April, 1985

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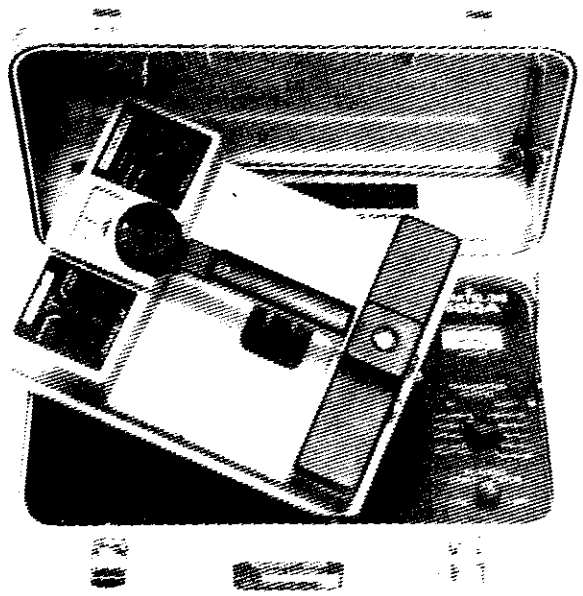
Dynatel® 500A Cable Locator Operator's Manual



Finding Cable Location and Depth Using the Dynatel 500A Cable Locator

Contents

1. General

1.01 This section covers the description, use, care and maintenance of the Dynatel* 500A Cable Locator (Fig. 1).

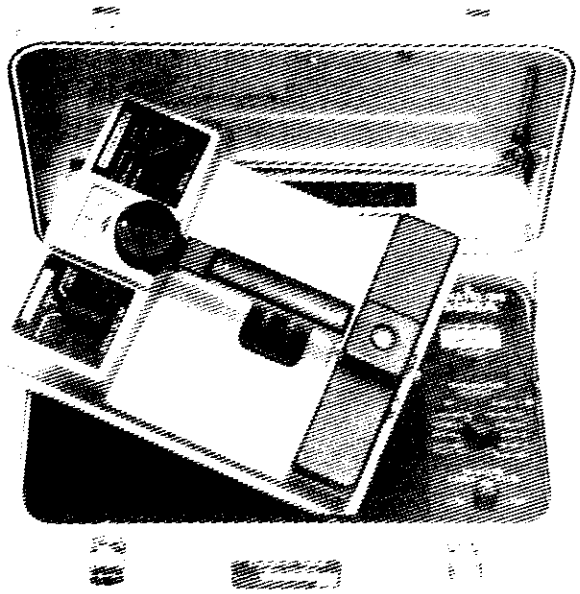


Fig. 1 — The Dynatel 500A Cable Locator

1.02 This portable, battery-powered tone set locates and traces the path of buried or underground (UG) cables. It will detect RF (Radio Frequency) and AUDIO frequencies applied to a conductor by the transmitter, and will detect 60 Hz AC current with the receiver alone. Other applications include locating butt-splices, slack-loops, unknown laterals, cut service drops, and encapsulated closures. The locator will accurately indicate the depth of buried or UG cables, and it will find clear or severed cable ends. It provides a high-frequency (RF) tone for positive conductor or cable identification, and an AUDIO frequency tone for common grounded cable and extended distance locating.

1.03 The 500A locates cables without taking them out of service. A High-frequency RF tone is put on the cable or conductor for most locates of less than a mile in distance. This tone will not noise-up the circuits or interfere with signals or conversation on the cable. For greater tracing distances, or for such continuously grounded cables as lead sheath, a Low- or Audio-frequency tone is provided. This mode will push tone for far greater distances than the RF mode, but may tend to noise-up circuits under some conditions. If there is substantial 60 Hz induced on the cable, or if tracing a working power cable, the Receiver may be used to trace the 60 Hz signal without the need for a transmitter by turning the TONE SELECT switch to POWER CABLE.

1.04 The receiver is highly sensitive to all the tracing frequencies. This sensitivity is continually adjustable to prevent error due to overdriven signal. Received signal strength is indicated audibly through the loudspeaker and visibly on the meter. The Sensitivity Control adjusts both loudspeaker volume and meter deflection.

1.05 The receiver is physically independent of the transmitter in all tracing modes and has one-hand adjustment at normal walking speeds.

2. Description

2.01 TRANSMITTER & RECEIVER: The Cable Locator consists of a transmitter, a receiver, and accessory items (Fig. 2). The transmitter and receiver cases are made of high-density polyethylene for light weight and high durability, and are colored bright yellow for visibility. Both are water-resistant in wet-weather operation. For compact storage and carrying, the receiver and accessories fit into the transmitter case. To preserve battery life, "off" switches are activated on both Transmitter and Receiver when the receiver is fitted into the transmitter case. A stainless steel ground rod is clipped to the set's lid.

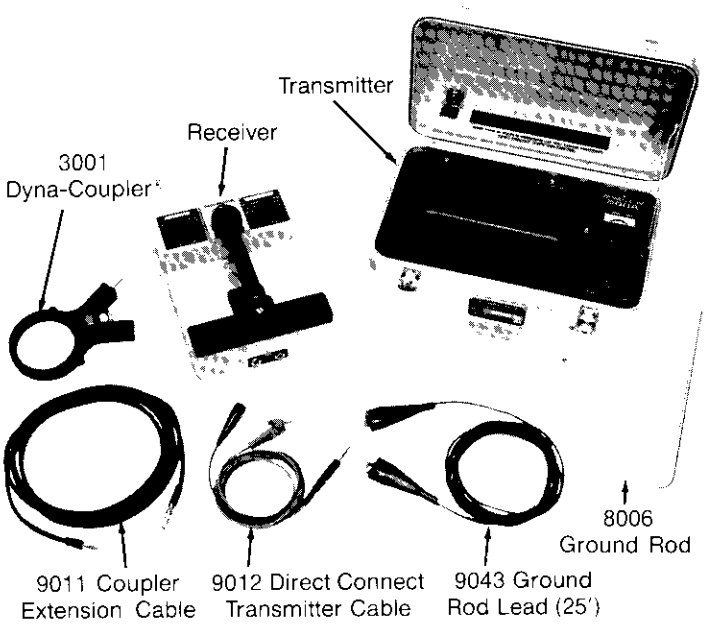


Fig. 2 — The 500A Cable Locator with Accessory Units

2.02 The TRANSMITTER (Fig. 3) has a single selector switch located on the panel next to the accessory storage well. Above this switch is a meter which indicates transmitter output level and functions as a volt-ohmmeter.

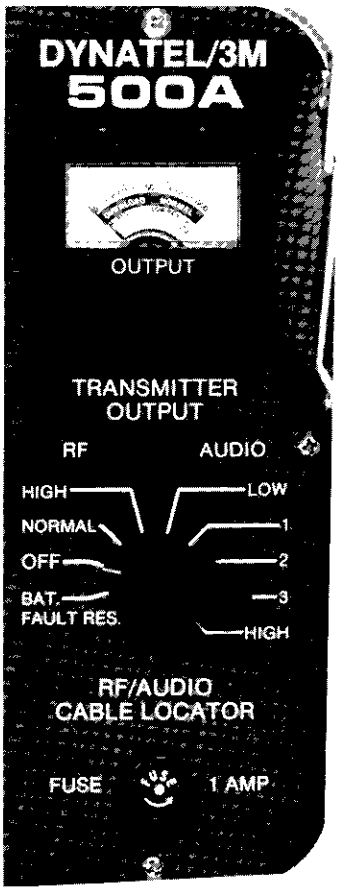


Fig. 3 — Transmitter Unit Control Panel

(a) The TRANSMITTER OUTPUT selector is a nine position switch for selecting the output mode, output level, volt-ohmmeter functions and a battery test. The positions are, clockwise from lower left:

BAT./FAULT RES.: Battery test position. A spring-return, momentary-contact switch puts load on the transmitter batteries for test when the 9012 Direct Connect Transmitter Cable is connected and its clips shorted (See Par. 7.01). This position also indicates circuit integrity for tracing in the AUDIO mode. (See Par. 2.04). Both 9011 and 9012 cables may be tested for continuity by this method.

OFF (Voltage): Transmitter battery power is off. IMPORTANT: In this position, the set acts as a Voltmeter when attached with the 9012 Direct Connection Transmitter Cable to a conductor. The meter will indicate the presence of AC or DC voltage up to 600 volts.

RF NORMAL: Sets transmitter output power to Radio-Frequency (300 kHz) mode at NORMAL level. This level is used for most short locates and provides maximum battery life.

RF HIGH: Sets transmitter output to Radio-Frequency mode at HIGH level. This will provide a noise-free tracing tone for distances up to a mile, but will reduce battery life.

AUDIO (LOW, 1, 2, 3, HIGH): Selects the AUDIO frequency (577.5 Hz) and signal level for tracing at great distance or through continually grounded cable such as lead sheath.

(b) The TRANSMITTER OUTPUT jack, on the side of the set below, the transmitter output panel, is a standard telephone jack for connecting accessories for direct connection in either mode or inductive coupling in RF mode with the Dyna-Coupler .

2.03 The RECEIVER operating panel (Fig. 4) has two selector switches flanking a level reference meter and sensitivity control. The tracing frequency is selected by the TONE SELECT switch, and the RECEIVER MODE switch controls the receiver operating modes.

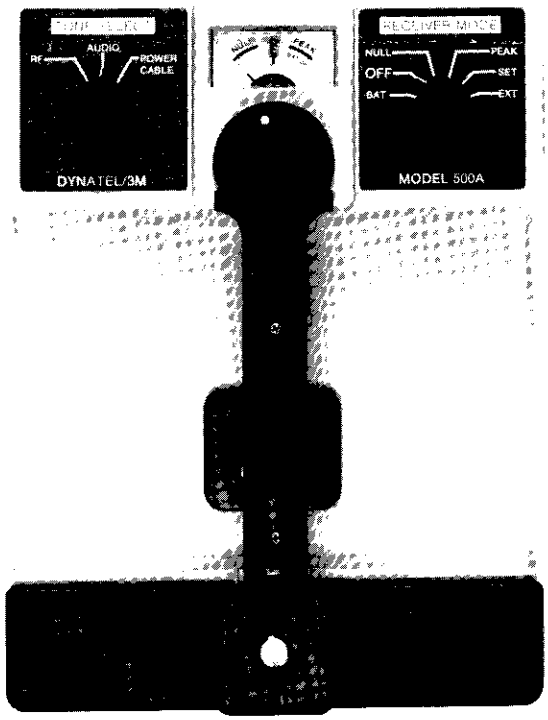


Fig. 4 — Receiver Unit

(a) TONE SELECT is a three-position switch to select the tracing frequency. RF and AUDIO detect signals generated by the transmitter. The POWER CABLE position detects 60 Hz AC current.

(b) The RECEIVER MODE selector is a 6-position switch which controls the following receiver operating modes:

OFF: Turns off receiver power.

BAT: Battery test position. Momentary-contact, spring-return switch puts test load on receiver batteries. (See Sec. 7 for Bat. test procedures.)

NULL: Selects NULL mode operation for cable location (see Par. 4.01(a)). In NULL mode, the loudspeaker tone sharply decreases and the needle deflects to the "Null" (left) side of the meter when the receiver is directly over the cable.

PEAK: Selects PEAK mode operation for cable location (see Par. 4.01(b)). In PEAK mode, with the receiver handle parallel to the cable path, the loudspeaker tone is at its highest and the needle deflects to the "Peak" (right) side of the meter when the receiver is directly over the cable.

NOTE: PEAK is not as sharp (well-defined) an indication as NULL, but is more reliable if cable curves or branches. Always check any locate in both modes.)

SET: SET mode is used to set a reference on the meter for use in cable depth determination (see Sec. 5).

EXT: EXT sets operation of the receiver to the external jack for use of the Dyna-Coupler, and the optional 3011 Inductive Probe, and the optional 3013 Direct Probe.

(c) The Receiver Signal Level Meter (Fig. 5) indicates the strength of the tone being received. Needle deflects to the right (PEAK) at greatest volume. Needle deflects to the left (NULL) for weak or canceled signal. The yellow center zone (SET) provides a reference for cable depth location. The BAT OK zone indicates acceptable battery condition.

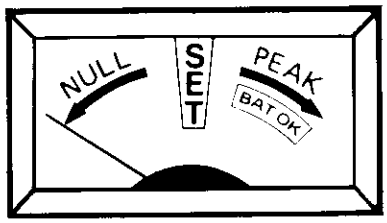


Fig. 5 — Receiver Signal Level Meter

(d) The Sensitivity Control Knob adjusts meter sensitivity and tone volume in the loudspeaker.

(e) The Loudspeaker provides an audible indication of signal level. It is protected from weather by an overlapping cover.

(f) The TONE COIL jack (Fig. 6) is an input connector for use in the AUDIO mode with an accessory coil for cable identification.

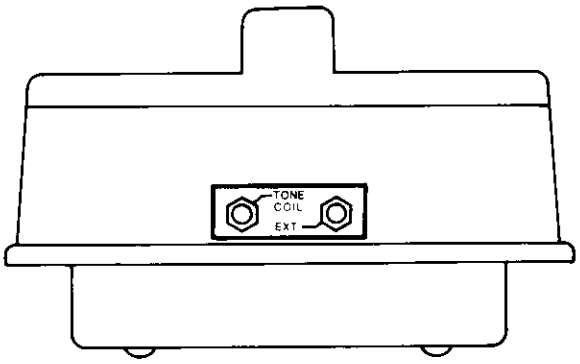


Fig. 6 — Receiver Unit EXTernal and TONE COIL Jacks

(g) The EXT Jack (Fig. 6) is a signal input jack for use with accessories such as the Dyna-Coupler, the 3011 Inductive Probe Head (available separately), and the 3013 Direct Probe Head (available separately). This jack is energized with the RECEIVER MODE switch in EXT mode.

(h) The black Battery Access Cover Screw secures the battery access cover. For battery changing procedure, see par. 7.02(b).

2.04 LOCATING METHODS: The 500A TRANSMITTER puts an RF or AUDIO tracing tone on a conductor which is detected and traced by the RECEIVER. In addition, the receiver is capable of tracing without transmitted tone if a conductor has been energized by AC voltage. The receiver will detect 60 Hz AC current flow without the aid of tone broadcast by the transmitter.

(a) RF (Radio Frequency) Tone: RF Tone is used in most locates. RF transmission is a high frequency tone which provides good accuracy in congested service areas. This mode offers a variety of ways to tone a conductor, and is less susceptable than other frequencies to power and man-made interference. It will not noise-up a circuit and does not require metallic contact or far-end grounding.

(b) AUDIO Tone: AUDIO transmission is a low-frequency tone which carries for long distances in PIC and continuously-grounded conductors such as lead or armor-sheathed cable. AUDIO Signal requires direct connection to a conductor and the far end must be grounded. Ground integrity is checked in the BAT./FAULT RES. switch position. On test, the meter needle must be well into the green section.

NOTE: AUDIO Tone is best used for long traces in relatively uncongested areas. It may noise up working lines and can be susceptible to power line and man-made interference.

(c) POWER CABLE. In POWER CABLE mode the receiver detects and traces 60 Hz AC current along a conductor. The transmitter is not used in this mode.

NOTE: The POWER CABLE setting will detect only current flow. It will not detect potential in a non-working, energized conductor.

3. Transmitter Operation

3.01 RF TRANSMITTER SETUP. The transmitter puts RF tone on a cable in three ways: Direct Connection (Metallic Contact); Inductive Coupling (Dyna-Coupler); General Induction (Radiation).

(a) DIRECT CONNECTION: This method requires access to the cable shield or conductors. Plug the 9012 Direct Connect Transmitter Cable into the Transmitter Output Jack at the side of the transmitter.

(1) Connect the RED clip to any conductor, or to the isolated shield.

(2) The transmitter must be sitting on the ground or, if a stronger signal is required, ground the set directly with the BLACK clip attached to the ground rod. Set the ground rod in good soil several feet off, and perpendicular to, the cable path.

NOTE: Never ground to water pipe or other services in the area as returning signal may create an out-of-phase condition which will mislead the locate.

(3) Turn the TRANSMITTER OUTPUT selector to RF NORMAL for most short locates. Use RF HIGH only for extended distance locates up to a mile.

(b) INDUCTIVE COUPLING. The Dyna-Coupler (Fig. 7) puts tone selectively on a cable by simply clamping around it. This eliminates the need to disconnect bonds or make direct connection to a conductor, but it does require access to the cable.

(1) Connect the 9011 Coupler Extension Cable to the Transmitter Output Jack and clamp the coupler around the cable. There is no minimum conductor size, but the jaws of the coupler must fully close for good tone transmission.

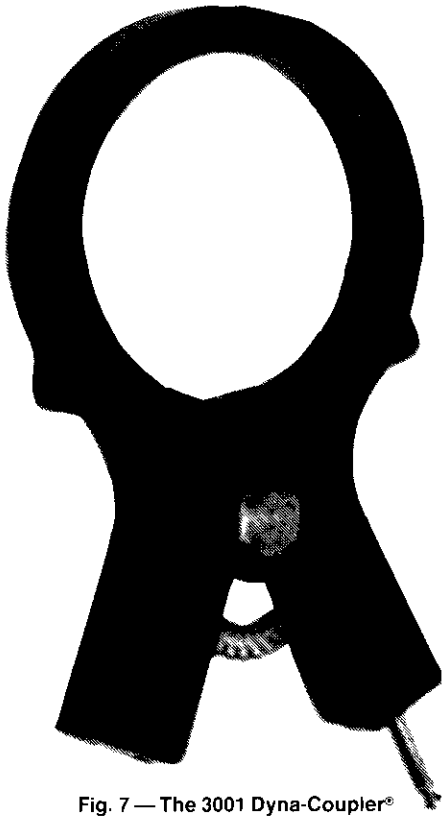


Fig. 7 — The 3001 Dyna-Coupler®

(2) For best results, do not use the Dyna-Coupler on a cable that is clear at both ends; under these circumstances use a direct connection to the shield or to one conductor. (See Par. 3.01(b)).

(3) Turn the TRANSMITTER OUTPUT selector to RF NORMAL for most locates. Use RF HIGH only for extended distance locates up to a mile.

(c) GENERAL INDUCTION: General Induction broadcasts tone generally into an area. Set the transmitter on the ground over the cable and turn the output level to RF/NORMAL for most applications. The transmitter case handle must be parallel to the cable path. No access to the cable is necessary. This method should only be used when there are no other conductors present, or when all conductive buried services are to be located in a general area.

NOTE 1: Do not use the receiver within 50 feet of the transmitter as signal will be received through the air and mislead the locate.

NOTE 2: Be certain that the transmitter is directly over the cable to be located (this can be assured by leaving the receiver in NULL mode on the ground near the cable 50 feet away and moving the transmitter back and forth across the path). Listen for maximum tone from the receiver.

4.06 RECEIVER MODE SELECTION: NULL and PEAK

(a) PEAK (Fig. 9): In this mode, signal increases to a maximum as the cable is passed, and then diminishes as the receiver moves further off the cable path. The meter needle will deflect to the "Peak" zone and then return as the midpoint is passed. "Peak" is less sensitive than "Null" but allows speed in uncomplicated locates and it is more reliable when tracing changes in cable direction. Signal falls off rapidly if the handle is not in line with the cable being traced — a useful method to follow sharp bends in cable.

(b) NULL (Fig. 9): In this mode, the signal picked up by the receiving coil cancels when it is directly over the cable. The meter needle deflects to the "Null" area and the speaker falls silent. As the receiver moves past the cable midpoint, the audio signal increases and the needle will return to the right. NULL gives a more precise center point than PEAK, but is more apt to be mislead by foreign conductors in the area. Swing the receiver across the suspected cable path with a sweeping motion. In NULL, the point of minimum needle deflection and tone is the cable path.

(1) Use the Sensitivity Control Knob to adjust reception for meter needle action in the mid-zone area. Adjusting gain for hard meter overdrive will confuse the locate.

NOTE: Each locating mode has its advantage. To assure maximum accuracy, and to eliminate any doubts of a locate, check the trace in both modes. If still in doubt, expose the cable.

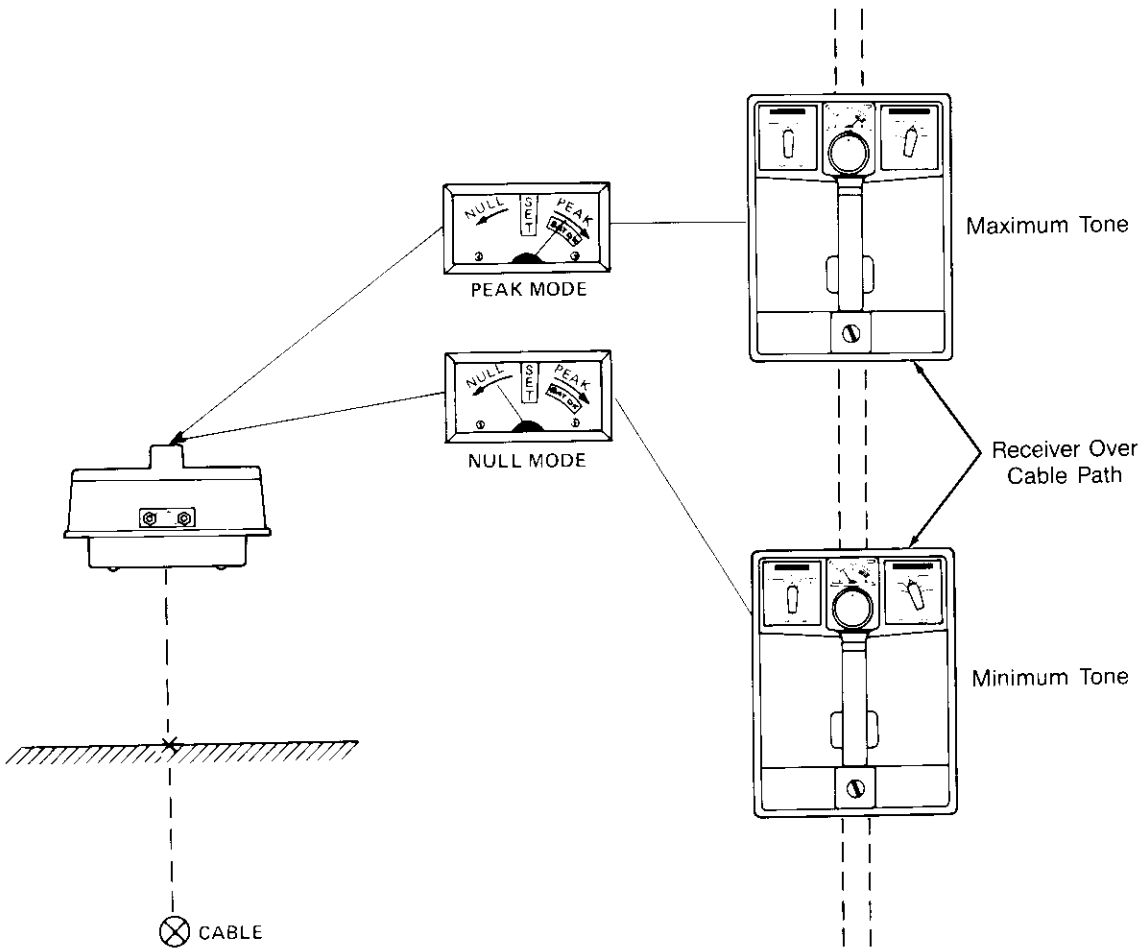


Fig. 9 — Signal Indications in PEAK and NULL Modes

5. Determining Cable Depth

5.01 DIRECT MEASUREMENT: First determine the exact cable path using RF or AUDIO transmitted tone. To determine depth:

(1) Place the receiver on the ground directly above the cable, with the handle parallel to the path (See Fig. 10).

(2) Turn the RECEIVER MODE selector to SET. Adjust the VOLUME control so that the meter needle is centered in the yellow area labeled SET.

(3) Turn the RECEIVER MODE switch to PEAK. Note that the meter reading and the loudspeaker tone both increase.

(4) Raise the receiver straight up from the ground until the meter needle returns to the SET area of the meter.

(5) Measure the distance from the bottom of the receiver to the ground. This distance is equal to the depth of the cable below the surface at this point. (See Fig. 10).

NOTE: The POWER CABLE reception mode may be used to measure depth on conductors with 60 Hz AC current. However, the measurement accuracy may be affected by other power conductors in the area — including overhead lines.

5.02 TRIANGULATION METHOD: As Direct Measurement is limited by the height the operator can hold the receiver, the triangulation method may be used to measure the depth of deeply buried cable. Using either RF or Audio transmission, determine the exact cable path. To measure depth:

(1) With the receiver in NULL mode, mark a point on the cable path (Fig. 11[1]).

(2) Hold the receiver so the handle is parallel to the cable path and tilt it so the bottom is at the 45 degree angle relative to the ground (Fig. 11[2]).

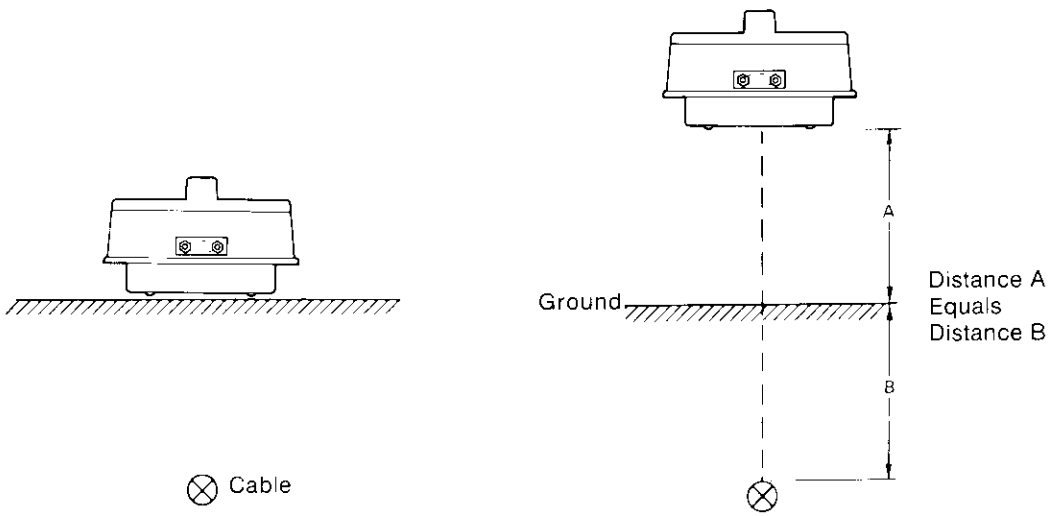


Fig. 10 — Determining Cable Depth — Direct Measurement

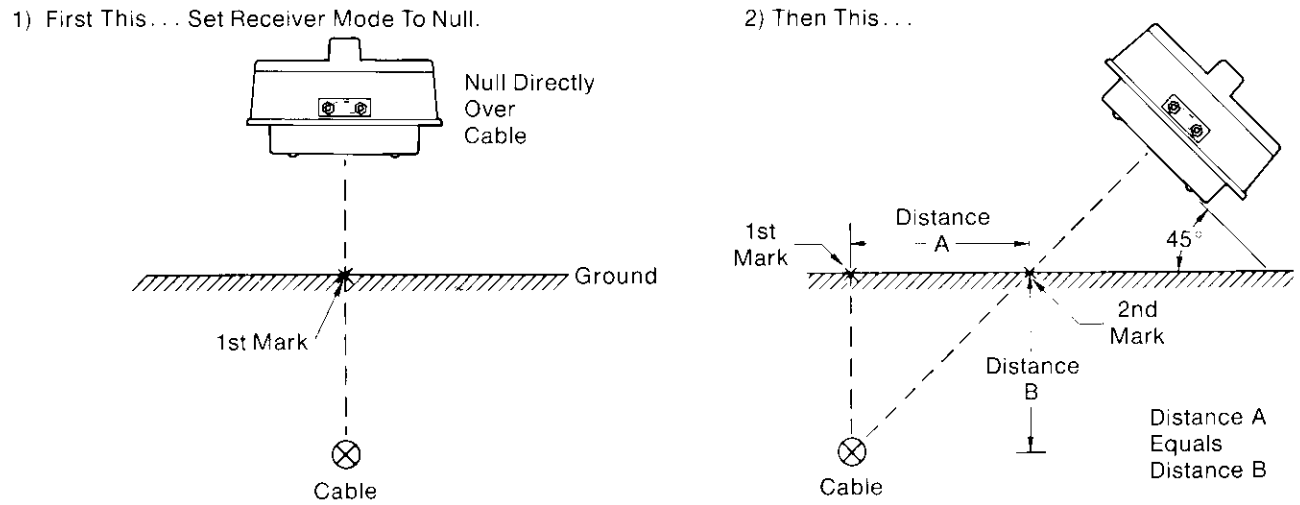


Fig. 11 — Determining Cable Depth — Triangulation

(3) Maintaining the receiver angle, move to the side of, and perpendicular to, the cable path until the receiver again indicates a NULL.

(4) Mark the ground at the point a perpendicular line would project from the bottom of the angled receiver.

(5) The distance between the first mark and the second mark equals the depth of the cable below the first mark.

NOTE: The accuracy of this measurement is dependent upon the accuracy of the 45 degree angle at which the receiver is held. For best results, hold the receiver close to the ground while performing this measurement.

6. Special Applications

6.01 Identifying Cables with RF Signal

(1) At an access where cable identity is known, put tone on the sought cable with a Direct Connection or an extra Dyna-Coupler.

(2) At an access at the far end of the cable group, connect a Dyna-Coupler (Fig. 12) to the receiver EXT Jack with the 9011 Coupler Extension Cable.

(3) Set the RECEIVER MODE selector to EXT and adjust the meter needle to about half-scale deflection. Do not overdrive the receiver.

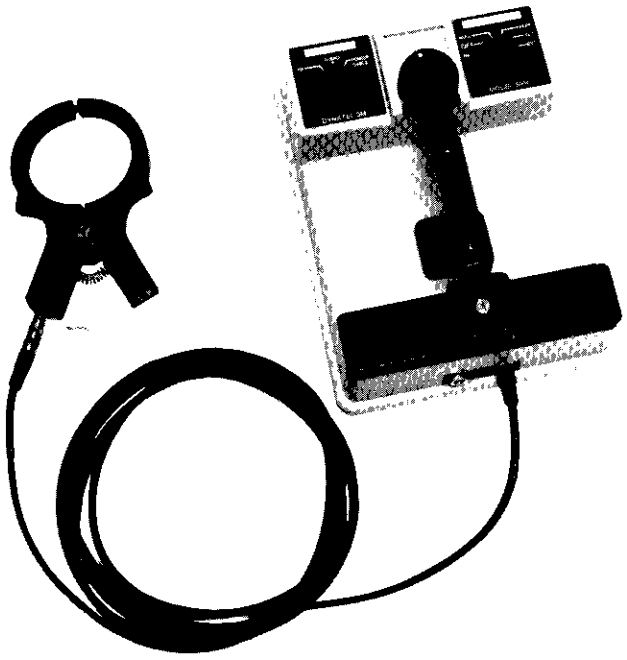


Fig. 12 — Receiver Setup for Cable Identification with the Dyna-Coupler®

(4) Check each cable in the group. The cable with a significantly higher reading than the others is the one being sought.

6.02 Identifying Individual Conductors within a Cable using RF Signal.

(1) At a splice or access, put tone on the conductor to be identified with a Dyna-Coupler or by Direction Connection. If the Dyna-Coupler is used, apply tone to only ONE conductor of the pair.

(2) At the far-end access connect the optional 3013 Direct Probe Head to the EXT Jack of the receiver using the 9023 6 ft. probe cable.

(3) Set the RECEIVER MODE selector to EXT and adjust the meter needle to about half-scale deflection. Do not overdrive the receiver.

(4) Tone will be loudest when the 3013 Direct Probe Head contacts the sought pair.

NOTE: This RF tone will not pass through load coils. If a load is present in the test section, use AUDIO Signal frequency. (See Par. 6.04)

6.03 Identifying Common-Grounded conductors (Wet Pulp Section) using RF Tone.

(1) Open enough shield in the wet cable to gain access to all pairs for tagging.

(2) Place the Dyna-Coupler around a SINGLE conductor (either tip or ring) of the pair to be identified (Fig. 13).

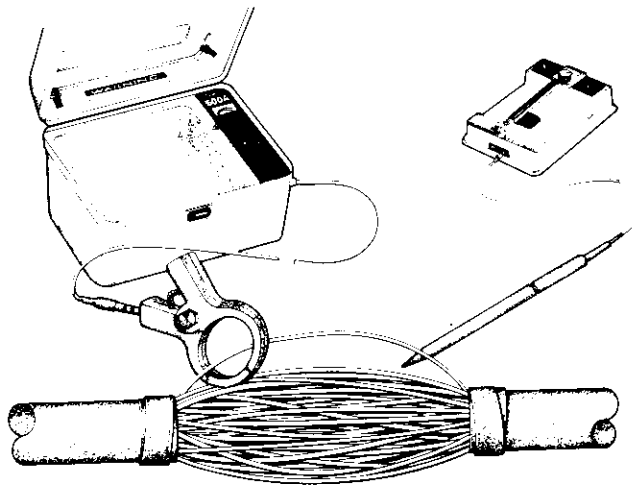


Fig. 13 — Setting a Reference for Conductor Identification

(3) Turn the TRANSMITTER MODE selector to RF NORMAL.

(4) Connect the 3011 Inductive Probe Head to the receiver EXT Jack, using the 9023 6 ft. probe cable.

(5) In the same splice, place the toned wire in the groove of, and perpendicular to, the 3011 Inductive Probe Head. Adjust the volume to set a reference for that conductor. Do not overdrive the receiver.

(6) In the splice, test for tone on conductors throughout the cable. If tone is louder on other wires, cut a single conductor of the test pair (Fig. 14) and apply tone directly with the 9012 Direct Connection Cable. Set a reference as in (5) above.

(7) Again test for louder tone on other conductors. If such signal exists, put tone metallic on the pair by cutting the remaining conductor of the test pair and connecting the black lead of the 9012 Direct Connection cable (Fig. 15). Set a reference as in (5) above.

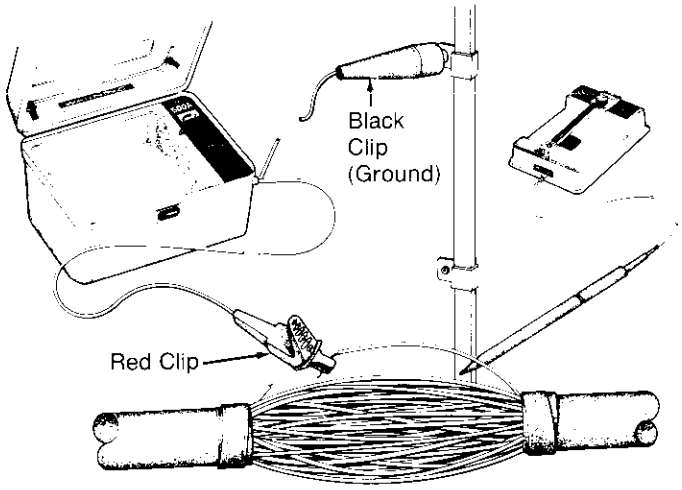


Fig. 14 — Direct Connection to Single Conductor

(8) Again test for louder tone on other conductors in the cable. If louder tone is still heard on other conductors, the 500A will not tone through the wet. Move the transmitter to the far end of the section and retest.

(9) Once tone is correctly adjusted and best current is on the conductor or pair, take the receiver to an access beyond the wet and explore the conductors with the 3011 Inductive Probe Head. Do not change the volume control. The loudest tone will identify the test conductor or pair.

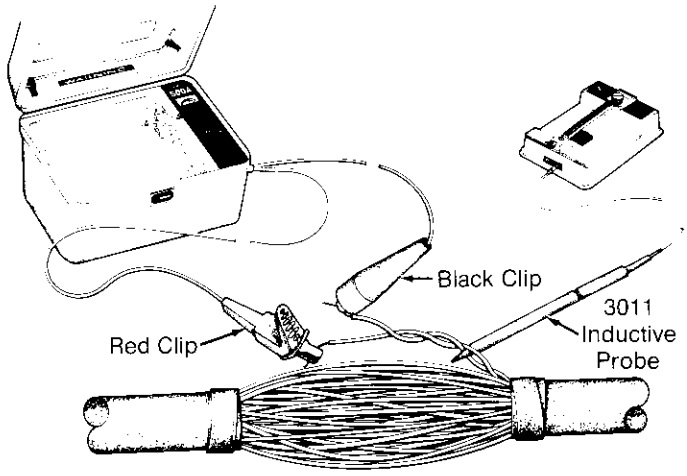


Fig. 15 — Direct Connection for Tone Metallic

6.04 Identifying a Cable with AUDIO Signal

(1) At an access where the cable is known, short or ground a vacant pair.

(2) At a far-end access where cable is known, connect the 500A transmitter across the shorted or grounded pair.

(3) Turn the TRANSMITTER OUTPUT selector to the BAT./FAULT RES. position. The needle must register in the green zone.

(4) Next turn the TRANSMITTER OUTPUT selector to AUDIO (LOW, 1, 2, 3, or HIGH). Use the highest setting where the meter needle stays in the green zone.

(5) Move to the access where cable identity is unknown. Connect an exploring coil to the TONE COIL jack of the receiver and select AUDIO on the TONE SELECT switch and EXT on the RECEIVER MODE selector.

(6) Test each cable in the access with the exploring coil. The sought cable will be the only one with tone on it.

6.05 Identifying individual conductors within a cable using AUDIO Signal.

(1) At an access, apply AUDIO tone metallic or grounded.

(2) At the location where the conductor is being sought, attach the 3013 DIRECT PROBE HEAD to the receiver using the 9023 6 ft. probe cable.

(3) Explore the conductor group with the probe. The conductor or pair with the most tone is the sought conductor.

NOTE: A Banana Probe or a 147-type amplifier may be used in lieu of the 500A Receiver.

6.06 SLACK-LOOPS and BUTT-SPLICES: To identify the presence of a Slack-Loop or Butt-Splice in a cable path using RF or AUDIO tone, first locate and mark the cable path using RF or AUDIO tone. Retrace the path in the following manner:

(1) Set the RECEIVER MODE selector to PEAK.

(2) Hold the receiver so the handle is PERPENDICULAR (across) the cable path and the tone from the receiver is minimum (Fig. 16).

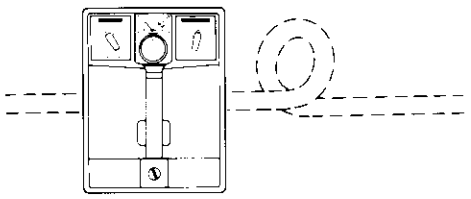


Fig. 16 — Slack-Loop or Butt-Splice Location

(3) Retrace the cable path with the receiver held in this manner. When the receiver passes over a slack loop or butt splice, the tone will increase and the meter needle will deflect to "Peak." This indicates a sudden change in signal caused by a turn or "wow" in the cable path.

NOTE: The receiver will sense loops and butt splices only if the handle is held perpendicular to the cable path. When the handle is held parallel to the path, tracing tone is constant and such underground configurations will not be apparent.

(4) Mark each occurrence of increased tone. Whenever such a signal condition is encountered, it should be checked to see if an unknown lateral exists (see Par. 6.07).

6.07 UNKNOWN LATERALS. To check for unknown laterals from a closure, first mark the cable path and then retrace marking any butt splices or slack loops as in paragraph 6.06 (above).

(1) Switch the receiver to PEAK mode and walk 10 to 25 feet off the path, away from the mark (Fig. 17). Hold the receiver so that the meter end of the handle points directly AWAY from the mark. Walk in a circle around the mark with the receiver always point outward.

(2) The receiver will remain relatively quiet until it crosses a lateral. When directly over a lateral, tone will be at its loudest. As there may be several laterals radiating from the closure, mark each occurrence of tone around the circle. After each lateral is located, its path may be traced and marked.

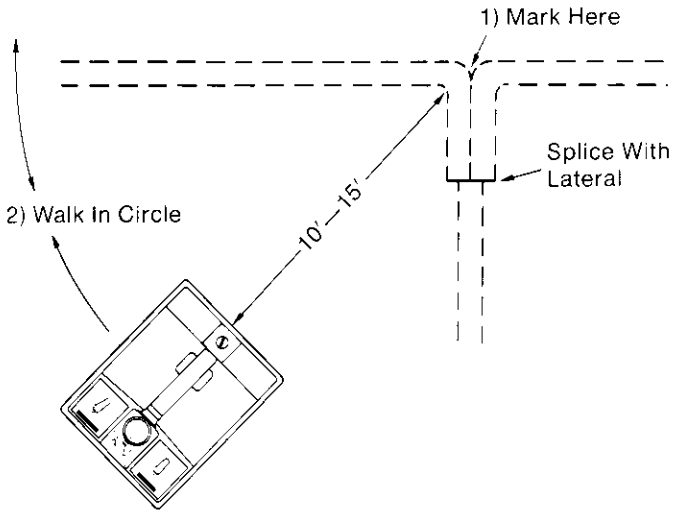


Fig. 17 — Locating Laterals, Drops from Splice, Encapsulation, Riser, etc.

6.08 LOCATING CABLES FROM PEDESTALS or ACCESSIBLE CLOSURES: Put tracing tone on the cable or conductor either Directly (RF or AUDIO) or with the Dyna-Coupler (RF Signal only).

NOTE: When using RF Signal and the Dyna-Coupler, be sure to place the Coupler between the common bond and the point where the cable goes underground. The bond actually backstops the tone and directs it down the cable.

(1) Switch the receiver to PEAK mode and walk 10 to 25 feet away from the access. Hold the receiver so that the meter end of the handle point directly AWAY from the pedestal or closure. Circle with the receiver always pointing outward.

(2) The receiver will remain relatively quiet until it crosses a cable. Directly over the cable to which tone is attached, the tone will be at its loudest. As there may be several cables radiating from the closure, mark each occurrence all the way around the circle. After each cable is located, tone may be applied and its path may be traced and marked.

6.09 SERVICE DROP PATH LOCATION: When locating the path of a service drop from a house or other building, use standard cable location procedures. It may be most convenient to use a direct connection to the drop at the protector.

(1) Connect the RED clip of the transmitter output cable to the protector and place the transmitter on the ground (or use the BLACK clip to the ground rod).

(2) Locate the cable using standard NULL or PEAK mode and the techniques outlined in Section 4.

6.10 LOCATING A CLEAR OR SEVERED END: This procedure locates the unterminated or open end of a cable or drop. Normally, it can only be performed in the RF Signal mode, but if the severed end of the cable is grounded, AUDIO Signal may be used. Check for ground with the BAT./FAULT RES. setting of the TRANSMITTER OUTPUT selector.

(1) If the cable is bonded or connected at one end, use the Dyna-Coupler to put RF Signal on the cable. Attach the Coupler between the bonding or connecting point and the point where the cable goes underground.

(2) Use Direct Connection for AUDIO Signal if the cable is grounded at the far end, or for RF Signal if the cable is clear at both ends.

(3) Set the Receiver to PEAK and trace the cable path. The signal will decrease suddenly at the site of the clear or severed end.

6.11 CABLE CONNECTION TIPS

(a) RISERS. When locating a cable going underground from a riser, use RF Signal and the Dyna-Coupler. Reach above the U-guard, pull the cable away from the pole and attach the Coupler around the cable. The path of the cable can now be traced.

(b) PRESSURIZED CABLES. To put tone on pressurized buried or toll cable, locate a pressure valve and connect the transmitter directly to the valve assembly with the RED clip. For best results, place the transmitter as far away from the valve assembly as possible. Use the 9043 Extension Cable Assembly (20 ft.) as a cable extension. Test for ground continuity with the TRANSMITTER OUTPUT selector at BAT./ FAULT RES. to assure continuity between the valve and the cable.

7. Care and Maintenance: Operator maintenance of the 500A set is limited to battery replacement and minor care.

7.01 BATTERY TEST

(a) TRANSMITTER: The TRANSMITTER OUTPUT selector has a momentary-contact BAT. FAULT RES. battery test position. To check the batteries, plug in the 9012 Direct Connection Transmitter Cable and short the Red to the Black clip. Hold the switch fully counter-clockwise for 5 to 10 seconds. The batteries are good if the meter needle remains in the "Bat OK" section of the meter. As the batteries age, the meter needle will not deflect as far into the "OK" range. When the needle is at the low end or below, replace the Batteries.

(b) RECEIVER: Remove the receiver from the transmitter case and hold the RECEIVER MODE selector fully counter-clockwise to BAT for 5 to 10 seconds. The meter should indicate "Bat OK." If not, replace the batteries.

7.02 BATTERY REPLACEMENT

(a) TRANSMITTER: The transmitter uses four standard 6-volt carbon-zinc lantern cells. See Table A for replacement types. To change the batteries, use the following procedure:

(1) For access to the transmitter battery compartment, take the receiver out of the transmitter. The batteries are located in the bottom of the carrying case, beneath a plastic storage tray. Remove the four screw fasteners and lift the storage tray out. Remove the battery cover clamp and cover.

(2) Disconnect each battery, lift from case and replace with a fresh battery. Place new batteries in the same position as the old batteries. Attach the wiring as indicated in Fig. 18.

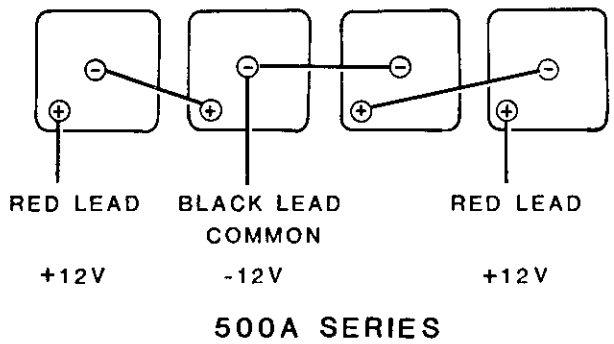


Fig. 18 — Transmitter Battery Hookup

NOTE: The transmitter has a protection circuit that prevents damage if the leads are connected incorrectly. HOWEVER, THE TRANSMITTER WILL NOT OPERATE IN THIS CONDITION.

(3) After the batteries have been changed, verify correct connections by repeating battery test procedure. Replace the cover, clamp and storage tray. Tighten the screw fasteners.

(b) RECEIVER: The receiver uses four 9-volt transistor batteries located under the access cover at the end opposite the controls. See Table A for replacement types. To change the batteries, use the following procedure:

(1) Remove the black access cover and replace all batteries. Retest.

(2) Replace access cover and tighten the cover screw.

7.03 BATTERY LIFE

(a) Battery life should exceed 100 hours of use under average field conditions.

7.04 FUSES

(a) Testing and replacing the transmitter fuse: Insert the Direct Connection Cable into the transmitter output jack. Set the OUTPUT Selector to BAT./FAULT RES. and hold the fuse between the red and black clips. The meter needle should deflect into the green zone. If not, the fuse is open and must be replaced.

7.05 AVAILABLE CONNECTION CABLES and ACCESSORIES (Fig. 19)

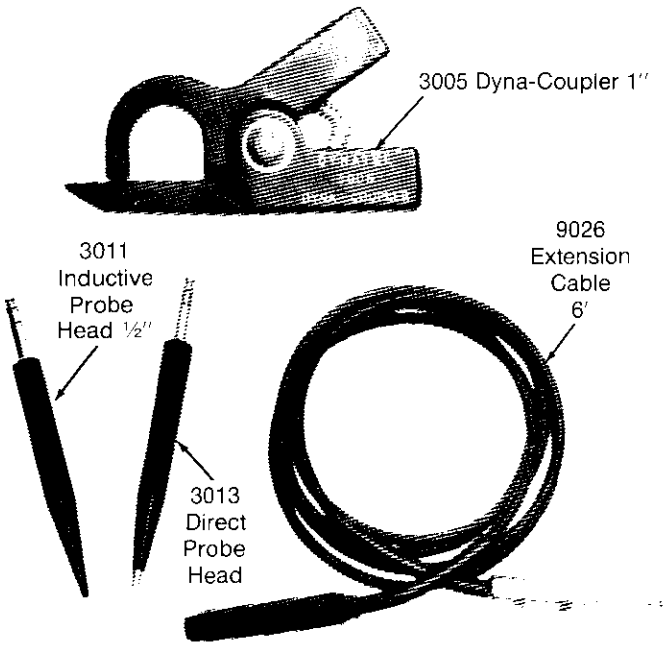


Fig. 19 — Accessories for the 500A Locator Available Separately from Dynatel/3M

8. Repairs

8.01 DYNATEL/3M operates two service centers for the repair of Dynatel instruments. There are no other factory authorized service facilities for our products.

8.02 If your 500A appears to be malfunctioning, review this manual to be sure the unit is being operated correctly and check the transmitter and receiver batteries, the transmitter fuse, and the connection cables. If the malfunction still exists, call the nearest of the two Service Centers listed below.

Sunnyvale, California
(San Francisco Area)
(408) 733-4300

Atlanta, Georgia
(404) 447-7145

You will receive over-the-phone assistance to identify the problem and determine if the unit needs repair. If factory service is needed, shipping instructions will be given by phone.

TABLE A

Battery Types

UNIT	No. of Batteries	Voltage	NEDA	Eveready	Burgess	Ray Ovac
Transmitter	4	6V	915	510S	F4BP	954
Receiver	4	9V	1064D	1222	2MN6	D-1604*

*Long life

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Patent-Pending

Important Notice to Purchaser:

All statements, technical information and recommendations contained herein are based on tests we believe to be reliable, but the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties expressed or implied:
Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Neither seller nor manufacturer shall be liable for any injury, loss or damage, direct or consequential, arising out of the use of or the inability to use the product. Before using, user shall determine the suitability of the product for his intended use, and user assumes all risk and liability whatsoever in connection therewith. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.

34-7016-2573-2
1000-0753-801

Litho in U.S.A. with 3m film and chemicals.

Test & Measurement Systems/3M
PO Box 2963
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