

GRAIN STORAGE SOLUTIONS

S230883

REV A/ECN 24-033/6-23-24



INSTALLATION / OPERATIONS MANUAL STEPS SERIES 2 Head Space Sensor/Monitor



Guardian GMS

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NOTES



The Shelly Cloud Mobile Application

Shelly Cloud gives you opportunity to control and adjust all Shelly® devices from anywhere in the world. The only thing you need is connection to the Internet and our mobile application, installed on your smartphone or tablet. To install the application please visit Google Play or App Store.

Registration

The first time you open the Shelly Cloud mobile app, you have to create an account which can manage all your Shelly® devices. Forgotten Password In case you forget or lose your password, just enter the e-mail address you have used in your registration. You will then receive instructions on how to change your password.

WARNING!

Be careful when you type your e-mail address during the registration, as it will be used in case you forgot your password. After registering, create your first room (or rooms), where you are going to add and use your Shelly devices. Shelly Cloud allows easy control and monitoring using a mobile phone, tablet or PC.

NOTES



Sorghum EMC (Equilibrium Moisture Content)

Outside Air Relative Humidity

Outside Air Temp	46%	52%	58%	65%	72%	78%	85%	92%	99%
30	11.8	12.5	13.2	14.1	15.1	16.1	17.6	19.8	26.2
35	11.7	12.4	13.1	14.0	15.0	16.0	17.5	19.8	26.1
40	11.6	12.3	13.0	13.9	14.9	15.9	17.4	19.7	26.1
45	11.5	12.2	12.9	13.8	14.8	15.8	17.3	19.6	26.0
50	11.4	12.1	12.8	13.7	14.7	15.7	17.2	19.5	25.9
55	11.3	12.0	12.7	13.6	14.6	15.7	17.2	19.4	25.9
60	11.2	11.9	12.6	13.5	14.5	15.6	17.1	19.3	25.8
65	11.1	11.8	12.5	13.4	14.5	15.5	17.0	19.3	25.7
70	11.0	11.7	12.4	13.3	14.4	15.4	16.9	19.2	25.7
75	10.9	11.6	12.4	13.3	14.3	15.3	16.8	19.1	25.6
80	10.9	11.5	12.3	13.2	14.2	15.2	16.8	19.1	25.5
85	10.8	11.5	12.2	13.1	14.1	15.2	16.7	19.0	25.5
90	10.7	11.4	12.1	13.0	14.0	15.1	16.6	18.9	25.4
95	10.6	11.3	12.0	12.9	14.0	15.0	16.5	18.8	25.4
100	10.5	11.2	11.9	12.9	13.9	14.9	16.5	18.8	25.3
110	10.4	11.1	11.8	12.7	13.7	14.8	16.3	18.6	25.2

Pairing the Steps Sensor Bulb to the network

Step 1

Install the battery in the Steps Sensor Bulb. Battery Type: 3V DC-CR123A
 Place your Steps Sensor Bulb in the wifi network where you want to use it. Press the Button - the LED should turn on and flash slowly. **WARNING:** If the LED does not flash slowly, press and hold the Button for at least 10 seconds. The LED should then flash quickly.

Note: Go to Setting/Network & Internet/wifi on your smart phone. Search for the device that you are trying to add. When you find it on the wifi list go to Step2 and 3.



Pairing the Steps Sensor Bulb to the Network Continued

Step 2

Choose “Add Device”. In order to add more devices later, use the Menu at the top right corner of the main screen and click “Add Device”. Type the name and password for the WiFi network, to which you want to add Shelly.

Step 3

If using iOS: you will see the following screen On your iOS device open Settings > WiFi and connect to the WiFi network created by Shelly, e.g. ShellyHT-35FA58. - If using Android your phone will automatically scan and include all new Shelly devices in the WiFi network, that you defined. Upon successful Device Inclusion to the WiFi network you will see the following pop-up:

Step 4

Approximately 30 seconds after discovery of any new devices on the local WiFi network, a list will be displayed by default in the “Discovered Devices” room.

Step 5

Select Discovered Devices and choose the Shelly device you want to include in your account.

Step 6

Enter a name for the Device. Choose a Room, in which the device has to be positioned. You can choose an icon or upload a picture to make it easier to recognize. Press “Save Device”.

Step 7

To enable connection to the Shelly Cloud service for remote control and monitoring of the Device, press “yes” on the following pop-up.

Rice EMC (Equilibrium Moisture Content)

Outside Air Relative Humidity

Outside Air Temp	46%	52%	58%	65%	72%	78%	85%	92%	99%
30	12.5	13.1	13.7	14.5	15.4	16.3	17.7	19.7	25.5
35	12.2	12.8	13.4	14.2	15.1	16.1	17.4	19.5	25.3
40	11.9	12.6	13.2	14.0	14.9	15.8	17.2	19.2	25.1
45	11.7	12.3	13.0	13.8	14.7	15.6	17.0	19.0	25.0
50	11.5	12.1	12.7	13.6	14.5	15.4	16.8	18.9	24.8
55	11.3	11.9	12.5	13.4	14.3	15.2	16.6	18.7	24.6
60	11.1	11.7	12.3	13.2	14.1	15.0	16.4	18.5	24.5
65	10.9	11.5	12.2	13.0	13.9	14.9	16.2	18.3	24.4
70	10.7	11.3	12.0	12.8	13.7	14.7	16.1	18.2	24.2
75	10.5	11.1	11.8	12.6	13.6	14.5	15.9	18.0	24.1
80	10.3	11.0	11.6	12.5	13.4	14.4	15.8	17.9	24.0
85	10.2	10.8	11.5	12.3	13.3	14.2	15.6	17.8	23.9
90	10.0	10.7	11.3	12.2	13.1	14.1	15.5	17.6	23.8
95	9.9	10.5	11.2	12.0	13.0	13.9	15.4	17.5	23.6
100	9.7	10.4	11.0	11.9	12.8	13.8	15.2	17.4	23.5
110	9.5	10.1	10.8	11.6	12.6	13.6	15.0	17.2	23.3



Wheat EMC (Equilibrium Moisture Content)

Outside Air Relative Humidity

Outside Air Temp	46%	52%	58%	65%	72%	78%	85%	92%	99%
30	12.3	12.8	13.4	14.1	15.0	15.8	17.1	19.0	24.5
35	12.0	12.6	13.2	13.9	14.7	15.6	16.9	18.8	24.3
40	11.8	12.3	12.9	13.7	14.5	15.4	16.6	18.6	24.1
45	11.6	12.1	12.7	13.5	14.3	15.2	16.4	18.4	23.9
50	11.3	11.9	12.5	13.3	14.1	15.0	16.3	18.2	23.8
55	11.1	11.7	12.3	13.1	13.9	14.8	16.1	18.0	23.6
60	11.0	11.5	12.1	12.9	13.8	14.6	15.9	17.9	23.5
65	10.8	11.4	12.0	12.7	13.6	14.5	15.8	17.7	23.4
70	10.6	11.2	11.8	12.6	13.4	14.3	15.6	17.6	23.2
75	10.4	11.0	11.6	12.4	13.3	14.2	15.5	17.4	23.1
80	10.3	10.9	11.5	12.3	13.1	14.0	15.3	17.3	23.0
85	10.1	10.7	11.3	12.1	13.0	13.9	15.2	17.2	22.9
90	10.0	10.6	11.2	12.0	12.9	13.7	15.1	17.1	22.8
95	9.9	10.5	11.1	11.8	12.7	13.6	14.9	16.9	22.7
100	9.7	10.3	10.9	11.7	12.6	13.5	14.8	16.8	22.6
110	9.5	10.1	10.7	11.5	12.4	13.3	14.6	16.6	22.4



Pairing the Steps Sensor Bulb to the Network Continued

Steps Sensor Bulb Settings

After your Steps Sensor Bulb is included in the app, you can control it, change its settings and automate the way it works. To enter the details menu of the device, click on it's name. From there you may control the device, as well as edit its appearance and settings.

Sensor settings

Temperature Units: Setting for change of the temperature units. • Celsius • Fahrenheit

Send Status Period: Define the period (in hours), in which Steps Sensor Bulb will report its' status. Possible range: 1 ~ 24 h.

Temperature Threshold: Define the temperature Threshold in which Steps Sensor Bulb will "wake up" and send status. The value can be from 1° up to 5° or you can disable it.

Humidity Threshold: Define the humidity Threshold in which Steps Sensor Bulb will "wake up" and send status. The value can be from 0.5 up to 50% or you can disable it.



Pairing the Steps Sensor Bulb to the Network Continued

Internet/Security

WiFi Mode – Client: Allows the Steps Sensor Bulb to connect to an available WiFi network. After typing the details in the respective fields, press Connect.

WiFi Mode – Access Point: Configure Steps Sensor Bulb to create a WiFi Access point. After typing the details in the respective fields, press Create Access Point.

Restrict Login: Restrict the web interface (IP in the Wi-Fi network) of Steps Sensor Bulb with a Username and Password. After typing the details in the respective fields, press Restrict Login.

Settings

Firmware Update

Update the firmware of Steps Sensor Bulb, when a new version is released.

Time Zone and Geo-location

Enable or Disable the automatic detection of Time Zone and Geo-location.

Factory Reset

Return Steps Sensor Bulb to its factory default settings.

Device Information

Here you can see the: • Device ID - Unique ID of Steps Sensor Bulb • Device IP - The IP of Steps Sensor Bulb in your Wi-Fi network

Edit Device

From here you can edit: • Device Name • Device Room • Device Picture
When you are done, press Save Device.



CORN EMC (Equilibrium Moisture Content)

Outside Air Relative Humidity

Outside Air Temp	46%	52%	58%	65%	72%	78%	85%	92%	99%
30	13.4	14.2	15.0	15.9	17.1	18.2	19.8	22.3	29.1
35	13.0	13.8	14.6	15.6	16.7	17.8	19.5	21.9	28.9
40	12.6	13.4	14.2	15.2	16.3	17.5	19.1	21.6	28.6
45	12.3	13.1	13.9	14.9	16.0	17.2	18.8	21.4	28.4
50	12.0	12.7	13.5	14.6	15.7	16.9	18.6	21.1	28.2
55	11.6	12.4	13.3	14.3	15.4	16.6	18.3	20.9	28.0
60	11.4	12.1	13.0	14.0	15.2	16.3	18.1	20.6	27.8
65	11.1	11.9	12.7	13.8	14.9	16.1	17.8	20.4	27.6
70	10.8	11.6	12.5	13.5	14.7	15.9	17.6	20.2	27.4
75	10.6	11.4	12.2	13.3	14.5	15.6	17.4	20.0	27.3
80	10.3	11.1	12.0	13.1	14.2	15.4	17.2	19.8	27.1
85	10.1	10.9	11.8	12.8	14.0	15.2	17.0	19.6	26.9
90	9.9	10.7	11.6	12.6	13.8	15.0	16.8	19.4	26.8
95	9.7	10.5	11.4	12.4	13.6	14.9	16.6	19.3	26.7
100	9.5	10.3	11.2	12.2	13.5	14.7	16.5	19.1	26.5
110	9.1	9.9	10.8	11.9	13.1	14.3	16.1	18.8	26.3



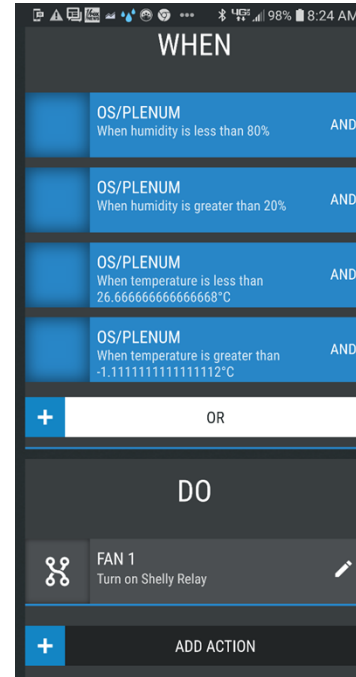
SOYBEAN EMC (Equilibrium Moisture Content)

Outside Air Relative Humidity

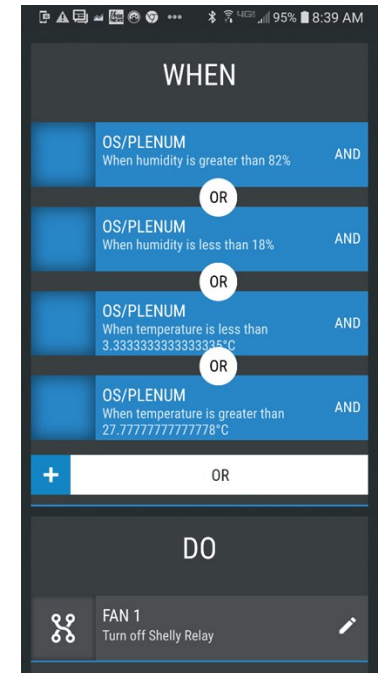
Outside Air Temp	46%	52%	58%	65%	72%	78%	85%	92%	99%
30	9.4	10.4	11.5	12.8	14.2	15.7	17.8	20.9	29.4
35	9.3	10.3	11.3	12.6	14.1	15.5	17.7	20.8	29.3
40	9.1	10.1	11.2	12.5	13.9	15.4	17.5	20.7	29.2
45	9.	10.	11.0	12.3	13.8	15.3	17.4	20.6	29.1
50	8.8	9.8	10.9	12.2	13.7	15.1	17.3	20.4	29.0
55	8.7	9.7	10.7	12.1	13.5	15.0	17.2	20.3	28.9
60	8.5	9.5	10.6	11.9	13.4	14.9	17.	20.2	28.8
65	8.4	9.4	10.5	11.8	13.3	14.8	16.9	20.1	28.8
70	8.2	9.3	10.3	11.7	13.2	14.6	16.8	20.0	28.7
75	8.1	9.1	10.2	11.5	13.0	14.5	16.7	19.9	28.6
80	8.	9.	10.1	11.4	12.9	14.4	16.6	19.8	28.5
85	7.8	8.9	9.9	11.3	12.8	14.3	16.5	19.7	28.4
90	7.7	8.7	9.8	11.2	12.7	14.2	16.4	19.6	28.4
95	7.6	8.6	9.7	11.0	12.6	14.1	16.3	19.5	28.3
100	7.4	8.5	9.6	10.9	12.5	14.0	16.2	19.4	28.2
110	7.2	8.3	9.3	10.7	12.2	13.8	16.0	19.2	28.1

Automatic Operation based on Humidity and Temperature.

Set it up in Scenes



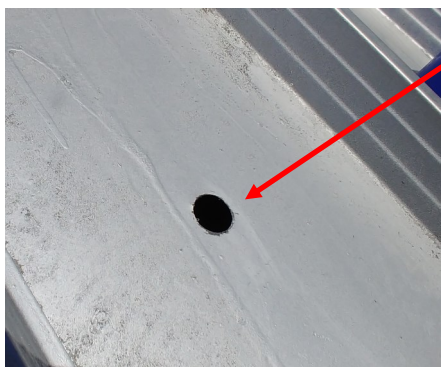
Fan will run when the humidity is between 80% and 20% and when the temperature is between 26.6 celuis (80 degree F) and -1.1 celuis (30 F).



The fan will turn off when the humidity is greater than 82% or less than 18% or the temperature is greater than 27.7 celeuis (82 F) or less than 3.3 celeuis (38 F).



Steps S2 HS Used to Monitor Head Space



Drill a 1 ¼ " hole in the roof panel.

Mount the Steps OSPL/HS housing the same as the one in the plenum.

Do not remove the bottom plug when the housing is used as a head space monitor.



Head Space Monitor is mounted on the outside of the roof. Mount one as close to the center of the bin as possible to monitor the peak air under the roof.



Steps S2 Sensor Bulb lays in the housing.



Steps S2 Sensor Bulb hanging in a goose neck roof vent.



Steps S2 Sensor Bulb.