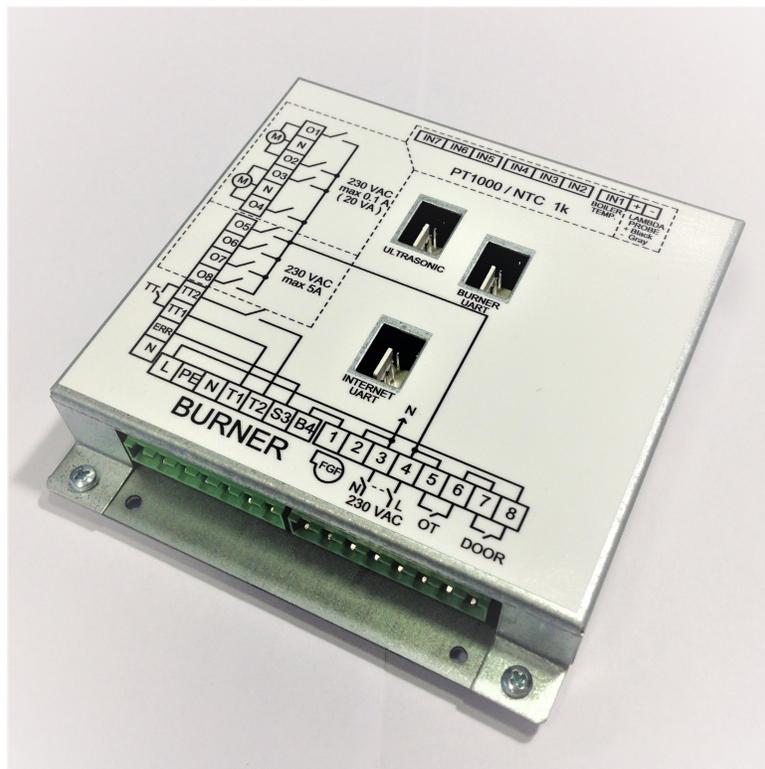




# Boiler controller

## Instruction manual

DK8002A1



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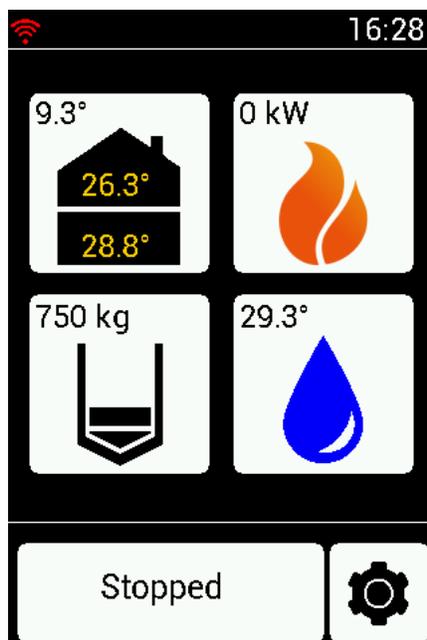
## 1 Introduction

Boiler controller EP0012 is meant to be used as an electronic thermostat, boiler cleaning controller and heating controller through two 3T valve motors with all burners manufactured by Pelltech OÜ. It has 7 resistive inputs for measuring different temperatures, two outputs for 3T valve motors, four 230V 5A outputs, one Lambda (O<sub>2</sub>) input and one ultrasonic (ULTRASONIC) input for extra modules. As extra modules, there are available wireless temperature sensors and internet module. Controller's touchscreen reacts to a finger or a blunt object touch.

## 2 Communication

Boiler controller has two UART outputs for communication: INTERNET and BURNER. BURNER UART is connected with burner, through which the controller also gets its power. INTERNET UART is for communication with Pelltech internet module. Internet module is connected with CAT 5 cable with local router, through which the server communicates with both the burner and the boiler controller. This kind of communication is needed to display information in our cloud.pelltech.eu server.

## 3 Main screen

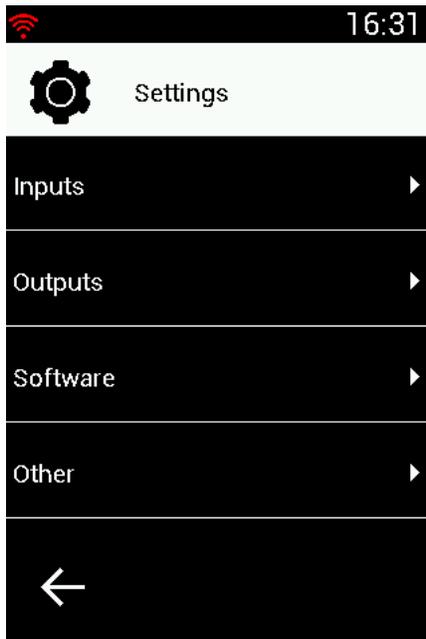


Controller main screen is divided to four main icons.

- House - Room temperatures (26,3° and 28,8°) and the outside temperature (9,3°) is displayed.
- Fire - Burners current power (0 kW) is displayed.
- Silo - Pellets left in the silo (220 kg) is displayed.
- Water - Domestic hot water temperature (29,3°) is displayed.

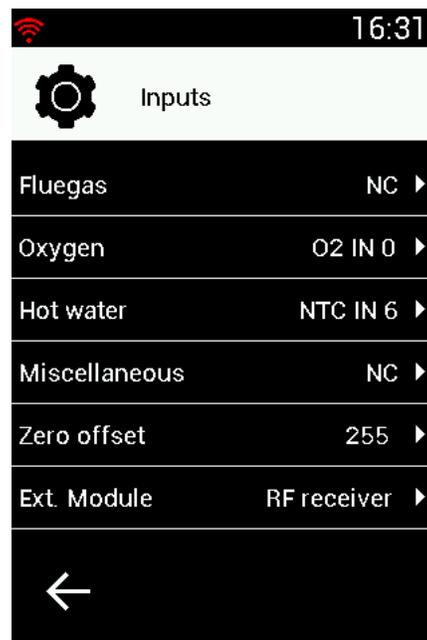
Additionally, in the lower part of the screen are displayed burners current state (which upon touch leads to log screen) and boiler controller settings button.

## 4 Settings



In boiler controller settings menu, you can configure boilers inputs and outputs, update controllers and burners software and change other settings. To enter a menu, just press on the appropriate area on the touchscreen.

### 4.1 Inputs



Boiler controller has 7 inputs for temperature sensors, one input for oxygen sensor (LAMBDA) and one input for external module (ULTRASONIC). Only 1k NTC and PT1000 sensors are compatible with controller, other sensors won't work. For oxygen sensor, only Pelltech's EP0022 can be used. Each input has to be connected to a function to be usable. For example, input IN7 is connected with Boiler function to be used as boiler temperature input. All inputs (from IN1 to IN7) can be configured for all functions.

Wireless temperature sensors can also be used with controller with RF receiver, which will be connected into "ULTRASONIC" port and configured through controller.

#### 4.1.1 External module configuring

Sensor in the "ULTRASONIC" port can be configured in inputs screen second page, accessed by pushing the  button in the lower right corner. In the opened screen, choose the last row "Ext. Module", after that opens a page where you can choose the sensor type connected into the "ULTRASONIC" port. Current selection is displayed in the middle of the screen "PAR 323 ....". Selection can be changed by pressing on the selection arrows. Selection will be confirmed by pushing the OK button in the lower right corner, after that you will be taken back to inputs screens first page.

#### 4.1.2 Inputs configuring

To access input configuration screen, you have to push the  button in the lower right corner that opens the "Settings" screen. In there choose "Inputs". This opens a list of inputs that can be configured. In the left column are functions, to which you can choose inputs and in the right column are according functions input status:

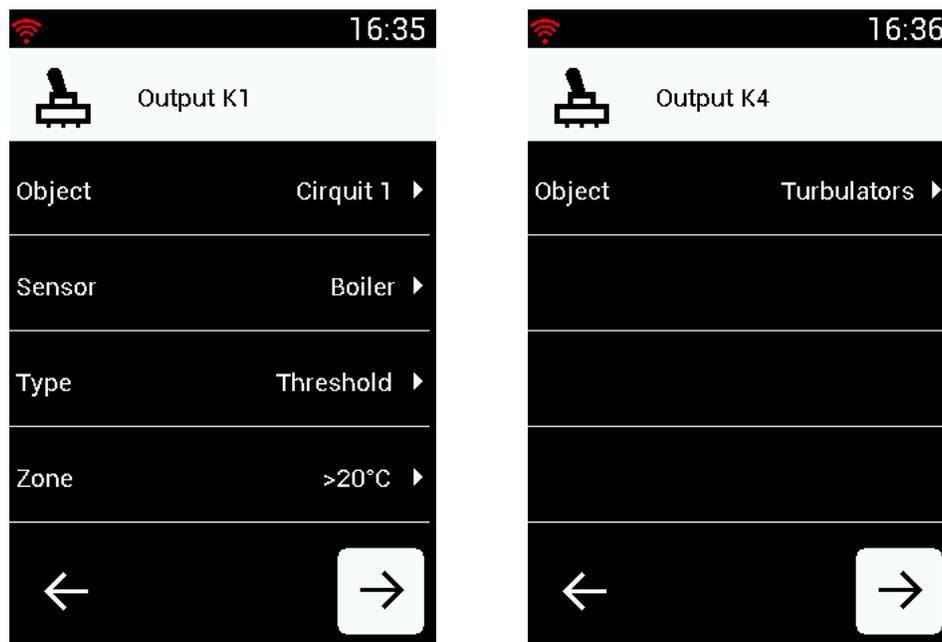
- NC - "Not connected" no sensor is chosen for this function.
- RF XX.X - RF sensor that is displaying XX.X °C is connected to this function.
- IN X XXXX - Sensor from port X with type XXXX is connected to this function.

To add/remove/change a functions sensor, you have to push on the according line, after what opens the sensor choice screen. Current selection is displayed in the middle of the screen with the text "SENSOR CHOICE ....". Selection can be changed with selection buttons and "OK" button must be pressed from the lower right corner to confirm the selection. If "RF" was chosen, then a list of available wireless sensors will be shown, changing and confirmation is done the same way as on the previous screen. If "IN X" was chosen, then the sensor type list will be displayed. Choosing between these is done the same way as on the previous screen. Choosing "NC", if the function had a sensor connected to it, removes it. Choosing a new sensor for a function also removes old sensor.

## 4.2 Outputs

Boiler controller has four 220V 5A relays for controlling external devices and capability to drive two 3T valve motors. Each relays functionality can be individually configured and isn't uniquely defined. 3T valve motors has to be connected so that circuit 1 motor is connected under O3, N, O4 and the circuit 2 motor is connected under O1, N, O2.

### 4.2.1 Outputs configuring



To configure outputs, you have to press  on the main screen that opens "Settings" screen. Choose "Outputs". This opens first relays K1 configuration.

Relays configuration is divided to four:

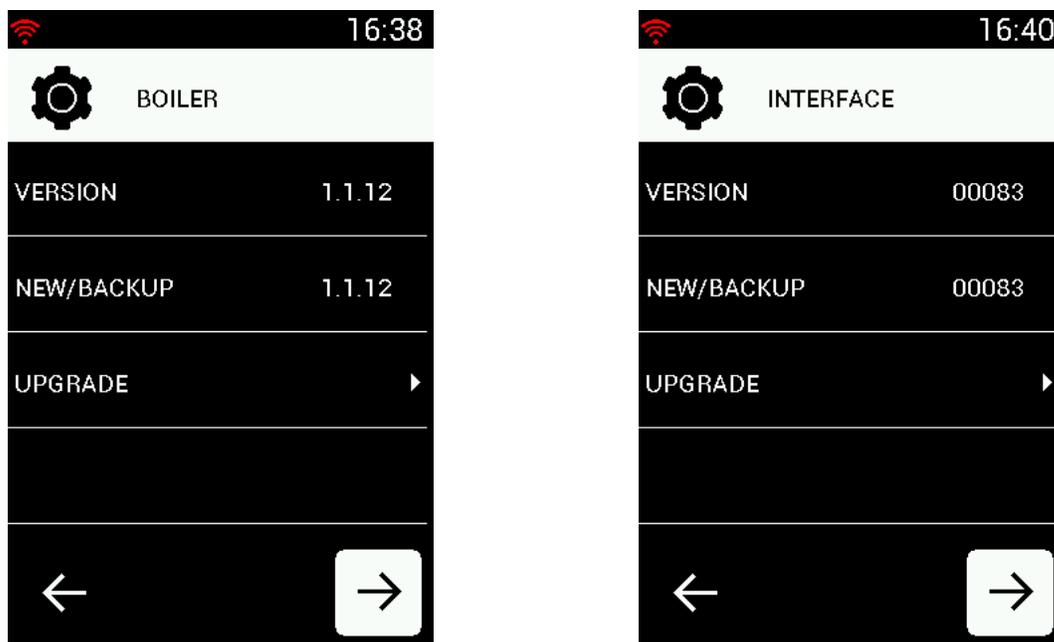
- Object- Relays function. For example controlling the circuit 1 pump.
- Sensor – Sensor, which temperature is used to control the relay.
- Type – Type of control, that is used for switching the relay. For example threshold.
- Zone - Temperature or time zone that is used in controlling the relay.

There are three ways how the controller controls the relays that can be changed under “Type”:

- Hysteresis – Relays are controlled with two temperatures. Dropping below lower temperature turns the relay on and going over the higher temperature turns the relay off.
- Threshold – Only one temperature is defined. Going over it turns the relay on and dropping below it turns the relay off.
- Time – Relay is controlled by time. Defined are the time to turn the relay on and the time to turn the relay off.

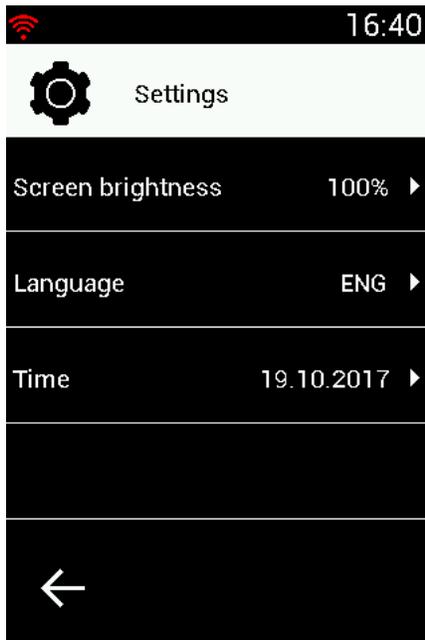
Each relay is configured the same way. To see the next relays configuration, you have to push  in the lower right corner.

### 4.3 Software



In software screen burners, controllers and its design (interface) can be updated. Every part has its own screen that has similar construction. On the first row is displayed the current version, on the second row is displayed new or backup version, depending on are you trying to update or to go back to an older version. Pushing on the third row starts the update process.

## 4.4 Other



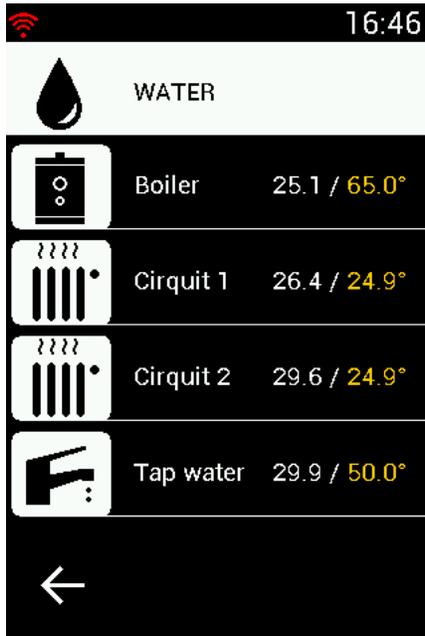
Under other settings you can change the screen brightness, system language and enter or change the time of the controller.

## 5 Burners log

State	Time
Stopped : NOW	29:22:51
Waiting	109:00:00
Power off	00:00:00
No Power	00:00:05
Waiting	168:00:00
No Power	00:00:04

Burner log screen displays last 30 states of the burner connected to it. Current state is marked with the prefix "CUR" (Current) and its current time can be seen in the column on the right. Arrows in the lower part of the screen can be used to move around in the log.

## 6 Water



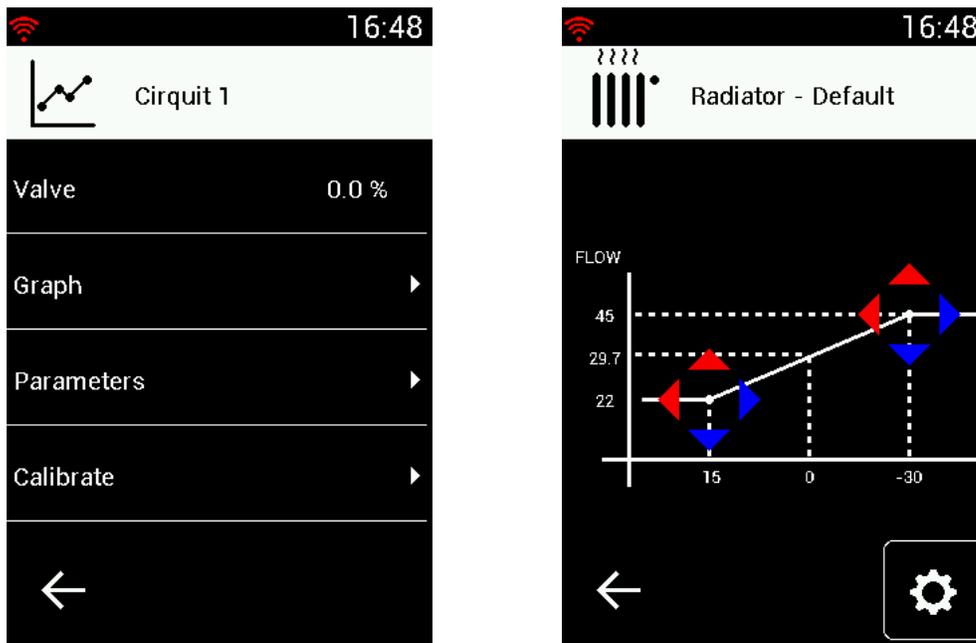
Current boiler temperature, heating circuits temperatures and domestic hot water temperature and its setpoints (brighter numbers) are displayed in the water screen.

### 6.1 Boiler



Under the option "Boiler" you can change the boilers setpoint and hysteresis, that are used in controlling the boilers electronic thermostat. The boilers thermostat will be turned on when the temperature of the boiler has dropped below setpoint - hysteresis level and turned off, when the temperature has risen above setpoint + hysteresis.

## 6.2 Circuit 1 ja Circuit 2 (Heating circuits)



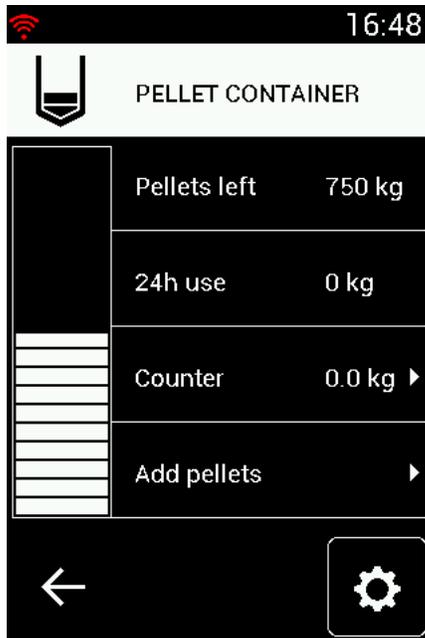
Under Circuit 1 and Circuit 2 (Heating circuits) you can configure temperatures of the circuits. To this menu, we have gathered the parameters influencing the flow, graphs of the circuits and the calibration of the 3T valves.

During the calibration, the 3T valves are turned in to safe position, which is closed.

### 6.2.1 Graph (Heating graph)

In the heating graph menu, you can configure the curve of the heating. The points on the graph define the relation between the flow temperature and outside temperature. To change the temperature of a point, just click on the arrows around the point. The settings button  in the lower right corner takes to a screen, where it is possible to restore default settings of the graph or go back to the configuration made earlier. Configurations made earlier are saved until the next changes to the graph are made.

## 7 Pellet container (Fuel)



Fuel menu allows to change and observe activities related to pellets: change the silo size, add pellets, view the usage of pellets in the last day and change parameters related to fuel.

Amount of pellets left in the silo can also be changed with the slider, located on left of the screen. Changes made with the slider have to be confirmed with the OK button that will be displayed over the settings button in the lower right corner. Leaving the screen with the back button doesn't save the changes.

## 8 Fire



Under the menu "Fire" are gathered important information and parameters about the burner, boiler and heating system.

- In menu "Power" it is possible to observe and change parameters related to power.
- In menu "Fluegas" it is possible to observe draught, oxygen value, fluegas temperature and change their parameters.
- In menu "Fan" it is possible to observe fans speed and change their parameters.
- In menu "Cleaning" it is possible to change parameters related to cleaning.

The on/off button in the lower right corner is used to turn the burner on and off.

## 9 House (Room heating)



Room heating can be separately controlled if room sensors are used. In that case, the flow temperature of the heating circuits will depend of the room temperature desired.

- In the screen are displayed the outside temperature, the room temperatures followed by the desired temperatures and the current state of the heating control:
- Comfort - Room temperature is hold according to the heating schedule defined by the user.
- Away - Constant temperature is kept in rooms until the given time, after what heating by the schedule will be restored.
- Manual - Constant temperature will be hold for

given hours.

### 9.1 Heating plan

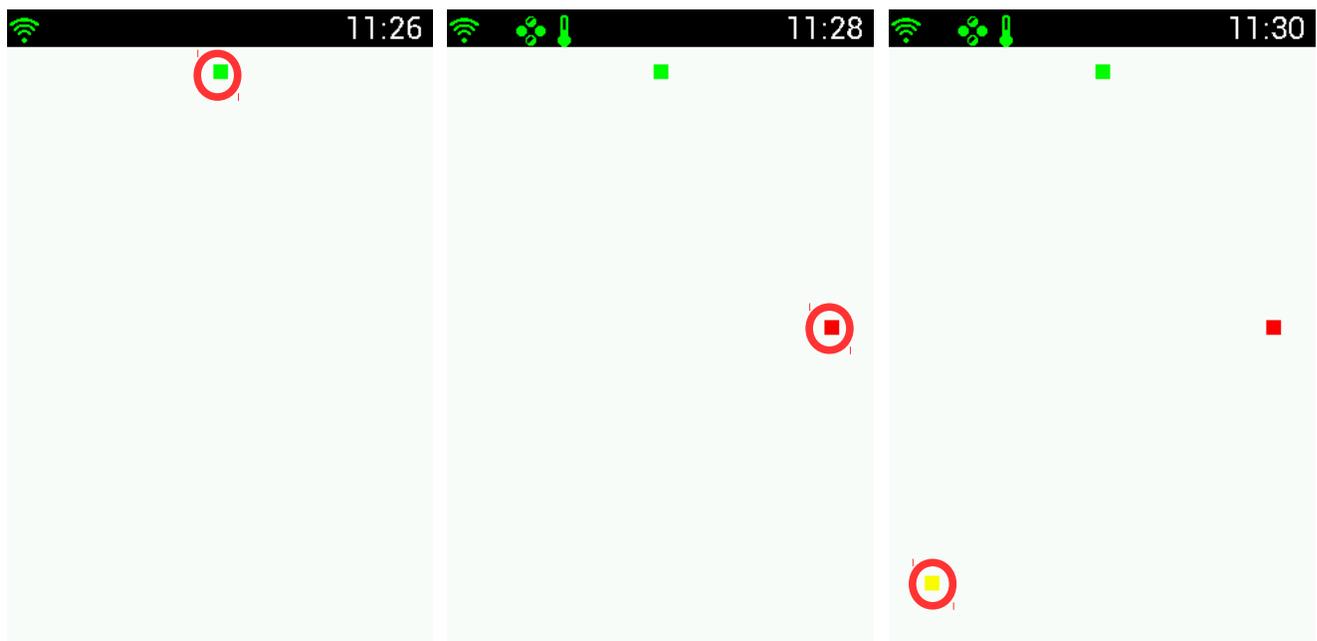


comfort heating is used, the user has the opportunity to design separate heating schedules for both rooms, that consist of different schedules for the weekdays and weekends. Every schedule consists of 4 entries: morning, day, evening and night. In each you can define a time and temperature, to which the setpoint will be moved at that time.

To change entry, just press on it on the screen, after which you will be taken to screen where you can enter a new time and temperature for this entry.

In the settings menu, accessed with the settings button in the lower right, it is possible to change the state of the heating control and the temperature currently being hold.

## 10 Screen calibration



First calibration dot

Second calibration dot

Third calibration dot

If there are problems with screen (doesn't react, acting weird), then it probably needs calibration. To do that, hold your finger on the screen for ~10 seconds. If you remove the finger, the screen should go white with one dot on the upper part of the screen. Press on the dot after what another one appears. Press on that also and on the next on too. (There should appear three dots on different parts of the screen).

You have 8 seconds to push each calibration dot, waiting too long will restart the controller.

After pressing the last dot, the device returns to Main screen and the screen should be calibrated.