TSX SERIES

High power laboratory DC Power Supplies



350/360 watts, standard and bus programmable

Low noise, excellent transient response

CV & CI operation with automatic crossover

Comprehensive protection including variable OVP trip

High setting resolution, remote sense terminals

USB, RS232, GPIB and LAN (LXI) interfaces

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TSX SERIES High power laboratory DC Power Supplies

POWER WITH PRECISION & SIMPLICITY

High accuracy digital meters, current meter damping

High power levels in a compact & lightweight casing

Low noise, excellent transient response

High setting resolution, remote sense terminals

CV & CI operation with automatic crossover



SELV compliant

Universal mains input ~110-240V

35V-10A & 18V-20A models

Fan-free operation

Bench or rack mounting,front & rear terminals

Comprehensive protection including variable OVP trip

THE TSX

The TSX model incorporates conventional analog controls for precision with simplicity.

Coarse and fine voltage controls offer fast setting with high setting resolution at all levels while a semi-logarithmic current control provides resolution commensurate with the current level.

Fan-free operation means that these PSUs add no noise to the bench environment. These PSUs are ideally suited to general purpose applications in many technology areas.

HIGH ACCURACY METERING

All TSX models incorporate high resolution digital meters for both voltage and current. V and I levels can be set to high accuracy prior to connection to the load and the limit settings can be checked at any time. A damping switch for the current meter enables the average value of rapidly changing currents to be read.

LINEAR POST REGULATION FOR UNRIVALLED PERFORMANCE

The heart of all TSX PSUs is an innovative regulator design which combines switch mode pre-regulation with linear post-regulation. The pre-regulator uses specially developed techniques to dramatically reduce the capacitance between input and output thus eliminating the high levels of common-mode noise normally associated with switch mode PSUs. The linear post-regulator combines very low levels of output noise with excellent load regulation and transient response. The result is performance comparable with a pure linear design.

CONSTANT VOLTAGE OR CONSTANT CURRENT OPERATION

All TSX PSUs can operate in both constant voltage and constant current modes with automatic crossover and automatic mode indication.

FULL OVERVOLTAGE PROTECTION

All versions incorporate a fully variable OVP trip to protect against regulator failure. The output is fully protected and other protection functions include regulator overtemperature, and sense miswiring.

COMPACT AND LIGHTWEIGHT

The hybrid regulator design provides a PSU which is both smaller and lighter than competitive products. The high thermal efficiency also means that the PSUs are silent in operation since fan cooling is unnecessary *.

BENCH OR RACK MOUNTING

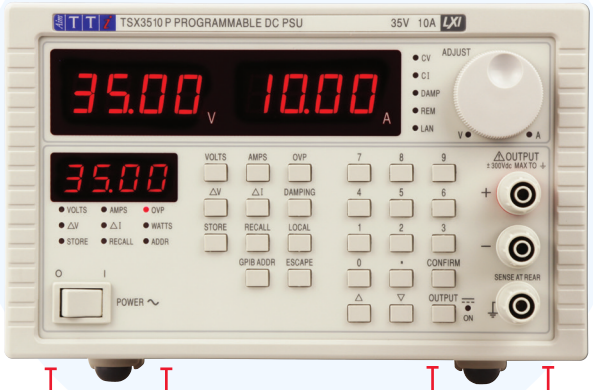
The attractively styled casing takes up very little bench space. The case is half rack width (3U height), an optional rack-mount kit is available. Output terminals are fitted at both front and rear.

* Note that in rack environments with limited ventilation fan cooling may become necessary

TSX SERIES High power laboratory DC Power Supplies

POWER WITH PROGRAMMABLE VERSATILITY

- SELV compliant
- USB, RS232,GPIB* and LAN (LXI) interfaces
- Keyboard setting of all parameters
- Low noise, excellent transient response
- High setting resolution, remote sense terminals
- CV & CI operation with automatic crossover
- Fully programmable with bus readback of volts and amps
- Comprehensive protection including variable OVP trip



- Fan-free operation
- Universal mains input ~110-240V
- 35V-10A & 18V-20A models
- Bench or rack mounting, front & rear terminals
- Watts display, non-volatile storage of 25 settings
- Delta (step) control of volts and amps
- High accuracy digital meters, current meter damping
- High power levels in a compact & lightweight casing

*Optional

THE TSX-P

The TSX-P contains all of the features of the TSX alongside a wealth of 'ease of use' orientated keyboard functions with full remote programmability.

A THIRD DISPLAY FOR CLARITY AND SAFETY

To provide additional data and to avoid the possibility of ambiguity or error an auxiliary display is incorporated.

All keyboard entries appear on this display for inspection before they are actioned.

This failsafe system avoids such possibilities as setting 25 Volts instead of 2.5 Volts. The auxiliary display is also used to set and display a variety of useful information.

KEYBOARD OR QUASI-ANALOG CONTROL

Voltage and current levels can be entered directly from the keypad to a resolution of 10mV or 10mA giving unparalleled speed and precision.

Alternatively a rotary control can be used to set voltage or current in a manner simulating a conventional analog control.

WATTS DISPLAY FOR ADDED CONVENIENCE

When not being used for other purposes the auxiliary display shows the output power in Watts (Volts x Amps).

DELTA-MODE CONTROL

Voltages and currents can be stepped up and down by a fixed increment set from the keyboard. This facility is invaluable for repetitive testing where, for example, the effect of 1% changes in voltage need to be observed. The delta increment is clearly shown on the auxiliary display.

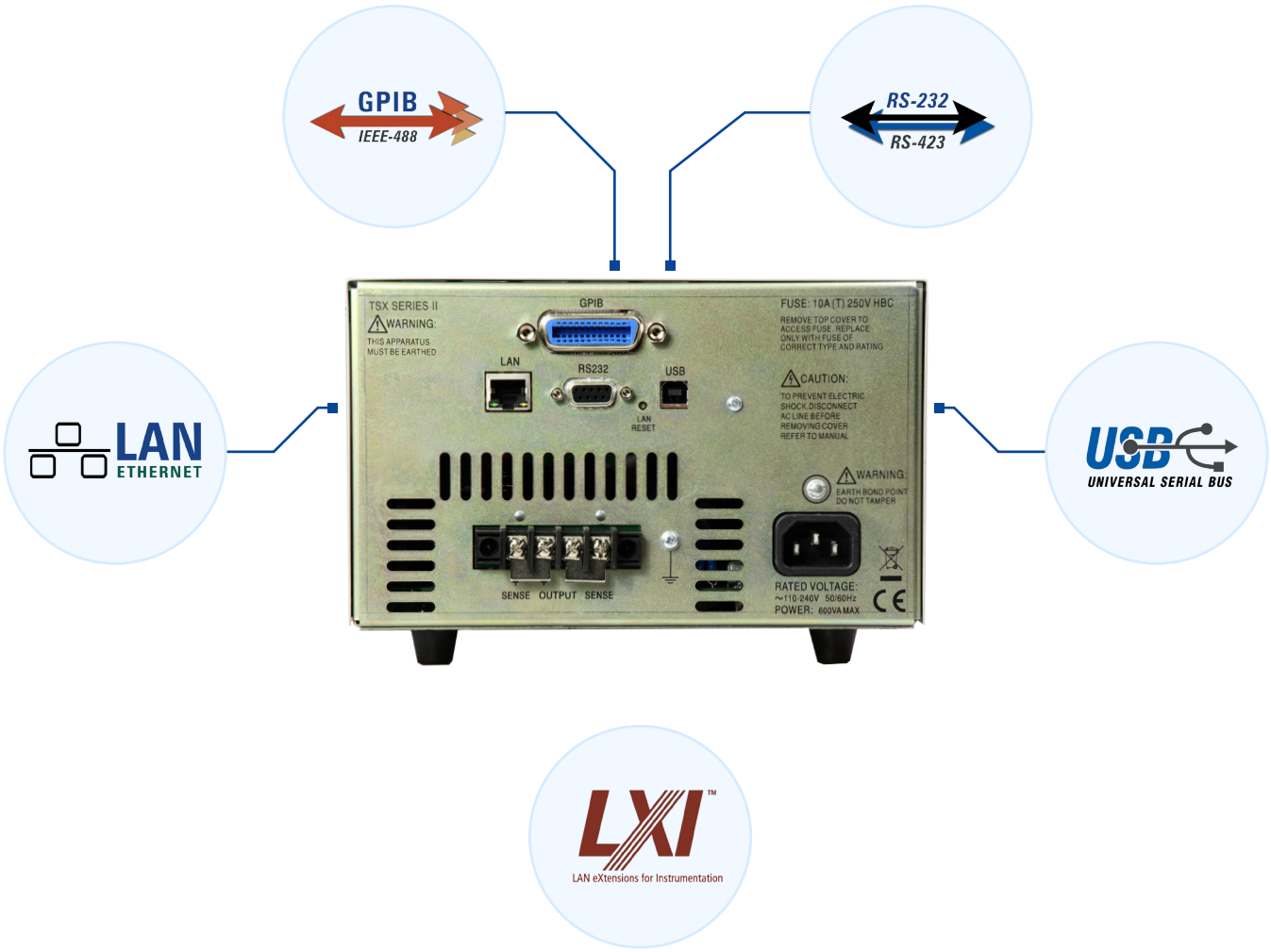
NON-VOLATILE STORAGE OF MULTIPLE SETTINGS

25 non-volatile memories are provided for storing frequently used settings. Each store holds a voltage, current and OVP setting.

This facility is particularly useful in repetitive testing situations within production, development or inspection areas.

TSX SERIES High power laboratory DC Power Supplies

POWER WITH PROGRAMMABLE VERSATILITY



COMPREHENSIVE BUS INTERFACES [TSX-P]

To meet a wider variety of growing needs, the TSX-P provides a comprehensive array of digital bus interfaces. GPIB (optional), USB, RS-232, and LAN (Ethernet) with LXI support are all included.

GPIB IEEE-488

The GPIB interface is compliant with IEEE-488.1 and IEEE-488.2. GPIB remains a widely used interface for system applications.

RS-232 RS-423

An RS-232/RS-423 interface is provided for use with legacy systems. This type of serial interface remains in common usage and is perfectly satisfactory for lower speed applications.

USB UNIVERSAL SERIAL BUS

USB provides a simple and convenient means of connection to a PC and is particularly appropriate for small system use. A USB driver is provided which supports Windows 2000 and above including Win 8 and 10.

LAN ETHERNET

The LAN interface uses a standard 10/100 base-T Ethernet hardware connection with ICMP and TCP/IP Protocol for connection to a Local Area Network or direct connection to a single PC. This interface supports LXI and is highly appropriate for system use because of its scalable nature and low cost interconnection.

LXI

The LAN interface is LXI compliant. LXI (LAN eXtensions for Instrumentation) is the next-generation, LAN-based modular architecture standard for automated test systems managed by the LXI Consortium, and is expected to become the successor to GPIB in many systems. For more information on LXI go to:

www.aimtti.com/go/lxi

BUS FUNCTIONS

Bus controlled functions include set voltage, set current, set OVP, set output on/off, read voltage, read current.

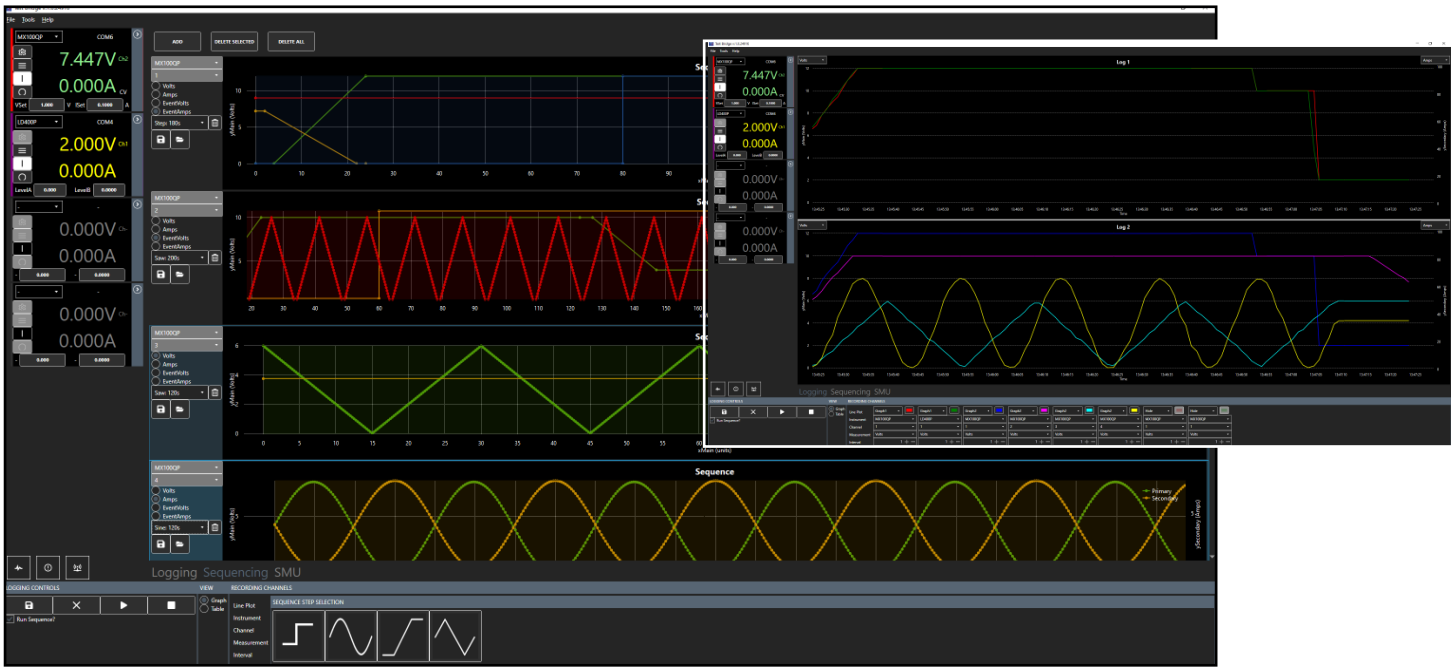
LABVIEW & IVI DRIVER

An IVI driver for Windows is included. This provides support for common high-level applications such as LabView*, LabWindows*, and Keysight VEE*.

* LabView and LabWindows are trademarks of National Instruments Keysight VEE is a trademark of Keysight Technologies. Windows is a trademark of Microsoft.

TEST BRIDGE SOFTWARE

- MULTI INSTRUMENT CONTROL
- LOGGING TO TABLE AND GRAPH FORMAT
- TIMED SEQUENCE CONTROL ACROSS ALL INSTRUMENTS AND CHANNELS
- USB, LAN AND RS232 COMPATIBLE





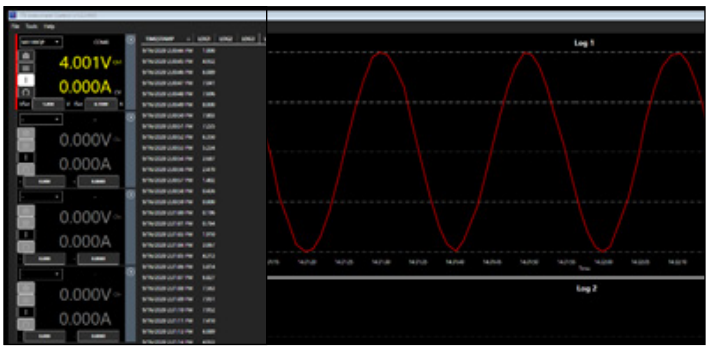
MULTI INSTRUMENT CONTROL

Up to four instruments can be connected at one time, each one can be controlled by the instrument panel; settings and limits can be viewed and amended in the settings menu. Live and set data can be displayed for all channels on a multiple channel instrument, each one colour coded for ease of identification.

Compatible with Aim-TTi PSU and Loads: PL, QL, MX, CPX, TSX, QPX, and LD.

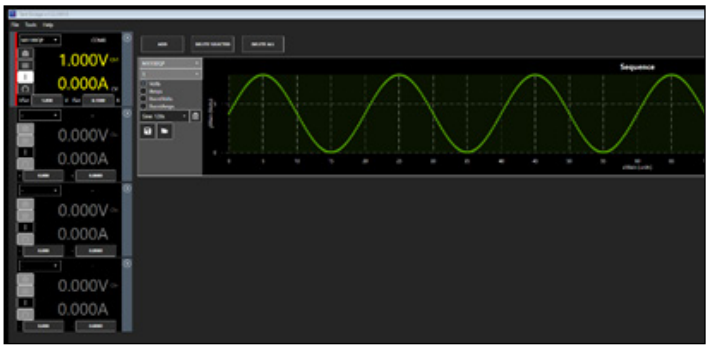
LOGGING TO TABLE AND GRAPH

Logging channels capture live data, they can be set to record values from any output on an active instrument at specified time intervals. Varying measurement intervals can be set alongside units and plot line colour. The results are plotted on one of the two available graphs and can also be viewed in a table. The graph provides advanced zooming and panning functions, allowing efficient data analysis. The data can be exported as a .TSV file.



TIMED SEQUENCE CONTROL

Each sequence is allocated to a specified channel on an instrument. Two different units can be added to each sequence, along with two events. A range of built in step options are available including: sine, triangle, ramp and step.



Test Bridge software can be downloaded from:
https://www.aimtti.com/support

TSX and TSX-P Technical Specifications

OUTPUT SPECIFICATIONS

Operating modes:	Constant voltage or constant current with automatic crossover.
Voltage range:	0V to 35V (TSX3510/TSX3510P) 0V to 18V (TSX1820/TSX1820P)
Current range:	0A to 10A (TSX3510/TSX3510P) 0A to 20A (TSX1820/TSX1820P)
Overvoltage protection:	1V to 40V (35V/10A); 1V to 25V (18V/20A).
Load regulation:	For any load change, measured at the O/P terminals, using remote sense: - Constant voltage: <0.01% ± 5mV - Constant current: < 0.01% ±0.5mA
Line regulation:	Change in output for a 10% line change: - Constant voltage: <0.01% ± 5mV - Constant current: < 0.01% ± 250uA
Ripple & noise:	Typically <1mV rms; <3mVrms max in CV mode
(20MHz bandwidth)	Typically <3mA rms; <5mArms max in CI mode
HF common mode noise:	Typically <3mV rms, <15mV pk.
Transient response:	100µs to within 50mV of setting for a 5% to 95% load change.
Temperature coefficient:	Typically <100ppm/°C.
Overvoltage protection delay:	<200µs.
Protection functions:	Overvoltage trip. Regulator over temperature. Sense miswiring.
Status indication:	LED indicators for Output ON, constant voltage mode, constant current mode, current meter damping, remote operation, and LAN status; trip & error messages on display.
Output terminals:	Front panel: Universal 4mm safety binding posts on 19mm (0·75") spacing Rear panel: Terminal block screw terminals.
Output protection:	Forward protection by Over-Voltage-Protection (OVP) trip. Output will withstand an applied forward voltage of up to 50V (35V/10V), 35V (18V/20A) Reverse protection by diode clamp for reverse currents up to 3A.

METER SPECIFICATIONS

Meter types:	Dual 4 digit meters with 12·5mm (0.5")LEDs. Reading rate 4Hz
Meter resolutions:	10mV,10mA.
Meter accuracies:	Voltage 0.2% of reading ± 1 digit, Current 0.5% of reading ± 1 digit.

GENERAL

Input voltage range:	110V – 240V AC ± 10%, 50/60Hz. Installation Category II.
Power requirement:	600VA max.
Electrical safety:	Complies with EN61010-1.
EMC:	Complies with EN61326-1.
Temperature:	Operating: +5°C to +40°C, 20% to 80%RH. Storage: -40°C to +70°C.
Cooling:	Fan-less convection cooling.
Size:	200 x 140 x 385mm (WxHxD); Half rack width x 3U height.
Weight:	4.5kg (TSX versions) 5.0kg (TSX-P versions)
Rack mount Options:	3U Rack Mount for half rack width instruments, (RM300A)

FRONT PANEL CONTROLS - TSX

Voltage setting:	Via single rotary controls for coarse and fine control.
Current setting:	Via single turn semi-logarithmic rotary control.
Overvoltage setting:	Via screwdriver adjustable preset potentiometer.
Output On/Off:	Latching push-push switch operating electronic power control.

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.
** Labwindows is a trade-mark of National Instruments Corporation.*

FRONT PANEL CONTROLS - TSX-P

Voltage setting:	Direct keyboard entry or quasi-analog rotary control.
Current setting:	Direct keyboard entry or quasi-analog rotary control.
Overvoltage setting:	Direct keyboard entry.
Output On/Off:	Push button control with indicator lamp operating electronic power control.
Delta Mode:	Increase or decrease voltage or current in user-selectable steps.
Store/Recall:	Store and recall voltage, current and OVP levels from non-volatile memory (25 memories).
Address Setting:	Set GPIB address
Damping ON/OFF:	Sets current meter damping ON or OFF

NOTE: all voltage and current levels set via the keyboard are displayed on a separate 0.3" 4 digit display. This entry preview system ensures that the user can observe the value entered before it is effected thus avoiding possible error. The display is also used for setting additional functions and for displaying watts.

DIGITAL INTERFACES - TSX-P

Operational Functions:	Set voltage, set current, set OVP; set output on/off; read output voltage; read output current; read output power.
RS232:	9600 baud, 9 pin D-connector (female).
GPIB (Optional):	Conforming with IEEE488.1 & IEEE488.2.
USB Interface:	Standard USB 2.0 hardware connection. Implemented as a Virtual COM Port.
LAN Interface:	LAN Ethernet 100/10base-T hardware connection. 1.4 LXI Core 2011
Setting resolution:	Voltage- 10mV. Current- 10mA.
Setting accuracy:	Voltage- ±(0.1% + 10mV) Current- ±(0.2% + 20mA)
Readback resolution:	Voltage- 10mV. Current- 10mA.
Readback accuracy:	Voltage- ±(0.2% + 1 digit) Current- ±(0.5% +1 digit)
Operating software:	Software for operating the PSUs under GPIB or RS232 control is available including a Labwindows* driver.

RESPONSE TIMES:

Remote Command Processing Time:	Typically <50ms between receiving the command terminator for a step voltage change at the instrument and the output voltage beginning to change.
Power Supply:	An internal time constant, T, (typically 22ms) governs the settling time of a step voltage increase.

NOTE: Settling time to within 1% of the step change = 4.6T, to 0.1% = 6.9T, to 0.01% = 9.2T; for example, after a 10V step the output will be within 1 digit (10mV = 0.1%) of its new value in typically 150ms. For load current of 1 Amp or more, settling times for downward steps will be very similar; however, response times will be longer at low loads.

Models		Voltage/Current	Power
TSX1820	TSX1820P	18 volts/20 amps	360 watts
TSX3510	TSX3510P	35volts/10 amps	350 watts

Designed and built in Europe by:

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