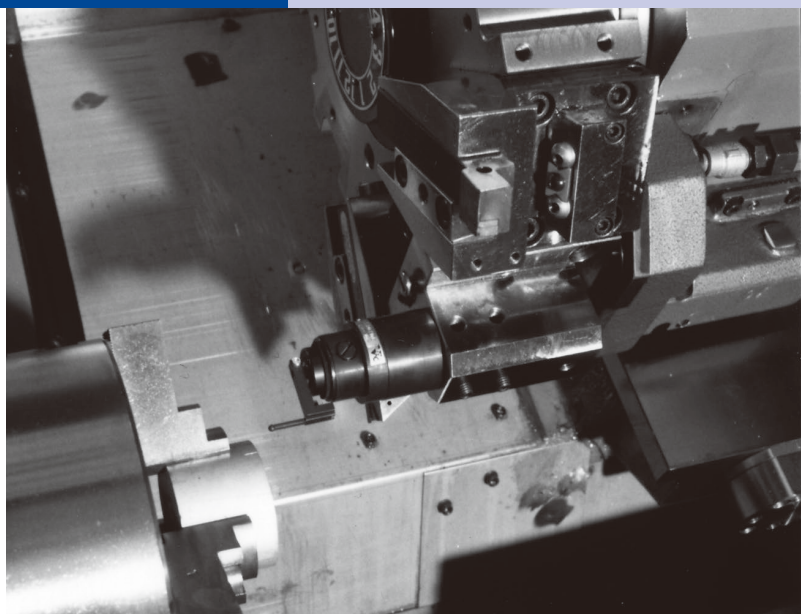


Summary

- Touch probes can be used for measuring workpiece dimensions, centering or positioning by installing in CNC machines such as lathes, machining centers, grinders, special-purpose machines or robots.
- When the stylus makes contact with a workpiece or table, a high-precision ON/OFF output signal is generated and that is sent to the CNC or PC device.
- An I/F unit for protecting the contact can be provided internally or installed externally (except for RC-K3E).



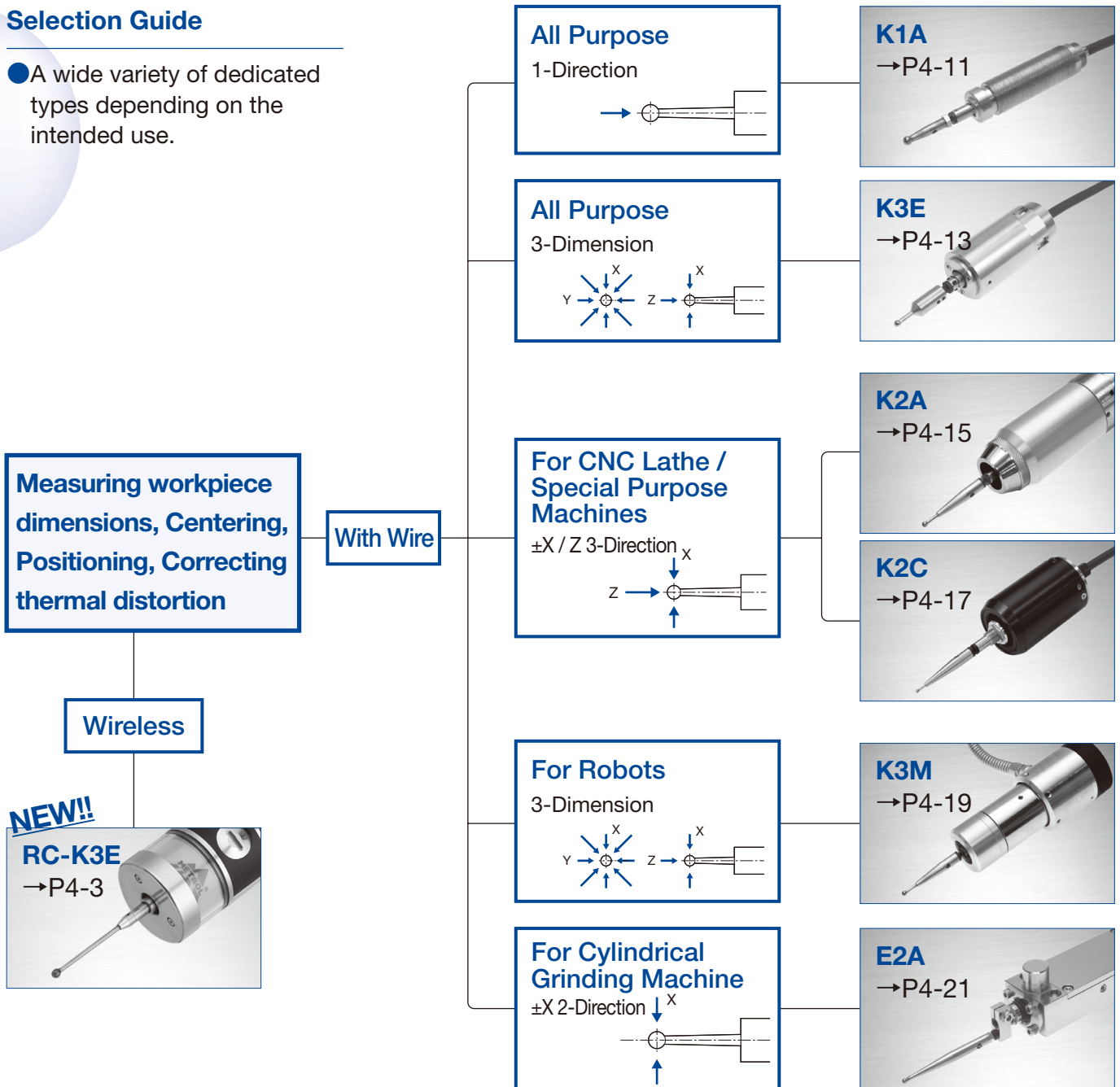
Features

- 1) The internal switch is of the contact type, has high precision, and is free of movement differential.
- 2) Since there is no need of an amplifier, there is no temperature drift caused by self-generation and temperature characteristic of the sensor unit.
- 3) Outputs over-travel warning signal (Only E2A).

	With pretravel	Without pretravel
Structure	High-precision, high-durable internal touch switch able to be operated by movement of the stylus.	As the built-in contact serves as a swing fulcrum, the ON → OFF signal is output instantaneously as the fulcrum moves away.
Drawings for basic structure		
Features	<ul style="list-style-type: none"> · The finger needs to be pushed in from the position in which the contact ball is in contact with the workpiece until it starts operating. (for relative position detection) · Resistant to occurrence of erroneous signals and chattering caused by vibrations and impacts. · Material having low electrical resistance used for contact switch for extremely long contact life. 	<ul style="list-style-type: none"> · As it starts operating at the moment it touches, high-precision position detection is possible. · Susceptible to occurrence of erroneous signals and chattering caused by vibrations and impacts. · Inferior contact life since contact switch are required to be hard and there are restriction on contact materials.

Selection Guide

- A wide variety of dedicated types depending on the intended use.



Touch probes with wire

(mm)

Product name	K1A	K3E	K2A	K2C	K3M	E2A
Direction	1-Direction 	3-Dimension 	±X / Z 3-Dimension 	±X / Z 3-Dimension 	3-Dimension 	±X 2-Direction
Pretravel	With pretravel	Without pretravel	With pretravel	Without pretravel	With pretravel	With pretravel
Application	Measurement of workpiece endsurfaces	Measuring outer diameter, inner diameter, end surfaces and centering			For robots	Measuring end surfaces for grinder
I/F unit (P4-9)	External	External	Built-in	External	Built-in	External
Page	P4-11	P4-13	P4-15	P4-17	P4-19	P4-21

◎For wireless type, please select High-precision Touch Probe **RC-K3E** (P4-3).

RC-K3E

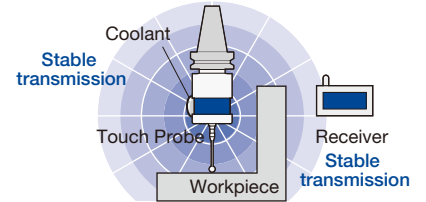
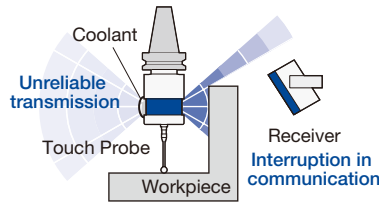
High-precision Wireless Type

NEW



2.4GHz! Uninterrupted by NOISE. New Radio Transmission System

- ✗ Conventional infra-red optical communication**
Affected by obstacles and coolant
- ✓ Metrol's new radio transmission system**
Uninterrupted by obstacles and coolant



- Selects the optimal channel automatically by searching the radio wave frequency band at all times.
- Designed for highly-reliable, noise resistant radio transmission.
- Compared to optical probes, radio probes are more suitable for large turnmill centres and 5-Axis machines for precise measurement.

1µm Repeatability

- Four-point support, unique mechanical structure.
- No correction of software "lobing".
- Achieves 1µm (2σ) repeatability.

φ40 Ultra compact size

Ideal for compact machining centers and high-speed machines with small shanks.

Energy saving! 180 hours without a battery change



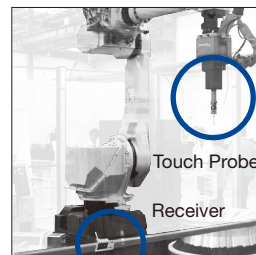
Battery lasts for 180 hours under continuous use.
50% more energy saving compared to conventional infra-red optical communication system.
No deterioration of accuracy with decreasing battery life.

Improved visibility by mounting the receiver externally.

No hassles of cleaning the coolant and chips as compared to conventional internally mounted units.



Receiver



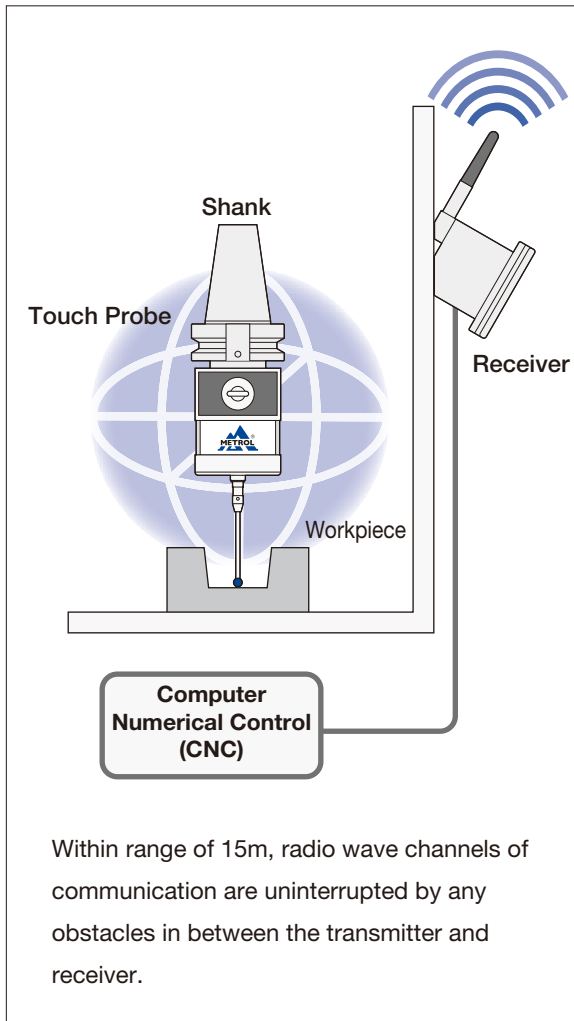
For Robot



For Robo-drill

Touch Probe for CNC Machine Tools

System structure

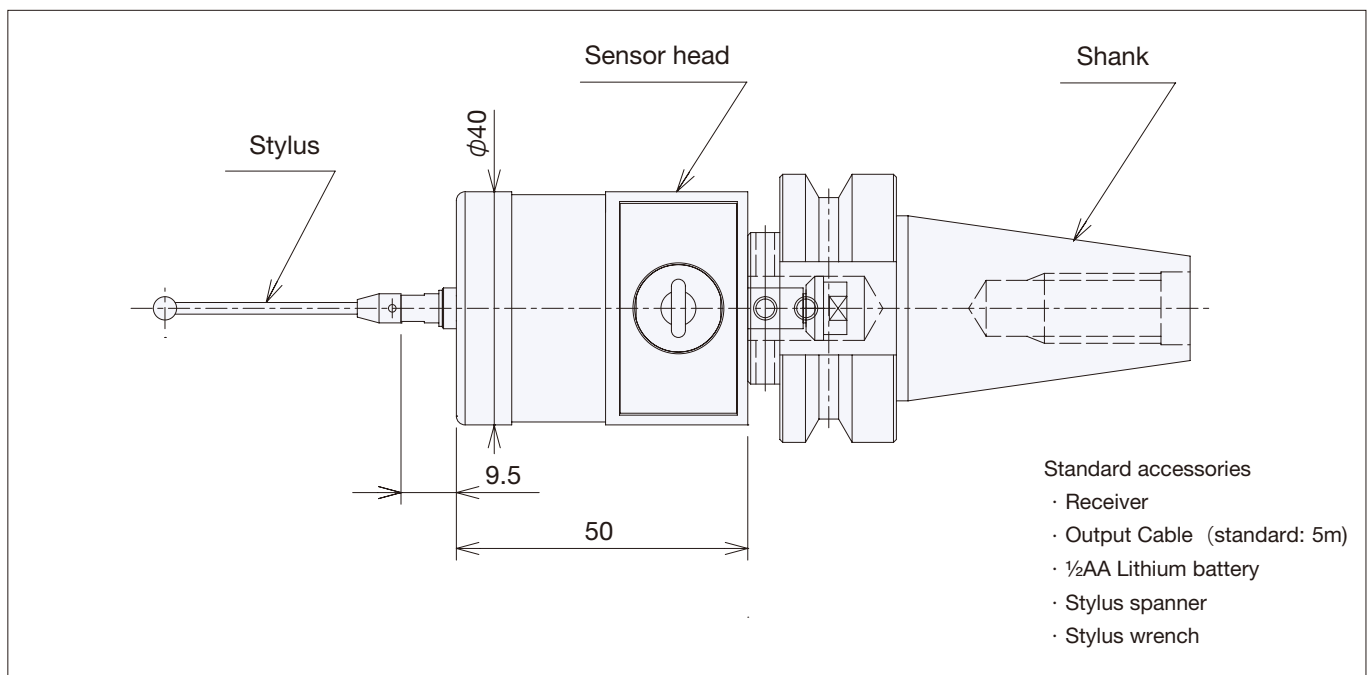


Within range of 15m, radio wave channels of communication are uninterrupted by any obstacles in between the transmitter and receiver.

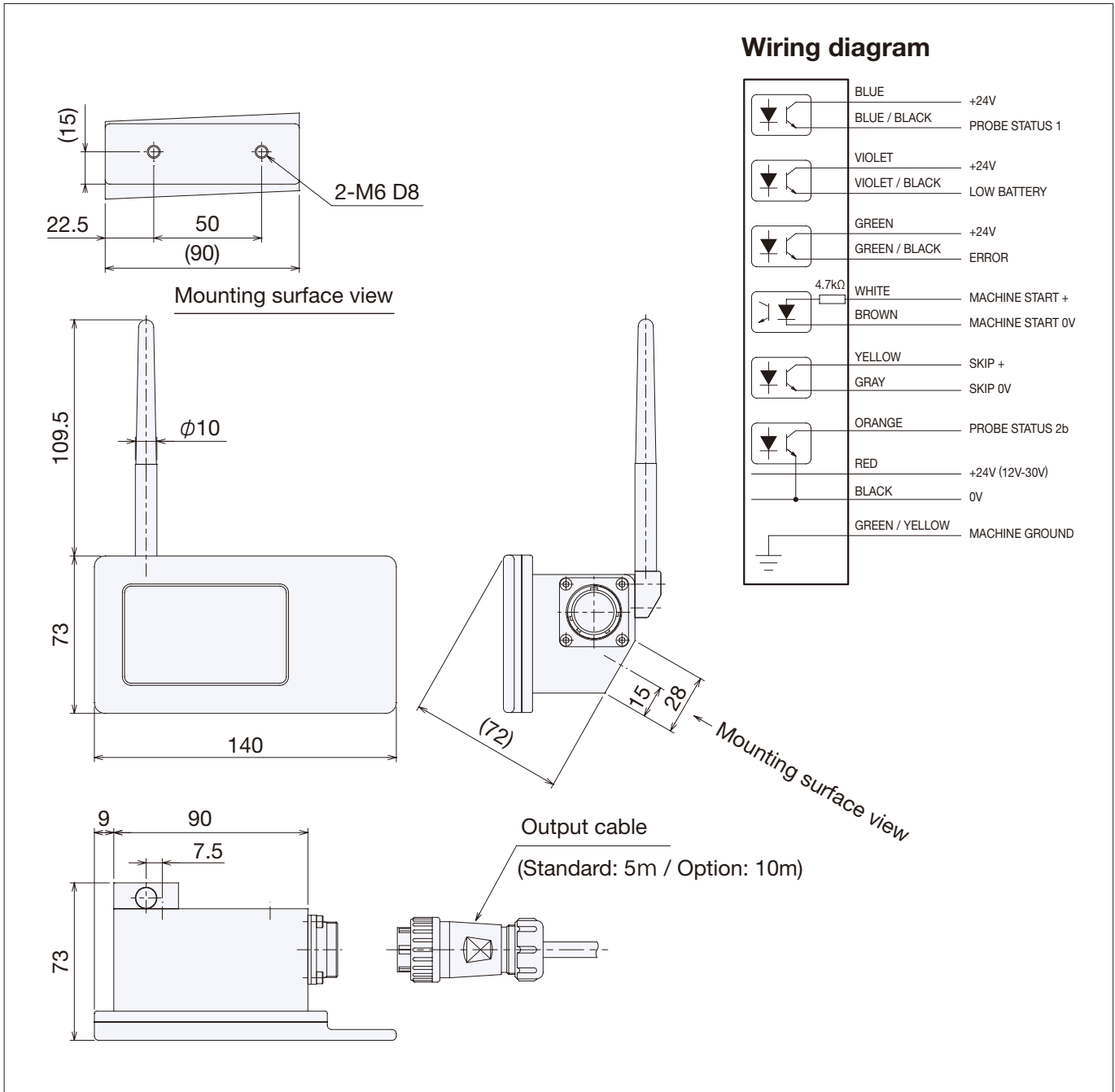
Specifications

Main application	Measuring workpiece dimensions, centering
Single direction repeatability	1.0 μm (2σ) *At the Speed of : 150 mm/min
Contact life time	3 million
Signal transmission format	FSK (DSSS) transmission format
No. of channels	37
Radio frequency	2400MHz - 2480MHz
Power ON/OFF signal	M code
Signal transmission range	Max. 15m
Receiver / Interface	Receiver antenna-integrated interface
Sensing directions	5 directions $\pm X$, $\pm Y$, $+Z$
Contact Force (when using standard stylus)	XY : 0.5N Z : 5.5N
Overtravel (when using standard stylus)	XY directions : $\pm 7^\circ$ $+Z$ direction : 3 mm
Operating environment	For indoor use only
Protective structure	IEC IP67
Storage temperature	-10°C - 70°C
Operating temperature	5°C - 50°C
Weight(excluding a shank)	With battery : 290g Without battery : 280g
Battery	$\frac{1}{2}$ AA lithium-thionyl chloride battery (3.6V) 1Time
Time until battery replacement	After start of low battery indication : approx. 1 hr
Low battery indication	Flashing of battery alarm LED (orange)
Dead battery indication	Illumination of battery alarm LED (orange)
Battery life	5% use (72 min/day) : 62 days Continuous use : 180 hours

Outer dimensions



Outer dimensions



Options

<Shank>

Various options are available on request.



Size : BT30
Product No. : **H-BT30-001**



Size : BT40
Product No. : **H-BT40-001**

<Shear screw>

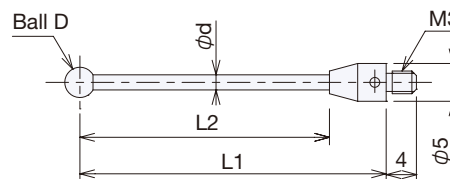
Once a horizontal overload is applied to the measuring stylus, the shear screw breaks to protect the interior.
Replace the shear screw referring to the instruction manual.

<Stylus>

● Stylus list

Product No.	D	φd	L1	L2	(mm)
F-R50T-405	5.0	2.5	40.5	33	
F-R40T-405	4.0	2.0	40.5	33	
F-R30T-405	3.0	1.5	40.5	33	
F-R20T-205	2.0	0.8	20.5	13	
F-T10H-155	1.0	0.7	15.5	8	

* Please contact us for more options of styli.



● Stylus No.

F - R Ball diameter(D) **T -** Length(L1)

Shaft material
(**T** : Tungsten carbide, **H** : High speed steel)
Ball material (**R** : Ruby, **T** : Tungsten carbide)

Precautions

- 1) Use the shortest stylus as possible. Long stylus are more likely to cause chattering and malfunctions due to vibrations or impacts.
- 2) The stylus should be firmly fixed to the sensor head.
- 3) Clean the stylus frequently and remove adhesion of coolant or cutting chips on it in order to prevent variation in signal point.
- 4) Replace the stylus when it is worn or stuck with foreign substances which cannot be cleaned up.
- 5) Using big ball reduces the effect of surface finishing of the workpiece being inspected, avoiding erroneous measurement.
- 6) When the stylus has an extremely small stem diameter (ϕd), the shear screw may not be effective.
- 7) Using the stylus with extremely small stem diameter (ϕd) at high feed speed may result in breakage or variations in accuracy.

Specification sheet

E-mail : touchsensor@metrol.co.jp

▼ Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications (Bold : Standard)

Date:(mm,dd,yy) _____

Shank	<input type="checkbox"/> BT30	<input type="checkbox"/> BT40
Shear screw	<input type="checkbox"/> Not required	<input type="checkbox"/> Required
Stylus No.	_____ (Standard : F-R40T-405)	

Company	
Dept. / Title	
Customer name	
Address	
TEL	
FAX	
E-mail	

How to order

1. Spec sheet

Please fill out the specification sheet and send to Metrol.

2. Selection

The drawing of specific model based on spec sheet is sent.

3. Confirmation

Check the drawing to select/confirm the specific model.

4. Order

The quotation is sent and you can place an order.

E-mail: **touchsensor@metrol.co.jp**
PDF sheet is available for download at www.metrol.co.jp/en

FAX: +81-42-528-1442 touchsensor@metrol.co.jp

— Copy this page and use repeatedly —

■Stylus

1. The Stylus length can be optionally selected. The material may be changed depending on the length. (shaft standard: stainless steel)
2. Tungsten carbide balls with a diameter of $S\phi 2-\phi 5$ are used for the contact.
3. Accuracy and movement before operation vary according to stylus length, mounting orientation and amount of offset.
4. Use the shortest stylus as possible. Long stylus is more likely to cause chattering and malfunctions due to vibrations or impacts.
5. The stylus should be firmly fixed to the sensor head.
6. Remove adhesion of coolant or cutting chips onto the stylus in order to prevent variations in signal point.
7. Replace the stylus when it is worn or stuck with foreign substances which cannot be cleaned up.
8. The larger ball contact reduces the effect of the surface finish of the workpiece being inspected, avoiding erroneous measurement.

■Shear screw

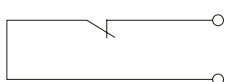
1. Once a horizontal overload is applied to the stylus, the shear screw breaks to protect the interior.
2. Replace the shear screw by referring to the instruction manual. Replacement by a wrong procedure may result in damaging the interior.

■Contact structure (Output mode)

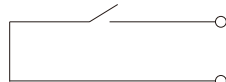
Output mode (Contact structure)	
NC (b contact)	The contact is normally closed (ON) and opened during operation (OFF). Available with and without pretravel. Malfunctions(disconnection / contact troubles) diagnosed using interlock (fail-safe).
NO (a contact)	Contact normally open (OFF). Closed during measurement (ON). All NO types have pretravel.

Circuit diagram

Nomally closed (NC)



Nomally open (NO)



■Mounting

- The shape of the mounting portion depends on the model. Please refer to each product page.
- Directional pins are used for $\pm X$, Z 3-Direction type (K2A, K2C)

■Cables

1. Do not pull on cables with excessive force (up to about 30N (3 kgf)).
2. The cable bending radius should be R7 or more.
3. Since switch contacts may be damaged by the current higher than the rated due to induction of noise and surges, install cables as far away from motor power sources and noise sources as possible (particularly when bundling cables).
4. Do not damage cables during wiring. This impairs water resistance capacity.
5. Cover cables with protective tubes when there is a risk of damaging to cables by the usage environment. Minimum bending radius when using protective tubes is R25 and the maximum length is 15 m.

■Electrical

1. Contact rating: DC5V - DC24V
Steady current :10mA or less (Rush current : 20mA or less)
2. Make electrical connections so that the sensor is grounded when the machine body is grounded.
3. As the sensors with LED have polarity, please be aware of the (+) (-) connection. Recommended value of 10 mA, resistive load. Limit the LED forward current below 10mA.
4. In the case of using I/F unit, refer to P4-9 for output specification.

■Connectors (see P6-2)

Cables can be branched between the sensor and machine with connectors, thereby facilitating assembly and maintenance. these connectors are waterproof, and highly durable.

There are two types of connectors available and both types are rated IP67.

• Direct-out Connectors

The connector is attached to the sensor head (only applicable for K3MA).

• Connectors

The connector is attached at a midpoint in the cable (distance from sensor: min. 1m)

Note: Do not pull the cable when remove the connector.
Press the connector firmly until it tightly fits with O-ring.

■Protective covers

Protective cover are for preventing damage to rubber boots and impairment of water-resistance or dustproofing caused by metal fragments and other cutting.

- 1) Protective covers are not provided for some products.
In that case, an extra cover is needed to protect rubber boot from damaging by cutting chips.
- 2) Even for products with boots protective covers, please consider the mounting orientation, direction of the chips and coolant and the like to make sure that chips and coolant do not get accumulated within the boots protection cover.

■Proper Tool Contact

- 1) Ensure that the workpiece touches the contact along a straight line in the direction in which it is pushed.
- 2) Do not excessively press the stylus to the stroke end.
It may damage the sensor or the workpiece.
- 3) Set to a lower speed in the case of measuring workpieces made of flexible materials such as aluminum or resin.
However, operating speed slower than 10mm/min is not recommended.
- 4) Even for the same work, changing the operation speed will cause errors in accuracy.

Note : Please be sure that the operating speed when the contact that has been pushed in is returned to the original state is within the range in which the contact can follow the work. When it is rapidly returned, the internal may be damaged in reaction.
Similarly, do not return it rapidly when testing it with a finger during installation, cleaning, etc.

●Requesting Quotation

- Send us the quotation request along with attached spec sheet (with additional requirement if any) by Fax/E-mail.
FAX: +81 42 528 1442/ Email: touchsensor@metrol.co.jp
- The format (figure number) is determined when the delivery specification figure is submitted.

●Ordering Replacement and Spare Parts

- Please specify the product name (model name) on the nameplate attached to the product.
- Please add an "H" after the product No. when not requiring accessories such as an I/F unit or relay cable (machine side). Please add an "S" when ordering a set.

Plug-in I/F unit for contact protection (Standard accessories for K1A / K2C / K3E / E2A)



1) Protection for the dry contacts from inrush current

The I/F unit is not needed, when using the sensors under the contact rating. Being separated from I/O circuit, the dry contacts of the sensors remain intact from sudden inrush current.

2) Increase the output current

Enable to drive a relay or similar devices directly.
When driving a relay by this unit, the repetitive accuracy will be reduced due to delay of the relay.

3) Level conversion unit

Level conversion (normally close to normally open, normally open to normally close).

Output specification

Product name	CL-1F	
Output method	Photo MOS relay	
Diagram		
Output level	No-voltage floating output	
Output capacity	AC/DC200V 100mA	
Operating time	Delay	500μs (representing value)
	Spread	10-20μs

Electrical specification

Power supply voltage	DC24V ±10% (Full-wave rectification with ripple 5% or less)
Power consumption	15mA
Input	One contact signal
Output	Transfer output (in-phase or inverted output)
Operating temperature range	0-50°C

Outer dimension

Terminal layout

Socket unattached

[VOTTOM.VIEW]

Socket adjustment list

Manufacturer	Panasonic	OMRON
Relay socket	HC2	MY2
Terminal block socket	HC2-SFD-S	PYF-08A

Electrical load connecting

CL-1F

In case used equivalent to NPN open collector output form

In case used equivalent to PNP open collector output form

■Precautions

- 1) Do not connect the load exceeding the output rating specified for each model. Since the switching parts and interface elements may be damaged due to the flow of excessive current caused by noise or surge induction, place the sensor at a distant location from any power lines or other sources of noise.
- 2) As a rule of thumb, connect one sensor to one unit.
- 3) Select the installation location of I/F unit so that the cable length between the sensor and the I/F unit should not exceed 20m .
- 4) Since the I/F unit is not water-proof, protect it from water and oil.
- 5) In the case of using Normally-open type sensor with a LED indicator, I/F unit can be used only when the LED is normally OFF and turns ON in operation. In the same way, for Normally-close type sensor, the unit can be used only when the LED is normally ON and turns OFF in operation.
- 6) This I/F unit is especially designed for the METROL sensors, do not use this I/F unit with the sensor of other manufacturers.



■ Touch probes for CNC machines tool are used for measuring workpiece dimensions, centering and positioning.

Standard specifications

(mm)

Product name	K1A
Contact structure	NC (Normally closed)
Output mode	NC (Normally closed) or NO (Normally open) (when using an external I/F unit CL-1F)
Pretravel	Approx. 0.2
Stroke	3
Repeatability*	0.001 (Recommended operating speed of 50 - 200mm/min)
Contact life time	3 million
Protective structure	IP67
Contact force	2N
Contact material	Tungsten carbide ball
Contact rating	DC5V - DC24V Steady Current: 10 mA or Less Rush Current: 20 mA or Less Limit the LED forward current below 10mA.
Cable	Oil resistant $\phi 5$ / 2 cores Tensile strength 30N, Minimum bending R7
LED lamp	Default : LED ON / Operating : LED OFF
Standard accessories	External I/F unit CL-1F (Refer to P4-9) Two hexagonal nuts

* with stylus length of 35.5mm (**F635**)

Precautions

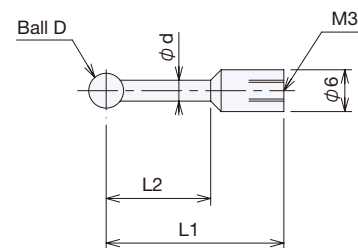
- Rubber materials used in some products are applicable to water-soluble coolants and alkaline liquids. (Refer to P6-4)
- Operating speed slower than 10mm/min is not recommended.

- Precautions for Touch Probe...P4-7
- Precautions for Sensor Connecting...P1-3
- Technical Guide...P6-1
- Cable Options...P6-2

Options

● Stylus list

D	ϕd	L2	Stylus No.					
5	3	within 15	F615	F625	F635	F645	F655	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	15	15	15	15
4	2.5	within 15	F614	F624	F634	F644	F654	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	10	10	10	10
3	1.8	within 8	F613	F623	F633	F643		
			L1	15.5	25.5	35.5	45.5	
			L2	6.5	8	8	8	
2	1.2	within 5	F612	F622	F632	F642		
			L1	15.5	25.5	35.5	45.5	
			L2	5	5	5	5	



Outer dimensions

K1A

Material : S15C
Treatment : Raydent coating
Product name : **S622**

Protective cover : Mostly for downward (horizontal installation possible)

● Circuit diagram

Power supply voltage : DC24V±10%
Power consumption : 15mA
Output capacity : DC200V 100mA
AC200V 100mA

Specification sheet

E-mail : touchsensor@metrol.co.jp

▼ Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications

Date:(mm,dd,yy) _____

Stylus No. (refer to the left page)	_____ (Standard : F635)
-------------------------------------	---------------------------------

Cable options (1m/unit)

Length / Cable protection	_____ m / <input type="checkbox"/> Not required	<input type="checkbox"/> Protective tube _____ m (Upper limit:15m)	<input type="checkbox"/> Wire braid _____ m (Upper limit:10m)
Connector (Refer to P6-2)	<input type="checkbox"/> Not required	<input type="checkbox"/> Connector	
Machine side cable option	Length	_____ m	
from connector (if desired)	Cable protection	<input type="checkbox"/> Not required	<input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)

Company	
Dept. / Title	
Customer name	
Address	
TEL	
FAX	
E-mail	

How to order

1. Spec sheet

Please fill out the specification sheet and send to Metrol.

2. Selection

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3. Confirmation

Check the drawing to select/confirm the specific model.

4. Order

The quotation is sent and you can place an order.

✉ E-mail: touchsensor@metrol.co.jp
PDF sheet is available for download at www.metrol.co.jp/en

FAX: +81-42-528-1442 ✉ touchsensor@metrol.co.jp

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■ Touch probes for CNC Machine Tools are used for measuring of workpiece dimensions, centering and positioning.

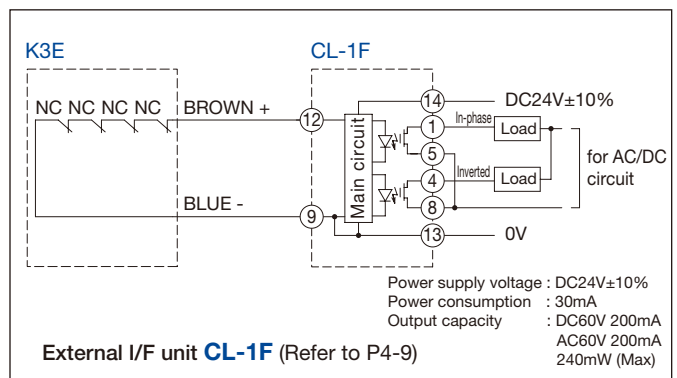
Standard specifications

(mm)

Product name	K3E
Contact structure	NC (Normally closed)
Output mode	NC (Normally closed) or NO (Normally open) (when using an external I/F unit CL-1F)
Pretravel*	0
Stroke*	X=2 Z=1
Repeatability	0.001 (2 σ) (Recommended operating speed of 50 - 200mm/min)
Contact life time	300,000
Protective structure	IP67
Contact force*	X=1N Z=4.5N
Contact material	Tungsten carbide ball
Contact rating	DC5V - DC24V Steady current :10mA or less Rush current : 20mA or less
Cable	Oil resistant $\phi 5 / 2$ cores Tensile strength 30N, Minimum bending R7
Standard accessories	External I/F unit CL-1F (Refer to P4-9)

* with stylus length of 35.5mm (**F4607**)

Circuit diagram



Precautions

- As the built-in contact serves as a swing fulcrum, excessive operation speed will accelerate the deterioration of the contacts. In addition, as the contact material with low electrical resistance cannot be used, it needs to be energized only during measurement to protect the contact life.
- Operating speed slower than 10mm/min is not recommended.

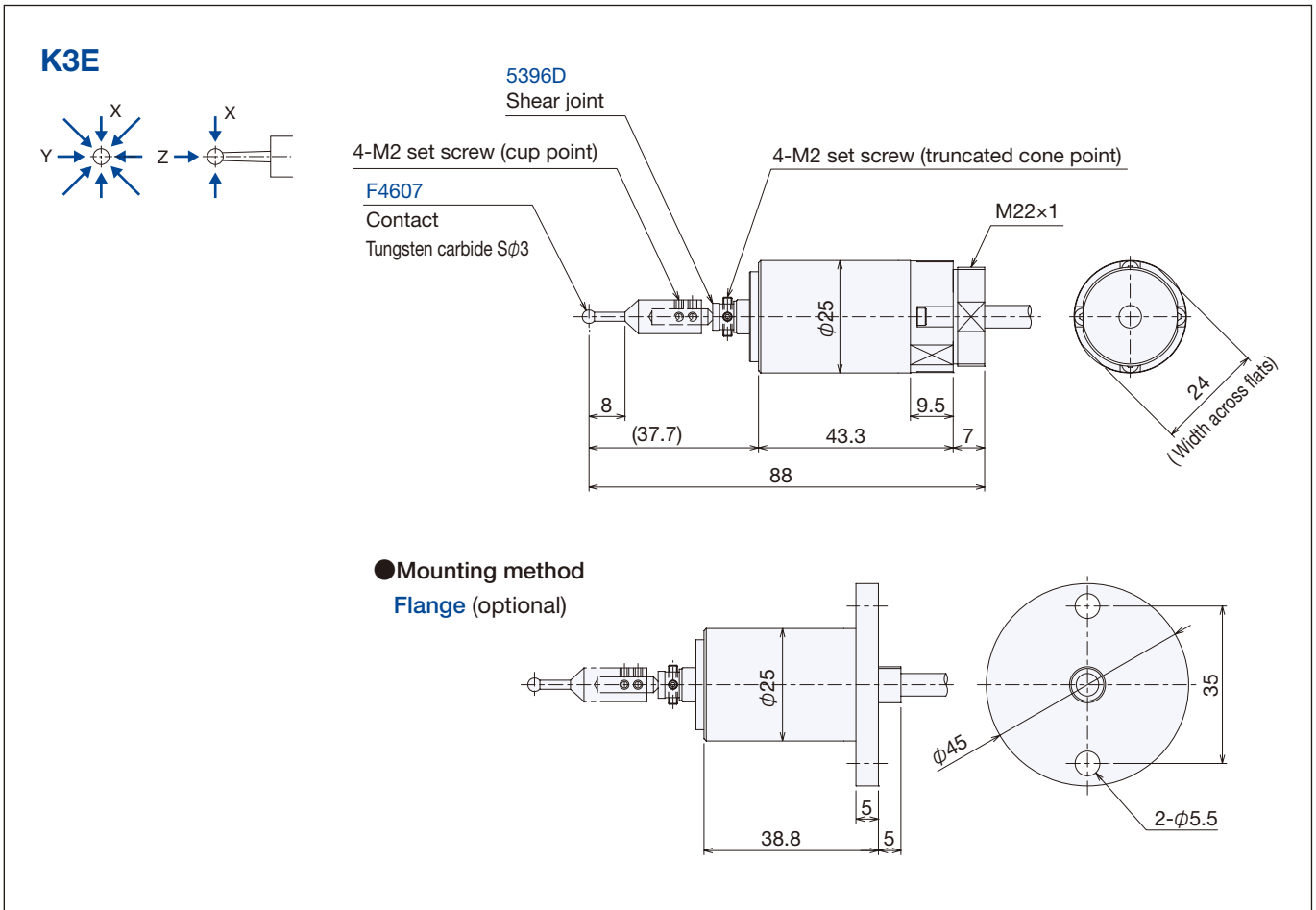
●Precautions for Touch Probe...P4-7

●Precautions for Sensor Connecting...P1-3

●Technical Guide...P6-1

●Cable Options...P6-2

Outer dimensions



Specification sheet

E-mail : touchsensor@metrol.co.jp

▼ Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications (Bold:Standard)

Date:(mm,dd,yy) _____

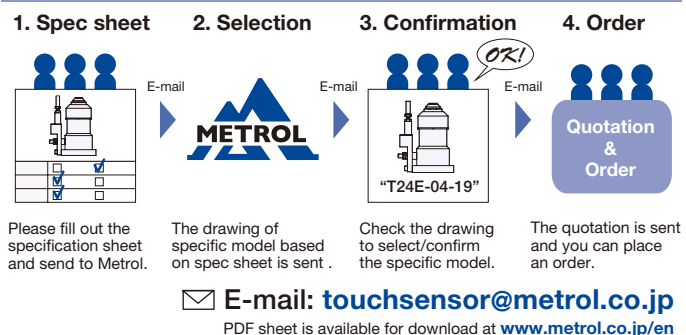
Mounting method	<input type="checkbox"/> M22×1	<input type="checkbox"/> Flange
-----------------	---------------------------------------	---------------------------------

Cable options (1m/unit)

Length / Cable protection	_____ m / <input type="checkbox"/> Not required	<input type="checkbox"/> Protective tube _____ m (Upper limit:15m)	<input type="checkbox"/> Wire braid _____ m (Upper limit:10m)
Connector (Refer to P6-2)	<input type="checkbox"/> Not required	<input type="checkbox"/> Connector	
Machine side cable option from connector (if desired)	Length _____ m	Cable protection <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)	

Company	
Dept. / Title	
Customer name	
Address	
TEL	
FAX	
E-mail	

How to order



FAX: +81-42-528-1442 ✉ touchsensor@metrol.co.jp

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■ Touch probes for CNC lathes are reused for measuring inner diameter, outer diameter, and end surfaces.

Standard specifications

(mm)

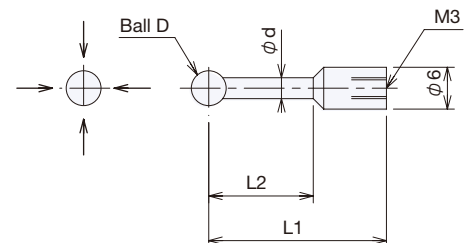
Product name	K2A
Contact structure / Output mode	NC (Normally closed)
Pretravel	X=Approx. 0.6* Z=Approx. 0.1
Stroke	X=±8* Z=4
Repeatability	0.001 (Recommended operating speed of 50 - 200mm/min)
Contact life time	3 million
Protective structure	IP67
Contact force	X=1N* Z=2.5N
Contact material	Tungsten carbide ball
Contact rating	DC5V - DC24V Steady Current: 10 mA or less Rush Current: 20 mA or less Limit the LED forward current below 10mA.
Cable	Oil resistant $\phi 5$ / 4cores Tensile strength 30N, Minimum bending R7
LED lamp	Default : LED ON / Operating : LED OFF

* with stylus length of 35.5mm (F635)

Options

● Stylus list

D	ϕd	L2	Stylus No.					
5	3	within 15	F615	F625	F635	F645	F655	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	15	15	15	15
			F614	F624	F634	F644	F654	
4	2.5	within 15	L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	10	10	10	10
3	1.8	within 8	F613	F623	F633	F643		
			L1	15.5	25.5	35.5	45.5	
			L2	6.5	8	8	8	
			F612	F622	F632	F642		
2	1.2	within 5	L1	15.5	25.5	35.5	45.5	
			L2	5	5	5	5	



Precautions

- Rubber materials used in some products are applicable to water-soluble coolants and alkaline liquids. (Refer to P6-4)
- Operating speed slower than 10mm/min is not recommended.

● Precautions for Touch Probe...P4-7

● Precautions for Sensor Connecting...P1-3

● Technical Guide...P6-1

● Cable Options...P6-2

Touch Probe for CNC Machine Tools / Special Purpose Machines

Outer dimensions

● Mounting method
Flange (optional)

● Circuit diagram

Built-in I/F unit (standard)

LED: ORANGE (DC24V), GREEN (NC (In-phase)), YELLOW (Photo MOS AC / DC), BLACK (0V)

Power supply voltage: DC24V
Power consumption: 10mA
Output: DC60V 100mA (Resistance load), AC60V 100mA (Peak value)

External I/F unit (optional)

K2A connected to CL-1F (Refer to P4-9)

Power supply voltage: DC24V±10%
Power consumption: 15mA
Output capacity: DC200V 100mA, AC200V 100mA

Specification sheet

E-mail : touchsensor@metrol.co.jp

▼ Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications (Bold:Standard)

Date:(mm,dd,yy)

Stylus No. (refer to the left page)	_____ (Standard : F635)
I/F unit (Output mode)	<input type="checkbox"/> Built-in (<input type="checkbox"/> NC : Nornally closed <input type="checkbox"/> NO : Nornally open) <input type="checkbox"/> External CL-1F (Output both NO and NC. Refer to P4-9)
Mounting method	<input type="checkbox"/> Bottom screw <input type="checkbox"/> Flange

Cable options (1m/unit)

Length / Cable protection	_____ m / <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)
Connector (Refer to P6-2)	<input type="checkbox"/> Not required <input type="checkbox"/> Connector
Machine side cable option from connector (if desired)	Length: _____ m Cable protection: <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)

Company	
Dept. / Title	
Customer name	
Address	
TEL	
FAX	
E-mail	

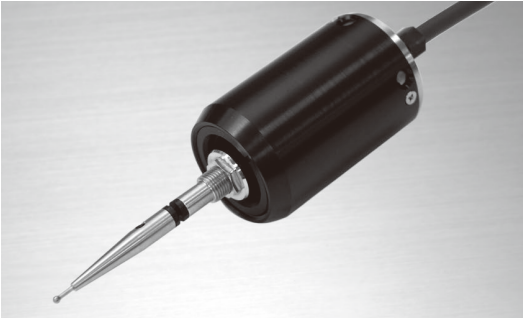
How to order

- 1. Spec sheet**
Please fill out the specification sheet and send to Metrol.
- 2. Selection**
The drawing of specific model based on spec sheet is sent.
- 3. Confirmation**
Check the drawing to select/confirm the specific model.
- 4. Order**
The quotation is sent and you can place an order.

E-mail: touchsensor@metrol.co.jp
PDF sheet is available for download at www.metrol.co.jp/en

FAX: +81-42-528-1442 ✉ touchsensor@metrol.co.jp

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■ Touch probes for CNC lathes are used for measuring of inner diameter, outer diameter, and end surfaces.

Standard specifications

(mm)

Product name	K2C
Contact structure	NC (Normally closed)
Output mode	NC (Normally closed) or NO (Normally open) (when using an external I/F unit CL-1F)
Pretravel	0
Stroke	X=±8* Z=4
Repeatability	0.001 (Recommended operating speed of 50 - 200mm/min)
Contact life time	300,000
Protective structure	IP67
Contact force	X=0.4N* Z=2.5N
Contact material	Tungsten carbide ball
Contact rating	DC5V - DC24V Steady Current: 10 mA or less Rush Current: 20 mA or less Limit the LED forward current below 10mA.
Cable	Oil resistant $\phi 5$ / 2 cores Tensile strength 30N, Minimum bending R7
LED lamp	Default : LED ON / Operating : LED OFF
Standard accessory	External I/F unit CL-1F (Refer to P4-9)

* with stylus length of 35.5mm (**F635**)

Precautions

- Rubber materials used in some products are applicable to water-soluble coolants and alkaline liquids. (Refer to P6-4)
- Operating speed slower than 10mm/min is not recommended.

●Precautions for Touch Probe...P4-7

●Precautions for Sensor Connecting...P1-3

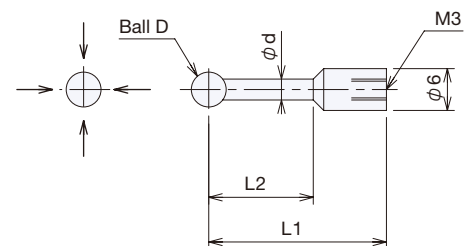
●Technical Guide...P6-1

●Cable Options...P6-2

Options

●Stylus list

D	ϕd	L2	Stylus No.					
5	3	within 15	F615	F625	F635	F645	F655	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	15	15	15	15
4	2.5	within 15	F614	F624	F634	F644	F654	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	10	10	10	10
3	1.8	within 8	F613	F623	F633	F643		
			L1	15.5	25.5	35.5	45.5	
			L2	6.5	8	8	8	
2	1.2	within 5	F612	F622	F632	F642		
			L1	15.5	25.5	35.5	45.5	
			L2	5	5	5	5	



Touch Probe for CNC Machine Tools / Special Purpose Machines

Outer dimensions

K2C

Protective cover : Mostly for downward/ horizontal installation

● **Circuit diagram**

Power supply voltage : DC24V±10%
 Power consumption : 15mA
 Output capacity : DC200V 100mA
 AC200V 100mA

Specification sheet

E-mail : touchsensor@metrol.co.jp

▼ Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications

Date:(mm,dd,yy) _____

Stylus No. (refer to the left page)	_____ (Standard : F635)
-------------------------------------	---------------------------------

Cable options (1m/unit)

Length / Cable protection	_____ m / <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)
Connector (Refer to P6-2)	<input type="checkbox"/> Not required <input type="checkbox"/> Connector
Machine side cable option	Length _____ m
from connector (if desired)	Cable protection <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)

Company	_____
Dept. / Title	_____
Customer name	_____
Address	_____
TEL	_____
FAX	_____
E-mail	_____

How to order

- 1. Spec sheet**
 E-mail
- 2. Selection**
 E-mail
- 3. Confirmation**
 E-mail
- 4. Order**
 E-mail

Please fill out the specification sheet and send to Metrol.

The drawing of specific model based on spec sheet is sent.

Check the drawing to select/confirm the specific model.

The quotation is sent and you can place an order.

✉ E-mail: touchsensor@metrol.co.jp
 PDF sheet is available for download at www.metrol.co.jp/en

FAX: +81-42-528-1442 ✉ touchsensor@metrol.co.jp

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- Touch probes for CNC Robots are used for measuring of workpiece dimensions, centering and positioning.
- Compatible with high-speed contacts for robots.
- Free of lobing phenomena.

Standard specifications

(mm)

Product name	K3MA
Contact structure	NO (Normally open)
Output mode	NC (Normally closed)
Pretravel	X=Approx. 0.4* Z=Approx. 0.1
Stroke	X, Y=±10* Z=4
Repeatability	0.03 (At operating of speed 500 - 1000mm/min) 0.01(At operating of speed 100 - 200mm/min)
Contact life time	3 million
Protective structure	IP67
Contact force	X, Y=1N* Z=3N
Contact material	Tungsten carbide ball
Contact rating	DC5V - DC24V Steady Current: 10 mA or Less Rush Current: 20 mA or Less Limit the LED forward current below 10mA.
Cable	Oil resistant $\phi 5$ / 4cores Tensile strength 30N, Minimum bending R7
LED lamp	Default : LED OFF / Operating : LED ON

Precautions

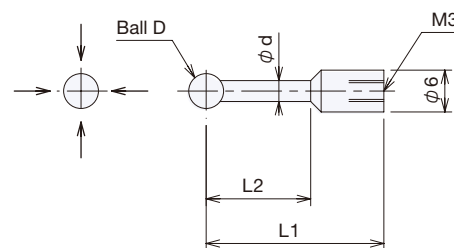
- Rubber materials used in some products are applicable to water-soluble coolants and alkaline liquids. (Refer to P6-4)
- Operating speed slower than 10mm/min is not recommended.
- Precautions for Touch Probe...P4-7
- Precautions for Sensor Connecting...P1-3
- Technical Guide...P6-1
- Cable Options...P6-2

* with stylus length of 35.5mm (F635)

Options

● Stylus list

D	ϕd	L2	Stylus No.					
5	3	within 15		F615	F625	F635	F645	F655
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	15	15	15	15
				F614	F624	F634	F644	F654
4	2.5	within 15	L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	10	10	10	10
3	1.8	within 8		F613	F623	F633	F643	
			L1	15.5	25.5	35.5	45.5	
			L2	6.5	8	8	8	
				F612	F622	F632	F642	
2	1.2	within 5	L1	15.5	25.5	35.5	45.5	
			L2	5	5	5	5	



Outer dimensions

K3MA

Tungsten carbide ball S ϕ 5
Directivity not required

F635 Stylus
S45 Shear screw
2-LED lamp

Protective cover : Mostly for downward (horizontal installation possible)

● Circuit diagram

Power supply voltage : DC24V±10%
Power consumption : 10mA
Output capacity : DC60V 100mA (Resistance load)
AC60V 100mA (Peak value)

● Mounting method

Flange (Optional)

Specification sheet

E-mail : touchsensor@metrol.co.jp

▼ Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications (Bold:Standard)

Date:(mm,dd,yy) _____

Stylus No. (refer to the left page)	_____ (Standard : F635)		
Output mode	<input type="checkbox"/> NC : N omally closed	<input type="checkbox"/> NO: Nomally open	
Mounting method	<input type="checkbox"/> B ottom screw	<input type="checkbox"/> Flange	

Cable options (1m/unit)

Length / Cable protection	_____ m / <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)		
Connector (Refer to P6-2)	<input type="checkbox"/> Not required <input type="checkbox"/> Direct-out connector <input type="checkbox"/> Connector		
Machine side cable option	Length	_____ m	
from connector (if desired)	Cable protection	<input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)	

Company	
Dept. / Title	
Customer name	
Address	
TEL	
FAX	
E-mail	

How to order

1. Spec sheet

Please fill out the specification sheet and send to Metrol.

2. Selection

The drawing of specific model based on spec sheet is sent.

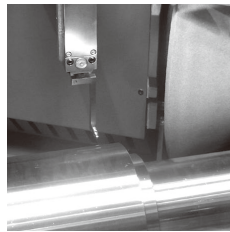
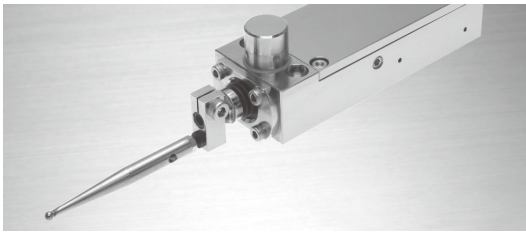
3. Confirmation

Check the drawing to select/confirm the specific model.

4. Order

The quotation is sent and you can place an order.

✉ E-mail: touchsensor@metrol.co.jp
PDF sheet is available for download at www.metrol.co.jp/en



■ Touch probes for CNC cylindrical grinders are used for measurement of workpiece end surfaces.

Standard specifications

(mm)

Product name	E2A
Contact structure	NC (Normally closed)
Output mode	NC (Normally closed) or NO (Normally open) (when using an external I/F unit CL-1F)
Pretravel*	Less than 0.5
Stroke*	±7 (Approx. 5°)
Repeatability	0.002(Recommended operating speed of 50 - 200mm/min)
Contact life time	3 million
Protective structure	IP67
Contact force*	1.2N
Contact material	Tungsten carbide ball
Contact rating	DC5V - DC24V Steady Current: 10 mA or less, Rush Current: 20 mA or less Limit the LED forward current below 10mA.
Cable	Oil resistant $\phi 5$ / 4 cores Tensile strength 30N, Minimum bending R7
LED lamp	Default : LED ON / Operating : LED OFF
Standard accessory	External I/F unit CL-1F (Refer to P4-9)

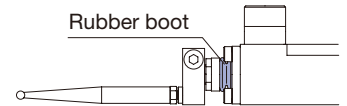
Over travel signal

Output mode	NC (Normally closed)
Contact rating	DC24V 20mA(MAX)

* with stylus length of 54.5mm (1025D)

Precautions

· If grinding powder accumulates on the rubber boot, please rinse with coolant or clean it.



· Rubber materials used in some products are applicable to water-soluble coolants and alkaline liquids. (Refer to P6-4)

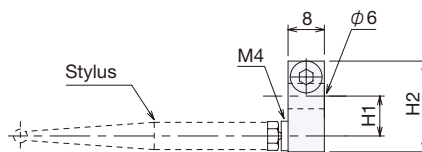
· Operating speed slower than 10mm/min is not recommended.

- Precautions for Touch Probe...P4-7
- Precautions for Sensor Connecting...P1-3
- Technical Guide...P6-1
- Cable Options...P6-2

Options

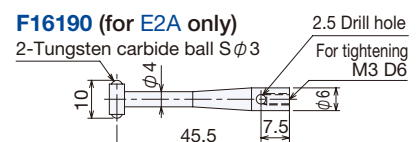
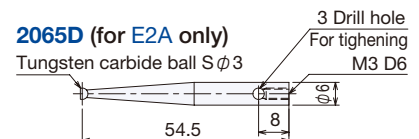
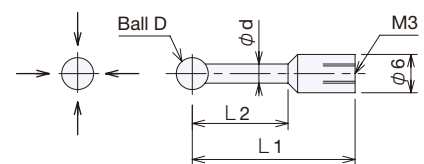
● Stylus holders (for E2A)

Stylus holder No.		F01	F02	F03	F04	F05
H1		10	15	20	25	30
H2		23.5	28.5	33.5	38.5	43.5



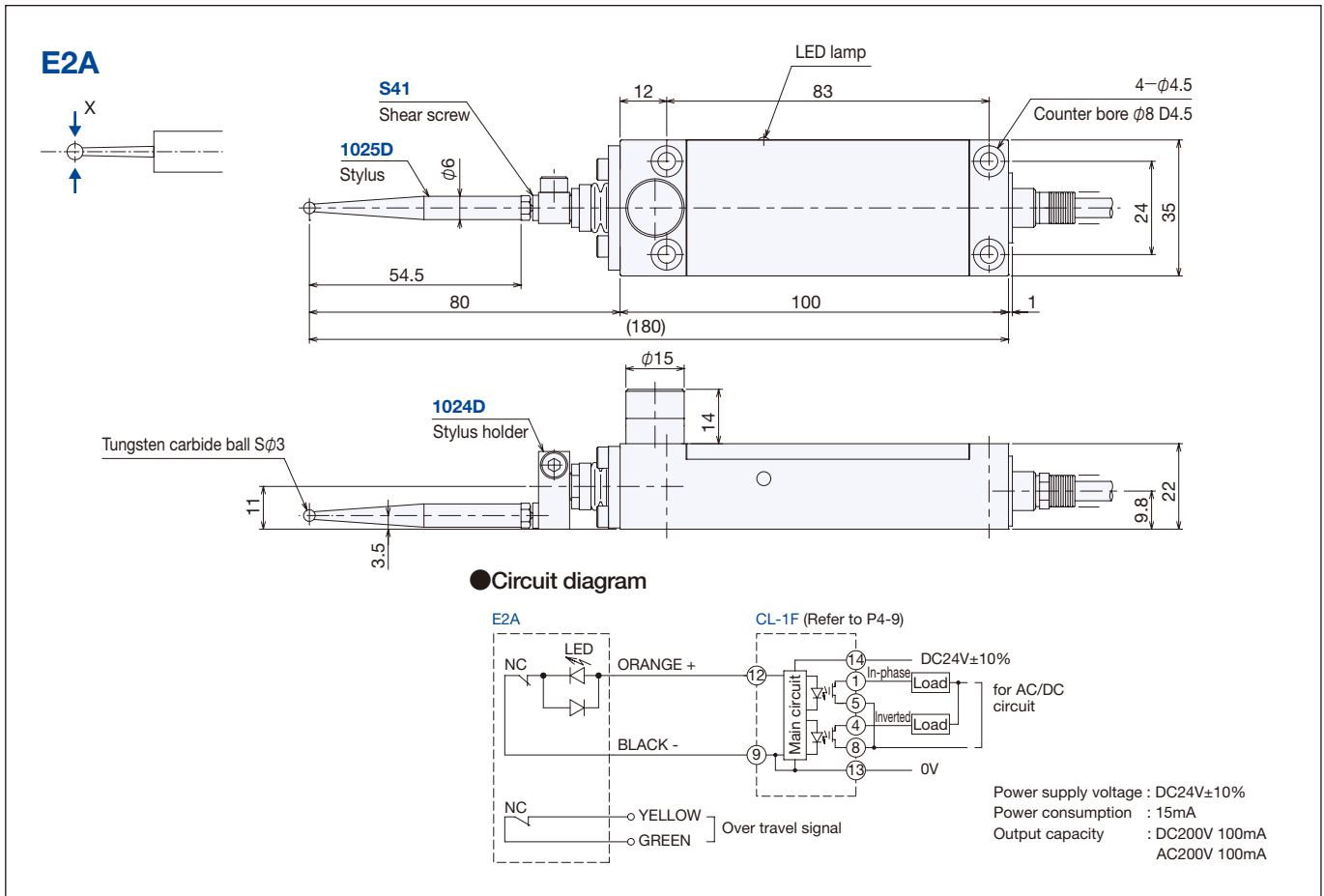
● Stylus list

D	ϕd	L2	Stylus No.					
5	3	within 15	F615	F625	F635	F645	F655	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	15	15	15	15
4	2.5	within 15	F614	F624	F634	F644	F654	
			L1	15.5	25.5	35.5	45.5	55.5
			L2	6.5	10	10	10	10
3	1.8	within 8	F613	F623	F633	F643		
			L1	15.5	25.5	35.5	45.5	
			L2	6.5	8	8	8	
2	1.2	within 5	F612	F622	F632	F642		
			L1	15.5	25.5	35.5	45.5	
			L2	5	5	5	5	



Touch Probes for CNC Cylindrical Grinders

Outer dimensions



Specification sheet

E-mail : touchsensor@metrol.co.jp

▼Please send us your inquiry by fax/e-mail after copying this page, and filling in necessary information. Sample :

Optional specifications

Date:(mm,dd,yy) _____

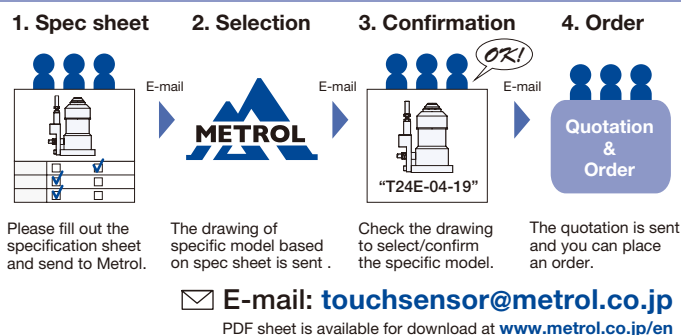
Stylus holder No. (refer to the left page)	_____ (Standard : 1024D)
Stylus No. (refer to the left page)	_____ (Standard : 1025D)

Cable options

Length / Cable protection	_____ m / <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)
Connector (Refer to P6-2)	<input type="checkbox"/> Not required <input type="checkbox"/> Connector
Machine side cable option	Length _____ m
from connector (if desired)	Cable protection <input type="checkbox"/> Not required <input type="checkbox"/> Protective tube _____ m (Upper limit:15m) <input type="checkbox"/> Wire braid _____ m (Upper limit:10m)

Company	
Dept. / Title	
Customer name	
Address	
TEL	
FAX	
E-mail	

How to order



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