Testing Services







eDrive Testing

- Component testing
- System & functional testing
- Durability tests
- Environmental testing
- Inverter testing
- EMC (emission, immunity)

Driveline Testing

- Lubrication & Ventilation testing
- Functional testing
- Durability testing
- Ultimate strength testing

Engine Testing

- Function - durability - emission testing
- High altitude & climate test bench
- Dynamic engine test benches
- Hybrid drivetrain testbeds 48V & HV

Thermal System Testing

- Component tests
- Module tests
- Complete thermal system tests (ViL)
- Thermal system control strategy validation
- Refrigerant system test

Battery Cell Testing

- Thermal performance characterization
- Aging / lifetime
- Engineering/development of electro-thermal cell models

Fatigue Testing

- Fatigue component tests - functional fatigue testing on system level
- Measurement data logging and processing
- Material and joint testing for FEMFAT database

Vehicle Testing

eDrive Testing

Test Configurations

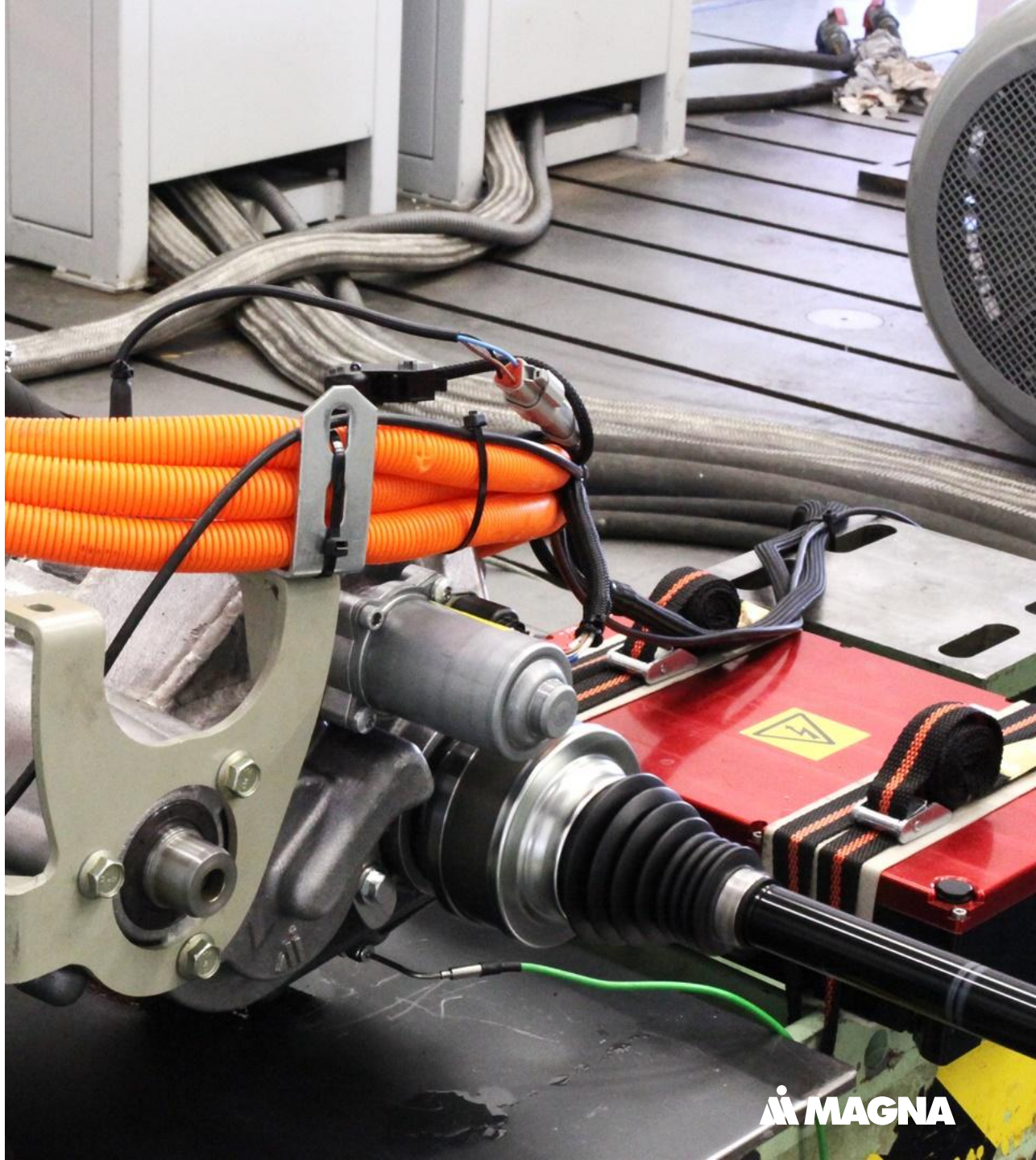
- Component testing
- System and functional testing
- Benchmarks
- Durability tests (B2B)
- Efficiency analysis

Specification and Supported Engines

- Engine speed < 20.000rpm
- Performance up to 529kW
- Environmental conditions (water, oil and environment)
- Wide range of applications: passenger car, light & heavy duty trucks, nonroad, etc.

Measurement Equipment

- Battery simulator (@1250V, 1400A)
- Regatron 48V / HV systems
- Precision power analyzer



Environmental, Inverter & EMC Testing

Thermal & Environmental Test Center
- Climatic Tests
- Thermal Shock Tests
- Coolant / Pressure Pulsation
- Vibration Tests
- Corrosion Tests
- IP Tests – Water and Dust
- Stone Chip
- Free fall

Inverter Test Field
- 3x Power Module Qualification acc. AQG324
- 1x 48V E-Motor Emulator (Power-HiL)
- 2x HV Power-HiL
- 1x HV Inverter durability test rig
- 1x Ripple Emulator
- 1 x HV function test rig (LV124/LV148)

Electromagnetic Compatibility (EMC)
- Inhouse EMC-Chamber acc. CISPR 25, 150kHz – 18 GHz, Semi-Anechoic Chamber

Thermal eDrive System Testing
- Calibration of thermal protection & de-rating strategy

Driveline Testing

Lubrication & Ventilation Testing

Functional Testing

- Bearing adjustment
- Contact pattern
- Shifting of gears
- Engagement of locks
- Clutch characteristics
- Temperature behavior loaded
- Efficiency measurement
- NVH measurements

Durability Testing

- Gears, Bearings
- Differential
- Seal rings
- AWD clutch
- Actuation system
- Park lock

Ultimate Strength Testing

- Static ultimate strength testing
- Dynamic ultimate strength testing

Dynamic Tilt Test Bench

Validation of Design / Optimization

- Lubrication
- Ventilation (Breather function)
- Temperature behavior (unloaded)
- Drag torque (spin losses)
- Max. Payload 500kg
- High dynamic tilting

Inclinations

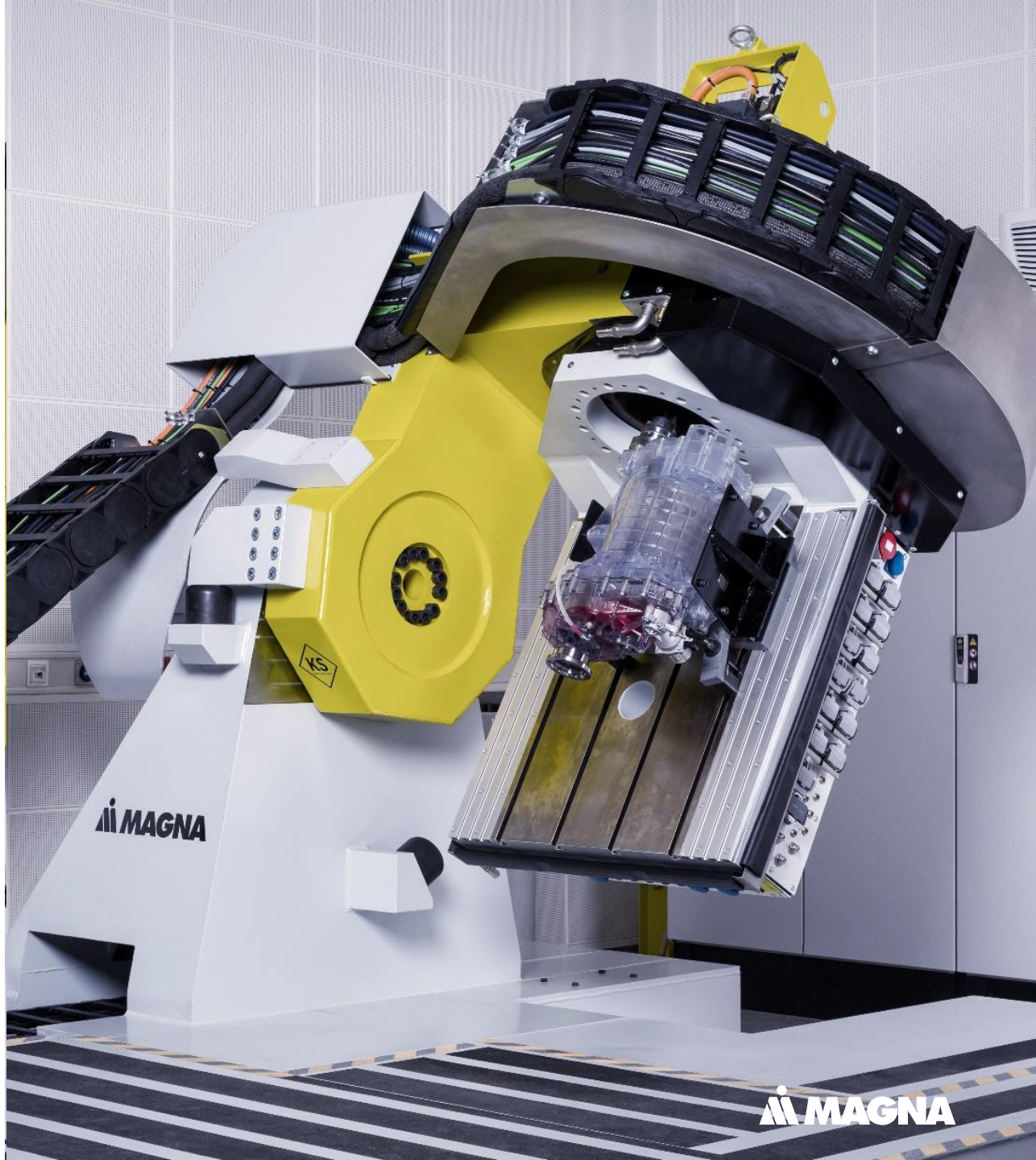
- Longitudinal ± 60°
- Lateral ± 60°
- 120°/s tilting speed

Drive

- Power 27,5 kW
- Speed ± 10.000 rpm
- Torque ± 130 Nm

Measurements

- Torque Flange; 200 Nm
- Pressure, Temperature, CAN, Analog I/O...



Engine Test Bench

Main Development Topics

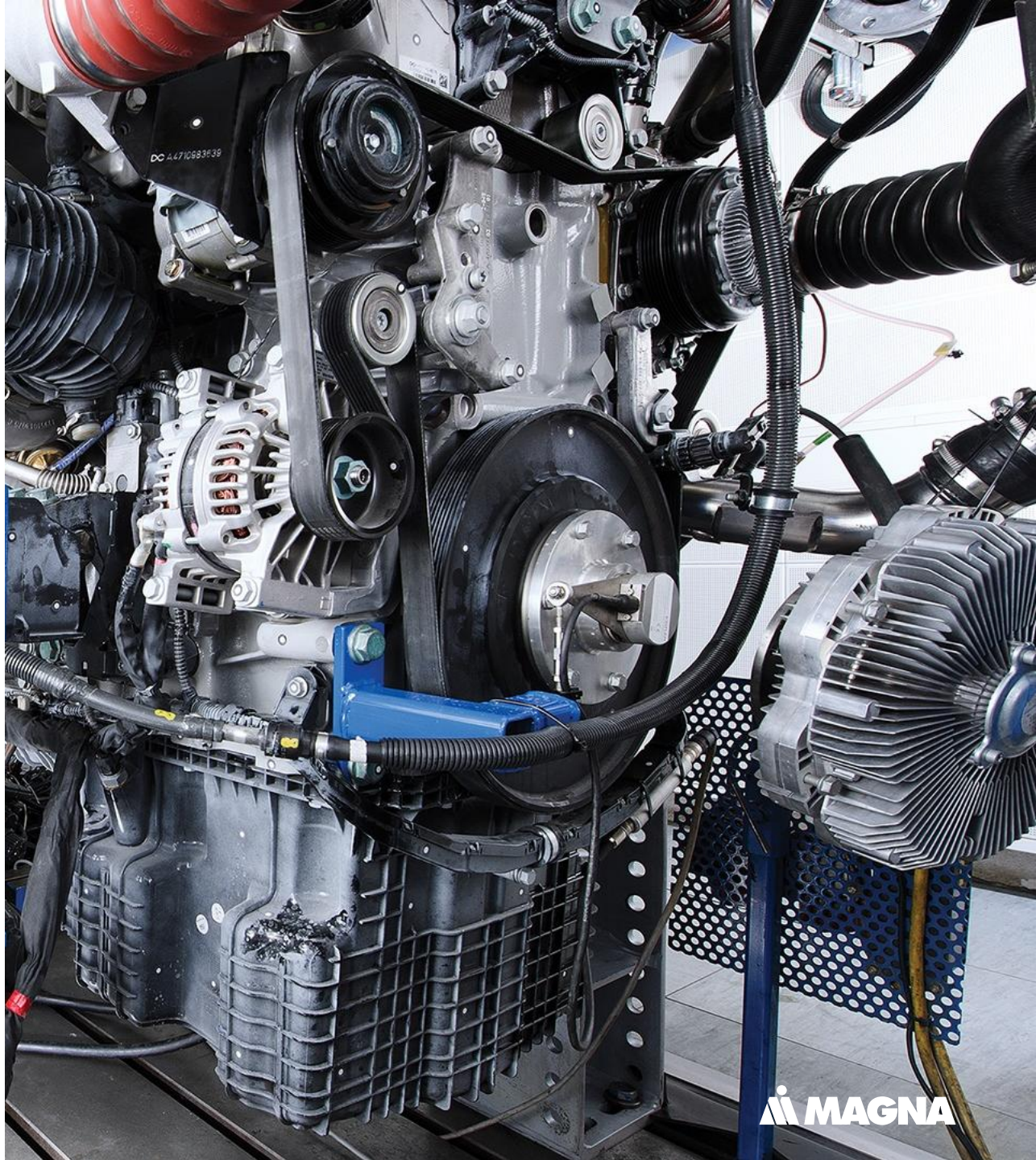
- Dynamic and steady state testing
- Function & durability testing
- Engine and OBD calibration
- Exhaust gas after treatment calibration and development
- Component testing
- Engine benchmark
- Engine homologation
- Frictional power analysis

Specification and Supported Engines

- Compression and sparked ignition engines
- Power range: up to max. 520kW
- Field of applications: passenger car, light & heavy duty trucks, nonroad, ….

Measurement Equipment

- AVL FTIR/IAG FTIR
- AVL Micro Soot
- AVL Particle Counter
- AVL Opacimeter
- AVL Coriolis
- AVL Indicating System
- AVL Flow Sonix
- AVL Fuel Measurement
- Horiba Mexa
- Oil Soot Analyzer
- Smart Sampler
- 48V Powersupply
- And many more…



High Altitude & Climate Test Bench

Test Chamber

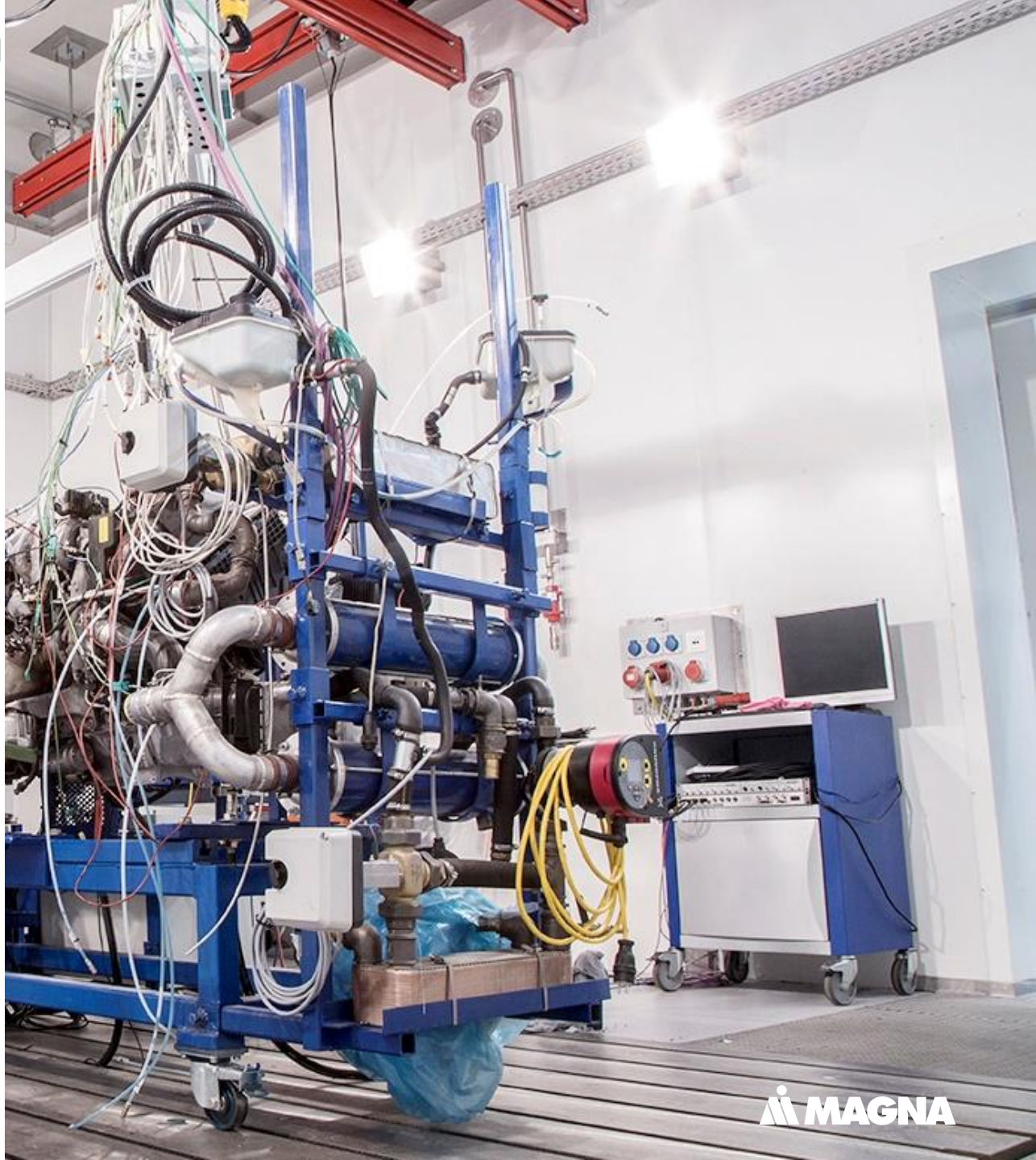
- Max. altitude: 5000m (540mbar)
- Mech. performance: 520kW
- Electr. Performance: 180kW@800V
- Torque: 3100Nm
- Max. speed: 8000 U/min

- Humidity abs.: 24g/kg
- Rel.: 95% @ T< 28°C
- Temperature: -30°C / + 50°C

Emission Measurement Equipment

- COH/CO2 -Analyzer
- COL -Analyzer
- CO2 -EGR –Analyzer
- CO2 -Analyzer
- THC -Analyzer Heated
- NO, NO2 u. NOx -Dual Detector (Analyzer heated)

- Accuracy class 1% full scale or 2% of reading
- Sampling rate1 Hz
- FTIR
- AVL Particle Counter
- AVL Micro Soot



Thermal System Testing

Test Configurations

- Component Tests (Radiators, HV heater, AC Compressor,…)
- Module Tests (Cooling Circuit, A/C System, HVAC System,…)
- Complete Thermal System Tests (ViL)
- Thermal System Control Strategy Validation
- Refrigerant System Test (R1234yf, R290, R744, …)

Test Chamber

- Ambient
  - Temperature -15 °C to +50°C
- Air flow
  - Air flow circuits 2 circuits
  - Air flow 1 up to 8000 m^3/h
  - Air temperature 1 -15 to +50 °C,
  - Air flow 2 up to 800 m^3/h
  - Air temperature 2 -15 °C to +50 °C, up to 80% rH
- Coolant
  - Cooling circuits 4 circuits
  - Coolant temperature -20 to +90 °C
  - Coolant volume flow up to 50 l/min
  - Heating performance up to 24 kW
  - Cooling performance up to 17 kW
- HV Supply
  - Voltage up to 800 V
  - Power up to 32 kW
- Measurement equipment
  - Air mass flow
  - Air speed
  - Humidity
  - Temperature (air, coolant, refrigerant)
  - Pressure (air, coolant, refrigerant)
  - Coriolis mass flow measurement device
  - Refrigerant mass flow
  - Coolant volume flow
  - Oil circulation rate (OCR)

Battery Cell Testing

Test Configurations

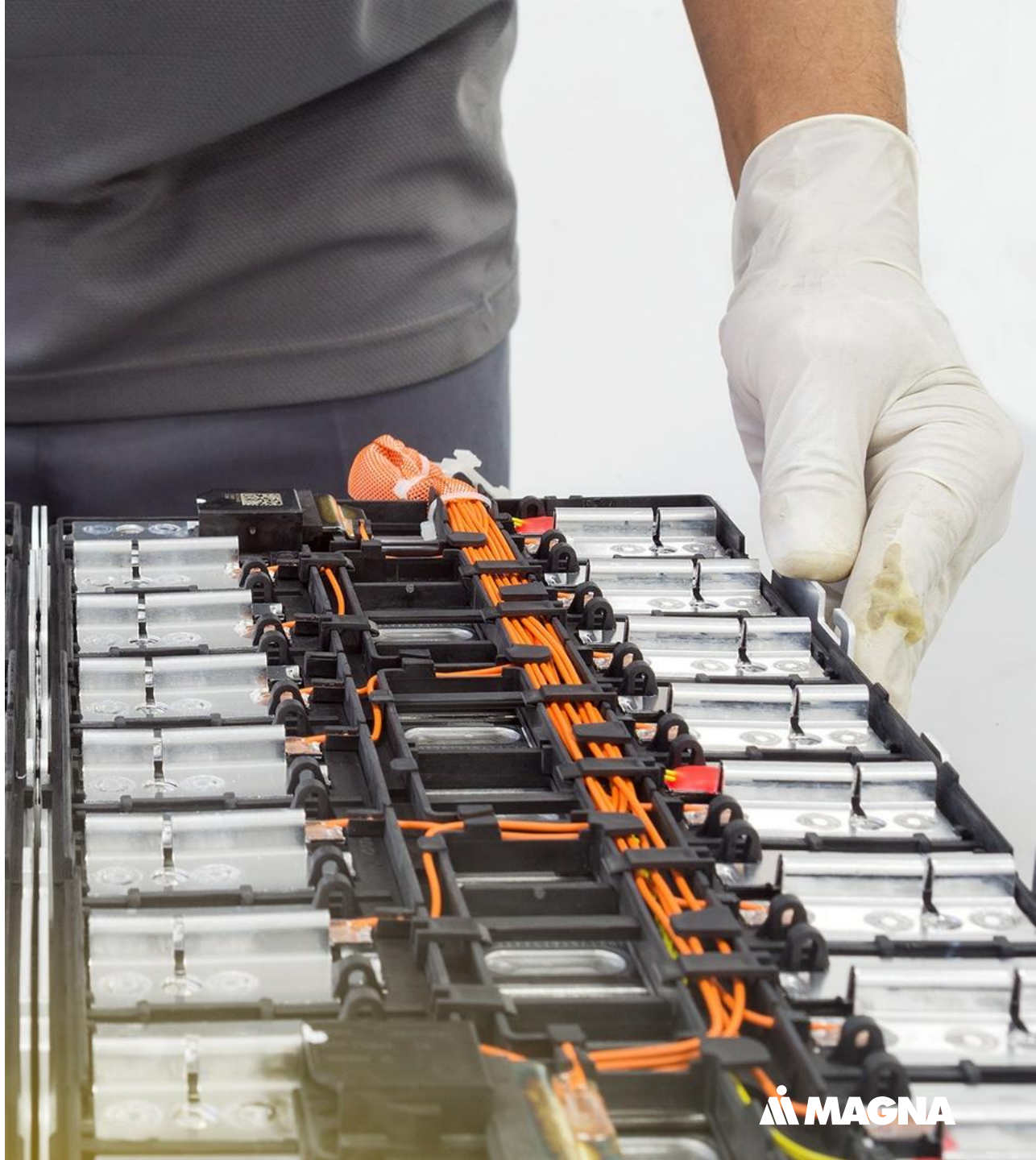
- Electrical characterization (performance, capacity, inner resistance)
- Thermal performance characterization
- Aging / lifetime
- Engineering/development of electrothermal cell models

Temperature Chamber

- - 40 to 90°C
- 5 K/min
- 4500 W heat compensation
- 1000 l
- Safety: HL5

Cell Cycler

- 0 – 5 V
- 12 channels á 50 A
- 4 channels á 600 A
- Parallelization up to 2400 A
- ± 0,01 % @ current
- ± 0,025 % @ voltage



Fatigue Laboratory / Fatigue Testing

Equipment & Infrastructure

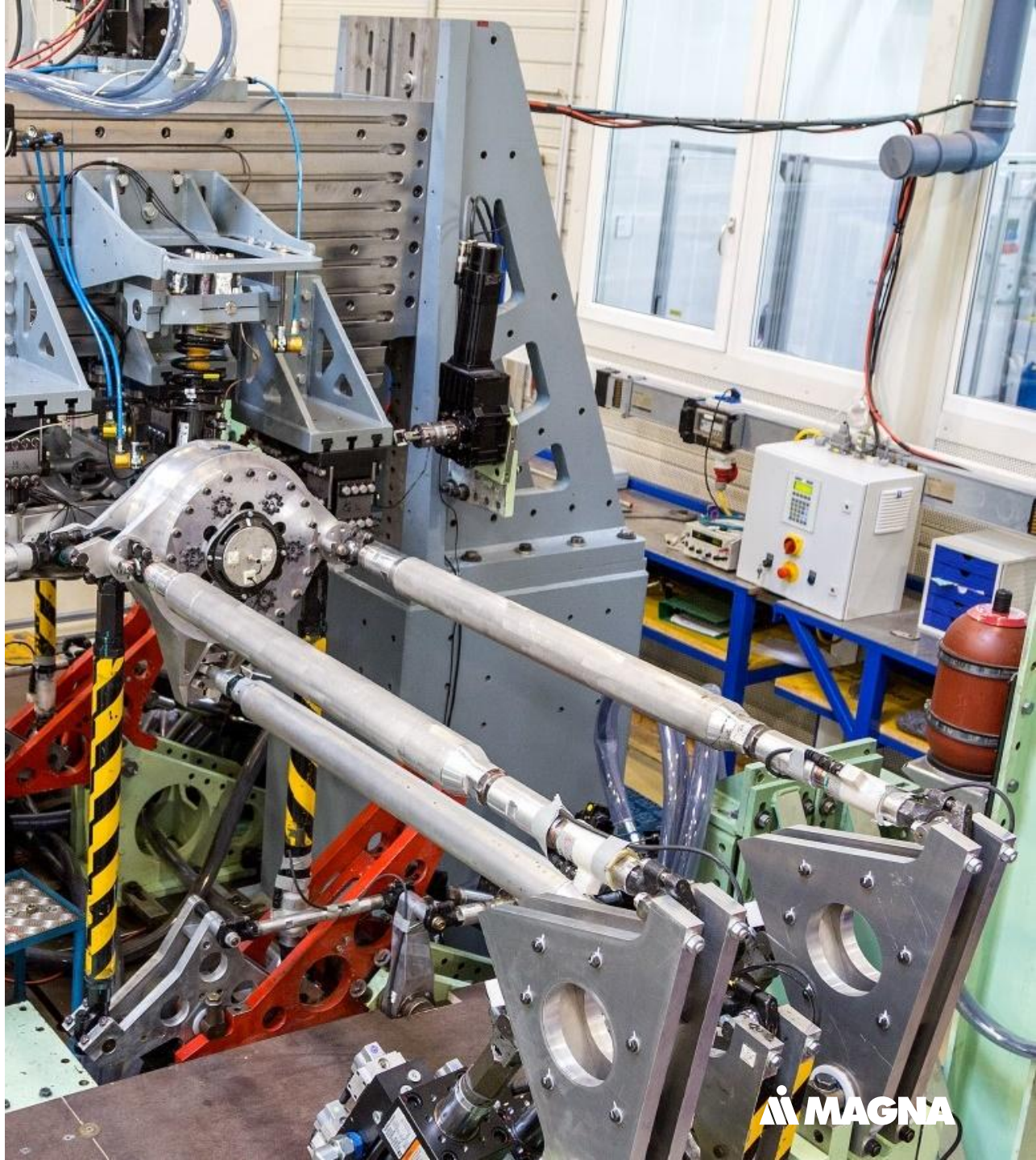
- 250 servo-hydraulic actuators
- Forces between 10kN – 500kN
- Frequency up to 100Hz
- Up to 40 actuators can be controlled simultaneously
- 9 foundations (Up to 500tons)
- Max. weight of specimen 50tons
- Flexible modular test rig systems

Main Testing Topics

- Body fatigue
- Axle and suspension
- Exhaust system
- Frame and subframe
- Steering system
- Front end
- Other attachment parts and components
- Measurement data logging and processing

Fatigue Testing Workflow

- Temperatures
- Pressure
- Volume Flow
- Creation of test program
- Test rig iteration
- Fatigue testing



Fatigue Laboratory / Fatigue Testing

Equipment & Infrastructure

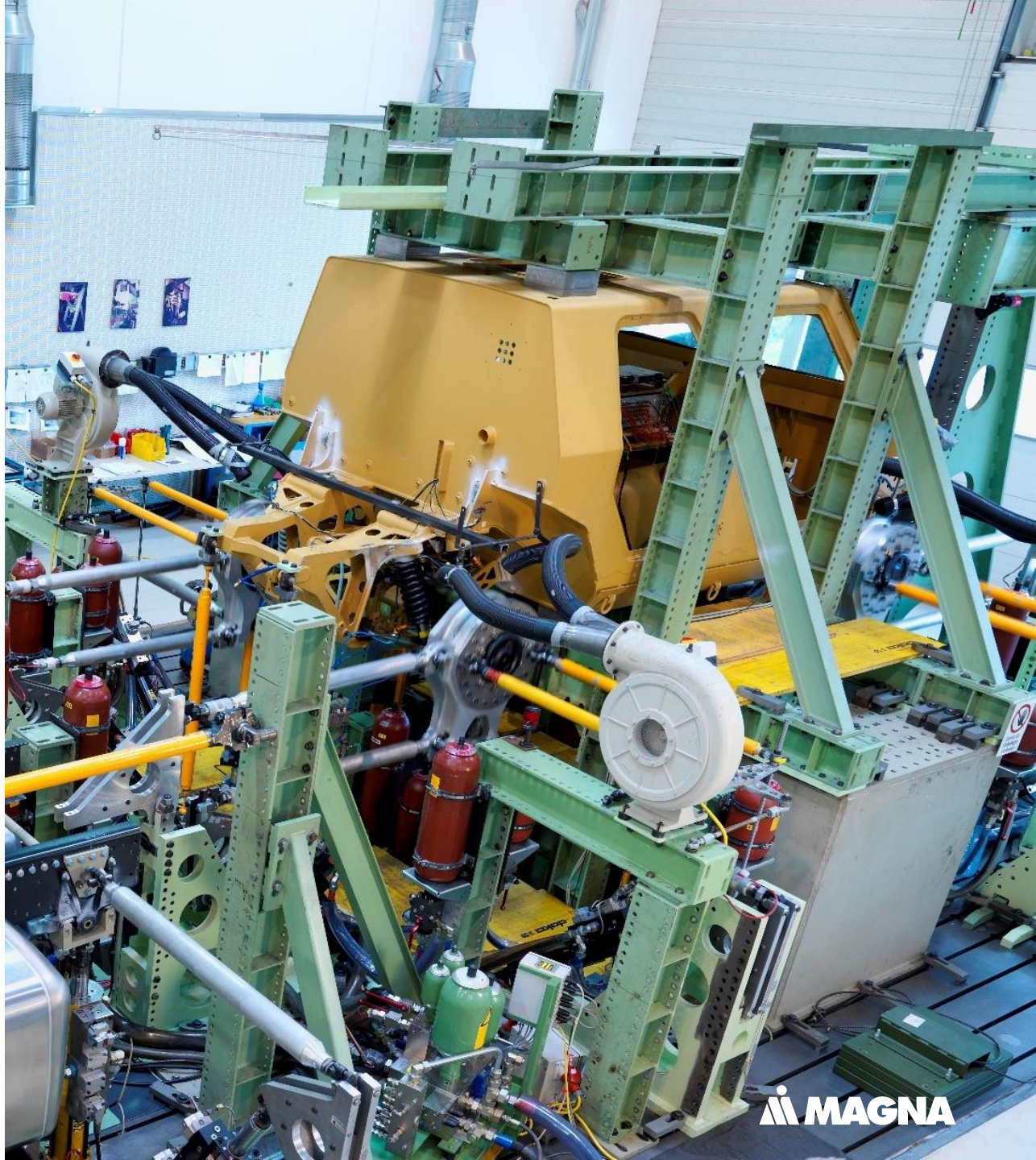
- 250 servo-hydraulic actuators
- Forces between 10kN – 500kN
- Frequency up to 100Hz
- Up to 40 actuators can be controlled simultaneously
- 9 foundations (Up to 500tons)
- Max. weight of specimen 50tons
- Flexible modular test rig systems

Main Testing Topics

- Cabin/body
- Axle and suspension
- Add-on parts and components
- Frame and subframe
- Steering system
- Determine material properties
- Measurement data analysis and processing
- Functional testing
- Testing under corrosion
- Special test rig design
- Material specimen testing (high T)
- Joint testing (thermal, mechanical)

Fatigue Testing Workflow

- Temperatures
- Pressure
- Volume Flow
- Creation of test program
- Test rig iteration
- Fatigue testing



Vibration Test Rig & Temperature Chamber

TIRA TV 59412/AIT-440

Technical Data

- Max force $sine_{pk}$/$random_{RMS}$/$shock_{pk}$: 125/115/375kN
- Max stroke PTP sine/random/shock: 63,5/63,5/76,2mm
- Max g sine/random/shock: 100/90/30g
- Frequency: 5-2500Hz
- Max. load: 910kg
- Moving masses vert./hor.: ~310/~350kg
- Watercooled, controlled to max. 15°C for max performance

CTS TV-70/2300-5

Technical Data

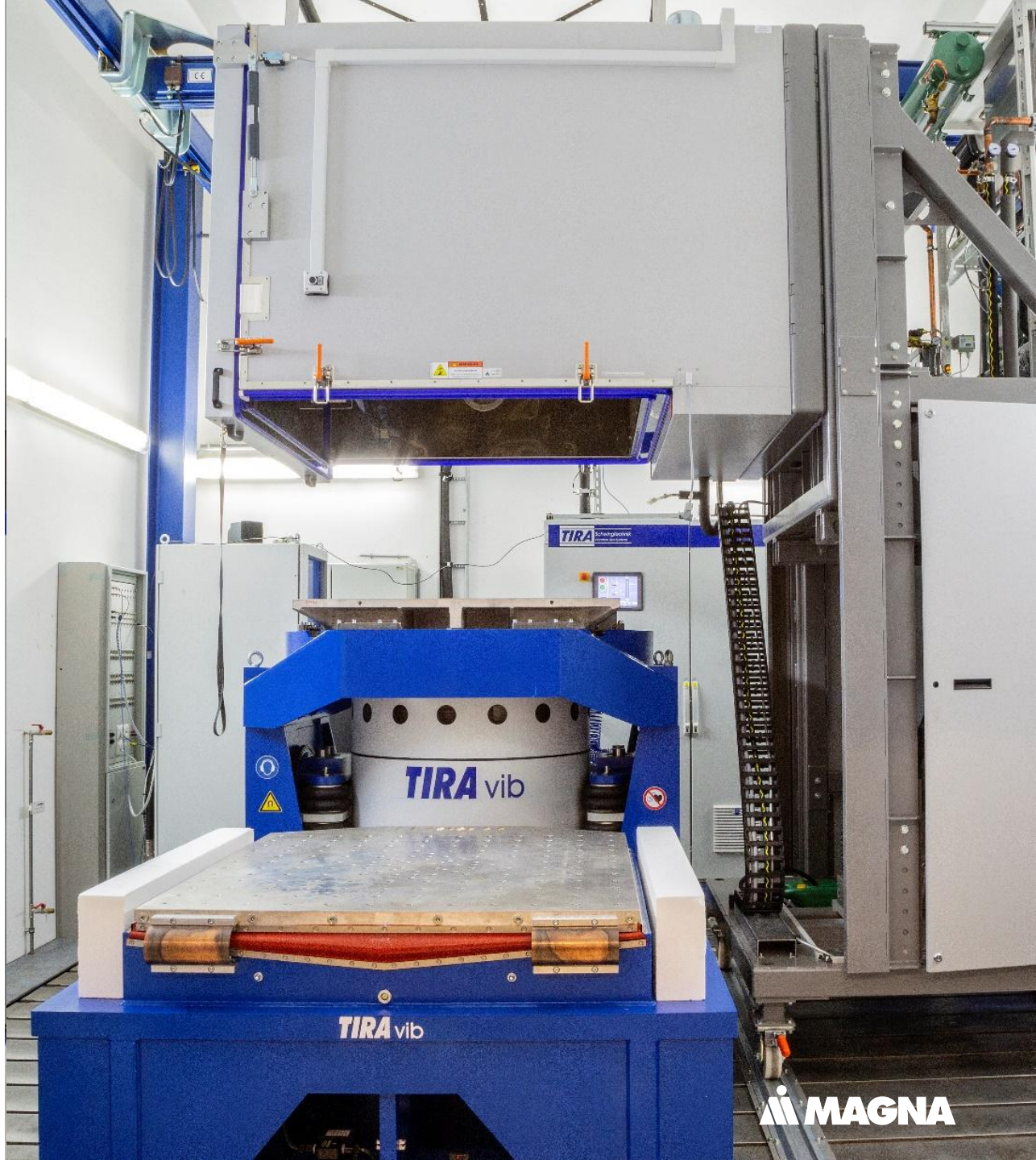
- Temperature range: -70°C-180°C
- Max. temperature gradient: 5K/min (heating & cooling) 18kW power
- Dimensions inside: 1400x1400x1150mm; 2300l

Periphery

- Cooling conditioning unit 3,5kW; 35-79lpm; R452a; 0,5-3,2bar
- Up to 1000V/90A (bidirectional) power unit
- Vector CAN communication unit

Application

- M04/M05 vibration and shock tests acc. all common specifications (LV124, LV147, IEC 60068-2-64, etc…)



4WD Chassis Dynamometer

Main Development Topics

- Acoustics and vibrations
- Energy and thermal management
- Torque management
- Emission development
- Functional development

Specifications

• Roller diameter:	48”
• 4 single wheel drives:	4 x 250 KW
• Maximum vehicle speed:	240 km/h
• Max. drag force:	12.000 N / axle
• Flexible wheelbase from:	2.0 – 4.4m
• Vertical load per axle:	4.500kg

Wind Tunnel

• Maximum airflow:	140.000 m³/h
• Variable outlet:	0,54 … 1,8m²
• Temperature condition:	-15°C up to 50°C

NVH Test Cell

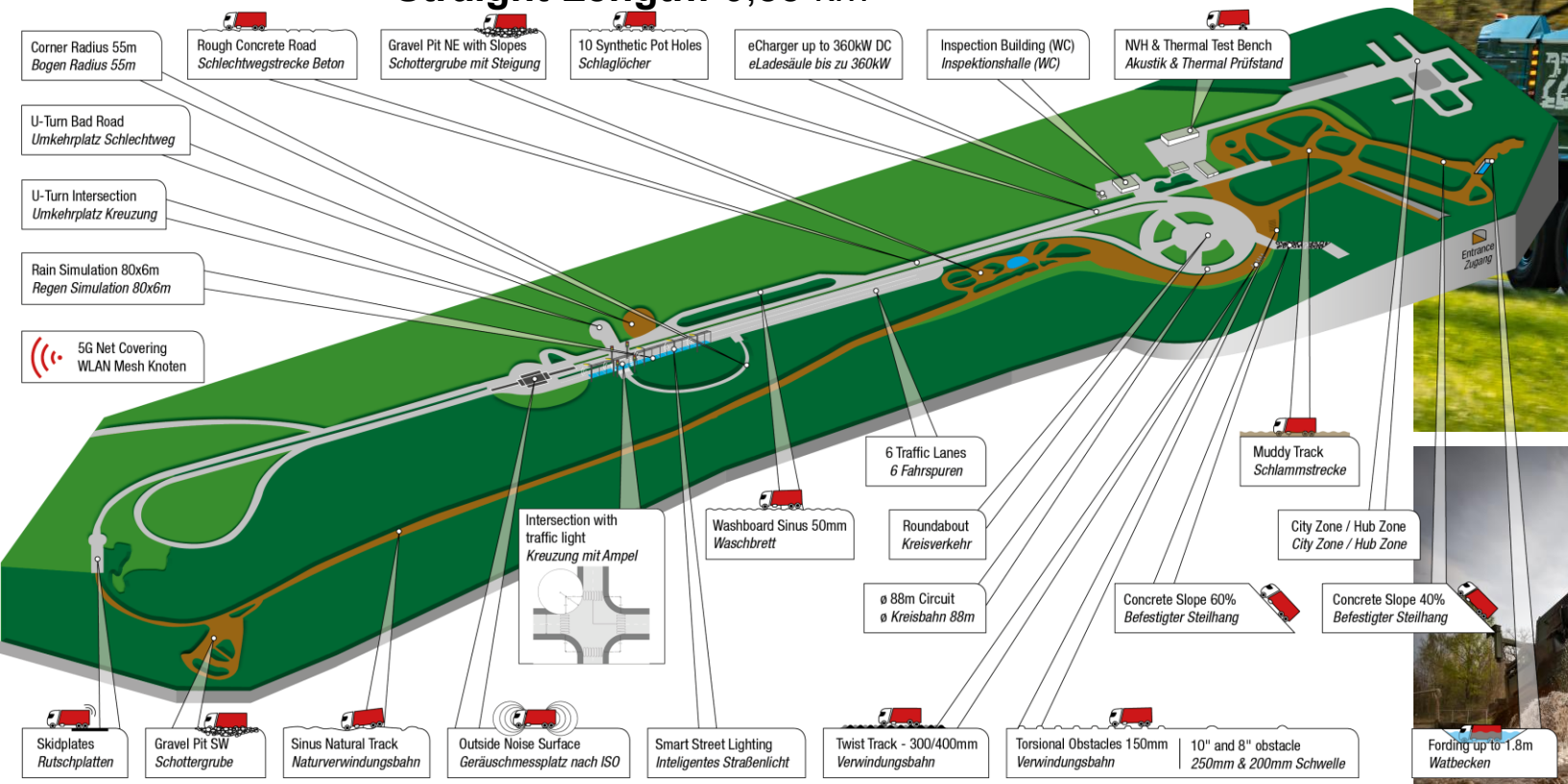
• Free field from:	40Hz to 10KHz
• Cell dimensions (l x b x h):	12 x 8,3 x 4,5m

ECS Proving Ground

Off Road: 7,2 km

On Road: 2,2 km

Straight Length: 0,85 km



Overall Vehicle Testing

On our in-house Proving Ground we are able to cover on- and off-road overall vehicle testing scopes for conventional tests as well as up to 450 test scenarios in terms of ADAS and autonomous driving.

- Concrete slope 40-60 %
- On-road up to 2,2km; rough road 7,2km
- Washboard
- Fording up to 1,8m
- Outside noise acc. ISO 10844
- ADAS testing & benchmarking
- EURO NCAP tests
- City zone available

Digital Twin Proving Ground | 2024

Description

Magna has digitalized on- and off-road tracks of its in-house Proving Ground in Austria and offers a virtual simulation environment for advanced and cost-effective vehicle development.

Key Facts

- Development / consulting for trajectories on tracks for durability and/or function testing
- High quality of simulation results due to calibration with real test data
- Reproduction of complex traffic scenarios and real recorded test maneuvers
- ADAS function testing as well as sensor perception testing & optimization
- Virtual benchmarking & comparison
- 60 individual tracks, e.g.: rough road, washboard, obstacles, potholes, 40% and 60% slopes (off-road & concrete), fording
- 25m pre- and post-road extension of each single track for HDT use