Dramiński Twist Grain pro

Grain moisture meter
with sample compressor

INSTRUCTION MANUAL **EN**

ISO 9001 | CE

CONTENT

EN

INTRODUCTION

Thank you for purchasing our new Dramiński Twist Grain pro grain moisture meter. This perfect product will be irreplaceable device in your activity. Due to its special design (and pressing the sample before the measurement), you will accurately determine your grain humidity.

Innovative solutions, state-of-the-art technology, vast versatility, USB connection and a possibility to connect an external temperature probe change the purchase of your TG pro into a priceless investment. We wish you fruitful harvests and pleasant work with the intelligent Draminski Twist Grain pro grain moisture meter.

The manufacturer DRAMINSKI S.A. is always ready to support their users with their knowledge and simultaneously reserves the right to introduce changes and improvements to the design and the software. DRAMINSKI S.A. also reserves the right to introduce changes to the present instruction manual.

Before using the device, please, read this instruction manual carefully. It will guarantee safety for the user and long, reliable functioning of the grain moisture meter.
Declaration of conformity is located at the head office of DRAMINSKI S.A., ul. Owocowa 17, 10-860 Olsztyn, Poland.

More information and current data you will find at
www.draminski.com
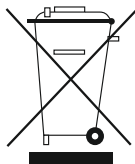
We would like to remind that electronic devices, batteries and accumulators cannot be thrown away into common domestic waste containers. The user is responsible to handover these types of waste to companies which deal with such utilization in accordance with the applicable legal provisions. By assuring proper utilization you help protect natural environment.

EQUIPMENT

CHAPTER 1

EQUIPMENT

1. Dramiński Twist Grain Pro grain moisture meter,
2. Tightening cap of the measuring chamber (with inserted 3V battery type CR-2032),
3. Transport case,
4. Carrying strap attached to the case which enables hanging the device,
5. USB cable used to communicate with the computer,
6. Instruction manual,
7. 4 alkaline batteries 1.5V type LR6, AA,
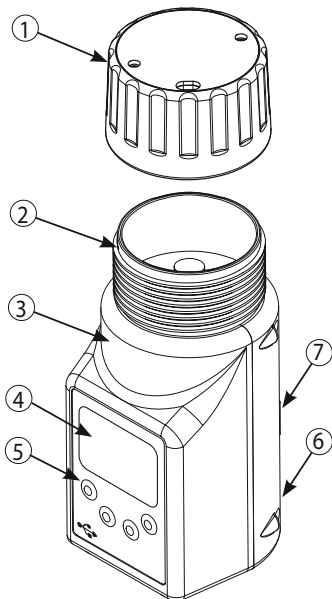8. Rubber protection of mini-USB slot.

CONSTRUCTION OF THE DEVICE

CHAPTER 2

EXTERNAL CONSTRUCTION

1. Tightening cap with a sound signaling a proper force of clamping,
2. Measuring chamber with a digital temperature sensor,
3. High quality ABS body,
4. LCD LED backlit graphic display,
5. Four-button membrane keyboard,
6. Mini-USB slot with a rubber protector,
7. Chamber for 4 batteries 1.5V type LR6, AA.
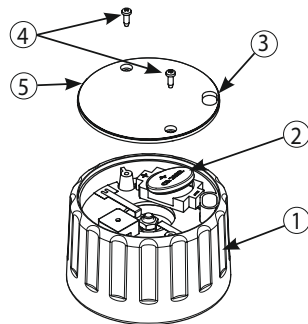
1. The cap's body is made with addition of fibreglass,
2. Battery 3V (type CR-2032) of the sound buzzer,
3. The slot to remove grain residuals,
4. Screws 2.5x10,
5. Lid of the cap.

APPROXIMATE DIMENSIONS

16,5 cm

7 cm
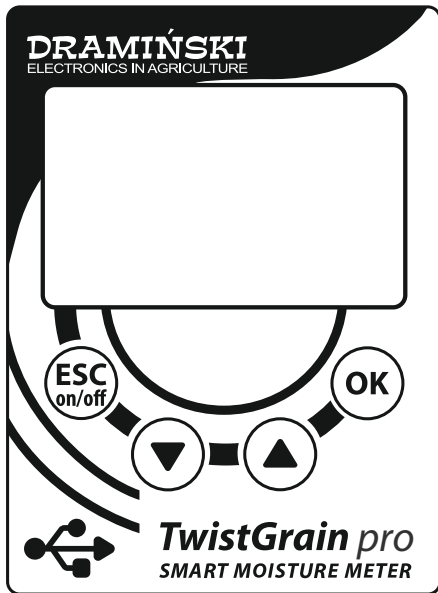
7,5 cm

KEYBOARD FUNCTIONS

CHAPTER **3**

(ESC on/off)	– To turn on the device. – To turn off the device, hold the button for 5 seconds, (NOTICE! TG pro can be turned off via the menu using "**Turn off!**", if the device is not operated, it will turn off automatically in order to save the battery). – To start the main menu – hold the button for 2 seconds. – To delete program functions.
(OK)	– To confirm program function – To start measurement.
(∨) (∧)	– To navigate up and down the menu. – To set the values in the menu. – To select the grain from the list of species.
(∨)	– To clear the average result of the measurements of a particular sample.
(∧)	– To save the result with the date and hour to the memory of the device.

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ELECTRONICS IN AGRICULTURE

ESC on/off   **OK**

▼ ▲

TwistGrain pro
SMART MOISTURE METER

HOW TO START THE DEVICE

CHAPTER 4

The Twist Grain pro is ready to operate if the battery chamber contains properly inserted batteries (it is necessary to pay attention to polarity).

In the main menu of the device you can select the operating mode which you would like to use currently (basic or advanced).

In the basic mode we focus on easiness of the use and quick and comfortable measurements of humidity and temperature of the grain so that operating of the device was user-friendly for beginners.
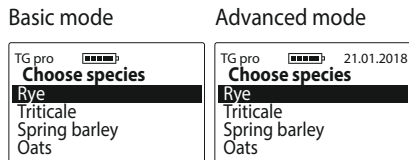
In the advanced mode there are options enabling the usage of the external temperature probes, saving thousands of measurements to the internal memory of the device with dates and hours, segregation of the measurements taking into account the grain samples, place of storage, suppliers and much more information so that to satisfy the needs of the most demanding customers. Additionally, people who use the advanced mode can download special software from our site **www.draminski.com** to communicate with the computer which enables downloading the data from the TG pro to the computer hard disk, creating reports, prints, diagrams, spreadsheets etc

Turn ON the device using the (ESC on/off) button.

a) a greeting message appears on the display which determines the name of the device, the software version, the version of calibration and the series number, for example:

DRAMIŃSKI
www.draminski.com
TwistGrain pro
Firmware v: 1.42 K:0.10
SN: TG000030

b) then a list of available species appears on the display, in the upper corner appears a model of the device and current battery status (in the advanced mode there is also a date). After the device is turned on, there appears the latest tested species, for example:

Basic mode   Advanced mode

TG pro		TG pro	21.01.2018
Choose species		**Choose species**	
Rye		Rye	
Triticale		Triticale	
Spring barley		Spring barley	
Oats		Oats	

NOTICE! If the batteries are too low to carry on operating, the device automatically signals it with the following message:

```
┌─────────────────────────┐
│ TG pro      ▭▭          │
│    Change batteries     │
│         ┌─┬─┐           │
│         └─┴─┘           │
└─────────────────────────┘
```
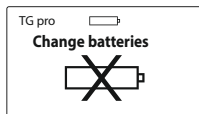
It means that the batteries have to be replaced by new ones.

c) in order to save the source of power supply, when the keys are not used, the devices turns to stand-by mode after a certain time, it means that the display turns black (this time can be set in the menu, see chapter: MAIN MENU). Pressing on any key causes that the device gets to operating mode again,

d) if the TG pro is in stand-by mode for a few minutes, it will be turned off automatically (this time can be set in the menu, see chapter: MAIN MENU). The device will signal this by turning on the display and there

appears a countdown from 10 to 0, which can be aborted by any button. However, if you do not do it, the device will turn off automatically in order to save the source of energy, for example:

```
┌──────────────────┐  ┌──────────────────┐
│ TG pro  ▭▭▭▭     │  │ TG pro  ▭▭▭▭     │
│                  │  │                  │
│  Power off in 5  │  │  Power off in 1  │
│                  │  │                  │
└──────────────────┘  └──────────────────┘
```

e) in order to turn off the device, hold the $\begin{smallmatrix}ESC\\on/off\end{smallmatrix}$ button for 5 seconds or from the position of the MAIN MENU choose option "**Turn off!**"

f) during the measurements, in the lower part of the display you see the cues what a certain button of the membrane keyboard is responsible for, for example:

In the advanced mode
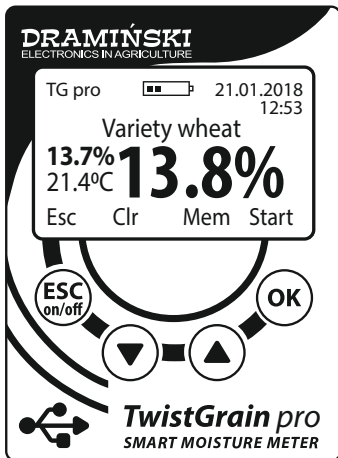
(function **Esc)** causes that you go back to the list of available species,

(function **Clr**) clears the average result,

(function **Mem**) safes the result in the internal memory,

(function **Start)** launches another measurement.

NOTES FOR MEASUREMENTS

CHAPTER **5**

– Before you start the measurements, it is necessary to check if the measuring chamber is clean and dry. It is important to remember to remove the grain from the chamber as soon as the measurement is finished.

– Fill the measuring chamber with the grain to the edge and then twist the tightening cap until you hear a sound signal. It is forbidden to add the grain after the sample has been pressed. In the case of some species (for example, grass seeds) which have an increased humidity, the cap may not produce the sound signal and in such a case it should be twisted to the end in order to perform the measurement (do not add any grain to the chamber).

– If the sound signal of the tightening cap is too weak, it is necessary to untwist the cap and replace the battery to a new one. It is forbidden to bend the plates which cause that the buzz produces a signal.

– During the measurements residual grain may penetrate to the screw of the cap. In order to make twisting the cap easier, you should regularly clean the screw, do not use any sharp tools for that purpose.

– Please, remember to clean the chamber carefully so that not to damage the temperature sensor which is located at the bottom of the measuring chamber.

– The water which is cumulated on the surface of the sample (for example, dew) can have an influence on the measurement results, that is why it is necessary to avoid those situations and before the measurement you need to "air" the sample.

– It is necessary to remember that the device has an automatic temperature compensation. That is why pay attention to the temperature of the measuring chamber, it should be similar to the temperature of the tested sample (the cold sample should not be tested in the device which has been exposed to the sun, and vice versa).

– The final result must be calculated from three measurements for the given sample (the average is calculated and displayed automatically). The number of meas-

urements from which the average is calculated can be changes in the main menu.

– To enable saving the measurement results to the memory of the device, it is necessary to run the advanced mode (additionally in the main menu of the device you can choose if the saved result must be the average of the measurements).

– In order to save the measurements from an external probe to the memory of the device, it is necessary to turn to the advanced mode and in the settings you should give this probe a name (it is important because it helps the results to be properly catalogued).

– If you notice some important deviations in the results for a certain species which increase or decrease the value in the whole measurement range in comparison to the laboratory method (drying and weighing method), it is recommended to modify the measurements (see CHAPTER: MODIFICATION OF HUMIDITY RESULTS).

– Every species has a different range of the measured humidity. However, its exceed is signaled by a proper sign, for example:

"**<8.5%**" (below the range), when the humidity of the tested sample is less than 8.5%,

"**>35.0%**"(above the range), when the humidity of the tested sample is more than 35%.

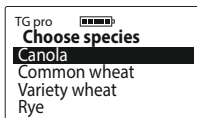# HUMIDITY MEASUREMENTS

CHAPTER 6

In order to perform grain moisture measurements:

a) turn on the device with the help of (ESC on/off) button, after a greeting message a list of available species appears (the TG pro displays the last tested grain species as soon as it is turned on),

b) with the help of (∨) or (∧) buttons, select (highlight) the name of the species which you are going to test and then confirm with the (OK) button,

```
TG pro   ▱▱▱▱▱
  Choose species
Canola
Common wheat
Variety wheat
Rye
```

```
TG pro          ▱▱▱▱▱
        Canola
   Pour in sample
   tighten the cap
Esc               Start
```

c) in accordance with the message, fill (to the edge) the measuring chamber with the tested grain,

d) fix the tightening cap on the thread of the measuring chamber until you hear a sound made by the cap. This sound means that the force of the tightening is correct. However, in order to save the battery of the cap you need to untwist it slightly until the signal disappears

(**NOTICE:** In the case of too soft grain the cap may not produce and sound. Then you need to twist it to the end of the thread, but never add any grain),

e) when the grain is properly pressed, start the measuring (function "**Start**") with the help of the (OK) button. (**NOTICE:** When the display shows the message "**Analysing...**" do not touch the measuring chamber),

```
TG pro   ▱▱▱▱▱
        Canola
      Analysing...
```
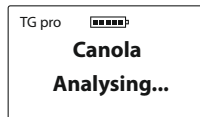
f) In a few seconds the display will show the moisture percent result (%) and the temperature of the sample (°C or °F depending on the user's settings),

```
TG pro          ▱▱▱▱▱
              Canola
22.1ºC  9.9%
Esc               Start
```
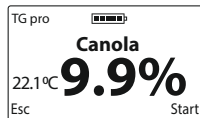
The moisture measurement result is presented taking into account the corrections connected with the temperature of the sample (automatic temperature compensation),

g) when the measurement is finished, untwist the tightening cap and empty the measuring chamber. You need to do it carefully so that not to cause any mechanical damage to the temperature sensor which is at the bottom. Since the measuring chamber is empty, the device is ready for further operation. In order to perform measurements of another sample of the same species, fill the measuring chamber again and twist the cap properly. Then start the measurement with the (OK) button (or with the help of the $\left(\begin{smallmatrix} ESC \\ on/off \end{smallmatrix}\right)$ button go back to the list to select another species).

NOTICE! Proper cleaning of the measuring chamber is very important when you change the species of the sample and when you measure the samples with different and increased humidity,

h) the final result of the moisture of the given sample is the average of, let's say, last three measurements.

The TG pro calculates it automatically and shows on the left side of the display (below the temperature result), for example:
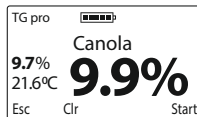
The number of measurements from which the average is calculated can be changed in the main menu. The results above and below the range are not taken into account when the average is calculated. If you want to calculate the average result from the beginning, you can clear it (function **Clr**) with the help of the $(\vee)$ button or go back to the list of the species with the help of the $\left(\begin{smallmatrix} ESC \\ on/off \end{smallmatrix}\right)$ button,

i) The Twist Grain pro enables saving of 50 thousands of measurements to the internal memory of the device with the help of the $(\wedge)$ button (function **Mem**). In order to use it, go to the main menu and change to "advanced" mode. Additionally, the user can choose if they want to save the current result of the average of the last measurements.

```
TG pro    ▭▭▭▭▸   21.01.2018
                   11:03
          Canola
21.6°C 9.9%
Esc           Mem  Start
```
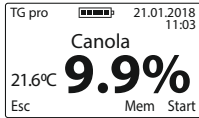
j) when you finish the measurements, in order to save the source of power supply, it is necessary to switch off the device holding the (ESC on/off) button for 5 seconds or with the help of the option "**Turn off!**" available in the main menu.

EXTERNAL TEMPERATURE PROBE MEASUREMENTS

CHAPTER **7**

The Dramiński TwistGrain pro moisture meter can be used as a professional agricultural thermometer when you attach the external temperature probe to the mini-USB port. The TG pro is designed so that the user can purchase a probe of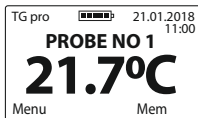 different construction without the necessity of calibration of the probe with the device. What is important is that every probe has its unique ID number. You can give it its own name and use the possibility of saving of thousands of measurements with the date and hour in the internal memory of the device. The TG pro automatically recognises the probes which have ever been connected and makes proper catalogues of the saved results.

The menu of the device enables management of the probes and the parameters of the device (adding new probes, renaming, deleting from the memory, clearing the results, changing the temperature scale $^0C/^0F$). In order to learn about all the functions, please, familiarise yourself with Chapter 11: MAIN MENU.

1. In order to use the temperature probe, change to advanced mode and connect the probe to the mini-USB port and start the option "**Temperature measurement**" in the Main menu. The probes which have not been added to the memory under their own name are recognised as "**No name**" by the device.

2. In order to save the results, the probe should be added to the memory of the device (see CHAPTER 11: MAIN MENU) When the probe is saved, the device recognises it automatically and displays its name, for example: "**PROBE NO 1**" At this moment using the $(\wedge)$ button (function **Mem**) we can save thousands of the results to the memory with the date and hour so that to transfer these data to the computer and store, create reports, spreadsheets, graphs of changes in the function of the time or generate the prints.

```
┌─────────────────────────────┐
│ TG pro    ▭▭▭▭  21.01.2018  │
│                      11:00  │
│        PROBE NO 1           │
│       21.7ºC                │
│ Menu              Mem       │
└─────────────────────────────┘
```

Special software for data transition is available at the site
www.draminski.com, bookmark **Products / Moisture
meters / Draminski TwistGrain pro.**

LIST OF AVAILABLE SPECIES AND HOW TO ADD NEW SPECIES

CHAPTER **8**

The Draminski TG pro moisture meter is able to save some hundreds of different sorts of grain in its memory which the user can use when performing the measurements. The list of the available species may be different depending on the current commercial offer, promotion or the country where the TG pro was purchased.

Always updated list of all available species can be found at **www.draminski.com** in the bookmark **Products / Moisture meters / Draminski TwistGrain pro.**

Every Draminski TG pro user can activate additional species by entering their code in the main menu using the option "**Add species**" (see CHAPTER: MAIN MENU). In order to obtain this special code activating the species which you need in your TG pro, please, contact us:

e-mail: agri@draminski.com
phone: +48 89 527 11 30
or the nearest certified distributor of Draminski S.A.

Contact us if you have species which have not been developer yet or a special grain variety which you would like to examine, because mutually we can create new species in order to satisfy your needs. These species can also be added into your device using a special code.

Thanks to these modern solutions the TG pro has become a versatile moisture meter which will always be up-to-date and will have unlimited possibilities.

UPDATE VIA USB

CHAPTER 9

The Draminski TG pro has a mini-USB port which gives fast and comfortable way for the user to update the data in the memory of their device, the software, the list of language versions, update new functions in the device and many other things.

Check update availability at **www.draminski.com** in the bookmark **Products / Moisture meters / Draminski TwistGrain pro.**

You will also find there step-by-step instructions how to process the update.

Our software developers did their best to make updating easy and user-friendly so that even those users who have little computer technology knowledge would not have any problems with that.

If you have any questions or doubts, please, contact your specialists.

e-mail: agri@draminski.com
phone: +48 89 527 11 30

MODIFICATION OF HUMIDITY RESULTS

CHAPTER **10**

The Dramiński TG Pro has humidity curves saved in its memory. They were developed on the basis of normalized samples (their density was determined and the mass of 1000 grains). Thanks to them the results are accurate and repeatable. However, it might happen that in a certain year (due to different factors), the user's harvest is slightly different from the normalized grain and then deviations in humidity results may occur.

These factors are as follows:

1. Shape of the grain and its ripeness (plumpness),
2. Variety qualities of the grain,
3. Level of contamination and tailings,
4. Level of devastation of the grain by pests and fungi.

NOTICE!

Please, remember to compare the measurements only to laboratory drying and weighing method but not to other moisture meters because they may mislead you.

The Draminski TG pro moisture meter enables introduction of modification of the measurements autonomously. When modification is carried out, each species is treated separately. When modification has been carried out, the sign "*****" (asterisk) appears next to the species. During the measurements below the name of the tested species there appears information about the value of modification (the result automatically takes into consideration the introduced modification), for example:

before   after
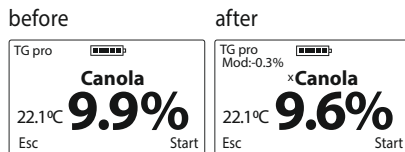
It is recommended to reset the default settings and if necessary introduce new modification again. When you reset the default settings, the "*****" (asterisk) will disappear.

A detailed description how to carry out modification of humidity results and how to reset default settings you will find in Chapter: MAIN MENU.

MAIN MENU

CHAPTER 11

Using the functions of the main menu the user can turn off the device quickly, adjust operating settings to their needs, add new species, manager the memory and do many other things.

To start MAIN MENU hold the button (ESC on/off) for 2 seconds.

1. **Turn off!**

To turn off the device, enter the **MAIN MENU** with the help of the (ESC on/off) button then with the help of (∨) or (∧) select the option **Turn off!** and confirm with the (OK) button.

```
TG pro    [████] 21.01.2018
 Main menu
 Turn off!
 Species list
 Operating mode
 Temperature measurement
```

Thanks to this function the user can turn off the device quickly without the necessity of holding the (ESC on/off) button for 5 seconds.

2. **Species list**

In order to return from the **MAIN MENU** to the list of species, use the (ESC on/off) button or with the help of the arrows select the **Species list** and confirm with the (OK) button.

```
TG pro    [████] 21.01.2018
 Main menu
 Turn off!
 Species list
 Operating mode
 Temperature measurement
```

3. **Operating mode**

```
TG pro    [████] 21.01.2018
 Main menu
 Turn off!
 Species list
 Operating mode
 Temperature measurement
```

a) **Basic** – in order to make operation of the device easy and use only basic functions of the menu, enter the **Main menu / Operating mode** then with the help of (∨) or (∧) select the option **Basic** and confirm with (OK), for example:

```
TG pro      ▬▬▬▬▬
 Operating mode
 Basic
 Advanced
```
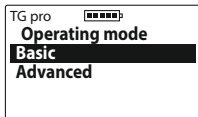
b) **Advanced** – in order to use all the options of the device such as real-time clock, saving the measurements, operating the temperature probe, etc, enter **Main menu / Operating mode**, then using $\vee$ or $\wedge$ select the option **Advanced** and confirm with (OK), for example:

```
TG pro      ▬▬▬▬ 21.01.2018
 Operating mode
 Basic
 Advanced
```
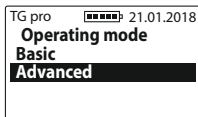
4. **Temperature measurement**

In order to use the external temperature probe, connect it to the TG pro via mini-USB port, enter the **Main menu**, then navigate $\vee$ or $\wedge$ and choose the option **Temperature measurement** and confirm with (OK) button.

NOTICE: In order to save the results to the memory of the device, add the probe in the settings of the main menu and name it.

```
TG pro    ▬▬▬   21.01.2018
 Main menu
 Turn off!
 Species list
 Operating mode
 Temperature measurement
```
```
TG pro   ▬▬▬   21.01.2018
                  11:00
 PROBE NO 1
 21.7⁰C
 Menu          Mem
```

5. **Settings**

```
TG pro    ▬▬▬   21.01.2018
 Main menu
 Species list
 Operating mode
 Temperature measurement
 Settings
```
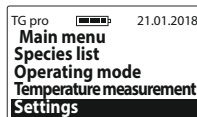
5.1 **Language**

In order to change a language version of the device, enter the **Main menu / Settings / Language**, then choose the language version with the help of $\vee$ or $\wedge$ and confirm with the (OK) button, for example:

TG pro 🔋 21.01.2018	TG pro 🔋 21.01.2018
Settings	**Language**
Language	**English**
Display	Polski
Power auto off	Deutsh
Number of averages	Français

5.2 **Display**

TG pro 🔋 21.01.2018
Settings
Language
Display
Power auto off
Number of averages

5.2 a) **Backlight intensity** – energy saving LED backlight is used in the device. However, you need to remember that stronger backlight consumes more electric power which discharges the battery quicker. In order to decrease backlight intensity, enter the **Main menu/ Settings / Display / Backlight intensity**, then select a proper value with the help of $\vee$ or $\wedge$ and confirm with the $\boxed{OK}$ button, for example:
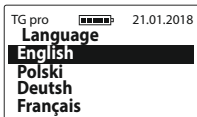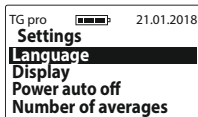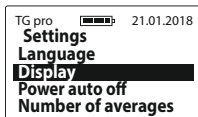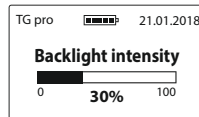
TG pro 🔋 21.01.2018	TG pro 🔋 21.01.2018
Display	**Backlight intensity**
Backlight intensity	
Backlight off time	
LCD contrast	0 **30%** 100

5.2 b) **Backlight off time** – regulation of time after which the display backlight turns off and the device turns to the stand-by mode waiting until the keyboard is used (this time is calculating from the moment the keyboard was used for the last time). In order to change the backlight off time, enter the **Main menu / Settings / Display / Backlight off time**, then navigate with $\vee$ or $\wedge$ to select the proper time and and confirm with $\boxed{OK}$, nfor example:

TG pro 🔋 21.01.2018	TG pro 🔋 21.01.2018
Display	**Backlight off time**
Backlight intensity	
Backlight off time	
LCD contrast	3 **20sec** 250
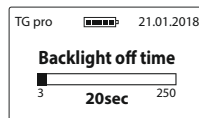
5 2 c) **LCD contrast** – in order to change the LCD contrast, enter the **Main menu / Settings/ Display / LCD contrast**, then choose an appropriate value with the help of $(\vee)$ or $(\wedge)$ and confirm with (OK), for example

```
TG pro  ▦▦  21.01.2018    TG pro  ▦▦  21.01.2018
 Display                     LCD contrast
 Backlight intensity
 Backlight off time       10      12       30
 LCD contrast
```
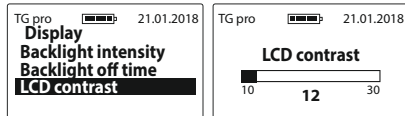
5.3 **Power auto off**

Regulation of time after which the device turns off automatically counts down from the moment when the keyboard was touched for the last time. In order to change the power auto off, enter the **Main menu / Settings / Power auto off**, then choose an appropriate value with the help of $(\vee)$ or $(\wedge)$ and confirm with (OK), for example:
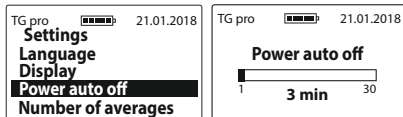
```
TG pro  ▦▦  21.01.2018    TG pro  ▦▦  21.01.2018
 Settings                    Power auto off
 Language
 Display                   1     3 min     30
 Power auto off
 Number of averages
```

5.4 **Number of averages**

The device automatically calculates the average of the last measurements. In order to set the number of measurements from which the average is calculated, enter the **Main menu / Settings / Number of averages**, then choose an appropriate number with the help of $(\vee)$ or $(\wedge)$ and confirm with (OK), for example:

```
TG pro  ▦▦  21.01.2018    TG pro  ▦▦  21.01.2018
 Settings                    Number of averages
 Language
 Display                   2      3        20
 Power auto off
 Number of averages
```
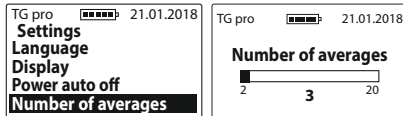
The average results appears on the left side of the display (above the temperature value) after three measurements have been performed if the number of averages is set to "**3**", for example:

EN

```
TG pro          ▭▭▭▭▭
          Canola
9.7%
21.6°C   9.9%
Esc      Clr        Start
```
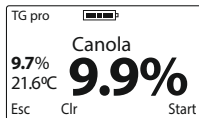
Notice! In order to calculate the average result from the beginning, you can clear it. Select the function (function **Clr**) with the help of $\vee$ and a message appears: "**Clear average?**" then confirm with the (ok) button or delete with them $(\frac{ESC}{on/off})$ button (the average will also be cleared if you return to the list and select the species).

5.5 **Temperature scale**

In order to change the temperature scale from Celsius to Fahrenheit or vice versa, enter the **Main menu / Settings / Temperature scale**, then select a proper scale with the help of $\vee$ or $\wedge$ and confirm with the (ok) button, for example:
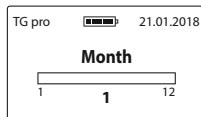
```
TG pro      ▭▭▭▭ 21.01.2018    TG pro      ▭▭▭▭ 21.01.2018
 Settings                      Temperature scale
Display                        Celsius
Power auto off                 Fahrenheit
Number of averages
Temperature scale
```

5.6 **Date & time**

The TG pro has a real time clock thanks to which the results are saved to the memory with the current date and time of the test.

```
TG pro  ▭▭▭▭▭ 21.01.2018
 Settings
Power auto off
Number of averages
Temperature scale
Date & time
```
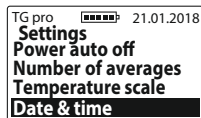
5.6 a) **Set date** – in order to set current time, enter the **Main menu / Settings / Date & time / Set date**, then with the help of $\vee$ or $\wedge$ select proper value and confirm accordingly: year / month / date, for example:

```
TG pro      ▭▭▭▭ 21.01.2018    TG pro      ▭▭▭▭ 21.01.2018
 Date & time
Set date                              Year
Set time
Date notation metric           2017   2018    2099
Time notation   24H
```

```
TG pro      ▭▭▭▭ 21.01.2018    TG pro      ▭▭▭▭ 21.01.2018
      Month                          Day

  1     1      12            1    21        31
```
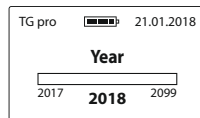
5.6 b) **Set time** – in order to set time, enter the **Main menu / Settings / Date & time / Set time**, then with the help of ⌄ or ⌃ select the proper value and confirm accordingly hour / minute with (OK), for example:
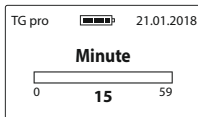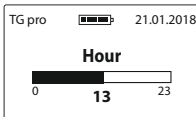
5.6 c) **Date notation** – in order to change date notation, enter the **Main menu / Settings / Date & time**, with the help of ⌄ or ⌃ choose the option **Date notation**, and then change into **metrical** (day, month, year) or **imperial** (month, day, year) and confirm with the (OK) button for example:

5.6 d) **Time notation** – in order to change time notation, enter the **Main menu / Settings / Date & time**, with the help of ⌄ or ⌃ choose the option Time notation, then using the (OK) button change from **24H** to **12H**, for example
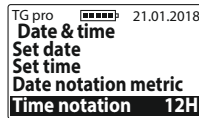
5.7 **Temperature probes**

This option enables adding external temperature probes to the memory so that to be able to save the measurements to a certain catalogue, change names of the previously added probes or delete them permanently with their catalogue measurements.

TG pro ▭▭▭▭▶ 21.01.2018
 Settings
Number of averages
Temperature scale
Date & time
Temp. probes
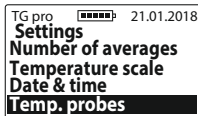
5.7 a) **Add probe** – in order to add a probe and create a catalogue for measurements, connect the probe to the mini-USB port, enter the **Main menu / Settings / Temperature probes / Add probe**, enter its name (navigate with arrows and confirm the highlighted signs with the (OK) button), when the name is ready, use the $\overset{ESC}{(on/off)}$ button, then the message appears: "**Save name?**", which should be accepted with the (OK) button or rejected with the $\overset{ESC}{(on/off)}$ button, for example:

TG pro ▭▭▭▭▶ 21.01.2018
 Temp. probes
Add probe
Rename
Remove the probe

TG pro ▭▭▭▭▶ 21.01.2018
 Probe name
PROBE NO 1
< ▮0 1 2 3 4 5 6 7 8 9
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
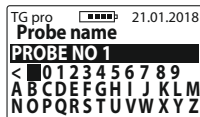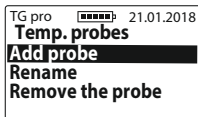
5.7 b) **Rename** – in order to rename previously saved probe, enter the **Main menu / Settings / Temperature probes / Rename,** select the name you would like to change with the arrows and accept with the (OK) button, enter a new name for this probe (change with the help of the arrows and confirm the highlighted signs with the (OK) button. When the name is ready, use $\overset{ESC}{(on/off)}$, then a message appears: "**Save name?**", which should be accepted with the (OK) button or rejected with the $\overset{ESC}{(on/off)}$ button.

TG pro ▭▭▭▭▶ 21.01.2018
 Temp. probes
Add probe
Rename
Remove the probe

TG pro ▭▭▭▭▶ 21.01.2018
 Rename
PROBE NO 1
SILO FOR CANOLA

TG pro ▭▭▭▭▶ 21.01.2018
 Probe name
< ▮0 1 2 3 4 5 6 7 8 9
A B C D E F G H I J K L M
N O P Q R S T U V W X Y Z
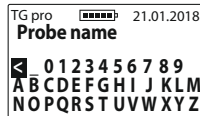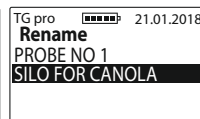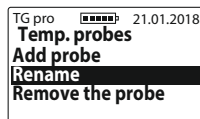
5.7 c) **Remove the probe** – in order to remove the probe with its measurements, enter the **Main menu / Settings / Temperature probes / Remove the probe**,

select the name of the probe you would like to remove with the help of the arrows and confirm with (OK), then a message appears "**Remove?**", which should be accepted with (OK), or rejected with (ESC on/off).

```
TG pro        ▭▭▭▭  21.01.2018
 Remove the probe
PROBE NO 1
SILO FOR CANOLA
```

5.8 **Memory**
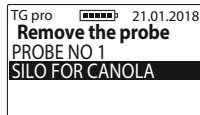
```
TG pro        ▭▭▭▭  21.01.2018
 Settings
Temperature scale
Date & time
Temp. probes
Memory
```

5.8 a) **Save** – in order to change the way of saving the measurements, enter the **Main menu / Settings / Memory**, with the help of (∨) or (∧) select the option **Save**, then using the (OK) buttons change to **results** or **average**, for example:

```
TG pro        ▭▭▭▭  21.01.2018        TG pro        ▭▭▭▭  21.01.2018
 Memory                               Memory
Save:         result                 Save:        average
Delete humidity results              Delete humidity results
Delete temperature res               Delete temperature res
Available memory                     Available memory
```

5.8 b) **Delete humidity results** – in order to delete all of the saved humidity results of the grain, enter the **Main menu / Settings / Memory**, with the help of (∨) or (∧) select the option **Delete humidity results** and confirm with (OK).

```
TG pro        ▭▭▭▭  21.01.2018
 Memory
Save:         result
Delete humidity results
Delete temperature res
Available memory
```

5.8 c) **Delete temperature results** – in order to delete all the temperature results from the external probes, enter the **Main menu / Settings / Memory**, then with the help of (∨) or (∧) select the option **Delete temperature results** and confirm with (OK).

```
TG pro  ▭▭▭▭▭ 21.01.2018
 Memory
Save:            result
Delete humidity results
Delete temperature res
Available memory
```

5.8 d) **Available memory** – ain order to check memory availability, enter the **Main menu / Settings/ Memory**, with the help of $\vee$ or $\wedge$ select the option **Available memory** and confirm with the OK button, for example:

```
TG pro  ▭▭▭▭▭ 21.01.2018     TG pro  ▭▭▭▭▭ 21.01.2018
 Memory                        Available memory
Save:            result        Number of probes
Delete humidity results            18/20
Delete temperature res            Results
Available memory                   99%
```
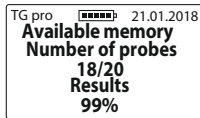
6. **Result modification**

Before entering any modification (correction) of the results, it is necessary to read CHAPTER: MODIFICATION OF HUMIDITY RESULTS

In order to insert modifications for the species, enter the **Main menu / Result modification**, with the help of $\vee$ or $\wedge$ select the species you would like to modify, then select the value by which you would like to increase or decrease the humidity vaue and confirm with the OK button, for example:

```
TG pro  ▭▭▭▭▭ 21.01.2018     TG pro  ▭▭▭▭▭ 21.01.2018
 Main menu                     Choose species
Operating mode                Canola
Temperature measurement       Common wheat
Settings                      Variety wheat
Result modification           Rye
```

```
TG pro  ▭▭▭▭▭ 21.01.2018
 Canola
 Value of change

-6.0   -0.3%    6.0
```
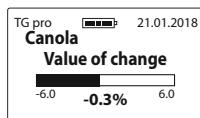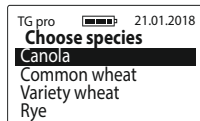
When the modifications have been made, at the name of the species there appears "*****"(asterisk) informing by which value the default settings have been modified, for example:

```
TG pro  ▭▭▭▭▭           TG pro  ▭▭▭▭▭
                       Mod:-0.3%
     Canola                 ˣCanola
22.1ºC 9.9%           22.1ºC 9.6%
Esc          Start    Esc          Start
```
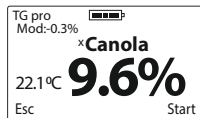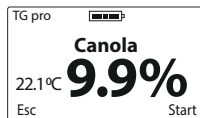
In order to return to the default settings, set to "**0,0%**", then the asterisk next to the name of the species also disappears, for example:

```
TG pro      ▄▄▄▄
  Canola
      Value of change

-6.0    0.0 %    6.0
```
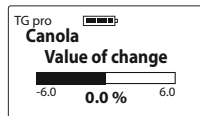
7. Add species

First read CHAPTER: LIST OF AVAILABLE SPECIES AND HOW TO ADD NEW SPECIES.

In order to add new species to the TG pro grain moisture meter, enter the **Main menu** with the help of $\vee$ or $\wedge$ and then select the option **Add species** and confirm with OK, for example:

```
TG pro   ▄▄▄▄  21.01.2018      TG pro   ▄▄▄▄  21.01.2018
 Main menu                     Enter code:
Temperature measure
Settings                       < 0 1 2 3 4 5 6 7 8 9
Result modification            A B C D E F
Add species
```

In order to enter the special code, select proper signs with the help of $\vee$ or $\wedge$ and confirm with OK (in order to delete the sign, use the symbol "**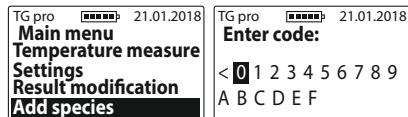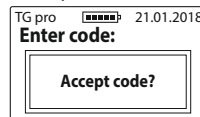<**" and confirm with OK). When you have entered the code, a message appears: "**Accept code?**", which should be confirmed with OK, or example:

```
TG pro   ▄▄▄▄▄  21.01.2018
 Enter code:

      Accept code?
```

Notice! Entering the same code enables adding and deleting the species (alternately) in the available list of the device. The codes are for this particular device, thus if you would like to activate new species in two TG pro moisture meters, you would need two different codes.

8. About

In order to check information about the device and contact details of the manufacturer, enter the **Main menu** with the help of $\genfrac{}{}{0pt}{}{ESC}{on/off}$, then use the buttons $\vee$ or $\wedge$ and choose the option **About** and confirm with OK button.

Here you can check the model of the device, its firmware, series number and on the second page the address and contact details of the Draminski S.A. company.

```
TG pro  [████]  21.01.2018
 Main menu
 Settings
 Result modification
 Add species
 About
```

```
DRAMIŃSKI
www.draminski.com
   Twist Grain pro
Firmware v:1.4C K:0.10
SN: T G000010    ➡
```

```
Dramiński S.A.
ul. Owocowa 17
10-860 Olsztyn, Poland
e-mail: wilgo@draminski.com
phone:  +48 89 527 11 30
MADE IN POLAND
```
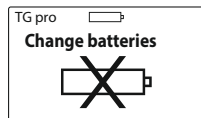
CHANGE OF BATTERIES

CHAPTER 12

UThe device automatically signals when the batteries are low. In such a situation immediately after the device has been switched on or when it is being operated, a message appears "**Change batteries**" in graphic form and then the TG pro turns off automatically.

The moisture meter is powered by four 1.5 V type LR6, AA batteries.

In order to change the batteries:
– open the cover of the battery compartment with the help of the ribbon tip,
– place the ribbon across inside of the battery compartment, so that its tip comes beyond the cover,
– insert new batteries in accordance with their polarity +/- (pressing the ribbon inside),
– put the cover again. When you hear a click, it means that

the security device is properly locked and there is no risk that the batteries fall out.
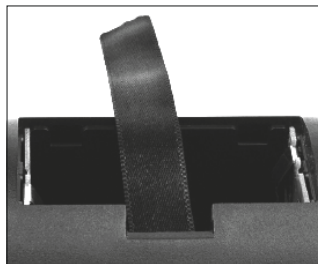
Change of batteries in the tightening cap with a buzzer.
One battery 3V (type CR-2032) powers the buzzer in the tightening but of the measurement chamber. When the sound becomes weak or disappears, it is necessary to change the battery.

To change the battery you should:
– unscrew two screws which are in the cap,
– lift the lid and delicately lever the battery from the base,
– insert a new battery in accordance with polarity +/-,
– put the lid of the tightening cap again and screw
  it with two screw (2.5x10).
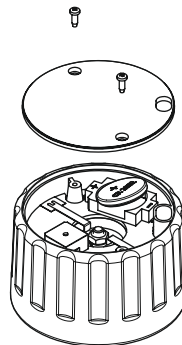
FINAL NOTES

CHAPTER 13

- The grain moisture meter should be protected against direct impact of water. Avoid using it in alternately extreme temperatures. You cannot allow water vapour condense on the metal parts of the device because it might have an influence on the measurement results.

- At the end of a season. when you finish working with the device, you need to clean and dry the measuring chamber and the tightening cap properly. The device must be kept in a dry and warm room. Proper maintenance and storage conditions guarantee long life and reliability of the device.

- If you are not going to use the device for a longer time, it is recommended to take out the batteries from the battery compartment in order to limit the risk of damage of the device due to leakage of the electrolyte. **It is recommended to use batteries of recognised manufacturers**.

- If any problems appear with the device or when interpreting the results, it is recommended (before sending the device to the service) to contact the manufacturer, that is DRAMINSKI S.A. or the nearest authorized distributor. This contact is important especially before sending the device to the warranty servicing because most of the problems can be solved remotely. However, when you send properly operating device groundlessly, you will be charged with costs of maintenance and shipment.

- It is forbidden to dismantle the device, to interfere or maintain it by unauthorized people, because it might cause permanent damage and it will invalidate the warranty.

- Pay attention to the rubber shield of the mini-USB slot, because when it is missing, the slot is exposed to dirt.

TECHNICAL DATA

CHAPTER 14

Dimensions	$16.5 \times 7.0 \times 7.5$ cm
Weight of the device	520 g (with batteries and the tightening cap)
Way of filling the chamber	manual
Method of humidity measurement	impedance in 4 frequencies
Sample's capacity	90 ml
Measurement control	single system microcomputer
Power supply	4 batteries 1.5V type AA + 1 battery 3V type CR-2032
Power intake	from 30 to 72 mA w depending on the user's settings
Approximate time of continuous operation on one battery set	77 hours when backlight is set to 0% 54 hours when backlight is set to 30%
Low battery indicator	graphic
Measurement resolution	humidity – 0.1%, temperature – 0.1℃/℉
Humidity measurement accuracy	$\pm$ 0.5 % for normalized grain $\pm$ 1 % in the range up to 10 % of humidity $\pm$ 1.5 % in the range over 10 % of humidity and can increase if the sample's humidity increases
Temperature measurement accuracy	$\pm$ 0.5℃ in the range from 0℃ to 85℃ / $\pm$ 0.9℉ in the range from 32℉ to 185℉
Temperature measurement range	from 0℃ to 125℃
Correction of measurements	using the keyboard – option "modification"
Save data	internal storage
Internal memory capacity	– 50000 measurements with date and time – 20 external temperature probes recognised automatically on the basis of ID number – 20 language versions – 400 species

Checking the memory status	from menu
External temperature probe	with a digital temperature sensor connected to mini-USB port
Display	graphic LCD LED backlit, diagonal 2"
Keyboard	membrane
Temperature compensation	considered automatically
Additional functions	real time clock, save measurements to the memory (date, time and sample number), data transmission to PC, preview of memory status, preview of battery status, temperature measurement with an external probe, change of operating mode (basic/advanced), modification of humidity results, adding new species using special codes, calculation of the average result, automatic temperature compensation, pop-up menu, setting the display parameters, selecting a language version, selecting the temperature scale, change of power auto off time, update of data and software, special software to manage the data saved on PC (generation of reports, spreadsheets, diagrams, prints)
Recommended operating temperature	from 10℃ to 35℃
Recommended storage temperature	from 5℃ to 45℃

www.draminski.com

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