

磁滞测功机概述 Overview of hysteresis dynamometer

磁滞测功机由齿极定子、空心杯转子、支架、底板、转速传感器、力矩传感器、励磁线圈及轴承组成，通常适用于 3000W 以下的中高速被试品的测试，由于不需要依靠转速产生转矩，因此可以进行从空载到堵转的全程测试。常规的磁滞测功机使用风扇冷却，运行功率超过 500W 的磁滞测功机通常采用循环液体（水）冷却、压缩气体冷却和鼓风机冷却等，适用于测试微小电机、直流电机、串激电机和罩极电机等，对于测试异步电机的性能尤为突出。

The hysteresis dynamometer consists of a toothed stator, a hollow cup rotor, a bracket, a bottom plate, a rotational speed sensor, a torque sensor, an excitation coil and a bearing. It is suitable for testing of medium and high speed test products below 3000W, because it does not need to rely on the rotation speed to generate the rotation. Moments, so full-scale testing from no-load to stall can be performed. Conventional hysteresis dynamometers use fan cooling. Hysteresis dynamometers with operating power exceeding 500W are usually used for circulating liquid (water) cooling, compressed gas cooling, and blower cooling. They are suitable for testing small motors, DC motors, and series motors. And the shaded pole motor, etc., is especially outstanding for testing the performance of asynchronous motors.

普通磁滞测功机 Ordinary hysteresis 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	HD-100B/F	0.4~10.000mNm	0~3000rpm	10W	30W
2	HD-200B/F	0.6~20.000mNm	0~3000rpm	20W	40W
3	HD-500B/F	1.5~50.00mNm	0~3000rpm	30W	50W
4	HD-1KB/F	4~100.00mNm	0~2500rpm	45W	90W
5	HD-2KB/F	6~200.00mNm	0~2500rpm	90W	200W
6	HD-3KB/F	8~300.00mNm	0~2500rpm	95W	250W
7	HD-5KB/F	10~500.0mNm	0~2000rpm	120W	300W
8	HD-10KB/F	0.04~1.0000Nm	0~1500rpm	200W	400W
9	HD-20KB/F	0.06~2.0000Nm	0~1500rpm	300W	600W
10	HD-30KB/F	0.08~3.0000Nm	0~1500rpm	400W	750W
11	HD-30KB/W	0.1~3.0000Nm	0~1500rpm	500W	900W
12	HD-50KB/F	0.16~5.000Nm	0~800rpm	600W	1000W
13	HD-75KB/W	0.3~7.500Nm	0~800rpm	800W	1500W
14	HD-100KB/F	0.4~10.000Nm	0~400rpm	800W	1200W
15	HD-100KB/W	1~10.000Nm	0~500rpm	1200W	1800W

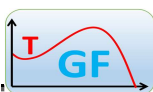


16	HD-150KB/F	0.6~15.000Nm	0~4000rpm	1000W	1500W
17	HD-150KB/W	1.2~15.000Nm	0~4000rpm	1200W	1800W
18	HD-200KB/F	0.8~20.000Nm	0~4000rpm	1000W	1600W
19	HD-200KB/W	2~20.000Nm	0~4000rpm	1650W	2500W
20	HD-300KB/F	1.5~30.000Nm	0~3000rpm	1000W	2400W
21	HD-300KB/W	3~30.000Nm	0~3000rpm	2200W	3000W

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》）

高速磁滞测功机 High speed hysteresis 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	HD-100B/F	0.5~20.000mNm	0~30000rpm	8W	35W
2	HD-200B/F	0.5~20.000mNm	0~30000rpm	8W	35W
3	HD-300B/F	0.8~30.000mNm	0~30000rpm	12W	50W
4	HD-500B/F	1.6~50.00mNm	0~30000rpm	12W	50W
5	HD-1KB/F	4~100.00mNm	0~25000rpm	25W	90W
6	HD-1KB/A	4~100.00mNm	0~25000rpm	80W	200W
7	HD-2KB/F	6~200.00mNm	0~25000rpm	25W	90W
8	HD-2KB/A	6~200.00mNm	0~25000rpm	80W	200W
9	HD-3KB/F	8~300.00mNm	0~25000rpm	65W	250W
10	HD-3KB/A	8~300.00mNm	0~25000rpm	120W	400W
11	HD-5KB/F	10~500.0mNm	0~25000rpm	65W	250W
12	HD-5KB/A	10~500.0mNm	0~25000rpm	120W	400W
13	HD-10KB/F	0.04~1.0000Nm	0~25000rpm	80W	400W
14	HD-10KB/A	0.04~1.0000Nm	0~25000rpm	350W	800W
15	HD-20KB/F	0.06~2.0000Nm	0~25000rpm	120W	580W
16	HD-20KB/A	0.06~2.0000Nm	0~25000rpm	500W	1000W
17	HD-30KB/F	0.12~3.0000Nm	0~25000rpm	150W	700W
18	HD-30KB/A	0.12~3.0000Nm	0~25000rpm	800W	1300W
19	HD-30KB/B	0.12~3.000Nm	0~25000rpm	900W	1500W
20	HD-50KB/F	0.15~5.000Nm	0~22000rpm	200W	1000W
21	HD-50KB/A	0.15~5.000Nm	0~22000rpm	1200W	1500W
22	HD-50KB/B	0.15~5.000Nm	0~22000rpm	1500W	2000W
23	HD-60KB/F	0.2~6.000Nm	0~22000rpm	300W	1400W

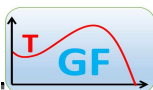


24	HD-60KB/A	0.2~6.000Nm	0~22000rpm	700W	1500W
25	HD-60KB/B	0.2~6.000Nm	0~22000rpm	1500W	2500W
26	HD-140KB/F	1.0~14.000Nm	0~12000rpm	700W	2000W
27	HD-140KB/A	1.0~14.000Nm	0~12000rpm	1800W	2800W
28	HD-140KB/B	1.0~14.000Nm	0~12000rpm	3000W	3500W
29	HD-280KB/F	2~28.000Nm	0~10000rpm	1300W	3800W
30	HD-280KB/A	2~28.000Nm	0~10000rpm	2800W	5000W
31	HD-280KB/B	2~28.000Nm	0~10000rpm	5500W	7000W

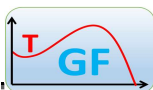
注：转矩测试范围下限是指测功机顺 1000rpm 运行时的转矩值。高于 1000rpm 运转时转矩测试下限值允许大于规定的下限值。（摘抄自测功机系统相关国标《JB/T 7584.1-94》）

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。

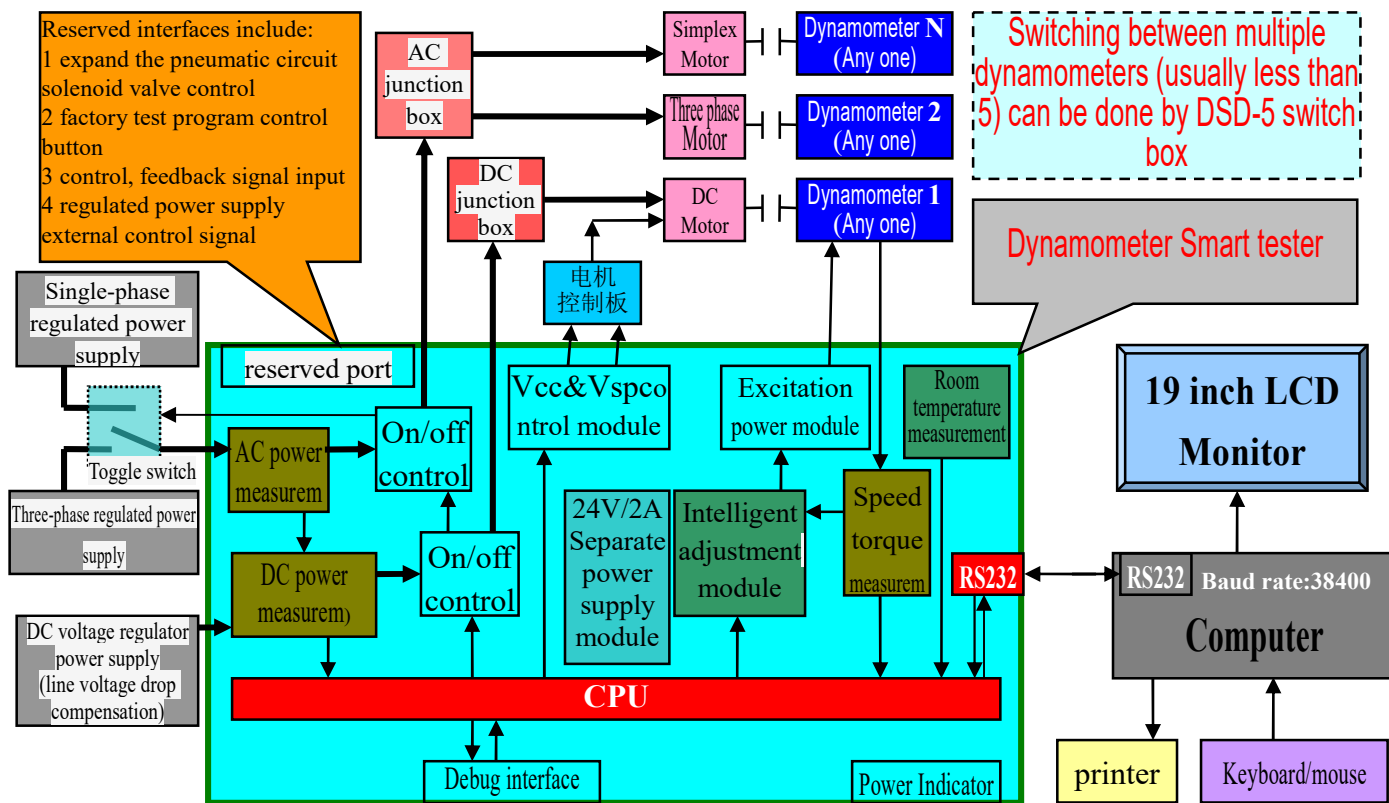


	Life test: standard 15-stage alternating load and constant value timing test, automatic closed-loop operation and pre-loading function, multiple intelligent protection.
控制对象 control object	HD 磁滞全系列、MPD 磁粉全系列、ECD 涡流全系列，包含风冷式、水冷式、气冷式和鼓风机冷却 HD hysteresis dynamometer, MPD magnetic powder dynamometer, ECD 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.
测量参数 Measurement parameters	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.
保护防护 Protection against	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.
输出测量 Output measurement	<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>
电量测量 Electricity measurement	<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.</p>



	<p>Single-phase power measurement module (serial-excited motor mode) [500V*1 group/40A*1 group] Accuracy: better than $\pm 0.2\%$ F.S. ■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$\pm 0.2\%$F.S.</p> <p>Single-phase electricity measurement module (induction motor complete machine mode) [500V*3 group/40A*1 group] Accuracy: better than $\pm 0.2\%$ F.S. ■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$\pm 0.2\%$F.S.</p> <p>Single-phase electricity measurement module (induction main and auxiliary winding mode) [500V*3 group/40A*3 group] Accuracy: better than $\pm 0.2\%$ F.S. ■三相电量测量模块（三相电机模式）[500V*3组/40A*3组] 精度：优于$\pm 0.2\%$F.S.</p> <p>Three-phase electricity measurement module (three-phase motor mode) [500V*3 group/40A*3 group] Accuracy: better than $\pm 0.2\%$ F.S. 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>
<p>优势功能 Advantage function</p>	<p>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.</p>
<p>安装夹具 Mounting fixture</p>	<p>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.</p>
<p>稳压电源 Regulated power supply</p>	<p>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.</p>
<p>测功机 Dynamometer</p>	<p>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.</p>
<p>其它测量 Other measurements</p>	<p>环境温度测量和机头本体温度测量。 Room temperature measurement and dynamometer body temperature measurement.</p>

3. 控制原理示意图



4 组成示意图

