Baldwin™-Series
Model 3300 / 3300P
Flow Control Drawer

User's Manual

PERMA PURE LLC
A HALMA COMPANY
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Unpacking

Perma Pure has made every effort to ship you a high quality product that has been thoroughly inspected and tested. It has been carefully packed to ensure that it arrives at your facility in good condition. Even though every effort has been made to prevent damage during the transportation process, damage can occur by the carrier. This is out of control of Perma Pure and is the responsibility of the carrier to ensure that your equipment arrives intact and undamaged.

- Inspect outside packaging. If there is any visible damage, inform the carrier at the time of deliver. ***This inspection is important! Once the package is signed for, responsibility for any visible damage then transfers to the consignee.***

- Unpack your equipment. Visually inspect the outside of your equipment for any damage. If there is any damage, ***contact the carrier immediately***. Generally, a carrier must be notified within 24 hours of the delivery to make a hidden damage claim.

Items in the carton include:

(1) Model 3300 Flow Control Drawer

(1) User's Manual

If any of the above parts are missing or damaged, call the helpline at **(800) 337-3762 ext-145**.

Introduction

Thank you for purchasing this product from Perma Pure LLC. This manual has been assembled so that it can answer all questions regarding operation. Please keep the operators manual near the equipment for future reference. There may also be optional equipment available that was not ordered at the time of original purchase, which may be described and/or illustrated in this manual.

If you still have any questions regarding your equipment's operation, available options or technical support, please contact your purchasing dealer or contact Perma Pure directly.

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This equipment is to be installed and operated by trained personnel, with sufficient command of the English language to clearly understand the instructions and safety warnings.

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General description

The Baldwin™-Series Model 3300 Flow Control Drawer allows easy control of sample and calibration gases. With the Model 3300, you may choose whether to control sample gases, cal gases, and stack probe blowback, manually or by PLC.

The standard Model 3300 is configured for two gas channels, and two calibration gases (zero and span). Manual control switches are provided for selection of system or direct calibration. Four flow meters are included for visual indication & control of stack calibration gas flow, individual analyzer flow, and bypass.

Model 3300 has a provision for system bias checks. System integrity is verified by comparing the calibration gas flow to the stack filter head and through the entire sample system to the calibration gas introduced directly to the continuous gas analyzer common sample manifold. This check indicates problems such as system leakage and gas component loss.

Features:

- Manual or PLC control of sample & calibration gases
- Up to 6 gas analyzer channels
- Up to 8 cal gas channels (including zero and span)
- Multiple flow meters: cal gas to probe, total flow to analyzers, individual analyzer channels
- Pump vacuum gauge
- Sample / cal gas pressure gauge
- Cal gas regulator
- Optional pressure transmitters, Model 3300P

The Model 3300 Flow Control Drawer is a 19" Rack Mountable integrated gas flow control system for monitoring and controlling of:

1. Total Extracted Sample Flow
2. Individual Analyzer Sample Flow
3. Bypass Flow Control
4. Calibration Gas Pressure Regulation & Flow
5. Bias Check (Sample Loss Due to Leaks or Gas Absorption)
6. Calibration Gas Leak Detection
7. Stack Probe Blowback

Physical description

- Dimensions: 5U (8.75"), 19" Rack Mount, 18" depth
- Weight: 24 lbs (10.9 kg)

Specifications

Input cal-gas channels (maximum of 14)	
Sample	5-15 psig
Vacuum	0-30 in. Hg.
Calibration	5-35 psig
Output gas channels (maximum of 6)	0-2.5 lpm
Blowback	Specify 12 VDC, line voltage or dry contact
Electrical requirements	90-240 VAC, 50/60 Hz; 100 watts

Connections

(refer to Appendix A3 for back panel drawing)

1. All Sample Gas Connections are via 1/4" stainless steel bulkhead fittings.
2. All Calibration Gases are 1/4" SS Tube Quick Connects.
3. All Bulkhead Connections are labeled and follow the following functions:

Sample In ---------- (SAMPLE)
Sample Vacuum Sense In ---------- (VACUUM)
Calibration Gas Out to Stack Filter Assembly -------- (STACK)
Analyzer #1 ---------- (CH1)
Analyzer #2 ---------- (CH2)
Analyzer #3 ---------- (CH3)
Analyzer #4 ---------- (CH4)
Analyzer #5 ---------- (CH5)
Analyzer #6 ---------- (CH6)
Calibration Gas #1-14---------- (CG1-8)

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Important Safety Warnings

Please be sure to review the following basic safety procedures. These procedures represent the MINIMUM requirements to operate the equipment safely. It is the ultimate responsibility of the operator to ensure proper safety practices are utilized at the point of operation.

- **NEVER** attempt to operate this equipment in an explosive or otherwise hazardous area.
- **NEVER** exceed any specified rating for the equipment. Voltage, temperature and pressure ratings must be closely observed and not exceeded. Voltage rating of the equipment **MUST** match the rating on the data label. Please make sure that it matches before powering up the equipment.
- This equipment is **NOT** designed to be used in an explosive environment.
- This equipment is **NOT** designed to operate in a wet environment.
- **Sample gas is potentially dangerous**. A leak test is recommended at initial startup and as often as necessary to maintain a safe working environment around the equipment. The gas stream exhaust must exit away from all personnel to prevent dangerous exposure.
- **NEVER operate the equipment with any part of the enclosure unsecured**. All operated doors and covers must be in place and secured prior to operation. Electrical current may be present behind covers or doors, even if tools are not necessary to access these components.
- **NEVER** attempt service on this equipment without first disconnecting all energy sources. Repair of this equipment should only be done by properly trained personnel that are familiar with the potential risks involved with servicing of the equipment.
- **NEVER** replace fuses with types other then the sample specification of type and current. Do not bypass this or any other safety device.
- **NEVER** operate this equipment if it is visibly damaged or the possibility exists that it may have been damaged.
- The use of components that have not been purchased through an authorized Perma Pure dealer or directly from Perma Pure may compromise the safety of the operator. Additionally, use of non-authorized components may change the operating characteristics of this equipment. Any changes to the equipment, that modify its operation in any way, are dangerous, and are strictly prohibited.
- Read the entire operating manual before attempting to set up or operate the equipment.
- Please heed all warning labels that are on the equipment. They are there to remind you of possible hazardous conditions.
- Verify the integrity of any mechanical and/or electrical connections that are made to the unit.
    - Verify that the unit is connected to the proper rated power for the system
    - Verify that the unit is plumbed properly to operate effectively

Operation

A sample conditioning system supplies a clean, dry sample to the back panel of the Model 3300 Flow Control Drawer. The stack probe filter and sample pump performance are indicated by the Flow Control Drawer Vacuum/Pressure Gauges.

Note: Please refer to the attached Model 3300 Flow Diagram for an example of an integrated continuous emissions monitoring system flow schematic using the Model 3300 Flow Control Drawer.

Flow from the conditioning system enters the Model 3300 Flow Drawer sample/calibration manifold. Here, either sample or calibration gas (for direct calibration) can be directed to the atmospheric pressure sample manifold and then on to the individual analyzer gas channels. Individual sample flowmeters indicate the flow rate of each gas channel. A bypass flowmeter vents excess sample gas not used by the continuous gas channels and also acts as an atmospheric vent.

The Model 3300 Flow Control Drawer has the ability to switch the sample and as many as eight (8) calibration gases to the analyzer rack directly or via the total sampling system. This is done through two (2) sets of solenoid valves: (1) the calibration gas solenoid valves which are mounted on a common manifold at the rear of the drawer, and (2) the system/direct solenoid valves located in the front of the drawer. A block & bleed solenoid valve, which prevents the manifolds from being pressurized during sampling, is also part of the system/direct solenoid valve set.

The calibration function will only take place when both a calibration gas solenoid valve and either the system solenoid valve or direct solenoid valve have been selected. In Local mode, the calibration gas solenoid valves are cascaded, that is if there are more than one (1) calibration gas solenoid valve switches in the on position, only the highest numerical calibration gas solenoid valve will be active. This is not the case with computer control. The programmer can select any or all of the calibration gas solenoids. Also, computer control is not allowed in the Local mode. While in the Local/Direct Calibration mode, manual blowback is allowed, but not while in the Local/System Calibration mode. While under computer control, blowback is allowed when nothing else is activated, but not in any Calibration mode.

The Model 3300 has a provision for system bias checks. System integrity is verified by comparison of calibration gas flow through the stack filter assembly to calibration gas flow directly to the gas analyzers. This check indicates problems such as system leakage and gas component loss.

A probe filter blowback relay contact is provided on the Flow Control Drawer to facilitate Manual or computer initiated blowback. For Blowback there is a 250V, 6Amp dry contact form C relay output provided on the back panel for blowback implementation. There are two (2) vertical terminal block assemblies on the back panel provided for computer interface. The 16-point terminal block is used for computer control and the 40- point terminal block is used for computer verification of flow control drawer operation.

Pressure Sensor Board Option

Upstream, (stack filter/and sample line) the pressure drop is actively monitored by a vacuum transmitter, the sample gas flow is verified by a sample manifold pressure transmitter and presence of adequate calibration gas is verified by a pressure transmitter on the calibration gas manifold.

Local Mode Operation

To enter the Local mode, toggle the Remote/Local switch to the right. While in the Local mode, the operator can perform manual calibrations and blowback.

The flow control drawer is in Local Control when the Local Switch is selected, the red LED is on and the green Sample LED is on as well. In this mode, all switches on the front panel are enabled for local operator control and Computer Control is disabled. All Calibration Gas (CG) functions, Direct/System, and blowback are available for the local operator. When the Local LED is OFF, the PC or PLC has control and can remotely duplicate local control functions. The Local Switch provides an output to the PLC/PC to indicate that the Flow Control Drawer is offline, (i.e., the analyzers' outputs are not reliable).

CONTROL FUNCTIONS:

Switches	Sample	Blowback	Direct Calibration	System Calibration
Local		X	X	X
Direct			X	
System				X
Blowback		X		
Cal Gas 1-8			X	X

Manual System Calibration: To perform manual system calibration, toggle the Direct/System switch to the right. Then toggle any of the Calibration Gas switches to the right. This will allow the selected calibration gas to flow to the analyzer suite via the total sampling system. In this mode, manual blowback is not allowed.

Manual Direct Calibration: To perform manual direct calibration, toggle the Direct/System switch to the left. Then toggle any of the Calibration Gas switches to the right. This will allow the selected calibration gas to flow to the analyzer suite directly, bypassing the total sampling system. In this mode, manual blowback is allowed.

Manual Blowback: To perform manual blowback, depress the Blowback switch to the right. This switch is a momentary switch, that is, it will return when released. When the operator toggles the Blowback switch, two things happen; first, the blowback relay will be activated, and second, the direct solenoid valve will be activated. With the direct solenoid valve activated, the analyzer suite will be protected from blowback pressurization.

Computer Control Mode Operation

Computer Control (CC): To enter Computer Control mode operation the Remote/Local switch must be toggled to the left. Computer control is initiated through the 16 Position vertical terminal block on the back panel. To activate a particular function, 5VDC is applied to the appropriate terminal. The Remote and Local functions are identical. This can be done in one of two ways. The first way is to take the +5 VDC from terminal 10 or 12, pass it through a set of dry contacts on a computer controlled relay, and back to the appropriate terminal. The second way is to take +5VDC directly from the computer control to the appropriate terminal. For this method, please note that the flow control drawer GND on Terminal 14 and 16 must be connected to the GND on the computer control unit, to electrically reference both systems together.

Computer Control Terminals Summary

Terminal 2	=	System Calibration	Terminal 1 = Cal Gas 1
Terminal 4	=	Direct Calibration	Terminal 3 = Cal Gas 2
Terminal 6	=	Blowback	Terminal 5 = Cal Gas 3
Terminal 8	=	NA	Terminal 7 = Cal Gas 4
Terminal 10	=	+5 VDC	Terminal 9 = Cal Gas 5
Terminal 12	=	+5 VDC	Terminal 11 = Cal Gas 6
Terminal 14	=	GND	Terminal 13 = Cal Gas 7
Terminal 16	=	GND	Terminal 15 = Cal Gas 8

Computer Sense CS: Along with the computer control mode of operation, a computer verification method is also incorporated into the system. A 40 pin vertical terminal block on the back panel allows the computer to verify the actions initiated by the computer. This is done through a set of normally open dry contacts that are associated with each particular function.

Computer Sense Terminals Summary

FUNCTION	TERMINALS
Cal Gas Valve 1	1 & 2
Cal Gas Valve 2	3 & 4
Cal Gas Valve 3	5 & 6
Cal Gas Valve 4	7 & 8
Cal Gas Valve 5	9 & 10
Cal Gas Valve 6	11 & 12
Cal Gas Valve 7	13 & 14
Cal Gas Valve 8	15 & 16
System Calibration	17 & 18
Direct Calibration	19 & 20
Blowback*	31 & 32
Local Mode*	39 & 40

*Note: The sense contacts are normally closed when activated except for blowback

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COMPUTER CONTROL TRUTH TABLE

Terminal #	2	4	1	3	5	7	9	11	13	15	6
FUNCTION											D
System/Calibration 1	*		*								D
System/Calibration 2	*			*							D
System/Calibration 3	*				*						D
System/Calibration 4	*					*					D
System/Calibration 5	*						*				D
System/Calibration 6	*							*			D
System/Calibration 7	*								*		D
System/Calibration 8	*									*	D
Direct/Calibration 1		*	*								
Direct/Calibration 2		*		*							
Direct/Calibration 3		*			*						
Direct/Calibration 4		*				*					
Direct/Calibration 5		*					*				
Direct/Calibration 6		*						*			
Direct/Calibration 7		*							*		
Direct/Calibration 8		*								*	
Blowback											*

D = Disabled

Pressure Sensor (Model 3300P)

The pressure sensor option provides:

- Vacuum pressure sensor 0- (-15) psig
- Sample pressure sensor 0-30 psig
- Calibration gas pressure sensor 0-30 psig

Outputs

1. The standard output from all sensors is 4-20 mADC, isolated, loop powered 1

2. Outputs are terminated on the Flow Control Drawer back panel on the analog output Pressure Transducer Terminal Strip.

Connections

	24 VDC Supply	4 to 20mA Output
Vacuum	Pin 1	Pin 2
Sample	Pin 7	Pin 8
Calibration gas	Pin 9	Pin 10

Sensor Calibration

1. All sensors are calibrated at the factory, and should not be adjusted in the field without proper calibration pressure sources.

Troubleshooting and Maintenance Guide

Symptom	Diagnostic	Fix
No LED display	Not plugged in	Plug in instrument
	Power switch is off	Turn on power
	Fuse blown	Replace fuse
	Power supply defect 12 VDC red-black	Replace power supply
	Check jumper JP1	Jumper 1-2; 3-4; 5-6
	Ribbon cable loose Defective control board	Tighten ribbon cables Replace control board
Manual Control (Local)		
Switches have no effect	Remote/Local switch in remote	Select local
Inadequate sample flow	Low sample pressure	Adjust sample pressure Cylinder to 15 psig
No system cal gas flow	No cal gas from bottle Cal gas solenoid not operating	Check cabling Replace cal gas solenoid Replace control board
	Flow drawer regulator set <10psig Cal gas Flowmeter closed Block/bleed solenoid constantly vents System cal gas solenoid valve defective	Set regulator to 10 psig Adjust Flowmeter Replace solenoid SV9 Replace solenoid SV10
No direct cal gas flow	Direct cal gas solenoid valve defective	Replace solenoid SV11 Check cables and connector boards for good connections
Computer Control (Remote)		
Computer control has no effect	Remote/Local switch in local Computer control wiring to terminal block is wrong	Select remote
No computer sense	Ribbon cable is loose Defective control board Computer sense wiring to terminal block is wrong	Check cables. Replace control board See computer control wiring section in manual
	Ribbon cable is loose	Check cables

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Replacement parts

4D-3300

Part No.	Description
2FTS-021	Cal-Gas connector
3DCB-006	Circuit board: switch board, FCD
2FIV-003	Flow meter: 0.1 - 10 LPM w/valve
2FIN-002	Flow meter: 0.1 - 10 LPM no valve
2FIV-005	Flow meter: 0.2 - 2.5 LPM w/valve
1PSD-032	Power supply: 100W, 12VDC
2GAP-006	Pressure gauge: 2-1/2" dia. Face
2RPF-005	Pressure regulator: 0 - 30 psig, aluminum
2VSB-001	2-way solenoid valve, 12 VDC
2VSB-002	3-way solenoid valve, 12 VDC
2FTS-021	Cal-Gas connector
3DCB-006	Circuit board: switch board, FCD

4D-3300P

2FTS-021	Cal-Gas connector
3DCB-006	Circuit board: switch board, FCD
2FIV-003	Flow meter: 0.1 - 10 LPM w/valve
2FIN-002	Flow meter: 0.1 - 10 LPM no valve
2FIV-005	Flow meter: 0.2 - 2.5 LPM w/valve
1PSD-032	Power supply: 100W, 12VDC
2GAP-006	Pressure gauge: 2-1/2" dia. Face
2RPF-005	Pressure regulator: 0 - 30 psig, aluminum
2VSB-001	2-way solenoid valve, 12 VDC
2VSB-002	3-way solenoid valve, 12 VDC
2FTS-021	Cal-Gas connector
3DCB-006	Circuit board: switch board, FCD
2FIV-003	Flow meter: 0.1 - 10 LPM w/valve

Appendix A: Flow Control Drawer Drawings

A1: Panel drawing
A2: Flow schematic

REVN	DATE	DESCRIPTION	DRAWN	APPROVED
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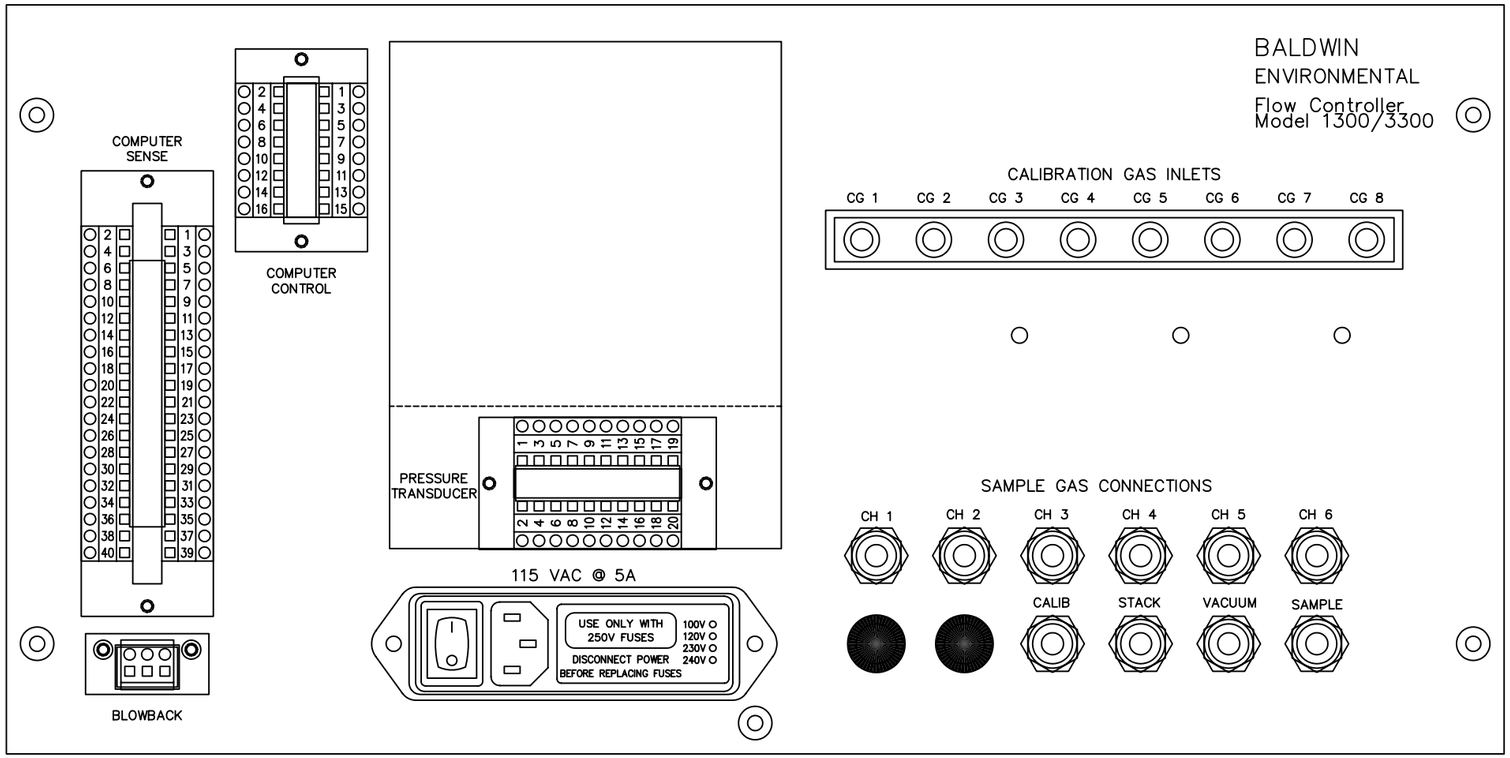

BACKPANEL TERMINAL CONNECTIONS:

COMPUTER SENSE TERMINALS:
DRY CONTACTS

TERMINAL PAIR	FUNCTION	
1,2	CAL GAS VALVE CG1	
3,4	CAL GAS VALVE CG2	
5,6	CAL GAS VALVE CG3	
7,8	CAL GAS VALVE CG4	
9,10	CAL GAS VALVE CG5	
11,12	CAL GAS VALVE CG6	
13,14	CAL GAS VALVE CG7	
15,16	CAL GAS VALVE CG8	
17,18	SYSTEM CALIBRATION	
19,20	DIRECT CALIBRATION	
31,32	BLOW BACK	NORMALLY CLOSED
39,40	LOCAL MODE	NORMALLY CLOSED

COMPUTER CONTROL TERMINALS:
Activated by +5vdc

TERMINAL	FUNCTION
1	CAL GAS VALVE CG1
2	SYSTEM CALIBRATION
3	CAL GAS VALVE CG2
4	DIRECT CALIBRATION
5	CAL GAS VALVE CG3
6	BLOWBACK
7	CAL GAS VALVE CG4
8	NA
9	CAL GAS VALVE CG5
10	+5 VDC
11	CAL GAS VALVE CG6
12	+5 VDC
13	CAL GAS VALVE CG7
14	GROUND GND
15	CAL GAS VALVE CG8
16	GROUND GND

NOTE: The +5vdc used to activate computer control functions may be taken from terminals 10 & 12 and run through dry contacts on a PLC and back to the desired function terminal. Or, the +5vdc may be supplied by the PLC directly if the PLC ground reference is tied together with the ground reference found on terminals 14 & 16. Note that these ground references are NOT earth ground.

BLOWBACK
LINE POWER OPTION
L, N, G
12 VDC OPTION
+, −, EARTH GROUND
DRY CONTACT
NO, COM, NC

PRESSURE TRANSDUCER TERMINALS:

PRESSURE OUTPUTS:

PS1: 0−(−15PSIG) VACUUM
PS4: 0−30PSIG SAMPLE PRESS
PS5: 0−30PSIG CAL GAS PRESS

CURRENT OUTPUTS: 4−20 mAdc
Odd numbered terminals are +24vdc inputs. Even numbered terminals are 4−20 mA outputs.

TERMINALS: 1+; 2−
TERMINALS: 7+, 8−
TERMINALS: 9+; 10−

LOOP POWERED CURRENT OUTPUTS, REQUIRES EXTERNAL +24VDC FROM REMOTE READOUT DEVICE

ITEM	QTY	DESCRIPTION	MANUF.
USED FOR:		MODEL NUMBER: 3300	
		DESCRIPTION: Flow Control Drawer Back Panel	

UNLESS OTHERWISE SPECIFIED
SURFACE FINISHES 125
TOLERANCE DECIMALS
2 PLACE = ± .02
3 PLACE = ± .010
ANGLES = ± .5°
HOLES =
CONCENTRICITY .005TI R
INSIDE CORNERS .031R MAX
REMOVE BURRS BREAK EDGES TO .005 MIN. − .020 MAX.

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DRAWN BY: DWM DATE 8/4/99
APP'D: DATE
MATERIAL
FINISH
DESIGN DIMENSIONS ARE IN INCHES
( ) DENOTES MILLIMETER EQUIVALENTS WHEN USED

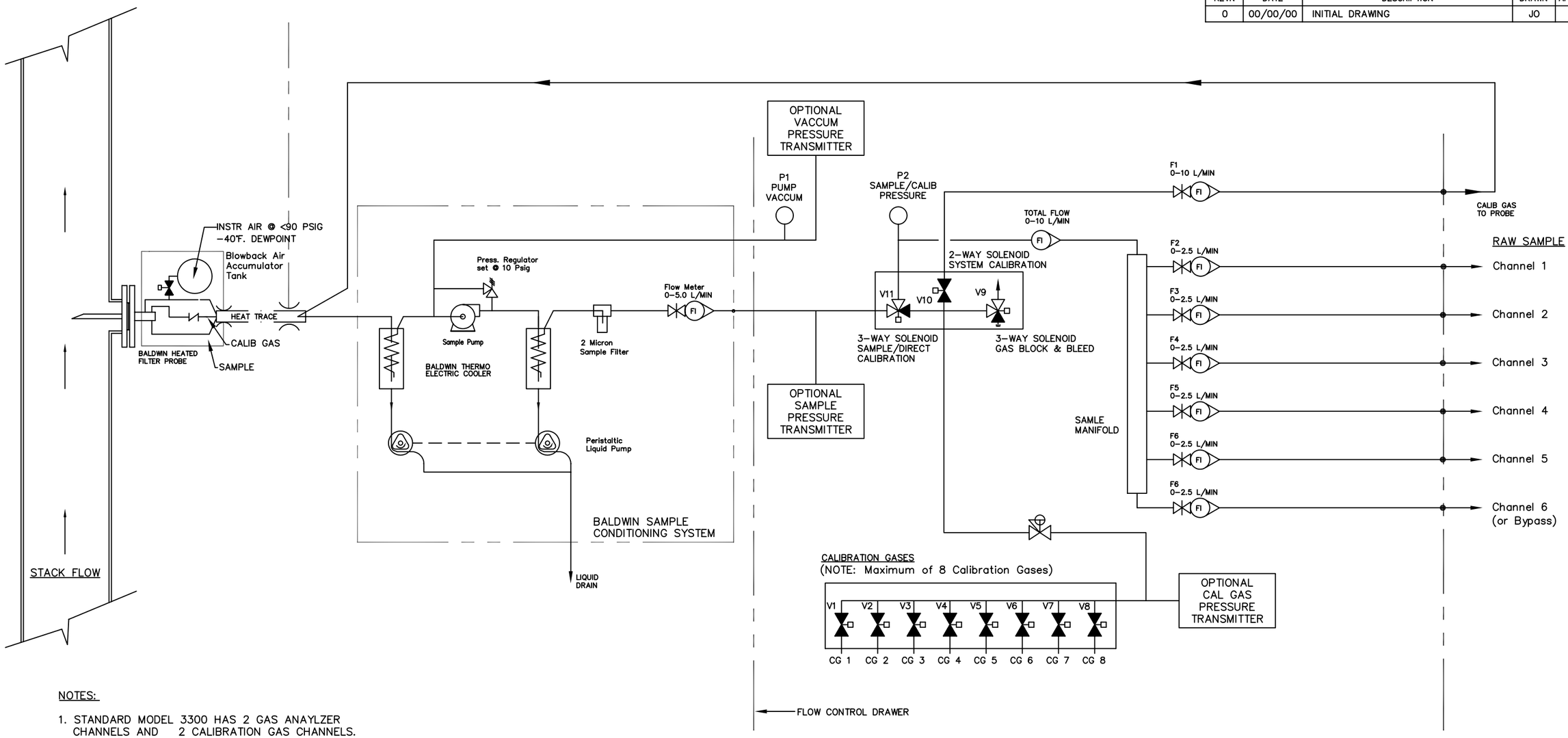
BALDWIN ENVIRONMENTAL, INC.

PART DESCRIPTION
Flow Control Drawer Back Panel

SIZE	SCALE:	DRAWING/PART NO.:
B	1/1	3300REAR

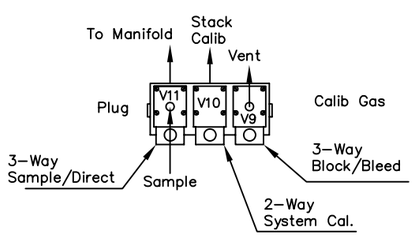
CAD DIR: S:\DRAW\ SHEET 1 OF 1

REVN	DATE	DESCRIPTION	DRAWN	APPROVED
0	00/00/00	INITIAL DRAWING	JO	



NOTES:

1. STANDARD MODEL 3300 HAS 2 GAS ANAYLZER CHANNELS AND 2 CALIBRATION GAS CHANNELS.



ITEM	QTY	DESCRIPTION	MANUF.

USED FOR: MODEL NUMBER:
DESCRIPTION: MODEL 3300 FLOW CONTROL DRAWER

UNLESS OTHERWISE SPECIFIED
TOLERANCE DECIMALS
1 PLACE = ±.02
2 PLACE = ±.02
3 PLACE = ±.010
SURFACE FINISHES 125
ANGLES = ±5°
HOLES = +.003/−.001
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BALDWIN, INC.

DRAWN BY: JO DATE 06/19/02
APP'D: DATE
MATERIAL
FINISH
DESIGN DIMENSIONS ARE IN INCHES
( ) DENOTES MILLIMETER EQUIVALENTS WHEN USED

BALDWIN, INC.

PART DESCRIPTION: MODEL 3300 FLOW DIAGRAM
SIZE: B | SCALE: NTS | DRAWING/PART NO.: 3300 FLOW
CAD DIR: S:\S&M\DWGS\FLOW CONTROL DRAWER | SHEET 1 OF 1

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Appendix B: Warranty and Disclaimer

Perma Pure LLC

Perma Pure (Seller) warrants that product supplied hereunder shall, at the time of delivery to Buyer, conform to the published specifications of Seller and be free from defects in material and workmanship under normal use and service. Seller's sole obligation and liability under this warranty is limited to the repair or replacement at its factory, at Seller's option, of any such product which proves defective within one year after the date of original shipment from seller's factory (or for a normal usable lifetime if the product is a disposable or expendable item) and is found to be defective in material or workmanship by Seller's inspection.

Buyer agrees that (1) any technical advice, information, suggestions, or recommendations given to Buyer by Seller or any representative of Seller with respect to the product or the suitability or desirability of the product for an particular use or application are based solely on the general knowledge of Seller, are intended for information guidance only, and do not constitute any representation or warranty by Seller that the product shall in fact be suitable or desirable for any particular use or application; (2) Buyer takes sole responsibility for the use and applications to which the product is put and Buyer shall conduct all testing and analysis necessary to validate the use and application to which Buyer puts the product for which Buyer may recommend the use or application of the product by others; and (3) the characteristics, specifications, and/or properties of the product may be affected by the processing, treatment, handling, and/or manufacturing of the product by Buyer or others and Seller takes no responsibility for he nature or consequence of such operations or as to the suitability of the product for the purposes intended to be used by Buyer or others after being subjected to such operations.

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