



CH Apem Producted



CH Apem

CONTENTS 目录

01-07 CH 系列微型电阻式操纵杆
CH Series Miniature Resistive Joysticks

08-15 K 系列紧凑型开关操纵杆
K Series Compact Switch Joysticks

CH SERIES MINIATURE RESISTIVE JOYSTICKS

CH系列微型电阻式操纵杆



典型应用 Typical Applications

- 移动摄像和CCTV控制系统
- 测试计量设备
- 医药成像系统
- 自动化机器控制
- 视频编辑及生产设备
- 工业及科学用仪表
- Move Photography CCTV Control System
- Medical Imaging System
- Measurement Equipments
- Automative Control
- Video Editing Equipments
- Industrial Instruments

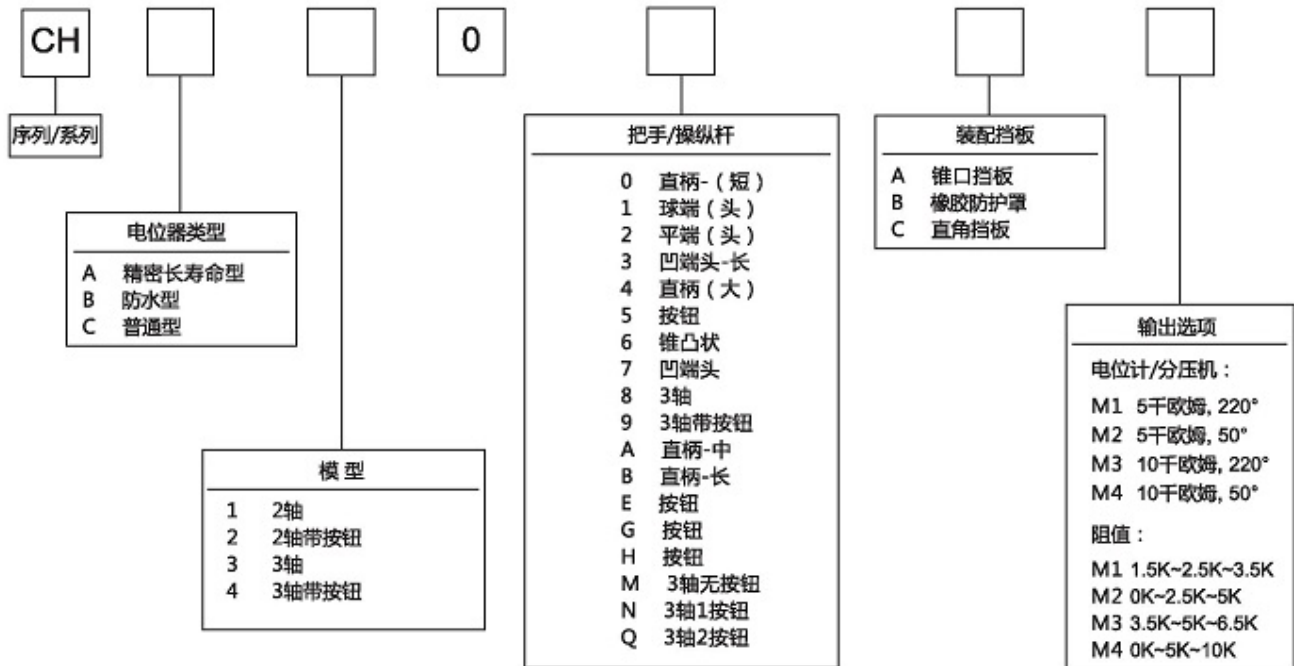
特点 Features

- 操作灵活
- 复位误差小
- 寿命长
- Flexibe Handling
- Small Resetting Error
- Long Life-Time

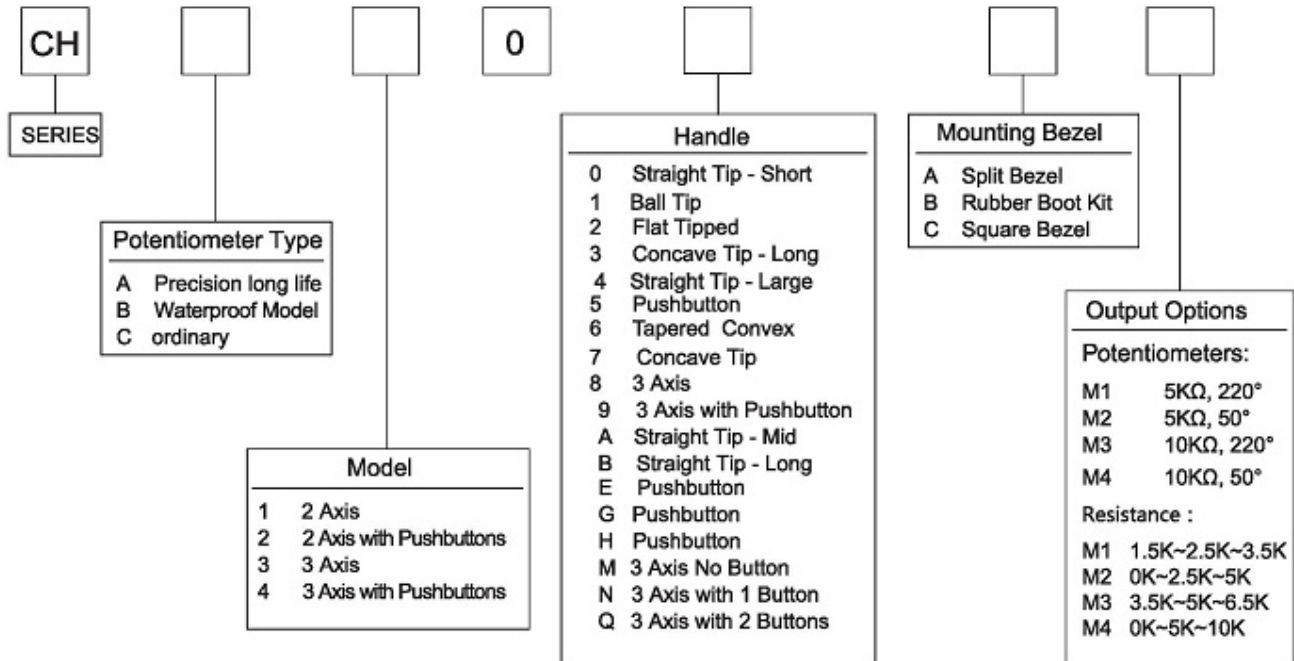
可选项 Optionals

- 端子型号
- 引线长度
- 防尘盖
- 开关
- 电位器型号规格
- 操纵手感轻或重
- Terminal Type
- Lead Length
- Seal Form
- Switch
- Potentiometer
- Soft Or Heavy Handling

型号选用说明



Model Explanation


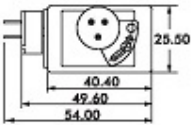

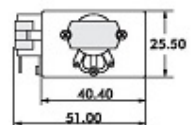

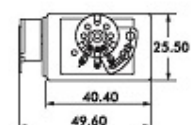


CH系列示意图 CH Series Schematic Diagram



1.底部选择 At the bottom of the choice


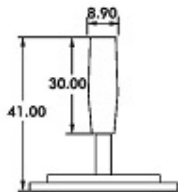

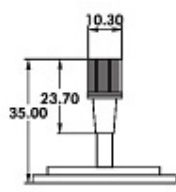

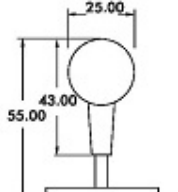

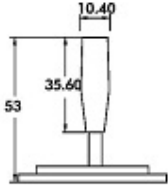

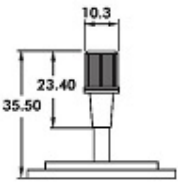

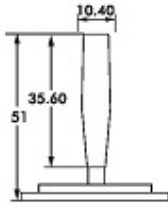

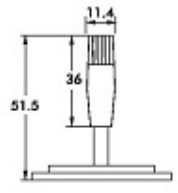

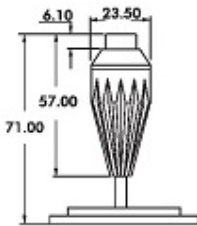

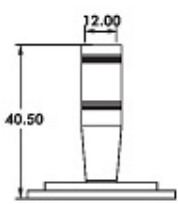

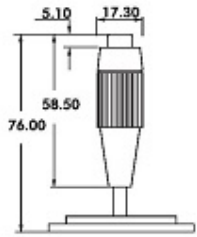

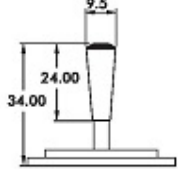

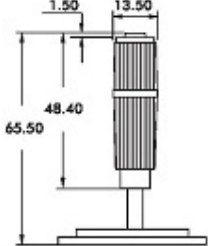
见型号选用说明See model selection(CH ■ 0)

型号 Type	产品图 Product figure	外形尺寸(mm) Outline Dimension
A.精密长寿命型		
B.防水型		
C.普通型		

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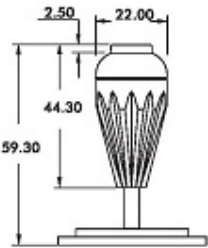

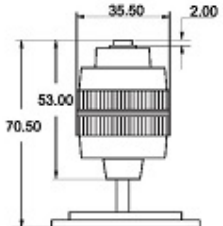

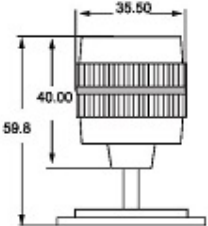

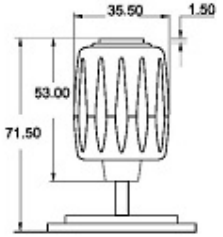

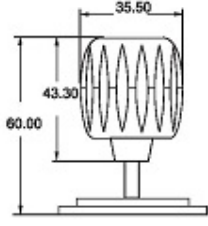

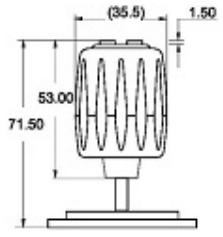
2.手柄选择 The handle to choose

见型号选用说明 See model selection (CH 0)

型号 Type	外形尺寸(mm) Outline Dimension	型号 Type	外形尺寸(mm) Outline Dimension
CH 100 	 8.90 30.00 41.00	CH 107 	 10.30 23.70 35.00
CH 101 	 25.00 43.00 55.00	CH 10A 	 10.40 35.60 53
CH 102 	 10.3 23.40 35.50	CH 10B 	 10.40 35.60 51
CH 103 	 11.4 36 51.5	CH 205 	 6.10 23.50 57.00 71.00
CH 104 	 12.00 40.50	CH 20E 	 5.10 17.30 58.50 76.00
CH 106 	 9.5 24.00 34.00	CH 20G 	 1.50 13.50 48.40 65.50

2.手柄选择 The handle to choose

见型号选用说明See model selection(CH 0)

型号 Type	外形尺寸(mm) Outline Dimension	型号 Type	外形尺寸(mm) Outline Dimension
CH 20H 	 2.50, 22.00, 44.30, 59.30	CH 409 	 35.50, 2.00, 53.00, 70.50
CH 308 	 35.50, 40.00, 59.8	CH 40N 	 35.50, 1.50, 53.00, 71.50
CH 30M 	 35.50, 43.30, 60.00	CH 40Q 	 (35.5), 1.50, 53.00, 71.50

3.防尘圈选择 Shield to choose

见型号选用说明See model selection(CH 0)



4.电位器选择 Potentiometer to choose

见型号选用说明See model selection(CH 0)

电位器 Potentiometer	M1	M2	M3	M4
	5KΩ 220°	5KΩ 50°	10KΩ 220°	10KΩ 50°
阻值 Resistance	1.5K~2.5K~3.5K	0K~2.5K~5K	3.5K~5K~6.5K	0K~5K~10K

注：可按需求选配各种规格

Note: Can Be Equipped With Various Specifications According To Demand

电位计选项 Potentiometer Options

电位器 Potentiometer	M1	M2	M3	M4
电气元件 Electrical Element	导电塑料 Conductive Plastic	导电塑料 Conductive Plastic	导电塑料 Conductive Plastic	导电塑料 Conductive Plastic
轨道电阻 Track Resistance	5K	5K	10K	10K
独立线性 Linearity	±1.0%	±1.0%	±1.0%	±1.0%
轨道运行角度 Track Operating Angle	220°	50°	220°	50°
全阻值误差 CRV	±10%	±10%	±10%	±10%
功率消耗 Power Dissipation	0.25W@40°C	0.25W@40°C	0.25W@40°C	0.25W@40°C
旋转寿命 Rotational Life (万)	30/50/100	30/50/100	30/50/100	30/50/100

注：可以定制
Notes: Upon Request

电气性能 Electrical Character

- 复位的误差率: 0.06KΩ
- 预期回转使用寿命: 300,000次和500,000次可选
- 工作温度: -20°C to 70°C
- Reset Error Rate: 0.06KΩ
- Extected Lifecycle: 300,000 Cycles Or 500,000Cycles Choose
- Operating Temperature: -20°C To 70°C

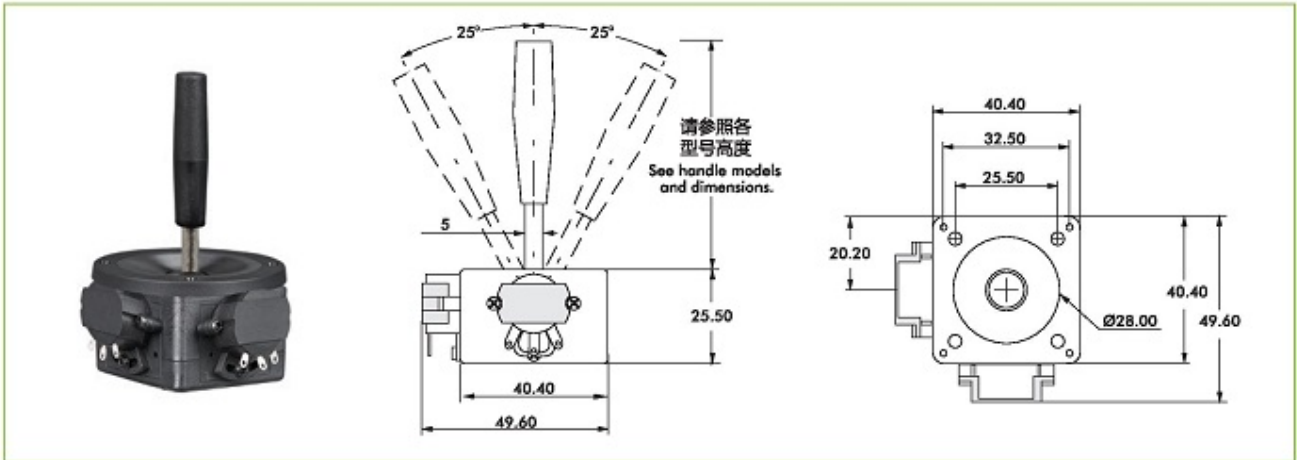
机械性能 Mechanical Character

- 电阻值: 5KΩ, 10KΩ可选
- 电阻公差: ±20%
- 独立线性公差: ±1%
- 分辨率: 无穷大
- 抵抗温度系数: ±400ppm/° C
- 输出平滑: 最大0.5%
- X和Y轴电转角: 25°
- Z轴电转角: 5°
- CH400Z轴电位器、CH400Z轴电位器及按钮开关导线: AWG28铁氟龙绝缘镀银彩色导线标准线长200mm 或按客户要求
- 绝缘电阻: 50MΩ@500VDC, 60sec
- Resistance: 5KΩ, 10KΩ Choose
- Resistance Tolerance: ±20%
- Independent Linearity: ±1%
- Resolution: Infinite
- T.C.R: ±400Ppm/° C
- Outputs Smoothness: Max 0.5%
- X And Y Axis Rotating Angle: 25°
- Z Axis Rotating Angle: 5°
- CH400Z Axis Potentiometers、CH400Z Axis Potentiometers And Button: Awg28 Sliver Plated, Ptfе Insulated Standard Length 200Mm Other Lengths On Request
- Insulation Resistance: 50MΩ@500Vdc, 60Sec

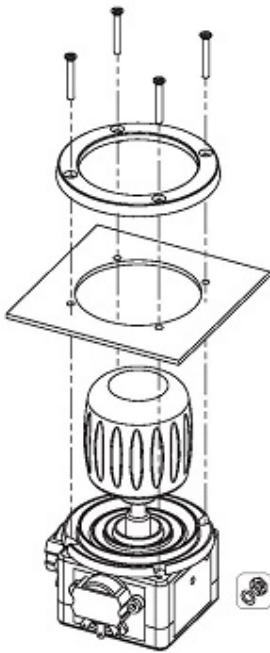
环境参数 Environmental Parameter

- 工作温度: -26°C to 70°C
- 储存温度: -40°C to 70°C
- Operating Temperature: -26°C to 70°C
- Storage Temperature: -40°C to 70°C

外形尺寸 Outline Dimension



安装方式 Installation Method



A

1. 前安装挡板(FM)
A = 分割挡板
开孔尺寸 = 39.70mm(1.562in)



B

B = 橡胶防护罩
开孔尺寸 = 39.70mm(1.562in)

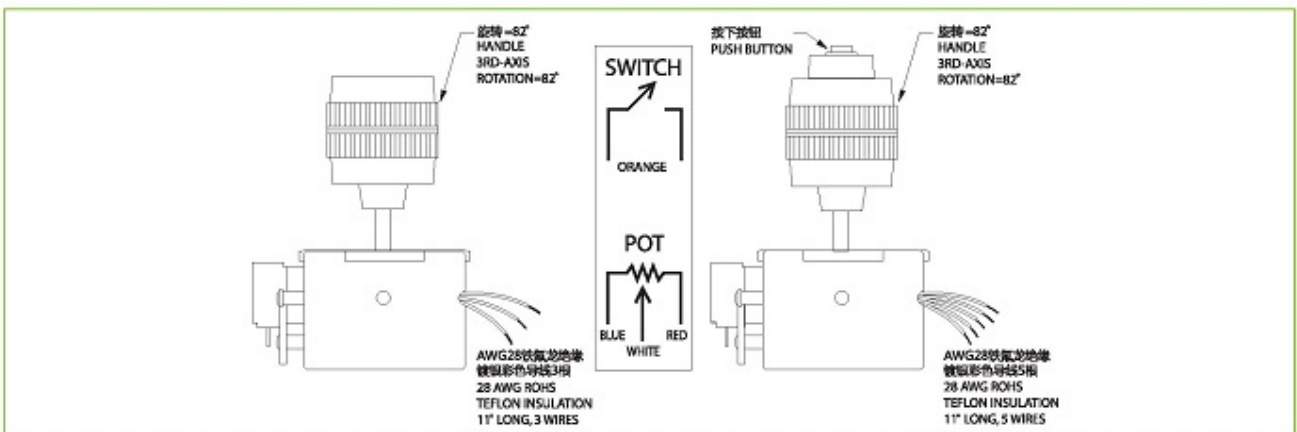


C

2. 后安装挡板 (RM)
C = 正方形边框
开孔尺寸 = 30.15mm(1.187in)

1. Front Mounting Bezels (FM)
A = Split Bezel
Cutout dimensions = 39.70mm(1.562in)
B = Rubber Boot
Cutout dimensions = 39.70mm(1.562in)

2. Rear mounting bezels (RM)
C = Square Bezel
Cutout dimensions = 30.15mm(1.187in)



K SERIES COMPACT SWITCH JOYSTICKS

K 系列紧凑型开关操纵杆



命名法 Name Regulation

$\frac{K}{1} \frac{CV}{2} \frac{4/4A}{3} - \frac{Y}{4} \frac{Q}{5} - \frac{C}{6} \frac{4}{7} \frac{R2}{8} \frac{G}{9} - \frac{B}{10} \frac{M}{11} - \frac{R}{12} \frac{0000}{13}$

1. K指特殊定制的机械规格

K : Special For The Mechanical Specification

2. CV指低价位开关型操纵杆系列

CV : Switch Joystick With Low Price

3. 4指底部外壳的大概尺寸，以CM为单位

4 : The Rough Size Of The Bottom,The Unit Is CM

4. 机械类型Mechanical Type:

- X:单轴调节型 X : 1-axis adjustment type
- Y : 双轴调节型 Y : 中间间距松开 2-axis adjustment type

5.操纵杆的可选操作方向，如下图所示：

Direction Of The Joystick,As Shown Below:

- X : 只能在X, Y轴上十字操作
X : just Can Be "+"Direction On X And Y Axis
- Q : 360°方形操作 (标准型)
Q : 360° Degree Square Operation (Standard Type)
- I : 只能在Y轴上型操作
I : just Can Be "I"Operation On Y Axis



6. 手柄选择Mechanical Choose:

- C:圆
- D:圆柱
- F:锥形
- H:高大的锥形
- J:按钮*
- M:按钮*
- T:按钮*
- V:子弹
- AE:摇臂*
- AJ:不锈钢
- C: Round
- D: Cylindrical
- F: Conical
- H: Tall Conical
- J: Pushbutton*
- M: Pushbutton*
- T: Pushbutton*
- V: Bullet
- AE: Rocker*
- AJ: Stainless Steel

7. 安装开关的个数Switch Quantity

- 2.....安装2个开关
- 4.....安装4个开关
- 5.....安装5个开关
- 2.....2 Switches
- 4.....4 Switches
- 5.....5 Switches

8. 弹簧复位装置Spring Return Installment

- R1:单轴调节带弹簧复位 (X轴或Y轴)
- R2:双轴调节带弹簧复位 (X轴或Y轴)
- R1:1-axis with spring return (X axis or Y axis)
- R2:2-axis with spring return (X axis or Y axis)

9. 安装部件Components

- G:带防尘橡皮罩
- G:within The Dust-Proof Rubber Cover

10. 把手带按钮开关、开关可选颜色

Handle With Button Switch , The Color Can Choose

- B:黑色
- Y:黄色
- G:绿色
- R:红色
- O:橘色
- U:蓝色
- S:不锈钢
- B:Black
- Y:Yellow
- G:Green
- R:Red
- O:Orange
- U:Blue
- S:Stainless

11. 把手按钮开关类型The Type Of The Button Switch

- M:触发型
- L:切换型
- M:Triggering Type
- L:Converted Type

12. 把手带按钮开关带灯、指示灯可选颜色

The Handle Can Be Within The Lamp And Color Can Be Choose

- W:白色
- Y:黄色
- G:绿色
- R:红色
- O:橘色
- U:蓝色
- W:White
- Y:Yellow
- G:Green
- R:Red
- O:Orange
- U:Blue

13. 四位数, 用于特殊的客户需求

For Client's Special Requirement

机械性能 Mechanical Character**操纵杆的控制范围 Control Range Of The Joystick**

- X,Y两轴:自中心位置起约 $\pm 12^\circ$
- 操作压力:带弹簧自动复位装置
- X,Y轴:约2.2N~2.8N (220gf~280gf)
- 操作温度范围:-20°C~+65°C
- 振动:10~55Hz 98m/S²
- 冲击:294m/S²
- 防护等级:IP65 (安装面板以上)
- 预期寿命:约200,000次
- 质量:约40g
- X,Y Two Axis: Starting Form The Central Location Approx $\pm 12^\circ$
- Operating Pressure: With Spring Return Device
- X,Y Axis: Approx 2.2N~2.8N (220gf~280gf)
- Operating Temperature Range: -20°C~+65°C
- Vibration: 10~55Hz 98m/S²
- Impact: 294m/S²
- Protection Class: IP65(Above The Mounting Panel)
- Life Expectancy: Approximately 200,000 Times
- Quality: About 40g

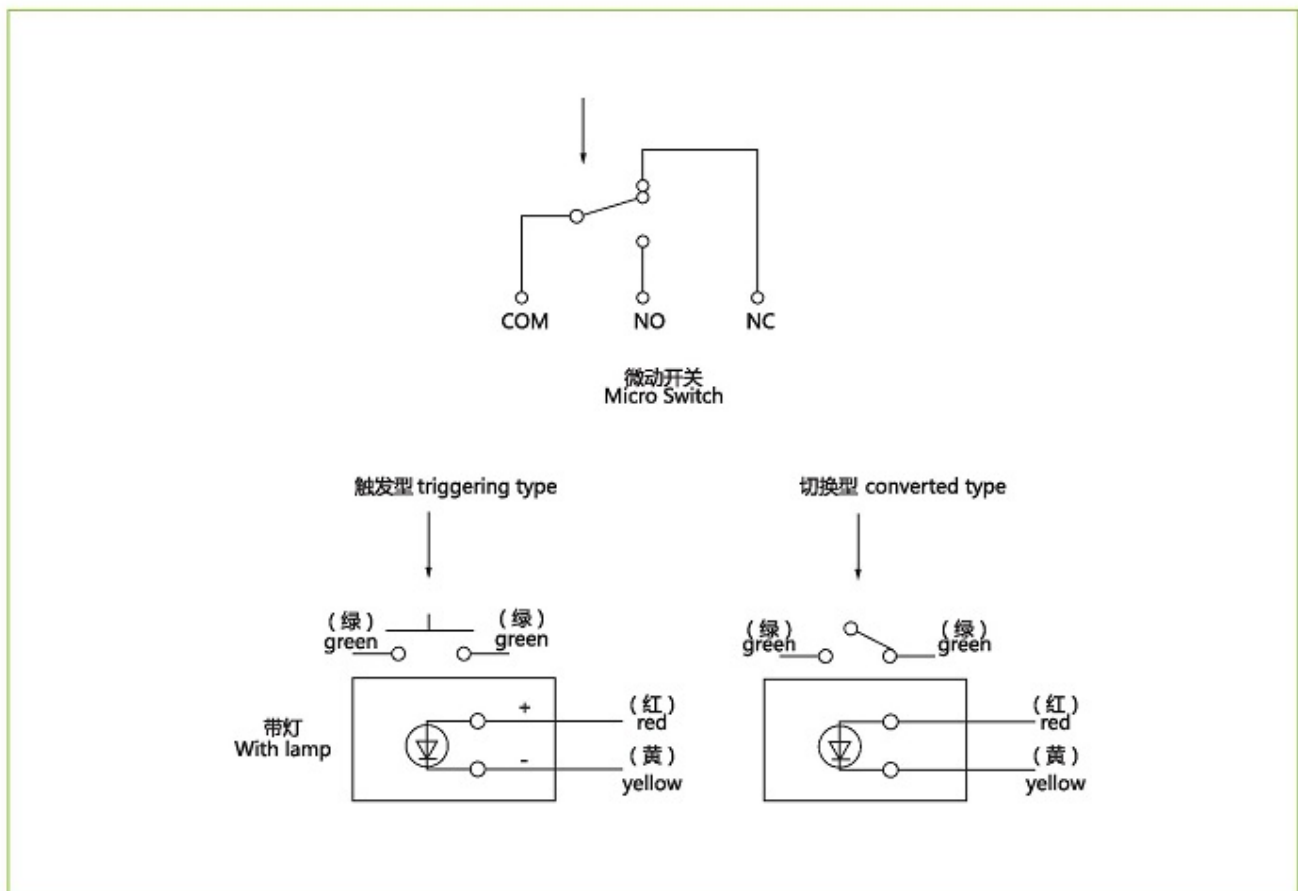
电气性能 Electrical Character

- 把手按钮开关触点容量: 50VDC/0.1A
- 微动开关触点容量: 250VAC/5A
- 发光二极管 (LED) 额定值: 2VDC,20mA
- Handle Button Switch Contact Capacity: 50VDC/0.1A
- Micro Switch Contact Capacity: 250VAC/5A
- Light Emitting Diode(Led) Rating: 2VDC,20Ma

可选特殊规格 Optional special specifications

- 特殊机械结构
- 特殊把手
- 特殊杆高
- 特殊弹簧复位力
- 特殊防尘罩
- 把手按钮开关可选
- 微动开关触点容量可选 (250VAC/10A)
- 信号级开关可选
- Special Mechanical Structure
- Special Handle
- Special Rod Length
- Special Spring Return Force
- Special Dust Cover
- Could Choose Handle Button Switch
- Could Choose Micro Switch Contact Capacity (250VAC/10A)
- Could Choose Signal Level Switch

开关接线示意图 Switch Wiring Diagram



K系列示意图 K Series Schematic Diagram



1.底部选择 At the bottom of the choice

型号 Type	产品图 Product figure	外形尺寸(mm) Outline Dimension
CV4		
CV4A		

2.防尘圈选择 Shield to choose



CV4



CV4A

3.手柄选择 The handle to choose

型号 Type	参数 parameter	外形尺寸(mm) Outline Dimension
CV4A-YQ-F4R2G 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request	
KCV4A-YQ-D4R2 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request	
KCV4A-YQ-24R2 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request	
KCV4A-YQ-34R2 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request	
KCV4A-YQ-AJ4R2G 	材料Material : 不锈钢Stainless Steel 表面处理Finish Standard : 本色Natural 颜色Color : 不锈钢Stainless Steel 其他颜色Other Colors : 没有可供选择Not Available	
KCV4A-YQ-H4R2G 	材料Material : 不锈钢Stainless Steel 表面处理Finish Standard : 本色Natural 颜色Color : 不锈钢Stainless Steel 其他颜色Other Colors : 没有可供选择Not Available	

3.手柄选择 The handle to choose

型号 Type	参数 parameter	外形尺寸(mm) Outline Dimension
KCV4A-YQ-T5R2GRM 	材料Material : 不锈钢Aluminum 表面处理Finish Standard : 抛光Anodized 颜色Color : 不锈钢Stainless steel 其他颜色Other Colors : 不可以定制Not Available 备注Notes : 带开关With Switch	
KCV4A-YQ-AE5R2GBL 	材料Material : 不锈钢Aluminum 表面处理Finish Standard : 抛光Anodized 颜色Color : 不锈钢Stainless steel 其他颜色Other Colors : 不可以定制Not Available 备注Notes : 带切换开关With a switch	
KCV4A-YQ-J5R2GRM 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request 备注Notes : 手柄开关Handle Switch	
KCV4A-YQ-E5R2GBM 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request 备注Notes : 手柄开关Handle Switch	
KCV4A-YQ-G5R2GBM 	材料Material : 尼龙Nylon 表面处理Finish Standard : 亚光Matt 颜色Color : 黑色Black 其他颜色Other Colors : 可以定制Upon Request 备注Notes : 手柄开关Handle Switch	
 KCV4A-YQ-V4R2	 KCV4A-YQ-64R2	 KCV4A-YQ-74R2

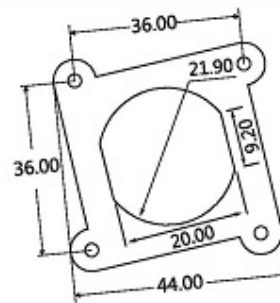
4.开关选择 Switch to choose

微动开关 Micro switch	K1	K2	K3	K4
触点容量 Contact capacity	250VAC/5A	250VAC/10A	250VAC/5A(防水)	250VAC/10A(防水)

注：可按需求选配各种规格

Note: Can Be Equipped With Various Specifications According To Demand

CV4A 安装方式 CV4A Installation Method



注意：

操纵杆安装在面板下方。

提供所有布什安装杆标准是一种粘合剂聚氯乙烯密封垫片。这应该是安装在操纵杆和面板之间，在应用中，需要一个良好的密封。

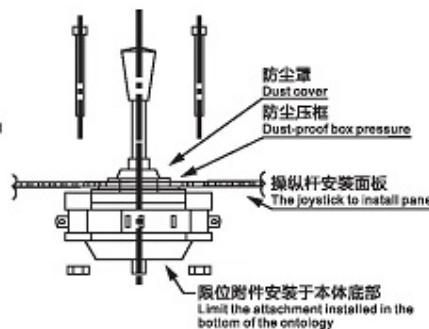
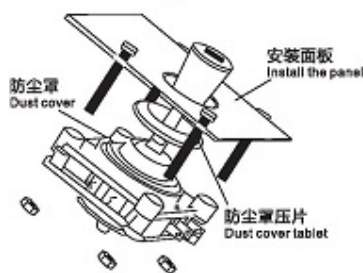
NOTE:

The joystick is mounted from beneath the panel.

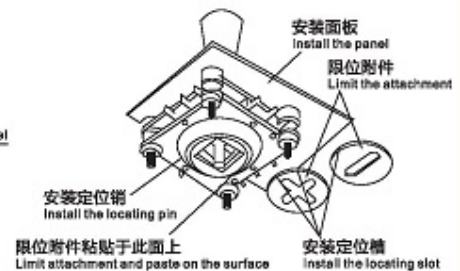
Supplied as standard with all bush mount joysticks is an adhesive P.V.C. sealing gasket. This should be fitted between the joystick and the panel, in applications where a good seal is needed.

CV4 安装方式 CV4 Installation Method

Cv4安装示意图
Cv4 installation diagram



限位附件粘贴示意图
Limit the attachment paste schematic diagram



注：

客户可根据自己需要，采用X型或I型限位附件，粘贴于操纵杆地面。

粘贴时请注意：

1.安装地位稍和安装定位槽的配合。2.粘贴时主要以限位的方向是否和使用需要的方向一致。

※我们可以根据客户的要求将限位附件实现粘贴于操纵杆底部，作为一个单元提供。

NOTE:

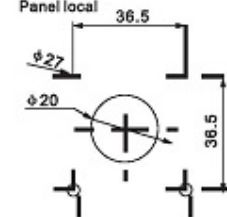
Customers can need according to oneself, use X or type I limit attachments, paste to lever the ground.

PASTE, PLEASE NOTE:

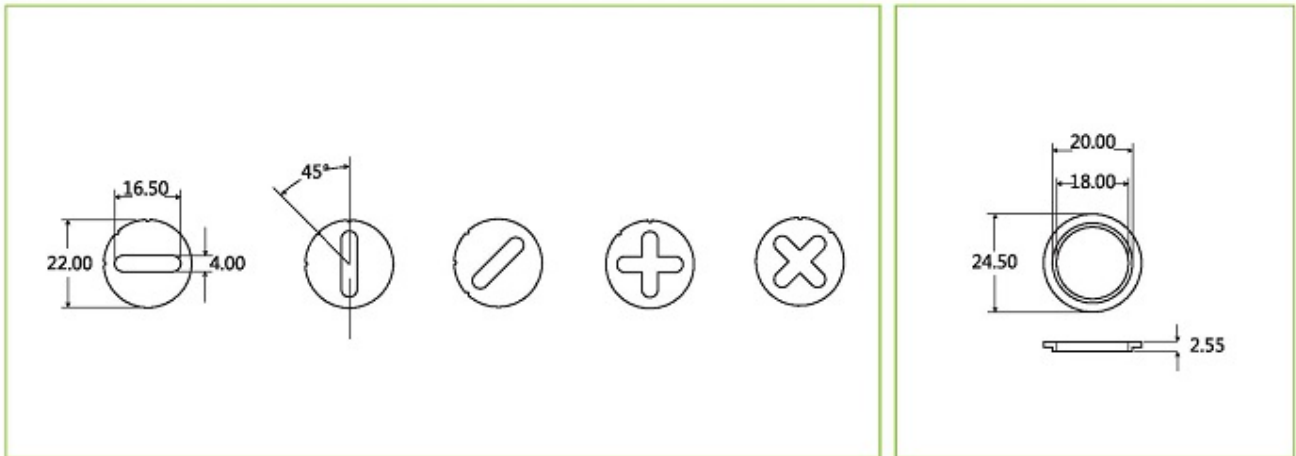
1.Fit position slightly and fit the installation slot. 2.Paste when the direction of the limit is consistent with the direction of use needs.

※We can according to customer requirements will limit attachment to stick at the bottom of the joystick, as a unit to provide.

面板布局
Panel local

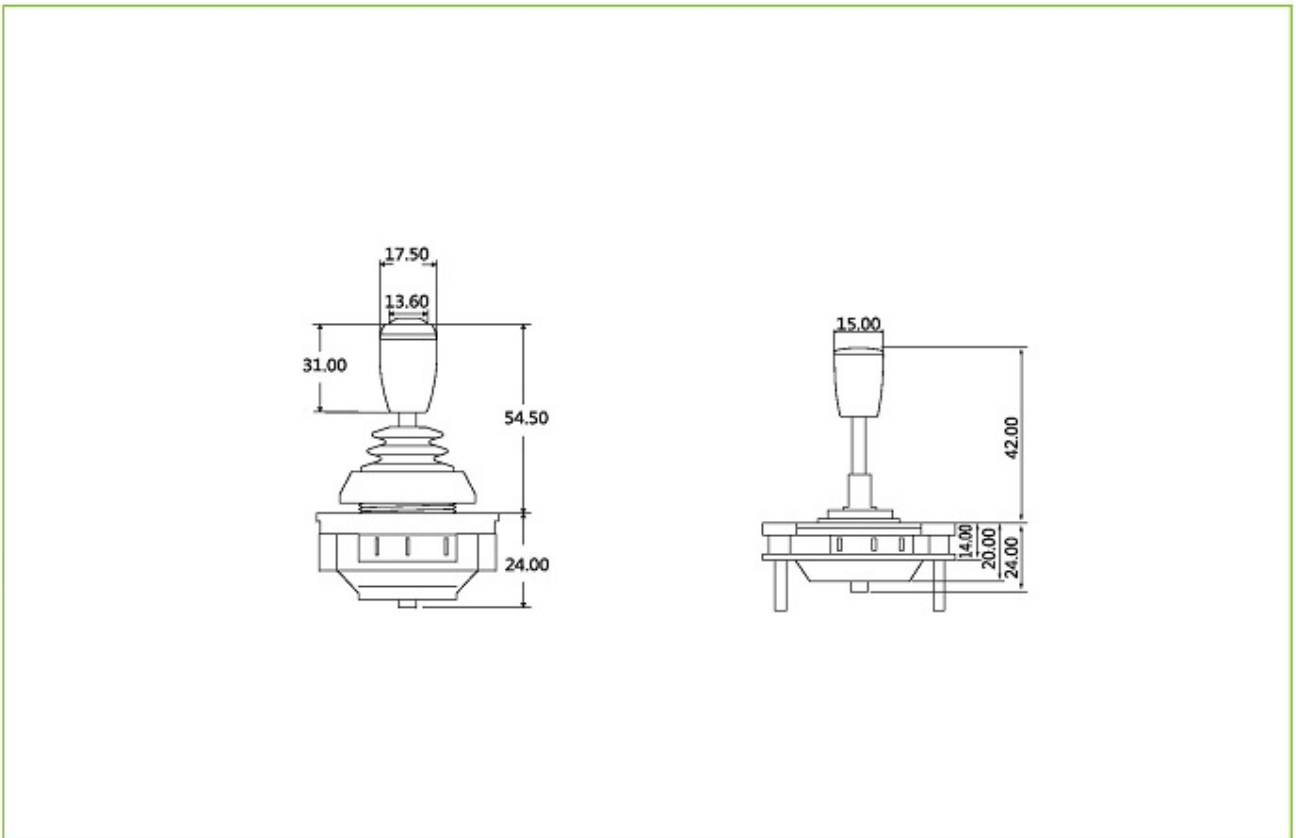


限制和边框 Limiters And Bezel Set



注 NOTES:
 1. 尺寸毫米/(英寸) 1. Dimensions are in mm/(inch)

外形尺寸 Outline Dimension



PRODUCT INFORMATION

产品须知

设计须知 Design guidelines

操纵杆控制器使用了精密级导电塑料电阻，因此请确保用电压法使用操纵杆控制器。（电压加在接线端1和接线端3上，并从接线端2上获得输出。）请注意接线端2（移动触点）上通过的电流不能大于1mA,因为过量的电流会烧坏电阻（通过接线端2的适量电流应低于10 μ A）。

操纵杆控制器使用了精密感应型非接触电位器，因此在使用和检验时，请勿在IN（输入）接线端以外的其他接线端上施加电压，否则会烧坏电位器。

若电位器带中心抽头，中心位置的输出恒定去约为3°

如果每一轴向上装有开关，开关的切换角度位于自中心位置 \pm 约5°。按照您的需求还有更高精度可选。

请注意操纵杆的横向负荷和/或推拉力不能大于50N（5.0kgf），否则操纵杆可能弯曲。如果操纵杆上受力大于50N（5.0kgf），请事先询问我们。

请注意电位器的接线端和/或导线上受力不能大于10N(1kgf)。

如果操作环境长时间震动、冲击，请时间询问我们。震动、冲击、预期寿命的额定值基于下列测试条件：

震动10~55Hz 符合MTL-STD-202-201标准。

冲击294m/符合MTL-STD-202-201标准。

预期寿命是基于下述条件测得的：室温下，操纵杆以每分钟40次来回的速度前后运动。

Design guidelines:

Joysticks controller uses precise plastical conduct electrical resistance. Therefore, please ensure to use voltage method to control joysticks. (a voltage on the terminal 1 and 3, and get the output on the terminal 2). Please attention to the electric current on the terminal 2 should be less than 1 m A. Because too much current will burnout the electrical resistance. (the proper electric current through the terminal 2 should be less than 10 μ A). Joysticks controller uses precise type induction contact less potentiometer. When using and checking it, 1/on mustn't apply voltage except the IN(input) terminal. Or it will case the potentiometer burnout.

If the potentiometer has axis, the output of central position should be about 3°.

If each axis has upside switch, the switch angle should be \pm 5° from the central position. Of course, there is more prcision to choose accord of your need.

Please pay Attention to the Joysticks lateral load or push-pull effort should be less than 50N (5.0kgf), otherwise the joysticks should be bent, If the force on the joysticks should be bent. If the force on the joysticks is more than 50N(5.0kgf), yon should inquiry us at first.

Attention: the force on the Potentiometer Terminal should be less than 10N.(1kgf).

If the operating environment get the shake and Impact for a long time, please inquire us . The shake, Impact and the Expectant life rated value should be tested in the following Conditions:

Shake: 10~55Hz up to the standard MTL - STD -202-201

Impact: 294m /up to the standard MTL - STD -202-201

The Expectant life span should be tested in the following condition: AT room temperature , the joysticks have the seesaw motion at the speed of 40 times per minute. Use the information

使用须知 Use the information

此样品中提到的所有数值都是基于通常安装方法及应用条件。若是用于特殊安装方法及应用，这些数值可能有所变化。因此，考虑到您的实际操作、性能、可靠性、安全性等，我们善意地要求您，经过仔细检验及测试，对所有数据进行确认。

如果带弹簧复位，根据型号，在X和Y轴上分别有2中弹簧复位压力，一种是使用了2根弹簧的强复位压力（我们所指的“区分方向”）；另一种是使用了1根弹簧的复位压力（我们所指的“全方位型”），因此选型时注意他们的不同。若不用手控而反复地使用弹簧进行复位，预期寿命可能比预定值缩短，因为这样操作可能导致中心位置电位器的电阻磨损，以及其他内部结构的损坏。控制操纵杆时应尽可能轻缓。

把手内安装的电位器和开关是防尘结构而防水结构。在室外、潮湿、雾气等恶劣环境下使用时，订货前请先询问我们。

若一直在室内使用，防尘橡皮罩和防水橡皮罩会逐渐老化，因此我们建议使用1~1.5年后替换新的橡皮罩（防尘防水橡皮罩可作为零部件选购）。

我们不对所谓的“产品责任”负责，除非我们对使用或应用情况有完全充分的了解并出具书面确认。这一原则也适用于救生设备和核设施的应用。

Use the information

The mentioned values of the sample are according to the usual Install Method and application condition. If you use the special Install Method and application, the values may vary. Thus, considering your actual operation and its performance, Reliability, security etc.

We ask you to check and test the joysticks carefully and confirm all the values, If the joysticks with spring return, according to the Type, There are two kinds of spring return pressure on X and Y AXB. One uses two spring return and the other uses one spring return pressure. So you should care the differences when you choose the Type.

If you use the spring to return the position repeatedly, the expectant span life may be shorter than the expectant value. Because the operation may cause the wear resistance of central position and the other inner structure. So please control the joysticks carefully.

The potentiometer and switch in the handle are to prevent dust but not water. Thus, if you use it in the mist or fog or outdoors, you should inform us at first.

If you use it indoors, the Dust proof rubber cover and waterproof rubber cover will age gradually, so we suggest that you should replace the new rubber cover in one or one and half years, (you can buy the Dust proof and water proof rubber cover as spare part.)

We are not responsible for so-called "product liability", unless we understand the usage conditions fully and issue a written confirmation. This rule is also applicable to the application of life-saving equipment and nuclear facilities.