Official Speed Control of the Pro Tour, Masters, Big Air and U.S. Open

WakeboardPro

By PerfectPass

Version Xy 6.5

ST300 Paddlewheel

November 2003

PERFECTPASS ®
World Record Speed Control

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USER'S GUIDE

Section 1.   INITIAL SET UP

(1) INITIAL SET UP   (The display will guide you through this set up)
                                   (Read slowly and carefully)

Your new PerfectPass system must now complete a short set up procedure to familiarize itself with your particular boat and engine.

If your system has already been initialized at the factory, it will start up in Wakeboard Mode and is ready to use. Read Section 2.

Turn the key to on and power up the system. You will note a short delay of a few seconds before the display becomes active.

Step (1)   **Initial Hours.** Some of PerfectPass systems contain an hour meter. If [Initial HRS 000] appears, enter in the number of hours on your boat using Up Key. Press Menu to proceed.

Step (2)   **Engine Selection**. On some systems you will be asked to select the engine in your boat. It will appear as **[6.0 / 8.1 ^ = Yes].** This means if you have an optional 6 or 8.l Litre engine, press Up. For all others including 5.7L, press Down.

Step (3)   Turn boat engine on. After a few seconds the display will be in Wakeboard speed mode as follows:

<div align="center">

[WAKB D   20.0   0.0]

set speed   digital
(mph)   speedometer

</div>

MPH ⟷ KPH

The system starts life in MPH. If you wish to run in KPH, turn key off, then press and <u>hold</u> the Menu and Down keys together as you turn boat on and power system. After a few seconds [Read in MPH ^ = Y] will appear. Press Up for MPH, Down for KPH. It will then ask [Wakeboard only ^ = Y] for wakeboard modes, press the Up key.

Section 2.   WAKEBOARD MODES

There are two operating modes to choose from. RPM Wakeboard/Ski or Speed based Wakeboard, which uses the input from the paddle wheel.

Why two choices?

Some prefer the pull of the RPM mode which is very smooth, particularly if you do not have a large load & numerous people. If the boat is heavily loaded, the rpm mode may not control well coming out of the turns or recover speed quickly enough after a strong pull. RPM mode is preferred for slalom skiing and other towed water sports.

The speed based wakeboard mode is generally more accurate and load does not generally affect its ability to control speed. It works best in the 10 - 25 MPH range. (It is not designed for speeds above 30 mph). The speed mode is also very popular for wake surfing. (Prior to using your boat for wake surfing, check with your boat builder or dealer to confirm it is safe for this sport).

We recommend you try both modes and use the one you prefer most.

Speed Based Wakeboard

Set speed

[WAKB D w 20.0   0.0]

Actual Speed

The set point desired speed is shown in the center and is changed by pressing the up or down keys. This can be done on the fly. The digital speedometer on the right will display the actual boat speed as soon as the boat accelerates.

Using the Speed Control

ON/OFF Keys – Any time you are not using the speed control, press the OFF Key and OFF will appear on the screen. When OFF is selected, you are running totally manual.
(The ON/OFF Keys should only be pressed when boat is in neutral)

When you are ready to tow a rider, turn control ON, then select the desired speed by pressing the UP or DOWN Keys. Pull the rider up normally and drive smoothly to the set speed. Once this speed is reached PerfectPass will automatically take control and will confirm engagement via an audible beep and the data will become underlined.
(You should leave hand on throttle handle for safety and to ensure it does not pull back on its own which will cause system to disengage)

If the rider falls or you wish to disengage system, simply pull back on the throttle to idle or neutral. Pull rider back up and system will once again take control once the set speed is reached.

Speed changes can be made at any point, whether in neutral or on the fly using the Up & Down keys.

When you have finished using the speed control, go to neutral and press the OFF Key.

Driving Tips:

1. If you pull the rider up with too much throttle, the boat speed will surpass the set point for a few seconds and then work its way back. You can always pull the manual throttle back a little to assist the system in a smoother engagement.
2. More Throttle - If you see the # sign appear on the screen, this indicates the servo is running out of cable. Press the manual throttle forward a little until # sign disappears.
3. Double Up – The system always allows you to override it temporarily, so in a double up you can apply more manual throttle if required to keep the boat speed at the right speed. And you can pull back on manual throttle to help system coming out of a turn if required.
4. Always keep your hand on the manual throttle. Remember, any time you pull back on the throttle, PerfectPass will immediately disengage.

Most systems will likely not require changes to the factory settings. However, these settings can be adjusted if necessary.

Digital Speedometer (Speedo Adjust) – If you feel the digital speedometer is not reading accurately, it can be easily adjusted via the **"Speedo Adjust"** feature in the menu. When "speedo adjust" <u>is on screen</u>, press the Up or Down keys and the boat speed will increase or decrease until the correct speed is reached.
Example: To calibrate the PerfectPass system to match the conventional speedometer or GPS reading, set the system at a desired speed (such as 18 mph). Bring the boat up to speed and engage the system. If the conventional reads 20 mph, you would press menu and "speedo adjust" will be on screen. Press the down key numerous times until the boat speed drops to 18 mph on the conventional speedometer so it matches the PerfectPass readout.

Let the boat speed settle for a few seconds to confirm accuracy.

(You will notice that the system may cause the engine to sound "nervous" in this mode. This is normal as long as the digital speedometer is holding to a few 10ths of a mph. (This sound is the system anxiously awaiting a command to adjust the speed).

KDW (Adjustable Pull Characteristics) *The pull can be quickly adjusted to tailor your boat, load and riding style. <u>KDW is accessed by turning the control off, then</u> <u>pressing the Up & Down Keys together</u>. A typical value is 80. If the engine is slow to react to rider's pull, an adjustment may be necessary. Boats with larger loads may require much higher values such as 80. The higher the number, the more aggressive the system will control speed corrections. After changing KDW, press Menu and NN will appear. (Normal KDW range is 80 – 160).*

NN (Adjustable Paddle Filter Factor) – NN is set at about 150 and represents the "Filter Factor" of the paddle. The higher the value, the more speed samples are taken from the Paddle prior to speed adjustment. It is rare for NN to require adjustment from Factory setting. If you believe your system is more "nervous" than it should be, try raising the NN. (Typical range is 100 to 180). If you feel the speed is slowly "swinging" more than it should, try a lower value. Press menu to return to Wakeboard mode.

To move to RPM mode, press Menu Key twice until "WKBD Speed ^ = RPM" appears.

Press the Up Key to move to RPM based Wakeboard/Ski.

RPM Based Wakeboard

Set value   actual speed
{ 2500 w 2500   0.0 }
             tachometer

To drive in this mode, simply turn control on, set the desired set speed (as an RPM Value), then drive to the set point and PerfectPass will take over. Speed adjustments can be made on the fly by pressing the up or down keys.

The RPM mode should be used for any speeds above 25 mph as you will find it extremely smooth.

Section 3. THE DISPLAY/MOVING THROUGH MENU

Every time you turn the system on it will return to the last event and speed that was used.

Once the engagement point is reached PerfectPass will let you know it has taken control by <u>underlining</u> data on the display plus there is an audible beep. To disengage PerfectPass, simply pull back on the throttle.

<u>On/Off</u> The ON/OFF key turns the servo motor control on and off. When off, the system will not engage. Note: Any time you operate your boat the system will be powered up, although it can be in the off mode. When you are not using the speed control, it should be in the OFF mode. Always return to neutral when pressing the ON/OFF keys.

<u>Menu</u> (Moving Mode to Mode) The menu button allows you to move through the various features and event modes. For example, if you wish to move from speed based wakeboard to RPM/Ski mode, simply press the menu button until " WAKEBOARD SPD ^ = RPM" appears. This means do you want to move from speed-based wakeboard? Press the up key and the RPM Wakeboard/Ski event appears, it's that simple!

By scrolling through the menu you will find the following event options:

WAKEBOARD	-	Two modes, RPM, Ski/Wakeboard or Speed Based Wakeboard.
CALIBRATE SPEEDO	-	For adjusting the accuracy of the speed control and digital speedometer. (See Page 3).
LAKE TEMPERATURE/ BATTERY VOLTAGE/ HOUR METER	-	Press Menu & Up Key together. Press menu again for battery voltage and hour meter. (Lake temp. and Hour Meter not available on all boats).
SOFTWARE CONFIRMATION	-	On many boat brands, the software on initial start up allows you to select the engine that is in the boat. (This ensures the correct RPM control). Which engine is selected is found in the Lake Temp sub-menu (Menu and UP keys together).

Examples:
<u>MasterCraft</u>   6.0 / 8.1 or TBI/MCX/LTR
<u>Malibu</u> LS1 / 8.1 or MON III/CARB
<u>Nautiques</u> 6.0 / 8.1 or EXC/MPI

If yours is selected incorrectly, perform a "System Reset".
See Page 6.

Note: *The odometer will read in kilometers if you selected the system to run in metric when first initialized.*

CALIBRATE TEMP	-	If the accuracy needs to be adjusted, press the Up and Down Keys together when Water Temp is on the screen. You can now calibrate the temp up or down.

Section 4. Trouble Shooting/General Information

You can learn a lot from just turning on key and watching system start up. Every time PerfectPass is powered you will see the back light in Display glow green followed by a beep as the screen becomes active. When the Master Module sees a solid 12 volts +, the Intel processor starts which puts the data on screen and the servo motor will perform its "auto tighten" check.

A. NOT CONTROLLING

Servo Motor "Auto tighten" Test

Check: To confirm proper operation of the 4 phase servomotor, perform the following test. With key OFF, check to see if servomotor can be easily turned and that set screw in knob is snug. (It should turn freely, if not the motor may be seized) Turn knob in clockwise direction until snug, then turn it back counter clockwise <u>one</u> full turn.
Now turn key ON and servo should perform its "auto tighten" function and wind in the cable (approximately ¾ of a turn). (Every time system is powered, it will do an "auto tighten" which confirms all electrical phases are OK). Ideally, you should hold knob gently during "auto tighten" test to put a little stress on electrical connection.

Remember the servo- motor will run very hot, particularly the gold resistor.

If motor <u>does not</u> wind in or just vibrates, then an electrical connection is likely bad. Unplug both connectors at servomotor and closely inspect the crimps and wiring. Gently pull on each wire to make sure the wire is securely in crimp. Also check the connectors on the gray servo power cable at both ends (See servo testing in addendum for detailed testing).

If this test is OK, do a "Linkage Test" as described in section B.

B. **Linkage Test -** With key OFF, push the manual throttle open to ¾ position. Then take the black knob on servo motor and slowly wind the knob in a counter clockwise direction, then in a clockwise direction. As you do this, the throttle will slowly open and close with each step of the motor. In no place should the cable catch or hook or this will cause the system to surge. If the cable comes into contact with any part, fuel rail, cross over pipe or decorative engine cover, adjust cable and servo as required. (The cable should have a nice smooth bend in to the throttle connection. If you feel the cable is too long, contact PerfectPass)

The brass L adapter should <u>freely swivel</u> as the throttle opens & closes.
(If your boat has a plastic decorative engine shroud, you may wish to remove it temporarily and see if the problem disappears).

With key <u>OFF</u>, push manual throttle to full open and back to neutral. Does PerfectPass throttle cable move forward and back freely without jamming or rubbing against cover, fuel rails, etc?

C. **System surging in neutral** – Check gap between the PerfectPass cable & the Morse control / Teleflex cable. There should be No Gap. (See photo C in instruction manual).

D. **System accelerates past set point** – If the system accelerates past the set point and is very slow to work back to the set speed, the engine return spring may be weak. PerfectPass can open the throttle, but depends on the engine return spring to bring it back towards neutral. A spring can be easily added. It may also be a throttle cable / mechanical problem. See Linkage Test , Section B above.

On Water Test – To confirm this, drive the boat carefully with engine cover open. Set speed at a lower setting (i.e. 20 mph) and have driver engage system and press throttle up to 25 MPH. As boat speed exceeds 20 mph, the servo should turn counter clockwise to let out cable and slow engine. If servo counter rotates, the return spring should pull throttle back towards neutral. If servo rotates but boat does not slow, the return spring is not pulling or something is preventing the throttle or cable from moving.

E. **No RPM tachometer reading** – If the display tachometer reading is 00, check to make sure rpm sensor is plugged into the correct port on Master Module. Check connections of rpm sensor. (Check installation as per instructions).

F. **Digital speed readout** – If the digital speedometer is not reading at all, check to make sure it is plugged in correctly. Check the paddle wheel to confirm the wheel is not damaged and is spinning freely.

G. **Blown Fuse (5 amp, 1.25 inch fuse)**

The most common reason a fuse will blow is if the red wire in the servo power cable is grounded or shorted. Inspect the wire for any breaks, pinches or failure especially near the gold resistor on the servomotor.

H. **System Reset** – If you would like to reset the entire system to original factory specifications, you can do so by **pressing & holding the ON/OFF & MENU Keys together as you power up the system.** After about 5 seconds the display will show [System Reset ^ = Y] Press the up key to continue with a reset. It will then ask if you wish to run in just wakeboard modes [Wakeboard only ^=Y]. Answer <u>YES</u>.

I. **Change Display from MPH to KPH/Wakeboard only –** If you wish to have the display read in metric or vice versa, you can move between modes by pressing and holding Menu & Down Keys together as you power up the system. After selecting MPH or KPH, press menu and it will ask if you wish to run Wakeboard only or three events.

J. **System surging in Trick or Wakeboard Speed Mode –**

Check: If your system works very well and controls smoothly in the rpm mode, but surges and hunts in the speed based mode, it is likely a paddle wheel related problem.

1. Does the paddle wheel impellar spin freely. (if not, change impellar)
2. Is the paddle wheel housing under the hull pointing straight forward. The arrow on the housing must be pointing straight ahead.
3. Is the impellar installed in the assembly in the correct direction.
4. Is the paddle insert <u>fully</u> and properly set in the housing.
5. Is the paddle wheel installed in the correct location. Call for details on your boat model. It cannot be installed directly behind a strake, water intake, etc. which could disturb the flow of water.
6. Perform a System Reset. Press & hold the ON/OFF & MENU Keys together as you power up the system. Continue holding until you see the System Reset Prompt.
7. If it only surges when the boat is heavily loaded in a certain configuration, it may be a location problem.

If the problem cannot be corrected, it could possibly be a defective paddle wheel.

Volts / Servo Motor Test *(Access by holding Menu & Down Key together as you power up boat)*

Voltage Tests

The servo motor and its associated cabling can be tested without the boat engine running. Press and hold the MENU key and the DOWN key while the system is being powered up. Eventually the display will read:

[SERVO TEST ^ = Y]

If you then press the UP key, the system will enter a series of diagnostic tests that can help troubleshoot a system problem.

This is the intro to the 12v supply and servo motor test features. (Boat engine should be running in NEUTRAL) Press menu to continue.

13.5 = OK SERVO OFF – The system automatically powers down the servo and measures the supply voltage level. This level with engine running should be between 13.0 and 14 volts. (If the voltage is below 13.0 volts, this display will show it is low. Press menu to continue.

12.9 = OK SERVO ON – The system turns the servo motor on to measure the power supply and resulting voltage. This level should be between 12.2 – 13.2 with engine running. A reading below 12.1 volts will produce a "LO" indication. Press menu to continue into **Servo Motor Test** function.

The difference between the voltage readings of these two tests indicates the condition of the connections. A difference of more than 1.2 volts indicates a potential wiring problem.

[PHASE TEST ^ = END]

The servo motor will automatically slowly rotate and continually check all phase circuits (Green, Black, Brown, White). If a circuit is bad or "Open", the screen will change to [BROWN PHASE ??] which means the brown phase wire is open and should be investigated. The brown wire at both plug ends and at servo should be checked and also the motor lead connected to the brown wire at the six-pin motor connector. Press Menu and any other open phases will be displayed. To return to main screen, press the Up key.

PerfectPass Wakeboard Pro
Installation Instructions

Step 1.   *Installation of Servo Motor*

Using the two provided hose clamps, loosely mount the servo motor on top of the cooling water hose leading to drivers side exhaust manifold (starboard side on standard inboard engines). See Figure A. Tighten later after final positioning. (See amended installation details "Photo" if inserted for certain engines).

Remove ball joint connector from throttle control lever and remove from the coupling end of Morse control / Teleflex cable. (See Figure B).

Position servo motor throttle cable in line with the throttle control lever. Ensure the locking 10/32 nut is in place on Morse control / Teleflex throttle cable. Screw threaded brass hex connector on the PerfectPass cable onto the end of the Morse control throttle cable. (Do **not** over tighten hex nut). Install L shaped brass throttle adapter to throttle control lever using identical hole as original ball joint. (L adapter must be able to swivel). Using an Allen key, tighten L shaped adapter mounting bolt. (See Figure C). You may find it helps to move the Morse control lever into gear during installation to allow more clearance. (Be sure the washer is against the brass L-Adapter and not under the nut).

Check and adjust position of servo motor ensuring the motor box cover closes properly and servo throttle cable is not in contact with any moving parts. Make sure servo motor cable has 2 or 3 inches of free travel. Securely tighten hose clamps on servo motor. (Do not "tie wrap" cable as it must be able to move freely).

With the throttle in neutral position, adjust brass hex connector if necessary to ensure there is **no gap** between it and the end of the servo motor cable (any gap may cause engine to surge up and down in neutral). Adjust and snugly tighten all parts. (See photo's, **DO NOT OVER TIGHTEN**).

Turn the black servo motor knob in a <u>clockwise position</u> until **snug**. With throttle in neutral, the linkage should appear as in Figure C.

Linkage Test – This is a quick & easy test to check throttle cable & linkage.
With key OFF, push throttle lever to ¾ open position. Now take the black knob on servo motor and wind it counter clockwise a full turn and then clockwise a full turn. Do this slowly in each direction and as you do this the engine throttle arm should be opening and closing very smoothly. If the cable is "rubbing" or "catching" on a fuel rail or decorative engine cover, the servo & cable should be repositioned to eliminate this. The stainless cable inside the black jacket MUST be able to seamlessly move for the control to work properly.

With key off, push manual throttle to full open position and back to neutral. PerfectPass cable should move freely in both directions.

> **IMPORTANT**: - Never "tie wrap" PerfectPass throttle cable.
> - Make sure all wires are tied away from hot or moving parts and there is adequate clearance.
> - The manual throttle on your boat <u>should operate</u> and feel the same as before the PerfectPass was installed, or you may have to adjust the hex nut.

Step 2.   *Installation of Master Module*

Mount the Master Module under the dash normally on the bulkhead accessible behind and right of the passenger seat in a dry location. It can also be installed on the left side of driver's bulkhead. The wires from under the dash pod can be easily fed across the bulkhead.

Route servo motor power cable from Master Module to servo motor and connect. (Use tie wraps to keep cable away from moving parts). Make sure the tips **on the plug are facing up** towards the top of the Master Module box. A wire snake will be helpful.

Step 3. **Mount Dash Display**

Remove the right speedometer (if boat has two speedometers) or remove tachometer and install the **In Dash PerfectPass Display** and connect into Master Module. (If there is a speedo tube on back, it can be plugged using a golf tee or clamp).

If you have the standard **External Display**, install using supplied <u>mounting post</u> to the right of dash next to wind screen. In the event you have **5" gauges**, generally the PerfectPass 5" display replaces the tachometer. (See specific details included with 5" gauges).

Step 4. **Connect Power Wire**

Depending on the boat and model, there are a number of ways to connect to a switched (12 volt) power source.

1. On boats with traditional analogue gauges and posts on back of tachometer, there is a 12 volt (+) post often marked (IGN) which is an easy connection to the purple wire. The black wire end can attach to the ground (-) post marked (GND).
2. On boats with Borg Warner gauges with no posts, attach the PerfectPass purple power wire to the purple wire leading to the ignition terminal. The black wire can be securely grounded to the grounding bar or other suitable ground location.
3. **2000 - 2004 Nautiques** – There is a main wiring harness and large white plug located behind the dash pod. Connected to this plug is a purple wire carrying the switched 12 volts and a black wire which is a suitable ground connection.
4. **2002 – 2004 MasterCraft** – Power, RPM and Paddle Wheel speed is all located in the special plug and play harness supplied with each system. The MasterCraft supplied white connector is on every boat specifically for PerfectPass. You may have to remove the driver's foot panel to locate this connector in the boat's wiring harness.

Step 5. **RPM Cable Installation**

This connection will depend on the brand and year of boat you own.

(1) **Standard Installation** (Older boats and boats with traditional Analogue gauges with Posts on back)

The **Gray wire** with ring terminal can be easily attached to the "SEND" post on back of tachometer. This Gray wires picks up the raw engine rpm from this post. The **Black wire** ring terminal can be attached to any suitable ground, including the ground post on the tachometer. (If there is not a post, connect to the solid gray wire coming from the tachometer).

(2) **2002 - 2004 MasterCraft** – The custom wiring harness supplied by PerfectPass allows for plug & play for RPM, Power & Paddle Wheel.

(3) **1998- 2004 Malibu** (Borg Warner Gauge System)

In behind the dash pod on most models, Malibu has left a Gray (RPM) wire that terminates at a large female spade connector. If you can locate this, you can simply attach the Gray wire on the rpm sensor cable to this connector.

Alternatively, you can locate the solid gray wire in the main wiring harness that leads <u>into the</u> Borg Warner control box under the dash. Use a blue "Tee Tap" connector to connect to this gray wire. You can then attach the gray rpm sensor wire to this using a push on spade connector. The black wire can be securely connected to any suitable ground.

LS-1 On this engine (pre 2002 only), you only connect the Black wire on the RPM Sensor cable to the Gray wire leading to the Borg Warner control box. (same as LT-R MasterCraft). The gray RPM sensor wire is left un-connected.

(4) **1999 – 2001 MasterCraft, 2000 Supra, 2000-2002 Infinity (All Other Brands Using Borg Warner Gauges)**

TBI & Multi Port Engines (except LT-R) – Locate the solid gray wire in the main wiring harness that leads from the engine <u>into the</u> Borg Warner control box under the dash. This solid gray wire carries the raw engine rpm. Use a blue "Tee Tap" connector to connect to this gray wire. You can then attach the gray wire on the rpm sensor to this using a push on spade connector. The black wire can be securely connected to any suitable ground.

LT-R / LT-1 - On this engine the Gray wire lead on the PerfectPass RPM Sensor cable <u>is not</u> <u>used</u> <u>and can be taped off</u>. The separate **Black wire** end must be connected to the Gray wire located in the main wiring harness <u>leading into</u> the Borg Warner MDC Control box. It is on the engine side of the box that the raw rpm is located. You can attach a blue "Tee Tap" connector to this Gray wire, and attach the RPM sensor cable end to this "Tee Tap" using a supplied spade connector.

(5) **2000 – 2002 Nautiques**

Same as standard #1 above, except the rpm signal can be picked from the Gray wire coming from the back of the tachometer.

(6) **2003 - 2004 Nautiques**

Located behind the dash pod is a large wiring harness with a large white plug. The Gray wire in this plug carries the raw rpm of the engine and has been brought to the pod solely for the PerfectPass system. This gray wire is not connected to any gauge. Use a blue "Tee Tap" connector or other splice method to attach the gray wire on the PerfectPass rpm sensor cable to this Gray wire in the harness. The Black wire (ground) on the RPM Sensor cable can be attached to the black wire in this same boat harness.

Step 6.   Install Paddle Wheel speed sensor and connect to Master Module. (See attached detailed instructions). Note: On most late model boats, a paddlewheel is already standard so PerfectPass did not supply a second paddlewheel.

Step 7.   Test system power by turning on key. Following a short delay the black servo knob should be difficult to turn indicating system is powered.

A final and easy test to ensure servo motor and cabling is working properly is to turn key <u>OFF</u>, then turn the black knob on servo motor counter clockwise by ¾ of a turn. Now turn key ON and system should perform an "Auto-Tighten" function and wind cable in a clockwise direction until tight.

(If motor does not wind in, but simply vibrates for 5-6 seconds, the servo power cable at Master Module may be plugged in upside down or a connector at servo motor may be damaged. (Pull plugs apart and inspect pins).

For assistance call (902) 468-2150.

Installation and Setup Instructions
for PerfectPass Paddlewheel System – ST300 Paddlewheel

Tools and Material Required

2 inch hole saw,   Sealant eg. GE silicone sealer

Installation

      The 2-inch hole is placed approximately 6-7 inches (16 - 18 cm) perpendicular to the centerline of an inboard ski boat, beside the drain plug under the engine. Never install behind a strake, depth sounder, etc. Normally this is on the passenger side away from the bilge pump and other cables etc. Ensure there is sufficient room to pull the inner paddlewheel assembly from the housing when it is mounted under the engine. In this area of the bottom of the hull there is normally a flat surface away from the turbulence of the tracking fins and lifting strakes. The hole saw is used to cut the hole for the paddlewheel working from the bottom of the boat. (You may wish to drill a pilot hole with a drill bit from the inside to make it easier to locate from underneath)

      Before disassembling the paddlewheel unit take note of the arrow on the bottom of the housing and on the top of the inner paddlewheel assembly near the cable exit, these arrows both point forward when the unit is installed. Disassemble the paddlewheel unit by unscrewing the locking cap until it is completely free to turn, then pull complete assembly up and separate from housing. Take care not to loose the paddlewheel itself and its stainless steel shaft, which maybe free when the unit is disassembled.

      Remove housing nut and rubber ring gasket. (This gasket will be installed later on the inside of boat). The sealant must be placed on the surface of the sealing flange on the housing and also on some of the lower threads of the housing to help lock the sealing nut in place. The bottom of the hull in the area of installation must be clean and dry for the sealant to seal properly; inside the bilge should also be clean to allow the seal nut to be properly tightened. Install housing from below boat with the arrow on the bottom surface of the housing pointed toward the <u>forward</u> direction of travel of the boat, parallel to the keel of the boat. Install gasket and seal nut should be tightened snugly by hand so that the sealant is forced out of the sealing surface and the housing flange is as close as possible to the hull surface. The excess sealant <u>must </u>be wiped away from the housing to give the water flow a clear path. A final check of the location of this directional arrow and inside notch in housing should be made before the sealant is allowed to setup.

      Reassemble the paddlewheel unit by sliding the inner unit into the housing with the arrow on the inner housing pointing toward the front. (Ensure paddlewheel assembly is properly centered in "notch" of housing, with arrow pointing toward bow). <u>Hand tighten</u> the locking cap.

The output cable should be run under the floor with the servo power cable so that it can be plugged into the master module.

(Included with this unit is a "Plug" and extra paddle and axle kit.)

V-DRIVE / WAKEBOARD BOATS / STERN DRIVES – The paddle is typically installed in front of the engine, just behind the gas tank. *(This area is generally accessible from the engine compartment or under rear seat.)* It is installed typically 7 – 8 inches off center, clear of any strakes in the hull, depth sounders, etc. Refer to any addendums that may be included. Never install behind a water intake or any other item that could cause turbulence.

The key to a good installation is to place the paddle in a location where there is nothing to disturb the flow of water in front of the paddle for 5-6 feet.

WARNING
RELEASE OF LIABILITY – ASSUMPTION OF RISK

IMPORTANT
(Detach, sign and mail immediately)

<u>YOU MUST READ THIS!</u>

The PerfectPass Speed Control device is a high performance mechanism designed solely for use with competitive water ski and wakeboard boats operating under ideal, calm conditions utilizing a spotter and all other safety crew and requirements of tournament water skiing. <u>The PerfectPass Speed Control device should not be used for any other purpose or under any other conditions.</u>

YOUR USE OF YOUR PERFECTPASS SPEED CONTROL DEVICE IS CONDITIONAL UPON YOU ASSUMING ALL RISKS, LOSSES AND DANGERS RELATING TO USE OF THIS DEVICE.

Both purchaser and/or anyone utilizing the PerfectPass Speed Control device acknowledges that their purchase and or use of this device is conditional upon them releasing and forever discharging PerfectPass Speed Control Systems Inc., its directors, officers, employees, agents and/or dealers, their heirs, and assigns **from any and all liability for personal injury or property loss** and from 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 PerfectPass Speed Control device, **and whether caused by any persons negligence or otherwise**.

The PerfectPass release of liability, and warranty agreement shall be interpreted in accordance with the laws of the Province of Nova Scotia, Canada, and **IT IS FURTHER AGREED** that any legal proceedings that either directly or indirectly relate to the PerfectPass Speed Control device shall be conducted within the Province of Nova Scotia, Canada, regardless of where arising.

The purchaser hereby agrees to inform any subsequent purchasers or anyone using the PerfectPass Speed Control device, of the conditions of this Release of Liability, Assumption of Risk Agreement. It is agreed that there shall be absolutely no alterations to this agreement whether by implication or otherwise.

_____   _____
Purchaser Signature   Date

_____
Address

_____   _____
                                                                                  Serial Number (found on Master Control
Module)

_____
Name (Please Print)

(Must be signed to affect valid purchase and activate warranty agreement, detach and mail immediately to PerfectPass Control Systems Inc., 218 Wright Avenue, Dartmouth, Nova Scotia, B3B 1R6, Canada).

LIMITED WARRANTY

During the first 12 months from date of original retail purchase, any PerfectPass component that fails due to defects in materials or workmanship will be repaired or replaced at the option of PerfectPass at no charge.

All warranty claims must be authorized in advance and a Return Authorization (R/A #) issued. All packages, correspondence, documents and packing slips must reference this R/A #.

Warranty excludes components damaged my improper installation or improper use of boat. Servo Motors are water resistant, but not water proof. Servo motors may become damaged if excess water is run in a boats bilge and this may void warranty. Ensure your boat is properly "bilged" prior to operating.

Warranty Service:

1. If your PerfectPass was factory installed, any warranty issues should be directed to your authorized dealer. PerfectPass encourages all customers to contact us prior to visiting your dealer for "technical support" as many issues may be easily handled direct with customer.
2. If your PerfectPass was purchased and installed by a dealer you may contact your dealer direct or initiate a warranty claim with PerfectPass.
3. If your PerfectPass was purchased directly from the Company, contact us at the number below.

Warranty Service / Technical Support
PerfectPass Control Systems Inc.
218 Wright Ave.
Dartmouth, Nova Scotia
CANADA B3B 1R6
(902) 468-2150

(Hours 8:00 am – 4:00 pm EST)

PERFECTPASS®
THE WORLD LEADER IN SPEED CONTROL