Application Note 25

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-Space Chamber Setup



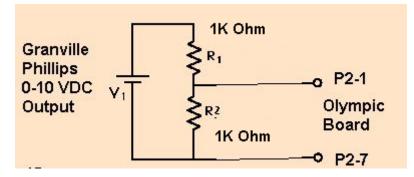
Overview

The Synergy Controller supports Space Chamber applications with Granville Philips ION Vacuum gauges. This application note explains the setup procedure and provides examples for these installations.

Note that this application note is based on controller software 2.7.9 and may not apply for all previous versions. Consult the factory for upgrade information.

CAUTION! : The Analog inputs on the controller will be damaged if the 10 V transducer output is attached without a voltage divider.

1. Wire the Granville Philips 10 Volt output thru a 2:1 voltage divider as shown below. (Analog inputs 2, 3 or 4 may also used) Note: 1K/1K ohm resistor divider must be used. A precision 1% metal film resistor suitable for this application is the Panasonic ERO-S2PHF1001 available from Digikey.



Signal	Olympic Board Connector-Pin	Reference
Analog Input 1	P2-1	P2-7
Analog Input 2	P2-5	P2-7
Analog Input 3	P2-6	P2-7
Analog Input 4	P2-11	P2-7

2. Install Software version 2.4.81 or higher.

3. Select the chamber setup for Temperature Pressure as shown below and reboot as instructed.

SETUP/Chamber Setup/ Select Generic Temperature, Pressure

Setup Screen	ALARM
Chamber Setup	
Chamber Type:	
Synergy Temperature, Pressure	TP248d.CDF
Chamber Description	
Synergy Temperature, Pressure	TP248d.CDF
Alarm, Internal Comm	Change

4. Setup the Hi Res input calibration for the input used as shown below.

SETUP\Calibration\Input\Hi Res\Analog 1 (P2-1 to P2-7)

Set High Eng. Scale to 10 Volts Set Low Eng. Scale to 0 Volts Set High Volts Scale to 5 Volts Set Low Volts Scale to 0 Volts

Set	up Screen	ALARM	
eack	\Calibration\Input\High Res\Analog 1\		
Raw Ca	alibration (m,b)	100.00, 0	
High Eng. Scale		10.00	
Low En	ig. Scale	0.00	
High Vo	olts Scale	5.000	
Low Vo	its Scale	0.000	•
	D	escription	
Chang	Help is not available f	for this item.	
Alarm, C	H2 Low	467.3C 0.0 9	%

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Setup the Type to "Other" as shown below. Selecting a Temperature or Vaisala type would obviously be inappropriate and would create erroneous readings.

Setup Screen		
	\High Res\Analog 1\	
High Eng. Scale	10.00	٦
Low Eng. Scale	0.00	
High Volts Scale 5.000		
Low Volts Scale	0.000	
Туре	Other	
	Description	
Change		
Alarm, CH2 Low	467.3C 0.0 %	

Set	up Screen	11:36:53 PM
e Back	\Calibration\Input\High Res\Analog 1\Type Available Options	
Vsla-An Vsla-An Vsla-Ch Vsla-Ch Vsla-Ch Vsla-Ch Other	4 1 2 3	
Steady 9	Accept	Cancel 467.3C 47.2 %

4. Select the channel sensor

SETUP\Calibration\Calibration Channel 2

Select Analog 1 for sensor (CH2 Sensor Select code 130)

Setup Screen	ALARI	м
Back Calibration\Calibration	n Channel 2\	
CH2 Sensor Select	130	
Pressure Calibration	0.00	
Humidity Gain %(m)	100.00	
Low Alarm, Channel 2	-10.00	_
High Alarm, Channel 2	104.00	-
De	escription	
Help is not available f	or this item.	
Alarm, Internal Comm	0.0 C	0.0 T

5. Setup the Altitude calibration constant based on the Emission setting for the Granville Philips ION gauge as follows:

n = 12 for 10 mAn = 11 for 1 mA n = 10 for 0.1 mA

SETUP/Calibration/Altitude Value

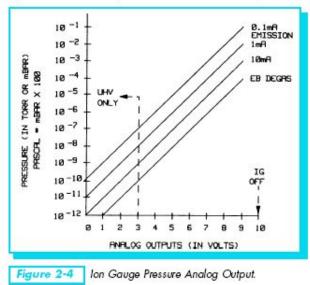


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2 The Ion Gauge Electrometer Module

The UHV electrometer option (307016) switches in a preamplifier as pressure decreases at an ion (collector) current of 10⁻¹⁰ A. For example, this corresponds to a pressure of 10⁻⁹ Torr with 10 mA emission current. When this switching occurs, there will be a brief (about 2 s duration) drop in the analog output signal. After the electrometer has settled out, the signal is, again, proportional to the common logarithm of pressure as shown by the UHV ONLY area of Figure 2-4.



A standard 1/8 in. miniature phono jack connector and plug are supplied.

The characteristics of this type of analog output voltage are ideal for applications requiring closed loop control. The voltage signal is smooth and continuous throughout all the decades of pressure measurement. This format is useful for computerized data acquisition because a simple equation (finding the common antilogarithm) may be programmed to calculate pressure from the voltage output.

The equation is:

 $P = 10^{(V-n)}$

Where V = analog output voltage;

n = 12 for the 10 mA emission current range;

n = 11 for the 1 mA emission current range;

n = 10 for the 0.1 mA emission current range.

For example, if emission current is set to the 1 mA range and the analog output voltage is 3.25 volts, the pressure (in units selected) may be determined by raising 10 to the power (V-11) or

 $P = 10^{(3.25-11)} = 1.8 \times 10^{-8}$ (Torr, for example)

Series 307 Vacuum Gauge Controller November, 2001

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5. Pressure is displayed on Chan. 2 in scientific notation as shown below.

Main Screen	12:27:03 PM
Chan. 1 - Temp. C	Chan. 2 - Press. T Torr Set Point Off
Actual 25.0 C	Actual 1.2e-5
Temp C	
0.0	Minutes 5
Chamber Off	25.0 C 1.2e-5

- 6. The log file also records pressure in scientific notation in units of Torr.
- 7. Now that the controller is setup, confirm displayed values using the table below.

Output in Torr is 10^{((Vhires*2)-n)}

With n = 12 and 5 volts on the Olympic board input, the controller will show 1.0e-2 With n = 11 and 5 volts on the Olympic board input, the controller will show 1.0e-1 With n = 10 and 5 volts on the Olympic board input, the controller will show 1.0e-0

With n = 12 and 0 volts on the Olympic board input, the controller will show 1.0e-12 With n = 11 and 0 volts on the Olympic board input, the controller will show 1.0e-11 With n = 10 and 0 volts on the Olympic board input, the controller will show 1.0e-10

With n =12 and 2.1 volts on the Olympic board input, the controller will show 1.6e-8 With n =11 and 2.1 volts on the Olympic board input, the controller will show 1.6e-7 With n =10 and 2.1 volts on the Olympic board input, the controller will show 1.6e-6

This concludes the Space Chamber Setup demonstration. For more information concerning Space Chamber Setup, consult the Synergy Controller Technical Manual on our website and/or contact technical support at the factory.

Synergy Controller

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About Tidal Engineering

Headquartered in Randolph, NJ, Tidal Engineering Corporation has been designing and building award-winning embedded hardware and software for test and measurement and data acquisition applications since 1992. The company is recognized for technical expertise in such areas as Embedded IEEE 488, and turnkey SCADA (Supervisory Control and Data Acquisition) systems. Tidal's products are available exclusively through ADI American Distributors Inc., an ISO-9002 certified distributor of electronic and electromechanical components and assemblies.

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