ATESTEO North America
Introduction

ATESTEO
Excellence in drivetrain testing

ATESTEO North America East Lansing

3410 West Rd
East Lansing
MI 48823

ATESTEO North America East Lansing

Overview

- 10 state-of-the-art test benches for testing driveline components of the E-Mobility market.

- Drivetrain testing on test benches with 3 electric motors with:
  - Drive speed up to 20,000* RPM and an output of 293 kW
  - Drive torque up to 2565 Nm with output of 535 kW or 3,100 Nm with output of 660 kW when overloaded
  - Output torques of up to two times 6000 Nm with an output of 500 kW or 8,000Nm with an output of 600 kW each when in overload.

- Testing of environmental influences in climatic chambers with control of:
  - Temperature in high range from -45°C to +160°C and
  - Relative humidity from 10% to 90%.

- The interior dimensions of the climatic chambers allow test material up to a length of 2500 mm to be accommodated.

- All test benches are equipped with DC controllers with a power of up to 650 kW, 1000V, 1000A.

- Start of test operation: May 2024.

Generator Overview

Rig No.	Layout	Input Dyno				Output Dyno				Climatic Chamber 3100 l	Climatic Chamber 2700 l	Battery Simulator
		Power (kW)	Max Torque (nm)	Max Speed (RPM)	Max w/ Overload (Power/Torque/Speed)	Power (kW)	Max Torque (nm)	Max Speed (RPM)	Overload (Power/Torque/Speed)			
Test Cell 1	Climatic 2 Dyno	N/A	N/A	N/A	N/A	500	6006nm @ ≤795RPM	3000RPM @ ≤1273nm	600kW, 8002nm @ ≤716RPM, 3000RPM ≤1273nm (1min every 3min)	X		400kW, 1000V, 1000A
Test Cell 2	3 Dyno	198	630nm @ ≤3000RPM	10000RPM @ ≤189.1nm	240kW, 764nm @ ≤3000RPM, 10000RPM @ ≤189nm (1 min every 10min)	245	3342nm @ ≤ 700RPM	3000RPM @ ≤ 732nm	350kW, 4776nm ≤700RPM, 3000RPM ≤732nm (1min every 10min)			400kW, 800V, 1000A
Test Cell 3	3 Dyno	536	2559nm @ ≤2000RPM	8500RPM @ ≤348nm	660kW, 3151nm ≤2000RPM, 8500RPM @ ≤326nm (1 min every 10min)	500	6006nm @ ≤795RPM	3000RPM @ ≤1273nm	600kW, 8002nm @ ≤716RPM, 3000RPM ≤1273nm (1min every 3min)			650kW, 1000V, 1000A
Test Cell 4	3 Dyno	536	2559nm @ ≤2000RPM	8500RPM @ ≤348nm	660kW, 3151nm ≤2000RPM, 8500RPM @ ≤326nm (1 min every 10min)	500	6006nm @ ≤795RPM	3000RPM @ ≤1273nm	600kW, 8002nm @ ≤716RPM, 3000RPM ≤1273nm (1min every 3min)			650kW, 1000V, 1000A
Test Cell 5	3 Dyno	293.2	400nm @ ≤7000RPM	20000RPM @ ≤140nm	421.5 kW, 20,000 @ ≤201nm, 575nm @ ≤7000RPM (5s every 100s)	245	3342nm @ ≤ 700RPM	3000RPM @ ≤ 732nm	350kW, 4776nm ≤700RPM, 3000RPM ≤732nm (1min every 10min)			400kW, 1000V, 1000A
Test Cell 6	3 Dyno	293.2	400nm @ ≤7000RPM	20000RPM @ ≤140nm	421.5 kW, 20,000 @ ≤201nm, 575nm @ ≤7000RPM (5s every 100s)	245	3342nm @ ≤ 700RPM	3000RPM @ ≤ 732nm	350kW, 4776nm ≤700RPM, 3000RPM ≤732nm (1min every 10min)			400kW, 1000V, 1000A
Test Cell 7	Climatic 2 Dyno	N/A	N/A	N/A	N/A	245	3342nm @ ≤ 700RPM	3000RPM @ ≤ 732nm	350kW, 4776nm ≤700RPM, 3000RPM ≤732nm (1min every 10min)		X	650kW, 800V, 1000A
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Test Cell 1	Climatic 2 Dyno	N/A	N/A	N/A	N/A	450	5405nm @ ≤795RPM	3000RPM @ ≤1146nm	540kW, 7202nm @ ≤716RPM, 3000RPM ≤1146nm (1min every 3min)	X		400kW, 1000V, 1000A
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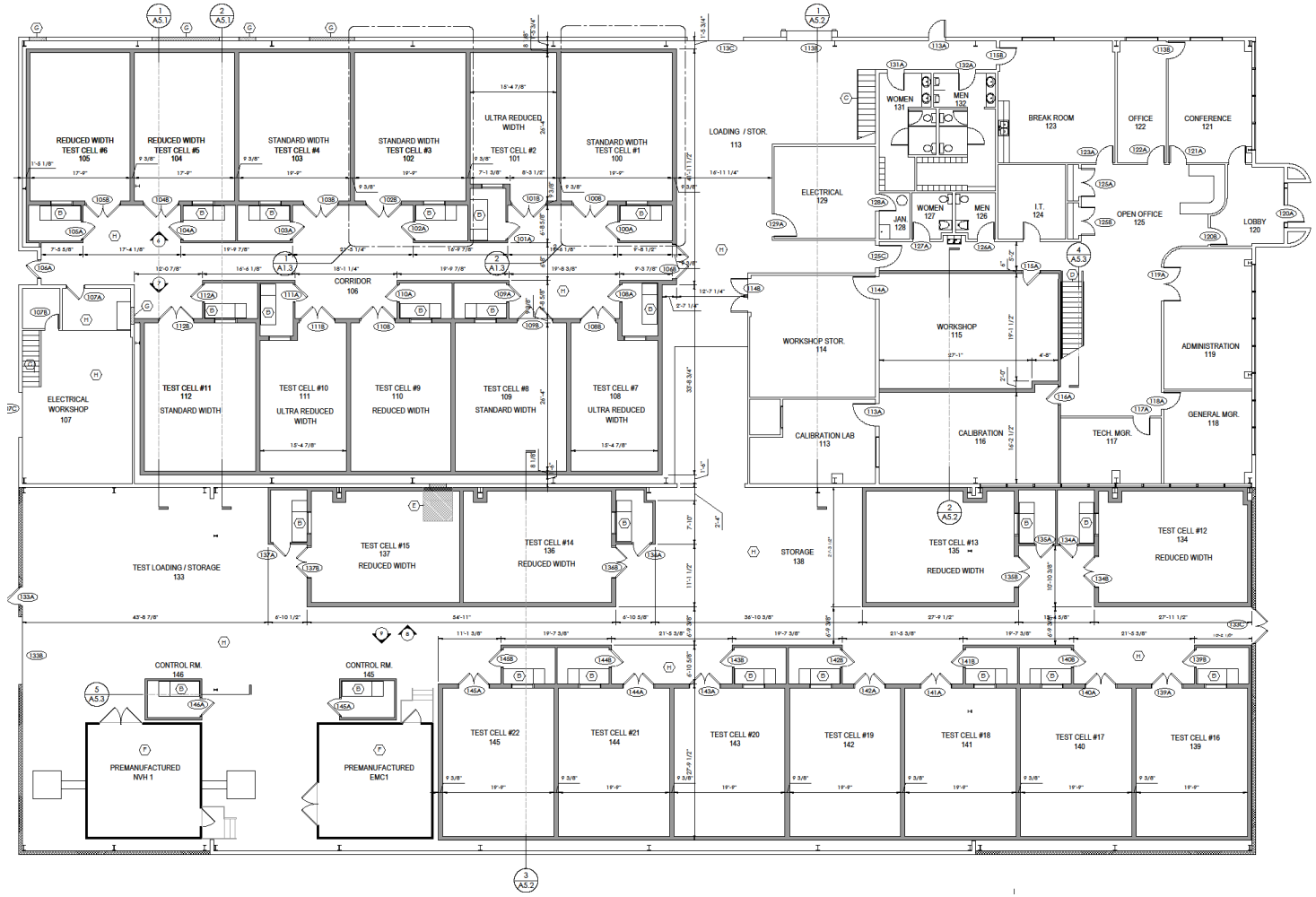
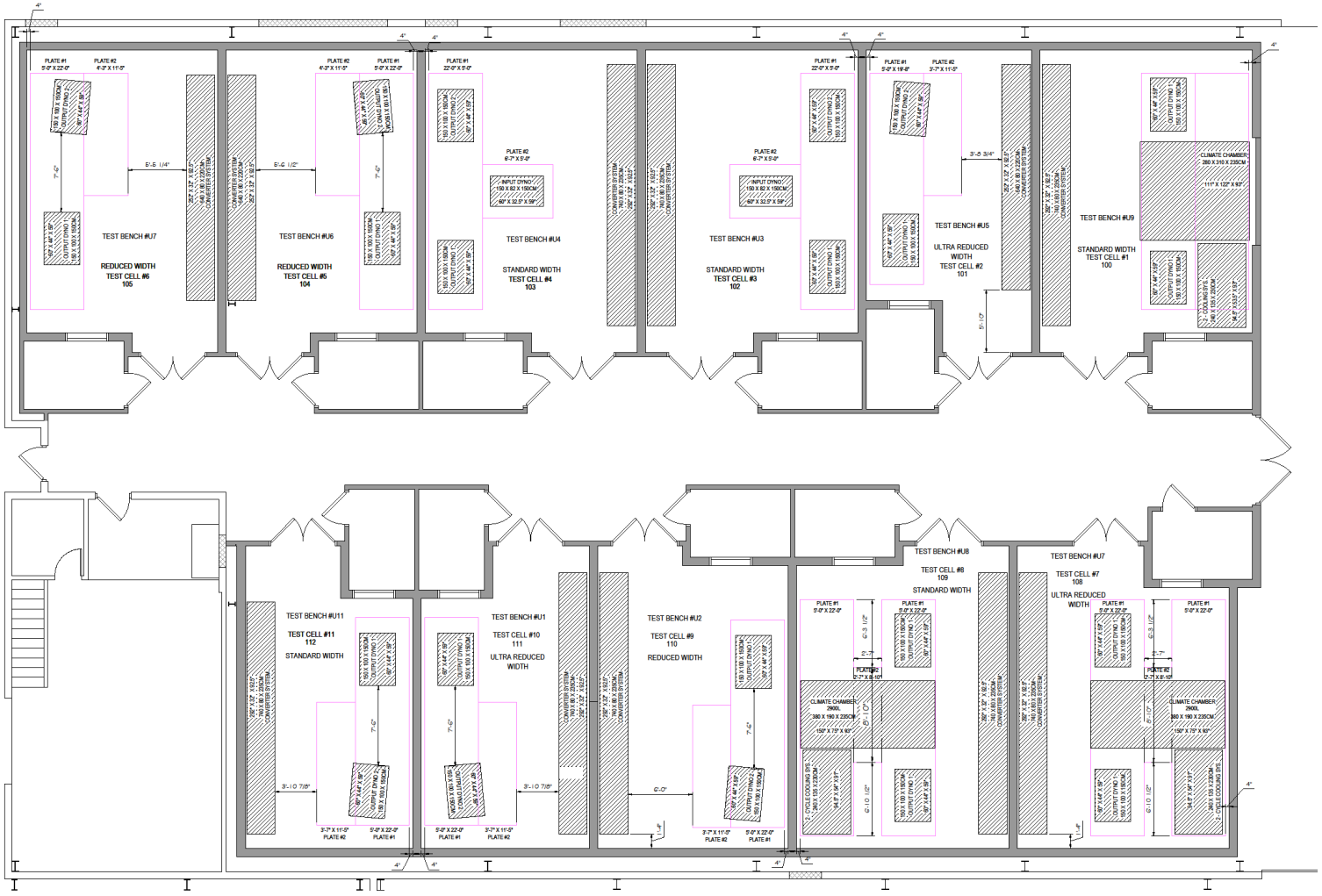
1st Floor Layout

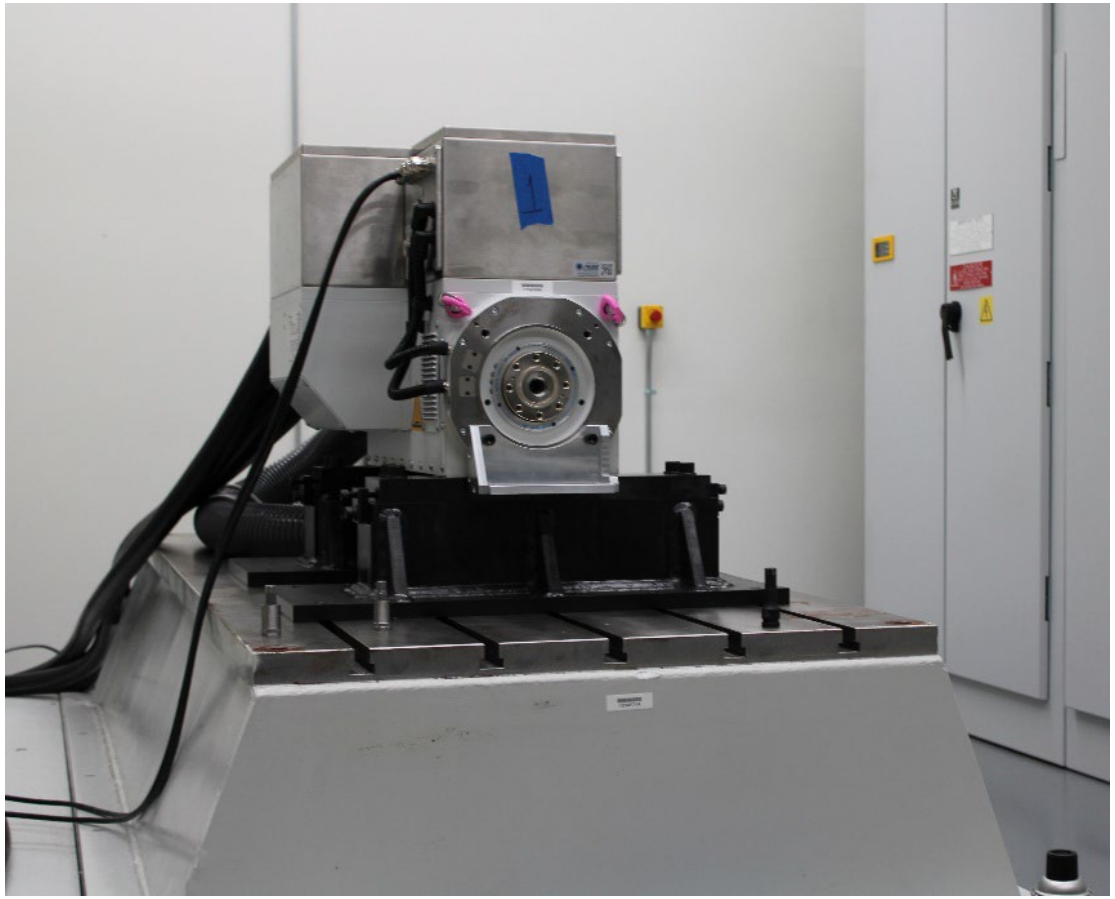


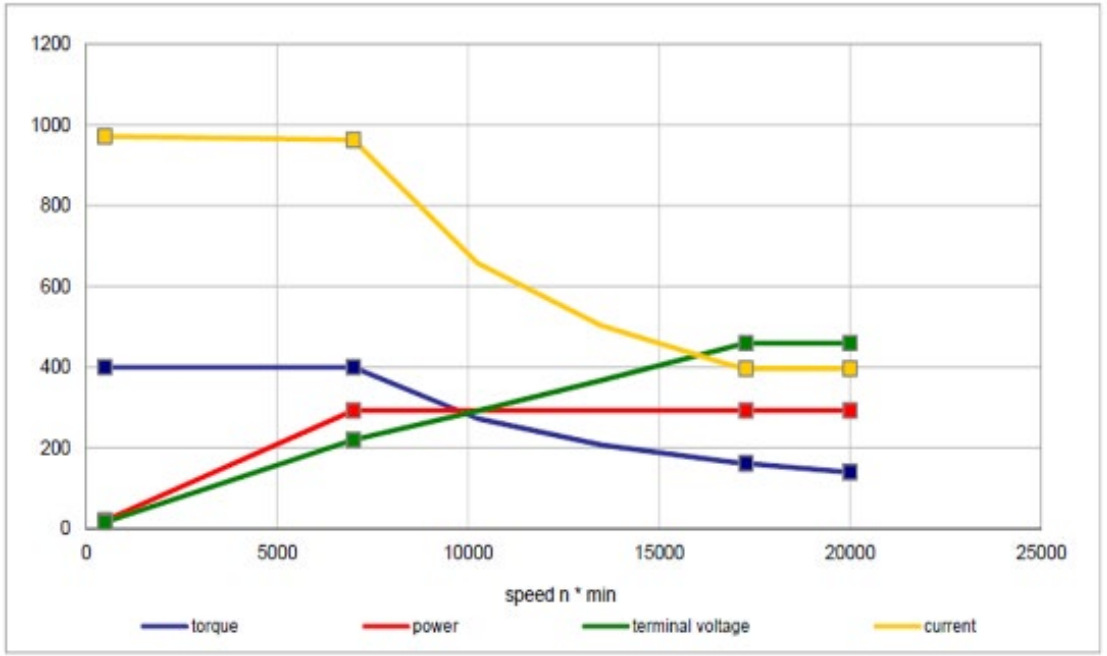
Phase 1 Test Cells



Electric Motors | PM High Speed Input Dyno

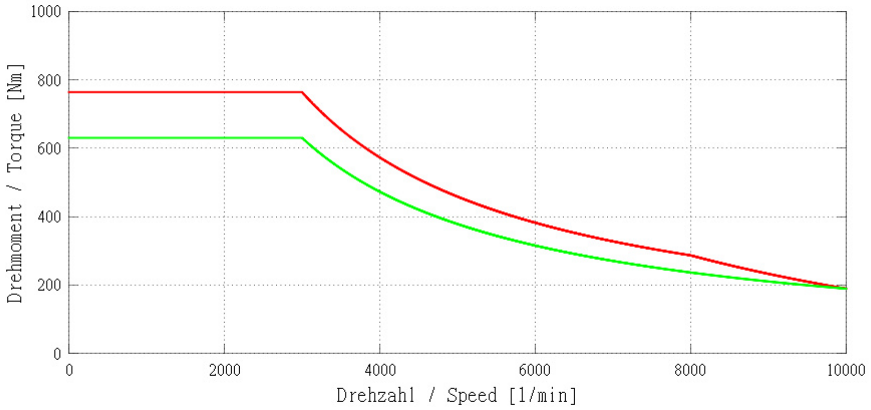
20,000 RPM – 400 Nm (575 Nm Overload) – 293 kW (421 kW Overload)





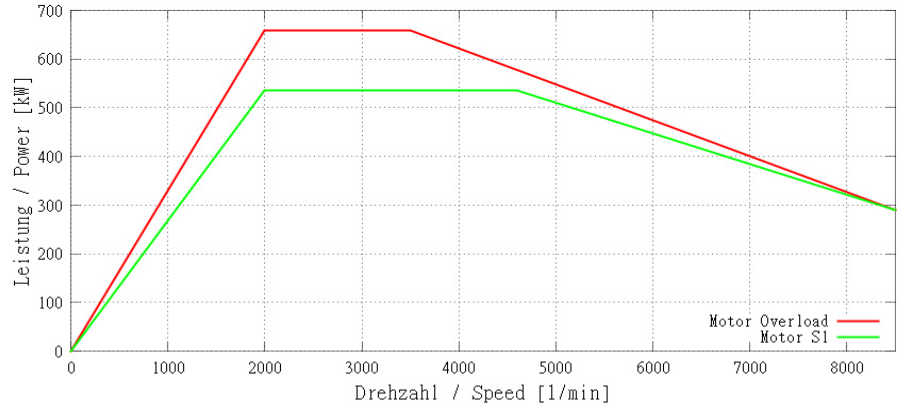
Electric Motors | AC Standard Input Dyno

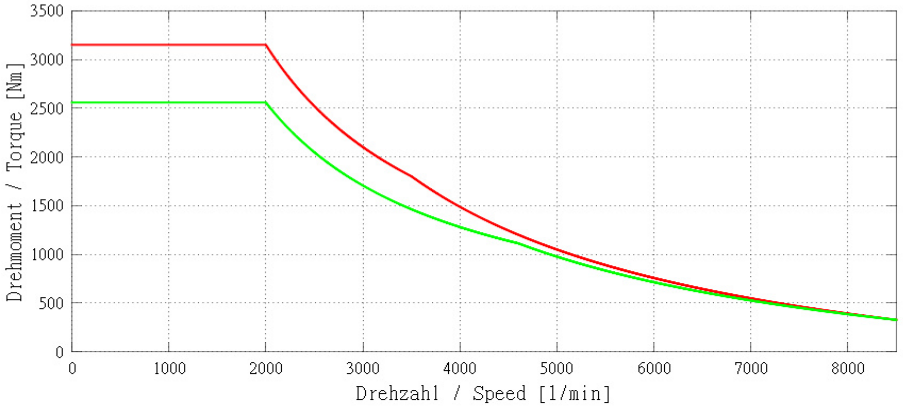
10,000 RPM – 630 Nm (764 Nm Overload) – 198 kW (240 kW Overload)



Electric Motors | AC High Torque Input Dyno

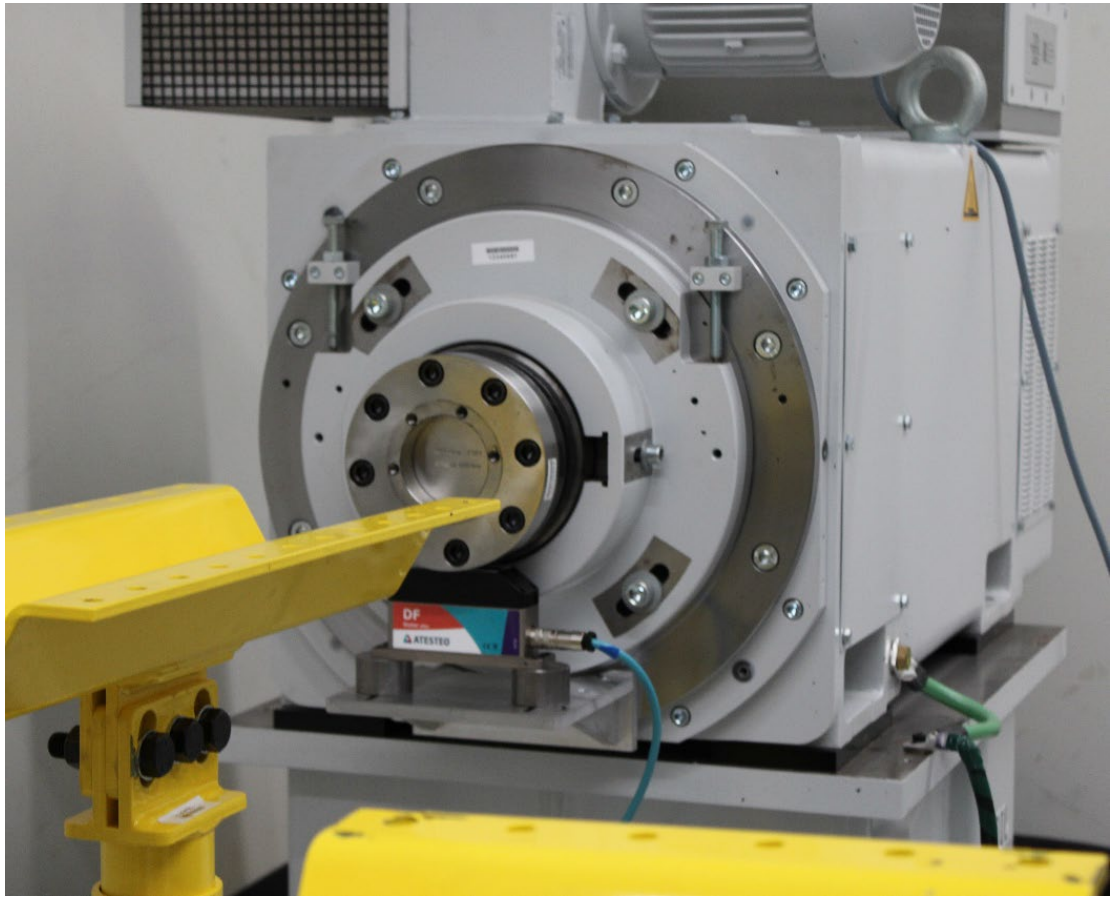
8500 RPM – 2,559 Nm (3,151 Nm Overload) – 535 kW (660kW Overload)

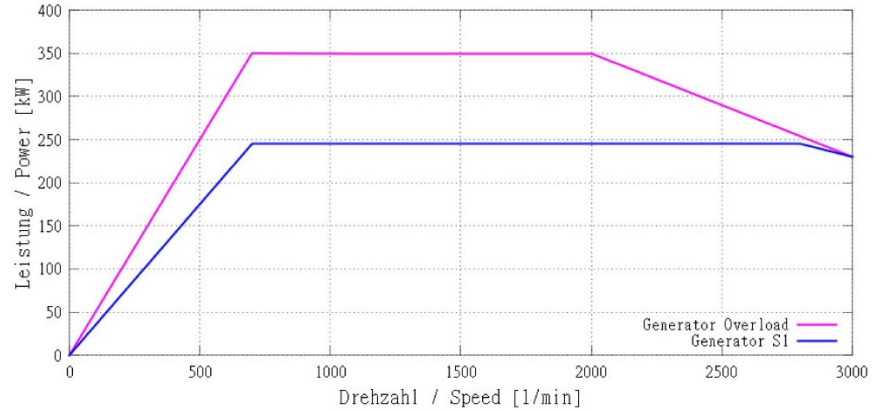


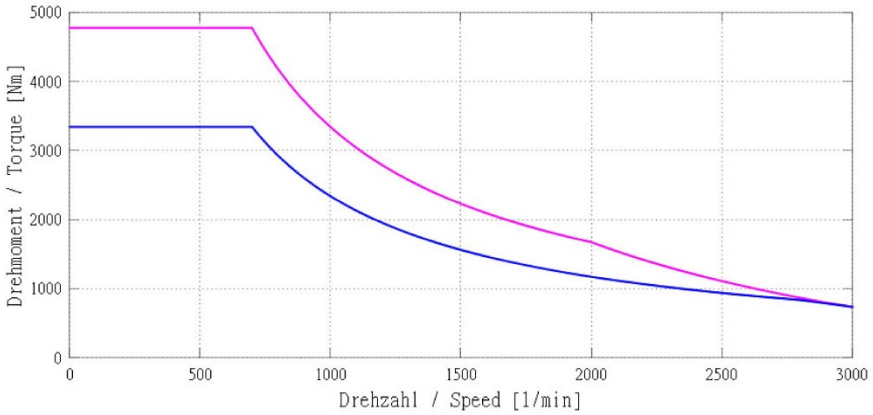


Electric Motors | AC Standard Output Dynos

3,000 RPM – 3,342 Nm (4776Nm Overload) – 245 kW (350kW overload)

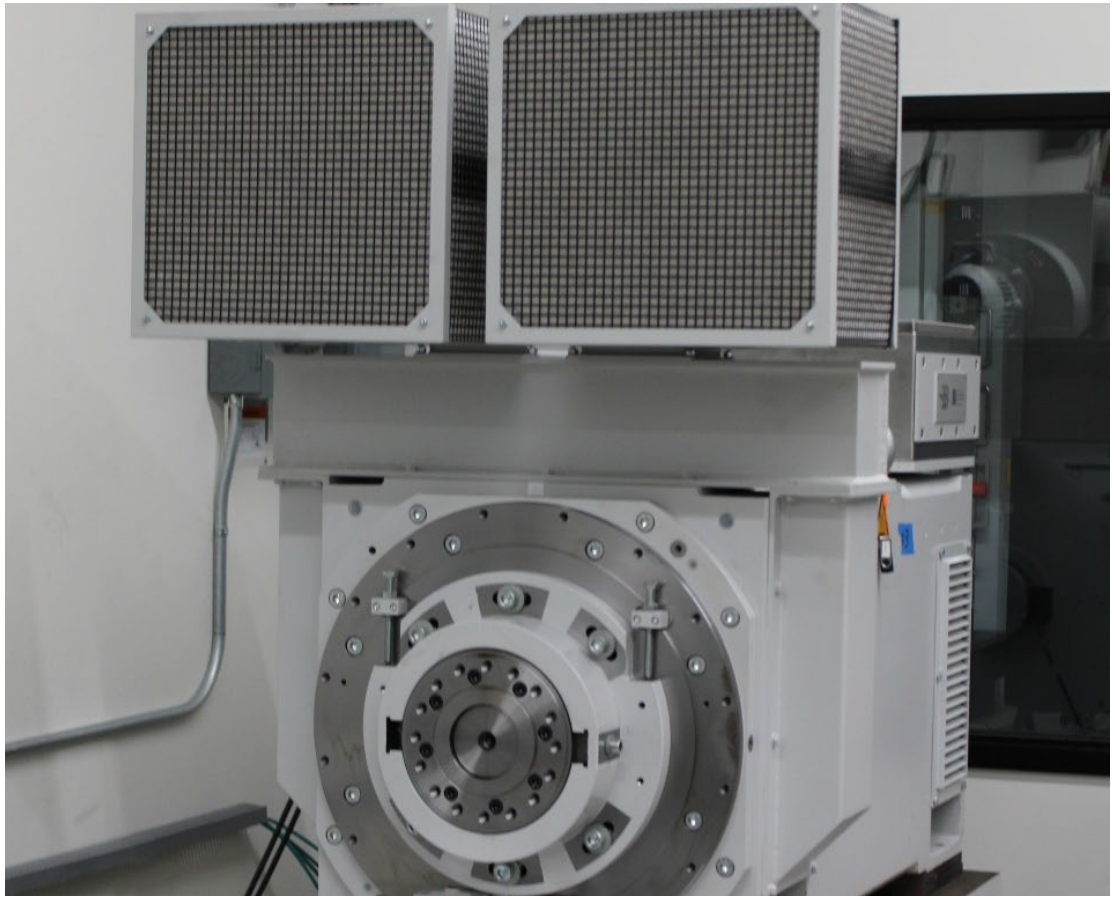


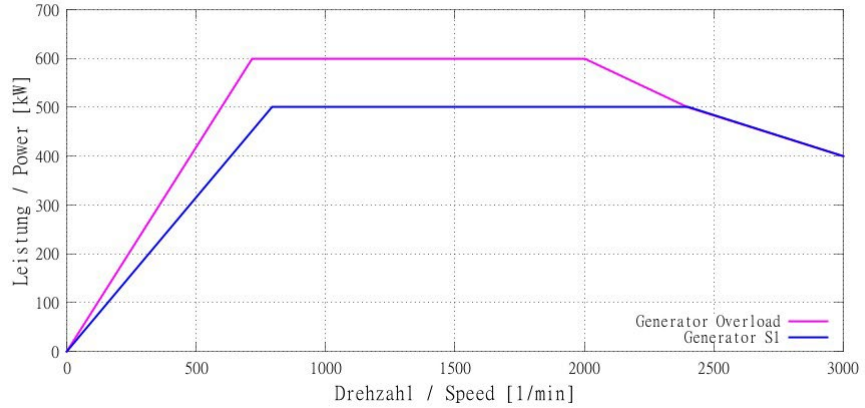


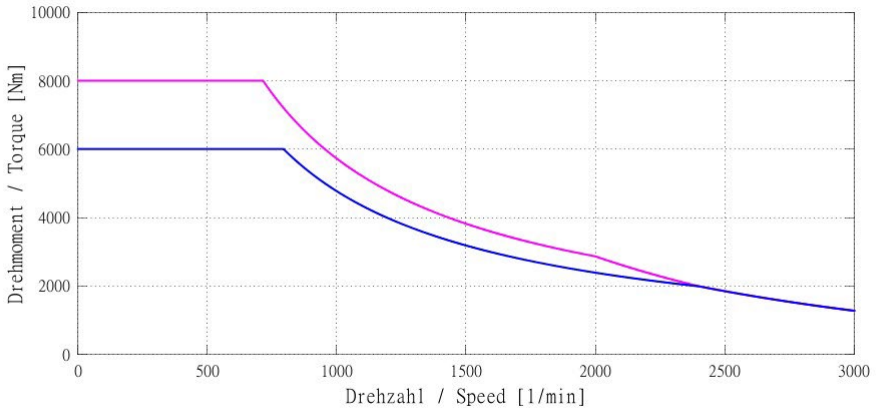


Electric Motors | AC High Torque Output Dynos

3,000 RPM – 6,000 Nm (8,000 Nm Overload) – 500 kW (600 kW Overload)

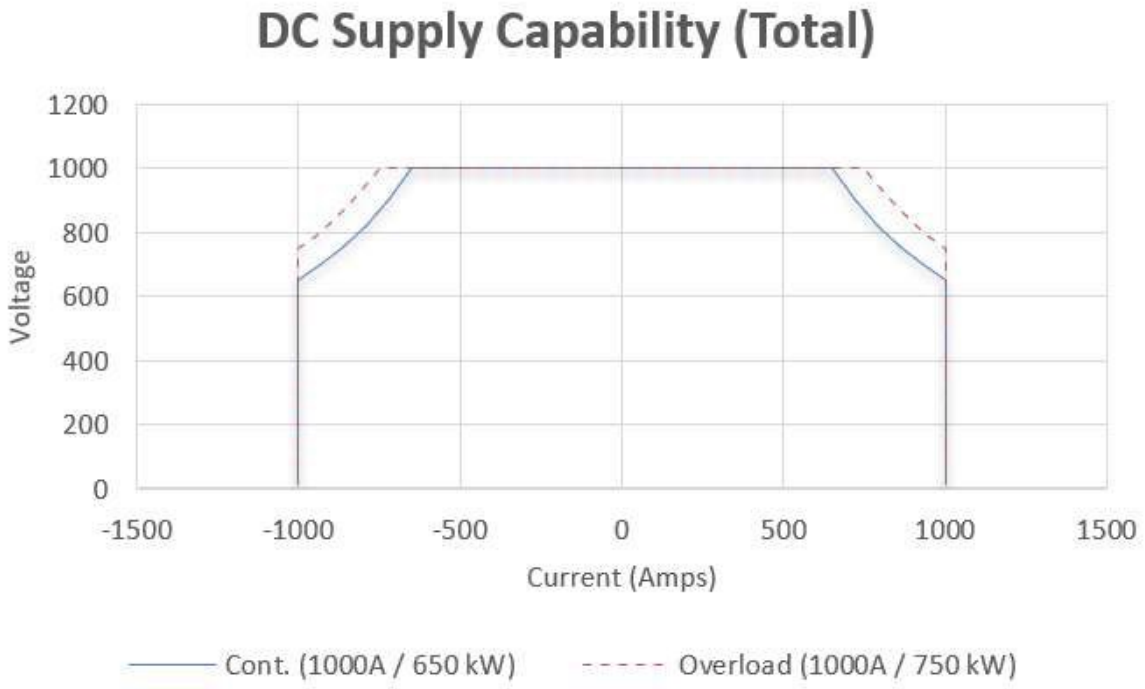






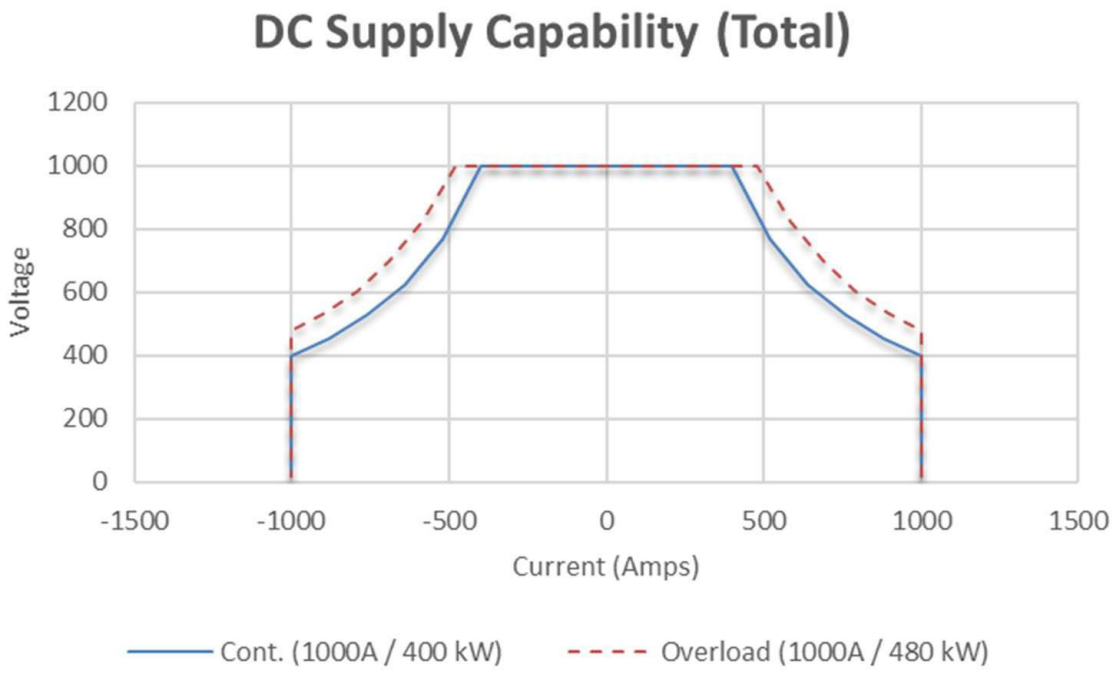
Battery Simulator

1,000 V – 650 kW



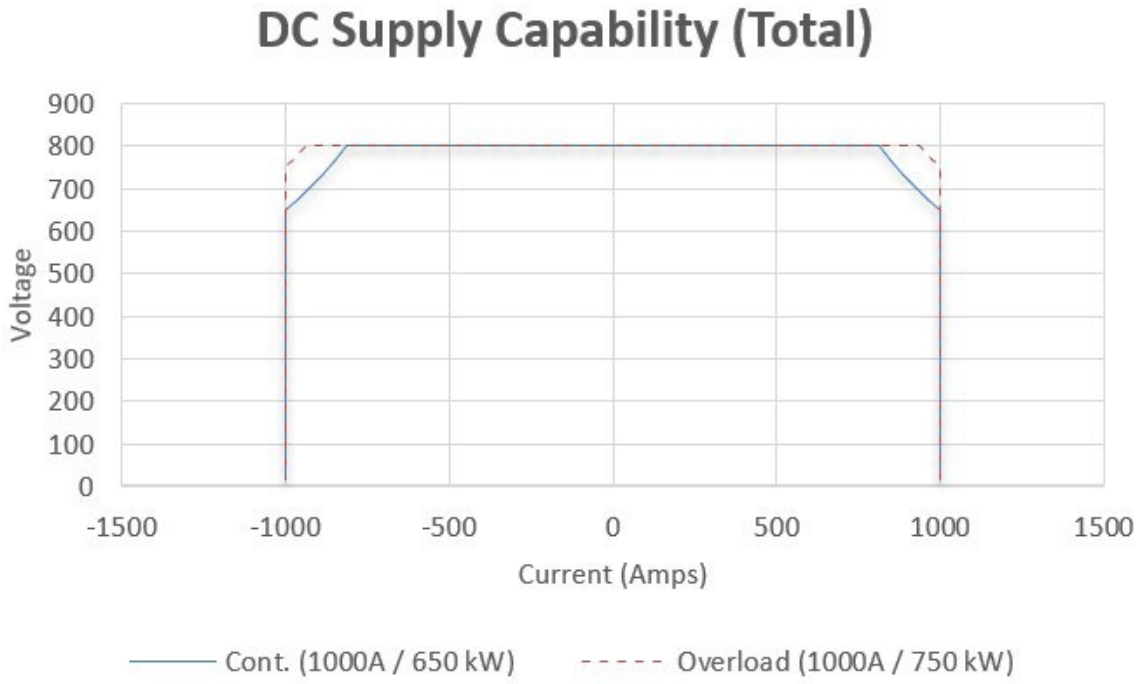
Battery Simulator

1,000 V – 400 kW



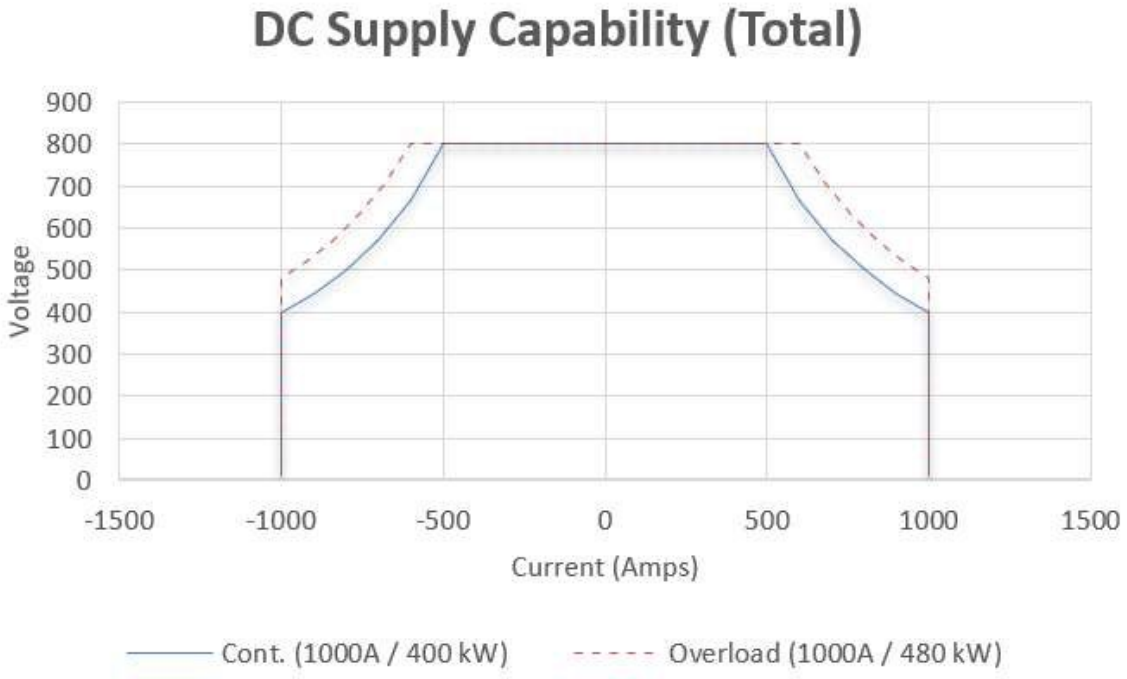
Battery Simulator

800 V – 650 kW



Battery Simulator

800 V – 400 kW



Climatic Chambers

Inside Dimensions:
Cell 1:
Inside: 2500 x 1100 x 1100 mm (L x W x H)
Volume: 3000 liter

Cell 7 and 8:
Inside: 1550 x 1695 x 1100 mm (L x W x H)
Volume: 2900 liter

Temperature Control:

Temperature range:	-45 °C to +160 °C
Temperature deviation:	≤ ±0.3 °C temporary
Heating approx.:	7 °C/min, according to IEC 60068-3-5
Cooling approx.:	7 °C/min, empty chamber

Heating with max 400 kg test material aluminum:

Heating approx.:	4.5 °C/min. linear from -40°C to +90°C
Cooling approx.:	4.5 °C/min. linear from +90°C to -30°C

Humidity Control:

Temperature range:	+10 °C to +90 °C
Humidity range:	10% to 95% r.h.
Without heat radiation	
Dew point range:	+5°C to +88°C
Temperature deviation:	≤ ±0.3 °C temporary
Humidity deviation:	≤ ±1.5 % r.h.

2 Cycle Water-Glycol Cooling

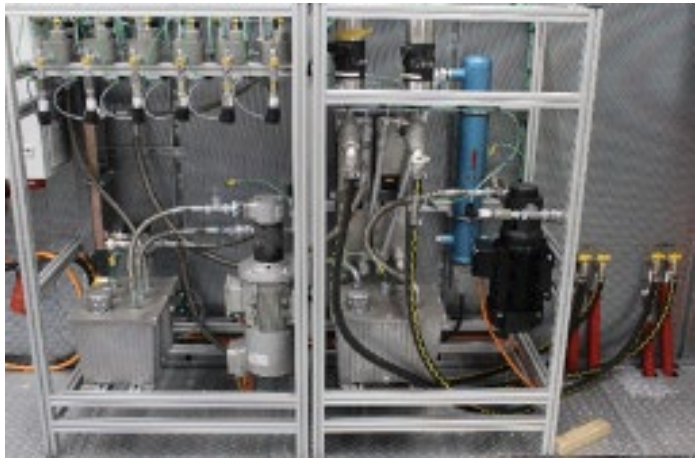
Temperature Control both Cycles:

Heating approx.:	4 °C/min, -30°C to +135 °C
Cooling approx.:	4 °C/min, +135°C to -20°C
Temperature deviation:	≤ ±1.0 °C temporary

Without test samples

Heating power:	24 kW
Cooling power:	22 kW (for both cycles in total)

Specific Cooling Systems



Oil hydraulic systems*

- Temperature range -5 to 120°C
- 3 different pressure circuits independently adjustable 0 to 40 bar
- 2-8 volume channels independently adjustable 0 to 25 l/min
- total max. flow 45 l/min

*** - Available in Germany, can borrow if needed**

Oil conditioning systems

- Volume flow adjustable ~0 to 12.8 l/min
- Temperature adjustable ~15 to 115°C*
- Max. pressure ≤ ~5 bar

*** - Can be coupled with CTS 2-cycle to achieve lower temperature**

Water conditioning system

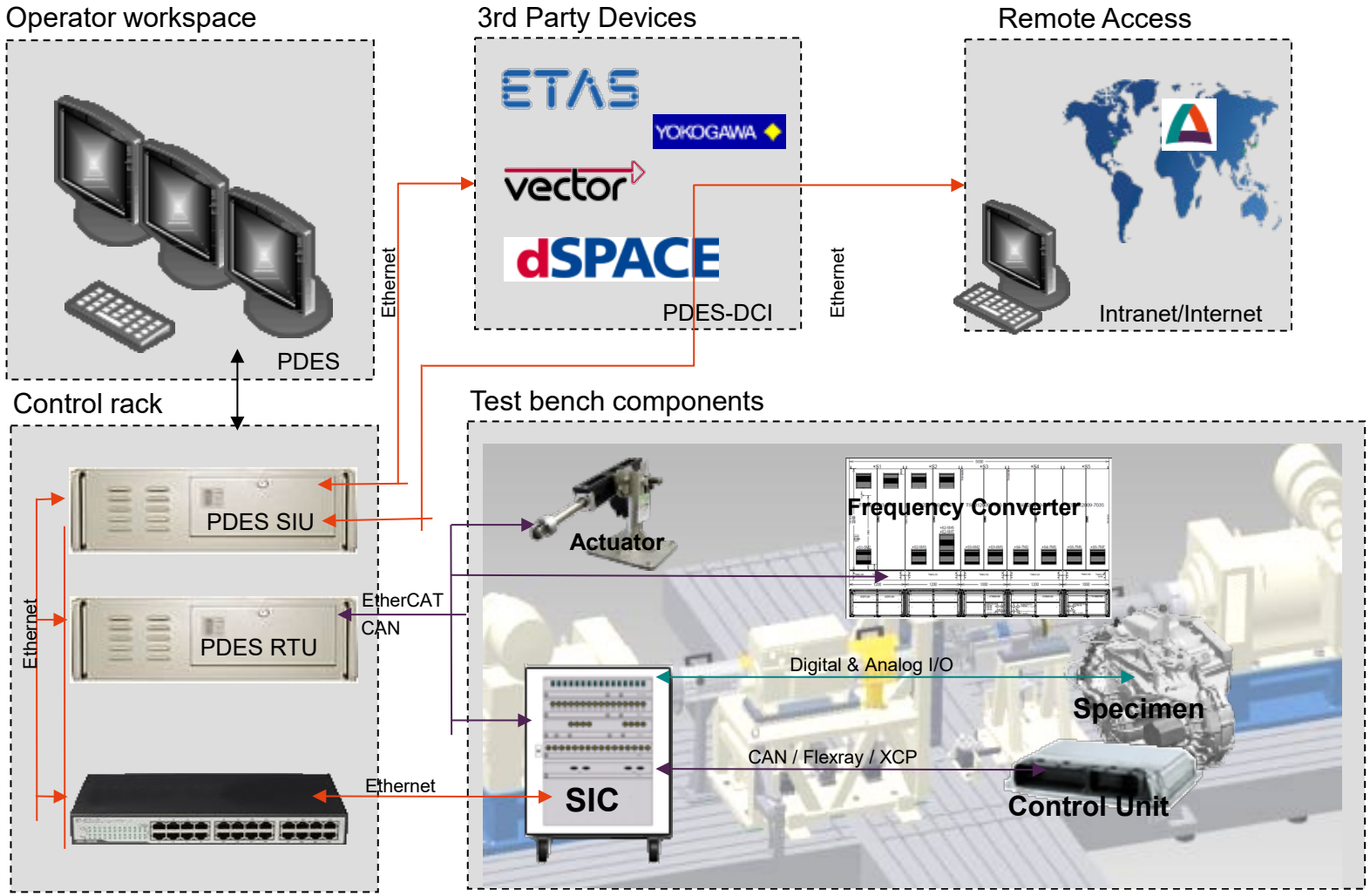
- Volume flow adjustable ~0 to 40 l/min
- Temperature range ~15 to 115°C

Automation System PDES

The demands on future-proof automation systems are constantly growing and require a high degree of flexibility and scalability.

With PDES, we use our proprietary real-time automation system that is applied and tested at ATESTEO locations worldwide.

With its open architecture and support for common interfaces and standards, our system is ready for your testing tasks.



Automation System PDES

Powerful development platform

- Code editor, Layout designer
- Real time controllers & -tasks
- Sequence generator

Interfaces

- Real-time fieldbus (EtherCAT, CAN, Flexray…)
- Open device interface via Ethernet interface (Yokogawa, FLIR, IMC…)
- ASAM interface to ECU MCD platforms (INCA, CANape, …)
- Database interface (SQL, Excel, …)
- Interfaces programmable according to your specific needs

Data management

- Extensively configurable data acquisition
- Import/export of common data formats (MDF4, FAMOS, Matlab, Excel, ASCII,...)
- Wide range of options for signal analysis (FFT, classification, filter,...)
- Report generator
- Database-supported file storage

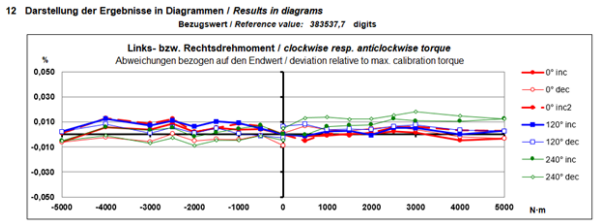
Calibration Laboratory

Which quantities of torque can ATESTEO calibrate?

Is ATESTEO an accredited laboratory?

What turnaround times does ATESTEO offer for calibration?

Which manufacturers' sensors can be calibrated at ATESTEO?



Calibration test benches for torque as a quantity to be measured

- The calibration laboratory is accredited by DAkkS.
- The calibration is based on
  - The reference principle
  - DIN 51309:2005, VDI/VDE 2646, factory standard
  - Automated calibration process

- Calibration test benches with various ranges:
  - Calibration independent of sensor manufacturer
  - Measuring range of 10 Nm to 3 kNm
    with an expanded measurement uncertainty of 0.02%
  - Measuring range of 1 kNm to 10 kNm
    with an expanded measurement uncertainty of 0.02%

Thank you for your interest!

ATESTEO

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