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产品规格书

Product Specification

文件编号 File No.: 4528515GGS208

顾客 Customer: <u>INVENT Solution</u>			
顾客产品名称 Customer Product Name: _____			
顾客零件号 Customer Part No.: _____			
宏发产品名称 Hongfa Product Name: <u>继电器 RELAY</u>			
宏发产品型号 Hongfa Product Part No.: <u>HF115F/024-2ZS4B</u>			
发布日期 Release Date: <u>2024年1月15日</u>			
生产工厂 Production Plant: _____			
版本 Version: <u>a</u> 更改单号 Number of Modification: _____			
宏发审批签字 Signature by Hongfa			顾客确认 Customer Approval
拟制 Released by	审核 Checked by	批准 Approved by	负责人 By: 日期 Date:
张聪阳	陈永兵	林正极	
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变更履历 Revision Record

顾客 Customer		产品型号 Product Part No.		
变更版 Version No.	变更日期 Change Date	变更内容 Description	原因 Reason	负责人 By

产品规格书 Relay Specification

顾客 Customer: INVENT Solution

1 品种 Type Model

1.1 种类 Type: 电磁继电器 Electromagnetic Relay

1.2 型号 Part NO.: HF115F/024-2ZS4B

1.3 外形尺寸 Outline dimensions: 29mm×12.7mm×15.7mm

1.4 触点形式 Contact Form: 2组转换 2 Form C

1.5 触点材料 Contact Material: AgNi

2 安全认证 Safety Approvals

认证机构 Certification Agency	认证号 File No.
UL/CUL	E134517
VDE	116934
CQC	CQC17002168381

上述认证号代表该产品取得相关认证，但具体认证内容请以我公司提交的认证证书为准。The above certificate No. is just a license No. Please refer to the certificates we supplied for detail information.

3 线圈额定参数 Coil Rating

at 23 °C

额定电压 Rated Voltage Vd. c.	动作电压 (1) Operate Voltage Vd. c.	释放电压 (1) Release Voltage Vd. c.	允许最大线圈电压 (2) Max Allowable Coil Voltage Vd. c.	线圈电阻 Coil Resistance Ω	线圈功耗 Coil Power 大约 Approx. W
24	≤16.8	≥2.4	36	1440×(1±10%)	0.4

备注: (1) 上述值为初始值。

(2) 允许最大线圈电压是指继电器线圈在短时间内能够承受的最大电压值。

Note: (1) The data shown above are initial values

(2) Maximun allowable coil voltage refers to the maximun voltage which relay coil could endure in a short period of time.

4 触点参数 Contact Parameters

4.1 触点额定负载 Contact Rating: 8 A 250 Va. c.

4.2 最大切换电流 Max Switching Current: 8 A

4.3 最大切换电压 Max Switching Voltage: 250 Va. c.

4.4 最小适用负载 Min Applicable Load: 6 V, 1 A

5 性能 Performance

5.1 接触电阻 Contact Resistance: 100 mΩ max (at 6 Vd. c. 1A)。(四端法 Four Probe Method)

5.2 动作时间 Operate Time: ≤ 15 ms。

5.3 释放时间 Release Time: ≤ 8 ms。

5.4 耐久性 Endurance

5.4.1 电耐久性 Electrical Endurance

结构型式 Version	触点材料 Contact Material	触点负载 Contact Rating	环境温度 Ambient Temperature	通断比 ON: OFF	电耐久性 Electrical Endurance
4 型 type 4	AgNi	阻性负载 Resistive Load 8 A 250 Va. c.	常温 Room Temperature	1 s: 9 s	NO 端: 5×10^4 次 (ops)
4 型 type 4	AgNi	阻性负载 Resistive Load 5 A 30 Vd. c. ¹⁾	常温 Room Temperature	1 s: 9 s	NO 端: 6.5×10^4 次 (ops)

注:1) 阻性负载 5A 30Vd.c. 无认证, 寿命次数为内部摸底次数, 供参考

5.4.2 机械耐久性 Mechanical Endurance

结构型式 Version	触点负载 Contact Rating	环境温度 Ambient Temperature	通断比 ON: OFF	机械耐久性 Mechanical Endurance
4 型 type 4	无负载 No load	常温 Room Temperature	0.1s: 0.1s	1×10^7 次 (ops)

5.5 介质耐电压 Dielectric Strength (漏电流 Leakage Current: 1 mA)

5.5.1 断开触点电路的各引出端之间 Between terminals of each opened contact circuit: 1000 Va. c. (50/60 Hz 1 min)。

5.5.2 所有线圈引出端与所有触点电路引出端之间 Between all coil terminals and all contact circuit terminals: 5000 Va. c. (50/60 Hz 1 min)。

5.5.3 各独立的触点电路的引出端之间 Between terminals of separate contact circuits: 2500 Va. c. (50/60 Hz 1 min)。

5.6 绝缘电阻 Insulation Resistance

5.6.1 断开触点电路的各引出端之间 Between terminals of each opened contact circuit: 1000 MΩ (500 Vd. c.)。

5.6.2 所有线圈引出端与所有触点电路引出端之间 Between all coil terminals and all contact circuit terminals: 1000 MΩ (500 Vd. c.)。

5.6.3 各独立的触点电路的引出端之间 Between terminals of separate contact circuits: 1000 MΩ (500 Vd. c.)。

5.7 线圈温升 Coil Temperature Rise: 55 K max.

以 110%额定电压激励，触点负载 8 A. 环境温度：85 °C。

Coil voltage: 110% of the rated coil voltage, Contact load: 8 A. Environmental temperature is 85 °C.

5.8 振动 Vibration

非励磁状态：继电器长度垂直于振动方向，频率 10 Hz~150 Hz 加速度 49 m/s²；

继电器长度平行于振动方向，频率 10 Hz~150 Hz 加速度 14.7 m/s²。

No energized: Vibration direction vertical to the relay length, frequency 10 Hz~150 Hz acceleration 49 m/s²;

Vibration direction parallel to the relay length, frequency

10 Hz~150 Hz acceleration 14.7 m/s².

励磁状态：频率 10 Hz~150 Hz 加速度 98 m/s²。

Energized: Frequency 10 Hz~150 Hz acceleration 98 m/s².

继电器外观、结构和性能不应有异常。It shall be no abnormalities in appearance, construction and performance.

5.9 冲击 Shock

稳定性：98 m/s²（脉冲持续时间 11 ms），6 次（三个相互垂直轴线的每一个方向 6 次，总共 36 次），闭合回路的断开或开路回路的闭合时间应不超过 100 μs。

Functional: 98m/s²(Duration 11ms), 6 shocks (six ops in both directions of each of the three mutually perpendicular axes, totally 36 ops), No opening or closing of any closed or opened contact circuit respectively shall exceed 100 μs.

强度：980 m/s²（脉冲持续时间 6 ms），6 次（三个相互垂直轴线的每一个方向 6 次，总共 36 次）继电器外观、结构和性能不应有异常。

Destructive: 980 m/s²(Duration 6 ms), 6 shocks (six ops in both directions of each of the three mutually perpendicular axes, totally 36 ops) There should be no abnormalities in appearance, construction and performance.

5.10 引出脚强度 Terminal Strength

PCB 引出脚：在 PCB 引出脚轴线方向上施加 5 N 拉力或压力，持续时间 6 s，继电器应无异常。

PCB Terminals: No damage on the relay when applying 5 N tension or pressure for 6 s on the axis direction of terminals.

5.11 耐焊接热 Soldering Heat Resistance

5.11.1 焊接温度 Soldering Temperature: (260±5) °C

5.11.2 焊接时间 Soldering Time: (3~5) s

5.12 焊接性能 Solderability

继电器引出端在焊锡温度 (250±3) °C 下，浸锡时间 (3±0.3) s 之后，被浸锡部分应有 90%以上连续覆盖一层锡层

Terminals dipped into the soldering bath should be 90% tin plated at $(250 \pm 3) ^\circ\text{C}$ for (3 ± 0.3) s.

5.13 耐温性 Temperature Resistance

5.13.1 耐热 Heat Resistance

$(85 \pm 2) ^\circ\text{C}$ 温度中放置 16 h, 恢复常温 2 h 后, 继电器的结构及性能应无异常。

At $(85 \pm 2) ^\circ\text{C}$ for 16h storage follow by 2 hours at room temperature, no damage on internal structure, all parameters conform.

5.13.2 耐寒 Cold Resistance

$(-40 \pm 2) ^\circ\text{C}$ 度中放置 16 h, 恢复常温 2 h 后, 继电器的结构及性能应无异常。

At $(-40 \pm 2) ^\circ\text{C}$ for 16h storage follow by 2 hours at room temperature, no damage on internal structure, all parameters conform.

5.14 耐湿性 Moisture Resistance

在温度 $(40 \pm 2) ^\circ\text{C}$ 湿度 90%~95% RH 中放置 48 h, 恢复常温 2 h 后, 继电器的结构及性能应无异常。且绝缘电阻应不小于 $10 \text{ M}\Omega$ (500 Vd.c.)。

The humidity was 90%~95% RH at $(40 \pm 2) ^\circ\text{C}$ for 48h storage follow by 2 hours at room temperature, no damage on internal structure, all parameters conform. Insulation resistance should be not less than $10 \text{ M}\Omega$ (500 Vd.c.).

6 产品标识 Marking

6.1 外壳颜色 Case Color: 黑色 Black

6.2 印字位置 Marking Position: 顶面 Top Face

6.3 印字颜色 Ink Color: 激光 Laser

7 标准测试条件 Standard Test Conditions

7.1 温度 Temperature: $23^\circ\text{C} \pm 5^\circ\text{C}$

7.2 湿度 Humidity: 25%~75% RH

7.3 方向 Direction of Measurement: 任意 Free

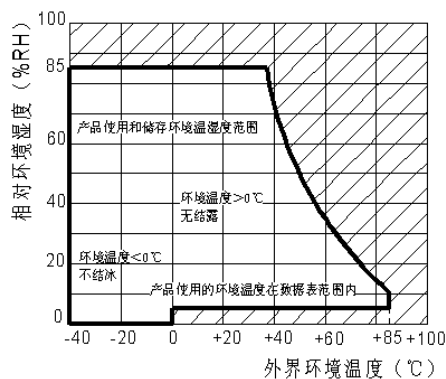
8 使用环境条件 Operate Ambient Conditions

8.1 环境温度 Ambient Temperature: $-40 ^\circ\text{C} \sim 85 ^\circ\text{C}$

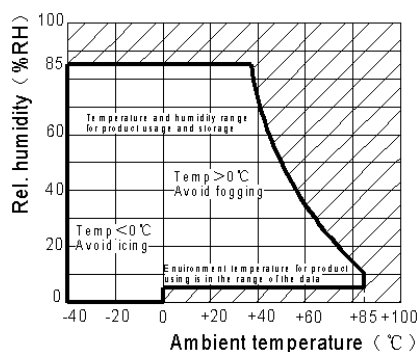
8.2 环境湿度 Ambient Humidity: 5%~85% RH

8.3 安装方向 Mounting Direction: 任意 Free

注：使用环境条件不能导致继电器内部产生结露、结冰，否则会导致继电器失效。另外，湿度范围会随温度而有所不同，因此请控制在下图所示的范围。



Note: The ambient environment of application shall not cause any dewing or icing inside the relay. Otherwise, the relay may not work properly. The humidity range varies with the temperature. Use within the range indicated in the graph below.



9 贮存条件 Storage Conditions

9.1 温度 Temperature: 0 °C ~ 40 °C

9.2 湿度 Humidity: 20%~80% RH

9.3 环境 Environment

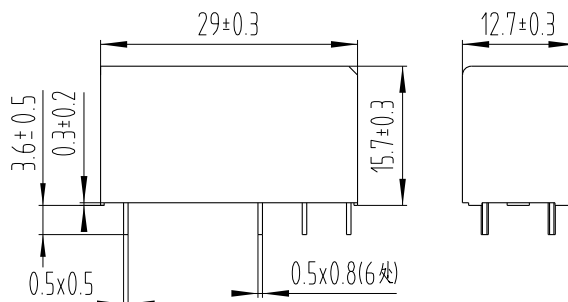
9.3.1 产品贮存场地不能有腐蚀性气体 Store in locations where the product is not exposed to corrosive gas.

9.3.2 贮存中应避免阳光直照产品 Avoid sunshine during storage.

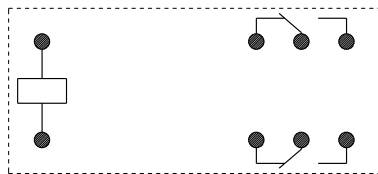
9.3.3 堆码高度 Stacking Height: ≤ 7 层 layers

10 产品结构 Configuration

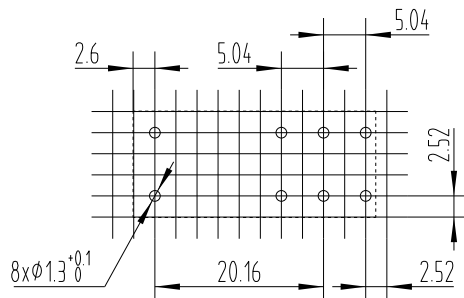
10.1 外形图 Outline Dimensions



10.2 接线图 (底视图) Wiring Diagram (Bottom View)



10.3 安装孔尺寸图 (底视图) PCB Layout (Bottom View)



注：产品外形尺寸未注尺寸公差及 PCB 板未注尺寸公差按下表执行。

Note: All unspecified tolerance (including outline dimensions and PC board dimensions) please refer to the following table.

产品外形尺寸未注尺寸公差 Outline dimensions with no tolerance specified mm		PCB 板未注尺寸公差 PC board dimensions with no tolerance specified mm
外形尺寸 Outline Dimensions	公差 Tolerance	±0.1
≤1	±0.2	
>1~5	±0.3	
>5	±0.4	

11 订货标记 Ordering Information

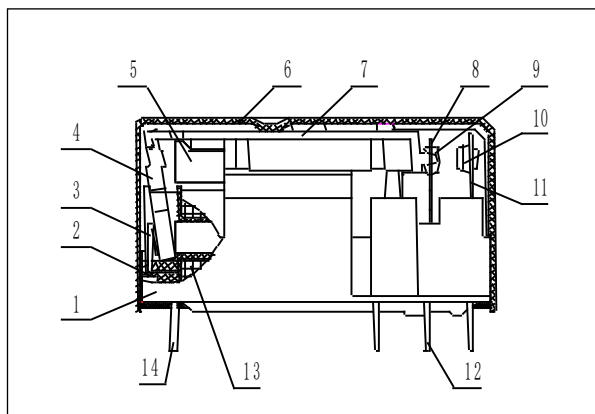
HF115F / 024 - 2Z S 4 B
① ② ③ ④ ⑤ ⑥

- | | |
|-------------------------|----------------------------------|
| ① 产品型号 Product part NO. | HF115F |
| ② 线圈电压 Coil voltage | 024:24 Vd. c. |
| ③ 触点形式 Contact form | 2Z: 两组转换 (2 Form C) |
| ④ 封装形式 Construction | S: 塑封型 (Plastic sealed) |
| ⑤ 结构形式 Version | 4: 5.0mm 两组 8A (5.0mm 2 pole 8A) |
| ⑥ 触点材料 Contact material | B: AgNi |

12 主要零部件 Important Parts And Components

序号 Serial No.	零部件名称 Parts And Components Name	材料名称 Material Name	备注 Remark
1	底座 Base	工程塑料 plastic	
2	线圈架 Bobbin	工程塑料 plastic	
3	压簧片 Hing spring	铜合金 Copper alloy	
4	衔铁 Armature	纯铁 Fe	
5	轭铁 Yoke	纯铁 Fe	
6	外壳 Cover	工程塑料 plastic	
7	推动块 Card	工程塑料 plastic	
8	动簧片 Mov. spring	铜合金 Copper alloy	
9	动触点 Mov. contact	银镍 AgNi	
10	静触点 Stat. contact	银镍 AgNi	
11	静簧片 Stat. spring	纯铜 Copper	
12	焊片 Terminal	纯铜 Copper	
13	漆包线 Coil wire	纯铜 Copper	
14	线圈引出脚 Coil Terminal	铜合金 Copper alloy	

结构图 Construction Schematic



13 其他说明 Others

13.1 对于塑封型产品,在焊接完成后,如果要进行清洗,请与宏发技术中心联系。Regarding the plastic sealed relay, if cleaning is necessary after soldering, please contact Hongfa R&D center.

13.2 避免在强磁场条件下使用继电器,外界强磁场会造成继电器动作和释放等参数发生变化。Avoid using relays in strong magnetic field because it will change the parameters of relay such as operate and release voltage.

13.3 对宏发而言,不可能评定继电器在每个应用领域、应用环境的所有性能参数要求,因而,客户应根据具体的使用条件选择与之相匹配的产品,若有疑问,请与宏发联系获得更多的技术支持。但产品的选型责任仅由客户负责。We could not evaluate all the performance and all the parameters for every possible application field and environment. Thus

the user should be in a right position to choose the suitable produce for their own application. If there is any query, please contact Hongfa for the technical service. However, it is the use' s responsibility to determine which product should be used only.

13.4 本产品规格书中标称的使用环境温度范围指的是产品在特定负载条件下的最大耐受温度范围。对于防爆规格产品的使用环境温度按相应防爆认证证书的规定。Operating temperature range in this specification refers to the maximum tolerable temperature range under specific load conditions. To explosion-proof product, the ambient temperature should conform to regulations in related explosion-proof certification.

13.5 继电器的电耐久性次数可能会因使用环境条件的不同而有差异。对于部分产品，为获得更好的电耐久性能，需打开外壳的透气孔。产品的电耐久性能详细情况见认证证书。本产品规格书中电耐久性所列的试验条件、触点负载可能未包含在认证证书中，当使用环境条件与认证条件不同时，电耐久性能需要由具体试验确认。Differences in relay electrical endurance cycles would exist due to difference in operating ambient conditions. To some products, in order to better perform in electrical endurance, vent hole is required to be opened. The electrical endurance of the products detailed in the safety certificates. The test condition and contact rating for electrical endurance in this specification may not be included in the safety certificates, in case that the condition in real applications is different from safety certificates, the electrical endurance of the relay must be confirmed by tests.

13.6 本产品规格书供客户使用时参考，其中，未明确规定的要求条件，参考“继电器术语解释及使用指南”（见 <https://source.cn.hongfa.com/pdf/web/viewer.html?file=\Uploads\Down\PDF\GR1001.pdf>）。The specification is for reference only. See to “Terminology and Guidelines” (see <https://source.cn.hongfa.com/pdf/web/viewer.html?file=\Uploads\Down\PDF\GR1001.pdf>) for more information.

13.7 为了保持继电器的性能，请注意不要使继电器掉落或受到强冲击。掉落后的继电器建议不再使用。To maintain the performances of relays, please do not make the relay drop or be shocked strongly. Suggest that the relays dropped not be used.

13.8 规格书内的各项性能参数是基于标准测试条件下测得的初始值。All the performance data listed in the datasheet are the initial values tested under standard testing condition.

13.9 请避免让继电器在含有机硅的环境下使用，否则有机硅进入继电器内部后，有可能会
导致继电器触点加速失效。使用环境气体中，如果含有水汽及 H₂S、SO₂、NO₂、Cl、P、粉尘
等以及目前未知的有害物质、元素，可能会导致继电器使用过程中，触点发生电阻变大、接
触不良等。以上情况下，请对产生有害物质、元素的物料进行管控或使用塑封继电器规格，
并进行相关试验验证，确认是满足使用要求。Please avoid using the relay in an
environment containing organic silicon, otherwise the entry of organic silicon into
the relay may acceleration contact failure. If there are harmful substances and
elements such as water vapor, H₂S, SO₂, NO₂, Cl, P, dust, etc., as well as unknown harmful
substances and elements, In the use of environmental gases, it may lead to increased
contact resistance and poor contact during the use of relays. In the above
situations, please control the materials that produce harmful substances and elements
or use plastic sealed type, and arrange relevant tests to confirm that it meet the
requirements for actual use.

13.10 环保措施 Environmental Protection

宏发产品均符合 RoHS 要求。Hongfa products are all RoHS compliant.

13.11 宏发保留对产品更改的权利，客户在首次下单之前应确认此规格书内容，必要时可
要求我司提供新的规格书。Hongfa reserves the right to make changes. Customers should
reconfirm the contents of the specification before first orders and ask for us to
supply a new specification if necessary.

13.12 事前协议事项 Priority Consultation

无