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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR VIBREX BALANCE KIT, MODEL B4591 CONSISTING OF VIBREX TESTER, MODEL 11 BLADE TRACKER, MODEL 135M-11 AND BALANCE PHAZOR, MODEL 177M-6A

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SECTION I
IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of Vibrex Balance Kit, Model B4591, consisting of Vibrex Tester, Model 11; Blade Tracker, Model 135M-11; and Balance Phazor, Model 177M-6A. The manufacturer's manual and TM 55-4920-402-13/P were used as the prime data sources in compiling these instructions. The equipment being calibrated will be referred to as the TI (test instrument) throughout this bulletin.

a. Model Variations. None.

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

2. Forms, Records, and Reports.

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25.

b. Adjustments to be reported are designated (R) at the end of the sentence in which they appear. When adjustments are in tables, the (R) follows the designated adjustment. 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
Calibrator Model 11 RPM	900 and 1800 rpm at 60 Hz
Double interrupter logic (Balancer model 177M-6A)	IPS equals 0.8 ±0.08 at 1800 rpm IPS equals 0.4 ±0.04 at 900 rpm
Single interrupter logic (Balancer model 177M-6A)	0.8 IPS ±0.08 at 1800 rpm 0.4 IPS ± 0.04 at 900 rpm
Balance mode (Strobex model 135M-11)	0.8 IPS ±0.08 at 1800 rpm 0.4 IPS ±0.04 at 900 rpm

SECTION II
EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 2 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Set AN/GSM-286. Alternate items may be used by the calibrating activity when the 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 ratio between the standard and TI.

5. Accessories Required. The accessories required for this calibration are common usage items issued as indicated in 4 above, and are not listed in this calibration procedure. All peculiar accessories are supplied with the TI.

Table 2. Minimum Specifications of Equipment Required

Common name	Minimum use specifications	Manufacturer and model (part number)
CALIBRATOR[1]	900 and 1800 rpm at 60 Hz	Chadwick-Helmuth, Model 11
DC POWER SUPPLY	Output voltage: 0 to 30 V Output current: 0 to 5 amps	NJE, Model CS36CR30D2 (7907346-2)
FREQUENCY COUNTER	Range: 10 to 40 Hz Accuracy: ±0.25 Hz	Hewlett-Packard, Model 5345A (MIS-28754/1 Type 1) w/5355A

[1]Supplied with the Vibrex Balance Kit, Model B4591.

SECTION III
CALIBRATION PROCESS FOR
CALIBRATOR CHADWICK-HELMUTH, MODEL 11

6. Preliminary Instructions

a. The instructions outlined in paragraphs **6** and **7** are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI and TM 55-4920-402-13/P.

c. Unless otherwise specified, all controls and control settings refer to the TI.

7. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fall to observe safety precautions.

a. Screw magnetic pickup and two accelerometers into their respective holes on TI.

NOTE

Screw the magnetic pickup in until it just touches the interrupter screws. Then, back out the magnetic pickup 1/6 turn to provide clearance. Tighten jam nut on magnetic pickup.

b. Connect TI power cable to dc power supply using cable supplied with TI.

c. Set power supply **ON-OFF** switch to **ON** and adjust output for 28 volts.

d. Remove two opposite pairs of interrupter screws on TI rotor disc, leaving only two opposite single screws.

e. Connect frequency counter to magnetic pickup on TI using a BNC to test hook type lead.

f. Set TI **CAM RATE (RPM)** switch to **1800**.

g. Set TI **MOTOR ON** switch to **MOTOR ON**.

8. RPM Test

a. Performance Check

(1) View rotor disc under ordinary fluorescent room lights (60 Hz) and adjust TI 1800 RPM pot until outer ring appears stopped. Frequency counter will indicate 30 ±1 Hz.

NOTE

If frequency counter does not indicate 30 ±1 Hz, take corrective action to insure line frequency of fluorescent lighting is 60 Hz.

NOTE

To convert frequency counter indication to RPM, multiply by 60.

(2) Set TI **CAM RATE (RPM)** switch to **900**.

(3) Adjust **900 RPM** pot until next ring on the rotor disc appears stopped. Frequency counter will indicate 15 ±1 Hz.

(4) Set TI **MOTOR ON** switch to down position.

(5) Disconnect lead from magnetic pickup on TI.

(6) Replace two opposite pairs of interrupter screws on TI rotor disc.

b. Adjustments. No further adjustments can be made.

9. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA label/form in accordance with TB 750-25.

SECTION IV
CALIBRATION PROCESS FOR BALANCE PHAZOR, MODEL 177M-6A AND BLADE TRACKER, MODEL 135M-11

10. Preliminary Instructions

a. The instructions outlined in paragraphs 10 and 11 are preparatory to the calibration process. Personnel should become familiar with the entire bulletin before beginning the calibration.

b. Unless otherwise specified, verify the result of each test and, whenever the test requirement is not met, take corrective action before continuing with the calibration. Adjustments required to calibrate the TI are included in this procedure. Additional maintenance information is contained in the manufacturer's manual for this TI.

c. Unless otherwise specified, all controls and control settings refer to the TI.

11. Equipment Setup

WARNING

HIGH VOLTAGE is used or exposed during the performance of this calibration. DEATH ON CONTACT may result if personnel fall to observe safety precautions.

a. Screw magnetic pickup and two accelerometers supplied with TI into their respective holes on the calibrator.

NOTE

Screw magnetic pickup in until it just touches interrupter screws. Then, back out the magnetic pickup 1/6 turn to provide clearance. Tighten jam nut on magnetic pickup.

b. Connect accelerometer cables supplied with TI and dress them around behind calibrator and crossed so there will be no force from cables that might pull the cam-followers away from cam. Connect the other end of accelerometer cables to accelerometer channel A and B of TI.

c. Connect magnetic pickup cable between calibrator and magnetic pickup channel A of TI.

d. Connect TI dc power cable to calibrator.

e. Connect calibrator to dc power supply and adjust dc power supply output to 28V.

f. Set TI controls as follows:

(1) **INTERRUPTER LOGIC** switch to **DOUBLE**.

(2) **MAGNETIC PICKUP** switch to **COMMON**.

(3) **RPM RANGE** switch to **X10**.

(4) **RPM TUNE** dial to **180**.

(5) **FUNCTION** switch to **A**.

g. Verify that all six screws are installed in the edge of calibrator rotor disc.

h. Set calibrator **CAM RATE** switch to **1800** and **MOTOR ON** switch to **ON**.

12. Double Interrupter Logic Test

a. Performance Check

(1) Press and hold TI **TEST** pushbutton.

(2) Verify that 12:00, 6:00 and 1:00 o'clock lights light (a light at 12:30 o'clock instead of 1:00 o'clock is permissible).

(3) Release **TEST** pushbutton and observe clock position of lighted light.

(4) Push and hold **VERIFY TUNE** pushbutton on TI and adjust **RPM TUNE** dial to return light to clock position observed in (3) above.

(5) Release **VERIFY TUNE** pushbutton and observe new clock position.

(6) Repeat (4) and (5) above until there is no change whether pushbutton is pushed or released. Read the clock position with **VERIFY TUNE** pushbutton released.

(7) Verify the following indications on TI:

(a) **PHAZOR** indication is between 2:30 and 3:30 o'clock.

(b) **IPS** meter indication is between 0.72 and 0.88.

(c) **RPM TUNE** dial is between 176 and 184.

(8) Set calibrator **CAM RATE** switch to **900**.

(9) Set TI **RPM RANGE** switch to **X1**, and **RPM TUNE** dial to **900**.

(10) Repeat (3) through (6) above and verify the following indications:

(a) **IPS** meter indication is between 0.36 and 0.44.

(b) **RPM TUNE** dial is between 882 and 918.

b. Adjustments. No adjustments can be made.

13. Single Interrupter Logic Test

a. Performance Check

(1) Set calibrator **CAM RATE** switch to **1800** and stop calibrator.

(2) Disconnect magnetic pickup from **CHANNEL A** and connect to **CHANNEL B**.

(3) Set TI controls as follows:

(a) **INTERRUPTER LOGIC** switch to **SINGLE**.

(b) **RPM RANGE** switch to **X10**.

(c) **FUNCTION** switch to **B**.

(d) **RPM TUNE** dial to **180**.

(e) **MAGNETIC PICKUP** switch to **COMMON**.

(4) Remove two opposite pairs of interrupter screws on calibrator leaving only two opposite single screws.

(5) Run calibrator and push and hold **TEST** pushbutton on the TI. Only the 12 o'clock light should light.

(6) Release **TEST** pushbutton and observe clock position of lighted light.

(7) Push and hold **VERIFY TUNE** pushbutton on TI and adjust **RPM TUNE** dial to return light to clock position observed in (6) above.

(8) Release **VERIFY TUNE** pushbutton and observe new clock position.

(9) Repeat (7) and (8) above until there is no change when **VERIFY TUNE** pushbutton is pushed or released.

(10) Verify the following indications on TI:

(a) **PHAZOR** indication is between 8:30 and 9:30 o'clock.

(b) **IPS** meter indication is between 0.72 and 0.88.

(c) **RPM TUNE** dial is between 176 and 184.

(11) Set calibrator **CAM RATE** switch to **900**.

(12) Set TI **RPM RANGE** switch to **X1** and **RPM TUNE** dial to **900**.

(13) Repeat (5) through (9) above and verify the following indications:

(a) **IPS** meter indication is between 0.36 and 0.44.

(b) **RPM TUNE** dial is between 882 and 918.

b. Adjustments. No adjustments can be made.

14. Balance Mode Test

a. Performance Check

(1) Set calibrator **CAM RATE** switch to **1800 RPM**.

(2) Set TI **RPM RANGE** switch to **X10** and **RPM TUNE** dial to **180**.

(3) Set Strobex **MODE** switch to **A**.

(4) Set calibrator **MOTOR ON** switch to down position.

(5) Connect Strobex (Model 135M-11) to TI Strobex connector.

(6) Install two opposite pairs of interrupter screws on calibrator rotor disc (all six screws installed).

(7) Set calibrator **MOTOR ON** switch to **MOTOR ON**.

NOTE

Because of calibrator two-lobe cam, the accelerometer generates two signals per revolution, causing Strobex to flash twice per revolution. The following steps reference **"h"** in the "**ch**" logo located in the center position of the strobe disc.

(8) Squeeze and hold Strobex trigger. Aim Strobex at calibrator rotor strobe disc to illuminate strobe pattern. Verify that stem of **"h"** in logo appears stopped in two positions.

(9) Note clock angle of stem of **"h"** in logo. Press and hold balancer **VERIFY TUNE RPM** pushbutton and adjust **RPM TUNE** knob until clock angle of stem of **"h"** is the same as observed before **VERIFY TUNE** pushbutton was pressed.

(10) Release **VERIFY TUNE** pushbutton and observe new clock angle of stem of **"h".** Repeat (9) and (10) until there is no change in clock angle of stem of **"h"** whether **VERIFY TUNE** push-button is pressed or released.

NOTE

When balancer is tuned properly, stem of **"h"** appears stopped at approximately 1:30 and 7:30 o'clock.

(11) Verify that TI indicates the following :

(a) **IPS** meter is between .72 and .88 at 1800 rpm.

(b) **RPM TUNE** dial is between 176 and 184.

(12) Release Strobex trigger.

(13) Set TI **RPM RANGE** switch to **X1**. Set calibrator **CAM RATE (RPM)** switch to **900.**

(14) Adjust TI **RPM TUNE** knob for indication of **900** on **RPM TUNE** dial.

(15) Squeeze and hold Strobex trigger. Aim Strobex at calibrator rotor strobe disc to illuminate strobe pattern. Verify that stem of **"h"** in logo appears stopped in two positions.

(16) Note clock angle of stem of **"h"** in logo. Press and hold balancer **VERIFY TUNE** pushbutton and adjust **RPM TUNE** knob until clock angle of stem of **"h"** is the same as was observed before **VERIFY TUNE** pushbutton was pressed.

(17) Release verify tune pushbutton and observe new clock angle of stem of **"h".**

(18) Repeat (16) and (17) until there is no change in clock angle of stem of **"h"** whether **VERIFY TUNE** pushbutton is pressed or released.

NOTE

When balancer is properly tuned, stem of **"h"** appears stopped at approximately 1:30 and 7:30 o'clock.

(19) Verify that balancer indicates the following:

(a) **IPS** meter is between .36 and .44 IPS.

(b) **RPM TUNE** dial is between **882** and **918** rpm.

(20) Release Strobex trigger.

b. Adjustments. No adjustments can be made.

15. Final Procedure

a. Deenergize and disconnect all equipment.

b. Annotate and affix DA Label/Form in accordance with TB 750-25.

By Order of the Secretary of the Army:

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