

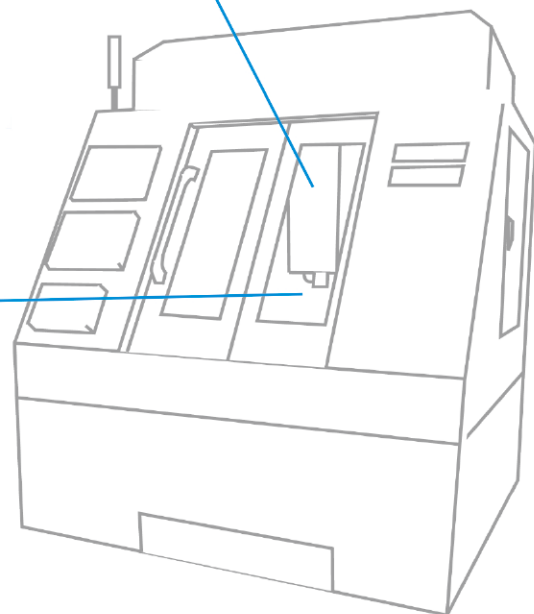
# Tool Setter

for CNC Machine Centers

# 2020

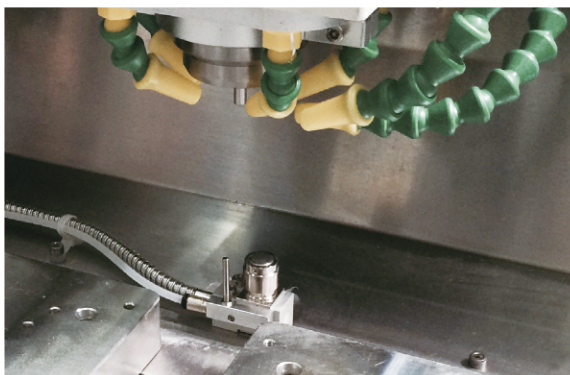
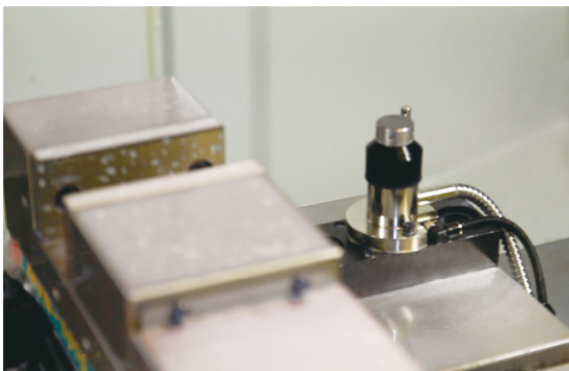
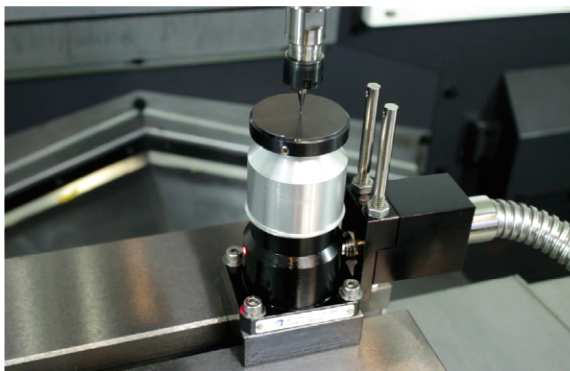


**Keep Sensing**  
**Keep Loving**  
**Keep Moving**



Made in Taiwan

# Application example



Tsense Factory

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## Main features



Zero Presetting



Abrasion & Breakage Detection



Length Compensation

## About Ballsum

- ✓ Founded in 2008.
- ✓ Providing high-precision positioning switch products.
- ✓ 100% made in Taiwan.
- ✓ A brand owned by T-sense Technology Co.,Ltd

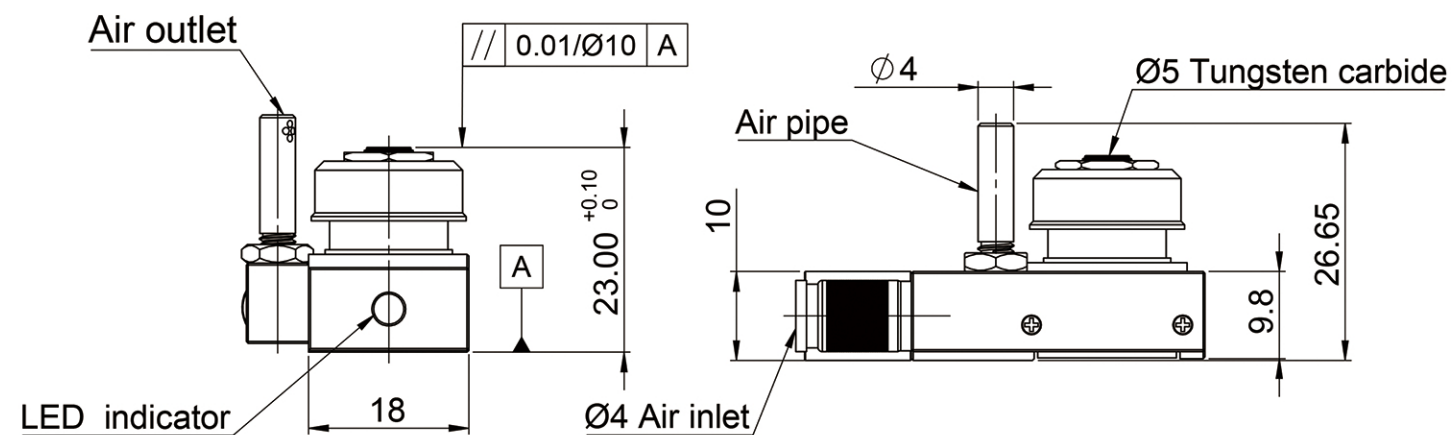
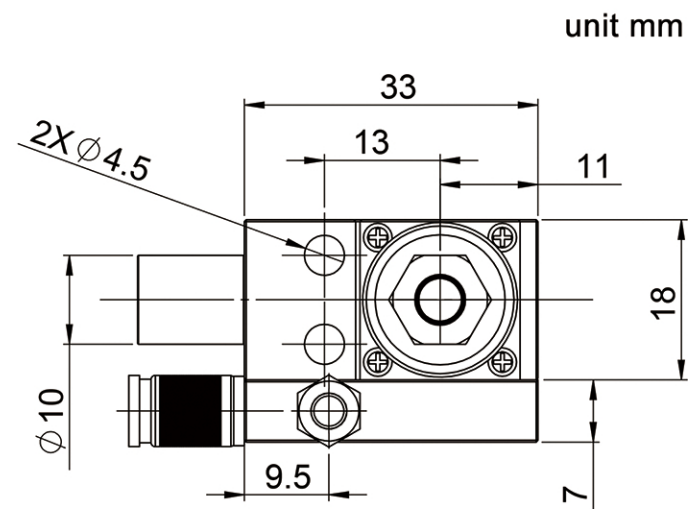




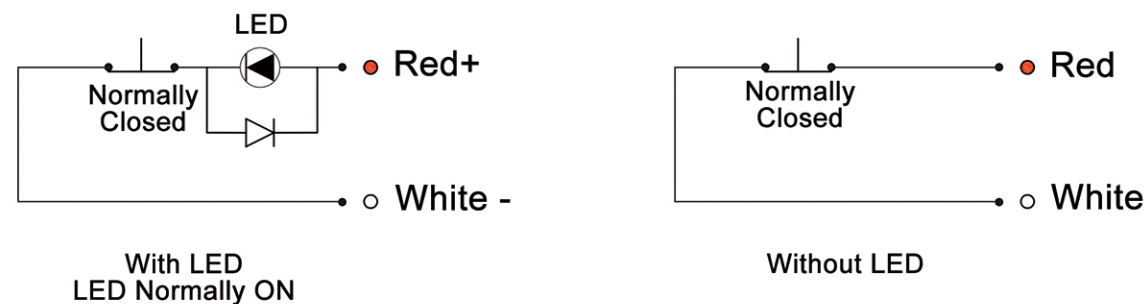
- Commonly being applied for dental mold CNC machines or glass cutting machines
- Mainly used as precise tool positioning , wear and breakage detection



## Dimensions



## Circuit Diagram



## Specification

Pretravel Dist.	0mm <sup>*1</sup>
Stroke	2.5mm
Contact Structure	Dry contact
Output Mode	B : normally closed(NC)
Repeatability	0.001mm ( operating speed 50-200mm/min)
Contact Rating	DC5V - 24V less than 20mA
Contact Lifetime	3 millions
Contact Surface	Carbide tungsten HRA 90.5
Contact Force	1.2N (1.0N to 1.5N)
Cable	Oil resistant , minimum bend R7
Ingress Protection	IP67 <sup>*2</sup>
Signal	Default: LED ON , Triggered: LED OFF

\*1 The sensor will be triggered when the position is changed from 0.000mm to 0.001mm

\*2 The inside rubber cover for ingress protection may be worn or torn by randomly flying chips or coolant when cutting. Please equip an additional cover to prevent high pressure coolant hitting the sensor directly.

## Available Options

LED indicator	<input type="checkbox"/> Default with <input type="checkbox"/> Without(-N)
Length of cable	<input type="checkbox"/> Default 3.0M <input type="checkbox"/> Customized ____M (-L_)
Length of conduit	<input type="checkbox"/> Default 2.5M <input type="checkbox"/> Customized ____M (-H_)
Air pipe	<input type="checkbox"/> Yes (-A) <input type="checkbox"/> Default not required
Contact force	<input type="checkbox"/> Default 1.0-1.5N <input type="checkbox"/> 0.5N (-C05)

## Code Examples

BTFC1 with LED , cable 3M , conduit 2.5M , without air pipe , contact force 1.2N

BTFC1-N without LED , cable 3M , conduit 2.5M , without air pipe ,contact force 1.2N

BTFC1-A-L5-H0 with LED , cable 5M , no conduit , with air pipe , contact force 1.2N

BTFC1-A-C05 with LED , cable 3M , conduit 2.5M , with air pipe , contact force 0.5N

## External I/F Component (Optional Accessory) Refer to page 15

Enable the output capacity up to 100mA .

Prevent breakdown from a wrong +/- connection .

Normally open or normally closed output conversion is available.

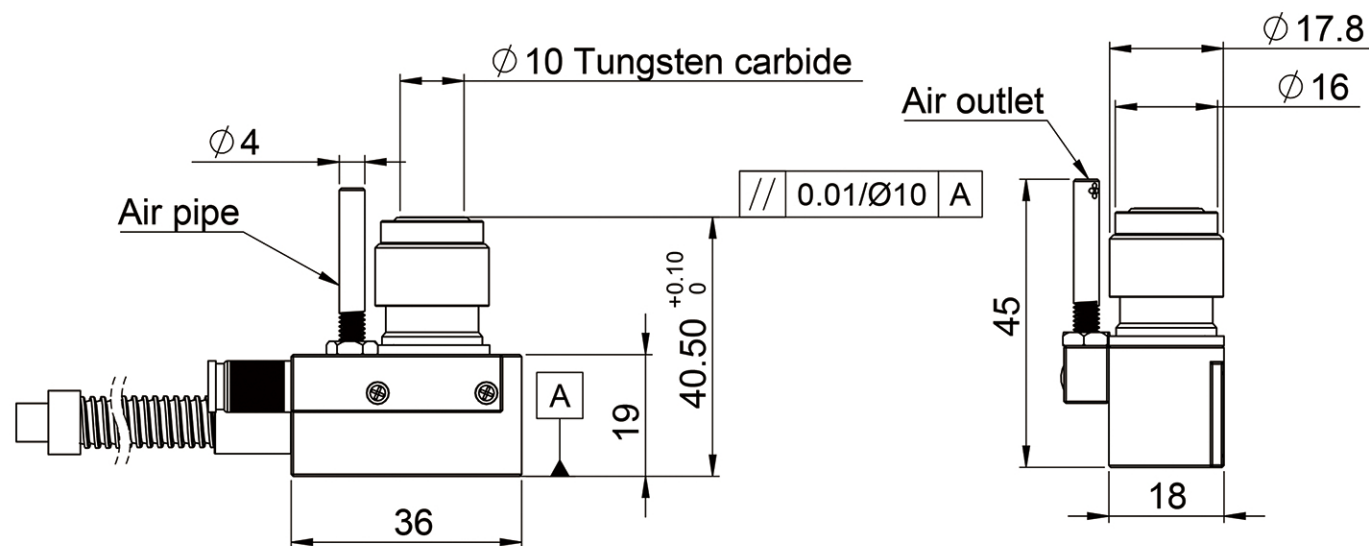
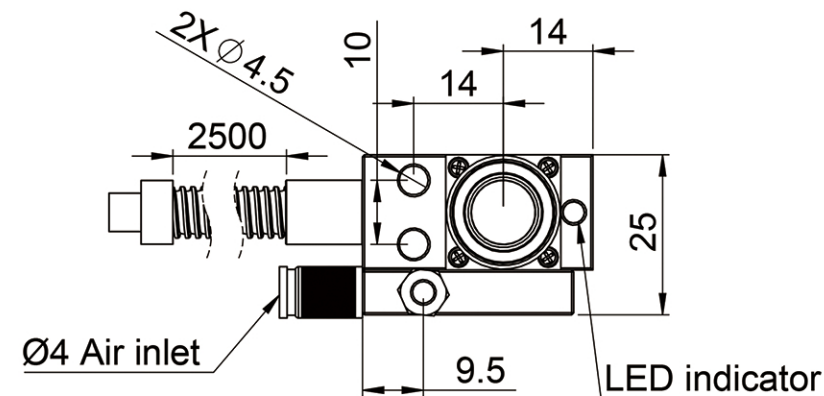


- With an over-travel signal function , damage by accident can be prevented.
- Mainly used as precise tool positioning , wear and breakage detection

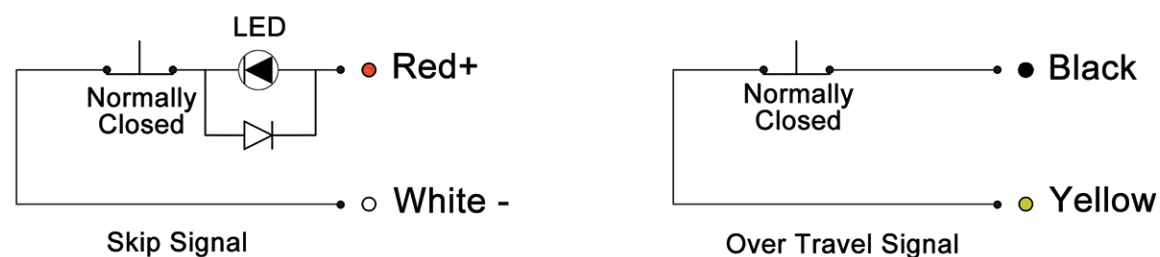


## Dimensions

unit mm



## Circuit Diagram



## Specification

Pretravel Dist.	0mm <sup>*1</sup>
Stroke	5.0mm
Contact Structure	Dry contact
Output Mode	B : normally closed(NC)
Repeatability	0.001mm ( operating speed 50-200mm/min)
Contact Rating	DC5V - 24V less than 20mA
Contact Lifetime	3 millions
Contact Surface	Carbide tungsten HRA 90.5
Contact Force	1.5N (1.3N to 1.8N)
Over Travel Signal	2.5mm(from skip signal) B:NC
Cable	Oil resistant , minimum bend R7
Ingress Protection	IP67 <sup>*2</sup>
Signal	Default: LED ON / Triggered: LED OFF

<sup>\*1</sup> The sensor will be triggered when the position is changed from 0.000mm to 0.001mm.

<sup>\*2</sup> The indise rubber cover for ingress protection may be worn or torn by randomly flying chip or coolant when cuting. Please equip an additional cover to prevent high pressure coolant hitting the sensor directly.

## Available Options

Length of cable	<input type="checkbox"/> Default 3.0M <input type="checkbox"/> Customized ____M (-L_)
Length of conduit	<input type="checkbox"/> Default 2.5M <input type="checkbox"/> Customized ____M (-H_)
Air pipe	<input type="checkbox"/> Yes (-A) <input type="checkbox"/> Default not required
Contact force	<input type="checkbox"/> Default 1.3-1.8N <input type="checkbox"/> 0.5N (-C05)

## Code Examples

**BTF2** cable 3M , conduit 2.5M , without air pipe , contact force 1.5N

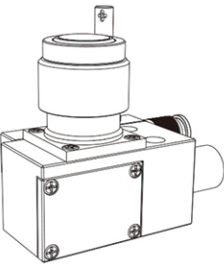
**BTF2-L5-H1** cable 5M , conduit 1M , without air pipe ,contact force 1.5N

**BTF2-A-L3-H0** cable 3M , no conduit , with air pipe , contact force 1.5N

**BTF2-A-C05** cable 3M , conduit 2.5M , with air pipe , contact force 0.5N

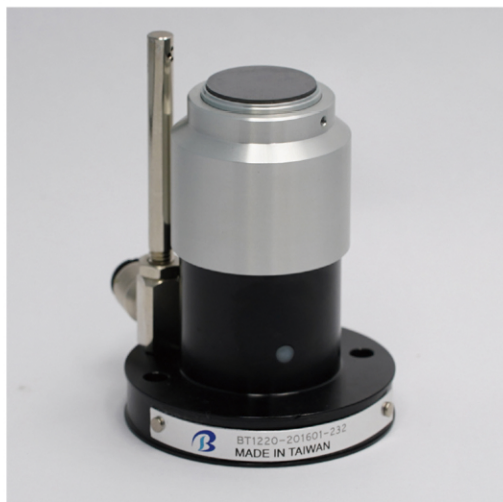
## External I/F Component (Optional Accessory) Refer to page 15

Enable the output capacity up to 100mA .  
Prevent breakdown from a wrong +/- connection .  
Normally open or normally closed output conversion is available.

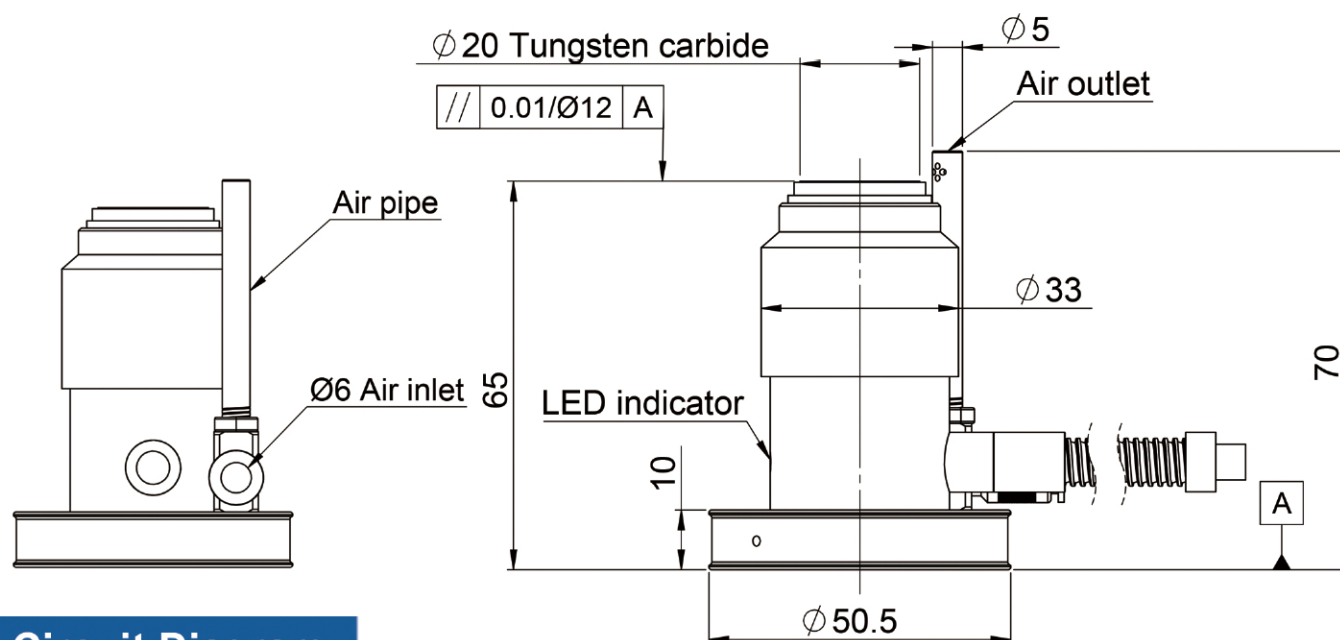
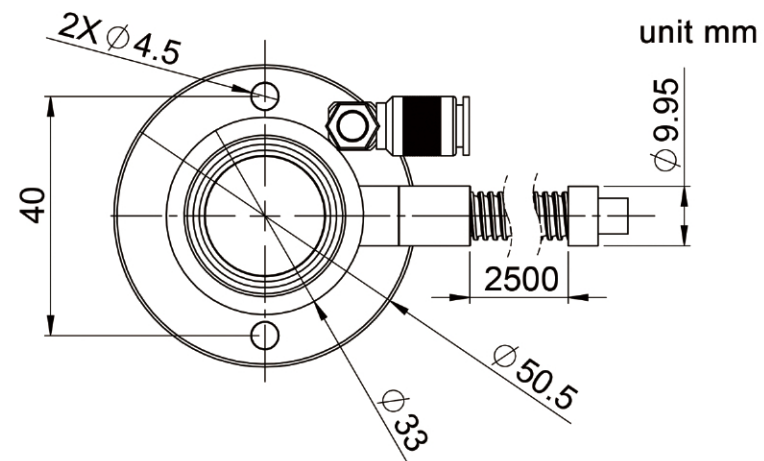




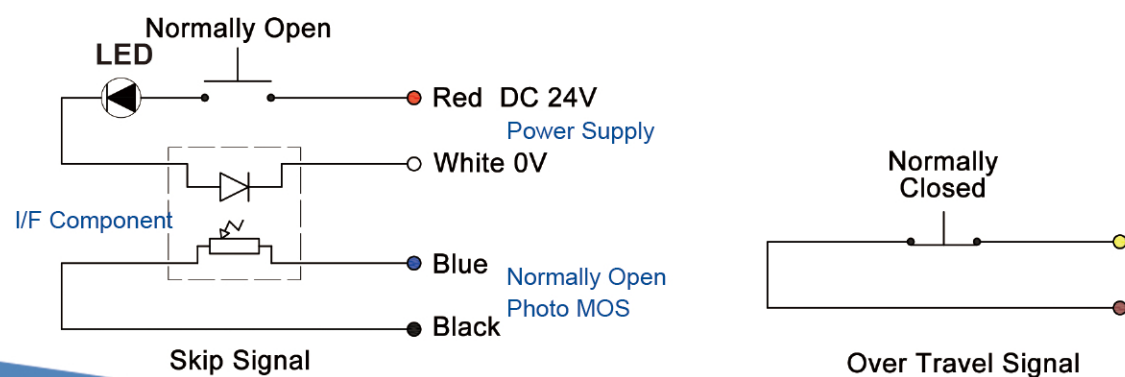
- With an over-travel signal function, damages by accident can be prevented
- Mainly used as precise tool positioning, wear and breakage detection



## Dimensions



## Circuit Diagram



## Specification

Pretravel Dist.	0mm <sup>*1</sup>
Stroke	5.0mm
Contact Structure	Dry contact
Output Mode	A : normally open(NO) B:NC is optional
Repeatability	0.001mm ( operating speed 50-200mm/min)
Contact Rating	DC5V - 24V less than 20mA
Contact Lifetime	3 millions
Contact Surface	Carbide tungsten HRA 90.5+ AlTiCrN Coating
Contact Force	$\approx 1.5N$
Over Travel Signal	2.5mm(from skip signal) B:NC
Cable	Oil resistant , mininum bend R7
Ingress Protection	IP67 <sup>*2</sup>
Signal	Default: LED OFF / Triggered: LED ON

<sup>\*1</sup> The sensor will be triggered when the position is changed from 0.000mm to 0.001mm.

<sup>\*2</sup> The inside rubber cover for ingress protection may be worn or torn by randomly flying chip or coolant when cutting. Please equip an additional cover to prevent high pressure coolant hitting the sensor directly.

## Available Options

Length of cable	<input type="checkbox"/> Default 3.0M <input type="checkbox"/> Customized ____M (-L_)
Length of conduit	<input type="checkbox"/> Default 2.5M <input type="checkbox"/> Customized ____M (-H_)
Cable connector	<input type="checkbox"/> Quick connector (-P) <input type="checkbox"/> Default fixed
Contact structure	<input type="checkbox"/> Default NO <input type="checkbox"/> NC (-NC) LED OFF when triggered

## Code Examples

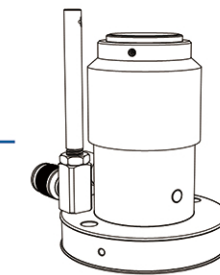
BT1220 cable 3M , conduit 2.5M , fixed cable type

BT1220-L5-H1 cable 5M , conduit 1M , fixed cable type

BT1220-P cable 3M , conduit 2.5M , quick connector cable type (refer to page 24)

BT1220-P-L5-H3 cable 5M , conduit 3M , quick connector cable type

BT1220-NC-L8-H3 cable 8M , conduit 3M , fixed cable type, normally closed contact structure

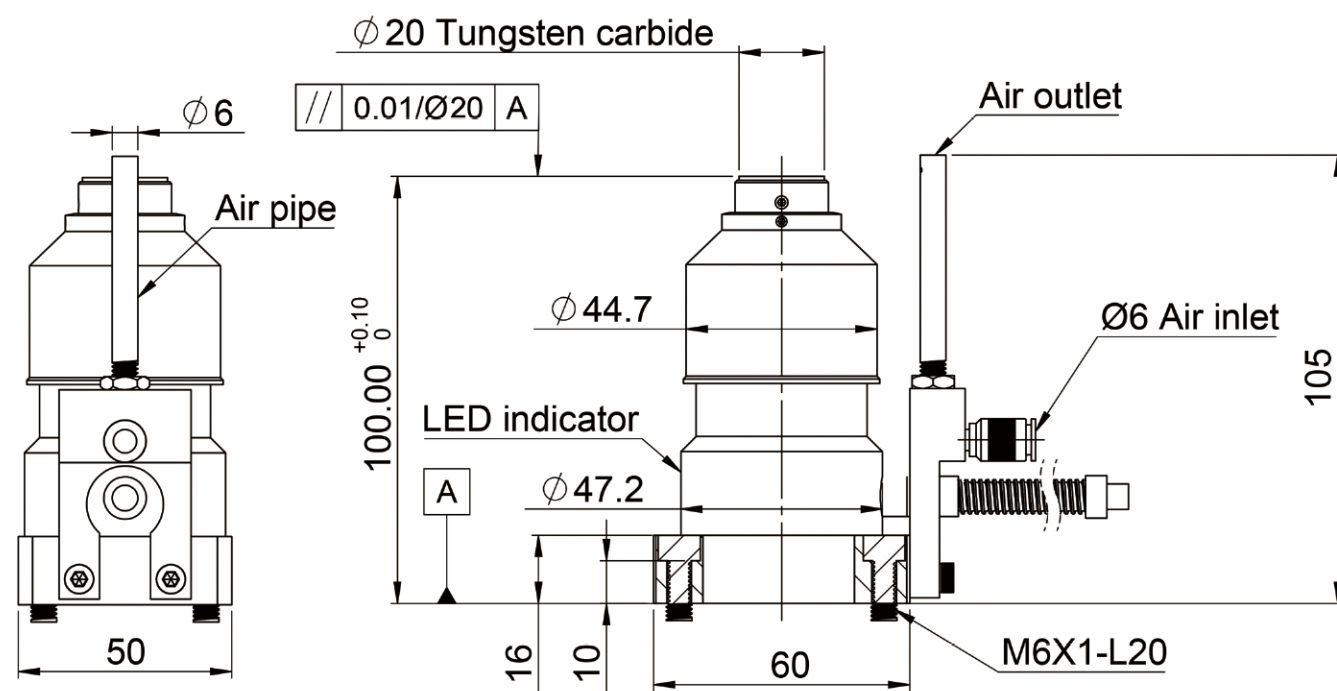
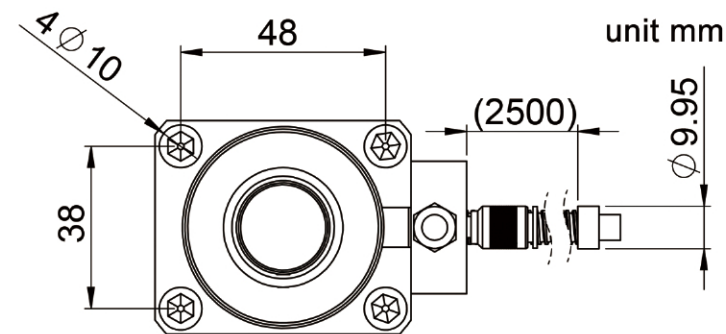




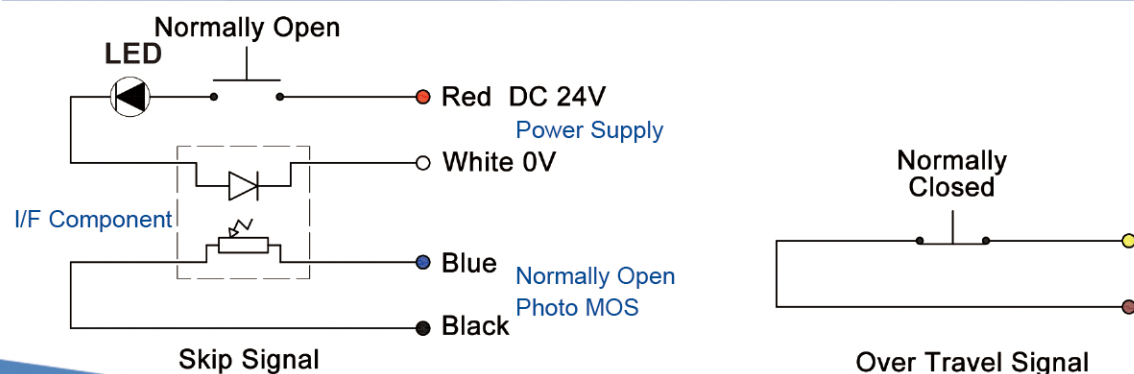
- With a buide-in high precision linear guide ball bearing, the lifetime is prolonged
- Mainly used as precise tool positioning , wear and breakage detection



## Dimensions



## Circuit Diagram



## Specification

Pretravel Dist.	≅0.5mm
Stroke	12mm
Contact Structure	Dry contact
Output Mode	A : normally open(NO) B:NC is optional
Repeatability	0.001mm (operating speed 50-1500mm/min)
Contact Rating	DC5V - 24V less than 20mA
Contact Lifetime	5 millions
Contact Surface	Carbide tungsten HRA 90.5+ AlTiCrN Coating
Contact Force	≅2.5N
Over Travel Signal	6.0mm(from skip signal) B:NC
Cable	Oil resistant , minimum bend R7
Ingress Protection	IP68 <sup>*1</sup>
Signal	Default: LED OFF / Triggered: LED ON

<sup>\*1</sup> The inside rubber cover for ingress protection may be worn or torn by randomly flying chips or coolant when cutting .Please equip an additional cover if needed.

## Available Options

Length of cable	<input type="checkbox"/> Default 5.0M <input type="checkbox"/> Customized____M (-L_)
Length of conduit	<input type="checkbox"/> Default 3.0M <input type="checkbox"/> Customized____M (-H_)
Cable connector	<input type="checkbox"/> Quick Connector (-P) <input type="checkbox"/> Default fixed
Contact structure	<input type="checkbox"/> Default NO <input type="checkbox"/> NC (-NC) LED OFF when triggered

## Code Examples

**BT20** cable 5M , conduit 3M , fixed cable type

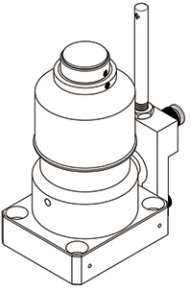
**BT20-L10-H5** cable 10M , conduit 5M , fixed cable type

**BT20-P** cable 5M , conduit 3M , quick connector cable type (refer to page 24)

**BT20-NC-L8-H3** cable 8M , conduit 3M , fixed cable type, normally closed contact structure

## Precaution

Operation speed slower than 10mm/min is not recommended.  
The repeatability remaining 0.001mm when operating at speed 1500mm/min is tested in most CNC machines.  
However, the performance of repeatability might be different in some particular kinds of CNC machines.  
Please try and find your own best operation speed for your CNC machines.

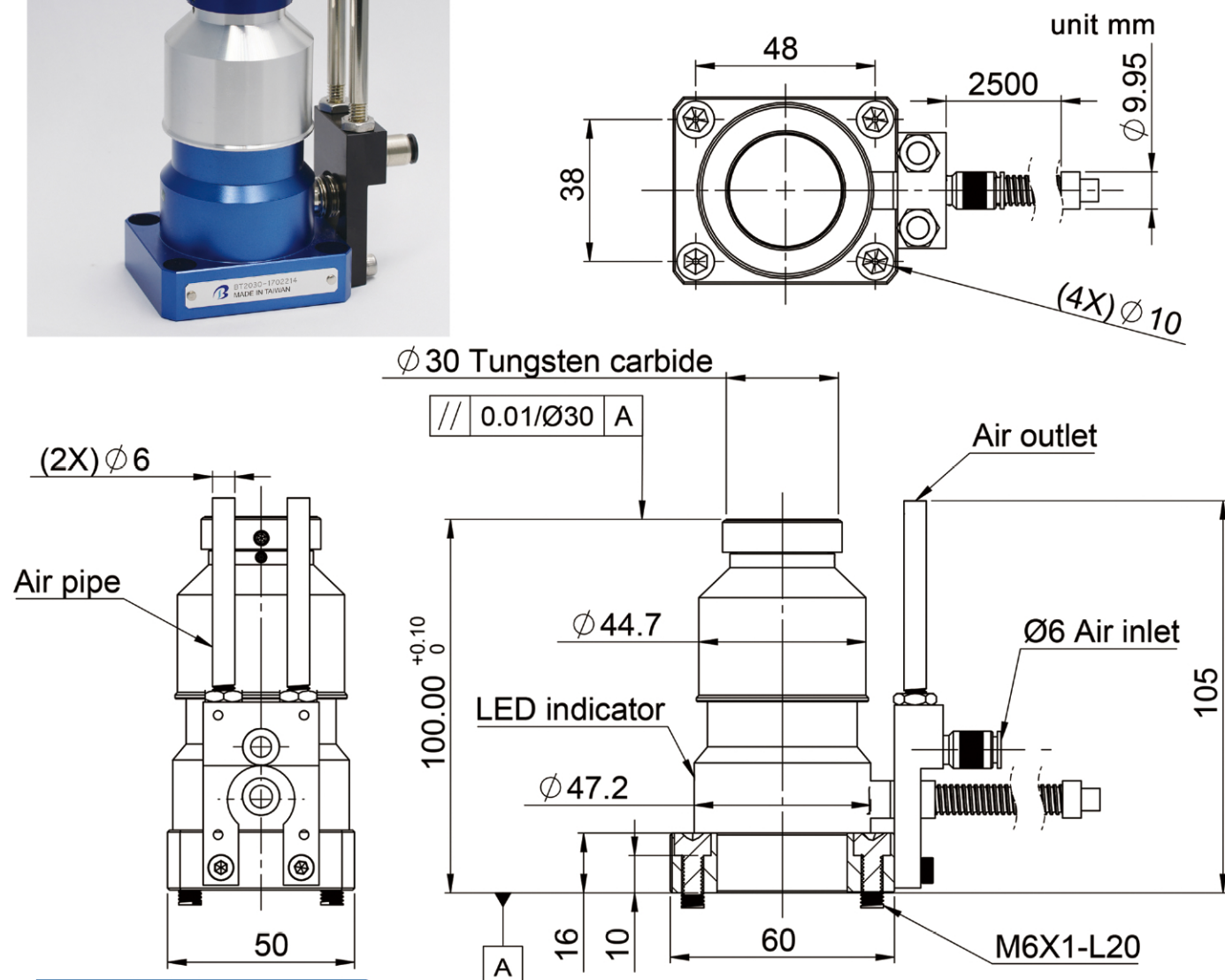




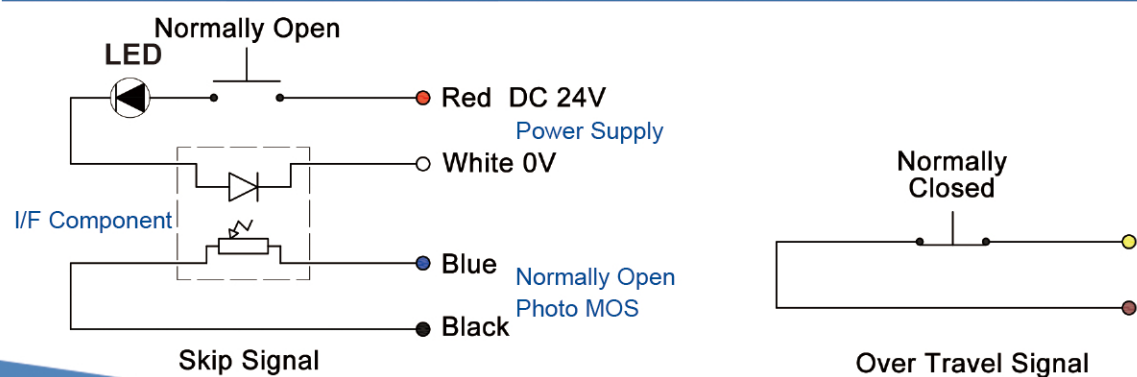
- With a high precision linear ball bearing inside, the lifetime is prolonged
- Mainly used as precise tool positioning , wear and breakage detection



## Dimensions



## Circuit Diagram



## Specification

Pretravel Dist.	≒0.5mm
Stroke	12mm
Contact Structure	Dry contact
Output Mode	A : normally open(NO) B:NC is optional
Repeatability	0.001mm (operating speed 50-1500mm/min)
Contact Rating	DC5V - 24V less than 20mA
Contact Lifetime	5 millions
Contact Surface	Carbide tungsten HRA 90.5+ AlTiCrN Coating
Contact Force	≒2.5N
Over Travel Signal	6.0mm (from skip signal) B:NC
Cable	Oil resistant , Minumum bend R7
Ingress Protection	IP68 <sup>*1</sup>
Signal	Default: LED OFF / Triggered: LED ON

<sup>\*1</sup> The inside rubber cover for ingress protection may be worn or torn by randomly flying chip or coolant when cutting .Please equip an additional cover if needed.

## Available Options

Length of cable	<input type="checkbox"/> Default 5.0M <input type="checkbox"/> Customized ____M (-L_)
Length of conduit	<input type="checkbox"/> Default 3.0M <input type="checkbox"/> Customized ____M (-H_)
Cable connector	<input type="checkbox"/> Quick Connector (-P) <input type="checkbox"/> Default fixed
Contact structure	<input type="checkbox"/> Default NO <input type="checkbox"/> NC (-NC) LED OFF when triggered

## Code Examples

BT2030 cable 5M , conduit 3M , fixed cable type

BT2030-L10-H5 cable 10M , conduit 5M , fixed cable type

BT2030-P cable 5M , conduit 3M , quick connector cable type (refer to page 24)

BT2030-NC-L8-H3 cable 8M , conduit 3M , fixed cable type, normally closed contact structure

## Precaution

Operation speed slower than 10mm/min is not recommended.  
The repeatability remaining 0.001mm when operating at speed 1500mm/min is tested in most CNC machines.  
However, the performance of repeatability might be different in some particular kinds of CNC machines.  
Please try and find your own best operation speed for your CNC machines.

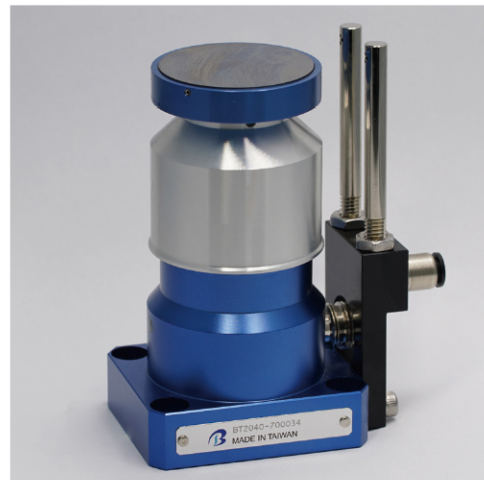


# BT2040

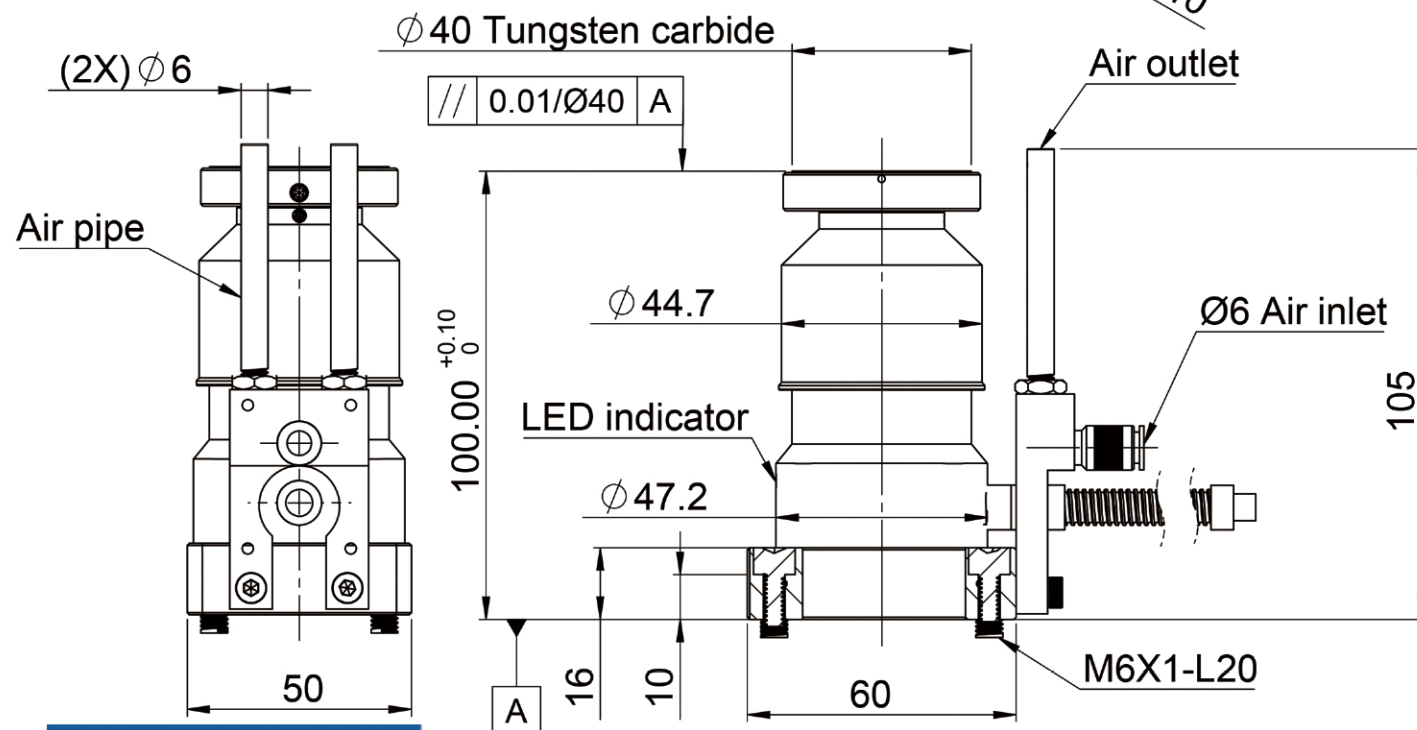
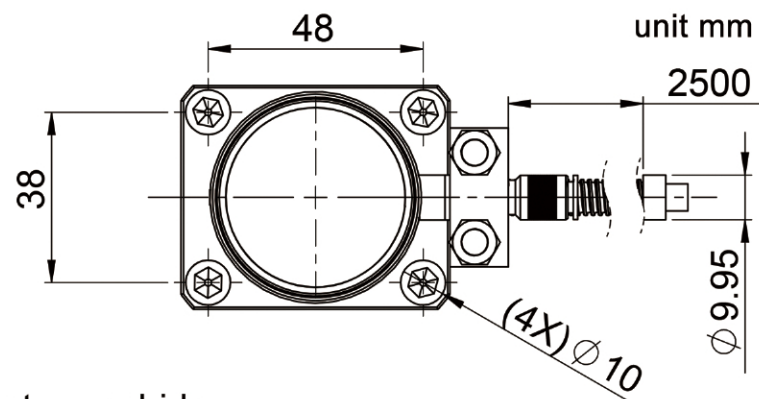
Tool Setter for CNC Machine Centers  
φ40 Contact



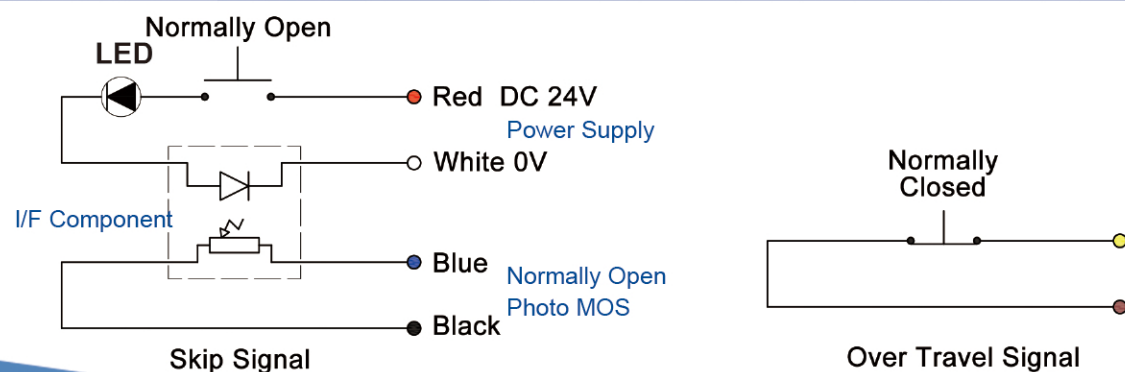
- With a build-in high precision linear guide ball bearing , the lifetime is prolonged
- Mainly used as precise tool positioning , wear and breakage detection



## Dimensions



## Circuit Diagram



## Specification

Pretravel Dist.	≅0.5mm
Stroke	12mm
Contact Structure	Dry contact
Output Mode	A : normally open(NO) B:NC is optional
Repeatability	0.001mm (operating speed 50-1500mm/min)
Contact Rating	DC5V - 24V less than 20mA
Contact Lifetime	5 millions
Contact Surface	Carbide tungsten HRA 90.5+ AlTiCrN Coating
Contact Force	≅2.5N
Over Travel Signal	6.0mm(from skip signal) B:NC
Cable	Oil resistant , minimum bend R7
Ingress Protection	IP68 <sup>*1</sup>
Signal	Default: LED OFF / Triggered: LED ON

<sup>\*1</sup> The inside rubber cover for ingress protection may be worn or torn by randomly flying chips or coolant when cutting .Please equip an additional cover if needed.

## Available Options

Length of cable	<input type="checkbox"/> Default 5.0M <input type="checkbox"/> Customized ____M (-L_)
Length of conduit	<input type="checkbox"/> Default 3.0M <input type="checkbox"/> Customized ____M (-H_)
Cable connector	<input type="checkbox"/> Quick Connector (-P) <input type="checkbox"/> Default fixed
Contact structure	<input type="checkbox"/> Default NO <input type="checkbox"/> NC (-NC) LED OFF when triggered

## Code Examples

**BT2040** cable 5M , conduit 3M , fixed cable type

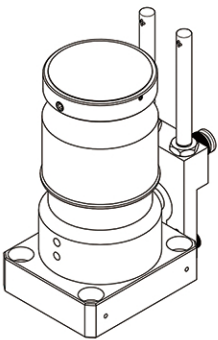
**BT2040-L10-H5** cable 10M , conduit 5M , fixed cable type

**BT2040-P** cable 5M , conduit 3M , quick connector cable type (refer to page 24)

**BT2040-NC-L8-H3** cable 8M , conduit 3M , fixed cable type, normally closed contact structure

## Precaution

Operation speed slower than 10mm/min is not recommended.  
The repeatability remaining 0.001mm when operating at speed 1500mm/min is tested in most CNC machines.  
However, the performance of repeatability might be different in some particular kinds of CNC machines.  
Please try and find your own best operation speed for your CNC machines.



BT2040

Automatic Tool Setter

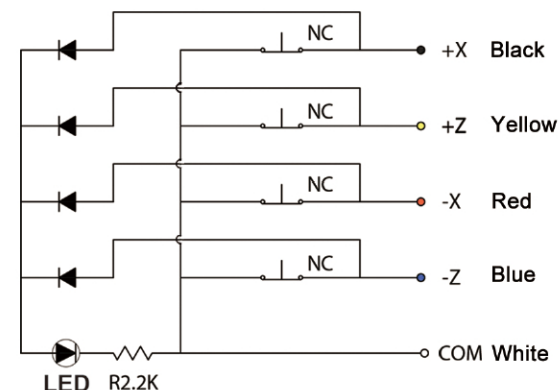


# B4A-II

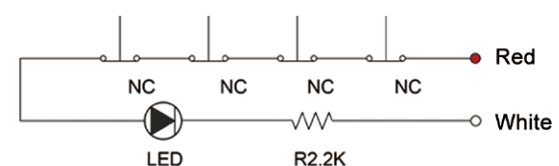
Tool Setter for CNC Lathe  
4 Axis



## Circuit Diagram

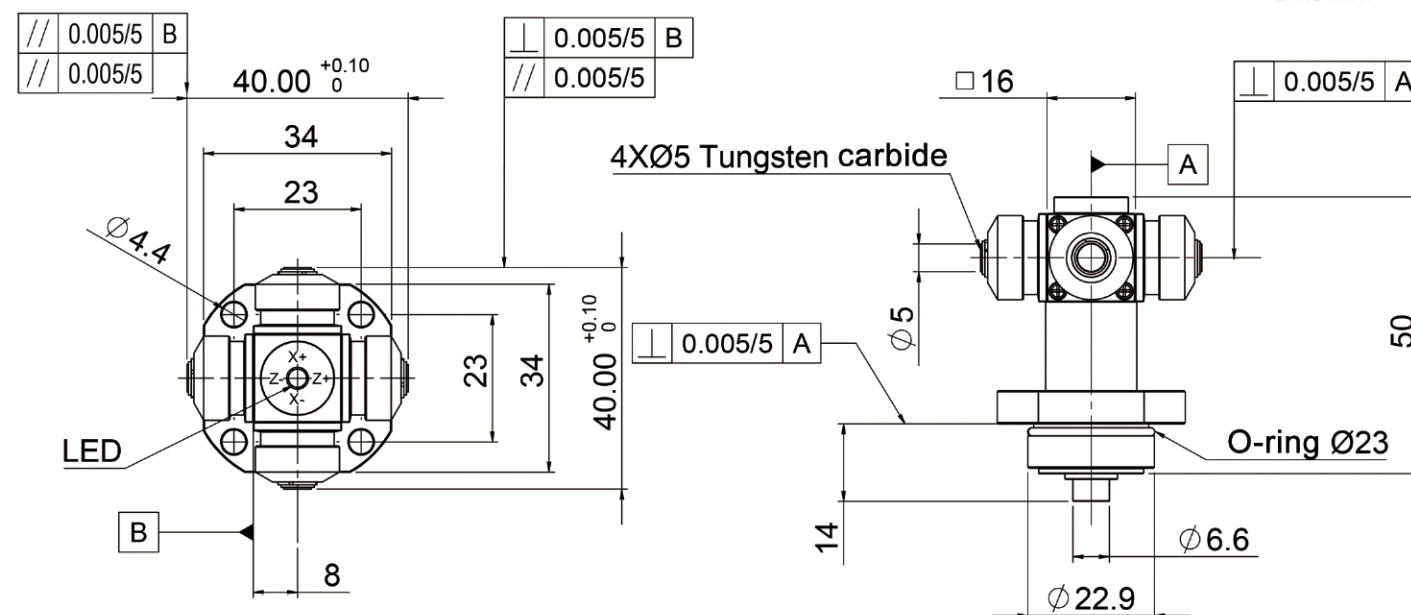


4 signals type  
item: B4A-II



1 signal type  
item: B4A-II-1

## Dimensions



unit mm

## Specifications

Contact Rating	DC5V - 24V 20mA	Stroke	1.5mm
Repeatability	0.001mm	Contact Force	1.3-1.8N
Pretravel Distance	≒0mm	Cable	5m
Contact Lifetime	2 millions	Ingress Protection	IP67

\* Optional accessory B4AI/F

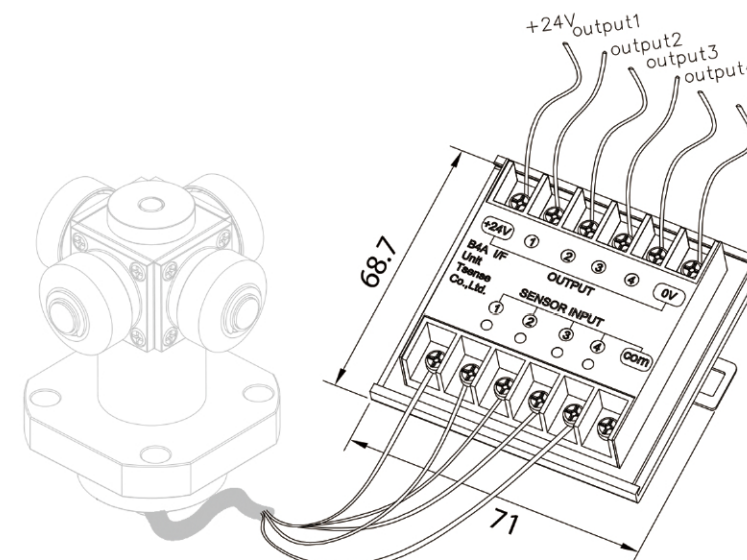
1. Increase output capacity up to 100mA
2. Protect sensors from inrush current
3. Convert NC to NO

## Precaution

- Do not press different sensors synchronously.
- Please note that adhesive and sealants may be eroded by coolant.
- Limit the LED forward current below 10mA.

# B4AI/F

External I/F Unit ( 4 ports , 4 signals )  
accessory for B4A-II & B4A-II-1



## Specification

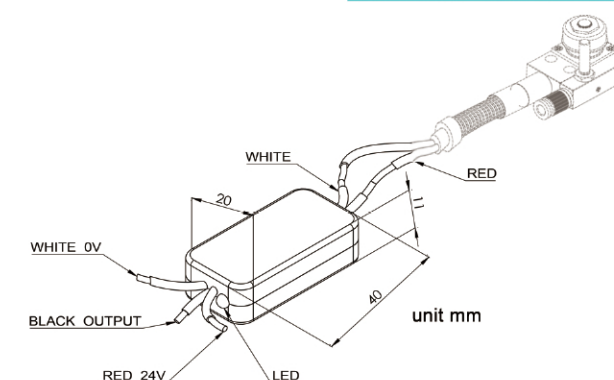
Output Mode	PNP
Output Capacity	DC 24V , less than 350mA
Operating Latency	Average 300usec , max 500usec
Output Method	Inverted output (NC->NO, NO->NC)
Input	4 signals
Power Supply	DC24V , power consumption 30mA

- Protect contact from rush current, increase output current up to 350mA, and convert output from normally closed to normally open or from normally open to normally closed.
- A latch is designed for quick installation.
- 4 ports are all isolated output terminals.
- This I/F unit is especially designed for the T-SENSE/BALLSUM sensors. Do not use this I/F unit with sensors of other manufacturers.

\* B4AI/F is not a waterproof device.

# BTFI/F

External I/F Unit ( 1 port , 1 signal )  
accessory for BTF1 & BTF2 & BCW & BCS



## Specification

Output Mode	NPN-NO , NPN-NC , PNP-NO , PNP-NC
Output Capacity	DC24V , less than 100mA
Operating Latency	Average 27.8usec
Output Method	PhotoMos relay
Power Supply	DC24V , power consumption 10mA

- Protect contact from rush current, increase output current up to 350mA, and convert output from normally closed to normally open or from normally open to normally closed.
- Item number and output mode  
BTFI/F-NA Output mode NPN-NO  
BTFI/F-NB Output mode NPN-NC  
BTFI/F-PA Output mode PNP-NO  
BTFI/F-PB Output mode PNP-NC
- This I/F unit is especially designed for the T-SENSE/BALLSUM sensors.

\* BTFI/F is not a waterproof device.



# BTS Series

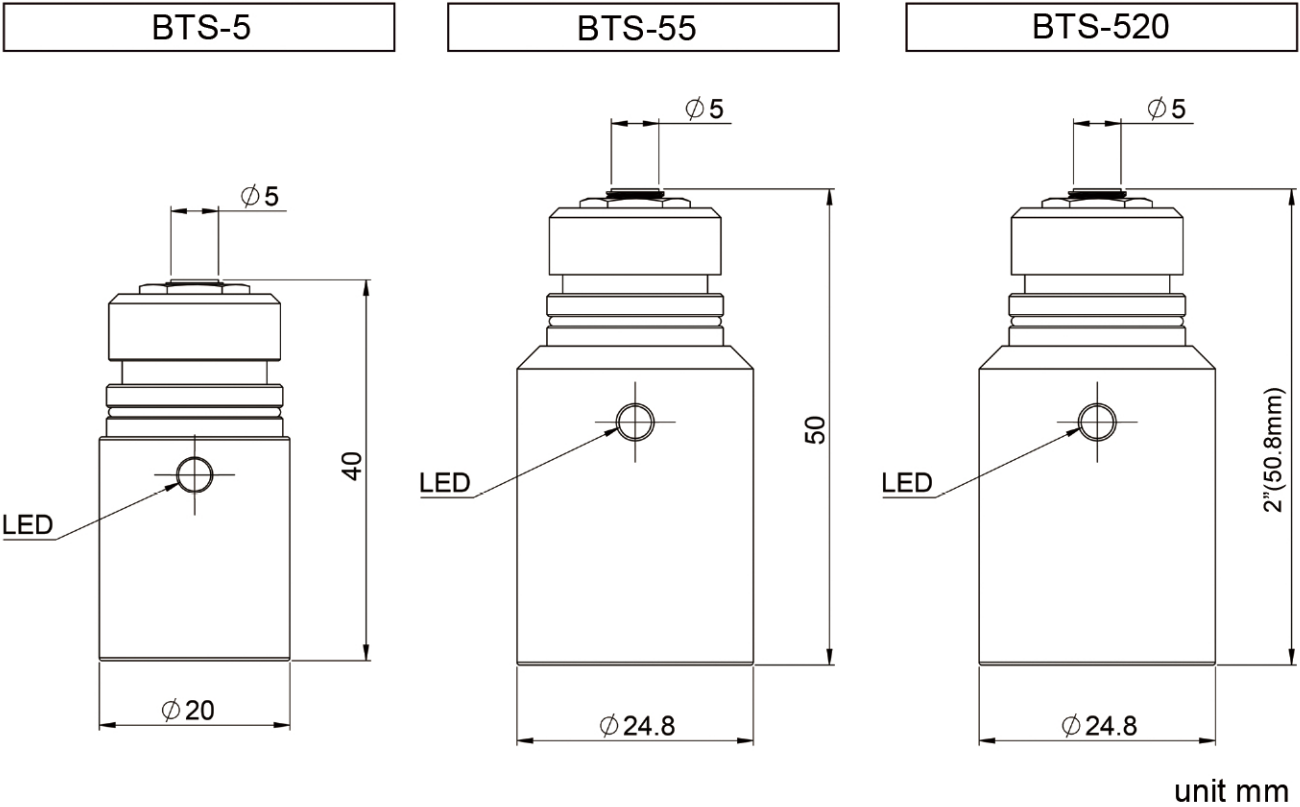
LED Type High-precision  
Manual Type Tool Setter



- Mainly used to reduce the time when setting up tools , identify broken tools .and compensate thermal changes when remaining static
- Applied to cutting tools as small as  $\phi 0.1\text{mm}$



## Dimensions



unit mm

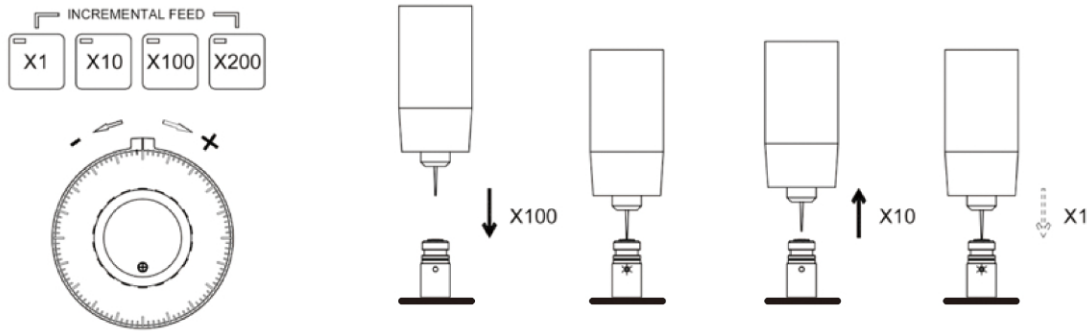
## Batteries Replacement

Use a Phillips screwdriver when opening the bottom cover. The product is pre-installed with a magnetic bottom cover. If having different requirements, change to the non-magnetic bottom cover.

## Specification

Item	BTS-5	BTS-55	BTS-520
Trigger Position(from rest)	Z axis $\div 0$		
Height	40mm	50mm	2”(50.8mm)
Stroke	2mm		
Ingress Protection	IP6X、IPX7(IEC 60529)		
Repeatability	1μm		
Contact Force	1.0N	0.5N	
Contact Surface	Tungsten Carbide (HV 1410、HRA 90.5)		
Battery	3V (two SR44 or LR44 required)		
Battery Lifetime	Approximately 250 hours		
Weight(without batteries)	43g	72g	
Operation Temperature	+5°C to +50°C		
Signal	LED (Red)		

## Measuring Method



Place the presetter on the workpiece surface and move the spindle downward in the z-axis, touching the tungsten steel surface until the LED light turns on. At this point, move the spindle away, slowly until the light is off. Now move downward once again at the slowest speed, stopping when the light turns on again. At this time, the distance from the workpiece to the tool can be used as the origin coordinate of tool length measurement and the reference coordinate of the wear correction of tools.

## Precautions

- As with any precision instrument, the accumulation of dust or fluid will affect the accuracy and service life of the product. Use the included dust cover to protect the probe when not in use, as shown to the right.
- Although the product is waterproof and dustproof, it is not recommended to be placed in a working environment with cutting fluid and dust for extended periods. Clean and return the tool to the storage case after use for added protection.
- The product may also be used to measure in x-axis or y-axis by utilizing the magnetic base.
- Discard the batteries in a designated recycling center after replacement if possible. Do not litter or discard in the general garbage.
- The figures for the product specifications are measured at a temperature of  $25^{\circ}\text{C} \pm 0.5^{\circ}\text{C}$  prior to leaving the factory.
- To measure precisely, when operating in an environment with different or extreme parameters, use gage blocks if necessary to compensate for the height of the product.





# MMP-Z

LED Type High-precision  
Manual Z-axis Touch Probe



This touch probe is a tool providing the operator a simple method to measure the height of a workpiece with high precision. The LED light on the touch probe will be triggered while the touch probe contacts the workpiece. At the point when the light is turned on, the Z-axis coordinate is the height position of the workpiece. Therefore, the touch probe can be used to help reducing the errors and decreasing the defective loss when producing.



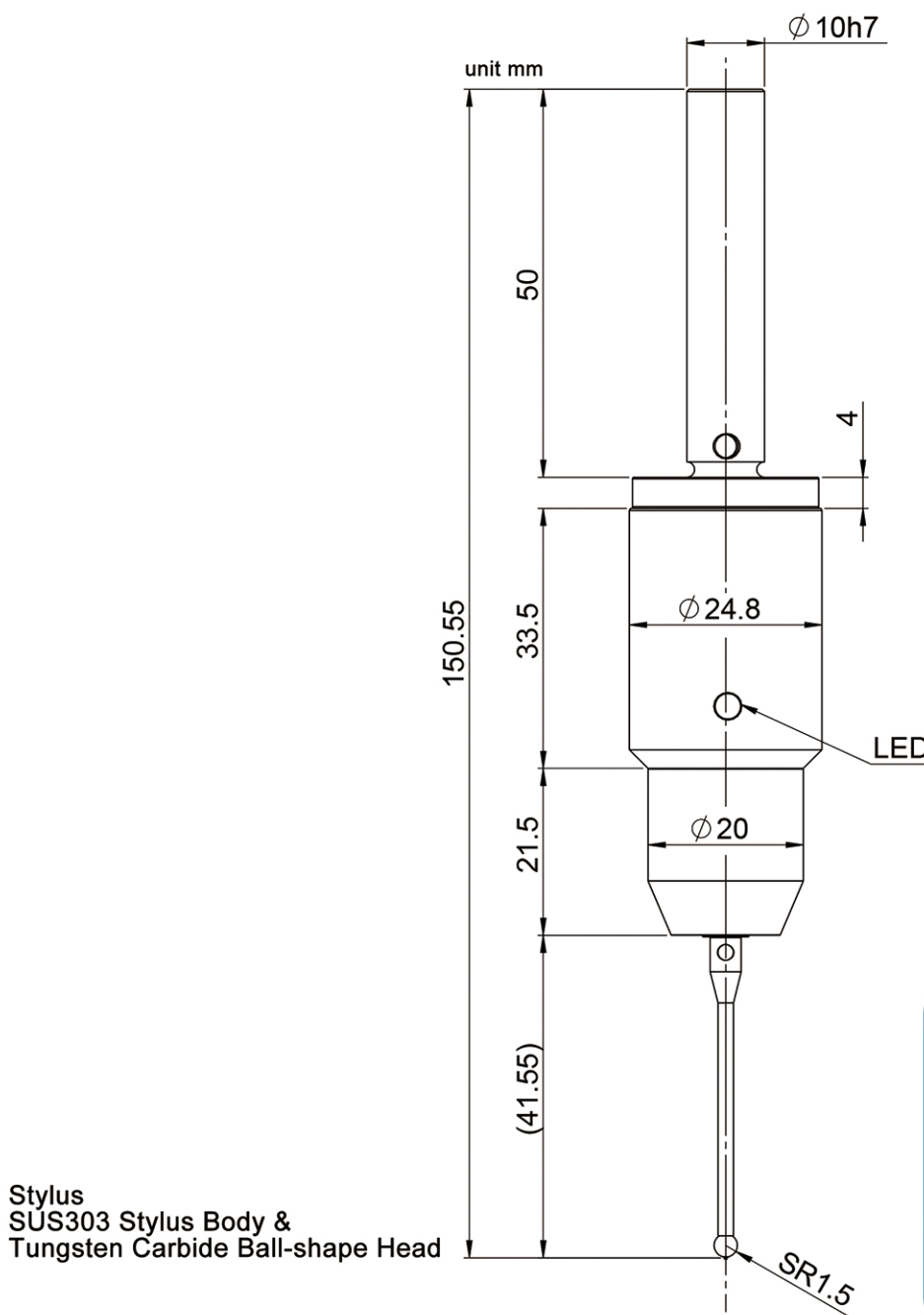
## Specification

Item	MMP-Z
Trigger Position	$\approx 0\text{mm}$
Contact Force	1.0N , 4.0N , 7.0N
Stroke	2mm
Ingress Protection	IP67
Repeatability	$\pm 1\mu\text{m}(2\sigma)$
Measuring Direction	$\pm Z$
Stylus Material	Stainless, Tungsten
Stylus Mounting	M3
Battery	LR44 x 2
Battery Lifetime	250 hours (when LED continuous on)

## Code Example

Item Number	MMP-Z	MMP-Z-4N	MMP-Z-7N
Contact Force	$\approx 1.0\text{N}$	$\approx 4.0\text{N}$	$\approx 7.0\text{N}$

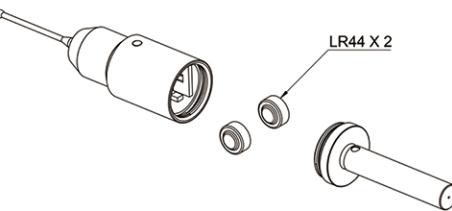
## Dimensions



## Trigger Direction

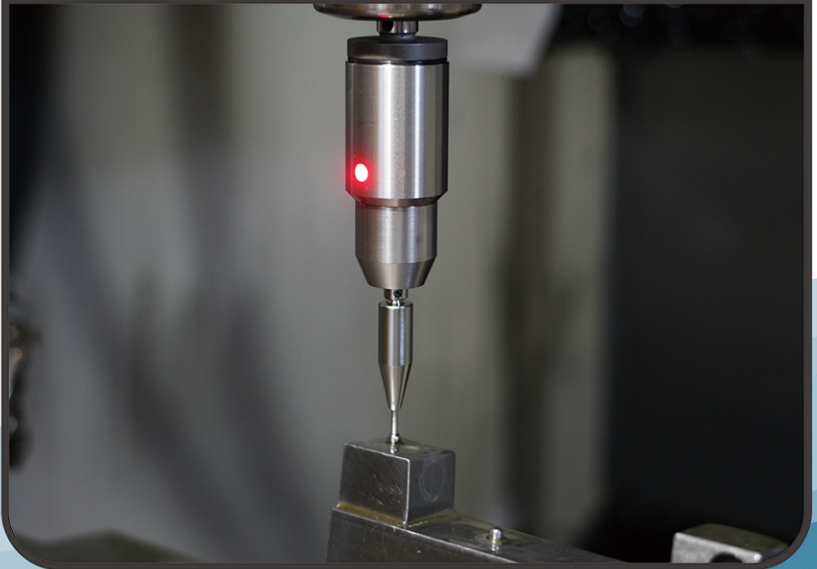


## Battery



LED can be continuous ON  
over 250 hours

## Operation Illustration



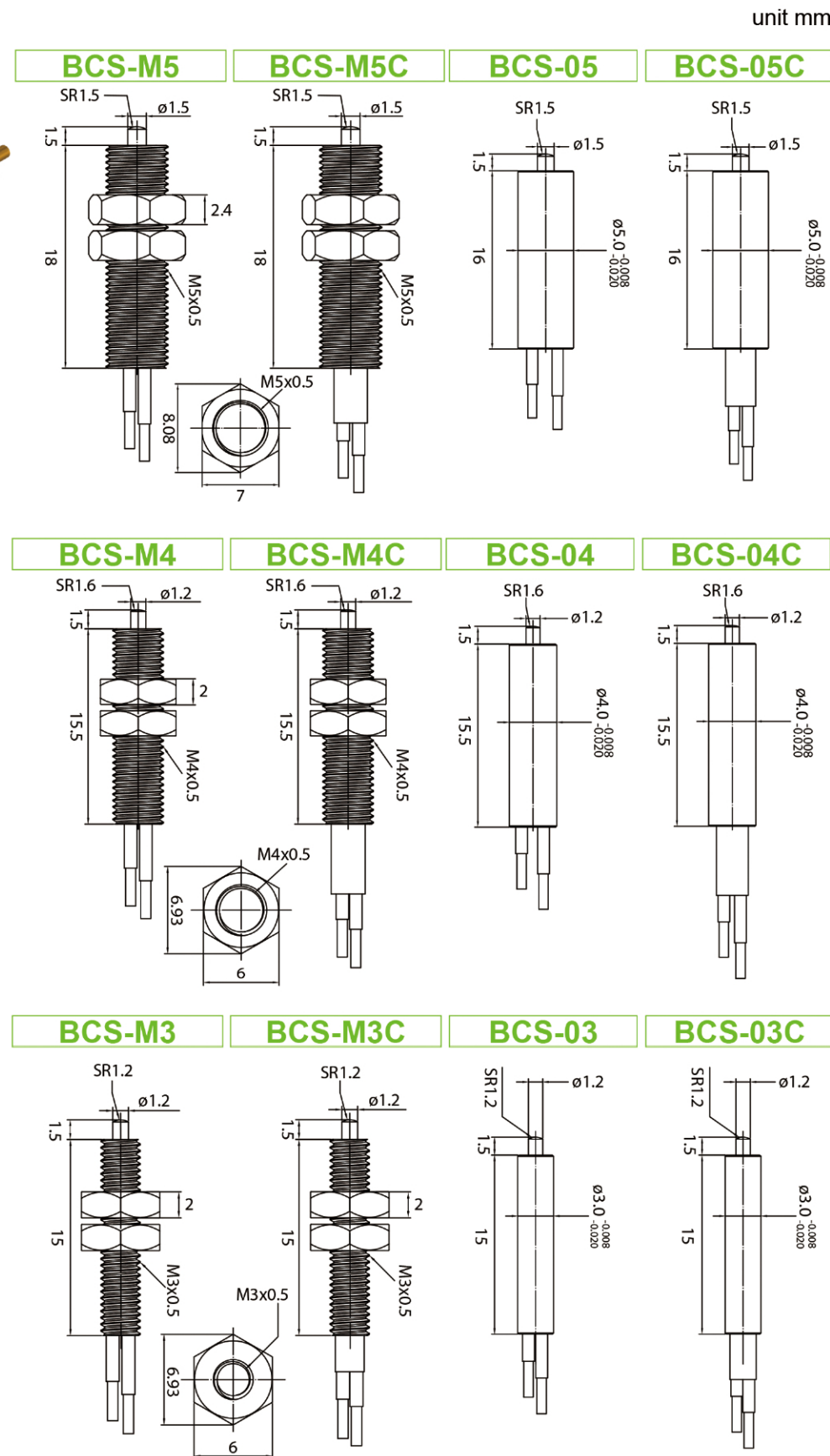
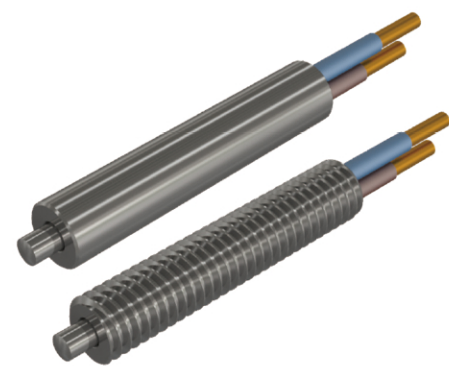


# BCS series

Ultra-small High-precision  
Touch Sensor



## Dimensions



## Specification

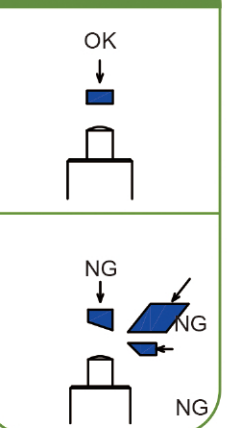
Item	BCS-03(ø3)	BCS-04(ø4)	BCS-05(ø5)
	BCS-M3(M3x0.5)	BCS-M4(M4x0.5)	BCS-M5(M5x0.5)
Diameter	3mm	4mm	5mm
Material	SUS303		
Contact Surface Material	SUJ2 HRC 58±2		
Contact Surface Diameter	1.2mm	1.2mm	1.5mm
Contact Trigger Force	0.5N		
Stroke	1.5mm		
Trigger Position(from rest)	About 0.2mm (Please adjust the installation position to the trigger position)		
Contact Rating	DC+5V~DC+24V 20mA(maximum) (It burns out the LED lights if the current is higher than this value.)		
Output Mode	B:NC		
Ingress Protection	IP40		
Repeatability	0.001mm (BCS-M3) 0.003mm (BCS-M3N)	0.001mm (BCS-M4) 0.003mm (BCS-M4N)	0.001mm (BCS-M5) 0.003mm (BCS-M5N)
Cable Type / Standard Length	Double Wire(BCS-M3) 0.5M Oil-Resistant Cable(BCS-M3C) 2M	Double Wire(BCS-M4) 0.5M Oil-Resistant Cable(BCS-M4C) 2M	Double Wire(BCS-M5) 0.5M Oil-Resistant Cable(BCS-M5C) 2M
LED	With(BCS-M3-L) Without(BCS-M3)	With(BCS-M4-L) Without(BCS-M4)	With(BCS-M5-L) Without(BCS-M5)

## Code Examples

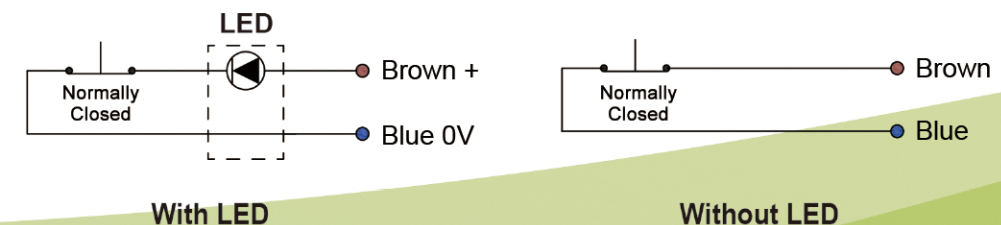
**N** stands for the repeatability of 0.003mm, **C** the cable, and **L** the LED light.  
The number following with the letter **C** stands for the customized cable length.

Item	BCS-M3C-L	BCS-M5NC5-L	BCS-04	BCS-05-L
Material	3mm	5mm	4mm	5mm
Screw Thread	M3 x 0.5	M5 x 0.5	no	no
Repeatability	0.001mm	0.003mm	0.001mm	0.001mm
Cable Type	2M	Lengthen to 5M	Double Wire 0.5M	2M
LED	With	With	Without	With

### Trigger Direction



## Circuit Diagram



\*Refer external I/F component (optional accessory) to page 15

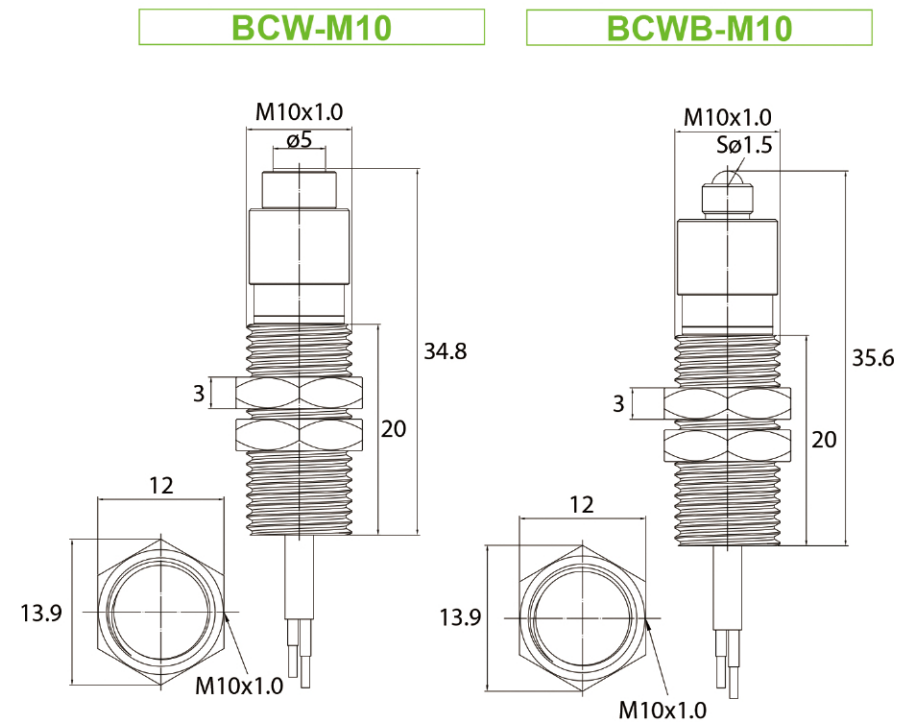
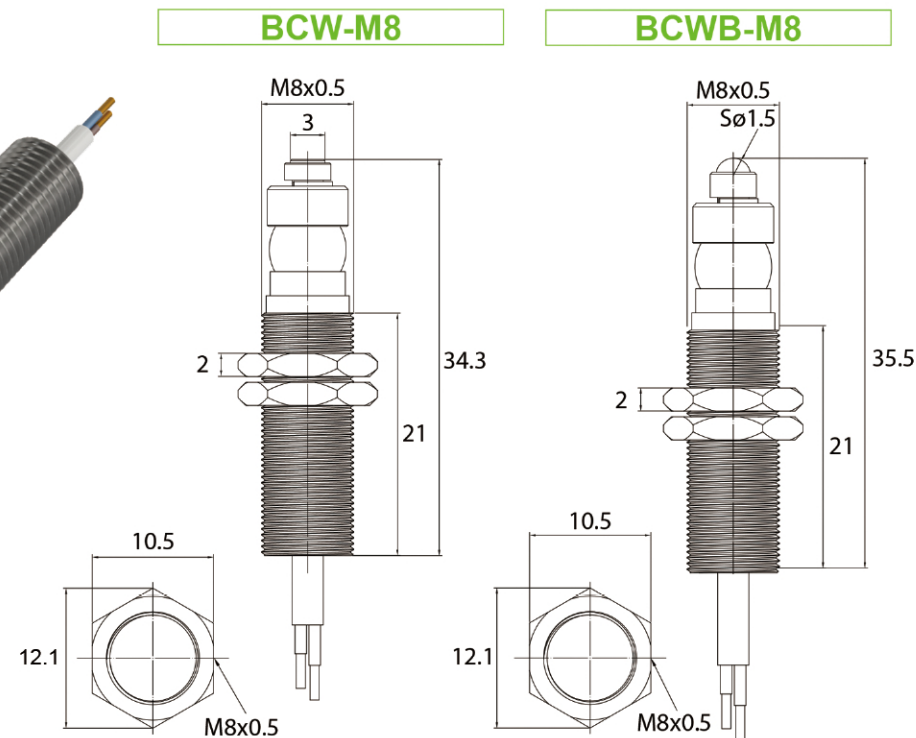


# BCW series High-precision Touch Sensor



## Dimensions

unit mm



## Specification

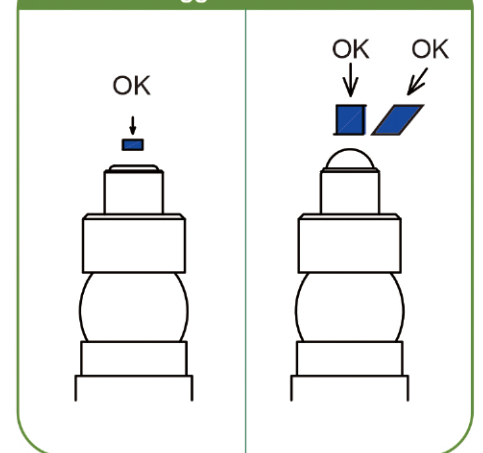
Item	BCSB-M8(M8x0.5)	BCSB-M10(M10x0.5)
	BCS-M8(M8x0.5)	BCS-M10(M10x0.5)
Diameter	8mm	10mm
Material	SUS303	
Contact Surface Material	1.5mm	
Contact Surface Diameter	3mm	5mm
Contact Trigger Force	0.8N	
Stroke	Flat:Tungsten Carbide HRA 90.5    Ball:SUJ2 HRC 62	
Trigger Position(from rest)	About 0.2mm (Please adjust the installation position to the trigger position)	
Contact Rating	DC+5V~DC+24V 20mA(maximum) (It burns out the LED lights if the current is higher than this value.)	
Output Mode	B:NC	
Ingress Protection	IP67	
Repeatability	0.001mm (BCW-M8C) 0.003mm (BCW-M8NC)	0.001mm (BCW-M10C) 0.003mm (BCW-M10NC)
Cable Type / Standard Length	Oil Resistant ø2.8 / 2M	
LED	With(BCW-M8-L) Without(BCW-M8)	With(BCW-M10-L) Without(BCW-M10)

## Code Examples

**N** stands for the repeatability of 0.003mm, **C** the cable, and **L** the LED light.  
The number following with the letter **C** stands for the customized cable length.

Item	BCW-M8NC6-L	BCW-M10C
Material	8mm	10mm
Screw Thread	M8 x 0.5	M10 x 0.5
Repeatability	0.003mm	0.001mm
Cable Type	Lengthen to 6M	3M
LED	With	Without

## Trigger Direction



## Circuit Diagram



\*Refer external I/F component (optional accessory) to page 15

High-precision Touch Sensor

BCS series





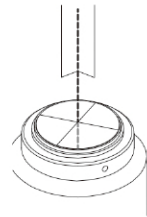
# Precautions

## Terms of warranty

- 1.Warranty period is valid for 15 months.
- 2.Within the warranty period, malfunctioning products will be exchanged for new products or repaired for free.
- 3.The coverage is limited to Ballsum products only, any other related loss or damages resulting from the malfunctioning product is not covered by the warranty.
- 4.Malfunctions occurred due to using products in manners deviated from precautions , specification and usage procedures described in this catalogue or our website is not covered by the warranty.
- 5.Please note that service fee is not included in the price list of products.

## Mounting

- 1.Be aware not to drop the sensor when mounting. It is a very high sensitive device.
- 2.Mounting ,wiring and removing the sensor should be operated when the power is OFF.
- 3.Forecefully rotating the contact may cause an internal damage.
- 4.Please program the machine to stop within the stroke range of the sensor.
- 5.Install the sensor to a rigid place where there is no machining vibrations.
- 6.T-sense is an professional sensor manufacturer .If any requirements related to machinery programming, please turn to CNC machine makers.
- 7.For no-pretravel distance sensors , chatter or bouncing may trigger the sensor unexpectedly. Please turn ON the signal detection function when measuring to avoid the situation.



## Fingers and water

- 1.Pressing with fingers and then releasing the sensor rapidly may damage the internal contacts.
- 2.The water and dust protection of all BALLSUM sensors are certified by SGS institution.
- 3.Please note that adhesive and sealants may be eroded by coolant.
- 4.Cables are not waterproof and may be damaged by cutting chips. Equipped a proper length of protection conduit is needed.



## Tool contact

- 1.For repeatability of BT20 series products :operation speed at 0.001mm:1500mm/min is performed perfectly in recently manufactured CNC machines but may not work for all kinds of machines.Please test and find your own best operation speed for your machines.
- 2.Please operate at a lower speed when the diameters of contact tool is  $\phi 0.07\text{mm}$  to  $\phi 0.9\text{mm}$ .

## Cable connector

The water-resistant standard of quick connector type is IP67. Use tool to fasten the connector after plugging in. Plugging in the connector only by hand is not suggested.



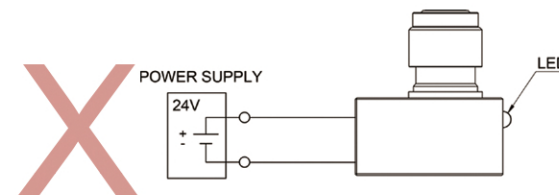
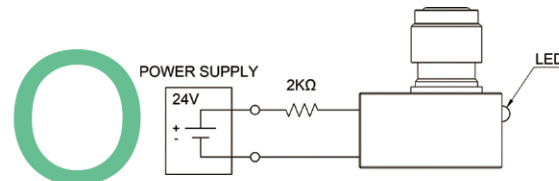
Normal Connector



Quick Connector

## Electronic

Do not connect sensors directly to power supply. A current-limit resistor is needed to protect LED.( 2V ) from being burned.



## Guide to choose your tool setter

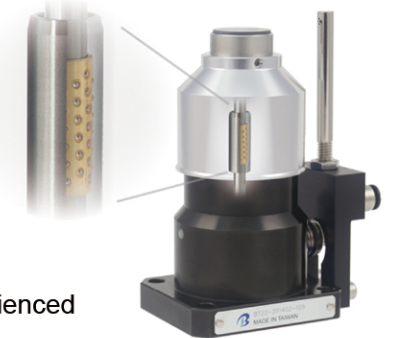
Feature Item	Operation Method	Bearing Type	Overtravel Protection	Pretravel Distance	Recommend Operating Speed	Ingress Protection Rating	Contact Protection
BTFC1	Automatic	Thrust bearing	-	-	50-200mm/min	IP67	-
BTF2	Automatic	Thrust bearing	Yes	-	50-200mm/min	IP67	Electronic
BT1220	Automatic	Thrust bearing	Yes	-	50-200mm/min	IP67	Electronic
BT1220S	Automatic	Thrust bearing	Yes	Yes	50-200mm/min	IP67	Electronic Mechanical
BT20	Automatic	Ball bearing	Yes	Yes	50-1500mm/min	IP68	Electronic Mechanical
BT2030	Automatic	Ball bearing	Yes	Yes	50-1500mm/min	IP68	Electronic Mechanical
BT2040	Automatic	Ball bearing	Yes	Yes	50-1500mm/min	IP68	Electronic Mechanical
B4A-II	Automatic	Thrust bearing	-	-	50-1500mm/min	IP67	Electronic
BTS5	Manual	Thrust bearing	-	-	-	IP67	-
BTS55/520	Manual	Thrust bearing	-	-	-	IP67	-

## Reference

### Operation method

Automatic type / wire to the CNC machine controller and the detection procedure will process automatically by CNC machine.

Manual type / an operator is needed to move the tool to touch the sensor , observing the changing of LED signal to find out the position.



### Ball bearing

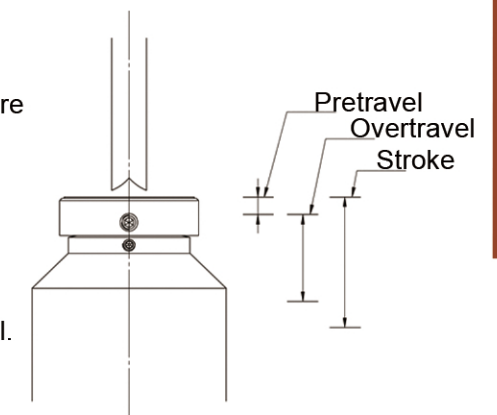
Compared with a thrust bearing , a ball bearing equipped tool setter have a better advantage over higher precision , longer service life , lower friction and vibration.T-SENSE Technology is a company fully experienced in manufacturing high precision ball bearings since 1978.

### Contact protection

The contact rating is DC5V to DC24V , and current should be limited below 20mA. A electronic protection device is designed to reduce the damage from rush current higher than 20mA or ESD. A mechanical protection device is designed to protect the internal structure being damaged by a rapid returning or tool shifting horizontally.

### Pretravel / Overtravel / Stroke

Pretravel is the distance from free position to skip signal point. Overtravel is the distance from skip signal point to emergency stop signal. Stroke means total distance from free position to operating limit position. Pretravel distance helps tool setter have a better anti-shock capability. The longer the overtravel distance is, the less chance of colliding happens.







Distributor / Agent information

Manufacturer

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