INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE JZ-72.6 LINE COUPLING TUNERS

TWO–FREQUENCY PHASE-TO-GROUND
LINE COUPLING TUNERS
WITH TWO–WINDING MATCHING TRANSFORMER

TYPE JZ 72.6 – STYLE 290B883A23 – WITHOUT DRAIN COIL
TYPE JZ 72.6D – STYLE 606B363A10 – WITH DRAIN COIL
TYPE JZ 72.64 – STYLE 606B363A13 – WITH 0.006 MFD. SERIES CAPACITOR
*** TYPE JZ 72.64D – STYLE 290B883A25 – WITH .006 MFD. SERIES CAPACITOR AND DRAIN COIL**

All possible contingencies which may arise during installation, operation, or maintenance, and all details and variations of this equipment do not purport to be covered by these instructions. If further information is desired by purchaser regarding his particular installation, operation or maintenance of his equipment, the local Westinghouse Electric Corporation representative should be contacted.

SUPERSEDES I.L. 41-947.3B
*Denotes change from superseded issue.

EFFECTIVE APRIL 1974

SAFETY WARNING!

Protect your life while making adjustments! Before handling any part of the electrical circuits:

1. BE SURE THE GROUNDING SWITCHES IN THIS ASSEMBLY ARE IN THE "GROUNDED" OR CLOSED POSITION.

2. BE SURE THAT ALL POWER SWITCHES IN THIS ASSEMBLY ARE TURNED "OFF".

Protect the equipment against damage by not applying power until thoroughly familiar with the ADJUSTMENTS described in this book.

SAFETY FIRST!

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SUPPLEMENTARY DATA

APPLICATION

These Line Coupling Tuners are designed for phase-to-ground coupling of two carrier frequencies from separate coaxial cables through a single coupling capacitor to a power line.

DESCRIPTION

Mechanical Description

The line tuner is mounted in a cabinet suitable for outdoor installation. Knockouts are provided on each side of the cabinet for the capacitor lead-in bushing. Knockouts for 1½ inch conduit for the coaxial cables are located in the bottom of the cabinet. The outline, mounting dimensions and the location of the knockouts are shown in Fig. 3.

All electrical components are mounted on a hinged panel which can be opened for making the coaxial cable, capacitor lead-in and ground connections. The grounding switch, spark gap, tuning controls, metering jacks and all tap connections are accessible from the front of the panel.

Electrical Description

The electrical circuits are shown in Fig. 2. The high frequency tuner components are mounted on the left hand side of the panel and the low frequency components are on the right. Each coaxial cable connects through a jack J1 to the primary of a matching transformer T1. The secondary winding of T1 connects, through a jack J2 to to the line tuning coil L1. The line tuning coils are connected to the trap units. Both trap units consist of tapped inductance L2, which has an adjustable powdered-iron core, and tuning capacitors C-3 and C-4. Links on the front of the panel provide for connecting the tuning capacitors in series, parallel or one capacitor alone. The High Frequency Trap, mounted on the right hand side of the panel contains two additional capacitors C-1 and C-2 which may be required for proper tuner adjustment. Links are provided on the front panel to permit series, parallel or single capacitor connections.

Both trap circuits are connected to a protector unit, which consists of an adjustable spark gap SG-1 and a knife switch S-1. The spark gap protects the equipment from excessive voltage surges. The knife switch is provided for grounding the lead-in from the coupling capacitor while adjustments are being made.

The JZ72.64 tuner includes a .006 mfd. capacitor in series with the output lead to the protector unit. This allows the tuner to be used with coupling capacitors up to 0.015 mfd. When a drain coil is supplied with the tuner, it is identified as a Type JZ 72.6D tuner. If both capacitor and drain coil are included, the tuner is Type JZ 72.64D.

Typical response curves for the type JZ 72.6 tuners are plotted in Fig. 1. These curves were taken with an 1870-mmf. coupling capacitor and a 300-ohm resistive load. The two sections of the tuner were adjusted for resonance (f_r) at 30 and 37.5 kHz, 80 and 100 kHz, and 160 and 200 kHz, respectively, for the three pairs of curves.

CHARACTERISTICS

Frequency Range:	30 to 200 kHz.
Input Impedance:	50 to 70 Ohms
Output Impedance:	100 to 1000 Ohms
Power Rating:	100 Watts Carrier - Unmodulated 25 Watts Carrier - 100% Modulated
Coupling Capacitor Range:	JZ 72.6 — .00075 to .004 mfd. JZ 72.64 — .00075 to .015 mfd.
Minimum Frequency Separation:	25% of the lower frequency

INSTALLATION

It is recommended that the Line Tuner be located as near to the coupling capacitor as possible. The mounting dimensions are shown in Fig. 3.

Remove the upper knockout from the side of the cabinet nearest the coupling capacitor and install the porcelain bushing for the capacitor lead-in as described in the following section.

Connections

CAUTION

Before making any connections to this equipment, turn off the power switch of the carrier transmitter and ground or open circuit the lead-in at the coupling capacitor.

* The assembly of the Style 719B629G01 accessories for the coupling capacitor lead-in cable is shown in Fig. 10. Allow sufficient length of cable to connect to the grounding switch contact stud with the panel swung open.

NOTE

The instructions in Fig. 5 state that the unused taps are to be shorted when a tap lower than 100 is used and also when the frequency is above 150 kHz.

This procedure will leave a gap in the inductance range between tap 100 with the unused turns not shorted and tap 88 with the unused turns shorted. Continuous inductance adjustment can be obtained by using tap 113 with unused turns shorted as the next lower inductance tap below tap 100 with the unused turns not shorted.

Final Adjustments

After making the connections of trap capacitors, trap coil taps, and line tuning coil taps as determined under Preliminary Adjustments, the circuits must be adjusted to meet the requirements of the particular installation.

The trap circuits should be tuned to resonance before the line tuning coils are adjusted. For tuning with a local transmitter connected to cabinet terminal number 3, connect a thermocouple-type milliammeter to Jack J-1 on the right side of the panel or connect a vacuum-tube voltmeter from Jack J-2 on the right to ground. Turn on the local transmitter and adjust the core of the trap coil L-2 on the right for minimum current in Jack J-1 or minimum voltage from Jack J-2 to ground. Lock core in this position.

If the other channel also has a local transmitter, adjust the trap coil L-2 on the left for minimum current in Jack J-1 on the left or minimum voltage from Jack J-2 on the left to ground.

To adjust the trap circuit with a signal from a remote transmitter, measure the signal voltage from Jack J-2 to ground. Have the transmitter turned on and off several times to be certain that the desired signal is the one which is being received. Adjust the core of the trap coil for minimum voltage and lock the shaft.

After both trap circuits have been adjusted, tune the line tuning coils for resonance. Turn on the local transmitter and adjust the core of the line tuning coil, L-1, for maximum current in Jack J-1. If the current is increasing with the core all the way in or all the way out, change the tap connection to the next higher or lower tap, respectively.

To tune the line tuning coil with a signal from a remote transmitter, adjust the coil for maximum voltage from Jack J-2 to ground.

A line coupling tuner which is used to bypass a circuit breaker should be adjusted with the circuit breaker open. However, since this may be very difficult to arrange, an alternate method is to disconnect the coupling capacitor from the line and connect its high potential side to ground through a resistor. If the impedance of the line with the circuit breaker open is known, use a resistor of this value. If the line impedance is not known, use a 500-ohm resistor. Adjust the trap coils and line tuning coils in accordance with the previous instructions.

The matching transformer taps should then be adjusted by the following procedure:

Open the coaxial-cable circuit by disconnecting the COAX link from the transformer tap (2 or 3). Connect a non-inductive resistor of approximately 60 ohms between the COAX terminals (cabinet terminals 2-3 or 4-5). The wattage rating of the resistor must be sufficient to dissipate the output of the transmitter. Connect a thermocouple-type milliammeter in series with the 60-ohm resistor. Turn on the local transmitter and record the current through the resistor. Then turn off the transmitter.

Disconnect the resistor and reconnect the COAX link to the transformer tap. Turn on the transmitter and compare the current reading in Jack J-1 with the value obtained with the resistor. If the current values are different, change the transformer tap connections to the taps which give a current in Jack J-1 nearest the current measured through the resistor. After each change of transformer taps, readjust the core of the line tuning coil for maximum current.

Tuning Adjustment with Dummy Load Resistors

An adjustment procedure for obtaining a more exact impedance match is shown in Fig. 4, Line Coupling Tuner Adjustment. The dummy load resistors must be of sufficient wattage rating to dissipate the transmitter output.

Adjustment of Spark Gap

Adjust the spark gap SG-1 to 0.015 inch spacing. Observe the gap while the local transmitter is trans-

mitting full power. If the gap arcs over, increase the spacing until the arcing stops. The minimum spacing for the gap depends upon the carrier power, the power line impedance, and the capacitance of the coupling capacitor.

MAINTENANCE

Routine Checks and Records

This Tuning Unit requires very little maintenance. It should be inspected occasionally to see if there has been excessive burning of the spark gap.

If the spark gap shown signs of burning, rotate the discs to a new position and readjust the gap. Usually a semi-annual or yearly inspection is sufficient.

A permanent record should be kept of tap settings and the position of the coil-tuning cores so that they can be restored to the correct positions in case of unauthorized changes.

Ordering Replacement Parts

Replacement parts for this Tuning Unit may be ordered through the nearest Westinghouse District Office. When ordering, include:

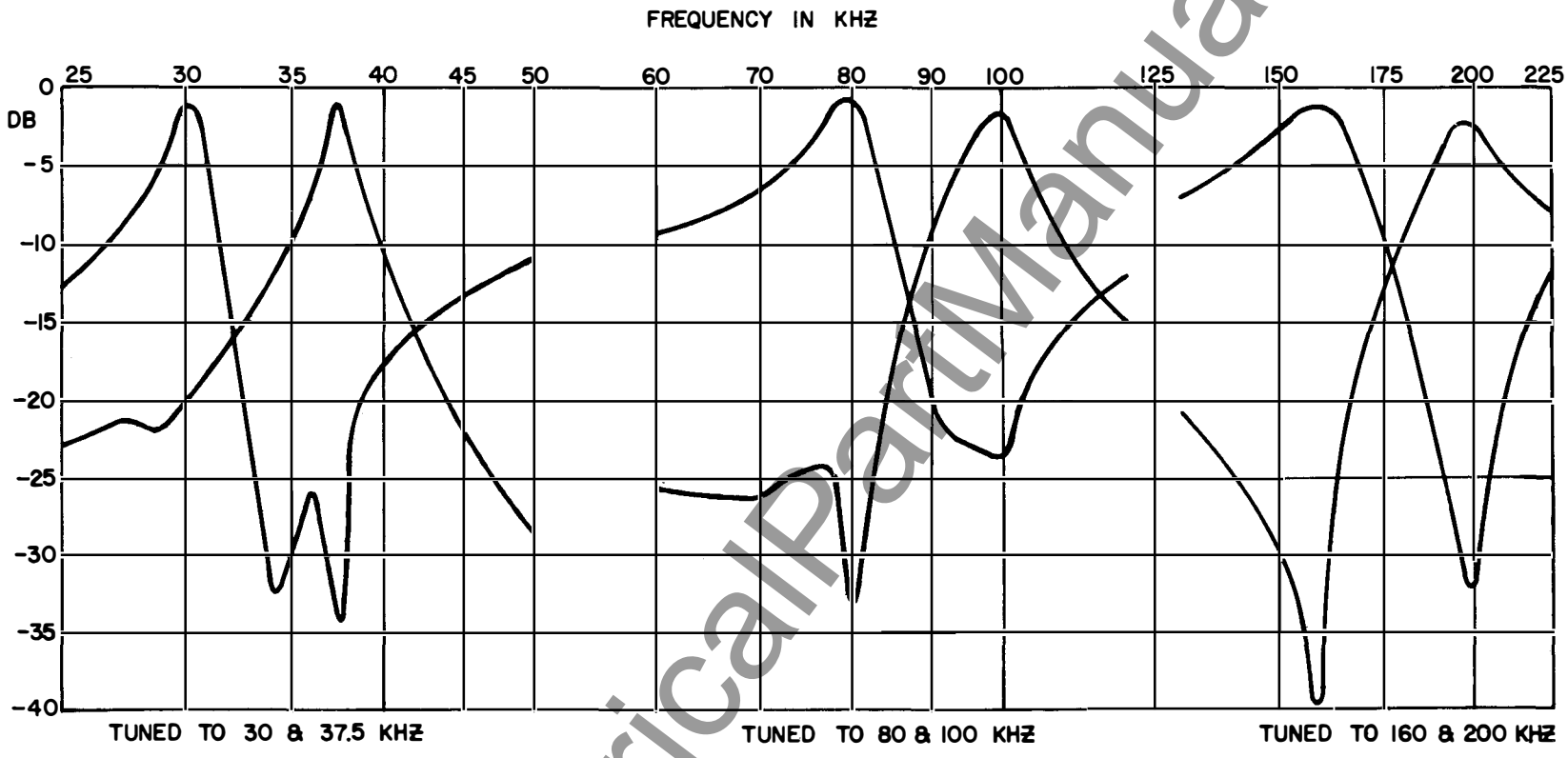
1. The following data from the nameplate of the Line Tuner:

   (a) The type number; (b) the style number.

2. The (a) Electrical Parts List symbol; (b) the function; (c) the description; (d) the designation.

ELECTRICAL PARTS LIST

CIRCUIT SYMBOL	FUNCTION	DESCRIPTION	STYLE NUMBER
		SUB-ASSEMBLIES	
L-1	Line Tuning Coil	Line Tuning Coil Assembly	1474218
T-1	Transformer	Transformer Assembly	407C741G02
	High Frequency Trap	Trap Unit Assembly	540D760G01
—	Low Frequency Trap	Trap Unit Assembly	6294D16G01
—	Protector Unit	Protector Unit Assembly	1474014
		COMPONENT PARTS	
C-1	Capacitor-Series	Mica- 1200 mmf. ± 5%, 5000 V	290B762H01
C-2	Capacitor-Series	Same as C-1	
C-3	Capacitor-Trap Tuning	Mica- 2200 mmf. ± 5%, 5000 V	290B762H02
C-4	Capacitor-Trap Tuning	Same as C-3	
J-1	Jack-Coax Metering	Binding Post Type 2 Binding Posts 1 Shorting Link	 185A431H01 1474455
J-2	Jack-Line Metering	Same as J-1	
SG-1	Spark Gap	Disc Type	2 of 183A358H20 (discs only)
		OPTIONAL	
L-3	Drain Coil (When Used)	20,000 ohms minimum impedance over 30- 200 kHz.	* 607B800G03
C-5	Series Capacitor (When Used)	Mica, 0.006 mfd., ± 5% 3000 V, PACW.	584C256H03



FREQUENCY RESPONSE
TYPE JZ-72.6 LINE TUNER

COUPLING CAP.- 1870 MMF.
LOAD RES. - 300-OHMS

Fig. 1. Response Curves of JZ 72.6 Tuner. (Dwg. 862A348)

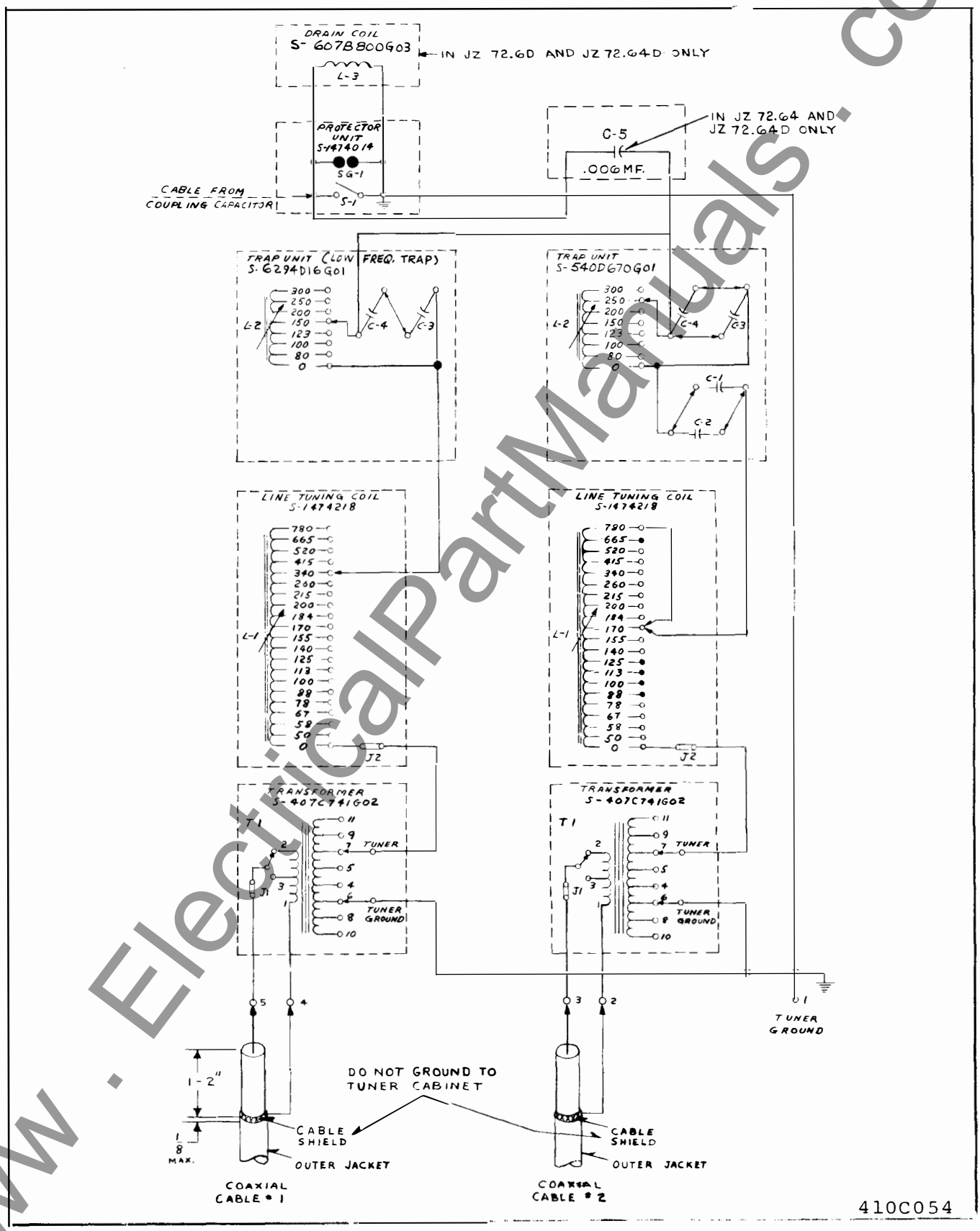
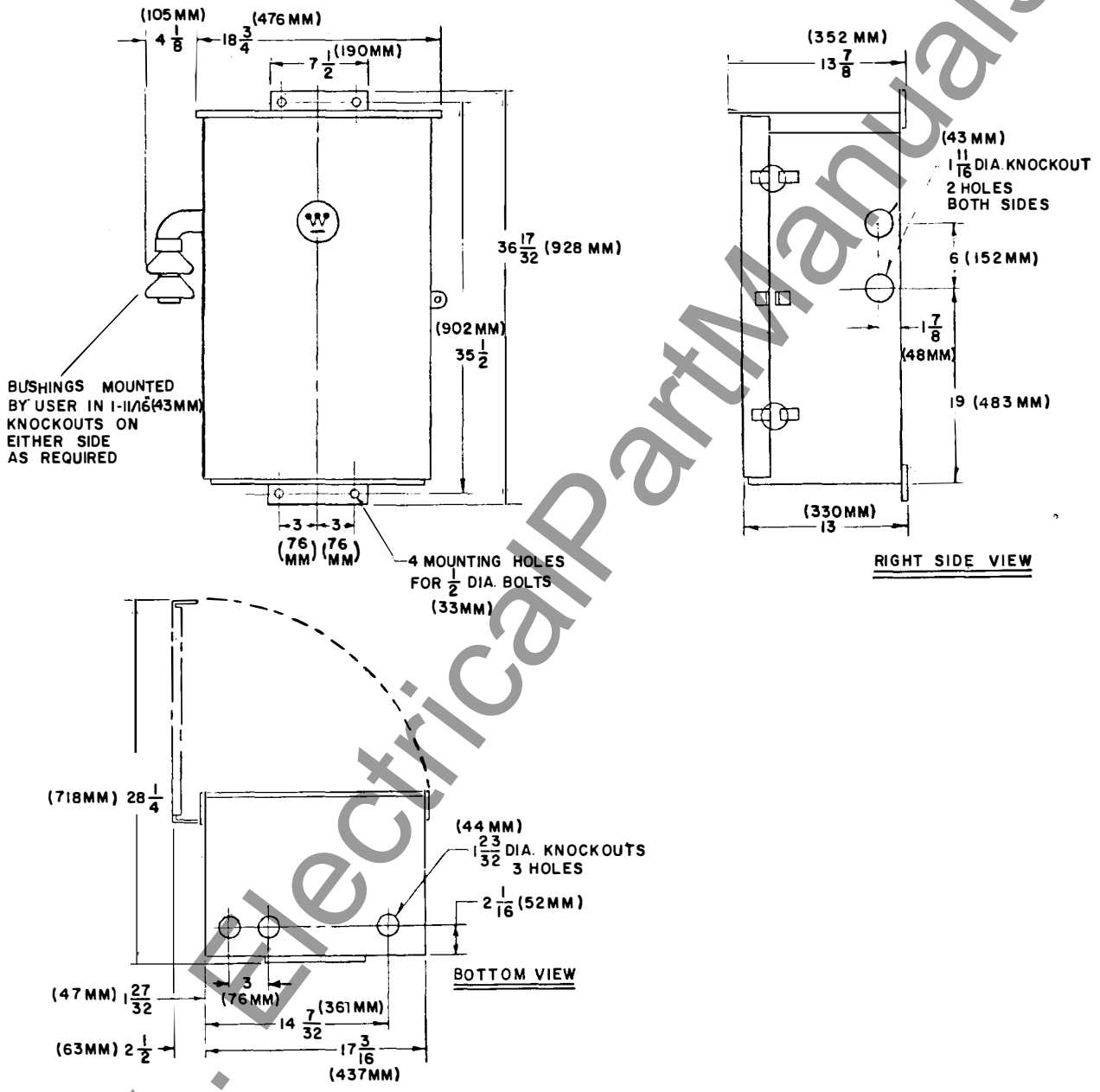


Fig. 2. Internal Schematic (Dwg. 410C091)



* *Fig. 3. Tuner Cabinet – Outline (Dwg. 50-B-7683)*

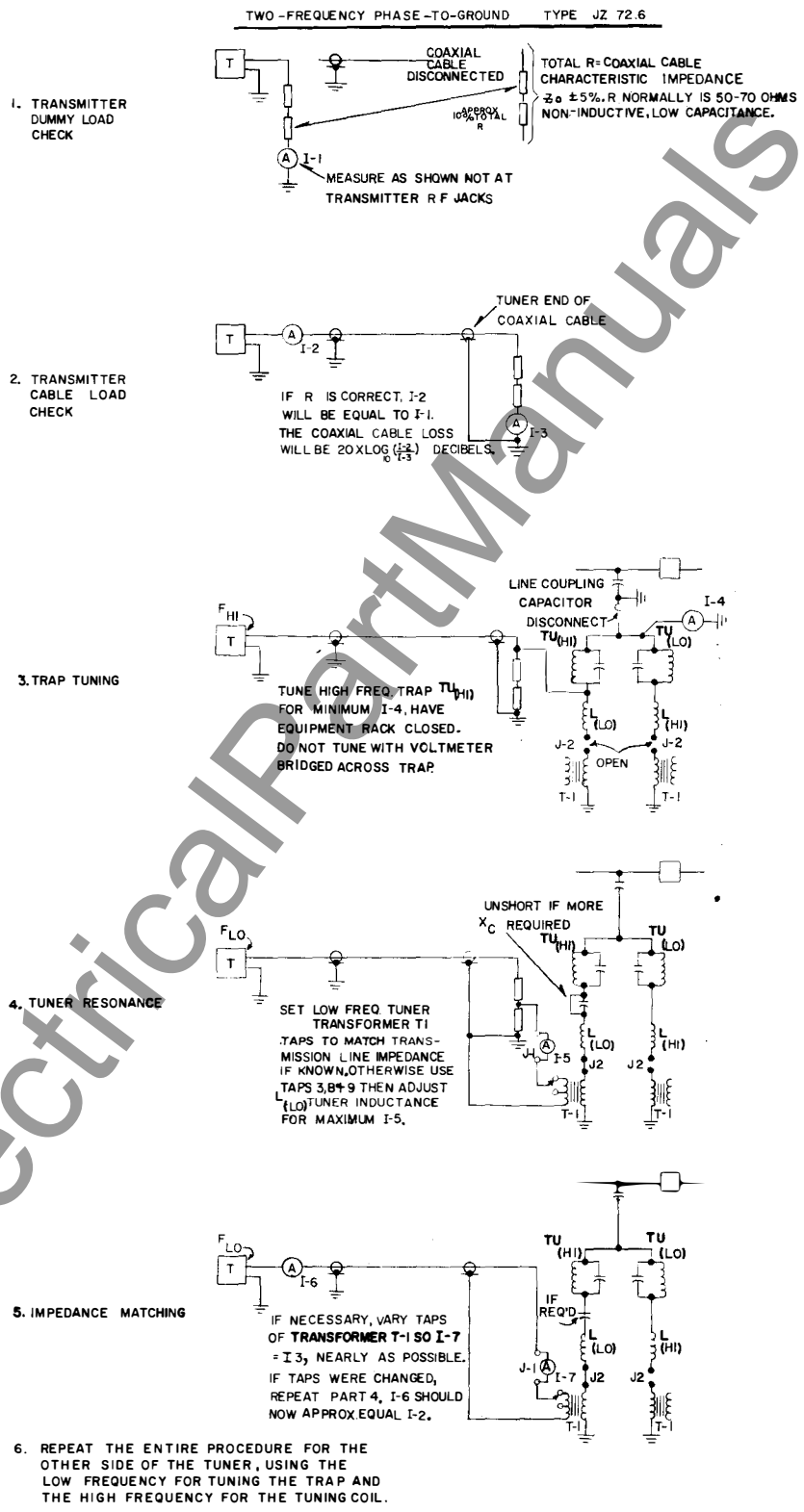


Fig. 4. Line Coupling Tuner Adjustment (Component Location as Viewed from Rear of Panel) (Dwg. 585C117)

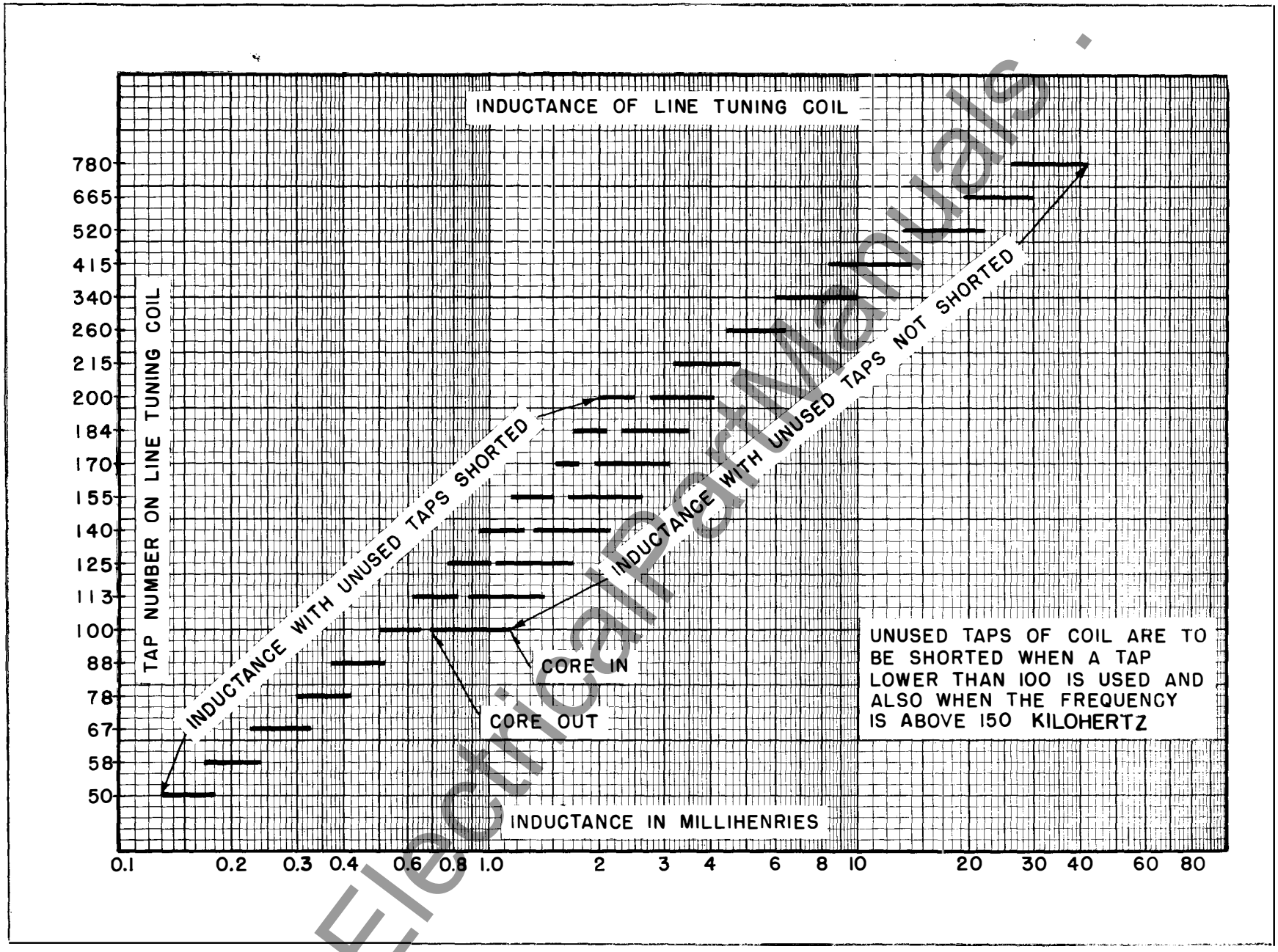
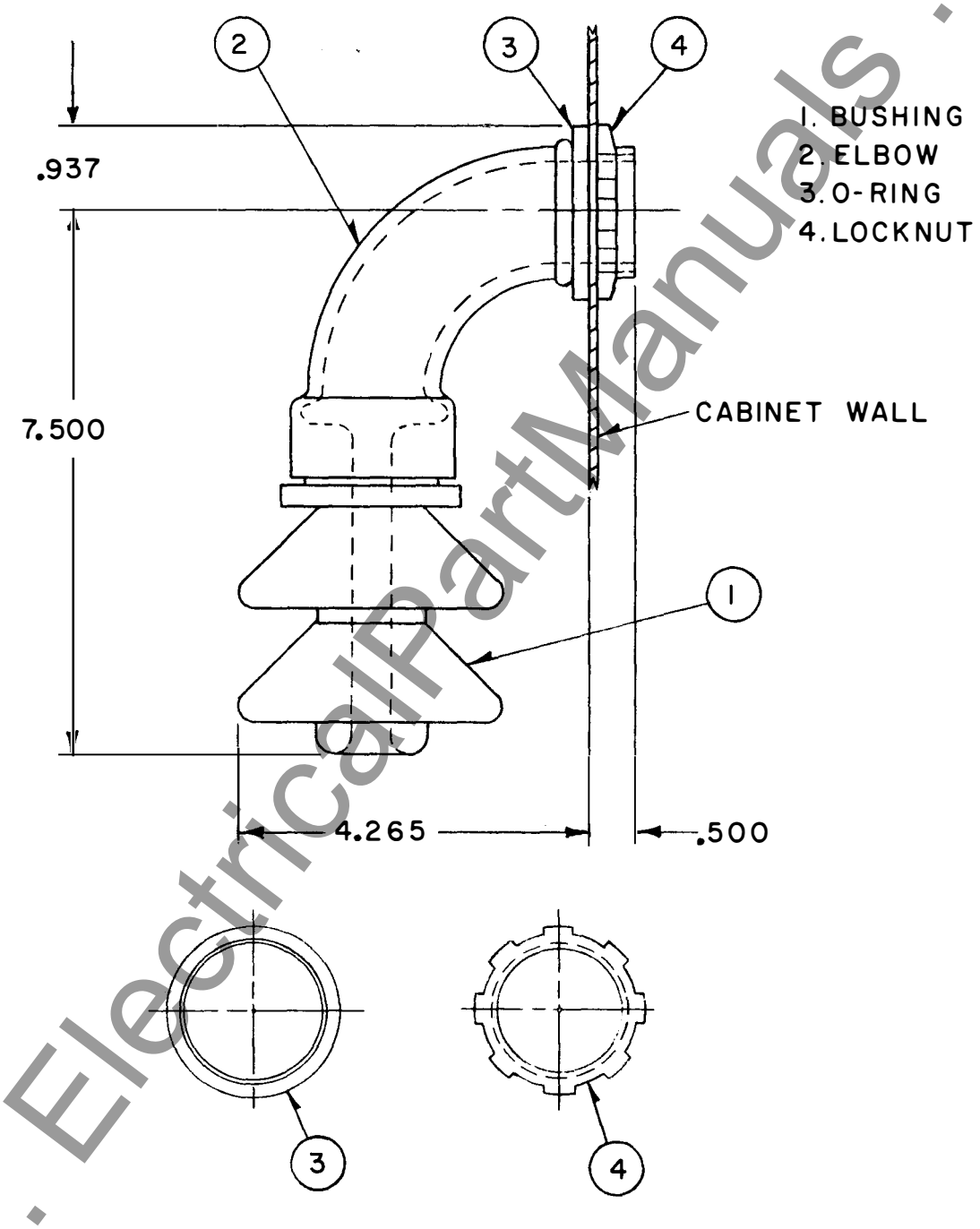


Fig. 5. Inductance of Line Tuning Coil (Curve 358433)



* *Fig. 10. Lead-In Bushing Assembly*

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