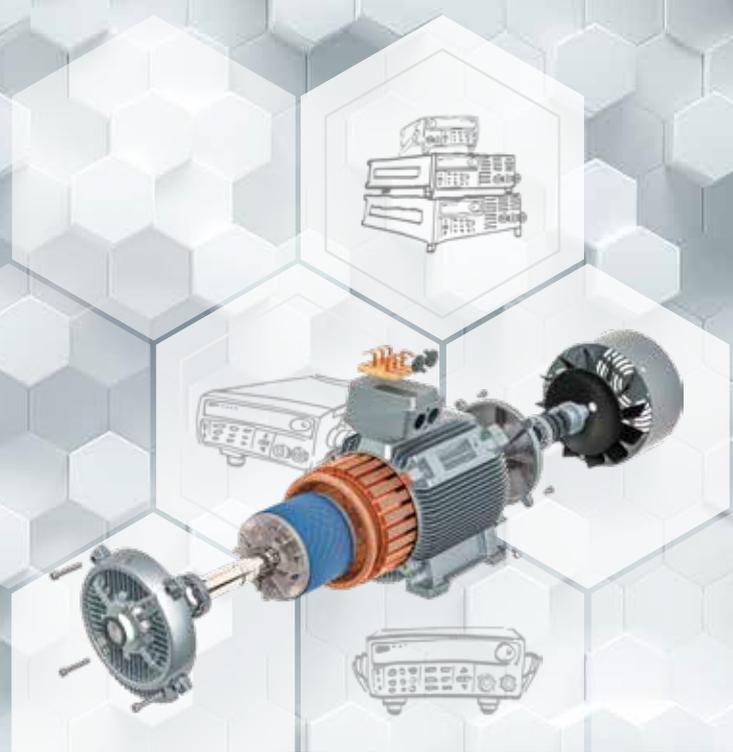


# ITECH TEST SOLUTION Electric Motor

YOUR POWER  
TESTING  
SOLUTION



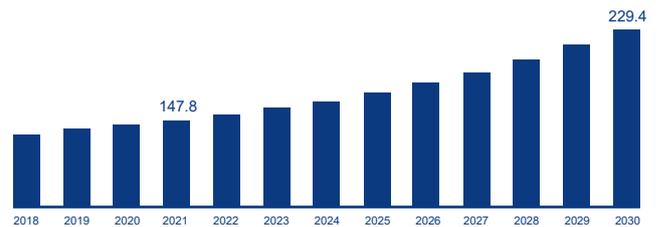
# ITECH TEST SOLUTION Electric Motor



The motor has strong versatility. Any application that requires the conversion of electrical energy to mechanical energy needs an electric motor. Therefore, motors are widely used in various industrial fields. Some key factors such as increasing technological breakthroughs and an increase in EV production drive the global electric motor sales market growth. This also brings test challenges to the applied test instruments as well.



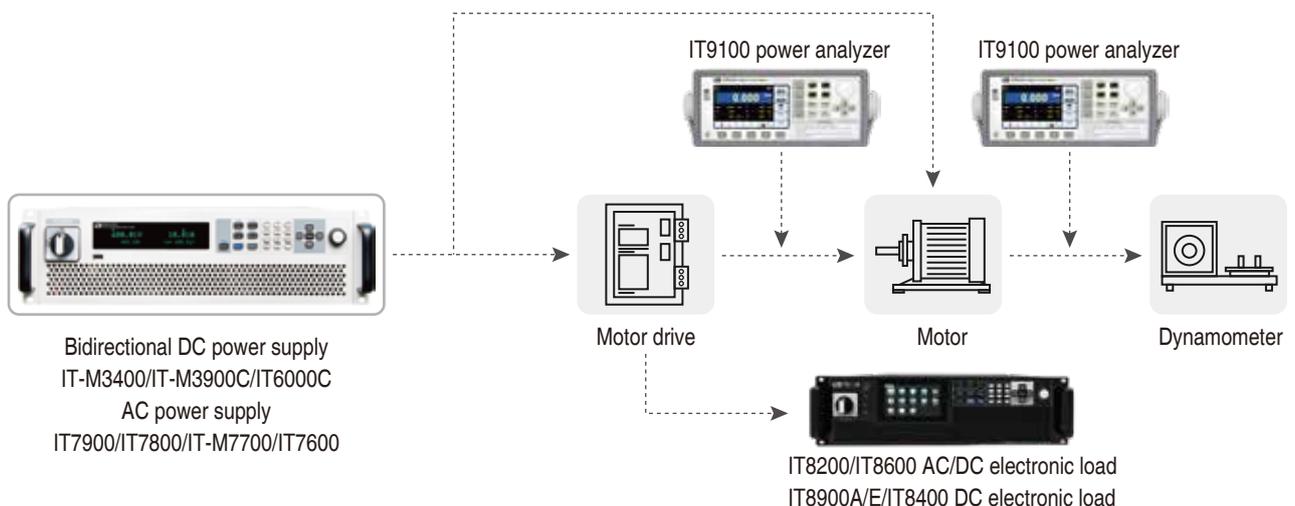
**Electric Motor Sales Market, 2018-2030(USD Billion)**  
CAGR Around 8.4% from 2022-2030



Source: Acumen Research And Consulting

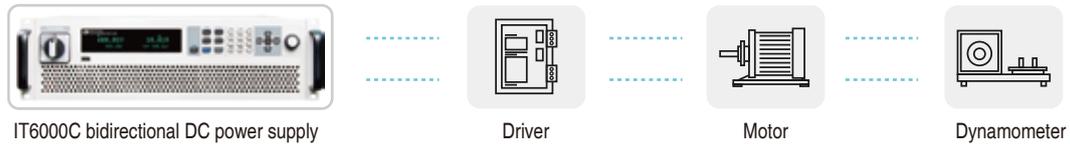
## Test Solution

Motors include DC motors and AC motors according to the type of power supply. Motor testing is necessary for motor research, use and maintenance.



# DC motor test

DC motors are widely used in home appliances, medical equipment, automobiles and so on. When testing DC motors, there will be high current at the moment of starting up and back electromotive force as well. ITECH bidirectional power supplies can meet the test requirement well even under the above challenges. And there are many models for selection, which can test DC motors of various specifications.



### Product

- IT-M3400 bidirectional DC power supply
- IT-M3900B/C bidirectional DC power supply
- IT6000B/C bidirectional DC power supply
- IT6500C bidirectional DC power supply

### Specification

- Voltage: max.2250V
- Current: max.2040A
- Power: max. 2MW
- Max. voltage measurement accuracy:  $\leq 0.02\%+0.02\%FS$
- Max. current measurement accuracy:  $\leq 0.1\%+0.1\%FS$

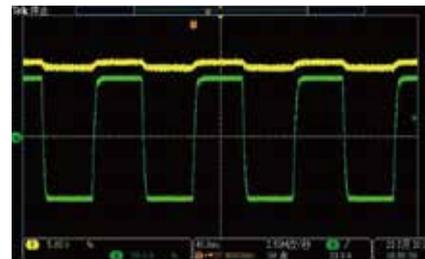
## Source and sink functions in one unit with high power density

ITECH bidirectional power supply integrates source and sink functions in one unit. It's easy for wiring connection. It provides full protections and wide power ranges. At the same time, ITECH bidirectional power supply has high power density, 18kW in 3U single unit, largely saving your room.



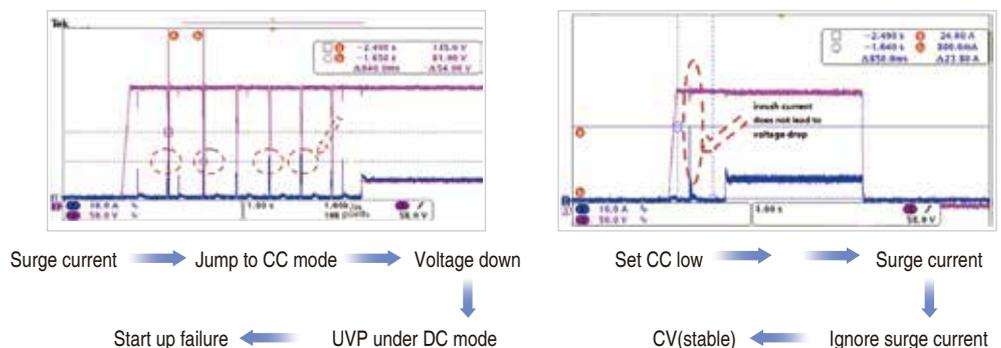
## Bidirectional current flow with seamless switch

ITECH bidirectional power supply can quickly and seamlessly switch between absorbing current and sinking current, which is good for absorbing the back EMF generated by the working motor.



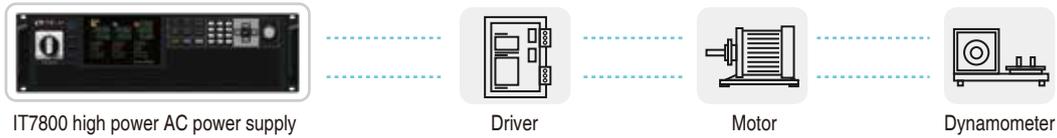
## CC priority to avoid current overshoot

The ITECH power supply has the CC/CV priority function. When the current non-overshoot mode is selected, it can avoid the problem of the high current at the moment of motor startup that causes the supply voltage to drop, and ensure the normal startup of the motor.



# AC moter test

AC motors are widely used in industry and scientific research thanks to the low price, easy maintenance and multiple power specifications. As an inductive load, several times the surge current will be generated by an AC motor at the moment of starting up, which will trigger the lpeak protection and cause the AC power supply for testing to stop outputting. At the same time, the current RMS of the AC motor is low and the peak-to-peak value is high, resulting in high CF too. When testing, users often need to choose a power supply with much higher power to deal with the instantaneous surge current. However, you don't need to do so if selecting a ITECH AC power supply.



### Product

- IT7900 regenerative grid simulator
- IT7800 high power programmable AC/DC power supply
- IT-M7700 high performance programmable AC power supply
- IT7600 high performance programmable AC power supply

### Specification

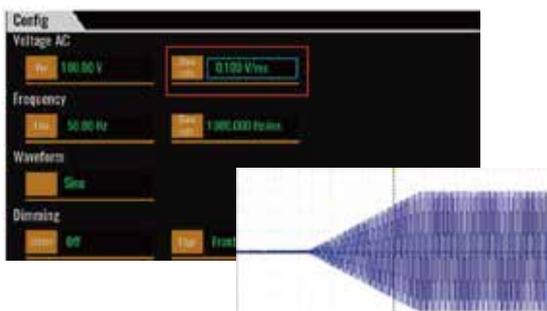
- Voltage: 0-700V
- Power: 0-960KW
- Frequency: 10-5000Hz
- Max. voltage measurement accuracy: <math>< 0.1\% + 0.1\%FS</math>
- Max. current measurement accuracy: <math>< 0.1\% + 0.2\%FS</math>

### Highlight

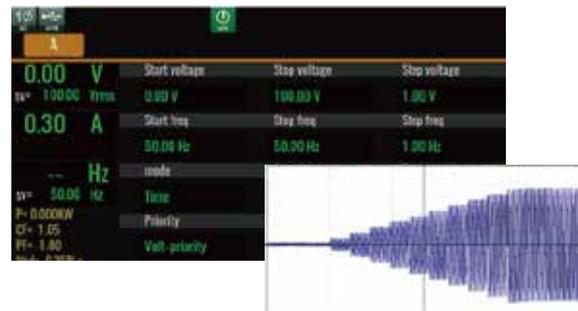
- High precision power supply, wide power range, high power density, 15kVA in 3U
- Full protection, OCP, OCP (both peak and effective value), OVP, OPP
- Simulate arbitrary waveform output, output 0-360° start/stop phase angle can be set
- Built-in multiple communication interfaces, provide free PC software, support long-term test data collection

## How does ITECH power supply deal with the start-up surge current of an AC motor ?

As an inductive load, the AC motor will generate several times the surge current at the moment of starting, which will trigger the lpeak protection and cause the AC power to stop outputting. ITECH AC power supply can avoid it by setting voltage rising slope and voltage step rising.



The voltage rises slowly after setting the output voltage slope



The voltage rises step by step after setting sweep

## Up to 6 times peak current output

When the AC motor is running, the effective value of the current is low, and the peak-to-peak current is high, which leads to a high CF. ITECH AC power supply can output 6 times the peak current instantly, so you no longer need to buy an AC power supply with higher power, saving your cost.v



Current waveform of a small AC motor( CF=2 )

# Motor driver test

We usually build a test platform using a motor and a mechanical load to test a motor drive. Due to the influence of load dynamic characteristics and transient time, it is often impossible to test under multiple loading conditions. At this time, it is recommended to use ITECH electronic load. Its waveform programming function can well simulate a variety of loading conditions.



## Product

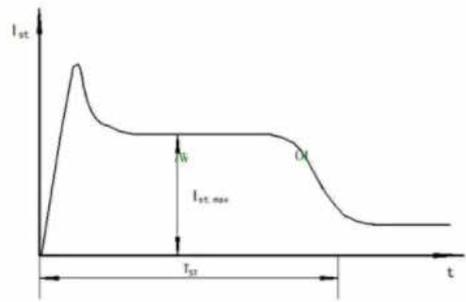
- IT7900P regenerative grid simulator
- IT8200/IT8600 AC/DC electronic load
- IT8900A/E/IT8400 DC electronic load
- IT6000C/IT-M3900C/IT-M3400 DC electronic load
- IT7900/IT7800/IT-M7700 AC power supply

## Advantage

- ITECH electronic load has fast dynamic characteristics, can quickly change load parameters, and conduct impact load response tests.
- The ITECH solution can repeatedly set the same test conditions to solve the problems of short duration of transient conditions such as acceleration and deceleration of the motor and difficulty in reproducing the same conditions.
- The traditional solution is complicated, it needs to consider the power recovery of the load and connect multiple power analyzers. The ITECH solution has a simple structure and supports real-time data recording, no additional power analyzer needed.
- There are losses with the traditional solutions, it is impossible to accurately control the load power of the electric drive, and the test accuracy is not high. However, ITECH's power supply and load accuracy are high, the wiring is simple. The SENSE function can also compensate for cable loss.

# Short-term over-power loading reducing test cost

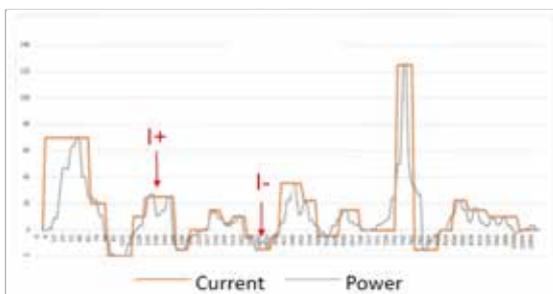
The starting current of the motor is high. In order to simulate it, it is often necessary to purchase a higher-power electronic load. IT8400 series electronic load supports double power loading for the period up to 3 seconds.



Starting current of a motor

# IT7900P works as a motor simulator to simulate the dynamic characteristic of the motor

The back electromotive force will be generated during the motor running. At present, more and more motor drives have the function of absorbing the back electromotive force. Ordinary AC electronic loads do not have the function of simulating the back electromotive force generated by the motor, but ITECH IT7900P can do it. By editing the LIST waveform and set different parameters, the motor can be simulated for dynamic and static loading.



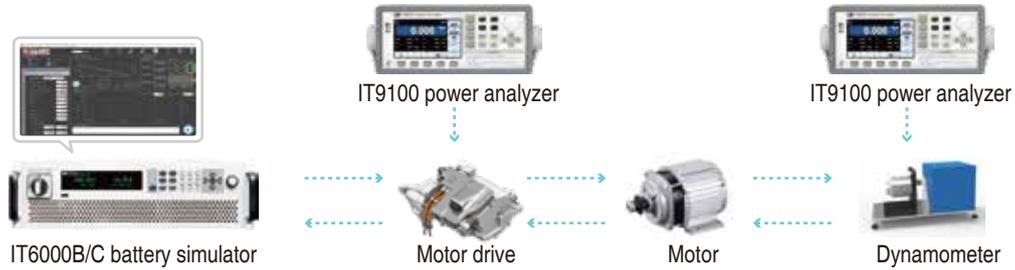
EV motor working condition simulation



IIT7900P simulates the motor from loading to generating back EMF

# EV motor test

ITECH has a complete set of EV testing solutions. As one of the core components of EV, the motor has become the research object of automobile motor manufacturers, certification bodies and professional research institutes. ITECH can provide professional power testing technologies for them.



### Product

- IT6000B/C battery simulator
- IT9100 power analyzer

### Specification

- Voltage: up to 2250V
- Current: up to 2040A for single unit
- Power: up to 2MW

### Advantage

IT6000C with battery simulation software can simulate the power battery as the front-end input for EV motor testing, with high-speed dynamic response. When the motor speed fluctuates, the output voltage of the battery simulator can quickly recover and stabilize, avoiding the lag of power regulation and the UVP triggered by unbalanced power supply voltage.

## Battery simulation software BSS2000



### Highlight:

- Accurately simulate battery SOC, depth of discharge, open circuit voltage, internal resistance, etc.
- Repeat the same parameter condition test
- High efficiency, quickly verify the characteristics of DUT using different batteries
- Small, high power density, easy to move
- Built-in characteristic curves of 8 battery types

## Motor efficiency test

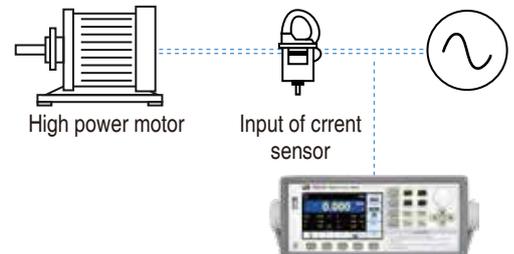
Motor efficiency test is one of the most important motor test items. The motor efficiency calculation formula is  $\eta = (P_{out}/P_{in})/100\%$ . The accuracy of the measured values is critical. The test method is generally carried out by using an electric dynamometer or a motor-to-drag.

### Product

IT9100 power analyzer

### Specification:

- Voltage: 0~1000V
- Current: 0~50A
- Accuracy: voltage and current accuracy up to 0.1%
- Bandwidth: 100kHz
- Harmonic: 50th

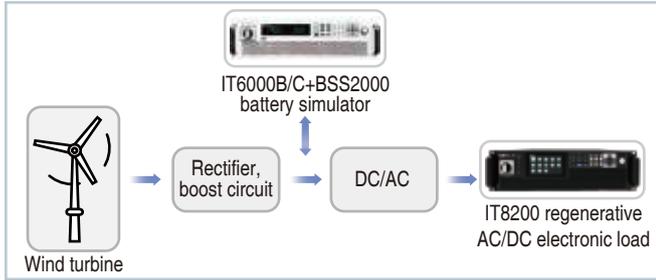


### Highlight

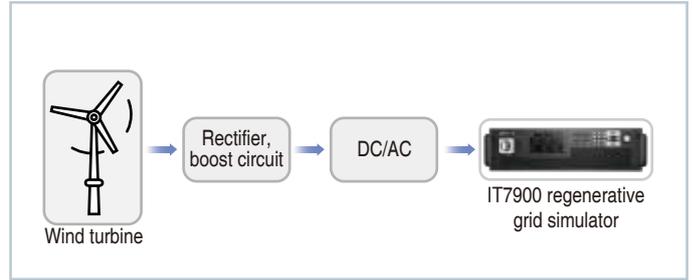
- IT9100 power analyzer can measure power factor, harmonics, efficiency, power consumption and crest factor, etc.
- In addition to supporting rear panel wiring, it also supports external current sensor wiring input
- Built-in RS232/USB/LAN communication interface, provide USB-Host for saving test data and waveforms
- Multiple ranges, the minimum current range is 5mA, and the measurement result display is accurate to 5 digits, which is more accurate

# Wind turbine test

There are mainly 2 types of wind turbines, grid-connected and off-grid turbine. As an important part of the wind power system, it's necessary to have the wind turbine to be performance tested and grid connection tested.



Off-grid test



Grid-connected test

## Product

- IT7900P high performance regenerative grid simulator
- IT7900 regenerative grid simulator
- IT8200 regenerative AC/DC electronic load
- IT6000B/C+BSS2000 battery simulator

## IT7900P High Performance Regenerative Grid Simulator

- IT7900P=IT7900+IT8200, applied to on-grid/off-grid testing
- 15kVA in 3U, power extended to 960kVA after parallel connection
- Support single-phase/three-phase/reverse-phase/multi-channel mode
- Harmonic simulation and analysis up to the 50th order
- Meet regulatory testing Requirements of LVRT, phase jump, frequency change, harmonic injection, etc.
- Built-in standard regulatory waveforms such as IEC61000-4-11/4-13/4-14/4-28
- Efficient power regeneration

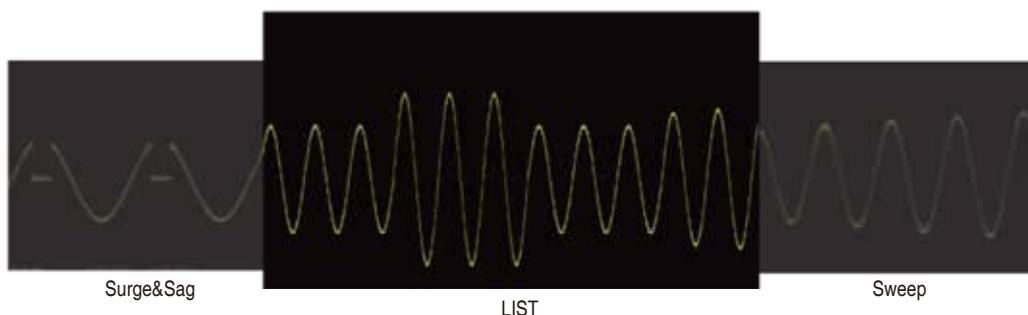
## Anti-islanding function makes the test easier

Anti-islanding is one of the must-test items for grid-connected power conversion products. The ITECH IT7900/IT7900P series has a built-in anti-islanding protection test function. Just one-click, you can enter it. This function can simplify the test process and improve test efficiency.



## Arbitrary waveform editing to meet grid-connected regulations tests

IT7900/IT7900P series grid simulators provide rich waveform editing functions. By Surge&Sag, LIST, and Sweep functions, you can simulate the recurrence of mains power and abnormal power grid, and meet various grid-connected regulation tests.



This information is subject to change without notice. For more information, please contact ITECH.

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