

TESTER AT 5422

1. General.—This Instruction describes the facilities given by Tester AT 5422 and states the conditions under which it should be provided.

Tester AT 5422 is designed for testing subscribers' lines and junctions. It supersedes Testers AT 67, AT 2607, AT 5000, CB 1019, CB 1020, CB 1024, CB 1235, CBS 424 and CBS 429, which, except in a small number of applications, do not provide adequate testing facilities.

2. Provision.—In an existing exchange if an obsolescent tester does not provide adequate facilities Tester AT 5422 can be obtained under maintenance-exchange procedure.

For new installations Testers AT 5422 should be provided in accordance with General, A 3005.

One Tester AT 5422 should be installed at P.A.B.X.s having an ultimate capacity of 300 extensions or more.

In Maintenance Controls of 5,000 lines and over, one Tester AT 5422 should be fitted on a Stand, Testing, No. 23, or otherwise mounted in a convenient position on the end of the M.D.F. Its use will relieve congestion on the test desk during periods of extra load, such as a cable break-down.

3. Outline of facilities.—Provision is made for:—

(a) Connexion of the tester to the required line by means of plugs and cords at the M.D.F

(b) Monitoring, speaking and listening on a line, and holding a call

(c) Testing into the exchange equipment, or out to line

(d) Testing for voltage and measurement of resistance

(e) Loop and battery dialling

(f) Ringing ordinary and shared service subscribers

(g) Simulation of U.A.X. calls to parent exchange (C.C.B. or ordinary calls)

(h) Simulation of calls (normal or emergency) from C.C.B. lines at C.B. exchanges

(j) Continuity testing with a test bell

(k) The connexion of miscellaneous equipment, such as an ohmmeter, a dial speed tester or howler, to a line.

4. Battery, ringing current, and earth supply.—Internal batteries are used for testing. A 67·5V Battery, Dry, No. 18 provides for high resistance measurements, and a 1·5V Cell, Leclanché, DS 6, for low resistance measurements.

The exchange battery supplies are used for signalling and speaking purposes, with appropriate strappings in the tester for 22V, 30V and 40V exchanges.

Exchange battery, earth, and ringing current can be connected to the tester by permanent wiring, or by cord and plug.

A hand generator is supplied for use where machine ringing is not available.

5. Voltmeter.—Tester AT 5422 is provided with a sensitive 200-ohm, 500-microamp moving coil instrument with a scale calibrated 0 to 50 volts. The instrument is also calibrated for use as an ohmmeter. Resistance within the range 5000 to 500000 ohms is measured by multiplying the scale reading by 100. Resistance within the range 50 to 5000 ohms is measured by operating the LOW RESISTANCE key and reading the scale direct. Operation of the LOW RESISTANCE key causes the applied voltage to be reduced from 67·5V to 1·5V and the effective resistance of the meter circuit to be reduced from 50000 to 500 ohms.

Before using the meter as an ohmmeter to measure resistance on either range, the potentiometer should be adjusted with the ZERO CHECK key operated until the meter reads zero ohms.

With the TEST LINE or TEST EXCHANGE key operated as appropriate, operation of the VOLTMETER key connects the meter to the B-line.

One side of the test battery is earthed, and by operating the EARTHING key, the line opposite the one to which the voltmeter is connected is earthed during resistance measurements.

Operation of the LOW VOLT SCALE key will enable potentials of less than 5V to be measured. Under these conditions, because the resistance of the voltmeter circuit is reduced from 100000 to 10000 ohms, the reading on the voltage scale should be divided by 10.

6. Monitoring, speaking and dialling.—While the keys on the testing circuit are normal the insertion of the test-cord plugs into the test springs on the M.D.F. protector does not interrupt a call which might be in progress. Monitoring (with speaking) conditions are given when the SPEAK key is operated. Subsequent monitoring can be re-applied, when required, by operation of the MONITOR key. Either a service telephone connected across the terminals of the tester or a Telephone No. 280 plugged in the jack provided can be used for speaking, monitoring and dialling. (A Telephone No. 80 will allow speaking and monitoring).

Either loop or battery-dialled pulses can be sent out depending upon whether or not the BATTERY DIAL key is operated in conjunction with the SPEAK key.

7. Ballistic test.—The approximate capacitance of a line can be judged from the degree of momentary deflexion of the voltmeter needle when the LINE REVERSE key is operated. If it is a shared service line on which the tests are being made, the TEST SHARED SERVICE key will have to be operated additionally.

8. Test bell.—When the TEST BELL key is operated to connect the test bell to line (via BATTERY FEED key operated), audible warning will be given if there is an earth on the B-wire, a battery on the A-wire, or a short circuit or loop across the A- and B-wires. With the LINE REVERSE key operated additionally, the test bell will respond to an earth on the A-wire, a battery on the B-wire, or a short-circuit or loop as before. Any one of these conditions can be due to a fault (in which case the test bell is used for locating the fault), or it may be a condition put on by a faultsman to attract the attention of the exchange testing staff.

9. Holding calls.—A call on the service line will be held by a 600 ohm loop when the HOLD SERVICE LINE key is operated. Under these conditions another call can be made, or a line tested, using the remainder of the test circuit.

10. Simulation of U.A.X. calls to the parent manual switchboard.—Either an ordinary call or a coin-collecting box call can be simulated, causing the appropriate manual switchboard calling lamp to glow. This is achieved by the operation of BATTERY FEED, UAX CALL MANUAL, and UAX CALL ORDINARY keys for an ordinary call, or by the operation of BATTERY FEED,

UAX CALL MANUAL, and UAX CCB keys for a coin-collecting-box call.

11. Simulation of normal or emergency calls from coin-box lines to C.B. exchange.—This can be done by operating the CCB NORMAL CALL key for normal calls and by operating the CCB EMERGENCY key for emergency calls. When the operator answers, the tester supervisory lamp glows.

12. General test conditions.—A summary of commonly-encountered line faults, with the test circuit key operations necessary to complete diagnosis, is given in Table I.

In Table I, it is assumed that:—

(a) After monitoring, the TEST LINE or TEST EXCHANGE key is operated (dependent on the direction in which it is wished to test) in addition to the keys referred to in the second column of the table.

(b) The meter has been mechanically corrected for zero error (if necessary), using the setting screw.

(c) When resistance measurements are to be made, the meter is first electrically corrected for zero error, using the potentiometer.

TABLE I

Tests for	Keys to be operated	Remarks	Schematic diagram of voltmeter conditions
Earth on B-wire	KV	Meter gives a reading of insulation between B-wire and earth. Ohms scale reading should be multiplied by 100	67.5V
Earth on A-wire	KV, KR	Meter gives a reading of insulation between A-wire and earth. Ohms scale reading should be multiplied by 100	67.5V
Insulation resistance	KV, KE	Meter gives a reading of insulation between A- and B-wires. Ohms scale reading should be multiplied by 100	67.5V
Low resistance earth on B-wire	KV, KLR	Meter gives a direct reading of resistance in the range 50-5000 ohms between B-wire and earth	1.5V
Low resistance earth on A-wire	KV, KLR, KR.	Meter gives a direct reading of resistance in the range 50-5000 ohms between A-wire and earth	1.5V

TABLE 1 (cont.)

Tests for	Keys to be operated	Remarks	Schematic diagram of voltmeter conditions
Loop or short-circuit	KV, KLR, KE	Meter gives a direct reading of resistance in the range 50-5000 ohms round the loop	
Disconnexion on D.E.L.s	KV, KE, and KR. KR operated and restored a few times	A ballistic deflexion of $\frac{1}{2}$ to $\frac{2}{3}$ full scale is obtained when the line circuit is complete via the subscriber's instrument capacitor. If the line is disconnected, only a small deflexion results which is proportional to the line capacitance up to the point of disconnexion	
Disconnexion on S.S. lines, B-wire	KV, and KTS. KTS operated and restored a few times	For a ballistic test on the B-wire of a shared service subscriber	
Disconnexion on S.S. lines, A-wire	KV, KR, and KTS. KTS operated and restored a few times	For a ballistic test on the A-wire of a shared service subscriber	
Negative potential on B-wire to earth	KV, KN	A deflexion on the meter denotes a negative potential on the B-wire	

TABLE 1 (cont.)

Tests for	Keys to be operated	Remarks	Schematic diagram of voltmeter conditions
Negative potential on A-wire to earth	KV, KN, KR	A deflexion on the meter denotes a negative potential on the A-wire	
Positive potential on B-wire to earth	KV, KN, KVR	A deflexion on the meter denotes a positive potential on the B-wire	
Positive potential on A-wire to earth	KV, KN, KVR, KR	A deflexion on the meter denotes a positive potential on the A-wire	

13. **Label designations.**—A list of certain key label changes which are being made on later models of the tester is given in Table 2.

TABLE 2

Earlier designation	New designation
TEST BATTERY CUT-OFF AND RECEIVE NEGATIVE	REC. NEG.
LOW VOLT SCALE	VOLTS ÷ 10
LOW RESISTANCE	OHMS
VOLTMETER	VM & OHMS × 100
UAX CALL MANUAL	CALL MAN
UAX COIN BOX	UAX CCB CALL
UAX CALL ORDINARY	UAX ORD CALL
TEST SHARED SERVICE	TEST SS
COIN BOX NORMAL CALL	CCB NORM. CALL
COIN BOX EMERGENCY CALL	CCB EMER. CALL

Reference:—General, A 3005
(TPM 2/2)

END