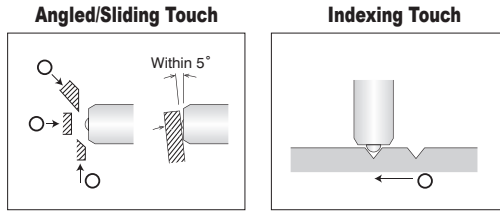


# Precision Limit Switches

## Ball Plunger Limit Switches

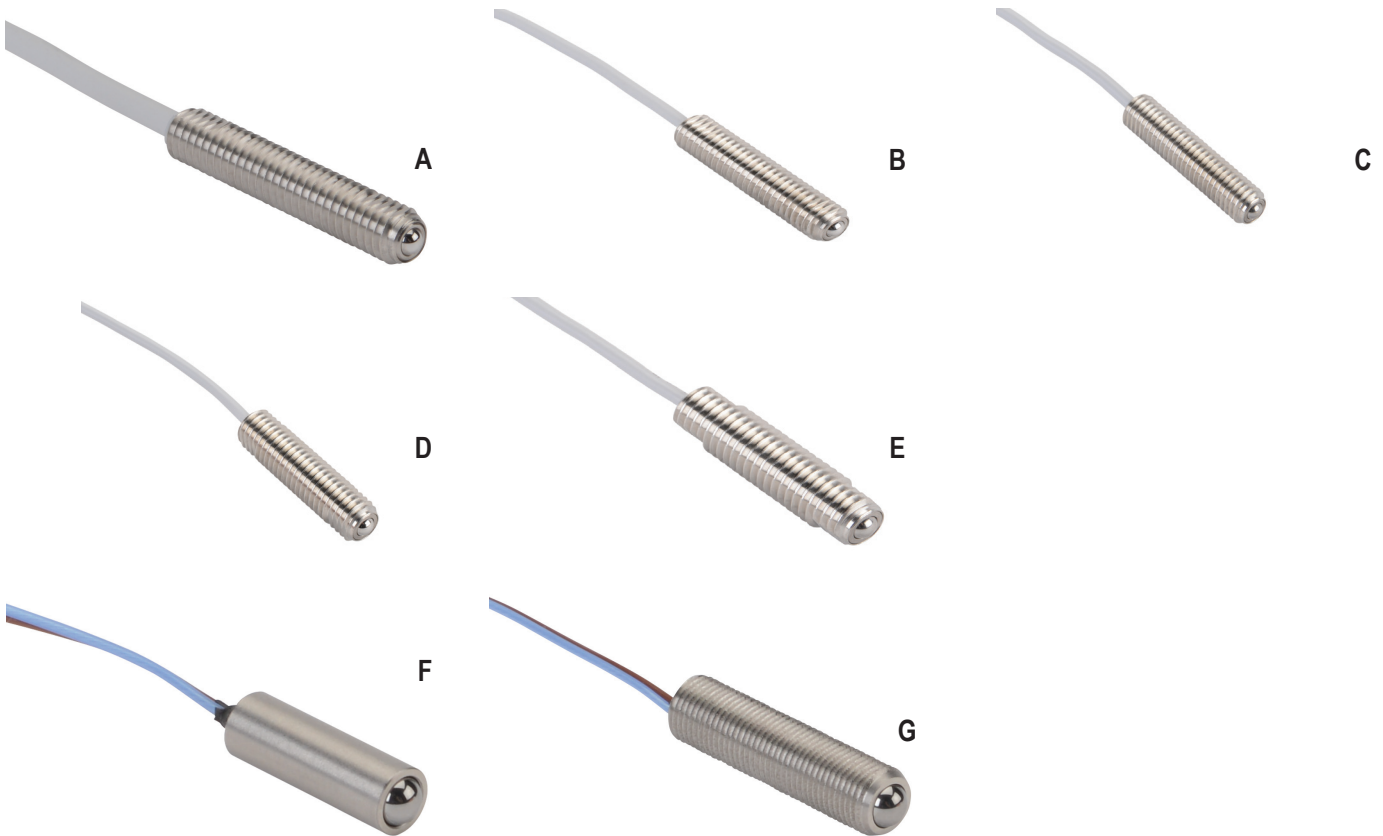
- Indexing positioning ball plunger combined with touch switch for confirmation signal
- Dual function reduces number of components required
- 10 micron ( $\mu\text{m}$ ) repeat accuracy
- Angled/Sliding Touch
- Higher contact force ideal for indexing



O indicates correct target approach and orientation.  
X indicates approach and orientation that should be avoided.

Ball Plunger Limit Switches Selection Chart										
Part Number	Price	Drawing Link	Actuator/Head Type*	Barrel Type	Barrel Diameter/Thread*	Stroke	Switching Output	Contact Force	Connection Type	Photo
<b>Indexing/Angled/Sliding Touch</b>										
<a href="#">BP060A-L</a>		<a href="#">PDF</a>	Ø 3mm ball	Threaded	Ø M6×1.0	0.8 mm	N.O.	8N (Max. 13N)	Cable, 2m length	A
<a href="#">BP060A-LF</a>		<a href="#">PDF</a>						1N		
<a href="#">BP080A-L</a>		<a href="#">PDF</a>	Ø 4mm ball					Ø M8×1.25		
<a href="#">BP080A-LF</a>		<a href="#">PDF</a>			1N	C				
<a href="#">BP100A-L</a>		<a href="#">PDF</a>	Ø 5mm ball		Ø M10×1.5	1.2 mm		10-20N		D
<a href="#">BP100A-LF</a>		<a href="#">PDF</a>						1N		E
<a href="#">BP4SWA</a>		<a href="#">PDF</a>	Ø 3mm ball	Smooth	Ø 4mm	0.8 mm	1N	Core wire, 0.5m length	F	
<a href="#">BP5MWA</a>		<a href="#">PDF</a>	Ø 3mm ball	Threaded	M5×0.5	1mm			G	

\* Ø = diameter  
-L: LED indicator (mounted in cable 120mm from the switch)



# Precision Limit Switches

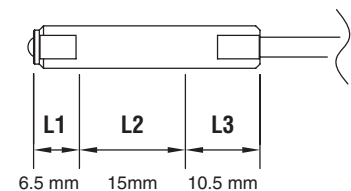
Ball Plunger Limit Switches Specifications					
Series	BP060A	BP080A	BP100A	BP4SWA	BP5MWA
<b>Environmental</b>					
Degree of Protection	IP40				
Temperature Range	Operating: 0–80°C (32–176°F) (Ice-free)				
<b>Mechanical Ratings</b>					
Enclosure Material	303 Stainless Steel				
Pretravel	0.3 mm				
Torque (for nuts on threaded barrels, set screws on smooth barrels)	See Torque Limit Figure			NA	1 N·m
Oscillation	10–55Hz total amplitude 1.5 for X, Y, Z each direction				
Impact	300 m/s <sup>2</sup> for X, Y, Z each direction				
Repeat Accuracy	Both On–Off, Off–On: 0.01 mm (range)(axial direction)*				
Recommended Minimum Operating Speed	10 mm/minute				
<b>Electrical Ratings</b>					
Contact Life	3 million operations			1 million operations	3 million operations
Contact Voltage	5–24VDC				
Steady Current Rating	10mA or less				
Max In-rush Current Rating	10mA (limit current to protect LED indicator)			20mA	
Connection Type	Cable: 2m Oil resistant Ø2.8/2 cores, Tensile strength 30N, minimum bending R7.			Core wire cable: 0.5m (×2), Oil resistant, Ø0.66, Tensile strength 15N	
Indicating	-L: LED indicator (mounted in cable 120mm from the switch)			N/A	

\* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

## Circuit Diagrams

Without LED	With LED
<p>Normally open (N.O.)</p>	<p>Normally open (N.O.)</p>

## Torque Limits



### Tightening torque for case screws and nuts

Applicable model	L1		L2		L3	
	length	Tightening torque	length	Tightening torque	length	Tightening torque
BP060A	6.5	2.5N·m	15	5N·m	10.5	2.5N·m
BP080A	8	5N·m	21.5	10N·m	5.5	5N·m
BP100A	6.5	15N·m	22.5	25N·m	9	15N·m

#### Caution

Use the lower torque (i.e. torque corresponding to L1 and L3) while tightening the bolt between lengths L1 and L2 or L2 and L3 in the picture. Please make sure to use a locknut if the bolt is likely to shift in position due to the vibrational impacts.