

Series 2380

Programmable DC Electronic Loads



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

Key Features

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

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 25 kHz. 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 overtemperature protection (OTP), overvoltage protection (OVP), overcurrent protection (OCP), overpower 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 communications. A current monitor interface simplifies monitoring input current waveforms by providing a connection for an oscilloscope.



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

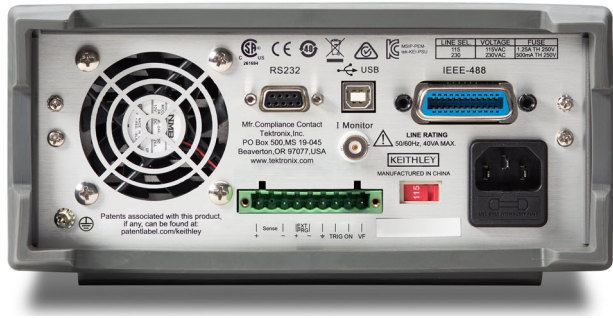
Series 2380 Programmable DC Electronic Loads



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



Model 2380-500-30 rear panel.



Model 2380-500-15 rear panel.

Specifications

Specifications are subject to change without notice.

Model 2380-500-15

		Low Range	High Range
Rated Value (0°C to 40°C)	Input Voltage	0 V to 500 V	0 V to 500 V
	Input Current	0 A to 3 A	0 A to 15 A
	Input Power	200 W	200 W
	Minimum Operating Voltage	0.6 V at 3 A (maximum 0.9 V)	4.5 V at 15 A
Constant Voltage Mode	Range	0.1 V to 50 V	0.1 V to 500 V
	Resolution	1 mV	10 mV
	Accuracy	±(0.05% + 0.025% FS)	±(0.05% + 0.025% FS)

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		Low Range	High Range
Constant Current Mode	Range	0 A to 3 A	0 A to 15 A
	Resolution	0.1 mA	1 mA
	Accuracy	$\pm(0.05\% + 0.05\% \text{ FS})$	$\pm(0.05\% + 0.05\% \text{ FS})$
Constant Resistance Mode The voltage/current input is no less than 10% FS (FS indicates the full scope)	Range	0.3 Ω to 10 Ω	10 Ω to 7.5 k Ω
	Resolution	0.001 Ω	0.1 Ω
	Accuracy	0.01% + 0.08 S The scope of readback resistance is $(1/(1/R + (1/R)*0.01\% + 0.08), 1/(1/R - (1/R) * 0.01\% - 0.08))$	0.01% + 0.0008 S
Constant Power Mode The voltage/current input is no less than 10% FS	Range	200 W	200 W
	Resolution	10 mW	10 mW
	Accuracy	0.1% + 0.1% FS	0.1% + 0.1% FS

Dynamic Mode

		Low Range	High Range
CC Mode	T1 & T2	20 μs to 3600 s; Res: 1 μs	20 μs to 3600 s; Res: 1 μs
	Accuracy	5 $\mu\text{s} \pm 100 \text{ ppm}$	5 $\mu\text{s} \pm 100 \text{ ppm}$
	Ascending/Descending Slope 10% to 90% current ascending slope from 0 to maximum current	0.0001 A/ μs to 0.1 A/ μs	0.001 A/ μs to 1 A/ μs
	Minimum Rise Time 10% to 90% current rise time	$\sim 10 \mu\text{s}$	$\sim 10 \mu\text{s}$

Measuring Range

		Low Range	High Range
Readback Voltage	Range	0 V to 50 V	0 V to 500 V
	Resolution	1 mV	10 mV
	Accuracy	$\pm(0.025\% + 0.025\% \text{ FS})$	$\pm(0.025\% + 0.025\% \text{ FS})$
Readback Current	Range	0 A to 3 A	0 A to 15 A
	Resolution	0.01 mA	0.1 mA
	Accuracy	$\pm(0.05\% + 0.05\% \text{ FS})$	$\pm(0.05\% + 0.05\% \text{ FS})$

Series 2380 Programmable DC Electronic Loads

		Low Range	High Range
Readback Power	Range	200 W	200 W
	Resolution	10 mW	10 mW
	Accuracy	$\pm(0.1\% + 0.1\% \text{ FS})$	$\pm(0.1\% + 0.1\% \text{ FS})$

Protection Range

	Low Range	High Range
Overpower Protection	~210 W	~210 W
Overcurrent Protection	~3.3 A	~16.5 A
Overvoltage Protection	~530 V	~530 V
Overtemperature Protection	~85°C	~85°C

Specifications

		Low Range	High Range
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		214.81 mm × 104.24 mm × 397.03 mm	

Model 2380-120-60

		Low Range	High Range
Rated Value (0°C to 40°C)	Input Voltage	0 V to 120 V	0 V to 120 V
	Input Current	0 A to 6 A	0 A to 60 A
	Input Power	250 W	250 W
	Minimum Operating Voltage	0.18 V at 6 A	1.8 V at 60 A
Constant Voltage Mode	Range	0 V to 18 V	0 V to 120 V
	Resolution	1 mV	10 mV
	Accuracy	$\pm(0.05\% + 0.025\% \text{ FS})$	$\pm(0.05\% + 0.025\% \text{ FS})$

Series 2380 Programmable DC Electronic Loads

		Low Range	High Range
Constant Current Mode	Range	0 A to 6 A	0 A to 60 A
	Resolution	0.1 mA	1 mA
	Accuracy	$\pm(0.05\% + 0.1\% \text{ FS})$	$\pm(0.05\% + 0.1\% \text{ FS})$
Constant Resistance Mode The voltage/current input is no less than 10% FS (FS indicates the full scope)	Range	0.05 Ω to 10 Ω	10 Ω to 7.5 k Ω
	Resolution	0.001 Ω	0.1 Ω
	Accuracy	0.01% + 0.08 S The scope of readback resistance is $(1/(1/R + (1/R)*0.01\% + 0.08), 1/(1/R - (1/R) * 0.01\% - 0.08))$	0.01% + 0.0008 S
Constant Power Mode The voltage/current input is no less than 10% FS	Range	250 W	250 W
	Resolution	10 mW	10 mW
	Accuracy	0.2% + 0.2% FS	0.2% + 0.2% FS

Dynamic Mode

		Low Range	High Range
CC Mode	T1 & T2	20 μs to 3600 s; Res: 1 μs	20 μs to 3600 s; Res: 1 μs
	Accuracy	5 $\mu\text{s} \pm 100 \text{ ppm}$	5 $\mu\text{s} \pm 100 \text{ ppm}$
	Ascending/Descending Slope 10% to 90% current ascending slope from 0 to maximum current	0.0001 A/ μs to 0.25 A/ μs	0.001 A/ μs to 2.5 A/ μs
	Minimum Rise Time 10% to 90% current rise time	~20 μs	~20 μs

Measuring Range

		Low Range	High Range
Readback Voltage	Range	0 V to 18 V	0 V to 120 V
	Resolution	0.1 mV	1 mV
	Accuracy	$\pm(0.025\% + 0.025\% \text{ FS})$	$\pm(0.025\% + 0.025\% \text{ FS})$
Readback Current	Range	0 A to 6 A	0 A to 60 A
	Resolution	0.1 mA	1 mA
	Accuracy	$\pm(0.05\% + 0.1\% \text{ FS})$	$\pm(0.05\% + 0.1\% \text{ FS})$

Series 2380 Programmable DC Electronic Loads

		Low Range	High Range
Readback Power	Range	250 W	250 W
	Resolution	10 mW	10 mW
	Accuracy	$\pm(0.2\% + 0.2\% \text{ FS})$	$\pm(0.2\% + 0.2\% \text{ FS})$

Protection Range

	Low Range	High Range
Overpower Protection	~260 W	~260 W
Overcurrent Protection	~6.6 A	~66 A
Overvoltage Protection	~130 V	~130 V
Overtemperature Protection	~85°C	~85°C

Specifications

		Low Range	High Range
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		214.81 mm × 104.24 mm × 397.03 mm	

Model 2380-500-30

		Low Range	High Range
Rated Value (0°C to 40°C)	Input Voltage	0 V to 500 V	0 V to 500 V
	Input Current	0 A to 3 A	0 A to 30 A
	Input Power	750 W	750 W
	Minimum Operating Voltage	0.36 V at 3 A	3.6 V at 30 A
Constant Voltage Mode	Range	0 V to 50 V	0 V to 500 V
	Resolution	1 mV	10 mV
	Accuracy	$\pm(0.025\% + 0.05\% \text{ FS})$	$\pm(0.025\% + 0.05\% \text{ FS})$

Series 2380 Programmable DC Electronic Loads

		Low Range	High Range
Constant Current Mode	Range	0 A to 3 A	0 A to 30 A
	Resolution	0.1 mA	1 mA
	Accuracy	$\pm(0.05\% + 0.05\% \text{ FS})$	$\pm(0.05\% + 0.05\% \text{ FS})$
Constant Resistance Mode The voltage/current input is no less than 10% FS (FS indicates the full scope)	Range	0.15 Ω to 10 Ω	10 Ω to 7.5 k Ω
	Resolution	0.001 Ω	0.1 Ω
	Accuracy	0.01% + 0.08 S The scope of readback resistance is $(1/(1/R + (1/R)*0.01\% + 0.08), 1/(1/R - (1/R)*0.01\% - 0.08))$	0.01% + 0.0008 S
Constant Power Mode The voltage/current input is no less than 10% FS	Range	750 W	750 W
	Resolution	10 mW	10 mW
	Accuracy	0.2% + 0.2% FS	0.2% + 0.2% FS

Dynamic Mode

		Low Range	High Range
CC Mode	T1 & T2	20 μs to 3600 s; Res: 1 μs	20 μs to 3600 s; Res: 1 μs
	Accuracy	5 $\mu\text{s} \pm 100 \text{ ppm}$	5 $\mu\text{s} \pm 100 \text{ ppm}$
	Ascending/Descending Slope 10% to 90% current ascending slope from 0 to maximum current	0.0001 A/ μs to 0.1 A/ μs	0.001 A/ μs to 1 A/ μs
	Minimum Rise Time 10% to 90% current rise time	~20 μs	~20 μs

Measuring Range

		Low Range	High Range
Readback Voltage	Range	0 V to 50 V	0 V to 500 V
	Resolution	1 mV	10 mV
	Accuracy	$\pm(0.025\% + 0.025\% \text{ FS})$	$\pm(0.025\% + 0.025\% \text{ FS})$
Readback Current	Range	0 A to 3 A	0 A to 30 A
	Resolution	0.1 mA	1 mA
	Accuracy	$\pm(0.05\% + 0.05\% \text{ FS})$	$\pm(0.05\% + 0.05\% \text{ FS})$

		Low Range	High Range
Readback Power	Range	750 W	750 W
	Resolution	10 mW	10 mW
	Accuracy	$\pm(0.2\% + 0.2\% \text{ FS})$	$\pm(0.2\% + 0.2\% \text{ FS})$

Protection Range

	Low Range	High Range
Overpower Protection	~760 W	~760 W
Overcurrent Protection	~3.3 A	~33 A
Overvoltage Protection	~530 V	~530 V
Overtemperature Protection	~85°C	~85°C

Specifications

		Low Range	High Range
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		482 mm × 131.4 mm × 580 mm	

General

Memory Capacity	100 sets of measurements and selectable parameters.
Signal Connections	Front Panel: Input: Stud and threaded knob terminals for lug connectors (200 W and 250 W versions). Rear Panel: Input: Terminal Bars (750 W 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

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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 120 VAC nominal and 240 VAC nominal. “J” versions: 100 VAC, nominal.
Frequency	50/60 Hz.
Power Consumption	2380-500-15: 40 VA. 2380-120-60: 40 VA. 2380-500-30: 150 VA.
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	For indoor, non-residential use only. Altitude: Operating: 2000 m (6562 ft) above sea level. Temperature and Relative Humidity: ▪ Operating: 0°C to 40°C full accuracy with 80% relative humidity at up to 35°C, non-condensing. ▪ Storage: –20°C to 70°C, 10% to 85% relative humidity up to 40°C, 5% to 60% relative humidity above 40°C.
Net Weight	200 W/250 W models: 4.65 kg. 750 W model: 24.95 kg.
Shipping Weight	200 W/250 W models: 7 kg. 750 W model: 31.75 kg.
Recommended calibration frequency	1 time/year.
Warranty	3 years.

Ordering Information

2380-500-15	Programmable DC Electronic Load, 500 V, 15 A, 200 W
2380-120-60	Programmable DC Electronic Load, 120 V, 60 A, 250 W
2380-500-30	Programmable DC Electronic Load, 500 V, 30 A, 750 W

Supplied Accessories

Quick Start Guide
Power cord

Available Accessories

2380-001	9-pin Rear Panel Mating Connector
2380-002	DUT Connection Protective Cover
7007-1	Double-Shielded Premium IEEE-488 Interface Cable, 1 m (3.2 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, 1 m (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
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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 2380-500-15-1-EW.

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