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.
Address	2592-5, Inaba-Minamimata, Nagano City, 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

SPI ENGINEERING
– Simple, Precision and Innovation –

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-hwa 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 Pvt Ltd.
Philippines	MESCO INC.
Denmark	Dana Tool A/S
France	AMBPR
Netherlands / Belgium / Luxembourg	Opticon Benelux Naarden B. V.

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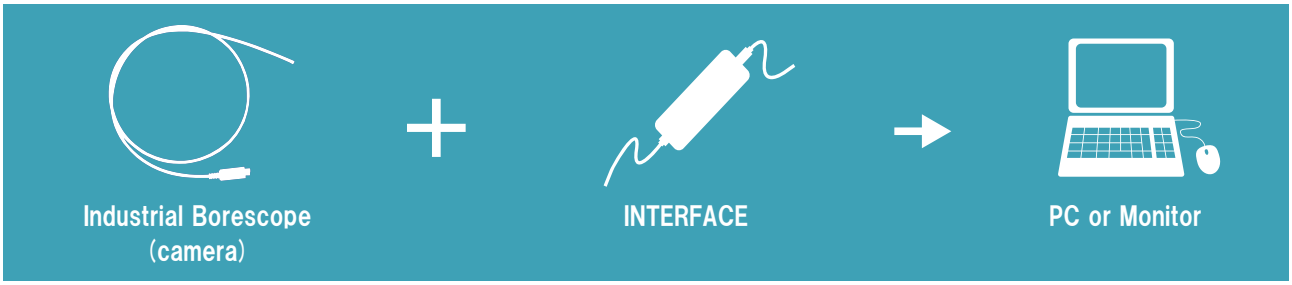
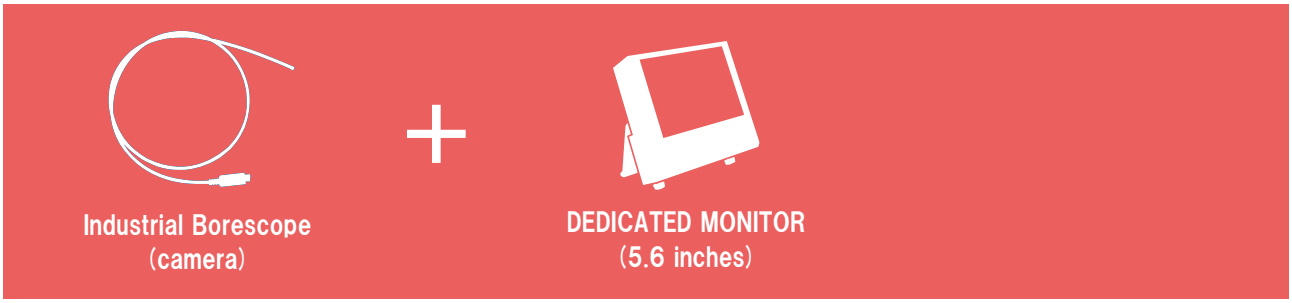
About Industrial Borescope

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.

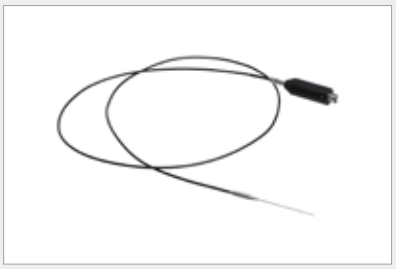
Super-Ultra Small Industrial Video Borescope

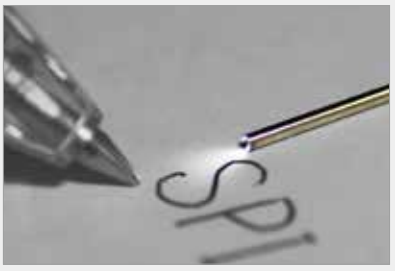
Model number : HNL-0.98CAM120 series

φ0.98mm

Equipped with wide-angle lens | With side view attachment (→P14) | Detailed specifications (→P15)

An Industrial Borescope with a tip diameter of 0.98 mm.
It is the world's thinnest image sensor type Industrial Borescope that does not use fiber (according to our research).





Super-Ultra Small Industrial Video Borescope

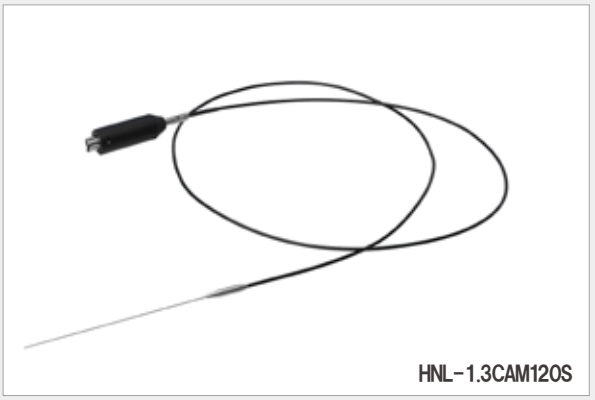
Model number : HNL-1.3CAM120

φ1.3mm

Equipped with wide-angle lens | With side view attachment (→P14) | Detailed specifications (→P15)

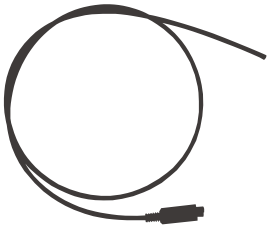
An Industrial Borescope with a tip diameter of 1.3 mm. You can inspect even small holes that could not be inserted with conventional products.

HNL-1.3CAM120



HNL-1.3CAM120S

【Variations in use】



Industrial Borescope
HNL-0.98CAM120SQ
HNL-1.3CAM120 (S)

\+ Interface HKT-USB type X (page13) → PC (USB input)

\+ Interface HKT-USB type WII (page13) (Super-resolution application version) → PC (USB input)

\+ Interface HKT-DVI type WII (page13) → TV monitor (HDMI input)

\+ 5.6" TFT Portable Monitor HKT-5.6SAII (Page12)

Super-Ultra Small Industrial Video Borescope

Model number : HNL-1.8CAM120

φ1.8mm

An Industrial Borescope with a tip diameter of 1.8 mm.
It is a high-pixel image sensor type Industrial Borescope that does not use fibers, and can be easily used anywhere with simple functions.Although it is a very small camera with a tip diameter of φ1.8 mm, it has 400 x 400 pixels and is useful for inspecting foreign substances, scratches, burrs, etc. that were difficult to find until now.

Equipped with wide-angle lens

With side view attachment(→P14)

Detailed specifications(→P15)

Super-Ultra Small Industrial Video Borescope

Model number : HNL-2.5CAM120

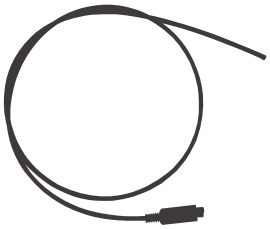
φ2.5mm

An Industrial Borescope with a tip diameter of 2.5 mm.
HNL-2.5CAM120 is an Industrial Borescope developed mainly for use in inspection lines. In addition to the shape that is easy to hold, it also comes with a ring that can fix the wire.

Equipped with wide-angle lens

Detailed specifications(→P15)

【Variations in use】



Industrial Borescope
HNL-1.8CAM120
HNL-2.5CAM120

\+ Interface HKT-USB type X (page13) → PC (USB input)

\+ Interface HKT-USB type WⅡ(page13) (Super-resolution application version) → PC (USB input)

\+ Interface HKT-DVI type WⅡ(page13) → TV monitor (HDMI input)

\+ 5.6" TFT Portable Monitor HKT-5.6SAⅡ(Page12)

Ultra Small Industrial Video Borescope

Model number : HNL-2.9CAM series

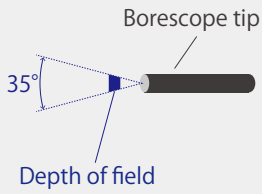
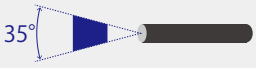
φ2.9mm

With side view attachment (→P14)

Detailed specifications (→P15)

Focal range

There are two types of models in the HNL-2.9CAM series.You can select and use the camera with the best focus for the work from the one that focuses close (N) and the one that focuses far (F).

Model number	HNL-2.9 CAM35N	HNL-2.9 CAM35F
Angle of view	35°	35°
Depth of field	5mm～10mm	10mm～50mm
Image diagram		

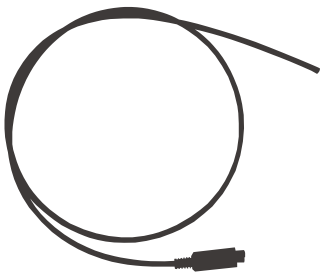
Tube variation

There are standard tub and 2 types, and you can select the material of the camera tube according to the usage environment.

SUS blade coating specifications (V type)

Shape retention tube specifications (H type)

【Variations in use】



Industrial Borescope
HNL-2.9CAM series

＋

Interface
HKT-USB type X（page13）

→

PC
（USB input）

＋

5.6" TFT Portable Monitor
HKT-5.6SAII（Page12）

Ultra Small Industrial Video Borescope

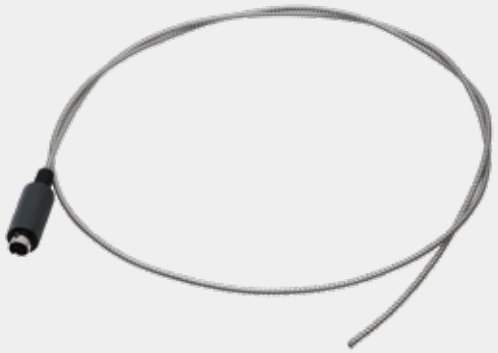
Model number : HNL-2.9CAM120K

φ2.9mm

Equipped with wide-angle lens

With side view attachment (→P14)

Detailed specifications (→P15)

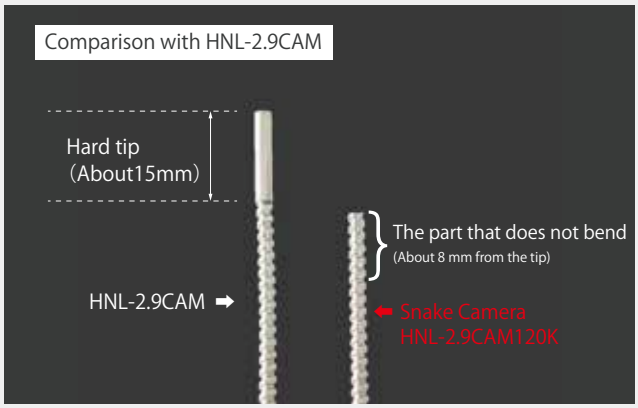


Borescope with a short hard tip

HNL-2.9CAM120K (Snake Camera)

The hard tip is short, making it easier to insert into a bent workpiece than other borescope cameras. In addition, the light source at the tip of the camera is equipped with an optical fiber light guide to achieve brighter illumination than our HNL2.9CAM borescope of the same diameter.

CAUTION
- Please refrain from sharp bending of R30mm or less.
- When the inside of the work is bent at a right angle
- If the surface is uneven, it may not be possible to insert the borescope.



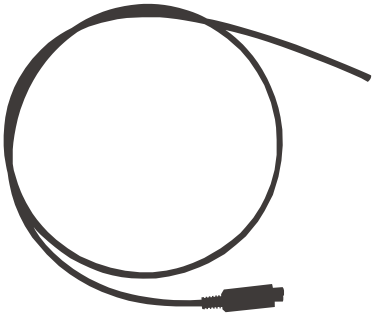
Snake Camera Protector

Protects the tip of the Borescope Camera.

It is especially recommended when the borescope is used frequently and the tip is scraped.

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

【Variations in use】



Industrial Borescope
HNL-2.9CAM120K

\+ Interface HKT-USB type X (page13) → PC (USB input)

\+ Interface HKT-USB type WII (page13) (Super-resolution application version) → PC (USB input)

\+ Interface HKT-DVI type WII (page13) → TV monitor (HDMI input)

\+ 5.6" TFT Portable Monitor HKT-5.6SAII (Page12)

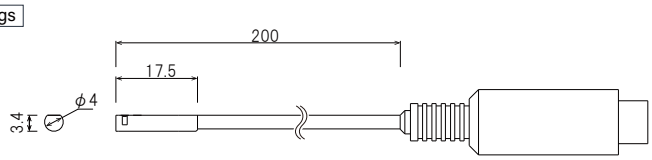
Side View Camera

Model number：SDV-4.0CAM120

ϕ4.0mm

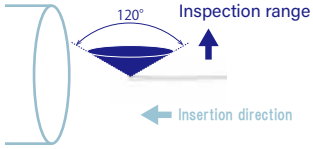
A side-view camera that you can see the side with respect to the insertion direction. You can choose from two types：rigid pipe specifications that do not bend and shape retention specifications that bend.

Drawings

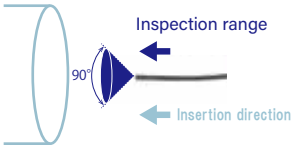


Specification

Side View Camera：SDV-4.0CAM120(H)
Angle of view 120°



HNL-4.6 CAM90N
Angle of view 90°

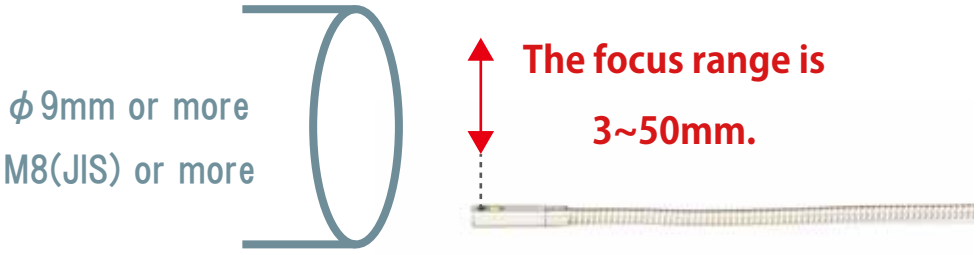


Selectable from 2 types of specifications according to the application

SDV-4.0CAM120 rigid pipe specifications
(Non-flexible)

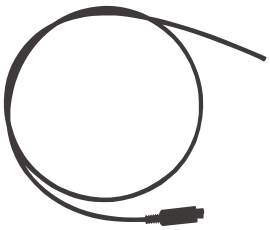
SDV-4.0CAM120H shape retention specifications
(Flexible)

The standard holes for which SDV-4.0CAM120(H) can be used are φ9 mm or more and M8 or more.



If the hole to be inserted is too large or too small, you will not get a clear image.

【使用バリエーション】



側視カメラ：SDV-4.0CAM120(H)

＋ インターフェース
HKT-USB type X（13 ページ）
→ お持ちの PC
（USB 入力）

＋ インターフェース
HKT-USB type WⅡ（13 ページ）
（超解像適用版）
→ お持ちの PC
（USB 入力）

＋ インターフェース
HKT-DVI type WⅡ（13 ページ）
→ お持ちのモニタ
（HDMI 入力）

＋ 5.6 インチ液晶モニタ
HKT-5.6SAⅡ（12 ページ）

Industrial Video Borescope

Model number : HNL-4.6CAM series

ϕ4.6 mm

With side view attachment (→P14)

Detailed specifications (→P15)

Depth of field

There are two models in the HNL-4.6CAM series.You can select and use the Borescope camera with the best focus for the work from the one that focuses near (N) and the one that focuses far (F).

Model No.	HNL-4.6 CAM90N	HNL-4.6 CAM90F
Angle of view	90°	90°
Depth of field	5mm～10mm	10mm～50mm

Tube variation

There are standard tub and V type, and you can select the material of the camera tube according to the usage environment. V type has better wear resistance than standard tube.

SUS blade coating
(V type)

【Variations in use】

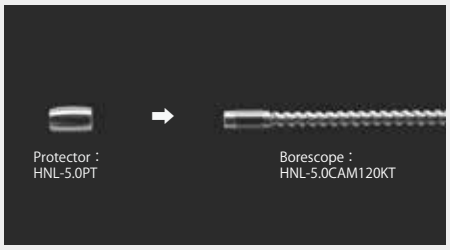
5.6" TFT Portable Monitor
HKT-5.6SA II (Page12)

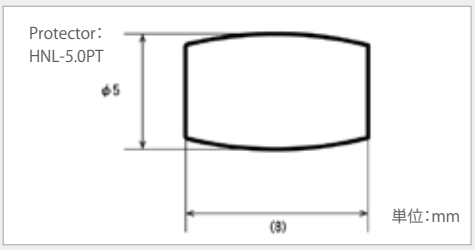
Industrial Video Borescope

Model number : HNL-5.0CAM120KT

ϕ5.0 mm

This is an Industrial borescope that can be fitted with a protector.





【Variations in use】

Interface
HKT-USB type X (page13)

Interface
HKT-USB type W II (page13)
(Super-resolution application version)

Interface
HKT-DVI type W II (page13)

5.6" TFT Portable Monitor
HKT-5.6SA II (Page12)

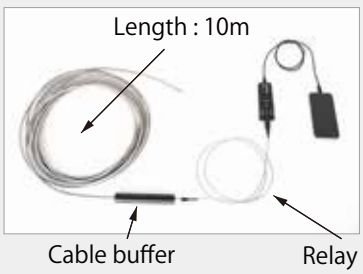
Industrial Video Borescope

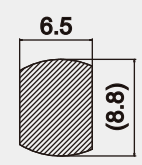
Model number : MRU-7CAM120SQ

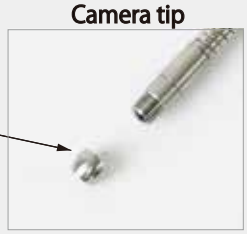
ϕ9mm

(When a 10A protector is attached to the tip)

Standard long camera with protector







【Variations in use】

Interface
HKT-USB type 2 (page13)

5.6" TFT Portable Monitor
HKT-5.6SA II (Page12)

High-Definition Industrial Video Borescope

Model number : HNL-4.6HDC110SQ

φ4.6mm

Equipped with wide-angle lens | With side view attachment (→P14) | Specifications (→P16)

1 million pixels (HD)

Tip diameter : 4.6 mm

The high-definition Borescopes (HNL-4.6HDC series) are Industrial Borescope that has 1 million pixels (720 pixels in height and 1280 pixels in width) while having a diameter of φ4.6 mm at the tip of the Borescope.

You can choose from two specifications, standard tube specifications and tubeless specifications, according to the work you want to see. You can easily check the video on your PC or TV.

Full High-Definition Industrial Video Borescope

Model number : HNL-6.0HDC

φ6.0mm

Equipped with wide-angle lens | With side view attachment (→P14) | Specifications (→P16)

2 million pixels (FHD)

Tip diameter : 6.0 mm

Full HD Borescopes (HNL-6.0HDC series) are industrial Borescopes that display 2 million pixels (constant 1080 pixels, horizontal 1920 pixels) CMOS pixels.

High-definition Borescopes have about 12 times as many pixels as conventional Borescopes (compared to our company), so you don't have to worry about the roughness of the image even if you enlarge or print it.Furthermore, because it uses a wide-angle lens, it is possible to observe the entire subject in detail while projecting it on a large screen.

Tube variation

Standard tube specifications (PE coated tube)
HNL-6.0HDC140SQ

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.

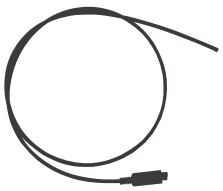
Shape retention specifications
HNL-6.0HDC140SQ H

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.

【Variations in use】



Industrial Borescope
HNL-4.6HDC series
HNL-6.0HDC series

+

Interface
HKT-DVI (for 4.6HDC)
HKT-DVI (for 6.0HDC)
(Page 13)

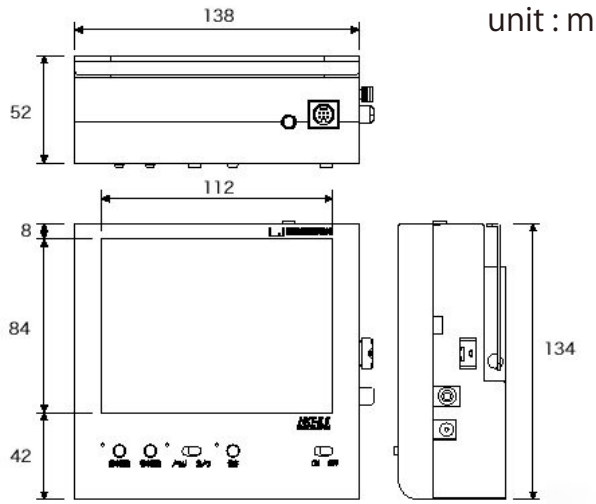
PC
(USB input)

Monitor
(HDMI input)

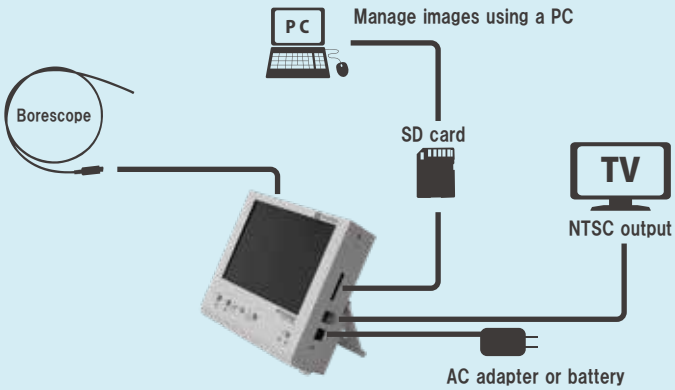
Borescope Dedicated Monitor

Model number : HKT-5.6SA II

Detailed specifications (→P14)



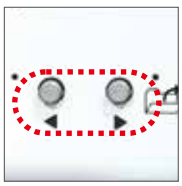
It is a dedicated monitor for industrial endoscopes.
It is compatible with all cameras except high-definition cameras.
It comes with an image saving function, allowing you to save and review images instantly on-site with the endoscope.
The images are saved in JPEG format on an SD card, making it easy to manage them on a computer.
For power supply, it is equipped with a battery holder in addition to an AC adapter, allowing it to be used even in outdoor or electricity-free locations.



Common 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.



5.6″

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.

User-replaceable battery operations

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

5.6″

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.

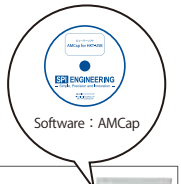
SD card

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.

USB Interface

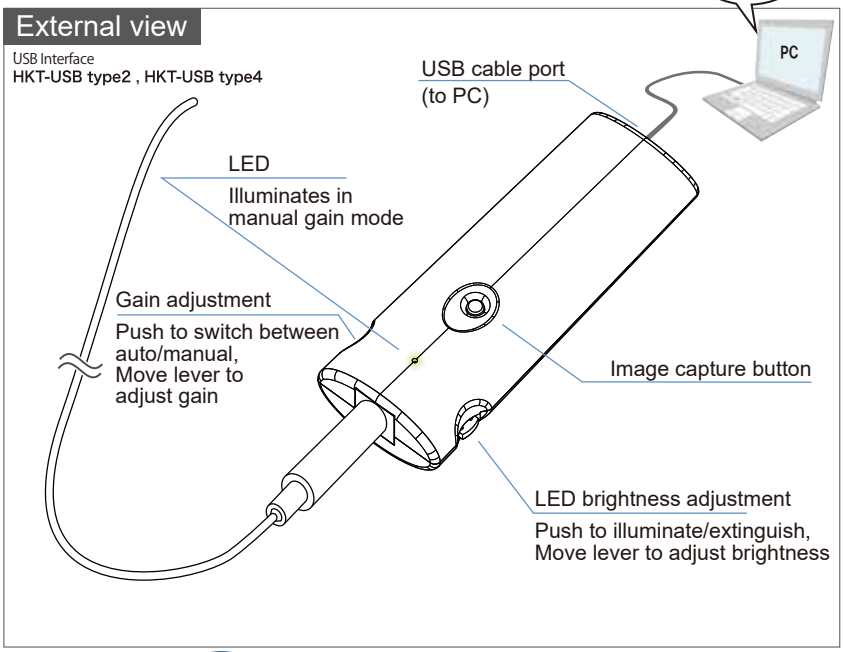
Model number : HKT-USB type2 , HKT-USB typeX , HKT-USB typeW II



Detailed specifications (→P16)

Can be connected to your PC (Windows 10 recommended)
(not compatible with Macintosh)
Equipped with image save (capture) function
Switchable between auto gain and manual gain
(Effective for subjects that are prone to halation)
Equipped with LED lighting dimming function
Movable tip industrial endoscope can also be connected.

External view



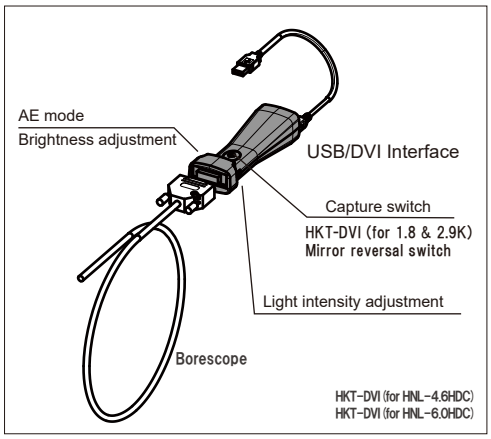
AMCap for HKT-USB
When connecting an industrial borescope to a PC,
the viewer software to be used.

USB/DVI Interface

Model number : HKT-DVI typeW II[※1], HKT-DVI (for HNL-4.6HDC)[※2], HKT-DVI (for HNL-6.0HDC)

※1・・・HKT-DVI type W II only supports DVI output.
※2・・・If the camera length of the HNL-4.6HDC exceeds 2m,
the DVI output will be limited to 30 FPS.

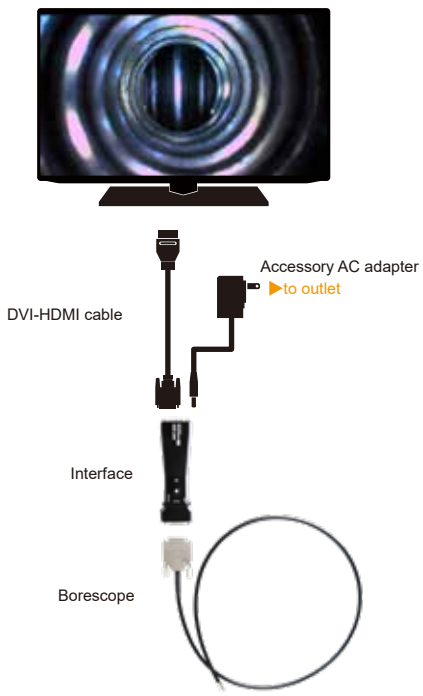
Detailed specifications (→P16)



By operating the USB / DVI interface (HKT-DVI),
you can adjust the brightness and brightness of
the image and save the still image.

【connect to PC】

【connect to television】

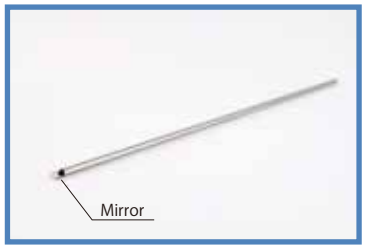


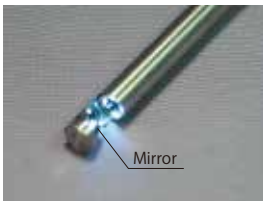
Camera Attachment

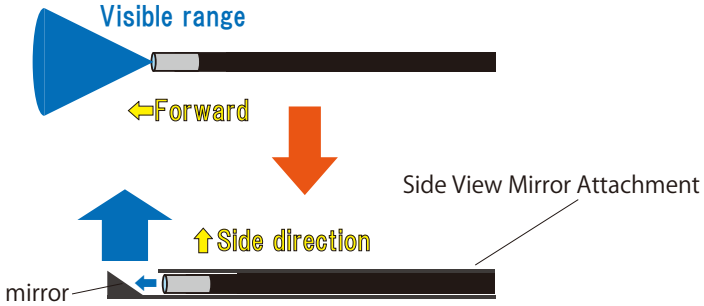
※The presence or absence of each attachment differs depending on the model of the borescope.
Please check in advance if necessary.

• Side View Mirror Attachment

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

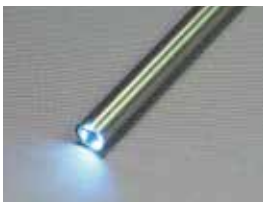


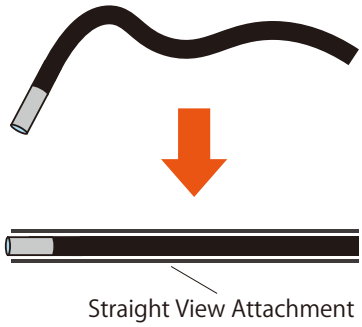




• Straight view Attachment

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





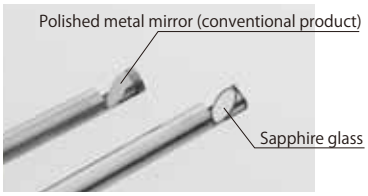
We accept mirror replacement repair. ※1

Please contact us for details.

※1･･･Models are limited to φ2.9mm side view or φ4.6mm side view.

φ2.9mm side view attachment：HNL-2.9S9D-G
φ4.6mm side view attachment：HNL-4.6S9D-G

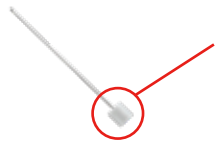
The above is a sapphire glass specification.
Compared to polished metal mirrors, it is less likely to get scratched.



Side View Mirror Attachment・Straight View Attachment specification

Specifications are subject to change without notice for improvement.
This product is for industrial use. Please do not use it for medical purposes.

HNL-4.6S9D200
A B



Standard products for HNL-2.9CAM, HNL-4.6CAM, and HNL-6.0CAM Comes with a handle.

		Side View Mirror Attachment						
		For HNL-0.95CAM	For HNL-1.3CAM	For HNL-1.8CAM	For HNL-2.9CAM		For HNL-4.6CAM	For HNL-6.0CAM
		90° Side View	90° Side View	90° Side View	90° Side View	60° Side View	90° Side View	90° Side View
A		HNL-0.98SDV	HNL-1.3SDV	HNL-1.8SDV	HNL-2.9S9D-G	HNL-2.9S6D	HNL-4.6S9D-G	HNL-6.0SDV
B	Full length	40mm (Max : 95mm)	95mm	100mm (Max : 300mm)	200mm (Max : 500mm)		200mm (Max : 500mm)	200mm (Max : 500mm)
	Outer diameter	φ1.2mm	φ1.6mm	φ2.2mm	φ3.2mm		φ5.2mm	φ6.5mm

HNL-4.6STV200
A B

		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	φ2.2mm	φ3.2mm	φ5.2mm	φ6.5mm

ϕ0.98mm～ϕ2.5mm Borescope specification

Specifications are subject to change without notice for improvement.
This product is for industrial use. Please do not use it for medical purposes.

HNL-1.3CAM120

A

		Industrial Borescope ϕ0.98mm	Industrial Borescope ϕ1.3mm		Industrial Borescope ϕ1.8mm	Industrial Borescope ϕ2.5mm
A		HNL-0.98CAM120SQ	HNL-1.3CAM120	HNL-1.3CAM120S	HNL-1.8CAM120	HNL-2.5CAM120
	Depth of field(mm)	3～30			3～50	
	Angle of view（※2）	120°				
	Outer diameter(mm)	φ0.98	φ1.3		φ1.8	φ2.5
	Light source	Fiber Optic Light Guide (with light modulation function).				
	Waterpoof propety	Drip-proof(IP53)				
	Temperature resistance	0～50℃				
	Sensor（※1）	1/36" color CMOS sensor			1/18" color CMOS sensor	
	Effective pixels	400 x 400				
	Dedicated Monitor	HKT-5.6SA Ⅱ				
	Output (Interface)	HKT-USB typeX				
		HKT-USB type W Ⅱ				
		HKT-DVI type W Ⅱ				
	Effective insertion length	Standard：1m	Relay cable：800mm	Standard：1m	Standard：1m Max：6m	Relay cable：800mm
	Tip hard part length	Standard：45mm (Tip ϕ0.98mm hard part)	Standard：100mm (Tip ϕ1.3mm hard part)		20mm	Standard：50mm Max：200mm
	Remarks	Flexible type (※3)	Pen type	S:Flexible type (※3)		with handle

※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.)

※3 Tip φ0.95mm Hard part does not bend.

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

ϕ2.9mm～ϕ4.6mm Borescope specification

Specifications are subject to change without notice for improvement.
This product is for industrial use. Please do not use it for medical purposes.

HNL-4.6CAM90NV

A B C
(When selecting an option)

		Small Borescope φ2.9mm			Side View Camera φ4.0mm	Borescope φ4.6mm		Borescope φ5.0mm	Borescope for gas pipes
A		HNL-2.9CAM			SDV-4.0CAM	HNL-4.6CAM		HNL-5.0CAM	MRU-7CAM
B		35N	35F	120K	120	90N	90F	120KT	120SQ
	Depth of field(mm)	5～10	10～50	3～50	3～50	5～10	10～50	3～50	5～100
	Angle of view	35°		120°	120°	90°		120°	120°
	Outer diameter(mm)	φ2.9			φ4.0	φ4.6		φ5	φ9(with 10A Protector)
	Light source	LED		Light Guide※3	LED	LED		Light Guide※3	LED
	Waterpoof propety	Drip-proof(IP53)							
	Temperature resistance	0～50℃							
	Sensor	1/10" color CMOS sensor		1/18" color CMOS sensor		1/18" color CMOS sensor		1/18" color CMOS sensor	1/10" color CMOS sensor
	Effective pixels(※1)	400 x 400			400 x 400	320 x 240		400 x 400	400 x 400
	Output	HKT-5.6SA II							
		HKT-USB type2		HKT-USB typeX				HKT-USB type X	HKT-USB type2
				HKT-USB type W II				HKT-USB type W II	
				HKT-DVI typeW II				HKT-DVI typeW II	
C	Tube option ※2 (standard：1m)	Standard tube(Max：20m)		K：Casing tube (1m only)	Rigid pipe (Standard：200mm Max：200mm)	Standard tube（Max：10m）		KT：Casing tube (1m only)	SUS flexible tube (Standard：10m)
		V：SUS Braiding coated (max 20m)			H：Shape retention (Standard：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.

φ4.6mm / φ6.0mm High-Definition Borescope specification

Specifications are subject to change without notice for improvement.
This product is for industrial use. Please do not use it for medical purposes.

HNL-6.0HDC140SQH
A B C
(When selecting an option)

		High Definition Borescope φ4.6mm		Full High Definition Borescope φ6.0mm		
		Standard tube	Tubeless specification	Standard tube	Shape retaining tube	Tubeless specification
A		HNL-4.6HDC		HNL-6.0HDC		
B		110SQ		140SQ		
	Depth of field(mm)	5～100㎜		10～100㎜		
	Angle of view	110°		140°		
	Outer diameter(mm)	φ4.6㎜		φ6.0㎜		
	Light source	LED		LED		
	Waterpoof propety	waterproof(IP53)		waterproof(IP53)		
	Temperature resistance	0～50℃		0～50℃		
	Sensor ※1	1/11" color CMOS sensor		1/6" color CMOS sensor		
	Effective pixels	1280×720p		1920 x 1080p		
	Supported interface	HKT-DVI (for HNL-4.6HDC)		HKT-DVI (for HNL-6.0HDC)		
	Effective length	Standard：1m Max：5m		Standard：1m Max：5m	Standard：1m (1m only)	Standard：1m Max：5m
C	Tube option	Standard tube	TL : Tubeless specification	Standard tube	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･･･2m or more is USB output only. Please note.

Notice ･ ･ ･ It has sometimes "Stray Light" in this products
Please note that there is no problem with the inspection standards of semiconductor manufacturers.

Dedicated Monitor specification

Specifications are subject to change without notice for improvement.
This product is for industrial use. Please do not use it for medical purposes.

	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-4.0CAM120 HNL-4.6CAM series	HNL-5.0CAM120KT MRU-7CAM120SQ
Output	SD card, NTSC video output		
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.

Interface specification

Specifications are subject to change without notice for improvement.
This product is for industrial use. Please do not use it for medical purposes.

	USB Interface			DVI Interface	For High-Definition Borescope USB/DVI Interface	
Model number	HKT-USB type X	HKT-USB type W Ⅱ	HKT-USB type 2	HKT-DVI type W Ⅱ	HKT-DVI (for HNL-4.6HDC)	HKT-DVI (for HNL-6.0HDC)
Input (camera)	HNL-0.98CAM120SQ HNL-1.3CAM120(S) HNL-1.8CAM120 HNL-2.5CAM120	HNL-2.9CAM120K SDV-4.0CAM120 HNL-5.0CAM120KT	HNL-2.9 series MRU-7CAM120SQ	HNL-0.98CAM120SQ HNL-1.3CAM120(S) HNL-1.8CAM120 HNL-2.5CAM120 HNL-2.9CAM120K SDV-4.0CAM120 HNL-5.0CAM120KT	HNL-4.6HDC series	HNL-6.0HDC series
Output interface	USB2.0			DVI output	①USB output (USB2.0, UVC1.1) ②DVI output ※Alternate output	
Output pixels	400×400	800 x 800 equivalent	400×400	800×720	1280×720	1920×1080
Output frame rate	30 fps			60 fps	60fps ※2	30 fps
Power Unit	USB bus power			DC6V (AC adapter)	At USB output: USB bus power At DVI output: DC6V (AC adapter)	
Compatible PC (program)	Windows 10 recommended (AMCap(Viewer software) / "camera" app. (in windows 10)) ※1				Windows 10 recommended AMCap(Viewer software) "camera" app. (in windows 10)※1	
Compatible monitors				HDMI input 720P (60Hz) Compatible TV or monitor	HDMI input 720P (60Hz), 1080P (30Hz) Compatible TV or monitor	

※1 We recommend the application program AMCap. However, in the case of Windows 10, it works with the "camera" of the standard application built into Windows. (Still images and videos can be saved)

※2･ ･ ･ If the camera length of HNL-4.6HDC is 2m or more, the DVI output will be 30FPS.

SPI ENGINEERING

— Simple, Precision and Innovation —

CAUTION

- When Video Borescope LED at the tip is used continuously at 40℃ 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.
- 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.

www.spieng.com

Manufactured and Distributed by

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