Series 2380

Programmable DC Electronic Loads

- 200W, 250W, and 750W models
- Supports up to 500V or 60A
- Constant current (CC),constant voltage (CV), constant resistance (CR), and constant power (CP) operating modes
- LED simulated load test mode
- Readback voltage and current resolution down to 0.1mV/0.01mA
- Dynamic mode with cycle rate up to 25kHz
- Voltage rise and fall time measurement
- Current monitor function
- List mode
- Battery test mode
- Built-in GPIB,USB, and RS-232 interfaces

Series 2380 programmable DC electronic loads can sink a wide range of voltages and currents. The 200W Model 2380-500-15 can accept up to 500V or 15A. The 250W Model 2380-120-60 can accept up to 120V or 60A. The 750W Model 2380- 500 30 can accept up to 500V or 30A. These single-output, stand-alone electronic loads are cost-effective and self-contained.

Multiple Operating Modes

These DC electronic loads can operate in constant current (CC), constant voltage (CV), constant resistance (CR), or constant power (CP) mode. They can also be configured to provide a dynamically changing load to the DC source with load switching times as fast as 25kHz. Versatile internal, external, and remote triggering options allow synchronizing the dynamic load behavior with other events.

Comprehensive Protection

Protection functions built into Series 2380 DC electronic loads ensure the reliability and safety of all tests. These functions include over temperature protection (OTP), over voltage protection (OVP), over current protection (OCP), over power protection (OPP), and local/remote reverse voltage (LRV/RRV) protection. A power-on system self-test ensures the instrument is operating properly.

Full Complement of Settings and Controls

To maximize testing efficiency, you can save test parameters into any one of 100 memory locations for quick recall. All load parameters, such as voltage, current, slew rate, and dynamic mode time intervals, can be set using the front panel controls or programmed remotely. A numeric keypad and rotary knob allow entering settings quickly and setting parameters to their full resolution easily. USB-TMC, GPIB and RS-232 interfaces are built in for remote control and communication. A current monitor interface simplifies monitoring input current waveforms by providing a connection for an oscilloscope.

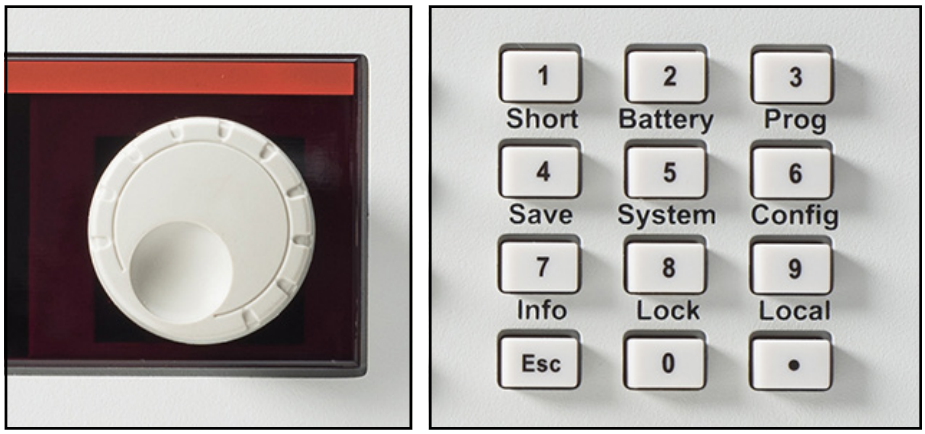


Figure 1. Use either the rotary knob or the keypad to quickly enter settings and set parameter values using all the available resolution.

KEITHLEY
A Tektronix Company

2380

Programmable DC Electronic Loads

Ordering Information

2380-500-15
Programmable DC Electronic Load, 500V, 15A, 200W

2380-120-60
Programmable DC Electronic Load, 120V, 60A, 250W

2380-500-30
Programmable DC Electronic Load, 500V, 30A, 750W

2380J-500-15
Programmable DC Electronic Load, 500V, 15A, 200W-Japan only

2380J-120-60
Programmable DC Electronic Load, 120V, 60A, 250W-Japan only

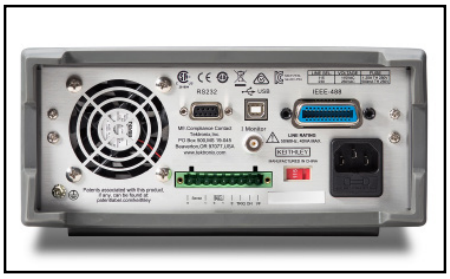
2380J-500-30
Programmable DC Electronic Load, 500V, 30A, 750W-Japan only

Accessories Supplied

Quick Start Guide
Documentation CD
Power cord

APPLICATIONS

- Environmental test, stress test, and accelerated life testing for AC/DC power sources and DC/DC modules
- LED lighting drivers and high power component testing
- Automotive electronics testing
- Battery research and discharge testing
- Production test



Model 2380-500-15 rear panel

Model 2380-500-15 front view showing the safety covers on the input terminals.

Model 2380-500-30 rear panel

ACCESSORIES AVAILABLE

2380-001	9-pin Rear Panel Mating Connector
2380-002	DUT Connection Protective Cover
7007-2	Double-Shielded Premium IEEE-488 Interface Cable, 2m (6.5 ft)
KP-CL-488LPA	IEEE-488.2 Interface Board for the PCI Bus
USB-B-1	USB Cable, Type A Connector to Type B Connector, 1m (3.3 ft)

RACK MOUNT KITS FOR THE 2380-500-15 AND THE 2380-120-60

4299-7	Universal Fixed Rack Mount Kit
RMU2U	Fixed Rack Mount Kit
386759800	RMU2U Rack Mount Cosmetic Filler Panel

RACK MOUNT KIT FOR THE 2380-500-30

2380-RM	Full-Rack-Width Instrument Fixed Rack Mount Kit

SERVICES AVAILABLE

Model Number*-1-EW
3-year factory warranty from date of shipment extended 1 additional year

Model Number*-5Y-EW
3-year factory warranty from date of shipment extended to 5 years

C/Model Number*-3Y-STD
KeithleyCare 3 YR STD Calibration Plan

C/Model Number*-3Y-DAT
KeithleyCare 3 YR Calibration w/Data Plan

C/Model Number*-5Y-STD
KeithleyCare 5 YR STD Calibration Plan

C/Model Number*-5Y-DAT
KeithleyCare 5 YR Calibration w/Data Plan

* Replace the specific power supply model number in place of Model Number to generate the appropriate model number for a service item. Example for a 2380-500-15, a 1-year extended warranty model number would be 2380-500-15-EW.

KEITHLEY
A Tektronix Company

Specifications

Model 2380-500-15/2380J-500-15

		Low Range	High Range
Rated Value (0°–40°C)	Input Voltage	0–500 V	0–500 V
	Input Current	0–3 A	0–15 A
	Input Power	200 W	200 W
	Min. Operating Voltage	0.6 V at 3 A (maximum 0.9 V)	4.5 V at 15 A
Constant Voltage Mode	Range	0.1–50 V	0.1– 500 V
	Resolution	1 mV	10 mV
	Accuracy	±(0.05% + 0.025% FS)	±(0.05% + 0.025% FS)
Constant Current Mode	Range	0–3 A	0–15 A
	Resolution	0.1 mA	1 mA
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.05% FS)
Constant Resistance Mode [1]	Range	0.3 Ω–10 Ω	10 Ω–7.5 kΩ
	Resolution	0.001 Ω	0.1 Ω
	Accuracy [2]	0.01% + 0.08 S	0.01% + 0.0008 S
Constant Power Mode [3]	Range	200 W	200 W
	Resolution	10 mW	10 mW
	Accuracy	0.1% + 0.1% FS	0.1% + 0.1% FS
Dynamic Mode			
CC Mode	T1 & T2	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs
	Accuracy	5 µs ± 100 ppm	5 µs ± 100 ppm
	Ascending/ Descending Slope [4]	0.0001–0.1 A/µs	0.001–1 A/µs
	Minimum Rise Time [5]	~10 µs	~10 µs
Measuring Range			
Readback Voltage	Range	0–50 V	0–500 V
	Resolution	1 mV	10 mV
	Accuracy	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)
Readback Current	Range	0–3 A	0–15 A
	Resolution	0.01 mA	0.1 mA
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.05% FS)
Readback Power	Range	200 W	200 W
	Resolution	10 mW	10 mW
	Accuracy	±(0.1% + 0.1% FS)	±(0.1% + 0.1% FS)
Protection Range			
Overpower Protection		~210 W	~210 W
Overcurrent Protection		~3.3 A	~16.5 A
Overvoltage Protection		~530 V	~530 V
Over Temperature Protection		~85°C	~85°C
Specification			
Short Circuit	Current (CC)	~3.3 / 3 A	~16.5 / 15 A
	Voltage (CV)	~0 V	~0 V
	Resistance (CR)	~300 mΩ	~300 mΩ
Input Terminal Impedance		~1 MΩ	~1 MΩ
Dimensions		214.81mm × 104.24mm × 397.03mm	

Model 2380-120-60/2380J-120-60

		Low Range	High Range
Rated Value (0°–40°C)	Input Voltage	0–120 V	0–120 V
	Input Current	0–6 A	0–60 A
	Input Power	250 W	250 W
	Min. Operating Voltage	0.18 V at 6 A	1.8 V at 60 A
Constant Voltage Mode	Range	0–18 V	0–120 V
	Resolution	1 mV	10 mV
	Accuracy	±(0.05% + 0.025% FS)	±(0.05% + 0.025% FS)
Constant Current Mode	Range	0–6 A	0–60 A
	Resolution	0.1 mA	1 mA
	Accuracy	±(0.05% + 0.1% FS)	±(0.05% + 0.1% FS)
Constant Resistance Mode [1]	Range	0.05 Ω–10 Ω	10 Ω–7.5 kΩ
	Resolution	0.001 Ω	0.1 Ω
	Accuracy [2]	0.01% + 0.08 S	0.01% + 0.0008 S
Constant Power Mode [3]	Range	250 W	250 W
	Resolution	10 mW	10 mW
	Accuracy	0.2% + 0.2% FS	0.2% + 0.2% FS
Dynamic Mode			
CC Mode	T1 & T2	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs
	Accuracy	5 µs ± 100 ppm	5 µs ± 100 ppm
	Ascending/ Descending Slope [4]	0.0001–0.25 A/µs	0.001–2.5 A/µs
	Minimum Rise Time [5]	~20 µs	~20 µs
Measuring Range			
Readback Voltage	Range	0–18 V	0–120 V
	Resolution	0.1 mV	1 mV
	Accuracy	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)
Readback Current	Range	0–6 A	0–60 A
	Resolution	0.1 mA	1 mA
	Accuracy	±(0.05% + 0.1% FS)	±(0.05% + 0.1% FS)
Readback Power	Range	250 W	250 W
	Resolution	10m W	10m W
	Accuracy	±(0.2% + 0.2% FS)	±(0.2% + 0.2% FS)
Protection Range			
Overpower Protection		~260 W	~260 W
Overcurrent Protection		~6.6 A	~66 A
Overvoltage Protection		~130 V	~130 V
Over Temperature Protection		~85°C	~85°C
Specification			
Short Circuit	Current (CC)	~6.6 / 6 A	~66 / 60 A
	Voltage (CV)	0 V	0 V
	Resistance (CR)	~30 mΩ	~30 mΩ
Input Terminal Impedance		~300 kΩ	~300 kΩ
Dimensions		214.81mm ×104.24mm × 397.03mm	

NOTES*

1. The voltage/current input is no less than 10% FS (FS indicates the full scale). Accuracy is defined as: % of reading + % of full scale.
2. The range of read-back resistance is between (1/(1/R + (1/R)*0.01% + 0.08)Ω and 1/(1/R–(1/R)*0.01%–0.08))Ω.
3. The voltage/current input is no less than 10% FS.
4. Ascending/descending slope: 10%–90% current ascending slope from 0 to maximum current.
5. Minimum rise time: 10%–90% current rise time.

*Specifications are subject to change without notice.

Model 2380-500-30/2380J-500-30

		Low Range	High Range
Rated Value (0°–40°C)	Input Voltage	0–500 V	0–500 V
	Input Current	0–3 A	0–30 A
	Input Power	750 W	750 W
	Min. Operating Voltage	0.36 V / 3 A	3.6 V / 30 A
Constant Voltage Mode	Range	0–50 V	0–500 V
	Resolution	1 mV	10 mV
	Accuracy	±(0.025% + 0.05% FS)	±(0.025% + 0.05% FS)
Constant Current Mode	Range	0–3 A	0–30 A
	Resolution	0.1 mA	1 mA
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.05% FS)
Constant Resistance Mode [1]	Range	0.15 Ω–10 Ω	10 Ω–7.5 kΩ
	Resolution	0.001 Ω	0.1Ω
	Accuracy [2]	0.01% + 0.08 S	0.01% + 0.0008 S
Constant Power Mode [3]	Range	750 W	750 W
	Resolution	10 mW	10 mW
	Accuracy	0.2% + 0.2% FS	0.2% + 0.2% FS
Dynamic Mode			
CC Mode	T1 & T2	20 µs–3600 s; Res: 1 µs	20 µs–3600 s; Res: 1 µs
	Accuracy	5 µs ± 100 ppm	5 µs ± 100 ppm
	Ascending/ Descending Slope [4]	0.0001–0.1 A/µs	0.001–1 A/µs
	Minimum Rise Time [5]	~20 µs	~20 µs
Measuring Range			
Readback Voltage	Range	0–50 V	0–500 V
	Resolution	1 mV	10 mV
	Accuracy	±(0.025% + 0.025% FS)	±(0.025% + 0.025% FS)
Readback Current	Range	0–3 A	0–30 A
	Resolution	0.1 mA	1 mA
	Accuracy	±(0.05% + 0.05% FS)	±(0.05% + 0.05% FS)
Readback Power	Range	750 W	750 W
	Resolution	10 mW	10 mW
	Accuracy	±(0.2% + 0.2% FS)	±(0.2% + 0.2% FS)
Protection Range			
Overpower Protection		~760 W	~760 W
Overcurrent Protection		~3.3 A	~33 A
Overvoltage Protection		~530 V	~530 V
Over Temperature Protection		~85°C	~85°C
Specification			
Short Circuit	Current (CC)	~3.3 / 3 A	~3.3 / 30 A
	Voltage (CV)	0 V	0 V
	Resistance (CR)	~120 mΩ	~120 mΩ
Input Terminal Impedance		1 MΩ	1 MΩ
Dimensions		482mm × 131.4mm × 580mm	

General

Memory Capacity: 100 sets of measurements and selectable parameters.

Signal Connections:

Front Panel: Input: Stud and threaded knob terminals for lug connectors (200W and 250W versions).

Rear Panel:

Input: Terrminal Bars (750W version).

Current Monitor Output: BNC.

Remote Sense, Analog Input, External Trigger, Voltage Fault: 9-pin terminal block.

Communications:

USB: USB2.0 device, type B, USB-TMC compliant.

RS-232: DB-9 connector.

GPIB: IEEE-488.2 compliant.

Cooling Method: Fan.

Fan Speed vs. Internal temperature:

Temperature	40°C	50°C	70°C	85°C
Fan status	First gear	Second gear	Third gear	Temperature protection (OH) and load is shut off.

Power Source:

AC Input: Switchable between 120VAC nominal and 240VAC nominal.

"J" versions: 100VAC, nominal.

Frequency: 50/60Hz.

Power Consumption:

2380-500-15: 40VA.

2380-120-60: 40VA.

2380-500-30: 150VA.

EMC: Conforms to European Union EMC Directive.

Safety:

Canadian Certification: CSA listed to UL Std. No. 61010-1(3rd Edition) and Can/CSA-C22.2 No. 61010-1-12.

European Union Compliance: Conforms to European Union Low Voltage Directive.

Environment:

Altitude: Operating: 2000m, (6562 ft) above sea level.

Temperature and Relative Humidity:

Operating: 0° to 40°C full accuracy with 80% relative humidity at up to 35°C, non-condensing.

Storage: –20° to 70°C, 10% to 85% relative humidity up to 40°C, 5% to 60% relative humidity above 40°C.

Net Weight:

200W/250W Model: 4.65kg.

750W Model: 24.95kg.

Shipping Weight:

200W/250W Model: 7kg.

750W Model: 31.75kg.

Recommended calibration frequency: 1 time/year.

Warranty: 3 years.

NOTES*

1. The voltage/current input is no less than 10% FS (FS indicates the full scale). Accuracy is defined as: % of reading + % of full scale.
2. The range of read-back resistance is between (1/(1/R + (1/R)*0.01% + 0.08)Ω and 1/(1/R–(1/R)*0.01%–0.08))Ω.
3. The voltage/current input is no less than 10% FS.
4. Ascending/descending slope: 10%–90% current ascending slope from 0 to maximum current.
5. Minimum rise time: 10%–90% current rise time.

*Specifications are subject to change without notice.

KEITHLEY
A Tektronix Company

Contact Information:

ASEAN / Australia (65) 6356 3900
Austria 00800 2255 4835
Balkans, Israel, South Africa and other ISE Countries +41 52 675 3777
Belgium 00800 2255 4835
Brazil +55 (11) 3759 7627
Canada 1 800 833 9200
Central East Europe and the Baltics +41 52 675 3777
Central Europe & Greece +41 52 675 3777
Denmark +45 80 88 1401
Finland +41 52 675 3777
France 00800 2255 4835
Germany 00800 2255 4835
Hong Kong 400 820 5835
India 000 800 650 1835
Italy 00800 2255 4835
Japan 81 (3) 6714 3010
Luxembourg +41 52 675 3777
Mexico, Central/South America & Caribbean 52 (55) 56 04 50 90
Middle East, Asia, and North Africa +41 52 675 3777
The Netherlands 00800 2255 4835
Norway 800 16098
People's Republic of China 400 820 5835
Poland +41 52 675 3777
Portugal 80 08 12370
Republic of Korea 001 800 8255 2835
Russia & CIS +7 (495) 6647564
South Africa +41 52 675 3777
Spain 00800 2255 4835
Sweden 00800 2255 4835
Switzerland 00800 2255 4835
Taiwan 886 (2) 2656 6688
United Kingdom & Ireland 00800 2255 4835
USA 1 800 833 9200

Rev 0415

For Further Information
Tektronix maintains a comprehensive, constantly expanding collection of application notes, technical briefs and other resources to help engineers working on the cutting edge of technology.V**isit www.tektronix.com or www.keithley.com**.

121715.KI 1KW-60327-0

KEITHLEY
A Tektronix Company