interscan corporation
21700 Nordhoff St.
Chatsworth, CA. 91311
Phone 818.882.2331

DILUTION SYSTEM

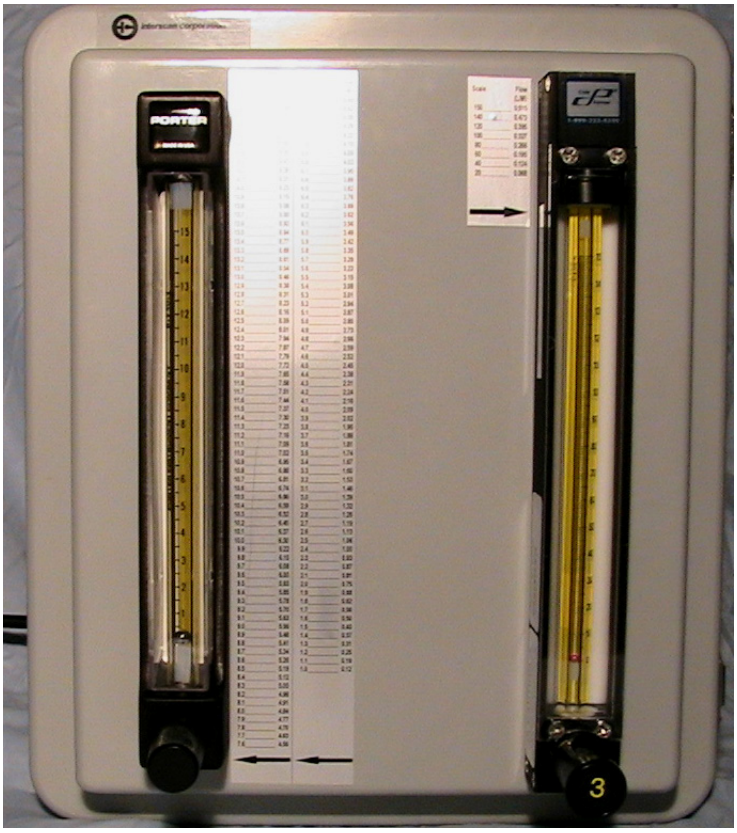


TABLE OF CONTENTS

DEFINITIONS

Purified Air – Air with following properties:

THC <0.5 ppm
CO < 0.5 ppm
NOx < 0.5 ppm
SO2 < 0.5 ppm
N2O < 0.5 ppm
Particulates < 0.45µ.

Diluent **-** a diluting substance of purified air or nitrogen.

INTRODUCTION

Interscan monitoring systems are produced with the customer in mind. We take pride in producing quality customized products. Our goal is to minimize maintenance and cost while maintaining accuracy and instrument reliability. The Dilution System is part of this goal. Electrochemical sensors are consumed quickly with higher levels of detected gas. This would require replacement of the sensor at frequent intervals. The Dilution System addresses this situation by reducing the sample at a pre-determined ratio to a low level before introduction to the Interscan Monitor. This causes the sensor to be consumed a lower rate.

The Dilution system operates by mixing a known flow sample with a predetermined flow rate of a **diluent** of Nitrogen (N_2) or ***purified air***. The flow rate of **diluent** is determined by Interscan based on the required dilution level for the application. The mixture is then passed through a tee manifold.

NOTE: The exhaust is then exited to an appropriate area that is at ambient pressure or less than – 3 inches of vacuum to prevent interruption in flow rate.

A sample is pulled by the Interscan monitoring system perpendicular to the mixture flow stream. The level is then indicated on a digital display at the original level (Before Dilution).

INSTALLATION & SETUP

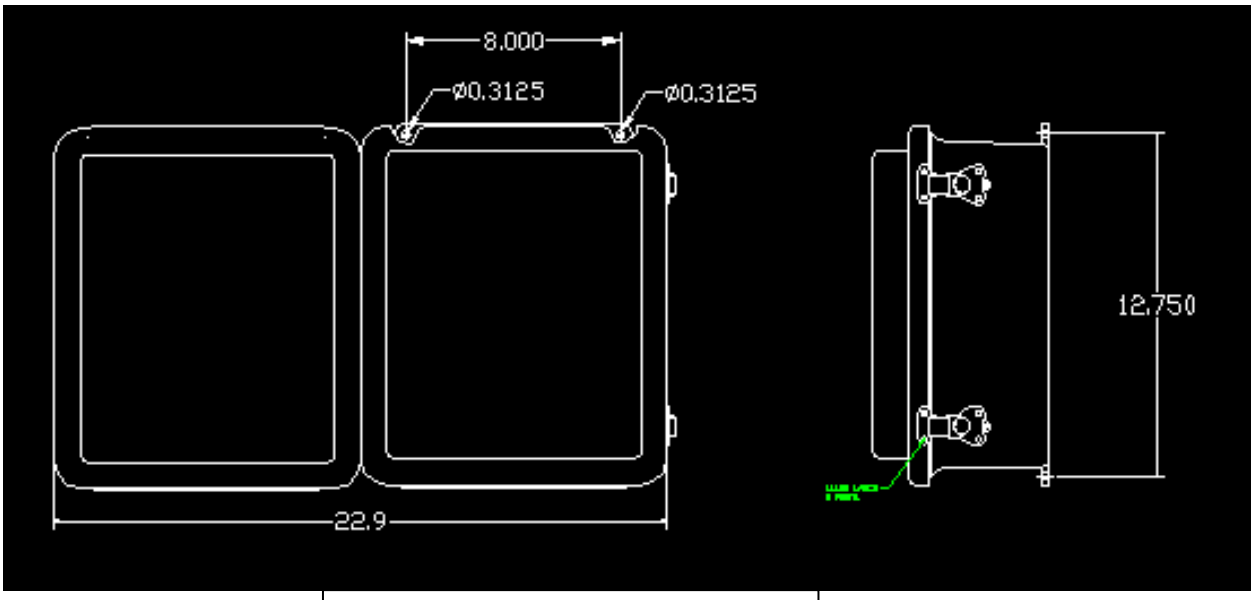


Figure 1: Mounting Dimensions

The enclosure can be set on a table or can be wall mounted. Refer to figure 1 for Mounting to wall. This is accomplished by using four 5/16 inch (0.3125) [7.93mm] bolts. Allow 22.9 inches [581.66mm] for overall width with door open. The hole pattern is 8.000 inch [203.2mm] width by 12.750 inches [323.85mm] height.

All tubing used for connections is ¼ O.D. x 1/8 I.D. [6.35mm O.D. x 3.175mm I.D.]. A **Diluent** regulated to 80 PSI maximum must be connected to the "Diluent Inlet". Connect the "Exhaust" port to a vent at ambient pressure or maximum vacuum of -3 inches of water.

Note: Connecting the "Exhaust" port to high pressure or vacuum vents will cause erroneous readings.

Connections to the "Inlet" and "Analyzer" ports can be made in most instances with BEV-A-LINE IV tubing. Bromine, Chlorine Dioxide, and Hydrogen Bromide require the use of tubing which is dark in color such as black. Use of clear, translucent or opaque tubing allows the gas to react with ultraviolet radiation resulting in improper readings.

Connect the sample intake tube to the "Inlet" port of the Dilution System. *Note: A Millipore filter has been supplied to remove particulates above 0.45 microns. This filter should be installed in the inlet line if particulates are present. Consult Millipore picture on page 10 for proper connection.* The Dilution System is presently set up for sampling from a non-pressurized source. Consult figure 2 and instructions for conversion to sample pressure inlet. The "Analyzer" port on the Dilution System is connected to the Interscan monitor "INLET" port.

CONVERSION TO PRESSURE INLET

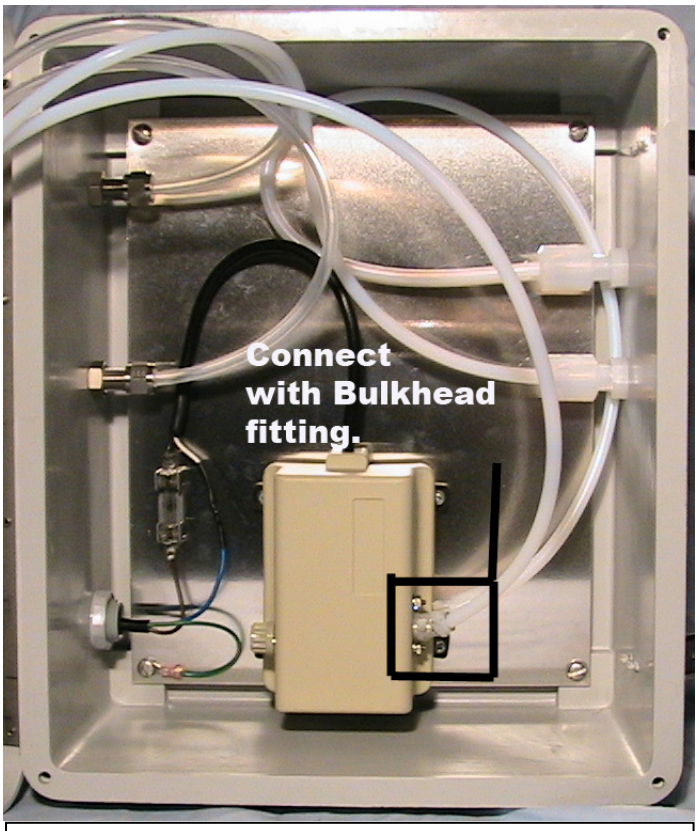


Figure 2: Pressure Inlet Connection.

Refer to Flow Diagram page 9. A Teflon bulkhead fitting (P/N 419-00032) is required to modify the "Inlet" port for a pressure input. *Note: Sample must be regulated not to exceed 80 PSI maximum.*

Remove the tubing connected to the pump. Connect the tubing together using a Teflon bulkhead (P/N 419-00032).

Note: The pump is not used in this configuration. The line cord will not need to be plugged in for operation.

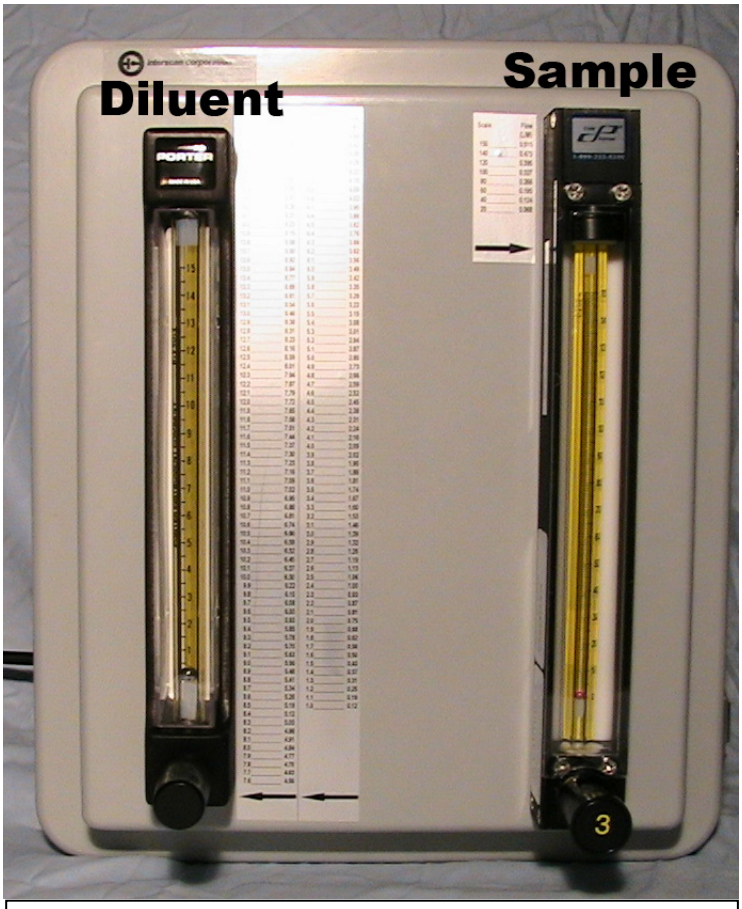


Figure 3: Flowmeters

Set the middle of the flowmeter floats (ball indicator) as follows:
Diluent @ 4.4 (2.37 l/m),
Sample @40 (0.1239530 l/m).
This provides a dilution of 20 : 1
(actual 20.120150379579356691649254152784:1).

The ratio is calculated as follows:

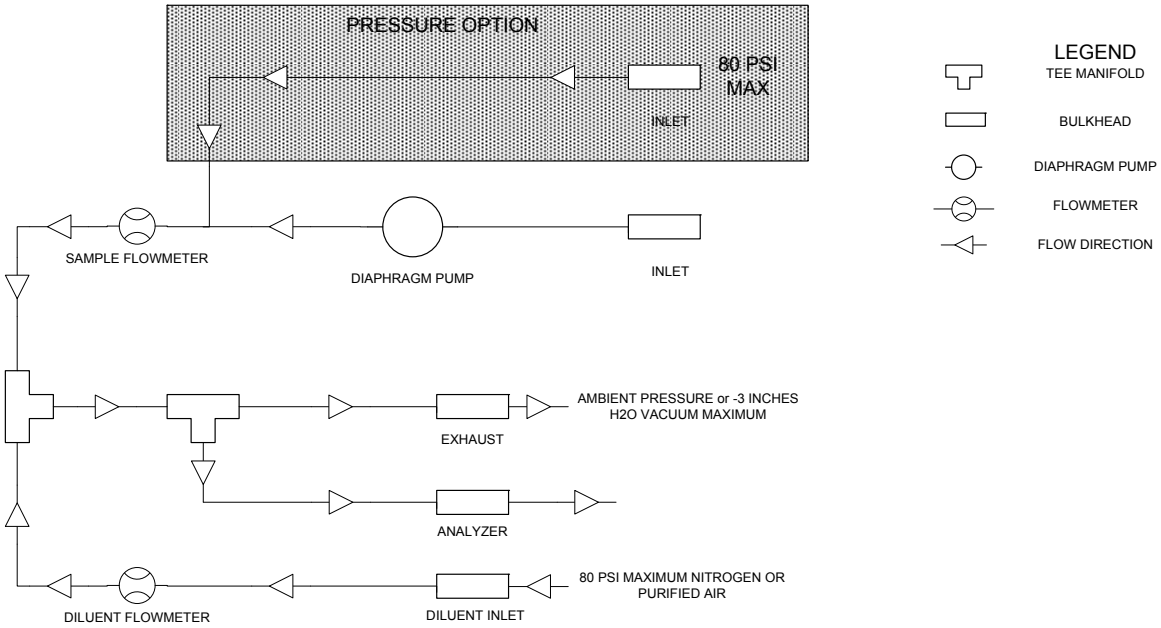
D – Flowrate of Diluent in liters per minute,
S – Flowrate of Sample in liters per minute,

Dilution Ratio= (D + S)/S.

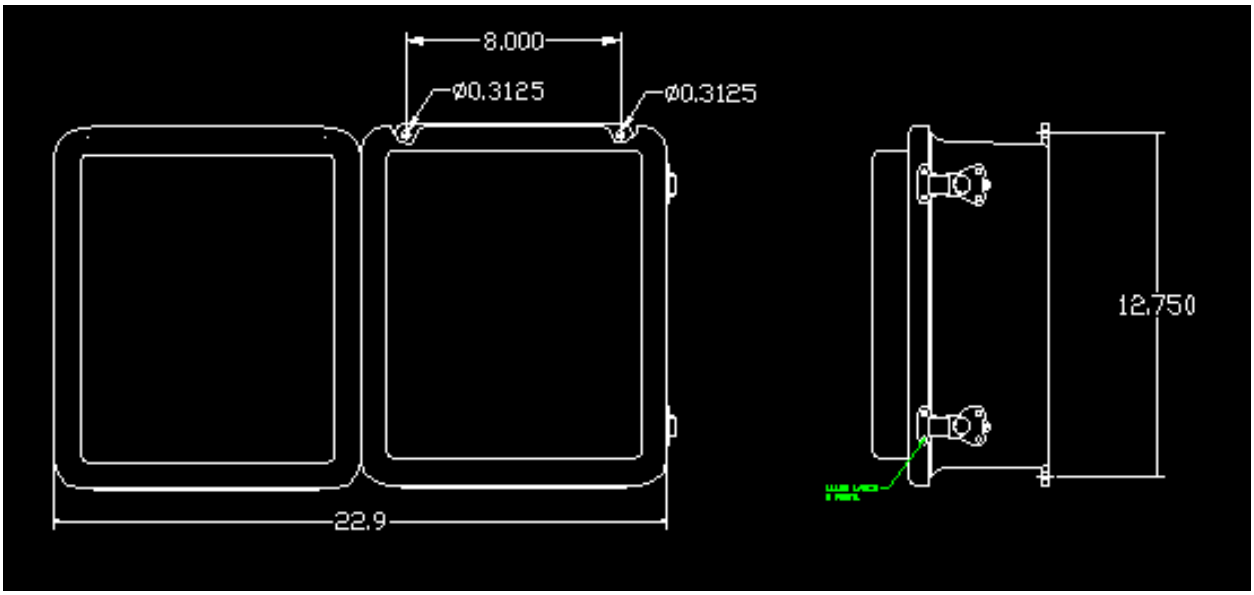
Plug in the AC line cord if no modification has been performed. Turn on the power to the Interscan monitor. Allow the monitor to stabilize. Readings will be displayed at true levels before dilution.

DIAGRAMS & DRAWINGS

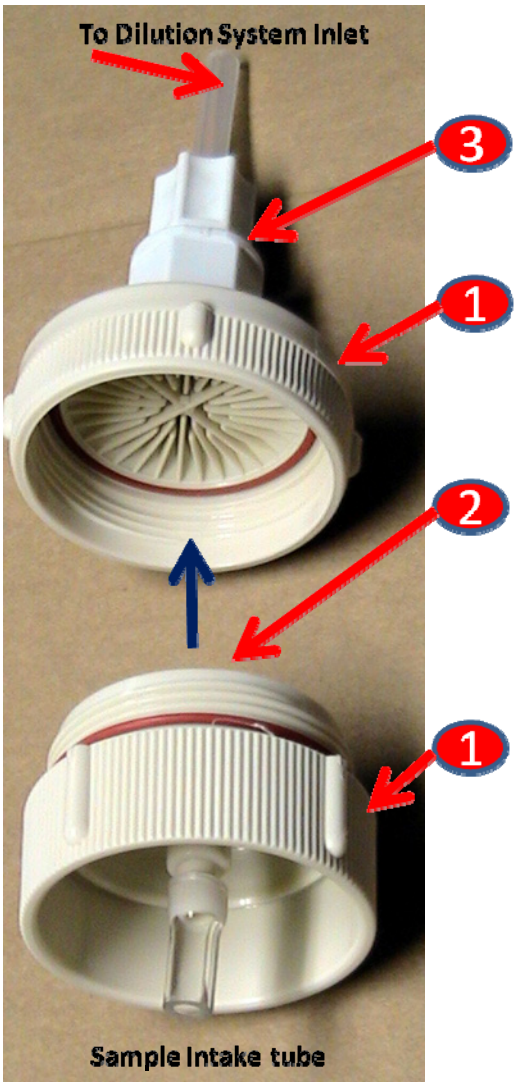
FLOW DIAGRAM



WALL MOUNT DIMENSIONS



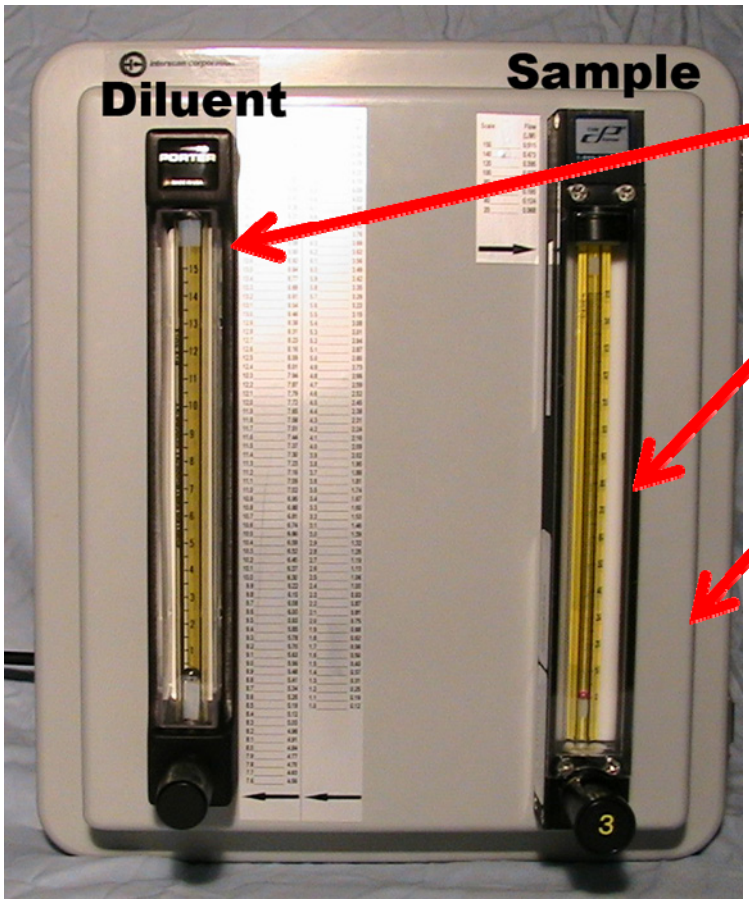
MILLIPORE



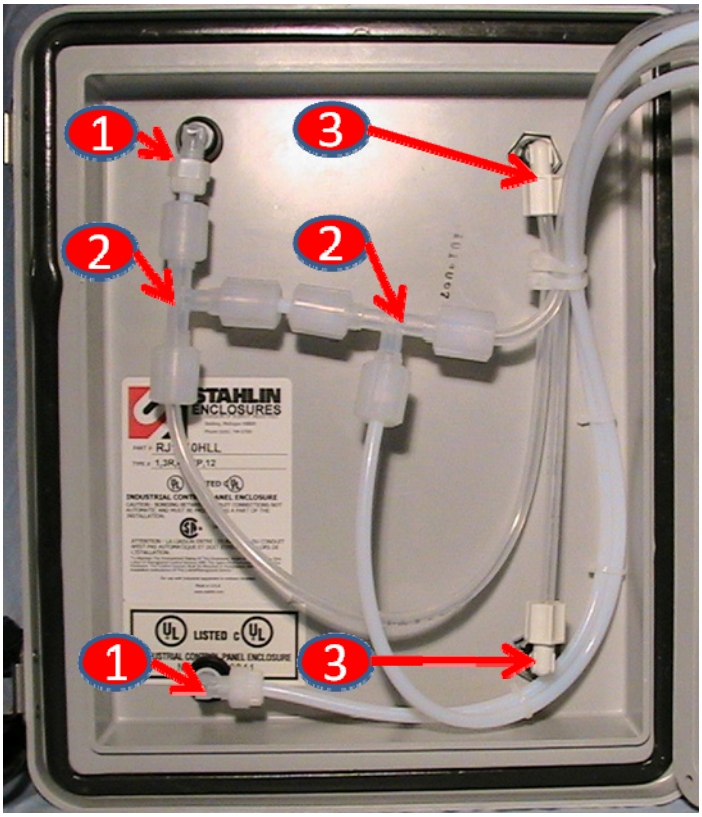
	PART NUMBER
1	417-00004
2	417-00002
3	419-00050

Shimmering side of filter element.

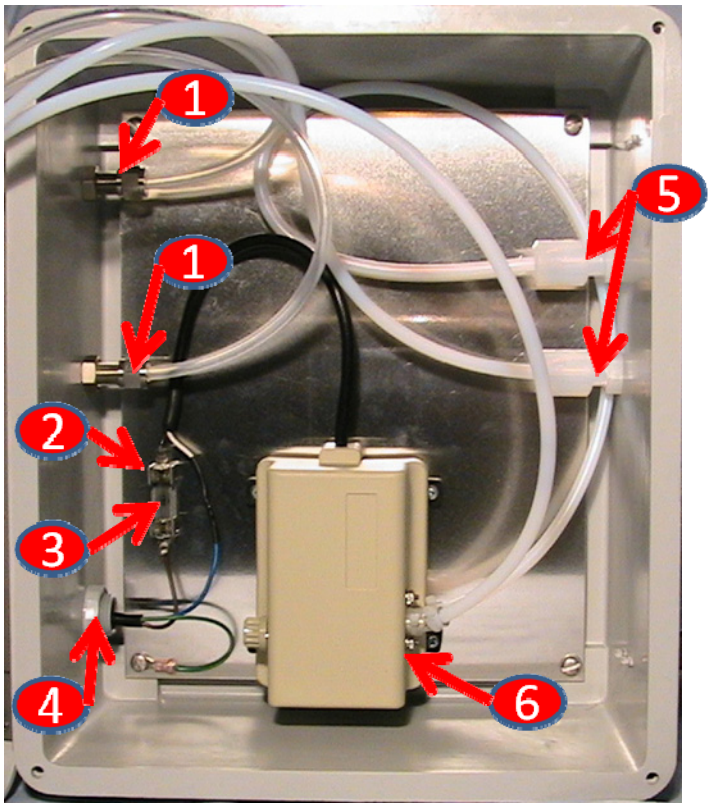
PARTS LOCATION



PART NUMBER	
1	421-00005
2	421-00004
3	415-00027



	PART NUMBER
1	419-00033
2	419-00022
3	419-00005



	PART NUMBER
1	419-00013
2	517-0005
3	515-0005
4	412-0002 403-00018
5	419-00032
6	413-00001 or 413-00002

PARTS LIST

Enclosure…….. 415-00027
Fittings, Inlet & Analyzer…….. 419-00032
Fittings, Diluent Inlet & Exhaust…….. 419-00013
Fittings, Mixing and Sample Manifold…….. 419-00022
Fittings, Diluent Flowmeter (2)…….…… 419-00005
Fittings, Sample Flowmeter (2)……..419-00033
Flowmeter, Diluent……..421-00005
Flowmeter, Sample…….. 421-00004
Pump, 115 VAC……..413-00001
Or
Pump, 220 VAC…….. 413-00002
Holder, Fuse……517-00005
Fuse, AGC-1…….. 515-00005
Line Cord, U.S……..516-00006
Strain Relief, Body, Line Cord……... 412-00002
Strain Relief, Nut, Line Cord…… 403-00018
Housing, Millipore Filter…… 417-00004
Element, Millipore Filter (25/pkg)…… 417-00002
Fitting, Millipore Tubing…… 419-00050

CERTIFICATES

Parker Hannifin Corporation
Porter Instrument Division
245 Township Line Rd.
P.O. Box 907
Hatfield, PA 19440-0907 USA
(215) 723-4000 / fax (215) 723-2199
FM-1080-0

CERTIFICATE OF ACCURACY

This is to certify that meter serial number 00-974-00 is certified to an accuracy of +/- 5 % of FULL SCALE and has been calibrated using standards whose accuracies are traceable to the National Institute of Standards and Technology (N.I.S.T.) according to our procedures.

All traceable certifications and related procedures for the equipment used are on file at Parker Hannifin Corporation, **Porter Instrument Division**.

Barometer Number:	1680
Vol-U-Meter Number:	1363
Type of Gas:	AIR
Gas Used for Calibration:	AIR
Pressure Gauge Number:	N/A
Timer Number:	996
Thermometer Number:	PICO 1526
Calibrated By:	SZK
Date Calibrated:	08/22/07

Uncertainty of measurements: +/- 0.3 % of reading

Calibrations were performed under a controlled Quality System Manual, which incorporates the requirements of ISO Guide 25, ISO 10012-1, ISO 9001 (1994) and ISO 13485. Parker Hannifin Corporation, **Porter Instrument Division's** ISO 13485 registration (Medical Devices – Quality Management Systems – System Requirements for Regulatory Purposes) includes Design Controls and Metrology Systems.

0065280H FM-0258 Rev.H

Parker Hannifin Corporation
Porter Instrument Division
245 Township Line Rd.
P.O. Box 907
Hatfield, PA 19440-0907 USA
(215) 723-4000 / fax (215) 723-2199

FLOWMETER CALIBRATION DATA

CUSTOMER	ORDER NO.	DATE
INTERSCAN CORP	326027-0	08-22-2007

Tube #:	B-250-2-SS	Metered Fluid:	AIR
Float Material:	STN STL	Metered Temperature:	70.0* F
Float Density:	8.03 G/CC	Metered Pressure:	14.7 PSIA
Serial No.:	00-974-00	Metered Density:	N/A
Units:	L/MIN	Metered Viscosity:	N/A

SCALE		FLOW	SCALE		FLOW	SCALE		FLOW
150.0	---	10.05	125.0	---	8.13	100.0	---	6.29
149.0	---	9.97	124.0	---	8.06	99.0	---	6.22
148.0	---	9.89	123.0	---	7.98	98.0	---	6.15
147.0	---	9.81	122.0	---	7.91	97.0	---	6.07
146.0	---	9.73	121.0	---	7.84	96.0	---	6.00
145.0	---	9.65	120.0	---	7.76	95.0	---	5.93
144.0	---	9.57	119.0	---	7.69	94.0	---	5.85
143.0	---	9.49	118.0	---	7.62	93.0	---	5.78
142.0	---	9.42	117.0	---	7.55	92.0	---	5.71
141.0	---	9.34	116.0	---	7.47	91.0	---	5.64
140.0	---	9.26	115.0	---	7.40	90.0	---	5.56
139.0	---	9.18	114.0	---	7.33	89.0	---	5.49
138.0	---	9.10	113.0	---	7.25	88.0	---	5.42
137.0	---	9.03	112.0	---	7.18	87.0	---	5.35
136.0	---	8.95	111.0	---	7.11	86.0	---	5.28
135.0	---	8.87	110.0	---	7.03	85.0	---	5.21
134.0	---	8.80	109.0	---	6.96	84.0	---	5.14
133.0	---	8.72	108.0	---	6.88	83.0	---	5.07
132.0	---	8.65	107.0	---	6.81	82.0	---	5.00
131.0	---	8.57	106.0	---	6.74	81.0	---	4.94
130.0	---	8.50	105.0	---	6.66	80.0	---	4.87
129.0	---	8.42	104.0	---	6.59	79.0	---	4.80
128.0	---	8.35	103.0	---	6.52	78.0	---	4.73
127.0	---	8.28	102.0	---	6.44	77.0	---	4.66
126.0	---	8.20	101.0	---	6.37	76.0	---	4.59

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Parker Hannifin Corporation
Porter Instrument Division
245 Township Line Rd.
P.O. Box 907
Hatfield, PA 19440-0907 USA
(215) 723-4000 / fax (215) 723-2199

FLOWMETER CALIBRATION DATA

CUSTOMER	ORDER NO.	DATE
INTERSCAN CORP	326027-0	08-22-2007

Tube #:	B-250-2-SS	Metered Fluid:	AIR
Float Material:	STN STL	Metered Temperature:	70.0* F
Float Density:	8.03 G/CC	Metered Pressure:	14.7 PSIA
Serial No.:	00-974-00	Metered Density:	N/A
Units:	L/MIN	Metered Viscosity:	N/A

SCALE		FLOW	SCALE		FLOW	SCALE		FLOW
75.0	---	4.52	50.0	---	2.79	25.0	---	1.05
74.0	---	4.45	49.0	---	2.72	24.0	---	.99
73.0	---	4.38	48.0	---	2.65	23.0	---	.92
72.0	---	4.31	47.0	---	2.58	22.0	---	.86
71.0	---	4.24	46.0	---	2.51	21.0	---	.79
70.0	---	4.18	45.0	---	2.44	20.0	---	.73
69.0	---	4.11	44.0	---	2.37	19.0	---	.67
68.0	---	4.04	43.0	---	2.30	18.0	---	.60
67.0	---	3.97	42.0	---	2.23	17.0	---	.54
66.0	---	3.90	41.0	---	2.16	16.0	---	.48
65.0	---	3.83	40.0	---	2.08	15.0	---	.42
64.0	---	3.76	39.0	---	2.01	14.0	---	.35
63.0	---	3.69	38.0	---	1.94	13.0	---	.29
62.0	---	3.62	37.0	---	1.87	12.0	---	.23
61.0	---	3.55	36.0	---	1.80	11.0	---	.16
60.0	---	3.48	35.0	---	1.73	10.0	---	.10
59.0	---	3.41	34.0	---	1.66			
58.0	---	3.34	33.0	---	1.59			
57.0	---	3.27	32.0	---	1.52			
56.0	---	3.20	31.0	---	1.45			
55.0	---	3.13	30.0	---	1.38			
54.0	---	3.07	29.0	---	1.31			
53.0	---	3.00	28.0	---	1.25			
52.0	---	2.93	27.0	---	1.18			
51.0	---	2.86	26.0	---	1.12			

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625 East Bunker Court • Vernon Hills, Ilinois 60061-1844
TOLL FREE: 1-866-466-6225 • FAX: 847-247-2984 • www.InnoCalSolutions.com

NIST-TRACEABLE CALIBRATION CERTIFICATE

ACCREDITED 1746.01

Catalog Number **17080-00**
Certificate Reference Number **5219211-00-1-1**
Purchase Order Number **2051**

Unit Under Test 1: 03217-67
Description: Cole-Parmer 150-mm Correlated Flowmeter with PTFE; Sapphire float, with high-resolution valve 9.9 mL/min water flow rate
Serial Number 1: 177806-1
Secondary ID: CP021025
Equipment Condition: NEW

Certificate Completed for: **INTERSCAN**
21700 NORDHOFF ST
CHATSWORTH CA 91311-5889

Innocal certifies that the methods to perform this calibration have been validated and that the measurement standards used to obtain the data contained in this report are traceable to the National Institute of Standards and Technology (NIST). Innocal further certifies that the measurements were performed in accordance with our quality management system which has been accredited to ISO 17025 and conforms to ANSI/NCSL Z540-1.

Calibration Standards Used

Manufacturer	Function Performed	Model Number	Serial Number	Due Date
Hart Scientific	Thermometer	1521	A46377	08/27/2007
Thermometrics	Thermistor Probe	5610	A461563	08/30/2007
DHI Instruments	Pressure/Flow Reference	RPM3 A0100b	1698	09/05/2007
DHI Instruments	Pressure/Flow Reference	molbox1-A	706	08/28/2007
DHI Instruments	Flow Bloc	1E3-VCR-V-Q	2685	09/05/2007

Lab Technician: 315

Received Date: 08/16/2007
Date Completed: 08/20/2007

Issue Date: 08/20/2007
Due Date: 08/20/2008

Please note: A number of factors may cause your calibrated item to drift out of the calibration before the re-cal. Date.
This certificate shall not be reproduced except in full and requires written approval from InnoCal.
** Results data shown relates only to above listed item(s)*

Page 1 of 2

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NIST-TRACEABLE CALIBRATION CERTIFICATE
Correlation Test Report

Certificate Reference Number: 5219211-00-1-1

Unit Under Test Information

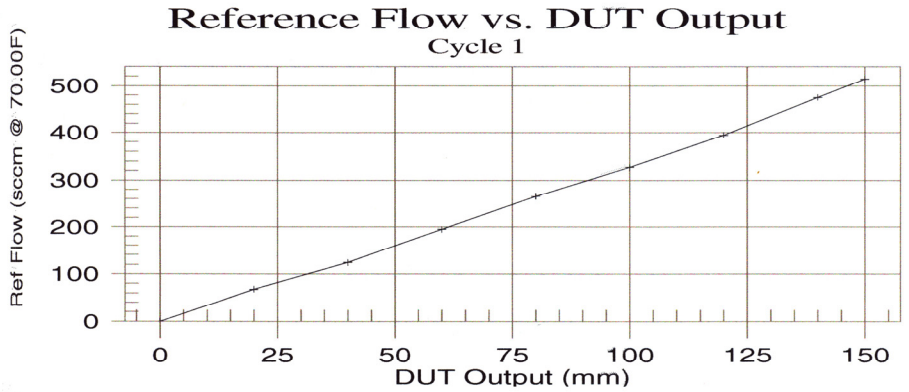
Model Number: 03217-67
Serial Number: 177806-1
Manufacturer: COLE PARMER
Calibration Gas: Air
Process Gas: Air

ID Number: CP021025
Flow Range: 0.000 to 522.500 sccm @ 70.00F
Tolerance: N/A

Final determination of compliance or non-compliance of the measurement results contained in this report rests with the customer. For "accredited" calibrations determination of "Compliance" as reported on this certificate are based on measured data, manufacturers published specifications and the reported measurement uncertainty at a 95% confidence level. For further information see ILAC-G8: 1996

Calibration Data

Meter Indication (mm)	Reference Flow (sccm @ 70.00F)	Meter Temp (C)	Meter Press (kPa)
0.0	0.0000	21.604	98.705
20.0	67.9771	21.551	98.703
40.0	123.9530	21.578	98.689
60.0	194.8395	21.615	98.69
80.0	266.0148	21.655	98.687
100.0	327.1530	21.576	98.685
120.0	394.5801	21.583	98.688
140.0	475.1952	21.58	98.694
150.0	514.6133	21.57	98.698



DUT Uncertainty: 0.555%DUTFS
This certificate was performed under the climate controlled lab conditions of: 22C 69%RH 987mbar
Additional Comments: Calibration Procedure CP/FLOW-001 was used to complete this calibration.

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