

### 3. Recording Facility

The voltage time profile is recorded on a 585 Tektronix oscilloscope with the aid of a type 1A5 offset pre-amplifier plug-in unit. This unit allows observation of the profile which is superimposed on top of the voltage step developed across the gauge when the constant current supply is initially turned on. This voltage step, knowledge of which is necessary for data reduction, is measured during the preliminary setup. This measurement is performed using the comparison voltage available on the 1A5 plug-in unit in conjunction with a precision voltmeter. The comparison voltage is used to nullify the voltage step while the comparison voltage is in turn monitored by the voltmeter. This measurement can be made to well within 0.5% accuracy.

Cable termination is carried out at the gauge rather than the oscilloscope end of the line. Figure 25 shows a schematic gauge with representative termination resistors. Termination at the gauge rather than at the oscilloscope eliminates the problem of a current shunting the gauge and therefore simplifies data reduction. In practice the gauge element will change resistance by about an ohm as the stress profile passes the gauge. The terminating resistance values should be selected so that proper termination is effected when the gauge resistance is in its final state.

## V. GUN PERFORMANCE

### A. Projectile Velocity

Predicted velocity curves for the gun as designed using nitrogen or helium are shown in Fig. 26. Also shown are representative data points derived from the approximately fifty shots fired to date at pressures up to 3000 psi. The agreement is seen to be good for helium, but is less satisfactory for nitrogen. The reason for the discrepancy is not established; possibly throttling at the orifices connecting the breech to the barrel, which is more important for nitrogen than for