

LabStart -aw

Operating Instructions



Leading the market thanks to INNOVATIVE solutions and sensor technology

novasina
The Art of Precision Measurement

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1. Introduction

1.1 Have an Amazing Start!

Thank you for having purchased the **Novasina LabStart-aw** for measuring **water activity**. You got a basic and robust but accurate aw-meter. A good start is essential for every project and undertaking. That is why the LabStart-aw has been developed. This instrument is simple- to- operate, providing basic measurement functions, yet still having built-in automatic equilibrium detection and the well-proven resistive-electrolytic sensor technology as employed in all Novasina water activity meters.

Optional chemical protection filters assist with high solvent – content samples, as well as true water activity detection with high repeatability.

Although the LabStart-aw is a starter instrument, it offers great value, is simple and easy-to-use.

VALID FOR FIRMWARE VERSION V 1.00 AND ABOVE

1.2. Important Notes

Intended use

The Novasina **LabStart-aw** is exclusively intended for measuring **WATER ACTIVITY** under strict adherence to the information and notes given in this manual. Any use beyond this scope is considered to be a violation of the intended purpose and may endanger your safety or could result in the product being damaged. Any use of this Novasina instrument other than intended is at customer's own risk and by no means will the manufacturer or supplier be liable for any resulting damage.

Safety instructions

- The Novasina **LabStart-aw** system should be serviced, maintained and repaired only by qualified people who are familiar with the equipment.
- The **LabStart-aw** system must not be used in hazardous zones or similar areas. The design was made only for laboratory environments.
- No explosive materials and no highly inflammable substances may be measured in the measurement chamber system.
- Before connecting the unit to the mains, ensure that:
 - The mains voltage is within 90...260V, at 50 or 60Hz. Please check the type plate of the system!
 - The power cable between the mains and the instrument is not damaged.
- The Novasina **LabStart-aw** system may be used only under the specified operating conditions (see chapter 8).
- Observe and strictly adhere to the local regulations regarding the handling of mains- powered devices.
- Use only genuine accessories and spare parts available from your Novasina supplier or visit the homepage www.novasina.com.
- This instrument must not be modified in any way without the written consent of the manufacturer.
- Never open the instrument without removing the mains power cable first to avoid any risk of dangerous currents.

2. General Product Description

2.1. System Overview

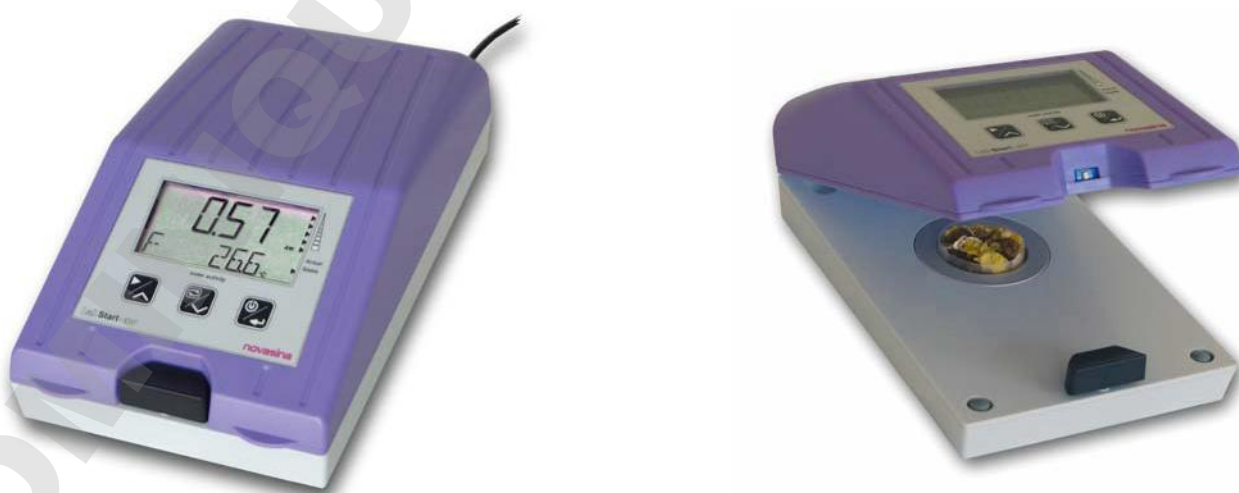
The **LabStart-aw** system has been specially developed for determining the fraction of **free water** in a test sample like food, cosmetics or pharmaceuticals. This fraction is also known as „**water activity**“ in the foodstuffs industry and may not be confused with the water content (g water / g substrate). The water activity of a sample is indicated by the so called a_w -value and is within the range of 0 (absolute dryness) and 1 (condensing humidity).

Only the free water takes actively part to the exchange with the ambient humidity and has a big importance regarding the microbiological stability respectively the biological functions of microorganisms. The water activity is also influencing considerably the chemical properties of foodstuff.

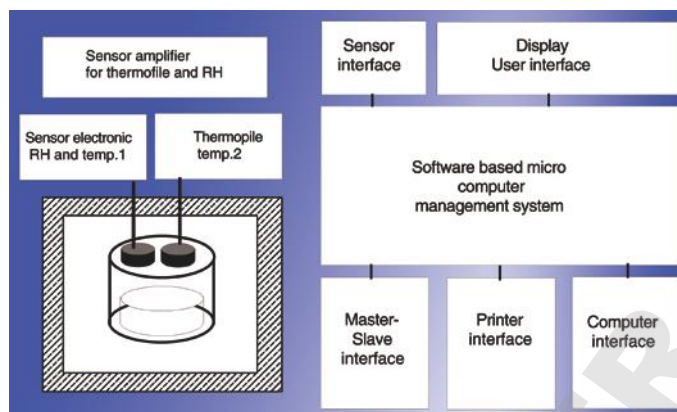
For the a_w -value determination, the equilibrium air humidity over a sample (*water-vapour pressure*) is measured. This behaves proportional to the a_w -value. The fundamental requisite for determining water activity quickly and with extreme precision is equilibrium state between sample's free water and air humidity and an excellent moisture sensor that allows an exact, reproducible measurement over a very wide range (*moisture from 0.... 100% RH*). Novasina has been developing special electrolytic moisture sensors that stand out for such unique properties for more than 50 years.

The integrated, resistive electrolytic **LabStart-aw** sensor is based on the new chemical substance of the Novasina „Novalyte Technology“, which achieves an outstanding accuracy and reproducibility.

LabStart-aw



2.2. System Architecture

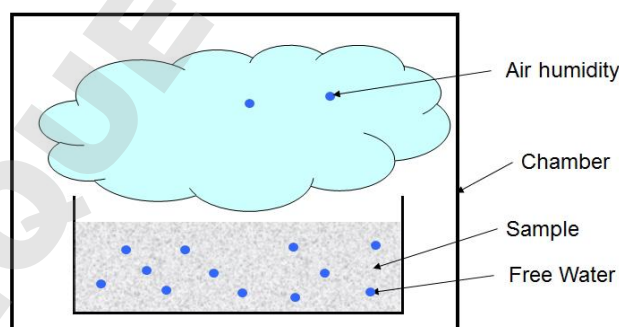


The **LabStart-aw** consists of modular assemblies in combination with the unique resistive electrolytic Novasina measurement technology, which is built inside the aW sensor. The aW measurement signal is electronically processed together with the NTC-based temperature measurement. Afterwards it is further processed by a high capacity micro controller. This is handling the LCD display unit. The mains are supplying the whole electronics with power.

The **LabStart-aw** does not offer an internal temperature control, but has a surface temperature sensor based on an infrared measurement. For checking and adjusting the aW values, humidity standards (see chapter 7.3) can be used.

2.3. Why Equilibrium is important

The basic principle of water activity measurement is the exchange of free water in your sample with the enclosed, surrounding air in the measurement chamber:



This exchange process ends in equilibrium where the mass transfer of free water to the air is equal to air humidity diffusing back to sample. At this point the measurement can be taken. If taken earlier, it might be that more free water is in the sample than in the air and this results in a wrong value.

2.3.1 How to detect equilibrium?

Novasina's approach is very simple. In equilibrium state, free water mass transfer is constant, thus, air humidity does not change at all. So, the **LabStart-aw** is monitoring the change in air humidity and issues a stable value once the aW-value does not change more than 0.001aw within two minutes.

2.4. Overview



2.4.1. Function keys

Each function key has 2 markings. Upper key functions include main operation as starting a measurement or switch screen to see measurement time. Lower functions help the user navigating through the menu.

2.4.2. Function key < Menu >



Measurement mode (upper key function)

- With this key the device is switched on
- Access to menu
- Device is switched off if pressed for a long time

Menu mode (lower key function)

- Carries out the selected function or enables the parameter setting
- Adapts the set parameters
- By pressing for a long time you get from each menu point directly to the measurement mode

2.4.3. Function key < Actual/Stable >



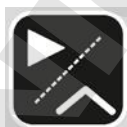
Measurement mode (upper key function)

- Switches over between the actual measurement value and the stable value
- By pressing for a long time you get the following view :
 - upper display line; number of measurement
 - lower display line; actual measuring time (actual) and stability time (stable)

Menu mode (lower key function)

- Switches a menu point downwards
- Decreases a flashing displayed digit

2.4.4. Function key <Start Stop >



Measurement mode (upper key function)

- Starts the measurement
- Interrupts the current measurement

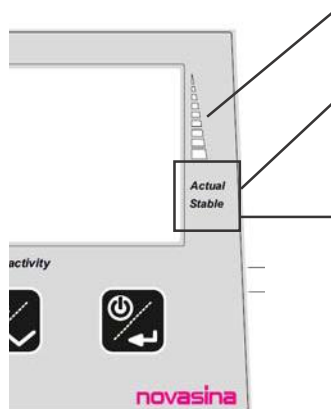
Menu mode (lower key function)

- Switches a menu point upwards
- Increases a flashing displayed digit

2.4.5. Display - symbols

Displays the stability progress;

As soon as the measurement has started, the 1st symbol is displayed. When the stability is reached, all 5 symbols are displayed contemporaneously.



Actual

Symbol appears, when the actual measurement is displayed. The symbol is displayed flashing.

Stable

Symbol appears, when the stable measurement value is displayed.

A **LabStart-aw** is used as a stand-alone device. The power supply for the **LabStart-aw** is done by an external power cord.

2.5. Scope of Delivery



Novasina **LabStart-aw A_w** - measurement instrument with non-temperature controlled sample chamber with basic measurement functions.

Standard Accessories :

- Power supply with EU and US insert
- 1 unit of humidity standards : SAL-T 75%rH
- 25 pcs standardised disposable sample dishes
- Factory calibration certificate
- Tension ring
- 5 pcs pre-filter (white)

2.6. Optional accessories

Mechanical filter

The white pre-filter protects the measurement cell mechanically from direct sample contact in case of overfilling of the sample cup. This filter should be replaced at least once a year or if it became dirty, otherwise there is a risk of faulty measurement by outgassing material stucked on the filter.

Chemical protection filter for true water activity values

Depending on the application, the **LabStart-aw** precision measuring cell has to be protected from damaging, volatile compounds. For this reason, Novasina provides various protection filters. Please consult the filter data sheet to select the appropriate protection filter or contact your local Novasina representative if you need help. Thanks to these filter systems the measurement cell lifetime can be extended considerably and a true water activity value can be obtained as the volatiles will be absorbed but water vapour will be passed through.

By this absorption process, the filter will inevitably get saturated by time. A regular check is mandatory to avoid a contamination of the sensor by an ineffective, saturated filter system. It is done by calibration intervall surveillance.



3. Putting into Operation

3.1. Packaging / Installation

The **LabStart-aw** measurement instrument is delivered in a solid but simple packaging including all necessary accessories. Please store this package in case you need to return the instrument to your local Novasina distributor. Upon receipt, please check first to make sure everything is present, and immediately notify your Novasina sales partner if anything is missing or broken. Do not put damaged or incomplete measuring instruments into operation.

The equipment must be installed in a laboratory on an even surface, avoiding vibrations, strong heat radiation, air flow and dust.

3.2. Putting into Operation



- Check if the local mains voltage matches with the identification plate of the supplied external power supply and plug it to the socket.
- Plug the external power supply cable to the instrument socket on the back of the **LabStart-aw**.
- Afterwards you can switch on the instrument by pushing the right function key. A start display (self test) appears shortly and the software version is displayed on the upper display line.



Note:

The **LabStart-aw** is very efficient and requires only little electrical power. The power supply fits with the latest standards (fulfills „energy star level IV“). That's why the instrument can be switched on permanently and kept ready for measurements at any time. For accurate aw-value measurements, the instrument should be in a temperature equilibrium. For this reason the **LabStart-aw** should be only switched off, when no measurements are performed for a period of one month or more.

4. Description of Instrument Functions

The **LabStart-aw** system is a simple to use laboratory measurement instrument. It can be adjusted to the user's needs by parameter settings explained in this chapter.

4.1. Starting the instrument

After switching on, the **LabStart-aw** needs a certain time before the sensor is heated up. During this time the display shows the „WARMUP“ message. After this time (normally 2 minutes) the display changes automatically to the measurement mode. During the warm up, an extensive function check of the internal modules as well as of important software function is performed. Observed failures are shown on the display. During this period the device can be configured or measurements can be activated by pushing the „Start/Stop“ button. The measurement though starts only after the termination of the warm up period.

4.2. Prepare sample and start a measurement

Fill the sample cup with sample. As water activity is not mass depended, the amount you fill-in does not affect the result. Most appropriate is filling it by half. Bulkier material must be suitably crushed or manually cut into small pieces. Products consisting of several layers, or an outer coating, must also be crushed (e.g. confectionery products). Prolonged hand contact with the product must be avoided (falsification of measured value!). A grinder, if used, must not warm up the product. **Do not compress** the sample or pinch it out, it would reduce the surface area. The larger the surface area, the faster the aw value detection. Put the sample cup in the measurement chamber. Be careful not contacting the measurement head or measuring cell, especially if powder samples are measured. Most of them are electrostatically charged and stick to surfaces. Close the chamber by pushing the upper part of the instrument down until you hear a click (lock in place of black button). You can now read the actual value in „aw / %RH“ or „°C / °F“ on the display.

Important!

After closing the instrument, an IR temperature measurement is done right away. Is the sample **4°C hotter** than the system, the information „**OPEN CH**“ is shown on the display. Simultaneously a beep sounds for 30 seconds! (That can be interrupted by pushing any key)

In this case, the sample should be removed **as quick as possible** from the measurement chamber of the **LabStart-aw** to prevent a condensation inside the chamber. Otherwise this could lead to a limitation of the measurement accuracy for a longer period.

Put the cover on the sample dish and let it cool down before you start another measurement.

Note:

This warning function is not working if the IR measurement is inactivated due to an inserted protection filter (option).



0.32
ANALYZE^{aw}

The measurement is started by pressing the „**Start/Stop**“ button. Once pressed, the analysis function is initiated and the display shows „**ANALIZING**“.

As long as it is flashing alternately (Analizing/ ...°C) the aw-value and the temperature are not stable. The result can be read at earliest when the „**stable**“-value is displayed. An acoustic signal indicates the end of the measurement .

During the analysis the display shows permanently the current a_w -value and on the 2nd display line alternately the sample temperature. As soon as the measurement has reached stability, the stable value is displayed. on the right side of the display, a stable indicator is helping the user to determin whether it is close or far away from stable conditions thus completion of measurement. This indicator consists of 5 bars which will get fuller as more the stable conditions are fulfilled. If the measurement chamber is opened or not completely closed, the measurement will either not start or will be interrupted immediately.

4.1.2. Switching over the measurement display

The **LabStart-aw** has 2 different display modes for the current or stable aw-value. The mode can be selected by the function button „**Actual/Stable**“. If no stable value is reached, the symbol „ - - - „ is displayed in the „Stable“-view. Also the current measuring time respectively the stability time and sample number can be called up by pushing the Actual/Stable button for a longer time.

The current mode is shown by an arrow in the lower right display area („Actual“ or „Stable“).

4.1.3. Stability parameter setting



Different than other Novasina aw-meters, the **LabStart-aw** does not offer a stable time selection. There is just one mode (F (fast)) available which is equal to a stability time of 2mins.

4.1.4. Switching off the system



Remove the sample from the measurement chamber (if applicable) and switch off the device by pushing the „Menu / Enter“ button by a longer time. Switch-off the **LabStart-aw** before power supply is interrupted.

4.2. Configuration menu

By pushing the button [Menu] you get to the configuration menu, where you can select the single menu points using the button (up) or (down) to navigate.

4.2.1. Submenu „Stability factor“ - * STAB

After starting a measurement, the analysis phase of the aw measurement is activated. The observation time, during which the aw-value variation has to be $< 0.001 a_w$ can be optimised for each sample. This is, together with a constant temperature during the measurement, the **most important** criteria for an accurate, reliable and stable value. The LabStart-aw has just one pre-set mode (F). If you need a selectable stability time or different modes, opt-in for another instrument.

BEEP DUR

Setting of the duration of the acoustic signal once the stability has been reached.

Acoustic signal („beep“) at stability :

Duration of the acoustic signal („beep“) : **0...10 min; 0 = OFF**

EXIT

Quit the submenu „Stability factor“.

4.2.2 Submenu „Calibration“ - * CALIB

With this function the **LabStart-aw** can be checked periodically and if necessary adjusted at two points with the Novasina humidity standards „SAL-T“. One standard (75%rH) is supplied with each **LabStart-aw**. This re-usable salt tablets can be inserted into the measurement chamber and generates well defined aw values. Please refer to chapter 6.2. if you need a step by step guidance through the calibration process.

CAL XX

The deviation between the actual measurement value and the chosen reference value (=calibration point) is displayed. The instrument recognises automatically the used humidity reference as soon as the menu is activated. The temperature influence on the humidity reference is also taken into account. With the buttons [up] or [down] the second calibration point can be selected. If a value has not been calibrated, the display flashes. If then „Enter“ is pressed, the value is calibrated after a query.

CAL CLR

Single or all calibration points can be cancelled in this menu

CLR Cxx	=	cancels a single point (xx)
ALL	=	cancels all calibration points
no	=	no calibration point is cancelled

„EXIT“

Quit the submenu „Calibration“

4.2.3. Submenu „Display settings“- * LCD

Set contrast and displayed units in this menu.

CONTR

For an comfortable reading, the display contrast can be adapted individually.

LC-Display contrast: **0....9**

UNIT

The **LabStart-aw** can display the measured values (results) in various units.

„UNIT H“

Humidity / AW: **aw-value or relative humidity in % RH**

„UNIT T“

Temperature: **°C or °F**

EXIT

Quit the submenu „Display settings“

5. Important Notes About The Sensor

The sensor supplied with the Novasina *LabStart-aw* was factory tested and then calibrated at the following two a_w -value reference points : **0.33aw and 0.75aw**.

Humidity sensors are subject to certain ageing phenomena, which manifest themselves in deviations from the original value. These deviations can be compensated by recalibration. We therefore recommend you to periodically check the accuracy at the humidity reference points by verification and to recalibrate the instrument if deviation is more than $\pm 0.01a_w$ to the theoretical value at given temperature.

The standards are reusable and have a long lifetime with adequate handling. All calibration data are stored on the intelligent sensor. Thus a new sensor can be used directly without calibrating the **LabStart-aw** afterwards.

5.1 Correct handling of the sensor



Please read this information carefully, especially if you have purchased a replacement sensor and you are going to install it.

The Novasina sensor is a highly sensitive precision device. Please observe the following rules in order to avoid measuring errors or even destruction of the sensor :

- Do not let fall down either the measurement cell nor the **LabStart-aw** or physically shock it.
- Do not process a measurement if the white pre-filter is not mounted.
- Use Novasina protection filters, which can be mounted in front of the sensor, if you measure samples containing volatiles as acids, glycerin, PEG, alcohols or aroma. The protection filter absorbs the volatile compound but let water vapor passing thru. This way you will get a true water activity value even if volatiles are present in the sample. Ask your local supplier to get more info about filters.
- Sensors that are not used should be stored in the original plastic case in a dust free, neutral atmosphere at room temperature and ambient humidity.
- If the **LabStart-aw** is not in use, keep the measurement chamber empty and closed.
- Do not clean the sensor, you will destroy it! Clean the measurement chamber from time to time but do not use aggressive or abrasive chemicals.
- Never connect the sensor to an Ohmmeter or other analyzing equipment. This may damage the sensor and will expire the warranty of the sensor!



Note:

If possible always leave the **LabStart-aw** switched ON. The integrated heating system protects the sensor from saturation and the instrument is always ready for the next measurement.

6. Calibration

6.1. Factory Calibration, Delivery Status

Every **LabStart-aw**, as well as every new replacement sensor „CM-4“ is delivered factory calibrated at 0.33aw and 0.75aw which is confirmed on the included factory certificate. A **LabStart-aw** has its full accuracy even after exchange of a new sensor, No initial calibration by the customer is required as sensor is shipped pre-calibrated. Best practice is verifying the sensor after mounting. For the verification and a possible calibration of the **LabStart-aw** there is one SAL-T salt tablet (75%rH) included. If required, a 33%rH SAL-T standards is available as accessory. These reusable salt standards generate defined and reproducible humidity- respectively a_w - values.

Define a standard quality process for your aw-measurements and start first with shorter verification intervals. Afterwards you increase it according to the results and deviation. Possible deviations occur by contamination, pollution, vibration or general aging of the sensor. Experience in the field have shown that a calibration once a month is more than sufficient.

6.2. Calibration Process

Before calibrating the instrument, the following points should be considered:

- The calibration can only be processed **between 15°C - 30°C**.
- An adequate visual control and the right handling of the SAL-T standards has to be done in advance.
- Please shake the SAL-T before you place it in the measuring chamber. Thereby the standard is activated and salt crystals which possibly stick at the membrane are released.

Please place first the **SAL-T 75** into the chamber. Close the chamber and wait at least 45mins before you proceed. This time is necessary to reach the equilibrium in humidity and get a high precision. Afterwards you can proceed:

The calibration function is selected in the menu: „* **CALIB**“ -> „**CAL xx**“.

The system automatically shows you the reference value, which is nearby the calibration point. Check if the displayed value effectively corresponds to the inserted SAL-T salt in the chamber. If necessary use the button [up] or [down] to select the correct reference.

--- The deviation between the actual measurement value and the selected reference value (= calibration point) is shown now.

The temperature influence on the humidity reference is taken into account. Activate the calibration by pushing the „**enter**“ key.

For safety reason you will now be asked again, if the calibration at this point really should be carried out - „**SAVE ?**“. Answer this question with „**Yes**“ by pushing on [up] or [down]. The system saves now the new calibration on the sensor and shows „**DONE**“ on the display after successful storage.

Now you can go forward with the calibration of the 33%rH point if you have purchased this salt standard from Novasina. Please note that only those two points (75%rH and 33%rH) are available on the **LabStart-aw**. All other SAL-T standards will not be recognized but can be used for verification purpose. Define internal calibration routines in your quality process to assure that the procedure is always performed equally.

6.3. Clear Calibration Points

This function clears all calibration points, which are irrevocably saved on the measuring sensor. If a calibration point was calibrated wrong a single or all calibration points can be cleared. The function is performed when you enter the menu:

„* CALIB“ -> „CAL CLR“. By selection of the adequate menu point the function is carried out.

7. Maintenance

7.1. Cleaning of the instrument

Before cleaning, switch off the **LabStart-aw** and **disconnect it from the mains**.

For cleaning of the whole instrument, use a soft and slightly humid cloth. If you consider using a cleaning or disinfecting agent, please verify that it should not contain any aggressive substances. Whenever possible, use water. Air the measurement chamber afterwards to remove residual humidity, otherwise it might lead to wrong results.

Make sure that no liquid find its way inside the instrument. Protect as well the connectors on the backside from any cleaning liquid.

7.2. Cleaning of the aw-measurement cell „CM-4“

Please do NEVER clean the sensor CM-4 itself. The sensor is a very sensitive element with a chemical filter protection on the top. Every cleaning with chemical or mechanical means (wiping, use pressurized air etc.) will destroy the measuring sensor inevitably. Possible warranty claims expire instantly.

7.3. Periodic Recalibration with Humidity Standards

Like all precision measurement instruments, the **LabStart-aw** must be checked periodically and if necessary recalibrated. This procedure was already described in the chapter 6. Only in this way you can secure the accuracy of your measurements. The Novasina SAL-T humidity standards are applicable for this procedure.

There are no general rules for the periodic control of the system. This mainly depends on the product character, the frequency of measurement, further ambient conditions and the aging of the sensor. Novasina recommends the following steps:

- Verify the instrument weekly with the SAL-T 75% or 33%. For that purpose, please the SAL-T standard in the chamber, close it and wait 45mins
- Compare the current value with theoretical one at given temperature
- If deviation is more than $\pm 0.01aw$, calibrate the instrument. Just go to *CAL menu and perform without opening the chamber. This way you can profit from the already established equilibrium.

7.4. How to check operating conditions of SAL-T standards

There is no expiry date defined for the humidity standards. We can only refer to past experience of customers regarding the length of time for which these can be used for, which is between 2 to 5 years before they have to renew them. However, this is not guaranteed since it depends on the handling, storage, the frequency of use and also on the type of humidity standards themselves. Clumps are not an issue as long as there is always some small salt crystals are present in the tablet. Please make sure that all SAL-T standards are shaken twice a month for approx. 1 minute, nevertheless if used or not.

The check of operability has to be done visually. Below you can find pictures and information regarding the two SAL-T standards which can be used with the **LabStart-aw**. To proceed with the visual check, remove salt tablet from plastic container, shake it and place it on a table with white membrane facing towards the table.



SAL-T 75%

Solid white crystals in pink colored solution.
Ratio of solid crystals and water is approx. half/half.
Standard is no longer in good shape if water amount is less than 1/3 or if just salt crystals are left.



SAL-T 33%

Sticky blue water/salt mixture.
Ratio of solid crystals and water is approx. half/half.
Standard is no longer in good shape if water amount is less than 1/3 or if just salt crystals are left.

7.5. Replacing Protection Filters

Always use protection filters to protect the measuring sensor from contamination by unwanted particles or volatile components. Various filters are available for different type of volatiles. Please consult the filter selection data sheet or contact your local Novasina agent if you need help.

Such chemical protection filters have to be replaced periodically due to the fact that they get saturated. Filters can increase the measurement time.

Novasina provides the following protection filters for the **LabStart-aw** :



- **eVC-21 filter :**
Chemical filter: protects against short-chained organic acids as acetic and formic acid and other carboxylic acids (butyric acid etc) and oxidizing agents as hydrogen peroxide and chlorine and as well againts diluted sulfur dioxide
- **eVC-26 filter :**
Chemical filter: protects against various substances as nitrogen oxides, amines, aldehyde solvents, aromatic hydrocarbons, oil vapours, fine dust particles.
- **Redox filter :**
Chemical filter : protects against volatiles containing primary and secondary alcohols (attention, ethanol is an exception, eVALC filter or special alcohol cell has then be used), glycerin, glycols, aroma, perfumes, flavours etc.
- **eVALC-1 alcohol filter :**
Chemical-mechanical filter : protects against fine dust or alcohol (ethanol) till a content of 0.5% (mass percent) in the sample.

7.5.1 How check protection filters for saturation

All filters are apsorption-type, thus they will become saturated after some time and loose their functionality. It is of crucial importance to check the filter for saturation. Please proceed as follows:

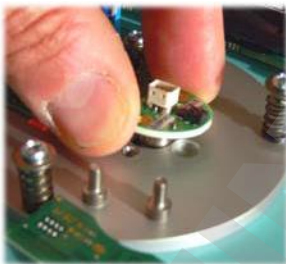
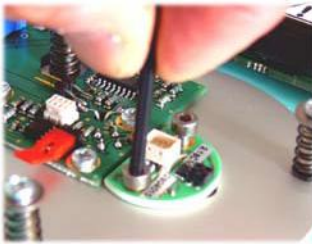
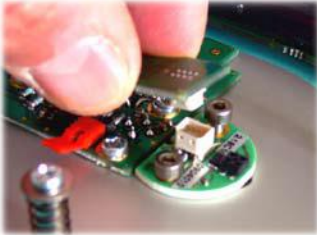
1. Select a SAL-T standard which has an aw-value close to the procduts which are normally measured with the instrument.
2. Shake the standard and place it into the measurement chamber. Close the chamber and wait for 45 minutes. Take the reading.
3. Compare the reading with the theoretical value at this point and at the measurement temperature.
4. If the deviation is more than +/- 0.01aw, perform a calibration. Note the date of calibration.
5. If the calibration interval gets shorter (i.e. from 30 days to 20 days) at least two times in a row, replace the filter. The more frequent calibration is an indication for sensor contamination.
6. By replacing the filter, you get an idea about the exchange interval (install date to exchange date) and you can define a standard filter exchange interval.

Attention !



Defective or wrong mounted filters do not fulfill their function and provide the risk of instrument or sensor damage. Such filters must be replaced immediately.

7.6. Replacing a CM-4 Sensor Unit



The **LabStart-aw** contains sensitive electronic assemblies. Please protect these items from electrostatic discharge (esd) by discharging yourself at a grounded, conductive surface (e.g. radiator) before you open the housing of the instrument.

- Switch off the instrument and disconnect the mains from the system.
- Open the measurement chamber and dismount the 4 screws of the cover plate using the hexagon wrench which was delivery with the instrument
- The housing cover can now be separated from the upper measurement chamber plate

NOTE: The upper measurement chamber plate is still connected to the lower housing by a ribbon cable. Do not loosen or remove the ribbon!

- Look for the board which covers the sensor and remove it by grabbing the PCB on the side walls and firmly lifting it.
- Remove now the two screws which fix the actual sensor in the measuring head and remove the sensor unit completely out of the head.

Note:

It is recommended to exchange the white pre-filter (sinter filter) as well. Press the sinter filter downwards and insert a new one.

- Insert now the new measuring sensor in the respective place and fix it with the two screws.

Warning !

- Never apply any pressure with any item on the top of the measuring cell. This might damage the sensor protection filter and makes the sensor useless
- Always remove the measuring sensor while exchanging the sinter filter, otherwise you risk that the sensor and a purchase of a new one would be required.

Important: Make sure you mount back the cover correctly. Special care has to be taken for the 4 screws fixing the cover to the cover plate. Screw them tightly. If cover is not closed properly, measurement problems can occur

8. Technical Specifications LabStart-aw

General :

Supply	:	5VDC +/- 6%, max. 4W (during charging of battery) Normal operation < 0.5W
Line adapter*	:	90 - 264 VAC, 50/60 Hz, output 5VDC (Novasina part no. 260 0505) * can only be operated in the range of 0...+40°C

Operating ambient conditions:

Operating temperature	:	5 ... 45 °C (during charging max. 40°C)
Humidity range	:	5 ... 95%rh, not saturated
Dimensions (instrument)	:	225x140x85 mm
Weight (instrument)	:	1.2 kg
Protection class	:	IP 30

Temperature measurement :

Measuring principle	:	NTC
Measuring range	:	5 ... 45 °C
Accuracy	:	+/- 0.15 °C
Resolution	:	0.1 °C

Humidity measurement :

Measuring principle	:	Resistive-electrolytic sensor
Measuring range	:	0.03 ... 1.00 aw
Measuring accuracy after	:	+/- 0.03aw (within the calibration range)
2-point-calibration	:	between 15 ... 30 °C
Resolution	:	0.01aw (1%rh)
Repeatability	:	+/- 0.01 aw

Display :

Type	:	Reflectible LC-Display wiht adjustable contrast
Dimensions	:	35x69 mm

Instrument standards :

Tested CE standards	:	The LabStart-aw instrument fulfills the followed actual CE standards, EC 61000-6-1:2005, EN 61000-6-1:2005, IEC 61000-6-3: 2006, EN 61000-6-3:2007
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Emitted electromagnetic radiatons with frequency in the range of 320...340 Mhz might have an temporary influence on the temperature (IR) measurement up to 1,5 K during the radiation!

8.1. Equilibrium humidity values of the SAL-T humidity source

Type of Hum.check	Novasina type	EU Toxic classe	Color of salt	Chem. symbols	% relative humidity in relation of temperature ($x / 100$ in a_w)				Literature Reference
					15°C	20°C	25°C	30°C	
SAL-T / 33	SC-33	--	blue	MgCl ₂ -6H ₂ O	33.3	33.1	32.8	32.4	A
SAL-T / 75	SC-75	--	purple	NaCl	75.6	75.5	75.3	75.1	A/B

Lit :
 A : Greenspan, Humidity Fixed points of Binary Saturated Aqueous Solutions
 Journal of Research of the National Bureau of Standards Vol. 81A, No1 01/02 1977
 B : Robinson R.A. and Stokes R.H. Electrolyte Solutions, Butterworths London 1959

9. Troubleshooting

The calibration of the a_w -value is not possible?

1. Check if SAL-T standards are in good shape or not. If not, replace.
2. Sensor is defective or contaminated and has to be replaced

You have a drift of the a_w -value after completing the measurement

1. Temperature of the probe is not in equilibrium process
2. Sample has a second sorption step. In this case, the **LabStart- a_w** is not appropriate

Reading of the LCD screen is very bad

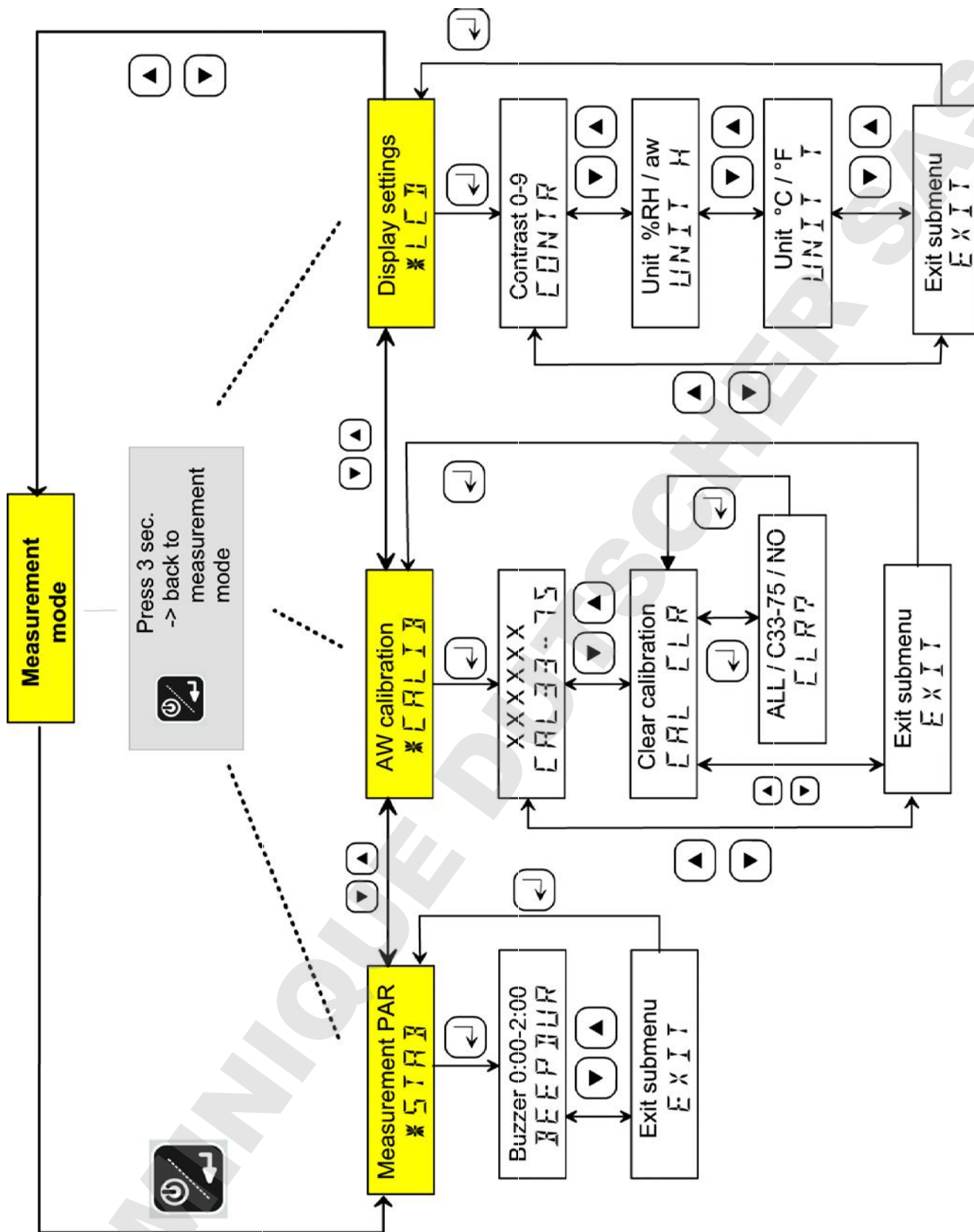
1. Contrast of the screen is not set properly
2. Ambient light is bad. Please change the place of the instrument

9.1. Error Messages

If any error message appears on the **LabStart-aw** screen, please proceed as follows:

Please write down the error message carefully or take a picture. Switch the instrument off and restart. If the error message persists, please follow the instructions on the table and/or contact your Novasina representative (www.novasina.com)

Error report	Error description	Needed action
„DEW“	SAL-T standard or sample is too hot	Immediately open the chamber, take out sample, put cover on it and let cool down. Then take away cover and restart measurement.
„RANGE“	Measurement value is outside calibration range	Check humidity standard. Check if correct calibration range of SAL-T standard has been chosen. Replace sensor
„TEMP“	Calibration temperature is outside allowed range of 15°C...30°C	Check ambient conditions and relocate instrument if temperature requirements can not be met.
„XX SENSOR“	Error given by measurement cell	The installed humidity sensor is either not compatible or not accepted by the instrument. restart the instrument. If error persists, please contact your local distributor
„NO SENS“	Measurement cell was not recognized	Double-check, if a measurement cell (CM-4) is installed. If error persists, please contact your local distributor
„FATAL“	An internal error occurred	If error persists, please take a picture of the error code and send it to your local distributor





Novasina – Swiss Quality, Flexibility and Competence

Since its establishment almost 50 years ago, the Novasina company has specialised in the accurate measuring of air and material humidity. The basis of this was the world's first, self-developed electronic measuring sensor for measuring humidity. This technology is based on the resistive electrolytic measurement principle. This was further developed and optimised over decades. This measuring principle is generally the most demanding and most accurate. Modern substances and materials allow continuous optimisation and expansion of the area of application of this measuring sensor. Today the highly accurate humidity measurement is among our core competences and forms an important pillar of our success. Intensive research and development further ensures a decisive advantage for us. Novasina sensors and measuring instruments are mainly applied to the area of air and material humidity. This is almost exclusively used in industrial applications as well as in research and development.

We fully develop and produce Novasina precision measuring instruments in which our Know-how of many years is always included. We are proud of the „SWISS MADE“ label, which guarantees the highest quality, innovation and longevity.

The diversity of our customers, business partners and applications as well as our international orientation makes Novasina the competent partner for demanding humidity measurements in the industrial area!

Your Novasina Team



Consulting, Sales and Service:

Manufacturer :

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