maturo

POSITIONING EQUIPMENT FOR EMC AND WIRELESS TESTING

WE MAKE THINGS MOVING

PRODUCT OVERVIEW

OUR COMPANY & TEAM

maturo is a global manufacturer of electromechanical positioning systems for EMC, automotive, radio and radar measurements. The product range includes:

- / Positioning Systems
- / Controller
- / Antenna Masts & Stands
- / Turntables of different size and load
- / Linear Positioner
- / Dynamometers for vehicle measurements
- / Special Designs of Positioning Systems
- / Open-Area test sites positioning equippment

All specifications of our products can be individualized according to customer requirements. In addition **maturo** provides a variety of customized positioning systems. Please contact our sales department for more information.

The design and manufacture of our positioning systems is carried out by our specially trained and highly qualified employees with decade-long experience.

OUR SERVICE FOR YOU:

- / Implementation of customized solutions.
- / Low-maintenance, reliable design of the products.
- / Fast response times and high availability.
- / Service by experts.
- / Innovative development and research.
- / Repair and service of HD (Heinrich Deisel) products and other positioning systems.


CERTIFICATE

The Certification Body
of TÜV SÜD Management Service GmbH
certifies that

maturo GmbH
Am Kalvarienberg 24
92536 Pfreimd
Germany

has established and applies
a Quality Management System for

Development, design, construction,
manufacturing and distribution of electro mechanic
positioning systems (special machinery).

An audit was performed, Report No. 707004808.
Proof has been furnished that the requirements
according to

ISO 9001:2008

are fulfilled. The certificate is valid from 2014-12-03 until 2016-01-08.
Certificate Registration No. 12 100 44862 TMS

Product Compliance Management
Munich, 2014-12-03

ZERTIFIKAT

Die Zertifizierungsstelle
der TÜV SÜD Management Service GmbH
bescheinigt, dass das Unternehmen

maturo GmbH
Am Kalvarienberg 24
92536 Pfreimd
Deutschland

für den Geltungsbereich

Entwicklung, Konstruktion,
Herstellung und Vertrieb von elektromechanischen
Positioniersystemen (Sondermaschinenbau)

ein Qualitätsmanagementsystem
eingeführt hat und anwendet.
Durch ein Audit, Bericht-Nr. 707004808,
wurde der Nachweis erbracht, dass die Forderungen der

ISO 9001:2008

erfüllt sind. Dieses Zertifikat ist gültig vom 2014-12-03 bis 2016-01-08.
Zertifikat-Registrier-Nr. 12 100 44862 TMS

Product Compliance Management
München, 2014-12-03

location Certificates

PRODUCTION

maturo - Everything from one source! Beginning with design and development right up to production. Our qualified staff produces highly complex electromechanical positioning systems for EMC, automotive, radio and radar measurements at our over 10,000 m² large company site with more than 4,500 m² production and office space. Quality at its highest stage. Made in Germany!

INSTALLATION & SERVICE

Our trained service engineers assemble our all-in-one systems directly on site. The maturo service team is on your duty worldwide.

Therefore installation, service and repairs can be realized quickly and flexible.

PRODUCT OVERVIEW

1. CONTROLLER

For the operation of our automatic positioning systems plenty of operating devices for any applications are available.

All controllers were designed in-house by maturo and undergo a process of constant development. Especially, our new controller generation 3.0 works with our in-house programmed software, the maturo control Application (mcApp), on an existing measurement PC.

Fully automatic remote control by measurement software of all well-known manufactures via GPIB or TCP/IP interface is ensured.

A software, which allows an automatic measurement procedure, can be programmed in all high-level programming languages like Python, Matlab, C++ or C#..

NCD

- / Controls up to eight devices
- / GPIB & LAN (TCP/IP) for remote control
- / USB interface
- / Works with most common EMC software

HCU

- / In combination with NCD or stand-alone
- / Operating directly inside the chamber
- / Shielded flexible control cable

FCU3.0

- / Controls up to four devices
- / LAN (TCP/IP) for remote control
- / In-house Software mcApp
- / Easy service and update capability via the HSU3.0

FCU3.0-S & FCU3.0-S-lite

- / Same functions as the FCU3.0
- / FCU-S: controls one device with multiple axes
- / FCU-S-lite: controls one device with one axis

TCU3.0

- / In combination with the FCU3.0 / FCU3.0 – S / FCU3.0-S-lite
- / Windows 10 Industrial Tablet
- / Can be used instead of an existing measurement PC
- / McApp preinstalled

INCLUDED AT EVERY

- / FCU3.0
- / FCU3.0-S
- / FCU3.0-S-lite

Handheld service unit (HSU3.0)

Maturo dongle

mcApp

PRODUCT OVERVIEW

2. ANTENNA MASTS

In our portfolio you can find manual, semi and fully automatic antenna masts for positioning of antennas for any applications and operation sites. Different measurement heights, load capabilities and range of motion are available.

Mainly high tensile plastics with low reflective dielectric constant are used for these products in order to minimize the influence of the antenna masts to the measurement results. Furthermore, the masts have a solid and low maintenance design.

Additionally, different types are available, for example high-precision versions or for outdoor use.

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

CAM

- Electrical height adjustment from 1 m to 6 m above ground level
- Pneumatic polarisation 0°/90°
- Load capability up to 12 kg

AM

- Electrical height adjustment from 1 m to 6 m above ground level
- Electrical polarisation 0°/90°
- Load capability up to 15kg

TAM

- Twin tower design
- Electrical tilt function up to 45°
- Electrical height adjustment from 1 m to 6 m above ground level
- Pneumatic or electrical polarisation 0°/90°
- Load capability up to 15 kg

BAM

- Electrical tilt function up to 45°
- Electrical height adjustment from 1 m to 6 m above ground level
- Pneumatic polarisation 0°/90°
- Load capability up to 15 kg

DAM

- Twin tower design for heavy antennas
- Electrical height adjustment from 1 m to 6 m above ground level
- Pneumatic or electrical polarisation 0°/90°
- Load capability up to 20 kg

PRODUCT OVERVIEW

3. ANTENNA STANDS

As an addition to our antenna masts, there is a variety of antenna stands in our product range. Equally to the masts, we offer manual, semi and fully automatic antenna stands for positioning of antennas for any applications and operation sites. Different measurement heights, load capabilities and range of motion are available.

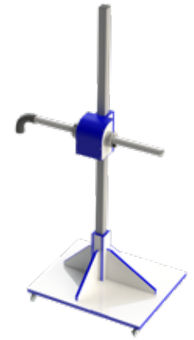
Mainly high tensile plastics with low reflective dielectric constant are used for these products in order to minimize the influence of the antenna masts to the measurement results. Furthermore, the stands have the same properties as the masts, e.g. a solid and low maintenance design.

Additionally, different types are available, for example high-precision versions or for outdoor use.

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

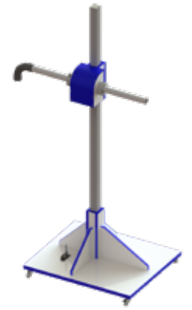
MAS

/ Fixed measuring height
/ Manual height adjustment from 0.7 m to 4 m above ground level
/ Manual polarisation
/ Manual tilt up to 30° available
/ Load capability up to 15 kg



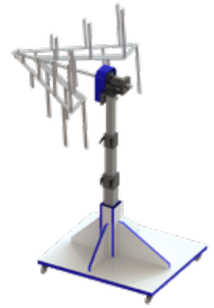
PAS

/ Fixed measuring height
/ Manual height adjustment from 0.7 m to 4 m above ground level
/ Pneumatic polarisation 0°/90°
/ Load capability up to 12kg
/ Capability of two or three antennas possible



ASP

/ Fixed measuring height
/ Manual height adjustment from 1 m to 2.2 m above ground level
/ Pneumatic polarisation 0°/90°
/ Load capability up to 15 kg
/ Direct mounting of long and heavy antennas



EAS

/ Fixed measuring height
/ Manual height adjustment from 1 m to 2 m above ground level
/ Electrical polarisation 0°/90°; 360° available
/ Load capability up to 15 kg

PRODUCT OVERVIEW

4. LINEAR POSITIONERS

Our product range also includes different types of linear positioners for the performance of various measurement methods. The system allows automatic measurements of the field homogeneity according to EN 61000-4-3 and IEC 61000-4-3, as well as measurements of the RFI power according to CISPR, EN, ANSI, VCCI and VDE standards.

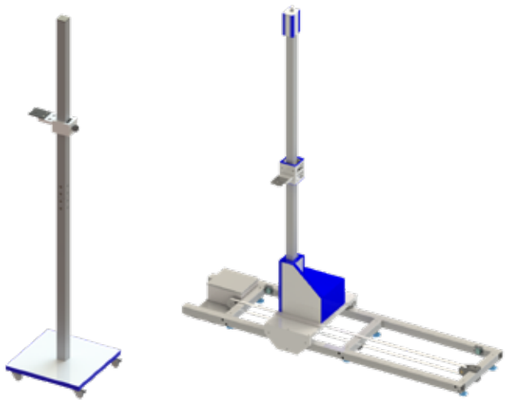
The devices are mainly made of plastics with low dielectric constants in order to minimize the influence of these devices to the measurement results.

CGR

- Track height 800 mm above ground level
- Moving range up to 6.0 m
- Load capability 15 kg

FPP

- Manual height adjustment from 0.8 m to 2.3 m above ground level available
- Moving range up to 6.0 m available
- Both axes with optional electrical adjustment
- Load capability 3 kg



LP

- For horizontal moving of antenna masts and stands
- Different range lengths available
- Load capability up to 300 kg

PRODUCT OVERVIEW

5. OTA/CTIA POSITIONING SYSTEMS

Our innovative OTA/CTIA positioning systems were especially developed for the smooth and accurate positioning of devices and antennas during tests. Both can be positioned in linear axes (vertical and horizontal) and in rotation axes (elevation, azimuth, tilt and polarisation), depending on customer requirements.

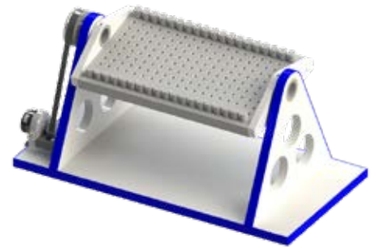
Each axis is available in different accuracy ratings. The rotation axes are available with an accuracy of up to 0.01° with a repeatability of up to 0.05°. The precision of the linear axes is available up to 0.01 mm. Furthermore, the positioners are available for a wide range of loads.

Additional, there are many accessories available, e.g. implementation of a trigger signal to enable on-the-fly measurement, rotary joints, hollow shaft slip ring in azimuth axes and much more.

These systems are compliant with CTIA, joint CTIA & Wi-Fi Alliance and 3GPP test plans and allow cellular (2G, 3G, LTE, LTE aggregation) and non-cellular (A-GNSS, WLAN, Bluetooth) OTA testing capabilities. All axes are also available as high precision variants. These systems are designed for high accurate antenna measurement capabilities for both near-field and far-field data acquisition and come up with 5G NR FR1 / FR2 OTA testing capabilities.

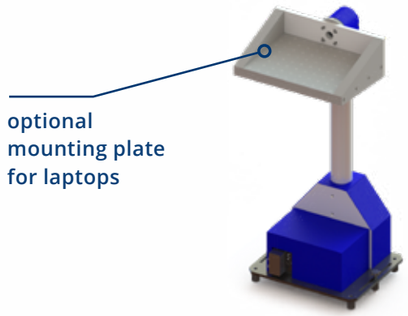
KE

- / Tilt device
- / Designed for radiated measurements on devices under test at horizontal rotation axis
- / Different types of devices can be mounted onto the tilting plate made of Rohacell
- / Clamping bolts, made of Rohacell, are integrated on the tilting plate which allows the fixing and adjustment of cables



TD

- / Designed for mobile phone measurements
- / Bracket made of Rohacell
- / Load capability up to 10 kg
- / Usually mounted onto a turntable (OTAP-System)



OTAP

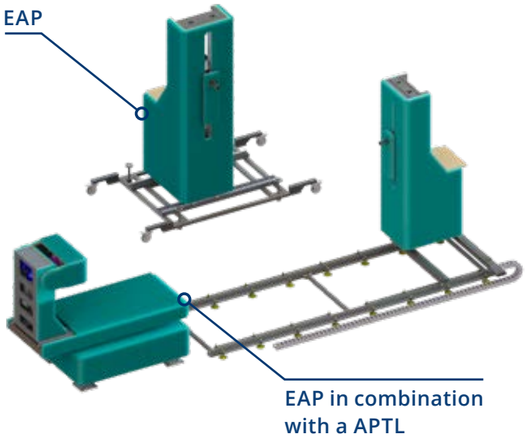
- / Over-The-Air Positioner
- / Vertical and horizontal rotation for 3D measurements
- / For three-dimensional over-the-air radiation measurements on handheld wireless devices, mainly mobile phones
- / Smooth rotation of test objects in both azimuth and elevation axis
- / Independent rotation of both axes

EP

- / Elevation positioner
- / Designed for measurements in electromagnetic absorption chambers at a fixed measuring height
- / Different measuring heights are available upon request
- / Positioning accuracy up to 0.05°
- / Load capability up to 50 kg, higher upon on request
- / Usually mounted onto a turntable (OTAP-System)

EAP

- Electrical Antenna Positioner for high accurate antenna measurement capabilities in both near-field and far-field data acquisition
- Antenna height and elevation axis electrically adjustable
- Linear movement in both axes (y and z) electrically
- Different load capabilities up to 50 kg
- Positioning accuracy up to 0.05°

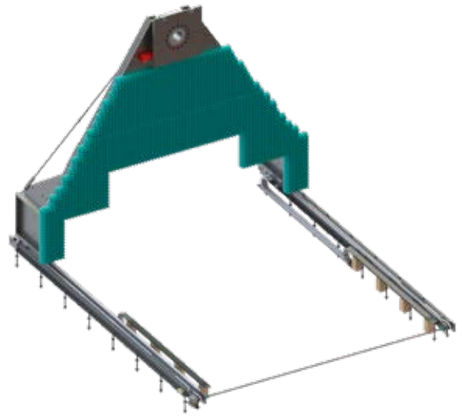


WPTC

- Spherical Conical-Cut system
- Compliant with CTIA, joint CTIA & Wi-Fi Alliance and 3GPP test plans
- Cellular (2G, 3G, LTE, LTE carrier aggregation) and non-cellular (A-GNSS, WLAN, Bluetooth) OTA testing capabilities
- Accuracy sufficient for a frequency coverage up to 18 GHz
- Positioning accuracy up to 0.05°
- Ideal for small Antenna-Under-Test (AUT) like mobile phone devices, handhelds or CPEs to perform high-speed measurement
- Different sizes available

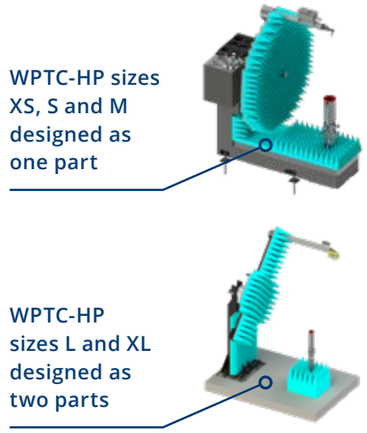
PWC

- Plane Wave Converter
- For 5G massive MIMO base station testing
- Designed for instantaneous measurements of far-field characteristics at close distance
- For real-time radiated power and transceiver measurements
- Polarisation angle 360°
- Linear movement electrical or manual



WPTC-HP

- Spherical Conical-Cut system
- High accurate antenna measurement capabilities for both, near-field and far-field data acquisition
- 5G NR FR1 / FR2 OTA testing capabilities
- Accuracy sufficient for a frequency coverage up to 90 GHz
- Positioning accuracy up to 0.03°
- Ideal for small Antenna-Under-Test (AUT) like mobile phone devices, handhelds or CPEs to perform high-speed measurement
- Ideal for heavy Antenna-Under-Test (AUT) for example for military application
- Different sizes available

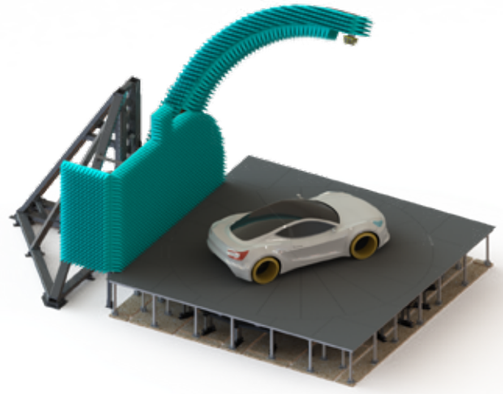


APTL

- Azimuth, polarisation, tilt and linear positioner
- Spherical Great-Circle Cut system
- High accurate antenna measurement capabilities for both, near-field and far-field data acquisition
- 5G NR FR1 / FR2 OTA testing capabilities
- Accuracy sufficient for a frequency coverage up to 90 GHz
- Positioning accuracy up to 0.05°
- Ideal for Antenna-Under-Test (AUT) like satellite dishes or massive MIMO base station-antennas
- Load capability up to 90 kg

SG-TT-HP

- High-Precision Spherical Gantry and Turntable
- Spherical Conical-Cut system
- High accurate antenna measurement capabilities for both, near-field and far-field data acquisition
- Positioning accuracy up to 0.01°
- 5G NR FR1 / FR2 OTA testing capabilities
- Ideal for Antenna-Under-Test e.g. installed in vehicles
- Different sizes available



PRODUCT OVERVIEW

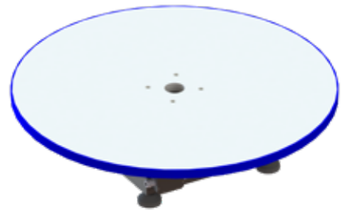
6. TURNTABLES

Maturo offers a wide range of different turntables for EMC -, Automotive – and Radar Cross Section measurements for use in semi- and full-anechoic chambers or open area test sites.

Versions with diameters from 0.3 m up to 16.0 m and a load capability from 10 kg up to 100 tons are available.

TT-PF

- Low-profile, free-standing design
- Installation on surface floor in electromagnetic absorption chambers
- Cover plate (made of integral skin-foam sheets made of PVC) diameter up to 1.0 m
- Rotation angle from -200° to 400°
- Accuracy up to +/- 0.1°
- Load capability up to 150 kg



TT-WF

- Low-profile, free-standing design
- Installation on surface floor in electromagnetic absorption chambers
- Cover plate (made of laminated wood) diameter up to 2.0 m
- Rotating angle from -200° to 400°
- Accuracy up to +/- 0.1°
- Load capability up to 1000 kg

TT-WF-I

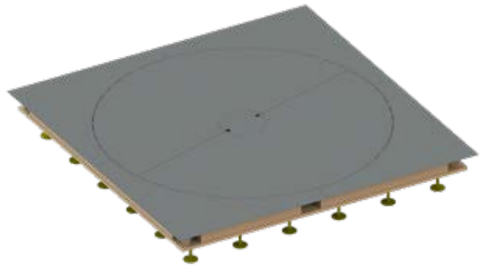
- Low-profile, integrated in chamber floor of fully anechoic chambers
- Installation of ferrites directly on the turntable cover
- Cover plate (made of laminated wood) diameter up to 2.0 m
- Rotating angle from -200° to 400°
- Accuracy up to +/- 0.1°
- Load capability up to 1000 kg

TT-WI

- Low-profile, integrated in chamber floor fully anechoic chambers
- Cover plate (made of laminated wood) diameter up to 2.0 m
- Rotating angle from -200° to 400°
- Accuracy up to +/- 0.1°
- Load capability up to 1000 kg

TT-SI

- Low-profile, integrated in chamber floor of semi anechoic chambers
- Cover plate (made of stainless steel) diameter up to 2.0 m
- Rotating angle from -200° to 400°
- Accuracy up to +/- 0.1°
- Load capability up to 2000 kg

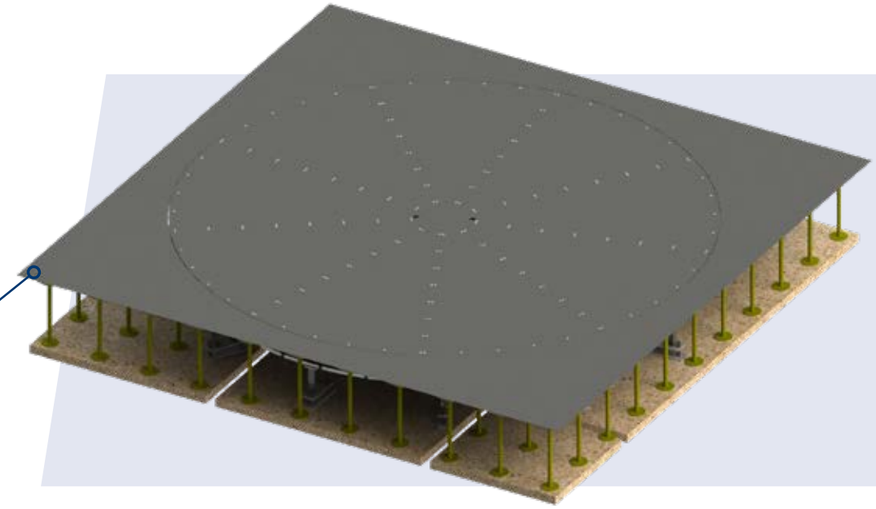


TT-heavy duty

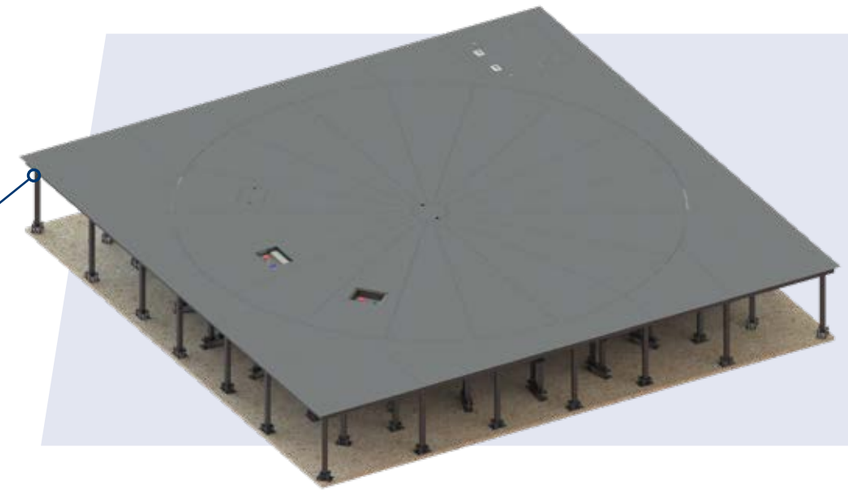
/ Integrated in chamber floor of semi anechoic chambers electromagnetic absorption chambers
/ Cover plate (made of stainless steel) diameter up to 16.0 m
/ Rotating angle from -200° to 400°, endless also possible
/ Accuracy up to +/- 0.01°
/ Concentricity tolerance within +/- 3 mm
/ Elevation tolerance less than 5 mm
/ Rotating speed adjustable up to 2 rpm (depending on the diameter)
/ Load capability up to 100 tons
/ Solid and low maintenance design
/ Long-lasting, maintenance-free contact system

Open Area Design

/ For flush mounted installation in open area test sites (OATS)
/ Cover plate is made of galvanized or stainless steel
/ Drive unit and electronic components water-resistant
/ Temperature working range: from -20 °C to +40 °C

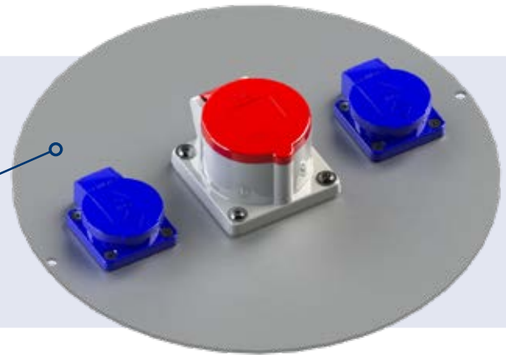


TT3.0



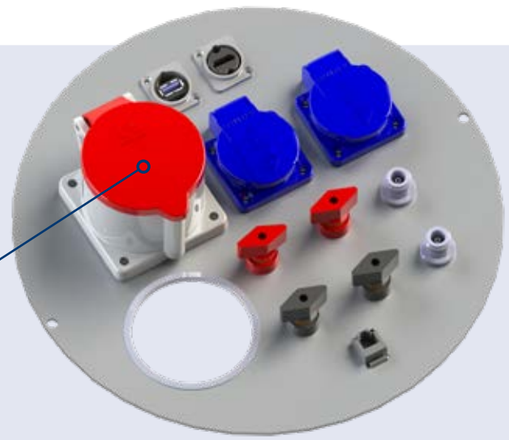
TT6.0

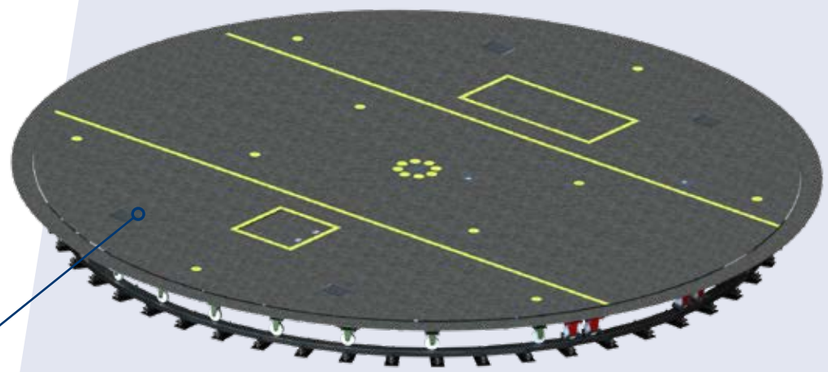
Standard center plate included to every turntable



Other connectors available upon request:

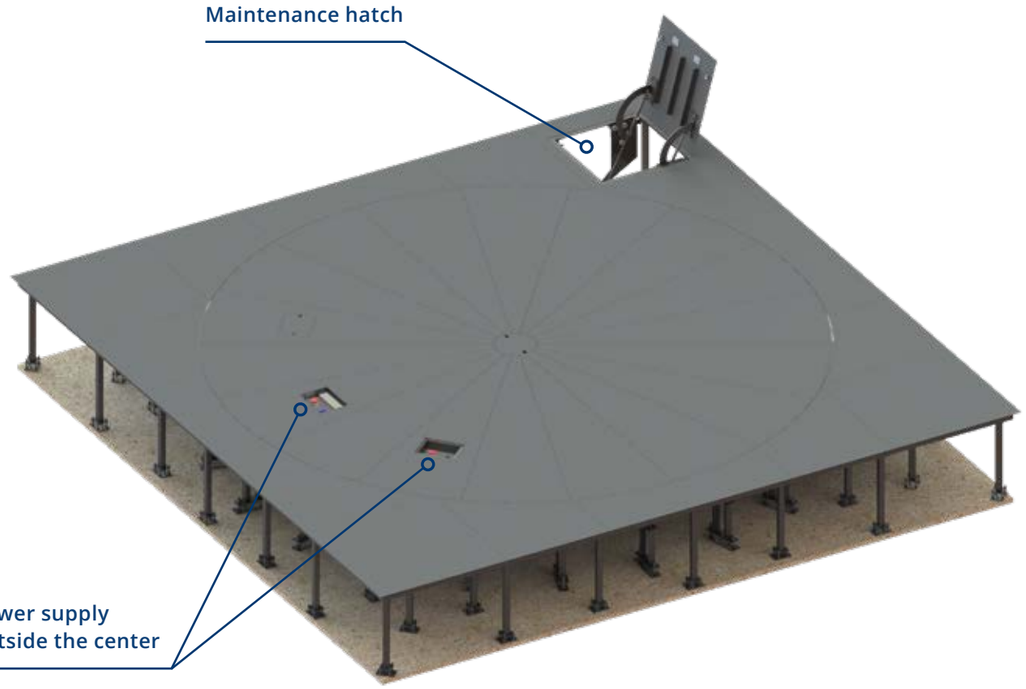
Customized center plate example





TT14.0 for open area test side with heavy duty area and 4 ventilation hatches for drying the pit

OPTIONS FOR HEAVY DUTY TURNTABLES, FOR EXAMPLE:



Continuous rotation with integrated slip rings or rotary joints

Power supply for EUT with slip ring or rotary joint

Prevents cables from twisting and damage while rotating.

Different versions of slip rings/rotary joints are available.

Integrated exhaust extraction system

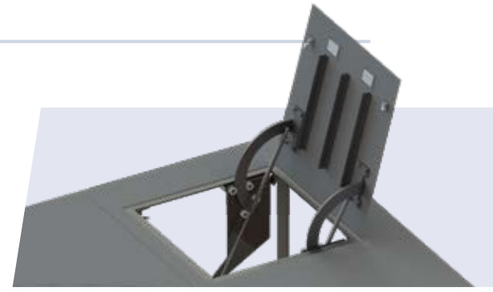
The exhaust extractions system includes the following components:

- / Movable exhaust pipes mounted above the cover; the pipe is attached rear left and rear right to the vehicle area
- / Exhaust pipe fixed underneath the cover; provided up to the honeycomb in the shielded wall of the pit
- / Adapters to connect the exhaust pipe to the honeycomb

Maintenance hatch

Service hatch available at the turntable border, which allows easy access from above the turntable for maintenance works. The opening is covered with a removable stainless-steel cover and is equipped with a ladder.

Pneumatic open and close operation available

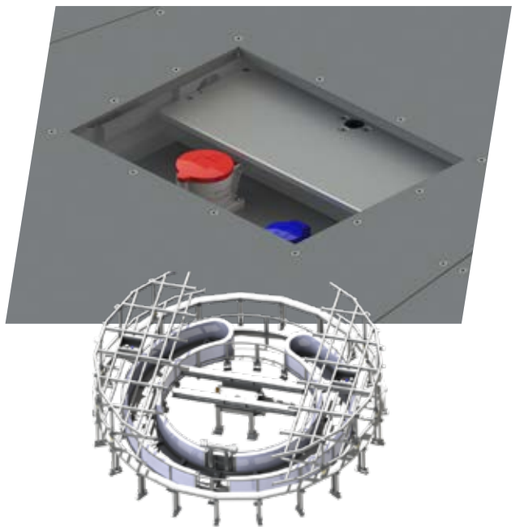


External power supply outside the center with energy chain

The power supply for the EUT is distributed by an energy chain (movable cable duct) to the connection boxes (access panels). **Power supply** outside the turntable centre is provided by access panels, which are located along the perimeter of the turntable for easy access. It is possible to integrate various types of sockets and connectors for the power supply of the EUT.

The state-of-the-art energy chain is equipped with wheels and rollers at the bottom and the side walls for a smooth and maintenance free running.

Pneumatic open and close operation of the power supply cover available



Integrated cooling fan system

Shielded fans provide a sufficient cooling for the motor of the vehicle under test.

A removable plastic air scoop on top of the turntable is used to detour the airflow.

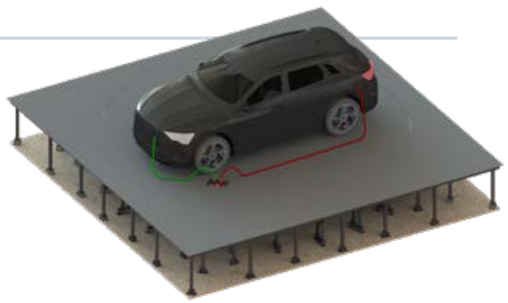
The fan speed can be set either proportional to the roller speed (up to 80 km/h) or to a constant speed.

Installation of the cooling fans is below the cover

- / Wind speed up to 80 km/h
- / Air flow up to 20.000 m³/h

Vehicle charging possibility

Our external power supply outside the turntable center can also be equipped with connectors that are powerful enough for charging vehicles on the turntable.



PRODUCT OVERVIEW

7. DYNAMOMETERS

Maturo offers a wide spectrum of free-standing and chassis dynamometers for EMC/EMI measurements of all kind of commercial and military vehicles. Additionally, it is possible to perform functional and continuous testing, drive and break analysis as well as testing of ABS, ESP etc. to vehicles ranged from bicycles up to trucks. The free-standing versions can be used either on top of the chamber floor or on a turntable. The integrated types are designed for a flush-mounted installation integrated either in the chamber floor or in a turntable.

The dynamometers are equipped either with independently passive or independently active axes, which can be linked mechanically or electrically, respectively. Therefore, they are designed for rear/front or all wheel driven vehicle.

A velocity of up to 200 km/h with an acceleration/deceleration of up to 2g is possible. Different operation modes, for example road simulation according to the A-B-C-parameter method, ensure a wide usability.

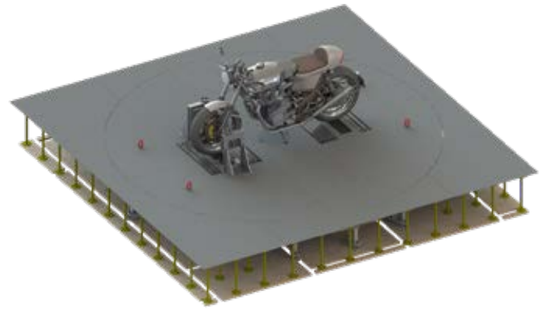
Tire safety covers, fixing points incl. lashing straps are included to each dynamometer.

DYN_E-Bike

/ For measurements of E-Bikes and Pedelecs according to 15194:2018 for EPACs (Electrically Power Assisted Cycles)

TT3.5-1t-FR-DYN

/ Dynamometer with two axes (two single rollers) for motorcycles with CD-MOT – clamping device for motorcycles



DYN4WD

/ Dynamometer with two active axes (four roller pairs) designed.

/ Also available as free-standing version

TT7.5-5t-DYN-4WD

/ Dynamometer with two active axes (four roller pairs) integrated in a turntable with integrated cooling fan, exhaust extraction system, external power supply and a maintenance hatch

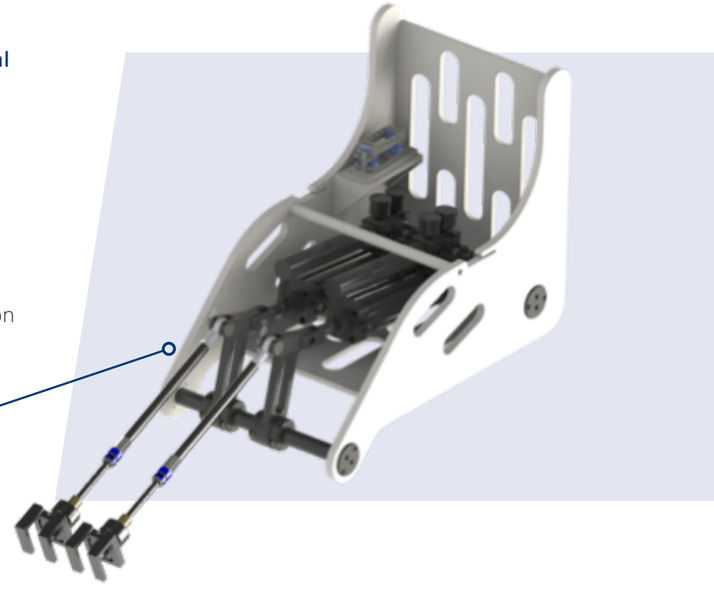
FEATURES AND OPTIONAL ACCESSORIES FOR DYNAMOMETERS, FOR EXAMPLE:

Operating modes

- Recuperation mode: The dynamometer runs with constant speed, to load vehicle batteries for example. The values for speed, acceleration and deceleration can be entered.
- Gradient mode: Individual movement profiles, which can be set for each wheel independently
- Road simulation: The resistive torque can be adjusted with different parameters, like uphill/downhill angle, vehicle weight, or wind force factor. For uncomplicated handling, the operation software suggests typical values for the resistive torque based on the entered vehicle weight.
- Roll blocking mode for easy setup of the vehicle
- ESP/ABS mode (optional): Different torque on rollers for testing the ESP and ABS function

Robot R – AB for accelerator and brake pedal

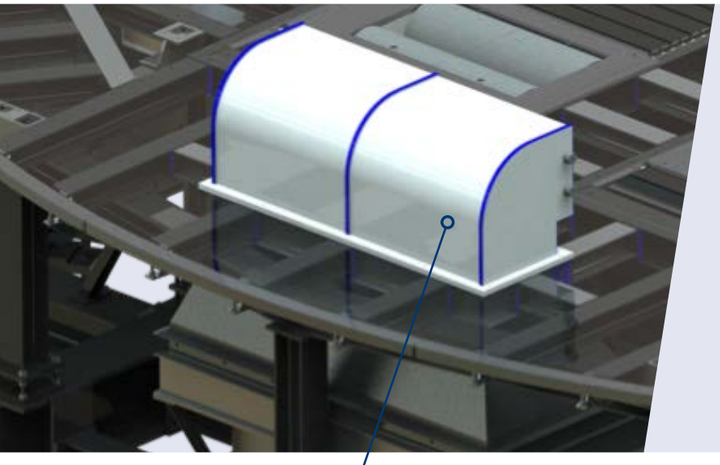
- Remote controlled vehicle driving on chassis dynamometer for EMC tests
- Actuation of pedal positions to external, analogue setpoints
- Quick snap–in mechanism of pedal actuator for individual settings
- Easy mounting in vehicle
- No EMC emission due to pneumatic operation



R-AB, Robot for accelerator and brake pedal

Stand-alone or turntable integrated cooling fan system

- Adjustable guide plates for wind direction
- Different maximum air flows and maximum wind speeds available, e.g. 20 000 m3/h and 80 km/h
- Wind speed manually adjustable or automatic adjustment depending on vehicle speed
- The stand-alone option is equipped with four wheels for easy movement and made of plastic and wood.
- The integrated option is also removable (resulting hole can be covered by the incl. stainless steel plates) and the materials above the turntables are plastics.



In turntable integrated cooling fan

Mobile cooling fan

CD-MOT for fixation of motorcycles at front wheel

- Manual adjustment to be able to fix different sized wheels
- Made of aluminum for a strong and rigid fixation

CD-MOT for fixiation of motorcyles

PRODUCT OVERVIEW

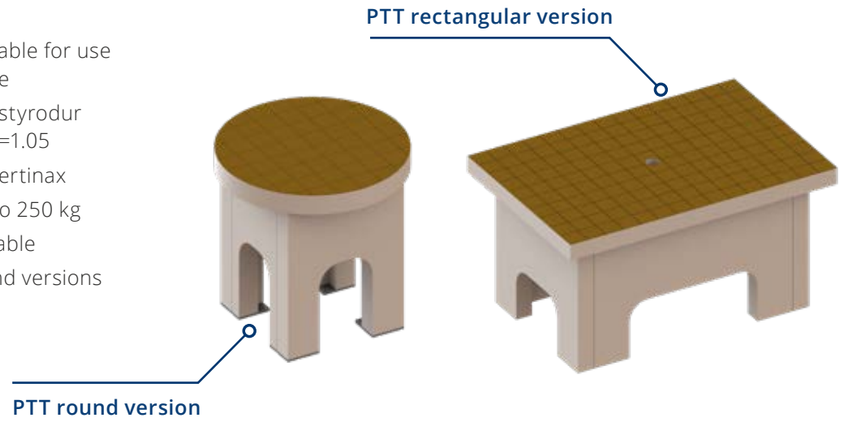
8. TEST TABLES

Maturo also offers a wide range of different test tables as accessories for testing laboratories, which are either made of non-conductive material with a low dielectric constant ϵ_r or of wood with a conductive metal tabletop. Versions according to IEC/EN 61000-4-2, CISPR 25 or MIL-STD-461 standard are available.

All test table can be manufactured individually according to customer's demand.

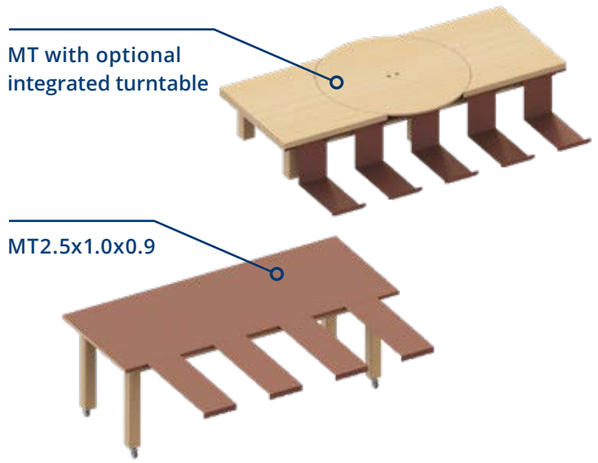
PTT

- Free standing test table for use on top of a turntable
- Materials available: styrodur ϵ_r=1.2 or Rohacell ϵ_r=1.05
- Material tabletop: pertinax
- Load capability up to 250 kg
- Different sizes available
- Rectangular or round versions



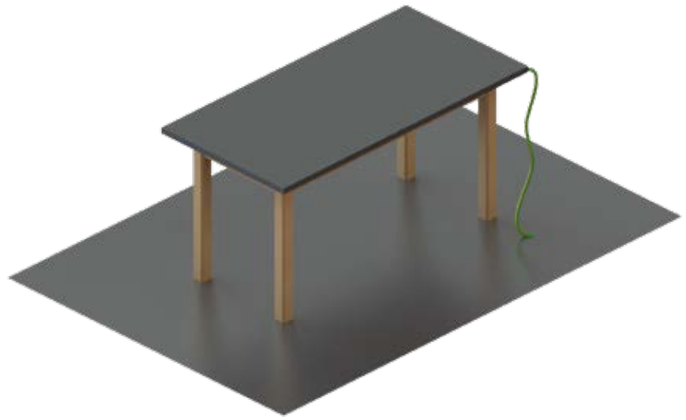
MT

- Free standing test table made of laminated wood according to CISPR 25
- Different tabletop materials available, e.g. copper, stainless-steel, aluminum
- Equipped with castors for effortless moving in the chamber
- Load capability up to 750 kg
- Different sizes available
- Combinable with an integrated turntable



ESD

- Free standing test table made of laminated wood according to IEC/EN 61000-4-2
- Material of tabletop and ground plane: aluminum
- Load capability up to 100 kg
- Different sizes available



PRODUCT OVERVIEW

9. CUSTOMIZED / SPECIAL SOLUTIONS

Maturo is well-known and specialized for rapid and uncomplicated realization of individual customer requirements and wishes.

Please contact us regarding your application and requirement, so that we can seek together for common solutions.

For example, some reference projects:

HAM 13.0-20kg-E

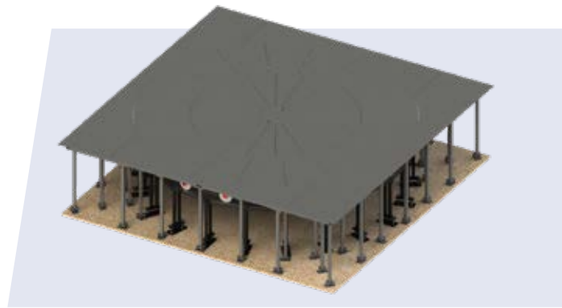
- Heavy duty antenna mast with a measuring height from 1.0 m to 13.0 m
- Suitable in magnetic absorption chambers
- Material: plastic and reinforced fibreglass except base plate and drive mechanism (max. 0.4 m above ground level)
- Load capability 20 kg
- Positioning speed adjustable up to 10 cm/s
- Positioning accuracy +/- 1 cm

TT 11.0-13t-DYN-6WD

- Heavy duty turntable with integrated dynamometer with 3 active axes (6 roller pairs)
- Diameter 11.0 m
- Load capability 13 tons
- Rotating speed up to 1.5 rpm
- Positioning accuracy +/- 0.1°
- Vehicle speed up to 150 km/h
- Acceleration/deceleration up to 1.5g

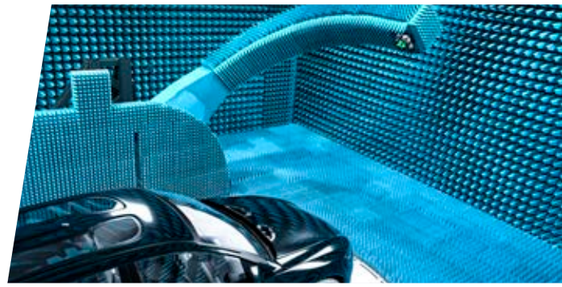
DTT3.0/5.0-10t

- Two heavy duty turntables integrated in one turntable
- Independent rotation of either inner turntable only or both turntables together
- Inner diameter 3.0 m (independent operation)
- Load capability up to 10 tons
- Outer diameter 5.0 m (together with inner turntable)



TT6.0-5t-SG4.5-10kg-HP

- Heavy duty turntable in combination with a spherical gantry for antenna measurements
- Diameter of turntable 6.0 m
- Load capability 5 tons
- Rotating speed up to 2 rpm
- Positioning accuracy +/- 0.01°
- Radius of elevation arm 4.5 m with a height adjustment of the pivot point from 0.6 m to 2.0 m above turntable
- positioning accuracy +/- 0.01°



maturo GmbH

Am Kalvarienberg 24
92536 Pfreimd - Germany

phone: +49 (0) 9606 923913-0
fax: +49 (0) 9606 923913-29

info@maturo-gmbh.de
www.maturo-gmbh.com