



DYNATEL™ LINE TESTER 946-PT

FULL-FEATURED POTS/INSIDE WIRING TESTING

The 3M™ Dynatel™ line tester 946-PT is a full-featured unit enabling installation and maintenance crews to efficiently qualify and troubleshoot inside wiring for telephone service qualification. With the push of a single button, the easy-to-use 946-PT tester performs a wide range of tests to analyze twisted pair problems. Results can be stored and uploaded to a PC for efficient record keeping.

FLEXIBLE, PRACTICAL FEATURES

The 946-PT line tester is designed for functionality and ease of use. Features include:

- Self-calibration
- Graphical user interface – user-friendly, icon-based display of test results
- Single button autotest for line qualification with pass/fail indication
- Replaceable test leads
- Backlit high resolution/high contrast LCD display
- Simultaneous display of T-R, T-G and R-G readings in Ohms, Volts and Opens.
- Accepts Alkaline, Ni-Cad or NiMH batteries

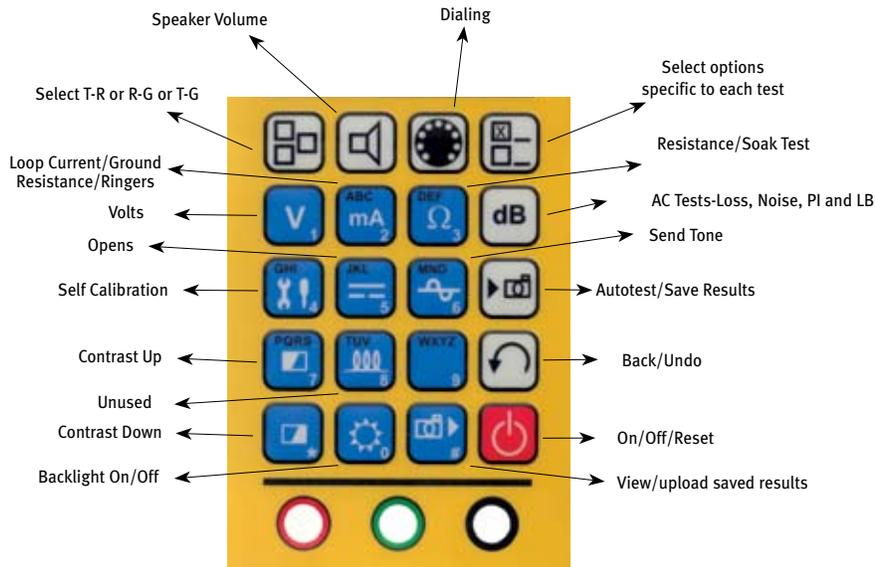
RUGGED, WEATHER-RESISTANT DESIGN

The 946-PT test set is housed in a lightweight, hand-held case for portability and ease of handling. The unit is weather-resistant and weighs only 1 lb (0.5 kg).

The Dynatel brand and its distinctive Dynatel yellow color are your assurance of rugged dependability.



3M™ Dynatel™ Line Tester 946-PT



3M™ Dynatel™ 946-PT Keypad Legend

FUNCTION	DESCRIPTION
Voltage (V)	Detects and measures the presence of foreign DC and AC voltages on R-T, R-G and T-G. Measures CPE voltage.
Current (mA)	Measures DC line current from CPE.
Ground Resistance	Measures and displays the ground path resistance (when supported by the switch).
Ringers	Measures and displays the equivalent ringer count where one ringer equals 0.47uF.
Resistance test (Ω)	Measures conductor and insulation resistance up to 30 megohms. Accurate readings in the presence of foreign voltage. Full autoranging.
Insulation soak test	Monitors the leakage resistance from the test leads to ground and indicates changes in the insulation resistance over time in the presence of high voltage. Increasing resistance is an indication of a wet fault and decreasing resistance is an indication of oxidation, which is breaking down and becoming more conductive.
Opens	Detects opens. Measures the open length of cable pair at distances up to 100,000 ft.
Tone	Provides 577 Hz ID tone for conductor identification, and 404, 1004 and 2804 Hz precision tones for determining circuit loss.
Loss	Measures voiceband loss up to 5KHz, displaying frequency and level.
Noise	Measures circuit noise and power influence, and displays calculated balance. C-Message Weighting is used in the U.S. and Canada, and a Psophometric Filter where ITU (CCITT) Standards are used.
Longitudinal balance	This test provides active measurement of line balance.
Dial key	Allows storage of 10-14 digit numbers for testing of active lines.
Result summary screen	This screen shows the results from last V, mA, Ohms, Opens, Noise, PI, and LB test in a tabular form for easy analysis. If desired, these results can then be saved to one of 10 result storage locations.
Result storage	Storage will be provided for 10 sets of results. Each set will include a 10 digit numeric identifier and the following measurements: V (T-R), mA, Ohms (T-R), Ohms (T-G), Ohms (R-G), Open Length (T-R), Open Length (T-G), Open Length (R-G), Noise, Power Influence, and Longitudinal Balance.
Result review	Means will be provided to review any result set on the screen of the 946-PT.
Result upload	Results can be uploaded to a PC through the test leads using an adapter and pc software provided with the unit.

ELECTRICAL SPECIFICATIONS

FUNCTION	RANGE	RESOLUTION	ACCURACY*	TEST LEADS
Voltage (AC)	0 to 75 VAC	1 V	±1 V	R-T, R-G, T-G
	75 to 250 VAC	1 V	±3 V	R-T, R-G, T-G
Voltage (DC)	0 to ± 100 V	1 V	±1 V	R-T, R-G, T-G
	±100 to ±350 V	1 V	±3 V	R-T, R-G, T-G
Loop current (DC)	0 to ±110 mA	1 mA	±2 mA	A R-T (Zin = 430 Ω)
Loop resistance	0 to 999 Ω	1 Ω	± 5 Ω or 3%	R-T, R-G, T-G
Leakage resistance and insulation soak	1 kΩ to 9.9 kΩ	10 Ω	± 3%	R-T, R-G, T-G
	10 kΩ to 99.9 kΩ	100 Ω	± 3%	R-T, R-G, T-G
	100 kΩ to 999 kΩ	1 kΩ	± 3%	R-T, R-G, T-G
	1 MΩ to 9.9 MΩ	100 kΩ	± 3%	R-T, R-G, T-G
	10 MΩ to 30 MΩ	1 MΩ	± 10%	R-T, R-G, T-G
Loop loss	-50 to +10 dBm			R-T (Zin=600)
	200 to 5000 Hz	1 dB	±1 dB	
Noise metallic with C-message weighting**	0 to 60 dBrc	1 dB	±2 dB	R-T (Zin=600)
Noise to ground with C-message weighting**	40 to 100 dBrc	1 dB	±2 dB	R and T-G(Zin=100K)
Opens***	0 to 9,999 ft.	1 ft.	± 20 ft. ±5%	Ring, tip, mutual
	10,000 to 99,999 ft	100ft	+/- 5%	
Frequency during loss, single frequency only	200 to 5,000 Hz	1 Hz	±3 Hz	R-T
Longitudinal balance	0 to 65 dB	1 dB	±2 dB	TR-G
Ground resistance	0 to 50 Ω	1 Ω	± 3 Ω	

*Percent of reading

**C-message specification has additional frequency dependent tolerance. Refer to "Subscriber Loop Transmission Test Set Specification", Bell System PUB 55020, January 1982.

*** Opens length accuracy may be affected on tip and ring when measuring unshielded cables such as category 5, 5e, etc. Mutual length will not be affected.

OUTPUT	FREQUENCY	AMPLITUDE	ATTACHMENT	REMARKS
ID tone	577.5 Hz	8 Vpp	R-T	Squarewave, interrupted
Precision tone	404, 1004, 0 2804	±0.5 dBm	R-T	600Ω source, continuous sinewave. <10%THD

ENVIRONMENTAL SPECIFICATIONS

Operating temperature	0° to 140°F (-17° to 60°C)
Storage temperature	-40° to 140°F (-40° to 60°C)
Humidity	0 to 95%
Vibration	Random 3-axis vibration at 12.5 Grms for 20 minutes
Rain proof/splash proof	Meets UL50, Rain test
EMI/EMC	Meets FCC part 15, Class A: Digital Devices for the US, and EN55022 (radiated emissions), EN55024-2 (electrostatic discharge), EN55024-3 (radiated immunity), EN55024-4 (transient immunity) and IEC1010 (product safety) for Europe.

3M™ DYNATEL™ LINE TESTER 946-PT

PHYSICAL SPECIFICATIONS

946-PT	SIZE (H X W X D) IN. (CM)	WEIGHT (INCLUDING BATTERIES)	SHIPPING WEIGHT	DISPLAY SIZE
	(7.5"H x 4"W x 1.5"D)	1 lb. with battery and soft case	1.5 lbs (0.7 kg)	2.25" x 1.25"
	19 cm x 10.2 cm x 3.8 cm	(0.5 kg)		(5.7 cm x 3.2 cm)

GENERAL SPECIFICATIONS

Batteries	4 - disposable alkaline (AA or LR6) but will accept user provided Ni-Cad or NiMH batteries with user provided external charger
Battery life	Alkaline: up to 25 hours continuous, dependent on temperature and use of backlight.
Dialing	DTMF and pulse dialing - 10 number storage (12 hours typical use)
Display	Graphical LCD with universal icons
Test leads	Removable red, black and green leads; 5 ft. (1.5 m)
Over voltage protection	450 VDC, 250 VAC. between any leads to protect the internal circuit
Keypad	Field-rugged, waterproof membrane keypad
Function keys	V (voltage), mA (loop current/ground resistance), ohms (resistance/soak test), OPENS, TONE, DB, AUTO

Note: Routine calibration is not recommended or required.

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