

Manual for the Single Control Unit SCU



For the operation of a Turntable TT, (Turn Device TD)

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1) Safety instructions, general instructions, Decommissioning

1.1) 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 to the different fields of duty exactly. (Maintenance, upkeep, etc.)

1.2) Danger caused by energy

1.2.1 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.



1.2.2 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.



1.3) Residual hazards



In spite of 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.



1.3.1 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.



1.3.2 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.



1.3.3 Danger of slipping



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

1.3.4 Explosion hazard through flammable detergents



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

1.3.5 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.



1.3.6 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 area of the system.



1.3.7 Risk of death by falling loads



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



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

1.3.8 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.

1.3.9 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 is staying unauthorized in the area of risk.

1.3.10 Danger from laser beams



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



1.4) General instructions



Before carrying out any repairs, always contact matur GmbH previously
Independent repairs or modifications to the equipment may cause warranty expire.



Before any repairs the electrical power supply must be interrupted. At many points of the individual components 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.

1.5) Decommissioning

1.5.1 Switch of 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

1.5.2 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.

1.5.3 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.

2) 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 do so by the appropriate local authority. The installation must be in compliance 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.

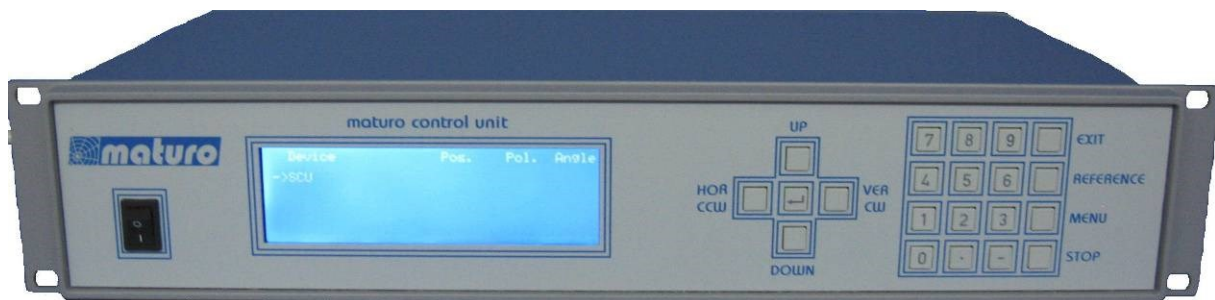
Regularly inspect all equipment and conduct scheduled maintenance in accordance with the factory recommendations provided. Only use replacement parts and fasteners ordered directly from the factory.

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.

3) Technical Data of Controller SCU

The **Single Control Unit SCU** is suited for the operation of one device with one axis of motion. Those devices are usually used for the operation of turntables, cable guide rails or any other positioning equipment. This controller SCU permits the operation in manual, semi-automatic and remote control mode via IEEE 488.2 (GPIB bus) of multiple devices simultaneously.



Technical Data

| | | |
|---------------------|---------|--|
| Data interface | | IEEE 488.2 (GPIB-Bus) |
| Device interface | | CAN-Bus via fibre optic cable |
| Transfer rate | | 100 baud |
| Display | | 4 x 40 characters |
| Voltage | | 110-240 VAC, 50/60 Hz, single phase |
| Current consumption | approx. | 20W |
| Fuse | | T 125mA, 250V |
| Size (W X D) | | 19" Rack mount (427 x 300 mm) |
| Height | | 2 HE (87 mm) |
| Temperature range | | 5°C - 40°C |
| Total weight | | 5 kg |
| Accessories | | 1.5 m power supply cable Service manual |

The multiple control unit SCU works with HP, R&S, and etc. software. The IEEE 488 (GPIB) is available as an interface device

4) Connecting devices to SCU with fibre optic cables

1. Power of the device and SCU.
2. Connect "IN" at SCU with "OUT" of the device, prefer the red line. Connect "OUT" at SCU with "IN" of the device, prefer the black line. If your device is prepared for a HCU (Hand Control Unit), you have to connect the SCU to the port named "SCU".
3. Power on the device and wait for 30 seconds.
4. Connect the power cable and switch on the power
Attention: Power Consumption: 110-240V, 50/60 Hz, 16A
5. Power on the SCU. While booting the following is shown:

```
PLEASE WAIT.....INITIALIZING!  
Version: 1.20      IEEE-Addr1: 7
```

6. When the SCU is ready for working the following MAINSCREEN is shown:

```
Device          Pos.   Pol.  Angle  
->SCU  
  GuideRail      not referenced
```

In this example the main screen shows the SCU itself and a not referenced Cable Guide Rail CGR.

7. With "UP" and "DOWN" you can navigate the arrow "->" between the devices.

5) Menu of SCU

1. Navigate the arrow “->” to the SCU and press “ENTER”. Now there is a double arrow “=>” in front of the SCU. The double arrow “=>” always marks the chosen device (here SCU).

```
Device          Pos.   Pol.  Angle
=>SCU
=>GuideRail     2.50m
```

2. Press “MENU”. The menu screen opens.

```
----- CONTROLLER MENU -----
information
-> display contrast
IEEE addresses
```

With “UP” and “DOWN” you can navigate the arrow.

3. If you want to change the display contrast, go to “display contrast” with the arrow and press “ENTER”.
4. Change the contrast by pressing “UP” or “DOWN”. When finished press “ENTER” to confirm, then “EXIT”. You are back in the MAINSCREEN again.
5. For changing the IEEE-address repeat steps 4.1, 4.2 and 4.3, but choose “IEEE-address”.
6. Change the address with “UP” or “DOWN” and confirm with “ENTER”. Quit with “EXIT”, the MAINSCREEN is shown again

6) Moving a Turntable (Turn Device)

1. Navigate the arrow in the MAINSCREEN with “UP” or “DOWN” to the Turntable (Turn Device) and press “ENTER”. The double arrow marks him now as chosen device.
2. Press “REFERENCE”,

```
Device      Pos.   Pol.  Angle
SCU
=>Turn Table 90.1°
```

Then “ENTER”. The Turntable (Turn Device) is now slowly moving to his reference point, normally +90°.

```
Device      Pos.   Pol.  Angle
SCU
=>Turn Table 97.7°
new value   referencing...
```

3. When referencing is finished you will be able to move the Turntable (Turn Device) manually or with entering a new position.
Note: You must make a reference process if the Turntable (Turn Device) shows “not referenced”,
Referencing is also when the Turntable (Turn Device) is at a defined position.
4. Press “CW” and hold it, the Turntable (Turn Device) will move clockwise, but only up to his maximum limit, normally +400°. Press “CCW” and hold it, the Turntable (Turn Device) will move counter-clockwise, but only up to his minimum limit, normally -200°.
5. To move to a defined position press “ENTER”,

```
Device      Pos.   Pol.
SCU
=>Turn Table 90.0°
new value   90.0°
```


Input the new position, e.g. 360.

```
Device          Pos.   Pol.  Angle
SCU
=>Turn Table    90.1°
new value       360°
```

And press “ENTER” again. The Turntable (Turn Device) will move to his new position.

To move endless in clock wise direction input 999,
To move endless in counter clockwise direction input -999°.

```
Device          Pos.   Pol.  Angle
SCU
=>Turn Table    180.0°
new value       360.0°
```

```
Device          Pos.   Pol.  Angle
SCU
=>Turn Table    360.1°
```

6. With pressing, “STOP” while the Turntable (Turn Device) is moving he will brake and stop then.

7) Menu of Turntable (Turn Device)

1. When a Turntable (Turn Device) is chosen (double arrow =>) by pressing "MENU" you will enter the Turntable (Turn Device) menu. With "UP" and "DOWN" you can navigate to the individual points.

```
----- DEVICE MENU -----  
  
-> information  
   movement limits  
   Positioning sPeed
```

2. Navigate to "information" and press "ENTER". The device type, the serial number and the firmware version is shown.

```
----- DEVICE INFORMATION -----  
  
device type           0x400  
serial number         471070108  
firmware version      11.10
```

You cannot make any changes there.
Press "EXIT" and you will be back in the MAINSCREEN.

3. Go to the Turntable (Turn Device) menu again as explained in 6.1; navigate to "movement limits" and press, "ENTER". The first two lines are the hardware limits, normally +400° and -200°. You cannot change these hardware limits.

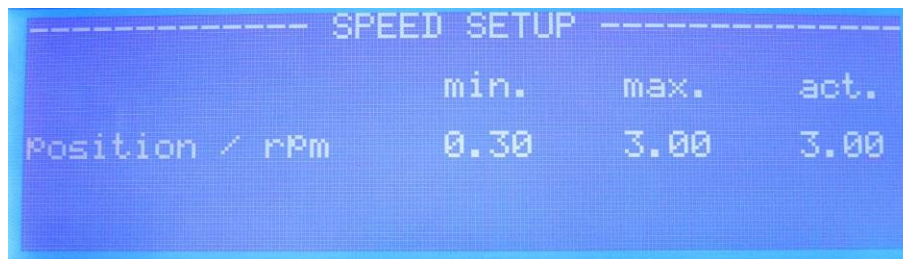
```
----- DEVICE MENU -----  
  
information  
-> movement limits  
   Positioning sPeed
```

4. Standard for the user limits is "no".

```
----- LIMITS SETUP -----  
  
hardware limit maximum      400.0°  
hardware limit minimum     -200.0°  
  
user limit maximum          no  
user limit minimum          no
```

You can type in user limits and confirm with "ENTER". With "UP" and "DOWN" you can navigate between user limit maximum and minimum.

5. To delete a user limit navigate to the according, input a higher (or lower) limit and confirm with "ENTER". Repeat this with the second user limit. Press "EXIT" to go back to the MAINSCREEN.
6. Go to the Turntable (Turn Device) menu again as explained in 6.1; navigate to "positioning speed" and press, "ENTER". You will see the possible minimal and maximal speed.

A screenshot of a terminal window showing the "SPEED SETUP" menu. The menu is displayed in a monospaced font on a dark background. The title "SPEED SETUP" is centered at the top, flanked by dashed lines. Below the title, there are four columns: "min.", "max.", and "act.". The first row shows "Position / rpm" with values 0.30, 3.00, and 3.00 respectively.

| | min. | max. | act. |
|----------------|------|------|------|
| Position / rpm | 0.30 | 3.00 | 3.00 |

You can change the actual speed by type in a value and confirm with "ENTER". Press "EXIT" to go back to the MAINSCREEN.

8) Trouble Shooting for Controller SCU

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

1. Check power supply – must be between 208V and 240V
2. Check both fuses at the backside of the controller
3. Check user limits and remove the limits, if not in use (see manual for controller)
4. Check fibre optic cables and connections (if possible change cables from a different device and check)
5. Use a short cable for connection directly to the device in the chamber
6. Disconnect the power supply of the device and the controller for approx. 1 minute; reconnect the power supply and carry out referencing

| Fault | Probable Cause | Suggested Remedy |
|--|--|--|
| Display does not light up | <ul style="list-style-type: none"> • LCD display not connected properly or display has malfunction | <ul style="list-style-type: none"> • Check all connectors of the display |
| Display lights up but no text is shown | <ul style="list-style-type: none"> • Wrong adjustment of the display contrast | <ul style="list-style-type: none"> • Check display contrast in the menu |
| Problems with IEEE interface to software | <ul style="list-style-type: none"> • Wrong software installed • Malfunction at the connector | <ul style="list-style-type: none"> • Update of software • Change of IEEE-connector |

Please contact our service department by:

Phone: +49 9606 9239130

Or by

Email: service@matur-gmbh.de

When contacting matur, please always provide the serial number of the products.

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 one year from date of shipment, if maintenance is done regularly. Standard maturo products include the following:

- Antenna Mast 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 or 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 works 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.

EG Konformitätserklärung gemäß EMV-Richtlinie 2014/30/EU
Declaration of Conformity in accordance with EMC guideline 2014/30/EU

Hiermit wird erklärt, dass das Produkt:
We hereby declare that the product:

| | |
|--|--|
| Produktbezeichnung: <i>Product:</i> | Controller SCU |
| Seriennummer: <i>Serial number:</i> | SCU/xxx/xxxxxxxx |
| Baujahr: <i>Year:</i> | 2015 |
| Hersteller: <i>Manufacturer:</i> | matur GmbH, Am Kalvarienberg 24, 92536 Pfreimd |

mit den Vorschriften folgender Europäischer Richtlinien übereinstimmt:
has been manufactured according to the regulations of the following European directives:

- 2014/30/EU Elektromagnetische Verträglichkeit – EMV-Richtlinie
- 2014/30/EU *Electromagnetic compatibility – EMC directive*

- 2014/35/EU Elektrische Betriebsmittelrichtlinie
- 2014/35/EU *Electrical equipment directive*

Grundlagen dafür sind folgende harmonisierte Normen:
Basis for that are the following harmonized standards:

- EN 55022:2010 Class B
- EN 61000-4-2:2009 Level 2/3
- EN 61000-4-3:2006 + A1:2008 + A2:2010 Level 2
- EN 61000-4-4:2004 + A1:2010 Level 2
- EN 61010-1:2010 Safety requirements for electrical equipment for measurement, control and laboratory use.

matur GmbH
Am Kalvarienberg 24
92536 Pfreimd
info@matur-gmbh.de
Telefon: +49 (9606) 923913-0
Telefax: +49 (9606) 923913-29

Pfreimd, den 20.05.2015



Gerhard Strehl, Managing Director

| | | |
|---------------------------------------|---|---|
| Firmenstempel <i>Company stamp</i> | Ort und Datum der Ausstellung <i>Place and date of issue</i> | Name, rechtsverbindliche Unterschrift <i>Name and signature of authorised person</i> |
|---------------------------------------|---|---|

GPIB commands for the Single Control Unit SCU



For Turntable TT & Turn Devices TD



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Chapter 1: GPIB-Bus commands for Turntables & Turn Devices

General information

- All outputs through the GPIB-Bus are five characters long, followed by Line Feed (0AH). Missing positions are filled with blanks (20H).
- All values are transferred in DG.
- The commands, values and units must be transferred in capital letters and separated by blanks.
- No more than 32 characters may be sent in one transmission.
- The Line Feed or the EOI can be used as an end character (CR will be ignored).

Registers

The GPIB-Bus interface of the control device has several registers available. By transmitting the register name, the register is made the current register. If the device is addressed as TALKER, it outputs the contents of the register set.

If a value has been loaded previously with LD, it is accepted into the next following register.

Input Registers

These registers can be assigned a value with the LD command. They can be readout when the register name is received and the control unit is then addressed as TALKER.

- WL - Wise Limit cannot be larger than 400°.
- CL - Counter-clockwise Limit cannot be smaller than -200°.
- NP - Next Position. Set point for the GO command.
- SP - Speed, valid numbers are 1 to 8.

Output Registers

These registers are only for readout of information.

- CP - Current Position
- BU - Busy Motor status
0: Motor is off
1: Motor is on

The BU register indicates if the motor and thereby also the turntable or turn device are currently moving.

For mechanical reasons, the motor cannot start immediately after the receipt of a start command.

Therefore it is necessary to wait until the turntable moves (BU = 1), before it is possible to enquire with BU whether the previous command has been completed. If the mast is already located in the desired position when a GO command is received, BU will nevertheless be set on 1 for approx. 0.5 sec.

Commands to Load the Registers

LD nnn DG - Load the value nnn into the register following.

Commands to Control the Turntable or Turn Device

CW - Moves the table clockwise until the limit is reached or a STOP command (ST) is send.

CC - Moves the turntable or turn device counter-clockwise until the limit is reached or a STOP command (ST) is send.

GO - Moves the turntable or turn device to the position which is in the set point register (NP).

ST - Stops the movement of the turntable or turn device.

Chapter 2: Error Messages

- E – P Power is sent after a loss of mains power
- E – S Syntax is sent when an invalid command is received
- E – V Value is sent when a value does not lie within the valid limits
- E – D Device is sent when the device no longer reacts, meaning that the motor does not move in spite of the control. It is also sent if the addressed device does not exist.

Chapter 3: General programming of the GPIB-BUS at MCU

Speed setting of a device

You can set speed 1 to 8 with the SP-Register. To change the speed of the turntable, make the following two steps:

Select the Turntable "LD 1 DV"

Write "LD 5 SP" sets the speed to five. The speed depends on the maximum speed of the device.

For example the maximum speed of the turntable is 2.0 U/min
 $(2.0 \div 8) * 5 = 1.25$ U/min is the new speed

The maximum speed of each device can be readout in the device-menu of the SCU.

Go to a new position

For setting a new position of the turntable make the following two steps:

Select the Turntable "LD 1 DV"

Write the command "LD 180.0 DG NP GO" (the turntable moves to 180 degree)

With the commands "CC" and "CW" it is possible to move the turntable to minimum and maximum limit.

"CC" – Turntable moves to minimum limit (e.g.: -200 degree)

"CW" – Turntable moves to maximum limit (e.g.: +400 degree)

For stopping the turntable make the following two steps:

Select the turntable "LD 1 DV"

Write the command "ST"

For setting a new position of the cable guide rail follow the same steps:

Except: Select the cable guide rail with writing "LD 2 DV"

Write the command "LD 300.0 CM NP GO" (the cable guide rail moves to 3.0 meter)

Readout the actual position of the device:

Select the device by writing "LD x DV". (x = 2 => Cable Guide Rail and x = 1 => Turntable)

Write "CP" (set the Pointer to the CP-Register)

Readout of six Bytes (applies to cable guide rail and turntable)

In general all registers can be readout in the same way.

E.g.: WL and the CL Register

| Device address | Device |
|----------------|------------------------|
| 1 | Turntable (TT) |
| 2 | Cable Guide Rail (CGR) |

matur GmbH
Am Kalvarienberg 24 o 92536 Pfreimd o Germany
Web: www.matur-gmbh.de



Notes