



USB Interface+ User Manual

Gesytec GmbH
Pascalstr. 6
52076 Aachen, Germany

Tel. + (49) 24 08 / 9 44-0
Fax + (49) 24 08 / 94 4-100
email: info@gesytec.de
www.gesytec.com

Doc. ID: LVU/UserDoc/LVU_Manual-EN-v1.4.docx,
Version v1.4, 07/02/2014



This manual ...

... provides you with all the information which you will require to use the Easyton[®] USB Interface⁺.

However, this manual will neither explain aspects of Echelon's[®] LONWORKS[®] technology, nor details of the ISO/IEC 14908 standard on which this product is based, nor Echelon's Microprocessor Interface Program (MIP). Details concerning the Easyton VNI Interface USB network driver, which has been designed in accordance with the driver specifications of the Echelon Corporation and above named standard are not part of this documentation. For further information on the LONWORKS technology please refer to the extensive documentation provided by Echelon. Especially Echelon's "LONWORKS Host Application Programmer's Guide" will be required if applications are to be developed using Gesytec's Easyton Interfaces as a network interface.

After a general presentation of the Easyton USB Interface⁺ in Chapter 1, Chapter 2 describes the necessary steps to install the module.

Chapter 3 contains a general technical description.

Chapter 4 provides some information on the usage of the Interface⁺ as virtual network node (MIP).

This documentation is subject to changes without notice. Gesytec assumes no responsibility or liability for any errors or inaccuracies that may appear in this document.

Gesytec shall have no liability or responsibility to the original purchaser or any other person or entity with respect to any claim, loss, liability, or damage caused or alleged to be caused directly or indirectly by any Gesytec product or the accompanying documentation.

Easyton is registered trademark of Gesytec GmbH.

Echelon, LON, LONWORKS, and NEURON are registered trademarks of Echelon Corporation. Windows is a registered trademark of Microsoft. Other names may be trademarks of their respective companies.

Contents

- 1 Product Information4**
 - 1.1 Scope of Delivery4
 - 1.2 Overview4
 - 1.2.1 Network Side5
 - 1.2.2 USB Side.....5
 - 1.2.3 VNI (Virtual Network Interface)6
 - 1.2.4 MIP6
- 2 Installation7**
 - 2.1 Hardware Installation7
 - 2.2 Driver Installation7
 - 2.2.1 Driver for Windows Operating System (WDM Drivers)8
 - 2.2.1.1 Installation using the Windows Assistant8
 - 2.2.1.2 Manual Installation and Update8
 - 2.2.1.3 Driver Instances8
 - 2.2.1.4 Parameter Setting9
 - 2.2.1.5 De installation12
 - 2.2.2 Windows and 16 Bit Applications12
 - 2.2.3 EasyCheck – Test Utility for Windows Drivers13
- 3 Technical Description14**
 - 3.1 Network Interface14
 - 3.2 USB Interface.....14
 - 3.3 Connector Pin Assignment14
 - 3.4 Status LED15
 - 3.5 Technical Specification.....15
- 4 Programming Information.....16**
 - 4.1 LONWORKS Network Node.....16
- 5 List of Figures.....17**
- 6 List of Tables17**
- 7 Index.....18**

1

Product Information



Figure 1-1 Easylon USB Interface⁺

1.1 Scope of Delivery

- PC plug-in card
- Mounting instruction
- USB cable
- Installation and documentation disk (CD-ROM) with
 - network drivers for 32 bit and 64 bit versions of Windows¹ XP, Vista, 7, 8, Server 2003, 2008, 2008 R2, 2012
 - Easylon RNI Software for remote LONWORKS access
 - EasyCheck utility for Easylon Interfaces
 - WLDV32.DLL
 - Documentation

1.2 Overview

The Easylon USB Interface⁺ is a network interface link between a personal computer with USB and a control network following the ISO/IEC 14908 standard or the LONWORKS specifications. A FTT-10 transceiver for usage in free topology (TP/FT) Networks is used.

As an Easylon Interface⁺ the network interface provides up to eight logical driver interfaces thus realizing the parallel access of several applications to the network either in MIP or LNS compatible mode.

¹ A Linux driver is available in source code on demand.

1.2.1 Network Side

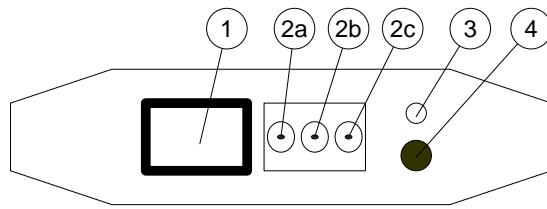


Figure 1-2 Network side connectors and LEDs

- (1) RJ-45 (pins 1 and 2: network, 7 GND)
- (2) screw-plug terminal
- (2a) shield, (2b) and (2c) network
- (3) status LED (yellow)
- (4) service button

The Easylyon USB Interface⁺ is provided with a service button and status LED. The module provides two connectors, either of which can be used:

- RJ-45 socket
- 3 pin screw-plug terminal

1.2.2 USB Side

Significant feature on the USB side is the USB socket. The red and green LED next to it indicate the following:

- | | |
|-------|-------------------------------|
| Green | blinking: in normal operation |
| Red | blinking: firmware is loaded |
| | ON: error, e.g. after reset |

If both LEDs are off, the module is out of operation

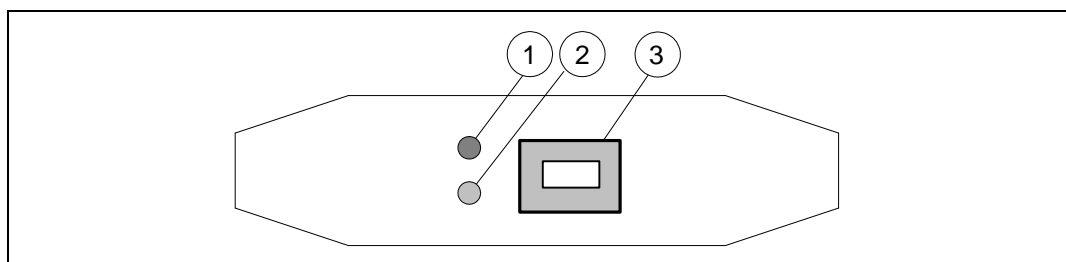


Figure 1-3 USB side connectors and LEDs

- (1) error LED (red)
- (2) status LED (green)
- (3) USB socket

1.2.3 VNI (Virtual Network Interface)

With VNI Echelon defined a transparent mode of operation for LonWorks interfaces. In this mode LonTalk packets are not preprocessed on the interface device, but the PC realized the complete network access. Thus the applications running on the PC receives and sends the messages. VNI interfaces overcome several limitations of the conventional interfaces using MIP or NSI firmware. For instance they offer an increased performance. Easylon Interfaces⁺ are compatible with the Echelon VNI interfaces and can be used with LNS based software such as LonMaker for Windows without problems.

1.2.4 MIP

The Neuron Chip used on the conventional network interface requires a firmware to realize the interface functionality. The de facto standard was the MIP firmware. Many applications still use the functionality of this firmware, which realizes layers 3–5 of the LonTalk protocol, namely network, transport and session. Using the drivers of the Easylon VNI Interfaces (Interface⁺) up to 8 logical MIP interfaces can be used with one interface card, i.e. an Easylon VNI Interface replaces 8 standard MIP interface cards.

2

Installation

Please check the delivered items. You must find the Easylon USB Interface+, an USB connector cable and an installation CD, also containing the documentation.

2.1 Hardware Installation

Connect the USB socket of the Interface module to an USB port of the PC using the cable delivered with the device (cf. Figure 1-3, (3)). Connectors can be identified by the sticker at the device bottom..



Figure 2-1 USB rear side

After installing the drivers as described in the chapter below, connect the USB device to the LonWorks network using either the RJ45 jack or the 3 pin screw plug connector which can be used alternatively (cf. Figure 1-2, (1), (2)).

2.2 Driver Installation

Drivers for different operating systems are available for the Easylon PCIe Interface. Currently these are Windows 2000, XP, Vista, 7 and 8 and the Windows Server OS 2003, 2008 und 2008 R2, 2012. The drivers support both, the 32 and the 64 bit version of these operating systems. Latest driver versions you can download via the Easylon Support pages of our web site: www.gesyttec.com Installation is describe in the following sections:

Windows operating systems

chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**

16-bit driver under 32-bit Windows

chapter 2.2.2

This section also describes in short the diagnosis utility “EasyCheck” which can be installed separately from CD.

The “Driver and Documentation” CD will lead you to the installation of drivers for different operating systems (OS). However, all setups can as well be started manually for each OS and the respective interface card directly from the CD.

2.2.1 Driver for Windows Operating System (WDM Drivers)

This section describes installation and setup of the Easylon Interface card drivers for the Windows operating system from Windows XP onwards.

The setup program is using the same WDM driver (Windows Driver Model) for all operating systems.

Note: For installation you can either use the Windows assistant or the program FastUpd.exe for manual installation. The latter is especially helpful if you are running Windows 7 and later or have to install several instances of the driver.

Finally de-installation of the driver is explained

2.2.1.1 Installation using the Windows Assistant

After the Easylon Interface has been mounted Windows will recognize the new device and start the hardware assistant.

If Windows should not find the driver on the “Drivers and Documentation” CD or the driver should be elsewhere, please select the appropriate drive and select the setup file “LvXLvu.inf” and the driver “Gesyttec Lvuwdm Driver” from the “LvXLvu“ directory.

2.2.1.2 Manual Installation and Update

The easiest way to install the driver is to ignore the hardware assistant and run

FastUpd.exe or FastUpd64.exe²

from the „LvXLvu“ folder of the CD-ROM.

The same program you will use to update an existing driver.

2.2.1.3 Driver Instances

The driver consists of a basic part for the interface hardware “LVU_{x-y}”³ and of up to eight logical VNI drivers „LVU_{x-y-Vniz}“ and up to eight logical MIP driv-

² For 64-bit systems

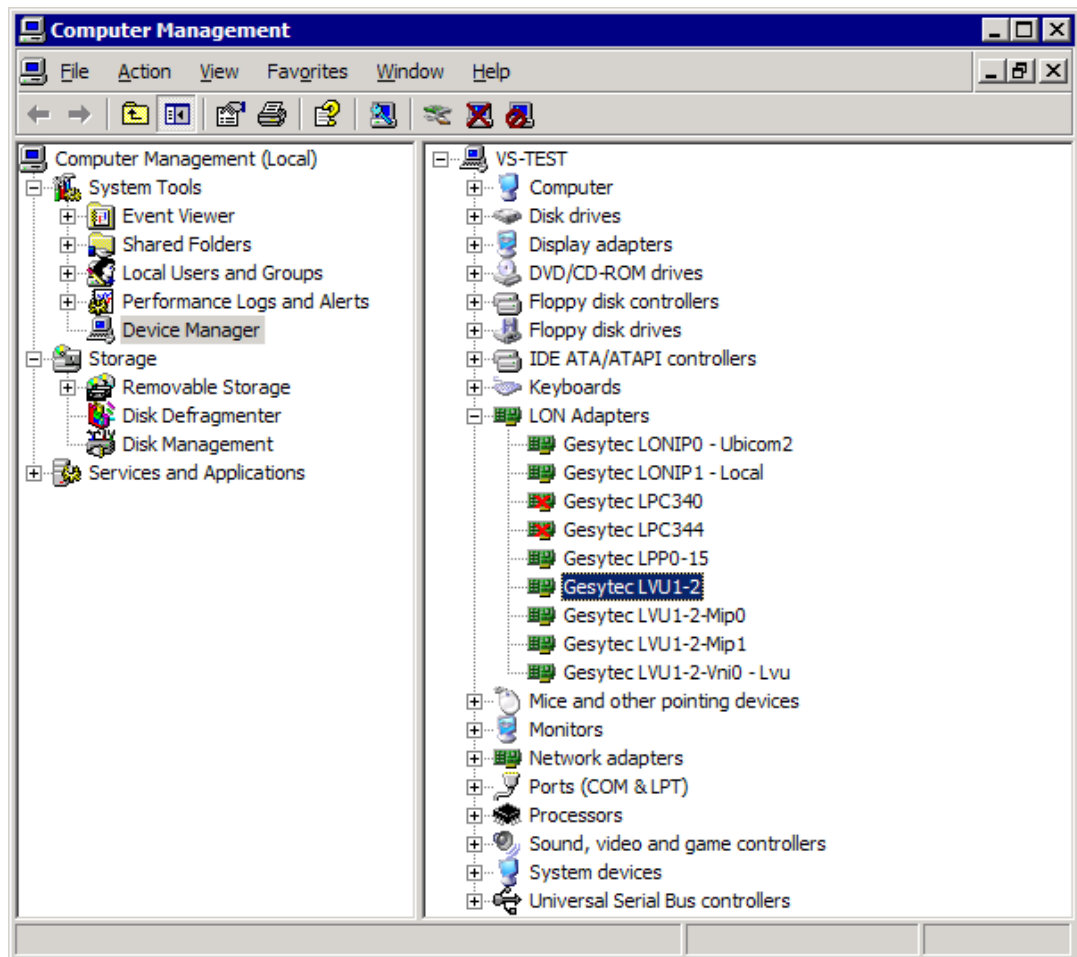
³ x is designating the number of the USB host controller and y the port. If external hubs have been cascaded the respective port numbers are given as well.

ers, „LVUx-y-Mipz“. These driver instances can be used like independent network interfaces.

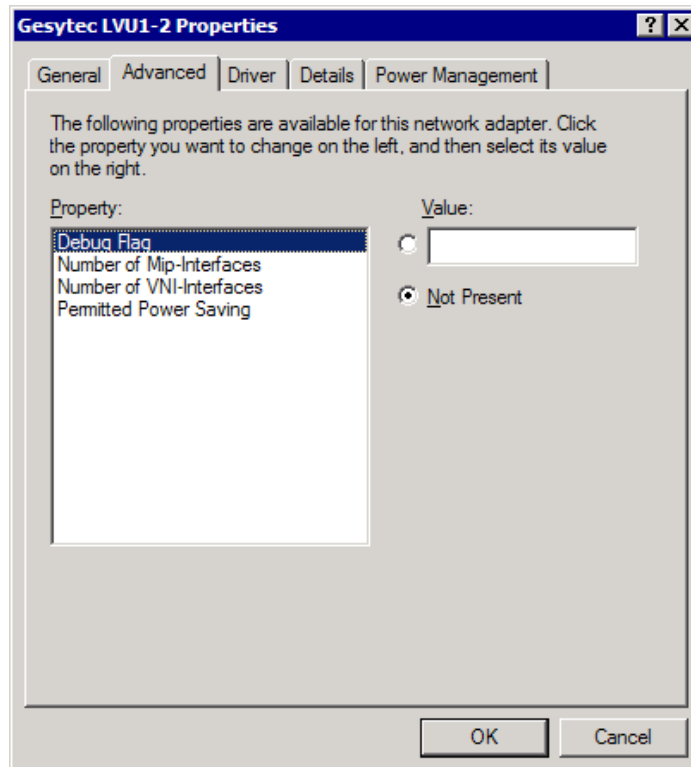
For each logical driver instance an individual node-id (unique identification corresponding to the Neuron-ID) is used. VNI and MIP drivers with the last digit z will be assigned the same node-id. There is a maximum of 8 node-id available for each interface device.

2.2.1.4 Parameter Setting

Settings for the Easylyon VNI Interfaces can be parameterized in the Device Manager. Select the respective interface board under LON Adapters and modify the settings.



The „Advanced“ TAB allows setting of individual properties. Parameters for interface device.



Debug Flag

This field contains a DWORD in hexadecimal notation of different flags for debug purposes. Usually it is set to 0 (= not existing). By setting the single bits certain debug features can be turned on. At the moment the bits 1 and 3 are used:

- Bit 1: Telegrams at the interface between PC and interface hardware are displayed in the debug output.
- Bit 3: CREATE and CLOSE of the driver are displayed in the debug output.

NOTE: The Debug Output can be displayed using, for example, the program DebugView, available at www.sysinternals.com.

Number of MIP -Interfaces

The number of virtual MIP-Interfaces can be set here (0 – 8, default = 2).

Number of VNI-Interfaces

The number of virtual VNI-Interfaces (Interfaces⁺) can be set here (0 – 8, default = 1).

ATTENTION There are 8 node-IDs available for each interface device. These have to be assigned appropriately to the applications using the device either as VNI or as a

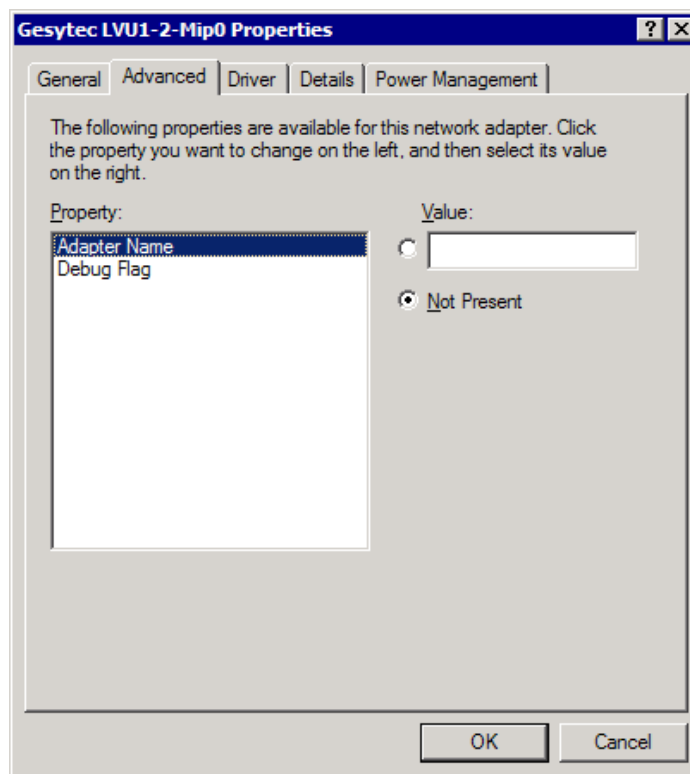
MIP interface. If, for example, a VNI application is using the instance LVU_x-y-Vni0 with its corresponding node-id, a MIP application must not use the instance LVU_x-y-Mip0.

VNI applications (e.g. LNS) usually generate a node-id of their own, which will then be additional to the 8 standard node-id belonging to the interface device.

Permitted Power Saving

Usually the LON USB adapter allows a standby mode with applications running (Standby). At certain conditions however, (e.g. LON USB adapter using a hub under Windows 2000) the current supply to the USB adapter will be shortly interrupted during return from the standby mode by the hub. Under such conditions the standby mode must be turned off (None).

Parameters for logical instance



Adapter Name

An arbitrary name can be chosen freely (e.g. building 7).

NOTE This name must not be used by another instance. If the name is already in use, the device will not start (code 10).

Debug Flag

This field contains a DWORD in hexadecimal notation of different flags for debug purposes. Usually it is set to 0 (= not existing). By setting the single bits certain debug features can be turned on. At the moment the bits 0, 1 and 3 are used:

- Bit 0: LON telegrams at the interface from and to the application are displayed in the debug output.
- Bit 1: Telegrams at the interface between PC and interface hardware are displayed in the debug output.
- Bit 3: CREATE and CLOSE of the driver are displayed in the debug output.

2.2.1.5 De installation

WDM drivers are de installed using the “Device Manager”. Among “LON Adapters” select the “Gesyttec LVUx-yy” driver and click “de-install”.

2.2.2 Windows and 16 Bit Applications

The Windows driver for the 32 bit Windows versions also provides a 16 bit interface. (Unfortunately Microsoft does not support this in the 64 bit versions.) To use it, the following entry has to be made in the file „config.nt“, usually found in the windows\system32 directory:

```
Device=%SystemRoot%\system32\lpxdos.exe -Llvu1-2-Mip0
```

The 32 bit LON device used is specified by the optional -L or /L parameter:

```
//Lname
```

name =

```
lvu1-2-Mip0
```

for device LVU at USB host controller 1 and with port number 2 at USB root hub

Note: Two subsequent “l” characters have to be entered, one indicating the parameter -L, the second as first character of the name: -Llxxxx

The 16 bit LON device used is specified by the following optional parameter:

```
/Dn
```

with n = 1...9 for LON1 to LON9

Without this parameter, the interface will be assigned the first unused name starting with “LON1”.

2.2.3 EasyCheck – Test Utility for Windows Drivers

In addition to the drivers, the test utility “EasyCheck” can be installed in the respective program directory (default: : \Easylon\Lpx). The program checks interface and software environment and displays information, from which can be concluded on the reasons for problems in connection with the interface.

EasyCheck runs an analysis of the system’s software. It will open the selected interface, check the driver version and display it. By sending a “query status” command the communication with the hardware is tested. Using the “read memory” command the utility will show if the device is running MIP or NSI firmware. Properly installed Easylon Interfaces will send a corresponding answer.

3 Technical Description

3.1 Network Interface

Easylon Interface⁺ cards are using an FPGA for accessing the control network. The programming is loaded at start up. 512 kbytes RAM are available to the FPGA as network buffer for transmit and receive. For use in protocol analysis each packet received is transmitted to the application with timestamp of 1 ms accuracy. The FPGA is connected to the computer bus.

Eight node-ids are available on the interface for identification within the control network (cf. “ Driver Instances”). The interface status is signaled by a status LED. The Service push button is read by the driver software.

3.2 USB Interface

The Easylon USB Interface⁺ has been developed according to USB 2.0 standard, high speed. It can as well operate at USB 1.1 interfaces.

3.3 Connector Pin Assignment

For network connection the Easylon USB Interface⁺ provides a RJ45 jack and a 3 pin screw-plug terminal, which can be used alternatively. Pin assignment is shown in the below.

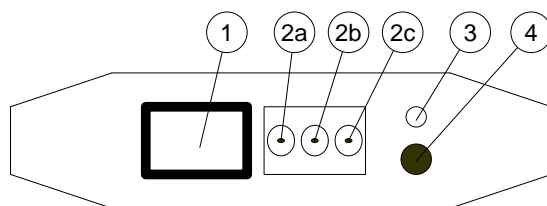


Figure 3-1 Connectors on network side

- (1) RJ-45 (pins 1 and 2: network, 7 GND)
- (2) screw-plug terminal
- (2a) shield, (2b) and (2c) network
- (3) status LED (yellow)
- (4) service button

3.4 Status LED

On its USB side the module shows a red error and a green status LED.

Green	blinking: in normal operation
Red	blinking: firmware is loaded ON: error, e.g. after reset

If both LEDs are off, the module is out of operation

The status LED at the network side (Figure 1-2, 3) signals network traffic.

3.5 Technical Specification

Network Interface

Type	ISO/IEC 14908 compliant control network interface
Node ID	in EEPROM
Transceiver	FTT-10A
Connectors	- RJ 45 - 3 pin screw plug terminal
Usability	Free Topology and Link Power networks

USB Interface

Connector	USB socket (USB Series B)
-----------	---------------------------

Power Supply

Power Consumption	5 V, from USB port 100 mA max.
-------------------	-----------------------------------

Temperature

operation	0 °C – 50 °C
storage	-20 °C – +60 °C

Humidity	according to DIN 40040, class F
----------	---------------------------------

Dimensions

Weight	128 * 71 * 23 [mm] 135 g
--------	-----------------------------

EMC

Immunity	EN 61 000-6-2, (industrial)
Emission	EN 55 022 A/B, (home and industrial)

4 Programming Information

4.1 LONWORKS Network Node

Being an IEC14908 compatible interface device the Easyton Interface⁺ card can be used as a network node in a LONWORKS network. The Interface⁺ can realize one or more virtual MIP interfaces. As the external interface file (.xif) required for using the device as a network node can only be created for a specific application an example .xif file is provided. This must be adapted with the XIF editor prior to usage. The file can be found on the “Drivers & Documentation” CD.

Network Interface	Transmission Rate	XIF –File
TP/FT for virtual MIP interfaces	78 kbps	lolv075f.xif

Table 4-1 Network access and .xif files

5 List of Figures

Figure 1-1	Easyton USB Interface ⁺	4
Figure 1-2	Network side connectors and LEDs.....	5
Figure 1-3	USB side connectors and LEDs.....	5
Figure 2-1	USB rear side	7
Figure 3-1	Connectors on network side.....	14

6 List of Tables

Table 4-1	Network access and .xif files	16
-----------	-------------------------------------	----

7 Index

- 16 bit applications 12
- Adapter Name 11
- connector 15
- connector pin assignment 5, 14
- Debug Flag 10, 12
- dimension 15
- driver 7
- driver instances 8
- EasyCheck 13
- humidity 15
- installation 7
- LED 5
- Linux 4
- MIP 6
- network interface 14
- node ID 15
- Number of Mip-Interfaces 10
- Number of VNI-Interfaces 10
- permitted power saving 11
- power consumption 15
- programming 16
- RJ45 14
- RJ-45 5
- RJ-45 14
- scope of delivery 4
- screw-plug terminal 14
- standby 11
- temperature 15
- transceiver 15
- USB cable 4
- USB interface 14
- USB socket 5
- Virtual Network Interface 6
- VNI 6
- Windows
 - 7 8
- xif file 16