Technical Information

TOX® ProcessMonitor

Edition: 05/06/2025, Version: 2

TOX® PRESSOTECHNIK SE & Co. KG, Riedstrasse 4, 88250 Weingarten / Germany
www.tox.com

Table of contents

1 Important information

1.1 Legal note

All rights reserved.

Operating instructions, manuals, technical descriptions and software published by TOX® PRESSOTECHNIK SE & Co. KG ("TOX® PRESSOTECHNIK") are copyright and must not be reproduced, distributed and/or otherwise processed or edited (e.g. by copying, microfilming, translation, transmission in any electronic medium or machine-readable form). Any use - including of extracts - contrary to this condition is prohibited without approval in writing by TOX® PRESSOTECHNIK and may be subject to criminal and civil legal sanctions.

If this manual refers to goods and/or services of third parties, this is for example only or is a recommendation by TOX® PRESSOTECHNIK.
TOX® PRESSOTECHNIK does not accept any liability or warranty/guarantee with reference to the selection, specifications and/or usability of these goods and services. The use and/or representation of trademarked brands that do not belong to TOX® PRESSOTECHNIK are for information only; all rights remain the property of the owner of the trademarked brand.

Operating instructions, manuals, technical descriptions and software are originally compiled in German.

1.2 Exclusion of liability

TOX® PRESSOTECHNIK has checked the contents of this publication to ensure that it conforms to the technical properties and specifications of the products or plant and the description of the software. However, discrepancies may still be present, so we cannot guarantee complete accuracy. The supplier documentation included with the system documentation is an exception.

However, the information in this publication is checked regularly and any required corrections are included in subsequent editions. We are grateful for any corrections and suggestions for improvement. TOX® PRESSOTECHNIK reserves the right to revise the technical specifications of the products or plant and/or the software or documentation without prior notice.

1.3 Conformity

The product is compliant with EU guidelines.
See separate Declaration of conformity or installation declaration.

1.4 Validity of the document

1.4.1 Content and target group

This manual contains information and instructions for the configuration and administration of the software, as well as for safe operation and safe maintenance or servicing of the product.

This software manual describes the general configuration options of the software. Due to customer-specific settings and the assignment of rights, the display of the screens may differ.

- All information in this manual is up to date at the time of print.
  TOX® PRESSOTECHNIK reserves the right to make changes that improve the system or increase the standard of safety.
- The information is intended for:
  - the operator
  - the administration and setup personnel
  - the service personnel
  - the operating personnel (with restrictions by the assignment of rights)

1.4.2 Other applicable documents

In addition to the available manual, further documents can be supplied. These documents must also be complied with. Other applicable documents can be, for example:

- additional operating manuals (e.g. of components or of a whole system)
- Supplier documentation
- Instructions, such as software manual, etc.
- Technical data sheets
- Safety data sheets
- Data sheets
- Schematics

1.5 Gender note

In order to enhance readability, references to persons that also relate to all sexes are normally only stated in the usual form in German or in the corresponding translated language in this manual, thus e.g. "operator" (singular) for male or female, or "operators" (plural) for male or female". This should in no way convey any gender discrimination or any violation of the principle of equality, however.

1.6 Displays in the document

1.6.1 Display of warnings

Warning signs indicate potential dangers and describe protective measures. Warning signs precede the instructions for which they are applicable.

Warning signs concerning personal injuries

⚠ DANGER

Identifies an immediate danger!

Death or severe injuries will occur if appropriate safety measures are not taken.

➔ Measures for remedial action and protection.

⚠ WARNING

Identifies a potentially dangerous situation!

Death or serious injury may occur if appropriate safety measures are not taken.

➔ Measures for remedial action and protection.

⚠ CAUTION

Identifies a potentially dangerous situation!

Injury may occur if appropriate safety measures are not taken.

➔ Measures for remedial action and protection.

Warning signs indicating potential damage

NOTE

Identifies a potentially dangerous situation!

Property damage may occur if appropriate safety measures are not taken.

➔ Measures for remedial action and protection.

1.6.2 Display of general notes

General notes show information on the product or the described action steps.

Identifies important information and tips for users.

1.6.3 Highlighting of texts and images

The highlighting of texts facilitates orientation in the document.

✓ Identifies prerequisites that must be followed.

1. Action step 1
2. Action step 2: identifies an action step in an operating sequence that must be followed to ensure trouble-free operation.
   ▷ Identifies the result of an action.

▶ Identifies the result of a complete action.

➔ Identifies a single action step or several action steps that are not in an operating sequence.

The highlighting of operating elements and software objects in texts facilitates distinction and orientation.

- <In square brackets> identifies operating elements, such as buttons, levers and (valves) stopcocks.
- "with quotation marks" identifies software display panels, such as windows, messages, display panels and values.
- **In bold** identifies software buttons, such as buttons, sliders, checkboxes and menus.
- **In bold** identifies input fields for entering text and/or numerical values.

1.7 Contact and source of supply

Only use original spare parts or spare parts approved by TOX® PRESSOTECHNIK.

TOX® PRESSOTECHNIK SE & Co. KG
Riedstraße 4
88250 Weingarten / Germany
Tel. +49 (0) 751/5007-767
E-Mail: info@tox-de.com

For additional information and forms see www.tox.com

2 Safety

2.1 Basic safety requirements

The software for the products is prepared according to the latest state-of-the-art. However, operation of the product may involve danger to life and limb for the user or third parties or damage to the plant and other property.

For this reason the following basic safety requirements will apply:

- Read the manual and observe all safety requirements and warnings.
- Operate the product only as specified and only if it is in perfect technical condition.
- Remedy any faults in the software, product or system immediately.

2.2 Organizational measures

2.2.1 Safety requirements for the operating company

- The software manual must always be kept available at the operation site of the product. Ensure that the information is always complete and in legible form.
- Only allow authorized persons access to the product and software.
- Instructions for special operating features (e.g. work organization, work processes, appointed personnel) and supervisory and reporting obligations must be added to the operating manual and software manual.

2.2.2 User profiles, user and password protection

The software has the following level by default:

	TOX1 (Operator)	tox2 (Installer)	tox3 (Maintenance engineer)	tox4 (Expert)
Standard password	tox1	tox2	tox3	tox4
Minimize	√	√	√	√
Close	√	√	√	√
Fullscrn.	√	√	√	√
Basic settings	√	√	√	√
Backup/restore HMI		√	√	√
Edit notifications		√	√	√
Edit favorites		√	√	√
Manual operation		√	√	√
Error reset		√	√	√
Configuration - Simple		√	√	√
Software update			√	√
WebVisu			√	√
Device management			√	√
Operating system settings (only TOX® UDI Panel / TOX® UDI Module)			√	√
Edit dashboard			√	√
Edit technology processes			√	√
Process monitoring system			√	√
Reset standard counter			√	√
Export			√	√
Configuration - Normal			√	√
Edit processes				√
Export/import processes				√
User administration				√
Configuration - Critical				√

3 Product overview and function description TOX® ProcessMonitor (PMO)

Function description

The TOX® ProcessMonitor (PMO) in versions Core and Advanced is a platform for process monitoring.

It consists of:

- A control unit TOX® ProcessMonitorControl (PMC) in version Core (PMC-C) or Advanced (PMC-A)
- Several modules can be linked for sensor data recording. Either in decentralized form with TOX® EdgeUnit and/or with switch cabinet unit TOX®ChannelModule.

The control unit TOX® ProcessMonitorControl (PMC) transmits the data to the TOX® Software, which is installed on a TOX® UDI Panel, a TOX® UDI Module or on a customer computer (e.g. line PC).

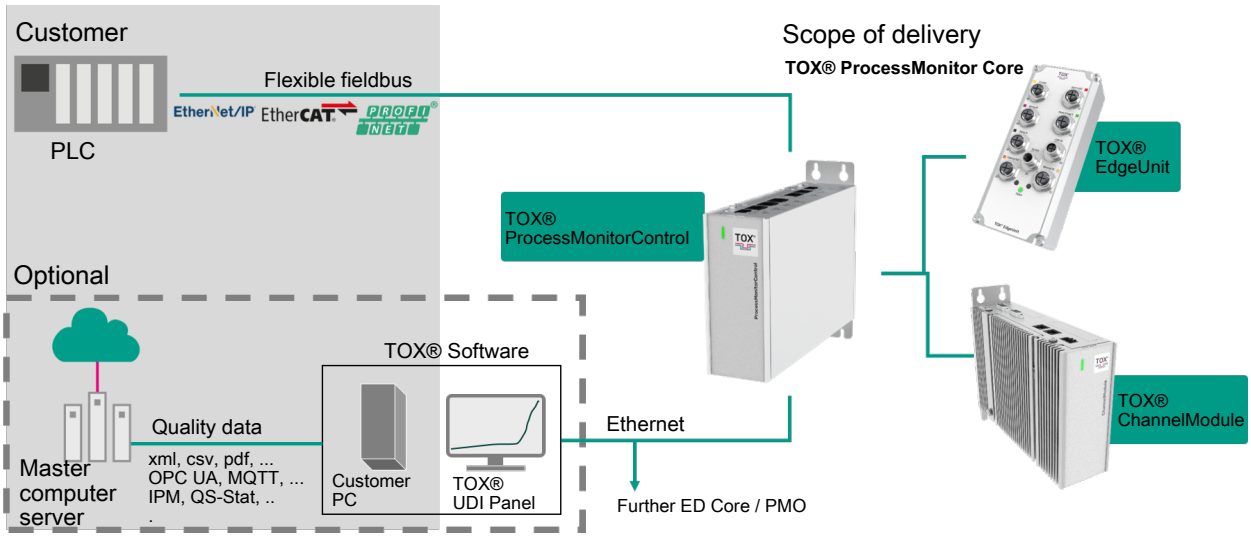
Different sensor signals can be recorded and monitored. The signals are taken up from one or several TOX® EdgeUnits or TOX®ChannelModules.

If required, up to 2 digital outputs can be switched per TOX® EdgeUnit. The interface (e.g. for starting the measurement and corresponding feedbacks) is implemented via fieldbus (Profinet, ETherCAT or ETherNet IP). Also a start via digital outputs is possible.

Scope of delivery

Components	
TOX® Software See separate document: Software manual. The software can be used on the TOX® UDI Panel or on the customer PC.	
Optional: TOX® UDI Panel See separate document: Operating Manual UDI Panel. Alternatively TOX® Software on customer PC.	
TOX® ProcessMonitorControl Core	
TOX® EdgeUnit and/or TOX®ChannelModule	 
Optional: Cable set consisting of: • 24 VDC supply TOX® EdgeUnit • Data line to TOX® EdgeUnit	
Optional: • TOX® UDI Panel • TOX® UDI Module • Force sensor • Distance sensor • Proximity switch • And many others	

3.1 System overview



4 Technical data

4.1 TOX® ProcessMonitor (PMO)

For technical data, see data sheet TOX® EdgeUnit , TOX® SystemControl Core and TOX® ProcessMonitor,
www.tox.com.

4.2 Requirements for the installation location

The following requirements for commissioning the TOX® ProcessMonitor must be met:

- Supply voltage 24 VDC

5 Installation

5.1 Electrical connections

5.1.1 Connections

For connections, see wiring diagram.

5.1.2 Supply voltage

For the connection data of the supply voltage see the wiring diagram.

5.1.3 Shielding

- Always lay the shield connection with a conductive clamp over a large area of the conductive and grounded base plate of the switch cabinet.
- Keep the unshielded connection ends as short as possible.
- Distance between the shield clamps for control lines and motor cables at least 80 mm.

Note on maintenance-friendly cable installation:

- Moving cables are wearing parts! For fast replacement the standard cables can be combined with extension cables at the moving locations, only the moving extension cable is then replaced in case of wear.
- Observe the bending radii of the lines.
  For technical data see data sheet (www.tox.com).
- Prevent "kinking", especially for plug insertion.
- Do not lay cables freely hanging, provide strain relief.

Note for the EMC-compliant wiring outside the switch cabinet:

- In the case of longer cable lengths, a greater distance between the cables outside the switch cabinet is necessary.
- In the case of parallel cable routing (cable routes) of cables with different signal types, the electromagnetic interference must be minimized by a metallic partition or separate cable ducts.
- Lay motor cables and brake cables separate from resolver / signal cables.

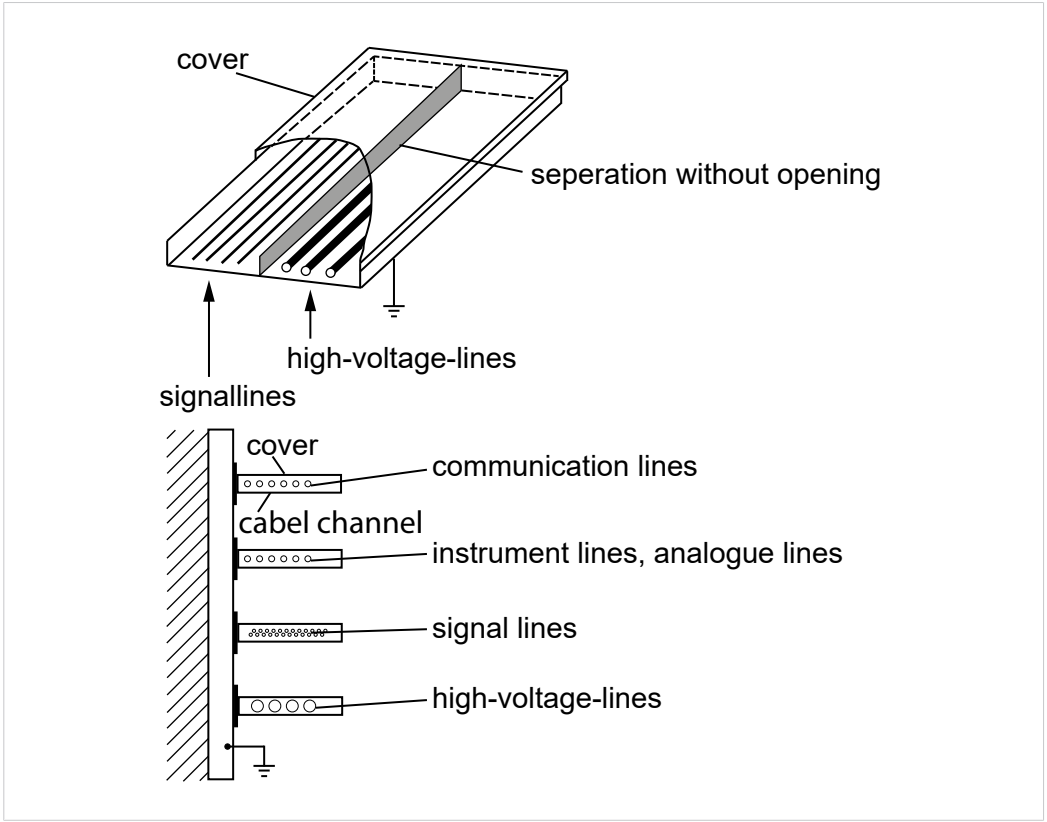


Fig. 1 Schematic diagram: EMC-compliant cable laying in the field

Additional detailed documents about EMC-compliant wiring are available in the documents enclosed with the product.

6 Commissioning

6.1 Requirements for the commissioning

Prerequisite for the commissioning via the software is the hardware configuration of the components contained in the scope of supply.

Scope of delivery: See delivery document.

- All components are properly installed.
- The components have been properly installed.
  See circuit diagram TOX® ProcessMonitor (PMO).
- The field bus is connected and ready to run (optional).
- TOX® Software for controlling the component is installed.

After all the above-mentioned points have been carried out, the power supply and the separate power supply can be switched on.

When the device TOX® ProcessMonitor is correctly wired, the LEDs on the TOX® ProcessMonitorControl Core (PMC-C), and the TOX® EdgeUnit / TOX® ChannelModule light up. The connection is correct when all LEDs light up blue or green.

6.2 Configuration and operation

6.2.1 Necessary knowledge and authorizations

The following applies:

- Knowledge and authorization when handling networks
- Knowledge and authorization when handling the operating systems used
- Knowledge and authorization when handling the work processes used

The operation is based on the conventions of Microsoft® Windows® programs. Menu items or buttons can be activated using the mouse pointer.

For touchscreen operations, an on-screen keyboard appears if required. The on-screen keyboard is opened by clicking on the "keyboard" button.

6.2.2 Configuration of the interface on the customer PC

The following applies for the interface:

- Internet protocol version 4 (TCP/IPv4)
- Sub-network mask: 255.255.255.0

  In this case, all pieces of equipment in the network can be reached via the network address '192.168.50'.
- DNS server address: DNS server not required.

  An existing server in the subnet can be specified for the value. If there is no DNS, the input field remains blank.

Internet protocol version 6 (TCP/IPv6) is not supported.

6.2.3 Installation of the TOX® Software

The TOX® Software must be installed on the PC with the TOX® ProcessMonitorControl. This you find in the link made available to you.

For the installation of the TOX® Software see TOX_Manual_HMI.

6.2.4 Configuring user administration

The preconfigured user administration can be used for the user administration, or one that is individually configured.

For the user name and passwords of the preconfigured user administration see Defining user profiles, user and password protection.

For creating an individually configured user administration of the TOX® Software see TOX_Manual_HMI.

6.2.5 Device management

The Ethernet connection between the TOX® Software and the TOX® ProcessMonitorControl Core is configured via the device management.

To use the device management you must be located in the corresponding standard user profile or in your own user profile with comparable authorizations. The device management is located under the toothed-wheel icon.

The factory settings of the IP address of the TOX® ProcessMonitorControl Core and the corresponding network settings on the PC can be used without changes to the device management.

As alternative, the settings in the device management (see software manual) can be adjusted.

6.2.6 Function test of force sensors

During commissioning of the TOX® ProcessMonitorControl Core a function test of the force sensors must be carried out prior to the first executed process.

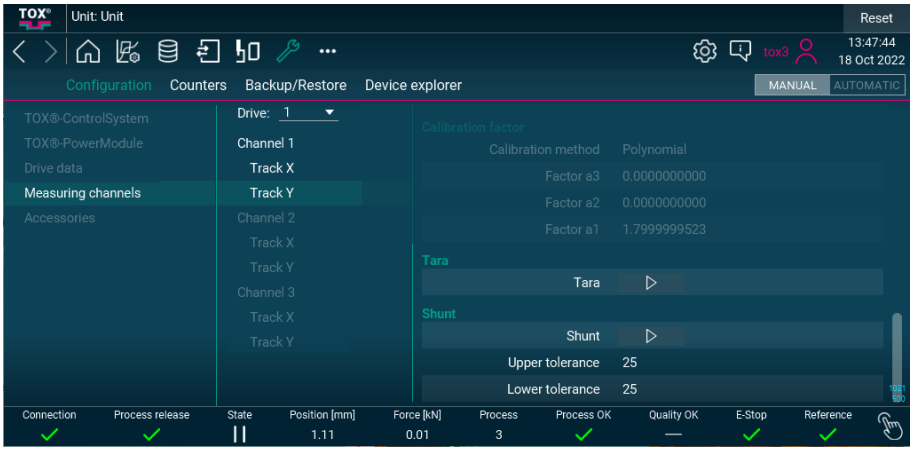


Fig. 2 Function test of force sensors

Testing the DMS measuring chain with TOX® EdgeUnit / TOX®ChannelModule

1. Select menu path **Configuration / measuring channels**.
2. Select drive.
3. Select **Track Y** in **Channel 1**.
4. Actuate and hold the **Shunt** button.
   - ▷ The DMS measuring chain is being tested.
   - ▷ The value displayed must be within the range of the values in the brackets.

Specifying the zero point of the SMS measuring chain

During commissioning, the zero point of the DMS measuring chain can be set as an option.

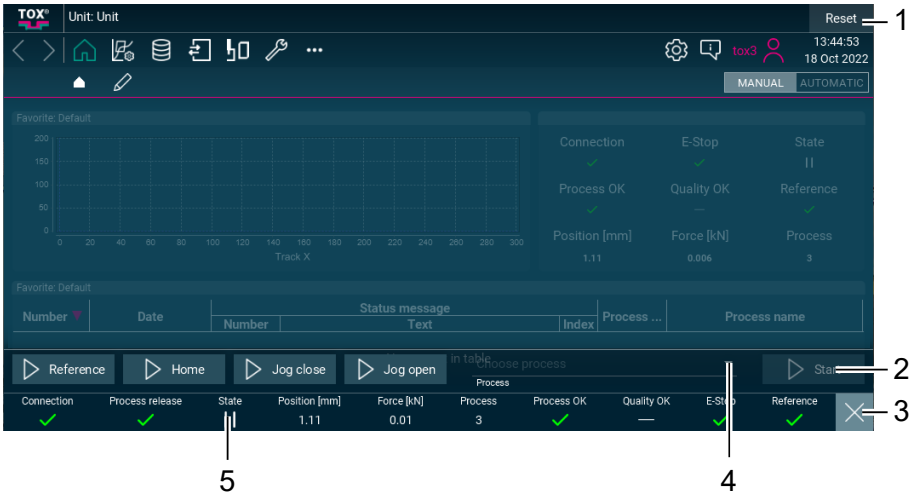
The zeroing (tare function) of the measuring chain has the effect of setting all values to zero. Including a tool that may be mounted on the working piston of the drive.

1. Select menu path **Configuration / measuring channels**.
2. Select drive.
3. Navigate to the track via the channel that was selected as force signal input.
4. Actuate and hold the **Tare** button.
   ▷ The DMS measuring chain is being zeroed.
   ▷ The value displayed must be within the range of the values in the brackets.

6.2.7 Start sample process

For a detailed description of the sample processes see the TOX_Processmanual_TOXControlSystem.

Processes with several process steps following each other automatically and more complex movement processes are listed in operating mode "Automatic". In automatic mode the selection of the process number is active via the drop-down menu. The buttons for the basic movements are blocked independent of the access authorization when automatic mode is activated.



1 Reset
2 Start
3 Manual operating screen / closing
4 Process
5 Status
- >: Operation
- ||: Pause

Fig. 3 Sample process

✓ The TOX® Software is open.

✓ The user is logged in with a suitable user level. The necessary write permissions are available.

✓ Menu Status bar > Operating window is open.

✓ Operating mode is switched to "Automatic".

1. Select the process in the drop-down menu.
2. Actuate and hold the **Start** button until the end of the process.
   ▷ The process is being performed.
   ▷ Process Result (IO/NIO) appears after a process is finished.
3. Release the **Start** button.

▶ Status changes to "pause" as soon as the process is finished (at the same time as process result, point 2, appears).

Different sample processes are available in the TOX® Software. See process manual.

7 Extended commissioning

7.1 Editing and creating processes

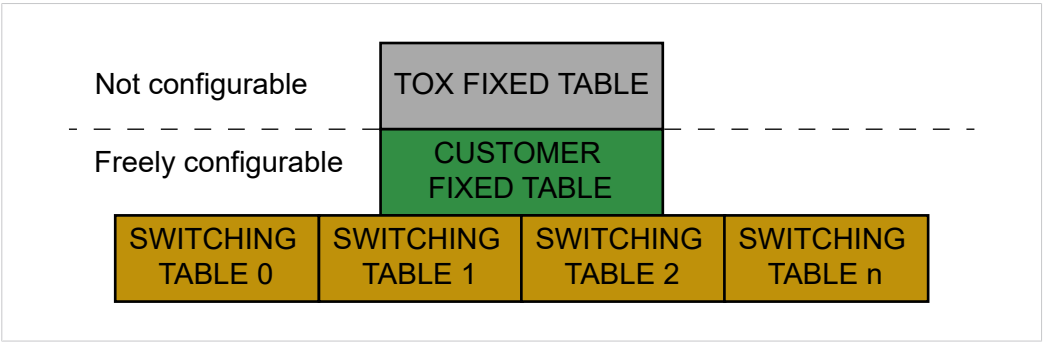
See software manual and process manual.

7.2 Activation via external control system

If the activation is to made external, a fieldbus connection between the external control system and the TOX® ProcessMonitor must be established. This can be checked by sending and receiving of Lifebits. If unusual data can be seen on the interface, observe the order of the bits (little endian, big endian). This can be changed in the parameters of the TOX® ControlSystem .

The total setup of the configurable fieldbus interface with a description of all modules and tables is available in the document / the technical information "TOX_TI_Fieldbus_Interface_TOXControlSystem_xx". There, among others, you also find sequence diagrams for example processes.

First, for the operation of the flexible fieldbus interface, it is important to understand the setup of the interface. All sections up to the first 8 bytes (byte 0 to 7) can be freely occupied. While the 44 bytes (byte 20 to 63) of the switchover table can be occupied several times. Depending on a selection in the non-configurable section of the TOX Fixed Table only one switching table is respectively displayed and updated.



If unusual data can be seen on the interface, observe the order of the bits (little endian, big endian). This can be changed in the parameters of the TOX® ControlSystem .

In the freely configurable sections of the interface, so-called modules are inserted. The change of the interface structure can be made under "..." and fieldbus. A module can be understood as a structure of data types that makes a specific information or control system available. An overview about the most-used input and output modules follows:

- Current values, operating mode, drive, motion
- Bundled PLC data sets
- Bundled window values
- Final values - Message management

The modules listed here are also stored as standard in the configurable part of the interface. That the incoming signals and on the output side the respective return messages/outputs of the TOX® ProcessMonitor are illustrated applies to all modules.

7.3 Evaluating process data

For the evaluation of the process data there are different possibilities that supply different information in different formats. The most important are final values about the fieldbus, export data on the network path and archives of the TOX® Software.

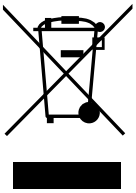
The process data received via the fieldbus are summarized in modules window values and final values. Also the actual values from the PLC can be read and saved accordingly. Additional information is available in the corresponding operating manual/technical information.

The export data contain final values, diagram data and process data which can be exported as CSV or XML file. An export directory is specified to which the computer, on which the TOX® Software is installed, has access. In this export directory are then the corresponding data. Under TOX® Software Settings -> Export Settings a corresponding parameterization is to be made for the use of export files. The parameterized export file are stored automatically in the set path. Additional information is available in the original operating manual "TOX_Manual_HMI".

The archives can also be used to export final values, diagram data, process data and window results. For this the files must be selected manually from the archive view. One archive file receives a lot of information, but is stored in a TOX® Software-specific format. Additional information is available in the original operating manual "TOX_Manual_HMI".

8 Disassembly and Disposal

8.1 Disposal



When disposing of packaging, consumables and spare parts, including the machine and its accessories, the relevant national environmental protection regulations must be complied with.

For the environmentally compatible utilization and disposal of its electronic components, please contact the certified disposal company for electronic waste or return it to TOX® PRESSOTECHNIK.

For further information about the take-back and forms see www.tox.com in the service sector.

Regarding questions about disposal please contact TOX® PRESSOTECHNIK SE & Co. KG (see Contact and source of supply, Page 8).

Index