



Features

- Contains a .01% FS secondary pressure standard for each range
- SERVO pressure calibrator
- Up to 10 separate calibration ranges may be incorporated
- Fast slew rate

General Description

The Servo Pressure Calibrator is designed to accurately regulate and measure known pressures for individual pressure sensor characterization. This calibrator is programmable and includes an on-board processor, A/D, software controlled servo-valve, LED display on front panel, and pressure standard. Up to 10 servo calibrators can be operated in one system. Each of these Servo Pressure Calibrators may be a different full scale range (with its own secondary pressure standard), and each calibrator is capable of generating an infinite number of pressures within its range plus zero.

The Servo Pressure Calibrator allows operation at elevated line pressures or at very low tunnel static pressures.

Applications

I. DSM/RAD/E-RAD Calibration System

The calibrator is an optional system component of the DSM/RAD/E-RAD pressure measurement systems. The **PressCal** calibration software commands the SPC calibrator to generate one or more known pressures to the ZOC or DSA pressure scanners, for an accuracy check, or an automatic on-line calibration.

II. Stand-Alone Calibration System

The SPC Servo pressure calibrator may also be used in a stand-alone mode. In this mode, the calibrator is controlled by sending ASCII commands from a Host computer, via RS232 or Ethernet. It would be used in this mode to generate pressures to calibrate individual pressure transducers. This could be used in the metrology lab, shop floor, or test cell.



*SPC3000
Servo Pressure Calibrator in 19 inch enclosure
(2 ranges shown)*

Calibration Method

The DSM/RAD/E-RAD systems have a 6 month calibration cycle. Scanivalve's **PressCal** software allows the calibrator to be used to verify ZOC or DSA transducer accuracy, perform calibrations, and post calibration validations. In addition, all commands shown on page 2 can be performed through HyperTerminal. The calibrator can be used to calibrate pressure sensors on demand, perform system leak checks, and validate sensor data.

PressCal software automates the calibration process. During these tests, the software controls the ZOC or DSA calibration valves pneumatically switching them to the calibration manifold position, as well as controlling Scanivalve's SPC3000 pressure calibrator.

The software can perform an "as received" test, and generate a complete report showing the accuracy of each sensor. If a calibration is required, **PressCal** will perform an "on-line" calibration. When the calibration is complete, **PressCal** performs a validation test. This test generates a report showing the accuracy of each sensor for the pressures specified in the test setup.

Stand-Alone Calibration System

When the Model SPC Servo Pressure Calibrator is used in the stand-alone mode, the user can issue specific commands or write his own macro commands similar to what Scanivalve has done when used with the DSM pressure measurement system. It is available in a 19 inch rack mount enclosure (4 Servo Pressure Calibrators to a rack). Some of the user commands available are shown below.

- RP** Read and display pressure in Engineering Units. Default is psia. Other pressure units can also be shown.
- GP** Go to a specific positive pressure.
- GN** Go to a specific negative pressure (positive pressure applied to the reference line). A vacuum source may also be applied for a below atmospheric calibration with a GP command.
- NC** Enter a new coefficient
- BP** Burn the new coefficient values to EEPROM.
- DC** Display all coefficient names and their values held in EEPROM.
- IC** Initialize the Servo calibrator settings.
- DP** Display frequency output (period) for temperature and pressure from Paroscientific quartz pressure standard.
- ZO** Supply pressure set to zero.
- EC** Energize Closure. Each calibrator module contains external closure circuits. The last 5 circuits can operate external solenoid valves to open or shut-off Nitrogen bottle supplies, etc. The user can control any of them by means of closure control commands (EC commands). Each circuit provides a maximum of 100mA current at 24Vdc.
- SI** Display serial number of calibrator and pressure standard.

Calibration Engineering Units

The Servo Pressure Calibrator operates internally in PSI pressure units. Pressure output may be Bar, inches H₂O, cmH₂O, KPa, Kg/cm², PSF, Pa, atm, N/m², N/cm², torr, mBar, mmHg, g/cm² as well as any user chosen units.

Diagnostic Testing

The internal calibrator pneumatic valving and the associated EC energize closure commands, allow the user the flexibility to perform diagnostic leak tests for the entire calibration system.

The externally available commands can be used to control 24Vdc devices (i.e., solenoid valves, status lights, turn-on pumps, etc.)

Model SPC3000

This calibrator is available with a Paroscientific quartz secondary pressure standard with $\pm 0.01\%$ full scale accuracy.



SPC3000 Front and Rear Panel

Calibration of Secondary Pressure Standard

The secondary standard is very easy to calibrate by supplying calibration pressures through fittings on the rear panel, and burning the new coefficients on an EEPROM. This can be accomplished with a PC utilizing a software package from Paroscientific, Inc.

CPM3000 Control Pressure Module



CPM3000 Front and Rear Panel

The CPM3000 Control Pressure Module contains the solenoid valves necessary to switch the DSA/ZOC calibration valves between one of four modes of operation (sense, calibrate, purge and leak test). One is required per ZOC Pressure System and fits in one of the SPCENCL2100 enclosure slots. The CPM3000 is not required for stand-alone calibrator applications or with the Intelligent SPCENCL3200.

SPCENCL2100 Enclosure (RS-232 Communication to the Calibrator)

The SPCENCL2100 is a 19 inch rack mounted enclosure that houses the SPC Servo Pressure Calibrator and CPM3000 Control Pressure Module. Up to four SPC servo calibrators can fit into one enclosure. This enclosure is ordered separately from the servo pressure calibrators.

SPCENCL3200 (Ethernet TCP/IP Communication)

The SPCENCL3200 is an Intelligent 19 inch rack mounted enclosure that supports up to 4 each SPC3000 Pressure Calibrators. No CPM3000 is required with this enclosure. The enclosure has a 10/100baseT communication port for Ethernet, TCP/IP communication.

Specifications

Capacity:

10 pressure ranges
(4 ranges per enclosure)

Absolute Pressure Ranges:

Calibrator Pressure Ranges	Reference Transducers
1 psig	0-2 psig
5 psi	0-23 psia
15 psi	0-30 psia
30 psi	0-45 psia
50 psi	0-100 psia
100 psi	0-200 psia
200 psi	0-200 psia
300 psi	0-300 psia
500 psi	0-1000 psia
750 psi	0-1000 psia

Calibrator Accuracy:

1psig = $\pm 0.04\%$ full scale
5 psi & up = $\pm 0.02\%$ full scale

Interface:

SPC3000 with
SPCENCL2100
SPCENCL3200

RS232C to the calibrators
Ethernet 10/100baseT

Power Requirement:

For use in
SPCENCL2100 or
SPCENCL3200

Customer supplied 115
or 230Vac

On Board A/D:

16 bit A/D

Required: Solenoid Valve Supply Air:

90 psi minimum
120 psi maximum

Weight:

SPC3000
CPM3000

9.16 lbs. (4.15 kgm)
3.85 lbs. (1.75 kgm)

Ordering Information

- SPC3000 / PR 50 psi**

Model: SPC3000 / PR 50 psi

Pressure Standard: -PR Gauge (1 psig) / -PR Absolute

Calibrator Pressure Range: -1 psig / -5 up to 750 psi
- CPM3000**

Model: CPM3000

For use with SPCENCL2100. Not required for SPCENCL3200.
- SPCENCL2100**

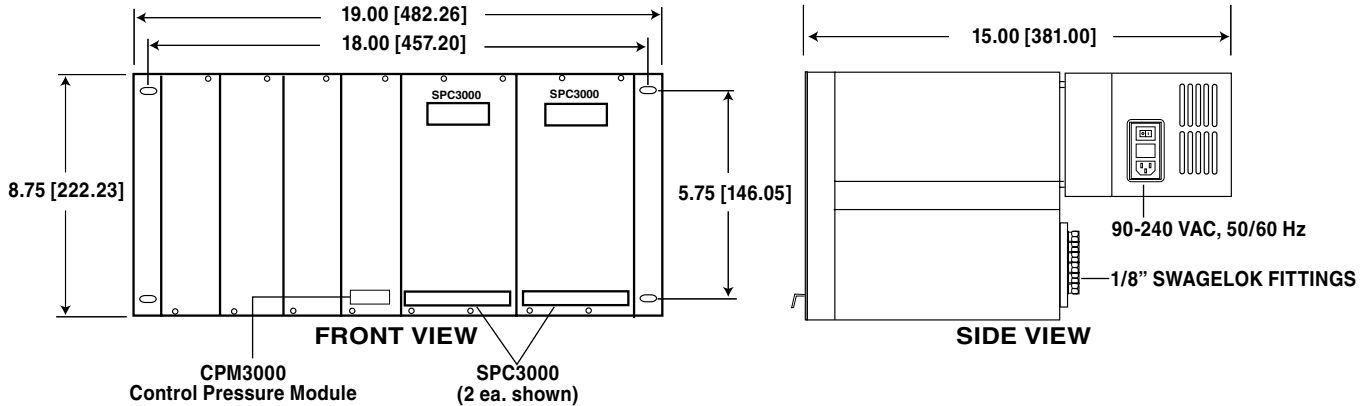
Model: SPCENCL2100

Calibrator enclosure. Items 1 and 2 above fit in this 19" rack enclosure. (specify 115 or 230Vac.)
- SPCENCL3200**

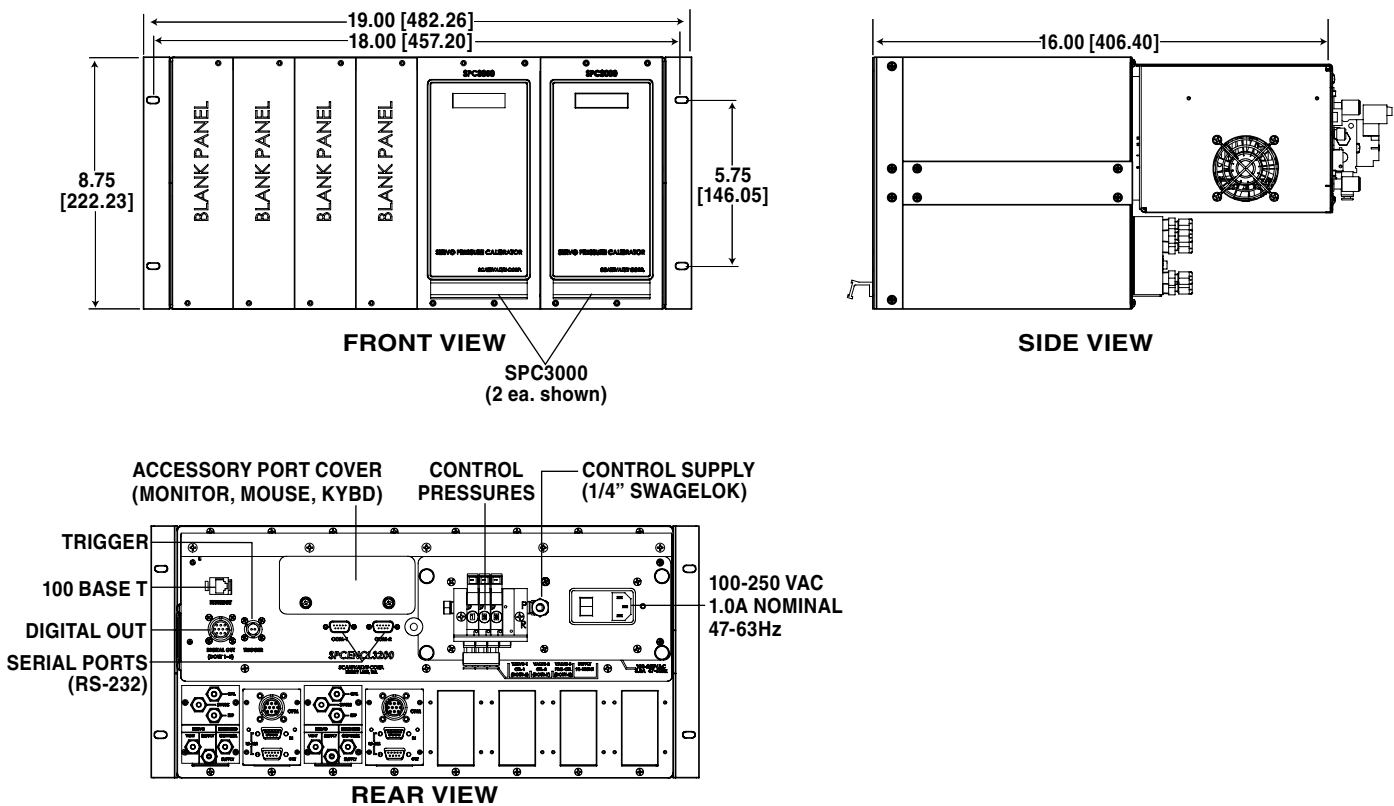
Model: SPCENCL3200

Intelligent calibrator 19 inch rack enclosure for item 1 with Ethernet communication.

SPCENCL2100



SPCENCL3200 (Intelligent Enclosure)



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