

SOFTWARE USER MANUAL

DS-GYRO3 V26-1



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2. About this document

This is the users manual for the DS-GYRO3 module, which will help you to start a DS-Gyro3 device and the plug-in.

2.1. Legend

The following symbols and formats will be used throughout the document.



Important

It gives you important information about the subject.
Please read carefully!



Hint

It gives you a hint or provides additional information about a subject.



Example

Gives you an example of a specific subject.

3. Introduction

DS-GYRO3 is a high performance Micro-Electro-Mechanical System (MEMS) based Inertial Measurement Unit (IMU). With its rugged housing and industry standard communication protocols it is designed to meet the needs of various applications.

The unit by itself sends standard inertial measurement data with an additional magnetometer and diagnostic information. By connecting the unit onto an USB port of a PC with Dewesoft software installed this data can be displayed, processed and stored. Additionally Dewesoft calculates the unit orientation from inertial measurements with an Extended Kalman Filter (EKF) algorithm.

3.1. General Specifications

Parameter	Value
Volume/Size	60 x 45 x 27 mm
Weight	55 grams
Power Consumption	0.5 Watts
Operating Temperature Range	-40°C to +85°C
Data Rate	1800 Hz / 300 Hz (USB & CAN) 1200 Hz / 200 Hz (USB & CAN) 600 Hz / 100 Hz (USB & CAN)
Supply Voltage	+5 VDC (USB supply)
Vibration	Random: 20-2000 Hz MIL-STD-810G 2.5grms Sinusoidal: 10-2000 Hz 10g Peak Non-operating: 7.7 g's RMS
Shock	Operating: 25 g bump half-sine, 6 ms duration, both polarities, each axis, per IEC 60068-2-27 Non-operating: 40 g Shock at 11 msec duration per MIL-STD-810G Method 516.7 Procedure I 500 g's 0.5 mSec, Half Sine
Environmental protection	IP67 (unit housing IP68)
Communication protocols	USB, CAN

3.2. Sensor Specifications

Parameter	Gyroscopes	Accelerometers
Range	+/- 490 deg/s in all axes	+/- 16g in all axes
Bias repeatability	65 °/h (1σ)	1 mg (1σ)
Bias in-run stability	3 °/hr (1σ)	0.02 mg (1σ)
Random walk	0.15 °/√hr	0.02 m/s/√hr
Bandwidth	200Hz at 90° phase, 400Hz at -3dB (Output frequency dependent)	200Hz at 90° phase, 400Hz at -3dB (Output frequency dependent)
Scale Factor Static g Sensitivity	300 ppm/g (1σ)	/
Bias Static g Sensitivity	20 °/hr./g (1σ)	/
Scale Factor Repeatability	1400 ppm (1σ)	250 ¹ ppm (1σ)

¹ Model as a +1500 PPM offset with the one sigma value as shown.



Important

Sensor specifications are valid at room temperature.

3.3. Typical noise @ 1800 Hz sample rate / 400 Hz Bandwidth

Axes	Gyro (Deg/s)	Accel (mg)	Gyro (Deg)	Accel (mm/s)
X/Y	0,15	2,5	0,0005	0,06
Z	0,15	5	0,0005	0,12

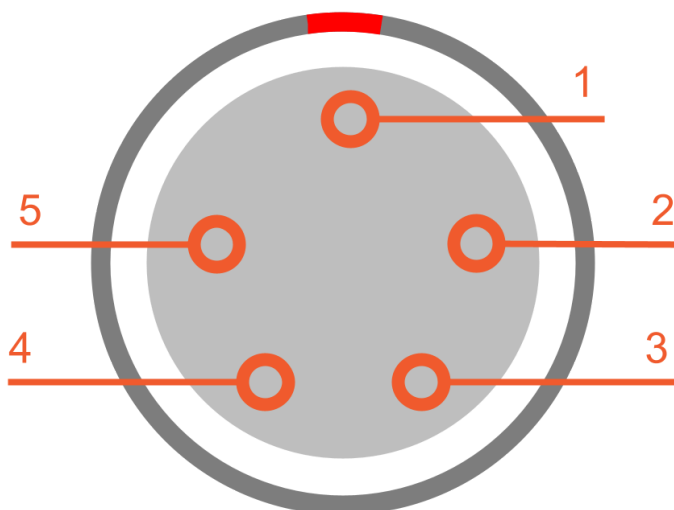
NOTE: Typical noise is valid at room temperature.

3.4. PIN layout for CAN

Function	LEMO 5 - PIN
CAN - H	PIN - 3
CAN - L	PIN - 4
GND	PIN - 5

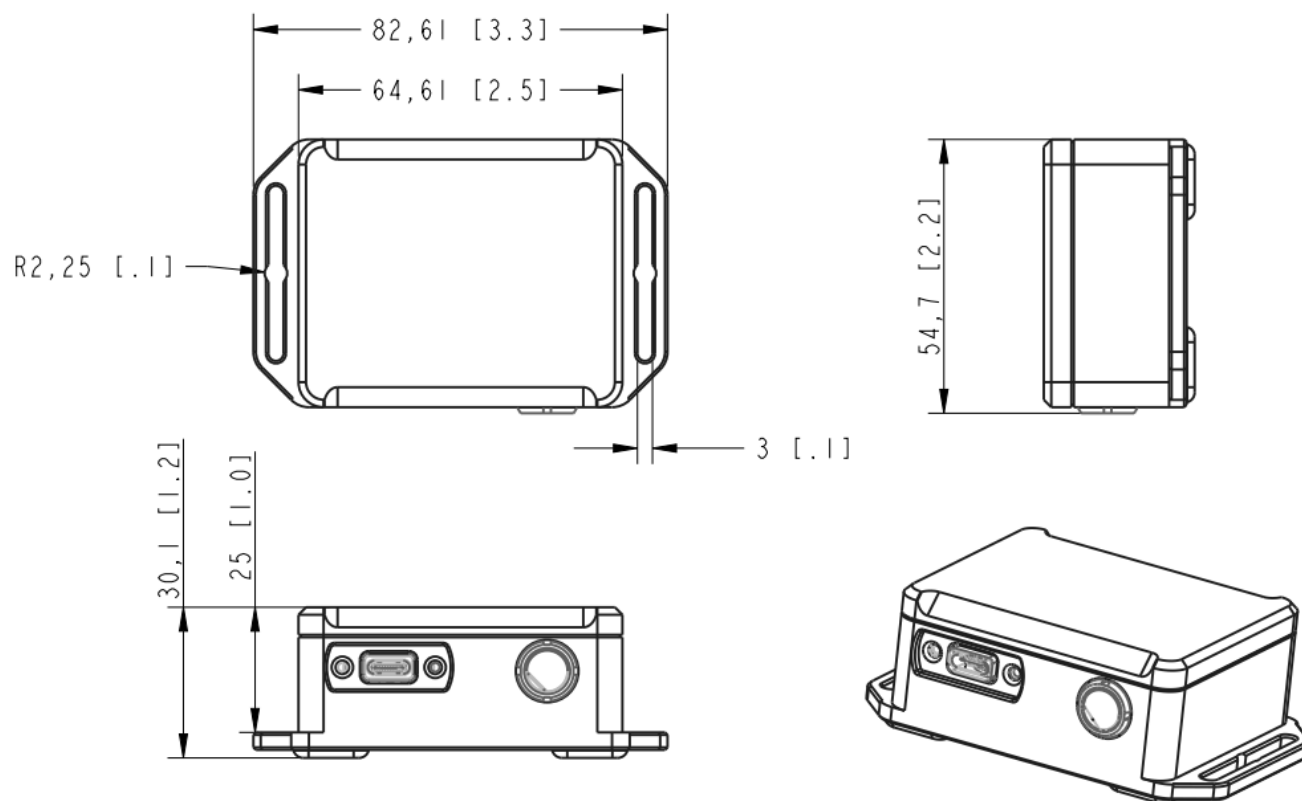
Connector type Lemo EEG.0T.305.CLL

Matting connector Lemo FGG.0T.305.CLAC50Z



Detailed view of CAN port (female) on DS Gyro-3

4.1. Technical drawing



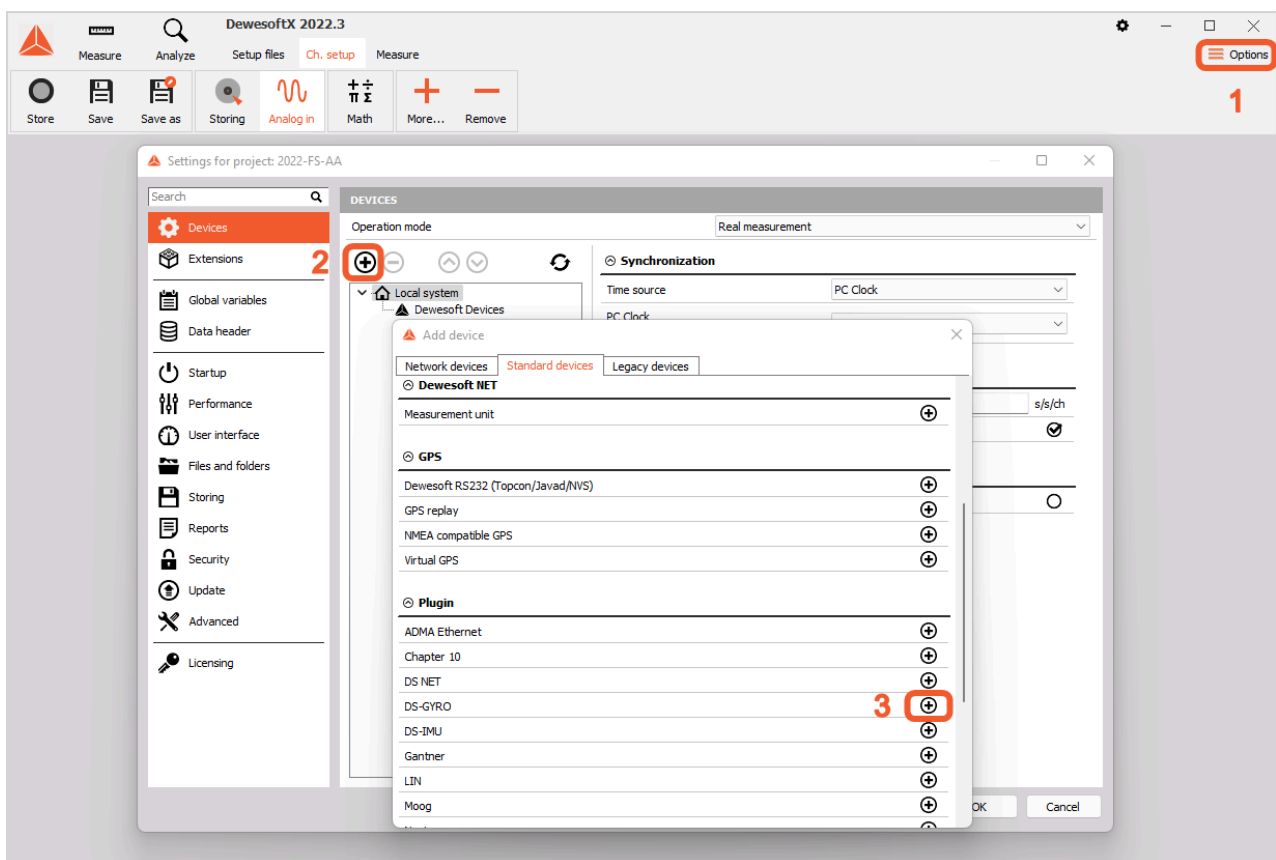
NOTES:
- Dimensions mm [inch]

5. Configuration

Adding DS-GYRO plugin

First step is adding the DS-GYRO plugin, in DewesoftX in the upper right corner you press options and choose settings.

With “+” sign you add the device and there find the DS-GYRO plugin. Second “+” sign is used for adding the plugin in the DEWESoftX devices tab.

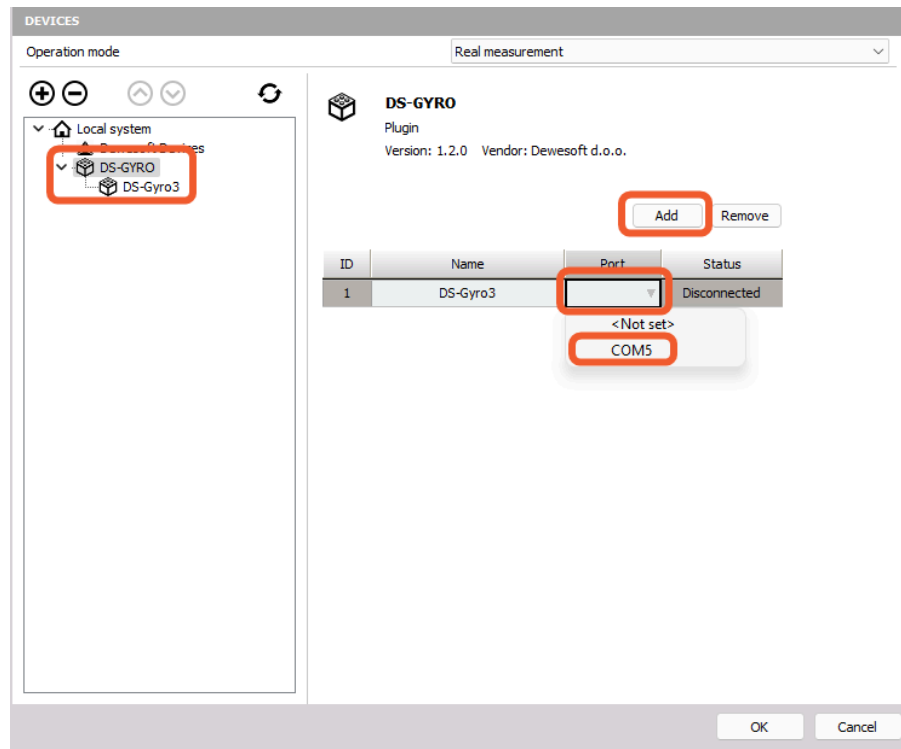


Before connecting the device, the TUSB driver needs to be installed on the computer. The driver is available on our Dewesoft download page ([LINK](#)).

In the DS-GYRO plugin there is support for multiple devices. Device is added with the Add button and removed with the Remove button.

Serial port of the device must be defined, if not sure which port is the right one, check in the device manager or simply try multiple. When the COM port is right Status will go from Disconnected to Connected state.

Device name can be configured by clicking on the name of the device.



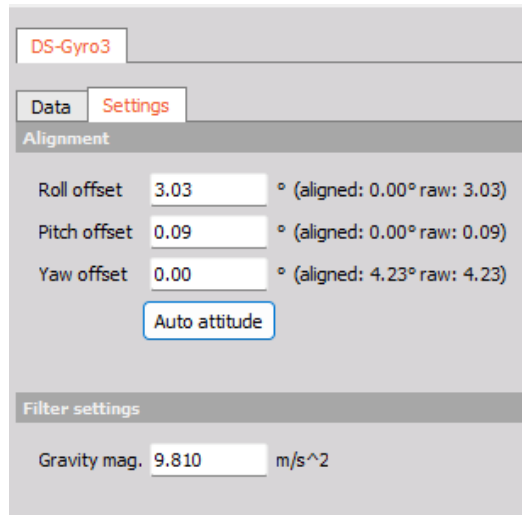
If there is no DS-GYRO3 plugin available in Dewesoft (older versions), it can be downloaded on Dewesoft [Webpage](#) under Support/Downloads/Plugins.

When the plugin is downloaded and unzipped, it must be added to the DS-Gyro3 plugin folder into the DewesoftX install folder, C:\DewesoftX_Release\Bin64\Addons64.

5.2. Device settings

Under the device settings tab there are alignment and filter settings.

Alignment is allowing us to align all three axes due to mounting errors and compensating the terrain unevenness. When using auto alignment the device needs 5 seconds of steady state to set the offsets and realign.



The screenshot shows the 'DS-Gyro3' settings window. It has two tabs: 'Data' and 'Settings', with 'Settings' currently selected. The window is divided into two main sections: 'Alignment' and 'Filter settings'. In the 'Alignment' section, there are three input fields for offsets: 'Roll offset' (3.03), 'Pitch offset' (0.09), and 'Yaw offset' (0.00). Each field has a unit indicator and a note: '° (aligned: 0.00° raw: 3.03)' for Roll, '° (aligned: 0.00° raw: 0.09)' for Pitch, and '° (aligned: 4.23° raw: 4.23)' for Yaw. Below these fields is a button labeled 'Auto attitude'. The 'Filter settings' section contains a 'Gravity mag.' input field with the value 9.810 and a unit indicator 'm/s^2'.

Alignment	
Roll offset	3.03 ° (aligned: 0.00° raw: 3.03)
Pitch offset	0.09 ° (aligned: 0.00° raw: 0.09)
Yaw offset	0.00 ° (aligned: 4.23° raw: 4.23)

Auto attitude

Filter settings	
Gravity mag.	9.810 m/s^2

Filter settings allow us to consider or neglect the gravitational acceleration.

5.3. CAN output

Can output is enabled by default, .dbc file for decoding the CAN messages can be found in the Setup folder of DewesoftX.

The CAN line must be Terminated with a 120 Ohm resistor between CAN H and CAN L.

5.4. Licensing

License must be registered to all the computers that the Gyro3 will run on.

License becomes active then the DS-GYRO3 device is plugged and recognized by the DS-GYRO plugin.

6. Warranty information

Notice

The information contained in this document is subject to change without notice.

Note:

Dewesoft d.o.o. shall not be liable for any errors contained in this document. Dewesoft MAKES NO WARRANTIES OF ANY KIND WITH REGARD TO THIS DOCUMENT, WHETHER EXPRESS OR IMPLIED. DEWESOFT SPECIFICALLY DISCLAIMS THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. Dewesoft shall not be liable for any direct, indirect, special, incidental, or consequential damages, whether based on contract, tort, or any other legal theory, in connection with the furnishing of this document or the use of the information in this document.

The copy of the specific warranty terms applicable to your Dewesoft product and replacement parts can be obtained from your local sales and service office. To find a local dealer for your country, please visit <https://dewesoft.com/support/distributors>.

6.1. Calibration

Every instrument needs to be calibrated at regular intervals. The standard norm across nearly every industry is annual calibration. Before your Dewesoft data acquisition system is delivered, it is calibrated. Detailed calibration reports for your Dewesoft system can be requested. We retain them for at least one year, after system delivery.

6.2. Support

Dewesoft has a team of people ready to assist you if you have any questions or any technical difficulties regarding the system. For any support please contact your local distributor first or Dewesoft directly.

Dewesoft d.o.o.
Gabrsko 11a
1420 Trbovlje Slovenia

Europe Tel.: +386 356 25 300
Web: <http://www.dewesoft.com>
Email: Support@dewesoft.com

The telephone hotline is available Monday to Friday from 07:00 to 16:00 CET (GMT +1:00)

6.3. Service/repair

The team of Dewesoft also performs any kinds of repairs to your system to assure a safe and proper operation in the future. For information regarding service and repairs please contact your local distributor first or Dewesoft directly on <https://dewesoft.com/support/rma-service>.

6.4. Restricted Rights

Use Slovenian law for duplication or disclosure. Dewesoft d.o.o. Gabrsko 11a, 1420 Trbovlje, Slovenia / Europe.

6.5. Printing History

Version 2.0.0, Revision 217 Released 2015 Last changed: 23. July 2018 at 16:54.

6.6. Copyright

Copyright © 2015-2019 Dewesoft d.o.o. This document contains information which is protected by copyright. All rights are reserved. Reproduction, adaptation, or translation without prior written permission is prohibited, except as allowed under the copyright laws. All trademarks and registered trademarks are acknowledged to be the property of their owners.

6.7. Trademarks

We take pride in our products and we take care that all key products and technologies are registered as trademarks all over the world. The Dewesoft name is a registered trademark. Product families (KRYPTON, SIRIUS, DSI, DS-NET) and technologies (DualCoreADC, SuperCounter, GrandView) are registered trademarks as well. When used as the logo or as part of any graphic material, the registered trademark sign is used as a part of the logo. When used in text representing the company, product or technology name, the ® sign is not used. The Dewesoft triangle logo is a registered trademark but the ® sign is not used in the visual representation of the triangle logo.

7. Safety instructions

Your safety is our primary concern! Please be safe!

7.1. Safety symbols in the manual



Warning

Calls attention to a procedure, practice, or condition that could cause the body injury or death



Caution

Calls attention to a procedure, practice, or condition that could possibly cause damage to equipment or permanent loss of data.

7.2. General Safety Instructions



Warning

The following general safety precautions must be observed during all phases of operation, service, and repair of this product. Failure to comply with these precautions or with specific warnings elsewhere in this manual violates safety standards of design, manufacture, and intended use of the product. Dewesoft d.o.o. assumes no liability for the customer's failure to comply with these requirements.

All accessories shown in this document are available as an option and will not be shipped as standard parts.

7.2.1. Environmental Considerations

Information about the environmental impact of the product.

7.2.2. Product End-of-Life Handling

Observe the following guidelines when recycling a Dewesoft system:

7.2.3. System and Components Recycling

Production of these components required the extraction and use of natural resources. The substances contained in the system could be harmful to your health and to the environment if the system is improperly handled at its end of life! Please recycle this product in an appropriate way to avoid unnecessary pollution of the environment and to keep natural resources.



This symbol indicates that this system complies with the European Union's requirements according to Directive 2002/96/EC on waste electrical and electronic equipment (WEEE). Please find further information about recycling on the Dewesoft web site www.dewesoft.com

 Restriction of Hazardous Substances

This product has been classified as Monitoring and Control equipment and is outside the scope of the 2002/95/EC RoHS Directive. However, we take care of our environment and the product is lead-free.

7.2.4. General safety and hazard warnings for all Dewesoft systems

Safety of the operator and the unit depend on following these rules.

- Use this system under the terms of the specifications only to avoid any possible danger.
- Read your manual before operating the system.
- Observe local laws when using the instrument.
- DO NOT touch internal wiring!
- DO NOT use higher supply voltage than specified!
- Use only original plugs and cables for harnessing.
- You may not connect higher voltages than rated to any connectors.
- The power cable and connector serve as Power-Breaker. The cable must not exceed 3 meters, the disconnect function must be possible without tools.
- Maintenance must be executed by qualified staff only.
- During the use of the system, it might be possible to access other parts of a more comprehensive system. Please read and follow the safety instructions provided in the manuals of all other components regarding warning and security advice for using the system.
- With this product, only use the power cable delivered or defined for the host country.

- DO NOT connect or disconnect sensors, probes or test leads, as these parts are connected to a voltage supply unit.
- Ground the equipment: For Safety Class 1 equipment (equipment having a protective earth terminal), a non-interruptible safety earth ground must be provided from the mains power source to the product input wiring terminals.
- Please note the characteristics and indicators on the system to avoid fire or electric shocks. Before connecting the system, please read the corresponding specifications in the product manual carefully.
- The inputs must not, unless otherwise noted (CATx identification), be connected to the main circuit of category II, III and IV.
- The power cord separates the system from the power supply. Do not block the power cord, since it has to be accessible for the users.
- DO NOT use the system if equipment covers or shields are removed.
- If you assume the system is damaged, get it examined by authorized personnel only.
- Adverse environmental conditions are Moisture or high humidity Dust, flammable gases, fumes or dissolver Thunderstorm or thunderstorm conditions (except assembly PNA) Electrostatic fields, etc.
- The measurement category can be adjusted depending on module configuration.
- Any other use than described above may damage your system and is attended with dangers like short-circuiting, fire or electric shocks.
- The whole system must not be changed, rebuilt or opened.
- DO NOT operate damaged equipment: Whenever it is possible that the safety protection features built into this product have been impaired, either through physical damage, excessive moisture, or any other reason, REMOVE POWER and do not use the product until the safe operation can be verified by service-trained personnel. If necessary, return the product to Dewesoft sales and service office for service and repair to ensure that safety features are maintained.
- If you assume a more riskless use is not provided anymore, the system has to be rendered inoperative and should be protected against inadvertent operation. It is assumed that a more riskless operation is not possible anymore if the system is damaged obviously or causes strange noises. The system does not work anymore. The system has been exposed to long storage in adverse environments. The system has been exposed to heavy shipment strain.
- Warranty void if damages caused by disregarding this manual. For consequential damages, NO liability will be assumed!
- Warranty void if damage to property or persons caused by improper use or disregarding the safety instructions.
- Unauthorized changing or rebuilding the system is prohibited due to safety and permission reasons (CE).
- Be careful with voltages >25 VAC or >35 VDC! These voltages are already high enough in order to get a perilous electric shock by touching the wiring.
- The product heats during operation. Make sure there is adequate ventilation. Ventilation slots must not be covered!
- Only fuses of the specified type and nominal current may be used. The use of patched fuses is prohibited.
- Prevent using metal bare wires! Risk of short circuit and fire hazard!
- DO NOT use the system before, during or shortly after a thunderstorm (risk of lightning and high energy over-voltage). An advanced range of application under certain conditions is allowed with therefore designed products only. For details please refer to the specifications.
- Make sure that your hands, shoes, clothes, the floor, the system or measuring leads, integrated circuits and so on, are dry.

- DO NOT use the system in rooms with flammable gases, fumes or dust or in adverse environmental conditions.
- Avoid operation in the immediate vicinity of high magnetic or electromagnetic fields, transmitting antennas or high-frequency generators, for exact values please refer to enclosed specifications.
- Use measurement leads or measurement accessories aligned with the specification of the system only. Fire hazard in case of overload!
- Lithium ion batteries are classified as not hazardous when used according to the recommendations of the manufacturer described in Battery Safety Data Sheet, which is available for download from [this link](#).
- Do not switch on the system after transporting it from a cold into a warm room and vice versa. The thereby created condensation may damage your system. Acclimatise the system unpowered to room temperature.
- Do not disassemble the system! There is a high risk of getting a perilous electric shock. Capacitors still might be charged, even if the system has been removed from the power supply.
- The electrical installations and equipment in industrial facilities must be observed by the security regulations and insurance institutions.
- The use of the measuring system in schools and other training facilities must be observed by skilled personnel.
- The measuring systems are not designed for use in humans and animals.
- Please contact a professional if you have doubts about the method of operation, safety or the connection of the system.
- Please be careful with the product. Shocks, hits and dropping it from already- lower level may damage your system.
- Please also consider the detailed technical reference manual as well as the security advice of the connected systems.
- This product has left the factory in safety-related flawlessness and in proper condition. In order to maintain this condition and guarantee safety use, the user has to consider the security advice and warnings in this manual.

EN 61326-3-1:2008

IEC 61326-1 applies to this part of IEC 61326 but is limited to systems and equipment for industrial applications intended to perform safety functions as defined in IEC 61508 with SIL 1-3.

The electromagnetic environments encompassed by this product family standard are industrial, both indoor and outdoor, as described for industrial locations in IEC 61000-6-2 or defined in 3.7 of IEC 61326-1.

Equipment and systems intended for use in other electromagnetic environments, for example, in the process industry or in environments with potentially explosive atmospheres, are excluded from the scope of this product family standard, IEC 61326-3-1.

Devices and systems according to IEC 61508 or IEC 61511 which are considered as “operationally well-trying”, are excluded from the scope of IEC 61326-3-1.

Fire-alarm and safety-alarm systems, intended for the protection of buildings, are excluded from the scope of IEC 61326-3-1.

7.3. Documentation version history

Version	Date	Notes
V23-1	23.3.2023	Initial manual release
V23-2	28.6.2023	Corrections: - general technical specifications (chapter 3.1.) - sensor specifications (chapter 3.2.)
V23-3	7.8.2023	Added Gyroscopes specifications (chapter 3.2)
V26-1	20.8.2026	Minor text fix