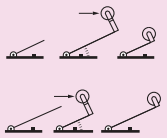
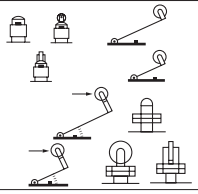
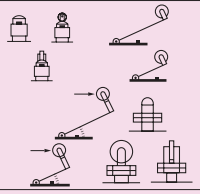
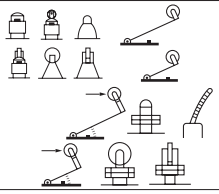
Limit Switches Selection Guide

Classification			Subminiature size (Horizontal)		Compact size (Horizontal)				
Product name			SL (AZ3) Micro Limit Switches		HL (AZH) Limit Switches (Die cast case)	HL (AZH) Limit Switches (Die cast case)	HL (AZH) Limit Switches (Plastic case)		
Appearance									
Part No. (initial)			AZ3		AZH20, 22	AZH23	AZH10, 12		
Features			· A limit switch with high-density mounting that improves stroke capacity through an O.T. absorption-type spring · LED lamp type also available		· High sealability that satisfies IEC IP67 · Wiring is screw-terminal type · Bifurcated type also available	· High sealability that satisfies IEC IP67 · Less wiring, less installation connector type · LED lamp type also available	· Bifurcated type available · Perfect for applications that prioritize economy		
Protective construction	Dust-proof type	IP60	Rubber-cover type ○	Socket with cord type ○	○	○	○		
	Abrasion-proof type	IP64	—	○	○	○	○		
	Surge-proof type	IP65	—	—	○	○	—		
	Corrosion-proof type	IP67	—	—	○	○	—		
	Oil-resistant type	—	—	○	○	○	○		
With lamps	Neon		—	—	—	—	—		
	LED		—	○	—	○	—		
Ratings (load resistance)			4 A 250 V AC 4 A 125 V AC 4 A 30 V DC 0.1 A 125 V DC		(Standard type) 5 A 125 V AC 5 A 250 V AC 5 A 8 V DC 5 A 14 V DC 5 A 30 V DC 0.5 A 125 V DC 0.25 A 250 V DC (Bifurcated type) 0.1 A 125 V AC 0.1 A 8 V DC 0.1 A 14 V DC 0.1 A 30 V DC	(Bifurcated type) without LED lamps 0.1 A 125 V AC 0.1 A 8 V DC 0.1 A 14 V DC 0.1 A 30 V DC with LED lamps 0.1 A 24 V DC	(Standard type) 5 A 125 V AC 5 A 250 V AC 5 A 8 V DC 5 A 14 V DC 5 A 30 V DC 0.5 A 125 V DC 0.25 A 250 V DC (Bifurcated type) 0.1 A 125 V AC 0.1 A 8 V DC 0.1 A 14 V DC 0.1 A 30 V DC		
Life (ope.)	Mechanical		Min. 10^7		Min. 10^7	Min. 10^7	Min. 10^7		
	Electrical		Min. 10^5		Min. 10^5	Min. 10^5	Min. 10^5		
Operating force			1.18 N {120 gf} max. 1.96 N {200 gf} max. (short lever type) 2.94 N {300 gf} max.		2.45 N {250 gf} max. 3.92 N {400 gf} max. 11.8 N {1,200 gf} max. (Plunger type)	2.45 N {250 gf} max. 3.92 N {400 gf} max. 11.8 N {1,200 gf} max. (Plunger type)	2.45 N {250 gf} max. 3.92 N {400 gf} max.		
Available actuators									
Terminals			• Rubber cover [Solder and quick connect (#110) terminal] • Socket with cord		Screw terminal	Connector terminal	Screw terminal		
Wiring			Cabtire code		Cabtire code	Cabtire code	Cabtire code		
Mounting pitch (Applicable screw)			Cross-angled wiring 28 × 14 mm 1.102 × 0.551 in (M4)		33 mm 1.299 in (M4)	33 mm 1.299 in (M4)	33 mm 1.299 in (M4)		
Available standards			UL, C-UL		UL, CSA, TÜV, CE	UL, CSA, TÜV, CE	UL, CSA, TÜV, CE		
Page			P.1295~		P.1297~	P.1297~	P.1297~		

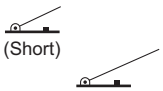
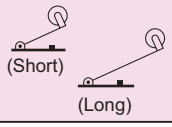
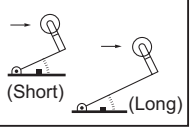
○: Available —: Not available

Notes: 1) Excludes limit switch replacement parts
2) Excludes exposed part of terminals, externally mounted components, and magnet catches.
3) Figures in parentheses ( ) indicate rated current of water-resistant type.

■ Actuators

Push plunger	Roller plunger	Cross-roller plunger	Roller arm	Adjustable roller arm	Adjustable rod
					

	Compact size vertical type		Door switch	
	QL (AZ4) Micro Limit Switches		Compact Magnelimit	Magnelimit
				
	AZ4		AZC3	AZC1
	• A subminiature, highly accurate limit switch with built-in environment-proof functions • Cord extraction can be changed in four directions, due to the dedicated L socket • LED lamp can also be attached		• Built-in switch detection Dual-role switch in one unit • Safe design prevents operator making errors	• Built-in switch detection Dual-role switch in one unit • Construction possible with 100V AC power
	L socket type ○	Socket with cord type ○	———	———
	○	○	———	———
	○	———	———	———
	———	———	(Note 2) ○	———
	○	○	———	———
	———	———	———	———
	———	○	———	———
	5 A 250 V AC		(Note 3) 5 A (2 A) 125 V AC 5 A (2 A) 250 V AC 5 A (2 A) 30 V DC	5 A 125 V AC 5 A 250 V AC 5 A 30 V DC
	Min. 10^7		Min. 10^5	Min. 10^5
	Min. 3×10^5		Min. 5×10^4	Min. 5×10^4
	6.86 N {700 gf} max. (Plunger type) 1.11 N {113 gf}, 4.41 N {450 gf} max. (Arm type)		———	3.43 N {350 gf} max.
			———	———
	• L socket [Solder and tab (#110) terminal] • Socket with code		Tab #110 terminal Lead wire	Screw terminal
	Cabtire code		Cabtire cord	Cabtire cord
	14 × 28 mm 0.551 × 1.102 in (M4)		30 mm 1.181 in (M3)	52 mm 2.047 in (M4)
	UL, CSA		UL, C-UL	UL, C-UL, CE
	P.1299~		P.1301	P.1302

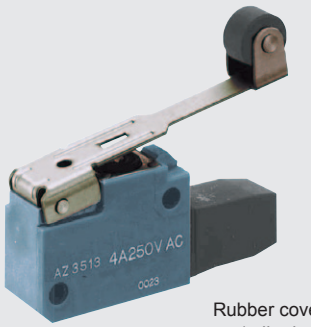
	Flexible rod	Hinge lever	Roller lever	One-way roller lever
				

Subminiature Size Horizontal Type

SL (AZ3) Micro Limit Switch

RoHS compliance

Related Information ■Precautions in using ..... P.1303~



Rubber cover type
(roller lever)

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Features

- Subminiature limit switch
- A light force commensurate to the microswitch.
- Achieves stroke tolerance (O.T./T.T.) of 0.67
- Long life (electrical life: 10^5, mechanical life: 10^7)
- Built-in safety features and excellent environment proofing

Typical applications

- Food processing
- Spinning
- Assembly lines, etc.

Subminiature size horizontal Micro Limit Switches

PRODUCT TYPE

Switch body

Actuator	Operating Force (O.F.)	Exposed terminal type	Rubber cover type	Socket with cord type*
		Part No.	Part No.	Part No.
Hinge lever	1.18 N {120 gf}	**AZ3012**	**AZ3512**	**AZ3712**
	1.96 N {200 gf}	**AZ3022**	**AZ3522**	**AZ3722**
Roller lever	1.18 N {120 gf}	**AZ3013**	**AZ3513**	**AZ3713**
	1.96 N {200 gf}	**AZ3023**	**AZ3523**	**AZ3723**
One-way roller lever	1.96 N {200 gf}	**AZ3024**	**AZ3524**	**AZ3724**
Hinge short lever	2.94 N {300 gf}	**AZ3025**	**AZ3525**	**AZ3725**
Short roller lever	2.94 N {300 gf}	**AZ3026**	**AZ3526**	**AZ3726**
One-way short roller lever	2.94 N {300 gf}	**AZ3027**	**AZ3527**	**AZ3727**

*Socket with cord type is combination of;

Socket with cord type = Exposed terminal type + Socket with cord (cord length: 1 m 3.281 ft)

Note: Foreign standards type are also available. When ordering, add suffix "**9**" to part No.. ex) **AZ3012<u>9</u>**

Sockets (Used in combination with the exposed terminal type)

Product name	Specifications	Part No.
L socket	The roller can be attached in any of four directions.	**AZ3806**
Socket with cord	Cord length 1 m 3.281 ft	**AZ3807**
	Cord length 2 m 6.562 ft	**AZ3827**
	Cord length 3 m 9.843 ft	**AZ3837**
	Cord length 5 m 16.405 ft	**AZ3857**

Socket with LED (with exposed terminal type)

Product name	Lamp connection	Lamp rating	Part No.
Socket with LED lamp for QL and SL switches (cord length: 1 m 3.281 ft)	Normally open (N.O.) connection	6 V DC	**AZ3807162**
		12 V DC	**AZ3807161**
		24 to 48 V DC	**AZ380716**
	Normally closed (N.C.) connection	6 V DC	**AZ3807362**
		12 V DC	**AZ3807361**
		24 to 48 V DC	**AZ380736**

Notes: 1) Types with 24 to 48 V DC lamp rating are recommended for PC input use.
2) The following cord lengths are also available and lot-produced upon request.

Cord length	Part No.
2 m 6.562 ft	**AZ38 2 7*6***
3 m 9.843 ft	**AZ38 3 7*6***
5 m 16.405 ft	**AZ38 5 7*6***

The 3rd digit (boxed) of part number denotes the length of cord.
Numerals come in the asterisked (*) digits, which show the lamp specifications.

The 5th digit / The 7th digit: 1: N.O. connection, 3: N.C. connection; None: 24 to 48 V DC, 1: 12 V DC, 2: 6 V DC

CONNECTION METHOD FOR RUBBER COVER

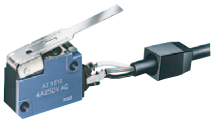
1) Remove the rubber cover from the limit switch.

2) After stripping the sheath from the appropriate cord (refer to the following table) and removing the covering of the lead wires, insert the cord into the rubber cover.

· Table of applicable code

Wire name	Applicable wire		
	Conductor	Wire strand	Finished outside diameter
Vinyl cabtire cord (VCTF)(JIS C3306)	0.75 mm^2	2-wire	ø6.6 mm ø0.260 in
	1.12 × 10^{-3} in^2	3-wire	ø7.0 mm ø0.276 in

3) Connect lead wire to the receptacle terminals (#110) with insulating sleeve provided and insert it into the terminal of limt switch. (The lead wire can directly be soldered to the terminals without using receptacle terminals)



4) Push the rubber cover securely over the terminals.

CAUTIONS FOR USE

Ambient conditions

- The use of these switches under the following conditions should be avoided.
  If the following conditions should become necessary, we recommend consulting us first.
  - Use where there will be direct contact with organic solvents, strong acids or alkalis, or direct exposure to their vapors.
  - Use where inflammable or corrosive gases exist.
  - Because these switches are not of water resistant or immersion-proof construction, their use in water or oil should be avoided. Also, locations where water or oil can normally impringe upon the switch or where there is an excessive accumulation of dust should be avoided.
- To improve reliability during actual use, it is recommended that the operation be checked under installation conditions.
- If O.T. is too big, the life of limit switch will be shortened switching friction.
  Use it with enough margin of O.T. 70 % of O.T. standard value will be good for use.
- Do not use the switch in a silicon atmosphere. Case should be taken where organic silicon rubber, adhesive, sealing material, oil, grease or lead wire generates silicon.
- Avoid use in excessively dusty environments where actuator operation would be hindered.
- This is designed to use inside. When used outdoors (in places where there is exposure to direct sunlight or rain such as in multistory car parks) or in environments where ozone is generated, the influence of these environments cause deterioration of the rubber material and damage for the products.
- Do not change the operating position by bending the actuator.

Mounting and wiring

- Although SL limit switches have large over-travel (O.T.), excessive O.T. will occur wear and change in its characteristics.
  Specifically, where there is a need for long life, it is recommended that the proper O.T. as given below should be used.
  - Within 1 to 3 mm 0.039 to 0.118 in
- When the operating object is in the free condition, force should not be applied directly to the actuator.
- Use their own accessories when mounting and wiring SL limit switches so as to maintain their own characteristics.
  When the SL rubber cover type is used, there should absolutely be no tension applied to the cord. If there is the fear that tension may be applied, the L socket or socket with cord attached should be used. The maximum permissible tension with the above socket use is 98 N{10 kgf}.
- The tightening torque when installing this limit switch should be 1.18 to 1.47 N·m (12 to 15 kgf·cm).

Compact Size Horizontal Type

HL (AZH) Micro Limit Switch

RoHS compliance

Related Information ■Precautions in using ..... P.1303~

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Features

- **Broad lineup (Plastic case and Die casting case type)**
- **Superior environmental resistance (Die casting case type)**
- **Standardized connector type**
- **Lineup includes bifucated (twin contact) type as well as standard load type**
- **Economical plastic case type**

Industrie Forum Design Hannover **Prize awarded**

Compact, high-performance limit switch with superior environmental resistance

PRODUCT TYPE

Body

Actuator \ Type	Die casting case: Screw terminal type: Standard	Die casting case: Screw terminal type: Bifurcated	Die casting case: Connector type: Bifurcated: Without LED	Die casting case: Connector type: Bifurcated: With LED	Plastic case: Screw terminal type: Standard	Plastic case: Screw terminal type: Bifurcated
						
	Part No.	Part No.	Part No.	Part No.	Part No.	Part No.
Push plunger	Common to panel mount push plunger				**AZH1001**	**AZH1201**
Roller plunger	Common to panel mount roller plunger				**AZH1002**	**AZH1202**
Cross roller plunger	Common to panel mount cross roller plunger				**AZH1003**	**AZH1203**
Panel mount push plunger	**AZH2031**	**AZH2231**	**AZH2331**	**AZH233116**	**AZH1031**	**AZH1231**
Panel mount roller plunger	**AZH2032**	**AZH2232**	**AZH2332**	**AZH233216**	**AZH1032**	**AZH1232**
Panel mount cross roller plunger	**AZH2033**	**AZH2233**	**AZH2333**	**AZH233316**	**AZH1033**	**AZH1233**
Sealed push plunger	**AZH2011**	**AZH2211**	**AZH2311**	**AZH231116**	**AZH1011**	**AZH1211**
Sealed roller plunger	**AZH2012**	**AZH2212**	**AZH2312**	**AZH231216**	**AZH1012**	**AZH1212**
Sealed cross roller plunger	**AZH2013**	**AZH2213**	**AZH2313**	**AZH231316**	**AZH1013**	**AZH1213**
Short roller lever	**AZH2041**	**AZH2241**	**AZH2341**	**AZH234116**	**AZH1041**	**AZH1241**
Roller lever	**AZH2021**	**AZH2221**	**AZH2321**	**AZH232116**	**AZH1021**	**AZH1221**
One-way short roller lever	**AZH2044**	**AZH2244**	**AZH2344**	**AZH234416**	**AZH1044**	**AZH1244**
One-way short lever	**AZH2024**	**AZH2224**	**AZH2324**	**AZH232416**	**AZH1024**	**AZH1224**
Flexible	———	———	———	———	**AZH1066**	**AZH1266**
Remarks			1) Lamp with LED is rated at 24 V DC. Please inquire if you need a 12 V DC type. 2) When shipped, the cords are all placed for extension from the right side. If you need cords for the left side, please make the change following the instructions			

Note: For TÜV accredited products, please add "**CE**" at the end of the part No. when ordering. Ex) **AZH1001CE**

Options

Product	Specifications						Application	Part No.
	Pin arrangement	Type	Core No.	Color of wire	Conductor	Length of cable		
Cable connector cord	AC	Straight	4	Brown, White, Blue, Black	0.5 mm² 0.75 × 10⁻³ in² (Circumference: ø6.5 ø0.256 approx.)	3 m 9.843 ft	All connector type	**AZH28113**
		Angle						**AZH28133**

CAUTIONS

Common for all types

- This limit switch is designed under the premise that it will be used in a standard industrial device. Accordingly, there are limits as to what can be tolerated if used outdoors or where water and oil, etc., may get on the device.
  The following table indicates how much water and oil can be withstood (classification of protective structure).

	Plastic case (AZH1*)	Die casting case (AZH2*)
Protective classification	IP64	IP67
Testing method	No harmful effect when sprayed with water for 10 minutes from all angles.	Water does not enter product after immersion in water 1 m 3.281 ft deep for 30 minutes.
Limits on use	Cannot be used outdoors or in a place where water and oil, etc., will continually contact the device.	Cannot be used outdoors where it can be rained on directly and cannot be used submersed in water or in oil, etc.

Note: Although, initially, the protective classification complies under the testing above, due consideration must be taken because great differences may result depending on factors such as duration of operation, installation method, and environment.

- **The internal mechanism will break if the actuator is moved beyond its Total-travel (T.T.). Always use within the T.T.**

Die casting case

- Do not expose HL limit switch to hot water (over 60 °C +140 °F) and in a water vapor environment.
- Avoid the place where organic solvents, strong acid, strong alkali liquid and vapor may attach to the products directly. Prevent using the HL limit switch in place where inflammable or corrosive gas will be generated.
- Do not change the operating position by bending the actuator.
- Use within an ambient temperature of –10 to 80 °C. +14 to +176 °F (However, do not allow it to freeze.)
- If O.T. is too big, the life of limit switch will be shortened by switching friction.
  Use it with enough margin of O.T. 70 % of O.T. standard value will be good.
- Attach the terminal cover securely to the body with the metal stop latch to the projection of the body.
- Confirmation test in the actual application is highly recommended.
- Do not use the switch in a silicon atmosphere. Care should be taken where organic silicon rubber, adhesive, seling material, oil, grease or lead wire generates silicon.
- This is designed to use inside. When used outdoors (in places where there is exposure to direct sunlight or rain such as in multistory car parks) or in environments where ozone is generated, the influence of these environments cause deterioration of the rubber material and damage for the products.
- Avoid use in excessively dusty environments where actuator operation would be hindered.

Plastic case

- Do not use in water or oil.
  Do not place the switch where it is always exposed to water or dust splash.
- Do not expose HL limit switch to hot water (over 60 °C +140 °F) and in a water vapor environment.
- Avoid the place where organic solvents, strong acid, strong alkali liquid and vapor may attach to the products directly. Prevent using the HL limit switch is place where inflammable or corrosive gas will be generated.
- Do not change the operating position by bending the actuator.
- Use within an ambient temperature of –10 to 80 °C. +14 to +176 °F (However, do not allow it to freeze.)
- If O.T. is too big, the life of limit switch will be shortened switching friction. Use it with enough margin of O.T. 70 % of O.T. standard value will be good for use.
- Attach the terminal cover securely to the body to the extent you can identify the clicking or locking sound.
- A confirmation test in the actual application is highly recommended.
- Do not use the switch in a silicon atmosphere. Case should be taken where organic silicon rubber, adhesive, sealing material, oil, grease or lead wire generates silicon.
- This is designed to use inside. When used outdoors (in places where there is exposure to direct sunlight or rain such as in multistory car parks) or in environments where ozone is generated, the influence of these environments cause deterioration of the rubber material and damage for the products.
- Avoid use in excessively dusty environments where actuator operation would be hindered.

Subminiature Size Vertical Type

QL (AZ4) Micro Limit Switch

RoHS compliance

Related Information ■Precautions in using ..... P.1303~

L socket type
(Roller arm)

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Features

- **Subminiature design**
- **With appropriate O.T. range display**
- **O.P. accuracy of ±0.2 (O.P. repeated accuracy initially ±0.03) achieved**
- **A subminiature limit switch with a great stroke margin (O.T./T.T.)**
- **Long life (mechanical life of minimum 10^7 times and a long electrical life of min. 3 x 10^5 times)**
- **A mechanism with excellent environment proofing**

Typical applications

- **Precise small machine**
- **Machine tool etc.**
- **Place where precision and solidity**

High precision micro limit switches with excellent environment proofing

PRODUCT TYPE

Switch body

Actuator	Exposed terminal type	L socket type*	Socket with cord type*
	Part No.	Part No.	Part No.
Push plunger	**AZ4001**	**AZ4601**	**AZ4701**
Roller plunger	**AZ4002**	**AZ4602**	**AZ4702**
Cross roller plunger	**AZ4003**	**AZ4603**	**AZ4703**
Roller arm	**AZ4004**	**AZ4604**	**AZ4704**
Adjustable rod	**AZ4007**	**AZ4607**	**AZ4707**
Adjustable roller arm	**AZ4008**	**AZ4608**	**AZ4708**

Note: UL recognized, CSA certified type available. When ordering, add suffix "**9**" to part No.. Ex) **AZ40019**
*L socket type or socket with cord type is combination of;

L socket type = Exposed terminal type + L socket , Socket with cord type = Exposed terminal type + Socket with cord type (cord length: 1 m 3.281 ft)

Sockets (Used in combination with the exposed terminal type)

Product name	Specifications	Part No.
L socket	The roller can be attached in any of four directions.	**AZ3806**
Socket with cord	Cord length 1 m 3.281 ft	**AZ3807**
	Cord length 2 m 6.562 ft	**AZ3827**
	Cord length 3 m 9.843 ft	**AZ3837**
	Cord length 5 m 16.405 ft	**AZ3857**

Socket with LED (Used in combination with the exposed terminal type)

Product name	Lamp connection	Lamp rating	Part No.
Socket with LED for QL and SL Switches (Note: Cord length 1 m 3.281 ft)	Normally open connection	6 V DC	**AZ3807162**
		12 V DC	**AZ3807161**
		24 to 48 V DC	**AZ380716**
	Normally closed connection	6 V DC	**AZ3807362**
		12 V DC	**AZ3807361**
		24 to 48 V DC	**AZ380736**

Notes: 1) Types with 24 to 48 V DC lamp rating are recommended for PC input use.
2) The following cord lengths are also available and lot-produced upon request.

Cord length	Part No.
2 m 6.562 ft	**AZ38 2 7*6***
3 m 9.843 ft	**AZ38 3 7*6***
5 m 16.404 ft	**AZ38 5 7*6***

The 3rd digit (boxed) of product code denotes the length of cord. Numerals come in the asterisked (*) digits, which show the lamp specifications.

The 5th digit / The 7th digit: 1: N.O. connection, 3: N.C. connection; None: 24 to 48 V DC, 1: 12 V DC, 2: 6 V DC

CAUTIONS FOR USE

Ambient conditions

- The use of these switches under the following conditions should be avoided.
  If the following conditions should become necessary, we recommend consulting us first.
  - Use where there will be direct contact with organic solvents, strong acids or alkalis, or direct exposure to their vapors.
  - Use where inflammable or corrosive gases exist.
- Because these switchies are not of water resistant or immersion-proof construction, their use in water or oil should be avoided. Also, locations where water or oil can normally impringe upon the switch or where there is an excessive accumulation of dust should be avoided.
- In order to maintain the reliability at a high level under practical conditions of use, the actual operating conditions should be checked for the benefit of the quality of the product.
- Do not use the switch in a silicon atmosphere. Case should be taken where organic silicon rubber, adhesive, sealing material, oil, grease or lead wire generates silicon.
- Avoid use in excessively dusty environments where actuator operation would be hindered.
- This is designed to use inside. When used outdoors (in places where there is exposure to direct sunlight or rain such as in multistory car parks) or in environments where ozone is generated, the influence of these environments cause deterioration of the rubber material and damage for the products.

Wiring

- Although QL limit switches have large over-travel (O.T.), excessive O.T. will occur wear and change in its characteristics.
  Specifically, where there is a need for long life, it is recommended that the proper O.T. should be used.
  When the operating object is in the free condition, force should not be applied directly to the actuator.
- Use their own accessories when mounting and wiring QL limit switches so as to maintain their own characterisrics.

Socket with LED

- The OFF condition leakage current at each voltage is as follows.

Rated operating voltage	6 V	12 V	24 V	48 V
24 to 48 V DC	———	———	1.6 mA	3.2 mA
12 V DC	———	2.6 mA	5.2 mA	———
6 V DC	2.5 mA	5.6 mA	———	———

- Even the polarity of power source is connected in the opposite way, LED is not broken. However, LED is not lit on.

Door Switch

Compact Magnelimit

RoHS compliance

Related Information ■ Precautions in using ..... P.1303~

panasonic-electric-works.net/sunx

The second series of MAGNELIMIT featuring improved user friendliness and reduced size.

Features

- Combination of magnet (support) and limit switch (detection) saves on both construction and space, making it a perfect choice for equipment interlock.
- The built-in magnet safeguards checking of the facility's cover and gate
- Safe design prevents operator making errors.
- 1 Form C (N.O., N.C.) contact construction
- The product comes with three different types of weight sustainability: 9.8 N {1 kgf}, 29.4 N {3 kgf} and 49.0 N {5 kgf}
- Water-resistant type also available
  (internal switches only)

Typical applications

- Detection of safety cover opening/closing for factory automation equipment and inspection systems, etc.
- Detection of opening/closing of closet or storage-room doors.

PRODUCT TYPES

Form	Specifications			Part No.
	Contact construction	Case color	Sustainable weight sustainability	
General #110 terminal	1c	Ash-gray	9.8 N {1 kgf}	**AZC31111G**
			29.4 N {3 kgf}	**AZC31113G**
			49.0 N {5 kgf}	**AZC31115G**
Water-resistant #110 terminal			9.8 N {1 kgf}	**AZC31211G**
			29.4 N {3 kgf}	**AZC31213G**
			49.0 N {5 kgf}	**AZC31215G**
Water-resistant, lead wire down			9.8 N {1 kgf}	**AZC31311G**
			29.4 N {3 kgf}	**AZC31313G**
			49.0 N {5 kgf}	**AZC31315G**
Water-resistant, lead wire out			9.8 N {1 kgf}	**AZC31411G**
			29.4 N {3 kgf}	**AZC31413G**
			49.0 N {5 kgf}	**AZC31415G**
Options	Metal plate			**AZC3801**

Note: The unit comes with one magnetic plate. Water resistance (IP67) applies to internal switches only. Excludes exposed part of terminals, externally mounted components, and magnet catches.

Magnelimit

RoHS compliance

Related Information ■ Precautions in using ..... P.1303~

panasonic-electric-works.net/sunx

New double-role switch with a magnet for holding objects and a built-in switch for detection

Features

- A switch that makes electrical contruction possible at 100 V AC power
- The built-in magnet safeguards checking of the facility cover and gate
- Built-in switch with accurate ON/OFF detection
- Combination of magnet (support) and limit switch (detection) saves on both construction and space.
- Two types of contact: 1 Form A (ON when gate is closed), and 1 Form B (ON when gate is open)
- The unit case comes in three colors: Yellow, Brown, and Gray.
- The product comes with three different types of weight sustainability: 9.8 N {1 kgf}, 29.4 N {3 kgf} and 49.0 N {5 kgf}.

Typical applications

For closets | For storage areas | For facilities covers

PRODUCT TYPES

Product name	Specifications			Part No.
	Contact construction	Case color	Sustainable weight sustainability	
Magnelimit 1 Form A type	1 Form A (ON when gate is closed)	Yellow	29.4 N {3 kgf} type (Note 2)	**AZC11013Y**
		Brown		**AZC11013A**
		Gray		**AZC11013H**
Magnelimit 1 Form B type	1 Form B (ON when gate is open)	Yellow		**AZC11113Y**
		Brown		**AZC11113A**
		Gray		**AZC11113H**
Options	Metal plate (Note 1)	Metal plate (13 × 60 × 1.6 mm 0.512 × 2.362 × 0.063 in)		**AZC1801**

Notes: 1) The unit comes with an metal plate enclosed.
2) Weight sustainability also comes in 9.8 N {1 kgf} and 49.0 N {5 kgf} types. Specify when ordering by replacing "**3**" with "**1**" for the 9.8 N {1 kgf} type, and "**5**" for the 49.0 N {5 kgf} type at the end of the part No.

CAUTIONS FOR USE

- Because the magnelimit is not waterproof, avoid using in areas where it may be splashed with either water or oil. Also, avoid using in locations where dust may accumulate.
- Do not use in atmospheres where the unit may directly come into contact with any kind of organic solvent, strong acid or alkaline liquids, or combustible or corrosive gasses.
- Avoid using in silicon environments such as organic silicon-based rubber, solvents, sealants, oil, grease, or wiring.
- The moveable parts on the magnelimit such as the gates are equipped with a stopper, so avoid attachments that require them to bear the full load.
- In order to improve reliability under actual working conditions, check the quality under as close to actual working conditions as possible.
- This magnelimit has a built-in electromagnet. For this reason, take care not to place floppy disks, magnetic cards, or other magnetic recording mediums near the unit, as the data may be corrupted or lost.

SAFETY PRECAUTIONS

To prevent injury and accidents, be sure to observe the following instructions.
Make sure to read the operating instructions and the following precautions for use before installation, operation, maintenance, or inspection. Before using the product, the users must have a thorough understanding of the equipment, safety information, and miscellaneous precautions for its use.

Warning Indicates a possible hazard that will result in death or serious physical injury of the operator in the event of incorrect handling.

Caution Indicates a possible hazard that will result in physical injury of the operator or only property damage in the event of incorrect handling.

Warning

- Incorporate fail-safe or other safety means in the product if the product is used for a purpose that can lead to physical injury or extensive damage.
- Do not use the product in any flammable gas atmosphere. Otherwise, this may result in an explosion.

Caution

- Securely fix the cables with terminal screws. Otherwise, loose connections may result in overheating or smoke.
- Do not use the product outside the ratings or specified environmental conditions. Otherwise, this may result in overheating or smoke.
- Do not touch the terminals while the power is on. Otherwise, this may result in an electric shock.

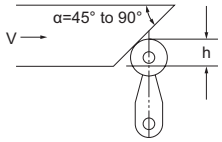
For precautions regarding individual products, see the "Precautions in using" section of the individual product pages.

Design of operating dog and operating speed

Pay attention to the following points when designing the dog for limit switch operation.

- Make the dog faceplate as smooth as possible.
- Adjust both the dog angle and the set arm angle as below, depending on the operating speed.
- The depth (h) of the dog effects the lifespan of the limit switch. Therefore, set the depth to a maximum of 80 % of the Total Travel (T.T.)
- The relationship between the speed of the dog (V = m/s) and the tip angle (α) is as follows:

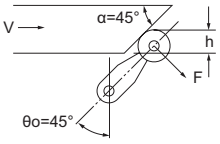
• V ≦ 0.2 m/s



α	Vmax (m/s)
45°	0.2
60°	0.1
60° to 90°	0.05

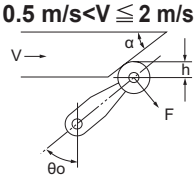
When V ≦ 0.2 m/s, set the arm to perpendicular and set the arm rise angle to between 45° and 90°. If the dog rise angle is reduced, the maximum tolerable speed is increased. As a rule, α = 45° is optimum.

• V ≦ 0.5 m/s



Because the arm jiggle is as a minimum at a comparative speed such as V ≦ 0.5 m/s, setting both the dog angle so that it travels perpendicularly and the arm angle to 45° is optimum.

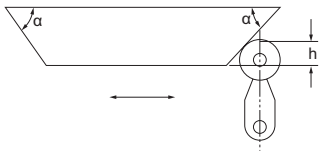
• 0.5 m/s<V ≦ 2 m/s



α	Vmax (m/s)
40°	0.7
35°	0.9
30°	1.3
25°	2.0

The maximum tolerable speed can be extended by further reducing the dog rise angle from 45° when 0.5 m/s < V ≦ 2 m/s. It is necessary to set the arm so that the dog's cutting surfaces are always parallel (θ o = 90°– α)

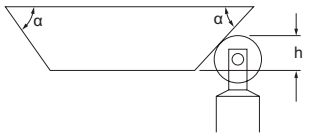
• Overriding the dog (V ≦ 0.2 m/s)



α	Vmax (m/s)
45°	0.2
60°	0.1
60° to 90°	0.05

If overriding the dog, set the arm perpendicularly, so that α =45°. If the dog angle is reduced, the tolerable speed is increased.

• Roller plunger type



α	Vmax (m/s)	h
20°	0.5	(0.5 to 0.7)T.T
30°	0.25	(0.6 to 0.8)T.T

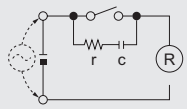
Even if overriding the dog, set the forwards and rearwards motion exactly the same, and avoid any settings that make the actuator accelerate rapidly from the dog.

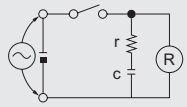
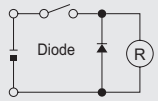
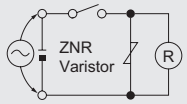
- Operation speed
  - When the operation (acting and reverting) speed is exceedingly slow, switching of the contacts will become unstable and this could cause problems such as failure to make contact and welding.
    As a guide, the speed should be at least 1 mm/s.
  - When the operation (acting and reverting) speed is exceedingly fast, be careful because the violent motion could cause breakage and with increased frequency, contact switching will not be able to keep up. As a guide, the switching frequency should be within 20 times per minute.

Protection circuit

- The ON/OFF circuit for the guidance load may suffer contact damage due to surges or inrushes when the power is turned either ON or OFF. Consequently, insertion of a protective circuit as per the following diagram is recommended, in order to protect the contacts.

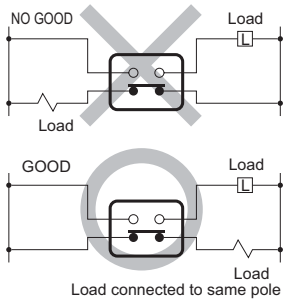
Circuit	Cautions for use

Limit switch contact 	• r must be a minimum of 10 Ω;
	• When using AC power:
	  • Impossible when R impedance is large.
	  • Possible when c, r impedance is sufficiently small compared with R impedance.

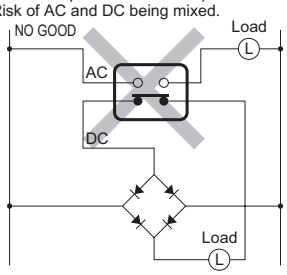
Limit switch contact 	Can be used with both AC and DC as appropriate. r~R C : 0.1 μF
Limit switch contact 	• Dedicated DC use. • AC is impossible
Limit switch contact 	Can be used with both AC and DC as appropriate.

- Do not connect either irregular poles or power sources to a switch contact.

Power connection examples (irregular pole connection)



Example of unsuitable power connection (abnormal power connection)
Risk of AC and DC being mixed.



- Avoid circuits where power may find a way between the contact points (as this may cause welding.)
- Using electronic switch circuits (low power, low current)
  - Bouncing and chattering are generated due to collision between the contacts when the limit switch is switching between them, and this sometimes causes such problems as white noises and error pulses in both the electronic circuit and the reverberation equipment.
  - If the generation of bouncing and chattering becomes a problem, it is necessary to consider installing a CR circuit or other absorption circuit given the circuit design.
  - This is particularly necessary when high contact reliability is needed, and is unsuitable for silver contact switches. Switches with gold contacts possess excellent performance.

Cautions for use

- Do not attempt to physically alter any part of the switch itself, such as the actuator, or switch attachment vent, as this may cause alterations to both characteristics and performance, and damage the insulation.
- Do not pour any lubricants such as oil or grease onto the moving parts of the actuator, as there is a possibility that this will cause a malfunction due to seepage into the inside, and impair the motion. Silicon-based grease in particular affects the contact points badly.
- If the switches are not to be used for an extended period of time, their contact reliability may be reduced due to oxidation of the contact points. Because accidents may result from the impaired conductivity, always implement a check beforehand.
- Prolonged continuous use of the switch hastens deterioration of the parts (especially the seal rubber) and may cause a malfunction in the release. For this reason, always implement a check beforehand.
- Usage in the vicinity of either the switch operating position (O.P.) or the release position (R.P.) results in unstable contacts. If using the NC contact point, set the actuator to return to the free position (F.P.) Also, is using the NO contact point, hold the ratings values down to 70 to 100 % for the overtravel (O.T.)
- If the actuator is forced beyond its total travel (T.T.), the internal mechanism may be damaged. Always use within the T.T.
- Do not apply unreasonable force to the actuator, as this may result in damage and impaired movement.
- The switch, if dropped, may break due to excessive vibration and impact. Therefore, please use extra caution when transporting and installing.
- Condensation inside the switch may occur if there are rapid ambient temperature changes when the switch is in a high temperature and humidity. Since this occurs easily during marine transport, be extra cautious of what the environment will be when shipping. Condensation is the phenomenon in which water vapor condenses into switch-adhering water droplets when the temperature rapidly drops in a high-temperature, high-humidity atmosphere or when the switch is quickly moved from a low temperature location to a place of high temperature and high humidity. It is the cause of insulation deterioration and of rust.
- Be careful of freezing in temperatures below 0 °C 32 °F. Freezing is the phenomenon in which moisture adhering to the switch from condensation or when in unusually high-humidity environments freezes onto the switch when the temperature drops below the freezing point. Please extra caution because freezing can lock moving parts, cause operational delays, or interfere with conductivity when there is ice between the contacts.
- In low-temperature, low-humidity conditions, plastic becomes brittle and the rubber and grease harden, which may lead to malfunction.
- Long term storage (including during transport) in high temperature or high humidity environments or where the atmosphere contains organic or sulfide gas, will cause sulfide or oxide membrane to form on the contact surfaces. This in turn will cause unstable or failed contacting that may lead to functional malfunction. Please verify the atmosphere when storing and transporting.
- Packaging should be designed to reduce as much as possible the potential influence of humidity, organic gas, and sulfide gas, etc.
- Please avoid sudden changes in temperature. This is a cause of switch deformation and encourages the seal structure to breathe, which may lead to seal failure and operational malfunction.
- If installing a thermoplastic resin case, the use of a spring washer tightened directly against the case will cause the case to collapse and become damaged. Therefore, please add a flat washer before tightening. Also, be careful not to install if the case is being twisted.
- For the purpose of improving quality, materials and internal structure may be changed without notice.
- This is designed to use inside. When used outdoors (in places where there is exposure to direct sunlight or rain such as in multistory car parks) or in environments where ozone is generated, the influence of these environments cause deterioration of the rubber material and damage for the products.

Precautions relating to the installation environment

Avoid using in silicon environments such as organic silicon-based rubber, solvents, sealants, oil, grease, or wiring.