RENCO

R35i Modular

The R35i Modular uses OPTO-ASIC technology to provide our highest level of performance in a modular encoder. This innovative technology minimizes components to increase product reliability in the smallest possible package. The R35i also provides optional brushless commutation outputs and the highest resolution data channels available in the industry. The enhanced slide lock mechanism automatically centers and gaps the encoder thus making installation simpler than ever before.

Features:

- Small size 35mm [1.38 inch]
- Patented slide lock for easy installation
- Line count up to 8192
- 2 data channels in quadrature
- Once around index pulse
- 3 commutation channels (optional)
- CMOS ASIC technology
- Up to 500 KHz frequency response

Environmental:

Operating Temp	-30° to 115°C
Excursion Limits:	
Storage Temp	-40° to 125°C
Shock	50 G's for 11mS duration
Vibration	20 to 2000 Hz @ 10 G's
Humidity	85%/85°C non-condensing
IP Rating	IP40 with closed cover

Mechanical:

Moment of Inertia	2.0g-cm^2 [2.9 x 10^{-5} oz in sec^2] for 8mm hub with metal disk 2.625g-cm^2 [3.7 x 10^{-5} oz in sec^2] for 8mm hub with glass disk
Weight	10 encoders with tray = 10 oz.
Base Material	PET 530
Cover Material	PET 530
Disc Material	Metal 0.05 THK TYP for 250-4096 resolutions Glass .9mm THK TYP for 8000 & 8192 resolutions
Hub Material	Stainless Steel
Shaft Max End Play	±0.254mm [± 0.010]
Shaft Run Out	0.025mm [.001"] TIR
Mounting Hardware	C or H: 2 x M2.5 or #2-56 UNC screws with captive washer C4 or H4: 2 x M2.5 or #4-40 UNC screws

Electrical:

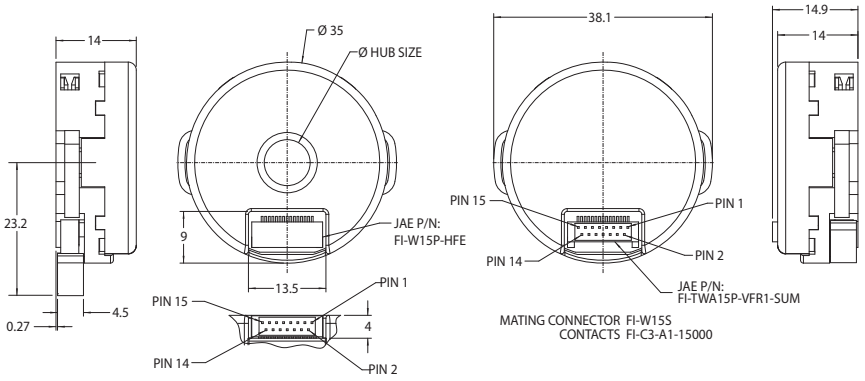
Signals	Incremental plus optional commutation
Input Voltage	5.0 VDC ± 10% Single or Dual Supply
Current	See Pin Functions Table on Page 2
Output Format	A/B in phase quadrature. INDEX width & location gated with respect to data
Output Type	LD = AM26C31 20 mA Source or Sink Max. PP = Source or Sink 4mA Min. VO = Open Collector 4 mA Sink Min. (Comm only) VC = Open Collector w/ 2K Ohm pull-ups 4mA Sink Min. (Comm only)
Output Logic Levels	Logic 0 = 0.5 V Max, Logic 1 = 2.5 V Min.
Operating Frequency	To 500 KHz

Resolution:

Line Count	250, 256, 360, 500, 512, 720, 1000, 1024, 2000, 2048, 4000, 4096, 8000, 8192
Commutation	0, 2, 3, 4
Index Gating	1 = Index Gated with A & B, Index width 90° ± 45° 6 = Index Gated with A- & B-, Index width 90° ± 45° 7 = Centered on A & B, Index width 270° ± 45° 8 = Centered on A- & B-, Index width 270° ± 45°

www.renco.com • 805.968.1525 • 26 Coromar Drive • Goleta, CA 93117

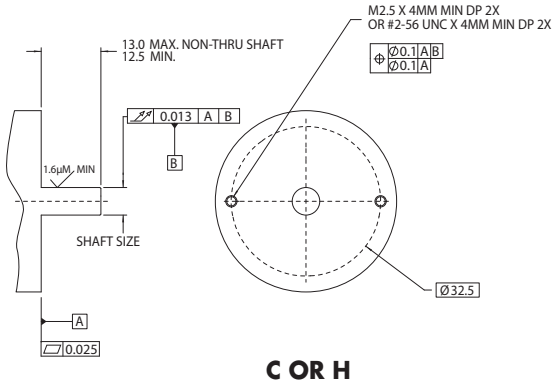
Mechanical Dimensions



RADIAL CONNECTOR COVER WITH HOLE SHOWN

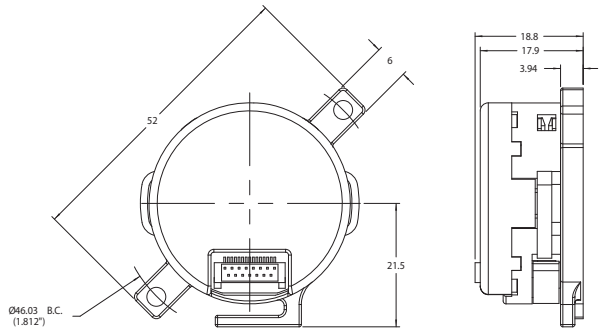
AXIAL CONNECTOR WITH CLOSED COVER SHOWN

Mounting Requirements



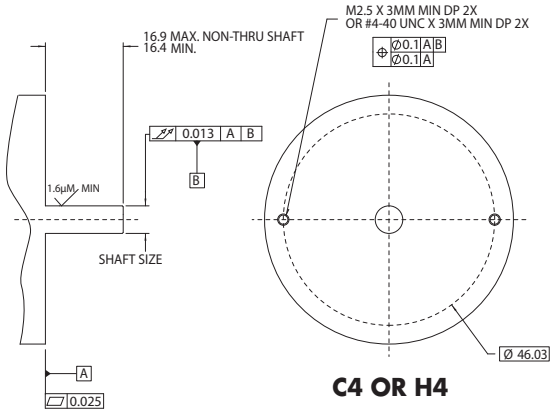
C OR H

Mechanical Dimensions



AXIAL CONNECTOR WITH C4 OPTION SHOWN

Mounting Requirements



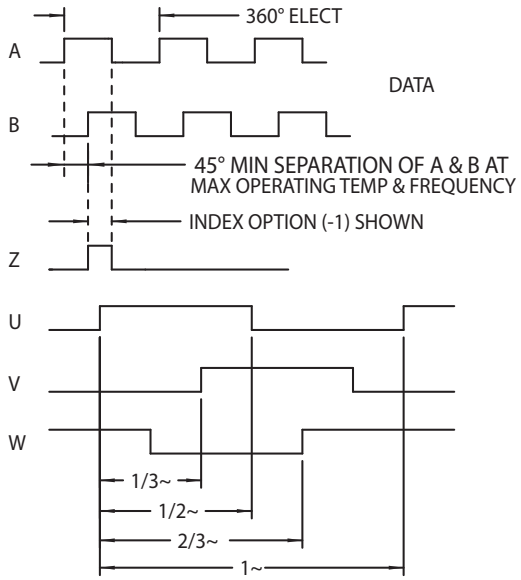
C4 OR H4

Pin Functions

PIN NO.	5/0 LD/0	5/0 LD/LD	5/0 LD/PP	5/0 PP/0	5/0 PP/PP	5/0 0/LD	5/0 0/PP	5/5 LD/VO OR LD/VC	5/5 PP/VO OR PP/VC
1	A	A	A	A	A			A	A
2	A-	A-	A-					A-	
3	B	B	B	B	B			B	B
4	B-	B-	B-					B-	
5	Z	Z	Z	Z	Z			Z	Z
6	Z-	Z-	Z-					Z-	
7		U	U		U	U	U	U	U
8		U-				U-		GND2	GND2
9		V	V		V	V	V	V	V
10		V-				V-		+5V2	+5V2
11		W	W		W	W	W	W	W
12		W-				W-			
13	+5V	+5V	+5V	+5V	+5V	+5V	+5V	+5V	+5V
14	GND	GND	GND	GND	GND	GND	GND	GND1	GND1
15									
CURRENT (mA)	100	160	108	48	56	100	48	108	56

Phase Quadrature

CCW VIEWING ENCODER TOP
PP/PP OPTION SHOWN



Hub Size

SPECIFY	HUB SIZE +0.01 -0	SHAFT SIZE +0 -0.013
1/8	3.17	3.167
3/16	4.757	4.754
3/16+	4.765	4.762
5mm	5	4.997
6mm	6	5.997
1/4	6.345	6.342
1/4+	6.353	6.350
5/16	7.932	7.929
5/16+	7.94	7.937
8mm	8	7.997
3/8	9.52	9.517
3/8+	9.528	9.525

Output Format

VOLTAGE	DATA/COMM	
5/0	LD/0	LD/LD
	LD/PP	PP/0
	PP/PP	0/LD
	0/PP	
5/5	LD/VO	LD/VC
	PP/VO	PP/VC

Closure Option

SPECIFY	CLOSURE OPTION
C	CLOSED COVER
H	COVER W/ HOLE
C4	46.02 MTG, CLOSED COVER
H4	46.02 MTG, COVER W/ HOLE

Connector

A = Axial
R = Radial

Ordering Information

R35i - _____ (RESOLUTION See Front Page) / _____ (COMMUTATION See Front Page) - _____ (HUB SIZE) - _____ (OUTPUT FORMAT) - 5/_____ (VOLTAGE See Front Page) - _____ (GATING OPTION See Front Page) - _____ (CONNECTOR) - _____ (CLOSURE OPTION)

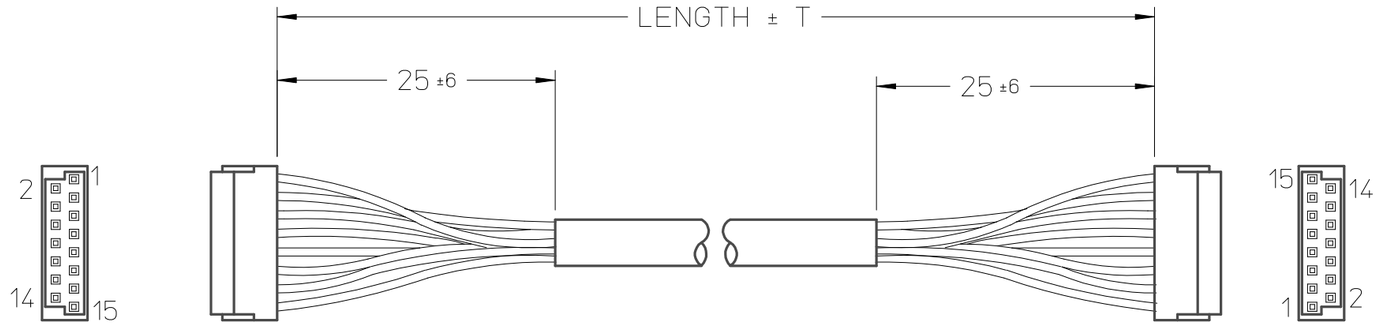
For Technical and Sales Information, Call 805.968.1525 • For Custom Configurations, Consult Factory • All Dimensions in Metric Units • Specifications May Change without Notice

NOTES: UNLESS OTHERWISE SPECIFIED

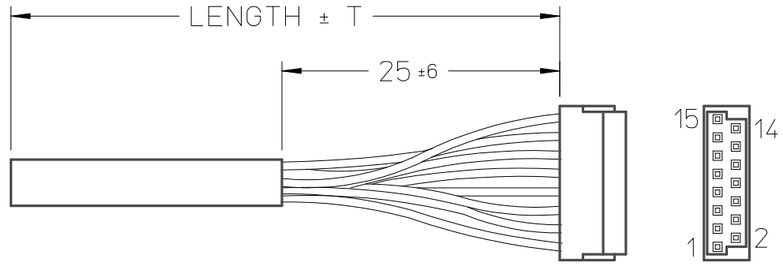
1. PART # 606544 SERIES, SEE TABLES 1 & 2.

TABLE 1	
PART #	LENGTH
606544-01	1000 (1M)
606544-03	2000 (2M)
606544-05	3000 (3M)

TABLE 2	
PART #	LENGTH
606544-02	500 (0.5M)
606544-04	1000 (1M)
606544-06	1500 (1.5M)



DUAL CONNECTOR CABLE
SEE TABLE 1



SINGLE CONNECTOR CABLE
SEE TABLE 2

TERMINATION		
PIN NO.	COLOR	FUNCTION
1	YEL	CH A
2	YEL/WHT	CH A-
3	BLU	CH B
4	BLU/WHT	CH B-
5	ORN	INDEX
6	ORN/WHT	INDEX-
7	GRN	CH U
8	GRN/WHT	CH U-
9	BRN	CH V
10	BRN/WHT	CH V-
11	WHT	CH W
12	GRY/WHT	CH W-
13	RED	+Vcc
14	BLK	GND
15	GRY	F-GND

LENGTH TOLERANCES	
LENGTH	T
461-910	± 25
911-1810	± 75
1811- UP	± 100

D521878-01-A-02

RELEASE # 41710

MAT'L 2 | FINISH

THIRD ANGLE PROJECTION

TEXT Add dual connector option

DRAWN	Cepeda	01/24/08
APPV'D		
REL'D		

TOLERANCES
UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN MILLIMETERS

RENCO ENCODERS INC.
26 COROMAR DR
GOLETA, CA. 93117

TITLE
Connecting cable, R35i, LD/LD

SIZE	FSCM NO.	DWG NO.	VER	REV	SHT
B	34479	606545-01-A-01			

SCALE NONE | THIS DWG PREPARED IN ACCORDANCE WITH: ASME Y14.5M -1994 | PAGE 1 OF 1

Verify that you received the following items:

- Encoder
- Cover
- Setscrew wrench
- M2.5 or #2-56 Torx Head Mounting Screws with Captive Washer

CAUTION ---- ESD Precautions Apply ---- CAUTION

Motor Preparation

Dynamic alignment requires a second motor to backdrive the target motor. Connect motor winding U to channel 2 of an oscilloscope.

Encoder Preparation

IMPORTANT! Do not apply power to the encoder at this time.

Verify that the slide lock mechanism is fully extended and the setscrew is in the 3 o'clock position. This will put the index and U commutation underneath the sensors within •10 mechanical degrees. (Figure 1)

Step 1

Align encoder mounting tabs with mounting holes on the motor. Slide encoder onto the motor shaft until the encoder is resting on the motor endplate. (Figure 1) If encoder hub does not slide easily, check that the hub setscrew does not extend into the hub bore or that burrs are not present on the motor shaft. If either exists, remove encoder and correct fault.

Step 2

Mount the encoder to the endplate by installing the supplied Torx head mounting screws with captive washer under the screw head. Secure mounting screws finger tight, allowing encoder housing to rotate. (Figure 2)

Threadlocker 222 may be applied to screw threads to prevent screw from unthreading during operation.

Step 3

Secure the hub setscrew with 20 oz-in torque. (Figure 3)

CAUTION: Over tightening the setscrew will cause Brinelling of the shaft making it difficult to remove encoder.

Bonding of encoder hub is recommended for high speed or accel/decel operation of motor.

(Bonding and Debonding Methods)

Step 4

Install test cable to encoder for commutation alignment. Apply power to the encoder. Connect commutation U to channel 1 of oscilloscope with oscilloscope set for positive trigger on channel 1. While holding encoder body firmly, back drive motor so that motor shaft rotates CCW when viewing encoder pc board (500 RPM MAX for 1 minute MAX). Motor speed should be adjusted for constant velocity of the motor shaft. (Figure 4)

Step 5

Rotate housing until rising transition of commutation U occurs at the zero crossing of the motor back-emf signal of winding U. (Figure 5) Secure mounting screws with 30 oz-in torque. Push in slide lock mechanism.

Step 6

Verify proper alignment of commutation U with back-emf signal of winding U. If not aligned properly, stop back-driving the motor, pull out slide lock mechanism, loosen mounting screws and return to Step 5.

Step 7

Bond hub to motor shaft using recommended bonding method. (Bonding and Debonding Methods)

Step 8

Remove test cable and install cover. (Figure 6) Install cable assembly. Encoder is now ready for operation.

Encoder Removal

Remove cable assembly.

Remove cover.

Pull out slide lock mechanism to installation position.

Loosen hub setscrew (If hub has been bonded, see (Bonding and Debonding Methods)

Remove encoder mounting screws.

Remove encoder.

FIGURE 1

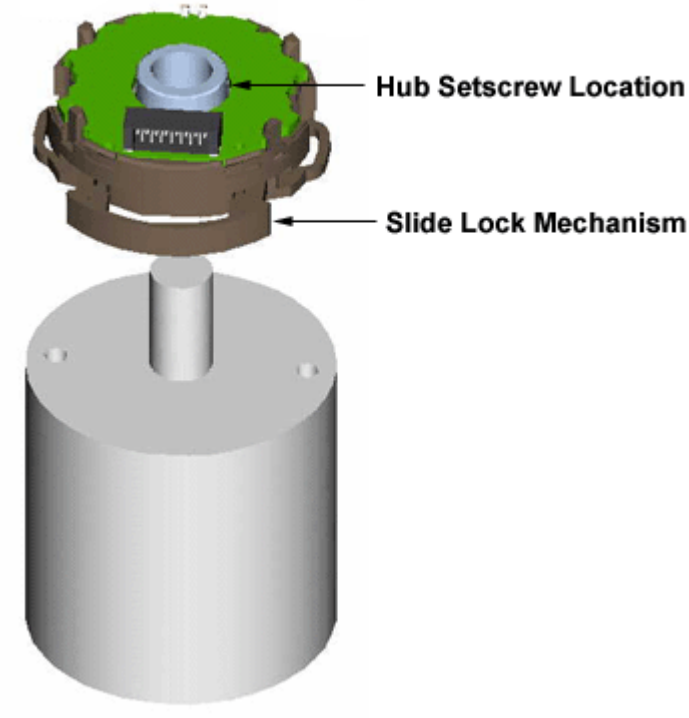


FIGURE 2

FIGURE 3

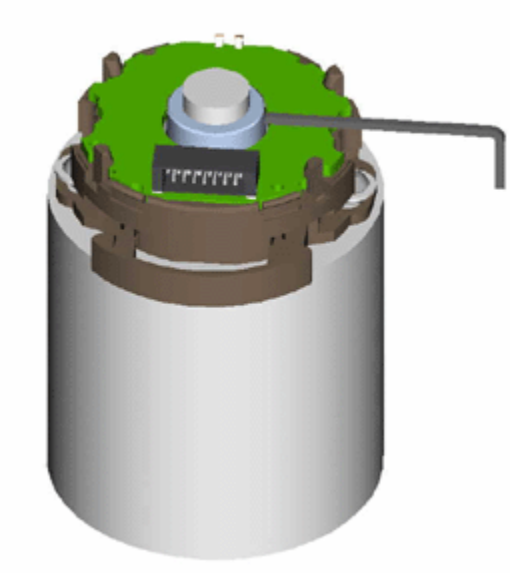
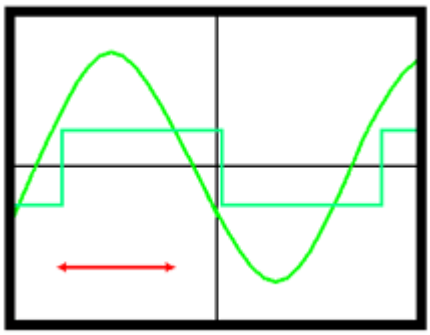
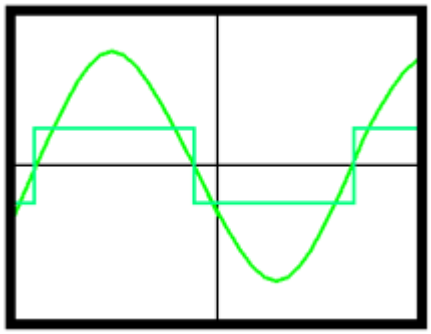


FIGURE 4



Commutation not aligned with motor winding

FIGURE 5



Proper commutation alignment with motor winding

FIGURE 6

RETURN TO TOP