

10 OF THE MOST COMMONLY ASKED QUESTIONS
REGARDING THE DELTA TCA R.F. AMMETER SYSTEM



DELTA ELECTRONICS



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1. My TCA meter deflects downward with modulation. Is the system operating properly?

Yes. Engineers are used to an increased meter indication as seen on a thermocouple meter when the carrier is modulated. The TCA System operates in a different manner. The rectified R.F. signal is composed of DC and modulation components. Due to the ballistics of the meter, the modulation components are cancelled. A carrier level indication remains, which deviates as a direct function of the transmitter carrier shift. Therefore, the downward deflection of the meter is due to negative carrier shift.

2. On my thermocouple ammeter, the F.C.C. rules required my current reading to fall in the upper two-thirds of the meter scale. Does this same rule hold true with the TCA meter?

No. The TCA meters have linear current scales and thus qualify under the rules for expanded scale instruments. Rule 73.125 (d)(2) reads: "Full scale reading shall not be greater than five times the minimum normal readings." Rule 73.125 (a)(3) reads: "The maximum rating of the meter shall be such that it does not read off scale during modulation or normal operation." TCA R.F. Ammeters do not deflect upward with modulation as does the thermocouple ammeter. Thus, with a stable system, readings from 20% of full scale to full scale are legal. The user should allow for some current variation however. A TCA-5, for example, might reasonably be used to read currents from 1.1 to 4.5 amperes, thereby permitting a 10% variation of current.

3. Please explain why the back of the TCA meter box is sealed.

As with any precision instrument, factory calibration is required. Although the customer may be perfectly qualified to replace a defective diode, he has no means of calibrating the instrument once the repairs are completed. Section 73.1215 (f) of the F.C.C. Rules and Regulations states, "Repaired instruments shall not be used unless a certificate of calibration has been provided showing that the instrument conforms to the manufacturer's specifications for accuracy." After the Delta technician calibrates the R.F. Ammeter, the meter box is riveted closed to prevent any field adjustment of the calibration setting.

4. I have noticed a difference between the readings of my thermocouple and the TCA meter. Which meter is accurate?

Although we cannot make a blanket statement concerning each and every TCA meter, our records have indicated that when this occurs the TCA meter gives the proper indication.

We qualify this statement by assuming that the TCA is of recent calibration and not damaged. Usually, the differences that you mention exist in the area of one half to one ampere. Any greater deviation indicates a more severe problem - one or both meters are defective.

5. Why does this difference in meter indications between the TCA and thermocouple occur?

Keep in mind that although both instruments measure current, the means by which the current is measured are different. The thermocouple ammeter converts the heat generated by the current flowing through the meter into an indication. The thermocouple ammeter is also calibrated at 60 Hz instead of a broadcast frequency. The TCA, on the other hand, is not temperature sensitive and is calibrated at 1 MHz. The TCA has a very flat frequency response across the AM Broadcast band, further guaranteeing the meter's accuracy. During the initial design stages of the TCA, several factory-fresh thermocouple meters were connected in series; and a standard current was passed through them. Each meter indicated a different value. This lack of uniform accuracy gave added impetus toward developing an alternative ammeter for the broadcast engineer.

6. Why must I include the toroid when sending my TCA meter box back for repair?

The TCA R.F. Ammeter is calibrated as a complete system. After any work is performed on the R.F. Ammeter, it is Delta's policy to recalibrate the ammeter. Best results are obtained when the meter box is calibrated to the toroid with which it will be used.

7. Can the Toroid (TCT) be mounted outside the Tuning House or Coupling Box?

Yes, however, exposure to the elements may result in a compromised voltage rating. The standard toroid is insulated to 10 kV. For best results; however, some provision should be made for mounting the toroid inside the tuning enclosure.

8. What would occur if the toroid (TCT) to my R.F. Ammeter is reversed, that is to say the arrow is pointing away from, instead of toward, the tower.

There will be no noticeable effect. The result of such an installation would be a 180° phase shift; however, the

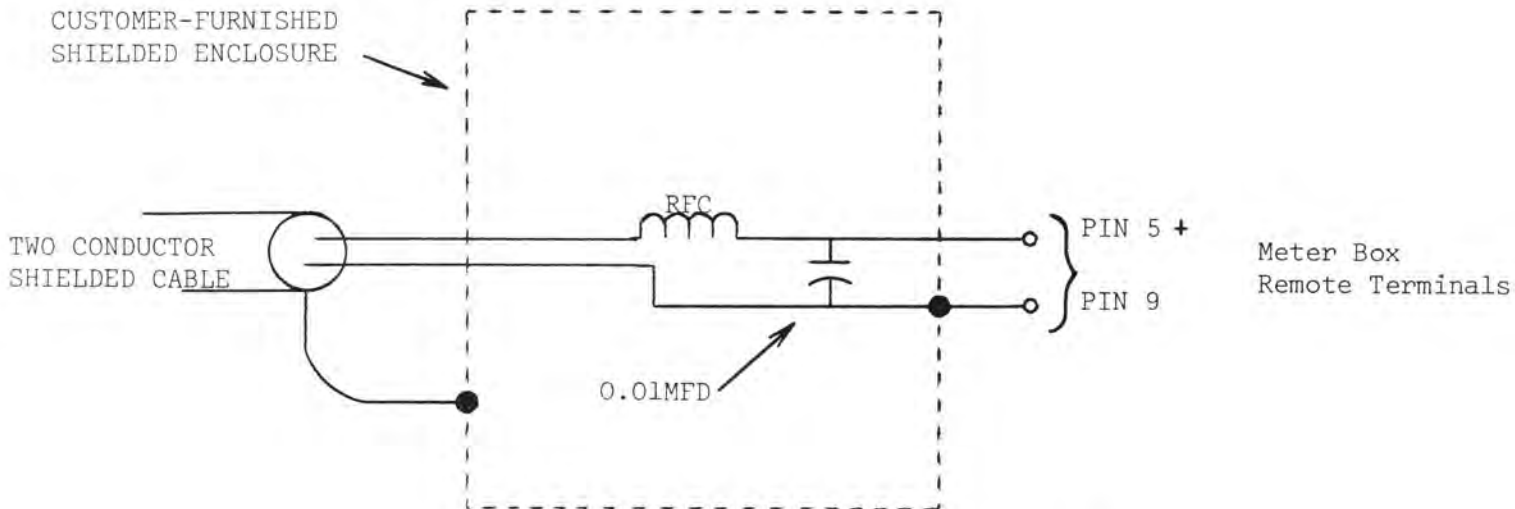
magnitude would remain the same. Since the TCA instrument is measuring current, the phase reversal is inconsequential. It is important to note that, when the TCT toroids are used for antenna monitor sampling, the arrows are all oriented in the same direction for each tower. This will assure proper phase sampling of the directional array.

9. My tower lighting wiring passes through the copper conductor which goes to the tower. What effect does the 60 Hz AC signal have on my ammeter?

None, as long as all wires pass through the conductor. With both positive and negative wires contained inside the conductor, the net effect is zero, since the magnetic field produced by one wire is cancelled by that of the other.

10. What does Delta recommend to eliminate R.F. which occurs on the remote output line?

To begin with, the remote output line should be two-conductor shielded cable. The shield on this cable should be properly grounded to pin 9 of the meter box. If R.F. pickup is still a problem, the remote leads can be bypassed to ground with a 0.01 MFD disc capacitor. Added protection can be obtained by using R.F. chokes placed in series as shown below. These components should be placed in a shielded enclosure located at the meter box.



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