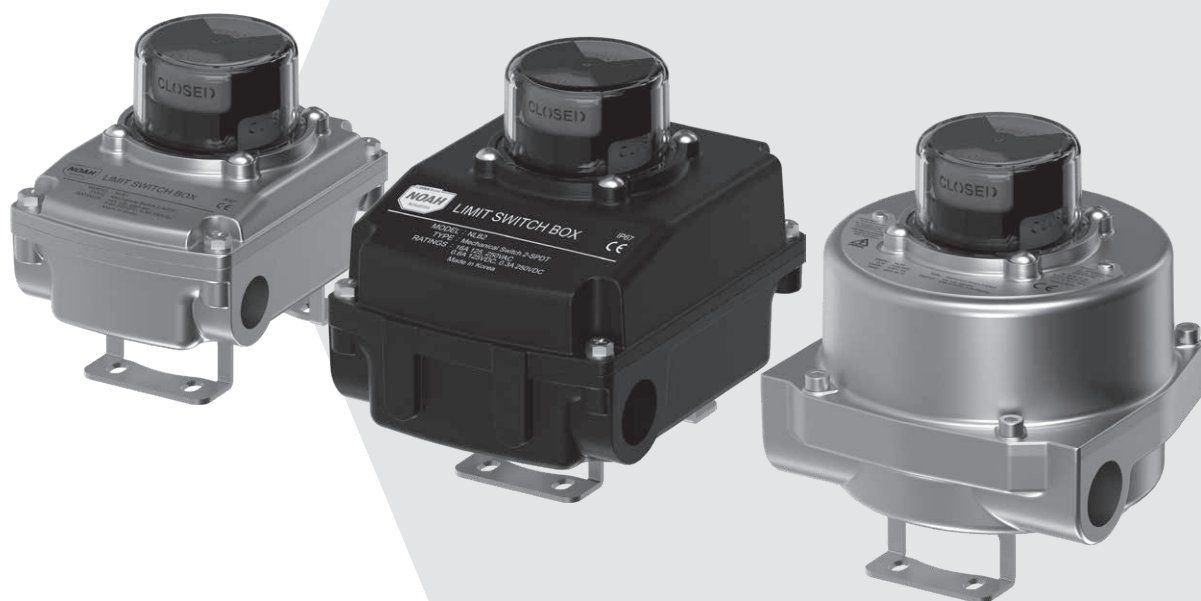


rotork®

Keeping the World Flowing
for Future Generations



Noah NLB Range

Installation, commissioning and
maintenance manual



(in progress: IECEx, ATEX)

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1. Introduction

This manual explains the installation, operation, and maintenance procedures for the NLB range limit switch box.

Specifications may vary depending on the product model, and product specifications may be changed without prior notice for performance improvements. Rotork shall not be held liable for such changes.

Please read and fully understand this manual before using the product and keep it accessible for future reference.

2. Precautions for Use

2.1 General Precautions

⚠ Before installation, make sure that the specifications of the ordered product match those indicated on the nameplate.

⚠ Transport the product properly according to its weight. When lifting the product assembled with an actuator, ensure that all the load is not applied to the limit switch box.

⚠ Do not apply strong impact to the product. Impact may damage the enclosure or internal components, resulting in degraded performance.

⚠ Untrained personnel must not disassemble or modify the product under any circumstances.

⚠ If the user assembles this product with an actuator, the limit switch setting must be reconfigured. Failing to do so may result in incorrect valve position indication in the control room, causing control issues.

⚠ Power must be turned off before opening the cover and performing wiring work.

⚠ After installation, be sure to connect both internal and external grounding terminals.

2.2 Explosionproof Precautions (in progress: IECEx, ATEX)

For explosionproof models, certified cable glands in accordance with the Occupational Safety and Health Act and IEC/EN 60079 standards must be used. Rotork is not responsible for any issues caused by the use of non-certified components.

Use cables rated for at least +101 °C (+214 °F) and cable glands rated for at least +83 °C (+181 °F).

⚠ Special conditions for safe use

- For information about the flameproof joints, please contact Rotork
- Do not open the protective cover in explosive environments
- Bolts used for the enclosure cover and housing must be of A2-50 grade strength
- To prevent electrostatic discharge damage, wipe the product with a damp cloth before use

This product complies with Ministry of Employment and Labor Notification No. 2016-4.

Do not use dual-threaded adapters when installing cable entries. Also, do not use plugs in conjunction with dual-threaded adapters.

Unused cable entries must be sealed with Ex d IIC rated plugs.

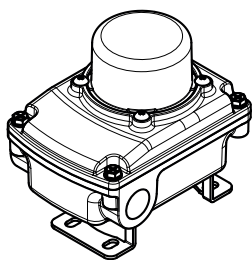
3. Product Description

3.1 Product Overview

This product is installed on actuators or gearboxes that do not have indicators or separate contact switch boxes. It uses a dome-type indicator to visually display the valve's open and closed positions, and it is designed to provide electrical signals through internal contact switches.

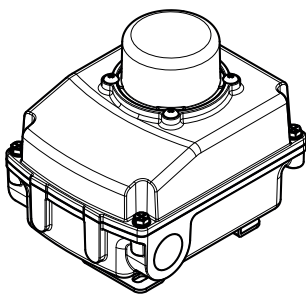
3.2 Product Types

3.2.1 Standard Type



Uses either mechanical switches or proximity sensors to transmit electrical signals via contacts.

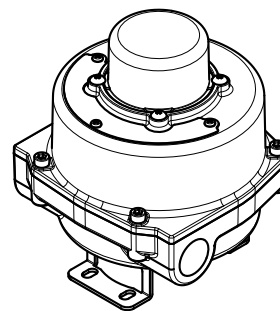
3.2.2 Optional Type



Uses either mechanical switches or proximity sensors to transmit electrical signals via contacts.

Supports up to four switches to provide electrical signals.

3.2.3 Explosionproof Type (in progress: IECEx, ATEX)



Uses either mechanical switches or proximity sensors to transmit electrical signals via contacts.

Supports up to four switches to provide electrical signals.

Employs a flameproof (Ex d) structure that contains electrically induced explosions within the enclosure, preventing the spread of flammable materials to the outside.

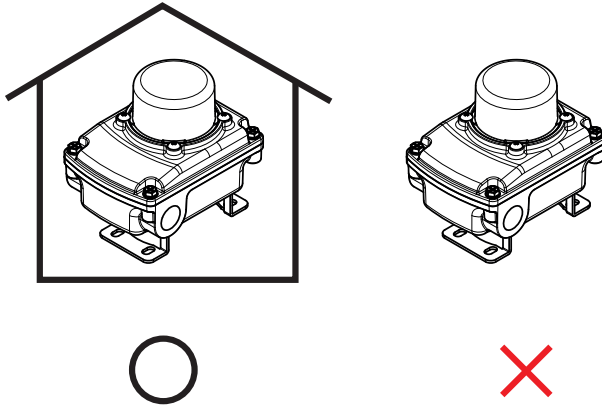
4. Storage and Operating Temperature

4.1 Storage

If the limit switch box is not installed immediately after purchase, it must be stored indoors in a dry and clean environment.

Avoid locations with vibration or sudden temperature changes. If stored in a high-humidity environment, place silica gel inside the storage box to help prevent condensation.

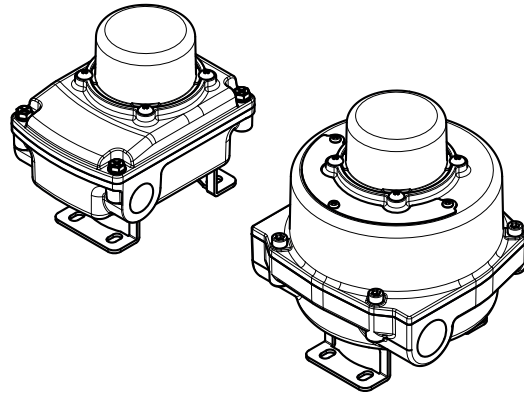
Do not remove the stickers on the cable entries until wiring is ready on site.




Storage location	Indoor
Storage temperature	+18 °C ± 5 °C (+64 °F ± 9 °F)

 **Improper storage will void warranty.**

4.2 Operating Temperature



Type and Rating		Ambient Temperature
Standard and Optional		-20 to +80 °C (-4 to +176 °F)
Explosionproof 	Ex db IIC T6 Gb (in progress: IECEX, ATEX)	-20 to +60 °C (-4 to +140 °F)

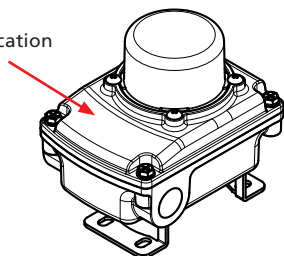
- The limit switch box case is made of Aluminium alloy with an anodised finish and outdoor coating to prevent corrosion.
- For explosionproof products, the actuator temperature must remain below the ambient temperature of +60 °C (+140 °F). The process temperature of pipelines connected to the actuator must also stay below +60 °C (+140 °F).

5. Nameplate Design and Identification

Check the nameplate on the delivered limit switch box to ensure the electrical specifications and model number are correct.

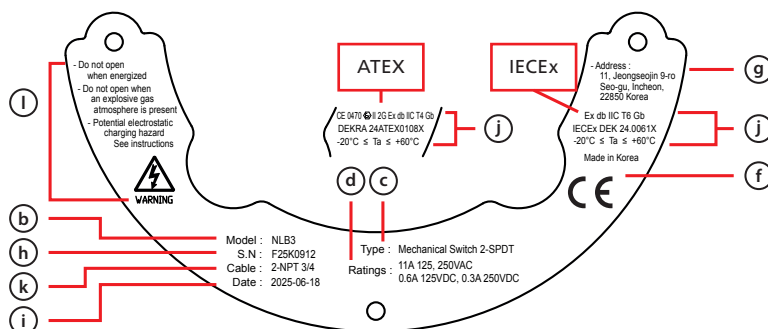
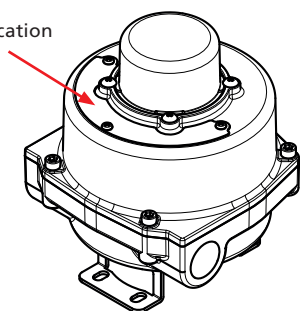
Standard and Optional Types

Nameplate location






Explosionproof Type (in progress: IECEx, ATEX)

Nameplate location



Ⓐ Manufacturer logo	Manufacturer logo
Ⓑ Model	Displays the model name
Ⓒ Type	Indicates internal contact type (mechanical switch or proximity sensor)
Ⓓ Ratings	Displays electrical specs for switch or sensor
Ⓔ IP rating	Indicates waterproof/dustproof rating
Ⓕ Certification mark	Shows applicable certifications
Ⓖ Manufacturer information	Manufacturer information
Ⓗ Serial no.	The manufacturer's control number is given one number per limit switch box
Ⓘ Date	Manufacturing date
Ⓛ Explosionproof grade and certification no.	Shows protection type, rating, and certificate number
Ⓚ Entry size	Indicates cable entry specifications
Ⓛ Explosionproof warnings	Do not open the protective cover in areas with explosive gases. Do not open the cover while power is applied. Refer to the user manual.

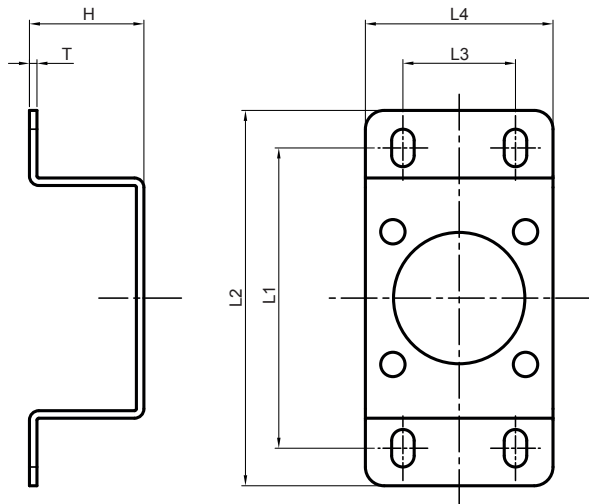
   If the product is explosionproof, the nameplate must contain explosionproof symbols and certification authority numbers. If these are missing, the product is not an explosionproof model and you must immediately contact the seller or manufacturer.

6. Specifications

6.1 General Specifications

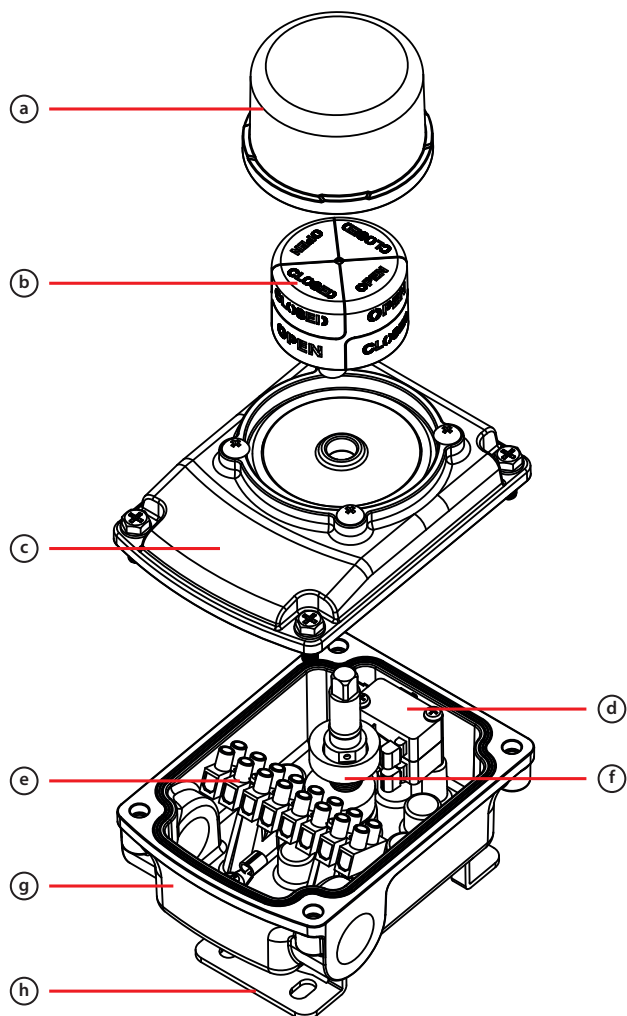
Switch type	Mechanical switch or proximity sensor
Enclosure rating	Waterproof/dustproof / IP67 (Option : IP68 (ONLY SUS))
Operating angle	0 to 90° ± 5°
Enclosure material	Aluminium Alloy, Stainless Steel (SUS316L) (Option: SUS304, SUS316)
Surface treatment	Anodising
Surface coating	Polyester powder (TGIC-FREE)

6.2 Bracket Specifications

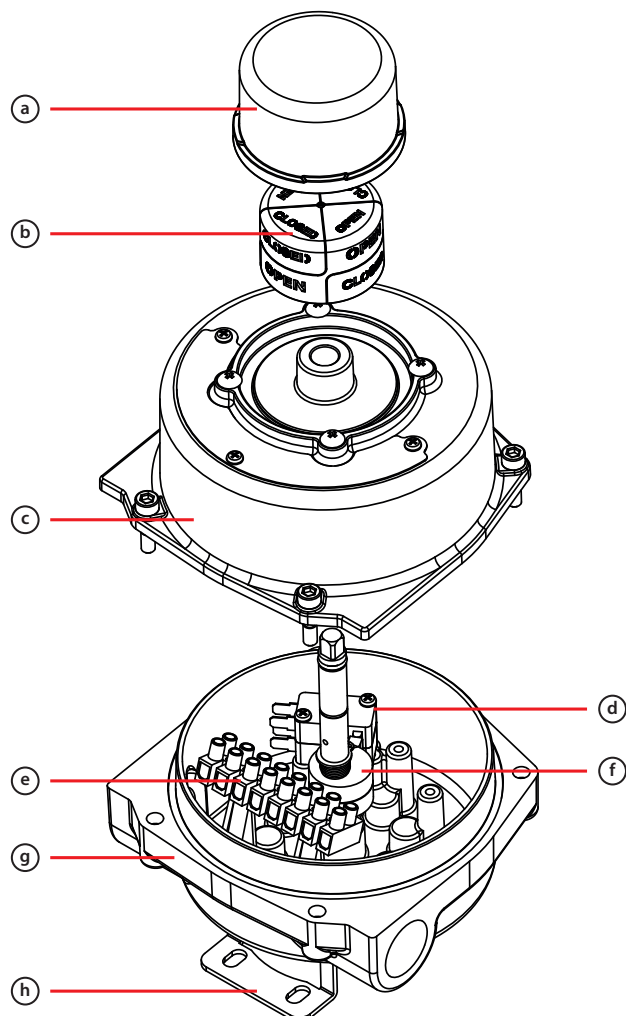


	Type 1	Type 2
L1	80	130
L2	100	150
L3	30	
L4	50	
H	30.5	40.5
T	2	
Material	SUS304	

7. Product Structure and Nomenclature



Standard and Optional Type



Explosionproof Type

(a)	Window
(b)	Indicator
(c)	Top cover and nameplate
(d)	Mechanical switch or proximity sensor
(e)	Terminal
(f)	Shaft and cam switch
(g)	Body
(h)	Bracket

8. Model Code and Options

NLB



(A)



(B)



(C)



(D)



(E)



(F)

(A) Model

1	STANDARD
2	OPTION
2	EXP

Selectable Models

(B) Enclosure Material

NLB1, NLB2, NLB3	A	Aluminium Diecasting
NLB1, NLB3	B	SUS316L
NLB1, NLB3	C	SUS304
NLB1, NLB3	D	SUS316

Selectable Models

(C) Cable Entries

NLB1	P2	PF ½
NLB1 NLB3 - B, C, D	M0	M20 x 1.5P
NLB1 NLB3 - B, C, D	N2	NPT ½
NLB1 - B, C, D NLB2	P4	PF ¾
NLB1 - B, C, D NLB2, NLB3	M5	M25 x 1.5P
NLB1 - B, C, D NLB2, NLB3	N4	NPT ¾

Selectable Models

(D) Switch Type

NLB1, NLB2, NLB3	A	2 - SPDT
NLB1	B	POT
NLB1 - B, C, D NLB2, NLB3	C	2 - SPDT + POT
NLB2, NLB3	D	2 - SPDT + CPT (in progress)
	E	3 - SPDT
	F	4 - SPDT
	G	2 - DPDT
NLB1, NLB2, NLB3	H	2 - PSN17
NLB2, NLB3	I	2 - NJ4-12GM-N
	J	2 - NBB2-V3-E2
	K	4 - NBB2-V3-E2
	L	2 - NJ2-V3-N
	M	4 - NJ2-V3-N

Selectable Models

(E) Bracket Type

NLB1, NLB2, NLB3	1	30 x 80
	2	30 x 130

Selectable Models

(F) Option

NLB1, NLB2, NLB3	T	TERMINAL 12 POINT
NLB1, NLB3 - B, C, D	I	IP68

9. Switch and Sensor Specifications

Mechanical Switch Specifications

SPDT (SZM-V16-5FA-61, 1C)	Electrical rating	16 A (125/250 VAC), 0.6 A (125 VDC), 0.3 A (250 VDC) ½HP (125,250 VAC) Note: If EXP type, the rating is 11 A (125/250 VAC)
	Certifications	UL, CSA, SEMKO, CQC, KC
	Operating temperature	-25 to +130 °C (-13 to +266 °F)
DPDT (DZ-10GW-1B, 1C)	Electrical rating	10 A (125/250 VAC), 2 A (480 VAC) 0.5 A (125 VDC), 0.25 A (250 VDC)
	Certifications	UL, CSA
	Operating temperature	-25 to +80 °C (-13 to +176 °F)

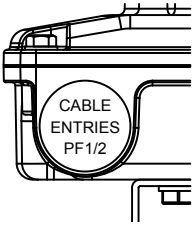
Proximity sensor specification

PSN17-5DNU (PNP N.O.)	Electrical rating	Below 200 mA, 12-24 VDC
	Certifications	CE, UKCA, EAC / IP67
	Operating temperature	-25 to +70 °C (-13 to +158 °F)
NJ4-12GM-N (NAMUR N.C.)	Electrical rating	Not Detected 3 mA Detected below 1 mA or less, 8.2 VDC (R approx. 1 kΩ)
	Certifications	CE, ATEX, IEC, IECEx, cULus, CCC, DNV / SIL2 / IP67
	Operating temperature	-25 to +100 °C (-13 to +212 °F)
NBB2-V3-E2 (PNP N.O.)	Electrical rating	Voltage drop below 3 V, 10~30 VDC
	Certifications	CE, cULus, UKCA / IP67
	Operating temperature	-25 to +70 °C (-13 to +158 °F)
NJ2-V3-N (NAMUR N.C.)	Electrical rating	Not Detected 3 mA Detected below 1 mA or less, 8.2 VDC (R approx. 1 kΩ)
	Certifications	CE, ATEX, IEC, IECEx, cULus, CCC / SIL2 / IP67
	Operating temperature	-25 to +100 °C (-13 to +212 °F)

10. Cable Entries

The limit switch box includes two cable entries.

The entry specifications can be customised upon request.
Note that different continents may use different standard types, so entry specifications should always be checked when purchasing.

	Standard	Optional	Explosionproof
	2 x PF 1/2, M20x1.5, NPT1/2 2 x PF 3/4, M25x1.5, NPT3/4 (Only SUS)	2 x PF 3/4, M25x1.5, NPT3/4	2 x M20x1.5, NPT1/2 (Only SUS) 2 x M25x1.5, NPT3/4

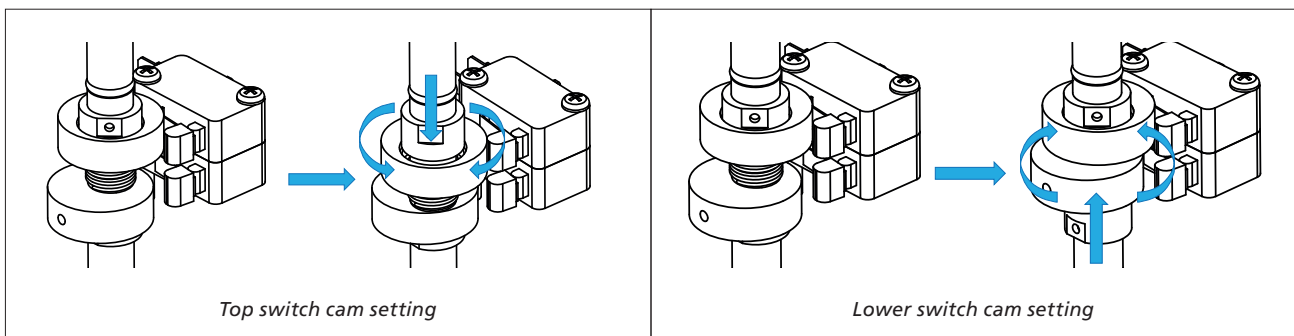
Note: For explosionproof models, only NPT and metric thread types are permitted.

11. Cam Switch Setting Method

⚠ After the actuator and the limit switch box are assembled, the limit switch must be configured.

Without setting the limit, accurate position detection is not possible.

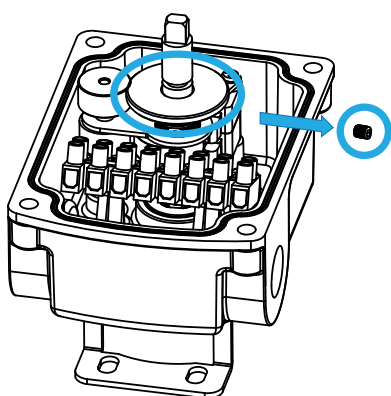
- 1) Use a Phillips screwdriver or hex wrench to loosen the fixing bolts and remove the top cover of the limit switch box connected to the actuator.
- 2) Operate the actuator to the fully closed position.
- 3) Rotate the upper cam until the switch activates.
(The cam is spline-shaped and can be lowered and turned.)
- 4) Operate the actuator to the fully open position.
- 5) Rotate the lower cam until the switch activates.



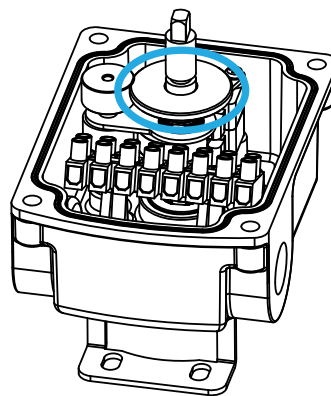
- 6) After setup, verify that the switches operate correctly in both the fully open and fully closed positions.

12. Potentiometer Setting Method

- 1) Move the actuator to the fully closed position.
- 2) Use a Phillips screwdriver or hex wrench to loosen the fixing bolts and remove the top cover.
- 3) Refer to the wiring diagram inside the top cover and use a multimeter to check the resistance value between the potentiometer wires (Black, Blue).
- 4) If the resistance value is incorrect, remove the set screw on the gear connected to the shaft.
- 5) With the set screw removed, turn the gear to adjust the resistance value as follows:
 - 1 k Ω potentiometer: approx. 90 Ω (80-100 Ω)
 - 10 k Ω potentiometer: approx. 900 Ω (800-1 k Ω)
- 6) While maintaining the resistance value, re-tighten the set screw to secure the gear to the shaft.
- 7) After setup, verify that the resistance values are within the normal range in both the fully open and fully closed positions.



Remove the set screw only after fully closing the actuator



After adjustment, check resistance value in fully open and fully closed positions

13. Electrical Wiring Method

⚠ An electrical wiring diagram is attached to the top cover of the limit switch box.

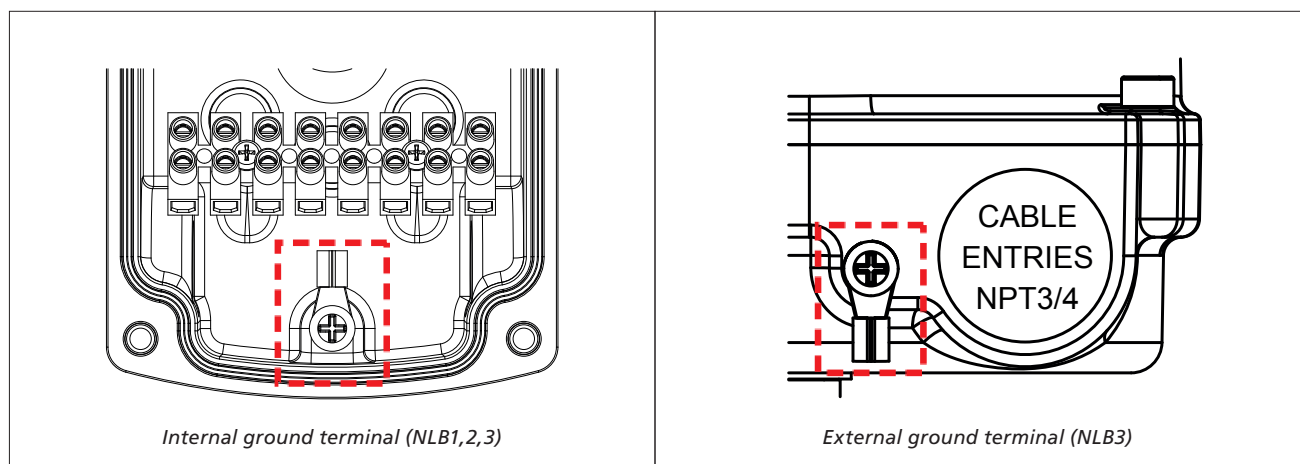
If the wiring diagram is missing, contact your supplier or the manufacturer immediately.

Always apply power with the cover closed.

If power is applied during work, stop immediately and turn off the power.

- 1) Use a Phillips screwdriver or hex wrench to remove the top cover of the limit switch box.
- 2) Perform wiring according to the diagram inside the cover. Use cable ties to organise internal wires.
- 3) Connect both internal and external grounding terminals.

Conductor Cross-Section (S) (mm ²)	Minimum Ground Conductor (Sp) (mm ²)
$S \leq 16$	S
$16 < S \leq 35$	16
$S > 35$	0.5



Note: Tightening torque: 3 Nm

- 4) After completing wiring, seal any unused cable entries with appropriate plugs. For explosionproof products, after completing wiring, any unused cable entries must be sealed with Ex d IIC rated plugs.

- 5) When reassembling the top cover, confirm the O-ring is properly seated to maintain waterproof and dustproof performance.

Note: When assembling, align the square shaft of the point shaft with the square hole of the indicator.

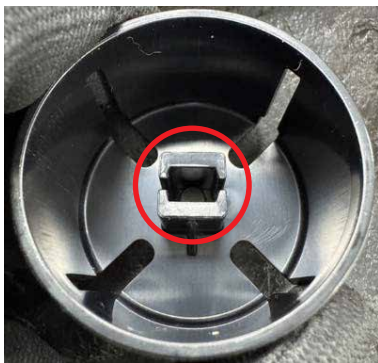
- 6) After reassembly, verify that the contact output is functioning correctly.

14. Troubleshooting

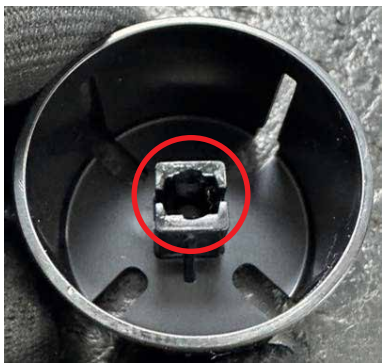
During operation, various issues may cause malfunctions.

If the unit does not operate normally, first check for mechanical issues. If no mechanical issues are found, check the electrical components.

Symptom	Possible Cause	Action
Top cover does not fit	Indicator direction misaligned	Align the square hole of the indicator with the square shaft of the point shaft. (Forcing the cover may damage the indicator.)
Mismatch between actuator and indicator position	Damaged indicator square hole	Open the window on the top cover and inspect the square hole of the indicator. Replace if damaged.
Signal error in control room	Wiring error	Verify wiring according to the wiring diagram.
	Improper cam switch setting	Verify that the cam switch functions properly at both fully closed and fully open positions.
	Damaged mechanical or cam switch	Inspect for physical damage and replace if necessary.
	Damaged potentiometer	Remove the gear from the point shaft and inspect the potentiometer for damage.




Normal: Square hole intact



Damaged: Square hole broken

15. Maintenance

 **Before performing any maintenance, read the product manual thoroughly and turn off the power.**

For EXP - Recommended replacement cycle: Every 6 months or after 10,000 operations (1 cycle = 1 open + 1 close)

- 1) Visually inspect the exterior and open the top cover to check internal components (mechanical switch or proximity sensor, cam switch, terminal, grounding, etc.). Replace any damaged parts.

(Use only parts supplied by Rotork or equivalent certified components)

- 2) Inspect the wiring connected to terminals. If loose or damaged, rewire and secure them properly.

Note: Improperly tightened bolts or plugs may cause water ingress.

16. Warranty Information

The following cases are not covered under the free warranty service.

- Damage or malfunction due to user negligence
- Malfunctions caused by unauthorised modifications or repairs
- Electrical failures resulting from unauthorised changes to wiring
- Water ingress caused by unsealed conduit connections
- Failures due to improper limit switch settings
- Damage caused by fire, flooding, or other natural disasters
- Failures occurring after one year from the date of shipment



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