

# DB11 Yagi Assembly Manual



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# DB11 Yagi – Component Checklist (72-2011-01)

Use this list to ensure that everything you ordered has been included in the shipment It is a good idea to mark the options you have purchased, for future reference.

#### MAIN ANTENNA BOX

Ο	QTY	PART NUMBER	ITEM
	1	70-3401-01	EHU, 20m Driven
	2	70-3407-01	EHU, DB11 20m Driven w/Relay
	1		Controller (SDA 100 or SDA 2000)
	1		Controller Operator's manual (SDA 100 or SDA 2000)
	1	20-8030-02	33V Power Supply
	1	20-8040-01	Power Cord
	1	70-2037	Connector Junction Box
	1	71-0017	Connector Junction Box Manual
	1	71-0018	DB11 assembly manual
	1		DB11 Sweep Picture Sheet
	1	72-0010-41	DB11 Control Cable Kit
	6	60-1006-22	FERNCO rubber boot
	1	72-0050-11	DB11 Hardware kit, nuts and bolts
	1	72-0051-12	DB11 Small parts kit
	1	20-6208-01	25 Pin Male Connector
	1	20-6209-01	25 Pin Back Shell
	6	10-1013-02	Telescoping Poles (DB11 poles Cut to 97.5 inches by customer)

#### SWEEP BOX

Ο	QTY	PART NUMBER	ITEM	
	6	10-1153-01	DB11 style sweep	
	3	10-1151-11	Return bracket 12 inch	
	1	10-1021-43	8 inch mast plate	
	1	72-0052-11	DB11 Saddle kit	
	1	Check length	Control cable, 16 Conductor or 20 Conductor (40m dipole opt)	
			OPTION: surge suppressor 06108 = 8pos 06112 = 12pos 06116 = 16pos	
	1	21-6301-80	Coax jumper cable, 8 ft	
	2	21-6301-30	Coax jumper cable, 3 ft 6 in	
	3	70-2030-11	DB-Style Mounting Plate	
	1	70-3001-01	Coax Switch assembly, box, lid hardware and screws.	
		70-6010-01	OPTION: DB25 Field Splice	



# DB11 Yagi – Component Checklist (Continued) (72-2011-01)

	BOOM BOX		
Ο	QTY	PART NUMBER	ITEM
	1	10-1202-01	1-3/4 inch x 72 inch boom section
	1	10-1202-61	1-3/4 inch x 62 inch boom section
	1	10-1203-31	1-1/2 inch x 8 inch boom splice

# DB11 Yagi - Antenna Kit Contents

#### DB11 Hardware Kit 72-0050-11

QTY	SPARES	PART NUMBER	ITEM
30	2	60-0017	10-32 x 3/4" Pan head
30	4	60-0018	#10 Washer
32	2	60-0019	10-32 Nylock nut
28	2	60-0030	1/4 inch Nylock nut
16	2	60-0041	1/4 inch Washer
28	2	60-0046	5/16 inch Nylock nut
4	1	60-0062	1/4 inch x 2 3/4 inch bolt
8	1	60-0065	5/16 inch x 3 1/2 inch bolt
20	1	60-0075	5/16 inch x 3 1/4 inch bolt
10	1	60-0112	10-32 x 3/8 inch set screw
2	0	60-0113	10-32 x 5/8 inch pan head
24	1	60-0140	1/4 inch x 5/8 inch bolt

#### DB11 Saddle Kit 72-0052-11

QTY	PART NUMBER	ITEM
24	10-1601-03	1 3/4 in Aluminum Saddle
6	10-1152-11	DB11 Return Bracket, Top Plate
4	10-1601-22	2 in Aluminum Saddle



#### DB11 Control Cable Kit 72-0010-41

QTY	PART NUMBER	ITEM
14'	21-5001-01	4 Conductor Cable
8'	21-5013	6 Conductor Cable
24"	09-1022	Coax Seal

#### DB11 Small Parts Kit 72-0051-12

QTY	PART NUMBER	DESCRIPTION
1	09-0001	Tape, <sup>3</sup> / <sub>4</sub> PVC electrical QTY 1
1	09-0007	Silicone Wrap, Blue ½" x 10mm
12	09-0013-CUT	Grip Tape, 1 x 2 inch
1	09-1025	Conical Grinding Stone
1	10-1028-21	Anti-Seize Stick
12	10-1059-01	Polyolefin Heat Shrink 1-1/2" x 3"
1	10-1619-01	Coax switch bracket
6	60-0150	Cap for return tube .843
6	60-1006-41	Boot, DB11 return
12	60-6000-50	Hose Clamps, Type M



# **EHU WIRING INSTRUCTIONS**

Follow the directions below for wiring each of your element housing units (EHU) to the connector junction box.

Trim approximately 1.5 inches of the outer jacket of the control cable (4 or 6 wire, depending on which EHU). Remove the shield material, the support thread and cut the ground wire off as shown in **figure 1.1**. Attach electrical tape at the end of the trimmed control cable jacket so that there is no chance for a short. Remove 0.25 inches of the insulation from each of the individual 22 AWG wires, leaving bare copper. **Figure 1.2** shows how the control cable should look like when you are finished with the trimming. Dip each of the copper wires into connector protector before inserting into the terminal plug. **Figure 1.3** shows what the connector protector will look like.

The terminal header assembly consists of the terminal header and the terminal plug as shown in **figure 1.4**. The plug is shipped loosely attached to the header. Remove this plug when wiring and firmly plug back in when completed.

Follow the wire sequence in **figure 1.5** for each EHU. The 6-pin wiring sequence is for the director and reflector elements, and the 4-pin wiring sequence is for the driven element. *Be careful to ensure that there are no bare wires protruding out from the terminal clamps, to avoid potential shorts.* 

The wiring sequence for each EHU is also imprinted on the PCB that the terminal header is mounted on (located inside the EHU), as shown in **figure 1.4.** Pay no attention to the second row of imprinted text, these pins are for use in the manufacturing of the board itself and are of no use to you. **Figure 1.4** shows a blue line crossing out the text in question.







# **EHU WIRING INSTRUCTIONS (CONTINUED)**

Check to be sure the terminal plug is firmly inserted into the terminal header.

Lay the control cable wire inside the wire tray of the EHU as shown in **figure 1.6**. This trough acts as a strain relief so that the cable will not be pulled out of the EHU. It is a good idea to leave a small amount of slack between the plug and the point which the tray starts as shown in **figure 1.7**.

Using the coax seal and cut into 1-inch strips as shown in **figure 1.8**. You will need three strips. The remainder can be used to seal the driven element SO239 connectors, should you wish to.

Apply coax seal on top of the control cable and work it around the cable and on top of the cable tray as shown in **figure 1.9**. This will help keep water from entering the EHU. Apply the coax seal to the remaining areas of the wire tray as shown in **figure 1.10**.

Repeat wiring and coax seal preparation for each EHU. When finished, the EHU's will be secured to the aluminum element mounting plates. This is covered in detail later.













## **RECOMMENDED TOOLS FOR ASSEMBLING THE ANTENNA**

12" Level 25' Tape Measure 5/16", 7/16", 1/2", 9/16", 3/8" sockets and wrench (deep well works best) Screwdriver #1 Flat head #1 Phillips #2 Phillips Volt-ohm meter

Razor Knife 3/32 allen wrench 2 work benches (saw horses or clamping work benches work the best) 5/16" nut driver (or drill works well with driver bit) Pliers Hammer Wire Cutters and strippers Torque wrench (capable of 5-20 ft lbs) (6.8-27.1 Nm)

#### STARTING ASSEMBLY

In the hardware kits we have provided extra hardware. This is a precaution in case fasteners are lost or damaged during assembly.

A large, cleared flat area is ideal for assembly of an antenna of this size and complexity. Typically, an area 16ft x 24ft would be ideal. We recommend using sawhorses or sturdy tables when installing the boom. By having the boom elevated, it is easier to ensure that the elements are level.

If you do not have room near the tower to assemble the antenna, we suggest you find a place that you can put the antenna together in its entirety and then disassemble as needed for transportation to the tower area.

Use of a level for adjusting the Element Housing Units (EHU's) is highly recommended. This is a surprisingly accurate and consistent method. Simply place the level on the mast plate and adjust each element accordingly.



# **BOOM ASSEMBLY PROCEDURE**

#### Locate boom pieces in the Antenna Boom Box

QTY 1 1 3/4" x 62" Aluminum Tube QTY 1 1 3/4" x 72" Aluminum Tube QTY 1 1 1/2" x 8" Center Splice Tube

Always apply anti-seize lubricant to stainless steel hardware. This will prevent galling, which destroys the bolts and can be a real problem getting apart. Each bolt has a specific length for the aluminum boom piece it is holding together. The bolts will be a little bit long, so we provide you with 4 stainless steel washers per bolt to make up the difference. It is critical you use these washers, so that only the shank of the bolt is engaging the aluminum tubing

- Apply a thin film of anti-seize or a spray-on lubricant (i.e. WD-40, Dry Lube) to the male engagement area of the boom sections.
- Secure the bolts nuts and washers onto the boom. Each boom bolt will require four of the washers, used as spacers.
- Repeat this for each section until the boom is completely assembled as shown in figure 2.





#### MAST PLATE ASSEMBLY

Locate the parts shown in figure 3 below and use figure to assemble the mast plate onto the boom.

Pay close attention to the orientation of the mast plate on the boom. Notice that the mast plate is not centered on the boom section joint but is slightly offset towards the longer 72 inch boom section. Two of the aluminum saddle clamps will clamp directly on the joint between the boom sections.









# **ELEMENT HOUSING UNIT SPACING**

#### Locate the three Element Housing Units (EHU) with gaskets, in the Antenna Box

QTY 1 Driven EHU 20m (This is the only EHU that uses 4 conductor wire)

QTY 2 Director / Reflector EHU DB11 (both are identical and use 6 conductor wire)

#### *Note:* Refer to figure 5 on the following page for the hardware required to connect the EHU's to the boom.

Spacing of the elements in relation to each other is CRITICAL. Take great care to ensure that the elements are mounted as shown in **figure 4** below. All dimensions are taken from the center of the element, which is the center-point of the fiberglass tube that houses the copper beryllium strip, both at the EHU and at the return EST.

#### Figure 4





## ELEMENT HOUSING ASSEMBLY PROCEDURE

- Attach the appropriate EHU to the mounting plate and return mounting bracket. Then attach the
- mounting plates to the boom. See figure 5.
- Use a level to check the EHU and Return mounting bracket before tightening the aluminum saddles to the boom. When the plate is level tighten the saddle bolts to 20 ft/lbs (27.09Nm).





# WIRING THE CONTROL CABLE TO THE ANTENNA SWITCH

#### Locate the following kits:

QTY 1	72-0010-41	DB11 Cable Kit
QTY 1	70-3001-01	COAX Switch Assy

Note: Refer to figure 7 for assembly hardware required for this step.

- Follow figure 6 for wiring the control cable to the Coax Antenna Switch
- Once wired correctly, the cable must be pulled through the drain hold on the lid of the Coax Antenna Switch.
- The loose end of the control cable will be wired to the connector junction box. This procedure will be completed in a later step of the assembly process. For now, let the control cable hang unattached while the coax antenna switch is mounted to the antenna.
- DO NOT secure the lid and gasket to the enclosure until the final testing has been completed.

Figure 6

**Control Wiring for Coax Antenna Switch** 





#### **MOUNTING THE COAX ANTENNA SWITCH**

- Attach the Coax Switch Bracket to the Antenna Switch Housing Lid.
- Attach the assembly to the boom, WITHOUT the housing and gasket (as shown in figure 7.) The housing and gasket will be installed later after testing is completed.





# WIRING THE COAX CABLE TO THE ANTENNA SWITCH

**Note:** Take care not to bend the cable over any sharp corners of the boom assembly, or particularly, the top plate on the antenna tower, or the cable could be damaged. Do not bend the cable in a smaller diameter than 10 inches. Do not clamp anything over the cable that could possibly pinch, or damage it. A short-circuit of the cable may cause damage to the electronic controller.

- The coax cables have been made specifically for each individual element.
- Follow **figure 8** and **figure 9** below for connecting the coax to the antenna switch box. Tighten all coax connectors with pliers to ensure a good connection.
- Weather-proofing should be done when all testing and assembly have been completed.







# SECURING THE COAX AND ELEMENT CONTROL CABLE TO THE BOOM

**Note:** Take care not to bend the coax or control cable over any sharp corners of the boom assembly, or particularly, the top plate on the antenna tower, or the coax/control cable could be damaged. Do not clamp anything over the coax/control cable that could possibly pinch, or damage it.

When taping the cable to the boom, start on the ends of the boom and work towards the mast plate. This will allow you to trim the cable to the exact length if desired.

We recommend labeling all the wires at the connector junction box location. Knowing which wire goes to each EHU could be very handy in the event of any control cable issues later when the antenna is in the air!

- Secure the coax and control cables from the EHU's to the boom.
- Use the outdoor electrical tape (09-0001) to secure the cable to the boom Only two wraps of the tape are needed to hold the cable to the boom.
- Tape the control cable and coax cable to the boom approximately every two feet.
- Once both cables have been secured to the terminal housing or connector junction box, the control cable can be trimmed to length or coiled up and out of the way.

#### WIRING THE ELEMENT HOUSINGS

Refer to the connector junction box manual for instructions on how to install the junction box and wire the elements. The diagram of the DB11 wiring is found on page 8 of the connector junction box manual. You'll already have wired the control cable to the EHUs on page 8 of this manual so now you'll need to connect those control cable wires to the connector junction box.

# PREPARING THE CONTROL CABLE

- 1. Strip the jacket and aluminum shielding off of the control cable as shown in figure 5.20, approximately 2.75" from end of control cable, being careful not to damage the individual wires.
- 2. Strip the plastic insulation off of each of the control cable wires, approximately 0.25" in length should be bare wire.



# CONNECTING CONTROL CABLE TO THE DB25 SOLDERED CONNECTOR

If you purchased the default DB25 connector, follow the steps below to connect it to your control cable. If you purchased the optional DB25 Field Splice upgrade, skip ahead to the next section.

- 1. Solder each wire to the appropriate pin of the 25 pin connector. Refer to the table on the following page for the correct wiring sequence.
- 2. Attach the clamp to the control cable approximately 1" from the connector and secure with the provided hardware as shown in figure 5.21.
- 3. Place the connector between the back-shell halves as shown in figure 5.22 and secure with the provided hardware.

# CONNECTING CONTROL CABLE TO THE OPTIONAL DB25 FIELD SPLICE

The optional DB25 Field replaces the standard connector with a convenient solder-less connection of the control cable to the SteppIR controller. If you purchased this option, follow the steps below to connect it to your control cable.

- 1. Apply the provided dielectric grease to the exposed copper portion of each wire.
- Connect each wire to the appropriate terminal and tighten using a flat head screwdriver. Note that the terminals may be closed by default. If so, turn the terminal screw ccw ~10 turns to open it before inserting the wires. Consult the table on the next page for the correct wiring sequence.
- 3. Position the control cable between the cable clamp halves as shown in figure 5.23.
- 4. Tighten the two pan head screws until the cable is snug, but do not over-tighten.
- 5. Thread the two thumb screws into the connector face as shown in figure 5.23.
- 6. Plug the DB25 splice into the back of the controller and twist the thumb-screws to secure it.







Pin	24 Conductor DB42, DB36 (w/80m)	16 Conductor 4E, DB36 (No 80m)	16 Conductor DB11, DB18/18E	12 Conductor 2E, 3E	2x4 Conductor BigIR/SmallIR w/Coil	4 Conductor BigIR, SmalIIR, Dipole
-	BLACK	BLACK	BLACK	BLACK	BLACK	BLACK
2	WHITE	RED	RED	BROWN	RED	RED
ю	WHITE/BLACK STRIPE	GREEN	GREEN	RED	GREEN	GREEN
4	<b>BLACK/WHITE STRIPE</b>	WHITE	WHITE	ORANGE	WHITE	WHITE
£	BLUE	BROWN	BROWN	YELLOW	BLACK	
9	<b>BLUE/WHITE STRIPE</b>	BLUE	BLUE	GREEN	RED	
7	<b>BLUE/RED STRIPE</b>	ORANGE	ORANGE	BLUE	GREEN	
8	BLUE/BLACK STRIPE	YELLOW	YELLOW	VIOLET	WHITE	
6	ORANGE	VIOLET	VIOLET	GREY		
10	<b>ORANGE/RED STRIPE</b>	GREY	GREY	WHITE		
11	<b>ORANGE/BLACK STRIPE</b>	PINK	PINK	PINK		
12	GREEN	CREME	CREME	CREME		
13	BLACK/RED STRIPE		WHITE/ORANGE STRIPE			
14	ORANGE/GREEN STRIPE	WHITE/BLACK STRIPE				
15	WHITE/BLACK-RED	WHITE/RED STRIPE				
16	RED/BLACK-WHITE	WHITE/GREEN STRIPE				
17	<b>BLACK/WHITE-RED</b>	WHITE/ORANGE STRIPE				
18	<b>GREEN/WHITE STRIPE</b>					
19	<b>GREEN/BLACK STRIPE</b>					
20	RED					
21	<b>RED/WHITE STRIPE</b>					
22	WHITE/RED STRIPE		WHITE/RED STRIPE			
23	RED/BLACK STRIPE		WHITE/BLACK STRIPE			
24	<b>RED/GREEN STRIPE</b>		WHITE/GREEN STRIPE			
Solder	the unshielded drain wire of the story	e control cable to the chassis (	ground) of the Standard 25 Pin	Connector, or one	of the "G" pins on the optio	nal Field Splice









# PRELIMINARY WIRING AND MECHANICAL EHU TESTING

Read the SDA-100 Operators Manual so that you are familiar with operation of the controller. You will also need an ohm meter or continuity tester for most of these tests. At this time the controller should NOT be connected to your radio or computer. Also, the coax jumper cables and fiberglass poles should not be installed on the antenna.

#### EHU Test:

- 1. With the control cable NOT CONNECTED to the controller, turn the controller on. It should read "Manual Mode Elements Home". If not, push the "Retract" button. After the controller is finished tuning it may turn off and, if so, you will need to turn the controller back on. The controller will now read "Manual Mode Elements Home".
- 2. ENSURE THAT ALL THE ELEMENTS ARE CLEAR OF ANY OBSTRUCTIONS. The copper tape will be extended out from both sides of each EHU for approximately 6 inches.
- 3. Go into Setup mode and select "Create/Modify".
- 4. Now CONNECT the control cable to the controller.
- 5. Select each element (you can only do one at a time), REF, DVR, D1 and extend them to around 16" as indicated on the controller display. There will be approximately 3 inches of copper strip protruding out of each side of the EHU. This will allow you to put an ohm meter probe on the copper tapes during the tests. Clarification of the abbreviations on the screen of the SDA 100 controller: REF is the reflector, DVR is the driven element, and D1 is the director.



- 6. If at this point if any of the tapes do not extend, or the individual EHU/element does not correspond to the correct controller description, (I.E.: The Antenna Reflector is controlled by the REF position on the controller.) STOP, retract the elements, disconnect the control cable and correct any wiring errors. Then start at the beginning of these instructions.
- Now DISCONNECT the control cable BEFORE exiting "Create/Modify". (This is to prevent the elements from moving when changing the controller to the first test frequency. Exit "Create/Modify" by pushing the "Setup" button.)
- 8. Set the controller to the "Normal" direction by pushing the button labeled "Norm". The green LED next to the button should light.
- 9. Set the controller to any frequency in the 17m band.
- 10. When the controller indicates it is no longer trying to move the elements (the LED labeled "Tuning" will stop flashing) RECONNECT the control cable again.



- 11. Set your ohm meter to a low ohms scale (around 200 ohms or so).
- 12. Measure the resistance on each of the three elements (Driven, Ref, D1) between the center conductor of the SO-239 on the EHU and EACH of the two copper tape elements on that same EHU as shown in figure 5.31 and Figure 5.32. The Driven element should measure a very low resistance of 3 ohms or less (has Continuity) while REF and D1 should measure as an OPEN circuit (a very high resistance value, NO continuity). Note that when an element is in the "driven" mode there will be continuity between the copper tapes on that EHU. Rest assured it is only a short at DC and not RF frequencies, this is intended by the design of the balun.





#### **Coax Switch Test:**

- 13. On the antenna Coax Switch Box, use the ohm meter to verify there is very low resistance, less than 3 ohms (has continuity) between the center conductor of the SO-239 connector labeled "IN" and the center conductor of the SO-239 labeled "OUT3" as shown in figure 5.33. Verify that an Open circuit (very high resistance reading, no continuity) exists between the center pin of the "IN" coax connector and "OUT1" center pin as shown in figure 5.34 and also between "IN" and "OUT2" coax connector center pins as shown in figure 5.35.
- 14. If any of these tests fail, STOP, Push RETRACT, DISCONNECT the controller cable and check your wiring and correct any mistakes. Then restart the test procedure at the beginning.
- 15. If all the tests results are good from step 15, DISCONNECT the control cable.



- Set the controller to any frequency in the 20m band and stay in the "NORM" direction and wait for the "Tuning" LED to stop.
- 17. RE-CONNECT the control cable. Now D1 is the driven element and should measure less then 3 ohms (has continuity) between the EHU coax connector center pin and EACH of the two copper elements. The Driven is not used on 20m and is disconnected by the Coax Switch Box. The REF EHU should now measure as an OPEN circuit (very high resistance, no continuity) between the coax connector center pin and EACH of the copper tapes.



- 18. The antenna Coax Switch Box should now measure less than 3 ohms (has continuity) between the "IN" coax connector center pin and the "OUT1" connector center pin. There should also be an OPEN circuit (very high resistance, No continuity) between "IN" and "OUT2" coax connector center pins and also between "IN" and "OUT3" coax connector center pins.
- 19. DISCONNECT the control cable from the back of the controller.
- 20. Set the controller to the "180" direction, stay on the same 20m frequency, and wait for the "Tuning" LED to stop.
- 21. RE-CONNECT the control cable and repeat the above procedure except now REF is the driven element and should measure less than 3 ohms (has continuity) between the EHU coax connector center pin and the EACH of the copper tapes. The Driven EHU is still not used on 20m. D1 EHU should now measure as an OPEN circuit (no continuity, very high resistance) from the center pin of the coax connector to EACH of the copper tapes.
- 22. The antenna Coax Switch Box should now measure less than 3 ohms (has continuity) between the "IN" coax connector center pin and the "OUT2" connector center pin. There should be an Open circuit (No continuity, very high resistance) between the center pin of the "IN" coax connector and "OUT1" connector center pin and also the "IN" and "OUT3" coax connector center pins.
- 23. If the results of these tests are good DISCONNECT the control cable. On the controller push the "SETUP" button and select "RETRACT ELEMENTS" and choose "YES". Wait until the "Tuning" LED stops.
- 24. RE-CONNECT the control cable. You should still be in "SETUP". Scroll through and select "CALIBRATE" and then choose "YES". The copper tape will go back into the EHUs, and you will now hear a ratcheting sound for approximately 70 seconds. When finished the controller and antenna are now synchronized.
- 25. Push "POWER" and the controller will now turn off. DISCONNECT the control cable.
- 26. This concludes the tests and verifies the antenna is wired correctly and that all of the relays are switching correctly.



# PROCEDURE FOR HEATSHRINKING THE TELESCOPING POLES

The telescoping poles come packed with all 4 sections together for shipping purposes only. When installing, the pole sections will need to be separated, with the two larger sections comprising one single pole assembly, and the two smaller sections comprising another single pole assembly (see figure 11 below).



Each telescoping pole section joint requires 1 polyolefin heat shrink piece (PN 10-1059-01). Once finished, the seal is secure and waterproof. This product requires a heat gun for activation of the adhesive. We also recommend wearing gloves in case you need to reposition the heated tubing.

- Place the heatshrink on joints A and B shown in **figure 10** above. When positioning the heat shrink, place it so that the joint of the telescoping pole is centered in the middle of the heat shrink.
- Using a heat gun (hair dryers will NOT work), apply heat evenly around the entire area of heat shrink. *Note:* There are 4 blue colored lines imprinted on the tubing. The joint is considered done being heated and waterproof when the lines change color to a yellowish green. Each line needs to change in color to ensure even adhesion temperatures.
- Note that the heatshrink may slide down the tube as it constricts. Wearing heat-resistant gloves you can slide the heatshrink back up the pole to center it over the joint before the adhesive sets.
- Once the heatshrink has cooled, follow the instructions on the following page to prepare the fiberglass elements.





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# PROCEDURE FOR SECURING TELESCOPING POLES TO EHU

#### Locate the following kits for assembling the Telescoping Poles:

QTY 6 60-1006-22 Rubber Boots QTY 1 72-0050-11 Hardware Kit

- To secure the telescoping poles to the element housing unit, first slide a rubber boot over the base section of the telescoping pole as shown in **figure 11**.
- Slide the rubber boot over the metal ring on the EST of the element housing as shown in **figure 11**. Make sure the large hose clamp on the rubber boot slides over the metal ring on the EST of the element housing unit.
- The hose clamp that is located on the smaller end of the rubber boot should be positioned so that it is past the black raised ring on the telescoping pole as shown in **figure 11**. This will help keep the telescoping pole securely attached, in addition to the gripping pressure applied by the clamp itself. Once the rubber boot is in the correct location, tighten both hose clamps as shown in **figure 12**.
- Due to the possibility of cold flow of the plastic boot material, be sure to re-tighten the hose clamps after approximately 30 minutes to ensure a tight connection.
- Repeat the same process for each of the remaining element tubes.
- Using the 1/4 inch bolts, nuts and return brackets, secure the element return tubes to the boom as shown earlier in **figure 5**.







# 

# STEPPIR COMMUNICATION SYSTEMS 5 YEAR LIMITED PRODUCT WARRANTY

#### (as of May 22, 2023; Prior to that date warranty is 2 years)

Our products have a limited warranty against manufacturers defects in materials or construction for five (5) years from date of shipment. Do not modify this product or change physical construction without the written consent of Fluidmotion Inc, dba SteppIR Communication Systems.

This limited warranty is automatically void if the following occurs: improper installation, unauthorized modification and physical abuse, customer misuse or damage from weather events or natural disasters that are outside of the stated survivability of the product. For wind damage, proof of winds beyond 100 mph must be presented. Lightning or near-lightning events are not covered under this warranty. Driver chip module replacement is not covered under this warranty. This warranty is not transferrable.

SteppIR Communication System's responsibility is strictly limited to repair or replacement of defective components, at SteppIR's discretion. SteppIR will not be held responsible for any installation or removal costs, costs of any ancillary equipment damage or any other costs incurred as a result of the failure of our products.

In the event of a product failure, a return authorization is required for warranty repairs. This can be obtained at www.steppir.com. Shipping instructions will be issued to the buyer for defective components, and shipping charges to the factory will be paid for by the buyer. SteppIR will pay for standard shipping back to the buyer. The manufacturer assumes no further liability beyond repair or replacement of the product.

Modification of this product is not authorized and may cause product failure, injury or death.

#### SPECIFICATIONS

Weight	63 lb / 28.57 kg
*Projected Area	11.08 sq ft / 1.03 sq m
Longest Element	19 ft / 5.79 m
Turning Radius	10.5 ft / 3.2 m
Boom Length	11 ft / 3.35 m
Mast Hardware	2.0 in / 5.08 cm
Power Rating	3 KW
Frequency Coverage	13.8 MHz—54 MHz
Cable Requirements	16 conductor 22 ga shielded
Tuning Rate	1.33 ft/sec - 0.4 m/sec

\*Projected area is the total perpendicular surface area measured in square feet/square meters, that is exposed to wind. To calculate wind load you always take the largest projected area whether that is from the perspective perpendicular to the boom or perpendicular to the elements. In the case of SteppIR Yagi's, the maximum projected area will always be the sum of the surface area's perpendicular to the Yagi elements. This calculation is a constant number and will not change regardless of EIA specification changes. Do not mistake this projected area calculation as anything more than a datapoint to present to your structural engineer, tower manufacturer or rotator manufacturer so that they can determine what is necessary for your application.

When sizing an antenna to a tower, many factors need to be taken into consideration including, but not limited to: projected area of antenna in square feet or square meters, weight of the antenna and other items on tower, turning radius, element lengths, antenna height, location exposure category, locations three-second gust wind-speed, locations maximum radial ice loading.

Improper specification of an antenna or rotator to a tower can result in product failure, injury or death. SteppIR is not an expert on tower or rotator sizing and for this reason will never offer any recommendation – this specification process is meant for industry professionals such as a structural engineer, tower manufacturer or rotator manufacturer. Please do not attempt to self-specify our products – the information provided by SteppIR is to be utilized by industry professionals only and we will not accept any liability for improperly specified antenna/tower/rotator applications.



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