



## Technical Specifications

### Electrical

Maximum Voltage Injection	See Model Table below
Minimum Voltage Injection	See Model Table below
Minimum Current for Monitoring <sup>(1)</sup>	50 A RMS
Minimum Current for Injection <sup>(1)</sup>	125 A RMS
Maximum Rate of Change of Frequency (ROCOF) Withstand	1 Hz/sec for 1s, 2 Hz/s for 0.25s

### Physical

Mass	14550 lbs (6600 kg)
Dimensions	See Figure Above
Mounting	Supported by ground-mounted insulators, suspended from a structure via insulators or installed as part of a Mobile SmartValve Unit
Cooling	Liquid-cooling interface between power semiconductors and redundant-fan-equipped liquid-to-air heat exchangers using redundant pumps all at line potential. Sealed enclosure coolers for controlling internal ambient temperature.

### Communication

Communication Architecture	EMS integration via PowerLine Gateway™ located at substation
Communication Security Features	The standard offering uses a multilevel ISM band RF protocol optimized for fast telemetry. The RF variant uses SHA-256 to ensure cryptographic integrity of all messages while supporting full observability by utility firewalls. The Fiber-Optic package uses fiber-optic communication between the communication system and the SmartValve devices.

### Sensor Accuracy

AC Line Current	± 6 %
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Maximum Voltage (Corona-free)	550 kV RMS line-to-line
Power	Powered by line current
Operational Frequency Range	47.00 Hz – 52.00 Hz 57.00 Hz – 62.00 Hz
Fault Current Rating	63 kA RMS for 1 second
Peak Fault Current Rating	164 kA @ 60Hz 158 kA @ 50 Hz

### Environmental

Operating Ambient Temperature Range <sup>(2)</sup>	-40°F to 104°F (-40°C to 40°C)
Storage Temperature Range <sup>(2)</sup>	-40°F to 104°F (-40°C to 40°C)
Condensing Operating Humidity Range	5% to 100%
Maximum Sustained Rain	4.0 in/hr (102 mm/hr)

Intrusion Protection	IEC 60529, Designed to IP 55, Tested to IP X5
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### Other

Software and Firmware	Designed to meet IEC 61508 SIL-2
Electrical Connections	ANSI C119.4

<i>Model</i>	<b>Injection Mode</b> Continuous Current Rating (A RMS) <sup>(3)</sup>	<b>Maximum Voltage Injection at 50 Hz or 60 Hz</b> (V RMS) <sup>(4)</sup>	<b>Minimum Injection Voltage at 50 Hz or 60 Hz</b> (V RMS) <sup>(5,6)</sup>	<b>Maximum Ramp Rate</b> (kV/sec) <sup>(7)</sup>	<b>Monitoring Mode</b> Continuous Current Rating (A RMS) <sup>(1,3)</sup>	<b>Maximum 2-Hour Injection Mode Current</b> (A RMS) <sup>(1,3)</sup>
<i>SmartValve 10-1800</i>	1800	± 5660	566	5.6	2250	2160
<i>SmartValve 10-3600</i>	3600	± 2830	283	2.8	4500	4320

**Notes:**

1. In Monitoring Mode, the SmartValve is bypassed and does not inject voltage, while telemetry data is still transmitted. In Injection Mode, the SmartValve injects voltage in series with the line and telemetry data is transmitted.
2. The standard device is rated to operate at the temperatures listed. The device with the High-Temperature package is rated to operate at temperatures up to 113°F (45°C). Operation down to -40°F (-40°C) is feasible if the device is continuously energized below -13°F (-25°C). If the device is exposed to conditions between -40°F (-40°C) and -13°F (-25°C) while not energized, the device will need to operate in Monitoring Mode for some time before entering Injection Mode. The device can operate in a de-rated mode at temperatures outside of the specified operating conditions (e.g. 122°F (50°C)). Ratings for those conditions are available upon request.
3. The standard device fulfills this rating at 104°F (40°C), 1000 W/m<sup>2</sup> of solar radiation and 1000 m elevation. The device with the High-Temperature package fulfills this rating at 113°F (45°C), 1000 W/m<sup>2</sup> of solar radiation and 1000 m elevation. Ratings at other environmental conditions (e.g. 122°F (50°C)) or durations (e.g. 15 minutes) are available upon request.
4. Maximum RMS AC of the output voltage for an individual device. Maximum voltage injection of a SmartValve System of *n* devices in series per phase is *n* times the Maximum Voltage Injection of an individual device.
5. Minimum RMS AC of the output voltage for an individual device. Minimum voltage injection per phase of a SmartValve System consisting of *n* devices per phase is the Minimum Injection Voltage of a single device as the other *n-1* devices per phase can be operated in Monitoring Mode.
6. The value shown is for the standard device. When equipped with the High-Reliability package, the minimum injection voltage for an individual device is 57 V RMS for both the SmartValve 10-1800 and SmartValve 10-3600.
7. The value shown is for an individual device. For a SmartValve System with *n* devices in series per phase, the maximum ramp rate of the set is *n* times the Maximum Ramp Rate. The ramp rate for the Enhanced-Availability package will be similar but there will be an additional delay to reach some set points.
8. Emergency current ratings apply to the SmartValve in both Injection Mode and Monitoring Mode.

**About Smart Wires**

Smart Wires is the world’s leader in modular power flow control. Smart Wires technology enables utilities to unlock the large amounts of spare capacity that exists on their systems today. This means they can reduce congestion to save customers money and more quickly connect new renewables and demand. Increasing the use of the existing grid is more cost-effective and less disruptive to communities and the environment than traditional solutions. Smart Wires technology is quick to install and easy to scale or redeploy, providing valuable flexibility given today’s rapidly changing electric system. Based in California, with offices in Ireland and Australia, Smart Wires partners with utilities around the globe to address the unique challenges they face.

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