



EA Features

- Single-ended driver or differential driver/receiver available
- Three digital channels (A/B/I encoder signals) per adapter
- Variety of connector options



EA Product Description

DIFFERENTIAL CABLE DRIVER/RECEIVER

The EA-D-L-10- is a differential RS-422 cable driver which converts the single-ended A/B/I output from USD's single-ended incremental encoders (or any three TTL level digital signals) to 3 pairs of differential signals. This allows the encoder to drive long cables (up to 1000 ft.) and reduces false switching in noisy environments. Various connector options are available on the 5-pin input side of this adapter. The output differential signals are available on a male 10-pin latching connector (FH10). The differential signal from the EA-D-L-10- can be connected directly to USD's QSB (<https://www.usdigital.com/products/accessories/interfaces/usb/qsb/?s=QSB-D>) and USB4 (<https://www.usdigital.com/products/accessories/interfaces/usb/usb4/?s=usb4-d>) interface products.

The corresponding receiver, EA-R-L-10- converts the received differential signals back to 3 single-ended TTL level digital signals. The differential input side of the receiver is a 10-pin male latching connector (FH10). Various connector options are available on the single-ended 5-pin output side.

The EA-D-H-10- is the same as the EA-D-L-10-, but offers a wide operating voltage range of 7.5 to 30VDC and a large output voltage swing proportional to the power supply voltage. This adapter allows 5V encoders to be used in high voltage applications.

SINGLE-ENDED CABLE DRIVER

The EA-D-L-5- driver converts 3 single-ended, low drive digital signals to 3 single-ended, high current drive digital signals. This variant is useful since the TTL outputs of some incremental encoders can sink (pull-down) just under 4mA and source (pull up) only about 200 uA. The output side of the driver is a 5-pin male latching connector (FH5). Various connector options are available on the single-ended 5-pin input side.

The EA-D-H-5- is the same as the EA-D-L-5-, but offers a wide operating voltage range of 7.5 to 30VDC and a large output voltage swing proportional to the power supply voltage. The EA-D-H-5- allows 5V encoders to be used in high voltage applications.

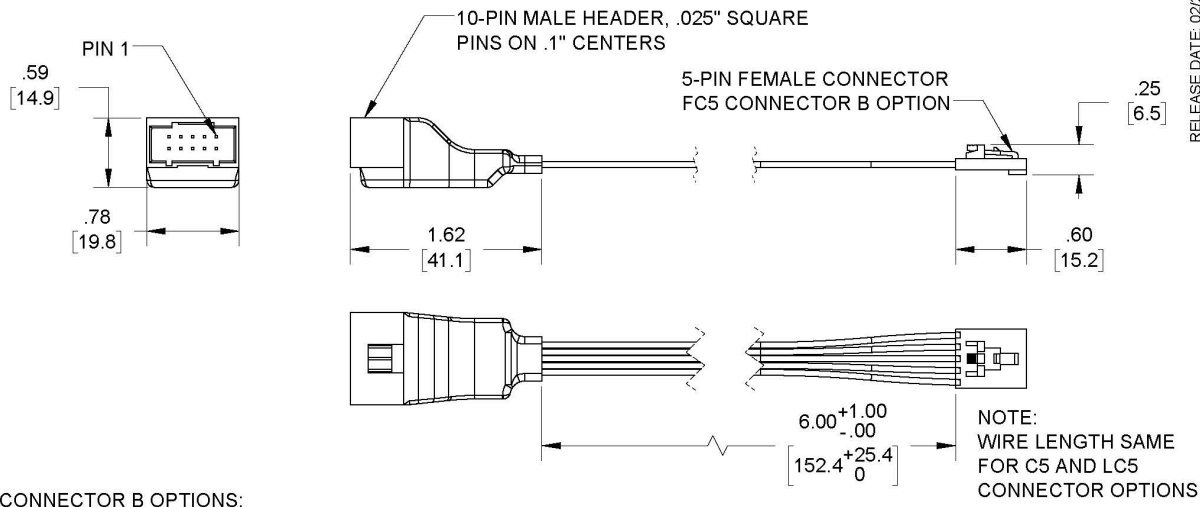
US Digital can supply nearly any cable to your specifications. See the Cables

(<https://www.usdigital.com/products/accessories/cables/>) & Connectors (<https://www.usdigital.com/products/accessories/connectors/>) page for more information.

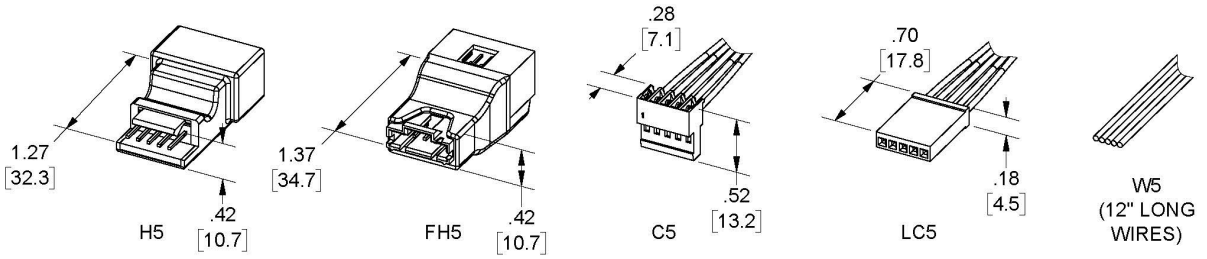
Mechanical Drawings

EA INCREMENTAL ENCODER ADAPTER, RECEIVER, LOW VOLTAGE, FH10

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



US DIGITAL 1400 NE 136th Avenue
Vancouver, Washington 98684, USA

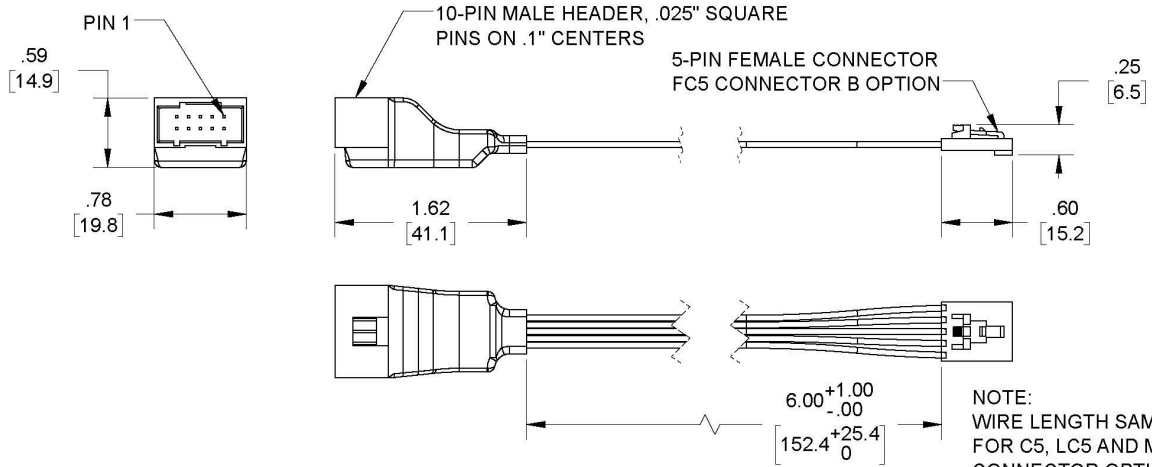
info@usdigital.com
sales@usdigital.com
support@usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

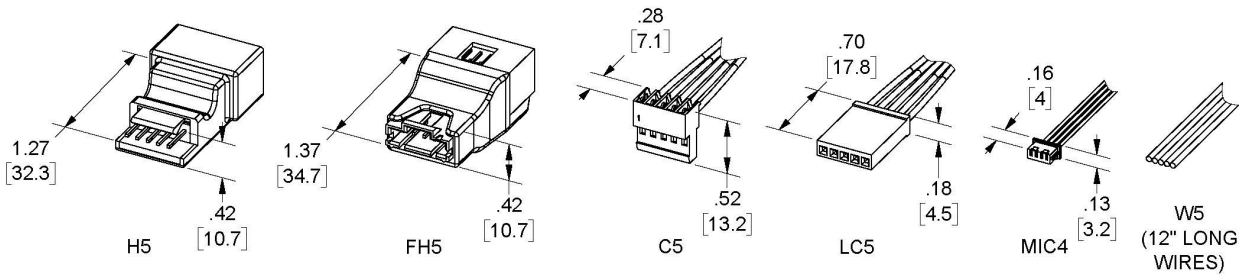
UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

EA INCREMENTAL ENCODER ADAPTER, DRIVER, LOW VOLTAGE, FH10

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



US DIGITAL 1400 NE 136th Avenue
Vancouver, Washington 98684, USA

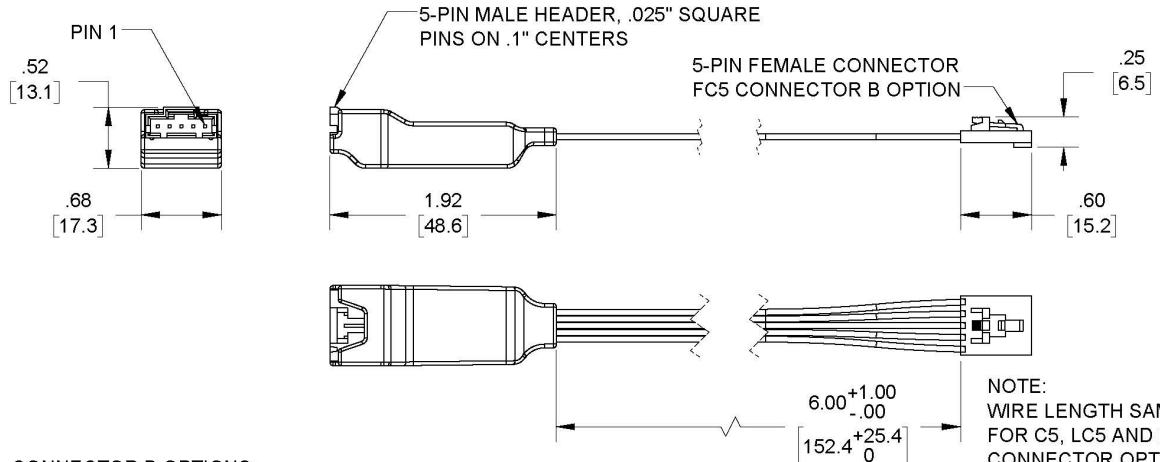
info@usdigital.com
www.usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

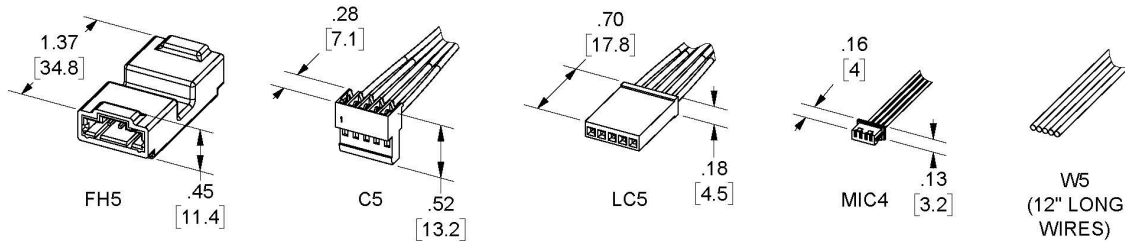
UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

EA INCREMENTAL ENCODER ADAPTER, DRIVER, LOW VOLTAGE, FH5

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



US DIGITAL 1400 NE 136th Avenue
Vancouver, Washington 98684, USA

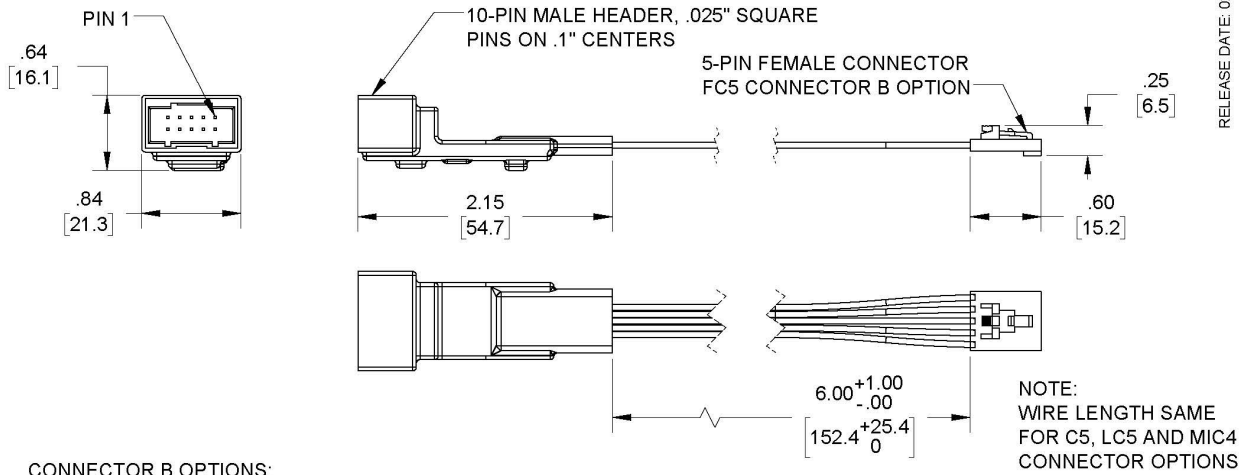
info@usdigital.com
www.usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

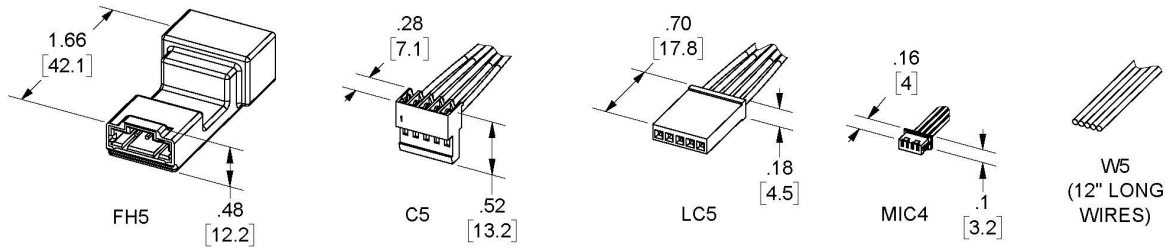
UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

EA INCREMENTAL ENCODER ADAPTER, DRIVER, HIGH VOLTAGE, FH10

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



US DIGITAL 1400 NE 136th Avenue
Vancouver, Washington 98684, USA

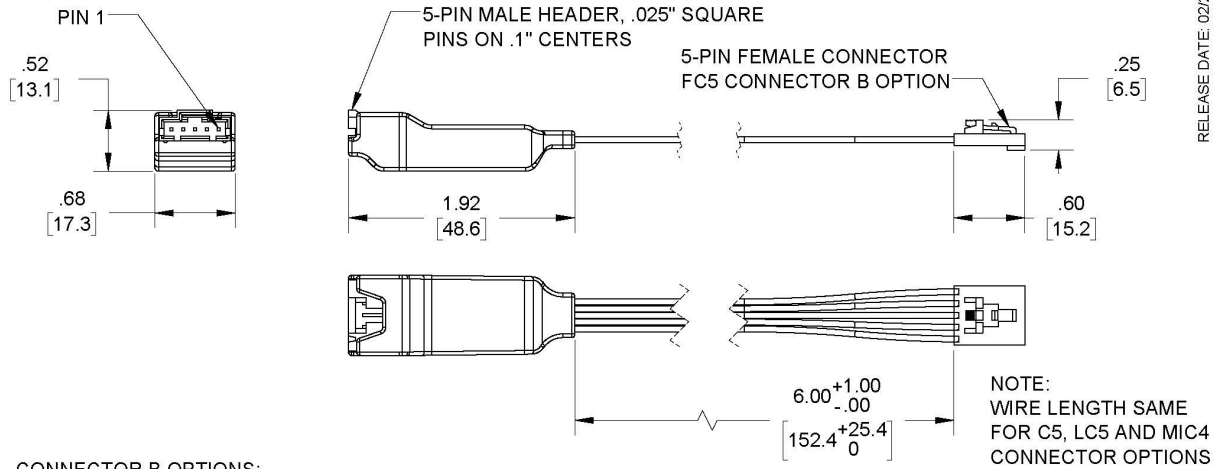
info@usdigital.com
www.usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

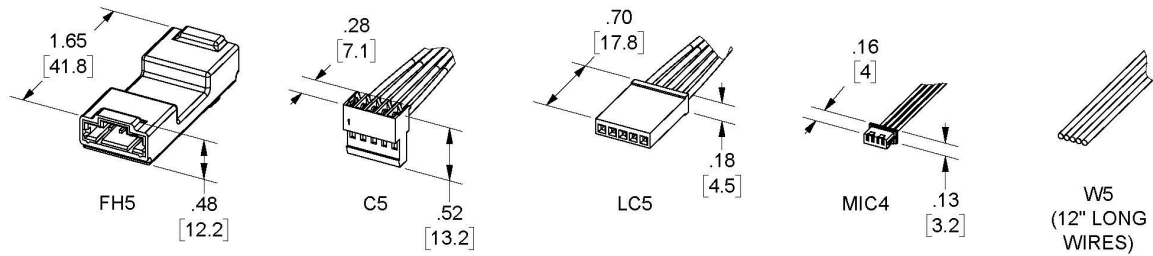
UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

EA INCREMENTAL ENCODER ADAPTER, DRIVER, HIGH VOLTAGE, FH5

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



US DIGITAL 1400 NE 136th Avenue
Vancouver, Washington 98684, USA

info@usdigital.com
www.usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

Specifications

ENVIRONMENTAL

PARAMETER	MIN.	MAX.	UNITS
Operating Temperature	-40	85	C
Electrostatic Discharge, Human Body Model			
EA-D	-3	3	
EA-D10-HV	-1	1	
EA-R	-3	3	



EA-D-L-5-, EA-D-L-10- DRIVER ELECTRICAL CHARACTERISTICS

PARAMETER	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	-	5.5	Volts	-
Supply Current	-	4.5	9.0	mA	-
Output High Voltage	2.5	-	-	Volts	I(OH) = -20 mA
Output Low Voltage	-	-	0.8	Volts	I(OL) = 20 mA
Propagation Time	-	-	15	ns	-

EA-D-H-5-, EA-D-H-10- DRIVER ELECTRICAL CHARACTERISTICS

PARAMETER	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage (Vs)	7.5	-	30	Volts	
Encoder Supply Current	-	-	200	mA	
Propagation Time	-	236	330	ns	
Output Low Voltage	-	-	0.5	Volts	
Output High Voltage	-	Vs - 2.0	-	Volts	
Output Current Source/Sink	-	20	-	mA	

EA-R-L-10- RECEIVER ELECTRICAL CHARACTERISTICS

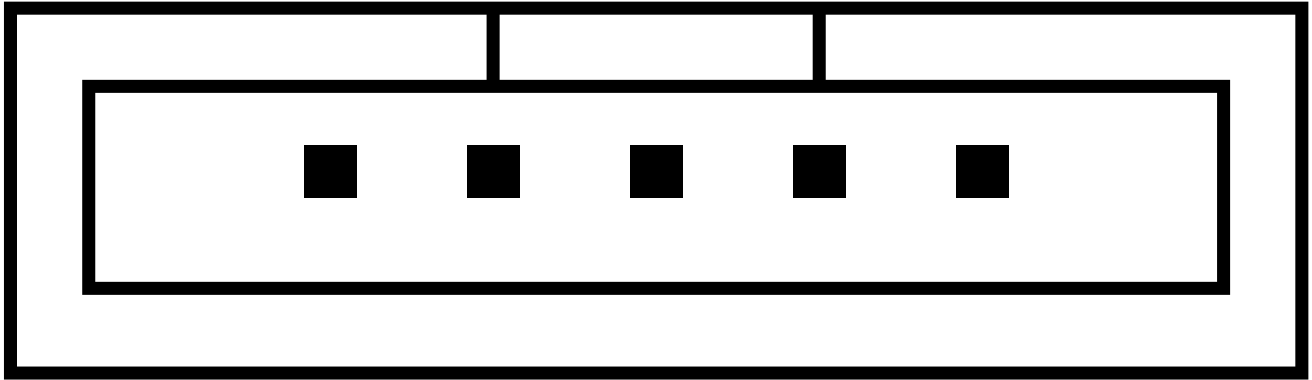
PARAMETER	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	-	5.5	Volts	-
Supply Current	-	16	25	mA	-
Input High Voltage	2.0	-	-	Volts	I(OH) = -20 mA
Input Low Voltage	-	-	0.8	Volts	I(OL) = 20 mA
Propagation Time	-	-	35	ns	-

DRIVER (EA-D-) PINOUT

For a Driver, the input connector is a 4-pin or 5-pin connector chosen from: H5, FH5, C5, FC5, LC5, MIC4, W5. See "4-pin, 5-pin Connector Options" for pictures of the available connectors.

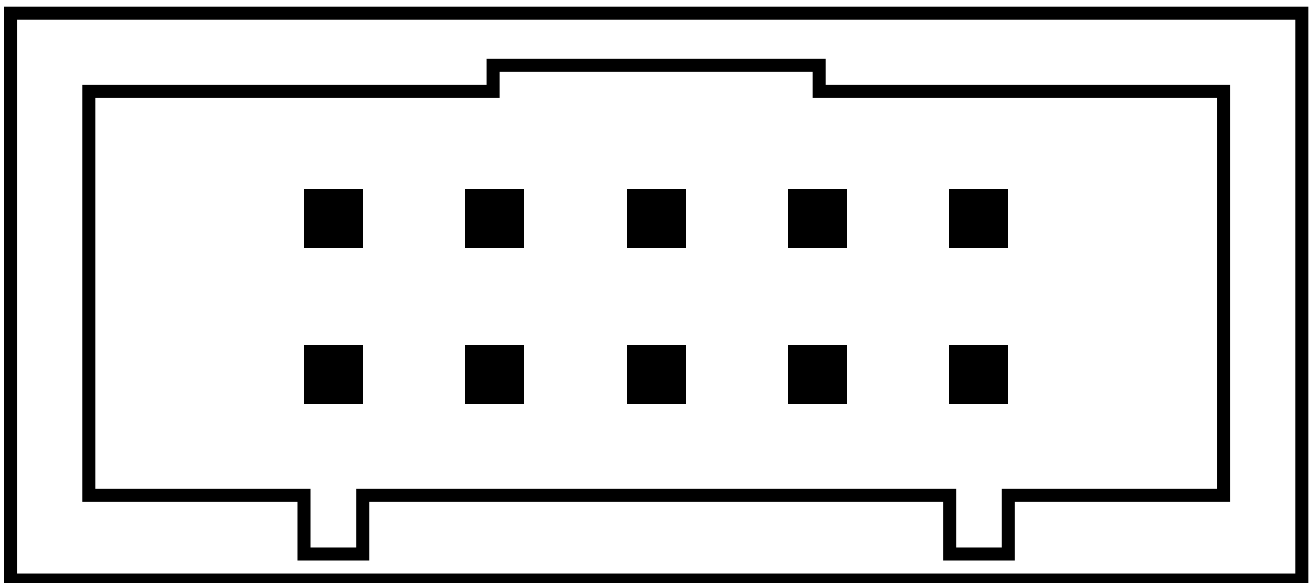
The output connector is either a 5-pin latching connector (FH5) or a 10-pin latching connector (FH10).

FH5 Output Connector:



5 4 3 2 1

FH10 Output Connector:



9 7 5 3 1

10 8 6 4 2



EA Incremental Encoder Adapter

PIN	INPUT 4-PIN CONNECTOR (MIC4)	INPUT 5-PIN CONNECTOR (H5, FH5, C5, FC5, LC5, W5)	EA-D-L-5-/EA-D-H-5- OUTPUT 5-PIN CONNECTOR (FH5)	EA-D-L-10-/EA-D-H-10- OUTPUT 10-PIN CONNECTOR (FH10)
1	+5VDC power	Ground	Ground	Ground
2	A channel (in)	Index (in)	Index (out)	Ground
3	Ground	A channel (in)	A channel (out)	Index- (out)
4	B channel (in)	+5VDC power	+5VDC power +7.5 to +30VDC power in (EA-D-H-5- only)	Index+ (out)
5		B channel (in)	B channel (out)	A- channel (out)
6				A+ channel (out)
7				+5VDC power +7.5 to +30VDC power in (EA-D-H-10- only)
8				+5VDC power +7.5 to +30VDC power in (EA-D-H-10- only)
9				B- channel (out)
10				B+ channel (out)

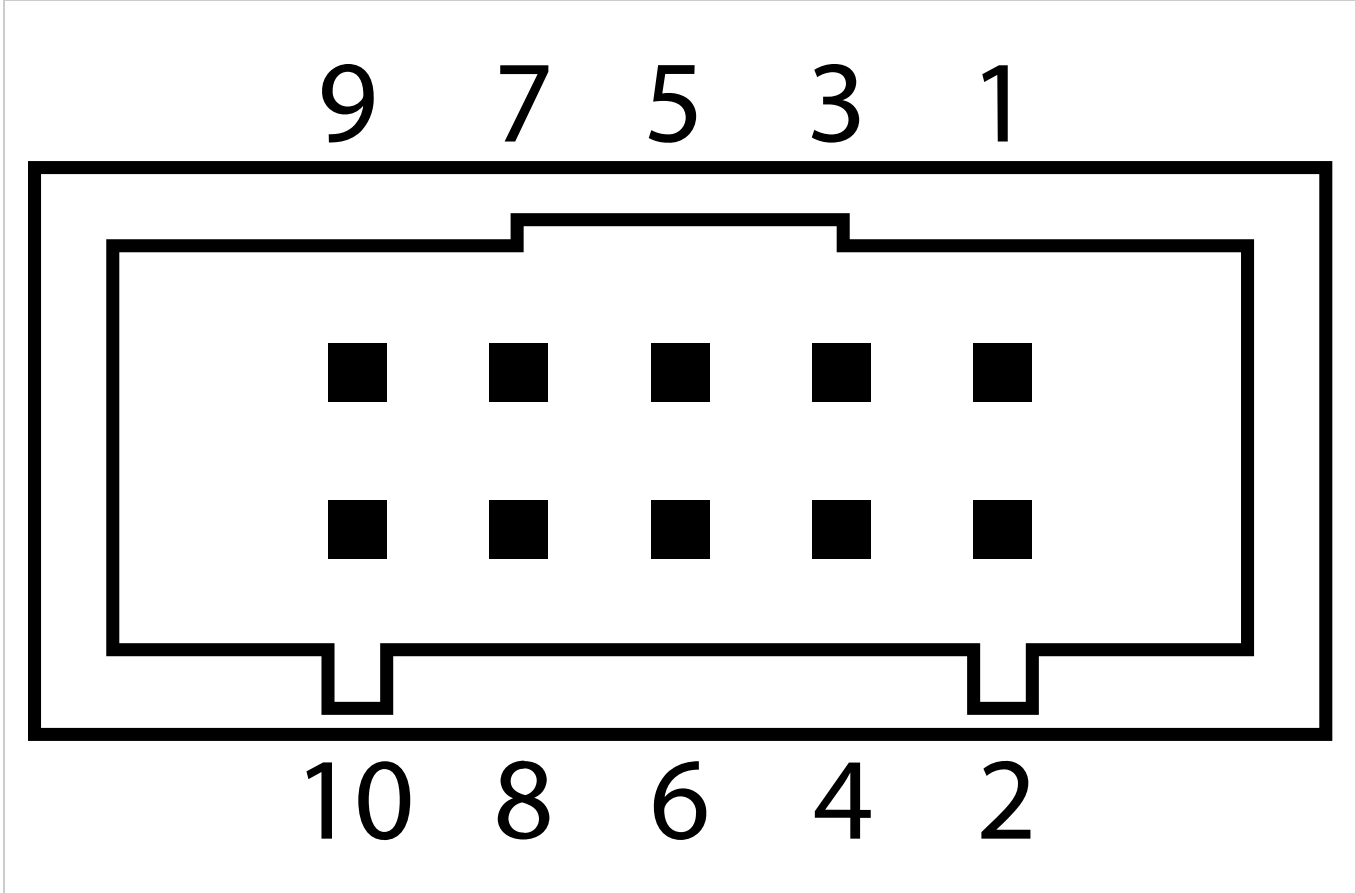
Notes:

(1) For the Low voltage (EA-D-L-) versions, the +5VDC pins on the input and output connectors are electrically connected together, so power can be applied on either the input or output connector. For the High voltage (EA-D-H-) versions, the 7.5 to 30VDC power is applied at the OUTPUT connector. +5V out is generated at the INPUT connector.

RECEIVER (EA-R-) PINOUT

For a Receiver, the input connector is always a 10-pin latching connector (FH10). The output connector is a 5-pin connector chosen from: H5, FH5, C5, FC5, LC5, W5. See "4-pin, 5-pin Connector Options" for pictures of the available connectors.

FH10 Input Connector



PIN	INPUT 10-PIN CONNECTOR (FH10)	OUTPUT 5-PIN CONNECTOR (H5, FH5, C5, FC5, LC5, W5)
1	Ground	Ground
2	Ground	Index (out)
3	Index- (in)	A channel (out)
4	Index+ (in)	+5VDC power
5	A- channel (in)	B channel (out)
6	A+ channel (in)	
7	+5VDC power	
8	+5VDC power	
9	B- channel (in)	
10	B+ channel (in)	

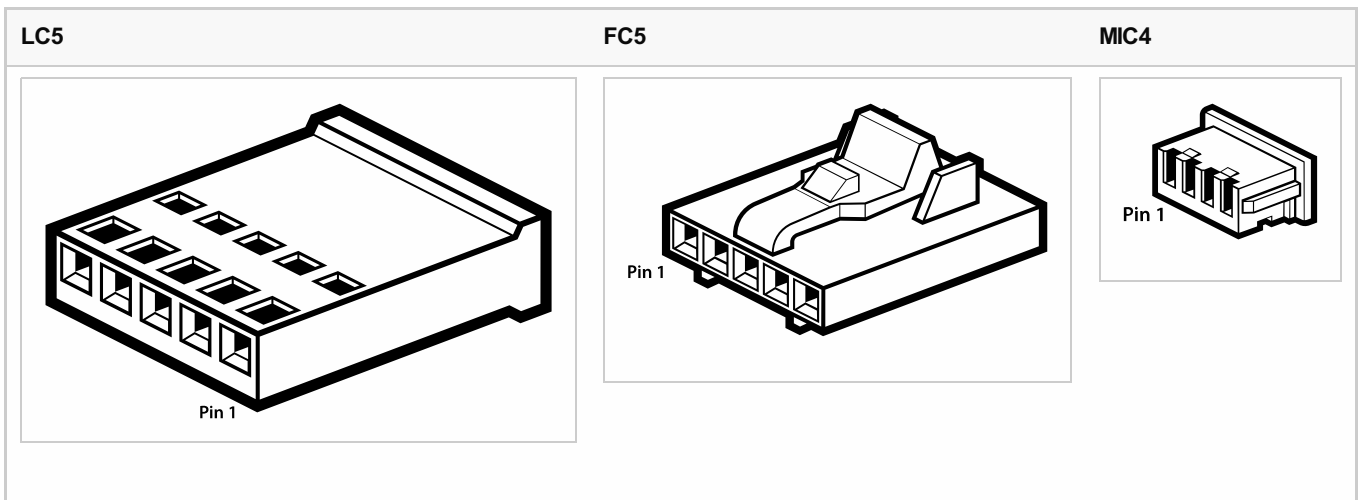
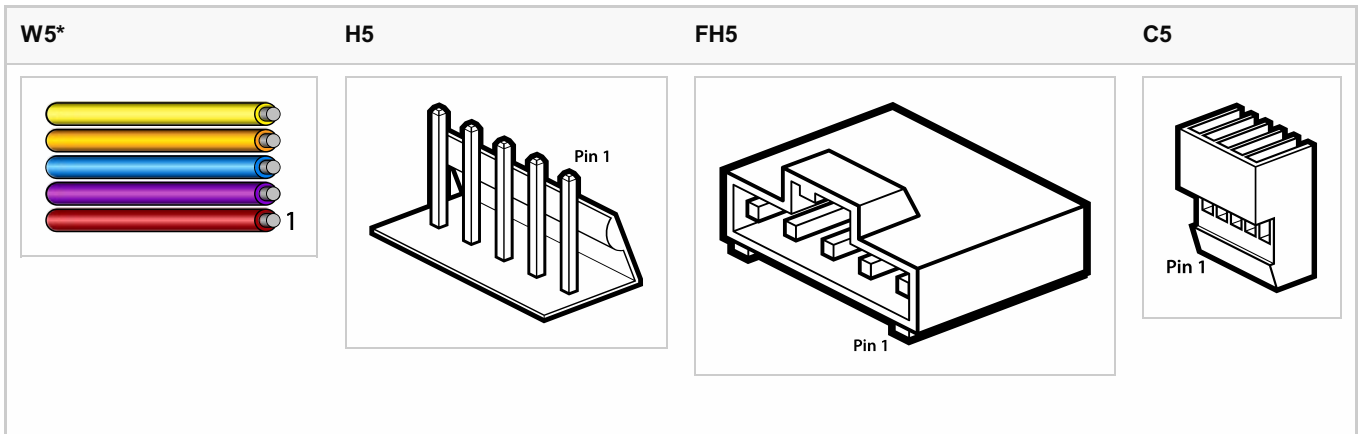
Notes:

(1) The +5VDC pins on the input and output connectors are electrically connected, so power can be applied on either the input or output connector.



4-PIN, 5-PIN CONNECTOR OPTIONS

CONNECTOR	DESCRIPTION
H5	5-pin right-angle male header soldered in place.
FH5	5-pin latching header soldered in place.
W5*	Five 12" discrete wires, no connector on the end.
C5	Five 6" discrete wires with a standard mating connector on the end.
LC5	Five 6" discrete wires with a locking mating connector on the end.
FC5	Five 6" discrete wires with a latching mating connector.
MIC4	Four 6" discrete wires with a micro mating connector.



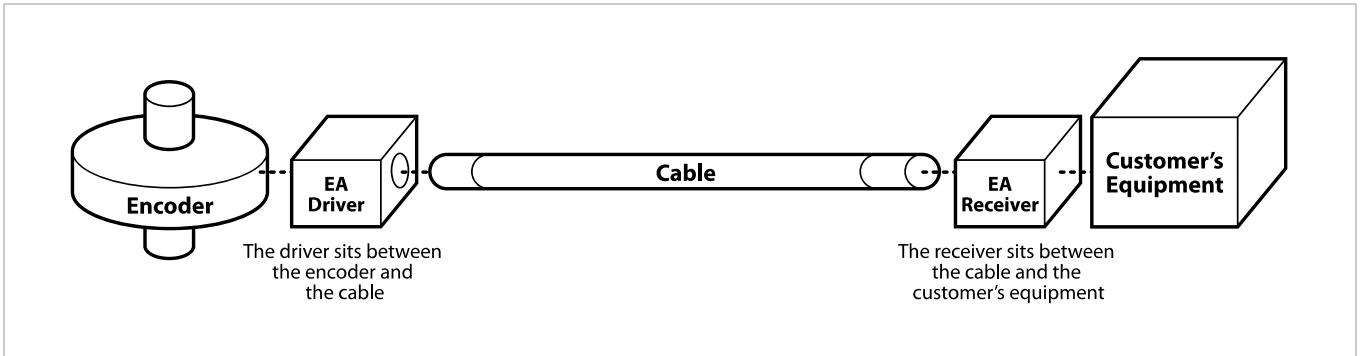
*Note: The W5 pin-outs are as follows:



EA Incremental Encoder Adapter

PIN	DESCRIPTION	COLOR
1	Ground	Brown
2	Index	Violet or NC
3	A channel	Blue
4	+5VDC power	Orange
5	B channel	Yellow

DRIVER VS. RECEIVER



Notes

- US Digital® warrants its products against defects in materials and workmanship for two years. See complete warranty (<https://www.usdigital.com/company/warranty>) for details.

Configuration Options

EA	Type	Voltage	Connector A	Connector B
	D (Driver)	L (Low Voltage)	5 (FH5)	C5 (Inline Version with C5 Connector)
	Connector A: Output	H (High Voltage)	10 (FH10)	FC5 (Inline Version with FC5 Connector)
	Connector B: Input			FH5 (FH5 Header)
	R (Receiver)			H5 (H5 Header)
	Connector A: Input			LC5 (Inline Version with LC5 Connector)
	Connector B: Output			MIC4 (Inline Version with MIC4 Connector)
				W5 (12" discrete wires)

PLEASE NOTE: This chart is for informational use only. Certain product configuration combinations are not available. Visit the EA product page (<https://www.usdigital.com/products/EA>) for pricing and additional information.