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检 测 报 告

TEST REPORT

报告编号：C21-155-WT
Report No.

委 托 单 位：HANZHONGKUN(SHANGHAI) CONTROL SYSTEM CO., LTD.
Customer

样 品 名 称：HITORK Intelligent Electric Actuator
Name of EUT

型 号 / 规 格：HKM.2
Model/Type

制 造 单 位：HANZHONGKUN(SHANGHAI) CONTROL SYSTEM CO., LTD.
Manufacturer

颁 发 日 期：May 20, 2021
Issue Date

上海仪器仪表自控系统检验测试所有限公司
Shanghai Inspection and Testing Institute of Instruments and Automation Systems Co., Ltd.(SITIIAS)
国家工业控制系统安全和自动化仪表产品质量监督检验中心
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检 测 报 告
Test Report

样品名称 Name of EUT	HITORK Intelligent Electric Actuator	型号/规格 Model/Type	HKM.2
委托单位 Customer	HANZHONGKUN(SHANGHAI) CONTROL SYSTEM CO.,LTD.	地 址 Address	F1,Building NO.5,NO.98 Songhai Road, Qingpu District,Shanghai
制造单位 Manufacturer	HANZHONGKUN(SHANGHAI) CONTROL SYSTEM CO.,LTD.	地 址 Address	F1,Building NO.5,NO.98 Songhai Road, Qingpu District,Shanghai
检测项目 Test Item（s）	1.Basic error 2.Basic deviation of position output signal 3.Return difference 4.Dead band 5.Time lag 6.Deviation of rated travel time 7.Starting characteristic 8.Repeatability error of stroke control mechanism 9.Insulation resistance 10.Insulation strength11.Temperature rise 12.Stability of long-term operation 13.Repeatability error of maximum and minimum control torque 14.Manual-electric switching mechanism 15.Intelligent basic functions 16.noise 17.Effect of Ambient temperature change 18.Effect of Damp heat 19.Effect of power supply voltage change 20.Effect of mechanical vibration influence 21.Effect of transportation environmental 22.Radiated,radio-frequency,electromagnetic field immunity test 23.Electrical fast transient/burstimmunity test 24.Surge immunity test 25.Electrostatic discharge immunity test 26.Power frequency magnetic field immunity test 27.Appearance 28.Degrees of protection provided by enclosure		

分包 Subcontract 无 No √ 有 Yes ____ 分包项目 Item(s) Subcontracted ____ 分包单位 Subcontractor ____

检测依据 Test Standard/ Specification JB/T8219-2016 《Conventional and intelligent electric actuators for industrial-process control systems》

受样方式 Method of Getting EUT 送样 Delivered by Client √ 抽样 Sampled ____ 抽样程序 Sampling Procedure ____

样品接收日期 Date of Getting EUT 2021.02.22 样品数量 Number of EUT 1

样品编号 Serial No. of EUT E20210402001

检测日期 Date of Testing 2021 年 Year 02 月 Month 26 日至 Day to 2021 年 Year 05 月 Month 14 日 Day

检测结论 Conclusion The test items meet the requirements of JB/T8219-2016.

报告撰写人: Prepared by	Tan Wenzhi	职务/职称: Title	Engineer
项目负责人: Project Manager	Tan Wenzhi	职务/职称: Title	Engineer
审 定: Approved by	Jiang Peilei	职务/职称: Title	Senior Engineer
批 准: Authorized by	Yan Zhihong	职务/职称: Title	Quality Manager / Senior Engineer

检测单位 Testing Organization
上海仪器仪表自控系统检验测试所有限公司
Shanghai Inspection and Testing Institute of Instruments and Automation Systems Co.,Ltd. （SITIIAS）

被认可/授权机构名称 Accredited/Authorized Organization

一、样品描述
Description of EUT

The sample is intelligent multi-turn modulating electric actuator.

二、检测环境条件及地点
Environmental Conditions Location of Test

环境温度： (18～22)℃ 相对湿度： (58～60)% 其它： /
Temperature Relative Humidity Others

检测地点： Building 7,building 9,building 15,building 16, No.103,Caobao Road,Xuhui District, Shanghai,China
Location

三、检测用主要仪器设备
Main Test Apparatus

序号 No.	仪器设备名称 Name Test Apparatus	型 号 Model	编 号 Serial No.	检定有效期 Expiry Date
1	Electric actuator test bench	400Nm	SIPAI/T-J03092	2022.01.02
	Electric actuator test bench	6000Nm	SIPAI/T-J03139	2023.04.14
3	Signal generator	ZT-01C	SIPAI/T-J05154	2021.05.31
4	Digital multimeter	34401A	SIPAI/T-J05124	2021.10.28
5	Digital oscilloscope	MSO2012B	SIPAI/T-J06021	2022.03.23
6	Stopwatch	J9-1	SIPAI/T-J08009	2021.06.04
7	Megohmmeter	5050T	SIPAI/T-J05015	2021.11.07
8	Withstand voltage tester	ZHZ8D	SIPAI/T-J05020	2021.08.17
9	Infrared Thermometer	RAYMX4PC	SIPAI/T-J02104	2021.08.12
10	Noise meter	320	SIPAI/T-J10035	2022.03.12
11	High and low temperature damp heat test chamber	C，1500，-70	SIPAI/T-J09041	2021.11.14
12	Drop test bench	Y5212/ZF	SIPAI/T-J10024	2022.06.07
13	Impact test bench	C2000	SIPAI/T-J10027	2022.04.16
14	Electric vibration test system	DC-3200-36/SV-0808	SIPAI/T-J10028	2021.06.09
15	3m method improved semi-anechoic chamber	07'×08'-4	SIPAI/T-J07001	2021.07.07
16	Signal generator	SMC100A	SIPAI/T-J07122	2022.11.23
17	dynamometer	NRP2	SIPAI/T-J07124	2022.11.28
18	Ultra-small conducted anti-interference signal simulator	UCS 500N5 EFT/5-VCS/5	SIPAI/T-J07072	2021.10.26
19	Capacitive coupling clamp	HFK	SIPAI/T-J07072a	2021.10.26
20	Three-phase coupling/decoupling network	CNI 503A2	SIPAI/T-J07072b	2021.10.26
21	Electrostatic discharge generator	NSG 435	SIPAI/T-J07134	2021.06.13
22	External magnetic field test device	GSH-205A	SIPAI/T-J07039	2021.11.22
23	Dust laboratory	SC-6	SIPAI/T-J09034	2022.10.03
24	Water tank	/	/	/

四、检测依据
Standard/Specification for the Test

JB/T8219-2016《Conventional and intelligent electric actuators for industrial-process control systems》

五、合格判定依据
Criteria for Conformit

JB/T8219-2016《Conventional and intelligent electric actuators for industrial-process control systems》

六、检测结果及单项结论
Test Results and Conclusion

详见第 3 页至第 8 页
Please See Page to Page

七、顾客见证
Client Witness

无 √ 有 ___ 见证人： 所属单位：
No Yes Witnessed by Organization

八、附加信息
Additional Information

The content of this report is the type test based on JB/T8219-2016.

检 测 结 果 及 结 论
Test results and Conclusion

序号 No.	检测项目 Type of Test	标准条款 StandardClause	检测方法/条件 Test Method/Condition	技术要求 Requirements	样品编号 Serail No	检测结果 TestResults	结论 Conclusion
1	Basic error	6.1.1	Slowly increase or decrease the input signal and record the input signal value and the output stroke value in the forward and reverse stroke directions. Calculate the basic error.	±1.0%	E20210402001	0.63%	qualified
2	Basic deviation of position output signal	6.1.2	Connect the actuator output signal to an external 250Ω load impedance. Run the actuator to the "full off" position, adjust the position output signal to 4mA; Run the actuator to the "full open" position, adjust the position output signal to 20mA.Then run The actuator and record the position output signal value of each point in the forward and reverse stroke direction. Calculate the basic deviation.	≤1.0%		0.19%	qualified
3	Return difference	6.1.3	The return difference of the actuator is determined by the absolute value of the maximum algebraic difference between the basic error of the positive and negative strokes of each test point measured by 1 and 2	≤1.0%		0.47%	qualified
4	Dead band	6.1.4	The dead band should be measured at 25%, 50% and 75% of the rated stroke. a) Slowly change (increase or decrease) the input signal until the output shaft has a noticeable stroke change. Record the input signal value at this time; b) Then slowly change (reduce or increase) the input signal in the opposite direction until the output shaft has a noticeable stroke change. Record the input signal value at this time. Calculate the dead band.	≤1.0%		0.50%	qualified
5	Time lag	6.1.5	Apply a step signal of 15% of the input range to the input signal terminal of the regulating actuator, record the input signal curve and the position output signal curve with an oscilloscope, and observe the time difference from the start value of the input signal to the start of the output signal.	≤1.0s		0.38s	qualified
6	Deviation of rated travel time	6.1.6	Apply a signal to enable the actuator to move the rated stroke.Record the time when the shaft moves to the rated stroke.	18.75s（10r）±20%		19.3s 2.93%	qualified
7	Starting characteristic	6.1.7	Apply rated load to the actuator,change the power supply voltage to the negative limit value, actuator should be able to start normally.	Power supply voltage 342V Load 450Nm Should be able to start normally.		start normally	qualified

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8	Repeatability error of stroke control mechanism	6.1.8	Apply 20%～50% of the rated load to the actuator. Open and close the actuator for 5 times. Observe and record the stroke value.Calculate the change of stroke value.	±5°		3.8°	qualified
9	Insulation resistance	6.1.9	Use a megger with 500V to measure insulation resistance between input signal terminal and shell between power supply terminal and input signal terminal between power supply terminal and shell.	≥20MΩ ≥50MΩ ≥50MΩ		500MΩ 500MΩ 500MΩ	qualified
10	Insulation strength	6.1.10	Apply power voltage from 0V to 500V slowly to input signal terminal and shell. Apply power voltage from 0V to 1500V slowly to power supply terminal and input signal terminal. Apply power voltage from 0V to 2000V slowly to power supply terminal and shell. Hold for 1 minutes when the voltage reaches the voltage.	Should be no breakdown and no arcing		no breakdown and no arcing	qualified
11	Temperature rise	6.1.11	The actuator should run for 12 hours continuously. Measure temperature rise after the operation.	≤60℃	E20210402001	40.4℃	qualified
12	Stability of long-term operation	6.1.12	The actuator should run for 48 hours continuously. Retest the following: basic error deviation of position output signal return difference dead band starting characteristics	±1.0% ≤1.0% ≤1.0% ≤1.0% Should be able to start normally.		0.59% 0.16% 0.33% 0.50% start normally	qualified
13	Repeatability error of maximum and minimum control torque	6.1.13	a) Install the actuator on the test bench, set the torque protection value in the opening and closing directions to the maximum and minimum control torque or the maximum and minimum control thrust values, start the actuator and gradually load it until "overturning" "Moment" or "over-thrust" alarm action to measure the output torque or thrust value. Measure three times in each direction of opening and closing, and take the average value as the base value of output torque or thrust. b) Calculate the repeat error of the control torque or thrust.	±10%		1.74%	qualified

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14	Manual-electric switching mechanism	6.1.14	a) No-load switching check. Switch the actuator from electric to manual.Turn the handwheel clockwise and counterclockwise by no less than one revolution. Switch the actuator from manual to electric .Turn the electric actuator in positive and negative directions by no less than one revolution. Repeat twice . b)With- Load switching check. The actuator is installed on the test bench, Adjust the actuator to the maximum control torque. Repeat operation of a.	The switching mechanism should be convenient and reliable. The hand wheel should not rotate when it is in electric mode.	E20210402001	The switching mechanism is convenient and reliable. The hand wheel do not rotate when it is in electric mode.	qualified
15	Intelligent basic functions	6.1.15	Install the electric actuator on the test bench and verify the following functions. a) Display function b) Parameter setting function c) Field configuration function 1) Switch contact for running status output 2) Remote and local switch control function d) Fault self-diagnosis and alarm function 1) Power failure alarm 2) Enable backup power e) ESD function f) Upper and lower limit protection function	a) Display information should benormal,complete and clear. b) The setting of working parameters such as stroke and torque, the calibration of the current input signal and the adjustment of the current output signal should be normal. c) 4-way switch contact output should meet the setting requirements; the torque protection value setting function should be normal and reliable; the jog and hold control setting function should be normal and reliable. d) When the power supply fails, the backup power supply is enabled, a fault is displayed and a set of switching contacts are output. The switching signal is released when the external power is restored. e) ESD function should be normal and reliable. f) The upper and lower limit protection functions should be effective and reliable, and have alarm displays and switch contact outputs. It shall be possible to continuously measure the output torque.		All functions are available and normal.	qualified

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16	noise	6.1.16	Under the condition that the indoor doors and windows are tightly closed and the indoor environmental noise does not exceed 45 decibels, the actuator is started with no load, and the opening and closing directions are repeated twice. Use a sound level meter to measure the noise of the actuator at a distance of 1 m from the surface of the actuator and	≤75dB（A）	E20210402001	68.7dB(A)	qualified
17	effect of Ambient temperature change	6.1.17	Under no-load conditions, put the actuator into a temperature test box. The test temperature and test sequence are: 20°C, 60°C, 20°C, 0°C, -30°C, 20°C; it should be maintained at each temperature point 2h, after the product has reached thermal stability, measure the low-end value and high-end value of the position signal output at the 0% and 100% positions of the full stroke respectively, and calculate the output when every two adjacent temperatures change by 10°C. The amount of change	Low-end value change: ≤0.75%/10℃ High-end value change: ≤0.75%/10℃		0.32%/10℃ 0.32%/10℃	qualified
18	Effect of Damp heat	6.2.2	Under no-load conditions, place the actuator in a humid heat test chamber, first increase the temperature to 40 ° C ± 2 ° C, and then adjust the relative humidity to 91% to 95%, and maintain it for 48h. Immediately after the moist heat test, the actuator was taken out of the moist heat box, and the insulation resistance between the specified terminals was measured.	Between input terminal and shell ≥2MΩ Between input terminal and power terminal ≥2MΩ Between power terminal and shell ≥2MΩ		200MΩ 200MΩ 300MΩ	qualified
19	Effect of power supply voltage change	6.2.3	Under no-load conditions, the power supply voltage of the actuator is adjusted from the nominal value to the positive and negative limit values respectively. At the 0% and 100% positions of the full stroke, the low-end value and high-end value of the position signal output are measured.	Low-end value change≤0.75% High-end value change≤0.75%		0.00% 0.00%	qualified

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20	Effect of mechanical vibration influence	6.2.4	Under no-load conditions, install the actuator on a vibration test bench and run the actuator to 0% and 100% of the full stroke, respectively. Sweep the vibration in three mutually perpendicular directions at a frequency of 10 Hz to 150 Hz to find the resonance point, and then perform a vibration resistance test at the resonance frequency for 30 min. If there is no resonance point, perform a vibration resistance test at 150 Hz for 30 min. During the test, measure the low-end and high-end values of the output of the actuator, calculate the changes in the low-end and high-end values, and confirm whether the results meet the requirements.	After the test, the fasteners should not be loose and there should be no mechanical damage. Low-end value change: ≤1.0% High-end value change: ≤1.0%	E20210402001	No looseness and no damage. 0.34% 0.26%	qualified
21	Effect of transportation environmental	6.2.5	a) Temperature: High temperature: + 55 ℃, 16h (If the environmental temperature influence test has been performed at 55 ℃ (or higher than 55 ℃), it can be exempted) Low temperature: -40 ° C, 16h b) Impact: acceleration 100m / s2 ± 10m / s2, pulse repetition frequency 60 times / min ～ 100times / min, impact times 1000 times ± 100 times c) Free fall height 100mm Re-test the basic error, basic deviation of position output signal, return difference, dead zone, starting characteristics and appearance.	Basic error: ± 1.0% Basic deviation of position output signal: ≤1.0% Return difference : ≤1.0% Dead band:≤1.0% Starting characteristics should start normally Appearance should meet requirements.		0.65% 0.19% 0.61% 0.44% Normal start. Appearance meets requirements	qualified
22	Radiated, radio-frequency, electromagnetic field immunity test	6.2.2	The actuator is operated to 50% of the full stroke under no-load condition. The actuator is irradiated with a radiated electromagnetic field with a frequency of 80MHz to 1000MHz and a strength of 3V/m, which is 3 meters away from the actuator.	The actuator should be able to work normally. The change of the position output signal should be ≤1.0%.		0.21%	qualified

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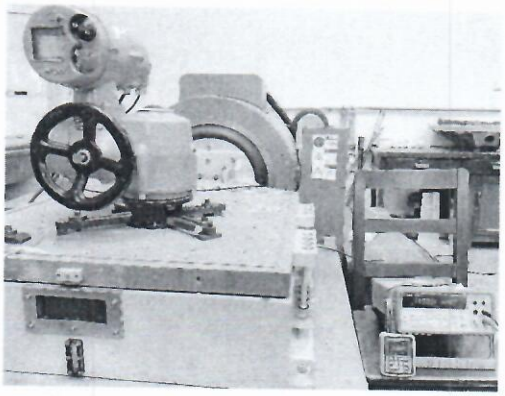
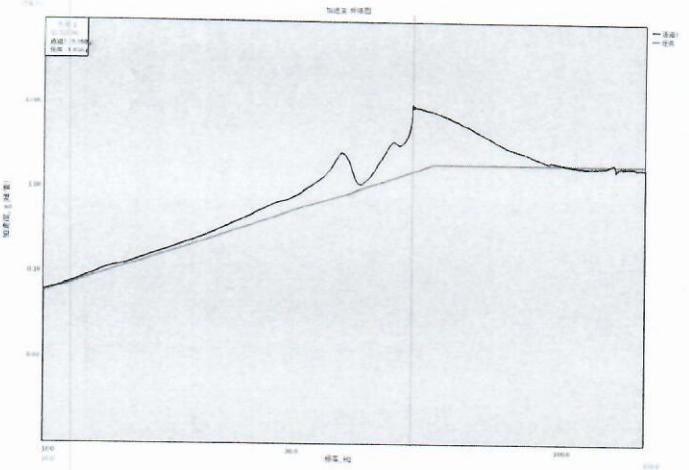
23	Electrical fast transient/burst immunity test	6.2.7	The actuator is operated to 50% of the full stroke under no-load condition. Apply plus or minus 1000V at the power terminal and plus and minus 500V test voltage at the signal input end. Observe and Record the position output signal or the change in the stroke value of the output shaft (rod), and confirm whether the value meets the requirements.	The actuator should be able to work normally. The change of the position feedback output signal should be ≤1.0%	E20210402001	0.18%	qualified
24	Surge immunity test	6.2.8	The actuator is operated to 50% of the full stroke under no-load condition. Apply positive and negative 1KV voltage between the power line of the actuator and ground.	The actuator should be able to work normally. The change of the position feedback output signal should be ≤1.0%		0.07%	qualified
25	Electrostatic discharge immunity test	6.2.9	The actuator is operated to 50% of the full stroke under no-load condition. The shell of the actuator is grounded. Apply positive and negative 4kV contact discharge and a positive and negative 8kV air discharge to the actuator.	The actuator should be able to work normally. The change of the position feedback output signal should be ≤1.0%		0.04%	qualified
26	Power frequency magnetic field immunity test	6.2.10	The actuator is operated to 50% of the full stroke under no-load condition. Put the actuator on the external magnetic field test stand with a magnetic field strength of 400 A/m and a test direction of X/Y/Z.	The actuator should be able to work normally. The change of the position feedback output signal should be ≤1.0%		0.27%	qualified
27	Appearance	6.3	visual inspection	The metal surface should be coated, panel and nameplate should be smooth and complete, there should be no loose fasteners, moving parts should be flexible and reliable.		Meet the requirements	qualified
28	Degrees of protection provided by enclosure	6.4	Carry out the enclosure protection test according to the method specified in GB/T 4208-2017, the test level is IP68 (2m, 2h).	There should be no dust and no water in the enclosure.		There is no dust and no water in the enclosure. It conforms to IP68 (2m, 2h).	qualified

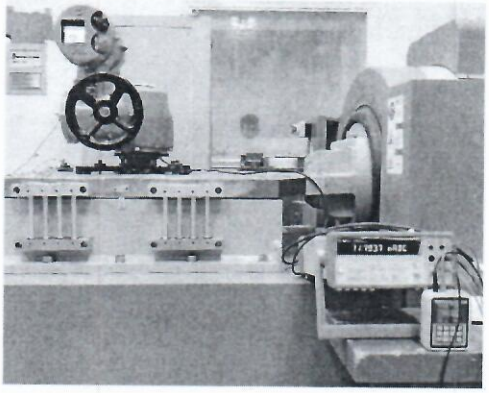
Attachment 1: Related pictures of mechanical vibration test

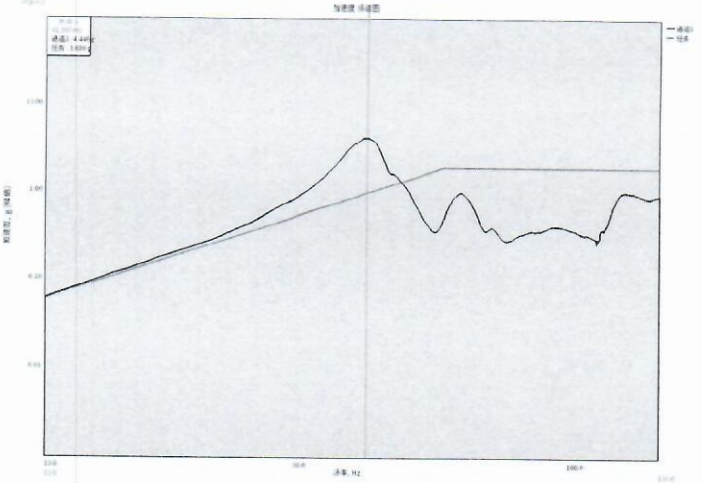
X 方向



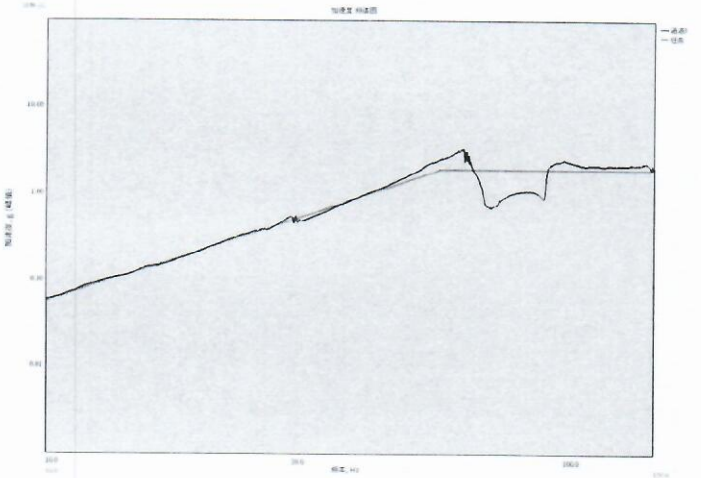


Y 方向



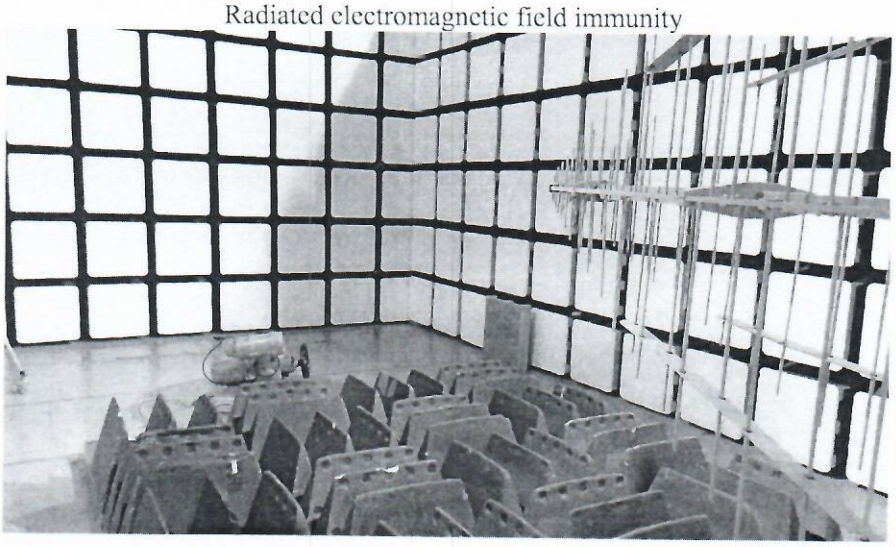


Z 方向

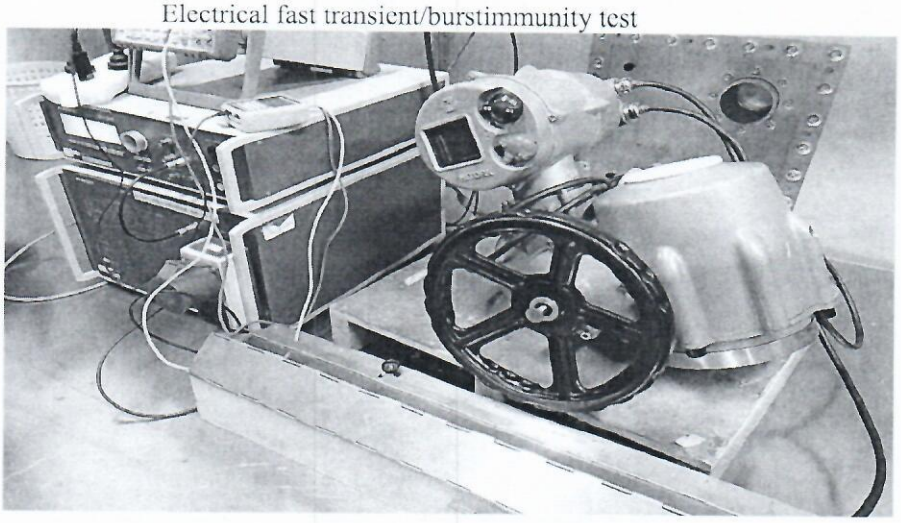


Attachment 2: Related pictures of EMC test

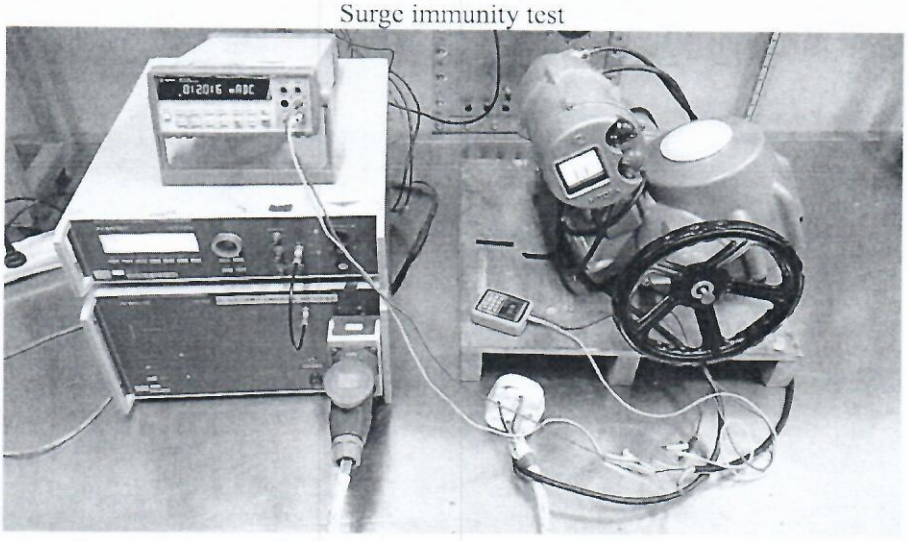
Radiated electromagnetic field immunity



Electrical fast transient/burstimmunity test

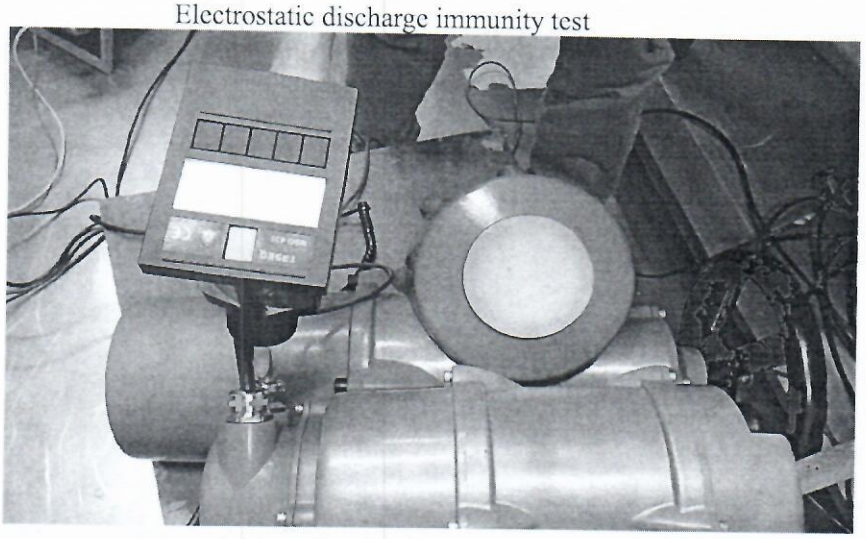


Surge immunity test



Attachment 2(continued): Related pictures of EMC test

Electrostatic discharge immunity test



Power frequency magnetic field immunity test