

Sentinel[®] 3520

LEAK AND FLOW TEST INSTRUMENT



Description

The Sentinel 3520 patented leak test technology delivers balanced accuracy, cycle time and Gage R in complex and challenging situations. In combination with the sigPOD controller equipped with Sciometric's PSV™ software, the Sentinel 3520 offers advanced leak test capabilities for diverse sets of requirements to meet your needs on the line.

SUPPORTED TEST TYPES

- Pressure/Vacuum Decay - Leak Standard
- Pressure/Vacuum Decay - ΔP
- Pressure/Vacuum Decay - $\Delta P/\Delta T$
- Occlusion - Pressure or Vacuum
- Ramp to Proof - Pressure (Burst Test)
- Pressure Verify
- Customizable Pressure / Flow Sequencing
- Mass Flow (Flow Models)
- Test Volume Verification (Flow Models)

Highlights

- Pressure measurement and control resolution down to $\pm 0.000,01$ psi
- Flow measurement down to ± 0.2 % of full scale
- High flow fast fill up to 300 SLPM
- Test parts from 1 cc to 1,000,000 cc in volume
- Helium evacuate and fill
- Customizable pressure and flow sequencing
- Bi-directional flow measurement for the detection of over-pressurized parts or other test anomalies
- sigPOD controller with PSV™ software uses digital process signatures (waveforms) for advanced data analysis
- Visualized control charts, histograms and other SPC tools right at the station, using the sigPOD controller screen

Key Features

Patented PID controlled electronic regulators for pressure and flow

Fully adjustable control loop settings for electronic regulators

Valve-operated calibration port for automatic verification

Unit under test (UUT) isolate valve allows complete self-test without any external connection changes

Dedicated temperature sensors for advanced temperature compensation capability

Pass/fail decisions with digital process signatures (waveforms)

Air piloted valves to reduce effects of heat in high flow manifold version

Latching valves reduce effects of heat in low volume manifold version

Sentinel 3520 Features

99 TEST PROGRAMS

- Program selection and flexibility
- Pressure, flow, and vacuum test types
- Timers
- Pressure limits
- Reject limits
- Calibration parameters
- Units of measurement
- Digital I/O
- Tooling control

AUTO TEST SETUP

- Automated optimization of test program based on maximum user allowable cycle time
- Simplifies instrument test programming and setup

PROGRAM LINKING

- Allows multiple tests to be performed on a single part
- With the sigPOD controller, allows flexibility to perform other in-process tests on the same part, at the same time or preceding the leak test (eg. press-fit, torque, weld, dispense, sound and vibration, etc.)

ADVANCED TEMPERATURE COMPENSATION (OPTIONAL)

- Maintains test accuracy by monitoring and automatically making continuous adjustments for changes in temperature due to test and environmental conditions
- Features two channels for part and ambient temperature sensing with a resolution of $\pm 0.0001^\circ\text{C}$
- Uses high accuracy, low noise resistance temperature detector (RTD) sensors

SELF-TEST FUNCTIONS

- Internal leak detection process
- Program calibration verification (when an external leak standard is used)
- Issues can be identified to the component level

TUNING ASSISTANT

- The system includes a tuning assistant feature that allows complete tuning of the leak test for optimized test results including fill and test times and PID valve control

DESIGNED FOR PRECISE ACCURACY

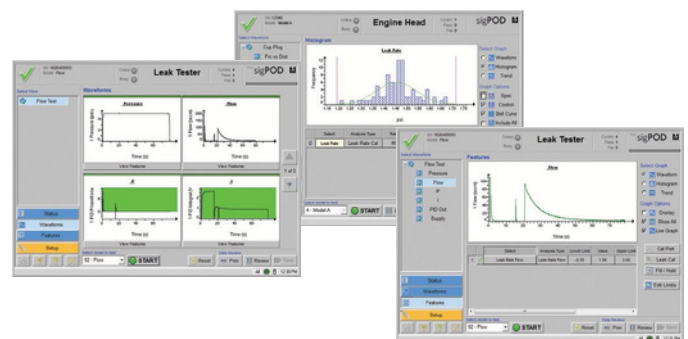
- Highly optimized manifold design
- High quality sensors, including a MEMS digital flow meter for 5x better accuracy
- Precision measurement electronics, featuring three high speed processors, quad 24-bit A/D converters and sub micro volt level PCB design and layout
- μPSI pressure regulation with advanced electronic dual stage proportional valves

ULTRA-FAST FILL AND STABILIZATION

- Dual high-speed electronic servo regulator design
- High flow fast fill up to 300 SLPM with $\frac{1}{2}$ " diameter ports and valves to move air quickly
- Second stage high precision regulator and orifice for superb pressure and flow accuracy

STORE, VIEW AND ANALYZE DATA

- Access up to 10,000 complete test records stored on system
- Unique PSV™ software measures hundreds or thousands of datapoints at every stage of your test, providing comprehensive digital process signatures (waveforms) for higher accuracy pass/fail decisions
- Using the sigPOD controller screen, view data in-station using built-in control charts, histograms and other SPC tools to easily set test limits, determine cycle times, and more



Sciometric's Process Signature Verification (PSV™) software

Sentinel 3520 Features (Cont'd)

ADVANCED DATA CAPABILITIES (OPTIONAL)

- Collect and analyze data from up to five supported Sentinel devices using the turnkey QualityWorX CTS DataHub data storage and analytics solution featuring Sciometric Studio™ analytics
- Expandable options to collect and analyze data from as many devices as you require (applicable across a variety of stations, including leak test and other in-process tests) and complete traceability using Sciometric's QualityWorX solution

The Sentinel 3520 offers flexible options for collecting and analyzing data. Please speak with your sales associate for more information.

Every Sentinel 3520 shipment comes standard with the following accessories:

- 24 VDC power supply (universal input 120/240 VAC, NA power cord (not NEMA-rated.)
- Ethernet cable
- Power connector
- Ethernet connector
- Vibration mount kit
- Latching valve service tool (shipped only with "B" fill configurations)

Speak to your sales associate to learn more about the optional accessories available.

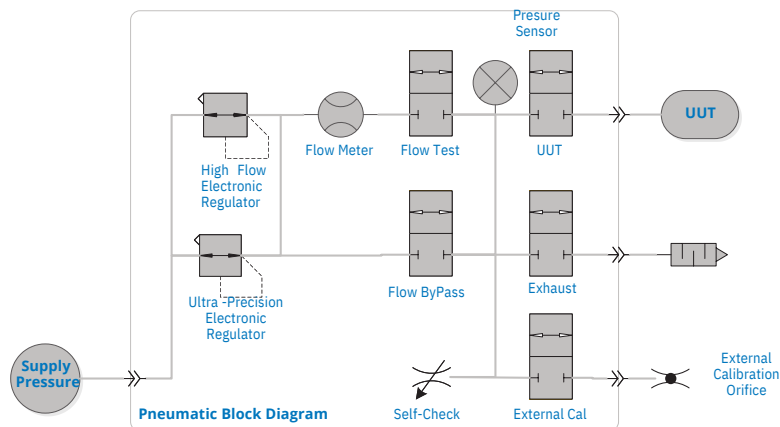
SIGPOD CONTROLLER FEATURES

- sigPOD running Sciometric PSV™ software
- 4 leak channels supported per controller
- On-board storage for 10,000+ complete records, including waveforms
- Flexible PSV configurable test software
- Support for custom software applications
- IP52 rated enclosure suitable for industrial environments
- Full color, 10.4" integrated touchscreen display (Optional)
- EtherNet/IP, PROFINET or Modbus TCP communication
- Interface separate from pneumatics to allow closer proximity to part under test, reducing hose length and minimizing other factors that affect accuracy



See Sciometric sigPOD datasheet for more information.

System Diagram



UUT= Unit under Test

Technical Specifications

GENERAL	
Dimensions (HxWxD)	7" x 10.4" x 8.25" (117.8 x 264 x 210 mm)
Operating temperature	5 – 40 °C
Operating humidity	8 – 90 %
Elevation	≤2000 m
Finish	Powder-coated aluminum
Environmental	IP65, Pollution Degree: 2
Mounting options	Integrated wall mount brackets
Vibration mounts	Included and required for operation
Weight	22.5 lbs (10.2 kg)
Approvals	CE, cNEMKOus
PNEUMATIC	
Leak test system	
Number of test channels per 3520	1
Valve life rating (cycles)	100,000,000 (low volume manifold), 10,000,000 (high flow manifold)
System leak	<0.02 SCCM at 10 psig
Fill rate (max)	20 SLPM (low volume manifold), 300 SLPM (high flow manifold)
Air supply preparation for supply and pilot	
Standard	ISO 8573.1:2001 Class 1.4.2 or better
Pre-filter	≤5 µm
Air dryness	≤3 °C dew point
Oil concentration	≤0.1 mg/m3
Gas compatibility	Air, helium, nitrogen (consult factory for compatibility with other gases)

Supply pressure	
Maximum	100 psig for positive pressure; 5-3 psi below desired test pressure for vacuum pressure
Minimum	5-20 psi above test pressure for positive pressure; 13.75 psiv (28" Hg) for vacuum pressure
Required flow capacity	1000 SLPM (35 SCFM) or higher at 100 psig
Stability	±0.1 psi
Pre-regulation	Precision input regulator with supply pressure effect <0.1 psi per 100 psi input pressure change is required (see optional accessories list).
Pilot pressure (high flow manifold only)	
Minimum	30 psig or supply pressure, whichever is greater
Maximum	135 psig
Test pressure sensor	
Range Selection	(see model chart)
Accuracy	±0.25 % of FS, best-fit straight line
Temperature error band	±1.0 % of FS from 4 °C to 60 °C
Noise	<10 ppm rms of FS (<0.001 % of FS) - 300 Hz bandwidth <1 ppm rms of FS (<0.0001 % of FS) - 1 Hz bandwidth
Resolution	0.06 ppm of FS

FS= Full Scale

Technical Specifications (Cont'd)

FLOW METER (flow models only)	
Range selection	(see model chart)
For full scale ranges ≤ 3000 SCCM	Accuracy (forward) at 25 °C ¹ : ±1 % of reading when value is >20 % of FS ±0.2 % of FS when value is <20 % of FS Accuracy (reverse): +/- 0.5% of FS Repeatability ¹ : ±0.05 % of reading when value is >20 % of FS ±0.01 % of FS when value is <20 % of FS Pressure coefficient: ±0.014 % of reading/psi Response time: 4 ms (0.004 s) Full scale of flow sensor is configurable within ranges, as follows: •10 SCCM and 50 SCCM •100 SCCM and 250 SCCM •1000 SCCM and 3000 SCCM
For full scale ranges ≥ 10 SLPM	Accuracy: ±1.5 % of FS (15 to 25 °C) Repeatability: ±0.5 % of FS Temperature coefficient: <0.15 % of FS/°C Pressure coefficient: <±0.01 % of FS/psi Response time: 6 s for ±2 % of FS for readings
Over range protection	Pressure is reduced to ensure no damage to flow meter
Minimum resolution	0.01 %
Bandwidth	10 Hz

ELECTRICAL	
Input power	
Connector	M12 4 pin T-code plug
Supply	24 V (22 to 26 VDC)
Ripple	<250 mV peak to peak
Power (Max)	40 W (including all accessories)
Power (Typ)	10 W (single channel leak test)
Power (Idle)	6 W
Inrush current	5 A for 0.25 s
Ethernet	
Connector	M12 4 pin D-code socket
Data rate	100/10 Mbps
External valve interface	
Connector	M12 8 pin A-code socket
Valves	(4×) 2.5 W at 24 V
Temperature input (×2)	
Connector	M12 4 pin A-code socket
Sensor	100 Ω Platinum RTD
Excitation	1.25 mA
Range	0 °C to 200 °C
Noise	<0.001 °C rms
Bandwidth	10 Hz

¹ 10 SCCM range values are 2x higher.

Configuration Options

PRESSURE AND FLOW RANGES

The Sentinel 3520 is built to meet your requirements for pressure range, flow meter range and fill configuration using the below ordering options. Leak Master must be specified upon ordering.

E XAMPLE : The Sentinel 3520 optimized for large part volumes, 0 to 30 psig absolute pressure transducer, 10/50 SCCM mass flow meter range, dual precision electronic regulators, 2 temperature inputs and 4 digital outputs. Includes: power and Ethernet connectors and vibration mounts.

10500-3520-D0AC

	Pressure range		Flow meter range	Fill configuration
10500-3520-	Y	0	Y	Y
	A – 0 to 5 psig	0	0 – no flow meter	B – Low volume manifold (20 SLPM fill rate)
	B – 0 to 10 psig	0	A – 10 / 50 SCCM ³	C – High flow manifold (300 SLPM fill rate)
	C – 0 to 15 psig	0	B – 100 / 250 SCCM ³	
	D – 0 to 30 psig	0	C – 1000 / 3000 SCCM ³	
	E – 0 to 50 psig	0	D – 10 SLPM	
	F – -15 to 95 psig	0	E – 30 SLPM	
	G – -15 to 0 psig	0		
	H – -5 to 0 psig	0		
	I – -15 to +15 psig	0		

³ The A, B and C are dual range flow meters, e.g., A can be configured to operate as either a 10 SCCM or 50 SCCM Full Scale flow meter. Selection is performed remotely by the controller software.

Mounting Information

The Sentinel 3520 unit has rear integral brackets for mounting. Dimensions are in inches [mm].

