Technical Specifications

RATINGS
Voltage and Current: 80 volts maximum, 80 amps maximum.
Power Dissipation: 320 watts maximum continuous at 28°C.
Min. Operating Voltage: 16V.
Setting Accuracy: ±0.5% +2W.
Meter Resolution: 1W.
Regulation: <30mV for a 20W to 280W power change.
Slew Rate Range: <33mA/V/s to >400A/V/ms
Setting Accuracy: ± (0.5% + 2 digits).
Meter Resolution: 0.001A/V or 0.01A/V depending on range.
Regulation: <2% for a 20W to 280W power change.
Slew Rate Range: <8mA/ms to >2500A/ms
Setting Accuracy: ± (0.5% + 2 digits).
Meter Resolution: 1mA on 8A range, 10mA on 80A range.
Regulation: <2% for a 20W to 280W power change.
Slew Rate Range: 0 to 83A in 2 ranges, set by 10 turn control.
Setting Accuracy: ±0.2% +2A.
Meter Resolution: 1A on 8A range, 10A on 80A range.
Regulation: <2% for a 20W to 280W power change.
Setting Accuracy: ±0.5% +2 digits.
Meter Resolution: 1mA on 8mA range, 10mA on 80mA range.
Regulation: <2% for a 20W to 280W power change.
Setting Accuracy: ±0.5% +2 digits.
Meter Resolution: 1mV on 8V range, 10mV on 80V range.
Regulation: <2% for a 20W to 280W power change.
Setting Accuracy: ±0.5% +2 digits.
Meter Resolution: 0.01A/V or 0.01A/V depending on range.
Regulation: <2% for a 20W to 280W power change.
Setting Accuracy: ±0.5% +2 digits.
Meter Resolution: 0.0A/V to 40A/V in 2 ranges, set by 10 turn control.
Regulation: <2% for a 20W to 280W power change.
Setting Accuracy: ±0.5% +2 digits.
Meter Resolution: 0.0A/V to 40A/V in 2 ranges, set by 10 turn control.
Regulation: <2% for a 20W to 280W power change.
Constant Power Mode
Setting Range: 0 to 320W, set by 10 turn control.
Remote Disable
- when the front panel input enable switch is in the on position, this input can be used to turn the load on or off in response to an external logic signal.
- the change between the Level A and Level B settings for any mode can be done in response to an external logic signal.
- the inputs for analogue or TTL have an impedance of 400kΩ to the power negative terminal and a common mode range of ±100V.
- remote disable - when the front panel input enable switch is in the on position, this input can be used to turn the load on or off in response to an external logic signal. Fully opto isolated input.
- remote or local voltage sensing can be selected via a rear panel switch. Sense connections are on the rear panel terminal block.
- input impedance: 680kΩ.
- max. voltage drop: 6 volts.
- remote control.
- Analogue - the level for any mode can be set by an external analogue voltage (4V full scale).
- TTL - the change between the Level A and Level B settings for any mode can be done in response to an external logic signal.
- the inputs for analogue or TTL have an impedance of 400kΩ to the power negative terminal and a common mode range of ±100V.
- remote disable - when the front panel input enable switch is in the on position, this input can be used to turn the load on or off in response to an external logic signal. Fully opto isolated input.
- current monitor.
- an analogue signal representing the current waveform is available for connection to an oscilloscope or external meter. Scaling is 50mV/Amp and compliance is ±3V with respect to the load negative terminal.
- protection.
- the load incorporates both a power limiter circuit and a fault trip which responds to excess voltage, current, power or temperature. The trip puts the load into a high impedance state. Surge suppressors are incorporated to limit transient voltage spikes.
- general.
- rear terminals: input via 5mm terminal/binding posts. Remote sense, current monitor, remote control via terminal block.
- power requirement: 220V - 240V or 110V - 120V ±10%, 50/60Hz.
- installation category II. Consumption 30VA max.
- current monitor via 4mm sockets.
- front terminals: input via 4mm terminal/binding posts (35A max.). Current monitor via 4mm sockets.
- power requirement: 220V - 240V or 110V - 120V ±10%, 50/60Hz.
- installation category II. Consumption 30A max.
- operating range: 5°C to -40°C, 20% to 80% RH.
- storage range: -40°C to +70°C.
- environmental: Indoor use at altitudes up to 2000m. Pollution degree 2.
- safety and EMC: complies with EN61010-1 and EN61326. Size: 130 x 212 x 45mm (HxWxD). 3U x half rack.
- weight: 6kg.
- option: 19-inch rack mount kit.
- accuracy specifications apply for 18°C to 28°C and 50% power.
- Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.
LD300 Electronic DC Load

80 amps, 80 volts, 300 watts

CI, CR, CG, CV and CP modes

transient generator, variable slew rate

Compartment electronic DC load

The LD300 is an inexpensive electronic load which is suitable for testing and characterising a wide variety of dc power sources. It can be used to investigate the behaviour of many different types of power source such as batteries, solar cells, fuel cells or wind generators, as well as electronic power supply units. Its wide voltage/current range, multiple operating modes and built-in transient generator give it the versatility to offer test solutions from the design laboratory through to the component test area.

Low minimum operating voltage

The LD300 can operate at voltages below 500mV for currents up to 10 amps. At higher currents the fixed internal resistance of 25mΩ gradually raises the minimum operating voltage, but it remains below 1 volt up to 40 amps and below 2 volts up to 80 amps. This low operating voltage allows it to be used for many low voltage applications for which other electronic loads are unsuitable.

Multiple modes of operation

Constant current (CI) mode is used for load testing of normal voltage-source power supplies and for constant current discharge testing of batteries. This mode provides rapid measurement of power source regulation (V/I characteristics).

Constant voltage (CV) mode is used for load testing of constant current power supplies. The unit operates as a high power shunt regulator.

Constant resistance (CR) mode is also incorporated. As well as showing settings in amps per volt, this mode provides better resolution when setting very low equivalent resistance values.

Constant conductance (CG) mode is also incorporated. Settings are displayed in Ohms and milli-Ohms.

Adjustable voltage drop-out

Some power sources, such as rechargeable batteries, can be damaged if their output voltage falls below a certain level. The LD300 provides automatic protection by incorporating fully variable voltage dropout (CI, CR, CG and CP modes).

Transient generator and variable slew

The LD300 incorporates a full variable frequency, variable duty cycle transient generator. Switching between the two preset levels can be done at any frequency between 0.1Hz and 10kHz. The transient generator can be used in all operating modes. The rate of change between levels (slew rate) is controllable over a wide range.

Slew rate control applies to all changes of level including remote control and manual changes between level A and level B. A slow-start function can be selected for situations where latching would otherwise occur at switch-on.

High resolution setting & measurement

The levels for each operating mode are set using high quality ten turn potentiometers for both level A and level B. Levels are displayed using four digit meters which provide resolution down to 1mA, 1mV and 1mΩ.

Remote control

The LD300 incorporates analogue remote control for all modes of operation. When “external voltage” is selected the level becomes linearly proportional to the voltage applied to the remote control inputs on the rear panel. Any waveform can be used as the control voltage allowing complex load conditions to be simulated using, for example, an arbitrary waveform generator. Alternatively, a logic signal can be used to switch between levels. When “external TTL” is selected, the level is switched between the two preset levels in response to an external logic signal.

The remote control inputs have a wide common mode range allowing the control voltage to be referenced independently of the load terminal voltages.

Current waveform monitor

It is often important to be able to observe the load current waveform on an oscilloscope. The LD300 provides a calibrated monitor output for this purpose as well as a sync output from the transient generator.

The monitor output has several volts of compliance with respect to the load input, thus allowing it to be connected to a grounded oscilloscope without current diversion.

VERSATILE SOLUTION FOR TESTING DC POWER SOURCES

- Constant current, resistance, conductance, voltage and power modes
- Wide voltage and current range, 0 to 80 volts and 0 to 80 amps.
- 300 watts continuous dissipation at 40°C
- Low minimum operating voltage of <1V at 40A
- Ten turn controls for level setting
- Built-in transient generator with variable slew
- Current monitor output for waveform viewing
- Variable drop-out voltage for battery testing
- Analogue remote control capability

CI, CR, CG, CV and CP modes

transient generator, variable slew rate

Transistor load

The LD300 incorporates a full variable frequency, variable duty cycle transient generator. Switching between the two preset levels can be done at any frequency between 0.1Hz and 10kHz. The transient generator can be used in all operating modes. The rate of change between levels (slew rate) is controllable over a wide range.

Slew rate control applies to all changes of level including remote control and manual changes between level A and level B. A slow-start function can be selected for situations where latching would otherwise occur at switch-on.

High resolution setting & measurement

The levels for each operating mode are set using high quality ten turn potentiometers for both level A and level B. Levels are displayed using four digit meters which provide resolution down to 1mA, 1mV and 1mΩ.

Remote control

The LD300 incorporates analogue remote control for all modes of operation. When “external voltage” is selected the level becomes linearly proportional to the voltage applied to the remote control inputs on the rear panel. Any waveform can be used as the control voltage allowing complex load conditions to be simulated using, for example, an arbitrary waveform generator. Alternatively, a logic signal can be used to switch between levels. When “external TTL” is selected, the level is switched between the two preset levels in response to an external logic signal.

The remote control inputs have a wide common mode range allowing the control voltage to be referenced independently of the load terminal voltages.

Current waveform monitor

It is often important to be able to observe the load current waveform on an oscilloscope. The LD300 provides a calibrated monitor output for this purpose as well as a sync output from the transient generator.

The monitor output has several volts of compliance with respect to the load input, thus allowing it to be connected to a grounded oscilloscope without current diversion.
The LD300 is an inexpensive electronic load which is suitable for testing and characterising a wide variety of dc power sources. It can be used to investigate the behaviour of many different types of power source such as batteries, solar cells, fuel cells or wind generators, as well as electronic power supply units. Its wide voltage/current range, multiple operating modes and built-in transient generator give it the versatility to offer test solutions from the design laboratory through to the component test area.

**Low minimum operating voltage**

The LD300 can operate at voltages below 500mV for currents up to 10 amps. At higher currents the fixed internal resistance of 25mΩ gradually raises the minimum operating voltage, but it remains below 1 volt up to 40 amps and below 2 volts up to 80 amps. This low operating voltage allows it to be used for many low voltage applications for which other electronic loads are unsuitable.

**Adjustable voltage drop-out**

Some power sources, such as rechargeable batteries, can be damaged if their output voltage falls below a certain level. The LD300 provides automatic protection by incorporating fully variable voltage dropouts (CI, CR, CG and CP modes). The transient generator can be used at all operating modes. Switching between the two preset levels can be done at any frequency between 0.1Hz and 10kHz.

** Asi to change between levels (slew rate) is controllable over a wide range.**

Slew rate control applies to all changes of level including remote control and manual changes between level A and level B. A slow-start function can be selected for situations where latching would otherwise occur on switch-on.

**High resolution setting & measurement**

The levels for each operating mode are set using high quality ten turn potentiometers for both level A and level B. Levels are displayed using four digit meters which provide resolution down to 1mA, 1mV and 1mΩ. Settings for slew rate, transient frequency, duty cycle and drop-out voltage can also be displayed.

**Remote control**

The LD300 incorporates analogue remote control for all modes of operation. When “external voltage” is selected the level becomes linearly proportional to the voltage applied to the remote control inputs on the rear panel. Any waveform can be used as the control voltage allowing complex load conditions to be simulated using, for example, an arbitrary waveform generator. Alternatively, a logic signal can be used to switch between levels. When “external TTL” is selected the level is switched between the two preset levels in response to an external logic signal. The remote control inputs have a wide common mode range allowing the control voltage to be referenced independently of the load terminal voltages.

**Current waveform monitor**

It is often important to be able to observe the load current waveform on an oscilloscope. The LD300 provides a calibrated monitor output for this purpose as well as a sync output from the transient generator. The monitor output has several volts of compliance with respect to the load input, thus allowing it to be connected to a grounded oscilloscope without current diversion.
**Technical Specifications**

**RATINGS**
- Voltage and Current: 80 volts maximum, 80 amps maximum.
- Power Dissipation: 320 watts maximum continuous at 28°C.
- Min. Operating Voltage:
  - +5V to +10V increments.
- Setting Accuracy: ± 0.5% on any range, 10mV on 80V range.
- Regulation: 2% for a 20W to 280W power change.
- Meter Resolution: 0.001A/V or 0.01A/V depending on range.
- Slew Rate Range: <33mA/V/s to 400A/V/ms.
- Setting Range: 0 to 320W, set by 10-turn control.
- Setting Accuracy: ± 2% of range.
- Setting Resolution: 0.1Hz, 1Hz, 10Hz depending on range.

**Operating Modes**
- **Constant Current Mode**
  - Setting Range: 0 to 80A in 2 ranges, set by 10-turn control.
  - Meter Resolution: 1mA on 8A range, 10mA on 80A range.
  - Setting Accuracy: ± (0.2% + 20mA).
  - Regulation: ± 2% of range.
  - Slew Rate Range: ±8mA/µs to ±320A/µs.
- **Constant Voltage Mode**
  - Setting Range: +5V to 80V, set by 10-turn control.
  - Meter Resolution: 1mV on 8V range, 10mV on 80V range.
  - Setting Accuracy: ± (0.2% + 2 digits).
  - Regulation: ± 2% of range.
  - Slew Rate Range: ±2.5A/µs to ±80A/µs.
- **Constant Power Mode**
  - Setting Range: 0 to 80W, set by 10-turn control.
  - Meter Resolution: 1W.
  - Setting Accuracy: ± (0.2% + 2W).
  - Regulation: ± 2% of range.
  - Slew Rate Range: ±0.1W/µs to ±3.2W/µs.

**Level Control**
- Level A, Level B: Transient Internal (switching between A and B using the built-in generator), Transient External (switching between A and B using an external switching signal), and Remote (level proportional to an external voltage).
- Level A, Level B:
  - Each set by 10-turn potentiometer. Range, resolution and setting accuracy as above shown.
  - Slew Rate Control: All changes of level are subjected to slew rate control which is adjustable over a 30,000:1 range by 150µA position switch and vernier.
  - Input Enable: Latching switch which turns the load condition on.
  - Slow Start: Engages slew rate control to limit the speed of the ON transition when the input is enabled.
  - Dropout Voltage: Defines a minimum voltage below which the load current will reduce to zero (as may be required for testing batteries or power sources that can not be short circuited). Adjustable from 0V to 80V.

**Transient Generator**
- Pulse Repetition Rate: 0.1Hz to 10kHz in 3 overlapping ranges.
- Setting Resolution: 0.1Hz, 1Hz, 10Hz depending on range.
- Setting Accuracy: ± 2% of range.
- Pulse Duty Cycle: 1% to 99% continuously variable.
- Sync Output: Pulse synchronous with transient level change.

**Displays and Metering**
- Dual 4 digit LED displays showing a variety of settings or measurements as set by a five position switch.
- Setting Displays: Level A and Level B, Frequency and Duty Cycle, Slew Rate and Drop Out.
- Measurements: Amps and Volts, Watts and Ohms (calculated from V and I measurements).
- Meter Accuracy: Voltage ±(0.1% + 2 digits), Current ±(0.2% + 2mA).

**Remote Voltage Sense**
- Remote or Local voltage sensing can be selected via a rear panel switch.
- Sense connections are on the rear panel terminal block.
- Input Impedance: 60kΩ (each input) to load negative.
- Max. Voltage Drop: 6 volts.

**Remote Control**
- Analogue - the level for any mode can be set by an external analogue voltage (4V full scale).
- TTL - the change between the Level A and Level B settings for any mode can be done in response to an external logic signal.
- The inputs for analogue or TTL have an impedance of 400kΩ to the power negative terminal and a common mode range of ±10V.
- Remote Disable - when the front panel input enable switch is in the on position, this input can be used to turn the load on or off in response to an external logic signal. Fully opto isolated input.

**Current Monitor**
- An analogue signal representing the current waveform is available for connection to an oscilloscope or external meter. Scaling is 50mV/Amp and compliance is ±3V with respect to the load negative terminal.

**Protection**
- The load incorporates both a power limiter circuit and a fault trip which responds to excess voltage, current, power or temperature. The trip puts the load into a high impedance state. Surge suppressors are incorporated to limit transient voltage spikes.

**General**
- Rear Terminals: Input via 5mm terminal/binding posts. Remote sense, current monitor, remote control via terminal block.
- Power Requirement:
  - 220V - 240V or 110V - 120V ±10%, 50/60Hz.
- Storage Range: -40°C to +70°C.
- Environmental: Indoor use at altitudes up to 2000m.
- Safety and EMC: Complies with EN61010-1 and EN61326.
- Size: 130 x 212 x 435mm (HxWxD), (3U x half rack).
- Weight: 6kg.
- Option: 19-inch rack mount kit.

Accuracy specifications apply for 18°C to 28°C and 50W power. Thurlby Thandar Instruments Ltd. operates a policy of continuous development and reserves the right to alter specifications without prior notice.

**DC Electronic Load, 80A, 80V, 300W**
- Constant current, resistance, voltage and power
- Transient generator, variable slew rate, soft start
- Current monitor output, analogue remote control

**AIM & THURLBY THANDAR INSTRUMENTS**

**LD300**

**AIM-TTi**

**Designed and built in Europe by:**

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Email: info@aimtti.com Web: www.aimtti.com
Company name and product brands
Thurlby Thandar Instruments Ltd. (TTi) is one of Europe’s leading manufacturers of test and measurement instruments.

Products have been sold under two brand names: TTi and Aim.

In the future, however, the full product range will be branded Aim-TTi.

This changeover will be gradual and many products will continue to carry the TTi or Aim brands for some time to come.

Web Addresses (URLs)
The preferred URL for obtaining information concerning Aim-TTi products is:

www.aimtti.com (international customers)

Customers in the UK should use the URL:

www.aimtti.co.uk

Customers in the USA should use the URL:

www.aimtti.us

Note that previous URLs such as www.tti-test.com will continue to operate for the time being.