cei

CABLE SOLUTIONS GUIDE
INDUSTRY LEADING PERFORMANCE
VOLUME IV

CAMERA LINK

CoaXPress

FIREWIRE

CAMERA LINK

GigE

USB 3.0

ANALOG VIDEO

HISTORY

Components Express, Inc. was incorporated in 1992 specializing in datacom and telecom cable assemblies. In 1998, the company began producing telecom devices. By 2001, CEI began building specialty cables for the machine vision market place. Today, our high quality in house manufacturing capabilities and cost – effective international manufacturing operations allow us to offer both simple cable assemblies and complex devices used in the machine vision data path.

Dedication to service has been rewarding to CEI and our customers. Today, CEI uses up to 80,000 square feet of flexible manufacturing space and up to 200 employees worldwide. Our services include engineering, R&D, manufacturing, finished goods warehousing and global distribution.

Components Express, Inc. fully recognizes and supports the following: programs, initiatives and policies.
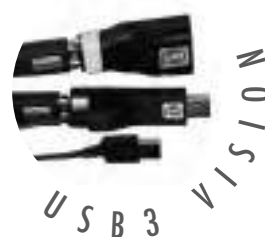
- R.E.A.C.H. Compliant
- GREEN
- DRC / Conflict Free

REV. C

TABLE OF CONTENTS

All cables and power supplies are RoHS compliant

BITMAXX

CAMERA LINK HS

USB3 VISION

POWER SUPPLIES

CAMERA LINK
MACHINE VISION CABLES

PART NUMBER REFERENCE   M V C - X - X - X - ( ) M

Select Connector Type: End "1"

MDR Male Straight Exit = 1	MDR Male Exit *LEFT* w/Recessed Screws = 11
MDR Female Straight Exit = 2	HDR / SDR Female Straight Exit = 12
MDR Male Low Profile R/A Exit *UP* = 3	MDR Male R/A *UP* 135° Exit *LEFT* = 13
MDR Male Low Profile R/A Exit *DWN* = 4	MDR Male R/A *DWN* 135° Exit *LEFT* = 14
HDR / SDR Male Straight Exit = 5	14P HDR / SDR PoCL Lite Straight Exit w/Recessed Screws = 15
HDR / SDR Male R/A Exit *UP* w/Recessed Screws = 6	MDR Latch Type Straight Exit = 16
HDR / SDR Male R/A Exit *DOWN* w/Recessed Screws = 7	HDR / SDR Male Exit *RIGHT* w/Recessed Screws = 17
MDR Male Ext. Profile R/A Exit *UP* = 8	HDR / SDR Male Exit *LEFT* w/Recessed Screws = 18
MDR Male Ext. Profile R/A Exit *DWN* = 9	HDR / SDR Male R/A *UP* Ext. Profile w/Recessed Screws = 19
MDR Male Exit *RIGHT* w/Recessed Screws = 10	HDR / SDR Male R/A *DWN* Ext. Profile w/Recessed Screws = 20

Cable Type Options:

HIFLEX BLACK = 1	30 AWG = 3	PoCL Lite = 5
HIFLEX PoCL = 2	30 AWG PoCL = 4	

Select Connector Type: End "2"

MDR Male Straight Exit = 1	MDR Male Exit *LEFT* w/Recessed Screws = 11
MDR Female Straight Exit = 2	HDR / SDR Female Straight Exit = 12
MDR Male Low Profile R/A Exit *UP* = 3	MDR Male R/A *UP* 135° Exit *LEFT* = 13
MDR Male Low Profile R/A Exit *DWN* = 4	MDR Male R/A *DWN* 135° Exit *LEFT* = 14
HDR / SDR Male Straight Exit = 5	14P HDR / SDR PoCL Lite Straight Exit w/Recessed Screws = 15
HDR / SDR Male R/A Exit *UP* w/Recessed Screws = 6	MDR Latch Type Straight Exit = 16
HDR / SDR Male R/A Exit *DOWN* w/Recessed Screws = 7	HDR / SDR Male Exit *RIGHT* w/Recessed Screws = 17
MDR Male Ext. Profile R/A Exit *UP* = 8	HDR / SDR Male Exit *LEFT* w/Recessed Screws = 18
MDR Male Ext. Profile R/A Exit *DWN* = 9	HDR / SDR Male R/A *UP* Ext. Profile w/Recessed Screws = 19
MDR Male Exit *RIGHT* w/Recessed Screws = 10	HDR / SDR Male R/A *DWN* Ext. Profile w/Recessed Screws = 20

Option: Length in Meters

Physical:

Cable Color:	Black
Shell Color:	Black
Shell Construction:	Pre-molded in Polyethelene, fully shielded and over-molded in black PVC.
Cable Construction:	Meets Automated Imaging Association Camera Link Standard. Skew-within pair: 35 ps/m max Skew-channel skew per chipset: 50 ps/m max. All cables are Camera Link approved.

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CONNECTOR TYPE OPTIONS:

1 MDR Male
Straight Exit

2 MDR Female
Straight Exit
w/Removable Hardware

3 MDR Male Low Profile
R/A UP

4 MDR Male Low Profile
R/A DOWN

5 HDR / SDR Male
Straight Exit

6 HDR / SDR Male R/A
Exit UP
w/Recessed Screws

7 HDR / SDR Male R/A
Exit DOWN
w/Recessed Screws

8 MDR Male Ext. Profile
R/A Exit UP

9 MDR Male Ext. Profile
R/A Exit DOWN

10 MDR Male
Exit RIGHT
w/Recessed Screws

11 MDR Male
Exit LEFT
w/Recessed Screws

12 * HDR / SDR Female
Straight Exit

13 MDR Male R/A UP 135°
Exit LEFT

14 MDR Male R/A DOWN 135°
Exit LEFT

15 ** 14P HDR / SDR PoCL Lite
Straight Exit
w/Recessed Screws

16 * MDR Latch Type
Straight Exit
Diecast

17 HDR / SDR Male
Exit RIGHT
w/Recessed Screws

18 HDR / SDR Male
Exit LEFT
w/Recessed Screws

19 HDR / SDR Male R/A UP
Ext. Profile
w/Recessed Screws

20 HDR / SDR Male R/A DOWN
Ext. Profile
w/Recessed Screws

* Connector #12 & 16 are ONLY compatible with cable types 3 & 4.
** Cable type 5 is ONLY compatible with connector #15.

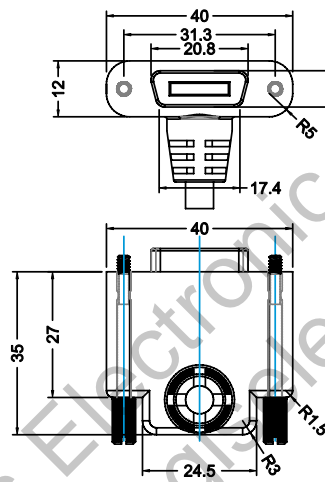**See pages 4 – 5 for profile drawings.**   REV. C
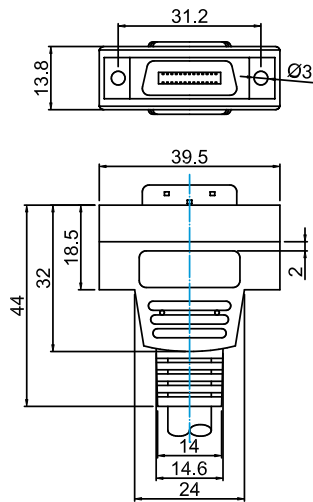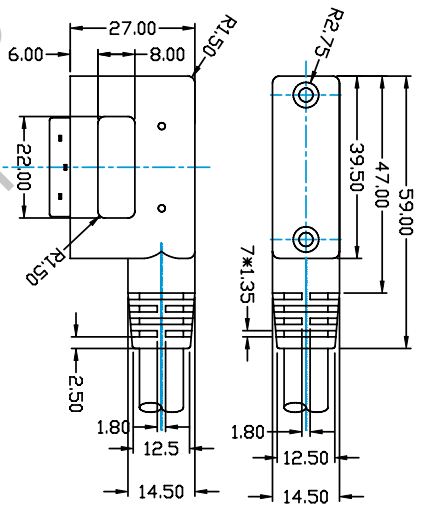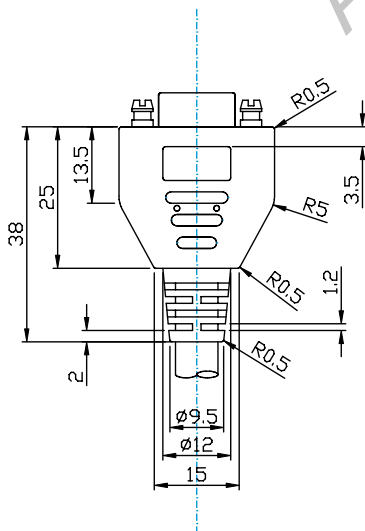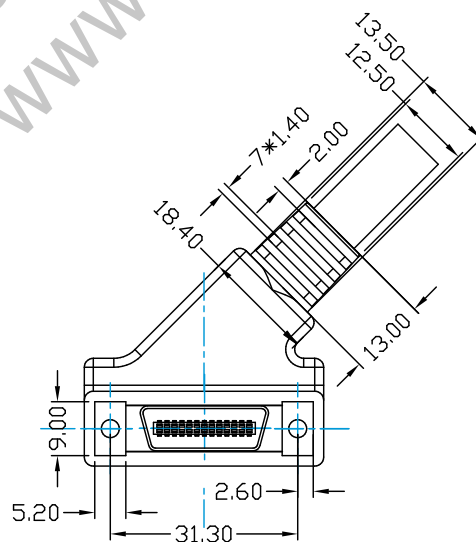
PROFILES 1 & 2
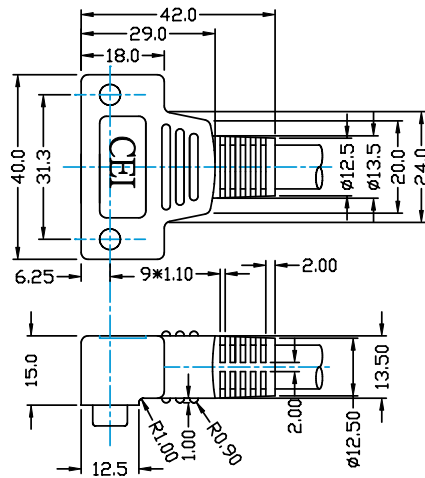
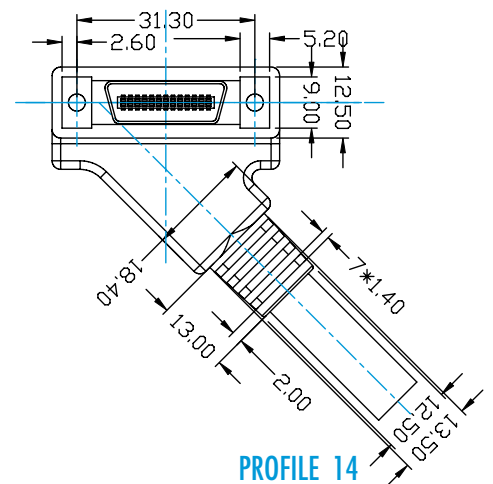PROFILES 3 & 4
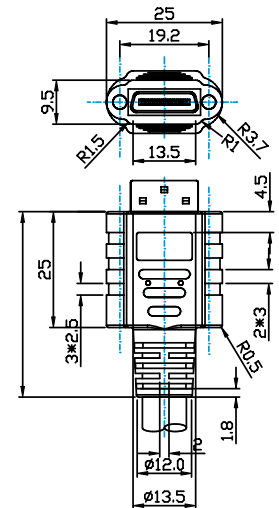
PROFILE 5
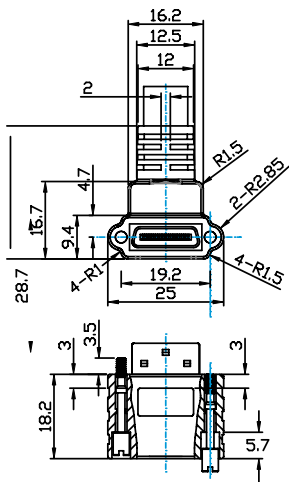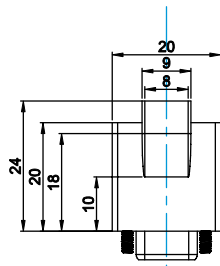
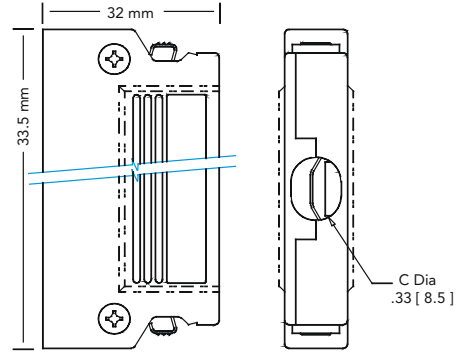PROFILES 6 & 7

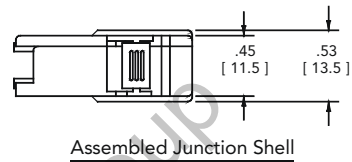PROFILES 8 & 9

PROFILES 10 & 11

PROFILE 12

PROFILE 13

PROFILE 14

REV. C

PROFILE 15
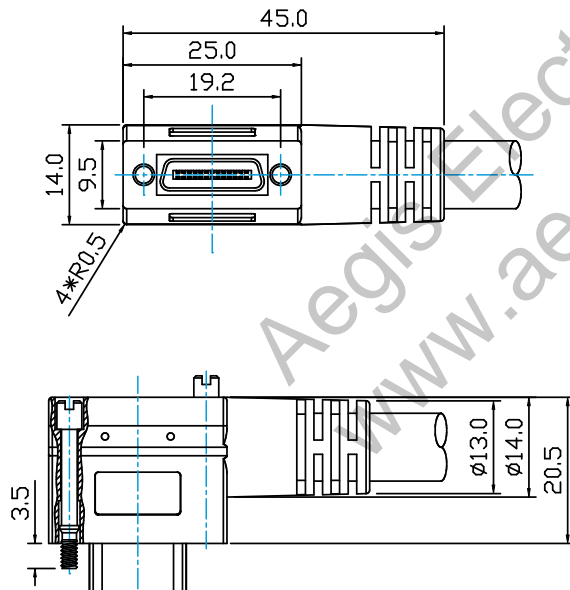

32 mm

33.5 mm

C Dia
.33 [8.5]

.45
[11.5]

.53
[13.5]

Assembled Junction Shell

PROFILE 16
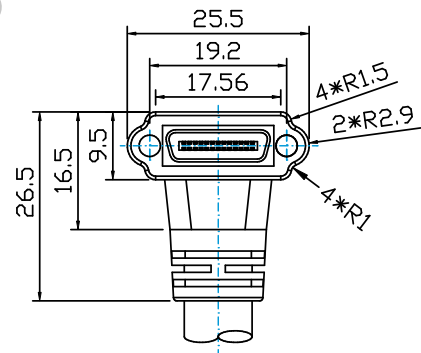
45.0
25.0
19.2
14.0
9.5
4✳R0.5

Ø13.0
Ø14.0
20.5
3.5

PROFILES 17 & 18

25.5
19.2
17.56
4✳R1.5
2✳R2.9
4✳R1
26.5
16.5
9.5

2.0
5✳1.0
3.0
14.0
Ø13.5
Ø12.5
2.0
2.0
19.0
0.5

PROFILES 19 & 20
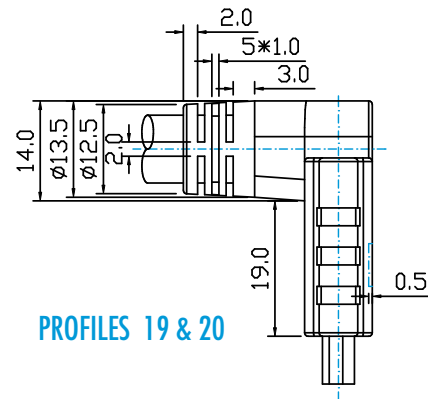
PART NUMBER REFERENCE   M X - X - X - X - ( ) M

Select Profile Type:

*Standard Dimension Type: 99 = V
*Extended Dimension Type: 116 = A

Select Connector Type: End "1"

RJ45 Straight = 1	Horizontal R/A Up w/Thumbscrews = 7
RJ45 Vertical w/Thumbscrews = 2	Horizontal R/A Down w/Thumbscrews = 8
RJ45 Horizontal w/Thumbscrews = 3	RJ45 Vertical *RIGHT* Exit w/Thumbscrews = 9
RJ45 Straight Industrial IP67 = 4	RJ45 Vertical *LEFT* Exit w/Thumbscrews = 10
RJ45 R/A *DOWN* w/Clip = 5	RJ45 Horizontal *RIGHT* Exit w/Recessed Screws = 11
RJ45 Vertical R/A *DOWN*	RJ45 Horizontal *LEFT* Exit w/Recessed Screws = 12
w/Recessed Screws = 6	M12 X-Coded 10Gig = 13

Cable Type Options:

SSTP (CAT 6) = 1 *	C-Track Cable (CAT 5e) = 4 *
Industrial HIFLEX TIC-TOC (CAT 5e) = 2 *	Robotic (CAT 5e) = 5 *
Extended Distance (CAT 6) = 3	10Gig (CAT 6a) = 6 *

Select Connector Type: End "2"

RJ45 Straight = 1	Horizontal R/A Up w/Thumbscrews = 7
RJ45 Vertical w/Thumbscrews = 2	Horizontal R/A Down w/Thumbscrews = 8
RJ45 Horizontal w/Thumbscrews = 3	RJ45 Vertical *RIGHT* Exit w/Thumbscrews = 9
RJ45 Straight Industrial IP67 = 4	RJ45 Vertical *LEFT* Exit w/Thumbscrews = 10
RJ45 R/A *DOWN* w/Clip = 5	RJ45 Horizontal *RIGHT* Exit w/Recessed Screws = 11
RJ45 Vertical R/A *DOWN*	RJ45 Horizontal *LEFT* Exit w/Recessed Screws = 12
w/Recessed Screws = 6	M12 X-Coded 10Gig = 13

Option: Length in Meters

* *Cable types 1, 2, 4, 5 & 6 are ONLY suitable up to 60 meters.*

* *Cable type 6 is ONLY suitable with configurations that include connector #13.*

* *For configurations using connector type: 6, 11, 12, with cable type 2, 4, 5 the rated speed is Cat-5. The rated speed with cable type 1 & 3 is Cat-5e.*

* *Connector type #13 is not suitable for connectors 6, 11, 12.*

REV. C

Physical:
Cable Color:	Black
Shell Color:	Black
Shell Construction:	Pre-molded in Polyethelene, fully shielded and over-molded in black PVC.
Cable Construction:	Meets EIA/TIA standards, category performance certified.

CONNECTOR TYPE OPTIONS:
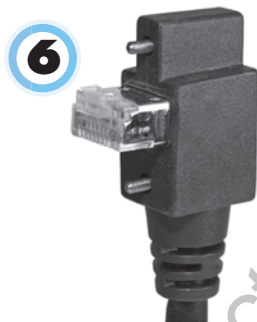
1 RJ45 Straight

2 RJ45 Vertical
w/Thumbscrews

3 RJ45 Horizontal
w/Thumbscrews

4 RJ45 Straight
Industrial IP67

5 RJ45
R/A DOWN w/Clip

6 RJ45 Vertical
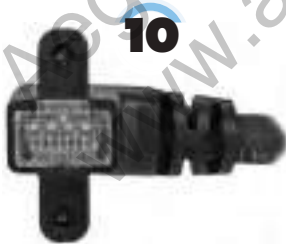R/A DOWN
w/Recessed Screws

7 Horizontal R/A UP
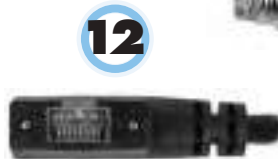w/Thumbscrews

8 Horizontal R/A DOWN
w/Thumbscrews

9 RJ45 Vertical
RIGHT Exit
w/Thumbscrews

10 RJ45 Vertical
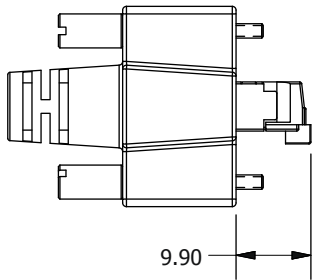LEFT Exit
w/Thumbscrews

11 RJ45 Horizontal
RIGHT Exit
w/Recessed Screws

12 RJ45 Horizontal
LEFT Exit
w/Recessed Screws

13 M12 X-Coded
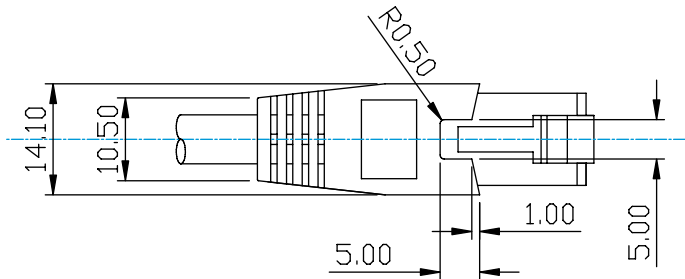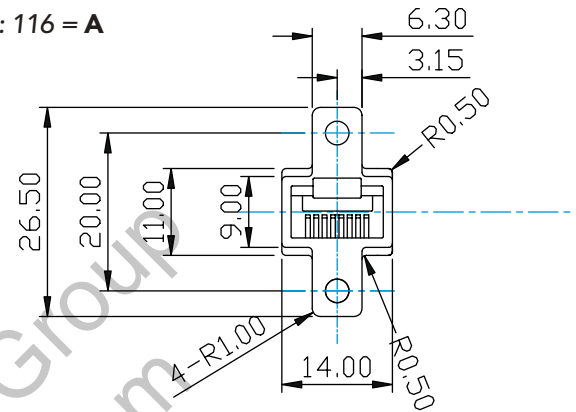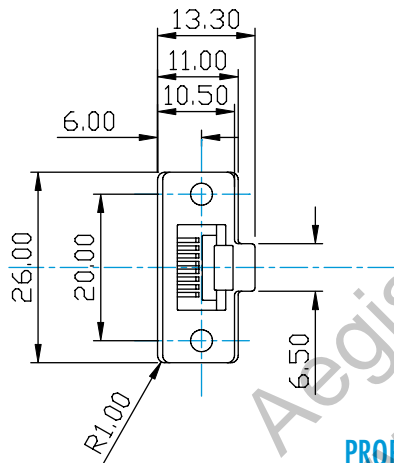10Gig

See page 8 & 9 for profile drawings.

TYPE 99
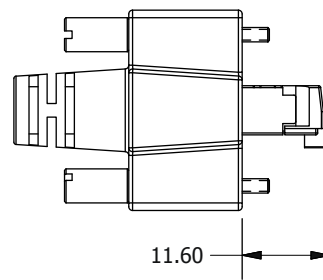
9.90

TYPE 116

11.60

Standard Dimension Type: 99 = V
Extended Dimension Type: 116 = A

R0.50
14.10
10.50
5.00
1.00
5.00

PROFILE 1

6.30
3.15
R0.50
26.50
20.00
11.00
9.00
4-R1.00
14.00
R0.50

PROFILE 2

13.30
11.00
10.50
6.00
26.00
20.00
6.50
R1.00

PROFILE 3

12.00
5.00
2.00
10.50
12.00
1.50
R0.50
9*1.20
R0.50

13.50

PROFILE 4

16.00max
5.75
R7.00
13.75
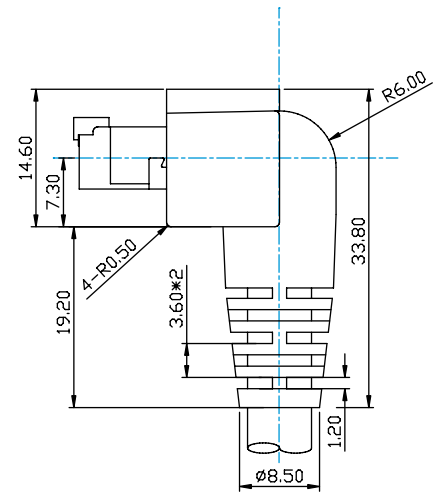9.50
R1.50
28.50
2.00
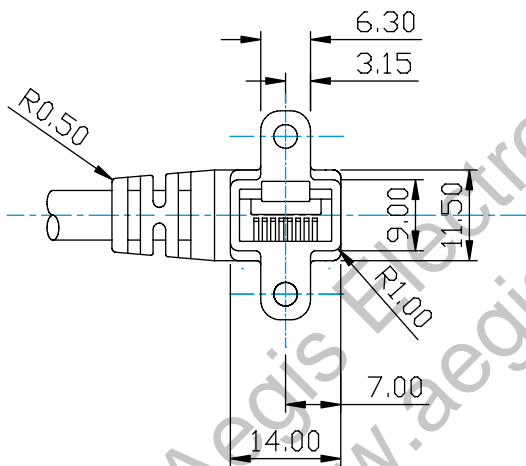1.35
R0.50
1.60
Ø10.5
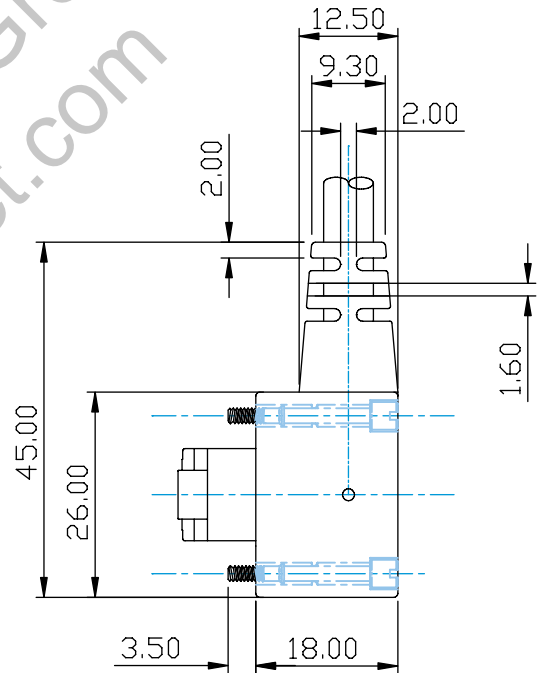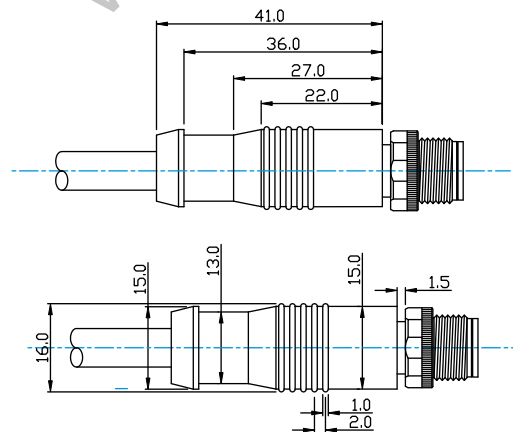11.50
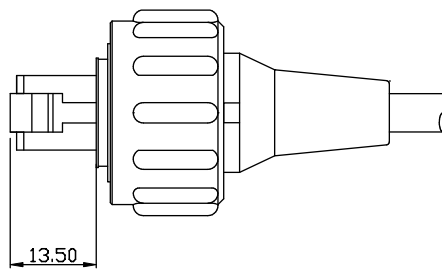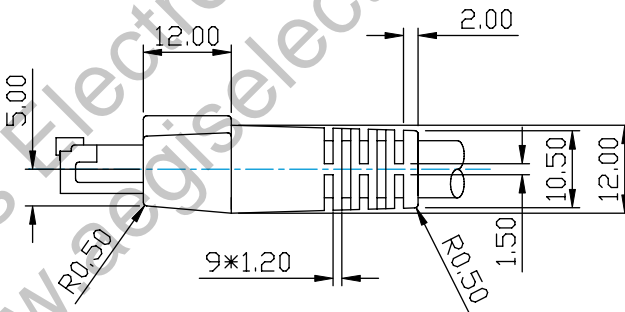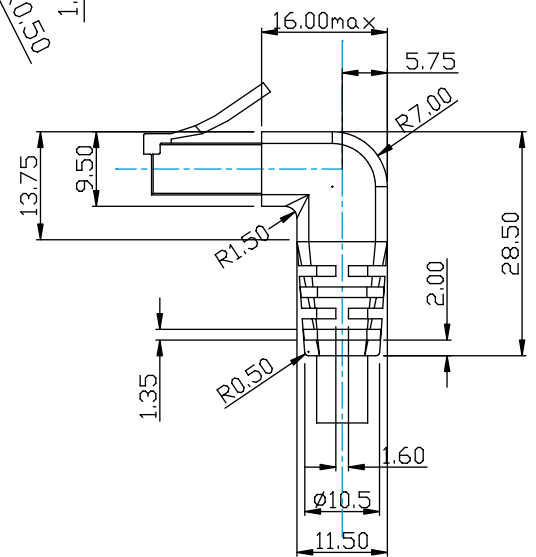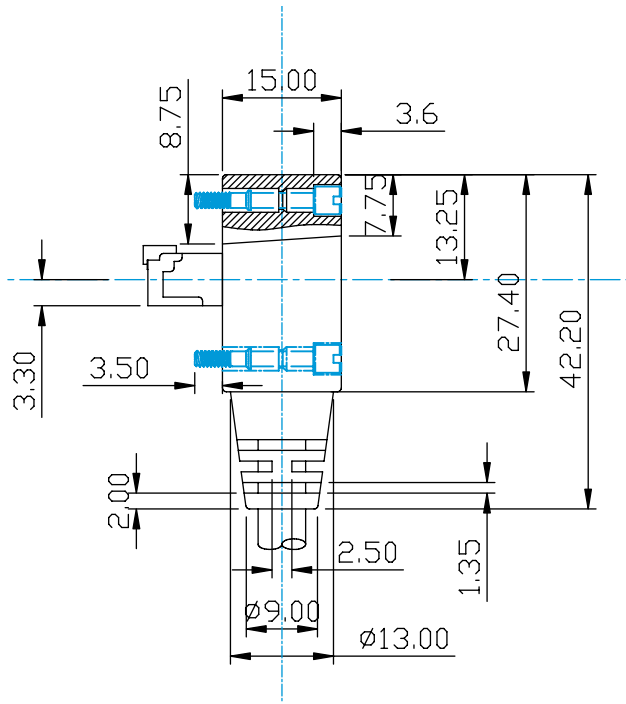
PROFILE 5

PROFILE 6

PROFILE 7 & 8

PROFILE 9 & 10

PROFILE 11 & 12

PROFILE 13

FIREWIRE
IEEE-1394 CABLES

PART NUMBER REFERENCE M V F · X · X · X · ( ) M

Select Connector Type: End "1"

1394b 9 Pin w/Thumbscrews = 1	1394b R/A *UP* w/Recessed Screws = 11
1394b 9 Pin Friction Fit = 2	1394b R/A *DOWN* w/Recessed Screws = 12
1394a 6 Pin w/Thumbscrews = 3	1394b 9 Pin Exit *RIGHT* w/Screw = 13
1394a 6 Pin Friction Fit = 4	1394b 9 Pin Exit *LEFT* w/Screw = 14
1394a 6 Pin w/Latches = 5	1394a 6 Pin R/A (Cable Exit Pin 1) = 15
1394b 9 Pin R/A *UP* = 6	1394a 6 Pin R/A (Cable Exit Pin 6) = 16
1394b 9 Pin R/A *DOWN* = 7	1394a 6 Pin Female = 17
1394b 9 Pin Exit *RIGHT* = 8	1394a 6 Pin R/A (Cable Exit Pin 1) = 18
1394b 9 Pin Exit *LEFT* = 9	1394a 6 Pin R/A (Cable Exit Pin 6) = 19
1394b 9 Pin Female = 10	

Cable Type Options:

Standard Static Cable = 1
HIFLEX = 2
Extended Distance = 3
ROBOTIC = 4 *

Select Connector Type: End "2"

1394b 9 Pin w/Thumbscrews = 1	1394b R/A *UP* w/Recessed Screws = 11
1394b 9 Pin Friction Fit = 2	1394b R/A *DOWN* w/Recessed Screws = 12
1394a 6 Pin w/Thumbscrews = 3	1394b 9 Pin Exit *RIGHT* w/Screw = 13
1394a 6 Pin Friction Fit = 4	1394b 9 Pin Exit *LEFT* w/Screw = 14
1394a 6 Pin w/Latches = 5	1394a 6 Pin R/A (Cable Exit Pin 1) = 15
1394b 9 Pin R/A *UP* = 6	1394a 6 Pin R/A (Cable Exit Pin 6) = 16
1394b 9 Pin R/A *DOWN* = 7	1394a 6 Pin Female = 17
1394b 9 Pin Exit *RIGHT* = 8	1394a 6 Pin R/A (Cable Exit Pin 1) = 18
1394b 9 Pin Exit *LEFT* = 9	1394a 6 Pin R/A (Cable Exit Pin 6) = 19
1394b 9 Pin Female = 10	

Option: Length in Meters

* Cable type 1: Suitable up to 4.5M
* Cable type 2: Suitable up to 8M
* Cable type 3: Suitable for 6 - 10M
* Cable type 4: Is Not compatible w/Conn. Type: 5

Physical:

Cable Color:	Black
Shell Color:	Black
Shell Construction:	Pre-molded in Polyethelene, fully shielded and over-molded in black PVC.
Cable Construction:	Meets industry S-400 and S-800 standards. All cables are fully certified.

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CONNECTOR TYPE OPTIONS:

1
1394b 9 Pin
w/Thumbscrews

2
1394b 9 Pin
Friction Fit

3
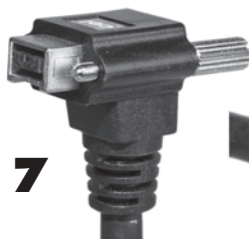1394a 6 Pin
w/Thumbscrews

4
1394a 6 Pin
Friction Fit

5
1394a 6 Pin
w/Latches

6
1394b 9 Pin
R/A UP

7
1394b 9 Pin
R/A DOWN
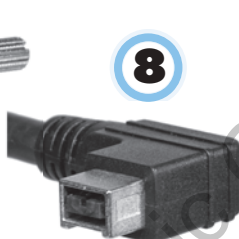
8
1394b 9 Pin
Exit RIGHT
Friction Fit

9
1394b 9 Pin
Exit LEFT
Friction Fit

10
1394b 9 Pin
Female
w/Removeable Hardware

11
1394b R/A UP
w/Recessed Screws

12
1394b R/A DOWN
w/Recessed Screws

13
1394b 9 Pin
Exit RIGHT
w/Recessed Screw
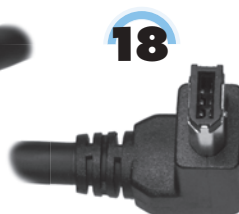
14
1394b 9 Pin
Exit LEFT
w/Recessed Screw

15
1394a 6 Pin R/A
(Cable Exit Pin 1)
Friction Fit

16
1394a 6 Pin R/A
(Cable Exit Pin 6)
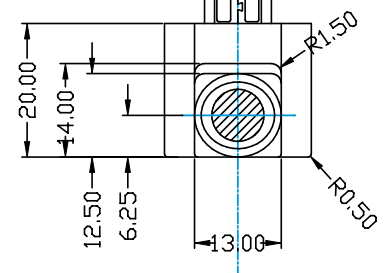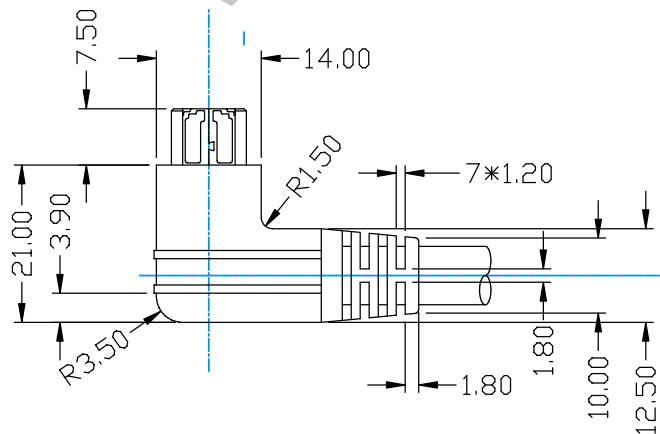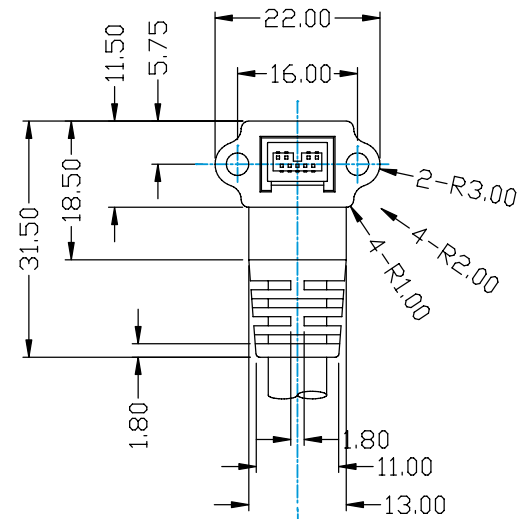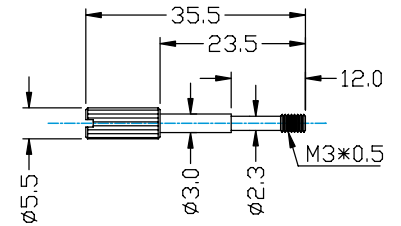Friction Fit

17
1394a 6 Pin
Female
Friction Fit

18
1394a 6 Pin R/A
(Cable exit Pin 1)
Friction Fit

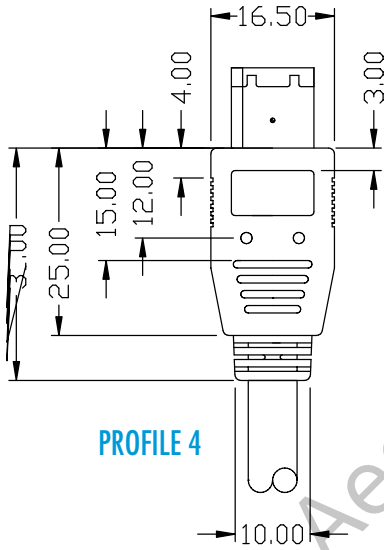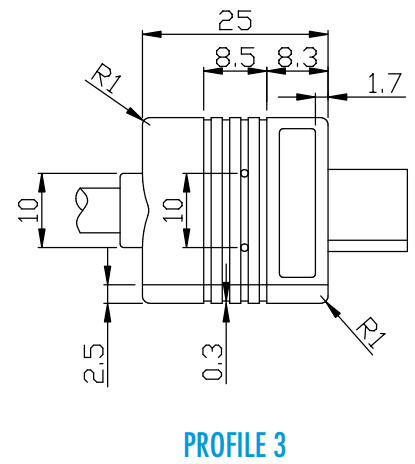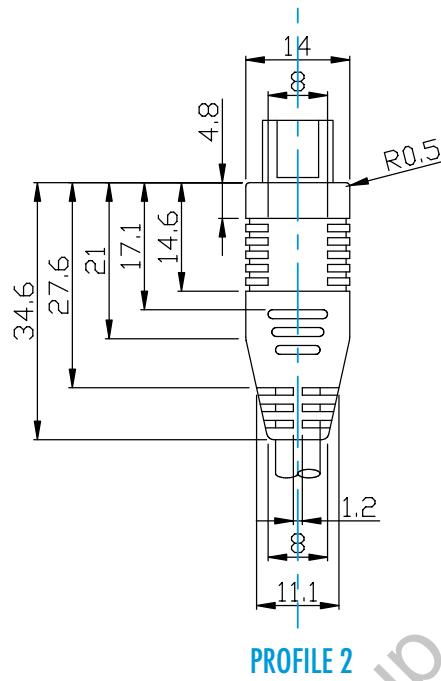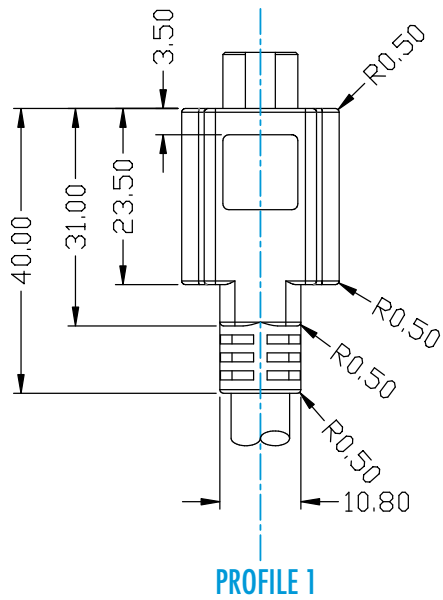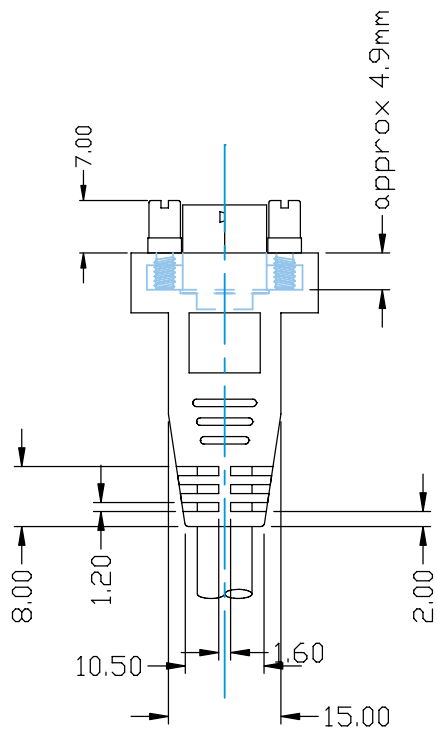**19**
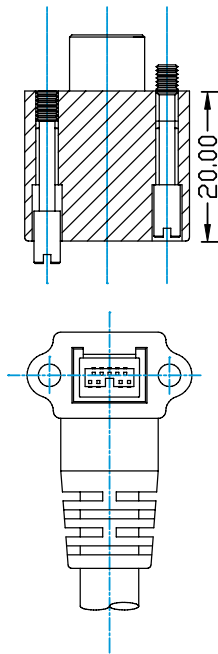1394a 6 Pin R/A
(Cable Exit Pin 6)
Friction Fit

See page 12 & 13 for profile drawings.

PROFILE 1

PROFILE 2

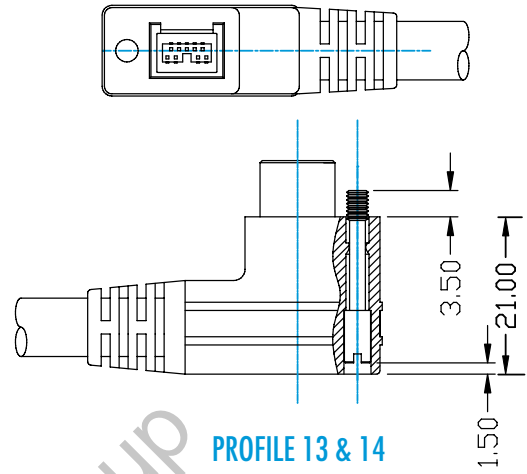PROFILE 3

PROFILE 4

PROFILE 5

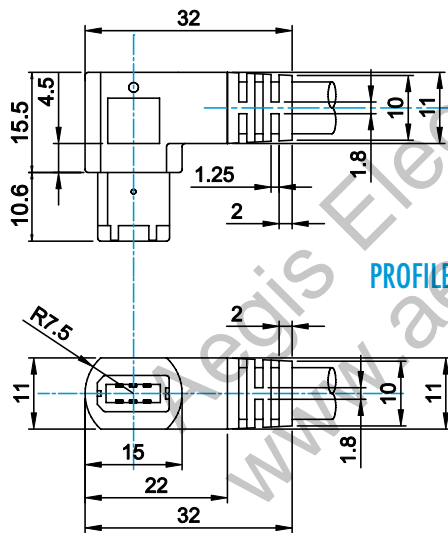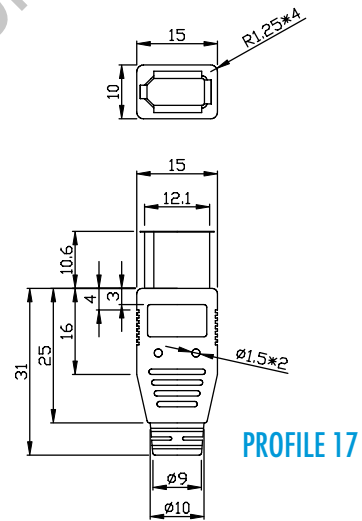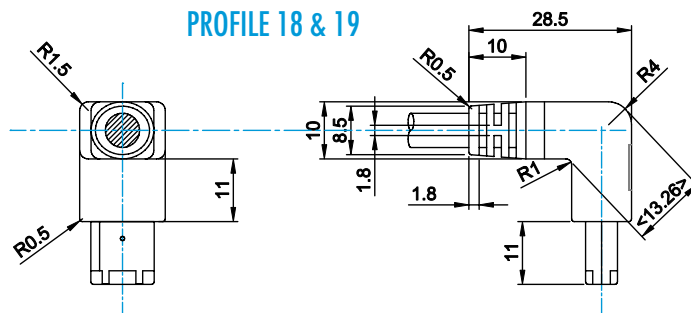PROFILE 8 & 9
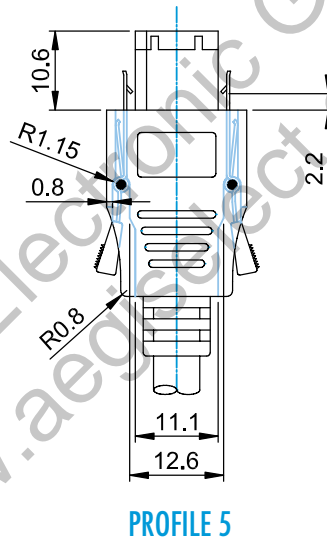
PROFILE 6 & 7

REV. C

PROFILE 10

PROFILE 11 & 12

PROFILE 13 & 14

PROFILE 15 & 16

PROFILE 17

PROFILE 18 & 19
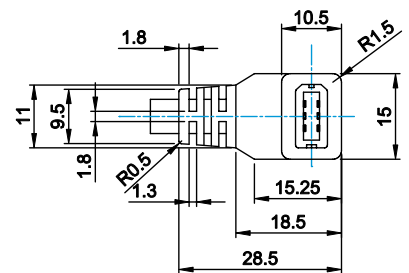
A N A L O G
CABLES

PART NUMBER REFERENCE
M V A ▪ X ▪ X ▪ X ▪ X ▪ ( ) M

Select Connector Type: 1-8 End "1"

Gender, Body and Pin Count
(*from page 15*) End "1"

Connector Orientation:
See example at right

Straight = 0
Right Angle 360° = 1 *
Right Angle   45° = 2 *
Right Angle   90° = 3
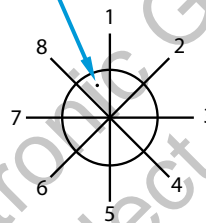Right Angle 135° = 4
Right Angle 180° = 5 *
Right Angle 225° = 6 *
Right Angle 270° = 7
Right Angle 315° = 8

** PLEASE NOTE: Right Angle
orientations are available for
connector types: 1, 2, 5 & 6*

**Example: Right Angle
orientation #3 (90°)**

Pin #1

Cable Type Option:

24 AWG x 12C (I/O) = 1 *
ULTRAFLEX (Video) = 2 *
28 AWG x 6C (I/O) = 3 *
26 AWG x 8C (I/O) = 4 *

Select Connector Type: 1-8 End "2"

Gender, Body, and Pin Count
(*from page 15*) End "2"
X on End "2" denotes flying leads

Option: Length in Meters

* *X End option for step "4" denotes flying leads for cable.*
* *Cable type 1 is only for End A types 1-4 going to End B flying leads (X).*
* *Cable type 2 is only available for end types 1-4.*
* *Customer specified pin-out/color code for flying leads*
* *Cable type 3 is only available for end types 5, 6 & Flying Leads.*
* *Cable type 4 is only available for end types 7, 8 & Flying Leads.*
* *Step 2: Right Angle options 1-8 will only be available for end types 1,2, 5 & 6*
* *Connector P/N is for reference only.*

Physical:

Cable Color:	Black
Shell Color:	Black
Shell Construction:	Pre-molded in Polyethelene, fully shielded and over-molded in black PVC.
Cable Construction:	Mini coaxial lines plus discrete wires for all standard RGB, HD and VD applications.

CONNECTOR TYPE OPTIONS:

1

12 Pin Female Plug
HR10A-10P-12S*

2

12 Pin Male Plug
HR10A-10P-12P*

3

12 Pin Female Jack
HR10A-10J-12S*

4

12 Pin Male Jack
HR10A-10J-12P*

5

6 Pin Female Plug
HR10A-7P-6S*

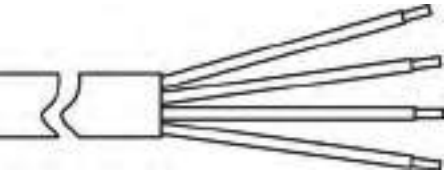**6**
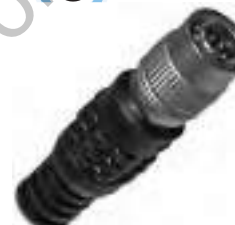
6 Pin Male Plug
HR10A-7P-6P*

7

8 Pin Female Plug
HR25-7TP-8S*

8

8 Pin Male Plug
HR25-7TP-8P*

X
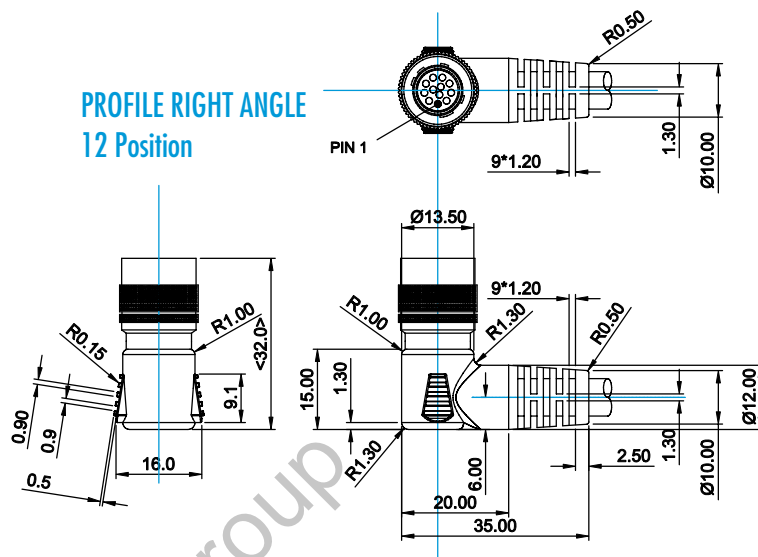
Flying Leads
for End "2"

* Connector P/N is for reference only.

See page 16 for profile drawings.

PROFILE RIGHT ANGLE
12 Position

PIN 1

PROFILE 1, 2, 3 & 4

PROFILE 5 & 6

PROFILE 7 & 8

PROFILE RIGHT ANGLE
6 Position

2" JACKET STRIP
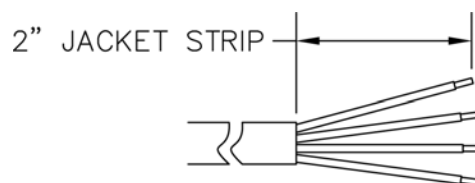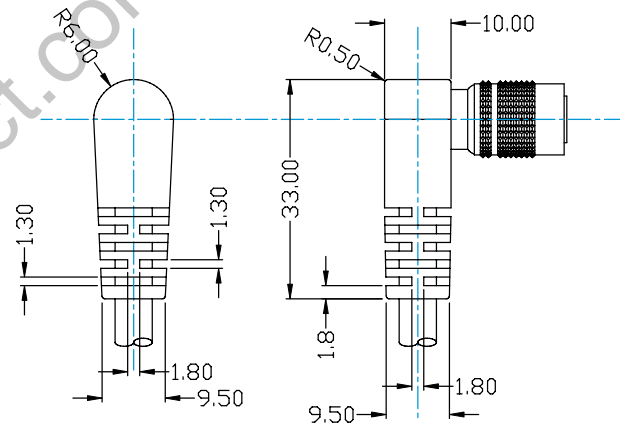
PROFILE X

BITMAXX
EXTENDED DISTANCE CAMERA LINK CABLES
MVB-EP

CEI's exclusive Bitmaxx technology utilizes Pre-Emphasis and Equalization in order to extend the distance of Camera Link Cables.

Technology:

Equalization is an analog technique to reverse the low pass effect of the cable with a high pass filter to recover and restore the original signal.

Pre-Emphasis is a unique signal improving technique that opens the eye pattern at the far end of the cable for point to point applications. Pre-Emphasis adds additional output current during the transition time of the bit.
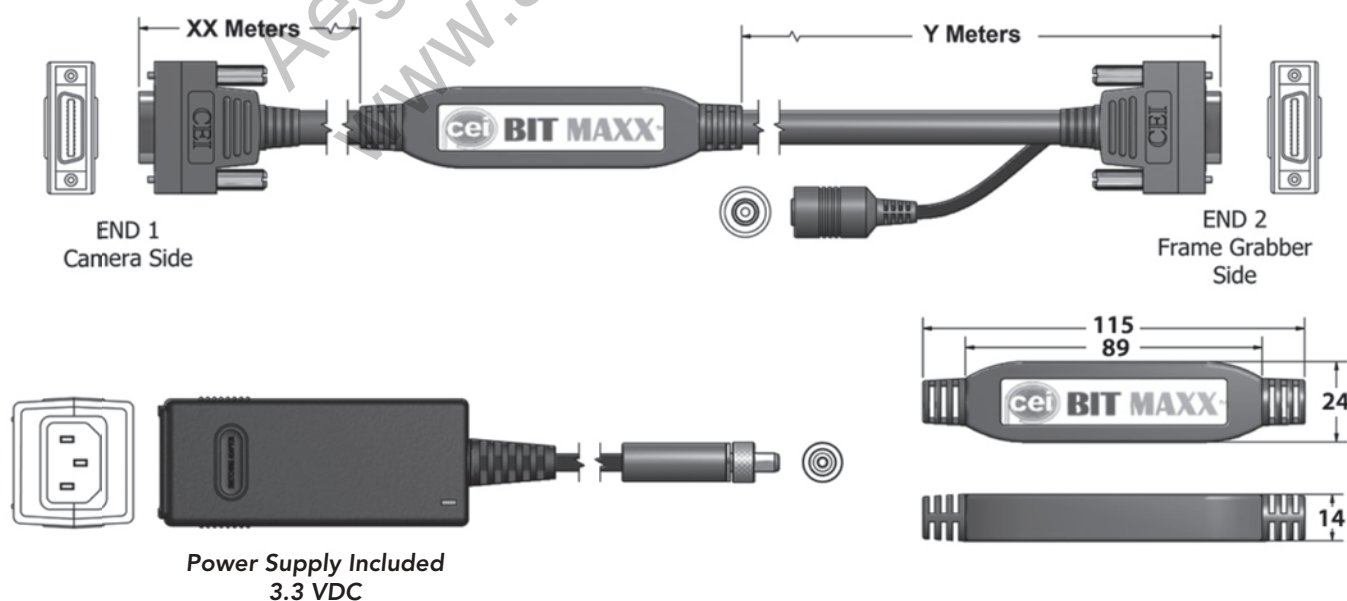
Benefits:

• Double your cable distance
• Fraction of the cost of repeaters
• High-flex cable construction
• Compact, low profile solution
• PoCL compatible
• Base and Full configurations available

BIT MAXX™

Physical Dimensions:

Units = mm

END 1
Camera Side

XX Meters

Y Meters

END 2
Frame Grabber Side

115
89
24
14

Power Supply Included
3.3 VDC

Base Configuration
Part Numbers:

MVB-EP-B-(XX)-(Y)
1 Bitmaxx EP base cable, MDR to MDR
1 Power supply (Does NOT include cord)

MVB-EPMC-B-(XX)-(Y)
1 Bitmaxx EP base cable
HDR (Camera side) to MDR (FG side)
1 Power supply (Does NOT include cord)

MVB-EPMF-B-(XX)-(Y)
1 Bitmaxx EP base cable
HDR (FG side) to MDR (Camera side)
1 Power supply (Does NOT include cord)

MVB-EPMM-B-(XX)-(Y)
1 Bitmaxx EP base cable, HDR to HDR
1 Power supply (Does NOT include cord)

*See Performance chart below for Length vs Speed.
For MDR-MDR configurations only.

Performance chart — CERTIFIED SPEED MHz vs CABLE LENGTH METERS

Legend: ■ Std. CL Full MHz   ■ EP Base MHz   BIT MAXX

Cable Length (m)	Std. CL Full MHz	EP Base MHz
7	80	102
8	78	99
9	72	97
10	70	94
11	65	89
12	59	88
13	52	85
14	45	82
15	38	80
16		77
17		70
18		66
19		64
20		59
21		58
22		53