PowerPard

GTAKE provides reliable, high-precision, and optimal battery simulators and four-quadrant drive systems for test rigs

With years of technology accumulation and research breakthrough in the field of electric vehicles, GTAKE is also providing battery simulators, drive control systems and professional pre-sale and after-sale service for test rigs in the field of automobile and other industries. GTAKE provides high precision, quick dynamic response, wide adjustment range, outstanding energy-saving effect, as well as stable and reliable products and system solutions to customers. The products have passed strict verification by domestic and overseas customers. In the field of electric vehicle test rigs, there are hundreds of our products and systems running well at customer sites while receiving great recognition worldwide.

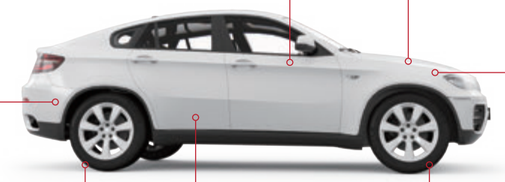
Typical Test Rig Applications:

- Test rigs for internal combustion engines, motors, gearboxes or all-in-one products of automobile
- Test equipment for product development and mass production
- Test rigs for electric tools, such as electric screwdrivers and saws
- Test equipment for charging/discharging of battery packs
- Specific test rigs, such as balancing, noise and resonance test
- Test rigs for martial equipment, such as gearbox at tank
- Test rigs for power systems of airplanes and helicopters, like alternator, hydraulic system, fuel pump, and ram air turbine

Typical Test Rig

GTAKE is qualified to provide four-quadrant drive and battery simulator systems for the test of following components and parts:

01



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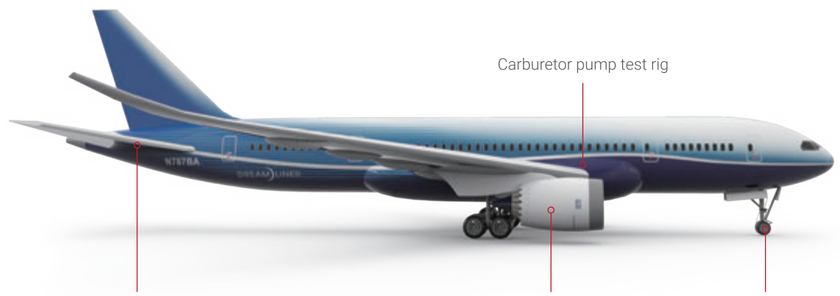


PowerPard Advantages

- Common DC bus structure. Energy recycles in the system, while the mains supply only needs to replenish the energy loss of the system
- The battery simulator and drive system can share one AFE unit, saving the system hardware configuration and reducing the installation space of the test rig
- No matter the performance test during product development or quality control in the phase of mass production, GTAKE battery simulator and four-quadrant drive system are able to ensure the safety, precision, and best reliability according to testing requirements.
- High control precision, low voltage fluctuation and current ripple
- High power factor at the grid side, ⩾0.99 (when running at unit power factor)*1
- Low current THD at the grid side, ＜2.5% at rated power*2
- Strong overload capacity, 150% @ 1min
- Thorough system protection
- Applicable to different mains voltage in different countries

Power Factor*1 ⩾

0.99

Current THD*2 ＜

2.5%

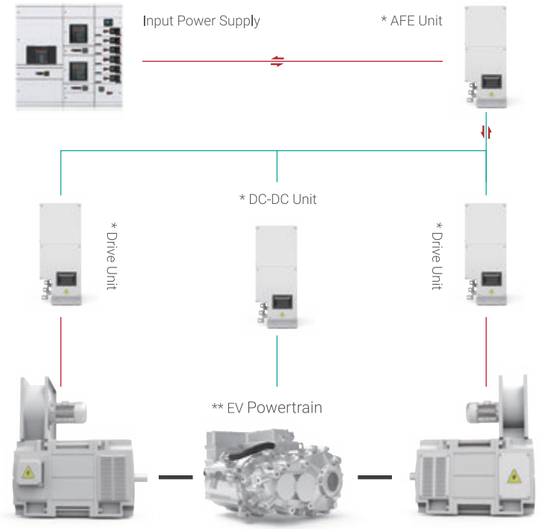
Voltage Regulation Accuracy*3 ＜

0.1%

01

Test Equipment for Electric Vehicle Powertrain

Besides the traditional drive control system, electric vehicle powertrain testing usually requires a controllable DC power supply to simulate different output status of the vehicle battery. GTAKE PowerPard system contains battery simulator and four-quadrant drive system, which can not only provide precise power output control for motors, motor controllers, gearboxes and all-in-one products in electric vehicles, motorcycles and a variety of special vehicles , but also manifest the system performance under different output status of the battery according to the test requirements.



Features

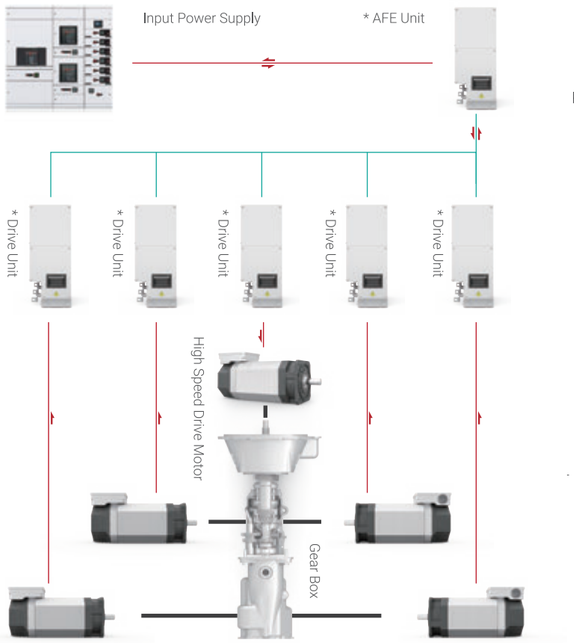
- Voltage output: 24V - 1000V DC. Current output: +/- 1250A
- Integrated design, easy for installation and maintenance
- Support a variety of communication modes, such as CAN, CANopen, Ethercat, ProfiNet, etc.
- Provide system solutions for the testing of motors, motor controllers, gearboxes, battery packs and all-in-one products in the phase of R&D and production

02

Gearbox Test Rig

GTAKE drive system can be used to control the input and output torque and speed of different gearboxes. Whether it is a four-wheel or two-wheel loading gearbox, our control system, by virtue of excellent control algorithms, hardware configuration & bus communication mode, can achieve accurate synchronization of the loading motor, or the differential control according to the test requirements.

To meet the strict requirements of such testing, we usually use low-inertia permanent magnet synchronous motor or asynchronous motor for the input control of gearbox. With torque control mode of input motor and speed control mode of the loaded motor, GTAKE drive system can realistically simulate all the operating status of the gearbox, providing reliable test condition for design verification & manufacture quality assurance. Customers only need to focus on the requirement of the measurement and the analysis of the result.



Applications

- Transmission efficiency test
- Product lifespan test and strength measurement
- Speed synchronous control of the loaded motor
- Input motor torque control
- Quick acceleration and deceleration test
- Dynamic performance response test
- Simulation of real road conditions. Calculate & simulate the torque & speed under different driving conditions
- Simulate the rotary speed and resistance at four-wheel/two-wheel driving

* Parts with asterisk are in the scope of supply

AC DC Hard Connect Energy Flow

03

Engine Test Rig

GTAKE four-quadrant drive system is applicable to the test rig in the phase of development or manufacture of internal combustion engine. In this application, the drive control system can accurately simulate the speed and torque of the vehicles under all kinds of operating and driving status, providing accurate and reliable test data for the performance evaluation, design improvement, calibration or production quality assurance.

GTAKE four-quadrant drive system can not only accurately and quickly simulate the required loading torque, but also feed the regenerated energy from the drive system back to the grid through its AFE unit, reducing power consumption without generating harmonic interference to the grid.

* Parts with asterisk are in the scope of supply

AC DC Hard Connect Energy Flow

Applications

- Lifespan and burn-in test
- Efficiency test
- Durability test
- Exhaust gas measurement
- Temperature rise test
- Vibration and noise test
- Calibration of internal combustion engine

04

Vehicle Road Simulation Test Rig

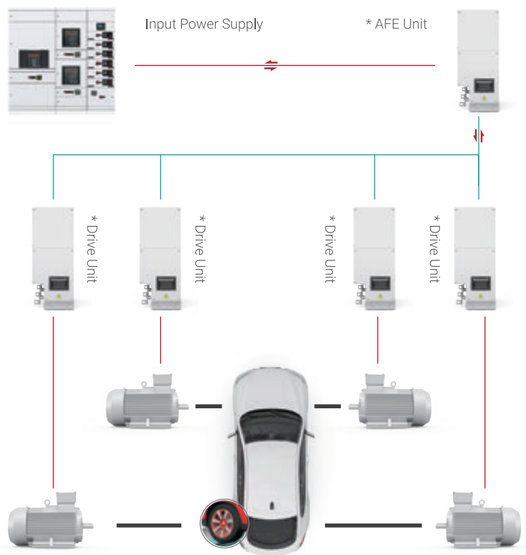
With GTAKE PowerPard system, the driving speed and resistance of the vehicle under different road conditions can be simulated, such as bumps, damaged pavement, ups and downs, etc., including all kinds of operations, such as startup, braking, steering and so forth. Properties and performances of the tested vehicle under different road conditions can be realistically recurred.

The internal functions of the vehicle, like the safety features ABS and EPS, can also be simulated by PowerPard system. The system has the characteristics of fast response and precise compensation control, and can perform various measurement requirements - high accuracy, repetition, quick switch, and periodic recurrence, etc. The influence factors such as frictional resistance, electric, thermal dependence, and the inertia moment of the entire power system can be simulated as required. Through bus communication, GTAKE drives are able to achieve quick and accurate synchronous control. Customized PowerPard system solution can meet the requirement of rolling road simulation for the test of pure electric, hybrid and fuel vehicles. Through the common bus structure, the test system can make use of the energy generated in braking status of a motor to another one in driving, or feed the surplus energy back to the grid. The power consumption of the test rig is therefore significantly reduced.

Applications

- Frame durability test
- Test for ABS, ESP and ASR
- Brake test
- Two-wheel/four-wheel drive system test
- Cruise control test
- Uphill/downhill test
- Vehicle mass simulation
- Wind resistance test
- Performance test
- Exhaust gas measurements

* Parts with asterisk are in the scope of supply



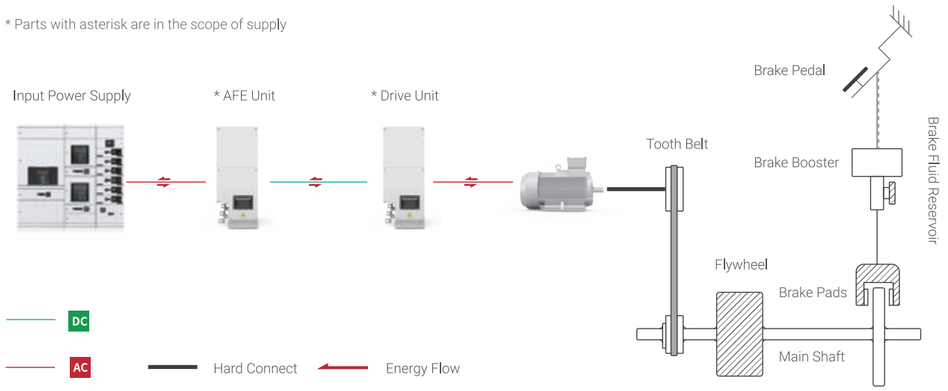
05

Component Test Rig

In addition to the integral system test requirement, in many industries such as automobile, aerospace, machine manufacturing and military, usually it is necessary to further test some of the components of the system. Through the component test rig, the components of the system can be loaded and tested so as to ensure its performance, safety, reliability and durability, further guaranteeing the system quality, and providing valuable data for the test and analysis of the whole system.

The setup of component test rig is not only significant for its R&D and production quality assurance, but also crucial for the obtainment of relevant qualifications/certifications and customer trust. Compared with system test rig, the cost of component test rig is lower. GTAKE technical team is able to assist customers in setting up new component test rig or upgrading the existing test equipment.

* Parts with asterisk are in the scope of supply

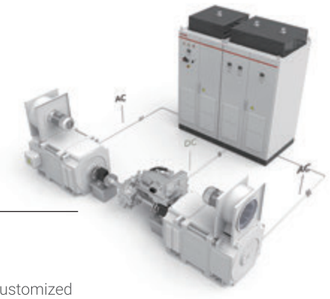


Typical Component Test

- Air compressor
- Bearing test
- Rotary gear train test
- Cylinder test
- Alternator starter test
- Shock absorber
- Clutch
- Automobile/motorcycle cable test
- Steering wheel
- Ram air turbine test
- Tooth belt
- EV components
- Balancing stand

PowerPard

Specifications



DC Side

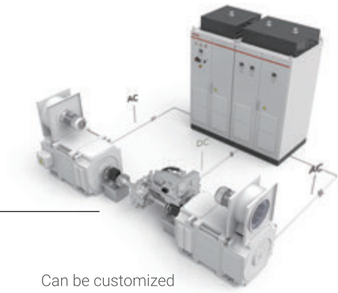
Rated Power	30 - 630kW	Can be customized
Voltage	24 - 1000V	Continuously adjustable
Rated Current	±60 - ±1000A	Can be customized
Voltage Regulation Accuracy*3	⩽0.1% FS	
Voltage Ripple Vrms	⩽0.2% FS	
Current Accuracy	⩽0.1% FS	
Voltage Response Time	⩽5ms	Sudden loading time from 10% to 90% of the rated load
Conversion time	⩽10ms	Conversion time from -90% to 90% of the rated load
Protection	Over-current, over-voltage, over-temperature, over-load, etc.	

Grid Side

Rated Voltage	3AC 380/400/415/440/460/480V	Effective value of line voltage
Allowable Voltage Range	304 - 437V	Rated voltage, -20% - +15%
Rated Current	60 - 1100A	
Rated Frequency	50/60Hz ± 2.5Hz	
Current THD	＜3%	2.5% at rated power
Power Factor	⩾0.99	
Overload Capacity	150%, 1min	
Protection	Over-current, over-voltage, over-temperature, over-load, etc.	

PowerPard

Specifications



Drive Side

Rated Power	30kW - 630kW	Can be customized
Input Voltage Range	300Vdc - 1000Vdc	Input voltage range of DC bus
Rated Current	60A - 1100A	Can be customized
Output Voltage Vrms	3 AC: 0 - $U_{dc}/\sqrt{2}$, deviation ＜ ±3%	U_{dc} : input bus voltage
Output Frequency	0.00 - 600.00Hz, Resolution: 0.01Hz	Output frequency 0.0 - 1500.0Hz optional
Overload capacity	150%,1min; 180%,10s; 200%,0.5s	Once per 10 minutes
Control Mode	Closed-loop vector control（FOC）	
Speed Range	1:1000	
Speed Control Accuracy	±0.02%	
Speed Fluctuation	±0.1%	
Torque Control Accuracy	±3%	
Torque Response Time	⩽5ms	Sudden loading time from 10% to 90% of the rated load

Others

Operation Interface	Operation panel / PC software
Communication	Default: 485, Optional: ProfiNet / EtherCAT / CAN

To ensure the PowerPard system to fulfill the requirements optimally, GTAKE team usually tailors **customized product solution** and provide sophisticated technical support according to the application requirements.

Remote & local service support

To guarantee the safe and stable operation of PowerPard system, we provide customers with remote and local service support:

- Pre-sale technical exchange
- Local installation and commissioning
- Maintenance and repair service
- After-sale technical support
- All spare parts within product lifespan are procurable

Customized service & expert support

Meanwhile, GTAKE can also provide expert service to its customers, such as expanded, special and innovative upgrading for the test rig system:

- Remote technical support and consultation
- On-site support and assistance at the appointed time
- Professional technical analysis and continuous system optimization and upgrade

According to customer requirements, we are able to provide **customized multi-dimensional training**. The quick response service ensures that your need be fulfilled in a timely manner throughout the entire process.

Customized Training

Different test rig users have different training requirements on the knowledge and operating skills related to the battery simulator and four-quadrant drive system. GTAKE technical team can provide customized training to their designers, operators and maintenance engineers:

- General introduction of the system
- Commissioning techniques
- Product operation
- Fault diagnosis and troubleshooting

Quick Response of Supply Chain and Service Support

After the product solution is confirmed and the sales contract is signed, GTAKE professional team in supply chain shall respond instantly to the production of the customized products, and deliver the qualified PowerPard products to the customer designated location in time. Meanwhile, our technical service engineers are ready to provide local installation, commissioning, and technical training at the appointed time as required.

Quality Assurance

We attach great importance to the design, production, testing, packaging and so forth. To ensure the delivery of flawless, quality-consistent products, all the products are inspected and tested strictly before shipment.

We cooperate with reputed third parties to propel all our components, production processes, quality control system, and finished products to meet the standards of automobile industry.

High technology enterprise & product certificates

Third party test reports