## *Research Concepts RC2500 Antenna Controller Resolver Mounting Hardware*

The RC2500 is designed to interface with Clifton Precision model 11-BHW-48F/F662 resolvers (other resolvers have been used as well – contact the factory for information). This resolver is approximately 1.1" in diameter and 1.6" long with a 1/8" shaft (sealed). A data sheet on this resolver is available from Research Concepts Inc. (RCI). This document discusses mounting clamps, shaft couplers, electrical connections and environmental protection of the resolver.

### Mounting the Resolver

The resolver should be mounted to a plate using synchro clamps that make contact with the resolver via the groove cut around the circumference of the resolver body near the shaft end of the device. Note that a clamp should not be placed around the body of the resolver as this can result in a slight distortion of the resolver body which will degrade the sensor's accuracy.

The resolver can be mounted several ways. Please refer to the resolver's mechanical drawing. If the resolver mounting plate is drilled to accept the resolver's 0.6250" diameter shoulder use the Berg SQ-15 or Sterling Instrument S3109Y-CS-10 (RCI p/n Z-RSLVR-SQ15) clamp. If the resolver mounting plate is drilled to accept the resolver's 1.0000" diameter shoulder use the Berg SQ-11 or Sterling Instrument S3109Y-CS-07 (RCI p/n Z-RSLVR-SQ11) clamp. These clamps hold the resolver in place by clamping against the edge of the groove described in the previous paragraph. The clamps require that a 4-40 screw hole be tapped into the mounting plate.

The Sterling Instrument S3000Y-CO29S (0.6250" diameter shoulder mounting) is an L type clamp that can also work in this application. The L clamp is held in place with a 4-40 stainless steel screw (not supplied). All of these clamps are made of stainless steel. Three or four clamps should be used on each resolver. Contact information for these vendors is given below.

### Shaft Couplers

The Clifton Precision 11-BHW-48F/F662 resolver is equipped with a 0.120" diameter shaft that is approximately 0.5" in length. The following table lists shaft couplers that are available from various vendors. In the table D1 refers to the bore diameter on one end of the coupler and D2 refers to the bore diameter on the other end of the coupler. All dimensions are in inches.

| Part Number | Vendor | D1 | D2 | OD | Length | Comments |
|---|---|---|---|---|---|---|
| C05-5 | Berg | .1248 | .2498 | 0.69 | 1.5 | Precision Bellows Coupling with set screws, stainless steel. RCI (Z-CPL-CO5-5). CO5-5C is similar with clamp style couplings and an OD of 0.8". |
| C05-1 | Berg | .1248 | .1248 | 0.69 | 1.5 | Precision Bellows Coupling with set screws, stainless steel. p/n CO5-1C is similar with clamp style couplings and an OD of 0.8". |
| 59925K83 | McMaster Carr | .125 | .125 | 0.25 | 0.54 | Bellows Coupling with set screws, nickel, p/n 59925K84 is similar with a length of 0.48" |
| 6208K11 | McMaster Carr | .125 | .156 | 0.75 | 1.0 | Helical Beam Coupling with shaft clamps, anodized aluminum, low cost. |

### Electrical Connections and Environmental Protection

The Clifton Precision 11-BHW-48F/F662 resolver has a sealed shaft and six 28 AWG (7 x 36 AWG) wires that exit the body of the resolver via an opening in the side of the resolver (as opposed to an endplate). For cabling between the controller and the resolver a cable consisting of three, 22 AWG, shielded, twisted pairs should be

employed (Belden 9329 or 87777, Alpha 58613, Carol C8573). This cable is available from Research Concepts (p/n CBL-3x2_22-STP). The drain wires in the cable that allow connection to the foil shield should be connected only at the controller and not at the resolver. 3/8" heat shrink tubing can be used at the resolver end of the cable to prevent the frayed foil shielding material from coming in contact with earth ground.

For installations where a resolver is replacing a synchro it may be possible to use the existing 5 conductor, shielded, synchro cable. This substitution is not a recommended but it has proven satisfactory for some customers.

The following table describes the required connections …

| Signal Name | Resolver Lead Colors | Controller Resolver Connector Terminal (J2 Az, J3 El, J4 Pol) |
|---|---|---|
| Reference + | Red/White | 2 |
| Sin -, Cos - | Black, Blue | 3 |
| Sin + | Yellow | 5 |
| Shield Ground | | 6 |
| Reference - | Yellow/White | 8 |
| Cos + | Red | 9 |

3M UR (RCI p/n CN-JIZR) connectors are insulation displacement type, butt style, connectors filled with dielectric grease that can be used to connect the resolver leads to the controller interface cable.

To provide environmental protection of the resolver and cable connections a length of 1 ½" diameter heatshrink tubing (Alpha FIT 421 1 ½", RCI p/n HS-421-1_50) can be placed over the resolver. The tubing will not shrink to the diameter of the interface cable but could be shrunk to fit the ½ NPT threaded portion of a liquid tight cable type, strain relief (Heyco 3224, RCI p/n CN-3224).

Vendors

W.M. Berg Inc., ph 800-232-BERG, catalog B2000, 'Master Catalog'

Sterling Instrument, ph 516 328 3300, 'Handbook of Design Components Catalog', number D220-3

McMaster-Carr Supply Co., ph 630 833 0300
Heyco Products, Inc. ph: 800 526 4182

Alpha Wire Company, www.alphawire.com

Belden, www.belden.com

Mouser Electronics, www.mouser.com for 3M UR type connectors

Research Concepts, Inc,
5420 Martindale Rd., Shawnee, KS 66215 USA
ph: 913.422.0210 fax: 913.422.0211
www.researchconcepts.com email: sales@researchconcepts.com

| RCI Part Number | Description | Cost |
|---|---|---|
| Z-RSLVR-SQ15 | Resolver Clamp | Call for pricing. |
| Z-RSLVR-SQ11 | Resolver Clamp | |
| Z-CPL-CO5-5 | 1/8” to ¼” shaft coupler | |
| CBL-3x2_22-STP | Cable consisting of three 22 AWG twisted pairs, shielded, with bare drain wire | |
| HS-421-1_50 | 1 ½” Heat shrink tubing | |
| CN-3224 | Cable strain relief, liquid tight, ½” NPT fitting | |
| CN-JIZR | 3M UR type insulation displacement butt connector with dielectric grease | |