



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.

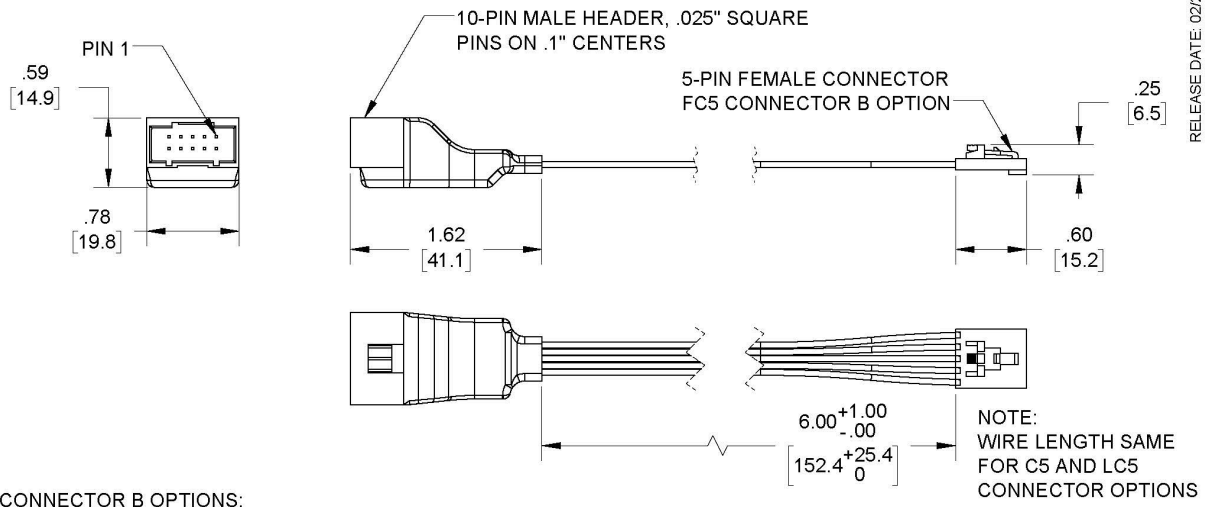
US Digital can supply nearly any cable to your specifications. See the Cables

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

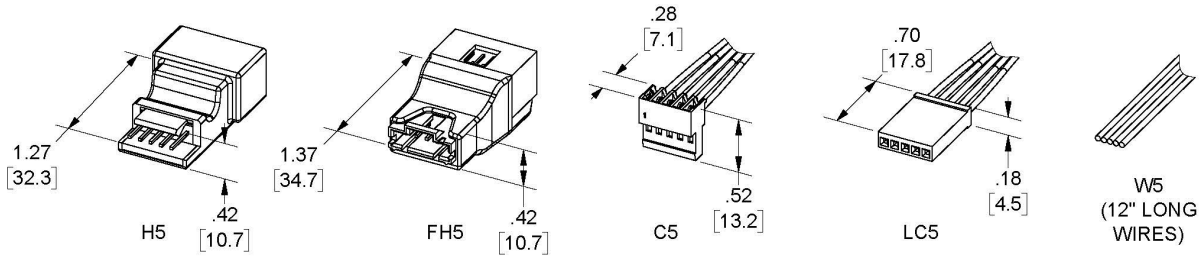
Mechanical Drawings

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

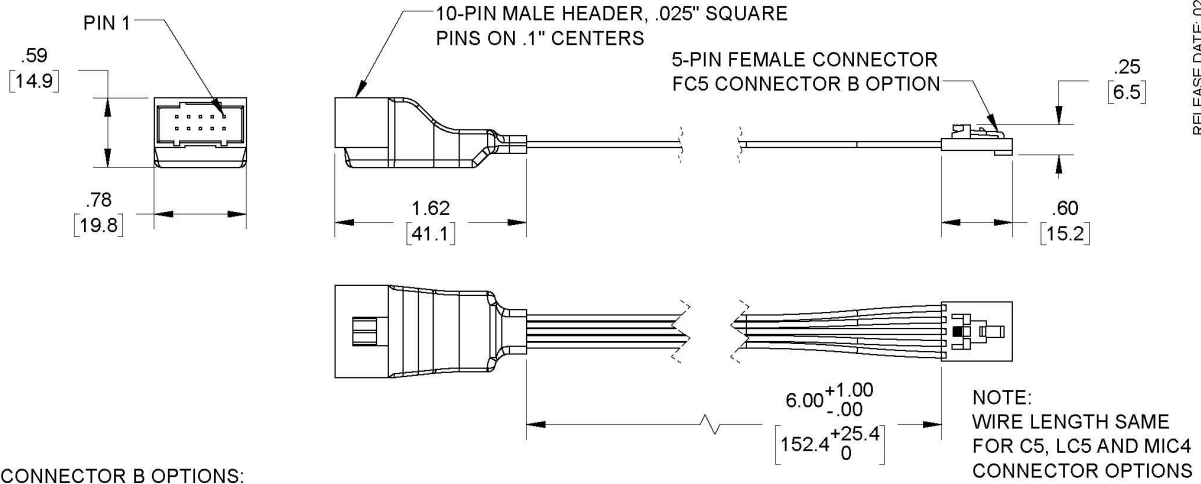
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Toll-free: 800.736.0194

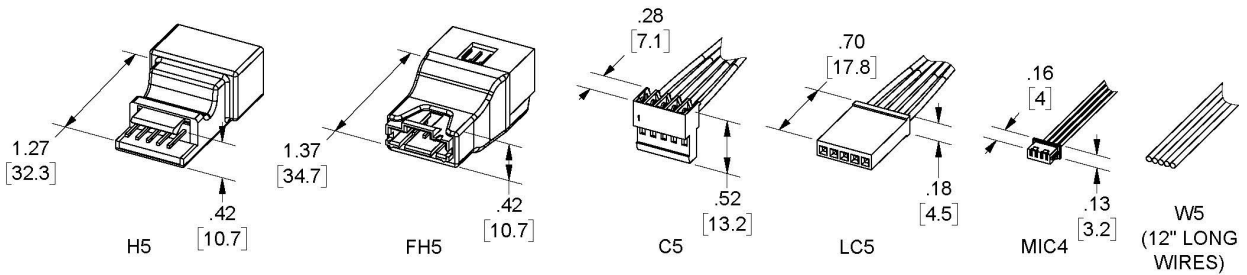
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EA INCREMENTAL ENCODER ADAPTER, DRIVER, LOW VOLTAGE, FH10

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



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Vancouver, Washington 98684, USA

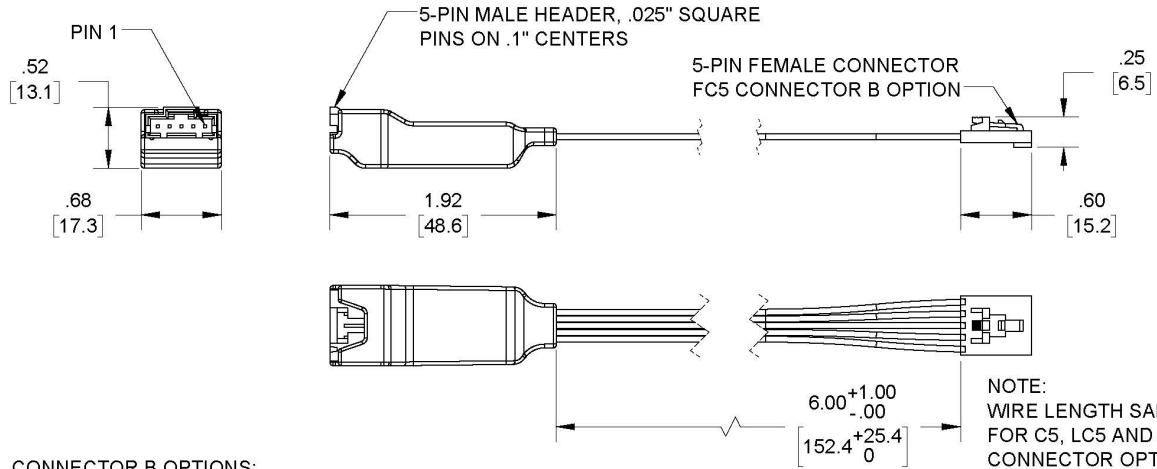
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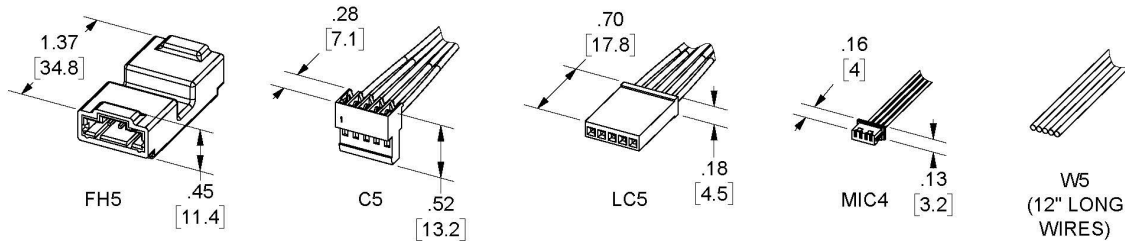
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EA INCREMENTAL ENCODER ADAPTER, DRIVER, LOW VOLTAGE, FH5

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



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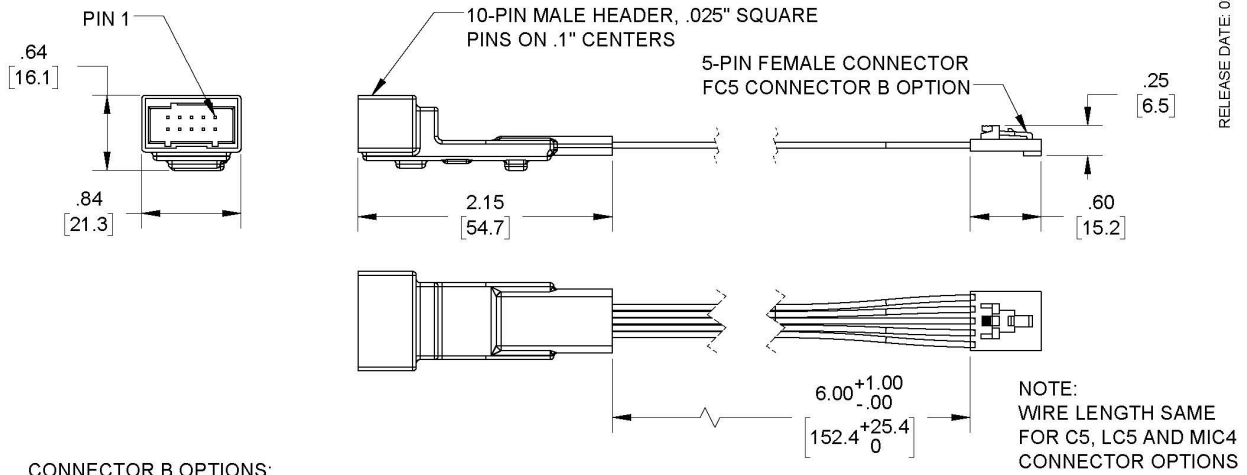
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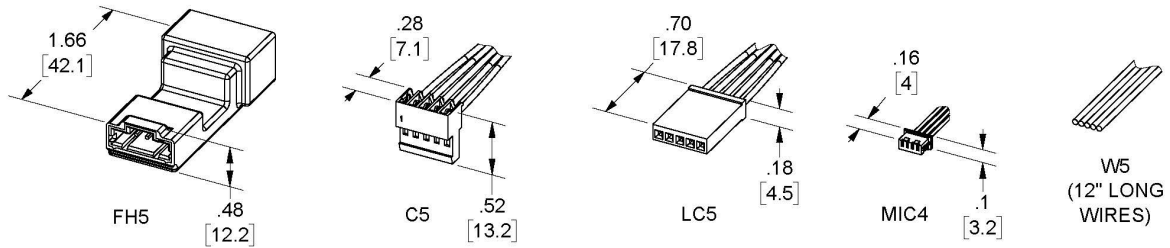
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EA INCREMENTAL ENCODER ADAPTER, DRIVER, HIGH VOLTAGE, FH10

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



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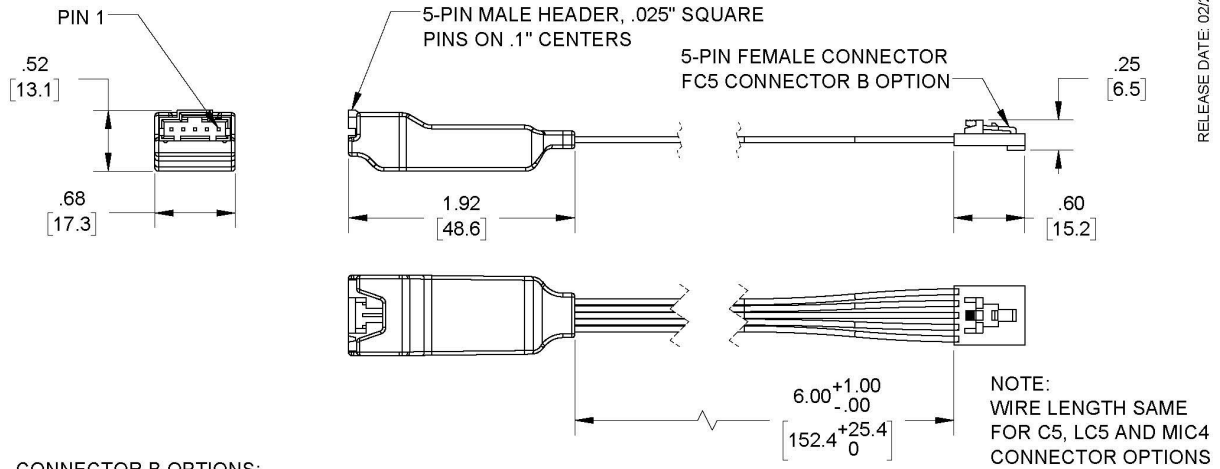
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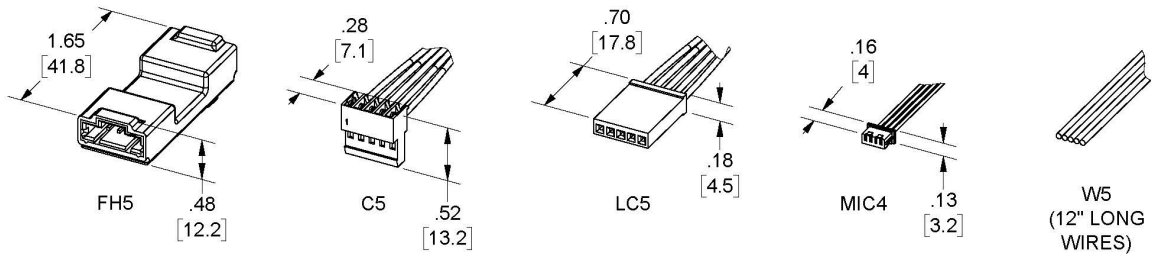
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EA INCREMENTAL ENCODER ADAPTER, DRIVER, HIGH VOLTAGE, FH5

RELEASE DATE: 02/27/2019



CONNECTOR B OPTIONS:



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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

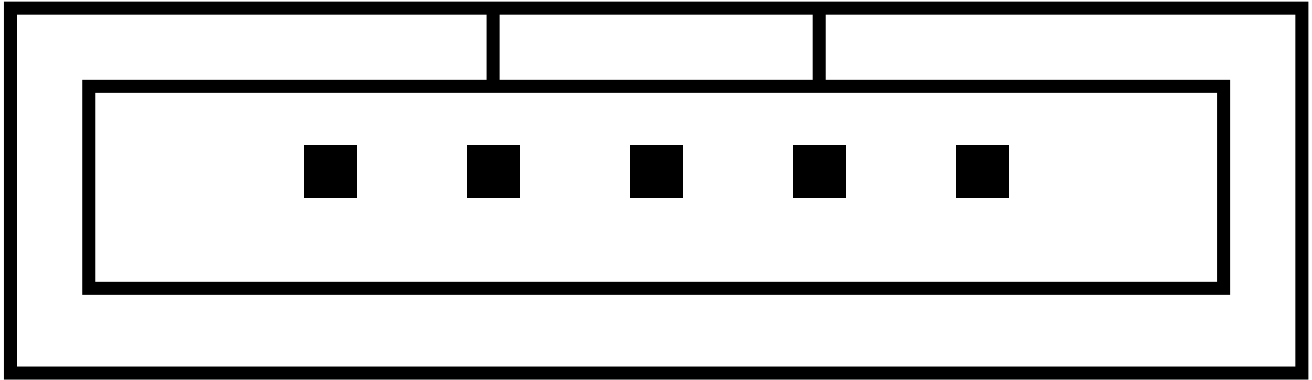
PARAMETER	MIN.	TYP.	MAX.	UNITS	NOTES
Supply Voltage	4.5	-	5.5	Volts	-
Supply Current	-	16	25	mA	-
Input High Voltage	2.0	-	-	Volts	I(OH) = -20 mA
Input Low Voltage	-	-	0.8	Volts	I(OL) = 20 mA
Propagation Time	-	-	35	ns	-

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.

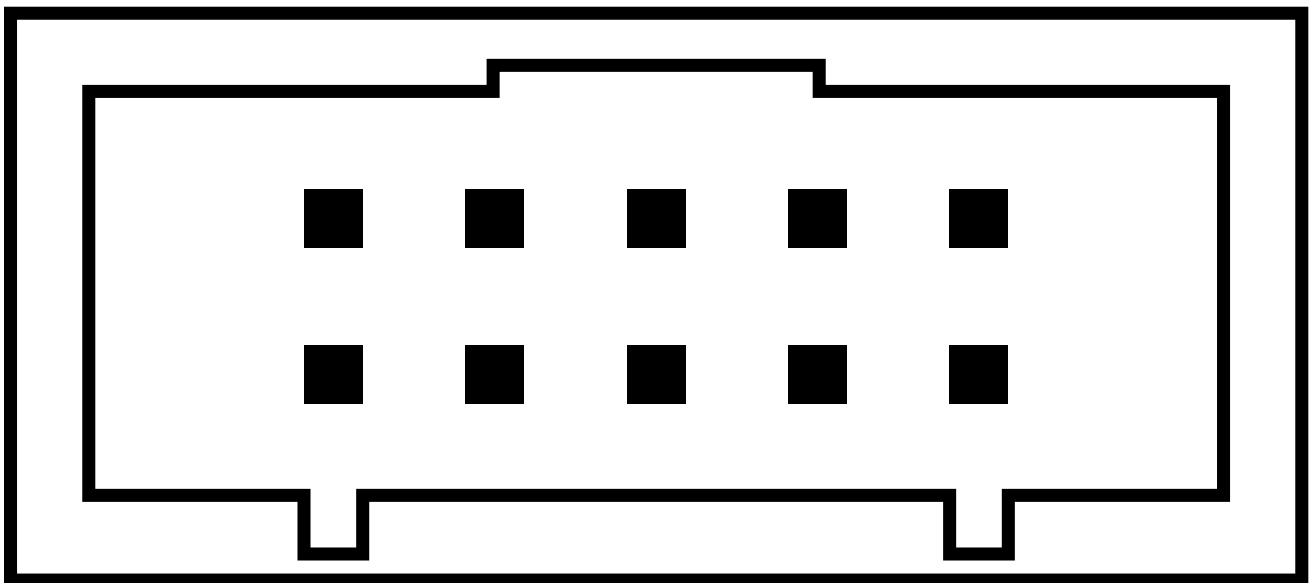
The output connector is either a 5-pin latching connector (FH5) or a 10-pin latching connector (FH10).

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)

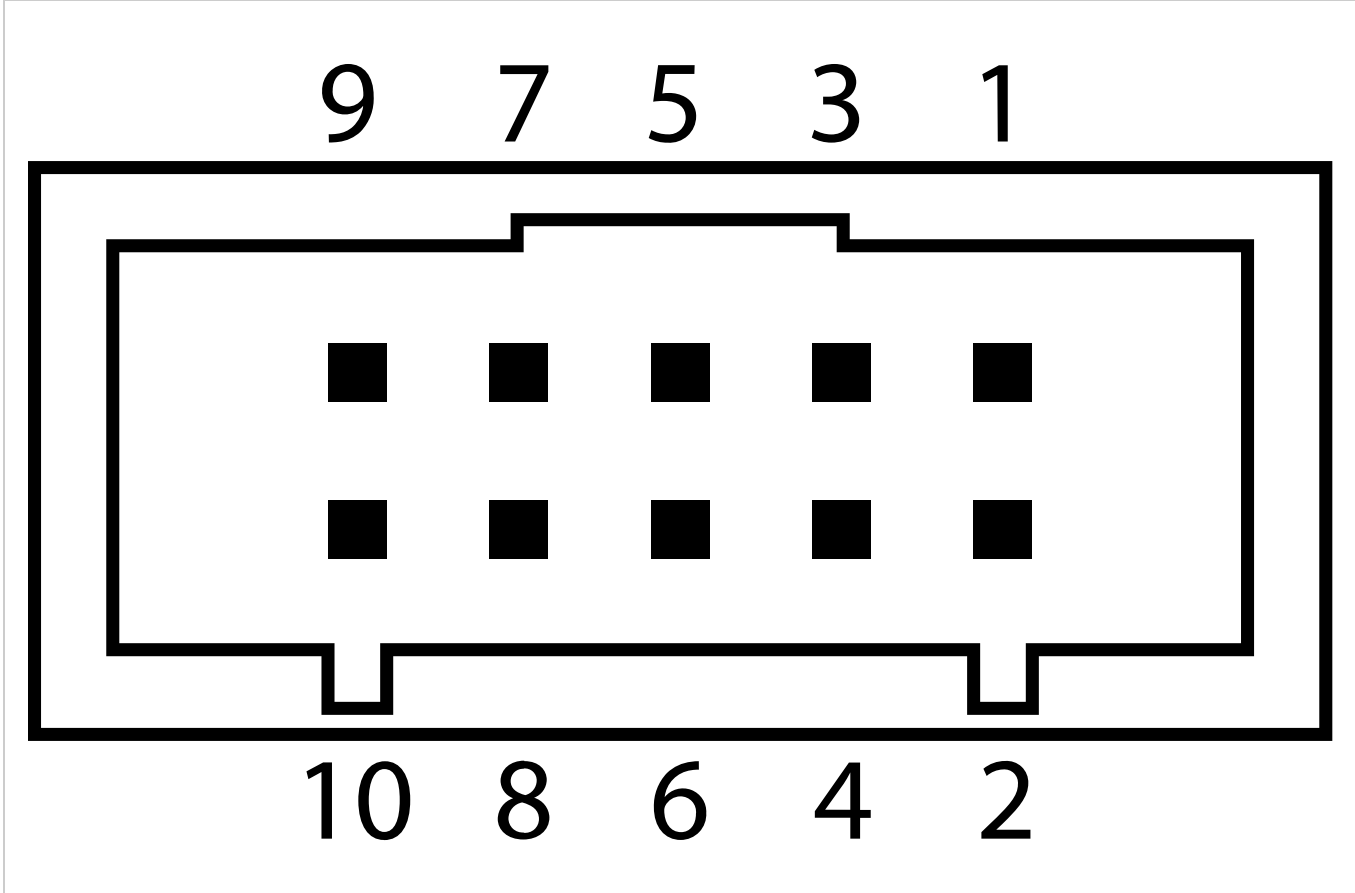
Notes:

(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)	

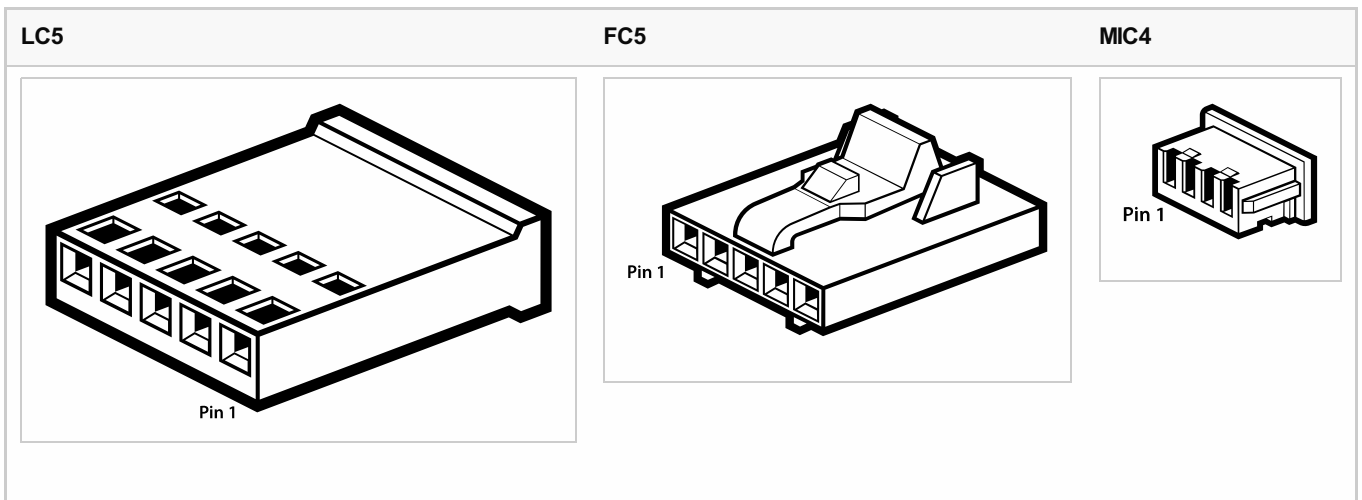
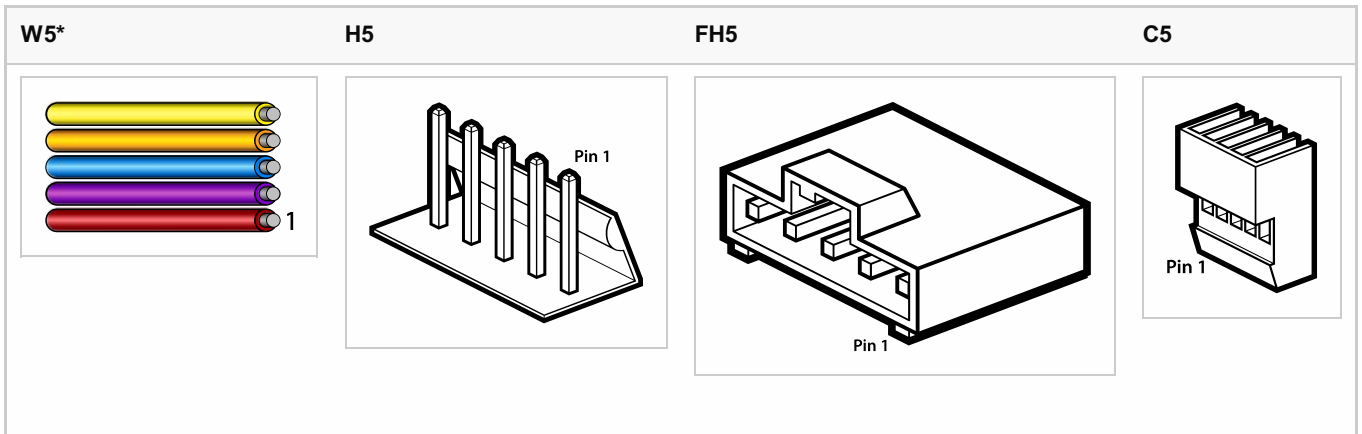
Notes:

(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.



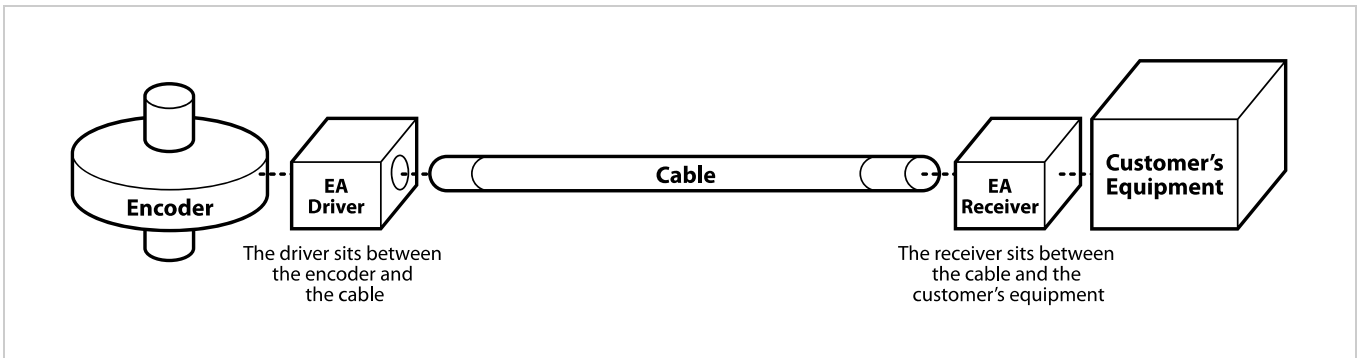
*Note: The W5 pin-outs are as follows:



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)
	R (Receiver)	H (High Voltage)	10 (FH10)	FC5 (Inline Version with FC5 Connector)
				FH5 (FH5 Header)
				H5 (H5 Header)
				LC5 (Inline Version with LC5 Connector)
				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.