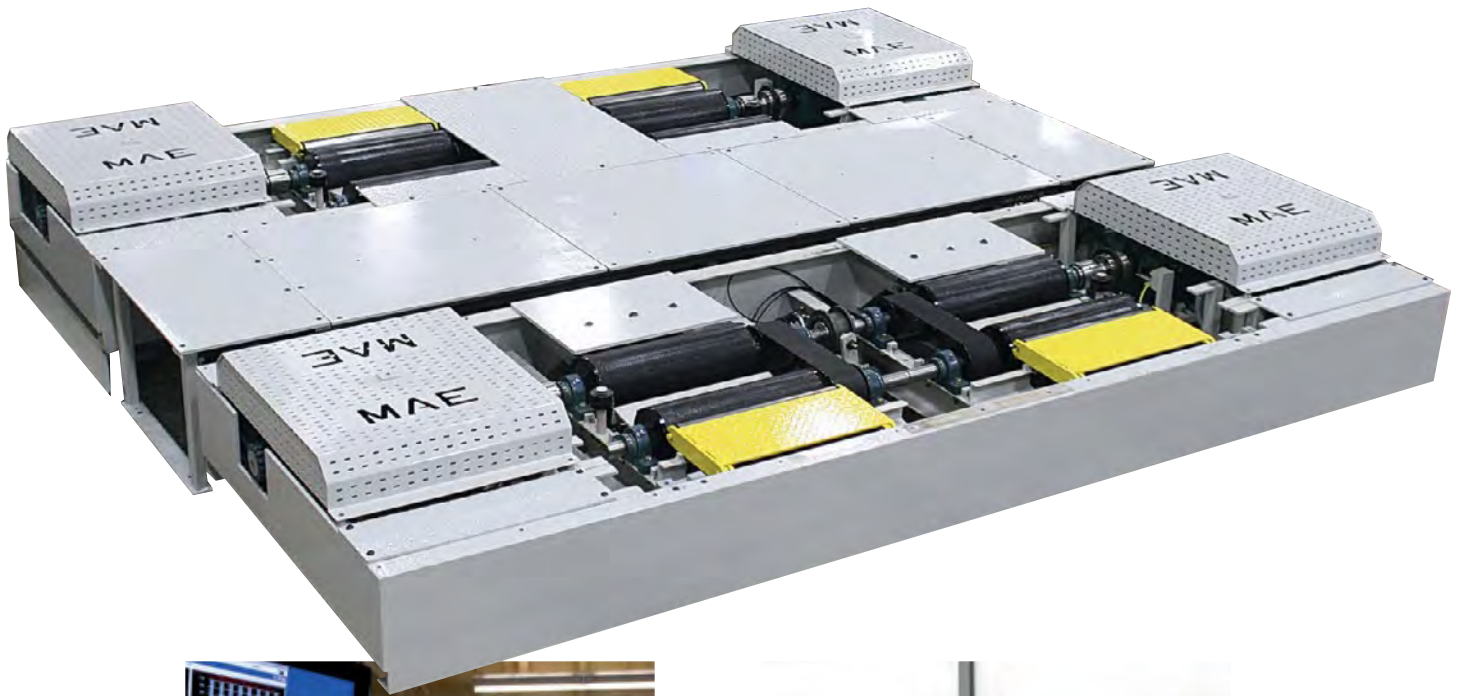


E-Mobility Testing Solutions



MAE-AWD-400-AC/EC Series

*Universal All-Wheel-Drive AC Automotive Test Stand
Designed for All Electric Vehicle Types*



MAE-AWD-400-AC/EC Series

The engineers at MAE developed the MAE-AC-4000 Series Test Stand for R&D, Calibration, Certification, End-Of-Line, and Repair/Maintenance testing applications. This new universal automotive test stand was designed to rigorously and efficiently test the next generation

of electric and hybrid vehicles as they are developed, calibrated, certified and then roll off your production lines.



- Universal Automotive Test Stand
- 2WD & AWD Vehicles
- Adjustable Wheelbase (90-140")
- Independent AC Motor per Roll Set
- Electric Hybrid Systems Development
- Calibration & Certification
- EOL Production Testing
- Regeneration Testing
- Inertia Simulation
- ABS Braking/ESC Skid Simulation
- Thermal Imaging & Vibration Analysis
- Designed for all EV, BEV, HEV, PHEV, FCEV

End-Of-Line Production Testing

As a EOL test stand, the MAE-AC-4000 Series offers a flexible solution for test control, data acquisition and operator interface, stepping test operators through each step of an automated EOL test sequence in a simple and user-friendly format, while collecting, analyzing and reporting on vehicle systems status and performance data. MAE's AC-4000 test stand communicates with each vehicle via CAN communication to determine pass/fail results and to establish certain vehicle systems statuses as required during the test procedure. The flexibility of MAE's systems allows us to easily adapt to meet unlimited test procedures and simulation requirements.

MAE's experience and expertise with sophisticated End-of-Line systems stems from having supplied a host of fully-integrated, automated testing solutions for a wide range of EOL testing applications. MAE offers completely customized end of line testing solutions for your specific end of line testing applications.

A sample EOL test procedure is illustrated in the figure on the left. MAE can easily customize an automated EOL test sequence to meet your EOL testing requirements.



EV R&D, Calibration, Certification

Designed for all EV development, calibration, and certification, the MAE-AC-4000 Series performs traction system motoring, ABS/ESC testing with skid simulation, regenerative braking and traction condition simulations using road load and federal drive cycles, electrical power systems analysis, efficiency testing, fuel consumption testing, repair & maintenance and other complete vehicle or sub systems evaluations. MAE offers several lab-grade software and data acquisition packages for Hardware-in-the-loop and R&D environments.

MAE-AWD-400-AC/EC Series

Roll Diameter:	8.575" (217.81 mm)
Roller Surface:	Knurled (Standard), Optional: Chrome, Carbonite
Rotation:	Uni-Directional
Operation Speed Range:	0-80 MPH (129 KPH)
Power Conversion Unit (PCU):	AC Inverter Duty Motor/Generator
PCU Size:	Continuous Duty: 75-hp @1150 - 3200 rpm (x4) Intermittent Duty: 150% of continuous duty for 1 out of 5 minutes; Forced air fan cooled
PCU Speed Sensor:	Independent speed sensor, minimum 1,024 pulses/rev
PCU Thermal Overload:	Thermal switch wired normally closed
Inverter Online Power Regeneration (standard):	Power Module regenerates power back onto supply power lines instead of into the Power Dissipation Coil
Line Reactance:	Inverter/Controller has built-in line reactance to balance and reduce noise injected back into the supply circuits. Additional external line reactance optional
Inertia Selection Increment:	1 lb. for simulation
PCU Force Measuring Accuracy:	In-line Torque Meter ± 833 lb.ft Accuracy Class: ±0.1% of rated output at all values ± 10-100% of rated output
Inverter/Controller:	Self contained controller operates the PCU and the Power Regeneration System (Inverter Power Dissipation Coils). Features include: PCU Over Current, PCU Over Temperature, PCU Power Dissipation Coils over Temperature (if used), Supply Power Phase Loss, PCU Short Circuit Protection, PCU Supply Voltage, PCU Over Speed, PCU Supply Current
Road Load Increments:	0.1 hp @ 50 MPH Precisely, to vehicle loading coefficients
Vehicle Loading (Trans):	$TRLHP@Obmph = \{Av * Obmph\} + \{Bv * Obmph^2\} + \{Cv * Obmph^3\}$ Where: TRLHP = Track Road Load Horse Power Obmph = Observed mph Av, Bv, Cv = Road Load Coefficients
Wheelbase Movement:	Gearmotor
Wheelbase Range:	90 - 140 Inches (2286 - 3556 mm)
Vehicle Restraint System:	Automatic pop-up roller restraints
Ambient Temperature Range:	68 to 86° F, 10-95% relative humidity (non-condensing). Intended for use in a climate controlled laboratory environment with adequate air ventilation and exhaust removal systems, optional from MAE
Machine Shipping Weight:	16,000 lbs. (7257 kg)



Customizable drive cycles include speeds and grades



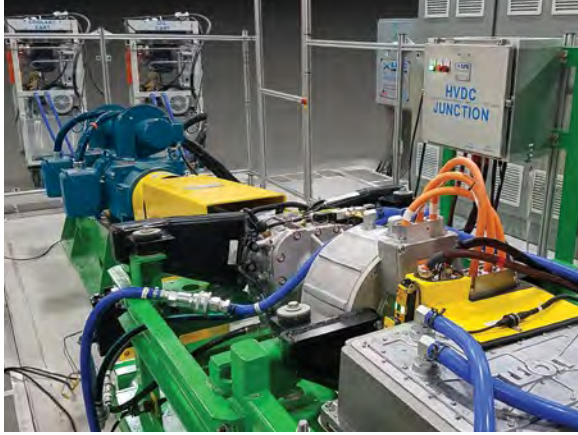
Robotic pedal-throttle actuators for automatic driving



Thermal Imaging and vibration analysis are commonly integrated into EOL test stands. Thermal images on key under hood points before and after cycle testing allows QA engineers to establish pass/fail criteria based on areas-of-interest and temperature limits.

Mustang Advanced Engineering

EV Powertrain Test Cell



EV e-Axle Test Stand



Mustang Advanced Engineering

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Twinsburg, OH 44087

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Fax: (330) 425-3310

Email: Sales@MustangAE.com

MustangAE.com

Global Leaders in EV Testing

MAE is a test cell system integrator capable of supplying turnkey, fully functional, integrated test cell solutions. MAE draws on more than 35 years of equipment production and test cell integration experience to provide customers the perfect test cell for their requirements. MAE leverages our vast test cell experience and our safety minded engineers to develop test cells that are safe and meet local and national safety requirements. Safety is achieved through physical barriers, electrically lockable access barriers monitored until conditions are safe to unlock, guards, dual hand touch pads, light curtains, electrical lockable doors/covers, pressure pads, lights, lamps and sound. Safety is also designed into the high-power electrical systems with lock-out/tag-out requirements, arch flash analysis and facility interface design.

Additional EV Test Articles

MAE is poised to serve the Electric Vehicle markets (EV, BEV, HEV, PHEV, FCEV) and its current and future testing needs. Additional test stands MAE has designed and created include:

- Electric Powertrain
- Electric Motors
- Electric Motor Control Units
- Electric DC/DC Converters
- Battery Simulators
- Components and accessories
- Climate controller interfaces
- Inverters
- Fuel Cells
- Gearboxes
- Batteries
- Coolant conditioning systems
- Hydrogen fuel supply systems
- Test article interfaces

About MAE

Mustang Advanced Engineering is a leading supplier of advanced, custom engineered testing and measurement systems. Located in Twinsburg, Ohio since 1986, MAE delivers world-class testing solutions, custom design support, technical assistance, backed by a dedicated factory service team, making them a trusted source of expertise for the global industrial market. Visit MustangAE.com for more information. Follow them on Facebook, Twitter, LinkedIn, and Instagram

