

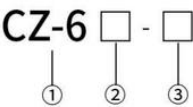


特点 Features

- 内藏CM-1卧式限位开关
- 具有高机械强度的一体铸造铝合金外壳
- 具耐油、防水和防压结构
- 额定值及特性同CM-1卧式限位开关
- 引动器种类多，方便使用
- Built-in CM-1 horizontal limit switch
- High mechanical strength, mainly consists of aluminum cast
- Water-proof and oil-proof construction
- Same rated value and characteristic with CM-1 horizontal limit switch
- Various actuators for different applications



选型说明 Model Designation



序号 No	项目 Item	代号 Code	说明 Description
①	产品系列 Product series	CZ-6	卧式限位开关 Horizontal limit switch
②	头部结构 Head structure	001	平头按钮式头 Flat head button type head
		002	横向滚轮按钮式头 Horizontal roller button head
		003	竖向滚轮按钮式头 Vertical roller button head
		004	V 铁架滚轮式头 V iron frame roller head
		101	带密封圈平头按钮式头 Flat head button type head with sealing ring
		102	带密封圈横向滚轮按钮式头 Horizontal roller button head with sealing ring
		103	带密封圈竖向滚轮按钮式头 Vertical roller button head with sealing ring
		104	带密封圈 V 铁架滚轮式头 V-iron frame roller head with sealing ring
		143	Z 铁架滚轮式头 Z iron frame roller head
		106	带密封圈全弹簧式头 Full spring head with sealing ring
③	特殊规格 Special specifications	无 None	M20 (1 导管型) M20 (1 catheter type)
		P	PG13.5 (1 导管型) PG13.5 (1 catheter type)

特性 Characteristics

操作速度 Operation speed	5mm 至 0.5m/s 5mm-0.5m/s
动作频率 Operating frequency	电气:20次/分 Electical: 20 operations/min
接触电阻 Contact resistance	25mΩ 以下 (初期) 25mΩmax. (initial value)
绝缘电阻 Insulation resistance	100MΩ 以上 (在 500VDC 以下) 100MΩ min. (at 500VDC)
最小使用负载 Minimum working load	DC24V 10mA 以上 Min DC24V 10mA
额定绝缘电压UI Rated insulation voltage	380V
额定冲击耐受电压 Uimp Rated impulse withstand voltage	2.5kV
约定自由空气发热电流Ith Convention free air heating current	15A
电介强度 Dielectric strength	非连续端子间1000VAC, 50/60Hz持续1分钟 1000VAC, 50/60 Hz for 1 minute between terminals of the same polarity 载电流与无载电流零件间1890VAC, 50/60Hz持续1分钟 1890VAC, 50/60 HZ for 1 minute between current-carrying and non-current-carrying metal parts 端子和接地之间1890VAC, 50/60Hz持续1分钟 1890VAC, 50/60 HZ for 1 minute between each terminal and ground
振动 Vibration	10至55Hz, 1.5mm双振幅 10-55Hz, 1.5mm double amplitude
冲击 Shock	机械耐久 :1,000m/Sec2(约 100G' S) 误动作耐久: 100m/s ² (约 10G' S) *1 Mechanical durable: 1, 000m/Sec2 (about 100G' S) Malfunction: 300m/Sec ² (about 30G' S)*1
周围温度 Ambient temperature	使用时 :-20~+80°C (没有结冰) Using: -20~+80°C (With no icing)
湿度 Humidity	95%RH 以下 <95% RH
电气寿命 Electrical life	50万次以上(AC240V/3A阻性负载) More than 500,000 cycles (AC 240V/3A resistive load) 20万次以上(AC240V/15A阻性负载) More than 200,000 cycles (AC 240V/15A resistive load)
防水等级 Protection level	IP65(CZ-6101、CZ-6102、CZ-6103、CZ-6104、CZ-6143、CZ-6106)

注1. 上述值为初始值。

注2. 有些型号中可能与上述内容不同, 请另外垂询。

*1. 盘簧型除外

*2. 该保护结构基于标准(EN69047-5-1)规定的测试方法, 请根据使用环境、使用条件来事先确认密封性。

*3. 寿命的条件为环境温度25~35°C、环境湿度40~70%RH时的数值。

Note 1. The above values are initial values.

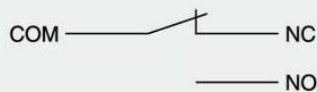
Note 2. Values of some models may be different from the above, please contact us for details.

*1: Except coil spring type

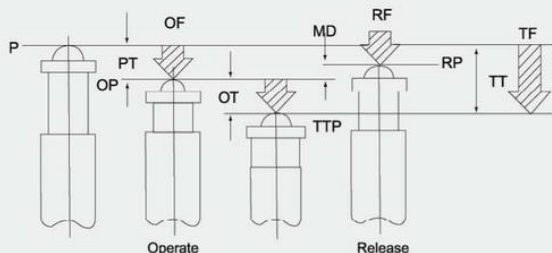
*2.The protection structure is tested based on method predetermined by standard (EN69047-5-1), please confirm the sealing in advance according to the operating environment and conditions.

*3.The conditions of life are the values under the ambient temperature of 25~35°C and humidity of 40 to 70% RH. For other detailed conditions, please contact us.

接点型式 Contact Form



动作特性 Operating Characteristics



OF: 动作力

RF: 回复力

TF: 总行程动作力

FP: 自由位置

OP: 动作位置

RP: 返回位置

TTP: 总行程位置

PT: 预行程位置

OT: 过行程

MD: 响应差的行程

TT: 总行程

OF: Operating Force

RF: Releasing Force

TF: Total Force

FP: Free Position

OP: Operating Position

RP: Releasing Position

TTP: Total Tavel Position

PT: Pre Travel

OT: Over Travel

MD: Movement Differential

TT: Total Tavel

国际认证规格 International Certification Specifications

认证规格 Certification specifications	规格 Specifications	文件No. Document
CCC	GB/T 14048.5	请咨询昌得代表处 Please consult the CNTD Representative Office
CE	EN 60947-5-1	

安全标准认证额定规格 Safety Standard Certification Rated Specifications

TUV (EN 60947-5-1), CCC(GB/T 14048.5)

项目 Item	使用类型 Usage type	AC-15	DC-13
额定工作电流 Rated working current(Ie)		15A	0.3A
额定工作电压 Rated working voltage(Ue)		250V	220V

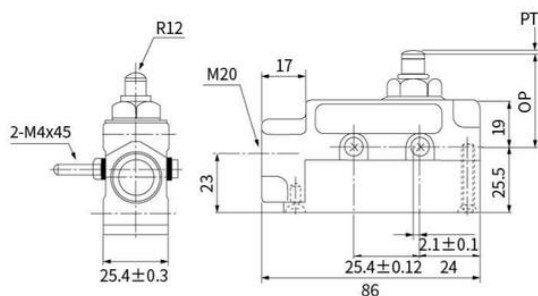
注：请使用符合IEC60269的gl或gG型10A保险丝作为短路保护装置。开关内未配保险丝。

Note: Please use gl or gG 10A fuses that comply with IEC60269 as short-circuit protection devices. The switch is not equipped with a fuse.

外观和尺寸 Appearance and Dimension

CZ-6001

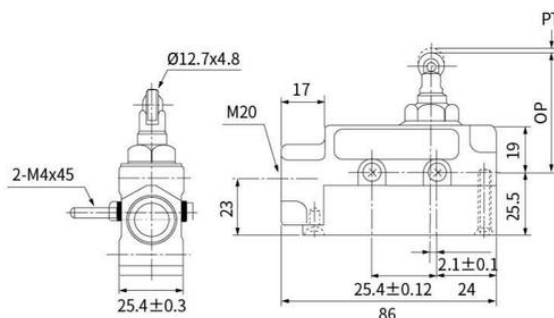
平头按钮式头
Flat head button
type head



动作特性 Operating Characteristics	CZ-6001
动作力 OF (最大Max.)	3.5N
释放力 RF (最小Min.)	1.14N
预行程 PT (最大Max.)	0.4mm
行程移动分辨率 MD (最大Max.)	0.05mm
过行程 OT (最小Min.)	5.5mm
动作位置 OP(mm.)	38.2±0.8mm

CZ-6002

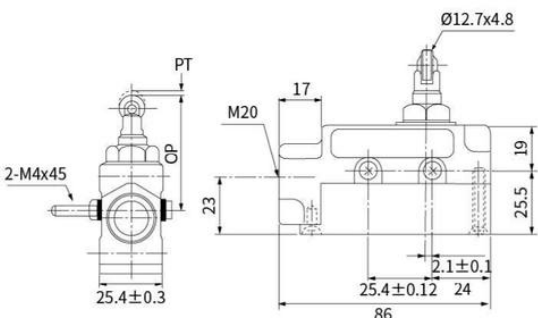
横向滚轮按钮式头
Horizontal roller
button head



动作特性 Operating Characteristics	CZ-6002
动作力 OF (最大Max.)	3.5N
释放力 RF (最小Min.)	1.14N
预行程 PT (最大Max.)	0.5mm
行程移动分辨率 MD (最大Max.)	0.05mm
过行程 OT (最小Min.)	3.6mm
动作位置 OP(mm.)	49.7±1mm

CZ-6003

竖向滚轮按钮式头
Vertical roller
button head

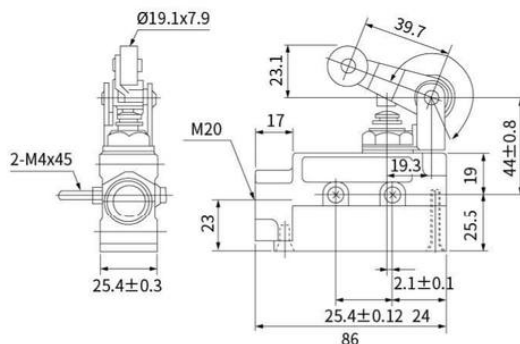


动作特性 Operating Characteristics	CZ-6003
动作力 OF (最大Max.)	3.5N
释放力 RF (最小Min.)	1.14N
预行程 PT (最大Max.)	0.5mm
行程移动分辨率 MD (最大Max.)	0.05mm
过行程 OT (最小Min.)	3.6mm
动作位置 OP(mm.)	49.7±1mm

外观和尺寸 Appearance and Dimension

CZ-6004

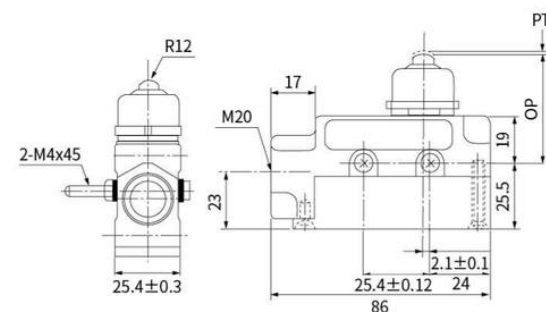
V 铁架滚轮式头
V iron frame
roller head



动作特性 Operating Characteristics	CZ-6004
动作力 OF (最大Max.)	5.7N
释放力 RF (最小Min.)	1.7N
预行程 PT (最大Max.)	4mm
行程移动分辨率 MD (最大Max.)	0.4mm
过行程 OT (最小Min.)	6mm
动作位置 OP(mm.)	-

CZ-6101

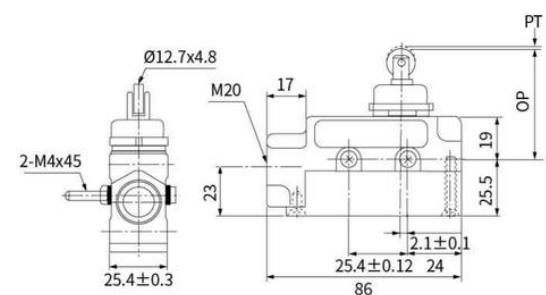
带密封圈
平头按钮式头
Flat head button
type head with
sealing ring



动作特性 Operating Characteristics	CZ-6101
动作力 OF (最大Max.)	8N
释放力 RF (最小Min.)	2.4N
预行程 PT (最大Max.)	2mm
行程移动分辨率 MD (最大Max.)	0.1mm
过行程 OT (最小Min.)	5mm
动作位置 OP(mm.)	45.8 $\pm$ 0.8mm

CZ-6102

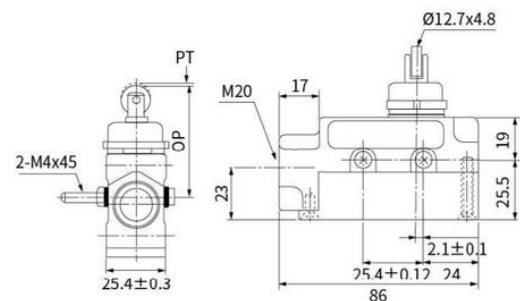
带密封圈横向
滚轮按钮式头
Horizontal roller button
head with sealing ring



动作特性 Operating Characteristics	CZ-6102
动作力 OF (最大Max.)	5N
释放力 RF (最小Min.)	1N
预行程 PT (最大Max.)	1mm
行程移动分辨率 MD (最大Max.)	0.12mm
过行程 OT (最小Min.)	3.5mm
动作位置 OP(mm.)	49.7 $\pm$ 0.8mm

CZ-6103

带密封圈竖向
滚轮按钮式头
Vertical roller button
head with sealing ring



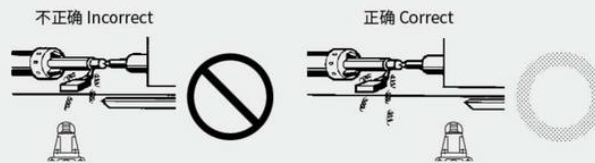
动作特性 Operating Characteristics	CZ-6103
动作力 OF (最大Max.)	5N
释放力 RF (最小Min.)	1N
预行程 PT (最大Max.)	1mm
行程移动分辨率 MD (最大Max.)	0.12mm
过行程 OT (最小Min.)	3.5mm
动作位置 OP(mm.)	49.7 $\pm$ 0.8mm

使用注意事项 Using Precautions

关于使用环境 Regarding the Usage Environment

在户外环境或存在特殊切削油、化学溶剂、药品等条件下，密封件的性能可能会下降。在使用前，务必根据具体的使用环境来评估维护和更换的需求。安装开关时，选择一个避免直接暴露于切削碎屑或粉尘的位置至关重要。同时，需定期检查并清除驱动杆和开关表面的任何切削残留物和类似泥土的物质，以保证开关正常工作。

In outdoor settings or areas exposed to specific cutting fluids, chemical solvents, or pharmaceuticals, the performance of sealing components can be compromised. Prior to use, it's essential to assess the need for maintenance and replacement based on the specific operational environment. When installing the switch, it's crucial to position it away from direct exposure to cutting debris or dust. Regular inspection and cleaning of any residues or mud-like substances on the drive rod and the body of the switch are necessary to maintain its proper functioning.



在环境中频繁振动或受到冲击的情况下，开关可能会出现由于摩擦而产生的微粒，这些微粒可引起接触问题和性能退化，例如接触不良和响应不稳定。在剧烈振动或强烈冲击的情况下，接点可能会出现错误动作或遭受损害。为此，应避免在易受振动和冲击影响的地点安装开关，尤其是那些可能导致共振的位置。开关使用的物理接点在特定条件下可能受到环境中的硅气体影响。当电弧发生时，这些硅气体可能与之反应，在接点处形成氧化硅沉积，导致接触困难。如果开关附近有使用硅基材料（如硅油、硅胶、硅质电缆等），则应考虑采用接点保护电路来减少电弧产生，并消除硅气体的释放。

In environments with frequent vibration or impact, switches may produce friction-generated particles, leading to contact issues and performance degradation, such as poor contact and unstable response. Extreme vibration or strong impacts can cause incorrect switch operations or damage. Therefore, avoid installing switches in vibration-prone or impact-prone areas, especially where resonance might occur. The physical contacts in switches can be affected by environmental silicon gases under certain conditions. When arcing occurs, these gases may react and form silica deposits at the contact points, causing contact difficulties. If silicone-based materials (like silicone oil, silicone rubber, silicon cables, etc.) are used near the switch, consider using contact protection circuits to reduce arcing and eliminate the release of silicon gases.

安装 Install

对于滚珠摆杆型封闭式开关，滚珠臂在发货前已临时拧紧于任意位置。安装开关时，请确保调整位置后重新拧紧滚珠臂，防止它在运行期间松动。为了充分保持封闭式开关侧的安装螺丝段的密封，请正确插入每个 O 型环，并用锁紧螺母固定。布线进入导管口时，请确保切屑和其它外部物体不会进入开关。

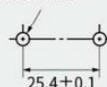
For ball swing type enclosed switches, the ball arm has been temporarily tightened in any position before shipment. When installing the switch, make sure to adjust the position and retighten the ball arm to prevent it from loosening during operation.

To fully maintain the sealing of the installation screw section on the closed switch side, please insert each O-ring correctly and secure it with a locking nut.

When wiring enters the conduit opening, ensure that chips and other external objects do not enter the switch.

安装孔 Mounting Hole

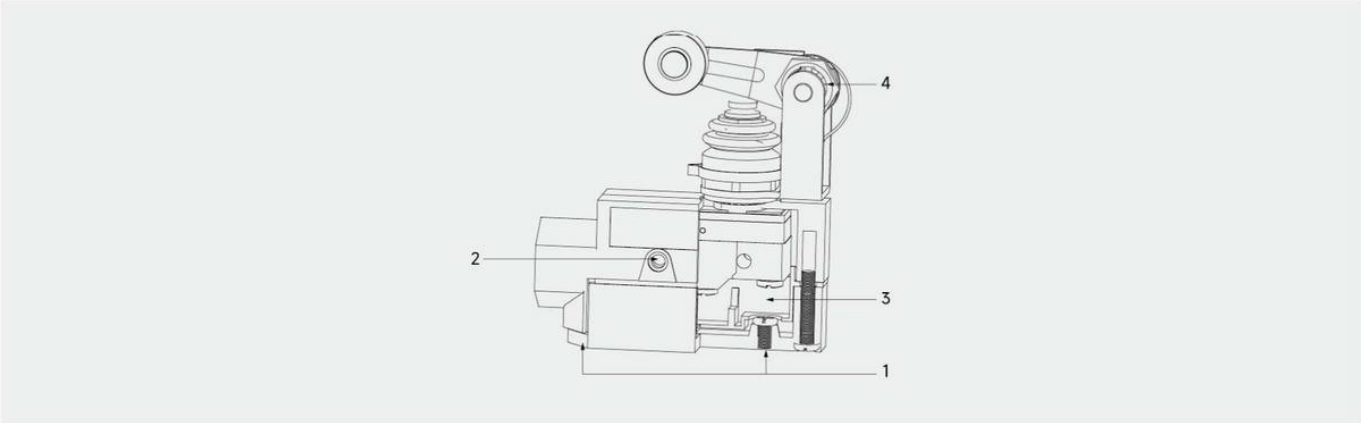
侧面安装 Side mounting
2, Ø4.3 安装孔或
M4 螺纹孔
2, Ø4.3 Threaded hole mounting hole
or M4 threaded hole



正确紧固转矩 Correct tightening torque

螺丝松动可能导致功能故障。请确保按下表将螺丝拧紧到正确转矩
Loose screws may cause functional failure. Please ensure that the screws are tightened to the correct torque according to the table below

编号 Number	类型 Types of	正确紧固转矩 Correct tightening torque
1	盖安装螺钉 Cover mounting screws	1.18~1.37N·m
2	开关安装螺纹 *1 Switch installation thread * 1	1.18~1.37N·m
3	开关端子螺丝 (M4 螺丝) Switch terminal screw(M4 screw)	0.78~1.18N·m
4	滚珠臂安装螺母 Ball arm mounting nut	4.90~5.88N·m

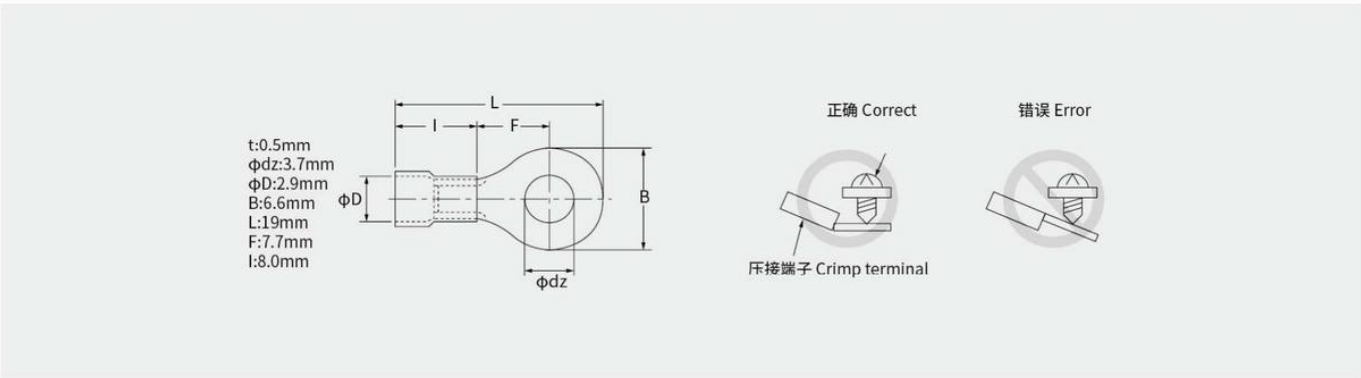


*1. 此扭矩范围适用于侧面安装。(M4 螺丝)
*1. This torque range is suitable for side mounting. (M4 screw)

接线注意事项 Wiring Precautions

请在断电状态下进行开关接线操作，通电状态下接线可能会造成触电危险。
接线时务必注意，不要让导线的细小碎片或其他微粒进入开关内部。
使用绝缘管和 M3.5 压接端子连接时，按照图示正确放置压接端子，避免压迫到外壳或外盖。适用的导线尺寸为 AWG20 至 AWG18 或 0.5 至 0.75mm²。
选用适当长度的导线以确保外盖平整关闭且牢固。切勿将压接端子塞进外壳缝隙，这可能导致外壳损坏或变形。
为防止端子与开关外壳内部接触，使用厚度不超过 0.5mm 的端子。

Always wire the switch with the power off to avoid the risk of electric shock.
Ensure no small wire fragments or particles enter the switch during wiring.
When connecting with an insulated tube and M3.5 crimp terminals, position the terminals as shown in the diagram to avoid pressing against the casing or cover. The suitable wire size is AWG20 to AWG18 or 0.5 to 0.75mm².
Use wires of appropriate length to ensure the cover closes smoothly and securely. Do not stuff the crimp terminals into gaps in the casing, as this may cause damage or deformation.
To prevent contact between the terminals and the interior of the switch housing, use terminals with a thickness of no more than 0.5mm.



适用导线 Applicable Conductor

电线名称 Wire name	推荐使用电线 Wire is recommended		
	线芯数 Number of cores	导体 Conductor	成品外径 Nom OD
塑料橡皮绝缘软电线 Plastic rubber insulated flexible wire	2芯 2-core 3芯 3-core 4芯 4-core	0.5~0.75mm ²	圆形 Circular φ6~φ9
600V 塑料绝缘 塑料外皮电缆(VVF) 600V plastic insulation Plastic sheathed cable	2芯 2-core	φ1/φ1.2/φ1.6	

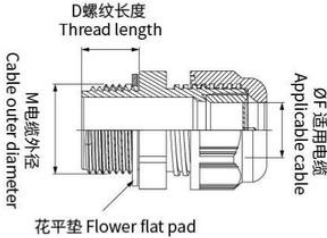
若电线含有硅油，可能会导致接触不良。为确保电气设备的正常运行，请避免使用含硅油的产品。
The presence of silicone oil in wire may result in inadequate contact. To ensure the proper functioning of electrical equipment, please refrain from using products containing silicone oil.

操作 Operate

操作方法、凸轮或挡块的形状、操作频率和超程 (OT) 都会显著影响使用寿命以及限位开关的精度。请确保凸轮的形状足够平滑。
检查 OT 是否有足够余量。实际 OT 应为 OT×0.7~1。
The operating method, shape of the cam or stop, operating frequency, and overtravel (OT) all significantly affect the service life and the accuracy of the limit switch. Please ensure that the shape of the cam is smooth enough.
Check if OT has sufficient margin. Actual OT should be OT × 0.7~1.

连接器 Connector

为了符合 IP67 标准，请使用推荐的连接器
To comply with the IP67 standard, please use the recommended connector

连接器图片 Connector picture				连接器尺寸 Connector size			
 M16*1.5-07 M18*1.5-07 M20*1.5-07 M20*1.5-09							
连接器型号 Connector model	螺纹规格 M Thread specification M	螺纹长度 D Thread length D	适用电缆外径 F Applicable cable outer diameter F	连接器防护等级 Connector protection grade	温度 Temperature	密封垫类型 Gasket type	颜色 Color
M20*1.5-07	M20*1.5	10mm	Ø4-7mm	IP67	-25~80℃	花平垫 Flower flat pad	灰色 / 黑色可选 Grey / Black Optional
M20*1.5-09	M20*1.5	10mm	Ø5-9mm	IP67		花平垫 Flower flat pad	
M18*1.5-07	M18*1.5	10mm	Ø4-7mm	IP67		花平垫 Flower flat pad	
M16*1.5-07	M18*1.5	10mm	Ø4-7mm	IP67		花平垫 Flower flat pad	

CZ-6 系列产品，常规导管螺纹默认为 M20*1.5，请使用建议的连接器和密封垫，并按照正确的扭矩进行固定。同时，请使用与连接器相匹配外径的电缆。建议使用的连接器螺纹长度不长于 10mm，否则螺纹会在开关盒内凸起或连接器按装不紧，从而干扰其他元件及防护等级，需其他导管螺纹的产品定制生产，同时需匹配相对应的连接器。
For the CZ-6 series products, the default standard conduit thread is M20*1.5. Please use the recommended connectors and gaskets and fix them according to the correct torque. At the same time, please use a cable with an outer diameter that matches the connector. It is recommended that the thread length of the connector used should not exceed 10mm; otherwise, the thread may protrude inside the switch box or the connector may not be installed tightly, thereby interfering with other components and the protection level. For products that require other conduit threads, customized production is necessary, and corresponding connectors should also be matched.

微小负载型的使用 Applications Under Minimal Load

开关接点可用于一般负载或微小负载。但是，已经连接过一般负载的接点，就不能用于连接更小容量的负载。否则，可能导致接触面的糙化，而且可能失去接触可靠性。

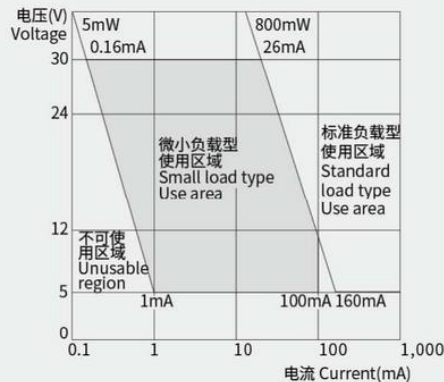
如果在开关微小负载电路时使用一般负载用开关，可能会引起接触不良。下图为开关负载区域范围定义。本目录册内产品适用于 DC24V 10mA 以上范围，当使用负载小于 DC24V 10mA 以下时，可能存在由于电流过小无法击破触点表面氧化膜或硫化膜的现象，从而导致开关接触不良。所以当使用负载小于 DC24V 10mA 以下时，请咨询昌得电气科技有限公司进行产品定制。

请设置 CR 电路等吸收电路，防止震荡和抖动所导致的噪声和脉冲缺失，对于开关时会产生冲击电流的负载，请插入接点保护电路，以免导致耐久性降低。

Switch contacts can be used for general loads or small loads. However, contacts that have already been connected to general loads cannot be used to connect smaller capacity loads. Otherwise, it may lead to roughness of the contact surface and loss of contact reliability.

If a general load switch is used when switching a small load circuit, poor contact may be caused. The following diagram shows the switching load area range definition. The products in this catalog are suitable for DC24V 10mA or above. When the load is less than DC24V 10mA or below, the oxidized film or vulcanized film on the contact surface may be unable to be broken due to too small current, resulting in poor switch contact. Therefore, when the load is less than DC24V 10mA, please consult CNTD Electrical Technology Co., Ltd. for product customization.

Please set the absorption circuit such as CR circuit to prevent noise and pulse loss caused by shock and jitter, for the load that will produce impulse current on the switch, please insert the contact protection circuit to avoid reducing durability.



使用注意事项 Using Precautions

本公司产品是作为工业产品而设计生产，严格遵守工业产品标准。我司明确声明，除非经过特殊设计并得到我司明确书面确认，我司产品不适用于以下应用场合：

- 要求极高可靠性的应用场合，包括核能、燃气、电力等要求长期稳定运行的系统。
- 要求极高安全性的应用场合，涉及人身安全与财产的情况。
- 苛刻条件、严酷环境的应用场合，包括室外、存在化学污染、电磁、振动或冲击影响的环境。
- 有火灾或爆炸风险的应用场合，包括存在易燃易爆性气体、强酸强碱化学品等物质的环境。
- 涉及军工用途、航天航空项目的应用场合。

The company's products are designed and produced as industrial products, in strict compliance with industrial product standards. We expressly declare that, unless specifically designed and expressly confirmed by us in writing, our products are not intended for the following applications:

- Applications that require high reliability, including nuclear, gas, electric and other systems that require long-term stable operation.
- Applications requiring very high security, situations involving personal safety and property.
- Applications in harsh conditions, harsh environments, including outdoor, chemical contamination, electromagnetic, vibration or shock effects.
- Applications where there is a risk of fire or explosion, including environments where flammable and explosive gases, strong acids and alkali chemicals are present.
- Applications involving military use and aerospace projects.