

Super-Ultra Small Industrial Video Borescope

Product catalog

Authorized Dealer



SPI ENGINEERING
— Simple, Precision and Innovation —



**No need to
disassemble,
damage or cut.**

**Any scratches, spots of dirt
and small holes
can't escape from this.**

SPI ENGINEERING
— Simple, Precision and Innovation —

As long as there is an invisible place Our challenge continues.



Simplicity is the ultimate sophistication

[Simple]

Our commitment is to deliver simple solution with competitive features while keeping cost as affordable as possible.

[Precision]

Our commitment is to deliver valuable solution to those who require precise work as precision instrument.

[Innovation]

Our commitment is to bring innovation into industry and customers through our products.

SPI ENGINEERING Co.,Ltd.
CEO : HARAYAMA KOICHIRO

Company Profile

| | |
|-------------------------|---|
| Company Name | SPI Engineering Co.,Ltd. 2592-5, Inaba-Minamimata, Nagano City, |
| Address | Nagano, JAPAN 380-0917 |
| Date of Establishment | 2006. July.13 |
| Capital | 9,990,000yen |
| Employees | 10 |
| Business Outline | Manufacturing and sales of electronic, precision, and medical products including R&D related to these products. |
| Representative Director | CEO : HARAYAMA KOICHIRO |



Our Main Customers

| | |
|-------------------|---|
| [Automotive] | TOYOTA, HONDA, NISSAN, DAIHATSU, SUBARU, SUZUKI |
| [Manufacturing] | SONY, PANASONIC, HITACHI, RICOH, KOMATSU |
| [Heavy Industry] | mitsubishi, KOBELCO |
| [Railway] | JR (JAPAN RAILWAYS) |
| [Telco] | NTT(Japanese telecommunications company) |
| [Aerospace parts] | JAXA |

Offices (Distributor with exclusive sales rights in the area)

| Area | Company Name |
|------------------------------------|--|
| Korea | Kyung-hws Tools&Machinery Co.,Ltd. |
| Taiwan | QTS Corporation |
| Thailand | UNO Machinery Thailand |
| China | 深圳高精達精密工具有限公司 |
| Malaysia | Accurate Technology & Services Sdn. Bhd. SANKYO MACHINE TOOLS (MALAYSIA) SDN.BHD. |
| India | Godrej & Boyce Mfg Co Ltd. / Precision Products Marketing |
| Philippines | MESCO INC. |
| Denmark | Dana Tool A/S |
| France | AMBPR |
| Netherlands / Belgium / Luxembourg | Opticon Benelux Naarden B. V. |

- 01 Corporate Philosophy
- 02 Company Profile
- 03 Table of Contents
- 04 About Industrial Borescope
- 05 Borescope diameter 0.5mm / 0.98mm / 1.3mm
- 06 Borescope diameter 1.8mm (High resolution / Rigid pipe)
- 07 Borescope diameter 2.5mm / 2.9mm
- 08 Borescope diameter 2.9mm(Snake camera, Snake camera High resolution)
- 09 Side View Camera diameter 4.0mm
- 10 Borescope diameter 4.6mm / 5.0mm
- 11 HD Industrial Borescope 4.6mm / 5.0mm / 6.0mm
- 12 Dedicated Monitor
- 13 Interface
- 14 Camera Attachment
- 15 Specifications
- 16 Specifications

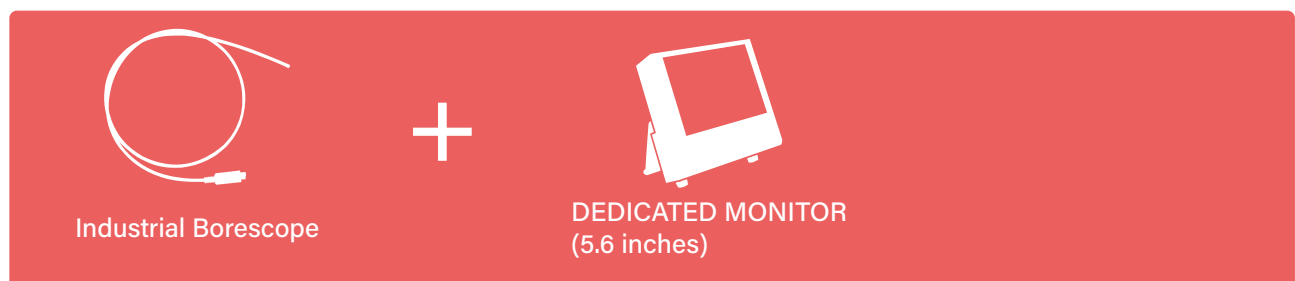
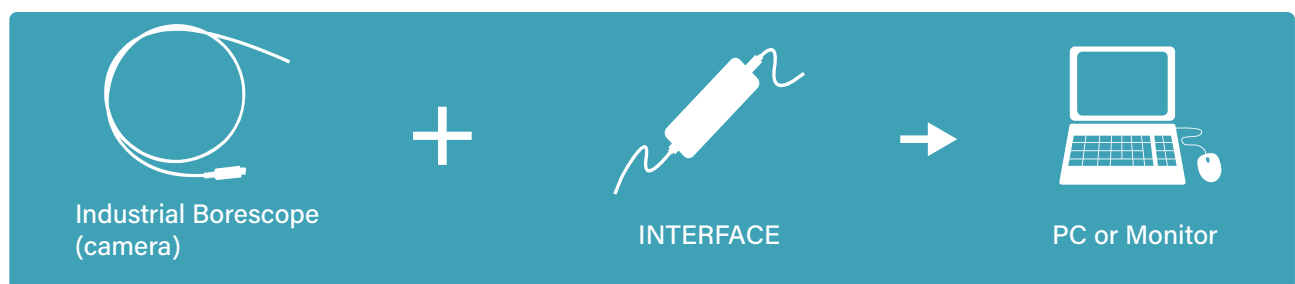
About Industrial Borescope



Features

The SPI ENGINEERING Video Borescopes has CMOS sensor at the tip of the probe. You can see inside the holes that you cannot see, and you can use it to inspect your product or equipment.

Please use as a set with **INTERFACE** or **DEDICATED MONITOR**



(Note) SPI Engineering sells products only to corporate customers and rents demo machines. Please note that we do not do business with general (individual) customers.

HNL-0.5CAM80S

Diameter **0.5mm**

This fiberscope has a tip diameter of 0.5mm. It contains 9,000 built-in image fibers, delivering high image quality despite its 0.5mm diameter. It also features light adjustment and edge enhancement functions.



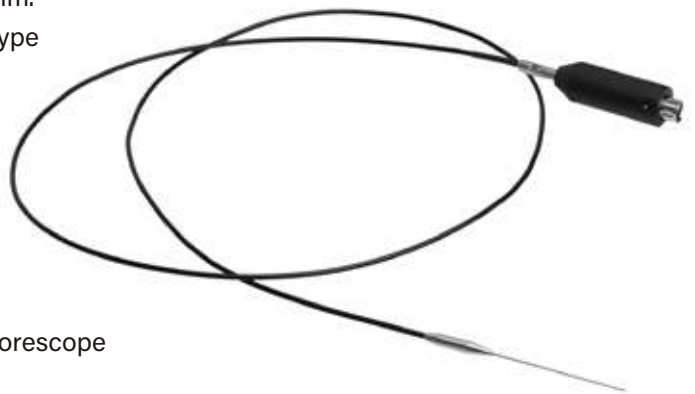
HNL-0.98CAM120SQ

Diameter **0.98mm**

This Industrial Borescope has a tip diameter of 0.98 mm. It is the world's thinnest fiber-free image sensor type Industrial Borescope (according to our research).



← Ballpoint pen and Borescope



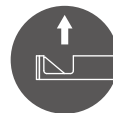
Dedicated Monitor
HKT-5.6SA II



Your PC
(USB input)



Your Monitor
(HDMI input)



Side Mirror Attachments
available

HNL-1.3CAM120(S)

Diameter **1.3mm**

This Industrial borescope has a tip diameter of 1.3 mm. It can inspect small holes that were previously impossible to insert with conventional products. You can choose from two types: pen type and flexible type. (The rigid tip ($\Phi 1.3$ mm) of both types does not bend.)



HNL-1.3CAM120 (Pen Type)
Ideal for mounting on robots, jigs, etc.



HNL-1.3CAM120S (flexible type)
Ideal for manual work.



Dedicated Monitor
HKT-5.6SA II



Your PC
(USB input)



Your Monitor
(HDMI input)



Side Mirror Attachments
available

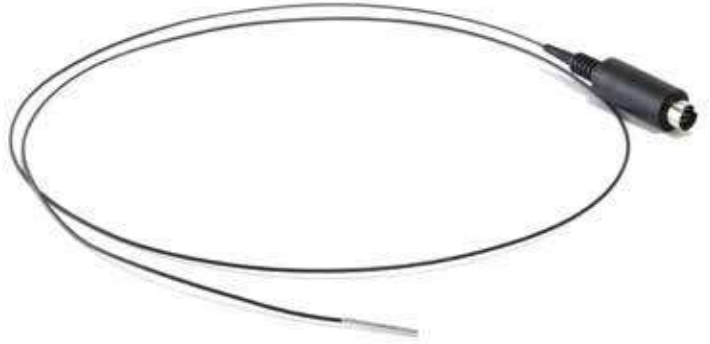
HNL-1.8CAM120

Diameter  **1.8mm**

This is a best-selling product.

Although this camera is extremely small, with a tip diameter of $\varnothing 1.8\text{mm}$, its 400 x 400 pixels make it useful for inspecting previously difficult-to-detect foreign objects, scratches, burrs, and other objects.

It's extremely easy to use, and images can be viewed on a variety of media, including a dedicated monitor, PC, and TV (monitor).



Side Mirror Attachments available



Dedicated Monitor
HKT-5.6SA II



Your PC
(USB input)



Your Monitor
(HDMI input)



HNL-1.8CAM120SQ

Diameter  **1.8mm**

The best-selling model "HNL-1.8CAM120" has been improved.

This product is ultra-thin, measuring just 1.8mm in diameter, but its resolution has been significantly improved from 400x400 to 720x720 pixels.

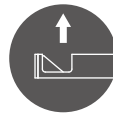
When inspecting tight spaces and fine details, it now offers clearer and more detailed images than ever before.



Your PC
(USB input)



Your Monitor
(HDMI input)



Side Mirror Attachments available

HNL-1.8CAM120ST

Diameter  **1.8mm**

The best-selling model "HNL-1.8CAM120" has been improved.

The HNL-1.8CAM120ST features a rigid pipe design that prevents the tip from bending.

Compared to the HNL-1.8CAM120, which has the same diameter, the LED at the tip is six times brighter, and The HNL-1.8CAM120ST is stronger.



Dedicated Monitor
HKT-5.6SA II



Your PC
(USB input)



Your Monitor
(HDMI input)



Side Mirror Attachments available

HNL-2.5CAM120

Diameter  **2.5mm**

This is an Industrial Borescope with a tip diameter of 2.5 mm. The HNL-2.5CAM120 is an Industrial Borescope developed primarily for use on inspection lines. In addition to its easy-to-hold shape, it also comes with a ring for securing the wire.



Dedicated Monitor
HKT-5.6SA II



Your PC
(USB input)



Your Monitor
(HDMI input)

HNL-2.9CAM series

Diameter  **2.9mm**

This is a long-selling product. Tip diameter is 2.9mm. It features a narrower field of view than other Borescopes. You can choose the focal length and tube type.



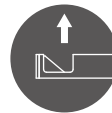
Dedicated Monitor
HKT-5.6SA II



Your PC
(USB input)



Your Monitor
(HDMI input)



Side Mirror Attachments
available

Focal Length

The HNL-2.9CAM series has two models, one that focuses on close objects (N) and one that focuses on far objects (F), allowing you to select the camera with the optimal focus for your work.

Model number

HNL-2.9 CAM35N

HNL-2.9 CAM35F

Angle of view

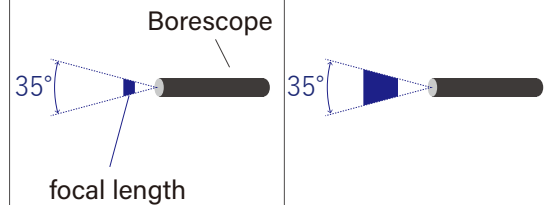
35°

35°

Depth of view

5mm~10mm

10mm~50mm



Tube Variations

You can choose the material of the camera tube depending on the usage environment. The H type can maintain the tube shape.



SUS blade coating
(V type)

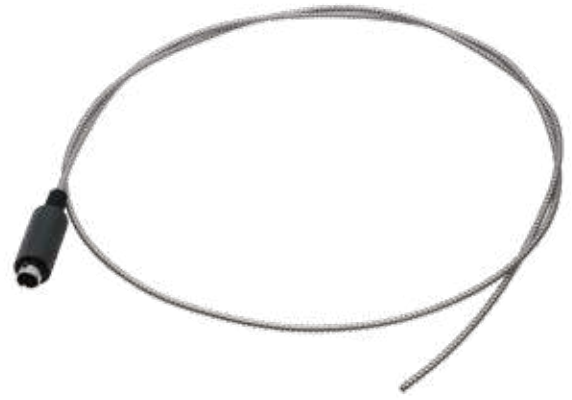


Shape-retaining tube
(H type)

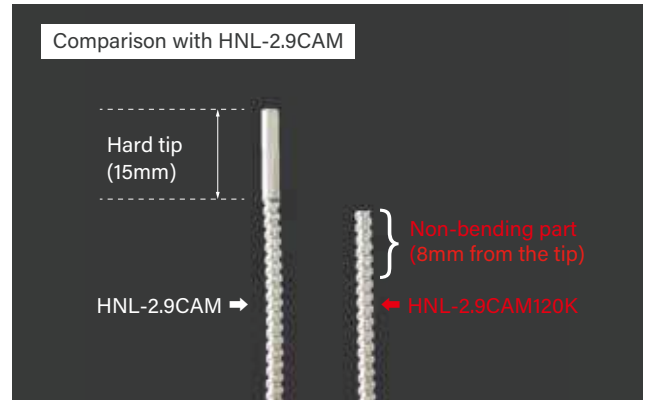
HNL-2.9CAM120K

Diameter **2.9mm**

The short rigid tip makes it easier to insert into curved objects compared to other borescope cameras. In addition, the light source at the tip of the camera is equipped with an optical fiber light guide, achieving brighter illumination than our HNL2.9CAM Series with the same diameter.



Side Mirror Attachments available



Snake Camera Protector

Protects the tip of the camera.

Particularly recommended if the endoscope is used frequently and the tip is prone to wear.

| | |
|----------------|---------------|
| Model number | HNL-2.9PT |
| Outer diameter | φ3.3mm×L5.5mm |



Caution: Please avoid sharp bends of R30mm or less.
If the inside of the workpiece is bent at a right angle or the surface is uneven, it may be impossible to insert the Borescope.

HNL-2.9CAM120KSQ

Diameter **2.9mm**

The above-mentioned model, the "HNL-2.9CAM120," has been further improved.

This product is ultra-thin, measuring just 2.9mm in diameter, but its resolution has been significantly improved from 400x400 to 720x720 pixels.

When inspecting tight spaces and fine details, clearer and more detailed images than ever before are now possible.

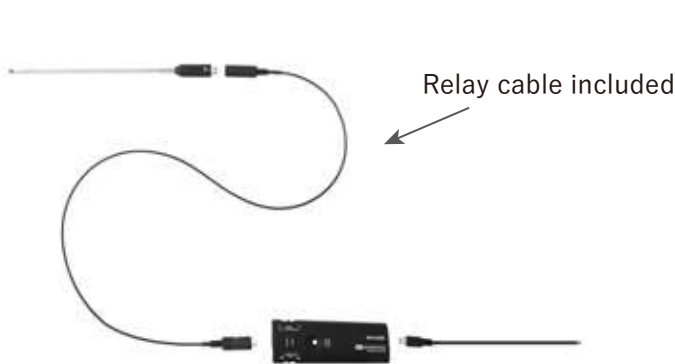
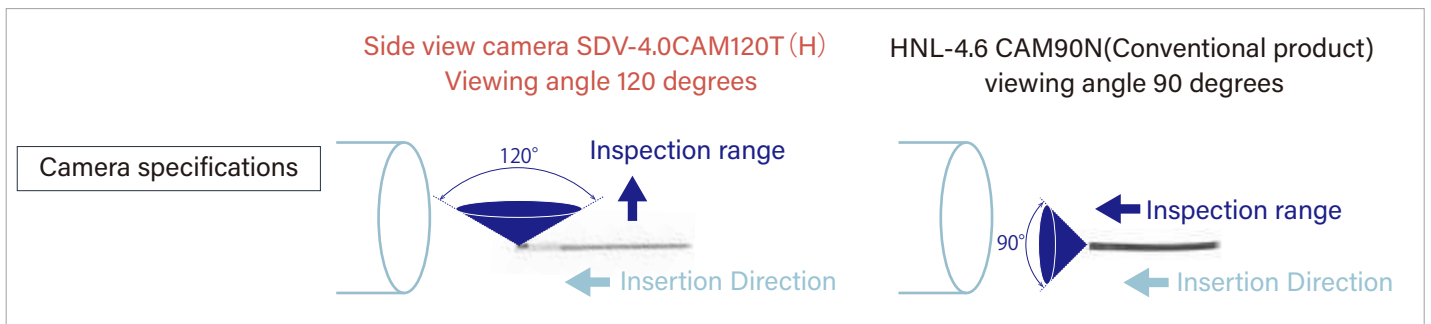


Side Mirror Attachments available

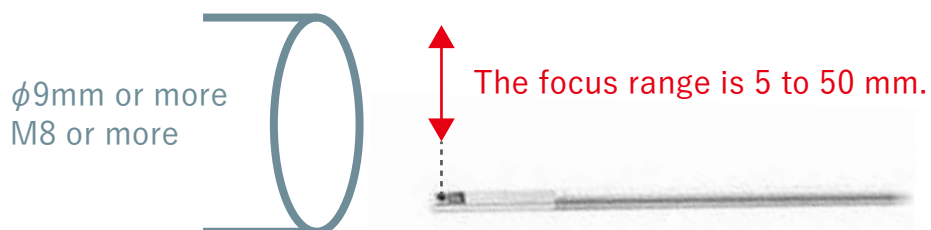
SDV-4.0CAM120T (H)

Diameter **4.0mm**

Most conventional industrial endoscopes are designed to display images from the front. While a side-view attachment allows for lateral viewing, cameras with a wide field of view narrow the visible range, posing an issue of insufficient visibility. The SDV-4.0CAM120T(H) is a dedicated side-view model with the camera itself positioned sideways. It can capture clear images directly to the side of the insertion direction without relying on an attachment. It enables reliable, high-precision inspections without sacrificing visibility.



The Side View Camera SDV-4.0CAM120T(H) can be used with holes of $\Phi 9\text{mm}$ or larger and M8 or larger. If the insertion hole is too large or small, a clear image will not be obtained.



HNL-4.6CAM Series

Diameter **4.6mm**

This is a long-selling product. Tip diameter is 4.6mm.
Focal length and tube type are selectable.



Side Mirror Attachments available



Depth of view

The HNL-4.6CAM series has two models, one that focuses on close objects (N) and one that focuses on far objects (F), allowing you to select the camera with the optimal focus for your work.

| | | |
|---------------|-----------------------|-----------------------|
| Model number | HNL-4.6 CAM90N | HNL-4.6 CAM90F |
| Angle of view | 90° | 90° |
| Depth of view | 5mm~10mm | 10mm~50mm |

Tube Variations

There are two types of camera tubes: standard and V type (SUS braid coated), allowing you to select the material of the camera tube depending on the environment in which it will be used. The V type is more abrasion resistant than the standard tube.



Standard Tube

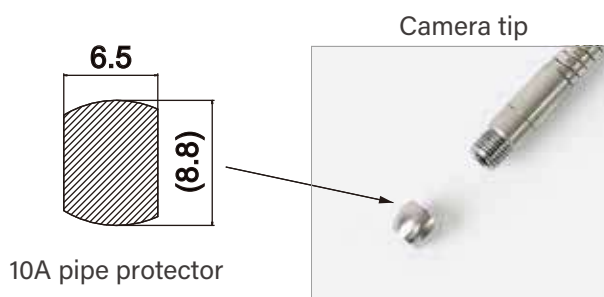
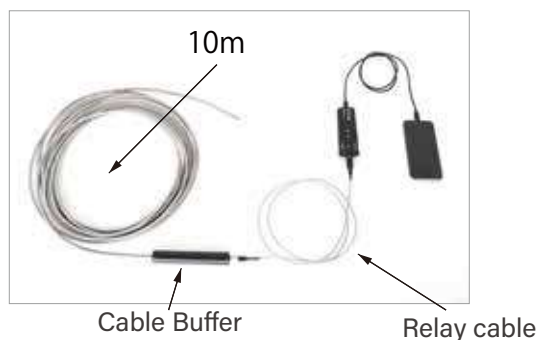


SUS blade coating (V type)

MRU-7CAM120SQ

Diameter **9.0mm**
(When a 10A protector is attached to the tip)

The MRU-7CAM120SQ is an industrial camera developed for use on gas pipes.
It is 10m long and comes with a protector attached to the tip.

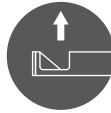


HNL-4.6HDC110SQ(TL)

Diameter **4.6mm**

The high-definition borescope (HNL-4.6HDC series) is an industrial borescope that achieves 1 million pixels (720 vertical pixels, 1280 horizontal pixels) despite its narrow tip diameter of just 4.6 mm.

You can choose from two specifications: standard tube or tubeless, depending on the work you want to view. You can easily view the image on your PC, TV, etc.



Side Mirror Attachments available

HNL-4.6HDC110SQST

Diameter **5.0mm**

This high-definition borescope is a rigid, non-bending type with a tip protected by a sturdy pipe.

Compared to other borescopes, the pipe is thicker and more durable, making it recommended for use in situations where the pipe is prone to rubbing.



HNL-6.0HDC140SQ

Diameter **6.0mm**

The Full HD borescope (HNL-6.0HDC series) is an industrial borescope equipped with a 2-megapixel (1080 vertical pixels, 1920 horizontal pixels) CMOS image sensor. HD borescopes have approximately 12 times the number of pixels (compared to our company's previous models) of conventional borescopes, meaning that image grain is not noticeable even when enlarged or printed. Furthermore, the wide-angle lens makes it possible to observe the entire subject in detail while projecting it onto a large screen.



Standard tube specifications
(PE coated tube)



This is a tube coated with polyethylene having excellent lubricating property when pushed in. Since the borescope power supply line and the tube are partitioned by a stainless coil, external damage is not exerted easily on the tube in this structure.

Shape retention specifications
HNL-6.0HDC140SQ H

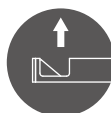


In this type, the shape of the tube can be retained. Since the entire tube is formed of metal (copper wires and SUS wires), this tube has high rigidity. The outer circumference has a bellows-type structure, and therefore, the push-in capability is inferior to that of a PE-coated tube.

Tubeless specifications
HNL-6.0HDC140SQ TL

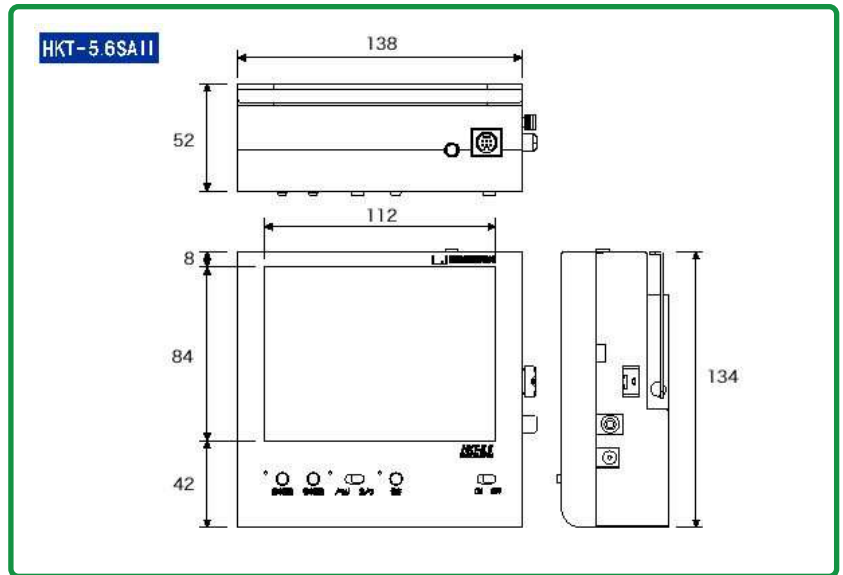


This product use electric wire only. The wire passed the quality test for 100,000 times bending. You can attach many places without irritation with hard tube.



Side Mirror Attachments available

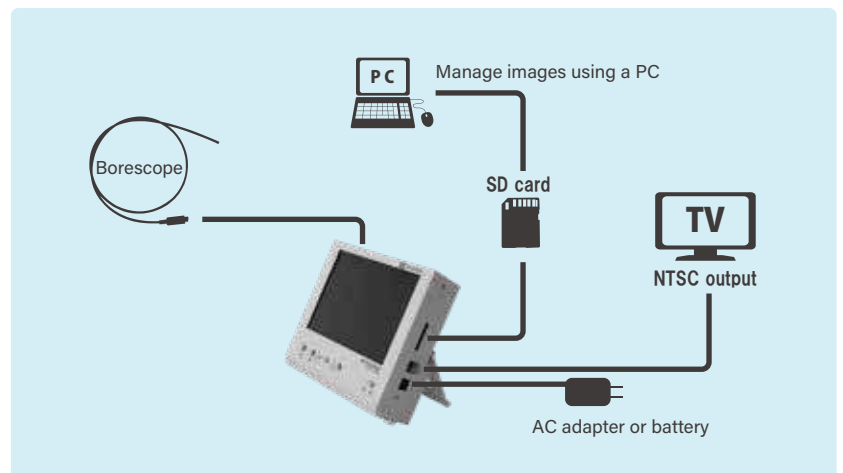
HKT-5.6SA II Borescope dedicated monitor



This is a dedicated monitor for Industrial Borescopes. It is compatible with all cameras except high-definition cameras.

It comes standard with an image saving function, allowing you to save and review images immediately after using the endoscope. Images are saved in JPEG format on an SD card, making them easy to manage on a computer.

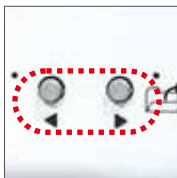
In addition to an AC adapter, it also comes equipped with a battery holder so it can be used outdoors or in places without electrical equipment.



➤ Specification of Monitor

Adjustable LED lights intensity

Intensity of White LEDs mounted on the tip of camera can be adjusted by switches on the monitor in 8 different levels of brightness.



AE ON/OFF function

There is a function to switch between AE mode and manual gain mode.

This function is useful for observing mirror-finished subjects susceptible to halation.

Tilting Desk-Top Mount

Angle of monitor screen can be easily adjustable according to your comfort and the stand can be stored to monitor when it is not in use.



Battery-powered

Portable monitor can be also operated by regular battery. HKT-5.6SA requires 4 C batteries.



Save images to external memory

In the same way as a typical digital camera, you can capture images by simply pressing a button, and these images are stored on the included memory media (JPEG format).

When you have finished capturing images, you can use the data in whichever way suits your purpose, such as transferring the image data to a PC in the same way as a photograph taken with a digital camera.



SD card

Guide function

The brightness of the LED light, number of pictures taken, and remaining battery life are displayed at the top left of the monitor screen.

AMCap for HKT-USB

When connecting an industrial borescope to a PC, the viewer software to be used.

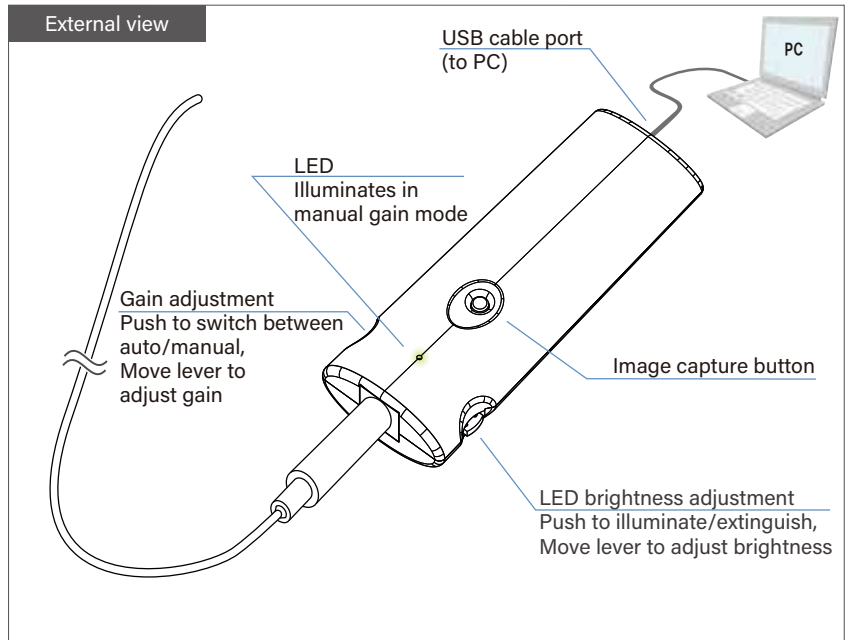


USB Interface

HKT-USB Type X, HKT-USB Type WS, HKT-USB Type 2, HKT-USB Type XS

Detailed specifications(→P16)

- Connect the Borescope camera to your PC
- Equipped with image capture function
- Equipped with LED lighting dimming function
- Auto/manual gain switching
- (Features available vary depending on the model)



DVI Interface

HKT-DVI TypeW II, HKT-DVI-720P

Detailed specifications(→P16)

- Can be connected to your PC
- Equipped with stop moving function
- Equipped with LED lighting dimming function
- Manual gain switching possible



HKT-DVI TypeWS Compatible Borescope

- HNL-0.98CAM120SQ
- HNL-1.3CAM120(S)
- HNL-1.8CAM120(ST)
- HNL-2.5CAM120
- HNL-2.9CAM120K
- HNL-4.0CAM120T(H)

HKT-DVI-720P Compatible Borescope

- HNL-1.8CAM120SQ
- HNL-2.9CAM120KSQ

USB / DVI Interface

HKT-DVI (for HNL-4.6HDC), HKT-DVI(for HNL-6.0HDC)

Detailed specifications(→P16)

- Connect your HD Borecope camera to your PC or TV monitor.
- Image saving function (only when connected to a PC).
- LED lighting dimming function.
- Auto/manual gain switching.



Compatible Borescope

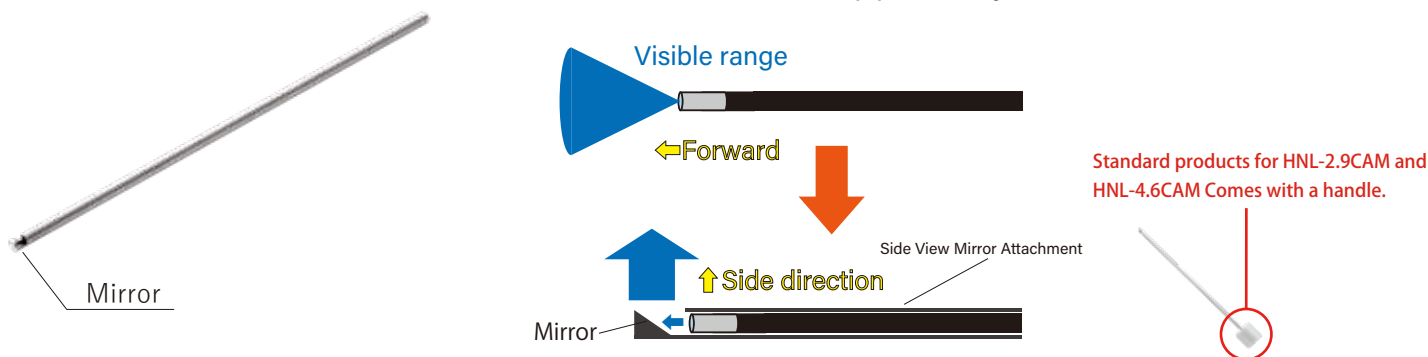
- HNL-4.6HDC110SQ(ST)
- HNL-6.0HDC140SQ



Side View Mirror Attachment

The presence or absence of each attachment differs depending on the model of the borescope. Please check in advance if necessary.

The mirror at the end of the pipe allows you to see the side.



We accept mirror replacement repair. Please contact us for details.

※1

※1...Models are limited to $\phi 2.9\text{mm}$ side view or $\phi 4.6\text{mm}$ side view.

The model below is made of Sapphire Glass. It is less susceptible to scratches than polished metal mirrors.

$\phi 2.9\text{mm}$ side view attachment: HNL-2.9S9D-G
 $\phi 4.6\text{mm}$ side view attachment: HNL-4.6S9D-G

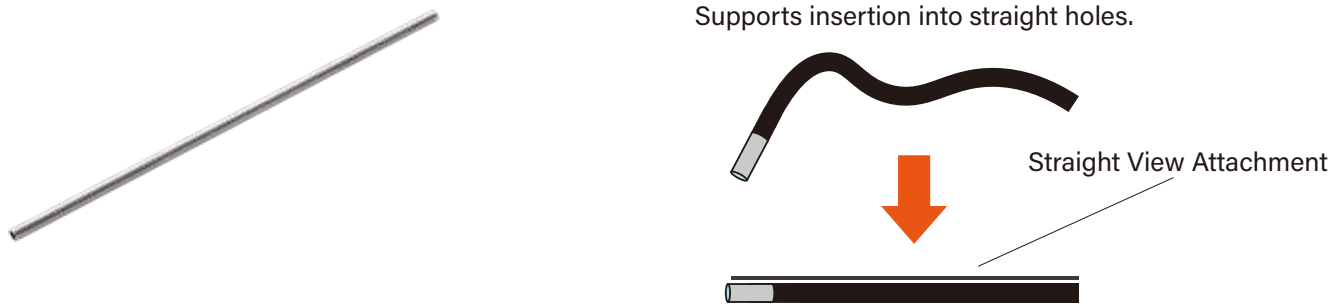


| | | Side View Mirror Attachment | | | | | | |
|---|----------------|-----------------------------|---------------------|---------------------|---------------------|---------------|---------------------|---------------------|
| | | For HNL-0.98CAM | For HNL-1.3CAM | For HNL-1.8CAM | For HNL-2.9CAM | | For HNL-4.6CAM | For HNL-6.0HDC |
| A | | 90° Side View | 90° Side View | 90° Side View | 90° Side View | 60° Side View | 90° Side View | 90° Side View |
| | | | HNL-0.98SDV | HNL-1.3SDV | HNL-1.8SDV | HNL-2.9S9D-G | HNL-2.9S6D | HNL-4.6S9D-G |
| B | Full length | 40mm (MAX:95mm) | 95mm | 100mm (MAX:300mm) | 200mm (MAX:500mm) | | 200mm (MAX:500mm) | 200mm (MAX:500mm) |
| | Outer diameter | $\phi 1.2\text{mm}$ | $\phi 1.6\text{mm}$ | $\phi 2.2\text{mm}$ | $\phi 3.2\text{mm}$ | | $\phi 5.2\text{mm}$ | $\phi 6.5\text{mm}$ |

Straight view Attachment

The presence or absence of each attachment differs depending on the model of the borescope. Please check in advance if necessary.

Holds the tube shape of the borescope. Supports insertion into straight holes.



| | | Straight View Attachment | | | |
|---|----------------|--------------------------|---------------------|---------------------|---------------------|
| | | For HNL-1.8CAM | For HNL-2.9CAM | For HNL-4.6CAM | For HNL-6.0HDC |
| A | | HNL-1.8STV | HNL-2.9STV | HNL-4.6STV | HNL-6.0STV |
| B | Full length | 100mm (Max:300mm) | 200mm (Max:500mm) | | |
| | Outer diameter | $\phi 2.2\text{mm}$ | $\phi 3.2\text{mm}$ | $\phi 5.2\text{mm}$ | $\phi 6.5\text{mm}$ |

φ 0.98mm ~ φ 2.5mm Industrial Borescope specification

HNL-1.8CAM120SQ



| A | HNL-0.5CAM | HNL-0.98CAM | HNL-1.3CAM120 | | HNL-1.8CAM | | | HNL-2.5CAM |
|----------------------------|--|--|---|---------------------------------|-------------------------|----------------|-------------------|----------------------------|
| B | 80S | 120SQ | 120 | 120S | 120 | 120SQ | 120ST | 120 |
| Depth of field(mm) | 3~7 | 3~30 | | 5~50 | | | 3~30 | 5~50 |
| Angle of view(※2) | 80° | 120° | | | | | | |
| Outer diameter(mm) | φ 0.5 | φ 0.98 | φ 1.3 | | φ 1.8 | | | φ 2.5 |
| Light source | Fiber Optic Light Guide (with light modulation function) | | | | | | | |
| Waterproof property | Waterproof(※ 6) | Drip-proof(IP53) | | | | | | |
| Temperature resistance | 0~50°C | | | | | | | |
| Sensor(※1) | 1/18" | 1/36" color CMOS sensor | | | 1/18" color CMOS sensor | | 1/36" | 1/18" |
| Effective pixels | 9000(fibers) | 400 x 400 | | | 720 x 720 | | 400 x 400 | |
| Dedicated Monitor | HKT-5.6SA II | | | HKT-USB typeX | | HKT-USB typeXS | | HKT-5.6SA II |
| Output (Interface) | Built-in Interface (USB connection only) | HKT-USB type WS | | | HKT-DVI-720P | | HKT-USB type WS | |
| | | HKT-DVI type W II | | | HKT-DVI-720P | | HKT-DVI type W II | |
| Effective insertion length | 1m | Standard:1m | Relay cable:800mm | Standard:1m | Standard:1m MAX:6m | | Relay cable:800mm | |
| Tip hard part length | | Standard:45mm MAX:95mm(※5) (Tip φ0.98mm hard part) | Standard:100mm (Tip φ 1.3mm hard part) | standard:100mm MAX:200mm(※3) | 20mm | | 100mm only | standard:50mm MAX:200mm |
| Remarks | | Flexible type (※4) | Pen type | Flexible type (※4) | | | | |

- ※1 There are pixel defects in the CMOS Imaging Sensor. Standards of this products conform to CMOS Imaging sensor maker standards.
- ※2 This product may tilt the camera module during the manufacturing process.
There is a possibility of deviation by up to 5° (It may be 30mm away from the camera tip and 2.6mm off the center.)
Please note that due to its structure, the hard tip may be misaligned.
- ※3 The tip has a hard part with a diameter of 1.3 mm. Even when extended, the total length is 1 m. Please contact us if you require a length longer than 200 mm.
- ※4 The hard tip does not bend. ※5 Custom orders available: Minimum 20mm. ※6 Only the fiber part is completely waterproof.

Notice . . . It has sometimes "Stray Light" in Industrial Video Borescope. Please note that there is no problem with the inspection standards of semiconductor manufacturers.

φ 2.9mm ~ φ 4.6mm Industrial Borescope specification

HNL-4.6CAM90NV



| | φ 2.9mm Ultra Small Industrial Video Borescope | | | | φ 4.0mm Side View Borescope | φ 4.6mm Video Borescope | | Borescope for gas pipes |
|--------------------------------|--|-------|---------------------------|-------------------------|--|-------------------------|------------------------------------|----------------------------------|
| A | HNL-2.9CAM | | | | SDV-4.0CAM | HNL-4.6CAM | | MRU-7CAM |
| B | 35N | 35F | 120K | 120KSQ | 120T | 90N | 90F | 120SQ |
| Depth of field(mm) | 5~10 | 10~50 | 5~50 | | 5~50 | 5~10 | 10~50 | 5~100 |
| Angle of view(※2) | 35° | | 120° | | 120° | 90° | | 120° |
| Outer diameter(mm) | φ 2.9 | | | | φ 4.0 | φ 4.6 | | φ 9(with10A protector) |
| Light source | LED | | Light Guide ※3 | | LED | LED | | LED |
| Waterproof property | Drip-proof(IP53) | | | | | | | |
| Temperature resistance | 0~50°C | | | | | | | |
| Sensor(※1) | 1/10" color CMOS sensor | | | 1/18" color CMOS sensor | | 1/18" | | 1/10" |
| Effective pixels | 400 x 400 | | | 720 x 720 | 400 x 400 | | 320 x 240 | 400 x 400 |
| Output (Interface) | HKT-5.6SA II | | | | HKT-5.6SA II | | | |
| | HKT-USB type2 | | HKT-USB typeX | HKT-USB typeXS | HKT-USB typeX | | HKT-USB type2 | |
| | HKT-USB type WS | | HKT-DVI-720P | | HKT-USB type WS | | HKT-DVI typeW II | |
| C | Standard tube(Max:20m) | | K : Casing tube (1m only) | | Rigid pipe (Standard:200mm Max:500mm) | | Standard tube (Max:10m) | SUS flexible tube (Standard:10m) |
| Tube options (Standard: 1m) ※2 | V : SUS Braiding coated (max 20m) | | | | H : Shape retention (Standard:200mm Max:200mm) | | V : SUS Braiding coated (max 100m) | |
| | H : Shape retaining tube (max 1m) | | | | | | | |

- ※1 There are pixel defects in the CMOS Imaging Sensor. Standards of this products conform to CMOS Imaging sensor maker standards.
- ※2 As for tube extension, the extendable length is different for each tube specification. If the length of the tube exceeds 1m(standard), it becomes a special order item. For details,please contact us.
- ※3 Fiber Optic Light Guide (with light modulation function).

Notice . . . It has sometimes "Stray Light" in Industrial Video Borescope. Please note that there is no problem with the inspection standards of semiconductor manufacturers.

φ 4.6mm ~ φ 6.0mm Industrial Borescope specification

HNL-6.0HDC140SQH



| | φ 4.6mm HD Borescope | | φ 5.0mm | φ 6.0mm FHD Borescope | | |
|----------------------------|--------------------------|----------------------------|--|--------------------------|-------------------------|----------------------------|
| | Standard tube | Tubeless specification | HD Borescope | Standard tube | Shape retaining tube | Tubeless specification |
| A | HNL-4.6HDC | | HNL-4.6HDC | HNL-6.0HDC | | |
| B | 110SQ | | 110SQST | 140SQ | | |
| Depth of field(mm) | 10~100mm | | 10~100mm | 10~100mm | | |
| Angle of view(※2) | 110° | | 110° | 140° | | |
| Outer diameter(mm) | Φ4.6mm | | Φ5.0mm | Φ6.0mm | | |
| Light source | LED | | LED | LED | | |
| Waterproof property | waterproof(IP53) | | waterproof(IP53) | waterproof(IP53) | | |
| Temperature resistance | 0~50°C | | 0~50°C | 0~50°C | | |
| Sensor(※1) | 1/11" color CMOS sensor | | 1/11" color CMOS sensor | 1/6" color CMOS sensor | | |
| Effective pixels | 1280×720 | | 1280×720 | 1920 x 1080 | | |
| Output (Interface) | HKT-DVI (for HNL-4.6HDC) | | HKT-DVI (for HNL-4.6HDC) | HKT-DVI (for HNL-6.0HDC) | | |
| Effective insertion length | standard: 1m Max: 5m ※2 | | standard: 1m Max: 5m ※2 | standard: 1m Max: 5m | standard: 1m (1m only) | standard: 1m Max: 5m |
| C Tube options | Standard tube (PE & SUS) | TL: Tubeless specification | standard: 185mm (MAX: 500mm) (Hard tip φ 5mm) ※3 | Standard tube (PE & SUS) | H: Shape retaining tube | TL: Tubeless specification |

※1 There are pixel defects in the CMOS Imaging Sensor. Standards of this products conform to CMOS Imaging sensor maker standards.

※2 Please note that for lengths of 2m or more, only USB output is available.

※3 If you require a specific length please contact us.

Note: Due to variations in the lens, stray light may occasionally occur.

Dedicated Monitor specification

| 5.6 inch TFT monitor | |
|----------------------|---|
| Model number | HKT-5.6SA II |
| Screen size | 112 × 84mm |
| Effective resolution | 640 × 3 (RGB) × 480 |
| Input (camera) | HNL-0.98CAM120SQ HNL-1.3CAM120(S) HNL-1.8CAM120 HNL-2.5CAM120 HNL-2.9 Series HNL-2.9CAM120K SDV-4.0CAM120T(H) HNL-4.6CAM Series HNL-1.8CAM120ST MRU-7CAM120SQ |
| Output | SD card, NTSC video output (excluding high-definition cameras) |
| Storage format | JPEG |
| Power | AC adapter (6V,1.8A) |
| Power (dry cell) | 4 size C batteries (3 hours in continued use)※2 |
| Unit dimension | 138×134×52mm |
| Weight (※1) | 800g |

※1 Weight when the battery is removed.

※2 We recommend rechargeable batteries or EVOLTA (manufactured by Panasonic Energy) as the recommended batteries. The continuous use time shown in the table is the time when using EVOLTA.

High-definition Interface specifications

| USB/DVI Interface for HD Borescopes | | |
|-------------------------------------|---|--------------------------|
| Model number | HKT-DVI (for HNL-4.6HDC) | HKT-DVI (for HNL-6.0HDC) |
| Input (camera) | HNL-4.6HDC Series | HNL-6.0HDC Series |
| Output Interface | ①USB output (USB2.0, UVC1.1) ②DVI output ※Alternate output | |
| Output pixels | 1280×720 | 1920×1080 |
| Output frame rate | 60fps ※1 | 30 fps |
| Power | At USB output: USB bus power At DVI output: DC6V (AC adapter) | |
| Compatible PC (program) | Windows 11 recommended "AMCap"(Viewer software) "camera" app. (in windows 11)※1 | |
| Compatible monitors | HDMI input 720P (60Hz), 1080P (30Hz) Compatible TV or monitor | |

※1 If the camera length of the HNL-4.6HDC exceeds 2m, the frame rate will be 30FPS.

Interface specifications

| Model number | USB Interface | | | | DVI Interface | |
|-------------------------|---|-------------------------------------|---------------------------------|-------------------------------------|---|--|
| | HKT-USB Type X | HKT-USB Type WS | HKT-USB Type 2 | HKT-USB Type XS | HKT-DVI Type W II | HKT-DVI-720P |
| Input (camera) | HNL-0.98CAM120SQ HNL-1.3CAM120(S) HNL-1.8CAM120 (ST) HNL-2.5CAM120 | HNL-2.9CAM120K SDV-4.0CAM120T(H) | HNL-2.9 Series MRU-7CAM120SQ | HNL-1.8CAM120SQ HNL-2.9CAM120KSQ | HNL-0.98CAM120SQ HNL-1.3CAM120(S) HNL-1.8CAM120 (ST) HNL-2.5CAM120 | HNL-2.9CAM120K SDV-4.0CAM120T(H) HNL-1.8CAM120SQ HNL-2.9CAM120KSQ |
| Output (Interface) | USB2.0 | | | | DVI output | |
| Output pixels | 400×400 | 800×800 equivalent | 400×400 | 720×720 | 800×720 equivalent | 720×720 |
| Output frame rate | 30 fps | | | | 60 fps | 60 fps |
| Power | USB bus power | | | | DC6V (AC adapter) | DC6V (AC adapter) |
| Compatible PC (program) | Windows 11 recommended (AMCap, Camera) ※1 | | | | | |
| Compatible monitors | | | | | HDMI input 720P(60Hz) Compatible TV or monitor | HDMI input 720P(60Hz) Compatible TV or monitor |

※1 The recommended application program is AMCap. However, in the case of Windows 11, it works with the built-in Windows camera app. (Still images and videos can be saved.)

SPI ENGINEERING

– Simple, Precision and Innovation –

When Video Borescope LED at the tip is used continuously at 40°C or higher,
The LED lifetime may be extremely reduced.

About electrostatic breakdown voltage
The CMOS sensor at the tip of the borescope camera is extremely sensitive to static electricity
(static electricity withstand voltage 2kV)
When handling this product, it may be necessary to take measures against static electricity,
such as static electricity removal by workers and static electricity removal in work spaces.
Please contact us for details.



CAUTION

About product dimensions (tolerance)
Actual product dimensions and catalog values may be slightly different.
Please contact us for details.

Warranty period
1 year warranty for monitor and interface.(Excludes those due to the user's responsibility)
Borescope camera is not guaranteed. (Excluding initial failure)

The specifications and appearance may change without notice.

These products are for industrial use. Please do not use these for medical.

Manufactured and Distributed by

SPI ENGINEERING Co.,Ltd.

2592-5 Inaba-Minamimata,Nagano City,
Nagano, JAPAN 380-0917

TEL : +81-26-274-5731

Fax : +81-26-274-5732

E-mail : sales@spieng.com

URL : <https://spieng.com/en/>



www.spieng.com

Authorized Dealer

