

FP-2009

**INSTALLATION AND
TUNING INSTRUCTIONS
Q-CIRCUIT RES-LOCK
DUPLEXERS
CM-1009**

ENCLOSURES

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CI-1071

Q-Circuit Res-Lok Duplexers

Description

Sinclair Q circuit duplexers consist of 3 or 4 inch square Res-Lok coupled cavities with rotatable coupling loops to optimize VSWR (return loss) without removal or replacement of the loops.

The duplexers can be either horizontally or vertically installed into standard 19 inch racks or cabinets and are furnished with adjustable mounting brackets. Special mounting brackets can be furnished for 24 inch rack or cabinet mounting.

General Information

These duplexers are shipped factory tuned to transmit and receive specifications as requested by the customer. No further adjustments are required unless a change is required in frequencies, insertion loss, or isolation settings.

Refer to pages CI-1072 and CI-1073 for specifications of the various models.

Typical models and electrical specifications are listed for reference only. Other models and specifications are available from Sinclair through their catalog or by contacting Sinclair sales or engineering departments.

The cavity interconnect cables consist of a one piece harness assembly and are factory fabricated to specific lengths depending upon frequencies. These cable types or lengths should not be altered in the field without first consulting Sinclair for precautions to be taken.

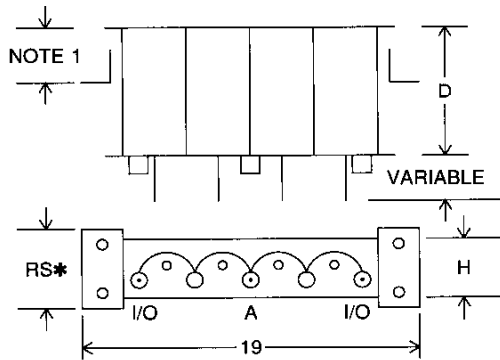
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Sinclair Technologies Inc., 55 Oriskany Drive, Tonawanda, New York 14150 (716) 874-3682 (800) 288-2763 Fax: (716) 874-4007

Q-Circuit Res-Lok Duplexers

CI-1072

Electrical Specifications	Q-1220E	Q-2220E	Q-3220E	Q-4220E
FREQUENCY RANGE MHz	66-88	132-174	406-512	806-960
FREQUENCY SEPARATION MHz	0.2 MIN.	0.5 MIN.	3.0 MIN.	45 MIN.
INSERTION LOSS dB				
Tx/Rx to Ant.	1.8 max.	1.5 max.	0.8 max.	1.0 max.
ISOLATION dB				
Tx noise supression at Rx				
Rx isolation at Tx	65 min.	70 min.	75 min.	80 min.
Maximum Input VSWR	1.5:1 (ref. to 50 OHMS)			
Input Power Watts	350 max.			150 max.
Temperature Range	-40°C to +60°C			
Terminations	Type "N" Female			

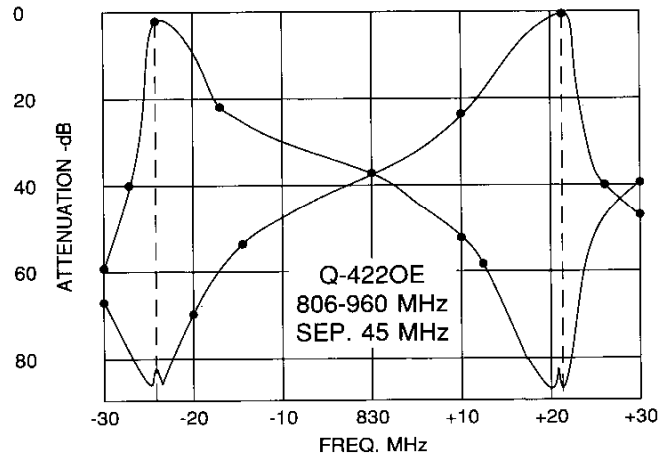
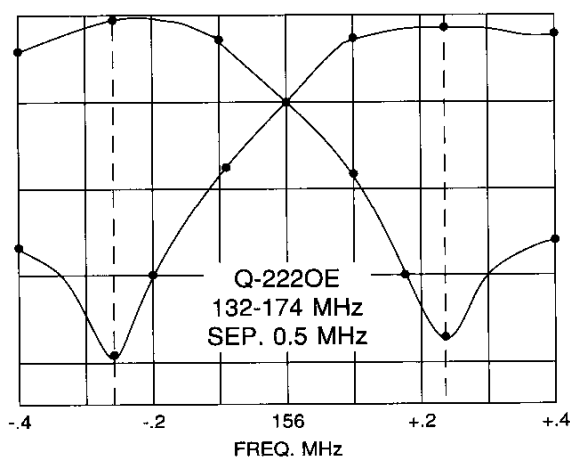


DIMENSIONS - INCHES

MODEL	H	RS*	D
Q-1220E	4.17	5.25	48.3
Q-2220E	4.17	5.25	24.2
Q-3220E	4.17	5.25	10.3
Q-4220E	4.17	5.25	5.5

RS* - VERTICAL RACK SPACE REQ'D.
NOTE 1: MOUNTING BRACKETS ARE ADJUSTABLE FR TO RR.

TYPICAL RESPONSE CURVES



CI-1073

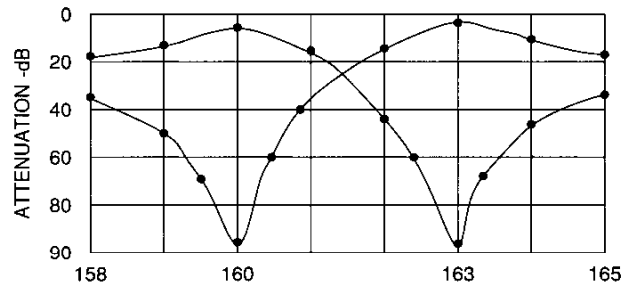
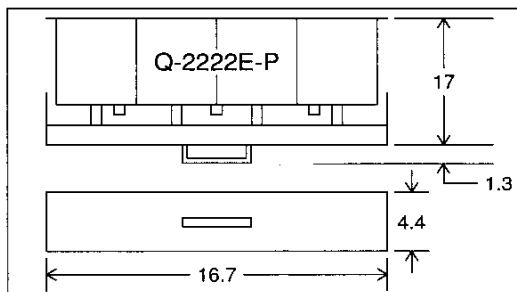
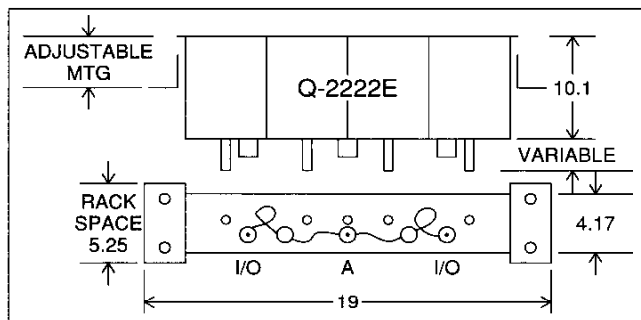
**Q-Circuit
Res-Lok
Compact Q-2222E**

Description

The Q-2222E uses Res-Lok construction and a special folded cavity design resulting in an extremely compact 4 cavity unit for use in the 148-174 MHz band. Operating at separations from 0.5 to 3.0 with moderate insertion loss and isolation values of from 75 to 85dB are achieved.

The Q-2222E-P is a portable version of the same model utilizing a special heavy duty protective cover with a carrying handle. Input and output connectors are accessible at the front and rear of the cover.

Electrical Specifications	CLOSE SPACING	MODERATE SPACING	WIDE SPACING
FREQUENCY RANGE MHz	2 BANDS (148-165) (160-174)		
FREQUENCY SEPARATION MHz	0.5	1.5	3.0
INSERTION LOSS (MAX) db	2.3	1.8	1.1
ISOLATION (MIN) Db			
Tx Noise Suppression at Rx			
Rx Isolation at Tx	75	80	85
MAX. INPUT VSWR	1.5:1 (ref. to 50 OHMS)		
INPUT POWER WATTS	120 Max.		
TEMPERATURE RANGE	-40°C to +60°C		
TERMINATIONS	Type "N" Female		



FREQUENCY - MHz
TYPICAL RESPONSE CURVE
WIDE SPACING 3.0 MHz



CI-1074

Q-Circuit Res-Lok Duplexers

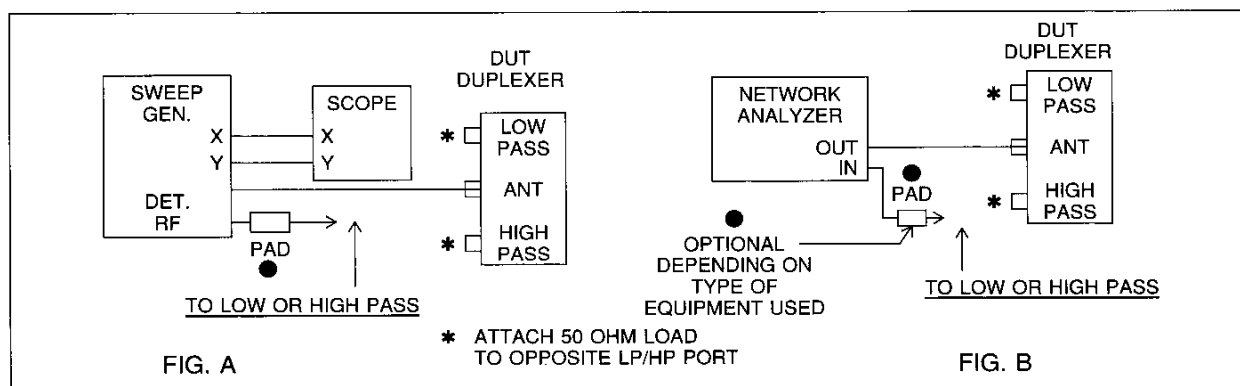
Tuning Instructions

The duplexers are pre-tuned to the exact frequencies as ordered. No further tuning or adjustments should be required.

Retuning instructions are furnished for the purpose of readjustment in the event of minor frequency changes which may be required in the associated duplexers in the field.

The cavities associated with each duplexer are equipped with adjustable coupling loops and attached variable capacitors to facilitate insertion loss and selectivity changes without removal or replacement of the loops. The loops are locked into place with three holding screws and have been preset at the factory upon delivery, to the customer specifications.

Each duplexer is furnished with a one piece cable harness of critical lengths and types according to the frequency band and should not be altered.



Typical test equipment setups are shown in Figures A and B. Refer to the following pages for tuning of the duplexers.

- It is recommended to use A 6-10 dB attenuator pad in the input lines in order to reduce VSWR reflections which may be introduced in the test equipment being used.

Recommended Equipment (or equivalent)

Fig. A Sweep generator

Hewlett Packard-Model 8754

Oscilloscope

Fig. B Network analyzer

Hewlett Packard-Model 8752 A

300 KHz 3 GHz

A/R-6-10 dB, 50 OHM attenuator (pad)

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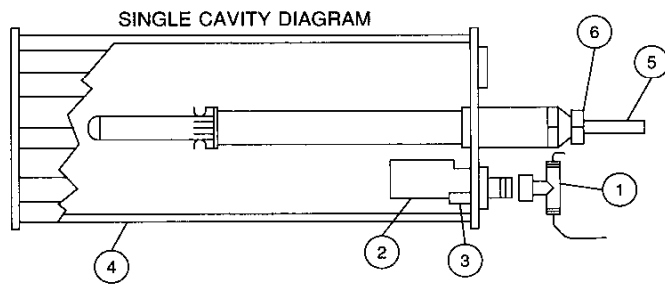
CI-1075

Q-Circuit Res-Lok Duplexers

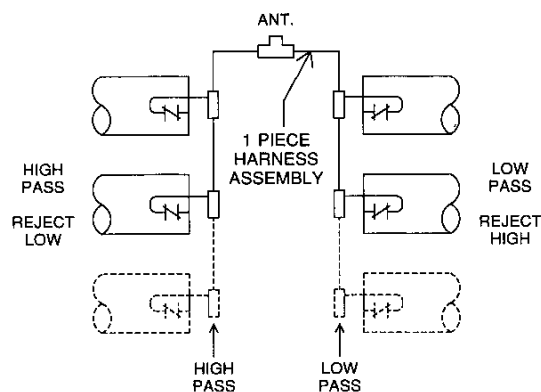
Retuning Procedure

Standard 1/4 Wave Cavity Versions.

Refer to Page CI-1074 for recommended equipment and typical test equipment setups. Page CI-1072 lists the specifications for the standard models.



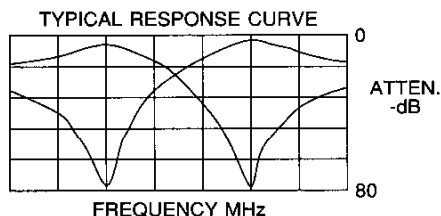
1. MAIN LINE TEE CONNECTOR
2. COUPLING LOOP-WITH 3 HOLDING SCREWS
3. VARIABLE CAPACITOR
4. RESONANT CAVITY BODY
5. SLIDING TUNING ROD
6. TUNING ROD LOCK NUT



TYPICAL 4 - 6
CAVITY SYMMETRICAL

Procedure

1. Loosen the tuning rod lock nuts.
2. Set the frequency to be passed into the high pass terminal and detect it at the antenna terminal with the low pass terminal terminated with 50 OHMS. Adjust the high pass tuning rods for maximum signal.
3. Set the frequency to be passed into the low pass terminal and detect it out the antenna terminal with the high pass terminal terminated with 50 OHMS. Adjust the low pass tuning rods for maximum signal.
4. Set the frequency to be rejected into the high pass terminal and detect at the low pass terminal-adjust the capacitors at the high pass cavities for minimum signal.
5. Set the frequency to be rejected into the low pass terminal and detect at the high pass terminal-adjust the capacitors at the low pass cavities for minimum signal.
6. Repeat steps 2-5, then tighten the tuning rod lock nuts securely into position. Finally check that both high and low are tuned to the new frequencies and VSWR (return loss) is 1.5:1 or greater at both frequencies.



WARNING

Do not tune the duplexer with the TX keyed into the duplexer.

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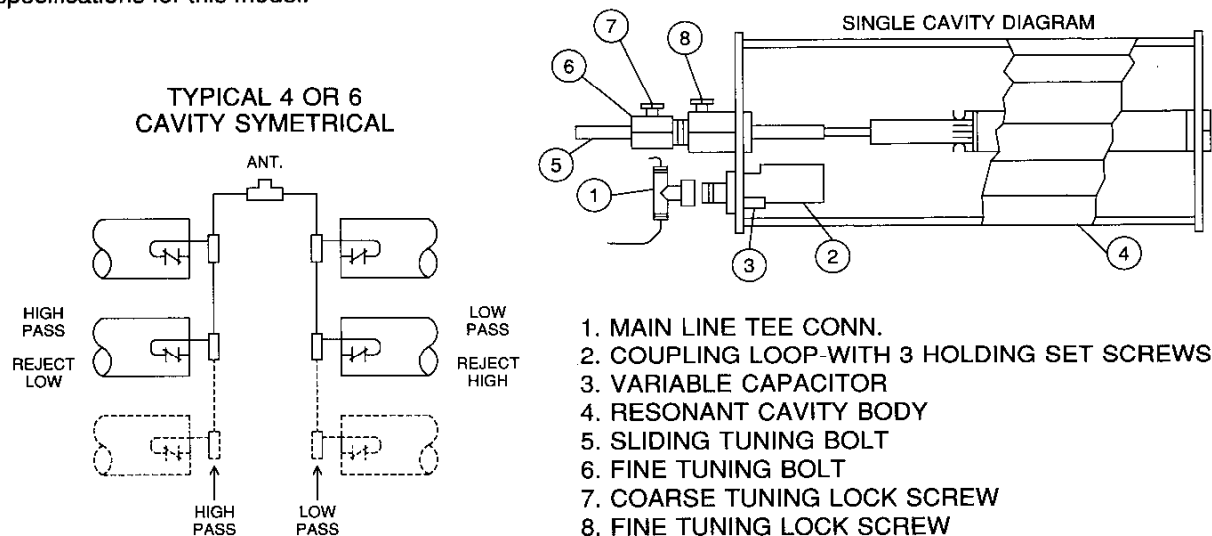
CI-1076

Q-Circuit Res-Lok Duplexers

Retuning Procedure

Special folded cavity version-Q-2222E

Refer to Page CI-1074 for recommended and typical test equipment setups. Page CI-1073 lists the specifications for this model.

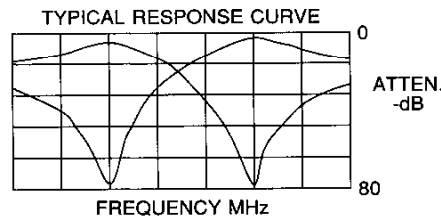


The cavity has a coarse tuning adjustment for large changes in frequency and a fine tuning adjustment for small changes in frequency at the passband required. Coarse tuning is accomplished by unlocking the coarse tuning lock screw and sliding the tuning rod in or out. Fine tuning adjustments are made by locking the coarse tuning lock screw securely and loosening the fine tuning lock screw, then rotating the fine tuning bolt, for maximum signal.

1. Set the frequency to be passed into the high pass terminal and detect it at the antenna terminal with the low pass terminal terminated with 50 OHMS. Adjust the high pass tuning rods for maximum signal.
2. Set the frequency to be passed in to the low pass terminal and detect it out the antenna terminal with the high pass terminal terminated with 50 OHMS. Adjust the low pass tuning rods for maximum signal.
3. Set the frequency to be rejected into the high pass terminal and detect at the low pass terminal - adjust the capacitors at the high pass cavities for minimum signal.
4. Set the frequency to be rejected into the low pass terminal and detect at the high pass terminal - adjust the capacitors at the low pass cavities for minimum signal.
5. Repeat Steps 1-4, then tighten all tuning rod lock screws securely into position. Finally check that both high and low are tuned to the new frequencies and VSWR (return loss) is 1.5:1 or greater at both frequencies.

WARNING

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Q-Circuit Res-Lok Duplexers

Replacement Parts

Replacement parts are available for the various models of this series of duplexers. Contact the Sinclair sales or engineering departments for delivery, minimum order requirements, prices and replacement parts for other models not described in the tuning instructions.

MODEL	LOOP ASS'Y	HARNES ASS'Y	LOOP CAPACITOR
Q-222OE	350386	350582	5602
Q-322OE	350581	350548	5202
Q-422OE	Part Of Harness Assembly	350589	5302
Q-2222E	350586	350582	5602

Mounting Bracket - 246052
for 4 cavity 19 in.
rack or cabinet.

Tools Required:

5/16 Hex or open end wrench

7/8 open end wrench

Phillips head screwdriver

Note: If large changes in frequencies or other specifications are required, the duplexers may be returned to the factory for retuning at a minimum charge.

In such case, contact Sinclair sales to receive a return authorization prior to returning the unit.

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