

Stopper Bolt with a Built-in Switch

ST

Machine Components with a Built-in Switch serie

1 signal seating check, plunger type

Straight touch type (Plain bearing)

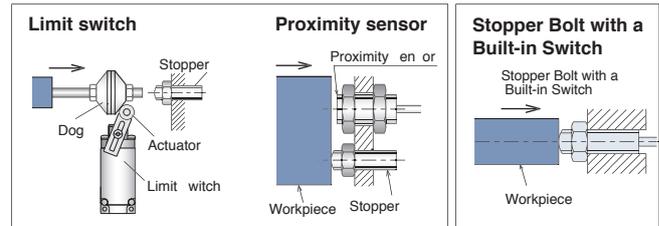
PAT.PEND.

2 tasks with 1 device.

Housing a high-accuracy built-in switch in a stopper bolt

Realization of compact machine size by reducing the number of parts.

Differences from conventional sensors



No need of dogs and stopper bolts → Compact machine design

Maintenance cost is greatly reduced by applying cartridge type

- When replacing the sensor by reason of breakdown, no need for detaching the stopper bolt or adjusting the position of it. Simplify maintenance procedure.
- No need to visit customer sites for repair
- Installing stopper bolt and adjust the position before installing the built-in type sensor to avoid twisting the cable.



The availability ratio of the machine and cut-down of maintenance time

Standard product name

(mm)

Shape	Standard product name	Output mode	Size	Protective structure	with LED	Cartridge name
Straight bolt type	STS060P A/B	A : Normally open B : Normally close	M6 × 1	IP65 *1	STS060P A/B-L	KS21PA/KS21PB
	STS080P A/B		M8 × 1.25		STS080P A/B-L	KS23PA/KS23PB
	STS100P A/B		M10 × 1.5		STS100P A/B-L	KS23PA/KS23PB
Hexagonal bolt type	STE060P A/B		M6 × 1		STE060P A/B-L	KS21PA/KS21PB
	STE080P A/B		M8 × 1.25		STE080P A/B-L	KS23PA/KS23PB
	STE100P A/B		M10 × 1.5		STE100P A/B-L	KS23PA/KS23PB
Water resistant type	with upward protective cover	STP080U A/B	M8 × 1.25	IP67 *2	STP080U A/B-L	KS30A/KS30B
		STP100U A/B	M10 × 1.5		STP100U A/B-L	
	with downward protective cover	STP080D A/B	M8 × 1.25		STP080D A/B-L	
		STP100D A/B	M10 × 1.5		STP100D A/B-L	

e.g. STS060PA, STS060PB

The rubber material is intended for water-soluble cutting oil (Alkaline).

For oiliness, chlorine-base, purified water and other chemicals, consult METROL for assistance.

-L : LED indicator (120mm from the sensor)
Add "-L" after cartridge name for LED type
e.g.) KS21PA-L

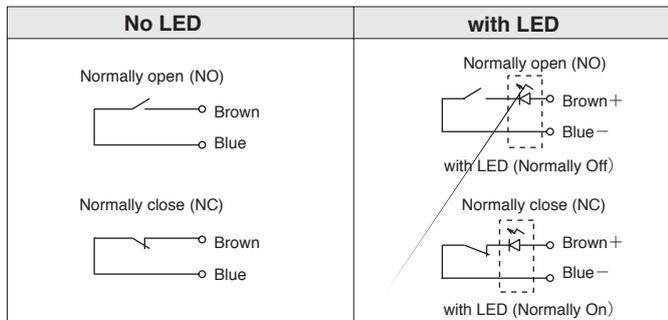
Stopper Bolt with a Built-in Switch

Common specification

Switch structure	Dry contact
Output mode	A: Normally open / B: Normally close
Signal point	0.3 from stopper surface
Stroke	0.7
Repeatability	Both On→Off, Off→On/ 0.01 (At operating speed 50~200mm/min)*
Movement differential	0
Contact life time	10 million (No bungle caused by vibration and use under contact rating)
Contact force	STS , STE:2N STP:3N
Contacting part material	SUS ball HRc40~50 (Refer to P2-6)
Hardness of the stopper surface	Hardened steel HRc40-50 (Refer to P2-6)

*Operating speed slower than 10mm/min is not recommended.

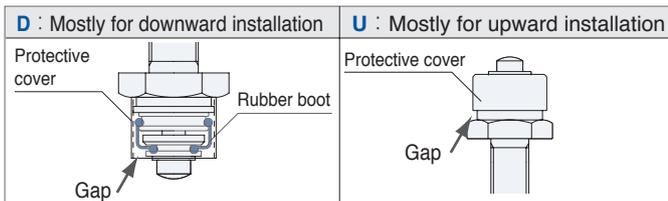
Circuit diagram



Electrical specification / circuit diagram. (Refer to P2-1)
CL type interface unit cannot be used with LED.

Protective covers

The protective cover protects rubber boot from damage caused by metal cuttings etc. and prevents impairment of water- and dust-resistant property. Choose the suitable cover according to sensor mounting direction so that the metal cuttings and coolant can't enter from the gaps (See the drawings below and also Refer to P6-5).



Instruction for cartridge installation

- Anti-loosening agent is applied to the screw of the built-in cartridge. And the screw is not tightened on delivery. Tighten the screw by fingers activate the anti-loosening agent.
- Do not tighten the screw by pliers. It may cause damage to the sensor.
- The cartridge is thin. Handle it carefully.
- When installing the cartridge type sensors, give consideration to enough space to replace the cartridge.

For metal cuttings and coolant

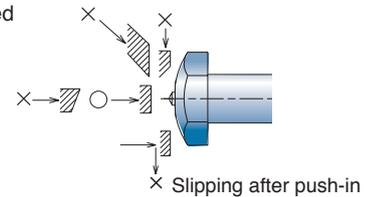
Protective cover is strongly recommended to avoid damage from cuttings and coolant when the sensor is used in machining environment. In addition, an extra cover is recommended to avoid direct hit by high-pressure coolant or heavy cuttings.

(mm)

Withstand load	5000N
Impact resistance	0.4J
Cable (Refer to P2-4)	Standard length 2m Oil resistant φ3 / 2 cores, Tensile strength 30N, minimum bending R7 Cable protector (Detachable)
Operating temperature range	0°C~80°C (Ice-free)
Temperature drift	0
Maximum operating speed	5m/min
Oscillation	10~55Hz total amplitude 1.5 for X,Y,Z each direction
Impact	300m/s ² for X,Y,Z each direction
Contact rating	DC+5V~DC+24V 20mA (MAX) Resistance load
Standard accessory	Two fixing nuts and a toothed washer

How to use

Make contact with the detected object at right angle (with deflection angle ±3°)



Screw / nut tightening torque

	Screw / Nut	Tightening torque	Applicable models
Machine Components with a Built-in Switch	M6×1	8N・m	ST
	M8×1.25	20N・m	
	M10×1.5	35N・m	
Stopper-Mini	M10×0.75	10N・m	STM

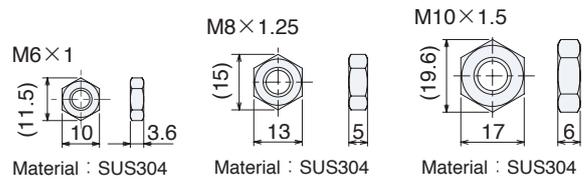
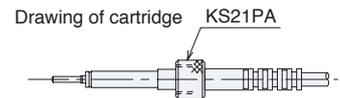
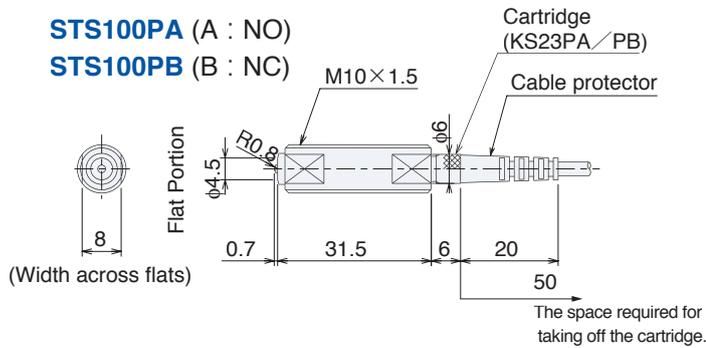
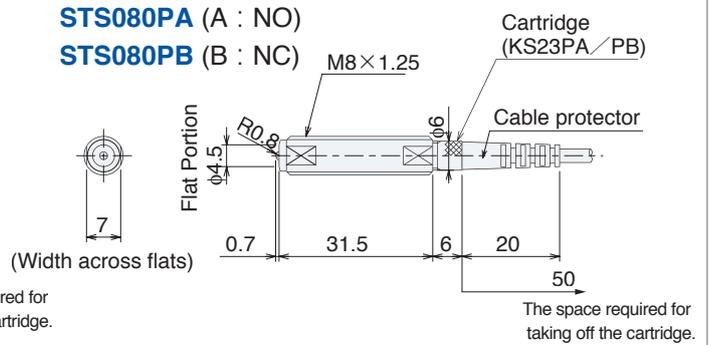
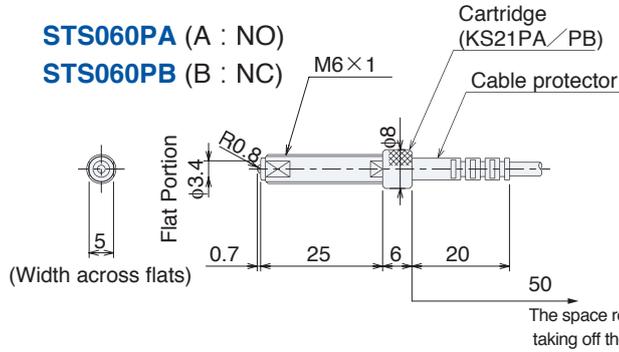
Protective covers

(mm)

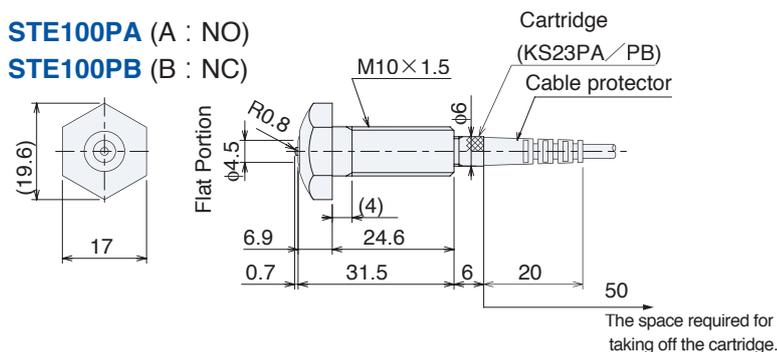
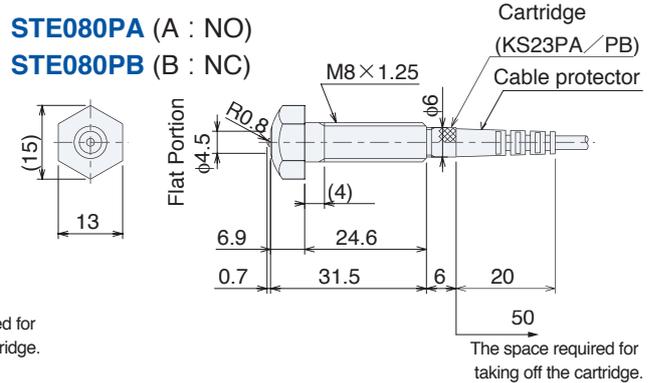
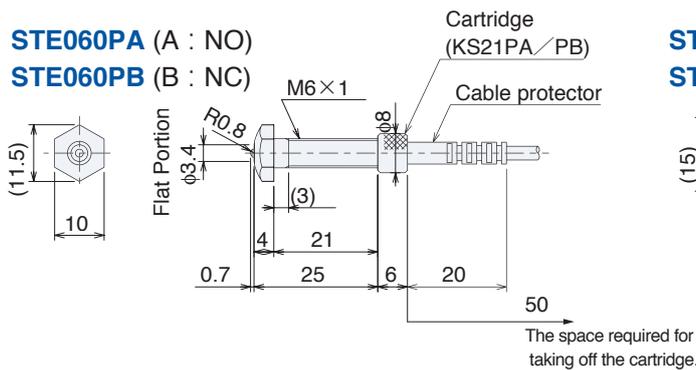
Standard product name	Output mode	Protective structure	Cartridge name
STS060 A/B	A : Normally open B : Normally close	IP40	KS21A / KS21B
STS080 A/B			KS23A / KS23B
STS100 A/B			KS21A / KS21B
STE060 A/B			KS23A / KS23B
STE080 A/B			
STE100 A/B			

Outer dimension

Straight bolt



Hexagonal bolt type



Outer dimension

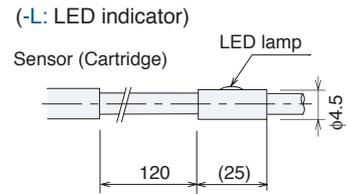
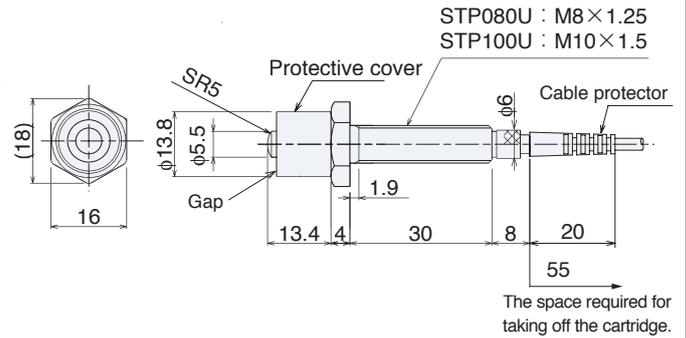
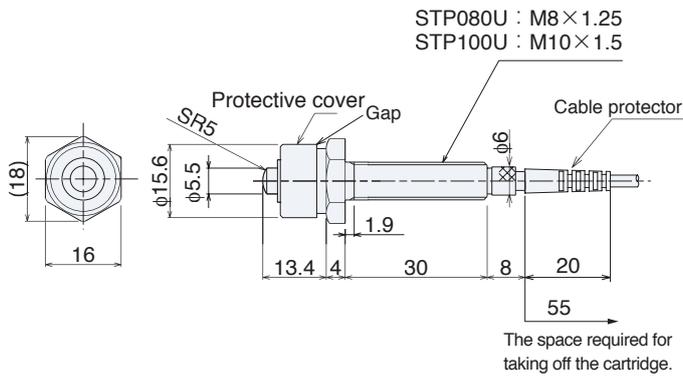
Water-resistant type (IP67)

with upward protective cover

- STP080UA** (A : NO)
- STP080UB** (B : NC)
- STP100UA** (A : NO)
- STP100UB** (B : NC)

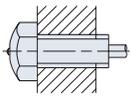
with downward protective cover

- STP080DA** (A : NO)
- STP080DB** (B : NC)
- STP100DA** (A : NO)
- STP100DB** (B : NC)

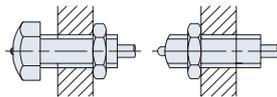


How to fix the sensor

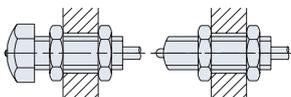
Simply screw in
(No need for position setting)



Screw in to the mounting hole
and apply a lock nut



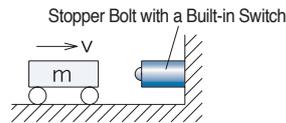
Insert the sensor in the mounting
hole and apply two fixing nuts



Impact-resistance calculation

Inertia collision

$E = 1/2mv^2$
m : Mass kg
v : Speedm/s

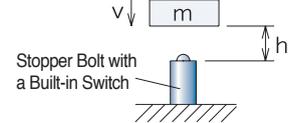


e.g.)

m	v	$mv^2 / 2$ [J]
80	0.1	0.4
320	0.05	0.4
80	0.05	0.1

Vertical free fall

$E = mgh$
g : Gravitational acceleration 9.8m/s²
h : Dropping height m



e.g.)

m	h	$v = \sqrt{2gh}$	mgh [J]
0.4	0.05	1	0.2
0.4	0.1	1.4	0.4