



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 US Digital'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-W5 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). The single-ended 5-pin output side has five wires.

SINGLE-ENDED CABLE DRIVER

The EA-D-H-5- driver converts the single-ended A/B/I output from USD's incremental encoders (or any 3 TTL level signals) to 3 digital outputs with a large voltage swing proportional to the power supply voltage. The power supply voltage range is 7.5 to 30VDC. The EA-D-H-5- allows 5V encoders to be used in high voltage applications. The output side of the driver is a 5-pin male latching connector (FH5). Various connector options are available on the 5-pin input side.

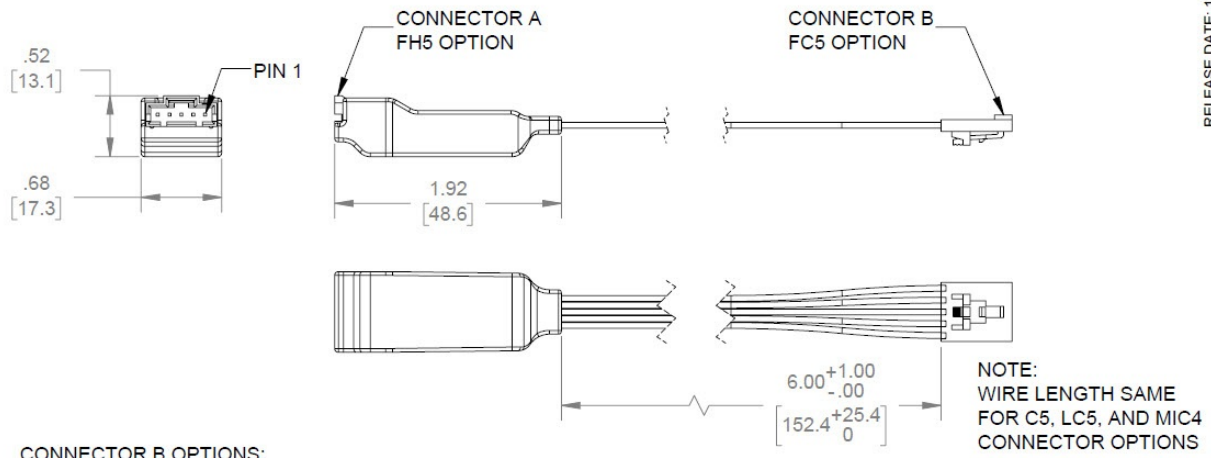
US Digital can supply nearly any cable to your specifications. See the Cables

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

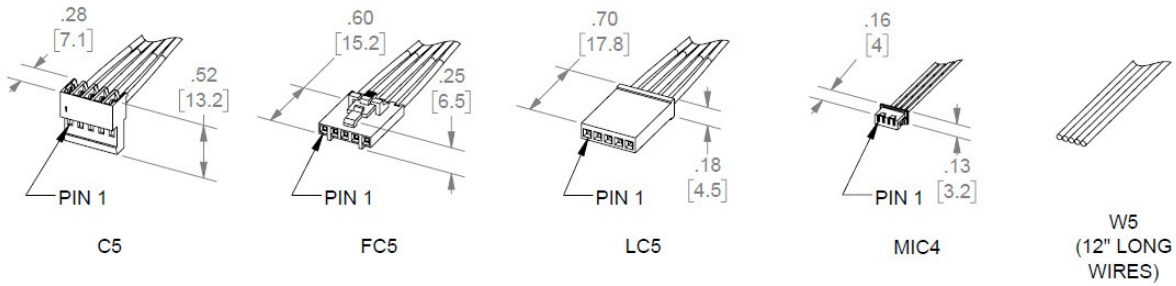
Mechanical Drawings

EA INCREMENTAL ENCODER ADAPTER, DRIVER, HIGH VOLTAGE, FH5

RELEASE DATE: 11/13/2024



CONNECTOR B OPTIONS:



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

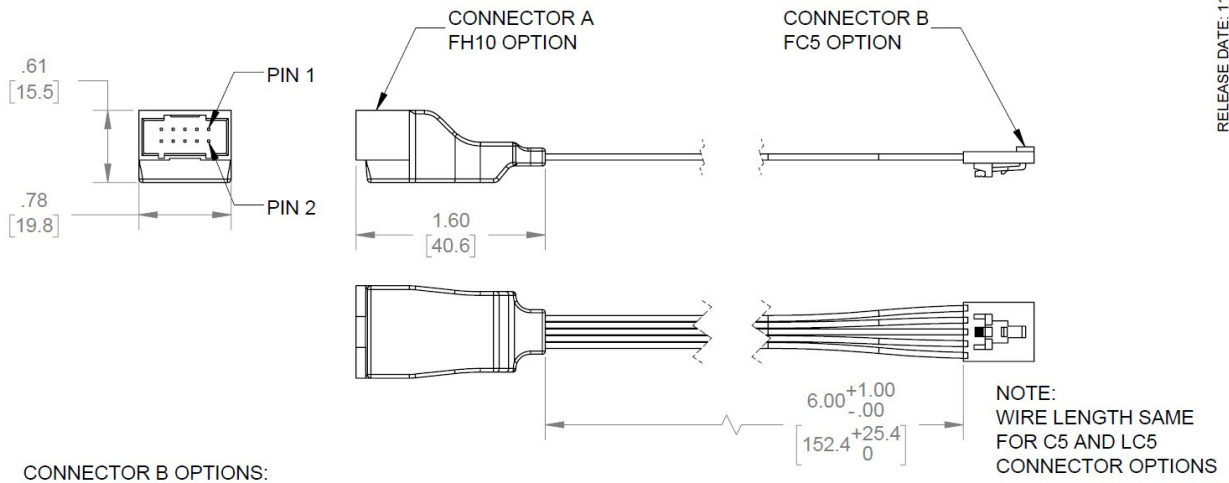
info@usdigital.com
www.usdigital.com

Local: 360.260.2468
Toll-free: 800.736.0194

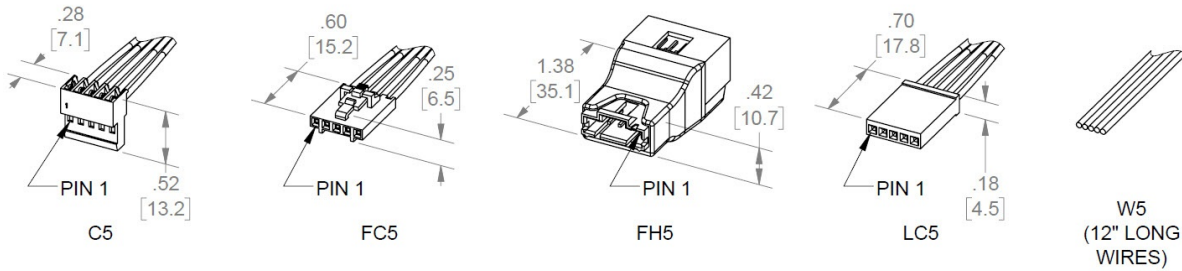
UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

EA INCREMENTAL ENCODER ADAPTER, DRIVER, LOW VOLTAGE, FH10

RELEASE DATE: 11/13/2024



CONNECTOR B OPTIONS:



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

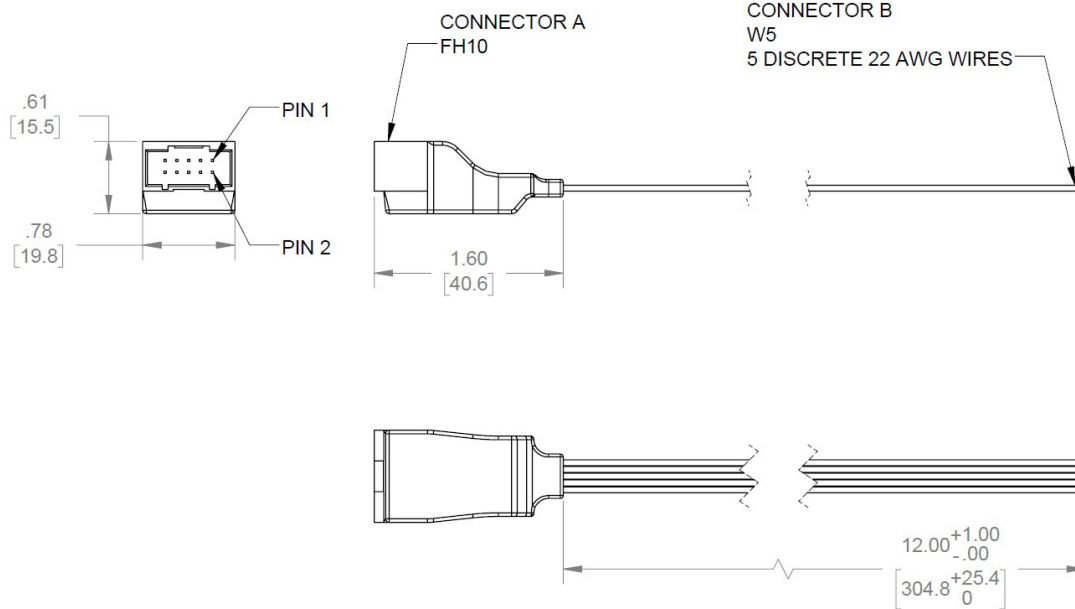
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Toll-free: 800.736.0194

UNITS: INCHES [MM]
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EA-R-L-10-W5 INCREMENTAL ENCODER ADAPTER, RECEIVER

RELEASE DATE: 11/13/2024



US DIGITAL 1400 NE 136th Avenue
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UNITS: INCHES [MM]
METRIC SHOWN FOR REFERENCE ONLY

Specifications

ENVIRONMENTAL

PARAMETER	VALUE	UNITS
Operating Temperature	-40 to 85	C
Electrostatic Discharge, Human Body Model	± 3	kV



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- 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	

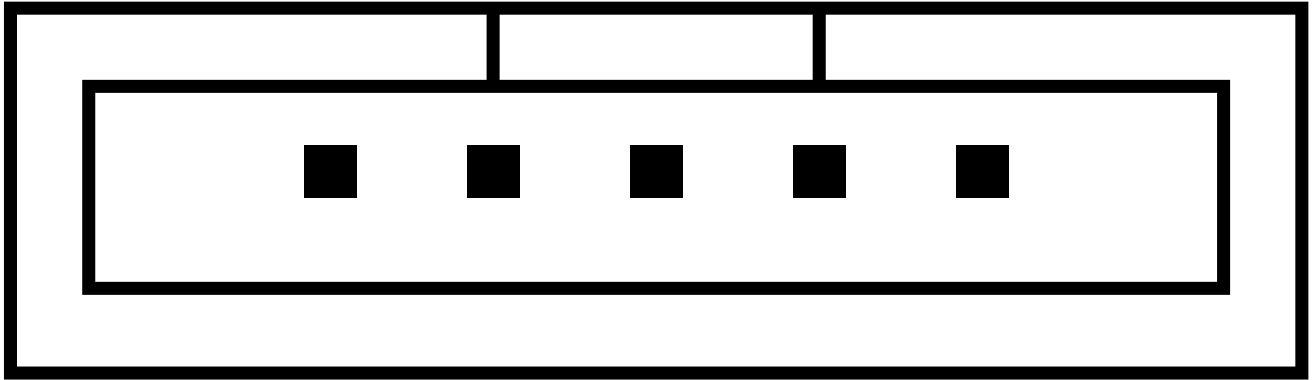
EA-R-L-10-W5 RECEIVER ELECTRICAL CHARACTERISTICS

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

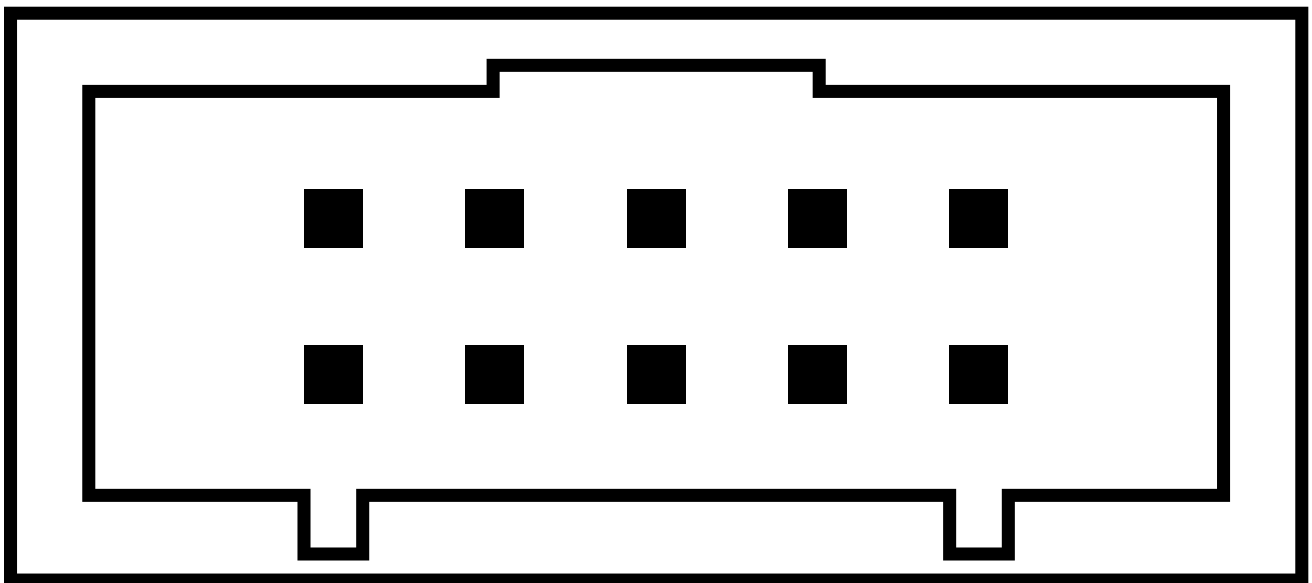
The driver input is a 4-pin or 5-pin connector. See "Connector B Options" for pictures of the available connectors. The output connector is a 5-pin latching connector, FH5 (TE # 2-103634-7), or a 10-pin latching connector, FH10 (MOLEX# 74162-2010).

FH5 Output Connector:



5 4 3 2 1

FH10 Output Connector:



9 7 5 3 1

10 8 6 4 2



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

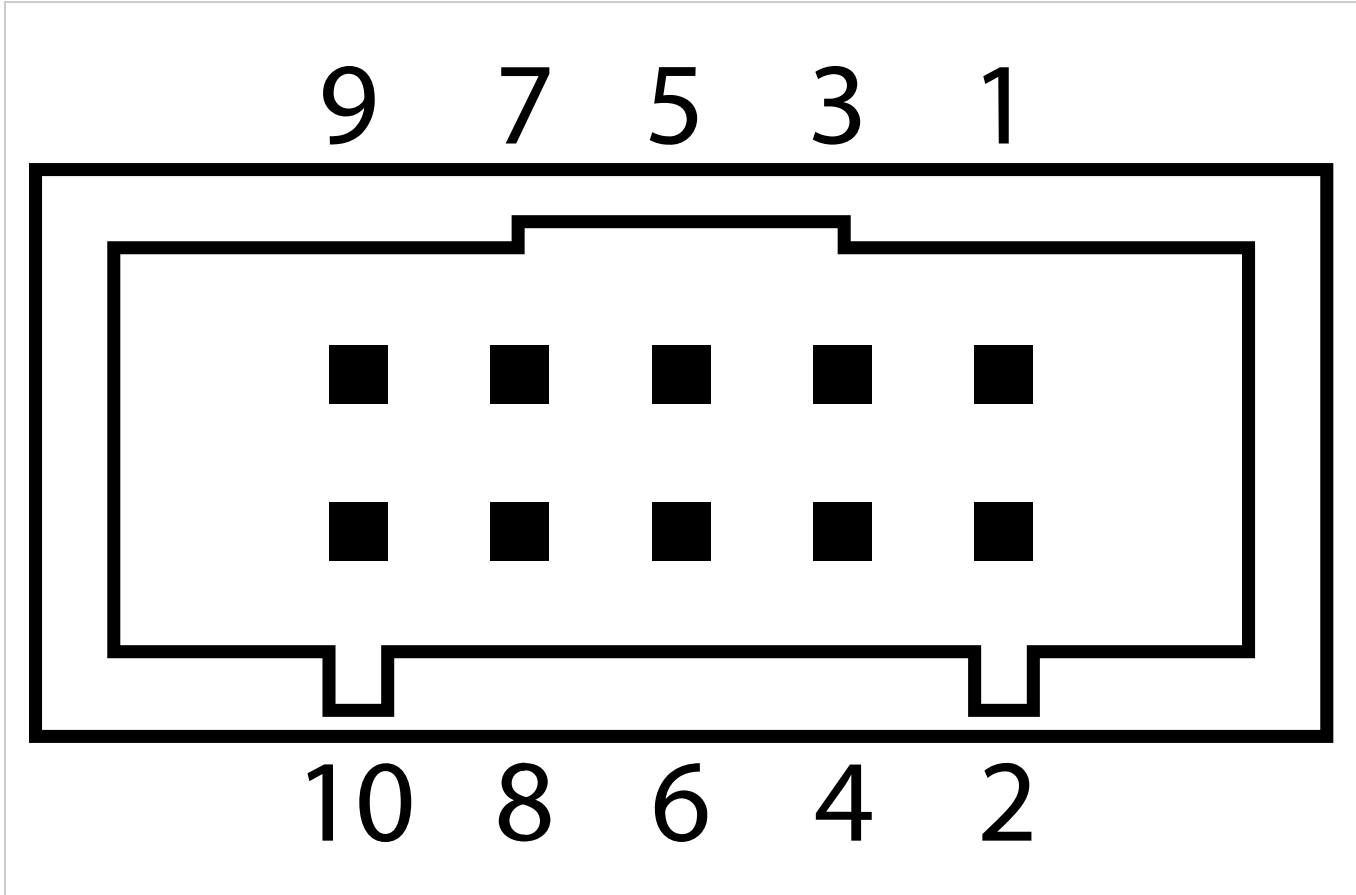
Notes:

(1) For the EA-D-L-10, the +5VDC pins on the input and output connectors are electrically connected together, so power can be applied to either the input or output connector. For the EA-D-H-5, the 7.5 to 30VDC power is applied at the OUTPUT connector. +5V out is generated at the INPUT connector.

RECEIVER (EA-R-) PINOUT

The receiver input is a 10-pin latching connector, FH10 (MOLEX# 74162-2010). The output has five 12" discrete wires (W5).

FH10 Input Connector



PIN	INPUT 10-PIN CONNECTOR (FH10)	OUTPUT 5-PIN (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:

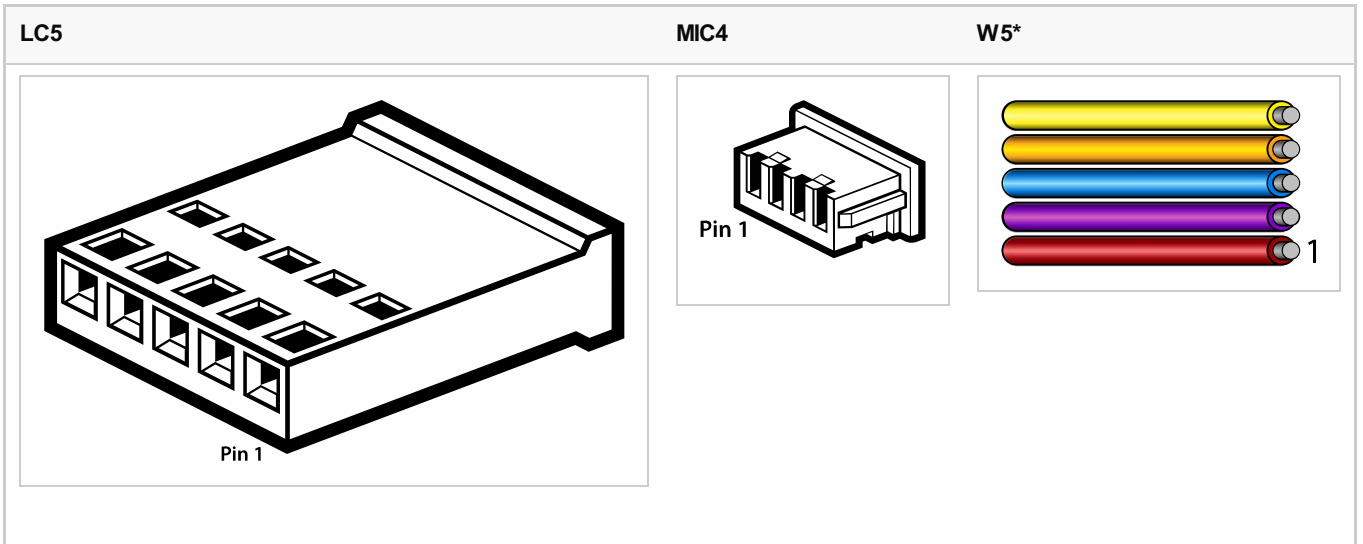
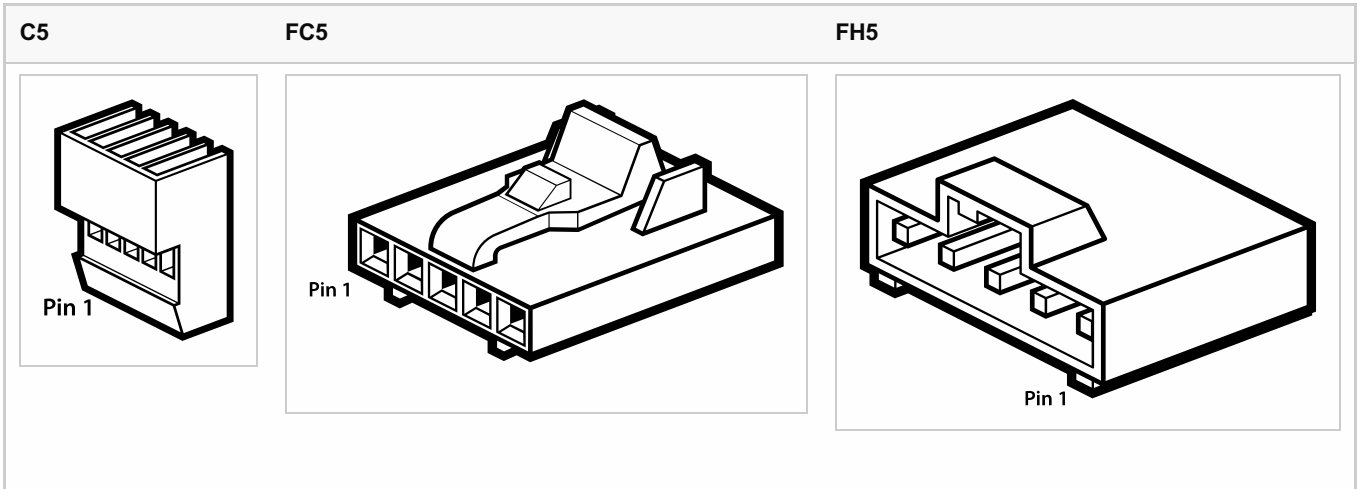
(1) The +5VDC pins on the input and output connectors are electrically connected, so power can be applied to either the input or output.

CONNECTOR B OPTIONS



EA Incremental Encoder Adapter

OPTION	DESCRIPTION	MANUFACTURER INFO
C5	Five 22 AWG 6" discrete wires with a standard connector	TE# 3-640440-5
FC5	Five 22 AWG 6" discrete wires with a latching connector	MOLEX# 14-56-7052
FH5	5-pin latching header	TE# 2-103634-7
LC5	Five 22 AWG 6" discrete wires with a locking connector	TE# 1-87175-2 (Housing) TE# 87124-1 (Contacts)
MIC4	Four 26 AWG 6" discrete wires with a micro connector	MOLEX# 51021-0400 (Housing) MOLEX# 50079-8000 (Contacts)
W5*	Five 22 AWG 12" discrete wires	UL 1061-22/7-3



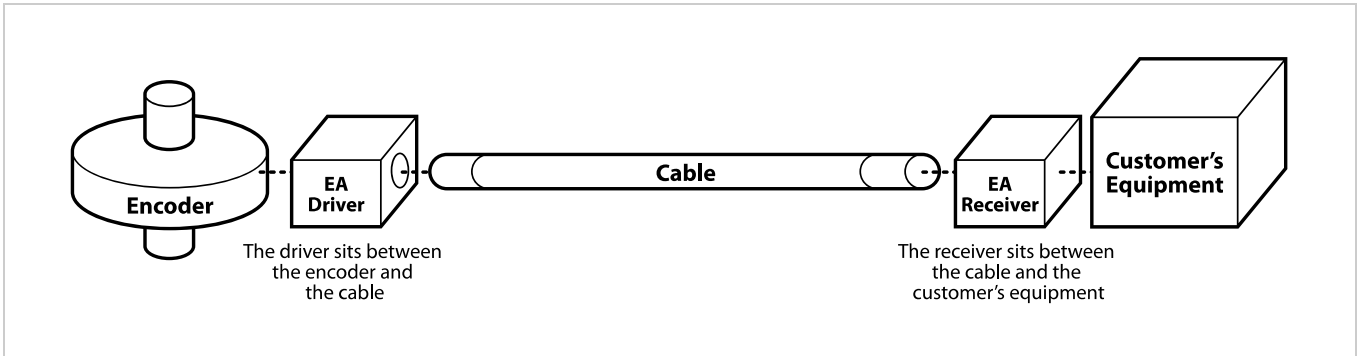
*Note: The W5 pin-out is as follows:



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.