

Operating Manual

Injection probe

for resistive material moisture measuring device with BNC connector
with integrated temperature sensor (thermocouple type K)

GSF 40TF



-  Please carefully read these instructions before use!
-  Please consider the safety instructions!
-  Please keep for future reference!



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1 General Note

Read this document carefully and get used to the operation of the device before you use it. Keep this document within easy reach near the device for consulting in case of doubt.

Mounting, start-up, operating, maintenance and removing from operation must be done by qualified, specially trained staff that have carefully read and understood this manual before starting any work.

The manufacturer will assume no liability or warranty in case of usage for other purpose than the intended one, ignoring this manual, operating by unqualified staff as well as unauthorized modifications to the device. The manufacturer is not liable for any costs or damages incurred at the user or third parties because of the usage or application of this device, in particular in case of improper use of the device, misuse or malfunction of the connection or of the device.

The manufacturer is not liable for misprints.

2 Safety

2.1 Intended Use

The slim and robust injection probe is a first-class tool for humidity measurements of pressed straw or hay (bales) and grain. An additional display has to be connected (e.g. GMH 3830 / -50).

The measuring is based on electrical resistance measuring and therefore suitable compression has to be provided to get sufficient contact during the measuring.

The temperature measuring via the integrated sensor in the tip has to get enough adjusting time.

2.2 Safety signs and symbols

Warnings are labeled in this document with the followings signs:



Caution! This symbol warns of imminent danger, death, serious injuries and significant damage to property at non-observance.



Attention! This symbol warns of possible dangers or dangerous situations which can provoke damage to the device or environment at non-observance.



Note! This symbol point out processes which can indirectly influence operation or provoke unforeseen reactions at non-observance.

2.3 Safety guidelines

This device has been designed and tested in accordance with the safety regulations for electronic devices. However, its trouble-free operation and reliability cannot be guaranteed unless the standard safety measures and special safety advises given in this manual will be adhered to when using the device.

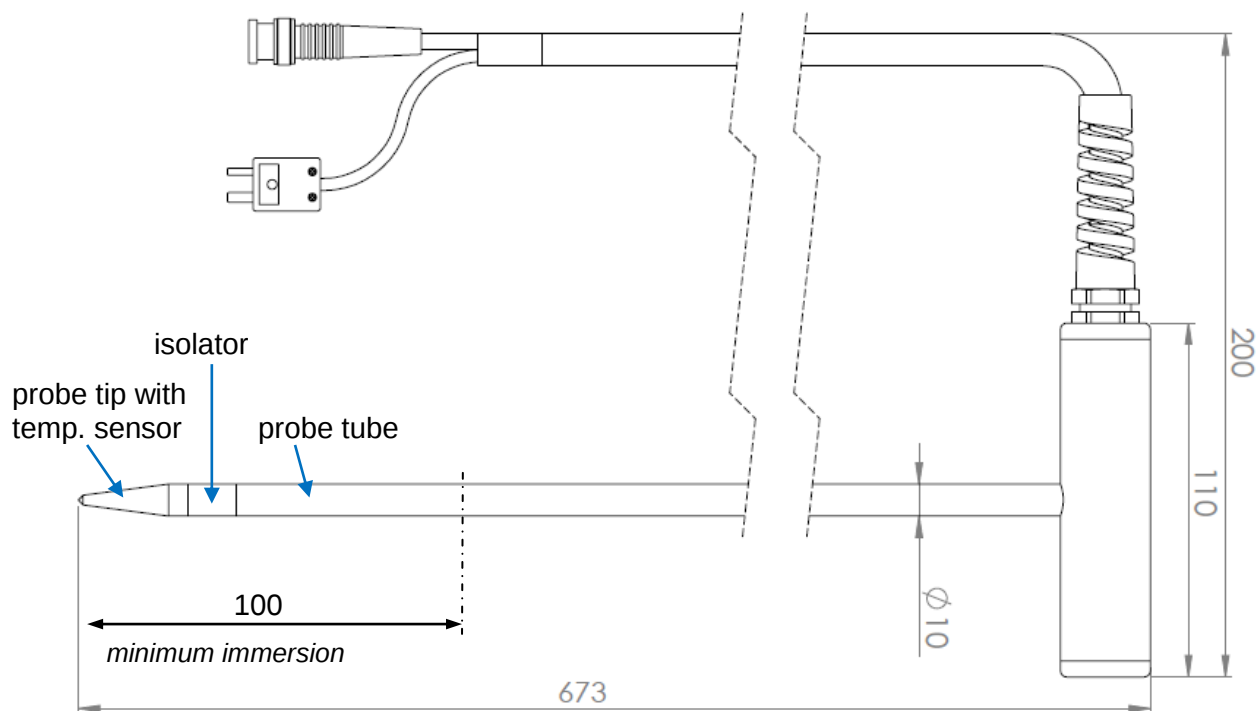


Risk of injury! Only use this injection probe is extremely carefully, keep it out of reach from children.

3 Operating and Maintenance

- Treat the injection probe carefully (do not throw, hit against etc.). Protect plugs and sockets from soiling.
- When disconnecting the cable from the instrument, do not pull at the cable but on the plug. For locking and unlocking the movable ring has to be turned in its according direction. When having attached the plug right, it can be connected or disconnected gently without effort.
- The plastic isolator has to be clean and dry in the range of the sensor pike, when not, faulty measurements may occur.

4 Measurement Basics



The resistance of the medium between the probe tip and the probe tube is measured. The medium being measured has to be compressed well.

The best is, having a constant pressure onto the medium during the measurement. Do not release during the measuring, otherwise the contact to the medium can be interrupted, in this case a too dry value would be measured.

It is better to repeat the measurement a few times for best results: the higher values are decisive.

The measurement is depending on temperature. For an exact measuring result the temperature is automatically compensated when using the suitable instrument (e.g. GMH 3830). The temperature-measuring is done at the tip of the probe, a sufficient time to adjust the sensors temperature to the material has to be waited for.

Different measuring results are depending on different types of curve data: Select correct wood-group or material-type before measuring. Refer to operation manual of the connected measuring device. When pushing in the probes, oscillating movements have to be avoided. Otherwise hollows between the probes and the material may falsify the measurement.

The measuring values

For storability and evaluation of quality and purpose the measuring is a valuable decision support – Beside other criteria like smell (mouldy?)– consistency (dust...) and look (colour, dirt...).

For freshly harvested material like straw, hay and grain the following can be recommended:

below 16 % u	Material is sufficiently dry and storable
16 - 20 % u	Material contains significant moisture, eventually dry it before storage
above 20 % u	Material contains excess moisture, stop harvesting if possible!

Irregular moisture distributions

Please consider: depending on storage and harvesting procedure, there can be irregular distributions of moisture within the bales or grain heaps/stores.

Measuring precision

The measuring with GSF 40 is no high-precision measuring, it is designed for approximate determination of material moisture. Depending on state and sort of material there may be deviations. The strength of the measuring system lies within the ability, due to the construction and usability, to gather fast and comfortably many measurements spread over the bale/store (deep inside, at the floor, at critical weathered places..) – in practical use this often is much more valuable than single precision measurements and also is a valuable supplement to single precision measurements!

Minimum immersion / minimum amount of material

For best measuring results, the black isolator at the probe tip has to be completely immersed into the material plus at least 5 cm of the stainless steel shaft has to be in good contact to the material.

When measuring grain, try to use at least ~ 500ml of grain, covering the probe tip and ensure to have enough contact/compressed grain around the probe – In heaps/stores higher than 30 cm and minimum immersions of 20 cm no additional measures have to be taken; otherwise the measurement values may be too low.

Keep probe clean!

Especially when measuring in wet hay, the probe may be soiled very strong, this may produce to low measuring displays.



Soiled probe -> wrong measuring!

In hard cases we suggest fine grinding fleece or at least suitable household sponges for cleaning. Do not use steel wool!

Display values at air

If the probe is not correctly in contact to material, the instrument may display any value! This is caused by the design and measurement method.

At values above 25% u the measurement precision decreases!

But decision making in this range is: Wet is wet, no matter how wet!

Different measuring units

Older instruments (e.g. GMH 3830 before V1.4) cannot be switched from moisture content u to w, in this case the wet basis moisture content can be calculated like following:

$$\text{Wet-basis moisture } w [\%] = 100 * \text{Moisture content } u [\%] / (100 + \text{Moisture content } u [\%])$$

Example: 1 kg of wet wood, which contains 500 g of water has a moisture content u of 50%

5 Specifications

Measuring principle	Resistive material moisture measurement temperature: insulated thermocouple type K in probe tip 0...100 °C
Connection	BNC and thermo element type K plug (cables fixed on probe)
Profile	shaft Ø 10 mm
Overall length	67.3 cm
Measuring depth	60 cm
Weight	350 g

6 Reshipment



DANGER

All devices returned to the manufacturer have to be free of any residual of measuring media and/or other hazardous substances. Measuring residuals at housing or sensor may be a risk for persons or environment



Use a adequate transport package for reshipment, especially for fully functional devices. Please make sure that the device is protected in the package by enough packing materials.

7 Disposal instructions



The device must not be disposed in the unsorted municipal waste! Send the device directly to us (sufficiently stamped), if it should be disposed. We will dispose the device appropriate and environmentally sound.