High-speed Digital Transmission Cable for Machine Vision

Overview

Oki offers a full lineup of cables for machine vision with excellent transmission performance and movement durability to support advanced image processing abilities.

In recent years, the increased use of machine vision by industrial devices has created a demand for higher speeds and precision, particularly with image transmission, and transmission methods are also quickly shifting to digital formats.

General interfaces include “Camera Link”, “IEEE1394.a/IEEE1394.b”, “Gigabit Ethernet”, and “USB3 Vision”. These interfaces offer the following benefits.

USB3 Vision

This machine vision standard uses a USB 3.0 interface. Various standards bodies, such as the AIA (US), EMVA (Europe), and JIIA (Japan), have established it as a world standard (G3). USB 3.0 is currently included on many personal computers and is expected to become a standard camera interface.

Camera Link

Currently positioned as the digital interface that can easily handle the largest volume of digital images and continues to be the default digital interface for machine vision.

IEEE1394.a, IEEE1394.b

A high-speed, general-purpose serial interface. Because an image processing system can be configured to drive multiple cameras simultaneously through a daisy chain, star, or mixed configuration using bus connections, applications and uses that utilize the extensibility are expected.

Gigabit Ethernet

This interface based on conventional Ethernet technology has been standardized for machine vision of technical and industrial devices, industrial robots, and other devices, and its market is expected to increase rapidly in the future.

Oki has successively supported these machine vision digital interfaces and is also working to develop and commoditize products specialized for FA applications, particularly those that have advanced bending characteristics and durability.

Oki machine vision digital interface cables

These cables have excellent transmission and noise-proof properties, as well is being strongly resistant to bending.
They have great benefits as the "arteries of image processing" that support machine vision.

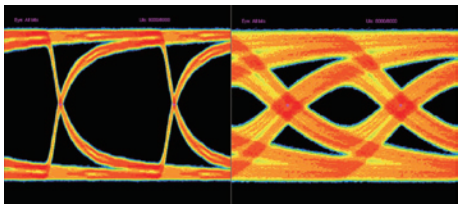
Excellent transmission characteristics

Our unique uniform construction and materials offer:

- Low attenuation / low crosstalk / low skew
- Uniform characteristic impedance lengthwise
- Transmission distance extension to exceed standards

(*Clean Eye* Camera Link cable, 1394a long cable series, 1394B L series)

Transmission eye pattern of 400 Mbps

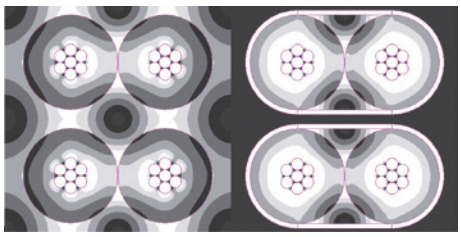


(OKI product) (Competing product)

Strong noise-proof properties

Plastic tape with a metal coating to shield the interior and the braided wire inside the cable both shield the entire cable.
This configuration also improves shielding against noise.

Effect of internal shielding
(electromagnetic field simulation)

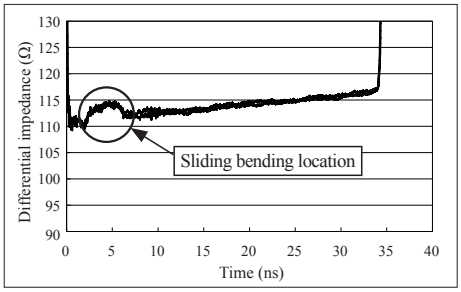


(No) (Yes)

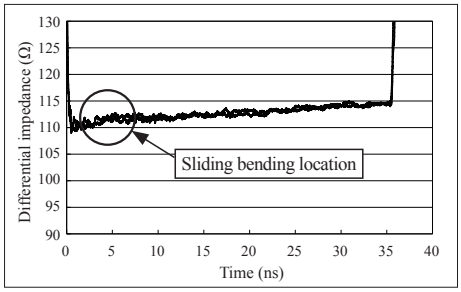
Strong durability against movement

Oki performs its own unique durability testing and quality evaluations on cables for moving parts, which require strong durability. These cables are very durability against bending and twisting. Even with use in moving parts, disconnections are rare, and there is little fluctuation in characteristic impedance. This durability enables high-grade image-signal transmission.

(Evaluation example) Fluctuation in differential impedance after 1 million sliding motions



(Standard item)



(Sliding-bending compliant item)

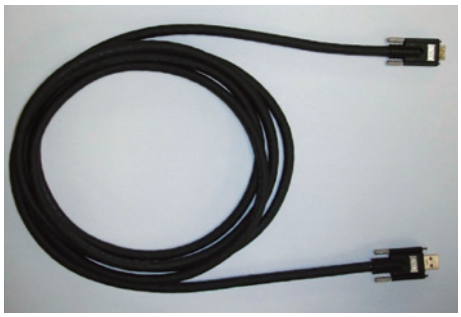
USB3 Vision cable

USB3 Vision flexible cable

RoHS compliant

UL 758 Style 20276 80˚C 30 V

This highly durable cable complies with USB3 Vision standards. It realizes both a high-speed transmission of 5 Gbps and high-grade durability against movement.



Features

- Durable enough for up to 1 million movements.
- The screw-lock connector complies with USB3 Vision standards and ensures highly reliable connections.
- Optimal for moving-part applications housed and used in cable pairs.
- Compliant with the RoHS directive.

Display of product names

USB3–KR1- (1) - (2) - (3)

(1): Board-side connector. (See the chart to the right.)
(2): Camera-side connector. (See the chart to the right.)
(3): Cable length (m)
Symbol examples: 1 m: 010
1.5 m: 015
3 m: 030

Connector symbol

	Connector type	Connector symbol
(1) Board side	Standard A (without screw)	A
	Standard A (with screw)	AS
(2) Camera side	Standard B	B
	Micro B (without screw)	MB
	Micro B (with screw)	MBS

Specifications

Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	Oil-proof PVC
	Color	Black
	Outer diameter	Standard 8.2 mm
	Flame retardant	VW-1
Complete product	Cable length	Max. 3 m Note 1
	Connector type	Standard A (with/without screw) Standard B Micro B (with/without screw)
	Connector color	Black

Note 1. Transmission distance (cable length) due to USB 3.0 standards.
Consult us for lengths that exceed the standard.

Performance

Transmission distance	Max. 3 m Note 1
Transfer speed (Gbps)	Max. 5
Mobility	Sliding bending: 1 million times or more Note 2 Bend radius R: 100 mm

Note 2. Under Oki test conditions and methods. For details, see page 3.
Furthermore, the values here are for reference only and are not guaranteed values.

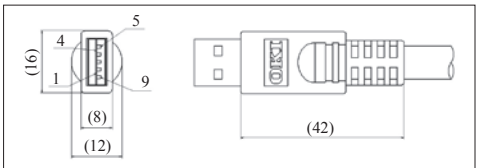
Usage environment

Operation temperature range	-10 to 80˚C
Application location	Fixed or moving part
Minimum bend radius (Recommended value) Note 3	Fixed: 35 mm or more Mobile: 100 mm or more

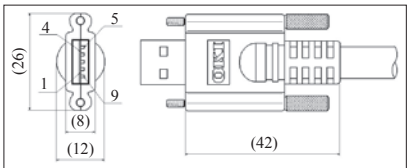
Note 3. The minimum bend radius is the recommended value for stable use.

Overview diagram

[Board side]

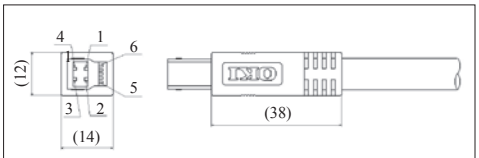


Standard A (without screw) [mm]

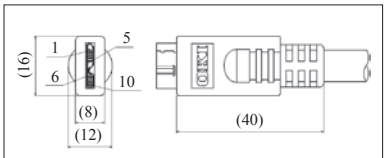


Standard A (with screw) [mm]

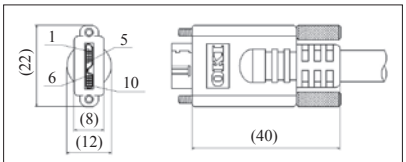
[Camera side]



Standard B [mm]



Micro B without screw [mm]



Micro B with screw [mm]

USB3 Vision active optical cable (AOC)

All-quartz | Indoor | Movable | RoHS

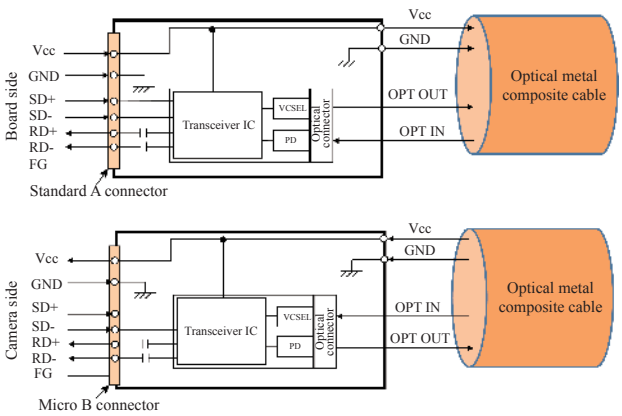
Simply replacing an existing USB 3.0 interface cable with this product provides an active optical cable (AOC) capable of high-speed communication of up to 5 Gbps and a maximum distance of 20 m. The cable contains a high-speed circuit board that converts electrical signals to optical signals in the connector, and signal transmission is carried out over optical fiber. The cable also contains a metal feeder wire, which makes it optimal for small instruments that cannot accept power from external sources.

Important) This cable cannot be used with models that require compatibility with USB 2.0 as there is no USB 2.0 line.

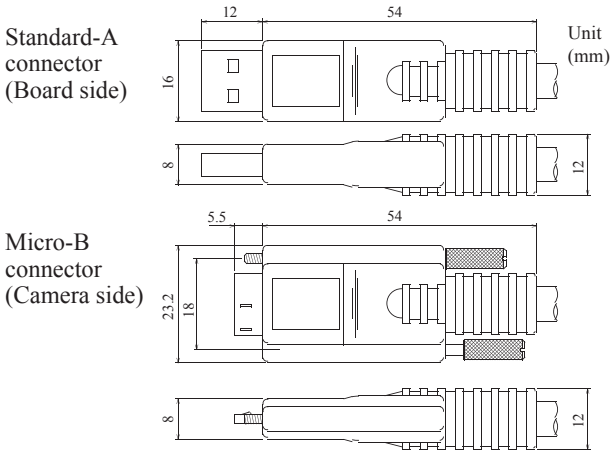
Features

- Maximum transmission distance of 20 m (3 m for a standard USB 3.0 cable).
- Maximum high-speed transmission of 5 Gbps.
- Sliding bending performance: 1 million times or more.*1
- Signal transmission is carried out over optical fiber resistant to noise.
- The compact design embeds an electric/optical conversion module in the connector. A feeder wire is also embedded, so an external power source is not required.

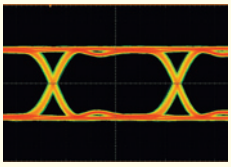
Block diagram



Connector-shape dimension diagram



Main specifications

Item	Specifications	Notes
Interface standard	USB3 Vision	Super Speed only
Transmission speed	Max. 5 Gbps	Theoretical value
Power source	5 ±0.25 V	Power supplied from USB 3.0 port (External power source not required)
Consumption	Maximum 100 mA (both ends)	
Cable length	Max. 20 m	
Cable outer diameter	φ7 mm	Outer coating: PVC; color: orange
Sliding bending characteristics	100 million times or more*1	Bend radius R=70 mm*1
Signal transmission medium	GI50/125 optical fiber	
Operation temperature range	-10 to 70˚C	
Connector	USB3.0 Standard-A ⇔ USB3.0 Micro-B (Without fixing screw) (With fixing screw)	
Eye pattern (3 Gbps)		

*1 These are actual values under our testing conditions and not guaranteed values.

Camera Link cable

CL-＊＊series

Line-up

● Selection conditions

Configuration				Wiring part		PoCL support		Series name	Cable type		Manufacturing compatible connector*									Cable length**	Directionality	Standard cable outer diameter mm	Standard cable color
											MDR			SDR 26-pin					SDR 14-pin					
Full	Medium	Base	PoCL-Lite	Fixed	Sliding Bending	Yes	No		Features	Symbol	Straight	Right angle Up	Right angle Down	Straight	Right angle Up	Right angle Down	Right angle Left	Right angle Right	Straight				
○	○	○	–	○	–	○	○	CL-H series	Standard cable	H	○ (Beige)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	1-15m	No	8.9	Beige
–	○	○	–	○	–	○	○	CL-S series	Small-diameter cable	S	○ (Beige)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	1-10m	Yes	7.5	Beige
○	○	○	–	○	○	○	○	CL-KH series	Standard/high-grade sliding cable	KH	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	1-10m	No	9.3	Black
–	○	○	–	○	○	○	○	CL-K series	High-grade-sliding compatible cable	K	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	1-10m	Yes	8.0	Black
–	○	○	–	○	○	○	○	CL-KS series	Low-skew, high-grade sliding cable	KS	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	1-10m	Yes	9.0	Black
○	○	○	–	○	–	○	○	CL-STH series	Ultra-small diameter cable	STH	–	–	–	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	1-4m	No	5.1	Black
–	–	–	○	○	–	○	–	CL-LS series	PoCL-Lite	LS	–	–	–	○ (Black)	–	–	–	–	○ (Black)	1-5m	Yes	6.1	Beige
–	–	–	○	○	○	○	–	CL-LK series	High-grade sliding, PoCL-Lite cable	LK	–	–	–	○ (Black)	–	–	–	–	○ (Black)	1-4m	Yes	6.7	Black
○	–	–	–	○	–	○	○	*Clean Eye* Camera Link cable	Low-skew extension cable (with repeater)	HC	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	10-20m	Yes	8.7	Beige
–	○	○	–	○	○	○	○		Low-skew, high-grade sliding cable (with repeater)	KS	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	○ (Black)	–	–	–	10-20m	Yes	9.0	Black

*For details of compatible connectors, see pages 14 and 15.
**The standard cable length range of items manufactured with connectors. Please consult us for longer lengths.
***Parentheses () indicate the connector color.

Display of product names

[CL-H/CL-S/CL-KH/CL-K/CL-KS/CL-STH/CL-LS/CL-LK series]

CL - (1) - (2) - P - (3)

- (3): Cable length symbol
- P: PoCL: P*; non-PoCL: no indication
- (2): Connector combination symbol
- (1): Cable type symbol (H/S/KH/K/KS/STH/LS/LK)

*Only low-skew, high-grade sliding cables (CL-KS series) support both PoCL and non-PoCL, but the cable supports both PoCL and non-PoCL.

[*Clean Eye* Camera Link cable]

CL - (1) - (2) - P EX F - (3)

- (3): Cable length symbol
- F: Full configuration item: F
- Base/medium configuration item: no indication
- EX: *Clean Eye* repeater unit symbol: EX
- P: PoCL: P*; non-PoCL: no indication
- (2): Connector combination symbol
- (1): Cable type symbol (HC/KS)

(1) Cable type symbol

Symbol	Meaning
H	Standard cable
S	Small-diameter cable
KH	Standard/high-grade sliding cable
K	High-grade-sliding compatible cable
KS	Low-skew, high-grade sliding cable
STH	Ultra-small diameter cable
LS	PoCL-Lite compatible cable
LK	High-grade-sliding, PoCL-Lite compatible cable
HC	Low-skew extension cable
KS	Low-skew, high-grade sliding cable (with repeater)

(2) Connector combination symbol

Frame grabber side / Camera side	MDR Straight	MDR Right angle Up	MDR Right angle Down	SDR 26-pin Straight	SDR 26-pin Right angle Up	SDR 26-pin Right angle Down	SDR 26-pin Right angle Left	SDR 26-pin Right angle Right	SDR 14-pin Straight
MDR Straight	MM	MM2(MU)	MM2(MD)	MS2 or SM*	MS2(SU)	MS2(SD)	–	–	–
MDR Right angle Up	MM(MU)	MM(MU/MU)	MM(MD/MU)	MS2(MU) or SM(MU)*	MS2(SU/MU)	MS2(SD/MU)	–	–	–
MDR Right angle Down	MM(MD)	MM(MU/MD)	MM(MD/MD)	MS2(MD) or SM(MD)*	MS2(SU/MD)	MS2(SD/MD)	–	–	–
SDR 26-pin Straight	MS	MS(MU)	MS(MD)	SS	SS2(SU)	SS2(SD)	SS2(SL)	SS2(SR)	SL2
SDR 26-pin Right angle Up	MS(SU)	MS(MU/SU)	MS(MD/SU)	SS(SU)	SS(SU/SU)	SS(SD/SU)	–	–	–
SDR 26-pin Right angle Down	MS(SD)	MS(MU/SD)	MS(MD/SD)	SS(SD)	SS(SU/SD)	SS(SD/SD)	–	–	–
SDR 26-pin Right angle Left	–	–	–	SS(SL)	–	–	–	–	–
SDR 26-pin Right angle Right	–	–	–	SS(SR)	–	–	–	–	–
SDR 14-pin Straight	–	–	–	SL	–	–	–	–	LL

*"SM", "SM(MU)", and "SM(MD)" apply to *Clean Eye* Camera Link cables only.

(3) Cable length symbol (Example)

Symbol	Cable length
010	1m
020	2m
030	3m
050	5m
070	7m
100	10m
120	12m
130	13m
140	14m
150	15m
200	20m

Camera Link cable

CL-H series

Full | Medium | Base | Fixed part

Features

A general standard cable.
Can be used in a wide range of configurations from full configuration to base configuration.

Name

PoCL type: CL -H - (2) -P - (3)
Non-PoCL type: CL -H - (2) - (3)
(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19) Note 1

Note 1. In the case of PoCL, the cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	PoCL type	Non-PoCL type
Cable	UL	UL 758 Style 20276	
	Rated temp./volt.	80˚C / 30 V	
	Sheath material	PVC	
	Color	Beige	
	Outer diameter	Standard 8.9 mm	
	Flame retardant	VW-1	
Complete product	PoCL	Supported	Not Supported
	Connector type	MDR or SDR (26-pin)	
	Connector color	See Line-up table (page 18)	

Performance

Transmission distance (guideline)	15 m (at 66 MHz)
Skew [ps/m]	35 or less

Usage environment

Application location	Fixed part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) Note 2	40 mm or more

Note 2. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-S series

Medium | Base | Fixed part

Features

A small-diameter cable.
Can be used in medium and base configurations.

Name

PoCL type: CL -S - (2) -P - (3)
Non-PoCL type: CL -S - (2) - (3)
(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19) Note 1

Note 1. In the case of PoCL, the cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	PoCL type	Non-PoCL type
Cable	UL	UL 758 Style 20276	
	Rated temp./volt.	80˚C / 30 V	
	Sheath material	PVC	
	Color	Beige	
	Outer diameter	Standard 7.5 mm	
	Flame retardant	VW-1	
Complete product	PoCL	Supported	Not Supported
	Connector type	MDR or SDR (26-pin)	
	Connector color	See Line-up table (page 18)	

Performance

Transmission distance (guideline)	10 m (at 66 MHz)
Skew [ps/m]	50 or less

Usage environment

Application location	Fixed part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) Note 2	30 mm or more

Note 2. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-KH series

Full | Medium | Base | Fixed part | Moving part

Features

Supports moving parts.
Can be used in a wide range of configurations from full configuration to base configuration.

Name

PoCL type: CL -KH - (2) -P - (3)
Non-PoCL type: CL -KH - (2) - (3)
(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19)[Note 1]

Note 1. In the case of PoCL, the cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	PoCL type	Non-PoCL type
Cable	UL	UL 758 Style 20276	
	Rated temp./volt.	80˚C / 30 V	
	Sheath material	PVC	
	Color	Black	
	Outer diameter	Standard 9.3 mm	
	Flame retardant	VW-1	
Complete product	PoCL	Supported	Not Supported
	Connector type	MDR or SDR (26-pin)	
	Connector color	See Line-up table (page 18)	

Performance

Transmission distance (guideline)	10 m (at 66 MHz)
Skew [ps/m]	50 or less
Mobility	Sliding bending: 1 million times or more [Note 2] Bend radius R = 100 mm Speed: 70 times per minute Sliding distance: 350 mm

Note 2. Under Oki test conditions and methods. These values are for reference only and are not guaranteed values.

Usage environment

Application location	Fixed or moving part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) [Note 3]	Fixed: 40 mm or more Mobile: 100 mm or more

Note 3. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-K series

Medium | Base | Fixed part | Moving part

Features

Supports moving parts.
Can be used in medium and base configurations.

Name

PoCL type: CL -K - (2) -P - (3)
Non-PoCL type: CL -K - (2) - (3)
(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19)[Note 1]

Note 1. In the case of PoCL, the cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	PoCL type	Non-PoCL type
Cable	UL	UL 758 Style 20276	
	Rated temp./volt.	80˚C / 30 V	
	Sheath material	PVC	
	Color	Black	
	Outer diameter	Standard 8.0 mm	
	Flame retardant	VW-1	
Complete product	PoCL	Supported	Not Supported
	Connector type	MDR or SDR (26-pin)	
	Connector color	See Line-up table (page 18)	

Performance

Transmission distance (guideline)	10 m (at 66 MHz)
Skew [ps/m]	50 or less
Mobility	Sliding bending: 1 million times or more [Note 2] Bend radius R = 100 mm Bend speed: 18 times per minute Sliding distance: 1000 mm

Note 2. Under Oki test conditions and methods. These values are for reference only and are not guaranteed values.

Usage environment

Application location	Fixed or moving part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) [Note 3]	Fixed: 35 mm or more Mobile: 100 mm or more

Note 3. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-KS series

Medium | Base | Fixed part | Moving part

Features

A low-skew cable that enables high-speed and long-distance transmission. Supports moving parts.
Can be used in medium and base configurations.

Name

For PoCL/non-PoCL use: CL - KS - (2) - (3)
(2): Connector combination symbol (See page 19)
(3): Cable length symbol (See page 19)[Note 1]

Note 1. In the case of PoCL, the cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	For both PoCL/non-PoCL use
Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	PVC
	Color	Black
	Outer diameter	Standard 9.0 mm
	Flame retardant	VW-1
Complete product	PoCL	Supported
	Connector type	MDR or SDR (26-pin)
	Connector color	See Line-up table (page 18)

Performance

Transmission distance (guideline)	7 m (at 85 MHz)
Skew [ps/m]	25 or less
Mobility	Sliding bending: 3 million times or more [Note 2] Bend radius R = 100 mm Speed: 70 times per minute Sliding distance: 300 mm

Note 2. Under Oki test conditions and methods. These values are for reference only and are not guaranteed values.

Usage environment

Application location	Fixed or moving part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) [Note 3]	Fixed: 40 mm or more Mobile: 100 mm or more

Note 3. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-STH series

Full | Medium | Base | Fixed part

Features

Has the narrowest external diameter of the series. (Standard 5.1 mm)
Can be used in a wide range of configurations from full configuration to base configuration.

Name

PoCL type: CL -STH - (2) -P - (3)
Non-PoCL type: CL -STH - (2) - (3)
(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19)[Note 1]

Note 1. In the case of PoCL, the cable length must be 4 m or less due to power source restrictions.

Specifications

	Type	PoCL type	Non-PoCL type
Cable	UL	UL 758 Style 20239	
	Rated temp./volt.	80˚C / 30 V	
	Sheath material	PVC	
	Color	Black	
	Outer diameter	Standard 5.1 mm	
	Flame retardant	VW-1	
Complete product	PoCL	Supported	Not Supported
	Connector type	MDR or SDR (26-pin)	
	Connector color	See Line-up table (page 18)	

Performance

Transmission distance (guideline)	4 m (at 85 MHz)
Skew [ps/m]	50 or less

Usage environment

Application location	Fixed part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) [Note 2]	25 mm or more

Note 2. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-LS series

PoCL-Lite

Fixed part

Features

Complies with PoCL-Lite standards. Has a small 14-pin SDR connector and is optimal for connections with ultra-small cameras (Cubic 22 mm). About 15% thinner than a standard analog camera cable, so cable routing is also good.

Name

CL –LS - (2) -P - (3)

(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19)[Note 1]

Note 1. The cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	PoCL type
Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	PVC
	Color	Beige
	Outer diameter	Standard 6.1 mm
	Flame retardant	VW-1
Complete product	PoCL	Supported
	Connector type	SDR (26 pin or 14 pin)
	Connector color	See Line-up table (page 18)

Performance

Transmission distance (guideline)	5 m (at 85 MHz)
Skew [ps/m]	50 or less

Usage environment

Application location	Fixed part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) [Note 2]	25 mm or more

Note 2. The minimum bend radius is the recommended value for stable use.

Camera Link cable

CL-LK series

PoCL-Lite

Fixed part

Moving part

Features

A cable for moving parts that complies with PoCL-Lite standards. Has a small 14-pin SDR connector and is optimal for connections with ultra-small cameras (Cubic 22 mm). Fifteen percent thinner than a standard analog camera cable, so cable routing is also good.

Name

CL –LS - (2) -P - (3)

(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19)[Note 1]

Note 1. The cable length must be 10 m or less due to power source restrictions.

Specifications

	Type	PoCL type
Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	PVC
	Color	Black
	Outer diameter	Standard 6.7 mm
	Flame retardant	VW-1
Complete product	PoCL	Supported
	Connector type	SDR (26 pin or 14 pin)
	Connector color	See Line-up table (page 18)

Performance

Transmission distance (guideline)	4 m (at 85 MHz)
Skew [ps/m]	50 or less
Mobility	Sliding bending: 1 million times or more [Note 2] Bend radius R = 100 mm Bend speed: 18 times per minute Sliding distance: 1000 mm

Note 2. Under Oki test conditions and methods. These values are for reference only and are not guaranteed values.

Usage environment

Application location	Fixed or moving part
Operation temperature range	-20 to 75˚C
Minimum bend radius (Recommended value) [Note 3]	Fixed: 30 mm or more Mobile: 100 mm or more

Note 3. The minimum bend radius is the recommended value for stable use.

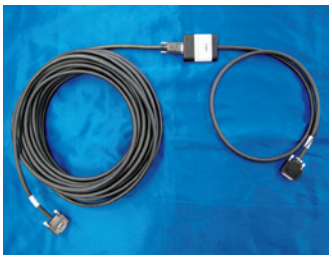
Camera Link cable

Clean Eye Camera Link cable

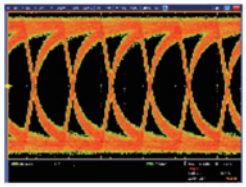
Full | Medium | Base | Fixed part | Moving part

Features

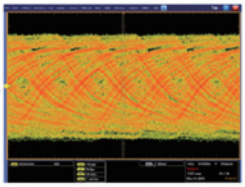
- A *Clean Eye* unit is added to a dedicated cable to enable transmission up to a maximum of 20 m at 85 MHz, which is double the industry standard.
- Full configuration items and base/medium configuration items are available in PoCL and non-PoCL types.
- The repeater unit is not placed in the middle as with conventional cables but is instead installed on the frame grabber side.
- Even with 20 m/85 MHz transmission, an extremely clean eye pattern is formed, enabling high-quality transmission.



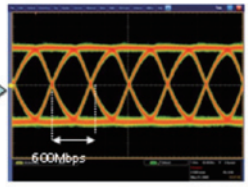
(Standalone cable: 7 m)
Eye is open



(Standalone cable: 20 m)
Opened eye is crushed



(Standalone *Clean Eye* Camera Link cable: 20 m)
A clean eye



Name

Full configuration item (for fixed uses): CL -HC - (2) -P*EXF - (3)
Base/medium configuration item (for fixed/moving parts): CL -KS - (2) -P*EX - (3)
(2): Connector combination symbol (See page 19) (3): Cable length symbol (See page 19)[Note 1] *In the case of PoCL, no indication.

Note 1. In the case of PoCL, the cable length must be 20 m or less due to power source restrictions.

⚠ Be aware that full configuration items do not support moving applications.

Specifications

Type		Full support item		Base/medium item	
		PoCL type	Non-PoCL type	PoCL type	Non-PoCL type
Cable	UL	UL758 Style 20276		UL758 Style 20276	
	Rated temp./volt.	80˚C / 30 V		80˚C / 30 V	
	Sheath material	PVC		PVC	
	Color	Beige		Black	
	Outer diameter mm	Standard 8.7		Standard 9.0	
	Flame retardant	VW-1		VW-1	
Clean Eye repeater unit	Weigh g	About 270		About 250	
	Consumption W	1.0 (typ.)		0.5 (typ.)	
	Color	Silver		Black	
	Outer diameter mm	57 (W) × 18 (H) × 68 (D) *Excluding protrusions		57 (W) × 18 (H) × 68 (D) *Excluding protrusions	
Complete product	PoCL	Supported	Not Supported	Supported	Not Supported
	Connector type	MDR or SDR (26-pin)		MDR or SDR (26-pin)	
	Connector color	Black		Black	

Note 2. We do not sell the *Clean Eye* unit individually. Furthermore, it cannot be used in combination with other Camera Link cables.

Performance

Type	Full support item	Base/medium item
Transmission distance	Max. 20 m (at 85 MHz)	Max. 20 m (at 85 MHz)
Mobility	–	Sliding bending: 3 million times or more [Note 3] Bend radius: R=100 mm Sliding speed: 70 times per minute Sliding distance: 200 mm

Note 3. Under Oki test conditions and methods. For details, see page 3.
Furthermore, the values here are for reference only and are not guaranteed values.

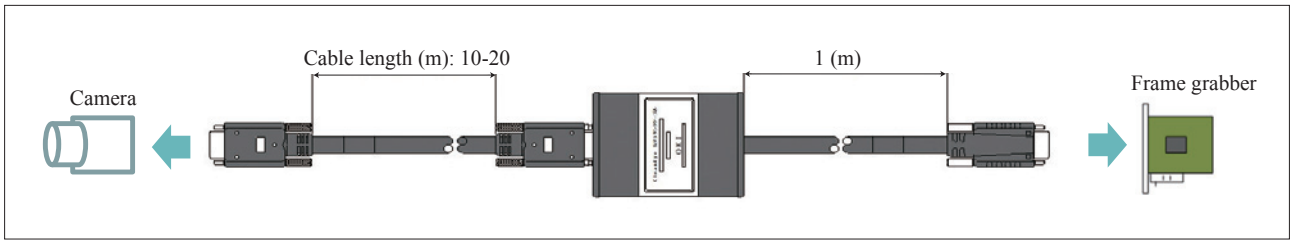
Usage environment

Type	Full support item	Base/medium support item
Application location	Fixed part	Fixed or moving part
Operation temperature range	-5 to 45˚C	-5 to 45˚C
Humidity	20% to 80% (no condensation)	20% to 80% (no condensation)
Minimum bend radius (Recommended value) Note 4	40 mm or more	Fixed: 40 mm or more Mobile: 100 mm or more

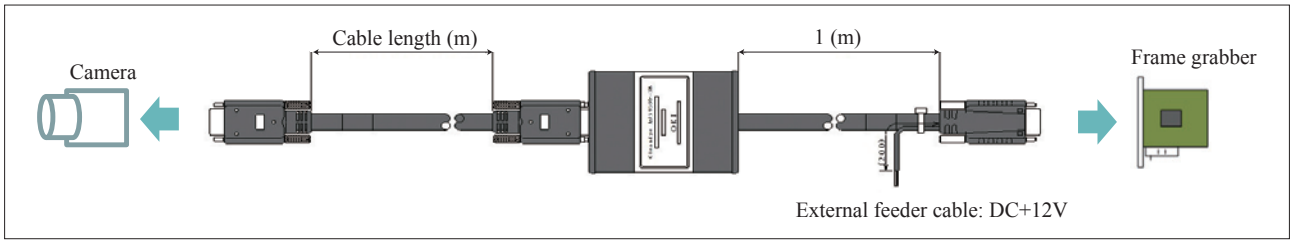
Note 4. The minimum bend radius is the recommended value for stable use.

Overview diagram / connection example

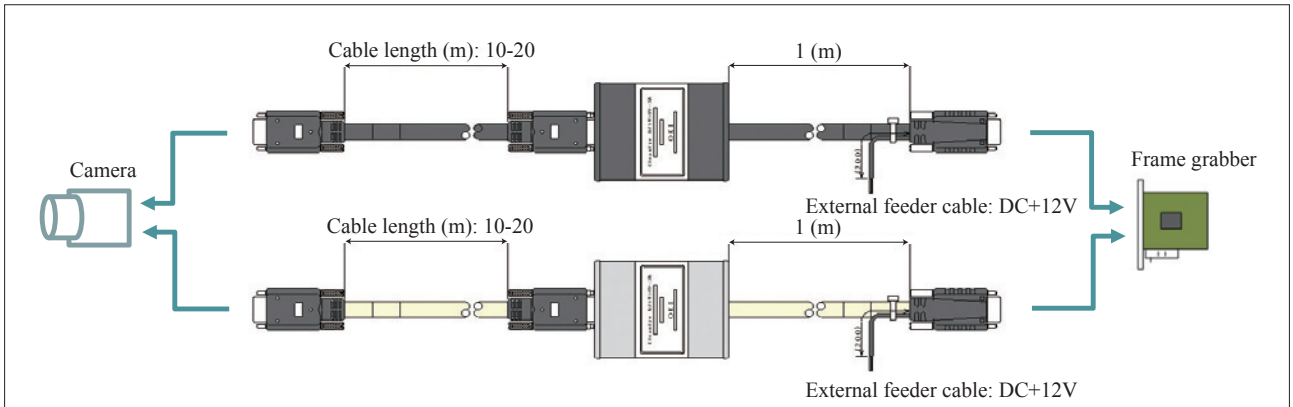
[Base/PoCL]



[Base/non-PoCL]



[Full/non-PoCL]



*In a medium configuration, two basic configuration items form two parallel connections. In a full configuration, a base configuration item and a full configuration item form two parallel connections.
*In the case of PoCL, there is no external feeder cable.

IEEE1394.a interface cable

High-grade sliding 1394.a cable

1394 K1 series

RoHS compliant

UL758 Style 20276 80˚C 30 V

An IEEE1394.a interface cable with excellent sliding-bending characteristics.
Used in sliding-bending locations of machine vision cameras and similar items.

Features

- Suitable for uses that require sliding characteristics, such as wiring inside cable pairs.
- The conductor construction and cable material provide high-grade sliding characteristics.
- Environmentally friendly. Compliant with the RoHS directive.

Display of product names

1394 K1 (1) M ROHS

(1): Cable length (up to 4.5 m at an interval of 0.5 m)

Specifications

Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	Heat-resistant PVC
	Color	Gray
	Outer diameter	Standard 7.4 mm
	Flame retardant	VW-1
	Cable length	0.5 to 4.5 m (0.5 m interval)
Complete product	Connector type	6-pin 1394 with latch
	Connector color	Gray

Performance

Transmission speed/distance	4.5 m or less at 400 Mbps
Mobility	Sliding bending: 5 million times or more Note 1 Bend radius R=30 mm Bend speed: 80 times per minute Sliding distance: 300 mm

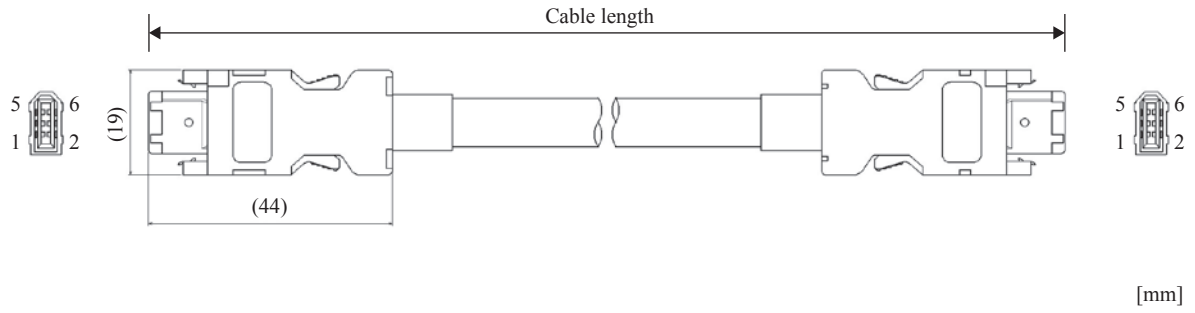
Note 1. Under Oki test conditions and methods. For details, see page 3.
Furthermore, these values are for reference only and are not guaranteed values.

Usage environment

Application location	Fixed or moving part
Operation temperature range	-5 to 45˚C
Minimum bend radius (Recommended value) Note 2	30 mm or more

Note 2. The minimum bend radius is the recommended value for stable use.

Overview diagram



IEEE1394.b interface cable

High-grade sliding 1394.b cable

1394B K series

RoHS compliant

UL758 Style 20276 80˚C 30 V

An IEEE1394.b interface cable with excellent sliding-bending characteristics.
Used in sliding-bending locations of machine vision cameras and similar items.

Features

- Suitable for uses that require sliding characteristics, such as wiring inside cable pairs.
- The conductor construction and cable material provide high-grade sliding characteristics.
- Environmentally friendly. Compliant with the RoHS directive.

Display of product names

1394B K (1)

(1): Cable length symbol (up to 4.5 m at an interval of 0.5 m)(Example) 1 m: 010; 4.5 m: 045

Specifications

Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	Heat-resistant PVC
	Color	Black
	Outer diameter	Standard 7.5 mm
	Flame retardant	VW-1
	Cable length	0.5 to 4.5 m (0.5 m interval)
Complete product	Connector type	9-pin with screw lock (beta type)
	Connector color	Black

Performance

Transmission distance/speed	4.5 m or less at 800 Mbps
Mobility	Sliding bending: 3 million times or more Note 1 Bend radius R=30 mm Bend speed: 80 times per minute Sliding distance: 300 mm

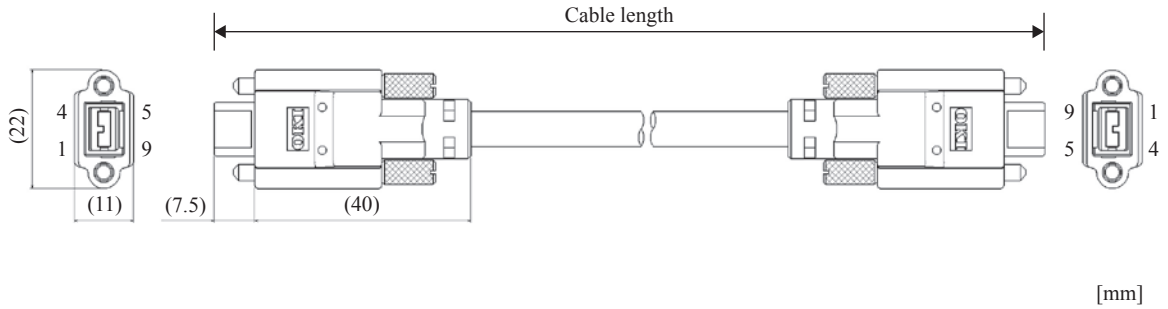
Note 1. Under Oki test conditions and methods. For details, see page 3.
Furthermore, these values are for reference only and are not guaranteed values.

Usage environment

Application location	Fixed or moving part
Operation temperature range	-5 to 45 ˚C
Minimum bend radius (Recommended value) Note 2	30 mm or more

Note 2. The minimum bend radius is the recommended value for stable use.

Overview diagram



IEEE1394.a interface cable

1394a long cable series

RoHS compliant

This cable enables long-distance transmission for IEEE1394.a standards (4.5 m): up to 20 m, 30 m, 50 m at 400 Mbps, 200 Mbps, and 100 Mbps, respectively.

Features

- Our special cable configuration (patented) is designed for low attenuation and enables long-distance transmission.
- The special cable configuration and shielding are designed to improve noise-proof properties for FA environments.
- A 6-pin connector with a lock is used as standard to provide high-grade fitting and retention.
- We offer a connector conversion adapter cable to support 4-pin and no-lock 6-pin connections.
- Environmentally friendly. Compliant with the RoHS directive.

Name

Name	Supported transmission speed (Mbps)	Cable length (m)
1394 long cable 400MBPS 5M ROHS	400/200/100	5
1394 long cable 400MBPS 10M ROHS	400/200/100	10
1394 long cable 400MBPS 15M ROHS	400/200/100	15
1394 long cable 400MBPS 20M ROHS	400/200/100	20
1394 long cable 200MBPS 30M ROHS	200/100	30
1394 long cable 100MBPS 40M ROHS	100	40
1394 long cable 100MBPS 50M ROHS	100	50

Specifications

	Type	Cable length 15 m or less	Cable length Over 15 m
Cable	Sheath material	PVC	
	Color	Gray	
	Outer diameter (mm)	Standard 6.4	Standard 8.2
Complete product	Cable length (m)	5, 10, 15	20, 30, 40, 50
	Connector type	6-pin 1394 with latch	
	Connector color	Gray	

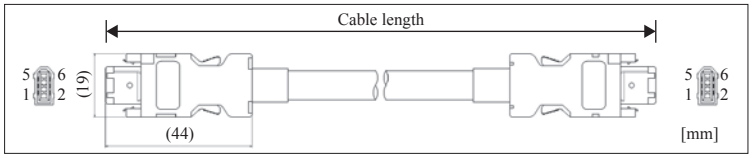
Performance / usage environment

Transmission speed/ distance	20 m or less at 400 Mbps
	30 m or less at 200 Mbps
	50 m or less at 100 Mbps
Application location	Fixed part
Operation temperature range	-5 to 45 ˚C
Minimum bend radius (Recommended value) Note 1	Cable length 15 m or less: 30 mm or more Cable length more than 15 m: 35 mm or more

Note 1. The minimum bend radius is the recommended value for stable use.

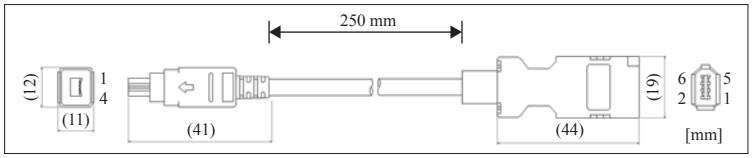
Overview diagram

[1394.a long cable (Supports 6-pin connectors with locks)]

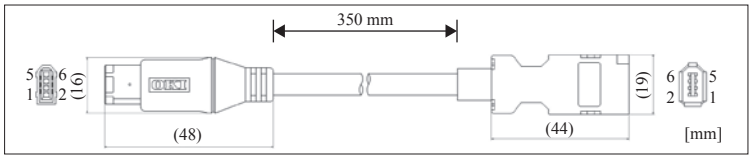


- Option: connector conversion adapter cable

[4-pin conversion cable] Name: 6/4 AD L=250 mm



[6-pin conversion cable without lock] Name: 6/6 AD L=300 mm



IEEE1394.b interface cable

1394.b long cable

1394B L series

RoHS compliant

UL758 Style 20276 80˚C 30V

The standalone cable enables a maximum transmission distance of 8 m, which greatly exceeds the standard length of 4.5 m! This cable is suitable for robot cameras and other applications that require long-distance transmission.

Features

- Our special cable configuration (patented) is designed for low attenuation and enables long-distance transmission.
- Complies with IEEE1394.b interface standards (transmission speed: 800 Mbps)
- Maximum transmission distance of 8 m! (Standard length: 4.5 m)
- The special cable configuration lowers attenuation and realizes a transmission distance twice the standard
- The special cable configuration and shielding ensure noise-proof properties in FA environments.
- Sold with connectors added.
- Environmentally friendly. Compliant with the RoHS directive.

Display of product names

1394B L (1)

(1): Cable length symbol (up to 8 m at an interval of 0.5 m)

(Example) 5 m: 050; 8 m: 080*Consult us separately for cable lengths exceeding 8 m.

Specifications

Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Sheath material	Heat-resistant PVC
	Color	Black
	Outer diameter	Standard 7.5 mm
	Flame retardant	VW-1
	Cable length	5 to 8 m (0.5 m interval)
Complete product	Connector type	9-pin with screw lock (beta type)
	Connector color	Black

Performance

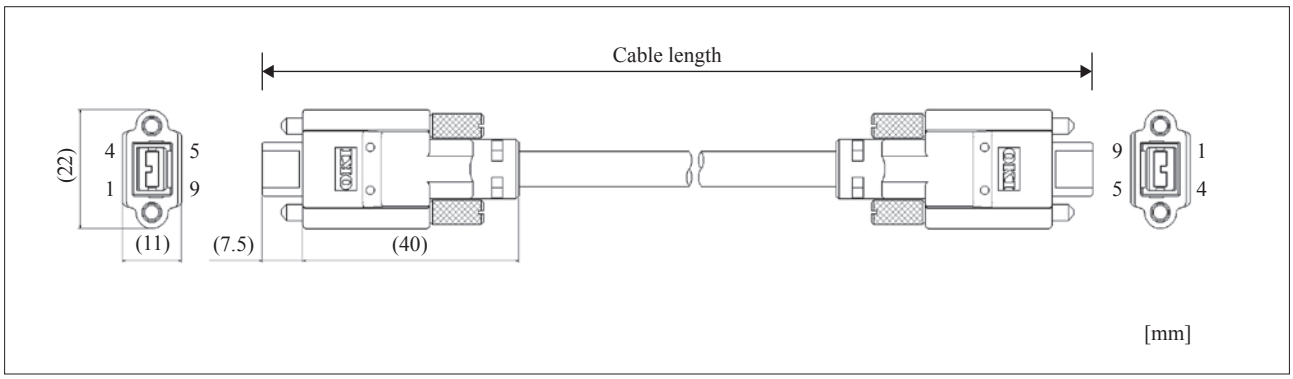
Transmission speed/distance	8 m or less at 800 Mbps

Usage environment

Application location	Fixed or moving part
Operation temperature range	-5 to 45˚C
Minimum bend radius (Recommended value) Note 1	30 mm or more

Note 1. The minimum bend radius is the recommended value for stable use.

Overview diagram



Gigabit Ethernet cable

High-grade bending, shielded, enhanced category 5 LAN cable

C5E (S-HFR) series

RoHS compliant

With special polymers and special shielding, this shielded LAN cable provides unprecedented high-grade bending characteristics. This cable supports Gigabit Ethernet and enables transmission speed of 1 Gbps. Also supports industrial Ethernet and other high-speed image transmission methods.

Features

- Strong flexibility and extreme elasticity.
- Special polymer insulation and special braided shielding with excellent bending characteristics provide high-grade bending and sliding characteristics. This cable also handles twisting motions.
- Supports industrial high-speed image transmission methods.
- The special braided shielding increases the noise-proof properties of this cable.
- The oil-proof sheath enables use in factories and other similar environments.
- A standard shielded modular plug (RJ-45) can be used. Furthermore, we offer screw-lock connectors for machine vision and other uses.
- Environmentally friendly. Compliant with the RoHS directive.

Name

We sell standalone cables and harness items individually.

Manufacturing shape	Model no.
Standalone cable (standard length: 200 m bundle)	AWG26 4P TPMC-C5E (S-HFR) K
Double-ended RJ45 with harness	C5E (S-HFR) (K) - (1)
Screw-lock RJ45 with harness Note 1	C5E (S-HFR) (K) - HSL - (1)

(1): Cable length (m)
Symbol examples: 1 m : 1
2.5 m: 2.5
40 m: 40

Note 1. Single-ended screw-lock type.

Specifications

Cable	UL	UL 758 Style 20276
	Rated temp./volt.	80˚C / 30 V
	Conductor size	AWG26 pair twist wire conductor
	Insulator material	Special polymer
	Shielding	Special braided shielding
	Sheath material	Oil-proof PVC
	Color	Black
	Outer diameter	Standard 6.8 mm
Complete product	Cable length	Max. 40 m
	Connector type	RJ45 or screw-lock RJ45
	Connector color	Black (boot, mold color)

Performance

Transmission distance		Max. length 40 m
Transmission speed [Gbps]		1
Attenuation [dB/40 m](20˚C)		24 or less (100 MHz)
Near-end crosstalk attenuation [dB]		30 or more (100 MHz)
PSNEXT [dB]		27 or more (100 MHz)
Return loss [dB]		10 or more (100 MHz)
Delay time [ns/40 m]		555 (10 MHz)
Withstand voltage [V/1 minute interval]		AC 350
Mobility	Sliding bending	3 million times or more Note 2 Bend radius R: 50 mm
	Swinging bending	300 thousand times or more Note 2 Bend radius R: 20 mm
	Torsion	5 million times or more Note 2 Torsion angle: ±180°

Note 2. Under Oki test conditions and methods. For details, see page 3.
Furthermore, these values are for reference only and are not guaranteed values.

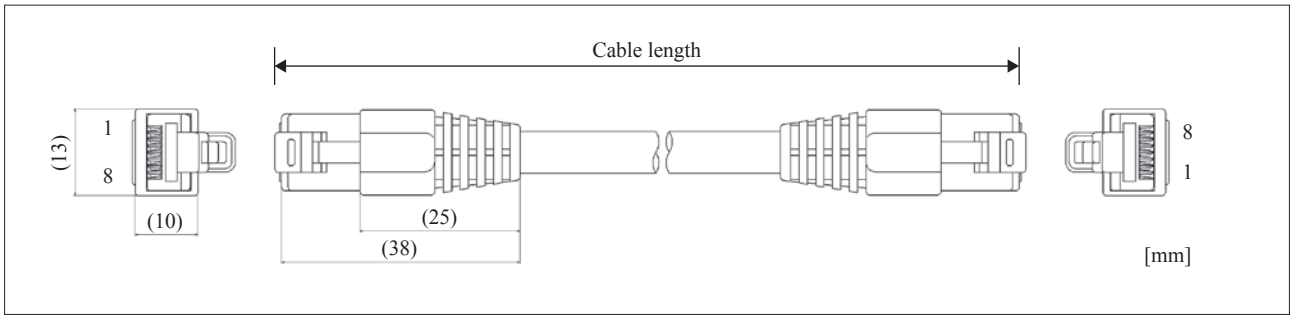
Usage environment

Operation temperature range	-10 to 60˚C
Application location	Fixed or moving part
Minimum bend radius (Recommended value) Note 3	Fixed: 30 mm or more Mobile: 50 mm or more

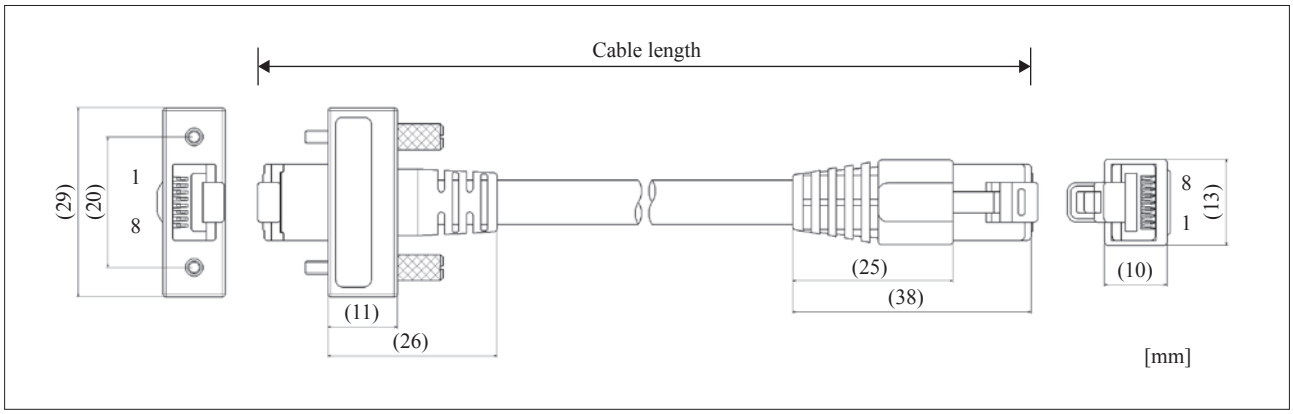
Note 3. The minimum bend radius is the recommended value for stable use.

Overview diagram

[Double-ended RJ45 with harness]



[Screw-lock RJ45 with harness]



Other LAN-related products

In addition to these enhanced category 5 products, we offer the following as unshielded (UTP) patch cords

- Standard-grade TPMC-C5e350
- Eco-grade EM-TPMC-C5e350

Additionally, we offer the following as floor-fixed wiring:

- Standard-grade DTI-C5e350
- Eco-grade EM-DTI-C5e350

When used in combination with these products, a transmission distance of 40 m or greater is supported. Contact us for details.