

VS-3000E Sensor System Standard Operating Procedure

This VS-3000E Standard Operating Procedure involves two programs:

- The VS-3000/3000E Sensor Monitor
- CalFAST 3000E™ Calibration Software Robot
- Both programs must be properly installed prior to using this procedure. The programs are provided with each system by VitalSensors

A Lab Reference Instrument and Lab Reference Data Must be Available so that the VS-3000E™ Calibration Software can be used to align and maintain the sensors.

For Questions

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Field Service Procedure 200019 VS3000E

Standard Operating Procedure for Soda

General Notes for Calibration and Sampling - SOP:

Startup:

- When first running a brand and it is in equilibrium near to target concentration press “Set to Target” button. This will offset the sensor to the target concentration values.

For a brand/product to be considered *calibrated*, the following criteria must be fulfilled:

- You must take samples on 3 tanks/batches of the same product
- You must take at least 3 samples per tank/batch
- Results will be automatically processed by the *CalFAST-3000E* Software Robot.
- Best practice is to enter all lab data taken into the Sensor Monitor using the Go button
- At least 3 additional samples must be entered monthly per product group to minimize offsetting
- If VitalSensors engineering services are purchased, quarterly VitalSensors will remote in and optimize sensor performance. Remote access is required for this service.

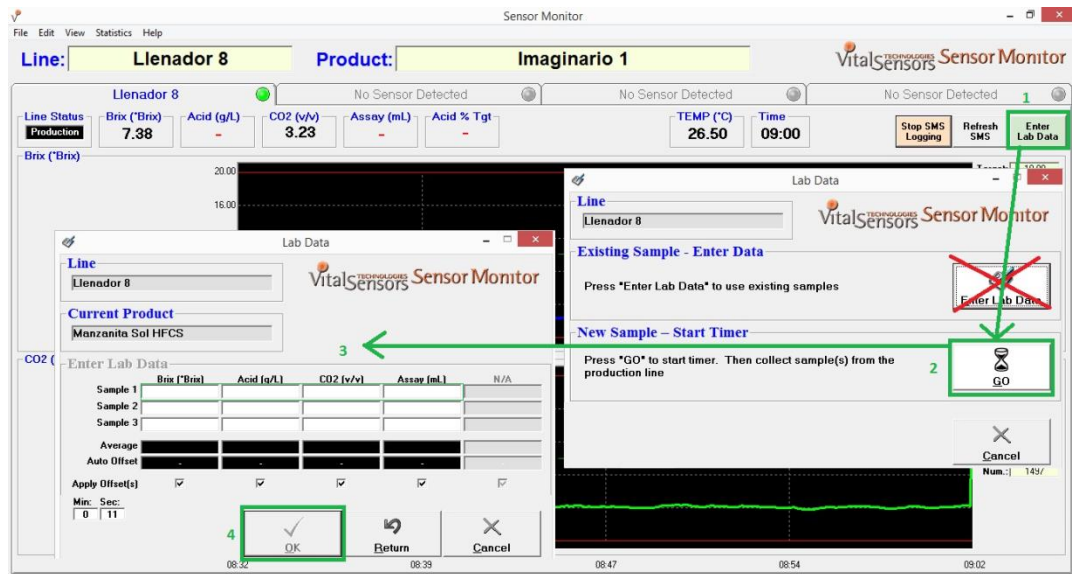
Sampling across 3 tanks provides concentration variability and temperature variability. Encompassing these varying factors during the calibration process ensures stable measurements moving forward.

After Calibration, periodic lab sampling must be done according to the Plant schedule. **The following are rules of thumb that may change with production and plant experience**

- Take lab sample at least 10 minutes after startup of the line
- For **CO₂** if the difference between the CarboQC or other instrument and the inline sensor is less than 0.1 grams/liter or .05 v/v % the Sensor Monitor will not generate a new offset.
- For **Brix** if the difference between a refractometer/density lab instrument is less than .05 the Sensor Monitor will not generate a new offset
- For **Acid** if the difference between a titrator lab instrument is less than .1 the Sensor Monitor will not generate a new offset
 - Acid is entered using mlNaOH into the Sensor Monitor in the Assay column
 - If a spectrometer is used for the phosphoric acid measurement, acid percent of target number is entered into the acid percent of target column. mlNaOH target must be entered for each product.
- This data must be entered using the Sensor Monitor software using the Go button. This will automatically generate the correct concentration offset and enter the correct sample time into the Lab data file.

Entering Lab Data on the Sensor Monitor Using “GO” Button

- Click Enter Lab Data
- Click “Go”
- Take sample
- Enter value into correct column
- Click “OK”



Enter Lab Reference Data for Product in Production Tips:

- The lab sample timer is the time it takes to grab the sample, measure and enter it into the Sensor Monitor. This will ensure that the lab sample time is correct.
- The lab sample measurement should be as precise as possible. If there is a large deviation in the lab sample versus product target and limits consider retaking the sample to confirm the data.

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- If satisfied with Lab value, click OK

Lab Data

Line: Line1 Release

Current Product: Cherry Coke

	Brix (*Brix)	Acid (g/L)	CO2 (v/v)	N/A	Assay (mL NaOH)	N/A	Acid % of Target
Sample 1			5.28				
Sample 2							
Sample 3							
Average	-	-	5.28	-	-	-	-
Auto Offset	-	-	-13.956	-	-	-	-

Apply Offset(s):

NOTE: Enter only measured data, leave other field(s) blank.

PRESS:
 <Save to SMS> to accept new value(s)
 <Return> to comeback to previous screen
 <Cancel> to exit from Add Lab Data menu

Save Return Cancel

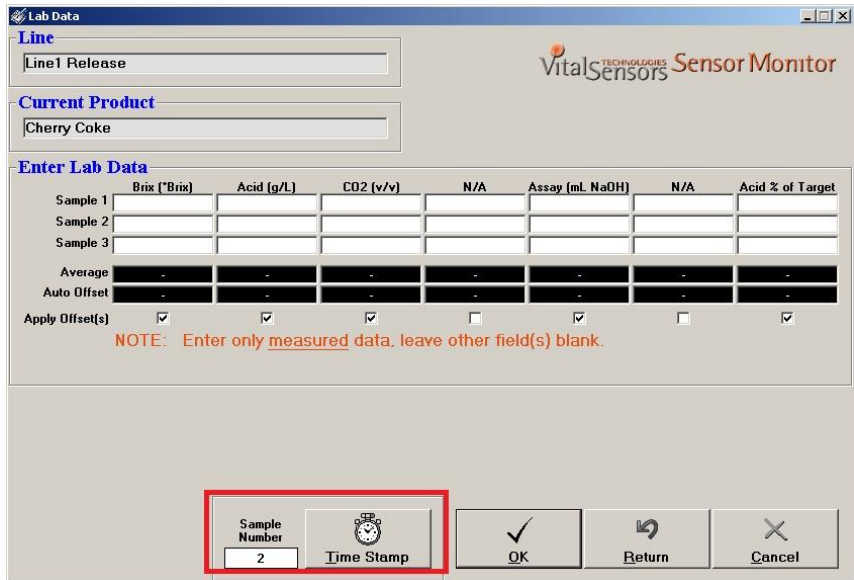
- Sensor Monitor Display with CO2 only after Lab data entry.



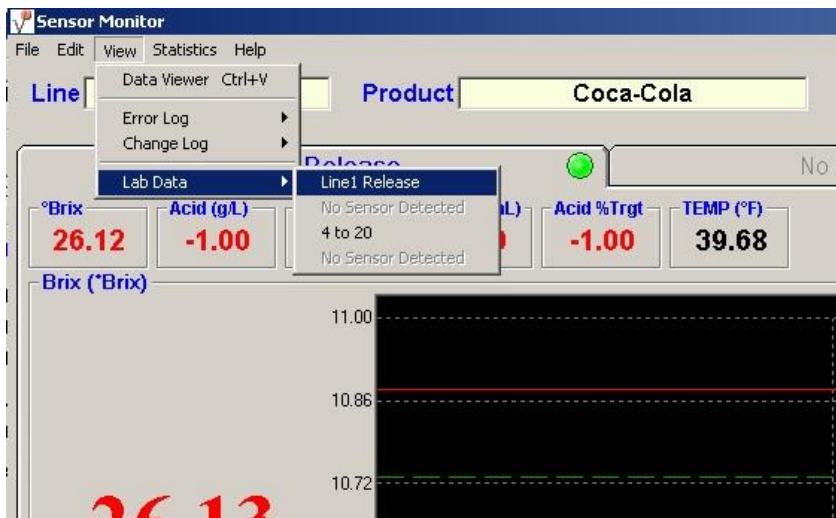
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**Entering Lab Data on the Sensor Monitor Using “Time Stamp” Button
 (Alternate Method)**

- For samples that have a long lead time before lab results and do not require an automatic offset, the Time Stamp button can be used. A name for the sample can be entered and a time stamp will be generated.



- The Lab Data sheet can be viewed and edited under the View Menu. When using multiple sensors, make sure the correct line is selected.



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Lab Data List

DATE	TIME	Sample No.	Brix (*Brix)	Acid (g/L)	CO2 (v/v)	N/A	Assay (mL NaOH)	N/A	Acid % of Target	PRODUCT	NEW
05/25/2017	02:42:13	-	10.74	-	-	-	-	-	-	Cola	
05/26/2017	07:48:04	-	-	0.6487001	4.25	-	13.19356	-	99.80001	Diet Cola	
05/26/2017	11:34:39	-	10.72	-	4.18	-	-	-	-	Cola	
05/26/2017	11:57:52	-	10.87	2.89	4.24	-	9.01	-	-	Cola	
06/05/2017	09:50:57	-	-	0.6519501	-	-	13.25966	-	100.3	Diet Cola	
06/05/2017	10:21:44	-	-	-	4.2	-	-	-	-	Diet Cola	
06/05/2017	16:49:15	-	10.74	-	4.22	-	-	-	-	Cola	
06/05/2017	19:19:38	-	10.78	-	4.24	-	-	-	-	Cola	
06/05/2017	19:54:02	-	10.76	-	4.22	-	-	-	-	Cola	
06/06/2017	14:11:05	-	10.85	2.862	4.22	-	9.11	-	-	Dr Soda	
06/06/2017	16:43:19	-	10.85	-	-	-	9.11	-	-	Dr Soda	
06/07/2017	07:42:04	-	-	0.64948	4.26	-	13.20942	-	99.92001	Diet Cola	
06/07/2017	09:39:28	-	-	0.455	4.25	-	9.254	-	70	Diet Cola	
06/07/2017	10:00:37	-	-	0.65	-	-	13.22	-	100	Diet Cola	
06/07/2017	10:01:15	-	-	0.65	-	-	13.22	-	100	Diet Cola	
06/07/2017	10:02:00	-	-	0.65	-	-	13.22	-	100	Diet Cola	
06/07/2017	10:47:48	-	-	0.65	-	-	13.22	-	100	Diet Cola	
06/07/2017	12:28:40	-	-	0.64675	-	-	13.1539	-	99.5	Diet Cola	
06/07/2017	17:33:10	-	10.75	-	4.24	-	-	-	-	Cola	
06/07/2017	18:41:58	-	10.74	-	4.23	-	-	-	-	Cola	
06/08/2017	03:21:08	-	-	3.12	4.26	-	9.87	-	-	Diet Dr Soda	
06/09/2017	04:35:25	-	10.56	-	4.31	-	-	-	-	Lemon Lime	
06/09/2017	04:50:12	-	10.56	-	-	-	-	-	-	Lemon Lime	
06/09/2017	08:34:32	2	-	-	-	-	-	-	-	Diet Cola	New

Enter New Value(s)

2			5.27			
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Remove X Accept ✓ Cancel ↩ Save EXIT

- In this method, the Lab data is edited and entered through the View lab data option.
- Several samples can be taken over time and entered all at once.
- Correct Date/Time from Sensor Management Station is automatically recorded, and the sample names(if entered) are shown for reference
- No offset is entered, but the robot will offset automatically as part of calibration; An offset can also be manually entered (see full Sensor Monitor User Manual for details).

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Notes on Calibration

All VS3000E sensors have the robot software enabled during initial software installation and setup. The calibration maintenance operations are automatically performed and there is no customer actions required. If the VitalSensors warranty and maintenance plan was purchased, VitalSensors will log in remotely every three months to verify and optimize the sensor performance.

Over time Soft Drinks, juices and other beverages should be done in groups with similar ingredients and concentrations: Colas, Diet Colas, Citric Soft Drinks and Citric Diet Drinks. This strengthens the calibration for all of the beverages in the group because with fewer data points per brand you get more concentration range and temperature range.

After the first six months the calibration should be updated for at least one product in each group

Once a month a data point should be taken on each beverage and should be processed through CalFAST to insure that the sensor always gets more stable over time. If before the one month maintenance any product offset becomes greater than .2% CalFAST should be run to increase the accuracy of the sensor.

Laboratory data must be carefully taken with accepted, consistent procedure using laboratory instrumentation that is maintained and regularly calibrated. Failure to adhere to good lab procedure will not yield good inline sensor results!