



# Panasonic

ideas for life

COMPACT SIZE  
LIMIT SWITCHES

# ML (AZ7) Limit Switches

Terminal mold types (epoxy-sealed terminal type) also available.



Standard type  
(Short roller lever)

Compliance with RoHS Directive

## FEATURES

### 1. Long life

High efficiency coil spring switching mechanism for long life: More than 10<sup>7</sup> mechanical operations.

### 2. Great mechanical strength while being compact and lightweight

The attachment pitch is 25.4mm (1.000inch), same as for the Z basic model microswitch. Also, the outer cover cap uses a strong plastic with excellent mechanical characteristics. An M4 bolt can be used for the attachment.

### 3. The overtravel (O.T.) is large with great shock absorption

### 4. The switch itself is constructed to be dust-proof and oil resistant

The switch itself is closed flush with the diaphragm and the compressed rubber ring, so that the terminal mold type (epoxy-sealed terminal type) is perfectly flush with the terminal parts.

## TYPICAL APPLICATIONS

Used in sequence control of food processing machines, automatic packaging machines, conveyers, and processors. Ideal for light industry machinery when installation pace is limited and a protective construction is sought.

## PRODUCT TYPE

### 1. Standard type

Actuator	Part No.
Short push plunger	AZ7100
Push plunger	AZ7110
Hinge lever	AZ7120
Roller lever	AZ7121
One-way roller lever	AZ7124
Hinge short lever	AZ7140
Short roller lever	AZ7141
One-way short roller lever	AZ7144
Panel mount push plunger	AZ7310
Panel mount roller plunger	AZ7311
Panel mount cross roller plunger	AZ7312
Flexible rod	AZ7166

- Notes) 1. When ordering an overseas-specified product, refer to the foreign standards overview.  
2. Cadmium free contact types are available on a custom-made basis. Please add an "F" to the end of the part number when ordering.

### 2. Terminal mold type (epoxy-sealed terminal type)

Actuator	Cord outlet direction	
	N.C.	COM
	Part No.	
Short push plunger	AZ7400	AZ7401
Push plunger	AZ7405	AZ7406
Hinge lever	AZ7410	AZ7411
Roller lever	AZ7415	AZ7416
One-way roller lever	AZ7420	AZ7421
Hinge short lever	AZ7425	AZ7426
Short roller lever	AZ7430	AZ7431
One-way short roller lever	AZ7435	AZ7436
Panel mount push plunger	AZ7440	AZ7441
Panel mount roller plunger	AZ7445	AZ7446
Panel mount cross roller plunger	AZ7450	AZ7451
Flexible rod	AZ7460	AZ7461

# ML (AZ7)

## FOREIGN STANDARDS

Standards	Applicable product	Part No.
UL	File No. : E122222 Ratings : 10A 250V AC Product type : Standard type only	Order by standard part No.
C-UL	File No. : E122222 Ratings : 10A 250V AC Product type : Standard type only	
TÜV	File No. : J9551204 Ratings : AC-15 2A/250V~ Product type : Standard type only	

## SPECIFICATIONS

### 1. Rating

Rated control voltage	Load	Resistive load (cosφ≒1)	Inductive load (cosφ≒0.4)	Motor or lamp load	
				N.C. contact	N.O. contact
125V AC		10A	6A	3A	1.5A
250V AC		10A	4A	1.5A	1A
115V DC		0.4A	0.05A	-	-

### 2.Characteristics

Contact arrangement	1 Form C	
Initial contact resistance, max.	15mΩ* (By voltage drop 6 to 8V DC at rated current)	
Contact material	AgCdO contact	
Initial insulation resistance (At 500V DC)	Min. 100 MΩ	
Initial breakdown voltage	1,500 Vrms for 1 min Between non-consecutive terminals 2,000 Vrms for 1 min Between dead metal parts and each terminal 2,000 Vrms for 1 min Between ground and each terminal	
Shock resistance	In the free position	Max. 98m/s <sup>2</sup> {10G}
	In the full operating position	Max. 294m/s <sup>2</sup> {30G}
Vibration resistance	55 Hz, double amplitude of 1.5 mm	
Expected life (Min. operation)	Mechanical	10 <sup>7</sup> (at 50 cpm)
	Electrical	2 × 10 <sup>8</sup> (at 20 cpm)
Ambient temperature/Ambient humidity	-20 to +60°C -4 to +140°F/Max. 95% R.H. (at 20°C 68°F)	
Max. operating speed	120 cpm	

\*The resistance of a copper wire is not included.

### 3.EN60947-5-1 performance

Item	Rating
Rated insulation voltage (Ui)	250VAC
Rated impulse withstand voltage (Uimp)	2.5kV
Switching over voltage	2.5kV
Rated enclosed thermal current (Ithe)	10A
Conditional short-circuit current	100A
Short-circuit protection device	10A fuse
Protective construction	IP64 (switch)
Pollution degree	3

### 4. Operating characteristics

Characteristics	O.F. (N{gf}) max.	R.F. (N{gf}) min.	Pretravel (P.T.), max. mm inch	Movement Differential (M.D.), max. mm inch	Overtravel (O.T.), min. mm inch	Operating Position (O.P.) mm inch
Short push plunger	5.88 {600}	0.98 {100}	2.0 .079	0.8 .031	0.8 .031	30±0.8 1.181±.031
Push plunger	5.88 {600}	0.98 {100}	2.0 .079	0.8 .031	5.0 .197	44±1.2 1.732±.047
Hinge lever	1.47 {150}	0.39 {40}	13.5 .531	3.2 .126	4.0 .157	25±2.0 .984±.079
Roller lever	1.77 {180}	0.49 {50}	11.0 .433	2.4 .094	3.0 .118	40±1.9 1.575±.075
One-way roller lever	1.96 {200}	0.59 {60}	11.0 .433	2.4 .094	3.0 .118	50±2.0 1.969±.079
Hinge short lever	2.16 {200}	0.59 {60}	8.5 .335	2.0 .079	2.5 .098	25±1.3 .984±.051
Short roller lever	2.35 {240}	0.78 {80}	6.5 .256	1.5 .059	2.0 .079	40±1.6 1.575±.063
One-way short roller lever	2.75 {280}	0.98 {100}	6.5 .256	1.5 .059	2.0 .079	50±1.6 1.969±.063
Panel mount push plunger	5.88 {600}	0.98 {100}	2.0 .079	0.8 .031	6.0 .236	21.8±0.8 .858±.031
Panel mount roller plunger	5.88 {600}	0.98 {100}	2.0 .079	0.8 .031	6.0 .236	33.3±1.2 1.311±.047
Panel mount cross roller plunger	5.88 {600}	0.98 {100}	2.0 .079	0.8 .031	6.0 .236	33.3±1.2 1.311±.047
Flexible rod	1.18 {120}	-	25 .984	-	11 .433	36 1.417 (T.T.)

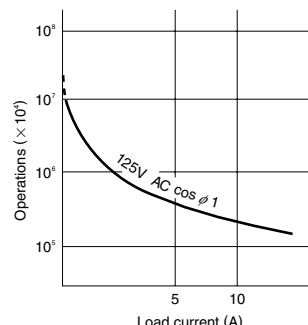
Note) For the operating characteristics, refer to the TECHNICAL INFORMATION.

### 5. Protective characteristics

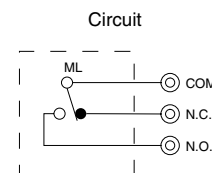
Protective construction	Standard type	Terminal mold type (Epoxy-sealed terminal type)
IEC		
IP60	○	○
IP64	-	○

## DATA

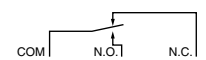
### 1. Life curve



## WIRING DIAGRAM



### Terminal

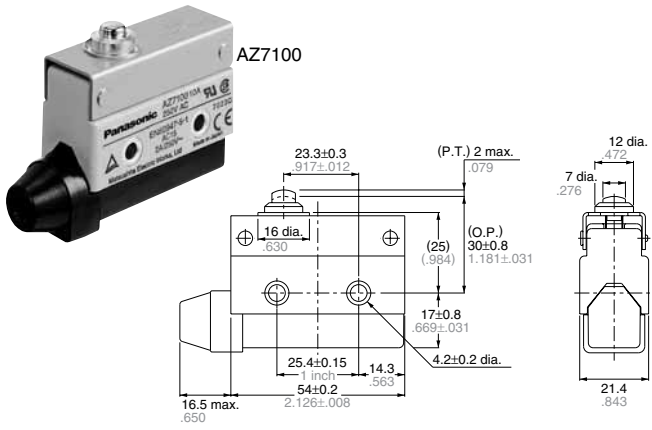


Standard type

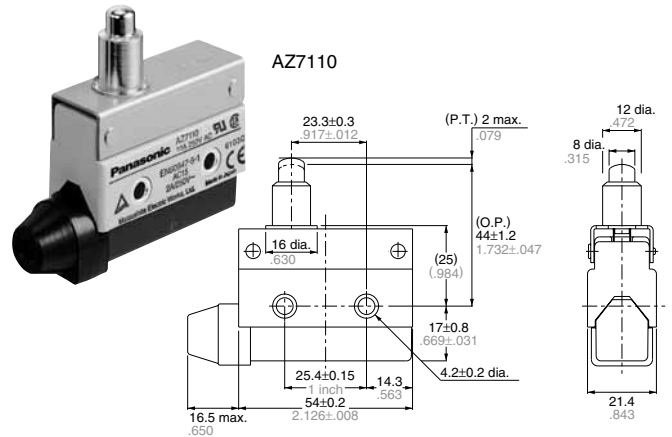


## DIMENSIONS

### • Short push plunger

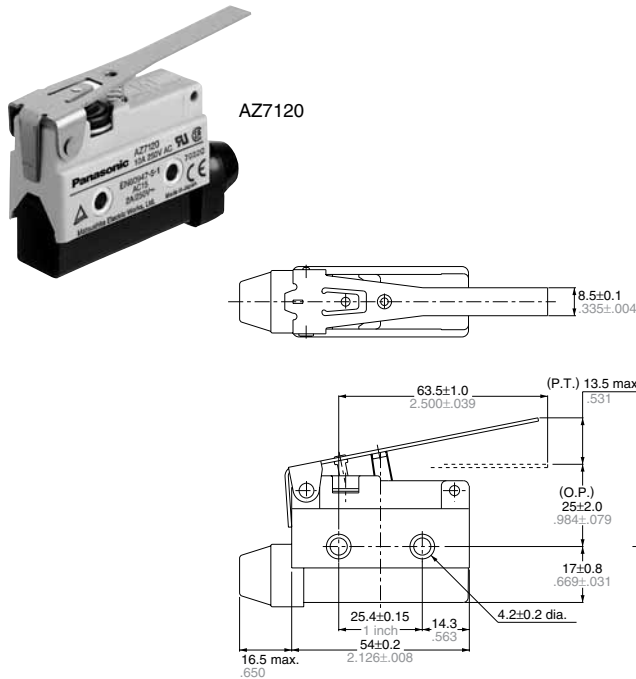


### • Push plunger

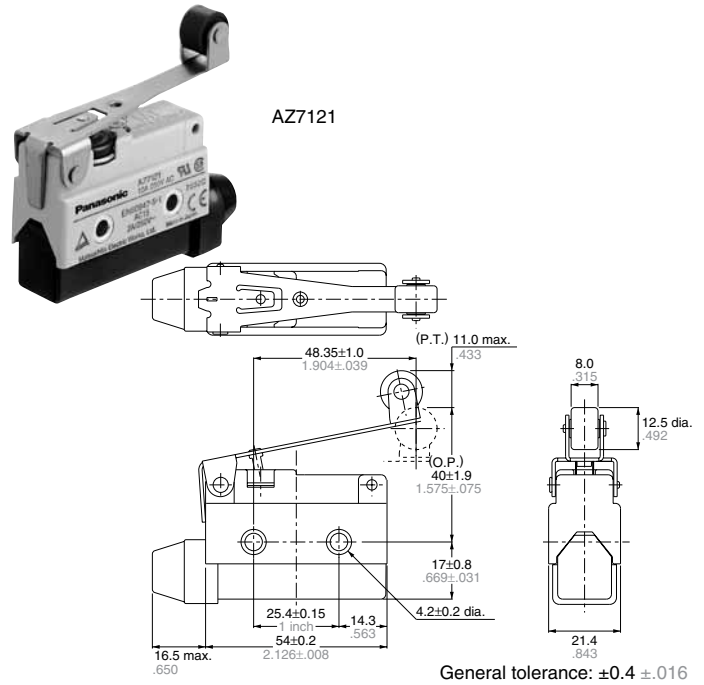


General tolerance: ±0.4 ±.016

### • Hinge lever

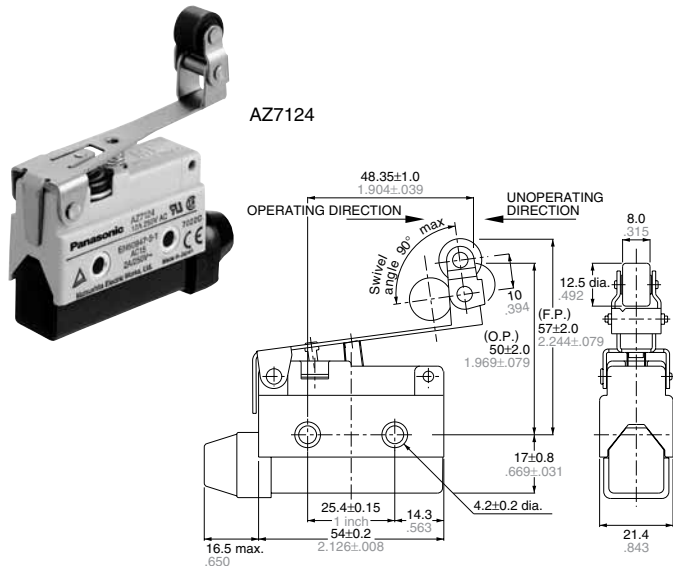


### • Roller lever

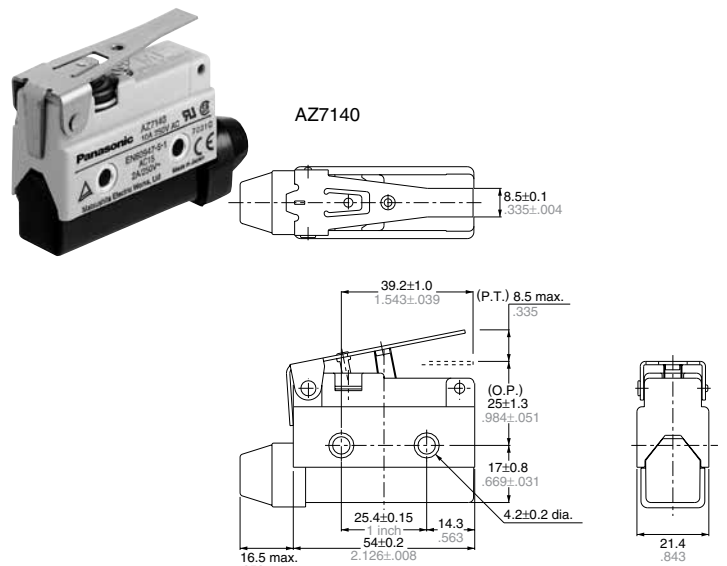


General tolerance: ±0.4 ±.016

### • One-way roller lever



### • Hinge short lever

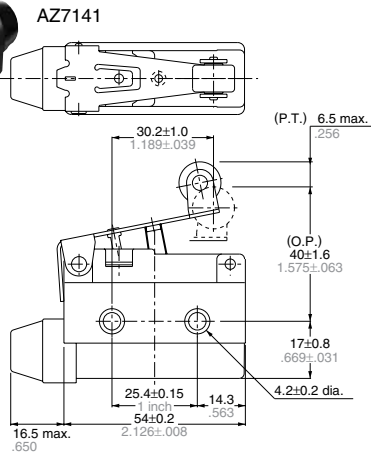


General tolerance: ±0.4 ±.016



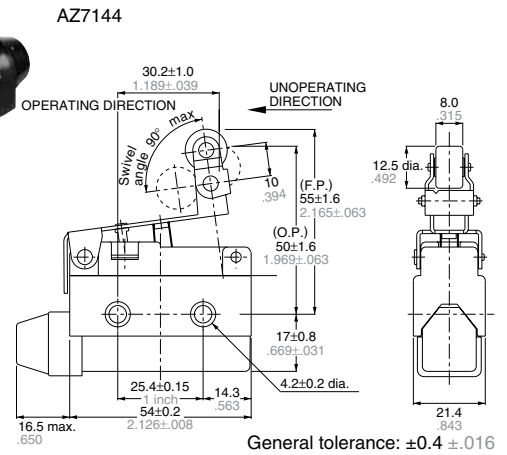
# ML (AZ7)

## • Short roller lever

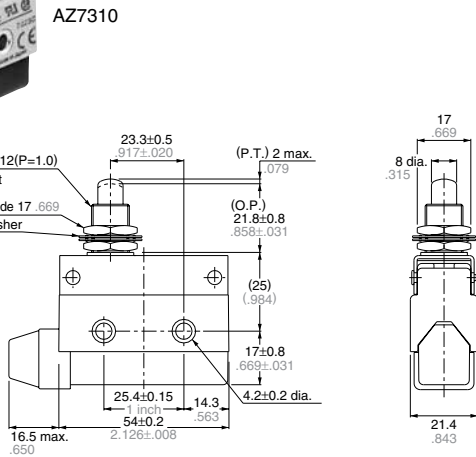


## • One-way short roller lever

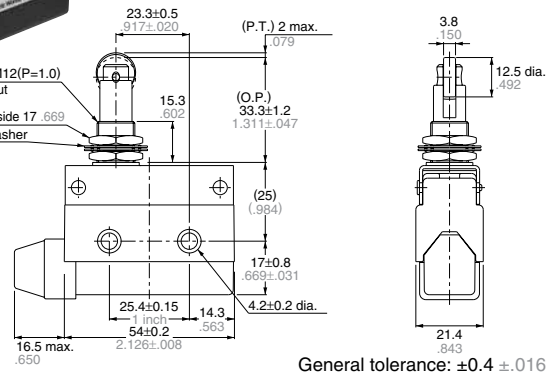
mm inch



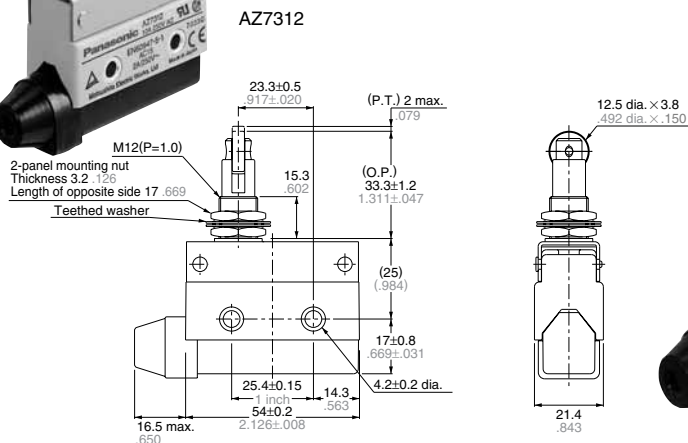
## • Panel mount push plunger



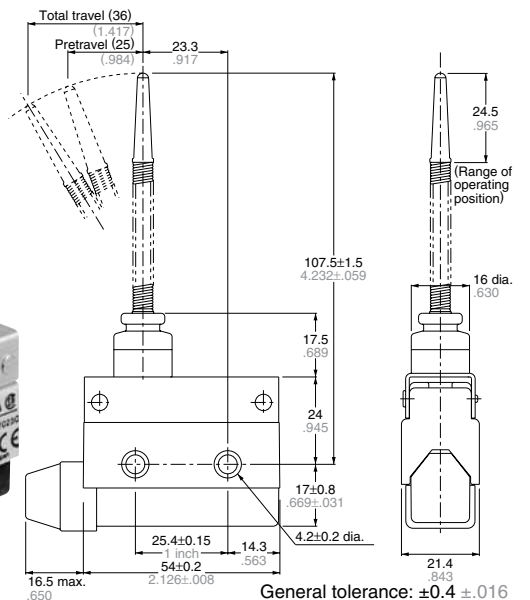
## • Panel mount roller plunger



## • Panel mount cross roller plunger



## • Flexible rod





## Terminal Mold Type (Epoxy-Sealed Terminal Type)

The waterproof type (IP64) has its terminals sealed with epoxy resin.

### 1. Type of product

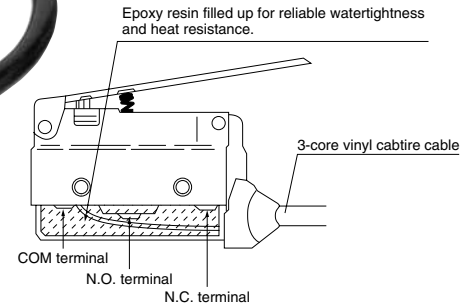
All the standard type have this epoxy-sealed terminal types.

### 2. Appearance

The dimensions are the same as those of the standard type.

The cord outlet is located either at the N.C. or COM side.

The cord is 1 m 3.281ft. long.



Cord outlet direction: N.C.



Cord outlet direction: COM



### • Cord specifications

Type	Vinyl cable (VCT)(3 × 1.25mm <sup>2</sup> )
Cord length	1m 3.281ft.
Lead colors	Black: COM Red: N.C. White: N.O.

## CAUTIONS

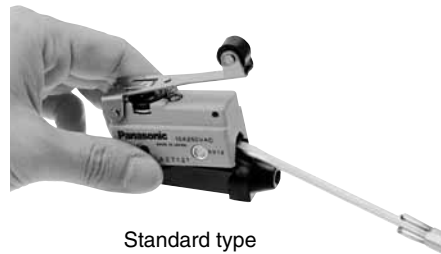
### 1. Ambient conditions

- When the switch is to be used in places where oil or is abundant, bore a drain hole in the bottom of the terminal cover.
- Avoid places where highly acid or alkaline fluids are used or high temperatures prevail.
- This model uses silver terminals. Therefore, if used at relatively low frequencies for long periods of time, or if used with very small loads, the oxidation that forms on the contact surfaces will not wear away and eventually cause improper contact. For such applications, use limit switches with gold/metal contacts (e.g. VL limit switches) or ones meant for small loads (e.g. HL limit switches).
- This switch is not designed for underwater use. Do not use the unit underwater.
- To improve reliability during actual use, it is recommended that the operation be checked under installation conditions.
- If OT is too big, the life of limit switch will be shortened switching friction. Use it with enough margin of OT. 70% of OT 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.

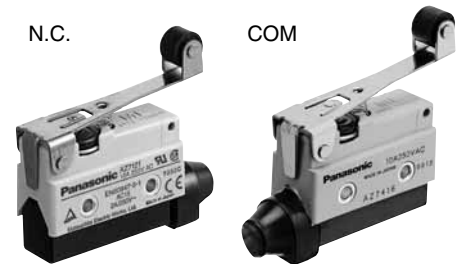
- When used outdoors (in places where there is exposure to direct sunlight or rain such as in multistory car parks) or in environments where ozone is generated, the influence of these environments may cause deterioration of the rubber material. Please consult us if you intend to use a switch in environments such as these.
- Do not store in places where organic gas might be generated or in places of high dust content or high humidity.

### 2. Mounting and wiring

- Remove the terminal cover with a  $\ominus$  driver. Insert the lead wire through the knock-out of the terminal cover. (The terminal cover of the epoxy-sealed terminal type is filled with resin. It cannot be removed.)



- Connect the lead wire to the terminal. When connecting the terminals with the fasten lug, those with the insulation sleeve are recommended. Tightening torque: 1.18 to 1.47 N·m {12 to 15 kg·cm}
- The terminal cover can be mounted in both directions.
  - In this case, fasten the terminal cover in the opposite direction.



- Side mounting  
To mount onto a side, use M4 screws with washers and secure it firmly. The tightening torque should be 1.18 to 1.47 N·m (12 to 15 kg·cm).
- Panel mounting  
(panel mount plunger type)  
When installing the panel mounting type onto a panel, the tightening torque for the hex. nut should be 7.84 N·m (80 kg·cm).
- For terminal mold types (epoxy-sealed terminal types), there are two types by the cord outlet direction; N.C. side and COM side.

### 3. Flexible rod

- Put the detective object to the tip of plastic part.
- Avoid pushing the tip of actuating spring in the direction of axis. In the places of oil or water splashes and much dust area, use the limit switch with keeping the actuating spring in the vertical direction.