

Operator Quick Guide

ORBISPHERE 3624



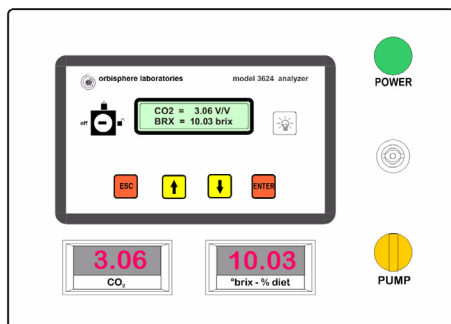
Operating Information

About this Guide

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Instrument Controls

The front panel of the 3624 ProBrix Plus instrument has several displays and controls.



The **Power Switch** and **Pump Switch** are used to turn the instrument or pump on/off respectively.

The **CO₂** and **°brix-%diet** LED displays are driven by analog outputs from the instrument.

The **Key Switch** should be turned to the horizontal unlocked position to start the instrument in measurement mode. The function keys are only active if the key switch is in the unlocked position. Use the vertical locked position to avoid accidental modifications.

The **Display** has a two-line liquid crystal display (LCD) with 16 characters per line.

A **Light Button**, when pressed, provides illumination to the LCD for three minutes.

Four **Function Keys** provide simple operator control over the instrument functions:

- **ESC** jumps back a step within a program menu.
- The **↑ ↓** keys are used to scroll through screen displays.
- **ENTER** selects a highlighted item from the menu.

Main Menu

The operator controls the instrument by menu-selectable commands using the four function keys. The main menu has three choices:

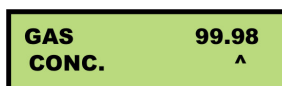
- **MEASURE** to start the measurement sequence.
- **OPTIONS** to enable the instrument to be customized.
- **CALIBRATE** to provide a choice of sensor calibration procedures.



To select one of these commands, first press **ESC** until the main menu is displayed (as illustrated above), next press the **↑ ↓** keys until your choice is flashing, and then press **ENTER**.

Entering Values

When entering numbers in any of the instrument menus, the current numerical value is displayed with one digit highlighted by the **^** symbol below it.



Use the **↑ ↓** keys to increase/decrease the value of the digit (0-9 plus a decimal point) until you reach your required target value.

Press **ENTER** to shift the highlight symbol one digit to the right and repeat the process. Pressing **ENTER** after the last digit saves the value.

Measurement - Instrument

Switching on the indicating instrument first shows the software version and date on the LCD, and then switches to a **Configuration Display** showing the gas being measured, the purge gas required for the CO₂ sensor, and the membrane model number for this sensor.

CO2 = 2.345 v/v
BRX = 10.34 brix

A configuration screen appears briefly, before switching to a **Calibration**

Coefficients screen for several seconds before finally switching to an **O2 Measurement Display**. This display then alternates every few seconds

with one of the CO₂ or °Brix/%Diet measurement displays (illustrated left).

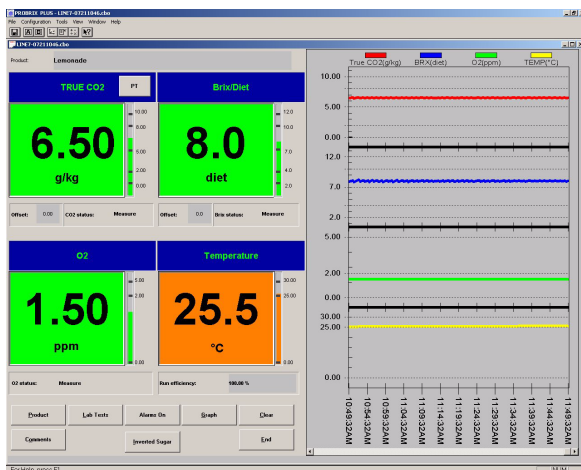
Press the \uparrow \downarrow keys to switch between these three measurement displays. You may experience a delay before the display changes, depending on the purge/measurement cycle of the CO₂ sensor. Press the **ESC** key to exit from these displays and move to the **Main Menu**.

The O₂ and Brix/Diet LED displays are driven by analog outputs from the instrument. These displays are updated at regular time intervals but may vary slightly from the instrument LCD's displayed values.

Measurement - PC

Once the ProBrix Plus PC Program software is installed on your PC, it is recommended that no screen savers are set and that the PC is not switched off unless absolutely necessary.

The PC Program maintains a window for each active LINE, which are activated via the **Start Line A/B** command in the **Configuration menu**, or by the **A/B buttons** on the toolbar at the top left of the screen.



The **Numerical Indicator Panel** shows information relating to the last measurement, and is divided into four, containing the CO₂ data, the Brix/Diet data, the O₂ data and the temperature information. For each of these, the units of measurement, the most recent measurement value and a vertical bar graph are shown.

The background colors show:

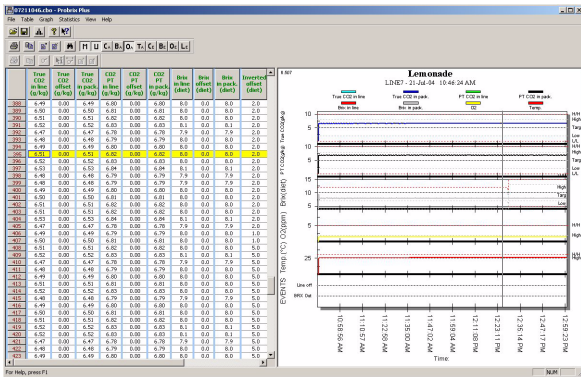
- GREEN** measurements are within High and Low limits
- ORANGE** measurements are outside High or Low limits, but inside High/High and Low/Low limits
- RED** measurements are outside High/High or Low/Low limits or an error has occurred

The **Status Panel** is displayed below the indicator panel and shows the status for CO₂, Brix/Diet and O₂ indicating **Standby**, **Measure** or **Fault**.

The **Graphic Panel** contains four charts showing the measurements over a one-hour period. Any one-hour period within the last 7½ hours can be viewed using the horizontal scroll bar. The lines on the graph are color-coded as per the description at the top of the panel. Placing the mouse cursor over a data point on the graph will cause the cursor to change to a hand symbol. Clicking the mouse when the hand symbol is visible will cause a message box to appear giving the values of the measurements, including the time they were taken.

The **Buttons Panel** at the bottom of the window contains eight additional options.

PBViewer Program



The **PBViewer Plus** program allows you to view statistical information that has been saved by the PC Program from the current or previous product runs, in a graphical and tabular format. You can start PBViewer Plus from within the ProBrix Plus PC Program by selecting **PBViewerPlus** from the **Tools** menu. This will display details for the current Product Run.

The program can also be run on a stand-alone basis and can be started by double-clicking the Desktop icon. Starting the program this way will

display an empty details screen, until you select a file to open from the **File Menu**.

There are three standard views available - the Table Window, the Graph Window or a combination of both. The illustration shows the combined view.

File Menu

This menu contains a standard list of File options to allow you to open a file of historical data. When selecting this menu, the four most recently accessed files are listed.

Opening a file will display the initial screen showing data in either tabular or graphical format, or a combination of the two. You can resize these areas by dragging the slider bar left or right with the mouse, or alternatively using the **Split** command in the **View Menu**.

Any changes you make can then be **Saved** from this menu, as well as being saved to a different file using the **Save As** option. You can also use the **Print Setup** option to set up the printer you wish to use during the process for any hard-copy output. The **Properties** option allows you to view standard information about the file and product.

Table Menu

While in the Table Window, you can right click the mouse for quick access to some of the Table Menu options.

A copy option lets you select table contents as a text file and copy them to the clipboard for pasting into other applications (e.g. Excel). The search option allows you to search for a specified alarm or event chosen from a drop-down list.

You can change what measurements are displayed in the table, the formatting for the

numerical values and color options for highlighted rows. Also, you can adjust the default and sizes of selected rows or columns, and define the measurements you want to view.

Graph Menu

This option gives you multiple ways of customizing the output.

From the **General** window, these include the title bars, color or black and white, the data displayed in either or both tabular and graphical form. Choose the styles that suit you best. Select the **Plot Style** tab to define how the graphs should be displayed (bar graph, line graph, etc.). These can be different for each measurement.

The **Subsets** tab allows you to define which sets of measurement data you wish to display. Select the **Points**, **Font** and **Color** tabs and personalize your graphical displays to suit your requirements.

Statistics

The statistics option will show the measurements in graphical and/or tabular format depending on how you customize the output.

Double click anywhere in the window to display the customize menu which allows you to customize your display. Right click the mouse to display a list of quick access display options.

Click the hand symbol (when available) for a pop-up display of statistics applicable at that point.

Setting Instrument Options

Your instrument is pre-set with certain default values to anticipate your measurement conditions, such as measurement display units, thermal cutoff temperature, etc. You may, however, change these using the Instrument Modify Options Menus.

Several of these menus duplicate functions that are more efficiently performed from the PC. For those menus that are *exclusive* to the instrument, the phrase **Instrument Only** has been added to the section headings.

It is advisable to give the PC control priority over the instrument. To do this, make sure you confirm the Change Product mode on the instrument.

DISPLAY UNITS

This option allows you to specify your type of measurement (CO₂ or Brix), the units of measurement to be displayed, the display resolution (i.e. decimal point placement), the number of display ranges desired and the temperature units to be displayed. Additional choices of gas solubility are provided for CO₂ measurements.

THERMAL CUTOFF (instrument only)

If the sample temperature is liable to exceed the compensated temperature range of the sensor, you can set an upper temperature limit to automatically cut off the electrical signal to the sensor to extend the sensor's life. Once enabled, if the sample temperature exceeds this limit, then alarms are set and a message appears on the PC and the instrument LCD.

ALARM

Upper and lower alarm limits are software adjustable throughout the measurement range. If the measured concentration is outside the specified limits, the instrument sets an alarm.

SERIAL OUTPUT (instrument only)

The instrument serial output is normally used to interface to the PC for analysis of measurement data via the ProBrix Plus PC Program.

CONTINUOUS PURGE (instrument only)

Use this option to view the sensor voltages, particularly when seeing the **Prg** message on your instrument LCD.

ROLLING AVERAGE (instrument only)

The rolling average feature causes the instrument to average measurements over successive measurement cycles. It suppresses sharp peaks and troughs, while retaining reasonably fast response to real concentration changes. This option also acts as a noise filter for Brix/Diet measurement.

LANGUAGE (instrument only)

The instrument can display its menus in English, French, Japanese, Spanish, German, or Italian although the units of measurement remain the same.

Note that this only changes the language for the menus on the instrument. The language used on the PC is always English.

HOLD RECOVERY (instrument only)

This option allows you to choose a longer or shorter recovery time after a Hold condition has ended.

OFFSET

You may wish to apply a specific offset value to the displayed gas measurement. Be aware that this offset value will be lost once a different product is selected.

CORRECTIONS (instrument only)

This option is reserved for qualified Orbisphere Service Representatives only. As such, if you feel that corrections are required, please contact your local Orbisphere Service Representative to perform this operation for you.

CHANGE PRODUCT

Products can be changed either at the PC or directly on the instrument depending on how the change product parameter has been set.

PC Configuration Menu

Setting a LINE Configuration

Up to two filling lines may be displayed in the program window. Each line will be connected to a separate PC COM port, which will have been set up during the installation process.

Access the LINE you wish to configure, by selecting the **Line A** or **Line B** option. Modify parameters for that LINE by selecting the **Change** button.

Products List

The **Products List** option allows you to set a number of parameters for each product. There is one product list per LINE, each with a maximum of 9998 products. Note that product zero is reserved for water measurement, and product 9999 is the default product used by the system when the LINE is inactive. The default values for both of these products are pre-set and cannot be modified.

First select the LINE you wish to enter/modify details for, by selecting either LINE A or LINE B in the top left box.

Then select a product using one of the following methods:

- By typing the product number, if known, in the upper right-hand box
- By using the right-hand scroll bar
- By using the Search button to find a product name

Once a product is selected, you can now enter/modify the default parameters. Note that modifications are only activated the next time a run is started for this product.

Oxygen and Temperature Values

Set the units and limits for oxygen and temperature displays and alarms. The values are applicable to **all** products on both Line A and B.

Autosave

This option allows you to select the time delay for automatically saving measurement data. Set to **None** (no Autosave required), **End of Run** (save only on completion) or at a time interval of 1, 2, 5, 10, 30 or 60 minutes.

As the year is not part of the filename, ensure these measurement files (**MMDDHHMM.cbo**) are backed up and deleted at the end of each year.

Water Calibration Status

For Diet measurements only, it may be desirable to perform a water density calibration periodically. This can be conveniently done during a long rinse-down period. To enable this calibration, select this option, and turn the status to **On**.

Alarms Delay

System alarms are disabled each time a new run is started or when the **Alarms ON/OFF** button is selected. The ProBrix Plus PC Program automatically re-enables these after a delay period of 5 minutes.

Selecting this option and entering a value of between 0 and 30 will override the default to the new value.

Sound Alarms

The ProBrix Plus PC Program can trigger audible alarm messages. To receive these messages on your PC, it must be equipped with speakers and have a sound card installed.

Serial Output

You can send formatted measurement and product data to other computers on your network. Select the serial communications port linked to the other computer. You cannot use the same ports that have already been configured for LINE A and/or LINE B.

For detailed information on the format of the data elements transmitted, please press the **Help** button on this window and then select **Additional serial output** help.

Calibration - From Instrument

BAROMETRIC PRESSURE SENSOR

The instrument internal barometric pressure sensor is calibrated at the factory, and normally requires no further attention. However, you may wish to calibrate it against your own instrumentation, or simply check the instrument for accuracy.

CO₂ SENSOR

The sensor can be calibrated using either:

- 1) A source of 100% pure CO₂ gas at a known elevated pressure (**Partial Pressure**)
- 2) A known concentration of CO₂ gas at a known pressure (**Fraction**)
- 3) A known concentration of dissolved CO₂ (**Dissolved**)

The **Partial Pressure** method is generally recommended when measuring at higher line pressures, and requires a precise in-line pressure gauge to perform.

For the **Partial Pressure** and **Fraction** methods, shut off the sample flow to the sampling module, then open the front panel and remove the CO₂ sensor from its flow chamber. Do not disconnect the cables or purge gas connections from the sensor. Before calibrating, make sure that the grill in the front of the CO₂ sensor is clean and dry. Insert the sensor in the flow chamber, and tighten with its collar.

The **Dissolved** method requires a known concentration of CO₂ dissolved in liquid as a reference sample, flowing in-line through the sample line.

For all of the three methods described above, expose the sensor to the gas and stabilize the reading by operating in Measurement Mode for about 30 minutes. After this time, press **ESC** and select **CALIBRATE** from the main menu, followed by **SENSOR CO2** and the calibration method. Then, select your calibration measurement unit.

Enter the gas concentration of the calibration medium. Press **ENTER** to start the calibration process. The instrument starts three calibration

cycles. The gas and temperature measurements are displayed along with the current calibration cycle number.

On completion of the three cycles, the instrument then shows the sensitivity of the sensor as a percentage of the sensitivity determined when calibration was last performed.

This percentage must be between 50% and 150% in order to calibrate. If the percentage is outside the limits, you will see the **CALIBRATION OUT OF BOUNDS** message. You will need to press **ESC** to continue. Check that the membrane does not need to be replaced and that no leaks are evident.

If the percentage is within the limits press **ENTER** to accept and complete the calibration process (the message **CALIBRATION COMPLETE** will appear briefly) or **ESC** to abort.

O₂ SENSOR

The **In Air** method places the O₂ sensor in water-saturated air, to provide a known oxygen reference against which to calibrate.

Shut off the pump and turn off the sample flow to the sampling module. Open its front panel and remove the O₂ sensor from its flow chamber. Do not disconnect the sensor cable.

Dry the sensor thoroughly, before placing the sensor storage cap under tap water. Shake off any excess water, but leave a few drops inside the cap. Then, loosely place the storage cap back on the sensor, holding it in place by a few turns of its collar.

Select **CALIBRATE** from the main menu followed by **O2 IN AIR** to start the calibration. The process is then similar to the CO₂ sensor calibration.

The **Direct** method calibrates the oxygen sensor against a liquid sample containing a known level of dissolved O₂, flowing through the sample line.

Select **CALIBRATE** from the main menu followed by **O2 DIRECT** and the calibration units. Then enter the gas concentration of the calibration sample to start the calibration. The process is then similar to the CO₂ sensor calibration.

Calibration - From PC

DIET CALIBRATION

There are three types of diet calibration available, depending on the type of product.

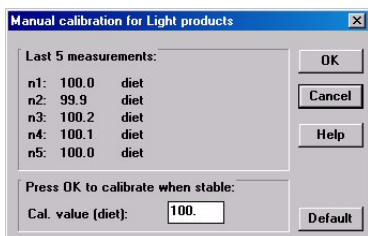
Automatic (diet-a and T.A.-a products only)

Automatic calibration performs a calibration based on three successive stable measurement cycles at the start of a product run, and assumes the product is **in spec** when the run starts. After three successive stable measurements, the new Diet Calibration Coefficient is calculated based on the target value for the product.

If there is a large difference between the new coefficient and the last calibration, a warning message will be displayed when you press the Product button, showing the percentage difference between the two values.

Manual (diet-m and T.A.-m products only)

A dialog box appears automatically. The last five measurements are initially set to zero.



Manual calibration for Light products

Last 5 measurements:	
n1:	100.0 diet
n2:	99.9 diet
n3:	100.2 diet
n4:	100.1 diet
n5:	100.0 diet

Press OK to calibrate when stable:

Cal. value (diet):

Buttons: OK, Cancel, Help, Default

Once the measurements displayed indicate a stable condition (at least three successive stable measurement cycles), press **OK** to close the dialog box and to calculate the new slope value for the current product, which is based on the value in the edit box.

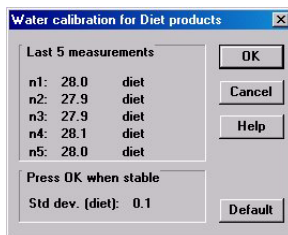
The target measurement for the product is automatically displayed in the edit box, as the calibration value. This can be changed based on any Lab Tests performed, as it is used in calculating the calibration coefficient.

Absolute (diet and T.A. products only)

Before doing a calibration, it is necessary to check your water calibration coefficient first. This can be done during the next rinse-down period.

Make sure you have set the **Water Calibration Status** to **On** and select water (product number 0)

as the product for measuring. As you start the measurement process, a new dialog box appears automatically.



Water calibration for Diet products

Last 5 measurements	
n1:	28.0 diet
n2:	27.9 diet
n3:	27.9 diet
n4:	28.1 diet
n5:	28.0 diet

Press OK when stable

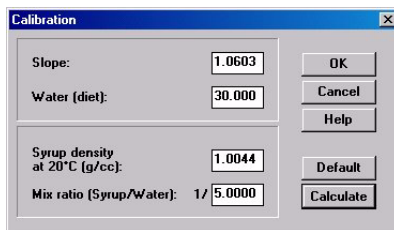
Std dev. (diet): 0.1

Buttons: OK, Cancel, Help, Default

The dialog box will initially display zeros in the last five measurements column. These values are then updated every 15 seconds, as new as measurements are taken.

When the measurements indicate a stable condition, press **OK** to close the dialog box and apply the most recent reading (**n1**) as the new water coefficient. This new coefficient will be applied as the water correction factor for all diet and T.A. products.

Once the water calibration is complete, you can now go through the product calibration process. Select the **Calibration** button in the **Products List** window for the required product. This will display the density of the syrup (at 20°C) and the mixing ratio (volume of syrup to volume of water), which can *only* be modified if this is a diet product (not applicable to T.A. products).



Calibration

Slope:

Water (diet):

Syrup density at 20°C (g/cc):

Mix ratio (Syrup/Water): 1/

Buttons: OK, Cancel, Help, Default, Calculate

The current Slope value is displayed, along with the Water calibration coefficient calculated during the water calibration run described above. These can be changed if required.

Press **Calculate**, to compute a new slope value for the product. Press **OK** to apply these new parameters to future measurements of this product.

Measurement Troubleshooting

The following table lists possible measurement errors, which could be caused by poor handling of the instrument and/or identifiable installation conditions.

Symptom	Probable Cause	Corrective Action	Expected Result
Message Out	Sensor not connected	Check sensor cable connection (at sensor and instrument end)	Measurement should return after approximately 20 seconds
Message Prg (CO ₂)	Purge pressure too low or wrong purge gas	Restore correct purge pressure and gas (refer to the TC Sensors - Maintenance & Installation Manual for details). Push the small plastic tube firmly into the purge exit and check purge flow rate (over 3 bubbles per second.) Check voltage in continuous purge mode.	In continuous purge mode, voltage should be in the range -2.5V to +4.5V. If purge flow rate is too small, or if voltage remains above 4.5V, contact your Orbisphere agent
	Damaged sensing element caused by mishandling during membrane replacement	For experienced <i>service personnel only</i> : Remove membrane and support. Check for broken wires of the thermal conductivity chip under microscope	Contact your Orbisphere agent
System does not start: No display or backlight	Improper line voltage	Check instrument voltage	Select proper voltage (115V or 230V) on power supply card
	Blown fuse	Unplug instrument and replace blown fuse.	Instrument should start up. If not, or if fuse blows again, contact your Orbisphere agent
High sample temperature	Blockage of sample flow causing heat buildup from pump	Check outlet of sample flow for blockage. If a check valve is in use, verify proper orientation	Temperature should decrease as normal sample flow resumes
Voltage drift during measurement (CO ₂)	Purge gas pressure too low	Set 2 bar gauge pressure or adjust pressure in order to get over 3 bubbles per second from exit tube	Measurement will return to expected value
Low reading (CO ₂)	Leak in purge inlet line	Check line for leaks with soapy water	Expected reading
High reading (CO ₂)	Erroneous calibration in gas with a wet membrane protection grill	Recalibrate in liquid, or, dry out the membrane and calibrate in gas	Expected reading
Totally erratic readings (CO ₂)	Water condensation into the thermal conductivity element due to purge failure or humid purge gas	Blow <i>dry</i> purge gas in "continuous purge mode" overnight. Resume measurement mode.	In most cases, sensor operates properly. But condensation may result in serious damage, requiring service

Measurement Troubleshooting (cont)

Symptom	Probable Cause	Corrective Action	Expected Result
Noisy reading during gas calibration	Calibrating gas flow restricted generating pressure pulses	Make sure calibration gas flows freely	Stabilized reading
Noisy readings during measurement	Improperly mounted protection cap or membrane on CO ₂ or O ₂ sensor	Turn off purge gas and check membrane and protection cap mounting procedure. Restart purge	Stabilized reading
	Leaking solenoid valve in CO ₂ sensor	Check purge outlet. No gas bubble should evolve during the measurement ramp	If solenoid leaks (more than 1 bubble in 15 seconds), return sensor to Orbisphere
	Grounding mismatch between Orbisphere instrument and electronic accessories (plotter, terminal)	Plug all accessories and instrument into same mains terminal	Stabilized reading
Calibration out of bounds	Wrong membrane model; pierced/torn membrane; or two membranes superimposed	Replace membrane	Calibration constant should be $\pm 50\%$ of default value
	Wet protection cap	Blow grill with compressed air and let dry, carefully, in dry gas flow for one hour	
	Wrong calibration values entered against actual calibration fluid or pressure	Check that gas concentration or pressure fit the entered numerical data and units	

Sensor Warning Messages

The following table lists sensor warning messages, where #n is defined as follows:

- #0 refers to the CO₂ sensor
- #1 refers to the Brix/Diet sensor
- #2 refers to the O₂ sensor

The last three messages in the table apply to the Brix/Diet sensor only.

Message on Instrument LCD	LCD Code	PC Event List	High/ Low Relay	Hi-Hi/ Lo-Lo Relay	Reason	Action
#n CHECK THE SENSOR	Out	Sensor out	On	On	Sensor disconnected	Connect sensor
#n WARNING THERMAL CUTOFF	Hot	Sensor too hot	On	On	Sensor Thermal cutoff	Check process
#0 SENSOR PURGE FAILURE	Prg	Overflow	On	On	At the beginning of a measurement cycle if V3beg< -2500mV or V3beg> +4450mV	Restore purge gas
#0 RAMP LIMIT VIOLATED	Lmt	Overflow	On	On	At the end of a measurement cycle if V3end< -2500mV or V3end> +4450mV	Check membrane
#0 PURGE VOLTAGE DRIFTING	Chk	N/A	Off	Off	At the beginning of a measurement cycle if V3beg< -2000mV or V3beg> +3950mV OR at the end of a measurement cycle if V3end< -2000mV or V3end> +3950mV	Check purge gas
#n ATTENTION LOW LIMIT	LoL	Low limit	On	Off	Low limit alarm	Check process
#n ATTENTION HIGH LIMIT	HiL	High Limit	On	Off	High limit alarm	Check process
#n ATTENTION LOWLOW LIMIT	LLL	Lo/Lo limit	On	On	LowLow limit alarm	Check process
#n ATTENTION HIGHLIMIT	HHL	Hi/Hi limit	On	On	HighHigh limit alarm	Check process
OSCILLATOR STOPPED	Osc	Overflow	On	On	Brix/Diet sensor malfunction	Check sensor connections
U-TUBE EMPTY	Emp	Overflow	On	On	Brix/Diet sensor U-tube empty	Restore sample
DEGASSING IN U-TUBE	Deg	Overflow	On	On	Sample drop-off in U-tube	Restore sample

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