

Test Systems for a Clean and Safe Environment



## **The Road in Your Lab**

Pioneering Test Systems  
for Road Driving Simulation



# Welcome to Haldenwang

Our Headquarters in The Beautiful Allgäu



Our headquarters are located in Haldenwang in the heart of the Allgäu region, approx. 12 km northeast of Kempten. For more than 20 years, AIP has been developing, testing, and manufacturing future-oriented automotive testing technologies to promote a clean and safe environment.

Please feel free to contact us to setup an appointment to see our latest products and information services.

We look forward to your visit!



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. Surrounded by mountains, forests, meadows and lakes, the area invites you to linger. The charming nature of this area led the Bavarian King Ludwig II to build his world-famous fairy tale castle 'Neuschwanstein' here.

AIP – Working where others take their holidays ...





# AIP automotive

Our Motto: Technology- and Service Leadership



AIP complements the product line of the APL group with premium class vehicle special test benches.

AIP designs and manufactures individual test systems for development and manufacturing centers, most vehicle OEM's and their tier suppliers locally and globally.

AIP develops and manufactures special testing equipment (reproducible road driving simulation) for cars, trucks, motorcycles, ATV's, tractors, forklift trucks, special vehicles, etc., in the areas of research and development, type approval and quality assurance.

- Emission and fuel consumption measurement
- Acoustic measurement (NVH)
- Endurance testing COP
- Performance measurement (e.g. in a wind tunnel)
- Functional testing (e.g. in climatic and altitude chambers)
- Verification electro-magnetic compliance (EMC)
- Hydraulic road simulation testing (shaker)
- Emission measurement systems
- Test automation
- Robot driver/Throttle actuator
- Vehicle cooling fans
- Drivers aid systems



The AIP comprehensive system solutions are modular in design and easily adaptable to various vehicle types and customer requirements (budget, time frame, laws and regulations, etc.).

Through close long-term cooperation with our customers worldwide and a high degree of self-motivation AIP has applied innovative solutions to the development of new testing equipment for a variety of testing requirements.

The motivation and creativity of our employees, a modern environmentally friendly production facility and the continuous development of our Products and Services has led to a high level of customer satisfaction and trust.

Our quality management is certified according to ISO 9001 and ISO 14001 standards.

**DIN ISO 9001**

Certification  
of Quality  
Management



**AIP**  
— automotive —

**DIN ISO 14001**

Certification  
of Environmental  
Management



**AIP**  
— automotive —



## AIP Under New Flag

**The APL Automobil-Prüftechnik Landau GmbH, located in Landau/Germany, has recently acquired majority shares of MAHA-AIP GmbH & Co. located in Haldenwang/Germany.**

Effective March 4, 2017, APL Automobil-Prüftechnik Landau GmbH, based in Landau/Pfalz, acquired a major shareholding position in AIP GmbH from MAHA Maschinenbau Haldenwang GmbH & Co. KG, located in Haldenwang/Allgäu.

The AIP division was originally a profit center for Maschinenbau Haldenwang which separated to become an independent GmbH & Co. KG in 2005.

MAHA Maschinenbau Haldenwang GmbH & Co. KG held 70 % and Mr. Anton Knestel 30 % of the company shares (in addition to Mr. Christian Hartmann, one of the two managing directors since AIP was founded).

Mr. Anton Knestel maintains 30 % ownership in shares and continues with the management of AIP (currently 180 employees/sales approx. €40 million/year) with Mr. Christian Hartmann at the Haldenwang location.

An extension of the production & assembly area at the Haldenwang site is currently planned based on customer orders (scheduled beyond 2018) to consolidate and sustainably expand the technology leadership of AIP.

AIP develops and produces extremely successful individual test systems for R&D and quality assurance centers for many of the renowned premium-class car manufacturers, their suppliers, as well as official certification laboratories in Germany and globally.

AIP supplies vehicle test systems for the realistic, reproducible simulation of road drives in laboratory operations (e.g. in the areas of emission measurement, durability testing, electromagnetic compliance testing, NVH measurement, etc.). The innovative testing technology offered by AIP is highly-recognized in the fields of electric mobility, autonomous driving, and the development of driving assistance systems.

In addition to vehicle test systems for road driving simulation, AIP is highly recognized in the areas of measurement technology for stationary and mobile (RDE) exhaust gas analysis as well as flexible test stand automation software in Germany and globally.

APL, located in Landau/Pfalz, is one of the leading engineering companies supporting the automotive service industry with a technological focus on automotive drive development and testing.

The APL-Group (formerly at a total of 6 locations/ with currently approx. 1200 employees) includes, in addition to APL GmbH, IAVF Antriebstechnik GmbH, APS-technology GmbH, the MOT a research and development company for engine technology, optics, and thermodynamics mbH and the IAVF-Volke group audit center for com-

bustion engines (IVP). With the latest addition of AIP as the 6th member of the APL-Group another location and all the current 180 employees have been added.

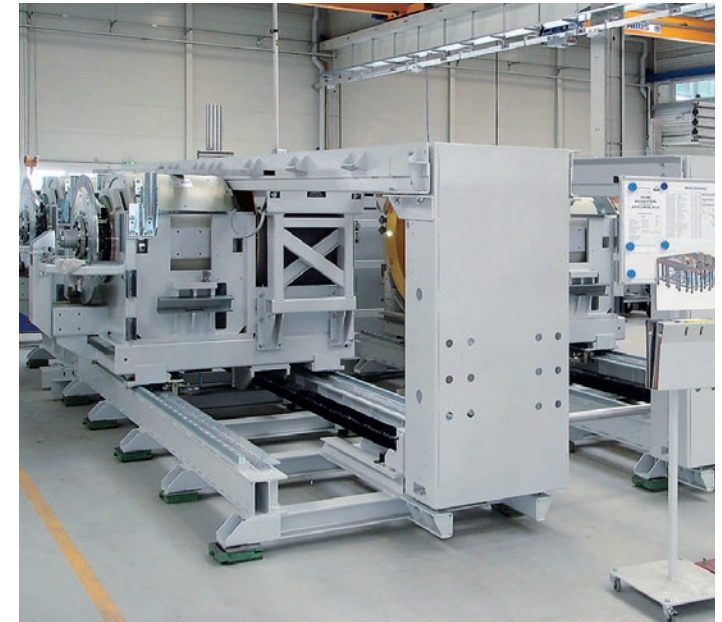
The mid-term goal is to strengthen the various business areas by applying common synergies within the APL-Group to sustainably expand market position and presence.

[www.apl-landau.de](http://www.apl-landau.de)



# AIP automotive

Our Headquarters in The Beautiful Allgäu



AIP occupies the research and development center building addition – Section A. Prior to equipment delivery to the customer each test system is setup and subjected to a pre-acceptance test and a wide variety of quality checks to ensure the functionality and product quality before the test systems are shipped to the customer.

In July 2014, a ground-breaking ceremony was conducted for the new building addition – Section B to the existing AIP research and development center. The ground floor includes production and QA area for the AIP exhaust gas measurement technologies, Test cells for the development of powertrain test benches and test bench automation. The upstairs includes offices for MD, Sales, Project Management, Software Development and the Service Department.

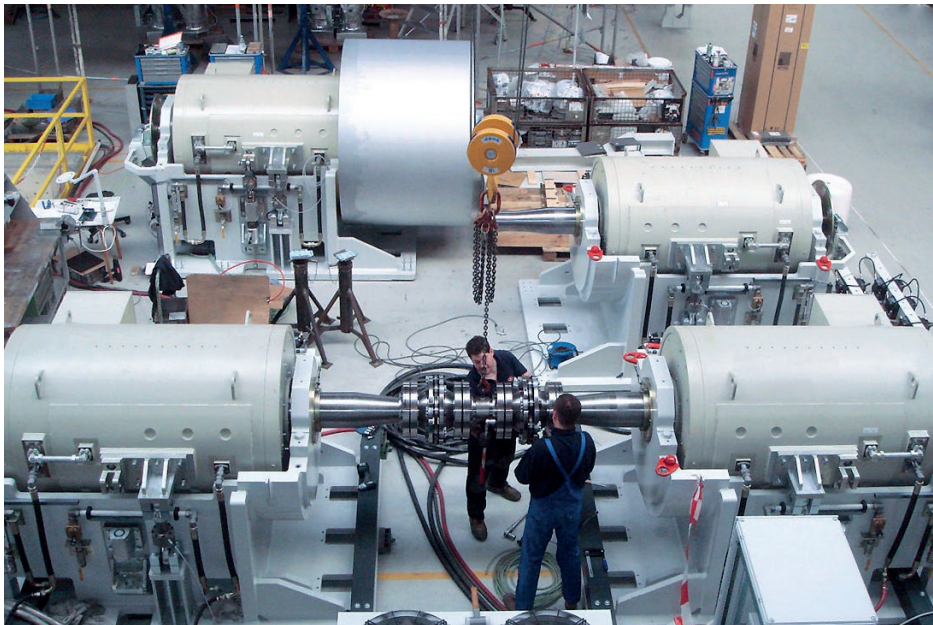






Theoretical and practical training on the equipment takes place in our training department. State of the art manufacturing capabilities provides substantial production depth at our headquarters in Haldenwang.

Each AIP test system built in Haldenwang is subjected to a detailed function test prior to shipment.



# AIP automotive

## AIP Milestones



### 1994

Formation of the AIP profit center to amend the standard MAHA workshop equipment product line with tailor-made vehicle testing solutions for the automotive industry. **Quality certification per ISO 9001.**



### 1998

Development of the first 48" Emission Chassis Dyno 4WD per EPA standards, utilizing a MIM-design and AC-motor technology. Due to AIP's

innovations in the accuracy of the AIP electrical 4WD synchronization module/dyno controller, AIP became the state-of-the-art supplier in this field and the market leader within just a few years for manufacturing 48" chassis dynos.

### 2000 – 2007

Cooperation Contract between AIP and HORIBA in the range of Emission Chassis Dynos.

### 2004

The EPA (Environmental Protection Agency, Ann Arbor/USA) selected AIP as a supplier for their first 48" four-wheel drive chassis dynamometer

(reference test regarding new legislation and regulations in range pollutant emissions for cars and delivery vehicles). Due to the outstanding product quality and performance the EPA in 2010 selected four additional AIP 48" four-wheel drive chassis dynamometer systems.

### 2005

The former AIP profit center became an independent legal entity, MAHA AIP GmbH & Co. KG (today AIP GmbH & Co. KG).



The use of modern production facilities in Haldenwang and a well-developed infrastructure led to great advantages being realized by AIP and its customers especially in terms of in-house manufacturing capacity and global service.

### 2006

CARB (Californian Air Research Board) selected AIP to supply 4WD 48 MDD test stands as their reference test stand for performing 4WD emission tests. **Certification per ISO 14001.**



### 2007

More than 320 Emission Chassis Dynos 48" have been successfully installed globally since 1999.

Extensive product development activities with high growth in other vehicle test dyno applications, e.g. NVH-, EMC- or vehicle endurance test (mileage accumulation tests) occurred. Opening of AIP branch in Shanghai/Pudong, China.

### 2008

New product range – emission measuring systems. AIP designs and manufactures Solid Particle Counter, CVS, Particle Mass Controller and various other systems.

### 2009

Cooperative contract between AIP and Prime ONE Contracting to provide turn-key solutions, sales and service of AIP equipment in US, Canada, Mexico and Brazil.

### 2011

Founding of the company MAHA-PA (MAHA process Automation), based in Karlsruhe, Germany. Development of test stand automation software products MPAS/MTOS.

### 2012

Expansion of product ranges Emission Measurement Systems (N<sub>2</sub>O measurement, analysis systems) and high-density wind tunnel balances with 5-band- or 1-band-wheel drive units. Supplied a complete exhaust measuring cell with AIP testing: 48" Roller Dynamometers, Emission Measurement Systems and Test automation MPAS – TÜV Nord located in the city of Essen.



## 2013

The EPA (Environmental Protection Agency, Ann Arbor/USA) selected AIP as a supplier for their first 72" HD 4WD Chassis Dyno for testing commercial vehicles (Reference test regarding new laws and regulations in the field of emission of trucks, buses, etc.).

The product portfolio increased with the addition of powertrain test facilities and new developments in the areas of – mobile emission measurement (PEMS) on LDV, mobile urea measurement in the exhaust AdBlue® for stationary fuel consumption measurement.

## 2014

AIP developed and supplies a new vehicle cooling fan design 40500-135.

This vehicle cooling fan meets and exceeds the requirements of current and future standards:

- UNECE GTR 15
- 40 Code of Federal Regulations §1066.105 (test cycles FTP, HFET, US06 & LA-92)
- ECE-R83 (Annex 4, Annex 4a).

## 2015

### Commencement of Business of the AIP Research & Development Center

in June 2015 to include the newly built AIP research and development center – Stage 2. This modern, two-storey building with a total area of approximately 3,700 m<sup>2</sup> was an extension to the AIP R&D Center completed in 2008.

Growth in the AIP measurement product range in recent years required specific criteria to be implemented in the new building addition for development, production and quality assurance which were not possible in the previous building.

The development, manufacturing and the QA area departments of the AIP emission measurement and testing facilities (including a Powertrain test bench/test cell with 30 m<sup>2</sup>) were setup in the new research and development centre addition. Additionally, a central lobby area with meeting rooms, a spacious lounge/break room, and a patio with views of the Allgäu alps and its surroundings were also included.

Upstairs, modern offices among others exist for management, sales, project management, software development and service. Throughout the building, a heating/cooling ceiling ensures a pleasant room climate. Bright, light-flooded rooms and large Windows offer an inspiring atmosphere.

The opening of the Stage 2 building addition allowed all AIP employees to be located under one roof > optimum conditions concerning interfaces, communication, shorter distances, as well as the creation of additional jobs.

The new premises are also used for the continuous expansion of the AIP product range and for research and development related to the automotive industry – worldwide.

### RDE Real Drive Emission measurement (PEMS)

AIP produced and supplies portable emissions measurement systems (PEMS) to customers in Germany and neighbouring countries. The occupation of the new AIP research and development centre addition has allowed increased productivity of the mobile exhaust gas measurement systems (RDE).

The extremely compact and lightweight PEMS measuring system has become a highlight in the market and an excellent example of the capabilities AIP now offers.

### Commissioning of the first 72" 4WD chassis dynamometers for heavy duty vehicles at the EPA (Environmental Protection Agency) in Ann Arbor, Michigan.

The EPA has been using various AIP 48" all-wheel drive dynamometer for cars, SUVs and pickups (up to 4,500 kg axle load) since 2004. Now the EPA will be using this proven technology for testing heavy-duty trucks.

The aim in the future is for Heavy-duty vehicles to undergo complete vehicle testing with exact exhaust tests in reproducible operations vs. being limited to primarily testing just the drive units (e.g. engine test benches).



# AIP automotive

## AIP Milestones

### 2017

The German APL Automobil-Prüftechnik Landau GmbH, located in Landau/Germany, acquired majority shares (70 %) of MAHA AIP GmbH & Co. KG, located in Haldenwang/Germany.

Since March 2017 MAHA AIP is no longer a member of the MAHA Maschinenbau Haldenwang Group and trades from December 2017 on as AIP GmbH & Co. KG. with a new company Logo.



The management continues to be performed by Mr. Anton Knestel and Mr. Christian Hartmann.

### New construction of a assembly and logistics hall

In November 2017, a ground-breaking ceremony was conducted for the new building addition – Section C to the existing AIP research and development center. The new building expands the production and assembly area for vehicle test benches and measurement technology.

### Key data

Total area inside:	3,000 m <sup>2</sup>
Additional jobs:	about 30
Logistics outdoor area:	1,500 m <sup>2</sup>
Max. Crane loads:	40 tons
Construction time:	11/2017 until 08/2018

**Opening** of AIP Automotive China Co., Ltd in **Shanghai/Pudong, China.**







# Emission Technology



NO <sub>x</sub>	N <sub>2</sub> O
l/km	CO <sub>2</sub>
HC	CO
°C	F





# Emission Chassis Dynos

ECDM – Convincing Concepts for Accurate, Reproducible Measurements



## Emission Chassis Dynos

CDM – compelling designs for accurate, repeatable measurements.

Emission Chassis Dynos for rear-, front- or all-wheel-drive vehicles and motorcycles, etc. Conforms to US-spec “EPA RFP C100081 T1” as well as to current European and Japanese Guidelines.

## Applications

In research, development centers, car manufacturers and their suppliers (two-wheel- or all-wheel drive).



## • Emission tests

- UNECE GTR 15
- GB 18352.6-2016 (China 6)
- EU 2017/1151 incl. RDE
- TRIAS 31-J042(4)-01
- ECE-R83
- 40 CFR 1066  
(Code of Federal Regulations §1066.105, following test cycles FTP, HFET, US06 & LA-92)
- WLTP
- FTP 75/SFTP (US06)
- EPA
- ECE + EUDC
- Japan 10 ... 15 mode

- Temperature tests (climate chambers)
- Fuel consumption
- Pre-conditioning
- Quality checks (COP)
- Mileage accumulation
- Electric vehicle tests





# Emission Chassis Dynos

ECDM – Emission Chassis Dynos



## CDM 48" - Emission Chassis Dyno 2WD / 4WD - LDD / MDD

- 48" (1,219 mm) Roller set with AC motor for LDVs and MDVs
  - Precise, reproducible mass simulation
- Accuracy exceeds EPA's requirements
- Extremely compact design
  - Slim pit dimensions
- Excellent 4WD synchronization with high dynamic regulation between the front- and rear roller set
  - max. speed diff. = 0.01 mph (0.02 km/h)
  - max. angular deviation roller set FA to RA = 0.2°
- Low wear and low maintenance construction for multiple shift-operation
- Intelligent bearing concept
  - no test stand 'warm-up' required
- Modular test stand concept for various applications and budgets
- Fast data availability
  - Simple, intuitive test stand setup and operation
- Interface to standard emission measurement systems





# Emission Chassis Dynos



ECDM – Emission Chassis Dynos



48" Emission Chassis Dyno – single axis design with automatic vehicle fixation



# Emission Chassis Dynos

## Heavy Duty Dynos



### CDM 72" Chassis Dynamometer 2WD / 4WD HDD - Heavy Duty

- 72" (1,828 mm) Roller set with AC motor for measurement of heavy trucks, buses, ... (MIM, 'inline principle' or multi-motor principle)
- Precise, reproducible mass simulation
- Accuracy exceeds EPA's requirements
- Extremely compact design
- Narrow pit dimensions
- Excellent 4WD synchronization
  - high dynamic regulation
- Interface to common emission measurement systems
- Variety of performance classes available



### Optional Accessories

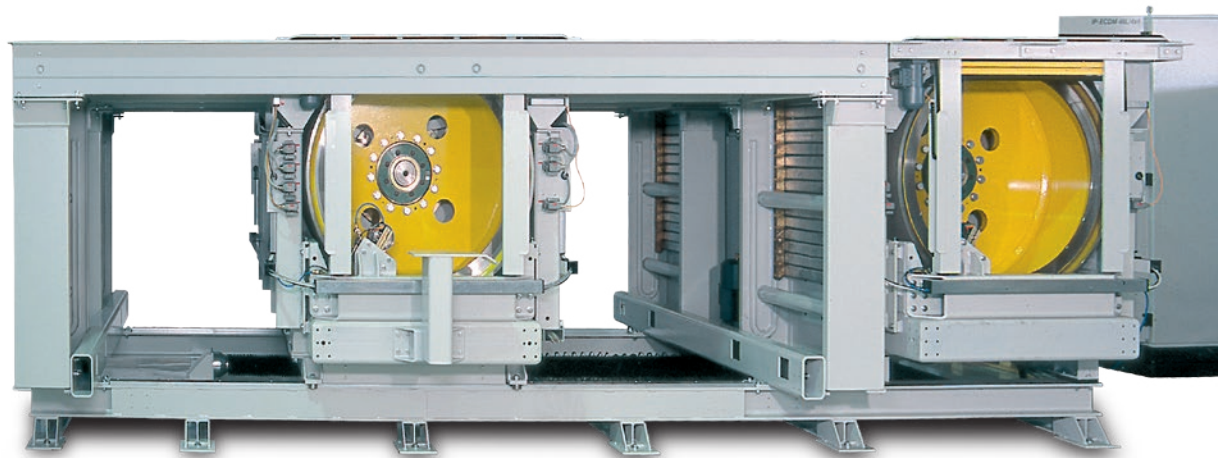
- Hydraulic tie-down device
- Automatic centering device
- Automatic lowering of test stand decking plates for tandem axle (dual axle) operation
- Service central pit between rolls, including height-adjustable service platform





# Emission Chassis Dynos

CDM-References since 1999: More than 670 Emission Chassis Dynos Systems installed – Worldwide!



AUDI	Ingolstadt, Neckarsulm, D
APL	Landau
APS	Bietigheim Bissingen
Akrapovic	Slovenia
APL / APS	Germany
ARTC	Taiwan
Autovaz	Russia
Beijing Emission	China
Bentley	England
BMW	Aschheim, Muc (FIZ / EVZ).

BOSCH Abstatt, Feuerbach,  
Schwieberdingen, D  
Australia, China, France, Italy,  
India, Japan, Korea

CARB  
CATARC  
CAERI  
CAPSA (PSA)  
DPCA (PSA)  
Changan Visteon  
Continental  
PSA (Citr./Peug.)  
Daimler AG

Ingolstadt, Neckarsulm, D  
 Landau  
 Bietigheim Bissingen  
 Slovenia  
 Germany  
 Taiwan  
 Russia  
 China  
 England  
 Aschheim, Muc (FIZ/EVZ),  
 Dingolfing, D  
 Steyr, A  
 Abstatt, Feuerbach,  
 Schwieberdingen, D  
 Australia, China, France, Italy,  
 India, Japan, Korea  
 USA, CA  
 China  
 China  
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 China  
 China  
 Germany  
 France  
 Bremen, Sindelfingen,  
 Untertürkheim, D, USA

Delphi  
Dekra  
Denso  
DINEX  
DLG  
DLR  
Dongfeng Nissan  
DPCA  
d2T  
EETI  
ENGIE  
[EPA](#)  
FAKT,  
FAURECIA  
FAW  
FAW Volkswagen  
FEV/RWTH  
Ford  
Fraunhofer Institut  
Fujian Daimler  
GAZ  
Geely  
GHIC  
Gillet  
Greatwall  
Guangzhou Auto

France, Korea, China  
Lausitzring, D  
Germany  
Danmark  
Germany  
Stuttgart, D  
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USA, MI  
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Edenkoben, D  
China  
China

Harbin Dongan  
Head Acoustics  
Hitachi  
Honda  
HORIBA  
Hubai Dong Feng  
Hyundai  
IAV  
INA  
Instituto Nacional  
del Agua  
ITRI  
IVP  
Johnson Matthew  
JRC  
ISP Salzbergen  
Kefico  
KFE  
KIER  
Kingdom Vehicle  
Lamborghini  
Magna Steyr  
Maruti Suzuki  
Mazda  
MBUSI  
MBtech

China  
Herzogenrath, D  
China  
Japan, USA  
Oberursel (Testcenter), D  
China  
Germany  
Berlin, Ingolstadt, D  
Herzogenaurach, D

Argentina  
Taiwan  
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Italy  
Germany  
Korea  
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Taiwan  
Italy  
Graz, A  
India  
Japan, Germany, Thailand  
USA  
Germany

Min. of Transport  
Min. of Transport  
Mitsubishi Electric  
Mitsubishi Motors  
NIER  
NISSAN

PATAC (GM)  
Porsche  
RAR  
Renault  
SABS  
SAIC  
Shell  
Skoda  
SMVIC  
SIEMENS VDO  
SSanyong  
Subaru  
Songz  
Suzuki  
TAI  
Technogerma  
Tenneco  
Toyota

TÜV Nord  
TÜV Süd  
UAES  
Uni Chongqing  
Uni Ulm  
Uni Bucurest  
Uni Ostfalia  
Uni Karlsruhe  
UTAC  
Vicom  
Volvo  
VW

Wuxi Weifu  
Weifu Diesel  
Yamaha  
Yutong  
ZMZ

\* Extract, Stand 05/2018

Chile  
Equador  
Netherlands  
USA  
Korea  
China, Japan, Spain, USA,  
Mexico  
China  
Germany  
Romania  
France, Romania, Spain  
Republic of Southafrica  
China  
England  
CZ  
China  
China  
Korea  
Japan, USA  
China  
Japan, Hungary  
Thailand  
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Czech Republic, Japan,  
Republic of Southafrica  
USA (MI, TX, CA), China  
Germany  
Germany  
China (Wuhu, Shanghai)  
China  
Germany  
Romania  
Germany  
Germany  
France  
Singapore  
Sweden, China  
Wolfsburg, Kassel, Salzgitter  
D, USA, Southafrica  
China  
China  
Japan  
China  
Russia



# Emission Chassis Dynos

Dynos for Motorcycles, Scooters, ATV's



## ECDM-21MC Exhaust Dynamometers for Motorcycles / Trikes and ATV's

Designed for use in Research and Development centers, manufacturing plants of motorcycle OEM's and their tier suppliers.

- Emission measurement
- Temperature experiments (cold chamber)
- Preconditioning
- Production quality control (COP)
- 75 FTP/SFTP (US06)
- EPA fuel economy tests
- ECE + EUDC
- Japan 10 ... 15 mode
- Mileage accumulation

### Features

- Electrical mass simulation
- 200 ... 1,600 lbs (electric)
- Single roller with 400 mm diameter (other roll diameters available upon request)
- AC motor 50 kW or larger
- Wear and maintenance-free design for multi-shift operation
- Fast data availability through simple, user-friendly setup and clear operation
- A modular test concept for a variety of development stages, requirements and budgets

### Optional Accessory Packages

- E.g. for the expansion of power, the test speed and e.g. the temperature range (e.g. -30°C ... +45°C)
- Vehicle cooling fans in different versions





# Test Stand Accessories



## Vehicle Cooling Fan AIP Compact Air

Two different fan types are available:

### Type 40.500 – 135

Air volume 40.500 m³/h  
Air speed max. 135 km/h

### Type 48.000 – 160

Air volume 48.000 m³/h  
Air speed max. 160 km/h

The AIP vehicle cooling fan is used for vehicle engine cooling during a simulated road drive on a chassis dyno or flat belt, in accordance with specified driving cycles

- UNECE GTR 15
- GB 18352.6-2016 (China 6)
- EU 2017/1151 incl. RDE
- TRIAS 31-J042(4)-01
- ECE-R83
- 40 CFR 1066  
(Code of Federal Regulations §1066.105,  
following test cycles FTP, HFET, US06 &  
LA-92)



## Optional accessories

- Electric height adjustment
- Electric moving system 'easy-to-move' for easy fan positioning in front of the test vehicle
- Ultrasonic distance sensor
- Optical center alignment sensor
- Extended temperature range

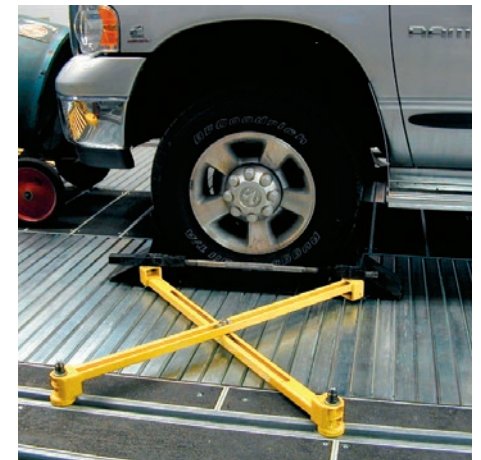




# Test Stand Accessories



- Vehicle cooling fans (radial/axial)
- Cooling fans for tires, vehicle components, catalysts, etc.
- Drivers aid system
- 2WD/4WD Vehicle restraint systems
- Custom pit decking available
- Automatic driving robot







# Emission Measuring Systems

## Emission Volume Identification



### CVS Constant Volume Sampler

**For the certification of vehicles and combustion engines according to the latest emission regulations, such as: UNECE R83, EPA 40 CFR 86, WLTP TRIAS Att 42).**

- Most compact CVS system on the market
  - Consistently straight exhaust system
  - Tandem blowers
  - Components networking via EtherCAT
  - 3x probe sampling venturi
  - Max. flow 30 m<sup>3</sup>/min
- Features**
- Most compact CVS system on shared cabinet design, with very easy access for maintenance and service work
  - Standard industrial hardware avoids high replacement costs
  - Low switching time for 15 flow levels (<250 ms)
  - Simultaneous filling, analyzing, rinsing and evacuation ensures maximum efficiency
  - High-capacity vacuum pump for high-speed rinse/evacuation of the bag
  - Modular expansion (e.g. dilution air treatment, dilution path control)



### AIP Test Cell

For internal development work, customer and staff training, test equipment and exhaust test bench automation tools, which are continuously updated with functional test cells available for use as well.



# Emission Measuring Systems

## Particle Measurement



### SPC Solid Particle Counter

For determining the number concentration of solid exhaust particles in combustion engines

Sampling is from a full or partial flow dilution system or even directly possible from the raw exhaust gas sample. An optimized sampling system for raw exhaust protects the particle counter from excessive particulate and temperature stress.

#### Features

- Designed in accordance with European regulations and beyond the specifications of the German Automotive Industry (ECE R83, PMP Group). Certified by AEA Energy & Environment
- Compact design 19" / 6U
- Ease of service
- Optional TSI or Grimm CPC
- Automated procedures for startup and maintenance
- Aerodynamic raw exhaust diluter (optional)

### HFID Heated Flame Ionization Detector

For continuous measurement of THC in the dilution tunnel.

- Heated sampling probe
- Analyzer – quick 'snap-in' technology
- 19" rack design

### PMC Particle Mass Controller

For the gravimetric determination of particulate mass solid exhaust particles from internal combustion engines.

Provides space for the integration of a heated analyzer e.g. for THC measurement of diesel vehicles.

#### Features

**Design in accordance with worldwide requirements (UNECE R83, EPA 40 CFR 86, TRIAS Att. 42 WLTP).**

- Very compact (19" / 6U)
  - on request also available as a separate desktop unit
- Up to 4 filter paths
- Mass Flow, regulated to 80 NI/min.
- Automatic self-calibration with 2 integrated venturi nozzles

Example: 19" cabinet design with integrated HFID, SPC and PMC, incl. supply unit.





# Emission Measuring Systems

## Modular Emission Measurement System



CO / CO <sub>2</sub>	ABB Uras (NDIR)
O <sub>2</sub>	ABB Magnos (PMD)
THC	ABB Fidas (FID)
THC / NMHC	ABB Fidas (Cutter - FID)
NO <sub>x</sub> / NO / NO <sub>2</sub>	AIP CLD or ABB Limas
N <sub>2</sub> O	AIP QCL
Further components on request.	



### 'Snap-in' Principle

Plug-in modules with locking mechanism allows quick docking of measurement modules from the front of the system cabinet. The gas connections are separated by undocking while the electrical supply remains wired. Advantage: Servicing of the analyzer modules in the normal operating condition.

## EMS Exhaust Measurement System

**Modular exhaust measuring system for determining a limited and non-limited exhaust gas components from diluted and undiluted vehicle exhaust.**

In the development of AIP EMS were the requirements/compliance to global legislation in the foreground (UNECE R83, EPA 40 CFR 86 & 1065 TRIAS Att 42, WLTP).

### Application

- On a chassis dynamometer in conjunction with a CVS system for vehicle certification
- On engine test beds
- On a chassis dynamometer in conjunction with a raw exhaust gas sampling system for research and development of catalysts

### Features

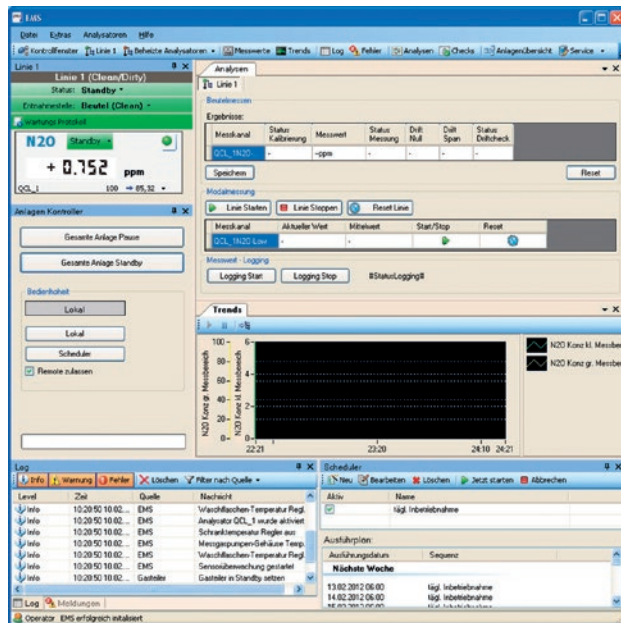
- Compact cabinet design, easy accessibility for maintenance and service work. The back wall of the cabinet can be placed directly against the wall of the test cell
- Components networking via EtherCAT
- Reduced operating costs

- Standard industrial hardware avoids high cost of spare parts
- Mobile using a pump truck, the unit can be pulled out during operation
- 2 lines in a 19" cabinet (1 + tracer/EGR)
- Components quick-change concept ('snap-in' principle) ensures maximum system availability



# Emission Measuring Systems

## Reproducible N<sub>2</sub>O Measurement



### QCL / N<sub>2</sub>O Quantum Cascade Laser

Measurement of the nitrous oxide levels in vehicle emissions is becoming increasingly important because N<sub>2</sub>O with 298 CO<sub>2</sub> equivalent possesses a very high global warming potential.

#### Application

Certification of cars and internal combustion engines in accordance with future emissions legislation, e.g.

- EPA 40 CFR 1065
- EPA 40 CFR 1066, WLTP GTR
- Meets the requirements in terms of EURO VI
- Universal application in research, development and quality assurance

#### Benefits

- Compact stand-alone or 19" rack-mount analyzer module
- High selectivity and sensitivity
  - no cross sensitivity to CO, CO<sub>2</sub>, H<sub>2</sub>O, NO<sub>x</sub>, C<sub>x</sub>H<sub>x</sub>
- Easy operation and calibration
- Short rise times T<sub>90</sub>: < 2 sec.
- Low detection limit: < 10 ppb
- No LN<sub>2</sub> cooling required

#### Measuring Principle

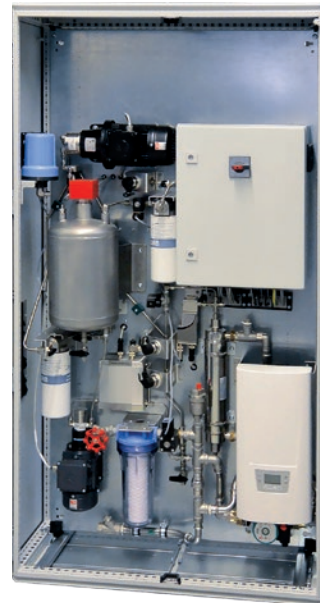
The QCL laser module is designed to emit laser light to measure N<sub>2</sub>O in the MIR range. The advantage of using a Quantum Cascade Laser is the extremely narrow band width of the emitted laser light, where a very high selectivity to the desired measurement component can be achieved. When measured over a long path gas-flow cell the coupled laser light is partially absorbed. The absorption rate determined by the analyzer software is a measure of the concentration of the component gas.





# Emission Measuring Systems

## Fuel Consumption Measurement



### KVM Fuel Consumption Meter

The AIP KVM fuel consumption meter has been designed for research and development with the reproducible, continuous and dynamic fuel consumption measurement in conjunction with chassis dynos, engine- and powertrain test benches.

The KVM system operates according to the Coriolis principle which ensures precise, pressure- and temperature-controlled fuel conditioning as a basis for an accurate fuel consumption measurement.

#### Application Examples

- Development tool for complete vehicles, engines and drive trains
- Development tool for ECU's, injection systems, etc.
- Range detection
- Quality inspection

## Nitric Oxide Measurement



### Chemiluminescence Detector CLD

For the reproducible measurement of high concentrations of gaseous nitrogen oxides (NO or NO<sub>x</sub>) in the ppb range from vehicle emission.

The compact 19" CLD-measuring system is suitable for integration into the AIP emission measurement system, as well as in existing systems from other manufacturers.

#### Application Examples

- Development tool for complete vehicles, engines and drive trains
- Development tool for ECU, fuel injection systems, etc.
- Quality inspection



# Emission Measuring Systems

## Mobile Vehicle Emission Analysis RDE



### Portable Emissions Measurement System (PEMS)

The compact measurement system allows for mobile exhaust gas measurement during an actual road trip. The device fitted on the test vehicle hardware includes flue gas analyzers, exhaust gas mass flow meter, a weather station a GPS system and the connection to the vehicle network for constituent evaluation. A probe delivers the vehicle exhaust gases from the test box in real-time mode. The component emissions ( $\text{CO}$ ,  $\text{CO}_2$ ,  $\text{NO}_x$  [or  $\text{NO} + \text{NO}_2$ ]) together with the associated engine, vehicle and environmental parameters are then recorded for analysis.

#### Application Examples

- Measurement and analysis of the exhaust emissions directly from the vehicle, while on an actual road trip
- Fuel consumption measurement
- Analysis for engine development and exhaust after-treatment
- Component testing

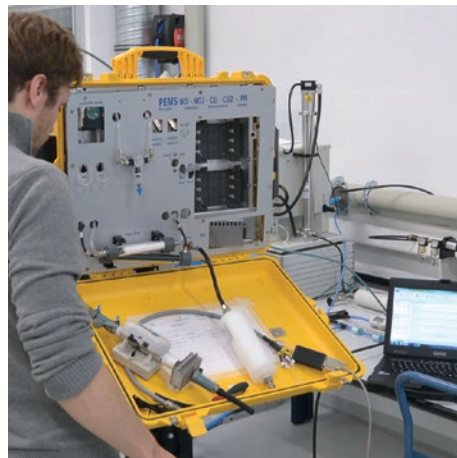




# Emission Measuring Systems



Mobile Vehicle Emission Analysis RDE

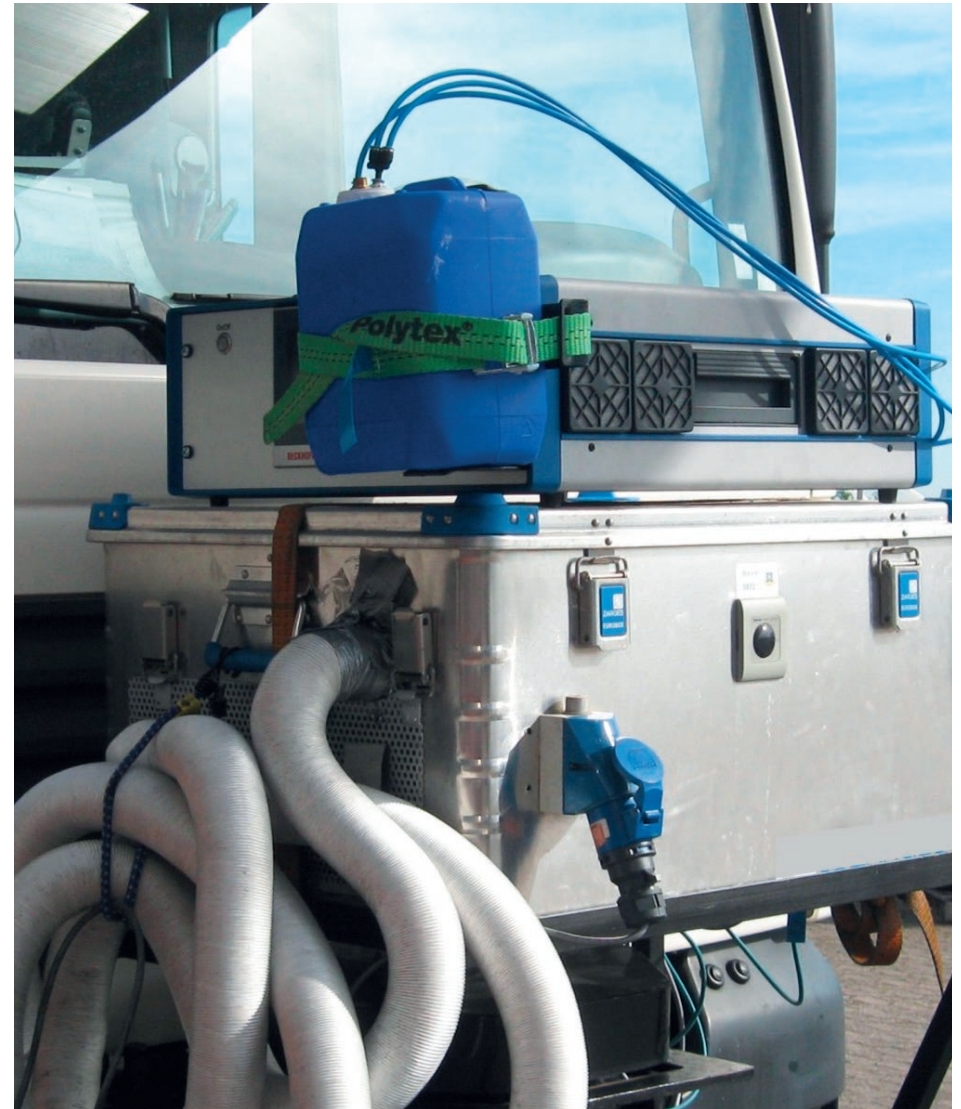






# Emission Measuring Systems

## Mobile Urea Consumption Measurement







# Emission Measuring Systems

## Mobile Urea Consumption Measurement

### DEF or AdBlue® Consumption Meter

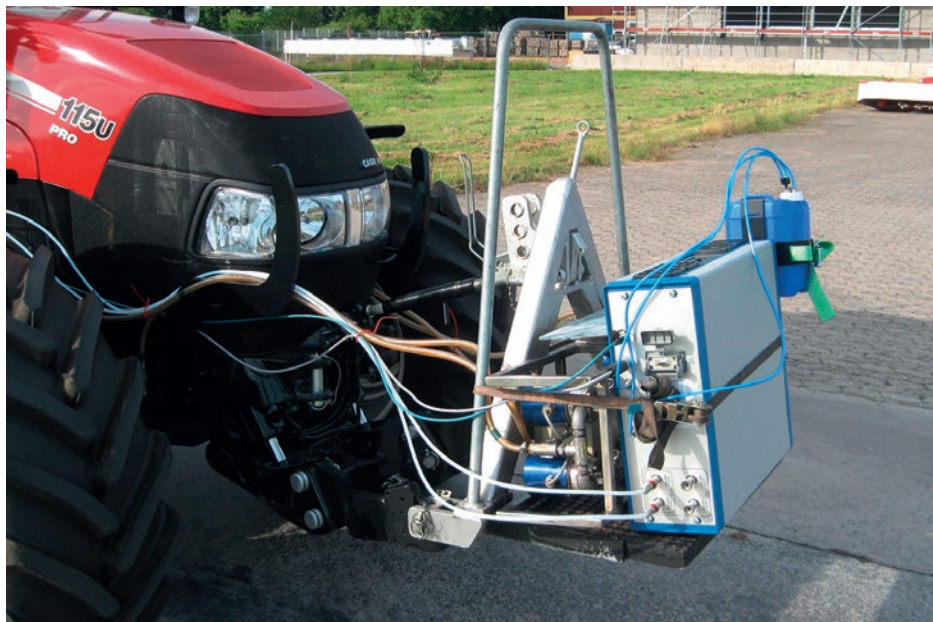
Urea  $\text{CH}_4\text{N}_2\text{O}$ , or better known as DEF or AdBlue® is added to reduce pollution of exhaust gases and to reduce fuel consumption.

Developed by AIP, the compact measuring system is suitable for stationary or mobile use and is used by vehicle manufacturers in research and development for reproducible metering, combined with road trip simulation, test bench or, 'on-board' the vehicle during a real road trip. The measuring principle of the Coriolis sensor

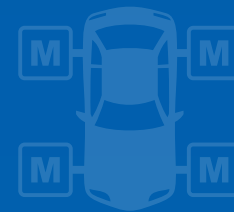
does not produce any influence on the dosing by the measuring device.

#### Application Examples

- Development tool for complete vehicles, engines and drive trains
- Range detection
- Exhaust emission measurement
- Component testing
- Quality inspection



# Research and Development







# Test Stands for R&D and COP Measurement

## Wind- and Climatic-Measurement



### CDM 75L Chassis Dynamometer (4-Motor)

For use in wind tunnels and climatic chambers to measure e.g. vehicle aerodynamics.

Different designs available for 2WD and 4WD applications

- AC-motor per roll, e.g. 300 kW
- Test speed, e.g. 300 km/h
- Temperature range, e.g.: -40°C ... +60°C
- Service aisle with integrated lifting platform to access the underbody of the test vehicle
- The service platform is used as service pit cover when lifted up in test cell floor position
- Special water management design for rain-/snowfall simulation in wind-tunnels
- Multi-motor principle, each roll has an individual motor
- Inline-principle
- Motor-in-the-middle design (MIM)
- Special thermal isolated test stand design, water-cooled drives
- Roller dia. 75" (1,905 mm)





# Test Stands for R&D and COP Measurement

## Function- and Performance Tests



### CDM-FRP Function-Performance Test Stands (Multi-Motor Principle)

Front-, rear- and 4-wheel driven vehicles can be tested under load on the test stand with repeatable road load simulation, force, speed, etc. Each roll is equipped with an individual drive.

This modular drive concept is suitable especially for 'single wheel measurement' (hybrid vehicles, wheel motors, etc.) and considerably extends the testing capabilities over traditional MIM motor design chassis dynos.

#### **Reliable Test Results Under All Conditions.**

Various test configurations are available for individual budgets and applications, for example:

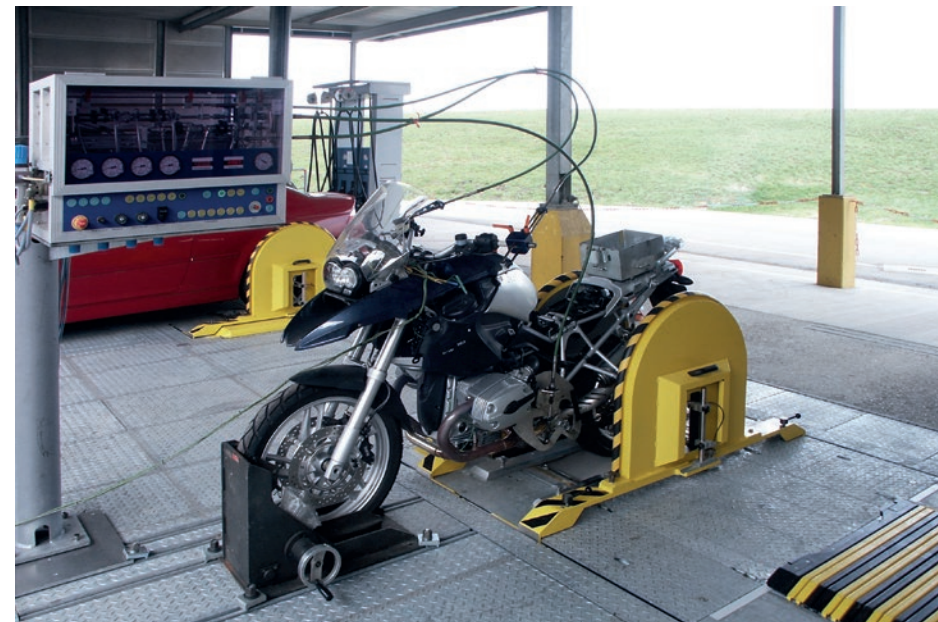
- in a wind tunnel
- in a climate chamber
- in EMC chambers with turn table
- for acoustic measurements
- in an altitude chamber





# Test Stands for R&D and COP Measurement

## Endurance for Mileage Accumulation/Quality Assurance



### CDM 48L/M and CDM 62.6 L/M Mileage Accumulation

Reproducible, automated endurance measurements in a test cell or outdoors for simulating life cycles for a complete vehicle, vehicle components and lubricants, etc.

#### Roller Diameter 48" or 62.6"

- Motor-in-the-middle (MIM) design for compact pit dimensions
- Robust system design, low maintenance
- Easy to access with optional sub-systems:
  - Throttle actuator or automatic driving robot
  - Data collection/data processing systems
  - Vehicle cooling fan
  - Automatic refueling
- Test speeds up to 350 km/h (option)
- Optional: Various performance packages as well as noise reduction modifications available, e.g. to reduce tire noise

#### Example

Motorcycle adaptation kit for two-wheeled cycle test in conjunction with a 48" or 62.6" chassis dynamometer

- Reduced mechanical base inertia
- Noise absorbing safety barriers and roller coating (optional)
- Vehicle positioning sensors, integrated in the test stand safety loop





## Test Stands for R&D and COP Measurement







# Test Stands for R&D and COP Measurement

## Electromagnetic Compliance (EMC) Measurement



### CDM 37.5L / EMC Chassis Dynamometer

2WD or 4WD roller test stands for light and medium duty vehicles, motorcycles, ATVs for the indoor measurement of electromagnetic compliance of the test vehicle driving on a rolling road.

Reproducible measurement of internal and external EMC effects created through the vehicle to the environment or vice versa.

#### Roll Diameter 37.5" (953 mm)

- Special AIP motor design to avoid emission of electromagnetic disturbance
- Multi-motor-design (individual drive motors for ea. roll) rolls can be controlled individually, e.g. for ABS tests, traction control tests or other vehicle tests
- E.g. 121 HP (90 kW) per motor (other power packages available)
- Test speed up to 124 mph (200 km/h) – other configurations upon request
- Option: P-JAMES EMC Drive Robot pneumatic brake, - clutch actuator as well as steering wheel actuator designed for EMC test



- Option: turntable, integrated in the test stand decking, to align the test vehicle into different angle positions toward the EM-antenna while driving the vehicle on the rolling road

Different diameters available.

The AIP Chassis Dynamometer design has no "detectable RF-radiation" in the frequency range between 30 kHz ... 3 GHz!





# Test Stands for R&D and COP Measurement

## Noise, Vibration and Harshness (NVH) Measurement



Service aisle in between the covered rolls allows for easy access underneath the test vehicle to install microphones or other sensors.

Option: Individual roll surface plates for a reproducible simulation of road surfaces.

### CDM 75L NVH Chassis Dynamometer

For the measurement and analysis of

- exterior noise (pass-by measurement)
- internal noise (comfort measurement)

Roll Diameter 75" (1.905 mm)

- 4-motor design (inline)
- Various road surface simulation shells for the simulation of different road surface conditions (e.g. rough asphalt, small cobbled streets, etc.)
- Soundproofed rolls for preventing the 'bell effect'
- Integrated service center pit with height adjustable service platform

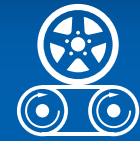
- Water-cooled drive motors
- Special vehicle restraining systems (e.g. wheel hub fixation) available
- Drive motors, rolls and test stand decking are sound-absorbing insulated to reduce the noise to test e.g. 41 dB(A) at 50 km/h
- Test speed to 250 km/h

Optional various performance and climatic pack-ages available.

Multi-motor principle: each roll is driven individual by a liquid cooled AC motor (single wheel measurement possible).







# Flat Track Systems for R&D and COP Measurement

Simulation of Road Drives in the Laboratory



## FRDM 20L Flat Track Dynamometer 'NewtonFinder'

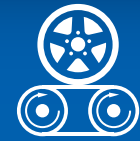
Designed for the study of very small frictional losses in the drive train.

The new testing method 'Newton Finder' enables high-precision measurement of the traction forces (Fx-forces). Each Newton, initiated by the vehicle, is measured accurately.

- Exact reproducibility of measurement conditions to reduce fuel consumption and CO<sub>2</sub> emissions
- Verbatim following of driving cycles with cornering, incl. steering operations

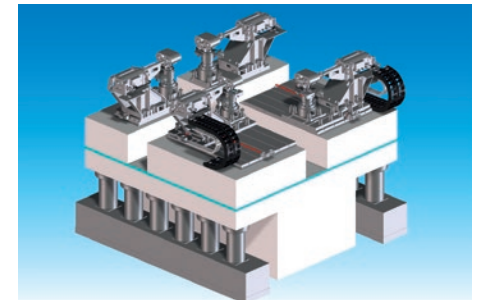
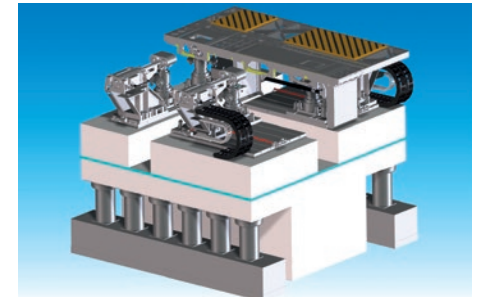
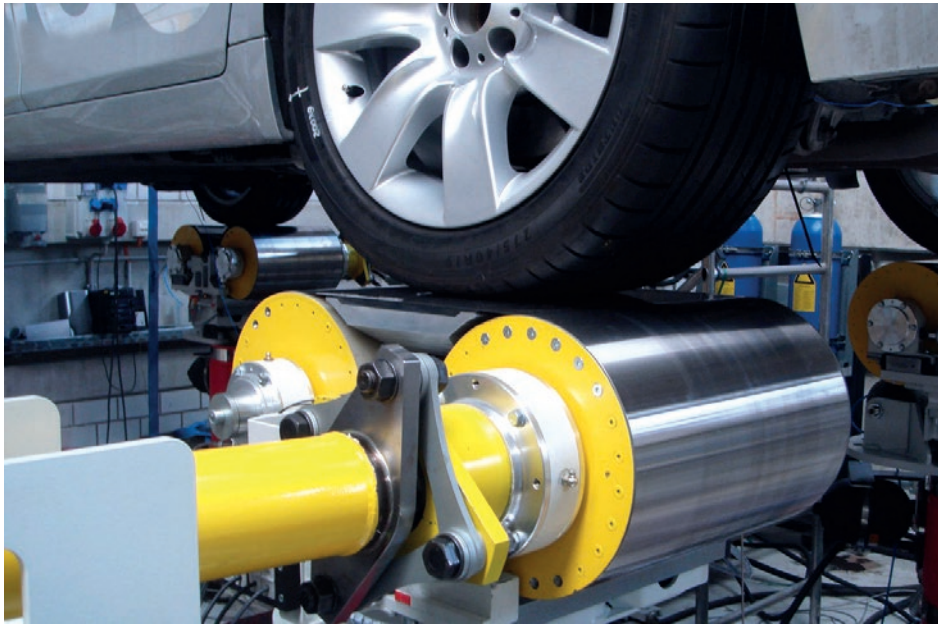
### Features

- Very compact, ergonomic design
- Highly dynamic built-in drive unit available
- Precise determination of the drag losses in simulated real driving conditions
- Maximum 0.4 mm deviation of the lateral band position during a steering operation
- Optional: 4-belt system with center belt for additional simulation of the road surface under the vehicle between the wheels



# Flat Track Systems for R&D and COP Measurement

## Acoustics and Vibration Control



### FRDM 12L

#### Pulsed Flat Road Dynamometer

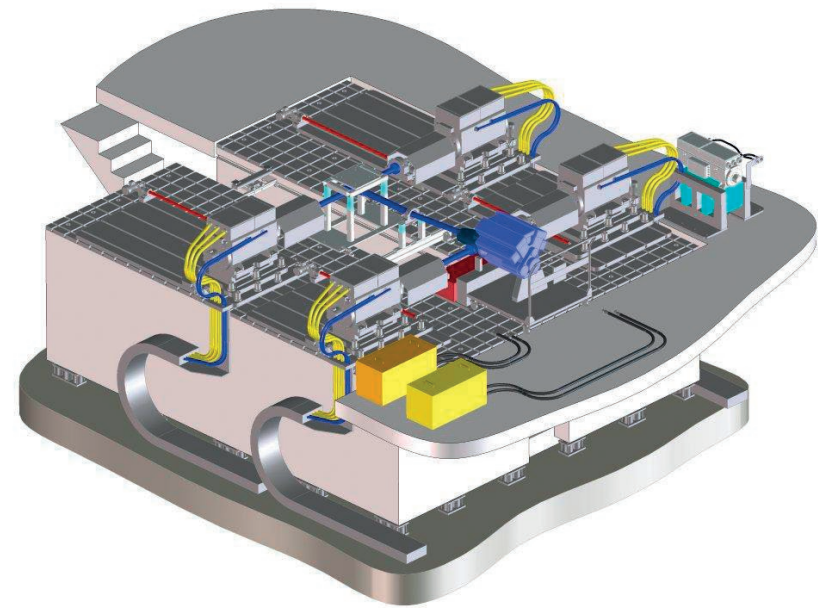
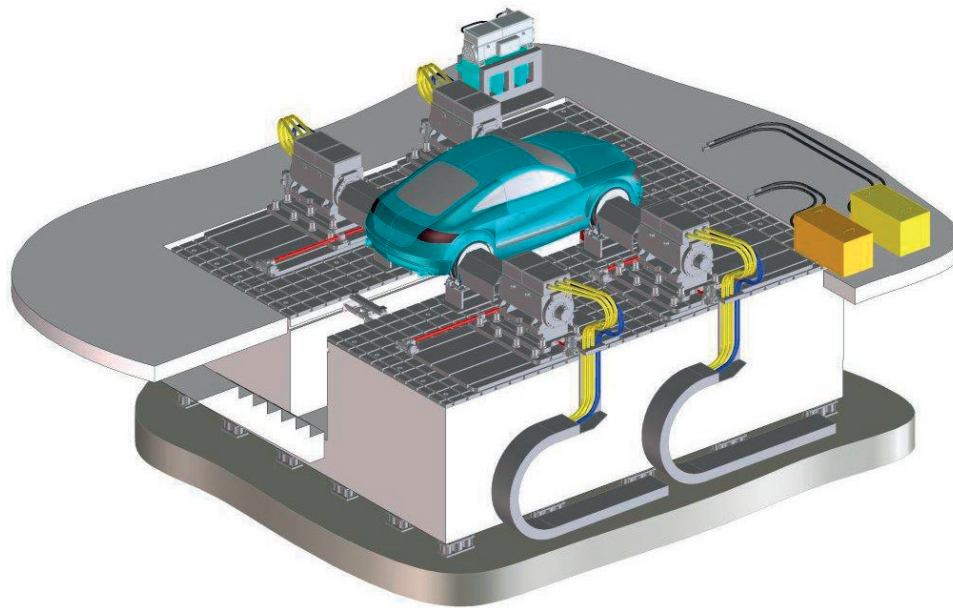
The pulsed flat road dynamometer provides highly dynamic excitation of the individual wheels in the vertical and horizontal direction during a road drive simulation. A robot driver operates the vehicle during an automatic test. The excitation of the vehicle wheels in the vertical direction provides realistic simulation of various road surfaces (i.e. pot holes, gaps, cobblestone streets, bridge joints, etc.). This system allows for either full vehicle or individual vehicle components to be tested.

#### Application Examples

- Study of the long-term stability/fatigue
- Noise analysis of complete systems and individual vehicle components
- Durability analysis
- Optimization of spring and damping behavior



# Powertrain Dynamometers



**Powertrain or engine test rig for analysis of the entire vehicle, the complete vehicle drivetrain or the components.**

Depending on the test requirements, the test stand configuration is setup for static- or dynamic tests.

Highly dynamic drives are used to derive torques in the test setup or to obtain them. Optionally, additional stimulations, such as the road surface simulation can be integrated by using hydraulic actuators in the test procedure.

## Application Examples

Realistic road driving simulation by tracing predetermined driving cycles or road profiles.

- Evaluation of energy efficiency
- Fuel consumption measurement and CO<sub>2</sub> emissions determination
- Range detection
- Exhaust gas measurement

Testing of the complete drive train in the entire vehicle or as an aggregate setup with bus simulation.



**Pulsed Power Train Dyno (Hub dyno combined with hydraulic shaker)**  
for the highly dynamic excitation of the individual wheels in the vertical and horizontal direction during a road drive simulation.





# Wind Tunnel Balance for Research & Development

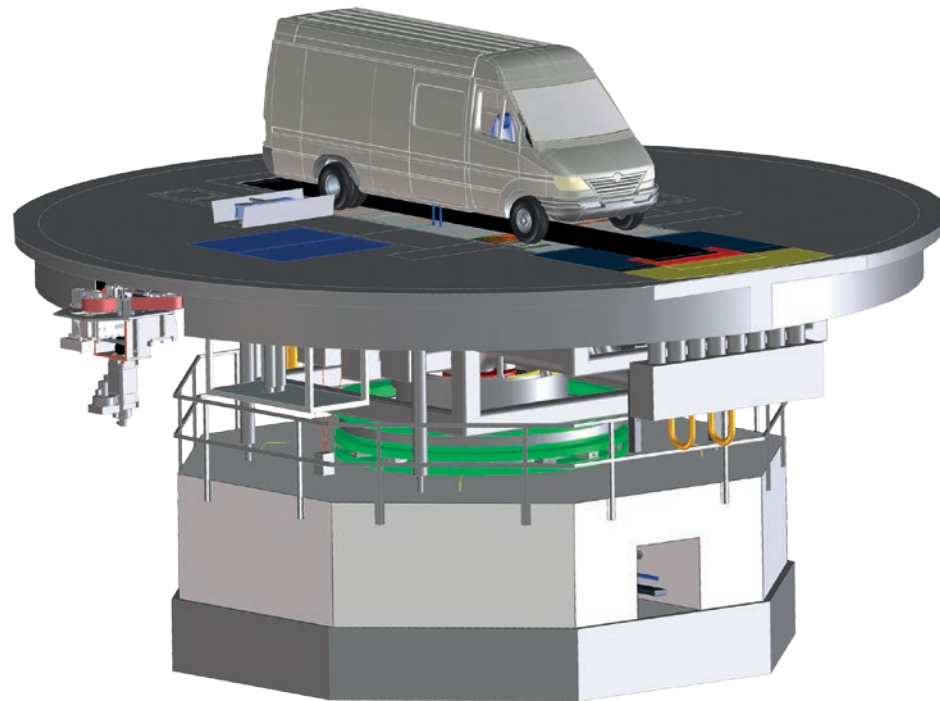






# Wind Tunnel Balance for Research & Development

## Aerodynamic Studies



### FRDM 20L Wind Tunnel Balance with Integrated 4WD Flat Track Dyno

For the development and basic research in the field of aerodynamic research on cars, delivery vans and racing cars in an aero-acoustic wind tunnel.

#### Test Stand Design (Example)

In order to come as close as possible to the real wind conditions which impacts a vehicle during a road trip, those conditions are simulated on a wind tunnel balance with an integrated flat track dyno ('rolling road').

The test project shown (example) includes, e.g. a 5-belt system, consisting of a driven belt unit



built into a turntable (e.g. 12 m diameter), which is combined with a high-resolution balance system.

This wind tunnel balance is primarily used for the reproducible determination of the forces introduced by the vehicle in x-y-z direction as well as for the precise measurement of induced roll-, pitch- and yaw moments. In addition, e.g. a sill-stacker cranes (SHE) to the horizontal fixing of the vehicle when turning wheels (wheels are driven by the WDU, vehicle's engine is not active) is included.

#### Test Bench Key Data (Example)

- Application for 2WD and 4WD vehicles
- Axle load max.: 2,000 kg
- Test speed max.: 265 km/h
- Wheelbase: min. 1,750 mm ... max. 3,750 mm
- Total weight (including turntable/wind tunnel balance): approximately 80 tons

For optional service accessibility, the center belt can be raised using the integrated lifting equipment.

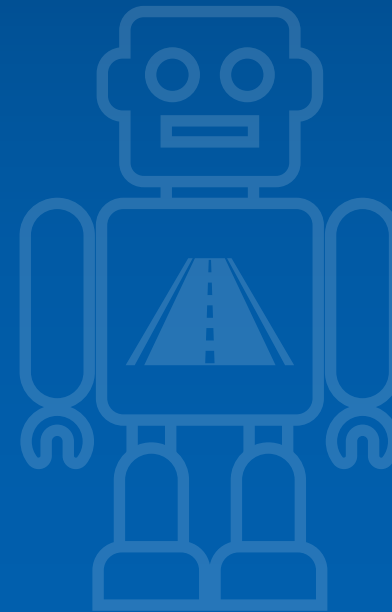
Further information available upon request.

(WDU – wheel drive unit) per wheel and a Center Belt (CB) for the simulation of the road surface under the test vehicle.

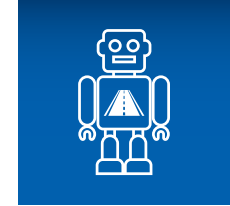
The AIP-5 belt system allows versatile use for reproducible aerodynamic and aero-acoustic measurement tasks (example: Cd value optimization, component strength test, ...).

For measurements with inclusion of crosswind effects on the test vehicle, the flat track dyno is

# Driving Robot







# Automatic Driving Robot JAMES

## Highly Reproducible Drive Cycles



## Automatic Driving Robot JAMES

The automatic driving robot JAMES was developed with the view to an intelligent and modular system design. This allows extremely short set-up/installation times and a simple, menu-driven operation. The application is usually in automated road driving simulations on a chassis dyno or on flat track dyno, requiring a high degree of reproducibility and accuracy.

### Application Examples

- Emission tests
- Mileage Accumulation tests
- Non-stop trips (24 hours/7 days)
- Reproducible road drive simulation in NVH-, Altitude- or Climatic Chambers
- Automated driving under adverse or hazardous environmental conditions

### Features

- Fuel consumption optimized (energy optimized)
- Emission optimized
- Compact, modular design
- Rugged design, low wear and minimal service
- Threaded spindle free driven linear-actuators (pending patent) for a high dynamic control of the pedals and the gear shift assembly
- Weight saving design
- Simple, fast installation (< 8 min.)
- Simple, menu driven setup (teach-in)

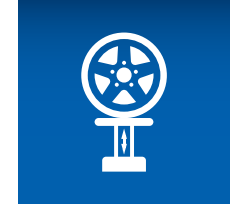


P-JAMES  
Pneumatic operated  
drive robot for  
EMC measurement

# Test Stand Automation







# Test Stand Automation

## Hydraulic Road Simulators (Shaker)



### Road Simulator

**Precise examinations of noise sources, endurance test, component tests, fatigue tests, etc. under dynamic loads is possible.**

#### Quality Benefits

Critical driving ranges can be driven repeatedly, modified and or reinforced without limits using dynamic road simulators. An exact analysis can be presented in detail concerning possible sources of disturbances and influencing variables.

#### Cost Advantages

Road simulators are used in conjunction with climate chambers and solar systems to achieve a substantial reduction in costs and time when compared to conventional testing involving real road driving under variable climatic conditions.

#### Application Examples

- Research of endurance stability/signs of fatigue
- Noise analysis of total systems and individual components
- Serviceability analysis
- Optimization of spring and damping properties

#### Generally

Depending on the application, hydraulic simulation test stands can be a one-poster system or multi-post systems.

- One poster system (shock absorber, component test, etc.)
- Multi-poster system (road simulator, exhaust line test, etc.)
- Multi-poster system (fender test, shaker, movements with 6 degrees of motion)



### E-Shaker

- Designed for development, research and quality assurance facilities
- Research into the long-term stability and fatigue of vehicle components or the entire vehicle (lifecycle test)
- Noise analysis (squeak & rattle test)
- Fatigue analysis

#### Features

- Compact design, low mass
- Low noise, no fans
- Low heat generation
- Special designs available upon request

## A white sports car is positioned on a test track, viewed from the front. In the foreground, a control room setup includes a Dell computer tower, two monitors displaying data and graphs, a keyboard, a mouse, and several control buttons and switches. The background shows a large industrial building with a glass facade.

- Incl. local test stand control modes (constant v, constant F, road-load-simulation)
- Incl. AK-interface (Ethernet) for the connection to external control systems
- Incl. diagnostic test functions / integrated oscilloscope
- Incl. test stand diagnostic tests, based on the following regulations: GTR15, 40 CFR 1066, AAMA

GTR15

40 CFR 1066

MULTIPOINT

(Incl. street load vehicle adaptation)

### Single-axle load simulation with synchronized towing role

**Vehicle database**

**Vehicle information**

Vehicle number:

Make:

Model:

Year:

Type:

Color:

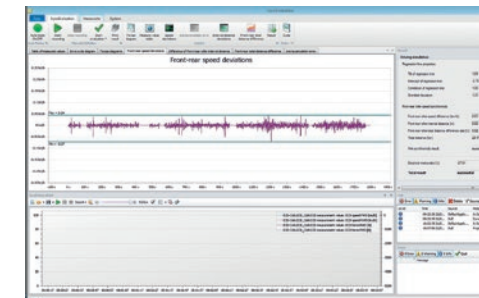
Transmission:

**Performance**

Graph showing Fuel consumption (L/100km) vs. Speed (km/h) for different engine types (A, B, C).

**Configurations**

Name	Year	Type	Target	Weight	Cost
A1	1350	115.00	3.58	19814	0.06
B1	89.00	85.00	4.59	11945	0.06
C1	85.00	75.00	7.38	7275	0.06
A2	85.00	85.00	11.57	14819	0.06
B2	45.00	15.00	25.79	2713	0.06
C2	25.00	15.00	39.37	446.9	0.06



Indirect measurement of vehicle engine power. The engine performance is calculated based on current environmental conditions and relevant regulations. Also requires suitable hardware (interface box, not included) to capture ambient conditions and the vehicle speed.

Evaluation of the test stand performance, based on the following legislation:

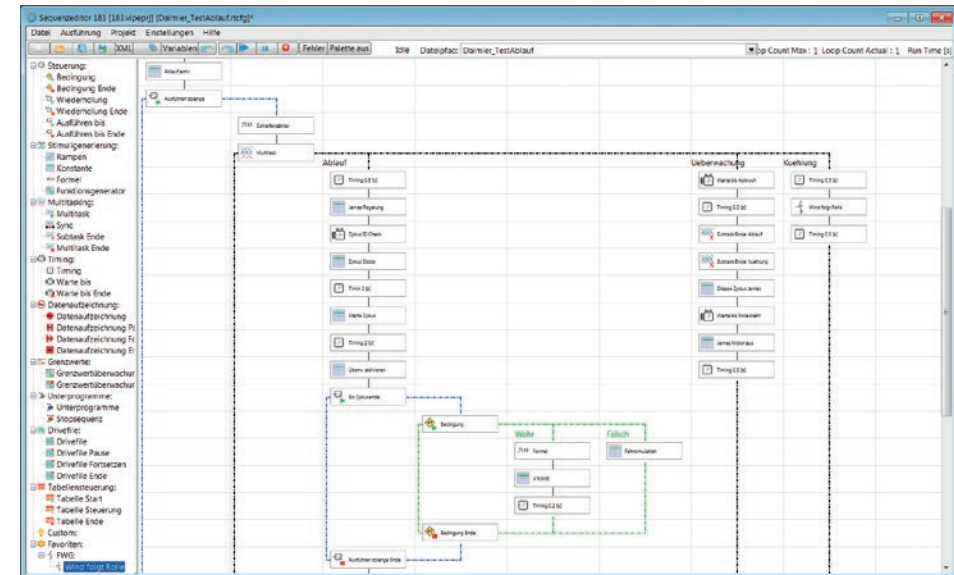
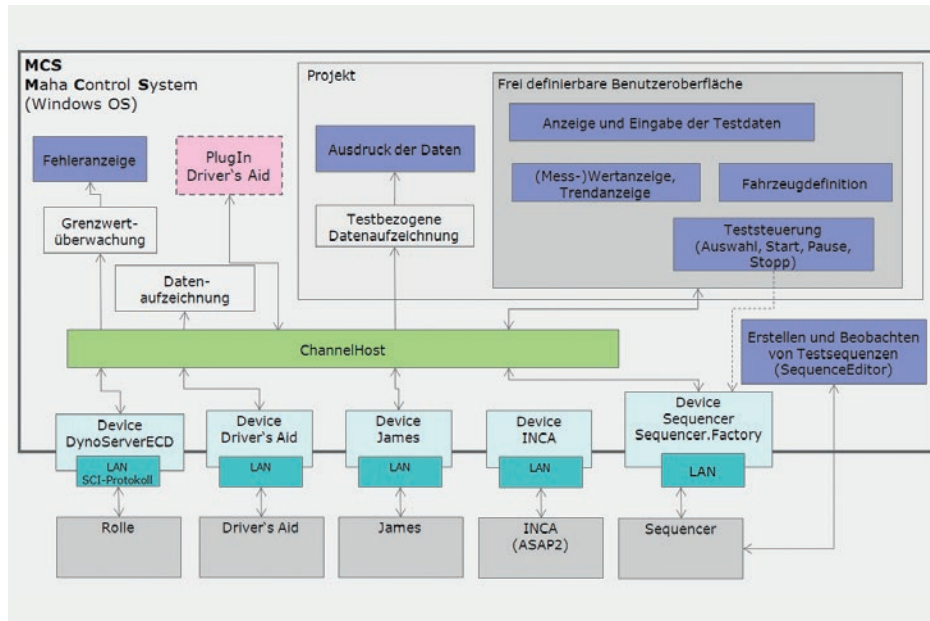
- JASO E011:2011
- GTR 15 – Annex 5 Paragraph 2.3 (4WD mode)





# Test Stand Automation

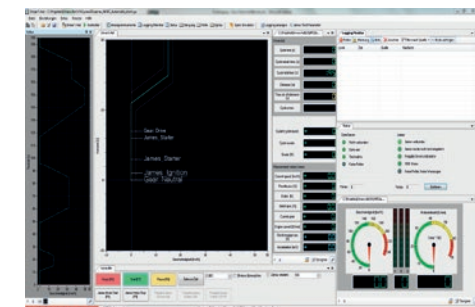
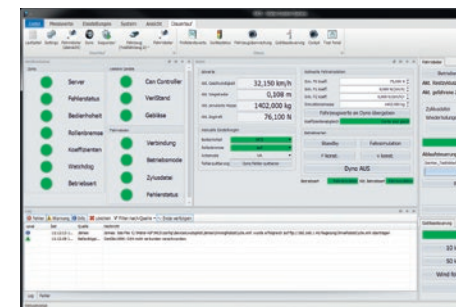
Software for System Control and Monitoring



## MCS Control System

Integral controlling and monitoring of comprehensive test stand systems and configurations

- Project management
- Test stand management
- Vehicle management
- PlugIn administration
- Creating and monitoring of test sequences
- Data recording
- Limit value monitoring
- Reporting





# Test Stand Automation

## Integrated Dyno Solution



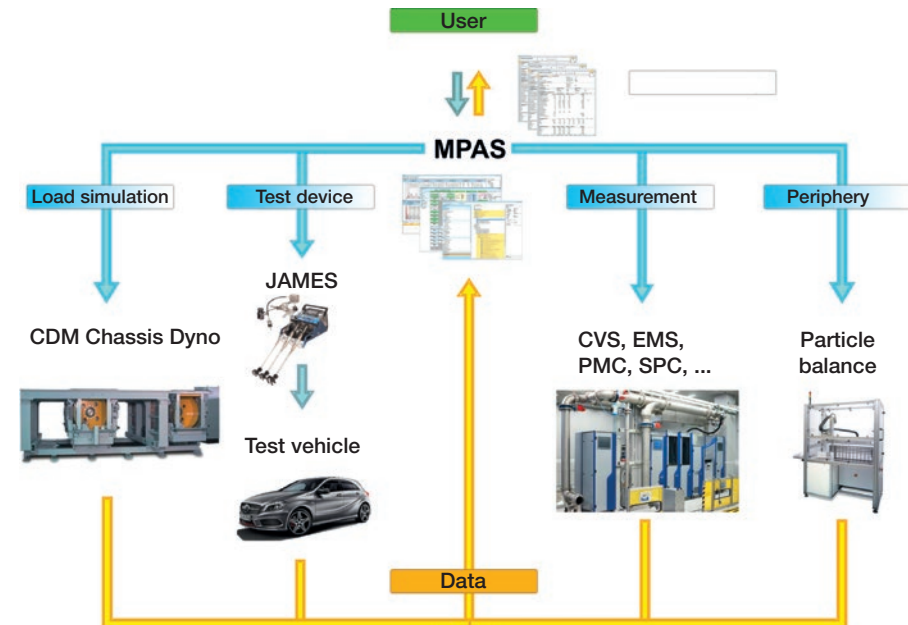
### MPAS Test Bench Automation

The comprehensive automation software MPAS was developed for single operating test rigs as well as complete test facilities with central data and or configuration management requirements.

- MPAS supports all national and international legal requirements for exhaust emission tests (light duty)
- Independent test data management, parameterization
- Analysis, recalculation and test analysis

#### Efficient

- Customer-optimized process flow
- Drag & Drop parameterization
- Easy operation
- Verifiable processes



#### Modular

- Manufacturer-independent device integration
- Easy integration of new drivers through add-in
- Open programming

#### Flexible

- Operating screens, processes, operating curves, calculations, reports, easily adaptable
- Integration of customer specific databases

#### Open Minded

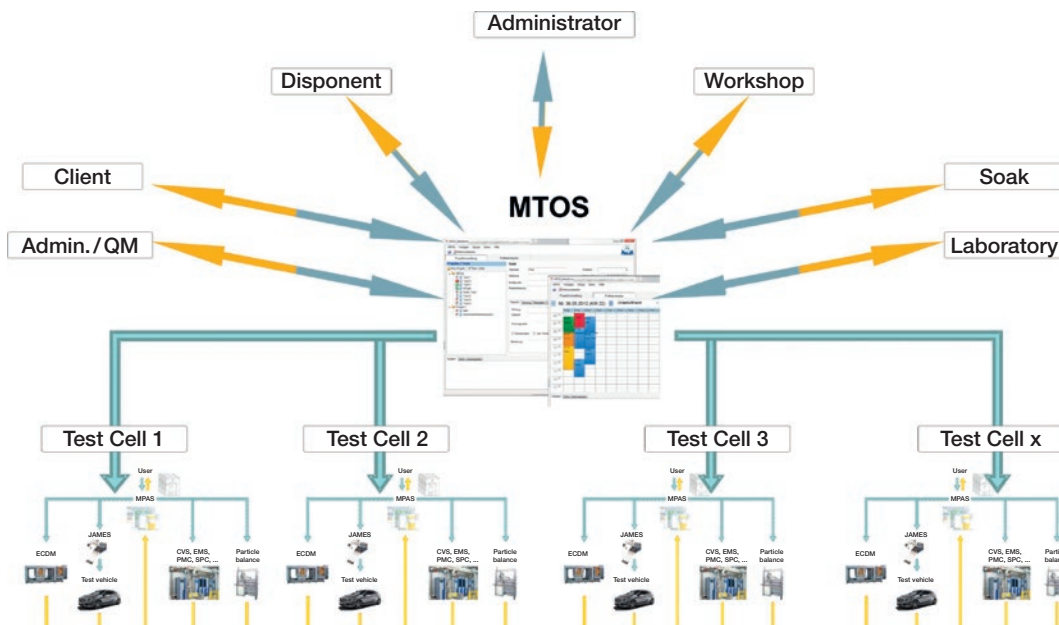
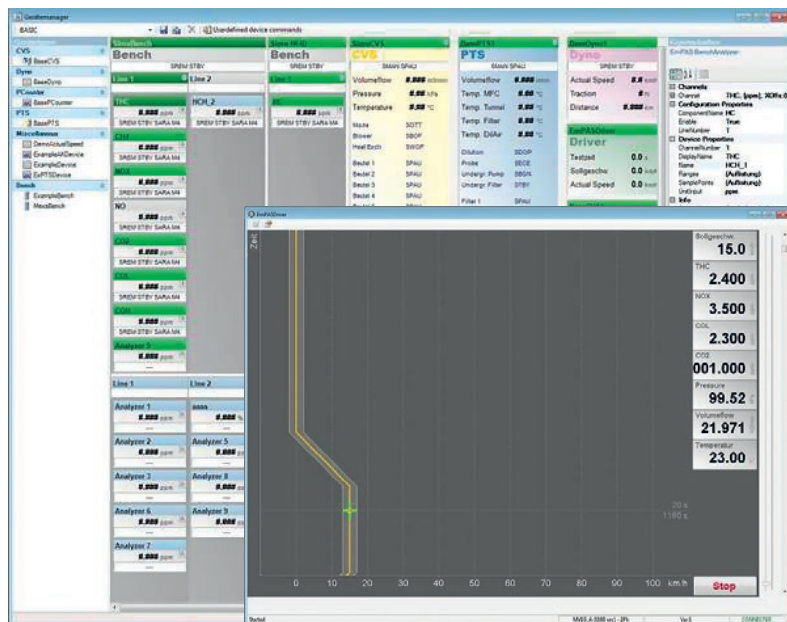
- Non-proprietary standard hardware
- Drivers reference via third party





# Test Stand Automation

## Integrated Test Facility Management



## MTOS Test Facility Management

Perform easy scheduling of respective test cell occupancy and capacity planning.

### Features

- Maximum test availability through plausibility checks during parameterization
- Easy to understand graphical Test procedure parameterization
- Consistent documentation of the test sequence
- Rapid migration of individual test benches to complete test facilities (test fields)
- Evaluation Excel-based (without macros)
- Drivers-Aid Software Module for the reproducible road drive simulations in combination with a chassis dyno
- incl. pre-installed, common driving cycles from Europe, USA, Japan, China
- incl. drive cycle editor function to create customized driving cycles

# Function







# Function-, Performance- and Brake Chassis Dynos

## Test Stands for Commercial Vehicles



### FRP 8x8 Function-Performance Roller Test Stand

The FRP 8x8 has been specially designed for conducting end of line quality and final check-out tests on commercial vehicles with 2-, 3- and 4 axles.

The system has multifunctional capabilities for conducting a wide variety of test procedures from simple driving tests up to special function tests such as TCS or differential lock functions.

### FRP / BPS Testlane for Tractors

Specially designed for end-line quality- and check-out tests. Two vehicles can be tested simultaneously using the combined "two-axle function roller test stand and brake roller test stand".



### BL Brake-Performance-Roller Test Stand for Forklifts

The BL test stand is a combined brake-performance roller test stand especially designed for model-, quality tests (DVT).

### LPS ST2AC Stationary Function-Performance Test Stand

For the examination of special vehicles (e.g. harvesters, construction vehicles, aircraft tractors, etc.) for vehicle development.



### FRP 500 / 4x4 Function-Performance Roller Test Stand

Roller test stand (4-motor units, one per roller pair) e.g. for the drive system development for heavy duty special purpose vehicles.



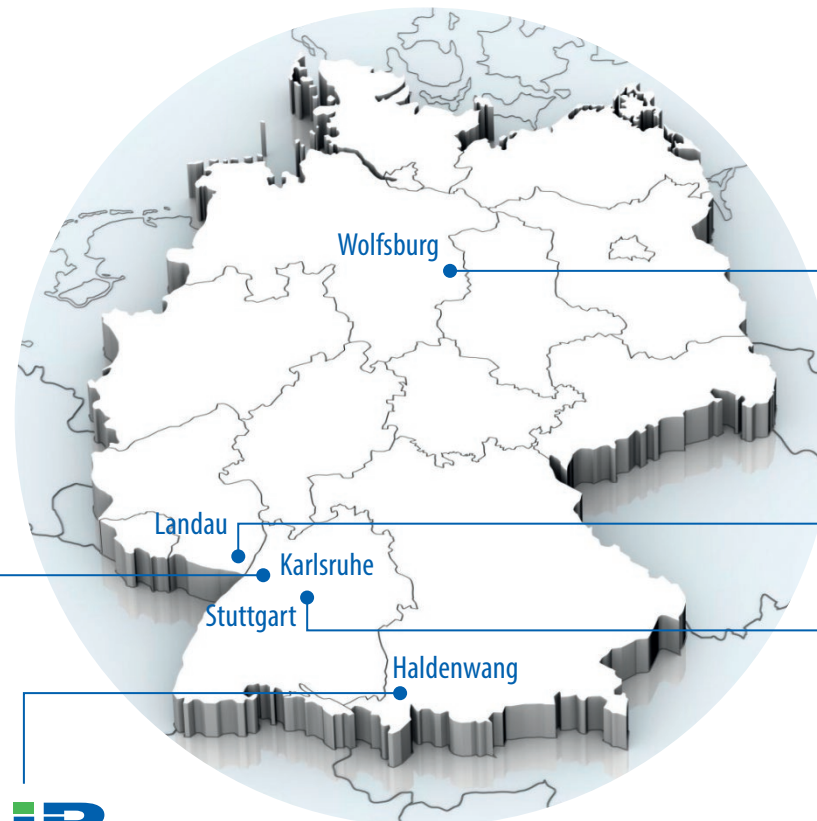
# APL Group

■ AIP ■ IAVF ■ APS ■ IVP ■ MOT

7 Locations

approx. 1400 Employees

approx. 240 Testbeds



**APL**  
|  
**IVP**

**APL**

**APS**-tech



The companies belonging to the APL Group – APL Automobil-Prüftechnik Landau, APL subsidiary Wolfsburg, APS-tech Fellbach, IAVF Antriebstechnik Karlsruhe, MOT Karlsruhe and IVP Wolfsburg – have more than 240 engine, gearbox and power train test stands combined.

AIP provides specific vehicle test benches for the realistic, reproducible simulation of road trips in laboratory operation, e.g. in the areas of exhaust measurement, endurance testing, measurement of electromagnetic compatibility, acoustic and vibration measurement. The innovative testing technology from AIP is also used in the areas of electro-mobility, autonomous driving and the development of driver assistance systems.

The individual companies within the group are responsible for their own operations and designated market segments however; synergies encourage the sharing of fundamental knowledge and technical equipment. Customers benefit from these shared capabilities which are offered as advanced services in one complete package.

More infos about APL Group:

[www.apl-landau.de](http://www.apl-landau.de)





# AIP Worldwide

## AIP Headquarters Germany



**AIP GmbH & Co. KG**  
Hoyen 30  
87490 Haldenwang / Germany

Phone: +49 (0)8374-2409-0  
Fax: +49 (0)8374-2409-551  
Email: [info@aip-automotive.de](mailto:info@aip-automotive.de)  
[www.aip-automotive.de](http://www.aip-automotive.de)



## Prime ONE Contracting / USA



**Prime One Contracting LLC.**  
4600 Danvers Drive SE  
Kentwood, MI 49512 / USA



Phone: +01 (616) 949-3333  
Fax: +01 (616) 949-7599  
Email: [sales@poc-aip.com](mailto:sales@poc-aip.com)  
[www.poc-aip.com](http://www.poc-aip.com)

Prime ONE Contracting (POC) is a veteran owned (small-business) company that was founded in 1999. Since the inception of the company the focus has been on customers and the constantly evolving testing marketplace. This attention led to continued expansion of our services & products to offer the latest advancements to customers.

Continued growth led to further expansion into foreign markets where POC was recognized by key companies in our industry. AIP located in Haldenwang, Germany was one such company that decided to partner with POC in 2008 as their sole solutions provider of test equipment for markets in Canada, USA, Mexico and Brazil. This partnership has allowed both POC & AIP to

leverage our collective strengths in R&D, engineering and support to offer a diverse portfolio of innovative products & services to our respective markets.

This partnership has secured key opportunities at the EPA, many of the OEM's and tier supplies who recognize our combined commitment, passion and ability to provide solutions which not only solve testing challenges now but in the foreseeable future as well.



## AIP Automotive China Co. Ltd



### AIP Automotive China Co., Ltd

Room E, Floor 12, YinDong Building,  
No.58 XinJinQiao Road, PuDong 201206,  
Shanghai, P. R. China

Phone: +86 (0) 21 / 6100-2071 / ext. 101  
Fax: +86 (0) 21 / 6100-2072  
Email: [info@aip-automotive.cn](mailto:info@aip-automotive.cn)  
[www.aip-automotive.de](http://www.aip-automotive.de)

The former branch office in Pudong/Shanghai was originally established in 2007 to support the AIP business with automotive industry customers (vehicle manufacturers, TIER suppliers, test facilities like CATARC, CAERI, ...) as a branch office of MAHA Maschinenbau GmbH & Co. KG.



Located in Shanghai, AIP China Sales, Project Management and Service provides reliable and competent customer care. AIP has secured almost 70 % of the Chinese market in approximately 10 years for the supply of special chassis dynos, such as NVH- and EMC-dynos, Heavy Duty Dynos.

Since 2018 the company trades in China as  
**AIP Automotive China Co., Ltd**



## AIP Agency South Korea



### CNFOENG Office / R&D Center

1001~1002ho, C dong  
INDEOGWON IT VALLEY, 40  
Imi-ro Uiwang-si Gyeonggi-do Korea, 437-120

Phone: 82-31-421-0133  
Fax: 82-31-8084-3132  
Email: [espark@cnfoeng.com](mailto:espark@cnfoeng.com)  
[www.cnfoeng.com](http://www.cnfoeng.com)



Made  
in  
Germany

AIP GmbH & Co. KG  
Hoyen 30  
87490 Haldenwang / Germany  
T: +49 (0)8374-2409-0  
F: +49 (0)8374-2409-551  
info@aip-automotive.de  
www.aip-automotive.de



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e-Mobility



Autonomous  
Driving



Test Bench  
Automation



Driving  
Robot



Vehicle  
Cooling Fan