



# THURLBY THANDAR INSTRUMENTS

## EL & EX Series



Compact bench DC power supplies

*single, dual and triple output models*

*powers from 30 watts to over 300 watts*

*voltage ranges from 0-18V to 0-150V*

# EL and EX series DC bench PSUs

compact bench power supplies offering an unrivalled combination of performance and value

## Power-matched technologies

The EL and EX series of DC bench power supplies have been designed to meet the need for a compact power supply of good performance at a reasonable price.

Two different technologies have been used - all linear for power levels up to 125 watts (EL series) and switch-mode pre-regulation with linear post-regulation for higher powers (EX series).

## Constant voltage or constant current

The main outputs can operate in constant voltage or constant current mode with automatic crossover and mode indication. Coarse and fine voltage controls are provided. The current control is logarithmic enabling low current levels to be set accurately.

## Simultaneous digital metering

The EL and EX series incorporate separate digital voltage and current meters on each main output. The meters use bright 14mm (0.56") LED displays and have an update rate of 4 per second providing near instantaneous response.

Simultaneous metering of voltage and current provides accurate information "at a glance" and avoids any possibility of misinterpretation.

When an output switch is set to "off", the current limit setting is displayed enabling conditions to be set before the load is connected.

## Ready for low-voltage logic

To reflect the increasing usage of low-voltage logic devices, the third output of the EL302T and EX354T can be switched between 5 volts and 3.3 volts.



EL & EX series - combined range		
Single Output		
EL301	30V/1A	30 watts
EL183	18V/3.3A	60 watts
EL302	30V/2A	60 watts
EL561	56V/1.1A	60 watts
EX355	35V/5A	175 watts
Dual Output		
EL302D	2 x 30V/2A	120 watts
EX354D	2 x 35V/4A	280 watts
EX752M	2 x 75V/2A or 1 x 75V/4A or 1 x 150V/2A	300 watts
Triple Output		
EL302T	2 x 30V/2A + 5V/1A	125 watts
EX354T	2 x 35V/4A + 5V/5A	305 watts

Further models will follow; please contact our sales desk or visit our web site for up to date information.

## EL - high performance with low costs

The EL series provides medium levels of power (up to 125 watts) in a compact and attractive case style using all-linear regulation.

High resolution controls allow precise setting of voltage and current levels which are indicated on accurate and highly legible digital meters.

Excellent line and load regulation is matched by very low noise and good transient response. Improved power efficiency ensures that the unit requires no fan cooling.

## A wide choice of voltage and current

Single output EL series power supplies are available in a variety of voltage and current combinations to suit differing applications.

## Single, dual or triple outputs

EL series units are also available in dual or triple output versions.

The EL302D, for example, has two independent and isolated outputs each with a 0 to 30V, 0 to 2A capability. The outputs operate in constant voltage or constant current mode with automatic crossover and mode indication. Each output has its own on-off switch. The outputs can be wired in either series or parallel to provide voltages up to 60 volts or currents up to 4 amps.

The EL302T has an additional 'logic voltage' output with a 1A current capability. This output can be selected as 5V or 3.3V via a front panel switch.



### EX - high power with high performance

The EX series provides high levels of power (up to 305 watts) in a compact and attractive case style.

Switch-mode pre-regulation is combined with linear post-regulation to provide performance comparable with an all linear design.

Excellent line and load regulation is matched by low noise and good transient response. High power efficiency makes fan cooling unnecessary.

EX series - initial model range			
Model	O/Ps	V max. / A max.	Power
EX355	1	35V/5A	175W
EX354D	2	2 x 35V/4A	280W
EX752M	2	2 x 75V/2A or 75V/4A or 150V/2A	300W
EX354T	3	2 x 35V/4A + 5V/5A	305W

### Single, dual or triple outputs

EX series units are available in single, dual or triple output versions.

The EX354D, for example, has two independent and isolated outputs each with a 0 to 35V, 0 to 4A capability. The outputs operate in constant voltage or constant current mode with automatic crossover and mode indication. Each output has its own on-off switch.

The outputs can be wired in either series or parallel to provide voltages up to 70 volts or currents up to 8 amps.

The EX354T has an additional 'logic voltage' output with a 5A current capability. This output can be selected as 5V or 3.3V via a front panel switch.

### Output voltages up to 150V

The EX752M is a dual output 300 watt PSU with Multi-Mode capability. This enables it to operate as a dual power supply with two independent and isolated outputs, or as a single power supply of double the power.

As a dual, each output provides 0 to 75V at 0 to 2A (mode A). As a single the output can be selected as either 0 to 75V at 0 to 4A (mode B) or 0 to 150V at 0 to 2A (mode C). In single modes, the unused half of the unit becomes completely inoperative and its displays are blanked.

Because of the higher voltages it can produce, the EX752M uses special safety binding posts which can accept spade terminals, 4mm plugs, or bare-end wires without exposing any metal parts.

### Safety and reliability

The EL & EX series has been designed to meet the stringent requirements of relevant IEC standards for safety and EMC.

All outputs are intrinsically short circuit proof, and are protected against external voltages and reverse currents.

### EL series - initial model range

Model	O/Ps	V max. / A max.	Power
EL301	1	30V/1A	30W
EL183	1	18V/3.3A	60W
EL302	1	30V/2A	60W
EL561	1	56V/1.1A	60W
EL302D	2	2 x 30V/2A	120W
EL302T	3	2 x 30V/2A + 5V/1A	125W

Models illustrated within this brochure:

Above: EL302T

EX355

EX752M (mode C)

Front cover: EX354T

EL183 (EL301, EL302, EL561 are similar)

EL302D

## EL series

### MAIN OUTPUTS

Voltage Range:	0V to 18V minimum (EL183) 0V to 30V minimum (EL301, EL302, EL302D, EL302T) 0 to 56V minimum (EL561)
Current Range:	0A to 1A minimum (EL301) 0A to 1.1A minimum (EL561) 0A to 2A minimum (EL302, EL302D, EL302T) 0A to 3.3A minimum (EL183)
Operating Mode:	Constant voltage or constant current with automatic cross-over and indication.
Voltage Setting:	By coarse and fine controls.
Current Setting:	By single logarithmic control.
Load regulation:	<0.01% of max. O/P for a 90% load change.
Line regulation:	<0.01% of max. O/P for a 10% line voltage change.
Output impedance:	Typically <5mΩ in constant voltage mode. Typically >50kΩ in constant current mode.
Ripple & Noise (20MHz bandwidth):	Typically <1mV rms, (CV mode).
Transient Response:	<20μs to within 50mV of set level for 90% load change.
Temp. Coefficient:	Typically <100ppm/°C.
Output Protection:	Outputs will withstand forward voltages of up to 20V above the rated output voltage. Reverse protection by diode clamp for currents up to 3A.
Status Indication:	Output ON lamps. Constant current mode lamps.
Output Switch:	Electronic. Preset voltage and current displayed when output is off.
Output Terminals:	4mm terminals on 19mm (0.75") pitch (see below).

### METERS (main outputs)

Meter Types:	Separate 3 digit meters for voltage and current with 14mm (0.56") LED displays. Reading rate 4/sec.
Meter Resolutions:	100mV, 10mA.
Meter Accuracies:	Voltage 0.3% ±1 digit. Current 0.6% ±1 digit.

### LOGIC OUTPUT (EL302T only)

Voltage:	5V or 3.3V, selectable by front panel switch.
Voltage accuracy:	±3%
Current limit:	1A minimum.
Load regulation:	<0.5% for a 90% load change.
Line regulation:	<0.1% for a 10% line voltage change.
Ripple & Noise (20MHz bandwidth):	Typically <1mV rms.
Output Protection:	Output will withstand up to 16V forward voltage. Diode clamp reverse protection for currents to 3A.
Output Terminals:	4mm terminals on 19mm (0.75") pitch (see below).
Status Indication:	Current limit lamp.

## GENERAL SPECIFICATIONS

### OUTPUT TERMINALS

Standard Type:	4mm "binding post" terminals suitable for plugs or wires.
EX752M only:	As above but with fully "touch proof" construction.
Optional (all models):	4mm safety sockets, suitable for shrouded plugs.

### POWER

AC Input:	EL series: 230V or 115V ±10% AC, 50/60Hz. EX355, EX752M: 99V to 262V AC, 50/60Hz. EX354D, EX354T: 230V ±14% (115V to order). Installation Category II.
Consumption:	See table for maximum VA figures for each model.

### ENVIRONMENTAL

Operating Range:	+5°C to +40°C, 20% to 80% RH.
Storage Range:	-40°C to +70°C.
Environmental:	Indoor use at altitudes to 2000m, Pollution Degree 1.
Safety:	Complies with EN61010-1.
EMC:	Complies with EN50081-1 and EN50082-1.

Designed and built in the U.K. by:



**Thurlby Thandar Instruments Ltd.**

Glebe Road, Huntingdon. Cambs. PE18 7DX England

Tel: 01480 412451 Fax: 01480 450409 Email: sales@ttinst.co.uk

Web: <http://www.ttinst.co.uk>

## EX series

### MAIN OUTPUTS

Voltage Range:	0V to 35V minimum (EX355, EX354D, EX354T) 0V to 75V or 0V to 150V minimum (EX752M)
Current Range:	0A to 2A or 0A to 4A minimum (EX752M) 0A to 4A minimum (EX354D, EX354T) 0A to 5A minimum (EX355)
Operating Mode:	Constant voltage or constant current with automatic cross-over and indication.
Voltage Setting:	By coarse and fine controls.
Current Setting:	By single logarithmic control.
Load regulation:	<0.01% of max. O/P for a 90% load change.
Line regulation:	<0.01% of max. O/P for a 10% line voltage change.
Output impedance:	Typically <5mΩ in constant voltage mode. Typically >50kΩ in constant current mode.
Ripple & Noise (20MHz bandwidth):	Typically <2mV rms, <10mV pk-pk, (CV mode).
Transient Response:	<200μs to within 50mV of set level for 90% load change.
Temp. Coefficient:	Typically <100ppm/°C.
Output Protection:	Outputs will withstand forward voltages of up to 40V (EX355, EX354D, EX354T) or 85V/170V (EX752M). Over-voltage clamp operates above these levels. Reverse protection by diode clamp for currents up to 3A.
Status Indication:	Output ON lamps. Constant current mode lamps.
Output Switch:	Electronic. Preset voltage and current displayed when output is off.
Output Terminals:	4mm terminals on 19mm (0.75") pitch (see below). Special safety terminals on EX752M.

### METERS (main outputs)

Meter Types:	Separate 3 digit meters for voltage and current with 14mm (0.56") LED displays. Reading rate 4/sec. (4 digit voltmeter on EX752M).
Meter Resolutions:	100mV, 10mA.
Meter Accuracies:	Voltage 0.3% ±1 digit. Current 0.6% ±1 digit.

### LOGIC OUTPUT (EX354T only)

Voltage:	5V or 3.3V, selectable by front panel switch.
Voltage accuracy:	±2%
Current limit:	5A minimum
Load regulation:	<0.5% for a 90% load change.
Line regulation:	<0.1% for a 10% line voltage change.
Ripple & Noise (20MHz bandwidth):	Typically <2mV rms, <10mV pk-pk.
Output Protection:	Output will withstand up to 7V forward voltage. Diode clamp reverse protection for currents to 3A.
Output Terminals:	4mm terminals on 19mm (0.75") pitch (see below).
Status Indication:	Current limit lamp.

MODEL	SIZE (W X H X D) mm	WEIGHT (kg)	Input VA max.
EL301	140 x 160 x 295	3.4	85
EL183	140 x 160 x 295	4.4	160
EL302	140 x 160 x 295	4.4	160
EL561	140 x 160 x 295	4.4	160
EX355	140 x 160 x 320	3.0	350
EL302D	260 x 160 x 295	7.5	320
EL302T	260 x 160 x 295	7.5	320
EX354D	260 x 160 x 320	4.3	600
EX354T	260 x 160 x 320	4.3	600
EX752M	260 x 160 x 320	4.4	600

Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.