Intercon 1™
by Nortech

Product Catalog

About Us

Intercon 1 by Nortech specializes in machine vision technology and is the premier producer of camera cables and assemblies in the United States. Since 1978 it has led the camera cable market in serving machine vision customers providing sophisticated engineering, specialized tools and methodologies to support groundbreaking vision technology.

Nortech Systems Inc. Corporate Links

www.intercon-1.com
www.nortechsys.com

USA and International Distributor Links

www.intercon-1.com/us-distributors-list/
www.intercon-1.com/international-distributors/

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CoaXPress

CoaXPress

F-CXP-xx-P

- Precision 75 ohm impedance
- 100% sweep tested
- JIIA certified to CXP-6 at 22 meters and CXP-3 at 55 meters

Product Specifications

Cable Specifications	
Overall Diameter	.242 Inches
Max Temperature	60 Degrees C
Jacket Color	Black
Min. Bend Radius	2.42 IN (Static)

Ordering Information

Order Number	Description
F-CXP-xx-P	CoaXPress BNC to BNC
F-CXP-xx-DIN	CoaXPress BNC to DIN 1.0/2.3
F-DIN-xx-DIN	CoaXPress DIN to DIN 1.0/2.3

CoaXPress 2.0

CXP2-xx-P | CXP2-xx-BNC | CXP2-xx-DIN

- Precision 75 Ohm impedance
- Silver plated copper conductor
- 100% sweep tested
- Designed for static applications
- PVC jackets

Product Specifications

Cable Specifications	
Overall Diameter	.159 Inches
Max Temperature	-30 to 75 C
Jacket Color	Black
Min. Bend Radius	1.6 Inches

The CoaXPress cable's gas-injected foam high-density polyethylene insulation reduces attenuation and extends the operating bandwidth of the cable. The solid center silver plated copper conductor along with both foil and braid shield maximize signal integrity and cable distance.

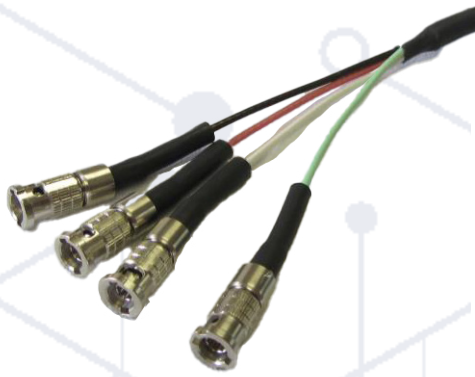
Primary Components	
Cable	Single Coaxial conductor - RG59 Mini
Connector A	75 Ohm HD-BNC Plug
Connector B	75 Ohm HD-BNC, BNC or DIN plug

Ordering Information

Order Number	Description
CXP2-xx-P	HDBNC to HDBNC
CXP2-xx-BNC	HDBNC to Standard BNC
CXP2-xx-DIN	HDBNC to DIN

CoaXPress 2.0 CXP-multi-cable

CXP2SD-xx-PX4



- Precision micro cables
- Optimized to provide maximum data rate
- 100% sweep tested cable
- Compliant to the JIIA CoaXPress 2.0 Standard
- Silver plated copper conductor
- Designed for static applications
- PVC jacket

Product Specifications

Cable Specifications	
Overall Diameter	.159 Inches
Max Temperature	-25° - 150°C
Jacket Color	Black
Min. Bend Radius	1 Inches
Flame Rating	VW-1

Primary Components	
Cable	4 conductor Micro-Coax-RG179
Connector A	75 Ohm HD-BNC, standard BNC oar DIN 1.0/2.3 Plug
Connector B	75 Ohm HD-BNC, standard BNC or DIN 1.0/2.3 Plug

Ordering Information

Order Number	Description
CXP2SD-XX-PX4	HDBNC to HDBNC
CXP2SDP-xx-PX4P	Standard BNC to Standard BNC
CXP2DDIN-XX-PX4DIN	DIN 1.0/1.3 to DIN 1.0/2.3a

InfiniFlex USB 2.0

IF-B2PA-xx-PA

Features

- 10 million + flex design
- Overmolded interfaces
- Small bend radius
- Dual Shielding
- Double Shielded to maximize performance
- Rugged overmold offers additional strain relief and increases the assembly's ability to perform with dependability
- The small cable OD allows continued performance and reliability at a tight bend radius

Product Specifications

Primary Components	
Overall Diameter	.117 Inches
Jacket Color	Violet
UL/CSA Rated	Yes
Min. Bend Radius	1.77 Inches
Flame Rating	VW-1

Primary Components	
Cable	1 Twisted Pair - 2 Discrete Wires
Connector A	USB 2.0 Type A Plug
Connector B	See below

Ordering Information

Order Number	Description
IF-B2PA-xx-PA	InfiniFlex USB 2.0 Type A to Type A
IF-B2PA-xx-PB	InfiniFlex USB 2.0 Type A to Type B
IF-B2PA-xx-PMBT	InfiniFlex USB 2.0 Type A to Type Mini B with Thumbscrews

Economy USB 3.0

B3PMBT-xx-PA

Features

- Supports high data rate transfers of up to 5 Gbps
- Low cost USB 3.0
- Thumbscrew locking
- Overmolded interfaces
- Secure robust interconnect from camera to computer
- Increased AWG sizes allows for better performance over longer distance

Product Specifications

Primary Components	
Overall Diameter	.240 Inches
Max Temperature	60° C
Jacket Color	Black
ULRated	UL 2725
Min. Bend Radius	2.4 Inches (Static)
Flame Rating	VW-1

Primary Components	
Cable	3 Twisted Pair 2 Discrete Wires
Connector A	USB 3.0 Type Micro B Plug
Connector B	USB 3.0 Type A Plug

Ordering Information

	Length		
Order Number	Meters	Feet	Description
B3PMBT-3.0-PA	3.0	9.84	USB 3.0 Micro B W/Thumbscrews to 3.0 A

USB 3.0 Hybrid Active Optical

Industrial High Flex Hybrid AO USB 3.0, F-AOC-B3PMBT-xx-PA

Features

- Supports high data rate transfers up to 5 Gps
- Robotic Grade - High Flex
- Thumbscrew locking
- EMI resistant
- No separate power required
- Contains both copper and fiber allowing for both power and data transmission over extended distances
- It's unique design utilizes specialized materials developed for the most demanding applications.

Product Specifications

Cable Specifications	
Overall Diameter	4.8 mm
Storage Temp	0° to 50° C /-20° to 70° C
Jacket Color	Black
Min. Bend Radius (Dynamic/Static)	50 mm / 20 mm
Min. Bend Radius	2.4 Inches (Static)
Flame Rating	VW-1

Primary Components	
Bend Radius	48 mm
Travel Distance	2000 mm
Cycle per minute	55 (back and forth = 1 Cycle)
Cycles achieved	7 million +

Primary Components	
Cable	Hybrid (Combination of Fiber and Copper)
Connector A	USB 3.0 Type Micro B Plug with Thumbscrews
Connector B	USB 3.0 Type A Plug

Ordering Information

Order Number	Description
F-AOC-B3PMBT-xx-PA	USB 3.0 Micro B W/Thumbscrews to 3.0 A

InfiniFlex USB 3.0

GSC-IFB3PMBT-xx-PA

Features

- Supports high data rate transfers of up to 5 gbps
- Robotic Grade - High Flex
- Thumbscrew locking
- Rugged overmolded interfaces
- Has been designed specifically for both rolling and torsional flex applications

Product Specifications

Cable Specifications	
Overall Diameter	.340 Inches
Max Temperature	-30° to +80° C
Jacket Color	Black
Min. Bend Radius	2.38 In. (static) 3.4 In. (Dynamic)
Super Speed Pair	26 AWG
UTP	26 AWG
Power and Ground	22 AWG

Primary Components	
Bend Radius	48 mm
Travel Distance	2000 mm
Cycle per minute	55 (back and forth) = 1 Cycle
Cycles achieved	7 million +

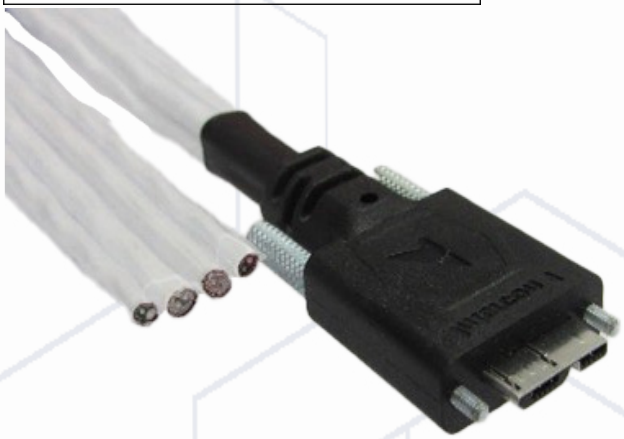
Ordering Information

Order Number	Description
GSC-IFB3PMBT-xx-PA	USB 3.0 Micro B W/Thumbscrews to 3.0 A
GSC-IFB3PMBT-xx-PAT	USB 3.0 Micro B W/Thumbscrews to 3.0 A W/Thumbscrews

InfiniFlex USB 3.1

IF-B3.1FPMBT-xx-PA

Featuring GORE® USB 3.0 Cables



Features

- Supports high data rate transfer of up to 10 Gps
- 35 mm minimum bend radius
- Thumbscrew locking
- Rugged overmolded interfaces
- Featuring GORE™
- Designed specifically for cable carrier systems
- Provides the ultimate in dependability

Product Specifications

Primary Components	
Cable	Twisted Pair
Connector A	USB 3.0 Type Micro B Plug
Connector B	USB 3.0 Typ A Plug

Primary Components	
Overall Diameter	3.6 mm x 17.2 mm
Max Temperature	-25° to +150° C
Jacket Color	White
Min. Bend Radius	10 mm (Static) 35 mm (Dynamic)

Ordering Information

Order Number	Description
GSC-IF-B3.1FPMBT-xx-PA	USB 3.0 Micro B W/Thumbscrews to 3.0 A

Gigabit Ethernet

Industrial High Flex and Static grade Gig E Assemblies

Our Industrial High Flex Gig E cables are designed to interface Gig E and Gig E Vision cameras directly to a computer, eliminating the need for frame grabbers. This is a solution for demanding applications that require more than the traditional cable can offer. Double shielded cable ensures the best electrical performance. Intercon's industrial high flex Cat 5e cable has exceeded 12 million + flex cycles in both tick tock and rolling torsion testing. The durable jackets provide an additional protection from elements such as water, oil, and abrasion. Our unique right/left and up/down strain relief orientations provide a solution for those applications where limited space exists behind the camera. The low profile right angle orientations eliminate the stress that can be placed on the cable, connector and camera when using a traditional straight assembly in these tight areas. The thumbscrew-locking feature ensures that the interface will remain secure despite motion and vibration.

Specifications

High Flex Cat 5e Cable Specifications	
Overall Diameter	.245 Inches
Max Temperature	80° C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	2.45 Inches (Static), 3.68 Inches (Dynamic)

Static Cat 6a Cable Specifications	
Overall Diameter	.235 Inches
Max Temperature	75° C
Jacket Color	Blue
UL Rated	Yes
Min. Bend Radius	2.35 Inches

High Flex Cat 6a Cable Specifications	
Overall Diameter	.275 Inches
Max Temperature	75° C
Jacket Color	Teal
UL Rated	Yes
Min. Bend Radius	2.75 Inches (Static), 4.13 Inches (Dynamic)

Gigabit Ethernet

Industrial High Flex and Static grade Gig E Assemblies

Step 1: Select Cable

(F-) Hi-Flex Cat5e **(C6-) Static Cat6a** **(IFC6-) Robotic flex Cat6a**

Step 2: Select First End


GEVPT-


GEVPTU-


GEVPTD-


GEVPTR-


GEVPTI-


GEVVPT-


GEVVPTU-


GEVVPTD-


GEVVPTR-


GEVVPTL-


GEVP-


M128


M128XP


M128-(D code)

Step 3: Select Length of Cable in Meters

Step 4: Select Second End

Horizontal Thumbscrews


-PT


-PTU


-PTD


-PTR


-PTL

Vertical Thumbscrews


-VPTD


-VPTU


-VPTD


-VPTR


-VPTL


-P


-M128


-M128XP


-M124 (D code)


-FL
(Flying Leads)


-C
(Blunt Cut)

Certified High Flex Camera Link

Intercon 1 high-flex cable construction adheres with the Camera Link specifications and performs past 5 million flex cycles.

Configurations are available with:
MDR to MDR, MDR to HDR, and HDR to HDR with straight overmolded ends or with a combination of right angle Up, Down, Left, or Right as well as low profile Up or Down. See page 30 for overmold dimensions.

Product Specifications

Durable overmolding	Tested to 10 million cycles
Thumbscrew locking	Robust High Flex cable
Camera Link Certified	

Camera Link Cable Options

e-Flex Camera Link and Power Over Camera Link Cable

Cable Specifications	
Overall Diameter	.352 Inches
Max Temperature	80° C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	3.80 Inches (Static) 5.55 Inches (Dynamic)
Flame Rating	VW-1

Primary Components	
Cablea	11 Individually Shielded Twisted Pairs
Jacket Material	PVC
Conductor Material	PE
Conductor AWG	28

Static Flat Camera Link (up to 5 meter)

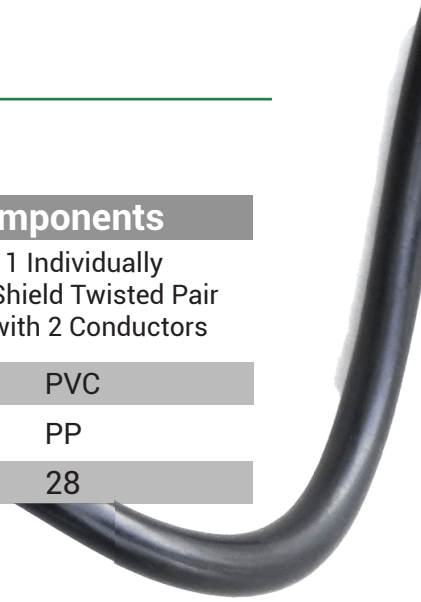
Cable Specifications	
Overall Diameter	0.06 x 0.69 Inches
Max Temperature	105° C
Jacket Color	Gray
UL/CSA Rated	Yes
Flame Rating	VW-1

Primary Components	
Cable	26 Conductor
Jacket Material	TPE
Conductor Material	TPE
Conductor AWG	30

High Flex Camera Link and Power Over Camera Link Cable

Cable Specifications	
Overall Diameter	.38 Inches
Max Temperature	80° C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	3.80 Inches (Static) 5.55 Inches (Dynamic)
Flame Rating	VW-1

Primary Components	
Cable	11 Individually Shield Twisted Pair with 2 Conductors
Jacket Material	PVC
Conductor Material	PP
Conductor AWG	28



Ordering Information For Camera Link

High Flex Camera Link and Power Over Camera Link Cable

Step 1: Select First End


CLCP-


CLCP3-


CLCPL-


CLCPR-


CLCPU-


CLCPD-


CLCPLD-


CLCPLU-

Step 2: Select Length of Cable in Meters

Step 3: Select Second End


-P


-P3


-PL


-PR


-PU


-PD


-PLD


-PLU

Products Ordering Numbers

CLCP-xx-P	Straight MDR overmold to Straight MDR overmold
CLCP*-xx-P	Right Angle MDR overmold to Straight MDR overmold
CLCP*-xx-P*	Right Angle MDR overmold to Right Angle MDR overmold
CLCP*-xx-PL*	Right Angle MDR overmold to Right Angle Low Profile MDR Up or Down
CLCP3-xx-P	MDR latch back shell to Straight MDR overmold

High Flex SDR/HDR Camera Link

Step 1: Select First End


MCLCP-


MCLCPD-


MCLCPR-


MCLCPL-


MCLCPU-

Step 2: Select Length of Cable in Meters

Step 3: Select Second End


-P


-P3


-PL


-PR


-PU


-PD


-PLD


-PLU


-MP


-MPD


-MPL


-MPR


-MPU

Products Ordering Numbers

MCLCP-xx-P	Straight HDR overmold to Straight MDR overmold
MCLCP*-xx-P	Right Angle HDR overmold to Straight MDR overmold
MCLCP*-xx-P*	Right Angle HDR overmold to Right Angle MDR overmold
MCLCP*-xx-PL*	Right Angle HDR overmold to Right Angle Low Profile MDR Up or Down
MCLCP-xx-MP	HDR Straight to Straight HDR overmold
MCLCP*-xx-MP*	Right Angle HDR overmold to Right Angle HDR overmold
MCLCP*-xx-P3	HDR right angle to Straight MDR back shell

High Flex Power Over Camera Link Cable

Step 1: Select First End


POCLP-


POCLP3-


POCLPL-


POCLPR-


POCLPU-


POCLPD-


POCLPLD-


POCLPLU-

Step 2: Select Length of Cable in Meters

Step 3: Select Second End


-P


-P3


-PL


-PR


-PU


-PD


-PLD


-PLU

Products Ordering Numbers

POLCP-xx-P	Straight MDR overmold to Straight MDR overmold
POCLP*-xx-P	Right Angle MDR overmold to Straight MDR overmold
POMLCP*-xx-P*	Right Angle MDR overmold to Right Angle MDR overmold
POCLP-xx-PL*	Straight MDR overmold to Right Angle Low Profile MDR Up or Down
POCLP3-xx-P	MDR latch back shell to Straight MDR overmold

High Flex SDR/HDR Power Over Camera Link

Step 1: Select First End


POMCLP-


POMCLPD-


POMCLPL-


POMCLPR-


POMCLPU-

Step 2: Select Length of Cable in Meters

Step 3: Select Second End


-P


-P3


-PL


-PR


-PU


-PD


-PLD


-PLU


-MP


-MPD


-MPL


-MPR


-MPU

Products Ordering Numbers

POMCLP-xx-P	Straight HDR overmold to Straight MDR overmold
POMCLP*-xx-P	Right Angle HDR overmold to Straight MDR overmold
POMCLP*-xx-P*	Right Angle HDR overmold to Right Angle MDR overmold
POMCLP*-xx-PL*	Right Angle HDR overmold to Right Angle Low Profile MDR Up or Down
POMCLP-xx-MP	Straight HDR to Straight HDR overmold
POMCLP-xx-PL*	Straight HDR overmold to Right Angle F

e-Flex MDR Camera Link

Step 1: Select First End


ECLP-


ECLP3-


ECLPL-


ECLPR-


ECLPU-


ECLPD-


ECLPLD-


ECLPLU-

Step 2: Select Length of Cable in Meters

Step 3: Select Second End


-P


-P3


-PL


-PR


-PU


-PD


-PLD


-PLU

Products Ordering Numbers

ECLP-xx-P	Straight MDR overmold to Straight MDR overmold
ECLCP*-xx-P	Right Angle MDR overmold to Straight MDR overmold
ECLCP*-xx-P*	Right Angle MDR overmold to Right Angle MDR overmold
ECLCP*-xx-PL*	Right Angle MDR overmold to Right Angle Low Profile MDR Up or Down
ECLCP3-xx-P	MDR latch back shell to Straight MDR overmold

High Flex MDR OR HDR Camera Link extension cables

Step 1: Select First End

CLCP-

MCLCP-

POCLP-

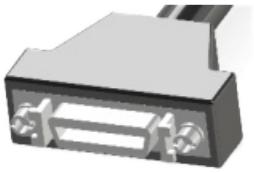
POMCLP-

ECLP-

Step 2: Select Length of Cable in Meters

Step 3: Select Second End

-MR



-R

Products Ordering Numbers

CLCP-xx-R (or MR)	Straight MDR to receptacle (MDR or HDR)
MCLCP-xx-R (or MR)	HDR overmold to receptacle (MDR or HDR)
POCLP-xx-R (or MR)	Straight MDR to receptacle (MDR or HDR)
POMCLP-xx-R (or MR)	Straight HDR overmold to receptacle (MDR or HDR)
ECLP-xx-R (or MR)	Straight MDR to receptacle (MDR or HDR)

Our High Flex extension cables offer system versatility and convenience when required to extend your current cable length. Both the plug and the receptacle connectors feature durable overmolded strain reliefs. The receptacle end is completed with 4/40 jack nuts to ensure locking and proper, constant connection through motion and vibration. Right angle and low profile right angle assemblies are also available in the extension format.
Right angles are available for all first end options. For custom versions contact customer service for more information.

Camera Link

Low Profile Right Angle Feed Thru Internal Assembly

- Lowest profile right angle Camera Link available
- Overmolded plug interface
- Pliable ribbon style for flexibility
- Receptacle jacknuts for easy mounting
- RoHS Compliant

Product Specifications

Primary Components	
Cable	Shielded Ribbon
Connector A	26 Pos MDR Plug angled Up or Down
Connector B	26 Pos MDR Receptacle

Ordering Information

Length			
Order Number	Meters	Inches	Description
CLFPU-0.2-R	0.2	8	CL Feed Thru RA Up
CLFPD-0.3-R	0.3	12	CL Feed Thru RA Down
CLFPU-0.2-RE	0.2	8	CL Feed Thru RA Up w/Epoxy
CLFPD-.3-RE	0.3	12	CL Feed Thru RA Up Down w/Epoxy

Infini-flex Camera Link

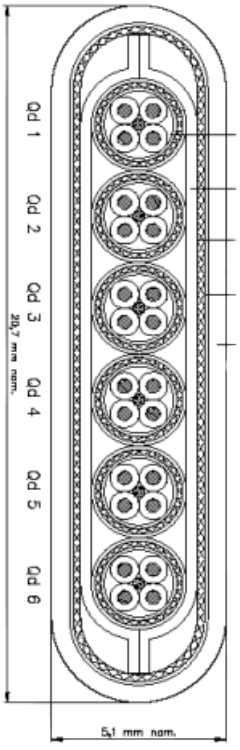
GORE Camera Link High Flex Flat Cables

- Overmolded interface with thumbscrew locking
- Low particulation for clean room applications
- High Flex cable designed to surpass 5 million flexes
- RoHS Compliant
- Unique Quad construction

Product Specifications

Primary Components	
Overall Diameter	5.1 mm x 20.7 mm
Jacket Color	White
UL/CSA Rated	21090
Min. Bend Radius	50 mm
Flame Rating	Retardant

Primary Components	
Cable	Shielded Ribbon
Connector A	26 Pos MDR or HDR Plug
Connector B	26 Pos MDR or HDR Plug



IO Cable Assemblies

Features

- Available in a wide selection of connector options including:
  - Female plug
  - Male Plug
  - Female Jack
  - Male Jack
- Available in 6, 8 or 12 pin configurations

Product Outline

Intercon offers custom and standard IO (Input/Output) cable assemblies available for most camera manufacturers.

Intercon IO cable assemblies are available in various lengths and connector options providing the ultimate solution in interconnects for you application.

Included with every assembly that is ordered with the flying leads or a blunt cut end option is the Intercon cable pin out/ color code allowing you to quickly terminate the assembly into your application.

Ordering Information

Contact customer service with the camera manufacturer name, model number, length of assembly as well as the type of motion (dynamic or static) and our customer service team will provide you with part number and pricing.

Analog Video

CCXC Style

VCP-xx-S

- Controlled impedance 75 Ohm video cable
- Resilient industrial grade PVC overmolding

Product Specifications

Cable Specifications	
Overall Diameter	.270 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	4.05 IN (Static)
Flame Rating	VW-1

Primary Components	
Cable	4 Coax Conductors, 4 Discrete Wires
Connector A	12 Pos Circular Plug w/Sockets
Connector B	12 Pos Circular Plug w/Pins

High Flex CCXC Style Cable

MVCP-xx-S

- Robust CCXC style cable
- Transmits high quality 75 Ohm video signals

xx to be replaced by the length in meters

Product Specifications

Cable Specifications	
Overall Diameter	.23 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	2.3 IN (Static) 3.45 IN (Dynamic)
Flame Rating	VW-1

Primary Components	
Cable	4 75 Ohm Coax conductors 4 Discrete
Connector A	12 Pos Circular Plug with Sockets
Connector B	12 Pos Circular Plug with Pins

CCMC Style

MCS-xx-P

- Designed for Sony medical cameras
- Transmit high quality video signals
- Rugged PVC overmolding
- Strain relief to ensure continued performance through repeated motion, vibration, or installations.
- Customizable options available.

Product Specifications

Cable Specifications	
Overall Diameter	.270 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	4.05 IN (Static)
Flame Rating	VW-1

Primary Components	
Cable	4 75 Ohm Coax conductors, 4 Discrete wires
Connector A	12 Pos Circular Plug w/ Sockets
Connector B	12 Pos Circular Plug w/Pins

JAI Pulnix Style

PVCS-xx-P

- High quality images
- Lengths up to 65 meters
- Industrial overmold
- Available in high flex to 30 meter

Product Specifications

Cable Specifications	
Overall Diameter	.270 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	4.05 IN (Static)
Flame Rating	VW-1

Primary Components	
Cable	4 Coax Conductors, 4 Discrete Wires
Connector A	12 Pos Circular Plug w/ Sockets
Connector B	12 Pos Circular Plug w/ Pins

JAI Pulnix Style

MPVCS-xx-P

- Lengths up to 30 meters
- High flex

Product Specifications

Cable Specifications	
Overall Diameter	.230 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	2.3 IN (Static), 3.45 (Dynamic)
Flame Rating	VW-1

Primary Components	
Cable	4 75 Ohm Coax and 4 Conductors
Connector A	12 Pos Circular Plug w/Sockets
Connector B	12 Pos Circular Plug w/Pins

Right Angle CCXC Style

VCS*-xx-P

- CCXC style assemblies offer a unique right angle overmold
- Right angle on the camera (socket) end and overmolded straight connector on the equipment end.
- Both connectors are available with a right angle.
- Add M to the part number for a high flex version (MVCS*-xx-P).

xx to be replaced by the length in meters
* Denotes direction, U=up, D=down, R=right, or L=left

Product Specifications

Cable Specifications	
Overall Diameter	.270 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	4.05 IN (Static)
Flame Rating	VW-1

Primary Components	
Cable	4 Coax Conductors, 4 Discrete Wires
Connector A	12 Pos Circular Plug w/Sockets
Connector B	12 Pos Circular Plug w/Pins

Low Profile Right Angle CCXC Style

VCS*2-xx-P

Product Specifications

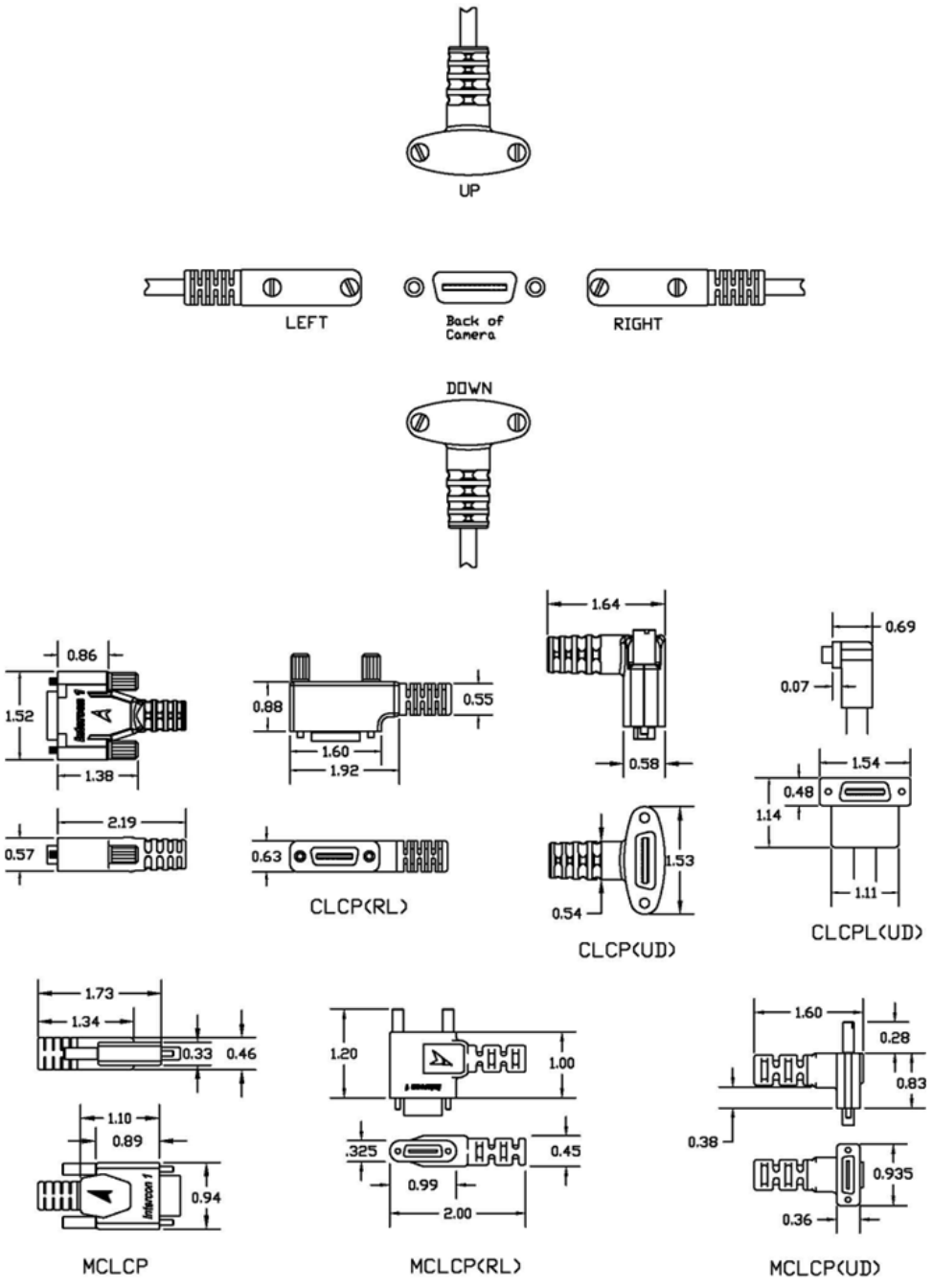
Cable Specifications	
Overall Diameter	.270 Inches
Max Temperature	80 Degrees C
Jacket Color	Black
UL/CSA Rated	Yes
Min. Bend Radius	4.05 IN (Static)
Flame Rating	VW-1

Primary Components	
Cable	4 Coax Conductors, 4 Discrete Wires
Connector A	12 Pos Circular Plug w/Sockets
Connector B	12 Pos Circular Plug w/Pins

- Low profile right angle overmold
- Add M to the part number for a high flex version (MVCS*2-xx-P)

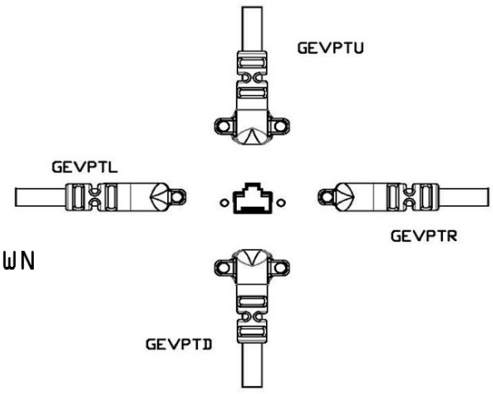
Detailed Assembly End Dimensions

Camera Link Overmold

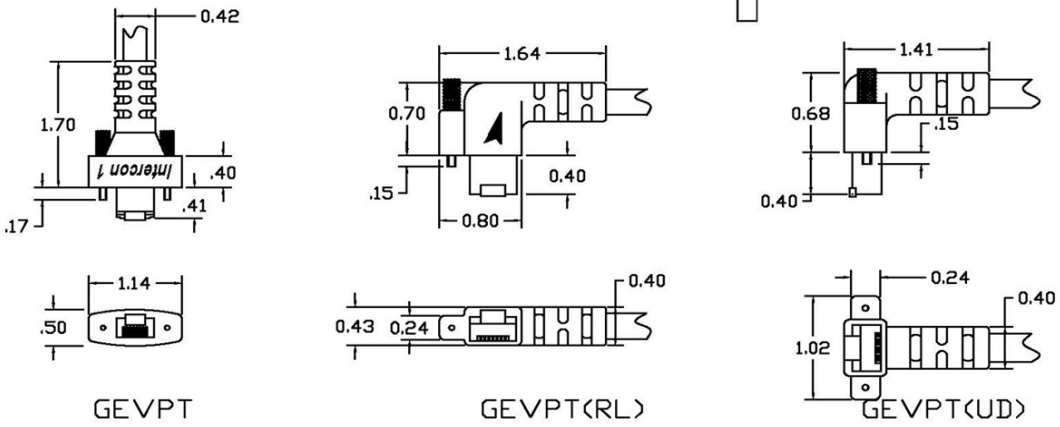


Gig E Overmold

ANGLE ORIENTATION

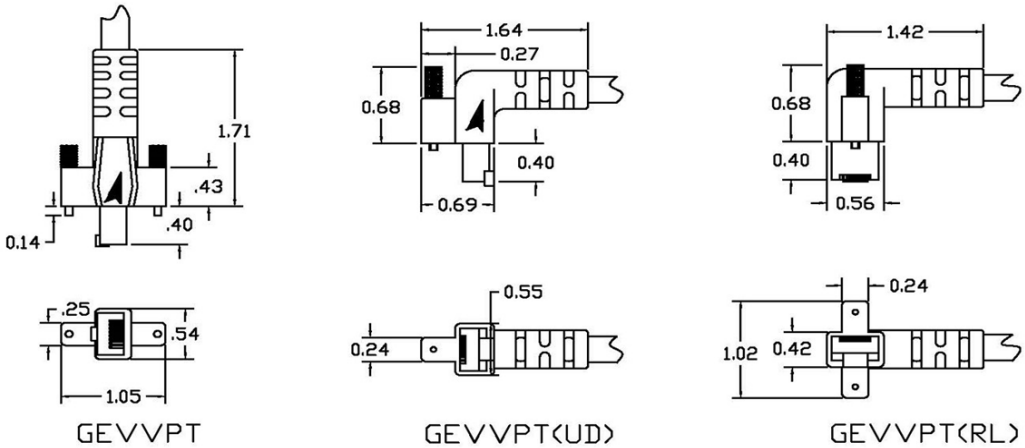


HORIZONTAL THUMBSCREWS SHOWN



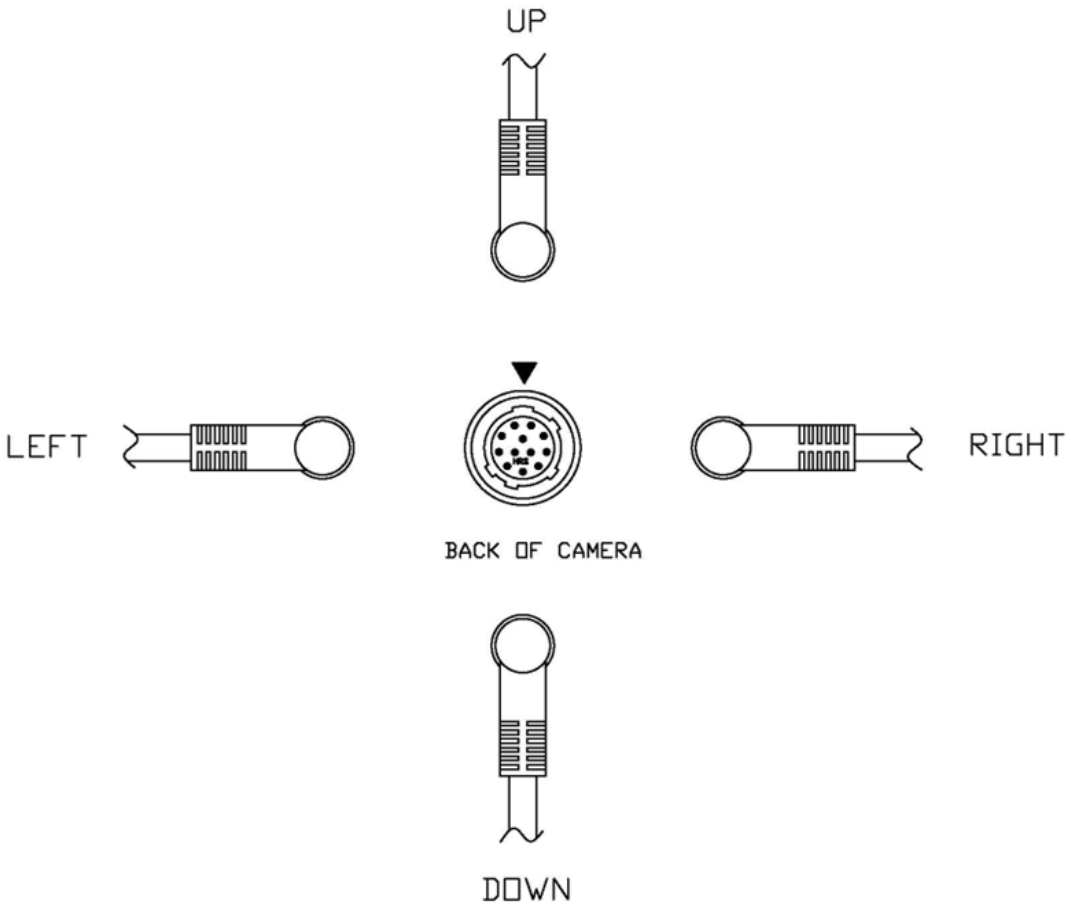
GEVPT GEVPT(RL) GEVPT(UD)

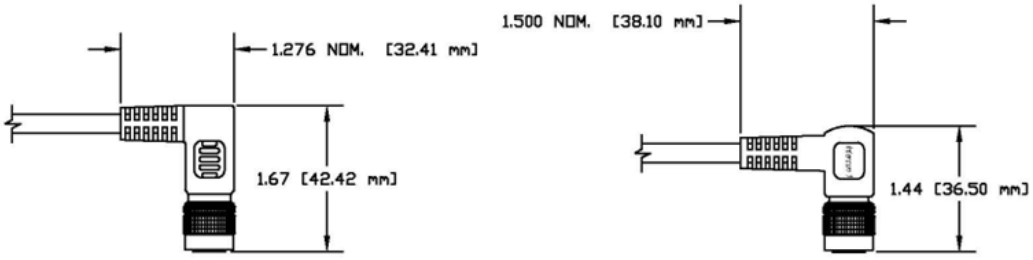
VERTICAL THUMBSCREWS SHOWN



GEVVPT GEVVPT(UD) GEVVPT(RL)

Analog/CCXC





STANDARD HEIGHT

LOW PROFILE

Technical Reference

Cable Guide

Conductors

There are many components in a cable that are important to consider when specifying a cable. Besides the outer jacket, there are: conductors, insulations, fillers, binders, identification, and shields. While some cables are designed for specific applications, others may give acceptable performance for general use. To determine durability and flex-life of a cable, it is important to understand cable construction. If you are unsure please consult our customer service professionals. This way, you may avoid repetitive and unnecessary cable replacements. Here are some basic features to keep in mind.

Conductors come in various gages and construction. Although there are many materials used in conductors, copper and aluminum are the two most common. Copper has better conductivity, but in larger gages it becomes less cost effective to use. Stranded construction is most used because of its better flexibility.

Insulations

Insulations come in many different materials. Many will work in most applications while others are specific to the environment it will be used in. Be sure to reference the typical insulation characteristics in this catalog.

Fillers

Fillers are generally used for adding strength, creating and maintaining a sequence within the cable, and filling gaps for a more uniform round appearance.

Types of filters:

- **Cotton or Rayon :** Most commonly used because of the relatively low cost.
- **Paper:** Mainly used in power cables because of the ability to get it in flame and moisture resistant properties.
- **Polypropylene:** Fairly common with its ability to mold to the shape of gap to be filled.
- **Solid Plastic:** Sometimes used because it can be extruded in any shape or diameter.
- **Kevlar:** Usually used when strength is important. It has an excellent longitudinal strength but can be expensive to use. This is normally used in fiber optic applications.

Binders

Fillers are generally used for adding strength, creating and maintaining a sequence within the cable, and filling gaps for a more uniform round appearance.

Types of filters:

- **Nylon/textile:** Is usually used when flexibility of a cable is required. These can be braided or wrapped.
- **Tapes:** generally a type of plastic like polyester or polypropylene.

Identification

Identification can be used to identify: manufacturer, cable type, UL/CSA certification, temp, volt, or fire rating, as well as others. Most companies refer to this information as the 'legend'. The five most used methods in identification are explained below.

Types of filters:

- **ID Threads:** Each manufacturing company has identification threads which can be placed inside the cable should the need arise to identify the manufacturer.
- **Surface Ink:** This is when the information is inked on the surface of the jacket.
- **Sequential Printing:** This method prints an ascending numerical number usually every foot.
- **Indent Printing:** An Impression of the information is put on the cable jacket.
- **Embossed Legend:** This is when the manufacturer will have raised lettering on the jacket. This is not common as this procedure is a more expensive operation.

Shielding

Shielding provides an efficient way to manage electromagnetic interference. When a shielded cable is present in an ambient electromagnetic field, interference current is induced in the shield. The incident energy is partially reflected from the shield and partially absorbed by the shield, and a small amount penetrates through the shield into the cable. The small amount of energy that makes it all the way through the shield generates an interference voltage in the signal carrying conductors of the cable. The smaller the interference voltage, the better the shield is working.
In addition to shielding effectiveness, electronic cable shields must satisfy a long list of electrical, mechanical, chemical, and cost requirements. As a result, a diversified line of shield designs has evolved in the wire and cable industry.

There are three general types of common shielding.

Braided

Braided is the most common method of shielding. It is comprised of interweaving layers of individual metal strands over cable or insulated conductors. Its consistent coverage remains so as the cable is flexed. The braiding material is normally a metal such as copper or aluminum but can also be other types of material plated with a conductive material. Typical wire size used is 32 to 40 AWG. Braid coverage can range from 70% to 95%. Generally more coverage equals better shielding. This type of shielding is ideal for minimizing low frequency interference and has a lower DC resistance than that of foil shielding. General uses for this type of shielding are low speed communication, good mechanical strength, or when increased flex life is needed. Drawbacks of the braided shield include high manufacturing costs due to the relatively slow speed at which the shield-braiding machinery forms the braid. Braided shields are usually bulkier, heavier and in some cases it may be harder to terminate because the braid has to be either combed out and pig tailed or combed out equally around the OD of the cable.

Foil

Foil can be constructed in single layer aluminum, conductive nylon, or two layers of aluminum with polyester backing. These types of shields are generally used for individually shielding multi-pair data cables. Foil shielding is the only commonly available shield that can give you 100% coverage. Although it is cheap, it severely limits flexibility and indeed breaks down under repeated flexing. Drain wires are normally used with this type of shield to make termination easier. Although this cable is generally more flexible than braided, it has a much shorter flex life because of its thin mechanical strength and the possibility of separation. Twisting of the conductor pairs with foil shielding can reduce cross talk, which provides the best electrical isolation between adjacent pairs.

Spiral/Serve

Spiral/Serve consists of 32 to 40 AWG copper strands (bare or tinned) in a helical shape around the cable or insulated conductors in a flat ribbon configuration. This type of shielding can give you up to 97 percent coverage. The advantage of this type of shielding is its superior flexibility, flex life, and ease of termination. Although it does not have the tensile strength of braid, the benefits are less copper, much faster to manufacturer, and can give you a smaller cable diameter. Generally spiral shields are not used above audio frequencies because of coil effect produced by the inductance or retractile cables.

Vertical Tray Flame Test - UL 1581/IEEE 383

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Fire / Flame Tests and Ratings

Customers of wire and cable should be aware of the latest regulations and the products that meet these standards. Many tests have been developed to measure the flame resistance of wire and cable products. Flame resistance of a cable is frequently defined as the ability to stop burning once the source of heat is removed. Here is a brief summary of the most widely used North American fire tests and ratings

Vertical Tray Flame Test - UL 1581/IEEE 383

This test is performed on cables attached to a 1ft wide and 8 ft tall vertical metal ladder tray. The source of combustion is a 10 inch ribbon burner with an air/propane mixture which will supply approximately 70,000 BTU's per hour. The flame is applied for 20 minutes, 24 inches from the bottom of the cable. This rating requires the cable to self-extinguish prior to reaching the top of the tray.

CSA FT - 4

This test is a later generation of the IEEE 383 test and is generally considered more stringent. To pass this test the resulting char distance must not be greater than 1.5 meters.

IEEE 1202

The IEEE 1202 flame test is the newest version of the original IEEE 383 Flame Test. It is practically identical to the CSA FT-4 test.

UL 1685

The UL 1685 is fundamentally the UL 1581 test with smoke emission requirements. A cable passing this test can be given a 'Limited Smoke listing'.

ICEA T - 29 - 520

This is another variation of the UL 1581 / IEEE 383 except the BTU value is 210,000 instead of 70,000 and cable spacing increases.

Vertical-Wire Flame Test - UL 1561 VW-1

This was the first flame test developed for studying flame spread on wire and cable. The test is performed with a 24 inch wire or cable and a Tirrill burner. Two clamps hold the single sample vertically. The burner is mounted at a 20° angle and the inner flame can touch the samples surface. Flame is applied for 15 seconds and is then reapplied 4 more times each time the wire ceases to burn. If the sample does not burn longer than 60 seconds after any application, or if less than 25% of the indicator flag burns, or the cotton batting is ignited during the test, the cable passes. A "tray rated" cable must meet this test as well.

CSA FT-1

This is the Canadian version of the VW-1 test

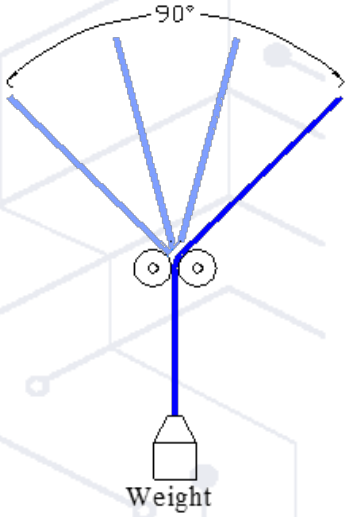
Flex Testing

Reliability Tests for 4 basic kinds of flexing

High performance cable should be considered when specifying a cable for automation. Conductors under constant motion can break due to heat generated from friction. Just because a cable is very flexible does not mean it will have a long life. In some cases, a more rigid outer cable jacket allows the conductors to move more freely inside resulting in less friction. The outer jacket not only needs to withstand constant flexing but provide protection against mechanical abrasion and environmental conditions like: chemical, moisture, and temperature. If the cables components have been designed for increased flexibility, jacket material can be determined respective to these environmental conditions. There are four basic types of flexing that most cables experience, they are: Bending, Rolling, Torsional, and Variable. These tests are basic guidelines to help with cable design associated to its function. Many cable manufactures have specific testing for their products. These examples are meant for a general understanding of basic flex testing.

Bend

Bend flexing is when the cable is flexed back and forth in one general place. This can come from many applications. Motion cameras are a very popular in this type of flexing. The cable is usually stationary while just behind the camera the cable will flex at the same place every time. This type of test is commonly referred to as “Tick Tock test” and “Flex test”.

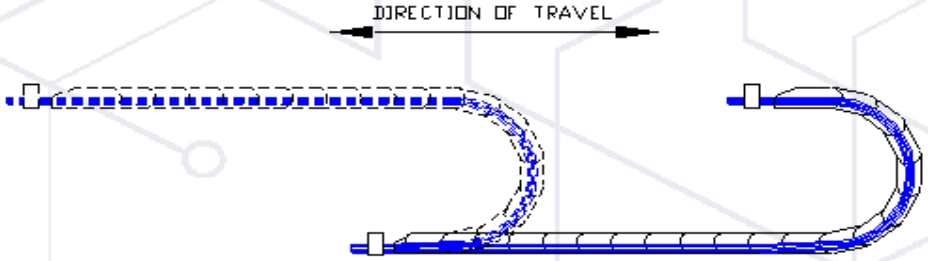


Bend Testing Guidelines

The cable is affixed to a pendulum type device and weighted. The amount of weight and size of the bend radii is dependent on the size of cable and its inner conductors. Every conductor is monitored and in the event of a failure, the test automatically stops. The cable is then flexed back and forth and counted until there is a failure within the cable.

Roll

Roll flexing is most common in automated equipment. The cable is harnessed in a flexible cable track and moved in a linear direction. This type of application will usually have an abrasion resistant jacket because of the constant rubbing against other wires, cables as well as the cable track itself. It is important to specify the correct cable to the bend radius of the cable track. A larger radius on the cable track can result in longer cable life.



Roll Testing Guidelines

The cable is installed and anchored within the cable track. Every conductor is monitored and in the event of failure, the test will stop. The cable track will be operated back and forth and counted until there is a failure within the cable.

Torsional

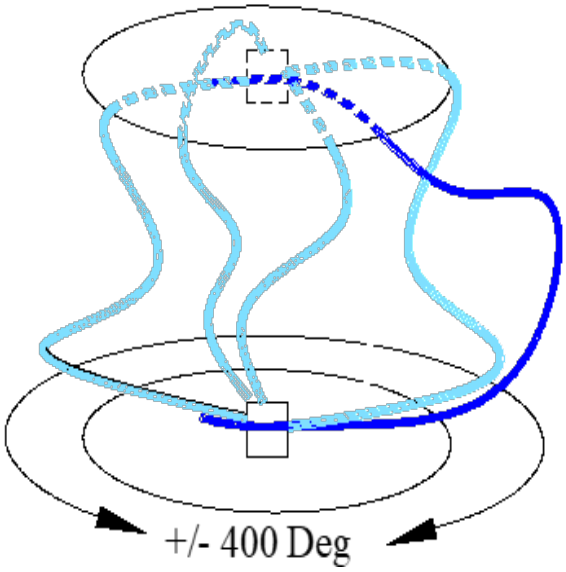
Torsional flexing is when a cable twists around its axis'. This is common to robotic applications and hand held devices with a cord. It is one of the more demanding mechanical stresses. The strain created by the twisting motion is different than that of a bend or roll flex. Because of this, standard high flex cables may not be suitable for these applications. For maximum performance, a cable designed specifically for torsion should be utilized.

Variable

Variable flexing is when the cable is fixed in two positions and has the freedom to bend and move in any direction. This is usually found in robotic applications. With this freedom of movement, cable selection is critical.

Variable Testing Guidelines

The cable is anchored in two separate places and then one end is rotated 400 degrees in each direction from its relaxed state. Test requirements may change slightly for specific cable design. Some alterations may include: length of cable or amount of twist. Every conductor is monitored and in the event of failure the test will stop.



General Guidelines

Consider the applications voltage, current, bend radius, physical location, environmental conditions, and flex cycle when choosing a cable. This can increase the life cycle which results in less downtime and longer maintenance intervals.

When troubleshooting a deteriorated cable, there are a few general things to look for.

Twisted Cable Jacket- The outside jacket generally starts to twist when the internal conductors have begun to unwind due to improper cable selection, installation, or shielding.

Outer Jacket Wear- Many times this is due to incorrect cable selection or installation. If the cable can contact any other surface while in motion, it will give opportunity for abrasion wear.

General Cable Failure- This happens most often because of harsh environmental conditions. The introduction to hazards like: moisture, welding spatter, oils, chemicals, temperature, and sunlight can degrade a cable assembly prematurely if it is not specified for the correct conditions.

Installation Data for High-Flex Cable in a Cable Track

When selecting cable for cable track the following criteria should be taken into consideration:
Different materials are designed for different environmental conditions. The following list is some of the most common environmental conditions to be considered:

- Abrasives
- Alcohols
- Alkali'
- Cold/Hot Temperatures
- Flame
- Indoor/Outdoor use
- Moisture
- Petroleum Products/Gasoline
- Minimum Bend Radius
- Shielding
- Oxidation
- Oils
- O+zone
- Sunlight

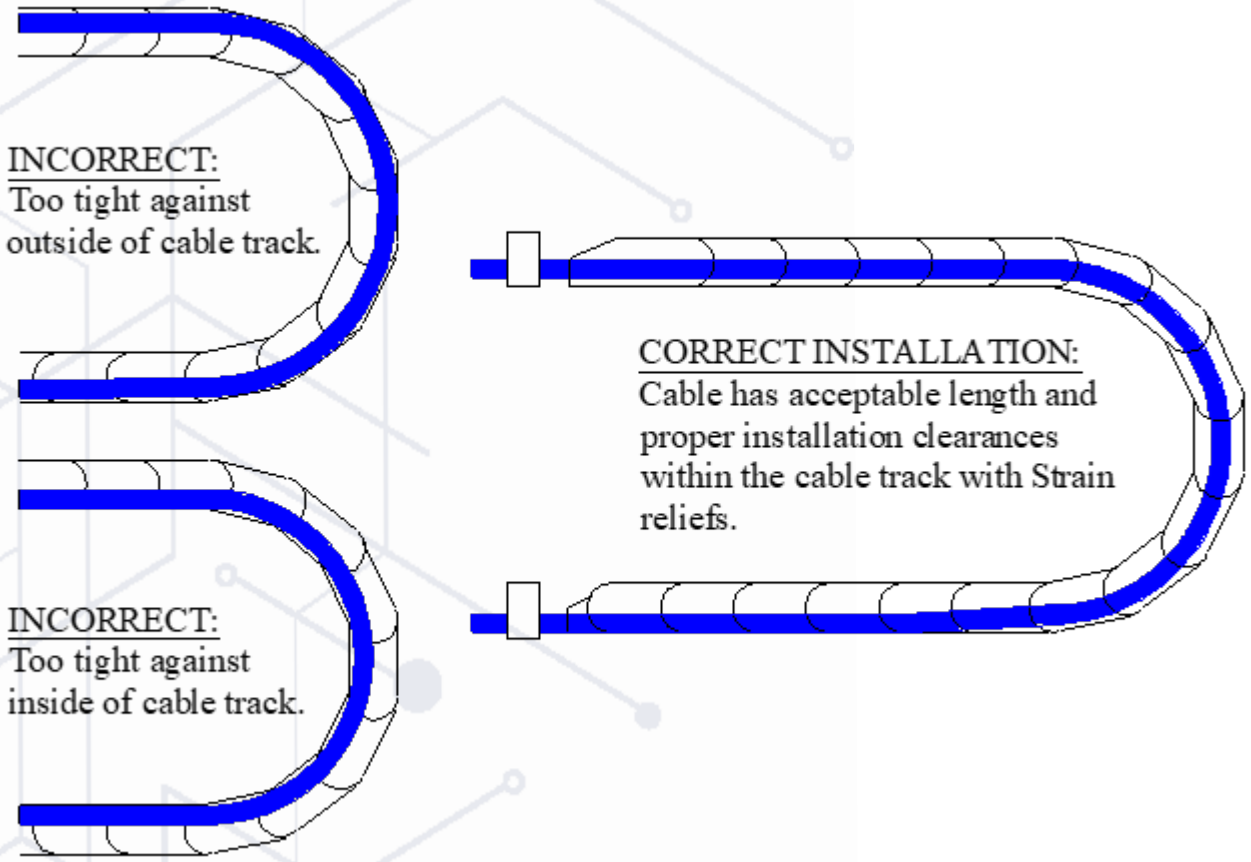
Other Factors to Consider

- Traveling Speed and Distance
- Frequency of Operation

Successful Installation Will Greatly Increase by following these guidelines:

1. Do not exceed the recommended minimum bend radius of the cable. This is based on a general application at a normal operating temperature. Many times a larger bend radius than the minimum will increase the service life of the cable.
2. Prepare the cable for torsion-free installation without twists, bends or kinks. Always unwind the cable from the outside layer of the reel or spool. Never pull a cable from a coil. Lay out the cable or hang it for 24 hours prior to installation. This will relax any remaining stresses resulting from production, transit, or storage. If the cable cannot be unstressed and still maintains a 'coil memory', shake it out by grasping the cable at its middle and vigorously shake the cable as you move to each end.
3. Once the cable is ready, wrap each end of the cable with non-residue producing identification tape and indicate the top of each cable end. Maintain this alignment throughout installation. This reduces the possibility of twist in the cable during installation.
4. Evaluate the weight and size of each cable. The cables, by weight, must be evenly distributed in the track. Place the heavier cables toward the outside of the track and the lighter ones toward the center. For a cable track that is side mounted, always place the larger cables toward the outside and the smaller cables toward the inside of the track.
5. Place the cables in the track in a 'working position' and loosely side by side. As a rule, allow at least 10% more of the cables diameter within the internal dimensions of the cable track. Do not weave the cables between or around other cables in the track. If spacers are provided in the track, separate the larger cables from smaller cables

6. Locate the proper attachment points for saddle clamps and affix at both ends of the cable track. Do not over tighten. The purpose for saddle clamps is to distribute the pressure evenly over a larger area of the jacket which reduces the possibility of crushing the conductors.
7. After the cable is installed, it should be cycled through several flex operations. During these initial flex operations observe cable movement and check for freedom from binding, rubbing, and pulling. It is critical that all cables move with complete freedom, throughout the cable track.



Intercon 1™ by Nortech

Intercon 1 by Nortech specializes in machine vision technology and is the premier producer of camera cable and assemblies in the United States. Since 1978 it has led the camera cable market in serving machine vision customers – providing sophisticated engineering, specialized tools and methodologies to support ground breaking vision technology.

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