



FUNCTION	EMISSION	APPROVAL	EDITION	CONTROL
ORGAN	SETEL	SETEL	September 06, 2006	SEATE
CHECKED	Vagner Lúcio	Flávio Spressola	No. 15042/201 - 3 ^o Edition	Bruno Fonseca
INSTRUCTION MANUAL FOR ADJUSTABLE WIDE-BAND TUNING DEVICE IN THE RANGE OF 50 - 205 kHz				Total of pages 10 Page 1

1.0 - ADJUSTABLE WIDE BAND TUNING DEVICE

The simplified elementary diagram is shown in figure 01. The complete circuit shown on the diagram figure 05 forms a half section constant “K” band pass filter. The two line terminals for the input terminals of the filter. The line trap coil L_1 with the capacitor C_1 form the shunt arm and the coils L_2 with the capacitor K form the series arm. The resistor R terminates the filter in its characteristic impedance (R_0). L_1C_1 and L_2K are resonant at f_0 , the GMF of the filter pass band.

The characteristic input impedance of the filter is:

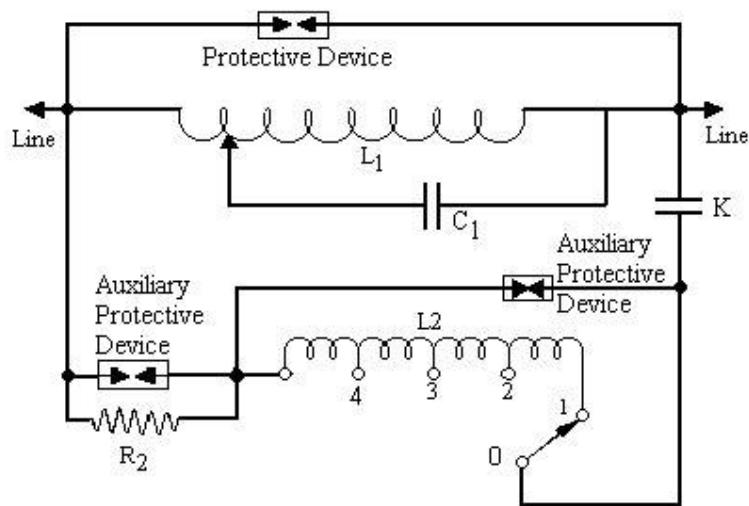
$$R_0 = \sqrt{\frac{L_1}{K}} = R_2$$

Where: L_1 = Inductance of the main coil. $L_1 = 0.265$ mH.

K = Capacitance of capacitor K .

R_2 = Resistance of resistor R_2

FIGURE 1



2.0 - TOOLS NEEDED (FOR THE ADJUSTMENT)

- A) 2 - 10 mm wrenches for the tap on the L_1 winding.
- B) 2 - 13 mm wrenches for changing the connections on the tuning device.
- C) 1 - 8 mm wrench for changing the L_2 strips.

3.0 - INSTRUMENTS NEEDED

See figure 5.

4.0 - TUNING PACKS

The tuning packs consist of the necessary elements for the adjustment of GMF from 50 kHz to 205 kHz and a terminal resistor of 400 Ω .

The possible band width is shown on figure 3 and 4.

5.0 - ADJUSTMENT

The line traps are usually adjusted in the factory for a bandwidth and impedance or resistive component specified by the customer. In this case the adjusted values were:

Impedance $Z = 400 \Omega$	Blocked bandwidth = 45 - 49 kHz
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If it is desired to change the blocked bandwidth, then the customer has to make a new adjustment, as follows:

- 5.1 - Disconnect the series arm R_2 , L_2 , K and the shunt C_1L_1 to the GHF f_0 of the selected bandwidth. The necessary connections are shown on the tuning chart (figure 3).
- 5.2 - Injected the carrier frequency GMF signal into the line trap coil through a resistor (usually about 10 Ω). See figure 5.
- 5.3 - Measure the voltage drop the over resistor by means of a selective voltmeter V_2 .
- 5.4 - Change the tapped connection on L_1 and search the position, where the maximum impedance over the line trap terminals is reached (voltage dip). Always tune the desired frequency with as much inductance L_1 as possible.
- 5.5 - Reconnect the series arm R_2 , L_2 , K and disconnect the shunt arm C_1L_1 . Install a jumper to short-circuit the resistor R_2 and make the proper connection for the selected frequency according to the tuning chart (figure 3). Adjust the ferrite core position in the inductance L_2 to get the minimum impedance in the circuit (voltage peak).
- 5.6 - Reconnect the shunt arm and reconnect the resistor R_2 .

6.0 - TRAP IMPEDANCE MEASUREMENT (SEE FIGURE 5)

- 6.1 - The measuring circuit is shown in figure 5. A 10 Ω resistor R₁ has to be inserted in the measuring circuit.
- 6.2 - Adjust the signal generator to the desired frequency for which the impedance is to be found.
- 6.3 - Record the voltage readings of both voltmeters V₁ and V₂. Knowing the value of R₁, the impedance can be calculated from the following equation.

$$IMPEDANCE = \frac{V_1(\text{voltage}) \times R_1(\Omega)}{V_2(\text{voltage})}$$

CONNECTION CIRCUIT 45 – 49 kHz

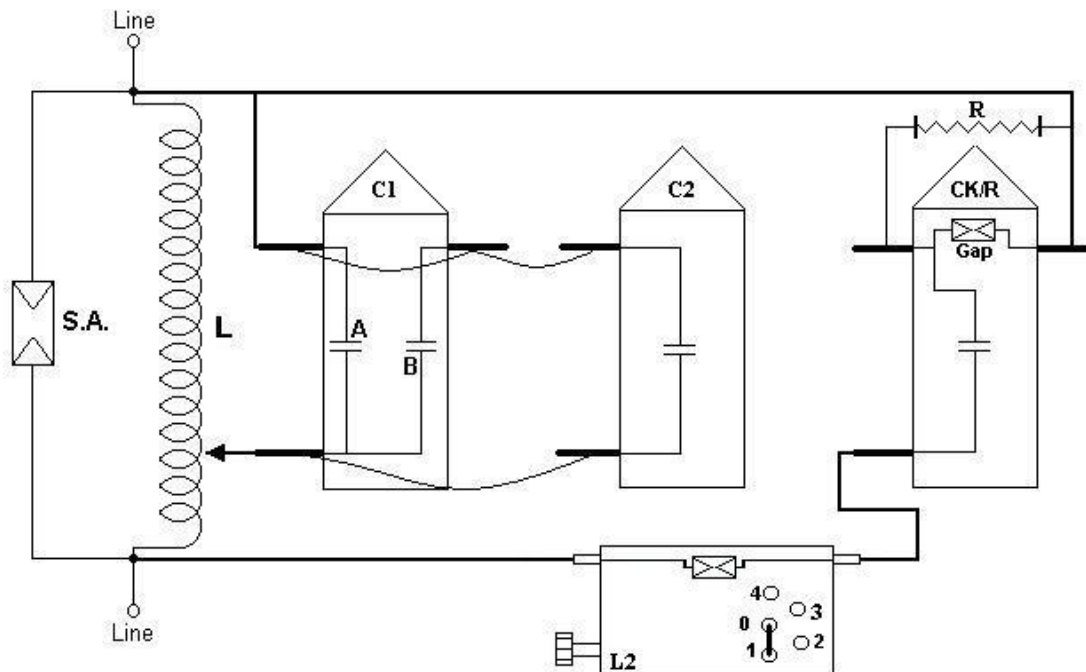
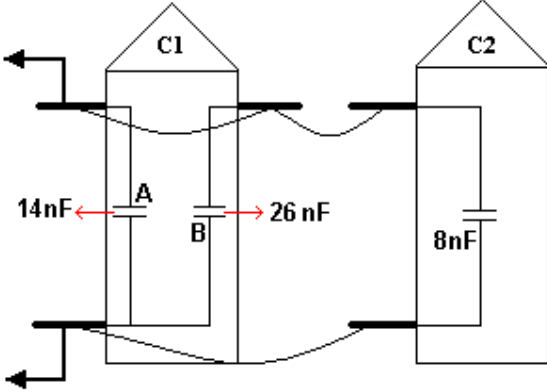
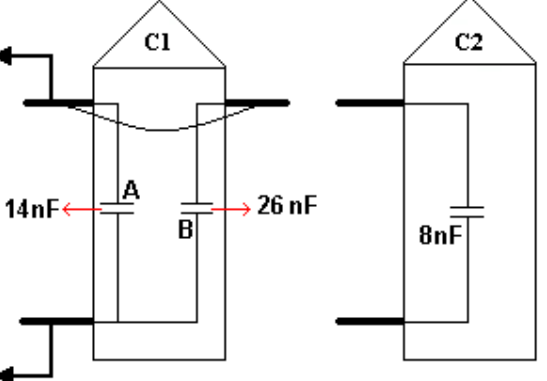
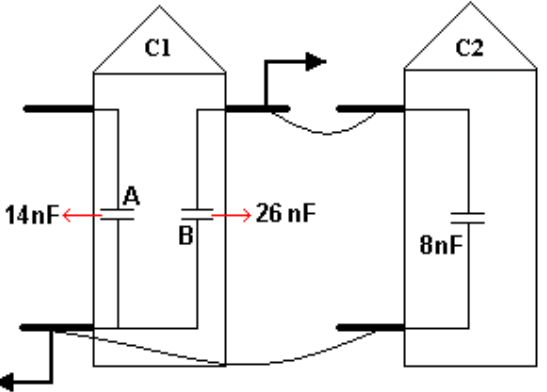
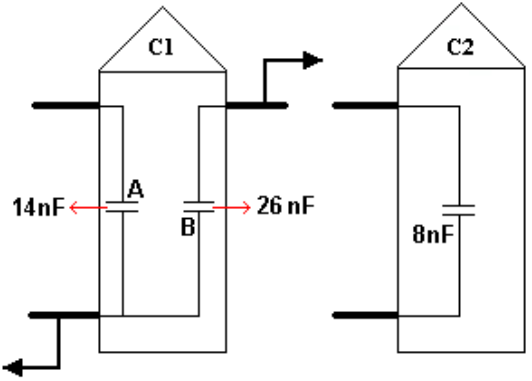
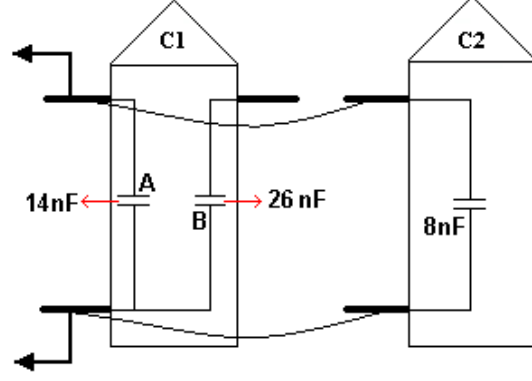
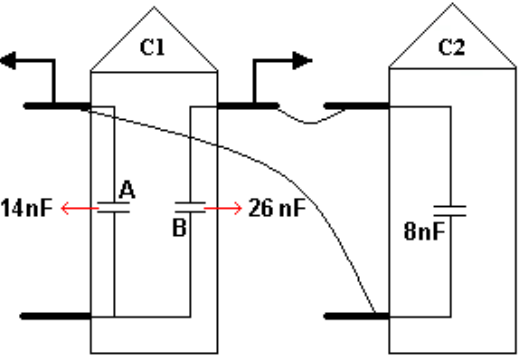
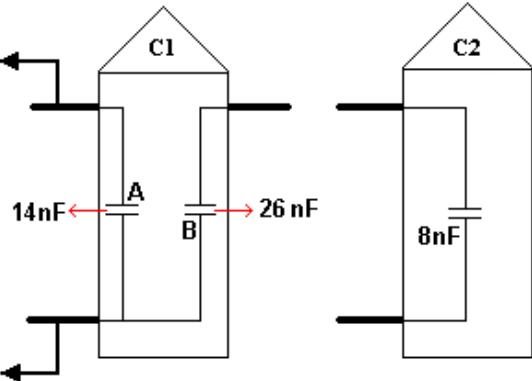
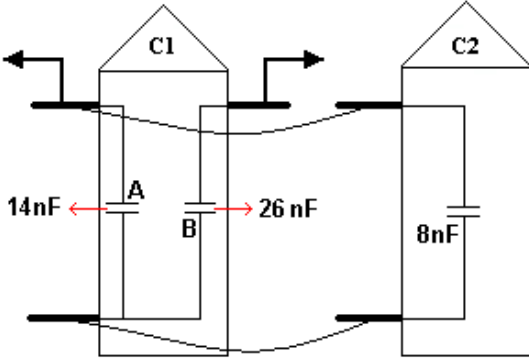
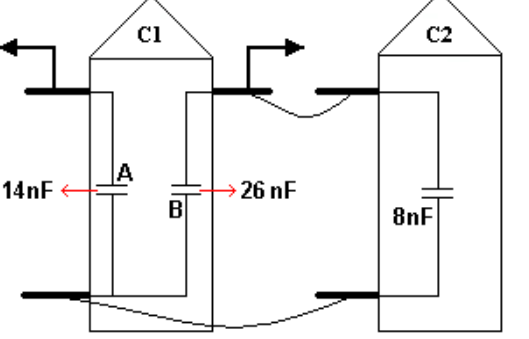
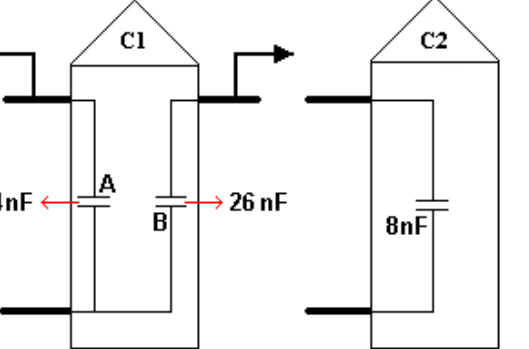
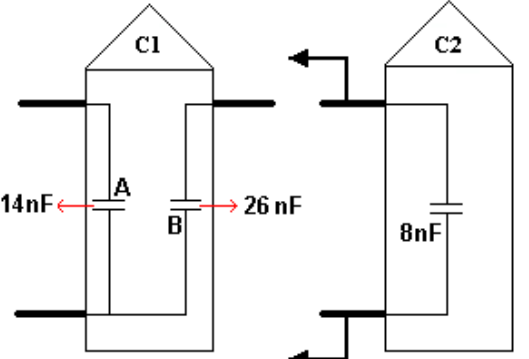


FIGURE 2 - CONNECTION DIAGRAM

FIGURE 3: TUNING CHARTS FOR THE SHUNT ARM OF AWB 50 - 205 kHz TRAPS.

C1/C2 CAPACITORS	GEOMETRIC MEAN FREQUENCY NOMINAL TUNING RANGE (kHz)	NOMINAL CAPACITORS AND DERIVATIONS (nF)
	45 - 49	$26+14+8=48$
	49 - 53	$26+14=40$
	53 - 61	$26+8=34$

C1/C2 CAPACITORS	GEOMETRIC MEAN FREQUENCY NOMINAL TUNING RANGE (kHz)	NOMINAL CAPACITORS AND DERIVATIONS (nF)
	61 - 72	26
	72 - 79	$14 + 8 = 22$
	79 - 83	$(26 \times 14 / 40) + 8 = 17.1$
	83 - 89	14

C1/C2 CAPACITORS	GEOMETRIC MEAN FREQUENCY NOMINAL TUNING RANGE (kHz)	NOMINAL CAPACITORS AND DERIVATIONS (nF)
	89 - 98	$((14+8) \times 26) / 48 = 12$
	98 - 103	$((26+8) \times 14) / 48 = 10$
	103 - 110	$(14 \times 26) / 40 = 9.1$
	110-120	8

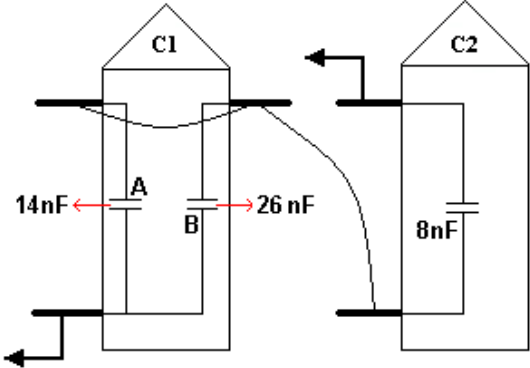
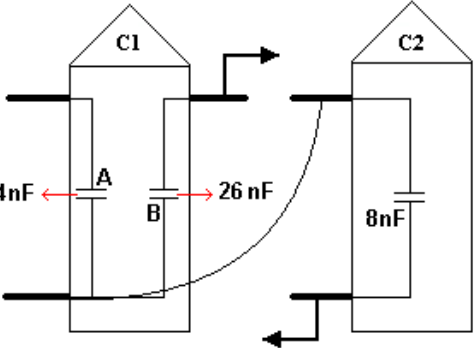
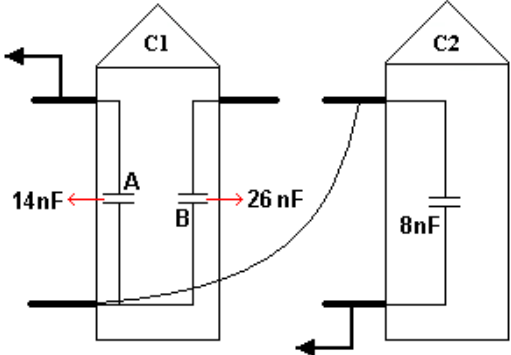
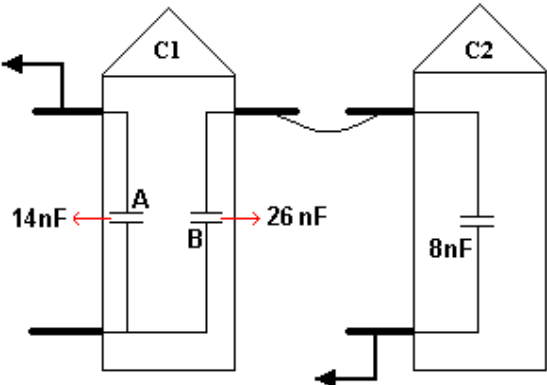
C1/C2 CAPACITORS	GEOMETRIC MEAN FREQUENCY NOMINAL TUNING RANGE (kHz)	NOMINAL CAPACITORS AND DERIVATIONS (nF)
	120-124	$((26+14) \times 8) / 48 = 6.7$
	124 - 137	$(26 \times 8) / 34 = 6.1$
	137-151	$(14 \times 8) / 22 = 5.1$
	151-205	$(9.1 \times 8) / 17.1 = 4.3$

FIGURE 4 - FOR THE SERIES ARM OF TUNING CHART, ADJUSTABLE WIDE BAND LINE TRAPS AND CONNECTION DIAGRAM

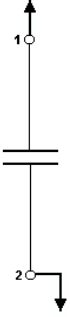
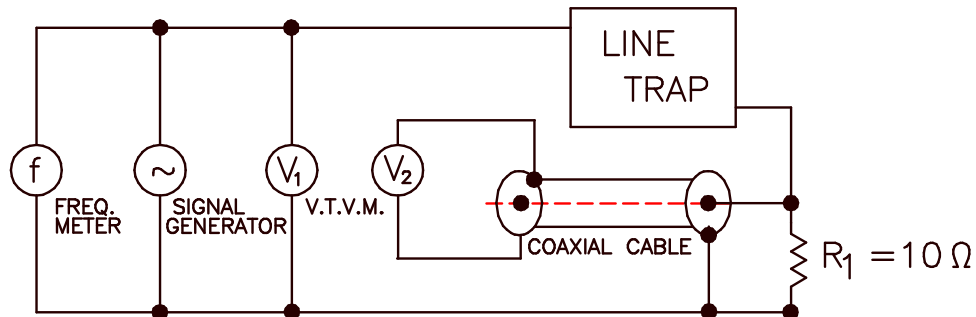
K 1.5 (nF)	GEOMETRIC MEAN FREQUENCY NOMINAL TUNING RANGE (kHz)	L2 TAP	R2 (Ω)
	43-55	0-1	400
	55-90	0-2	
	90-140	0-3	
	140-216	0-4	

FIGURE 5 - METHOD TESTING THE LINE TRAP IMPEDANCE



V_1 = Must be a selective voltmeter.

R_1 = Should be attached directly to the line terminal.

FIGURE 6 - ADJUSTABLE WIDE BAND TUNING DEVICE - LAY OUT THE TUNING ELEMENTS AND THEIR INTERCONNECTION

