

Manual

for

BAM 4.5 – P



1 Index

1	Index	2
2	Safety instructions, general instructions, decommissioning	3
2.1	Operator responsibility	3
2.2	Danger caused by energy	3
2.2.1	Danger from electrical energy	3
2.2.2	Danger from mechanical energy	4
2.3	Residual hazards	4
2.3.1	Risk of injury by malfunctions	4
2.3.2	Risk of impact, tripping falling	4
2.3.3	Danger of slipping	4
2.3.4	Explosion hazard through flammable detergents	5
2.3.5	Risk of injury from irritant, health damaging or caustic substances	5
2.3.6	No entry for unauthorized persons	5
2.3.7	Risk of death by falling loads	5
2.3.8	Risk of injury from hot surfaces	5
2.3.9	Risk of injury from use by unauthorized persons or third parties	6
2.3.10	Danger from laser beams	6
2.4	General instructions	6
2.5	Decommissioning	7
2.5.1	Switching off the system	7
2.5.2	Storage of the system	7
2.5.3	Dispose of the system	7
3	General Instructions and Precautions	8
4	Technical Data of Boresight Antenna Mast BAM	9
5	Definition of the assembly groups	11
6	Assembly and installation	12
7	Care and Maintenance	14
8	Trouble shooting for antenna mast BAM	16
9	Drive unit antenna mast BAM – P	17
10	Adjustment of pneumatic actuator	18
11	Belt adjustment	19
	Appendix	
	Warranty Statement	24
	Declaration of Incorporation	25
	EC declaration of conformity	27
	Circuit diagrams	28
	Drawing	33

2 Safety instructions, general instructions, decommissioning

2.1 Operator responsibility

- Make sure that the system is operated only by personnel who have been authorized and instructed by the operator.
- Define an area of risk, which must not be entered while operating the system.
- Affix the instructed person's signature, that the operating instructions have been read and understood.
- Ensure that a copy of the entire operating manual is permanently ready to hand at the system.
- Determine the responsibility in accordance with the different fields of duty exactly. (Maintenance, upkeep, etc.)

2.2 Danger caused by energy

2.2.1 Danger from electrical energy



The device may only be connected to a power supply, where the protective conductor has a proper grounding.



Any damage or interruption of the protective conductor inside or outside of the device, or interruptions of the protective earth terminal can result in injury.



The electrical commissioning of this device may only be performed by authorized personnel. The legal local rules and safety regulations must be adhered to.



Even when the device is turned off, there remains residual electrical energy in conduits!



Working at electrical components may only be performed by qualified electricians, before that the system must be disconnected from the mains.

2.2.2 Danger from mechanical energy



Caused by the movements of parts of the system, there is a risk of crushing as well as drawing-in hazard during operation. The defined area of risk must not be entered. While the system is stationary, there is a risk of impact as well as tripping hazard.

2.3 Residual hazards



Despite all precautions taken, there may occur unobvious residual hazards. These can be reduced by considering the safety advises, the intended use and the operating instructions.



2.3.1 Risk of injury by malfunctions



Malfunctions or operating conditions which may affect the safety, force the shutdown of the system by separating the power supply.



Before re-commissioning of the system, proper restoring of the intended condition is required.



2.3.2 Risk of impact, tripping falling



After removal of panels or plates, as required e.g., for maintenance, there is a danger to stumble against or to trip over parts of the system, or to fall in maintenance hatches.

2.3.3 Danger of slipping



During the operation or caused by malfunctions of the system there may form contamination or leak on ground near the system.

2.3.4 Explosion hazard through flammable detergents



During the maintenance there is a risk of explosion if highly flammable detergents are used for cleaning the system.

2.3.5 Risk of injury from irritant, health damaging or caustic substances



There are dangers when handling consumable supplies like oils, detergents, etc.



While working with these, the currently valid operating and work instructions or safety data sheets for handling of the respective substances must be observed.



2.3.6 No entry for unauthorized persons



There is risk of injury if unauthorized persons enter the pre-defined area of risk of the system. The operator must ensure that unauthorized persons, as visitors, customers, etc. have no access to the risk of area of the system.



2.3.7 Risk of death by falling loads



In the defined danger zone, there is risk of death caused by human error or insufficient secured loads.



During installation, repair or maintenance of the system, appropriate lifting devices must be used, and the personal protective equipment must be used.

2.3.8 Risk of injury from hot surfaces



Especially motors are heating up during operation and cause risk of burning. Before maintenance and repair it is necessary to ensure that all components are cooled down.

2.3.9 Risk of injury from use by unauthorized persons or third parties



There are risks if unauthorized persons or third parties operate the system via the control unit while personnel are staying unauthorized in the area of risk.

2.3.10 Danger from laser beams



During setup operation of the device laser systems are used. Never look into the laser beam! Wear safety glasses!

2.4 General instructions



Before carrying out any repairs, always contact maturo GmbH previously.



Independent repairs or modifications to the equipment may cause warranty to expire.



Before any repairs the electrical power supply must be interrupted. At many points of the individual component's voltages appear that can cause injuries when touching.



Only trained staff may carry out settings and / or repairs to the devices. At the capacitors inside the device can still be voltage even if the device is powered off.



Regularly inspect and maintenance all devices in accordance with the provided instructions

Only use spare parts that are ordered or recommended by the manufacturer.



The devices must be clean and free of dust. A dirty or dusty environment may cause electrostatic interference.



To prevent electromagnetic interference, we use filters with a high leakage.



These filters are installed in each phase and the neutral conductor. The filters are principally used in products which are grounded to the floor, for example AM, CAM, TAM, EAS, TD, WPTC, MVCF. The filters are also installed into turn tables with higher loads, starting at TT2.0-1t. In most EMC chambers no Residual Current protective device (RCD) is installed. This is legit when sockets are built for a specific item of electrical equipment. In this case, the high leakage current has no effect.

If you are planning to install an RCD in the EMC chamber, then a 30mA RCD is too small!

You must use a 300mA RCD!

Technical changes and errors expected as product enhancements are made regularly. Pictures included are for illustration only and do not represent all possible configurations.

2.5 Decommissioning

2.5.1 Switching off the system



Stop all remote controls by external software!

Move the devices to their parking positions (see instructions for the control unit)!



Turn off the respective control unit and devices with their power switches and disconnect the equipment from the power supply!

2.5.2 Storage of the system

Turn off the system, disconnect all data connections between control units and devices!

The storage area must be cool and dry to avoid corrosion on the individual devices of the system. The room temperature of the storage area must be constantly between 5°C and 25°C, the humidity must not be more than 50%.

- Prepare the individual parts of the system to avoid any external damaging influences during storage!
- If necessary, use cardboard, wooden boxes, and other packaging material!
- Secure all components against accidental tilting and instability!

2.5.3 Dispose of the system



This device must be disposed according to the applicable regulations and legislation from domestic waste. By collecting and recycling of recyclable materials the natural resources are conserved, and it is ensured, that all the applicable regulations for the protection of health and the environment are considered.

3 General Instructions and Precautions

Before this device is applied with power:

Ground it properly through the protective conductor of the power cable to a power source provided with protective earth contact. Any interruption of the protective (grounding) conductor, inside or outside the device, or disconnection of the protective earth terminal could result in personal injury.

The **electrical installation** of this product must be accomplished by an individual who is authorized to so do by the appropriate local authority. The installation must be compliant with local electrical safety codes.

Only qualified personnel are allowed to operate or service this equipment.

Before making service, contact maturo GmbH

Service or modifications of the device by yourself may void your warranty.

If you attempt to service the unit by yourself, disconnect all electrical power before starting. There are voltages at many points in the components which could, if contacted, cause personal injury. Only trained service personnel are allowed to perform adjustments and/or service procedures upon this device. Capacitors inside this instrument may still be charged even when instrument is disconnected from its power source.

Stay clear of moving components during the operation of the device.

Do not operate the device while somebody is close to moving parts.

The protection of the **area of risk** at site is part of the operator.

Read this manual completely before starting installation. This equipment must be installed and operated only by qualified personnel.

Regularly inspect all equipment and conduct scheduled maintenance in accordance with the factory recommendations provided. Only use replacement parts and fasteners ordered directly from the factory.

Information presented enclosed is subject to change as product enhancements are made regularly. Every effort has been made to ensure that the information in this manual is accurate. However, no liability or guarantee is assumed for the up-to-dateness, correctness and completeness of the information provided herein.

Pictures included are for illustration purposes only and do not represent all possible configurations.

4 Technical Data of Boresight Antenna Mast BAM 4.5 – P

Antenna height automatic adjustable	1.0 m – 4.5 m (non-tilted)
Total mast height	5.0 m
Load capability non tilted	max. 10 kg (when balanced)
Load capability tilted	max. 6 kg (when balanced)
For long and heavy antennas, a counter weight is required to balancing the load.	
Depending on the distance of the antenna gravity center	
Material of antenna mast	Plastic and reinforced fiberglass
Mast cross section	101 mm x 95 mm
Base L x W	1.3 m x 0.7 m
Position speed adjustable in combination with FCU3.0	1.0 cm/s – 35 cm/s
Position accuracy	+/- 0.5 cm
Pneumatic polarization	0° / 90° (vert. / hor.)
Polarization time	approx. 3 s
Polarization drive	Pneumatic rotary actuator
Control	Solenoid valve
Nominal pressure	max. 6 bar
Tilt angle automatically adjusted during scan	From -18.5° to +45°
Tilt accuracy	+/- 0.5°
Motor	DC stepper Motor
Antenna support drive	Toothed belt
Material of toothed belts	Kevlar reinforced (non-metallic)
Voltage	110 VAC – 230 VAC, 50 Hz / 60 Hz single phase
Current consumption	max. 16 A
Required RCD	300 mA
Control cable	Fiber optic lines
Remote control via	LAN (TCP/IP)
Interference suppression	20 dB under limits DIN EN 55011:2022-05 class B
Operating temperature	10° C – 35 ° C
Total weight	approx. 80 kg
Accessories	Service manual 3 m power supply cable 15 m pneumatic air hose 8 mm 1x pneumatic feed through

Brief description

The Boresight Antenna Mast **BAM 4.5-P** is suitable in magnetic absorption chambers. The antenna mast, with exception of the drive unit, is fabricated from plastic (PVC and reinforced fibreglass). The BAM 4.5-P has additionally an electrical tilt function from -18.5° to 45°, which automatically tilts during height scan. The tilting angle can be adjusted easily in accordance with the distance of the antenna to the EUT.

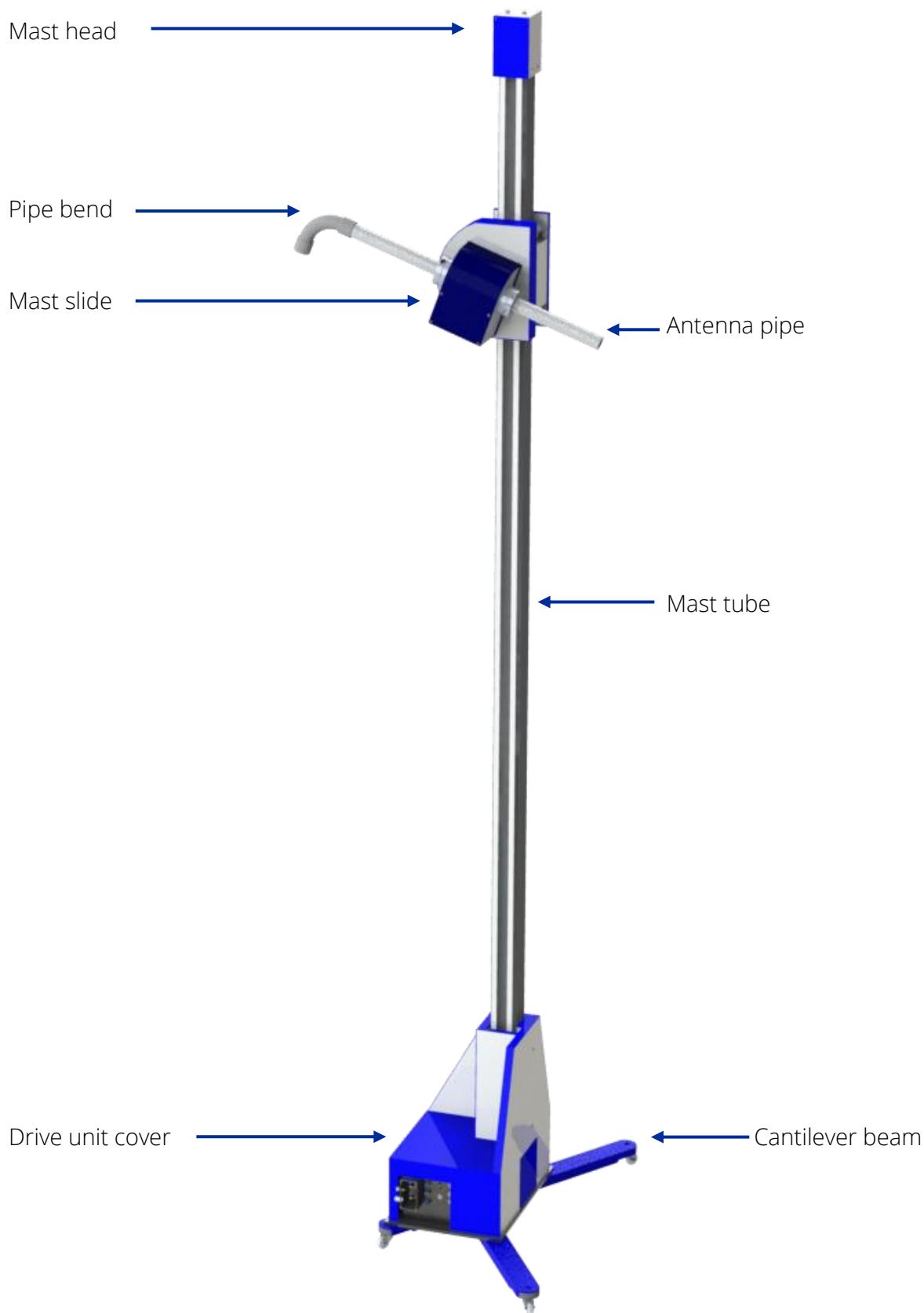
Metal parts are located only in the base plate and the drive mechanism (max. 0.3 m above ground level).

Antenna Adapters for all commercially available antennas are available upon request.

All antennas during polarisation rotate around their axis to eliminate any elevation errors.

The **LAN (TCP/IP) - interface** provides an additional control option for all functions, when operated with the **FCU^{3.0} Controller**.

5 Definition of the assembly groups



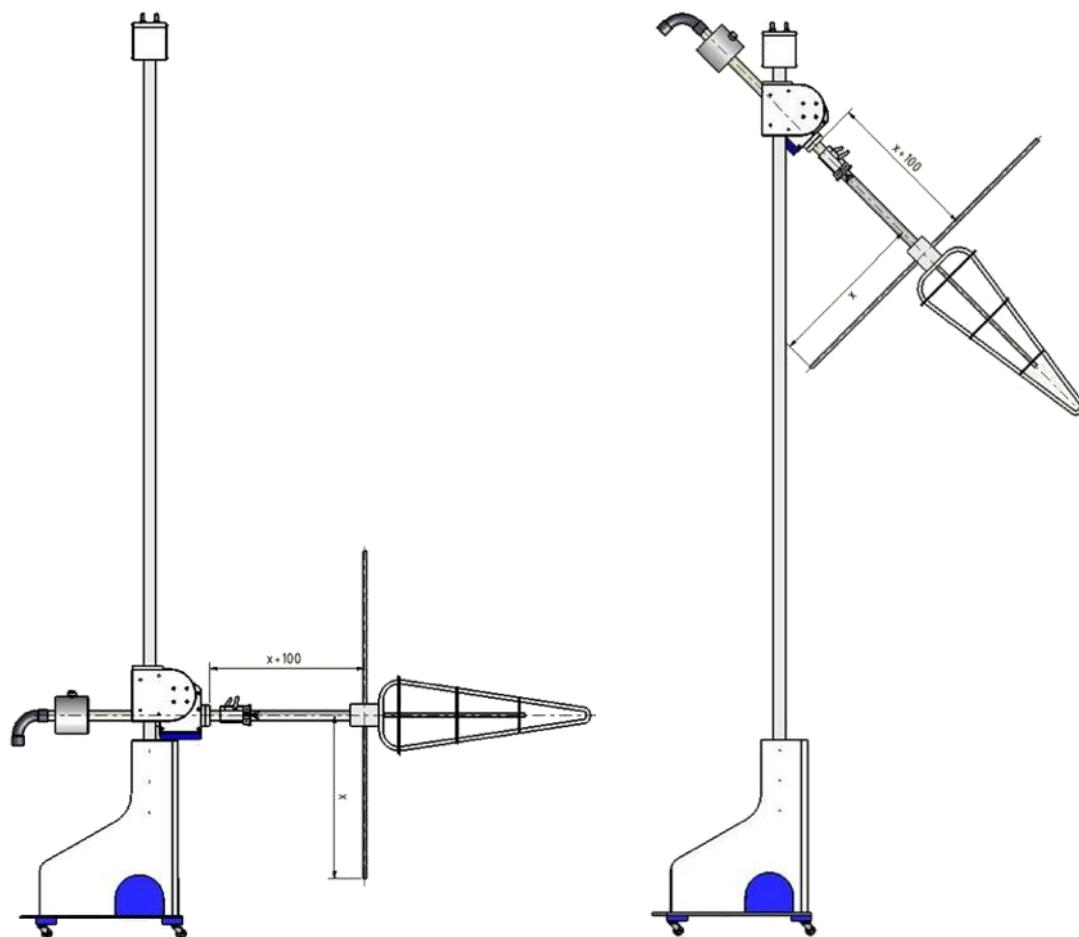
6 Assembly and installation

- 1) Fasten the 2 cantilever beams to the base plate!
- 2) Line up the mast to vertical position!
- 3) Take care of the extension rods for the limit switches!
- 4) Insert the antenna pipe into the hollow shaft at mast slide and fasten the fixing screws carefully at both sides!



- 5) Fix antenna adapter, antenna to the adapter and antenna cable!
- 6) Before tilting check width of antenna wings in respect of distance to the antenna mast! There must be a safety distance of 100 mm!

Calculation example:
If the distance antenna centre to antenna wing end is 500 mm, the distance antenna to the mounting must be 600 mm!



Tilt calculation example:

At 3 m measuring distance the tilt angle at 4.0 m height is 45° for 1 m EUT height.

- 7) Level antenna pipe while antenna and counter weight is mounted!
See manual of FCU^{3.0} controller!
- 8) Connect the fibre optic control cables from the antenna mast to the controller!
Take care of the colours!
- 9) Connect the 8 mm compressed air hose from the compressed air supply outside the chamber to the connection joint at the service unit at the mast base!
Note: Operating pressure is 6 bar.

8 mm compressed air hose connector



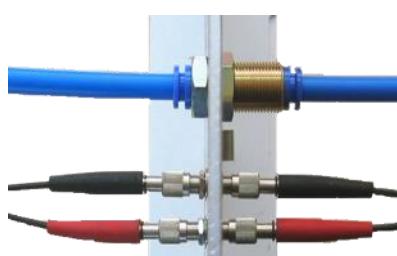
- 10) Connect the power cable and switch on the power!
Attention: 110 V – 230 V, 50 Hz / 60 Hz, 16 A power consumption
Only use the provided power supply cable!
Note: The power supply cable must be shielded and have good earthing!
- 11) Start positioning of the antenna mast according to the controller manual!
- 12) Fix antenna on the antenna pipe with an adapter and take care that the antenna is balanced! Use counter weight if available for balancing!

Note: Before disconnecting the mast from power, always move the mast to 1 m height and horizontal polarisation.

Caution:

Do not position the antenna mast underneath **halogen headlights** or any other heat source due to safe the plastic components!

Example: Connections (feed through) at shielded wall



7 Care and Maintenance

Caution:

Before performing any maintenance, disconnect the system and turn off power

Routine check:

- Prior to beginning normal operation of the mast, check the mast for any signs of damage or excessive wear!
- Verify the height readout of the controller and the physical position of the mast are the same!
- Verify that the antenna is secure mounted!
- Check the routing of all cables to make sure they do not interfere with the operation of the mast!

Six-month check:

- Clean the surfaces of the mast tube and casters at the mast slide when dirty by using a plastic cleaner with a soft cloth!
Note: Do not use solvents for cleaning!
- Pay attention that no dirt or foreign objects are on the toothed belt and clean when necessary!
Note: The toothed belt must be operated without lubrication!
- Lubricate the axles of the casters at the mast slide with conventional machine oil, whereby no oil should reach the running surface of the castors!
Note: No lubricant must be used at the driving axle (drive unit, toothed wheel)!

Note: The mast tube, the toothed belt and the casters and bearings at the mast slide and mast head must be clean and dust-free.

General:

- When not using cables or devices, always put on the provided dust covers!



Cleaning of cables see manual of NCD controller!

Routine Maintenance

To ensure a high level of reliability of operation, a long working life of the products, and substantially to avoid major repair costs, we offer the option of a maintenance contract with our service department.

This maintenance contract is carried out by our service engineers who accurately check and examine all the important components and functions at regular intervals of time, to be agreed from case to case.

The contract covers the mechanical and electrical or electronic parts of our products as well as the cooling units, safety devices, alternative and optional equipment, where these have been fitted to the products.

The details of the services to be provided by our maintenance service are agreed from case to case. We shall be happy to provide a suitable quotation on request.

8 Trouble shooting for antenna mast BAM

If there are problems with the device, please always carry out the following first:

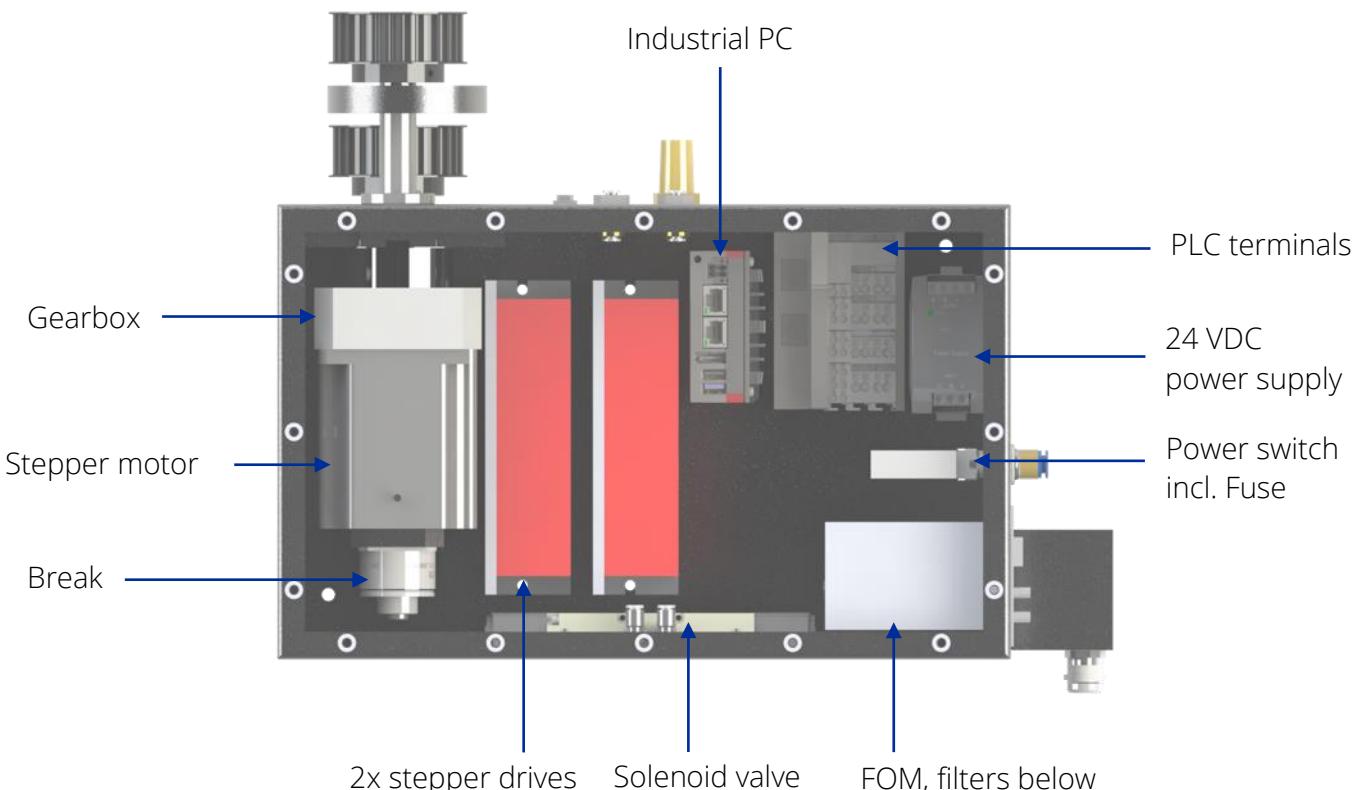
- Check power supply and fuses!
- Check fibre optic cables and connections (if possible, change cables from a different device and check)!
- Check user limits and remove the limits, if not in use (see manual of controller)!
- Use a short cable for connection directly to the turntable in the chamber!
- Disconnect the power supply of the device and the controller for minimum one minute! Reconnect the power supply and carry out positioning!

Please contact our service department by phone or by e-mail, please always provide the serial number of the products:

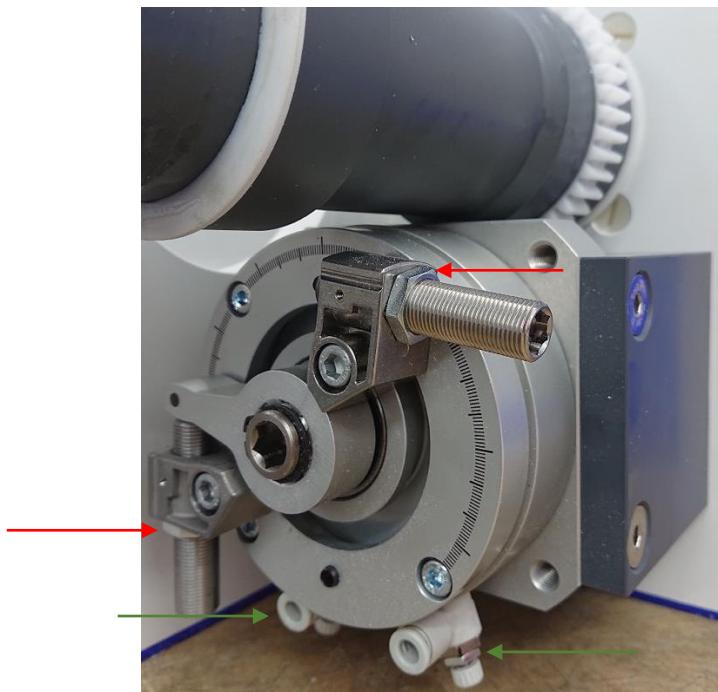
Phone: +49 9606 9239130

E-mail: service@maturo-gmbh.de

9 Drive unit antenna mast BAM – P



10 Adjustment of pneumatic actuator



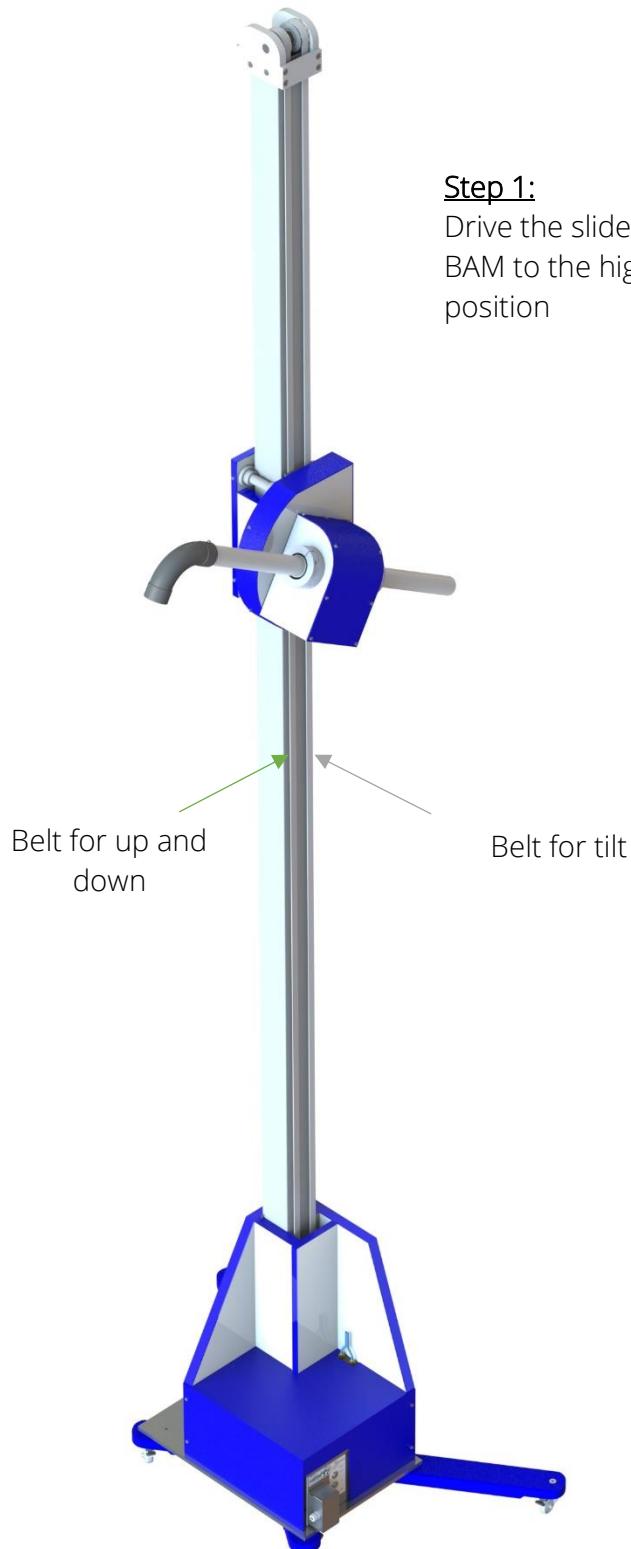
For the speed adjustment of the actuator the following steps need to be done:

- 1) Release both nuts at the actuator
- 2) Rotate both screws a few degrees (direction see below)
- 3) Check polarization speed
- 4) Repeat step 2 until the polarization works properly
- 5) Fasten both nuts again after successful adjustment
 - Reduce speed of polarization
 - o Turn screws clockwise
 - Increase speed of polarization
 - o Turn screws counterclockwise

For the limit adjustment of the actuator the following steps need to be done:

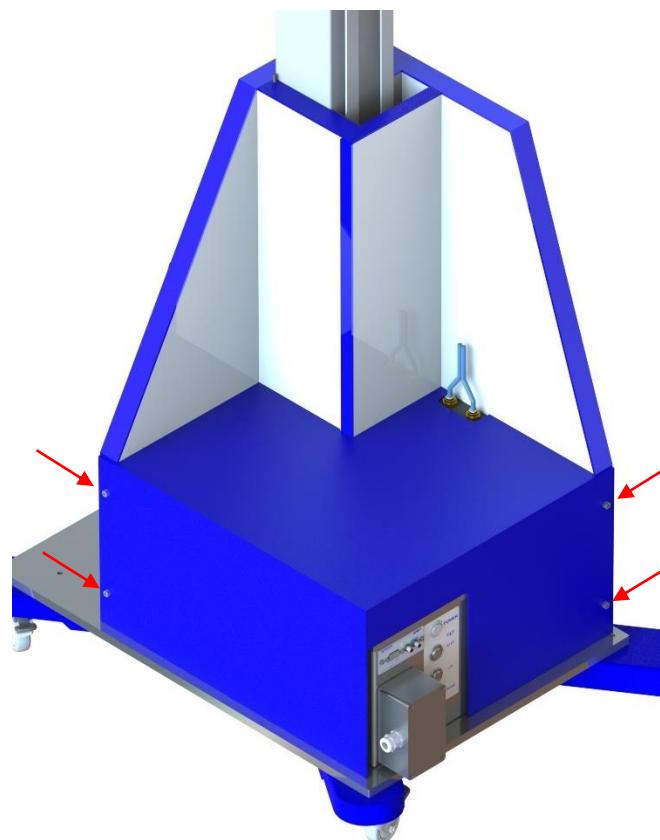
- 1) Disconnect the two compressed air hoses from the mast slide
- 2) Release nut from one side at the actuator
- 3) Rotate the screw a few degrees
- 4) Check the moving range by turning the actuator by hand
- 5) Repeat step 3 until the limit is correct
- 6) Fasten the nut again after successful adjustment

11 Belt adjustment

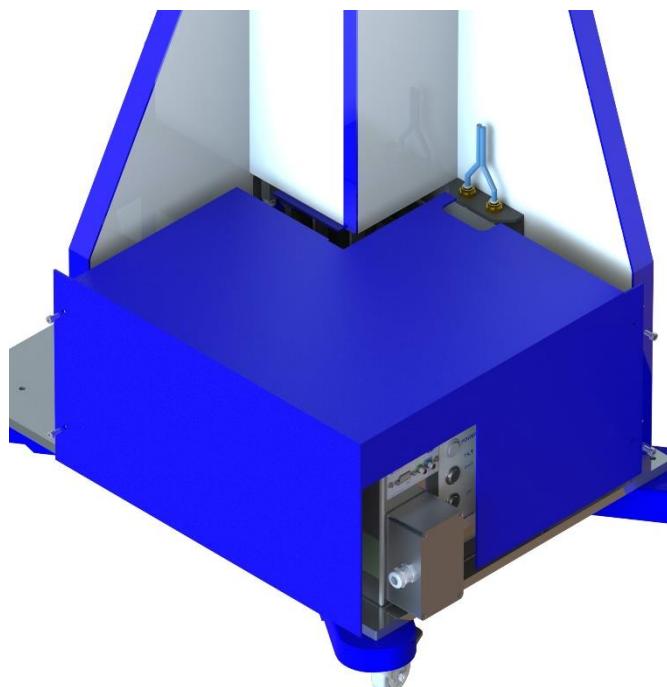


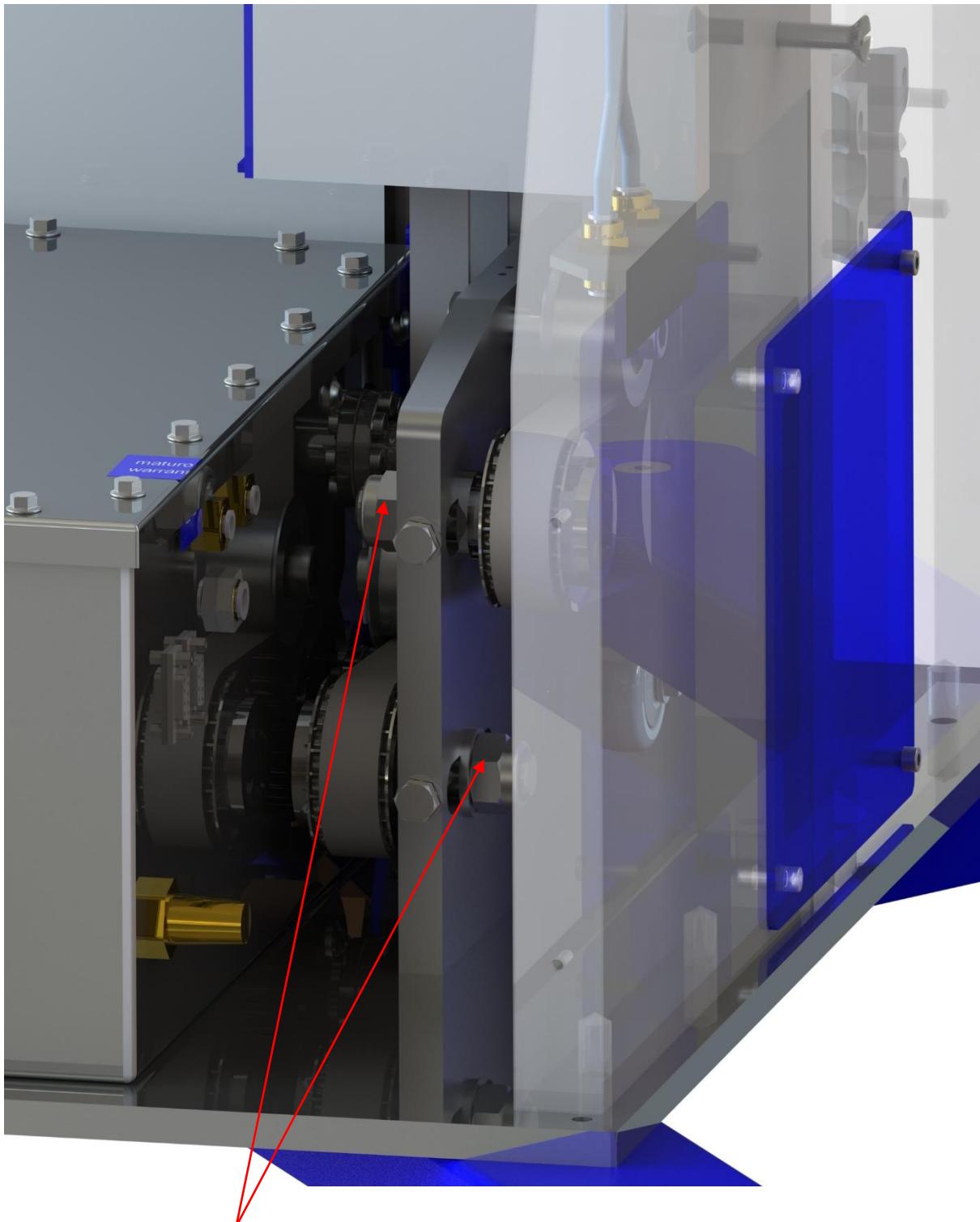
Step 1:

Drive the slide of the BAM to the highest position



Step 2:
Remove the cover

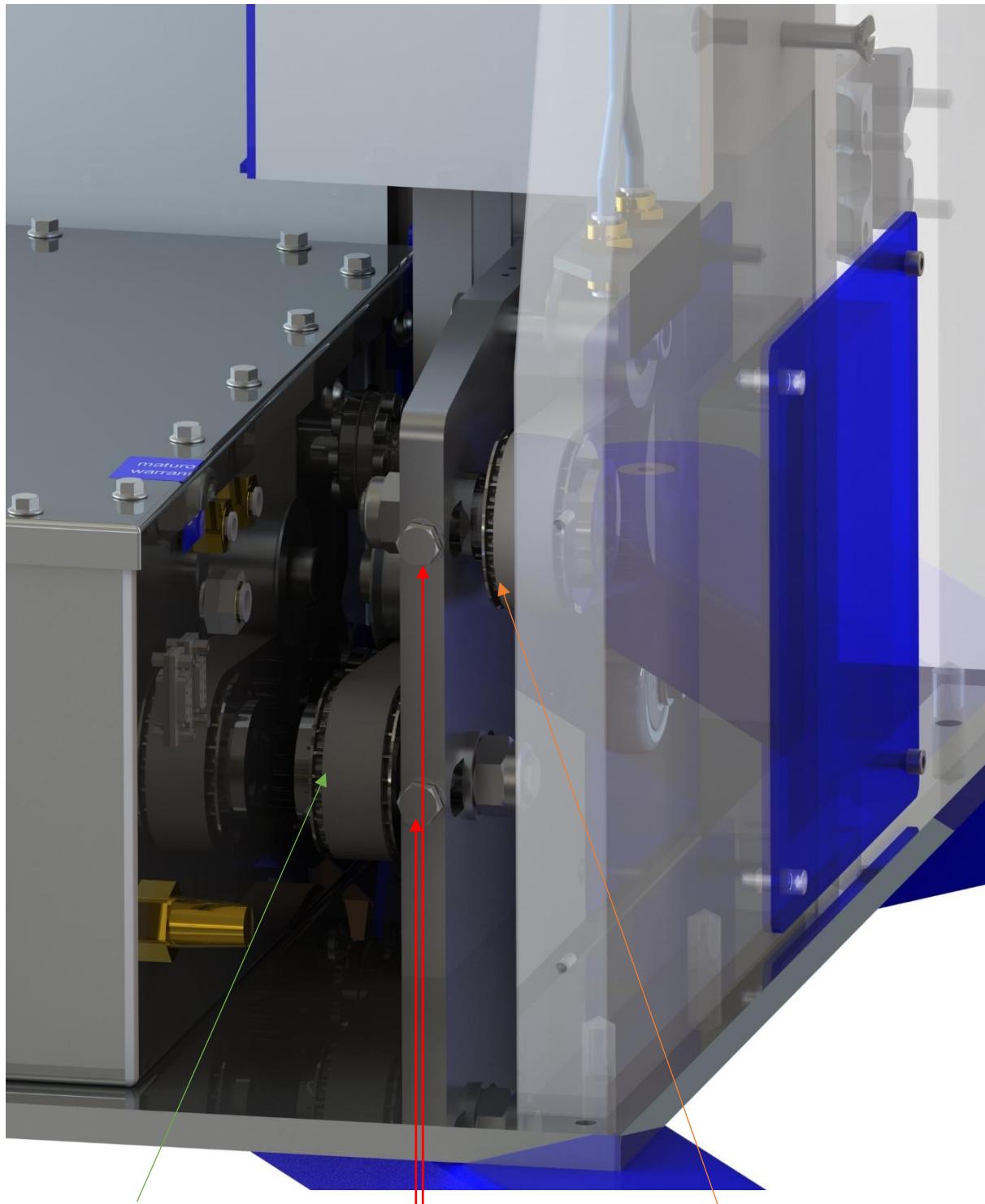




Step 3:

Loosen the lock screw of the
belt pulley

Note: fix this screw after
adjusting the belt



Belt for up and
down

Step 4:

Use those screws to adjust the
tension (look at step 5)

Clockwise – tighten

Counterclockwise – loosen

Belt for tilt



Step 5:

Check the belt with a spring balance to see if it is tight enough:
Set a spring balance at approx.
1.3 m from the ground.
Pull the spring balance until **10 kg**,
the distance between belt and
mast tube should be **100 mm**

Warranty Statement

Maturo GmbH, hereinafter referred as maturo, warrants that our standard products are free from defect in materials and workmanship for a period of two years from date of shipment if maintenances are done regularly. Standard maturo products include the following:

- Antenna Masts and Stands
- Turntables and Turn Devices
- Cable Guide Rails
- Controllers
- Dynamometers for the automotive industry

If the Buyer notifies the Seller of a defect within the warranty period, the Seller will at the Seller's option, either repair and/or replace those products that prove to be defective.

There will be no charge for warranty services performed at the location maturo designates. The customer must, however, prepay inbound shipping costs and any duties or taxes. Maturo will pay outbound shipping cost for a carrier of maturo's choice, exclusive of any duties and taxes. If maturo determines that warranty service can only be performed at the customer's location, the customer will not be charged for maturo's travel related costs.

This warranty does not apply for:

- Improper storage of our products outside our area of influence
- Errors during installation, commissioning, or operation
- Wear and tear during normal operations
- Unqualified maintenance works
- The application of unsuitable equipment and materials
- The results of repair work or other activities undertaken on our products, which have not been expressly approved by us.
- Consumable items such as fuses, batteries, etc
- Products which have been operated outside the specifications

Note: Please always contact maturo before shipping equipment to us.

Einbauerklärung

im Sinne der EG-Richtlinie Maschinen 2006/42/EG, Anhang II, Nr. 1 B

Declaration of Incorporation

in accordance with EC -Machinery Directive 2006/42/EC, appendix II, No. 1 B

Hiermit wird erklärt, dass das Positioniersystem, bestehend aus:

We hereby declare that the positioning system, consisting of:

Produktbezeichnung: <i>Product:</i>	Boresight Antenna Mast BAM 4.5 – P
Seriennummer: <i>Serial number:</i>	BAM4.5-P/440/3792.01
Baujahr: <i>Year:</i>	2023
Hersteller: <i>Manufacturer:</i>	maturo GmbH, Am Kalvarienberg 24, 92536 Pfreimd

Produktbezeichnung: <i>Product:</i>	Controller FCU ^{3.0}
Seriennummer: <i>Serial number:</i>	FCU ^{3.0} /525/3792.01
Baujahr: <i>Year:</i>	2023
Hersteller: <i>Manufacturer:</i>	maturo GmbH, Am Kalvarienberg 24, 92536 Pfreimd

in der gelieferten Ausführung zum Einbau in eine Anlage bestimmt ist.

Die grundlegenden Sicherheits- und Gesundheitsschutzanforderungen gemäß Anhang I der Maschinenrichtlinie kommen zur Anwendung und wurden eingehalten.

as delivered is designed for installation into a system.

The general safety- and health requirements according to appendix I of the Machinery Directive are applied and have been observed.

Zusätzlich entspricht dieses Positioniersystem folgenden Richtlinien:

Additionally, the positioning system in according to the following directives:

- | | |
|--------------|--|
| - 2014/30/EU | Elektromagnetische Verträglichkeit – EMV-Richtlinie |
| - 2014/30/EU | <i>Electromagnetic compatibility – EMC directive</i> |
| - 2014/35/EU | Elektrische Betriebsmittelrichtlinie |
| - 2014/35/EU | <i>Electrical equipment directive</i> |

Grundlagen dafür sind folgende harmonisierte Normen:

Basis for that are the following harmonized standards:

- DIN EN 55011:2022-05	Class B
- DIN EN 61000-4-2:2009-12	Level 2/3
- DIN EN 61000-4-3:2021-11	Level 2
- DIN EN 61000-4-4:2013-04	Level 2
- DIN EN 61010-1:2020-03	

Die speziellen technischen Unterlagen nach Anhang VII B wurden erstellt.

The relevant technical documentation according to appendix VII B have been issued.

Dieses Positioniersystem darf erst dauerhaft in Betrieb genommen werden, wenn festgestellt wurde, dass die Anlage, in die dieses Positioniersystem eingebaut werden soll, den Bestimmungen der Maschinenrichtlinie 2006/42/EG entspricht.

The commissioning of the positioning system is prohibited until it has been installed into a system which then meets the requirements of the EC Machinery Directive 2006/42/EC.

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Pfreimd, den 30.08.2023

Gerhard Strehl, Managing Director

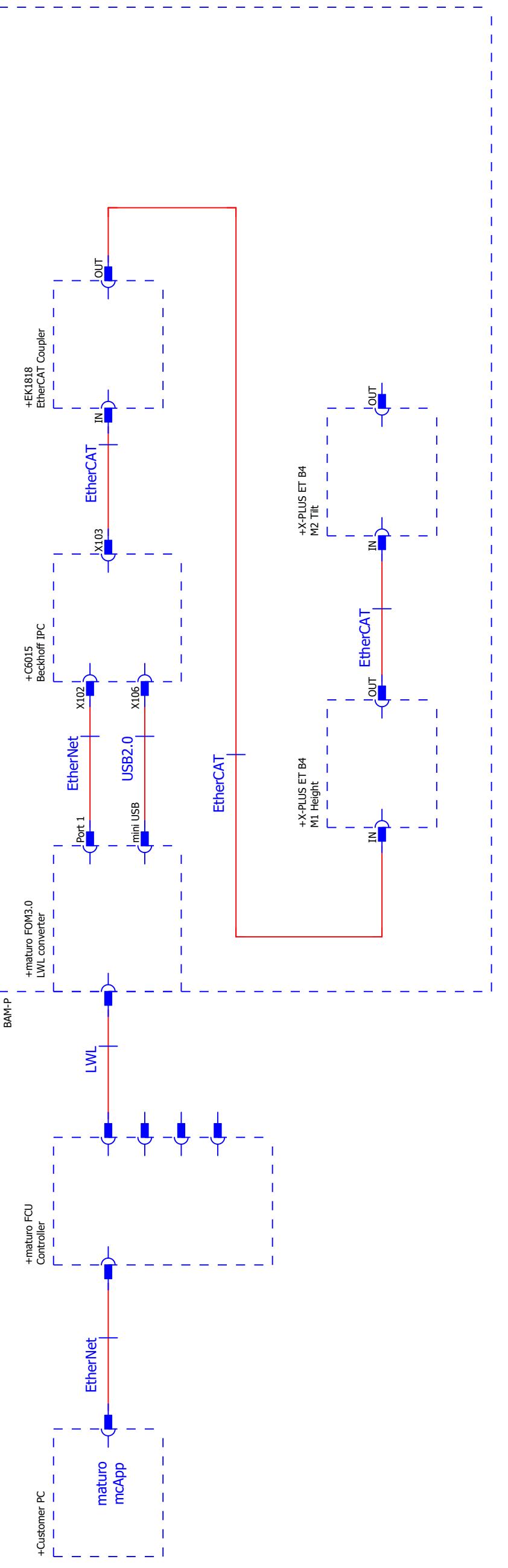
Firmenstempel <i>Company stamp</i>	Ort und Datum der Ausstellung <i>Place and date of issue</i>	rechtsverbindliche Unterschrift <i>Name and signature of authorised person</i>
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EU-Konformitätserklärung
im Sinne der EU-Richtlinie RoHS 2011/65/EU

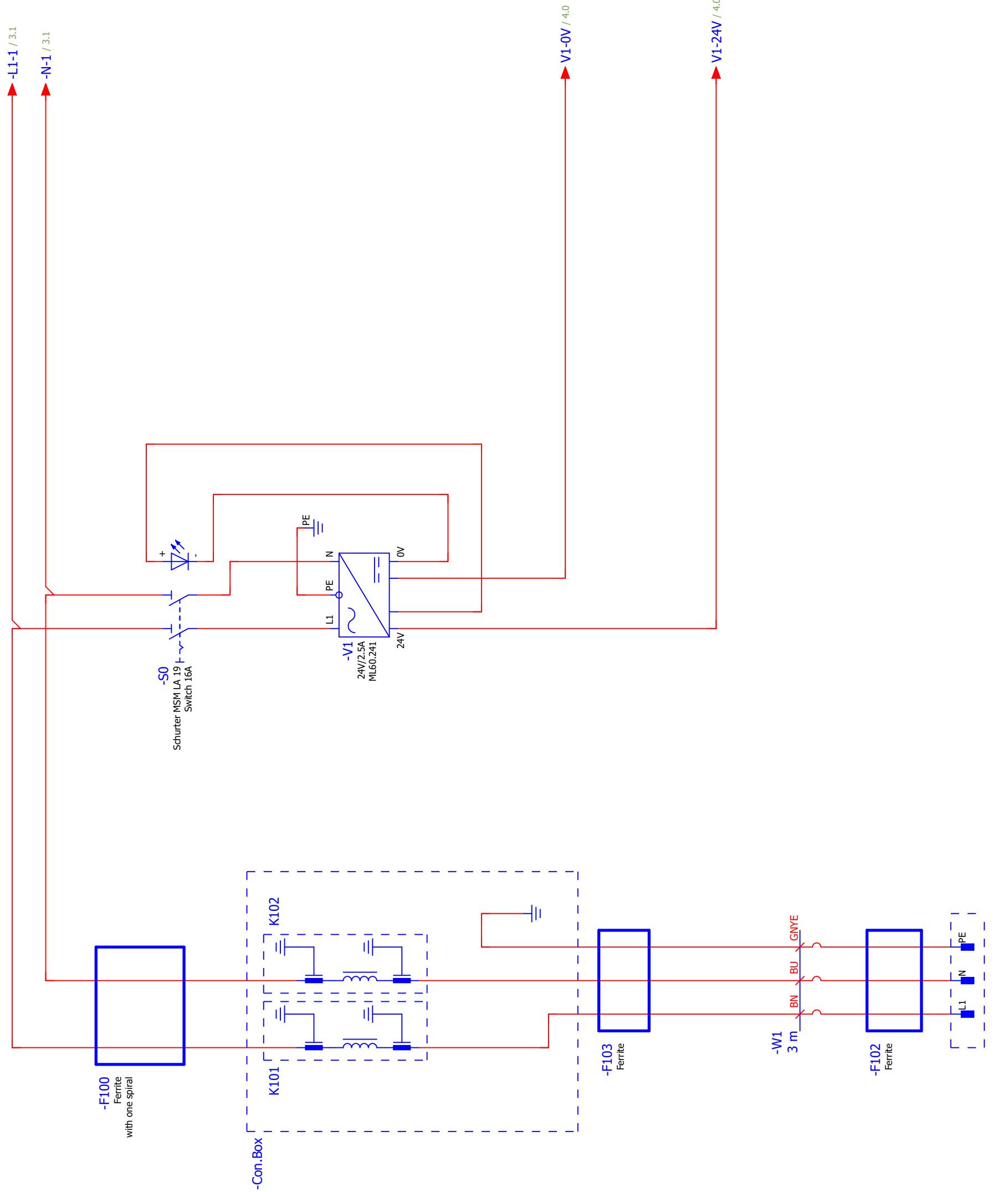
EC declaration of conformity
in accordance with EC Directive RoHS 2011/65/EU

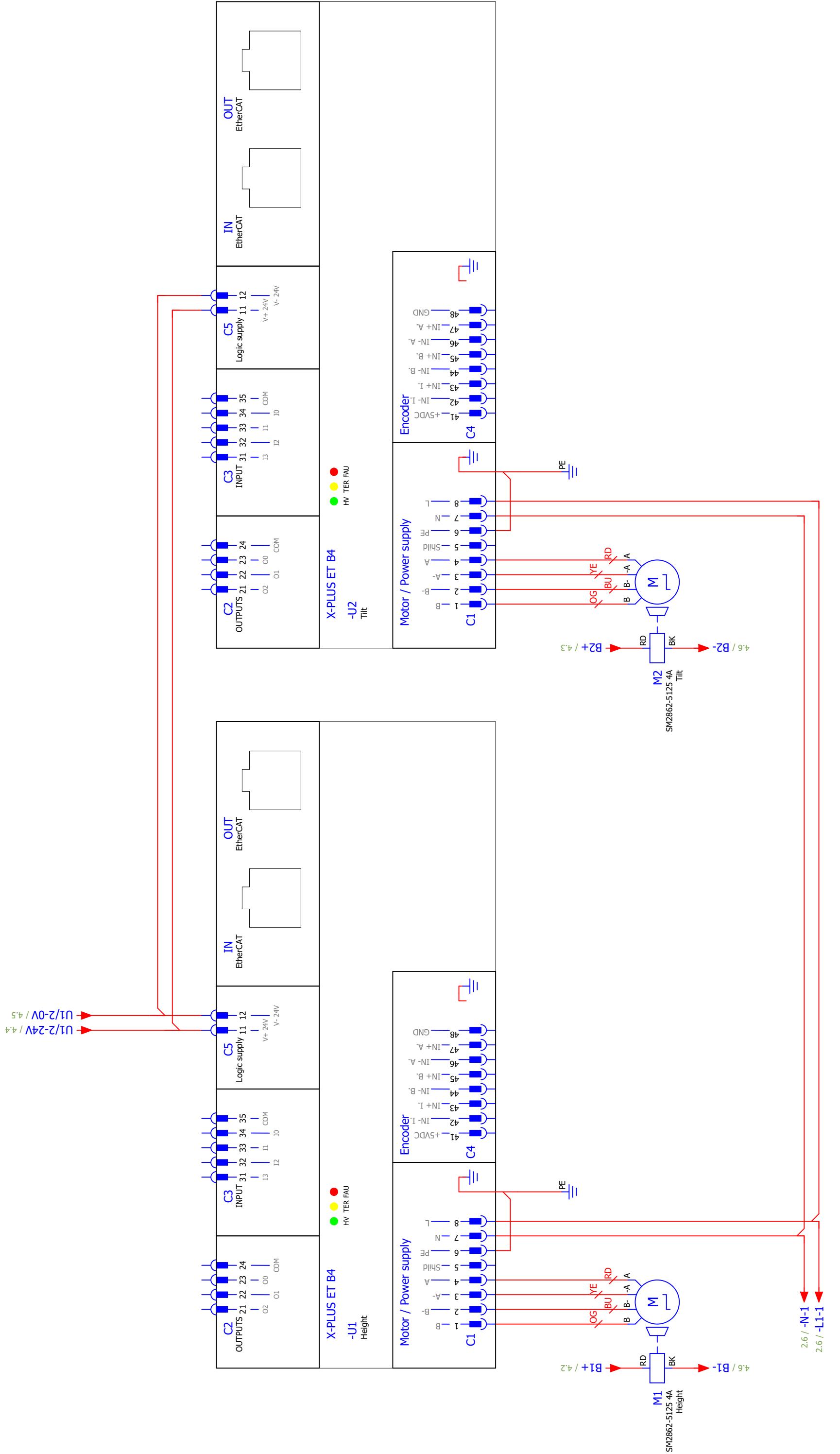
Unsere Produkte erfüllen die Vorschriften der Richtlinie 2011/65/EU des Europäischen Parlaments und des Rates vom 08.06.2011 zur Beschränkung der Verwendung bestimmter gefährlicher Stoffe in Elektro- und Elektronikgeräten, sowie der Einhaltung der Höchstkonzentration in homogenen Werkstoffen in Gewichtsprozent von Cadmium < 0,01%, sowie Blei, Quecksilber, sechswertiges Chrom (Cr⁶⁺), Polybromierte Biphenyle (PBB), Polybromierte Diphenylether (PBDE), Bis(2-ethylhexyl)phthalat ((DEHP), Benzylbutylphthalat (BBP), Dibutylphthalat (DBP) und Diisobutylphthalat (DIBP) < 0,1% gemäß Anhang II der Richtlinie. Wir erklären hiermit, dass alle unsere Produkte RoHS-konform produziert werden.

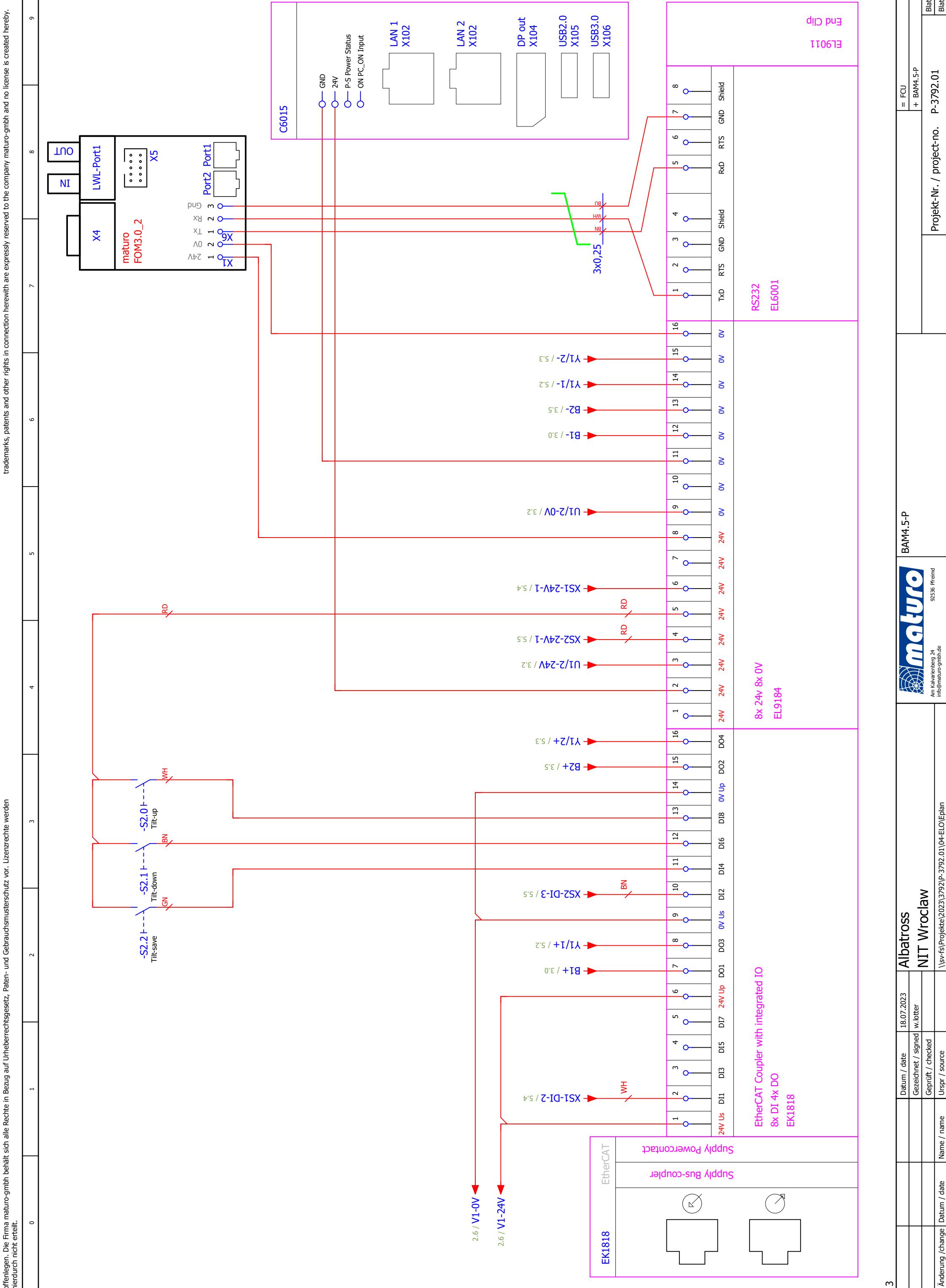
Our products comply with the regulation of Directive 2011/65/EU of the European Parliament and the Council dated 08.06.2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment and the observance of the maximum concentration in homogeneous materials by weight Cadmium < 0,01%, and lead, mercury, hexavalent chromium (Cr⁶⁺), polybrominated biphenyls (PBB), polybrominated diphenyl ethers (PBDE), Bis(2-ethylhexyl) phthalate (DEHP), Butyl benzyl (BBP), Dibutyl phthalate (DBP) and Diisobutyl phthalate (DIBP) < 0,1% according to Annex II of the Directive. We hereby declare that all our products are produced RoHS compliant.

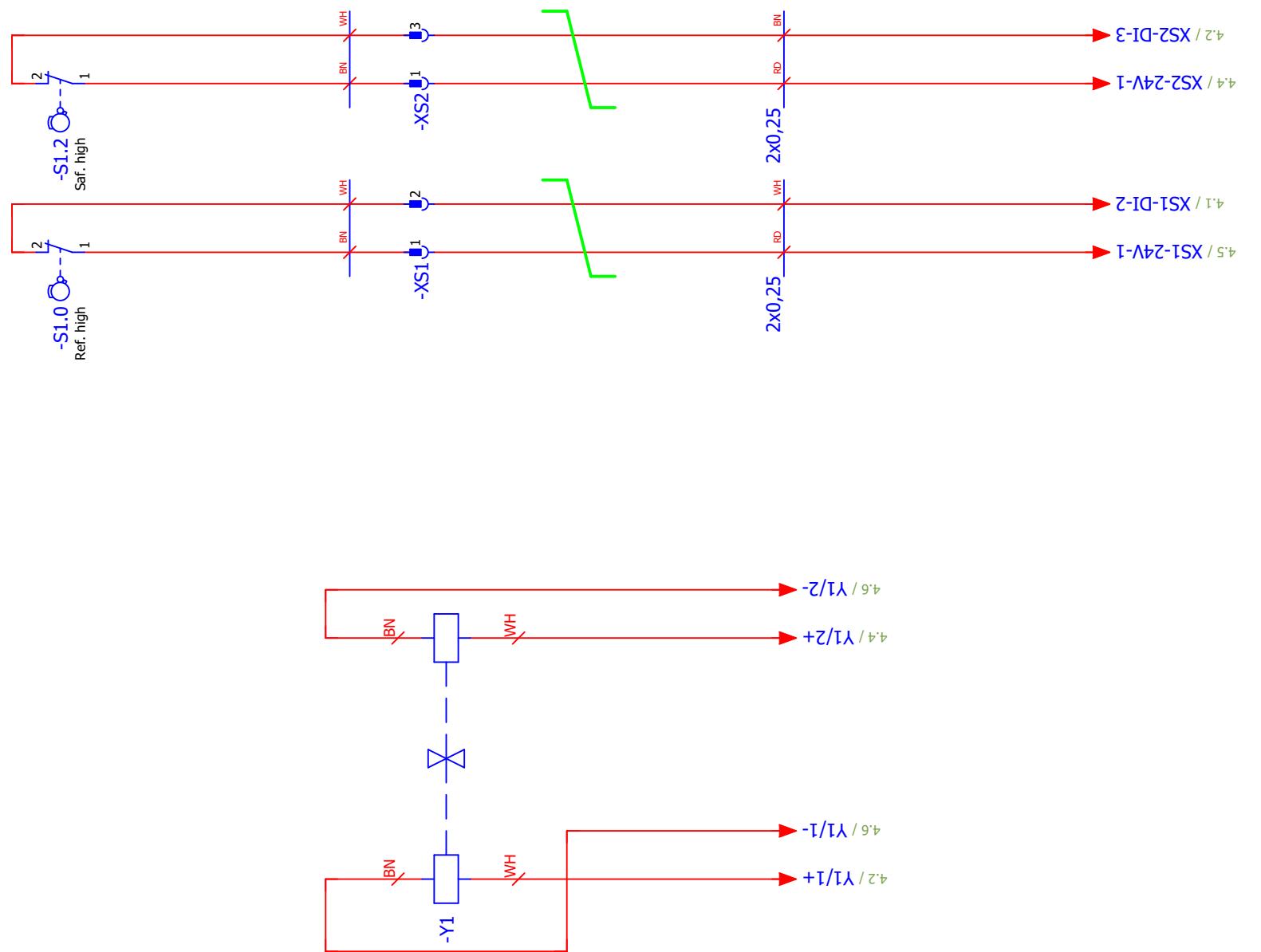


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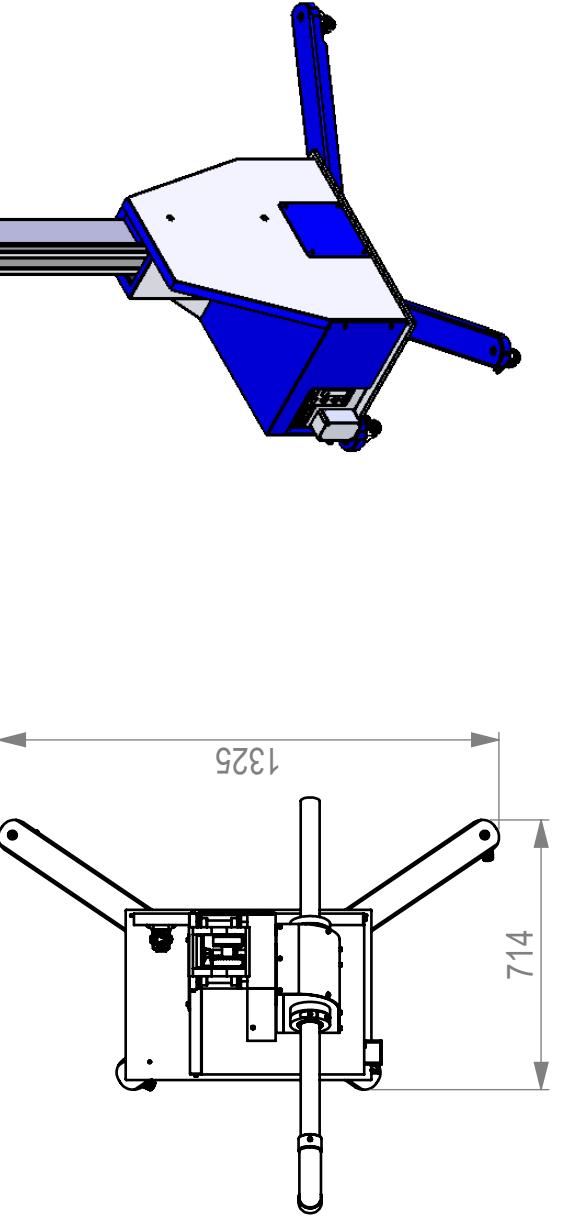
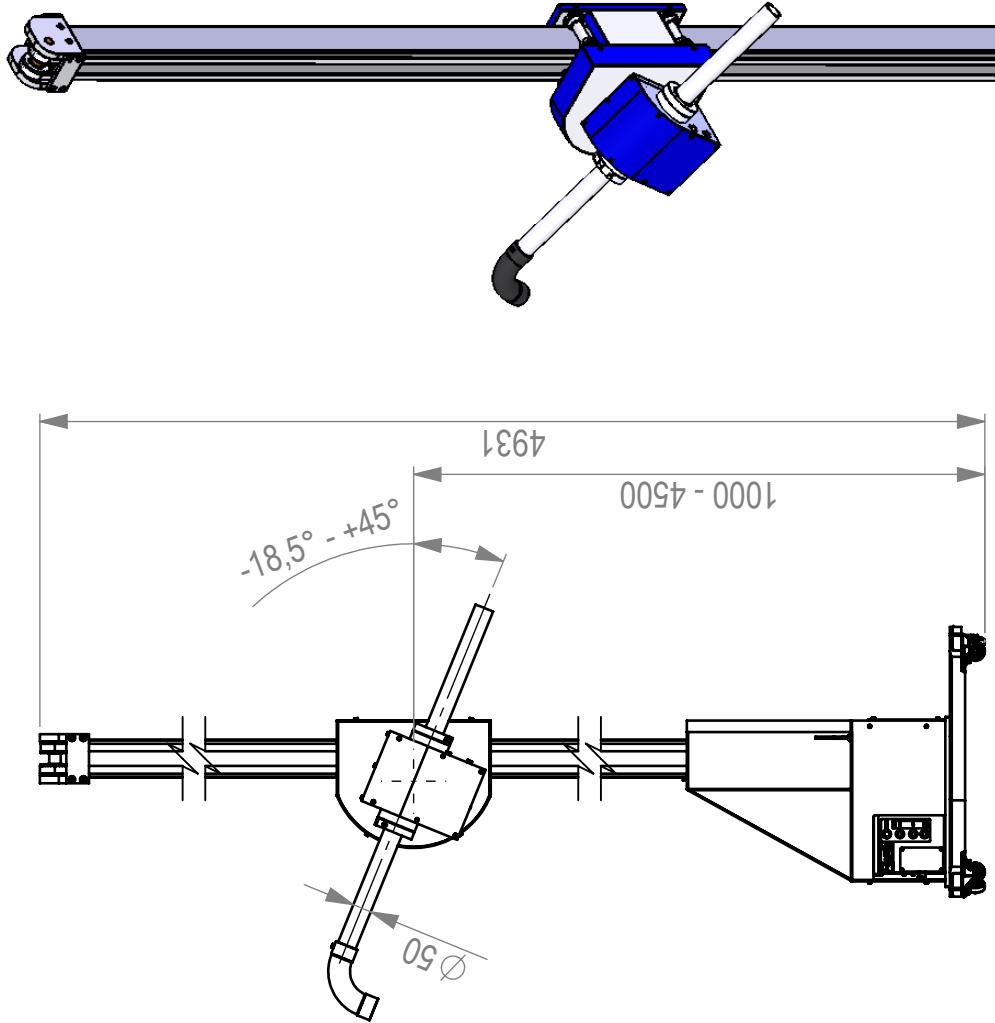


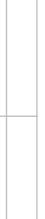


al
and
stated hereby.

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diseases. Patients with the disease have a higher risk of developing other diseases, such as heart disease and stroke. The exact cause of Alzheimer's disease is not known, but it is believed to be a combination of genetic, environmental, and lifestyle factors.



Projekt-Nr. / project-no.	P-3792.01	Gewicht / weight	78.18 kg	Material / material	Bearbeitung / treatment	
Toleranz / tolerance	DIN ISO 2768 T1 - m DIN ISO 2768 T2 - K	gezeichnet / signed	Datum / date 19.06.2023	Name / name Alwang	Title / title	BAM4.5-P-FCU
		geprüft / checked			Zeichnungs-Nr. / drawing-no.	
		freigegeben / approved				
				SolidWorks	Artikel-Nr. / order-no.	
					 Am Kalvarienberg 24 92336 Pfeind Germany	
					K:\SolidWORKS_Projekte\Projekte P-3790\3792\P-3792.01\BAM4.5-P\	
						Maßstab / scale 1 : 2
						Blatt sheet 22 / 2

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Notes