



PROGRAMMABLE CONTROL UNIT PCU-100 WITH GSM MODULE

Firmware version 2.0.3. or higher



Before the first use of the unit, read the instructions in this manual and keep it carefully.
The manufacturer reserves the right to do alteration without prior notice.

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SYMBOLS USED

In order to ensure maximum safety of control processes, we have defined the following safety and information instructions. Each instruction is marked with a corresponding pictogram.



Caution, warning, danger

This symbol informs about particularly important instructions for the installation and operation of the device or dangerous situations that may occur during installation and operation. Ignoring these instructions may be the cause of the fault, damage to or destruction of the device or may cause damage to health.



Information

This symbol indicates particularly important device characteristics and recommendations.



Note

This symbol indicates the useful additional information.

SAFETY



All the operations described in these operating instructions must be made only by trained personnel or by an authorised person. Warranty and post-warranty repairs must be carried out exclusively at the manufacturer. Incorrect sensor use, assembly or configuration may cause accidents in the application (tank overfilling or damage to the system components).

The manufacturer is not responsible for the improper use, working losses incurred by either direct or indirect damage and the expenditure incurred during the installation or the use of the sensor.

1. BASIC DESCRIPTION PCU-100 WITH GSM MODULE

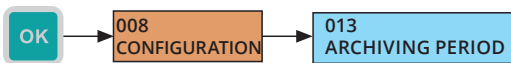
The extension module to the PCU-100 enables connection and sending of measured data to the server www.dinel.cloud, where this data is available from the Internet and where the data can be displayed in the form of graphs, tables and other graphic elements in the form of **widgets (see chapter 6. Web interface dinel.cloud, page 10).**

The module is inserted into the socket on the lower (source) printed circuit board PCU-100. When ordering a PCU-100 with a GSM module, this module will already be installed.

The module can be used with the PCU-100 -_- I and PCU-100 -_- H variants. Both variants can be with or without a display.

2. SIM CARD

It is necessary to have your own SIM card, which must have data transfers activated. The size of the data uploaded to the dinel.cloud server depends on the set period in the PCU-100. This is done in the following menu:



The minimum value write time that can be set is 1 second. With this setting, the size of the data sent to the dinel.cloud server is the largest and is around 4 MB per day. With regard to this, it is necessary to choose the appropriate data tariff at the operator so that the permitted amount of transferred data is not exhausted.

The SIM card for this module has been selected in the mini-SIM format for more convenient handling and longer connector life.



FIG. 1: The correct type of SIM card - mini SIM

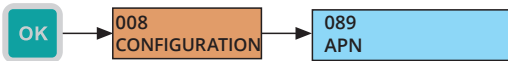
After inserting the SIM card, it is necessary to set the access point name (APN). By default, the APN is set to "Internet", the user name and password are not used. This setting works in most countries.

If your operator uses another APN to connect to the Internet for regular users, or you require a connection to private APNs, you must set this name and, if necessary, add a username and password.

After connecting to the APN, the PCU-100 must have access to the www.dinel.cloud server. This is important if you use private APNs, where you may need to allow additional access. For successful communication between the PCU-100 and the dinel.cloud server, it is necessary to enable access for HTTPS (TCP / IP, port 443).

2.1. APN settings

- Menu: **APN (ID 089)**
- Default value: internet
- [↔] - Move between characters, [↑] – Change the letter in the marked place



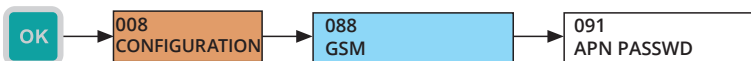
2.2. APN settings - user

- Menu: **APN USER (ID 090)**
- Default value: - (not used)
- [↔] - Move between characters, [↑] – Change the letter in the marked place



2.3. APN settings - password

- Menu: **APN PASSWD (ID 091)**
- Default value: - (not used)
- [↔] - Move between characters, [↑] – Change the letter in the marked place



3. HOW TO INSERT A SIM CARD



Disconnect the PCU-100 from the power supply before inserting the SIM card!

PCU-100 with GSM module is delivered without SIM card. To insert the card, proceed as follows:

1. Remove the front polycarbonate cover of the front panel, which is fixed in 4 places in the corners with plastic screws.

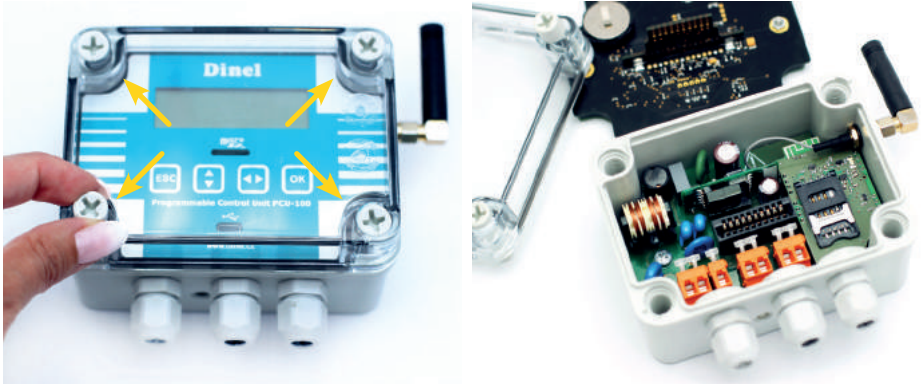


FIG. 2: Removing the polycarbonate cover

2. Grasp the front panel by the handles on the sides and pull it out of the connector by pulling appropriately on both sides.

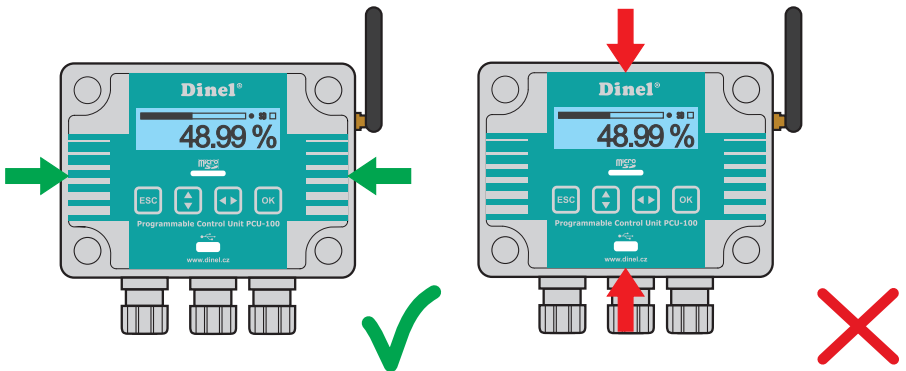
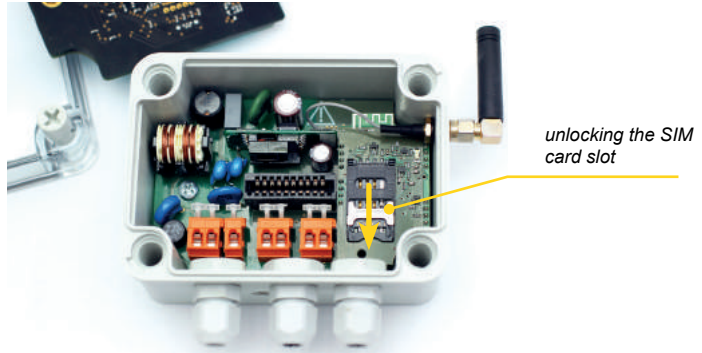


FIG. 3: Properly slide the panel out of the connector using the side grips

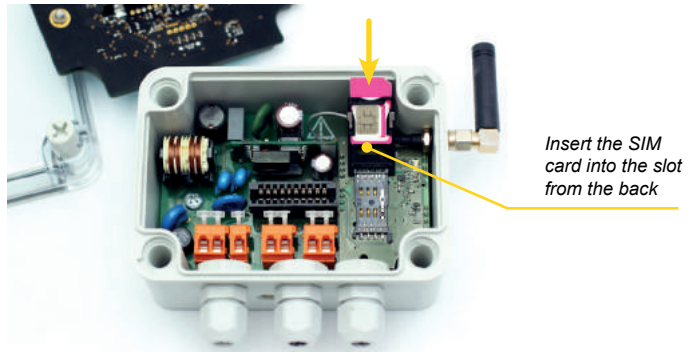


Electrical connection can only be made in a voltage-free state! The temperature of the internal components of the unit may under specific conditions exceed a temperature of 60 °C after a longer period of time in service. Take care when handling.

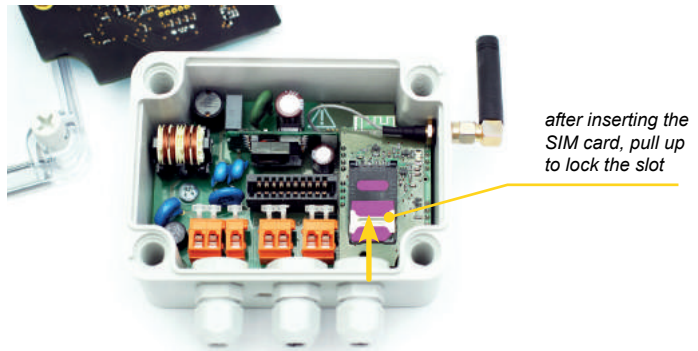
3. The SIM card belongs to the slot on the top of the module. Open the slot by sliding the metal tab down.



4. Insert the SIM card into the slot as shown in the pictures.



5. Close the slot by sliding the metal tab up.



6. Slide the front panel back into the connector. Screw on the polycarbonate cover with 4 screws using a torque wrench with a torque of 3 Nm.



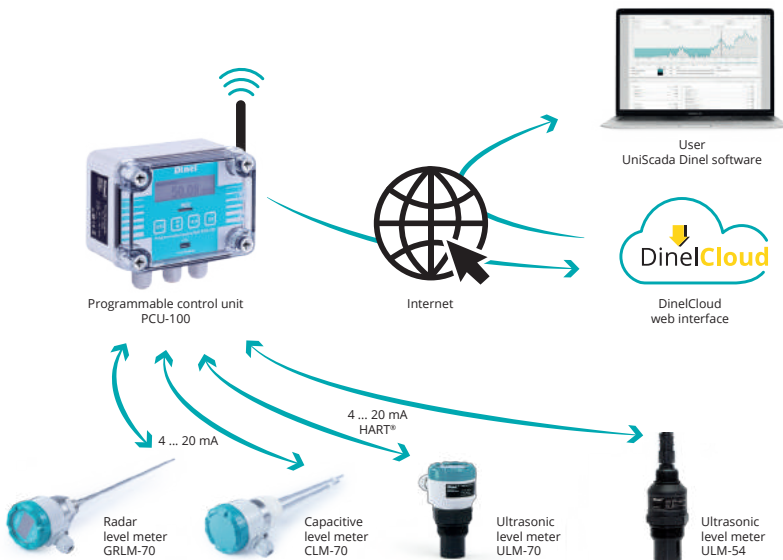
Be extremely careful when placing the cover in place. It is not possible to settle the front cover arbitrarily, there are located protrusions on the bottom of the housing and on the body of the boxes. At bad settlement, these protrusions may prevent the full engagement of the seal and the achievement of full coverage.



For more information on mechanical mounting, refer to the PCU-100 User's Guide.

4. CONNECTION SYSTEM

The following figure shows the communication diagram between the PCU-100 and the dinel.cloud server



A measuring probe is connected to the PCU-100 via a current loop (4-20 mA), which stores the measured value according to the set period, which can be read based on the set current or using the HART protocol (if the probe allows it). The PCU-100 with HART communication support is called PCU-100 - _ - H. More information on probe connection and proper setup can be found in the PCU-100 User's Manual.

The measured value is stored in the internal memory and at the same time sent to the dinel.cloud server together with the time stamp when the value was measured. The value is also shown on the display if the PCU-100 has a display. The value sent to the server does not contain any information about the unit (what physical quantity it is) and the user must know the individual values in advance based on the set ranges and conversions. This setting is described in detail in the PCU-100 User's Manual.

When using the GSM module, it is also necessary to have the correct time set on the PCU-100. This must be in UTC for the correct display of the measured value on the web interface of the dinel.cloud

server. The time is set in the following menu:



You can check the set time in the menu:



The PCU-100 remembers the last value sent from the internal memory. If the GSM connection is interrupted, the measured values are saved back after the signal is restored and the PCU-100 is reconnected to the Internet. All measured values will be stored on the dinel.cloud server, even if the PCU-100 was disconnected from the Internet at the time of measurement and data storage.

5. LIMITATIONS OF THE GSM MODULE

GSM module, uses GSM - 2G technology for connection, which, however, in some countries (especially outside Europe) is gradually turning off.



Always check with your operator to see if they support 2G technology, and if not, choose another that provides 2G technology in your country.

Many operators are likely to turn off 3G technology first. With such a procedure, the GSM module will continue to work without problems.

6. DINEL.CLOUD WEB INTERFACE

When purchasing the PCU-100 product with a GSM modem, you will receive a login name and password to the Cloud, which is used to view the measured data from the PCU-100. The portal is on the ThingsBoard platform and more detailed documentation can also be found at <https://thingsboard.io/docs/>.

6.1. Login procedure

1. Open a web browser and enter **www.dinel.cloud**
2. Fill in your login details and log in.

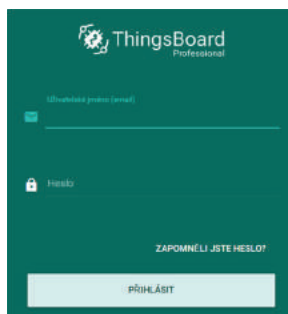


FIG. 4: Login screen

6.2. Main screen

On the next screen there is a menu on the left side and on the rest of the screen there is a dashboard, space with graphic objects - widgets. By default, the dashboard contains a graph of the measured value as a function of time, a widget showing the last measured value and finally a table with two columns: time and the value of the measured quantity.

We will set the final form of your dashboard (ie types and number of displayed widgets) according to your requirements when ordering. You can change this setting at any time. The account has the option of editing the dashboard (see chapter 6.4. Editing the dashboard on page 13).

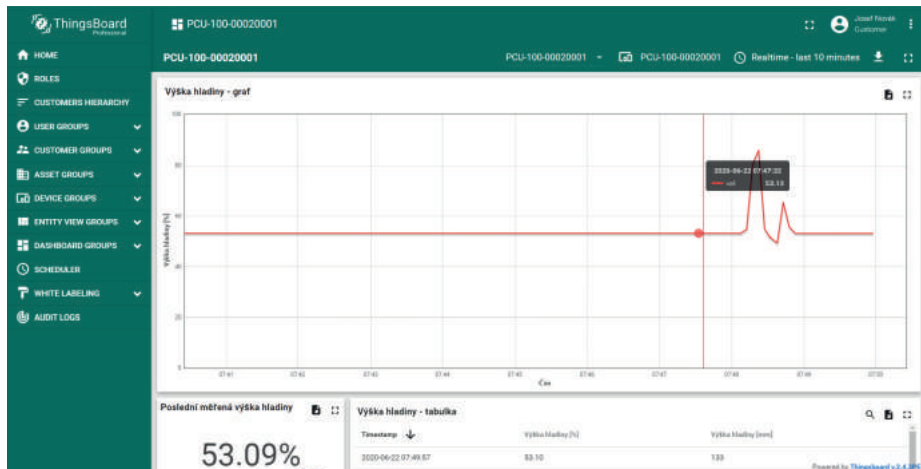


FIG. 5: Introductory dashboard

6.3. Change of language

After successful login, you can also change the language of the displayed texts for each user separately.

1. Click the 3 dots icon in the upper right corner next to your username.

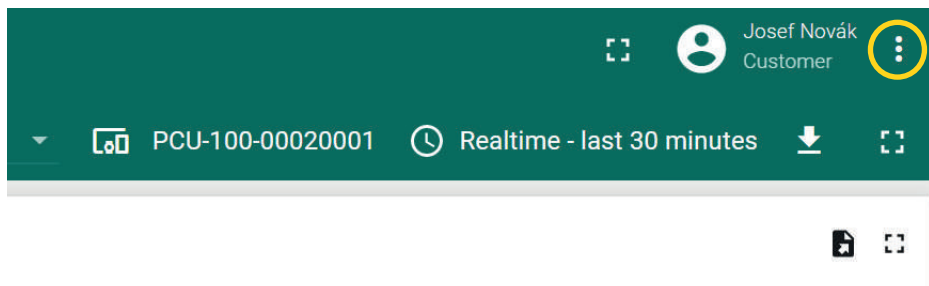


FIG. 6: Change of language

2. Then select Profile..

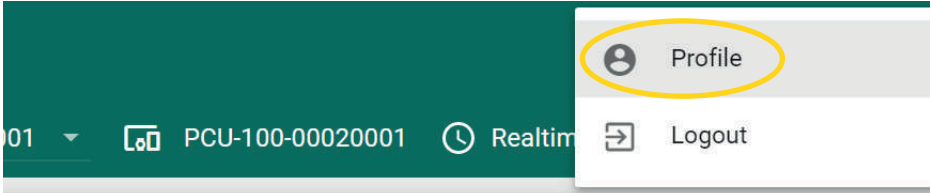


FIG. 7 :Change of language

3. In the following menu, select the desired language (see figure) and save it with the Save button.

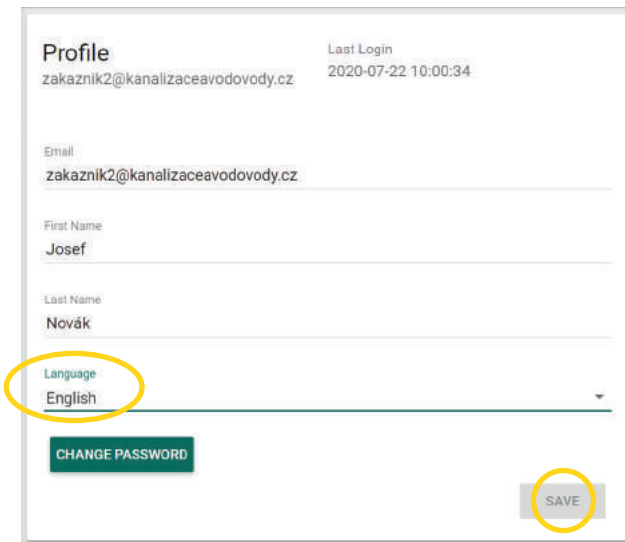


FIG. 8: Change of language

6.4. Dashboard editing

1. Log in to www.dinel.cloud with your account
2. In the left menu, select DASHBOARD GROUPS - ALL

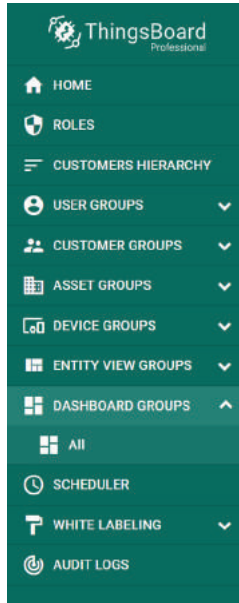


FIG. 9: Open the list of dashboards

3. Then select the dashboard you want to edit in the table and open it by clicking on the tile icon. Dashboards created when purchasing the GSM module are named PCU-100- <serial number>

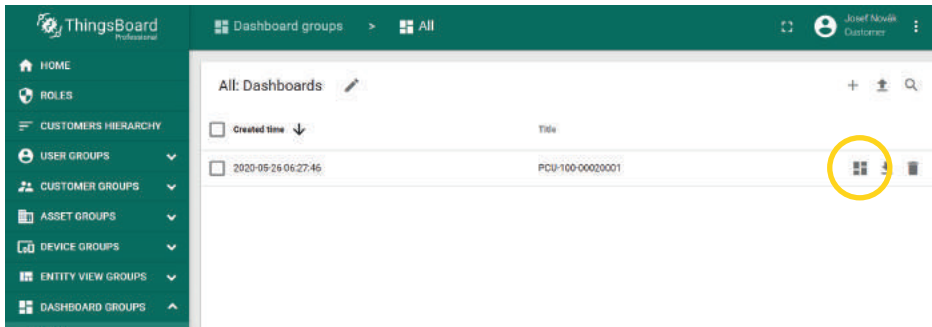


FIG. 10: Open dashboard editing

4. An editable dashboard will open, with a pencil in the lower right corner in the red circle. Click on it to open the edit.

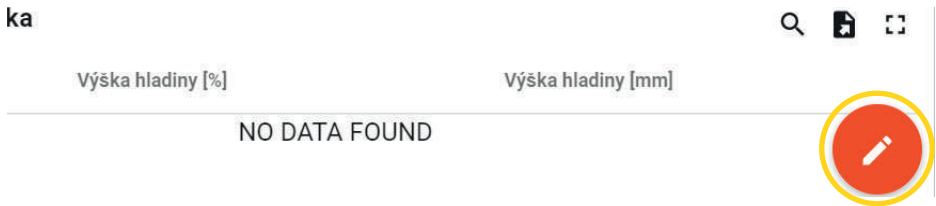


FIG. 11: Enable dashboard editing

5. Now, for each widget, a pencil icon appears in the upper right corner to allow it to be edited, as well as a cross icon to allow it to be deleted.



FIG. 12: Open widget editing

It is also possible to move individual widgets around the desktop differently and customize the display. Moving is done by marking the mouse cursor of the widget and simultaneously pressing the left mouse button and dragging to the desired location.

The ThingsBoard platform, on which dinel.cloud is built, offers a lot of options for editing the displayed dashboard. This guide does not cover all editing options.

Creating a new widget - a graph of the measured value as a function of time

6. Click on the + icon and then on the icon above it. A menu with a selection of widgets opens, in which you select Charts.



FIG. 13: Add a widget

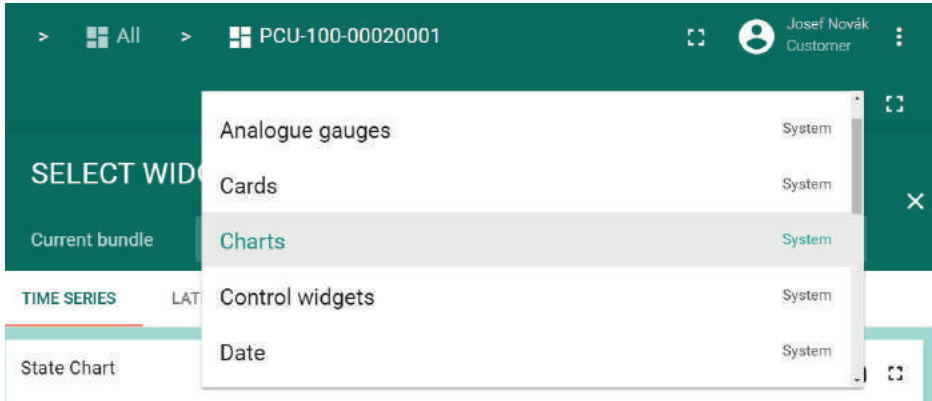


FIG. 14: Add widget - select type

- Then select the graph showing the measured value in the form of columns - Timeseries Bar and click on it.

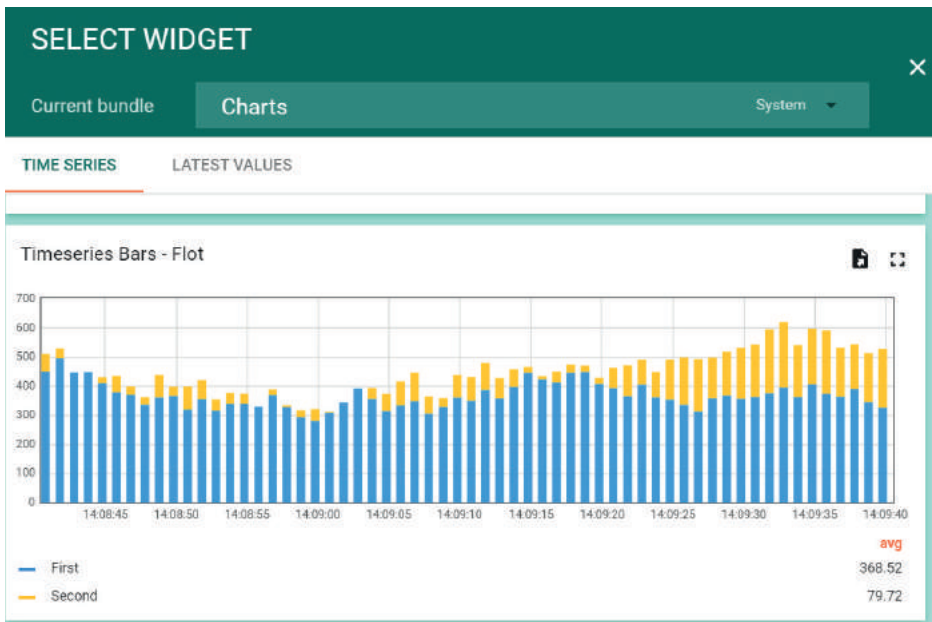


FIG. 15: New widget

8. In the next window, in the Data tab, click on the + ADD icon.

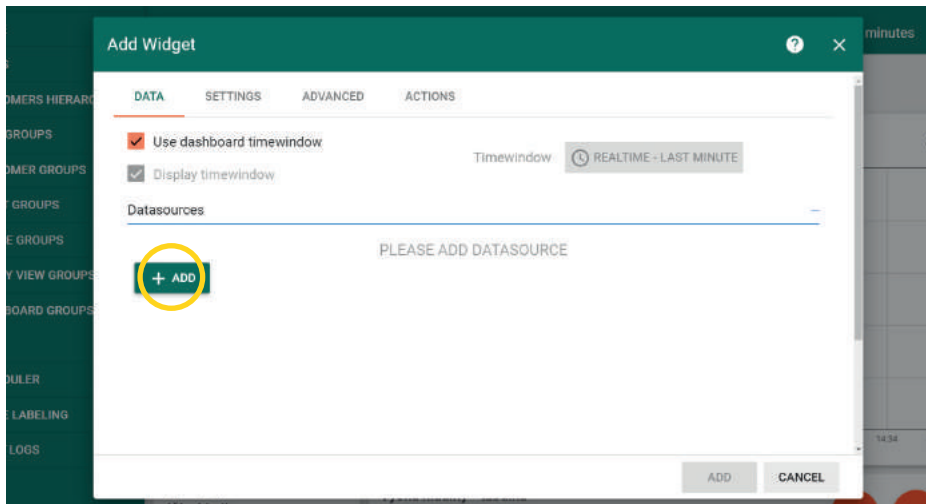


FIG. 16a: Widget editing - adding new data

And add the following line (Type: Entity, Parameters: PCU-100- <serial number>, Val value) and click on the ADD icon in the lower right corner.

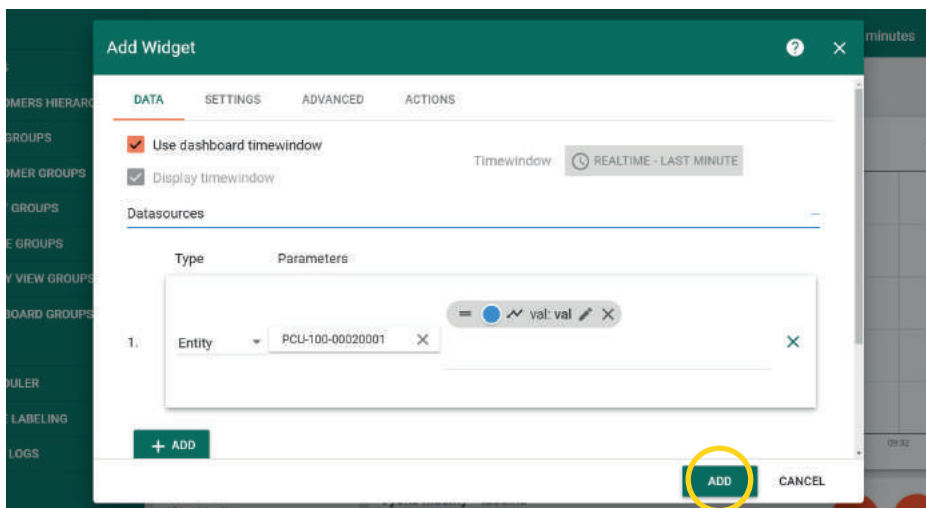


FIG. 16b: Widget editing - adding new data

This newly created chart will appear in the dashboard below all existing widgets.

Now we can resize it by dragging the lower right edge or move it arbitrarily on the surface. We can also edit this widget again by clicking on the pencil icon and possibly change the name or color in the Settings tab.

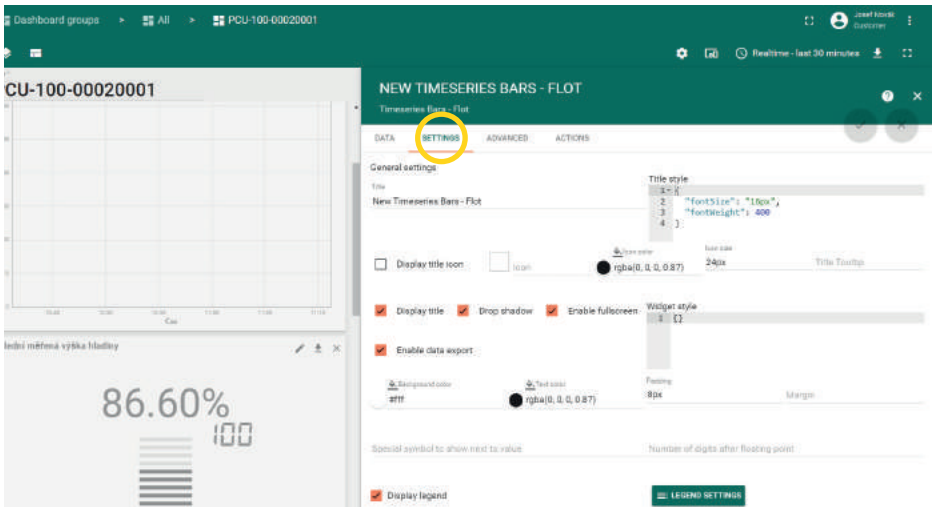


FIG. 17: Widget editing - settings

9. After editing, save the changes by clicking on the check mark button in the lower right corner.

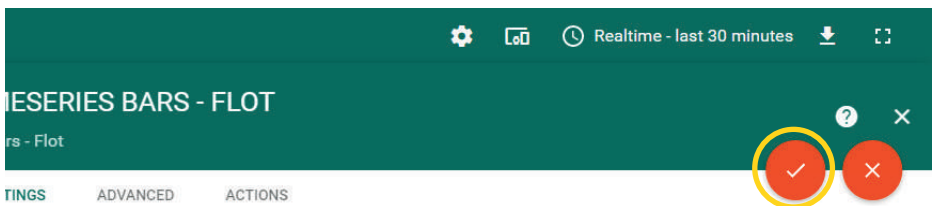


FIG. 18: Edit widget - insert changes

6.5. Add a new user

Within your account, you can add any number of other users who will be able to access the portal and view the measured values from the PCU-100. These users can have the same permissions as your account, or they can only view data without the possibility of editing.

1. Log in to the portal www.dinel.cloud
2. In the menu on the left, select USER GROUPS and choose Customer Administrators for accounts that can make changes and Customer Users for accounts that are for viewing only

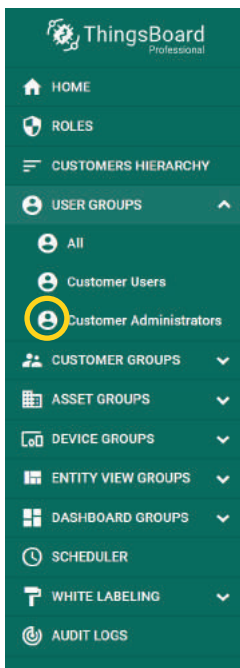


FIG. 19: Opening the user list

3. To add a new user, click the + icon in the upper right corner. The user joins after filling in the table.

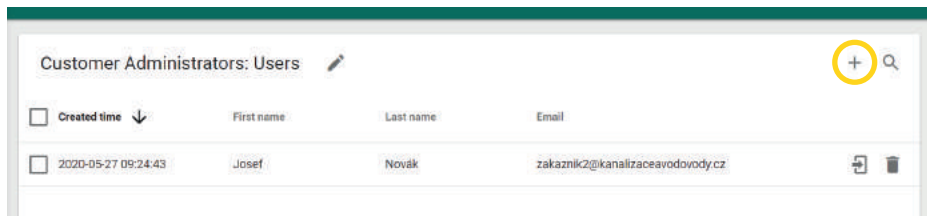


FIG. 20: Adding a new user

4. Pay attention to the item Activation method, here you choose the method of account activation. Display activation link, the display will show the link that must be passed to the user, but we recommend choosing the direct method Send activation link, which will send a link to the e-mail of the new user, who will set his password when activating the account.

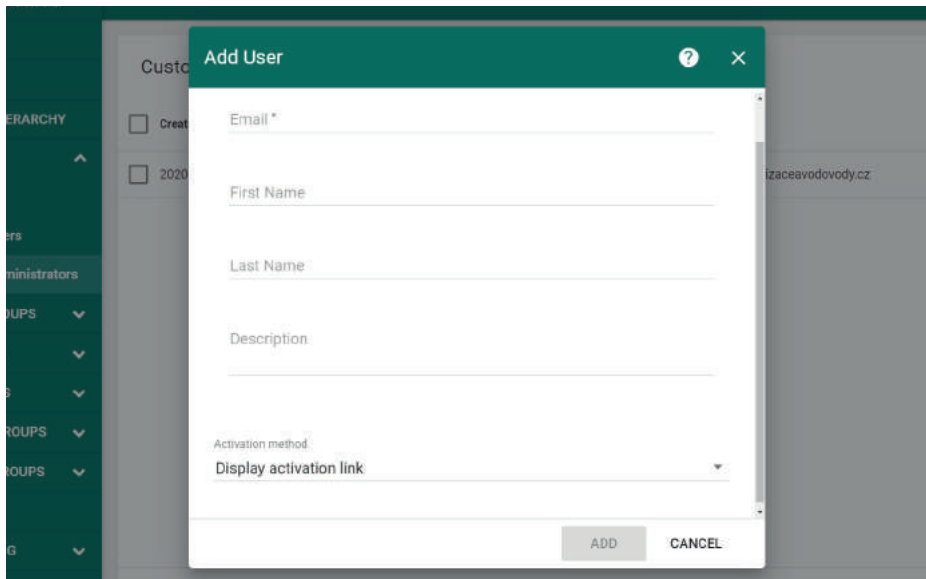


FIG. 21: Setting up a new user

5. We can now edit user data, especially for those who have a view-only account. Above all, set the default dashboard, which will be displayed after logging in. This change is made again in the USER GROUPS menu, where we select Customer Users and then modify the relevant user by clicking on a row in the table and selecting the default dashboard.

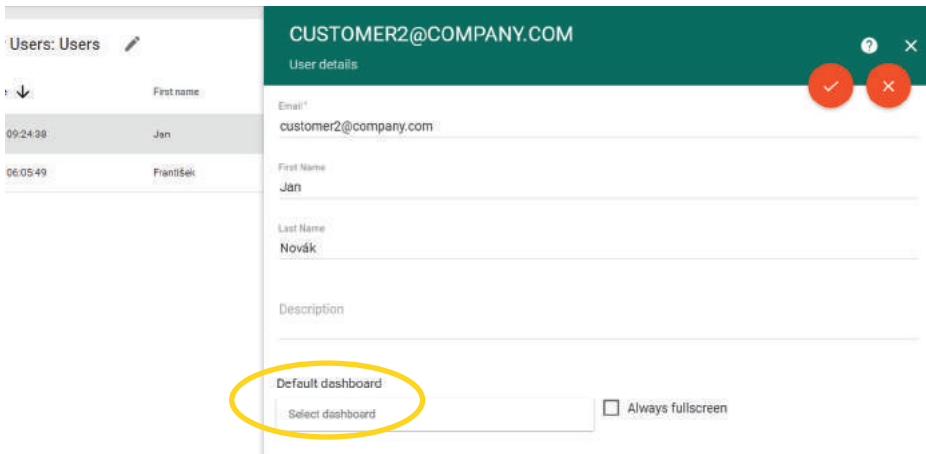


FIG. 22: Default user dashboard

6.6. Add a new device

When purchasing a PCU-100 with a GSM module, your device will already have an automatically set up account in the dinel.cloud portal. To view your devices, follow these steps:

1. Log in to www.dinel.cloud with your account
2. In the left menu, select DEVICE GROUPS - ALL

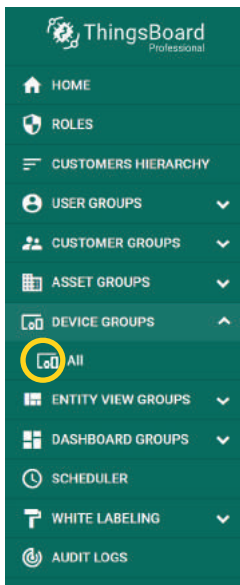
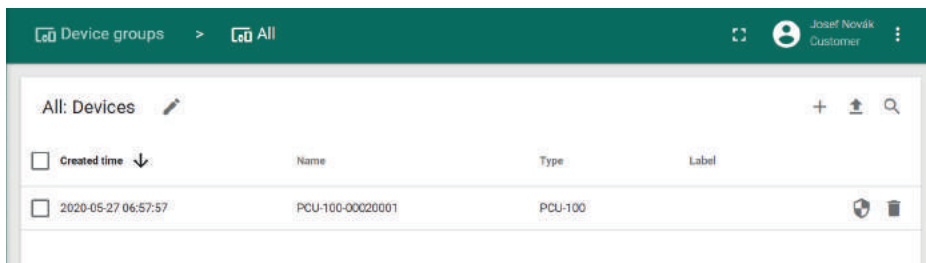


FIG. 23: Open device list

3. The list of your devices is in the following table.



Created time	Name	Type	Label
2020-05-27 06:57:57	PCU-100-00020001	PCU-100	

FIG. 24: Device list

If you have more than 1 device PCU-100 with GSM module, all devices can be in one account or you can have a separate account for each device or a combination of these two variants (ie multiple users access several devices, for each user it is possible to select which device has the ability to monitor). These variants and requirements must be specified when ordering.

7. SMS NOTIFICATION

The PCU-100 allows sending an SMS to the selected telephone number with a notification if the defined value of the measured quantity is exceeded. This can be used in various cases, especially used to respond more quickly to severe system errors, when the probe connected to the PCU-100 measured a value that should not normally occur and often requires the intervention of the operator and a possible system check that will lead to eliminate the problem.

The user defines the interval using 2 values (minimum and maximum). As soon as the measured value is outside this interval, the first SMS with a notification will be sent. The SMS has the following form:

PCU-100- <serial number>: ALARM ON, <time>, <measured value>

Example:

PCU-100-20001: ALARM ON, 2020-06-23T06:19:25, 3859

If the measured value remains in this interval. No further notifications are sent.

As soon as the measured value changes to the defined interval, while in the previous measurement it was outside the interval, a second SMS with a notification will be sent. The SMS has the following form:

PCU-100- <serial number>: ALARM OFF, <time>, <measured value>

Example:

PCU-100-20001: ALARM OFF, 2020-06-23T06:48:16, 3368

7.1. Phone number settings for sending notifications

- Menu: **ALARM TEL NUM (ID 092)**
- Default value: - (not used)
- [↔] - Move between characters, [↑] – Change the number in the marked place



7.2. Alert setting (ALARM) - lower limit

- Menu: **ALARM UNDER (ID 094)**
- Default value: - (not used)
- [↔] - Move between characters, [↑] – Change the number in the marked place



In the GSM menu (088), use the [↔] key on the ALARM UNDER line to enable or disable the use of this limit. This status is indicated by a square on the right side of the line. A solid square indicates that a defined lower limit is used. Conversely, an empty square indicates that the lower limit is not used.

7.3. Alert setting (ALARM) - upper limit

- Menu: **ALARM OVER (ID 093)**
- Default value: - (not used)
- [↔] - Move between characters, [↑] – Change the number in the marked place



Enabling or disabling the upper limit is done in the same way as for the lower limit.

7.4. Summary of conditions for sending SMS

- If no phone number is defined, the SMS is not sent.
- If no minimum or maximum is defined for the notification, the SMS is not sent. Defining means enabling in the GSM menu for individual alerts.
- If no maximum is specified for the alert, but the minimum is set, the interval is defined from minimum to + infinity.
- If the minimum for the notification is not specified, but the maximum is set, the interval is defined from -infinity to the maximum.



The SIM card must have the option for sending SMS activated. Please note that sending an SMS may be charged according to the set tariff and the contract with your operator.

Dinel[®]

industrial electronics

Dinel, s.r.o.
U Tescomy 249
760 01 Zlín
Czech Republic

phone: +420 577 002 002
email: obchod@dinel.cz

www.dinel.cz

The current version of the manual can be found on www.dinel.cz

Version: 07/2020



QMS
ISO 9001

