Synergy Controller K feet and Other Pressure Display Options
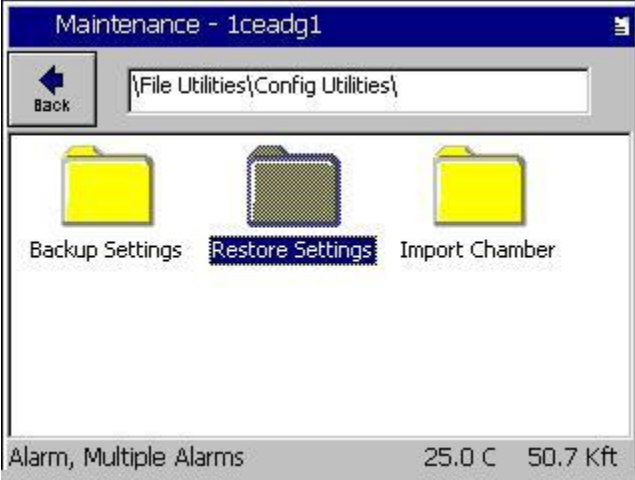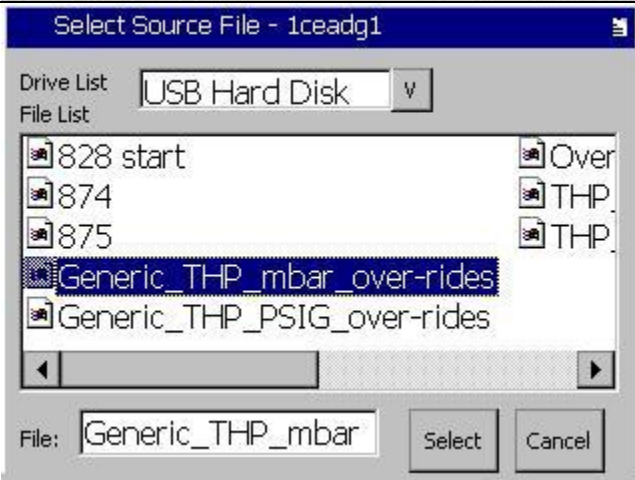
Introduction

The Synergy controller family is capable of controlling virtually any environmental test chamber including a variety of altitude chambers and vacuum ovens.

The two built-in (Generic) configurations for these systems are:
1. Generic Temperature Pressure
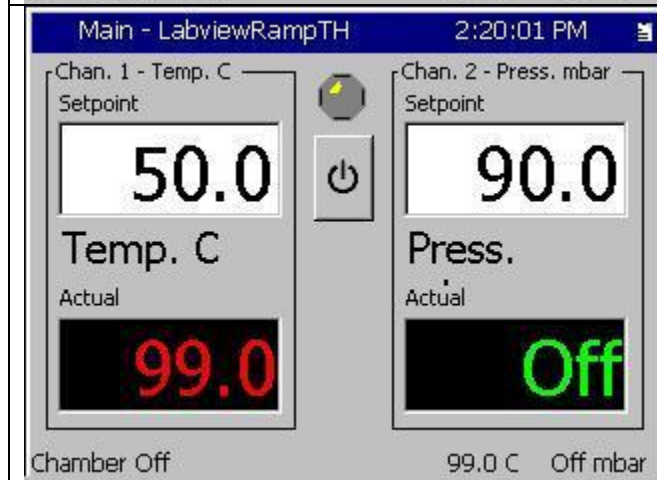2. Generic Temperature Humidity Pressure

The default unit of measure for pressure for these configurations is Torr. These Generic configurations can also be setup for alternate units of measure including PSIG and mbar (millibar) using configuration files such as "Generic_THP_mbar_over-rides.CFG" which are available from the factory and are easily loaded using the \File Utilities\Config Utilities function in the Maintenance screen as shown in the steps below:

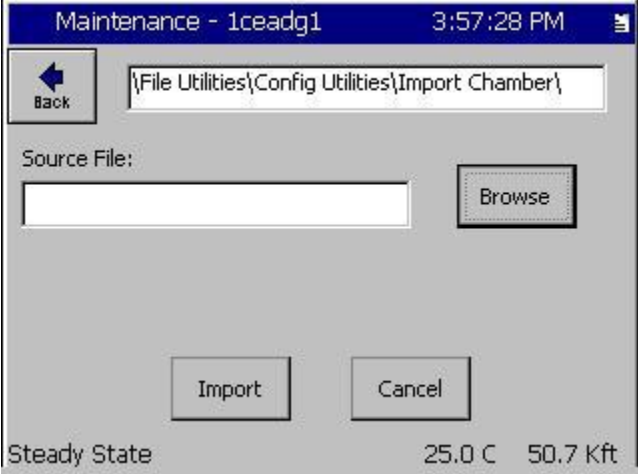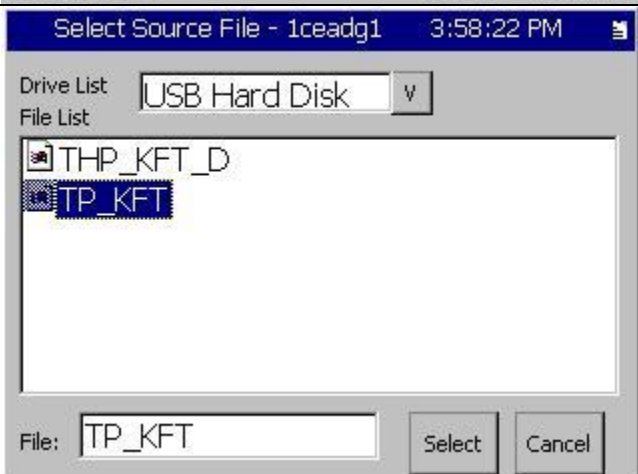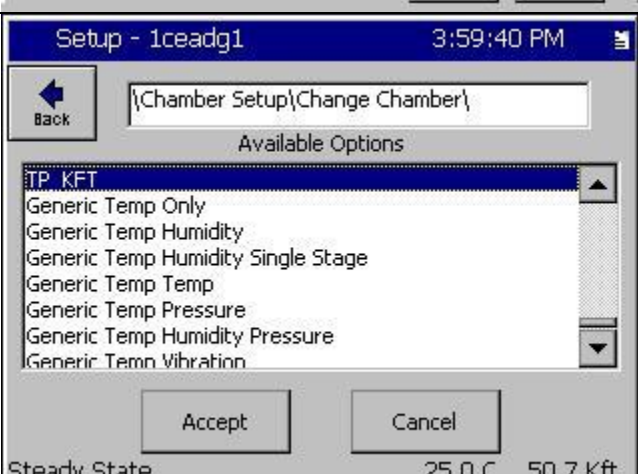|	
	Put the appropriate Settings File on the USB flash drive and place the drive in the controller's USB port. Then Browse to the Restore Settings folder.
	Restore the "Generic_THP_mbar_over-rides.CFG" to change the displayed units from Torr to mBar.
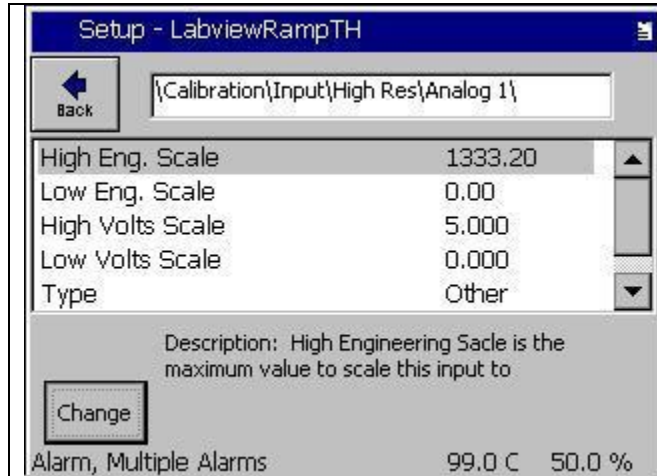
|	
	Set the High Engineering scale for the appropriate Synergy Controller High Res Analog input (for the pressure transducer input) to 1333.2 in the Setup\Calibration\Input\High Res\Analog screen. 1000 Torr = 1333.22 millibars
	The Main Screen of the Synergy Controller on the left is displaying pressure in units of millibar.

In addition to displaying pressure in units of Torr, PSIG , and millibars, to display pressure in units of K feet (Kft), you can load the THP_KFT and TP_KFT Chamber Definition Files (CDF).

	Insert the USB Flash Disk in the controllers USB port and browse to the Maintenance Screen\File Utilities Folder as shown on the left.
	Select the chamber type TP_KFT from the Chamber Setup Folder on the Setup Screen, the reboot the controller as instructed.
	Browse to the Chamber Setup Folder on the Setup Screen, select the new CDF file, and then reboot the controller as instructed.

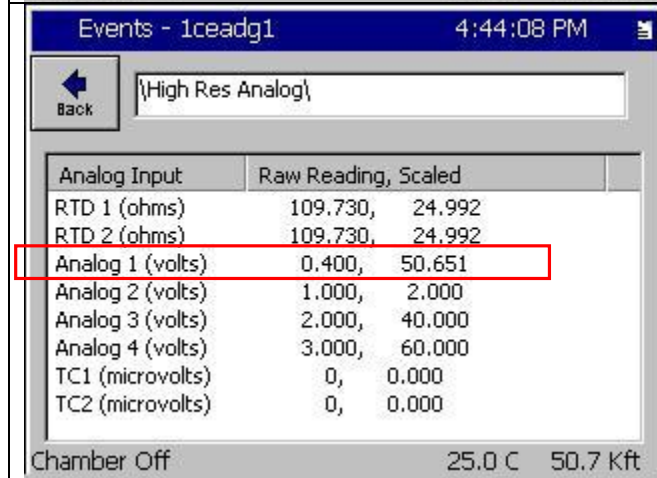|	
Setup - 1ceadg1 \Calibration\Altitude\ Altitude Value 0 Altitude Key 5BC1652F Description: Help is not available for this item. Change Alarm, Multiple Alarms 25.0 C Off Kft	Check the Setup\Calibration\Alt folder and to make sure that the Altitude Value is set to 0. You may need to re-enter the Altitude Key (Pressure Feature Registration) value to access this screen.
Setup - 1ceadg1 3:56:30 PM \Calibration\Input\High Res\Analog 1\ High Eng. Scale 1000.00 Low Eng. Scale 0.00 High Volts Scale 5.000 Low Volts Scale 0.000 Type Torr-Kft Description: High Engineering Sacle is the maximum value to scale this input to Change Steady State 25.0 C 50.7 Kft	Setup the Analog Input Browse to the Setup Screen and Open the Calibration\Input\High Res\Analog1\ Folder and adjust to the appropriate High Engineering and Low Engineering Scale for your transducer output in units of Torr. Scroll to the bottom of the screen and set the Type to Torr-Kft as shown on the left.
Setup - 1ceadg1 3:55:45 PM \Calibration\Calibration Channel 2\ CH2 Sensor Select 130 Pressure Offset (b) 0.00 Altitude Gain (m) 100.00 High Alarm, Channel 2 101.00 Low Alarm, Channel 2 0.00 Description: Set this Parameter to assign the Process Variable (PV) sensor for this Channel. Press Change to select from sensor list. Change Steady State 25.0 C 50.7 Kft	Setup the pressure channel as shown at the left.
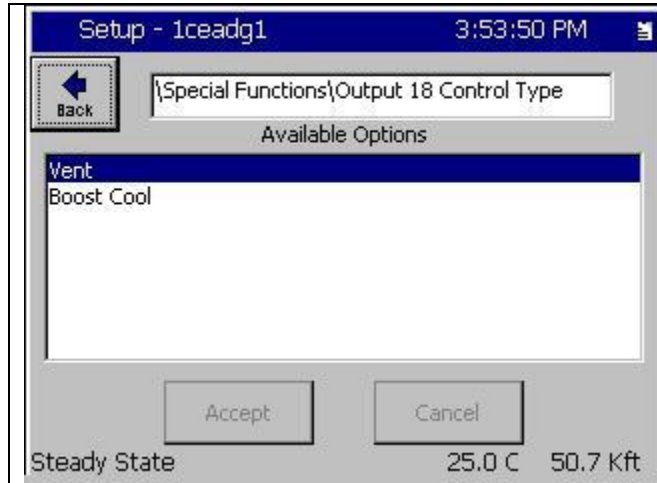
	Check the Output 18 control Type,
	And finally, go to the Main screen using the Main button and verify the units of display.
	The Raw Reading for the Analog Voltage input and the scaled value in Kft can be verified in the Events\High Res Analog folder against the spreadsheet: Synergy Controller Torr to Altitude conversion Rev B.xls
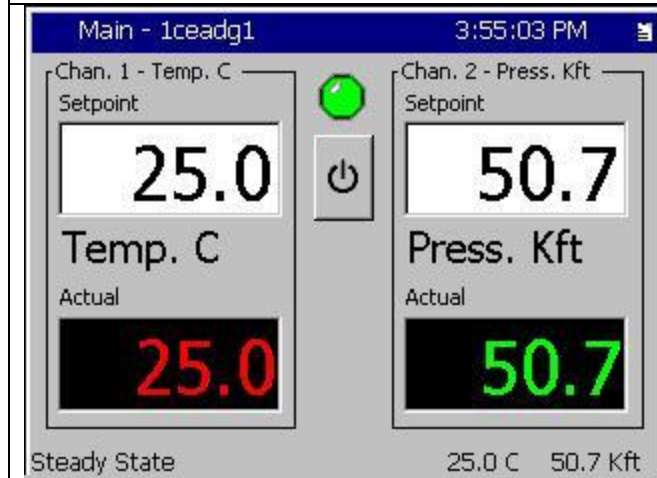
When 0.40 volts is entered, the calculated value for Torr and feet are 80 and 50561 (50.7 Kft) as shown at the left.

Notes:

1. The convention for Synergy Controller CDF files is that THP_KFT and TP_KFT CDFs are for full sized controllers including Synergy Micro, Synergy Micro 2 , Synergy Quattro and Synergy Nano TE1858-4 (Expanded mode versions) . NANO_THP_KFT and NANO_TP_KFT are for the standard ¼ DIN Versions (the TE1858-1, TE1858-3, and TE1858-3).

2. KFT capabilities are available on controller versions 2_8_6_Build_683 and newer. Contact the factory for information regarding upgrades.

3. Contact Tidal Engineering for the spreadsheets, CDF files, and the CFG files described in this application note.

4. Different Chamber Definition Files (CDF) are required because the Altitude/Pressure channel loop direction is inverted when we switch from Torr to kFt because altitude is inversely related to pressure.

5. The Synergy Controller implements the Torr to Kft conversion algorithm from noaa.gov as follows:

The Synergy Controller implements the Torr to Kft conversion algorithm from noaa.gov follows:

Pressure Altitude

From the user, a station pressure $\left(P_{sta}\right)$ is given. In order to calculate pressure altitude, the units for station pressure must be converted to millibars $\left(mb\right)$ or hectopascals $\left(hPa\right)$ For information on how to convert to millibars, see the link below:

http://www.srh.noaa.gov/elp/wxcalc/formulas/pressureConversion.html

Then, the pressure altitude $\left(h_{alt}\right)$ can be calculated using the equation below:

$$h_{alt} = \left(1 - \left(\frac{P_{sta}}{1013.25}\right)^{0.190284}\right) \times 145366.45$$

The answer will be units of feet. To convert the answer to units of meters see the equation below:

$$h_{m} = 0.3048 \times h_{alt}$$

About the Synergy Controller Family

Tidal Engineering's Synergy Controllers, both the Synergy Micro 2 and the ¼ DIN Synergy Nano provide state-of-the-art usability and connectivity for environmental test control and data acquisition and combine the functions of a chamber controller and a data logger and are designed to improve test efficiency by supporting both factory automation and test and measurement protocols and standards.

Synergy Controller feature highlights includes:

➔ Color touch screen
➔ Ethernet, RS-232 and GPIB communications
➔ Built in 100 MB Data logger with USB drive support
➔ Data Acquisition, up to 64 T-type thermocouples (Optional)
➔ Built-in Web Server for remote control; WebTouch Remote ™
➔ Compatible with Synergy Manager for PC based control, monitoring and programming.
➔ Built-in FTP Server for factory automation and test and measurement applications

For more information regarding these controllers please see the full Synergy Controller Technical Manual on our website at http://www.tidaleng.com/synergy.htm

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 Engineering Corporation
2 Emery Avenue
Randolph, NJ 07869
Tel: 973/328-1173
Fax: 973/328-2302
www.TidalEng.com
info@tidaleng.com