

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

**CALIBRATION PROCEDURE
FOR
CATHODE RAY RELAY TESTER
SIEMENS & HALSKE 9Tmse 109**

**Headquarters, Department of the Army, Washington DC
4 August 1980**

REPORTING OF ERRORS

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Section I. IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Cathode Ray Relay Tester, Siemens Halske 9Tmse109. The cathode ray relay tester being calibrated will be referred to as the TI (test instrument) throughout the bulletin.

a. Model Variations. This procedure pertains to only one model. Some instruments have trimmer capacitors C5c and C5d and some do not, according to the balance of the circuitry of resistors R1 and R22 and capacitor assembly C5.

b. Time and Technique. The time required to perform this calibration is approximately 2 hours using the dc low frequency technique.

2. Calibration Data Card. *a.* Forms, records, and reports required for calibration personnel at all levels are prescribed by TM 38-750. DA Form 2416

(Calibration Data Card) must be annotated in accordance with TM 38750 for each calibration performed.

b. Adjustments to be reported on DA Form 2416 are designated (R) at the end of the sentence in which they

appear. Report only those adjustments made and designated with (R).

3. Calibration Description. TI parameters and performance specifications which pertain to this calibration are listed in table 1.

TABLE 1. Calibration Description

Test Instrument Parameters		Performance Specifications
Scale		in % (percent).
Measuring range		20%
Error with bias		100% approx. 20 ms.
Distortion measurement		equal to or less than 0.25%
Error with transfer		100% \pm 20 ms.
Time measurement		equal to or less than 1%
Relay excitation		25 Hz sinusoidal current (30 Hz in special version for 60 Hz power frequency).
Energizing voltage (no load)		44 V.
Relay energizing current		equal to or less than 20 mA.
Power voltage		110/125/150/220/240V \pm 10%.
Power frequency		50 Hz \pm 1%. (special version: 60 Hz \pm 1%.
Power drain		approx. 20 VA.

Section II. EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment used in this calibration procedure. Alternate items may be used by the calibrating activity when this equipment listed in table 2 is not available. The items selected must be verified to perform satisfactorily prior to use and must bear evidence of current calibration. The equipment must meet or exceed the minimum use

specifications listed in table 2. The accuracies listed in table 2 provide a four-to-one accuracy ratio between the standard and the TI.

5. Accessories Required. The accessories listed in table 3 are to be used in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

TABLE 2. Equipment Required

Item number	Common name	Minimum use specifications	Calibration equipment Type/Model nr. and/or Mfg
A1	Audio Oscillator	Frequency: 210 to 225 Hz. Output: 20 to 30 Volts	HP 205 AG (Not available in the mobile calibration facility)
A2	Digital Oscillator	Range: 0 to 1000 Volts ac Accuracy: \pm 2%	HP 3490A
A3	Oscilloscope	Dual trace capability	HP 180D or Tek RM561A
A4	Variable Transformer	Range: 0 to 220 Volts*	(not available in the mobile calibration facility) Use a 220 volt monitored source

*Recommend the use of a 220 volt transformer during depot repair, overhaul or rebuild.

TABLE 3. Accessories Required

Item number	Common name	Description
B1	Clip, adapter	Banana jack to alligator clip (red)
B2	Clip, adapter	Banana jack to alligator clip (black)
B3	Lead, electrical (2 required)	Banana plug terminations (nominal length)
B4	Oscilloscope probes (2 required)	Part of oscilloscope A3