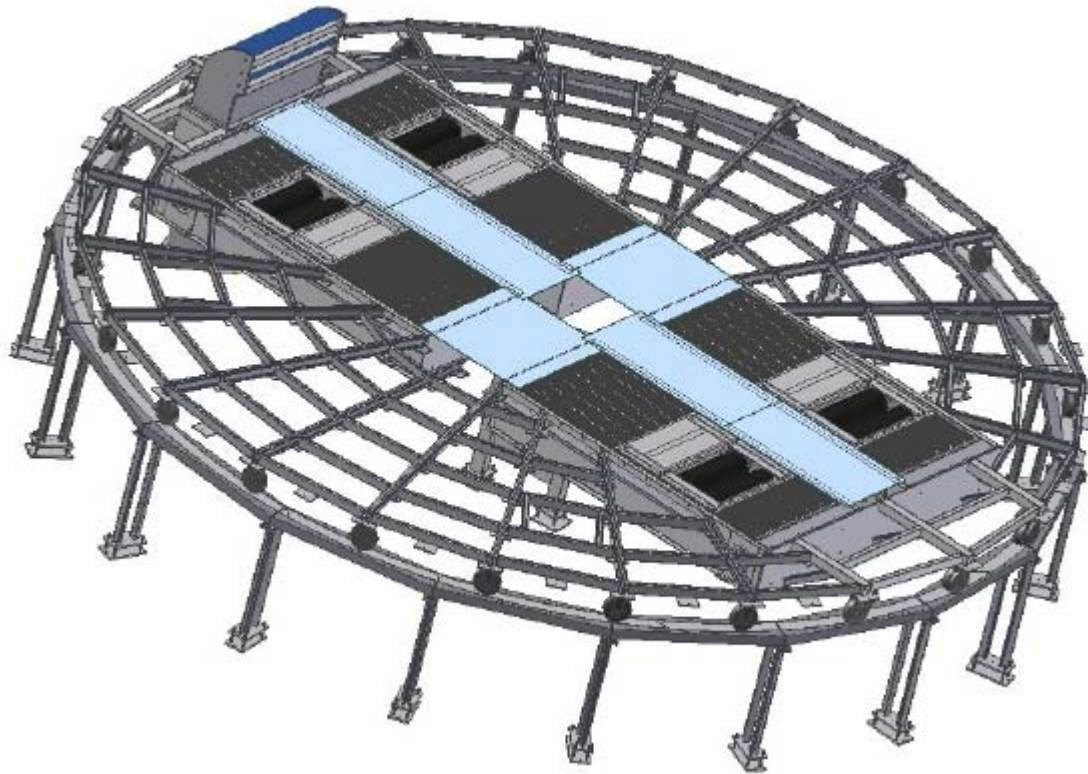




Rainford EMC Turntable TT 5.0-3t-DYN with Dynamometer DYN 4WD_I-2t



Specifications:

- **Integrated into turntable**
- **For use in anechoic chambers for EMI and EMC measurements**
- **2 active axles, for cars with rear/front—or four wheel drive**
- **4 independently controllable roller pairs**
- **Integrated into turntable or Groundplane**
- **Independent rotation of dynamometer and turntable**
- **Cooling fan, robot system, exhaust extraction system, and more available**

Information presented enclosed is subject to change as product enhancements are made regularly. Please contact us for current specifications. Pictures included are for illustration purposes only and do not represent all possible configurations.



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Rainford EMC Dynamometer DYN 4WD_I-2t



Technical Data:

Permissible axle load	1000 Kg (total 2000 Kg)
Max speed	100 km/h
Speed measurement accuracy	+/- 1 km/h
Wheelbase between the front wheels	Min. 1000mm Max. 2000mm
Wheelbase between the front and rear wheel	Min. 1800mm Max. 2700mm
Diameter car wheels	Min. 300mm Max. 800mm
Diameter rollers (4 roller pairs)	240mm

Specifications: Active axles

4 Drive/brake AC motor generator	each 11kW (Siemens)
4 Vector frequency inverter	each 15kVA (Siemens)
Voltage/current consumption	2 x 380V/63A/3-phase
4 Break resistors cooled by fan	
Connected to the E.U.T. filtered power socket	1 CEE type
Wiring	4w 10mm ²



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Acceleration	Max. 5m/s^2 (0.5g)
Deceleration	Max. 5m/s^2 (0.5g)
Speed measurement and control accuracy	+/- 1km/h
Controlled via fibre optic link	

Emission:

Less than 6 dB the limits of CISPR 12

Frequency range

150kHz—1GHz

Measuring point

1m above the floor level

5m distance to the table centre

Immunity:

Continuous field strength

200V/m

Transient field strength

600V/m

Frequency range

10kHz—18GHz

System Controller:

PC with serial communication to the dynamometer and Dynamo-Software

Brief Description:

General:

The Dynamometer DYN 4WD_I is constructed as a chassis dynamometer, which can be integrated into a turntable. Two active elements are used for vehicles with rear/front or four-wheel drive. The four roller pairs are independently operational. Each vehicle wheel is driven by a separate motor/generator system. It can be used for acceleration/retardation and in an endurance mode.

EMI/EMC:

The Dynamometer DYN 4WD_I is prepared to be used in an anechoic chamber for EMI and EMC measurements. All electronic components are located in a separate box. Which is shielded, and radio interference suppressed. The RF-Emission is less than 10 dB under limit 'B' on CISPR 12. The immunity against continuous field strength up to 200V/m is guaranteed.

Control Unit:

Each active element has two micro controller to control the frequency inverters and for the speed measurement system. The element is connected to the system controller via fibre optic links. The system controller PC is equipped with an IEEE interface to be connected to a host computer. Forward/backward turning and acceleration/retardation is programmable, speed profile can be created.



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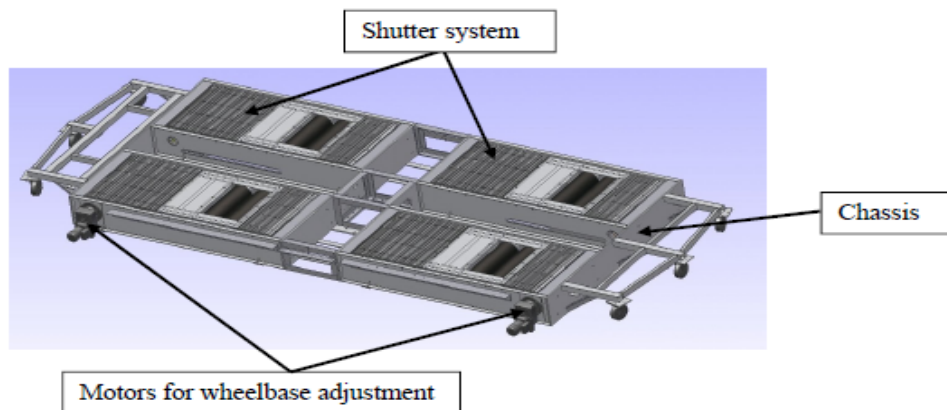
Figure: Principle of Control Unit

Safety and Emergency Function:

The maximum speed is limited by inverter function controller and by the internal micro controller. The temperature on the motors and inside the electronic box is being watched. Two emergency switches are located close to the stand and in the control room. In case of an emergency, the main power will be switched off.

Structure:

The 4 independent roller pairs of the dynamometer are integrated into a 'self-contained' frame, which minimizes the dynamic energy output to the turntable. The frame itself is placed into the turntable as pre-assembled assembly group for an easy installation of the system.



Rollers:

The rollers are static heated up to 2000 rpm and flame-coated.
Balance quality: Q 2.5 according to VDI 2060



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Rainford EMC Dynamometer DYN 4WD_I-2t

Wheel Base:

Independent adjustment of the front and rear axle allows to adjust the position of the vehicle in respect to the centre of the turntable.

Adjusting speed: approx. 20mm/s

Positioning accuracy: +/- 2mm

Operation of the wheel base adjustment is only possible at a standstill of the dynamometer.



Figure: Motor for wheelbase adjustment

Shutter system in track area:

An overlapping 'roller-type shutter' connection between the axles avoid gaps at the surface in every position of the wheelbase.

Each element is connected with conductive material to the turntable surface and the next element.

The maximum permissible axle load in the track area is 1000 Kg.



Figure: Shutter System



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Rainford EMC Dynamometer DYN 4WD_I-2t

Fixing elements:

The system is equipped with four lashing straps to fixing of the vehicle while running. Spring hooks allow an easy connection to the four fastening bolts. The straps are made of electrically neutral material.



Figure: Fixing System

Cooling fan system:

Shielded fans provide a sufficient cooling for the tyres and 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 60 km/h) or to a constant speed.

Installation of the cooling fans is below the cover

Wind speed: 60 km/h

Air flow: 10.000 m³/h



Figure: Cooling fan system



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Rainford EMC Dynamometer DYN 4WD_I-2t

Software for the Dynamometer:

The included software contains the following functions:

- Emergency stop
- Start cycle / stop cycle
- Speed control of the ventilator
- Speed control of the rollers
- Force at the rim (in Nm)
- Distance gone from the start of the cycle (in km)
- Cycle recording (profile)

To allow the following test cycles:

- Constant velocity
- Velocity gradient
- Street simulation
- ABS, ESP testing

The software includes:

- PC with Pentium processor
- Screen
- Keyboard, mouse and the necessary hardware

Utility Requirements for the System

1. Filters: the following filters have to be provided by the chamber manufacturer for the operation of the system.
 - 2 x 380V / 3-phase / 63A for the dynamometer
 - 1 x 380V / 3-phase / 32A for the turntable
 - 1 x 230V / single-phase / 16A for the cooling fan system
2. Control lines: fibre optic control lines and feed troughs through the shielded are included.
3. Compressed air: (Optional in combination with the robot)

The requirement for compressed air is as follows:

- Air pressure: 6 bars
- Capacity: approx. 0.4m³/h



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Rainford EMC Turntable TT 5.0-3t-DYN



Technical Data:

Diameter	5.0m
Payload	3.000Kg (additional to dynamometer)
Height	1.5m
Material cover plate	Stainless Steel
Rotating speed adjustable between	0.2—1.3 rpm
Positioning accuracy	better +/- 1°
Rotating angle	+/- 200° (total 400°)
Control cable	Fibre optic lines
Remote control via	IEEE interface
Turntable drive	Helical-bevel gear
Motor	Asynchrony motor, frequency inverter
Drive unit	Shielded and radio interference suppressed 6 dB under EN55022 (CISPR22) Class B



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Rainford EMC Turntable TT 5.0-3t-DYN

Current consumption	Max. 32A
Voltage, current consumption	380—400V, 50/60Hz, 3-phase
Concentricity tolerance	+/- 3mm
Elevation tolerance	less than 5mm
Ground plane connecting every	50mm
Square form environment (for easy connection to ground plane)	5.5 x 5.5m
Temperature working range	-10°C...+40°C
Accessories	Interface to NCD Controller 1.5m power supply cable Service manual

Brief Description:

The turntable TT 5.0-3t-DYN is especially designed for flush mounted installation at intermediate levels in electromagnetic absorption chambers. The framework design allows the possibility to integrate a chassis dynamometer.

A 380 mm diameter opening in the centre of the turntable provides the capability to insert power supply for testing.

The IEEE 488.0 (GPIB) bus provides an additional control option for all functions, when operated with the NCD controller.

Movement:

The rotation of the turntable can also be carried out while the chassis dynamometer is in operation. The angle is measured by a position encoder.

Limit switches:

The turntable is equipped with a limit switch and positioning switch system to guarantee the exact positioning of the turntable. An 'overturning' of the system is prevented by using limit switches.



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Rainford EMC Turntable TT 5.0-3t-DYN



Figure: Limit switch system

Safety for EUT:

For the safety of the EUT, the turntable is equipped with an acceleration/deceleration function for start and stop ramps to avoid jerky movements.

Emergency switch:

The turntable is equipped with an integrated emergency switch, which can be connected at the turntable perimeter.

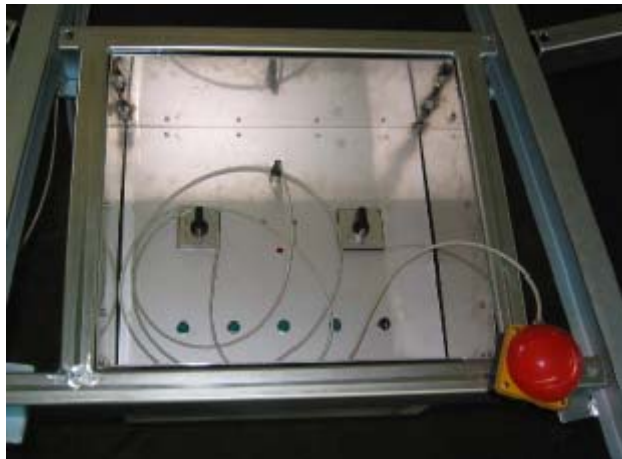


Figure: Emergency switch



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Connection to the ground plane:

Long-lasting, maintenance-free contact system to the ground plane is provided.

Material: hollow core copper beryllium tubing.

Details of the connection to the ground plane have to be discussed with us at the chamber design section.



Figure: Contact system between the turntable and to the ground plane

Covering:

The covering is made of stainless steel; the gap between the turntable and the ground plane should be less than 5mm. The radial run out is within a tolerance of ± 3 mm.

The height differences are within a range of 10mm or better.



Figure: Level system of turntable for height adjustment

Turntable structure:

Solid welded steel construction; parts are assembled with screws (for easy transportation). A framework design allows an easy installation of the dynamometer also if the dynamometer will be installed later on.



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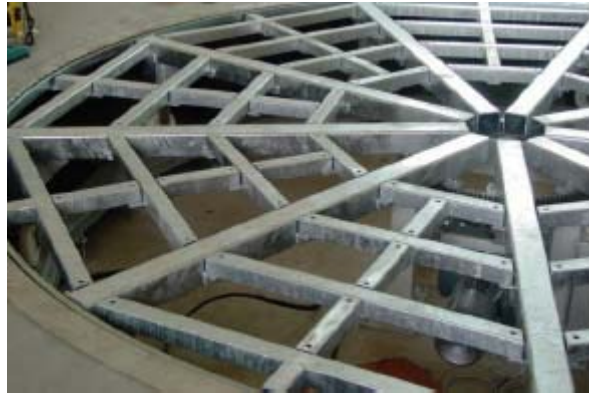


Figure: Turntable structure made of solid welded galvanised steel

Power Supply for EUT:

The power supply for the EUT is distributed by an energy chain (movable cable duct) to the connection boxes (access panels). The access panels are located at the perimeter of the turntable for easy access. Power supply outside the turntable centre provided by 2 access panels with a size of 0.4m x 0.4m; connectors tbd.



Figure: Principle of energy chain



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Exhaust extraction system:

The exhaust extraction 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
- Fixed 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

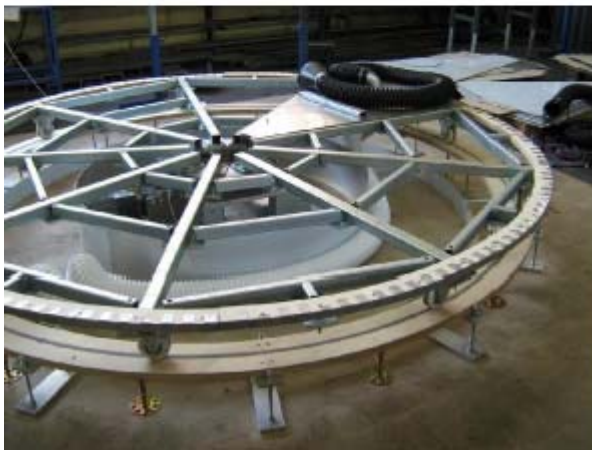


Figure: Principle of exhaust gas extraction system



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