

MKF-JS09

Mate Industrial Thumb Joystick, Hall effect, 1 or 2 axis, Panel Mounted



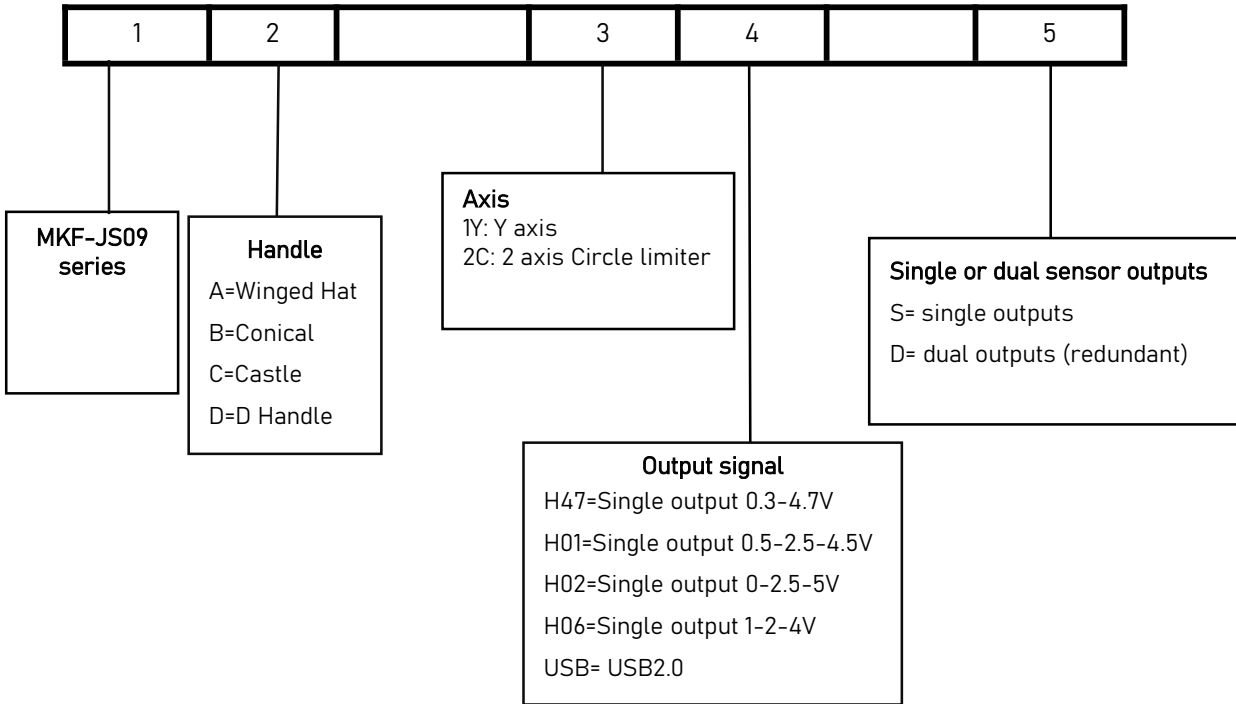
DESCRIPTION

MKF-JS09 thumbstick is a proportional two axes joystick in a miniature package. Featuring non-contacting Hall effect technology for long life performance, this series thumbstick is available with multiple linear output options including single and dual (redundant) outputs. It is similar in size and operation to “gamepad” controls, but in a rugged industrial package. Typical applications include pendant and remote controls as well as joystick handle and arm rest integration.

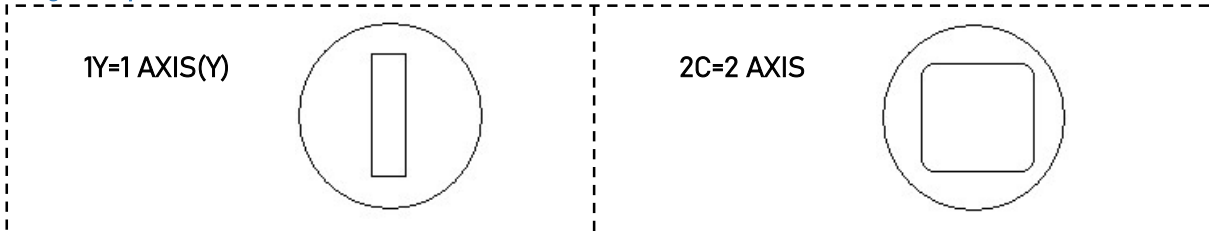
SPECIFICATION

Button	0
Operation Range	Circle, Straight
Operation Angle	XY axis $\pm 25^\circ$
Power Supply	DC5V, 12-24V(Optional)
Outputs	Analogue voltage, USB2.0
Life Span	5 million operating cycles
Material	engineering plastics
Degree of protection	IP67
Operation Temperature	-40°C to +70°C

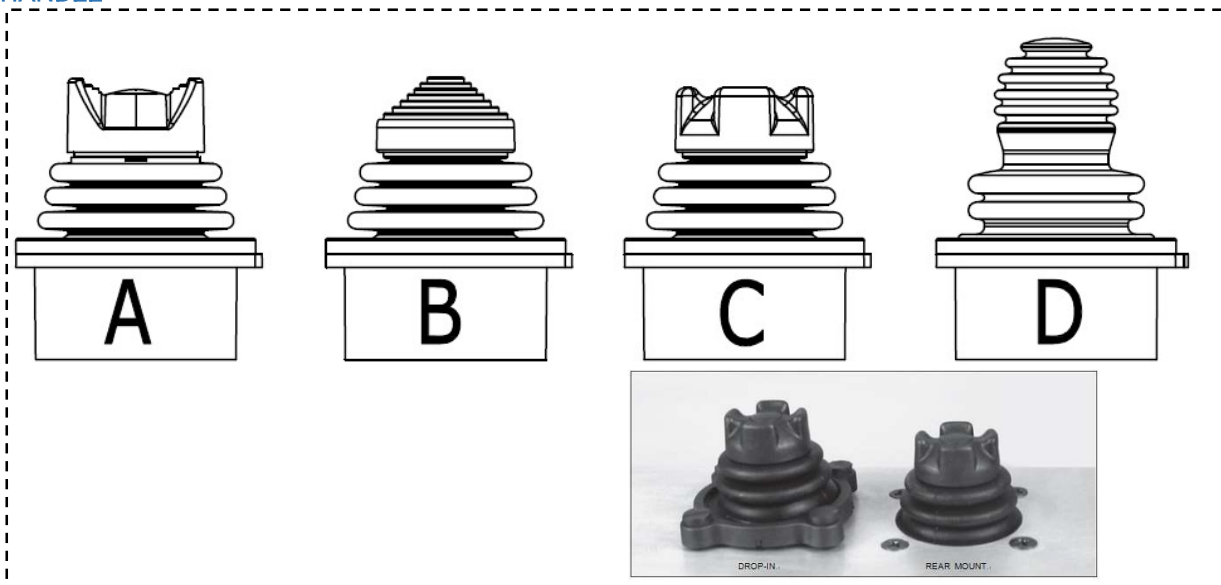
PRODUCT CONFIGURATION



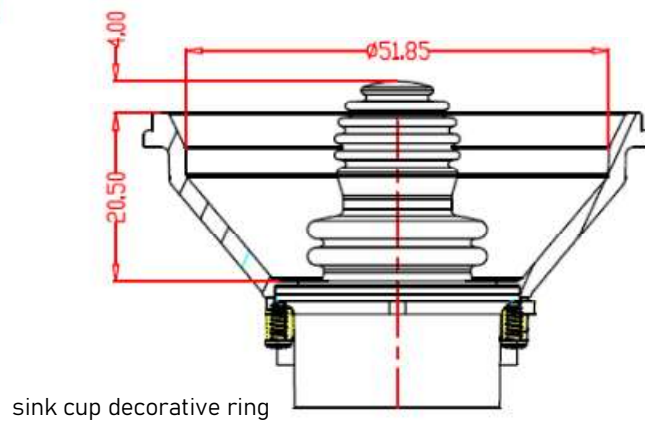
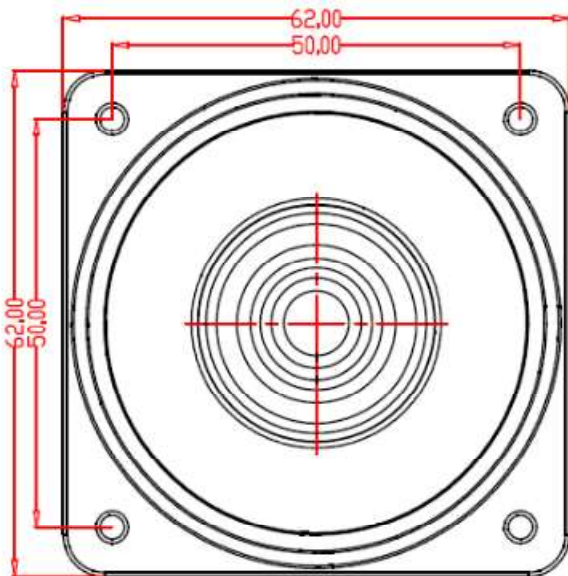
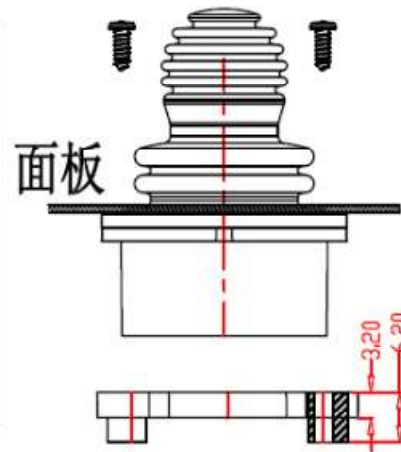
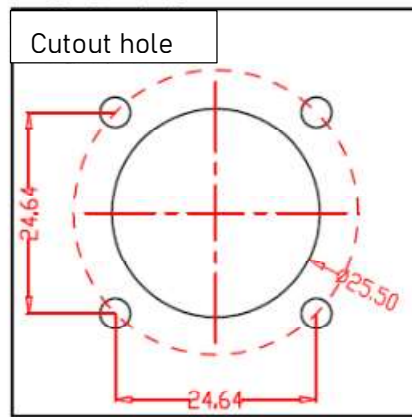
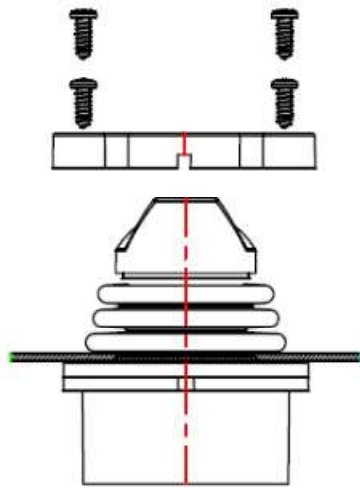
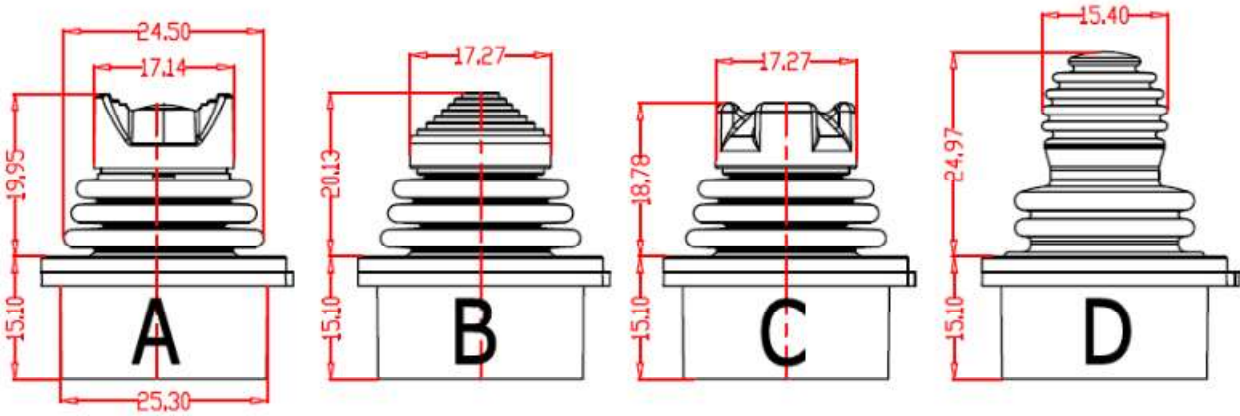
Range of operation



HANDLE



MECHANICAL DRAWING



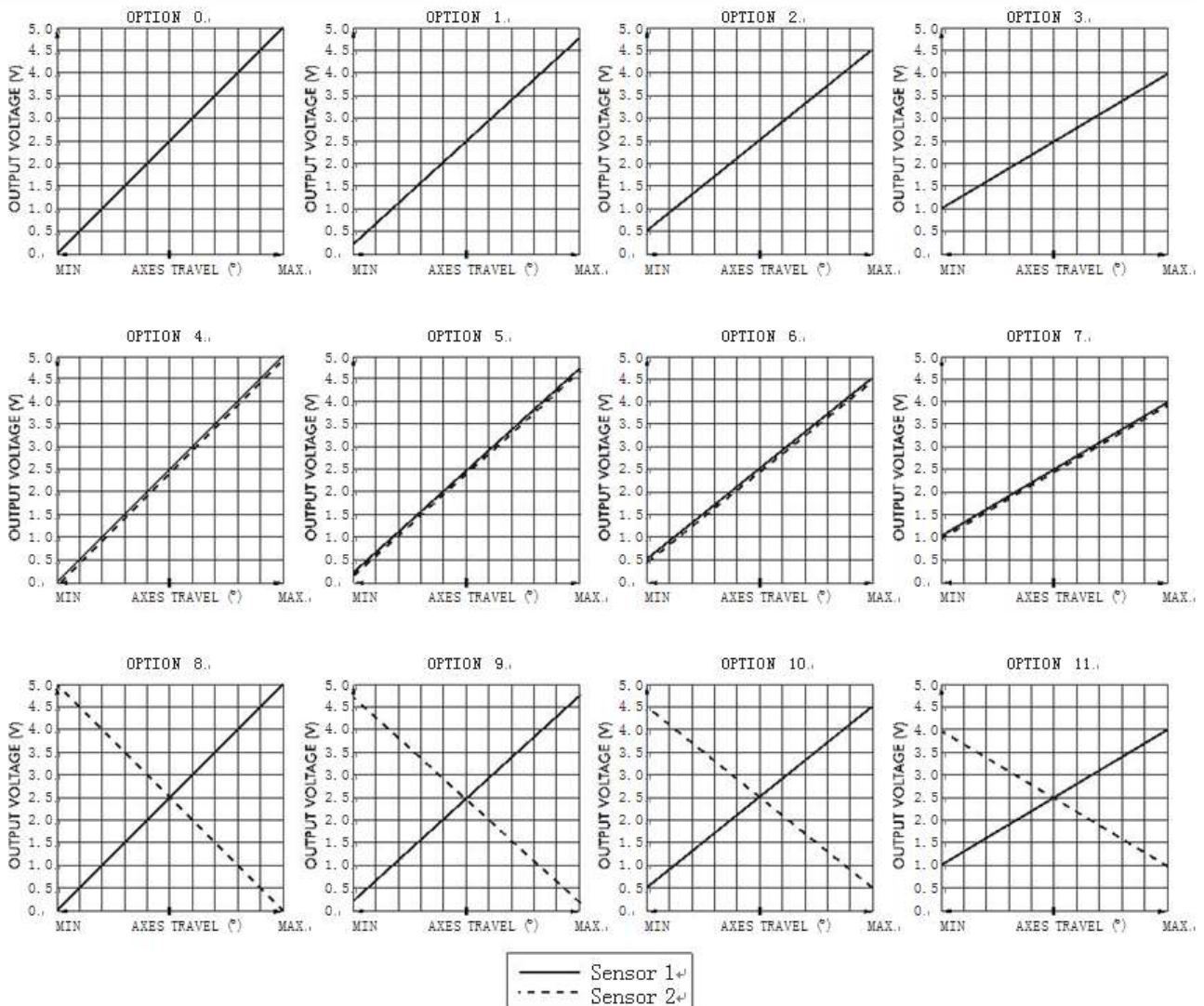
ELECTRICAL SENSOR

Resolution	1.22mV
Supply Voltage Range	5.00V±0.01V
Reverse Polarity Max	-10V
Over voltage Max	20V
Output Impedance	2Ω
Return to Center Voltage Tolerance	±250mV
Error Signal	1.0%

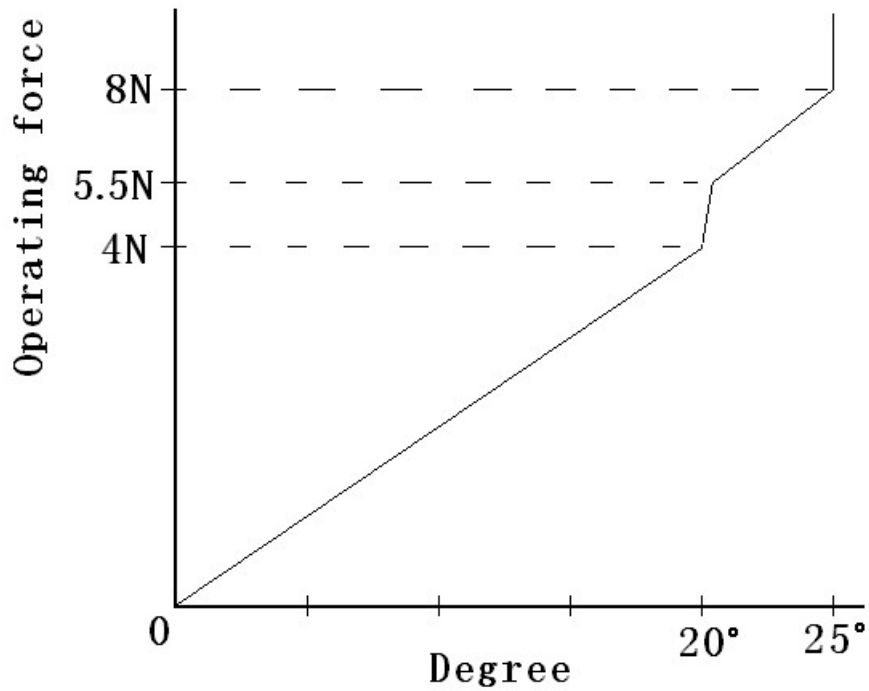
- ◇ Force applied to the top of the cap at full displacement.
 - ◇ All options are IP68 and IP69K rated, however Drop-in mounting does not prevent panel ingress.
- Note: The company reserves the right to change specifications without notice.

Analog signal output:

LINEAR OUTPUT OPTION S⁺

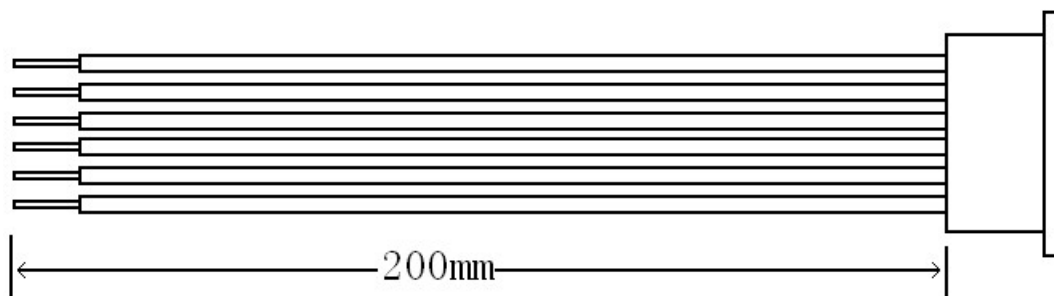


Operating force and angle drawing



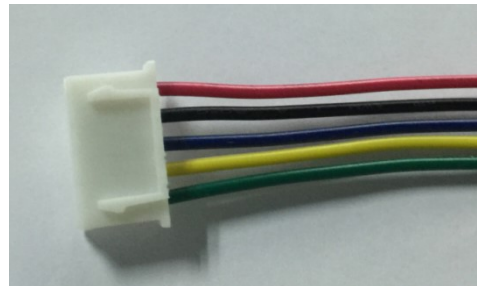
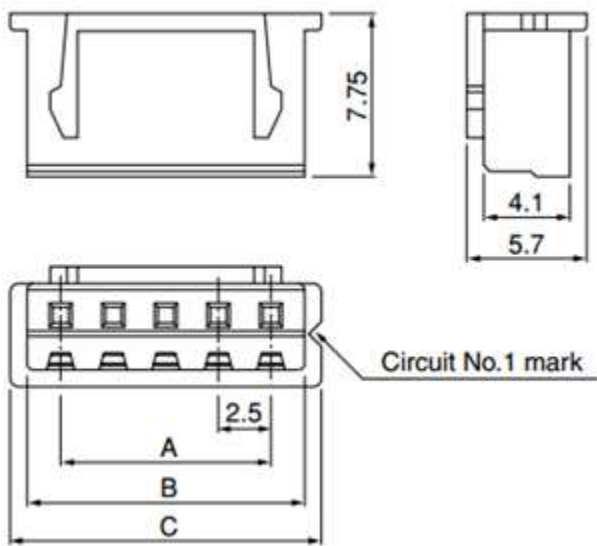
Connector-- Dual (redundant) output :Analog Voltage

- | | |
|-----------|------------|
| 1. Red | +5V |
| 2. Black | GND |
| 3. Yellow | X Signal 1 |
| 4. Green | Y Signal 1 |
| 5. Blue | X Signal 2 |
| 6. Brown | Y Signal 2 |



Connector: Single output

Model No:XHP-5

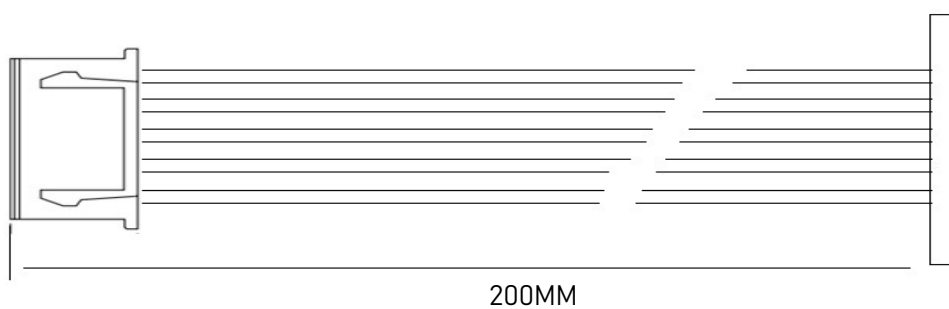


A=10.0 B=13.2 C=14.8 Q'ty/bag=1000

Analog Voltage

- | | | |
|----|---------|----------|
| 1. | Red | +5V |
| 2. | Black B | GND |
| 3. | Blue | NC |
| 4. | Yellow | X Signal |
| 5. | Green | Y Signal |

Connector: USB output



USB interface (Single output)

- | | | |
|----|---------|-----|
| 1. | Red | V+ |
| 2. | Black B | GND |
| 3. | Blue | D- |
| 4. | Yellow | D+ |
| 5. | Green | NC |

SPI Serial Protocol

1. Introduction

The MKF-JS09-SPI features a digital Serial Protocol mode. The MKF-JS09-SPI is considered as a Slave node.

The serial protocol of the MKF-JS09-SPI is a three wires protocol (/SS, SCLK, MOSI):

- /SS pin is a 5 V tolerant digital input
- SCLK pin is a 5 V tolerant digital input
- MOSI pin is a 5 V tolerant open drain digital input/output

The basic knowledge of the standard SPI specification is required for the good understanding of the present section.

2. SERIAL PROTOCOL Mode

The Joystick work in Slave mode

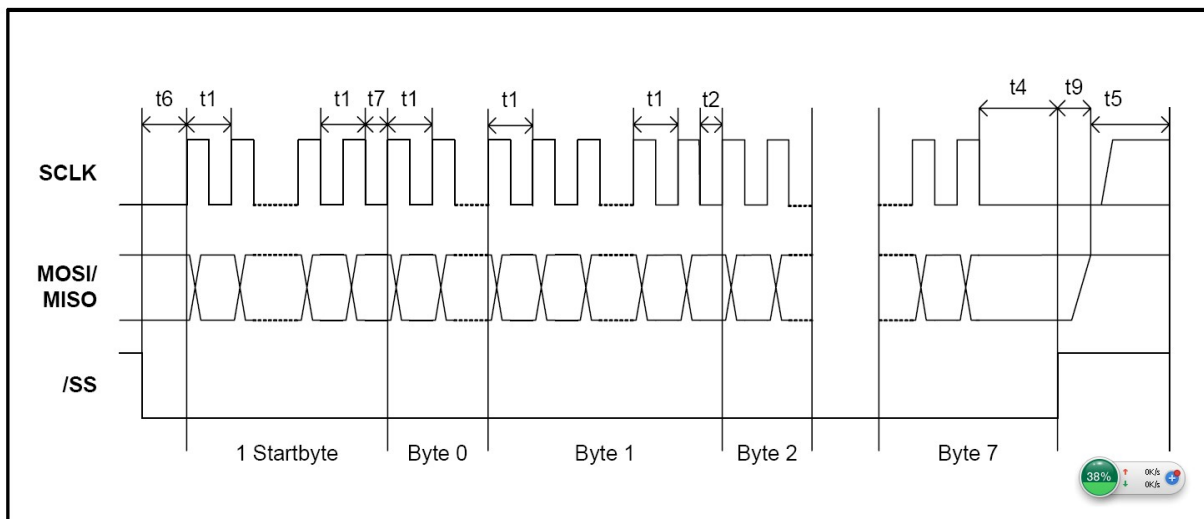
3. /SS (Slave Select)

- /SS pin is a 5 V tolerant digital input, Low level is enable.
- SCLK pin is a 5 V tolerant digital input
- MOSI-MISO pin is a 5 V tolerant open drain digital input/output

4. Timing

To synchronize communication, the Master deactivates /SS high for at least t_5 (1.5 ms). In this case, the Slave will be ready to receive a new frame. The Master can re-synchronize at any time, even in the middle of a byte transfer.

Note: Any time shorter than t_5 leads to an undefined frame state, because the Slave may or may not have seen /SS inactive.



Timings	Min ⁽³¹⁾	Max	Remarks
t1	- 2.3 μ s / 6.9 μ s	-	No capacitive load on MISO. t1 is the minimum clock period for any bits within a byte.
t2	- 12.5 μ s / 37.5 μ s	-	t2 the minimum time between any other byte
t4	- 2.3 μ s / 6.9 μ s	-	Time between last clock and /SS=high=chip de-selection
t5	- 300 μ s / 1500 μ s	-	Minimum /SS = Hi time where it's guaranteed that a frame re-synchronizations will be started.
t5	0 μ s	-	Maximum /SS = Hi time where it's guaranteed that NO frame re-synchronizations will be started.
t6	- 2.3 μ s / 6.9 μ s	-	The time t6 defines the minimum time between /SS = Lo and the first clock edge
t7	- 45 μ s / 45 μ s	-	t7 is the minimum time between the StartByte and the Byte0
t9	-	< 1 μ s	Maximum time between /SS = Hi and MISO Bus High-Impedance
T _{StartUp}	-	< 10 ms / 16 ms	Minimum time between reset-inactive and any master signal change

5. Slave Reset

On internal soft failures the Slave resets after 1 second or after an (error) frame is sent. On internal hard failures the Slave resets itself. In that case, the Serial Protocol will not come up. The serial protocol link is enabled only after the completion of the first synchronization

6. Frame Layer

The Figure 17 gives the timing diagram for the SPI Frame. The latch point for the angle measurement is at the last clock before the first data frame byte.

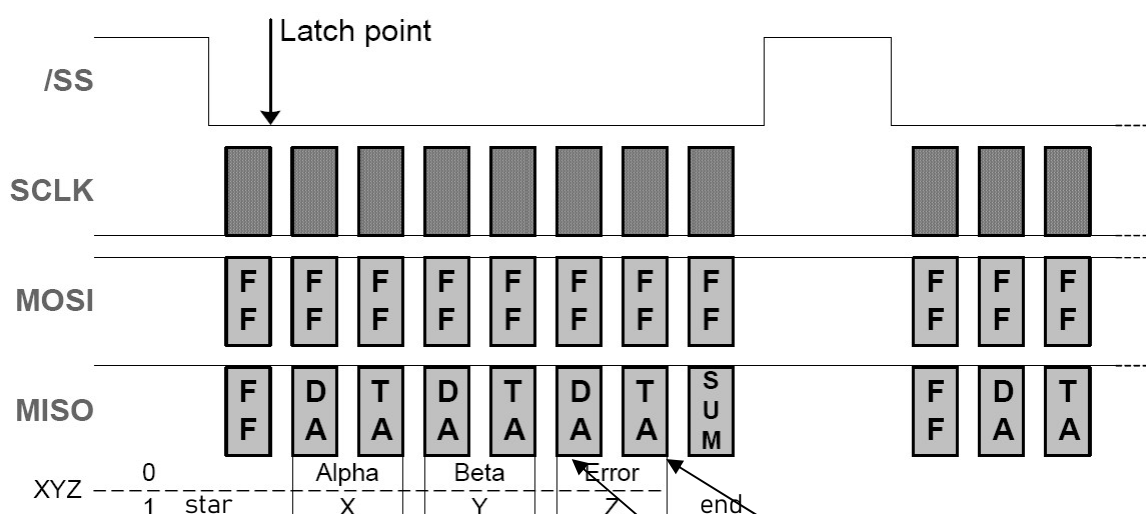


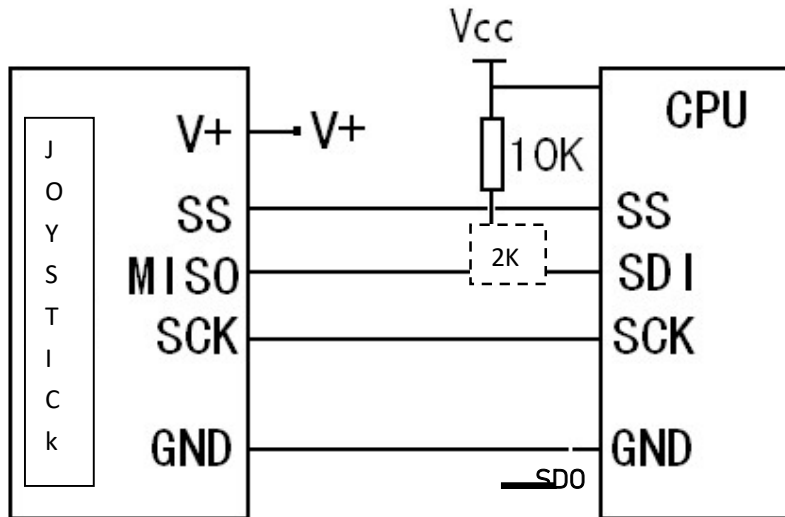
Figure 17 - Timing Diagram for the SPI Frame

X,Y = 0X0000-0XFFFF , Z = 0X0000 SCLK <= 1Mhz low byte high byte

SUM=XXL+XXH+YYL+YYH+ZZL+ZZH (low byte)

Example : FF 00 80 01 80 00 00 01

SPI Connection diagram

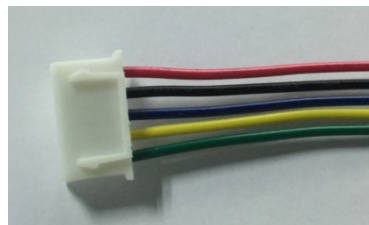


Connector Model No:XHP-5

SPI interface (Single output)

Connector Model No:XHP-5

- | | |
|-----------|------|
| 1. Red | V+ |
| 2. Black | GND |
| 3. Blue | SS |
| 4. Yellow | SCK |
| 5. Green | MISO |



MKF-JS09 joystick USB communication protocol

- Protocol: USB2.0 HID
- Identifying name: 3D Joystick Keyboard
- The same mode as the gamepad

1. Data format sent by USB keyboard (5 bytes HEX):

The USB keyboard sends the angle parameters of the keyboard's 3-axis joystick and the state value of the keyboard

byte1	byte2	byte3	byte4	byte5
XXL	XXH	YYL	YYH	BB

XXXX: X-axis data, 0X1000-0XF000, (BYTE2 data high, BYTE1 data low)

0X1000-0X7FFF Left
0X8000 Stop
0X8001-0XF000 Right

YYYY: Y-axis data, 0X1000-0XF000, (BYTE4 data high, BYTE3 data low)

0X1000-0X7FFF Up
0X8000 Stop
0X8001-0XF000 Down

BB: Button (No button 0x00)

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	0	0	0	0	0	0	按钮 1

USB data setting parameter method.

The factory has been set, the user does not need to set

1. USB set center point command (send command via USB)

f5 00 00 00 00 01 55 56

2. Set the low-order byte of the USB PID (send commands through USB)

Format: f5 0A Pid 00 00 00 CH

CH checksum: the low-order byte of the sum of 2-6bytes except the header F5

eg:

PID=0061 F5 0A 61 00 00 00 00 6b (default)

PID=0062 F5 0A 62 00 00 00 00 6c

PID=0063 F5 0A 63 00 00 00 00 6d