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Indian Standard

MEASUREMENT OF QUARTZ CRYSTAL UNIT PARAMETERS BY ZERO PHASE TECHNIQUE IN A Π-NETWORK

PART 1 BASIC METHOD FOR THE MEASUREMENT OF RESONANCE FREQUENCY AND RESONANCE RESISTANCE OF QUARTZ CRYSTAL UNITS BY ZERO PHASE TECHNIQUE IN A π-NETWORK

1. Scope

This standard specifies a simple method of measurement of resonance frequency and resonance resistance of quartz crystal units and describes a suitable measuring network.

The measuring method and the network are suitable for use over the frequency range 1 MHz to 200 MHz with a fractional frequency accuracy of the order of 10^{-6} with a reproducibility of 10^{-6} to 10^{-8} depending on the type of crystal unit being measured, and an accuracy of the measurement of resonance resistance of ±2% to ±5% depending on the accuracy of the voltage measurement.

However, above approximately 100 MHz the use of this measuring method is limited by the effects of the shunt capacitance C_0 of the crystal unit under test. To enable the measuring method to be used under these conditions, the use of some method of C_0 compensation is advisable.

A method of C_0 compensation will be issued in IEC Publication 444-3 as an IEC report.

Note — The modifications 10 the measuring system and network contained in this standard have been introduced to ensure that the claims contained within it are achievable. They do not, however, invalidate the network produced according to the first edition. These networks are still acceptable as an international standard method of measurement of resonance frequency f_r and resonance resistance R_r.

If the reference resistors described in the standard are slightly modified to allow insertion into networks manufactured according to the first edition of Publication 444 then the problem of obtaining satisfactory reference resistors is solved