

5 Channel Calibrator and SGDM System



Part # 0724



Part # 9742

User Manual



Questions? Contact us at 800-223-3977 or online at
<http://www.cleanair.com/equipment/Express/main.html>

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IMPORTANT!!!**BEFORE YOU BEGIN READ THIS!!!**

READ AND UNDERSTAND ALL INSTRUCTIONS BEFORE USING THIS SYSTEM!

SAVE THESE INSTRUCTIONS!!!

- **To Avoid Accidents...**
 - ✓ Keep your work area clean and well lit.
 - ✓ Keep unauthorized personnel away.
 - ✓ Exercise common sense.
- **Electrical Safety...**
 - ✓ Do not operate in combustible environments.
 - ✓ DO NOT operate these products when wet or in water.
 - ✓ ALWAYS be sure that the components of this system are operating with the correct voltage (120V).
 - ✓ Never remove a grounding prong or modify a plug.
 - ✓ Do not abuse the power cord or plug. Remove by handling plug only.
- **Personal Safety...**
 - ✓ Stay alert and pay attention to what you are doing.
 - ✓ Dress appropriately. Wear the appropriate personal safety devices.
 - ✓ Calibration and/or flue gases can be hazardous to human health. Be sure that all lines are properly vented to an open area.
 - ✓ Check the system for leaks after installation.
- **Equipment Maintenance...**
 - ✓ Maintenance and repairs should be performed only by one of Clean Air Express's trained technicians.

Customer Feedback

Clean Air Engineering takes pride in our quality products and services. We strive to provide the highest quality products and services in the industry. We realize the importance of end user input in the continual improvement of our products and services. Customer feedback is of paramount importance. **We encourage your feedback with any suggestions or problems that can help us improve our performance.** A customer feedback form is available online at <http://www.cleanair.com/About/feedback.html>. To emphasize our commitment to quality products and complete customer satisfaction, Clean Air Engineering's manufacturing division, CAE Express, offers what we feel is the best and most comprehensive warranty in the environmental industry.

1 Safety

Safety should always be considered first, and proper safety procedures should be followed.

1.1 Harmful Gas Inhalation

Some calibration gases can be potentially fatal if inhaled (e.g. carbon monoxide). Be sure to use the system outside or in a well ventilated area. If you suspect that your system may be leaking, do not use it.

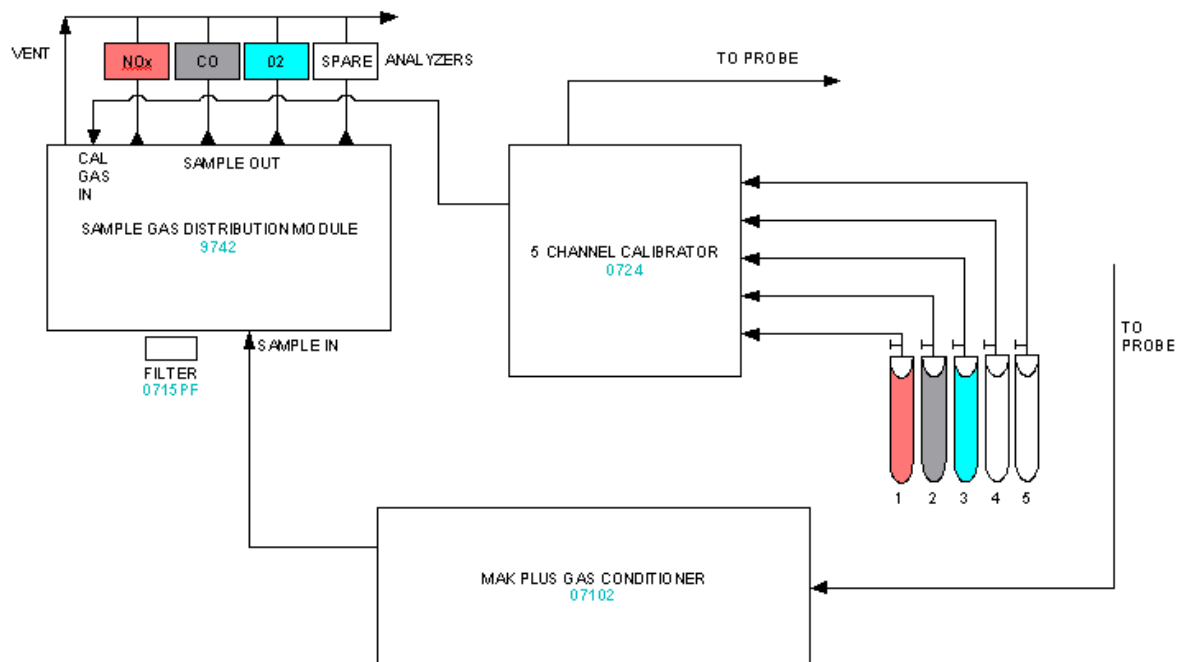
1.2 Electrical Shock

The 5 Channel Calibrator is powered by a standard 120 VAC line, thus potentially fatal shocks are possible. It is no more dangerous than many household appliances in this regard; however, care must be taken to avoid shock. Before performing any maintenance on this item or an assembly containing it, **turn off** and **unplug all components** from the 120 VAC line.



2 Principles of Operation

The 5 Channel Calibrator can be combined with the Sample Gas Distribution Module as shown below. The 5 Channel Calibrator is designed to interface CEM analyzers with five individual calibration gases. The gases can be controlled manually or remotely to flow through one of two calibration ports. The SGDM distributes sample gas to four analyzers. The design of the two allows for installation into a standard 19" instrument rack.



2.1 System Components

2.1.1 5 Channel Calibrator

See Figure 1a and Figure 1b.

Figure 1a

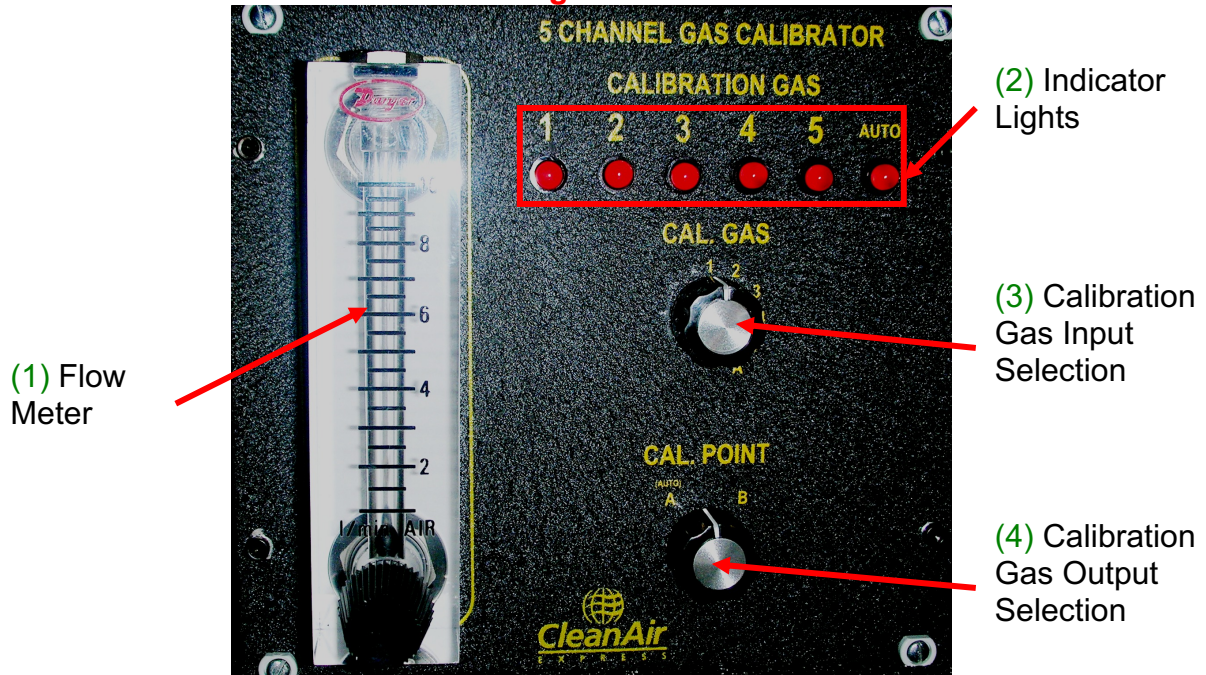
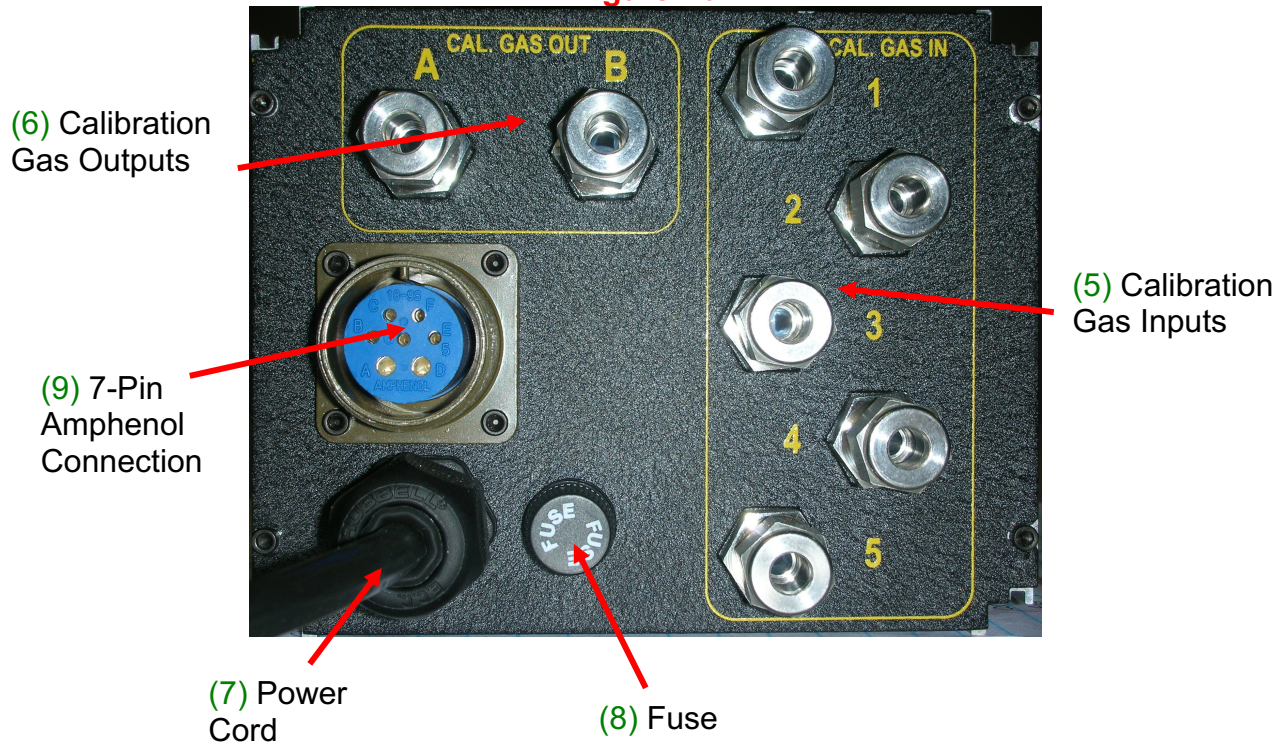


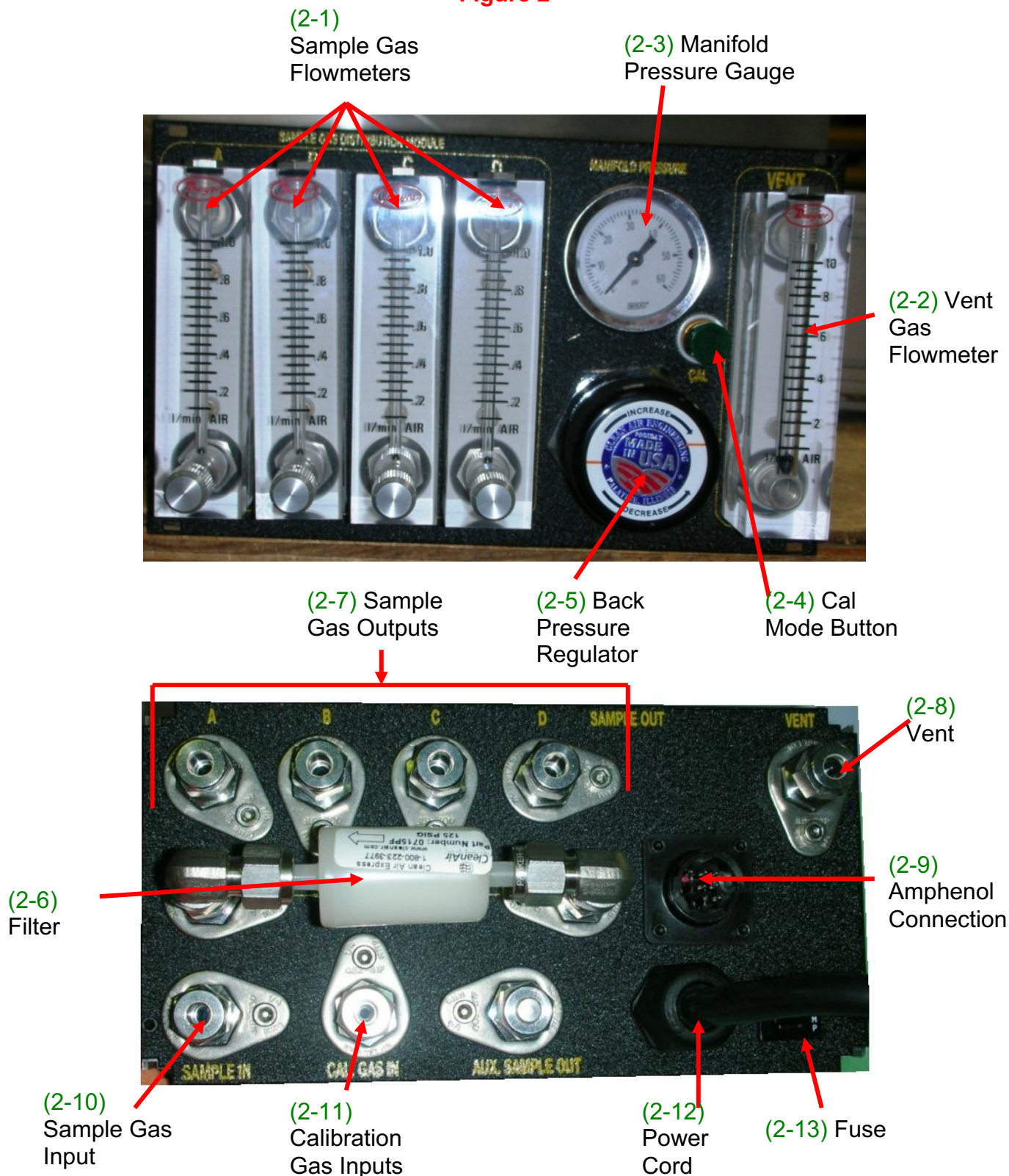
Figure 1b



2.1.2 Sample Gas Distribution Module

See **Figures 2a** and **2b**

Figure 2



2.2 System Operation

2.2.1 Setup

- 1) Connect calibration gases to the five ports labeled “CAL GAS IN” (5).
 - 2) Connect the device to be calibrated (e.g. probe tip) to the port labeled “CAL GAS OUT - A” (6).
 - 3) Connect the “CAL GAS IN” on the SGDM (2-11) to the 5 Channel Calibrator’s “CAL GAS OUT – B” (6)
- NOTE:** The “A” and “B” options on the knob denoted the letters above the “CAL GAS OUT” ports.
- 4) Connect the sample line to the “SAMPLE IN” port on the back of the SGDM (2-10). The sample gas must be clean and dry before it reaches this device. In most cases, a gas conditioner will be necessary to remove moisture.
 - 5) Plug in the devices if you have not already done so.

2.2.2 Calibration

- Probe Tip Calibration
 - 1) Select the desired calibration gas using the calibration gas output selector knob (3).
 - 2) Using the calibration output selector (4) on the 5 Channel Calibrator, select “A.”
 - 3) Using the flow meter on the 5 Channel Calibrator (1), adjust the calibration flow to 1-2 LPM higher than the stack flow rate (in the range of 1-10 liters per minute).
- Analyzer Calibration
 - 1) Select the desired calibration gas using the calibration gas output selector knob (3).
 - 2) Using the calibration output selector (4) on the 5 Channel Calibrator, select “B.”
 - 3) Press the green “CAL MODE” button on the SGDM (2-4).

NOTE: While in CAL Mode, the SGDM will vent any sample gas.

NOTE: While in CAL Mode, the “CAL MODE” button will be lit.

 - 4) Using the flow meter on the 5 Channel Calibrator (1), adjust the calibration flow to the 1-2 LPM higher than the stack flow rate (in the range of 1-10 liters per minute).
 - 5) Using the SGDM’s flowmeters (2-1) adjust the flow of calibration gas to the analyzers.

2.2.3 Sample Gas Distribution

- 1) Cease the flow of any calibration gases. Allow a few seconds for them to vent from the systems if necessary.
- 2) Press the green “CAL MODE” button on the SGDM (2-4) to enter Sample Mode. Be sure that it is NOT lit up.
- 3) Using the SGDM’s flowmeters (2-1) adjust the flow of sample gas to the analyzers.

2.2.4 Control via a Remote Device

- 1) Set the calibration output selector (4) to “A – AUTO”.
- 2) Set the calibration gas output selector knob (3) to “AUTO”.
- 3) Insert the 7 pin Amphenol plug from the remote device into the Amphenol input (9) on the back of the 5 Channel Calibrator.
- 4) Insert the Amphenol from the remote device into the Amphenol input (2-9) of the SGDM.
- 5) Plug in devices if you have not already done so.
- 6) Using the flow meters (1, 2-1), adjust the flow rate.
- 7) The input and output of the system can now be controlled with a remote device.

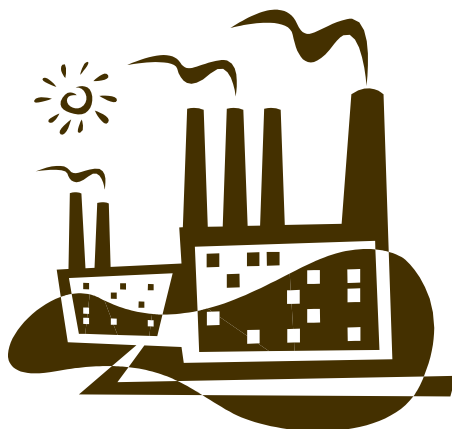
NOTE: The flow rates of the devices cannot be controlled via a remote device. Any changes must be performed manually.

3 Routine Maintenance and Inspection

 **CAUTION!!** – Do NOT disassemble this product! For internal maintenance contact Clean Air Express.

3.1 *Maintenance Issues*

For any other maintenance issues, concerns, or questions, please contact Clean Air Express at (800)-223-3977. Clean Air Express can also be reached by mail at 212 N. Woodwork Lane Palatine, IL 60067; by fax at (847)-991-8924 or on the web at <http://www.cleanair.com/equipment/Express/main.html>



4 Troubleshooting

Problem	Cause(s)	Fix
Stops running	No power	Ensure that the system is plugged in
	Blown fuse	Press the fuse back in
Auto mode does not work correctly	Incorrect configuration	Be sure that the input selector and the output selector are both set to auto and that the Amphenol connection is set.
System is leaking	Nuts and ferrules are too tight or too loose.	Be sure that the nuts and ferrules on the inputs and outputs are not over-tightened or too loose.
	Internal Leakage	Send to Clean Air Express for Maintenance.
Calibration gas is not reaching the correct location	Incorrect Configuration	Be sure that the input selector and the output selector are both set to the correct location.
	Closed Valves	Be sure that the flowmeter valves are opened.

Figure 3

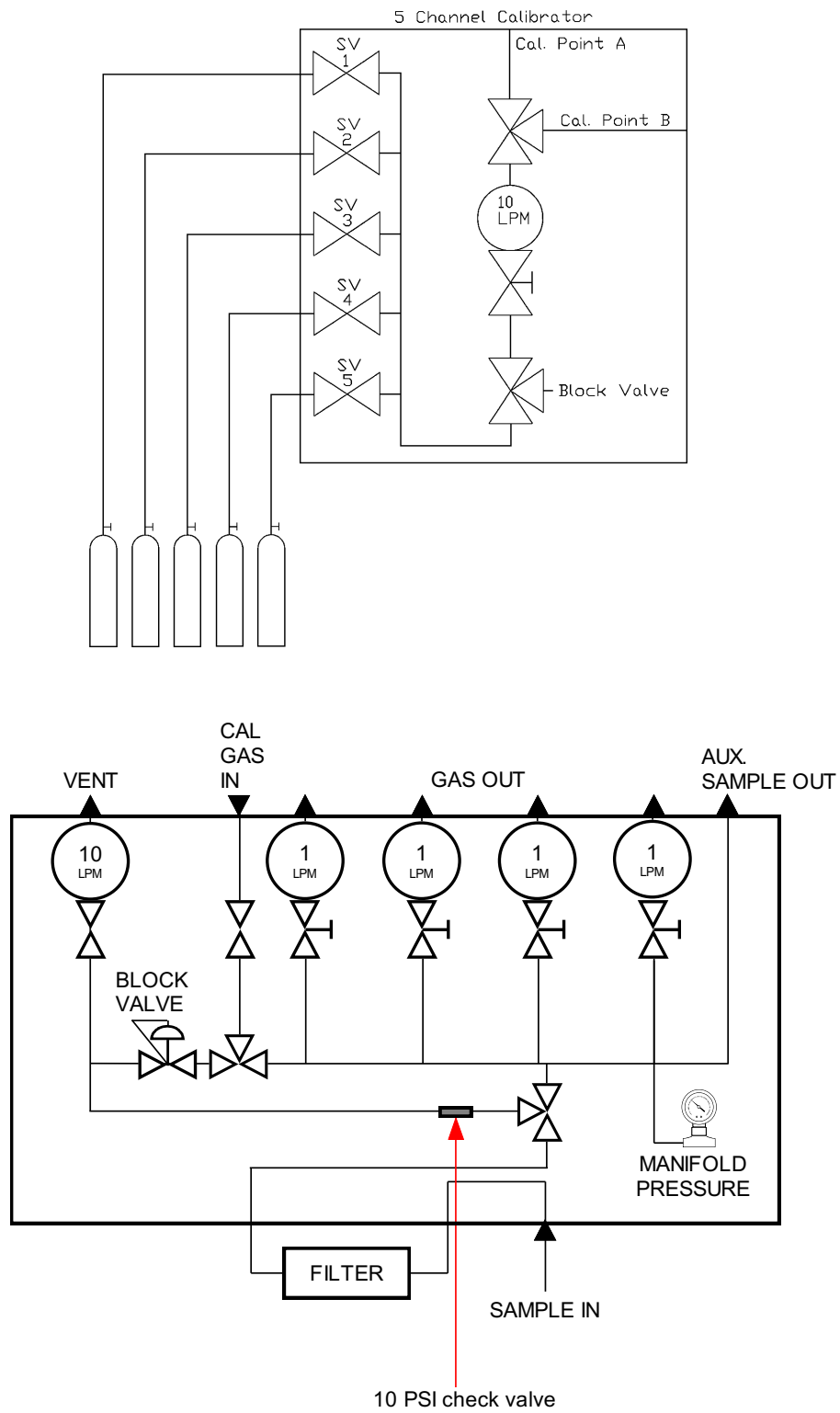
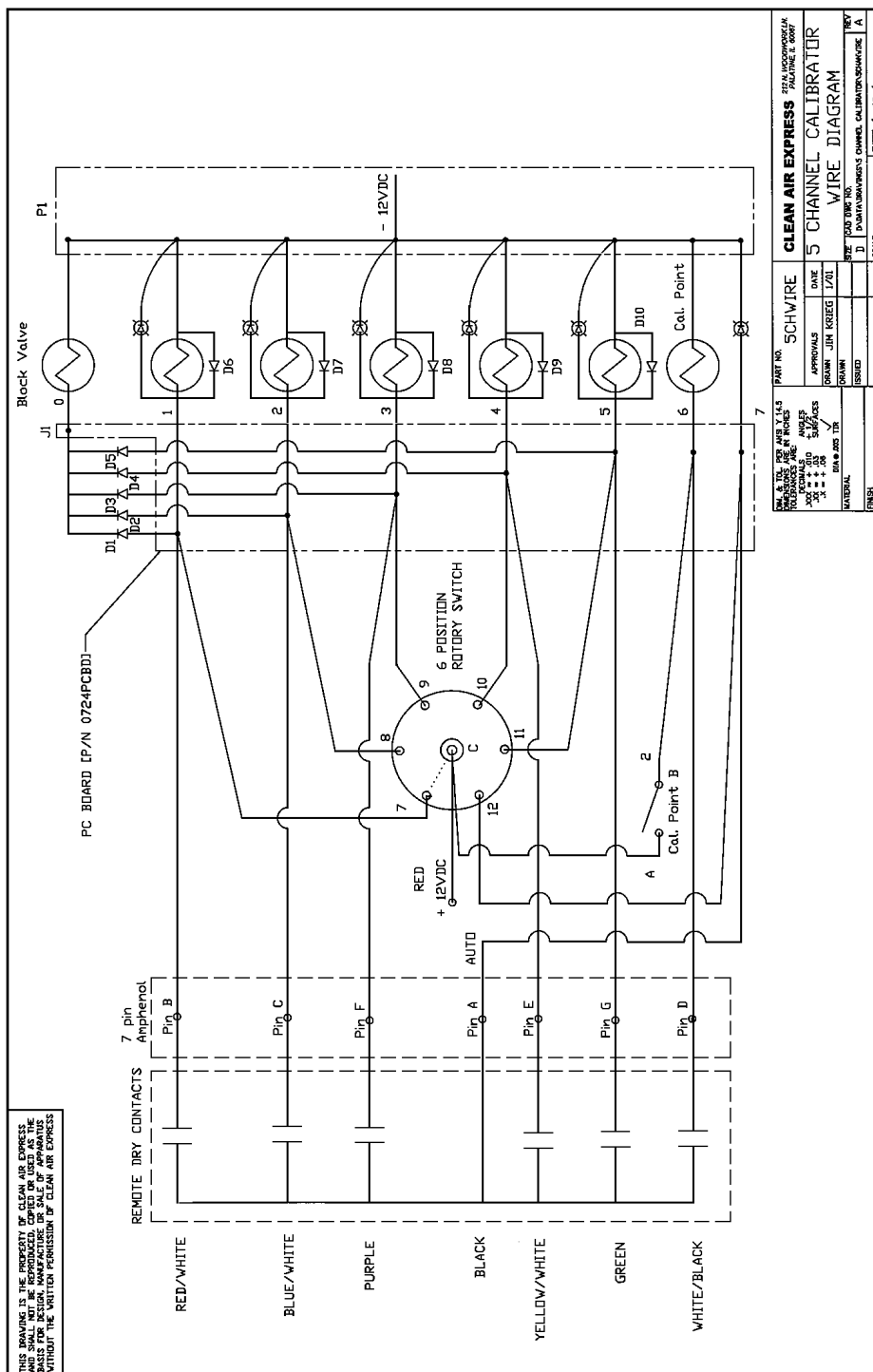


Figure 4



PART NO.		DATE		SCALE	
SCHWIRE		DATE		SCALE	
APPROVALS		DATE		SCALE	
DRAWN		DATE		SCALE	
CHECKED		DATE		SCALE	
TESTED		DATE		SCALE	
MATERIAL		DATE		SCALE	
FINISH		DATE		SCALE	
SHEET 1 OF 1		SHEET 1 OF 1		SHEET 1 OF 1	

Figure 5

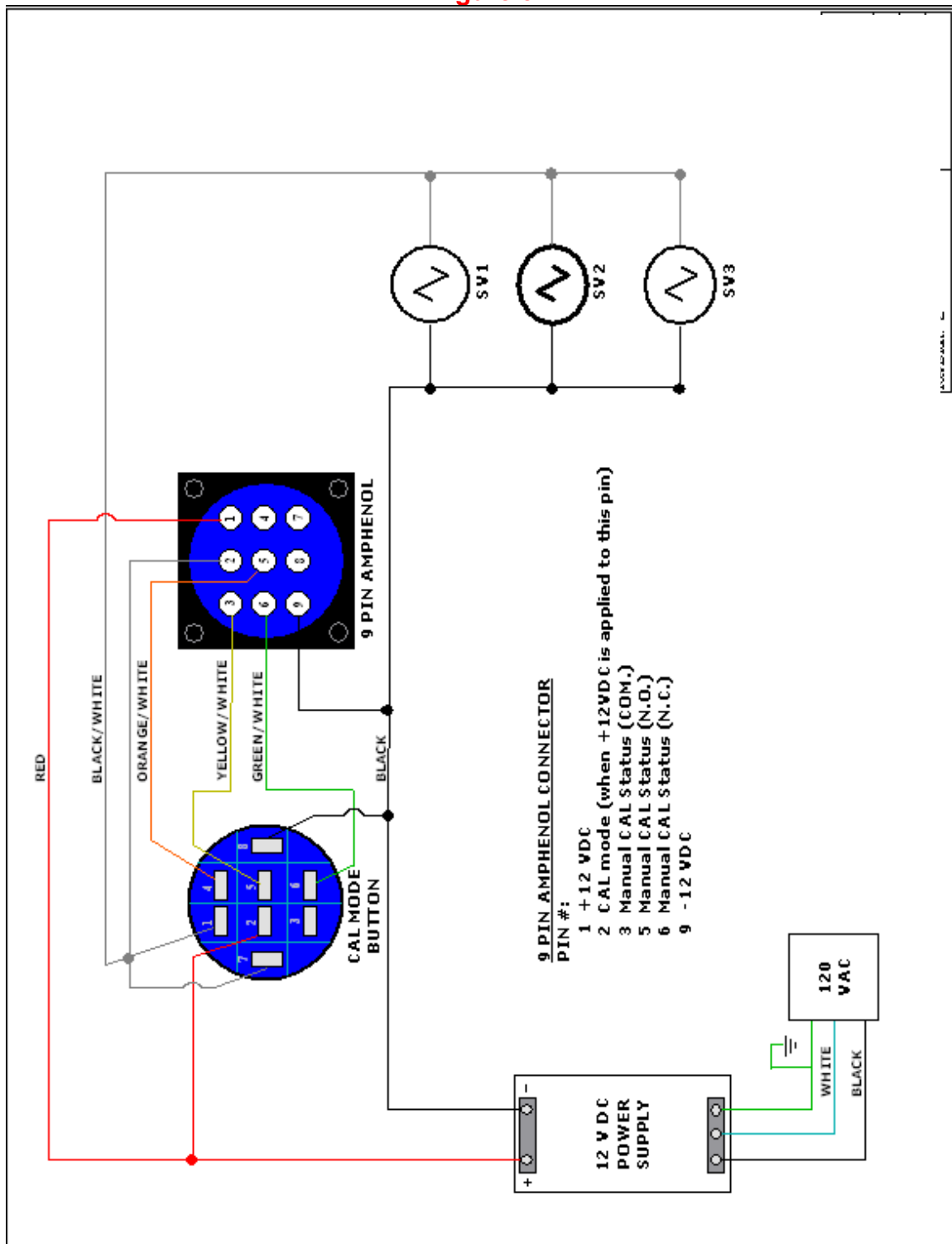


Figure 6



**CLEAN AIR ENGINEERING
PARTS LIST
5 CHANNEL CALIBRATOR**

May 22, 2008

Parent Part #: 0724

Type: F

COMPONENT	DESCRIPTION	QTY	UM	TYPE
0418SBU	BULKHEAD 1/4"T-1/4"T S.S.	7.0	EA	R
9102	6 POSITION ROTARY SWITCH	2.0	EA	R
9735	1/4 WATT PROBE DIODE MOTOROLA	10.0	EA	R
91053	RED INDICATOR LIGHT LEECRAFT	6.0	EA	R
35762	COSEL POWER SUPPLY	1.0	EA	R
9148	PANEL MOUNT FUSE HOLDER	1.0	EA	R
9109	18 GAUGE POWER CORD 7'	1.0	EA	R
9423	7 PIN FEMALE ASSY	1.0	EA	R
9761	SOLENOID 2 WAY 1/16 ORIFICE	5.0	EA	R
	STAINLESS STEEL 12VDC			
9759	SOLENOID 3 WAY UNIVERSAL	2.0	EA	R
	1/16" ORIFICE SS. BODY 12VDC			
92831	1/4"T-1/8"NPT KYNAR MALE	14.0	EA	R
	ELBOW ADAPTER			
92832	1/4" TUBE-1/8" PIPE MALE	3.0	EA	R
	KYNAR CONNECTOR			
9195	KNOB FOR 1/4" SHAFT AUGAT PKG	2.0	EA	R
	50B 1/4			
0073	RITTAL THUMB SCREW	4.0	EA	R
9748	FLOWMETER 1 - 10 LPM VALVED	1.0	EA	R
9291	1/4"X1/4"X1/4" TUBE UNION TEE	4.0	EA	R
	KYNAR			
97064	4 AMP SLO BLOW FUSE	1.0	EA	R
07241	5 CHANNEL CALIBRATOR BACK	1.0	EA	R
	PLATE			
07242	5 CHANNEL CALIBRATOR FRONT	1.0	EA	R
	PLATE			
9110SR	PLASTIC POWER CORD STRAIN	1.0	EA	R
	RELIEF AND NUT - BLACK			
007111	RITTAL 3U SIDE MEMBER 220	2.0	EA	R
	DEEP			
007113	RITTAL PERF. COVER 28HP X	2.0	EA	R
	220 DEEP			
007115	RITTAL COLLAR SCREW / SLEVE	4.0	EA	R
0076	RITTAL PLASTIC GUIDE RAILS	1.0	EA	R
0724PCBD	PC BOARD FOR 5 CH. CALIBRATOR	1.0	EA	R
9445	12 PIN CONNECTOR PC MOUNT	2.0	EA	R
35762B	COSEL OUTPUT HARNESS	1.0	EA	R
35762A	COSEL INPUT HARNESS	1.0	EA	R

CLEAN AIR ENGINEERING
PARTS LIST
SAMPLE GAS DISTRIBUTION MODULE

JUNE 23, 2008

Parent Part #: 9742

Type: F

COMPONENT	DESCRIPTION	QTY	UM	TYPE
0715RET	1/4" T HEX RETAINER	10.0	EA	R
0998	PORT CONNECTOR 1/4" MET	2.0	EA	R
	SAMPLE R - STAINLESS STEEL			
9742FP	SAMPLE GAS DELIVERY MODULE	1.0	EA	R
	FRONT PLATE			
9742RP	SAMPLE GAS DELIVERY MODULE	1.0	EA	R
	REAR PLATE			
99182	CHECK VALVE 10PSI - SS	1.0	EA	R
0418RSMC	UNION MALE 1/4"T-1/8"MNPT SS	5.0	EA	R
35001	SS MALE RUN TEE 5.0 EA R			
0417SMRE	ELBOW MALE 1/4"T-1/8"MNPT SS	5.0	EA	R
0418SME	ELBOW MALE 1/4"T-1/4"MNPT SS	2.0	EA	R
0418SUT	UNION TEE 1/4"T S.S.	3.0	EA	R
0418SBU	BULKHEAD 1/4"T-1/4"T S.S.	10.0	EA	R
9220 1/4"	CAP FITTING WITH NUT AND	1.0	EA	R
	FERRULE			
0418SUE	UNION ELBOW 1/4"T-1/4"T S.S.	2.0	EA	R
0418TF	FERRULE 1/4" PTFE	2.0	EA	R
9149	FUSE CLIP	2.0	EA	R
0715PF	FILTER - DISPOSABLE W/KYNAR	1.0	EA	R
	BODY			
9110SRB	PLASTIC POWER CORD STRAIN RE-	1.0	EA	R
	LEIF (BLACK)			
9109	18 GAUGE POWER CORD 7'	1.0	EA	R
9118	CIRCUIT BREAKER 5AMP 250 VOLT	1.0	EA	R
35762	COSEL POWER SUPPLY	1.0	EA	R
35762A	COSEL INPUT HARNESS	1.0	EA	R
35762B	COSEL OUTPUT HARNESS	1.0	EA	R
94271	STANDARD PLUG 9 PIN SIZE 13	1.0	EA	R
94272	CABLE CLAMP SIZE 13	1.0	EA	R
94273	STANDARD SQUARE FLANGE SIZE	1.0	EA	R
	13 RECEPTICLE 9 CONTACT			
9761	SOLENOID 2 WAY 1/16 ORIFICE	1.0	EA	R
	STAINLESS STEEL 12VDC			
9759	SOLENOID 3 WAY UNIVERSAL 1/16"	2.0	EA	R
9765	REGULATOR BACK PSI	1.0	EA	R
9746	FLOWMETER .15-1 LPM VALVED	4.0	EA	R
9748	FLOWMETER 1 - 10 LPM VALVED	1.0	EA	R
9750	PRESSURE GAUGE 0 - 60 PSI	1.0	EA	R
	PANEL MOUNT			
007111	RITTAL 3U SIDE MEMBER 220 DP	2.0	EA	R

CLEAN AIR ENGINEERING
 PARTS LIST
 SAMPLE GAS DISTRIBUTION MODULE

JUNE 23, 2008

Parent Part #: 9742

Type: F

COMPONENT	DESCRIPTION	QTY	UM	TYPE
-----	-----	-----	-----	-----
007114	RITTAL PERF. COVER 42HP X 220 DEEP	2.0	EA	R
0769250	PTFE TUBING 1/4"OD./1.125"ID. 100FT CONT. LGTH. COIL (PTFE)	6.0	FT	R
8906	KNOB 1/8" SHAFT	5.0	EA	R
0418RSFC	CONNECTOR 1/4"T-1/8"FNPT S.S.	1.0	EA	R
9434M	AMP PIN PART# 66103-2	6.0	EA	R

Our Guarantee

Clean Air Engineering warrants products to be free from defects and workmanship for a period of one year after delivery date. The remedy for defective goods shall be repair or replacement of defective parts or payment price of the goods for which damages are claimed, at Clean Air Engineering's option.

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