

Examples of settings

In this section, we provide examples of various typical Controller settings and some non-obvious functions. The section is constantly being supplemented, if you have an example of your own settings of any function, you can send us a description to info@nucular.tech.

Regenerative braking setting

It is instructions for Controllers with firmware v7.18 and for the On-board computer with v0.60B. If you have firmware v0.8.4 and v0.71B respectively, and a brake lever connected directly to the On-board computer, you need to set up a brake lever setting in the menu [section On-board computer > Control setup](#). Regeneration allows you to brake with an electric motor and charge the battery. This function cannot be implemented on geared wheel motors.

There are two ways to enable regenerative braking:

1. [By pressing a separate thumb brake \(analog brake\)](#).
2. [By releasing the throttle grip](#).

Regenerative braking by separate thumb brake

This regenerative braking method uses a separate analog brake lever or thumb brake.

1. First connect the thumb brake to the On-Board Computer to the **BRK** port or to the Controller to the **Control** port via the controller-side inputs wires (option) according to the [wiring](#) diagram.
2. If you have already [done](#) a full auto-setup of all systems earlier, then go directly to step 6. If you connect the thumb brake after going through auto-setup, go to step 3.
3. Go to the **Controller > Auto-setup menu section**, select **On** under **Brake**, then follow the on-screen instructions for Brake autodetection. After successful configuration, you will see an **OK** message. Then go to step 6. If errors occur during the auto-detect process (value **P** was frozen), go to step 4.
4. [Go to the On-board computer > Information](#), find the **Brake V** parameter and check that the voltage range of the brake lever changes when it is pressed and released from $\sim 0.8V$ to $\sim 4.2V$. If the range does not change, then you connected the thumb brake incorrectly or it is not working properly. If the range changes, then go to step 5. If you connected the brake lever directly to the Controller, then its voltage range can be checked in the **#Brake** menu item in the **Controller > Control** menu [section](#).
5. [Go to the Controller > Control](#) section and in the **Brake min** item set it to **150mV** more than the specified minimum value, and in the **Brake max** item set it to **150mV** less than the specified maximum value. Then go to step 6.
6. To set the regeneration level, [go to Controller > Control modes > Braking phase](#) and set up the level of phase current of braking. If you have a scooter, you can start with **20A**, for an electric bike you can start with **50A**, for a Sur-Ron with **70A**. Next, test the settings and, if necessary, increase or decrease the phase current to achieve the desired result.

Keep in mind that recuperation will not be possible with a fully charged battery.

Regenerative braking by releasing the throttle grip

With this type of braking, recuperation is activated when the throttle lever is released. The effect is similar to driving an electric car using one gas pedal, when pressed, accelerate, when released, slow down.

1. First, connect the thumb throttle or twist throttle to the On-Board Computer to the **THR** port or to the Controller to the **Control** port via the controller-side inputs wires (option) according to the [wiring](#) diagram.
2. If you have already [done](#) a full auto-setup of all systems earlier, then go directly to step 6. If you connect the throttle lever and do not connect the brake lever, go to step 3.
3. [Go to](#) the **Controller > Auto-setup menu** section, select **On** under **Throttle**, then follow the on-screen instructions for Brake autodetection. After successful configuration, you will see an **OK** message. Then go to step 6. If errors occur during the autodetect process, go to step 4.
4. [Go to](#) the **On-board computer > Information** menu, find the **ThrottleV** parameter and check that the voltage range of the throttle stick changes when it is pressed and released from ~ **0.75V** to ~ **4.35V**. If the range does not change, then you connected the handle incorrectly or it is not working properly. If the range changes, then go to step 5. If you connected the throttle lever directly to the Controller, then its voltage range can be checked in the **# Throttle** menu item under the **Controller > Control** menu [section](#).
5. [Go to](#) the **Controller > Control** section and in the **Throttle min** menu item set it to **150mV** more than the specified minimum value, and in the **Throttle max** item set it to **50mV** less than the specified maximum value. Then go to step 6.
6. In the [menu](#) item **Controller > Control > Throttle mode** select one of two throttle modes - **Speed** or **Speed+torque**.
7. Next, [under](#) **Controller > Control > Speed Lim. at 0% throttle**, select **On** to enable the speed limit at 0% throttle for braking with the throttle lever released.
8. To set the regeneration level, [go to](#) **Controller > Control modes > Braking phase** and set up the level of phase current of braking. If you have a scooter, you can start with **20A**, for an electric bike you can start with **50A**, for a Sur-Ron with **70A**. Next, test the settings and, if necessary, increase or decrease the phase current to achieve the desired result.

Reverse setting

Keep in mind that the reverse function cannot be implemented on geared motor wheels. You can use several methods to engage reverse:

1. [The On-board computer button](#).
2. [External button connected to the On-board computer](#).
3. [External button connected to the Controller](#).
4. [Selecting the control mode with activated function "Reverse"](#).
5. [Selecting the control mode with activated function "Reverse on brake"](#).

If desired, item 1 can be combined with other options to have several ways of reversing.

Switching on reverse with the On-Board Computer button

This method of switching on the reverse is the easiest to set up and is activated by one of the four buttons on the On-Board Computer.

1. Go to the **On-Board Computer > Buttons setup** menu and select which of the four On-Board Computer buttons you want to assign the reverse function to. For example, to the first button.
2. In **Hot key 1 type** menu item select the control signal type **Button**, and in the item **Hot key 1 func.** select the free number of the CAN input, e.g. **CAN Button4**.
3. Save the settings in the menu item **On-Board Computer > Save**.
4. Go to **Controller > I/O Configuration** to configure the reverse function for the selected CAN port. To do this, in **CAN port4** menu item, select the **RV** (reverse) value.
5. Save the settings in the **Controller > Save settings** menu item. The setup is complete, now you must press and hold the first On-board computer button for two seconds to activate reverse. When the function is activated, you will see the **R** icon at the top of the screen.

Switching on reverse with external button connected to the On-board computer

To use this method you need an external button or switch. To connect to the On-board computer, the wire must be crimped with pins according to the [diagram](#) and inserted into the PHD 2.0 connector, which are included in the package of the On-board computer.

1. The wire from the switch must be connected to the rear panel of the On-board computer in ports **I/O1** or **I/O2**.
2. Next, you need to check the functionality of the connected button and the activation of the input by closing the contact. Go to the **On-board computer > Information** menu and press the button. Depending on which port the wire is connected to, the values in the menu items **Input 1 function - Input 8 function** will change from **0** to **1** when the button connected to the On-board computer is pressed. If the value does not change, then the signal does not come and it is necessary to check the correct connection, contacts in the connector, wire, and the button itself. If everything is OK, go to point 3.
3. Let's assume you have connected the button to the **Input 2 func.**, it is the **IO2** input of the **I/O1** port. Now you need to assign to this On-board computer input the number of the CAN input for CAN-bus control and select the control signal type. Go to menu item **On-board computer > Buttons setup**, and in the menu item **Input 2 type**, select the control signal type, e.g. **Button**, and in menu item **Input 2 func.** select a free CAN input number, e.g. **CAN Button4**.
4. Save the settings in the menu item **On-Board Computer > Save**.
5. Go to **Controller > I/O Configuration** to configure the reverse function for the selected CAN port. To do this, in **CAN port4** menu item, select the **RV** (reverse) value.
6. Save the settings in the **Controller > Save settings** menu item. The setup is complete, now you must press the button to activate reverse. When the function is activated, you will see the **R** icon at the top of the screen

Switching on reverse with external button connected to the Controller

This method requires an external button or switch. To connect to the Controller, use controller-side

inputs wires (optional) with SM 2.54 3P connectors.

1. The wire from the switch should be connected [according](#) to the diagram to one of the ports on the controller-side inputs wires.
2. Next, you need to check the functionality of the connected button and the activation of the input by closing the contact. Go to menu **Controller > I/O configuration > Port state** and press the button. Depending on which port the wire is connected to, the values in **S1, S3, RV, CR** will change from **0** to **1** when a signal is applied. If the value does not change, then the signal is not coming and you need to check the correct connection, contacts in the connector, wire, and the button itself. If everything is OK, go to point 3.
3. Let's assume you have connected a button to the **RV** input. Now you need to assign the reverse function to this port on the Controller. Go to **Controller > I/O configuration** and select **RV** for the **Port RV** menu item.
4. Save the settings in the **Controller > Save settings** menu item. The setup is complete. Now you need to press the button to activate reverse. When the function is activated, you will see the **R** icon at the top of the screen. To disable reverse press the button again.

Switching on reverse by selecting the control mode with activated function "Reverse"

With this setting, reverse is activated when one of the four On-board computer buttons is activated in one of the control modes. To use this method it is necessary to activate the reverse function when selecting the control mode.

1. [Go to](#) the **Controller > Advanced modes** menu and select one of the control modes **S1, S2, S3** in which the reverse will be activated. For example, **S2**.
2. Go to **Controller > Advanced modes > Mode S2 to Reverse** menu item and select **On**.
3. Next, activate the advanced modes, for this, in the menu item **Controller > Advanced modes > Enable add. modes**, set the value to **On**.
4. Next, you need to select which on-board computer button will enable **Mode S2** and configure this function. [Go to](#) the **Controller > I/O configuration** menu section, select one of the CAN ports, for example **CAN Port 1** and select **S2** in this menu item.
5. Save the settings in the **Controller > Save settings** menu item.
6. [Go to](#) the menu item **On-board computer > Buttons setup**, select which On-board Computer button will activate **Mode S2**, e.g. second. To configure in the menu item **Hot key 2 type**, select the control signal type **Button**, and in the item **Hotkey 2 func.** select the number of CAN input previously configured in the controller — **CAN Button1**.
7. Save the settings under the **On-board computer > Save** menu item. The setup is complete. Now you have to press the second button of the On-Board Computer to activate the control **Mode S2** with activated reverse. When the mode is activated you will see the **R** icon at the top of the screen. To disable reverse you need to switch to another control mode, **S1** or **S3**, which must be pre-set to other buttons of the On-Board Computer.

Switching on reverse by selecting the control mode with activated function "Reverse on brake"

To use this method it is necessary to activate one of the control modes with activated function **Reverse on brake** using one of the four buttons of the On-Board Computer. After activating this function, pressing the brake lever again after stopping will engage reverse.

1. Go to the **Controller > Advanced modes** menu and select one of the control modes **S1**, **S2**, **S3** in which the reverse will be activated. For example, **S2**.
2. Go to **Controller > Advanced modes > Mode S2 to Reverse on brake** menu item and select **On**.
3. Next, activate the advanced modes, for this, in the menu item **Controller > Advanced modes > Enable add. modes**, set the value to **On**.
4. Next, you need to select which on-board computer button will enable **Mode S2** and configure this function. Go to the **Controller > I/O configuration** menu section, select one of the CAN ports, for example **CAN Port 1** and select **S2** in this menu item.
5. Save the settings in the **Controller > Save settings** menu item.
6. Go to the menu item **On-board computer > Buttons setup**, select which On-board Computer button will activate **Mode S2**, e.g. second. To configure in the menu item **Hot key 2 type**, select the control signal type **Button**, and in the item **Hotkey 2 func.** select the number of CAN input previously configured in the controller — **CAN Button1**.
7. Save the settings under the **On-board computer > Save** menu item. The setup is complete. Now, when you have **Mode S2** enabled, after you have pressed the brake lever and completely stopping, you can press the brake lever again within 4 seconds and hold it down to activate reverse. If more time passes between presses, the reverse will not be activated and you will have to press the brake again and again to activate the reverse. You will see **R** at the top of the screen when the mode is activated. To disable reverse you must release the brake lever, the controller will return to control **Mode S2**.

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