

High Accuracy Modular Primary Standard Gas Flow Calibrator Cal Labs & Industry

FEATURES

- Primary standard, dimensionally based piston prover system
- Accuracy:
 - DryCal 800: +/- 0.15% of reading mass flow
+/- 0.25% for the 3 series cell
- Flow Range: 0.5 sccm to 100 slpm
- For all inert gases
- For mass or volumetric flow rate
- Manufactured to ISO 17025 standard at NIST-accredited lab (NVLAP)
- Modular Design: use only what you need; Add flow cells in future
- For flow calibration labs and general industry use:
 - Primary standard calibration of mass flow meters and controllers
 - Calibration and verification of variable area flow meters
 - Extremely wide flow range covers most air sampling calibration requirements
 - Precision in-situ calibration of industrial flow meters and controllers
- Field portable: battery powered
- Fast: readings in 1 to 60 seconds (flow dependent)
- Easy: push one button!
- DryCal Pro Software
- Hands-free auto mode
- RoHS and CE compliant

008
DryCal
800



DESCRIPTION

Bring world class accuracy to your flow lab. The DryCal 800 is a modular piston prover that offers portability and low maintenance for customers who have many flow instruments needing to be validated or calibrated frequently. The DryCal 800 system comes with a base unit and choice of flow cells fitted with low mass borosilicate glass pistons with a low friction coating that oscillate between two detectors to quickly and accurately measure gas flow rates. The design of the DryCal 800 allows for increased flexibility and speed of reading.

The DryCal 800 series consists of a base and five interchangeable flow cells. Each cell has a specific range. Cells can be easily changed (no tools needed) within seconds and can be purchased separately. Cells for the model 800 can be used only with the 800 base.

Flow measurements can be taken manually (one reading at a time), or automatically in continuous mode. DryCal calibrators offer communications via RS-232 and USB and come with our DryCal Pro complete data collection software suite.

Make DryCal a workhorse in your calibration lab and save money by doing your own flow calibration.



WHY PRIMARY STANDARD?

DryCal 800 is a true primary standard in every sense of the word, because its accuracy is based upon primary SI units: The interior diameter of the glass measuring cylinder; the length of piston travel within the cylinder; and the time it takes the piston to travel this distance, implying a known volume. Our patented technology, therefore, offers accuracies at the level of national laboratories in one portable device

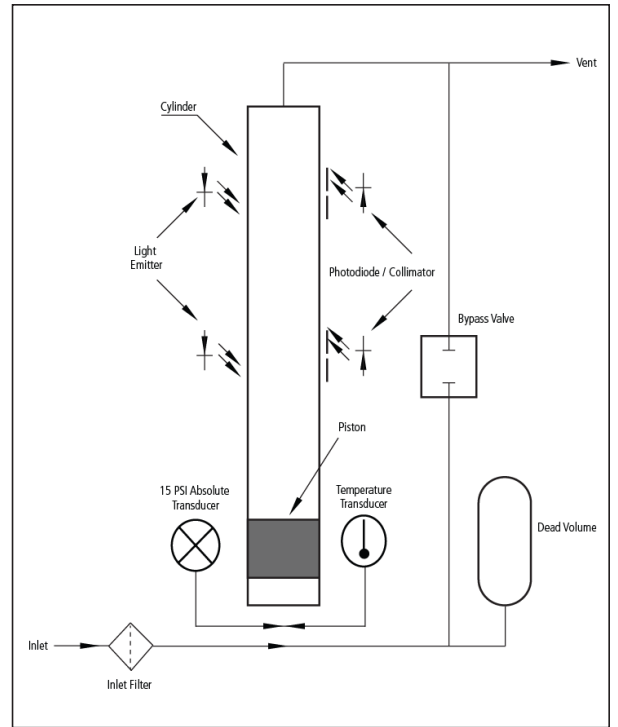
OPERATING PRINCIPLE

Sierra's DryCal model contain a nearly frictionless graphite piston that moves freely inside a borosilicate glass tube. When the parallel bypass valve is closed, the gas flow is directed into the tube to push the piston up (see Figure 1).

Two photo-optic sensors detect the piston as it travels past. The distance the piston travels between the two sensors is precisely defined and represents a known volume. Accurate crystal-based timers drive a microprocessor which calculates the rate of rise. This defines the volumetric flow rate.

At the same time, extremely accurate temperature and absolute pressure sensors collect data used to calculate the mass flow rate.

Figure 1: DryCal 800 - Standard



PERFORMANCE SPECIFICATIONS

Model ML-800	Range ⁽⁵⁾	Accuracy ⁽¹⁾ (% Reading)		Time Per Measurement (time in seconds)	Compression Fittings
		Mass ⁽³⁾	Volumetric ⁽²⁾		
200-800-3	0.5 sccm to 50 sccm	+/- 0.25	+/- 0.25 plus 0.002 sccm	1 to 60	1/8-inch ID Swagelok®
200-800-10	5 - 500 sccm (0.5 slpm)	+/- 0.15	+/- 0.15	3 to 135	1/4-inch ID Swagelok®
200-800-24	50 - 5000 sccm (5.0 slpm)	+/- 0.15	+/- 0.15	3 to 90	1/4-inch ID Swagelok®
200-800-44	500 - 50,000 sccm (50 slpm)	+/- 0.15	+/- 0.15	1 to 35	1/4-inch inlet, 1/2-inch Swagelok®
200-800-75	1000 sccm -100 slpm	+/- 0.15	+/- 0.15	1 to 50	1/2-inch Swagelok®

Table 1: Flow Cell Specifications

- Note:**
- Using the averaging mode will increase accuracy
 - Temperature range 5°C to 40°C (41°F to 104°F)
 - Temperature range 15°C to 30°C (59°F to 86°F)
 - From 30-50 slpm: 0.45% standardized, 0.3% volumetric
 - At gas pressure of 760 mmHg (1 atm), and a gas temperature of 25°C (77°F) with standardization temperature set to 0°C (32°F)

OPERATION SPECIFICATIONS

Operating Temperature

Volume: 5°C to 40°C (41°F to 104°F)

Mass: 15°C to 30°C (59°F to 81°F)

Operating Pressure

15 psia (1.03 barA)

Ambient Temperature

15°C to 30°C (59°F to 86°F)

Storage Temperature

0°C to 70°C (32°F to 158°F)

Gas Compatibility

Non-corrosive, humidity less than 70% non-condensing

Flow Modes

Suction and pressure

Pressure & Suction Fittings

See Table 1 Flow Cell Specifications on page 2

Warranty

1 year; battery 6 months

Approvals

CE; RoHS compliant

Built and calibrated to ISO 17025 by NVLAP-certified laboratory. All calibrations traceable to NIST.

Digital Communication

RS-232

PHYSICAL SPECIFICATIONS

Configuration

DryCal 800: base with modular, interchangeable flow cells (five)

Display

Backlit LCD

Weight

800

Base: 4.5 kg (10 lbs)

Cells: 80 oz (2300 g) to 160 oz (4535 g) flow cell dependent

Dimensions

Model	Width mm (in.)	Depth mm (in.)	Height mm (in.)
800	152 (6)	280 (11)	436 (17)

OPERATION SPECIFICATIONS

AC Power Adapter/Charger

100-240 VAC, 50-60 Hz

12V DC, >500ma, 2.5 mm, center positive,
North American standard, others available

Battery

Internal continuously chargeable sealed lead-acid battery

6 volt lead acid battery; battery Operational Time

(5 cycles/min)

Local Interface

Backlit LCD graphical display; Four directional arrow buttons on the control panel allow you to navigate through the menu; user selectable flow units plus time intervals

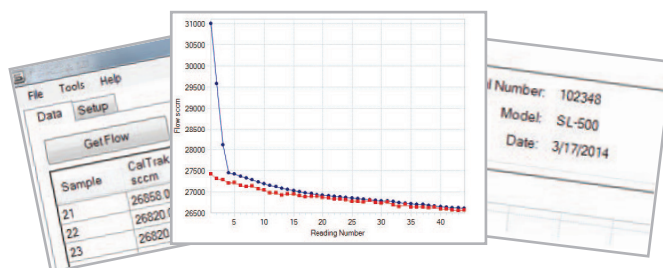
DryCal Pro Software

Software System Requirements

Windows® XP, and above

Microsoft Excel® 2003 and up

- Captures flow data from your DryCal instrument for easy export into common software packages, a PC, or Microsoft environment.
- Real-time data monitoring
- Upload the latest version of the firmware to your DryCal
- Enter flow rates from pumps or other flow source or flow meters and calibrate the flow source.
- Compare the flow measurements from your DryCal precision calibrator.



GAS FLOW SOURCE CONTROL

Mass Flow Controllers

Sierra's popular SmartTrak® 100 Series Mass Flow Controllers are ideal for generating and maintaining a constant flow of gas so that any type of flow meter can easily be calibrated. Special versions of the SmartTrak are available to cover the range of each DryCal flow cell. With the built-in display and controls, SmartTrak is a complete gas flow generation system.

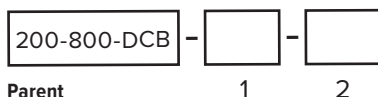


SmartTrak 100 Mass Flow Controller

DryCal 800 Back and Front View



Features



Instructions: To order a DryCal, please fill in the number block by selecting the codes from the corresponding features below.

Parent Number: DryCal SL Bases	
200-800-DCB	DryCal ML-800 +/-0.15% reading accuracy (flow cell dependent) gas flow calibrator (base only). Standard configuration includes: includes USB and touch screen. The DryCal base unit requires flow cell(s) to create an operational unit. See flow cell options below in Feature 1.

Feature 1: DryCal SL Cells	
200-800-3*	Ultra Low flow cell for use with 200-800-DCB unit. Flow range 0.5 sccm to 50 sccm; Accuracy: Volumetric: +/-0.25 % of reading plus 0.002 sccm / Mass: +/- 0.25% of reading; 1/8-inch compression fittings
200-800-10	Low flow cell for use with 200-800-DCB unit. Flow range 5 sccm - 500 sccm (0.5 slpm); Accuracy: Volumetric: +/-0.15% of reading/ Mass: +/-0.15% of reading; 1/4-inch compression fittings
200-800-24	Medium flow cell for use with 200-800-DCB unit. Flow range 50 sccm to 5000 sccm (5.0 slpm); Accuracy: Volumetric: +/-0.15% of reading/Mass:+/-0.15% of reading; 1/4-inch compression fittings
200-800-44	High flow cell for use with 200-800-DCB unit. Flow range 500 sccm to 50,000 sccm (50 slpm); Accuracy: Volumetric: +/-0.15% of reading/Mass:+/-0.15% of reading; 1-4-inch inlet, 1/2-inch outlet compression fittings
200-800-75**	High flow cell for use with 200-800-DCB unit. Flow range 1000 sccm - 100 slpm; Accuracy: Volumetric: +/-0.15% of reading/ Mass: +/-0.15% of reading; 1/2-inch compression fittings

*Note: 200-800-3 is only compatible with DryCal firmware versions 2.07 or higher.

**Note: 200-800-75 is only compatible with DryCal firmware versions 2.07 or higher.

Feature 2: Cases	
100-255	Hard, heavy-duty carry case with custom foam for ML-800. Fits one base and one cell
100-257-800	Hard, heavy-duty carry case with custom foam for ML-800. Fits one base and three cells



Measurably Different.®

DryCal is a registered trademark of Mesa Labs.

DryCal ML-800, formerly named CalTrak 800, is manufactured by Mesa Labs for Sierra Instruments.

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