have to be entered in the VAR area of the declaration editor (e.g..: variable AT %PB*.*). The following tables specify the addresses of the single memory areas.

Address area (decimal)	Address area (hexadecimal)	Size	Designation
0 - 511	0000 - 01FF	512 bytes	SndPd Process output data PLC → DeviceNet
512 - 3583	0200 - 00DFF	3 kbyte	Free
3584 - 4095	0E00 - 0FFF	512 bytes	RecvPd Process input data DeviceNet → PLC
4096 - 7167	1000H - 1BFF	3 kbyte	Free

Fig. 11-2: Addresses of the DP Master input and output data

Address area (decimal)	Address area (hexadecimal)	Size	Designation
0 - 6143	0000 - 17FF	6 kbyte	Free
6144 - 6655	1800 -19FF	512 bytes	SndPd Process output data PLC → DeviceNet
6656 - 7167	1A00 -1BFF	512 bytes	RecvPd Process output data DeviceNet → PLC

Fig. 11-3: Addresses of the DP Slave input and output data

Address area (hexadecimal)	Size	Designation
1C00H -1D1FH	288 bytes	DevMailbox[288] Message Buffer HOST → DEVICE
1D20H-1D23H	4 bytes	Date[4] Information Device
1D24H-1D27H	4 bytes	DeviceNumber[4]
1D28H-1D2BH	4 bytes	SerialNumber[4]
1D2CH-1D2FH	4 bytes	reserved[4]
1D30H-1D33H	4 bytes	PcOsName0[4] Information Driver
1D34H-1D37H	4 bytes	PcOsName1[4]
1D38H-1D3BH	4 bytes	PcOsName2[4]
1D3CH-1D3FH	4 bytes	OemIdentifier[4]
1D40H-1E5FH	288 bytes	HostMailbox[288] Message Buffer DEVICE → HOST
1E60H-1E6FH	16 bytes	FirmwareName[16] Information Firmware
1E70H-1E7FH	16 bytes	FirmwareVersion[16]
1E80H-1EBFH	64 bytes	Task1Parameter[64] Parameters of Task 1, 2
1EC0H-1EFFH	64 bytes	Task2Parameter[64]
1F00H-1F3FH	64 bytes	Task1State[64] States of Task 1, 2
1F40H-1F7FH	64 bytes	Task2State[64]
1F80H-1F87H	8 bytes	Task1Name[8] Information Task 1
1F88H	integer	Task1Version
1F8AH	byte	Task1State
1F8BH-1F8FH	bytes	reserved5
1F90H-1F97H	bytes	Task2Name[8] 8 Information Task 2
1F98H	integer	Task2Version
1F9AH	byte	Task2Condition
1F9BH-1F9FH	bytes	reserved5
1FA0H-1FA7H	8 bytes	Task3Name[8] Information Task 3
1FA8H	integer	Task3Version

Address area (hexadecimal)	Size	Designation
1FAAH	byte	Task3Condition
1FABH-1FAFH	bytes	reserved5
1FB0H-1FB7H	8 bytes	Task4Name[8] Information Task 4
1FB8H	Integer	Task4Version
1FBAH	byte	Task4Condition
1FBBH-1FBFH	bytes	reserved5
1FC0H-1FC7H	8 bytes	Task5Name[8] Information Task 5
1FC8H	integer	Task5Version
1FCAH	byte	Task5Condition
1FCBH-1FCFH	bytes	reserved5
1FD0H-1FD7H	bytes	Task6Name[8] 8 Information Task 6
1FD8H	integer	Task6Version
1FDAH	byte	Task6Condition
1FDBH-1FDFH	Bytes	reserved5
1FE0H-1FE7H	8 bytes	Task7Name[8] Information Task 7
1FE8H	integer	Task7Version
1FEAH	byte	Task7Condition
1FEBH-1FEFH	bytes	reserved5
1FF0H	integer	RcsVersion Information Operating System
1FF2H	byte	RcsError
1FF3H	byte	HostWatchDog
1FF4H	byte	DevWatchDog
1FF5H	byte	SegmentCount
1FF7H	byte	DriverType
1FF8H	byte	DpmSize Information of the Device
1FF9H	byte	DevType
1FFAH	byte	DevModel
1FFBH-7FDH	3 bytes	DevIdentifier[3]
1FFEH	byte	HostFlags Command and Acknowledge Location DEVICE → HOST
1FFFH	byte	DevFlags Command and Acknowledge Location HOST → DEVICE

Fig. 11-4: Address DP Master/Slave

The memory areas have the following function:

SndPd: In this memory area you will find the process data to be send.

RecvPd: In this memory area you will find the received process data.

DevMailbox: The data to be send to the controller board are written in this memory area.

HostMailbox: In this memory area the messages send from the controller board are available in a defined message format.

HostWatchDog/DevWatchDog: This two memory areas allow the mutual monitoring between the PLC user program (HOST) and the controller board (DEVICE). For this, the controller board retrieves the value of the DevWatchDog, increments this value and writes the increased value back in the HostWatchDog. A value of 255 is not incremented to 0, but to 1. The operation incrementing and writing back is executed within 20 ms. The monitoring is only active, when the value in the DevWatchDog is unequal to 0. After initializing the controller board the value in the DevWatchDog is 0, so that the monitoring function is deactivated. Thus, the user can switch on or off this monitoring via the PLC program.

SegmentCount: Number of still available memory segments to receive buffered messages. This value is entered by the controller board.

HostFlags/DevFlags: Monitoring of data exchange between host and controller board. The controller board describes the HostFlags; the host only retrieves the HostFlags. The host describes the DevFlags; the controller board retrieves the DevFlags.

12 List of Figures

Fig. 3-1: Hazard classification (according to ANSI Z535) 3-1

Fig. 4-1: Selection during installation 4-2

Fig. 5-1: Overview – Communication 5-1

Fig. 5-2: Steps for configuration of the Hilscher DeviceNet master to any DeviceNet device (slave) 5-2

Fig. 5-3: Steps for the configuration of the Hilscher DeviceNet master to Hilscher DeviceNet slave 5-3

Fig. 6-1: General block diagram of an EDS file 6-1

Fig. 6-2: Insert > Master 6-3

Fig. 6-3: Question in case of master replacement 6-3

Fig. 6-4: Online > Automatic network scan (during scanning) 6-4

Fig. 6-5: Online > Automatic network scan (after scanning) 6-5

Fig. 6-6: Explanations to Fig. 6-5 "Online > Automatic network scan (after scanning)" 6-5

Fig. 6-7: Information on a device in the automatic scan window 6-6

Fig. 6-8: Insert > Device (Slave) 6-7

Fig. 6-9: Device configuration 6-8

Fig. 6-10: Overview I/O connections 6-9

Fig. 6-11: Parameter data 6-12

Fig. 6-12: Device configuration for manual addressing 6-14

Fig. 6-13: Display when device is deactivated 6-14

Fig. 7-1: Driver selection – CIF Serial Driver 7-2

Fig. 7-2: CIF Serial Driver – Device assignment 7-2

Fig. 7-3: CIF Serial Driver – Device assignment 7-3

Fig. 7-4: Settings > Bus parameters 7-4

Fig. 7-5: DeviceNet master settings 7-5

Fig. 7-6: Storing of the different data types 7-7

Fig. 7-7: Image of the method of addressing for input 7-8

Fig. 7-8: Image of the method of addressing for output 7-8

Fig. 7-9: DeviceNet slave settings 7-9

Fig. 7-10: Settings > Project information 7-10

Fig. 7-11: Settings > Path 7-11

Fig. 7-12: Settings > Language 7-11

Fig. 7-13: Settings > Start options 7-12

Fig. 8-1: Security prompt before downloading 8-1

Fig. 8-2: Online > Download 8-1

Fig. 8-3 Online > Firmware download 8-2

Fig. 8-4: Online > Firmware / Reset 8-2

Fig. 8-5: Online > Device info 8-3

Fig. 8-6: Online > Live list 8-4

Fig. 8-7: Debug window 8-5

Fig. 8-8: Online > Device diagnostic 8-6

Fig. 8-9: Online > Global state field 8-7

Fig. 8-10: Extended device diagnostic 8-9
Fig. 8-11: PLC_TASK Common variables 8-10
Fig. 8-12: DNM_TASK Common variables 8-11
Fig. 8-13: Device running states 8-12
Fig. 8-14: Communication error 8-13
Fig. 8-15: Receive queue 8-14
Fig. 8-16: Transmit queue 8-15
Fig. 8-17: DeviceNet command counters 8-16
Fig. 8-18: Timeout counter 8-17
Fig. 8-19: Init counter 8-18
Fig. 8-20: Extended device diagnostic for Hilscher DeviceNet slave 8-19
Fig. 8-21: PLC_Task Common variables 8-20
Fig. 8-22: DNS_Task Common variables 8-21
Fig. 8-23: Receive queue 8-22
Fig. 8-24: Transmit queue 8-23
Fig. 8-25: Online > I/O monitor 8-24
Fig. 8-26: Logical network view and I/O watch 8-25
Fig. 8-27: I/O watch 8-26
Fig. 8-28: Get device attribute 8-27
Fig. 8-29: Set device attribute 8-27
Fig. 8-30: Online > Message monitor 8-28
Fig. 8-31: Save as 8-29
Fig. 8-32: Message Monitor – Example DeviceNet 8-30
Fig. 9-1: File > Print 9-2
Fig. 9-2: View > Device table 9-3
Fig. 9-3: View > Address table 9-4
Fig. 10-1: Table of CIF Device Driver – Error numbers 10-1
Fig. 10-2: Table of CIF Device Driver – Error numbers 10-2
Fig. 10-3: Table of CIF Device Driver – Error numbers 10-3
Fig. 10-4: Table of CIF Device Driver – Error number 10-4
Fig. 10-5: Table of CIF Serial Driver – Error numbers 10-5
Fig. 10-6: Table of CIF Serial Driver – Error numbers 10-6
Fig. 10-7: Table of RCS (answer message) – Error numbers 10-7
Fig. 10-8: Table of RCS (answer message) – Error numbers 10-8
Fig. 10-9: Database access – Error numbers 10-9
Fig. 10-10: Table of the Online Data Manager – Error numbers 10-10
Fig. 10-11: Table of Message Handler – Error numbers of the Online Data Manager 10-10
Fig. 10-12: Table of driver functions – Error numbers of the Online Data Managers 10-11
Fig. 10-13: Table of the subfunctions – Error numbers of the Online Data Managers 10-11
Fig. 10-14: Table database – Error numbers 10-12
Fig. 10-15: Table database – Error number 10-13
Fig. 10-16: Table database – Error numbers 10-14

Fig. 10-17: Table of database – Error numbers 10-15
Fig. 10-18: Table of the converting functions – Error numbers 10-16
Fig. 11-1: Overview Dual-Port Memory 11-1
Fig. 11-2: Addresses of the DP Master input and output data 11-1
Fig. 11-3: Addresses of the DP Slave input and output data 11-2
Fig. 11-4: Address DP Master/Slave 11-3

13 Service & Support

13.1 Helpdesk

Unser Kundendienst-Helpdesk im Hauptwerk Lohr am Main steht Ihnen mit Rat und Tat zur Seite. Sie erreichen uns

Our service helpdesk at our headquarters in Lohr am Main, Germany can assist you in all kinds of inquiries. Contact us

- telefonisch - by phone: **49 (0) 9352 40 50 60**
  über Service Call Entry Center - via Service Call Entry Center
  Mo-Fr 07:00-18:00 Mo-Fr 7:00 am - 6:00 pm
- per Fax - by fax: **+49 (0) 9352 40 49 41**
- per e-Mail - by e-mail: **service@boschrexroth.de**

13.2 Service-Hotline

Außerhalb der Helpdesk-Zeiten ist der Service direkt ansprechbar unter

After helpdesk hours, contact our service department directly at

+49 (0) 171 333 88 26

oder - or **+49 (0) 172 660 04 06**

13.3 Internet

Unter **www.boschrexroth.de** finden Sie ergänzende Hinweise zu Service, Reparatur und Training sowie die **aktuellen** Adressen *) unserer auf den folgenden Seiten aufgeführten Vertriebs- und Servicebüros.

Verkaufsniederlassungen
Niederlassungen mit Kundendienst

Außerhalb Deutschlands nehmen Sie bitte zuerst Kontakt mit unserem für Sie nächstgelegenen Ansprechpartner auf.

*) Die Angaben in der vorliegenden Dokumentation können seit Drucklegung überholt sein.

At **www.boschrexroth.de** you may find additional notes about service, repairs and training in the Internet, as well as the **actual** addresses *) of our sales- and service facilities figuring on the following pages.

sales agencies
offices providing service

Please contact our sales / service office in your area first.

*) Data in the present documentation may have become obsolete since printing.

13.4 Vor der Kontaktaufnahme... - Before contacting us...

Wir können Ihnen schnell und effizient helfen wenn Sie folgende Informationen bereithalten:

1. detaillierte Beschreibung der Störung und der Umstände.
2. Angaben auf dem Typenschild der betreffenden Produkte, insbesondere Typenschlüssel und Seriennummern.
3. Tel.-/Faxnummern und e-Mail-Adresse, unter denen Sie für Rückfragen zu erreichen sind.

For quick and efficient help, please have the following information ready:

1. Detailed description of the failure and circumstances.
2. Information on the type plate of the affected products, especially type codes and serial numbers.
3. Your phone/fax numbers and e-mail address, so we can contact you in case of questions.

13.5 Kundenbetreuungsstellen - Sales & Service Facilities

Deutschland – Germany

vom Ausland: (0) nach Landeskennziffer weglassen!
from abroad: don't dial (0) after country code!

Vertriebsgebiet Mitte Germany Centre	**SERVICE** **CALL ENTRY CENTER** **MO – FR** **von 07:00 - 18:00 Uhr** from 7 am – 6 pm	**SERVICE** **HOTLINE** **MO – FR** **von 17:00 - 07:00 Uhr** from 5 pm - 7 am **+ SA / SO**	**SERVICE** **ERSATZTEILE / SPARES** verlängerte Ansprechzeit - extended office time - ♦ nur an Werktagen - only on working days - ♦ von 07:00 - 18:00 Uhr - from 7 am - 6 pm -
Rexroth Indramat GmbH Bgm.-Dr.-Nebel-Str. 2 / Postf. 1357 97816 Lohr am Main / 97803 Lohr **Kompetenz-Zentrum Europa** Tel.: +49 (0)9352 40-0 Fax: +49 (0)9352 40-4885	**Tel. +49 (0) 9352 40 50 60** service@boschrexroth.de	**Tel.: +49 (0)172 660 04 06** **oder / or** **Tel.: +49 (0)171 333 88 26**	**Tel. +49 (0) 9352 40 42 22**
Vertriebsgebiet Süd Germany South	Vertriebsgebiet West Germany West	Gebiet Südwest Germany South-West	Gebiet Südwest Germany South-West
Rexroth Indramat GmbH Landshuter Allee 8-10 80637 München Tel.: +49 (0)89 127 14-0 Fax: +49 (0)89 127 14-490	Bosch Rexroth AG Regionalzentrum West Borsigstrasse 15 40880 Ratingen Tel.: +49 (0)2102 409-0 Fax: +49 (0)2102 409-406	Bosch Rexroth AG Service-Regionalzentrum Süd-West Siemensstr.1 70736 Fellbach Tel.: +49 (0)711 51046–0 Fax: +49 (0)711 51046–248	Bosch Rexroth AG Regionalzentrum Südwest Ringstrasse 70 / Postfach 1144 70736 Fellbach / 70701 Fellbach Tel.: +49 (0)711 57 61–100 Fax: +49 (0)711 57 61–125
Vertriebsgebiet Nord Germany North	Vertriebsgebiet Mitte Germany Centre	Vertriebsgebiet Ost Germany East	Vertriebsgebiet Ost Germany East
Bosch Rexroth AG Walsroder Str. 93 30853 Langenhagen Tel.: +49 (0) 511 72 66 57-0 Service: +49 (0) 511 72 66 57-256 Fax: +49 (0) 511 72 66 57-93 Service: +49 (0) 511 72 66 57-95	Bosch Rexroth AG Regionalzentrum Mitte Waldecker Straße 13 64546 Mörfelden-Walldorf Tel.: +49 (0) 61 05 702-3 Fax: +49 (0) 61 05 702-444	Bosch Rexroth AG Beckerstraße 31 09120 Chemnitz Tel.: +49 (0)371 35 55-0 Fax: +49 (0)371 35 55-333	Bosch Rexroth AG Regionalzentrum Ost Walter-Köhn-Str. 4d 04356 Leipzig Tel.: +49 (0)341 25 61-0 Fax: +49 (0)341 25 61-111

Europa (West) - Europe (West)

vom Ausland: (0) nach Landeskennziffer weglassen, Italien: 0 nach Landeskennziffer mitwählen
from abroad: don't dial (0) after country code, Italy: dial 0 after country code

Austria - Österreich

Bosch Rexroth GmbH
Bereich Indramat
Stachegasse 13
1120 Wien

Tel.: +43 (0)1 985 25 40
Fax: +43 (0)1 985 25 40-93

Austria – Österreich

Bosch Rexroth GmbH
Gesch.ber. Rexroth Indramat
Industriepark 18
4061 Pasching

Tel.: +43 (0)7221 605-0
Fax: +43 (0)7221 605-21

Belgium - Belgien

Bosch Rexroth AG
Electric Drives & Controls
Industrielaan 8
1740 Ternat

Tel.: +32 (0)2 5830719
- service: +32 (0)2 5830717
Fax: +32 (0)2 5830731
indramat@boschrexroth.be

Denmark - Dänemark

BEC A/S
Zinkvej 6
8900 Randers

Tel.: +45 (0)87 11 90 60
Fax: +45 (0)87 11 90 61

Great Britain – Großbritannien

Bosch Rexroth Ltd.
Rexroth Indramat Division
Broadway Lane, South Cerney
Cirencester, Glos GL7 5UH

Tel.: +44 (0)1285 863000
Fax: +44 (0)1285 863030
sales@boschrexroth.co.uk
service@boschrexroth.co.uk

Finland - Finnland

Bosch Rexroth Oy
Rexroth Indramat division
Ansatie 6
017 40 Vantaa

Tel.: +358 (0)9 84 91-11
Fax: +358 (0)9 84 91-13 60

France - Frankreich

Bosch Rexroth S.A.
Division Rexroth Indramat
Avenue de la Trentaine
(BP. 74)
77503 Chelles Cedex

Tel.: +33 (0)164 72-70 00
Fax: +33 (0)164 72-63 00
Hotline: +33 (0)608 33 43 28

France - Frankreich

Bosch Rexroth S.A.
Division Rexroth Indramat
ZI de Thibaud, 20 bd. Thibaud
(BP. 1751)
31084 Toulouse

Tel.: +33 (0)5 61 43 61 87
Fax: +33 (0)5 61 43 94 12

France - Frankreich

Bosch Rexroth S.A.
Division Rexroth Indramat
91, Bd. Irène Joliot-Curie
69634 Vénissieux – Cedex

Tel.: +33 (0)4 78 78 53 65
Fax: +33 (0)4 78 78 53 62

Italy - Italien

Bosch Rexroth S.p.A.
Via G. Di Vittoria, 1
20063 Cernusco S/N.MI

Tel.: +39 02 92 365 1
+39 02 92 365 326
Fax: +39 02 92 365 500
+39 02 92 365 516378

Italy - Italien

Bosch Rexroth S.p.A.
Via Paolo Veronesi, 250
10148 Torino

Tel.: +39 011 224 88 11
Fax: +39 011 224 88 30

Italy - Italien

Bosch Rexroth S.p.A.
Via del Progresso, 16 (Zona Ind.)
35020 Padova

Tel.: +39 049 8 70 13 70
Fax: +39 049 8 70 13 77

Italy - Italien

Bosch Rexroth S.p.A.
Via Mascia, 1
80053 Castellamare di Stabia NA

Tel.: +39 081 8 71 57 00
Fax: +39 081 8 71 68 85

Italy - Italien

Bosch Rexroth S.p.A.
Viale Oriani, 38/A
40137 Bologna

Tel.: +39 051 34 14 14
Fax: +39 051 34 14 22

Netherlands – Niederlande/Holland

Bosch Rexroth B.V.
Kruisbroeksestraat 1
(P.O. Box 32)
5281 RV Boxtel

Tel.: +31 (0)411 65 19 51
Fax: +31 (0)411 65 14 83
www.boschrexroth.nl

Netherlands - Niederlande/Holland

Bosch Rexroth Services B.V.
Technical Services
Kruisbroeksestraat 1
(P.O. Box 32)
5281 RV Boxtel

Tel.: +31 (0)411 65 19 51
Fax: +31 (0)411 67 78 14
services@boschrexroth.nl

Norway - Norwegen

Bosch Rexroth AS
Rexroth Indramat Division
Berghagan 1 or: Box 3007
1405 Ski-Langhus 1402 Ski

Tel.: +47 (0)64 86 41 00
Fax: +47 (0)64 86 90 62
jul.ruud@rexroth.no

Spain - Spanien

Bosch Rexroth S.A.
Divisiòn Rexroth Indramat
Centro Industrial Santiga
Obradors s/n
08130 Santa Perpetua de Mogoda
Barcelona

Tel.: +34 9 37 47 94 00
Fax: +34 9 37 47 94 01

Spain – Spanien

Goimendi S.A.
División Rexroth Indramat
Parque Empresarial Zuatzu
C/ Francisco Grandmontagne no.2
20018 San Sebastian

Tel.: +34 9 43 31 84 21
- service: +34 9 43 31 84 56
Fax: +34 9 43 31 84 27
- service: +34 9 43 31 84 60
sat.indramat@goimendi.es

Sweden - Schweden

Rexroth Mecman Svenska AB
Rexroth Indramat Division
- Varuvägen 7
(Service: Konsumentvägen 4, Älfsjö)
125 81 Stockholm

Tel.: +46 (0)8 727 92 00
Fax: +46 (0)8 647 32 77

Sweden - Schweden

Rexroth Mecman Svenska AB
Indramat Support
Ekvändan 7
254 67 Helsingborg

Tel.: +46 (0) 42 38 88 -50
Fax: +46 (0) 42 38 88 -74

Switzerland West - Schweiz West

Bosch Rexroth Suisse SA
Département Rexroth Indramat
Rue du village 1
1020 Renens

Tel.: +41 (0)21 632 84 20
Fax: +41 (0)21 632 84 21

Switzerland East - Schweiz Ost

Bosch Rexroth Schweiz AG
Geschäftsbereich Indramat
Hemrietstrasse 2
8863 Buttikon

Tel. +41 (0) 55 46 46 111
Fax +41 (0) 55 46 46 222

Europa (Ost) - Europe (East)

vom Ausland: (0) nach Landeskennziffer weglassen
from abroad: don't dial (0) after country code

Czech Republic - Tschechien Bosch -Rexroth, spol.s.r.o. Hviezdoslavova 5 627 00 Brno Tel.: +420 (0)5 48 126 358 Fax: +420 (0)5 48 126 112	Czech Republic - Tschechien DEL a.s. Strojírenská 38 591 01 Zdar nad Sázavou Tel.: +420 566 64 3144 Fax: +420 566 62 1657	Hungary - Ungarn Bosch Rexroth Kft. Angol utca 34 1149 Budapest Tel.: +36 (1) 422 3200 Fax: +36 (1) 422 3201	Poland – Polen Bosch Rexroth Sp.zo.o. ul. Staszica 1 05-800 Pruszków Tel.: +48 22 738 18 00 – service: +48 22 738 18 46 Fax: +48 22 758 87 35 – service: +48 22 738 18 42
Poland – Polen Bosch Rexroth Sp.zo.o. Biuro Poznan ul. Dabrowskiego 81/85 60-529 Poznan Tel.: +48 061 847 64 62 /-63 Fax: +48 061 847 64 02	Romania - Rumänien East Electric S.R.L. B-dul Basarabie, nr.250, sector 3 73429 Bucuresti Tel./Fax:: +40 (0)21 255 35 07 +40 (0)21 255 77 13 Fax: +40 (0)21 725 61 21 est@mb.roknet.ro	Romania - Rumänien Bosch Rexroth Sp.zo.o. Str. Drobety nr. 4-10, app. 14 70258 Bucuresti, Sector 2 Tel.: +40 (0)1 210 48 25 +40 (0)1 210 29 50 Fax: +40 (0)1 210 29 52	Russia - Russland Bosch Rexroth OOO Wjatskaja ul. 27/15 127015 Moskau Tel.: +7-095-785 74 78 +7-095 785 74 79 Fax: +7 095 785 74 77 laura.kanina@boschrexroth.ru
Russia - Russland ELMIS 10, Internationalnaya 246640 Gomel, Belarus Tel.: +375/ 232 53 42 70 +375/ 232 53 21 69 Fax: +375/ 232 53 37 69 elmis_ltd@yahoo.com	Turkey - Türkei Bosch Rexroth Otomasyon San & Tic. A..S. Fevzi Cakmak Cad No. 3 34630 Sefaköy Istanbul Tel.: +90 212 541 60 70 Fax: +90 212 599 34 07	Slowenia - Slowenien DOMEL Otoki 21 64 228 Zelezniki Tel.: +386 5 5117 152 Fax: +386 5 5117 225 brane.ozebek@domel.si	

Africa, Asia, Australia – incl. Pacific Rim

Australia - Australien AIMS - Australian Industrial Machinery Services Pty. Ltd. 28 Westside Drive Laverton North Vic 3026 Melbourne Tel.: +61 3 93 243 321 Fax: +61 3 93 243 329 Hotline: +61 4 19 369 195 terryobrien@aimservices.com.au	Australia - Australien Bosch Rexroth Pty. Ltd. No. 7, Endeavour Way Braeside Victoria, 31 95 Melbourne Tel.: +61 3 95 80 39 33 Fax: +61 3 95 80 17 33 mel@rexroth.com.au	China Shanghai Bosch Rexroth Hydraulics & Automation Ltd. Waigaoqiao, Free Trade Zone No.122, Fu Te Dong Yi Road Shanghai 200131 - P.R.China Tel.: +86 21 58 66 30 30 Fax: +86 21 58 66 55 23 richard.yang_sh@boschrexroth.com.cn gf.zhu_sh@boschrexroth.com.cn	China Shanghai Bosch Rexroth Hydraulics & Automation Ltd. 4/f, Marine Tower No.1, Pudong Avenue Shanghai 200120 - P.R.China Tel: +86 21 68 86 15 88 Fax: +86 21 58 40 65 77
China Bosch Rexroth China Ltd. 15/F China World Trade Center 1, Jianguomenwai Avenue Beijing 100004, P.R.China Tel.: +86 10 65 05 03 80 Fax: +86 10 65 05 03 79	China Bosch Rexroth China Ltd. Guangzhou Repres. Office Room 1014-1016, Metro Plaza, Tian He District, 183 Tian He Bei Rd Guangzhou 510075, P.R.China Tel.: +86 20 8755-0030 +86 20 8755-0011 Fax: +86 20 8755-2387	China Bosch Rexroth (China) Ltd. A-5F., 123 Lian Shan Street Sha He Kou District Dalian 116 023, P.R.China Tel.: +86 411 46 78 930 Fax: +86 411 46 78 932	China Melchers GmbH BRC-SE, Tightening & Press-fit 13 Floor Est Ocean Centre No.588 Yanan Rd. East 65 Yanan Rd. West Shanghai 200001 Tel.: +86 21 6352 8848 Fax: +86 21 6351 3138
Hongkong Bosch Rexroth (China) Ltd. 6th Floor, Yeung Yiu Chung No.6 Ind Bldg. 19 Cheung Shun Street Cheung Sha Wan, Kowloon, Hongkong Tel.: +852 22 62 51 00 Fax: +852 27 41 33 44 alexis.siu@boschrexroth.com.hk	India - Indien Bosch Rexroth (India) Ltd. Rexroth Indramat Division Plot. A-58, TTC Industrial Area Thane Turbhe Midc Road Mahape Village Navi Mumbai - 400 701 Tel.: +91 22 7 61 46 22 Fax: +91 22 7 68 15 31	India - Indien Bosch Rexroth (India) Ltd. Rexroth Indramat Division Plot. 96, Phase III Peenya Industrial Area Bangalore - 560058 Tel.: +91 80 41 70 211 Fax: +91 80 83 94 345 mohanvelu.t@boschrexroth.co.in	India - Indien Bosch Rexroth (India) Ltd. 1st Floor, S-10 Green Park ext. Market New Delhi – 110016 Tel.: +91 1 16 56 68 88 Fax: +91 1 16 56 68 87
Indonesia - Indonesien PT. Rexroth Wijayakusuma Building # 202, Cilandak Commercial Estate Jl. Cilandak KKO, Jakarta 12560 Tel.: +62 21 7891169 (5 lines) Fax: +62 21 7891170 - 71	Japan Bosch Rexroth Automation Corp. Service Center Japan Yutakagaoka 1810, Meito-ku, NAGOYA 465-0035, Japan Tel.: +81 52 777 88 41 +81 52 777 88 53 +81 52 777 88 79 Fax: +81 52 777 89 01	Japan Bosch Rexroth Automation Corp. Rexroth Indramat Division 1F, I.R. Building Nakamachidai 4-26-44, Tsuzuki-ku YOKOHAMA 224-0041, Japan Tel.: +81 45 942 72 10 Fax: +81 45 942 03 41	Korea Bosch Rexroth-Korea Ltd. Electric Drives and Controls Bongwoo Bldg. 7FL, 31-7, 1Ga Jangchoong-dong, Jung-gu Seoul, 100-391 Tel.: +82 234 061 813 Fax: +82 222 641 295
Korea Bosch Rexroth-Korea Ltd. 1515-14 Dadae-Dong, Saha-Ku Rexroth Indramat Division Pusan Metropolitan City, 604-050 Tel.: +82 51 26 00 741 Fax: +82 51 26 00 747 gyhan@rexrothkorea.co.kr	Malaysia Bosch Rexroth Sdn.Bhd. 11, Jalan U8/82, Seksyen U8 40150 Shah Alam Selangor, Malaysia Tel.: +60 3 78 44 80 00 Fax: +60 3 78 45 48 00 hockhwa@hotmail.com rexroth1@tm.net.my	Singapore - Singapur Bosch Rexroth Pte Ltd 15D Tuas Road Singapore 638520 Tel.: +65 68 61 87 33 Fax: +65 68 61 18 25 sanjay.nemade @boschrexroth.com.sg	South Africa - Südafrika TECTRA Automation (Pty) Ltd. 71 Watt Street, Meadowdale Edenvale 1609 Tel.: +27 11 971 94 00 Fax: +27 11 971 94 40 Hotline: +27 82 903 29 23 georgv@tectra.co.za
Taiwan Rexroth Uchida Co., Ltd. No.17, Alley 24, Lane 737 Cheng Bei 1 Rd., Yungkang Tainan Hsien Tel.: +886 6 25 36 565 Fax: +886 6 25 34 754 indra.charlie@msa.hinet.net	Thailand NC Advance Technology Co. Ltd. 59/76 Moo 9 Ramintra road 34 Tharang, Bangkhen, Bangkok 10230 Tel.: +66 2 943 70 62 +66 2 943 71 21 Fax: +66 2 509 23 62 sonkawin@hotmail.com		

Nordamerika – North America

USA Headquarters - Hauptniederlassung Bosch Rexroth Corporation Rexroth Indramat Division 5150 Prairie Stone Parkway Hoffman Estates, IL 60192-3707 Tel.: +1 847 6 45 36 00 Fax: +1 847 6 45 62 01 servicebrc@boschrexroth-us.com repairbrc@boschrexroth-us.com	USA Central Region - Mitte Bosch Rexroth Corporation Rexroth Indramat Division Central Region Technical Center 1701 Harmon Road Auburn Hills, MI 48326 Tel.: +1 248 3 93 33 30 Fax: +1 248 3 93 29 06	USA Southeast Region - Südwest Bosch Rexroth Corporation Rexroth Indramat Division Southeastern Technical Center 3625 Swiftwater Park Drive Suwanee, Georgia 30124 Tel.: +1 770 9 32 32 00 Fax: +1 770 9 32 19 03	USA SERVICE-HOTLINE - 7 days x 24hrs - **+1-800-860-1055**
USA East Region – Ost Bosch Rexroth Corporation Rexroth Indramat Division Charlotte Regional Sales Office 14001 South Lakes Drive Charlotte, North Carolina 28273 Tel.: +1 704 5 83 97 62 +1 704 5 83 14 86	USA Northeast Region – Nordost Bosch Rexroth Corporation Rexroth Indramat Division Northeastern Technical Center 99 Rainbow Road East Granby, Connecticut 06026 Tel.: +1 860 8 44 83 77 Fax: +1 860 8 44 85 95	USA West Region – West Bosch Rexroth Corporation 7901 Stoneridge Drive, Suite 220 Pleasant Hill, California 94588 Tel.: +1 925 227 10 84 Fax: +1 925 227 10 81	
Canada East - Kanada Ost Bosch Rexroth Canada Corporation Burlington Division 3426 Mainway Drive Burlington, Ontario Canada L7M 1A8 Tel.: +1 905 335 55 11 Fax: +1 905 335-41 84 michael.moro@boschrexroth.ca	Canada West - Kanada West Bosch Rexroth Canada Corporation 5345 Goring St. Burnaby, British Columbia Canada V7J 1R1 Tel. +1 604 205-5777 Fax +1 604 205-6944 david.gunby@boschrexroth.ca	Mexico Bosch Rexroth Mexico S.A. de C.V. Calle Neptuno 72 Unidad Ind. Vallejo 07700 Mexico, D.F. Tel.: +52 5 754 17 11 +52 5 754 36 84 +52 5 754 12 60 Fax: +52 5 754 50 73 +52 5 752 59 43 mariofelipe.hernandez@boschrexroth.com.mx	Mexico Bosch Rexroth S.A. de C.V. Calle Argentina No 3913 Fracc. las Torres 64930 Monterrey, N.L. Tel.: +52 8 333 88 34...36 +52 8 349 80 91...93 Fax: +52 8 346 78 71 mario.quiroga@boschrexroth.com.mx

Südamerika – South America

Argentina - Argentinien Bosch Rexroth S.A.I.C. "The Drive & Control Company" Acassuso 48 41/47 1605 Munro Provincia de Buenos Aires Tel.: +54 11 4756 01 40 Fax: +54 11 4756 01 36 victor.jabif@boschrexroth.com.ar	Argentina - Argentinien NAKASE Servicio Tecnico CNC Calle 49, No. 5764/66 B1653AOX Villa Balester Provincia de Buenos Aires Tel.: +54 11 4768 36 43 Fax: +54 11 4768 24 13 nakase@usa.net nakase@nakase.com gerencia@nakase.com (Service)	Brazil - Brasilien Bosch Rexroth Ltda. Av. Tégula, 888 Ponte Alta, Atibaia SP CEP 12942-440 Tel.: +55 11 4414 56 92 +55 11 4414 56 84 Fax sales: +55 11 4414 57 07 Fax serv.: +55 11 4414 56 86 alexandre.wittwer@rexroth.com.br	Brazil - Brasilien Bosch Rexroth Ltda. R. Dr.Humberto Pinheiro Vieira, 100 Distrito Industrial [Caixa Postal 1273] 89220-390 Joinville - SC Tel./Fax: +55 47 473 58 33 Mobil: +55 47 9974 6645 prochnow@zaz.com.br
Columbia - Kolumbien Reflutec de Colombia Ltda. Calle 37 No. 22-31 Santafé de Bogotá, D.C. Colombia Tel.: +57 1 368 82 67 +57 1 368 02 59 Fax: +57 1 268 97 37 reflutec@neutel.com.co reflutec@007mundo.com			

Printed in Germany