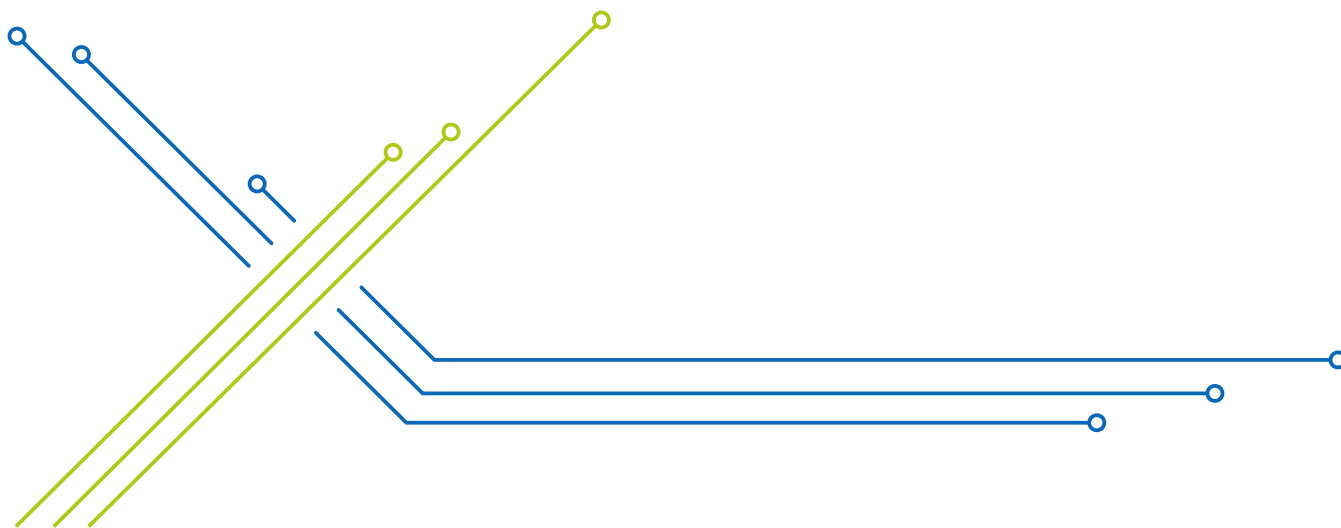


TSY 042

Training System Motion

INSTRUCTION MANUAL

Article number:	12-100-042-E
Date of creation:	16.03.2026
Version date:	07.04.2026



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

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.

Training System Motion

TSY 042

The DIAS-DRIVE 2000 training setup TSY 042 is based on the MDP2102-DDD-03 and is equipped with a motor including a safe HIPERFACE DSL encoder system and holding brake on axis 1 and a motor with resolver on axis 2.

Using the secure encoder system, all encoder-related safety functions of the MDD 2000 such as SS1, SS2, SLS, SOS, and others can be demonstrated during training using practical examples. The integrated holding brake also allows for testing of SBC (Safe Brake Control) and SBT (Safe Brake Test).

The second motor enables exciting practical exercises, such as the implementation of a “flying saw.” Furthermore, the motion library in the control can be used to simulate additional axes in order to represent complex motion sequences.

The training structure allows for Autotuning of the controller parameters on two different axes.

Thanks to the single-phase drive variant of the DIAS-DRIVE 2000 in combination with galvanic isolation, the training setup can be operated at an office or training workstation without having to take any special requirements for the power supply into account.

Advantages in training:

- Practical teaching of the motion and safety functions of the DIAS-DRIVE 2000, thanks to a motor with a safe encoder system and integrated brake.
- In combination with the TSY 041 Motion Extension Starter Kit, up to four physical axes are available, and additional axes can be simulated in the control.

The following system components are integrated in the TSY 042:

1x 230 V MDP 2100 (MDP2102-DDD-03)

1x AKM2G-21E servo motor with safe Hipertace DSL encoder system and holding brake on axis 1

1x AKM21C servo motor with resolver encoder system on axis 2

1x single-phase control and isolation transformer 250 VA

1x 24 V switching power supply for 24 V supply MDP 2102

1x emergency stop button

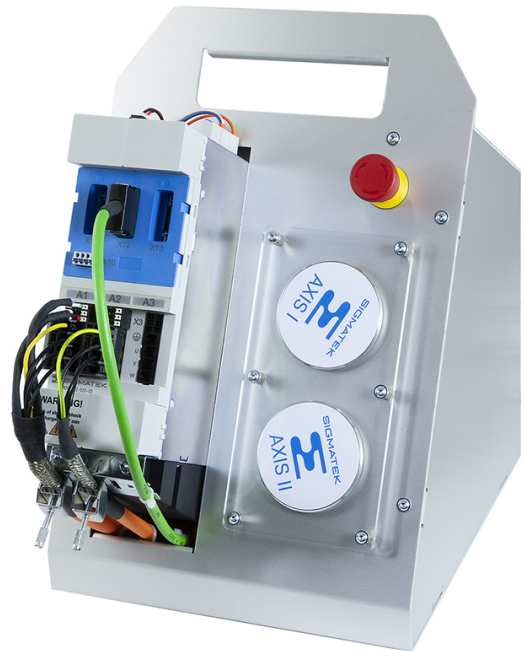


Table of Contents

1 Introduction	6
1.1 Target Group/Purpose of this Operating Manual	6
1.2 Important Reference Documentation	6
1.3 Contents of Delivery	6
2 Basic Safety Directives	7
2.1 Symbols Used	7
2.2 Disclaimer	8
2.3 General Safety Directives	9
2.4 Danger Electrical Shock	9
2.4.1 5 Safety Rules	10
2.5 Hot Surface Warning	10
3 IT Security	11
4 Standards and Directives	12
4.1 Safety of the Machine or Equipment	12
4.2 Directives	12
4.2.1 Norms	12
4.2.2 EU Declaration of Conformity	12
5 Technical Data	13
5.1 Performance Data	13
5.2 Electrical Requirements	13
5.3 Protection against Electric Shock	13
5.4 Environmental Conditions	13
5.5 Miscellaneous	14
6 Mechanical Dimensions	15
7 System Setup Control Elements	16
7.1 Example Setup	17
8 User Information	18
9 Transport/Storage	19
10 Maintenance	20
10.1 Repair	20
10.2 Fuse Replacement	21

11 Disposal22

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

- Safety System Handbook
- Operating Manual DIAS-Drive MDD 2000

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

1.3 Contents of Delivery

1x TSY 042

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.



DANGER

Electrical voltage

Tension électrique



DANGER

Danger for persons with pacemakers, implanted defibrillators or other active implants.

Danger pour les personnes portant un stimulateur cardiaque, un défibrillateur implanté ou d'autres implants actifs.

WARNING

Hot Surfaces

Surfaces chaudes

WARNING

Magnetic field warning

Alerte au champ magnétique

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.

2.4 Danger Electrical Shock

DANGER



During installation and operation, an especially high risk of electric shock exists.
Conductive components cannot be handled.

Il existe un risque de choc électrique pendant l'installation et l'utilisation. Les pièces sous tension ne doivent pas être touchées.

After shutting down the device or disconnecting from the mains voltage and following the 5 safety rules, a **wait time of 7 minutes** is required before voltage conducting components can be touched or connectors removed.

DANGER



If the ballast connector is not plugged in, the DC link voltage contacts are exposed! Coming into physical contact with them may result in electrical shock!

Si la fiche ballast n'est pas branchée, la tension du circuit intermédiaire peut être touchée ! Cela peut entraîner un choc électrique !

2.4.1 5 Safety Rules

WARNING



Before and during all work on electrical machines and equipment, all safety-relevant guidelines and the five safety rules must be observed and followed in the specified order!

Avant et pendant tous les travaux sur les machines et installations électriques, toutes les consignes relatives à la sécurité et les cinq règles de sécurité doivent être observées et respectées dans l'ordre indiqué !

1. Disconnect electrical circuits from voltage supply (including electronics and auxiliary circuits).
2. Secure against restarting.
3. Verify voltage-free condition.
4. Ground and short circuit.
5. Cover or cordon off any neighboring voltage-carrying components.

After completing the work, the safety measures taken must be removed in reverse order.

2.5 Hot Surface Warning

WARNING



During installation and operation, high temperatures can be generated on thermally conductive components (heat sinks) of the device. Before touching these components, the temperature must be checked. When required, the operator must wait until the temperature has dropped below 40 °C.

Failure to follow the above safety measures can lead to severe injuries.

Pendant l'installation et l'utilisation, les pièces thermoconductrices (radiateurs) des appareils peuvent atteindre des températures élevées. Avant tout contact, il convient donc de vérifier la température de ces pièces ; le cas échéant, il faut attendre que la température soit descendue en dessous de 40 °C.

Le non-respect de ces mesures de précaution peut entraîner des blessures graves.

3 IT Security

The products were developed for integration into a network protected against unauthorized access and installation in an access-protected area.

For example, the following hazards can affect the network or the environment:

- unauthorized access
- data manipulation
- physical access and manipulation
- and many other IT security breaches

It is the responsibility of the integrator or operator to carry out a risk analysis of the connections between MDD 2000 modules and their integration into the overall infrastructure. This may result in the following measures (if necessary):

- Installation of the MDD 2000 in an access-protected area
- Separating IT/OT networks (VLANs or physically)
- Firewalls
- etc.

The availability of the overall system can be affected by external attacks, which is why the above measures are necessary.

4 Standards and Directives

4.1 Safety of the Machine or Equipment

Observe all on-site rules and regulations for accident prevention and occupational safety.

4.2 Directives

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

4.2.1 Norms

Norms	Description
EN IEC 61800-3	Electrical Drives with Adjustable Speed Part 3: EMC requirements, including specific test methods
EN IEC 61800-5-1	Electrical Power Drive Systems with Adjustable Speed Part 5-1: Safety Requirements – Electrical, Thermal and Energy Requirements
EN IEC 61800-5-2	Electrical Drives with Adjustable Speed Part 5-2: Functional Safety Requirements

4.2.2 EU Declaration of Conformity



EU Declaration of Conformity

The product TSY 042 conforms to the following European directives:

- 2006/42/EG Machine Directive
- 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.

5 Technical Data

5.1 Performance Data

Interfaces	1x VARAN In (Tyco Mini I/O) 1x VARAN Out (Tyco Mini I/O)
------------	---

5.2 Electrical Requirements

Mains voltage	1x 230 V AC (Schuko plug)
Nominal power	250 VA
Mains voltage range	1x 207-240 V AC
Overvoltage category	II
Power frequency	50/60 Hz

5.3 Protection against Electric Shock

Protection against direct contact	Protective grounding (construction is in a fully grounded housing)
Protection in error case	In the error case, the device's internal fuse disconnects the power supply.
Internal fuse type	Fuse holder slow 5x 20 mm 3.15 A 250 V

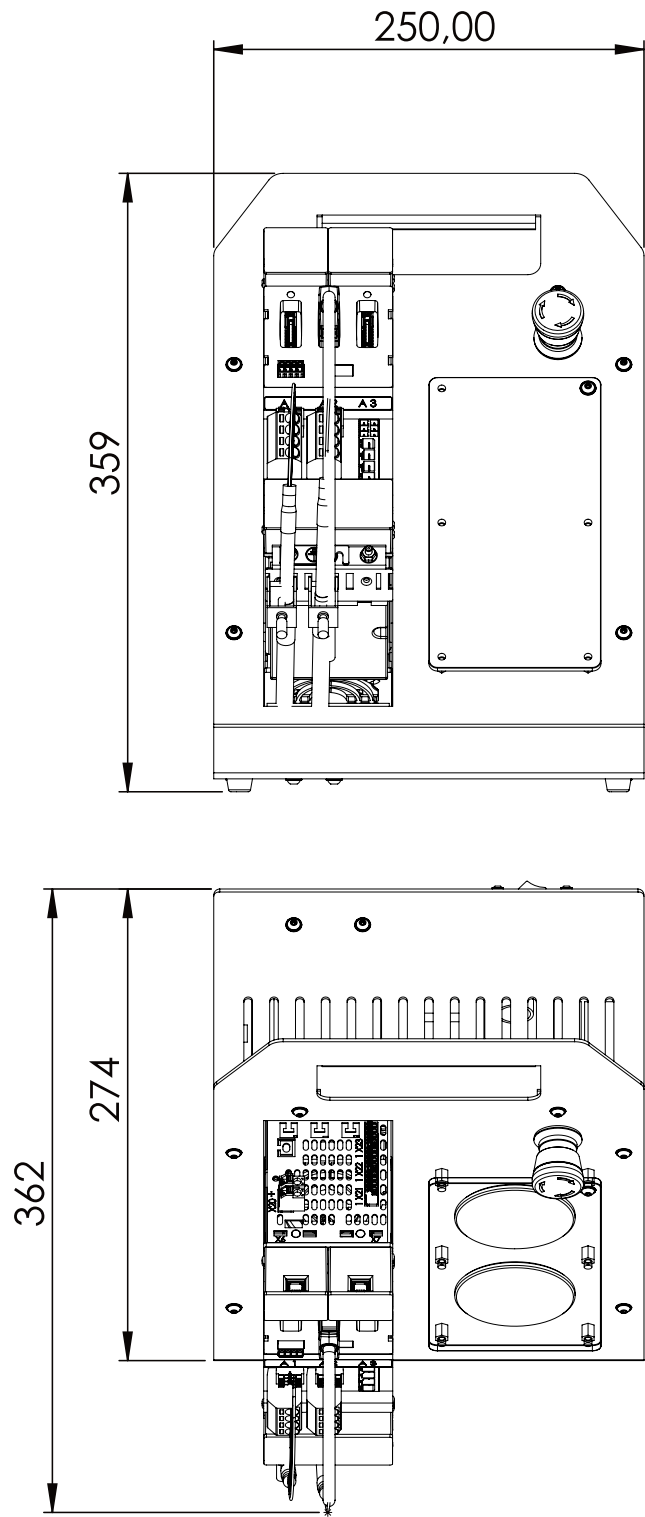
5.4 Environmental Conditions

Storage temperature	-25 ... +70 °C
Environmental temperature	0 ... +40 °C
Humidity	maximum relative humidity 85 %, non-condensing
Altitude	up to 1000 m above NN at rated values 1000-3000 m above NN with reduction by 1.5 % / 100 m (rated output current and rated input power affected)
Operating conditions	pollution degree 2
Noise emissions	≤ 70 dB
EMC resistance	IEC 61800-3 (industrial area)
EMC noise generation	IEC 61800-3 (industrial area)
EMC network impact	IEC 61800-3 (industrial area)
Vibration resistance	frequency: 5-150 Hz acceleration: 1 g amplitude: 0.075 mm (0.15 mm pp)
Shock resistance	acceleration: 15 g
Protection type	IP20

5.5 Miscellaneous

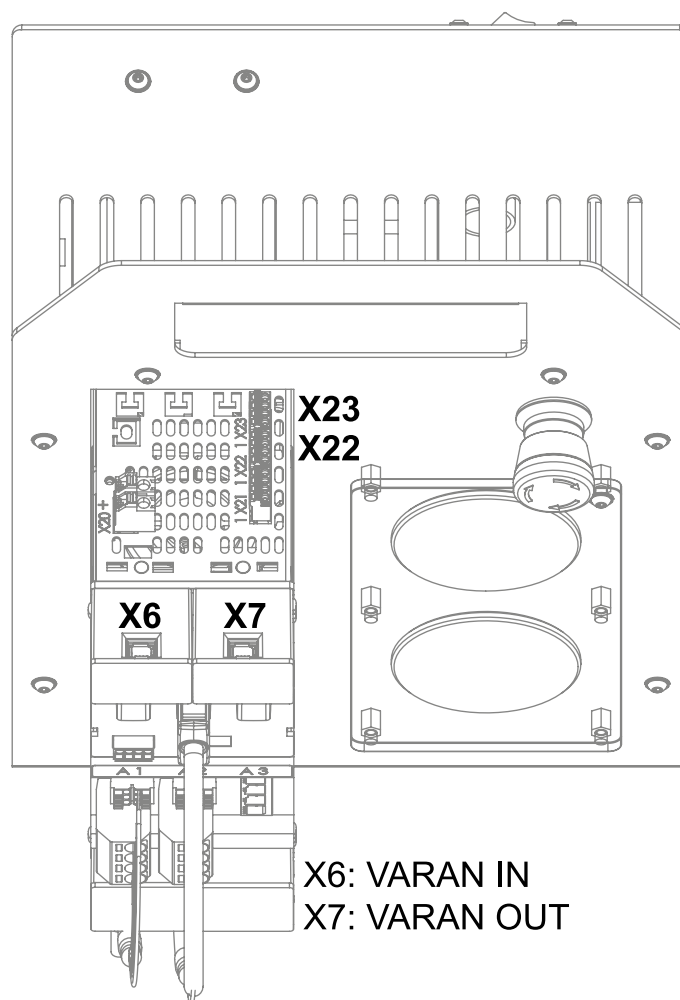
Article number	12-100-042	
Approvals	CE	yes
	UL	designed according to UL
	Functional Safety	yes
	UKCA	no
Mission time	20 years	

6 Mechanical Dimensions



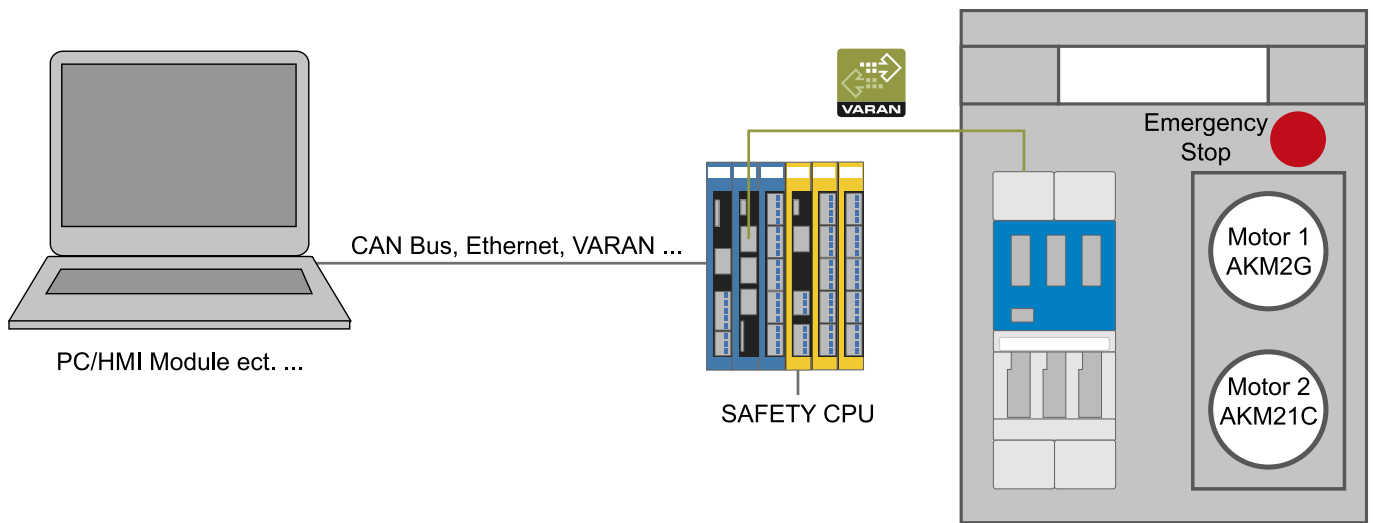
Dimensions (W x H x D)	250 x 380 x 390 mm
Weight	13 kg

7 System Setup Control Elements



The power supply for the TSY 042 is located on the rear panel and is connected using the cable provided.

7.1 Example Setup



INFORMATION



The TSY 042 training setup can only be operated with a functional PLC (e.g., CP 112) with a Salamander operating system.

Further information on the individual functions can be found in the operating instructions for the DIAS Drive MDD 2000.

8 User Information

DANGER



Risk of electric shock! Do not remove the DC link cover!

Risque d'électrocution ! Ne retirez pas le couvercle du circuit intermédiaire CC !

WARNING



The emergency stop is connected to the safety inputs of connectors X22 and X23 and activates the Safe Torque Off (STO) function of the motors.

The **supply voltage** of the system remains **switched on**!

L'arrêt d'urgence est connecté aux entrées de sécurité des connecteurs X22 et X23 et active la fonction Safe Torque Off (STO) des moteurs. La **tension d'alimentation** du système reste **activée** !

When disconnecting connectors X22 or X23, the drive enters a safety error state. If a different emergency stop architecture is used, e.g., using an external safety module, the user is responsible for implementing and ensuring the effectiveness of the emergency stop function. Wiring examples for STO using Safety PLC can be found in the DIAS-Drive MDD 2000 operating instructions.

CAUTION



Danger from rotating parts!

Danger lié aux pièces en rotation !

9 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.

10 Maintenance

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

10.1 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 9 Transport/Storage.

10.2 Fuse Replacement

There are two 3.15 A/250 V fuses in the cold device socket of the superstructure: one active fuse in the device and one spare fuse.

If the device no longer starts, it may be because the active fuse has blown. To replace the fuse, the following steps are necessary:

1. Unplug the power cord.
2. Open the power socket using a flathead screwdriver.



3. Swap fuse 1 with fuse 2.



11 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
07.04.2026	3	Introduction	Text changed
	14	5.5 Miscellaneous	Name and article number added