ADDI-DATA®
SPIRIT OF EXCELLENCE

TECHNICAL

DESCRIPTION

MSX-Exxxx

Intelligent Ethernet system

DIN EN ISO 9001:2008 certified

Edition: 02.05-07/2014

Product information

This manual contains the technical installation and important instructions for correct commissioning and usage, as well as production information according to the current status before printing.
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Warning!

The following risks result from the improper implementation of the Ethernet system and from use contrary to the regulations:

Personal injury

Damage to the Ethernet system, the PC and peripherals

Pollution of the environment.

- Protect yourself, others and the environment!
- Read the safety precautions (yellow leaflet) carefully!

  If this leaflet is not enclosed with the documentation, please contact us and ask for it.
- Observe the instructions of this manual!

  Make sure that you do not forget or skip any step!
  We are not liable for damages resulting from the wrong use of the Ethernet system.
- Pay attention to the following symbols:

NOTICE!
Designates hints and other useful information.

NOTICE!
Designates a possibly dangerous situation.
If the instructions are ignored, the Ethernet system, the PC and/or peripherals may be **destroyed**.

WARNING!
Designates a possibly dangerous situation.
If the instructions are ignored, the Ethernet system, the PC and/or peripherals may be **destroyed** and persons may be **endangered**.

Contents

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Chapter overview

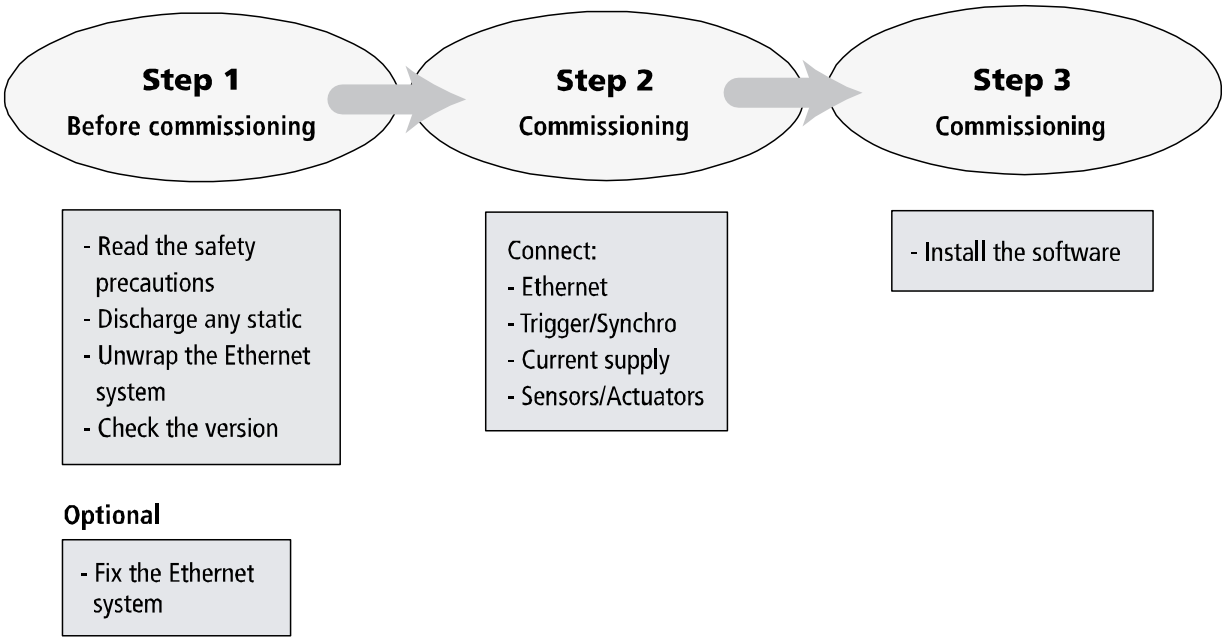
In this manual, you will find the following information:

Chapter	Content
1	Information on mounting the MSX-E system, pin assignments, the connection of peripherals and the system's LED display
2	Description of the software tool "ConfigTools" (required, for example, to adapt the IP address of the MSX-E system when using the system for the first time)
3	Description of general functions (e.g. Customer Key)
4	Description of the web interface of the MSX-E system for fast access to the system without programming
5	Software description: Access over SOAP/web service or Open Modbus (for PLC)
6	Procedure for returning (repairing, etc.) or disposing of the MSX-E system
7	Appendix with glossary and index
8	Contact and support address

1 Mounting and connection

1.1 Commissioning of the Ethernet system (overview)

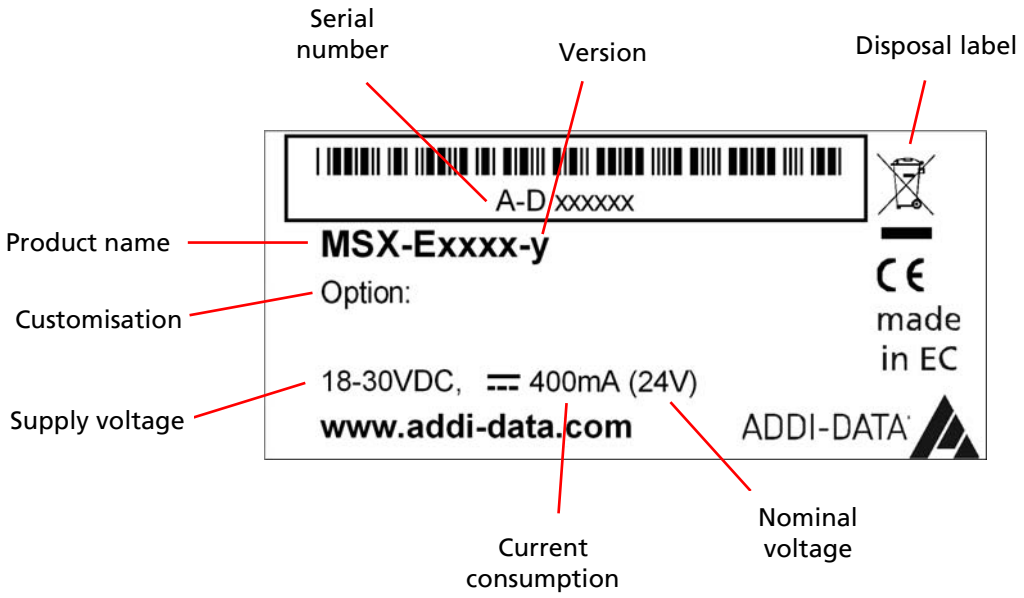
Fig. 1-1: Commissioning (overview)



Risk of injury!
Please follow the safety precautions! An improper handling of the Ethernet system may cause property damage and injury.

- Discharge any static by touching an earth wire.
- Remove the Ethernet system from its protective packaging.
- Check the type label on the bottom side of the Ethernet system to know if the system corresponds to your requested version.

Fig. 1-2: Type label



The type label contains, for example, the product name including the specific version name, and the serial number of the Ethernet system. In case of queries, these details always have to be kept at hand! For more information on the disposal label, see Chapter 6.2.

Information on cables and other accessories can be found in the accessories list of the MSX-E systems.

1.2 Fixing the Ethernet system

1.2.1 Mounting on a DIN rail

With the mounting set **MX-Rail**[1] (see document "MSX-E Accessories"), you can attach the Ethernet system to a DIN rail.

Risk of injury!
If you have already mounted this Ethernet system on a DIN rail and want to transport it in a switch cabinet or in other systems, please ensure that it is adequately secured for transport!
The Ethernet system could, for example, fall off the DIN rail, which could cause damage to the Ethernet system and/or other objects or injury of persons.

- Mount the Ethernet system on the DIN rail by inserting the clips with the springs under the DIN rail.

NOTICE!
The spring in the fastening clips points to the bottom of the housing (see the following figure).

Fig. 1-3: Fastening clips

- Push the Ethernet system as much as possible up and then backwards until the top of the fastening clips engages with the DIN rail.

[1] Please specify when ordering the Ethernet system!

1.2.2 Angle bracket mounting

With the mounting set **MX-Screw** (see document "MSX-E Accessories"), you can fit the Ethernet system for direct attachment to machines or other devices.

According to your requirements, you can fix all four brackets pointing either outwards or inwards.

Fig. 1-4: Brackets pointing outwards

Fig. 1-5: Brackets pointing inwards

To mount the brackets, proceed as follows:

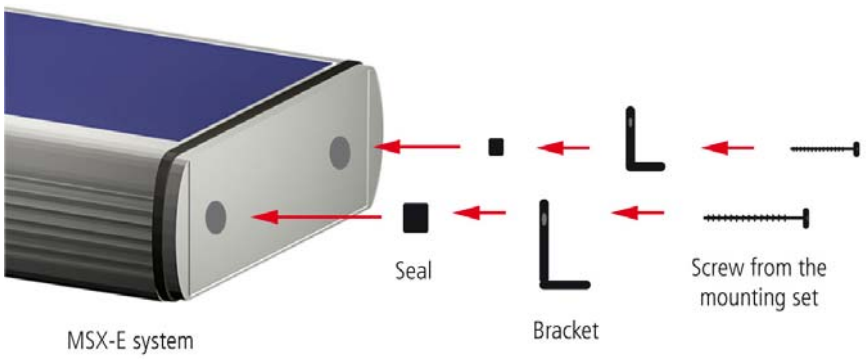
NOTICE!

The housing of the Ethernet system must not be opened or the warranty claim will be invalid (see also the system-specific MSX-E manual, Chapter 1.2.4)!

For this reason, the housing part to which the angle brackets are fixed has to be in a horizontal position during mounting to prevent it from loosening from the entire housing.

If the Ethernet system cannot be positioned in this way, the respective housing part has to be pushed towards the inside of the system during the whole mounting process so that the housing remains closed (see the following figure).

Fig. 1-6: Angle bracket mounting



- Loosen the screws at the side of the Ethernet system.
- For the remainder of the mounting process, please use only the **short** seals and screws from the mounting set.

Fig. 1-7: Mounting set: Seal and screw (short)

The original screw from the MSX-E system and the long seals or screws from the mounting set must **not** be used any longer.

Fig. 1-8: Mounting set: Original screw, seal and screw (long)

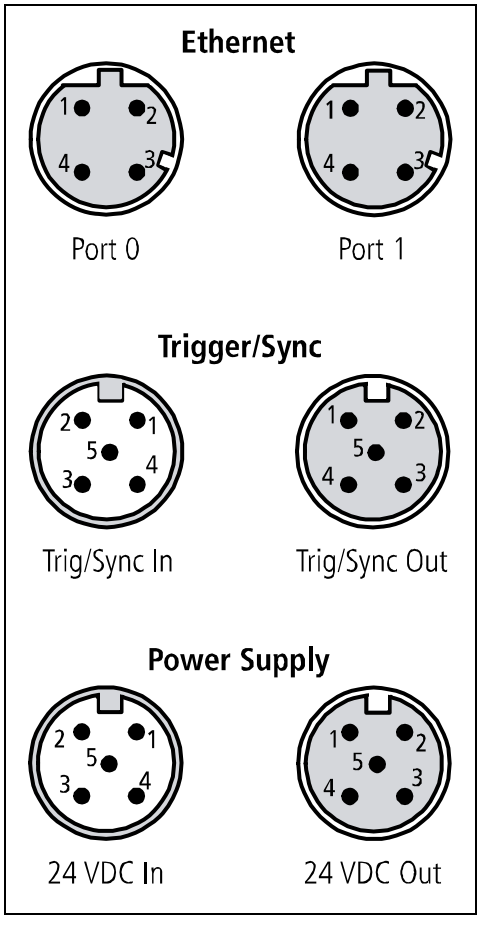
- Place a seal in one of the screw holes.
- Place the bracket on the seal.
- Fix the bracket with a short screw from the mounting set.
- Repeat these steps with the other screw holes.

Once you have mounted the brackets on the Ethernet system, you can attach the system directly to other devices or machines by using other screws.

1.3 Pin assignment

In this chapter, you will find the pin assignments of the connectors for Ethernet, trigger/synchro and the voltage supply of the Ethernet system **MSX-Exxxx**.

Fig. 1-9: Connectors



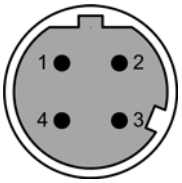
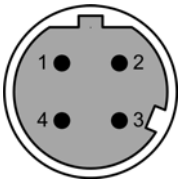
1.3.1 Ethernet ports

In order to access the MSX-E system, you have to connect one of the Ethernet interfaces (Port 0 or Port 1) to your PC. For this, you can use a **CMX-6x** cable.
To cascade the MSX-E systems with one another, you need a **CMX-7x** cable.

The LED display "Port 0 ACT/Link" or "Port 1 ACT/Link" gives you information on the status of the corresponding interface. For more details, see Chapter 1.6.1.

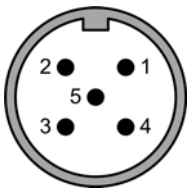
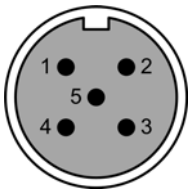
NOTICE!
The LED display only works if the MSX-E system is connected to the voltage supply.

Table 1-1: Pin assignment: Ethernet ports 0 and 1

	Ethernet Port 0	Ethernet Port 1	Cable (green)
Pin No.	**Female connector, D-coded, M12**	**Female connector, D-coded, M12**	**Lead colour**
1	TD0+	TD1+	yellow
2	RD0+	RD1+	white
3	TD0-	TD1-	orange
4	RD0-	RD1-	blue
			

1.3.2 Trigger/synchro

Table 1-2: Pin assignment: Trigger/synchro

	Trigger/Sync In	Trigger/Sync Out	Cable (purple)	
Pin No.	**Connector, 5-pin, M12**	**Female connector, 5-pin, M12**	**Lead colour**	**Lead pair**
1	Trigger input -	Trigger input -	blue	1
2	Trigger input +	Trigger input +	white	
3	Synchro input +	Synchro output +	red	2
4	Synchro input -	Synchro output -	black	
5	Ground	Ground		
				

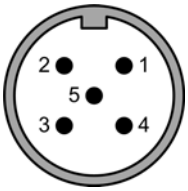
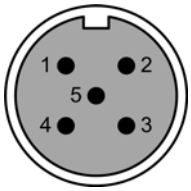
- Please use a shielded trigger/synchro cable.

Table 1-3: Trigger/synchro cables

Name	Cable end	Length
CMX-40	Open end / female connector, 5-pin	1.5 m
CMX-41	Open end / female connector, 5-pin	3 m
CMX-42	Open end / female connector, 5-pin	5 m
CMX-43	Open end / female connector, 5-pin	10 m
CMX-49	Open end / female connector, 5-pin	on request
CMX-50	Male connector, 5-pin / female connector, 5-pin	1.5 m
CMX-51	Male connector, 5-pin / female connector, 5-pin	3 m
CMX-52	Male connector, 5-pin / female connector, 5-pin	5 m
CMX-59	Male connector, 5-pin / female connector, 5-pin	on request
CMX-59_0,3	Male connector, 5-pin / female connector, 5-pin	0.3 m

1.3.3 Voltage supply

Table 1-4: Pin assignment: Voltage supply

	Power Supply In	Power Supply Out	Cable (black)
Pin No.	**Connector, 5-pin, M12**	**Female connector, 5-pin, M12**	**Lead colour**
1	24 V	24 V	brown
2	24 V	24 V	white
3	Ground	Ground	blue
4	Ground	Ground	black
5	not connected	not connected	grey
			

1.4 Connecting peripherals

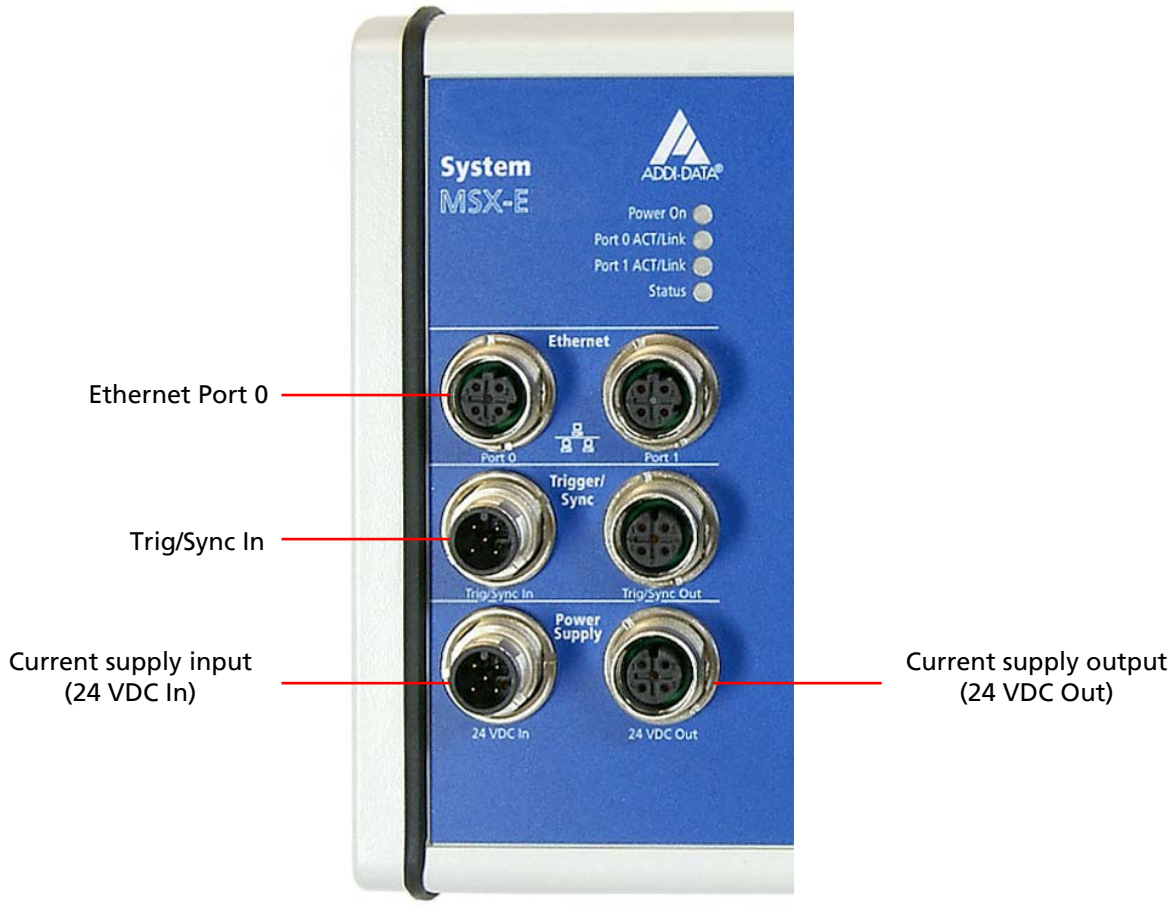
- Discharge any static by touching an earth wire.
- Remove the Ethernet system from its protective packaging.

Information on cables and other accessories can be found in the accessories list of the MSX-E systems.

1.4.1 Ethernet ports

- Plug the Ethernet cable into Ethernet Port 0[2].

Fig. 1-10: Connect peripherals



[2] If you want to connect several Ethernet systems, please read Chapter 1.5.

1.4.2 Trigger and synchro signals

- Plug the cable into the connector “Trig/Sync In”[3] (see Fig. 1-10).

1.4.3 Voltage supply

- Plug the cable into the input “24 VDC In”[1] (see Fig. 1-10).

1.4.4 Sensors or actuators

Information concerning the type of sensor or actuator, the corresponding pin assignment as well as connection examples can be found in the respective system-specific MSX-E manual.

Fig. 1-11: MSX-Exxxx: Connect sensors or actuators (example)

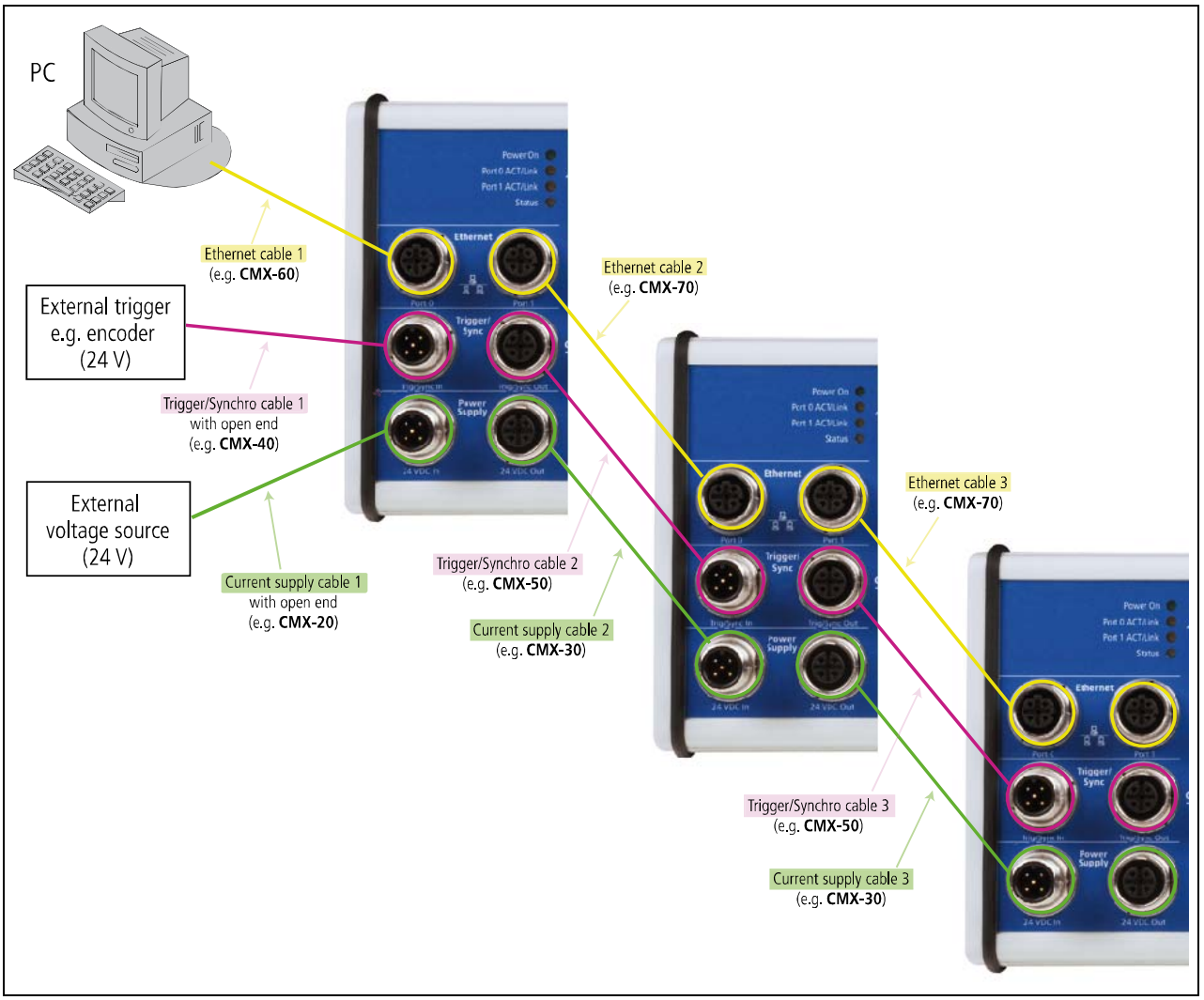
[3] If you want to connect several Ethernet systems, please read Chapter 1.5.

1.5 Connecting several Ethernet systems (cascading)

You have the possibility to connect several Ethernet systems to the **MSX-Exxxx**. In order to do so, proceed as follows:

- Connect the first Ethernet system (see description at the beginning of this chapter).
- Connect the components according to the following figure.

Fig. 1-12: Connect several Ethernet systems



1.6 LED display

1.6.1 Overview

The LEDs give you the following information:

Table 1-5: LED display

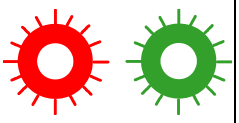
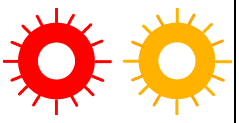
LED	Display	Meaning
ADDI-DATA logo	Lights white 	The system is ready for operation.
	No display 	The system is in energy-saving mode.
Power On	No display 	There is no voltage applied.
	Lights green 	Voltage is applied. The system is ready for operation.
Port 0 ACT/Link **or** **Port 1 ACT/Link**	No display 	There is no network connection.
	Lights yellow 	The Ethernet cable is connected to Port 0 or 1. The network connection is established.
	Flashes yellow 	
Status	Lights green  Fur further display settings, see the following table.	The system is ready for operation.

1.6.2 “Status” LED

The “Status” LED provides information on the current operating state of your MSX-E system.

Table 1-6: “Status” LED

Display	Meaning	Possible cause	Recommendation
No display 	The system is switched off.		Connect the system to the supply voltage.
Lights green 	The system is ready for operation.		
Flashes green 	The system is working.	- A firmware update is being applied. - Data acquisition is in progress.	
Flashes yellow/green 	Data acquisition is possible, but some components are not working correctly.	- The flash memory is no longer working properly. - An attempt has been made to execute a configuration with an incorrect IP address.	- Check the system’s IP address. - Contact us for a replacement or repair.
Lights yellow 	The system is ready for operation, but there is no connection to a network.	- The system is booting up. - The network cables are not connected.	- Wait until the initialisation of the system is finished (approx. 40 seconds). - Check the network connection (see LED “Port 0 ACT/Link” or “Port 1 ACT/Link”).
Flashes yellow 	Data acquisition is not possible, but the system can be accessed via the network connection.	- An update has been applied with faulty firmware. - A major component is not working correctly. - There has been a short circuit on the primary side of one or more sensors.	- Check the diagnosis on the system’s web interface. - Check the cables and sensors connected to the system. Use the latest firmware for your system. - Contact us for a replacement or repair.
Lights red 	The system cannot start up.	Hardware error (e.g. RAM)	Contact us for a replacement or repair.

Display	Meaning	Possible cause	Recommendation
Flashes red 	Harmful ambient conditions	The internal temperature is outside the working range (< -40 °C or > +85 °C).	- The system should be quickly exposed to warmer or colder temperatures (according to the working range temperatures). - Under these conditions, the measurement values may be inaccurate and the whole operation of the system be restricted. - Conditions of this kind may damage the internal components and therefore make the whole system unusable.
Flashes red/green 	The system is working and communicating correctly, but possible risks may be anticipated.	The internal temperature is LOW or HIGH.	- The system should be quickly exposed to warmer or colder temperatures (according to the working range temperatures).
Flashes red/yellow 	The system cannot be accessed via a network connection, and possible risks may be anticipated.	The internal temperature is LOW or HIGH **and** the network cables are not connected.	- The system should be quickly exposed to warmer or colder temperatures (according to the working range temperatures). - Check the Ethernet connection (see LEDs “Port 0 ACT/LINK” and “Port 1 ACT/LINK”). - Note that other faults may also occur in the meantime, which prevent data acquisition (e.g. a short-circuit).

2 Software tool “ConfigTools”

The software tool **ConfigTools** supports you in working with your Ethernet system.
It allows you, for example, to change the IP address, carry out firmware updates and calibrate transducers connected.

2.1 First steps

ConfigTools is to be found on the supplied CD. To install this software tool, proceed as follows:

- Insert the CD “MSX-E Systems” into the CD drive.

The CD browser interface is automatically displayed. If not, open the Windows Explorer, select the CD drive and open the file “AD-Systems.exe”.

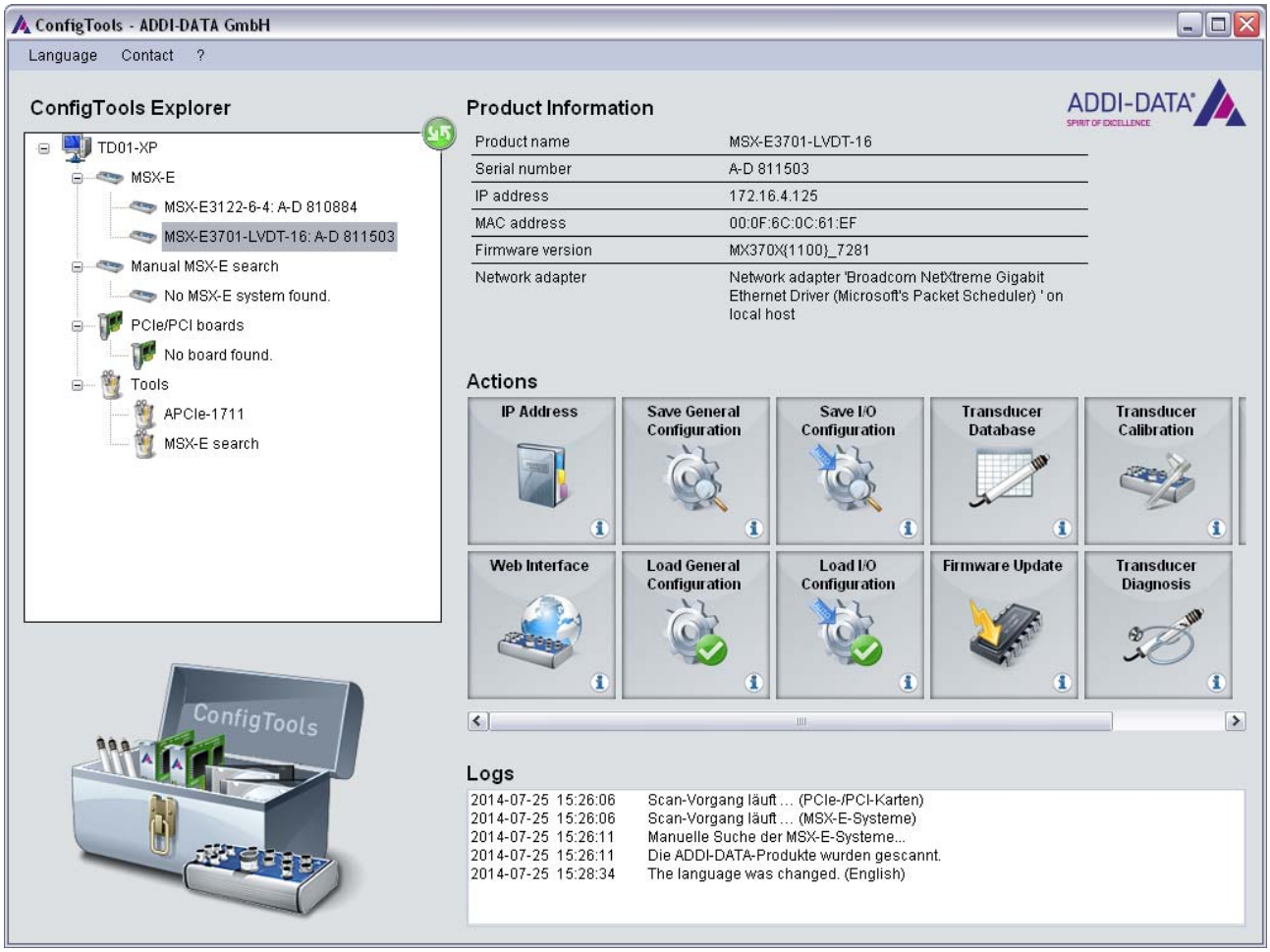
- Select the desired language and click on “Start”.
- Click on the desired MSX-E system and after that, under “Configuration”, on the button “ConfigTools”.
- Follow the instructions of the installation program.

As soon as you have started the installed software tool from your computer, the connected MSX-E systems are scanned.

Fig. 2-1: ConfigTools: Scan MSX-E systems

2.2 Main window structure

Fig. 2-2: ConfigTools: Main window



The **ConfigTools** main window comprises the following areas:

- Menu bar
- ConfigTools Explorer
- Product information
- Actions
- Logs.

2.2.1 Menu bar

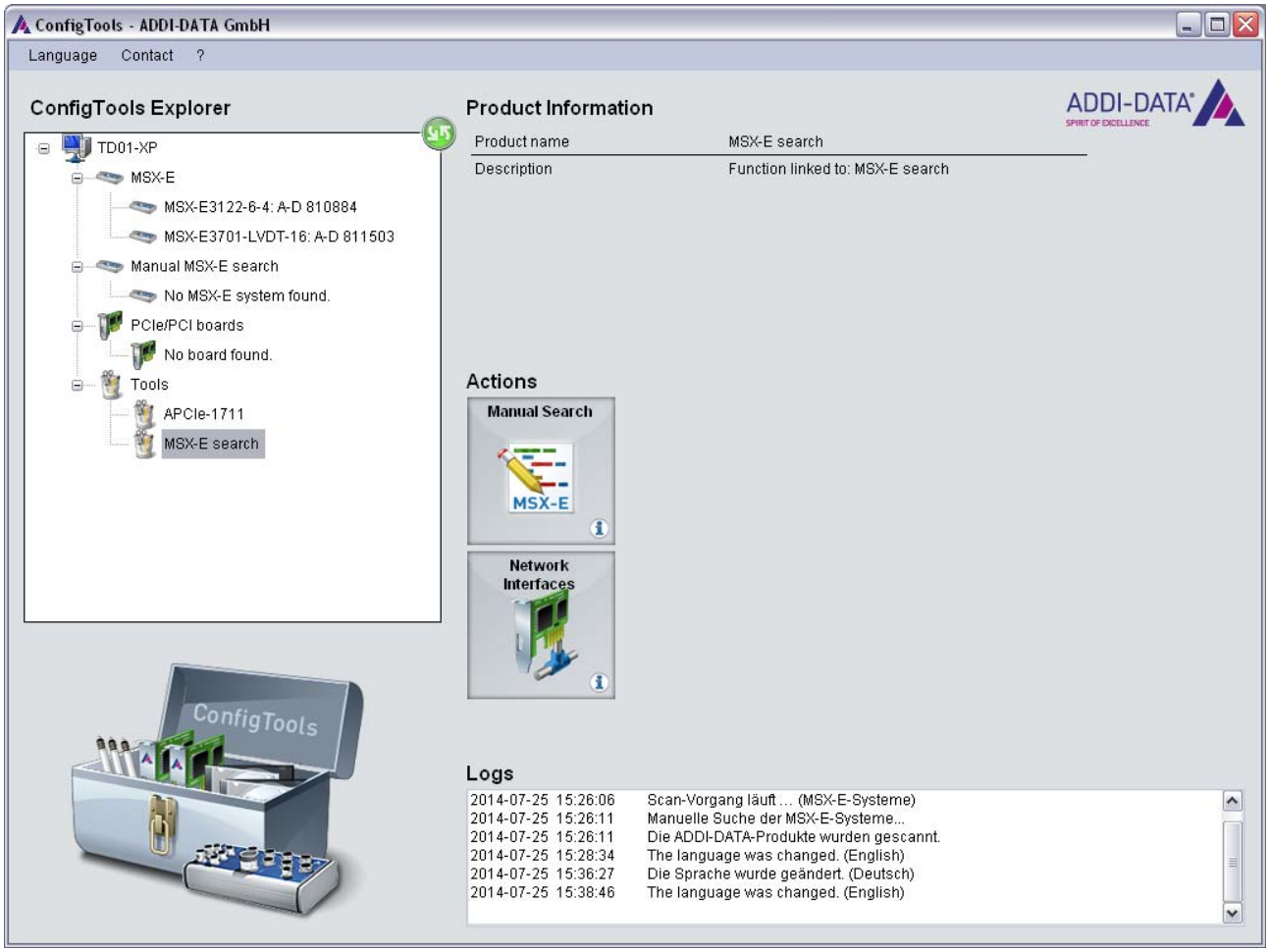
In the menu bar, you can define the language of the user interface. Available languages are English, German and French.
If you have questions on the automatic scanning or the manual search of the MSX-E systems, you will get more information under “?/Help”. Moreover, you can retrieve the version of the software tool (“?/About ConfigTools”) as well as the contact data of ADDI-DATA GmbH.

2.2.2 ConfigTools Explorer

After scanning, all connected MSX-E systems are listed in the “ConfigTools Explorer”.
If you click on the name of one of these systems, you will get corresponding product information such as IP address, MAC address and firmware version on the right-hand side of the main window.

To scan the connected systems once again, for example after connecting another MSX-E system, you have to click on the green icon in the top right of the “ConfigTools Explorer” area.

Fig. 2-3: ConfigTools: MSX-E search



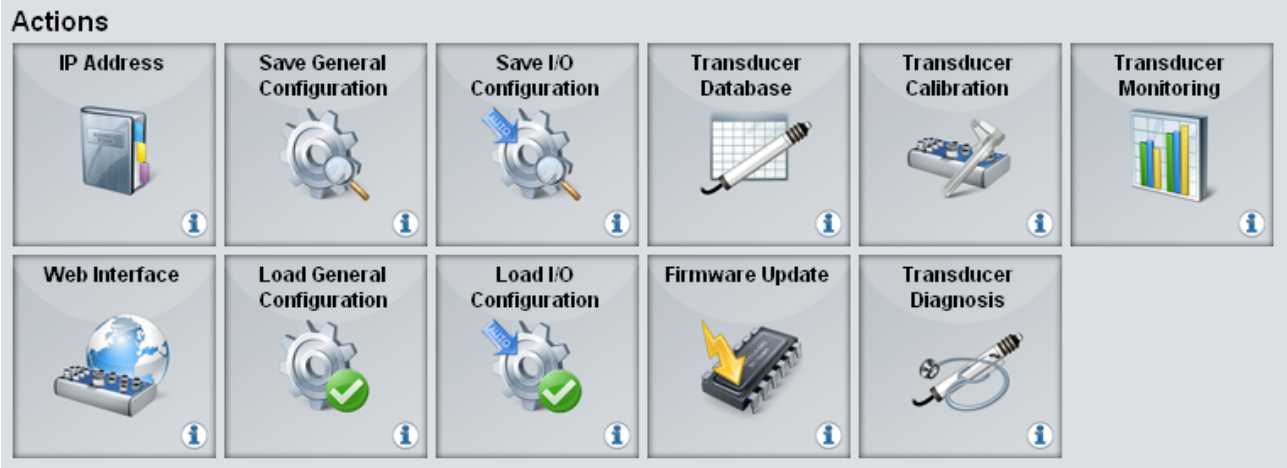
Under the entry “Tools”, if you click on “MSX-E search”, the buttons “Manual Search” and “Network Interfaces” will be displayed on the right of the main window.
MSX-E systems that have been found through the manual search are indicated in the “ConfigTools-Explorer” under “Manual MSX-E search”.
Via the button „Network Interfaces“, all of the network interfaces detected by **ConfigTools** are displayed.

More detailed information on the automatic scanning or the manual search of the MSX-E systems is to be found in the **ConfigTools** Help (see Chapter 2.2.1).

2.2.3 Actions

Below the “Product Information” area, there are buttons that enable you to perform various actions and to access the web interface of your MSX-E system.

Fig. 2-4: ConfigTools: Action buttons



The following actions are possible:

- **IP Address:** Change the IP address of the MSX-E system in order to adapt it, for example, to your corporate network (see also Chapter 4.4.1).
- **Web Interface:** Access the web interface of your MSX-E system and change the configuration (see also Chapter 4).
- **Save General Configuration:** Save the general configuration of the MSX-E system (including, for example, the network configuration), i. e. all the settings defined on the web interface apart from the I/O configuration.
- **Load General Configuration:** Load a file containing the general configuration of the MSX-E system.
- **Save I/O Configuration:** Save all function-specific settings defined on the web interface under “I/O Configuration” (see also Chapter 4.5).
- **Load I/O Configuration:** Load a function-specific configuration (see also Chapter 4.5).
- **Transducer Database:** Edit the user’s transducer database, that is, for example, change transducer features and add new transducers. The MSX-E database must contain the transducers that will be connected to the MSX-E system in order for the system to detect them.
- **Firmware Update:** Update the firmware of the MSX-E system. The required firmware file is available on the ADDI-DATA website under “Download / Driver download”. The name of the downloaded file corresponds to the firmware version.
- **Transducer Calibration:** Calibrate transducers connected to one or more channels.
- **Transducer Diagnosis:** Test transducers for errors (short-circuit, open load)
- **Transducer Monitoring:** Select the channels to be acquired and start the acquisition with monitoring. For each channel, each acquired value is immediately displayed in a diagram.

NOTICE!
Depending on the MSX-E system, a different number of buttons and accordingly, different types of actions are available.

3 Function description: General functions

In this chapter, you will learn more about additional functions that are available with all Ethernet systems:

- Hardware trigger
- Synchronisation and time stamp
- Temperature monitoring
- Customer key.

3.1 Hardware trigger

The digital 24 V trigger input of the MSX-E system can be used to start an acquisition.
You can select if the rising edge, the falling edge or both edges of the trigger signal generated externally should count. By means of the counter, you can define the number of edges after which the acquisition is to be started.

Examples:

- Selected edge: rising
  Counter value: 1
  The acquisition is started after every rising edge of the trigger signal.
- Selected edge: rising
  Counter value: 3
  The acquisition is started after every third rising edge of the trigger signal.
- Selected edge: rising and falling
  Counter value: 3
  The acquisition is started after every third edge of the trigger signal.

In order to suppress interfering signals, a software-programmable digital filter can be used for the trigger input.
The filter time may be in the range between 250 ns and 16.38 ms. When the filter is activated, every positive or negative pulse lasting shorter than the defined filter time is suppressed.

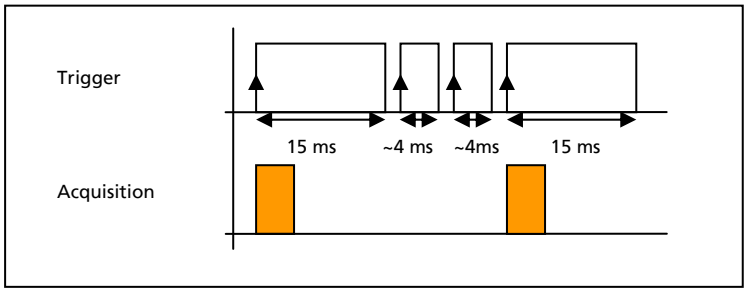
Example

The acquisition should be triggered after a rising edge.

The trigger signal always lasts longer than 10 ms. However, as it is not clean and bounces, this creates short voltage peaks of ~4 ms. In order that these bouncing signals are no longer identified as triggers, a filter of 10 ms is configured.

Trigger signal duration > 10 ms:	Trigger identified as a trigger
Trigger signal duration < 10 ms:	Trigger is ignored

Fig. 3-1: Example of a trigger



3.2 Synchronisation and time stamp

3.2.1 Synchronisation

The Synchro trigger input and output of the Ethernet system **MSX-Exxxx** can be used to synchronise multiple MSX-E systems with one another.
This makes it possible to start the data acquisition on multiple MSX-E systems simultaneously, to generate trigger events and to synchronise the time.
Depending on the MSX-E system, the synchro trigger signal can be generated by the timer function or also by the compare logic.

3.2.2 Master and slaves

An MSX-E system is detected as a master if it does not receive a signal from another MSX-E system at the synchro trigger input (“Trig/Sync In”). Consequently, MSX-E systems are detected as slaves if they receive such a signal.

NOTICE!
Only a master can generate a synchro trigger signal and synchronise the time of the slaves.

3.2.3 Time stamp

According to the functions and settings, a time stamp is available. You can use it to record the time at which the system acquired the data. Details on the time stamp format can be found in Chapter 5.5.2.

3.2.4 Time and date

Once an MSX-E system is no longer supplied with voltage, the UTC time, which depends on the time zone, as well as the date are reset to the 1 January 1970.
An NTP/SOAP command allows you to refresh the time and the date though (see MSX-E web interface, menu item “NTP client”).

3.3 Temperature monitoring

With temperature monitoring, you can read the temperature of the Ethernet system and set a temperature warning limit.

Table 3-1: Temperature monitoring: MSX-Exxxx

Temperature	Meaning
-30 °C to +70 °C	Temperature warning limit range
< -40 °C or > +85 °C	The Ethernet system shuts down automatically.

For the Ethernet systems **MSX-E3700** and **MSX-E3701**, other values apply:

Table 3-2: Temperature monitoring: MSX-E3700 and MSX-E3701

Temperature	Meaning
+5 °C to +60 °C	Temperature warning limit range
< 0 °C or > +70 °C	The Ethernet system shuts down automatically.

A list of all available software functions, with explanations, can be found in the SOAP documentation of the respective Ethernet system (see MSX-E CD or driver download on the ADDI-DATA website).

3.4 Customer key (security feature)

If you want to protect a package made up of a software application and one or more MSX-E systems and ensure that the application can only be run with the specified hardware, the Customer Key is a practical solution. This provides for certification between the MSX-E system and the application.

Table 3-3: Customer key

Customer key available		Application possible
Software	MSX-E system	
yes	yes	yes (only with identical customer keys)
yes	no	no
no	yes	yes
no	no	yes

To certify the MSX-E system, the user can define two keys on the MSX-E system, which are saved with the software function “MXCommon__SetCustomerKey”:

- a public key K1 (16 bytes)
- a private key K2 (32 bytes).

The software function “MXCommon__TestCustomerID” is then used to check whether the MSX-E system is certified.
When this software function is executed, a random 16-bit value is generated on the MSX-E system, which is encrypted using the two stored keys K1 and K2 and the AES algorithm (Rijndael).
The software function “MXCommon__TestCustomerID” then returns two arrays of 16 bytes each:

- one array with the random value [A]
- one array with the encrypted value [B]
  ([B] = result of calculating “AES ([A], K1, K2)”).

In the software application, the calculation AES ([A], K1, K2) has to be performed with the random value [A] from the MSX-E system. The result [B] from the software application is then compared with the result [B] from the MSX-E system, and the two results must match (see SOAP example on the CD “MSX-E Systems” in the folder “MSX-E Common/ CustomerKey”).
An identical result means that the MSX-E system has been configured with the correct certificate (keys K1 and K2) and is therefore suitable for the software application.

It is the responsibility of the application developer to ensure that these Customer Keys are protected within his software application against unauthorised access.

It is always possible to generate a new Customer Key on the MSX-E system. In the event of a change, the software also needs to be modified to ensure that it still works.
For security reasons, a change to the Customer Key on the MSX-E system may be prohibited. The blocking option can be activated on the web interface of the MSX-E system (menu option “System/Security”, section “Remote general system configuration authorisation”).

The use of the Customer Key has no effect on other functions of the Ethernet system.

4 Web interface: Quick access to the MSX-E system

4.1 Login

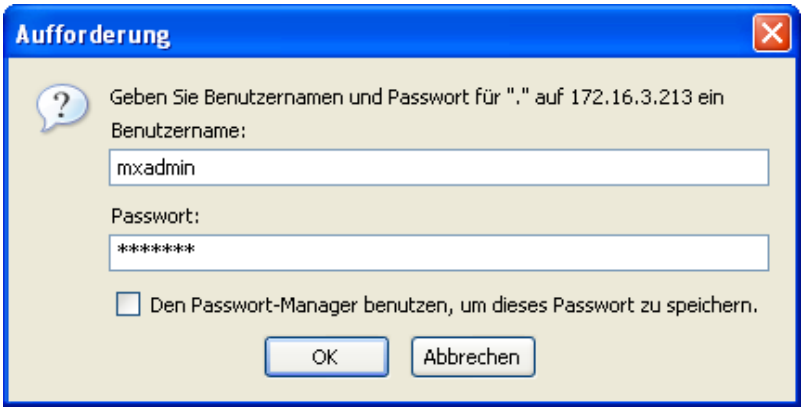
From the web interface of your MSX-E system, you can access the system quickly and manage your functions conveniently without programming.

To open the web interface of your MSX-E system, proceed as follows:

- Open a web browser (such as Mozilla Firefox, Internet Explorer, etc.) and enter the following address: **http://IP address of the Ethernet system**.

A login window is displayed.

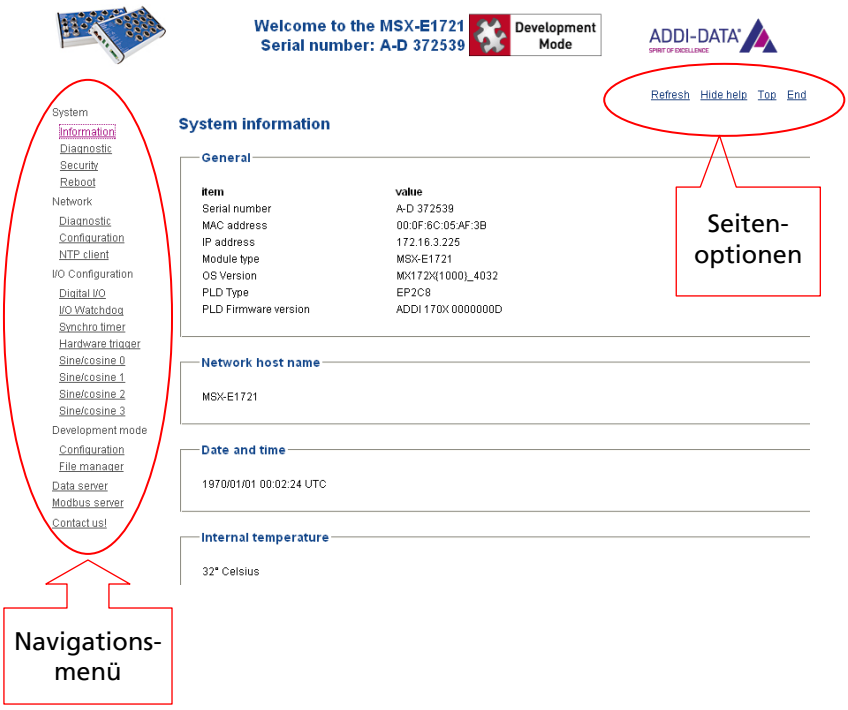
Fig. 4-1: MSX-E web interface: Login window



- Enter “mxadmin” as the user name and password.

4.2 Navigation

Fig. 4-2: MSX-E web interface: Homepage



On every web page, the options at the top right allow you to go to the “Top” or “End” of the page, to reload the current page (“Refresh”) or to display or suppress the page-specific Help (“Show help” or “Hide help”).
The page-specific help, which is always headed “Introduction”, explains the individual sections of the current page in more detail.
On the pages covering the functionality of the MSX-E system, the help also includes an overview of the respective pin assignment.
Via the navigation menu, you can access other web pages to adapt, for example, network settings to your needs (“Network/Configuration”).

4.3 “System”

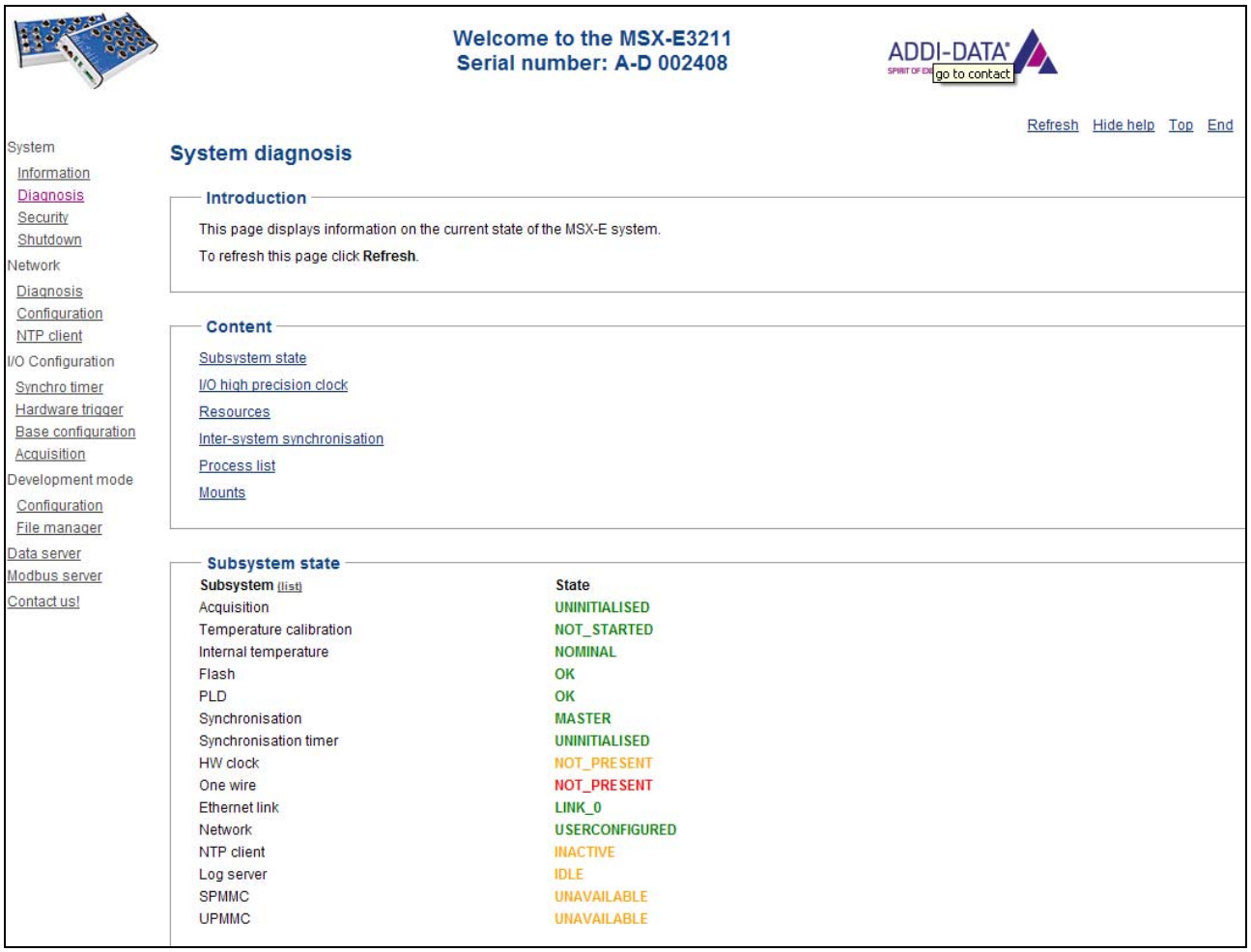
4.3.1 Menu item “Information”

After you have successfully logged in, the web interface of the MSX-E system shows the overview “System information” (see Fig. 4-2). Here, you get all important information on the MSX-E system such as serial number, the firmware used, host name and system time.

4.3.2 Menu item “Diagnosis”

This page gives you information on the current state of the MSX-E system.

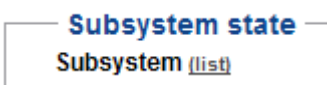
Fig. 4-3: MSX-E web interface: “System diagnosis”



1) Subsystems

In the section „Subsystem state“, the states of the single subsystems are displayed.

Fig. 4-4: Diagnosis: Subsystem state



By clicking on the button “(list)”, you get an overview of the subsystems and their possible states. By means of the subsystem ID and the state ID, the respective state can be retrieved over the event server (see also Chapter 5.5.1).

2) Date and time

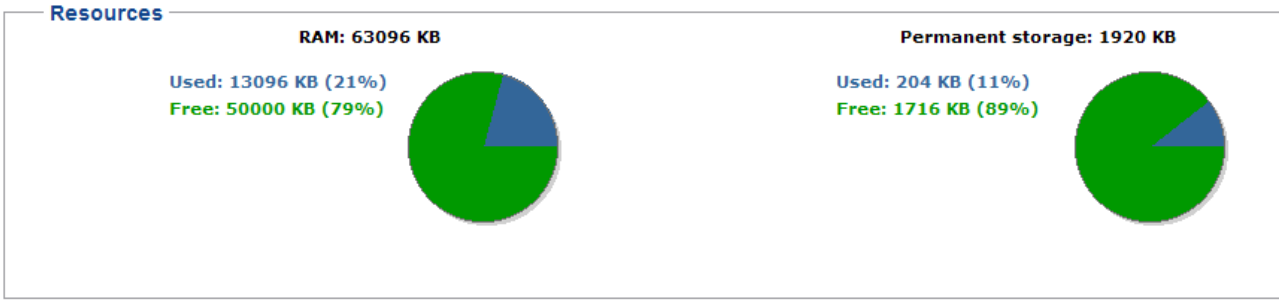
The current date and time of the MSX-E system are indicated in the section “I/O high precision clock”.

Fig. 4-5: Diagnosis: Real Time Clock

3) Memory state

In the section “Resources”, the current memory space of the RAM memory and that of the permanent memory are displayed.

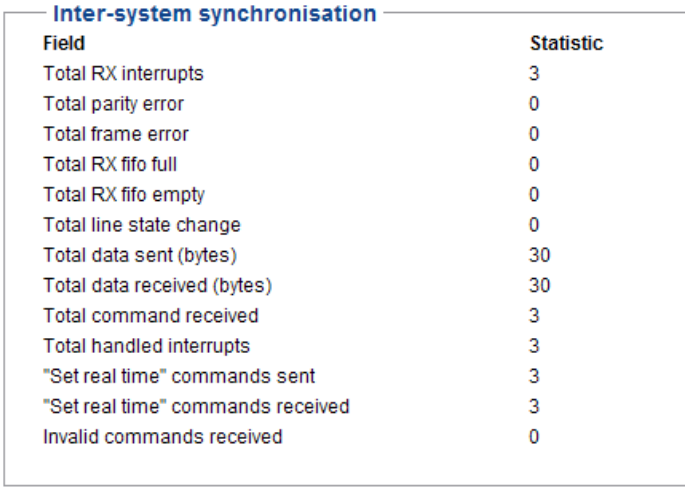
Fig. 4-6: Diagnosis: Resources



4) Synchronisation commands

The section “Inter-module synchronisation” contains information on synchronisation commands.

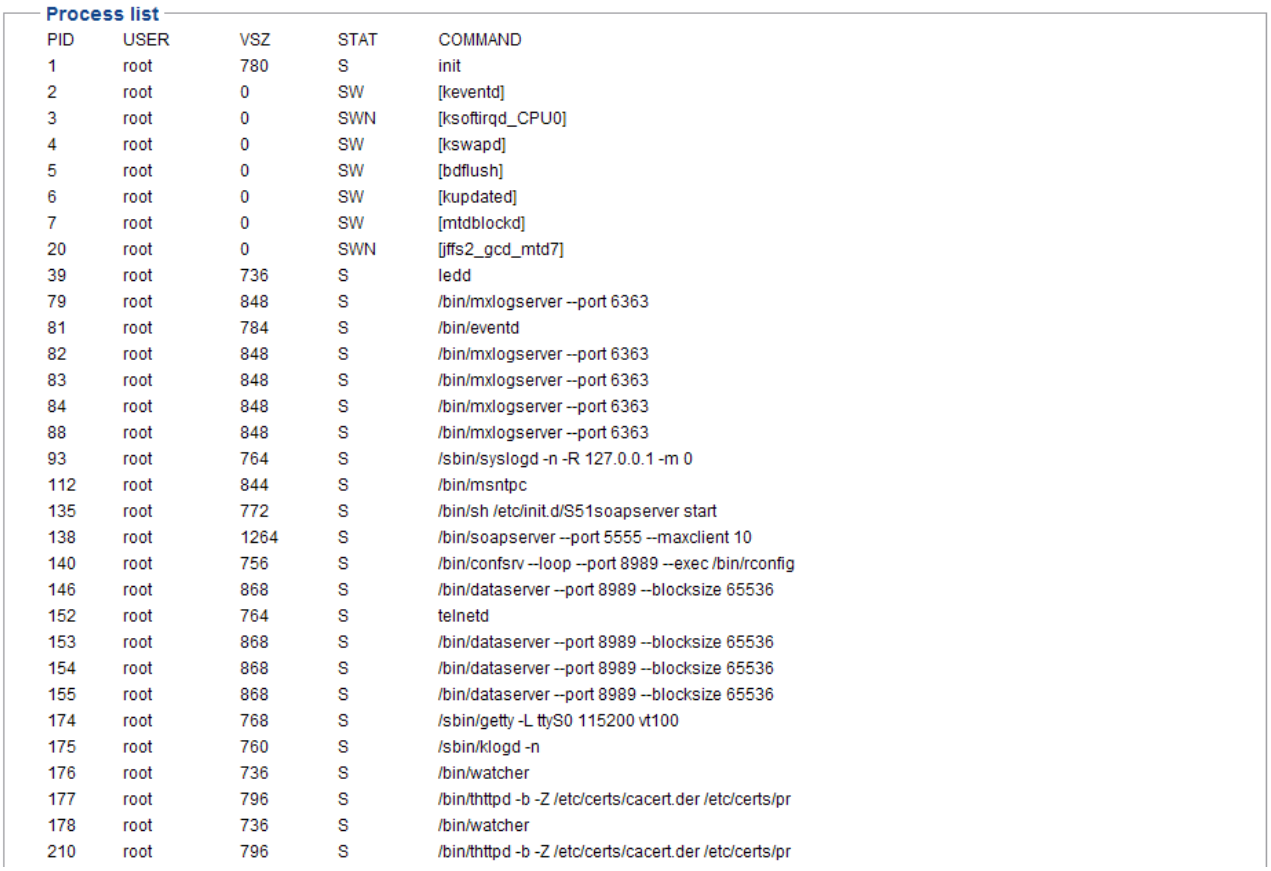
Fig. 4-7: Diagnosis: Inter-module synchronisation



5) Process list

In the section "Process list", the processes running on the MSX-E system are listed.

Fig. 4-8: Diagnosis: Process list



Process list

PID	USER	VSZ	STAT	COMMAND
1	root	780	S	init
2	root	0	SW	[keventd]
3	root	0	SWN	[ksoftirqd_CPU0]
4	root	0	SW	[kswapd]
5	root	0	SW	[bdflush]
6	root	0	SW	[kupdated]
7	root	0	SW	[mtdblockd]
20	root	0	SWN	[jffs2_gcd_mtd7]
39	root	736	S	ledd
79	root	848	S	/bin/mxlogserver --port 6363
81	root	784	S	/bin/eventd
82	root	848	S	/bin/mxlogserver --port 6363
83	root	848	S	/bin/mxlogserver --port 6363
84	root	848	S	/bin/mxlogserver --port 6363
88	root	848	S	/bin/mxlogserver --port 6363
93	root	764	S	/sbin/syslogd -n -R 127.0.0.1 -m 0
112	root	844	S	/bin/msntpc
135	root	772	S	/bin/sh /etc/init.d/S51soapserver start
138	root	1264	S	/bin/soapserver --port 5555 --maxclient 10
140	root	756	S	/bin/confsrv --loop --port 8989 --exec /bin/rconfig
146	root	868	S	/bin/dataserver --port 8989 --blocksize 65536
152	root	764	S	telnetd
153	root	868	S	/bin/dataserver --port 8989 --blocksize 65536
154	root	868	S	/bin/dataserver --port 8989 --blocksize 65536
155	root	868	S	/bin/dataserver --port 8989 --blocksize 65536
174	root	768	S	/sbin/getty -L ttyS0 115200 vt100
175	root	760	S	/sbin/klogd -n
176	root	736	S	/bin/watcher
177	root	796	S	/bin/thttpd -b -Z /etc/certs/cacert.der /etc/certs/pr
178	root	736	S	/bin/watcher
210	root	796	S	/bin/thttpd -b -Z /etc/certs/cacert.der /etc/certs/pr

6) Mounts

In the section "Mounts", there is a list containing the different partitions of the MSX-E system.

Fig. 4-9: Diagnosis: Mounts

Mounts

DEVICE	ON	TYPE	ACCESS
rootfs	/	rootfs	read/write
/dev/root	/	ext2	(rw,relatime)
proc	/proc	proc	(rw,relatime)
devpts	/dev/pts	devpts	(rw,relatime,gid=5,mode=620)
tmpfs	/tmp	tmpfs	(rw,relatime)
/dev/mtdblock/7	/store	jffs2	(rw,nosuid,nodev,noatime,nodiratime)

4.3.3 Menu item “Security”

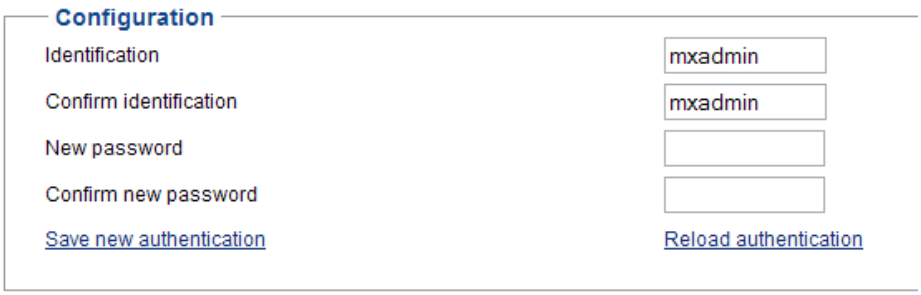
You can start running the MSX-E system immediately without any complex security settings.

Access restrictions can be set up by means of authentication on the MSX-E system web interface.
You can also use a Customer Key for additional security (see Chapter 3.4).
Via the menu option “System/Security”, you can configure the following security settings.

1) Access configuration

By default, the user name and password are both “mxadmin”.

Fig. 4-10: “Security”: Enter new password



- To change the password, enter the new password in the section “Webserver user name/password”, in the area “Configuration”, in the field “New password” and again in the field “Confirm new password”.

For this, please note the following:

- You should choose a password that is hard to guess.
- Keep the password out of sight of other people!
- All of the fields for the user name (“Identification” and “Confirm identification”) and password must be filled in.
- Any changes take effect immediately.

- After entering the new password, click on the “Save new authentication” button.

To prevent problems, the database that contains the password among other things is duplicated.
If your new password is not recognised, you have to re-enter the old one.

NOTICE!
Please note that this online form is the only way of changing the password from a remote PC or over the network.

2) TLS encryption for the web server

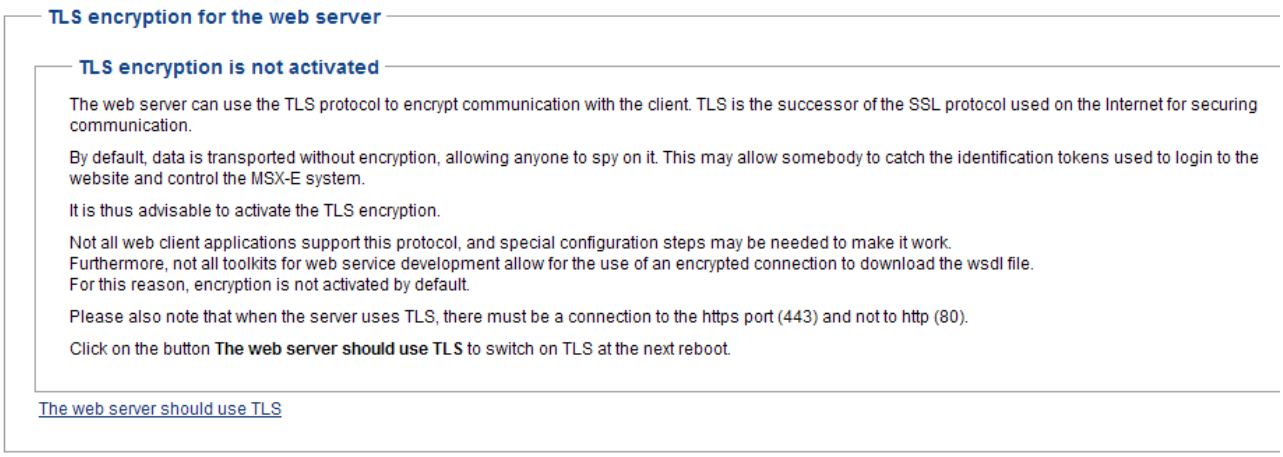
With standard data transfer methods, unwanted eavesdropping is possible. There is then a risk that unauthorised persons could obtain the password to log in to the web interface and thus operate the MSX-E system. That is why we advise you to activate TLS encryption.
The TLS protocol is the successor to the SSL protocol for secure communication over the Internet. The web server can use this protocol to encrypt communication with the client.

TLS encryption is not set as the default within the MSX-E systems, as not all web client applications use the TLS protocol and specific configuration settings may be needed. Also, not all web service development tools support an encrypted connection when downloading a WSDL file.

The web server can be modified to use the TLS protocol.
The protocol identification is then set to HTTPS (example: https://192.168.99.99). This assumes that the TLS protocol is enabled within the client browser. The configuration varies between browsers.

Please note: If the web server uses TLS, the connection must be made to the HTTPS port (443) and not to the HTTP port (80).

Fig. 4-11: "Security": TLS encryption



- In the section "TLS encryption for the web server", click on the button "The web server should use TLS" to use TLS the next time the system is restarted.

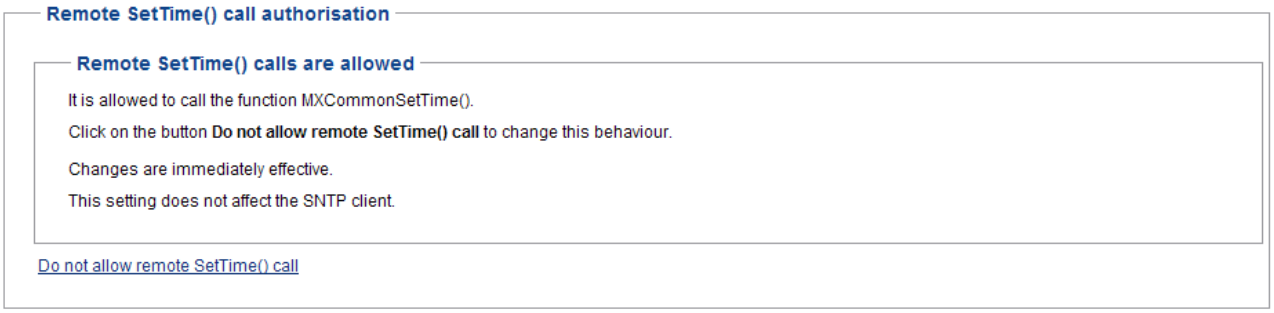
3) Authorisation settings

Changes to the system configuration from remote computers can be restricted or prohibited.
If one of the following options is blocked, this change takes effect immediately. It can be reset via the button for the option concerned.

a) Remote call “SetTime()”

The SOAP function “soap_call_MXCommon_SetTime()” enables the MSX-E system clock to be changed. By default, it is allowed to call this function from remote computers.

Fig. 4-12: “Security”: Remote call “SetTime()”



- In the section “Remote SetTime() call authorisation”, click on “Do not allow remote SetTime() call” to block remote calling of this function.

This setting has no effect on the SNTP client.

Tip: Time synchronisation by the NTP server is still supported even though remote “SetTime” calls are blocked. This option is especially suited to production systems.

b) Remote calls “autoconf/autostart”

The default setting allows the SOAP functions “SetAutoConfigurationFile()” and “StartAutoConfiguration()” to be called from remote computers.

Fig. 4-13: “Security”: Remote calls “autoconf/autostart”

- In the section “Remote autoconf/autostart authorisation”, click on “Do not allow remote autoconf/autostart changes” to block remote calling of these functions.

This setting has no effect on the web interface.

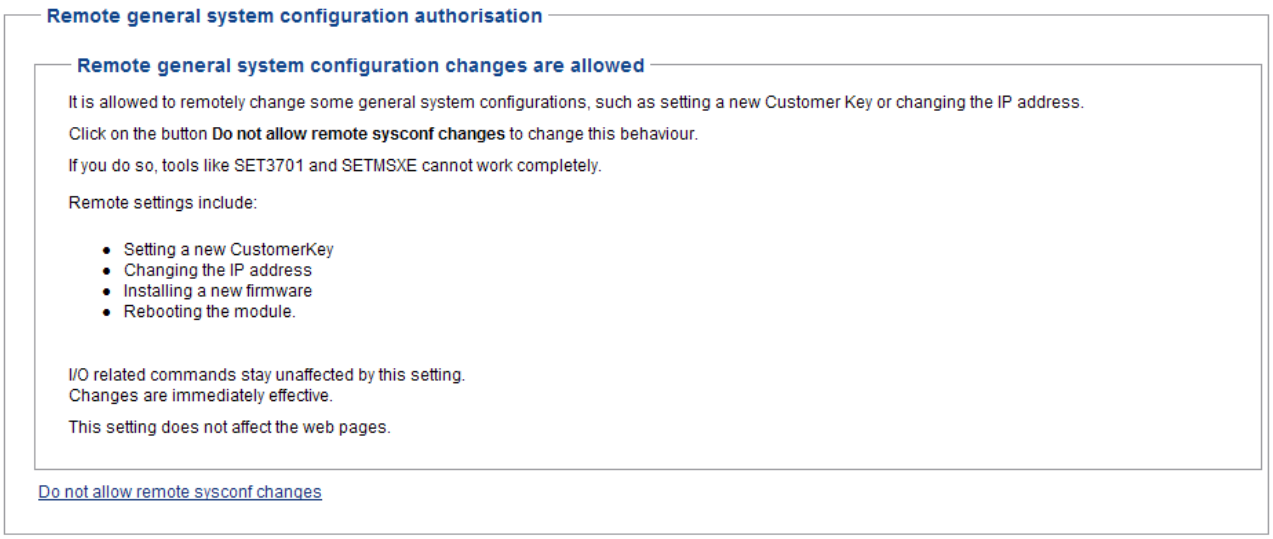
Tip: We advise you to set this option in a production system.

c) General configuration of the MSX-E system

By default, it is allowed to make changes to the general system configuration from remote computers. These changes include:

- Setting a new Customer Key (see also Chapter 3.4)
- Changing the IP address
- Installing new firmware
- Rebooting the Ethernet system.

Fig. 4-14: "Security": General system configuration



- In the section "Remote general system configuration authorisation", click on "Do not allow remote sysconf changes" to block such changes.

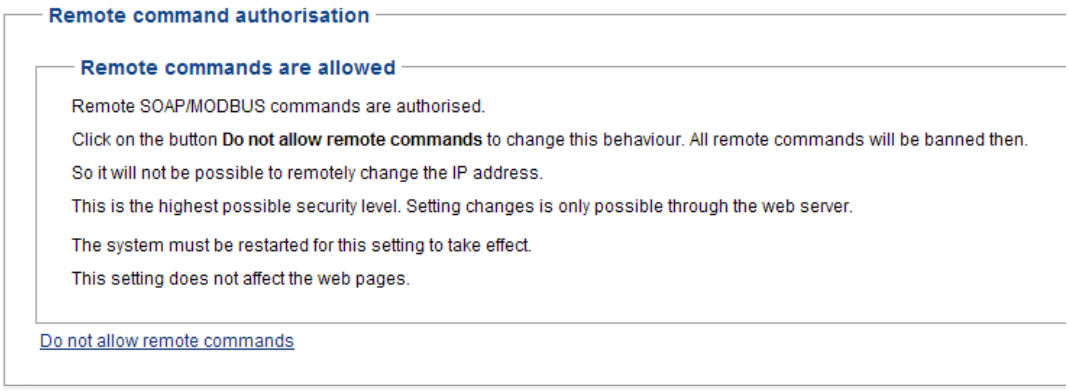
If you click on this button, tools like **SetMSXExxxx** will only work to a limited extent. Also, it will no longer be possible to change the IP address from outside the web server.
However, this setting has no effect on SOAP commands affecting the inputs or outputs, the web interface or the data/event server.

Tip: We advise you to set this option in a production system.

d) Remote commands

Remote SOAP or Modbus commands are allowed.

Fig. 4-15: "Security": Remote commands



- In the section "Remote commands authorisation", click on "Do not allow remote commands" to block the execution of remote commands.

This is the highest level of security. It will no longer be possible to change the IP address by a remote command. All settings can only be changed via the web interface.

To activate the new setting, the MSX-E system has to be **restarted.** This setting has no effect on the web interface or the data/event server.

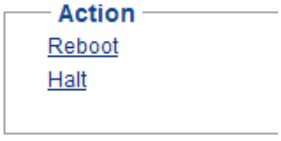
Tip: You can set this option for a production system that has been configured by means of the SOAP functions "SetAutoConfigurationFile()" and "StartAutoConfiguration()".

4.3.4 Menu item "Reboot" or "Shutdown"

Fig. 4-16: Reboot: Action

When you click on "Reboot", the MSX-E system is rebooted.

Fig. 4-17: Shutdown: Action



By clicking on the "Halt" button, the operating system of the MSX-E system is stopped so that the latter can be switched off safely.

4.4 „Network“

4.4.1 Menu item “Configuration”

1) Network configuration

From the “Network/Configuration” menu option, you can change the network configuration of your MSX-E system.

NOTICE!
Changes in “Advanced network mode” that are not appropriate to your network may cause problems in communication with the MSX-E system.

Fig. 4-18: Configuration: Network configuration

- In the section “Network configuration”, in the field “Network address”, enter an IP address in the form of “198.168.99.99” and click on “Save”.

The new value will be used when the MSX-E system is restarted.

In the field “Network host name”, you can enter up to 64 characters of any kind. When you click on “Save”, this change takes immediately effect.

2) Network logging

The MSX-E system can send logging information to a system in the network by using the syslog protocol.

Fig. 4-19: Configuration: Syslog (network logging)

- In the section “Syslog (network logging)”, in the field “Syslog Target”, enter the IP address of the system that receives the information and click on “Save”.

If the “Syslog Target” field is left blank, this function is deactivated.

The “Syslog Port” field contains the port number (UDP) that should be used. It must be a number between 1 and 65535. 514 is defined as the default value.

The new configuration will take effect when the MSX-E system is restarted.

4.5 „I/O Configuration“

The following two menu items are available on each MSX-E web interface.
Other menu items under “I/O Configuration” exclusively refer to the respective MSX-E system and are described in more detail in the corresponding system-specific MSX-E manual.

4.5.1 Menu item “Synchro timer”

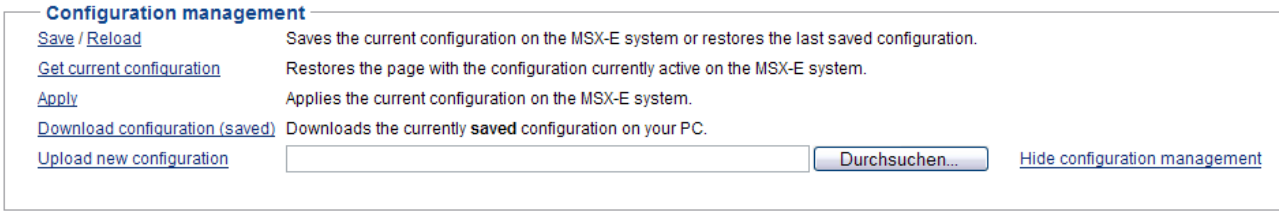
You can define whether and at which frequency a synchro trigger signal should be generated (see also Chapter 3.2).

4.5.2 Menu item “Hardware trigger”

On this web page, you can define and save a filter time for the digital trigger signal filter. For more information, read Chapter 3.1 of this manual.

4.5.3 “Configuration management”

Fig. 4-20: I/O Configuration: Configuration management



In the section “Configuration management” introducing every page under “I/O Configuration”, the following buttons are available:

- **Save:** The current configuration is saved on the MSX-E system.
- **Reload:** The configuration saved last on the MSX-E-System is loaded.
- **Get current configuration:** The web page containing the current configuration is restored.
- **Apply:** The current configuration is tested on the MSX-E system. If a configuration parameter is incorrect, an error message will be displayed.
- **Download configuration (saved):** The configuration saved last is downloaded by the MSX-E system to the computer.
- **Upload new configuration:** The selected configuration is uploaded by the computer to the MSX-E system.

NOTICE!
The configuration defined on the web interface is saved only locally, i. e. only on the MSX-E system.
However, over a computer, it is possible to readout the configuration and to save it in a file on the computer or on another storage medium by using the direct access sample "MSX-E Common\ Direct Access Samples\Visual C++ 6.0\ AutoConfig".
In the same way, the configuration saved externally can be reloaded on the MSX-E system by means of this sample.

4.5.4 "Autostart" (Automatic configuration start)

As soon as the MSX-E system is switched on, it can load a predefined configuration and execute it. In other words, an acquisition, for example, is started automatically after the system has booted up.

In order for the current configuration to be used as autostart configuration, proceed as follows:

- In the section "Autostart", select the option "Yes" to activate the autostart function.
- In the section "Configuration management", click on "Save" to save the current configuration including the defined autostart.

4.6 „Development Mode"

With the Development Mode of the intelligent Ethernet system **MSX-Exxxx**, you can implement both simple and complex measurement and control applications.

Possible applications

The Development Mode can be used to perform the following tasks:

- Generating an additional data server for previously computed values
- Creating a network which consists of several Ethernet systems
- Setting up a customised SOAP server to simplify procedures and to develop your own functions
- Data computation directly on the MSX-E system.

For further information on the Development Mode, including the programming process and loading the programs into the MSX-E system, please refer to the "Instruction Manual" of the Development Mode.

4.7 “Data server”

The data server is the network service that delivers the acquired data to clients via TCP/IP or UDP sockets. You can parameterise this service via the menu option “Data server”.

4.7.1 “Network protocol”

The data server supports both TCP/IP and UDP/IP protocols.

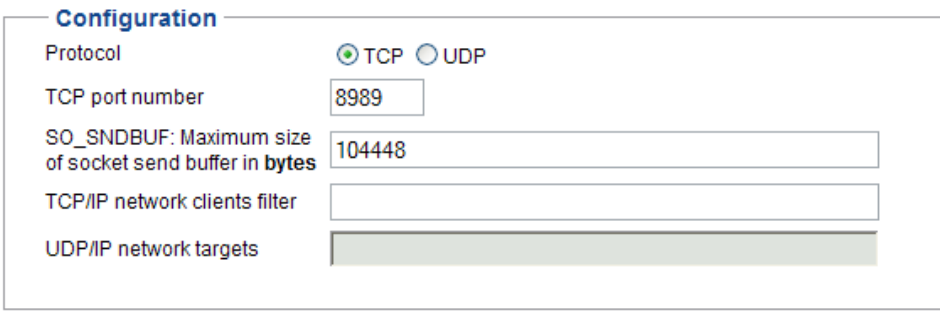
The **TCP/IP mode** is based on the client/server programming model. Clients have to be first connected to the server and read data on the socket. This protocol guarantees the packet delivery; otherwise the connection will fail.

NOTICE!

A maximum of five clients can be connected to the server simultaneously. This applies to all MSX-E systems from firmware revision 3230.

The **UDP/IP mode** is based on the programming model of separated data streams.
The data server sends data packets to the defined network client(s). The client has to open a socket and read data. The delivery of data packets is not guaranteed, since the data server cannot check whether the delivery was successful.

Fig. 4-21: Data server: Network protocol

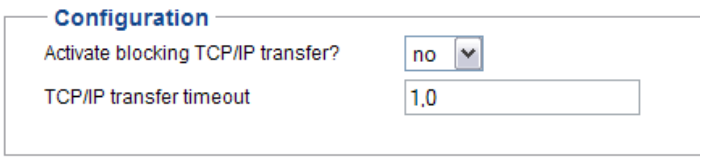


You have to specify UDP/IP clients precisely to the data server in the „UDP/IP network targets” field. For this purpose, enter a character string of the IP address and port number, separated by a space, as shown below: “IP1:PORT1 IP2:PORT2 ... IPn:PORTn”.
Example: “192.168.99.2:8080 192.168.99.3:8888”

4.7.2 „Blocking TCP/IP transfer“

In this mode, you can define a TCP/IP timeout in the form “s.µs”.

Fig. 4-22: Data server: Blocking TCP/IP transfer



With the value “1.0", the timeout is 1 second, that is, the server waits one second for a read confirmation from the data client. At the same time, it blocks the reading of the acquired data. If it does not receive the client’s confirmation after a second, the connection to this client is broken. If it does, then the data server continues with calling up the acquired data.
With the value “0.0”, the server would permanently block the data, as it would wait constantly for a read confirmation from the data client.

If for “Activate blocking TCP/IP transfer?” the option “yes” is selected, the data server’s throughput rate is reduced. However, this is an advantage if the connection with the client is unexpectedly blocked.

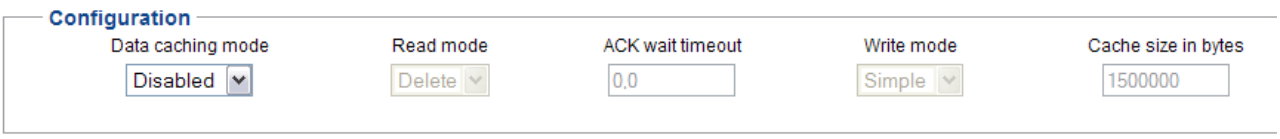
If the option “no” is selected for “Activate blocking TCP/IP transfer?”, the actual TCP/IP timeout corresponds to the protocol’s permitted minimum. In this mode, network problems are easier to identify than with the “yes” mode; moreover, the server’s throughput rate is higher.

4.7.3 “Data caching”

NOTICE!
You can only use the cache in TCP mode.

By default, the values that are acquired by the MSX-E system are lost unless at least one client is connected that reads them.
The data server can cache the data so that no data is lost. If a client is connected, it first receives the cached data and only then does it receive the newly acquired data.

Fig. 4-23: Data server: Data caching



1) "Data caching mode"

The data server can work in either Volatile mode or in Persistent mode.

- **Volatile:** In this mode, the data is cached in the RAM buffer. However, this data is lost when the MSX-E system is switched off. A high throughput rate is reached in Volatile mode.
- **Persistent:** The data is cached internally in a file. If the MSX-E system is restarted, the previously acquired data is still available.

NOTICE!
Due to the storage method, you achieve a lower throughput rate with the Persistent mode than with the Volatile mode.

2) "Read mode"

The data server can delete or keep data if a client is connected.

- **Delete mode:** The cache is emptied when a client connects to the data server to retrieve data. Newly acquired data is not cached, but sent directly to the connected clients via the TCP/IP socket.
- **Keep mode:** Data is systematically cached. When a client connects to the data server, it first receives the cached data, which remains in the buffer though.
- **ACK mode:** This mode in which only one client can be connected provides for a confirmation management of the data in the application level. The cached data will only be deleted when the client has sent a confirmation (ACK command).
  In this mode, you can define a timeout for the confirmation command in the form "s.µs". If the server has not received the client's confirmation within the defined time, the connection to this client is broken. With the value "0.0", the server would permanently block the data, as it would wait constantly for a read confirmation from the data client.

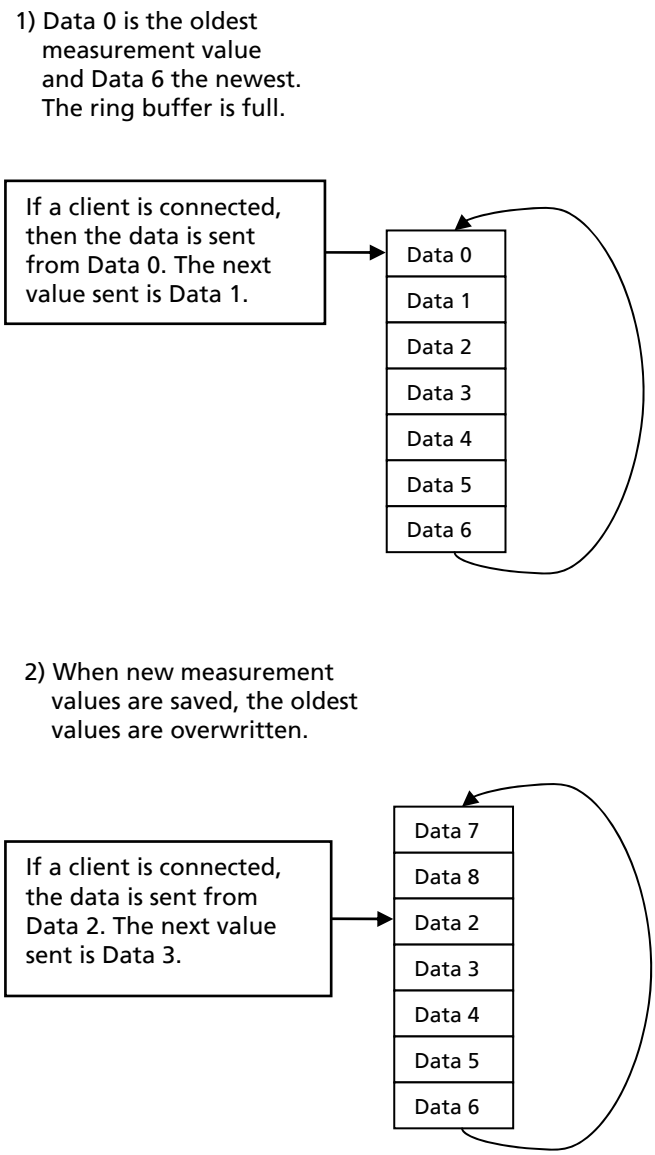
3) "Write mode"

The data server can work in Simple mode or in Circular mode. These modes define the procedures in the event of a cache overrun.

- **Simple mode:** Newly acquired values are ignored if the cache is full.
- **Circular mode (ring buffer):** If the cache is full, the oldest values are overwritten by the newest ones. If a client is connected, it receives the older values first.

Example with a ring buffer containing a maximum of 7 values:

Fig. 4-24: Ring buffer



4) "Cache size in bytes"

An additional parameter is the cache size. This is the number of bytes that the cache can handle. The maximum value depends on the number that is available to the storage medium. To avoid the risk of the system crashing, the server allocates at most 80% of available resources, that is, 20% of the memory remains free.

Note that in Persistent mode, 16 bytes are used for saving metadata. To get the actual memory size for data, this has to be deducted from the cache memory size.

4.7.4 Save and Restart

Fig. 4-25: Data server: What do you want to do?

In the section "What do you want to do?", the following buttons are available:

- **Save:** The MSX-E system saves your new configuration. This is reused each time the MSX-E system starts.
- **Reload:** The web page with the saved configuration is reloaded. Any changes that have not been saved will be lost.
- **Restart:** The data server is restarted.
- **Restart & reset:** The data server is restarted. If the data server has been configured in Persistent mode, the content of the cache file is deleted.
- **Restart & delete:** see the following note:

NOTICE!
If you have changed the configuration, you first have to save it by clicking on "Save" and then click on "Restart & delete" to restart the data server and to empty the cache.

4.8 "Modbus server"

On this web page, you can configure the Modbus server of the MSX-E system, which provides SOAP-related functions. For more information, please also read Chapter 5.3. of this manual.

5 Software

Once you have configured your Ethernet system with the software tool **ConfigTools** (see Chapter 2), you can access it in one of the following ways:

- SOAP/web service
- Open Modbus (in combination with a PLC).

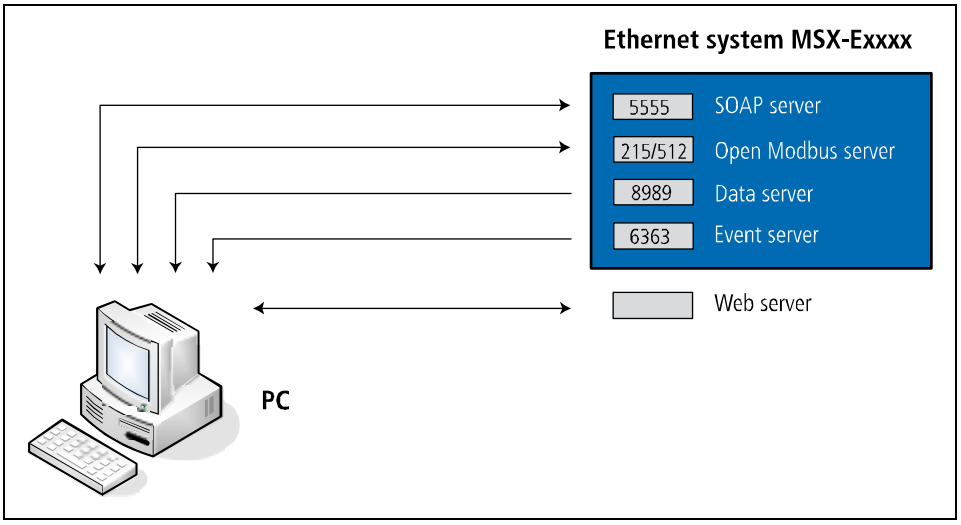
5.1 MSX-E system interface

Access to the MSX-E system is via a TCP/IP socket. The MSX-E system has three servers:

Table 5-1: MSX-E servers

Server	Protocol	Task	Port No.
Command server	SOAP	Receive and process commands (acquisition, initialisation, etc.)	5555
	Open Modbus		Little Endian = 215 Big Endian = 512
Data server	TCP or UDP socket	Data acquisition	8989
Event server	TCP socket	Event detection (temperature warning, short-circuit)	6363

Fig. 5-1: Overview: Servers



5.2 Access via SOAP/web service

Via SOAP/web service access, all the functions of the MSX-E system are supported so that no specific software is required.

5.2.1 SOAP definition

The SOAP protocol (Simple Object Access Protocol) can be used to exchange data between systems and execute Remote Procedure Calls. SOAP works with the support of other standards, such as XML to display the data or with Internet protocols in the transport and application layer to transfer the messages. SOAP is most often used via HTTP and TCP.

Fig. 5-2: SOAP in the TCP/IP protocol stack

<table>
<tr><td rowspan="2">Application</td><td colspan="4">SOAP</td></tr>
<tr><td>HTTP</td><td>HTTPS</td><td colspan="2">…</td></tr>
<tr><td>Transport</td><td colspan="4">TCP</td></tr>
<tr><td>Network</td><td colspan="4">IP</td></tr>
<tr><td>Net access</td><td>Ethernet</td><td>Token Ring</td><td>FDDI</td><td>…</td></tr>
</table>

The bidirectional software interface to interprocess (IPC) or network communication is called socket. Sockets are a standardised interface (API) between the operating system and the actual application software.

5.2.2 SOAP functions

For a detailed description of the individual software functions, read the SOAP documentation of the respective Ethernet system (see MSX-E CD or driver download on the ADDI-DATA website).

5.3 Access via Open Modbus (for PLC)

The Open Modbus protocol is an open non-proprietary protocol based on the Modbus protocol.

The Modbus server enables an Ethernet system to be controlled by a PLC, e.g. a SIMATIC S7 from Siemens. The S7 PLC starts acquisitions and reads data from the Ethernet system.
Detailed information on this can be found in the instruction manual “Ethernet I/O systems”.

NOTICE!
Please note that only Modbus via TCP is standardised.

In addition to the standardised Modbus access via TCP, the MSX-E systems also allow for access via UDP sockets.

Please find more details about Modbus on the supplied CD “MSX-E Systems”.

5.4 Data server

The data server is used to transfer data (see also Chapter 4.7). The type and the format of this data are described in more detail in the respective system-specific MSX-E manual.

5.5 Event server

The event server is a network service which informs the connected clients of events, i.e. state changes in subsystems.

Clients are connected to the event server via a TCP/IP socket and receive change notifications in the form of packets.
When a client is connected to an event server for the first time, it receives a packet with a summary of the current state of the MSX-E system. Every subsequent packet is associated with a change to a subsystem.

The event server can be used to call up diagnostic information, e.g. short-circuits.

5.5.1 Packet format

A packet contains a time stamp that indicates the time at which an event occurred.

Table 5-2: Event server: Packet format

Field	Size (bytes)
0 (packet format version)	1
Number of subsequent bytes	1
Subsystem ID	1
New state ID	1
tv_sec	4
tv_usec	4

5.5.2 Time stamp format

The time stamp format is based on the UNIX convention for displaying time data. In the programming language C, for example, the time stamp is represented like this:

```
struct timeval
{
  uint32_t tv_sec;     /* seconds */
  uint32_t tv_usec;    /* microseconds */
};
```

The “tv_sec” field holds the number of seconds since the start of the UNIX era (1 January 1970). Accordingly, the “tv_usec” field holds the number of microseconds.

6 Returning or disposing

6.1 Returning

In the event that you must return your Ethernet system, you should read the following checklist beforehand.

Checklist for returning your Ethernet system

- Specify the reason for returning your Ethernet system (e.g. exchange, modification, repair), the serial number of the Ethernet system, the contact person in your company including his/her telephone extension and e-mail address, as well as the mailing address for a potential new delivery.

- Please make a note of the serial number which is indicated on the Ethernet system.

Fig. 6-1: Serial number

- You do not have to indicate the RMA number.

- Please use an ESD protective cover for packing the Ethernet system. Then put it in a cardboard box so that it is protected as best as possible for shipping. Send the Ethernet system in its package together with your details to:

  ADDI-DATA GmbH
  Airpark Business Center
  Airport Boulevard B210
  77836 Rheinmünster
  Germany

- For any further questions, you can contact us directly at:

  Phone: +49 7229 1847-0

  E-mail: info@addi-data.com

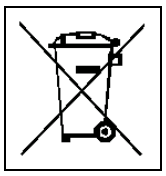
6.2 Disposal of ADDI-DATA devices

ADDI-DATA organises the disposal of ADDI-DATA products that were launched on the German market after the 13 August 2005.

If you want to return old devices, please mail your request to:
rohs@addi-data.com.

The following sign shows if the Ethernet systems were delivered after the 13 August 2005:

Fig. 6-2: Disposal: Labelling



This symbol indicates the disposal of electrical and electronic waste (valid in the European Union and other European countries with separate collection system). Products with this symbol must not be treated as household waste when you wish to dispose them.
If you dispose these products correctly, you will help to prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of these products. The recycling of materials will help to conserve natural resources.

For more detailed information about the recycling of these products, please contact your local city office, waste disposal service, the shop where you bought this product or the distributor you purchased this product from.

Disposal in other countries than Germany

Please dispose the product according to the country-specific regulations.

7 Appendix

7.1 Glossary

Buffer
The buffer is used for the temporary storage of information that is only needed at a later time.

Cascading
Cascading means connecting multiple similar elements together to enhance their individual effect. The individual elements must be such that the outputs of a given element are compatible with the inputs of the subsequent element in terms of values and functionality.

Data acquisition
Data acquisition means gathering information from sources such as sensors and transducers in an accurate, timely and organised manner. Modern systems convert this information to digital data which can be stored and processed by a computer.

Driver
A driver is a series of software instructions written specifically to manage particular devices.

ESD
= Electrostatic Discharge

On non-conductive surfaces, an electric charge is conducted away very slowly. If the dielectric strength is overcome, there is a fast potential equalisation between the surfaces involved. The often very sudden equalisation process is referred to as electrostatic discharge (ESD). Currents of up to 20 A may occur in this process.

Ethernet
The Ethernet is a baseband bus system originally developed in order to connect mini-computers. It is based on the CSMA/CD access method. Coaxial cables or twisted-pair cables are used as the transmission medium.
The transmission speeds are 10 Mbit/s (Ethernet), 100 Mbit/s (Fast Ethernet) and 1 Gbit/s or 10 Gbit/s (Gigabit-Ethernet).

This widely used technology for computer networking in a LAN has been standardised since 1985 (IEEE 802.3 and ISO 8802-3). Ethernet technology is now common practice in the office environment. After making even very tough real-time requirements possible and adapting the device technology (bus cables, patch fields, junction boxes) to the harsh application conditions of the industrial environment, Ethernet is now also increasingly used in the field areas of automation technology.

Event
An event is an occurrence detected by the MSX-E system. Where e. g. a short-circuit is detected and an event is activated, a short-circuit warning can be sent via the event server.

Ground line
Ground lines should not be seen as potential-free return lines. Different ground points may have small potential differences. This is always true with large currents and may cause inaccuracy in high-resolution circuits.

MAC address
MAC = Media Access Control

This is the hardware address of network components used to identify them uniquely within the network.

PLC
= Programmable Logic Controller

The PLC is a computer-based control unit whose functionality is defined by an application program. With standardised technical languages, this application program is relatively easy to produce. Because of its serial mode of operation, reaction times of PLCs are slower than those of VPS. As a family of devices with graduated and matched components, PLCs can now cover all levels of an automation hierarchy.

SOAP
= Simple Object Process Protocol

SOAP is a simple extensible protocol for exchanging information in distributed environments. It defines XML messages that can be exchanged between heterogeneous applications via HTTP.
SOAP is independent of operating systems and can be integrated into existing Internet structures, including Ethernet TCP/IP-based automation concepts. SOAP is based on Remote Procedure Calls and XML. This means that functions from other platforms can be called and used from any point within the network. Any results data can also be returned using XML schemas. This enables distributed computing capacity and non-redundant data storage in distributed systems.

TCP/IP
= Transmission Control Protocol/Internet Protocol

TCP/IP is a family of network protocols and therefore often just referred to as Internet protocol. The computers that are part of the network are identified via their IP addresses. UDP is another transport protocol that belongs to the core group of this protocol family.

Trigger
A trigger is a pulse or signal for starting or stopping a special task. Triggers are often used for controlling data acquisition.

UDP
= User Datagram Protocol

This is a minimal connection-free network protocol which is part of the transport layer within the Internet protocol family. The purpose of UDPs is to ensure that data transmitted over the Internet reach the correct application.

7.2 Index

8 Contact and support

Do you have any questions? Write or phone us:

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77836 Rheinmünster
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Fax: +49 7229 1847-222

E-mail: info@addi-data.com

Manual and software download from the Internet:

www.addi-data.com