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# CUSTOMER MANUAL

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## **EDX-FL-FH-DELTA-110-4UR Series**

**VHF Band Base Station Duplexer, 110W, 4.5-10MHz, 4U High**



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[WWW.EXCELWAVE.COM](http://WWW.EXCELWAVE.COM)

1-888-329-2878(Tel) 1-888-318-5528(Fax)

# PRODUCT DESCRIPTION

**EDX-FL-FH-Delta-110-4UR** series VHF base station duplexers are narrow band band-pass type duplexers with 4.5-10MHz Tx/Rx spacing and 110W maximum Tx channel power. The unit comes with 4U high 19" EIA standard rack mount panel. Each unit is assigned with model number identical to Tx/Rx frequencies and spacing that customer has ordered.

## Understand the Model Number

**Excelwave Standard Model Name: EDX-FL-FH-Delta-110-4UR**

- FL: The low pass band frequency in MHz
- FH: The high pass band frequency in MHz
- Delta: Tx/Rx frequency spacing in MHz
- 110: Maximum Tx channel power is 110W
- 4UR: The unit maximum height is 4U(7in)

For example, EDX-164.5-172.6-8.1-110-4UR, refers to a unit that has low pass band frequency at 164.5MHz and high pass band frequency 172.6MHz with 8.1MHz Tx/Rx spacing.

## Tuning Range

The Tx/Rx frequencies and spacing must be provided in customer order, identified in corresponding product model number and are pre-set at factory. The product is tuned individually for optimum performance thus frequency retuning at customer site is not recommended. How the unit does allow minor adjustment on the frequencies and performance touch up for maintenance. The typical tuning range is  $\pm 1$ MHz maximum around the factory present frequencies.

### Warning:

**Power handling and other performances are not warranted by the manufacturer for any frequency modification.**

# TUNING INSTRUCTION

## Tuning Tools

- Wrench
- Screw Driver
- 2-Ports Vector Network Analyzer

## Tuning Rods

3 different type of tuning rods are identified in Fig.1 with digital numbers, letters lowercase and uppercase, and colored in red, brown and blue respectively.



**Fig.1 Tuning rods**

- **Tuning Rods identified by digital numbers 1-4:** Low pass band frequency adjustment
- **Tuning Rods identified by digital numbers 5-8:** High pass band frequency adjustment
- **Tuning Rods identified by upper case characters A, B&C:** Low pass band bandwidth adjustment
- **Tuning Rods identified by upper case characters D, E&F:** High pass band bandwidth adjustment
- **Tuning Rods identified by lower case character a&b:** Out-of-band rejection (Tx/Rx isolation)

## Tuning Procedure

1. Slightly loosen the nuts for tuning rods 1-8.
2. To adjust the low pass band frequency to lower end, screw in the tuning rods 1-4 clockwise; To adjust the low pass band frequency to higher end, screw out the tuning rods 1-4 counter clockwise.

During the tuning process, switch between tuning rods 1, 2, 3 and 4 to remain the original shapes of the test curves until reach the target frequency.

3. To adjust the high pass band frequency to lower end, screw in the tuning rods 5-8 clockwise; To adjust the high pass band frequency to higher end, screw out the tuning rods 5-8 counter clockwise. During the tuning process, switch between tuning rods 5, 6, 7 and 8 to remain the original shapes of the test curves until reach the target frequency.
4. Tighten the nuts with wrench while holding the tuning rods in position with screw driver.
5. Usually pass band do NOT need adjustment. In case it is needed, tuning rods A, B&C can be used to adjust low pass band bandwidth, and D, E&F can be used to adjust high pass band bandwidth. Screw in the tuning rods A, B&C, or D, E&F clockwise will increase the pass band bandwidth, and screw out the tuning rods A, B&C, or D, E&F counter clockwise will decrease the pass band bandwidth.
6. After the bandwidths are achieved, tighten the nuts with wrench while holding the tuning rods in position with screw driver.
7. The return losses may become worse during above tuning processes for low and high pass band frequencies and bandwidths. If the return loss become worse when push the tuning rod down, the tuning rod needs to be screwed out counter clockwise slightly. Switch to other tuning screws to approach the desired frequencies and bandwidths. Otherwise, the tuning rods needs to be screwed in clockwise further.
8. After the desired pass band frequencies are achieved and return losses are optimized, if it becomes worse, unscrew the nuts for tuning rods a&b, slightly screw in or out tuning rods a&b to optimize the out-of-band rejection (Tx/Rx isolation).
9. Tighten the nuts with wrench while holding the tuning rods a&b in position with screw driver.
10. Verify the measurement curves on the network analyzer, ensure the low and high pass bands frequencies, pass bandwidths, insertion loss and rejection meet the requirement. Slightly re-adjust each tuning rod to optimize the performance if it is needed.
11. Check if each tuning rod is tightened by checking the stability of the measurement curves on network analyzer while pushing the running rods gently.
12. Label the low and high pass band frequencies on the duplexer body, and document and date the test curves and unit series number.

## Appendix: Sample Test Curves

**Model Number:** EDX-164.5-172.6-8.1-110-4UR

**SN:**20170928031

