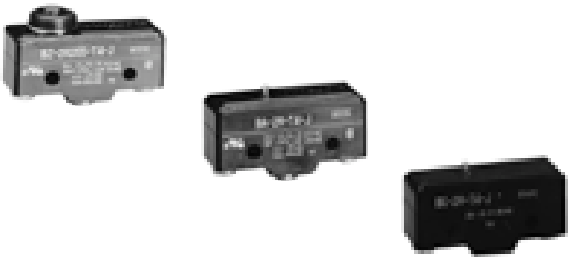
BZ, BA, BE Series Standard Basic Switches



FEATURES

These Switches are Used Extensively and Have Earned the High Respect of Our Customers.
Standard basic switches (**BZ, BA, BE** Series) are representative of Yamatake basic switches for their range of models and high performance.

SELECTION GUIDE

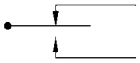
Type	BZ						BA	BE
Classification / Actuators	General purpose				Sealed type			
	Standard type	Low current load type	High sensitivity type	High sensitivity low current load type	Sealed type	Sealed low current load type	High capacity type (20A)	High capacity type (25A)
Pin plunger	○	○	○	○	○	○	○	○
Short plunger	○	○	○	○	○	○	○	–
Panel mount plunger	○	○	○	○	–	–	○	–
Panel mount roller plunger/ cross roller plunger	○	○	○	○	–	–	–	–
Fine plunger	○	○	○	○	○	○	–	–
Lever	○	○	○	○	○	○	○	–
Roller lever	○	○	○	○	○	○	○	–
Short roller lever	○	○	○	○	○	○	○	–
One-way roller lever	○	○	–	–	–	–	–	–
Reverse action lever	○	○	–	–	○	○	–	–
Reverse action roller lever	○	○	–	–	○	○	–	–
Reverse action short roller lever	○	○	–	–	○	○	–	–

Contact your agent for details of items marked by ''–''.

RATING/TERMINAL TYPE

Item / Type	Electrical rating	Catalog listing	Solder terminal	Screw terminal
BZ				
Standard/Sealed	15 A	**BZ-2R**	○	○
High sensitivity	15 A	**BZ-R**	○	○
Low current load	0.1A	**BZ-2R/R**	○	○
High capacity **BA, BE**	20 A	**BA**	○	○
	25 A	**BE**	○	○

CONTACT & TERMINAL TYPE

Item / Type	Catalog listing	Circuit configuration
Single-Pole Double-Throw	**BZ-2R/R, BA, BE**	

BASIC EN (IEC) STANDARD COMPATIBLE TYPE

EN (IEC) standard compatible standard type/high sensitivity type **BZ** models are available. For details, see page 10.

CONTACT SPACING

● In the catalog listing of the basic switch, the following code indicates the contact spacing:

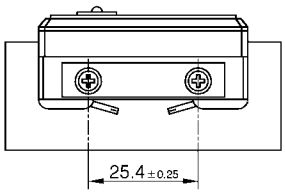
(Example) **BZ-2R-T4-J**

Code	Contact spacing	Features
R (Note)	0.15mm	High sensitivity, light actuation
2R	0.5mm	Basic model, high accuracy, and long life

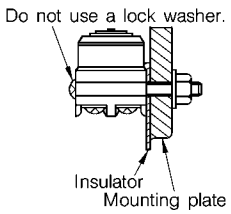
Note: Code R is for custom parts.

SWITCH MOUNTING METHOD

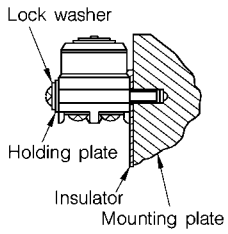
● When mounting by the side screw



Method for mounting on a thin plate



Method for mounting on a thick plate



Mounting screw

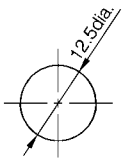
Use M4 screws for **BZ**, **BA** and **BE** switches. (M3.5 for the switches made by Honeywell, Inc. of the U.S.)

Tightening torque must be 1.2 to 1.5N-m.

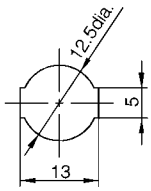
● Panel mounting (catalog listing **BZ-2RQ□-□-J**)

- When mounting on a panel, limit the tightening torque of the hexagonal head nut on the actuator to 4.90N-m.
- When mounting the panel mount plunger/roller plunger on the side panel, the switch is sometimes damaged if the dog startup angle or operation speed is large.
  Note that switch is sometimes damaged also if the impact operation and movement after operation is large.
- Drill the mounting hole as follows:

Panel mount plunger



Panel mount roller plunger



● Wiring to solder terminal type switches

- Quickly wire the lead wire to the solder terminal within five seconds using a 60W or less capacity soldering iron.
  Excessive heating sometimes causes the switch characteristics to degrade.
- After soldering, prevent tension force from being applied until the terminal section has sufficiently cooled.

General-purpose Basic Switches BZ Series

FEATURES

High-quality Switches That Have Passed the UL/CSA Standards.
* Approval No. UL: E37559. CSA: LR61643

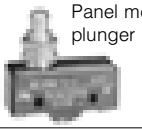
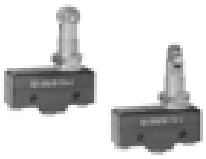
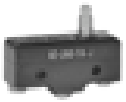
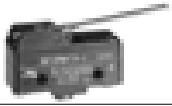
- Wide range of types.
  - Standard type.
  - Sealed type. (rain-proof structure)
  - High sensitivity. (small M.D.)
  - Reverse action lever type. (effective when there is impact operation)
- A wide range of actuators is available. Select the actuator according to your specific requirements and conditions of use.
- Mechanical life: 20 million cycles. (on pin plunger type)
- EN 60947-5-1 (IEC 947-5-1) compatible types available.

APPLICATIONS

- Machine tools and various industrial machinery
- For control of pressure, temperature, fluid level, weight, speed and time
- Household equipment, automobiles and control equipment

ORDER GUIDE

● Standard type

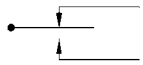
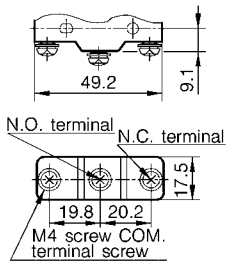
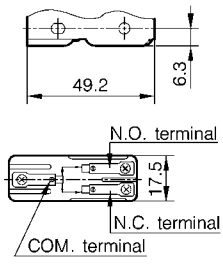
Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Pin plunger 	2.50 to 3.63	Min. 1.12	–	Max. 0.4	15.9±0.4	Min. 0.13	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2R-T4-J**
								Soldered		**BZ-2R-J**
Short plunger 	2.50 to 3.63	Min. 1.12	–	Max. 0.4	21.2±0.5	Min. 1.5	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RD-T4-J**
								Soldered		**BZ-2RD-J**
Panel mount plunger 	2.50 to 3.63	Min. 1.12	–	0.4	21.8±0.8	Min. 5.6	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RQ1-T4-J**
								Soldered		**BZ-2RQ1-J**
Panel mount roller/ Cross roller plunger 	2.50 to 3.63	Min. 1.12	–	0.4	33.3±1.2	Min. 3.6	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RQ18-T4-J** (roller)
										BZ-2RQ181-T4-J (cross roller)
								Soldered		**BZ-2RQ18-J** (roller)
										BZ-2RQ181-J (cross roller)
Fine plunger 	2.50 to 3.63	Min. 1.12	–	Max. 0.4	28.2±0.5	Min. 1.5	0.01 to 0.05	M4 screw	UL/CSA	**BZ-2RS-T4-J**
								Soldered		**BZ-2RS-J**
Lever 	Max. 0.69	Min. 0.14	27.4±0.7	–	19.1±0.7	Min. 5.6	0.18 to 1.27	M4 screw	UL/CSA	**BZ-2RW80-T4-J**
								Soldered		**BZ-2RW80-J**
Roller lever 	Max. 0.98	Min. 0.20	35.7±0.7	–	30.2±0.7	Min. 4	0.1 to 1.02	M4 screw	UL/CSA	**BZ-2RW82-T4-J**
								Soldered		**BZ-2RW82-J**
Short roller lever 	Max. 1.57	Min. 0.42	32.2±0.4	–	30.2±0.4	Min. 2.4	0.08 to 0.51	M4 screw	UL/CSA	**BZ-2RW822-T4-J**
								Soldered		**BZ-2RW822-J**
One-way roller lever 	Max. 1.57	Min. 0.42	43.3±0.4	–	41.3±0.4	Min. 2.4	0.08 to 0.51	M4 screw	UL/CSA	**BZ-2RW826-T4-J**
								Soldered		**BZ-2RW826-J**
Reverse action lever 	Max. 1.67	Min. 0.27	25±1.2	–	19.1±0.8	Min. 5.6	0.1 to 0.9	M4 screw	UL/CSA	**BZ-2RM-T4-J**
								Soldered		**BZ-2RM-J**
Reverse action roller lever 	Max. 2.35	Min. 0.56	35±1	–	30.2±0.8	Min. 4	0.05 to 0.7	M4 screw	UL/CSA	**BZ-2RM2-T4-J**
								Soldered		**BZ-2RM2-J**
Reverse action short roller lever 	Max. 5.30	Min. 1.67	31.5±0.5	–	30.2±0.5	Min. 2	0.03 to 0.3	M4 screw	UL/CSA	**BZ-2RM22-T4-J**
								Soldered		**BZ-2RM22-J**

● High sensitivity type (Actuator shape and external dimensions are the same as standard type.)

Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Pin plunger	1.94 to 2.50	Min. 1.12	–	Max. 0.4	15.9±0.4	Min. 0.13	0.005 to 0.008	M4 screw	UL/CSA	**BZ-R-T4-J**
								Soldered		**BZ-R-J**
Short plunger	1.67 to 2.65	Min. 1.12	–	Max. 0.4	21.2±0.5	Min. 1.5	0.005 to 0.013	M4 screw	UL/CSA	**BZ-RD-T4-J**
								Soldered		**BZ-RD-J**
Panel mount plunger	1.67 to 2.50	Min. 1.12	–	Max. 0.3	21.8±0.8	Min. 5.6	0.005 to 0.013	M4 screw	UL/CSA	**BZ-RQ1-T4-J**
								Soldered		**BZ-RQ1-J**
Panel mount roller/ Cross roller plunger	1.47 to 2.65	Min. 1.12	–	Max. 0.3	33.3±1.2	Min. 3.6	0.005 to 0.013	M4 screw	UL/CSA	**BZ-RQ18-T4-J** (roller) **BZ-RQ181-T4-J** (cross roller)
								Soldered		**BZ-RQ18-J** (roller) **BZ-RQ181-J** (cross roller)
Fine plunger	1.94 to 2.65	Min. 1.12	–	Max. 0.3	28.2±0.5	Min. 1.5	0.005 to 0.013	M4 screw	UL/CSA	**BZ-RS-T4-J**
								Soldered		**BZ-RS-J**
Lever	Max. 0.69	Min. 0.14	27.4±0.7	–	19.1±0.7	Min. 5.6	0.08 to 0.38	M4 screw	UL/CSA	**BZ-RW80-T4-J**
								Soldered		**BZ-RW80-J**
Roller lever	Max. 0.83	Min. 0.20	35.7±0.7	–	30.2±0.7	Min. 4	0.05 to 0.38	M4 screw	UL/CSA	**BZ-RW82-T4-J**
								Soldered		**BZ-RW82-J**
Short rollerlever	Max. 1.37	Min. 0.42	32.2	–	30.2	Min. 2.4	0.03 to 0.15	M4 screw	UL/CSA	**BZ-RW822-T4-J**
								Soldered		**BZ-RW822-J**

● Circuit configuration and terminal diagrams

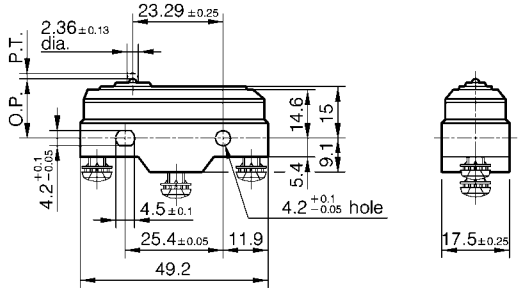
(unit: mm)

Model	Circuit configuration	Terminal dimensions	Switch mounting screw
BZ-2R□□ **BZ-R□□**	Single-Pole Double-Throw (SPDT) 	Screw terminal  Soldered terminal  **Note:** On reverse action types, the N.O. and N.C. terminal positions are reversed.	M4 screw

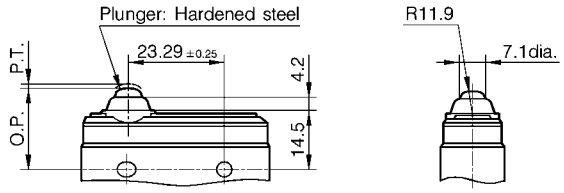
● External Dimensions

(Unit: mm
General tolerance: ±0.4mm)

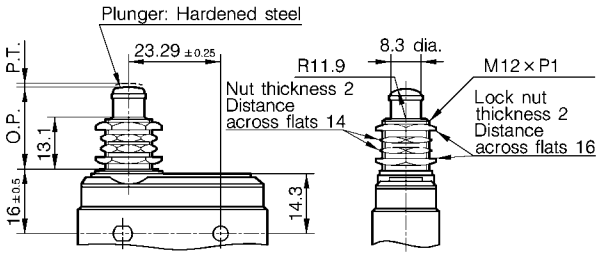
BZ-2R-T4-J, BZ-R-T4-J



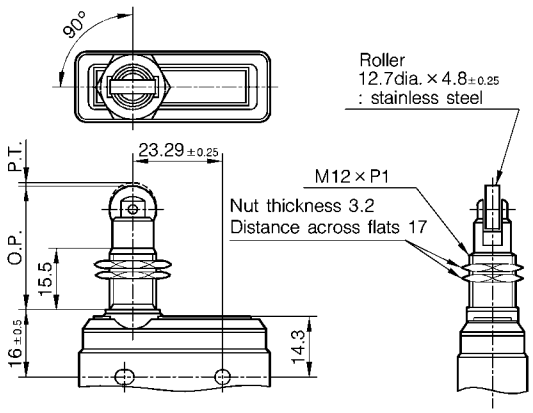
BZ-2RD-T4-J, BZ-RD-T4-J



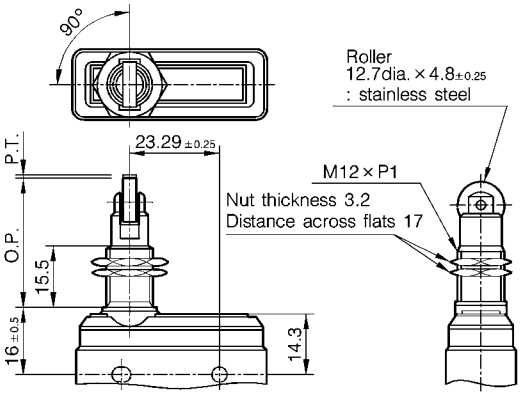
BZ-2RQ1-T4-J, BZ-RQ1-T4-J



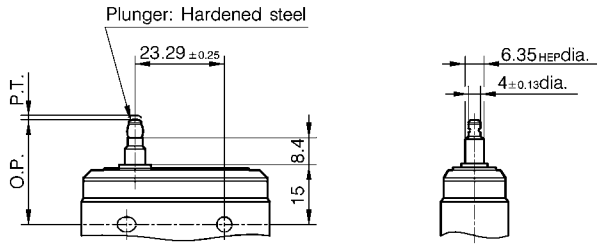
BZ-2RQ18-T4-J, BZ-RQ18-T4-J



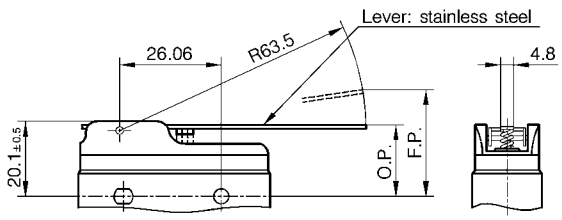
BZ-2RQ181-T4-J, BZ-RQ181-T4-J



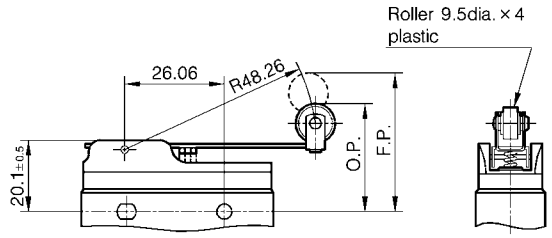
BZ-2RS-T4-J, BZ-RS-T4-J



BZ-2RW80-T4-J, BZ-RW80-T4-J

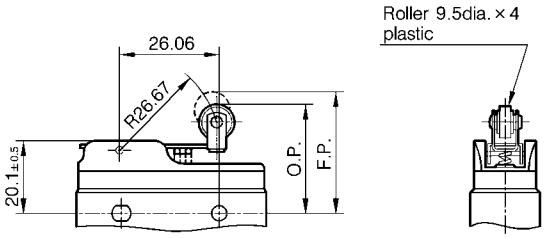


BZ-2RW82-T4-J, BZ-RW82-T4-J

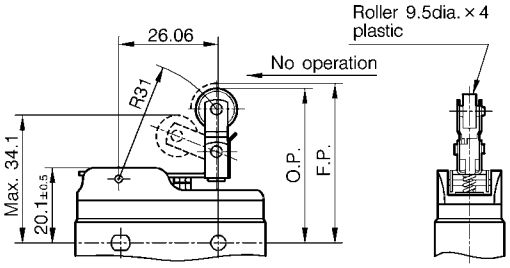


(Unit: mm
General tolerance: ±0.4mm)

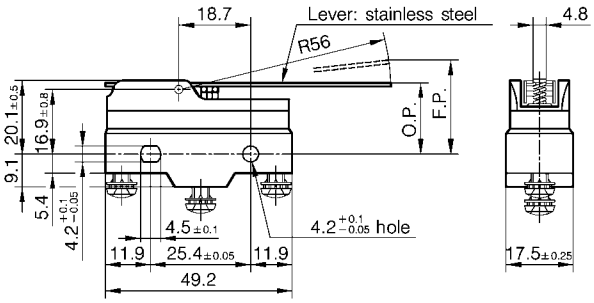
BZ-2RW822-T4-J, BZ-RW822-T4-J



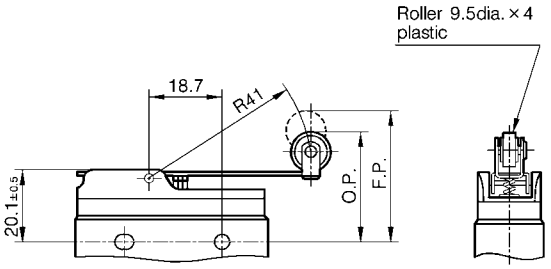
BZ-2RW826-T4-J



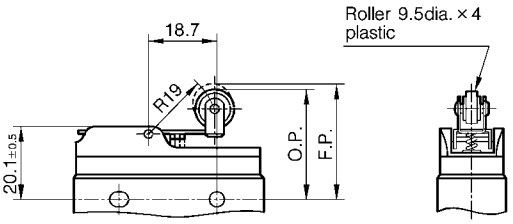
BZ-2RM-T4-J



BZ-2RM2-T4-J

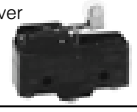


BZ-2RM22-T4-J



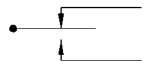
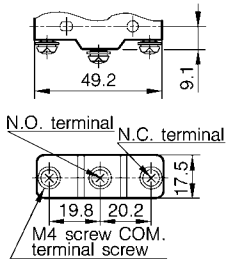
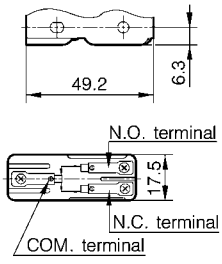
● Sealed type

Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Pin plunger 	2.50 to 4.17	Min. 1.12	Max. 17.8	–	15.9	Min. 0.13	0.01 to 0.06	M4 screw	UL/CSA	**BZ-2R55-T4-J**
								Soldered		**BZ-2R55-J**
Short plunger 	2.50 to 5.30	Min. 1.12	Max. 23	–	21.2±0.5	Min. 1.5	0.01 to 0.06	M4 screw	UL/CSA	**BZ-2RD55-T4-J**
								Soldered		**BZ-2RD55-J**
Fine plunger 	2.50 to 4.17	Min. 1.12	Max. 30	–	28.2±0.5	Min. 1.5	0.01 to 0.06	M4 screw	UL/CSA	**BZ-2RS55-T4-J**
								Soldered		**BZ-2RS55-J**
Lever 	Max. 0.69	Min. 0.14	27.4±0.7	–	19.1±0.7	Min. 5.6	0.18 to 1.27	M4 screw	UL/CSA	**BZ-2RW855-T4-J**
								Soldered		**BZ-2RW855-J**
Roller lever 	Max. 0.98	Min. 0.20	35.7±0.7	–	30.2±0.7	Min. 4	0.1 to 1.02	M4 screw	UL/CSA	**BZ-2RW8255-T4-J**
								Soldered		**BZ-2RW8255-J**

Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Short roller lever 	Max. 1.67	Min. 0.42	32.2±0.4	–	30.2±0.4	Min. 2.4	0.08 to 0.51	M4 screw	UL/CSA	**BZ-2RW82255-T4-J**
								Soldered		**BZ-2RW82255-J**
Reverse action lever 	Max. 1.67	Min. 0.27	22.6±1.2	–	19.1±0.8	Min. 5.6	0.1 to 0.9	M4 screw	UL/CSA	**BZ-2RM55-T4-J**
								Soldered		**BZ-2RM55-J**
Reverse action roller lever 	Max. 2.35	Min. 0.56	32.8±0.8	–	30.2±0.8	Min. 4	0.05 to 0.7	M4 screw	UL/CSA	**BZ-2RM255-T4-J**
								Soldered		**BZ-2RM255-J**
Reverse action short roller lever 	Max. 5.29	Min. 1.67	31.5±0.5	Max. 2	30.2±0.5	Min. 2	0.03 to 0.3	M4 screw	UL/CSA	**BZ-2RM2255-T4-J**
								Soldered		**BZ-2RM2255-J**

● Circuit configuration and terminal diagrams

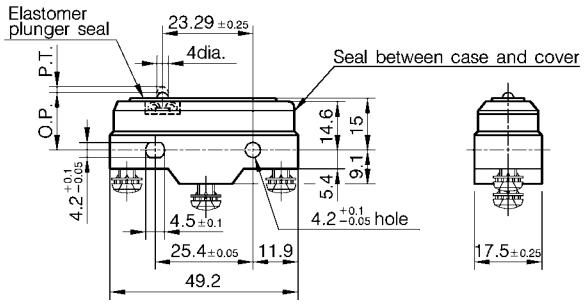
(unit: mm)

Model	Circuit configuration	Terminal dimensions	Switch mounting screw
BZ-2R□□	Single-Pole Double-Throw 	Screw terminal  Soldered terminal  **Note:** On reverse action types, the N.O. and N.C. terminal positions are reversed.	M4 screw

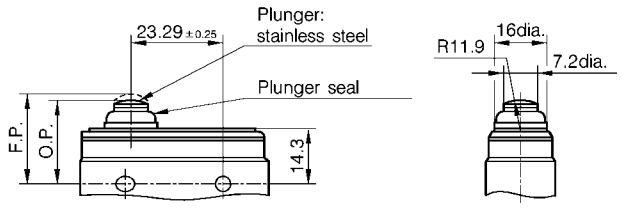
● External dimensions

(Unit: mm
General tolerance: ±0.4mm)

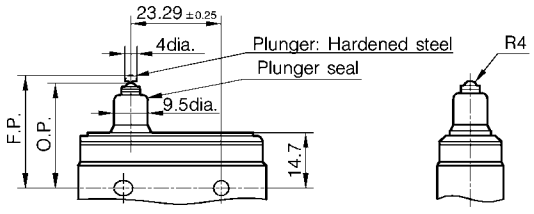
BZ-2R55-T4-J



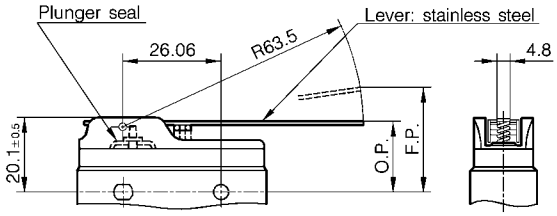
BZ-2RD55-T4-J



BZ-2RS55-T4-J

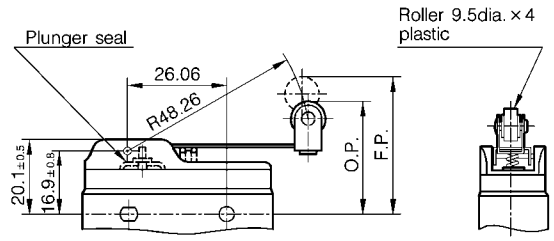


BZ-2RW855-T4-J

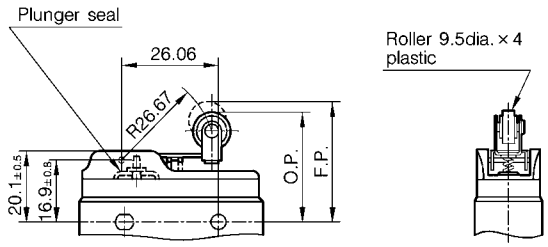


(Unit: mm
General tolerance: ±0.4mm)

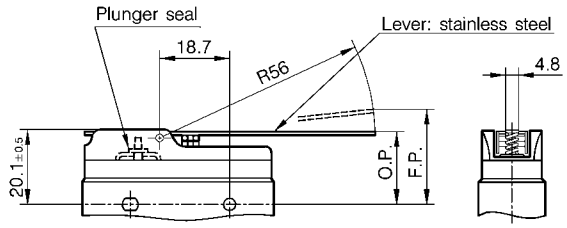
BZ-2RW8255-T4-J



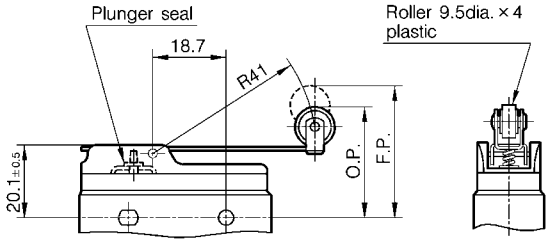
BZ-2RW82255-T4-J



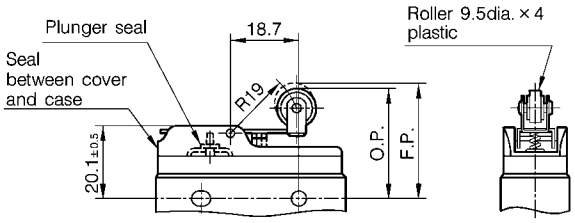
BZ-2RM55-T4-J



BZ-2RM255-T4-J



BZ-2RM2255-T4-J



EN (IEC) STANDARD COMPATIBLE BZ

Approval standard: EN 60947-5-1 (IEC 947-5-1)

EN standard compatible standard type/high sensitivity type products are available.

● **BZ** Series basic switches

Actuator, Name/Shape	Contact		Catalog listing
	Normal load	Low current load	
Pin plunger	○		**BZ-R3000-J**
		○	**BZ-R3000-JK**
	○		**BZ-2R3000-T4-J**
		○	**BZ-2R3000-T4-JK**
Short plunger	○		**BZ-RD3000-J**
		○	**BZ-RD3000-JK**
	○		**BZ-2RD3000-T4-J**
		○	**BZ-2RD3000-T4-JK**
Fine plunger	○		**BZ-2RS3000-T4-J**
		○	**BZ-2RS3000-T4-JK**
Lever	○		**BZ-RW3000-J**
		○	**BZ-RW3000-JK**
	○		**BZ-2RW3000-T4-J**
		○	**BZ-2RW3000-T4-JK**
Roller lever	○		**BZ-RW3001-J**
		○	**BZ-RW3001-JK**
	○		**BZ-2RW3001-T4-J**
		○	**BZ-2RW3001-T4-JK**

Actuator, Name/Shape	Contact		Catalog listing
	Normal load	Low current load	
Short roller lever	○		**BZ-RW3003-J**
		○	**BZ-RW3003-JK**
	○		**BZ-2RW3003-T4-J**
		○	**BZ-2RW3003-T4-JK**
One-way roller lever	○		**BZ-2RW3005-T4-J**
Panel mount plunger	○		**BZ-RQ3000-J**
		○	**BZ-RQ3000-JK**
	○		**BZ-2RQ3000-T4-J**
		○	**BZ-2RQ3000-T4-JK**
Panel mount roller plunger	○		**BZ-RQ3001-J**
		○	**BZ-RQ3001-JK**
	○		**BZ-2RQ3001-T4-J**
		○	**BZ-2RQ3001-T4-JK**
Panel mount cross roller plunger	○		**BZ-RQ3002-J**
		○	**BZ-RQ3002-JK**
	○		**BZ-2RQ3002-T4-J**
		○	**BZ-2RQ3002-T4-JK**

Note: Electrical rating in EN (IEC) standard approval
BZ-R ..... Standard load: 250Vac-2A, 30Vdc-0.5A
Low current load: 125Vac-0.1A, 30Vdc-0.1A
BZ-2R ..... Standard load: 250Vac-3A, 30Vdc-1A
Low current load: 125Vac-0.1A, 30Vdc-0.1A

Note: Approving body TÜV Rheinland, Approval No. R9551070

Note: UL/CSA also acquired

Note: For details of operation specifications, refer to the same actuator for the BZ general purpose type.

● Specifications

Rated operating voltage	Standard load	250Vac or 30Vdc
	Low current load	125Vac or 30Vdc
Application category and rating	Standard load	AC-15 3A-250Vac, DC-12 1A-30Vdc
	Low current load	AC-12 0.1A-125Vac, DC-12 0.1A-30Vdc
Rated frequency		45 to 65Hz or ''d.c.''
Rated insulating voltage (Ui)		250Vac
Rated impulse dielectric strength (Uimp)		4,000V
Rated energizing current (Ith)	Standard load	15A
	Low current load	1A
Short-circuit protection mechanism		Instant blowing fuse 15A, ABC made by BUSSMANN or equivalent
Conditional rated short-circuit current		100A
Switching overvoltage		Category III (IEC 4-1)
Electrical protection		Class II (IEC 536)

LOW CURRENT LOAD TYPE (cross point contact)

Low current load type standard, high sensitivity and rain-proof type **BZ** switches can be produced uniformly. However, for details on other types, contact your agent.

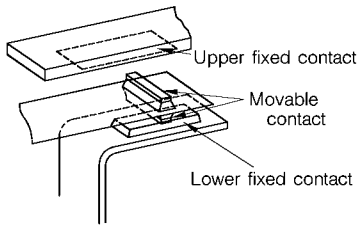
● Features

- As these are cross point contacts, contacts are concentrated at one location for enabling stable contact pressure.
- Gold alloy contacts are used to enable stable contact resistance at all times.
- These switches are ideal for use when minor changes in contact resistance are a problem, for example, when switching low current loads.

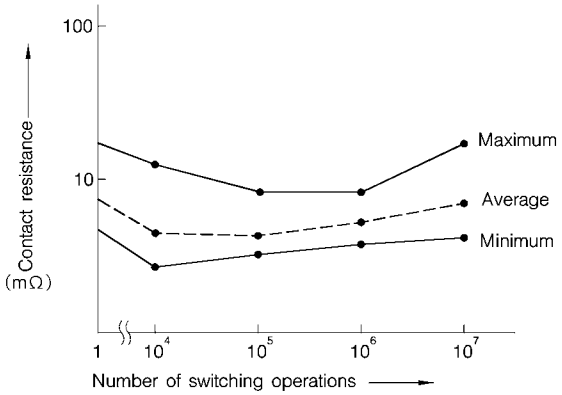
● Applications

- Copiers
- Peripheral and terminal equipment
- Automatic vendors
- NC machine tools
- Switching of miniature loads such as transistors and ICs

● Enlarged view of contact area



Gold alloy cross point contact



Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Same as general purpose type, high sensitivity type and sealed type. Refer to the respective page.										

Note: If the appended abbreviation **-JK** is made by attaching **K** to **-J** at the end of the model No., the type becomes a low current load type.

SPECIFICATIONS

Type			Standard - sealed	High sensitivity	Low current load
Representative catalog listing			**BZ-2R-T4-J**	**BZ-R-T4-J**	**BZ-2R-T4-JK**
External standard	Conformed standards		JIS C 4505		
	Approved standards		UL/CSA		–
Structure	Contact type		Single-Pole Double-Throw (SPDT)		Single-Pole Double-Throw (SPDT)
	Contact shape		Rivet		Cross point
	Contact material		Pure silver		Gold alloy
	Terminal shape		Soldered terminal, M4 screw terminal		Soldered terminal, M4 screw terminal
Electrical rating			See Tables BZ.1, BZ.2 and BZ.3.		
Electrical characteristics	Dielectric strength	Between non-continuous terminals	1,000V	600V	Refer to respective type.
		Between each terminal and non-conducting metal part	2,000V		1,250V
		Between each terminal and ground	2,000V		1,250V
	Insulation resistance		Min. 100MΩ (by a 500Vdc megger)		
	Initial contact resistance		Max. 15mΩ		50mΩ
	Temperature rise		30°C		50°C
	Inrush current		N.C.: 250Vac-30A, N.O.: 250Vac-15A		–
Mechanical characteristics	Actuator strength		Withstand load 10 times O.F. (operating direction) for 1 minute		
	Terminal strength		Soldered terminal: Withstand tensile load of 23N for 1 minute M4 screw terminal: Withstand tightening strength of 1.2N-m for 1 minute M3 screw terminal: Withstand tightening strength of 0.8N-m for 1 minute		
	Impact resistance**		300m/s²*	200m/s²*	Refer to respective type.
	Vibration resistance**		1.5mm peak-to-peak amplitude, frequency 10 to 55Hz, for 2 continuous hours*		
	Allowable operating speed		0.01mm/s to 0.3m/s*		0.01mm/s to 0.3m/s*
	Operating cycle		Max. 240 cycles/minutes		
Life	Mechanical life		Min. 20 million cycles, operating frequency 60 cycles/minute*		Min. 20 million cycles* operating frequency 60 cycles/minute
	Electrical life		250Vac-15A resistive load, min. 500,000 cycles		Min. 125Vac-0.1A resistive load, 20 million cycles
Environmental characteristics	Operating temperature range		–20 to +70°C (sealed type: –15 to +70°C)		
	Operating humidity range		Max. 85%RH		
Mounting	Recommended tightening torque		1.3 to 1.7N-m (M4 screw)		
	Insulation		Use an isolator when mounting.		

Note: * indicates value in above representative catalog listing. Unmarked items are values common to predecessor models in the series.
Note: ** indicates that the contact distance at the free position and final overtravel position is 1 ms or less.

Table **BZ**. 1 Electrical rating

Series	**BZ-2R**	**BZ-R**	Low current load type **BZ**
Rating	UL/CSA rating, 125, 250, 480Vac-15A, ⅛HP-125Vac, ¼HP-250Vac, 125Vdc-½A 250Vdc-¼A	UL/CSA rating, 125, 250, 480Vac-15A	125Vac-0.1A, 30Vdc-0.1A

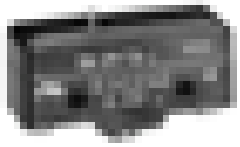
Table **BZ**. 2 Electric duty 1

Rating	AC rating												DC rating									
Rated voltage	125Vac				250Vac				480Vac				8Vdc		14Vdc		30Vdc		115Vdc		230Vdc	
Switching load	Resistance	Induction	Electric motor		Resistance	Induction	Electric motor		Resistance	Induction	Electric motor		Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction
			N.C.	N.O.			N.C.	N.O.			N.C.	N.O.										
BZ-2R□□	15	10	4	2	15	10	3	1.5	3	2	–	–	15	15	15	10	6	5	0.5	0.05	0.25	0.03
BZ-R□□									2	1.5			–									

High Capacity Basic Switches BA, BE Series

FEATURES

For Switching of Large Currents.



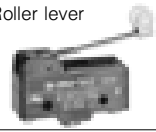
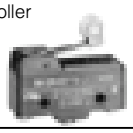
- Large currents can be switched by increasing the contact pressure.
- The electrical rating of BA type switches is 20A at all times.
- The BE type with current rating of 25A is ideal for use with particularly high capacities.
- A wide range of actuator type switches and auxiliary actuators is available.

APPLICATIONS

This switch is ideal when switching of large currents is required or for circuits subject to large inrush currents such as solenoids and lamps.

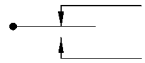
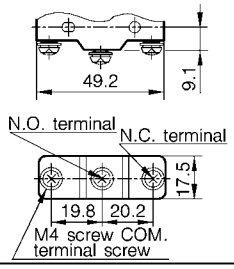
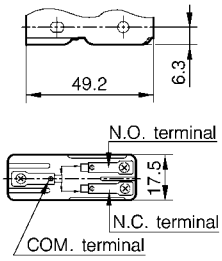
BA TYPE (20A)

- Order Guide

Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Pin plunger 	3.89 to 6.12	Min. 2.79	–	Max. 1.3	16.3±0.4	Min. 0.25	0.05 to 0.19	M4 screw	UL/CSA	**BA-2R-T4-J**
								Soldered		**BA-2R-J**
Short plunger 	3.89 to 6.12	Min. 2.79	–	Max. 1.3	26.2±0.5	Min. 2.5	0.05 to 0.19	M4 screw	UL/CSA	**BA-2RB-T4-J**
								Soldered		**BA-2RB-J**
Panel mount plunger 	3.89 to 6.12	Min. 2.79	–	Max. 1.3	21.8±0.8	Min. 5.6	0.05 to 0.19	M4 screw	UL/CSA	**BA-2RQ1-T4-J**
								Soldered		**BA-2RQ1-J**
Lever 	Max. 0.70	Min. 0.14	Max. 34.9	Max. 15.9	19±0.8	Min. 4	Max. 2.4	M4 screw	UL/CSA	**BA-2RV-T4-J**
								Soldered		**BA-2RV-J**
Roller lever 	Max. 0.97	Min. 0.14	Max. 42.1	Max. 11.9	30.2±0.8	Min. 2.4	Max. 2.16	M4 screw	UL/CSA	**BA-2RV2-T4-J**
								Soldered		**BA-2RV2-J**
Short roller lever 	Max. 1.57	Min. 0.42	Max. 36.1	Max. 6.4	29.8±0.4	Min. 1.2	1.Max. 2	M4 screw	UL/CSA	**BA-2RV22-T4-J**
								Soldered		**BA-2RV22-J**

● Circuit configuration and terminal diagrams

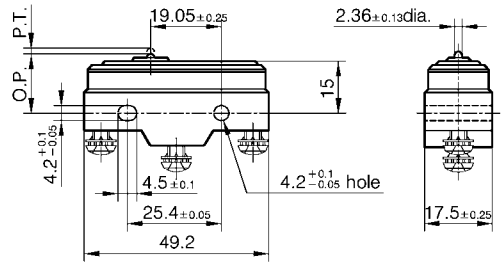
(unit: mm)

Model	Circuit configuration	Terminal dimensions	Switch mounting screw
BA	Single-Pole Double-Throw (SPDT) 	Screw terminal  Soldered terminal 	M4 screw

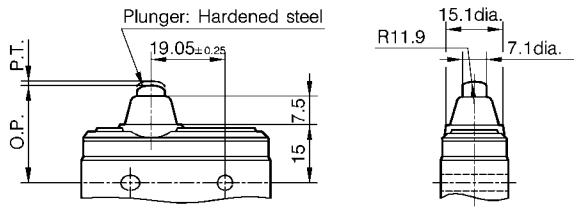
● External dimensions

(Unit: mm
General tolerance: ±0.4mm)

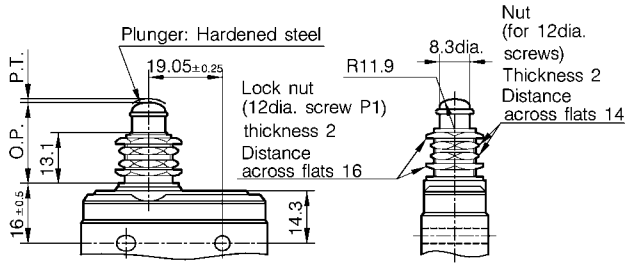
BA-2R-T4-J



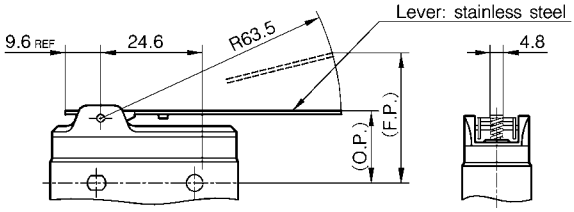
BA-2RB-T4-J



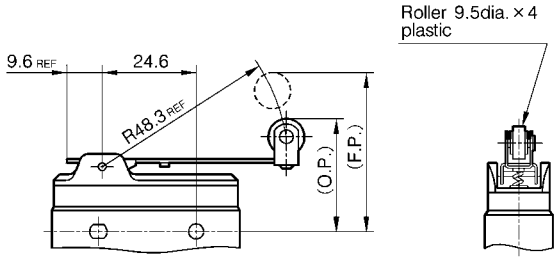
BA-2RQ1-T4-J



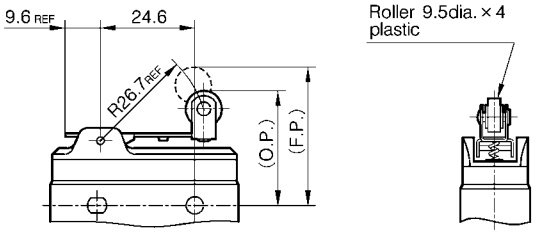
BA-2RV-T4-J



BA-2RV2-T4-J



BA-2RV22-T4-J



BE TYPE (25A)

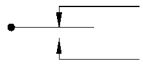
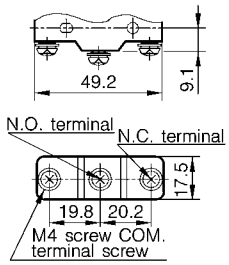
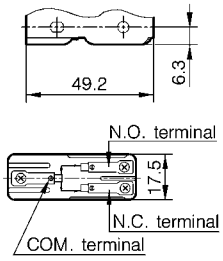
● Order guide

Actuators Name/Shape	O.F. (N) Operating force	R.F. (N) Release force	F.P. (mm) Free position	P.T. (mm) Pretravel	O.P. (mm) Operating position	O.T. (mm) Overtravel	M.D. (mm) Movement differential	Terminal	Approval standard	Catalog listing
Pin plunger 	3.89 to 6.12	Min. 2.79	–	Max. 1.3	16.3±0.4	Min. 0.25	0.05 to 0.19	M4 screw	UL/CSA	**BE-2R-T4-J**
								Soldered		**BE-2R-J**

Note: Contact your agent for selection of other actuators.

● Circuit configuration and terminal diagram

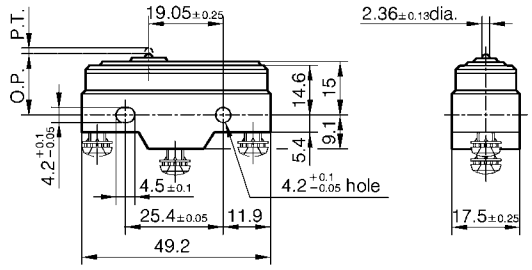
(unit: mm)

Model	Circuit configuration	Terminal dimensions	Switch mounting screw
BE	Single-Pole Double-Throw (SPDT) 	Screw terminal  Soldered terminal 	M4 screw

● External dimensions

BE-2R-T4-J

(Unit: mm
General tolerance: ±0.4mm)



SPECIFICATIONS

Type			Rating: 20A (at 125Vac)	Rating: 25A (at 125Vac)
Representative catalog listing			**BA-2R-T4-J**	**BE-2R-T4-J**
External standard	Conformed standards		JIS C 4505	
	Approved standards		UL/CSA	–
Structure	Contact type		Single-Pole Double-Throw (SPDT)	
	Contact shape		Rivet	
	Contact material		Silver	Silver-oxide cadmium
	Terminal shape		Soldered terminal, M4 screw terminal	
Electrical rating			See Tables Electrical rating 1 and 2.	
Electrical characteristics	Dielectric strength	Between non-continuous terminals	1,000V	1,000V
		Between each terminal and non-conducting metal part	2,000V	1,500V
		Between each terminal and ground	2,000V	1,500V
	Insulation resistance		Min. 100MΩ (by a 500Vdc megger)	
	Initial contact resistance		Max. 50mΩ	
	Temperature rise		30°C	50°C
	Inrush current		250Vac-75A	250Vac-96A
Mechanical characteristics	Actuator strength		Withstand load 10 times O.F. (operating direction) for 1 minute	
	Terminal strength		Soldered terminal: Withstand tensile load of 23N for 1 minute, M4 screw: Withstand tightening strength of 1.2N-m for 1 minute	
	Impact resistance**		300m/s²*	
	Vibration resistance**		1.5mm peak-to-peak amplitude, frequency 10 to 55Hz, for 2 continuous hours*	
	Allowable operating speed		0.04mm/s to 0.1m/s*	
	Operating cycle		Max. 240 cycles/minutes	
Life	Mechanical life		Min. 10 million cycles* (operating frequency 60 cycles/minute)	
	Electrical life		Min. 250Vac-20A resistive load, 400,000 cycles	Min. 250Vac-25A resistive load, 100,000 cycles
Environmental characteristics	Operating temperature range		–20 to +70°C	
	Operating humidity range		Max. 85%RH	
Mounting	Recommended tightening torque		1.3 to 1.7N-m (M4 screw)	
	Insulation		Use an isolator when mounting.	

Note: * indicates pin plunger type values. All unmarked items are values common to all models in the series.
Note: ** indicates contact release of 1ms or less at free position and operating limit positions.

Table Electrical rating 1. Electrical rating

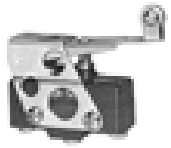
Model	BA	BE
Rating	UL/CSA rating, 125, 250, 480Vac-20A, ½HP-125Vac, 1HP-250Vac, 125Vdc-½A, 250Vdc-¼A	UL/CSA rating, 125, 250Vac-25A

● Table Electrical rating 2. Electric duty

Rating	AC rating												DC rating									
Rated voltage	125Vac				250Vac				480Vac				8Vdc		14Vdc		30Vdc		115Vdc		230Vdc	
Switching load	Resistance	Induction	Electric motor		Resistance	Induction	Electric motor		Resistance	Induction	Electric motor		Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction	Resistance	Induction
			N.C.	N.O.			N.C.	N.O.			N.C.	N.O.										
BA	20	15	7.5	7.5	20	10	5	5	10	5	–	–	20	15	20	15	6	5	0.5	0.05	0.25	0.03
BE	25	20	9.5	9.5	25	15	7	7	10	5	–	–	–	–	–	–	–	–	0.5	0.05	0.25	0.03

Basic (BZ, BA, BE) Series Auxiliary Parts

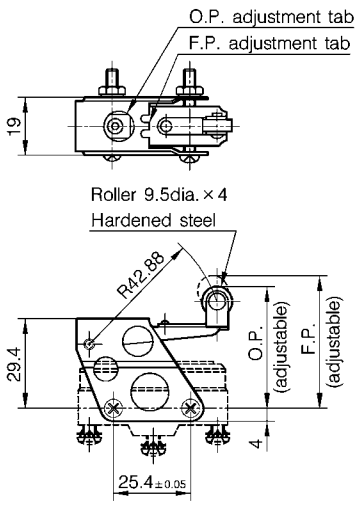
CATALOG LISTING

Actuator Name/Shape	F.P. (mm) Free position	O.P. (mm) Operating position	O.T. (mm) Overtravel	Catalog listing	Remarks
Roller lever 	39.5 to 43.7 (adjustable)	31.9 to 40.5 (adjustable)	Approx. 11.1	**AD5721R-J**	For **BZ**, M4×0.7×28REF, small round head screw (2), M4×0.7 nut (2), toothed washer (2) are provided.
Short roller lever 	42.1 (max.)	Approx. 36.1	Approx. 9.5	**AD3721R-J**	
Roller lever 	46 (max.)	Approx. 40.5	Approx. 9.5	**ADA3721R-J**	For **BA** and **BE**, M4×0.7×28REF, small round head screw (2), M4×0.7 Nut (2), toothed washer (2) are provided.
Roller plunger Cross roller plunger 	38.0 (max.)	35.2±1.2	Approx. 3.0	**MD3211-Q-J** (roller)	For **BZ**, M4 screws, nuts, and square lock washers (two each)are provided.
				MD3211-Q1-J1 **MD3211-Q1-J** (cross roller)	

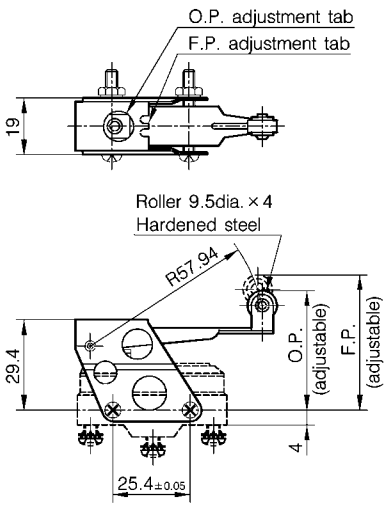
● External dimensions

(Unit: mm
General tolerance: ±0.4mm)

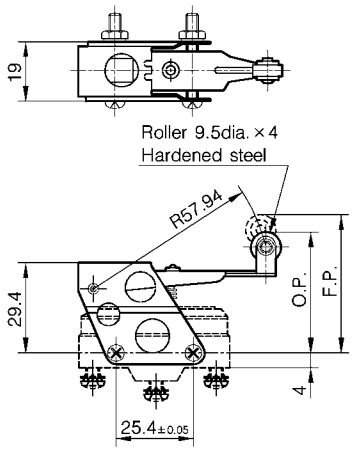
AD3721R-J



AD5721R-J

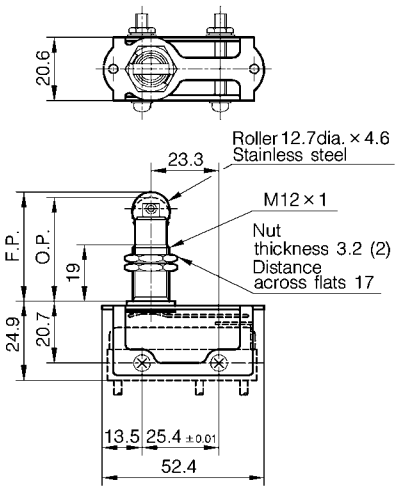


ADA3721R-J



MD3211-Q-J

(Unit: mm
General tolerance: ±0.4mm)



TERMINAL PROTECTION COVER

As this cover is tightened together with the switch mounting screw, handling is easy and contact accidents with exposed terminals are prevented.

5PA1-J
For solder terminal

5PA2-J
For screw terminal

PRECAUTIONS

● Mounting

- We recommend combined use of a spring washer and locking the screw with adhesive to prevent the screw from coming loose.
- Make sure that sufficient insulating space is maintained between terminals and the ground when the switch is mounted.
- Prevent force from being directly applied to the plunger or actuator with operating members in a free state, and use the switch in such a way that force is applied perpendicularly to the plunger.
- Set function after operating to at least 70% of the rated O.T. as the standard setting.
- When mounting the lever type switch, do not apply unnecessary force from the direction opposite to operation direction and from the side.

● Wiring

- Soldered terminals

Solder the terminal using a 60W soldering iron (soldering iron tip temperature: max. 350°C) making sure that the soldering time is kept to within five seconds. During soldering, prevent force from being applied to the terminals.

- Screw terminals

Tighten using round or open tip (Y-shaped) crimped terminals by a torque of 0.6N-m or less.

● Selecting the switch

- Select the switch taking into consideration that the switch should not malfunction even if the operating characteristics change by ±20% of the rated values.

● Environmental considerations

- Avoid use at dusty locations or at locations subject to corrosive gases or silicon that may adversely influence the contacts.

● Handling precautions

- When using the switch for switching inductive loads (relays, solenoids, buzzers, etc.), arc may cause the contacts to malfunction. To prevent this, we recommend inserting an adequate spark eliminating circuit.
- Reliability may drop if synchronization occurs in the AC circuit.

● Checking the actual load

- To improve reliability during actual use, we request that you check the quality of the switch in an actual operating state.

RESTRICIONS ON USE

This product has been designed, developed and manufactured for general-purpose application in machinery and equipment. Accordingly, when used in applications outlined below, special care should be taken to implement a fail-safe and/or redundant design concept as well as a periodic maintenance program.

- Safety devices for plant worker protection
- Start/stop control devices for transportation and material handling machines
- Aeronautical/aerospace machines
- Control devices for nuclear reactors

Never use this product in applications where human safety may be put at risk.

YAMATAKE

Specifications are subject to change without notice.

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