

磁粉测功机概述 Overview of magnetic powder dynamometer

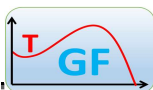
磁粉测功机又称电磁测功机，由带磁粉加载器、支架、底板、转速传感器、力矩传感器、轴承及冷却系统组成，常规磁粉测功机适用于 10KW 以下的低速被试品的测试，由于结构上需要转子和定子通过磁粉进行机械接触产生转矩，因此不适合中高速电机的测试。常规的磁粉测功机使用循环液体（水）冷却，运行功率于 500W 的磁粉测功机通常采用自然风对流冷却，适用于测试低速交直流电机、减速电机和部分汽车电机等。

Magnetic powder dynamometer, also known as electromagnetic dynamometer, is composed of magnetic powder loader, bracket, base plate, speed sensor, torque sensor, bearing and cooling system. Conventional magnetic powder dynamometer is applicable to the test of low-speed test object below 10kW. Because the structure requires mechanical contact between rotor and stator through magnetic powder to generate torque, it is not suitable for the test of medium and high-speed motor. The conventional magnetic powder dynamometer uses circulating liquid (water) cooling, and the magnetic powder dynamometer with operating power of 500W usually uses natural wind convection cooling, which is suitable for testing low-speed AC / DC motor, deceleration motor and some automobile motors.

磁粉测功机 Magnetic powder dynamometer

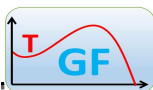
序号 Serial number	型号 Model	转矩范围 Torque range	转速范围 Speed range	连续运行功率 2 hours operation power	短时运行功率 5-minute operating power
1	MPD-20KB/F	0.1~2.000Nm	0~8000rpm	200W	400W
2	MPD-50KB/F	0.4~5.000Nm	0~8000rpm	300W	500W
3	MPD-50KB/W	0.4~5.000Nm	0~8000rpm	500W	800W
4	MPD-100KB/W	0.8~10.000Nm	0~4000rpm	900W	1200W
5	MPD-200KB/W	1.5~20.000Nm	0~4000rpm	2000W	3000W
6	MPD-500KB/W	3~50.00Nm	0~3000rpm	4000W	5500W
7	MPD-1000KB/W	8~100.00Nm	0~2000rpm	5000W	7000W
8	MPD-2000KB/W	15~200.00Nm	0~1000rpm	7000W	9000W
9	MPD-5000KB/W	30~500.00Nm	0~500rpm	9000W	14000W

注：转矩测试范围下限是指测功机顺 1000rpm 运行时的转矩值。高于 1000rpm 运转时转矩测试下限值允许大于规定的下限值。（摘抄自测功机系统相关国标《JB/T 7584.1-94》）

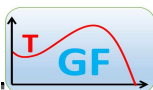


2. 全功能系统概述 A brief overview of all the features of the system

项目 project	标配全功能描述 (具体功能以实际选择型号为准) All functions of the conventional system (the specific function is based on the actual model selected)
系统组成 System composition	各类测功机机头、夹具/安装平台、联轴器/节、底板/底座、计算机系统、测试软件、测功机智能测控仪（GF-DST-00A）以及各类交流/直流稳压电源，串口通讯（波特率 38400），无需另配通讯卡。 Various types of dynamometers, fixtures and mounting platforms, couplings, base plates, computer systems, test software, dynamometer intelligent measuring and controlling instruments (GF-DST-00A) and various AC and DC regulated power supplies, serial communication (Baud rate 38400), no additional communication card is required.
整体优势 Overall advantage	输入输出参数均设计在同一主板测量，保证数据同步；250000 次/分的高速运算保证数据精准；16 位高速 AD 转换将转矩数据更精密测量；使用 CPLD 技术测量转速，绝对优势明显；站在用户角度开发设计，使操作更方便；分段校正技术的应用，以保证测试数据更加精准；智能防护，全面保护；单相、三相、直流电量间的切换由软件完成。 Input and output parameters are designed to be measured on the same motherboard to ensure data synchronization; high-speed operation of 250,000 times/min ensures data accuracy; 16-bit high-speed AD conversion measures torque data more precisely; using CPLD technology to measure speed, absolute advantage is obvious; The user's perspective develops the design to make the operation more convenient; the application of the segmentation correction technology to ensure more accurate test data; intelligent protection and comprehensive protection; the switching between single-phase, three-phase and DC power is completed by software.
主要功能 The main function	<ul style="list-style-type: none"> ■ 型式试验：手动/自动/定点测试、非稳定区域测量、10 组曲线比对、堵转测试带载启动、中英文报告。 Type test: manual / automatic / fixed point test, induction motor unsteady area measurement, 10 sets of curve comparison, stall test, with load start, Chinese and English report. ■ 出厂测试：定转矩、转速、电流、输出功率任一项，比对其余项，强大数据统计功能，多种智能设置。 Factory test: set torque, speed, current, output power, compare the remaining items, powerful data statistics function, a variety of intelligent settings. ■ 寿命试验：标配 15 阶段交变负载和恒值定时试验，自动闭环运行和预加载功能，多种智能保护。 Life test: standard 15-stage alternating load and constant value timing test, automatic closed-loop operation and pre-loading function, multiple intelligent protection.
控制对象 control object	HD 磁滞全系列、MPD 磁粉全系列、ECD 涡流全系列，包含风冷式、水冷式、气冷式和鼓风机冷却 HD hysteresis dynamometer, MPD magnetic powder dynamometer, ECD eddy current dynamometer, including fan cooling mode, circulating water cooling mode, compressed gas cooling mode and blower cooling mode.
适用范围 Scope of application	电容电机（洗衣机电机、油烟机电机、空调电机、风扇电机、多速电机等）、罩极电机、串激电机、直流电机（汽车风扇电机、雨刮电机、座椅电机、摇窗电机、天窗电机、轮毂电机、直流无刷电机）、外转子电机、旋转类电动工具（电钻、角磨、切割机、电园锯等）、三相电机和其它电机及派生产品。 Capacitor motor (washing machine motor, range hood motor, air conditioner motor, fan motor, multi-speed motor, etc.), shaded pole motor, series excitation motor, DC motor (automobile fan motor, wiper motor, seat motor, window motor, sunroof) Motor, hub motor, DC brushless motor), external rotor motor, rotary power tools (electric drill, angle grinder, cutting machine, electric garden saw, etc.), three-phase motor and other motors and derivative products.

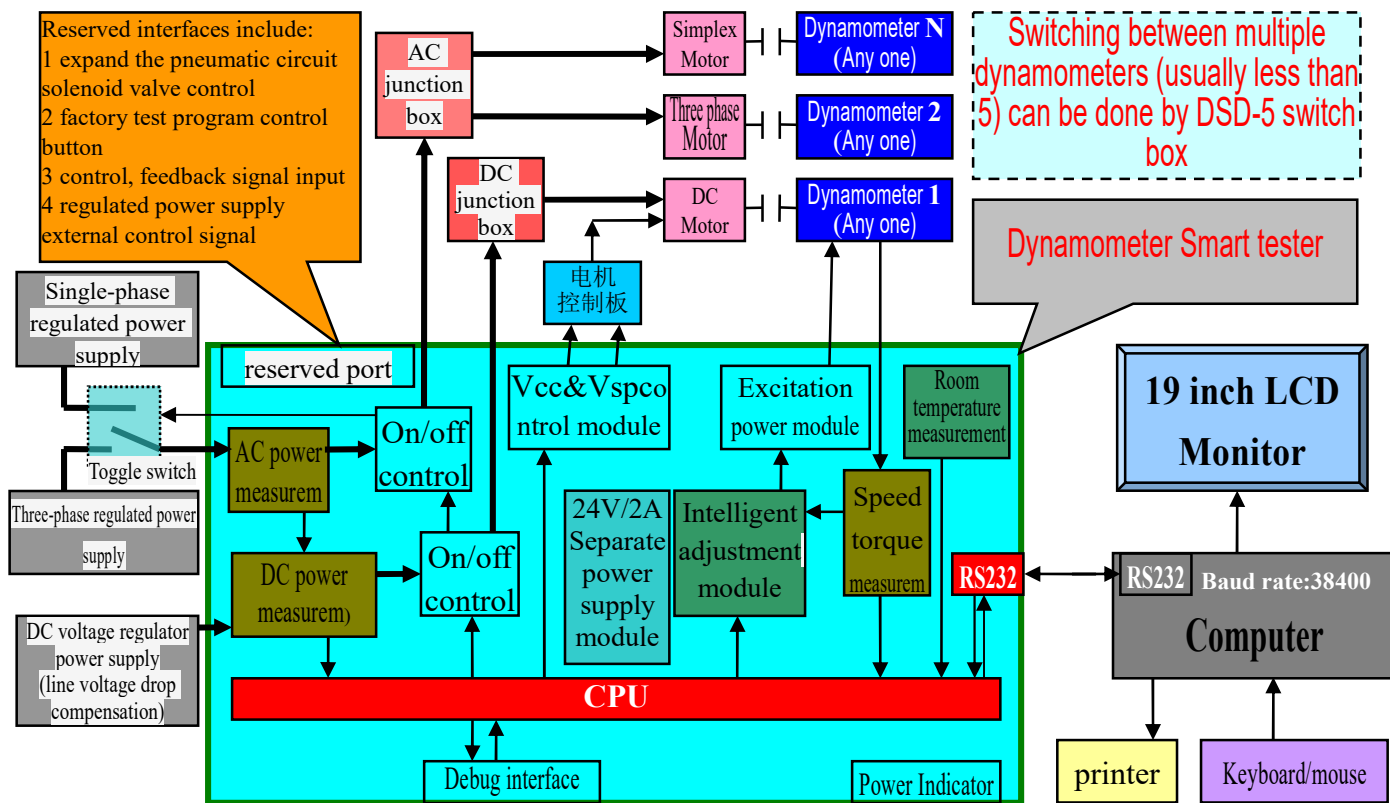


<p>测量参数 Measurement parameters</p>	<p>转速、转矩、输出功率、电压、电流、输入功率、主绕组电流、副绕组电流、副绕组电压、电容电压、功率因素、频率、效率、和环境温度及转向实时测取。 Speed, torque, output power, voltage, current, input power, main winding current, secondary winding current, secondary winding voltage, capacitance voltage, power factor, frequency, efficiency, ambient temperature and steering are measured in real time.</p>
<p>保护防护 Protection against</p>	<p>超速停机、过载停机、超矩停机、测试中转速过低自动停机、无转速停机、无电流停机、测试电压波动过大停机、加载异常停机、超矩机械限位等，最大限度保护测功机系统免受因操作失误带来的损害。 Overspeed shutdown, overload shutdown, over-torque shutdown, automatic shutdown during test low speed, no speed shutdown, no current shutdown, excessive test voltage fluctuation shutdown, abnormal load shutdown, over-torque mechanical limit, etc. The system is protected from damage caused by operational errors.</p>
<p>输出测量 Output measurement</p>	<p>■转速测量：0.01rpm~999.99rpm~1000.1rpm~9999.9rpm~10000rpm~40000rpm 精度：优于±0.1%F.S. Speed measurement: 0.01rpm~999.99rpm~1000.1rpm~9999.9rpm~10000rpm~40000rpm Accuracy: better than ±0.1%F.S.</p> <p>■转矩测量：10mNm~200mNm, 测试精度：优于±0.5%F.S.; 300mNm~ 500Nm 精度：优于±0.2%F.S. Torque measurement: 10mNm~200mNm, Accuracy: better than ±0.5% F.S.; 300mNm~ 500Nm Accuracy: better than ±0.2% F.S.</p> <p>■输出功率：0.0001W~9.9999W~99.999W~999.99W~9999.9W~99999W 精度：优于±0.2%F.S. Output power: 0.0001W~9.9999W~99.999W~999.99W~9999.9W~99999W Accuracy: better than ±0.2%F.S.</p> <p>■转向测量：CW（顺时针）、CCW（逆时针）、STOP（停机）-----实时测量（以试品输出轴转向判定） Steering measurement: CW (clockwise), CCW (counterclockwise), STOP (stop) -----real-time measurement (decision with test output shaft steering)</p>
<p>电量测量 Electricity measurement</p>	<p>■直流电量测量模块（纯直流电模式）[400V/10A/100A] 精度：优于±0.2%F.S. DC power measurement module (pure DC mode) [400V/10A/100A] Accuracy: better than ±0.2% F.S.</p> <p>■直流电量测量模块（直流塑封模式）[400V/10A/100A] +(Vcc 和 Vsp0~18V) 精度：优于±0.2%F.S. DC power measurement module (DC plastic motor) [400V/10A/100A] + (Vcc and Vsp0~18V) Accuracy: better than ±0.2% F.S.</p> <p>■单相电量测量模块（串激电机模式）[500V*1 组/40A*1 组] 精度：优于±0.2%F.S. Single-phase power measurement module (serial-excited motor mode) [500V*1 group/40A*1 group] Accuracy: better than ±0.2% F.S.</p> <p>■单相电量测量模块（感应电机整机模式）[500V*3 组/40A*1 组] 精度：优于±0.2%F.S. Single-phase electricity measurement module (induction motor complete machine mode) [500V*3 group/40A*1 group] Accuracy: better than ±0.2% F.S.</p> <p>■单相电量测量模块（感应主副绕组模式）[500V*3 组/40A*3 组] 精度：优于±0.2%F.S. Single-phase electricity measurement module (induction main and auxiliary winding mode) [500V*3 group/40A*3 group] Accuracy: better than ±0.2% F.S.</p> <p>■三相电量测量模块（三相电机模式）[500V*3 组/40A*3 组] 精度：优于±0.2%F.S. Three-phase electricity measurement module (three-phase motor mode) [500V*3 group/40A*3 group] Accuracy: better than ±0.2% F.S.</p> <p>注：以上测量模块全部具备，且可定制其它电压和电流量程(实际量程以双方确认的配置清单为准) Note: All the above measurement modules are available, and other voltage and current ranges can be customized (the actual range is subject to the configuration list confirmed by both parties)</p>



优势功能 Advantage function	转矩校正期限提醒、软件静态分段折算校正（行业原创）、通断控制、Vcc 和 Vsp 电压提供、（非整数）变速比例设置、自动识别测功机型号、动态说明书、CPLD 测量转速及转向、遇异常断电刹车、自动磁滞销磁功能、常规国标镶入软件、部分规格机头温度监控和急停功能。 Torque correction period reminder, software static segmentation correction (first in the industry), on-off control, Vcc and Vsp voltage supply, (non-integer) speed ratio setting, automatic identification dynamometer model, dynamic manual, CPLD measurement speed And steering, abnormal power off brake, automatic hysteresis degaussing function, conventional national standard mounting software, partial specification head temperature monitoring and emergency stop function.
安装夹具 Mounting fixture	普通升降台、多用夹具、专用夹具、三维夹具、落地式三维夹具可供选择。 Ordinary lifting tables, multi-purpose fixtures, special fixtures, 3D fixtures, floor-standing 3D fixtures are available.
稳压电源 Regulated power supply	直流稳压电源、单相变频稳压电源、三相变频稳压电源，依客户实际需要选择具体规格容量。 DC regulated power supply, single-phase regulated power supply, three-phase regulated power supply, according to the actual needs of customers to select specific specifications.
测功机 Dynamometer	高速磁滞测功机的工艺、材质、外观按照美国的 Magtrol 测功机样式生产，其它普通类型测功机同国内一致，仅精度由国内普遍的 $\pm 0.5\%F.S.$ 提升到 $\pm 0.2\%F.S.$ ，部分规格测功机特制后可达到 $\pm 0.1\%F.S.$ 。 The process, material and appearance of the high-speed hysteresis dynamometer are produced according to the American Magtrol dynamometer style. Other common types of dynamometers are consistent with the domestic ones, and the accuracy is only increased from $\pm 0.5\%FS$ to $\pm 0.2\%FS$ in the domestic market. The specification dynamometer can achieve $\pm 0.1\% FS$ after special design.
其它测量 Other measurements	环境温度测量和机头本体温度测量。 Room temperature measurement and dynamometer body temperature measurement.

3. 控制原理示意图



4 组成示意图

