

Moisture meter

Operating Manual humimeter FS1 & FS1.1 Grain moisture meter



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

Your humimeter FS1 & FS1.1 at a glance

The main unit



No.	Name	
1	Auxiliary plate for filling	
2	Measuring chamber	
3	Display	
4	Keypad	



Rear of the main unit



No.	Name
1	Battery compartment

The display



No.	Name
1	Product type
2	Moisture content in % ("6.1 How moisture content is defined")
3	Display symbols
4	Currently applied offset
5	Temperature display

The display symbols

Symbol	Name	Symbol	Name
اليه	Enter	\checkmark	Yes
<u>.</u>	Up	X	No
	Down	Ŷ	Change input Level
4	Back	OK	ОК
09	Enter numbers	С,	Change menu
AZ	Enter letters	Ċ	On/off button, display light
ļ	Continue / go right	*/	Setting the offset
iller and a second	Left		



The menus

The device has three different menus: product selection menu, offset menu and main menu

Product selection menu



No.	Name
1	Setting the offset
2	Display illumination / device on/off
3	For changing the product type

Main menu

The main menu comprises the following menu items:

• Options:

Language, Unlock, °C/°F, BL On Time, Auto Off Time, Materialcalibration, Password, Reset

• Status

Accessing the main menu: "4.3 Accessing the main menu" page 14

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1. Introduction

1.1 Information about this operating manual

This operating manual is designed to enable you to use the humimeter FS1 & FS1.1 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 humimeter FS1 & FS1.1. 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

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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

- Easy to use device for quickly measuring the moisture content of grain.
- The device must only be used for taking measurements on the products defined in the following sections of this manual (see "6. Product types").

2.2 Improper use

- The device is not suitable for measuring mouldy material.
- The device is not waterproof and must be protected from water and fine dust.

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:

- Remove the batteries if the device isn't used for a prolonged period of time (4 weeks).
- In case of damages or loose parts on the device, remove the batteries and 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
- Batteries older than six months

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 FS1's scope of supply

- humimeter FS1
- 4 pieces of AA Alkaline batteries
- Digital scale 150 grams
- Measuring cup 0.25 liter
- Plastic case
- Operating manual

3.2.2 FS1.1's scope of supply

- humimeter FS1.1
- 4 pieces of AA Alkaline batteries
- Digital scale 150 grams
- Measuring cup 0.25 liter
- Operating manual

3.3 Inserting batteries

- 1. Take hold of the device with one hand, press your thumb onto the engraved area of the battery compartment (1) and drag downwards (2) (figure 1).
- 2. Insert the batteries with negative and positive terminals matching those indicated on the battery compartment. Press down the batteries so that they lay flat on the bottom of the housing (figure 2).
- » As soon as all batteries have been inserted, the device switches on automatically.
- 3. Push the battery cover onto the housing until it clicks into place (figure 3).







4. Using the device - Basics

4.1 Switching the device on

- Press the 🕐 button for 3 seconds.
- » The display will then show the status indicator (figure 4).
- » After inserting the batteries, the device switches on automatically.

4.2 Automatic calibration

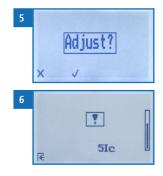
- » The display will show the message Adjust? (figure 5).
- 1. Make sure that the measuring chamber of the device is empty and place the device on a level table.
- 2. Confirm by pressing 📝.
 - » The display will now appear as shown in figure 6.
 - » The bar will run upwards. During this period, the device must remain on the table without external influence,
 - » which only takes a couple of seconds to complete.
 - » Once completed, the device will show the measuring window (see "Product selection menu" page 5).

4.3 Accessing the main menu

To do so: The devices is switched off.

- Switch on the device (see "4.1 Switching the device on").
- While switching on, keep both the \bigtriangledown and \bigtriangleup buttons pressed.
- The display will then show the main menu.







4.4 Selecting the product type

To do so: The device has to be in the product selection menu (figure 7).

For an overview of the different product types and the criteria for selecting them, please refer to "6. Product types".

- 1. Press the \bigtriangledown or \bigtriangleup button to move from one product type to the next Or
- 1. Press the ♥ or △ button for 3 seconds to open the product type overview (figure 8).
- 2. Use the arrow keys to move from one product type to the next
- 3. and keep any of them pressed to scroll through the types.



8	50g Corn
	60g Kye
	609 Wheat 509 Barley 309 Oats
	30g Oats
	▼ ▲ ₩

- 4. Confirm your selection by pressing
 - » The product type you selected will now be shown at the top of the display.

4.5 Taking a measurement

 For information on how to take a measurement, see section "5. The measuring process".

4.6 Switching the device off

To do so: The device has to be in the product selection menu. It is not possible to switch off the device when it is in the main menu.

• Press the 🕐 button for 3 seconds.

5. The measuring process

5.1 Preparing a measurement

To do so: The device has to have nearly the same temperature than the product being measured. It is recommended to let your humimeter device adjust to the surrounding temperature of the material being measured for at least 30 minutes.

- 1. Place the empty and clean measuring cup (0.25 liter) on the switched-off scale (figure 9). Then switch on the scale.
- » The scale must display 0.0 g with the empty measuring cup on it. The measuring cup must not be weighed.
- 2. Check whether the measuring chamber of the device is empty. When the device is switched on, there must not be any material in it.
 - » Empty the instrument and clean the measuring chamber if necessary (see "9.3 Cleaning the device").
- 3. Switch on the device (see "4.1 Switching the device on").
- 4. Perform the automatic calibration (see "4.2 Automatic calibration").
- Select the required product type (see "6. Product types") by pressing the T or the button (see "4.4 Selecting the product type").





5.2 Taking a measurement

To do so: The device has to have nearly the same temperature than the product being measured.

- Fill the measuring cup with the filling quantity displayed in the product type name (+/- 1.0 g) (figure 12) (see "6. Product types").
- Now slowly and evenly fill the measuring chamber of the device with the material being measured (figure 13).
- » For the filling, no funnel or similar device may be used.
- 3. The device will now display the moisture content (figure 14).
 - » The displayed value flashes when the moisture content exceeds the measuring range of the selected product type (figure 15). A flashing value signals a decreasing accuracy of the measurement. The measuring range is dependent on the product type (see "6. Product types").
 - » It is possible to apply an offset to the displayed measurement value (see "5.3 Offset function - Device adaptation").
- 4. Empty the device and make sure that there are no residues in the measuring chamber.
 - » Clean the measuring chamber if necessary (see "9.3 Cleaning the device").









Information - Measuring accuracy

Benefit from this rapid and non-destructive measuring procedure and take several moisture readings of the same sample material.

Î

Information - Incorrect readings

Always make sure to select the correct product type and the correct filling quantity for the material you are measuring. This prevents taking incorrect readings (see "10. Faults").



5.3 Offset function - Device adaptation

By changing the offset, the displayed measurement values can be adapted to other norms/standards. The displayed measuring value is corrected by the entered offset.

Example:

An offset of 1.5 % applied to a measurement value of 10.0 % results in a displayed measurement value of 11.5 %.

An offset of - 0.5 % applied to a measurement value of 10.0 % results in a displayed measurement value of 9.5 %.

5.3.1 Setting the offset

To do so: The device has to be switched on and be in the product selection menu.

- Select the required product type (see "6. Product types") by pressing the roduct type or the button (see "4.4 Selecting the product type").
- 2. Press 🔀 for 3 seconds.
- » The display will now show the material calibration menu for the selected product type (figure 17).
- » The offset is part of the material calibration menu.
- 3. Select **Offset**. To do so, press **T** or **A** and confirm by pressing **4**.





4. The data you have inputted can be overwritten at any time.

5. Inputting numbers:

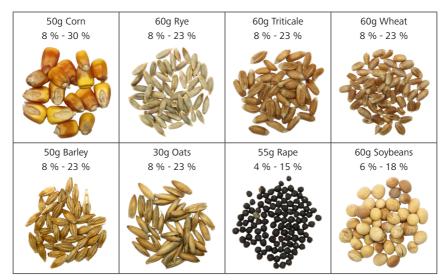
Press and hold **1** ... **9** to quickly scroll to the required number and either press it for 3 seconds or press **4** to confirm the selected number (figure 18).

- » Setting a negative offset is also possible! To do so, insert a minus sign before the first digit.
- » Take care of the position of the comma to prevent setting an offset that is too high!
- Moving forward: To move forward, press



- Moving back: Press to switch to another input level. To move back, press .
- 8. Confirm the offset by pressing 🚛.
 - » The offset has been saved.
- 9. Press **‡** to leave the material calibration menu.
- 10. The set offset will now be applied to the selected product type and shown in the display (figure 19).
 - » The displayed measurement value now deviates from the standard calibration!

6. Product types



19

55g Rape





6.1 How moisture content is defined

The device measures and shows a 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 the corresponding product norms)

7. Checking the device's status

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Status**. To do so, press **T** or **h** and confirm by pressing **+**.
 - » The display will then show the status indicator humimeter.
 - » The display will show the following information:



No.	Name
1	Serial number
2	Software version
3	Battery status

- 3. Confirm by pressing √.
- 4. Press 🗘 to leave the main menu.



8. Configuring the device

8.1 Selecting a language

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press $\overline{\Psi}$ or \underline{A} and confirm by pressing \cancel{P} .
- 3. Select Language. To do so, press 🔻 or 📥 and confirm by pressing 🚚
- 4. Navigate to the required language. To do so, press T or $\frac{1}{4}$ and confirm by pressing $\frac{1}{4}$.
- » The settings have been saved.
- 5. Press **+** to leave the **Options** menu.
- 6. Press $\mathbf{\hat{\mathbf{v}}}$ to leave the main menu.

8.2 Activating options

To do so: Some of the options must be deactivated.

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press **T** or **h** and confirm by pressing **+**.
- 3. Select Unlock. To do so, press 🔻 or 📥 and confirm by pressing 🚚.
 - » The display will now appear as shown in figure 20.
 - » On delivery, the four-digit password is the device's serial number.
- Inputting numbers:
 Press and hold ... to quickly scroll to the required number and either press it for 3 seconds or press to confirm the selected number (figure 21).
- Moving back: Press to switch to another input level. To move back, press .





- 6. Confirm the four-digit password by pressing **OK**.
 - » The settings have been saved.
 - » The °C/°F, BL On Time, Auto Off Time, Materialcalibration, Password, Reset options are now activated.
- 7. Press **4** to leave the **Options** menu.
- 8. Press 😱 to leave the main menu.

8.3 Deactivating options

Once the device has been switched restarted, the °C/°F, BL On Time, Auto Off Time, Materialcalibration, Password, Reset options will be deactivated again.

8.4 Selecting °C/°F

To do so: All of the options must be activated (see "8.2 Activating options").

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press **T** or **h** and confirm by pressing **H**.
- 3. Select °C/°F. To do so, press 🐺 or 📥 and confirm by pressing 🚚.
- 4. Navigate to the required temperature scale, i.e. Celsius (°C) or Fahrenheit (°F). To do so, press T or 🛓 and confirm by pressing 🕌.
- » The setting has been saved.
- 5. Press **H** to leave the **Options** menu.
- 6. Press 😱 to leave the main menu.



8.5 Reducing the device's power consumption

8.5.1 Configuring the display illumination time

To do so: All of the options must be activated (see "8.2 Activating options").

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press **T** or **h** and confirm by pressing **+**.
- 3. Select **BL On Time**. To do so, press **T** or **h** and confirm by pressing **+**.
- Select the required display illumination period (30 seconds, 2 minutes, 5 minutes, 10 minutes). To do so, press T or A and confirm by pressing A.
- » The setting has been saved.
- 5. Press **I** to leave the **Options** menu.
- 6. Press \bigcirc to leave the main menu.

8.5.2 Configuring automatic switch-off

To do so: All of the options must be activated (see "8.2 Activating options").

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press **T** or **i** and confirm by pressing **i**.
- 3. Select Auto Off Time. To do so, press 🐺 or 📥 and confirm by pressing ᆗ.
- » The setting has been saved.
- 5. Press **I** to leave the **Options** menu.
- 6. Press $\widehat{\mathbf{q}}$ to leave the main menu.

8.6 Configuring the material calibration function

The type calibration function is described in a separate operating manual.

8.7 Changing the password

To do so: All of the options must be activated (see "8.2 Activating options").

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press $\overline{\Psi}$ or \underline{I} and confirm by pressing $\underline{\downarrow}$.
- 3. Select **Password**. To do so, press **T** or **i** and confirm by pressing **4**.
- » The display will show the current password.
- 4. Overwrite the current password. To do so, press and hold **1 .. 9** to quickly scroll to the required number and either press it for 3 seconds or press **4** to confirm the selected number.

Moving back:

Press 💮 to switch to another input level. To move back, press 碱.

- 5. Confirm the new four-digit password by pressing **OK**.
- » The setting has been saved.
- 6. Press 🕂 to leave the **Options** menu.
- 7. Press $\mathbf{\hat{i}}$ to leave the main menu.

8.8 Resetting the device to its factory settings

To do so: All of the options must be activated (see "8.2 Activating options").

- 1. Access the main menu (see "4.3 Accessing the main menu").
- 2. Select **Options**. To do so, press 🐺 or 📥 and confirm by pressing 4.
- 3. Select **Reset**. To do so, press **T** or **h** and confirm by pressing **+**.
- » The display will then show the message Reset? (figure 22).
- 4. Confirm by pressing 📝.
- » The device will now be reset to its factory settings. All of your personal settings will be lost.
- » The display will show the status indicator humimeter (figure 23).

9. Cleaning and maintenance

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

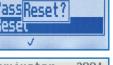
9.1 Changing batteries

The device constantly monitors the charge level of the batteries. The current battery status is shown on the status screen.

If the battery's charge is very low, the battery symbol will be shown with an exclamation mark. In that case, the batteries must be changed immediately (figure 25).

For changing the batteries, see section "3.3 Inserting batteries".

As the device's user, you are responsible by law for properly disposing of all used batteries, which must not be disposed of as domestic waste (Battery Directive).



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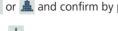




humimeter

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9.2 Care instructions

- Do not leave the device out in the rain. The device is not waterproof.
- Do not expose the device to extreme temperatures.
- Protect the device from strong mechanical shocks and loads.
- Remove the batteries after the harvesting season.

9.3 Cleaning the device

ATTENTION

Do not clean with fluids

Water or cleaning fluid getting inside the device can destroy the device.

Only clean with dry materials.

Plastic housing

• Clean the plastic housing with a dry cloth.

Measuring chamber

• Clean the measuring chamber with a soft brush.



10. 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 ma- terial being measured is too low or high. I.e. the material's temperature is lower than 0 °C or higher than +40 °C.	The temperature of the material being measured has to be between 0 °C and +40 °C.
	Temperature discrepancy between device and material being measured	Let the temperature adjust to the material being meas- ured (permitted difference of max. 3 °C).
	Wrong product type	Check whether you have selected the right product type (product) before taking a reading (see "6. Product types").
	Wrong filling quantity	Exactly fill in the filling quantity displayed in the product type name (+/- 0.5 gram).
	Mouldy or rain wet material	The accuracy decreases significantly.
	Stored and fermented corn from whole grain silage	May lead to a too high dis- played measuring value.
	Frozen material or material mixed with snow	The accuracy decreases significantly.
	Contaminated material	Highly contaminated mate- rial such as long ears of barley or foreign material can strongly influence the measuring result.

Fault	Cause	Remedy
	Entered offset	An entered offset leads to deviations on the displayed measured value. If the de- viation does not match your reference procedure, enter an offset corresponding to the difference or set the offset to 0.0 (see "5.3 Offset function - Device adapta- tion") to restore the factory characteristic curve.

11. Storage and disposal

11.1 Storing the device

The device must be stored as follows:

- Do not store outdoors.
- Store in a dry and dust-free place.
- Protect the device from sunlight.
- Avoid mechanical shocks/loads.
- Remove the batteries if the device isn't used for a period of 4 weeks or longer
- Storage temperature: -20 °C to +60 °C

11.2 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.



12. Device information

12.1 CE declaration of conformit

CE KONFORMITÄTSERKLÄRUNG *DECLARATION OF CONFORMITY*

Name/ Adresse des Herstellers:	Schaller Messtechnik GmbH										
Name/ address of manufacturer:	Max-Schaller-Straße 99										
	A – 8181 St. Ruprecht										
Produktbezeichnung:	humimeter										
Product designation:											
Typenbezeichnung: Type designation:	FS1 ; FS1.1 ; FS2 ; FS3 ; FS4 ; FS4.1 ; FS4.2 ; BP1										
Produktbeschreibung:	Messgerät zur Bestimmung des Wassergehalts in Lebens- mitteln										
Product description	Measuring instrument for determining the water content in foodstuffs										

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-An- forderungen 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

Bernhard Maunz Rechtsverbindliche Unterschrift des Ausstellers Legal binding signature of the issuer



UK DECLARATION OF CONFORMITY

Name/ address of manufacturer:	Schaller Messtechnik GmbH									
	Max-Schaller-Straße 99									
	A – 8181 St. Ruprecht									
Product designation:	humimeter									
Type designation:	FS1 ; FS1.1 ; FS2 ; FS3 ; FS4 ; FS4.1 ; FS4.2 ; BP1									
Product description:	Measuring instrument for determining the water content in foodstuffs									

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	Technical documentation for the assessment of electrical
replaced	and electronic products with respect to the restriction of
EN 50581:2012	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



12.2 Technical data

Display resolution	0.1 % moisture content, 0.5 °C/°F temperature
Measuring range (depending on product type)	(FS1) 5 % to 30 % moisture content (FS1.1) 5 % to 25 % moisture content
Calibration accuracy to reference material	(FS1) +/- 0.7 % (FS1.1) +/- 0.9 %
Operating temperature	0 °C to +40 °C
Storage temperature	-20 °C to +60 °C
Temperature compensation	Automatic
Power supply	4 x 1.5 Volt AA Alkaline batteries
Current consumption	60 mA (incl. display illumination)
Menu languages	English, German, French, Italian, Spanish, Por- tuguese, Czech, Polish, Hungarian, Russian, International
Display	128 x 64 illuminated matrix display
Device dimensions	155 x 75 x 90 mm
Device weight	360 g
Case dimensions (FS1's scope of supply)	270 x 220 x 80 mm
Weight of device + case	850 g
Device IP rating	IP 40

13. Notes

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