

## MJ2-1 Series

### Basic Limit Switch

#### ◆ Features

- ✓ Sealed actuator variants for better oil resistance
- ✓ High temp. resistant phenolic enclosure types (T385J)
- ✓ Fire resistant phenolic enclosure types (T200HF)

#### ◆ Recognition(s)

- ✓ CE – EN61058-1
- ✓ UL – UL-508
- ✓ CCC – GB14048.5-2008
- ✓ VDE – 0630/04.86
- ✓ RoHS Compliant
- ✓ Reach Unaffected



#### ◆ Characteristics

Positive Opening	Electrical Contact	Terminal Type	Contact Form(s)	Poles & Throws	Actuation Sequence(s)
No	3 Points	Screw	Form C	SPDT	Break(1) Make(2)

Operating Temp.	AC Rated	DC Rated	IP	Oil Resist	Dust Resist	Water Resist	Operating Speed
-15 to 80 C -15 to 150 C (phenolic)	15A 125V-250V, 20A 125V-250V	0.5A 125V, 0.25A 250V	40	Yes or No	No	No	0.01mm to 1m/sec

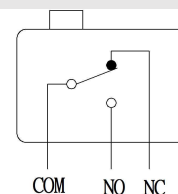
Operation Frequency	Contact Resistance	Insulation Resistance	Vibration
Mechanically: 240/min Electrically: 20/min	15mΩ max. (initial)	100MΩ min. (500VDC)	1.5mm amplitude at 10-55Hz

Storage Humidity	Service Life (min.)	Dielectric Strength
85% RH max	Mechanically: 20,000,000 operations Electrically: 500,000 operations	1000VAC, 50/60Hz for 1 minute between non-continuous terminals 2000VAC, 50/60Hz for 1 minute between current-carry part and ground

#### Recommended tightening forces

Purpose	Screw type	Tightening
Mounting	M4	1.18~1.37 N·m
Panel Mount Screw Nut		2.94~4.92 N·m
Screw terminal		0.25±0.05 N·m

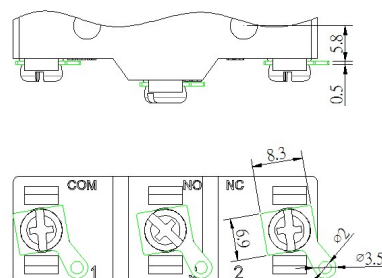
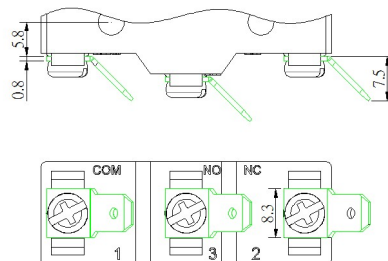
#### Circuitry

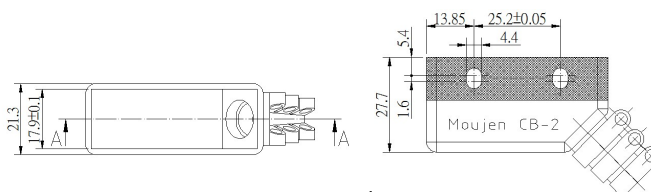
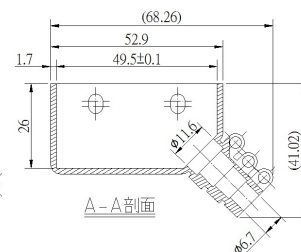


#### ◆ Materials

Actuation touch part	Electrical contact point	Enclosure
Nylon, Stainless Steel, Teflon, POM, Nickel plated copper or brass	Silver 99.9%	PBT plastic with glass fiber, or Phenolic resin (T385J or T200HF)

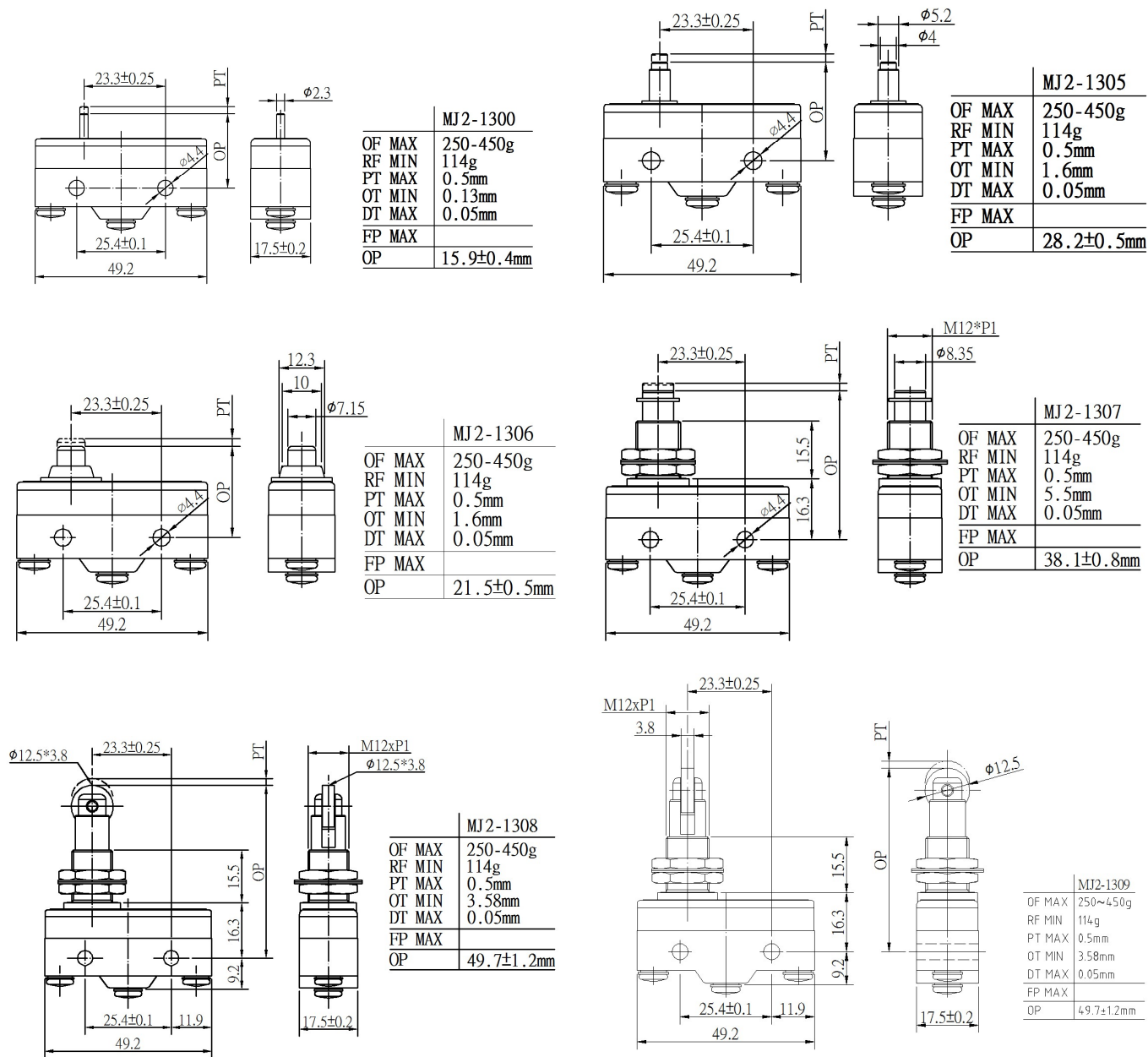
# ◆ Nomenclature

Series:	Actuator:	Terminal:	Enclosure Material:	Amps:
MJ2 –	1704 –		PH –	20
	<p>1300=Nickel plated copper Pin plunger 1305=Nickel plated copper Pin plunger, tall 1306=Nickel plated copper Plunger, short 1307=Nickel plated copper Plunger, tall, panel mount 1308=SUS303 Roller metal plunger, panel mount 1309=SUS303 Cross roller metal plunger, panel mount 1326=Teflon Plunger, short 1327=Teflon Plunger, tall, panel mount 1328=Teflon Roller metal plunger, panel mount 1329=Teflon Cross roller metal plunger, panel mount</p> <p>1500=Cat whisker metal lever 1503=POM Roller metal lever, r31.9mm, 1-way action 1504=POM Roller metal lever, r53.8mm, 1-way action 1506=Simulated roller metal lever, r28.1mm 1523=SUS303 Roller metal lever, r31.9mm, 1-way act 1524=SUS303 Roller metal lever, r53.8mm, 1-way act</p> <p>1701=Straight metal Lever, r63.5mm 1702=Straight metal Lever, r38.2mm 1703=POM Roller metal lever, r48.5mm 1704=POM Roller metal lever, r26.6mm 1705=POM Roller metal lever, r37.2mm 1706=Straight metal Lever, r28.7mm 1707=Straight metal Lever, r53mm 1708=PBT plastic lever, Red push lever type 1723=Nickel plated brass Roller metal lever, r48.5mm 1724=Nickel plated brass Roller metal lever, r26.6mm 1725=Nickel plated brass Roller metal lever, r37.2mm</p> <p><b>With Oil Resist Boot Seals</b></p> <p>1315=Nickel plated copper Pin plunger, tall 1316=Nickel plated copper Plunger, short 1317=Nickel plated copper Plunger, tall (no panel mount) 1336=Teflon Plunger, short 1337=Teflon Plunger, tall</p> <p>1513=POM Roller metal lever, r31.9mm, 1-way action 1514=POM Roller metal lever, r53.8mm, 1-way action 1516=Simulated roller metal lever, r28.1mm 1533=SUS303 Roller metal lever, r31.9mm, 1-way act 1534=SUS303 Roller metal lever, r53.8mm, 1-way act</p> <p>1711=Straight metal lever, r63.5mm 1712=Straight metal lever, r38.2mm 1713=POM Roller metal lever, r48.5mm 1714=POM Roller metal lever, r26.6mm 1733=Nickel plated brass Roller metal lever, r48.5mm 1734=Nickel plated brass Roller metal lever, r26.6mm</p>	<p><i>Blank</i>=Screw A=Quick (250, t=6.37mm) S=Soldering</p> <p><i>Blank</i>=Plastic PH=Phenolic (T385J) FR=Phenolic (T200HF)</p> <p><i>Blank</i>=15A 20=20A (only applicable to Phenolic enclosure types)</p>	<p><b>S – Soldering Terminal</b></p>  <p><b>A – Quick Connect Terminal</b></p> 	


**CB-2 – Terminal protection cover**


## ◆ Dimensions & Operating Characteristics

\*Measurements in *millimeters*



MJ2-1300



MJ2-1305



MJ2-1306



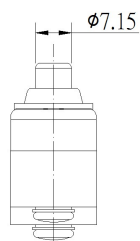
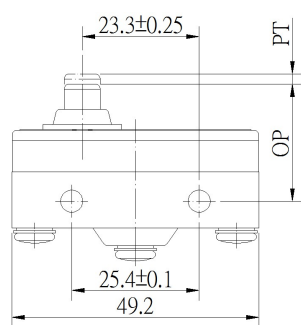
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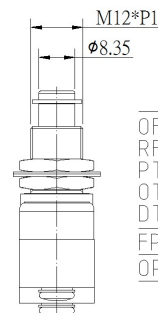
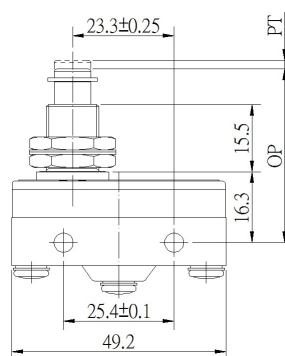
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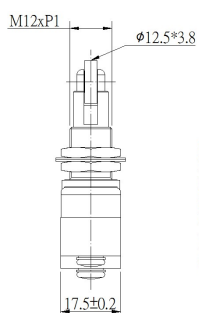
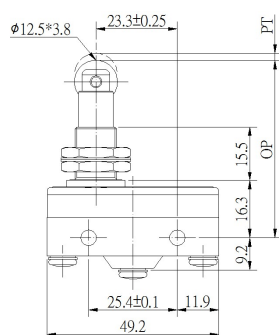
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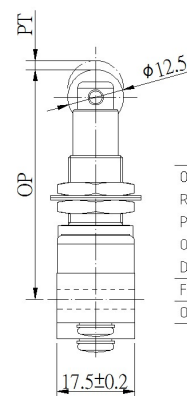
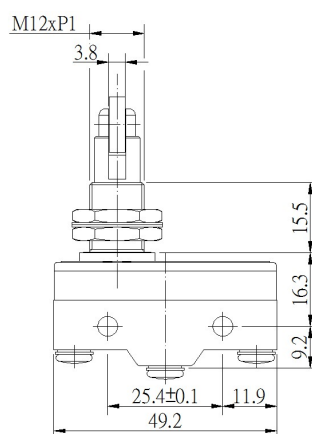
	MJ2-1326
OF MAX	250~450g
RF MIN	114g
PT MAX	0.5mm
OT MIN	1.6mm
DT MAX	0.05mm
FP MAX	
OP	21.5±0.5mm



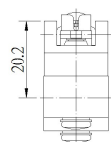
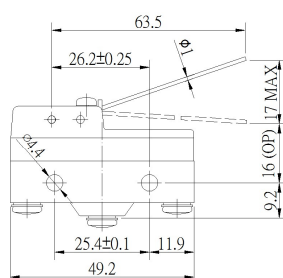
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OF MAX	250~450g
RF MIN	114g
PT MAX	0.5mm
OT MIN	5.5mm
DT MAX	0.05mm
FP MAX	
OP	38.1±0.8mm



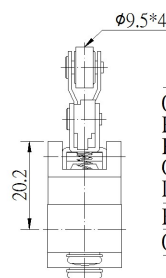
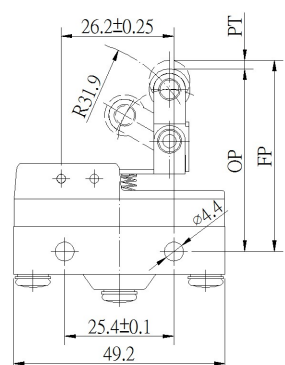
	MJ2-1328
OF MAX	250~450g
RF MIN	114g
PT MAX	0.5mm
OT MIN	3.58mm
DT MAX	0.05mm
FP MAX	
OP	49.7±1.2mm



	MJ2-1329
OF MAX	250~450g
RF MIN	114g
PT MAX	0.5mm
OT MIN	3.58mm
DT MAX	0.05mm
FP MAX	
OP	49.7±1.2mm



	MJ2-1500
OF MAX	10g
RF MIN	5g
PT MAX	10mm
OT MIN	6mm
DT MAX	3mm
FP MAX	
OP	20±1mm



	MJ2-1503
OF MAX	170g
RF MIN	42g
PT MAX	2.7mm
OT MIN	2.4mm
DT MAX	0.51mm
FP MAX	43.6mm
OP	41.3±0.8mm



MJ2-1326



MJ2-1327



MJ2-1328



MJ2-1329

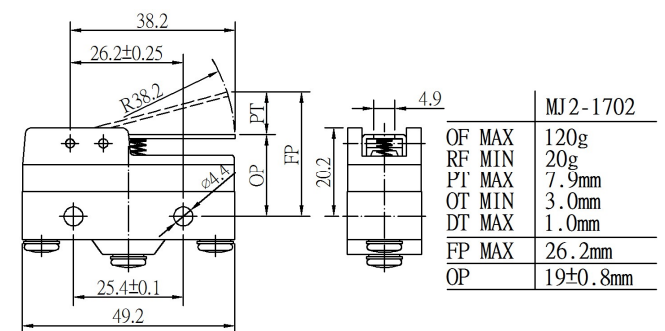
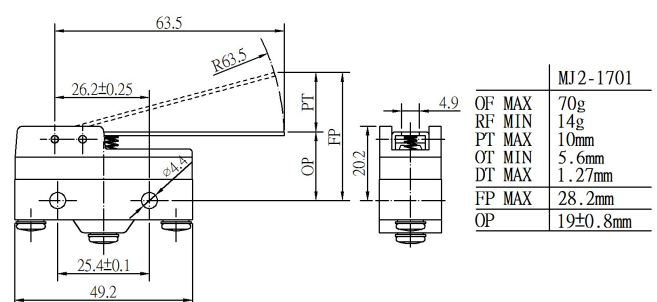
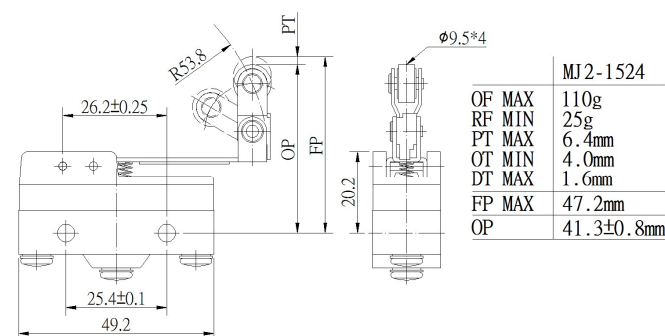
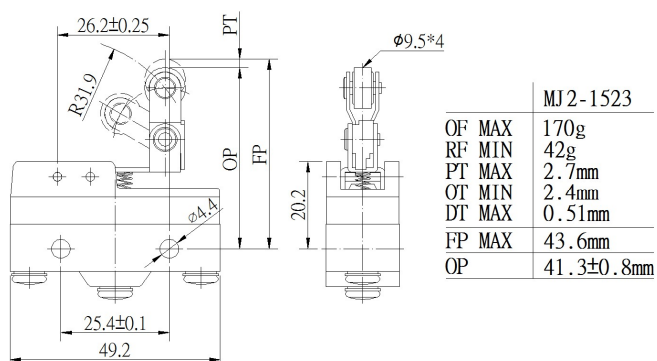
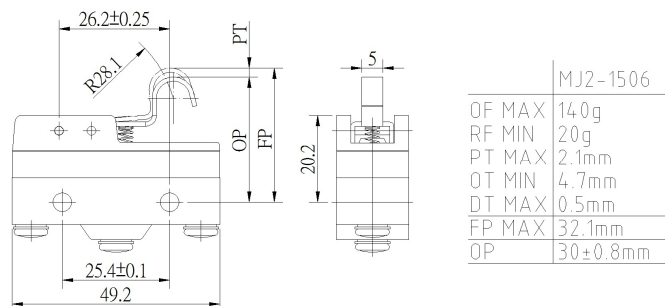
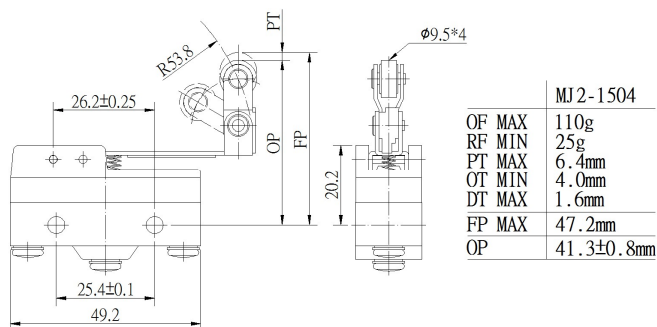


MJ2-1500



MJ2-1503





MJ2-1504



MJ2-1506



MJ2-1523



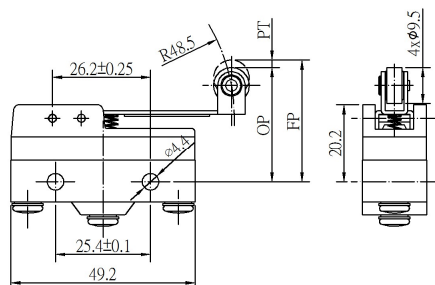
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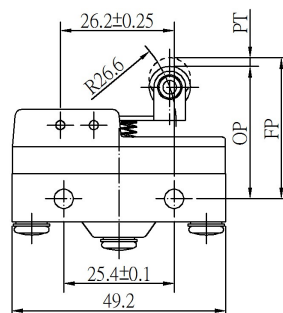
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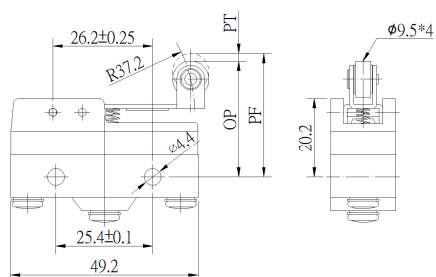
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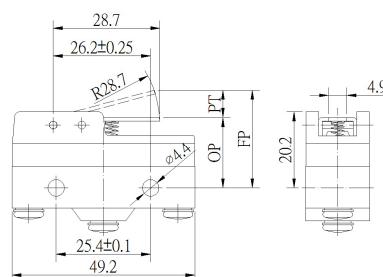
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OF MAX	100g
RF MIN	21g
PT MAX	7.1mm
OT MIN	4.0mm
DT MAX	1.6mm
FP MAX	36.5mm
OP	30.2±0.8mm



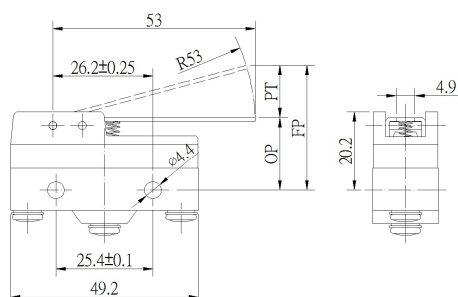
	MJ2-1704
OF MAX	160g
RF MIN	42g
PT MAX	3.5mm
OT MIN	2.4mm
DT MAX	0.5mm
FP MAX	34.5mm
OP	30.2±0.8mm



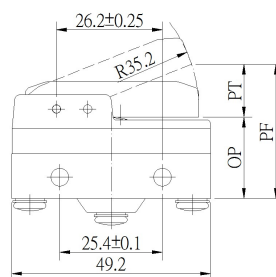
	MJ2-1705
OF MAX	125g
RF MIN	33g
PT MAX	5.7mm
OT MIN	3.4mm
DT MAX	1.1mm
FP MAX	35.8mm
OP	30.2±0.8mm



	MJ2-1706
OF MAX	120g
RF MIN	20g
PT MAX	6mm
OT MIN	3.0mm
DT MAX	1.0mm
FP MAX	25mm
OP	19±0.8mm



	MJ2-1707
OF MAX	90g
RF MIN	16g
PT MAX	9mm
OT MIN	4.8mm
DT MAX	1.15mm
FP MAX	27.2mm
OP	19±0.8mm



	MJ2-1708
OF MAX	180g
RF MIN	40g
PT MAX	6.0mm
OT MIN	1.4mm
DT MAX	1.5mm
FP MAX	30.1mm
OP	24.5±0.8mm



MJ2-1703



MJ2-1704



MJ2-1705



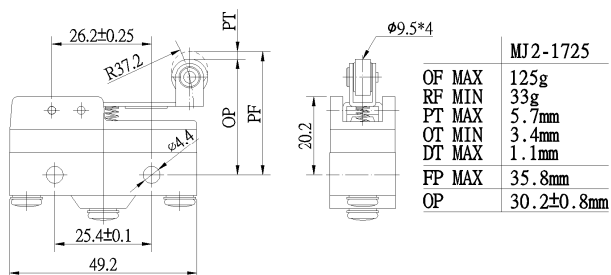
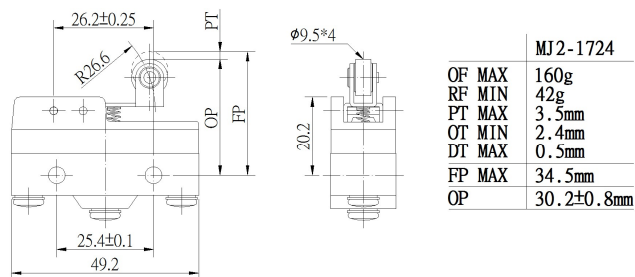
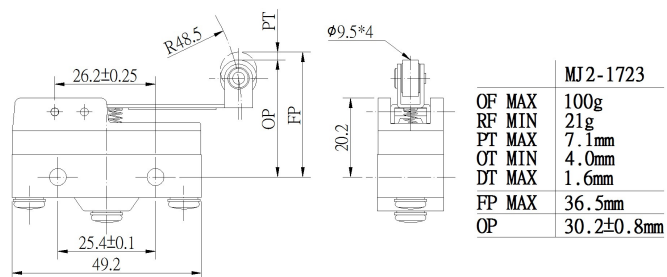
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MJ2-1707



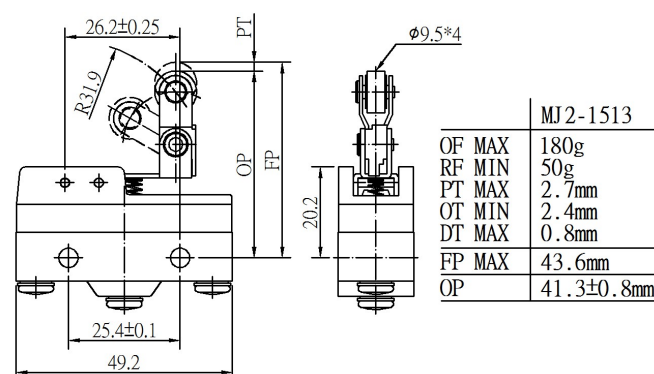
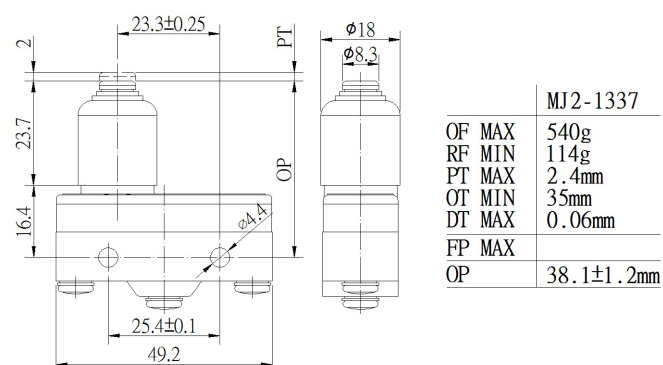
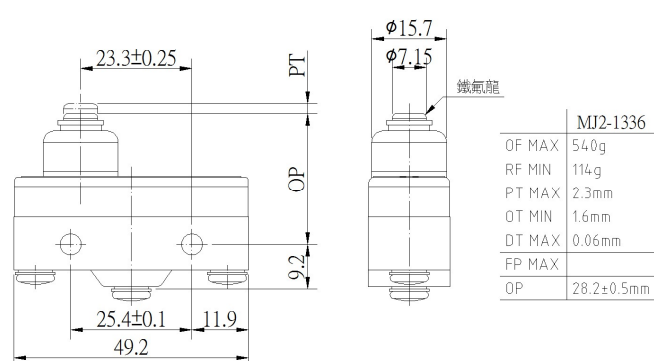
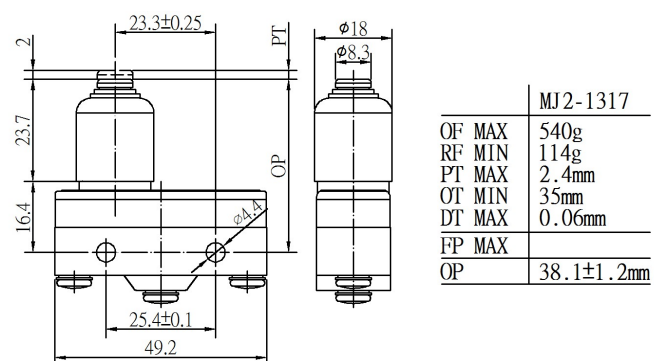
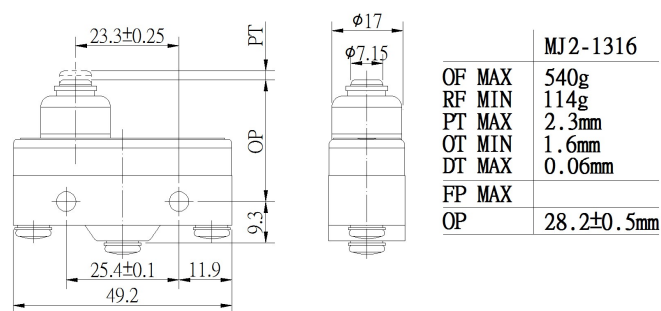
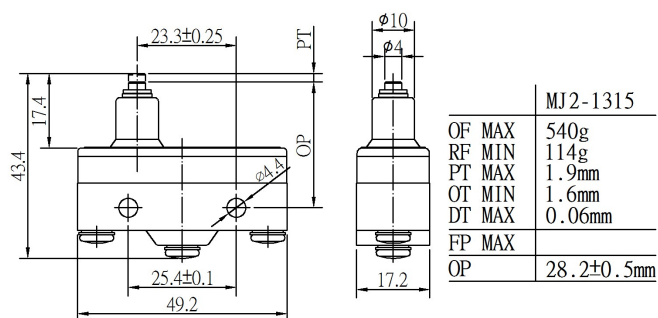
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**MJ2-1723**

**MJ2-1724**

**MJ2-1725**

# With Oil Resist Boot Seals



MJ2-1315



MJ2-1316



MJ2-1317



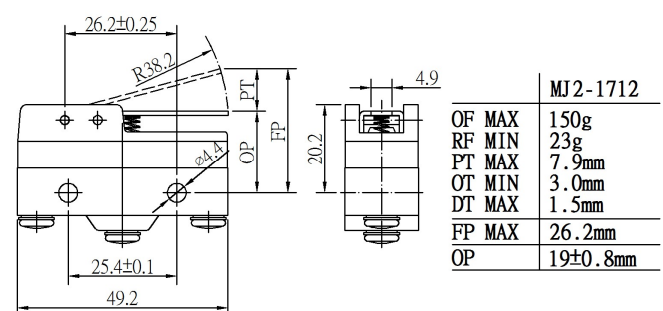
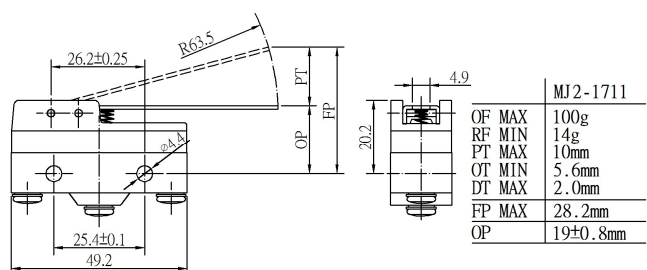
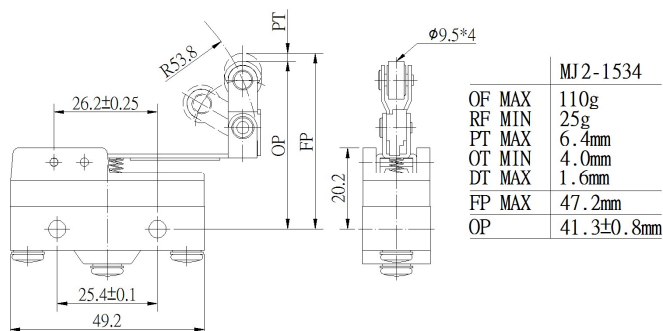
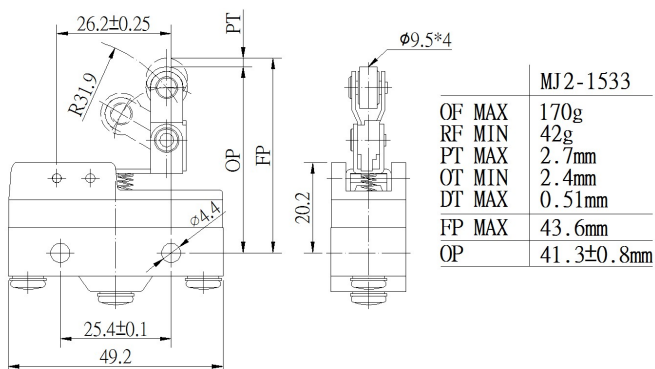
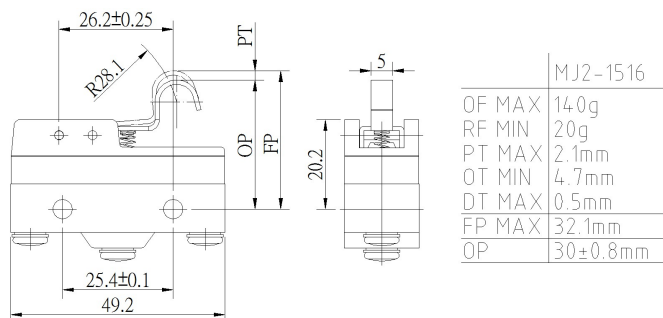
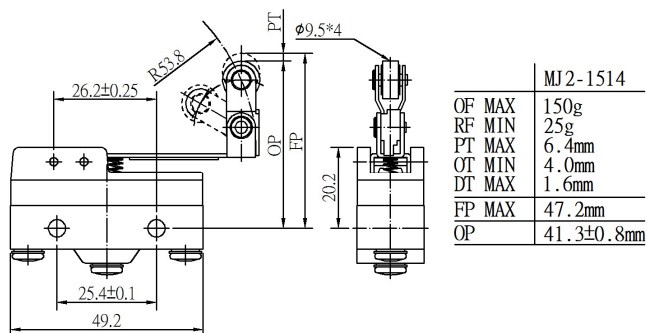
MJ2-1336



MJ2-1337



MJ2-1513



MJ2-1514



MJ2-1516



MJ2-1533



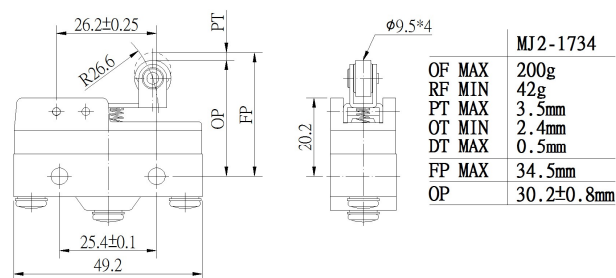
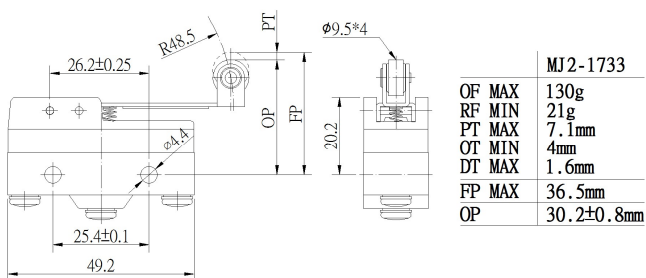
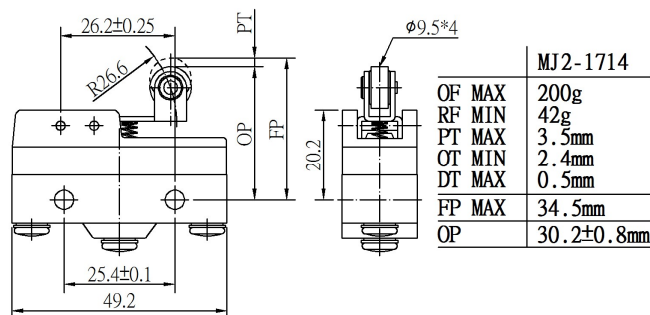
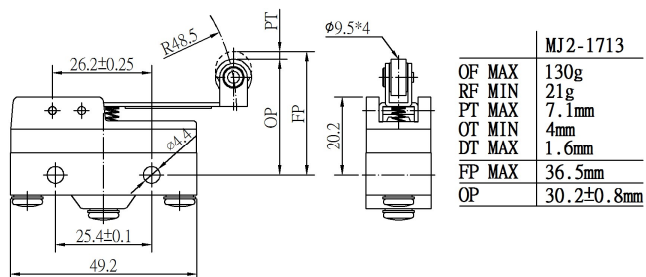
MJ2-1534



MJ2-1711



MJ2-1712



MJ2-1713



MJ2-1714



MJ2-1733



MJ2-1734



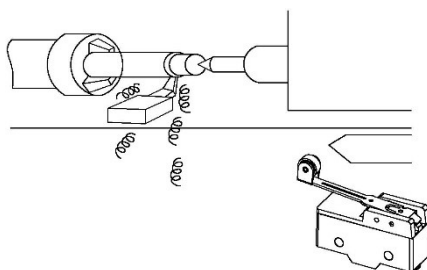
## Precautions for Safe Use

- Be sure to ground. Otherwise electric shock may result.
- Do not touch charged switch terminals while the switch is carrying current, otherwise electric shock may result.
- Do not disassemble or touch the inside while the power is turned on, otherwise electric shock may result.
- Do not handle products without proper protective gears; doing so may result in injury.
- Connect a fuse which has 1.5 to 2 times higher breaking current than the product, in order to prevent products from short-circuit damage.
- On the occasion when using the switch with EN/IEC/GB ratings, use a 10 A fuse that complies IEC60269, either type gG or gL.
- Operating conditions will affect product durability. Be sure to check with actual using conditions before usage.
- Do not drop the switch.
- Do not connect a Single Limit Switch to two power supplies that are different in polarity or type. This may increase the risk of interference.
- Be sure to keep the load current less than the rated value. Otherwise, there is the possibility that the switch may be damaged and/or burnout.
- Do not use the Switch by itself in atmospheres containing flammable or explosive gases. Arcs and heat resulted from constant actuating may cause fire or explosion.
- Be sure to prevent foreign materials such as scrapped cable intrusion into the switch when wiring. Otherwise, there is the possibility of spoiling normal operations.
- Do not wire to the wrong terminals.
- Using the Switch in a pressed-in state for an extended period of time can accelerate part deterioration and also lead to failure to return to the original position. Check the Switch beforehand, and perform periodic inspection and replacement.
- Do not store or use the switch at the following places: (i)where the temperature fluctuates greatly. (ii)where the humidity is very high and condensation may occur. (iii)Where the vibration is great. (iv)Where there is direct sun light. (v)Where exposed to salty winds. (vi)Where exposed to cutting powder, machining chips, oil, and chemicals inside the protective doors. (vii)Where exposed to cleansers, thinners, and other solvents.
- Do not use or store the Switch in locations with corrosive gas, such as sulfuric gas ( $H_2S$  or  $SO_2$ ), ammonium gas ( $NH_3$ ), nitric gas ( $HNO_3$ ), or chlorine gas ( $Cl_2$ ), or high temperature and humidity. Otherwise, contact failure or corrosion damage may result.
- Do not disassemble and/or modify the switch at any time. Otherwise, there is the possibility of spoiling the normal operation.
- Do not apply deformative and/or degenerative forces to products.
- If products have been used over an extended period of time or uses stated in products datasheets, contact reliability may still degrade due to natural oxidation; resulting in inadequate conductivity, which may lead to an accident. Please swiftly preform inspections and insure proper replacements are carried out.
- Only allow certified professionals to preform installing and maintenance tasks.

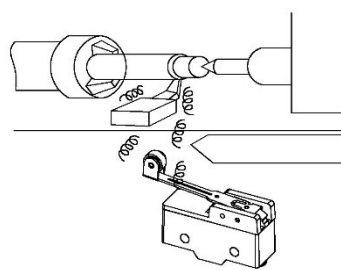
## Precautions for Correct Use

### Operating Environment

- This switch is only for indoor use. If it is used in outdoor, it may cause switch failure.
- Take special care if products are to be used at places where there is fine powder, mud and/or foreign materials accumulating. Check actual using conditions before using. If this is unavoidable, highly recommend integrating protective equipment. This is considered not Moujen's obligations.
- Seal material may deteriorate if a Switch is used outdoor or where subject to special cutting oils, solvents, or chemicals. Always appraise performance under actual application conditions and set suitable maintenance and replacement periods. This is considered not Moujen's obligations.
- Install Switches where they will not be directly subject to cutting chips, dust, or dirt. The Actuator and Switch must also be protected from the accumulation of cutting chips or sludge.



✓ Correct



✗ Incorrect

- Constantly subjecting a Switch to vibration or shock can result in wear, which can lead to contact interference with contacts, operation failure, reduced durability, and other problems. Excessive vibration or shock can lead to false contact operation or damage. Install Switches in locations not subject to shock and vibration and in orientations that will not produce resonance.
- The Switches have physical contacts. Using them in environments containing silicon gas will result in the formation of silicon oxide ( $\text{SiO}_2$ ) due to arc energy. If silicon oxide accumulates on the contacts, contact interference can occur. If silicon oil, silicon filling agents, silicon cables, or other silicon products are present near the Switch, suppress arcing with contact protective circuits (surge suppressor) or remove the source of silicon gas.
- If the Switch will be left in a location outside the storage environment conditions, if condensation has formed, or after long term storage exceeding one year, at the minimum, check the operating characteristics, contact resistance, insulation resistance, and dielectric strength. And conduct a check under the operating conditions.

### Handling & Usage

- Do not remove or replace any built-in switches. Doing so may damage the product, resulting in increased risk of malfunctioning.
- Do not use excessive force to insert, remove or twist keys of key-selector products. Doing so may damage the product, resulting in increased risk of malfunctioning.
- Do not actuate products and hold its position for excessive amounts of time. Doing so will reduce the life of the internal spring as well as structural integrity; thus, increase risk of malfunctioning.
- Do not bend or twist cables with excessive force. When bending is required, provide a bending radius of 45 mm min. so as not to damage the cable insulation or sheath. Excessive bending may cause fire or leakage current.
- To change the installation position of the actuator: By loosening the Allen-head bolt on the actuator lever, the position of the actuator can be set anywhere within 360°.
- To change the orientation of the head: By removing the head screws (two or four screws), mounting in any of four orientations is possible. Be sure to change the plunger for internal operations at the same time. The roller plunger can be set in either of two positions at 90°.
- Flipping the roller to a different side: Loosen the Allen-head bolt, allows flipping the roller to the opposite side.
- Adjusting the length of the rod or lever: The length of the rod or lever can be adjusted by loosening the Allen-head bolt.
- Adjusting the rolling arm lever: (i) The roller arm can be set freely within a range of 225° after loosening the nut. (ii) The roller arm mounting bracket can be set in any direction after loosening the nut.

## Mounting and Tightening

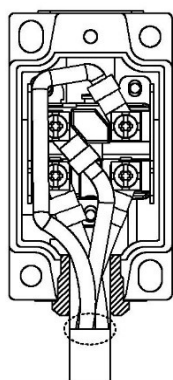
- Please view each individual product page's allowed parameters for details.
- Please follow these parameters diligently. Otherwise products may not function properly.

## Wiring & Cabling

- Use M3.5-nylon insulation covered crimp terminals (round type)
- Appropriate wire size is AWG18.
- Do not supply electric power when wiring. Otherwise electric shock may result.
- Do not pull on the wires with excessive force.
- Avoid connecting the wires directly to the terminal. Instead, attach using a crimp terminal.
- Grounding is only installed on models with ground terminals.
- In the case of prewired connector and direct connector: Holding the connector certainly when pulling connector. Do not pull the cable with excessive force.

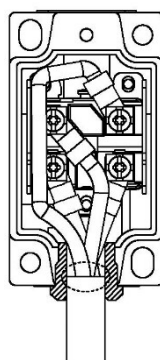
## Conduit Installation

- The connector must be tightened at a suitable tightening torque. Tightening with excessive torque could damage the case.
- Select the connector based on the sealed rubber inner diameter for matching the cable outer diameter.
- When mounting the connector, use seal tape (not needed if the connector includes an O-ring) on the threaded section of the connector to ensure sealing performance.
- To ensure compliance of this Switch with the CSA standards, use of a waterproof connector compliant to CSA regulations.
- Using an inappropriate connector or assembling Switches incorrectly (assembly, tightening torque) can result in malfunction, leakage current, or fire. Be sure to read the connector instruction manual thoroughly beforehand.
- Even when the connector is assembled and set correctly, ends of the cable inside the Switch may come in contact. This can lead to malfunction, leakage current, or fire. Thus, be sure to protect the end of the cable from splashes of oil or water and corrosive gases.
- The following wiring is recommended for preventing the entry of fluids from the conduit opening.



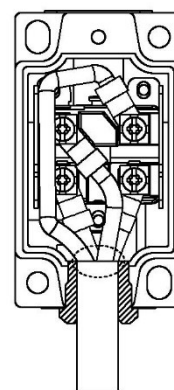
No envelopment of cable jacket in conduit. Exposed single wires.

✗ **Incorrect**



Partial/loose envelopment of cable jacket in conduit

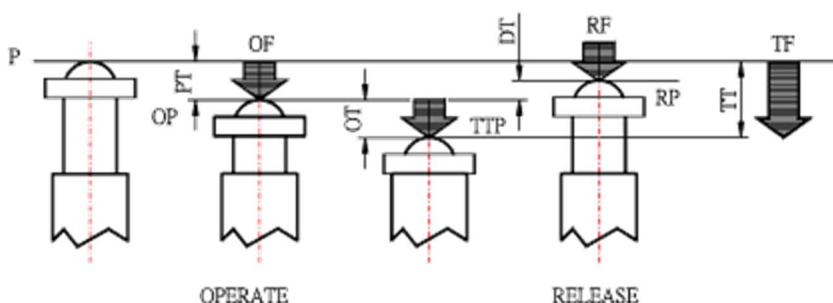
✗ **Incorrect**



Full envelopment of cable jacket in conduit.

✓ **Correct**

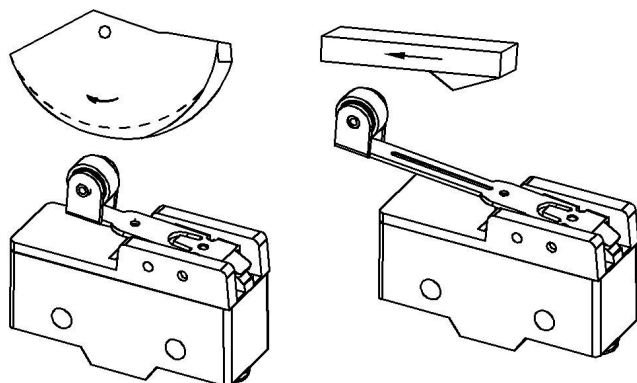
## Actuating Terminology



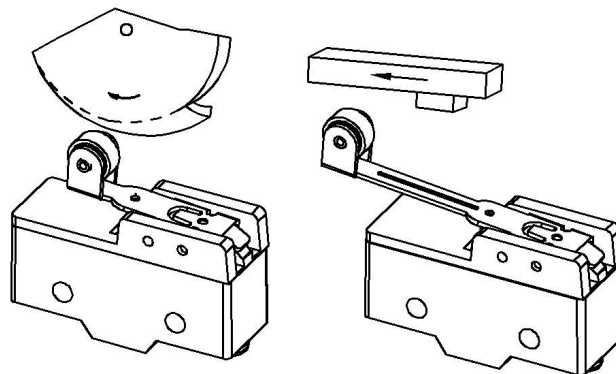
OF: Operating Force	TTP: Total Travel Position
RF: Releasing Force	PT: Pretravel
TF: Total Force	OT: Overtravel
FP: Free Position	DT: Travel Differential
OP: Operating Position	TT: Total Travel
RP: Releasing Position	

## Integrating into systems – Limit Switches

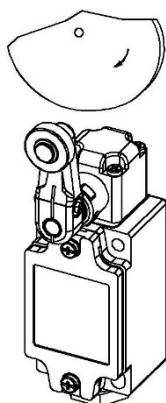
- Carefully determine the position and shape of the dog or cam so that the actuator will not abruptly snap back, thus causing shock. In order to operate the Limit Switch at a comparatively high speed, use a dog or cam that keeps the Limit Switch turned ON for a sufficient time so that the relay or valve will be sufficiently energized.
- The method of operation, the shape of the cam or dog, the operating frequency, and the travel after operation have a large influence on the durability and operating accuracy of the Limit Switch. The cam or dog must be smooth in shape.



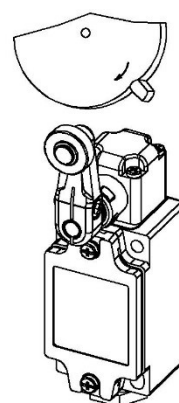
✓ Correct



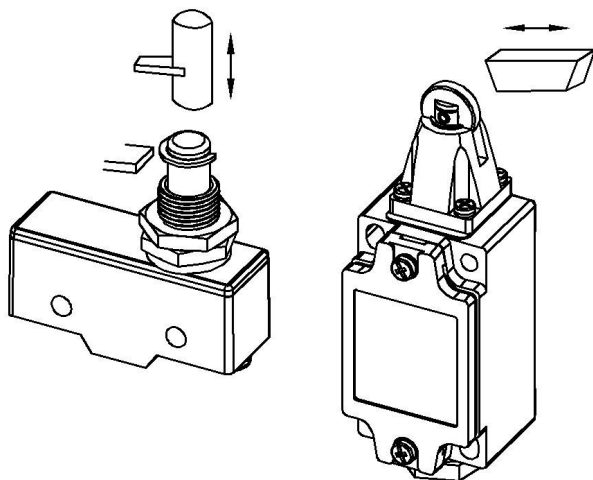
✗ Incorrect



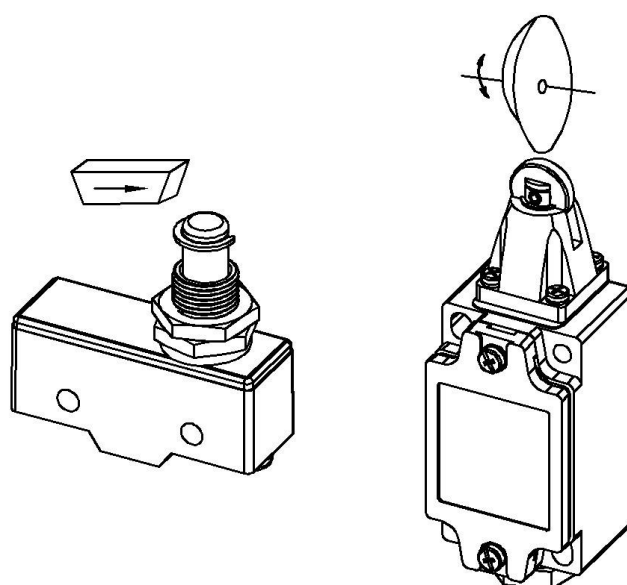
✓ Correct



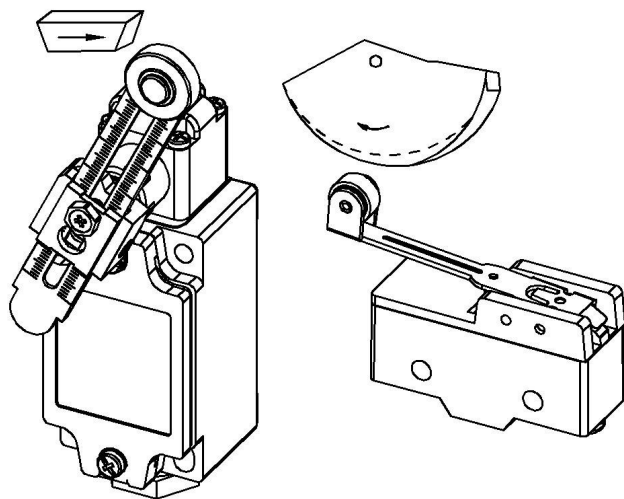
✗ Incorrect



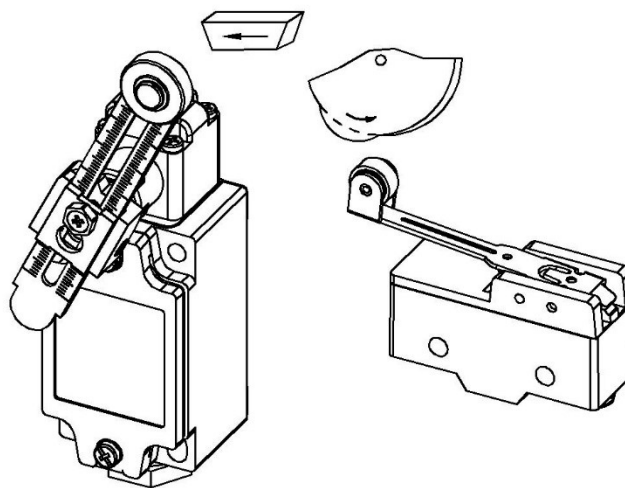
✓ Correct



✗ Incorrect

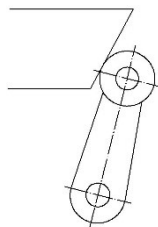


✓ Correct

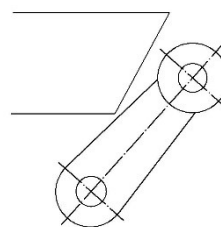


✗ Incorrect

- Appropriate force must be imposed on the actuator by the cam or dog in both rotary operation and linear operation. If the dog touches the lever as shown below, the operating position will not be stable.

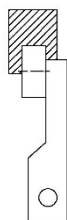


✓ Correct

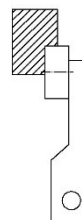


✗ Incorrect

- Unbalanced force must not be imposed on the actuator. Otherwise, wear and tear on the actuator may result.

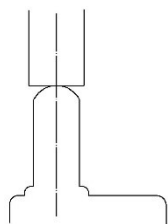


✓ Correct

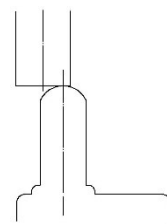


✗ Incorrect

- Mount so that the actuator travel after operation (OT) is not exceeded. If the travel after operation (OT) exceeds the limit, switch failure could result. When mounting the Limit Switch, be sure to adjust the Limit Switch carefully while considering the whole movement of the actuator.
- When using a pin-plunger actuator, make sure that the stroke of the actuator and the movement of the dog are located along a single straight line.



✓ Correct



✗ Incorrect



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