Schaller
Messtechnik / humimeter.com

Moisture meter

Operating Manual

HGT Wood chips moisture transmitter

for measuring the moisture content of wood chips

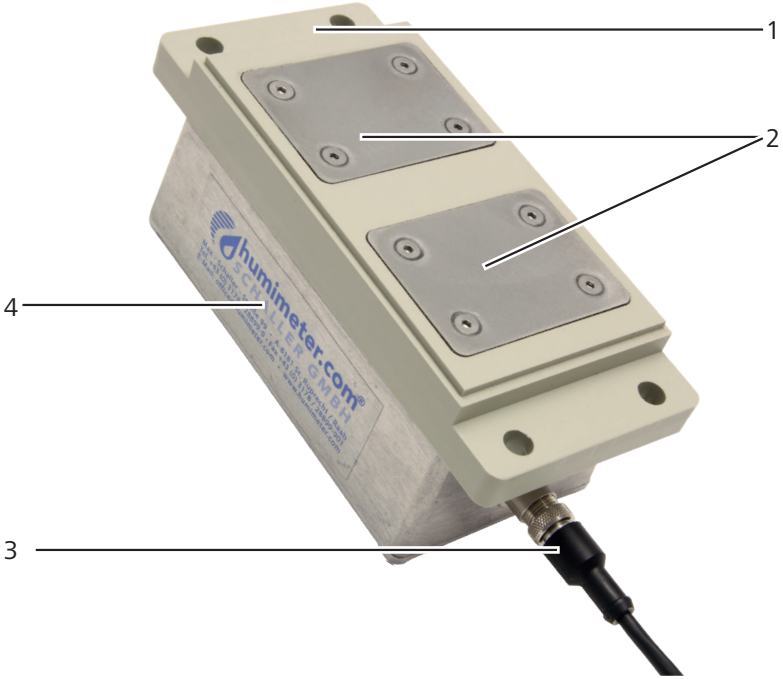
78,0 °F | 6,16% | 456 kg/m³ | −27,3 td | 0,64 aw | 51,9 %r.H. | 14,8 %abs | 100,4 g/m² | 09 m/s | 4,90 Ugl | 1

Version 5.3

Always read this operating manual before using the HGT!

Your HGT device at a glance

The main unit



No.	Name
1	Sensor block
2	Sensor surface
3	Connecting cable
4	Aluminium housing for electronics

Table of contents

1. Introduction

1.1 Information about this operating manual

This operating manual is designed to enable you to use the HGT safely and effectively. It is part of the device, has to be stored nearby and must be easily accessible to users at all times.

All users are required to carefully read and make sure that they have understood this operating manual before using the HGT. All of the safety and operating instructions detailed in this manual have to be observed to ensure the safety of the device.

1.2 Limitation of liability

All of the information and instructions provided in this operating manual have been compiled on the basis of the current standards and regulations, the state of the art, and the extensive expertise and experience of Schaller Messtechnik GmbH.

Schaller Messtechnik GmbH does not accept any liability for damage associated with the following, which also voids the warranty:

- Non-observance of this operating manual
- Improper use
- Inadequately qualified users
- Unauthorised modifications
- Technical changes
- Use of unapproved spare parts

This fast measuring procedure can be affected by a range of different factors. For this reason, we recommend periodically checking the device's measurements with a standardised oven-drying method.

We, as the manufacturer, do not accept any liability for any incorrect measurements and associated consequential damage.

1.3 Symbols used in this manual

All of the safety information provided in this manual is shown with a corresponding symbol.

ATTENTION

It is essential to observe this warning. Non-compliance can lead to damage to property or equipment.

Information

This symbol indicates important information that enables users to use the device more efficiently and cost-effectively.

1.4 Customer service

For technical advice, please contact our customer service department at:

Schaller Messtechnik GmbH
Max-Schaller-Straße 99
A - 8181 St.Ruprecht an der Raab

Telephone: +43 (0)3178 28899
Fax: +43 (0)3178 28899 - 901

E-mail: info@humimeter.com
Internet: www.humimeter.com

2. For your safety

The device complies with the following European directives:

- Restriction of Hazardous Substances in Electrical and Electronic Equipment (RoHS)
- Electromagnetic compatibility (EMC)

The device corresponds to state-of-the-art technology. However, it is still associated with a number of residual hazards.

These hazards can be avoided through strict observance of our safety information.

2.1 Proper use

- Online measurement of the water content (optionally water content and temperature) of wood chips by installation of a sensor in the material flow
- Fully calibrated system with calculation of the measuring value by the transmitter unit

2.2 Improper use

- The device must not be used in ATEX.

2.3 User qualifications

The device must only be operated by people who can be expected to reliably take the measurements. The device must not be operated by people whose reaction times may be slowed due to, e.g. the use of drugs, alcohol or medication.

All persons using this device must have read, understood and follow the instructions provided in the operating manual.

2.4 General safety information

The following safety information has to be observed at all times to avoid damage to objects and injury to people:

- In case of damages or loose parts on the device, contact Schaller Messtechnik GmbH or your dealer.

All of the device's technical features have been inspected and tested before delivery. Every device has a serial number. Do not remove the tag with the serial number.

2.5 Warranty

The warranty does not apply to:

- Damage resulting from non-observance of the operating manual
- Damage resulting from third-party interventions
- Products that have been used improperly or modified without authorisation
- Products with missing or damaged warranty seals
- Damage resulting from force majeure, natural disasters, etc.
- Damage from improper cleaning

3. On receipt of your device

3.1 Taking the device out of its packaging

- Take the device out of its packaging.
- Next, make sure that it is not damaged and that no parts are missing.

3.2 Making sure that all of the components have been included

Make sure that all of the components have been included by checking the package contents against the following list:

3.2.1 Scope of supply

- HGT
- Connecting cable of 1.9 m length
- Operating manual

Optional accessories:

- Analogue output for temperature measurement (-10 °C to +70 °C)
- Display with keyboard in the housing for HGT
- Test block

4. Installation of the wood chips moisture transmitter

4.1 Laying of the supply line or transmission line

- The cable must not be laid in the area of interference fields.
- Do not operate the transmitter in the area of electromagnetic interference fields.
- The cable must not be bent excessively.
- The permissible cross-sections for the installation must be observed.
- The cable length must be kept as short as possible.

» If an extension of the cable is required, the cross-section of the extension must not be below 0.25 mm^2.

4.2 Mounting the sensor

- During the measurement a continuous contact between the stainless metal sensor surfaces and the material being measured has to be ensured.
- For a correct measurement result, the product must exert a pressure of at least 20 N/dm^2 onto the sensor surfaces.
- There must be no contact of any conductive materials with the sensor surfaces.
- Mount the sensor on the four drilled holes (ø 9.0 mm) in the sensor block.

Possible mounting locations:

- Screw conveyor

» Installation at the bottom of the trough

- In-feed chute with hydraulic ram

» Installation at the side wall

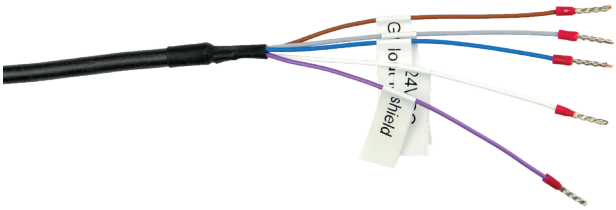
- Bunker

» Installation at the side wall (to ensure the minimum pressure, the sensor possibly has to be mounted at an angle)

Note for installation after the dryer:

After the drying process the material surface is much dryer than its core. Therefore an installation directly after the dryer will lead to too low measuring values. The specified minimum measuring range of 10% water content (for wood chips) will not be possible, in fact the measuring range limit is higher.

4.3 Pin assignment



Cable color	Pin no.	Function
Brown	1	Power supply V- (0 VDC) Ground current output
White	2	Power supply V+ (24 VDC)
Blue	3	Analogue output humidity 4 - 20 mA
Black	4	n.c.
Grey	5	Analogue output temperature 4 - 20 mA (optional)
Purple	Housing	Equipotential bonding GND

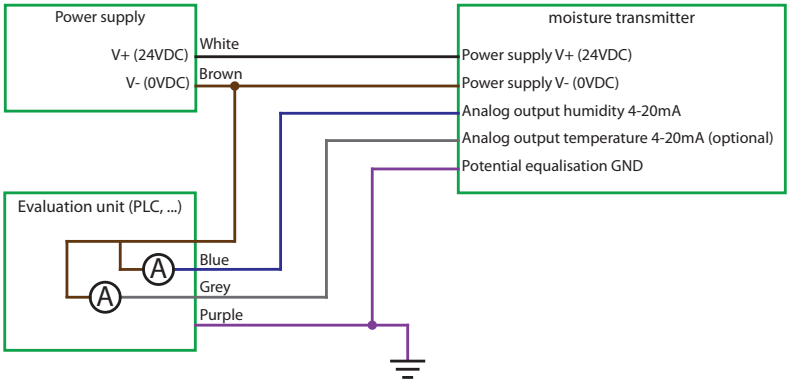
ATTENTION

Damage to the electronics due to incorrect cable connection

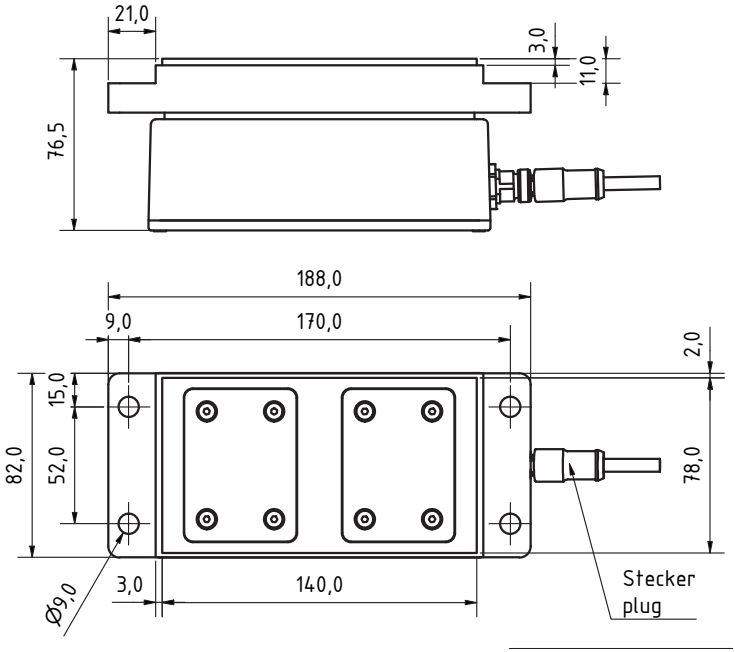
Incorrectly connected cables can lead to severe damage of the electronics.

► Connect all cables correctly.

4.4 Wiring diagram



5. Technical drawing HGT



6. Product types

Product type	Material	Measuring range
Wood chips	Wood chips P31 to P45	10 % - 50 %

The system has been calibrated for standard wood chip types from P30 to P45. In practice it may occur that the shown measuring value differs from the real value. This means that the measured material has a different "moisture calibration curve" than the type of material that has been used for the calibration.

6.1 Definition wood chip types (in accordance with EN ISO 17225-1)

The given numbers refer to the particle sizes that fit through the round screen openings.

- P16 at least 75 % of the mass between 3.15 and 16 mm
- P31 at least 75 % of the mass between 8 and 31.5 mm
- P45 at least 75 % of the mass between 8 and 45 mm
- P63 at least 75 % of the mass between 8 and 63 mm

6.2 Selection of calibration curve for wood chips

The calibration curves for wood chips depends on the wood type (hardwood, soft-wood), the size of the chips (size classes according to norm EN ISO 17225-1) as well as on the content of fine fraction.

If you are not sure which calibration curve is the best suited for your material, it is recommended to carry out a reference measurement by kiln-drying (according to EN ISO 18134-2).

Schaller Messtechnik GmbH will be happy to advise you on the selection of the right calibration curve. Please send a picture of your wood chips, placing a measuring tape to the material, to support@schaller-gmbh.at. You will receive a recommendation from us immediately.

6.2.1 Wood chips

For wood chips with fine fraction, mainly consisting of hardwood (maximum proportion of softwood of 30 %). For wood chips sizes from P31 to P45. The fine fraction mainly derives from barks, small branches and bushes. See example pictures 1 and 2.

If your wood chips don´t contain small parts (few fine fraction or no fine fraction) or if the wood chips contain a higher proportion of softwood, use one of the following calibration curves.

6.2.2 Coarse wood chips

For coarse wood chips without fine fraction, mainly consisting of hardwood (maximum proportion of softwood of 30 %). This curve also has to be used for wood chips with fine fraction, mainly consisting of softwood, with a proportion of softwood (spruce, fir, pine, larch) of 70 % and more. For wood chips sizes from P31 to P63. See example pictures 3 and 4.

If your wood chips mainly consist of softwood and don´t contain small parts (few fine fraction or no fine fraction), use the following calibration curve.

6.2.3 Industrial wood chips

For coarse wood chips without fine fraction, mainly consisting of softwood, with a proportion of softwood (spruce, fir, pine, larch) of 70 % and more. For wood chips sizes from P45 to P63. This curve is predominantly suited for measuring wood chips deriving from logs and full trees as well as sawmill residues without fine fraction. See example pictures 5 and 6.

6.2.4 Fine wood chips

For fine wood chips with a high proportion of fine fraction, consisting of at least one third hardwood. The fine fraction mainly derives from barks, small branches and bushes. For wood chips size P16. See example picture 7 and 8.

Example pictures wood chips

1

2

Example pictures coarse wood chips

3

4

Example pictures industrial wood chips

5

6

Example pictures fine wood chips

7

8

6.3 How moisture content is defined

The device measures and shows the material's moisture content. The moisture content readings it displays are calculated in relation to the material's overall mass:

$$\%WG = \frac{M_n - M_t}{M_n} \times 100$$

M_n: Mass of the sample with average moisture content

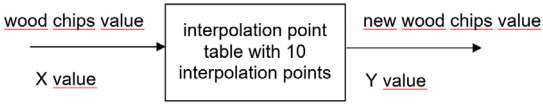
M_t: Mass of the sample with zero moisture content

%WG: Moisture content (in accordance with EN ISO 18134-2)

7. Interpolation point tables for a control system

For the measurement of coarse, industrial or fine wood chips, in the programming of the control system a special calibration curve has to be entered. This is done by using so-called interpolation point tables. The needed calibration curves are simulated by fixed points. The interpolation between the fixed points is straight.

The water content of the transmitter is used as the input value for the calculation of the interpolation point table. This is the value for standard wood chips and corresponds to the 4 to 20 mA and 0 to 80% water content.



7.1 Interpolation point table coarse wood chips:

Interpolation point	Analog output [mA] (X value)	Wood chips [%WC] (X value)	Coarse wood chips [%WC] (Y value)
0	4.00	0.0	0.0
1	5.20	6.0	6.0
2	5.80	9.0	9.0
3	7.20	16.0	16.0
4	8.70	23.5	24.9
5	10.40	32.0	37.2
6	11.20	36.0	43.0
7	12.16	40.8	50.0
8	14.10	50.5	55.0
9	20.00	80.0	55.0

7.2 Interpolation point table industrial wood chips:

Interpolation point	Analog output [mA] (X value)	Wood chips [%WC] (X value)	Industrial wood chips [%WC] (Y value)
0	4.00	0.0	0.0
1	5.20	6.0	6.0
2	5.80	9.0	9.0
3	7.20	16.0	16.0
4	8.70	23.5	26,3
5	10.40	32.0	42.3
6	11.20	36.0	50.0
7	13.24	46.2	55.0
8	17.00	65.0	55.0
9	20.00	80.0	55.0

7.3 Interpolation point table fine wood chips:

Interpolation point	Analog output [mA] (X value)	Wood chips [%WC] (X value)	Fine wood chips [%WC] (Y value)
0	4.00	0.0	0.0
1	5.20	6.0	6.0
2	5.80	9.0	9.0
3	7.20	16.0	16.0
4	8.70	23.5	22.8
5	10.40	32.0	29.4
6	11.20	36.0	32.5
7	14.00	50.0	43.5
8	14.56	52.8	50.0
9	20.00	80.0	55.0

8. Cleaning and maintenance

Regularly cleaning and maintaining the device will ensure that it will have a long service life and stay in good condition.

8.1 Care instructions

- Do not immerse the sensor in water.
- Do not expose the device to extreme temperatures.
- Do not bend the sensor cable excessively. Repeated bending of the sensor cable can lead to damage to the electronics of the sensor.
- Protect the device from strong mechanical shocks and loads.

8.2 Cleaning the device

Sensor surfaces

Clean the sensor plates with a cloth and cleaning alcohol.

9. Faults

If the measures listed below fail to remedy any faults or if the device has faults not listed here, please contact Schaller Messtechnik GmbH.

Fault	Cause	Remedy
Measuring error	The temperature of the material being measured is too low or high. I.e. the material's temperature is lower than +5 °C or higher than +40 °C.	The temperature of the material being measured has to be between +5 °C and +40 °C.
	Frozen material or material mixed with snow Accuracy decreases significantly	The material must not be frozen or mixed with snow.
	Measurement error due to too short temperature adjustment time	Let the device adjust to the surroundings.
	Mouldy or rain wet material Accuracy decreases significantly	Only measure dry, not mouldy material.

Fault	Cause	Remedy
	Air value being displayed	If there is no material above the sensor, the air value will be displayed (5.5 %).
	Incorrect material contact pressure	Make sure that the material exerts a pressure of at least 20 N/dm^2 onto the metal sensor plates.
	Polluted sensor plates	Clean the metal sensor plates (see "Cleaning the device").
	Conductive material on the sensor plates	Make sure that there is no contact of any conductive material with the sensor plates.

10. Storage and disposal

10.1 Storing the device

The device must be stored as follows:

- Avoid mechanical shocks/loads
- Storage temperature: -20 °C to +60 °C

10.2 Disposing of the device

Devices marked with this symbol are subject to Directive 2012/19/EU of the European Parliament and of the Council of 4 July 2012 on waste electrical and electronic equipment (WEEE).
If the device is being operated outside the European Union, the national regulations on the disposal of such devices that apply in the country of use must be observed.

Electronic devices must not be disposed of as domestic waste.

The device must be disposed of appropriately using appropriate collection systems.

11. Device information

11.1 EC declaration of conformity

KONFORMITÄTSERKLÄRUNG
DECLARATION OF CONFORMITY

Name/ Adresse des Herstellers: *Name/ address of manufacturer:*	**Schaller Messtechnik GmbH** **Max-Schaller-Straße 99** **A – 8181 St. Ruprecht**
Produktbezeichnung: *Product designation:*	**Schaller**
Typenbezeichnung: *Type designation:*	**HGT ; HGT-A; Universal-Transmitter**
Produktbeschreibung: *Product description*	**Messgerät zur Bestimmung des Wassergehalts in Biomasse** ***Measuring instrument for determining the water content in biomass***

Das bezeichnete Produkt erfüllt die Bestimmungen der Richtlinien:

The designated product is in conformity with the European directives:

EMV - Richtlinie 2014/30/EC	***EMC Directive 2014/30/EU***
RoHS - Richtlinie 2011/65/EG	***RoHS-Directive 2011/65/EU***

Die Übereinstimmung des bezeichneten Produktes mit den Bestimmungen der Richtlinien wird durch die vollständige Einhaltung folgender Normen nachgewiesen:

Full compliance with the standards listed below proves the conformity of the designated product with the provisions of the above-mentioned EC Directives:

EN 61326–1:2013	Elektrische Mess-, Steuer-, Regel- und Laborgeräte - EMV-Anforderungen *Electrical equipment for measurement, control, and laboratory use – EMC requirements*
EN IEC 63000:2019-05 *ersetzt / replaced* **EN 50581:2012**	Technische Dokumentation zur Beurteilung von Elektro- und Elektronikgeräten hinsichtlich der Beschränkung gefährliche Stoffe. *Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.*

Für das angeführte Produkt ist eine vollständige Dokumentation mit Betriebsanleitung in Originalfassung vorhanden.

For the mentioned product a complete documentation with manual of instruction in original version is available.

Bei Änderungen, die nicht vom Hersteller spezifiziert sind, verliert diese Konformitätserklärung die Gültigkeit.

In case of any changes not agreed upon with the manufacturer, this declaration of conformity loses its validity.

St. Ruprecht a.d. Raab, 31.07.2022

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Schaller Messtechnik GmbH
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AT - 8181 St. Ruprecht a. d. Raab
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Bernhard Maunz
Rechtsverbindliche Unterschrift des Ausstellers
Legal binding signature of the issuer

UK CA

DECLARATION OF CONFORMITY

Name/ address of manufacturer:	**Schaller Messtechnik GmbH** **Max-Schaller-Straße 99** **A – 8181 St. Ruprecht**
Product designation:	**Schaller**
Type designation:	**HGT ; HGT-A; Universal-Transmitter**
Product description:	**Measuring instrument for determining the water content in biomass**

The designated product is in conformity with the following directives:

- **Electromagnetic Compatibility Regulations 2016 Great Britain**
- **RoHS-Directive 2011/65/EU Directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment**

Full compliance with the standards listed below proves the conformity of the designated product with the provisions of the above-mentioned Directives:

EN 61326–1:2013	Electrical equipment for measurement, control, and laboratory use – EMC requirements
EN IEC 63000:2019-05 replaced **EN 50581:2012**	Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances.

For the mentioned product, a complete documentation with manual of instruction in original version is available.

In case of any changes not agreed upon with the manufacturer, this declaration of conformity loses its validity.

St. Ruprecht a.d. Raab, 31.07.2022

Bernhard Maunz
Legal binding signature of the issuer

11.2 Technical data

Measuring range moisture content	10 % to 50 %
Calibration accuracy moisture content	+/- 5.0 %
Measuring range temperature	-10 °C to +70 °C
Operating temperature	+5 °C to +40 °C
Outputs	Moisture content (4 - 20 mA) -Scaling (0 % to 80 %) Temperature (4 - 20 mA) (optional) -Scaling (-10 °C to +70 °C) Working resistance < 500 Ohm (UB 24 V)
Temperature compensation	Automatic
Power supply	24 VDC (18 to 29 VDC)
Current consumption	90 mA (without outputs and display)
Electrical connection	Connecting cable 1.9 m
Device dimensions	188 x 82 x 77 mm (without cable)
Device weight	744 g (without cable)
Device IP rating	IP 54

12. Notes

Climate
Environment

Materials

Food

Buildings

Bioenergy

Paper / Board

Schaller Messtechnik develops, produces and sells professional moisture meters and turnkey solutions.

Schaller Messtechnik GmbH

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