



TELEDYNE TEST TOOLS
Everywhereyoulook™

Quick Start Guide

T3PS11230, T3PS12415 and T3PS16006 DC Power Supply



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SAFETY INSTRUCTION

This chapter contains important safety instructions that you must follow when operating the T3PS1000 power supply and when keeping it in storage. Read the following before any operation to insure your safety and to keep the power supply in the best possible condition.

Safety Symbols

These safety symbols may appear in this manual or on the T3PS1000.



WARNING

Warning: Identifies conditions or practices that could result in injury or loss of life.



CAUTION

Caution: Identifies conditions or practices that could result in damage to the power supply or to other objects or property.



DANGER High Voltage



Attention: Refer to the Manual



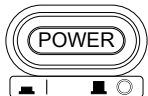
Protective Conductor Terminal



Earth (Ground) Terminal



Do not dispose electronic equipment as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased.



I Power On; connected to AC mains.

O Power Off; disconnected from AC mains.

Safety Guidelines

General Guideline • Do not place heavy objects on the power supply.



CAUTION

- Avoid severe impact or rough handling that may damage the power supply.
- Avoid discharges of static electricity on or near the power supply.
- Use only mating connectors, not bare wires, for the terminals.
- Do not block the cooling fan vent.
- The power supply should only be disassembled by a qualified technician.

(Measurement categories) EN 61010-1:2010 specifies the measurement categories and their requirements as follows. The T3PS1000 falls under category II.

- Measurement category IV is for measurement performed at the source of a low-voltage installation.
- Measurement category III is for measurement performed in a building installation.
- Measurement category II is for measurement performed on circuits directly connected to a low voltage installation.
- Measurement category I is for measurements performed on circuits not directly connected to Mains.

Power Supply



WARNING



- AC Input voltage: 115V / 230V $\pm 15\%$
- 47 ~ 63Hz
- Connect the protective grounding conductor of the AC power cord to an earth ground

Fuse



WARNING

- Fuse type: 115V input: T 10A 250V; 230V input: T 6.3A 250V
 - To ensure fire protection, replace the fuse only with the specified type and rating.
 - Disconnect the power cord before replacing the fuse.
 - Make sure the cause of fuse blowout is fixed
-

	before replacing the fuse.
Cleaning the power supply	<ul style="list-style-type: none"> • Disconnect the power cord before cleaning the power supply. • Use a soft cloth dampened in a solution of mild detergent and water. Do not spray any liquid into the power supply. • Do not use chemicals containing harsh products such as benzene, toluene, xylene, and acetone.
Operation Environment	<ul style="list-style-type: none"> • Location: Indoor, no direct sunlight, dust free, almost non-conductive pollution (Note below) • Relative Humidity: < 80% • Altitude: < 2000m • Temperature: 0°C to 40°C <p>(Pollution Degree) EN 61010-1:2010 specifies pollution degrees and their requirements as follows. The power supply falls under degree 2.</p> <p>Pollution refers to “addition of foreign matter, solid, liquid, or gaseous (ionized gases), that may produce a reduction of dielectric strength or surface resistivity”.</p> <ul style="list-style-type: none"> • Pollution degree 1: No pollution or only dry, non-conductive pollution occurs. The pollution has no influence. • Pollution degree 2: Normally only non-conductive pollution occurs. Occasionally, however, a temporary conductivity caused by condensation must be expected. • Pollution degree 3: Conductive pollution occurs, or dry, non-conductive pollution occurs which becomes conductive due to condensation which is expected. In such conditions, equipment is normally protected against exposure to direct sunlight, precipitation, and full wind pressure, but neither temperature nor humidity is controlled.
Storage environment	<ul style="list-style-type: none"> • Location: Indoor • Relative Humidity: < 70% • Temperature: -10°C to 70°C
Select AC Voltage	<p>Before powering up the power supply, select the AC input voltage from the rear panel.</p> <div>  CAUTION <div>AC LINE SELECT</div>  </div>

Disposal



Do not dispose this instrument as unsorted municipal waste. Please use a separate collection facility or contact the supplier from which this instrument was purchased. Please make sure discarded electrical waste is properly recycled to reduce environmental impact.

Power cord for the United Kingdom

When using the T3PS1000 in the United Kingdom, make sure the power cord meets the following safety instructions.

NOTE: This lead/appliance must only be wired by competent persons



WARNING: THIS APPLIANCE MUST BE EARTHED

IMPORTANT: The wires in this lead are coloured in accordance with the following code:

Green/ Yellow: Earth

Blue: Neutral

Brown: Live (Phase)



As the colours of the wires in main leads may not correspond with the colours marking identified in your plug/appliance, proceed as follows:

The wire which is coloured Green & Yellow must be connected to the Earth terminal marked with the letter E or by the earth symbol \oplus or coloured Green or Green & Yellow.

The wire which is coloured Blue must be connected to the terminal which is marked with the letter N or coloured Blue or Black.

The wire which is coloured Brown must be connected to the terminal marked with the letter L or P or coloured Brown or Red.

If in doubt, consult the instructions provided with the equipment or contact the supplier.

This cable/appliance should be protected by a suitably rated and approved HBC mains fuse: refer to the rating information on the equipment and/or user instructions for details. As a guide, cable of 0.75mm² should be protected by a 3A or 5A fuse. Larger conductors would normally require 13A types, depending on the connection method used.

Any moulded mains connector that requires removal /replacement must be destroyed by removal of any fuse & fuse carrier and disposed of immediately, as a plug with bared wires is hazardous if engaged in live socket. Any re-wiring must be carried out in accordance with the information detailed on this label.

O**VERVIEW**

This chapter describes the T3PS1000 series of power supplies, including their main features and front / rear panel introduction. After going through the overview, follow the Setup chapter (page 15) to properly power up and set operation environment.



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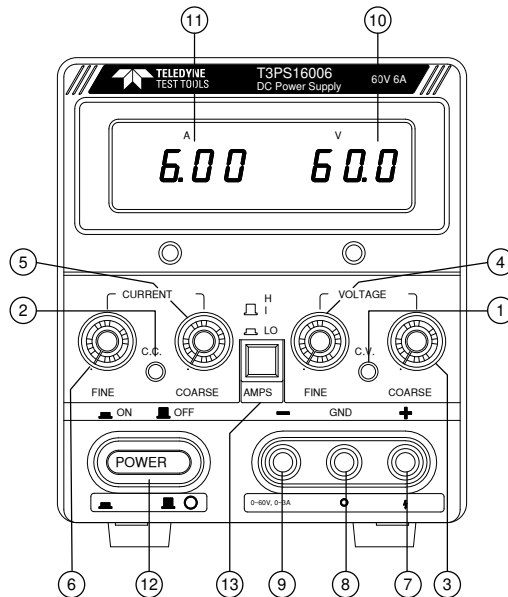
Main Features



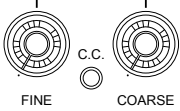
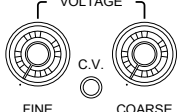
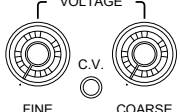
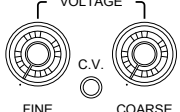
Features	<ul style="list-style-type: none">• Broad input power range: For 115V (97~133V), for 230V (195V~265V)• High frequency switching power• High power Density• High efficiency (70%)• Constant voltage and constant current operation• Remote output control (on/off)
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Model Differences

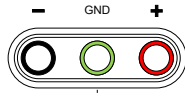
Model name	Voltage	Current	Watts	VA
T3PS11230	12V	30A	360	900
T3PS12415	24V	15A	360	900
T3PS16006	60V	6A	360	900

Front Panel Overview



- | | | |
|------------------------------|---|---|
| ① Constant voltage indicator | C.V.
 | The constant voltage indicator lights up when the power supply is in constant voltage mode. |
| ② Constant current indicator | C.C.
 | The constant current indicator lights up when the power supply is in constant current mode. |
| ③ Course current knob |  | Used for coarse adjustment of the current output. |
| ④ Course voltage knob |  | Used for coarse adjustment of the voltage output. |
| ⑤ Course voltage knob |  | Used for coarse adjustment of the voltage output. |
| ⑥ Fine voltage knob |  | Used for fine adjustment of the voltage output. |

- ⑦ Positive output terminal



Positive polarity terminal

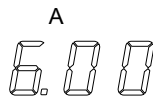
- ⑧ Ground terminal

Ground terminal

- ⑨ Negative output terminal

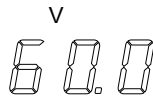
Negative polarity terminal

- ⑩ Current Display



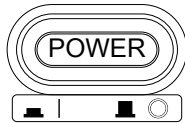
Displays the current output

- ⑪ Voltage display



Displays the voltage output

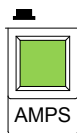
- ⑫ Power switch



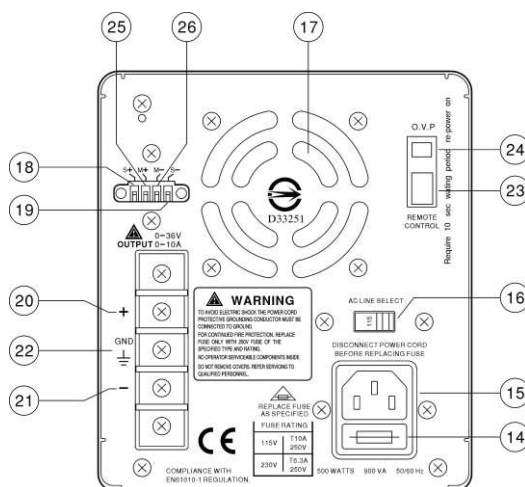
- ⑬ Range selector

■ HI

Selects high or low current range.



Rear Panel Overview

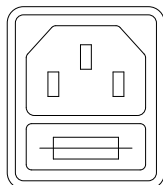


14 Fuse holder

DISCONNECT POWER CORD BEFORE REPLACING FUSE

115V input: T 10A 250V; 230V input: T 6.3A 250V

15 Power Socket



16 AC line select

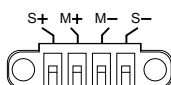
AC LINE SELECT

115V / 230V AC line select



17 Fan

18 S+ sense terminal



A positive input voltage remote sense terminal.

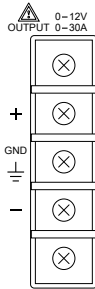
19 S- sense terminal

A negative input voltage remote sense terminal.

②① Positive output terminal

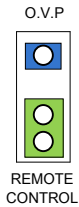
②② Ground

②③ Negative output terminal



②④ OVP adjuster

②⑤ Remote control terminal



Overvoltage protection adjustment

Remote control jumper.

Open = Remote output off

Short = remote output on

SET UP

This chapter describes how to properly power up and configure T3PS before operation.

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Installation Location

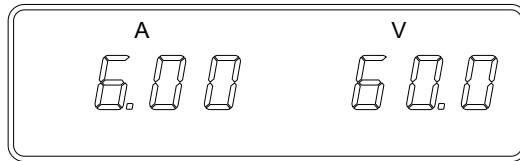
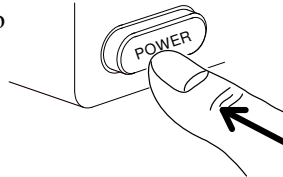
Ventilation and cooling fan clearance

Please ensure there is adequate ventilation and that the cooling fan has enough clearance to allow adequate airflow.

Power Up

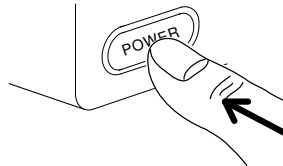
Power On

Press the Power switch to turn on the power. The current and voltage display will light up.



Power Off

Press the Power switch again to turn off the power. After two seconds, the meters and indicators turn off.

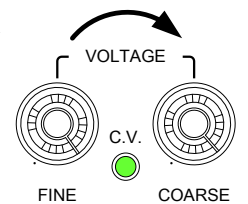


Over Voltage Protection Set Up

OVP setup Background

Over Voltage Protection (OVP) protects T3PS and DUT from excessive output Voltage. The user sets the maximum output voltage limit before operation. When the output voltage exceeds this limit, the output is shut off immediately.

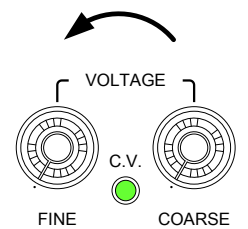
1. With the machine off, turn the voltage output to maximum.



2. Turn the OVP adjuster to maximum (fully clockwise)



3. Turn on the T3PS.
4. Adjust the voltage output to slightly above the desired OVP level.



5. Turn the OVP adjuster until the voltage displayed on the meter starts to drop. This sets the OVP level.



Setting range	5% rating to rating +5.5%.
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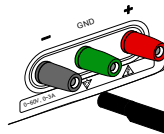
Note

Over voltage protection is always on and cannot be disabled. The OVP voltage however, can be set to the rating voltage +5.5%.

Load Cable Connection

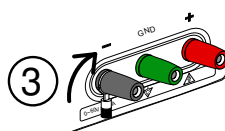
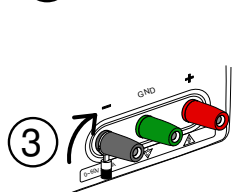
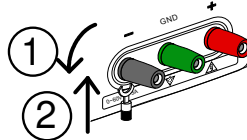
Standard accessory

Insert the plug into the socket.



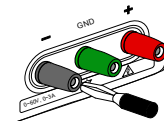
Test lead

1. Turn the terminal counterclockwise and loose the screw.
2. Insert the cable terminal.
3. Turn the terminal clockwise and tighten the screw.



Banana plug

Insert the plug into the socket.



Wire type

When using load cables other than the attached, make sure they have enough current capacity for minimizing cable loss and load line impedance. Use the table below to choose an adequate test lead for a given application.

UL (CSA) Model	1015 TEW Twisted wire							
AWG	24	22	20	18	16	14	12	10
Component pc/mm	11/0.16	17/0.16	21/0.18	34/0.18	26/0.25	44/0.25	46/0.25	65/0.32
Cross sectional area (mm ²)	0.22	0.34	0.53	0.87	1.32	2.08	3.29	5.23
Outer diameter	0.64	0.78	0.95	1.21	1.53	2.03	2.35	3.00
Maximum conductive resistance	88.6	62.5	39.5	24.4	15.6	9.90	6.24	3.90
Permissible current (A)	7.64	10.0	13.1	17.2	22.6	30.4	40.6	55.3

**Note**

The ambient temperature of “Permissible Current” is at 40°C. The withstanding temperature of a conductor is at 105°C according to the condition of the distributed single wire.

The permissible current listed as above is recommended to be used at under 70%.

If sense wires are needed, any wire gauge above UL (CSA) AWG 20 is permissible (18~10). When using a capacitive load, please twist the +output test lead with the (S+) sense wire. Similarly, twist the – output wire with the –S sense wire.

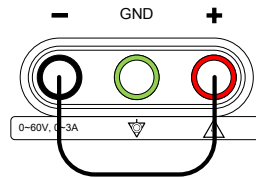
If the current value exceeds those shown above, wires can be used in parallel to increase the permissible current draw.

Setting the Current Level

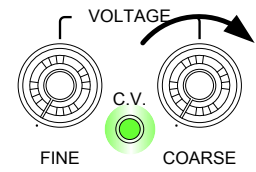
Background The current level must be set each time a new current level is needed.

Panel operation 1. Determine the maximum safe current for the EUT.

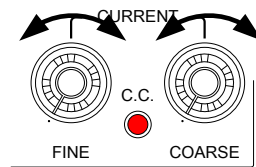
2. Short the positive (+) and negative (-) terminals.



3. Turn the coarse voltage knob away from the zero position until the C.C. knob becomes lit.

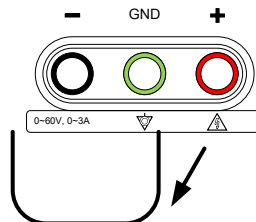


4. Adjust the current knobs to the desired current limit. The current will be shown in the ammeter display.



5. The current limit has now been preset. Do not change the current values.

6. Remove the short from the terminals.



7. The power supply is now ready for constant voltage operation.

Setting the Remote Control

Background The T3PS output can be controlled remotely using the remote control pins on the rear panel.

Output Off Remote control pins open.



REMOTE
CONTROL

APPENDIX

Specification

T3PS		11230	12415	16006
Max rating	Max Voltage	12V	24V	60V
	Max Current	30A	15A	6A
Input rating	Watts	360		
	VA	900		
Fuse	230V	T 10A 250V		
	115V	T 6.3A 250V		
Weight		3.3 kg		
Dimensions		128(W)x145(H)x285(D)mm		
Operation Environment		Indoor, Altitude up to 2000m, Installation Category II, Pollution degree 2		
Operation Temperature & Humidity		0° C to 40° C, <80%		
Storage Temperature & Humidity		-10° C to 70° C, <70%		
Accessories		Test Lead x 1 Quick Start Guide x 1 Power Cord x 3		
Constant voltage Operation	Output voltage 0 to rating voltage (adjustable)			
Voltage Regulation	Line Regulation	≤ 5mV		
	Load regulation	≤ 5mV		

	Recovery time	$\leq 500\mu\text{s}$ (50% load change, minimum load 0.5A)
	Ripple and noise	$\leq 5\text{mV}_{\text{rms}}, 100\text{mV}_{\text{p-p}}$
	Temperature coefficient	$\leq 100\text{ppm}/^{\circ}\text{C}$
Constant Current	Output current 0 to rating current (adjustable)	
	Line regulation	$\leq 3\text{mA}$
	Load regulation	$\leq 10\text{mA}$
	Ripple and Noise	$\leq 30\text{mA rms} \leq 10\text{mA rms} \leq 3\text{mA rms}$
Indicator Meter	Voltage display 3 1/2 Digits 0.39" Green LED display	
	Voltage Accuracy	$\pm(0.5\% \text{ of rdg} + 2 \text{ digits})$
	Current display 3 1/2 Digits 0.39" Red LED display	
	Current accuracy	$\pm(0.5\% \text{ of rdg} + 2 \text{ digits})$
Over voltage protection	range	5% rating to rating +5.5%
	accuracy	$\pm(V_{\text{set}} 1\% + 0.6\text{V})$
Insulation	Between chassis and terminal	$\geq 20\text{M}\Omega$ (DC500V)
	Between chassis and AC cord	$\geq 30\text{M}\Omega$ (DC500V)

ABOUT TELEDYNE TEST TOOLS



Company Profile

Teledyne LeCroy is a leading provider of oscilloscopes, protocol analyzers and related test and measurement solutions that enable companies across a wide range of industries to design and test electronic devices of all types. Since our founding in 1964, we have focused on creating products that improve productivity by helping engineers resolve design issues faster and more effectively. Oscilloscopes are tools used by designers and engineers to measure and analyze complex electronic signals in order to develop high-performance systems and to validate electronic designs in order to improve time to market.

The Teledyne Test Tools brand extends the Teledyne LeCroy product portfolio with a comprehensive range of test equipment solutions. This new range of products delivers a broad range of quality test solutions that enable engineers to rapidly validate product and design and reduce time-to-market. Designers, engineers and educators rely on Teledyne Test Tools solutions to meet their most challenging needs for testing, education and electronics validation.

Location and Facilities

Headquartered in Chestnut Ridge, New York, Teledyne Test Tools and Teledyne LeCroy has sales, service and development subsidiaries in the US and throughout Europe and Asia. Teledyne Test Tools and Teledyne LeCroy products are employed across a wide variety of industries, including semiconductor, computer, consumer electronics, education, military/aerospace, automotive/industrial, and telecommunications.

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