Performance Trends' "Mini USB"

Instructions for Hookup to Flow Bench

Performance Trends' "Mini USB" data logger will record data from your flow bench to greatly enhance your flow bench testing. The 2 figures below give an explanation of the various connections to the Mini USB, and how it hooks up to a typical SF 110, 600 or 300 or custom style flow bench.







After you hook up the Mini USB, you must enter the calibration numbers listed on page 5 of this document. Rarely, you may want to do your own calibration, following the procedure outlined in Appendix 5, starting on page 159.

You must specify that you are using a Mini USB Type of Electronics in the Port Flow Analyzer as shown in the menu to the right. You must also click on the "See Details (calibrations)" button to calibrate the sensors to match the manometers on your bench. See Page 41 in manual.

Inclined Flow Manometer Full Scale Reading Flow Scale Non-Linear (like SF cometer) Electronics Type Perf. Trends USB Mini Flack Box Com Port Com 4 Find Com Port # Readings to Average 20 Other Data	Flow Ranges Standard Flow Ranges being used Range #1 & 8 10 140 P You must set Type to "USB Mini" and then click on See Details to open up the Calibration screen to calibrate the Black Box.
See Details (calibrations)	

Schematic of Typical Custom Flow Bench



For more information, visit <u>www.performancetrends.com</u> and check out:

Port Flow Analyzer (software and flow bench accessories) Swirl Meter Tumble Fixture

Black Box Setup in Port Flow An	alvzer Software	
Port Flow Analyzer v3.58 Performance Trends [https://www.stattimini.txt] File Edit Greph Report Test Options Head Flow Bench Engine Preferences Help Elect Flow Bench Specs	tronics(F5) Sound Analysis	Click on Flow Bench at top of Main Screen to bring up Flow Bench specs screen shown here.
I 14456 General Bench Specs Test Corr. Type I 0" Test P Bid Superflow 110 Test Ope Rated Test Pressure, "water Test Date Incrined Flow Manameter	2017 9:31 am	Click on See Details
First Date Finite of Now Manometer Full Scale Reading 100 1 10 2 20 Flow Scale Non-Linear (Ike SF manometer) Range #11 & 8 4 40 5 44 6 Type Pert Trends IISR Mini Black Row	140 105 14 508.8 0.15	(calibrations) to enter typical calibrations for sensors in Mini USB.
Com Pot Com 4 r Find Com Bot Find Com Bo	choice here will 0.10-	
Bench Electronics Calibrations Back (ok) File Weather Station Calibrations Swirl/Tu Pressure Sensors Flow Pres. (inclined man.) Offset 4.6	Enter both the Offset and Factor for the sensors you are using. See the table below for typical calibration values.	
Calibrate Offset&Factor Factor .002263	Calibrate Offset&Factor Factor .0335	Linless you are familiar with
Comment Example for SF110	Comment Example for SF110	calibrating sensors, it is
Test Pres. (vert. man.) Offset -35.1	Flow Temp (T2) Offset 35	typically best to use the
Calibrate Offset&Factor Factor .0172	Calibrate Offset&Factor Factor .0335	factory calibrations provided
Comment Example for SF110	Comment Example for SF110	comfortable calibrating
Port Velocity (pitot tube) Offset -35.1	Other Sensors	sensors, click on the
Calibrate Offset&Factor Factor .0172	Swirl Meter Offset	Calibrate Offset & Factor
Comment Example for SF110	Calibrate Offset&Factor Factor	sensors and follow the
Help Some comment to describe the calibration of the Flow Temperature sensor. Click on the 'Load Date' button to load the current Time and Date as the comment. p	Tumble Meter Offset	instructions given by the program.

Typical Mini USB calibration numbers for a Custom and some SuperFlow Benches include:

	Offset	Factor
(Non-linear SuperFlow type manometers) Flow Pres, SF110 (% scale, 0.3 psi sensor) Flow Pres, SF300/600 (% scale, 1.0 psi sensor)	-4.6 -2.6	.002263 .001267 for SF600 .00286 for SF300
Test Pres (0.3 psi pn 7002 sensor) Test Pres (1.0 psi pn 7007 sensor) Test Pres (3.6 psi pn 7025 sensor)	-10.2 -35.1 -113	.005 .0172 .055
Test Temperature /Flow Temperature	35	.0335 (updated 3/27/19)

Factory (typical) Calibration for Mini USB	SN
Bench Electronics Calibrations Back (ok) File Weather Station Calibrations Hele Pressure Sensors Flow Pres. (inclined man.) Offset Calibrate Offset&Factor Factor Comment	P Temperature Sensors Test Temp (T1) Offset Calibrate Offset&Factor Factor Comment
Test Pres. (vert. man.) Offset Calibrate Offset&Factor Factor Comment	Flow Temp (T2) Offset Calibrate Offset&Factor Factor Comment
Port Velocity (pitot tube) Urrset Calibrate Offset&Factor Factor Comment Help Some comment to describe the calibration of the Tumble Meter. Click on the 'Load Date' button to load the current Time and Date as the comment. p 62 _161	Other Sensors Swirl Meter Offset Calibrate Offset&Factor Factor Comment Tumble Meter Offset Calibrate Offset&Factor Factor Calibrate Offset&Factor Factor Comment Calibrate Offset&Factor Factor Calibrate Offset&Factor

Enter the calibration numbers above for your Mini USB to get a typical "factory" calibration.

ા ો	Fvh #3	Int #4) Exh #4
Perf Trends R	eadings: Int #1	F9>	
Close Record	(F1) Port Velocity	Options Help	
Set Test Pres.	Act. Test Pre	s Freeze	
10 "	.00 •	Continuous Update	
Data Point	Valve Lift	 Foot Switch Enabled 	H /
1	.000	Foot Switch Disable	d /
E Test Temp (T	1) T Elow Temp (T ReZero Swirl/Tumbl	e /
0.0	00	Re-Zero Pressure Re	eadings
- Deat Vale alter		Eliminate Re-Zero Co	orrection
Port Velocity		Display Raw Flow Pr	ressure Readings
.0		Display Raw Test Pr	essure Readings
		Display Inclined Mar	nometer Full Scale
		Display Relative Con	nputer Speed
	!	 Display/Edit Fast Co 	mputer Recording Delay
400		Save Raw FlowCom	Data to Floppy
100	·····	Enable Debugging L	.og File
		Force to Set Test Pr	essure
		Send 'Enter' Keystro	kes After Setting Pressure
	l.	Adjust 'Enter' Keystro	okes Delay Time

During testing, you can click on Options, then click on one or both of the "ReZero" options to better "fine tune" the factory calibration. Using a factory calibration from the numbers above and then using the "ReZero" options is generally sufficient for most testing.

NOTE: Non-repeatability is often due to constantly changing (recalibrating) the calibration numbers in the screen above. Using the "ReZero" option should only improve the repeatability and keep data accurate.

Mini USB (Black Box) Read	ing Positive and Negative Pressure		If you have chosen
Preferences Engine Specs Definitions (calcs Printing / Graphing File Options General Operation Gen. Operation, cont. Setting Test Pressure Test Points Allow Test Pressure Set Points No Automatically Set Test Pressure No Auto Step Through Test No. user must prompt program to record data Allow Very High Pressures No Black Box Reads +/- Pres. Yes (check direction Yes (NO checking)	A Preference in the program lets you have the sensors measure both + and – pressure. This lets you simplify your bench design. Otherwise you need valves to keep the high pressure side always the high pressure side of the manometers and sensors, like in a Superflow bench, or swap hoses where you switch from Intake to Exhaust flow direction.	Perf Trends Readi Close Redord (F1) Set Test Pres 28 Data Point Swiil 1629 Black Box shows Exha an Intake port.	 the "Yes (check direction)" option, you may get warnings like this when you test. If you do, swap hoses on pressure taps on sensors. The other Yes option just reads the pressures and always assumes it is positive pressure.
Port Flow Analyzer You are getting very high negative (-) readings from the Vertic backward. Swap the hoses on the P2 fittings on the Black Box, front to ba If the flow bench is turned Off when you get this message, it n then clicking on 'Zero Out Pressures'.	al Test Pressure manometer. Usually this is caused by having the hoses to the Black Bo ck. nay be saying the sensors just need to be 'Re-Zeroed'. This can be done by clicking on o	x installed H m th Diptions, re	lere's another type of nessage you may get as ne program checks to ee if the pressure eadings make sense.

Typical Custom "Do it yourself" Bench Settings

	Choose "No" unless you have a "blower centered" bench as shown in Fig 2.5, page 12 in the Port Flow manual.	
Flow Bench Specs		
General Bench Specs	Set this to the Test Pressure you are using when you calibrate your Flow Ranges. SuperFlow uses 25".	
Type Custom Bench with Orifices	Jate 1/18/2013 6:42 pm	
Use Temperature Correction No ' y Flow R Rated Test Pressure, "water 25	anges	
En Inclined Flow Manometer	ter Ranges for your bench below Intake Exhaust	
Full Scale Reading 10 Range	e #1 36.7 44.9	
Linear Yes Range Range Range	# # 2 72.2 83.1 # # 3 148.8 164.8 # # 4 294.7 320.8	
Electronics Range Type Performance Trends 'Black Box'	e #5 441.7 476.7	
Com Port Com 1 V Find Com Port	#6 594.7 630.7	
# Readings to Average 10 Range		
Other Data None		
See Details (calibrations)		
These numbers are pressure reading is when the Test Press numbers are obtain typically mounts. Yo screen, or by filling Port Flow manual to	the amount of flow the bench is measuring when your Flow at the "Full Scale Reading" you've entered on this screen, sure is at the "Rated Test Pressure" on this screen. These ed by flowing a known diameter orifice where the head bu can either use the "Calibrate" option at the top of this out the worksheet at the end of Appendix 2, page 150 in the b determine these numbers.	
Set this to the maximum reading you will see on the Flow Pressure (inclined) manometer. If you are not trying to match an inclined manometer (no manometer is present), enter the maximum pressure you will measure with the Flow Pressure sensor. This maximum pressure should be in the same units as the Flow Pressure sensor is calibrated in. For example, if you enter the factory calibration numbers which are in Inches of Water (page 4), then this will be the maximum Inches of Water pressure you will likely see for Flow Pressure. In the screen above, it is set to 10" water if we used the factory calibration numbers. NOTE: If you go above the Full Scale Reading, the program will still calculated flow, so this entry is not critical.		
Set this to Yes unless you are tryin SuperFlow uses on their benches.	g to match some special "non-linear" manometer like what See examples below:	
Linear Scale: ' ' ' ' '	Non Linear Scale: ' ' ' ' ' '	