

XTO 161

X-DIAS Digital Output Module

Instruction Manual

Publisher: SIGMATEK GmbH & Co KG
A-5112 Lamprechtshausen
Tel.: +43/6274/4321
Fax: +43/6274/4321-18
Email: office@sigmatek.at
WWW.SIGMATEK-AUTOMATION.COM

Copyright © 2025
SIGMATEK GmbH & Co KG

Translation of the Original Instructions

All rights reserved. No part of this work may be reproduced, edited using an electronic system, duplicated or distributed in any form (print, photocopy, microfilm or in any other process) without express permission.

We reserve the right to make changes in the content without notice. SIGMATEK GmbH & Co KG is not responsible for technical or printing errors in this handbook and assumes no responsibility for damages that occur through its use.

X-DIAS Digital Output Module

XTO 161

16 short-circuit proof digital outputs

The X-DIAS Digital Output Module XTO 161 has 16 short-circuit-proof digital outputs (+24 V/0.5 A) in two supply groups. The supply voltage of each group is monitored for undervoltage.



Table of Contents

1 Introduction 4

 1.1 Target Group/Purpose of this Operating Manual 4

 1.2 Important Reference Documentation 4

 1.3 Contents of Delivery 4

2 Basic Safety Directives 5

 2.1 Symbols Used 5

 2.2 Disclaimer 7

 2.3 General Safety Directives 7

3 Standards and Directives 9

 3.1 Directives 9

 3.1.1 EU Conformity Declaration 9

4 Type Plate 10

5 Technical Data 11

 5.1 Digital Output Specifications 11

 5.2 Electrical Requirements 11

 5.3 Voltage Monitoring 12

 5.4 Environmental Conditions 13

 5.5 Miscellaneous 13

6 Mechanical Dimensions 14

7 Connector Layout 15

 7.1 Status LEDs 16

 7.2 Applicable Connectors 17

8 Label Field 18

9 Module Coding 19

 9.1 Module Coding XTO 161 19

 9.2 Coding Hole Positions on Wiring Board (TOP View) 19

10 Wiring	20
10.1 ESD Protection	20
10.2 Wiring Example	21
10.3 Note	22
10.3.1 Connecting Inductive Loads	22
11 Assembly/Installation	23
11.1 Mounting	23
12 Supported Cycle Times	25
12.1 Cycle Times below 1 ms (in μ s)	25
12.2 Cycle Times equal to or higher than 1 ms (in ms)	25
13 Transport/Storage	26
14 Storage	27
15 Maintenance	28
15.1 Service	28
15.2 Repair	28
16 Disposal	29

1 Introduction

1.1 Target Group/Purpose of this Operating Manual

This operating manual contains all information required for the operation of the product.

This operating manual is intended for:

- Project planners
- Technicians
- Commissioning engineers
- Machine operators
- Maintenance/test technicians

General knowledge of automation technology is required.

Further help and training information, as well as the appropriate accessories can be found on our website www.sigmatek-automation.com.

Our support team is happily available to answer your questions.
Please see our website for our hotline number and business hours.

1.2 Important Reference Documentation

- X-DIAS Designguide

This and additional documents can be downloaded from our website or obtained through support.

1.3 Contents of Delivery

1x XTO 161

2 Basic Safety Directives

2.1 Symbols Used

The following symbols are used in the operator documentation for warning and danger messages, as well as informational notes.



DANGER

Danger indicates that death or serious injury **will occur**, if the specified measures are not taken.

→ To avoid death or serious injuries, observe all guidelines.

Danger indique une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

→ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.



WARNING

Warning indicates that death or serious injury **can** occur, if the specified measures are not taken.

→ To avoid death or serious injuries, observe all guidelines.

Avertissement d'une situation dangereuse qui, faute de prendre les mesures adéquates, **entraînera** des blessures graves, voire mortelles.

→ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION

Caution indicates that moderate to slight injury **can** occur, if the specified measures are not taken.

→ To avoid moderate to slight injuries, observe all guidelines.

Attention indique une situation dangereuse qui, faute de prendre les mesures adéquates, **peut** entraîner des blessures assez graves ou légères.

→ Respectez toutes les consignes pour éviter des blessures graves, voire mortelles.

CAUTION

Danger for ESD-sensitive components.

Les signes de danger pour les composants sensibles aux décharges électrostatiques.

INFORMATION**INFORMATION**

→ Provides important information on the product, handling or relevant sections of the documentation, which require particular attention.

2.2 Disclaimer

The contents of this operating manual were prepared with the greatest care. However, deviations cannot be ruled out. This operating manual is regularly checked and required corrections are included in the subsequent versions. The machine manufacturer is responsible for the proper assembly, as well as device configuration. The machine operator is responsible for safe handling, as well as proper operation.

The current operating manual can be found on our website. If necessary, contact our support.

Subject to technical changes, which improve the performance of the devices. The following operating manual is purely a product description. It does not guarantee properties under the warranty.

Please thoroughly read the corresponding documents and this operating manual before handling a product.

SIGMATEK GmbH & Co KG is not liable for damages caused through, non-compliance with these instructions or applicable regulations.

2.3 General Safety Directives

The Safety Directives in the other sections of this operating manual must be observed. These instructions are visually emphasized by symbols.

According to EU Directives, the operating manual is a component of a product. This operating manual must therefore be accessible in the vicinity of the machine since it contains important instructions. This operating manual should be included in the sale, rental or transfer of the product, or its online availability indicated.

Regarding the requirements for Safety and health connected to the use of machines, the manufacturer must perform a risk assessment in accordance with machine directives 2006/42/EG before introducing a machine to the market.

INFORMATION



Operate the unit with devices and accessories approved by SIGMATEK only.

CAUTION

Handle the device with care and do not drop or let fall.
Prevent foreign bodies and fluids from entering the device.
The device must not be opened!

Manipulez l'appareil avec précaution et ne le laissez pas tomber.
Empêchez les corps étrangers et les liquides de pénétrer dans l'appareil.
L'appareil ne doit pas être ouvert!

If the device does not function as intended or has damage that could pose a danger, it must be replaced!

En cas de fonctionnement non conforme ou de dommages pouvant entraîner des risques, l'appareil doit être remplacé !

For your own safety and that of others, compliance with the environmental conditions is essential.

Pour votre propre sécurité et celle des autres, le respect des conditions environnementales est essentiel.

3 Standards and Directives

3.1 Directives

The product was constructed in compliance with the following European Union directives and tested for conformity.

3.1.1 EU Conformity Declaration



EU Declaration of Conformity

The product XTO 161 conforms to the following European directives:

- 2014/30/EU Electromagnetic Compatibility (EMC Directive)
- 2011/65/EU "Restricted use of certain hazardous substances in electrical and electronic equipment" (RoHS Directive)

The EU Conformity Declarations are provided on the SIGMATEK website.
They can be found in the download area of the respective product.

4 Type Plate

The type plate provides information about the product's features. The type plate shown here is only an example.

Approbations		Standards
QR-Code  BJ: XXXX/XX S/N XXXXXXXX	Short Name Specifications FS: XXX.XX.XX FW: XXX LD: XX.X HW: X.XX	Electrical Ratings  SIGMATEK Sigmatekstraße 1 A-5112 Lamprechtshausen www.sigmatek-automation.com
Article Number		Product Name

HW: Hardware version
FS: Safety version number
FW: Firmware version
LD: Logic device version
QR-Code: Serial number

5 Technical Data

5.1 Digital Output Specifications

Number	16
Short-circuit proof	yes
Maximum continuous current load allowed per channel	0.5 A
Maximum total current (per group of 8 channels)	4 A (100 % duty cycle) 3 A (100 % duty cycle) at 55 °C ambient temperature
Maximum total current (entire module)	8 A (100 % Power-on time) 6 A (100 % duty cycle) at 55 °C ambient temperature
Maximum braking energy of outputs (inductive load)	maximum 1 joule/channel
Residual current (off)	≤ 10 µA
Turn-on delay	< 200 µs
Turn-off delay	< 200 µs
Galvanical separation	no

5.2 Electrical Requirements

Voltage supply from S-DIAS bus	+24 V DC ±20 % (SELV/PELV) UL: NEC Class 2	
Protection class	III	
Current consumption Supply voltage +24 V I/O	corresponds to the load of the digital outputs	
+24 V power supply from the S-DIAS bus	+24 V ±20 %	
Current consumption on the S-DIAS bus (+24 V supply)	typically 13 mA	maximum 17 mA

INFORMATION



For USA and Canada:

The supply must be limited to:

- a) max. 5 A at voltages from 0-20 V DC, or
- b) 100 W at voltages from 20-60 V DC

The limiting component (e.g. transformer, power supply or fuse) must be certified by an NRTL (Nationally Recognized Testing Laboratory).

If this X-DIAS module is used on an S-DIAS supply module with several S-DIAS and X-DIAS modules, the total currents of the S-DIAS and X-DIAS modules used must be determined and checked. The total current of the +24 V supply must not exceed 1.6 A! The specification for the current can be found in the module-specific documentation under "Electrical Requirements".

5.3 Voltage Monitoring

Supply voltage +24 V I/O 1 & 2	supply voltage > 19.2 V (DC OK - LED lights up green)
--------------------------------	---

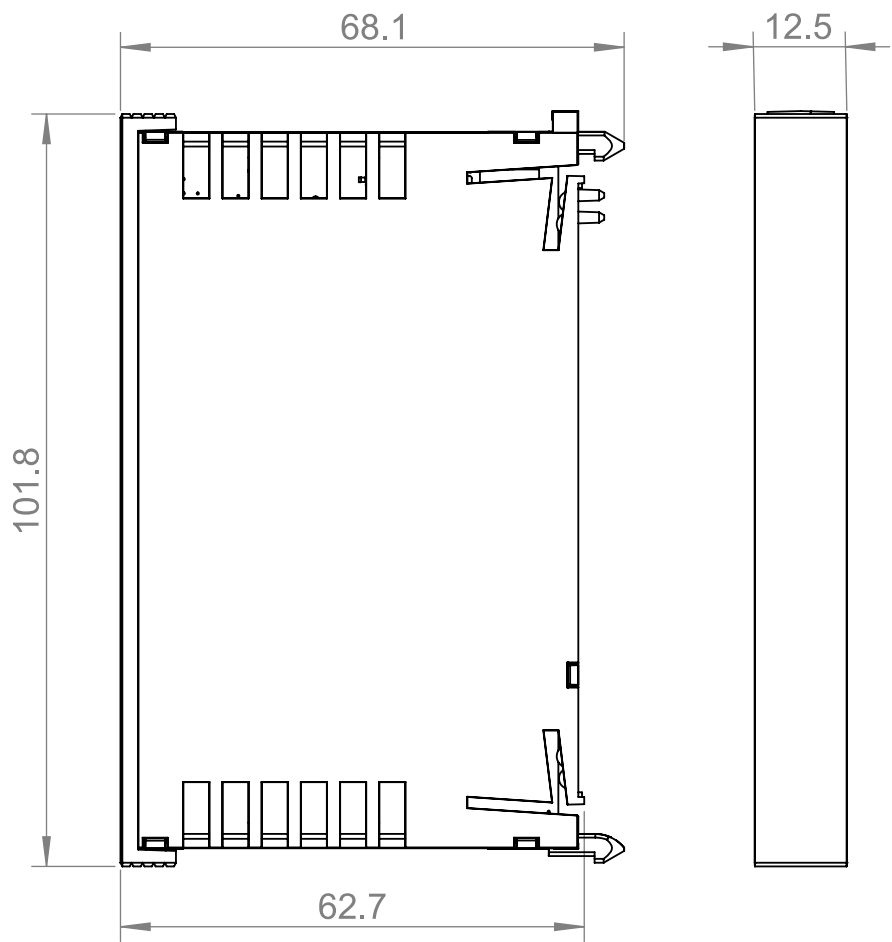
5.4 Environmental Conditions

Storage temperature	-40 ... +85 °C	
Environmental temperature	-25 ... +60 °C	
Humidity	0-95 %, non condensing	
Installation altitude above sea level	0-2000 m without derating > 2000 m up to a maximum of 5000 m with derating of the maximum environmental temperature by 0.5 °C per 100 m	
Operating conditions	pollution degree 2	
Noise emission	≤ 70 dB	
EMC resistance	EN 61000-6-2 (industrial area)	
EMC noise generation	EN 61000-6-4 (industrial area)	
Vibration resistance	EN 60068-2-6	3.5 mm from 5-8.4 Hz 1 g from 8.4-150 Hz
Shock resistance	EN 60068-2-27	15 g (147.15 m/s ²)
Protection type	EN 60529/NEMA 250	IP20/Type1

5.5 Miscellaneous

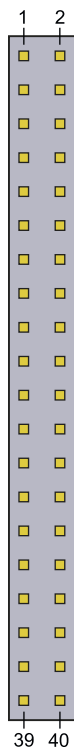
Article number	21-007-161	
Printed circuit board coating	no	
Approvals	CE	yes
	UL	designed according to UL
	Functional Safety	no
	UKCA	no

6 Mechanical Dimensions

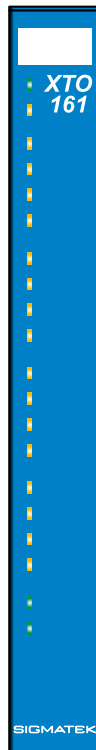


Measurements	12.5 x 101.8 x 62.7 mm (W x H x D)
Weight	0.2 kg

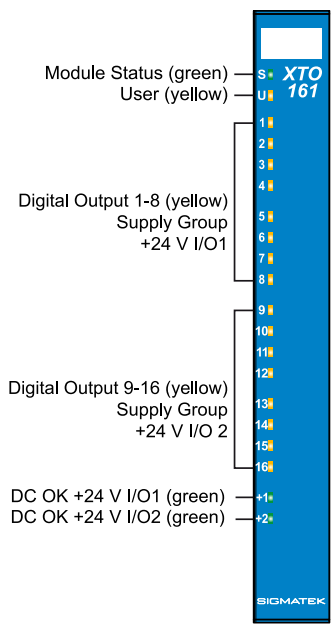
7 Connector Layout



Pin		Signal		Description
1	2	+24 V bus	+24 V bus	S-DIAS bus The +24 V voltage supply is provided by the S-DIAS CPU or the S-DIAS interface module.
3	4	GND	GND	
5	6	RxD- OUT	RxD- IN	
7	8	RxD+ OUT	RxD+ IN	
9	10	GND	GND	
11	12	TxD- IN	TxD- OUT	
13	14	TxD+ IN	TxD+ OUT	
15	16	GND	GND	
17	18	TO1	TO2	I/O signals
19	20	TO3	TO4	
21	22	TO5	TO6	
23	24	TO7	TO8	
25	26	TO9	TO10	
27	28	TO11	TO12	
29	30	TO13	TO14	
31	32	TO15	TO16	
33	34	+24 V I/O 1	+24 V I/O 1	
35	36	+24 V I/O 2	+24 V I/O 2	
37	38	GND	GND	
39	40	GND	GND	



7.1 Status LEDs

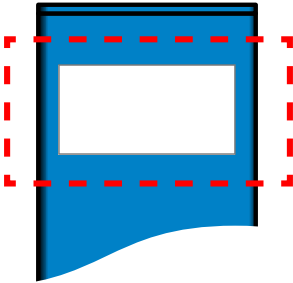


Module status	green	ON	module active
		OFF	no supply available
		BLINKING (5 Hz)	no communication
User	yellow	ON	adjustable by application (e.g. the module LED can be set to blinking through the visualization so that the module is easily found in the control cabinet)
		OFF	
		BLINKING (2 Hz)	
		BLINKING (4 Hz)	
Output Status	yellow	ON	output ON
		OFF	output OFF
DC OK	green	ON	voltage is supplied to the output group

7.2 Applicable Connectors

Connector wiring board: Samtec SSQ-120-01-L-D

8 Label Field



The labeling field is printed directly on the module.

9 Module Coding

X-DIAS modules have module coding by means of coding pins on the module housing. In combination with coding holes on the wiring board, a mismatching protection can be realized.

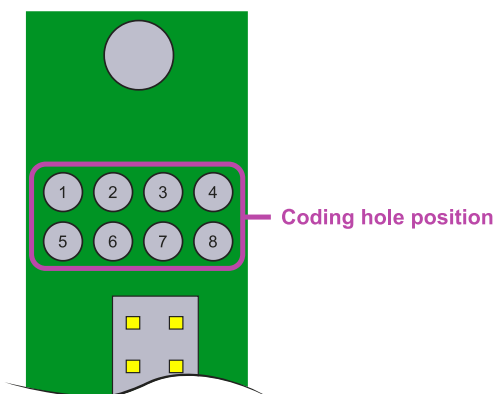
9.1 Module Coding XTO 161

Position 1	Position 2	Position 3	Position 4	Position 5	Position 6	Position 7	Position 8
X	X	O	X	X	O	O	O

X ... Coding pin present on the module -> there must be a coding hole on the wiring board

O ... No coding pin present on the module -> there must be no coding hole on the wiring board

9.2 Coding Hole Positions on Wiring Board (TOP View)



10 Wiring

10.1 ESD Protection

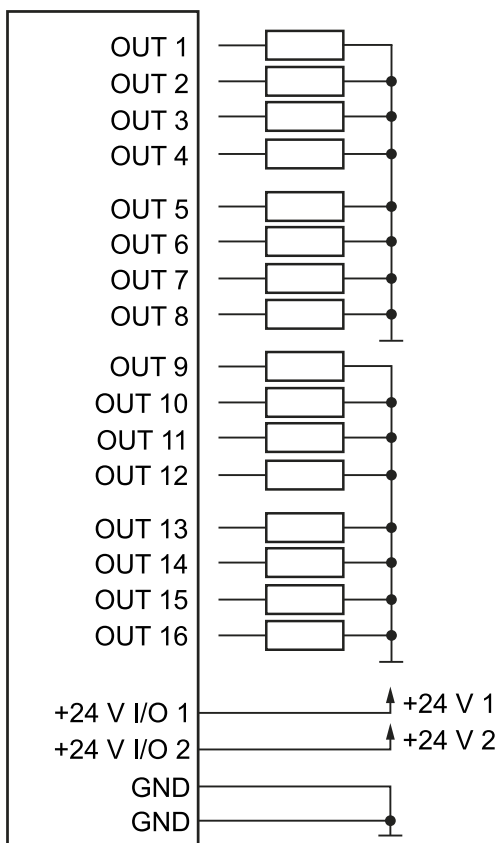


CAUTION

The operator must ensure that no ESD interference affects the product.

L'opérateur doit s'assurer qu'aucune interférence due à des décharges électrostatiques n'affecte le produit.

10.2 Wiring Example



10.3 Note

- The functional grounding of the X-DIAS modules is carried out via their GND connection on the wiring board. The wiring board must be connected to the grounded switch cabinet mounting plate with low resistance via the mounting screws.
- Outputs 1-8 are supplied with +24 V I/O 1 power, and outputs 9-16 with +24 V I/O 2 power.
- The cross section of the conductor for the +24 supply must be sufficient for the maximum total current.
- The outputs and can be turned off by turning off the +24 V supply voltage.
- Applying power to an output whose supply voltage exceeds 0.7 V is not allowed.

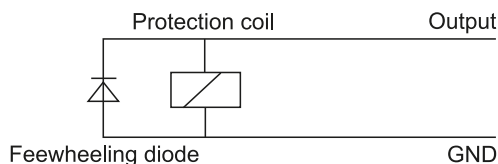
INFORMATION



The X-DIAS module CANNOT be connected/disconnected while voltage is applied!

Inductive loads must always be connected to a freewheeling diode or an RC network. This should be placed as close to the load as possible.

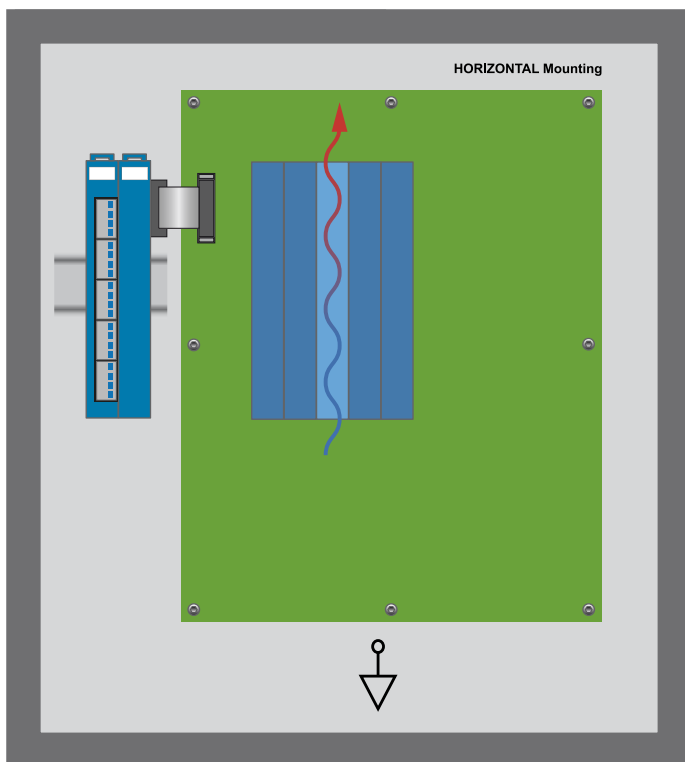
10.3.1 Connecting Inductive Loads



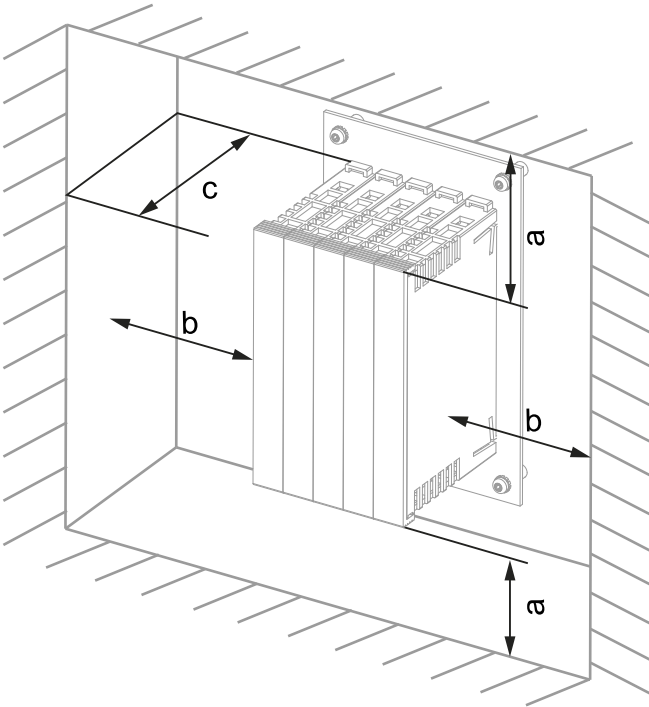
11 Assembly/Installation

11.1 Mounting

The S-DIAS modules are designed for installation into the control cabinet. To mount the modules, a DIN-rail is required. The DIN rail must establish a conductive connection with the back wall of the control cabinet. The individual S-DIAS modules are mounted on the DIN rail as a block and secured with latches. The functional ground connection from the module to the DIN rail is made via the grounding lug on the back of the S-DIAS modules. The modules must be mounted horizontally (module label up) with sufficient clearance between the ventilation slots of the S-DIAS module blocks and nearby components and/or the control cabinet wall. This is necessary for optimal cooling and air circulation to ensure proper function up to the maximum operating temperature.



Recommended minimum distances between the S-DIAS modules and the surrounding components or control cabinet wall:



a	b	c
30 mm (1.18")	30 mm (1.18")	90 mm (3.54")

a, b, c ... distances in mm (inches)

12 Supported Cycle Times

12.1 Cycle Times below 1 ms (in μs)

50	100	125	200	250	500
x	x	x	x	x	x

x = supported

12.2 Cycle Times equal to or higher than 1 ms (in ms)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

x = supported

17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x

x = supported

13 Transport/Storage

This device contains sensitive electronics. During transport and storage, high mechanical stress must therefore be avoided.

For storage and transport, the same values for humidity and vibration as for operation must be maintained!

Temperature and humidity fluctuations may occur during transport. Ensure that no moisture condenses in or on the device, by allowing the device to acclimate to the room temperature while turned off.

When sent, the device should be transported in the original packaging if possible. Otherwise, packaging should be selected that sufficiently protects the product from external mechanical influences. Such as cardboard filled with air cushioning.

14 Storage

When not in use, store the device according to the storage conditions. See chapter 13 Transport/Storage.

INFORMATION



During storage, ensure that all protective covers (if available) are placed correctly, so that no contamination, foreign bodies or fluids enter the device.

15 Maintenance

During maintenance as well as servicing, observe the safety instructions from chapter 2 Basic Safety Directives.

15.1 Service

This product was constructed for low-maintenance operation.

15.2 Repair

In the event of a defect/repair, send the device with a detailed error description to the address listed at the beginning of this document.

For transport conditions, see chapter 13 Transport/Storage.

16 Disposal



INFORMATION

Should you need to dispose of the device, the national regulations for disposal must be followed.

The device appliance must not be disposed of as household waste.



Changes Chart

Change date	Affected page(s)	Chapter	Note
-------------	------------------	---------	------