

Rotary antenna rotor controller GNI-r4



User manual

Introduction

The controller GNI-r4 supports one rotor. It is designed for rotors such as "RAU", "RAK" and similar. Antenna rotation is possible with a resolution of 1 degree in the range of 0-360 degrees with a reserve in each direction. The default value of the reserve is 180 degrees, and in this case the rotation is from -180 to +540 degrees. The upper and lower rotation limits (software switches) can be changed in MENU.

The current value of the antenna position is written into the EEPROM non-volatile memory when the final value (sent by the computer program) is reached, or when the "Stop" button is pressed.

External dimensions (W x H x D): 106 x 58 x 106 mm.

Installation

The controller GNI-r4 is powered from the computer's USB connector via the USB-mini cable and the USB-mini connector on the back panel. The current drawn from the USB output is typically 45 mA, up to 90 mA. For manual operation without a computer, you can use a typical charger or power bank with an USB socket.

The rotor motor power supply given to the 2.1/5.5 socket (plus in the centre!) on the rear panel can range from 12V to 24V. You can use any DC power supply with a current output at least 3 A, for example a typical 13.8V power supply used to power the transceiver. Equally good is the use of a 19 V power supply from the laptop, and at such a voltage the antenna rotation is 50% faster. Current consumption is approx. 1 A, maximum 3 A.

The motor power ground has galvanic separation from the controller and computer ground.

To connect the rotor, use the NC/4p (Mode 25-724-0) type connector, and plug it into the appropriate socket on the back plate with the connection to the pins as follows:

- Pin 1 (M1) – motor control (connector 1 in the RAU / RAK rotor junction box)
- Pin 2 (M2) – motor control (connector 2 in the RAU / RAK rotor junction box)
- Pin 3 (K2) – pulse sensor (connector 3 in RAU / RAK rotor junction box)
- Pin 4 (K1) – pulse sensor (connector 4 in RAU / RAK rotor junction box).

After installing and checking the connections, set the antenna towards north (azimuth 0) or south (azimuth 180) and perform the calibration as described below.

Front panel

Display:

- The upper line indicates by default the current azimuth of the antenna in the range of 0-359 degrees,
- The bottom line displays by default the current location of the antenna in the range defined by the lower and upper limits (e.g. -180 to +540 degrees).

Buttons:

- "+" start rotation clockwise
- "-" start rotation counter-clockwise
- "Stop" (red) immediate stop of the rotor, or calibration
- "MENU" (right) enter the settings menu.

Note - press the button and keep it pressed for about 1 second to activate a relay.

The LED1 (green) flashes with every pulse from the rotor pulser (every 1 degree). It lights continuously after each use of the "Stop" button, as well as: after a successful calibration of the antenna setting, after switching off the display backlight, and when the lower or upper rotation limit is reached. This backlight automatically turns off after (by default) 3 minutes of inactivity. The value of this time can be changed in the menu to a different one in the range of 1-30 minutes.

The LED2 (red) indicates the 12-24 V DC power supply connection.

Manual operation

To manually control the rotor, three front panel buttons are used: "+" (start of rotation clockwise), "-" (start of rotation to the opposite side) and "Stop" (red, immediate stop of the rotor after reaching the desired position or for other reasons). The rotation of the rotor will stop after pressing the "Stop" button. If during rotation you want to change its direction, it is recommended to first stop the movement by using the "Stop" key, and only then press the "+" or "-" button. The antenna location value is entered into the EEPROM non-volatile memory in the moment when the "Stop" button is pressed.

For manual control of the rotor, you can also use a mouse controller, attached to a dedicated mini-jack on the rear panel of the controller. Here the control works in a different way: pressing the right mouse button causes the antenna to rotate clockwise until the pressure is released, while pressing the left mouse button causes rotation in the opposite direction until the pressure is released. Pressing the middle button (or rotary knob) stops the rotor movement in the same way as the red button on the front panel.

Note - the mouse controller GNI-r4 is not a computer mouse and has no other functions except described above.

Calibration

The red button "Stop" also has the function of calibration, i.e. setting the initial position (zeroing) in any physical position of the antenna. Keep the "Stop" button pressed during power on or resetting the microcontroller and wait for the "Calibrate rotor" message to appear. If you want the azimuth values of the antenna and the actual position of the antenna to be set in the non-volatile EEPROM memory to 0 degrees (direction to the north), select the "-" button. If you want the azimuth values of the antenna and its position in the EEPROM memory to be set to 180 degrees (direction to the south), then select the "+" button. If you want to cancel the calibration, press the "MENU" key.

If during your antenna operation you find that the controller's display deviates from the actual one, set the antenna to the north or south with "+" and "-" buttons, and then calibrate.

Automatic operation

Controlling from a computer is possible using any program compatible with the AlfaSpid protocol.

The GNI-r4 controller has been checked with the following programs: DXView (part of DX Lab), HRD, N1MM Rotor, PstRotator, Spid Driver, as well as with the Alfa Radio test program (ALFAMD.py).

When configuring the software, select the AlfaSpid protocol in the appropriate program location. Then indicate the correct COM port (after connecting the USB cable it will be reported automatically - you can check its number in the Windows Device Manager), and then set: 1200 baud, 8 bits, 1 stop bit, no parity.

A rotation request below 3 degrees is ignored. The value of the dead zone can also be changed in the menu to another in the range 1-30 degrees.

The current antenna position value is entered into the EEPROM non-volatile memory when the target (sent by the computer program) is reached. You can use the "Stop" button during rotation. In this case, the rotation will be stopped immediately, and the current antenna position value will be displayed and written into the EEPROM non-volatile memory.

GNI-r4 controller programming

Press and hold the MENU button (gray on the right). "Entering setup .." will appear, followed by the first option:

1. „LOW ant. limit“. The number in brackets is the current value. If you want to change it, use the "+" and "-" buttons. The value can be set in the range -180 to -10 degrees. After setting the desired value, press the MENU button again.
2. „HIGH ant. limit“. The number in brackets is the current value. If you want to change it, use the "+" and "-" buttons. The value can be set in the range of 370 to 540 degrees. After setting the desired value, press the MENU button again.
3. „Dead zone (deg)“. It is the minimum value of rotation, which will be performed when receiving a command from an external program, below this value the command will be ignored. The number in brackets is the current value. If you want to change it, use the "+" or "-" buttons. The value can be set in the range of 1 to 30 degrees. After setting the desired value, press the MENU button.
4. „BL ON (minutes)“. This is the time after which the display backlight turns off automatically. The number in brackets is the current value. If you want to change it, use the "+" or "-" buttons. The value can be set in the range of 1 to 30 minutes. After setting the desired time, press the MENU button again. Press the "Stop" button if the backlight has turned off. All changes in the menu will be activated after restarting or resetting the controller.

Warnings

1. Each activation of the COM port on the computer (e.g. by selecting the "Enable" field in the "Rotator Control" tab in DXView) resets the microcontroller! This is not dangerous except when the antenna is currently in motion. Then the loss of information about the position of the antenna occurs, which can be dangerous for the coaxial cable. RAU/RAK rotors do not have any mechanical limit switch, but only software. Avoid the following when the antenna is turning:

- disconnecting the USB cable from the controller or computer
- turning off or restarting the computer
- changing of configuration of serial ports
- starting or closing the rotor servicing program
- activation (enable, open) or deactivation of the serial port in the rotor controlling program.

2. Take care of an adequate length of coaxial cable (not to over-wind), especially when using the maximum +/- 180 degree rotation reserve.

3. Motor control cables should have a diameter of at least 1.5 mm (AWG 14). If their length exceeds 30 m, it is recommended to use 2 mm wires (AWG 12). Cables from impulse sensor like 0.5 mm diameter (AWG 22) are sufficient.

Questions, complaints: sp5gni@gmail.com