

TMC SPECIFICATION

NO. S 1244

REV:

COMPILED: JR, T.T.

CHECKED: T.T.

APPD: [Signature]

SHEET 1

OF 14

TITLE:

3/11/69 ib/

COMPLETE TEST INSTRUCTIONS

FOR

BCT-10KA TRANSMITTER

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TITLE: TEST INSTRUCTIONS FOR BCT-10KA TRANSMITTER

TEST EQUIPMENT REQUIRED

- A. Simpson 260 multimeter or equivalent.
- B. One RF Ammeter 0-20 amperes.
- C. TER 25K 50 ohm unbalanced load.

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A. NOTE TO TESTER

The three phase power input leads are not to be connected to the transmitter until so directed in this test specification.

*B. MECHANICAL INSPECTION

1. Check all knobs and switches on the frame for proper operation.
2. Check PA Tune, control for counter readings of about 000 corresponding to minimum capacity. In addition, insure that the two PA tune variable capacitors are so ganged as to provide equal capacity variation.
3. Check to see that the PA bandswitch positions correspond to the proper PA bandswitch position.
4. Carefully check the PA bandswitch and PA compartment for good mechanical condition, obvious miswiring and loose connections.
5. Check the arrows on the Directional Coupler, for the proper directions. Two diodes are incorporated in this coupler. The 25 kw diode is for the forward power and the arrow must be pointing up. The second diode is for the reflected power and the arrow must be pointing down. At this time the inspection of the diodes should include checking to see that the diodes are properly seated in their sockets and making proper electrical contact. Also check the two coaxial leads with the fittings to see that they are secured properly to the front and the back coaxial fittings on the directional coupler.

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*C. PRELIMINARY

1. Check the 3 power input phases for shorts to ground, reading should be approximately 1 megohm.
2. Adjust time delay relay M302 to 5 minutes.
3. Pre-set overload adjustments as follows:

2R302	PA Bias	fully	CW
2R308	PA Plate	"	CW
2R312	PA Screen	"	CCW
2R324	IPA Voltage	"	CW
2R317	Driver Plate	"	CW
2R318	IPA "A" Plate	"	CW
2R321	IPA "B" Plate	"	CW

The above procedure allows the transmitter H.V. to be energized without overload under normal conditions.

4. Pre-set all bias adjustments fully CCW. This applies full available bias to all tubes for initial energizing of H.V.
5. Select bandswitch position for frequency of operation. Pre-set PA tune and PA load controls as per chart. If no chart is available, pre-set tune and load controls fully CCW.
6. Set exciter unit to standby position.
7. Connect extender card for overload board and extender cable from driver output to PA tube.
8. Connect the 3 phase input power to the transmitter.
9. Turn the Main Power breaker ON. The PA, Main blower must operate.
10. Turn OFF the wall power disconnect switch and when the Main blower has slowed sufficiently, check the direction of rotation. It must turn in the direction of the arrow indicator. The top fan should have the fan hubs facing up as viewed from below and rotate clockwise.

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*D. FUSE CHECKS

In the below listed fuse checks as the fuse is removed to check for the specified indication(s), each fuse must be checked for correct value and type. Turn ON the Main Power. (HV OFF)

1. Remove the Fan fuse; the top fan should stop running.
2. Remove the PA filament fuse; the PA tube filament voltage must be removed.
3. Remove the Exciter fuses; the Exciter Power Lamp should go out.
4. Remove the Blower (IPA) fuse; the Blower Motor should be rendered inoperative.
5. Remove the Interlock fuse; must remove voltage from the interlock system and the interlock indicator light.
6. Remove the fuses on the Driver Drawer one at a time; must remove the associated voltage.
7. Remove the Blower fuses on the control panel and observe the Main Blower must stop.

NOTE: Turn Main Power OFF before removing Blower fuses. Turn Main Power ON and observe Blower should not operate.

*E. INTERLOCK CURCUIT CHECK

1. Check the following interlocks. If all the following interlock switches are closed, the interlock indicator will light as the interlock switch is turned to its 10 positions successively.
 - a.) Air Switch
 - b.) IPA Drawer

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- c.) Exciter Drawer
 - d.) Rear Panels
 - e.) External (remove jumper to check)
 - f.) Front Panel
 - g.) Timer
 - h.) Band Switch
 - i.) Heat Overload
2. With Main Power, Circuit Breaker ON, the HV Circuit Breaker OFF, de-energize each of the aforementioned interlocks one at a time and observe the following:
- a.) The Interlock indicator should go OUT in each respective position.
 - b.) The Shorting relay should de-energize.
 - c.) The HV Circuit breaker should not hold in the ON position when so positioned, with the exception of the Heat Overload, Timer and Band Switch.
3. Before the HV is turned ON, the PA tube filaments should be pre-heated for 15 minutes. This is assuming that they have not been warmed up prior to this point.
- *a.) When the HV contactor closes, the Plate voltmeter should read 10 KV \pm 10%.
 - b.) The HV light should go ON. The Plate elapsed time meter should also energize.

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F. RF OUTPUT

1. Prior to tuning the transmitter, insure that all necessary safety shields are properly installed and an unbalanced 50 ohm TER 25K is connected to the output of the transmitter.

G. TUNING NOTES:

A. Power Output Indication:

1. Single tone indications, 10kw on Forward Power Meter for 10kw average.
2. For proper tuning of the transmitter to its rated full power output, 10 kw, the meter indications listed below should not be exceeded:

PA Plate Current	4.0 amperes
PA Screen Current	50. ma.

*H. IDLE PLATE CURRENT ADJUSTMENT

With transmitter turned ON but no RF drive from the exciter, set the PA idle plate current with the Bias Adjust Control for 2.5 amperes.

- a. Turn meter switch on IPA drawer to "DRIVER". Turn DRIVER BIAS control clockwise to obtain an indication of 20 on meter.
- b. Turn meter switch to IPA "A". Adjust IPA bias until meter indicates 25.
- c. Turn meter switch to IPA "B". Adjust IPA "B" bias until meter indicates 25.

Note: Meter positions Driver to IPA "B" times four (4) are actual PLATE CURRENT (i.e. $20 \times 4 = 80$ ma)
IPA total times eight (8) are total Plate Current of IPA "A" and "B" (i.e. $25 \times 8 = 200$ ma.) -cont'd.-

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NOTE:- cont'd.

The PA Plate idle current adjustment must be re-checked after 15 minutes. As PA tube heats up further the quiescent current increases. The above are the correct idling currents for normal operation.

I. OVERLOAD TRIGGER ADJUSTMENTS

The overload circuits are an important integral part of the BCT-10KA. They serve the purpose of protecting the tubes and power supplies from extreme conditions and malfunctions should such arise.

It should be remembered that the BCT-10KA is capable of peak power output many times that of the front panel meter indications. Therefore, the adjustments which appear to be much higher than normal indications are protecting the transmitter against peak surges higher than the transmitter rated capability. Overload trigger adjustments as follows: After each adjustment has been completed, return plate current to normal IDLING conditions.

- a. Turn High Voltage and adjust IPA voltage SLOWLY until overloads trigger back-off SLIGHTLY (CW) from this adjustment. Re-set overloads.
- b. Set PA BIAS ADJ for 6 Amps, Plate I and adjust PA plate overload to trip at this point. Re-set overload and check setting. Do not keep Plate Current at 6 Amps for more than 30 seconds.
- c. PA BIAS OVERLOAD THRESHOLD ADJUSTMENT: Adjust Bias Overload to point where transmitter trips. Retard setting slightly to obtain threshold adjustment. Re-set overload and check setting. Return Bias to normal if proper setting is obtained.
- d. Set Driver Bias Adjust to read 40 on meter. Adjust driver overload to trip at this point. Re-set overload and check. Return DRIVER IP to normal.

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- e. Set IPA "A" Plate I to read 55 on meter. Adjust IPA "A" overload to trip at this point. Re-set and check for proper setting. Return Plate I to normal.
- f. For IPA "B" follow IPA "A" procedure.
- g. PA Screen Overload. This adjustment must be made after transmitter has been tuned up and operating. PA Screen Adjustment as follows:

Unload transmitter as much as possible and return PA until maximum screen current is obtainable. Adjust PA screen overload to trip at this point. It should trip at approximately 60 mA. Reset overload and check setting.

Transmitter Overloads are now set and transmitter is now ready for operation.

*J. UNBALANCE OUTPUT TUNING

1. The transmitter PA output must be connected for Unbalanced output 50 ohms operation and terminated in 50 ohm unbalanced load.
2. Tune the transmitter to all frequencies listed on Tuning Test Chart. Record all data required by the Tuning Chart.

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TEST DATA SHEET

1. Mechanical Inspection completed _____ ()
2. Preliminary _____ ()
3. Fuse Checks completed _____ ()
4. Interlocks & Overloads:
 - a. Interlock Circuit check _____ ()
 - b. Plate Voltage after Contactor Closes _____ V.DC
5. PA Idle Plate Current adjusted to _____ amps.
6. Overloads Adjusted to trip as follows:
 - a. PA Plate at _____ amps.
 - b. PA Screen at _____ ma.
 - c. PA Bias Overload _____ ()
 - d. IPA "A" Overload _____ ma
IPA "B" Overload _____ ma
 - e. IPA Voltage Set Overload at Plate RF
and PA Plate current _____ ()
_____ ()
 - f. Driver Plate Current set at _____ ()
7. Unbalance Output tuning test completed _____ ()
8. IPA "A" Idling Plate Current Adjusted To _____ ma.
9. IPA "B" Idling Plate Current Adjusted To _____ ma.
10. Driver Plate Current Adjusted To _____ ma.

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TUNING CHART

The purpose of this tuning chart is to provide a record of the individual transmitter with respect to its frequency coverage and power output.

Exciter Frequency	Band	Screen Current (ma.)	Plate Current (amps)	Forward Power	Tune	Load Switch Pos.
450 kHz	450-			*		
500 kHz	750					
750 kHz	kHz					
750 kHz	750-					
1200 kHz	1200					
1200 kHz	1200					
1700 kHz	1700					
1700 kHz	1700-					
1999 kHz	2000					

NOTE* Transmitter coverage is extended to 450 kHz at REDUCED power level (7 kilowatts MAX.)

Tested by _____

Mfg. No. _____

Serial No. _____

Date _____

Remarks _____

