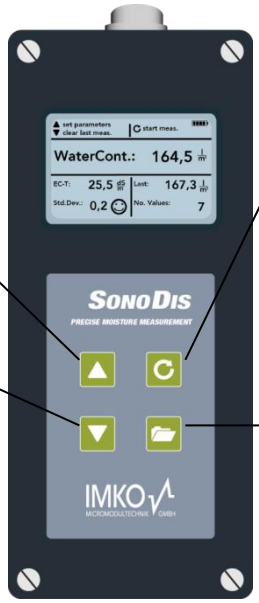
Short Instruction Sheet for SONO-WZ

Fresh concrete is a not easy to measure material. The use of SONO-WZ requires a careful compliance of the here described procedures.

The four control keys of SONO-DIS



„UP"

Back to previous menu item or setting

„DOWN"

- Go to next menu item or setting
- Deleting the value memory.

„Measurement/Activate"

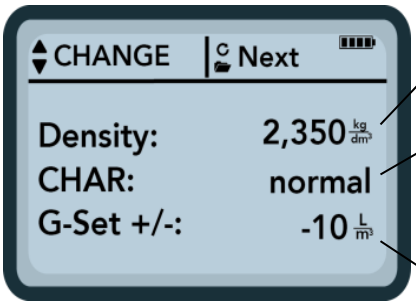
- Shutting SONO-DIS ON/OFF → press 1 second
- Perform measurement → press shortly
- Selection of a menu item → press shortly
- Storing a setting → press shortly

„Settings"

- Conclude Settings by pressing this button longer than 1 second
- Leave Menu Item by short pressing

Attention: For measuring concrete, the standard calibration curve **"Cal. No.4"** is pre-selected inside the SONO-DIS. When switching-on the SONO-DIS, the display shows the active calibration curve Cal.No.4. This pre-selection should be changed only if other materials as concrete shall be measured.

Enter the following three **base parameters** into the SONO-DIS:



If you want to measure the complete water content (the total kiln drying water content), the G-Set is to be entered with a plus value, with 1/3 of the core water!

Raw Density, take the value from the vibrating table test, or take the density from the mix computation.

Characteristic of the recipe with **fine** (positive-correction), **coarse** (negative correction), **normal** (no correction) or **special** (gap graded with negative correction).
Note: Primarily **the mortar** content in the concrete influences the parameter CHAR, **fine** means a higher mortar content, **coarse** a lower mortar content.

General-Set: Adjustment for type of concrete and type of aggregates with different core or core water content. Entering max. +- 50 liter. Typical value is -10 liter/m^3 which is automatically subtracted during measurement, when the effective water content (the active water) is to be measured.

Despite entering the correct three parameters, there could be fresh concrete recipes with rock types, where a single test of the G-Set parameter is necessary. This can be done with crosschecks of water content values determined by correctly mixed concrete with surface dried aggregates or by comparing the SONO-WZ with precise kiln dried values.

Please consider: Important points, published in the SONO-WZ manual have to be considered when determining kiln dried reference values! Concretes which do not comply with standards can tend to bleed. Such concretes are difficult to measure with SONO-WZ (but also with kiln drying test) and therefore it can come to measurement deviations.

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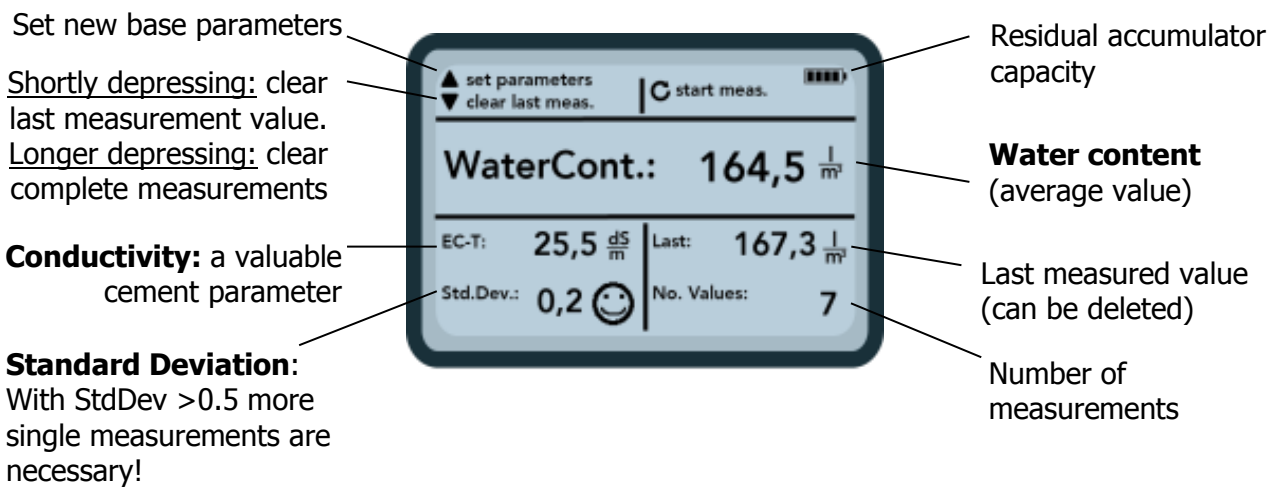
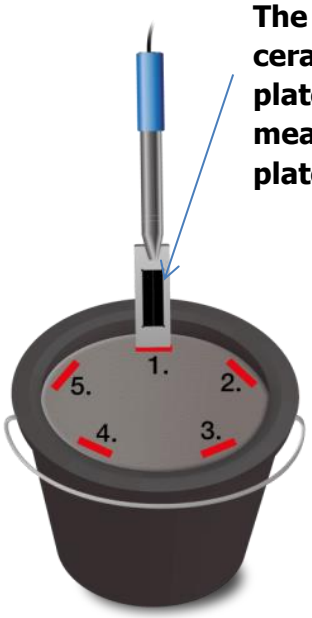
Measurement Mode and Display



Measurement procedure for concretes with low and mean slump values (F2, F3, F4)



The dark ceramic plate is the measuring plate !

Important: When sampling the concrete for the bucket, make certain that the concrete is not unmixed here! The probe head should be placed inside the concrete with a slight angle, at the edge of the bucket in position1. Compress the concrete by several knockings with the foot at the bucket, so that there are no air-gaps at the probe´s surface. Start the measurement by pressing the start button. For every new measurement cycle: Remove the SONO-WZ probe, prick in the probe at a different place around the edge of the bucket, shifted by 45 to 90 deg. and perform a further single measurement after compressing by several knockings at the bucket.

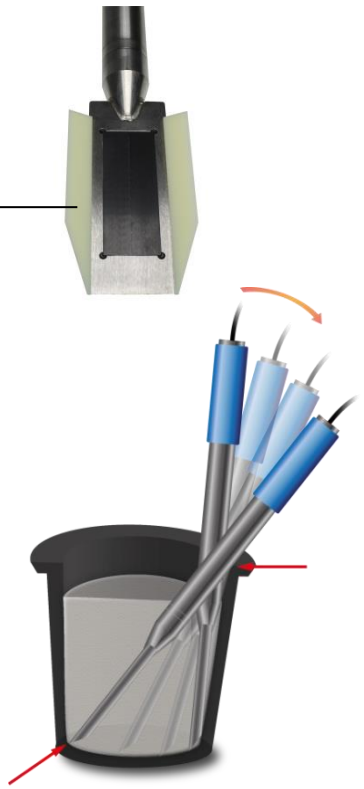
Do not move the probe during measuring!

Use a standard 10-12 liter plastic bucket. Do not use metal buckets or larger containers, due to correctly compaction!

- **Never prick twice at the same place in the bucket !**
- **Delete a single measurement value if the deviation is too high from the mean value!**
- **The higher the number of single measurement cycles, the higher the measurement accuracy!**
- **Before starting a series of measurements, it is recommended to make an initial test measurement and thereafter to delete this initial measurement result.**

Measurement procedure for liquid concretes with very high slump values (F5, F6)

Important: When sampling the concrete for the bucket, make certain that the concrete will be not unmixed already at sampling!



1) Fill the bucket with only three quarters of the volume.

2) Insert the SONO-WZ probe inside the concrete with the putted **plastic shovel,** with a slight angle, at the edge of the bucket in position1. The plastic shovel ensures that larger gravel didn´t "drift away" from the WZ-probe head during measuring.

3) Press the probe tip with the black ceramic window in front side, slowly and diagonally to the opposite side of the bottom of the bucket, so that the handle of the probe lies on the edge of the bucket. This ensures that a representative concrete mixture lies closed on the probe´s surface. Carry out this procedure several times, whereby the insertion of the probe at the edge of the bucket should be shifted by 70 to 90 degree.

Possible Problems

Pittfall1 in the laboratory: When using very dry aggregates in the lab, it is necessary to wait a certain delay before measuring with SONO-WZ. With dry aggregates, the water content result could be too high. The reason is that 10 to 20 minutes delay time can be necessary for saturation of the aggregates, dependent on type of rock.

Pittfall2 in the laboratory: During mixing of concrete in a small and open mixer, water escapes because the water adheres on extensive surfaces and evaporates there very quickly. A subsequent adding of water, e.g. +50 gram water for increasing the water content of a concrete from 175 liter/m^3 to 185 liter/m^3, will lead to significant deviations. Depending on mixing time, up to 5 liter/m^3 measurement error can be produced due to this effect.

Pittfall3 in the concrete plant: See also manual SONO-WZ, chapter "Pittfalls in the laboratory and the concrete plant".

Air voids and glass fibers reduce the concrete density. SONO-WZ reacts (unfortunately) neither to air voids nor to glass fibers. That is, that SONO-WZ shows a too high water content when measuring concrete with air voids or glass fibers. Depending on content of air voids or glass fibers, SONO-DIS displays 5 to 10 liters/m^3 too high. Depending on the concrete recipe we recommend here to adjust the parameter **G-Set** to -5 to -10 liters/m^3.
Also for concrete with **steel fibers**, the SONO-DIS shows a too high water content. Here also it is recommended to adjust the parameter G-Set with -5 to -10 liters/m^3 in the SONO-DIS.

SONO-WZ measures three types of water

Note: In principle SONO-WZ measures the same water like the kiln (oven) drying procedure.

1. **Free or effective water** in the concrete mixture, the water content which is count for the water/cement ratio (the desired result).

2. **A part of the core water.** Such capillary water is absorbed by the aggregates. Therefore this water must not be count for the water/cement ratio!

   If SONO-WZ is to measure the effective (active) water content:
   If a rock has e.g. 15 liters/m^3 of core water, then SONO-WZ sees only 1/3 of it. That is, the **G-Set** must then be entered with the remaining 2/3 as a negative value in order to measure the effective (active) water content. Here G-Set = -10 liters/m^3 if the core water is typically 15 liters/m^3.

   If SONO-WZ is to measure the complete water content (the total kiln drying water content):
   In this case, then the G-Set must be entered with a third of the positive value of the core water. Here G-Set = +5 liters if the core water is typically 15 liters/m^3.

3. **Chemical additives** which behave like water are therefore also measured by SONO-WZ, which must be taken into account.

It is recommended to adjust once the SONO-WZ to the used recipe with the type of rock or the location of the rock type (see also chapter "Capillary Water…." in the manual of SONO-WZ).

If SONO-WZ shows a too high water content for a specific concrete, than it is necessary to adjust the parameter **G-Set** with the corresponding number of liters. The precise value for the **G-Set** which has to be set once inside the SONO-DIS, and can be controlled or determined in two ways:

A) With comparative concrete measurements of SONO-WZ with correct and known values of water content (e.g. fresh concrete which is mixed with totally dried aggregates).
B) With comparative measurements of SONO-WZ with correct values of water content, controlled by several kiln dried values.

The kiln dried water content is set up as follows:
Kiln water content = effective water + capillary water + "water content" of chemical additives

Kiln dried reference values: Up to 6 important points, published in the SONO-WZ manual, have to be considered when determining kiln dried reference values!

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