# SpikeSafe™ Performance Series Precision Pulsed Current Source Specifications

# Performance Series Precision Pulsed Current Sources

| Mode Descriptions | | | Modes | | | |
|---|---|---|---|---|---|---|
| Mode | Description | Typical Application | PRF | PRF +BIAS | PRF +MODI | PRF +BIAS +MODI |
| DC | Constant current. | Any constant current application. LM-85, light measurement, characterization, R&D, production. | ✓ | ✓ | ✓ | ✓ |
| Single Pulse | Single pulse output (one transition on and off) according to configured pulse parameters. | Any single pulse application. LM-85, light measurement, characterization, R&D, production. | ✓ | ✓ | ✓ | ✓ |
| Continuous Pulse | Continuous current pulse train that transitions on and off according to configured pulse parameters. | Continuous pulse light measurements to reduce junction heating. Any other continuous pulse application. | ✓ | ✓ | ✓ | ✓ |
| Modulated Current (MODI) | A programmable sequence of DC current steps that define a waveform. Sequences may be finite or run indefinitely. | Cell phone flash emulation, rectifier ripple emulation. Requires purchase of optional Modulated Current function. | | | ✓ | ✓ |
| Pulsed Sweep | A series of N current pulses that increase or decrease in amplitude. Step number reported upon error. | I-V plots for LEDs, lasers, and other semiconductors. L-I plots for optoelectronics, overcurrent protection circuit tests, pulse withstand testing. | ✓ | ✓ | ✓ | ✓ |
| Bias | Constant DC bias current - generally used for K-factor determination. | Thermal resistance and Tj measurements. | | ✓ | | ✓ |
| Multiple Pulse | Similar to Single Pulse mode, but allows a programmable number of pulses to be output. | Simulated lightning strikes test. Other fixed pulse count device testing. | ✓ | ✓ | ✓ | ✓ |
| DC Dynamic | Constant current - current changes may occur while the source channel is enabled. | L-I-V sweeps, programmed ramps, low speed > 10s pulsing | ✓ | ✓ | ✓ | ✓ |
| Continuous Dynamic | Continuous pulse train - current changes may occur while the source channel is enabled. | PWM, production binning, closed-loop power control. | ✓ | ✓ | ✓ | ✓ |
| Continuous Pulse with Bias Current | A continuous current pulse train that drops to bias level during off times. | Thermal resistance and Tj measurements using Continuous Pulse mode. | | ✓ | | ✓ |
| Continuous Dynamic with Bias Current | A continuous current pulse train (identical to Continuous Dynamic mode), but the bias current source is always enabled and drawing the bias current through the load. | Thermal resistance and Tj measurements using Continuous Dynamic mode. | | ✓ | | ✓ |
| Single Pulse with Bias Current | Identical to Single Pulse mode, but the bias current source is always enabled and drawing the bias current through the load. | Thermal resistance and Tj measurements using Single Pulse mode. | | ✓ | | ✓ |
| Pulsed Sweep with Bias Current | Like Pulsed Sweep, but with programmable bias current summed in with pulse sweep. | Determine Tj rise during I-V or L-I-V plots for LEDs, lasers, and other semiconductors. Allows Pulsed Sweep to be optimized to minimize time and junction heating. | | ✓ | | ✓ |

# Performance Series Precision Pulsed Current Sources

VEKTREX™

| Specifications | Model (Max Current) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 2 | 3 | 4 | 5 | 8 | 10 | 16 | 20 | 32 | 40 | 60 |
| **Overall** | | | | | | | | | | | | |
| Recommended Min Current[7] | 339µA | 5.9mA | | | | 11.8mA | | 23.6mA | | 47.3mA | | 285mA |
| Min Voltage | 0V | | | | | | | | | | | |
| Max Voltage | 50V, 100V, 200V, 300V, 400V | | | | | 50V, 100V, 200V | | | | | | 50V |
| Independent Channels/Module | 1, 2, 4, 8 | | | | | 1, 2, 4 | | 1, 2 | | 1 | | |
| Max Power, per Channel[4] | 200W | 800W | 1kW | | | 1.6kW | | 3.2kW | | 6.4kW | | 3kW |
| Max Power, all Channels[4] | 1.6kW | 6.4kW | 8kW | | | 6.4kW | | | | | | 3kW |
| Output Conductor Pairs/Channel | 1 | | | | | 2 | | 4 | | 8 | | |
| Conversion Mode | Buck/Boost | | | | Buck | Buck/Boost | | Buck | | | | |
| **Pulsing** | | | | | | | | | | | | |
| Pulse Width Range[11] | 10µs-15000s | | | | | | | | | | | |
| Pulse Width Resolution | 1µs | | | | | | | | | | | |
| Pulse Width Accuracy[2] | 1µs | 1.5µs | 1µs | | | | | 1.3µs | | | | |
| Pulse Rise/Fall Time[3] | 200ns-3µs | 200ns-2µs | 200ns-3µs | | | | | 350ns-4.5µs | | | | 3µs-5µs |
| Typical Pulse Width Jitter | 30ns | | | | | | | | | | | |
| Timebase Accuracy | 50ppm | | | | | | | | | | | |
| Pulse Period Range[12] | 30µs-30000s, depending on settings | | | | | | | | | | | |
| Duty Cycle Range | 0-100% | | | | | | | | | | | |
| Multi Channel Pulse Synchronization | Settable, synchronized (+/-1µs), or staggered (1/N*Period) | | | | | | | | | +/-2µs | | |
| Pulse Count: Multi Pulse Mode | 0-2147483647 | | | | | | | | | | | |
| Pulse Count: Pulsed Sweep Mode | 3-10000 | | | | | | | | | | | |
| **Low Range Current** | | | | | | | | | | | | |
| Max Current | 40mA | 200mA | | | | 400mA | | 800mA | | 1.6A | | 3.2A |
| Setpoint Resolution | 1µA | 5µA | | | | 10µA | | 20µA | | 40µA | | 80µA |
| Output Current Accuracy | 0.05%+10µA | 0.04%+175µA | | | | 0.04%+350µA | | 0.04%+700µA | | 0.04%+1.4mA | | 0.2%+8mA |
| Current Measure Accuracy[13] | 0.7%+200µA | 0.4%+5mA | 0.1%+1mA | | | 0.1%+2mA | | 0.1%+4mA | | 0.1%+8mA | | 0.5%+4mA |
| **High Range Current** | | | | | | | | | | | | |
| Max Current | 500mA | 2A | 3A | 4A | 5A | 8A | 10A | 16A | 20A | 32A | 40A | 60A |
| Setpoint Resolution | 10µA | 50µA | 100µA | | | 200µA | | 400µA | | 800µA | | 1.6mA |
| Output Current Accuracy | 0.05%+75µA | 0.08%+500µA | 0.08%+1mA | | | 0.08%+2mA | | 0.08%+4mA | | 0.08%+8mA | | 0.3%+24mA |
| Current Measure Accuracy[13] | 0.2%+1mA | 0.4%+5mA | | | | 0.4%+10mA | | 0.4%+20mA | | 0.4%+40mA | | 0.5%+40mA |

| Specifications | Model (Max Current) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0.5 | 2 | 3 | 4 | 5 | 8 | 10 | 16 | 20 | 32 | 40 | 60 |
| **Misc.** | | | | | | | | | | | | |
| Nominal Current Ripple[1] | 0.01%+160μA | <1A: 0.03%+300μA<br>>1A: 0.06% | <1A: 0.03%+300μA<br>>1A: 0.03%+500μA | | <1A: 0.03%+300μA<br>>1A: 0.012%+1mA | | <1A: 0.03%+300μA<br>>1A: 0.012%+2mA | <5A: 0.05%+250μA<br>>5A: 0.02%+1.8mA | | <5A: 0.05%+250μA<br>>5A: 0.02%+4mA | | <10A: 0.05%+200μA<br>>10A: 0.02%+3mA |
| DC Ramp Rate: Low Speed Setting | 10V/s, 50mA/s | | | | | 10V/s, 100mA/s | | 10V/s, 200mA/s | | 10V/s, 400mA/s | | |
| DC Ramp Rate: Default Setting | 10V/s, 500mA/s | | | | | 10V/s, 1A/s | | 10V/s, 2A/s | | 10V/s, 4A/s | | |
| DC Ramp Rate: High Speed Setting | 1000V/s, 50A/s | | | | | 1000V/s, 100A/s | | 1000V/s, 200A/s | | 1000V/s, 400A/s | | |
| Current Stability[10] | 70ppm | | | | | | | | | | | |
| Voltage Monitor Accuracy | 3%+1V | | | | | | | | | | | |
| **Bias Current[5]** | | | | | | | | | | | | |
| Max Current | 33mA | | | | | 66mA | | 132mA | | 264mA | | |
| Setpoint Resolution | 1μA | | | | | 2μA | | 4μA | | 8μA | | |
| Bias Current Accuracy | 0.35%+60μA | | | | | 0.35%+120μA | | 0.35%+240μA | | 0.35%+480μA | | |
| Fall Time to Bias Current | 200ns-3μs | | | | | | | | | | | 500ns-6μs |
| 5% Settling Time After Falling Edge[8] | 10-70μs | | | | | | | | | | | |
| 0.1% Settling Time After Falling Edge[9] | 70-130μs | | | | | | | | | | | |
| **Modulated Current[6]** | | | | | | | | | | | | |
| Sequence Step Amplitude Range | 0-100% | | | | | | | | | | | |
| Min Step Width | 1ms | | | | | | | | | | | |
| Max Step Width | 10s | | | | | | | | | | | |
| Step Width Accuracy | 10μs | | | | | | | | | | | |
| Max Number of Steps | 20 | | | | | | | | | | | |
| Max Number of Step Sequences (Loops) | 3 | | | | | | | | | | | |
| Loop Count | 1 to 32767 or infinite | | | | | | | | | | | |
| Current Rise/Fall Time Each Step[3] | 5-8μs | | | | | | | | | | | |

## Specifications

| | |
|---|---|
| **Available Packages** | |
| 2U-Chassis | Rack mount / benchtop chassis 89mmH x 483mmW x 635mmD (including handles) |
| **External Interfaces** | |
| Trigger Out | TTL output equal to pulse on time |
| Trigger Polarity | Programmable |
| Trigger to Pulse Rising Edge | 2-25$\mu$s to rising edge of pulse. Based on current setpoint. |
| Trigger Jitter | <10ns typical |
| Remote Pause | Optoisolated input, pauses output, selectable polarity |
| Remote Disable | Optoisolated input, halts output, selectable polarity |
| Output Current Drive Type | Differential drive |
| Output Cabling | Single or multiconductor twisted pair |
| Recommended Max Output Cable Length | 6m |
| **Input Power** | |
| A/C Power | Selectable; single and three phase available; 50-60Hz |
| Power Conversion | Two-stage: DC-DC converter + analog current regulator |
| **General** | |
| Remote Control | 100-base T Ethernet, TCP/IP with SCPI syntax |
| Monitoring System | Built-in aquisition system monitors & reports voltage, current, and fault conditions |
| Device Protection | 2nd generation SpikeSafe™ protection including high-speed over current shutdown, slow start up, leakage detection and other protection algorithms |
| Calibration Interval | 2 years |
| Operating Conditions | For indoor use only, 10 to 35C, 70%R.H., <2000m altitude |
| Cooling | Air cooled |
| Particulate Level | Clean lab conditions |
| Other | CE |

## Notes

**All specifications at 23C+/-5C, pulsing specifications: outside cable <3m**

[1] RMS, 20MHz BW, primary frequency 100kHz or 200kHz

[2] Typical performance with automatic adjustements enabled, compensation settings tuned for best shape, I > 10% Imax

[3] Typical peformace with compensations settings tuned for fastest rise and best pulse shape, I > 10% Imax

[4] With suitable auxilary bulk power supply: Vbulk ≥ Compliance Voltage +20V for Buck models, Compliance Voltage/2 for Buck/Boost Models

[5] Requires BIAS option

[6] Requires MODI option

[7] Output current that guarantees 3% accuracy at calibration limit

[8] Typical time to recover to 95% of bias value, typical cable compensation Ibias>50% Max bias

[9] Typical time to recover to 99.9% of bias value, typical cable compensation Ibias>50% Max bias

[10] Typical p-p current variation over 1 hour, after warm up at 23C

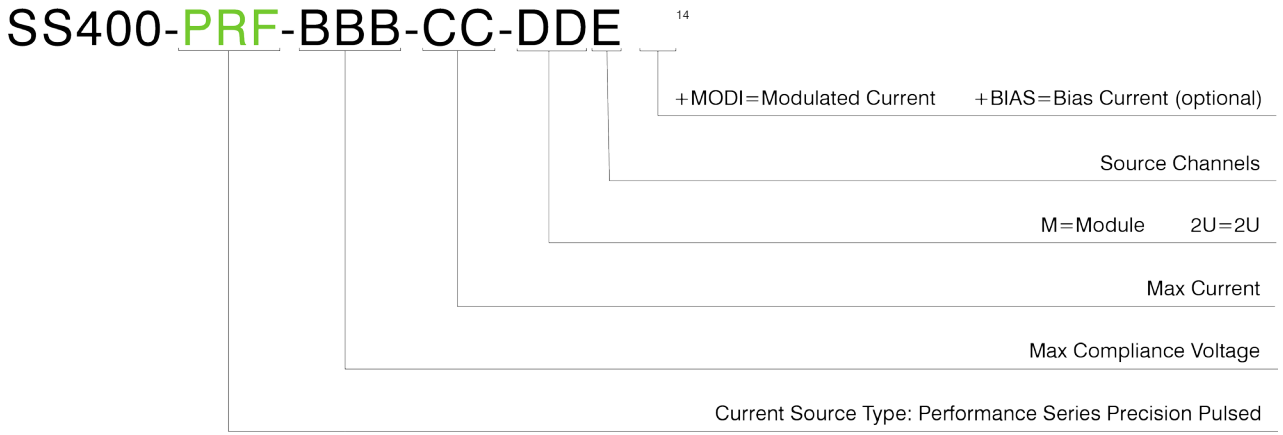
[11] Max Pulse Width is 10sec for: Pulsed Sweep, Bias Pulsed Sweep, and Multi Pulse modes. Minimum off-time is 300$\mu$s for Pulsed Sweep and Bias Pulsed Sweep

[12] Max Pulse Period is 30sec (up to 20sec max off-time) for: Pulsed Sweep, Bias Pulsed Sweep, and Multi Pulse modes

[13] 2-wire measurement designed for load monitoring. SpikeSafe Performance Current Sources may be paired with available high-speed DMM's for precise voltage and current measurements

[14] One or both of these optional upgrades can be specified

## Model Number Guide




Email **sales@vektrex.com** or visit **www.vektrex.com** to get more information and request a quote.