

TSP-21 Test Set

Dial Pulse or
Touch Tone
Hands-Free
Testing

 **HARRIS**
DRACON DIVISION



11710125-035

GENERAL

Dracon's TSP-21 test set employs the latest in integrated circuit design to provide either DTMF (Touch Tone) or dial pulse signaling output. The TSP21 test set is a self contained, line--powered unit designed to be used for line and switch testing and temporary communications in those situations where hands--free operation is desirable. This test set accepts a variety of test cords and headsets, and offers the following special features:

- Hands--free Operation
- Switch Selection of DTMF or Dial Pulse Signaling
- Talk/Monitor Mode
- Keypad (Signaling) In/Out Modes
- Polarity Indication
- Audible Ring Indicator
- Transmitter Mute
- Ground Start
- Automatic Redial (Dial Pulse Mode Only)
- Test Tone

The TSP-21 test set is dark blue in color and measures approximately 6-3/4 in. long, 3-1/2 in. wide and 2-3/4 in. high. It weighs approximately 21 ounces.

SPECIFICATIONS

Electrical:

Loop Limit:	2000 ohms maximum at 48VDC (20mA minimum loop current)
Talk Impedance:	150 ohms typical (similar to WECO 1013A and BECO 801)
Monitor Impedance:	6K ohms minimum at 1kHz
Test Tone:	577 Hz typical

Rotary Dial Output:

Pulsing Rate	10pps \pm 1/2 pulse
Percent Break	61% \pm 2%
Interdigit Interval	800 ms typical
Leakage During Break	400 uA maximum at 54VDC

SPECIFICATIONS

DTMF Output:

Tone Frequency Error	$\pm 1\%$ maximum
Level Per Tone Pair	0dBm maximum, -8dBm minimum
Low vs High Tone Difference	4dBm maximum

Physical:

Length	6 3/4 in. (17.15cm)
Width	3 1/2 in. (3.90 cm)
Height	2 1/2 in. (6.35 cm)
Weight	21 oz (600 g) maximum

Specifications subject to change without notice

PHYSICAL CHARACTERISTICS

The two-piece injection molded case is of high impact polycarbonate plastic which provides excellent insulating properties; and is designed to give rugged service and withstand the rough handling and shocks normally associated with craft tools.

The Belt Clip, located on the back of the case, is designed to ensure a secure connection to the craftperson's belt. The back of the case is contoured to fit snugly against the body when the test set is worn on the belt.

A velcro strap is provided to allow strapping the test set to the leg. The

FIGURE 1



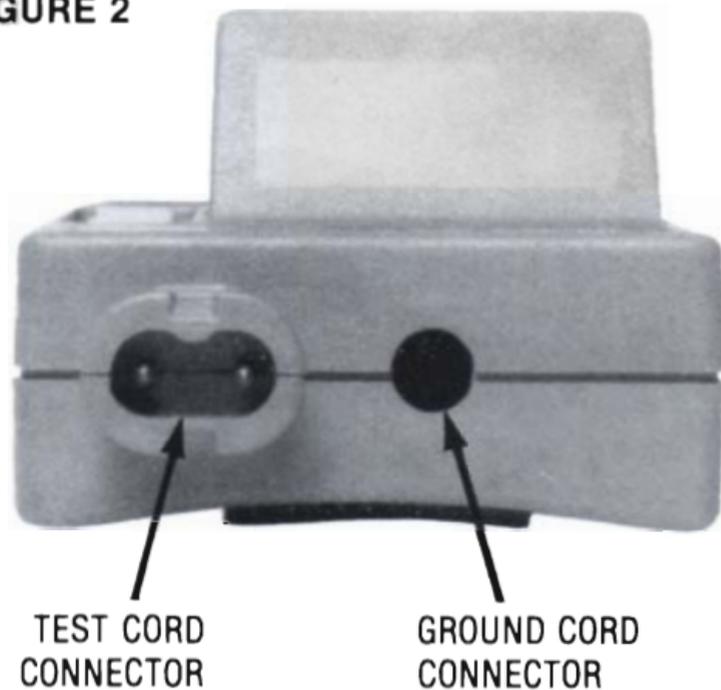
strap can also be used to hang the test set from a hook or around the craft person's neck. Refer to figure 5 for placement of the velcro self-adhesive strips supplied with the unit.

CONNECTORS

TEST CORD CONNECTOR
(Type 346A Plug) This connector accepts any 2-wire test cord which has a type 471A connector.

GROUND CONNECTOR
This connector accepts any ground cord which has a standard banana plug. The ground cord is used in conjunction with the GS (ground start) button to initiate a ground-start line seizure.

FIGURE 2



HEADSET CONNECTOR This plug accepts any telephone operator's headset which has a standard plug-in connector. Headsets with built-in amplifiers may be used with the test set as well as Type 52/53 headsets.

NOTE: Amplified Headset Restrictions — Headsets that have

amplified receivers will not work when the TALK/MONITOR switch is set to "MON". When using headsets that have an amplified receiver and/or transmitter, the receive sound level may be substantially lower when the KEYPAD IN/OUT switch is set to "IN".

DESCRIPTION OF TEST CORDS

STANDARD TEST CORD One end of this cord, is equipped with a 471A female connector that connects to the test set. The cord itself consists of one red and one black fabric covered conductor. Each conductor is fitted with an alligator clip which is offset 20 degrees

to minimize clip shorting on type 66 terminal blocks. The thumb handle and heel of each clip is covered with an insulating material. Each clip also has an insulation piercing spike.

NOTE: More information and part numbers for the optional items described below may be obtained from the Dracon catalog.

FIGURE 3



RED CONDUCTOR



**FEMALE
CONNECTOR**



OPTIONAL CORDS Four optional test cords are available for use with the TSP-21. They are described below.

- 5-foot cord with modular plug.
- 5-foot cord with 310 plug.
- 5-foot cord with 240A test plug and 1200 ohm mode switch. This cord is used when testing step-by-step switches.
- 20-foot cord with 346A plug and plug strain-relief. The 346A plug connects to the 471A connector on the standard cord. This arrangement extends the working range of the test set.

OPTIONAL ACCESSORIES

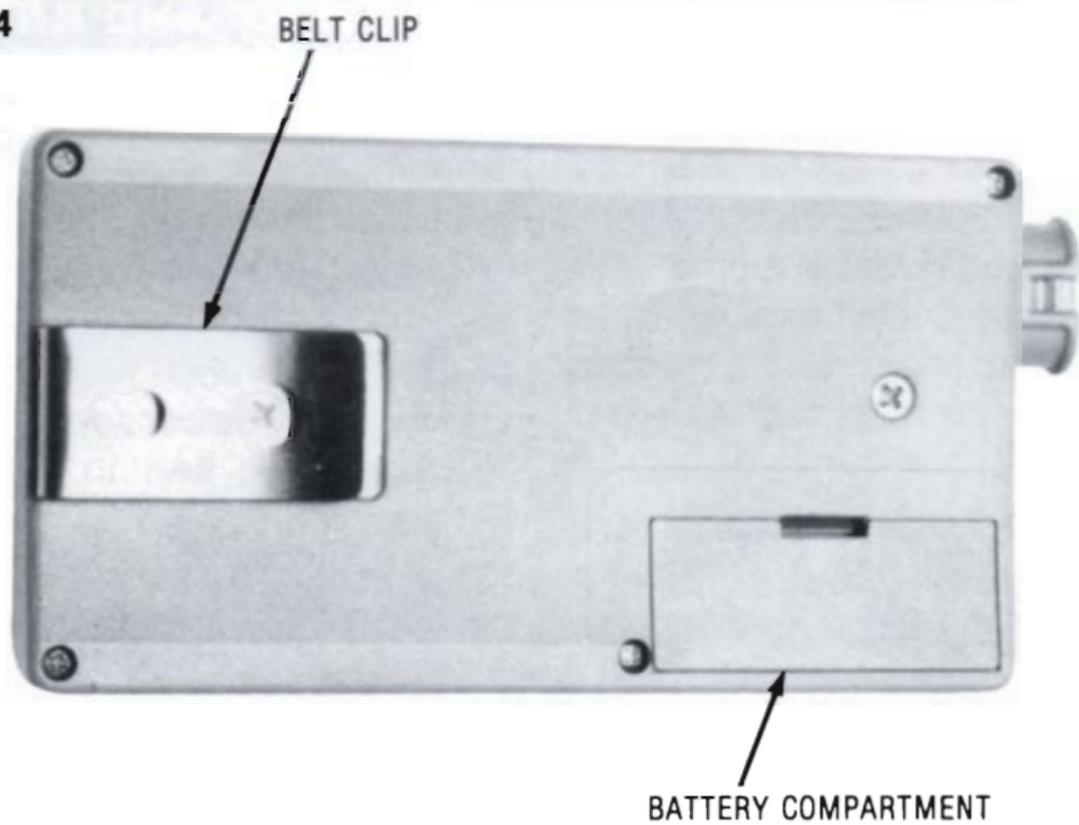
MODULAR ADAPTER Modular adapters provide a way for the standard test cord with alligator clips to test through modular jacks. The modular adapter has a short cord (either 4, 6 or 8 wire) with a modular plug. The adapter also has "clip on" terminals for connecting the cord clips.

NON-AMPLIFIED HEAD SET This headset is specially designed to work with the TSP-21. It has a non-amplified receiver, adjustable microphone and line clip.

BATTERY AND BATTERY COMPARTMENT

The battery compartment, located on the back of the case, holds a standard 9V battery (one battery is included with each test set). This battery supplies power to the redial memory when the test set is disconnected from the telephone line and to the test tone generator. A small coin or screwdriver may be used to open the battery compartment cover.

FIGURE 4



CONTROLS AND INDICATORS

Keypad The keypad is set into the case at a 45 degree angle, making it easy to use when the test set is worn on the belt. It has 12 buttons on a black plastic bezel. The bezel is recessed into the case to provide physical protection and to prevent accidental button operation.

DTMF/PULSE Switch Located below the keypad, this rocker switch selects the signaling output. The "TONE" position selects DTMF output and the "PULSE" position selects dial pulse output.

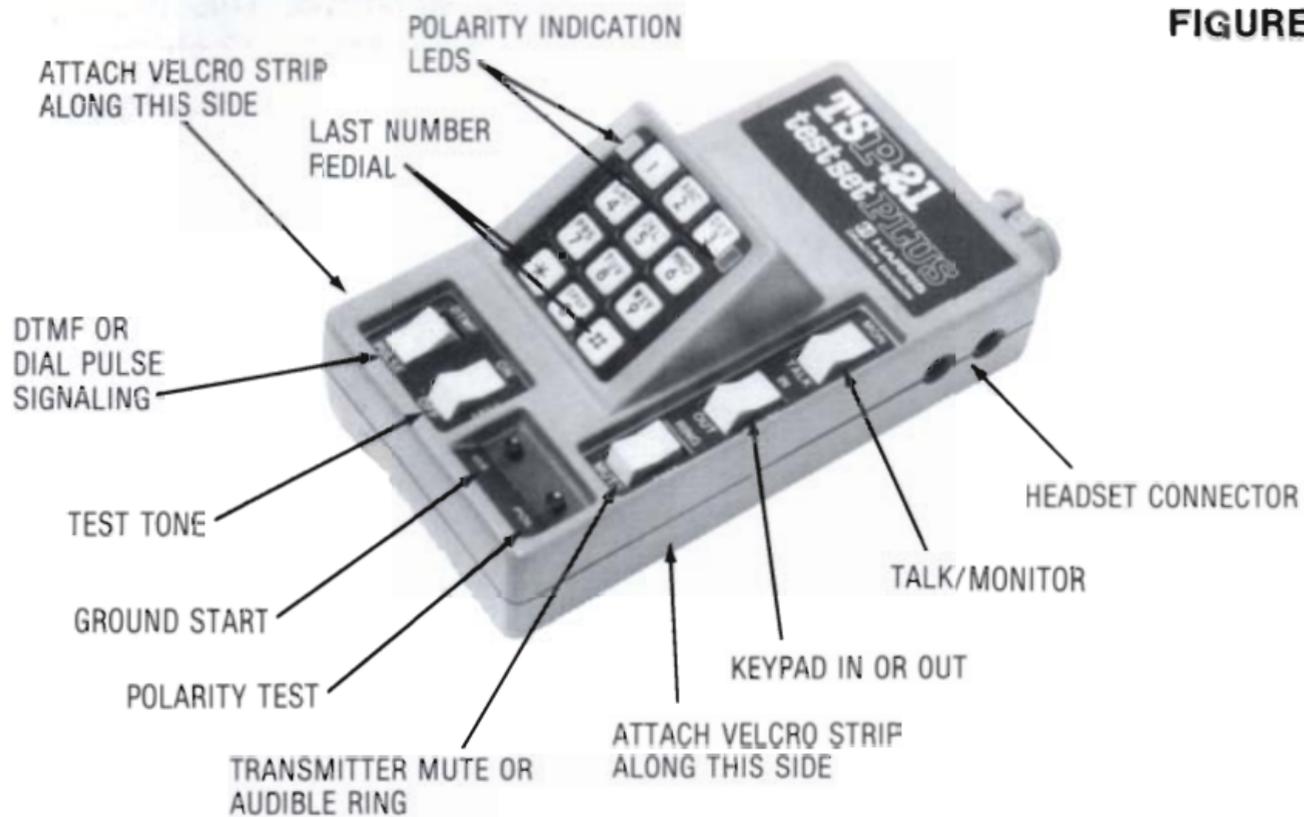
TEST TONE Switch Located below

the keypad housing, this switch activates the built in test tone generator.

GROUND START Button Located below and to the right of the keypad, this black button operates in conjunction with the ground lead of a three-wire test cord to initiate a ground-start line seizure. When the GS (ground start) button is pressed, the ground cord is connected to the ring conductor inside the test set.

POLARITY Button and LEDS Located below and to the right of the keypad, this black button is used in conjunction with the two LEDs located in the

FIGURE 5



keypad bezel to check line polarity. Pressing the POL (polarity) button when the TALK/MON switch is set to "MON", and the Test Set is connected to a telephone line or battery source, will cause one of the LEDs to light. The yellow LED will light if the red test lead is connected to the ring (negative) side of the line and black test lead is connected to the tip (positive) side of the line. If the position of the test leads is reversed, the red LED will light.

CAUTION: Operation of the POL (polarity) button on a busy circuit may cause annoying clicks or service interruptions.

NOTE: The TSP-21 test set is NOT

polarity sensitive. This test set will function normally when connected to the line in either polarity.

MUTE/RING SWITCH Located on the right of the keypad, operation of this rocker switch to "MUTE" mutes the transmitter, eliminating sidetone and providing improved intelligibility in noisy locations. Dialing is not recommended when in the "MUTE" position. When set in the "RING" position, this switch connects a ring detector circuit to the tip and ring. In the RING Mode, an audible ring indication is heard whenever a generator signal is present on the tip and ring. In the "NORM" position, the switch removes the ring

indicator from the tip and ring and disables the transmitter mute circuit.

KEYPAD IN/OUT Switch Located beside the keypad, this rocker switch selects the operation mode (signaling or non-signaling). When the switch is set to "IN", the test set operates as a modern electronic telephone set. This mode is used for all normal communication functions. The switch's "OUT" position bypasses the test set electronics, including the keypad. In this mode signaling is not possible, but the test set operates at very low voltages, much like standard test sets currently in use. Line testing is possible in either switch position. The

"OUT" position is recommended when testing at or near the loop limit (2000 ohms at 48VDC) or when testing on dry circuits. The "OUT" position must be used when the circuit voltage is 6V or less.

TALK/MONITOR Switch Located on the right side of the keypad, this rocker switch, when placed in the "TALK" position, establishes an off-hook condition for dialing and talking. In this mode the test set performs as a common battery telephone. The "MON" (monitor) position removes the transmitter from the circuit and provides a high impedance coupling to the line. This allows line monitoring without

disrupting conversations, data or signaling.

*** and # Keys** Located at the bottom of the keypad, either key activates the last-number-redial function, when the MODE switch is in the "PULSE" position.

OPERATION

Dialing:

- 1) Set the TALK/MONITOR switch to "MON".
- 2) Connect the test leads to the line and verify that the line is idle.
- 3) Set the KEYPAD switch to "IN".
- 4) Set the MODE switch to either

"PULSE" or "TONE" according to the type of signaling required ("PULSE" for dial pulse, "TONE" for DTMF).

- 5) Insure that the MUTE/RING switch is set to "NORM".
- 6) Set the TALK/MONITOR switch to "TALK" and verify that dial tone is received (if dial tone is furnished).
- 7) Enter the number to be called on the keypad.

NOTE: If "TONE" has been selected, the tones associated with each digit will be generated as the corresponding key is depressed. If "PULSE" has been selected, the number may be entered at any rate

on the keypad; digits will automatically pulse out at the correct rate.

- 8) To terminate the call (go on-hook), either during or after dialing, set the TALK/MONITOR switch to "MON".

Polarity Check:

- 1) Set the TALK/MONITOR switch to "MON".
- 2) Connect the test leads to the circuit under test and verify that the circuit is idle.
- 3) Press and hold the POL (polarity) button while the check is being conducted. If the red LED lights, the red test lead is connected to the tip (+) side of the line. If the yellow LED

lights, the red test lead is connected to the ring (-) side of the line.

CAUTION: Operation of the POLARITY button on a busy circuit may cause annoying clicks or service interruptions. Operation of this switch on an idle circuit may cause line seizure.

NOTE: The TSP-21 test set is not polarity sensitive. This test set will function normally when connected to the line in either polarity.

Line Monitoring:

- 1) Set the TALK/MONITOR switch to "MON" (the KEYPAD and MODE

- switches may be in either position).
- 2) Connect the test leads to the circuit under test. The line may now be monitored without disrupting traffic.

Operation on Low Voltage or Dry Circuits:

- 1) Set the KEYPAD switch to "OUT".
- 2) Set the TALK/MONITOR switch to "MON".
- 3) Connect the test leads to the circuit under test (verify that the circuit is idle if two-way communication is required).
- 4) Set the TALK/MONITOR switch to "TALK" for two-way communication.

NOTE: On a dry circuit, two-way communication is not possible; the test set can only be used for line monitoring.

NOTE: Setting the KEYPAD switch to "OUT" bypasses the test set electronics, thereby increasing its loop limit. The test set signaling function will not operate in this mode, but all other functions operate normally.

Ground Start Operation:

- 1) Set the TALK/MONITOR switch to "MON".
- 2) Connect the black test lead to the tip and the red test lead to the ring of

the circuit to be used and verify that the line is idle.

- 3) Set the KEYPAD switch to "IN".
- 4) Set the MODE switch for the desired type of dialing ("TONE" for DTMF or "PULSE" for dial pulse).
- 5) Set the TALK/MONITOR switch to "TALK".
- 6) Connect the ground lead to a ground.
- 7) Press the GS (ground start) button until dial tone is heard and then release the GS button (if dial tone is furnished).
- 8) Enter the number to be called on the keypad.
- 9) To terminate the call, set the TALK/MONITOR switch to "MON".

Redial (Pulse Signaling Only)

In this PULSE mode, dialed digits (17 digits maximum) are retained in the unit's memory, providing that the battery is installed. The 18th digit dialed causes the first digit dialed to be dropped from memory.

- 1) Set the TALK/MON to "MON" then back to "TALK".
- 2) Depress either the * or # key.

The number will be cleared from memory, if the battery is removed from the test set.

TEST TONE Operation A test tone generator is a feature of the TSP-21 test set. It provides a 0dB nominal (into 600

ohms), 577Hz typical square wave tone. The test tone is activated by the TEST TONE switch located on the front of the keypad housing (providing the TALK/MON switch is properly set, see below). To use the test tone for pair identification or line testing, follow the procedure presented below.

- 1) Ensure that the line is being monitored by someone who will verify presence of the tone.
- 2) Connect the test cord leads to the line (The TSP-21 test set is not polarity sensitive).
- 3) Set the TALK/MON switch to "MON".
- 4) Set the TEST TONE switch to "ON".

- 5) To discontinue the test tone, set the TEST TONE switch to "OFF".

MAINTENANCE

The Battery compartment should be inspected every six months for battery leakage and the battery should be replaced as necessary. Because of the low power consumption in standard units, the 9V battery should last for a period of time equal to its shelf life. Power consumption for tone operation is approximately 2ma. This will reduce battery life depending on tone usage. Use of a high quality alkaline battery is recommended.

Battery Installation

- 1) Using a coin or small screwdriver, remove the battery compartment door by forcing the door latch away from the case (Fig. 1).
- 2) Remove the old battery if installed.
- 3) Install an alkaline 9V transistor battery.
- 4) Replace the compartment door and snap it into place.

No other periodic maintenance is required. If the unit fails to operate properly, it should be returned to Dracon or an authorized service center for maintenance. A Return Authorization Number must be received before returning any equipment for repair.

This number may be received by calling the Dracon Customer Service Department at (805) 987-9511.

WARRANTY: Dracon guarantees equipment of its manufacture and each part or component thereof against all defects in material and/or workmanship and agrees to remedy any such defect at no charge provided that the defective unit is returned transportation prepaid to the Dracon factory from which shipment was made. This warranty extends for a period of one year from the date of installation or initial use, provided that this period shall not exceed 18 months from the date of shipment from factory. In no event will Dracon be liable for any incidental or consequential damages.

This warranty does not extend to products which have been subjected to neglect, accident or improper use, nor to units which have been altered by other than authorized Dracon personnel.

Caution: Use with 110 VAC 60 HZ power voids our warranty. Good safety procedures prohibit the use of this tool, and other ordinary telephone craft tools, with 110 VAC 60 HZ power.



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