*TB 55-4920-428-35

TECHNICAL BULLETIN

CALIBRATION PROCEDURE

FOR

CH-47 INTEGRATED LOWER CONTROL ACTUATOR (ILCA) BENCH TEST SET P/N 145GS278-1

***This bulletin supersedes TB 55-4920-428-35,15 August 1983.**

HEADQUARTERS, DEPARTMENT OF THE ARMY
19 JULY 1988

CHANGE

NO. 3

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 18 September 1996

CALIBRATION PROCEDURE

FOR

CH-47 INTEGRATED LOWER CONTROL ACTUATOR (ILCA)
BENCH TEST SET
P/N 145GS278-1

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CALIBRATION PROCEDURE

FOR

CH-47 INTEGRATED LOWER CONTROL ACTUATOR (ILCA)
BENCH TEST SET
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CALIBRATION PROCEDURE
FOR
CH-47 INTEGRATED LOWER CONTROL ACTUATOR (ILCA)
BENCH TEST SET
P/N 145GS278-1

TB 55-4920-428-35, 19 July 88, is changed as follows:

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DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

CALIBRATION PROCEDURE FOR CH-47 INTEGRATED LOWER CONTROL ACTUATOR (IL-CA) BENCH TEST SET P/N 145GS278-1

Headquarters, Department of the Army, Washington, D.C.

19 July 1988

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes, or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in the back of this manual directly to: Commander, US Army AviationTroop Command, ATTN: AMSAT-IMP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <mpmt%avma28@st-louis- emh7.army.mil>. A reply will be furnished directly to you. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028.

*This bulletin supersedes TB 55-4920-428-35, 15 August 1983.

SECTION I

IDENTIFICATION AND DESCRIPTION

1. Test Instrument Identification. This bulletin provides instructions for the calibration of the CH-47 Integrated Lower Control Actuator (ILCA) Bench Test Set, P/N 145GS278-1. TM 55-4920-428-13 was used as the prime data source in compiling these instructions. The equipment being calibrated will be referred to as the TI (Test Instrument) throughout the bulletin.

a. Model Variations. None.

b. Time and Technique. The time required for this calibration is approximately 3 hours, using the dc, low frequency and physical techniques.

2. DA Form 2416 (Calibration Data Card).

a. Forms, records, and reports required for calibration personnel at all levels are prescribed by TB 750-25. DA Form 2416 must be annotated in accordance with TB 750-25 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. When adjustments are in tables, the (R) follows the designated adjustment. Report only those adjustments made and designated with (R).

3. Calibration Description. TX parameters and performance specifications which pertain to this calibration are listed in tables 1 and 2.

NOTE

Table 1. Calibration Description indicates performance specifications for not modified test sets.

Table 2. Calibration Description indicates performance specifications for the modified test sets.

Table 1. Calibration Description (Test Set Not Modified)

Test Instrument Parameters	Performance Specifications	
Power Input Requirements	**115 to 117 vac 50-60 Hz**	
DC Power Supply PS2	Range: Accuracy:	28.0 vdc ±0.5 vdc
DC Power Supply PS1	Range: Accuracy: Range: Accuracy:	+ 12.0 vdc ±0.5 vdc -12.0 vdc ±0.5 vdc
AC Power Supply PS3	Range; Accuracy:	13.0 vac ±0.5 vac
Frequency P/O PS3	Range: Accuracy:	400 Hz ±5.0 Hz
Bite Terminal Voltages	Range: Accuracy: Range: Accuracy: Range: Accuracy: Range: Accuracy: Range: Accuracy: Range: Accuracy:	5.0 vdc ±0.3 vdc 12.0 vdc 0.5 vdc -12.0 vdc ±0.5 vdc 20.0 vdc ±1.0 vdc -20.0 vdc ±1.0 vdc 13.0 vdc ±0.5 vdc
Bite SAS1 Self, Cross SAS2 Self, Cross Voltages Valve Servo Voltage	Range: Accuracy: Range: Accuracy:	.9 vdc ±0.1 vdc 18.0 vdc or -18.0 vdc ±2.0 vdc
Nullmeters	Range: Accuracy:	-50 to +50 uadc ±5.0 uadc

Table 1. Calibration Description (Test Set Not Modified) (Continued)

Test Instrument Parameters Power Input Requirements	Performance Specifications 115 to 117 vac 50-60 Hz	
Pressure Gages	Range: Accuracy: Range: Accuracy:	0-600 psi ±5.0 psi 0-5000 psi ±50.0 psi
Force Gage	Range: Accuracy:	0-80 lbs ±1 division
Dial Indicators	Range: Accuracy: Range: Accuracy:	0-5 inches ±.001 inch 0-.030 inch ±.0005 inch

Table 2. Calibration Description (Modified Test Set)

Test Instrument Parameters Power Input Requirements	Performance Specifications 115 to 117 vac 50-60 Hz	
DC Power Supply PS2	Range: Accuracy:	28.0 vdc ±0.5 vdc
DC Power Supply PSI	Range: Accuracy: Range: Accuracy:	+ 12.0 vdc ±0.25 vdc -12.0 vdc ±0.25 vdc
AC Power Supply PS3	Range: Accuracy:	13.0 vac ±0.13 vac
Frequency P/O PS3	Range: Accuracy:	400 Hz ±5.0 Hz

Table 2. Calibration Description (Modified Test Set) (Continued)

Test Instrument Parameters **Power Input Requirements**	**Performance Specifications** **115 to 117 vac 50-60 Hz**
Bite Voltages	Range: 5.0 Vdc Accuracy: ±0.25 vdc Range: 12.0 vdc Accuracy: ±0.25 vdc Range: -12.0 vdc Accuracy: ±0.25 vdc Range: 19.5 vdc Accuracy: ±0.25 vdc Range: -19.5 vdc Accuracy: ±0.25 vdc Range: 13.07 vac Accuracy ±0.13 vac
SAS1 Self, Cross SAS2 Self, Cross Voltages	Range: 1.0 vac Accuracy: ±0.05 vdc
SAS1 or SAS3 LVDT Voltages	Range: 1.0 vac Accuracy: ±.05 vac Range: 2.0 vac Accuracy: ±.05 vac Range: 0.4 vac Accuracy: ±.02 vac
Nullmeters	Range: -50 to + 50 uadc Accuracy: ±5.0 uadc

SECTION II

EQUIPMENT REQUIREMENTS

4. Equipment Required. Table 3 identifies the specific equipment to be used in this calibration procedure. This equipment is issued with Secondary Transfer Calibration Standards Sets, AN/GSM-286. Alternate items may be used by the calibrating activity when the equipment listed in table 3 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 3. The accuracies listed in table 3 provide a four-to-one ratio between the standard and TI.

5. Accessories Required. The accessories listed in table 4 are issued as indicated in paragraph 4 above and are used in this calibration procedure. When necessary, these items may be substituted by equivalent items, unless specifically prohibited.

Table 3. Minimum Specifications of Equipment Required (Modified or Not Modified Test Set)

Item	Common Name	Minimum Use Specifications		Manufacturer, Model, and Part Number
A1	AUTOTRANSFORMER (Variable Power Transformer)	Range: Accuracy:	115 to l17 vac ±1.0%	General Radio Model W10MT3AS3 7910809
A2	DC POWER SUPPLY	Range:	0 to 5.0 vdc	NJE Model CS36CR30 7907346-2
A3	ELECTRONIC COUNTER	Range: Accuracy:	395 to 405 Hz ±.2%	Hewlett-Packard Model 5345A (MIS 28754 Type 1)
A4	DIGITAL MULTIMETER	Range: Accuracy:	115 to l17 vac +2.0 vac	Hewlett-Packard Model 3456A

Table 3. Minimum Specifications of Equipment Required (Modified or Not Modified Test Set) (Continued)

Item	Common Name	Minimum Use Specifications		Manufacturer, Model, and Part Number
		Range: Accuracy: Range: Accuracy:	20.0 mvdc to 28.5 vdc .02% 13.07 vac ±0.2%	or Fluke 8840A
A5	WAVE-TEK GENERATOR	Range:	0-3 volts, ac 400 Hz	
A6	RESISTANCE STANDARD	Range: Accuracy:	200K ohms ±0.5%	Biddle Gray 601147-1 7910328
A7	DEADWEIGHT TESTER	Range: Accuracy Range: Accuracy:	45 to 555 psi ±1.0 psi 450 to 45550 psi ±10 psi	Manifield Green, Model 1010525 (859893)
A8	WEIGHT SET	Range: Accuracy:	0 to 75 lbs Class-T	Class-T (7909056) (6685-00-873-1910)
A9	DIAL INDICATOR CALIBRATOR	Range: Accuracy:	0.00005 to 1 in ±0.00001 in	Federal Products Corp Model 4008-1 (MIS-10327)
A10	GAGE BLOCKS	Range: Accuracy:	0-5 inches ±0.00001 in	Starrett 7901961

Table 4. Accessories Required
(Test Set Modified or Not Modified)

Item	Common Name and/or (Official Nomenclature)	Description and (Part Number)
B1	ADAPTER	Single banana to spade lug (Black) (7907502-1)
B2	ADAPTER	Single banana to spade lug (Red) (7907499)
B3	CABLE ASSEMBLY	BNC plug to double banana plug (MS 90578-1441)
B4	LEAD 1	24-in, No. 18, single banana plug Terminations (Black) (7907498)
B5	LEAD 1	28-in, No 18, single banana plug Terminations (Red) (7907457)
B6	LEAD 1	SKC 4850-14
B7	TEST PROBE (X 10)	Tektronix, Type P6201 with 10X adaptor (P6201)
B8	CABLE 1	30-in, RG-58/U; double banana plug terminations (7907470)
B9	TEST PROD 2	Single banana jack to pin plug (662B)
B10	GAGE STAND ASSEMBLY	Stand Assembly (7912127)
B11	WEIGHTHOLDER	Holder Assembly (7910971)
B12	J U M P E R L E A D	10 in, No. 18 Wire with pin plug Terminations (Local Prefabricate)

SECTION III

PRELIMINARY OPERATIONS

6. Preliminary Instructions.

a. The instructions outlined in this section are preparatory to the calibration process. Personnel should become familiar with the applicable sections before beginning the calibration.

b. Items of equipment used in this procedure are referenced within the text by common name and item identification number as listed in tables 3 and 4. For the identification of equipment referenced by item numbers prefixed with A, see table 3, and for prefix B, see table 4.

WARNING

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

NOTE

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

7. Equipment Setup.

a. Check TI pressure gages and Nullmeters for mechanical ZERO and adjust if required.

NOTE

Electronic unit is P/N 145GS2783 and Hydraulic unit is PIN 145GS278-2.

b. Remove TI electrical instrument panel from case and remove three screws holding back of chassis and swing out for excess.

c. Connect TI power cable J8 to TI power connector and autotransformer (A1) and connect to 115 vac, 60 Hz power source.

d. Adjust autotransformer for 115 vac output.

e. Set TI power to ON and DEPRESS TI LAMPSTEST. TI panel lights will illuminate.

f. Set TI CYCLE MOTOR to OFF and SOLENOID SHUT-OFF to CLOSED.

CAUTION

Test equipment power will be switched OFF before making or removing leads from test instrument.

NOTE

If test set circuit has been modified, NOTE will specify.

SECTION IV

CALIBRATION PROCESS

NOTE

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 TI are included in this procedure. Additional maintenance information is contained in TM 55-4920-428-13 for this TI.

8. Nullmeters (SAS1) and (SAS2). (Not Modified Circuit).

a. Performance Check.

(1) Disconnect TI nullmeter (SAS1) leads from back of indicator.

(2) Connect test equipment as shown in figure 1 with decade resistor (A6) controls set to 200K ohms.

(3) Adjust DC power supply (A2) for +50 uadc on TI nullmeter (SAS1). Digital multimeter (A) will indicate between 45 and 55 mvdc.

(4) Adjust DC power supply for +25 uadc on TI nullmeter (SAS1). Digital multimeter will indicate between 20 and 30 mvdc.

(5) Adjust DC power supply for Null position on TI nullmeter (SAS1). Digital multimeter will indicate ZERO.

(6) Repeat technique (3) thru (5) above after changing polarity of test leads from back of TI nullmeter (SAS1). Digital multimeter will indicate negative readings in step (3) and (4) above.

(7) Connect TI nullmeter (SAS1) leads to back of indicator.

(8) Disconnect TI nullmeter (SAS2) leads from back of indicator and connect test equipment as shown in figure 1.

(9) Repeat technique (3) thru (6) above for the TI nullmeter (SAS2). Digital multimeter will indicate within the limits specified for each check.

(10) Connect TI nullmeter (SAS2) leads to back of indicator and disconnect test equipment.

b. Adjustments. No adjustments can be made.

9. Power Supply and Bite Voltages. (Not Modified Circuit).

a. Performance Check.

(1) Set TI POWER switch to OFF.

(2) Connect digital multimeter (A4) leads (B6) to the TI terminal board TB 4-10 (HI) and 5 (LOW)

(3) Set digital multimeter RANGE switches to 50 vdc.

(4) Set TI POWER to ON.

(5) Digital multimeter will indicate between 27.5 and 28.5 vdc. If not, perform b(1) below as shown in figure 2.

(6) Set TI SYSTEM SELECT to SAS1 and LINK TEST to CROSS FDBK. Observe TI DVM for an indication of 00.00 +00.01. If not, perform b(2) below.

(7) Set TI POWER to OFF.

(8) Disconnect digital multimeter lead from TI terminal board TB 4-10 (HI) and reconnect to TB 4-8(HI).

(9) Set TI POWER to ON.

(10) Digital multimeter will indicate between -19.0 and -21.00 vdc. Record reading.

(11) Position TI controls as listed from (a) and (b) below:

(a) SYSTEM SELECT to BITE.

(b) BITE to -20 v position.

(12) TI DVM will indicate the reading within ±00.01 of the digital multimeter reading recorded in step (10) above. If not, perform b(3) below.

(13) Set TI POWER to OFF.

(14) Disconnect digital multimeter lead from TI terminal board TB 4-8 (HI) and reconnect to TB 4-9 (HI).

(15) Set TI BITE to +20 v position.

(16) Set TI POWER on ON.

(17) Digital multimeter will indicate between 19 and 21 vdc. Observe indication on TI DVM between 19.00 and 21.00.

(18) Set TI POWER to OFF.

(19) Disconnect digital multimeter lead from TI terminal board TB 4-9 (HI) and reconnect to TB 4-12 (HI).

(20) Set TI POWER to ON.

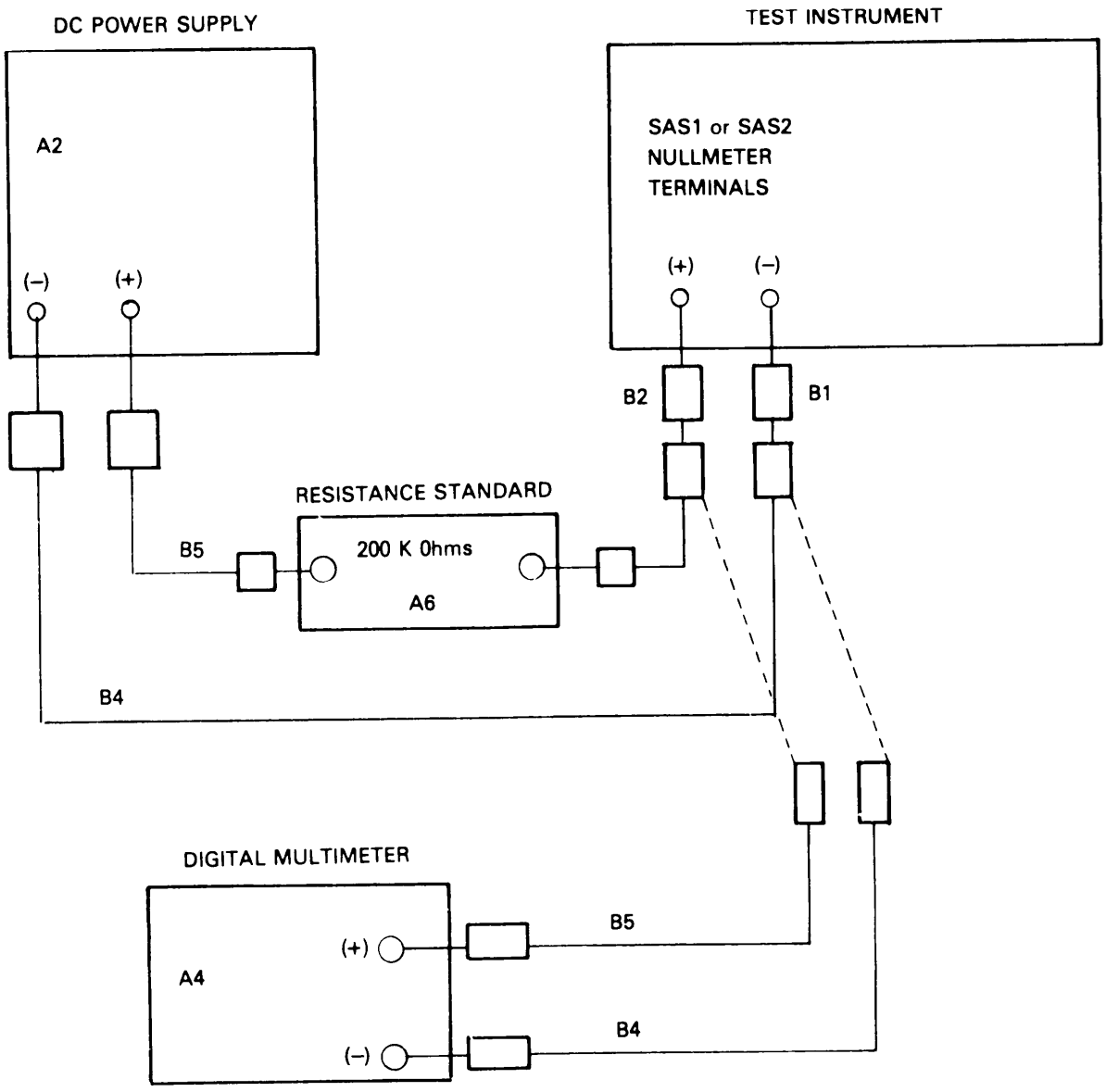
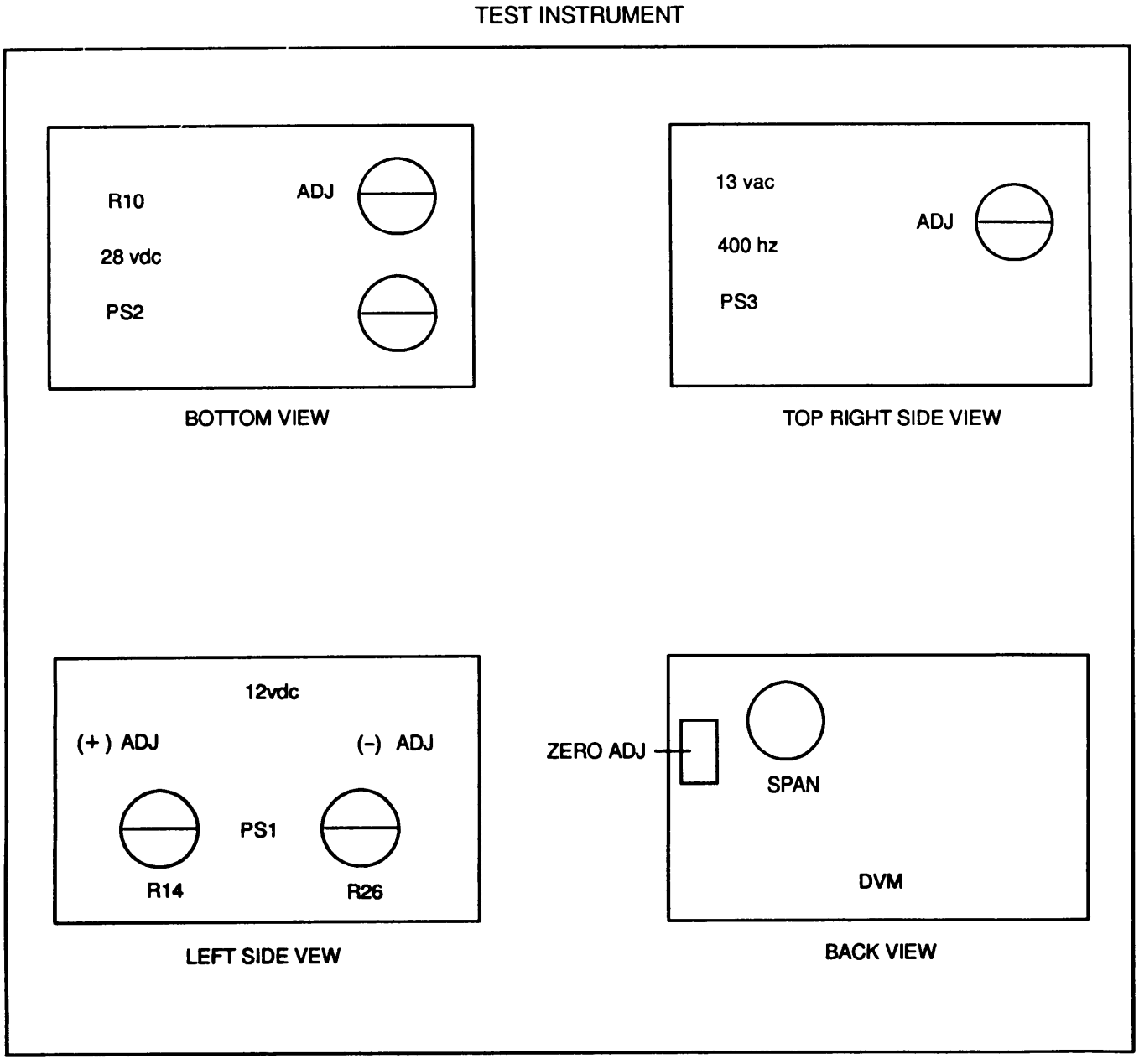


Figure 1. Nullmeter SAS1 or SAS2 Equipment Setup.



NOTE:
IF NOT MODIFIED USE R10,
R14, R26 AND ZERO ADJUST
IF MODIFIED TEST SET,USE
R13, R14, R26 AND -20 VDC ON THE DVM

Figure 2. DVM and Bite Voltages Adjustment Location.

(21) Set TI BITE switch to -12 v position. Digital multimeter will indicate between -11.5 and -12.5 vdc. If not, perform b(4) below as shown in figure 2.

(22) TI DVM will indicate between -11.50 and -12.50.

(23) Set TI POWER to OFF.

(24) Disconnect digital multimeter lead from TI terminal board TB 4-12 (HI) and reconnect to TB 4-11 (HI).

(25) Set TI BITE switch to + 12 v position.

(26) Set TI POWER to ON.

(27) Digital multimeter will indicate between 11.5 and 12.5 vdc. If not, perform b(5) below as shown in figure 1.

(28) TI DVM will indicate between 11.50 and 12.50.

(29) Set TI POWER to OFF.

(30) Disconnect digital multimeter lead from TI terminal board TB 4-11 (HI) and reconnect to TB 4-6 (HI).

(31) Set TI BITE switch to 5 v position.

(32) Set TI POWER to ON.

(33) Digital multimeter will indicate between 4.7 and 5.3 vdc. Observe indication on TI DVM between 4.70 and 5.30.

(34) Set TI POWER to OFF.

(35) Disconnect digital multimeter leads (B6) from TI terminal board TB 4-6(HI) and TB 4-5 (LOW) and reconnect to EXTERNAL METER jacks, using leads (B7) and (B8).

(36) Connect Electronic Counter (A3) leads (B3) to the digital multimeter leads.

(37) Set digital multimeter RANGE switches to 20 vac.

(38) Position TI controls (a) thru (c) as follows:

(a) EXTERNAL METER SELECT to REF and SYSTEM SELECT to BITE.

(b) BITE to 13 RMS.

(C) POWER to ON.

(39) Digital multimeter will indicate between 12.5 and 13.5 vac. Electronic Counter will indicate between 395 and 405 Hz. If not, perform b(6) below as shown in figure 2.

(40) TI DVM will indicate between 12.50 and 13.50.

NOTE

For SAS1 or SAS2 SELF and CROSS BITE checks, the FEEDBACK SELECT switch for the system must be set to the opposite function.

(41) Set digital multimeter RANGE switches to 20 vac.

(42) Position TI controls (a) thru (f) as follows:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS1 to SELF FDBK.

(c) BITE to SAS1 SELF.

(d) POWER to ON.

(e) PRESS TI SAS1 FEEDBACK SELECT to CROSS.

(f) FUNCTION SELECT to CLSD LOOP.

(43) Digital multimeter will indicate between .8 and 1.0 vac. Observe TI DVM for an indication between .8 and 1.0.

(44) Set TI POWER to OFF.

(45) Position TI controls (a) thru (e) as follows:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS1 to CROSS FDBK.

(c) BITE to SAS1 CROSS.

(d) POWER to ON.

(e) PRESS TX SAS1 FEEDBACK SELECT to SELF.

(46) Digital multimeter will indicate between .8 and 1.0 vac. Observe TI DVM for an indication between .8 and 1.0.

(47) Set TI POWER to OFF.

(48) Disconnect digital multimeter leads from TI EXTERNAL METER JACKS SAS1 and connect to EXTERNAL METER JACKS SAS2.

(49) Position TI controls (a) thru (f) as follows:

(a) SYSTEM SELECT to BITE.

(b EXTERNAL METER SELECT SAS2 to SELF FDBK.

(c) BITE to SAS2 SELF.

(d) POWER to ON.

(e) PRESS TI SAS2 FEEDBACK SELECT to CROSS.

(f) FUNCTION SELECT to CLSD LOOP.

(50) Digital multimeter will indicate between .8 and 1.0 vac. Observe TI DVM for an indication between .8 and 1.0.

(51) Set TI POWER to OFF.

(62) Position TI controls (a) thru (e) below:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS2 to CROSS FDBK.

(c) BITE to SAS2 CROSS.

(d) POWER to ON.

(e) PRESS TI SAS2 FEEDBACK SELECT to SELF.

(53) Digital multimeter will indicate between .8 and 1.0 vac. Observe TI DVM for an indication between .8 and 1.0.

(54) Set TX POWER to OFF and disconnect test equipment.

b. Adjustments.

(1) Adjust TI 28 vdc power supply PS2 potentiometer R10 for 28 vdc indication on digital multimeter (R).

(2) Remove bracket from TI DVM and adjust TI DVM ZERO adjust on left side of indicator for 00.00 on TI DVM (R).

(3) Remove bracket from TI DVM if necessary and adjust TI DVM SPAN (R1) adjust on back of indicator for the reading recorded in 8a(10) above on TI DVM (R).

NOTE

TEST SET has been Modified and Calibration Procedure Specifications have been Changed. Modified Test Set Only.

10. Power Supply and Bite Voltages (Modified Test Set Circuit).

a. Performance Check.

(1) Set TI POWER switch to OFF.

(2) Connect digital multimeter (A4) leads B6) to the TI terminal board TB 4-10 (HI) and TB 4-4 (LOW).

(3) Set digital multimeter RANGE switches to 50 vdc.

(4) Set TI POWER to ON.

(5) Digital multimeter will indicate between 27.5 and 28.5 vdc. If not, perform b(1) below as shown in figure 2.

(6) Set TI POWER to OFF.

(7) Disconnect digital multimeter lead from TI terminal board TB 4-10 (HI) and reconnect to TB 4-8 (HI).

(8) Set TI POWER to ON.

(9) Digital multimeter will indicate between -19.25 and -19.75 vdc. Record reading.

(10) Position TI controls as listed from (a) and (b) below:

(a) SYSTEM SELECT to BITE.

(b) BITE to -20 v position.

(11) TI DVM will indicate the reading within ±0.2% plus 10 counts maximum meter fluctuation of the digital multimeter reading recorded in step (9) above. If not, perform b(2) and (3) below.

(12) Set TI POWER to OFF.

(13) Disconnect digital multimeter lead from TI terminal board TB 4-8 (HI) and reconnect to TB 4-9 (HI).

(14) Set TI BITE to +20 v position.

(15) Set TI POWER to ON.

(16) Digital multimeter will indicate between 19.25 and 19.75 vdc. Observe indication on TI DVM between 19.25 and 19.75.

(17) Set TI POWER to OFF.

(18) Disconnect digital multimeter lead from TI terminal board TB 4-9 (HI) and reconnect to TB4-12 (HI).

(19) Set TI POWER to ON.

(20) Set TI BITE switch to -12 v position.

(21) Digital multimeter will indicate between -11.88 and -12.12 vdc. Record reading.

(22) TI DVM will indicate the reading within ±0.2% plus maximum meter fluctuation of digital multimeter reading recorded in step (21). If not, perform b(4) below.

(23) Set TI POWER to OFF.

(24) Disconnect digital multimeter lead from TI terminal board TB 4-12 (HI) and reconnect to TB 4-11 (HI).

(25) Set TI BITE switch to +12v position.

(26) Set TI POWER to ON.

(27) Digital multimeter will indicate between 11.88 and 12.12 vdc. Record reading. TI will indicate the reading within ±0.2% plus 10 counts of meter fluctuation of the digital multimeter recorded in Step (27). If not, perform b(5) below.

(28) Set TI POWER to OFF.

(29) Disconnect digital multimeter lead from TI terminal board TB 4-11 (HI) and reconnect to TB 4-6 (HI).

(30) Set TI BITE switch to 5 v position.

(31) Set TI POWER to ON.

(32) Digital multimeter will indicate between 4.75 and 5.25 vdc. Observe indication on TI DVM between 4.75 and 5.25.

(33) Set TI POWER to OFF.

(34) Disconnect digital multimeter leads (B6) from TI terminal board TB 4-6 (HI) and TB 4-5 (LOW) and reconnect to EXTERNAL METER jacks, using leads (B7) and (B8).

(35) Connect Electronic Counter (A3) leads (B3) to the digital multimeter leads.

(36) Set digital multimeter RANGE switches to 20 vac.

(37) Position TI controls (a) thru (c) as follows:

(a) EXTERNAL METER SELECT to REF and SYSTEM SELECT to BITE.

(b) BITE to 13 RMS.

(c) POWER to ON.

(38) Digital multimeter will indicate between 12.97 and 13.20 vac. Record reading. TI DVM will indicate the reading within ±0.8% plus 4 counts of maximum meter fluctuation of digital multimeter reading recorded in step (38). If not, perform b (6) below as shown in figure 2. (Modified Test Set).

(39) Electronic Counter will indicate between 395 and 405 Hz.

(39A) Set TI Power to OFF.

(40) Set digital multimeter RANGE switches to 20 vac.

(41) Position TI controls (a) thru (f) as follows:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS1 to SELF FDBK.

(c) BITE to SAS1 SELF.

(d) POWER to ON.

(e) PRESS TI SAS1 FEEDBACK SELECT to SELF.

(f) FUNCTION SELECT TO CLSD LOOP.

(42) Digital multimeter will indicate between 0.95 and 1.05 vac. Observe TI DVM for an indication between 0.95 and 1.05. Nullmeter will indicate 10 ± 1 minor division to the right.

(43) Set TI POWER to OFF.

(44) Position TI controls (a) thru (e) as follows:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS1 to CROSS FDBK.

(c) BITE to SAS1 CROSS.

(d) POWER to ON.

(e) PRESS TI SAS1 FEEDBACK SELECT to CROSS.

(45) Digital multimeter will indicate between 0.95 and 1.05 vac. Observe TI DVM for an indication between 0.95 and 1.05. Nullmeter will indicate 10 ± 1 minor division to the right.

(46) Set TI POWER to OFF.

(47) Disconnect digital multimeter leads from TI EXTERNAL METER JACKS SAS1 and reconnect to EXTERNAL METER JACKS SAS2.

(48) Position TI controls (a) thru (f) as follows:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS2 to SELF FDBK.

(c) BITE to SAS2 SELF.

(d) POWER to ON.

(e) PRESS TI SAS2 FEEDBACK SELECT to SELF.

(f) FUNCTION SELECT TO CLSD LOOP.

(49) Digital multimeter will indicate between 0.95 and 1.05 vac. Observe TI DVM for an indication between 0.95 and 1.05. Null meter will indicate 10 ± 1 minor division to the right.

(50) Set TI POWER to OFF.

(61) Position TI controls (a) thru (e) below:

(a) SYSTEM SELECT to BITE.

(b) EXTERNAL METER SELECT SAS2 to CROSS FDBK.

(c) BITE to SAS2 CROSS.

(d) POWER to ON.

(e) PRESS TI SAS2 FEEDBACK SELECT to CROSS.

(52) Digital multimeter will indicate between 0.95 and 1.05 vac. Observe TI DVM for an indication between 0.95 and 1.05. Nullmeter will indicate 10 ± 1 minor division to the right.

(53) Set TI POWER to OFF and disconnect test equipment.

b. Adjustments.

(1) Adjust TI 28 vdc power supply PS2 potentiometer R13 for 28 vdc indication on digital multimeter (R).

(2) Set BITE switch to -20 vdc.

(3) Remove bracket from TI DVM if necessary and adjust TI DVM SPAN (R1) adjust on back of indicator for the reading recorded in 10a(9) above on TI DVM (R).

(4) Adjust TI -12 vdc power supply PS 1 potentiometer R26 for -12 vdc indication on digital multimeter (R).

(5) Adjust TI + 12 vdc power supply PS 1 potentiometer R14 for + 12 vdc indication on digital multimeter (R).

(6) Remove cover from TI 400 Hz power supply PS3 adjustment and adjust for 13 vac indication on digital multimeter (R).

NOTE

Test Set Modified and Calibration Procedure Specifications have been changed. Modified Test Set Only.

11. SAS1 and SAS2 L V DT Voltages (Modified Circuit).

a. Performance Checks

(1) Connect test equipment as shown in figure 3. Place TI controls as follows:

(a) SYSTEM SELECT to SAS1.

(b) FEEDBACK SELECT TO SELF.

(c) EXTERNAL METER SELECT to SELF FDBK.

(d) FUNCTION SELECT to CLSD LOOP.

(e) LINK TEST switch to SELF FDBK.

(2) Adjust the Wave-Tek Generator (A5) until the Digital Multimeter (A4) indicates .010 vac± 0.001 vac. TI will indicate ±0.0001 of the Digital Multimeter. If not, perform b below as shown in figure 4.

(3) Adjust Wave-Tek Generator until Digital Multimeter indicates between 0.95 and 1.05 vac and needle in the SAS1 Nullmeter points to the right.

(4) TI DVM willindicate the same as Digital Multimeter within ±0.8% plus 6 counts maximum meter fluctuation. SAS1 Nullmeter wll indicate between 7.5 and 12.5.

(5) Adjust Wave-Tek Generator until the meter pointer on the SAS1 Nullmeter moves further to the right until decimal point displayed on TI DVM just shifts one place to the right.

(6) Adjust Wave-Tek Generator until the Digital Multimeter indicates between 1.95 and 2.05 vac and needle in the SAS 1 Nullmeter points to the right.

(7) TI DVM will indicate the same as Digital Multimeter within ± 0.8% plus 6 counts maximum meter fluctuation. SAS 1 Nullmeter will indicate between 17.5 and 22.5 (needle points to right).

(8) Adjust Wave-Tek Generator until the Digital Multimeter indicates between 0.38 and 0.42 vac and SAS Nullmeter indicates to the right.

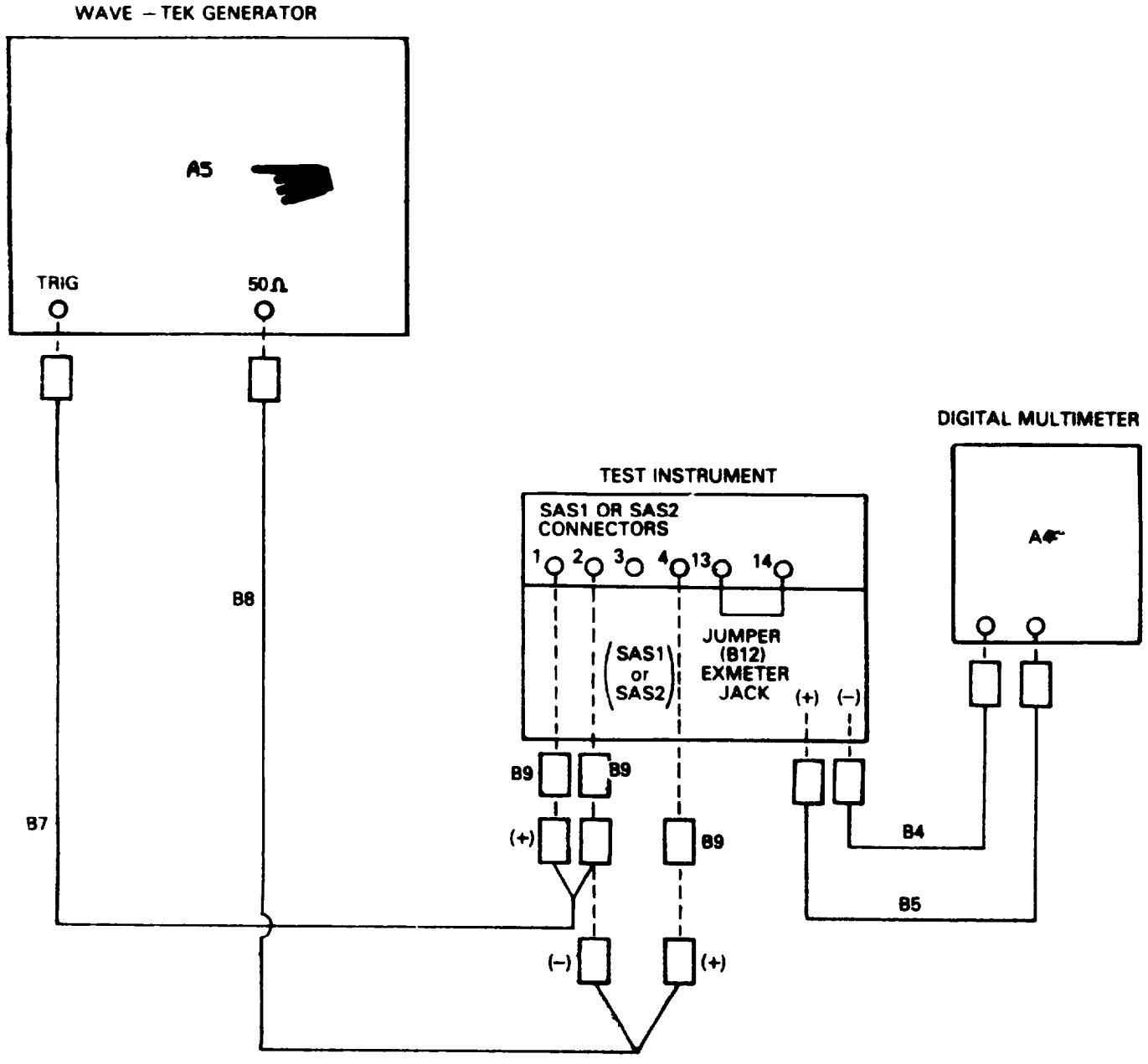
(9) TI DVM will indicate within 0.8% plus 6 counts maximum meter fluctuation of the reading on the Digital Multimeter.

(10) Push the SAS X 10 meter button and observe that Nullmeter indicates between 35.0 and 45.0 (needle points to right). Depress SAS1 X 10 meter button to obtain a Null reading on Nullmeter.

(11) TI DVM will indicate within ±0.8 mv of the external DMM (with a maximum meter fluctation of 4 counts). The external DMM will read less than or equal to 17 MVAC. The null meter will read 0 ± 1 minor division.

(12) Repeat technique steps (2) thru (11) for the SAS2 meter circuit.

b. Adjustments. Adjust Null adjust R23 until TI DVM indicates within ± 0.0001 of the Digital Multimeter.



NOTE: MODIFED TEST SET CIRCUIT

Figure 3. SAS1 or SAS2 - LVDT-Equipment Setup.

NOTE:
MODIFIED TEST
SET CIRCUIT

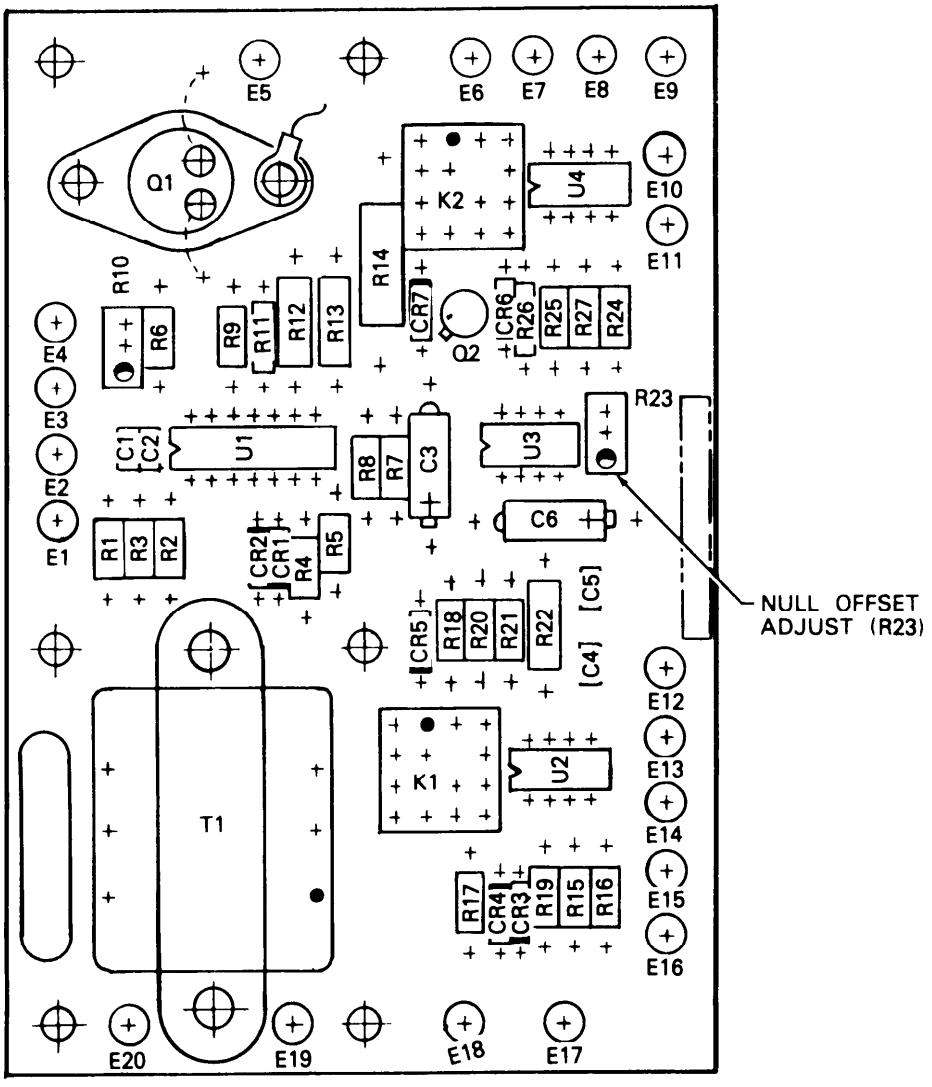


Figure 4. Precision Rectifier Circuit Card - Adjustment Location.

12. Pressure Gages.

a. Performance checks.

NOTE

Hydraulic oil MIL-M-5606 used in TI and Hydraulic oil MIL-L-7870A used in dead weight tester are not compatible. TI pressure gages will have to be cleaned out before and after calibration. If tee connectors are removed from TI pressure gages extreme care should be taken when tightening and mounting gages back in hydraulic unit. (Position of tee connectors should be observed when removing from mounting holes.)

(1) Observe that all TI switches are OFF and valves are in CLOSED position.

(2) Set TI SHUTOFF to OPEN.

(3) Remove the 12 (HEX) screws from TI panel and pull out hydraulic unit.

(4) Disconnect TI low pressure gage (0 - 600 psi) from hydraulic lines and remove from hydraulic unit. (Remove front panel cover around gage for excess to mounting bolts.)

(5) Connect dead weight tester (A7) to the TI low pressure gage.

(6) Place enough weights (supplied with pressure gage tester) on the appropriate pressure piston to obtain a pressure equal to 50 psi.

CAUTION

To avoid scoring the piston guide and damage to the dead weight cylinder, constantly rotate the weights and piston when inserting or removing the piston or when applying pressure. Do not remove weights when pressure is applied to dead weight cylinder.

(7) Using the hand pump, apply pressure to dead weight cylinder until the piston is approximately 9/16 inch above the dead weight cylinder. TI low pressure gage will indicate between 45.0 and 55.0 psi.

(8) Visually inspect the equipment connections for leakage. If leakage appears, release pressure and tighten or seal connections as required.

(9) Place appropriate weights on the dead weight tester to provide normal pressure corresponding to 100, 200, 300, 400, and 500 psi. TI low pressure gage will indicate within + 5 psi of nominal pressure generated by the dead weight tester for each indication.

(10) Disconnect dead weight tester from TI low pressure gage and reinstall in hydraulic unit.

(11) Disconnect TI high pressure gage (0 - 5000 psi) from hydraulic lines and remove from hydraulic unit and connect dead weight tester to the TI high pressure gage. Remove front panel cover around gage for excess to mounting bolts.)

(12) Repeat technique (6) thru (8) above, using applied pressure from dead weight tester of 500, 1500, 2500, 3500, and 4500 psi. TI high pressure gage will indicate within ±50 psi of nominal pressure generated by the dead weight tester for each indication.

(13) Disconnect dead weight tester from TI high pressure gage and reinstall in hydraulic unit.

b. Adjustments. No adjustments can be made.

13. Force Gage.

a. Performance check.

(1) Remove TI force gage from top of hydraulic top case.

(2) Attach weight holder (B11) to bottom side of TI force gage and record tare weight.

(3) Attach weights (A8) to the TI force gage weight holder to equal 10 lbs. TI force gage will indicate the reading within ±1 division plus tare weight.

(4) Attach weights to the TI force gage weight holder to equal 30, 60, and 75 lbs. TI force gage will indicate the reading within ±1 division for each applied weight plus tare weight.

b. Adjustment. No adjustment can be made.

14. Dial Indicators. See TB 9-5210-210-50.

a. Performance Check. DELETE.

b. Adjustments. DELETE.

U.S. GOVERNMENT PRINTING OFFICE: 1994 - 555-028/00224

15. Final Procedure.

a. De-energize and disconnect all equipment and reinstall protective cover on TI

b. When all parameters are within tolerance, annotate and affix DA Label 80 (US Army Calibrated Instrument). When the TI receives limited or special calibration, annotate and affix DA Label 163 (US Army Limited or Special Calibration). When the TI cannot be adjusted within tolerance, repair the TI in accordance with the maintenance manual. When repair is delayed for any reason or the TI cannot be repaired with local resources, annotate and affix DA Form 2417 (US Army Calibration System Rejected Instrument) and inform the owner/user accordingly in accordance with TB 750-25.

☆U.S. GOVERNMENT PRINTING OFFICE: 1992 - 654-028/60418

These are the instructions for sending an electronic 2028

The following format must be used if submitting an electronic 2028. The subject line must be exactly the same and all fields must be included; however only the following fields are mandatory: 1, 3, 4, 5,6, 7, 8, 9, 10, 13, 15, 16, 17, and 27.

From: "Whomever"<whomever@avma27.army.mil>
To: mpm%avma28@st-louis-emh7.army.miI

Subject: DA Form 2028

1. ***From:*** Joe Smith
2. *Unit:* home
3. ***Address:*** 4300 Park
4. ***City:*** Hometown
5. ***St:*** MO
6. ***Zip:*** 77777
7. ***Date Sent:*** 19-OCT-93
8. ***Pub no:*** 55-2840-229-23
9. ***Pub Title:*** TM
10. ***Publication Date:*** 04-JUL-85
11. *Change number:* 7
12. *Submitter Rank: MSG*
13. ***Submitter FNamte:*** Joe
14. *Submitter MName:* T
15. ***Submiter LName:*** Smith
16. ***Submitter Phone:*** 123-123-1234
17. ***Problem:*** 1
18. *Page:* 2
19. *Paragraph:* ***3***
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure: 7*
24. *Table:* 8
25. *Item: 9*
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

*U.S. GOVERNMENT PRINTING OFFICE: 1996 - 755-025/40274

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
CDR, 1st Br, 65th ADA
ATTN: SP4 J. Brown
Key West, FL 33040

DATE SENT
10 Jun 79

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 9-1430-550-34-1	7 Sep 72 .	Unit of Radar Set AN/MPQ-50 Tested at the HFC

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
9-19		9-5	
21-2	step 1C	21-2	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

"B" Ready Relay K11 is shown with two #9 contacts. That contact which is wired to pin 8 of relay K16 should be changed to contact #10.

Reads: Multimeter B indicates 600 K ohms to 9000 K ohms.

Change to read: Multimeter B indicates 600 K ohms minimum.

Reason: Circuit being checked could measure infinity. Multimeter can read above 9000 K ohms and still be correct.

SAMPLE

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER
SP4 J.T. Brown, Jr.

SIGN HERE
SP4 James Brown, Jr.

DA FORM 2 JUL 79 2028-2 REPLACES DA FORM 2028-2 1 APR 78 WHICH WILL BE USED UNTIL EXHAUSTED

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

TEAR ALONG PERFORATED LINE

REVERSE OF DA FORM 2028-2 Reverse of DRSTS-M Overprint 2, 1 Nov 88

TEAR ALONG PERFORATED LINE

FILL IN YOUR UNIT'S ADDRESS

FOLD BACK

DEPARTMENT OF THE ARMY

OFFICIAL BUSINESS

Commander
US Army Aviation Systems Command
ATTN: AMSAV-MC
4300 Goodfellow Boulevard
St. Louis, MO 63120-1798

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SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TB 55-4920-428-35	19 July 1988	CALIBRATION PROCEDURE FOR CH-47 ILCA BENCH TEST SET

BE EXACT PIN-POINT WHERE IT IS

PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

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St. Louis, MO 63120-1798

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TEAR ALONG PERFORATED LINE

The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 dekagram = 10 grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pound-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C

PIN: 053901-003