MINN KOTA®

AUTHORIZED SERVICE PROVIDER MANUAL

GPS NAVIGATION REPAIR

ADVANCED GPS CONTROL 2023-PRESENT
i-PILOT LINK BT 2017-2023
i-PILOT BT 2017-2023
i-PILOT LINK 2010-2016
i-PILOT 2009-2016

Revised 02/2023

NOTES

ATTENTION:

Authorized Service Provider Locator

Minn Kota has over 1000 Authorized Service Providers, equipped to properly repair your Minn Kota Product. Repairs completed by Authorized Service Providers receive a 90-day warranty which covers the parts and labor of the necessary repair if the paid repair fails. Purchased parts have no warranty and cannot be returned. For additional details on Minn Kota parts warranty, see https://minnkota.johnsonoutdoors.com/us/support/warranty. Johnson Outdoors Marine Electronics, Inc. disclaims all warranties, express and implied, except for those set forth at the above link.

Notice: You should only use this guide if:

1. The motor has no factory warranty. Improperly performing many of the operations suggested in this guide may void any remaining factory warranty on your Minn Kota product. If the product is within the factory warranty, the product should be delivered to an Authorized Service Provider for Repairs.
2. You have verified correct voltage and amperage to the product. This means more than just checking voltage. The deep cycle batteries must have been load tested and all connections must have been inspected and are clean and tight. Bad deep cycle batteries or loose or corroded connections may not prevent a voltmeter from obtaining a correct reading and those conditions may prevent your Minn Kota product working properly.
3. You have a complete understanding of and access to the necessary tools including a VOM/Volt Ohm Meter/Multi-meter, an Amp Meter capable of approximately 0.1 amp accuracy and reading up to 60 amps DC, and basic hand tools.

⚠ **Warning:** Always wear safety glasses and gloves. Disconnect all power to the Minn Kota product before beginning and work or maintenance. Johnson Outdoors Marine Electronics, Inc. is not responsible for any damage due to improper rigging or installation. If you do not have the skills, experience, and tools to perform the listed operations, seek the help of a Minn Kota Authorized Service Provider.

⚠ **Caution:** Read all product manuals, service instructions and warnings carefully before beginning and determine whether or not you understand and are prepared to complete the operation. Minn Kota Technical Support staff are not able to assist beyond the included instructions. Attempting these repairs and then taking the product to an Authorized Service Provider may result in additional time for them to diagnose and repair disassembled products (which will increase the cost of repairs).

Buy Parts Online Minn Kota and Cannon Parts available at https://motors.johnsonoutdoors.com.

CONTENTS

NOTES 1
ATTENTION: 2
TOOLS 4
REQUIRED DIAGNOSTIC TOOLS: 4
BOAT/RIGGING DIAGNOSTIC TOOLS 4
OPTIONAL DIAGNOSTIC TOOLS: 4
HISTORY (SYSTEMS IN CHRONOLOGICAL ORDER) 5
i-PILOT (i-PILOT 1.0) 2009-2010 (NON-BLUETOOTH) 5
i-PILOT 1.5 2011 – 2016 (NON-BLUETOOTH) 5
i-PILOT LINK (i-PILOT 2.0) 2011 – 2016 5
i-PILOT 1.6 BLUETOOTH (2017 – 2023) 5
i-PILOT LINK BT (i-PILOT 3.0 BLUETOOTH) (2017 – 2023) 5
ADVANCED GPS (2023 – PRESENT) 6
NAVIGATION SYSTEM SPECIFICATIONS 7
ADVANCED GPS NAVIGATION/i-PILOT 4.0 7
i-PILOT BT/i-PILOT 1.6 8
i-PILOT LINK BT/i-PILOT 3.0 8
i-PILOT/i-PILOT 1.0 & 1.5 9
i-PILOT LINK/i-PILOT 2.0 9
REPAIR SCENARIOS 10
CASE I. 10
APPENDIX 12
MINN KOTA ONE BOAT NETWORK AND i-PILOT VIDEOS 13

TOOLS

REQUIRED DIAGNOSTIC TOOLS:

- Foot Pedal compatible with the motor being evaluated

BOAT/RIGGING DIAGNOSTIC TOOLS

- VOM/Multimeter
- Battery Load Tester

OPTIONAL DIAGNOSTIC TOOLS:

- Cart with Power Supply and Motor Mounting Location
- Open space with a clear view of the sky where you can maneuver the cart

NOTICE: GPS locations “drift”, if a motor is put in Spot Lock and not moved to chase the drifting spot as if it was on the water moving the boat the motor will make a number of seemingly random steering and motor efforts and then shut off after a few seconds. A cart that you can move is necessary to actually test Spot Lock, when you put the motor into Spot Lock you will have to move the cart in the direction the motor points to accurately judge whether or not the motor is trying to maintain a location.

HISTORY (SYSTEMS IN CHRONOLOGICAL ORDER)

i-PILOT (i-PILOT 1.0) 2009-2010 (NON-BLUETOOTH)

- Combined AutoPilot and CoPilot functions
- Introduced Advanced AutoPilot feature used to navigate to a specific destination using GPS headings as opposed to a magnetic compass.
- Introduced Spot-Lock, an electronic anchor feature
- The ability to save and recall up to three Spot Locks
- Users could also record and playback three tracks each up to half a mile long.

i-PILOT 1.5 2011 – 2016 (NON-BLUETOOTH)

- Larger remote screen
- Increased storage of saved Spot-Lock locations and tracks to six.

i-PILOT LINK (i-PILOT 2.0) 2011 – 2016

- Non-Bluetooth
- i-Pilot Link allows the Minn Kota and compatible Humminbird units to communicate with each other via Ethernet connection, increasing the storage of saved Spot-Locks and i-Tracks to 2,500 and storing them in the Humminbird's memory.
- Update software via SD card inserted into the Humminbird
- Ability to navigate to waypoints saved in the Humminbird
- Follow-The-Contour (if connected to the Humminbird unit with the Ethernet Cable). Follow-The-Contour allows the boat to navigate automatically, using information from LakeMaster or AutoChart Live maps.
    - A LakeMaster map to follow a depth contour
    - The AutoChart Live data allows following along a bottom hardness, vegetation, or depth contour line from a custom map

i-PILOT 1.6 BLUETOOTH (2017 – 2023)

- Increased storage of saved Spot-Lock locations and tracks to 16
- Bluetooth Capability, allowing for the use of the i-Pilot App to update software and remote functions from a smartphone
- Bluetooth also allows connectivity of the trolling motor to the Talon or Raptor Shallow Water Anchors
- Introduction of the Heading Sensor. Once paired to an i-Pilot Controller it gives an additional feature of Spot-Lock Jog (Included with Ultrex, Ulterra, and Terrova models. Not included with PowerDrive models, but can be added.

i-PILOT LINK BT (i-PILOT 3.0 BLUETOOTH) (2017 – 2023)

- i-Pilot Link allows the Minn Kota and compatible Humminbird units to communicate with each other via Ethernet connection, increasing the storage of saved Spot-Locks and i-Tracks to 2,500 and storing them in the Humminbird's memory.
- Ability to navigate to waypoints saved in the Humminbird
- Follow-The-Contour (if connected to the Humminbird unit with the Ethernet Cable). Follow-The-Contour allows the boat to navigate automatically, using information from LakeMaster or AutoChart Live maps.

    - A LakeMaster map to follow a depth contour
    - The AutoChart Live data allows following along a bottom hardness, vegetation, or depth contour line from a custom map
- Bluetooth Capability, allowing for the use of the i-Pilot App to update software and remote functions from a smartphone
- Bluetooth also allows connectivity of the trolling motor to the Talon or Raptor Shallow Water Anchors
- Introduction of the Heading Sensor. Once paired to an i-Pilot Controller it gives an additional feature of Spot-Lock Jog (Included with Ultrex, Ulterra, and Terrova models. Not included with PowerDrive models, but can be added.
- Circle Mode was a new feature that was available if connected to a compatible Humminbird unit.

ADVANCED GPS (2023 – PRESENT)

- This replaces both i-Pilot and i-Pilot Link
- All equipped motors will have an Ethernet connection which will allow connectivity to compatible Humminbird units if the user wants to.
- Dodge Mode while in a navigation mode, the user can temporarily suspend or pause the navigation mode to manually steer and then resume the suspended navigation mode
- Drift Mode will automatically engage Advanced AutoPilot and Cruise Control simultaneously to maintain boat control and speed while drifting
- Locked Heading AutoPilot uses a compass heading to keep the motor pointed in the same compass direction
- Locked Course AutoPilot uses compass heading and GPS data to correct for wind, current and external forces to keep the boat on the intended course

NAVIGATION SYSTEM SPECIFICATIONS

ADVANCED GPS NAVIGATION/i-PILOT 4.0

2023-PRESENT

Equipped on all QUEST motors, all Ultrex and Ulterra, Optional on Terrova and PowerDrive

14 Button Remote powered by 2 AA batteries. Remote has 4 programmable One Boat Network Buttons, buttons for SpotLock, Menu, AutoPilot, Cruise Control and Power. Remote is Waterproof, Remote does NOT float.

Can be Connected to Humminbird Ethernet via standard Humminbird Ethernet Cable. 30' Cable included with motors equipped with Advanced GPS Navigation.

NOTICE: Ethernet Cables have Female Connectors on both ends. They come in various sizes, the Advanced GPS System will include a 30' Ethernet Cable, shorter cables are available. If a distance greater than 30' needs to be covered an Extension Cable is available. Helix Units require an adapter to connect to the Ethernet Network.

Humminbird Ethernet Cables:

• 720073-6	AS EC 5E	5' ETHERNET CABLE	
• 720073-2	AS EC 10E	10' ETHERNET CABLE	
• 720073-5	AS EC 15E	15' ETHERNET CABLE	
• 720073-3	AS EC 10E	20' ETHERNET CABLE	
• 720073-4	AS EC 30E	30' ETHERNET CABLE	Cable Included with System
• 760025-1	AS ECX 30E	30' ETHERNET EXTENSION	Male connector on one end
• 720074-1	AS EC QDE	ETHERNET ADAPTER CABLE	Connects Helix to Ethernet

i-Pilot Link systems had a female Ethernet Connector connecting the system via an Ethernet Extension Cable rather than a standard Ethernet Cable. On a boat that already has an extension cable rigged from a prior i-Pilot Link installation a short Ethernet Cable could be used to replace just the section of cable that was part of the i-Pilot Link System.

The One Boat Network App, available for Android and iOS smart phones, has full motor control for motors equipped with Advanced GPS Navigation.

i-PILOT BT/i-PILOT 1.6

2017-2023

Optional Equipment on Ultrex, Ulterra, Terrova and PowerDrive Motors.

16 Button Remote Powered by 3 AA batteries. 2 Soft Keys, function identified by the on screen option directly above the soft key, up/down menu navigation, Home, OK, Basic Motor Operation, GoTo, Cruise Control, Spot Lock, High Speed, and AutoPilot.

Can be controlled using the i-Pilot app available for Android and iOS smart phones. The App has basic motor controls only, the App's primary function is allowing software updates of the system.

i-PILOT LINK BT/i-PILOT 3.0

2017-2023

Optional Equipment on Ultrex, Ulterra, and Terrova Motors.

9 Button plus Touch Screen Remote Powered by a rechargeable LiPo battery. Navigation button (Finger), Spot Lock, Basic Motor Control, OK, and Home. Most options accessed via touch screen navigation.

Connects to Humminbird Ethernet for additional Control Options.

Can be controlled using the i-Pilot Link app available for Android and iOS smart phones. The App has basic motor controls only, the App's primary function is allowing software updates of the system.

NOTICE: Ethernet Cables have Female Connectors on both ends, the connector attached to the i-Pilot Link is Female, Standard Ethernet cables cannot be used to connect i-Pilot Link to the network. The included Cable is a 30' Extension Cable, if a longer distance is needed additional 30' extension cables can be added. Helix Units require an adapter to connect to the Ethernet Network.

Compatible Humminbird Ethernet Cables:

- 760025-1 AS ECX 30E 30' ETHERNET EXTENSION Cable Included with System
- 720074-1 AS EC QDE ETHERNET ADAPTER CABLE Connects Helix to Ethernet

i-PILOT/i-PILOT 1.0 & 1.5

2009-2016 (1.0 2009-2010, 1.5 2010-2016)

Add-on accessory for PowerDrive & Terrova. Optionally Equipped on Ulterra, Terrova, PowerDrive.

15 Button Remote Powered by a CR2450 Coin Cell Battery. Basic Motor Controls, Back Light, Record, AutoPilot, Cruise Control, Track to Start, Track to End, Pause, Spot Lock and Spot Lock recall. Ulterra Motors received a remote with 3 additional Buttons, Trim up, Trim Down, and Stow/Deploy.

These remotes are waterproof when new and do float. These remotes, the 1.0 Remote especially, was susceptible to tearing of the buttons that would allow water intrusion.

i-PILOT LINK/i-PILOT 2.0

2010-2016

Add-on Accessory for PowerDrive and Terrova.
Optionally equipped on Ulterra and Terova.

15 Button remote powered by a rechargeable LiPo battery. 2 Soft Keys, function identified by the on screen option directly above the soft key, up/down menu navigation, Home, OK, Basic Motor Operation, GoTo, Cruise Control, Spot Lock, and AutoPilot.

Connects to Humminbird Ethernet for additional Control Options.

Software updates done via SD Card inserted in connected Humminbird Unit.

NOTICE: Ethernet Cables have Female Connectors on both ends, the connector attached to the i-Pilot Link is Female, Standard Ethernet cables cannot be used to connect i-Pilot Link to the network. The included Cable is a 30’ Extension Cable, if a longer distance is needed additional 30’ extension cables can be added. Helix Units require an adapter to connect to the Ethernet Network.

Compatible Humminbird Ethernet Cables:

- 760025-1 AS ECX 30E 30’ ETHERNET EXTENSION Cable Included with System
- 720074-1 AS EC QDE ETHERNET ADAPTER CABLE Connects Helix to Ethernet

REPAIR SCENARIOS

CASE I. Motor is making erratic corrections when under GPS Navigation System Control (Spot Lock, AutoPilot, etc.)

Step 1. Check all electrical connections and battery condition to ensure that the proper voltage is supplied to the motor. Consistent voltage is critical to ensure the built-in compass is working correctly. (The i-Pilot system uses an internal compass to know which direction the controller and GPS receiver is pointing.) A load test of the battery should be performed to verify the battery(s) condition; a simple voltage check is not diagnostic.

Step 2. Be sure to keep all ferrous metallic objects away from the i-Pilot Controller as they will have an impact on the built-in compass. Such objects include: anchors, metal framework, etc…

Step 3. Check to ensure proper motor leadwire routing in control box.

A. The red and black motor leads in the control box should be routed on the coil cord half of the control box. (Away from the compass of the i-Pilot controller.)
B. The red and black motor leads in the control box should be twisted around each other to cancel out the magnetic field created around these wires when the motor is running.
    a. If the motor shaft was shortened, the brush leadwire should also be cut back the same length.
    b. If the motor shaft was shortened and the motor has a built-in transducer, the extra transducer cable should be routed out of the control box and down the coil cord.

NOTICE: The red/black wires should be twisted three times on both the coil cord and brush leadwire sides and then the insulator or shrink tube is slid in place over the spade connectors. This picture shows an Ulterra, but the wire routing is similar and critical for all motors with i-Pilot

Step 4. The i-Pilot GPS-based functions are dependent on having good GPS signals (Advanced AutoPilot, Spot-Lock, Track to Start/End). Check to make sure that a good signal is being

received and that the GPS signal strength indicator on the i-Pilot remote is showing at least one (1) bar. See Case V below.

Step 5. If the motor with i-Pilot being serviced is a 2017 or later model (Bluetooth version):

A. If motor has a separate Heading Sensor, it is very important that the Heading Sensor is properly installed and has gone through the calibration and offset procedures. While the Heading Sensor is there to help with navigation performance; if it is not properly installed/calibrated it can have a negative influence.
   a. Temporarily remove power from the Heading Sensor and see how Spot-Lock performance is impacted. If performance is improved, suspect that the Heading Sensor was improperly installed. (The Heading Sensor contains a compass that detects a magnetic field so it should not be installed near ferrous metals or wires that handle large currents, such as batteries,power cables, or speakers.) The Heading Sensor will not lose it pairing to the i-Pilot system when it is powered down.

B. Boat Scale can be adjusted on the i-Pilot remote.
   a. Ideal installation for a trolling motor is to have the proper amount of thrust for the size of the boat. If the motor thrust is not properly matched to the boat size, Boat Scale can be used to compensate for the mismatch. The default is zero, assuming that the boat and trolling motor thrust are properly matched. For an installation where the motor thrust is undersized for the boat, increase the Boat Scale. For installation where the motor thrust is oversized for the boat, decrease the Boat Scale.

Step 6. If, after following the previous steps, the problem of erratic steering persists replace the i-Pilot Controller.

CASE II. The boat doesn't seem to keep close enough to the recorded Spot-Lock location.

Step 1. Verify the trolling motor batteries are sufficiently charged.

Step 2. Check for weeds wrapped around and under the prop.

Step 3. In more extreme wind and current conditions, the boat will tend to stabilize a little downwind from the intended location. Relock the location the same distance upwind and expect that the boat will drift some in the downwind direction.

Step 4. See CASE I. Motor is making erratic corrections when under GPS Navigation System Control (Spot Lock, AutoPilot, etc.) on Page 10

CASE III. When in Advanced AutoPilot in strong winds, there is quite a bit of back and forth movement in the boat.

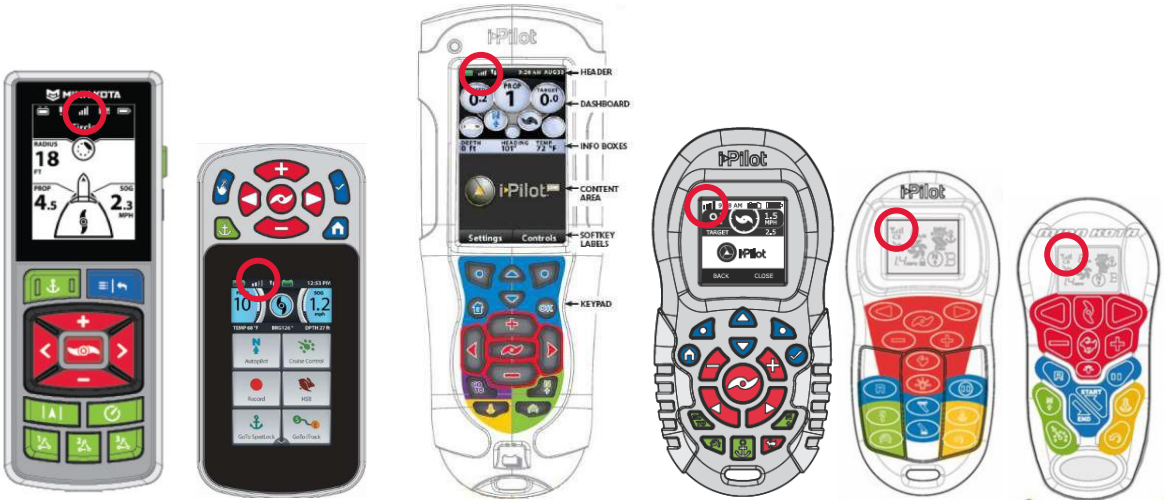
Step 1. While Advanced AutoPilot will keep your boat on a true heading, it may be at the expense of the boat having to continuously move to get back on the correct course. In these extreme

conditions you may be better off using Legacy AutoPilot and correcting for the wind manually.

Step 2. See CASE I. Motor is making erratic corrections when under GPS Navigation System Control (Spot Lock, AutoPilot, etc.) on Page 10APPENDIX

CASE IV. GPS features (Advanced AutoPilot, Spot Lock, Record a Track) will not engage.

Step 1. Verify that the GPS signal strength icon on the remote's LCD shows at least one bar. If there are no bars, the system will not allow these GPS-based features to be enabled.



NOTICE: GPS signal strength is indicated by 1-4 bars on screen (Circled on each remote diagram). If no bars are displayed all GPS functions will be disabled.

A. Ensure that the motor has a clear view of the sky so it can obtain GPS reception. (Motor cannot be indoors or under a roof, bridge, or tree canopy.)
B. Ensure the minimum voltage requirements at the motor are met.
C. Replace the Controller (Head).

CASE V. The i-Pilot GPS-based features drop out when the motor speed setting is increased.

Voltage to the system is dropping based on amp draw of the motor. This is not an issue within the motor. Load Test the batteries, check the connections. In operation the voltage to the Motor must not drop more than 5%.

MINN KOTA ONE BOAT NETWORK AND i-PILOT VIDEOS

MEGA Down Imaging
w/Jason Halfen

Built in MEGA Imaging
w/Chris Zaldain

Built in MEGA Side Imaging
w/Jason Halfen