ANMEP(F) Series Motor Emulator



Product Overview /

The ANMEP(F) Series Motor Emulator, applied in the testing of motor control units (MCU), can simultaneously meet both signal-level and power-level testing requirements. Based on preset motor parameters and operating conditions, it can simulate the electrical port characteristics (voltage, current, speed feedback, temperature feedback) of a real motor and directly act on the MCU, thereby achieving the purpose of replacing the real motor.

The motor emulator can overcome the disadvantages of traditional test bench systems, such as poor flexibility, high safety risks, high costs for parts and components, and significant mechanical vibration and noise, and it allows for flexible modification of motor body parameters and mechanical load parameters, making it a powerful verification device for the forward development and testing of MCU.

Product Features /

- Modular design based on full silicon carbide platform for high power density and high switching frequency.
- Motor types: Three-phase permanent magnet synchronous motor (PMSM), three-phase brushless DC motor (BLDC), and three-phase asynchronous motor.
- Motor models: Linear, non-linear, and harmonic.
- Control unit adopts distributed FPGA architecture with parallel computing for faster processing speed.
- Interleaved parallel technology for each power module, improving equivalent switching frequency and dynamic response characteristics.
- Operating condition simulation modes: Torque mode and speed mode.
- External speed feedback unit connected to the host via high-speed fiber optic.
- Position sensor simulation types: Rotary transformer, incremental quadrature encoder, UVW Hall sensors, eddy current encoder, and magnetoresistive encoder.
- Temperature sensor simulation: NTC, PTC.
- Low-voltage fault simulation: Excitation signal short circuit, excitation signal open circuit, sin/cos signal open circuit, short circuit, amplitude anomaly, phase anomaly, noise interference, temperature sensor short circuit, open circuit, and overtemperature fault.
- High-voltage fault simulation: Phase-to-phase short circuit, phase-to-N short circuit, phase loss fault, bus short circuit, bus open circuit, bus-to-phase short circuit, and stall.
- Memory function: Multiple memory groups for storing configuration parameters.
- Feedback function: Full power range feedback.
- Multiple protection function: Input over/undervoltage, input phase loss, bus overvoltage, output overvoltage, power module overcurrent, overtemperature protection, output short-circuit current limiting protection, and overspeed protection.

Product Application /

- Assistance in the test bench in verifying the control algorithms of the electronic control unit (ECU).
- Fault simulation of electronic control
- Extreme condition test of electronic control
- Functional verification and aging of electronic control

Technical Specifications /

Technical Specifications		
Number of Phases in the Power Grid	Three-phase three-wire +PE	
Input Voltage	380V±10%	
Input Frequency	50Hz±3Hz	
Power Factor	≥0.95	
Total Current Harmonic Distortion	≤5%	
Feedback Parameters		
Three-phase Line Voltage	323~437V (allowed grid voltage)	
Frequency	45~55 (allowed grid frequency)	
Power Factor	0.99 (standard AC source input, degree of distortion within 1.5%)	
Total Current Harmonic Distortion	5% (standard AC source input, degree of distortion within 1.5%)	
Feedback Function	Full power continuous energy feedback	
Product Model	**ANMEP200-1200S(F)**	**ANMEP400-1200S(F)**
Power	200kW	400kW
Peak Power	300kW（30s）	600kW（30s）
Bus Voltage	≥1200V	
Rated Current rms	420A@300V_{L-L}	840A@300V_{L-L}
Peak Current rms	600A(30S)	1200A(30S)
Maximum Output Line Voltage	800V_{L-L}	
Simulated Rotational Speed	300000rpm/pole pairs	
Motor Steering	Clockwise / counterclockwise	
Motor Torque	Forward & reverse	
Current Frequency	0-5kHz	
Current Response Speed	No less than 1000A/ms	
Control Mode	Speed control and torque control	
Stator Resistance	0~5Ω	
Motor Inductance	0~2.6mH	
Pole-pairs Number	1~20	

Product Model	ANMEP200-1200S(F)	ANMEP400-1200S(F)
Speed Control Accuracy	≤±1rpm	
Current Control Accuracy	0.1%F.S	
Model Iteration Cycle	1us	
Motor Type	three-phase permanent magnet synchronous motor (PMSM), three-phase brushless DC motor (BLDC), and three-phase asynchronous motor	
Model Type	Linear, non-linear, and harmonic	
Position Sensor	rotary transformer, incremental quadrature encoder, UVW Hall sensors, eddy current encoder, and magnetoresistive encoder	
Rotation Excitation Resistance	3kHz~20kHz	
Fast Data Upload Function	Under high-speed uninterrupted upload conditions, any eight parameters among IA, IB, IC, Id, Iq, EA, EB, EC, Ed, Eq, Ψd, Ψq, ω, and ϕ can be selected for uploading, with a transmission speed of 10 kHz.	
High-voltage Fault Simulation	Phase-to-phase short circuit, phase-to-N short circuit, phase loss fault, bus short circuit, bus open circuit, bus-to-phase short circuit, and stall	
Low-voltage Fault Simulation	Excitation signal short circuit, excitation signal open circuit, sin/cos signal open circuit, short circuit, amplitude anomaly, phase anomaly, noise interference, temperature sensor short circuit, open circuit, and overtemperature fault.	
Temperature Sensor	Four analog channels for NTC and PTC temperature sensor simulation are reserved	
Cooling Method	Forced air cooling	
Communication Interface	LAN, CAN, RS485/232 (select one of the two)	
Display Mode	8-inch LCD screen / host computer	
Protection Function	Input over/undervoltage, input phase loss, bus overvoltage, output overvoltage, power module overcurrent, overtemperature protection, output short-circuit current limiting protection, and overspeed protection	
Security Protection	An external emergency stop input interface is provided, which can achieve interlocking with the system emergency stop	
Operating Ambient Temperature	-10-40℃	
Ambient Humidity	20-90%RH, without condensation	
Dimension(W*H*D mm)	2200*1950*1040 (dimensional tolerance not exceeding ±5mm)	3400*1950*1040 (dimensional tolerance not exceeding ±5mm)
Weight	≤1500kg (weight tolerance not exceeding ±50kg)	≤3000kg (weight tolerance not exceeding ±50kg)
Noise	At low gear, the noise level is below 65 decibels At medium gear, the noise level is below 70 decibels At high gear, the noise level is below 75 decibels	

* The above specifications are subject to change without notice