#4300A-L4

SUPER RANGER MUTT®

Mobile Universal Trailer Tester

OPERATOR'S MANUAL

MADE IN USA

Ultra Portable, Battery Powered, Advanced Diagnostic Trailer ABS and Light Tester

Innovative Products of America® Incorporated
888-786-7899 • 234 Tinker Street, Woodstock, NY 12498 • www.ipatools.com

LETTER FROM THE PRESIDENT OF IPA®

My name is Ian Vinci and I would like to thank you for your interest in our products. In today's world, we have all experienced the lack of service and consideration demonstrated by many companies after you buy their products. They say whatever they can to make the sale, and then it's like pulling teeth to get any service response out of them. I know this myself firsthand and because of this, I want to be sure that your experience with IPA® meets your expectations and that IPA® never disappoints you with our service or customer response.

To prove my commitment to you, if for any reason, you are not happy with one of our products, or more importantly, with the response from our customer service department, or any member of the IPA® team, I invite you to contact me directly via my email, president@ipatools.com or call me at 888-786-7899. Your satisfaction is more important to me than the sale itself. We will not be in business for long if we don't make you completely happy with our products and service. I want IPA® to be different and be known for its quality and service.

With that said, please take a look at our product line. You will see innovative first time products that were created to help you do your job faster and better than before. I would also like to invite you to critique our products. If you can think of a better way to make them or changes that will make them work better, please contact me directly and I will be sure to look into it. If you have an innovation and would like some feedback, give me a call.

From all of us at IPA®, we thank you for taking the time to review our product line and wish you and your family the very best of everything.

Ian Vinci
President
IPA®

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PART 1: INTRODUCTION

The Super Ranger MUTT® with ABS is an advanced diagnostic, remote controlled trailer tester. It includes an internal lithium battery, is microprocessor controlled, and features state-of-the-art current sensing, computer controlled circuit protection, live circuit monitoring, as well as digital voltage and amperage draw readout.

The Super Ranger MUTT® will detect poor grounds, open circuits, crossed circuits, short circuits, and also features Pulsar® which aides in troubleshooting intermittent and dead shorts. Models equipped with ABS diagnostics can be utilized to read and clear codes and display troubleshooting information on a trailer via the 7-way connector. Readings are displayed on the face panel.

This manual covers the Super Ranger MUTT® Series technology. Please consult your specific model for your exact list of included options. This product is backed by a 1-year warranty with 24-hour repair or replace service. Should you run into any issues, please contact IPA® directly at 888-786-7899 or email tech247@ipatools.com.

1.1 Testing Functions

- ABS Testing:
  - Read and clear codes
  - Displays diagnostic troubleshooting information
  - Accesses ECU data: manufacturer, make, model, etc.
  - Automatically detects corroded ABS wires and faulty ECU's with patent-pending technology
- Electrical Testing (12 Volt Operation):
  - Automatic cross, open, overload, short and ground fault detection
  - Highly accurate digital ammeter with 5mA resolution
  - Chase down short circuits with Pulsar® mode
  - Ground failure detection: differentiates between wire and chassis ground

1.2 Registering Your Tester's Warranty

There are two options for registering your tester for warranty:

- Complete the included warranty card and mail it to:

  Innovative Products of America
  234 Tinker Street
  Woodstock, NY 12498

- Complete the online warranty registration at https://www.ipatools.com/warranty

PART 2: SAFETY INSTRUCTIONS

2.1 Important Information

It is important to read, understand and follow all safety messages and instructions printed in this manual and on the equipment before operating. If safety information is not heeded, serious injury or death of the operator or bystanders may occur.

Danger

Indicates a hazardous situation, if not avoided, will result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

Warning

Indicates a hazardous situation, if not avoided, could result in death or serious injury. The possible hazards are shown in the adjoining symbols or explained in the text.

Caution

Indicates a hazardous situation, if not avoided, may result in minor or major injury. The possible hazards are shown in the adjoining symbols or explained in the text.

The following safety alert symbols are used in this manual.

Symbol 1: Potential burn hazard. Sparks from electrical shorts can ignite flammable liquids such as fuel or oil. Heat from electrical overloads can cause fire hazards.

Symbol 2: Potential electrical hazard. Batteries have enough electrical energy potential to ignite flammable liquids such as fuel or oil. Wire overloads can cause electrical failures. Shock hazard exists.

Symbol 3: Potential explosive air hazard. Pneumatic pressures used with this equipment can cause explosive failures on damaged equipment.

Symbol 4: Potential eye hazard. Wear OSHA approved safety glasses. Battery acid and high air pressures create hazardous situations for eyes.

Symbol 5: Potential chemical burn hazard. Wear protective gloves. Battery acid is corrosive and can cause skin damage.

Symbol 6: Potential electrical hazard. Electrical energy can cause heat and burn hazards.

Symbol 7: Potential fire hazard. Use caution with flammable liquids such as fuel and oil. Electrical shorts can ignite flammable liquids and wiring.

Symbol 8: Important information is stated.

2.2 Lithium Battery Safety/Hazard Information

Risk of Fire, Serious Injury and/or Property Damage

- Do not modify, disassemble or alter the lithium battery.
- Avoid vibrating, puncturing, tampering, or contacting with metal.
- Only use the provided lithium battery charger.
- Never leave lithium battery unattended while charging.
- Disengage charger if lithium battery gets hot, smokes, swells or becomes odorous.
- If lithium battery leaks fluid onto your skin or in your eyes, rinse well with water and seek medical attention immediately. Do not rub fluid on skin or in eyes. Battery fluid can cause real harm if left untreated.
- Keep out of reach of children.
- Risk of fire is exacerbated if: battery is not recharged shortly after being fully discharged; battery is damaged; battery is defective; battery is used/stored at extreme temperatures; battery is reaching end of life cycle.
- Recharge lithium battery within 24 hours of full discharge.
- Do not charge lithium battery at temperatures below 40ºF (4°C).
- Do not expose lithium battery to saltwater or similar fluids.
- Do not drop lithium battery. If battery is dropped, inspect for damage. If damage is found, do not use.
- Discharge lithium battery at temperatures between 4ºF and 140ºF (-20°C and 60°C).
- Store lithium battery at temperates between 40ºF and 80ºF (4°C and 27°C).
- A frequently used lithium battery may be stored at 100% charge. If used infrequently, store lithium battery at 40% to 70% charge.

2.3 General Charger Use

Risk of Electric Shock and Fire

- Before connecting charger to unit, make sure Power switch is set to OFF.
- Do not remove or bypass the grounding pin.
- Do not operate charger with damaged cord or plug. Replace cord or plug immediately if damage occurs.
- Position power cord and charger cables away from the hood, doors and hot or moving engine parts where they could be damaged.
- Unplug power cord by grasping and pulling on the plug, rather than the cord when disconnecting charger from outlet.
- Charger power cord uses equipment-grounding conductor and a grounding plug. Plug only into a 120V AC outlet that is correctly installed and grounded in accordance with all ordinances and local codes.
- Unplug power cord from outlet before cleaning or maintaining tester and charger. Turning off controls does not reduce the risk of electric shock.
- Do not operate charger after a sharp impact, drop or any other damage. Do not disassemble charger.
- Use only recommended attachments.
- Do not charge a frozen battery.
- Do not overcharge a battery.
- Electric shock or fire can cause injury.

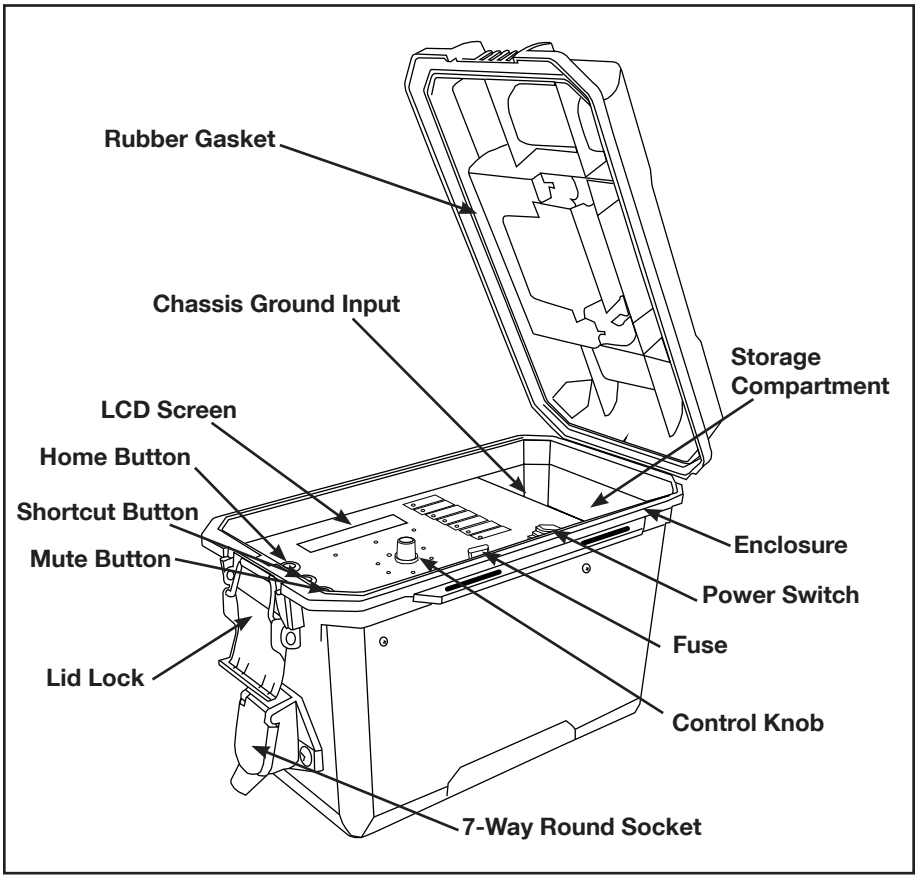
Risk of Entanglement

- Keep yourself, clothing and battery charger leads clear of moving parts such as fan blades, pulleys, hood and doors.
- Moving parts can cause injury.

Risk of Burns

- Batteries can produce short circuit current high enough to weld jewelry such as rings, bracelets and watches. You must remove them before working near batteries.
- Short circuits can cause injury.

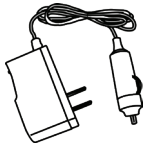
PART 3: WHAT'S INCLUDED



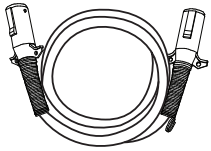
3.1 Included Parts and Accessories:

12-BUTTON REMOTE CONTROL
#MUT-RM12

500mA BATTERY CHARGER
#CHR0001



8-ft. 7-Way Round Pin
Diagnostic Cable
#7900K-1-8-AS2



Use the Provided Reference Numbers When
Ordering Products and Parts Above
Toll Free: 888-786-7899

PART 4: INITIAL SET-UP

4.1 Specifications

Connection Type:	7-Way Round Pin
Power Input:	12V DC
Battery:	Lithium Iron Phosphate (LiFePO4)
Ammeter:	5mA—21A
Max Output Current:	10A Continuous
Peek Inrush:	16A @ 30 Seconds
Controls:	Remote or Manual
Microprocessor:	2020 High-Speed
Display:	Dual-Line, 32 Character, All Environment Digital LCD Screen
Faceplate:	Water-Resistant and Sealed
Buttons:	Illuminated Pushbutton Switches
Storage:	6.75" L x 3" W x 7.5" D
Materials:	Plastic Case with Steel Control Panel and Battery Compartment
Weight:	11.3 lbs
Dimensions:	17" L x 9" W x 11" H

DC POWER

12 Volt DC Only

4.2 Battery/Power Supply Requirements

The Super Ranger MUTT® is shipped with an internal Lithium Iron Battery LiFePO4. It should only be charged with the supplied battery charger, which is specially designed to charge lithium batteries. The use of another type of battery charger will void the product warranty.

4.3 Shipping

Lithium batteries should never be air shipped fully charged. They must be discharged to less than 20% capacity. The voltage of the battery should read 12.9V or less prior to shipping the battery.

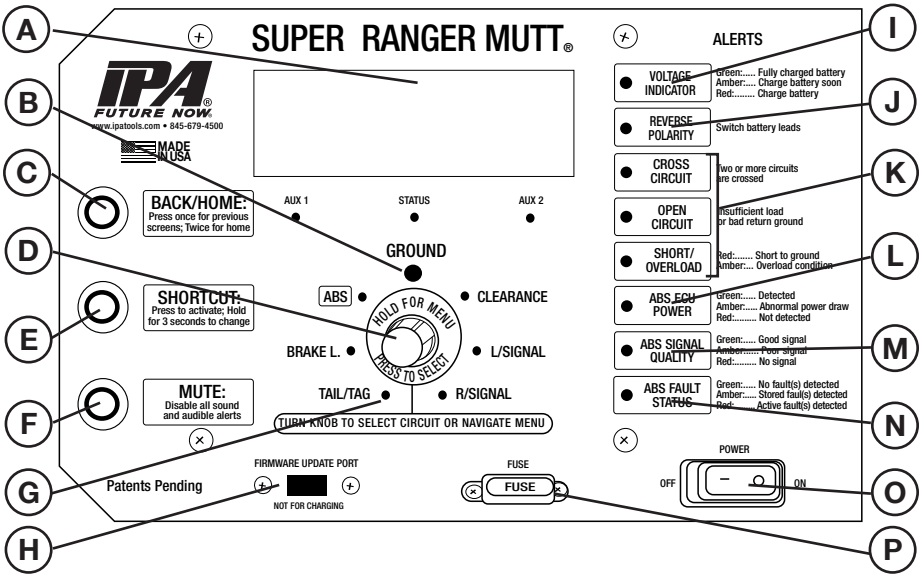
4.4 Auto Shutdown Feature

If left inactive for a period of 20 minutes, the Super Ranger MUTT® will enter a Sleep mode and power down.

- A sound is emitted every 20 seconds during Sleep mode.
- Activation of the control knob will cancel Sleep mode.

PART 5: GENERAL CONTROLS AND OPERATIONS

5.1 Control Panel



A. LCD Screen

Shows voltage, amperage, ABS readings, circuit settings and system menus.

B. Ground Integrity Indicator

Solid green LED indicates good ground. Blinking green LED indicates a bad/poor ground. Ground integrity is automatically verified when power is turned on.

C. Back/Home Button

Toggles display between reading voltage/current/amperage/ABS diagnostics and the last viewed menu or function screen.

D. Control Knob

Used to select trailer circuits or to navigate system menus.

E. Shortcut Button

Activates custom shortcut. Shortcuts can be set by holding button for three seconds.

F. Mute Button

Mute all alerts.

G. Circuit Indicators

The small green LEDs illuminate or blink in testing phase.

H. USB Port

Used to update firmware. NOT for charging.

I. Voltage Indicator

Green LED indicates fully charged battery. Amber LED indicates battery will need to be charged soon. Red LED indicates battery needs to be charged immediately.

J. Reversed Polarity Indicator

Indicates when battery leads need to be switched due to reversed polarity.

K. Trouble Warning Indicators

Flashing red LEDs indicate problems that may exist in a selected circuit. This includes the Cross Circuits indicator, Open Circuits indicator and Overload indicator.

L. ABS ECU Power Indicator

Indicates health status of ECU circuit by analyzing electronic signature of ABS ECU.

M. ABS Signal Quality Indicator

Indicates the communication status of ABS computer through proprietary technology. LED colors display the specific status and should be referenced in relationship to the ABS ECU Power and ABS Fault Status indicators.

N. ABS Fault Status Indicator

Indicates if any types of ABS faults are present on the trailer.

O. Main System Power Switch

Powers on or shuts off the Super Ranger MUTT®.

P. 30 Amp Fuse Socket

Overload protection.

5.2 Using the 12-Button Remote Control

The included 12-button remote control is preprogrammed to your Super Ranger MUTT® and should never lose its programming. In the event that you suspect your remote has lost its programming, contact technical support at 888-786-7899 or email tech247@ipatools.com.

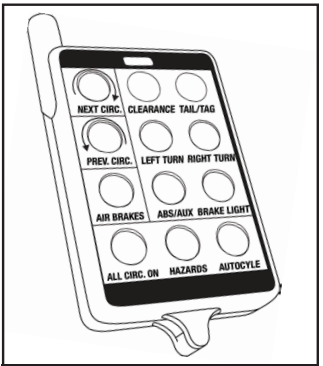
The supplied key fob battery for the remote control is 12V, Alkaline Energizer type A23. A Gold Peak type 23A or Duracell MN21 battery can also be used.

How to Program the 12-Button Remote

1. Press and hold the top-center button while turning the tester's main power on.
2. Continue to hold the button for two seconds and then release.
3. Your remote control is now programmed.

How to Use the 12-Button Remote

Pressing each button will select the corresponding circuit on the MUTT® (Pressing and holding the ABS/AUX or Brake Light button will latch both circuits on.)



12-Button Remote Control

WARNING: Inclement weather, nearby power transformers and closely parked trailers may reduce the remote signal.

PART 6: ELECTRICAL/LIGHTING TESTING

Complete the pretesting checklist prior to all testing procedures.

The Super Ranger MUTT® is microprocessor controlled and features a special diagnostic firmware, designed to speed up your inspection process. The MUTT® will power the selected electrical circuits and instantly alert you to any signs of a faulty condition. **To properly utilize the diagnostic features, a complete scan of the trailer's electrical system should be performed at the front of the trailer using the MUTT® prior to a walk-around inspection.** If any wiring faults are present, the MUTT® will blink or sound, alerting you to the issue. Only a one-time, walk-around/visual inspection is needed to confirm that each individual light bulb is properly illuminating.

NOTE: Some advanced functions may not be listed on the face panel, so it is important to read the manual in its entirety to ensure that you are getting the full use of this diagnostic system.

6.1 Pretest Checklist

The pretesting checklist should always be completed prior to using the Super Ranger MUTT®.

Unit Placement

- Place the tester on a flat, level surface.
- Chock trailer wheels to avoid rolling.

Maintain Connectors

Dielectric grease should be used on all connections to avoid corrosion. If a bad connection exists at the terminal junction, you may get an erroneous reading and the tester will not work properly.

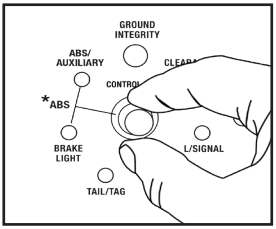
- Make sure you have a solid connection in the socket.
- Be certain the 7 pins in each plug are clean and spread to the proper size.
- Always check the connector pins on the tester for proper expansion. Over time, the pins may bend in slightly resulting in a poor connection between the connector and the cable ends. A flat head screwdriver can be used to expand the pins until a tight connection is made.

6.2 Selecting a Circuit

Circuits can be selected for testing manually, via remote control or by initiating Auto Cycle mode.

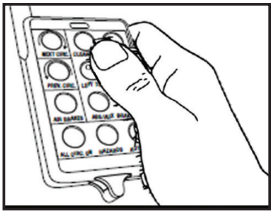
Manually

1. Turn the control knob to select a circuit. The control knob is automatically set to Ground Integrity when power is turned on.



12-Button Remote Control

1. Press and release the desired circuit's button.
2. Press the Next or Previous Circuit buttons to cycle through circuits.

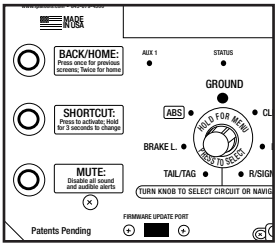


Auto Cycle Mode

Auto Cycle mode automatically tests one circuit at a time in a clockwise rotation.

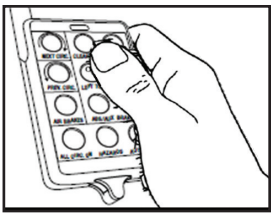
Manually

1. Access Auto Cycle mode as a shortcut setting via the Shortcut botton.
2. A five-second delay commences between circuit sections.
3. Circuits are automatically tested one at a time in a clockwise rotation.
4. To cancel Auto Cycle mode, momentarily press and release or turn the control knob.



12-Button Remote Control

1. Press and release the Auto Cycle button on the 12-Button Remote. The AUX2 indicator should illuminate.
2. A five-second delay commences between circuit sections.
3. Circuits are automatically tested one at a time in a clockwise rotation.
4. To cancel Auto Cycle mode, momentarily press and release or turn the control knob.



NOTE: Auto Cycle mode does not work when ABS or Brake Light circuits are selected.

6.3 Ground Integrity Test

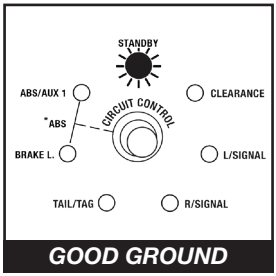
Each time the Super Ranger MUTT® is powered on, it automatically runs a Ground Integrity Test. A good ground connection must be established for the MUTT® to operate a trailer's electrical system.

1. Immediately after power up, the green lights around the control knob will illuminate.
2. A solid/healthy ground connection is indicated by a steadily illuminated Ground Integrity indicator.

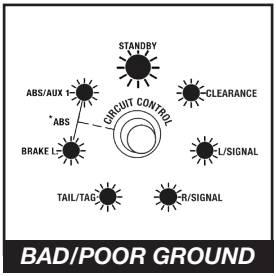
NOTE: The Super Ranger MUTT® cannot monitor ground condition while selecting circuits. A sudden loss of ground while testing circuits will present as open circuits on each selected circuit. To confirm ground status, turn control knob back to the ground position. While in ground position, the Super Ranger MUTT® continuously monitors the ground status.

3. Bad/poor ground or bad cable condition is indicated by all of the LEDs blinking simultaneously.
4. When one or more green circuit LEDs blink while the Ground Integrity indicator is steadily illuminated, it indicates that a solid ground has been established, but an open circuit has been detected. Refer to OPEN CIRCUIT on the next page.

Chassis and Pin Grounds



GOOD GROUND



BAD/POOR GROUND

A poor ground warning may be an indication that the connected trailer is only wired for chassis ground. There are two ground types. 1) Pin Ground: The ground wire from each light assembly is wired through the main harness up into the trailer plug. 2) Chassis Ground: The ground wire from each light assembly is grounded directly to the trailer chassis. Ground with the truck is established at the king pin.

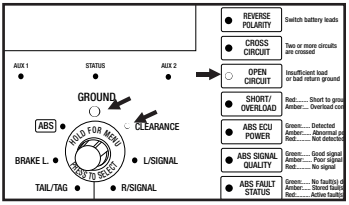
NOTE: DO NOT assume a bad ground warning is a result of a faulty trailer. Check cable connection.

6.4 Fault Indication

Open Circuit

An open circuit fault warning is triggered when the circuit draws under 5mA of power. The Super Ranger MUTT® has a circuit detection resolution of 5mA. When the Super Ranger MUTT® senses no load, it is often a symptom of a disconnected wire, cut wire, poor pin connection or bad return ground. The tester can detect open circuits in two ways.

1. During Ground Integrity Test: An individual circuit will blink and no audible alerts will be present.
2. During Circuit Selection: The LCD screen will indicate the type of fault. The corresponding circuit's LED and alert indicator will flash, and the tester will provide an audible alert (beep).

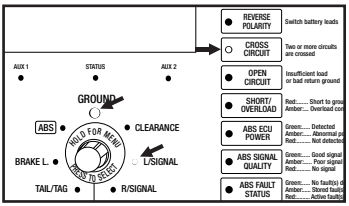


NOTE: Open Circuit indicator will only illuminate during circuit selection.

Crossed Circuits

The Super Ranger MUTT® indicates that two or more circuits are back feeding or crossed. This can be a symptom of two wires in the same harness wearing through their insulated coating and connecting.

1. When a crossed circuit is identified, the LCD screen will display "CROSS CIRCUIT". The circuit LED that should not be powered and needs correcting will flash, and the tester will provide an audible alert (beep).

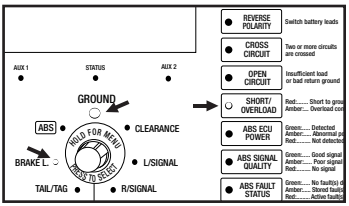


NOTE: In some cases, a crossed circuit may be a normal function of advanced diagnostic testing, such as with certain ABS systems.

Short/Overloaded Circuit

Short circuits or overloads can occur when a positive/hot wire touches ground or the load on the circuit exceeds the allowable current or amperage draw (factory default is 21 amps). A short or overload can also be a result of faulty lights or poor connections.

1. If a short or overloaded circuit is suspected, the tester will instantly suspend power for three seconds and enter PULSAR® mode until the short is removed.
2. The LCD screen will indicate the type of fault. The corresponding circuit LED and alert indicator will flash, and the tester will provide an audible alert (beep).



3. During PULSAR® mode, the tester enters a three-second countdown sequence. When the countdown completes, the tester will attempt to restore power to the circuit. If a short is still present, steps 1-3 will automatically repeat.

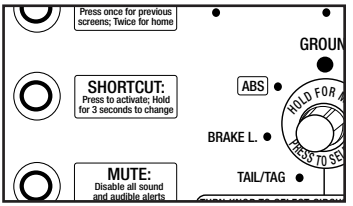
NOTE: PULSAR® mode can be a useful tool for finding dead and intermittent shorts.

6.5 Activating Hazard Lights

The four-way flashers on the trailer can be activated manually or with the remote control.

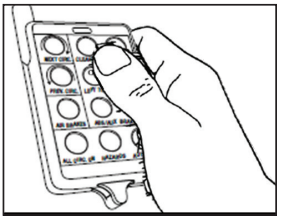
Manually

1. To activate/deactivate, access Hazard mode as a shortcut setting via the Shortcut botton.



12-Button Remote Control

1. To activate/deactivate, press and hold the Hazards button.



6.6 All Circuits On (Override) Mode

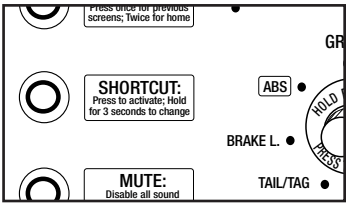
All Circuits On mode will engage all electrical circuits at the same time. While short circuit sensing is operational in this mode, if a short circuit is found, the Super Ranger MUTT® will not be able to identify which circuit is the cause of the short. Open and crossed circuit sensing is not operational in this mode.

On trailers using incandescent bulbs, All Circuits On mode will typically result in an overload because the amperage draw will exceed the maximum of 20 amps.

All Circuits On mode can be accessed manually or by remote control.

Manually

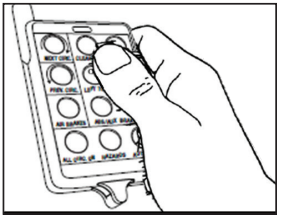
1. To activate/deactivate, access All Circuits On mode as a shortcut setting via the Shortcut botton.



NOTE: Does not work when ABS or Brake Light circuits are selected.

12-Button Remote Control

1. To activate/deactivate, press and hold the All Circ. On button.



PART 7: ABS DIAGNOSTICS

7.1 Accessing ABS Codes

The Super Ranger MUTT® is equipped with integrated ABS diagnostics and allows for the ability to access and clear ABS fault codes via the control panel LCD.

ABS Explained

Modern trailers with ABS systems store fault codes when an error or malfunction occurs. Trailers with ABS systems typically have an amber colored light labeled “ABS” located on the road side of the trailer. When an active fault is present, this light will illuminate, alerting the driver or technician that there is an active fault within the ABS system. When an ABS fault is active, the problem must be resolved, and the ABS light cleared in order for the trailer to pass inspection. ABS system faults are often associated with open circuits and loss of communication to the wheel speed sensors, or loss of power to the ABS ECU. While there are several ABS manufacturers, they all generally follow the SAE recommendations for how to display codes. These codes are traditionally accessed through two methods.

The simple analog method is commonly referred to as the Blink Code method. Each manufacturer differs in the way blink codes are initiated. Blink codes are a slower and more tedious way of retrieving ABS information with the major deficiency being most manufacturers do not allow you to clear codes via the Blink Code Method.

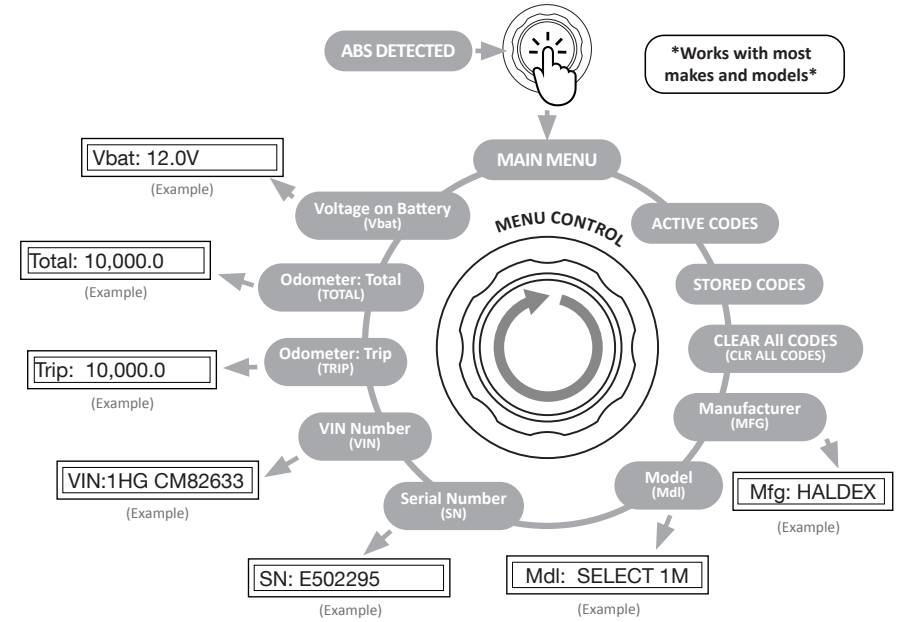
The method of using a scan tool to retrieve codes in commonly referred to as the Digital Fault method. Digital fault codes can be viewed along with the definition of the fault on the screen which improves troubleshooting time. The digital method also allows for codes to be cleared which prevents the technician from having to jack up the trailer and spin the wheels or pull it down the road just to clear a code.

SUPPORT LINKS AND INFORMATION: If you suspect an issue with the tester’s software or hardware, please call IPA® at 888-876-7899 or email tech247@ipatools.com. For issues with the trailer or ECU modules, please contact the ABS ECU manufacturer. The most common manufacturers are Meritor (www.meritor.com), WABCO (www.wabco-auto.com), Haldex (www.haldex.com), Bendix (www.bendix.com) and Gen2 (www.gen2abs.com).

7.2 Manual Controls

In this method, the user must use both the press function and the turn function of the control knob to access various menus and read through ABS troubleshooting information that is available within the LCD screen.

Once the tester is turned on and ABS is detected, you can turn the control knob to cycle through menus or sub-menus. Press the control knob to access the sub-menus.



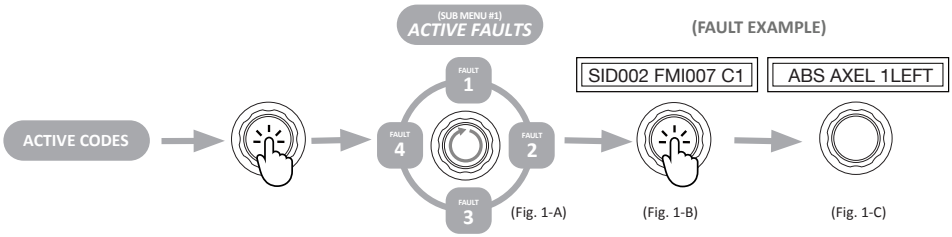
Note: Turning the control knob clockwise allows you to scroll through each sub-menu. Turning the control counterclockwise will back you out one sub-menu at a time.

The Super Ranger MUTT® communicates with the trailer's ABS ECU in real time, via IPA®'s proprietary internal ABS PLC communication module. This module is automatically activated as long as the ABS/AUX circuit is selected/powered up by the tester. Once activated, the ABS module will send information request commands to the trailer's ECU. The trailer's ECU will automatically broadcast back the ECU make, model, VIN, and mileage along with other basic information. This information is then stored inside the internal computer of the tester.

When fault codes or clear fault commands are requested, the ABS PLC communication module will send the command to the trailer's ECU. The user must then request fault codes again to verify that there are no active faults. Each Super Ranger MUTT® provides ABS data status lights which indicate the status of information either being sent to the trailer in the form of commands, or information being broadcasted from the trailer to the tester. When troubleshooting ABS connectivity issues, it is imperative for the technician to view these status LEDs. Failing to view the status LEDs could result in false assumptions such as a faulty ABS computer, broken ABS light and others.

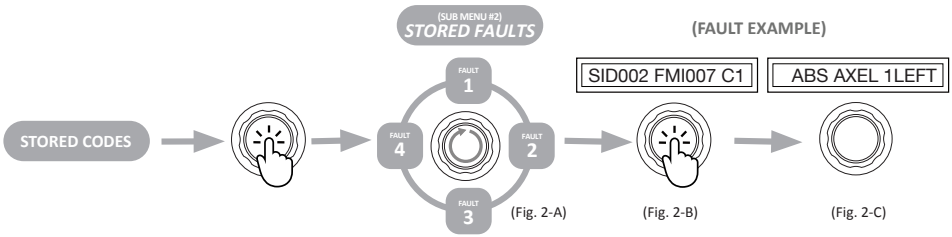
Accessing Active Faults (Sub-Menu #1)

With the ACTIVE FAULTS Sub-Menu 1 selected and the Active SID and FMI codes displayed, turn the control knob clockwise to cycle through the fault codes (Fig. 1-A). Press the control knob (Fig. 1-B) to read the fault description (Fig. 1-C).



Accessing Stored Faults (Sub-Menu #2)

With the STORED FAULTS Sub-Menu 2 selected and the Stored SID and FMI codes displayed, turn the control knob clockwise to cycle through the fault codes (Fig. 2-A). Press the control knob (Fig. 2-B) to read the fault description (Fig. 2-C).



Clear All Codes (Sub-Menu #3)

With the CLR ALL CODES Sub-Menu 3 selected, the screen will display CLR? NO/YES. Turn the control knob to YES or NO depending on your desire (Fig. 3-A). Press the control knob to make your selection (Fig. 3-B).

Note: You can only clear stored codes. Clearing a code will return you to the main menu.

7.3 Failure Mode Identifier (FMI) Assignments

The Failure Mode Identifier, FMI, describes the type of failure detected in the subsystem identified by the PID or SID. The FMI and either the PID or SID combine to form a given diagnostic code (see PID 194 for added clarification). The remaining failure mode identifiers would be assigned by the SAE Truck and Bus Low Speed Communications Network Subcommittee if additional common failure modes become detectable.

0	Data valid but above normal operational range (that is, engine overheating)
1	Data valid but below normal operational range (that is, engine oil pressure too low)
2	Data erratic, intermittent, or incorrect
3	Voltage above normal or shorted high
4	Voltage below normal or shorted low
5	Current below normal or open circuit
6	Current above normal or grounded circuit
7	Mechanical system not responding properly
8	Abnormal frequency, pulse width, or period
9	Abnormal update rate
10	Abnormal rate of change
11	Failure mode not identifiable
12	Bad intelligent device or component
13	Out of calibration
14	Special instructions
15	Reserved for future assignment by the SAE Subcommittee

7.4 SAE J1587 MID 137 SID List

Brake SIDs (MIDs = 136, 137, 138, 139, 246, 247)	
0	Reserved
1	Wheel Sensor ABS Axle 1 Left
2	Wheel Sensor ABS Axle 1 Right
3	Wheel Sensor ABS Axle 2 Left
4	Wheel Sensor ABS Axle 2 Right
5	Wheel Sensor ABS Axle 3 Left
6	Wheel Sensor ABS Axle 3 Right
7	Pressure Modulation Valve ABS Axle 1 Left
8	Pressure Modulation Valve ABS Axle 1 Right
9	Pressure Modulation Valve ABS Axle 2 Left
10	Pressure Modulation Valve ABS Axle 2 Right
11	Pressure Modulation Valve ABS Axle 3 Left
12	Pressure Modulation Valve ABS Axle 3 Right
13	Retarder Control Relay
14	Relay Diagonal 1
15	Relay Diagonal 2
16	Mode Switch ABS
17	Mode Switch ASR
18	DIF 1—ASR Valve
19	DIF 2—ASR Valve
20	Pneumatic Engine Control
21	Electronic Engine Control (Servomotor)
22	Speed Signal Input
23	Tractor ABS Warning Light Bulb
24	ASR Light Bulb
25	Wheel Sensor, ABS Axle 1 Average
26	Wheel Sensor, ABS Axle 2 Average
27	Wheel Sensor, ABS Axle 3 Average
28	Pressure Modulator, Drive Axle Relay Valve
29	Pressure Transducer, Drive Axle Relay Valve
30	Master Control Relay
31	Trailer Brake Slack Out of Adjustment Forward Axle Left
32	Trailer Brake Slack Out of Adjustment Forward Axle Right
33	Trailer Brake Slack Out of Adjustment Rear Axle Left
34	Trailer Brake Slack Out of Adjustment Rear Axle Right
35	Tractor Brake Slack Out of Adjustment Axle 1 Left

36	Tractor Brake Slack Out of Adjustment Axle 1 Right
37	Tractor Brake Slack Out of Adjustment Axle 2 Left
38	Tractor Brake Slack Out of Adjustment Axle 2 Right
39	Tractor Brake Slack Out of Adjustment Axle 3 Left
40	Tractor Brake Slack Out of Adjustment Axle 3 Right
41	Ride Height Relay
42	Hold Modulator Valve Solenoid Axle 1 Left
43	Hold Modulator Valve Solenoid Axle 1 Right
44	Hold Modulator Valve Solenoid Axle 2 Left
45	Hold Modulator Valve Solenoid Axle 2 Right
46	Hold Modulator Valve Solenoid Axle 3 Left
47	Hold Modulator Valve Solenoid Axle 3 Right
48	Dump Modulator Valve Solenoid Axle 1 Left
49	Dump Modulator Valve Solenoid Axle 1 Right
50	Dump Modulator Valve Solenoid Axle 2 Left
51	Dump Modulator Valve Solenoid Axle 2 Right
52	Dump Modulator Valve Solenoid Axle 3 Left
53	Dump Modulator Valve Solenoid Axle 3 Right
54	Hydraulic Pump Motor
55	Brake Light Switch 1
56	Brake Light Switch 2
57	Electronic Pressure Control, Axle 1
58	Pneumatic Back-Up Pressure Control, Axle 1
59	Brake Pressure Sensing, Axle 1
60	Electronic Pressure Control, Axle 2
61	Pneumatic Back-Up Pressure Control, Axle 2
62	Brake Pressure Sensing, Axle 2
63	Electronic Pressure Control, Axle 3
64	Pneumatic Back-Up Pressure Control, Axle 3
65	Brake Pressure Sensing, Axle 3
66	Electronic Pressure Control, Trailer Control
67	Pneumatic Back-Up Pressure Control, Trailer Control
68	Brake Pressure Sensing, Trailer Control
69	Axle Load Sensor
70	Lining Wear Sensor, Axle 1 Left
71	Lining Wear Sensor, Axle 1 Right
72	Lining Wear Sensor, Axle 2 Left
73	Lining Wear Sensor, Axle 2 Right

74	Lining Wear Sensor, Axle 3 Left
75	Lining Wear Sensor, Axle 3 Right
76	Brake Signal Transmitter
77	Brake Signal Sensor 1
78	Brake Signal Sensor 2
79	Tire Dimension Supervision
80	Vehicle Deceleration Control
81	Trailer ABS Warning Light Bulb
82	Brake Torque Output Axle 1 Left
83	Brake Torque Output Axle 1 Right
84	Brake Torque Output Axle 2 Left
85	Brake Torque Output Axle 2 Right
86	Brake Torque Output Axle 3 Left
87	Brake Torque Output Axle 3 Right
88	Vehicle Dynamic Stability Control System (VDC)
89	Steering Angle Sensor
90	Voltage Supply for Stability Control System
91	Brake Lining Display
92	Pressure Limitation Valve
93	Auxiliary Valve
94	Hill Holder System
95	Voltage Supply, Lining Wear Sensors, Axle 1
96	Voltage Supply, Lining Wear Sensors, Axle 2
97	Voltage Supply, Lining Wear Sensors, Axle 3
98	Reference Ground Connection
99	Lateral Accelerometer
100	Brake Light Relay
101	Differential Lock Control Output (Transfer Case)
102	Brake Warning Light Bulb
103	Yaw Rate Sensor
104	Service Odometer
105-150	Reserved for Future Assignment by SAE

PART 8: MAINTENANCE

8.1 Maintenance and Storage

- Switch power to OFF and remove all power cables before storing and cleaning.
- Wipe surfaces down with a well-wrung, soft, damp cloth.
- Diluted dishwasher liquid or similar substance can be used in the dampened cloth if necessary.
- Frequently clean and resize the 7-way pin connectors and add dielectric grease to the 7-way pin connector outlet. This will ensure a proper connection when using the Super Ranger MUTT®.
- Do not allow water to enter the control panel.
- Store in a cool, dry area when not in use and keep the lid closed to prevent dust from accumulating inside the unit.
- Do not store in direct sunlight.
- Do not store near magnetic field or damage to the microprocessor may occur.

8.2 Instructions for In- and Out-of-Warranty Repairs

If you experience any difficulty with your Super Ranger MUTT®, please call IPA® toll free at 888-786-7899 and speak to one of our tech-support representatives to determine if the tester should be returned for repair. Our return and service policies are designed to be simple and hassle free. Please follow the instructions listed in this manual when you feel you have a product that is in need of repair. If at any point in the process you are not happy with the service or support you receive from any member of the IPA® team, please email president@ipatools.com.

Step 1: Determine Type of Repair Needed

There are three types of repair:

Physically Broken – Tester has physical damage, i.e. switch snapped off, socket came loose, etc.

Erratic Behavior – Tester is not working properly, i.e. lights flashing, erroneous error warnings, etc.

Problems with Components/Accessories – Issues with items not in the main tester, i.e. remote not programming, battery charger issues, etc.

Step 2: Determining Service Action

Many issues can be fixed over the phone with the help of one of our tech-support team members. If you have an issue with one of our testers, call 888-786-7899 or email tech247@ipatools.com to speak with one of our team members. They will determine the best level of service to provide for the tester.

There are three levels of repair:

Fix Over the Phone – Tech support will walk the customer through the repair over the phone. No parts or in-house service is needed.

Field Repair – Tech support will send the required parts needed for the customer to service the tester in the field themselves.

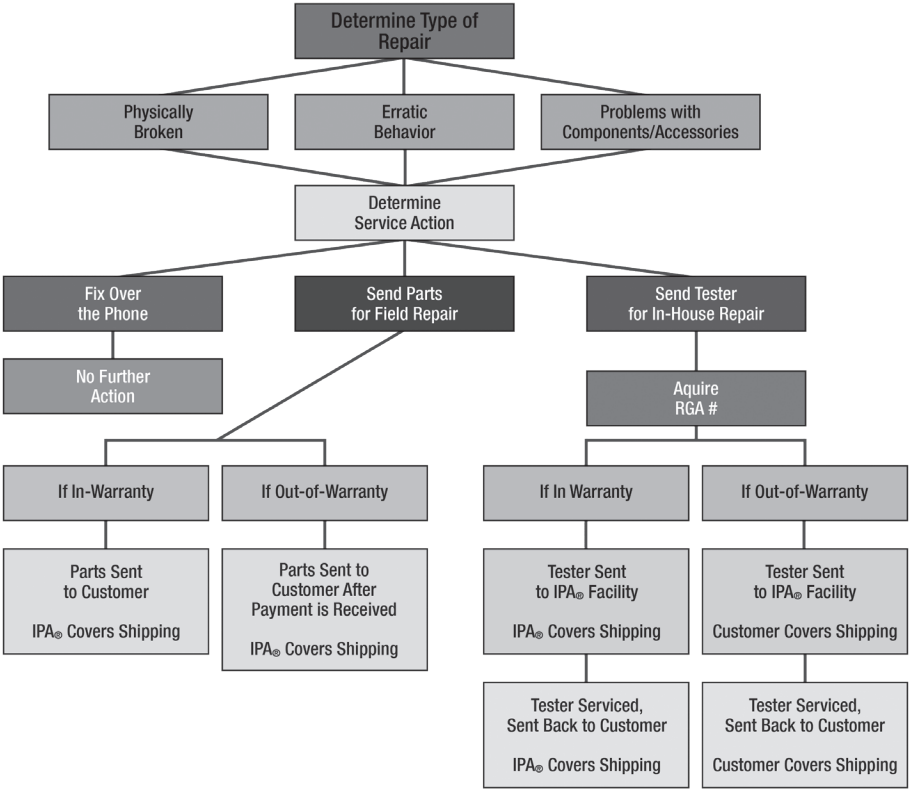
In-House Repair – The customer will send in the tester for the tech-support team to service in house.

Step 3: Acquire RGA

Once a tech-support team member determines parts need to be sent out for an in-field repair or the tester needs to be sent in for repair, an RGA # will be assigned along with next step instructions for the customer.

Note:

- Always take at least five pictures of your tester BEFORE sending the tester to the IPA® facility.
- IPA® is not liable for any damage that occurs to the tester during shipment.
- Consult a tech-support team member over the phone or via email before you send in any tester for repair. Testers with excessive sheet metal damage may not be eligible for repair and a tech may suggest another option, i.e. swap-out program or scratch-and-dent model.



Examples of situations and parts not covered by out-of-warranty service: punctured tires, dented sheet metal, standard misuse and abuse, worn-out connectors due to excessive use, water/fire damage.

PART 9: TROUBLESHOOTING

9.1 FAQ

- NEVER assume a connection is a quality connection. Many ABS issues are the direct result of poor pin or sensor connections. These poor connections can be located directly at the ABS ECU on the trailer and typically can be found at the 7-way round nose box connection. If you suspect poor connectivity problems, verify the 7-way cable is securely inserted into the 7-way connection. Make sure the cable head is bottomed out in the connector. Always be certain to check the 7 pins in each plug are clean and spread to proper size before using.
- ABS information is sent via PLC (power line communication). PLC is delivered on a frequency over the DC power wire and a loss of communication can occur from mild corrosion or faulty ground.
- Sometimes the ABS computer can be heard powering up when the ABS circuit is selected but no codes are retrieved. Or, the ABS light is on, signaling there is an Active Fault, but the Super Ranger MUTT® detects no communication from the ABS ECU on the trailer. These symptoms can be the result of poor wire connection at the 7-way connection or the main power connector going into the trailer ECU. Remove the connections and clean them with the IPA® #CLR-90, #CLR-188 and #CLR-250 pin cleaners. Once cleaned, treat the electrical connection with IPA® Contact Cleaner and Shield. These tools can be found in the IPA® #8048 HD Fleet Technician's Electrical Terminal Maintenance Set.

9.2 Common System Checks

There are many safety and operational functions to test on a trailer. With the Super Ranger MUTT®, these tests can be performed without the truck or tractor, quickly, accurately, and in most cases, with only one person. Below are a few common system checks that can be performed using the Super Ranger MUTT®.

- One-man leak and shake testing throughout the trailer.
- Pushrod travel measurements.
- Slacker adjustment reading specific to the manufacturer's specifications on brake chamber and proper operation activation.
- Even brake pressure activation.
- One-man, wheel-off-ground testing for brake strength and operation.

9.3 Common Troubleshooting Solutions

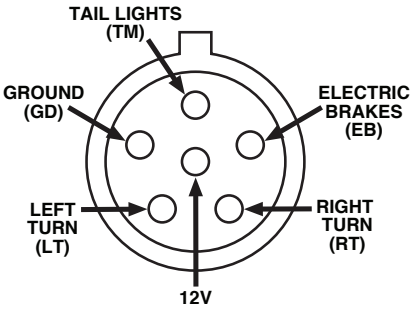
Symptom	Possible Cause	Solution
30-amp fuse keeps blowing.	Shorted cig. socket or power connector.	Remove wires going to cig. socket. If fuse still blows, call tech support at 888-786-7899.
Open Circuit Warning.	Poor pin connections.	Spread and grease pins.
	Trailer circuit is disconnected.	Check trailer wiring.
	Current draw from trailer is too low or nonexistent.	Make sure trailer lights are connected.
Short/Overload Warning: System goes into overload or short circuit protection if more than 10 amps of current draw at 12V is detected for longer than 69 milliseconds. Short is indicated by red LED. Overload is indicated by yellow.	Short circuit condition is detected if the overdraw > 50 amps in less than 69 milliseconds. Short is defined by positive power connected directly to ground.	Remove cause of short and retest.
	Overload is determined if overdraw > 10 amps but < 50 amps in 69 milliseconds. Overload is defined by more current being drawn than is allowed by circuit wiring sizes.	
Tester enters PULSAR® mode.	PULSAR® mode is triggered when current draw exceeds the maximum allowable default. PULSAR® mode should be accompanied by Short/Overload Warning. See Specifications for Max Output Current.	Remove cause of short/ overload. Current load settings are built into tester to protect the tester, its cable and the trailer. The tester is capable of handling higher current than default. If you wish to increase the default setting, contact tech support at 888-786-7899 and ask for availability.
Note: For more troubleshooting help, please call 888-786-7899 or email tech247@ipatools.com.		

PART 10: TYPICAL TRAILER WIRING

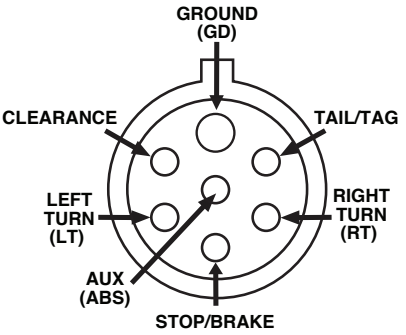
Note: Not all trailers/vehicles are wired to this standard. The use of an electrical circuit tester is necessary to ensure proper match of vehicle's wiring to trailer's wiring. On some trailers with 6-way round plugs, the 12V wire and electric brake wire may be reversed (particularly horse trailers).

Trailer Wiring (View From Front Plug)

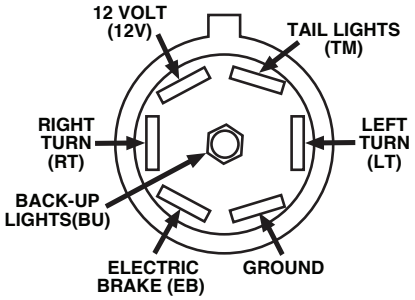
6-WAY ROUND PIN PLUG



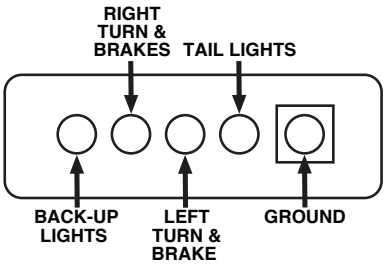
7-WAY ROUND PIN PLUG



7-WAY FLAT PIN PLUG



4/5-PIN PLUG



PART 11: OPTIONAL ACCESSORIES AND RELATED PRODUCTS

#9008-DL SUPER MUTT® PRO EDITION: (2) 12-Button Remote Controls, 5-ft. 7-Way Cable, 8-ft. Gladhands, 10A Smart Battery Charger, Face/Battery Shield and Rain Cover

#5611A-RT8 ALPHA MUTT® w/ ABS, RUGGED TABLET, & SLIDE-OUT BASE (Service-Truck Model): Rugged Tablet, 12-Button Remote Control, 20-ft. 7-Way Cable, 20-ft. Gladhand Hoses with Handles, Bluetooth® Antenna, 5-ft. Bluetooth® Extension Cable and Power Cable

#5710A-T10 ALPHA MUTT® w/ ABS (Shop Model): Tablet, 12-Button Remote Control, 12-ft. 7-Way Cable, 12-ft. Gladhand Hoses with Handles, Bluetooth® Antenna, 12-in. Bluetooth® Extension Cable, Power Cord for Internal Charger and Rain Cover

#9008-DL

#5611A-RT8

#5710A-T10

#8026 4/5 PIN TOWING MAINTENANCE KIT

#7866 4/5 PIN TRAILER HARNESS CHECKER

#8027 6-WAY ROUND PIN TOWING MAINTENANCE KIT

#7897 6-WAY ROUND PIN TRACTOR TRAILER CIRCUIT TESTER

#8028 7-WAY FLAT (SPADE) PIN TOWING MAINTENANCE KIT

#7893 7-WAY FLAT (SPADE) PIN TRAILER CIRCUIT TESTER

#8029 7-WAY ROUND PIN TOWING MAINTENANCE KIT

#7865L 7-WAY ROUND PIN TRACTOR TRAILER CIRCUIT TESTER

#8000 3-WAY TRAILER ADAPTER

#TSTPK1 MULTI-TRAILER TESTER JOBBER PACK

SERIAL #_____

Locate your serial number on the unit and record it above. Please be sure to send in your warranty card.

NOTES

Limited Three-Year Warranty

#4300A-L4 SUPER RANGER MUTT®
Mobile **U**niversal **T**railer **T**ester

Innovative Products of America® Incorporated has established a Limited Three-Year Warranty Policy for the Mobile Universal Trailer Tester #4300A Series, not including any wearable parts, i.e. cables, batteries, clips, etc.

Three-Year Limited Warranty/Return or Replace Policy: The product is covered for three years from the date of original user purchase under the stipulations of the standard warranty.

The product is warranted to be free from defects in workmanship or material. If there is a problem due to workmanship or material defect, Innovative Products of America® Incorporated will repair or replace the product within 24-working hours after it is received by the IPA® repair service center. In the event it is determined that the product has been tampered with, or altered in any way, the warranty is void and all claims against the product will not be honored. The warranty repair/return procedures require that the proof of purchase must be established (either by warranty card from the seller or by point of purchase receipt/invoice) and the manufacturer makes every attempt to return ship the product within three business days from the receipt of the returned product, freight prepaid.

If it has been determined that the tool has been damaged due to misuse, Innovative Products of America® Incorporated will repair the tool at a cost we deem reasonable and these charges will be the responsibility of the user. We truly want you to be happy with our products, so if you have any questions, call us toll-free at 888-786-7899.

IPA®
FUTURE NOW®
(OEM) Original Equipment Manufacturer USA

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