

Tixi Alarm CPU Ethernet

Hardware Manual

HE100 and HE400

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Security Advice

Intended Target Audience

This manual is aimed exclusively at suitably qualified electrical engineering specialists that are familiar with the safety standards required for electrical engineering and automation. The engineering, installation, commissioning, maintenance and testing of devices must only be carried out by qualified electrical technicians. Unless otherwise stated in this manual or other manuals, any intervention in the hardware and software of our products must only be carried out by our specialists.

Proper Use

Tixi Alarm CPUs are only designed for use in the application fields described in this manual. Ensure that all the specifications stated in this manual are observed. Unqualified interventions in the hardware or software, and failure to observe the warnings stated in this manual or on the product may lead to serious injury or material damage. No liability is accepted in such cases and any warranty claims become invalid.

Safety Instructions

The safety and accident prevention regulations specified for the application concerned must be observed during the engineering, installation, maintenance and testing of devices.

This manual contains special instructions that are important for the safe and proper handling of the device. The warning symbols of the individual instructions have the following meaning:



DANGER:

Means that there is a danger to the life and health of the user if the relevant safety measures are not taken.



ATTENTION:

Is a warning of possible damage to the device, software or other material damage if the relevant safety measures are not taken.

1 Tixi Alarm CPU Ethernet At A Glance

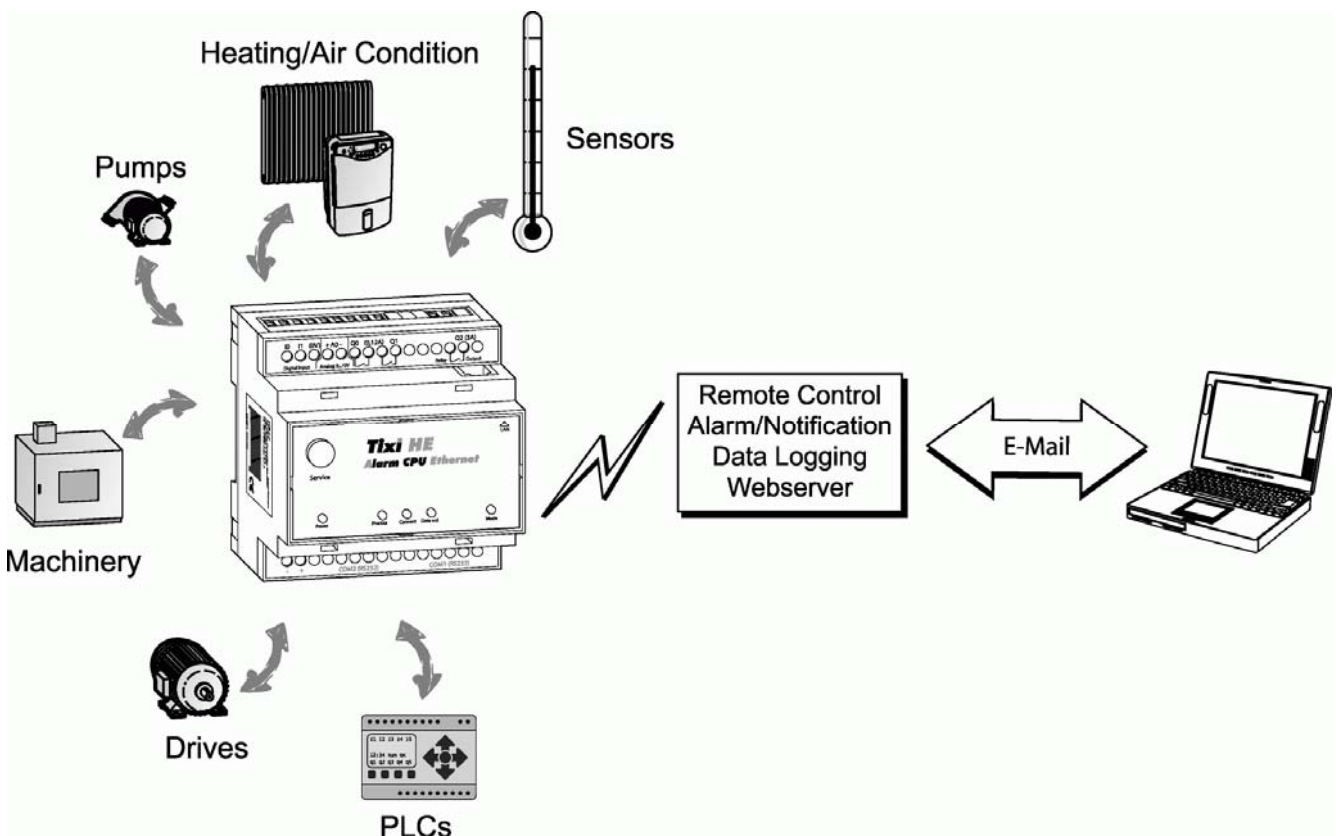
Tixi Alarm CPUs are new automatic control devices with a large data memory, several functions and integrated Internet technology. They are designed as intelligent communication computers with a 32-bit power CPU and a 2 MB non-volatile Flash memory. This can be expanded by up to 64 MB, thus providing enough space for your current and future data requirements.

Tixi Alarm CPUs work fully automatic and can

- send alarm and status messages via E-Mail
- receive switch commands via E-Mail or HTTP request and forward them to a PLC
- send the data of a connected PLC/system,
- exchange data between PLC/systems

1.1 State-Of-The-Art Communication

The Tixi Alarm CPU can communicate directly with the PLCs of several manufacturers using the relevant PLC protocol. Different bus systems are supported, too. User-friendly XML-based software allows the required functions to be configured easily.



The wide range of features available on the Tixi Alarm CPUs provide solutions for a number of applications such as the monitoring of temperature, pressures, levels, or the activation of motors, fans, pumps, slide valves and flaps.

1.2 Easy to retrofit

Tixi Alarm CPUs can be integrated in existing systems with a minimum of effort. The communication protocols of commonly used PLCs are already implemented and so modifications to the PLC program are normally not required.

2 Function Overview

2.1 Integrated PLC Protocols

Tixi Alarm CPUs can communicate directly with the PLCs of leading manufacturers using the relevant PLC protocol, and access PLC variables, markers and ports via the PLC programming interface. This can be achieved without having to adapt the PLC program or load a special function block for communication.

These protocols are supported:

- ABB
- Allen Bradley
- Berthel
- Carel
- Tixi
- Modbus
- Moeller
- SAIA
- Siemens
- Tixibus
- VIPA

OEM Protocols

Manufacturers (OEM) and customers with special PLCs may utilize one of these options:

- Common access to Modbus industrial standard or to the TixiBus protocol
- Tixi.Com implements the appropriate protocol into the Tixi Alarm CPUs.

2.2 Remote switching via HTTP request and E-Mail

A short command via HTTP request or E-mail can switch the optional outputs of the Tixi Alarm CPU, as well as those of a connected PLC. PLC variables may be set this way, too.

The execution of the command can also be acknowledged. 100 SMS switch commands with up to 10 parameters each can be defined as required. PLC variables can be queried quickly and with ease by E-mail without the need for a PC.

2.3 PLC Data Logging

Tixi Alarm CPUs may record any PLC data (variables, ports) and system data with timestamp inside the non-volatile Flash memory (2 MB - 66 MB). The poll cycle may be adjusted at will, as well as the extent of data being logged.

The logged data is sent as XML text file or as Excel-compliant CSV via E-mail. This may be triggered periodically via scheduler, or by a specific event occurring. There may be several logfiles in use at the same time. The memory acts as a ring buffer.

	A	B	C	D
1	Zeit	Temp_1	Temp_2	AirCond
2	09:00	21,3	11,5	0
3	09:10	21,3	11,5	0
4	09:20	21,4	11,4	0
5	09:30	21,3	11,3	0
6	09:40	21,4	11,3	0
7	09:50	21,4	11,4	0
8	10:00	21,5	11,5	0
9	10:10	21,4	11,5	0
10	10:20	21,5	11,6	1
11	10:30	21,6	11,7	1
12	10:40	21,8	11,7	1
13	10:50	22,1	11,8	1
14	11:00	22,1	11,7	1

2.4 Web Server inside the Tixi Alarm CPU

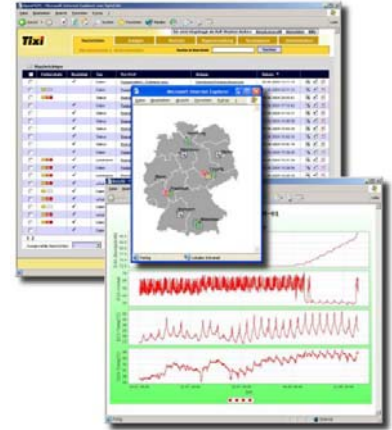
Web server functionality is implemented inside the Tixi Alarm CPU, so any web browser may be used to visualize facility status, PLC data and logfiles respective alter these by mouse click.

For that purpose, merely some HTML pages need to lodge inside the modem. Access is done via telephone network. Static IP addresses are not necessary.

2.5 Web Portal with Database and Facility Record

A variety of PLC systems and Tixi Alarm CPUs may be administered by means of a SQL database. Logged data may be stored, analyzed and visualized here.

Authorized users only are granted access to these data. The database may be adapted to custom needs with ease and is open to other systems as well.



3 Model and Equipment Versions

3.1 Interfaces and Terminals

Tixi Alarm CPUs are available in different configurations. Their basic functions identical; only the type and number of interfaces and I/Os may vary, according to the model used.

Interface	HE121 HE421	HE127 HE427	HE13x HE43x	HE141 HE441	HE147 HE447	HE171 HE471	HE176 HE476	HE123-M HE423-M	HE125-2S0 HE425-2S0
COM1	RS232	RS232	RS232	RS232	RS232	RS232	RS232	RS232	RS232
COM2	0	RS232	RS232	RS485/ 422	RS485/ 422	MPI	MPI	RS232	RS232
Digital In	0	2	0...12*	0	2	0	2	2	2
Analog In	0	1	1	0	1	0	1	0	1
Digital Out	0	2	0...4*	0	2	0	2	1	1
Relay Out	0	1	0	0	1	0	0	0	0
M-Bus	0	0	0	0	0	0	0	1	0
S0-Bus	0	0	0	0	0	0	0	0	2

*Devices featuring different I/O configurations may be manufactured upon request.

The HE400 models vary from the HE100 in that they come with an additional SD card reader.

3.2 Tixi I/O Modules

As accessories, there are Tixi I/O modules available for Tixi Alarm CPUs, which allow the device being expanded by up to 128 additional in- or output ports. Using the Tixi-I/O-Bus, up to 8 extension modules (with up to 128 I/Os at large) may be connected to the Tixi Alarm CPU. The Tixi-I/O-Bus may be used for custom applications, too.

I/O Module	Description
XP84D	8 digital inputs, 4 digital outputs
XP88D	8 digital inputs, 8 digital outputs
XP84DR	8 digital inputs, 4 relay outputs

3.3 Memory Modules

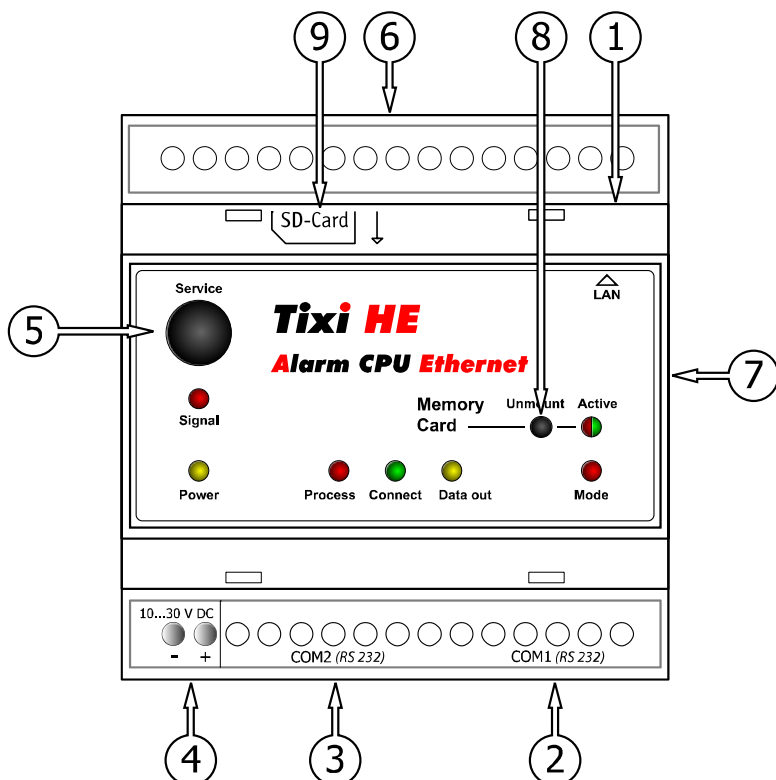
Tixi Alarm CPUs are equipped with 2 MB flash memory which saves data even without power supply. Additional flash memory modules allow to expand this memory to up to 66 MB.

Memory Module	Description
XC016	Tixi Flash Memory Module 16 MB
XC032	Tixi Flash Memory Module 32 MB
XC064	Tixi Flash Memory Module 64 MB

For additional information and purchase of these flash memory modules, please contact your retailer or Tixi.Com Gmbh directly.

4 Installation and Mounting

4.1 Overview of Terminals











Nr.	Label	Meaning
1	Ethernet	Ethernet jack (RJ45) with LEDs (see chapter 5.5)
2	COM1 (RS232)	9-pin D-Sub jack
3	COM2 (RS232)	9-pin D-Sub plug (HE12x, HE42x, HE13x and HE43x only)
3	COM2 (RS485/422)	5 Screw terminals (adjustable via DIP switches, HE14x and HE44x only)
3	COM2 (S7-MPI)	9-pin D-Sub jack (HM17x and HE47x only)
4	18...30 V DC	Power Supply (2 Screw terminals)
5	Service	Button
6	I/Os, M-Bus, S0-Bus and LEDs	depends on device type
7	Tixi I/O-Bus	6-pin precision jack for Tixi Bus connection
8	Unmount	Button to unmount SD Card (HE400 only)
9	SD-Card	SD Card slot (HE400 only)




A detailed depiction of all connectors of all Tixi Alarm CPU models is to be found within chapter 12.5 of this manual.

4.2 Meaning of LEDs





The following table holds an overview of the LED indicators meaning.

LED	Status	Meaning
Power (yellow)		Device operational
		No power supply
Process (red)		Processing in progress: message generation, variable changes etc.
		Normal Operation, no processing in progress
Connect (green)		No meaning
Data out (yellow)		Message ready to send waits inside the device
		No message in outbox
Mode (red)		Local transmode

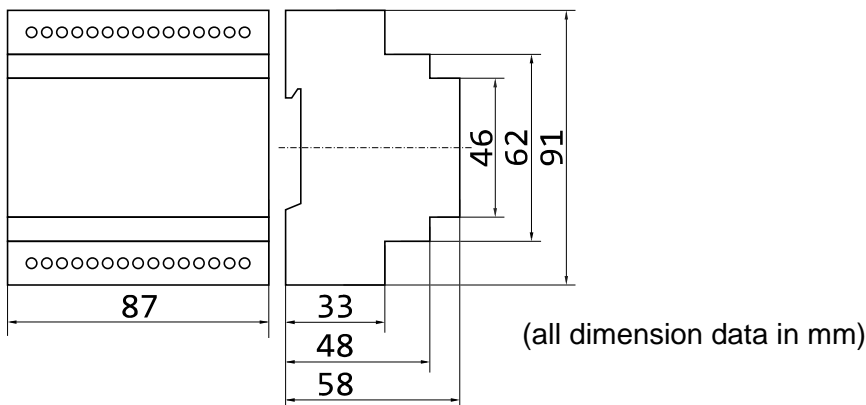
HE17x and HE47x only:

Connect Data		connection to PLC established
	 (flashes)	transmits data to/from PLC
Active Param.		modem is configured correctly and logged onto the MPI network

HE400 only:

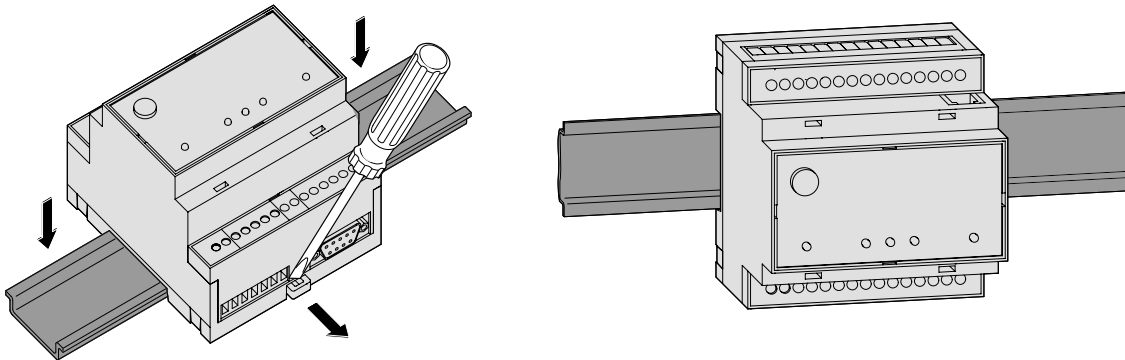
Signal (red)		Freely programmable, for custom use
Active		No SD Card present
		SD Card mounted
	 (flashes)	SD Card access

4.3 Dimensions



4.4 Installation

Mount the device by pushing or snap fitting it onto a DIN rail (top-hat rail 35 mm).



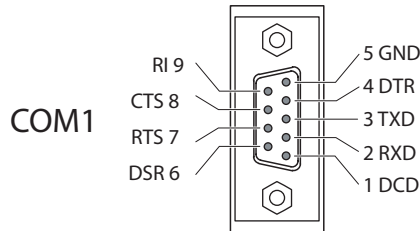
DANGER:

- The device must only be used in rooms that are dry and clean. Protect the device from humidity, water splashes or heat.
- The device must not be used in environments containing flammable gases, fumes or dust.
- Do not subject the device to shock or severe vibration.

5 Interfaces

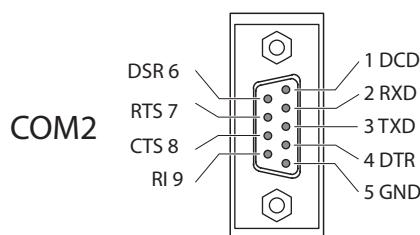
The serial interfaces COM1 und COM2 are to connect a PC, a PLC or other devices.

5.1 COM1 - RS232 (jack)



The RS232 interface COM1 (9-pole D-Sub socket) is provided on all Tixi Alarm CPU models. It is primarily used as a programming interface for connecting a PC. A standard 1:1 serial cable can be used for this (not supplied).

5.2 COM2 - RS232 (plug)



The 9-pole RS232 interface COM2 (plug) can be used for connecting a PLC directly and has the same assignment as the standard RS232 interface of a PC.

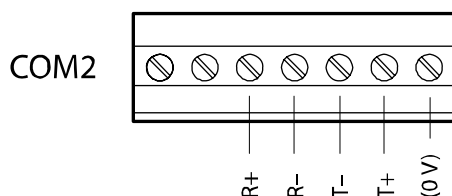
Tixi.Com offers several adapters to use with the RS232 interface. Detailed information on these adapters can be found in chapter 12.3.3 of this manual.

NOTE:

- As most PLCs require the use of a special serial programming cable, the programming cable of the PLC manufacturer should be used in all cases.
- Details on how to connect each PLC can be found in chapter **Fehler! Verweisquelle konnte nicht gefunden werden.** of this manual.

5.3 COM2 - RS485 / RS422

The HG4x series of Tixi Alarm CPUs is equipped with a RS485/422 interface in order to connect 2- and 4-wire bus systems. This interface is implemented as a 5 pin screw terminal, which is not galvanically insulated.

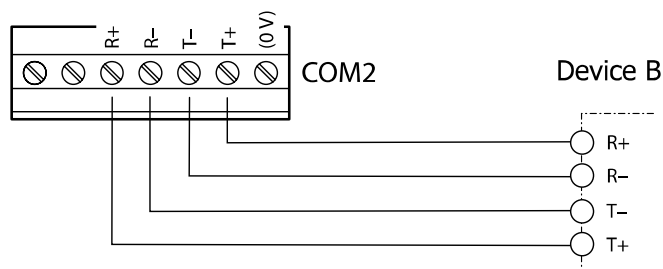


Assignment of the RS485/422, viewed from above.

NOTE:

- We recommend using "Twisted-Pair" cables. For RS422 and 4-wire RS485, two twisted pair cables are to be used.

RS422 Connection

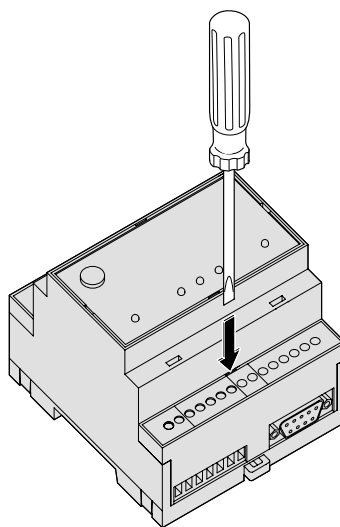


The **Receiving Lines** are to be connected to
*R+ (remote: T+) and
 R- (remote: T-),*
 the **Sending Lines** to
*T+ (remote: R+) and
 T- (remote: R-)*
 according to adjacent figure.

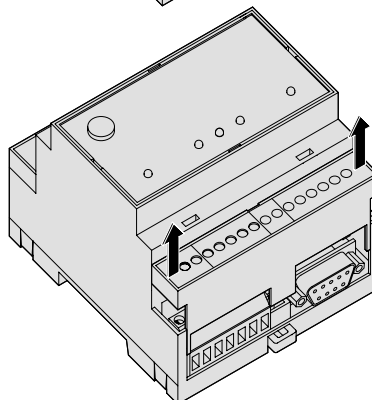
5.3.1 Accessing the DIP Switches

In order to set the operating mode of the RS485/422 interface, DIP switches are to be used. These are located right beneath the COM2 interface and may be accessed after removing the terminal cover:

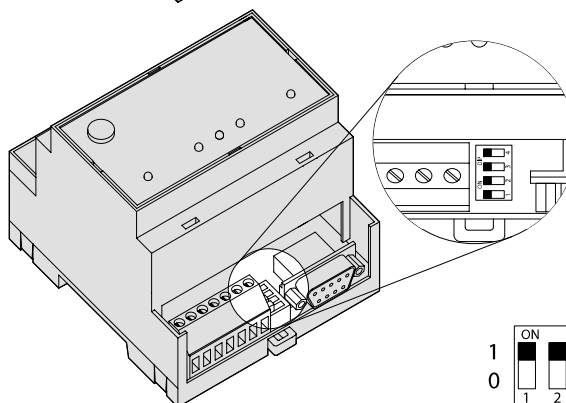
Put a screw driver (with 3 mm blade) into the slit between case and terminal cover and rotate the screw driver a little bit.



With an audible click, the terminal cover snaps out of the case and may be removed now.



Below this cover, you will find the DIP switches. Their exact meaning is described in the following table.



	ON			DIP
1				
0				
	1	2	3	4

5.3.2 *Setting operating mode via the DIP switches*

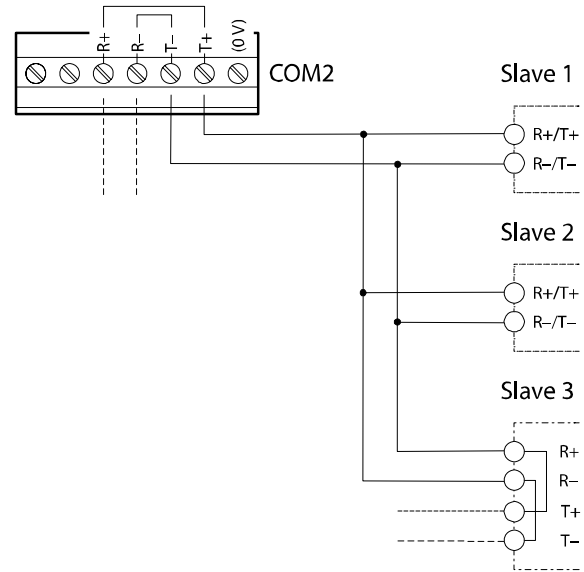
Operating mode	Switch 1	Switch 2	Switch 3	Switch 4	DIP
2-wire RS485 with termination	1	1	1	1	1111
2-wire RS485 w/o termination	0	0	1	1	0011
4-wire RS485 w/o termination	0	0	0	0	0000
4-wire RS485 with termination	1	1	0	0	1100
RS422	0	0	0	0	0000

NOTE:

- RS485 stipulates that the cables should be terminated at both ends of the transmission section. The termination prevents signal reflections in the cables and in times of no data transmission enforces a defined idle state on the bus.
- This termination can be implemented using, for example, specific resistors at the screw terminal. This can also be implemented via the DIP switches on theTixi Alarm CPU.

5.3.3 RS485 2-wire connection

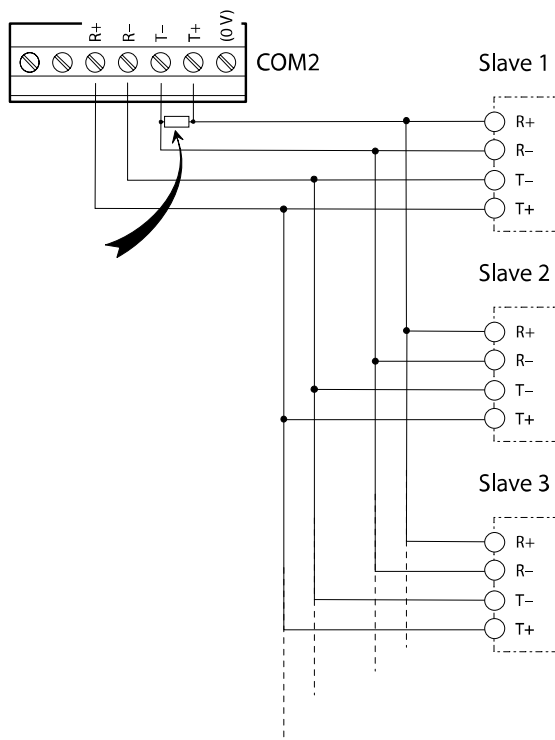
In this operating mode, transmit cables and receive cables are interconnected. If the Tixi Alarm CPU is installed at the beginning (first station) or end (last station) of the bus system, the bus system must be terminated by setting the DIP switches accordingly.



The twisted pair cable is to be connected to
T+ to T+ or R+ and for
T- to T- or R-
according to the adjacent figure.

5.3.4 RS485 4-wire connection

The terminals of the 2 twisted-pair cables are wired in the same way as for the RS422 connection. Both twisted-pair cables must be terminated if the Tixi Alarm CPU is installed at the start or end of the bus cables. The termination of the receive cables is activated via the DIP switches. The transmit cables must be terminated externally (see figure, arrow).



The twisted pair cables are to be connected according to the opposite sketch.

For termination of the sending line, put a resistor (120 Ohm/0,5 W) between the T+ and T- terminals.



ATTENTION:

Always ensure that the end devices are terminated correctly.
Incorrect or missing termination may give rise to communication faults.

5.4 COM2 - MPI (Multi Point Interface)

The MPI is a specific bus and is used to cross-link devices which comply to the Siemens S7-MPI. The MPI bus features RS485 levels and transmission rates of 19,2 or 187,5 kbaud.

The COM2-MPI is implemented as a 9-pin Sub-D jack with pin assignment as follows:

Pin	D-Sub jack MPI
1	n.c.
2	M24V
3	DATA.B
4	RTS AS
5	0V (M5V)
6	n.c.
7	+24V
8	DATA.A
9	RTS PG

NOTE

- Connection to S7 PLC (S7-300/400) is established using the Profibus Plug, which is not included.
- We recommend using the Siemens Profibus Plug (e.g. 6ES7-972-0BB12-0XA0) or any compliant one.

Detailed information on using the MPI can be found in chapter 11 of this manual.



ATTENTION:

Make sure the S7 PLC cable is connected correctly to the COM2. Confusing RS232 (COM1) and MPI (COM2) cables may damage the interfaces.

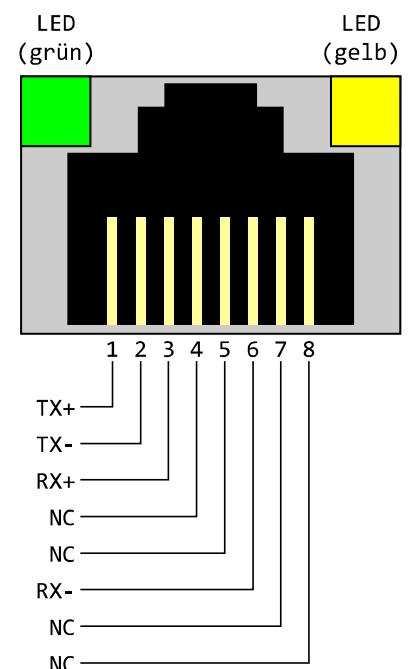
5.5 Ethernet Connection

The Ethernet connection complies to IEE 802.3, being an 8P8C jack (aka "RJ45 jack") and shielded. It's wiring allows to connect the Tixi Alarm CPU to a HUB or Switch using a 1:1 shielded Patch cable. The 8P8C jack holds two LEDs. Their meaning is as follows:

green: on	Ethernet connection established
green: flashes	Data transmission in progress
yellow: off	10 Base-T
Yellow: on	100 Base-T

The connection works in Auto Negotiation mode. Hereby, the data transmission rates are negotiated automatically with the connected HUB or switch.

The adjacent figure depicts the wiring of the 8P8C jack.



5.6 COM3 - M-Bus

The M-Bus is a 2-wire bus system intended for the automatic readout of resource meters, eg. for heating, water supply or electricity.

The M-Bus complies to DIN EN 13757-2 and DIN EN 13757-3. It acts as a master for up to 25 slaves (terminal devices).

M-Bus current usually is 36 V and symmetrically to grounding.

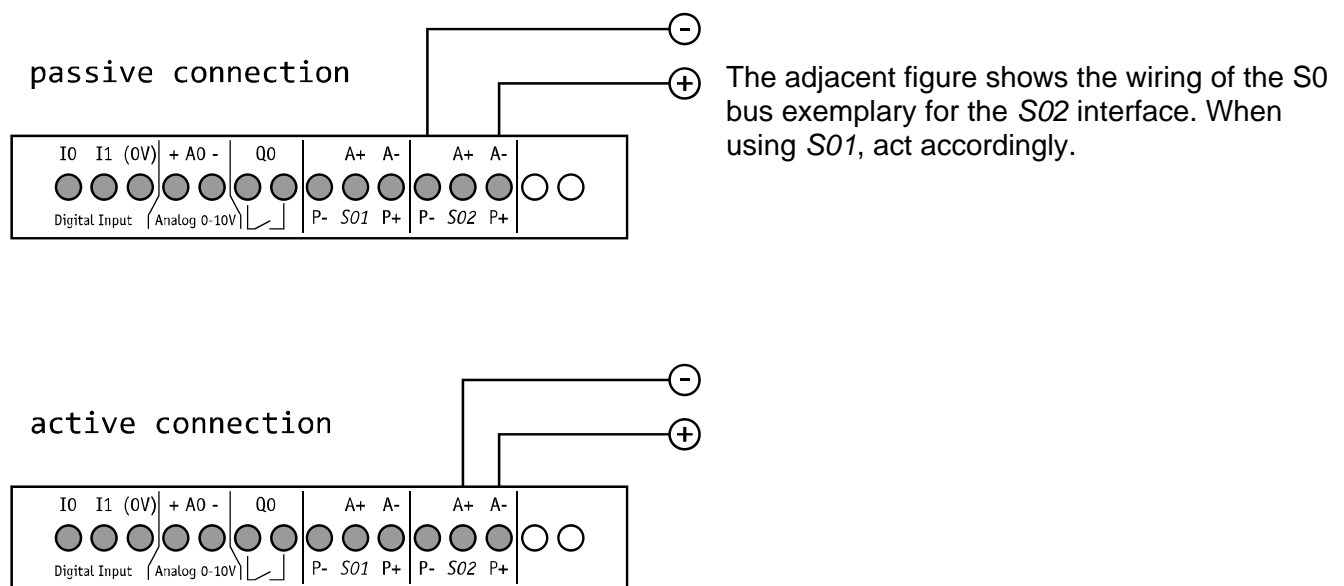
Data communication takes place in both directions with 8 data bits, 1 start bit, 1 stop bit and 1 parity bit (even parity). Baud rates may be 300, 2400, 9600 and 38400.

M-Bus length is ca. 1 km. Twisted telephone cables (unshielded) with 0,8 mm diameter are to be used.

5.7 S0 Power Interface

The power interface S0 is intended for secure transmission of consumption-proportional pulses towards the Alarm Modem, which then sums up these pulses in order to estimate counter readings etc.

The Alarm Modem got 2 S0 interfaces which comply to DIN 43864. Active or passive S0 devices are to be connected to these interfaces. For active connection, the Alarm Modem provides the current, while with passive connection, the S0 device supplies the current necessary for the S0 interface.



Technical data of the S0 interface are to be found within the appendix of this manual.

Both S0 interfaces may be adjusted regarding pulse frequency, pulse width, detection and debouncing time. Details on this matter are to be found within chapter 5.1 of the TiXML reference.

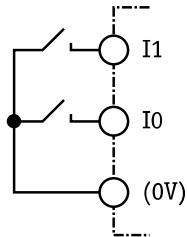
6 Digital and analog I/Os

The Input ports may detect and analyze digital and analog signals. Output and relay ports allow execution of switching commands.

NOTE:

Number and type of I/Os depend on modem type. Detailed overview of modem types and I/O configurations can be found in chapters 3 and 12.5 of this manual.

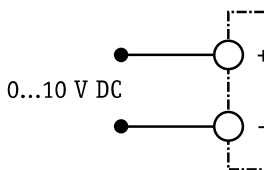
6.1 Digital Input



The digital input ports may be switched via *potential-free* switches or relay contacts.

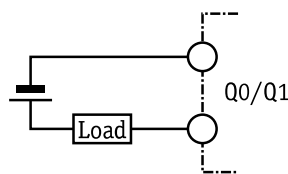
We recommend to keep lines short as possible.

6.2 Analog Input



Analog input ports may detect currents ranging from 0...10 V DC. Typical input power at 10 V is approx. 100 μ A.

6.3 Digital Output



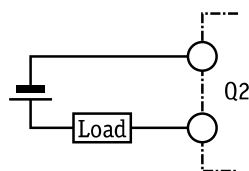
The digital outputs are potential-free and may switch voltages up to 125 V. Maximum load is 0,12 A.



ATTENTION: $I_{\max} = 0,12 \text{ A}$; $U_{\max} = 125 \text{ V AC/DC}$!

The maximum output load must not be exceeded in any case, as otherwise the output ports may be destroyed.

6.4 Relay Output



Ohm resistive and inductive loads may be connected to the relay outputs directly. Maximum load is 3 A / 230 V AC resp. 0,3 A / 110 V DC.



ATTENTION: $I_{\max} = 3 \text{ A at } 230 \text{ V AC} / 0,3 \text{ A at } 110 \text{ V DC}$











The maximum output load must not be exceeded in any case, as otherwise the output ports may be destroyed.

8 Operation

Once all installation steps have been completed, you can start operating the Tixi Alarm CPU.

After power-on, the device performs an automatic self-test, lighting all LEDs and checking all three memory types.

LEDs during the self test on power-up

Power	Process	Line	Data Out	Modem Mode	
					Start self test
					Testing LEDs
			 (flashes)		Memory test
					TAC is operational
Duration: approx. 12 sec					

Memory test

This tests the internal memory with RAM, program memory (Flash ROM) and the file system in the user memory (Flash). On basic models (2 MB for the user memory) this test lasts approx. 12 seconds. If memory expansions have been fitted, the time can be considerably longer depending on the size of memory in use.

Tixi Alarm CPU is operational

The device is then operational once the self-test is completed. If the Tixi Alarm CPU was correctly configured with a project and with the SIM card, it will log into its mobile network provider and “start work”.

9 Configuration and projects

9.1 Initial configuration

You can regard a Tixi Alarm CPU (TAC) in the same way as you would consider a PC with an operating system and many communication programs. After the initial power up, the task memory is empty and the TAC “doesn’t know” what it is meant to do. It has to be configured first of all and assigned a task. The task definition for the TAC with all the relevant data is called a project and is saved in a TiXML project file. These points are explained in the following paragraphs.

9.2 Loading projects in the Alarm Modem

You can create projects with TILA or TICO (see chapter **Fehler! Verweisquelle konnte nicht gefunden werden.**). The required parameters can be entered easily on the PC and then saved on the hard disk of the PC as a TiXML project file. The PIN of the SIM card is also entered via the software and into the project file. The project must then be loaded onto the Tixi Alarm CPU via the serial interface.

The device is now functional as a stand-alone device (i.e. without a PC) and can be used, for example, to monitor PLCs.

9.3 TiXML Console: TICO

For implementation of complex tasks, the Windows-based TICO software is available. Experience with programming in TiXML is recommended but not imperative.

TICO comes with a comprehensive step-by-step tutorial including demo projects, and with a detailed TiXML command reference.

NOTE:

As an introduction to TiXML and TICO, we recommend a 1...2 day training. Please contact Tixi.Com GmbH directly for more information on such training.

Additionally, Tixi.Com offers the service of creating custom projects appropriate to custom needs. Therefore, a project form is to be found at www.tixi.com.

The TiXML manual (chapter 3.14) documents the TCP/IP settings for the Tixi Alarm CPU, regarding IP address, Subnet mask and Gateway.

10 PLC Communication

Tixi Alarm CPUs may communicate with a PLC in these ways:

- The Tixi Alarm CPU can speak the language of your PLC.
Technical feature: The required **PLC driver** is integrated in the Tixi Alarm CPU.
- The PLC can speak the language of the Tixi Alarm CPU.
Technical feature: The **Tixi Driver** is loaded upon the PLC.
- The Tixi Alarm CPU and the PLC can speak a joint language.
Technical feature: Tixi Alarm CPU and PLC use the **same protocol**, e.g. Modbus or TixiBus.

The following sections provide information on how to connect the wide variety of PLCs supported to the Tixi Alarm CPU.

10.1 PLC Drivers inside the Tixi Alarm CPU

In order to enable communication between PLC and Tixi Alarm CPU, you need to select the appropriate feature pack for the PLC to be used. Drivers for PLCs not listed here may be developed by Tixi.Com upon custom need and/or specification.

PLC Manufacturer	PLC Type	Tixi Feature Pack
Tixi Electric	Alpha XL	FP-MIT-AI
	MELSEC FX1S/FX1N, FX2N/FX2NC, FX3U	FP-MIT-FX
Moeller Electric	EASY 400-800, MFD-Titan	FP-ML-EASY
	PS4-Serie	FP-ML-PS4
Siemens	Simatic S7-200	FP-S72
	Simatic S7-300/400	in HG7x integriert
VIPA	100V, 200V, 300V	FP-VIPA
ABB	AC010	FP-ABB-AC10
	AC31	FP-ABB-AC31
Saia Burgess	PCD1, PCD2, PCS	FP-SA-SB
Allen Bradley	PICO (Serie A + B, GFX)	FP-AB-PI
Theben	Pharao2	FP-TH-P2
Fieldbus Standards		
Modbus	RTU	FP-MOD-RTU
	ASCII	FP-MOD-ASC
Other Features		
Simultaneous use of 2 PLC protocols at the same Alarm Modem		FP-PLC2

* Please note that development of custom PLC drivers will be charged.

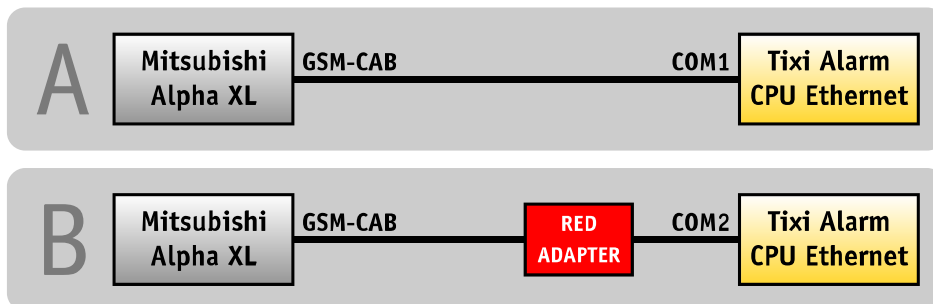
10.2 Mitsubishi Alpha XL

The Tixi Alarm CPU is connected to the Alpha XL using a Tixi GSM-CAB cable.

Please note the following:

- The Alpha XL must hold a program with "serial communication" enabled (9600/8N1). See Alpha XL Programming Software online-help for details. After activating such a program, the Alpha XL must be restarted.
- The GSM-CAB may be connected directly to the COM1 RS232 interface of the Tixi Alarm CPU.
- When using the GSM-CAB for a connection to the COM2 RS232 interface of the Tixi Alarm CPU, the Red Adapter must be used.

The following figure shows the possible connections:



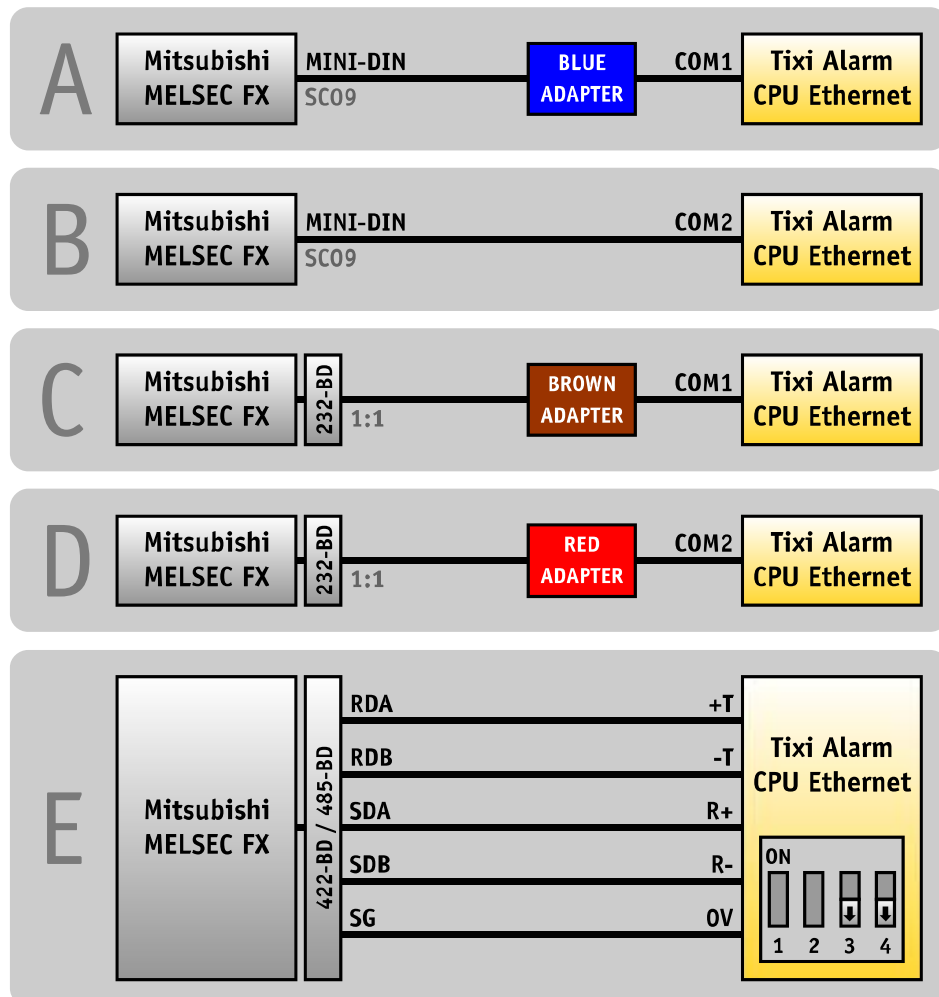
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.3 Mitsubishi MELSEC FX

The Tixi Alarm CPU may be connected to the FX-internal RS422 interface, or to an additional interface extension RS232-BD/RS422-BD/RS485-BD.

When using the BD extension, this interface must be activated with 9600/7E1 by means of the GX Developer Software. Both interfaces may be used simultaneously, e.g. to connect the FX to an Alarm Modem and a display unit at the same time.

The following figure shows the possible connections:

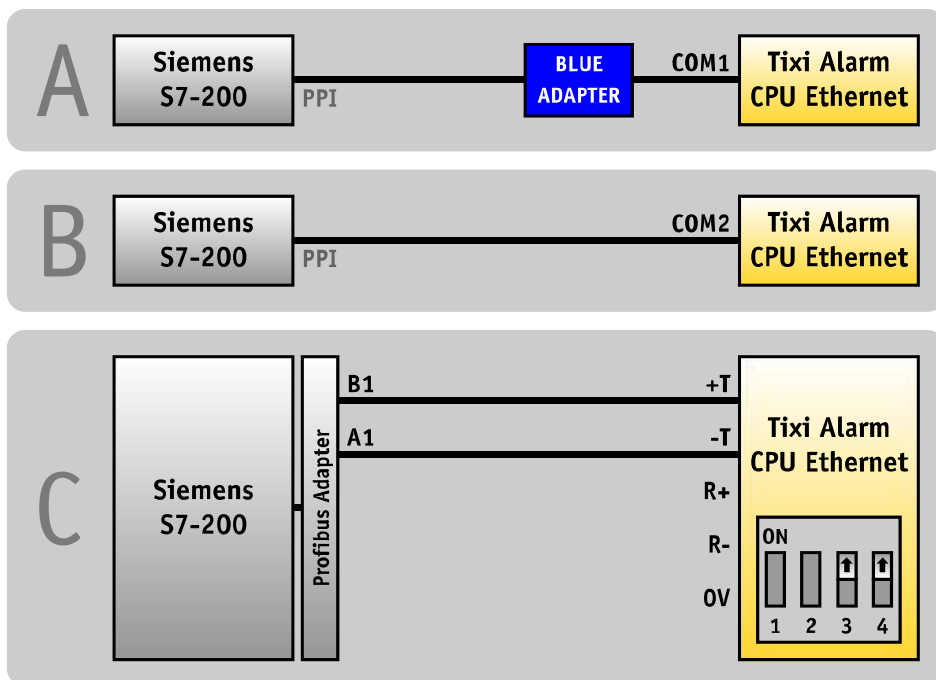


Details on obtaining the Tixi Adapters can be found in chapter 12.4 of this manual.

10.4 Siemens Simatic S7-200 (RS485)

The Siemens S7-200 may be connected via PPI cable (RS2323) or via the Profibus Adapter (RS485 extension card).

The following figure shows the possible connections:

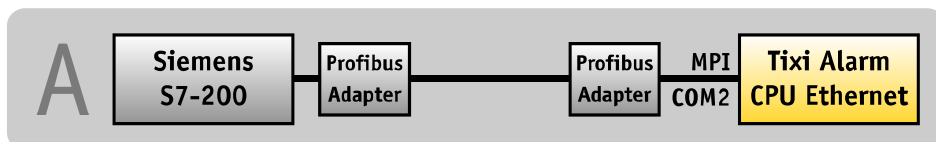


Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.5 Siemens Simatic S7-300/400 (MPI)

The S7-300/400 may be connected to the MPI of a Tixi Alarm CPU HG7x model.

The following figure shows the connection:



Detailed information for operating the Alarm Modem with a S7-300/400 can be found in chapter 11.

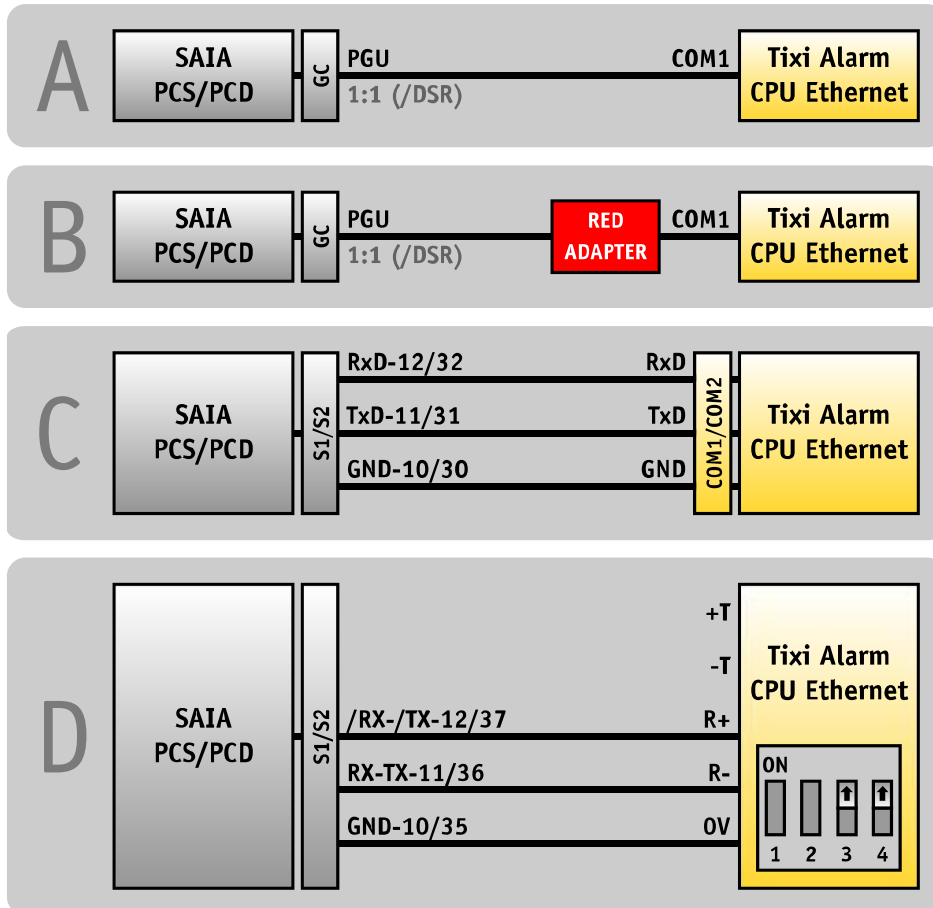
10.6 SAIA Burgess S-Bus

The Tixi Alarm CPU can be connected to any of the 3 serial interfaces S0...S2 of these PLCs. Only a 3-wire cable (RX, TX, GND) is necessary therefore.

Please note:

- When connecting the Tixi Alarm CPU to the PGU port (S0) of the PCD2, the DSR line must *not* be connected, as otherwise the PCD2 will deactivate the S-BUS.
- When connecting the Tixi Alarm CPUs COM1 RS232 interface to the PCD2, the DTR line must *not* be connected, as otherwise the PCD2 will deactivate the S-BUS.

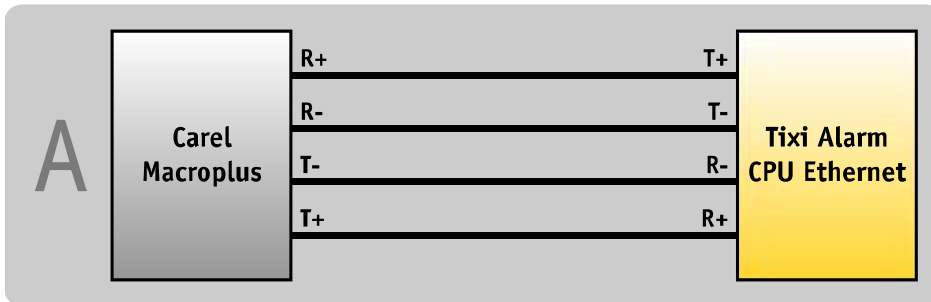
The following figure shows the possible connections:



Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.7 Carel Macroplus

The Macroplus may be connected to any Tixi Alarm CPU's RS232 interface using a RS422-RS232 adapter, or directly to the RS485/422 interface of a HG4x model:

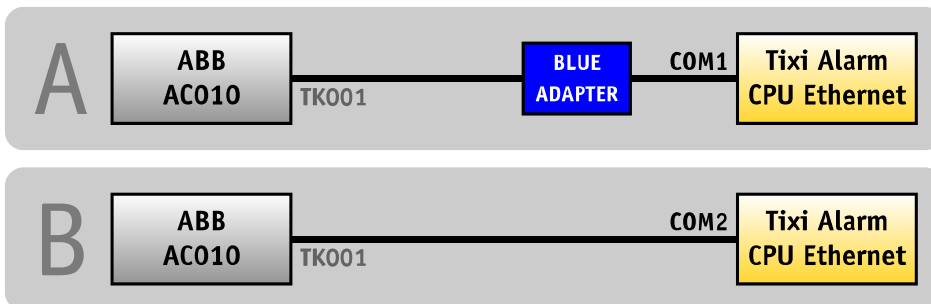


10.8 ABB AC010

The ABB AC010 is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the "TK001" programming cable along with a Blue Adapter.

When connecting to the COM2 RS232 interface of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



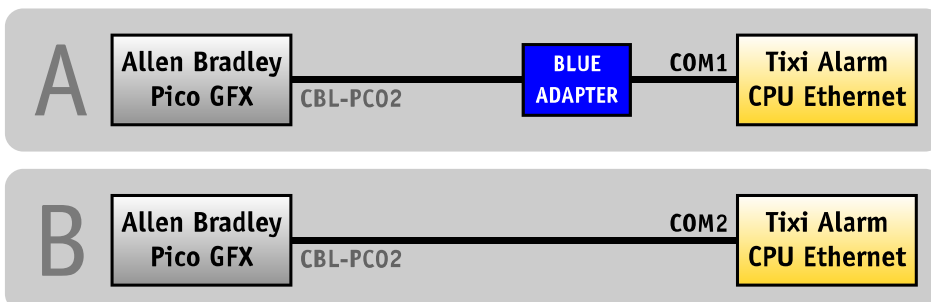
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.9 Allen Bradley Pico GFX

The Allen Bradley Pico GFX is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the "CBL-PC02" cable along with a Blue Adapter.

When connecting the Pico GFX to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



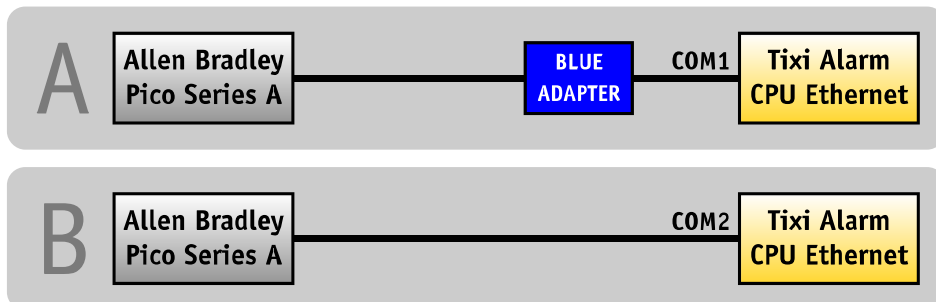
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.10 Allen Bradley Pico Series A + B

The Allen Bradley Pico Series A + B is connected to the COM1 RS232 interface of the Tixi Alarm CPU using a serial 1:1 cable along with a Blue Adapter.

When connecting the Pico Series A + B to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



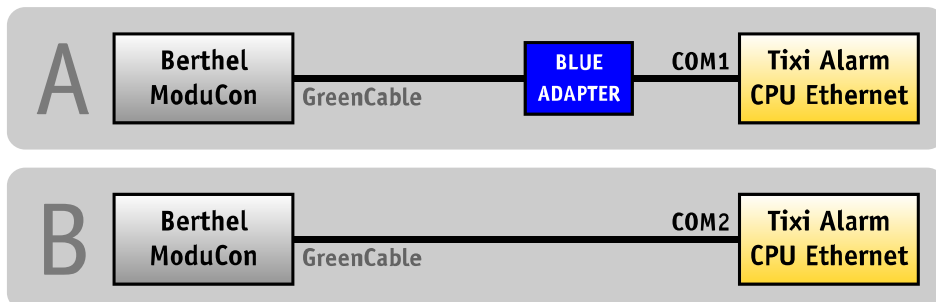
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.11 Berthel ModuCon

The Berthel ModuCon is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the "GreenCable" along with a Blue Adapter.

When connecting the Moducon to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



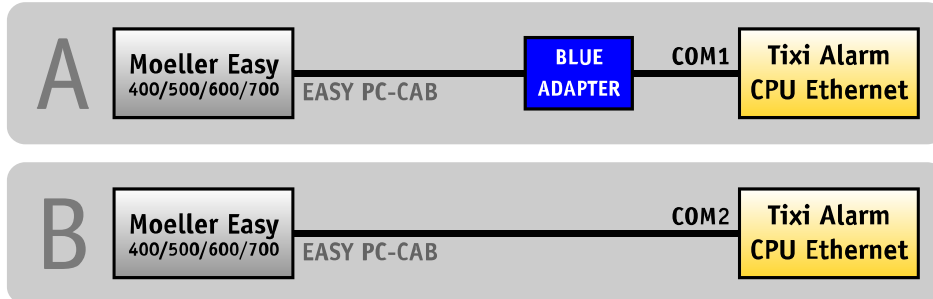
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.12 Moeller Easy 400/500/600/700

The Moeller Easy 400/500/600/700 is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the EASY-PC-CAB cable along with a Blue Adapter.

When connecting the Easy to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



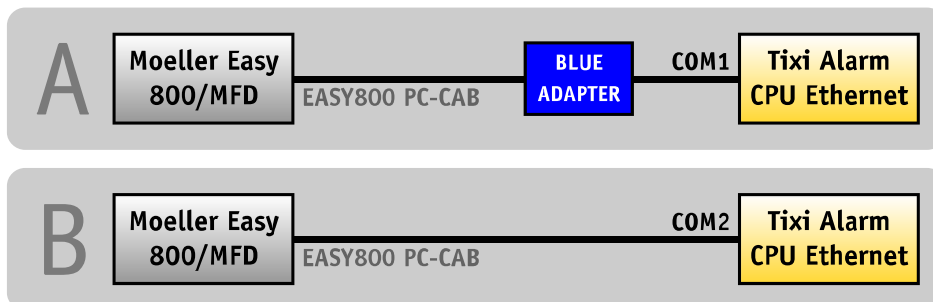
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.13 Moeller Easy 800/MFD

The Moeller Easy 800/MFD is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the EASY800-PC-CAB cable along with a Blue Adapter.

When connecting the Easy/MFD to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



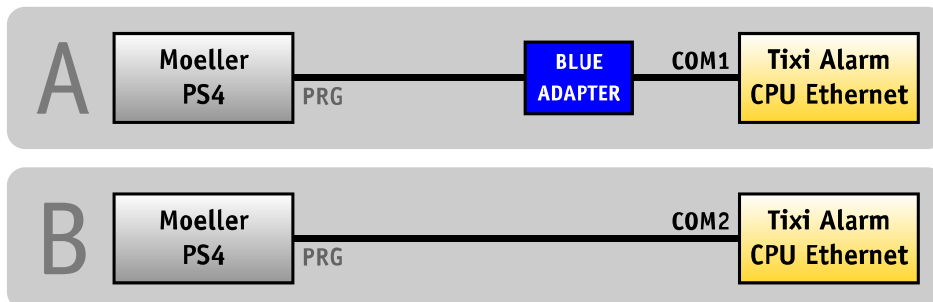
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.14 Moeller PS306/316, PS4-200 und PS4-300

The Moeller PS4 is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the ZB4-303-KB1 cable along with a Blue Adapter.

When connecting the PS4 to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



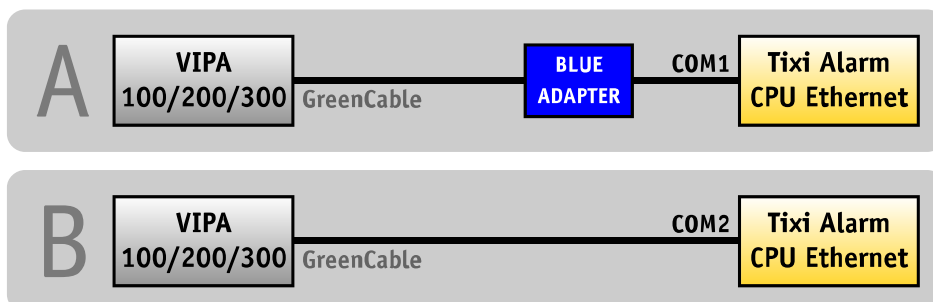
Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

10.15 VIPA

The VIPA is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the "GreenCable" along with a Blue Adapter.

When connecting the VIPA to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



Details on obtaining the Red Adapter can be found in chapter 12.4 of this manual.

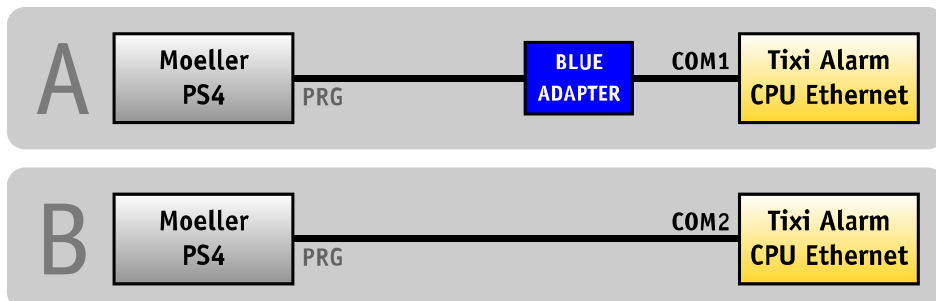
The S7-compliant VIPA can be connected to the MPI of an HE17x or HE47x, too. Detailed information on that can be found in chapter 11 of this manual.

10.16 Moeller XC/XVC

The Moeller Moeller XC/XVC is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the "ZB4-303-KB1" cable along with a Blue Adapter.

When connecting the Moeller XC/XVC to COM2 of the Tixi Alarm CPU, the Blue Adapter is not necessary.

The following figure shows the possible connections:



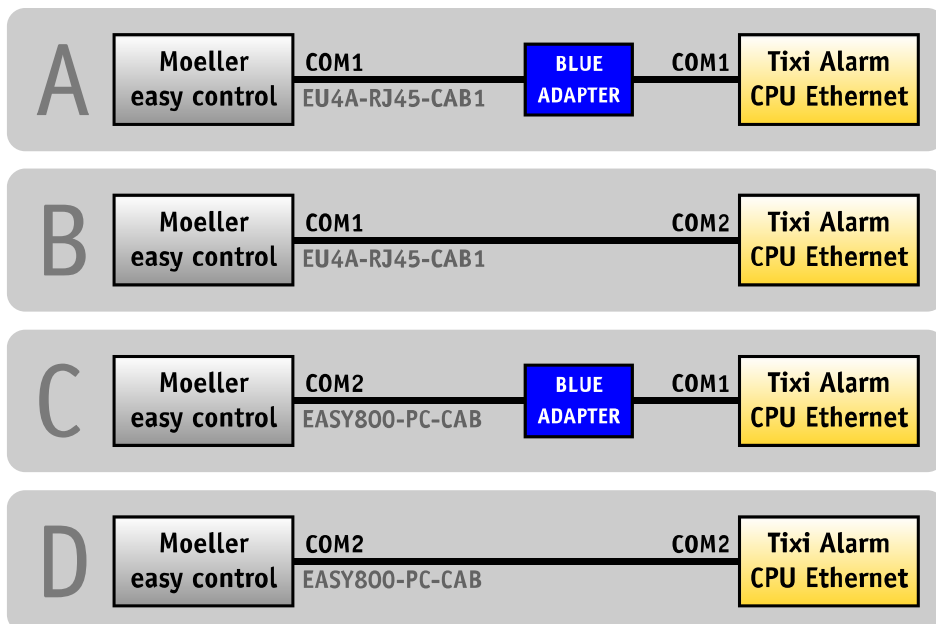
10.17 Moeller easy control

The COM1 interface of the Moeller easy control is connected to the COM1 RS232 interface of the Tixi Alarm CPU using the "EU4A-RJ45-CAB1" cable along with a Blue Adapter.

When connecting the COM1 interface of the Moeller easy control to COM2 of the Tixi Alarm CPU using the "EU4A-RJ45-CAB1" cable, the Blue Adapter is not necessary.

Alternately, the COM2 interface of the Moeller easy control may be connected to the COM1 interface of the Tixi Alarm CPU by means of the "EASY800-PC-CAB" cable along with a Blue Adapter.

When connecting the COM2 interface of the Moeller easy control to COM2 of the Tixi Alarm CPU using the "EASY800-PC-CAB" cable, the Blue Adapter is not necessary.



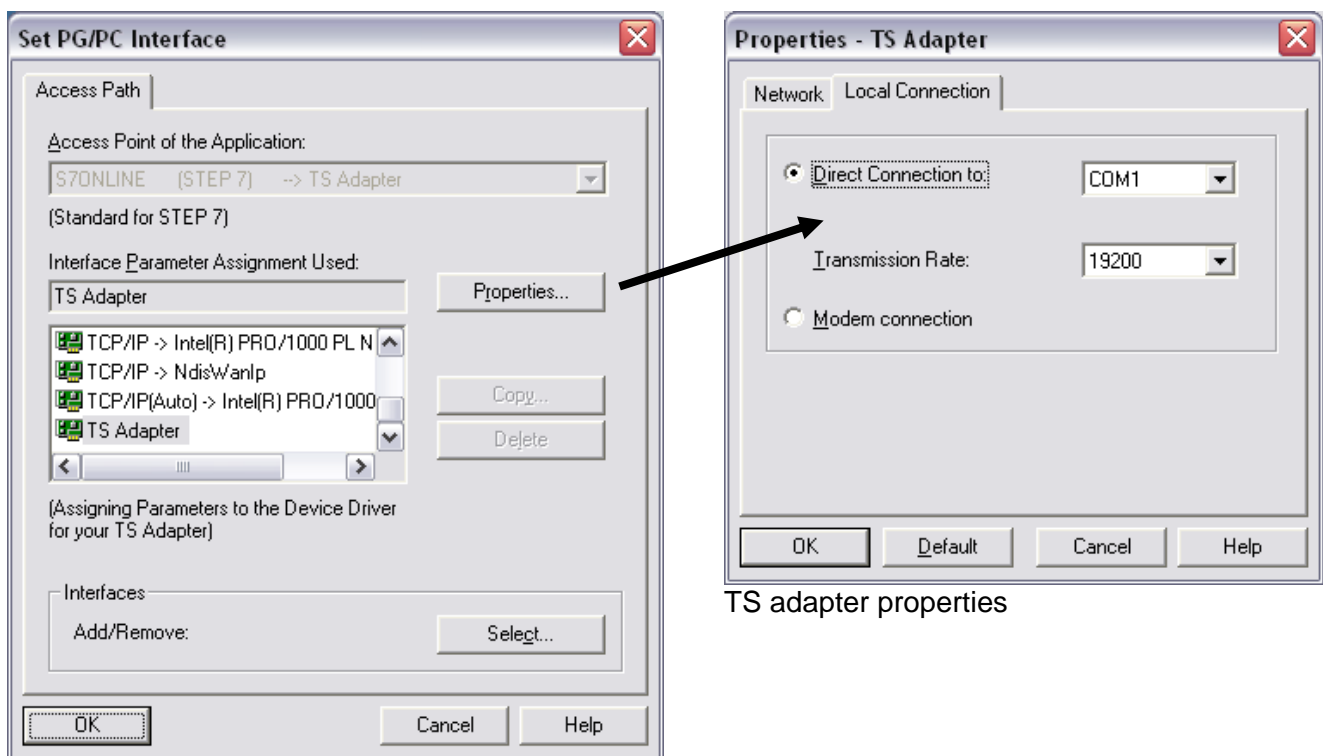
11 S7-300/400 TS Adapter, MPI (HM7x)

The HM7x Alarm Modem models are designed for being connected to a Siemens S7-300/400 PLC. They come with integrated **TS Adapter**, got the MPI protocol implemented and do comply to the **Siemens TeleService Software**.

11.1 Simatic PG/PC Interface

The TS Adapter and connected MPI devices can be accessed via the Step7 Simatic Manager using the PG/PC interface "TS Adapter", which is installed along with the Siemens TeleService application. The TS Adapter driver requires selecting the COM port by which the Alarm Modem is connected to the programming PC. For TeleService connection (remote dialup), the driver must be set to "Modem Connection". Such connection is done via a TAPI modem connected to the PC.

We recommend using the "Tixi Super Modem AT V.90 - SM03" for that purpose.



TS adapter properties

Selecting the PG/PC interface

11.2 Direct TS Adapter Connection

When directly connecting the TS adapter, set it to the COM port at which the Tixi Alarm CPU is connected to the programming PC.

After closing the direct connection, TiXML access to the Tixi Alarm CPU is restricted for 10 seconds.

12 Appendix

12.1 Technical Data of the HE series

12.1.1 Main Features

Alarm and fault indication unit	Automatic generation and sending of fault messages from message templates and actual values (from PLC or Tixi Alarm CPU). Up to 100 events can be defined to trigger actions (depending on of time requirements). Address book with up to 100 addresses, max. 100 message texts, max. 100 alarms.
Event	Event, such as: button actuation, fault, incoming call, PLC communication aborted, alarm acknowledgment, PLC variable or port change All actions in the Tixi Alarm CPU are event-triggered.
E-Mail	Send and receive E-mails (SMTP, POP3, ESMTP).
Security	Local and remote configuration can be protected against unauthorized access by login and password.

12.1.2 System Architecture

CPU	32-bit RISC processor
Program memory	2 MB Flash-ROM, 1 MB SRAM
Data memory	2 MB Flash Memory onboard, non-volatile
Expansions	16 MB, 32 MB, 64 MB Flash memory modules
System clock	Real-time clock, battery-backed

12.1.3 Firmware

Operating system	Commercial RTOS (real-time multitasking operating system) with C++ abstraction layer
File system	Commercial DOS compatible Flash file system C++ abstraction layer
External control protocol	TiXML: simple,XML-based protocol for modem configuration. External applications can create events / alarms by sending event commands.

12.1.4 Ethernet Connection

Connection	10/100 Base-T according to IEE 802.3 8P8C jack (RJ45), shielded
Galvanic Insulation	min. 1500 V

12.1.5 M-Bus

Conformity	DIN EN 13757-2, DIN EN 13757-3
Connection	M-Bus-Master for up to 25 Slaves, shortage-proof M-Bus current: 36 V, Bus length: ca. 1 km (telephone cable, 2 x 0,8 mm diameter, unshielded) 3 screw terminals, grid dimension 5,08 mm, diameter max. 2,5 mm ²

12.1.6 S0 Power Interface

Conformity	DIN 43864
Connection	2 connectors active and passive devices may be connected Current: usually 24 V, range 12-24 V, 30 mA Amperage: inactively: 0...2 mA, actively: 10...27 mA Debouncing time: 13 ms, line length: max. 3 m, unshielded 6 screw terminals, grid dimensions 5,08 mm, diameter max. 2,5 mm ²


12.1.7 I/O Ports

Input	digital	to be switched via potential-free contacts
	analog	0...10 V DC, resolution: 12 bit
Output	digital	potential-free, AC/DC 125 V, 120 mA
	relay	potential-free, 230 V AC 3 A oder 110 V DC 0,3 A
I/O Terminals		screw terminals (grid dimensions: 5,08 mm), cross-section max. 2,5 mm ²

12.1.8 Serial Interfaces

COM1	ITU-T V.24, V.28, Hardware-Handshake D-Sub 9-pole jack FIFO 16550, max. 230,400 bps, Signals: DTR, DSR, RTS, CTS, DCD, GND, RI, RxD, TxD Transmission distance: 12 m
COM2	D-Sub 9-pole plug, otherwise as for COM1
COM2 (RS485/422)	To EIA/TIA-485 5-pole screw terminal for T+, T-, R+, R-, 0 V max 230 kbit/s, not isolated Termination integrated, activated via DIP switches Transmission distance: max. 1200 m depending on the transmission rate, bus system and cable type
COM2 (S7-MPI) (HG7x only)	9-pole D-Sub jack, RS485, galvanically insulated transmission rate 19,2 or 187,5 kbit/s, no ferrule resistor Bus length: according to installation guidelines of the connected device (HG7x only) supported network type: MPI no AGDial feature

12.1.9 General Data

Power supply	10 – 30 V DC, max. 0.7 A, screw terminal 2.5 mm ² (HM23-M: 18...30 V DC)
LED-Anzeige	Power, Process, Line (connection), Data out, Modem Mode, Connect Data, Active Param.
Operating elements	Button
Gehäuse/Montage	DIN-Rail Casing, for rail 35mm (EN50022) vertical or horizontal
Conformity	 EMV: EN55022 (9:2003), EN55024 (10:2003) EN301489-1/7 (2000 GSM) Safety: EN60950 Telecom: GPP TS 51.010-1 (9:2002, v5.0.0.0) GCF-CC (10:2002, v3.8.1)
Temperature range	Operation: 0 to +50 °C , Storage: -30...+70°C
Permissible air humidity	5 to 95 % relative humidity, non-condensing
Schutzart	IP20
Degree of protection	Degree 2
Dimensions	Width 88mm x Height 58mm x Depth 91mm (w/o antenna plug, see Fehler! Verweisquelle konnte nicht gefunden werden.)
Weight	225g
Mechanical fastness	Vibration (sinus) according to IEC 60068-2-6 Vibration (broadband) according to IEC 60068-2-64 Shock according to IEC 60068-2-27

12.2 SD Card operation

The HE400 series of Tixi Alarm CPUs come with an integrated SD card slot. It can be utilized for transmitting projects and firmware into the device, and in order to download logfile content. You may use SD or MMC cards with up to 2 GB size, being formatted under Windows (FAT or FAT32).











If a memory card is inserted into the running device, it will be mounted automatically. In order to prevent this, just press the "unmount" button while inserting the memory card.

Before removing the memory card, press the "Unmount" button and wait for all read- or write access to be finished. This will be noticeable by the "Active" LED going out.

12.3 LEDs, Reset, Update, Error diagnosis

12.3.1 LEDs on restart

A restart with memory test of the Tixi Alarm CPU takes place after power-on, after factory reset and after updating the firmware.

Power (yellow)	Process (red)	Connect (green)	Data Out (yellow)	Mode (red)	
					Start self-test
					Testing all LEDs
			 (flashes)		Memory test
					TAC is operational
Duration: approx. 12 sec					

12.3.2 Factory Reset













A factory reset deletes all the data stored in the Tixi Alarm CPU and overwrites it with factory settings. The GSM settings (PIN) are retained.

Procedure:

1. Switch off the Tixi Alarm CPU.
2. Press the Service button and keep depressed.
3. Switch on the Tixi Alarm CPU and wait for the Power LED to flash.
4. Release the Service button momentarily and
5. Press again until the Power LED visibly flashes at a faster rate.
6. Release the Service button.




















The configuration is completely deleted and the TAC starts up with the default settings of the manufacturer.

LEDs on factory reset and restart

Power (yellow)	Process (red)	Connect (green)	Data Out (yellow)	Modem Mode (red)		Duration
 (flashes)					Service button pressed upon power-on	1...2 s
 (flashes rapidly)					Service button pressed again, until Power LED flashes somewhat faster	1...2 s
					Test of all LEDs	
			 (flashes)		Memory test, formatting data memory (complete deletion)	25 s
					Modem is operational	
Duration: approx. 30 s						

12.3.3 Firmware-Update

A new firmware can be loaded onto the Tixi Alarm CPU using an upload tool. In this case the LEDs of the Tixi Alarm CPU will light up as follows:

Power (yellow)	Process (red)	Connec t (green)	Data Out (yellow)	Modem Mode (red)		Duration
					TAC is operational.	
 (flashes)					Start of update.	2 s
					TAC waiting for commands.	
		 (flashes)	 (flashes)		After start of update: Transfer of firmware	250 s
	 (flashes)				Possibly during the update: Processing of transferred firmware in TAC.	
					Test of all LEDs	
			 (flashes)		Memory test	25 s
					TAC is operational.	
Total duration: approx. 4 min 40 s						

The duration of a firmware update may vary according to the operating system and the speed of the serial PC interface (the values shown in the table were achieved at 115,200 baud).



DANGER:

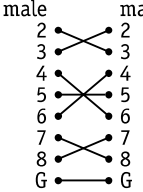
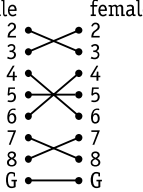
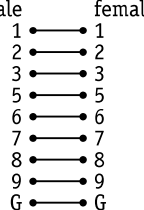
During a firmware updates the outputs of the Alarm Modem are set. Therefore an update should never be executed with connected periphery.

12.4 Accessories

For completion of your Tixi Alarm CPU system, you may order these parts from your distributor or directly from Tixi.Com:

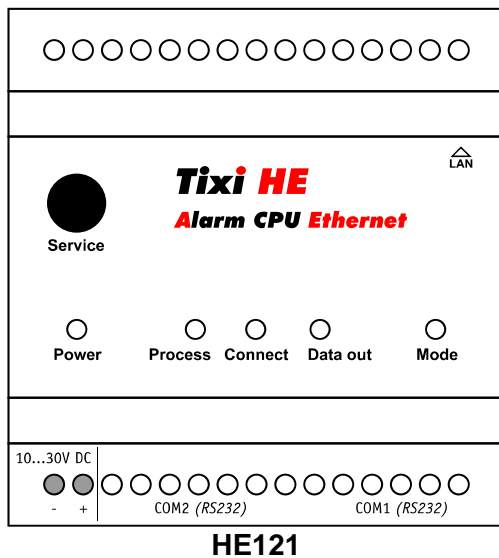
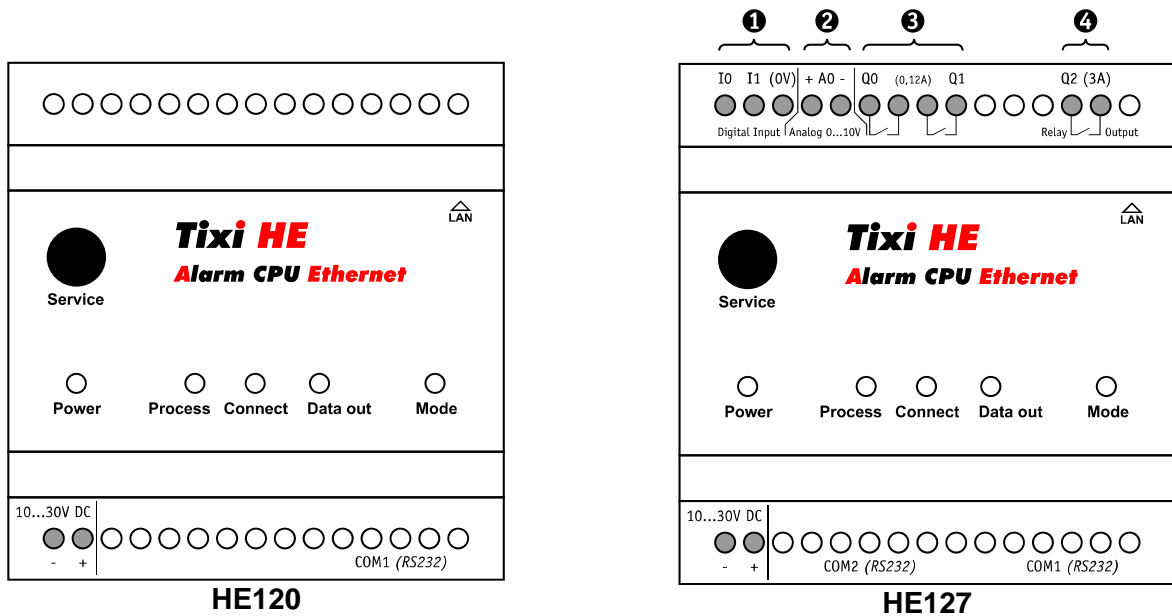
Accessories	Description
ZP-DC24-2A	Power Supply for DIN rail installation (24 V DC, 2 A)
ZM-Manset	Tixi Manual Set (contains all manuals on CDROM <i>and</i> as brochures)
ZK-R9M9F180	Serial RS232 cable (D-Sub-9 plug / D-Sub-9 jack, length: 180cm)
ZK-BA	Blue Adapter (nullmodem genderchanger RS232 D-Sub-9 plug/plug)
ZK-RA	Red Adapter (nullmodem adapter RS232 D-Sub-9 jack/jack)
ZK-BRA	Brown Adapter (for MELSEC FX/BD-Board at TAC COM1)

Wiring of Tixi Adapters

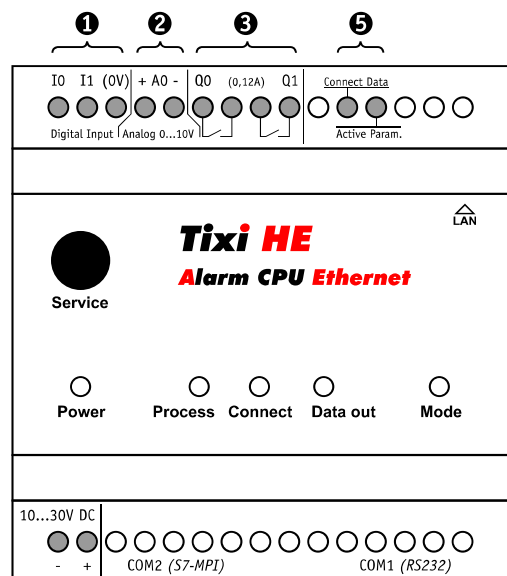
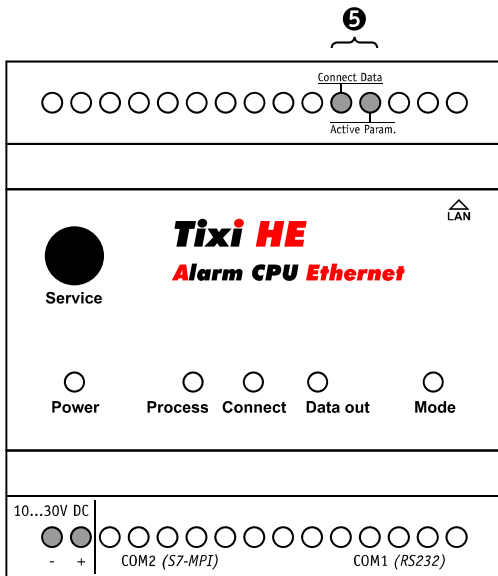
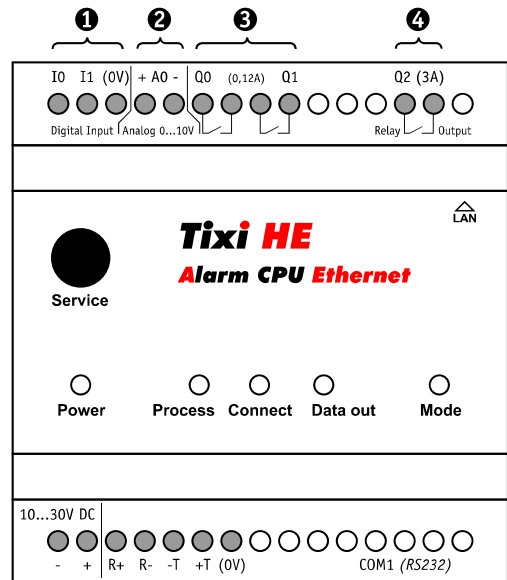
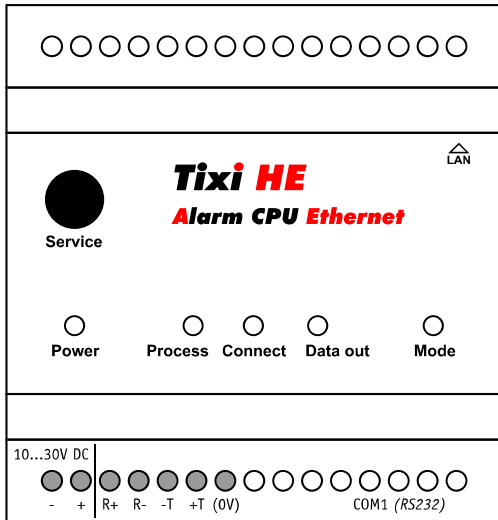
Blue Adapter	Red Adapter	Brown Adapter
<div>male</div> <div>  </div> <div>male</div>	<div>female</div> <div>  </div> <div>female</div>	<div>male</div> <div>  </div> <div>female</div>

12.5 Tixi Alarm CPU Models

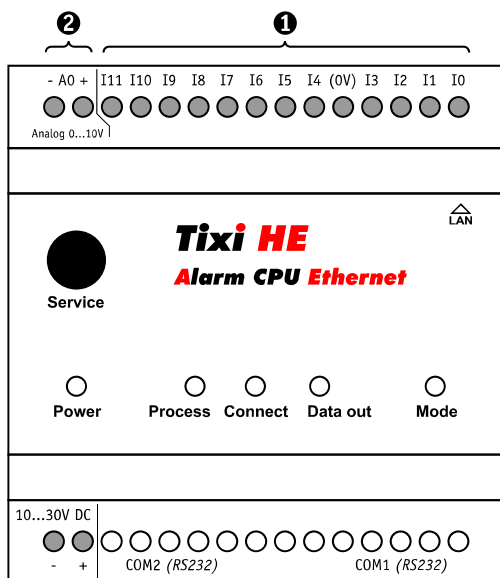
Tixi Alarm CPUs provide identical basic features, but come in a variety of models regarding type and number of I/Os and interfaces. These variants are depicted in the following figures.



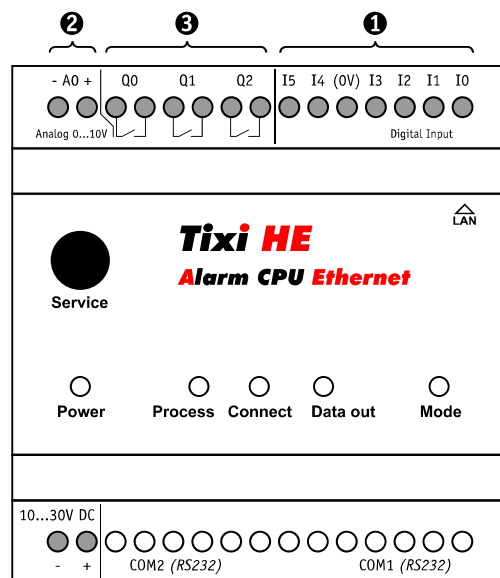
- ❶ Digital-Eingänge
- ❷ Analog-Eingang
- ❸ Digital-Ausgänge
- ❹ Relais-Ausgang
- ❺ LED-Anzeigen



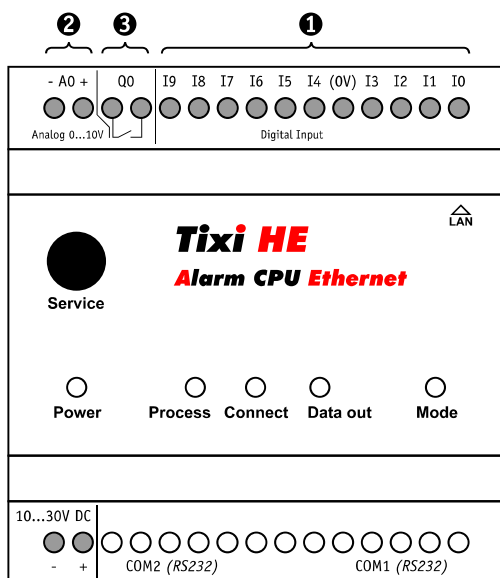
- ❶ Digital-Eingänge
- ❷ Analog-Eingang
- ❸ Digital-Ausgänge
- ❹ Relais-Ausgang
- ❺ LED-Anzeigen



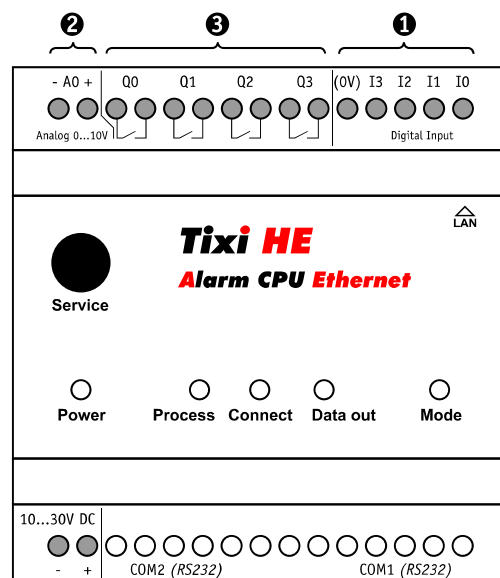
HE130



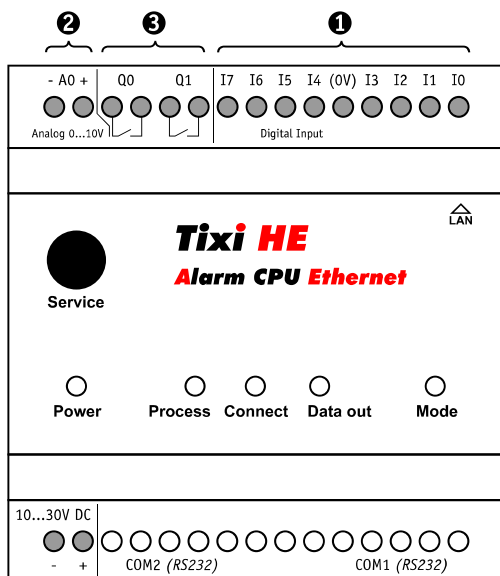
HE133



HE131

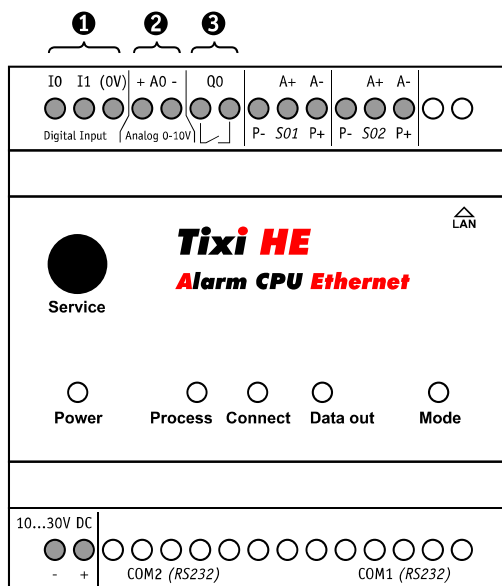


HE134

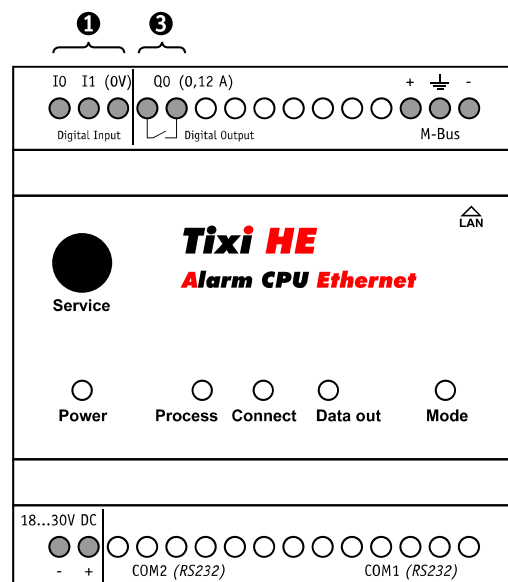


HE132

- ① Digital-Eingänge
- ② Analog-Eingang
- ③ Digital-Ausgänge
- ④ Relais-Ausgang
- ⑤ LED-Anzeigen



HE125-2S0

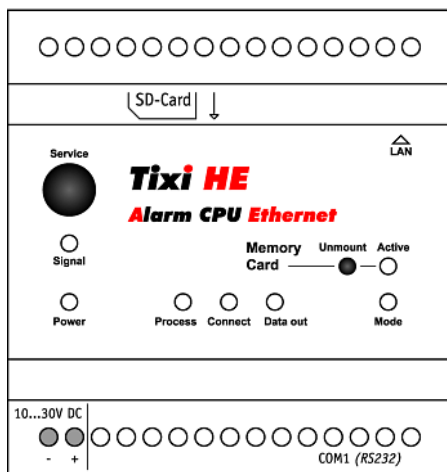


HE123-M

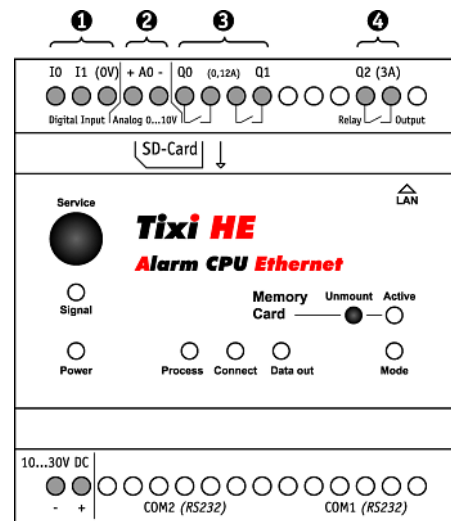
- ① Digital-Eingänge
- ② Analog-Eingang
- ③ Digital-Ausgänge
- ④ Relais-Ausgang
- ⑤ LED-Anzeigen

12.6 Modell- und Ausstattungsvarianten der HE400-Serie

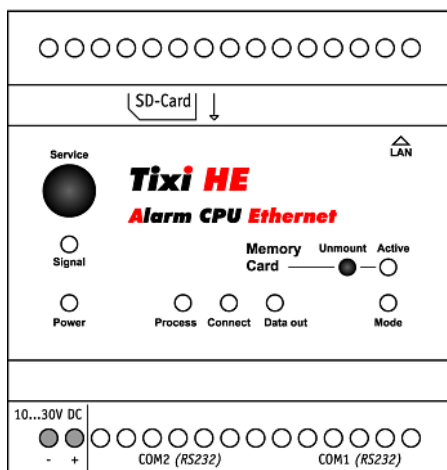
Die Tixi Alarm CPU Ethernet sind in den Grundfunktionen identisch. Sie unterscheiden sich jedoch in der Art und Anzahl der Schnittstellen. Die unterschiedlichen Varianten sind auf den folgenden Seiten dargestellt:



HE420

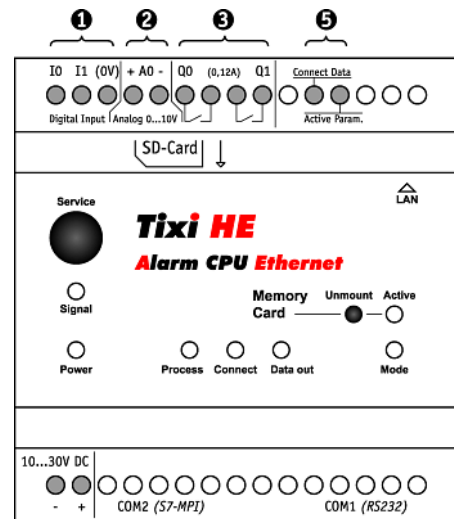
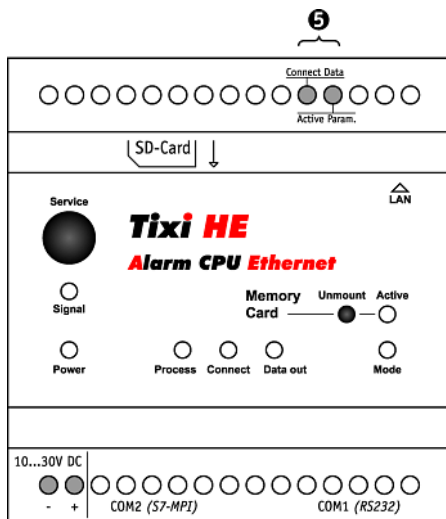
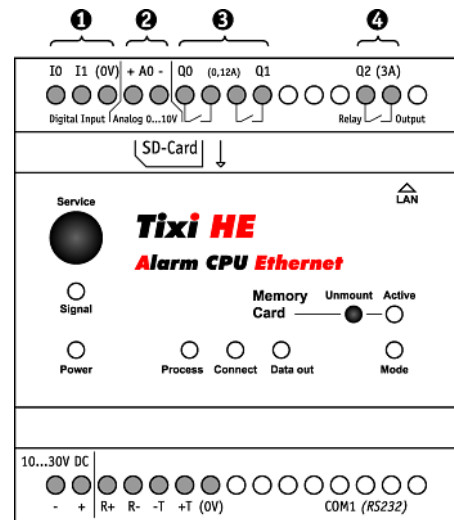
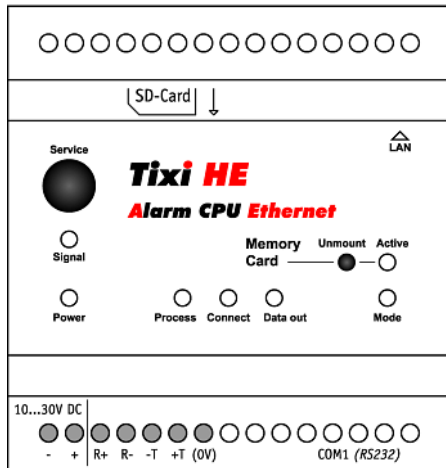


HE427

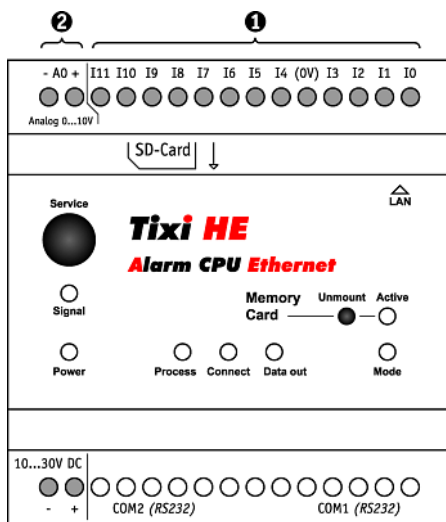


HE421

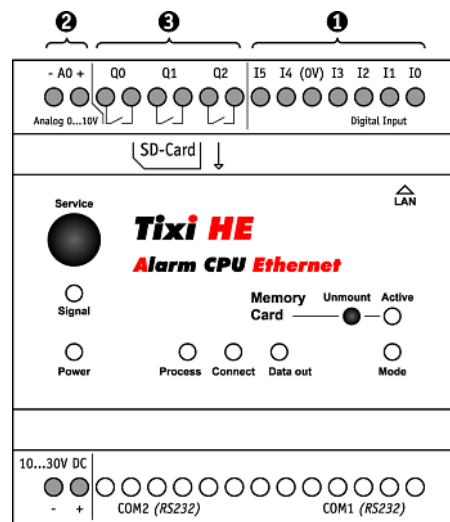
- ① Digital-Eingänge
- ② Analog-Eingang
- ③ Digital-Ausgänge
- ④ Relais-Ausgang
- ⑤ LED-Anzeigen



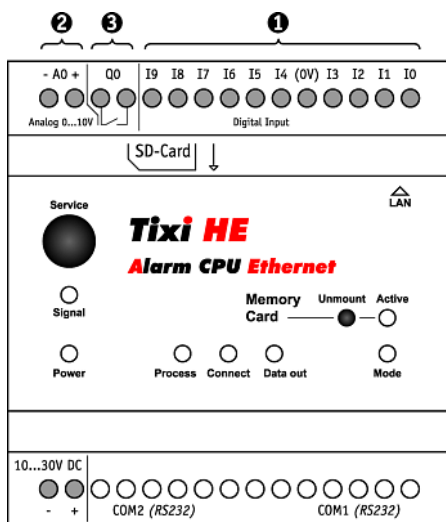
- ❶ Digital-Eingänge
- ❷ Analog-Eingang
- ❸ Digital-Ausgänge
- ❹ Relais-Ausgang
- ❺ LED-Anzeigen



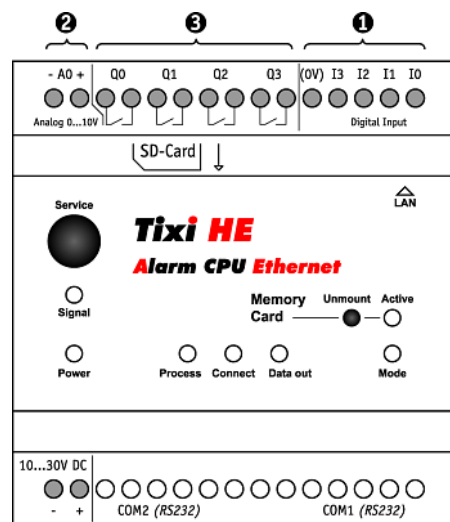
HE430



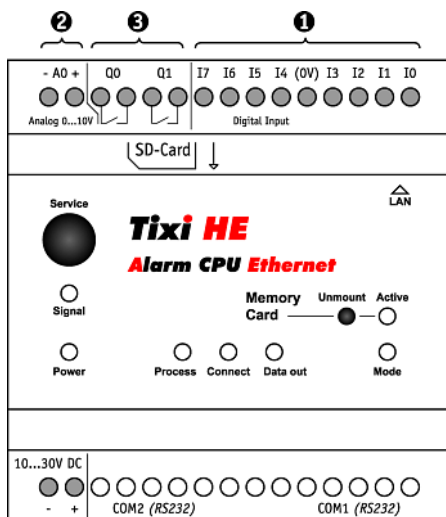
HE433



HE431

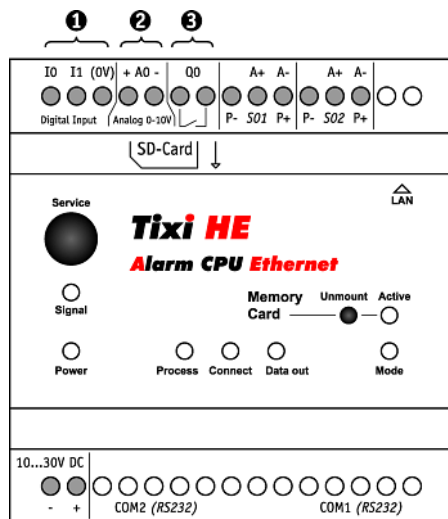


HE434

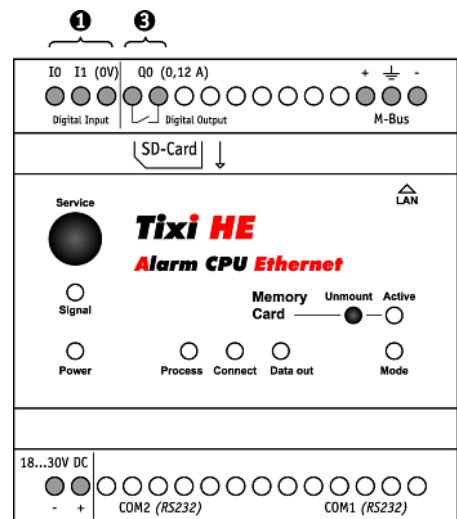


HE432

- ① Digital-Eingänge
- ② Analog-Eingang
- ③ Digital-Ausgänge
- ④ Relais-Ausgang
- ⑤ LED-Anzeigen



HE425-2S0



HE423-M

- ❶ Digital-Eingänge
- ❷ Analog-Eingang
- ❸ Digital-Ausgänge
- ❹ Relais-Ausgang
- ❺ LED-Anzeigen