H80 Series

Mate Industrial Joystick, Hall effect, Multi-axis, Panel Mounted

DESCRIPTION

Multi-axis Hall-type industrial joystick, instrument panel installation method, stainless steel and aluminum alloy materials, spring automatic return structure, German high-precision Hall-type sensor, linear correction in the full temperature range, IP66 protection level, smoother operation Hand feel, ergonomic mechanical design.

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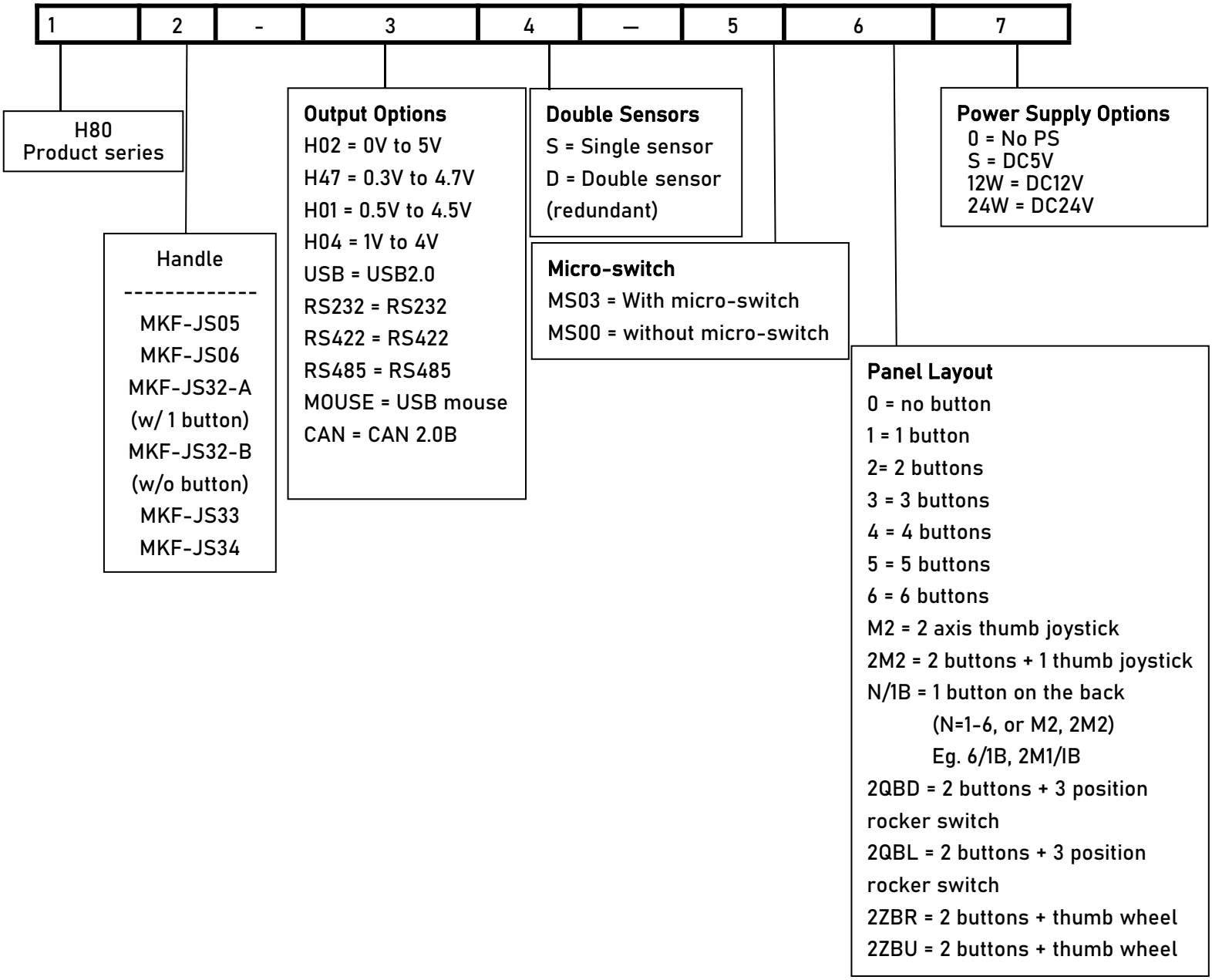
SPECIFICATION

Button	Specific modular construction of the handle enables application
Positioning	Spring automatically return
Operation Angle	±22.5°
Operation Limiter	Square
Power Supply	DC5V, 12-36V(Optional)
Signal Output	Analog voltage, RS232, RS422, USB, CAN(2.0)
Life Span	5 million operating cycles
Material	Aluminium, stainless steel, engineering plastics
Degree of protection	IP65
Operation Temperature	-40°C to +75°C
Power Consumption	Less than 32MA (analog voltage signal output, single signal output, 5V power supply)

PRODUCT CONFIGURATION



COMBINABLE HANDLES

MKF-JS05 / MKF-JS06

1. With enabling switch
2. Can be combined with 1-6 buttons, thumb wheel or rocker switch
3. Can be added with thumb joystick to finalize multi-axis

MKF-JS32

1. Straight Handle
2. With 1 button on the top

MKF-JS34
(Z axis twisted)

1. Handle can be twisted ±135°
2. Center mechanical gear feel
3. Z-axis with friction resistance positioning

MKF-JS33

The handle has a push switch function and can be pressed down 10MM. Equivalent to 1 button.

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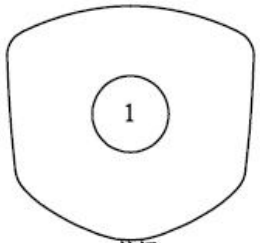
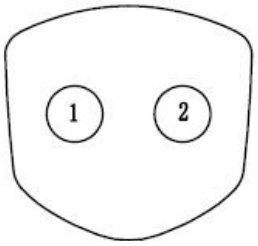
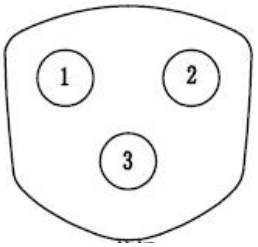
MKF-JS05 PANEL LAYOUT OPTIONAL



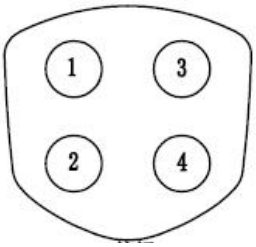
1 button



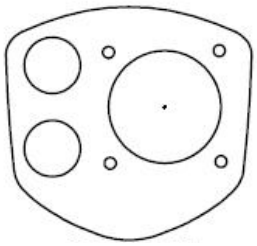
2 buttons



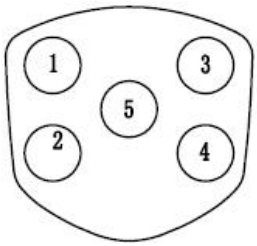
3 buttons



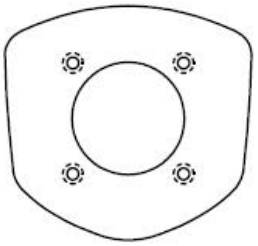
4 buttons



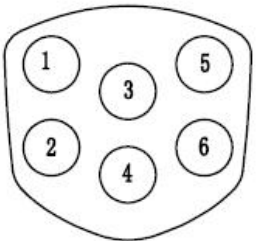
2 buttons + 1 thumb joystick



5 buttons

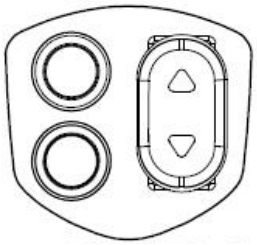


Thumb joystick

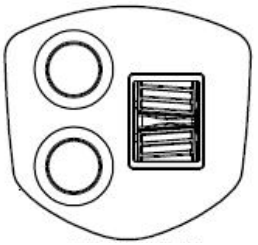


6 buttons

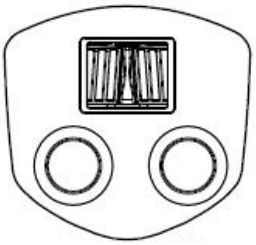
2QBD
(2 buttons + 3 position rocker switch down)



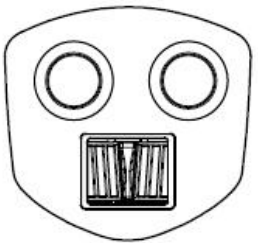
2QBL
(2 buttons + 3 position rocker switch right)



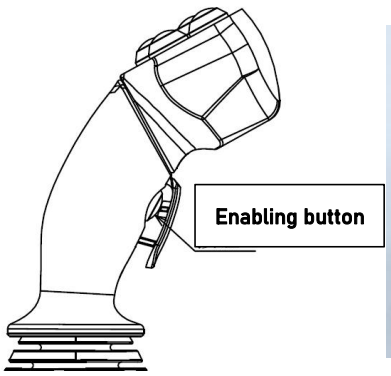
2ZBR
(2 buttons + 1 thumb wheel Right)



2ZBU
(2 buttons + 1 thumb wheel up)



2ZBD
(2 buttons + 1 thumb wheel down)



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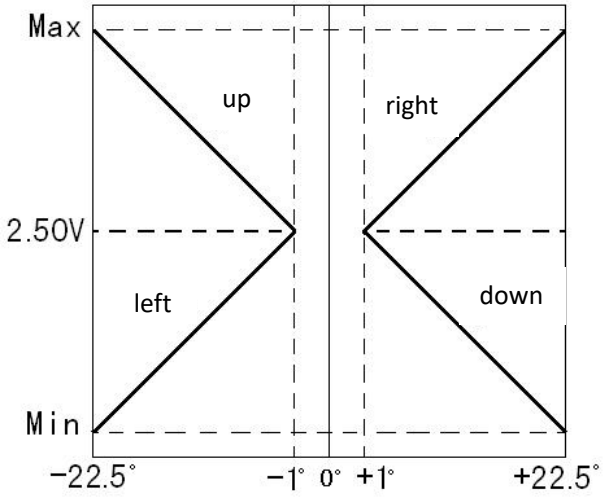
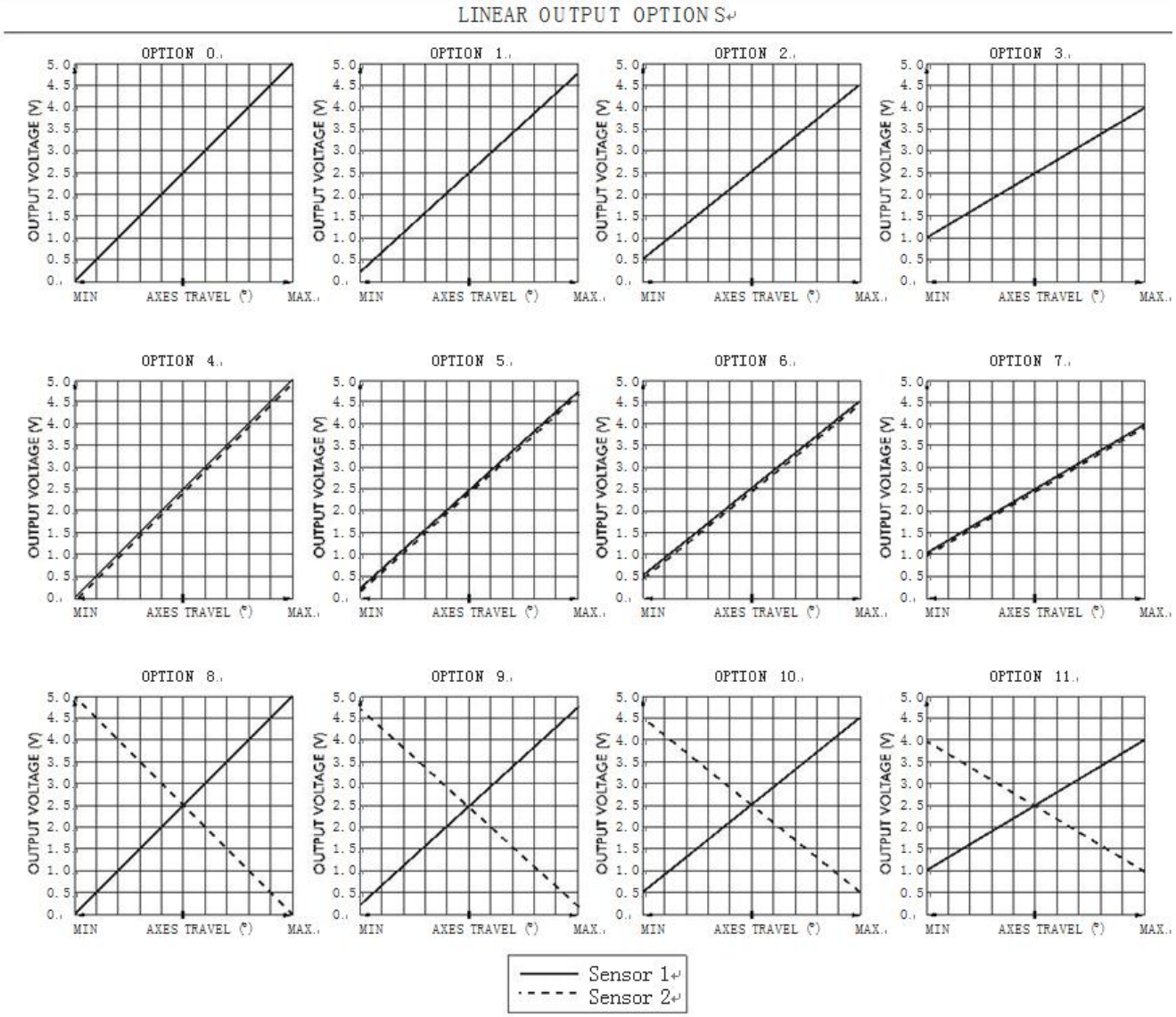
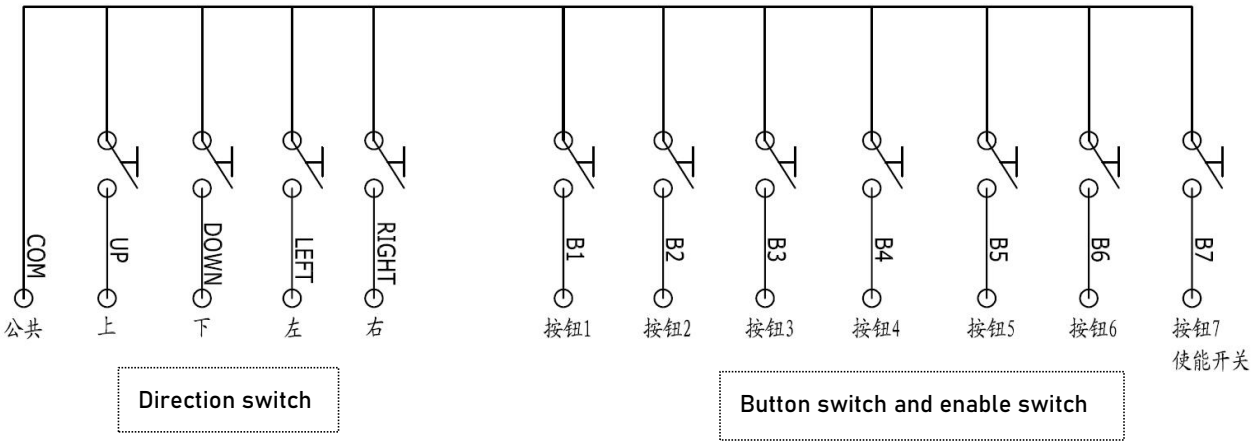
ANALOG SIGNAL OUTPUT



Analog voltage XY axis signal output graph



Schematic diagram of joystick direction switch and button switch:



Direction switch technical parameters:

Switch method: normally open
Starting angle: greater than 6°
Contact current: 1A/24V

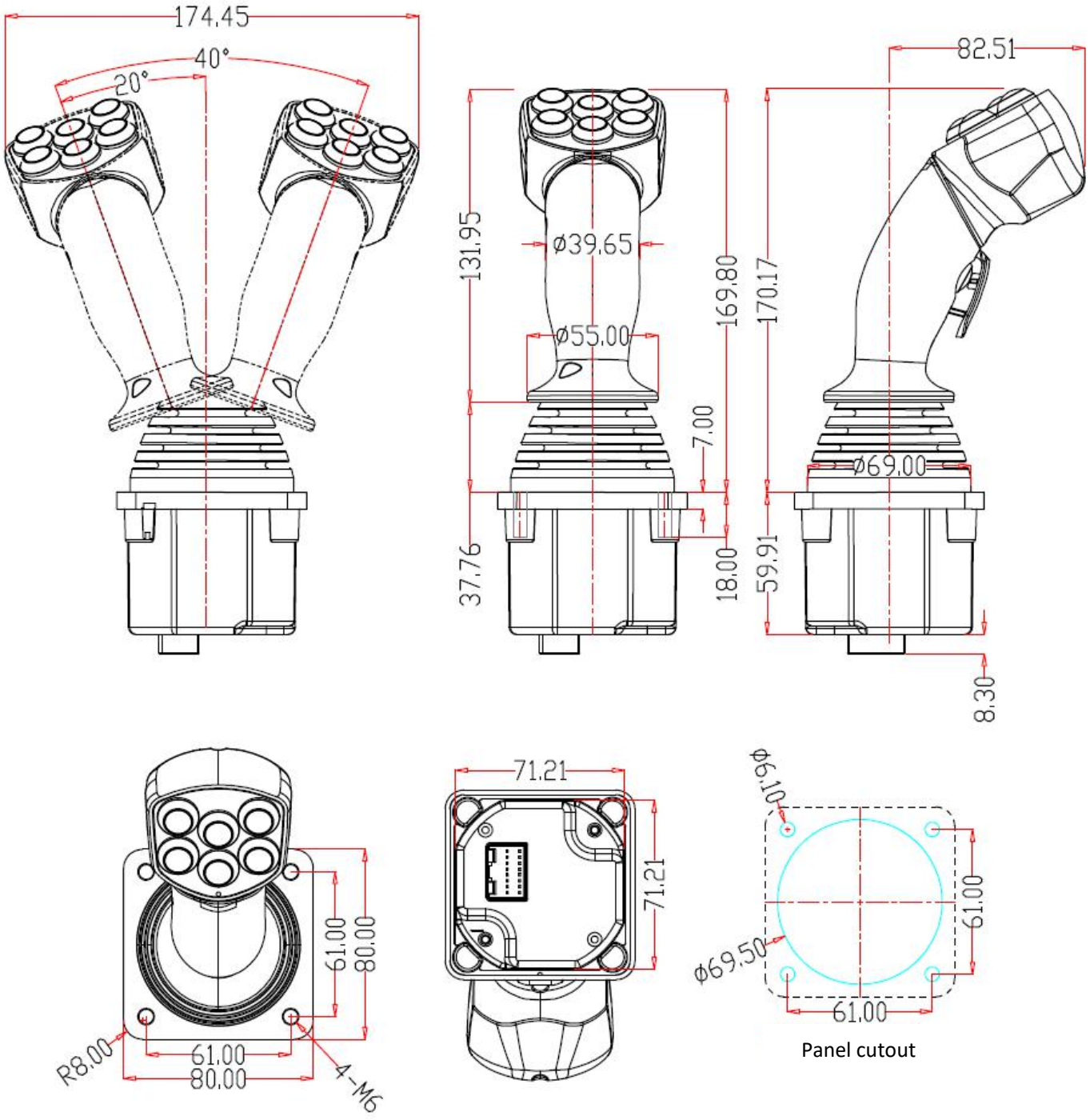
Button switch and enable switch:

Switch method: reset button (normally open)
Contact current: 1A/24V

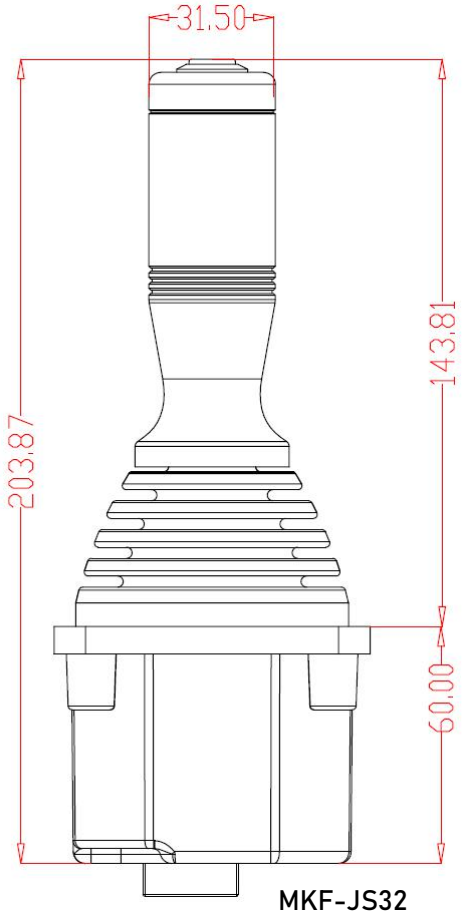
Electrical parameters:

Minimum working voltage: 4.2V (when 5V power supply), 10V (when 12-28V power supply)
The highest input voltage: 36V (when 12-28V power supply), 5.5V (when 5V power supply)
Working current: less than 32ma (when 5V power supply)
Button switch capacity: 1A/24V
Limit switch capacity: 1A/24V
Analog voltage signal output load: greater than 1KΩ
Analog voltage signal output center voltage: 2.50V or 5.0V
Analog voltage output signal: 0V～5V / 0.3V ～4.7V / 0.5V ～4.5V / 1V～4V

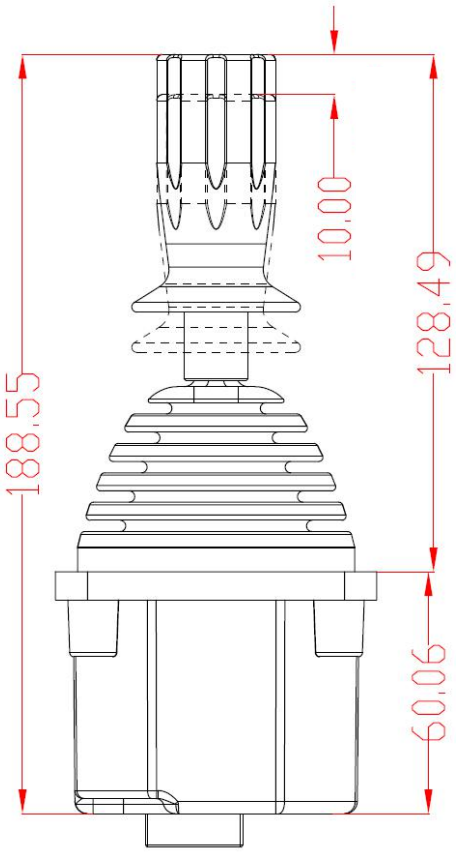
TECHNICAL DRAWINGS



Panel cutout



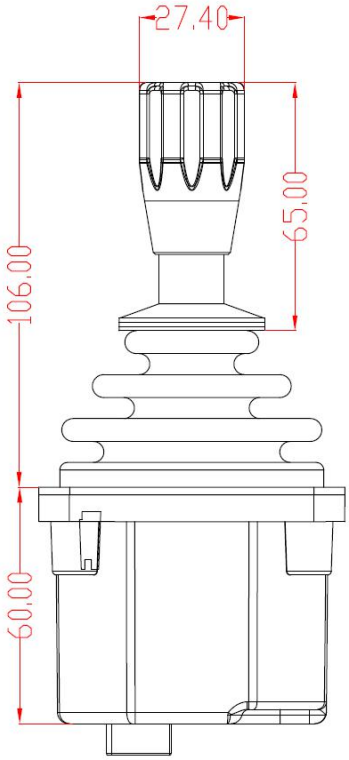
MKF-JS32



MKF-JS33

The handle has a push switch function and can be pressed down 10MM.

Equivalent to 1 button.



MKF-JS34

Z axis ±135° rotation

XY axis spring return, Z axis friction resistance positioning

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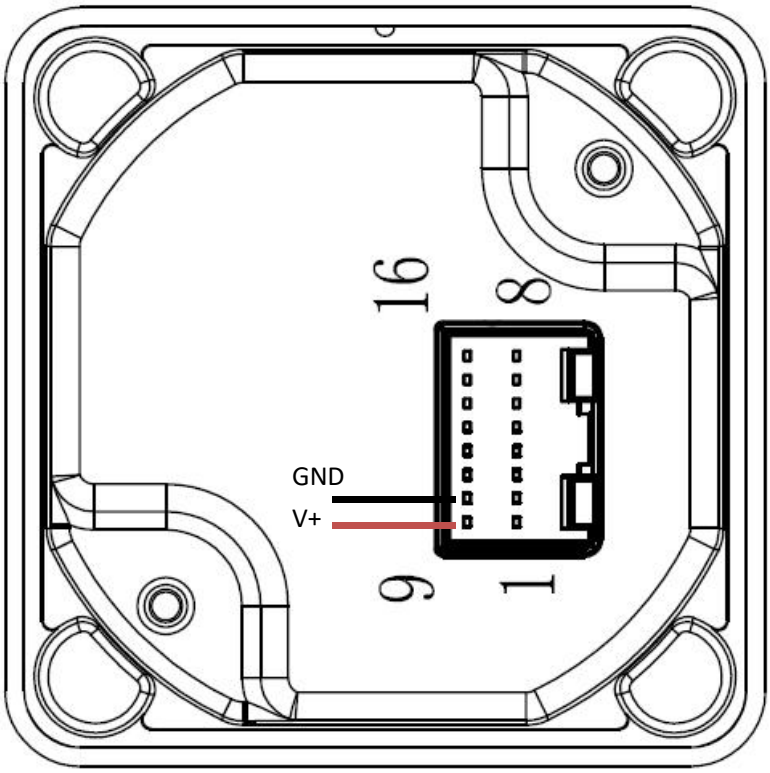
TERMINAL DIAGRAM



Front, back, left and right direction switch + button, analog voltage signal output:

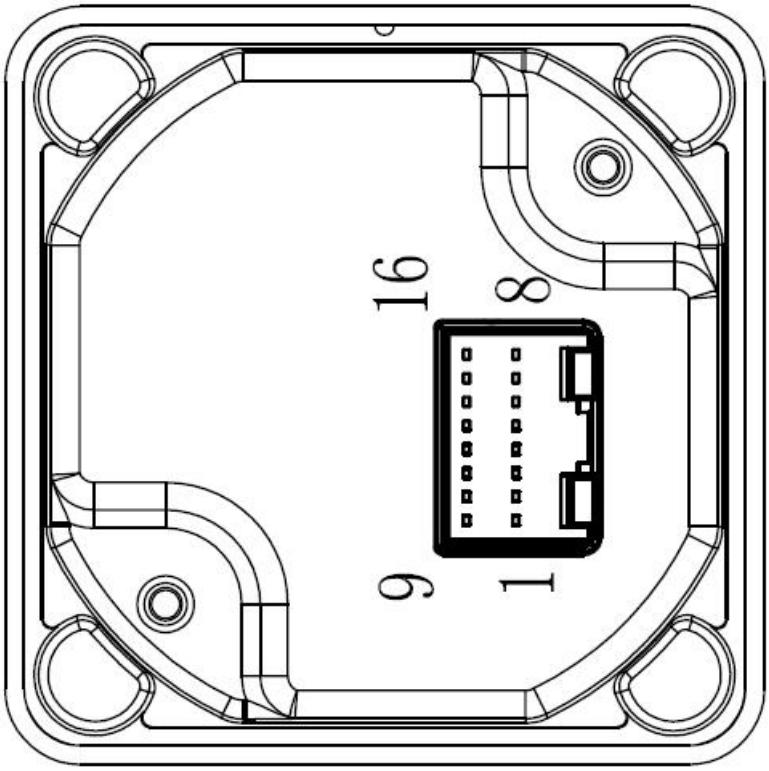
Pin	Symbol	Color	Function Description
1	COM		common terminal (common terminal of button and direction switch)
2	LEFT		direction - left switch
3	UP		direction - up switch
4	Y		Y axis signal output (up big, down small)
5	X		X axis signal output (right big, left small)
6	B7		Button 7 (enable switch)
7	B1		Button 1
8	B2		Button 2
9	V+		V+ power input positive, 5V or 12-29V
10	GND		GND Power input negative pole, GND power supply ground
11	RIGHT		RIGHT direction - right switch
12	DOWN		DOWN direction-down switch
13	B6		B6 button 6 (OUT4 thumb stick X)
14	B5		B5 Button 5 (OUT3 thumb stick Y)
15	B4		B4 Button 4
16	B3		B3 Button 3

Dual analog voltage signal output, 6 buttons + trigger switch, no direction switch:

Pin	Symbol	Color	Function Description
1	COM		common terminal (common terminal of button and direction switch)
2	X2		X2 axis signal output (Right small, left big)
3			
4	Y1		Y1 axis signal output (Up big, down small)
5	X1		X1 axis signal output (Right big, left small)
6	B7		Button 7 (Enabling switch)
7	B1		Button 1
8	B2		Button 2
9	V+		V+ power input positive, 5V or 12-29V
10	GND		GND Power input negative pole, GND power supply ground
11			
12	Y2		Y2 axis signal output (Up small, down big)
13	B6		Button 6 (OUT4 Thumb stick X)
14	B5		Button 5 (OUT3 Thumb stick Y)
15	B4		Button 4
16	B3		Button 3

Panel 1-6 buttons, trigger button linear voltage output, XY sensor analog voltage signal output:

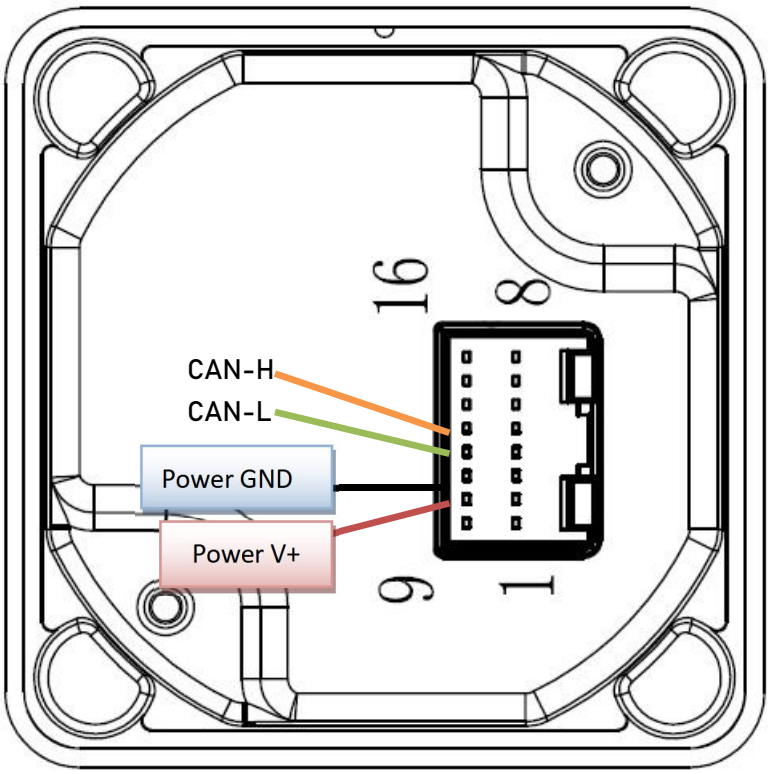
Pin	Symbol	Color	Function Description
1	COM		common terminal (common terminal of button and direction switch)
2	LEFT		Direction - Left Switch
3	UP		Direction - Up Switch
4	Y		Y axis signal output (Up big, down small)
5	X		X axis signal output (Right big, left small)
6	B7-Out		Trigger button signal output (0-5V)
7	B1		Button 1
8	B2		Button 2
9	V+		V+ power input positive, 5V or 12-29V
10	GND		GND Power input negative pole, GND power supply ground
11	RIGHT		Direction - Right Switch
12	DOWN		Direction - Down Switch
13	B6		Button 6 (OUT4Thumb stick X)
14	B5		Button 5 (OUT3Thumb stick Y)
15	B4		Button 4
16	B3		Button 3



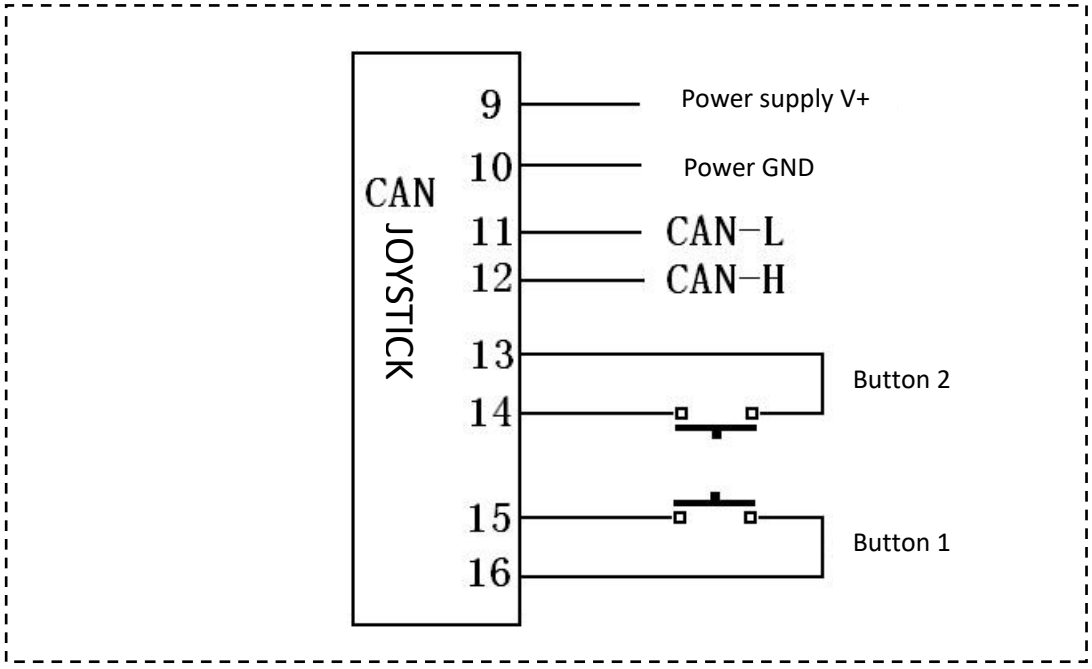
9 buttons + analog voltage signal output:

Pin	Symbol	Color	Function Description
1	COM		common terminal
2	B7-2 Enable		Button 7 (Enabling switch) (Direction left)
3	B10		Button 10 (Direction forward)
4	Y		Y axis output (Up big, down small)
5	X		X axis output (Right big, left small)
6	B7-1 Enable		Button 7 (Enabling switch)
7	B1		Button 1
8	B2		Button 2
9	V+		V+ power input positive, 5V or 12-29V
10	GND		GND Power input negative pole, GND power supply ground
11	B9		Button 9 (Right)
12	B8		Button 8 (backward)
13	B6		Button 6 (OUT4 Thumb joystick X)
14	B5		Button 5 (OUT3 Thumb joystick Y)
15	B4		Button 4
16	B3		Button 3

CAN Connector Pin Diagram



CAN Joystick Communication Wiring Diagram



CAN Bus Communication

- CAN2.0B
- Can ID: Extended Frames ID, Standard Frames ID. Default ID = 0X0101 (the user is allowed to change ID through the RS232Port)
- Baud rate: 125K, 250K, 500K, 1000K, default = 250K
- Interval 5-100ms continuous sending, 30ms by default

Data message format (HEX)

BYTE0	XXL X axis low	X axis data 0X0060～0X0800～0X0FA0
BYTE1	XXH X axis high	
BYTE2	YYL Y axis low	Y axis data 0X0060～0X0800～0X0FA0
BYTE3	YYH Y axis high	
BYTE4	ZZL Z axis low	Z axis data 0X0200～0X0800～0X0E00
BYTE5	ZZH Z axis high	
BYTE6	Button	Button
BYTE7	0XA5	Tail

XXL	XXH	YYL	YYH	0X00	0X00	Button	A5
X low	X high	Y low	Y high	Z low	Z High	Button	Tail

YYYYY axis angle
XXXX X axis angle
ZZZZ Z axis angle
Button Button

X-axis Parameter

MAX Left MIN	Stop	MIN Right MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

Y-axis Parameter

MAX Lower MIN	Stop	MIN Upper MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

Z-axis Parameter

MAX WIDE MIN	Stop	MIN TELE MAX
0X0200- -- -- 0X07ff	0800	0X0801- -- -- 0X0E00

Button Parameter

Bit7	Biy6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
IN1 External Button 1	Button 7	Button 6 IN2 External Button 2	Button 5	Button 4	Button 3	Button 2	Button 1

1 = button is pressed; 0 = no button is pressed. E.g. 00 08 00 08 00 08 00 A5

CAN bus communication mode: 4 axes

Protocol format

Joystick send data format: (hexadecimal HEX data)

BYTE0	XXL X-axis low position	X-axis data 0X0060～0X0800～0X0FA0
BYTE1	XXH X-axis high position	
BYTE2	YYL Y-axis low position	Y-axis data 0X0060～0X0800～0X0FA0
BYTE3	YYH Y-axis high position	
BYTE4	GX (Thumb joystick X)	3rd axis 0X01～0X80～0XFF
BYTE5	GY (Thumb joystick Y)	4th axis 0X01～0X80～0XFF
BYTE6	Button	Button
BYTE7	0XA5	Tail

GX, GY The X and Y axes of the small joystick on the handle panel.

X-axis parameters (base X-axis)

MAX LEFT MIN	STOP	MIN RIGHT MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

Y-axis parameters

MAX DOWN MIN	STOP	MIN UP MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

GX-axis parameters

MAX LEFT MIN	STOP	MIN RIGHT MAX
0X01- -- -- 0X7f	0X80	0X81- -- -- 0XFF

GY-axis parameters

MAX BACKWARD MIN	STOP	MIN FORWARD MAX
0X01- -- -- 0X7f	0X80	0X81- -- -- 0XFF

Communication Parameter of Joystick Setting

- Users can set and modify the communication parameters of the joystick (including CAN, RS232, RS422);
- All the above "parameters" can be modified only through RS422 or RS232 ports of the joystick, including CAN parameters.
- PC→joystick (RS422, RS485 or RS232) ,PC (serial debugging tool) software sends instructions to the joystick(RS422,RS485 or RS232).
- (If there is no serial debugging tool software, you can ask MATE technician for it.)
- If PC does not have COM port RS232 (DB9 9 pin head), you can use USB-RS232 converter (standard converter DB9 head, not TTL level converter)
- RS422, RS485 or RS232 communication interface on the joystick, default baud rate 9600.8.1.N

I. Basic parameter settings

a. ACK Confirmation (joystick-PC)

AA 55 AF

It indicates that the joystick successfully receives instructions and executes them.

b. Setting the joystick ID;

ID is the Address in RS232/RS422 or CANopen communication protocol (PC-> joystick)

Format

0xaf	0x0d	00	00	00	Address	0xf5
Head	Command	Data1	Data 2	Data 3	Data 4	End

Add=0x01～0x7F address: 1-127

Add=0x00 Null

E.g.

Setting ID=1: af 0d 00 00 00 01 f5 (HEX)

Setting ID=2: af 0d 00 00 00 02 f5 (HEX)

The Joystick return ACK

c. Reset Joystick (PC->Joystick)

0xaf	0x15	00	00	00	Add	0xf5
Head	Command	Data1	Data 2	Data 3	Data 4	End

Add=0x01~0x7f

(If the ADD has the same address as the joystick, it can reset the joystick.）

Add=0x00 Reset all joysticks

Add out of range (0-0x7f) invalid

E.g.

Reset all joysticks: af 15 00 00 00 00 f5 (HEX)

Reset joysticks(ID=1): af 15 00 00 00 01 f5 (HEX)

Reset joysticks(ID=2): af 15 00 00 00 02 f5 (HEX)

d. Setting the center position of the joystick (Setting Joystick centered position) (PC - > joystick)

It has set up this feature prior to shipment. Users can ignore the instructions.

0xaf	0x09	00	00	00	00	0xf5
Head	Command	Data1	Data 2	Data 3	Data 4	End

Joystick receiving this data, it's current location as a center point

E.g. af 09 00 00 00 00 f5 (HEX)

e. Communication port selection: (PC - > joystick)

Communication ports RS232/RS422/CAN one of them

(It has been set prior to shipment)

0xaf	0x05	XX	00	00	00	0xf5
Head	Command	Data1	Data 2	Data 3	Data 4	End

XX=00 CAN Port;

XX=01 RS232 Port;

XX=02 RS422 Port;

XX=03 RS485 Port;（RS232/422/485 Protocol）

XX=04 RS485 Port Modbus RTU Protocol;

E.g.

af 05 00 00 00 00 f5 (HEX) CAN

af 05 01 00 00 00 f5 (HEX) RS232

af 05 02 00 00 00 f5 (HEX) RS422

af 05 03 00 00 00 f5 (HEX) RS485

af 05 04 00 00 00 f5 (HEX) RS485 Modbus RTU

f. Refresh Rate Settings (PC -> joystick)

Refresh rate = the cycle time of sending 1 frame of data, such as setting 20ms (sending 1 frame of data to the host every 20MS)

Format:

0xaf	0x11	00	00	00	Ref	0xf5
Head	Command	Data1	Data 2	Data 3	Data 4	End

Ref = 0x0A~0x64 (10-100)ms, The unit is "milliseconds" (Default: 20ms)

Setting this parameter will take effect after reset or restart.

E.g. Set refresh rate = 20MS (send one frame per 20MS, send 50 times per second)

20MS	af 11 00 00 00 14 f5	(HEX)
25MS	af 11 00 00 00 19 f5	(HEX)
33MS	af 11 00 00 00 21 f5	(HEX)
50MS	af 11 00 00 00 32 f5	(HEX)

The joystick receives this instruction→ returns ACK→resets the joystick
Note: If the baud rate is low, the frame interval time will be longer. Default refresh rate 20ms.
(CAN baud rate 250K, RS232 and RS422 baud rate 9600)

g. Communication mode (Including CAN and RS232/422) (PC -> Joystick)

- Master-slave query: The joystick is a slave device, and only after receiving the query command from the host, will it send data back to the host.
- Timed automatic sending: send data to the host when the joystick is turned on, and the sending rate refers to "refresh rate setting"
- The factory has been set up and stored permanently.

Format:

0xaf	0x08	00	00	00	Mode	0xf5
Head	Command	Data1	Data 2	Data 3	Data 4	End

Mode=00 Timely Send
Mode=01 Master-Slave

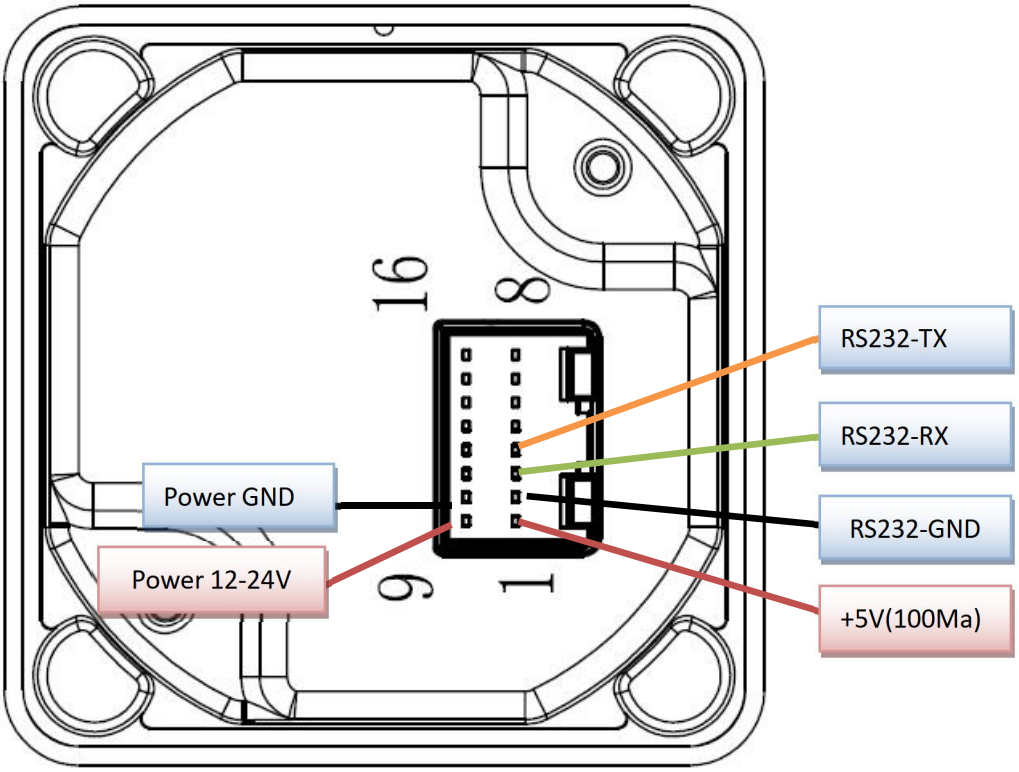
E.g. (PC->Joystick)
Master mode: af 08 00 00 00 00 f5 (HEX)
Slave mode: af 08 00 00 00 01 f5 (HEX)
Joystick return ACK (AA 55 AF) (joystick->PC)

h. Setting Number of axis of joystick: (PC-> joystick) only set by manufacturer
The factory has been set up and the user does not need to set it:

2 axis: af 0c 00 00 00 00 f5 (HEX)
3 axis: af 0c 01 00 00 00 f5 (HEX)
4 axis: af 0c 02 00 00 00 f5 (HEX)

The connection and communication protocol of RS232 communication

RS232 connector pin diagram:

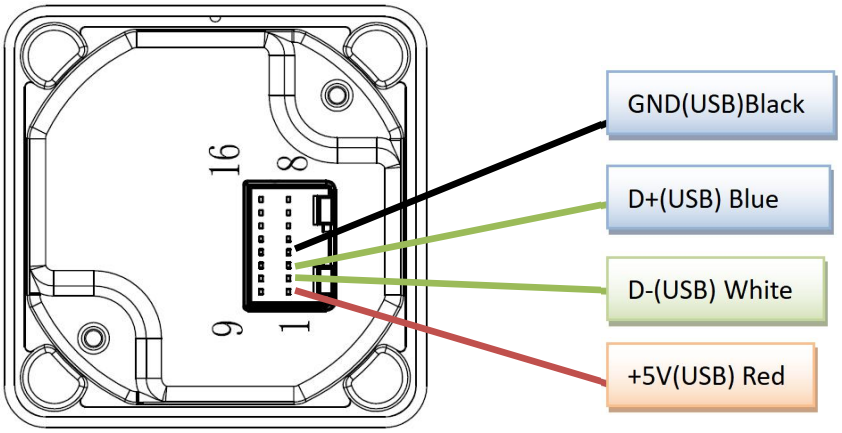


USB bus signal output:

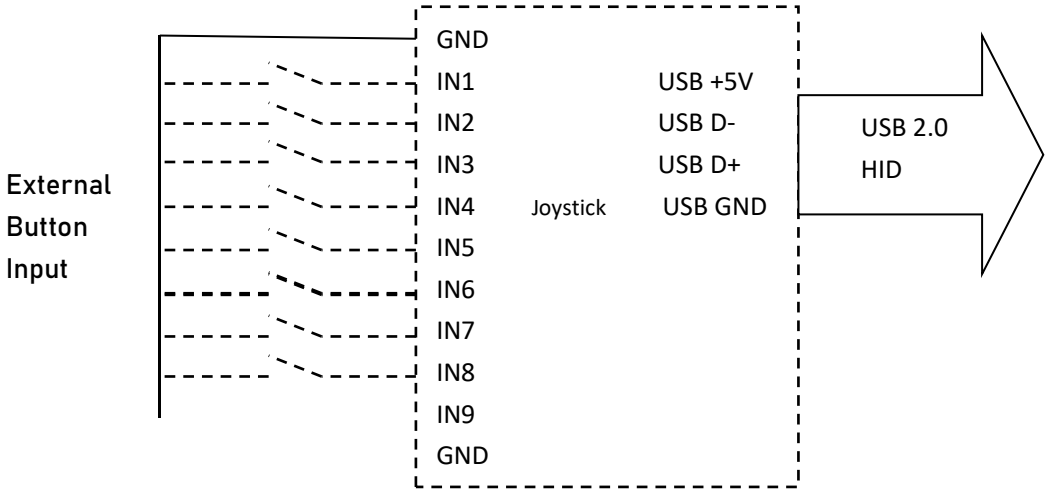
Pin	Symbol	Color	Function Description
1	USB +5V	Red	USB Communication +5V
2	D-	White	USB Communication data-
3	D+	Blue	USB Communication data+
4	GND	Black	Communication ground GND
5	Button IN9		Input 9 (external connection button 9)
6	Button IN8		Input 8 (external connection button 8)
7	Button IN7		Input 7 (external connection button 7)
8	GND		External button input common ground GND
9	**GND**		External button input common ground GND
10	Button IN6		Input 6 (external connection button 6)
11	Button IN5		Input 5 (external connection button 5)
12	Button IN4		Input 4 (external connection button 4)
13	Button IN3		Input 3 (external connection button 3)
14	Button IN2		Input 2 (external connection button 2)
15	Button IN1		Input 1 (external connection button 1)
16	GND		External button input common ground GND

Note: External button input: one end of the button is connected to "GND", and the other end is connected to "Button IN1-9"

USB connector pin diagram:



External push button switch input wiring diagram



Communication parameter setting of RS232, RS422 and RS485

Set the baud rate of RS232, RS422 and RS485 (PC->joystick)

RS232 and RS422 have the same baud rate, and the settings are valid at the same time

0xaf	0x0b	00	00	00	Baud	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

Baud=0X00 Baud rate=9600

Baud=0X01 Baud rate=19200

Baud=0X02 Baud rate=57600

Baud=0X03 Baud rate=115200

E.g:

set 9600 af 0b 00 00 00 00 f5 (HEX)

set 19200 af 0b 00 00 00 01 f5 (HEX)

set 57600 af 0b 00 00 00 02 f5 (HEX)

set 115200 af 0b 00 00 00 03 f5 (HEX)

The joystick receives this command, after execution, it will reply ACK

Check the position of the patrol joystick (PC->joystick)

This command is valid only when the "master-slave query" can be trusted mode

When there is no query command, the joystick does not output any data, check the joystick once and return it once.

0xaf	0x07	00	00	00	Add	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

address = 0x01-0x7f When the address is correct, loop back

When the joystick receives this data, it will send back the current position, check the joystick once and return it once, no data will be sent if it is not checked.

For example, query during RS232 communication:

(PC->Joystick) af 07 00 00 00 01 f5 (HEX)

(Joystick -> PC) FF 01 08 00 70 00 00 00 00 00 79

When the joystick receives this data, it will send the current position

Parameter setting of CAN communication:

The parameter setting of CAN should also pass through the RS232 or RS422 port;

CAN port baud rate: (PC->joystick)

0xaf	0x06	XX	00	00	00	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

XX=00 125K
XX=01 250K (default)
XX=02 500K
XX=03 1000K
XX=04 100K

For example:
af 06 00 00 00 00 f5 (HEX) CAN baud rate=125K
af 06 01 00 00 00 f5 (HEX) CAN baud rate=250K (default)
af 06 02 00 00 00 f5 (HEX) CAN baud rate=500K
af 06 03 00 00 00 f5 (HEX) CAN baud rate=1000K
af 06 04 00 00 00 f5 (HEX) CAN baud rate=100K

CAN Protocol Settings Can Protocol: (PC->Joystick)

0xaf	0x0a	00	00	TP	SS	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

SS=00 Common protocol ID=sending node ID, see (11) Joystick sending node ID setting) Default
SS=01 CANopen protocol ID=180+ID (refer to (2) Set joystick ID address)
MATE has been set for the customer

TP is TPDO in CAN OPEN protocol
TP=00: TPDO1 sends ID 0X0180+ID (see 1, 2, set joystick ID address) default
TP=01: TPDO2 sends ID 0X0280+ID (see 1, 2, set joystick ID address)
TP=02: TPDO3 sends ID 0X0380+ID (see 1, 2, set joystick ID address)
TP=03: TPDO4 sends ID 0X0480+ID (see 1, 2, set joystick ID address)
For example: af 0a 00 00 00 00 f5 (HEX) normal protocol
af 0a 00 00 00 01 f5 (HEX) CANopen protocol TPDO1

Joystick "Send Node ID" setting: (PC->Joystick)

Only applicable to "normal protocol", CANopen protocol does not use this command

0xaf 0x01 D1 D2 D3 D4 0xf5

Head Command Data 1 Data 2 Data 3 Data 4 Tail

D1.7=0 Extended frame 29 bits

D1.7=1 standard frame 11 bits

◆ 29-bit extended frame: data range 0X0-0X0FFFFFFF, data D1-D4 corresponds to "node identification code"

For example: Set the sending node identification code - extended frame "0X00F0F101"

af 01 00 f0 f1 01 f5 (HEX)

◆ 11-bit standard frame: data range 0X000-0X3FF, data D3-D4 corresponds to "node identification code"

For example: Set the sending node identification code - standard frame "0X181"

af 01 80 00 01 81 f5 (HEX)

Joystick "Receive Node ID" setting: (PC->Joystick)

Only applicable to "normal protocol", CANopen protocol does not use this command

0xaf 0x02 D1 D2 D3 D4 0xf5

Head Command Data 1 Data 2 Data 3 Data 4 Tail

D1.7=0 Extended frame 29 bits

D1.7=1 standard frame 11 bits

◆ 29-bit extended frame: data range 0X0-0X0FFFFFFF, data D1-D4 corresponds to "node identification code"

For example: Set the receiving node identification code - extended frame "0X00F0F101"

af 02 00 f0 f1 01 f5 (HEX)

◆ 11-bit standard frame: data range 0X000-0X3FF, data D3-D4 corresponds to "node identification code"

For example: Set the receiving node identification code - standard frame "0X1E1"

af 02 80 00 01 E1 f5 (HEX)

Joystick "Shield Node ID" setting: (PC->Joystick)

0xaf 0x03 D1 D2 D3 D4 0xf5

Head Command Data 1 Data 2 Data 3 Data 4 Tail

D1.7=0 Extended frame 29 bits

D1.7=1 standard frame 11 bits

◆ 29-bit extended frame: data range 0X0-0X0FFFFFFF, data D1-D4 corresponds to "node identification code"

For example: set the mask node identification code - extended frame "0X00002201"

af 03 00 00 22 01 f5 (HEX)

◆ 11-bit standard frame: data range 0X000-0X3FF, data D3-D4 corresponds to "node identification code"

For example: Set the mask node identification code - standard frame "0X122"

af 03 80 00 01 22 f5 (HEX)

2-3 axis joystick RS232/RS422 communication protocol

Default baud rate 9600.8.1.N

Factory default no address bits

Function: Send the position parameters of each axis of the joystick

1. No address bit, joystick sends data (9 bytes) (joystick-PC):

Joystick send data format: (hexadecimal HEX data)

FF	XXH	XXL	YYH	YYL	ZZH	ZZL	Button	CH
Head	X High	X Low	Y High	Y Low	Z High	Z Low	Button	Checksum

XXXX X-axis angle

YYYY Y-axis angle

ZZZZ Z-axis angle

Button Joystick Buttons

CH =XXH+XXL+YYH+YYL+ZZH+ZZL+Button (00-FF)

X-axis parameters

MAX LEFT MIN	STOP	MIN RIGHT MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

Y-axis parameters

MAX DOWN MIN	STOP	MIN UP MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

Z-axis parameters

MAX DOWN MIN	STOP	MIN UP MAX
0X0200- -- -- 0X07ff	0800	0X0801- -- -- 0X0E00

The 2-axis joystick is always at 0800

Button button parameters

Bit7	Biy6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
IN1 External button 1	Button 7	Button 6 IN2 external button 2	Button 5	Button 4	Button 3	Button 2	Button 1

button = 1 with button pressed, 0 without button pressed

Example: FF 08 00 08 00 08 00 00 18

With address, joystick sends data (10 bytes) (joystick-PC)

FF	Add	XXH	XXL	YYH	YYL	ZZH	ZZL	Button	CH
Header	Address	X High Bit	X Low Bit	Y High Bit	Y Low Bit	Z High Bit	Z Low Bit	Button	Checksum

Add address 0X01-0X40 is the same as the address of the inspection tour

Others are the same as the general agreement

CH =Add+XXH+XXL+YYH+YYL+ZZH+ZZL+Button (00-FF)

For example FF 01 08 00 08 00 08 00 00 19

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4-axis joystick

RS232/RS422 communication protocol with address bits

9600.8.1.N

Joystick send data (12 bytes) (Joystick-PC) KX, KY are 2-axis thumbsticks on the handle

FF	Add	XXH	XXL	YYH	YYL	KXH	KXL	KYH	KYL	Button	CH
Header	Address	Y High Bit	Y Low Bit	X High Bit	X Low Bit	KX High Bit	KX Low Bit	KY High Bit	KY Low Bit	Button	Checksum

Add address 0X01-0X40 is the same as the inspection address (factory address=01)

Others are the same as the general agreement

CH =Add+XXH+XXL+YYH+YYL+KXH+KXL+ KYH+KYL+Button (00-FF) low order sum

For example FF 01 08 00 08 00 08 00 08 00 00 21

X-axis parameters

MAX LEFT MIN	STOP	MIN RIGHT MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

Y-axis parameters

MAX DOWN MIN	STOP	MIN UP MAX
0X0060- -- -- 0X07ff	0800	0X0801- -- -- 0X0FA0

KX-axis parameter (Thumb joystick)

MAX LEFT MIN	STOP	MIN RIGHT MAX
0X0100- -- -- 0X07ff	0800	0X0801- -- -- 0X0F00

KY-axis parameter (Thumb joystick)

MAX DOWN MIN	STOP	MIN UP MAX
0X0200- -- -- 0X07ff	0800	0X0801- -- -- 0X0E00

Button Parameters

Bit7	Biy6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
IN1 External button 1	Button 7	Button 6 IN2 External button 2	Button 5	Button4	Button3	Button2	Button1

button = 1 with button pressed, 0 without button pressed