

Amigo — Manual

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Contact Information

Publisher and producer:

Kanardia d.o.o.

Lopata 24a

SI-3000

Slovenia

Tel: +386 40 190 951

Email: info@kanardia.eu

A lot of useful and recent information can be also found on the Internet. See <http://www.kanardia.eu> for more details.

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- <https://angusj.com/clipper2/>
- <https://flatbuffers.dev/>

- <https://www.oberhumer.com/opensource/lzo/>
- <https://rapidxml.sourceforge.net/>
- <https://www.sqlite.org/index.html>
- <https://www.nayuki.io/page/free-small-fft-in-multiple-languages>
- <https://rapidjson.org/>
- <https://design.ubuntu.com/font>

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Revision History

The following table shows the revision history of this document.

Rev.	Date	Description
2.6	Apr 2026	Software update section was added.
2.5	Apr 2026	Clear navigation data option was added to settings.
2.4	Mar 2026	Compatibility clarification added.
2.3	Mar 2026	Round 57 and 80 variants, software 4.x.
2.2	Feb 2024	Updated photos.
2.1	Feb 2024	LNAV/LVL button change, AP <code>Level</code> command.
2.0	Oct 2020	Servo motor settings and tuning capabilities, new screenshots, new definitions, prepared to work with Horis and Emsis as well.
1.0	Jun 2018	Initial release.

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1 Introduction

First of all, we would like to thank you for purchasing our Amigo. Amigo is an electronic device, which enhances autopilot functionality. Amigo can not act alone and it must be combined with some other Kanardia device. This can be Nesis, Aetos, Horis and Emsis PFD. In addition, it must be connected with autopilot servos.

This manual describes the technical description, operation, installation and tuning.

This manual revision is dedicated to software 4.x variant. If you are running older software (3.x), please refer to older revisions.

1.1 Icons Used Trough the Manual

A few icons appear on the side of the manual, which have special meanings:



This icon denotes information that needs to be taken with special attention.



This icon denotes background information about the subject.



This icon denotes an installation tip.

1.2 General Description

Amigo is an electronic device which is used as a remote unit for Kanardia autopilot system. It serves for easy changing of the autopilot parameters like desired track and altitude. It is also used for autopilot tuning.



Amigo can not work standalone and it must be connected with other Kanardia devices to exchange information. You can not use third party devices. The connection is made with a CAN bus. Typically, Amigo is connected with:

- Nesis, Nesis Lite (former Aetos) or Horis PFD device. They all host an AD-AHRS-GPS device internally, which is essential for proper AP operation. The AD-AHRS-GPS device provides attitude, altitude, airspeed, heading and GPS data required by an autopilot.
- Two servomotors, which are connected to the command system in order to steer an aircraft.

Amigo has a high-brightness IPS LCD display. The panel has two rotary-push knobs and two simple buttons, which are used to operate Amigo.

On the back side, Amigo has two primary CAN bus connectors, which allow simple autopilot integration. A RS232 connector is also provided for possible future extension of Amigo functions. It also host two secondary CAN connectors, which are reserved for future use, too.

1.3 Amigo's Forms

Amigo comes in four different forms:

- Horizontal rectangular form,
- Vertical rectangular form,
- Round form for a standard 80 mm diameter instrument panel hole,
- Round form for a standard 57 mm diameter instrument panel hole.

All forms run the same software. The user interface is nearly identical for the horizontal, round 80, and round 57 forms. There is a small difference in the screen layout for the vertical form.

1.4 General Precautions

The approved Pilot's Operating Handbook (POH) always supersedes the information in this manual. Refer to the approved Pilot's Operating Handbook (POH) for emergency procedures.



1.5 Compatibility Notes

Round Amigo forms are not capable of running 3.x software. This means that you can't use them in systems which are limited to software versions 3.x.¹

All devices connected to the same CAN bus as Amigo must run the same software version. This may require updating your existing devices. Please note that updating may have unwanted side effects. Consult the latest manuals and any software update guidelines before updating.

¹ Emsis systems are limited to version 3.11 and older Nesis III systems equipped with IGEP processors are limited to version 3.9. Nesis I or Nesis II systems are not compatible at all.

Rectangular Amigo forms can still run older 3.x software. However, you have to specify this request at the time of your order. Downgrading is not possible unless the device is sent to the factory.

1.6 Technical Specification

Table 2 shows some basic technical specification of Amigo autopilot controller.

Description	Value
Weight	170 g
Size (rectangular)	100 x 48 x 30 mm
Round 57	Standard 57 mm hole
Round 80	Standard 80 mm hole
Operational voltage	7 to 32 V
Power consumption	2.4 W
Current	200 mA at 12 V 100 mA at 24 V
Serial port	RS-232, autodetect
Operating temperature	-30 ~ +85 °C
Humidity	30 ~ 90 %, non condensing
Communication	CAN bus, 29 bit header, 500 kbit, Kanardia protocol

Table 2: Basic technical specifications for Amigo.

2 Operation

2.1 User Interface

Amigo user interface was carefully designed with an ease of operation in mind. The result is a device with only two rotary knobs and two push-buttons which provide an easy access to most commonly used autopilot functions.

LCD display is divided in two parts. The left part (or the top) refers to the lateral modes and the right part (or the bottom part) refers to altitude mode.

Figure 1 illustrates knobs, push buttons and the screen division for three forms: horizontal, vertical and round.



Figure 1: Amigo controls and screen layout organization. Vertical Amigo has layout split vertically: track and LNAV on top and altitude on the bottom. Other Amigos (horizontal and round 57 and 80) have layout split horizontally: track and LNAV on the left, altitude on the right.

- ① Lateral knob – TRK: Rotating the knob changes the target track. Once the desired target track is selected, push the knob to confirm the selection. If the lateral autopilot is not already active, it will be engaged automatically.
- ② Navigation mode – LNAV: A short press on the button activates the lateral navigation (LNAV) mode. The navigation data for this mode must be provided by some other device, such as Nesis, or from a third-party device connected via the serial port (e.g., SkyDemon, AERA). If no valid navigation data is available, the command is ignored.

Note: On older models, this function is operated via the HNAV button. The change is purely cosmetic; functionality remains identical.

- ③ Vertical knob ALT: Rotating the knob changes the target altitude. Once the desired altitude is set, push the knob to confirm the selection. If the

vertical autopilot is not already active, it will be engaged automatically. When navigating settings and menus, the same knob is used to make selections.

Long push activates the settings window.

- ④ Level button – LVL. Short press engages the AP **Level** command. Long press opens the vertical speed selection dialog. This is the target vertical speed to be used during climb or descent towards the target altitude.

Note: Older models have **VOPT** button. Here short press on the button selects the optional parameter for vertical mode – vertical speed. This is the target vertical speed to be used during climb or descent towards the target altitude. Long press on the **VOPT** engages the **Level** AP command.

See also section 3.4.

- ⑤ Lateral info: This part of LCD display shows lateral mode information – either track or LNAV.
- ⑥ Vertical info: This part of LCD display shows vertical mode information, altitude and vertical speed.

2.2 Autopilot Lateral Modes

Amigo consists of two lateral modes: track hold (TRK) and horizontal navigation (LNAV).

- To activate TRK mode, rotate the TRK knob and select the desired track. Push the knob to confirm it. This will change the target track and immediately activate the autopilot unless it was already active.
- To activate horizontal navigation mode, short press the LNAV button. The AP will now follow horizontal navigation from some other device (Nesis or Aetos are required).

2.2.1 Track Hold Mode

This mode engages roll servo motor to maintain the selected target track. Changing the target track is a simple two step process:

1. Rotate the TRK - lateral knob (1) and set the new target track. Figure 2 illustrates the case.
2. Push the TRK knob to confirm the selection.

In addition, short press on the TRK knob disengages roll servo motor (when servo was active) and another short press on the TRK knob engages the servo.



Figure 2: Direction rose is shown for more intuitive target track selection. The orange line points to the new target track selection and its numerical value is shown in the middle.

Target track value can take values from 1 to 360° with 1° resolution. Rotating the TRK knob clockwise increments the target track. Rotating the TRK knob counterclockwise decrements the target track. Moderate rotation of the TRK knob gives 1° per step change. Rapid rotation of the TRK knob gives 10° per step change.

Figure 3 illustrates the track hold mode situation.

- ① Target track. This value changes with TRK knob rotation.
- ② Current aircraft tracking.
- ③ A gray **Ext** symbol appears when some external third-party device has been detected on the AUX port (RS-232). If Amigo is actively following this device in a direct-to mode then gray color turns green.

2.2.2 LNAV Mode (Lateral Navigation)

Short press on a LNAV button engages the lateral navigation (LNAV) mode. This mode selects Nesis or Aetos (or some other device, which can act as

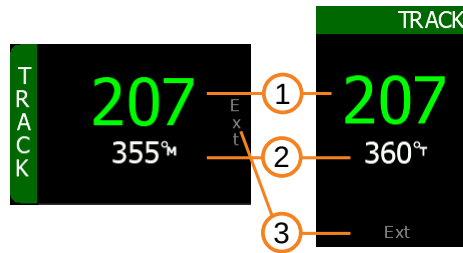


Figure 3: An example illustrating a case in which the track hold mode (TRK) is active.

a source) as a primary navigation source. The autopilot follows some pre-planned route or fly to a direct-to waypoint. It also engages roll servomotor if it is inactive. The LNAV mode takes care for the direction only – it does not affect the altitude. Use ALT control to change an altitude.

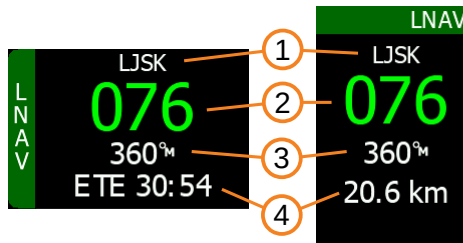


Figure 4: An example illustrating a case in which the lateral navigation mode (LNAV) is active.

Figure 4 illustrates a case:

- ① Active waypoint designation.
- ② Track required to reach the waypoint (adapts dynamically).
- ③ Current track.
- ④ Distance and ETE to the waypoint, alternating periodically.

When lateral navigation is following a route, then the active waypoint of the route is displayed on the screen. The waypoint will be adjusted automatically as the route progresses in time.

LNAV mode can be disengaged by pushing the TRK button.

2.3 Autopilot Vertical Modes

To keep the things simple, the altitude hold (ALT) mode is the only mode used here.

2.3.1 Altitude Hold (ALT)

The altitude hold mode (ALT) engages pitch servo motor to maintain selected target altitude.

Changing the target altitude is a simple two step process:

1. Rotate the ALT knob (3) and set the new target value. Figure 2 illustrates the case.
2. Push the ALT knob to confirm the new target.

Target altitude can take values from 0 to 20000 ft (6000 m) with 10 ft (or 10 m) resolution. Rotating the ALT knob clockwise increments target altitude. Rotating the ALT knob counterclockwise decrements target altitude. Moderate rotation of the ALT knob gives 10 ft/step (10 m/step) change. Rapid rotation of the ALT knob gives 100 ft/step (100 m/step) change.

Short press on ALT knob pauses altitude hold mode (if altitude hold mode is engaged) and disengages the pitch servo motor. Another short press on ALT knob reengages the pitch servo motor with previous target altitude.

ALT mode has an additional parameter vertical speed (VS) which defines the maximum vertical speed which the system will use to maintain or climb/descent to target altitude level. Default VS value is 500 ft/min. Long press on the LVL button opens a window, where the target vertical speed can be adjusted. Figure 5 illustrates the information of the altitude hold mode (ALT).

- ① Target altitude.
- ② Current altitude.
- ③ Current target vertical speed to be used during climb or descent.

During the altitude transition Amigo will try to maintain the vertical speed as close as possible to the target vertical speed. Due to aircraft performance limitations (engine power, trim position, flight configuration, altitude, weight, etc.) it might happen that aircraft can not reach the defined vertical speed. This can quickly lead to a dangerous condition where the airspeed becomes too high or too low. Always make sure the aircraft operates in the safe flight envelope.



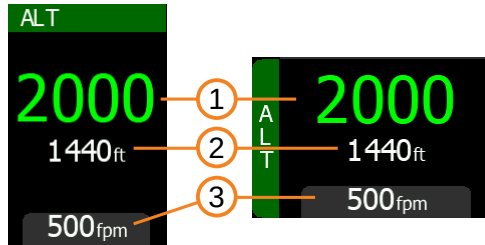


Figure 5: Altitude hold (ALT) example.

2.4 LNAV Button Operation

The LNAV button is used to activate the lateral autopilot in LNAV (lateral navigation) mode. The LNAV button is illuminated in one of the following colors:

White indicates that LNAV information is not available. Pressing the LNAV button has no effect.

Green indicates that LNAV information is available. Pressing the LNAV button activates LNAV mode.

Green–Yellow alternating colors indicate that multiple LNAV sources are available. Pressing the LNAV button displays a list of LNAV alternatives.

Blue indicates that LNAV mode is currently active.

LNAV information is available if at least one of the following situations is true:

- Kanardia Nesis is also present on the CAN bus, where Nesis is either operating in the *direct-to* mode or it is set to follow a route.
- Some third-party device is connected to Amigo (SkyDemon, AERA, etc.) and this device is properly transmitting navigation information.
- A route or a direct-to point was obtained either from Nesis or from a third-party device and now this device is disconnected. Amigo stores last active navigation situation and starts navigating on its own. For this reason, you may see green LNAV illumination even if the third-party device is disconnected or it was not connected yet.

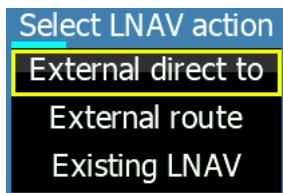


Figure 6: LNAV action selection window.

Depending on circumstances, Amigo asks for clarification about the LNAV source. Figure 6 shows such possibility.

External direct to means that the external device is transmitting the direct-to information. Selecting this option makes Amigo to actively follow whatever is selected on the external device. In the case of SkyDemon or AERA this is the most commonly used option. If you change the navigation target on the device, Amigo will accept the change automatically.

External route means that the external device has a complete route available for import. Selecting this option imports the route and makes Amigo following it as its own route. Any subsequent changes of the route on the third-party device are not adopted automatically. The **External route** must be invoked again, to copy the route. You will also note, that the **Ext** label on the screen has turned green. This means the device is being followed.

Existing LNAV will use either direct-to or route navigation that is currently active on Kanardia CAN bus (or stored internally in Amigo). This completely ignores third-party devices. This option is useful if you have Kanardia Nesis and third-party device connected the same time. It tells to listen to Kanardia navigation and ignore the third-party device.

The actual behavior depends strongly on state of Kanardia devices on CAN bus and third-party devices on serial port. If there is only one option available out of three options in total, this window is not shown and the only option executes immediately.

2.5 External Button Operation

An external push button can be connected to the AUX port. See section 5.5.1 for details about connection.

- A short press on the external button disconnects autopilot.
- A long press on the external button activates autopilot **Level** command. This means it activates the track hold mode and altitude hold mode at the same time. Current track and altitude are used to set the targets.

2.6 Disengaging The Autopilot

Autopilot servo motors can be disengaged in several ways. For more exhaustive list, please refer to the Autopilot Installation manual.

- A short press on TRK knob while the lateral hold mode is active disengages roll servo motor.
- A short press on ALT knob while the altitude hold mode is active disengages pitch servo motor.
- A press on AP button on Joyu control stick disengages both servo motors. Note: Joyu must be properly configured first.
- An external button can be connected to the AUX port. It is usually mounted on command stick or on steering wheel. A press on this button will disengage both servo motors.
- Power line for both servo motors must be routed via a circuit breaker switch. Turning off the circuit breaker will disengage both servo motors.

2.7 Options

Pressing the ALT knob for about two seconds opens the **Options** window as shown on Figure 7. This window allows:

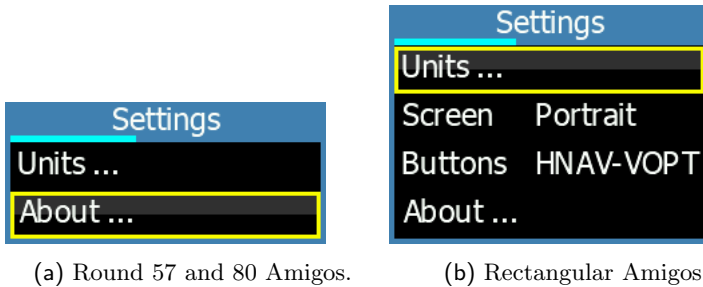
- Quick change of LCD brightness. Note that the change of brightness affects all Kanardia displays connected to the same CAN bus. A change on Amigo will also change brightness on Nesis/Aetos/Horis/Emsis ...
- The **Settings** option opens a new window, where user settings can be accessed. These settings affects Amigo only. See section 3.
- The **Autopilot** options open access to various autopilot settings, options and tuning windows. Use this with care. It shall not be used on normal operation. It shall be only used during autopilot tuning. See section 4.



Figure 7: Options window.

3 Settings

The **Settings** window gives access to some Amigo specific settings as it is shown on Figure 8.



(a) Round 57 and 80 Amigos.

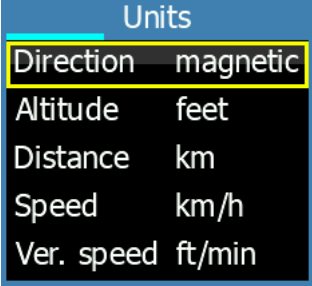
(b) Rectangular Amigos.

Figure 8: Settings depend on the Amigo model.

3.1 Units

The following units can be selected. Note that this unit selection affects Amigo only. Other devices connected to the CAN bus are not affected.

- Direction: true or magnetic.
- Altitude: feet or meters.
- Distance: kilometers, nautical miles or miles.
- Vertical speed: feet/min or m/s.
- Airspeed: kts, km/h or mph.



Units	
Direction	magnetic
Altitude	feet
Distance	km
Speed	km/h
Ver. speed	ft/min

Figure 9: Units window.

3.2 Clear Navigation Data

The **Clear nav. data** option is used to clear the residual navigation data from the last operation by force. It clears any direct-to point or any navigation route. This option shall be seldom used, if ever.

3.3 Screen

The **Screen** option is available on rectangular Amigo models only. It is used to define the screen layout orientation: portrait or landscape.

Use this options to change the orientation of the Amigo. You can also order new buttons for it, if you wish so.

3.4 Buttons

The **Buttons** options defines buttons used on Amigo. It is available on rectangular Amigo models only – mostly due to support legacy variants.

- **LNAV-LVL** is used in models starting to deliver in mid 2024. The press on the LVL button engages the autopilot **Level** command. The long press on the LVL button opens the vertical rate window.
- **HNAV-OPT** is used in older models. Here the press on the OPT button opens the vertical rate window and longpress on OPT button engages the autopilot **Level** command.

If you want to upgrade your buttons:

- Install the latest software version.
- Order the new buttons.
- Replace the old buttons with the new ones.
- Update this option to reflect the change.

3.5 About

The About window shows some information about Amigo; its serial number, software version and software creation date. In addition, it shows information about all devices connected to the CAN bus. Left of the colon is the device name and hardware version, right of the colon are software version, development version in parenthesis and serial number.

Turn the ALT knob to see all the units connected to the CAN bus.



Figure 10: About window.

4 Autopilot

The autopilot window is used to set and tune various autopilot parameters. It shall not be used in normal operation. This window shall be accessed only during autopilot setup, setting and tuning. Figure 11 shows four standard options.

In addition, there is a special case, which covers a software transition for versions 3.xx to version 4.xx. In this case you will see only one option labeled as **Transit 4.0**. Select this option to update internal options in the servos to a new format, which is understood by 4.0. It shall be used only once. Once executed, the option will not appear anymore.

Any accidental change of any of parameters in this section and subsections may result of autopilot being inoperative.



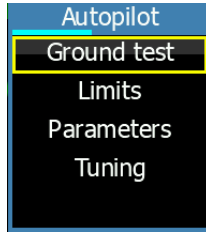


Figure 11: Autopilot options example, when **Seru v2** servo motors are connected. Hence the **Servo config** is not shown.

Servo config option appears only if **Seru v1** servo motor variant is detected. New servo motors (**Seru v2**) do not need this option anymore.

Limits is used to set autopilot system operational (safety) limits.

Parameters is used to define autopilot parameters in more details.

Tuning is used during flight testing to tune the autopilot regulator.

The more detailed description of all these autopilot items is given in a separate manual, *Autopilot Installation Manual*. No further details are given here.

5 Installation

We prepared cutout drawings for all Amigo variants. They can be downloaded from our web site <https://www.kanardia.eu>.

Carefully cut the opening. The opening must be tight. There is only about 1 mm margin between the slot edge and the Amigo panel end – there is almost no room for an error.

5.1 Amigo 80 Installation Warning

Handle with care: screws may be too long and may break the LCD display. Even originally provided screws may break the LCD display. Make sure the instrument panel is thick enough and double check the screw end does not touch the LCD beneath.

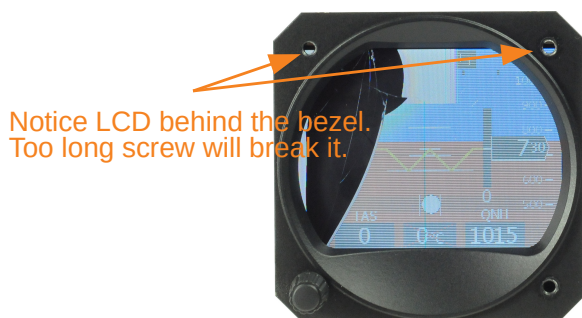


Figure 12: Warning: Screws may be too long for your panel thickness.

The LCD display can be damaged during the installation. This happens when mounting screw reaches the LCD display. We strongly advise you to double check the screw lengths. Even screws that are originally supplied with the instrument can damage the LCD display.

Our experiences show that the LCD is often damaged even before it is installed. Some users simply take a screwdriver and tighten the screws for no apparent reason.

We do not grant warranty for any broken LCD display, even if you used originally supplied screws.



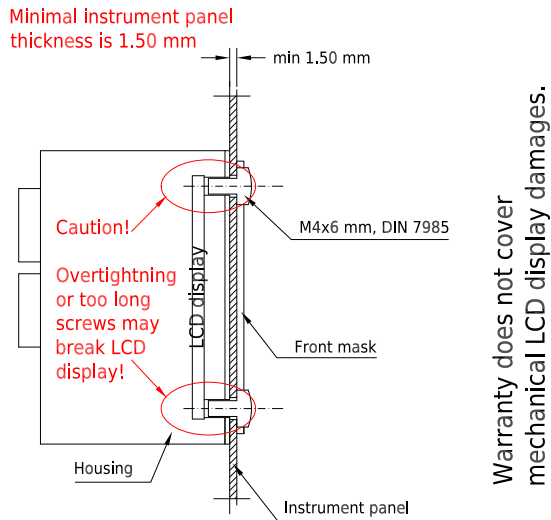


Figure 13: Warning: Screws may be too long for your panel thickness.

5.2 Rectangular Amigo

The mounting screw holes are located at all four corners of the Amigo front panel. The device is mounted using four screws type M3. To prevent internal stresses, please make sure that the instrument panel is flat. It is highly recommended that the instrument panel is mounted using rubber shocks, which reduce the vibrations.

Remove the mounting screws from the device. Insert the device from the front side of the instrument panel and fix it with all four screws.



Due to better access it is normally more convenient to connect all cables at the back of Amigo before fixing it into the instrument panel.

5.3 Round Amigos

There are two M4 screws on the top and two knobs on the bottom. Bottom knobs and nuts must be removed before the installation:

- Remove the caps of the knob first. These caps are tiny and easy to drop. A sharp object may be needed to separate the cap from the knob.

- Slightly loose the screw beneath the cap and slide the knob from the shaft.
- Unscrew the nuts and slide them from the shaft.

Install the instrument from the back side of instrument panel, then apply nuts, screws and knobs in reverse order.

5.4 Connections

Figure 14 shows Amigo's back side with all connection ports.

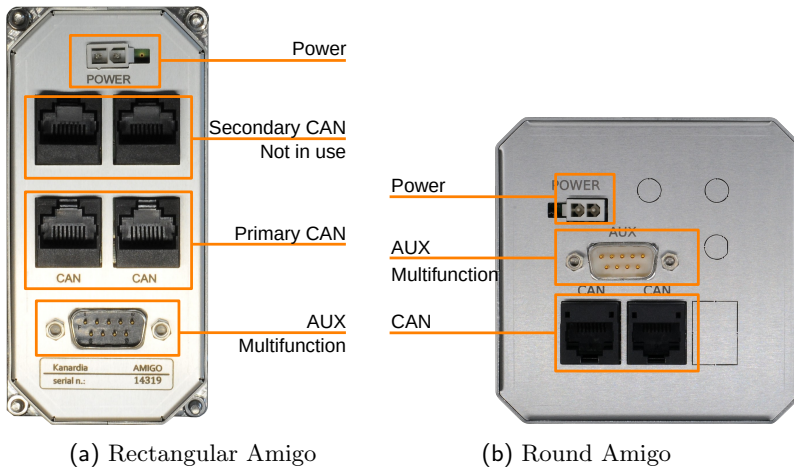


Figure 14: Connection ports.

POWER connection is seldom used. Amigo has a very modest power consumption and thus it get power from the CAN bus. However, it can be also powered from the power connector.

Secondary CAN Not in the use for the moment. Reserved for the future use. These connectors are not present in Amigo 57 and Amigo 80 models.

Primary CAN is our standard CAN connector. Use standard RJ45 Ethernet cable. Two CAN ports are provided so that devices can be daisy-chained. This connector must be used to connect Amigo to main CAN bus Nesis, Aetos and servos.

AUX – This is a multipurpose D-SUB 9 port. Currently only remote autopilot switch can be connected. More functions will be available with future SW versions.

5.5 The AUX Port

This is a multifunction port in a form of standard D-SUB 9 connector. An external push button and RS-232 communication can be connected.



Amigo Vertical/Horizontal and Amigo 80 have **different pinouts**. For Amigo Vertical/Horizontal, refer to table 3, and for Amigo 80, refer to table 4.

5.5.1 External Button

An external push button can be connected to the AUX port.

For Amigo Vertical/Horizontal: When pin 8 is connected to ground (GND on pin 4), the Amigo detects that the external button has been pressed. See Figure 16 for the connection diagram.

For Amigo 80: When pin 6 is connected to ground (GND on pin 5), the Amigo detects that the external button has been pressed. See Figure 17 for the connection diagram.

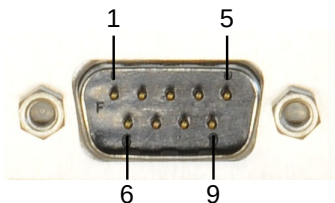


Figure 15: AUX connector pins.

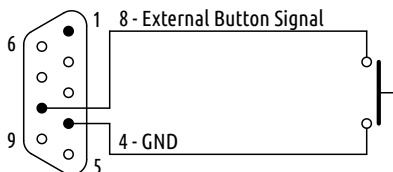


Figure 16: External buttons connection schematics for Amigo vertical/horizontal.

Table 3: Description of the AUX port pins for Amigo vertical/horizontal.

Pin	Description
1	NC
2	RX (RS-232)
3	TX (RS-232)
4	GND
5	GND (RS-232)
6	NC
7	NC
8	External button
9	12 V output, max 100 mA

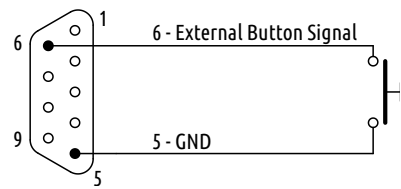


Figure 17: External buttons connection schematics for Amigo 80.

Table 4: Description of the AUX port pins for Amigo 80.

Pin	Description
1	NC
2	RX (RS-232)
3	TX (RS-232)
4	12 V output, max 100 mA
5	GND (RS-232)
6	External button
7	NC
8	NC
9	NC

SVEN Dongle

Our SVEN dongle may have different pin layout for the external button signal. Please refer to the SVEN documentation for more details.

6 Software Update

The Amigo software is updated indirectly through another device. Amigo is usually connected to Nesis, Aetos, or Horis, and you can use one of these to update the software.

- When connected to Nesis or Aetos, Amigo will be updated automatically. No special intervention is required.
- When connected to Horis, which is equipped with a micro SD card slot, Horis can be used to update Amigo. Update Horis first. The Horis update internally stores the update for Amigo as well. Once Horis has been updated, issue a command that will also update all connected devices. Please refer to the Horis documentation for more details.
- Some older Horis devices do not have a micro SD card slot. In this case, Amigo and other devices must be updated using the Blu dongle and the **Kanja** Android app. Please refer to the **Blu-Kanja** manual for more details.

7 Maintenance & Repair

No special maintenance is required. Amigo has no serviceable parts inside. In the case of malfunction, it must be sent to factory for a repair.

To avoid damaging the instrument, do not use any chemical cleaners, solvents, or abrasive materials on the device. Only clean the surface using a dry or slightly damp microfiber cloth.

Improper cleaning may result in permanent damage to the screen or housing and void the warranty.

8 Limited Conditions

Although a great care was taken during the design, production, storage and handling, it may happen that the Product will be defective in some way. Please read the following sections about the warranty and the limited operation to get more information about the subject.

8.1 Two Years Warranty

Kanardia d.o.o. warrants the Product manufactured by it against defects in material and workmanship for a period of twenty-four (24) months from retail purchase.

Warranty Coverage

Kanardia's warranty obligations are limited to the terms set forth below:

Kanardia d.o.o. warrants the Kanardia-branded hardware product will conform to the published specification when under normal use for a period of twenty-four months (24) from the date of retail purchase by the original end-user purchaser ("Warranty Period"). If a hardware defect arises and a valid claim is received within the Warranty Period, at its option and as the sole and exclusive remedy available to Purchaser, Kanardia will either (1) repair the hardware defect at no charge, using new or refurbished replacement parts, or (2) exchange the product with a product that is new or which has been manufactured from new or serviceable used parts and is at least functionally equivalent to the original product, or, at its option, if (1) or (2) is not possible (as determined by Kanarida in its sole discretion), (3) refund the purchase price of the product. When a refund is given, the product for which the refund is provided must be returned to Kanardia and becomes Kanardia's property.

Exclusions and Limitations

This Limited Warranty applies only to hardware products manufactured by or for Kanardia that have the "Kanardia" trademark, trade name, or logo affixed to them at the time of manufacture by Kanardia. The Limited Warranty does not apply to any non-Kanardia hardware products or any software, even if packaged or sold with Kanardia hardware. Manufacturers, suppliers, or publishers, other than Kanardia, may provide their own warranties to the Purchaser, but Kanarida and its distributors provide their products *AS IS*, without warranty of any kind.

Software distributed by Kanardia (with or without the Kanardia's brand name including, but not limited to system software) is not covered under this Limited Warranty. Refer to the licensing agreement accompanying such software for details of your rights with respect to its use.

This warranty does not apply: (a) to damage caused by use with non-Kanardia products; (b) to damage caused by accident, abuse, misuse, flood, fire, earthquake or other external causes; (c) to damage caused by operating the product outside the permitted or intended uses described by Kanardia; (d) to damage caused by service (including upgrades and expansions) performed by anyone who is not a representative of Kanardia or an Kanarida Authorized Reseller; (e) to a product or part that has been modified to significantly alter functionality or capability without the written permission of Kanardia; (f) to consumable parts, such as batteries, unless damage has occurred due to a defect in materials or workmanship; or (g) if any Kanardia serial number has been removed, altered or defaced.

To the extent permitted by applicable law, this warranty and remedies set forth above are exclusive and in lieu of all other warranties, remedies and conditions, whether oral or written, statutory, express or implied, including, without limitation, warranties of merchantability, fitness for a particular purpose, non-infringement, and any warranties against hidden or latent defects. If Kanardia cannot lawfully disclaim statutory or implied warranties then to the extent permitted by law, all such warranties shall be limited in duration to the duration of this express warranty and to repair or replacement service as determined by Kanardia in its sole discretion. Kanardia does not warrant that the operation of the product will be uninterrupted or error-free. Kanardia is not responsible for damage arising from failure to follow instructions relating to the product's use. No Kanardia reseller, agent, or employee is authorized to make any modification, extension, or addition to this warranty, and if any of the foregoing are made, they are void with respect to Kanardia.

Limitation of Liability

To the extent permitted by applicable law, Kanardia is not responsible for indirect, special, incidental or consequential damages resulting from any breach of warranty or condition, or under any other legal theory, including but not limited to loss of use; loss of revenue; loss of actual or anticipated profits (including loss of profits on contracts); loss of the use of money; loss of anticipated savings; loss of business; loss of opportunity; loss of goodwill; loss of reputation; loss of, damage to or corruption of data; or any other loss or

damage howsoever caused including the replacement of equipment and property, any costs of recovering, programming, or reproducing any program or data stored or used with Kanardia products and any failure to maintain the confidentiality of data stored on the product. Under no circumstances will Kanardia be liable for the provision of substitute goods or services. Kanardia disclaims any representation that it will be able to repair any product under this warranty or make a product exchange without risk to or loss of the programs or data. Some jurisdictions do not allow for the limitation of liability for personal injury, or of incidental or consequential damages, so this limitation may not apply to you.

8.2 TSO Information — Limited Operation

This product is not TSO approved as a flight instrument. Therefore, the manufacturer will not be held responsible for any damage caused by its use. The Kanardia is not responsible for any possible damage or destruction of any part on the airplane caused by default operation of instrument.