



Electrical Joystick Controller Expert

Shanghai Chengong Electrical Control Technology Co., Ltd.



**Shanghai Chengong Electrical Control Technology Co., Ltd.** is the first Chinese manufacturer in Shanghai, devote to industrial joysticks for 19 years, including joystick innovation, R&D, production and Special customize service.

Chengong has more than 2200m<sup>2</sup> workshop, the ratio of R&D people is more than 10 %, has over 40 series of products and 20 national patents and ISO9001 TUV certification.

The Industrial joysticks are applied to AWP (aerial work platform), CCTV remote control system, Construction Machinery, Heavy duty operations, Agriculture machine and engineer vehicles, crane, forklift, excavator, electrohydraulic control system and medical system.

In Aerial Work Platform, we have series joysticks, such us Genie, JLG, Haulotte, Skyjack, Manitou, Snorkel UpRight, SANY, XCMG, ZOOMLION, DLI, Mantall, Sinoboom and so on.

We will continue devoting to R&D industrial electronic controller, and supplying the best quality products to both international and domestic customers.



FJ3

FJ1

FJ9S

HJ20

FJ8

HJ70



#### Mission

Live better, Do better

#### Vision

(Strive to) Be a global first-class developer, manufacturer, and supplier of electronic control human-machine interfaces; let the world trust "Made in China."

#### Values

Responsibility, care, craftsmanship, sincerity, and no shortcut.



HJ30



HJ60



HJ50



HJ80

## Company History

- 2002** The company was founded with the name of "Shanghai Baoshi Industry and Trade Co., Ltd."
- 2007** Arrived the supply agreement with U. S. company on spare parts for aerial vehicle.
- 2009** Developed HJ5 series joystick, and obtained the company's first patent.  
Reached a supply agreement with V Company of Belgium; And got the patent of SS series top shape patent.
- 2012** The company changed its name from "Shanghai Baoshi Industry and Trade Co., Ltd." to "Shanghai Chen Gong Electronic Control Technology Co., Ltd."
- 2016** Moving to a new office location; Patented multi-axis joystick.
- 2018** To introduce the management philosophy of Daosh and establish the company values ;  
Obtain TUV ISO 9001 certification.
- 2019** The company promises that all products enjoy free maintenance service for shelf life.
- 2021** The company has 20 national patents.

## Responsibility and commitment

Quality first, keep improving!  
The product implements free maintenance for shelflife!



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# HJ5 Series Single Axis Joystick

## Product features

- Hall effect without contact angle detection;
- Friction, mechanical lock optional at center or end position;
- Wide supply voltage range.

## Application

Typical application on mining machinery, off-highway vehicle.

## Technical Information

### Electrical data

#### Hall

|                                |                       |
|--------------------------------|-----------------------|
| Power supply                   | $5 \pm 0.5\text{Vdc}$ |
| Power supply current           | $< 11\text{mA}$       |
| Maximum allowance overload     | 30Vdc                 |
| Reverse polarity voltage (max) | -15Vdc                |
| Center output voltage          | $2.5 \pm 0.1\text{V}$ |
| Output linearity tolerance     | $< \pm 0.2\text{V}$   |

### With electronic amplifier

|                           |                                               |
|---------------------------|-----------------------------------------------|
| Power supply              | 9~18Vdc (U 11~U 15) ;<br>18~36Vdc (U 21~U 25) |
| Power current consumption | 20mA                                          |

### Mechanical features

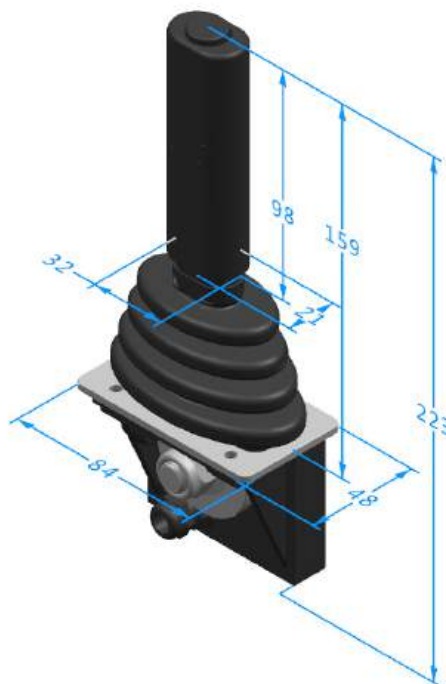
|                         |                                 |
|-------------------------|---------------------------------|
| Travel angle            | $\pm 35^\circ$ , $\pm 45^\circ$ |
| Operating type          | Friction                        |
| Breakout force          | 28-30N                          |
| Maximum allowable force | $> 300\text{N}$                 |
| Expecting life          | about 1 million cycles          |
| Weight                  | 540g (without handle)           |

### Environmental data

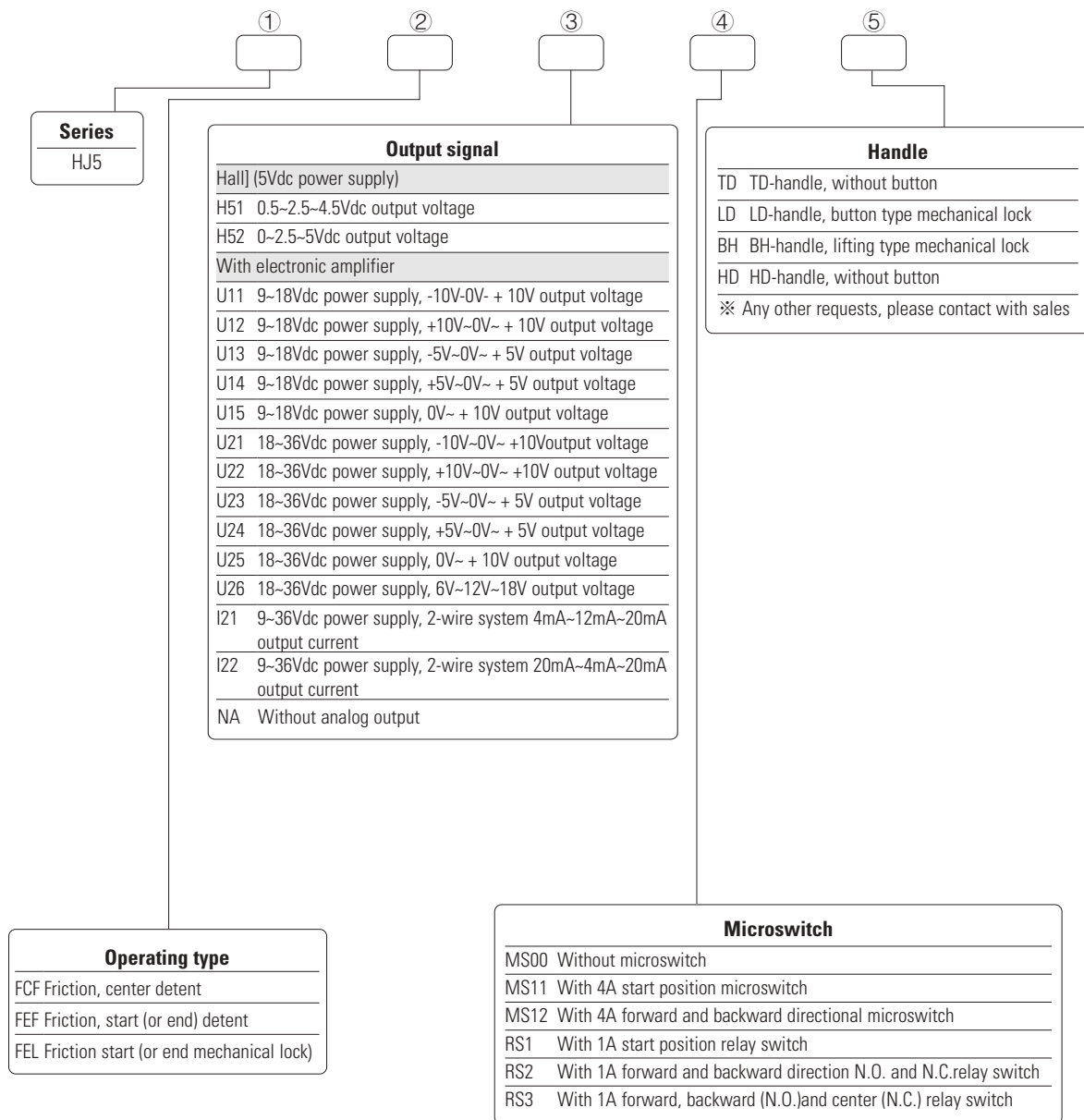
|                       |                                            |
|-----------------------|--------------------------------------------|
| Operating temperature | $-30^\circ\text{C} \sim +70^\circ\text{C}$ |
| Storage temperature   | $-40^\circ\text{C} \sim +85^\circ\text{C}$ |
| Protection level      | IP54(BH handle)<br>IP65(Other handle)      |



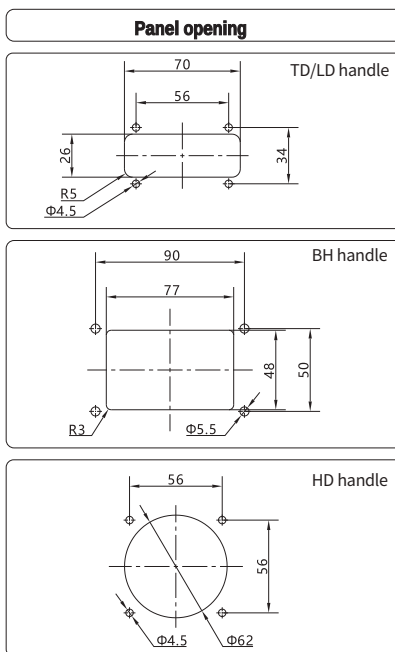
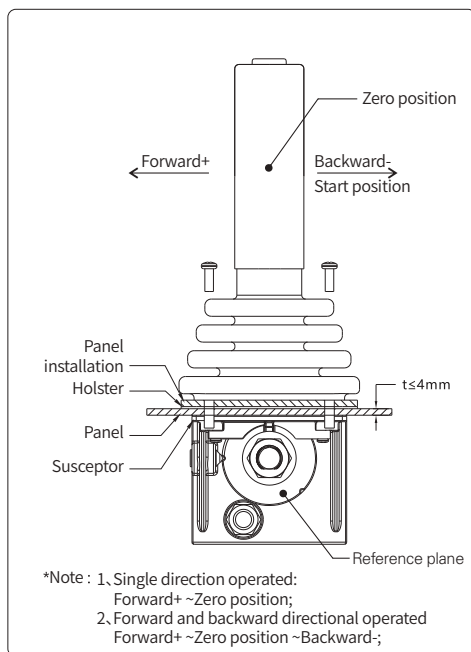
## Dimensions



## Product Configuration



## Product installation



## Electrical connections

### Hall

| NO. | Hall                   | Colour |
|-----|------------------------|--------|
| 1   | VCC                    | Red    |
| 2   | GND                    | Black  |
| 3   | OUT                    | Yellow |
| 4   | Normally open switch 1 | White  |
| 5   | Normally open switch 2 | Blue   |

### With electronic amplifier connections (output voltage)

| No. | Colour | RS2                    | RS3                    |
|-----|--------|------------------------|------------------------|
|     |        | 9 ~ 18Vdc              | 9 ~ 18Vdc              |
| 1   | Brown  | 18 ~ 36Vdc             | 18 ~ 36Vdc             |
| 2   | Blue   | 0V                     | 0V                     |
| 3   | Black  | Output positive        | Output positive        |
| 4   | White  | Output negative        | Output negative        |
| 5   | Yellow | com                    | com                    |
| 6   | Green  | Forward switch (N.O.)  | Forward switch (N.O.)  |
| 7   | Red    | Backward switch (N.O.) | Backward switch (N.O.) |
| 8   | Purple | Forward switch (N.C.)  | Center switch (N.C.)   |
| 9   | Gray   | Backward switch (N.C.) | Center switch (N.C.)   |

**Note:** See Appendix for wiring diagram and Appendix for output diagram.

# HJ8 Series Multi Axis Joystick

## Product features

- Hall-effect angle detection, long life.
- Spring return.
- Various output voltage range optional.
- Various handle optional.

## Application

Typical application on aerial platform vehicle, fire-fighter platform vehicle, scissor platform vehicle and other off-highway equipment.

## Technical Information

### Electrical Data

#### Hall or With Electronic Amplifier

Power supply 5±0.5Vdc OR CAN bus 9~36Vdc wide electricity Pressure input.

Power supply current <9mA (without handle)  
<18mA (with BWH)

Maximum allowance overload voltage 20Vdc

Reverse polarity voltage(max) 15Vdc

Output linearity tolerance < ± 0.2V

Analog rocker switch power supply 5.0 ± 0.5Vdc

Analog rocker switch output voltage 1.15~2.5~3.85V

### Mechanical features

Travel angle ± 18°

Operating type Spring return

Breakout force 9N

Operating force ( max ) 18N

Maximum allowable force >300N

Expecting life >1 million cycles

Weight 420g (without handle)

### Environmental data

Operating Temperature -30°C~ +70°C

Storage Temperature -40°C~ +85°C

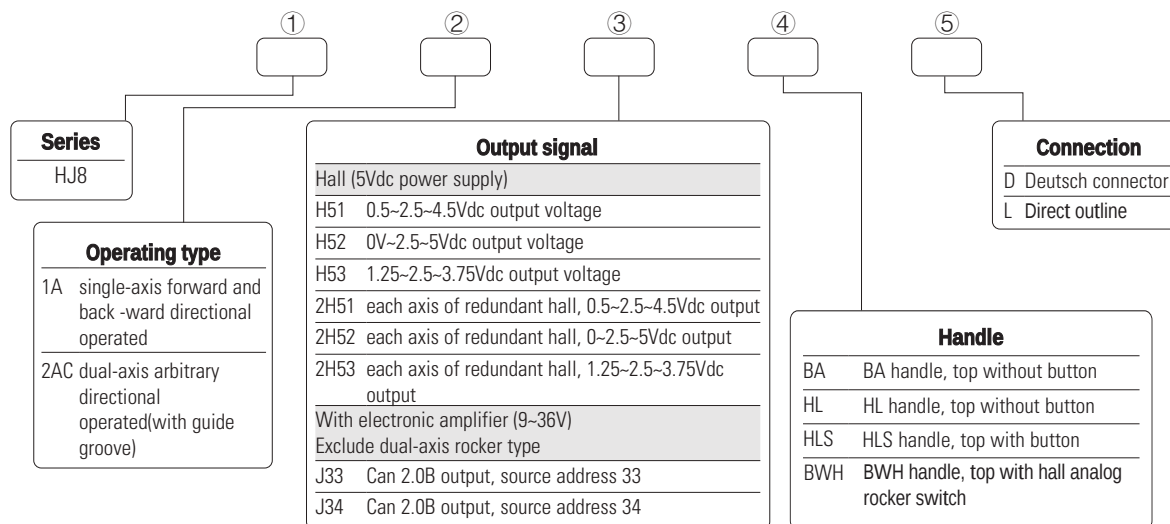
Protection level IP67



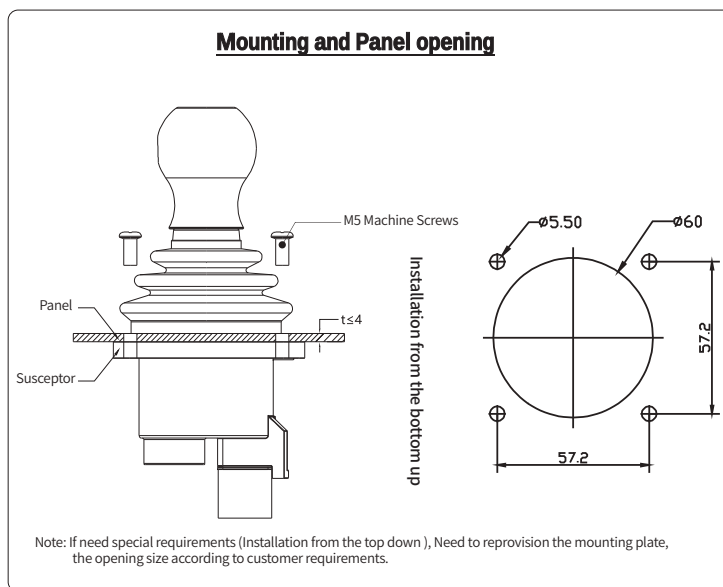
## Dimensions



## Product configuration



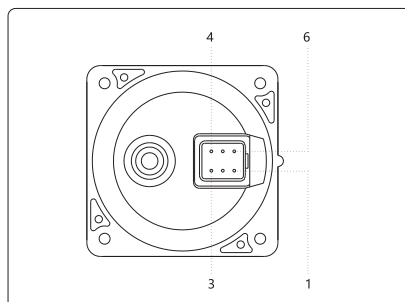
## Product installation



## Electrical connections

### Deutsch 6-pin connections

| Pin | Function                    |
|-----|-----------------------------|
| 1   | 0V                          |
| 2   | 5V                          |
| 3   | X out                       |
| 4   | Y out                       |
| 5   | Rocker analog output/Button |
| 6   | NA/Button                   |



# HJ20 Series Single Axis Joystick

## Product features

- Single-axis forward and backward directional or single directional operated;
- Friction lock or spring return;
- Center and start(end) position mechanical lock optional;
- Hall and potentiometer is selectable;
- Microswitch optional (maximum 10A@30Vdc);
- A variety of handle models can be configured.

## Application

Typical application on various electro-hydraulic control system of engineering vehicle sand other electrical control system.

## Technical information

### Electrical data

| Potentiometer           |                                          |
|-------------------------|------------------------------------------|
| Power supply resistance | <36Vdc                                   |
| Resistance              | 2K $\Omega$ , 5K $\Omega$ , 10K $\Omega$ |
| Center angle            | $\pm 3^\circ$                            |
| Maximum dissipation     | 0.2W                                     |

### Hall

|                                    |                             |
|------------------------------------|-----------------------------|
| Power supply                       | $5 \pm 0.5\text{Vdc}$       |
| Supply current                     | <11mA(setting power supply) |
| Maximum allowable overload voltage | 20Vdc                       |
| Reverse maximum allowance voltage  | -10Vdc                      |
| Output linearity tolerance         | $< \pm 0.2\text{V}$         |

### With electronic amplifier

|                        |                             |
|------------------------|-----------------------------|
| Supply voltage         | 18~36Vdc (U 21~U 25)        |
|                        | 9~36Vdc (I 21~I 22)         |
| Current consumption    | <20mA                       |
| Maximum output current | 10mA(Standard power supply) |

### Microswitch

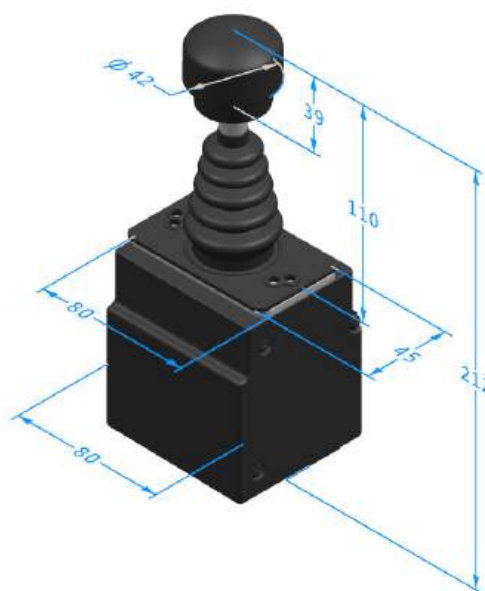
|                       |                                       |
|-----------------------|---------------------------------------|
| Load capacity         | 10A@30Vdc (Resistive load))           |
| Expecting life        | 5 million times (Mechanical)          |
|                       | 200 thousand times (Electrical))      |
| Insulation resistance | >100MQ (500Vdc Insulating-resistance) |
| Breakout angle        | $\pm 5^\circ$                         |

### Environmental data

|                       |                                            |
|-----------------------|--------------------------------------------|
| Operating temperature | -30 $^\circ\text{C}$ ~+70 $^\circ\text{C}$ |
| Storage temperature   | -40 $^\circ\text{C}$ ~+85 $^\circ\text{C}$ |
| Protection level      | IP65 (above the panel)                     |



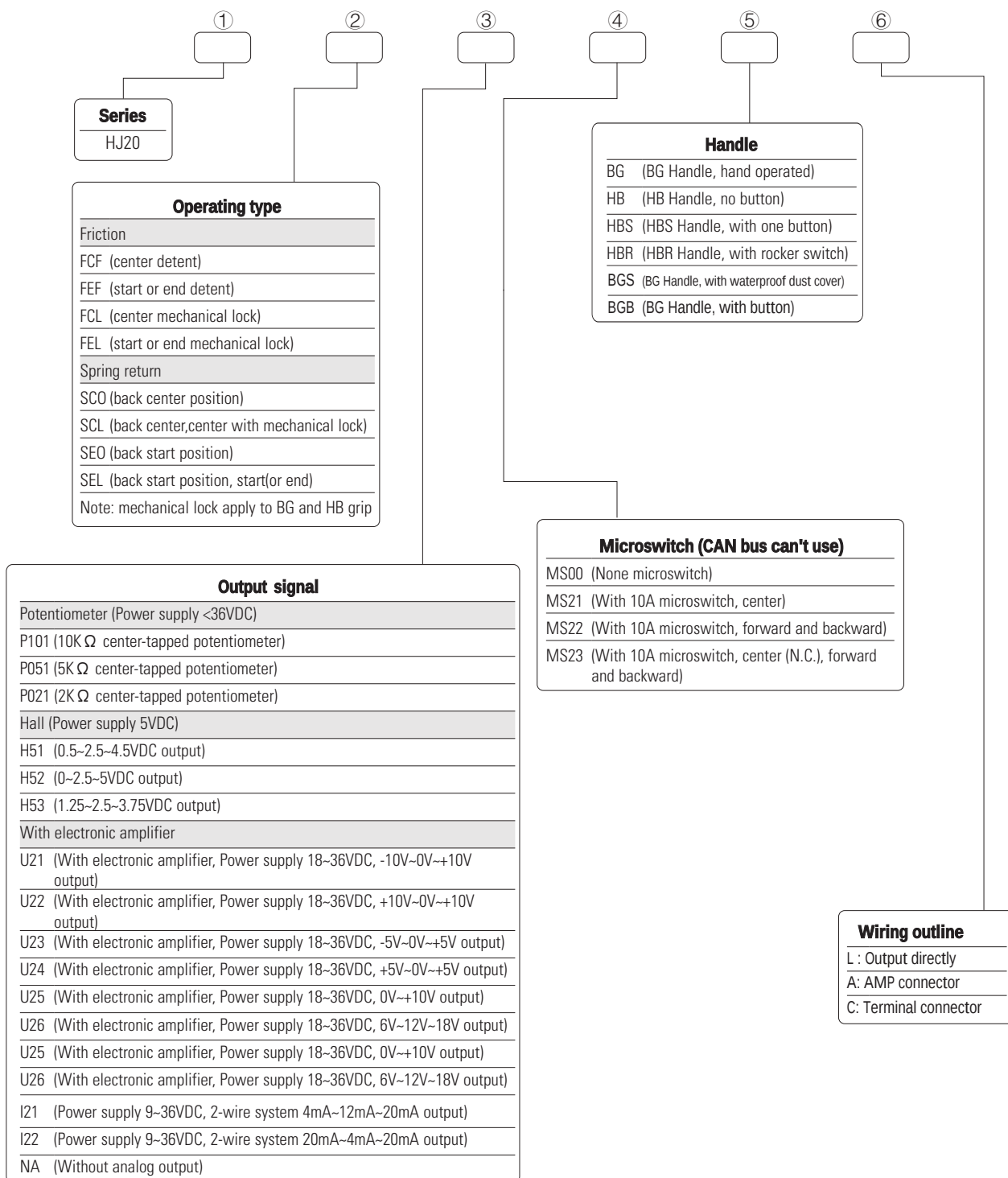
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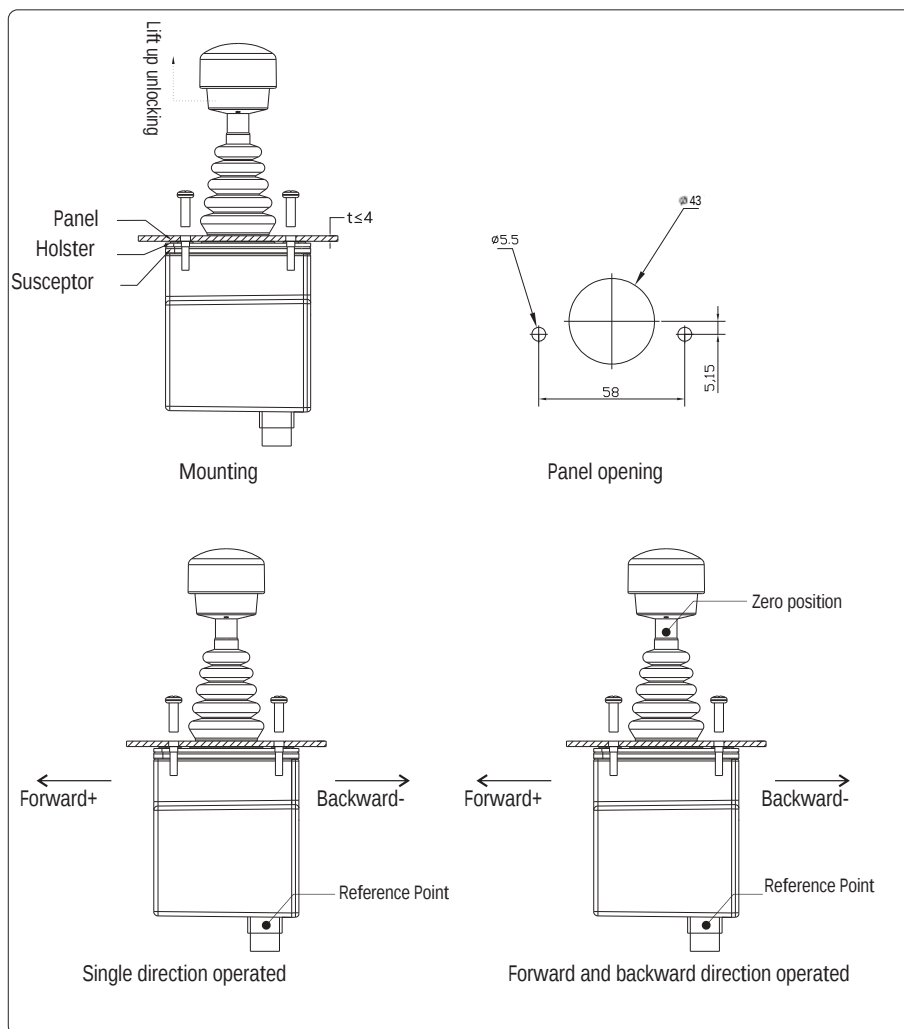
## Mechanical features

|                         |                                                   |
|-------------------------|---------------------------------------------------|
| Travel angle            | $\pm 37.5^\circ$ or $75^\circ$ (single direction) |
| Operating type          | Spring return or friction                         |
| Breakout force          | 8N (spring) 16N (friction)                        |
| Operating force(max)    | 18N (spring) 16N (friction)                       |
| Maximum allowable force | > 260N                                            |
| Expecting life          | >1 million cycles(potentiometer)                  |
|                         | >5million cycles (hall)                           |
| Weight                  | 500g (without handle )                            |

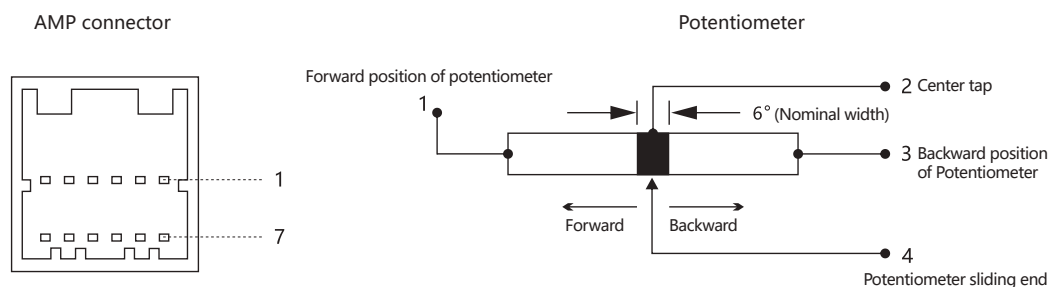
## Product configuration



## Product installation



## Electrical connections



| Pin potentiometer                                | Hall                                             | With electrical amplifier of output voltage      | With electrical amplifier of output current      |
|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|--------------------------------------------------|
| 1 Potentiometer forward terminal                 | 5VDC                                             | Power supply                                     |                                                  |
| 2 Potentiometer center tap                       | NA                                               | GND                                              |                                                  |
| 3 Potentiometer backward terminal                | GND                                              | Output positive ( + )                            | NA                                               |
| 4 Potentiometer sliding end                      | Output                                           | Output negative ( - )                            | NA                                               |
| 5 Directional switch forward (N.O.)              | Directional switch forward (N.O.)                | Directional switch forward (N.O.)                | Directional switch forward (N.O.)                |
| Start position switch of single direction (N.O.) | Start position switch of single direction (N.O.) | Start position switch of single direction (N.O.) | Start position switch of single direction (N.O.) |
| 6 Forward directional switch common terminal     | Forward directional switch common terminal       | Forward directional switch common terminal       | Forward directional switch common terminal       |
| Common terminal of start position                | Common terminal of start position                | Common terminal of start position                | Common terminal of start position                |
| 7 Directional switch back ward (N.O.)            | Directional switch backward (N.O.)               | Directional switch backward (N.O.)               | Directional switch backward (N.O.)               |
| Single direction (N/A)                           | Single direction (N/A)                           | Single direction (N/A)                           | Single direction (N/A)                           |
| 8 Backward directional common terminal           | Backward directional common terminal             | Backward directional common terminal             | Backward directional common terminal             |
| Single direction (N/A)                           | Single direction (N/A)                           | Single direction (N/A)                           | Single direction (N/A)                           |
| 9 Rocker left directional (N.O.)                 | Rocker left directional (N.O.)                   | Rocker left directional (N.O.)                   | Rocker left directional (N.O.)                   |
| 10 Handle of top switch common terminal          | Handle of top switch common terminal             | Handle of top switch common terminal             | Handle of top switch common terminal             |
| 11 Rocker right directional (N.O.)               | Rocker right directional (N.O.)                  | Rocker right directional (N.O.)                  | Rocker right directional (N.O.)                  |

# HJ30 Series Multi Axis Joystick

## Product features

- Spring return, single-axis or dual-axis operated;
- Cross direction or arbitrary direction operated optional;
- Potentiometer or hall effect angle detection, long life;
- Large current microswitch optional (10A@30Vdc);
- Various output optional;
- Various handle optional.

## Application

Typical apply on rotary drilling rigs, aerial fire trucks, Cranes shield machine and other electrical and elec-tro-hydraulic control system.



## Technical information

### Electrical Data

#### Potentiometer

|                    |                            |
|--------------------|----------------------------|
| Power Supply       | <36Vdc                     |
| Center Angle Power | 5K $\Omega$ , 10K $\Omega$ |
| Center Angle       | $\pm 3^\circ$              |
| Dissipation        | 0.2W                       |

#### Hall

|                                    |                                         |
|------------------------------------|-----------------------------------------|
| Power Supply                       | 5 $\pm$ 0.5Vdc                          |
| Supply Voltage                     | <11 mA (Single axis), <22mA (Dual-axis) |
| Supplycurrent                      |                                         |
| Maximum allowable overload voltage | 20Vdc                                   |
| Reverse maximum allowable voltage  | -10Vdc                                  |
| Output linearity tolerance         | < $\pm$ 0.2V                            |

#### With electronic amplifier

|                      |                                   |
|----------------------|-----------------------------------|
| Power supply         | 18~36Vdc (U 21~U 24)              |
| Current Consumption  | <20mA                             |
| Output Current (max) | 10mA with Standard Voltage Output |

#### 2-wire system current

|              |                   |
|--------------|-------------------|
| Power Supply | 9~36Vdc (I21~I22) |
|--------------|-------------------|

#### 4-wire system current

|              |                   |
|--------------|-------------------|
| Power Supply | 9~36Vdc (I41~I42) |
|--------------|-------------------|

#### Microswitch

|                       |                                                                      |
|-----------------------|----------------------------------------------------------------------|
| Load Capacity         | 10A@30Vdc ( Resistance load )                                        |
| Expecting Life        | >30 million cycles (Mechanical)<br>>200 thousand cycles (Electrical) |
| Insulation resistance | >100M $\Omega$ 500Vdc Insulating-resistance meter                    |
| Breakout angle        | $\pm 3^\circ \sim \pm 5^\circ$                                       |

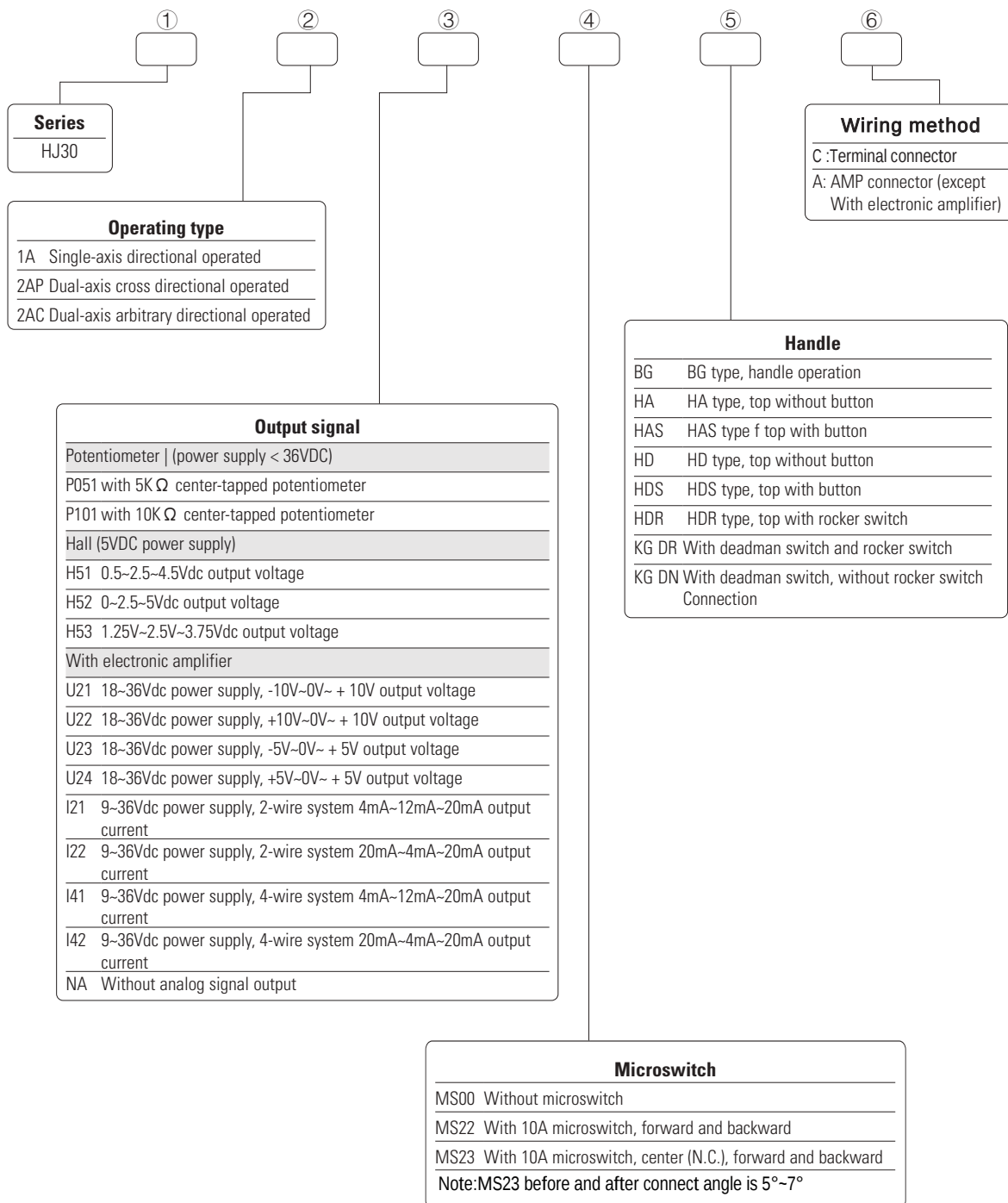
### Mechanical features

|                         |                                                              |
|-------------------------|--------------------------------------------------------------|
| Travel Angle            | $\pm 25^\circ$                                               |
| Operating Type          | Spring return                                                |
| Breakout Force          | 5N                                                           |
| Operating Force(max)    | 30N                                                          |
| Maximum Allowable Force | >300N                                                        |
| Expecting Life          | >2million cycles (Potentiometer)<br>>5 million cycles (Hall) |
| Weight                  | 460g (Without handle)                                        |

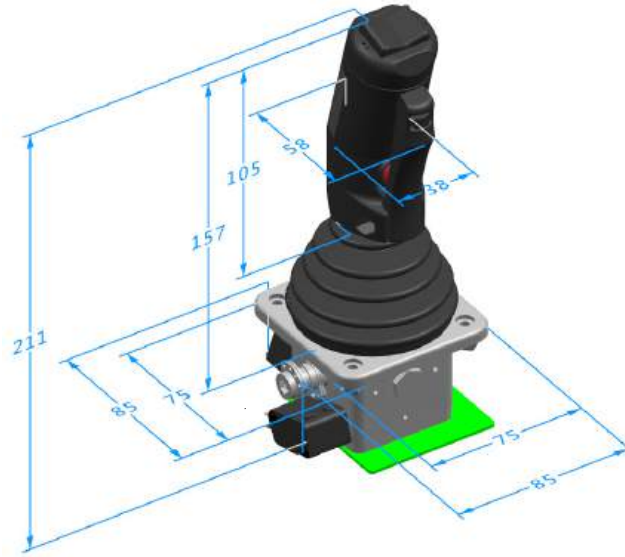
### Environmental data

|                       |                                |
|-----------------------|--------------------------------|
| Operating Temperature | -30 $^\circ$ C~ +70 $^\circ$ C |
| Storage Temperature   | -40 $^\circ$ C~+85 $^\circ$ C  |
| Protection level      | IP65 (Above the flange)        |

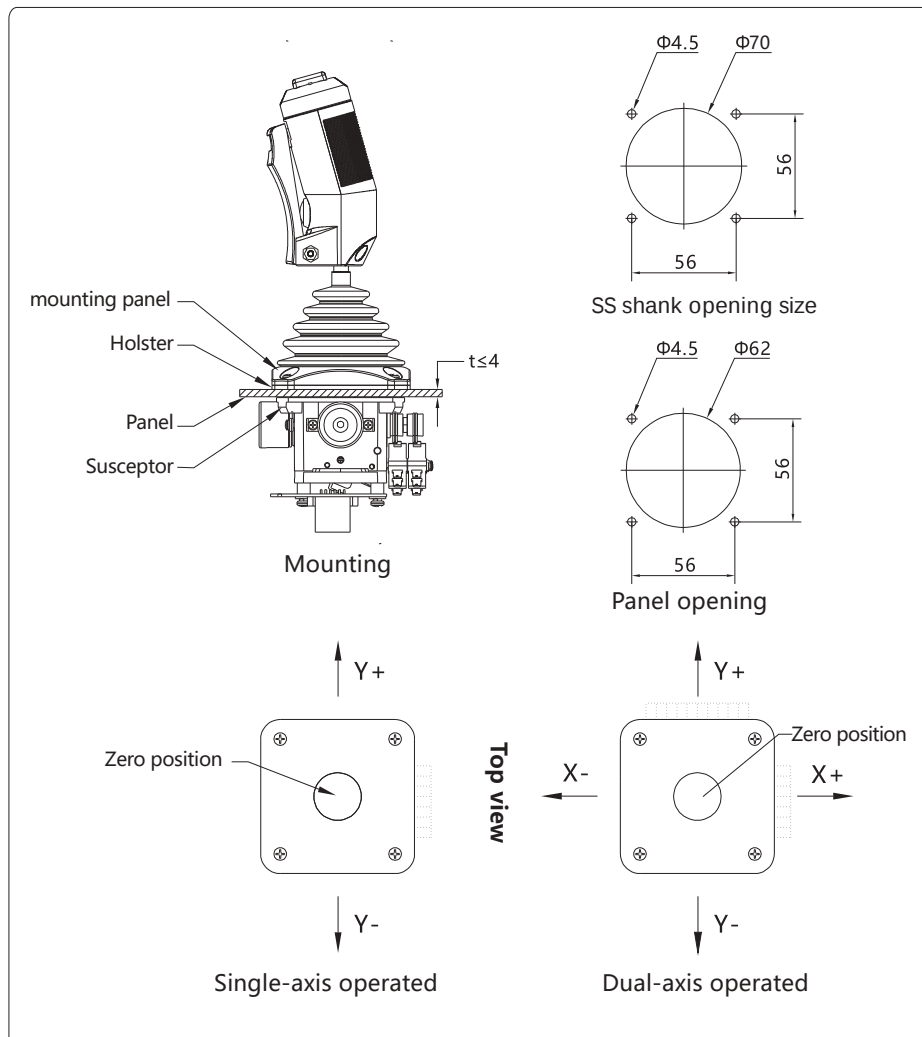
## Product Configuration



## Dimensions

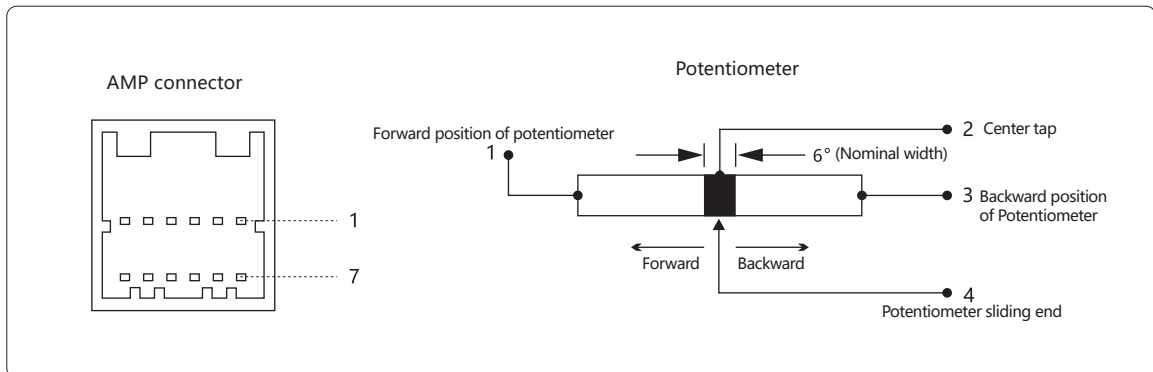


## Product installation



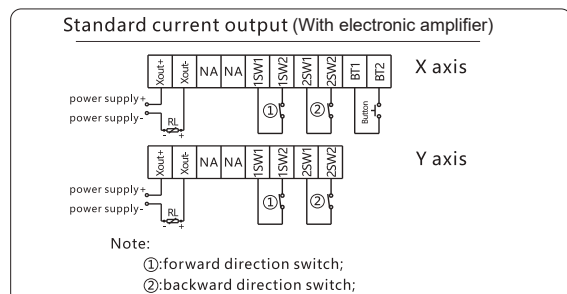
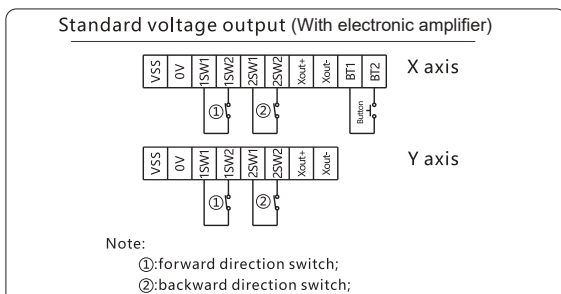
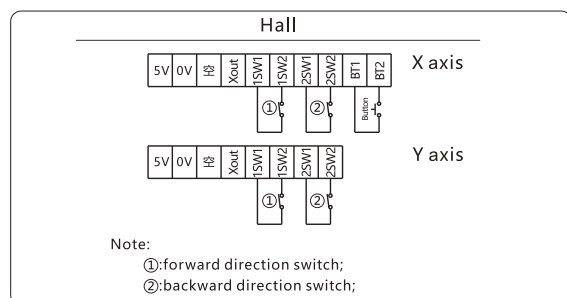
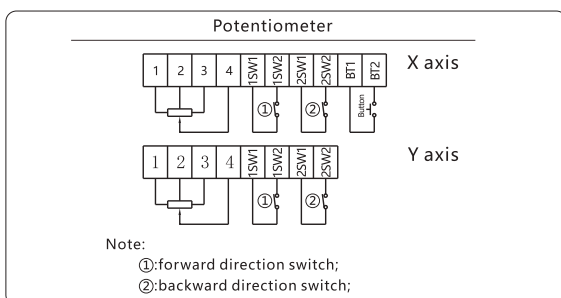
## Electrical Connections

### AMP connector



| Pin | Potentiometer                                    | Hall                                             |
|-----|--------------------------------------------------|--------------------------------------------------|
| 1   | Potentiometer forward terminal                   | +5Vdc                                            |
| 2   | Potentiometer center tap                         | NA                                               |
| 3   | Single direction(N/A)                            |                                                  |
| 4   | Potentiometer backward terminal                  | 0V                                               |
| 5   | Potentiometer wiper                              | Output                                           |
| 6   | Forward Directional switch (N.O.)                | Forward Directional switch (N.O.)                |
| 7   | Start position switch of single direction (N.O.) | Start position switch of single direction (N.O.) |
| 8   | Forward switch common terminal                   | Forward switch common terminal                   |
| 9   | Common terminal of start position                | Common terminal of start position                |
| 10  | Backward directional switch (N.O.)               | Backward directional switch (N.O.)               |
| 11  | Single direction(N/A)                            | Single direction(N/A)                            |
| 12  | Backward directional common terminal             | Backward directional common terminal             |
|     | Single direction(N/A)                            | Single direction(N/A)                            |
|     | Rocker left direction (N.O.)                     | Rocker left direction (N.O.)                     |
|     | Handle of top switch common terminal             | Handle of top switch common terminal             |
|     | Rocker right direction (N.O.)                    | Rocker right direction (N.O.)                    |
|     | Deadman switch                                   | Deadman switch                                   |

### Connector



# HJ50 Series Single Axis Joystick

## Product Features

- Rugged components designed for the construction environment
- Potentiometer tracks for angular-detecting
- Friction held and spring return
- Center-lock is a mechanical option
- Providing optional grips with different shapes
- The number and position of the switches are customized designed
- PWM output drives proportional solenoid valve
- Depending on the proportional solenoid valve to set starting current, maximum current and PWM frequency
- CAN output is an option



## Application

Typically used in cranes, loaders, excavators, forklifts, tractors, harvesters and aerial work platforms.

## Technical information

### Electrical parameter

| Potentiometric sensors                         |                                               |
|------------------------------------------------|-----------------------------------------------|
| supply voltage                                 | <36Vdc                                        |
| Total resistance value                         | 200 Ω , 1K Ω                                  |
| Potentiometer loading maximum voltage          | 32Vdc                                         |
| Potentiometer allows maximum power consumption | 2W (200 Ω ) , 0.5W(1K Ω )                     |
| CAN Bus                                        |                                               |
| supply voltage                                 | 9~36Vdc                                       |
| CAN Version                                    | CAN2.0B                                       |
| Deal                                           | J939                                          |
| COM port                                       | 6-core socket ( Deutsch )                     |
| Digital scaling drive                          |                                               |
| Supply voltage                                 | 9~36Vdc                                       |
| output driving                                 | The maximum current of two PWM channels is 3A |
| PWM frequency                                  | 100HZ~1000HZ                                  |
| minimum current                                | 0~0.4A                                        |
| maximum current                                | 0.4~3A                                        |

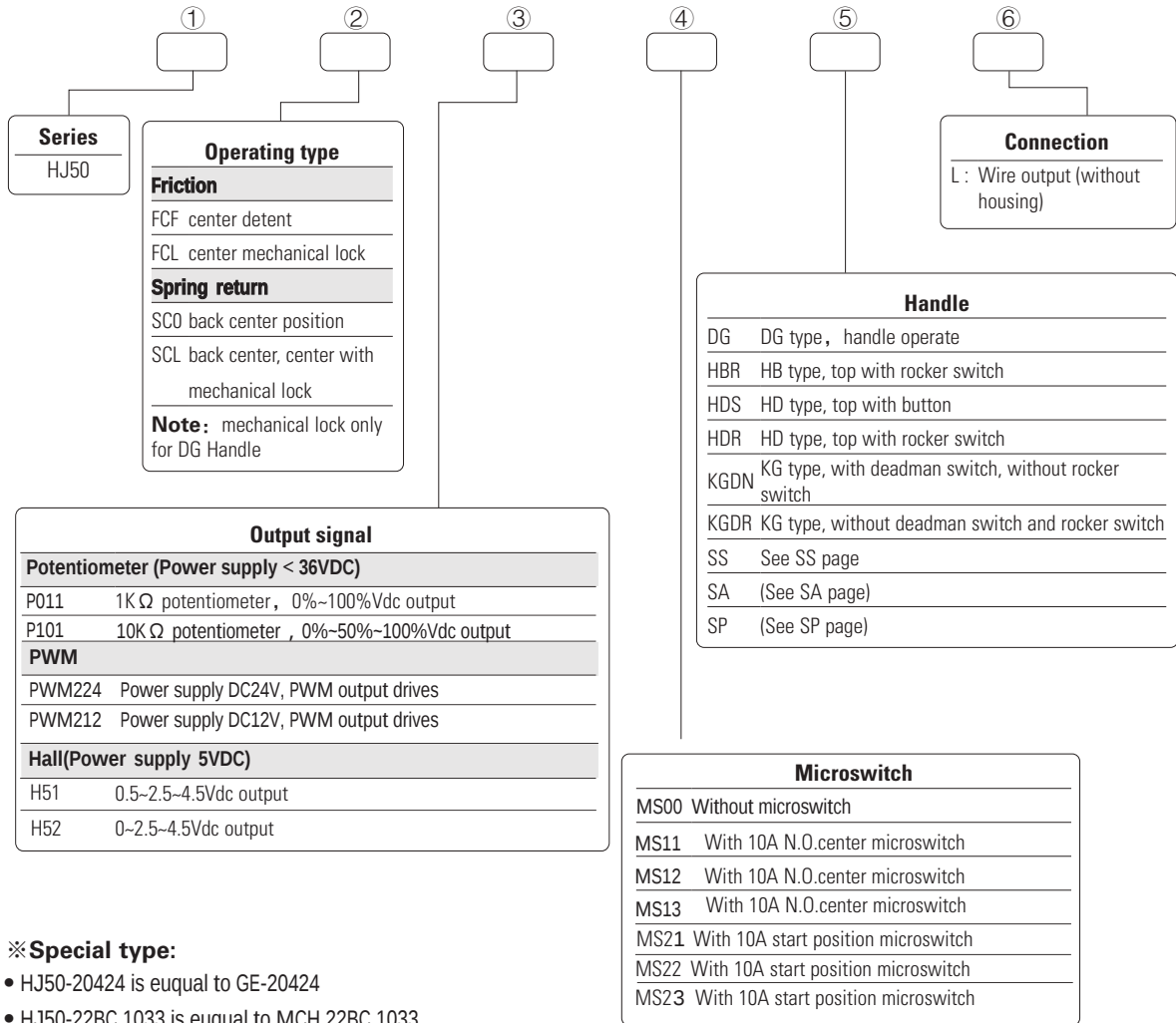
### Mechanical features

|                         |                                   |
|-------------------------|-----------------------------------|
| Travel angle            | ±30°                              |
| Operating type          | Spring return, Friction Held      |
| Breakout force          | 5N                                |
| Operating force(max)    | 11N                               |
| Maximum allowable force | >300N                             |
| Expecting life          | >2 Million Cycles (Potentiometer) |
| Weight                  | 470g (Without handle)             |

### Environmental data

|                       |                    |
|-----------------------|--------------------|
| Operating Temperature | -30°C~+70°C        |
| Storage Temperature   | -40°C~+85°C        |
| Protection level IP65 | (Above the flange) |

## Product configuration

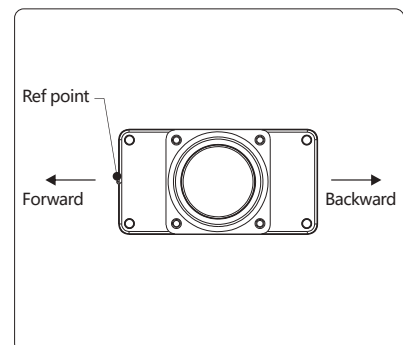


### ※Special type:

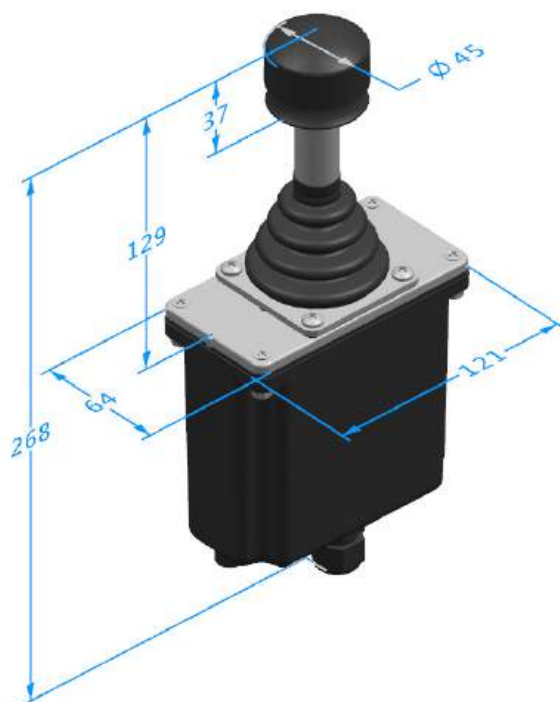
- HJ50-20424 is euqual to GE-20424
- HJ50-22BC 1033 is euqual to MCH 22BC 1033
- HJ50-12BC 107 is euqual to MCH 107
- HJ50-12BC 1078 is euqual to MCH 12BC 1078

## Electrical connections

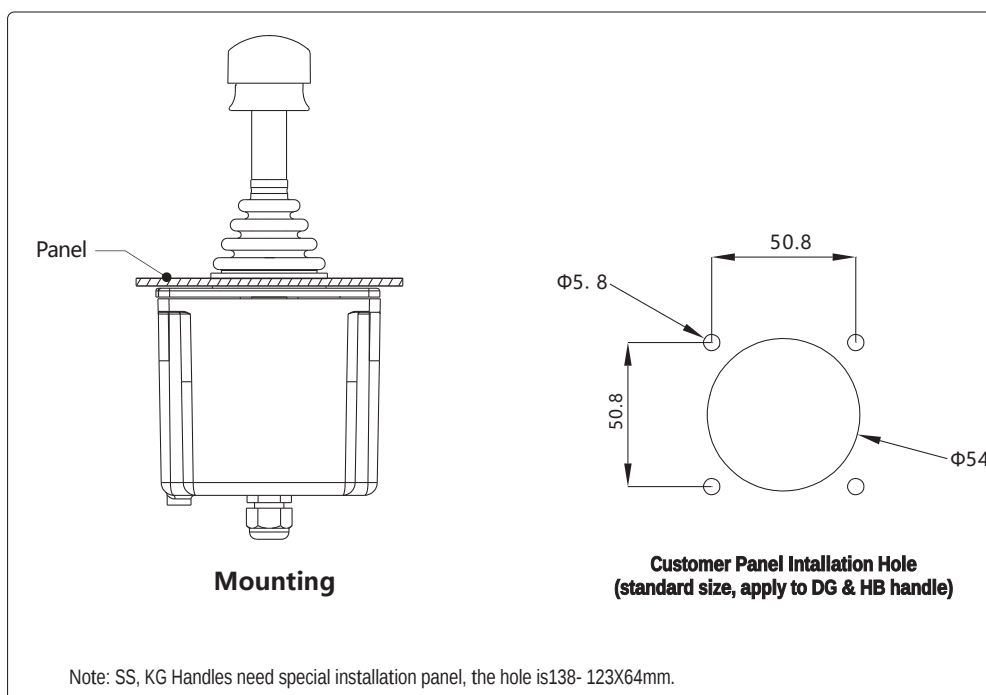
| Pin | PWM                                   | Potentiometer                    |
|-----|---------------------------------------|----------------------------------|
| 1   | 9-36V(VCC)                            | GND                              |
| 2   | Power supply 0V                       | VIN                              |
| 3   | Forward direction PWM drive output    | OUT                              |
| 4   | Backward direction PWM drive output   | N/A                              |
| 5   | PWM output common end,power supply 0V | N/A                              |
| 6   | Medium micro switch COM               | Medium micro switch COM          |
| 7   | Medium micro switch NO                | Medium micro switch NO           |
| 8   | Forward switch COM (N.O.)             | Forward micro switch COM         |
| 9   | Forward switch NO (N.O.)              | Forward micro switch NO          |
| 10  | Backward switch COM (N.O.)            | Backward micro switch COM (N.O.) |
| 11  | Backward switch NO (N.O.)             | Backward micro switch NO(N.O.)   |



## Dimensions



## Product installation



# HJ60 Series Multi Axis Joystick

## Product features

- Ergonomics design on mobile application.
- Uncontact hall effect and long expect-life potentiometer optional.
- Various handle, different number and location of button switches optional.
- Number of buttons, position can be customized.
- CAN bus output optional.
- Spring self - reset, multi - axis operation.

## Application

Typical application on Cranes, loaders, Forklifts, exca-vators, access platform, tractors, harvesters, and so on.

## Technical information

### Electrical data

#### Potentiometer

|                       |                                                        |
|-----------------------|--------------------------------------------------------|
| Power supply          | <36Vdc                                                 |
| Resistance            | 2K $\Omega$ , 4K $\Omega$ , 5K $\Omega$ , 10K $\Omega$ |
| Electrical angle      | $\pm 18^\circ$                                         |
| Center voltage        | 48%~52%Vdc (Power supply)                              |
| Center tap angle      | $\pm 2.5^\circ$                                        |
| On-load voltage (max) | 32Vdc                                                  |
| Power dissipation     | 0.25W ( $25^\circ$ )                                   |

#### Hall

|                                     |                       |
|-------------------------------------|-----------------------|
| Power supply                        | $5 \pm 0.5$ Vdc       |
| Supply current                      | <11mA (Each of hall ) |
| Maximum allowable over-load voltage | 20Vdc                 |
| Reverse maximum allowable voltage   | -10Vdc                |
| Output linearity tolerance          | $< \pm 0.2$ V         |

#### Directional switch

|                    |                             |
|--------------------|-----------------------------|
| Load capacity      | 2mA@30Vdc (Resistance load) |
| Breakout angle     | $\pm 3^\circ \sim 5^\circ$  |
| Contact resistance | <200 $\Omega$               |

#### With electronic amplifier

|                           |                    |
|---------------------------|--------------------|
| Power supply              | 18~36Vdc (U21~U24) |
|                           | 9~36Vdc            |
| Power current consumption | < 20mA             |
| Maximum output current    | 10mA               |

#### CAN BUS

|                 |          |
|-----------------|----------|
| Power supply    | 9~36Vdc  |
| CAN version     | CAN 2.0B |
| Deal            | J1939    |
| Connector ports | Deutsch  |

### Electrical data

#### Microswitch

|                       |                                                                 |
|-----------------------|-----------------------------------------------------------------|
| Load capacity         | 4A@30Vdc (Resistance load)                                      |
| Expecting life        | 3 million times (Mechanical)<br>200 thousand times (Electrical) |
| Insulation resistance | > 100M $\Omega$ (500Vdc insulating-resistance meter)            |
| Breakout angle        | $\pm 3^\circ \sim 5^\circ$                                      |

### Mechanical features

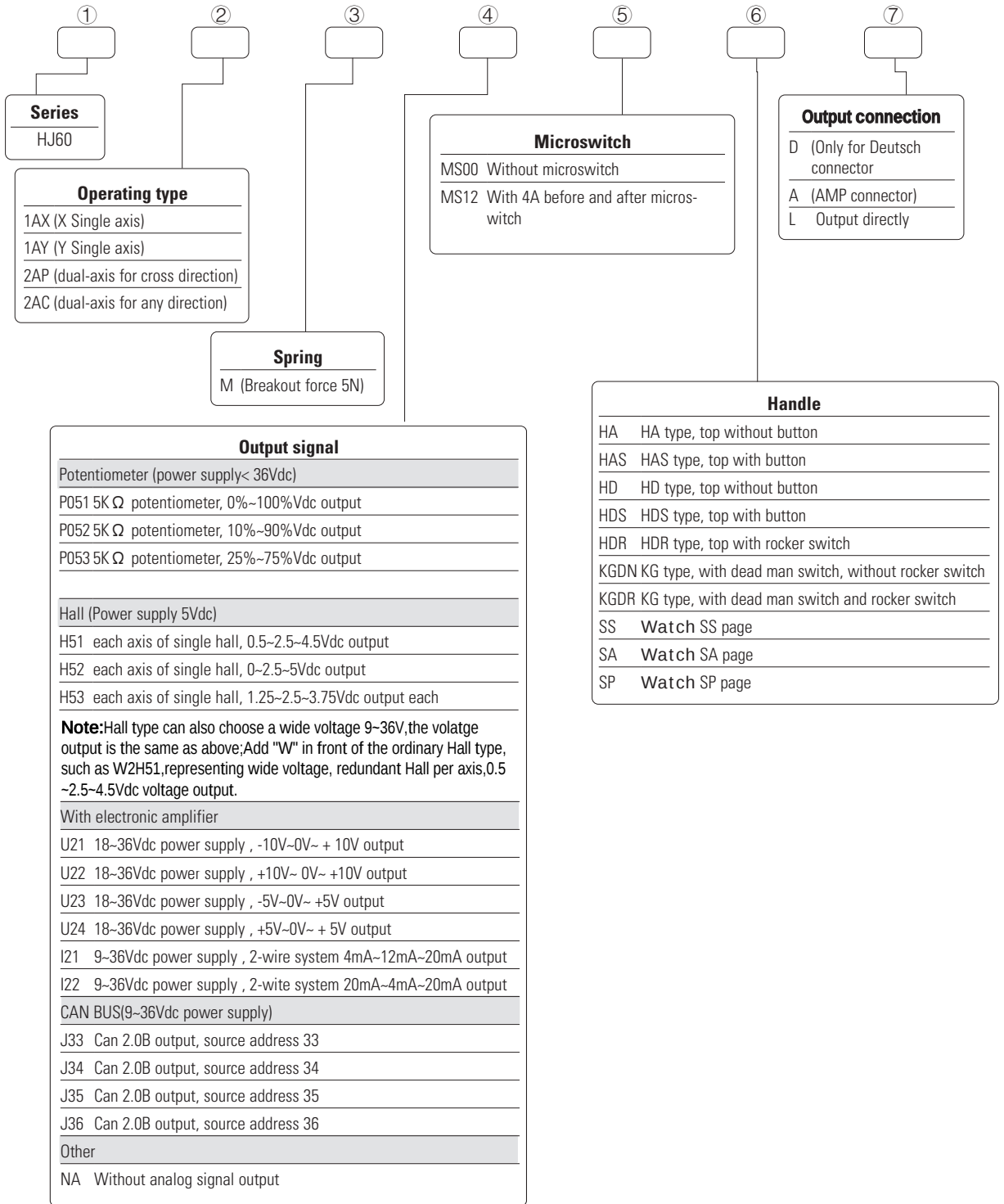
|                         |                                                                    |
|-------------------------|--------------------------------------------------------------------|
| Travel angle            | $\pm 20^\circ$                                                     |
| Operating type          | Spring return                                                      |
| Breakout force          | 5N                                                                 |
| Operating force(max)    | 16N                                                                |
| Maximum allowable force | >300N                                                              |
| Expecting life          | >2million cycles (Potentiometer)<br>>3million cycles (Hall effect) |
| Weight                  | 475g (Without handle)                                              |

### Environmental data

|                       |                               |
|-----------------------|-------------------------------|
| Operating Temperature | -30 $^\circ$ C~+70 $^\circ$ C |
| Storage Temperature   | -40 $^\circ$ C~+85 $^\circ$ C |
| Protection level      | IP65 (Above the flange)       |



## Product configuration

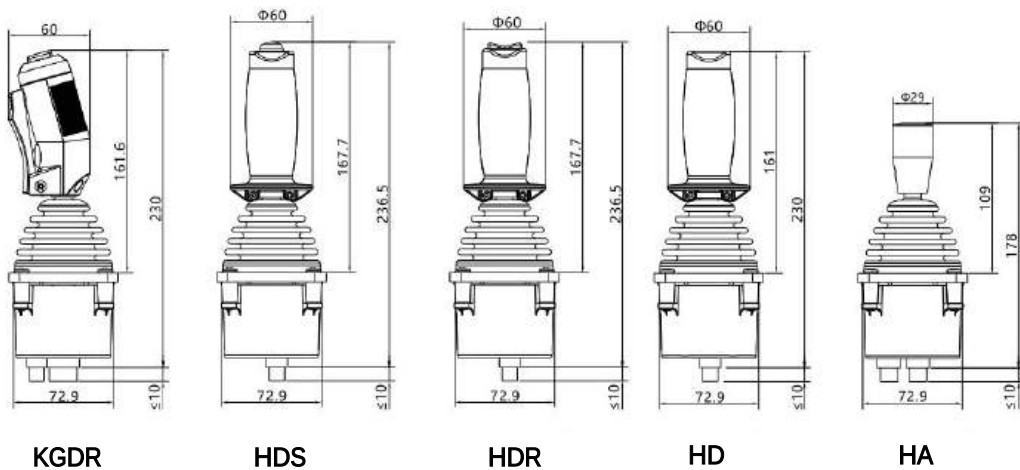


## Dimensions



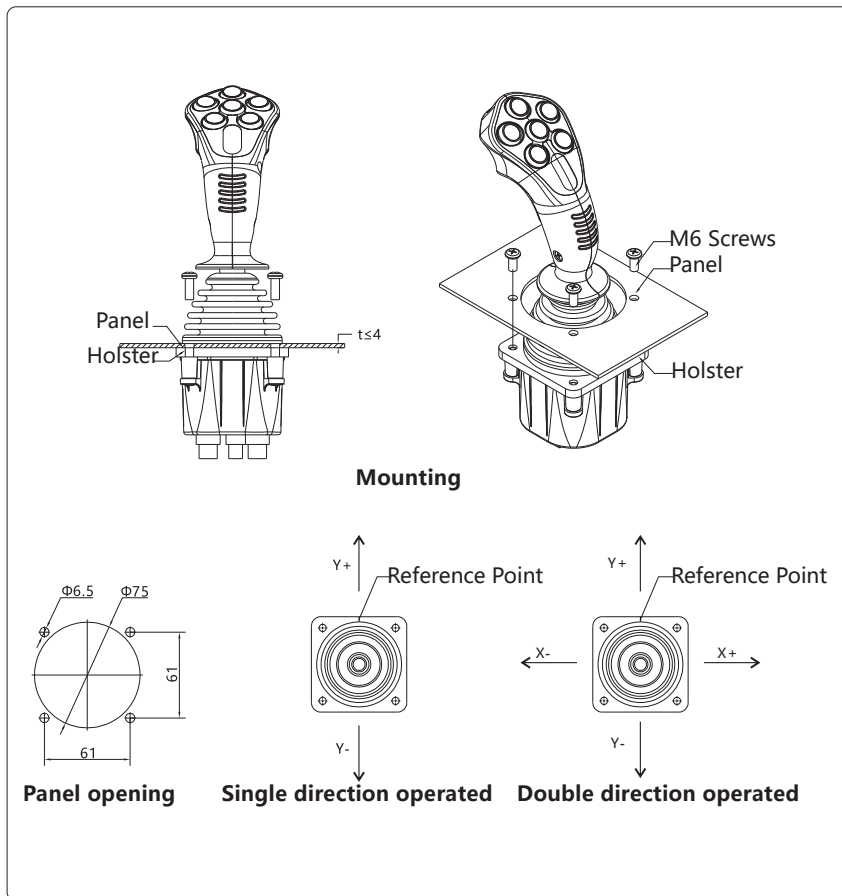
Optional button color :     

### The handle



Notes: Other choice reference other page.

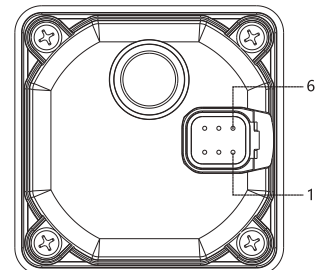
## Product installation



## Deutsch connection

| Pin | Can output | Color  |
|-----|------------|--------|
| 1   | GND        | Black  |
| 2   | VCC        | Red    |
| 3   | CAN high   | Yellow |
| 4   | CAN low    | Green  |
| 5   | CAN shield | N/A    |
| 6   | N/A        | N/A    |

## Deutsch connector



## Electrical connections

### AMP connector

#### 16 Pin

| Pin | Potentiometer                      | Hall                             | With electrical amplifier for output voltage | With electrical amplifier for output current |
|-----|------------------------------------|----------------------------------|----------------------------------------------|----------------------------------------------|
| 1   | Y-axis forward directional switch  | Button switch 4                  | Common terminal of button switch             | Common terminal of button switch             |
| 2   | N/A                                | Button switch 3                  | Button switch 1                              | Button switch 1                              |
| 3   | X-axis pot left terminal           | Button switch 2                  | Button switch 2                              | Button switch 2                              |
| 4   | X-axis pot wiper                   | Button switch 1                  | Button switch 3                              | Button switch 3                              |
| 5   | X-axis pot right terminal          | Top Button                       | Button switch 3                              | Button switch 3                              |
| 6   | X-axis pot right terminal          | Button switch 5                  | Button switch 5                              | Button switch 5                              |
| 7   | X-axis switch common terminal      | Button switch 6                  | Button switch 6                              | Button switch 6                              |
| 8   | X-axis left directional switch     | Deadman switch                   | Top Button                                   | Top Button                                   |
| 9   | Y-axis pot backward terminal       | Button switch 9                  | Deadman switch                               | Deadman switch                               |
| 10  | Y-axis pot wiper                   | Button switch 10                 | Deadman switch                               | Deadman switch                               |
| 11  | Y-axis pot forward terminal        | Common terminal of button switch | X-axis left directional switch               | X-axis left directional switch               |
| 12  | Y-axis pot center tap              | Deadman switch                   | X-axis pot right terminal                    | X-axis pot right terminal                    |
| 13  | Y-axis switch common terminal      | N/A                              | Y-axis backward directional switch           | X-axis switch common terminal                |
| 14  | Y-axis backward directional switch | N/A                              | Y-axis forward directional switch            | Y-axis forward directional switch            |
| 15  | X-axis right directional switch    | N/A                              | Switch common terminal                       | Y-axis forward directional switch            |
| 16  | N/A                                | N/A                              | N/A                                          | Y-axis switch common terminal                |

#### 12 Pin

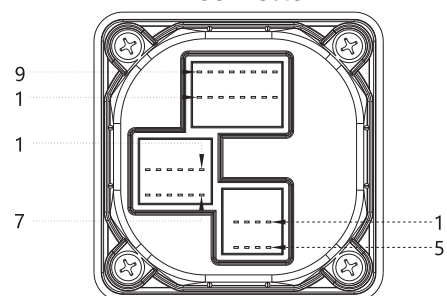
| Pin | Potentiometer                 | Hall                            |
|-----|-------------------------------|---------------------------------|
| 1   | Button switch 4               | +5V+ 5V (redundant hall)        |
| 2   | Button switch 3               | 0V (redundant hall)             |
| 3   | Button switch 2               | +5V power supply                |
| 4   | Button switch 1               | 0V power supply                 |
| 5   | Top button                    | Y-axis output (redundant hall)  |
| 6   | Button switch 5               | X-axis output                   |
| 7   | Button switch 6               | X-axis output (redundant hall)  |
| 8   | Deadman switch                | Y-axis output                   |
| 9   | Button switch 9               | Z1-axis output                  |
| 10  | Button switch 10              | Z2-axis output                  |
| 11  | Button switch common terminal | Z1-axis output (redundant hall) |
| 12  | Deadman switch                | Z2-axis output (redundant hall) |

Standard Hall output, 3/4/6/8 pin outlet

#### 8 Pin

| Pin | Hall                                             | Conversion circuit output |
|-----|--------------------------------------------------|---------------------------|
| 1   | Forward directional microswitch common terminal  | VCC                       |
| 2   | Forward directional microswitch output terminal  | GND                       |
| 3   | Backward directional microswitch output terminal | X-axis output             |
| 4   | Backward directional microswitch common terminal | Y-axis output             |
| 5   | Left directional microswitch common terminal     | Out com                   |
| 6   | Left directional microswitch output terminal     | NA                        |
| 7   | Right directional microswitch output terminal    | NA                        |
| 8   | Right directional microswitch common terminal    | NA                        |

AMP Connector



# HJ61 Series Friction Joystick

## Product features

- Ergonomic designed for pavement machinery applications.
- Non-contact Hall type sensor method.
- Friction-type handles can be operated in single - or biaxial cross form.
- The number and position of buttons can be customized.
- Optional CAN bus output.
- Friction positioning type.



## Application

This series of products are mainly used in all kinds of road machinery, construction machinery, agriculture and forestry machinery, mining machinery, usually used in the FNR file of equipment, can also be separately installed on the pilot valve operating mechanism for use.

## Technical information

### HALL

|                                 |                     |
|---------------------------------|---------------------|
| Power Supply                    | 5±0.5Vdc            |
| Supply Current                  | <11mA (Hall Sensor) |
| Limit allowed overvoltage       | 20Vdc               |
| Reverse limit allowable voltage | -10Vdc              |
| Linear error of output voltage  | <±0.2V              |

### CAN Bus

|                           |                         |
|---------------------------|-------------------------|
| Supply voltage            | 9~36Vdc                 |
| CAN version               | CAN 2.0B                |
| Agreement                 | J1939                   |
| Radio port interface card | 6-core socket (Deutsch) |

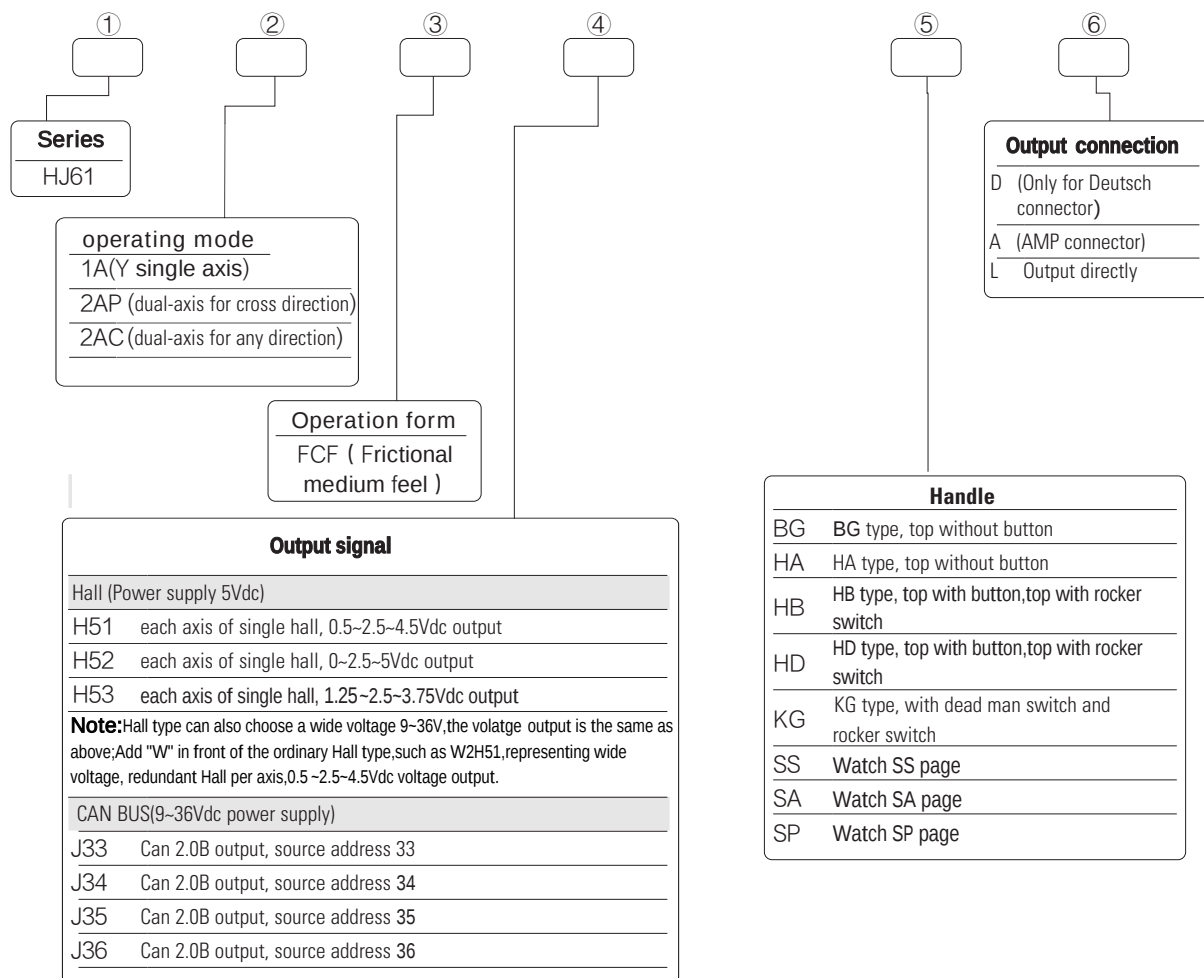
### Mechanical data

|                               |                        |
|-------------------------------|------------------------|
| Trunk sway angle              | ±20°                   |
| Operating mode                | Automatic spring reset |
| tripping force                | 4kgfcm                 |
| Maximum operating force       | 16N                    |
| Margin pressure test location | >300N                  |
| servicelife                   | >50 Times              |
| Weight                        | 475g (No Handle)       |

### Environment data

|                     |                             |
|---------------------|-----------------------------|
| Working temperature | -30°C~+70°C                 |
| Storage temperature | -40°C~+85°C                 |
| Level of protection | IP65 (Above mounting panel) |

## Product configuration



**AMP connector****16 Pin**

| Pin | Potentiometer                | HALL                             | With electrical amplifier for output voltage |
|-----|------------------------------|----------------------------------|----------------------------------------------|
| 1   |                              | Button switch 4                  | Common terminal of button                    |
| 2   | N/A                          | Button switch 3                  | Button switch 1                              |
| 3   | X-axis pot left terminal     | Button switch 2                  | Button switch 2                              |
| 4   | X-axis pot wiper             | Button switch 1                  | Button switch 3                              |
| 5   | X-axis pot right terminal    | Top button                       | Button switch 4                              |
| 6   | X-axis pot center terminal   | Button switch 5                  | Button switch 5                              |
| 7   |                              | Button switch 6                  | Button switch 6                              |
| 8   |                              | Deadman switch                   | Top button                                   |
| 9   | Y-axis pot backward terminal | Button switch 9                  | Deadman switch                               |
| 10  | Y-axis pot wiper             | Button switch 10                 | Deadman switch                               |
| 11  | Y-axis pot forward terminal  | Common terminal of button switch |                                              |
| 12  | Y-axis pot center terminal   | Deadman switch                   |                                              |
| 13  |                              | N/A                              |                                              |
| 14  |                              | N/A                              |                                              |
| 15  |                              | N/A                              |                                              |
| 16  |                              |                                  |                                              |

**12 Pin**

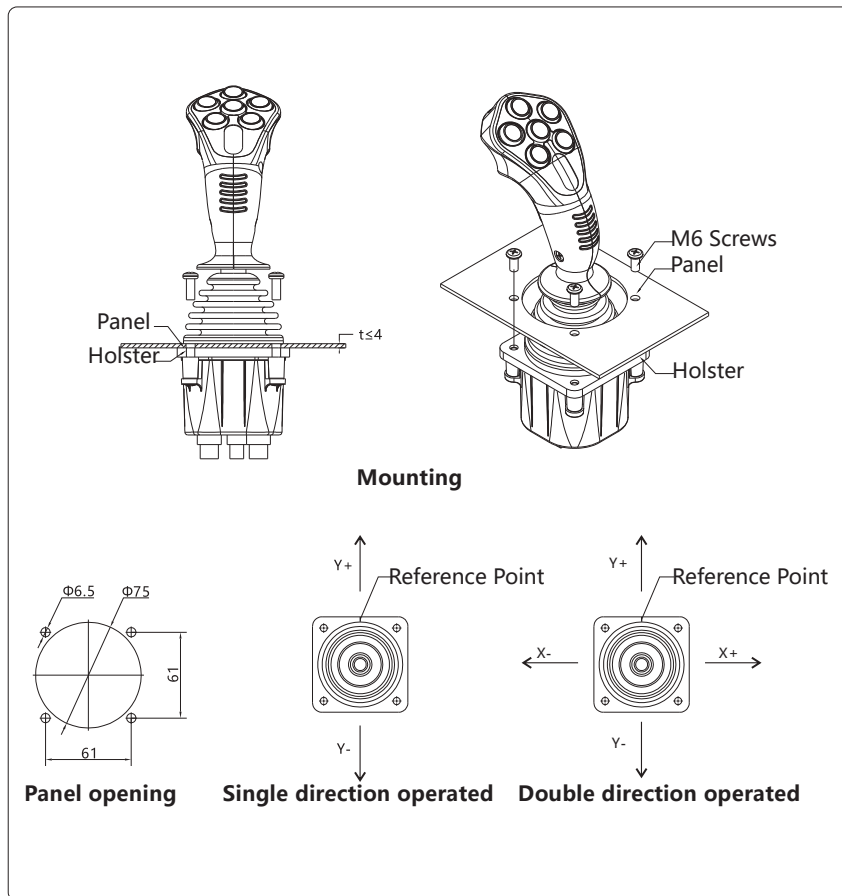
| Pin | Potentiometer                 | Hall                            |
|-----|-------------------------------|---------------------------------|
| 1   | Button switch 4               | + 5V (redundant hall)           |
| 2   | Button switch 3               | 0V (redundant hall)             |
| 3   | Button switch 2               | +5V power supply                |
| 4   | Button switch 1               | 0V power supply                 |
| 5   | Top button                    | Y-axis output (redundant hall)  |
| 6   | Button switch 5               | X-axis output                   |
| 7   | Button switch 6               | X-axis output (redundant hall)  |
| 8   | Deadman switch                | Y-axis output                   |
| 9   | Button switch 9               | Z1-axis output                  |
| 10  | Button switch 10              | Z2-axis output                  |
| 11  | Button switch common terminal | Z1-axis output (redundant hall) |
| 12  | Deadman switch                | Z2-axis output (redundant hall) |

Standard Hall output, 3/4/6/8 pin outlet

**8 Pin**

| Pin Hall | Conversion circuit output |
|----------|---------------------------|
| 1        | VCC                       |
| 2        | GND                       |
| 3        | X-axis output             |
| 4        | Y-axis output             |
| 5        | Out com                   |
| 6        | NA                        |
| 7        | NA                        |
| 8        | NA                        |

## Product installation



## Deutsch connection

| Pin | Can output | Color  |
|-----|------------|--------|
| 1   | GND        | Black  |
| 2   | VCC        | Red    |
| 3   | CAN high   | Yellow |
| 4   | CAN low    | Green  |
| 5   | CAN shield | N/A    |
| 6   | N/A        | N/A    |

# HJ70 Series Multi Axis Joystick

## Product features

- Spring return, single-axis or dual-axis operated.
- Cross direction or arbitrary direction operated optional.
- Hall effect angle detection long life.
- Various output option.
- Optional wide voltage 9 to 36Vdc application environment.

## Application

Typical application on Cranes, loaders, Forklifts, excavators, access platform, tractors, harvesters, and so on.



## Technical information

### Electrical data

| Hall                                   |                                          |
|----------------------------------------|------------------------------------------|
| Power supply                           | 5 ± 0.5Vdc                               |
| Supply current (nominal power supply): | < 11 mA (Single axis), <22mA (Dual-axis) |
| Maximum allowable overload voltage     | 20Vdc                                    |
| Reverse maximum allowable voltage      | -10Vdc                                   |
| Output linearity tolerance             | < ± 0.2V                                 |

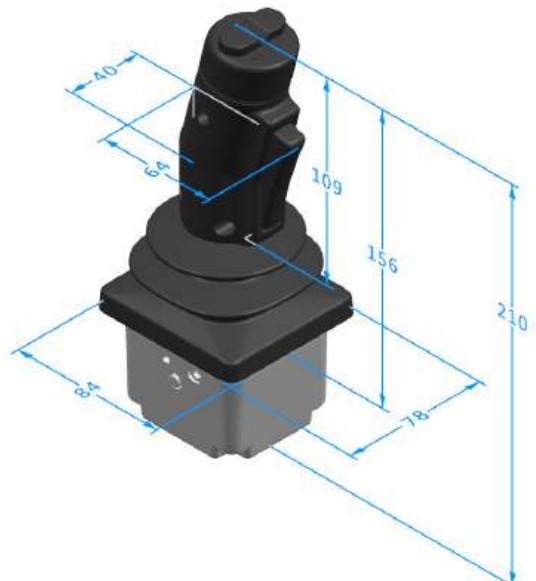
### Mechanical features

|                         |                                |
|-------------------------|--------------------------------|
| Travel angle            | ± 20°                          |
| Operating type          | Spring return                  |
| Breakout force          | 9N                             |
| Operating force(max)    | 20N                            |
| Maximum allowable force | >300N                          |
| Expecting life          | >1million cycles (Hall effect) |
| Weight                  | 450g (Without handle )         |

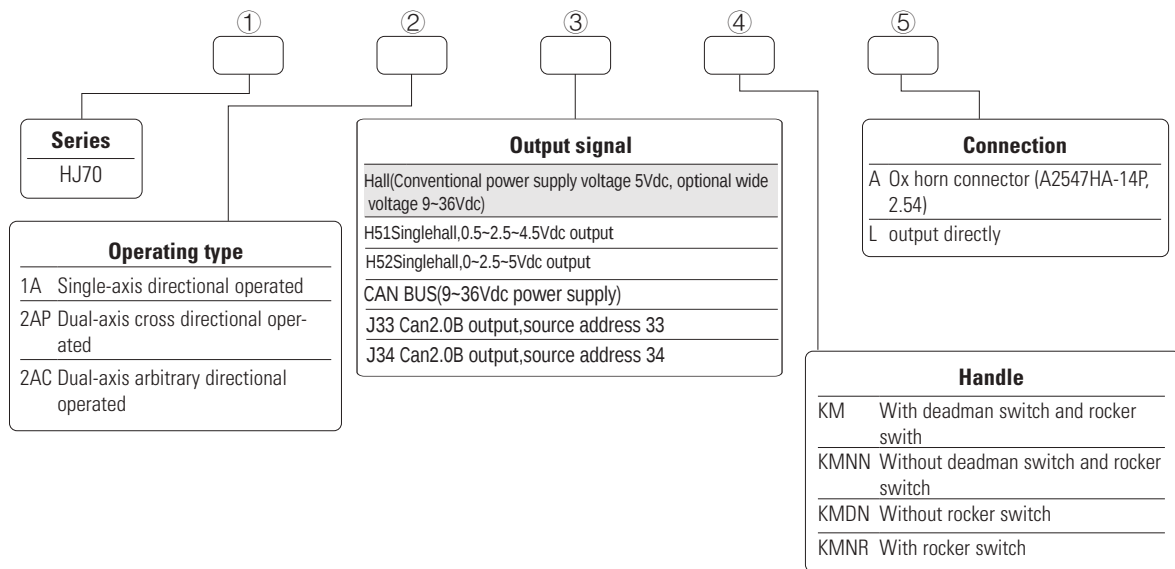
### Environmental data

|                       |                          |
|-----------------------|--------------------------|
| Operating temperature | -30℃~+70℃                |
| Storage temperature   | -40℃~+85℃                |
| Protection level      | IP65 (Above the flange ) |

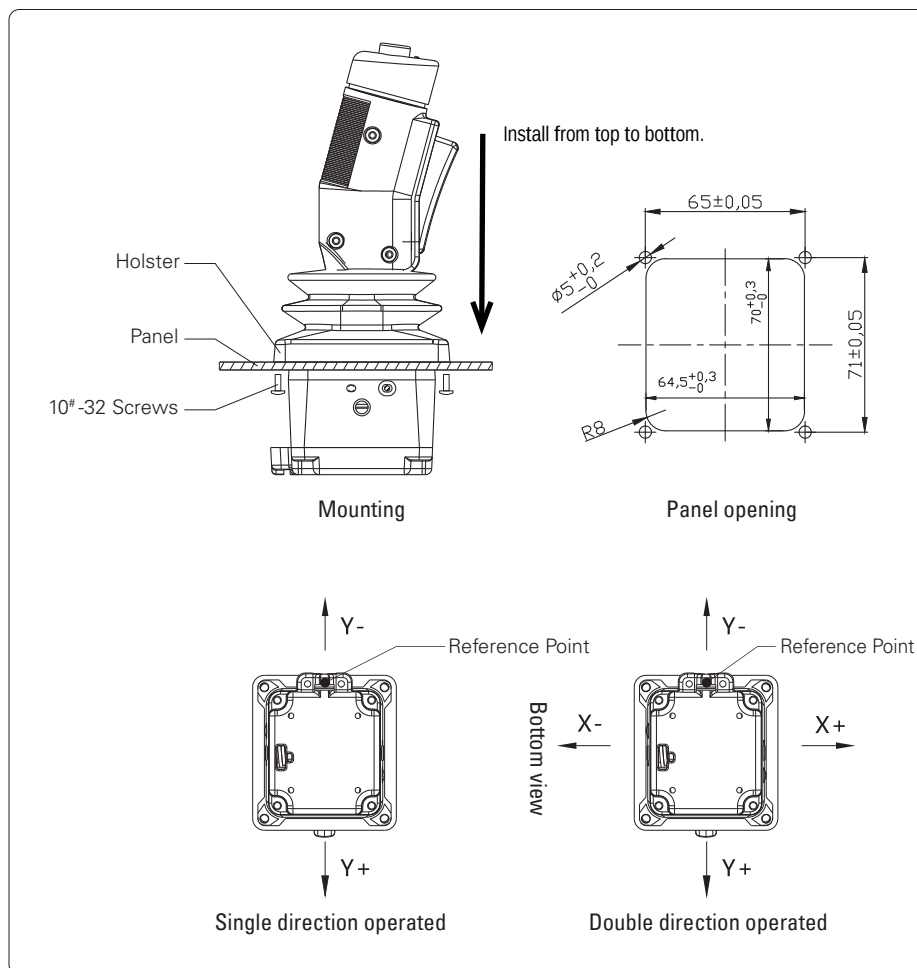
## Dimensions



## Product configuration



## Product installation



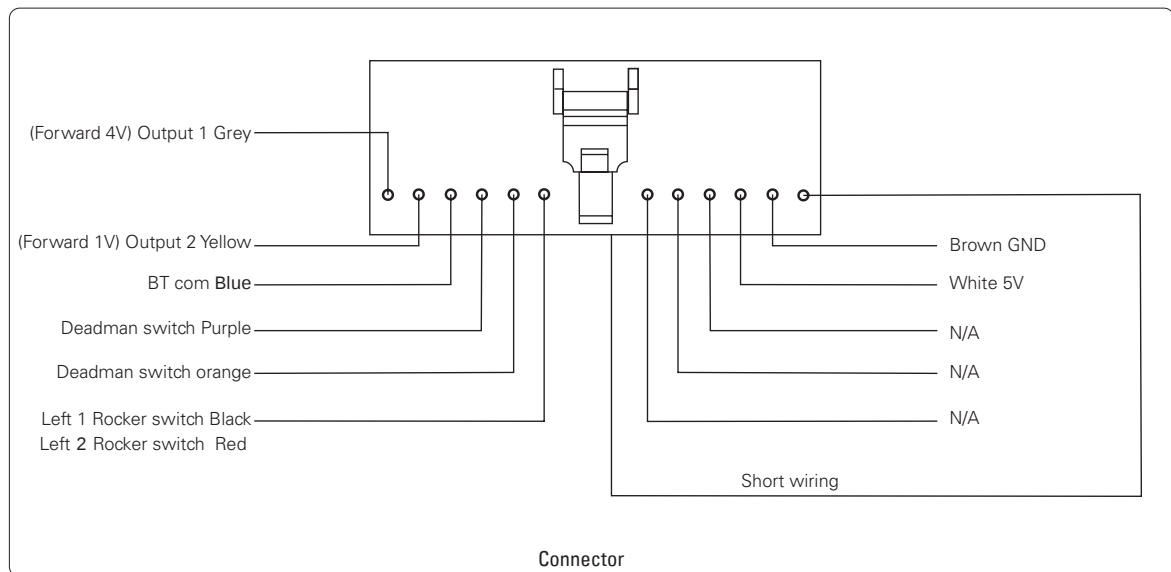
## Electrical connections

### Redundant hall

| Color       | Function                                       |
|-------------|------------------------------------------------|
| Grey        | Y-axis (forward and backward)                  |
| Yellow      | Y-axis Redundant output (forward and backward) |
| Blue        | Common terminal of Rocker switch               |
| Purple      | Deadman switch                                 |
| Orange      | Deadman switch                                 |
| Black       | Rocker switch (left)                           |
| Red         | Rocker switch (right)                          |
| Green       | X-axis (left and right)                        |
| Green&Black | X-axis Redundant output (left and right)       |
| White       | Power supply                                   |
| Brown       | 0V                                             |

### Hall effect

| Color  | Function                         |
|--------|----------------------------------|
| Grey   | Y-axis(left and right)           |
| Yellow | X-axis(left and right)           |
| Blue   | Common terminal of rocker switch |
| Purple | Deadman switch                   |
| Orange | Deadman switch                   |
| Black  | Rocker switch ( left)            |
| Red    | Rocker switch ( right)           |
| White  | Power supply                     |
| Brown  | 0V                               |



# HJ76 Series Multi Axis Joystick

## Product features

- Spring return, single-axis or dual-axis operated.
- Cross direction or arbitrary direction operated optional.
- Hall effect angle detection long life.
- Various output option.
- Optional handle upper end.

## Application

Typical application on aerial work platform.

## Technical information

### Electrical data

#### Hall

|                                       |                                         |
|---------------------------------------|-----------------------------------------|
| Power supply                          | $5 \pm 0.5\text{Vdc}$                   |
| Supply current (nominal power supply) | <11 mA (Single axis), <22mA (Dual-axis) |
| Maximum allowable overload voltage    | 20Vdc                                   |
| Reverse maximum allowable voltage     | -10Vdc                                  |
| Output linearity tolerance            | $< \pm 0.1\text{V}$                     |

### Mechanical features

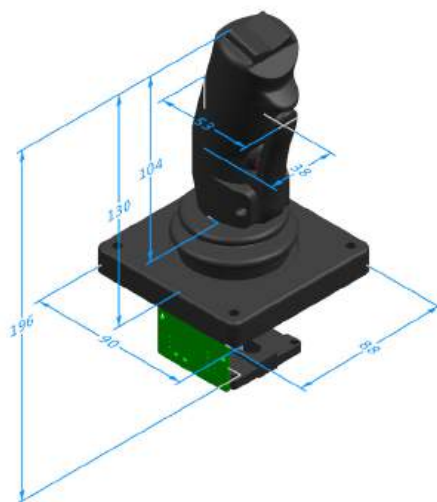
|                         |                                |
|-------------------------|--------------------------------|
| Travel angle            | $\pm 20^\circ$                 |
| Operating type          | Spring return                  |
| Breakout force          | 5N                             |
| Operating force (max)   | 11N                            |
| Maximum allowable force | >300N                          |
| Expecting life          | >2million cycles (Hall effect) |
| Weight                  | 450g (Without handle )         |

### Environmental data

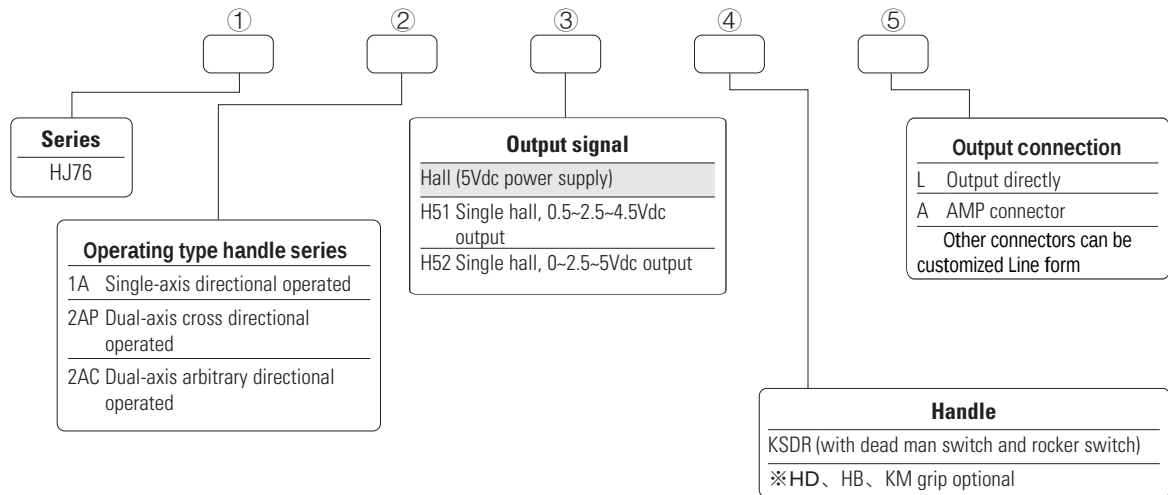
|                       |                                            |
|-----------------------|--------------------------------------------|
| Operating temperature | $-30^\circ\text{C} \sim +70^\circ\text{C}$ |
| Storage temperature   | $-40^\circ\text{C} \sim +85^\circ\text{C}$ |
| Protection level      | IP65 (Above the flange)                    |



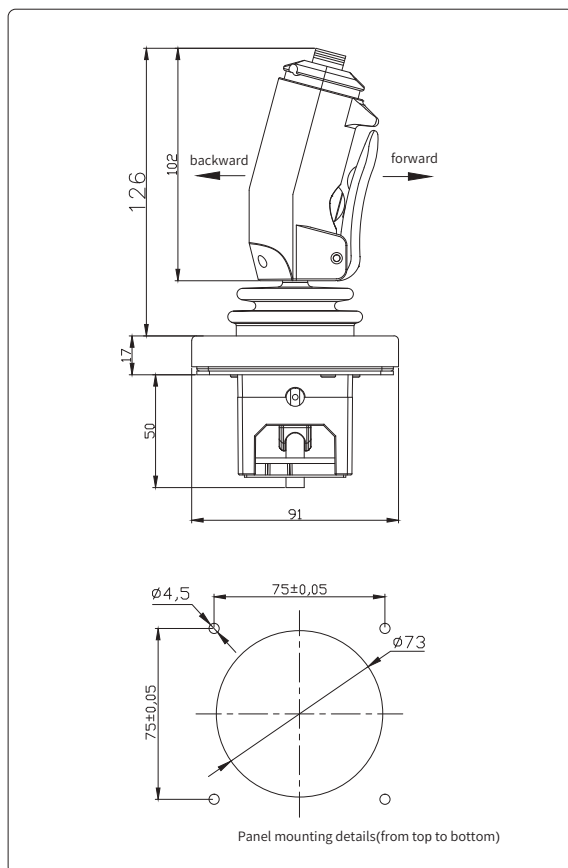
## Dimensions



## Product configuration



## Product installation



## Electrical connections

### Output directly (Single shaft, upper end with stilt plate and safety switch)

| Color  | Function                                     |
|--------|----------------------------------------------|
| White  | VCC                                          |
| Black  | GND                                          |
| Gray   | X&Y-axis output                              |
| Yellow | left Rocker switch                           |
| Purple | right Rocker switch                          |
| Brown  | Common terminal of rocker and deadman switch |
| Red    | Deadman switch                               |

# HJ77 Series Multi Axis Joystick

## Product features

- Ergonomic design, mainly for high-altitude working shear fork vehicle design application.
- The non-contact Hall sensor detects the operating Angle.
- Spring return handle in the form of uniaxial forward and backward direction operation.
- The upper end type and the signal type can be customized.
- Expandable CAN bus output.

## Application

This series of products are mainly used in high altitude working shear forklift, can be extended to other construction machinery vehicles.

## Technical information

### Electric parameter

|                                                      |                                          |
|------------------------------------------------------|------------------------------------------|
| Hall                                                 |                                          |
| Supply voltage                                       | 5±0.5Vdc                                 |
| Power supply current<br>(rated power supply current) | <11mA (single axis),<br>22mA (Dual-axis) |
| Limit allowed overvoltage                            | 20Vdc                                    |
| Reverse limit allowable voltage                      | -10Vdc                                   |
| Linear error of output voltage                       | <±0.1V                                   |

### Mechanical parameter

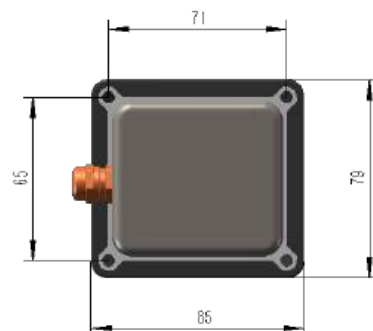
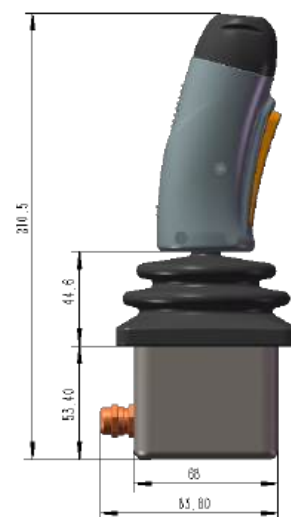
|                         |                               |
|-------------------------|-------------------------------|
| Shaking Angle           | ±20°                          |
| Operating mode          | Automatic spring reset        |
| Starting force          | 5N                            |
| Maximum operating force | 11N                           |
| Limiting force          | >300N                         |
| Service life            | >2M                           |
| Weight                  | About 560g (including handle) |

### Environmental parameter

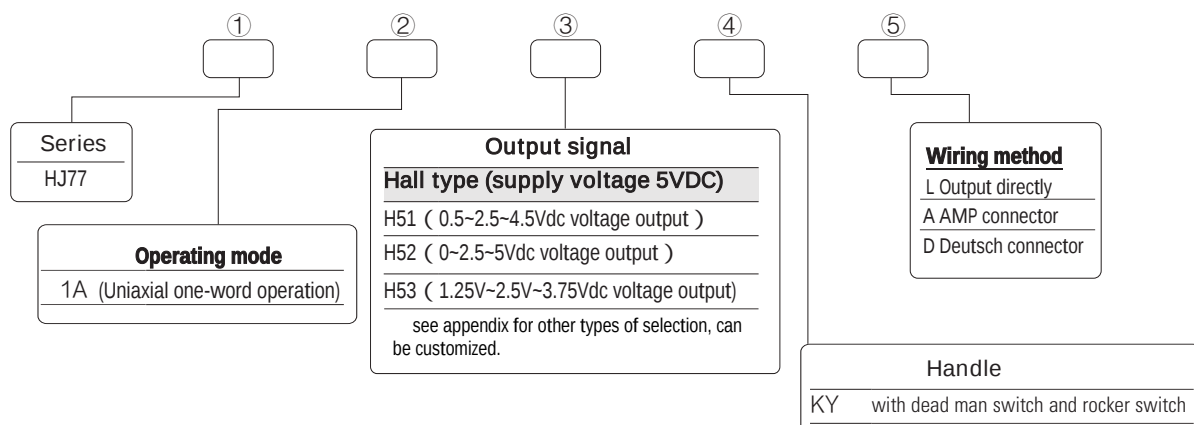
|                       |                             |
|-----------------------|-----------------------------|
| Operating temperature | -30C~+70°C                  |
| Storage temperature   | -40°C~+85°C                 |
| Level of protection   | IP66 (Above mounting panel) |



## Dimensions



## Product configuration



## Product installation



## Electrical connections

### 14 core connector outgoing cable definition

| Pin  | line color | function                                                 |
|------|------------|----------------------------------------------------------|
| 1    | grey       | Y-axis output (forward and backward direction)           |
| 2    | yellow     | Y-axis redundant output (forward and backward direction) |
| 3    | blue       | common rocker switch                                     |
| 4    | blue       | deadman switch                                           |
| 5    | purple     | deadman switch                                           |
| 6    | black      | left rocker switch                                       |
| 7    | red        | right rocker switch                                      |
| 8~11 | --         | --                                                       |
| 12   | white      | supply voltage 5Vdc                                      |
| 13   | brown      | power supply 0V                                          |
| 14   | --         | --                                                       |

# HJ80 Series Multi Axis Joystick

## Product features

- Heavy-duty industrial joystick;
- Spring return, single axis or two axis operation;
- Single or double grip available;
- Upper grip with vibrator optional;
- Hall sensor angle detection;
- Various output are available.

## Application

Cranes, loaders, excavators, etc

## Technical Information

### Electrical data

#### Hall

|                                       |                       |
|---------------------------------------|-----------------------|
| Power supply                          | $5 \pm 0.5\text{Vdc}$ |
| Supply current (nominal power supply) | <11 mA (Single axis)  |
| Maximum allowable overload voltage    | 20Vdc                 |
| Reverse maximum allowable voltage     | -10Vdc                |
| Output linearity tolerance            | $< \pm 0.2\text{V}$   |

#### CANBUS

|              |                 |
|--------------|-----------------|
| Power supply | 9~36Vdc         |
| CAN edition  | CAN2.0B         |
| Protocol     | J1939           |
| Terminal     | 6 Pin (Deutsch) |

### Installation

|                         |                  |
|-------------------------|------------------|
| Travel angle            | $\pm 20^\circ$   |
| Operating type          | Spring return    |
| Breakout force          | 3N               |
| Operating force(max)    | 8N               |
| Maximum allowable force | >300N            |
| Expecting life          | 3 million cycles |
| Weight                  | 1500g            |

### Environmental data

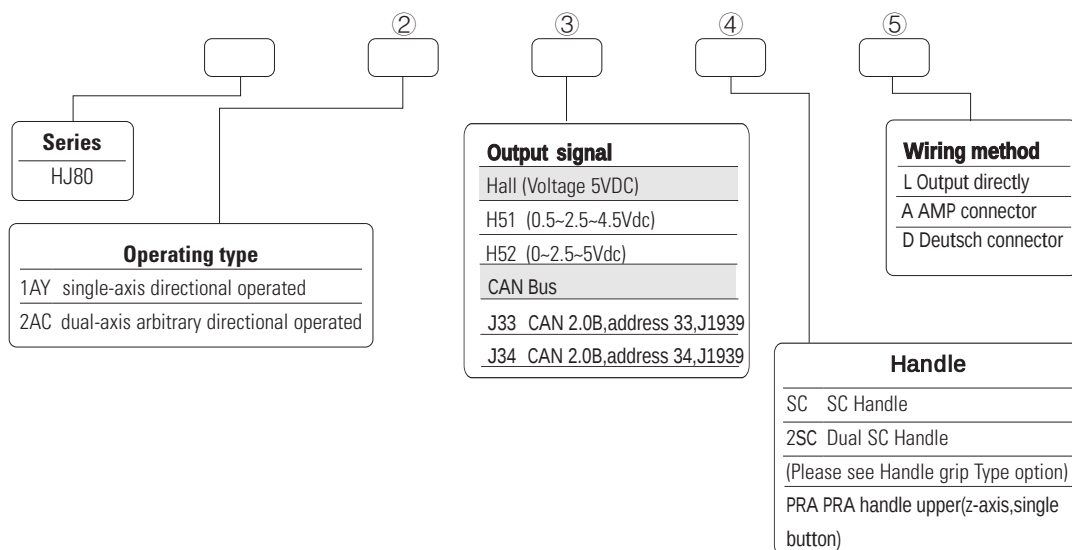
|                       |                         |
|-----------------------|-------------------------|
| Operating Temperature | -30°C~+70°C             |
| Storage Temperature   | -40°C~+85°C             |
| Protection level      | IP65 (Above the flange) |



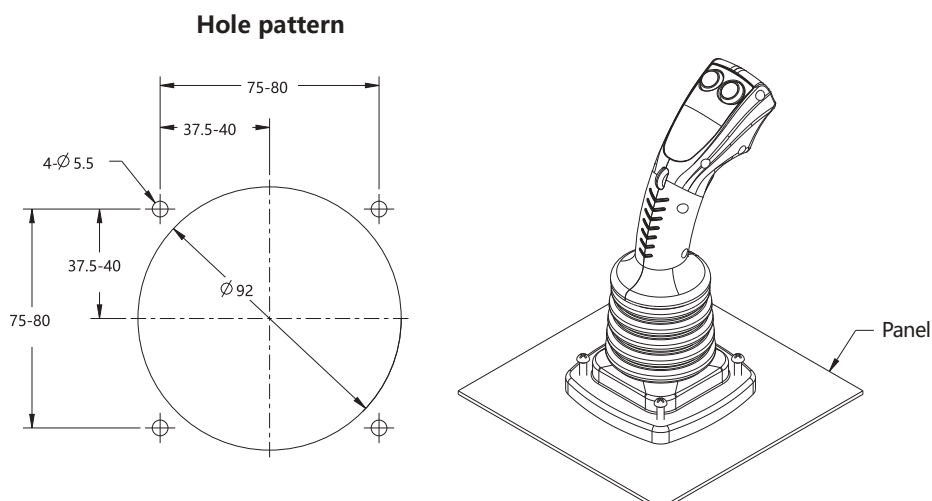
## Dimensions



## Product configuration



## Product installation



## Electrical connections

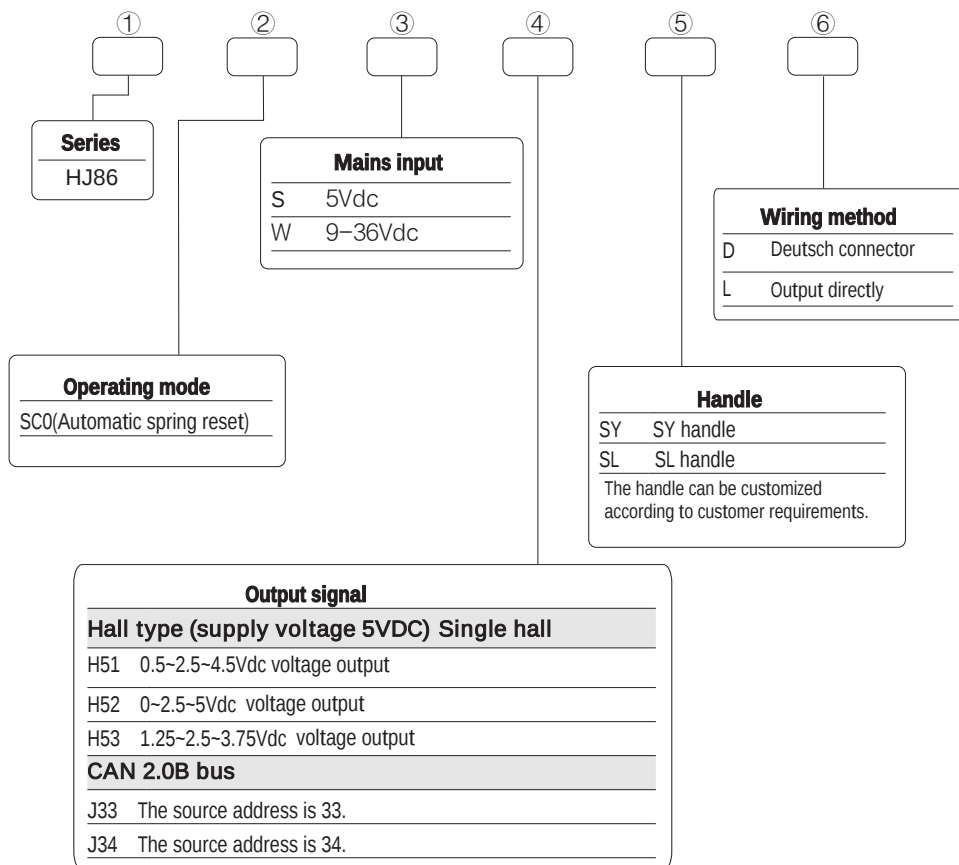
### Deutsch connector

| Pin | CAN output | Color  |
|-----|------------|--------|
| 1   | GND        | Black  |
| 2   | VCC        | Red    |
| 3   | CAN High   | Yellow |
| 4   | CAN Low    | Green  |
| 5   | CAN shield | N/A    |
| 6   | N/A        | N/A    |

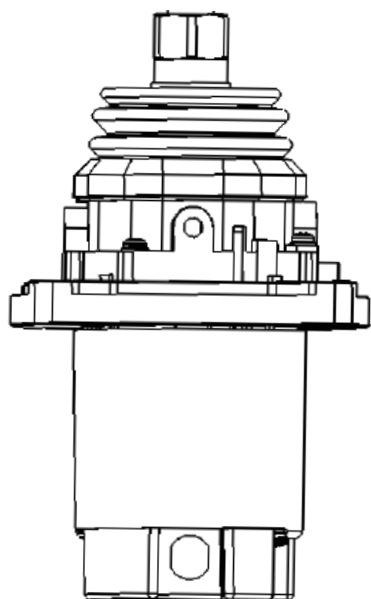




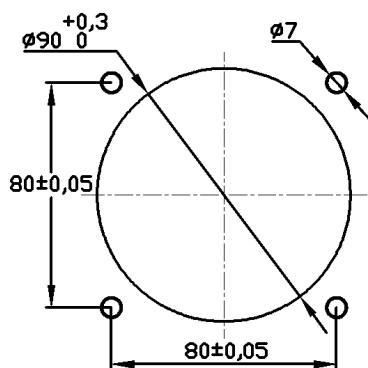
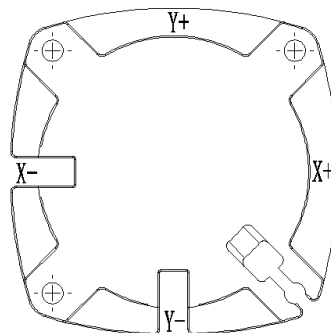
## Product configuration



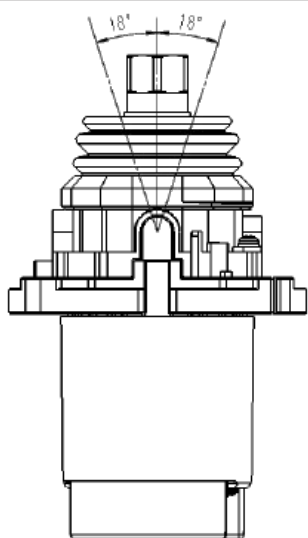
## Product installation



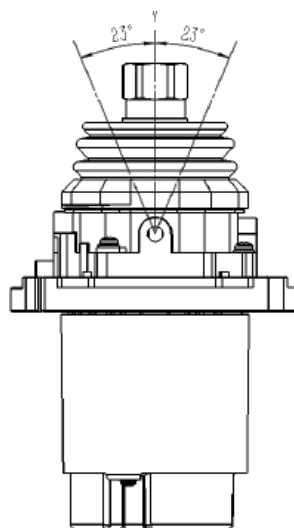
Customer installation diagram



Outline and hole size drawing



Side-to-side shaking angle



Angle of rocking back and forth

## Electrical connections

### CAN bus

| Pin | Outgoing definition      |
|-----|--------------------------|
| 1   | Power supply 9-36Vdc     |
| 2   | The supply voltage is 0V |
| 3   | HSCAN                    |
| 4   | LSCAN                    |
| 5   | CAN shield               |
| 6   | N/A                      |

### Hall sensor output definition

| Line color | function                                |
|------------|-----------------------------------------|
| red        | 5Vdc mains input                        |
| black      | GND                                     |
| yellow     | Hall output forward and backward        |
| white      | Hall output in left and right direction |

# HJ87 Series Multi Axis Joystick

## Product features

- Ergonomic design, mainly for high altitude working vehicle design application.
- The non-contact Hall sensor detects the operating angle.
- The spring return handle can be operated in any direction of single or double shaft.
- The type of the upper end and the number of switches and whether to configure analog quantity can be customized.
- Optional CAN bus output.

## Application

This series of products are mainly used in high-altitude working arm truck, road machinery, fire fighting vehicles, mining machinery and other equipment.



## Technical information

### Electrical parameter

| Hall                            |                          |
|---------------------------------|--------------------------|
| supply voltage                  | 5±0.5Vdc                 |
| supply current                  | < 11mA(Each hall sensor) |
| Limit allowed overvoltage       | 20Vdc                    |
| Reverse limit allowable voltage | -10Vdc                   |
| Linear error of output voltage  | ±0.2Vdc                  |
| CAN Bus                         |                          |
| Mains input                     | 9~36Vdc                  |
| CAN                             | CAN2.0B                  |
| agreement                       | J1939                    |
| Connection port                 | Customization            |

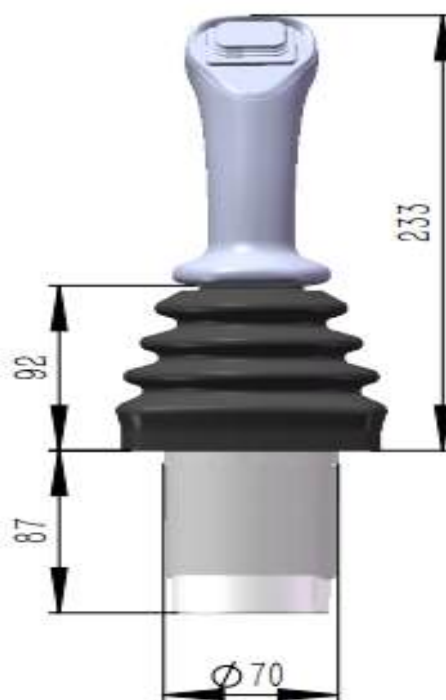
### Mechanical parameter

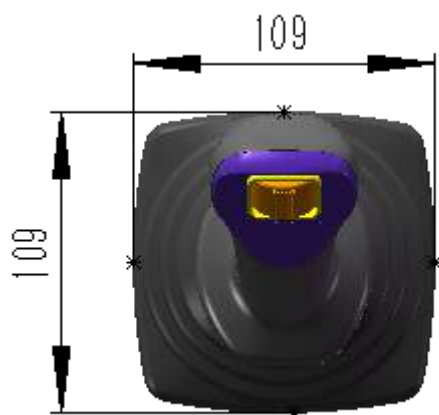
|                               |                            |
|-------------------------------|----------------------------|
| Shaking angle                 | ±23° before and after ±18° |
| Operating mode                | Automatic spring reset     |
| Starting force                | 4N                         |
| Maximum operating force       | 11N                        |
| Margin pressure test location | >300N                      |
| Service life                  | > 2M                       |
| Weight                        | About 1KG                  |

### Environmental parameter

|                       |                             |
|-----------------------|-----------------------------|
| Operating temperature | -30C~+70°C                  |
| Storage temperature   | -40°C~+85°C                 |
| Level of protection   | IP65 (Above mounting panel) |

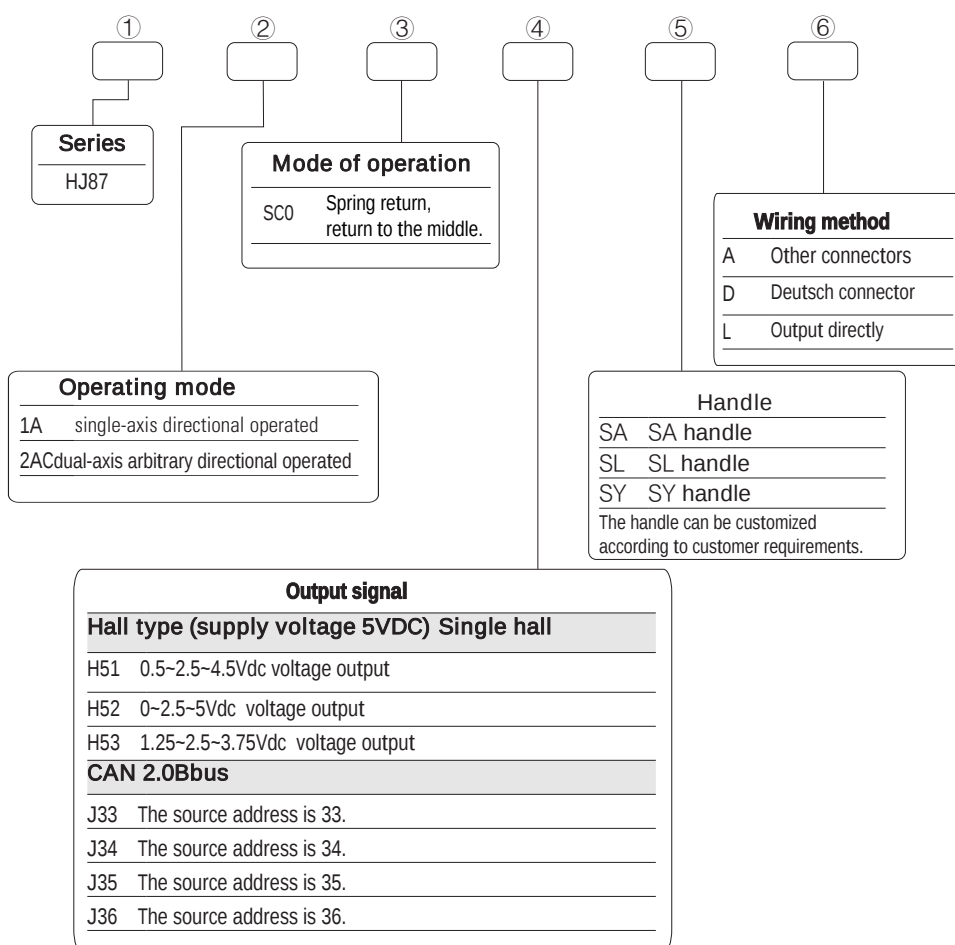
## Dimensions



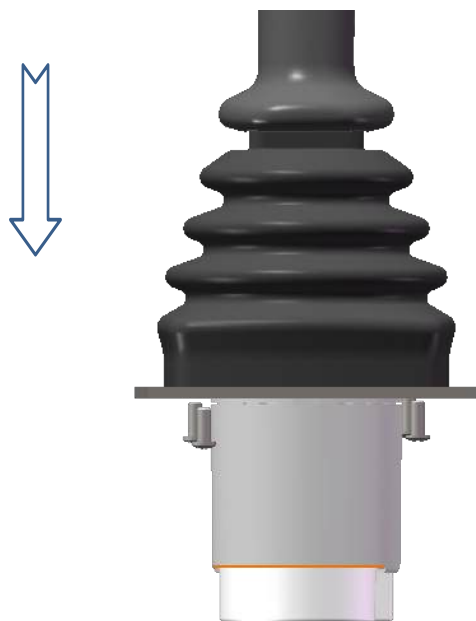


Planform

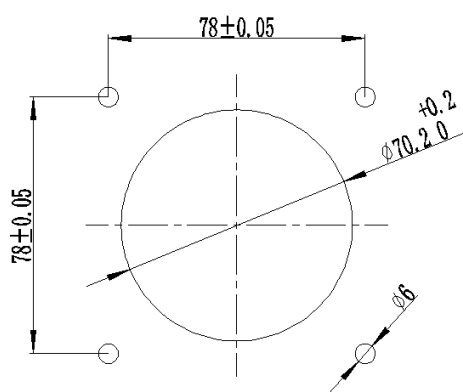
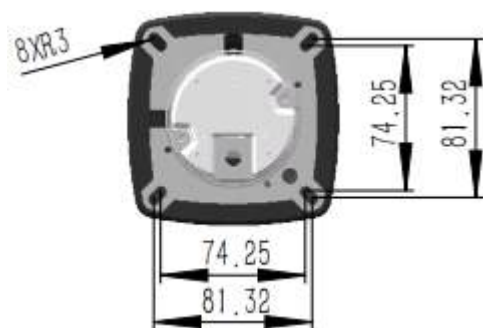
### Product configuration



## Product installation

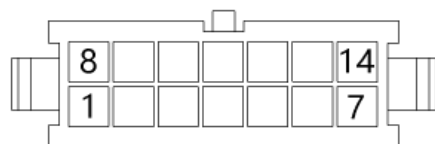


Customer installation diagram



Outline and hole size drawing

## Qualification definition



Wiring diagram

| The bottom line definition |            |                                | Top out line definition |                               |
|----------------------------|------------|--------------------------------|-------------------------|-------------------------------|
| pin                        | line color | function                       | line color              | function                      |
| 1                          | red        | The supply voltage is 5Vdc     | white                   | Stilt Plate left (1a)         |
| 2-3                        |            |                                | red                     | Common end of stilt board (1) |
| 4                          | black      | Power supply 0V                | brown                   | Stilt Plate right(1a)         |
| 5                          | blue       | The supply voltage is 12Vdc.   |                         |                               |
| 6-8                        |            |                                |                         |                               |
| 9                          | green      | Hall output.                   |                         |                               |
| 10                         |            |                                |                         |                               |
| 11                         | gray       | Y-output 12V (rear direction)  |                         |                               |
| 12                         |            |                                |                         |                               |
| 13                         | brown      | Y+ Output 12V (rear direction) |                         |                               |
| 14                         |            |                                |                         |                               |

# HJ90 Series Multi gear joystick

## Product features

- Grip type handle.
- Left and right direction spring self-reset.
- Large current switching output.
- Six gears, front, center, rear.

## Application

This series of products are mainly used in engineering vehicle transmission.

## Technical information

### Electrical parameter

|                 |          |
|-----------------|----------|
| Supply voltage  | 24Vdc    |
| Working voltage | 20-32Vdc |
| Maximum current | 4A       |

### Mechanical parameter

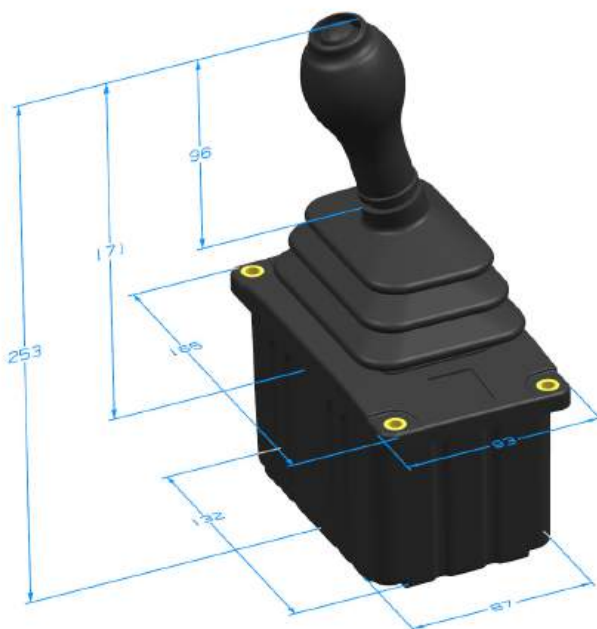
|                         |                                                                     |
|-------------------------|---------------------------------------------------------------------|
| Shaking angle           | $\pm 15^\circ$ (X-axis)                                             |
| Operating mode          | X-axis spring return<br>Y-axis front, center, and rear three gears. |
| Starting force          | 5N                                                                  |
| Maximum operating force | 25N                                                                 |
| Limiting force          | >300N                                                               |
| Service life            | >1M                                                                 |
| Weight                  | 1260g                                                               |

### Environmental parameter

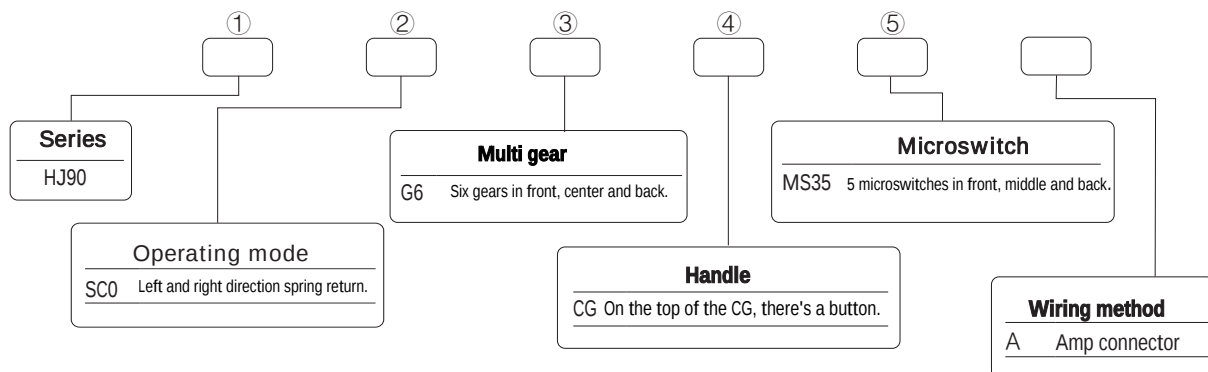
|                       |             |
|-----------------------|-------------|
| Operating temperature | -30°C~+70°C |
| Storage temperature   | -40°C~+80°C |
| Level of protection   | IP64        |



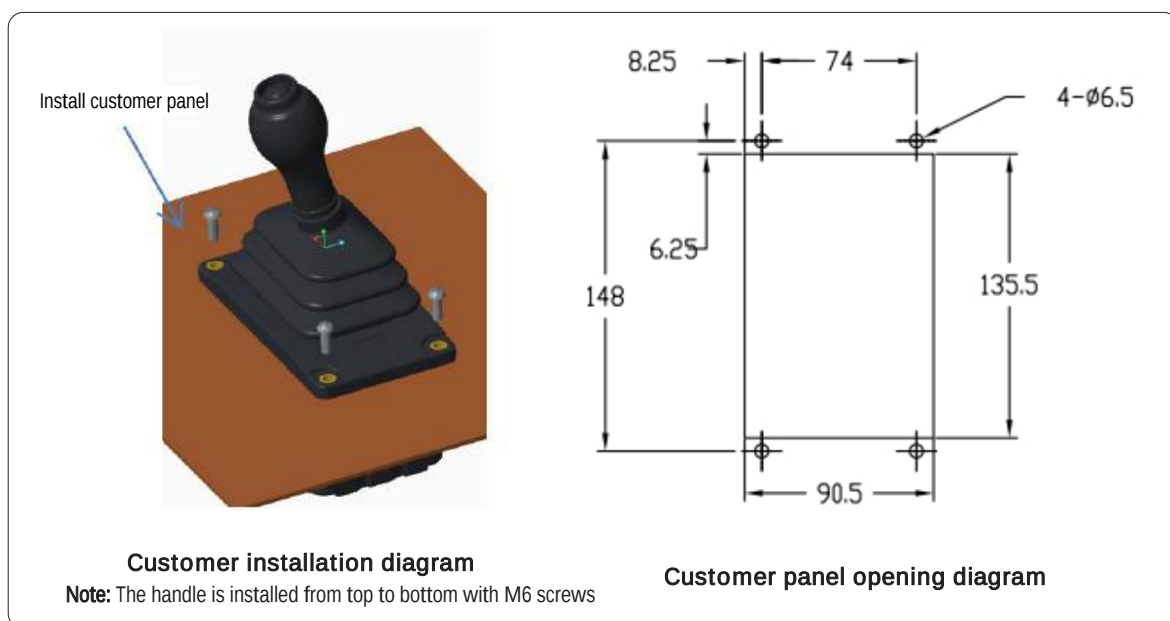
## Dimensions



## Product configuration



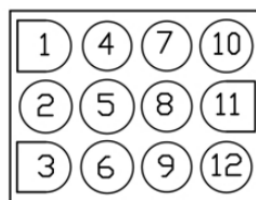
## Product installation



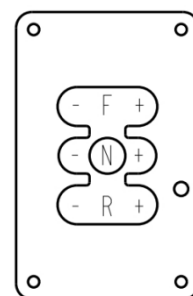
## Electrical connections

| Pin | Function     |
|-----|--------------|
| 1   | N/A          |
| 2   | COM          |
| 3   | N/A          |
| 4   | F            |
| 5   | N            |
| 6   | R            |
| 7   | T+           |
| 8   | T-           |
| 9   | N/A          |
| 10  | Upper button |
| 11  | N/A          |
| 12  | N/A          |

## Interface pin



## Direction definition



# HJ92 Series Single axis Joystick

## Product features

- Friction type single axis handle with Z limit.
- It CAN be applied to the CAN 2.0B universal protocol
- Customizable CAN protocol for customers.
- Various handle upper ends can be configured.

## Application

Agricultural sugarcane machine, cotton picker and other agricultural machinery.

## Technical information

### Electrical parameter

|                                  |              |
|----------------------------------|--------------|
| Supply voltage                   | 9~36Vdc      |
| Maximum supply voltage           | 36Vdc        |
| Maximum overload voltage         | 36Vdc        |
| Maximum reverse polarity voltage | /            |
| Load resistance                  | 1k $\Omega$  |
| Output type                      | CAN 2.0B     |
| Linear error of output voltage   | < $\pm 0.2V$ |

### Mechanical parameter

|                               |                                                                     |
|-------------------------------|---------------------------------------------------------------------|
| Shaking Angle                 | Forward+35° Backward-20°(Angle adjustable)                          |
| Operating mode                | Back and forth friction type, reset to the feel slot in the middle. |
| Starting force                | Starting force 5kgf $\pm$ 0.5kgf                                    |
| Maximum operating force       | 100kgf                                                              |
| Margin pressure test location | >300N                                                               |
| Service life                  | > 500,000 times                                                     |
| Weight                        | About 780g                                                          |
| Conventional operating moment | 4-55kgfvcmm                                                         |

### Environmental parameter

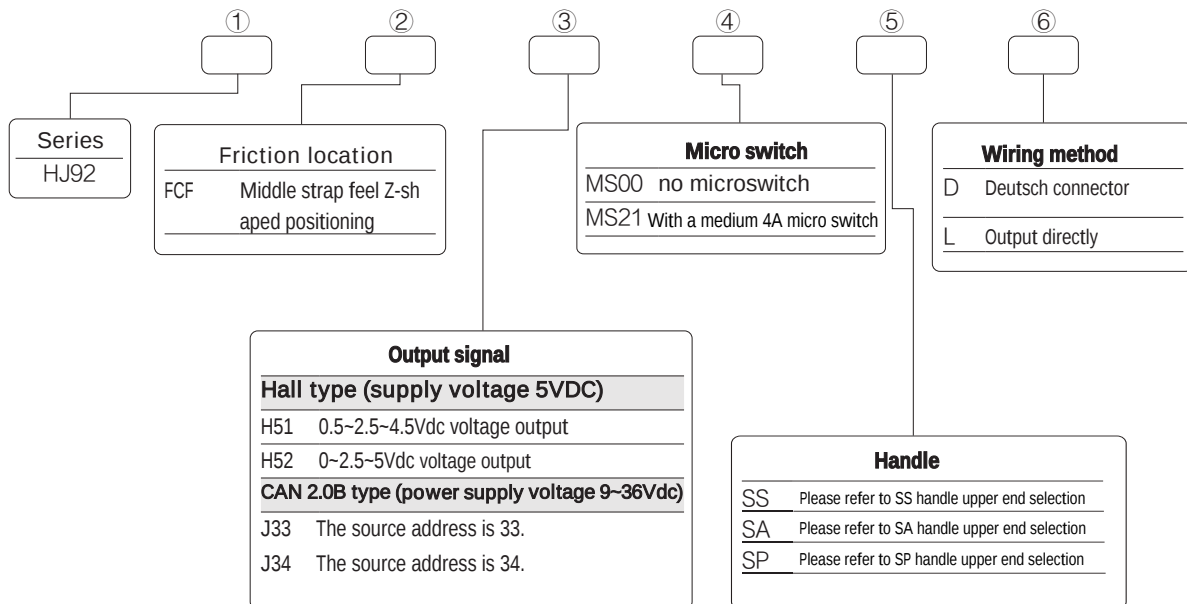
|                       |             |
|-----------------------|-------------|
| Operating temperature | -30C~+70°C  |
| Storage temperature   | -40°C~+85°C |
| Level of protection   | IP65        |



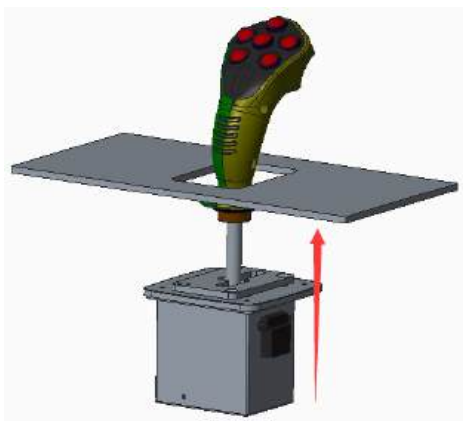
## Dimensions



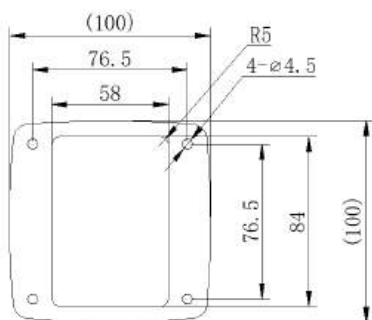
## Product configuration



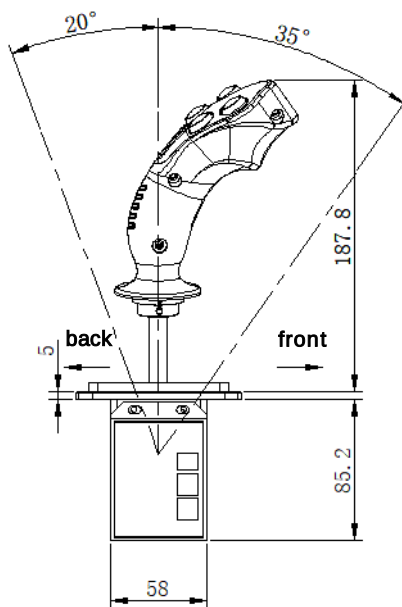
## Product installation



Customer installation diagram



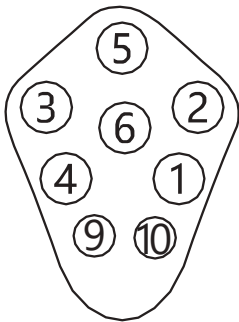
Customer panel opening diagram



Single axis operation direction definition

Note: The installation direction is from bottom to top. You are advised to install the joystick on the panel whose thickness is not greater than 4mm using M4\*10 screws.

Electrical connections



4 core Dechi plug-in wiring

| Pin | Connection |
|-----|------------|
| 1   | VCC        |
| 2   | GND        |
| 3   | CANH       |
| 4   | CANL       |



Button definition:  
Top button for safety number 7  
The switch is number 8

Optional button color:



## Future Trend



# FJ1 Series Single Axis Joystick

## Product features

- Single-axis finger operated, forward and backward directional operated.
- Spring return.
- The appearance of small, easy to install.
- Potentiometer or uncontact hall effect sensor.

## Application

Typical application on remote control unit, off-highway vehicle and industrial panel control.

## Technical information

### Electrical data

#### Potentiometer

|                           |                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|
| Power supply              | <32Vdc                                                                                                             |
| Total resistance          | 4K $\Omega$ or 5K $\Omega$                                                                                         |
| Electrical angle          | $\pm 28^\circ$                                                                                                     |
| Centertap angle           | $\pm 2.5^\circ$                                                                                                    |
| Dissipation(max)          | 0.25W (25°C, Non-load)                                                                                             |
| Center tap output voltage | 48%~52% ( $\pm 2\%$ )                                                                                              |
| Directional switch        | Power supply: <35Vdc<br>Maximum current: 2mA<br>Breakout angle: $\pm 5^\circ$<br>Contact resistance: <500 $\Omega$ |

#### Hall

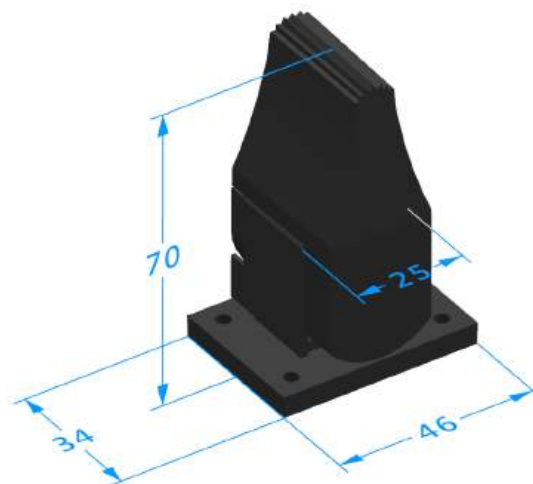
|                                    |                  |
|------------------------------------|------------------|
| Power supply                       | 5.0 $\pm$ 0.5Vdc |
| Power supply current               | <9mA             |
| Maximum allowance overload voltage | 30Vdc            |
| Reverse polarity voltage(max)      | -10Vdc           |
| Load resistance                    | >10K $\Omega$    |
| Resistance tolerance               | 2.5 $\pm$ 0.1V   |
| Output linearity tolerance         | < $\pm 5\%$      |

### Environmental data

|                       |                     |
|-----------------------|---------------------|
| Operating Temperature | -30°C~+70°C         |
| Storage Temperature   | -40°C~+85°C         |
| Protection level      | IP66 (Above flange) |



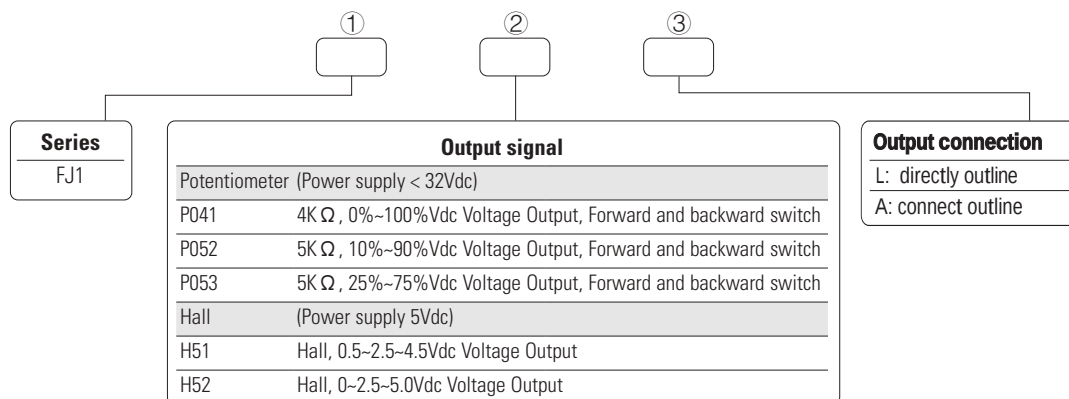
## Dimensions



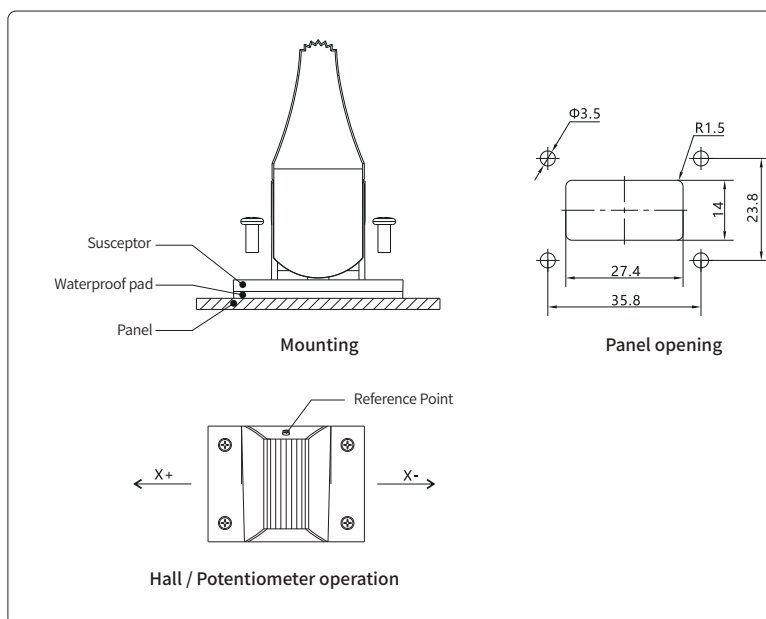
## Mechanical features

|                         |                                                               |
|-------------------------|---------------------------------------------------------------|
| Travel angle            | about $\pm 30^\circ$                                          |
| Operating type          | Spring return                                                 |
| Breakout force          | 1.3N                                                          |
| Operating force(max)    | 3N                                                            |
| Maximum allowable force | >50N                                                          |
| Expecting life          | >2 million cycles (Potentiometer)<br>>5 million cycles (Hall) |
| Weight                  | 45g                                                           |

## Product configuration



## Product installation

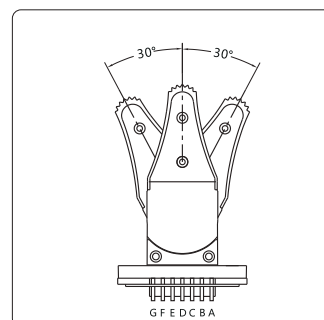


## Electrical connections

### Connection plug (FCI DUBOX™ 7 Pin Connection plu 76382-307)

| Pin | Potentiometer        | Hall | Color  |
|-----|----------------------|------|--------|
| A   | Center tap           | N/A  | Red    |
| B   | VCC                  | VCC  | Blue   |
| C   | Wiper output signal  | Bout | Black  |
| D   | GND                  | GND  | White  |
| E   | Switch terminal (X+) | N/A  | Yellow |
| F   | Switch terminal (X-) | N/A  | Green  |
| G   | COM                  | N/A  | Gray   |

**Note:** Mating terminal: FCI DUBOX™ 65240-007 Series Connector, Cable Length 20cm



# FJ3 Series Single Axis Joystick

## Product features

- Single-axis finger operated, forward and backward directional operated.
- Spring return.
- The appearance of small, easy to install.
- Un-contact hall effect sensor.
- Various output voltage range optional.
- The value ranges 9~ 36Vdc.



## Application

Typical apply on remote control unit, off-highway vehicle and industrial panel control

## Technical information

### Electrical data

|                                    |                                 |
|------------------------------------|---------------------------------|
| Power supply                       | 5.0 ± 0.5Vdc (standard voltage) |
| Power supply                       | 9~36Vdc (wide voltage)          |
| Power supply current               | <9mA; 18mA (redundant hall)     |
| Maximum allowance overload voltage | 30Vdc                           |
| Reverse polarity voltage(max)      | -10Vdc                          |
| Load resistance                    | >10K Ω                          |
| Resistance tolerance               | 2.5 ± 0.1V                      |
| Output linearity tolerance         | < ± 2%                          |

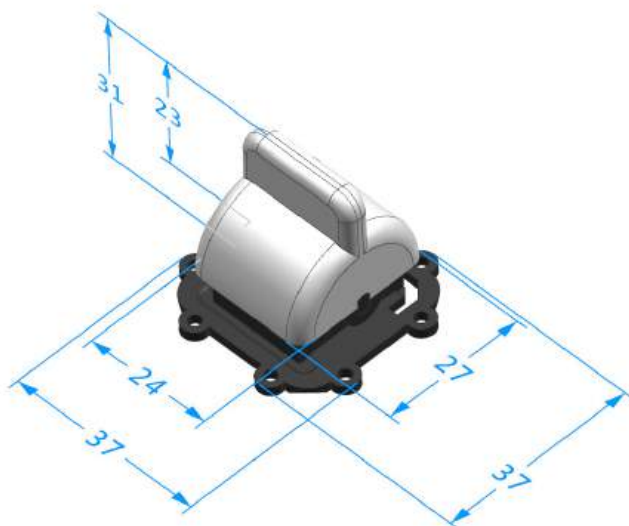
### Mechanical features

|                         |                   |
|-------------------------|-------------------|
| Travel angle            | About ± 30°       |
| Operating type          | Spring return     |
| Breakout force          | 1.3N              |
| Operating force(max)    | 3N                |
| Maximum allowable force | >30N              |
| Expecting life          | >2 million cycles |
| Weight                  | 45g               |

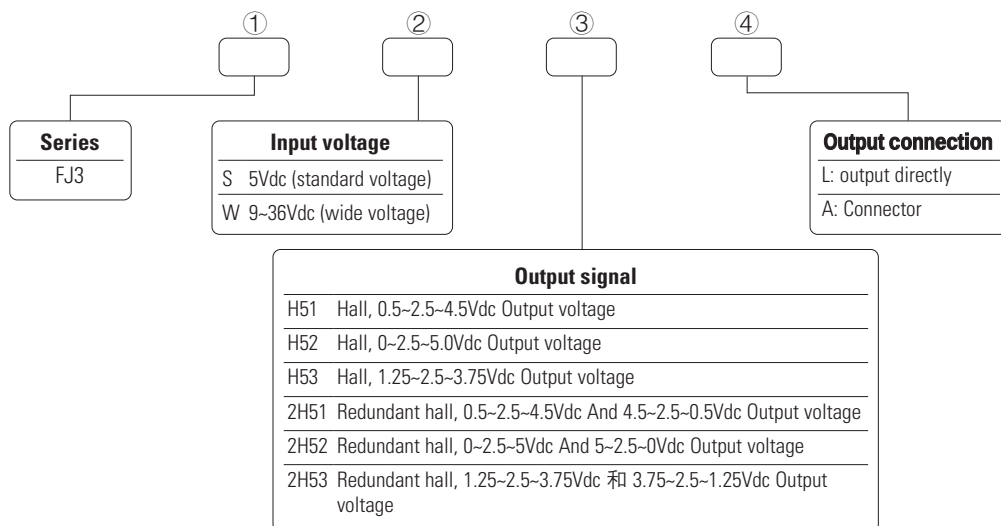
### Environmental data

|                       |                                 |
|-----------------------|---------------------------------|
| Operating temperature | -30°C~+70°C                     |
| Storage temperature   | -40°C~+85°C                     |
| Protection level      | IP65 (Only for electronic part) |

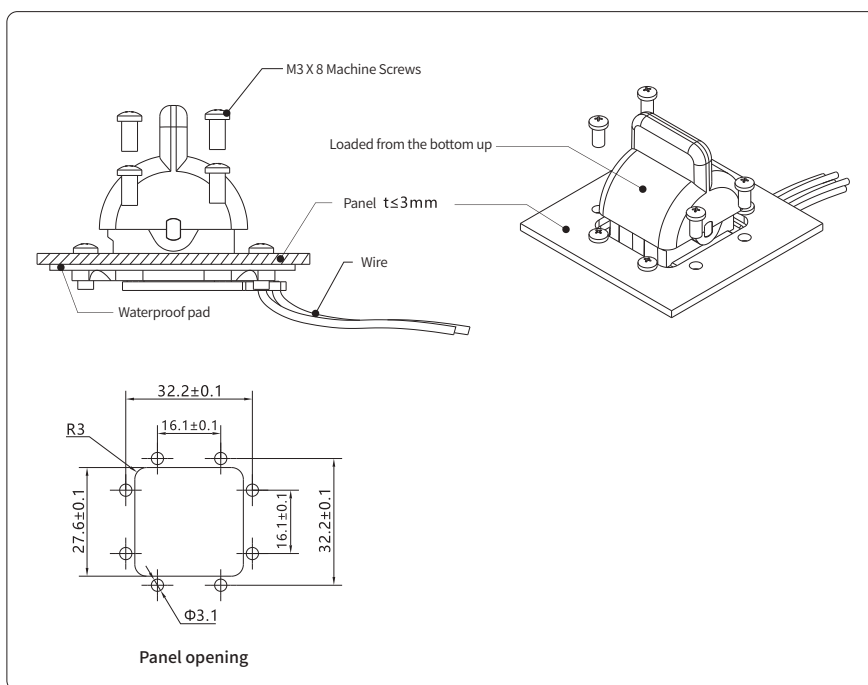
## Dimensions



## Product configuration



## Product installation



## Electrical connections

### Wire definitions

| Number | Function | Color  |
|--------|----------|--------|
| 1      | VCC      | Red    |
| 2      | GND      | Black  |
| 3      | Aout     | Yellow |
| 4      | Bout     | Green  |

# FJ6 Series Dual Axis Joystick

## Product features

- Finger operated , spring return.
- Arbitrary directional operated.
- Various voltage output optional.
- RS232 or USB connector output is available.
- Non-contact Hall sensor.

## Application

Typical application on remote electric wheel chair, CCTV, videocontrol equipment and medical equipment.

## Technical information

### Electrical data

|                                     |                                 |
|-------------------------------------|---------------------------------|
| Power supply                        | 5.0 ± 0.5Vdc (Standard Voltage) |
| Supply current                      | <9mA(Single output)             |
| Maximum allowance over-load voltage | 20Vdc                           |
| Reverse polarity voltage(max)       | -10Vdc                          |
| Load resistance                     | >10K Ω                          |
| Center tap voltage                  | 2.5 ± 0.1V                      |
| Output linearity tolerance          | < ± 4%                          |

### Mechanical features

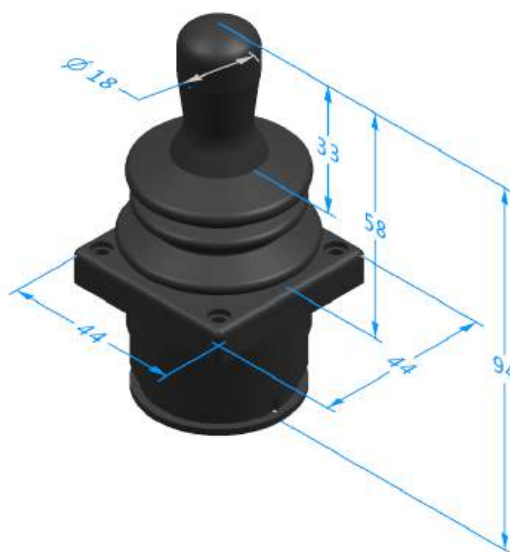
|                         |                   |
|-------------------------|-------------------|
| Travel angle            | About ± 20°       |
| Operating type          | Spring return     |
| Breakout force          | 2.3N              |
| Operating force(max)    | 6N                |
| Maximum allowable force | >300N             |
| Service life            | >3 million cycles |
| Weight                  | 120g              |

### Environmental data

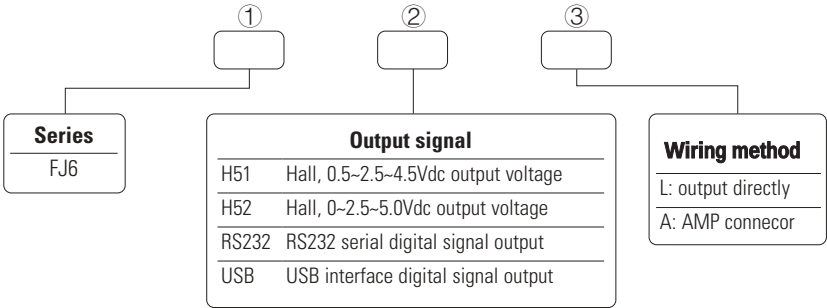
|                       |                         |
|-----------------------|-------------------------|
| Operating temperature | -30°C~+70°C             |
| Storage temperature   | -40°C~+85°C             |
| Protection level      | IP65 (Above the flange) |



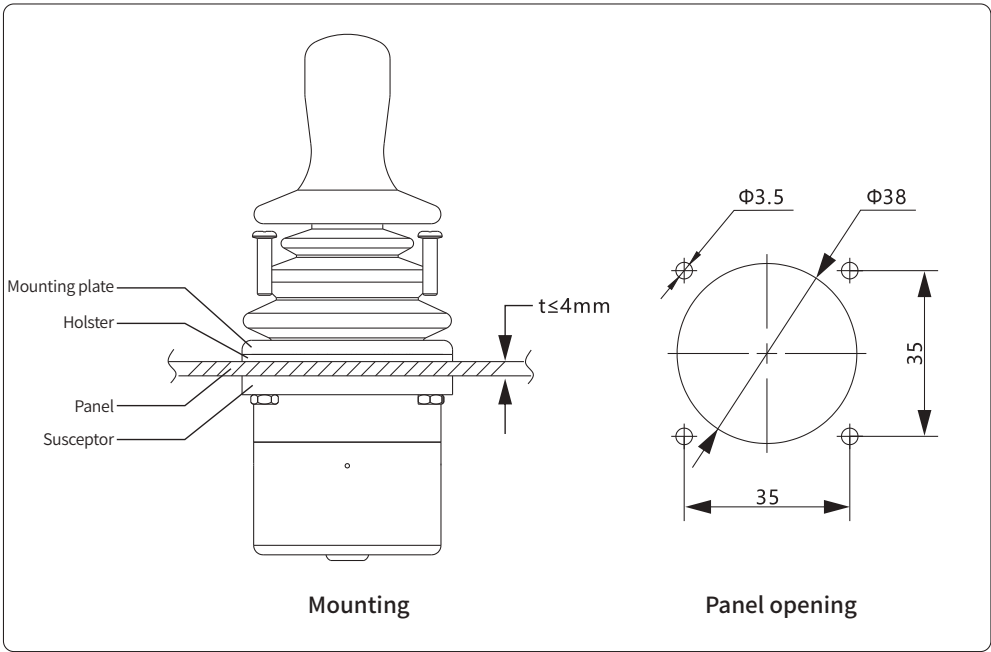
## Dimensions



### Product configuration



### Product installation



### Electrical connections

#### Output connection

| Function | Color  |
|----------|--------|
| VCC      | Red    |
| GND      | Black  |
| Xout     | Yellow |
| Yout     | Green  |

**Note:** See Appendix for schematic diagram of pin connection and Appendix for schematic diagram of output.

# FJ9S Series Three Axis Joystick

## Product features

- Based on ergonomic principles, modeling small and operation comfortable.
- Fingertip operation, Spring return.
- Three-axis large operating angle in any direction.
- Handle top with dual button at most.
- RS232 or USB connector output available.

## Application

Typical application on CCTV, Video control equipment, electric wheelchairs and medical equipment.

## Technical information

### Electrical data

|                                        |                                                         |
|----------------------------------------|---------------------------------------------------------|
| Power supply                           | 5 ± 0.5Vdc (standard voltage)<br>9~36Vdc (wide voltage) |
| Maximum supply current                 | 22mA (XY axis)<br>33mA (Z axis)                         |
| Maximum allowable overload voltage     | 20Vdc                                                   |
| Reverse maximum allowable voltage load | -10Vdc                                                  |
| resistance                             | 10K Ω                                                   |
| Center output voltage                  | 2.5 ± 0.1Vdc                                            |
| Output linearity tolerance             | < ± 4%                                                  |

### Mechanical features

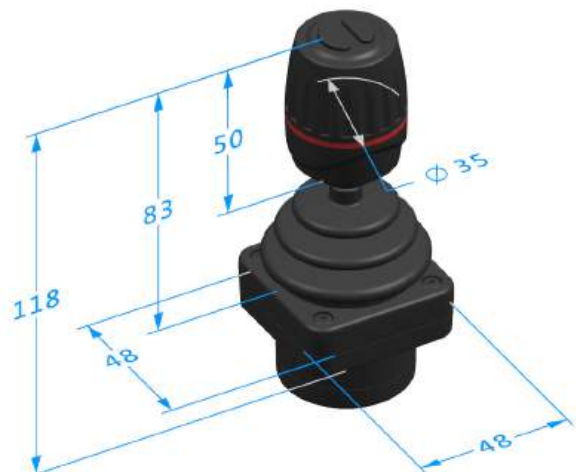
|                         |                                            |
|-------------------------|--------------------------------------------|
| Travel angle            | ± 28° (XY axis); ± 42° (Z axis)            |
| Operating type          | Spring return                              |
| Breakout force          | 3N                                         |
| Operating force(max)    | 8N                                         |
| Maximum allowable force | >300N                                      |
| Expecting life          | >3Million (XY axis)<br>>2Million (Z axis ) |
| Weight                  | 143.5g                                     |

### Environmental data

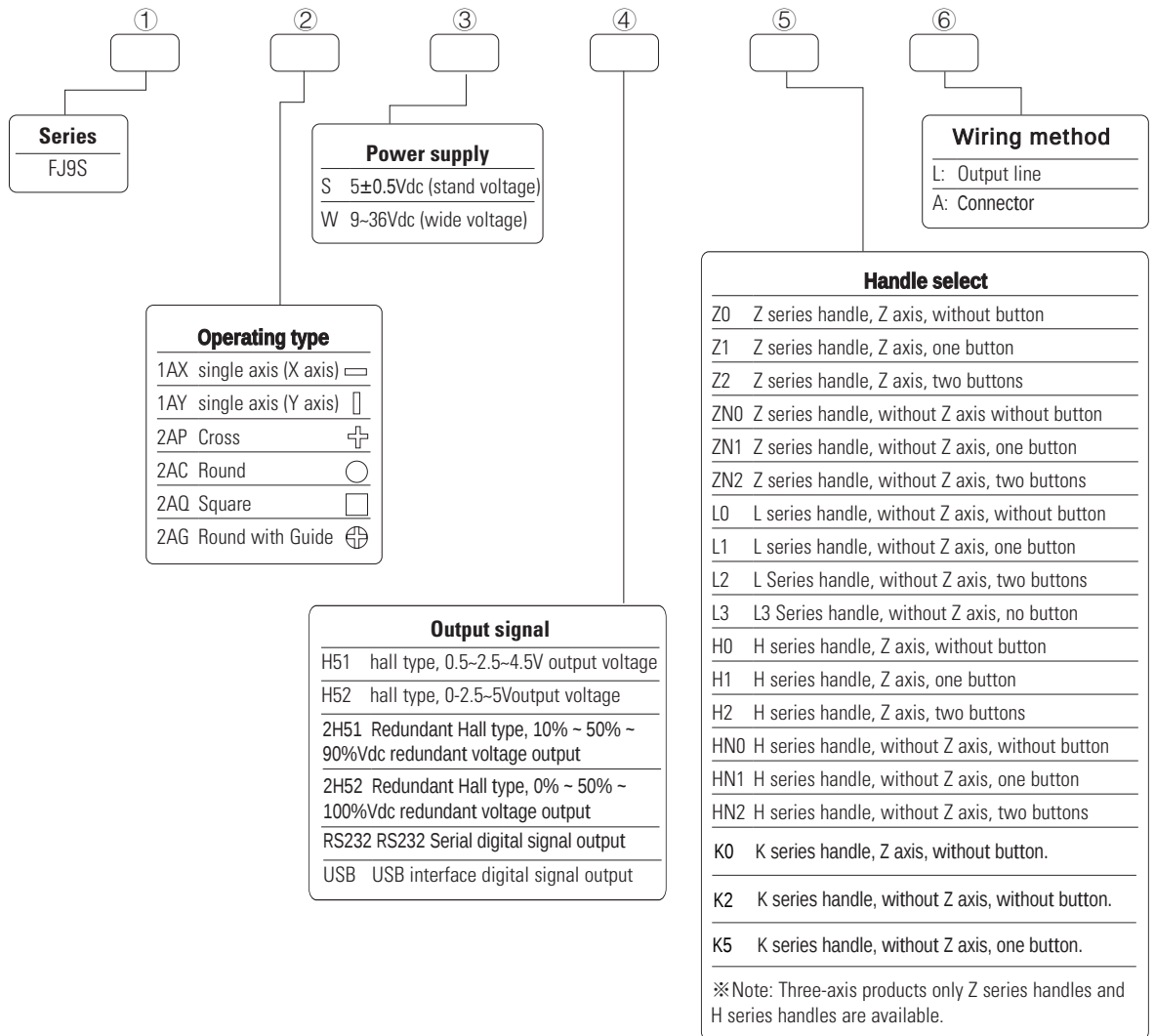
|                       |                         |
|-----------------------|-------------------------|
| Operating Temperature | -30°C~+70°C             |
| Storage Temperature   | -40°C~+85°C             |
| Protection level      | IP65 (Above the flange) |



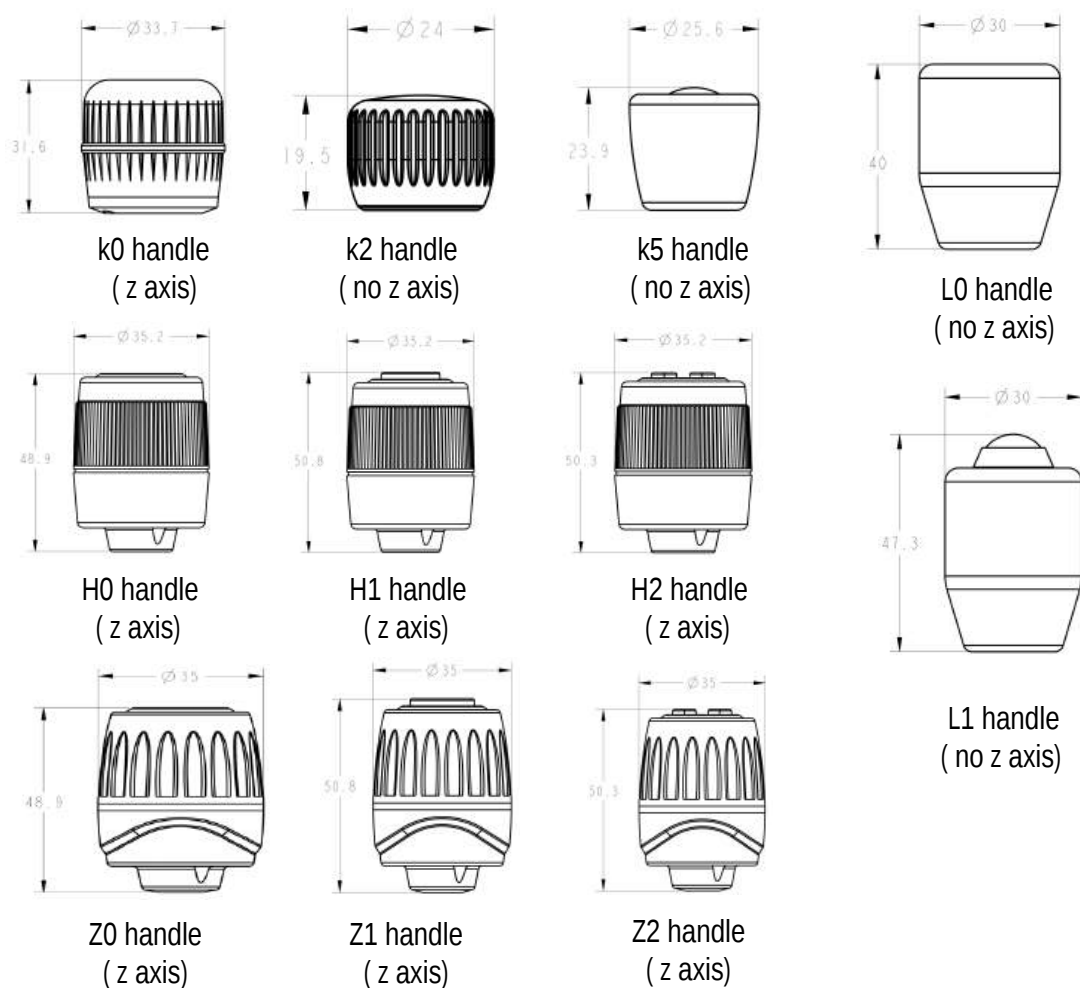
## Dimensions



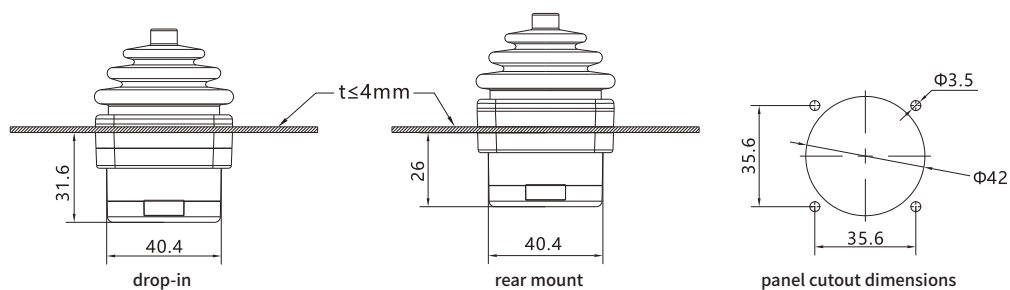
## Product configuration



## Handle

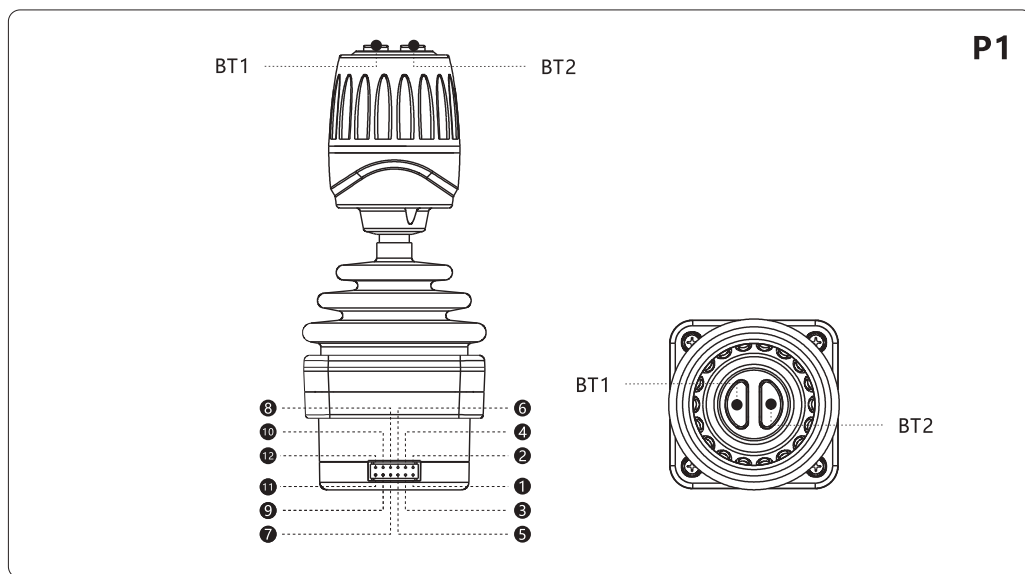


## Product installation



NOTE: With M3\*16 Phillips pan head machine screws

## Electrical connections



### Hall output

8-Pin Connector

| Pin | Hall  | Colour |
|-----|-------|--------|
| 1   | GND   | Black  |
| 2   | VCC   | Red    |
| 3   | X out | Yellow |
| 4   | /     | /      |
| 5   | Y out | Green  |
| 6   | /     | /      |
| 7   | Z out | Blue   |
| 8   | /     | /      |
| 9   | BT1   | Brown  |
| 10  | BTcom | White  |
| 11  | BT2   | Purple |
| 12  | /     | /      |

### Each axis of redundant hall

12-pin connector

| Pin | Hall   | Colour       |
|-----|--------|--------------|
| 1   | GND    | Black        |
| 2   | /      | /            |
| 3   | AX out | Yellow       |
| 4   | AY out | Green        |
| 5   | BX out | Yellow/White |
| 6   | BY out | Green/White  |
| 7   | AZ out | Blue         |
| 8   | BZ out | Blue/White   |
| 9   | BT1    | Brown        |
| 10  | BTcom  | White        |
| 11  | BT2    | Purple       |
| 12  | VCC    | Red          |

### USB

USB

USB Male Connector



**P2**

### RS232

RS232

RS232 output PCB



**P3**

# FJ11 Series Dual Axis joystick

## Product features

- Dual-axis finger operated, spring return.
- Spring return.
- With center tap potentiometer angle detection.
- Proportional amplifier to direct drive hydraulic proportional valve optional.

## Application

Typical application on remote control box, off-highway vehicle.

## Technical information

### Electrical data

|                                     |                                |
|-------------------------------------|--------------------------------|
| Power supply                        | <36Vdc                         |
| Total resistance                    | 5K $\Omega$                    |
| Electrical angle                    | $\pm 30^\circ$                 |
| Center tap voltage                  | 48%~52%Vdc                     |
| Center tap angle                    | $\pm 2.5^\circ$                |
| On-load voltage (max)               | 32Vdc                          |
| Allowance maximum power dissipation | 0.25W (25°C)                   |
| Load capacity:                      | 2mA@30Vdc (Resistance load)    |
| Breakout angle                      | $\pm 3^\circ \sim \pm 5^\circ$ |
| Contact resistance                  | <200 $\Omega$                  |

### Mechanical features

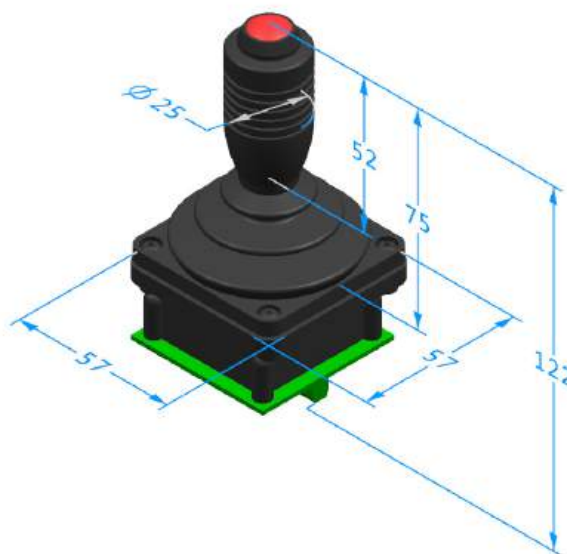
|                         |                                  |
|-------------------------|----------------------------------|
| Travel angle            | $\pm 32^\circ$                   |
| Operating type          | Spring return                    |
| Breakout force          | 3.8N                             |
| Operating force(max)    | 12N                              |
| Maximum allowable force | 300N(handle H greater than 160N) |
| Expecting life          | >2 million cycles                |
| Weight                  | 125g                             |

### Environmental data

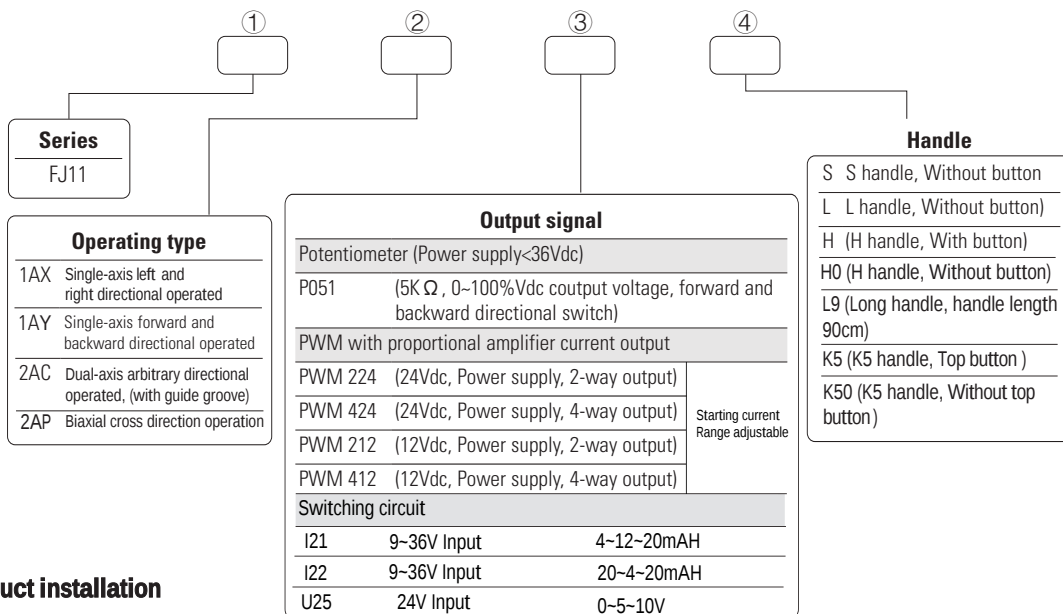
|                       |                         |
|-----------------------|-------------------------|
| Operating temperature | -30°C~+70°C             |
| Storage temperature   | -40°C~+85°C             |
| Protection level      | IP65 (above the flange) |



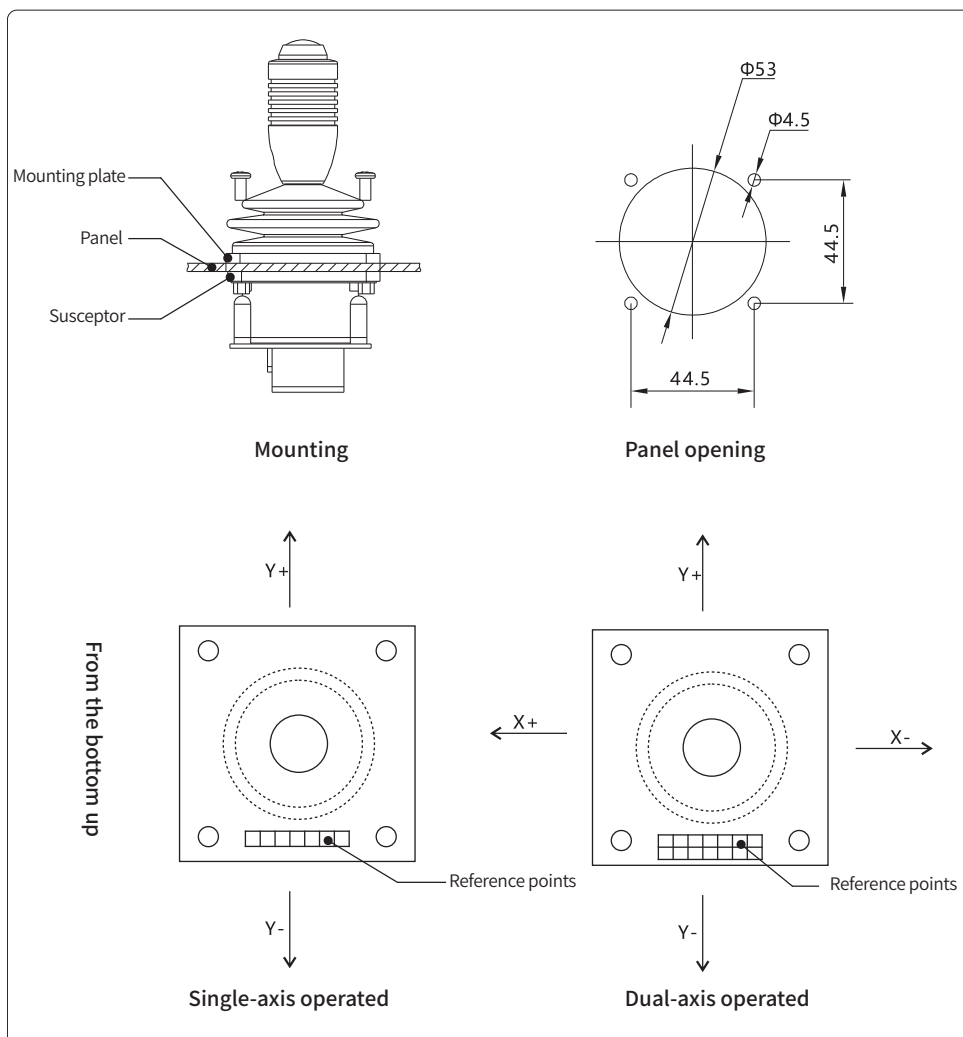
## Dimensions



## Product configuration



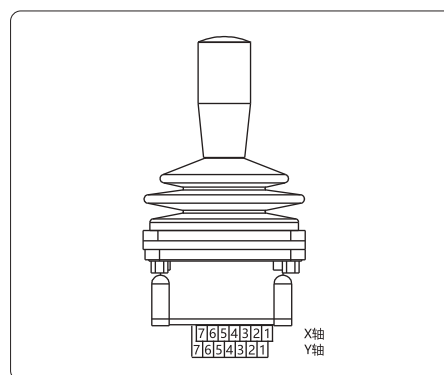
## Product installation



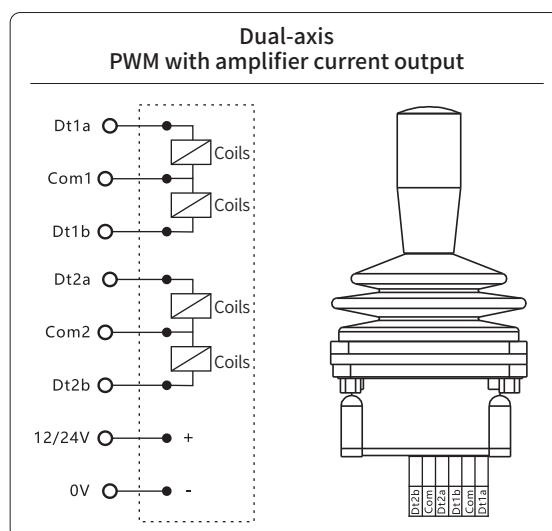
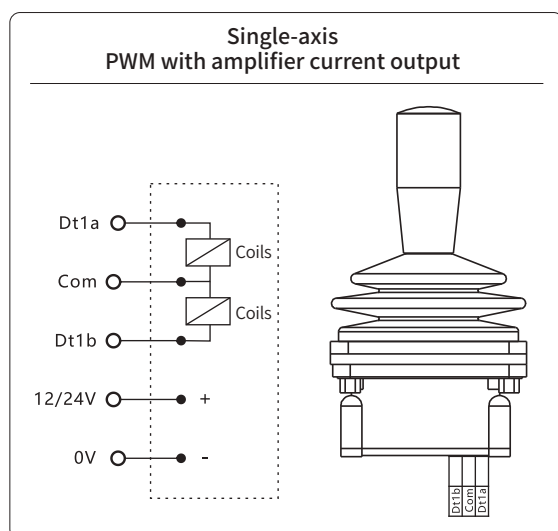
## Electrical connections

### connector

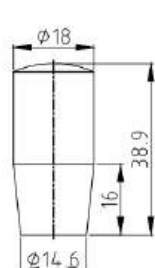
| Connector | Potentiometer             |
|-----------|---------------------------|
| 1         | Com                       |
| 2         | Forward switch            |
| 3         | Backward switch           |
| 4         | Potentiometer sliding end |
| 5         | Potentiometer terminal A  |
| 6         | Center tap                |
| 7         | Potentiometer terminal B  |
| 8         | Button switch             |
| 9         | Button switch             |



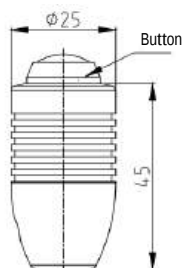
### With proportional amplifier



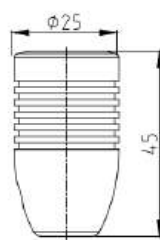
### See appendix



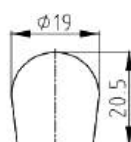
handle L



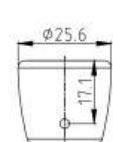
handle H



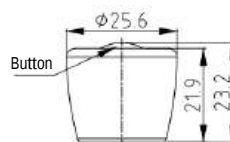
handle H0



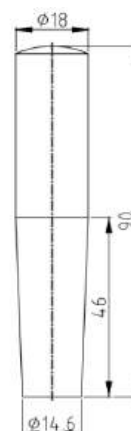
handle S



handle K50



handle K5



handle L9

# FJ100 Series Single Axis Joystick

## Product features

- Ergonomic design, comfortable grip, strong and durable.
- Single-axis finger operated, forward and backward directional operated.
- Small size and more joysticks could be installed and operated side by side.

## Application

Typical apply on remote control unit, off-highway vehicle and industrial panel control.

## Technical information

### Electrical data

|                                    |                           |
|------------------------------------|---------------------------|
| Power supply                       | 5 ± 0.5Vdc                |
| Max Current                        | <9mA;18mA(Redundant hall) |
| Maximum allowable overload voltage | 30Vdc                     |
| Reverse maximum allowable voltage  | -10Vdc                    |
| Load resistance                    | 10 k $\Omega$             |
| Center voltage                     | 2.5V ± 0.1V               |
| Output linearity tolerance         | < ± 3%                    |

### Mechanical features

|                      |               |
|----------------------|---------------|
| Travel angle         | ± 20°         |
| Operating type       | Spring return |
| Operating force(max) | 150 ~ 200N    |
| Expecting life       | > 1 million   |
| Weight               | 48 ± 5g       |
| Operating force      | 5-8N          |

### Environmental data

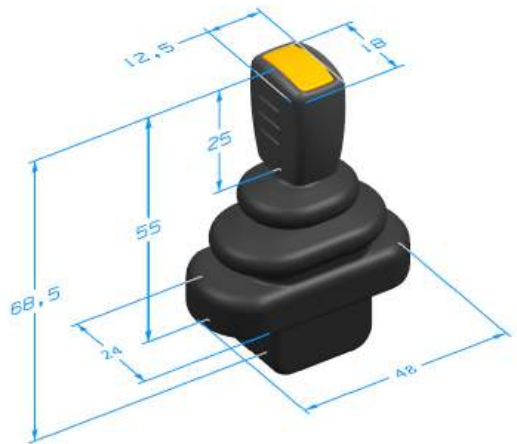
|                       |             |
|-----------------------|-------------|
| Operating Temperature | -30°C~+70°C |
| Storage Temperature   | -40°C~+85°C |
| Protection level      | IP68        |

## Interface information

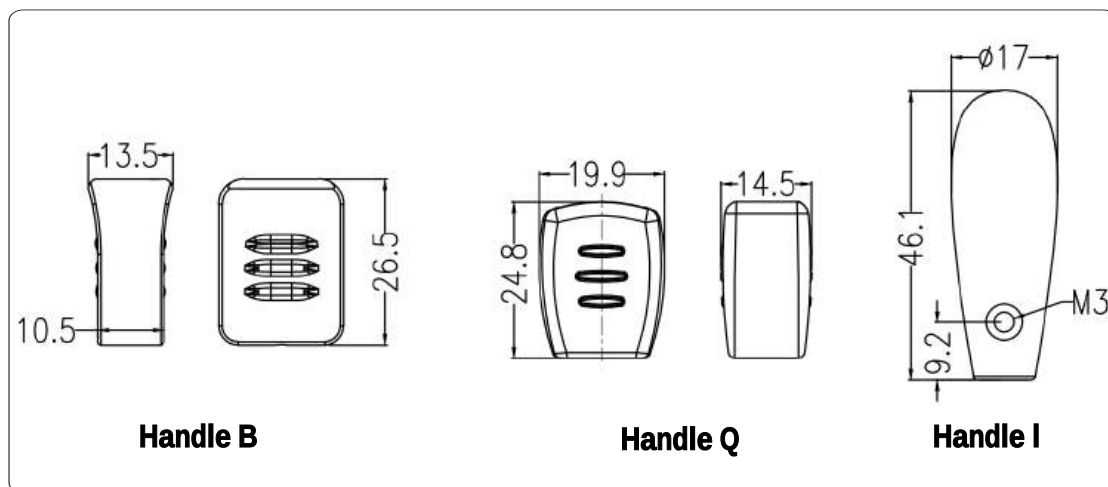
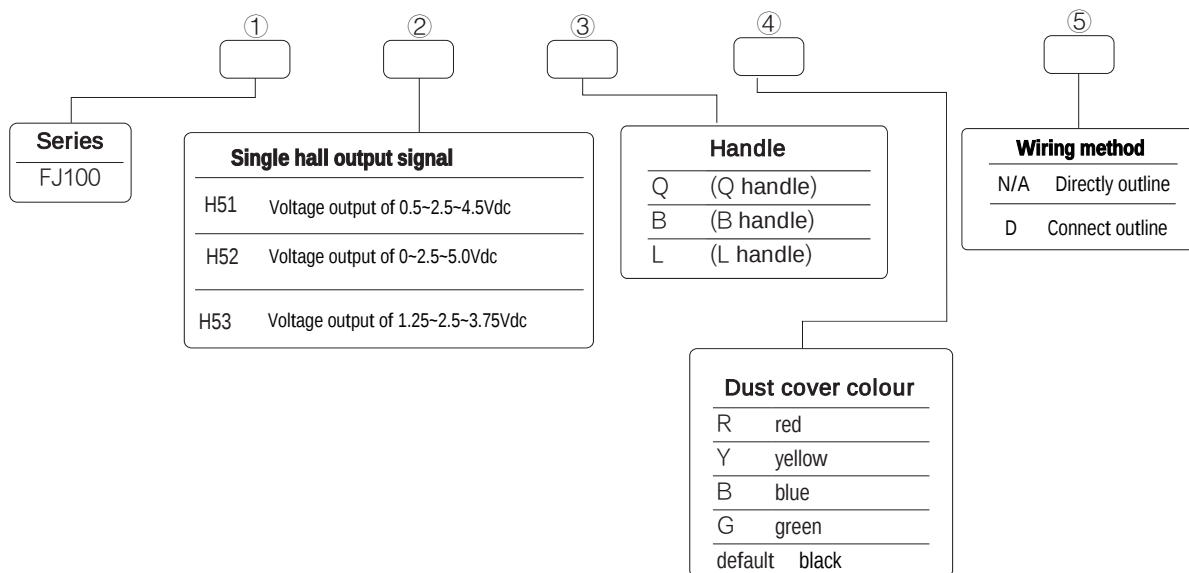
- 0.2mm<sup>2</sup> high temperature wire line (color is optional);
- Generally output line directly without connector (connector is optional if request);
- Handle color can be customized;
- Negotiate in advance if has special requirements.



## Dimensions

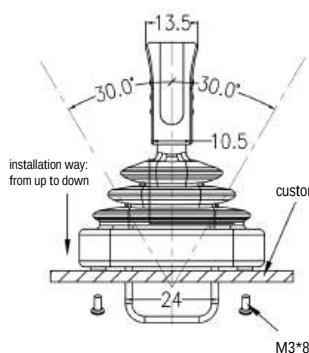


## Product Configuration

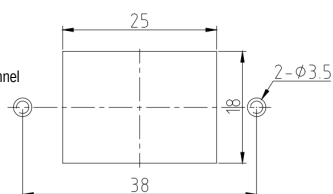


## Electrical Connections

| Color  | Function |
|--------|----------|
| Black  | GND      |
| Red    | 5V       |
| Yellow | Output   |



Product installation



Hole Size

# FJ120 Series Single Axis Joystick

## Product features

- Single-axis control on fore-and-aft direction
- Fingertip control, spring return
- Small size, easy to install
- Hall effect sensor for angular-detecting
- Customize output voltage range IP67

## Application

Typical application on remote control unit, off-highway vehicle and industrial panel control.

## Technical information

### Electrical data

#### Potentiometer

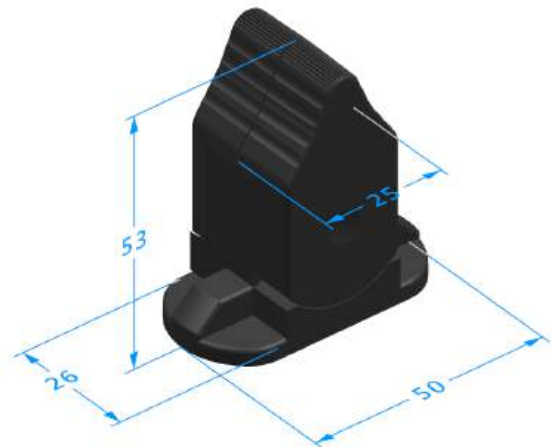
|                           |                                                                                                                    |
|---------------------------|--------------------------------------------------------------------------------------------------------------------|
| Power supply              | <32Vdc                                                                                                             |
| Total resistance          | 4K $\Omega$ or 5K $\Omega$                                                                                         |
| Electrical angle          | $\pm 28^\circ$                                                                                                     |
| Centertap angle           | $\pm 2.5^\circ$                                                                                                    |
| Dissipation(max)          | 0.25W (25°C, Non-load)                                                                                             |
| Center tap output voltage | 48%~52% ( $\pm 2\%$ )                                                                                              |
| Directional switch        | Power supply: <35Vdc<br>Maximum current: 2mA<br>Breakout angle: $\pm 5^\circ$<br>Contact resistance: <500 $\Omega$ |

### Mechanical features

|                         |                                   |
|-------------------------|-----------------------------------|
| Travel angle            | about $\pm 30^\circ$              |
| Operating type          | Spring return                     |
| Breakout force          | 1.3N                              |
| Operating force(max)    | 3N                                |
| Maximum allowable force | >50N                              |
| Expecting life          | >2 million cycles (Potentiometer) |
| Weight                  | 45g                               |



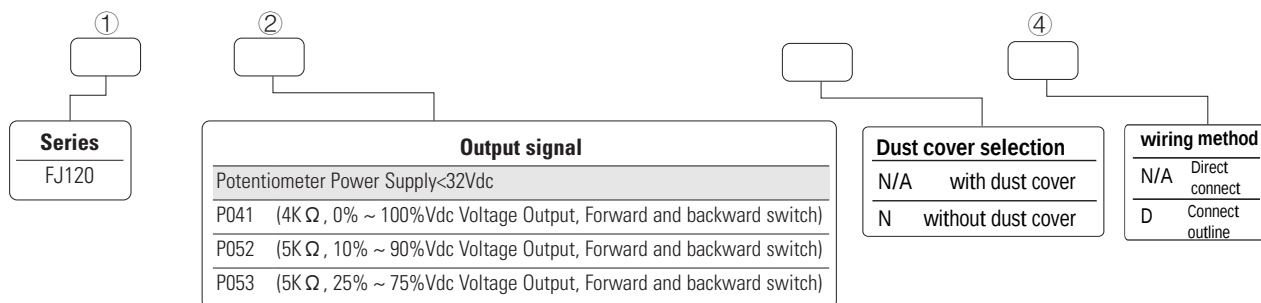
## Dimensions



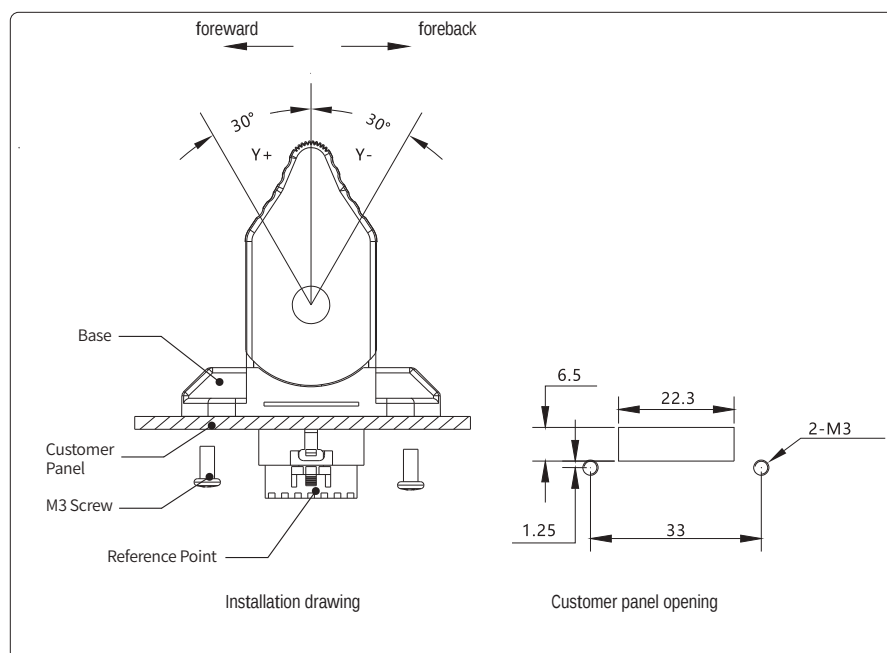
### Environmental data

|                       |                                |
|-----------------------|--------------------------------|
| Operating temperature | -30°C~+70°C                    |
| Storage temperature   | -40°C~+85°C                    |
| Protection level      | IP65 (Form above when mounted) |

## Product configuration



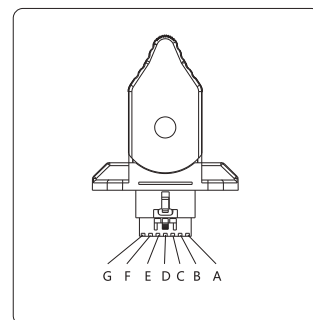
## Product installation



## Electrical connections

**Connection List**  
(FCI DUBOX™ 7Pin Connection plug 76382-307)

| Pin | Potentiometer        | HALL  | Color  |
|-----|----------------------|-------|--------|
| A   | Center tap           | N/A   | Red    |
| B   | VCC                  | VCC   | Blue   |
| C   | Wiper output signal  | B out | Black  |
| D   | GND                  | 0V    | White  |
| E   | Switch terminal (Y+) | N/A   | Yellow |
| F   | Switch terminal (Y-) | N/A   | Green  |
| G   | COM                  | N/A   | Gray   |



# FJ130 Series Single Axis Joystick

## Product features

- Fingertip type single shaft handle, forward and backward direction operation.
- Automatic spring reset. ( Note FJ131 with positioning lock )
- Compact and easy to install.
- Non-contact Hall sensor.
- Reliable structure, no dust cover, suitable for all kinds of harsh environment.
- The handle is covered with adhesive, comfortable to touch, and the color can be specified.
- Various modes of optional.

## Application

This series of products are mainly used in industrial remote control, various engineering vehicles or industrial machinery and equipment control panel.

## Technical information

### Electrical parameter

|                                 |                               |
|---------------------------------|-------------------------------|
| supply voltage                  | 5.0±0.5Vdc (standard voltage) |
| supply current                  | <9mA                          |
| Limit allowable voltage         | 20Vdc                         |
| Reverse limit allowable voltage | -10Vdc                        |
| load resistance                 | >10K $\Omega$                 |
| Median output voltage           | 2.5±0.1V                      |
| Linear error of output voltage  | < ± 2%                        |

### Mechanical parameter

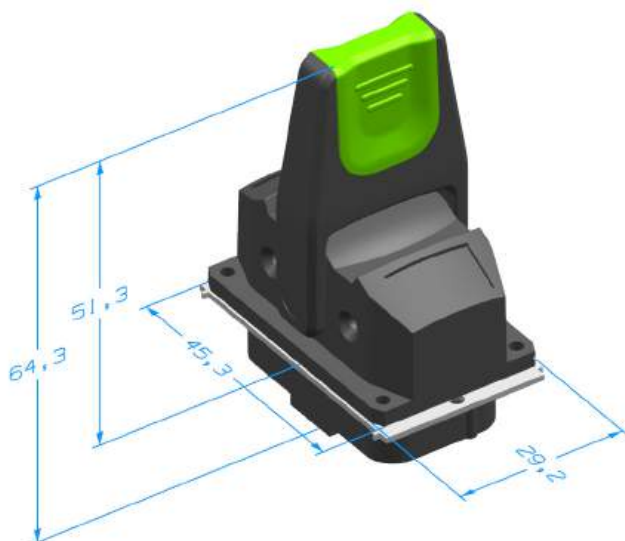
|                               |                        |
|-------------------------------|------------------------|
| Shaking angle                 | About±30°              |
| Operating mode                | Automatic spring reset |
| Starting force                | 1.3N                   |
| Maximum operating force       | 3N                     |
| margin pressure test location | >30N                   |
| service life                  | >2M                    |
| weight                        | 45g                    |

### Environmental parameter

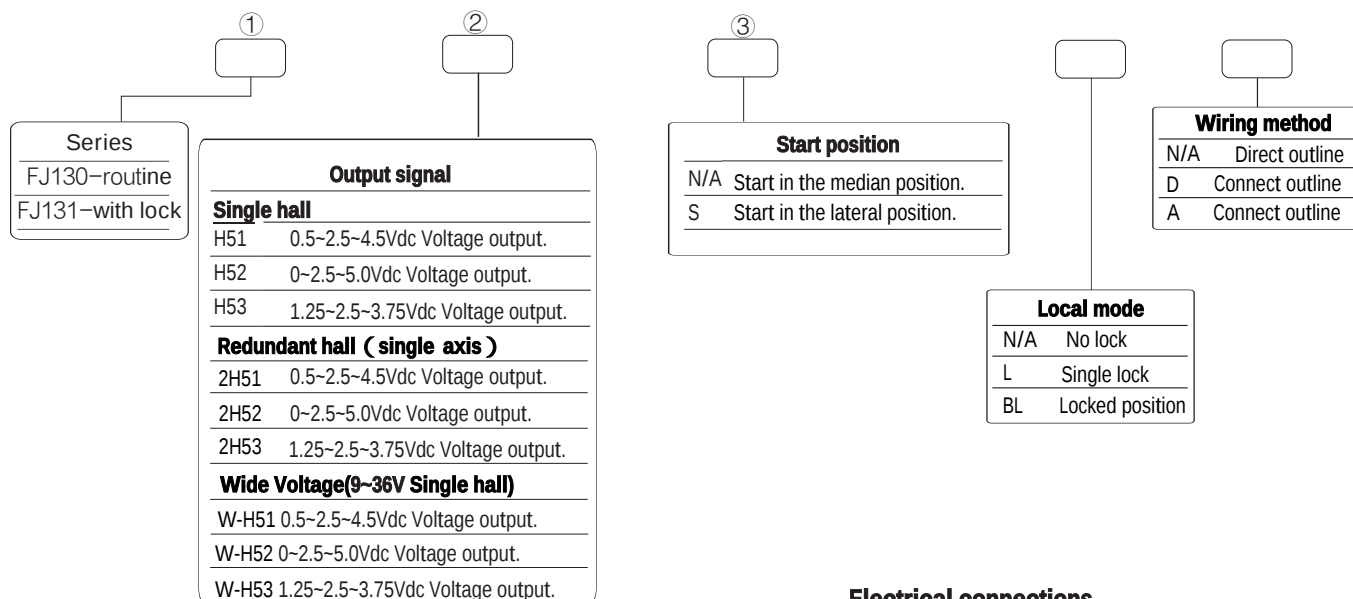
|                     |                                   |
|---------------------|-----------------------------------|
| Working temperature | -30°C~+70°C                       |
| Storage temperature | -40°C~+85°C                       |
| Level of protection | IP65 (Just for the electric part) |



Dimensions



## Product configuration

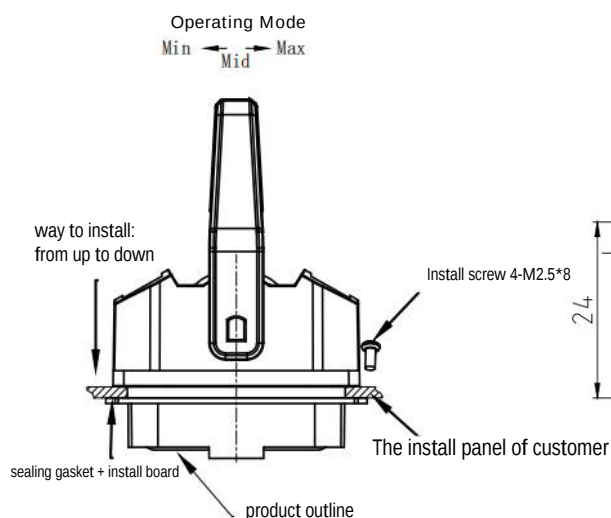


## Electrical connections

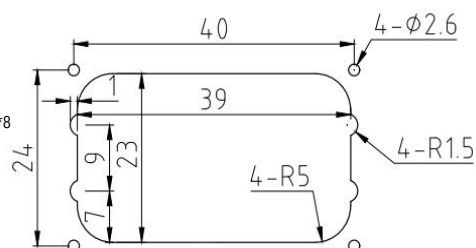
### Direct outline

| Line colour | Function          |
|-------------|-------------------|
| Red         | Input voltage -5V |
| Black       | 0V                |
| Yellow      | Output            |

## Product installation



Customer installation diagram



Customer panel opening diagram

# PS10 Series Press Hall Button

## Product features

- Non-contact hall sensor or long service life potentiometer test way.
- Designed for Industrial remote control , Dustproof and waterproof with long life.

## Application

This series of products is mainly used in industrial throttle switch, used in long distance operation, industrial operation panel analog quantity button.



## Technical information

### Electrical parameter

|                                 |                               |
|---------------------------------|-------------------------------|
| Supply voltage                  | 5.0±0.5Vdc (standard voltage) |
| Supply current                  | <9mA                          |
| Limit allowable voltage         | 20Vdc                         |
| Reverse limit allowable voltage | -10Vdc                        |
| Load resistance                 | >10K $\Omega$                 |
| Linear error of output voltage  | <±2%                          |

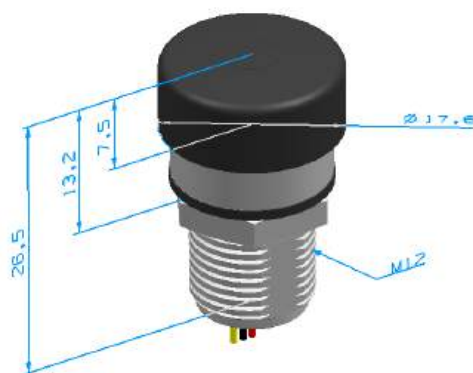
### Mechanical parameter

|                         |                        |
|-------------------------|------------------------|
| Shaking angle           | 4±0.3mm                |
| Operating mode          | Automatic spring reset |
| Maximum operating force | 1Nm Max                |
| Limit location force    | >300N                  |
| Service life            | >2M                    |
| Weight                  | 45g                    |

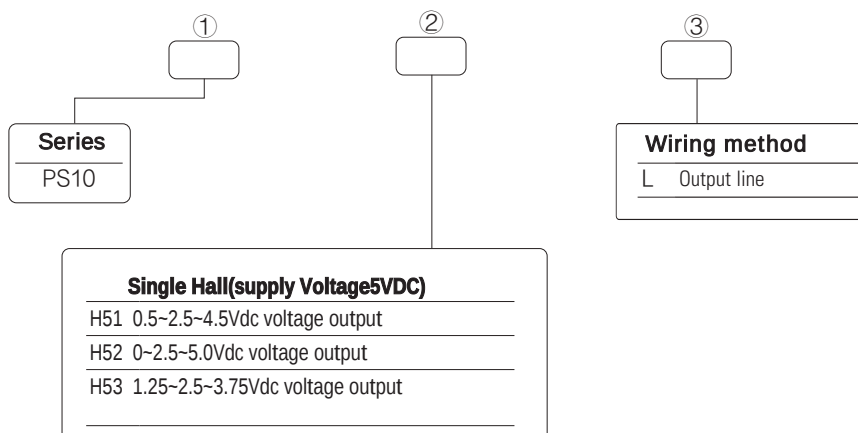
### Environmental parameter

|                     |                                     |
|---------------------|-------------------------------------|
| Working temperature | -30°C~+70°C                         |
| Storage temperature | -40°C~+85°C                         |
| Level of protection | IP65 (just for the electrical part) |

## Dimensions



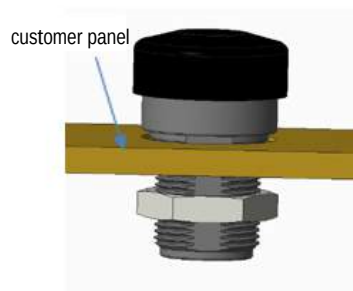
## Product Configuration



## Product Installation

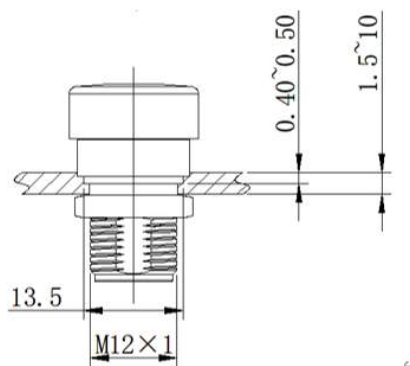
### Installation way

Explain: from up to down install button, thread specification M12\*1



Customer installation diagram

### Installation panel



Customer panel opening diagram

## Electrical connections

### Direct outlet

| Line colour | Function |
|-------------|----------|
| red         | 5V       |
| black       | 0V       |
| yellow      | OUT      |

# RS4 Series Fingertip operating Joystick

## Product features

- Fingertip joystick, turning way operation.
- Friction location ,starting band feeling.
- Compact shape, easy to install.
- Potentiometer and non-contact hall sensor.
- Different output voltage range .

## Application

This series of products are mainly used in industrial engeneering remote control、 kinds of engeneering vehicle or industrial mechinal equipment control panel.

## Technical information

### Electrical parameter

#### Potentiometric sensors

|                 |                                   |
|-----------------|-----------------------------------|
| Supply voltage  | 12Vdc                             |
| Working current | < 30mA                            |
| Output signal   | 0.5-4.5Vdc , Dextral augmentation |

### Mechancial parameter

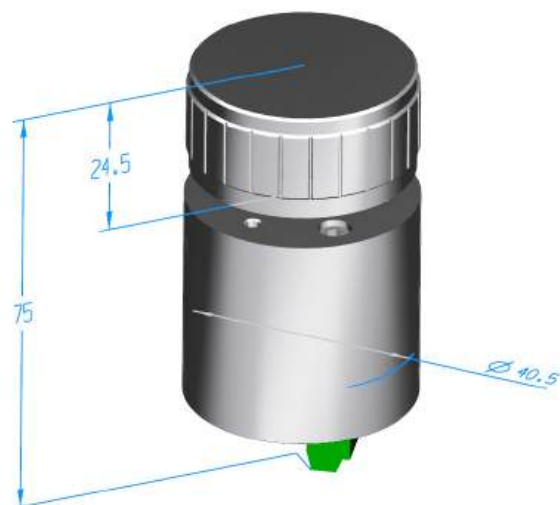
|                   |           |
|-------------------|-----------|
| Servive life      | >3M       |
| Electrical stroke | 270°+/-2° |

### Environmental parameter

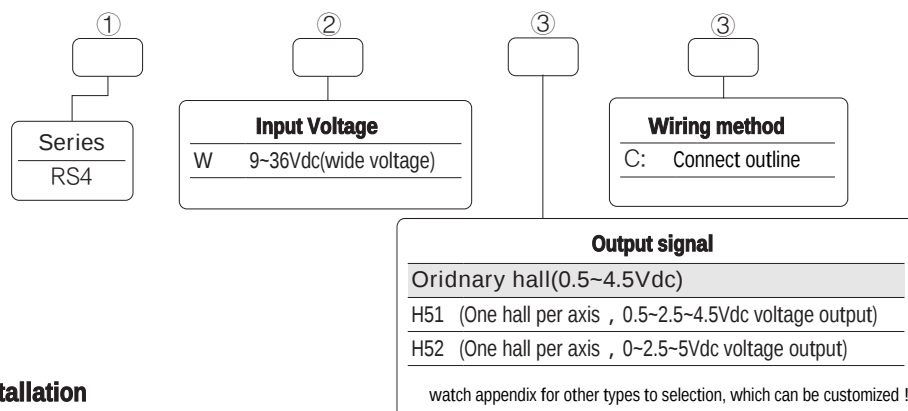
|                     |             |
|---------------------|-------------|
| Working temperature | -30℃~-70℃   |
| Storage temperature | -40℃~-85° ℃ |
| Level of protection | IP64        |



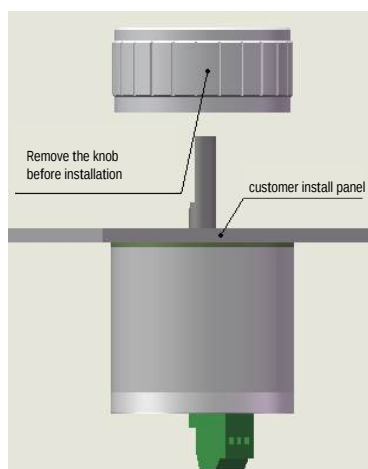
## Dimensions



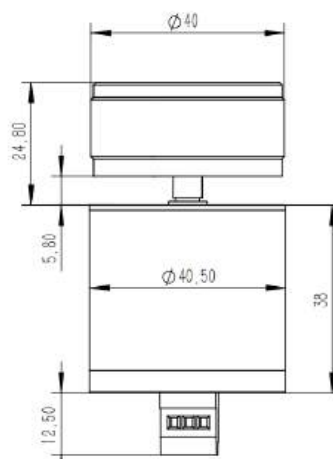
## Product configuration



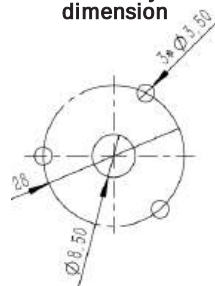
## Product installation



Install diagram



Boundary  
dimension



Install opening size

## Electrical connections

| Terminal | Function               |
|----------|------------------------|
| VCC      | supply voltage 9~30Vdc |
| OV       | power OV               |
| OUT      | hall output            |



# RS50 series Fingertip Operating Joystick

## Product features

- Dualing rotation operation or single rotation operation.
- Friction positioning , hand feeling comfortable.
- Hall untouch testing.

## Application

This series products are mianly used in the kinds of mechanical, road mechanical control panel.

## Technical information

### Electrical parameter

#### Potentiometric sensors

|                                 |                   |
|---------------------------------|-------------------|
| Mains voltage                   | 5±0.5Vdc or 9-36V |
| Maximum supply current          | 10mA              |
| Median output voltage           | 2.5±0.1V          |
| Reverse limit allowable voltage | -10Vdc            |
| Linear error of output voltage  | <±0.2V            |
| Limit allowable voltage         | 35Vdc             |

### Mechanical parameter

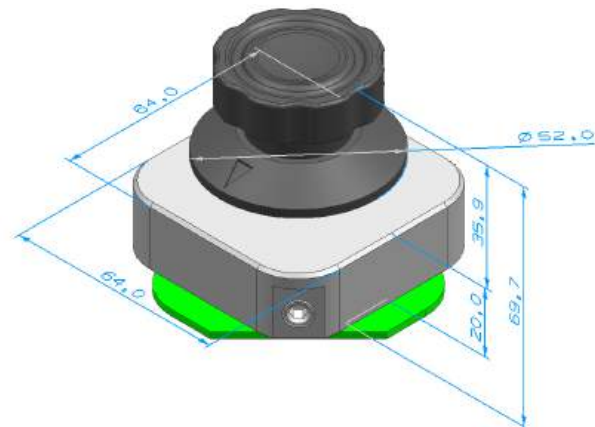
|                         |                                                                         |
|-------------------------|-------------------------------------------------------------------------|
| Rotation angle          | ±135°(dual operation , can be customized )<br>270° ( single operation ) |
| Operation mode          | friction location                                                       |
| Starting                | about 3N                                                                |
| Maximum operation force | about 15N                                                               |
| Limit location force    | about 100N                                                              |
| Serving life            | >5M                                                                     |

### Environmental parameter

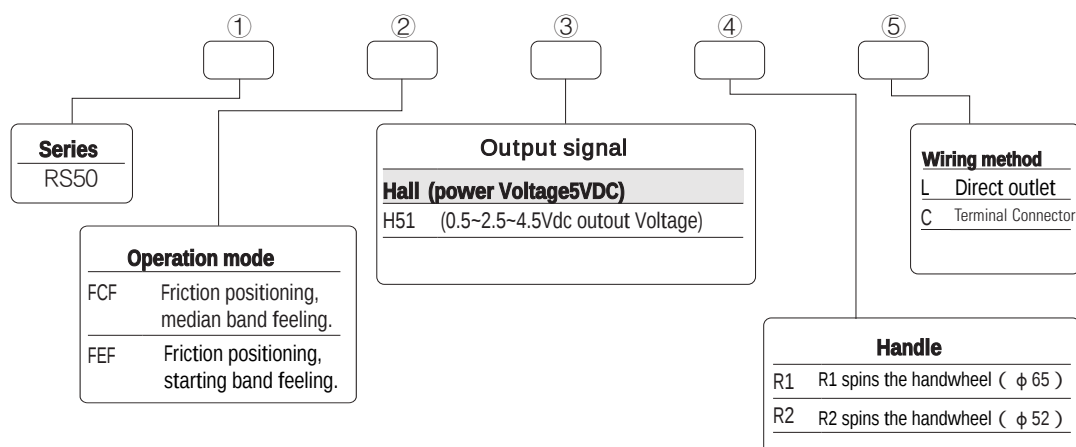
|                     |                                    |
|---------------------|------------------------------------|
| Working temperature | -30°C~+70°C                        |
| Storage temperature | -40°C~+85°C                        |
| Level of protection | IP67(just for the electronic part) |



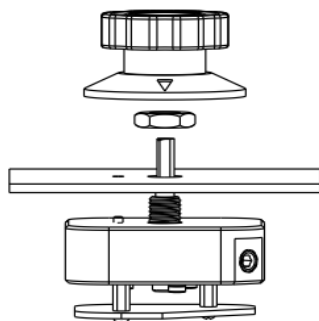
## Dimensions



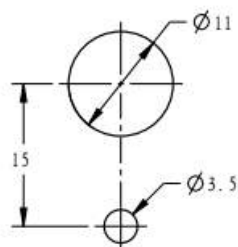
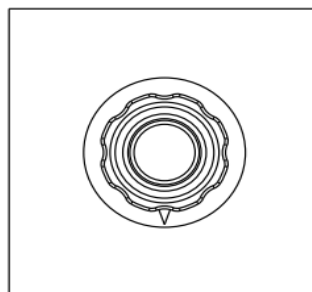
## Product configuration



## Product installation

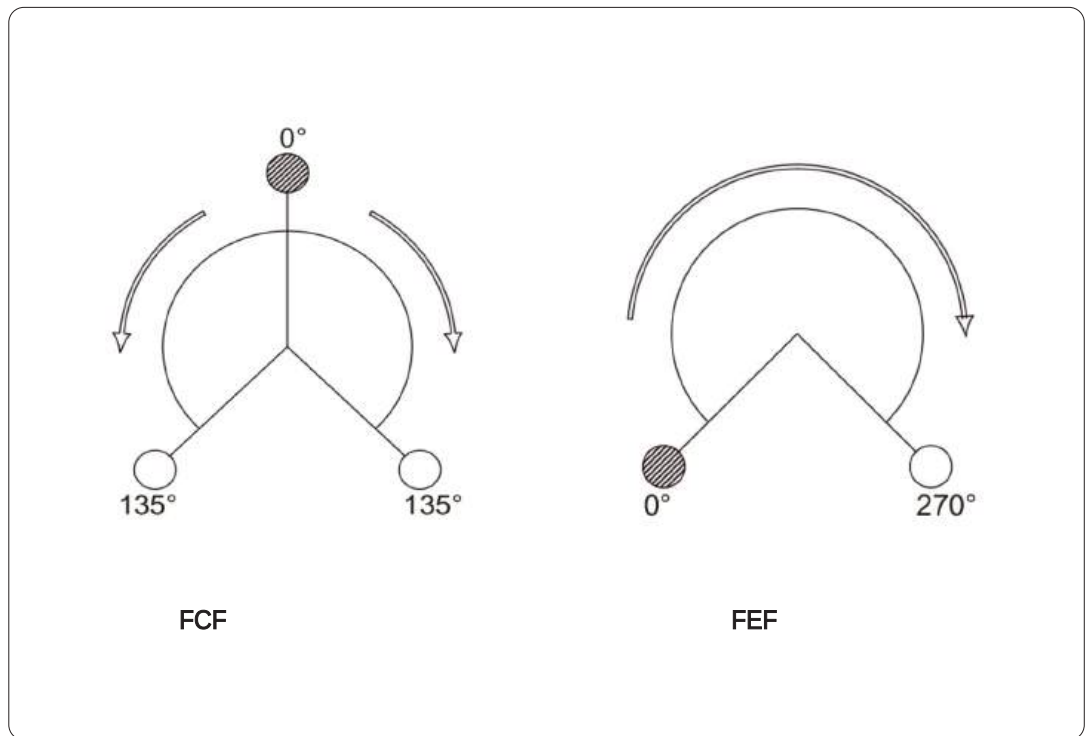


Installation instruction



Dimensions of mounting holes

## Operation direction



# TJ Series Dual Axis Joystick

## Product features

- Thumb operation
- Spring return
- Uncontact hall effect
- Switching output is optional.

## Application

Mainly used in various operating joystick, operating panels, and miniature remote control.

## Technical information

### Electrical data

|                                    |                                                   |
|------------------------------------|---------------------------------------------------|
| Power supply                       | $5 \pm 0.5\text{Vdc}$                             |
| Electrical angle                   | $\pm 25^\circ$                                    |
| Supply current (max)               | $<9\text{mA}; 18\text{mA}(\text{Redundant Hall})$ |
| Center tap output voltage          | $2.5 \pm 0.15\text{V}$                            |
| Reverse maximum allowable voltage  | $-10\text{Vdc}$                                   |
| Output linearity tolerance         | $< \pm 0.2\text{V}$                               |
| Maximum allowable overload voltage | $30\text{Vdc}$                                    |

### Mechanical features

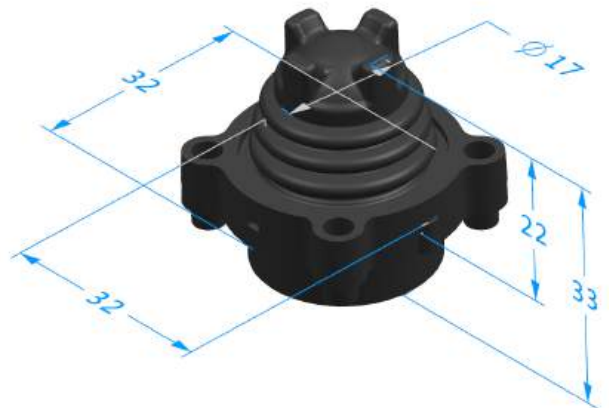
|                         |                |
|-------------------------|----------------|
| Travel angle            | $\pm 25^\circ$ |
| Operating type          | Spring return  |
| Breakout force          | about 2N       |
| Operating force ( max)  | about 5N       |
| Maximum allowable force | about 100N     |
| Expecting life          | $>1\text{ M}$  |
| Weight                  | about 18g      |

### Environmental data

|                       |                                            |
|-----------------------|--------------------------------------------|
| Operating temperature | $-30^\circ\text{C} \sim +70^\circ\text{C}$ |
| Storage temperature   | $-40^\circ\text{C} \sim +85^\circ\text{C}$ |
| Protection level      | IP67 (Only for electronic part)            |



## Dimensions



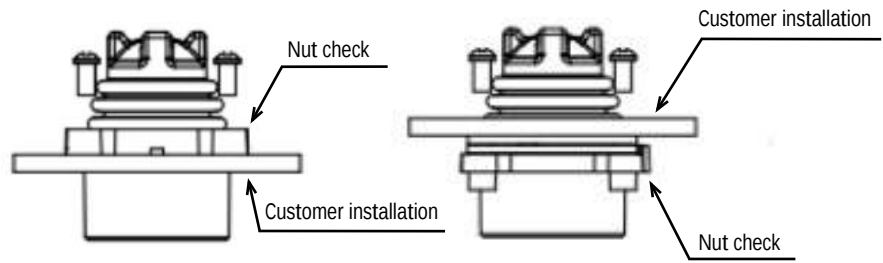
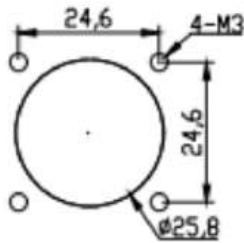
## TJS



## Product installation

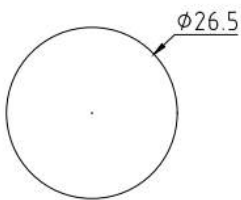
**TJ**

Opening size

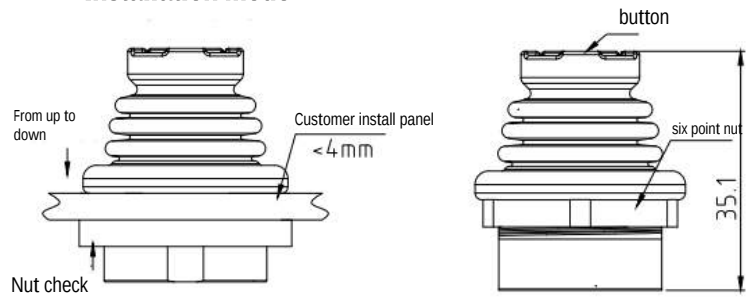


**TJS**

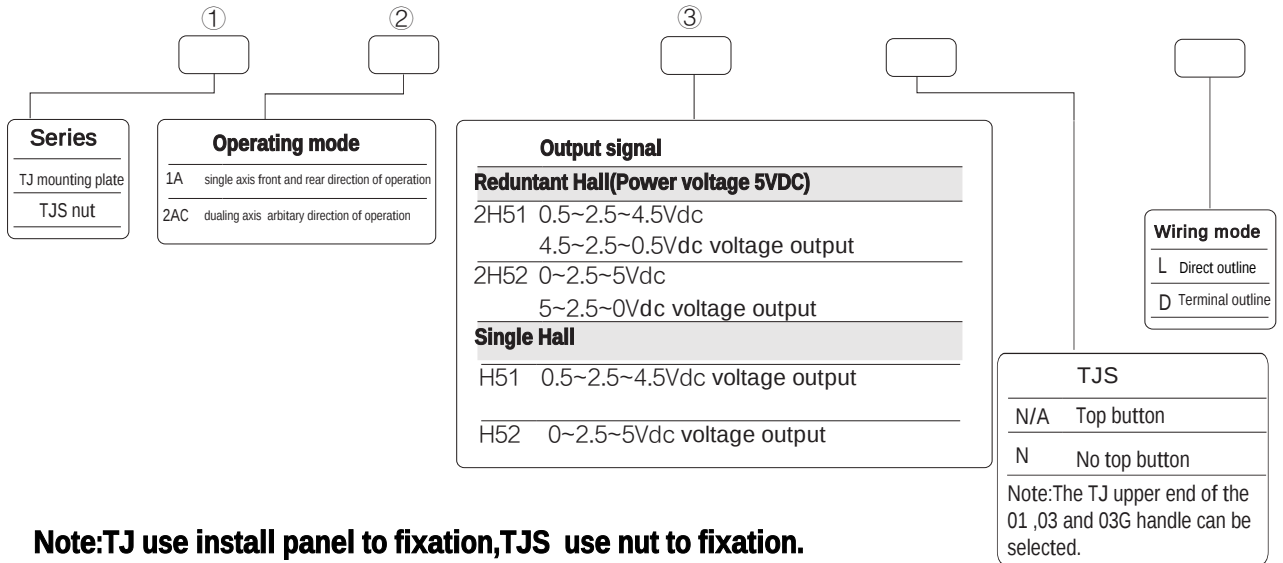
Opening size



### Installation mode

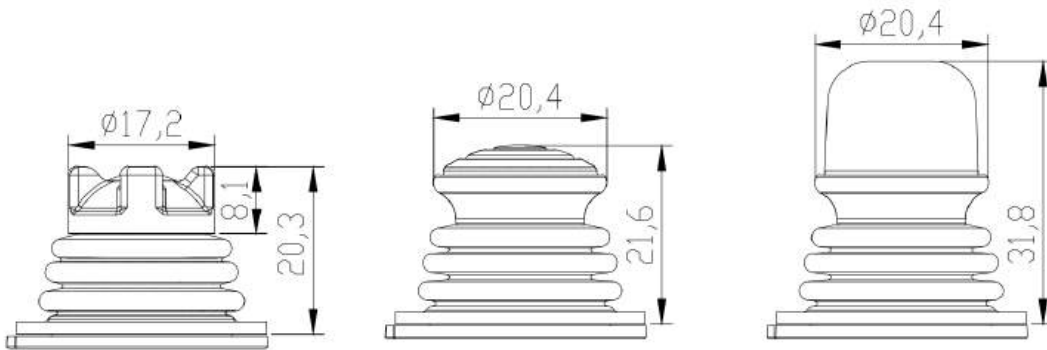


## Product configuration



**Note:**TJ use install panel to fixation,TJS use nut to fixation.

TJ upper end of handle optional :



01 Handle

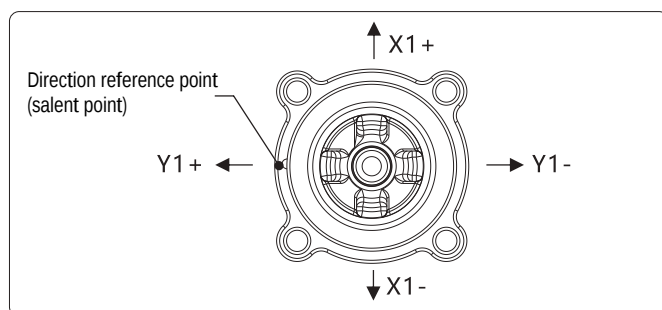
03 Handle

03G Handle

TJS The upper end of handle is fixed.

## Electrical connections

| Colour       | Function | Remark              |
|--------------|----------|---------------------|
| black        | GND      |                     |
| red          | VCC      |                     |
| yellow       | X1out    |                     |
| blue         | Y1out    |                     |
| yellow/white | X2out    | Redundancy specific |
| blue/white   | Y2out    | Redundancy specific |



# TW1 Series Double Axis Joystick

## Product features

- Thumb operation
- Spring return
- Uncontact hall effect



## Application

Typical apply on various joysticks, and operating panel.

## Technical information

### Electrical data

|                                    |                       |
|------------------------------------|-----------------------|
| Power supply                       | $5 \pm 0.5\text{Vdc}$ |
| Electrical angle                   | $\pm 42^\circ$        |
| Supply current (max)               | 10mA                  |
| Center tap output voltage          | $2.5 \pm 0.1\text{V}$ |
| Reverse maximum allowable voltage  | -10Vdc                |
| Output linearity tolerance         | $< \pm 0.2\text{V}$   |
| Maximum allowable overload voltage | 35Vdc                 |

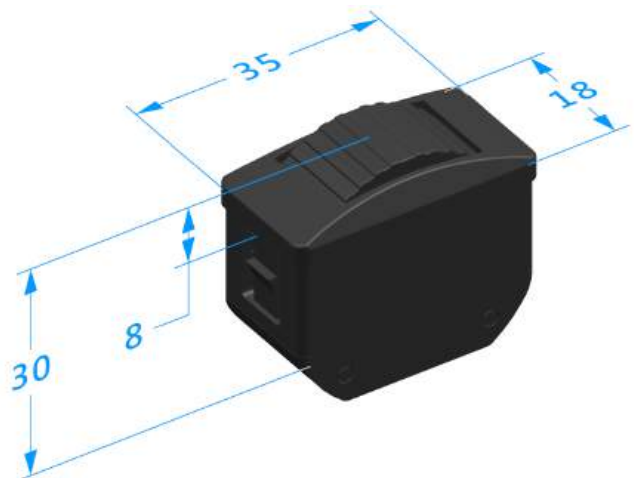
### Mechanical features

|                         |                      |
|-------------------------|----------------------|
| Travel angle            | $\pm 42^\circ$       |
| Operating type          | Spring return        |
| Breakout force          | about 2N             |
| Operating force (max)   | about 11N            |
| Maximum allowable force | about 100N           |
| Expecting life          | >100 thousand cycles |
| Weight                  | about 15g            |

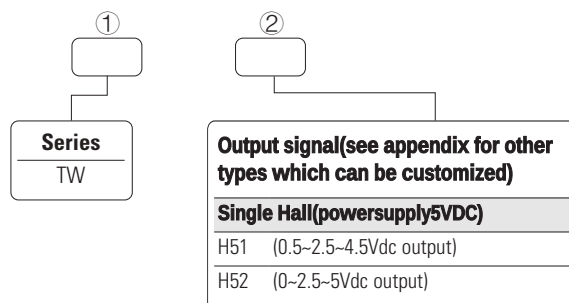
### Environmental data

|                       |                                            |
|-----------------------|--------------------------------------------|
| Operating temperature | $-30^\circ\text{C} \sim +70^\circ\text{C}$ |
| Storage temperature   | $-40^\circ\text{C} \sim +85^\circ\text{C}$ |
| Protection level      | IP67 (Only for electronic part)            |

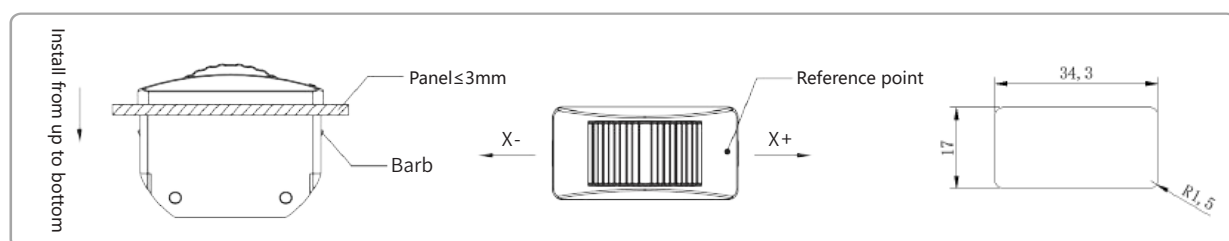
## Dimensions



## Product configuration



## Product installation



## Electrical connections

| NO. | Color | Function |
|-----|-------|----------|
| 1   | Red   | 5V       |
| 2   | Black | 0V       |
| 3   | Green | OUT      |

# TW2 Series Single Axis Joystick

## Product features

- Finger operation.
- Spring automatically reset.
- Hall no-touch detection.

## Application

This series products is mainly used in various operating handle,operating panels.

## Technical information

### Electrical parameter

|                                 |          |
|---------------------------------|----------|
| Supply voltage                  | 5±0.5Vdc |
| Maxium power electricity        | 10mA     |
| Median output voltage           | 2.5±0.1V |
| Reverse limit allowable voltage | -10Vdc   |
| Linear error of output voltage  | <±0.2V   |
| Limit allowed voltage           | 35Vdc    |

### Mechanical parameter

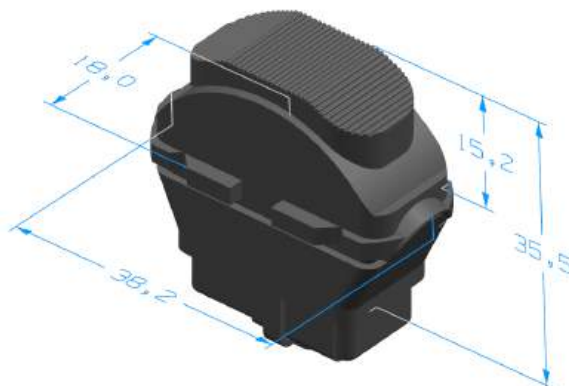
|                               |                        |
|-------------------------------|------------------------|
| Shaking angle                 | ±13°                   |
| Operating mode                | spring automatic reset |
| Starting force                | about 2N               |
| Operating force               | about 9N               |
| Margin pressure test location | about 100N             |
| Servive life                  | >1M                    |
| Weight                        | about 15g              |

### Environmental parameter

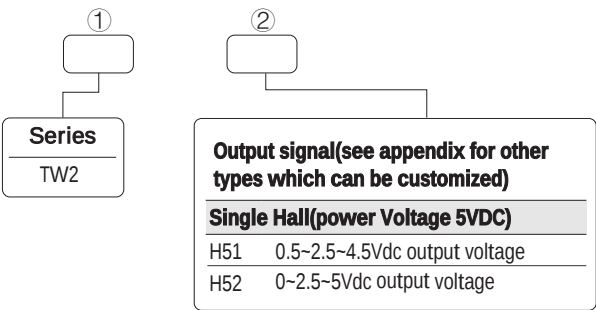
|                     |                                     |
|---------------------|-------------------------------------|
| Working temperature | -30°C~+70°C                         |
| Storage temperature | -40°C~+85°C                         |
| Level of protection | IP67 (just for the electrical part) |



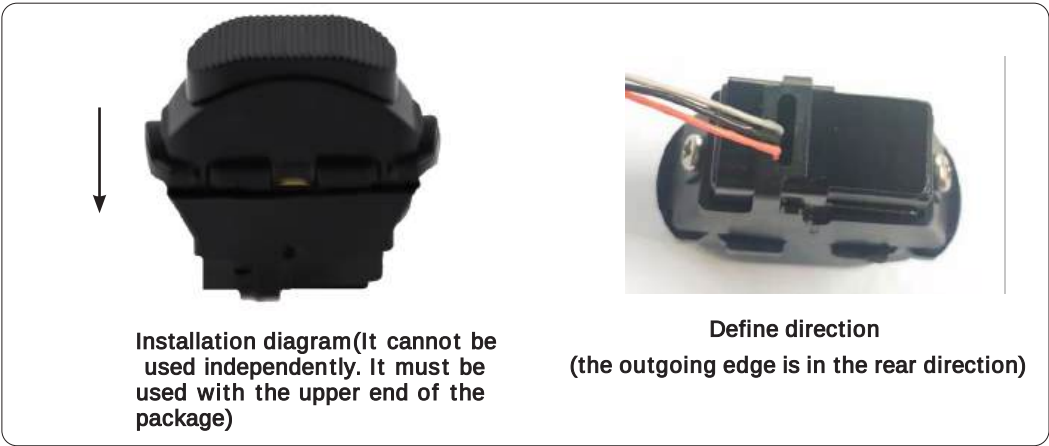
Dimensions



Product configuration



Product installation



Electrical connections

| Pin | Colour | Function    | Front   | Median  | Rear    |
|-----|--------|-------------|---------|---------|---------|
| 1   | orange | Input 5Vdc  | — —     | — —     | — —     |
| 2   | gray   | Hall output | 4.5±0.2 | 2.5±0.1 | 0.5±0.2 |
| 3   | black  | Power 0V    | — —     | — —     | — —     |

# TW3 Series Single Axis Joystick

## Product features

- Thumb operation.
- Spring automatic reset.
- Hall no-touch detection.

## Application

This series product is mainly used in various operation joystick,operating panels.

## Technical information

### Electrical parameter

|                                 |          |
|---------------------------------|----------|
| Power voltage                   | 5±0.5Vdc |
| Maximum supply current          | 10mA     |
| Median output voltage           | 2.5±0.1V |
| Reverse limit allowable voltage | -10Vdc   |
| linear error of output voltage  | <±0.2V   |
| limit allowed voltage           | 35Vdc    |
| Electrical angle in degree      | ±35°     |

### Mechanical parameter

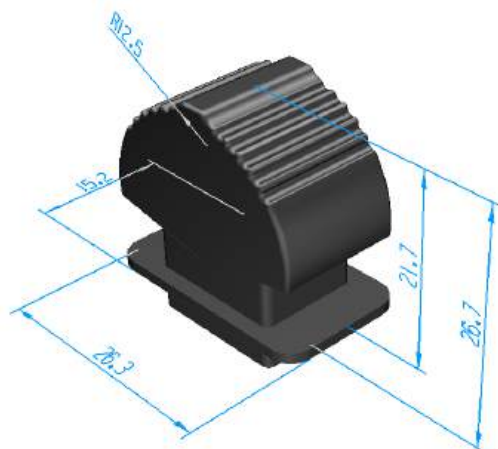
|                               |                        |
|-------------------------------|------------------------|
| Shaking angle                 | ±35°                   |
| Operating mode                | Automatic spring reset |
| Starting force                | about 2N               |
| Operating force               | about 3N               |
| Margin pressure test location | about 100N             |
| Serve life                    | >1M                    |
| Weight                        | about 15g              |

### Environmental parameter

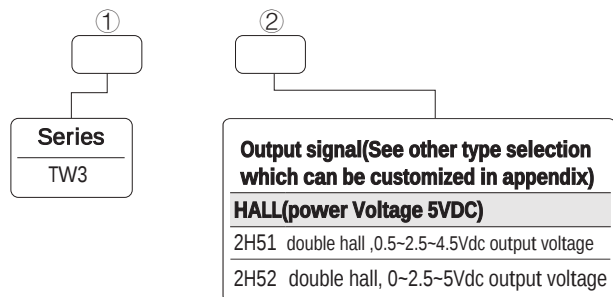
|                     |                                      |
|---------------------|--------------------------------------|
| Working temperature | -30C~+70°C                           |
| Storage temperature | -40°C~+85°C                          |
| Level of protection | IP67 (Just for the electricity part) |



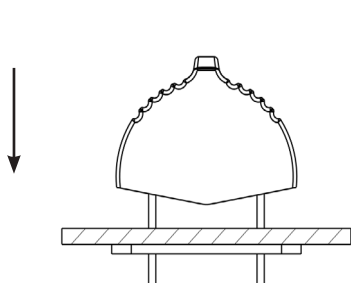
## Dimensions



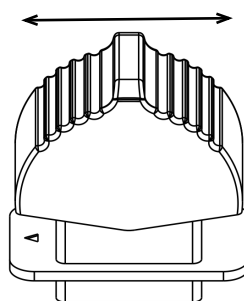
## Product configuration



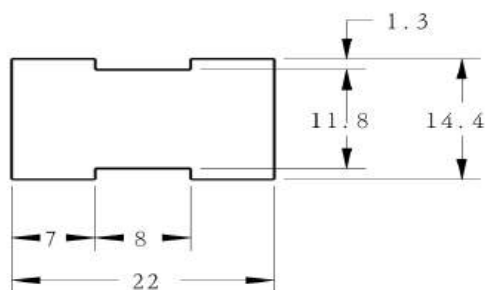
## Product installation



Installation diagram



Define direction  
(outgoing edge is rear direction)



Installation hole size

# SE Series Upper End of Handle

## Product features

- Ergonomic design comfortable grip.
- Adhesive handle, strong and durable, good waterproof performance.
- Can configure a variety of forms of panel combination.
- One button can be configured on the top.

## Application

This series product is mainly used in various of hoisting machinery , building machinery, forest machinery, Mining machinery, It can be assembled on the lower operating mechanism or separately installed on the pilot valve operating mechanism.



Dimensions

## Environmental data

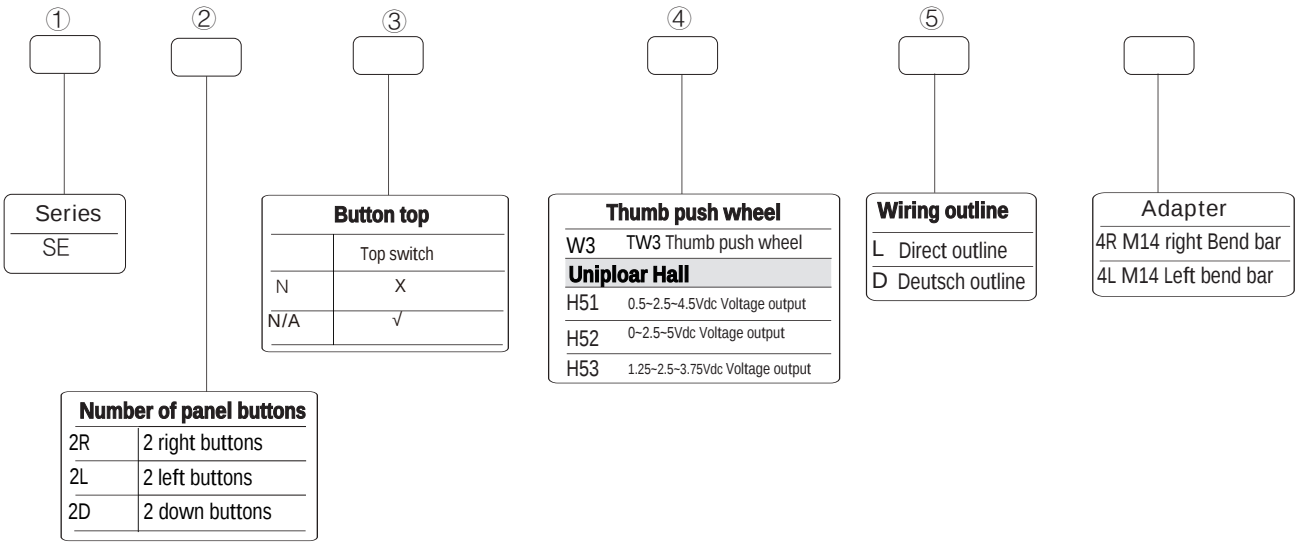
|                     |                             |
|---------------------|-----------------------------|
| Working temperature | -30° C~+70° C               |
| Storage temperature | -40° C~ +85° C              |
| Level of protection | IP65 (mounting above panel) |

## Interface information

- 0.5mm<sup>2</sup> Indicating Number, 0.2mm<sup>2</sup> high temperature colourline can be optional;
- Generally, it is a direct outgoing cable without terminal interface. The outgoing cable mode can be customized
- Line length define, please reference appendix.
- M14 Internal thread connection (standard) , can achieve a variety of transfer according to customer requirements.



Product configuration



# SS Series Handle

## Product features

- Ergonomic design, good handle feel
- Using Nylon makes components durable
- Various panel options
- One side switch is an option
- Dead man switch is available

## Application

Typically used in cranes, construction equipment, agricultural equipment, mining equipment. Installed on operating mechanism or pilot operated valves.



## Dimensions

## Environmental data

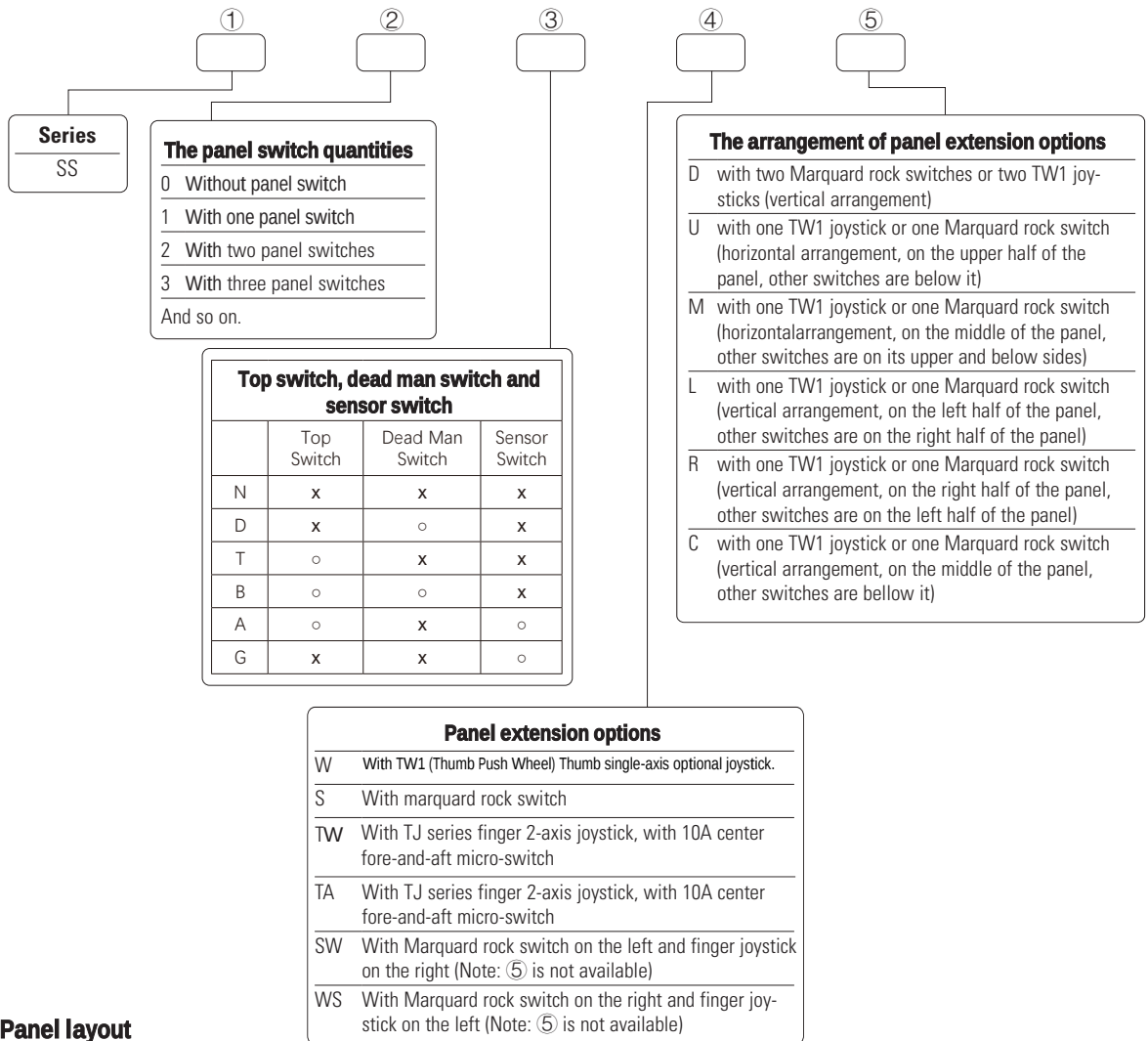
|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

## Interface information

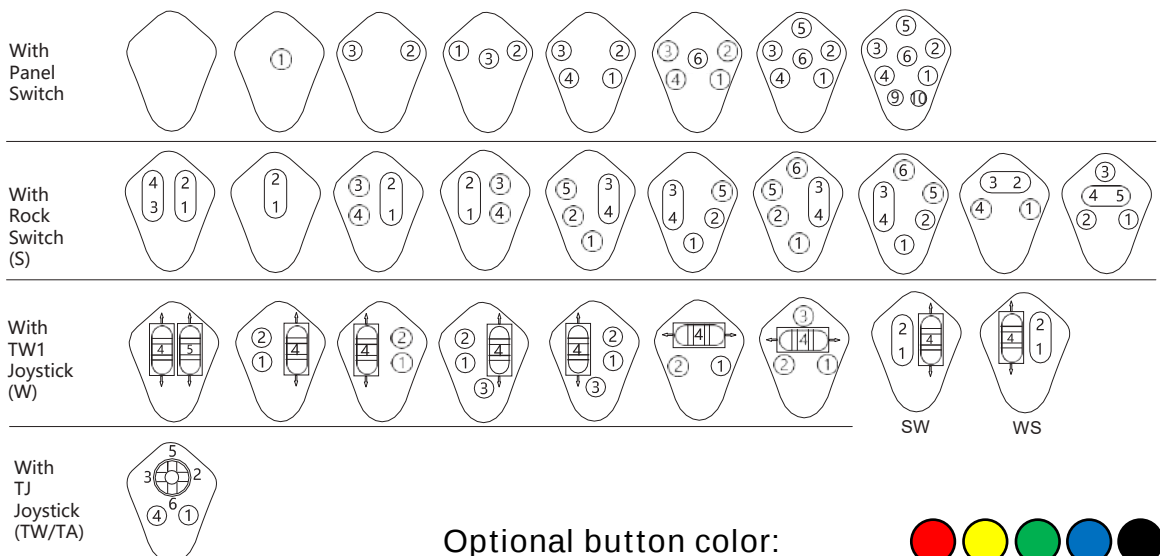
- 0.5mm<sup>2</sup> wire with number, 0.2mm<sup>2</sup> colorful high-temperature wire; Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment.
- M12 female mechanical interface.
- Please connect with the technical leader for special requirements.



## Product configuration



## Panel layout



Optional button color:



# SP Series Handle

## Product features

- Ergonomic design, good handle feel.
- Be made of polypropylene, sturdy and durable.
- Various panel options.
- One side switch is an option.
- One or Two finger joysticks are optional.

## Application

Typically used in cranes, construction equipment, agricultural equipment, mining equipment. Installed on operating mechanism or pilot operated valves.



## Environmental data

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

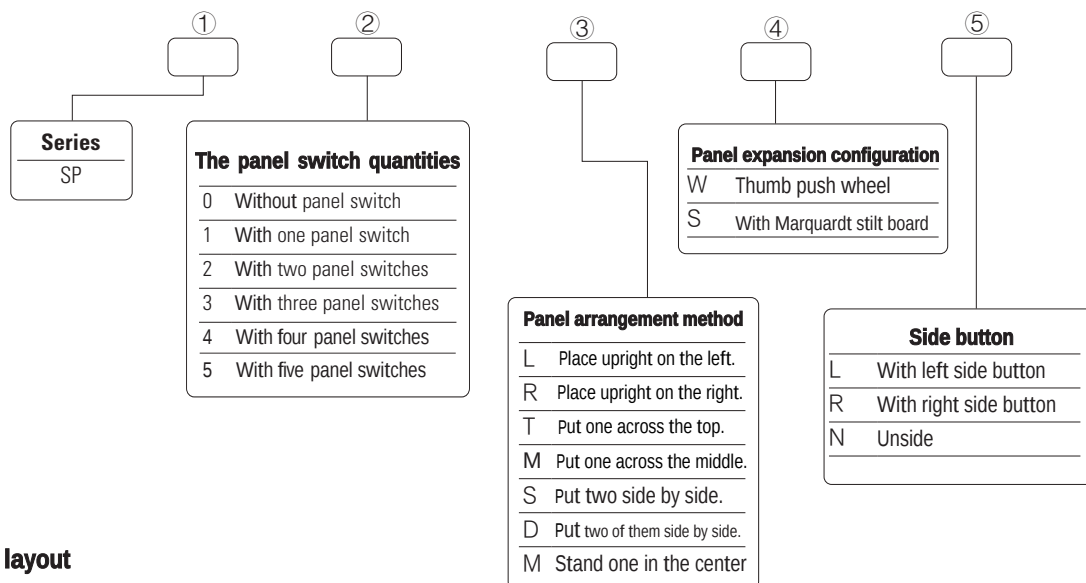
## Interface information

- 0.2mm<sup>2</sup> colorful high temperature wire;
- Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment.
- M12、 M14 female mechanical interface.
- Please connect with the technical leader for special requirements.

## Dimensions

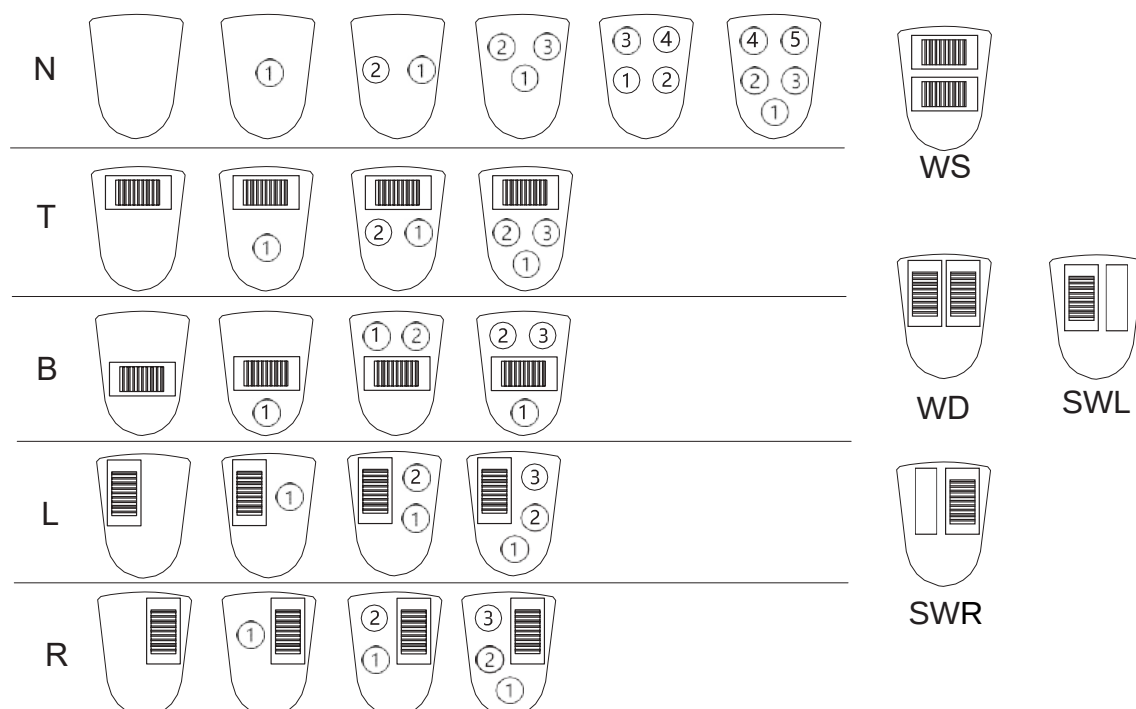


## Product configuration



## Panel layout

**Note:** Panel can be customized.



**Optional Button Color:**



# SA Series Handle

## Product features

- Ergonomic design, good handle feel;
- Using Nylon makes components durable;
- Various panel options;
- Dead man switch is an option.

## Application

Typically used in cranes, construction equipment, agricultural equipment, mining equipment. Installed on operating mechanism or pilot operated valves.



## Environmental data

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

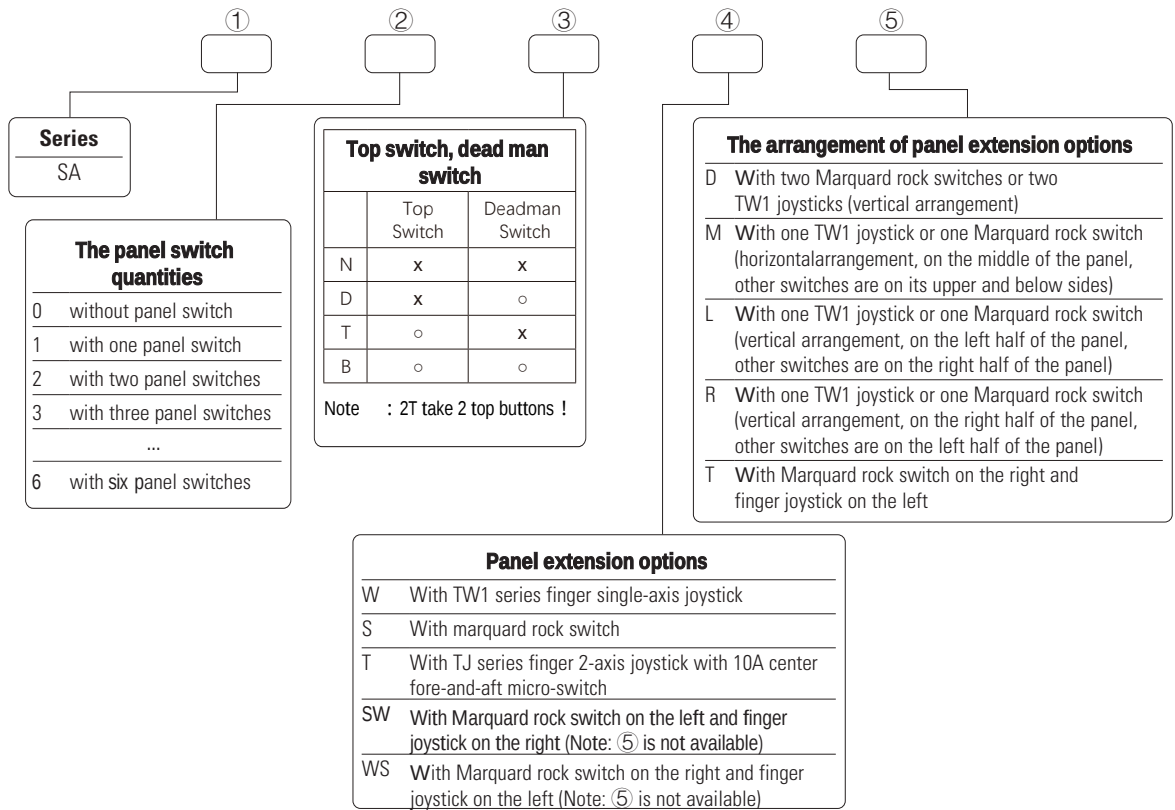
## Dimensions

## Interface information

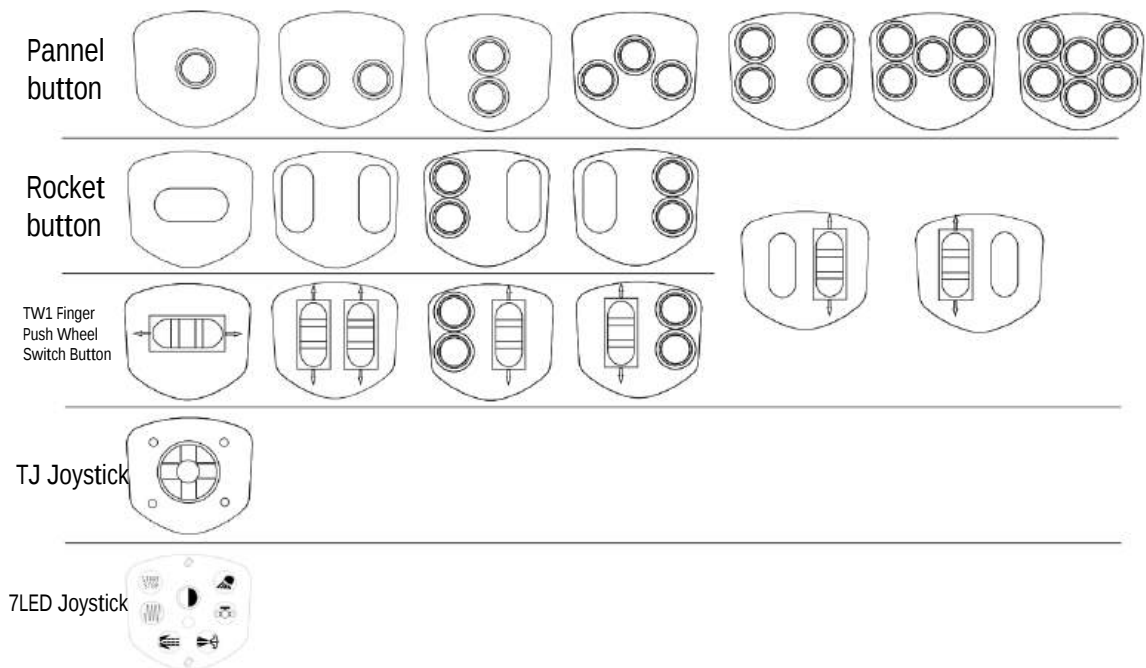
- 0.5mm<sup>2</sup> wire with number, 0.2mm<sup>2</sup> colorful high-temperature wire; Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment.
- Mechanical interface is customized designed.
- Please connect with the technical leader for special requirements.



## Product configuration



## Panel layout



Optional button color:



# SL Series Handle

## Product features

- Ergonomic design, touch comfortably;
- Coated joystick, suitable for long-term operation;
- Optional combination of various forms of panel;
- One button can be configured on the back.

## Application

This series of products are mainly used in a variety of excavators, loaders, lifting equipment and other construction machinery, can be separately installed in all kinds of construction machinery equipment can also be used with a variety of lower end.



## Dimensions

### Environmental parameter

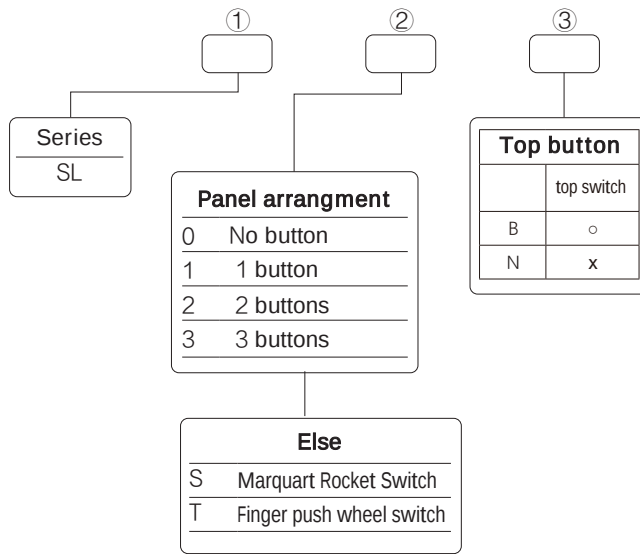
|                      |                                     |
|----------------------|-------------------------------------|
| Working temperature  | -30°C~+70°C                         |
| Storage temperature  | -40°C~ +85°C                        |
| Level of temperature | IP65 (above the installation panel) |

## Interface information

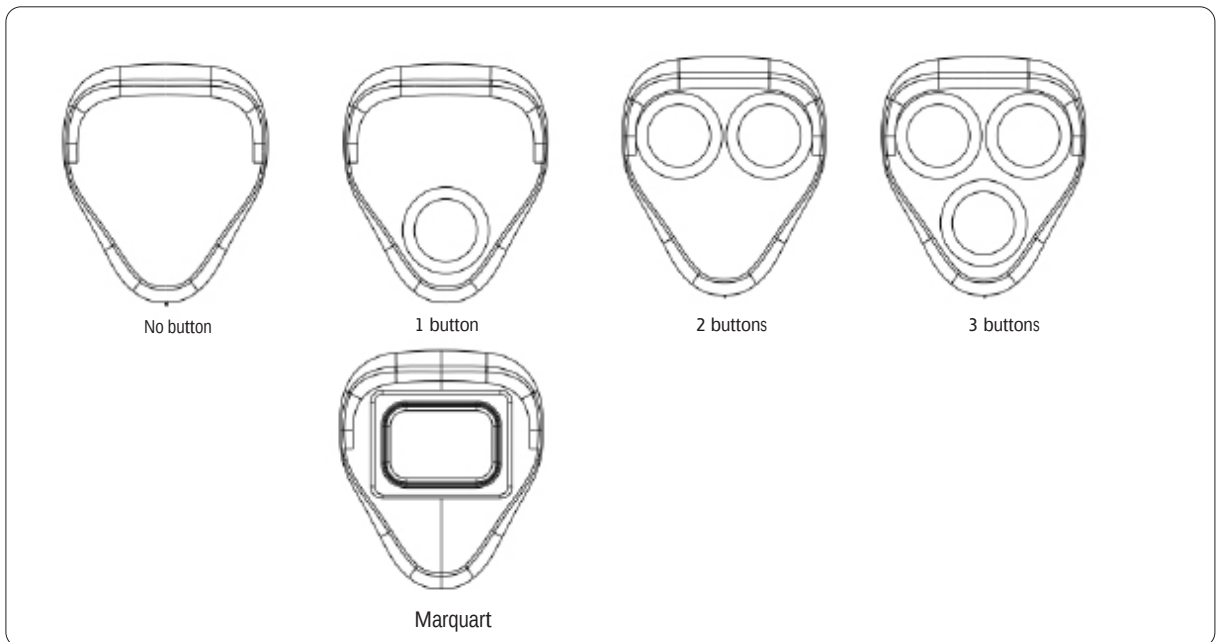
- 0.5mm<sup>2</sup> indicating number, 0.2mm<sup>2</sup> high temperature color line is optional;
- Generally, it is directly outgoing, without connector (optional connect or can be selected according to customer requirements);
- Please refer to the attachment for line length and line definition;
- Joystick connector can be customized;
- Any special request should be negotiated in advance.



## Product configuration



## Panel layout



# SY Series Handle

## Product features

- The whole package plastic handle, beautiful appearance;
- Waterproof and dust-proof, feel comfortable;
- Number of buttons panel can be optionaled;
- Optional safety switch ;
- Cables can be routed independently, and the routing mode is optional.

## Application

Mainly used with excavator handle, can also be separately installed in the pilot valve operating mechanism for use.

## Environmental parameter

|                     |                             |
|---------------------|-----------------------------|
| Working temperature | -30° C~+70° C               |
| Storage temperature | -40° C~ +85° C              |
| Level of protection | IP65 (Above mounting panel) |

## Interface information

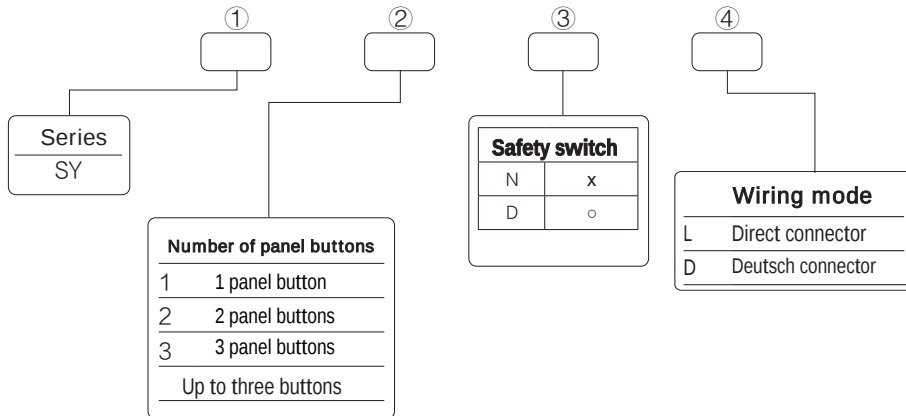
- Generally direct wire, 0.08x60 electronic wire color is optional;
- Terminal interface is optional;
- M14 external thread connection.



Dimensions



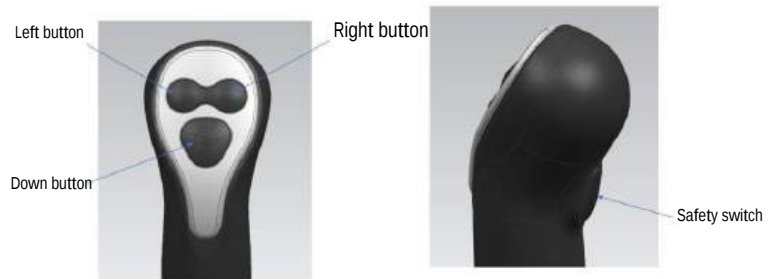
## Product configuration



## Outgoing line definition

### Line colour definition

|        |                           |
|--------|---------------------------|
| Black  | Upper end microswitch COM |
| Blue   | Left button               |
| Yellow | Right button              |
| Brown  | Down button               |
| White  | Safety switch COM         |
| Red    | Safety switch             |



# KG Series Handle

## Product features

- Ergonomic design, good handle feel;
- Using Nylon makes components durable;
- Dead man switch is an option.

## Application

Typically used in cranes, construction equipment, agricultural equipment, mining equipment. Installed on operating mechanism or pilot operated valves.



## Dimensions

## Environmental data

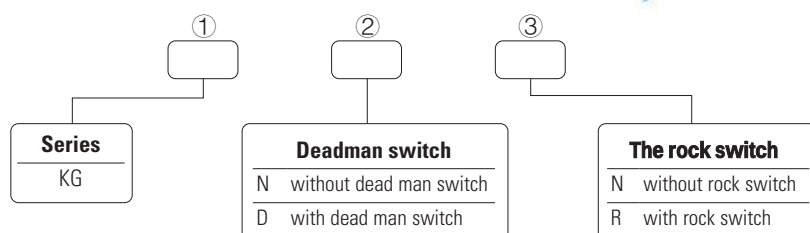
|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

## Interface information

- 0.2mm<sup>2</sup> colorful high temperature wire.  
Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment;
- Mechanical connector customized available;
- Special requirements please contact technical.



## Product configuration



# KM Series Handle

## Product features

- Ergonomic design, good handle feel;
- Using Nylon makes components durable;
- Deadman switch is an option.

## Application

Typically used in cranes, construction equipment, agricultural equipment, mining equipment. Installed on operating mechanism or pilot operated valves.



## Dimensions

## Environmental data

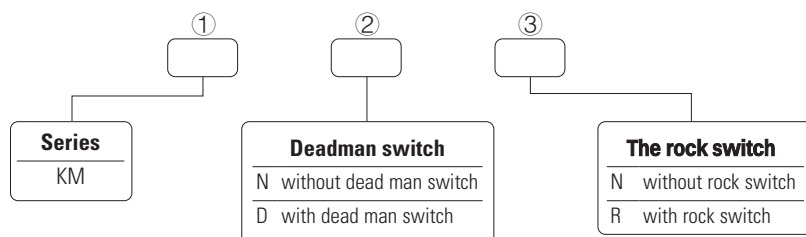
|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

## Interface information

- 0.2mm² colorful high-temperature wire;  
Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment.
- Mechanical connector customized available.
- Special requirements please contact technical.



## Product configuration



**Note:** If the hand grip don't have either of them, it should be KM.

# HA Series Handle

## Product features

- Ergonomic design, good handle feel;
- Using POM makes components sturdy and wear resisting.

## Application

Typically used in HJ30, HJ60 series joysticks.

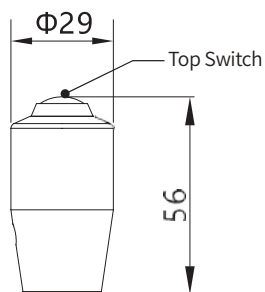
## Environmental data

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

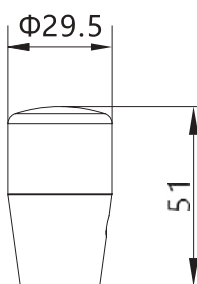
## Interface information

- 0.2mm<sup>2</sup> colorful high temperature wire;  
Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment.
- M8 female mechanical connector.
- Special requirements please contact technical.

## Product configuration



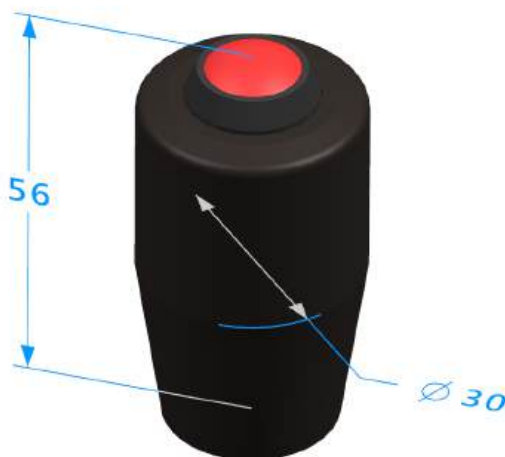
HAS



HA



## Dimensions



## HB Series Handle

### Product features

- Ergonomic design, good handle feel.
- Using Nylon makes components durable.

### Application

Typically used in HJ20, HJ21, HJ30, HJ60 series joysticks.



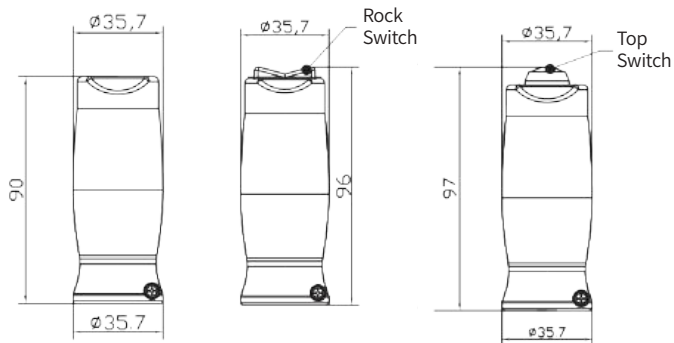
### Environmental data

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

### Interface information

- 0.2mm<sup>2</sup> colorful high-temperature wire;  
Normally,directly outlet without terminal.
- The wire length and determination,please refer to the attachment.
- M8 female mechanical connector.
- Special requirements please contact technical.

### Product configuration



HB

HBR

HBS

### Dimensions



# HD Series Handle

## Product features

- Ergonomic design, good handle feel
- Using Nylon makes components durable

## Application

Typically used in HJ20, HJ21, HJ30, HJ60 series joysticks.

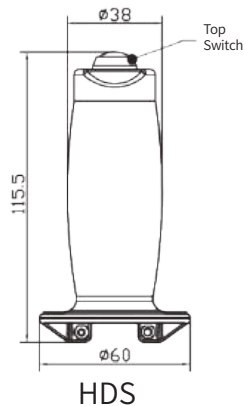
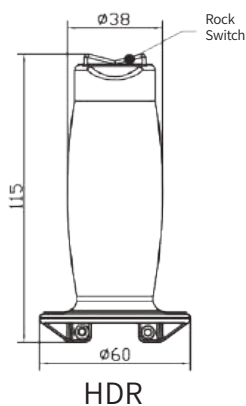
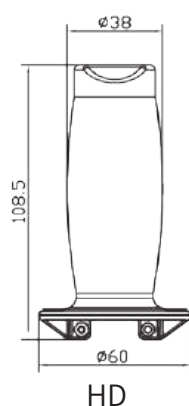
## Environmental data

|                       |                                     |
|-----------------------|-------------------------------------|
| Operating temperature | -30° C~+70° C                       |
| Storage temperature   | -40° C~ +85° C                      |
| Protection level      | IP65 (Above the installation panel) |

## Interface information

- 0.2mm<sup>2</sup> colorful high temperature wire;  
Normally, directly outlet without terminal.
- The wire length and determination, please refer to the attachment.
- M8 female mechanical connector.
- Special requirements please contact technical.

## Product configuration



## Dimensions



# KW Series Handle

## Product features

- Ergonomic design, good handle feel
- Using Nylon makes components durable
- Deadman switch available.

## Application

Its mainly used in all kinds of lifting machinery, construction machinery, agricultural and forestry machinery, mining machinery, can be assembled in the lower operating mechanism , also installed in the pilot valve operating mechanism separately.

## Environmental data

|                       |                        |
|-----------------------|------------------------|
| Operating Temperature | -30° C~+70° C          |
| Storage Temperature   | -40° C~ +85° C         |
| Protection level      | IP65 (Above the Panel) |

## Interface information

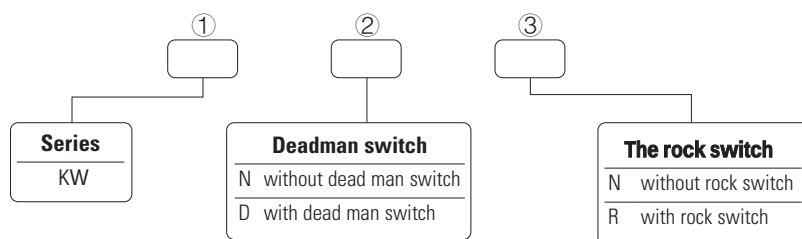
- 0.2mm2 colorful high-temperature wire;
- Normally, directly outlet without terminal(connector is available);
- The wire length and determination, please refer to the attachment;
- Handle adapter can be customized;
- Please connect with the technical leader for special requirements .



## Dimensions



## Product configuration





## Crane Joystick





## Aerial Work Platform Joystick



# Aerial Work Platform Joystick



GE-101005

## Used For

### Genie

Z45-25JRT, Z60-34RT  
Z60/34, Z80/60, Z45/25  
Z45/25J, Z135/70,  
Z51/30, JZ40/23N,  
Z40/23N, RJ Z45/25 IC,  
Z45/25J IC



GE-101173

## Used For

### Genie

Z135/70  
Z40/23N  
Z40/23N RJ



GE-101174

## Used For

### Genie

Z60/34, Z80/60, Z45/25  
Z45/25J, Z135/70,  
Z51/30 J, Z45/25 IC  
Z45/25J IC



GE-101175

## Used For

### Genie

Z60/34, Z80/60, Z45/25  
Z45/25J, Z135/70,  
Z51/30 J, Z45/25 IC  
Z45/25J IC



GE-62161

## Used For

### Genie

GS1530/1930  
GS2032/2632  
GS2046/2646/3246  
GS2668RT/3268RT  
GS2668DC/3268DC  
GS3390/4390/5390  
GS2668RT/3268RT  
Gs3384  
GS2668DC/3268DC



GE-78903

## Used For

### Genie

GS2046/2646/3246  
GS3390/4390/5390  
GS2668RT/3268RT  
GS3384  
GS2668DC/3268DC  
GS84/90  
GS30/32/46  
Gs2646  
GS2669RT/3369RT  
GS4069RT



GE-137634

## Used For

### Genie

GS1530/1532  
GS1930/1932  
GS2032/2632  
GS3232/2046  
GS2646/3246  
GS2669DC/3369DC  
GS4069DC  
GS4047



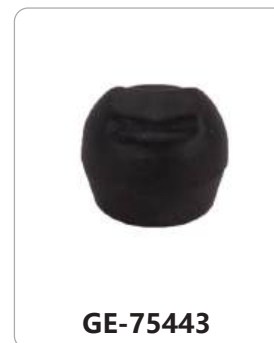
GE-42032

## Used For

### Genie

Z45/22 DC 2WD  
Z34/22N  
Z34/22DC  
Z30/20N  
Z30/20N RJ

# Aerial Work Platform AWP



# Aerial Work Platform Joystick



**56773**

## Used For

### Genie

Z45/25  
Z45/25J  
DC and BI Energy  
Z30/20N  
Z34/22  
Z30/20N RJ  
Z34/22 N



**99164**

## Used For

### Genie

GS2668 RT、GS3268 RT  
GS3384、GS84  
GS90、GS2669 RT  
GS3369 RT、GS4069 RT  
GS3384 RT、GS4390 RT  
GS5390 RT



**GE-20424**

## Used For

### Genie

Z34-22RT  
Z45-25JRT  
Z60-34RT  
S45、S65、S85



**GE-72278**

## Used For

### Genie

S40  
S45  
Z45-22RT



**GE-234923**

## Used For

### Genie

Z30-20N  
Z34-22N  
Z45-25JDC



**GE-T110234**

## Used For

### Genie

GR-20J  
GR-26J



**144065**

## Used For

### Genie

GS1932、GS2632  
GS324、GS5390 RT  
GS3384 RT



**119613**

## Used For

### Genie

101005、101174  
101175、101173



**137611**

## Used For

### Genie

Spare



**Genie 5 PCB 109503**

## Used For

### Genie

Spare

# Aerial Work Platform Joystick



**Used For**

**JLG**

260MRT、330CRT  
400CRT、3369LE  
4069LE、M3369  
M4069

**1600308**



**Used For**

**JLG**

400S、460SJ  
600A/600AJ  
600S/600SJ/660SJ  
601S、740AJ  
800A/800AJ

**1600283**



**Used For**

**JLG**

1100SB、1100S、1100SJP  
340AJ、1850SJ、400S  
18RS/18RSJ、24RS/24RSJ  
450A/450AJ SERIES 2  
510AJ、600A/600AJ  
600S/600SJ/660SJ  
608S、740AJ  
800A/800AJ  
800S/860SJ/810SJ

**100118416  
(1001166538)**



**Used For**

**JLG**

1100S、1100SJP、1200SJP  
1350SJP、340AJ、1250AJ  
1850SJ、18RS/18RSJ  
24RS/24RSJ、400S、460SJ  
450A/450AJ SERIES 2  
510AJ、600A/600AJ  
600S/600SJ/660SJ  
600SC/660SJC  
600S/600SJ/660SJ  
740AJ、800A/800AJ  
800S/860SJ/810SJ

**100118417**



**Used For**

**JLG**

E300AJ、E300AJP  
E/M400A、AJPnarrow  
W/M450A/AJ  
E400AN/E400AJP/E400AJPN  
M400AJP/M400AJPN  
E45A/AJ/E40AJP  
E40AAJPNARROW/M45A  
AJ/M40AJP  
M40AJPNARROW  
E600/E600J/E600JP/M600/  
M600J/M600JP

**100118418**



**Used For**

**JLG**

E300AJE300AJP  
E/M400A/AJPnarrow  
W/M450A/AJ  
E400AN/E400AJP/E400AJPN  
M400AJP/M400AJPN  
E45A/AJ/E40AJP/  
E40AAJPNARROW/M45A  
AJ/M40AJP  
M40AJPNARROW  
E600/E600J/E600JP/M600  
M600J/M600JP

**100118419**



**Used For**

**JLG**

6RS、10RS、1932RS  
3248RS、1532R  
1932R、530LRT  
4045R、1230ES  
2032ES、2632ES  
3246ES/2646ES  
1930ES  
2030ES/2630ES

**1001134438  
(1600402)**



**Used For**

**JLG**

269MRT、3369LE  
M3369、4069LE  
M4069、3394RT  
4394RT

**1600403**

## Aerial Work Platform Joystick



**1001100421**

Used For

**JLG** Toucan 10E, Toucan 26E  
Toucan 8E, Toucan 20E



**1600284**

Used For

**JLG** 600AJ, 800AJ  
460SJ, 600SJ



**1600458**

Used For

**JLG** Toucan 8E, Toucan 10E  
Toucan 12E



**JL-KR0048**

Used For

**JLG** Toucan 800A, Toucan 1010  
Toucan 1210, Toucan 1310



**159108**

Used For

**SKYJACK**

SJIII3215, SJIII3219  
SJIII3220, SJIII3226  
SJIII4620, SJIII4626  
SJIII4632, SJ3220  
SJ3226, SJ46XX



**159109**

Used For

**SKYJACK**

SJ6826 RT  
SJ6832 RT  
SJ8831 RT  
SJ8841 RT  
SJ9250 RT



**159111**

Used For

**SKYJACK**

SJIII4740  
SJ12  
SJ16  
SJ6832 RTE



**159230**

Used For

**SKYJACK**

SJ6826 RT  
SJ6832 RT  
SJ6826 RT  
SJ8831 RT  
SJ8841 RT  
SJ9250 RT



**138224**

Used For

**SKYJACK**

260MRT  
330CRT  
400CRT  
3369LE  
4069LE  
M3369  
M4069



**138225**

Used For

**SKYJACK**

SJ46 AJ  
SJ63 AJ  
SJ40 T/45 T  
SJ61 T/66 T  
SJ82 T/86 T

# Aerial Work Platform Joystick



**2441305160**

## Used For

### Haulotte

HA16P/PE/PN  
HA16PX, HA18P/PX  
HA20PX, HA26P  
H25TP, H25TPX  
H21T/TX  
H23T(X/P/PX)  
HA20P, HA61JRT  
HA26P(3°)  
HA51JRT



**2441305180**

## Used For

### Haulotte

HA16P/PE/PN  
HA16PX, HA18P/PX  
HA20PX, HA26PX  
H25TP, H25TPX  
H21T/TX, H23T(X/P/PX)  
HA20P, HA61JRT  
HA26P, HA51JRT  
HA26P(3°), HA80JRT



**2441305220**

## Used For

### Haulotte

COMPACT2247E  
COMPACT2277E  
COMPACT8, COMPACT8W  
COMPACT8-2032E  
COMPACT12-3347E  
COMPACT12  
COMPACT10-2747E  
COMPACT10, OPTIMUM6  
OPTIMUM8, HA12IP  
HA33JE, COMPACT10 RTE  
COMPACT2668 LCE  
COMPACT 10N



**2441305250**

## Used For

### Haulotte

STAR 8  
STAR 10  
STAR 13  
STAR 22  
STAR 26



**2441305340**

## Used For

### Haulotte

HA16SPX, HA18SPX  
HA16TPX, HA260PX  
H14T(X), HA15X  
HA16PX NT, HA46JRT  
HA18PX, HA51JRT  
HA18PX NT, HA32PX  
HA16X, HB44J  
HA20PX



**2441305350**

## Used For

### Haulotte

HA16SPX, HA18SPX  
HA16TPX, HA260PX  
H14T(X), HB40  
HA15X, HA16PX NT  
HA46JRT, HA18PX  
HA51JRT, HA18PX NT  
HA32PX, HA16X  
HB44J, HA20PX



**2441305360**

## Used For

### Haulotte

HA16SPX, HA18SPX  
HA16TPX, H14T(X)  
HB40, HA15X  
HA32PX, HA16X  
HB44J, HA20PX  
HA61JRT, HA260PX  
H21TX, HA120PX  
HA80JRT, HA26PX  
HA16X, HB44J  
HA20PX



**2441305370**

## Used For

### Haulotte

COMPACT 10DX  
COMPACT 12DX, HA12SXL  
COMPACT10/12DX  
H15SX(L), HS3388RT(XL)  
HS34388RT(XL)  
H18SX(L), HS5388RT(X)  
COMPACT2668/3368RT  
COMPACT2668RTE  
COMPACT12RTE  
COMPACT3368RTE  
COMAPCT10RTE

# Aerial Work Platform Joystick



**2901006230**

Used For

**Haulotte** HA16RTJ, HA16RTJPro  
HA32RTJPro, H23RTJPro



**2901006220**

Used For

**Haulotte** HA16RTJ, HA16RTJPro  
HA32RTJPro, HT23RTJPro



**2901006210**

Used For

**Haulotte** HA16RTJ, HA16RTJPro  
HA32RTJPro, HT23RTJPro



**2901011790**

Used For

**Haulotte**  
STAR8  
STAR10  
STAR22J  
STAR26J



**2901015000**

Used For

**Haulotte**  
COMPACT2247E  
COMPACT2277E  
COMPACT8  
COMPACT8W  
COMPACT8-2032E  
COMPACT12-3347E  
COMPACT12  
COMPACT10-2747E  
COMPACT10  
.....



**894573**

Used For

**manitou** 80VJR, 110VJR  
100VJR, 105VJR



**894575**

Used For

**manitou** 80VJR, 110VJR  
100VJR, 105VJR



**066785-000**

Used For

**UpRight** X20N, X26N  
X32N



**679253**

Used For

**manitou** 160ATJ, 165ATJ  
180ATJ, 200ATJ



**592604**

Used For

**manitou** 160ATJ, 165ATJ  
180ATJ, 200ATJ



**501882-000**

Used For

**Snorkel** AB38N  
**UpRight** AB38E



**3087801**

Used For

**Snorkel** S1930E, S1932E  
**UpRight** S2632E

# Forklift Joystick

## Product features

- Spring return, dual axis for any direction or cross direction
- Hall or Potentiometer available
- Comfortable operating

## Technical information

### Mechanical features

|                         |                         |
|-------------------------|-------------------------|
| Travel angle            | $\pm 30^\circ$          |
| Operating type          | Spring return           |
| Breakout force          | 9N                      |
| Maximum allowable force | >300N                   |
| Expecting life          | >3 million times (Hall) |
| Weight                  | 200g/260g               |

## Application

Used on forklift truck and other engineering vehicles, especially for Linde forklift.

### Environmental data

|                       |                         |
|-----------------------|-------------------------|
| Operating temperature | -30°C~ +70°C            |
| Storage temperature   | -40°C~ +85°C            |
| Protection level      | IP65 (Above the flange) |

### HJ12 Series



### HJ15 Series



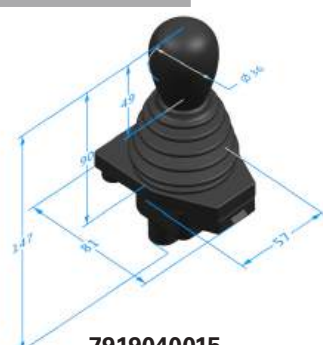
### HJ18 Series



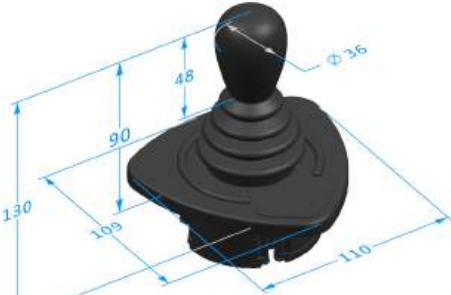
## HJ12 Series

| Dimensions                                                                                                 | Application                                                          | Electrical data                                                                                                                                                                                                                |              |           |                                      |        |                            |        |
|------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|--------------------------------------|--------|----------------------------|--------|
|  <p><b>7919040012</b></p> | 1120, 386-02, 387, 388,<br>392-02, 393-02, 394-01,<br>394-02, 396-02 | <p><b>Potentiometer</b></p> <table><tr><td>Power supply</td><td>20-80%Vdc</td></tr><tr><td>Limiting allowable power consumption</td><td>0.125W</td></tr><tr><td>Output linearity tolerance</td><td>&lt; ± 5%</td></tr></table> | Power supply | 20-80%Vdc | Limiting allowable power consumption | 0.125W | Output linearity tolerance | < ± 5% |
| Power supply                                                                                               | 20-80%Vdc                                                            |                                                                                                                                                                                                                                |              |           |                                      |        |                            |        |
| Limiting allowable power consumption                                                                       | 0.125W                                                               |                                                                                                                                                                                                                                |              |           |                                      |        |                            |        |
| Output linearity tolerance                                                                                 | < ± 5%                                                               |                                                                                                                                                                                                                                |              |           |                                      |        |                            |        |

## HJ15 Series

| Dimensions                                                                                                  | Application                                                          | Electrical data                                                                                                                                                                                                                                                                                                                                  |              |              |                |                              |                        |       |                                |        |                            |        |
|-------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|--------------|----------------|------------------------------|------------------------|-------|--------------------------------|--------|----------------------------|--------|
|  <p><b>7919040015</b></p> | 1120, 386-02, 387, 388,<br>392-02, 393-02, 394-01,<br>394-02, 396-02 | <p><b>Hall</b></p> <table><tr><td>Power supply</td><td>5.0 ± 0.5Vdc</td></tr><tr><td>Supply current</td><td>&lt;44mA (Rated supply voltage)</td></tr><tr><td>Supply voltage maximum</td><td>30Vdc</td></tr><tr><td>Reverse polarity voltage (max)</td><td>-15Vdc</td></tr><tr><td>Output linearity tolerance</td><td>&lt; ± 4%</td></tr></table> | Power supply | 5.0 ± 0.5Vdc | Supply current | <44mA (Rated supply voltage) | Supply voltage maximum | 30Vdc | Reverse polarity voltage (max) | -15Vdc | Output linearity tolerance | < ± 4% |
| Power supply                                                                                                | 5.0 ± 0.5Vdc                                                         |                                                                                                                                                                                                                                                                                                                                                  |              |              |                |                              |                        |       |                                |        |                            |        |
| Supply current                                                                                              | <44mA (Rated supply voltage)                                         |                                                                                                                                                                                                                                                                                                                                                  |              |              |                |                              |                        |       |                                |        |                            |        |
| Supply voltage maximum                                                                                      | 30Vdc                                                                |                                                                                                                                                                                                                                                                                                                                                  |              |              |                |                              |                        |       |                                |        |                            |        |
| Reverse polarity voltage (max)                                                                              | -15Vdc                                                               |                                                                                                                                                                                                                                                                                                                                                  |              |              |                |                              |                        |       |                                |        |                            |        |
| Output linearity tolerance                                                                                  | < ± 4%                                                               |                                                                                                                                                                                                                                                                                                                                                  |              |              |                |                              |                        |       |                                |        |                            |        |

## HJ18 Series

| Dimensions                                                                                                              | Application            | Electrical data                                                                                                                                                                                                                |              |           |                                      |        |                            |        |
|-------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------|-----------|--------------------------------------|--------|----------------------------|--------|
|  <p><b>7919040041 7919040042</b></p> | 351 series, 352 series | <p><b>Potentiometer</b></p> <table><tr><td>Power supply</td><td>20-80%Vdc</td></tr><tr><td>Limiting allowable power consumption</td><td>0.125W</td></tr><tr><td>Output linearity tolerance</td><td>&lt; ± 5%</td></tr></table> | Power supply | 20-80%Vdc | Limiting allowable power consumption | 0.125W | Output linearity tolerance | < ± 5% |
| Power supply                                                                                                            | 20-80%Vdc              |                                                                                                                                                                                                                                |              |           |                                      |        |                            |        |
| Limiting allowable power consumption                                                                                    | 0.125W                 |                                                                                                                                                                                                                                |              |           |                                      |        |                            |        |
| Output linearity tolerance                                                                                              | < ± 5%                 |                                                                                                                                                                                                                                |              |           |                                      |        |                            |        |

# HJ42 Series Joystick

## Product features

- Spring return, two axis operation in any direction.
- Hall sensor.
- The output is programmable.
- Set up the output signal device.

## Application

Mainly used in proportional valve control.

## Technical information

### With electronic amplifier

| Hall                               |              |
|------------------------------------|--------------|
| Power supply                       | 9-36Vdc      |
| Supply current                     | 22mA         |
| Maximum allowable overload voltage | 45Vdc        |
| Reverse maximum allowable voltage  | -10Vdc       |
| Output linearity tolerance         | $< \pm 0.1V$ |

### Mechanical features

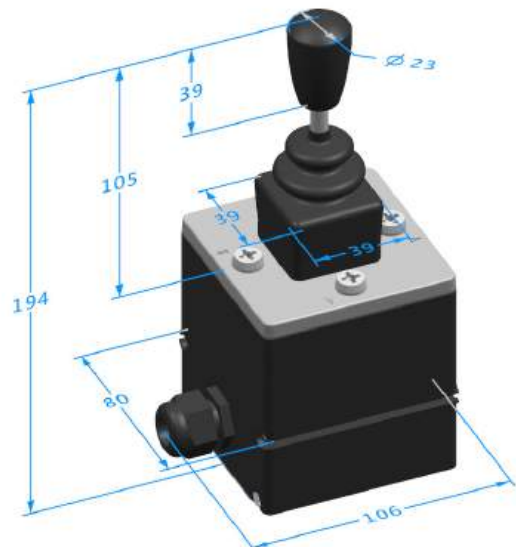
|                         |                  |
|-------------------------|------------------|
| Travel angle            | $\pm 20^\circ$   |
| Operating type          | Spring return    |
| Breakout force          | 2.5N             |
| Operating force(max)    | 5.5N             |
| Maximum allowable force | >300N            |
| Expecting life          | >1million cycles |
| Weight                  | 400g             |

### Environmental data

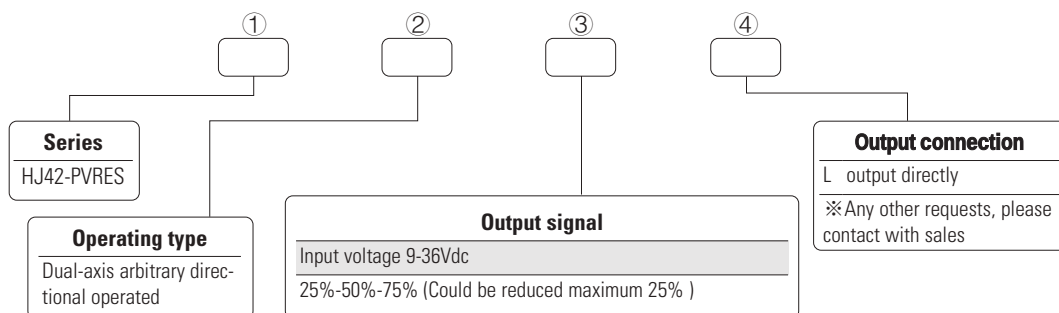
|                       |                         |
|-----------------------|-------------------------|
| Operating temperature | -30°C~ +70°C            |
| Storage temperature   | -40°C~ +85°C            |
| Protection level      | IP65 (Above the flange) |



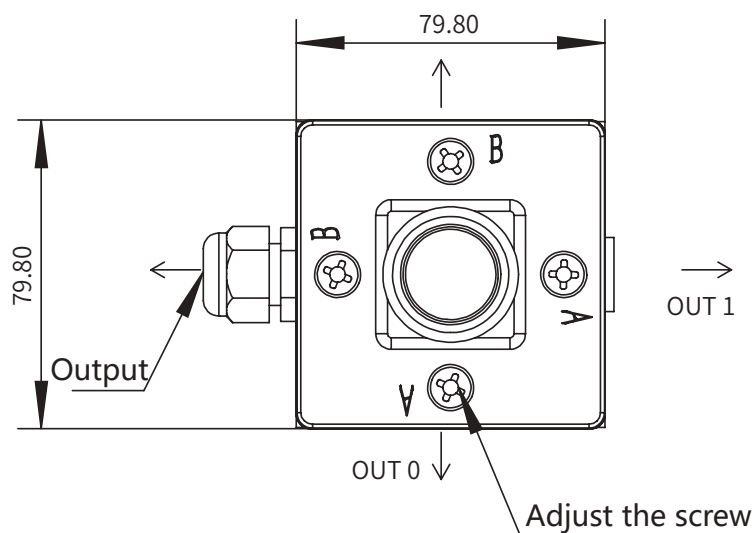
## Dimensions



## Product configuration



## Product installation



## Electrical connections

### Output directly

| Color           | Function      |
|-----------------|---------------|
| Red             | VCC           |
| Black           | GND           |
| White and Red   | Mircoswitch 1 |
| White and Blue  | Mircoswitch 2 |
| Yellow          | OUT0          |
| White and green | OUT1          |

# APPENDIX

## Output signal

### Output type

- Hall: Hall contactless sensor, code H;
- Potentiometer: Potentiometer output, code P;

### Naming rules

- Hall output (H); Generally, distinguish by Hall input voltage, such as H5X; H refers to Hall, 5 refers to Hall input voltage is 5V, X is sequence code 1~9, A~Z(excluding I, O, Z)

| Input voltage | Hall                        | Output       | Description         | Output Voltage(V) |
|---------------|-----------------------------|--------------|---------------------|-------------------|
| 5V            | Single Hall                 | H51          | 10% ~ 50% ~ 90%Vdc  | 0.5 ~ 2.5 ~ 4.5   |
|               |                             | H52          | 0% ~ 50% ~ 100%Vdc  | 0 ~ 2.5 ~ 5       |
|               |                             | H53          | 25% ~ 50% ~ 75%Vdc  | 1.25 ~ 2.5 ~ 3.75 |
|               |                             | H54          | 20% ~ 50% ~ 80%Vdc  | 1 ~ 2.5 ~ 4       |
|               |                             | H55          | 23% ~ 50% ~ 77%Vdc  | 1.15 ~ 2.5 ~ 3.85 |
|               |                             | H56          | 20% ~ 40% ~ 80%Vdc  | 1 ~ 2 ~ 4         |
|               |                             | H57          | 5% ~ 50% ~ 95%Vdc   | 0.25~2.5~4.75     |
|               |                             | H58          | 20% ~ 60% ~ 100%Vdc | 1 ~ 3 ~ 5         |
|               |                             | H59          | 90% ~ 10% ~ 90%Vdc  | 4.5 ~ 0.5 ~ 4.5   |
|               |                             | H5A(H35)     | 75% ~ 10% ~ 75%Vdc  | 3.5~0.5~3.5       |
|               |                             | H5B          | 3.9% ~ 33% ~ 62%Vdc | 0.195~1.65~3.1    |
|               |                             | H5C          | 30%~50%~77%Vdc      | 1.5~2.5~3.85      |
|               |                             | H5D          | 8%~40%~71%Vdc       | 0.4~2~3.55        |
|               |                             | H5E          | 8%~50%~92%Vdc       | 0.4~2.5~4.6       |
|               |                             | H5F          | 16%~50%~84%Vdc      | 0.8~2.5~4.2       |
|               |                             | H5G          | 84%~16%~84%Vdc      | 4.2~0.8~4.2       |
|               |                             | H5H          | 100%~0%~100%Vdc     | 5~0~5             |
|               |                             | H5Y          | .....               | .....             |
| 5V            | Each axis of redundant hall | 2H51         | 10% ~ 50% ~ 90%Vdc  | 0.5 ~ 2.5 ~ 4.5   |
|               |                             | 2H52         | 0% ~ 50% ~ 100%Vdc  | 0 ~ 2.5 ~ 5       |
|               |                             | 2H53         | 25% ~ 50% ~ 75%Vdc  | 1.25 ~ 2.5 ~ 3.75 |
|               |                             | 2H54         | 20% ~ 50% ~ 80%Vdc  | 1 ~ 2.5 ~ 4       |
|               |                             | 2H55         | 23% ~ 50% ~ 77%Vdc  | 1.15 ~ 2.5 ~ 3.85 |
|               |                             | 2H56         | 20% ~ 40% ~ 80%Vdc  | 1 ~ 2 ~ 4         |
| 7V            | Each axis of Hall           | H71(Special) | 10% ~ 50% ~ 90%Vdc  | 0.7 ~ 3.5 ~ 6.3   |
|               |                             | H72(Special) | 0% ~ 50% ~ 100%Vdc  | 0 ~ 3.5 ~ 7       |

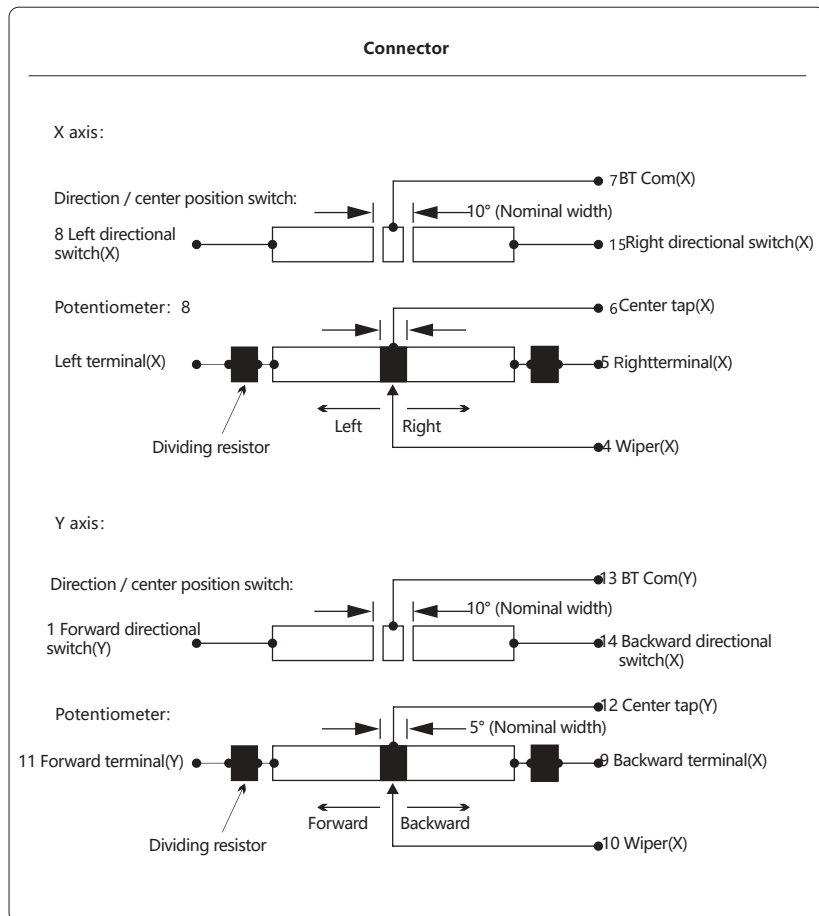
- Potentiometer output (P); Generally, distinguish by potentiometer input voltage, such as P052; Prefers to potentiometer, 05 refers to 5K potentiometer, 2 is sequence code 1~9, A~Z(excluding I, O, Z)

| Input Voltage | Potentiometer | Resistance | Description        | Note        |
|---------------|---------------|------------|--------------------|-------------|
| 9~36V         | P021          | 2K         | 0% ~ 50% ~ 100%Vdc | Rarely used |
|               | P022          | 2K         | 10% ~ 50% ~ 90%Vdc | Rarely used |
|               | P023          | 2K         | 25% ~ 50% ~ 75%Vdc | Rarely used |
|               | P041          | 4K         | 0% ~ 50% ~ 100%Vdc |             |
|               | P051          | 5K         | 0% ~ 50% ~ 100%Vdc |             |
|               | P052          | 5K/4K      | 10% ~ 50% ~ 90%Vdc | FJ1 used 4K |
|               | P053          | 5K         | 25% ~ 50% ~ 75%Vdc |             |
|               | P101          | 10K        | 0% ~ 50% ~ 100%Vdc |             |
|               | P102          | 10K        | 10% ~ 50% ~ 90%Vdc |             |
|               | P103          | 10K        | 25% ~ 50% ~ 75%Vdc |             |

Conversion circuit (U); Common selection, such as U21; Generation U refers to the voltage type, generation 2 refers to the power supply voltage 18~36V; 1 refers to sequence codes 1~9, A~Z(minus I, O, Z)

| Output | Power Voltage | Describe                   | Remark                     |
|--------|---------------|----------------------------|----------------------------|
| U11    | 9~18V         | -10~0~10Vdc Voltage output |                            |
| U12    | 9~18V         | 10~0~10Vdc Voltage output  |                            |
| U13    | 9~18V         | -5~0~5Vdc Voltage output   |                            |
| U14    | 9~18V         | 5~0~5Vdc Voltage output    |                            |
| U15    | 9~18V         | 0~10Vdc Voltage output     |                            |
| U21    | 18~36V        | -10~0~10Vdc Voltage output |                            |
| U22    | 18~36V        | 10~0~10Vdc Voltage output  |                            |
| U23    | 18~36V        | -5~0~5Vdc Voltage output   |                            |
| U24    | 18~36V        | 5~0~5Vdc Voltage output    |                            |
| U25    | 18~36V        | 0~10Vdc Voltage output     | Generally used on one side |
| U26    | 18~36V        | 6~12~18Vdc Voltage output  |                            |
| U27    | 18~36V        | 0~2.5~5Vdc Voltage output  |                            |
| U28    | 18~36V        | 0~5~10Vdc Voltage output   |                            |
| U29    | 18~36V        | 3~0~3Vdc Voltage output    |                            |
| U2A    | 18~36V        | 3~6~9Vdc Voltage output    |                            |

## Moldings wiring schematic



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