Stationary-type non-contact thermometer
Sensor/amplifier separate type

Measurement range

0 to 500°C (32 to 932°F)

THERMO-HUNTER®
BS series

Sensor head
<Wide-angle area type>   **<Small spot type>**
**BS-30T**   **BS-05T**

**Amplifier unit**
Use in combination with a sensor head
<4 to 20 mA output type>   **<1 mV/°C output type>**
BS-A   **BS-V**

Temperature control for rubber kneading
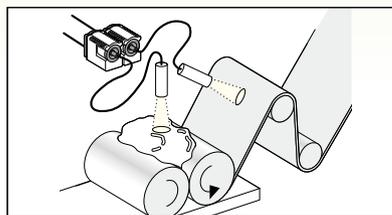
Temperature control for painted surfaces of building materials

CE
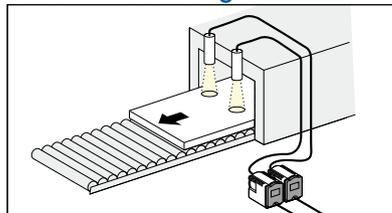
| Environmental-resistant | IP67 sensor head | Heat-resistant to 150°C (302°F) with purge unit | Digital display on amplifier | Emissivity teaching | 8 m heat-resistant extension cable |

Features

Sensor/amplifier separate type for flexible mounting

The sensor/amplifier separate design provides improved environmental resistance. The compact sensor features a stainless-steel body and a special steel structure for IP67-level waterproofing. A detachable connector cable is used between the sensor and the amplifier.
This design reduces the effort needed for changing the installation location or when performing maintenance.

IP67 waterproof sensor head

In harsh manufacturing lines, water and dust can cause sensors to fail, so environmental resistance is a must. The BS series is the first thermometer in its class to offer IP67 waterproofing and dustproofing.

Heat-resistant up to 150°C (302°F) (with use of optional accessories)

Using the optional BS-WP1 air purge/water-cooling jacket provides even greater environmental resistance. With water-cooling, the product can handle temperatures up to 150°C (302°F). The BS-WP1 can also be used for air purging, where air is blown onto the lens to protect against dust and dirt.

Built-in easy-to-configure digital display

The amplifier of the BS series is equipped with a digital display. The digital display allows users to easily check various function settings and measurement values.

### Simple emissivity adjustment: Teaching function

This product is equipped with a TEACH function that allows users to calculate and store emissivity automatically by inputting a temperature. This allows for drastic reductions in time spent on configuring settings.

Two types of analog output

The lineup includes a voltage output type that can be easily connected to a panel meter, and a current output type that is ideal for long-range transmissions. Users are able to select the desired type when selecting a model.

Type key

● **Sensor head**
BS-☐☐T
  [Field of view] 30: ø30 mm/500 mm
                   05: ø5 mm/100 mm
  [Type] BS Sensor/amplifier separate type

● **Amplifier unit**
BS-☐
  [Output] A: 4 to 20 mA output
            V: 1 mV/°C output

Specifications

■ **Sensor head**

Model	BS-30T	BS-05T
Measurement range	0 to 500°C (32 to 932°F) (Display: −20 to 520°C (−4 to 968°F))	
Field of view	ø30 mm/500 mm (Refer to field of view)	ø 5 mm/100 mm (Refer to field of view)
Optics	Silicone lens	
Sensing element/ spectral response	Thermopile/8 to 14 µm	
Response time	0.5 sec./90%	
Accuracy (ε≈1.0)	±1% or ±2°C (3.6°F) of reading, whichever is greater	
Repeatability	±1°C (1.8°F) of reading	
Emissivity (ε) adjustment	0.10 to 1.20 (0.01 per step)	
Ambient temperature	0 to 65°C (32 to 149°F), With air purge/water-cooling jacket installed: Air-cooled: 0 to 80°C (32 to 176°F), Water-cooled: 0 to 150°C (32 to 302°F)	
Ambient humidity	35 to 85% RH (no condensation)	
Storage temperature	−20 to 70°C (−4 to 158°F)	
Vibration resistance	3G (20 to 50 Hz, according to JIS C0911)	
Degree of protection	IP67 (equivalent to Grade 7 in the JIS protection rating)	
Weight	Approx. 300 g (including connector cable)	
Material	Aluminum	
Standard included accessories	—	

*Note that specifications are subject to change without prior notice for product improvement purposes.

■ **Amplifier unit**

Model	BS-A	BS-V
Analog output	4 to 20 mA	1 mV/°C
Analog output resolution	0.2°C (32.4°F)	
Analog display resolution	1°C (33.8°F) (digital display on back of amplifier)	
Functions	Simple emissivity adjustment: TEACH function Response time selection (DELAY) function: 1 (0.5 sec.) to 200 (approx. 10 sec.)	
Supply voltage/ current consumption	12 to 24 VDC ±10%/100 mA or less (at max. load)	
Ambient temperature	0 to 50°C (32 to 122°F)	
Ambient humidity	35 to 85% RH (no condensation)	
Storage temperature	−20 to 60°C (−4 to 140°F)	
Vibration resistance	3G (20 to 50 Hz, according to JIS C0911)	
Degree of protection	IP65 (equivalent to Grade 5 in the JIS protection rating)	
Weight	Approx. 320 g (including cable)	
Material	Ring/housing: Glass-filled PBT, Rear / Cover: PC	
Standard included accessories	Amplifier mounting bracket ×1, amplifier mounting screw (M4) ×2	

*Note that specifications are subject to change without prior notice for product improvement purposes.

Field of view

● **BS-30T/BS-30T**

(Unit: mm)

(Field of view diameter)

ø60 ø45 ø30 ø23 ø16

250
500
750
1000

(Measurement distance)

● **BS-05T/BS-05T**

(Field of view diameter)

ø38 ø22 ø5 ø16

100
200
300

(Measurement distance)

The field of view stated above are measurement diameters with an optical response of 90%. The size of the measurement target must be sufficiently larger than the figures shown in the above diagram.

Operating panel

Normal measurement

Emissivity TEACH settings

Emissivity manual settings

Response time settings

Up button

Down button

ENTER button

Options/Accessories

Air purge/water-cooling jacket

BS-WP1

Ambient temperature
(For BS-30/BS-05)

No purging
65°C (149°F)

Air-cooled
80°C (176°F)

Water-cooled
150°C (302°F)

Attaching an air purge/water-cooling jacket to the sensor head provides greatly improved environmental resistance.
*Instrumentation air or coolant is required.
*There is no need for sensor head fixture NB-SH30A when using BS-WP1.
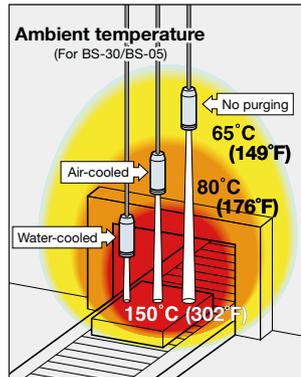
● Specifications

Air-cooled

Air is blown onto the lens of the surface during cooling to prevent the adhesion of dust.
Ambient temperature: Up to 80°C (176°F)
Air flow rate: 50 to 150 Nl/min.
Air temperature: 20°C (68°F)
Air pressure: 0.2 Mpa (2 kgf/cm²) or less
(limited to instrumentation air)

Water-cooled

Used for cooling only. Use in combination with air cooling can cause scattering of dust.
Ambient temperature: Up to 150°C (302°F)
Flow rate: 0.5 to 2 l/min.
Temperature: 30°C (86°F)
Pressure: 0.1 Mpa (1 kgf/cm²) or less

● Piping example
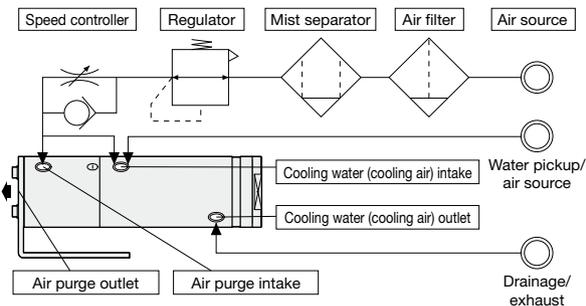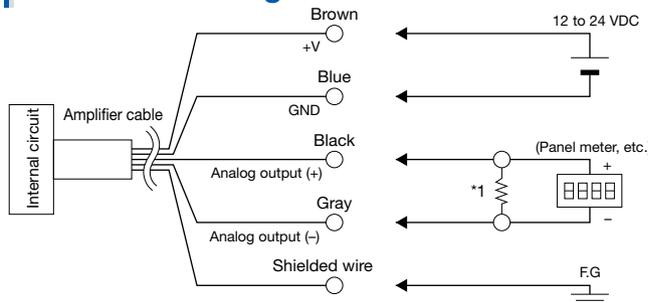
Speed controller | Regulator | Mist separator | Air filter | Air source

Cooling water (cooling air) intake — Water pickup/air source

Cooling water (cooling air) outlet

Air purge outlet | Air purge intake

Drainage/exhaust

Sensor-to-amplifier extension cable

BS-EC8

Connecting the optional BS-EC8 cable (8 m) to the standard connector cable (2 m) between the sensor and the amplifier provides up to 10 m of extension. Both standard and optional cables can handle temperatures up to 150°C (302°F).

Sensor head fixture

NB-SH30A

This base is used to fix cylindrical-type sensor heads.
It is a convenient accessory for installation.
* Cannot be used in combination with BS-WP1.

Black tape for glossy objects

HB-250

When attached to the surface of an object with unknown emissivity or a glossy object, this tape provides an emissivity of 0.95, enabling accurate non-contact temperature measurement. When using the tape, set the emissivity to $\varepsilon = 0.95$. The tape is built with material resistant to heat up to 250°C (482°F).
Total area: 60 mm × 2000 mm

Connection diagram

Internal circuit | Amplifier cable

Brown — +V — 12 to 24 VDC

Blue — GND

Black — Analog output (+) — (Panel meter, etc.) — *1

Gray — Analog output (–)

Shielded wire — F.G

Notes regarding connections
1. Use a power supply within the rated range, and pay careful attention to polarity.
2. For the meter and other products when connecting analog output for a voltage output type (BS-30TV/BS-05TV), use products with a power impedance of 100 kΩ or more.
3. When connecting analog output from a current output type (BS-30TA/BS-05TA) to a meter or other product, connect with a load resistance of 250 Ω or less (*1).
4. Do not connect the analog output (–) to GND or the like. Doing so will result in an error.
5. Do not short-circuit the analog output (+).
6. Using the same piping for parallel wiring with wiring input/output lines, power lines, or high-voltage lines may cause malfunctions due to EMI noise. Use shielded wire or a separate metal conduit.

Dimensions

● Amplifier

Connector

Ring

Cover

Model nameplate

68

42.5

45

92

11 40

Mounting screw hole M4 × 8 mm depth

Amplifier cable length: 2 m

● Sensor head

Connector cable

ø30

12

124

Cable length

2000 ±50

● Amplifier mounting bracket (Included accessory)

W1/4 tap
(Tripod mounting screw)

52

40

2-R6

ø6 ø6

25

31

2

31
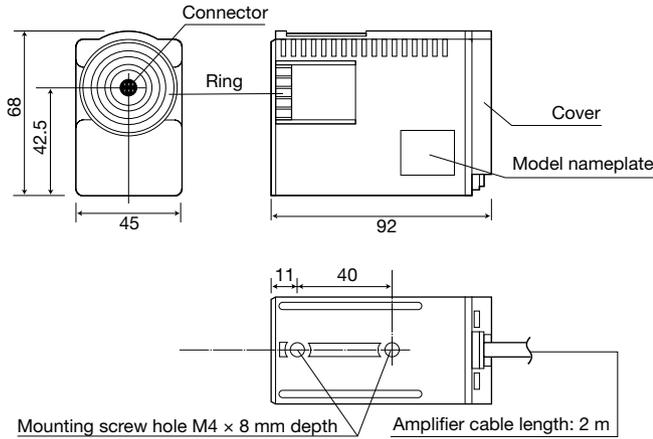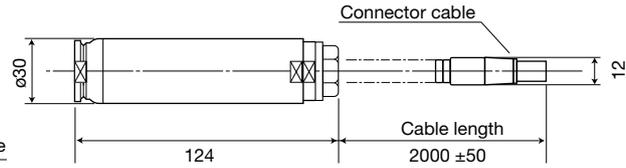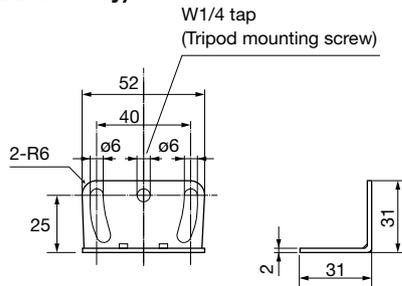
● Sensor head fixture NB-SH30A (sold separately)

64

2-ø9

42

2

ø30

12.5

42

84

70

28
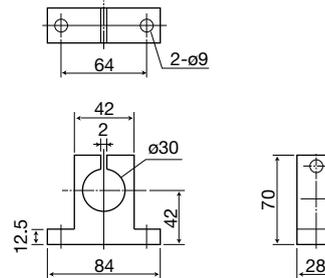
● Air purge/water-cooling jacket BS-WP1 (sold separately)

ø16

42

45

16

70

2-R3

32

40

2-ø6

3.2

150

12.5 48 14 60

Purge pipe

Air purge/water-cooling jacket

Cooling water/cooling air connection port (PF 1/8)

Air supply port (PF 1/8)

Cooling water/cooling air connection port (PF 1/8)

Mounting bracket
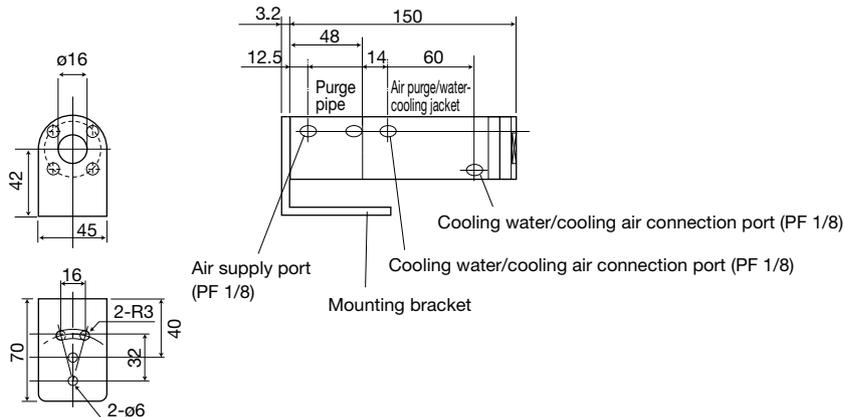
(Unit: mm)

Correct use

■ Situations where measurement may be difficult
• When measuring a mirror-like surface such as shiny metal.
*(Measure after attaching optional accessory HB-250 or after creating a matte finish using paint or the like.)
• When measuring through glass.

■ Exporting
• CE Mark: All Optex FA non-contact thermometers are available with CE compatibility.

■ Correct use
• Be sure to read the instruction manual thoroughly before using the product.
• This instrument is not a thermometer for taking body temperatures. It is not intended for use in medical practices.
• Sudden changes in ambient temperature can cause measurement errors. Please ensure the product is not subject to sudden temperature changes during use.
• Do not use the product near objects that generate strong electromagnetic waves, or in environments with corrosive gases or explosive gases.
• Use only the rated power supply with the product. Using the product outside of the 12 to 24 VDC range may cause malfunction, short-circuiting, fire, or injury.
• Do not touch the product to the measurement target. This product is a non-contact thermometer. Contact with a high-temperature surface may result in deformation, the need for repairs, and measurement errors.

Stationary-type non-contact thermometer
Sensor/amplifier separate type

Measurement range
0 to 500°C (32 to 932°F)

THERMO-HUNTER®
BS-02 series

Sensor head
<Fine spot type>
BS-02T

Amplifier unit
Use in combination with a sensor head
<4 to 20 mA output type> <1 mV/°C output type>
BS-A **BS-V**

レーザ光
ビームをのぞきこまないこと
最大出力1.0mW 波長630〜650nm
クラス2レーザ製品

レーザ光が直接あるいは鏡面体に反射して
目に入らないようにご注意ください。

ø2.5mm fine spot | Coaxial laser marker | IP67 sensor head | Digital display on amplifier | Emissivity teaching | 8 m heat-resistant extension cable

Features

Sensor/amplifier separate type for flexible mounting
The sensor/amplifier separate design provides improved environmental resistance. The compact sensor features a stainless-steel body and a special steel structure for IP67-level waterproofing. A detachable connector cable is used between the sensor and the amplifier. This design reduces the effort needed for changing the installation location or when performing maintenance.

ø2 mm fine-spot measurement with precise laser-marker sighting
This product features a field of view designed for measurement of heat generated by objects as small as ø2 mm.
In addition, the built-in coaxial laser marker points directly to the center of the field of view, ensuring the point of measurement is clearly visible. This means aiming is accurate even with minute targets in addition to easier sensor positioning during installation.
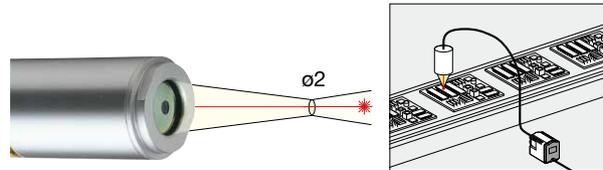
ø2

IP67 waterproof sensor head
In harsh manufacturing lines, water and dust can cause sensors to fail, so environmental resistance is a must. The BS series is the first thermometer in its class to offer IP67 waterproofing and dustproofing.

### Built-in easy-to-configure digital display
The amplifier of the BS series is equipped with a digital display. The digital display allows users to easily check various function settings and measurement values.

Simple emissivity adjustment: Teaching function
This product is equipped with a TEACH function that allows users to calculate and store emissivity automatically by inputting a temperature. This allows for drastic reductions in time spent on configuring settings.

Field of view

ø22
ø24
(Field of view diameter)
ø2
Laser marker
50
100
(Measurement distance)
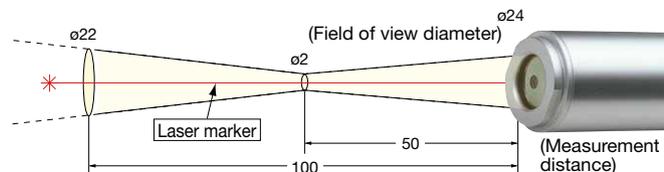
*The laser marker points directly to the center of the field of view.
*The field of view stated above are measurement diameters with an optical response of 90%.
*The size of the measurement target must be approx. 1.5 times larger than the measurement diameters shown in the above diagram.

(Unit: mm)

Type key

● **Sensor head**

BS-02T
02: ø2 mm/50 mm
[Field of view]
BS sensor/amplifier
[Type] separate type

● **Amplifier unit**

BS-□
A: 4 to 20 mA output
[Output] V: 1 mV/°C output
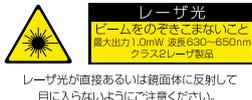
Specifications

■ Sensor head

| Model	BS-02T
Measurement range	0 to 500°C (32 to 932°F) (Display: −20 to 520°C (−4 to 968°F))
Field of view	ø2 mm/50 mm (Refer to field of view)
Optics	Silicone lens
Sensing element/ spectral response	Thermopile/8 to 14 μm
Response time	0.5 sec./90%
Accuracy (ε≈1.0)	±1% or ±2°C (3.6°F) of reading, whichever is greater
Repeatability	±1°C (1.8°F) of reading
Emissivity (ε) adjustment	0.10 to 1.20 (0.01 per step)
Sighting function	Coaxial laser marker (Class 2)
Ambient temperature	0 to 50°C (32 to 122°F)
Ambient humidity	35 to 85% RH (no condensation)
Storage temperature	−20 to 60°C (−4 to 140°F)
Vibration resistance	3G (20 to 50 Hz, according to JIS C0911)
Degree of protection	IP67 (equivalent to Grade 7 in the JIS protection rating)
Weight	Approx. 400 g (including connector cable)
Material	Aluminum
Standard included accessories	Sensor head mounting bracket

*Note that specifications are subject to change without prior notice for product improvement purposes.

■ Amplifier unit

| Model	BS-A	BS-V
Analog output	4 to 20 mA	1 mV/°C
Analog output resolution	0.2°C (32.4°F)	
Analog display resolution	1°C (33.8°F) (digital display on back of amplifier)	
Functions	Simple emissivity adjustment: TEACH function Response time selection (DELAY) function: 1 (0.5 sec.) to 200 (approx. 10 sec.)	
Supply voltage/ current consumption	12 to 24 VDC ±10%/100 mA or less (at max. load)	
Ambient temperature	0 to 50°C (32 to 122°F)	
Ambient humidity	35 to 85% RH (no condensation)	
Storage temperature	−20 to 60°C (−4 to 140°F)	
Vibration resistance	3G (20 to 50 Hz, according to JIS C0911)	
Degree of protection	IP65 (equivalent to Grade 5 in the JIS protection rating)	
Weight	Approx. 320 g (including cable)	
Material	Ring/housing: Glass-filled PBT, Rear / Cover: PC	
Standard included accessories	Amplifier mounting bracket ×1, amplifier mounting screw (M4) ×2	

*Note that specifications are subject to change without prior notice for product improvement purposes.

Options/Accessories

Sensor-to-amplifier extension cable
BS-EC8

Connecting the optional BS-EC8 cable (8 m) to the standard connector cable (2 m) between the sensor and the amplifier provides up to 10 m of extension. Both standard and optional cables can handle temperatures up to 150°C (302°F).

Sensor head fixture
NB-SH40A

This base is used to fix cylindrical-type sensor heads. It is a convenient accessory for installation.

Black tape for glossy objects
HB-250

When attached to the surface of an object with unknown emissivity or a glossy object, this tape provides an emissivity of 0.95, enabling accurate non-contact temperature measurement. When using the tape, set the emissivity to ε = 0.95. The tape is built with material resistant to heat up to 250°C (482°F).
Total area: 60 mm × 2000 mm

Dimensions

● Sensor head
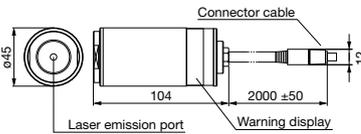
● Amplifier
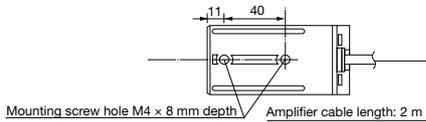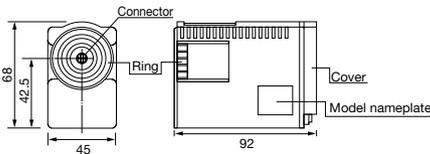
● Sensor head fixture
NB-SH40A
(Optional accessory)
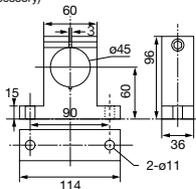
● Amplifier mounting bracket
(Included accessory)
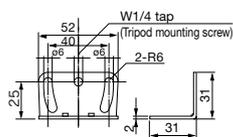
(Unit: mm)

Connection diagram
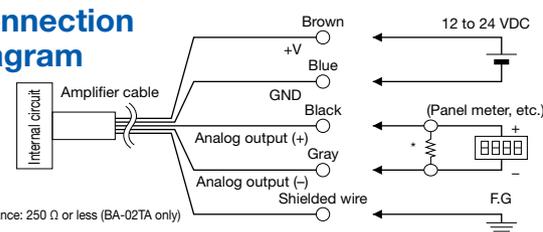
*Load resistance: 250 Ω or less (BA-02TA only)

Correct use

■ Situations where measurement may be difficult
- When measuring a mirror-like surface such as shiny metal.
  *(Measure after attaching optional accessory HB-250 or after creating a matte finish using paint or the like.)
- When measuring through glass.

■ Correct use
- Be sure to read the instruction manual thoroughly before using the product.
- This instrument is not a thermometer for taking body temperatures. It is not intended for use in medical practices.
- Sudden changes in ambient temperature can cause measurement errors. Please ensure the product is not subject to sudden temperature changes during use.
- Do not use the product near objects that generate strong electromagnetic waves, or in environments with corrosive gases or explosive gases.
- Use only the rated power supply with the product. Using the product outside of the 12 to 24 VDC range may cause malfunction, short-circuiting, fire, or injury.
- Do not touch the product to the measurement target. This product is a non-contact thermometer. Contact with a high-temperature surface may result in deformation, the need for repairs, and measurement errors.

■ Laser beam
- This product uses a Class 2 laser that conforms to JIS C 6802. Use the product according to the affixed labels.

■ Exporting
- Laser warning labels: Product specifications may differ slightly depending on the laws and compliance standards of the export destination country. Contact us for details.
- CE Mark: All Optex FA non-contact thermometers are available with CE compatibility.

Selection guide

Stationary-type

CS

SA-80

BA

BA-TC

BS

BS-02

BF

Portable-type

PT-7LD

PT-5LD

PT-S80
PT-U80

PT-2LD

PT-3S

Q & A

Support