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Isolators/ Circulators

Installation and Tuning Instructions

When used as isolators, both single and dual models are available with a variety of load terminations for the isolated ports. Retuning of these units may be performed in the field in the 2-4 MHz bandwidth by following the instructions below.

These units can be retuned within this bandwidth specification by adjusting the tuning capacitors located at the front and rear of the units. Retuning beyond the bandwidth specification is not recommended in the field as this may require a re-adjustment of magnets located internally to the units.

Single Stage Circulator

Dual Stage Circulator

Table 1: Electrical Specifications

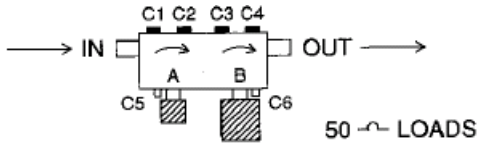
	Frequency Band (MHz)	Insertion Loss (-dB)		Isolation (-dB)	
		Typical	Maximum	Typical	Minimum
Single Stage	132-174	0.4	0.6	35	25
	406-512	0.3	0.6	35	25
	806-960	0.3	0.4	35	25
Dual Stage	132-174	0.7	1	75	50
	406-512	0.6	1.1	75	50
	806-960	0.55	0.7	75	50

VSWR: In/Out (all units) (23 dB+) 1.25:1 max

Note:
Ferrite isolators are subject to certain non linearities and may conduct or generate a weak signal harmonic. For proper IM protection, a low pass 2nd harmonic filter is often used between the isolator and antenna to suppress the 2nd and 3rd harmonic energy of the transmitter. The Sinclair AF series of 2nd harmonic filters are available for this purpose.

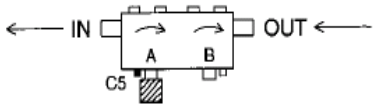
Tuning Instructions For The Dual Stage Isolator

1. Connect the signal source to the input port and monitor the output port. (The 50 ohms load used in the system must be terminated at the load ports).



2. Adjust capacitors C1 through C4 for minimum insertion loss at the centre frequency.

3. Reverse the equipment in/out connection to the isolator and remove the 50 Ohm load from the isolator port B.

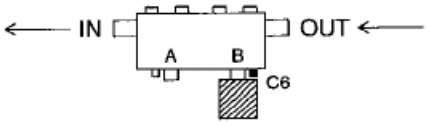


4. Adjust C5 to obtained maximum isolation of 35dB at the centre frequency. At this stage, we are adjusting the isolation of the first stage of the isolator.

5. Reverse the leads and check to make sure the VSWR is balanced and at its lowest at the frequency of interest, F_o

6. Remove the load from port A and connect the 50 ohm load that was originally on port B back to port B.

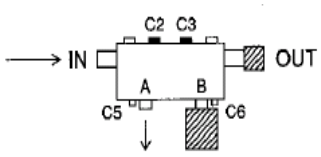
7. Reverse the leads once again.



8. Adjust C6 to obtained maximum isolation of 35 dB at the centre frequency. Now, we are adjusting the isolation of the second stage.

9. Reverse the leads and check to make sure the VSWR is balanced and at its lowest at the frequency of interest, F_o

10. Connect the signal sources to the input port of the isolator and monitor the port A. (Terminate the output port and port B with the 50 Ohm loads).



11. Adjust C2 and C3 for maximum isolation at the load port A. (This may require several minor back and forth adjustment for C2 and C3.). At this point, we are matching the two stages.

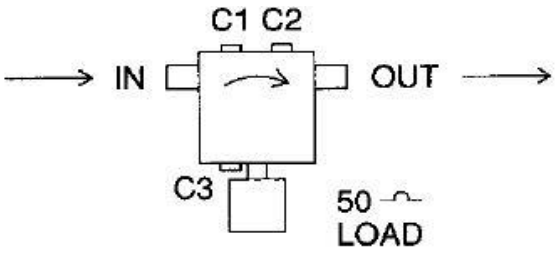
12. Restore all connection to step 1 and check insertion loss at the center frequency with the in connector on the input, and the out on the output. Once this is completed, reverse the leads and verify the isolation at centre frequency.

13. Optimize loss (VSWR) at the input port using C1 and the output port by adjusting C4.

14. Final minor optimized adjustments may be required by adjusting C5 and C6 only for isolation.

Tuning Instructions For The Single Stage Isolator

1. Connect the signal source to the input port of the isolator and monitor the output port (The 50 Ohm load used in the system must be terminated at the isolator load port).
2. Adjust capacitors C1 and C2 for minimum insertion loss at the center frequency (F_o).



3. Reverse connections to the isolator in/out ports and adjust capacitor C3 to obtain typical isolation at F_0 (=35 dB).
4. Restore the connections as in step 1 and again adjust C1 and C2 for minimum insertion loss at F_0
5. Fine tune C1 and C2 for best return loss (VSWR) at both input and output ports, the readings should agree with the specifications shown in table 1 above for a single stage isolator.