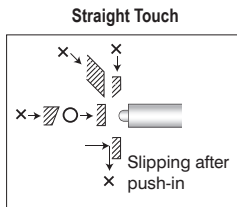


# METROL Precision Limit Switches

## Precision Touch Limit Switches

### Features

- Slim design (from M5) allows side-by-side installation
- Long-stroke and water-resistant models available
- 5 micron (µm) repeat accuracy
- Stainless steel housing
- Metal bearing
- Straight-touch and straight needle touch available



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



**CSJ055A-L**

**CS067A-CL**

Precision Touch Limit Switches Selection Chart									
Part Number	Price	Drawing Link	Actuator/ Head Type*	Barrel Type	Barrel Diameter/ Thread*	Stroke	Switching Output	Contact Force	Connection Type
<b>Straight Touch</b>									
<a href="#">CSJ055A</a>	\$45.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5 mm	Threaded	M5×0.5	2.8mm	(1) N.O.	1N	Cable, 3m [9.8ft]
<a href="#">CSJ055A-L</a>	\$54.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm			2.8mm	(1) N.O.	1N	
<a href="#">CSJS50A</a>	\$45.00	<a href="#">PDF</a>	Ø 2mm plunger SR 1.5mm	Smooth	Ø 5mm	2.8mm	(1) N.O.	1N	
<a href="#">CSJS50A-L</a>	\$54.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm			2.8mm	(1) N.O.	1N	
<a href="#">CS065A-L</a>	\$60.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm	Threaded	M6×0.5	2.8mm	(1) N.O.	1N	
<a href="#">CSS60A-L</a>	\$56.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm	Smooth	Ø 6mm	2.8mm	(1) N.O.	1N	
<a href="#">CSS60B-L</a>	\$56.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm			2.8mm	(1) N.C.	1N	
<a href="#">CS067A</a>	\$51.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm	Threaded	M6×0.75	2.8mm	(1) N.O.	1N	
<a href="#">CS067A-B</a>	\$55.00	<a href="#">PDF</a>	Ø 2mm plunger, Ø 4mm flat			2.8mm	(1) N.O.	1N	
<a href="#">CS067A-L</a>	\$60.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm			2.8mm	(1) N.O.	1N	
<a href="#">CS067B</a>	\$51.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm			2.8mm	(1) N.C.	1N	
<a href="#">CS067B-L</a>	\$60.00	<a href="#">PDF</a>	Ø 2mm plunger, SR 1.5mm			2.8mm	(1) N.C.	1N	
<a href="#">CS067A-BL</a>	\$65.00	<a href="#">PDF</a>	Ø 2mm plunger, Ø 4mm flat			2.8mm	(1) N.O.	1N	
<a href="#">CSS80A-L</a>	\$56.00	<a href="#">PDF</a>	Ø 3.5mm plunger, SR 3mm			Smooth	Ø 8mm	2.8mm	
<a href="#">CS087A-L</a>	\$60.00	<a href="#">PDF</a>	Ø 3.5mm plunger, SR 3mm	Threaded	M8×0.75	2.8mm	(1) N.O.	1N	
<a href="#">CSK087A</a>	\$58.00	<a href="#">PDF</a>	Ø 3.5mm plunger, SR 3mm			5mm	(1) N.O.	1N	
<a href="#">CSK087A-L</a>	\$67.00	<a href="#">PDF</a>	Ø 3.5mm plunger, SR 3mm			5mm	(1) N.O.	1N	
<a href="#">CSK087B-L</a>	\$67.00	<a href="#">PDF</a>	Ø 3.5mm plunger, SR 5mm			5mm	(1) N.C.	1N	
<a href="#">CSP087A-AL</a>	\$78.00	<a href="#">PDF</a>	Ø 5.5mm plunger, 2mm round			2.8mm	(1) N.O.	1N	
<a href="#">CSP087B-AL</a>	\$78.00	<a href="#">PDF</a>	Ø 5.5mm plunger, 2mm round			2.8mm	(1) N.C.	1N	
<b>Straight Needle Contact Touch</b>									
<a href="#">CSJ055A-CL</a>	\$60.00	<a href="#">PDF</a>	needle plunger, 1.5mm flat	Threaded	M5×0.5	2.8mm	(1) N.O.	1N	Cable, 3m [9.8ft]
<a href="#">CS065A-CL</a>	\$67.00	<a href="#">PDF</a>	needle plunger, 1.5mm flat		M6×0.5	2.8mm	(1) N.O.	1N	
<a href="#">CS067A-CL</a>	\$83.00	<a href="#">PDF</a>	needle plunger, 1.5mm flat		M6×0.75	2.8mm	(1) N.O.	1N	
<b>Spring Plunger</b>									
<a href="#">SP080A-L</a>	\$51.00	<a href="#">PDF</a>	Ø 2.5mm plunger SR 1.25mm	Threaded	M8×1.25 mm	3mm	(1) N.O.	8N	Cable 2m [6.56ft]

\* Ø = diameter, SR = surface radius

-L: LED indicator (mounted in cable 120mm from the switch)



# Precision Limit Switches

Precision Touch Limit Switches Specifications						
Type	Straight Touch Switches					
Series	CS	CSJ	CSS	CSK	CSP	SP
<b>Environmental</b>						
Degree of Protection	IP65				IP67	IP40
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)					
<b>Mechanical Ratings</b>						
Enclosure Material	Stainless Steel					
Pretravel	0.3 mm					2.2 mm
Torque (for nuts on threaded barrels, set screws on smooth barrels)	4 N•m	2 N•m	N/A	N/A	7 N•m	L1 10N•m L2 5•Nm
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction					
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction					
Repeat Accuracy	5 micron (µm) *					Both On-Off, Off-On 0.01mm (range)
Recommended Minimum Operating Speed	50mm (1.96 in)/minute					
<b>Electrical Ratings</b>						
Contact Life	10 million operations					3 million (spring)
Contact Voltage	5–24VDC					
Steady Current Rating	10mA or less					
Max In-rush Current Rating	20mA without LED indicator, 10mA with LED indicator					
Connection Type	Cable: 3m (2m for SP series) Oil resistant Ø2.8/ 2 cores, Tensile strength 30N, minimum bending R7					
Indicating	-L models: LED indicator (mounted in cable 120mm from the switch)					

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

## Circuit Diagrams

Without LED	With LED (-L models)
<p>Normally open (N.O.)</p>	<p>Normally open (N.O.)</p>
<p>Normally closed (N.C.)</p>	<p>Normally closed (N.C.)</p>

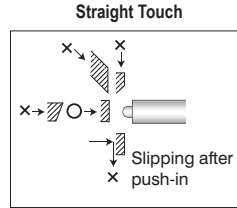


# Precision Limit Switches

## Precision Straight Touch Limit Switches

### Features

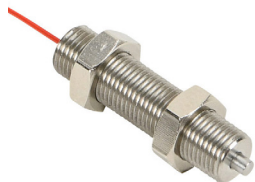
- Ultra-small design (M5 or Ø5)
- 3 micron (µm) repeat accuracy
- No movement differential
- Dustproof / water-resistant (IP67) models available
- Stainless steel housing
- Metal bearing



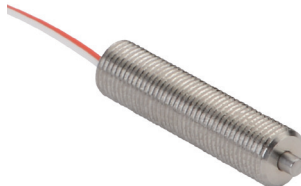
O indicates correct target approach and orientation.  
X indicates approach and orientation that should be avoided.

Precision Straight Touch Limit Switches Selection Chart											
Part Number	Price	Drawing Link	Actuator/Head Type*	Barrel	Barrel Diameter/Thread*	Stroke	Switching Output	Contact Force	Connection Type		
<a href="#">PT5M1WA</a>	\$93.00	<a href="#">PDF</a>	Ø 1.5mm plunger, SR 2mm	Threaded	M5×0.5	1.5mm	(1) N.O.	0.5N	Core wire, 0.5m [1.6ft]		
<a href="#">PT5M3WA</a>	\$72.00	<a href="#">PDF</a>	Ø 1.5mm plunger, SR 2mm			1.5mm	(1) N.O.	0.5N			
<a href="#">PT5M3WB</a>	\$72.00	<a href="#">PDF</a>	Ø 1.5mm plunger, SR 2mm			1.5mm	(1) N.C.	0.5N			
<a href="#">PT5M3CB</a>	\$85.00	<a href="#">PDF</a>	Ø1.5mm plunger, SR 2mm			Smooth	Ø 5 mm	1.5mm	(1) N.C.	0.5N	Cable, 2m [6.5ft]
<a href="#">PT5M3CB-L</a>	\$86.00	<a href="#">PDF</a>	Ø 1.5mm plunger, SR 2mm					1.5mm	(1) N.C.	0.5N	
<a href="#">PT5S3CB-L</a>	\$81.00	<a href="#">PDF</a>	Ø 1.5mm plunger, SR 2mm	Threaded	M5×0.5	1.5mm	(1) N.C.	0.8N			
<a href="#">PTP5M3CB-B</a>	\$101.00	<a href="#">PDF</a>	Ø 1.5mm plunger, Ø 3mm flat	Threaded		1.5mm	(1) N.C.	0.8N			
<a href="#">PTP5M3CB-L</a>	\$94.00	<a href="#">PDF</a>	Ø 11.5mm plunger, SR 2mm	Smooth	Ø 5 mm	1.5mm	(1) N.C.	0.8N			

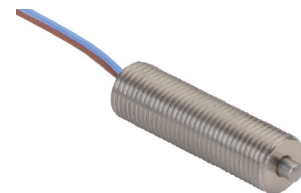
\* Ø = diameter, SR = surface radius  
-L: LED indicator (mounted in cable 120mm from the switch)



**PT5M1WA**



**PT5M3WA**



**PT5M3WB**



**PT5M3CB**



**PTP5M3CB-L**



**PTP5S3CB-L**



**PTP5M3CB-B**



**PTP5M3CB-L**



**PTP5S3CB-L**



# Precision Limit Switches

Precision Straight Touch Limit Switches Specifications		
Series	PT5x3xx	PTP5x3CB
<b>Environmental</b>		
Degree of Protection	IP40	IP67
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)	
<b>Mechanical Ratings</b>		
Enclosure Material	303 Stainless Steel	
Pretravel	0* (PT5M3WA and PT5M1WA about 0.3 mm)	
Torque (for nuts on threaded barrels, set screws on smooth barrels)	1 N·m	
Vibration	10–55 Hz total amplitude 1.5 for X, Y, Z each direction	
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction	
<b>Electrical Ratings</b>		
Contact Life	3 million operations	
Repeat Accuracy	Both On–Off, Off–On: 0.003 mm**	
Recommended Minimum Operating Speed	50 mm/minute	
Contact Voltage	5–24 VDC	
Steady Current Rating	10mA or less	
Max In-rush Current Rating	20mA without LED indicator, 10mA with LED indicator	
Connection Type	PTxxxWx: Core-wire cable, 0.5m (x2) Oil resistant Ø 0.6 Tensile strength 15N. PTxxxCB: Cable, 2m Oil-resistant Ø2.8/2 cores Tensile strength 30N, Minimum bending R7.	
Indicating	-L models: LED indicator (mounted in cable 120mm from the switch)	

\* Adjust the installed location of the switch by the signal switching point.

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

## Circuit Diagrams

Without LED	With LED (-L models)
<p>Normally open (N.O.)</p>	
<p>Normally closed (N.C.)</p>	<p>Normally closed (N.C.)</p> <p>LED Normally On</p>



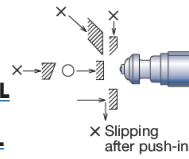
# Precision Limit Switches

## High Precision Touch Limit Switches

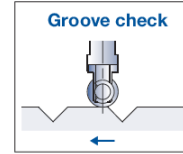
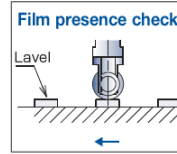
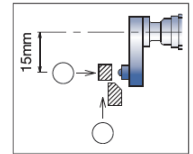
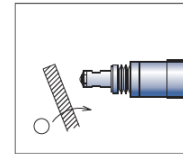
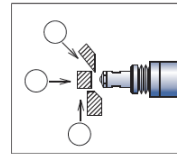
### Features

- 0.5 micron (µm) repeat accuracy
- No movement differential
- No temperature drift
- Dustproof / water-resistant (IP67)
- LED indicator
- Stainless steel housing

**P085DB-AL**  
**P10DB-A**  
**P10DA-AL**  
**P10DB-AL**  
**P10DLB-AL**



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



**P10DHA-TML**  
**P10DHB-TML**  
**P10DHLTB-TML**

High Precision Touch Limit Switches Selection Chart									
Part Number	Price	Drawing Link	Actuator/Head Type*	Barrel Type	Barrel Diameter/Thread	Stroke	Switching Output	Contact Force	Connection Type
<b>Straight Touch</b>									
<a href="#">P085DB-AL</a>	\$148.00	<a href="#">PDF</a>	Ø 5.5mm plunger, 2mm round	Threaded	M8×0.5	3mm	(1) N.C.	1N	Cable 3m [9.8ft]
<a href="#">P10DB-A</a>	\$129.00	<a href="#">PDF</a>	Ø8.5mm plunger, 2mm round	Threaded	M10×0.5	3mm	(1) N.C.	1N	
<a href="#">P10DB-AL</a>	\$148.00	<a href="#">PDF</a>	Ø 8.5mm plunger, 2mm round	Threaded	M10×0.5	3mm	(1) N.C.	1N	
<a href="#">P10DA-AL</a>	\$148.00	<a href="#">PDF</a>	Ø 8.5mm plunger, 2mm round	Threaded	M10×0.5	3mm	(1) N.O.	1N	
<a href="#">P10DLB-AL</a>	\$149.00	<a href="#">PDF</a>	Ø 8.5mm plunger, 2mm round	Threaded	M10×0.5	10mm	(1) N.C.	1N	
<b>Straight Touch With Ball Bearing</b>									
<a href="#">P10DHA-TML</a>	\$312.00	<a href="#">PDF</a>	Ø 2.5mm plunger, 8mm roller	Threaded	M14×0.5	3mm	(1) N.O.	1N	Cable 3m [9.8ft]
<a href="#">P10DHB-TML</a>	\$312.00	<a href="#">PDF</a>	Ø 2.5mm plunger, 8mm roller	Threaded	M14×0.5	3mm	(1) N.C.	1N	
<a href="#">P10DHLTB-TML</a>	\$343.00	<a href="#">PDF</a>	Ø 2.5mm plunger, 8mm roller	Threaded	M14×0.5	10mm	(1) N.C.	1N	

\* Ø = diameter, SR = surface radius

-xL: LED indicator (mounted in cable 120mm from the switch)





# Precision Limit Switches

## High Precision Touch Limit Switches

High Precision Touch Limit Switches Specifications				
Series	P08	P10	P10DH	P10DHL
<b>Environmental</b>				
Degree of Protection	IP67			
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)			
<b>Mechanical Ratings</b>				
Enclosure Material	303 Stainless Steel			
Pretravel	0*	P10DA / P10DHA: 0.2 mm P10DB / P10DHB: 0*		0*
Torque (for nuts on threaded barrels, set screws on smooth barrels)	4 N•m (2.95 lb•ft)	8 N•m (5.90 lb•ft)	10 N•m (7.38 lb•ft)	
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction			
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction			
Repeat Accuracy	Both On–Off, Off–On: 0.0005 mm (range)**			
Recommended Minimum Operating Speed	50mm/minute			
<b>Electrical Ratings</b>				
Contact Life	3 million operations			
Contact Voltage	5–24VDC			
Steady Current Rating	10mA or less			
Max In-rush Current Rating	20mA without LED indicator, 10mA with LED indicator			
Connection Type	Cable: 3m Oil resistant Ø5/2 cores (P08: Ø4/2 cores), tensile strength 30N, minimum bending R7, 20AWG			
Indicating	-AL: LED indicator (mounted in cable 120mm from the switch)			

\* Adjust the installed location of the switch by the signal switching point.

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

## Circuit Diagrams

Without LED	With LED (-AL models)
<p>Normally open (N.O.)</p>	<p>Normally open (N.O.)</p> <p>LED Normally Off</p>
<p>Normally closed (N.C.)</p>	<p>Normally closed (N.C.)</p> <p>LED Normally On</p>

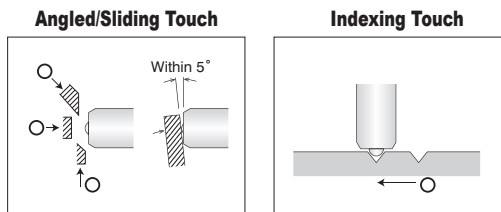


# Precision Limit Switches

## Ball Plunger Limit Switches

### Features

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

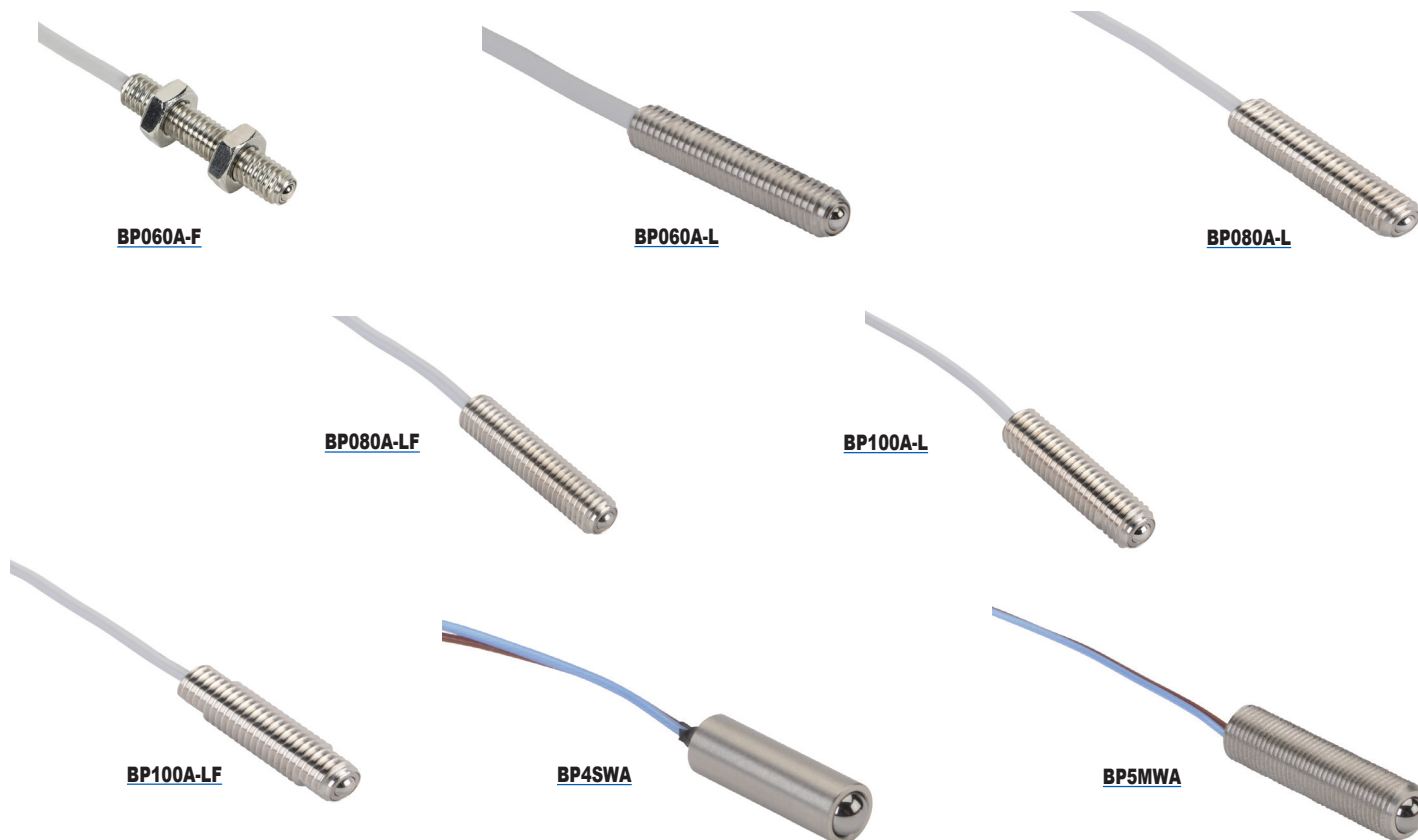


O indicates correct target approach and orientation.

### 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
<b>Indexing/Angled/Sliding Touch</b>									
<a href="#">BP060A-F</a>	\$46.00	<a href="#">PDF</a>	Ø 3mm ball plunger	Threaded	Ø M6×1.0	0.8mm	(1) N.O.	1N	Cable 2m [6.5 ft]
<a href="#">BP060A-L</a>	\$55.00	<a href="#">PDF</a>	Ø 3mm ball plunger			0.8mm	(1) N.O.	8-13N	
<a href="#">BP060A-LF</a>	\$55.00	<a href="#">PDF</a>	Ø 3mm ball plunger			0.8mm	(1) N.O.	1N	
<a href="#">BP080A-L</a>	\$66.00	<a href="#">PDF</a>	Ø 4mm ball plunger		Ø M8×1.25	1.0mm	(1) N.O.	10-16N	
<a href="#">BP080A-LF</a>	\$66.00	<a href="#">PDF</a>	Ø 4mm ball plunger			1.0mm	(1) N.O.	1N	
<a href="#">BP100A-L</a>	\$69.00	<a href="#">PDF</a>	Ø 5mm ball plunger		Ø M10×1.5	1.2mm	(1) N.O.	15-20N	
<a href="#">BP100A-LF</a>	\$69.00	<a href="#">PDF</a>	Ø 5mm ball plunger			1.2mm	(1) N.O.	1N	
<a href="#">BP4SWA</a>	\$78.00	<a href="#">PDF</a>	Ø 3mm ball plunger	Smooth	Ø 4mm	0.8mm	(1) N.O.	1N	Core wire 0.5m [1.64 ft]
<a href="#">BP5MWA</a>	\$73.00	<a href="#">PDF</a>	Ø 3mm ball plunger	Threaded	M5×0.5	1mm	(1) N.O.	1N	

\* Ø = diameter





# Precision Limit Switches

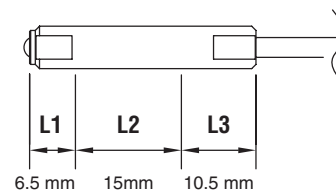
Ball Plunger Limit Switches Specifications					
Series	BP060A	BP080A	BP100A	BP4SWA	BP5MWA
<b>Environmental</b>					
Degree of Protection	IP40				
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)				
<b>Mechanical Ratings</b>					
Enclosure Material	303 Stainless Steel				
Pretravel	0.3 mm				
Torque (for nuts on threaded barrels, set screws on smooth barrels)	See Torque Limit Figure			NA	1 N•m
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction				
Shock	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	50mm/minute				
<b>Electrical Ratings</b>					
Contact Life	3 million operations			1 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 and -LF models: 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 Models	L1		L2		L3	
	Length	Tightening Torque	Length	Tightening Torque	Length	Tightening Torque
<b>BP060A</b>	6.5mm	2.5 N•m [1.84 lb•ft]	15mm	5 N•m [3.68 lb•ft]	10.5mm	2.5 N•m [1.84 lb•ft]
<b>BP080A</b>	8mm	5 N•m [3.68 lb•ft]	21.5mm	10 N•m [7.37 lb•ft]	5.5mm	5 N•m [3.68 lb•ft]
<b>BP100A</b>	6.5mm	15 N•m [11.06 lb•ft]	22.5mm	25 N•m [18.44 lb•ft]	9mm	15 N•m [11.06 lb•ft]

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.



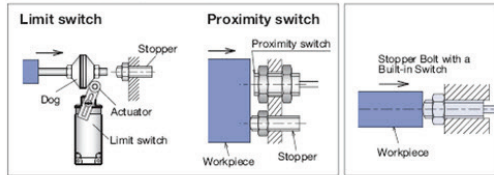
# METROL Precision Limit Switches

## Stopper Bolt Precision Limit Switches

### Overview

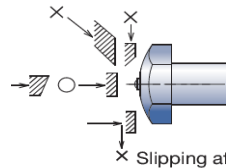
Stopper bolt precision limit switches incorporate a mechanical stop along with the limit switch function, eliminating the need for a separate mechanical stop in many situations. They can also absorb the high-impact forces required to stop a load.

**Stopper Bolt Limit Switches can reduce parts count**  
 conventional switches      stopper bolt switch



### Features

- 2 tasks with one device
- Housing a high-accuracy built-in switch in a stopper bolt
- Provides higher contact force ideal for indexing/positioning
- 10 micron (µm) repeat accuracy
- No movement differential
- Stainless steel housing



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

### Stopper Bolt Precision Limit Switches Selection Chart

Part Number	Price	Drawing Link	Actuator/Head Type*	Barrel Type	Barrel Diameter/Thread	Stroke	Switching Output	Contact Force	Connection Type
<a href="#">STP100UA-L</a>	\$82.00	<a href="#">PDF</a>	Ø 5.5mm plunger with upward cover Ø 5mm	Threaded	M10×1.5	0.7mm	(1) N.O.	4N	Cable 2m [6.56 ft]
<a href="#">STP100DA-L</a>	\$82.00	<a href="#">PDF</a>	Ø 5.5mm plunger with downward cover Ø 5mm	Threaded	M10×1.5	0.7mm	(1) N.O.	4N	
<a href="#">STS060PA</a>	\$41.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 3.4mm flat	Threaded	M6×1.0	0.7mm	(1) N.O.	2N	
<a href="#">STS060PA-L</a>	\$50.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 3.4mm flat	Threaded	M6×1.0	0.7mm	(1) N.O.	2N	
<a href="#">STS080PA-L</a>	\$66.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 4.5mm flat	Threaded	M8×1.25	0.7mm	(1) N.O.	2N	
<a href="#">STS100PA-L</a>	\$69.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 4.5mm flat	Threaded	M10×1.5	0.7mm	(1) N.O.	2N	
<a href="#">STE060PA-L</a>	\$54.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 3.4mm flat with hex	Threaded	M6×1.0	0.7mm	(1) N.O.	2N	
<a href="#">STE080PA-L</a>	\$72.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 4.5mm flat with hex	Threaded	M8×1.25	0.7mm	(1) N.O.	2N	
<a href="#">STE100PA-L</a>	\$72.00	<a href="#">PDF</a>	Ø 1.5mm plunger, 4.5mm flat with hex	Threaded	M10×1.5	0.7mm	(1) N.O.	2N	

\* Ø = diameter

#### STP Series (Stopper With Protective Cover)



#### STS Series (Straight Stopper Bolt)



#### STE Series (Hexagonal Stopper Bolt)

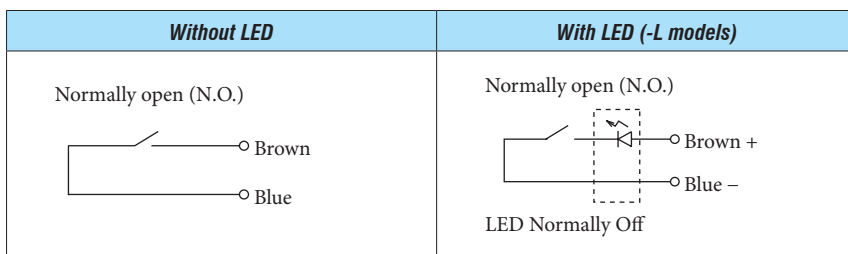


Stopper Bolt Precision Limit Switches Specifications			
Series	STP	STS	STE
<b>Environmental</b>			
Degree of Protection	IP67**	IP65**	
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)		
<b>Mechanical Ratings</b>			
Enclosure Material	Stainless steel		
Torque (for nuts on threaded barrels, set screws on smooth barrels)	See Torque Limit Figure		
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction		
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction		
Repeat Accuracy	Both On-Off, Off-On/ 0.01 (range) (At operating speed 50-200mm/min) *2		
Recommended Minimum Operating Speed	50mm (1.96in)/minute		
Withstand Load	5000N		
<b>Electrical Ratings</b>			
Contact Life	10 million (No bungle caused by vibration and use under contact rating)		
Impact resistance	0.4J		
Contact Voltage	5–24VDC		
Steady Current Rating	10mA or less		
Max In-rush Current Rating	20mA without LED indicator, 10mA with LED indicator		
Connection Type	Standard length 2m [6.56 ft] oil resistant 2.8 / 2 cores, 26AWG Tensile strength 30N, minimum bending R7		
Indicating	-L models: LED indicator (mounted in cable 120mm from the switch)		

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

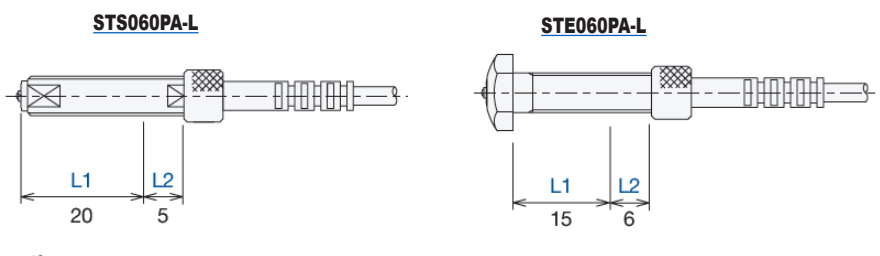
\*\* At normal temperature (0–80°C [32–176°F]).

## Circuit Diagram



## Torque Limits

Applicable models	Tightening torque
<b>STS060PA-L</b>	L1: 5 N•m [3.68 lb•ft] L2: 2.5 N•m [1.84 lb•ft]
<b>STE060PA-L</b>	
<b>STS060PA</b>	10 N•m [7.38 lb•ft]
<b>STS080PA-L</b>	
<b>STE080PA-L</b>	25 N•m [18.44 lb•ft]
<b>STS100PA-L</b>	
<b>STE100PA-L</b>	25 N•m [18.44 lb•ft]
<b>STP100UA-L</b>	
<b>STP100DA-L</b>	



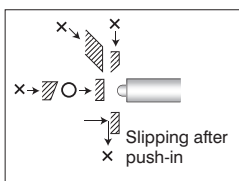
# METROL Precision Limit Switches

## Low Contact Force Limit Switches: CSFN / CS / CSJ

### Features

- 0.1N and 0.5N contact force
- 5 micron (µm) and 10 micron (µm) repeat accuracy
- Stainless steel housing
- Metal bearing
- Straight-touch and straight needle touch available

### Low Contact Force Straight Touch

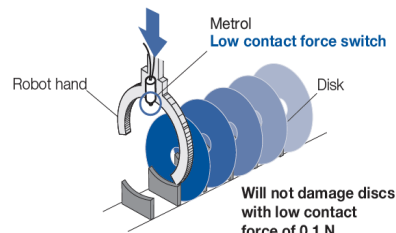


O indicates correct target approach and orientation.

X indicates approach and orientation that should be avoided.

### CSFN105A-H6X must be mounted downward

Detects presence of HDD discs



## Low Contact Force Limit Switches Selection Chart

Part Number	Price	Drawing Link	Actuator/ Head Type*	Barrel Type	Barrel Diameter/Thread*	Stroke	Switching Output	Contact Force	Connection Type
<b>Low Contact Force, Metal Bearing, Downward Mounting Only</b>									
<a href="#"><b>CSFN105A-H6X</b></a>	\$46.00	<a href="#">PDF</a>	Ø 2mm plunger [0.079 in] SR 1.5 mm [0.059 in]	Threaded	M10x0.5	2mm [0.079in]	NPN, N.O.	0.1N	3m [9.8 ft] cable
<b>Low Contact Force, Straight Touch, Metal Bearing</b>									
<a href="#"><b>CS067A-LG</b></a>	\$61.00	<a href="#">PDF</a>	Ø 2mm plunger [0.079 in] SR 1.5 mm [0.059 in]	Threaded	M6x0.75	2.8mm [0.110in]	(1) N.O.	0.5N	3m [9.8 ft] cable
<b>Low Contact Force, Straight Touch, Needle Contact</b>									
<a href="#"><b>CSJ055A-CG</b></a>	\$53.00	<a href="#">PDF</a>	needle plunger Ø 1.5mm flat [0.059 in]	Threaded	M5x0.5	2.8mm [0.110in]	(1) N.O.	0.5N	3m [9.8 ft] cable

Ø = diameter, SR = surface radius

\* Must be mounted in a downward direction



[\*\*CSFN105A-H6X\*\*](#)



[\*\*CS067A-LG\*\*](#)



[\*\*CSJ055A-CG\*\*](#)

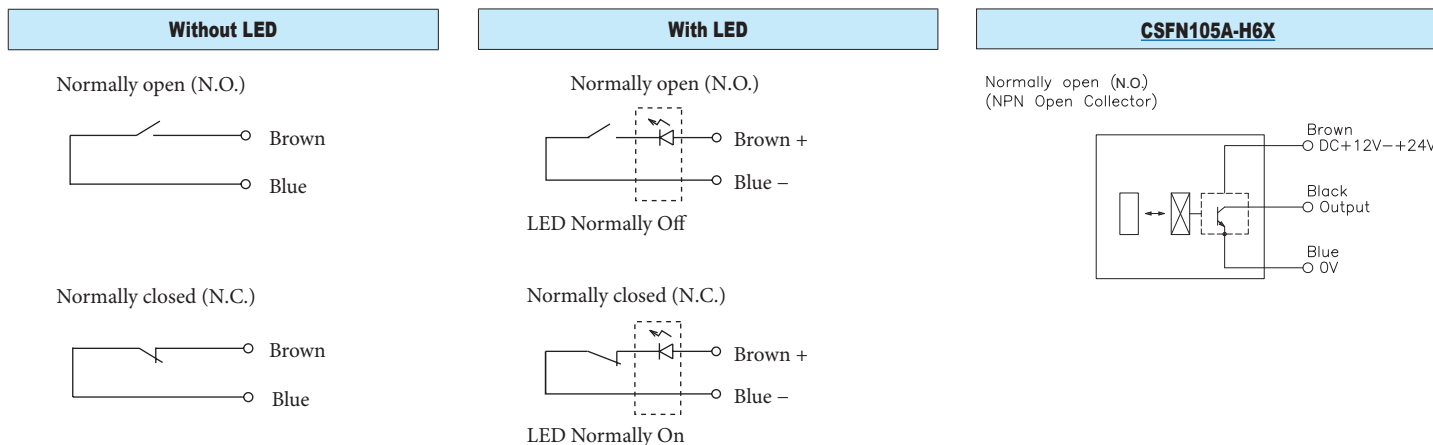


# Precision Limit Switches

Low Contact Force Limit Switches Specifications			
Series	CSFN Metal Bearing	CS Custom Metal Bearing	CSJ Custom Needle Contact
<b>Environmental</b>			
Degree of Protection	IP40		IP65
Temperature Range	Operating: 0 to 60°C [32 to 140°F] (Ice-free)		Operating: 0 to 80°C [32 to 176°F] (Ice-free)
<b>Mechanical Ratings</b>			
Enclosure Material	Stainless Steel (mounting nuts are Ni-plated brass)		
Pretravel	0.4 mm [0.016 in]	0.3 mm [0.012 in]	
Torque (for nuts on threaded barrels, set screws on smooth barrels)	4 N•m [2.95 lb•ft]	2 N•m [1.48 lb•ft]	N/A
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction		
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction		
Repeat Accuracy	0.01 mm (10 micron [μm]) *	0.005 mm (5 micron [μm]) *	
Recommended Minimum Operating Speed	50mm (1.96in)/minute		
<b>Electrical Ratings</b>			
Contact Life	10 million operations		
Contact Voltage	12–24VDC	5–24VDC	
Steady Current Rating	10mA or less		
Max In-rush Current Rating	10mA (limit current to protect LED indicator)		
Connection Type	Cable: 3m PVC (polyvinyl chloride) oil resistant Ø4/3 cores, 30AWG Tensile strength 30N, minimum bending R7	Cable: 3m PVC (polyvinyl chloride) oil resistant Ø2.8/2 cores, 26AWG Tensile strength 30N minimum bending R7	
Indicating	-L: LED indicator (mounted in cable 120mm from the switch)		

\* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm (0.393 in)/min is not recommended.

## Circuit Diagrams



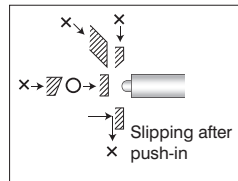
# METROL Precision Limit Switches

## 90-Degree Straight Touch Limit Switches

### Features

- Slim design
- 90-degree cable orientation
- Long-stroke models available
- 5 micron (µm) repeat accuracy
- Stainless steel housing
- Metal bearing

### 90-Degree Straight Touch



O indicates correct target approach and orientation.

X indicates approach and orientation that should be avoided.

### 90-Degree Straight Touch Limit Switches Selection Chart

Part Number	Price	Drawing Link	Actuator/ Head Type*	Barrel Type	Barrel Diameter/Thread*	Stroke	Switching Output	Contact Force	Connection Type
<a href="#">CSS60A-LR</a>	\$56.00	<a href="#">PDF</a>	Ø 2mm plunger [0.079in] SR 1.5mm [0.059in]	Smooth	Ø 6mm	2.8mm [0.110in]	(1) N.O.	1N	Cable 3m [9.84ft]
<a href="#">CS065A-LR</a>	\$67.00	<a href="#">PDF</a>					(1) N.O.		
<a href="#">CS067A-BLR</a>	\$67.00	<a href="#">PDF</a>	Ø 2mm plunger [0.079in] Ø 4.5mm flat [0.177in]	Threaded	M6x0.75		(1) N.O.		
<a href="#">CS067A-LR</a>	\$65.00	<a href="#">PDF</a>					(1) N.O.		
<a href="#">CS067B-LR</a>	\$65.00	<a href="#">PDF</a>	Ø 2mm plunger [0.079in] SR 1.5mm [0.059in]	Threaded	M8x0.75		(1) N.C.		
<a href="#">CS087A-LR</a>	\$65.00	<a href="#">PDF</a>	Ø 3.5mm plunger [0.138in] SR 3 mm [0.118in]				(1) N.O.		
<a href="#">CSJ055A-LR</a>	\$59.00	<a href="#">PDF</a>	Ø 2mm plunger [0.079in] SR 1.5 mm [0.059in]	Smooth	Ø 5mm		(1) N.O.		
<a href="#">CSJS50A-LR</a>	\$59.00	<a href="#">PDF</a>					(1) N.O.		
<a href="#">CSK087A-LR</a>	\$64.00	<a href="#">PDF</a>	Ø 3.5mm plunger [0.138in] SR 3 mm [0.118in]	Threaded	M8x0.75	5mm [0.197in]	(1) N.O.		
<a href="#">CSK087B-LR</a>	\$64.00	<a href="#">PDF</a>				(1) N.C.			

\* Ø = diameter, SR = surface radius



[CSS60A-LR](#)



[CS065A-LR](#)



[CS067A-BLR](#)



[CS067A-LR](#)



[CS067B-LR](#)



[CS087A-LR](#)



[CSJ055A-LR](#)



[CSJS50A-LR](#)



[CSK087A-LR](#)



[CSK087B-LR](#)



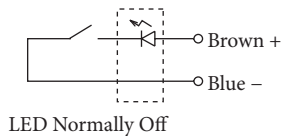
# Precision Limit Switches

90-Degree Straight Touch Limit Switches Specifications				
Series	CS	CSS	CSJ	CSK
<b>Environmental</b>				
Degree of Protection	IP65			
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)			
<b>Mechanical Ratings</b>				
Enclosure Material	Stainless Steel			
Pretravel	0.3 mm			
Torque (for nuts on threaded barrels, set screws on smooth barrels)	4 N•m [2.95 lb•ft]	N/A	2 N•m [1.48 lb•ft]	7 N•m [5.16 lb•ft]
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction			
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction			
Repeat Accuracy	5 micron (µm) *			
Recommended Minimum Operating Speed	50mm (1.96in)/minute			
<b>Electrical Ratings</b>				
Contact Life	10 million operations			
Contact Voltage	5–24VDC			
Steady Current Rating	10mA or less			
Max In-rush Current Rating	10mA (limit current to protect LED indicator)			
Connection Type	Cable: 3m [9.84 ft], oil resistant, Ø2.8/2 cores, tensile strength 30N [6.74 lbf], minimum bending R7, 2-26AWG			
Indicating	-L: LED indicator (mounted in cable 120mm from the switch)			

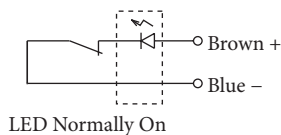
\* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

## Circuit Diagrams

Normally open (N.O.)



Normally closed (N.C.)



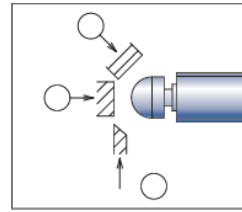
# METROL Precision Limit Switches

## Sliding Angled Offset Touch Limit Switches

### Features

- Metal and plastic hemisphere actuators
- 5 micron (µm) repeat accuracy
- Stainless steel housing

### Sliding Angled Offset Touch



O indicates correct target approach and orientation.

Sliding Angled Offset Touch Limit Switches Selection Chart									
Part Number	Price	Drawing Link	Actuator/ Head Type*	Barrel Type	Barrel Diameter/Thread*	Stroke	Switching Output	Contact Force	Connection Type
<a href="#">CSHP085A-L</a>	\$158.00	<a href="#">PDF</a>	Ø 4.7mm plunger SR 3mm	Threaded	M8×0.5	2.8mm [0.110in]	(1) N.O.	1N	Cable 2m [6.56 ft]
<a href="#">CSHP085B-L</a>	\$158.00	<a href="#">PDF</a>	Ø 4.7mm plunger SR 3mm	Threaded	M8×0.5		(1) N.C.	1N	
<a href="#">CSH121A-A</a>	\$79.00	<a href="#">PDF</a>	Ø 10mm hemisphere SR 5mm	Threaded	M12x1		(1) N.O.	1.5N	
<a href="#">CSH121A-AL</a>	\$78.00	<a href="#">PDF</a>	Ø 10mm hemisphere SR 5mm	Threaded	M12x1		(1) N.O.	1.5N	
<a href="#">CSH121B-AL</a>	\$81.00	<a href="#">PDF</a>	Ø 10mm hemisphere SR 5mm	Threaded	M12x1		(1) N.C.	1.5N	
<a href="#">CSH121A-APL</a>	\$90.00	<a href="#">PDF</a>	Ø 10mm hemisphere SR 5mm plastic	Threaded	M12x1		(1) N.O.	1.5N	
<a href="#">CSH121B-APL</a>	\$90.00	<a href="#">PDF</a>	Ø 10mm hemisphere SR 5mm plastic	Threaded	M12x1		(1) N.C.	1.5N	

\* Ø = diameter, SR = surface radius





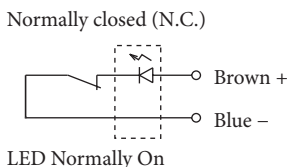
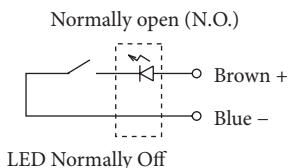
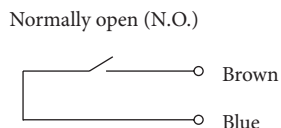
# Precision Limit Switches

Sliding Angled Offset Touch Limit Switches Specifications		
Series	CSHP	CSH
<b>Environmental</b>		
Degree of Protection	IP67	IP65
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)	
<b>Mechanical Ratings</b>		
Enclosure Material	Stainless Steel	
Pretravel	0.3 mm	
Torque (for nuts on threaded barrels, set screws on smooth barrels)	4 N•m [2.95 lb•ft]	12 N•m [8.85 lb•ft]
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction	
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction	
Repeat Accuracy	0.005mm (5 micron [μm]) *	
Recommended Minimum Operating Speed	50mm [1.96in]/minute	
<b>Electrical Ratings</b>		
Contact Life	10 million operations	
Contact Voltage	5–24VDC	
Steady Current Rating	10mA or less	
Max In-rush Current Rating	10mA (limit current to protect LED indicator)	
Connection Type	Cable: 2m [6.56ft] , oil resistant Ø2.8/2 cores, Tensile strength 30N [6.74 lbf], minimum bending R7, 2-26AWG	
Indicating	-L: LED indicator (mounted in cable 120mm from the switch)	

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

## Circuit Diagrams

Without LED	With LED
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# Precision Limit Switches

Precision Mini Straight Touch Limit Switches Specifications		
Type	Precision Angled	Precision Mini
Series	CSM	CSMP
<b>Environmental</b>		
Degree of Protection	IP65	IP67
Temperature Range	Operating: 0 to 80°C [32 to 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)	8 N•m [5.901 lb•ft]	
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction	
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction	
Repeat Accuracy	Both On–Off, Off–On: 0.003 mm*	
Recommended Minimum Operating Speed	50mm [1.96in]/minute	
<b>Electrical Ratings</b>		
Contact Life	10 million operations	
Contact Voltage	5–24VDC	
Steady Current Rating	10mA or less	
Max In-rush Current Rating	10mA (limit current to protect LED indicator)	
Connection Type	Core wire cable, 0.5 m (x2), oil resistant, Ø 0.6, tensile strength 15N, Cable: 2m, oil resistant Ø2.8/2 cores, tensile strength 30N [6.74 lbf], 2-26AWG	
Indicating	-L: LED indicator (mounted in cable 120mm from the switch)	

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

## Circuit Diagrams

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



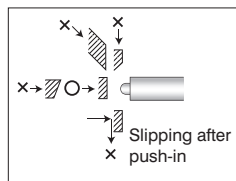
# Precision Limit Switches

## High-Vacuum Resistance Limit Switches

### Features

- Can be used in 10<sup>-5</sup> PA high-vacuum environments
- Switch body made using low outgassing material and adhesive

#### High Vacuum Resistance

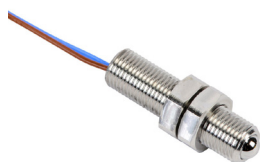


O indicates correct target approach and orientation.

X indicates approach and orientation that should be avoided.

High-Vacuum Resistance Limit Switches Selection Chart										
Part Number	Price	Actuator/Head Type*	Barrel Type	Barrel Diameter/Thread	Stroke	Output Mode	Repeatability	Contact Force	Connection Type	Drawing Link
<a href="#"><u>GN-BP5MA</u></a>	\$320.00	Angled touch ball plunger SR 3mm	Threaded	M5x0.5	1.0mm [0.039in]	(1) N.O.	0.01mm [0.00039in]	1N	Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5m [1.6ft] core wire, 27 AWG	PDF
<a href="#"><u>GN-BP5MA-R</u></a>	\$326.00	Angled touch ball plunger SR 3mm	Threaded	M5x0.5	1.0mm [0.039in]	(1) N.O.	0.01mm [0.00039 in]	1N	Cable direction: 90° Polytetrafluoroethylene (PTFE) 0.5m [1.6ft] core wire, 27 AWG	PDF
<a href="#"><u>GN-PT5M3A</u></a>	\$234.00	Straight touch Ø 1.5mm plunger SR 2mm	Threaded	M5x0.5	1.5mm [0.059in]	(1) N.O.	0.003mm [0.00012in]	0.5N	Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5m [1.6ft] core wire, 27 AWG	PDF
<a href="#"><u>GN-PT5M3B</u></a>	\$234.00	Straight touch Ø 1.5mm plunger SR 2mm	Threaded	M5x0.5	1.5mm [0.059in]	(1) N.C.	0.003mm [0.00012in]	0.5N	Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5m [1.6ft] core wire, 27 AWG	PDF
<a href="#"><u>GN-BP161B</u></a>	\$1,138.00	Angled touch Ø 2mm plunger SR 4mm	Threaded	M16x1	2.9mm [0.114in]	(1) N.C.	0.01mm [0.00039in]	1.5N	Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5m [1.6ft] core wire, 27 AWG	PDF
<a href="#"><u>GN-CSK141B</u></a>	\$1,138.00	Straight touch Ø 12mm plunger SR 4mm	Threaded	M14x1	5mm [0.197mm]	(1) N.C.	0.01mm [0.00039in]	0.8N	Cable direction: straight Polytetrafluoroethylene (PTFE) 0.5m [1.6ft] core wire, 27 AWG	PDF

\* Ø = diameter, SR = surface radius



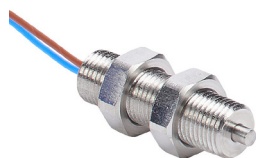
**GN-BP5MA**



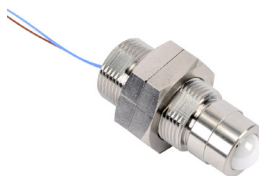
**GN-BP5MA-R**



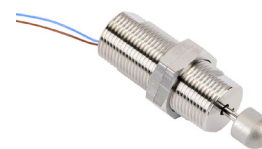
**GN-PT5M3A**



**GN-PT5M3B**



**GN-BP161B**



**GN-CSK141B**



# Precision Limit Switches

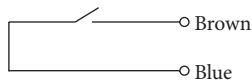
High-Vacuum Resistance Limit Switches Specifications	
Series	GN
<b>Environmental</b>	
Compatible Vacuum	10 <sup>-3</sup> PA
Degree of Protection	IP40
Temperature Range	120°C [248°F] (allowable baking temperature)
<b>Mechanical Ratings</b>	
Enclosure Material	304 Stainless Steel
Pretravel	0mm [0in]: (GN-PT5M3B, GN-CSK141B) * 0.2 mm [0.0079 in]: (GN-BP161B) 0.3 mm [0.0118 in]: (GN-BP5MA, GN-BP5MA-R, GN-PT5M3A)
Torque (for nuts on threaded barrels, set screws on smooth barrels)	1 N•m [0.73 lb•ft] GN-PT5M3A, GN-PT5M3B, GN-BP5MA 10 N•m [7.37 lb•ft] GN-CSK141B 12 N•m [8.85 lb•ft] GN-BP161B
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction
<b>Electrical Ratings</b>	
Contact Life	3 million operations
Repeat Accuracy**	Both On-Off, Off-On: See Selection Table
Recommended Minimum Operating Speed	50mm [1.96in] / minute
Contact Voltage	5-24 VDC
Steady Current Rating	10mA or less
Max In-rush Current Rating	20mA
Connection Type	0.5 m [19.69 in] Polytetrafluoroethylene (PTFE) core wire, 27AWG
Indicating	N/A

\* Adjust the installed location of the switch by the signal switching point.

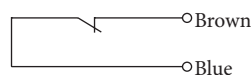
\*\* At operating speed 50-200 mm/minute. Operating speed slower than 10 mm/min is not recommended.

## Circuit Diagrams

Normally open (N.O.)



Normally closed (N.C.)



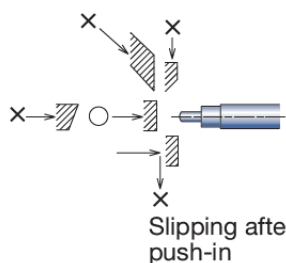
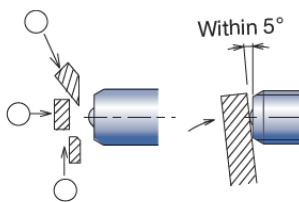
# METROL Precision Limit Switches

## High Temperature: HT Series Limit Switches

### Features

- Plunger and ball plunger models
- Constructed using heat resistant parts and adhesives
- Heat resistant cable
- Operating temperature upper limit of 200°C [392°F]

#### High Temperature HT Series



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

High Temperature Limit Switches Selection Chart									
Part Number	Price	Actuator/Head Type*	Barrel Type	Barrel Diameter/Thread	Stroke	Switching Output	Contact Force	Connection Type	Drawing Link
<b>Straight/Precision Touch</b>									
<a href="#">HT-CS067A</a>	\$235.00	Ø2mm plunger, SR 1.5mm	Threaded	M6×0.75	2.8mm	(1) N.O.	1N	Cable 2m [6.56ft]	PDF
<b>Indexing/Angled/Sliding Touch/Ball Plunger</b>									
<a href="#">HT-BP060A</a>	\$214.00	Ø 3mm ball plunger	Threaded	M6×1.0	0.8mm	(1) N.O.	6-13N	Cable 2m [6.56ft]	PDF
<b>Heat Resistant Stopper Bolt</b>									
<a href="#">STS060A-HT2</a>	\$196.00	1.5mm plunger 3.4mm flat	Threaded	M6×1.0	0.7mm	(1) N.O.	1N	Cable 2m [6.56ft]	PDF
<a href="#">STM82A-HT2</a>	\$192.00	Ø 3mm plunger with boot	Threaded	M10×0.75	0.3mm	(1) N.O.	1N	Cable 2m [6.56ft]	PDF

\* Ø = diameter, SR = surface radius





# Precision Limit Switches

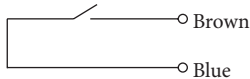
High Temperature Limit Switches Specifications				
Part Number	HT-CS067A	HT-BP060A	STS060A-HT2	STM82A-HT2
<b>Environmental</b>				
Degree of Protection	IP65**	IP40**	IP40**	IP65**
Temperature Range	Operating: 0 to 200°C [32 to 392°F] (Ice-free)			
<b>Mechanical Ratings</b>				
Enclosure Material	Stainless Steel			
Pretravel	0.3 mm (0.012 in)	0.5 mm [0.020 in] from end face	0.3 mm [0.012 in] from stopping face	Middle of stroke
Vibration	10–55 Hz total amplitude 1.5 for X, Y, Z each direction			
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction			
<b>Electrical Ratings</b>				
Contact Life	3 million operations			
Repeat Accuracy	0.01 mm [0.00039 in] * **			
Recommended Minimum Operating Speed	50mm [1.96in]/minute			
Contact Voltage	5-24 VDC			
Steady Current Rating	10mA or less			
Max In-rush Current Rating	20mA			
Connection Type	Cable: 2m [6.56ft] heat-resistant Ø 2.8 2 cores, 24AWG		Cable: 2m [6.56ft] heat-resistant Ø 2.8 2 cores, 26AWG	
Indicating	N/A			

\* At operating speed 50-200 mm [1.97-7.87 in]/minute. Operating speed slower than 10mm [0.39in]/min is not recommended.

\*\* At normal temperature (0 to 80°C [32 to 176°F]).

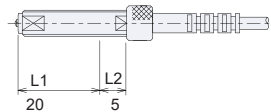
## Circuit Diagrams

Normally open (N.O.)

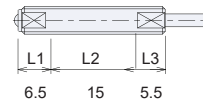


## Torque Limits

Stopper Bolt



Ball Plunger



Tightening Torque for Case Screws and Nuts						
Applicable Models	L1		L2		L3	
	Length	Tightening Torque	Length	Tightening Torque	Length	Tightening Torque
<b>HT-CS067A</b>	6.5mm	4 N•m [2.95 lb•ft]	—	—	—	—
<b>HT-BP060A</b>	6.5mm	2.5 N•m [1.84 lb•ft]	15 mm	5 N•m [3.68 lb•ft]	5.5mm	5 N•m [3.68 lb•ft]
<b>STS060A-HT2</b>	20mm	5 N•m [3.68 lb•ft]	5mm	5 N•m [3.68 lb•ft]	—	—
<b>STM82A-HT2</b>	6.5mm	10 N•m [7.376 lb•ft]	—	—	—	—

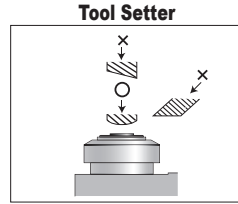
Caution: Use the lower torque (i.e. torque corresponding to L1 and L3) while tightening the bolt between lengths L1 and L2 or L2 and L3 in the picture. Please make sure to use a locknut if the bolt is likely to shift in position due to the vibrational impacts.

# METROL Precision Limit Switches

## High Precision Touch and Tool Setter Limit Switches

### Features

- Tool setter for blade positioning, wear detection, breakage, etc.
- 0.5 micron (µm) repeat accuracy
- No movement differential
- No temperature drift
- Dustproof / water-resistant (IP67)
- LED indicator



O indicates correct target approach and orientation.

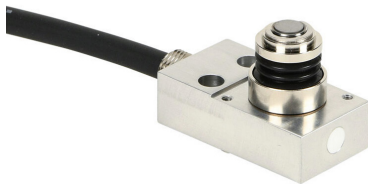
X indicates approach and orientation that should be avoided.

High Precision Touch and Tool Setter Limit Switches Selection Chart									
Part Number	Price	Drawing Link	Actuator/Head Type*	Mounting Direction	Mounting Hole	Stroke	Switching Output	Contact Force	Connection Type
<a href="#">P11DDB-DLD</a>	\$172.00	<a href="#">PDF</a>	Ø 16mm plunger, Ø5mm flat	downward	(2) Ø 4.6	3mm	(1) N.C.	1.5N	Cable 3m [9.8ft]
<a href="#">P11DDB-DULD</a>	\$186.00	<a href="#">PDF</a>	Ø 16mm plunger, Ø 5mm flat	upward	(2) Ø 4.6	3mm	(1) N.C.	1.5N	Cable 3m [9.8ft]
<a href="#">P11DMB-DULD</a>	\$172.00	<a href="#">PDF</a>	Ø 16mm plunger, Ø 5mm flat	upward	(2) M4	3mm	(1) N.C.	1.5N	Cable 3m [9.8ft]
<a href="#">P11EDB-DULD</a>	\$186.00	<a href="#">PDF</a>	Ø 16mm plunger, Ø 5mm flat	upward	(2) Ø 4.6	5mm	(1) N.C.	1.5N	Cable 3m [9.8ft]
<a href="#">P21EDBP-22-28</a>	\$634.00	<a href="#">PDF</a>	Ø 18.5mm plunger, Ø 10mm flat	upward	(2) Ø 4.6	5mm	(1) N.C.	1.5N	Cable 5m [16.4ft]

\* Ø = diameter

-xxLD: LED indicator (attached to sensor)

[P21EDBP-22-28](#) includes M5 air inlet



**[P11DDB-DLD](#)**



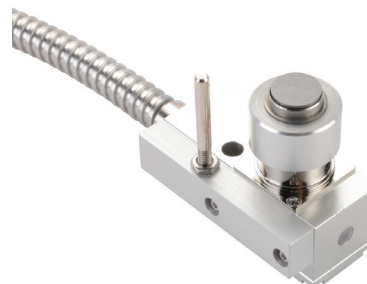
**[P11DDB-DULD](#)**



**[P11DMB-DULD](#)**



**[P11EDB-DULD](#)**



**[P21EDBP-22-28](#)**



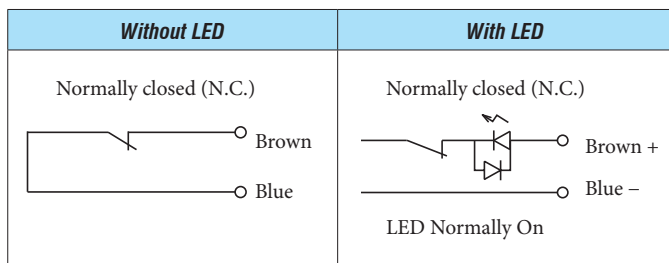
# Precision Limit Switches

High Precision Touch and Tool Setter Limit Switches Specifications		
Series	P11	P21
<b>Environmental</b>		
Degree of Protection	IP67	
Temperature Range	Operating: 0 to 80°C [32 to 176°F] (Ice-free)	
<b>Mechanical Ratings</b>		
Enclosure Material	Aluminum	
Pretravel	0*	1st signal 0*, 2nd signal 2.5 mm (0.098 in)
Torque (for nuts on threaded barrels, set screws on smooth barrels)	N/A	
Vibration	10–55Hz total amplitude 1.5 for X, Y, Z each direction	
Shock	300 m/s <sup>2</sup> for X, Y, Z each direction	
Repeat Accuracy	Both On–Off, Off–On: 0.0005 mm (range)**	
Recommended Minimum Operating Speed	50mm [1.96in]/minute	
<b>Electrical Ratings</b>		
Contact Life	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)	
Connection Type	Cable: 3m (9.84 ft) oil resistant Ø5/2 cores (P08: Ø4/2 cores) Tensile strength 30N, minimum bending R7, 30AWG	Cable: 5m (16.40ft) oil resistant Ø3.7/4 cores (P08: Ø4/2 cores), Tensile strength 30N, minimum bending R7, 30AWG
Indicating	-L: LED indicator (mounted in cable 120mm from the switch)	

\* Adjust the installed location of the switch by the signal switching point.

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

## Circuit Diagrams



### P21 Wiring

