



LJA10 Series Safety Limit Switch

User's Manual

LJA10-11A21N

LJA10-57A21N



**Thank you for purchasing our product.
This manual contains information for
ensuring correct and safe use of this
product.
Please read and understand it thor-
oughly before using this product,
and keep it nearby after installation for
handy reference.**

Azbil Corporation

NOTICE

Be sure that the user receives this manual before the product is used.

Copying or duplicating this user's manual in part or in whole is forbidden. The information and specifications in this manual are subject to change without notice.

Considerable effort has been made to ensure that this manual is free from inaccuracies and omissions. If you should find an error or omission, please contact the azbil Group.

In no event is Azbil Corporation liable to anyone for any indirect, special or consequential damages as a result of using this product.

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SAFETY PRECAUTIONS

■ About Icons

The safety precautions described in this manual are indicated by various icons. Please be sure you read and understand the icons and their meanings described below before reading the rest of the manual.

Safety precautions are intended to ensure the safe and correct use of this product, to prevent injury to the operator and others, and to prevent damage to property. Be sure to observe these safety precautions.




 **WARNING**

Warnings are indicated when mishandling this product might result in death or serious injury.

 **CAUTION**

Cautions are indicated when mishandling this product might result in minor injury to the user, or only physical damage to the product.

■ Examples

	Use caution when handling the product.
	The indicated action is prohibited.
	Be sure to follow the indicated instructions.

WARNING



Read and understand this User's Manual thoroughly and use this switch in accordance with this manual. Misuse may cause following risks or unsafe conditions:

- Fire
- Electrical shock
- Malfunction of switch
- Malfunction of positive opening operation.



Never attempt to perform wiring or its related work while power is ON to avoid risk of electrical shock or unexpected start-up.

CAUTION



Design and manufacturing of Safety System shall be performed correctly in accordance with the Safety Standard of the country where the equipment is going to be installed or EN60204-1 (IEC60204-1) Safety of Machinery - Electrical Equipment of Machines.



This safety limit switch LJA10 Series comply with EN60947-5-1 Low-voltage Switchgear and Control-gear. Use this switch within the scope of this standard and the product specifications.



Total safety of machine or equipment can not be established by this switch alone, total system including interface circuits, control circuits and application must meet with local safety standard or EN60204-1 (IEC60204-1). Also, total safety of machine or equipment in which this switch is used shall be completely checked by machine/equipment manufacturer and/or end user.



Use BUSSMANN FAST ACTING FUSE KTK-10(10A) or equivalent for short-circuit protection device used with this switch for export to Europe (CE marking). Use FAST ACTING FUSE 10A for export to China (CCC marking). When the fuse becomes open by short-circuit, replace this switch.



This switch shall be used in the circuit having maximum 6000V transient overvoltage.



Be sure to actuate the switch up to the positive opening position to ensure positive opening operation if contact welding occurred.



NC contact of this switch is the contact for Safety with positive opening operation, use NC contact for safety circuit.

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Conventions Used in This Manual

The following conventions are used in this manual:

Handling Precautions

: Handling Precautions indicate items that the user should pay attention to when handling the limit switch.

(1), (2), (3)

: The numbers with the parenthesis indicate steps in a sequence or indicate corresponding parts in an explanation.

Chapter 1. OUTLINE

■ Features

- LJA Series control switches have positive opening operation (NC contact only) approved to EN60947-5-1 and GB14048.5:2001 (electromechanical control circuit equipment) standards, as required when exporting machines to Europe or China.
The LJA Series can be used for any machines to which EN60204-1 and GB/T5226.1-1996 standards are applied.
- Mounting dimensions are compatible with Azbil Corporation LS Series limit switches and also conform to the EN50041 standard.
- The contact arrangement of the internal switch is the “two-circuit double-break” type, the so-called Zb(EN60947-5-1), where the NO contact (“a” contact by JIS) is electrically independent from the NC contact (“b” contact by JIS). Therefore, by means of this one switch, two electric circuits can be controlled. For example, the NC contact can be used for a safety circuit and the NO contact for an auxiliary circuit.

■ Applicable Laws, Regulations and Standards

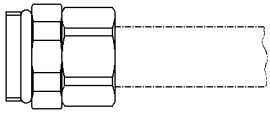
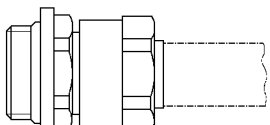
LJA10 Series are based on following standards:

Product certifications	Standard No.	Approval
TÜV	EN60947-5-1	R9551074
CQC	GB14048.5:2001	2003010305083858
UL	UL508	UL Listed/E96090
CSA	CSA22-2	c-UL

■ Model Number

Model number	Type of actuator
LJA10-11A21N	Roller-lever
LJA10-57A21N	Roller-plunger

■ Optional/Maintenance Parts

Parts	Model number
Conduit Sealing Plug	PA-J236
Conduit Sealing Connector (for Cable)	PA1 Series 
Conduit Sealing Connector (for Flexible piping)	PA3 Series 
Roller Lever	LS-6PA64-201

Chapter 2. STRUCTURE

■ Structure of LJA10-11A21N (Roller Lever type)

The force applied from outside the switch is transferred to the actuator lever → shaft → internal plunger → internal switch to switch the electrical circuit.

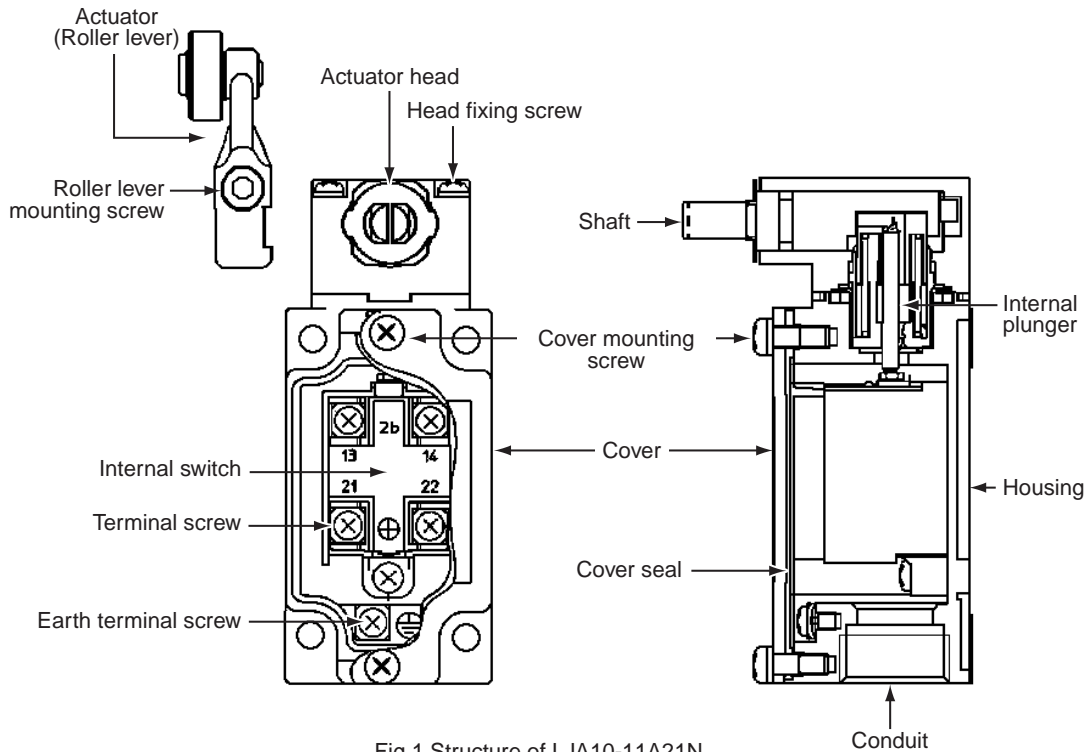


Fig.1 Structure of LJA10-11A21N

■ Structure of LJA10-57A21N (Roller Plunger type)

The force applied from outside the switch is transferred to the actuator plunger → internal plunger → internal switch to switch the electrical circuit.

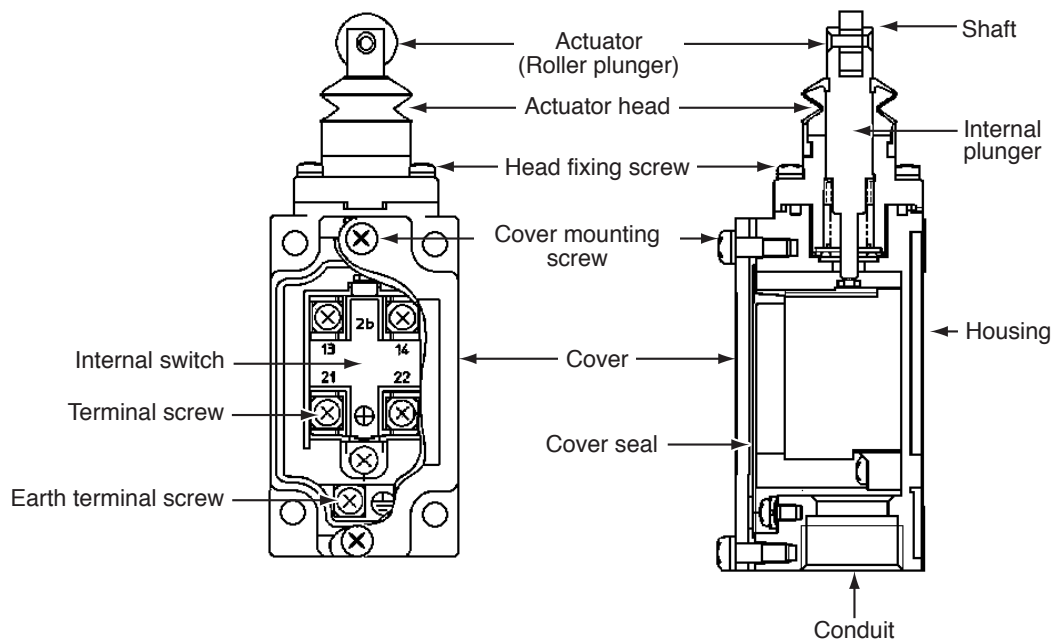


Fig. 2 Structure of LJA10-57A21N

Chapter 3. INSTALLATION

Handling Precautions

- When you leave the switch for a long period on the machine/equipment in process before wiring completed, keep the switch cover assembled and plug conduit by seal plug (PA-J236 - Separate order) to prevent any dust and/or liquid from entering the switch.
- Do not leave or use the switch in an atmosphere containing gases (H₂S, SO₂, Cl₂, etc.) that may adversely affect the contact and/or other materials. Failure to observe this instruction may cause contact failure.
- Do not allow the switch to come into contact with coolant containing chlorine and solvent (benzene, acetone, kerosene alcohol, etc.) that may adversely affect its seals. Failure to observe this instruction may result in malfunction.
- Do not use silicone rubber cable, silicone adhesives or silicone-contained grease. It may cause electrical contact conduction failure.
- Do not step on the switch, place heavy objects on it, or hit it with a hard object. Never apply to the switch lever or plunger a force five times larger than its operation force (OF). Failure to observe this instruction may result in malfunction.
- Switch mounting plate shall be rigid (thickness and shape) and durable to be free from deformation by switch operating force and/or vibration, to ensure stable operation of the switch.
- This switch can accept following mounting dimensions:
 - 30×60 (EN50041)- Refer to page 6, " ■ Mounting (EN50041)" for the detail
 - 30.2×58.2 (compatible with Azbil Corporation LS Series)Applicable mounting screw is M5.
Tighten switch mounting screw (M5) within 5 to 6N·m.

■ Changing Direction of Actuator

● Changing the actuator head direction (LJA10-11A21N)

For application flexibility, actuator head may be positioned in any of four directions.

- (1) Remove head fixing screws (4).
- (2) Place head in the desired position, and assemble four screws.
- (3) Tighten four screws.

! Handling Precautions

When tighten head fixing screws, first lightly tighten screws diagonally referring the illustration below then securely tighten screws in a same way within recommended torque 0.8 to 1.2N·m.

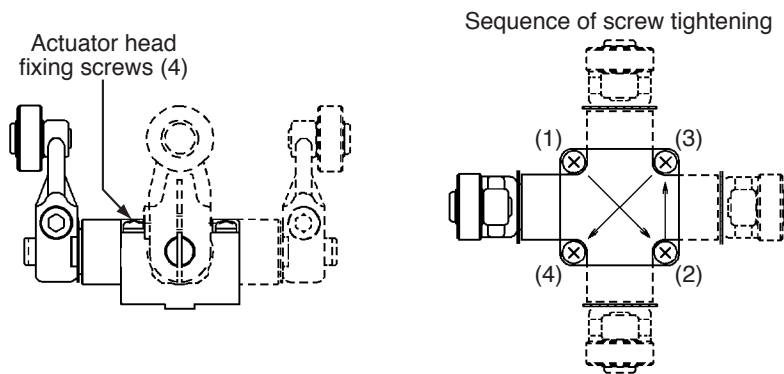


Fig. 3 Changing the actuator head direction (LJA10-11A21N)

● Changing direction of actuation (LJA10-11A21N)

Switch operates in CW and CCW rotation of lever when shipped.

This can be changed CW or CCW rotation only as follows:

- (1) Remove four head fixing screws.
Remove head and turn upside down.
- (2) Push and turn cap CW or CCW.
- (3) When ▲ mark on cap is adjusted to casted “R” Switch operate CW rotation only.
When ▲ mark on cap is adjusted to casted “L”, Switch operate CCW rotation only.
To resume, adjust ▲ mark on cap to casted “RL”.

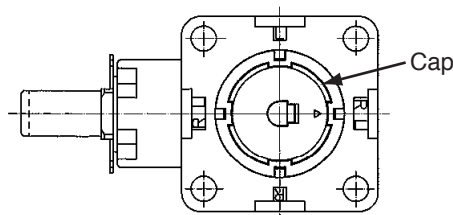


Fig. 4 Changing direction of actuation (LJA10-11A21N)

● Changing the actuator head direction (LJA10-57A21N)

For application flexibility, actuator head may be positioned in any of four directions.

- (1) Remove head fixing screws (4).
- (2) Place head in the desired position, and assemble four screws.
- (3) Tighten four screws.

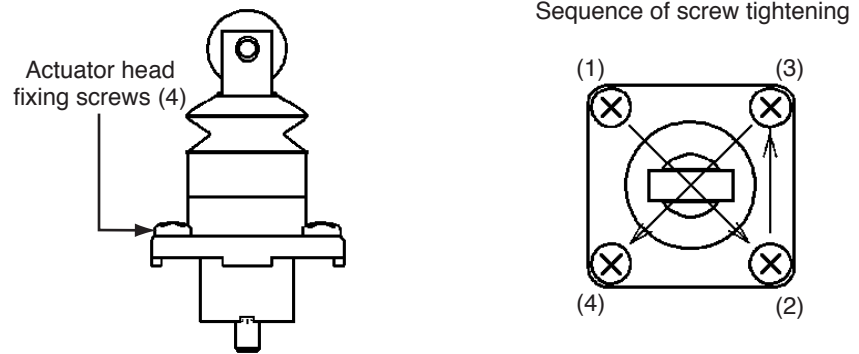


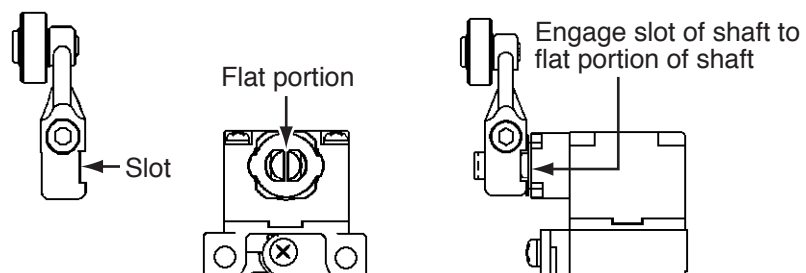
Fig.5 Changing the actuator head direction (LJA10-57A21N)

! Handling Precautions

When tighten head fixing screws, first lightly tighten screws diagonally referring the illustration below then securely tighten screws in a same way within recommended torque 0.8 to 1.2N·m.

■ Roller Lever Mounting

Lever has a slot which is intended to engage to the flat portion of shaft. Therefore lever can be mounted every 90 deg. step. Tighten lever mounting screw within 4 to 5.2N·m.



! Handling Precautions

If the lever and shaft are not correctly engaged and lever mounting screw becomes loose, switch might become malfunction.

■ Position of Dog

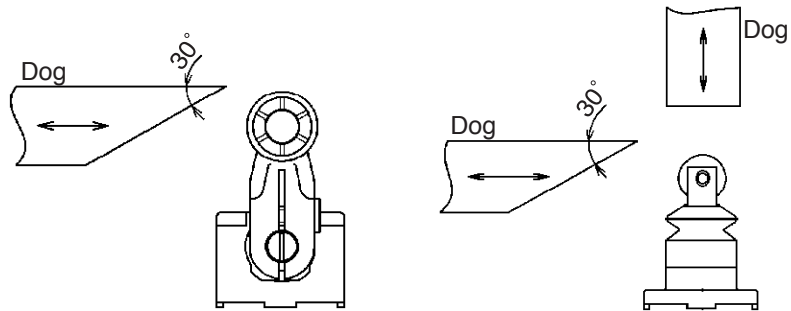


Fig. 7 Position of dog

! Handling Precautions

Dog shall not touch any objects other than roller.

■ Movement and Force after Operation

Actuator must be actuated beyond operating position of positive opening (PO) but within total travel (TT).

Refer to page 9, “■ Adjustment” for each value.

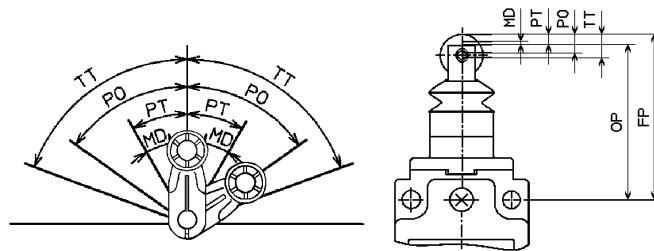


Fig. 8 Movement and force after operation

! Handling Precautions

Never apply to the switch lever or plunger a force five times larger than its operation force (OF).

■ Mounting (EN50041)

● Mounting

Mounting dimensions (30X60) of LJA10 Series comply with EN50041 however 3 places shall be fastened as shown.

! Handling Precautions

Use M5 screws for mounting. Tighten screws within 5 to 6N.m.

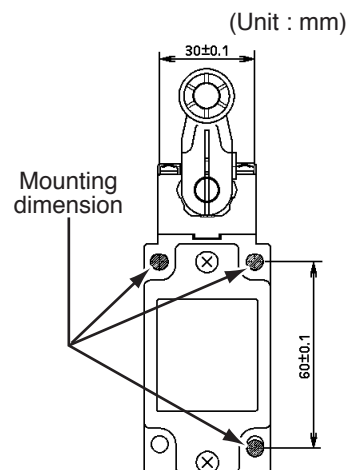


Fig. 9 Mounting (EN50041)

Chapter 4. WIRING

⚠ WARNING



Never attempt to perform wiring or its related work while power is ON to avoid risk of electrical shock or unexpected start-up.

ⓘ Handling Precautions

- Use Azbil Corporation PA1 Series or PA3 Series connector (separate order). After wiring, do not pull the cable with the force exceeding the values shown below.

Model number	Code	Applicable cable O.D. (mm)	Reference holding strength
PA-1* * * *	1	4 to 8	40N (6 mm dia.)
	2	8 to 12	100N (10 mm dia.)
	3	12 to 16	150N (14 mm dia.)
	10	6 to 10	80N (8 mm dia.)
	11	10 to 14	120N (12 mm dia.)

Model number	Reference holding strength
PA3 Series	100N

- Use NC contact for wiring of safety circuit. NC contact is the contact for safety.

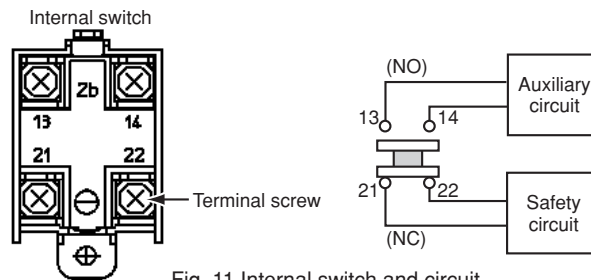


Fig. 11 Internal switch and circuit

■ Wiring Material and Crimp Terminal

ⓘ Handling Precautions

- Select suitable wire or cable for your application (Electrical ratings and temperature ratings).

- Use the following wires:

Cross-sectional area of conductor

• Stranded wire: 0.75 to 2.5mm² (18 to 14AWG)

• Solid wire: 0.75 to 1.5mm² (18 to 16AWG)

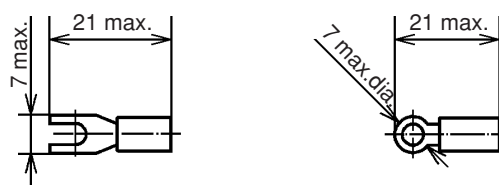
Conductor type

• Copper wire

Maximum number of conductors

• 2 for each terminal

- Use the stranded wire or solid wire as it is, or assemble a round-shape crimp terminal or Y-shape crimp terminal to the end of wire with insulator. Use the round-shape or Y-shape crimp terminal having the dimensions shown below.



(Unit : mm)

Fig. 12 Dimensions of crimp terminal

■ Wiring

Arrange terminals as illustrated.
Tighten terminal screws within 0.6 to 1.0N·m.

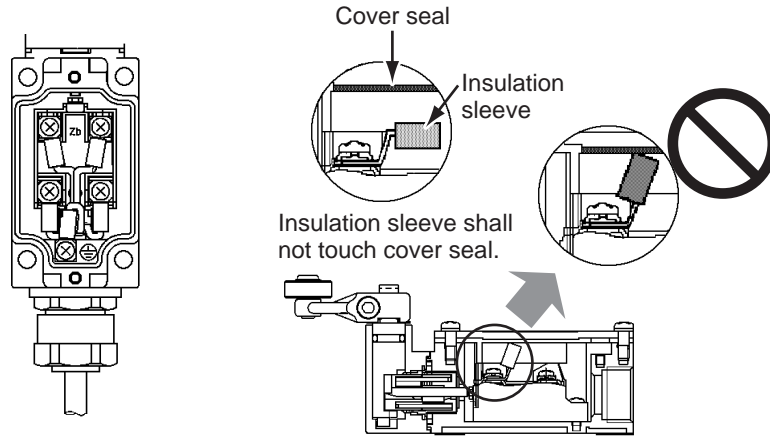


Fig.13 Wiring

! Handling Precautions

Bend terminals as shown not to touch the cover seal.

■ Treatment of Conduit

! Handling Precautions

- Use water tight seal connector which is capable of sealing performance of more than Type6P and IP67 (PA1 Series - separate order).
- Select seal connector which matches to the outer diameter of cable used.
- Nipple shall be tightened within 8 to 12 N·m to the switch housing.
- Seal nut shall be turned until cable is fastened then turned 1.5 to 2 turns further or up to extreme.

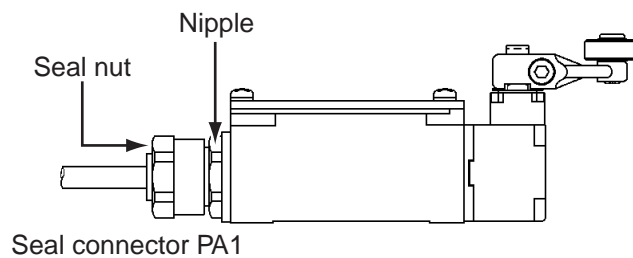


Fig. 14 Treatment of conduit

Chapter 5. ADJUSTMENT PROCEDURE

■ Items to be Checked before Operation

Check these 6 items listed below before operate.

1. Wired correctly.
2. Switch mounting screws, lever mounting screws, cover mounting screws and head fixing screws are not loose.
3. Slot of lever and flat portion of shaft must be engaged.
4. Conduit must be sealed tightly with proper sealing connector or flexible piping.
5. Actuator must be actuated beyond positive opening position, but within the total travel (TT).
6. Actuator shall be free from outer force when returned to the free position.

■ Adjustment

1. Switch operating position shall be adjusted by moving dog or switch mounting plate.
2. Actuator shall be rotated or pushed up to the value shown in the table below.

Model number	Adjustment limit
LJA10-11A21N	55° to 70°
LJA10-57A21N	5.5mm to 6.5mm

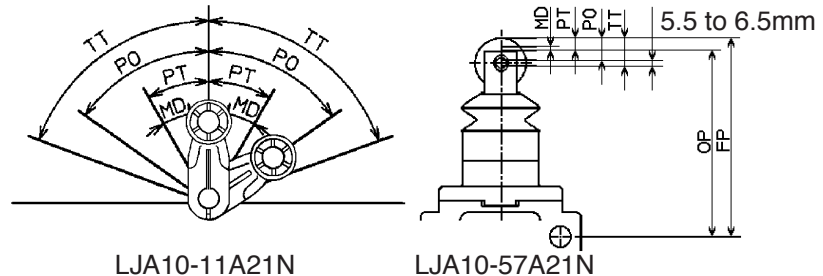


Fig. 15 Adjustment

Adjust position of dog so that the switch lever or plunger is actuated beyond positive opening position but within the total travel (TT).

! Handling Precautions

- If the actuation travel is not enough, positive opening operation may not work properly.
- Never rotate or push the actuator up to its end (stop position). Doing so may cause switch failure.

Chapter 6. MAINTENANCE & INSPECTION

■ Maintenance Checklist of LJA10-11A21N

No.	Inspection point	Inspection item	Inspection method	Maintenance method	Inspection cycle
1	Roller lever	<ul style="list-style-type: none"> Operating position Switch dislodged Loose mounting screws Roller rotation Roller abrasion 	<ul style="list-style-type: none"> Visually check for loose lever mounting screws, improper roller rotation or other problems or damage. 	<ul style="list-style-type: none"> Re-tighten mounting screws within 4 to 5.2N·m. If other defects are found, replace the lever. 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
2	Actuator head	<ul style="list-style-type: none"> Loose head fixing screws Damage to the exterior Deformation of shaft 	<ul style="list-style-type: none"> Visually check for loose head fixing screws. Check that the exterior of the head is not damaged. 	<ul style="list-style-type: none"> Re-tighten head fixing screw within 0.8 to 1.2N·m. If other defects are found, replace the limit switch. 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
3	Cover	Seal failure	<ul style="list-style-type: none"> Visually check for loose mounting screws (2). Check that the exterior of the cover is not damaged. 	<ul style="list-style-type: none"> Re-tighten cover mounting screw within 1.3 to 1.7N·m. If other defects are found, replace the limit switch. 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
4	Housing	<ul style="list-style-type: none"> Seal failure Loose mounting screws 	<ul style="list-style-type: none"> Visually check for loose mounting screws. Check that the exterior of the cover is not damaged. 	<ul style="list-style-type: none"> Re-tighten mounting screws. Replace the limit switch. 	Every 2 years
5	Internal switch (remove cover)	Operation failure	Visually check internal switch for normal operation	Replace the limit switch	Every 2 years
		Unstable contact continuity or condition	Check the electrical continuity of all the terminals using the circuit tester.	Replace the limit switch	Every 2 years
		Insulation failure	Check that each terminals properly insulated using the insulation resistance tester.	Replace the limit switch	Every 2 years
		Terminal screws	Check for loose terminal screws, any potentially serious cracking, rust, etc.	Re-tighten mounting screws within 0.6 to 1.0N·m.	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
6	Seal connector	Loose connector	Check for loose connector.	<ul style="list-style-type: none"> Re-tighten mounting screw Refer to page 8, "■ Treatment" of conduit 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
7	Operation	Switching operation	Manually check for smooth lever movement and ON/OFF of internal switch.	Replace the limit switch	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
		Lever angle	Check lever angle when actuated for 55 to 70° rotation.	Re-adjust dog position	Every 2 years

Note: Any assembled component can not be replaced, other than Roller lever.
Replace complete switch if required.

■ Maintenance Checklist of LJA10-57A21N

No.	Inspection point	Inspection item	Inspection method	Maintenance method	Inspection cycle
1	Actuator head	<ul style="list-style-type: none"> Loose head fixing screws Damage to the exterior Deformation of shaft Roller rotation Roller abrasion 	<ul style="list-style-type: none"> Visually check for loose head fixing screws. Check that the exterior of the head is not damaged. Check for improper roller rotation or other problems or damage. 	<ul style="list-style-type: none"> Re-tighten head fixing screw within 0.8 to 1.2 N-m. If other defects are found, replace the limit switch. 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
2	Cover	<ul style="list-style-type: none"> Seal failure Damage to the exterior 	<ul style="list-style-type: none"> Visually check for loose mounting screws(2). Check that the exterior of the cover is not damaged. 	<ul style="list-style-type: none"> Re-tighten cover mounting screw within 1.3 to 1.7 N-m. If other defects are found, replace the limit switch. 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
3	Housing	<ul style="list-style-type: none"> Seal failure Loose mounting screws 	<ul style="list-style-type: none"> Visually check that the exterior of the cover is not damaged. 	Replace the limit switch	Every 2 years
4	Internal switch (remove cover)	Operation failure	Visually check internal switch for normal operation	Replace the limit switch	Every 2 years
		Unstable contact continuity or condition	Check the electrical continuity of all the terminals using the circuit tester.	Replace the limit switch	Every 2 years
		Insulation failure	Check that each terminals properly insulated using the insulation resistance tester.	Replace the limit switch	Every 2 years
		Terminal screws	Check for loose terminal screws, any potentially serious cracking, rust, etc.	Re-tighten mounting screws within 0.6 to 1.0 N-m.	<ul style="list-style-type: none"> Retighten screws within the correct torque whenever necessary. At least every 6 months for other items.
5	Seal connector	Loose connector	Check for loose connector.	<ul style="list-style-type: none"> Re-tighten mounting screw Refer to page 8, "■ Treatment" of conduit 	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
6	Operation	Switching operation	Manually check for smooth lever movement and ON/OFF of internal switch.	Replace the limit switch	<ul style="list-style-type: none"> Re-tighten screws within the correct torque whenever necessary. At least every 6 months for other items.
		Lever angle	--	Re-adjust dog position	Every 2 years

Note: Any assembled component can not be replaced, other than Roller lever.
Replace complete switch if required.

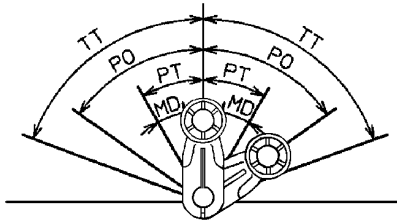
Chapter 7. SPECIFICATION

■ Specification

Section	Item	Specification
Standard	Conformed standards	JIS C 4508 IEC60947-5-1 EN50041
	Approved standards	EN60947-5-1 (TÜV) GB14048.5:2001(CQC) UL CSA
Structure	Type of contact	Zb (EN60947-5-1)
	Shape of contacts	Rivet
	Shape of terminals	Screw type
	Protection class	IP67 (IEC 60529)
	Pollution degree	3 (EN60947-5-1)
	EN60947-5-1	Control switch with positive opening operation (NC contact only)
	Electrical characteristics	
(1) General characteristics	Dielectric strength (50 to 60Hz, for 1 minute)	
	• Between unconnected terminals	2100Vac
	• Between each terminal and non-live metal part	5300Vac
• Between each terminal and ground	5300Vac	
• Between terminals of different polarities	5300Vac	
Insulated resistance	100MΩ min.	
Initial contact resistance	25mΩ max.	
Minimum operating contact current	24V-10mA, 12V-20mA	
(2) EN60947-5-1 IEC60947-5-1 GB14048.5:2001 Related characteristics	Rated operating voltage	400Vac, 250Vdc
	Conventional free air thermal current (I _{th})	10A
	Rated frequency	45 to 65Hz, or DC
	Rated insulation voltage (U _i)	500Vac, 275Vdc
	Rated impulse withstand voltage	Between each terminal and non-live metal part : 6000V Between nuconnected terminals : 7400V
	Short-circuit protective device	TÜV : FAST ACTING FUSE 10A BUSSMANN FAST ACTING FUSE KTK-10(10A) or equivalent CQC : FAST ACTING FUSE 10A
	Rated conditional short-circuit current	1000A (at coil load)
	Switching over voltage	Category 3 (IEC60204-1)
	Protection class (IEC60536)	Class 1
Mechanical characteristics	Actuator strength	Roller lever type 49N Roller actuator type 93N
	Terminal strength	1.0 N·m
	Shock durability	300 m/s ²
	Vibration durability (continuous 2 hours)	1.5mm, 10 to 55Hz
	Allowable operating speed	1mm/s to 0.5m/s
	Mechanical operating speed	120 cycles/min max.
	Cross-sectional area of conductor	Stranded 0.75 to 2.5mm ² (18 to 14AWG) Solid 0.75 to 1.5mm ² (18 to 16AWG)
	Maximum number of conductors	2 (for each terminal)
Life	Mechanical life	Roller lever type 15000000 cycles or more Roller plunger type 5000000 cycles or more
	Electrical life	100000 cycles or more at rated load 20 cycles/min
Environmental characteristics Recommended tightening torque	Operating temperature	-25°C to +70°C at no freezing
	Operating humidity	98% RH max.
	Switch mounting screws	5 to 6 N·m (M5)
	Roller lever mounting screws	4 to 5.2 N·m (M5)
	Terminal screws	0.6 to 1.0 N·m (M3)
	Cover mounting screws	1.3 to 1.7 N·m (M4)
	Head fixing screws	0.8 to 1.2 N·m (M3.5)

■ LJA10-11A21N

● Operating characteristics

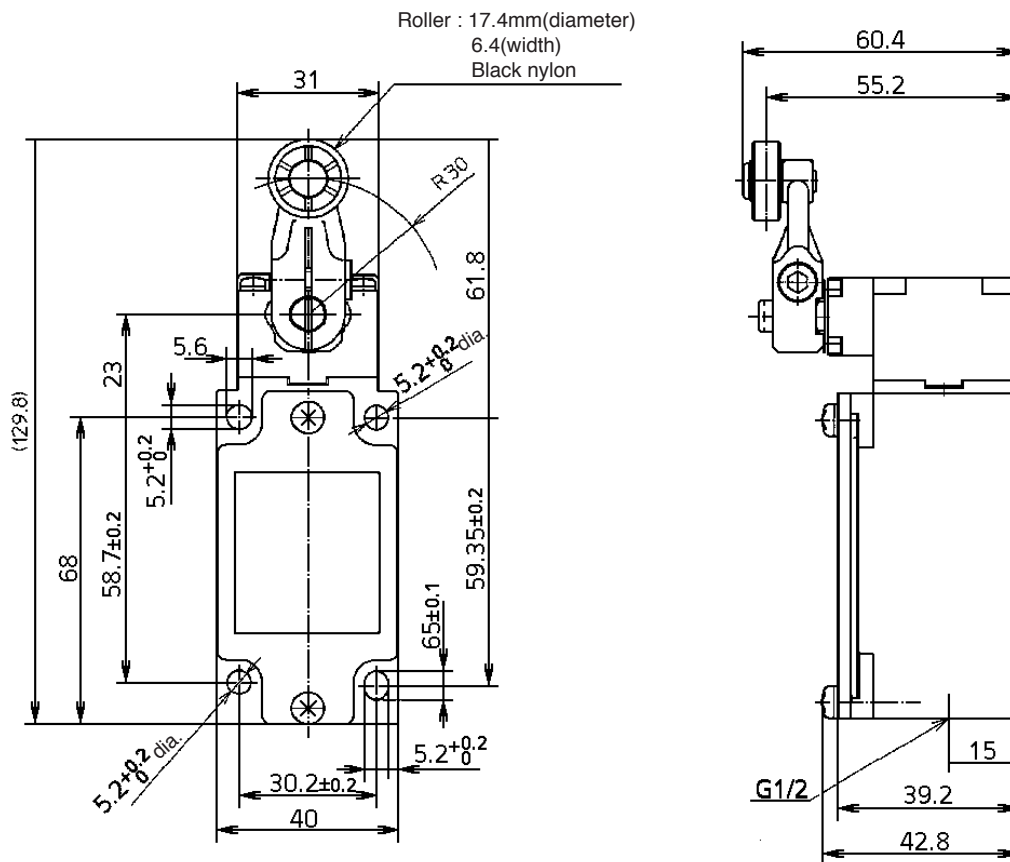


Item	Value
OF : Minimum force to operate	11.8N
RF : Maximum force of return	0.5N
PT : Minimum angle to operating position	25°
MD : Minimum angle between operating position and return position	13°
TT : Total operating angle of lever	70°
PO : Minimum angle to positive opening position	55°
POF : Minimum force of positive opening	12.7 N
OT : Maximum angle after operating	45°
RT : Maximum angle from return position to free position	--
TTF : Minimum force at total operating position	--

Operating characteristics shown above are based on EN60947-5-1.

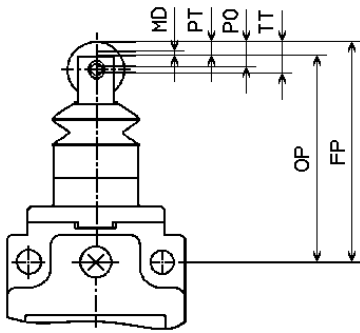
● Outward drawing

(Unit : mm)



■ LJA10-57A21N

● Operating characteristics

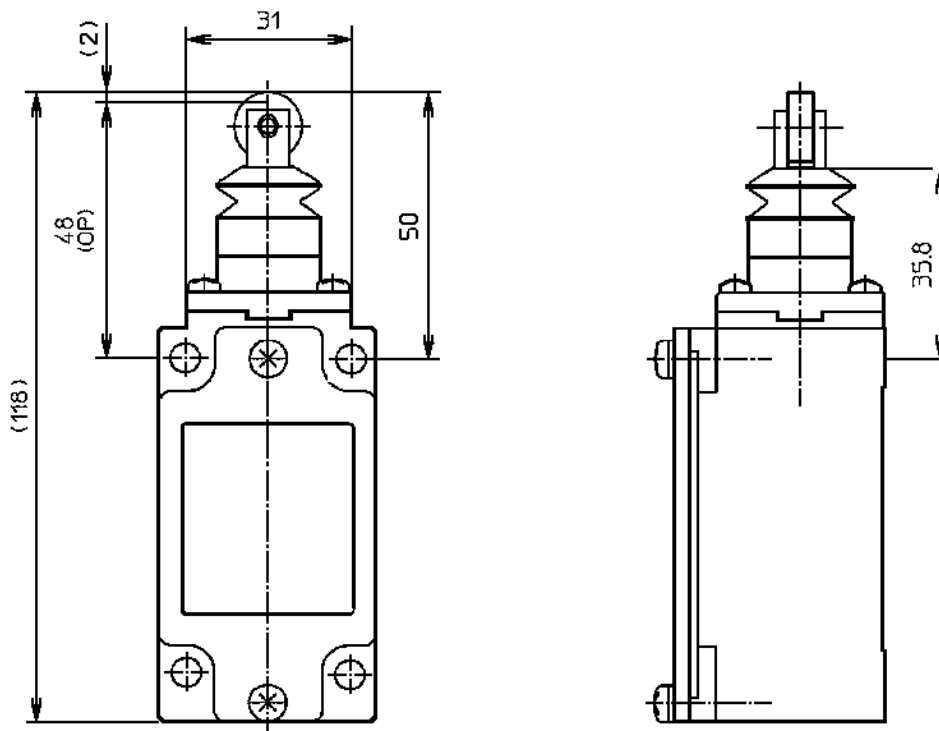


Item	Value
OF : Minimum force to operate	18.6N
RF : Maximum force of return	2.0N
FP : Free position	51mm
OP : Position of operating	48 ± 1mm
PT : Minimum travel to operating position	3mm
MD : Minimum travel between operating position and return position	1.3mm
TT : Total operating travel of lever	6.5mm
PO : Minimum travel to positive opening position	5.5mm
POF : Minimum force of positive opening	27N
OT : Maximum travel after operating	4.5mm
RT : Maximum travel from return position to free position	--
TTF : Minimum force at total operating position	--

Operating characteristics shown above are based on EN60947-5-1.

● Outward drawing

(Unit : mm)



GLOSSARY

EN60947-5-1 related

Rated insulation voltage (U_i)

The rated insulation voltage of an equipment is the value of voltage to which dielectric tests and creepage distance are referred.

Rated impulse withstand voltage (U_{imp})

The peak value of an impulse withstand voltage of prescribed form and polarity which the equipment's capable of withstanding without failure under specified conditions of test and to which the value of clearances are referred.

The rated impulse withstand voltage of an equipment (Limit switch, etc.) shall be equal to or higher than the value of the transient overvoltages occurring in the circuit in which the equipment is fitted.

LJA10 Series have a capability of 6000V impulse withstand voltage, therefore use this switch in a circuit having less than 6000v transient overvoltage.

Conventional free air thermal current (I_{th})

The conventional free air thermal current is the maximum value of test current to be used for temperature-rise tests of unenclosed equipment in free air.

AC-15

AC-15 is a one of Utilization categories. The equipment rated to AC-15 is capable to control electromagnetic load of more than 72VA.

DC-13

DC-15 is a one of Utilization categories.

The equipment rated to DC-13 is capable to control electromagnet.

Short-circuit protective device

Short-circuit protective device is the device to be used with the equipment (Limit switch, etc.)

Use BUSSMANN FAST ACTING FUSE KTK-10(10A) or equivalent for short-circuit protection device used with this switch for export to Europe (CE marking). Use FAST ACTING FUSE 10A for export to China (CCC marking).

Rated conditional short-circuit current

The rated conditional short-circuit current of an equipment -which protected by a short-circuit protective device- is the value of current, the equipment can withstand the short-circuit tests.

Switching overvoltages

Switching overvoltage of an equipment is the maximum transient voltage value generated during making-breaking tests. Switching overvoltages of LJA10 Series belong to Category 3.

Pollution degree

Pollution degree is a conventional number based on the amount of conductive dust, etc. relating to reduction in dielectric strength and/or surface resistivity. Pollution degree 3 means presence of conductive pollution.

Control switch with positive opening operation

A control switch having one or more break contact elements directly coupled to the switch actuator so that full opening of break-contact(s) is obtained when the actuator is moved through the positive opening travel.

Therefore break contact of this type of switch is positively separated when contact welding occurred.

 marking represents the CONTROL SWITCH WITH POSITIVE OPENING OPERATION.

IEC60536 related

Protection class against electrical shock

The class number represents means of protection against electrical shock.

Class I equipment:

Equipment in which protection against electrical shock does not rely on basic insulation only but which includes additional safety precautions such as provision of earth terminal are provided.

LJA10 Series is eligible for Class I equipment.

MEMO

MEMO

Revision History

Printed Date	Manual Number	Edition	Revised pages	Description
Mar. 2001	CP-SP-1104E	1st Edition		
Apr. 2001		2nd Edition	14	LJA10-11A21N-->LJA10-57A21N
Sep. 2004		3rd Edition	Inside of cover ii 1 7 12 15 16	RESTRICTIONS ON USE: Changed. CAUTION: Description of the 4th item changed. ■ Features: Description changed. ■ Applicable Laws, Regulations and Standards: CQC added. ■ Wiring Material and Crimp Terminal: Handling precaution changed. Chanced due to addition of CQC. Short-circuit protective device: IEC536 related description changed. IEC536 related: Changed.
Dec. 2005		4th Edition	8	■ Treatment of Conduit: changed description of the 1st item of Handling Precautions.
Mar. 2008		5th Edition	i	SAFETY PRECAUTIONS changed.
Apr. 2012		6th Edition		Company name changed.

Terms and Conditions

We would like to express our appreciation for your purchase and use of Azbil Corporation's products.

You are required to acknowledge and agree upon the following terms and conditions for your purchase of Azbil Corporation's products (field instruments, control valves, and control products), unless otherwise stated in any separate document, including, without limitation, estimation sheets, written agreements, catalogs, specifications and instruction manuals.

1. Warranty period and warranty scope

1.1 Warranty period

Azbil Corporation's products shall be warranted for one (1) year from the date of your purchase of the said products or the delivery of the said products to a place designated by you.

1.2 Warranty scope

In the event that Azbil Corporation's products has any failure attributable to azbil during the aforementioned warranty period, azbil shall, without charge, deliver a replacement for the said product to the place where you purchased, or repair the said product and deliver it to the aforementioned place.

Notwithstanding the foregoing, any failure falling under one of the following shall not be covered under this warranty:

- (1) Failure caused by your improper use of Azbil Corporation's products (noncompliance with conditions, environment of use, precautions, etc. set forth in catalogs, specifications, instruction manuals, etc.);
- (2) Failure caused for other reasons than Azbil Corporation's products;
- (3) Failure caused by any modification or repair made by any person other than azbil or azbil's subcontractors;
- (4) Failure caused by your use of Azbil Corporation's products in a manner not conforming to the intended usage of that product;
- (5) Failure that the state-of-the-art at the time of Azbil Corporation's shipment did not allow us to predict; or
- (6) Failure that arose from any reason not attributable to Azbil Corporation, including, without limitation, acts of God, disasters, and actions taken by a third party.

Please note that the term "warranty" as used herein refers to equipment-only-warranty, and Azbil Corporation shall not be liable for any damages, including direct, indirect, special, incidental or consequential damages in connection with or arising out of Azbil Corporation's products.

2. Ascertainment of suitability

You are required to ascertain the suitability of Azbil Corporation's products in case of your use of the same with your machinery, equipment, etc. (hereinafter referred to as "Equipment") on your own responsibility, taking the following matters into consideration:

- (1) Regulations and standards or laws that your Equipment is to comply with.
- (2) Examples of application described in any documents provided by Azbil Corporation are for your reference purpose only, and you are required to check the functions and safety of your Equipment prior to your use.
- (3) Measures to be taken to secure the required level of the reliability and safety of your Equipment in your use. Although Azbil Corporation is constantly making efforts to improve the quality and reliability of Azbil Corporation's products, there exists a possibility that parts and machinery may break down. You are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design, safety design, or the like so that the said Equipment may satisfy the level of the reliability and safety required in your use, whereby preventing any occurrence of physical injuries, fires, significant damage, and so forth.

3. Precautions and restrictions on application

Azbil Corporation's products other than those explicitly specified as applicable (e.g. azbil Limit Switch For Nuclear Energy) shall not be used in a nuclear energy controlled area (radiation controlled area). Any Azbil Corporation's products shall not be used for/with medical equipment.

In addition,

you are required to conduct a consultation with our sales representative and understand detail specifications, cautions for operation, and so forth by reference to catalogs, specifications, instruction manual, etc. in case that you intend to use Azbil Corporation's products for any purposes specified in (1) through (6) below.

Moreover, you are required to provide your Equipment with fool-proof design, fail-safe design, anti-flame propagation design and other designs of protection/safety circuit on your own responsibility to ensure the reliability and safety, whereby preventing problems caused by failure or nonconformity.

- (1) For use under such conditions or in such environments as not stated in technical documents, including catalogs, specification, and instruction manuals
- (2) For use of specific purposes, such as:
 - * Nuclear energy/radiation related facilities
[For use outside nuclear energy controlled areas] [For use of Azbil Corporation's Limit Switch For Nuclear Energy]
 - * Machinery or equipment for space/sea bottom
 - * Transportation equipment
[Railway, aircraft, vessels, vehicle equipment, etc.]
 - * Antidisaster/crime-prevention equipment
 - * Burning appliances
 - * Electrothermal equipment
 - * Amusement facilities
- (3) Supply systems such as electricity/gas/water supply systems, large-scale communication systems, and traffic/air traffic control systems requiring high reliability
- (4) Facilities that are to comply with regulations of governmental/public agencies or specific industries
- (5) Machinery or equipment that may affect human lives, human bodies or properties
- (6) Other machinery or equipment equivalent to those set forth in items (1) to (5) above which require high reliability and safety

4. Precautions against long-term use

Use of Azbil Corporation's products, including switches, which contain electronic components, over a prolonged period may degrade insulation or increase contact-resistance and may result in heat generation or any other similar problem causing such product or switch to develop safety hazards such as smoking, ignition, and electrification.

Although acceleration of the above situation varies depending on the conditions or environment of use of the products, you are required not to use any Azbil Corporation's products for a period exceeding ten (10) years unless otherwise stated in specifications or instruction manuals.

5. Recommendation for renewal

Mechanical components, such as relays and switches, used for Azbil Corporation's products will reach the end of their life due to wear by repetitious open/close operations.

In addition, electronic components such as electrolytic capacitors will reach the end of their life due to aged deterioration based on the conditions or environment in which such electronic components are used. Although acceleration of the above situation varies depending on the conditions or environment of use, the number of open/close operations of relays, etc.

as prescribed in specifications or instruction manuals, or depending on the design margin of your machine or equipment, you are required to renew any Azbil Corporation's products every 5 to 10 years unless otherwise specified in specifications or instruction manuals.

Field instruments (sensors such as pressure/flow/level sensors, regulating valves, etc.) will reach the end of their life due to aged deterioration of parts.

For those parts that will reach the end of their life due to aged deterioration, recommended replacement cycles are prescribed. You are required to replace parts based on such recommended replacement cycles.

6. Other precautions

Prior to your use of Azbil Corporation's products, you are required to understand and comply with specifications (e.g., conditions and environment of use), precautions, warnings/cautions/notices as set forth in the technical documents prepared for individual Azbil Corporation's products, such as catalogs, specifications, and instruction manuals to ensure the quality, reliability, and safety of those products.

7. Changes to specifications

Please note that the descriptions contained in any documents provided by Azbil Corporation are subject to change without notice for improvement or for any other reason.

For inquires or information on specifications as you may need to check, please contact our branch offices or sales offices, or your local sales agents.

8. Discontinuance of the supply of products/parts

Please note that the production of any Azbil Corporation's products may be discontinued without notice.

For repairable products, we will, in principle, undertake repairs for five (5) years after the discontinuance of those products. In some cases, however, we cannot undertake such repairs for reasons, such as the absence of repair parts.

For field instruments, we may not be able to undertake parts replacement for similar reasons.

azbil

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Specifications are subject to change without notice. (09)

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