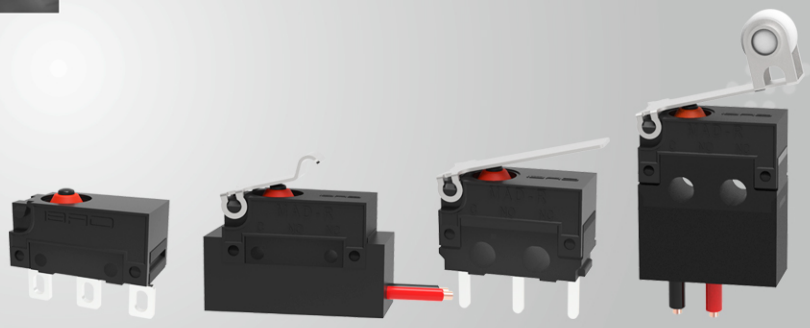
MAD-R SERIES



IP67 Waterproof Micro switch

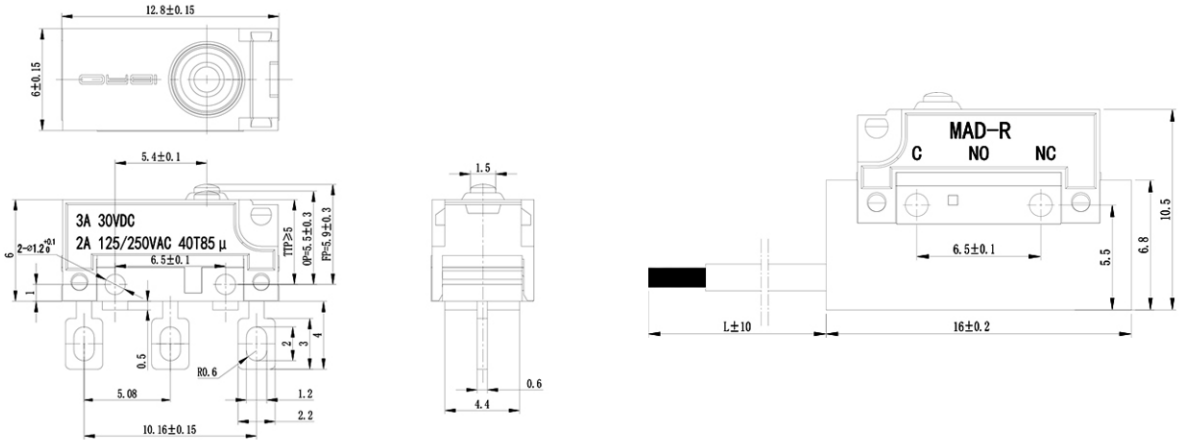
特点 FEATURE

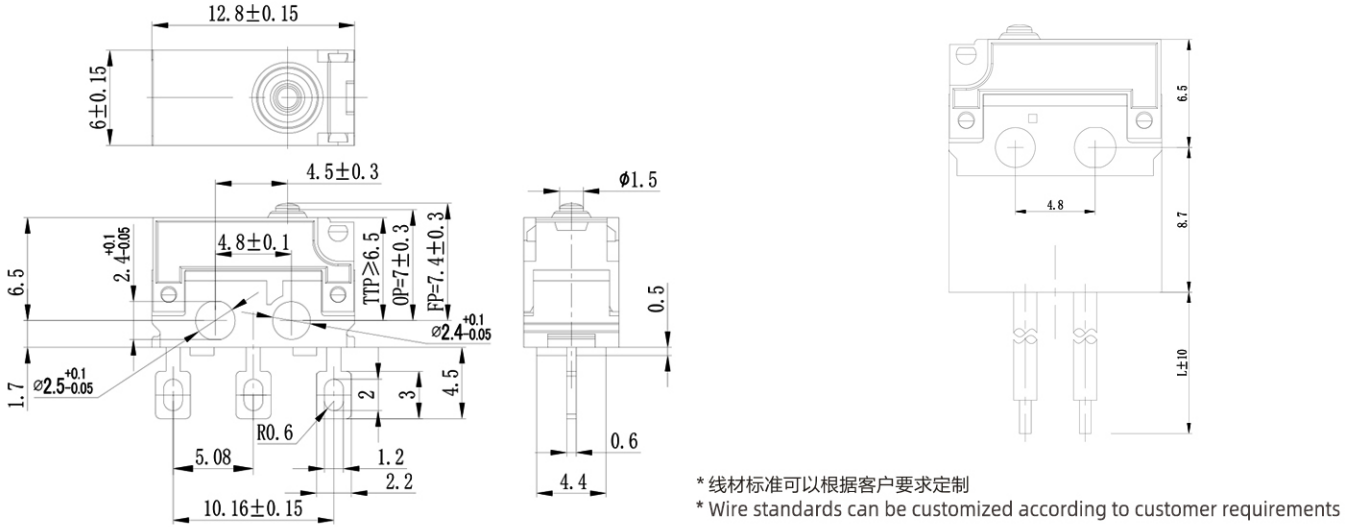
寿命长、可靠性高 · Long Life and High Reliability
配备各种形状的压杆 · Offer Variety Levers
接线端子与带线型可选 · Terminal or Wire
防水(IP67)设计 · Waterproof(IP67)Design

应用 APPLICATION

家用电器 · Home Appliance
输配电 · Power transmission and distribution
自动化设备 · Automatic Equipments
汽车电子 · Auto Electronics
农业机械 · Agricultural Machinery

外形尺寸图 OUTLINE DRAWING

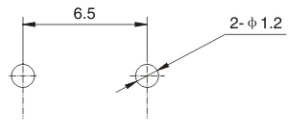


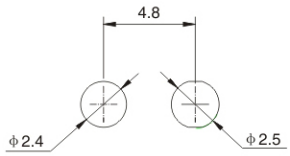


* 线材标准可以根据客户要求定制
* Wire standards can be customized according to customer requirements

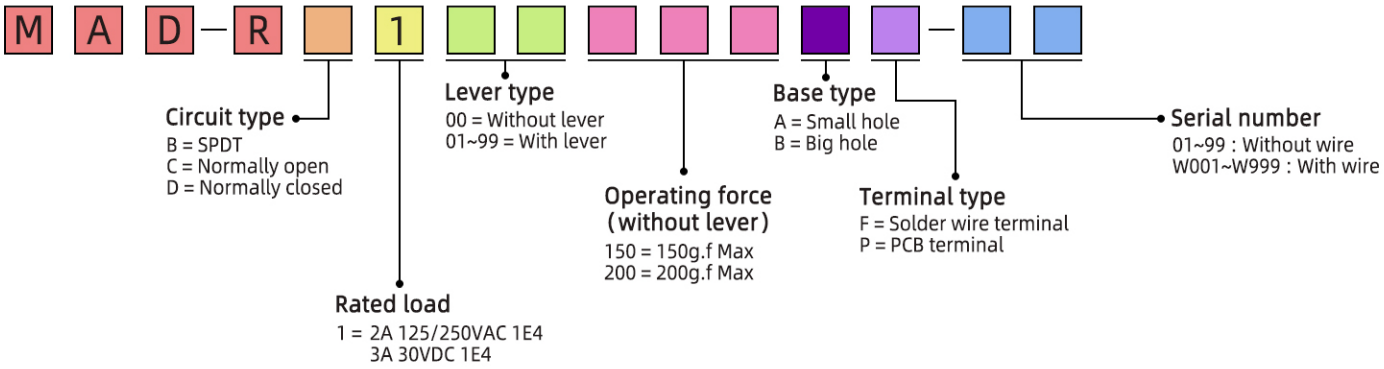
特性参数 PARAMETERS

额定负载/Rated Load		2A 125/250VAC；3A 30VDC
绝缘电阻/Insulation Resistance		100 MΩ Min
抗电强度/Dielectric Strength	端子之间/Between Terminal	500VAC（50～60HZ）
	端子与外壳之间/ Between Terminal and Base	1500VAC（50～60HZ）
初始接触电阻/Initial Contact Resistance		100mΩ Max
环境温度/Working Temperature		40T85
寿命/Service Life	电气/Electrical	10,000 Cycles
	机械/Mechanical	100,000 Cycles
安装尺寸/HOLE FOR MOUNTING		

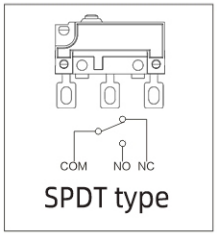




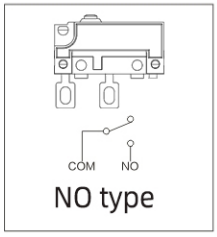
订货型号指引 ORDERING INSTRUCTION



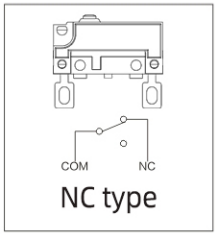
● 电路形式 Circuit type



A

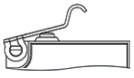
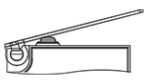


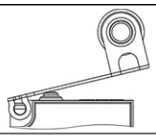
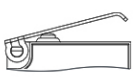
B



C

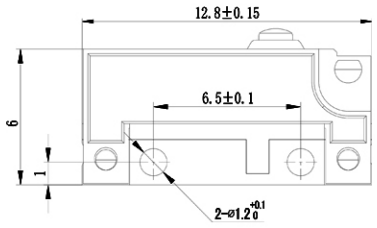
● 手柄类型 Lever type

00	
01	
02	

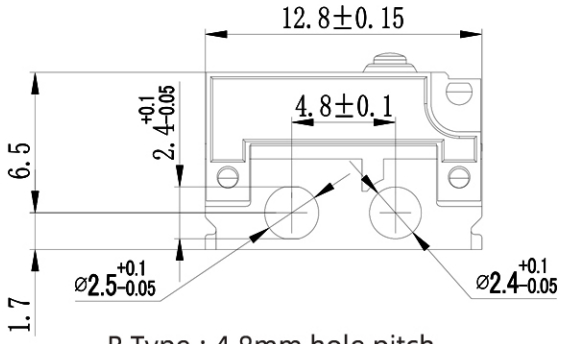
03	
04	
05	

※ For more lever types, please contact us, We accept paid customization.

● 基座类型 Base type

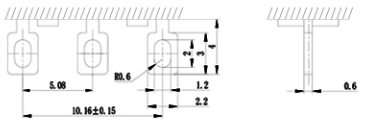
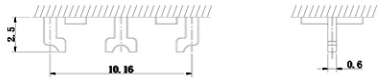


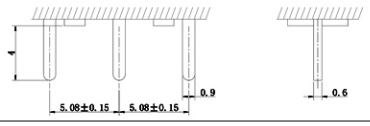
A Type : 6.5mm hole pitch
small size mounting hole



B Type : 4.8mm hole pitch
big size mounting hole

● 端子类型 Terminal type

F	
S	

P	
other	For more terminal types, please contact us, We accept paid customization.

开关参数规格 SWITCH SPECIFICTION

● 一般特性 General

适用范围 Application Area:
该规格书指微动开关(MAD-R Series)的一般使用范围
This specification is applied to the Micro switch (MAD-R series) for general applications.
产品名称 Part name:
微动开关 MICRO SWITCH OFF-(ON) 功能
使用温度范围 Operation Temperature rating： -40℃ ~ +85℃
相对湿度 Operation Relative Humidity ：≤85% at +40℃
实验条件 Test conditions:
环境湿度 Ambient Temperature： 5~35℃
相对湿度 Relative Humidity: 45~85%
大气压力 Air Pressure: 86~106Kpa(860~1060mbar)
操作频率 Operation frequency:
带电气负载：15次/分最大 15 operations/minute max(electrical)
机械操作：90次/分最大 90 operations/minute max(mechanical)

● 外观结构及尺寸 Appearance, Configuration and Dimensions

外观：产品外观良好，无锈蚀、裂纹和镀层缺陷
Appearance: Product appearance and no rust, crack and coating defects
结构尺寸：参见产品图纸
Structur and Dimension: See the outline drawing
标识：参见产品图纸
Sign: See the outline drawing
通过的安规认证 Safety Certification：RoHS,REACH,UL
产品防护等级 Degree of protection：IP67(Except terminal)
额定负荷 Ratings: 2A 125/250VAC； 3A 30VDC

● 电气性能 Electrical characteristic

No.	Item 项目	Criteria 标准	Test Method 实验方法
1	Initial Contact Resistance 初始接触电阻	不含线束Without wire：100mΩ max. 最大值 100 毫欧 含线束With wire：300mΩ max. 最大值 300 毫欧	Measured by a voltage drop method at 1A Max, 5VDC. Any equipment with error not more than 5% can be used. Resistance after test is the average of 5 successive measurements. 以 1A，5V 直流电，采用电压降法测量。也可用误差不超过 5%的仪表进行测量，实验后的电阻取 5 次测量的平均值。
2	Insulation Resistance 绝缘电阻	100MΩ min. 最小值 100 兆欧	500VDC voltage is applied between each pair of terminals and between the terminal and the metal frame for 60± 5S. 在相互绝缘的所有端子之间及各接线端子与外露的非载流金属零件之间加载 500V 直流电，持续时间 60±5S。
3	Dielectric strength 抗电强度	No dielectric breakdown occues 无击穿现象发生	500VAC (50~60Hz,cut –off current 10mA) is applied between non-connected terminals and between terminals and the metal frame for 60s. 在相互绝缘的所有接线端子之间 500V(50-60Hz)交流电，各接线端子与外壳或非载流金属零件之间加载 1500V（50-60Hz）交流电，持续时间 60S。

● 机械性能 Mechanical characteristic

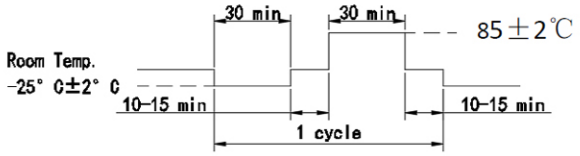
No.	Item 项目	Criteria 标准	Test Method 实验方法
1	Terminal strength 接线端子强度	After test, The terminal is not loose,damaged and the insulation layer is not damaged. The Electrical performance requirements specified in item3 shall be satisfied. 实验后：端子无松动、损坏及绝缘层的无破损。满足第 3 项规定的电气性能要求。	A static load of 64N shall be applied to the tip of terminal in a desired direction for 60 ± 1s. The test shall be done once per terminal. 以 64N 作用力沿轴向逐渐施加于接线端末端，作用力方向为离开开关向外指向，每个接线端子测量一次，时间 60±1S。
2	Solder Ability 可焊性	After test, More than 80% of immersed part shall be covered with solder. 实验后： 超过 80%的浸锡面积被焊料所覆盖。	Switch shall be checked after following test : (1) Solder: H63A (JIS Z3282) (2) Flux: Rosin Flux (JIS K 5902) having a nominal composition of 25% solids by mass of water white rosin in methyl alcohol (JIS K 1501) solution. (3) Soldering Temperature: 235 ± 5°C Immersing Time: 3 ± 0.5s Flux immersing time shall be 5 ~10s (4) Immersion Depth: Immersion depth shall be at copper plating portion of PCB after mounting.(Thickness of PCB=1.6mm) 试件在下述参数条件下进行试验: (1) 焊料：H63A （JIS Z 3282） (2) 焊剂：焊剂（JIS K 5902），质量百分比为 25%松香在甲醇(JIS K1501)溶液中 (3) 焊接温度：235±5°C 浸渍时间：3±0.5s 焊剂浸渍时间：5-10s (4) 浸渍深度：接线端应浸到离开关根部 1.6mm 处

No.	Item 项目	Criteria 标准	Test Method 实验方法
3	Impact test 耐焊接热	After test, The appearance and function shall be normal. The Electrical performance requirements specified in item 3 shall be satisfied. 实验后： 外观及操作均无异常。 满足第 3 项规定的电气性能要求。	Switch shall be checked after following test : (1) Solder: H63A (JIS Z3282) (2) Flux: Rosin Flux (JIS K 5902) having a nominal composition of 25% solids by mass of water white rosin in methyl alcohol (JIS K 1501) solution. (3) Soldering Temperature & Immersing Time Dip Soldering: 260±5°C 5±1s Manual Soldering: 350±5°C 2-3s (4) Immersion Depth: Immersion depth shall be at copper plating portion of PCB after mounting.(Thickness of PCB=1.6mm) 试件在下述参数条件下进行试验: (1) 焊料：H63A （JIS Z 3282） (2) 焊剂：焊剂（JIS K 5902），质量百分比为 25%松香在甲醇(JIS K1501)溶液中 (3) 焊接温度及浸渍时间： 自动焊接 260± 5℃ 5±1s 手工焊接 350±5℃ 2-3s (4) 浸渍深度：接线端应浸到离开关根部 1.6mm 处
4	Flux resistance 抗焊剂能力	After test, Flux shall not be risen up to contact. The switch shall be free from abnormalities in operation. 实验后： 焊剂不得上升进入开关内部，影响接触转换。 开关操作应无异常	Switch shall be checked after following test : (1) Euipment: Auto-Dip Chamber (2) Solder: H63A (JIS Z3282) (3) Flux: Rosin Flux (JIS K 5902) having a nominal composition of 25% solids by mass of water white rosin in methyl alcohol (JIS K 1501) solution. (4) Soldering Temperature: 235 ± 5°C (5) Immersing Time: 3 ± 0.5s (6) Immersion Depth: Immersion depth shall be at copper plating portion of PCB after mounting.(Thickness of PCB=1.6mm) 试件在下述参数条件下进行试验: (1) 设备：自动焊接机 (2) 焊料：H63A （JIS Z 3282） (3) 焊剂：焊剂（JIS K 5902），质量百分比为 25%松香在甲醇(JIS K1501)溶液中 (4) 焊接温度：235±5°C (5) 浸渍时间：3±0.5s (6) 浸渍深度：接线端应浸到离开关根部 1.6mm 处

● **寿命试验 Life test**

No.	Item 项目	Criteria 标准	Test Method 实验方法
1	Mechanical life 机械寿命	75% electrical performance requirements specified in item 3 shall be satisfied.	100,000 cycles of operation shall be performed continuously at a rate of 60±30 cycles per minute without load. 在不带负荷的条件下，速度为 60±30 次/分，在寿命试验设备上连续转换 100,000 次。
2	Electrical life 电气寿命	No abnormalities shall be observed in appearance and operation. 满足第 3 项规定的 75%电气性能要求。 外观及操作均无异常。	Operation shall be performed continuously at a rate of 6-15 cycles per minute with load as follow 在带以下负荷的条件下，速度为 6-15 次/分，在寿命试验设备上连续转换。 **2A 125/250VAC 10,000cycles** **3A 30VDC 10,000cycles**

● 耐候实验 Environmental test

No.	Item 项目	Criteria 标准	Test Method 实验方法
1	Cold Proof 低温	After test, Resistance: 2M ohm min. The Electrical performance requirements specified in item 3 shall be satisfied.	After testing at –25 ± 2°C for 96 hours, the switch shallbeallowedtostand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be eliminated. 试件在-25±2℃的温控箱内保持 96 小时，然后在正常温度和湿度下恢复 1 小时，并在此后 1 小时内对试品进行测量，水滴应消失
2	Hot Proof 高温	No abnormalities shall be observed in appearance and operation. 实验后： 绝缘电阻：2M ohm min. 满足第 3 项规定的电气性能要求。 外观及操作均无异常。	After testing at 85 ± 2°C for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. 试件在 85±2℃的温控箱内保持 96 小时，然后在正常温度和湿度下恢复 1 小时，并在此后 1 小时内对试品进行测量，水滴应消失。
3	Moisture Resistance 恒定湿热		After testing at 40± 2°C ,90~95% RH for 96 hours, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be eliminated. 试件在 40±2℃，90-95%RH 的温控箱内保持 96 小时，然后在正常温度和湿度下恢复 1 小时，并在此后 1 小时内对试品进行测量，水滴应消失。
4	Temperature Cycling 温度转换		A fter 5 cycles of following conditions, the switch shall be allowed to stand under normal temperature and humidity conditions for 1 hour, and measurement shall be made within 1 hour after that. Water drops shall be eliminated. 试件按下述实验条件试验 5 次，然后在正常温度和湿度下恢复 1 小时，并在此后 1 小时内对试品进行测量，水滴应消失。 

● 开关的储存 Storage of switches

1.请避开产生污染气体、有机气体的区域(如燃气、取暖器附近)以及灰尘、潮湿等环境。
Please avoid areas that produce polluted gases, organic gases (such as gas, near heaters), dusty, humid environments, etc.

2.保存温度湿度:温度5~35℃,湿度≤80%RH
Temperature & Humidity:Temp 5 ~ 35 ℃ and Hum 80% RH Max.

3.开关储存期为6个月，超过6个月需重新检查。
The storage period is 6 months, re-inspected over 6 months.

● 开关的使用 Use of switches

小心不要让开关跌落地面和受猛烈冲击，这样可能使开关的内部元件损坏，因开关的设计是适用于微小操作力的。
Be careful not to drop the switch to the ground and subject it to violent shocks which may damage the internal components of the switch because the switch is designed for small operating forces.