



Power Anytime, Anywhere

Tesla™ TI3100A Digital Volt/Amp Meter

User Manual



Built Smart...Proven Tough

Tesla Industries, Inc.
101 Centerpoint Blvd.
New Castle, DE 19720
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**NOTE: All users must read this entire manual prior
to operating the TI3100A DVAM.**

The TI3100A DVAM is a limited maintenance-free and sealed unit. No repairs are authorized. Warranty will be voided if unit is tampered with in any way, or if unauthorized repairs are made. For technical support please contact:

TESLA™ INDUSTRIES INCORPORATED
101 CENTERPOINT BLVD.
CENTERPOINT INDUSTRIAL PARK
NEW CASTLE, DELAWARE 19720
PHONE: (302) 324-8910
FAX: (302) 324-8912
WEBSITE: www.teslaind.com
EMAIL: tesla1@teslaind.com



CAUTION

Shock Hazard Potential

Improper use or failure to follow instructions in this user manual can result in unit damage and/or injury or death by electrical shock.

Any attempts to open or examine the inside of the TI3100A DVAM via a tool or device (borescope, probe, etc.) can result in unit failure and/or injury by electrical shock. This DVAM is maintenance free and should not be opened or disassembled for any reason.

Always protect the unit from short circuit.

Shipping Hazards: The TI3100A DVAM contains sealed, dry cell rechargeable batteries that do not pose a shipping hazard.

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Abbreviations and Symbols

Abbreviations that may be used within the text, headings and titles of this manual.

LIST OF ABBREVIATIONS




Abbreviation	Definition
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ac	Alternating Current
AFT	Airflow Technology
AWG	American Wire Gauge
amp or A	Ampere
cont	Continuous
°C	Degree Celsius
°F	Degree Fahrenheit
dc	Direct Current
EFF	Efficiency
ft	Feet
FWD	Forward
GPU	Ground Power Unit
Hr	Hour
Hz	Hertz
kg	Kilograms
kHz	Kilohertz
kW	Kilowatts
LED	Light Emitting Diode
max	Maximum
MΩ	megaohm
min	Minimum
MPU	Micro Power Unit
NEMA	National Electrical Manufacturers Association
Ω	ohm
PF	power factor
PFC	power factor correction
rms	root-mean-square
THD	Total Harmonic Distortion
TMDE	Test, Measurement, & Diagnostic Equipment
UAV	Unmanned aerial vehicle
Vac	Volts, Alternating Current
Vdc	Volts, Direct Current
W	watts

Section 1 – Safety Review

1.1 - Safety Notices

Safety notices appear throughout this manual to alert the user to important information regarding proper installation, operation, maintenance and storage of the unit. These notices, as illustrated below, contain a key word that indicates the level of hazard and a triangular icon that indicates the specific type of hazard.

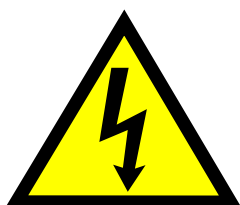
 WARNING	Indicates a condition, operating procedure or practice, which if not adhered to could result in serious injury or death.
 CAUTION	Indicates a condition or operating procedure, which if not strictly adhered to could result in damage or destruction of equipment.
 NOTE	Indicates a condition, operating procedure or practice, which is essential to highlight.

1.2 - Symbols

The following symbols will appear within the warning triangles to alert the user to the specific type of danger or hazard.



General Warning



Electrical Hazard



Explosion Hazard



Fire Hazard



Battery Warning



Guard from Moisture

Figure 1.2.1 – Different types of hazard and caution symbols

1.3 – Hazards



WARNING

Shock Hazard Potential

Severe injury or death from electrical shock may occur if either the user or the unit is wet while the operating unit is connected to a power source. Be sure to disconnect ac power from the ac source if the unit has come into contact with water. If AC Input Circuit Breaker has tripped due to water infiltration, DO NOT try to reset it with the ac line voltage attached.



WARNING

Shock Hazard Potential

Severe injury or death from electrical shock can occur when damp electrical plugs are connected to the TI3100A DVAM. Make sure the electrical outlet is switched off before making any connections. Failure to use proper grounding can cause potential shock hazard! Use only adapters with proper grounding mechanism.



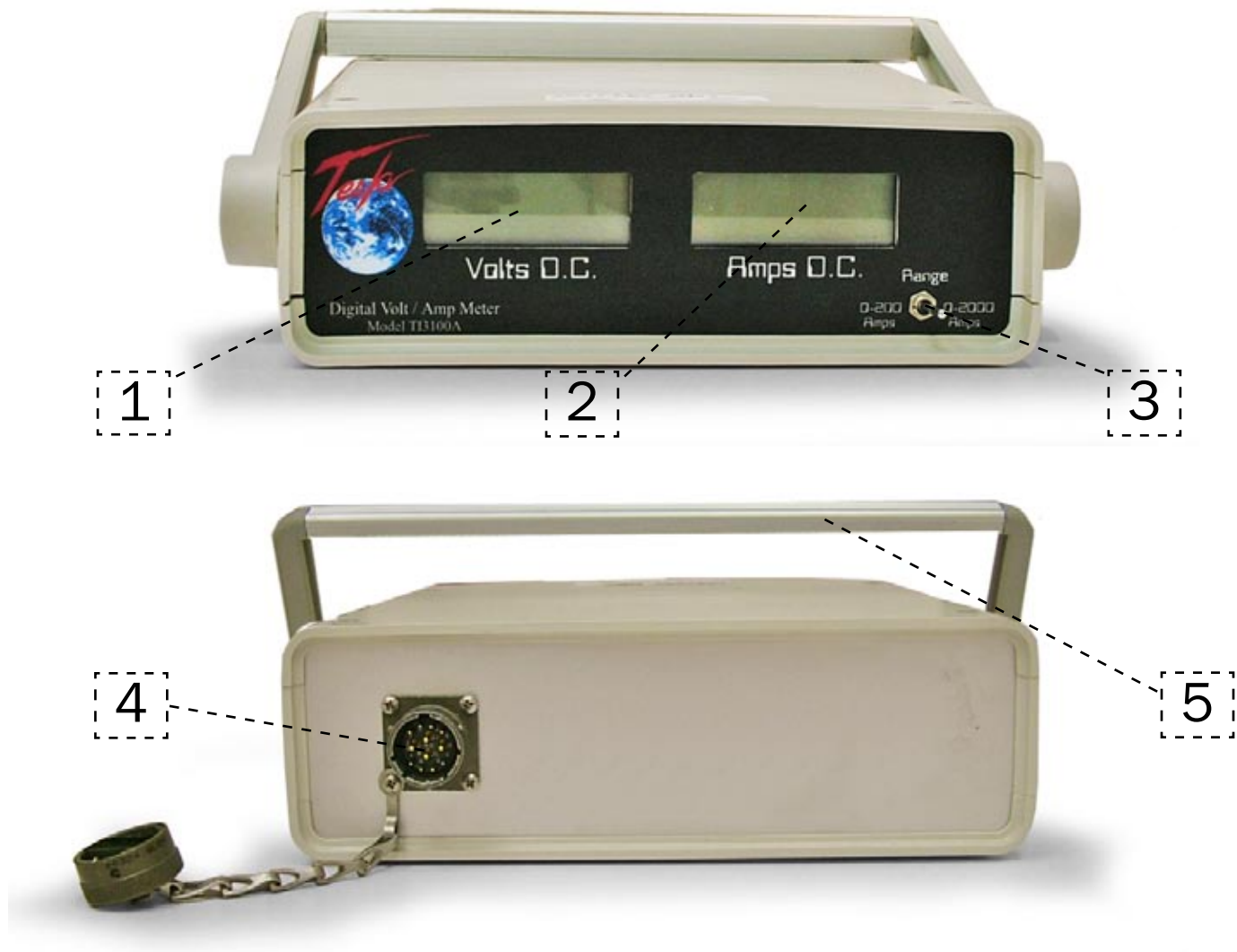
Figure 2.3.1 – Universal AC Input Cannon Plug



Figure 2.3.2 – Proper Ground Grounded Plug with Grounding Pin

Section 2 – Product Overview

2.1 – TI3100A DVAM Features and Overview



1. **Digital Volt Meter** – Displays the DC voltage output.
2. **Digital Amp Meter** – Displays the amperage draw.
3. **Amp Meter Toggle Switch** – Provides a more detailed reading extending two decimal places.
4. **AC Input Receptacle** – Connects to standard 10-125 VAC line voltage.
5. **DVAM Handle** – Easily moveable to use as a handle or as a prop to angle DVAM for better view.

2.2 – Introduction

This manual contains the complete operating instructions and procedures for the TI3100A Digital Amp/Volt Meter (DVAM). The DVAM 3100A provides measurements for all voltage ranges and amperage draws between zero and 2,000. Perfect for high power troubleshooting and systems checks. The Ideal Diagnostics Solution! The DVAM 3100A indicates the aircraft or vehicle's current demand. Integrated with the Tesla Turbo Start GPU power supply, the DVAM is a valuable troubleshooting tool. Never before has it been so easy to isolate faults.



Figure 1.2.1 – TI3100A DVAM

2.3 – High DC Power Measuring Solution

The DVAM 3100A provides measurements for all voltage ranges and amperage draws between zero and 2,000. This is the only effective meter for high power troubleshooting. The left meter indicates DC voltage output and the right meter indicates amperage draw. The meter's range changes from 0-200 AMPS to 0-2,000 AMPS with the flip of a switch. The 200 amp setting provides a more detailed reading extending to two decimal places. The 2,000 amp setting reads higher currents such as engine starts and in rush currents.



1.3.1 - Switched to 0-200 Amps



1.3.2 - Switched to 0-2000 Amps

Section 3 – Unit Specifications

3.1 – General Specifications

Features

Voltage DC:

- 1 Vdc to 200 Vdc

Current DC:

- 1 amp to 2000 amps

Accuracy:

- .0005%

Resolution:

- 01mV and .1 amps

Display:

- Dual 4.5 digit LCD Displays

Inputs:

- Dual Differential inputs

Vibration:

- Exceeds MIL-STD-810F

Size:

- 9.09" long x 10.90" wide x 3.69" high
- 230.89mm x 276.86mm x 93.73mm

Weight

- 1.6 lbs (0.7 kg)

Operating Temperature:

- 0°C to +70°C (32°F - 158°F)

Storage Temperature:

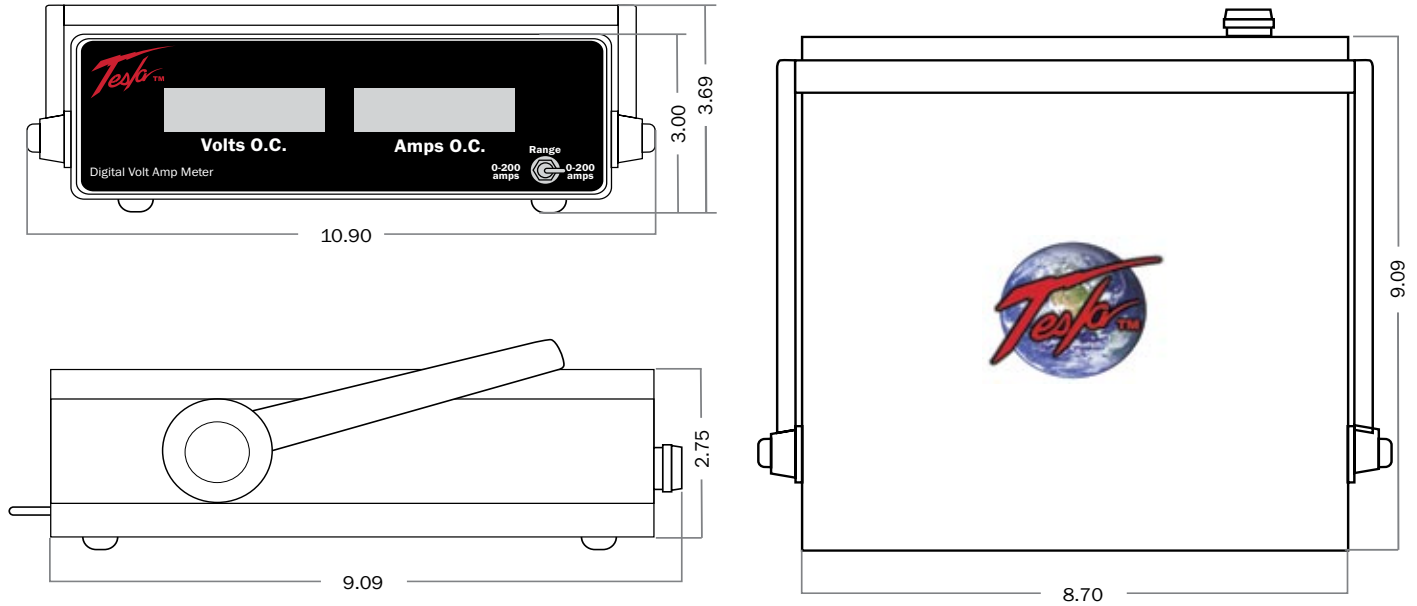
- -65°C to +80°C (-85°F to 176°F)

Warranty:

- 2 years (3 years optional)

3.2 – Physical Dimensions

*Measurements in inches



3.3 – Operating Positions

The TI3100 DVAM can be operated in both the horizontal and vertical positions as shown. The moveable handle allows for the DVAM to be propped up so the two screens can be easily seen.



Section 4 – Pre-Operation

4.1 – Pre-Operation

1. Be sure to check that all input and output cables are not damaged.
2. Check DVAM carefully for any evidence of damage.
3. Check that all connections are secure and free from water.



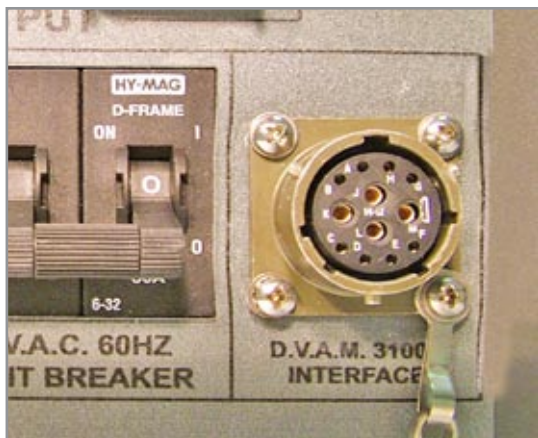
4.2 – Universal AC Line Cord and Interface Receptacle

The TI3100A-0010 is a Tesla Line cord designed to plug into either a ground power unit with a integrated receptacle, or the TI3100-00156 DC Cable equipped with a junction box.



4.3 – Connecting DVAM to Ground Power Unit

Some Turbo Start Ground Power Units are outfitted with an integrated receptacle for the TI3100 DVAM to plug directly into.



4.4 – Connecting DVAM Junction Box

For units other than the TI4400 and TI5400 series, a TI3100-00156 aviation cable will be needed to use the DVAM. The cable is a standard Tesla DC Cable equipped with a junction box, making it possible to use the DVAM with a unit that does not come with an integrated receptacle.



Section 5 – Operation Procedures

5.1 – Measuring a Vehicle's Start-up Draw

When starting a vehicle with a Tesla Turbo Start, the DVAM can be connected to measure the amount of current needed to start the vehicle. Because of the Turbo Start's advanced electronics, the amount of current a vehicle requires is matched by our system. When starting a vehicle the amperage will peak and then level off depending on the vehicle's current consumption curve.



5.2 – System Testing

The DVAM and Turbo Start can be used to check vehicles systems when individual systems are isolated.

- First turn off all non-related systems.
- Turn on individual system to be measured, then check current draw displayed on DVAM. Utilizing the proper military maintenance manual, compare the meter reading with the factory specifications for that system.

5.3 – Post Operation

Disconnect DVAM and store in case.

5.4 – Unit Care

Keep DVAM in case when not in use. Keep system clean and guard from moisture.

Section 6 – Optional Accessories

For units other than the TI4400 and TI5400 series, a TI3100A-00156 Aviation or TI3100A-00157 NATO cable will be needed to use the DVAM. Contact Tesla™ Customer Service for more information on pricing and options at (302) 324-8910.



TI3100A-00156

8' DC Aviation Interface Box Cable Assembly



TI3100A-00157

8' DC NATO Interface Box Cable Assembly

Repair Request Form

Please complete the information below to ensure prompt and accurate service. Include this form with the unit you are returning.
Thank you.

Date of return: _____

Company name & _____

Billing address: _____

Contact person: _____

Phone #: _____ Fax #: _____

Email: _____

Purchase Order #: _____

Model #: _____ Serial #: _____

Model #: _____ Serial #: _____

Shipping method to Tesla™: _____

Description of shipping package: _____

Description of problem: _____

Return to Tesla™ Industries, Inc.

101 Centerpoint Boulevard, New Castle, DE 19720 Attention: Repair Department



WE GET THE MILITARY STARTED!

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TI3100A DVAM

Digital Volt/Amp Meter

The DVAM 3100A is an excellent way for the end user to measure Direct Current systems with current draws from 0 to 2000 amps. This is the only effective meter for high power troubleshooting. We built this system because there was nothing else available on the market to measure high level currents.

The DVAM 3100A indicates the aircraft or vehicle's current demand. Integrated with a Tesla™ GPU for power, the DVAM is a valuable troubleshooting tool. Never before has it been so easy to isolate faults.

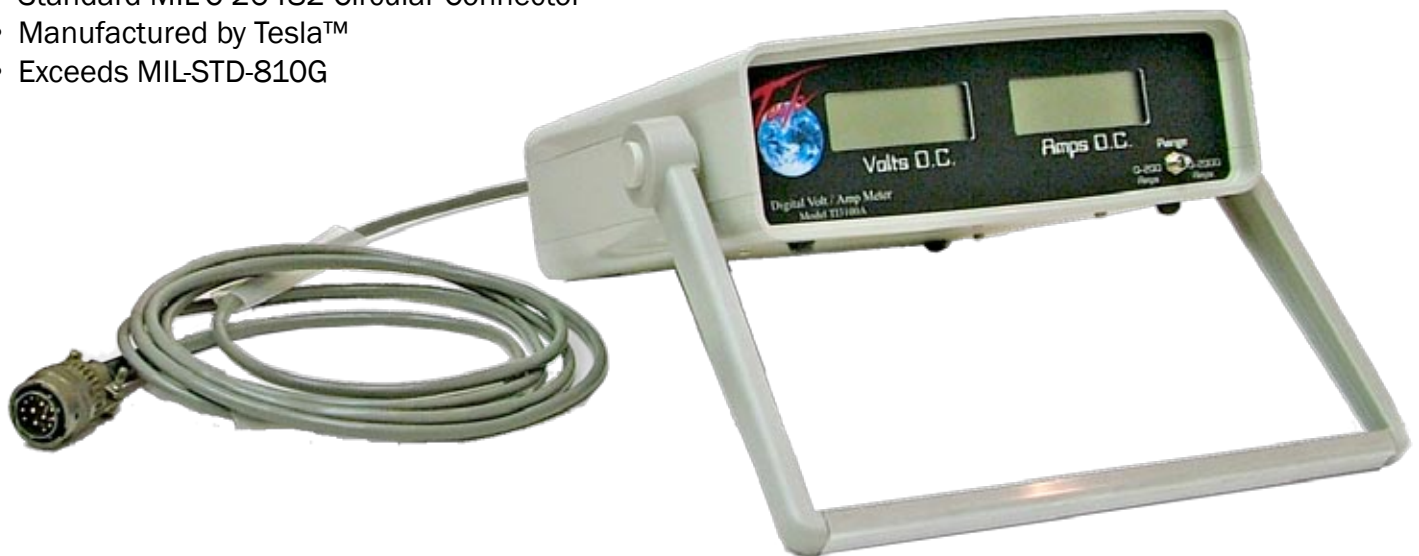
Plug the meter into dc cable's junction box or GPU meter connection and you are ready to go. The left meter indicates dc voltage output and the right meter indicates amperage draw. The meter's range changes from 0-200 amps to 0-2,000 amps with the flip of a switch. The 200 amp setting provides a more detailed reading extending to two decimal places.



Power Anytime, Anywhere

Features:

- Maintenance-free design
- 2-year warranty
- Standard MIL-C-26482 Circular Connector
- Manufactured by Tesla™
- Exceeds MIL-STD-810G



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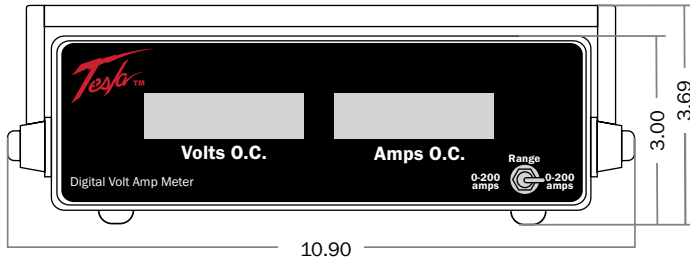


**The POWER
of RED™**

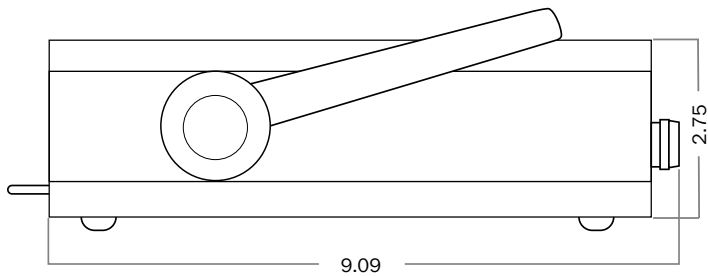


Dimensions and Technical Specifications

* All dimensions are in inches [millimeters]



Front View



Side View



Top View

Technical Specifications:

Storage Temperature	-65 °C to +80 °C (-85 °F to 176 °F)
Operating Temperature	0 °C to +70 °C (32 °F to 158 °F)
DC Voltage Range	Range: 0.01 Vdc to 199.99 Vdc Resolution: 0.01 Volts Accuracy: $\pm 0.05\%$ @ 72 °F
DC Current Range (200 amp scale)	Range: 0.01 amps to 199.99 amp Resolution: 0.01 amps Accuracy: $\pm 0.05\%$ @ 72 °F
DC Current Range (2000 amp scale)	Range: 0.1 amps to 1999.99 amp Resolution: 0.1 amps Accuracy: $\pm 0.5\%$ @ 72 °F
Display	Dual 4.5 digit LCD Displays
Inputs	Differential inputs
Vibration	Exceeds MIL-STD-810F
Weight	1.6 lbs (0.7 kg)
Warranty	2 years (3 years optional)



*Pictured with TI5400 400Hz GPU-24 UAV ACDC

Optional Accessory:

For units other than the **TI4400** and **TI5400** Series, a **TI3100A-00156** Aviation Cable, or a **TI3100A-00157** NATO Cable will be needed to use the DVAM.

Contact Tesla™ Customer Service (302) 324-8910 for more information on pricing and options.



TI3100A-00156
8' DC Aviation Interface Box
Cable Assembly



TI3100A-00157
8' DC NATO Interface Box
Cable Assembly