# SMSVAGA

patented

# SMS SCALE

User manual

Edition 4.0 · for scales with software from October 2026

smsvaga.com

OPTICAL d.o.o. · Kruševac

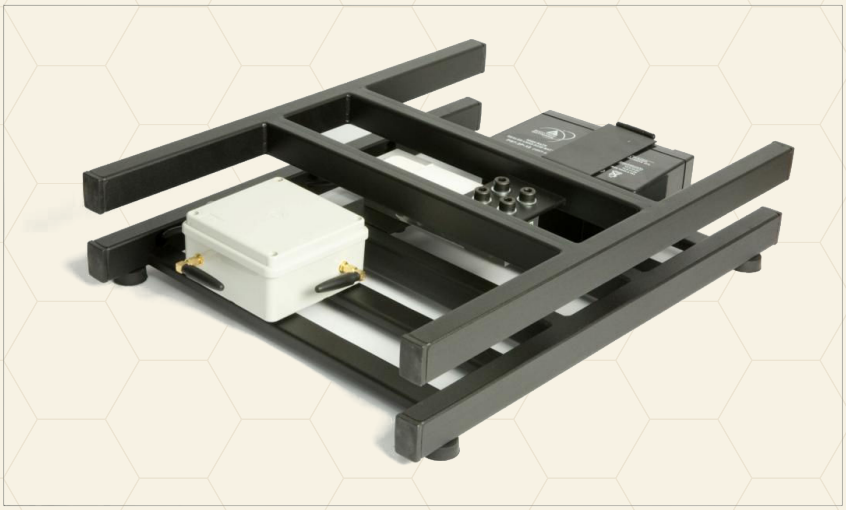
# Contents


1. WHAT IS THE SMS SCALE INDICATOR? 3
2. PARTS OF THE SMS SCALE 4
3. PREPARATION OF SCALE FOR USE 5
4. SMS COMMANDS FOR ADJUSTING THE SCALE 6
5. WEIGHING WITH SMS OR CALL 16
6. ADDING NEW EXTENSIONS ON THE HIVE 16
7. THE LEVER 17
8. WARNING MESSAGES 17
9. BALANCE CHECK 18
10. FREQUENTLY ASKED QUESTIONS 18
11. CHARGING AND STORING THE BATTERY DURING WINTER 20
12. TECHNICAL SPECIFICATIONS 21

# 1. WHAT IS THE SMS SCALE INDICATOR?

SMS Scale Indicator (hereinafter referred to as SMS Scale) is a specialized electronic device for monitoring the honey yield in the hive. It allows the beekeeper to read the yield at any time, without visiting the apiary - by a simple SMS message from any mobile phone, or through the application on Android and iPhone smartphones. Reading is also possible via Bluetooth on Android smartphones. Besides weighing, the SMS Scale can convey other parameters, such as position, humidity and temperature, or warnings about apiary security, and all this from the comfort of your home.

**Picture 1. SMS Scale with the battery**



## 2. PARTS OF THE SMS SCALE

The main parts of the SMS Scale are (Picture 2):

1. The metal construction

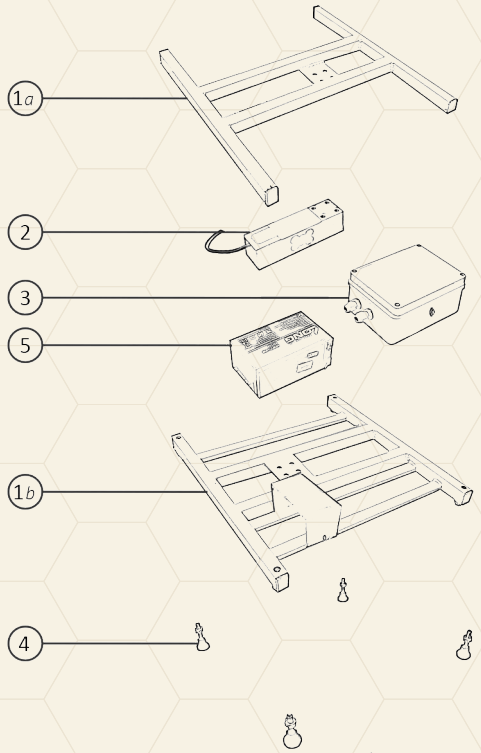
2. Measuring cell

3. Electronic circuit board with GSM/GPRS module, placed in a waterproof plastic box (box with electronics)

4. Adjustable leveling mounts

5. Power supply

**Picture 2. Main parts of the SMS Scale**




The construction consists of two H-shaped metal consoles (1a and 1b) connected with the measuring cell (2) in the middle. Console 1b carries the box with electronics (3) and the metal holder for the battery (5). The top of console 1a is the place for the beehive. The beehive can be placed directly on console 1a or on the protective pan (optional). The measuring cell allows accurate measurement of honey yield. Depending on the customer's needs, it can measure up to 120, 240 or 360 kg of mass.

The box with electronics contains an electronic circuit board with a GSM/GPRS module that allows sending and receiving messages about honey yield. The plastic box is waterproof and it is connected directly to the measuring cell.

Adjustable leveling mounts (4) are at the bottom of console 1b and their purpose is to level and stabilize the scale, ensuring accurate measurement.

In order for the scale to work, a power supply is necessary. The battery is sold separately. The SMS Scale construction is designed to fit small Gel batteries, but the beekeeper can use any type of battery up to 30V voltage.

Besides the main parts, the SMS Scale can use additional equipment. This equipment is not necessary, but it allows the beekeeper to make the most of the scale. These parts are:

6. Pan

7. GPS module with antenna

8. External GSM antenna

9. Solar panel

10. Different types of sensors for:

- measuring external temperature

- measuring humidity

- measuring temperature inside the hive

- securing the apiary

The pan has a protective role, shielding the other parts from weather conditions and dust. It can be made of thin tin or wood. At the back it has a small door with a lock which enables easier access to the battery, while on the lower side there are specially designed sockets which fit the construction of the scale; the rubber in the sockets prevents the pan from sliding.

The GPS module is a small electronic circuit that is mounted on the electronic board and, with the GPS antenna, it is used to precisely locate the SMS Scale.

The external GSM antenna amplifies the mobile network signal. It is used in locations where the GSM signal is weak.

The solar panel provides continuous power supply through solar energy. For connecting the solar panel, a battery and a battery charge controller are required.

It is possible to connect various types of sensors for measuring temperature, humidity and temperature inside the hive, as well as sensors which protect the apiary against theft.

## 3. PREPARATION OF SCALE FOR USE

1. Unpack the SMS Scale

2. Insert the SIM card

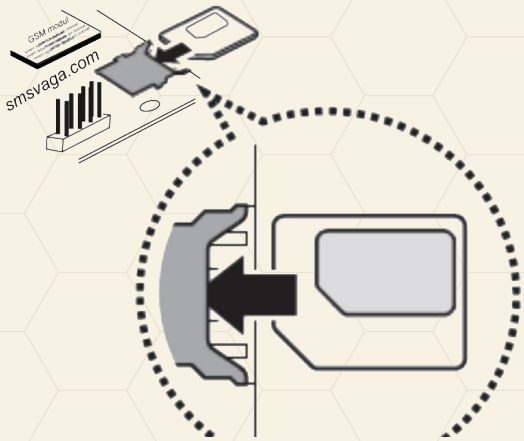
3. Attach additional equipment

4. Attach a fully charged battery

5. Visual indications

The SMS Scale is delivered in a closed cardboard box. After unpacking the device, it is necessary to unscrew the top of the box with electronics in order to insert a SIM card. The SIM card can be from any mobile service provider, domestic or foreign. It must be active, with PIN protection deactivated (deactivation of the PIN code is done according to the service provider's instructions). The SIM card is inserted into the provided slot on the electronic circuit board (Picture 3). Since 2017, the SMS Scale electronics uses only micro SIM cards. To insert a SIM card of the appropriate size, unscrew the two M3 nuts holding the electronic circuit board in the box, lift the board out of the box and insert the card in the direction of the arrow, with the SIM card contacts facing the board.

**Picture 3. Inserting the micro SIM card into the electronic circuit board**

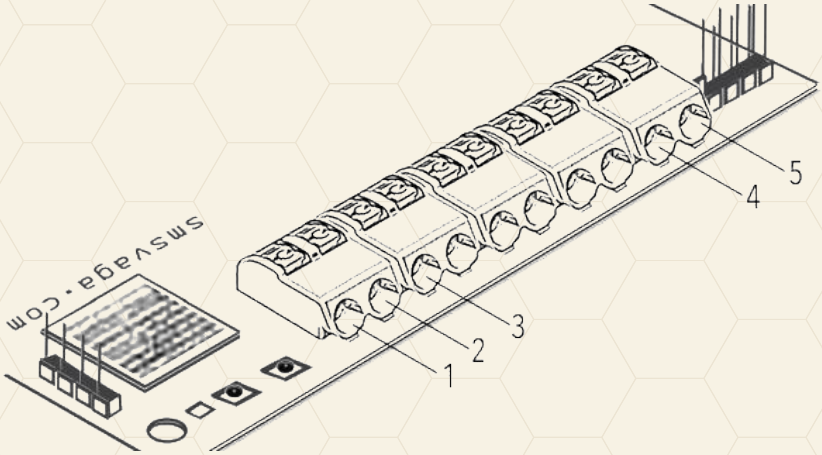


All additional equipment (sensors, GPS module, solar panel etc.) must be attached before connecting the scale to the battery.

Theft prevention sensors have 2 wires which are connected to places 1 and 2 of the block connector on the electronic board. The order of the wires is not important.

Temperature and humidity sensors have 3 wires which are connected to place 3 (data wire, usually green or yellow), place 4 (+, red wire) and place 5 (-, black wire) (Picture 4).

**Picture 4. Attaching the sensors**




When the SIM card is inserted into the electronics, attach the previously charged battery, ensuring that the red clamp is attached to + and the black one to -. When the power is on, the LED light on the electronics flashes every second, which means that the scale is searching for a GSM network. After approximately 20 seconds, the scale connects to the mobile network and the LED light flashes more slowly (once every 3 seconds). This means that the SMS Scale is ready to be used and the plastic box can be closed.

Using your mobile phone, call the number of the SIM card that is in the SMS Scale and the scale will memorize your number under the name „User“. The SMS Scale replies with: „Successfully created User: phone number“. The scale will not communicate with other numbers, and you can add as many Users to the SIM card phonebook as needed by sending a text message, which will be discussed later.

For accurate measuring it is necessary that the SMS Scale stands on a hard surface and that its position is level. This is achieved with the leveling mounts on the bottom of the construction: adjust them as desired, level the scale with a spirit level and tighten the nuts on the mounts. The scale is now ready to be used. When all the procedures are performed and the scale is in the apiary, ready for honey yield, the beekeeper sends the message TARA.

## 4. SMS COMMANDS FOR ADJUSTING THE SCALE

NOTE: SMS commands need to be written in all capital letters, from the beginning of the SMS message. All messages that do not meet the prescribed format will be automatically rejected, and the user will receive an SMS with the content: UNKNOWN COMMAND. The list of all commands is given in Table 1.

| No. | Command | Explanation |
|---|---|---|
| **1.** | ISO [space] [two letter abbreviation] | Language selection |
| **2.** | ADD [space] NUMBER [space] [mobile phone number 06xxxxxxx] | Adding a new User by SMS |
| **3.** | ADD [space] NUMBER1 [space] [mobile phone number 06xxxxxxx] | Adding or re-writing the first number (User) on the SIM card |

| | | |
|---|---|---|
| **4.** | DELETE [space] NUMBER [space] [mobile phone number 06xxxxxxx] | Deleting one particular User |
| **5.** | DELETE [space] NUMBER1 [space] [mobile phone number of first User] | Deleting the first User from the SIM card |
| **6.** | DELETE [space] ALL | Deleting all Users |
| **7.** | USERS | Shows all User numbers from the SIM card |
| **8.** | SCALE [space] [scale name up to 14 characters] | Defining the name of the scale |
| **9.** | TARA | Defining TARE |
| **10.** | MEASURE | Measuring the honey yield |
| **11.** | NOTIFICATION [space] 0 | Turning off the reply to a command |
| **12.** | NOTIFICATION [space] 1 | Turning on the reply to a command |
| **13.** | BT [space] 0 | Turning off Bluetooth |
| **14.** | BT [space] 1 | Turning on Bluetooth |
| **15.** | MODE1 | Measuring by call, several times per day |
| **16.** | MODE2 | Measuring by SMS, once per day |
| **17.** | TIME [space] MEASUREMENTS [space] [time of measurements in hours xx,yy] | Defining two yield measurement intervals when the scale is in MODE2 |
| **18.** | DAILY [space] 0 | When the scale is in MODE2, the report is sent only to the first User |
| **19.** | DAILY [space] 1 | When the scale is in MODE2, the report is sent to all Users on the SIM card |
| **20.** | LEVER [space] 0 | Turning off „Lever“ |
| **21.** | LEVER [space] 1 | Turning on „Lever“ |
| **22.** | TARA1 | Starts the process of adding new weight |
| **23.** | TARA2 | Ends the process of adding new weight |
| **24.** | TDI [space] [time of measurement in hours xx] | Defines the starting time for daily yield income |
| **25.** | NET [space] INFO [space] [number xxx] | Notification when the yield reaches a certain weight |
| **26.** | NET [space] INFO [space] OFF | Canceling the NET INFO command |
| **27.** | ALARM [space] START | Activating the alarm |
| **28.** | ALARM [space] STOP | Deactivating the alarm |
| **29.** | TIME [space] SET [space] HHMMSS [space] DDMMYY** | Manual time setting |
| **30.** | TIME [space] ZONE [space] [±x] | Manual time zone setting |
| **31.** | TIME | Checking the SMS Scale's time |
| **32.** | WEIGHT [space] LOSS [space] 0 | Deactivating the weight loss notification |
| **33.** | WEIGHT [space] LOSS [space] 1 | Activating the weight loss notification |
| **34.** | APN [space] [mobile operator APN setting] | Defining the APN of the mobile operator |
| **35.** | POSITION | The scale reports back the position where the SMS Scale is |
| **36.** | EMAIL [space] SET [space] [e-mail on which you want to receive reports] | Defining the User's e-mail for receiving reports |

| | | |
|---|---|---|
| **37.** | EMAIL [space] SET [space] SERVER [space] [server address] [space] [port] [space] [username] [space] [password] | Defining the User's e-mail server for receiving reports (if the User does not want to use the SMS Scale server) |
| **38.** | FTP [space] SET [space] [server address] [space] [port] [space] [user] [space] [password] [space] [/folder] | Defining the User's FTP parameters for receiving reports |
| **39.** | FTP OFF | Turning off report delivery to the FTP server |
| **40.** | REPORT [space] SMS | The User wants to get only SMS reports |
| **41.** | REPORT [space] EMAIL | The User wants to get only EMAIL measurement reports |
| **42.** | REPORT [space] SMS-EMAIL | The User wants to get SMS and EMAIL measurement reports |
| **43.** | REPORT [space] OFF | The User wants to turn off SMS and EMAIL, and get reports on the FTP server |
| **44.** | CREDIT [space] SET [space] [USSD code of mobile operator] | Setting up balance check using a USSD code |
| **45.** | CREDIT [space] SET [space] SMS [space] [SMS command of mobile operator] | Setting up balance check using an SMS command |
| **46.** | CREDIT | Checking the balance |
| **47.** | RESET | Turning the scale off and on |
| **48.** | RESET DEFAULT | Deletes all settings on the SMS Scale. Be sure to read the command explanation!!! |
| **49.** | OWNER [space] [mobile phone number that is in the scale 06xxxxxx] | Theft protection: the scale remembers its SIM card; if someone swaps it, it immediately texts the owner’s number and raises an alarm in the app** |
| **50.** | CONF | Reading the scale configuration. Works only via Bluetooth! |
| **51.** | UDP [space] SET [space] SERVER [space] IP_address [space] port [space] user [space] password [space] xx [measuring interval] | Setting up the scale for automatic sending of measurements, used by the Android/iPhone application |
| **52.** | UDP [space] ON / UDP [space] OFF** | Turns sending measurements to the server (app and portal) on / off |
| **53.** | OWNER [space] OFF** | Turns SIM card protection off (only from the owner’s number) |
| **54.** | FOTA [space] START** | Updates the scale software over the mobile network |
| **55.** | OPERATORS** | List of the mobile networks the scale can hear, with the code of each network** |
| **56.** | OPERATOR [space] [network code] / OPERATOR [space] AUTO** | Selects a mobile network by its code, or returns to automatic selection** |

** With the latest scale software (from October 2026).

```
ISO [space] [ISO 639-1 two letter abbreviation]
```

Command is used to choose the language. Available languages are: Serbian - sr, English - en, German - de, French - fr, Italian - it, Norwegian - no and Hungarian - hu.

Command example:

ISO en - the scale will operate in English

```
ADD [space] NUMBER [space] [mobile phone number 06xxxxxxx]
```

Command is used when the main User (defined when the device is started) wants to add new Users.

Command example:

ADD NUMBER 0601231231 - number 0601231231 is added as a new User

If the beekeeper adds the same number twice, the scale replies: “Number already exists in the phonebook!”

```
ADD [space] NUMBER1 [space] [mobile phone number 06xxxxxxx]
```

Command is used to define the first User or to re-write the first User on the SIM card. This command is sent by an already existing User.

Command example:

ADD NUMBER1 0601231231 - number 0601231231 is now placed as the first User

```
DELETE [space] NUMBER [space] [mobile phone number 06xxxxxxx]
```

Command is used to delete a User that was subsequently added.

Command example:

DELETE NUMBER 0601231231 - number 0601231231 is deleted from Users

```
DELETE [space] NUMBER1 [space] [mobile phone number 06xxxxxxx]
```

Command is used to delete the first User.

Command example:

DELETE NUMBER1 0601231231 - the number of the first User 0601231231 is deleted

```
DELETE [space] ALL
```

Command is used to delete all Users.

Command example:

DELETE ALL

```
USERS
```

This command lists all Users from the SIM card.

```
SCALE [space] [scale name up to 14 characters]
```

Command is used to name the scale. The name can consist of letters and numbers, with spaces, up to 14 characters.

Command example:

SCALE Bees Mountain 1

```
TARA
```

Command is used when the scale is in the apiary and the hive on the scale is ready for honey yield. After sending the command TARA, the beekeeper gets an SMS with information about the TARE value (the weight of the hive). NET is 0 kg. The SMS Scale sends back a text message with the measurement.

Command example:

TARA

```
MEASURE
```

Measuring is done by a free call, but it can also be done with the command MEASURE. The SMS Scale sends back a text message with the measurement.

Command example:

MEASURE

```
NOTIFICATION [space] 0 / NOTIFICATION [space] 1
```

Command is used when the User wants to get the reply “OK” or “Unknown command” from the device. These notifications are sent back only for commands which are not executed immediately (e.g. ALARM START, POSITION...).

NOTE: When replying, the device uses the credit of the SIM card that is in the scale.

Command example:

NOTIFICATION 0 - turns notifications off

NOTIFICATION 1 - turns notifications on

```
BT [space] 0 / BT [space] 1
```

These commands turn the integrated Bluetooth module on and off. Via Bluetooth, completely free of charge, the Android application can be used to set up the scale, perform measuring and taring, and read the SIM card credit.

Command example:

BT 0 - turns Bluetooth off

BT 1 - turns Bluetooth on

```
MODE1 / MODE2
```

These commands define the working mode of the scale. In MODE1 the scale is always on the network and measuring is done by call or SMS message, as many times per day as needed, while in MODE2 the scale is offline, performs 2 measurements during the day and sends one report message.

Command example:

MODE1 - measurement by calling

MODE2 - sleep mode with one daily report

```
TIME [space] MEASUREMENTS [space] [time of measurements in hours xx,yy]
```

Command which sets the times at which the scale does its measuring in MODE2.

Command example:

TIME MEASUREMENTS 08,20 - the scale will measure the yield at 8 in the morning and at 8 in the evening

```
DAILY [space] 0 / DAILY [space] 1
```

These commands define whether the MODE2 daily report is received by all Users on the SIM card or just by the first User. When this command is executed in MODE1, the scale will send the report as if it were in MODE2, while remaining available for calls and SMS messages throughout the day.

Command example:

DAILY 0 - only the first User gets the reports

DAILY 1 - all Users get the reports

```
LEVER [space] 0 / LEVER [space] 1
```

These commands turn the „Lever“ function on and off, which will be discussed later.

Command example:

LEVER 0 - the function is turned off

LEVER 1 - the function is turned on

```
TARA1 / TARA2
```

These two commands are used when extensions or semi-extensions are added to the beehive. Adding extensions will be discussed later.

Command example:

TARA1 - sent before adding an extension

TARA2 - sent after adding an extension

```
TDI [space] [time of measurement in hours xx]
```

During measuring, the daily income appears in the message, i.e. the yield from a defined starting point until the moment of measurement. The TDI command defines that starting point. If TDI is 06, then DI in the MODE1 message will be the honey yield of that day from 6 in the morning until the time of measurement. In MODE2, the daily income will be from 6 a.m. until the second measurement.

Command example:

TDI 07 - the starting point will be 7 a.m.

```
NET [space] INFO [space] [number xxx]
```

With this command, the beekeeper sets the scale to send a notification when the NET yield reaches a certain weight.

Command example:

NET INFO 102 - the scale will notify the beekeeper when the yield reaches 102 kg

```
NET [space] INFO [space] OFF
```

This command cancels the previous command.

Command example:

NET INFO OFF

```
ALARM [space] START / ALARM [space] STOP
```

These commands turn the alarm on and off. After finishing the work in the apiary, the beekeeper starts the alarm function. The next time he comes to the apiary, he deactivates the alarm. In the case of compromised safety, the beekeeper receives a warning SMS.

Command example:

ALARM START

ALARM STOP

```
TIME [space] SET [space] HHMMSS
```

This command is for manual time setting, in case the scale does not receive the time from the mobile network, or the received time is incorrect.

Command example:

TIME SET 152100 - sets the time to 15 hours, 21 minutes and 0 seconds

The new scale software** also accepts the date, as DDMMYY: TIME SET 152100 101026 - 15:21:00, 10 October 2026. The app does this with one button over Bluetooth and also sends the phone’s time zone.

```
TIME [space] ZONE [space] [±x]
```

This command is for manual time zone setting. The time zone is marked with +/- and the number of the time zone.

Command example:

TIME ZONE +1 - Central European Time Zone

```
TIME
```

Command after which the scale returns a message with the time it uses.

Command example:

TIME

```
WEIGHT [space] LOSS [space] 1 / WEIGHT [space] LOSS [space] 0
```

These commands activate and deactivate the notification about sudden weight loss. In case of a sudden weight loss of 1 kg or more compared to 5 minutes earlier, the beekeeper receives a warning message.

Command example:

WEIGHT LOSS 1 - turns the notification on

WEIGHT LOSS 0 - turns the notification off

```
APN [space] [mobile operator APN setting]
```

Defining the APN (internet) of the mobile operator. This option must be activated for the web services that the scale provides.

Command example:

APN internet - for Telekom

APN internet yettel gprs - for Telenor (Yettel)

APN internet internet internet - for VIP (A1)

If the APN is not set correctly, after 5 minutes the scale sends the message: “Wrong APN!”

```
POSITION
```

This command sends back a text message with coordinates and a link for visual view on Google Maps or Google Earth. In the base model of the SMS Scale, this option works through mobile network base stations. Due to the imperfections of this technology, deviations of up to several hundred meters are possible. If the beekeeper needs precise satellite locating, he can buy the additional GPS module with antenna.

Command example:

POSITION

```
EMAIL [space] SET [space] [e-mail on which you want to receive reports]
```

Setting the e-mail for delivering reports.

Command example:

EMAIL SET myname@gmail.com

```
EMAIL [space] SET [space] SERVER [space] [server address] [space] [port] [space] [username]
   [space] [password]
```

With the previous command, reports are sent to the User's e-mail through the SMS Scale server. If the beekeeper has his own e-mail server, he can set it with this command.

Command example:

EMAIL SET SERVER mail.optical.rs 25 smsscale 12345 - where mail.optical.rs is the server, 25 the port, smsscale the user and 12345 the password

```
FTP [space] SET [space] [server address] [space] [port] [space] [user] [space] [password]
   [space] [/folder]
```

This command sets an FTP server for delivering reports.

Command example:

FTP SET ftp.optical.rs 22 smsscale 12345 /reports - where ftp.optical.rs is the FTP server, 22 the port, smsscale the user, 12345 the password and /reports the folder for the reports

```
FTP OFF
```

This command turns off the delivery of reports to the FTP server.

Command example:

FTP OFF

```
REPORT [space] SMS
```

Command is used when the beekeeper wants to receive only SMS reports.

Command example:

REPORT SMS

```
REPORT [space] EMAIL
```

Command is used when the beekeeper wants to receive only e-mail reports.

Command example:

REPORT EMAIL

```
REPORT [space] SMS-EMAIL
```

Command is used when the beekeeper wants to receive both SMS and e-mail reports.

Command example:

REPORT SMS-EMAIL

```
REPORT [space] OFF
```

Command which turns off SMS and e-mail; the beekeeper gets his reports on FTP.

Command example:

REPORT OFF

```
CREDIT [space] SET [space] [USSD code of mobile operator] / CREDIT [space] SET [space] SMS
    [space] [SMS command of mobile operator]
```

These commands are used for setting up the balance check, using a USSD code or an SMS command.

Command example:

CREDIT SET *123# - balance check for A1 Serbia prepaid

CREDIT SET SMS ? 1260 - balance check for A1 Serbia postpaid

```
CREDIT
```

This command checks the remaining credit on the SIM card in the scale, after it has been set up with the previous command.

Command example:

CREDIT

```
RESET
```

This command turns the SMS Scale off and on again.

Command example:

RESET

```
RESET DEFAULT
```

Command used to delete all settings from the scale. This command also deletes the measuring cell settings which are necessary for accurate measuring. Use this command only after consulting the scale's technical support.

Command example:

RESET DEFAULT

```
OWNER [space] [+381641234567]** / OWNER [space] OFF**
```

Theft protection via the SIM card**. Together with the owner’s number, the scale remembers the SIM card that is in it at that moment. If someone swaps it, at the next start the scale texts “WARNING: SIM card replaced” to the owner’s number (with the location, if the scale knows it) and raises an alarm in the app and on the portal. The easiest way to turn it on is from the app or the portal (“Theft protection” box). Once it is on, only an SMS from the owner’s number can change it — never Bluetooth. If you changed the card yourself, confirm “I changed the card” in the app.

Command example:

OWNER +381641234567 - turns protection on with owner number 0641234567. OWNER OFF - turns it off.

```
CONF
```

This command is sent only via Bluetooth and it reads the current configuration of the scale.

```
UDP [space] SET [space] [server address] [space] [port] [space] [user] [space] [password]
   [space] xx [measuring interval]
```

Command which sets up the scale to automatically send measurements over the internet, used for monitoring via the Android or iPhone application.

Command example:

UDP SET ftp.optical.rs 2222 smsscale 12345 60 - where ftp.optical.rs is the server address, 2222 the port, smsscale the user, 12345 the password and 60 the number of minutes between measurements

```
UDP [space] ON / UDP [space] OFF**
```

UDP ON turns on sending measurements to the server every hour; if no server is set, the scale uses udp.smsvaga.com. UDP OFF only stops sending — the server setting is kept.

```
FOTA [space] START**
```

The scale downloads the latest software from our server over the mobile network and updates itself (5–15 minutes). If the scale already has the latest software, it says so in a reply and changes nothing. If the new version does not work, the scale goes back to the previous one on its own. Send it from a number in the scale’s phone book. The same can be done from the app, over Bluetooth.

```
OPERATORS**
```

The scale searches the mobile networks it can hear (GSM only) and returns the list in one message, for example: “GSM: 22001 Yettel*, 22003 mts, 22005 A1 SRB, 21890 HT x”. The asterisk marks the network the scale is on now, “x” a network that does not accept this SIM card. The search takes 10 to 60 seconds.

```
OPERATOR [space] [network code] / OPERATOR [space] AUTO**
```

The scale moves to the selected network without a restart, for example OPERATOR 22005. Take the code from the list returned by the OPERATORS command. If the selected network does not accept the scale, or disappears later, the scale moves to an available network by itself and tries to return to the selected one from time to time. OPERATOR AUTO restores automatic network selection. The choice is kept after a restart.

```
GET [space] LOGS**
```

Bluetooth only. The scale keeps the measurements of the last 30 days even when sending to the server fails. The app downloads them with “All measurements (30 days)” — they can be saved as .csv or sent to the server to fill the gaps in the chart.

## 5. WEIGHING WITH SMS OR CALL

Place the weight on the SMS Scale, which must first be leveled and tared, with the weight centered on the scale.

In MODE1, weighing can be performed by sending an SMS message with the content: MEASURE, or by calling the number of the SIM card in the scale. After dialing the SMS Scale number, it will “ring” twice and then reject the call. Because the call is not established, calling the SMS Scale is free of charge. After a few seconds, you will receive a return SMS message, hereinafter referred to as SMS-measurement, with the following information:

| | |
|---|---|
| **Scale: Bees Mountain 1** | scale name |
| **NETO: 17.82 kg** | NET honey yield |
| **TARA: 35.86 kg** | TARE weight (the hive) |
| **DI: 3.76kg** | daily income since the starting point |
| **GSM Signal: 21 (7 to 31)** | GSM signal strength |
| **Sys.Temp: 16C (-30C to 80C)** | temperature of the electronics in the box |
| **Battery status: 5/5** | battery status 1-5/5 |

For measuring in MODE2, it is first necessary to set the times when the SMS Scale will do the measurements. This is done with the command TIME MEASUREMENTS xx,yy. Then the beekeeper sends the command MODE2. An example of the message the beekeeper receives:

| | |
|---|---|
| **Scale: Bees Mountain 1** | scale name |
| **08h: 10.02kg 20C** | NET honey yield at 8 a.m., system temperature |
| **20h: 13.75kg 19C** | NET honey yield at 8 p.m., system temperature |
| **TARA: 35.86kg** | TARE weight |
| **DI: 3.90kg** | daily income since the starting point |
| **GSM Signal: 21 (7 to 31)** | GSM signal strength |
| **Battery status: 5/5** | battery status 1-5/5 |
| **2016-05-04 20:00:30** | date and time |

## 6. ADDING NEW EXTENSIONS ON THE HIVE

Using this function, the beekeeper knows at any time how much pure honey yield is in the hive, without having to calculate the NET and TARE values by hand each time a new extension is added during the forage season. This option is available only in MODE1.

TARA1 - used for adding new extensions and semi-extensions; the SMS Scale does not measure the weight of the new equipment, only the honey yield. The process of adding is very simple, and it is only necessary to follow these steps:

1. Before adding the extension, send the SMS Scale a message with the content TARA1 (from that moment the scale memorizes the current state and stops measuring until it gets the message TARA2). The scale replies with: “You have 10 minutes to complete the procedure of adding extensions and send an SMS with the content TARA2!”

2. After sending the message, the beekeeper places the extension or semi-extension on the hive, for which 10 minutes are provided (if the beekeeper does not manage to add the extension within the given time, the SMS Scale cancels the TARA1 message and measuring continues as if the message had never been sent).

3. When the extension or semi-extension is in place, the beekeeper sends the SMS Scale a message with the content TARA2, which concludes the process.

From the moment the SMS Scale receives the TARA2 message, measuring continues as usual, the only difference being that the weight of the new extension with frames has been transferred to TARE, while NET measuring continues from the value it had before the TARA1 message was sent.

After the TARA2 message is sent, the SMS Scale will perform a control measurement and reply to the beekeeper with an SMS showing the new TARE, with NET unchanged.

NOTE: Adding a new extension must be done no later than 10 minutes from sending the first message with the content TARA1. Otherwise, the SMS Scale will ignore the TARA1 command and continue measuring as before. This function is available via SMS messages or Bluetooth.

## 7. THE LEVER

This option gives beekeepers better insight into the morning start of the bee forage. Since the scale measures the honey yield at 21h of the previous day, it performs a control measurement in the morning at 6h. The scale then makes new control measurements and “remembers” when, after 6 a.m., the colony loses weight and reaches the minimum value which we call the “Lever”. As the honey yield grows after the morning departure of the bees, the scale will send a message to the beekeeper when the weight reaches the value from 21h of the previous day. The message looks like this:

**Scale: Bees Mountain 1 NET at 21h was 87.45kg, at 06h 87.02kg. The Lever was 86.56kg at 06:40h. The scale leveled out at 08:55h.**

## 8. WARNING MESSAGES

If the alarm in the apiary is triggered (when the ALARM START option is active), a warning message is received:

**Scale: Bees Mountain 1 WARNING: Compromised safety!!!**

In case of sudden weight loss (when the WEIGHT LOSS 1 option is active), the beekeeper receives the message:

**Scale: Bees Mountain 1 WARNING: Weight loss has been detected!!!**

If the weight on the scale reaches the defined value (when the NET INFO xxx option is active), a warning message is received:

**Scale: Bees Mountain 1 The defined NET value of xxxkg has been reached!**

If the weight on the scale approaches the load cell capacity, the beekeeper will receive a warning message:

**Scale: Bees Mountain 1 The scale will be overloaded soon. Please reduce the weight of the beehive!!!**

When the battery capacity drops to 1/5, the beekeeper receives a warning message, so he can prepare a charged battery in time:

**Scale: Bees Mountain 1 Battery capacity is 1/5. Please replace the battery.**

NOTE: All warning messages are active in both working modes of the SMS Scale!

## 9. BALANCE CHECK

There are two ways of checking the balance:

1. USSD codes

2. SMS commands

The settings are done with the following commands:

CREDIT [space] SET [space] [USSD code of mobile operator]

CREDIT [space] SET [space] SMS [space] [SMS command of mobile operator]

After the setup, the balance is checked with the command CREDIT.

There is also a “quick” balance check which does not require previous setup, done with the commands:

CREDIT [space] [USSD code of mobile operator]

CREDIT [space] [SMS command of mobile operator]

BALANCE CHECK OF THE SMS SCALE SIM CARD FOR MOBILE OPERATORS IN SERBIA:

| | | |
|---|---|---|
| **MTS** | Prepaid: | *100# |
| **MTS** | Postpaid: | *797# |
| **A1** | Prepaid: | *123# |
| **A1** | Postpaid: | SMS ? 1260 |
| **YETTEL** | Prepaid: | *131*1# |
| **YETTEL** | Postpaid: | *311# |

## 10. FREQUENTLY ASKED QUESTIONS

— The SMS Scale sends the message: “Unknown command!”

Make sure you have typed the command correctly, from the beginning of the message, in all capital letters and with no space after the command.

— The SMS Scale sends the messages: “Time is not synchronized because the APN is not set!” or “Command is not executed because the APN is not set!”

Set the APN parameters according to the Manual.

— The SMS Scale sends the message: “Command is not executed because communication with GPS satellites was not established and the APN is not set!”

Make sure the GPS antenna is properly connected, step out into an open area so the GPS module can connect with the satellites, and set the APN according to the Manual.

— The SMS Scale sends the message: “Command is not executed because the e-mail parameters are not set!”

Set the e-mail parameters according to the Manual.

— The measurement is incorrect

1. Make sure the scale is properly leveled.

2. Check the value of the TARE parameter.

3. Check with technical support whether the scale has been reset to factory settings.

— The SMS Scale does not send return SMS messages (SMS-measurements)

1. Make sure that your mobile phone number and contact name are correctly added to the SIM card phonebook (it must be a User).

2. Check the credit balance of the pre-paid card in the SMS Scale.

— SMS-measurements arrive later than usual

This problem is mainly caused by the state of the mobile operator's network, but be sure to also check the GSM signal strength in the SMS message you receive (the value must be between 7 and 31 for the scale to work smoothly).

— Sometimes the SMS Scale rejects the call on the first “ring” and does not send a return SMS message

The problem may be caused by the state of the mobile operator's network. Wait for a while and call again.

— When calling the SMS Scale, you occasionally hear the message that the “mobile subscriber is not available at the moment”

1. The problem is caused by the state of the mobile operator's network.

2. Check the GSM signal strength (the value must be between 7 and 31 for the scale to work smoothly).

— When calling the SMS Scale, you always hear the message that the “mobile subscriber is not available at the moment”

1. If the green indicator light blinks once per second - the area is not covered by a GSM signal, or the signal reception antenna is damaged.

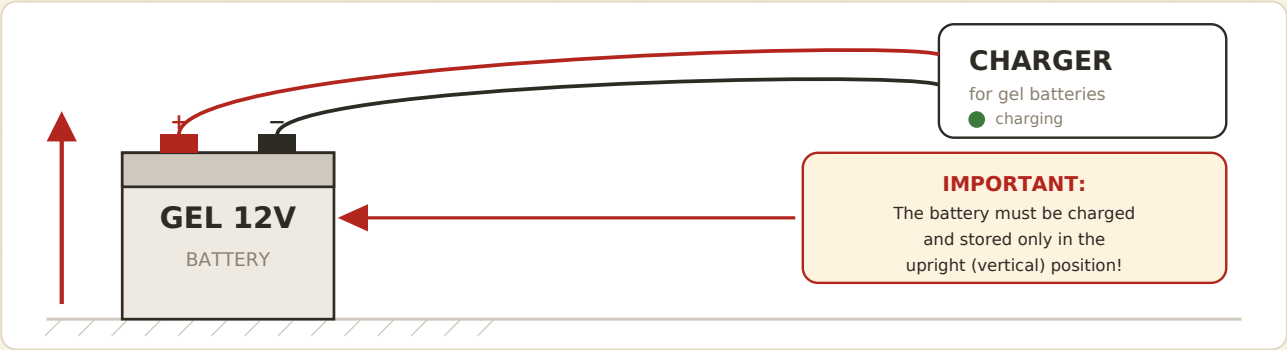
2. There was a power outage due to a discharged battery. It is necessary to recharge the battery.

## 11. CHARGING AND STORING THE BATTERY DURING WINTER

Charging the battery

The Gel (lead-acid) battery must be charged exclusively with a charger intended for gel/AGM batteries, with automatic voltage regulation. Ordinary car chargers do not have this regulation and can permanently damage the battery. The charging voltage must not exceed 14.4 V and the charging current must not exceed 2 A. Charging is finished when the charger indicates so - usually after 6 to 12 hours, depending on the battery capacity and the level of discharge. While charging is in progress, a red LED is usually lit on the charger, and when the battery is fully charged, a green LED turns on.

Charge the battery in a dry and ventilated room, at a temperature above freezing. First connect the clamps (red to +, black to -), and only then plug the charger in. During charging and storage, the battery must always stand in an upright (vertical) position, as shown in the sketch below.




Charging the gel battery in an upright position

Storing during winter

At the end of the beekeeping season, remove the battery from the scale, clean the clamps and charge it fully. Store it in a dry and cool place, ideally at a temperature of 5 to 15 °C - never in freezing conditions, because a discharged battery can freeze and crack at low temperatures.

Lead-acid batteries discharge on their own over time, so during winter the battery should be recharged every 2 months. Never leave it discharged: standing in a discharged state causes sulfation of the plates and permanently reduces the capacity. Before the new season, charge the battery fully - a healthy, fully charged 12V gel battery at rest shows about 12.8 V. A regularly maintained battery will last for many seasons and ensure reliable operation of the SMS Scale throughout the forage season.

## 12. TECHNICAL SPECIFICATIONS

The SMS Scale is manufactured according to the bottom-board dimensions of standard hive types:

| Type | Hive name | Construction (mm) | Pan (mm) |
|---|---|---|---|
| **LR/DB10** | Langstroth / Dadant-Blatt 10 | 350 × 450 × 90 | 412 × 504 × 100 |
| **DB12** | Dadant-Blatt 12 | 450 × 450 × 90 | 504 × 504 × 100 |
| **AŽ** | Alberti-Žnidaršič | 350 × 560 × 90 | 420 × 625 × 100 |
| **RV** | Rodna Voja | 350 × 350 × 90 | 414 × 414 × 100 |

| | |
|---|---|
| **Scale weight** | ≈ 5.8 kg (with battery 7.8 kg; with battery and pan ≈ 13 kg) |
| **Surface finish** | plastification, zinc, stainless steel; the pan can also be made of wood |
| **Measuring range (gross)** | up to 120 kg (error ± 10 g) or up to 240 kg (error ± 25 g); load cell up to 120 kg fitted as standard |
| **Operating temperature** | −30 °C to +80 °C |
| **GSM module** | Quad-band 850/900/1800/1900 MHz; Class 4 (2 W @ 850/900 MHz), Class 1 (1 W @ 1800/1900 MHz) |
| **GPRS** | Class 12 (max downlink and uplink 85.6 kbps) |
| **Bluetooth** | version 3.0 |
| **SIM card** | micro SIM, 1.8 V / 3.0 V |
| **Power supply** | DC 11–30 V |
| **Current consumption** | MODE1: 7 mA; MODE2: 3 mA |
| **Battery life (12 V / 7 Ah)** | MODE1 (always on the network): ≈ 45 days; MODE2 (sleep mode): ≈ 120 days |
| **Measuring methods** | free call, SMS message, Bluetooth, Android/iPhone application |
| **Report delivery** | SMS, e-mail, FTP, UDP packet (JSON format) |
| **Certificates** | CE, Serbian conformity mark (AAA), RoHS |

The SMS Scale is registered as a petty patent at the Republic of Serbia

Intellectual Property Office under the number 1456 UI.

The SMS Scale has a CE mark, Serbian conformity mark and RoHS certificate.

SMS Vaga je registrovana kao mali patent kod Zavoda za intelektualnu svojinu
Republike Srbije pod rednim brojem 1456 UI.
SMS Vaga poseduje CE znak, srpski znak usaglašenosti i RoHS sertifikat.