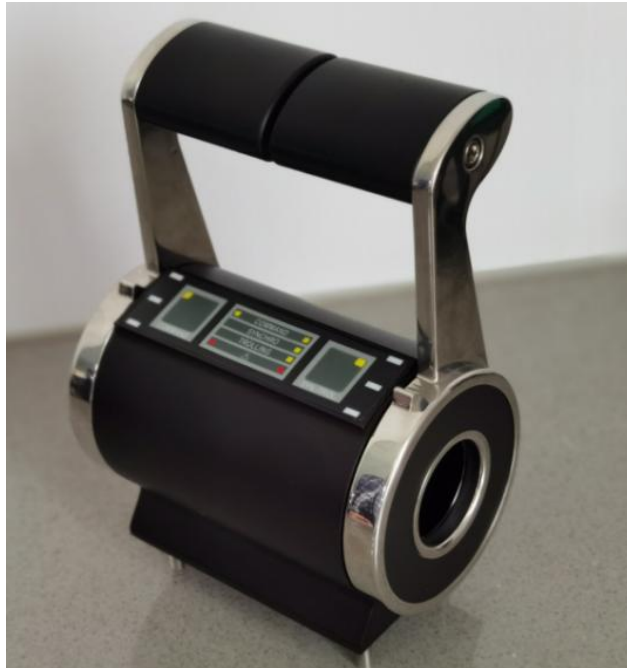# MKF-JS62

Mate Industrial Joystick, Hall effect, Multi axis, Left / Right hand, Panel Mounted


This is a dual engine controller/lever. Suitable for throttle control of twin-engine yachts, can control 2 engines, with throttle control, gear control functions. There are 3 mechanical gears DNR, synchronous indication. With Hall sensor, full temperature range linear compensation, 2 engines full electrical isolation technology, bus signal output and engine electronic throttle signal output, waterproof and anti-salt spray treatment, with good operating feel.

FEATURES

- Sensor: Hall sensor
- Operating angle: 150 degrees
- Gear: 3 files (DNR)
- Lifetime: more than 5 million times;
- Signal output: CAN/RS485/diesel engine electronic throttle signal/electric isolation of left and right engine throttle signals
- Power supply: DC24V (10-36V)
- Power consumption: 30mA/@DC24V (no load)
- Operating temperature: -40℃～+70℃
- Protection: IP67

MECHANICAL DRAWING
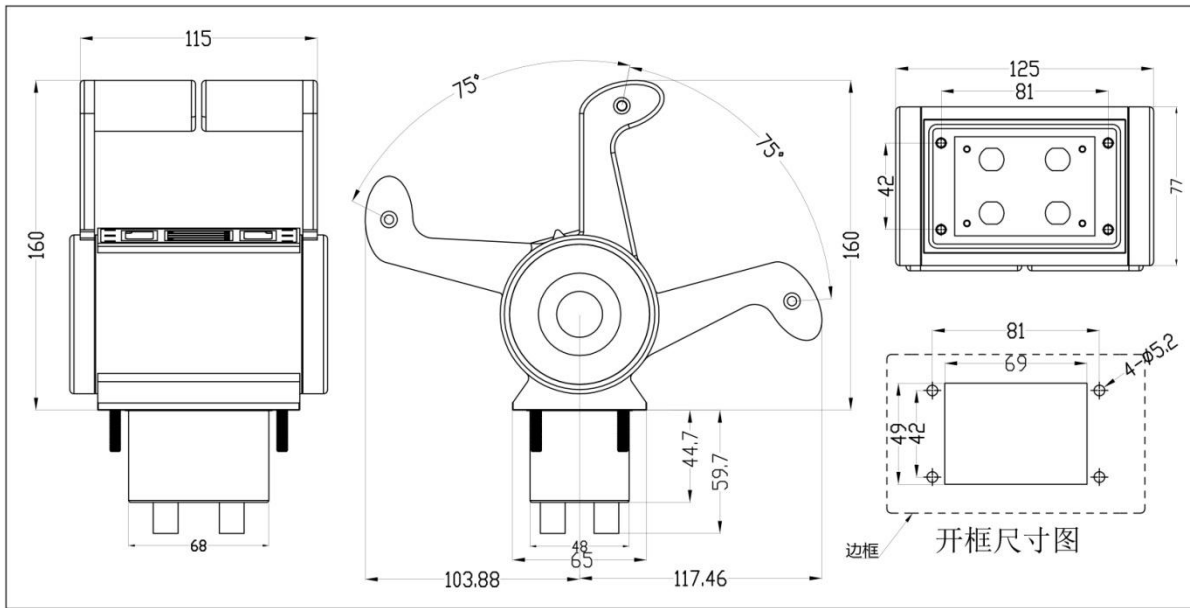
Electronic throttle control

1. When the engine is electronically throttled, the electrical signals of the left and right engine throttles are completely isolated

2. Gearbox gear control: 2 groups of relay switches for forward/backward, contact capacity 2A /@DC24V

3. The D gear is closed when moving forward/R gear is closed when reversing, and the D and R gear relays are fully disconnected when in neutral.

DNR indicator

D: forward gear

When the handle is in this gear, the red light of D gear is on, and when the handle is pushed forward again, this is the throttle control, and the green light of D gear is on;
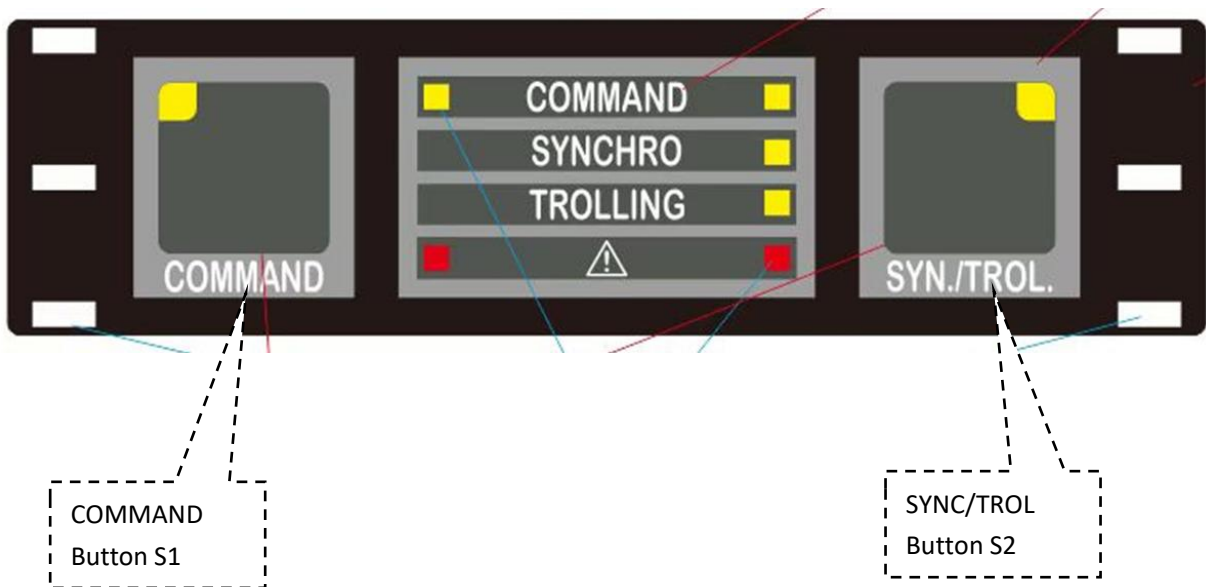
R: reverse gear

When the handle is in this gear, the red light of the R gear is on, and when the handle is pulled back again, this is the throttle control, and the green light of the R gear is on.

N: Neutral

When the handle is in this gear, the red light of N gear is on;

PANEL FUNTIONALITY

- Press 2 buttons, the light on the button will be on, and it will be off when you release it
- S1 and S2 buttons, long press for 3 seconds to switch functions

Button S1 (COMMAND) function switching sequence

The left command light is on → the right command light is on → the left and right command lights are all on → the left and right command lights are all off

Button S2 (SYNC/TROL) function switching sequence

SYNC light on → TROL light on → SYNC and TROL light on → SYNC and TROL light all off

When the power is turned on, when it is not in neutral, the Alarm light flashes, and when it returns to neutral, the alarm is released.

RS485 protocol format

Data bits: 8 bytes
Baud rate: 9600
Start bit 1, stop bit 1, invalid check bit

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
0xFF	xxL	ssL	xxR	ssR	Button	Led	CH
HEAD	LEFT HANDLE LEVEL	LEFT HANDLE ANGLE	RIGHT HANDLE LEVEL	RIGHT HANDLE ANGLE	BUTTON STATUS	LED STATUS	SUM

NOTE: CH=Byte1+Byte2+Byte3+Byte4+Byte5+Byte6 The low byte of the sum of the other bytes except the header.

xxR/xxL Specification Note

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
				Reversing throttle	R Gear	D Gear	Forward throttle

Note: Valid=1, Invalid=0

N file=0x00
D file=0x02
R file=0x04
forward throttle = 0x01
Arrival throttle = 0x08

ssL/ssR throttle angle value
Parameter range: 0x00–0x64 (hexadecimal) or 0–100 (decimal)
A value of 0 means 0% throttle
A value of 100 means the throttle is 100%

Button Status

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
						SYNC/TROL Button	COMMAND Button

Note: Button pressed = 1, Button released = 0

LED Status

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	0	Alarm Right LED	Alarm Left LED	TROL LED	SYNC LED	COMMAND RIGHT LED	COMMAND LEFT LED

Note: light on = 1 light off = 0

CAN PROTOCOL FORMAT

Data frame: 8 bytes

CAN ID: Support extended frame and standard frame (CAN ID setting after auspicious), default ID=0CFA0001

Baud rate: 250K

Byte0	Byte1	Byte2	Byte3	Byte4	Byte5	Byte6	Byte7
0x01	xxL	ssL	xxR	ssR	Button	Led	0xA5
Fixed value	Left handle gear	Left handle angle	Right handle gear	Right handle angle	Button Status	LED Status	Fixed value

xxL specification note

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
				Reversing throttle	R Gear	D Gear	Forward throttle

Note: Valid=1, Invalid=0

N file=0x00

D file=0x02

R file=0x04

forward throttle = 0x03

Arrival throttle = 0x0C

ssL throttle speed value

Parameter range: 0x00-0x64 (hexadecimal) or 0-100 (decimal)

A value of 0 means 0% throttle

A value of 100 means the throttle is 100%

Button Status

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
						SYNC/TROL Button	COMMAND Button

Note: Button pressed = 1, Button released = 0

LED Status

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
0	0	Alarm Right LED	Alarm LEFT LED	TROL LED	SYNC LED	COMMAND RIGHT LED	COMMAND LEFT LED

Note: light on = 1, light off = 0

YUCHAI/WEICHAI ENGINE CONNECOTR TABLE
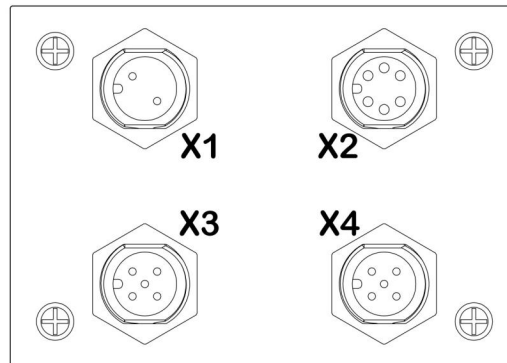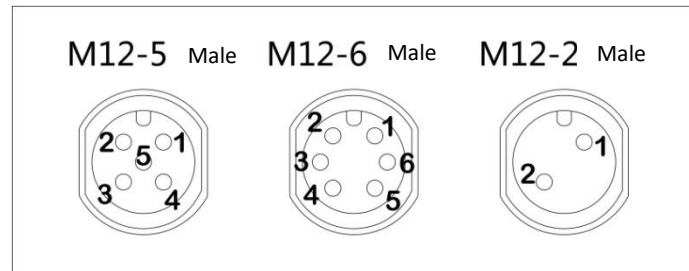
Power supply X1 (M12 aviation plug 2 cores – male)

PIN	Symbol	Color	Functionality	PCB Board
1	GND	Black	0V(GND)	GND
2	V+	RED	V+（power +）	24V

Gear switch X2: (M12 aviation plug 6-pin – male)

PIN	Symbol	Color	Functionality	PCB Board
1	R-COM	white	Right – switch public	RIGHT –COM
2	R-D	Blue	Right–D position switch	RIGHT –D
3	R-R	Purple	Right–R gear switch	RIGHT –R
4	L-COM	Brown	left – switch common	LEFT –COM
5	L-D	Grey	Left–D position switch	LEFT –D
6	L-R	Orange	Left-R switch	LEFT –R

Engine throttle signal: X3 right rudder signal, X4 left rudder signal (M12 aviation plug 5-pin – male)

PIN	Symbol	Color	Functionality	PCB Board
1	+5V		empty	
2	OUT1	Yellow	Signal 1 output(0.74-3.83)	(X3)RIGHT–S1/ (X4)LEFT–S1
3	OUT2	Green	Signal 2 output(0.37-1.94V)	(X3)RIGHT–S2/ (X4)LEFT–S2
4	GND		empty	
5	GND	Black	Power GND	(X3)RIGHT–GND/ (X4)LEFT–GND

The left and right 2 throttle control signals, the wiring is the same, only 3 wires are connected

Weichai engine connector wiring diagram

Weichai engine wiring diagram

MKF-JS62 Controller

X1(M12-2Male)
- 1 — Power GND(0V)
- 2 — Power 24V

X3(M12-5Male)
- 2 — Signal 1 (0.7-3.8) Yellow — 2
- 3 — Signal 2 (0.35-1.92) Green — 5
- 5 — 2Power 0V(GND) — 6

Weichai engine — AMP 174264-2 (Male)
1. Signal 1 Power 0V
2. Signal 1 Output 0.74-3.90V
3. Signal 1 Power +5V
4. Signal 2 Power +5V
5. Signal 2 Output 0.37-1.95V
6. Signal 2 Power 0V

1□ □6
2□ □5
3□ □4

X4(M12-5Male)
- 2 — Signal 1 (0.7-3.8) Yellow — 2
- 3 — Signal 2 (0.35-1.92) Green — 5
- 5 — 2Power 0V(GND) — 6

Weichai engine — AMP 174264-2 (Male)
1. Signal 1 Power 0V
2. Signal 1 Output 0.74-3.90V
3. Signal 1 Power +5V
4. Signal 2 Power+5V
5. Signal 2 Output 0.37-1.95V
6. Signal 2 Power0V

1□ □6
2□ □5
3□ □4

X2(M12-5Male)
- 1 — 24V
- 2 — [D] — 0V — Right rudder gear solenoid valve
- 3 — [R]
- 4 — 24V
- 5 — [D] — 0V — Left rudder gear solenoid valve
- 6 — [R]

Yuchai engine connector wiring diagram

Yuchai engine wiring diagram

MKF-JS62 controller

X1(M12-2 Male)
1 — Power GND(0V)
2 — Power 24V

X3(M12-5Male)
2 — Signal 1 (0.7-3.8) Yellow
3 — Signal 2 (0.35-1.92) Green
5 — 2 Power 0V(GND)

Yuchai engine
AMP 174264-2(Male)

3(Signal 1Power 5V)
2Signal 1(0.74-3.83)
4Signal2(0.37-1.92)
6(Signal 2Power 0V)
1(Signal 1Power 0V)

1. Signal 1 Power 0V
2. Signal 1 Output 0.74-3.83V
3. Signal 1 Output +5V
4. Signal 2 Output 0.36-1.92V
5. Signal 2 Power +5V
6. Signal 2 Power 0V

X4(M12-5Male)
2 — Signal 1 (0.7-3.8) Yellow
3 — Signal 2 (0.35-1.92) Green
5 — 2 Power 0V(GND)

Yuchai engine
AMP 174264-2(Male)

3(Signal 1Power 5V)
2Signal 1(0.74-3.83)
4Signal 2(0.37-1.92)
6(Signal 2Power 0V)
1(Signal 1Power0V)

1. Signal 1 Power 0V
2. Signal 1 Output 0.74-3.83V
3. Signal 1 Power +5V
4. Signal 2 Output 0.36-1.92V
5. Signal 2 Power+5V
6. Signal 2 Power 0V

X2(M12-5Male)
1 — 24V
2 — D — 0V — Right rudder gear solenoid valve
3 — R
4 — 24V
5 — D — 0V — Left rudder gear solenoid valve
6 — R

Bus Interface Pin Definition
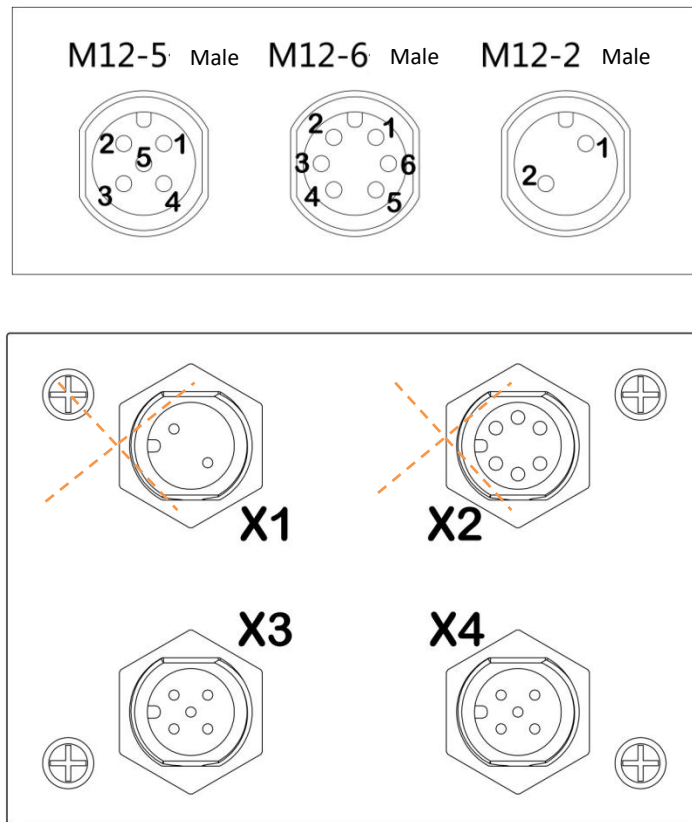
Only X3 is used for CAN bus signal output; X4 is only used for RS485 bus signal output; X1 and X2 are not used.

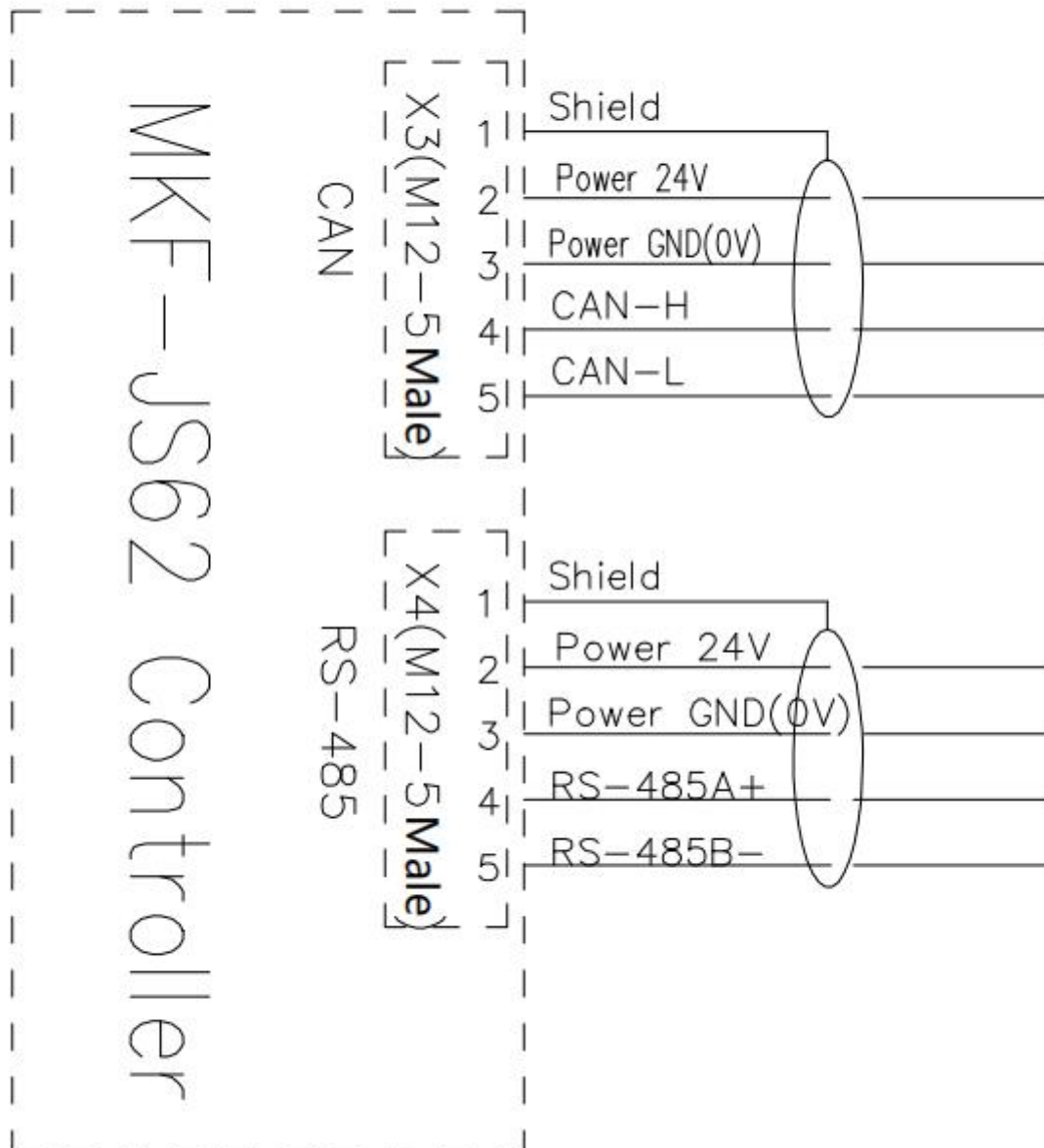1. CAN signal X3: (M12 aviation plug 5-pin – male)

PIN	Symbol	Color	Function	PCB Board
1	Shield	Brown	Brown(shielded)	
2	+V	White	White 24V (V+ power+)	+24V
3	–V	Blue	GND (V– power–)	0V(GND)
4	CAN-H	Black	CAN-H	CANH
5	CAH–L	Grey	CAH–L	CANL

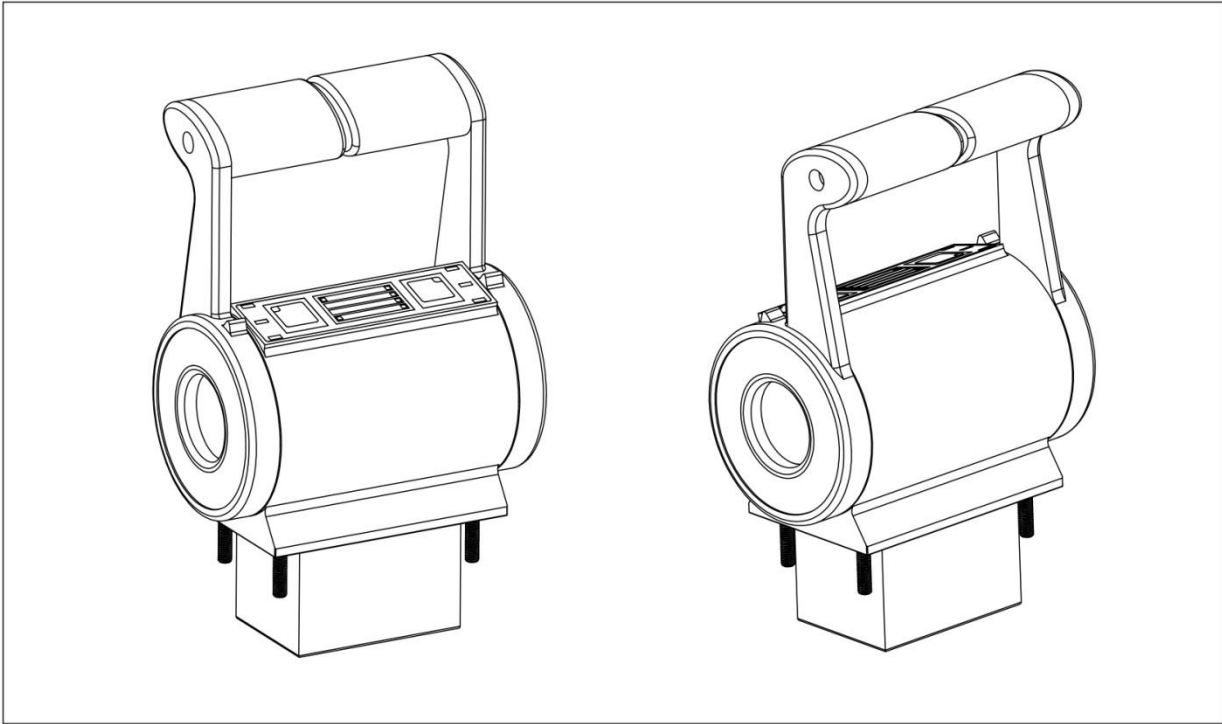2. RS485 signal X4: (M12 aviation plug 5-pin-male) (No RS485 function without this connector)

PIN	Symbol	Color	Function	PCB Board
1	Shield	Brown	Brown(shielded)	
2	+V	White	White 24V (V+ power+)	+24V
3	–V	Blue	GND (V– power–)	0V(GND)
4	RS-485A+	Black	RS-485A+	485A
5	RS-485B–	Grey	RS-485B–	485B

Bus signal output wiring diagram

MKF-JS62 Controller

X3(M12-5Male) CAN

Pin	Signal
1	Shield
2	Power 24V
3	Power GND(0V)
4	CAN-H
5	CAN-L

X4(M12-5Male) RS-485

Pin	Signal
1	Shield
2	Power 24V
3	Power GND(0V)
4	RS-485A+
5	RS-485B-

3D View

Communication parameter setting of joystick

Ver: 19.12.01

The user may need to set and modify the communication parameters of the joystick (including CAN, RS485);

All the above "parameter modification" can only be set through the RS485 interface of the joystick, including CAN parameters.

PC→Joystick (RS485) PC (serial port assistant) software sends commands to the joystick.

(If there is no serial port assistant software, please send email to info@dilicomp.com)

If the host PC does not have RS232 (DB9 9-pin connector), you need to buy a USB to RS485 converter;

If the host computer has an RS232 port, you need to buy an RS232 to RS485 converter.

The RS485 communication interface on the joystick, the factory default baud rate is 9600.8.1.N

1. Basic instructions:

1. ACK confirmation (joystick-PC)

AA 55AF

Indicates that the joystick successfully receives the address setting command and executes it.

2. Set the joystick ID address;

ID refers to the ID in the RS232/RS422 communication protocol, or the ID in the CANopen protocol

(PC->Joystick)

0xaf	0x0d	00	00	00	Add	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

Add=0x01～0x7F Address 1-127

Add=0x00 is invalid (when address=0, there is no address bit in RS232 or RS422)

E.g:

Set address 1 af 0d 00 00 00 01 f5 (HEX)

Set address 2 af 0d 00 00 00 02 f5 (HEX)

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

3. Reset joystick (PC->joystick)

0xaf	0x15	00	00	00	Add	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

Add=0x01～0x7f The address must be the same as the joystick address to reset

Add=0x00 reset the joystick for all addresses, any address is reset

Add range is not valid from 0-0x7f

E.g:

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

Reset address joystick 1: af 15 00 00 00 01 f5 (HEX)

Reset address joystick 2: af 15 00 00 00 02 f5 (HEX)

4. Set the center point of the joystick (for correcting the center point position) (PC->Joystick)

When it leaves the factory, it has been set, you can ignore this command

The PC is connected to the RS422 port of the joystick, the baud rate is 9600

0xaf	0x09	00	00	00	xx	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

xx=01 D gear position

xx=02 N position

xx=03 R gear position

Send data to the joystick to reset the stop position of the joystick.

For example (HEX):

D gear setting: af 09 00 00 00 01 f5

N gear setting: af 09 00 00 00 02 f5

R gear setting: af 09 00 00 00 03 f5

5. Signal output port selection: (PC->Joystick)

Joystick signal output port, choose one of the following options; (we have been set before shipment)

0xaf	0x05	XX	00	00	00	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

XX=00   CAN communication;

XX=01   RS485 communication

XX=02   RS485 Modbus RTU communication

XX=10   analog voltage (0.5-4.5V), 2-channel signal output, cross curve;

XX=11   analog voltage (0.5-4.5V), 2-channel signal output, independent curve before and after

1 signal output forward, 1 signal backward, the front and rear signals are separated;

XX=12   analog voltage (0.5-4.5V, median 2.5V), 2-channel signal output, cross curve;

XX=13   analog voltage dual-channel same-direction signal output (Yuchai, Weichai engine)

(1 = 0.74-3.84V/median 0.74V; 2= 0.37-1.92V median 0.37)

XX=14   analog voltage (0.1-4.6V), 2-channel signal output, cross curve;

XX=20   analog current signal (4-20mA), 2-way cross curve;

For example: af 05 00 00 00 00 f5 CAN communication

af 05 10 00 00 00 f5 analog voltage signal, median 0.5V, 2-way cross curve;

af 05 11 00 00 00 f5 Analog voltage signal, median 0.5V, independent curve before and after

af 05 12 00 00 00 f5 Analog voltage signal, median 2.5V, 2-way cross curve

af 05 13 00 00 00 f5 0.74-3.84V & 0.37-1.92V Yuchai & Weichai

af 05 14 00 00 00 f5 voltage (0.1-4.6V median 0.1V), 2-way crossover curve

af 05 20 00 00 00 f5 Analog current signal (4-20mA)

6. Refresh Rate Settings (PC->Joystick)

Refresh rate = frame interval for sending data, for example, set 20ms (send one frame of data to the host every 20MS)

0xaf	0x11	00	00	00	Ref	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

Ref =0x0A～0x64 (10-100)ms, the unit is "millisecond"; (Default: 20ms)

After setting this parameter, reset or restart takes effect

For example: Set the refresh rate of data sent by the joystick to 20MS (one frame of data is sent every 20MS, 50 times per second)

Set 20MS af 11 00 00 00 14 f5 (HEX)

Set 25MS af 11 00 00 00 19 f5 (HEX)

Set 33MS af 11 00 00 00 21 f5 (HEX)

Set 50MS af 11 00 00 00 32 f5 (HEX)

The joystick receives this command→reply ACK→reset the joystick

Note: The lower the baud rate, the longer the corresponding frame interval

Factory default: refresh rate 20ms (CAN baud rate 250K, RS232 and RS422 baud rate 9600)

7. Communication mode (master-slave query, timing automatic transmission, including CAN and RS485 communication) (PC->joystick)

Master-slave query: The joystick is a slave device, and it sends data back to the host only after receiving the query command from the host.

Timed automatic sending: the joystick sends data to the host when the joystick is turned on, and the sending rate refers to "refresh rate setting"

This parameter joystick is stored forever (Already set before shipment)

Format:

0xaf	0x08	00	00	00	Mode	0xf5
Head	Command	Data 1	Data 2	Data 3	Data 4	Tail

Mode=00 timing send / Mode=01 master-slave query

Example: (PC->Joystick)

Timing transmission mode af 08 00 00 00 00 f5 (HEX)

Master-slave query mode af 08 00 00 00 01 f5 (HEX)

After the setting is successful, the joystick returns to ACK (AA 55 AF) (joystick->PC)