

WLF-90C

Thruster control lever

User manual



User notice

► Disclaimer

Warning: Before using this product, please refer to the important safety information in the user manual and review all warnings, limitations and disclaimers.

This product is no substitute for proper training and careful seamanship. Proper installation and proper use of the equipment is the responsibility of the owner to avoid accidents, personal injury or property damage. The user of this product is solely responsible for compliance with maritime safety practices.

The owner is solely responsible for installing and using the equipment in a manner that will not cause accidents, personal injury or property damage. The user of this product is solely responsible for compliance with maritime safety navigation practices.

This document represents the product at the time of release. Ningbo SHANBEI Technology Co., Ltd. reserves the right to change product specifications at any time without prior notice. If you need any further assistance, please contact your nearest dealer.

► Governing language

This Statement, any instruction manuals, user guides and other Product-related information (documentation) may be or have been translated into another language (translation). If there is any conflict between any translated version of the document, the Chinese version of the document will be the official version of the document.

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► Cautions

- 1 Do not place the equipment at will without fixing it, so as to avoid serious damage when it is dropped due to turbulence or other factors during the voyage.
- 2 Do not use any power adapter that is not equipped with this product. Otherwise, the device may not work due to the different circuit design, or the performance may be affected or even damaged.
- 3 Do not disassemble the equipment. If the maintenance engineer is not authorized by the company to disassemble the equipment, the free warranty will be lost.
- 4 During use or cleaning, avoid any liquid or other objects falling into the equipment to avoid circuit damage or short circuit.
- 5 Do not place the device and its accessories in an environment prone to humidity or direct sunlight. Keep the device in a dry environment.
- 6 In case of hardware failure (such as damage to the machine shell or foreign matter falling into the machine, etc.), please stop using the machine immediately and contact the dealer in time.
- 7 The company shall not assume any legal or other liability for any maritime accident, monetary loss or loss of interests that occurs on vessels using this equipment.

Contents

1	Introduction	01
1.1	Overview	01
1.2	Product appearance	01
1.3	Product composition	02
1.4	Product size drawing	02
1.5	Product wiring diagram	03
2	Technical parameter	04
2.1	Product basic parameter	04
2.2	Standard version product technical description	04
2.3	Custom item technical description	04
3	Installation instructions	08
4	Test Verification Instructions and Precautions	10
4.1	Test Verification Instructions	10
4.2	Adjustment specification	10
4.3	Matters needing attention	11
5	Fault analysis and elimination	12
6	Safety protection and accident handling	13
6.1	Safety protection devices and precautions	13
6.2	Troubleshooting procedures and methods	13
7	Maintenance and repair	14
7.1	Daily maintenance and maintenance	14
7.2	Operation precautions	14
7.3	Long-term maintenance and maintenance	14
8	Transportation, storage and warranty	15
8.1	Transportation precautions	15
8.2	Storage precautions	15
8.3	Warranty period	15
9	Other	16
9.1	Phone number of the after-sales engineer	16
9.2	Company information	16

1 Introduction

1.1 Overview

The WLF-90C side push control handle is suitable for the operation of the bow and stern side thrusters. The product has the following characteristics:
Made of all-aluminum alloy, the handle is black and powder-coated. The scale is backilluminated for indication. The control damping and gear feedback feel are adjustable. It meets the electromagnetic compatibility and vibration requirements of IEC60945 standard. It has the advantages of compact design, sturdy structure and high precision.

Basic options		(Note: Option 1 is the default option)
Handle style	Standard style	
	Short style	
Type of handles	Dual (C2)	
	Up-Single(C1)	
	Down-Single(C3)	
Scale	Percentage	
Operating range	±60°	
	0~60°	
Tap feedback	Neutral only	
	Feedback for each position	
Output mode	5K potentiometer	
	4~20mA	
Backlight Adjustment	0~24V	
	Dimmer	
	PWM	
Operation position	FWD	
	AFT	

Table 1.1

1.2 Product appearance



1 Introduction

According to the number of handles, the products are divided into single-side push 90C1 and double-side push 90C2, as shown in Figure 1.2. When selecting, we should inform our sales staff according to personal needs to avoid unnecessary economic losses!



Figure 1.2

1.3 Product composition

Number	Name	Quantity
1	Thruster control lever	1
2	Accessories kit, including 16-bit terminal, screw fastener, etc	2(single deduction is 1)
3	Certificate of conformity	1
4	Warranty card	1
5	Specification	1
6	Factory test report and wiring diagram	1

Table 1.2

1.4 Product size drawing

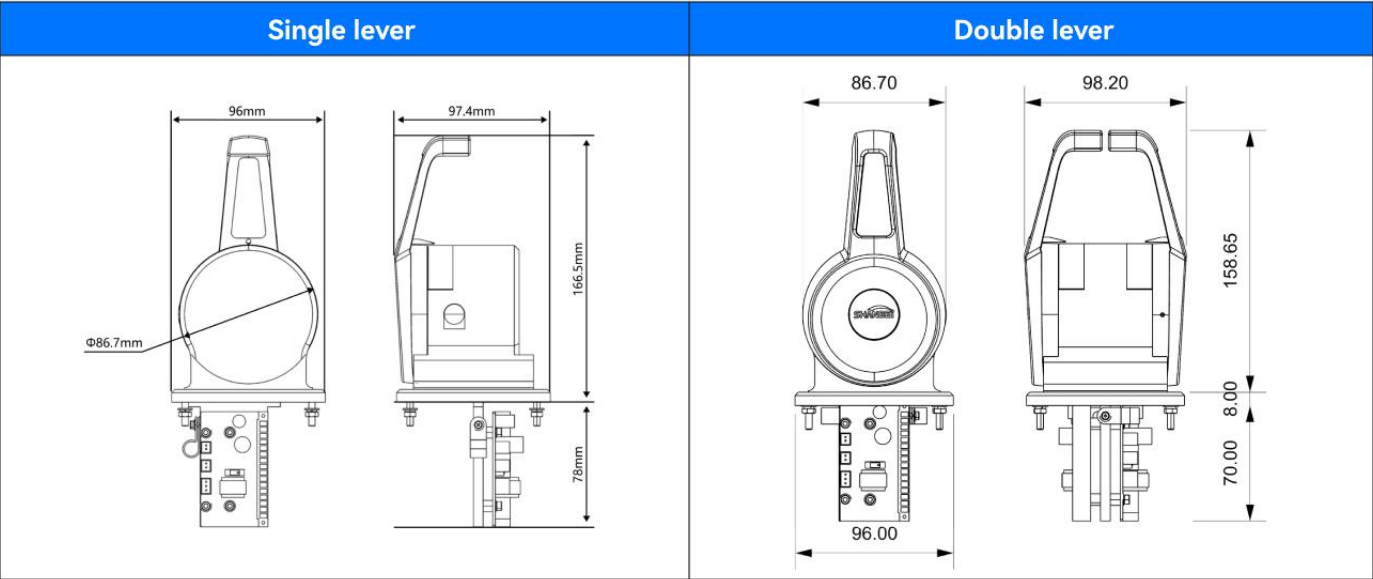


Figure 1.3

1 Introduction

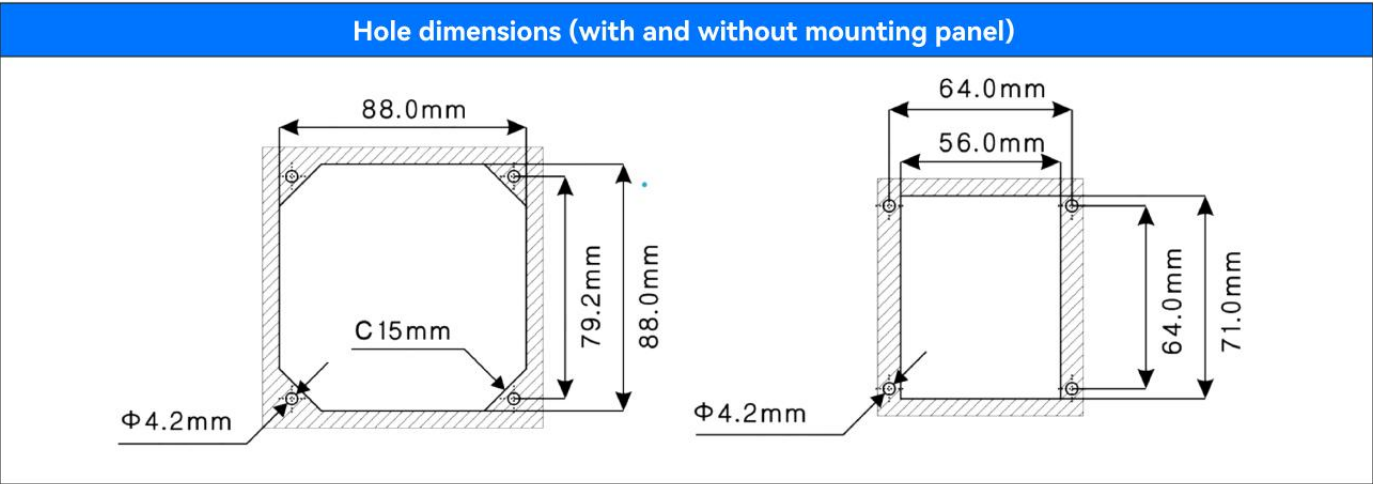


Figure 1.4

1.5 Product wiring diagram

Each side of the handle provides a separate PCB board, although this is a multi-in-one circuit board, but the production has been fixed in accordance with the requirements of the order to solidify the function (including output signal and dimming signal), each side contains 16 terminals, where P1~P3 is the potentiometer output signal (if any), P4~P5 is the output of 4~20mA (if any), P6 to P7 are commissioning ports, P11 to P12 are dimming ports, and P13 to P14 are DC24V power ports.

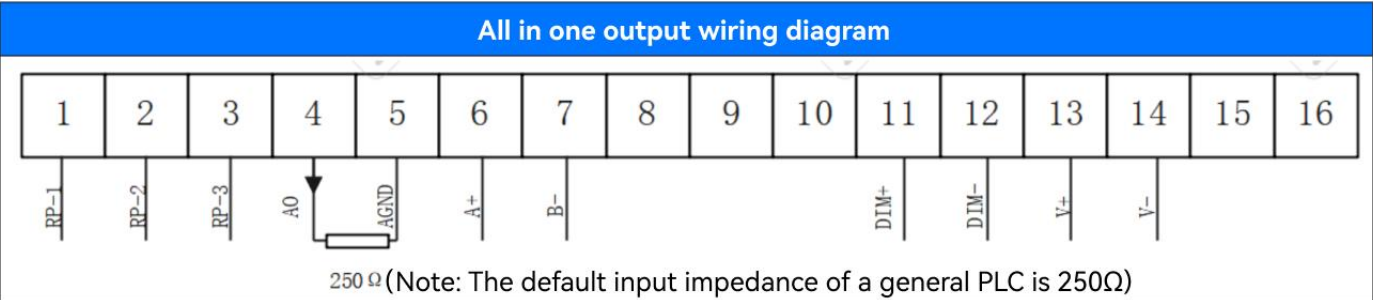


Figure 1.5

Terminal	ID	Feature	Terminal	ID	Feature
1	RP-1	Connect pin 1 of internal potentiometer	9	NC1	Reserve
2	RP-2	Connect pin 2 of internal potentiometer	10	NC2	Reserve
3	RP-3	Connect pin 3 of internal potentiometer	11	DIM+	Input signal 0-10V,PWM,100KΩ potentiometer positive
4	A0	4~20mA current analog output	12	DIM-	Input signal 0-10V,PWM,100KΩ potentiometer negative
5	AGND	4~20mA current analog output	13	V+	Power input +
6	A+	RS485 port A+	14	V-	Power input -
7	B-	RS485 port B-	15	NC8	Reserve
8	NC0	Reserve	16	NC9	Reserve

Table 1.3

2 Technical parameter

2.1 Product basic parameter

Supply voltage	24VDC
IP lever	IP44
Test standard	IEC60945
Operating temperature	5°C~55°C
Wiring	16 I/O terminal block
Feedback accuracy	≤1.0%

Table 2.1

2.2 Standard version product technical description

1. The main body of the handle is made of aluminum alloy, the surface is made of black spray plastic, the main shaft is made of stainless steel, and the interior is driven by copper gear.
2. The scale range is 100~0~100, the background color is left red and right green, the scale line and digital white, the backlight is always on, and the brightness can be adjusted by an external dimmer;
3. The operating moment is constant, the rotating moment and the feel of the caton point are adjustable;
4. Potentiometer brand Japan Sakae, model FCP22A, resistance tolerance $\pm 10\%$, independent linear tolerance 1.0%;
5. Output mode: direct potentiometer linear output, linear relationship with the scale, the theoretical output is shown in Figure 2.1, the actual output is seen in the product factory inspection report.

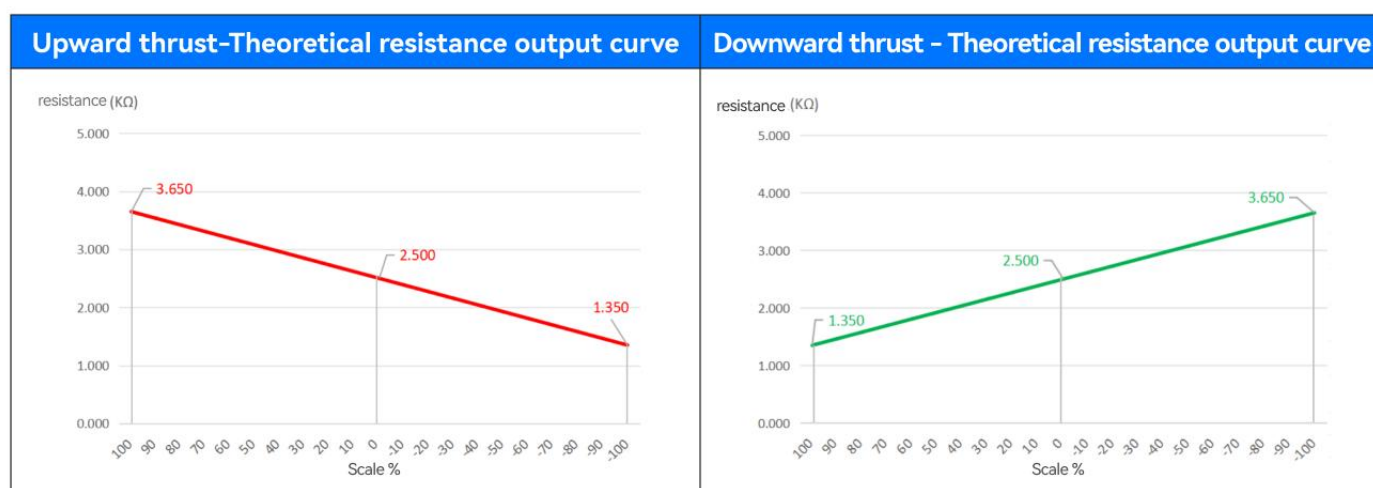


Figure 2.1

2.3 Custom item technical description

1. Short grip: the height of the handle is reduced, and other dimensions are unchanged; The dimensions are shown in Figure 2.2.

2 Technical parameter

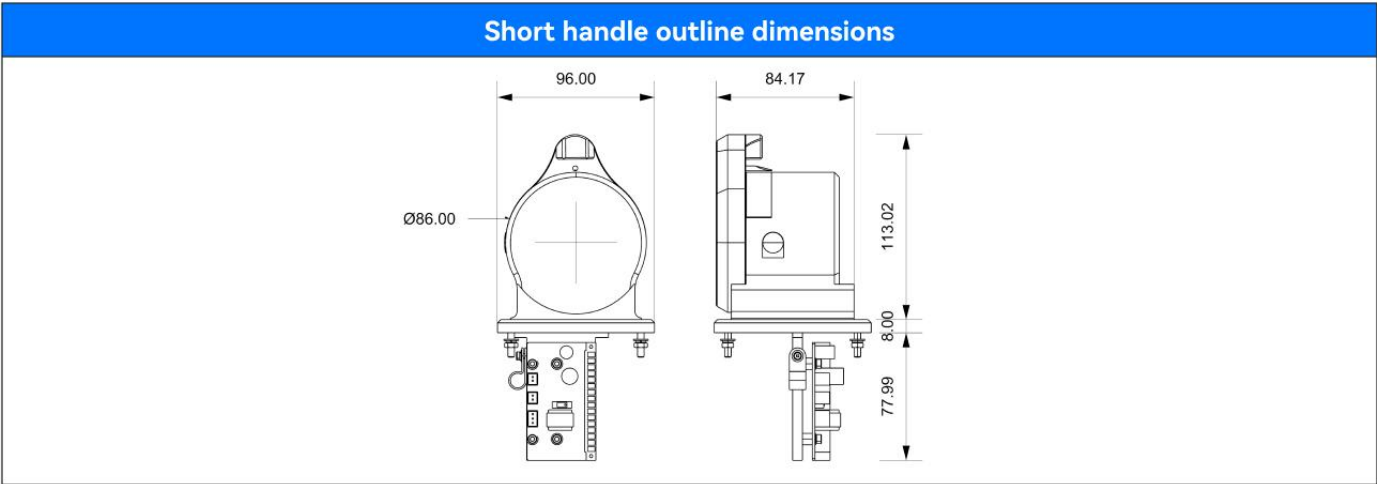


Figure 2.2

2. Mounting panel: The standard mounting panel size of the handle is 96*96mm, in order to reduce the size, you can cancel the mounting panel, the product appearance of the hole size is shown in Figure 2.3:



Figure 2.3

3. The rotation range of the handle can be $\pm 60^\circ$, $0\sim 60^\circ$, the default is $\pm 60^\circ$, as shown in Figure 2.4.

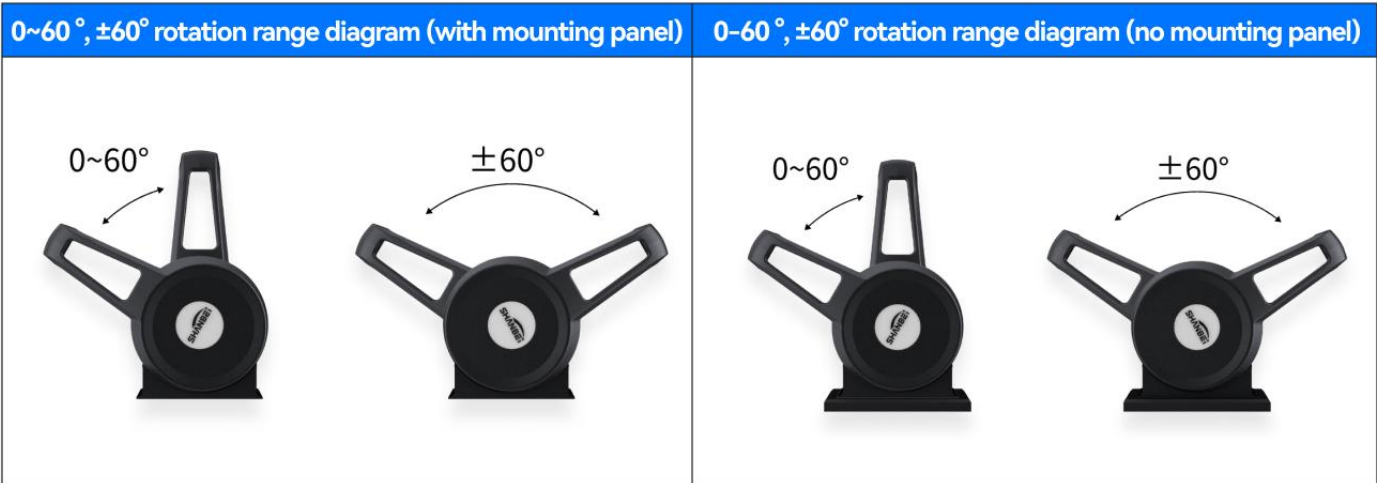


Figure 2.4

2 Technical parameter

4. Film scale: The film pasted on the handle is used to indicate the gear position, and different designs can be selected according to the type of propeller.



Figure 2.5

5. Gear feedback: The handle can provide stuck feedback at a specific gear, such as in the middle zero position or any other gear, and the default output is only stuck feedback at zero position.

6. Output signal: The handle can provide a variety of optional output signals for the control system, including the potentiometer direct output, 4~20mA. Please refer to Figure 1.5 for the connection of the direct output type of potentiometer, and Figure 2.1 for the corresponding relationship. Figure 2.6 shows the cable connections for 4 to 20mA outputs. Under normal circumstances, the corresponding relationship of the output signal is: the scale -100% corresponds to the 4mA output, the scale 0 corresponds to the 12mA output, and the scale +100% corresponds to the 20mA output.

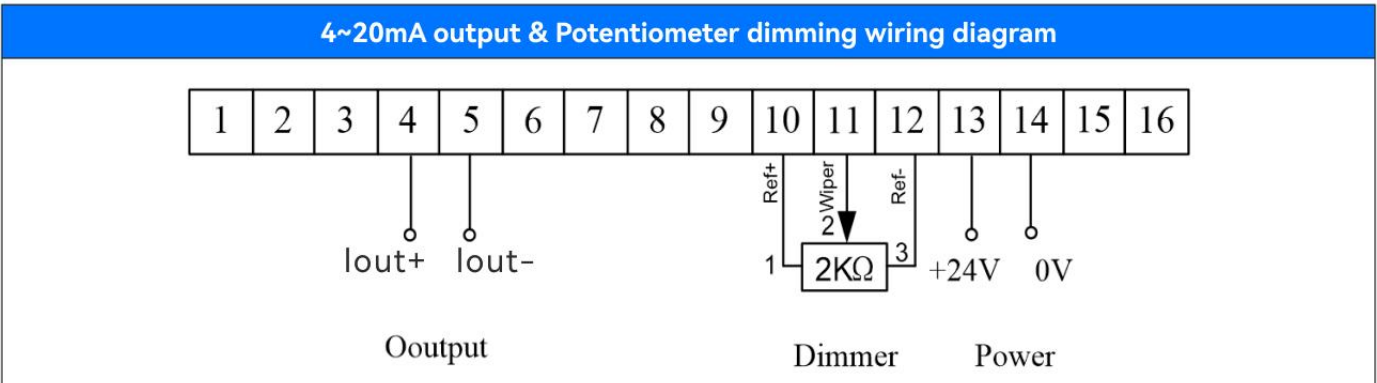


Figure 2.6

7. Backlight adjustment mode: the thin film of the handle adopts cold light source design, the brightness can be adjusted, and the dimming mode includes resistor adjustment (among which the dimming mode of the resistor is only suitable for our model VDM-96 dimmer, the resistance value is 2KΩ, the wiring is shown in Figure 1.5), 0-24V voltage adjustment, PWM. For 0-24V dimming signals, the dimming signal is the darkest at 0V and the brightest at 24V. Note that the dimming signal and the power signal cannot be shared, otherwise the handle signal output will be affected, resulting in failure to work normally. The wiring diagram is shown in Figure 2.7.

2 Technical parameter

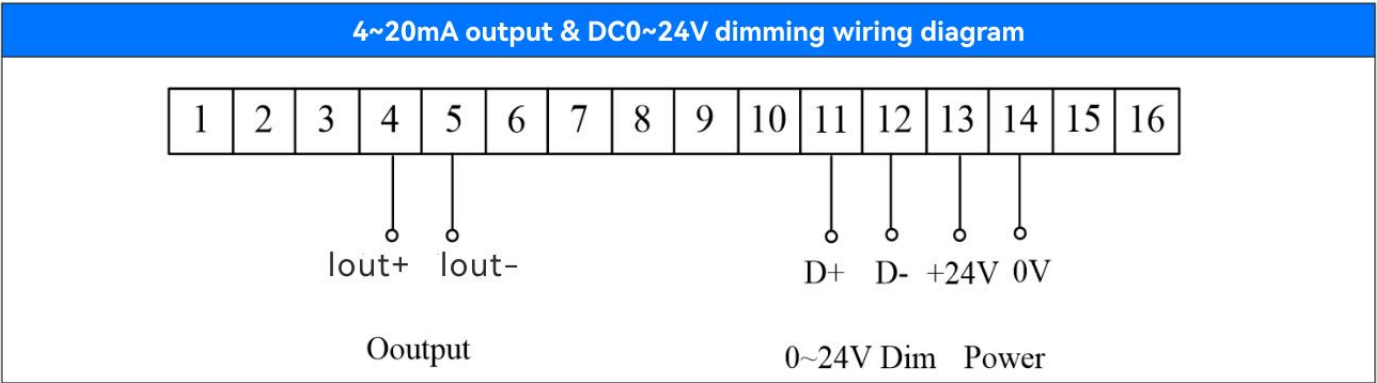


Figure 2.7

Each handle provides 16 terminal connections. Terminal 1/2/3 output handle potentiometer signal is used to calculate the current Angle; Terminal 10/11/12 connected to dimmer potentiometer, this part is optional; Terminals 13/14 are used to connect 24V DC power supplies, as shown in Figure 2.8.

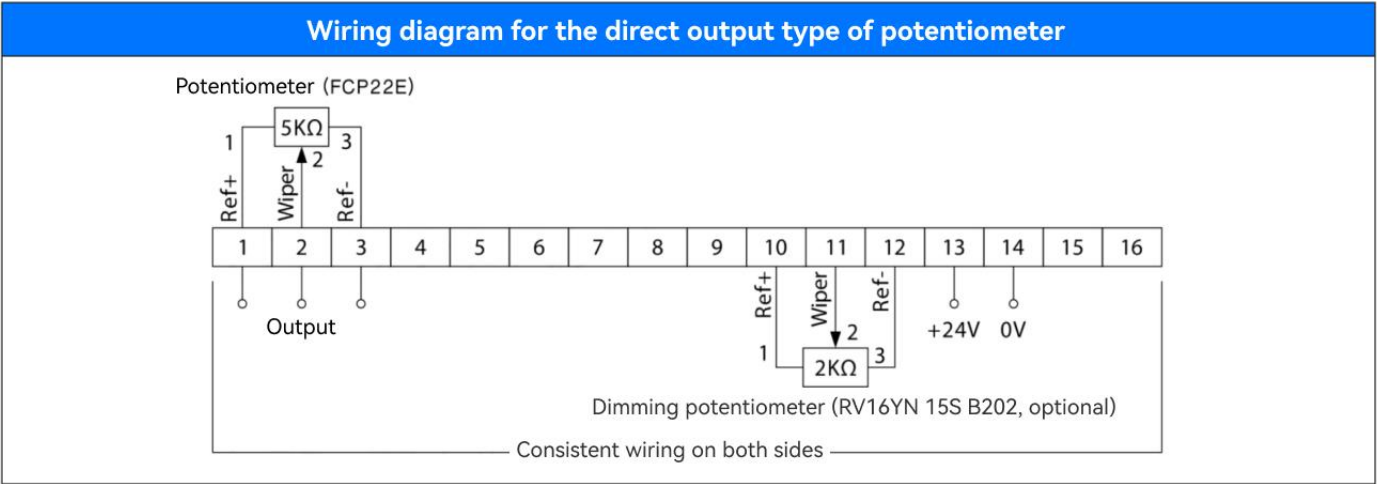


Figure 2.8

Some handles adopt the bottom wiring method. Each side of the handle provides 8 terminal connections. Terminals 1/2/3 output the potentiometer signal of the handle for calculating the current Angle, and terminals 5/6 are used for direct dimming, as shown in Figure 2.9

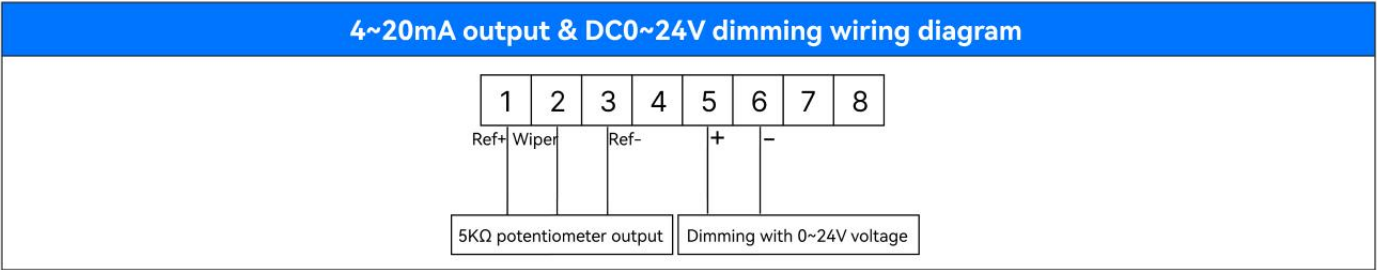


Figure 2.9

3 Installation instructions

1. Remove the four sets of installation accessories (nuts, spring washers, flat washers), as shown in Figure 3.1. Do not remove the installation studs. Set aside 4 sets of accessories, remember not to lose.

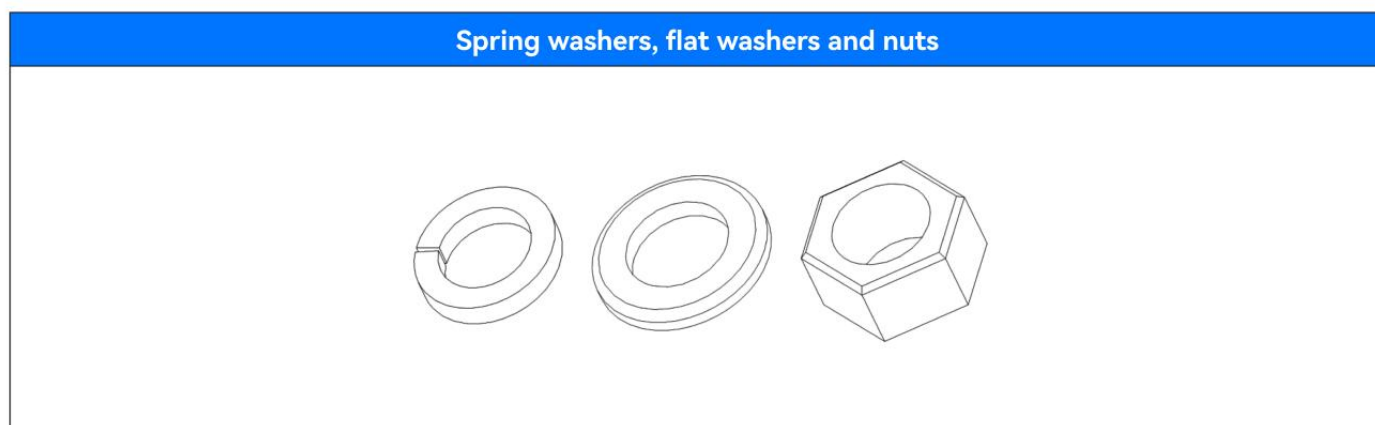


Figure 3.1

2. Place the handle vertically in the opening of the mounting plate as shown in the lower right corner of Figure 3.2, and align the screw with the hole B. Rotate or tilt the handle into the hole when it meets the protruding part.

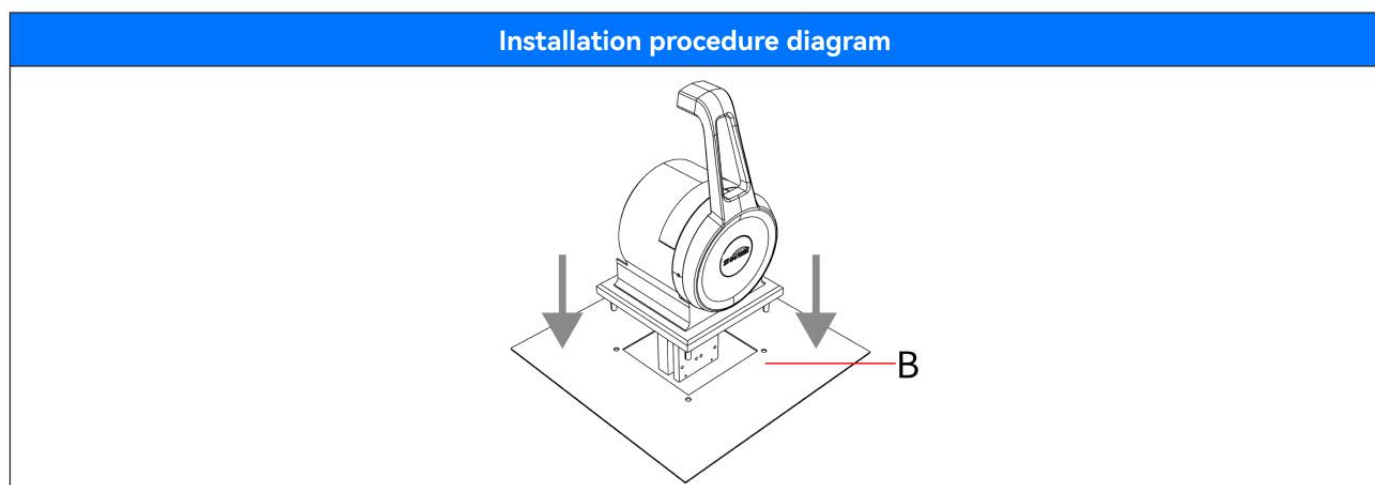


Figure 3.2

3. Secure the handle to the mounting plate by installing studs and accessories, and tighten nut C. Make the handle and mounting plate tight and reliable. There should be no gap or shaking on the contact surface, as shown in Figure 3.3.

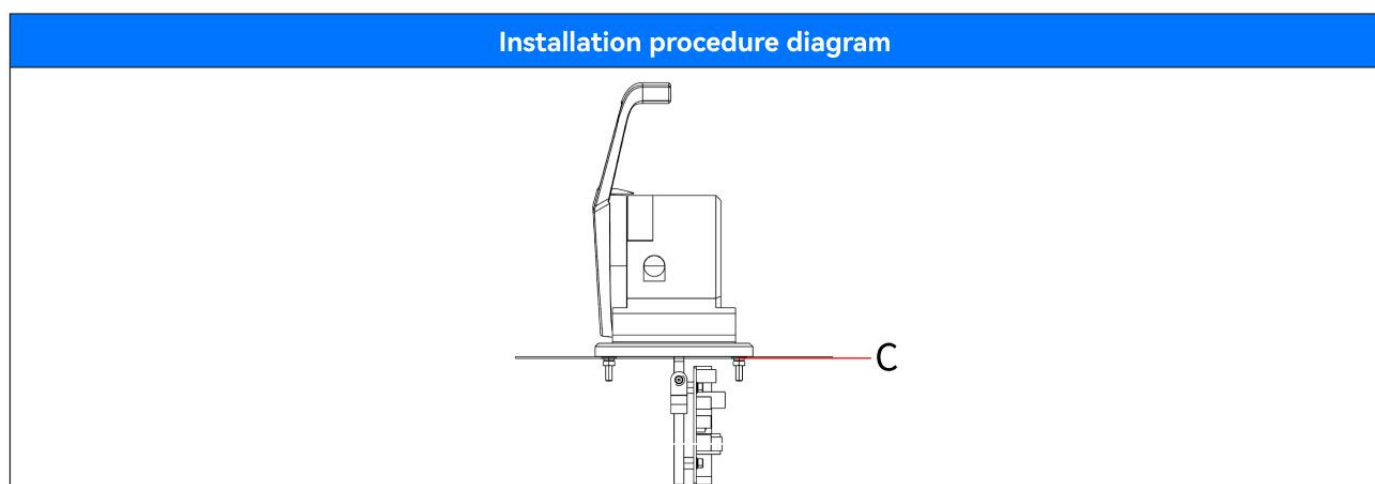


Figure 3.3

3 Installation instructions

4. Install the handle to the mounting plate and connect electrical cables. After the connection is complete, ensure that the external connection is firm and reliable.
5. Check the external cables, which should be connected normally; The backlight should emit light normally; Push the handle lever, the switch can complete the normal on-off action. After commissioning, disconnect the power supply.

4 Test Verification Instructions and Precautions

4.1 Test Verification Instructions

Control lever testing adopts two methods: power-on voltage measurement and power-off resistance measurement. The voltage test best simulates actual working conditions and delivers the highest measurement accuracy, so it shall be the preferred method.

1. Verify normal power supply to the control lever, and set the multi-meter to the DC voltage (VDC) range.
2. Measurement of reference supply voltage U_{fs} : Locate the two terminals of the potentiometer. Measure the voltage across the terminals with the multi-meter; connect the negative probe to the negative terminal and the positive probe to the positive terminal, and record the reference supply voltage U_{fs} .
3. Zero-position output calibration: Place the control lever at the zero position. Keep the negative probe connected as-is, connect the positive probe to the potentiometer wiper terminal, and record the zero-position voltage U_0 . This value shall be $U_0 \approx 50\% \cdot U_{fs}$.
4. Reverse pull output calibration: Maintain the existing multi-meter connection. Slowly pull the handle to the mechanical limit. The minimum voltage $U_{min} \approx 10\% \cdot U_{fs}$.
5. Forward push output calibration: Maintain the existing multi-meter connection. Slowly push the handle to the mechanical limit. The maximum voltage $U_{max} \approx 90\% \cdot U_{fs}$.
6. Evaluation of full-range linearity and contact stability: The voltage value shall increase continuously and linearly with the movement of the handle position. No abnormalities such as value jumps, sharp rises or drops, intermittent disconnection and stalling, or flickering readings are permitted.
7. The power-off resistance measurement method follows similar procedures. Note that the potentiometer in the lever has a nominal resistance of $5\text{ k}\Omega$ and total resistance tolerance of $\pm 10\%$. The acceptable range for total resistance is $4.5 \sim 5.5\text{ k}\Omega$.

4.2 Adjustment specification

1. As shown in Figure 4.1, open the silicone plug and rotate the hex wrench at A to adjust the size of the propulsion damping.



Figure 4.1

4 Test Verification Instructions and Precautions

2. As shown in FIG. 4.2, use an Allen wrench at B to rotate and adjust the strength of the push zero feel.

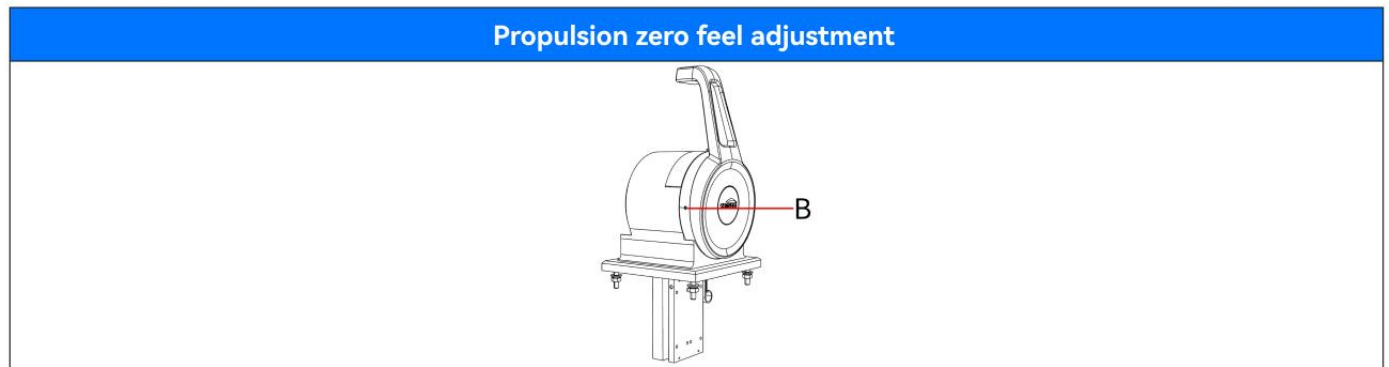


Figure 4.2

4.3 Matters needing attention

1. If it is not used according to the requirements, the loss shall be borne by the user; Rated backlight voltage $\leq 24V$. If the backlight is damaged due to exceeding the rated voltage, the user shall bear the responsibility.
2. In the process of use, when the output of the propulsion direction exceeds the range of $0 \sim 5K$, please stop using immediately; When the output value between the identification number 7 and 8 cannot be continuously changed, it should be stopped in time. Method of stopping the service: Disconnect the external power supply.
3. According to the characteristics of the accessories used in this product, the instantaneous input voltage shall not exceed 20% of the range specified in Figure 1.5 at any time. Avoid excessive instantaneous current and burning accessories.

5 Fault analysis and elimination

This product has been put into operation since the use, basically no fault, with our statistics, the after-sales problem is basically due to wiring errors, resulting in normal use, in addition, there is no technical fault. Customers in the use of the process, if you find technical problems, please promptly communicate with our technical personnel.

(Note: Each handle has a unique factory number)

6 Safety protection and accident handling

6.1 Safety protection devices and precautions

1. In the important position of this product, the fastening seals have been processed before leaving the factory, and shall not be disassembled without permission. If the seals are damaged, any product quality problems will be borne by the buyer.

2. The damping part used in this product is a loss part, the warranty period is 1 year, effective from the date of delivery; During the warranty period, there is a change in propulsion damping, which can not be used normally or seriously affect the operation, and we will maintain it free of charge. If damping changes occur outside the warranty period, which can not be used normally or seriously affect the operation, we can charge a small amount of labor and material costs for maintenance.

(Troubleshooting)

(Once this product fails to operate normally, please stop using and disconnect the power supply immediately, contact our after-sales service engineer for solutions)

6.2 Troubleshooting procedures and methods

1. In the process of use, there is an unsolvable fault problem, contact our after-sales service engineer.

2. During the warranty period, if the fault occurs due to the product itself, we will provide a complete replacement product and send it to the buyer for free replacement. And provide technical support; If the fault is not caused by the product itself, we can provide two options of complete replacement products and on-site services, which are selected by the buyer. All costs are borne by the recipient.

3. If the warranty period is exceeded and the fault occurs, we can provide two service options that can completely replace the product or replace some parts of the product, which are selected by the buyer. The required cost shall be borne by the purchaser.

7 Maintenance and repair

7.1 Daily maintenance and maintenance

In the daily non-use state, attention should be paid to the maintenance of this product. Through maintenance, maintenance can improve the service life of the product, the specific maintenance and maintenance methods are as follows:

1. Wipe the surface of the product regularly with a dry rag to ensure that the outside of the product is clean and tidy.
2. Disconnect the external power supply of the product, push it back and forth regularly, repeat about 10 times, and the cycle is 2 to 3 weeks. It can ensure smooth promotion and avoid the phenomenon of "aging" caused by long-term placement, which increases the damping and accelerates the wear of the damping part.

7.2 Operation precautions

1. Stop using the device when the handle cannot position itself at zero position. Contact our after-sales engineer.
2. The use process should be smooth and uniform, to avoid rapid pushing and pulling, the speed is too fast to form an impact and damage the product.
3. The input voltage shall be carried out in strict accordance with the wiring instructions. Failure to operate according to the regulations will cause product failure or other major accidents, which shall be borne by the buyer.

7.3 Long-term maintenance and maintenance

Long-term placement, maintenance maintenance methods, and daily maintenance, maintenance methods are the same.

8 Transportation, storage and warranty

8.1 Transportation precautions

Physical damage to the product caused by violent shaking and collision should be avoided during transportation.

8.2 Storage precautions

Room temperature, dry, cool environment. Avoid high temperature exposure or low temperature freezing, which will cause irreversible damage to the damping parts and reduce the service life.

8.3 Warranty period

The warranty period of this product is 12 months from the date of receipt of the goods by the buyer. Based on the date of receipt of documents for express delivery or the date of receipt of invoice.

9 Other

9.1 Phone number of the after-sales engineer

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Tel: 18067343163

9.2 Company information

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