

TECHNICAL MANUAL

**ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT, AND
DEPOT MAINTENANCE MANUAL**

**TEST SET, STABILIZATION EQUIPMENT TS-1894/ASM
(PART NO. 114E5987-4, NSN 4920-00-959-6125)
(PART NO. 114E5987-8, NSN 4920-00-133-7834)**

**This copy is a reprint which includes current pages from
Changes 1 through 4. The title was changed to read as
shown above by Change 4.**



**ORGANIZATIONAL, DIRECT SUPPORT, GENERAL SUPPORT,
 AND DEPOT MAINTENANCE MANUAL
 TEST SET, STABILIZATION EQUIPMENT TS-1894/ASM
 (PART NO. 114E5987-4. NSN 4920-00-959-6125)
 (PART NO. 114E5987-8. NSN 4920-00-133-7834)**

		Page
SECTION I.	INTRODUCTION AND DESCRIPTION	
1-1	General	1
1-2	Scope	1
1-2.1	Indexes of publications	1
1-2.2	Forms and records	1
1-2.3	Reporting of errors	1
1-2.4	Reporting of equipment improvement recommendation (EIR)	1
1-2.5	Administrative storage	1
1-2.6	Destruction of Army electronics materiel	1
1-3	Purpose of equipment	1
1-5	Adapter switch operation	2
1-5.1	Items comprising an operable equipment	2
1-6	Description of equipment	2
1-12	Theory of operation	3
1-14	Channel test circuits	3
1-15	Roll channel	3
1-16	Pitch channel	4
1-17	Yaw channel	4
1-18	Actuator simulator	5
1-21	Phase inverter	5
1-22	Chopper.....	6
1-23	Preamplifier and filter	6
1-24	Amplifier	7
1-25	Axis meter rectifier	7
1-26	External card test circuits	8
1-27	Demodulator-modulator card test circuit	8
1-28	Amplifier card	9
1-29	Amplifier card test circuit	10
1-30	Function meter circuits	13
1-31	Dc metering circuits	13
1-32	Ac metering circuits	14
1-33	Function meter rectifier	14
1-34	Miscellaneous test circuits	14
1-35	ASE mode	14
1-36	Half-gain mode.....	14
1-37	Power supplies	15
1-38	Ac power circuit.....	15
1-39	Dc power circuit	15
1-40	Pneumatic system	15
II.	SPECIAL SERVICE TOOLS	
2-1	Special service tools	23
III.	PREPARATION FOR USE, STORAGE, OR SHIPMENT	
3-1	Unpacking and inspection	25
3-2	Preparation for use	25
3-3	Preparation for storage	25
3-4	Preparation for shipment	25
IV.	OPERATING INSTRUCTIONS	
4-1	General	27
4-3	SAS component tests	27

	Page
SECTION IV.	
4-4 Preliminary procedures	27
4-6 SAS amplifier testing procedures	27
4-8 Channel tests using a rate table	27
4-9 Airspeed and sideslip tests	31
4-10 ASE mode tests	32
4-11 Excitation voltage tests	32
4-12 Interlock voltage tests	32
4-13 Pedal position variable resistor feedback voltage test	32
4-14 Internal test circuits	32
4-15 Printed-wiring circuit board (card) tests	33
4-17 Demodulator-modulator card	33
4-18 Amplifier card	33
4-19 Calibration card	33
4-20 Stopping procedure	33
4-22 Use of connector tools	35
V. PERIODIC INSPECTION, MAINTENANCE AND LUBRICATION	
5-1 Scope of maintenance	39
5-2 Preventive maintenance	39
5-2.1 Systematic care	39
5-2.2 Preventive maintenance checks and services	39
5-2.3 Preventive maintenance checks and services periods	39
5-2.4 Daily preventive maintenance checks and services chart	40
5-2.5 Weekly preventive maintenance checks and services chart	41
5-2.6 Quarterly preventive maintenance checks and services chart	41
5-2.7 Cleaning	43
5-2.11 Touchup painting	43
5-3 Lubrication	43
5-4 Adjustments	43
VI. TROUBLESHOOTING AND PARTS REPLACEMENT	
6-1 Troubleshooting procedures	45
6-2 General	45
6-3 Test equipment required	45
6-4 Troubleshooting tables	45
6-5 Parts replacement	45
6-7 Replacement of air pump assembly	45
6-8 Replacement of regulator valves	45
6-9 Replacement of tube assemblies	49
6-10 Replacement of air gages	49
6-11 Replacement of printed circuit cards	53
6-12 Repairs	53
6-13 Card repairs	53
6-14 Connector repairs	58
6-15 Selection of values for actuator simulator card capacitor C607 and resistor R648	58
6-16 Selection of value for amplifier card resistor R9	60
VII. DEPOT OVERHAUL STANDARDS	
7-1 Applicability of depot overhaul standards	65
7-2 Applicable references	65
7-3 Test facilities required	65
7-4 Preliminary procedures	65
7-5 Ac power supply circuit and meter rectifier circuit test	65
7-6 Dc power supply circuit test	66
7-7 Metering circuit tests	66
7-8 Actuator simulator tests	67
7-9 Internal amplifier card circuit test 70	70
7-10 External AMPLIFIER CARD TESTER circuit test	70
7-11 External DEM/MOD CARD TESTER circuit test	70
7-12 Half-gain circuits test	71
7-13 Pneumatic components test	71
7-14 Adapter circuits test	71
7-15 Stopping procedures	72
APPENDIX I. REFERENCES	75
II. BASIC ISSUE ITEMS LIST (BIIL) AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST (ITIAL) (Not Applicable)	
III. MAINTENANCE ALLOCATION	79
IV. ILLUSTRATED PARTS BREAKDOWN	83

Figure No.	LIST OF ILLUSTRATIONS	Page
1-1	SAS bench test set	iv
1-1.1	SAS bench test set adapter	v
1-2	Actuator-simulator card, schematic diagram	11
1-3	Amplifier card, schematic diagram	13
1-4	Function meter circuits, simplified schematic	15
1-5	Test Set, schematic diagram	15
1-6	Pneumatic system, schematic diagram	16
1-7	Adapter, schematic	17
3-1	Test set with mounting studs extended	26
4-1	Front panel, test set	28
4-2	Test setup	32
4-3	Connector contact tools	34
6-1	SAS bench test set, wiring diagram	53
6-2	Actuator-simulator card, wiring diagram	54
6-3	Amplifier card, wiring diagram	55
6-4	Adapter, wiring diagram	56
6-5	Left-rear view, SAS bench test set	57
6-6	Actuator-simulator card, test setup	58
6-7	Balance resistors location	59
7-1	Test device, simulated torque motor voltages	68
9-1	SAS bench test set, exploded view (sheet 1)	83
9-1	SAS bench test set, exploded view (sheet 2)	84
9-1	SAS bench test set, exploded view (sheet 3)	85
9-2	SAS bench test set component boards (sheet 1)	93
9-2	SAS bench test set component boards (sheet 2)	94
9-3	SAS bench test adapter	102

Table No.	LIST OF TABLES	Page
1-1	Equipment supplied	2
4-1	Controls	29
4-2	Indicators	30
4-3	Receptacles	31
4-4	Voltages at main connector test points	35
6-1	Meter test circuit troubleshooting	46
6-2	Internal and external card test circuit troubleshooting	49
6-3	Miscellaneous test circuit troubleshooting	50
6-4	DC resistance of transformers	53
6-5	Equipment required to fabricate test setup	60
7-1	AIRSPEED indicator test	71
7-2	DIFF. PRESSURE indicator test	71

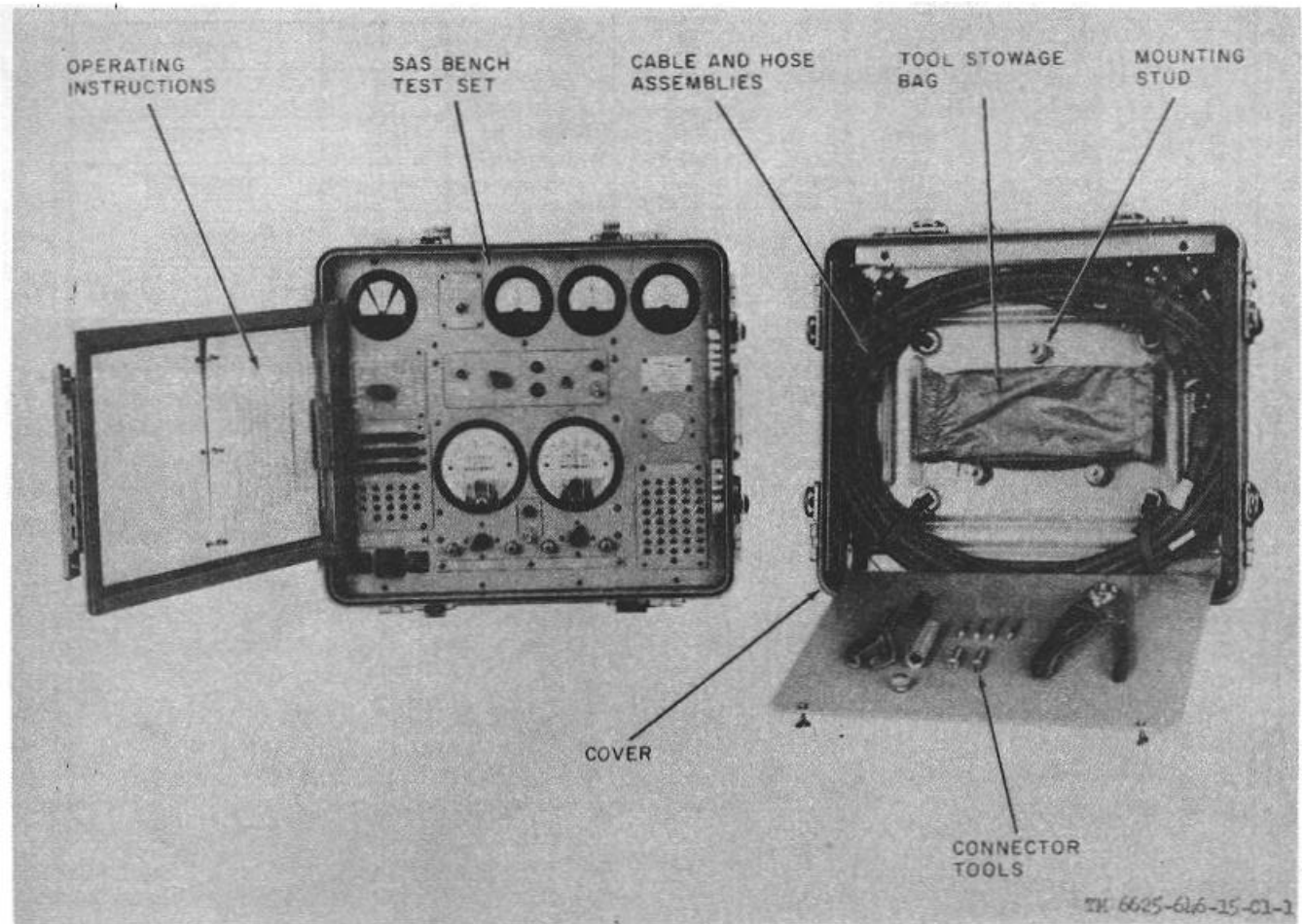


Figure 1-1. SAS bench test set.

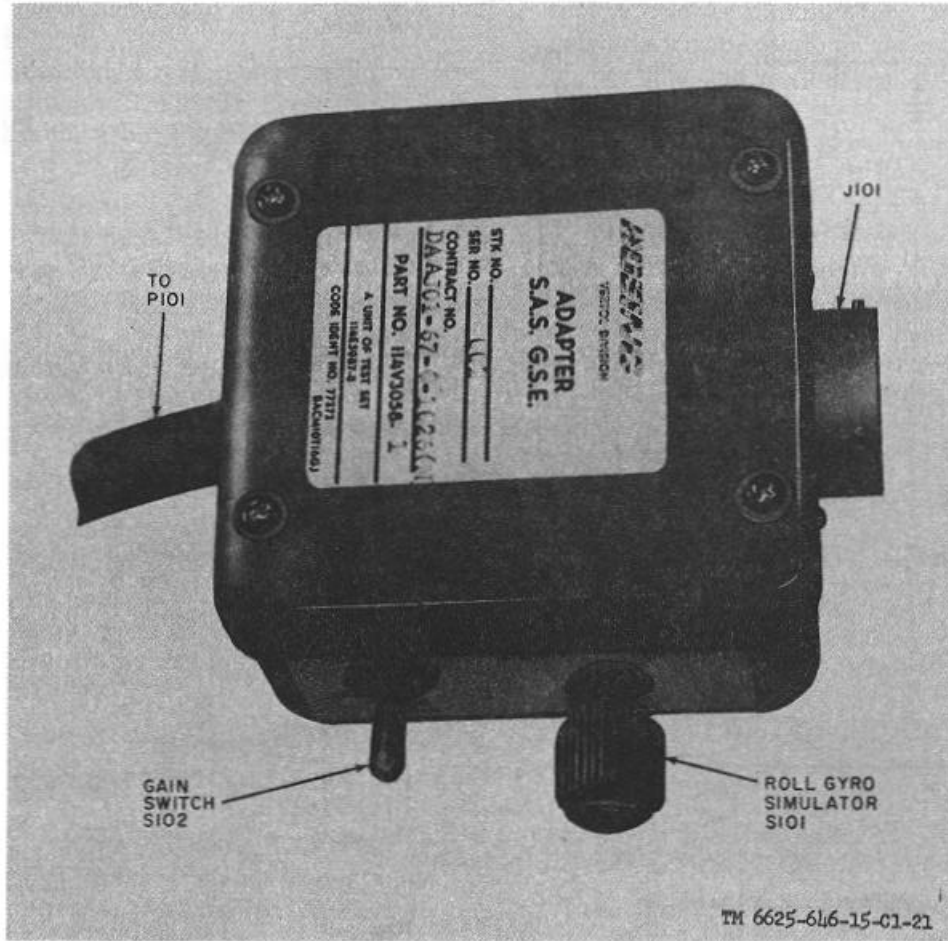


Figure 1-1.1 SAS bench test set adapter.

SECTION I INTRODUCTION AND DESCRIPTION

1-1. General

1-2. Scope

This manual describes Test Set, Stabilization Equipment TS-1894/ASM (fig. 1-1) and provides instruction for operation, maintenance, and functioning of the equipment. It includes the maintenance allocation chart and illustrated parts breakdown. Unless otherwise indicated, all references to the TS-1894/ASM apply to SAS Bench Test Set part Nos. 114E5987-4 and 114E5987-8.

1-2.1. Indexes of Publications

a. *DA Pam 310-4.* Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.

b. *DA Pam 310-7.* Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.

1-2.2. Forms and Records

a. *Reports of Maintenance and Unsatisfactory Equipment.* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. *Report of Packaging and Handling Deficiencies.* Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 70058/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29B, and DLAR 4145.8.

c. *Discrepancy in Shipment Report (DISREP) (SF 361).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C and DLAR 4500.15.

1-2.3. Reporting of Errors

You can help improve this manual by calling attention to errors and by recommending improvements and stating your reasons for the recommendations. Your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) should be mailed direct to Commander, US Army Communications & Electronics Materiel Readiness Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

1-2.4. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA Form 2407, (Maintenance Request). Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Electronics Command, ATTN: DRSEL-MA-Q, Fort Monmouth, NJ 07703. A reply will be furnished direct to you.

1-2.5. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1.

1-2.6. Destruction of Army Electronics Materiel

Destruction of Army electronics materiel to prevent enemy use shall be in accordance with TM 750-244-2.

1-3. Purpose of Equipment

1-4.

The test set tests the Stability Augmentation System (SAS) amplifier installed in CH-47 helicopters. The test set determines that a SAS amplifier or its plug-in cards perform according to minimum serviceability standards. Test cables and receptacles and air pressure connections are provided for SAS amplifier tests. In test set 114E5987-8, adapter 114V3058-1 (roll gyro simulator) is provided. Three CARD TESTER receptacles, marked DEM/MOD, AMPLIFIER, and CALIBRATION, are installed on the front panel. In addition, test points (test jacks) are provided for measuring input, output, and signal voltages at the receptacle of the SAS amplifier. Test jacks are also provided for measuring resistances or checking relay operation on its plug-in calibration card.

1-5. Adapter Switch Operation

An adapter switch is located behind a warning instruction panel on the front panel. The switch is factory-set at B for testing CH-47 SAS amplifiers. Position A is used for testing SAS amplifiers for other helicopters. Operating the switch from B to A transposes the pitch and roll channel circuits of the test set. It also changes the amplifier operating voltage output of the test set from 115 to 26 volts ac.