

Test Systems for a Clean and Safe Environment



# Vehicle/Components EMC Test Stands EMC Universal DC/AC Charging Box



**Mobility is our DNA**  
**Sustainability our Motto**



# New Groundbreaking Test Systems for E-Mobility

AIP plans and manufactures individual test systems for development and production centers for many of the well-known vehicle manufacturers in Germany and abroad. Our claim is technology- and service leadership in the field of vehicle testing technology.

State-of-the-art, environmentally friendly production techniques and the constant further development of our products and services create a prominent level of customer satisfaction and trust. We are in demand and valued internationally for this.

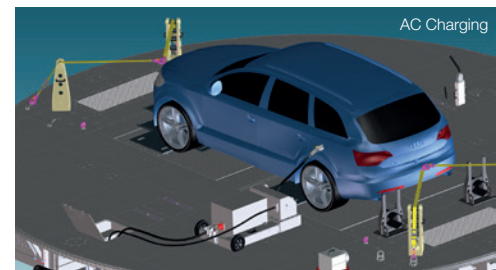
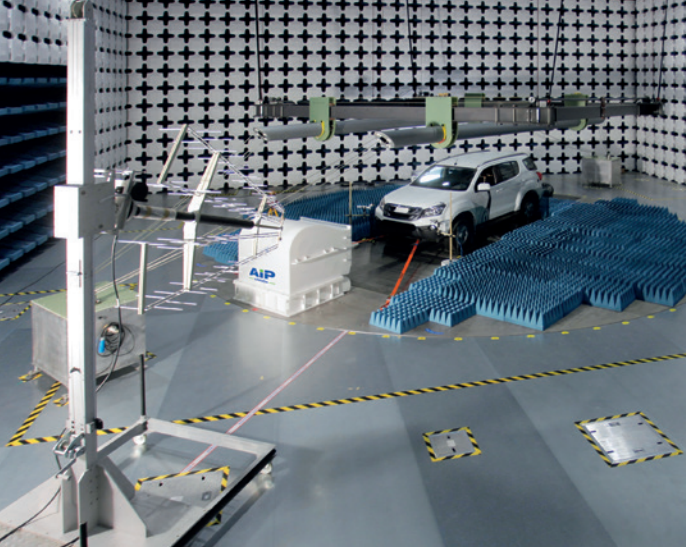
The recent development of many new products increasingly includes the areas of measurement technology and software development/automation in addition to classic mechanical and electrical engineering.

In particular, AIP supplies vehicle test stands (complete vehicles and components) for the realistic, reproducible simulation of road trips in laboratory operation, e.g. in the areas of emission measurement, endurance testing, measurement of electromagnetic compatibility, acoustic and vibration measurement.

AIP's innovative testing technologies are also used in the areas of E-Mobility, autonomous driving and in the development of driver assistance systems.

In addition to the vehicle test stands for road driving simulation, AIP has developed an extremely high level of awareness in the areas of measurement technology and flexible test stand automation worldwide.

Innovative projects for e.g. VW Group, Porsche, BMW, Mercedes, Audi, TESLA as well as for leading suppliers from France, Sweden, and Asia emphasize our high-ranking expertise in this important future section.



# High-Performance Solutions for a Wide Range of Applications



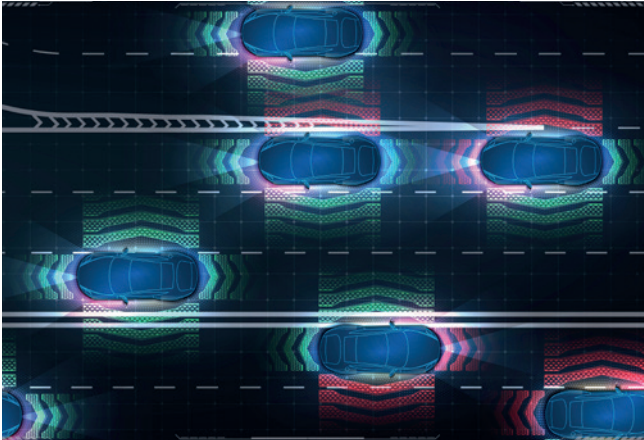
The AIP comprehensive system solutions are modular in design and easily adaptable to various vehicle types and customer requirements.

- Mobile and stationary charging stations for E-Mobility
- Test stands for electromagnetic compliance (EMC)
- Vehicle component EMC test stands
- Fuel cell test systems
- Battery (cell) testers and simulators
- Testing technology for driver assistance systems ADAS
- Acoustic measurement (NVH)
- Endurance testing, COP
- Test stands for multiple emission and consumption measurement
- Performance measurement, e.g. in a wind tunnel
- Hydraulic road simulation testing (shaker / pulser)
- Functional testing, e.g., in climatic and altitude chambers
- Stationary and mobile exhaust gas measurement / RDE
- Test automation
- Robot driver
- Drivers aid systems



# ADAS Testing Systems

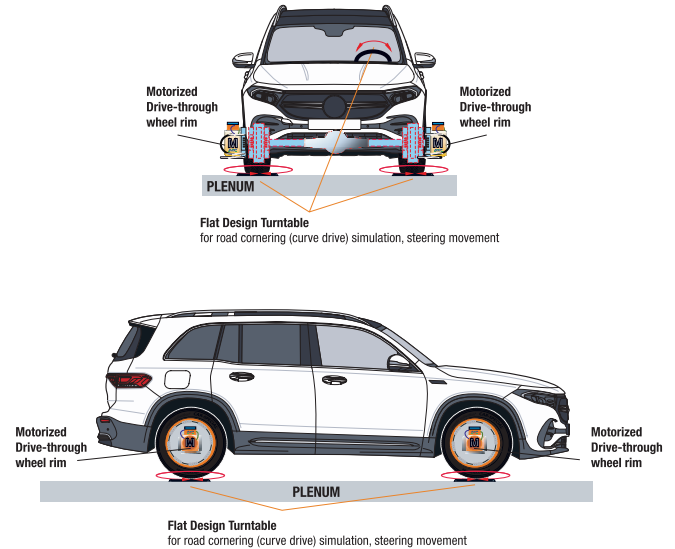
## Torque Wheel Dynamometer

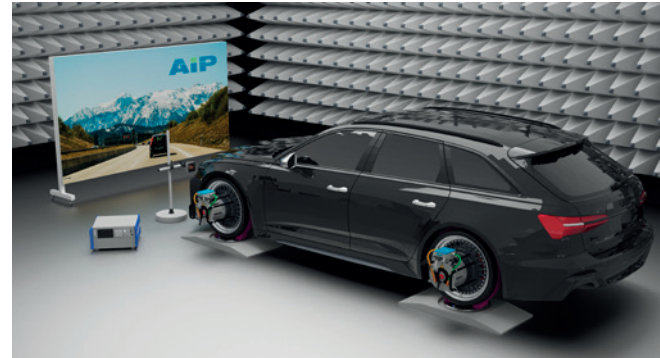
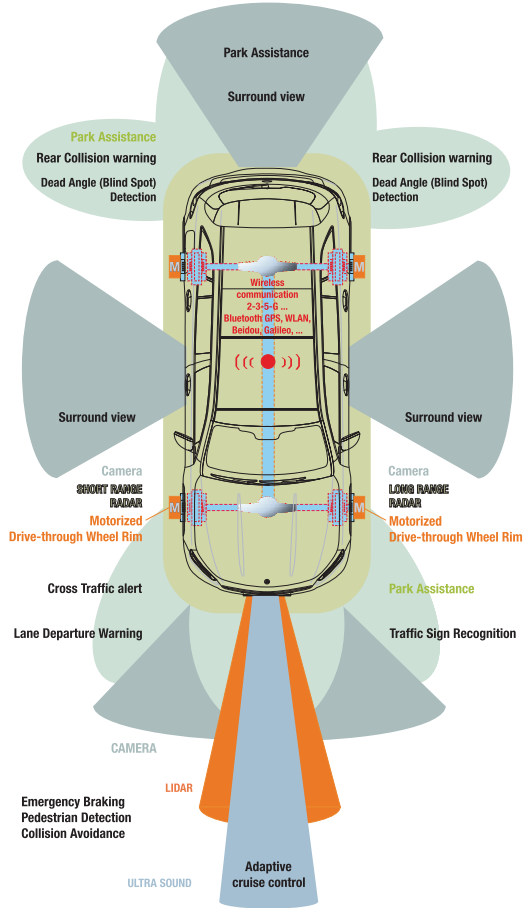


The test vehicle stands with motorized drive-through rims on turntables, integrated on the floor (plenum) e.g. of an EMC test cell. This setup allows steering movements during the driving simulation, with the vehicle stationary. Simulation of cornering, lane change, automatic parking/unparking, distance warning. Emergency braking behavior, etc.

While the wheels are stationary, the motorized, specially mounted drive-through rims drive the vehicle drivetrain in a synchronized manner, simulating behavior similar to real road driving.

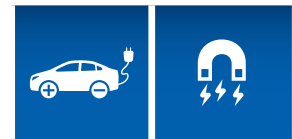
An embedded video system and radar target simulator integrated in the test cell floor in front of the vehicle projects a realistic roadway with different vehicles, obstacles, etc.





Torque wheel application allows simulation of driving turns, e.g. lane changes.

## Applications

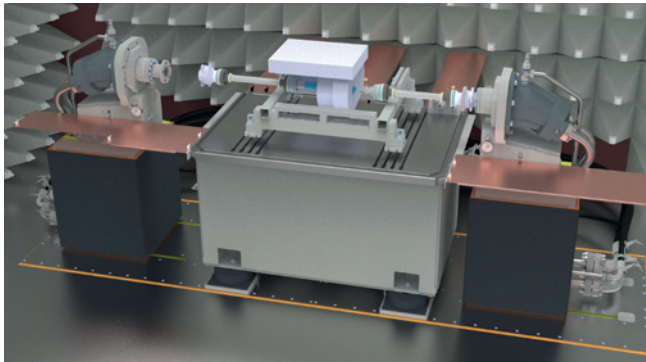
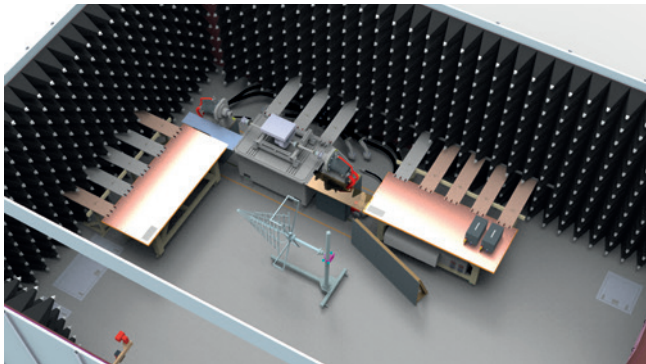


E-Mobility

EMC

# Component EMC Testing

## Powertrain Hydraulic Test Bench



Component testing according to:

- UN ECE R10 (CISPR 25)
- EMI according to ISO11452
- Impulse according to ISO7637
- OEM group standards (VW, BMW, Mercedes Benz, Ford, GM, etc.)

## Advantages

- Individual test bench setup and infrastructure planning
- General contracting with AIP possible
- Broad portfolio of equipment – especially designed for AIP
- Flexible setup possibilities for several types of DUTs
- Safety concept including chamber and measurement equipment
- High power capabilities for tests under full load
- Further testing possibilities upon request

## Features

- Movable hydraulic setup for different track widths
- 2200 rpm / 1500 Nm torque per side
- Shielded machine beds for max. EMC performance and min. disturbances
- Height adjustable DUT (device under testing) bed for different geometries
- Floor integrated base plate for minimum vibrations inside the EMC chamber
- Different antenna positions for full DUT (device under testing) picture
- CISPR 25 conform test bench design
- Powered by AIP designed hydraulic setup





# Component EMC Testing – Peripherals / Subsystems

## Powertrain Hydraulic Test Bench



### Features

#### Metron EMC

- Special shielded power analyzer
- High Voltage and current contacting of DUT (device under testing)
- Simulation of all vehicle communication paths through fiber optic wires
- Measurement inputs for different values
- Low voltage connectors for KI.30 and others
- Integrated and shielded in CISPR 25 table

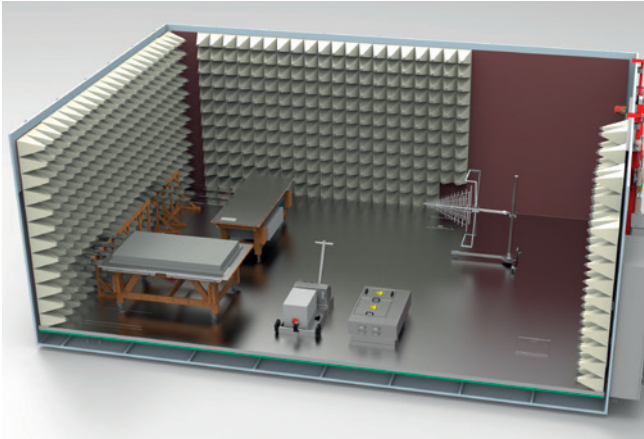
#### Battery Sim

- Individual power levels (starting @ 100kW)
- Powertrain, motor or battery applications
- Adapted for EMC use
- EMC filters and shielded cables
- Possibility of 2 separately controllable outputs



# Component EMC Testing – HV Test Bench

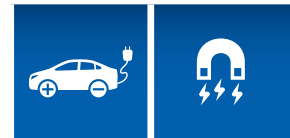
## HV Component Test Bench



## Features

- Flexible usage for different DUTs (devices under testing)
  - Battery Systems
  - OBCs
  - BMUs (battery measurement units)
  - Inverters
  - Controllers
  - Combined Systems
- Different AC and DC Power levels available
- Flexible switching possibilities (serial, parallel)
- Simulation of battery charging and discharging functions
- Multi-Purpose solutions for different EMC measurements

## Applications



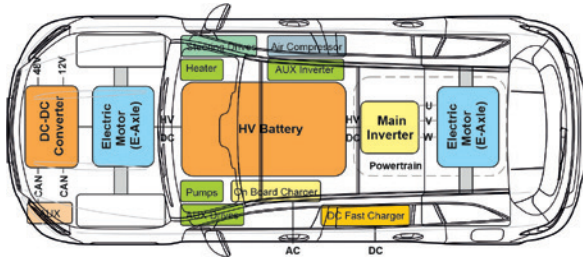
E-Mobility

EMC



# Component EMC Testing – Advantages

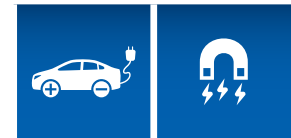
## Component Test Bench



## Advantages

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- General contracting with AIP possible
- Broad portfolio of equipment – especially designed for AIP
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- Further testing possibilities upon request

## Applications
















E-Mobility

EMC














# EMC Test Stand References









Extract of Satisfied AIP EMC Test Stands Customers (Single Roll Type Chassis Dynos)



Customer	Application	Destination	Delivery	Turntable dia. / m	Power kW / axle
BMW		Germany	2006	11	192
Fiat (CRF)		Italy	2008	8	192
FAW		China	2011	11	218
CAERI		China	2011	11	218
CATARC		China	2010	11	218
MB tech		Germany	2010	8	102
Fujian Daimler		China	2011	11	102
EETI		China	2012	11	218
ARTC		Taiwan	2012	11	218
AUDI		Germany	2012	9	218
Mercedes		Germany	2014	9	218
Mercedes		Germany	2014	9	218
Mercedes		Germany	2014	9	218



Customer	Application	Destination	Delivery	Turntable dia. / m	Power kW / axle
Rise, Avitar		Sweden	2016	11	218
Greatwall		China	2016	9	218
AKKA		Germany	2014	9	218
TESLA		USA	2016	9	218
IAV		Germany	2016	9	218
Yutong		China	2018	14	218
TDK		China	2019	11	218
Beiqi Foton		China	2019	11	218
VW WOB		Germany	2020	11	218
CATARC		China	2020	12	218
BMW		Germany	2020	9	100
EMITECH		France	2020	9	218
EDAG		Germany	2021	9	218

Customer	Application	Destination	Delivery	Turntable dia. / m	Power kW / axle
Liong Medical		China	2022	9	218
TESLA		China	2022	9	218
Brilliance (BBA)		China	2022	9	218
PATAC		China	2022	9	218
Chongqing Auto		China	2023	12	218
BOSCH		Hungary	2023	9	218
<b>Twin roll type</b>					
Suzuki Maruti		India	2012	9	40
<b>Other types</b>					
ARTC		Taiwan	2012	no turn table	idle mode

# EMC Universal DC Charging Box

Battery Charging in Compound with an EMC Test Stand



With the AIP EMC charging box, tests are conducted in accordance with the requirements of **ECE R10** and **GB/T18387**. This describes the testing of electrical and electronic components that are intended for installation in vehicles. A distinction is made between two types of tests:

1. Requirements relating to immunity to radiated and conducted interference in functions related to direct control of the vehicle, to the protection of the driver, passengers and other road users and to interference that could confuse the driver or other road users.

2. Requirements relating to the control of unwanted radiated and conducted emissions to protect the intended use of electrical or electronic equipment in your own or in neighboring vehicles or in their vicinity and the control of malfunctions caused by accessories that may have been retrofitted in the vehicle.

## Features DC Charging Box

- All-in-one box, compact design, movable
- Connection possibility for all common uncooled charging cables
- incl. integrated EMC filter technology
- incl. integrated charge control
- incl. possibility to integrate an optional power grid simulation (Line impedance stabilization network) LISN (800 A)
- The compact AIP charging technology can be used in conjunction with test stands from AIP RMV (EMC) or from other manufacturers
- Automatic full-surface contact to the base plate by its own weight

## Applications



E-Mobility



EMC

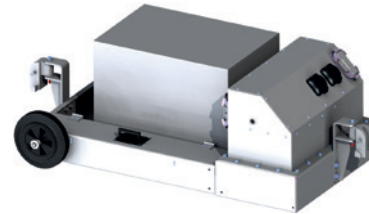


## Technical Specifications DC Charging Box

Dimension of housing (LxWxH)	1,330 x 875 x 408	mm
Output voltage range	50 ... 1,000	V
Current carrying capacity	500	A
<b>Max. Current carrying capacity for vehicle outlet 1</b>		
CCS Typ 1	200	A
CCS Typ 2	200	A
GB/T	250	A
CHAdeMO	250	A
<b>Max. Current carrying capacity for vehicle outlet 2</b>		
CCS Typ 1	500	A
CCS Typ 2	500	A
Current accuracy	0.05	% MW
CAN and Pilot ISN	can be easily installed if required (Space and coupling interface provided)	
2x DC LISN	up to 800 can be integrated (Schwarzbeck design)	A
LISN	can be easily removed for calibration	

## Features AC Charging Box

- All-in-one box, compact design, movable
- Simulation of all internationally established power systems up to 50 kVA
- Individual programming of voltage, current, phase config., phase shifting
- Simulations for phase failure, etc. possible
- Simple and mobile plug 'n' play solution for fast setup and testing
- Fully integrated measurement setup incl. network simulation
- All international charging standards
- LISN (Type Schwarzbeck) integrated and removeable
- Fully mobile version for easy handling
- Simulation of international AC Grids
- Operated form control point via PC



## Technical Specifications AC Charging Box

Dimension of housing (LxWxH)	1,300 x 700 x 490	mm
Performance	up to 50	kVA
Voltage	up to 480	V
Current per Phase	up to 72	A
LISN (Schwarzbeck design)	can be easily removed for calibration	

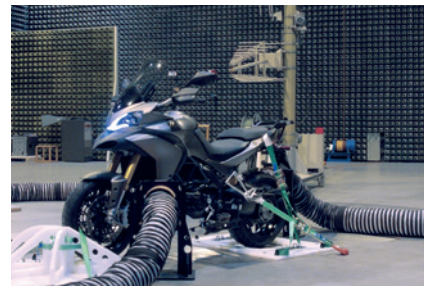


Example applications. Pictures with kind approval: RISE Research Institute of Sweden (Borås), AIP Automotive. Technical changes reserved.

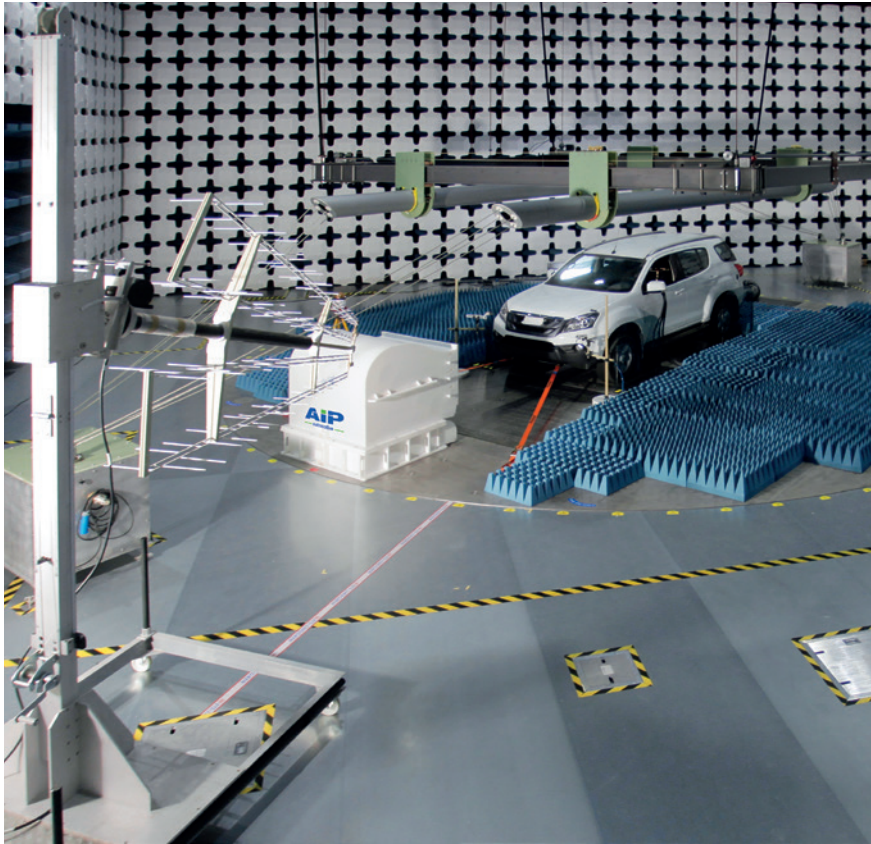
EMC test stand application:  
Generation of an electric field for testing the vehicle immunity to interference by means of a ,stripline' device







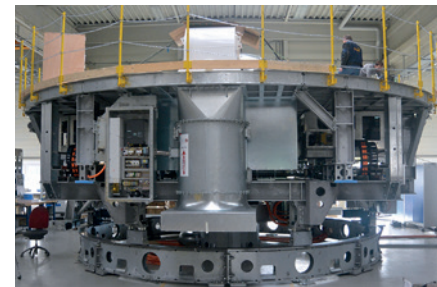
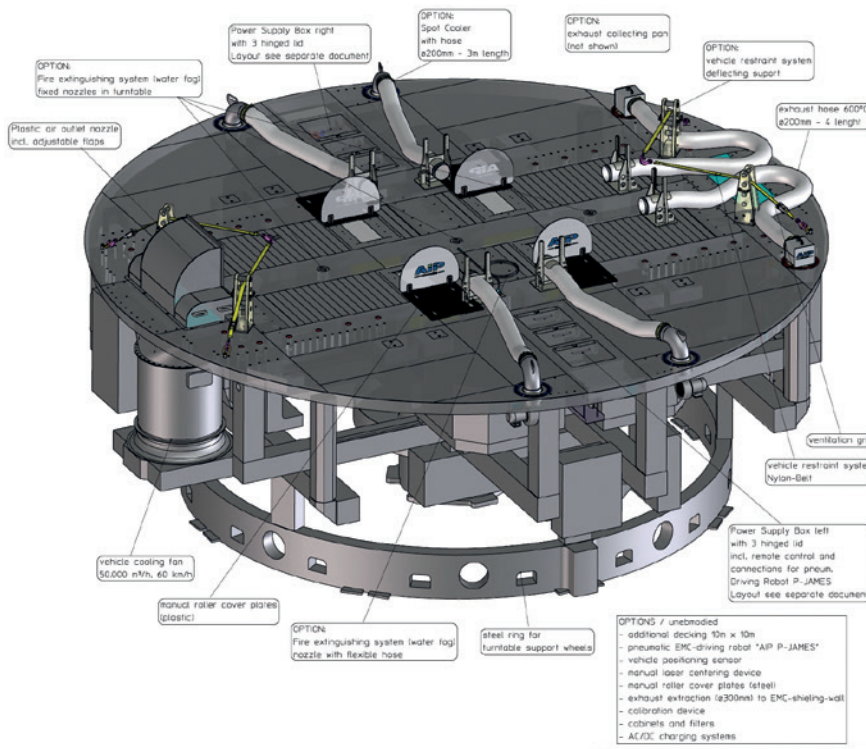
Example applications. Pictures with kind approval: Audi Ingolstadt, AIP Automotive.  
Technical changes reserved.



EMC test stand application:  
Generation of an electric field for testing the vehicle immunity to interference by means of a „stripline“ device



EMC test stand applications:  
48° EMC chassis dyno with 11 meter dia. turn table



EMC light duty vehicle application: Test Stand System architecture with optional extensions / accessories, 37,5" 4WD EMC chassis dyno with 9 meter dia. turn table

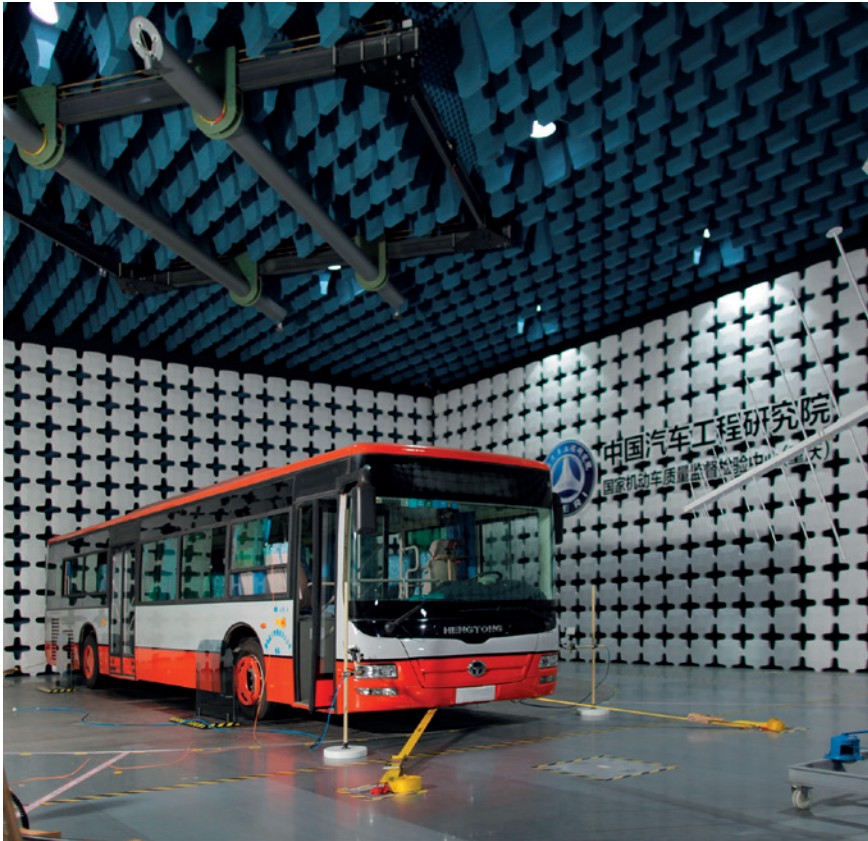
AIP quality USP:  
EMC chassis dyno factory pre-acceptance test



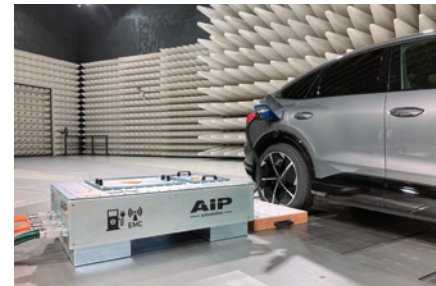
EMC chassis dyno application with EMC type wheel hub 4-WD restraint system



EMC chassis dyno:  
Optional pneumatic operated EMC type drive robot (AIP P-JAMES)



EMC heavy duty test stand applications:  
Chassis dynos with 11 meter dia. turn table



EMC DC charging unit

# Our Headquarters in the Beautiful Allgäu



Our headquarters are located in Haldenwang in the Allgäu region (in the heart of Bavaria), approx. 120 km southwest of Munich.

For more than 25 years, AIP has been developing, testing, and manufacturing future oriented automotive testing technologies to promote a clean and safe environment.

The Allgäu is the southern region of Germany and one of the most popular tourist areas in the country. It is especially known for its intact and charming nature.



The famous Neuschwanstein Castle in the heart of the Allgäu region

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Emission  
Measurement  
Systems



EMC



Chassis Dynos



Flat Track  
Systems



Hydraulic  
'Shaker'  
Test Stands



Multi-  
Shaker Unit



Windtunnel  
Balance



Powertrain  
Test Benches



e-Mobility



Autonomous  
Driving



Test Bench  
Automation



Driving  
Robot



Vehicle  
Cooling Fan