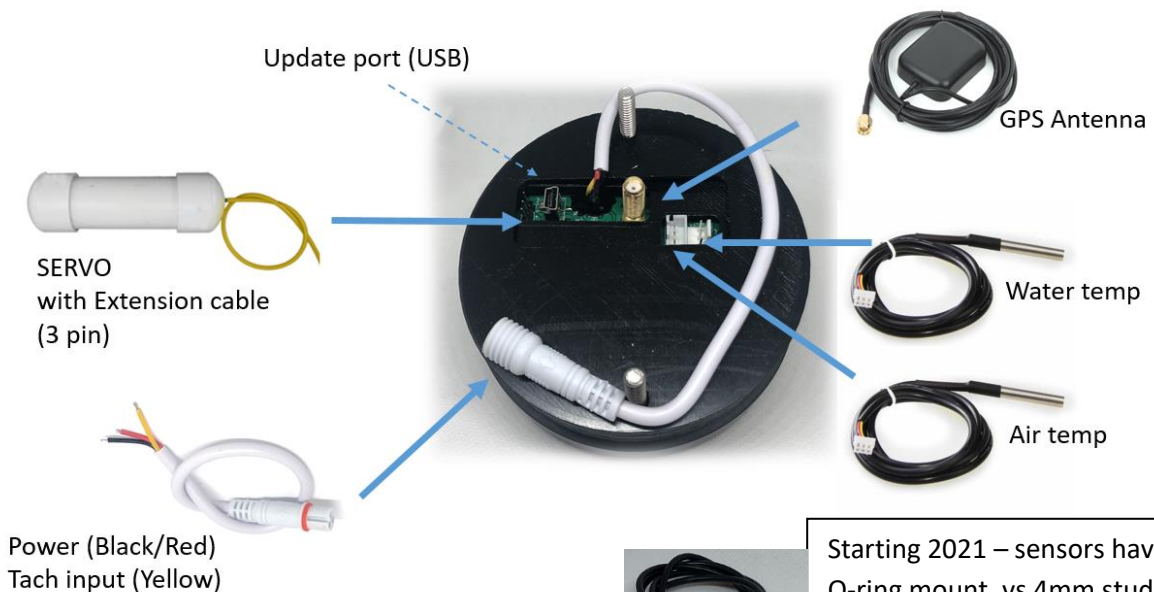


STEADYPASS

THE BOAT SPEED CONTROL SYSTEM

Thank you for your purchase!

SteadyPass system is designed to control (decrease) boat's throttle to maintain preset speed per GPS. Starting April 2022 we are re-introducing RPM control. Updated Menu as well



What's in the box:

- 1. Head unit with wingnuts. Fits in opening with diameter 87-90mm.**
- 2. Mating power cable (white). Use yellow for tach input.**
- 3. Short and long temperature sensors (Newer are with O-ring mount)**
- 4. Servo assembly in white PVC tube (assemble before power up)**
- 5. Adapter plate pre-fab: connecting servo cable to OEM throttle rod**
- 6. Two nylon nuts to mount adapter plate: should fit OEM throttle rod**
- 7. Allen wrench for servo fitting**
- 8. 3-pin 6 meter extension cable for servo**
- 9. GPS antenna**

Good To Know Facts:

- Kit body is not waterproof, but reasonably water resistant.
- Device power is provided by standard 12v boat power: kit comes assembled in 3.5" enclosure, with power leads (black(negative), red(12v) and yellow (tach input).
- Power polarity is important!
- Tachometer: connect to signal lead on your tach, which would likely be grey (for older analog units). This signal typically comes off negative coil lead.
- Servo install: Fit cap firmly to PVC tube BEFORE power on (it is removed for shipment purposes)
- Servo assembly needs to be fixed in a place without direct heat/water/etc exposure. Will need to adjust bowden cable to guarantee correct idle position and smooth operation after install.
- Servo connection: 3 wire lead, provides servo power, ground and PWM signal (standard for RC servo). Servo connects directly to head unit with extension 3-wire cable. Starting July 2019 – cable is included
- Temp sensors for air and water included. Early kits have one 4-pin connector for both sensors. Wiring diagram provided. August and later 2019 kits – have separate connectors for water/air. Cable extension may be required depending on boat. 5meter cable is included. 10 meter is optional.

Installation:

To be added drawing: MECHANICAL CONNECTION DIAGRAM

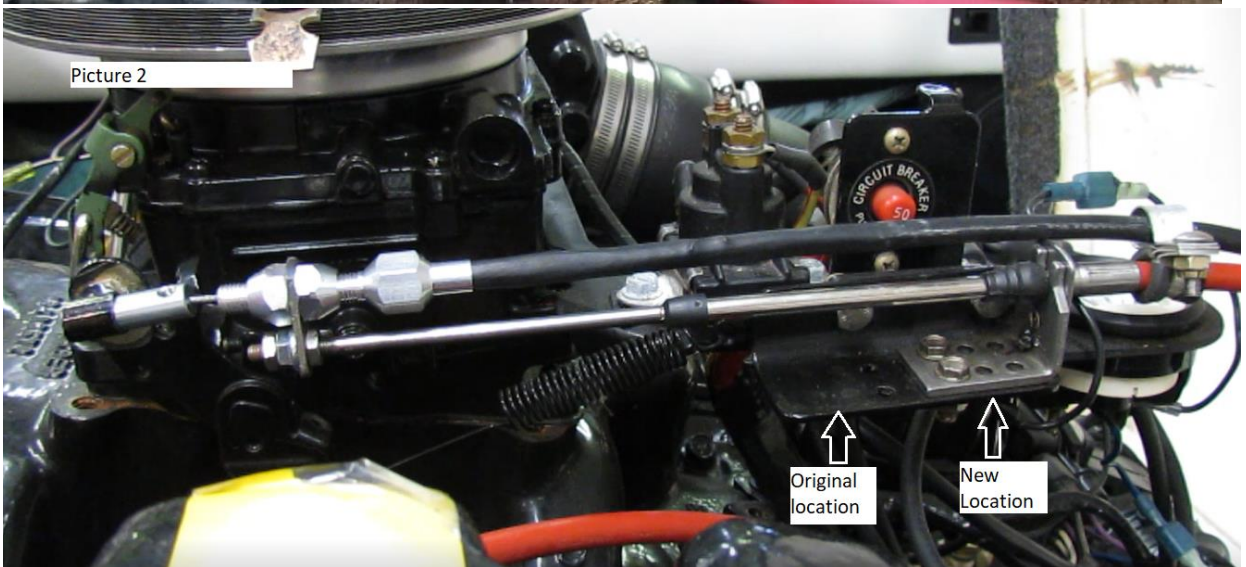
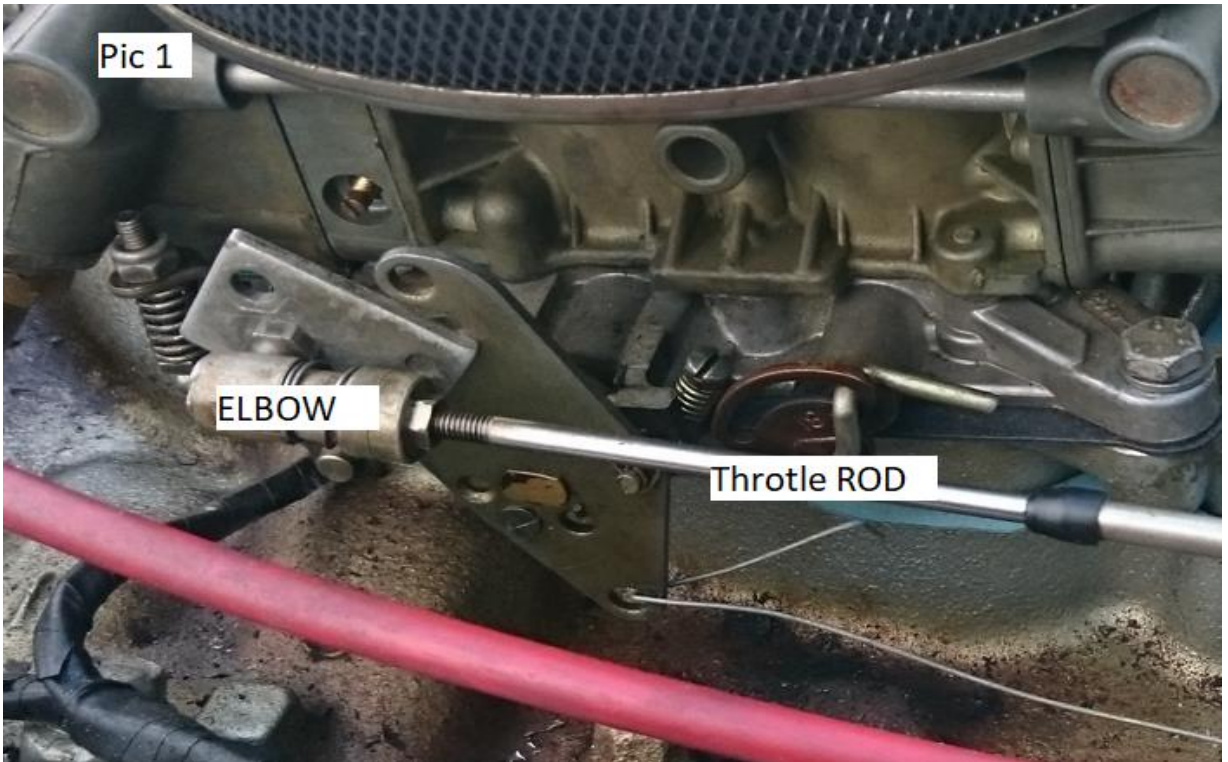
1. Unpack, inspect, make sure all parts are present.
2. Connect all parts together and power up from any 12v DC power supply to confirm all is functioning as intended after shipping:
 - a. Connect GPS antenna to head unit
 - b. Connect servo with cable to head unit
 - c. Connect temperature sensors (optional)
 - d. Connect 12v DC power to head unit – screen should light up.
 - e. Enter menu, select “Test Servo” mode – verify servo is moving smooth.
3. Work up a plan and connect Bowden cable to your throttle body: most challenging.

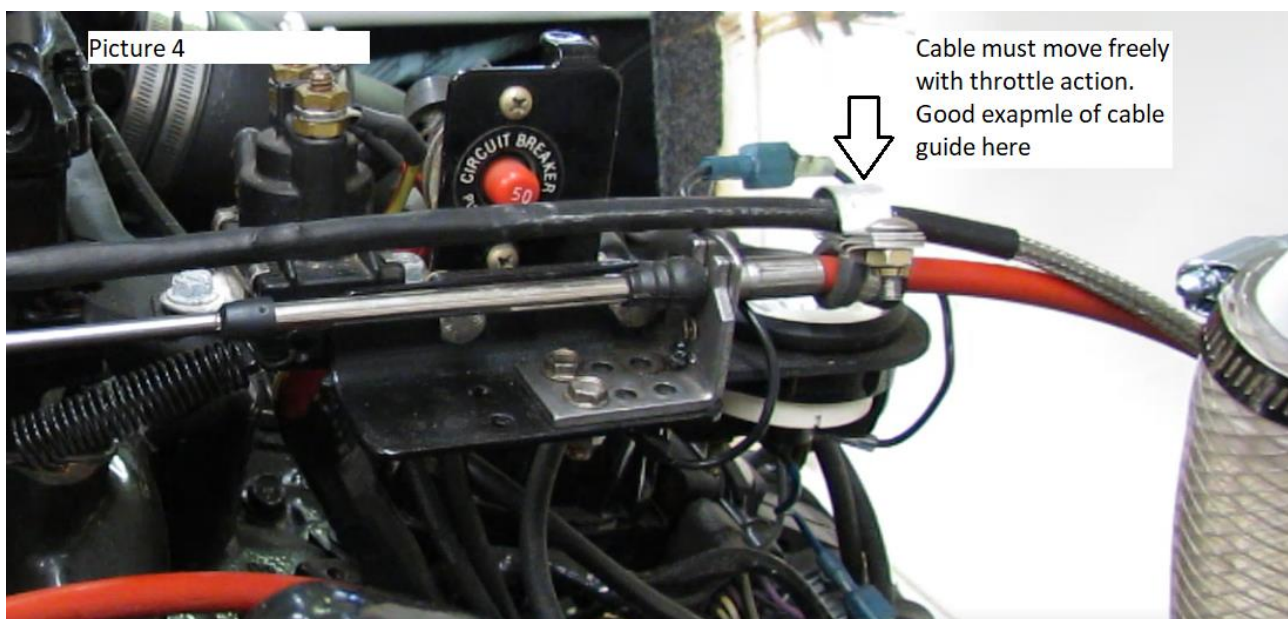
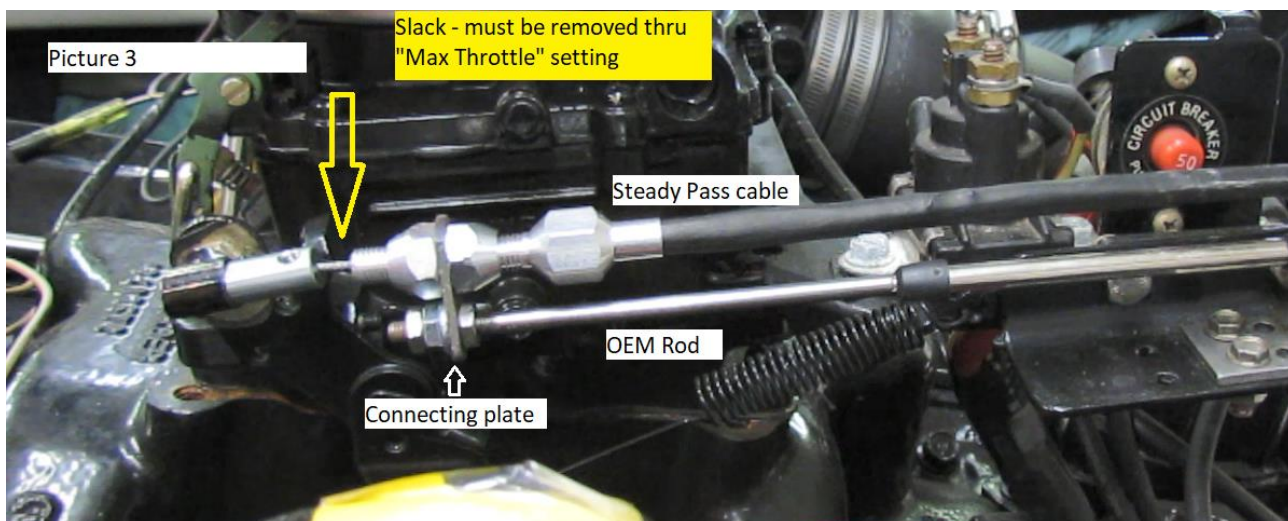
NOTE: Cable is connected IN SERIES, not in parallel to factory throttle rod. Steady Pass is NOT supposed to move throttle rod or throttle handle at helm. It is designed to add “slack” - releasing throttle body arm and decreasing speed to target.

NOTE1: Some throttle bodies will have weak return spring, and require additional spring.

NOTE2: Every boat is a bit unique in dimensions but overall idea is outlined below

 - a. Disconnect throttle rod from throttle body, and remote elbow assembly from throttle rod – keep any removed parts. (See picture 1)
 - b. For most boats - OEM Throttle rod assembly mount (outer shell) needs to be moved back, to allow space for Steady Pass connection. Your boat approach may vary – examples below. (See picture 2)
 - c. Connect tip of original throttle rod thru plate-adapter (connecting plate) to outer shell of Bowden cable, secure with nylon nuts on both sides of plate. (See picture 3)
 - d. Connect tip (elbow assembly, on the core of Bowden cable) to throttle arm (where throttle rod was connected originally). (Also on picture 3)
 - e. Cable guide is needed. Not provided. May be as simple as cable tie. Good example on Picture 4
 - f. With Steady Pass fully retracted (Bowden cable tip pressed against Bowden shell – can adjust in menu AND mechanically by repositioning cable tip) adjust position of throttle rod shell and Bowden cable to correct idle throttle configuration. When throttle control lever is in idle – your throttle body arm must be in idle. Verify with engine running in neutral.





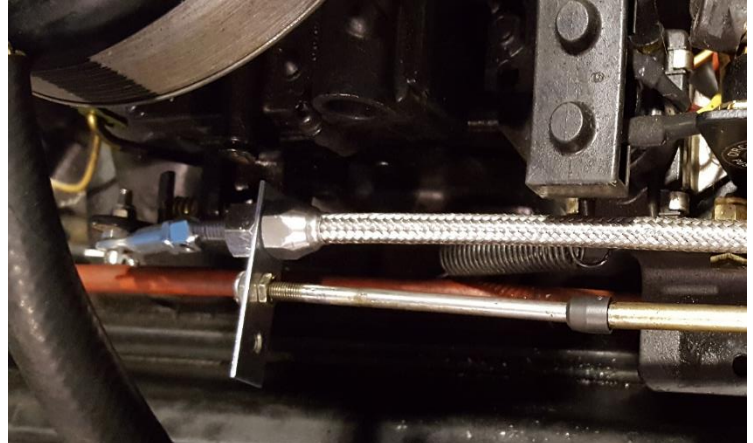
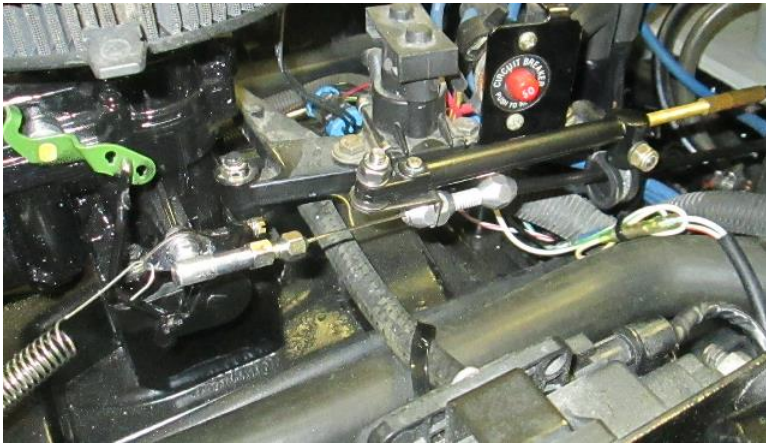
4. Place head unit into a "3.5" standard opening on the dash
5. Connect 12v power to your preference – ignition controlled ACC power or to a separate switch (unit does not shut down itself, and must be powered down to avoid battery drain when not in use)
6. Connect Tachometer signal wire in parallel to your boat tachometer signal.
7. Run servo control wire from head unit to servo – 3 pin connector does not have orientation key, but will not cause any harm when plugged in wrong. If you don't see servo moving – simply rotate 3 pin connector 180 degrees.
8. Mount GPS antenna and connect to head unit. GPS will work ok even when mounted under non-metal dash surface, but is most accurate when mounted on the open space with clear sky view. Double sided tape works great for mounting.
9. Install optional temperature sensors
10. Adjust servo range (instructions later in document) and verify correct operation of servo:
 - a. Put helm throttle handle to $\frac{3}{4}$ power, enter menu (long press) and enter option "Test Servo" on Steady Pass. Travel must be smooth and continuous.

- b. Enter menu “Max Throttle” setting – servo will retract and must apply light pressure to Bowden cable, very light intermittent buzzing is ok, cable connector tip needs to be pulled in firm against outer shell of Bowden cable, but must not cause servo stall. Rotate knob while in menu to change default servo position.
- c. Enter menu “Min Throttle” setting – servo is extended, and Bowden cable allows throttle body to close, decreasing throttle. Adjust to remove servo overextension: with Helm Throttle handle in FULL POWER – SteadyPass cable must extend but remain under tension

Pictures will best describe install, and we are continuously working on install aids

Pic1 Left: Bowden cable fitted with L-bracket to throttle cable and is in “Min Throttle” (de-throttle) position. Tip of Bowden cable core is connected to throttle body arm. Cable guide on the right. Additional spring on the left

Pic2 Right: Flat bracket used where throttle rod base had enough adjustment. Cable is in “non-activated” position



Usage:

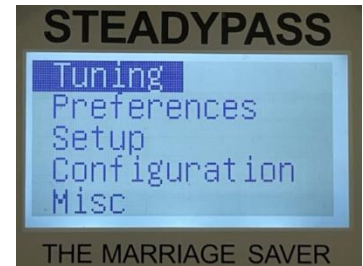
- Steady Pass currently has only 2 modes of operation: OFF and GPS-based SPEED
- Steady Pass works by decreasing throttle within mechanical limits of installation. So it will NEVER go faster than you set by throttle lever.
- To change mode: Single short (but firm) press on knob.
- Mode – shown in upper right corner.
 - OFF mode: device does not perform any servo movements, only displays current speed and time.
 - SPEED modes – rotate knob to set desired SPEED setting.
- During correct operation – driver accelerates moderately above desired speed, to allow throttle range for Steady Pass to use. Once current speed exceeds target sett – you will see “power” value

decrease in upper left corner, which indicates servo movement to decrease throttle. This is helpful at BETA testing stage to confirm correct operation.

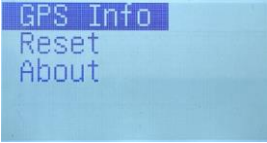
- Note – MPH and KPH speed options are available – change thru menu.
- Note – Current SPEED setting will be saved when entering menu. Upon next startup – unit will default to saved Speed value. There is also a separate line item in menu.

Menu v22:

Long press enters the main menu. Below you will find visualization of menu structure with descriptions:



Main Menu	2nd level	3rd level	Description
Tuning			PID coefficients, affecting GPS speed mode handling
	Target P		Target set of coefficients – used within 5mph of target speed
	Target I		
	Target D		
	Transition		Speed offset from target to transition from “Accel” to “Target” set
	Accel P		Set of PID coefficients used during acceleration. Initially – keep same as Target
	Accel I		
	Accel D		
Preferences			
	Start Speed		Boot up target speed.
	Start RPM		Boot up target RPM
	Volts warning		Voltage where readout will be highlighted on screen
	Plug warning		Splash screen drain plug message
	Menu Timeout		Time to self-exit out of menu. Typically 10sec
Setup			Misc setup items
	Engine Cyl		Number of engine cylinders – needed to show RPM correctly
	Clock Offset		Offset from GPS time – set to your time zone
	Hour Mode		24 or 12 hour time display
	Speed Units		MPH or KPH
	Temp Units		F or C
	Contrast		Typically 30. LCD contrast
Configuration			
	Servo		
		Min servo	Use at setup - verify Bowden tip lightly preset against cable. Fully retracted position of servo – corresponds to “no control” device mode.

		Max Servo	Use at setup - verify no cable slack at ~75% throttle handle position
		Test	Continuous cycle mode from min to max to verify linkage
	Display Items		
		Throttle	Hide/Show value from main screen
		Time	Hide/Show value from main screen
		Voltage	Hide/Show value from main screen
		Course	Hide/Show value from main screen
		Water	Hide/Show value from main screen
		Air Temp	Hide/Show value from main screen
		RPM	Hide/Show value from main screen
	Limits		
		RPM	On/off. Extra functionality to limit RPM (Alpha feature)
		Speed	On/off. Extra functionality to limit Speed regardless of operation mode (Alpha feature)
		Max RPM	Max RPM setting.
		Max Speed	Max Speed setting.
	River Mode		
		Enabled	Alpha level feature - automatically offset target speed to compensate for river flow
		Heading	River heading
		Heading Offset	Approximate river direction deviation
		Spd Offset	Offset target speed value
		Delay	Delay to apply
Misc			
	GPS info		GPS output
	Reset		Reset all settings or PID setting to factory preset
	About		Credits.

TUNING/SETUP

- It is often REQUIRED to adjust coefficients for specific boat – different power, torque and throttle response curves force that.
- As of v21 FW – we have two sets of coefficients – one for initial phase of reaching target speed, and second for phase of maintaining speed.

Logic behind coefficients:

Proportional Gain – increase if boat is mostly BELOW target speed

Integral Gain – adjusted before Derivative – to allow speed to oscillate above and below target

Derivative Gain – Increase to control oscillations

Too much Derivative coefficient – boat will be too sensitive to minor speed changes, and will “overreact”.

Too little Derivative gain – boat will be late to react to changes in speed, such as crossing a wave or a wakeboarder rope pull

Servo range setting verify before each season.

It is very important to verify/set servo range before operation. It is done by entering menu (long press knob) and adjusting MAX/MIN throttle settings so that servo is not pressing against mechanical limits and does not stall at end points.

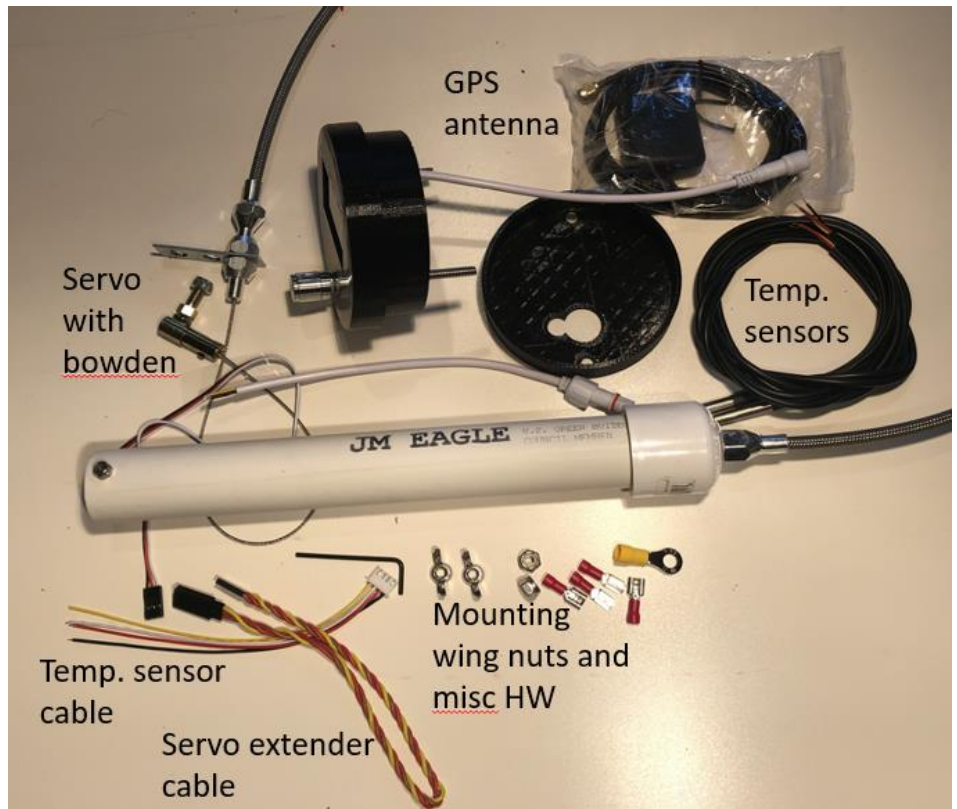
- Start by setting correct min/max limits in menu while servo is in your hands, before installing into the boat.
- Typical values for linear servo are 950 in “max throttle”, 1950 in “min throttle”. Servo min/max limits are slightly different for every servo.
- Menu has 3 lines for setup: Min throttle, Max throttle, TEST.
 - When in menu for one of the values – servo will position itself to the current number shown on screen.
- Set up “Min Throttle” (max servo value position) : This is position of maximum de-throttle.
 - Put help throttle handle to FULL power.
 - Enter menu by long press, then enter “min throttle” menu – servo will move to extended position
 - When in menu – rotate knob to find optimal position.
 - Bowden cable must allow throttle body to close, decreasing throttle. Adjust to remove servo over-extension: SteadyPass cable must remain under tension
 - Note, depending on your throttle body – it may not fully close. It is ok.
- Set Up default position – “Max Throttle” (min servo value)
 - Put Help Throttle Handle to IDLE
 - Enter “Max Throttle” menu
 - Servo is retracted fully but must not stall.

- This is done AFTER installation, because setting depends on bend radius of Bowden cable
 - Rotate knob to remove ALL cable slack, with LIGHT pressure of cable tip against cable outer shell
- Verify setting by entering “TEST MODE” in device menu – servo should continuously cycle without stops.

Updated servo and unit assembly.

Shown below: 3D printed body, two temp sensors (need to extend cables), power harness, short extender for servo (need to splice in 20 awg cable to fit boat size), servo in enclosure

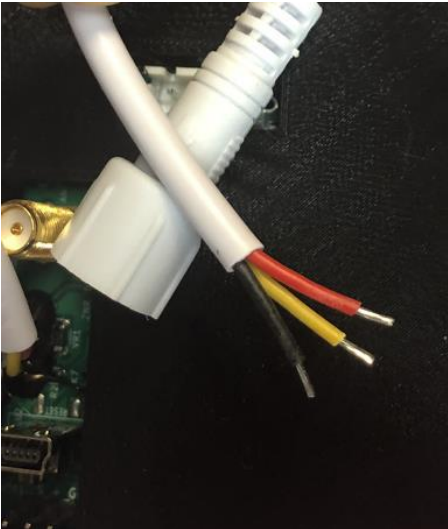
Don't forget to verify travel is smooth across full servo range when installed!



August and later 2019 have separate sensors with connectors installed.

Temperature sensors have individual 3-pin connectors.

Power and tachometer input is below:



Power and Tach input

By color:

- Yellow – Tach gauge
- Black – Ground
- Red – Power (+12v)

Please read and agree:

The SteadyPass Boat Speed Control system is designed solely for use with water ski and wakeboard boats operating under calm conditions with supervision, with driver in full control at all times, also utilizing a spotter and all other safety crew and requirements applicable to water sports and general boating. Steadypass Boat Speed Control system should not be used for any other purpose or under any other conditions. Your decision to proceed with installation is conditional upon you assuming all and any risk and losses related to use of this system.

Both purchaser and/or anyone utilizing the Steadypass Boat Speed Control system acknowledges that their purchase and or use of this device is conditional upon them releasing and forever discharging Opportunity LLC and Steadypass Boat Speed Control team from any and all liability for any injuries or losses or any other claims, demands, losses or causes of action, whether occurring prior to, during, or subsequent to or directly or indirectly connected with the use of the Steadypass Boat Speed Control System, and whether caused by any persons negligence or otherwise. In other words – while by mechanical design Steadypass is not able to increase speed above what boat operator sets by mechanical handle – please proceed at your own risks.