GLENDINNING ELECTRONIC ENGINE CONTROL

Compatible for all types of Electronically Controlled Engines!

EEC 2001™

Operations & Installation Manual

(version 0.9)

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CHAPTERS AT A GLANCE

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1.0 SYSTEM DESCRIPTION & CAPABILITIES

With the advent of electronically controlled engines in the marine industry, *GLENDINNING* has developed the EEC-2001 to be compatible with all types of electronically governed engines and will provide the boat operator with total control over the boat's propulsion system. The EEC-2001 incorporates the following features:

- *Single or dual lever control* — What's your preference? Single lever control, where a single control handle controls both throttle and gear, provides the maximum convenience, but some boat operators prefer dual lever control. We offer you both options!
- *Adjustable control head detent / friction settings* — This feature allows for the setting of the control head detent and /or friction quickly and easily while underway, without disassembling the control head!
- *"Posi-lock" gear lockout* — A dedicated button (WARM) is provided to lockout the gear and allows engine RPM to be increased safely.
- *High idle mode* — Up to 7 idle speeds are available and can be adjusted through system calibration.
- *Bump mode* — Want to make minute adjustments in engine speed (approx. 10-15 RPM)? Simply press the WARM or TROLL buttons!
- *Slow mode* — Limits maximum RPM available to approximately 50% of normal WOT. Very useful for manuevering or slow speed cruising (SLOW).
- *Battery voltage warning indicator* — Our system alerts you when either too low or too high voltage exists. The control system will continue to operate.
- *System diagnostic warning indicator* — The EEC-2001 monitors many parameters and notifies you when conditions fall outside suitable operating range.
- *Gear position indicating lights* — You know that the transmission has shifted into the appropriate gear with this visual gear position indicator.
- *Audible neutral indicator* — Audible alert sounds when transmission has been shifted into neutral.
- *Control head light dimmer* — Bright lights are great for daylight conditions, but can be distracting at night. This feature allows you to dim the control head lights for each station individually.
- *Two button station transfer* — No more accidental transfer of control from one station to another. Our system's TAKE button must be depressed twice in order to transfer control from one station to another.

1.1 SYSTEM COMPONENTS

The EEC-2001 system consists of 4 separate components. They are:

EEC-2001 KEYPAD
(Close-up)

CONTROL HEAD

The EEC-2001 control head was designed with a more contemporary, stylish look that is sure to accentuate any console—but good looks isn't all that it has going for it.

The EEC-2001 control head is by far the most informative control head in the industry today. The control head keypad has integrated switches and indicator lights which allow the boat operator to control all aspects of the boat's propulsion system.

Robust, watertight construction is a hallmark at Glendinning — we build our control heads to withstand the extreme conditions that exist in the marine environment.

CONTROL PROCESSOR

EEC-2001
CONTROL PROCESSOR

The control processor is the hub of the EEC-2001 control system and could be considered it's "brain" (central processing unit). The primary function of the control processor is to receive commands from the control head station that is "active" and position the gear and throttle to the commanded position.

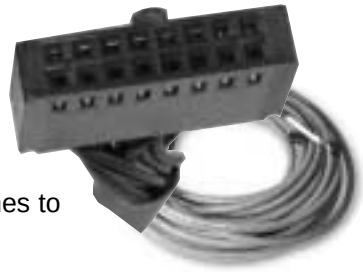
The control processor is completely sealed by a watertight cover to protect the electronics from moisture which could cause system failure.

Plug and play installation means you don't have to spend valuable time trying to figure out how to connect the engine and control heads to the control processor—just plug 'n play!

The Glendinning EEC-2001 allows the boat owner the ability to connect up to six (6) different control stations to one (1) control processor.

STATION CABLES

Glendinning's station cables are pre-terminated at the factory for ease of installation, and are completely shielded to eliminate problems caused by electromagnetic interference, complying with the latest and strictest standards in the industry. Both ends of the station cable has a connector which is identical on either end—no mistakes when it comes to plugging in the cable!



STATION CABLE
(INSET) Connector

ENGINE / GEAR HARNESSES

The engine and gear harnesses relay information from the control processor to the engine and gear controls. Connecting your gear and engine to the EEC-2001 Control Processor has never been easier. Each engine harness and/or gear harness is clearly labelled and simply plugs into the appropriately labelled port on the control processor.

2.0 OPERATING THE EEC-2001

Operating the EEC-2001 system is just as easy as the installation process. The EEC-2001 Control Head will constantly monitor various parameters and will alert the boat operator if the system falls outside the normal operating range.

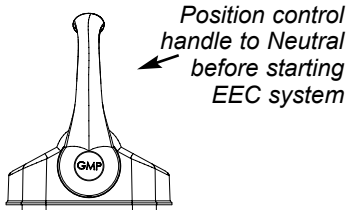
Familiarize yourself with the following functions BEFORE operation of the EEC-2001.

The functions necessary for operating the EEC-2001 are:

- System Startup Procedure
- Cruise Mode
- Warm Up Mode
- Slow Mode
- Automatic Synchronization Mode
- Troll Mode
- Station Transfer Process
- Warning Mode
- Alarm Mode

2.1 SYSTEM STARTUP

The procedure for starting up the EEC-2001 system is as follows:



1. Control Handles must be in the NEUTRAL position prior to starting the system.

2. Turn ON the EEC-2001 power switch. The system will perform a diagnostic test, checking various system parameters (indicated by the TAKE and TROLL lights illuminated). **DO NOT** move the control handles while the TROLL light is illuminated.

3. The EEC-2001 system is operational when the TAKE light is fully illuminated (not blinking). It is strongly recommended that the system be placed in WARM Mode prior to starting engines (see sec 2.3).

NOTES:

If the TAKE and TROLL lights remain on, the control handles are not in NEUTRAL. Leave control system power switch on and move one control handle at a time to verify that handles are in the neutral position. When both handles are in NEUTRAL, system will automatically complete startup procedure (TAKE light fully ON — TROLL light will go out).

If all four (4) lights on the keypad blink in unison, the EEC system is in Alarm Mode. Restart the system by turning OFF the EEC power switch and then turning back ON.

2.2 Cruise Mode

Cruise Mode is the normal operating mode for the EEC-2001. Other functions may be accessed while in Cruise Mode (see below):

The Control Head may respond in one of three ways during Cruise Mode:

1. **ACTIVE STATION** — During normal operation only the active station will be in command. TAKE light will be fully illuminated (not blinking) indicating that the station is "active" and in command of boat's propulsion system.

2. **INACTIVE STATION** — During normal operation all other stations are "inactive". The TAKE light on each inactive station will blink every 2 seconds indicating that the control head is an inactive station. The gear indicating lights will indicate gear position of active station and the Check Battery/Check System lights will operate.

3. **ALARM MODE** — During normal operation, the EEC system continuously monitors parameters and will alert operator of alarm conditions when they exist. Alarm Mode is indicated by all four (4) keypad lights blinking in unison, if this happens.

*TAKE light on at **active** station*

*TAKE light blinks at **inactive** station*

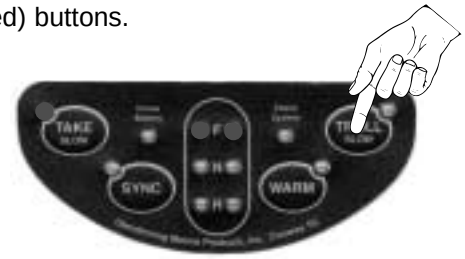
All 4 lights blinking in unison

Other Functions available from Cruise Mode are:

1. **BUMP MODE** — During normal operation, small changes in engine speed (approximately 10-15 RPM) may be made by pressing and releasing the WARM (increase speed) or TROLL (decrease speed) buttons.

To Increase Engine Speed Using Bump Mode, Press and Release WARM button

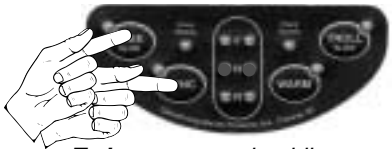
To Decrease Engine Speed Using Bump Mode, Press and Release TROLL button



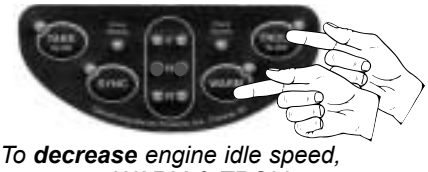
NOTE:

Engine speed can only be "bumped" when control handles are in gear and above idle speed. Amount of speed change per bump can be adjusted during system calibration.

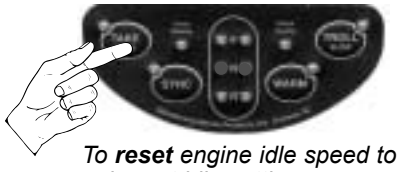
2. **HIGH IDLE MODE** — During normal operation, the boat operator is able to change the engine idle speed up to 7 different idle speed settings.



*To **increase** engine idle speed, press TAKE & SYNC simultaneously*



*To **decrease** engine idle speed, press WARM & TROLL simultaneously*



*To **reset** engine idle speed to lowest idle setting, press TAKE and release*

NOTE:

Idle speed can only be changed while control handles are in NEUTRAL. Idle speed change can be adjusted during system calibration.

2.3 WARM UP MODE

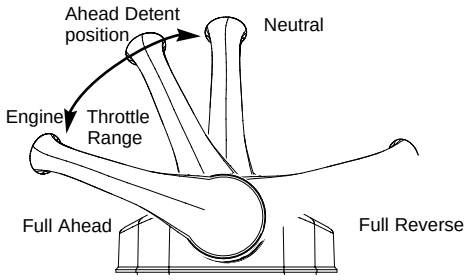
Warm up Mode allows the boat operator to operate the engine throttle by itself, while locking the transmission in NEUTRAL. It is **STRONGLY RECOMMENDED** that the EEC-2001 system be in Warm Up Mode **AT ALL TIMES** while boat is at the dock! This safety procedure will prevent the accidental engagement of transmission if the control head handles are inadvertently moved.

To utilize the Warm Up feature:

1. To engage, press and release the WARM button one time (control handles must be in NEUTRAL position to engage Warm Up Mode).

WARM LIGHT WILL BE ILLUMINATED WHEN EEC SYSTEM IS IN WARM MODE

2. Advance the control lever into and beyond the Ahead detent position. The engine gear will remain in NEUTRAL while engine speed is increased. Engine will not respond if handle is moved into or beyond the Astern detent position.



3. To disengage, bring handles back to NEUTRAL and press and release the WARM button one time.

WARM LIGHT WILL GO OUT WHEN WARM MODE IS TURNED OFF—EEC SYSTEM IS NOW IN NORMAL CRUISE MODE.

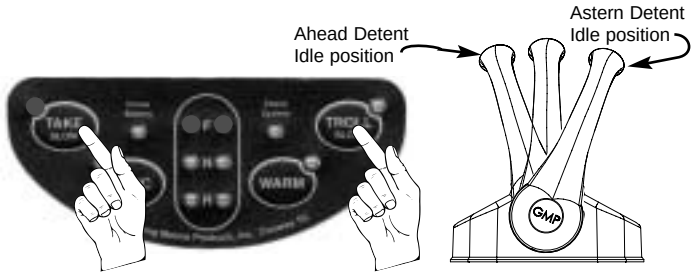
2.4 SLOW MODE

The Slow Mode limits the maximum RPM available to approximately 50% of normal WOT. This feature is very useful for manuevering or slow speed cruising.

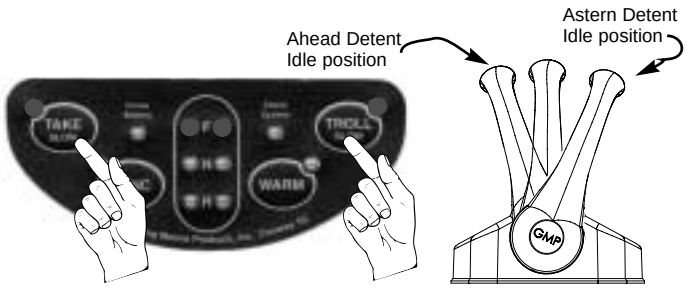
The Slow Mode is activated by:

1. To engage, press and release TAKE and TROLL buttons in unison, one time. Control handles must be in NEUTRAL position or Ahead/Astern detents to engage Slow Mode.

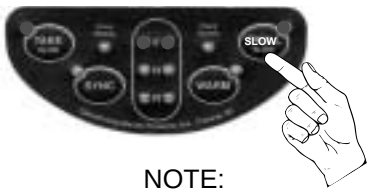
2. To disengage, press and release TAKE and TROLL buttons in unison, one time. Control handles must be in NEUTRAL position or Ahead/Astern detents to disengage Slow Mode.



TAKE AND TROLL/SLOW LIGHT WILL BLINK WHEN EEC SYSTEM IS IN SLOW MODE



SLOW LIGHT WILL GO OUT WHEN SLOW MODE IS TURNED OFF—EEC SYSTEM IS NOW IN NORMAL CRUISE MODE.



NOTE:

A different keypad is used on boats that are not equipped with trolling valves. In this case, Slow Mode is engaged by pressing the SLOW button one time. The SLOW light will be illuminated while the EEC-2001 system is in this mode.

2.5 Automatic Synchronization Mode

The Automatic Synchronization Mode allows the EEC system to automatically control one engine speed to exactly match speed of the other engine. Think of it as cruise control for your boat. Once underway, follow the instructions below to activate this feature and control both engines' speed with one handle.

SYNC light will be illuminated when EEC system is in Sync Mode

To activate the Automatic Synchronization Mode:

1. Press and release the SYNC button one time (before the SYNC function can engage, both engines must be in the Ahead gear and handles must be approximately matched — within 10% of total travel).

2. When SYNC function is energized, EEC system will automatically control one engine speed to match the speed of the other engine. If engine speed is changed manually by the boat operator, engine speed will automatically be changed to match (NOTE: Slave / Lead engine can be designated during system calibration).

3. To disengage, bring slave handle to match position of lead engine control handle and press and release SYNC button one time. *It is extremely important that the slave handle is brought back to a position relative to the lead handle prior to disengaging.*

SYNC light will go out when Sync Mode is turned off—EEC system is now in Normal Cruise Mode.

NOTE:

1. Synchronization mode will be automatically disengaged if both control handles are moved to NEUTRAL position together.

2. If lead handle is moved to NEUTRAL gear position by itself, synchronization mode will be automatically de-energized. Slave engine operation will continue to match lead engine operation (gear and throttle) until slave control handle is matched to lead control handle position.

2.6 Troll Mode

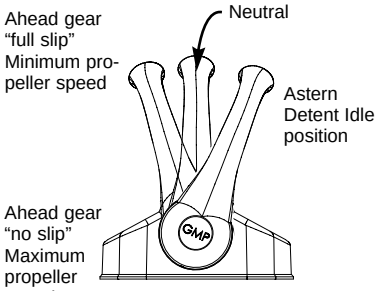
The Troll Mode is available only if the boat has been equipped with trolling valves and allows the boat operator to control the position of the transmission trolling valves.

TROLL light will be illuminated when EEC system is in Troll Mode

To activate Troll Mode:

1. With control handles in NEUTRAL, press and release TROLL button one time (control handles must be in NEUTRAL to engage Troll Mode).

2. Control troll valve position by movement of control handle. Engine throttle speed is maintained at idle while system is in Troll Mode.



TROLL light will go out when Troll Mode is turned off—EEC system is now in Normal Cruise Mode.

3. To disengage, move control handles back to NEUTRAL and press and release TROLL button one time.

NOTE:

1. BUMP Mode (sec 2.2) is available while troll valve is in operation to make small changes in troll valve modulation.

2. Engine idle speed may be adjusted during troll valve operation (see Cruise Mode sec. 2.2 for more information).

2.7 STATION TRANSFER PROCESS

The Glendinning EEC-2001 allows the propulsion system control to be transferred from one control station to another control station. This process requires the operator to depress the TAKE button twice in order for the transfer to take effect thus avoiding any inadvertent transfers from taking place without the boat operator's knowledge.

To transfer control follow these steps:

1. Press and release TAKE button one time, at the helm station where you want to take control (TAKE light will begin to blink and control head beeper will begin to sound).

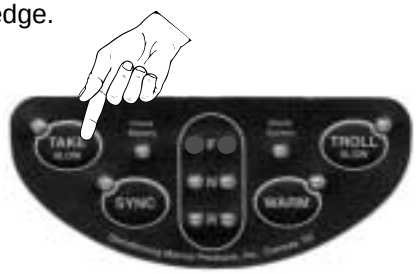
2. At the station where you want to take control, move the control handles to an appropriate throttle position.

Active Station Handle Position	Station Taking Control Handle Position
In Neutral.	In Neutral.
In gear, at Idle.	In Neutral, or same gear position at Idle.
In gear, above Idle.	In Neutral, or same gear position at same or lower speed setting.

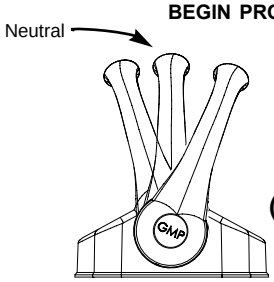
3. Press and release TAKE button a second time. The new control station is now the active station and has control of the engine and transmission.

NOTE:

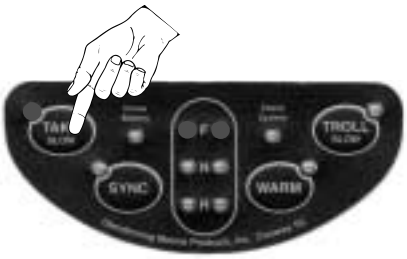
See the illustrations below for the light sequence at the station taking control:



INACTIVE STATION
PRESS TAKE BUTTON 1 TIME TO BEGIN PROCESS



ADJUST CONTROL HANDLES (SEE CHART AT LEFT)



INACTIVE STATION
PRESS TAKE BUTTON 2ND TIME WHILE TAKE LIGHT IS QUICK FLASHING TO COMPLETE STATION TRANSFER

1) Prior to pressing button, light blinks 1 time every 2 seconds (Inactive station heartbeat).

Light flashes 1 time every 2 seconds.

2) After pressing button 1 time, TAKE light will blink—blink rate will depend on control handle setting at station taking control.

Slow blink—handles **not** in appropriate position.
Quick blink—handles in appropriate position.

3) Control transfer is complete after pressing TAKE button second time, while TAKE light is quick flashing.

Solid TAKE light indicates transfer is complete. New station is now in control.

2.8 Warning Mode

During operation of the EEC-2001, the system will warn the operator when a problem is detected. System will continue to operate in unaffected functions.

	SYMPTOM	ACTION
CHECK BATTERY light blinks  **CHECK BATTERY INDICATOR** will blink when battery voltage conditions exist that are questionable.	**1)** *Slow blink*—One battery is either too high or too low. **2)** *Quick Blink*—Both batteries are either too high or too low.	**1)** Determine cause of input power problem. **2)** System will continue to operate normally, unless battery exceeds system parameters. If this occurs system will be switched into Alarm Mode (see page 10).
CHECK SYSTEM light blinks  **CHECK SYSTEM INDICATOR** will blink when a possible problem has been detected within the system.	**1)** Diagnostics tests have detected that part of the control system is not functioning normally.	**1)** Restart control system (turn OFF/ON). Move handles to Neutral during system startup. **2)** Determine part of system not operating properly (ie. gear, throttle, troll, etc.). **3)** Utilize alarm code recovery procedure to discover source of problem (see Operations Guide).

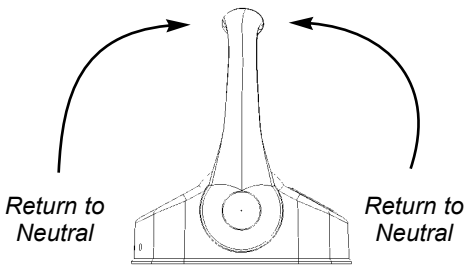
2.9 Alarm Mode

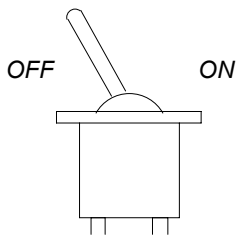
During operation, the EEC-2001 continuously monitors system functions and will alert operator if a system problem has been detected. When Alarm Mode is activated, control system will not continue to operate. In absence of control signal from EEC, transmission will normally go to NEUTRAL and engine throttle will normally go to IDLE.

All 4 lights blink in unison

ALARM IS INDICATED when all 4 lights are blinking in unison on the control keypad.

Return the main station control handles to NEUTRAL and turn EEC power switch OFF. Restart the EEC system.





3.0 INSTALLING THE EEC-2001

Installing the EEC-2001 is simple and easy. It is always important that proper care be given when installing any equipment on board your vessel. It is always a wise practice before cutting into the ship's interior to follow the old adage "measure twice, cut (or drill) once!"

The installation process includes the following four steps:

STEP 1: Mounting the Control Processor
STEP 2: Mounting the Control Head(s)
STEP 3: Connecting the Station Cables
STEP 4: Connecting the Engine / Gear Harnesses.

PRE-INSTALLATION PLANNING

The following considerations should be kept in mind before installation of the EEC-2001 system:

Environmental conditions—The Control Processor should be mounted in an area that is relatively dry and cool. Although the electronic components are reasonably well-sealed from moisture, the product enclosure is not designed for constant, direct contact with water. Since the longevity of electronic components is reduced in high temperature environments it is best to find an area of the engine compartment that is not exposed to temperature extremes. The Control Processor has been designed for installation in the engine compartment, and should be mounted where there is some air movement or ventilation.

Accessibility—During system calibration or troubleshooting, it will be necessary for the installer or repair technician to have access to the internal connections of the Control Processor. In view of this, the Control Processor should be mounted in a relatively accessible area.

Cables & Connectors—When routing Station Cables it is adviseable to inspect the route and make sure surfaces are free of any sharp edges or burrs which could nick the cable and compromise the reliability of the system.

Connectors are pre-terminated at the factory and should NEVER be forced into their proper recepticle. Make sure that the connector is properly aligned prior to insertion into the recepticle. If the connector is properly aligned, only a small amount of force will be necessary to insert the connector into the Control Processor or Control Head. Failure to properly align connector may damage the pins and cause the system to fail.

Connectors are one of the most important parts of the EEC-2001 system. Keep connectors covered and clean during installation. Most problems occur due to bad connections.

3.1 MOUNTING THE CONTROL PROCESSOR

The Engine Processor is essentially a digital computer, similar to those used in offices or at home. Although the system has been carefully designed to operate in conditions that are common in recreational yachts. Reliability of the system will be enhanced if the engine processor can be mounted in an area external to the engine room, where operating temperatures will be somewhat cooler.

Follow these steps to install the EEC-2001 Control Processor:

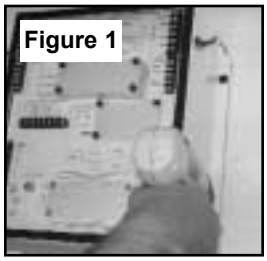


Figure 1

STEP 1: The Control Processor can be mounted anywhere in the engine room providing that the Processor is reasonably accessible so that inspection and/or repairs to the unit may be performed. The Control Processor should not be installed in adverse locations subject to saltwater exposure or excessive heat.

STEP 2: Mount the Control Processor using 1/4" (7mm) machine bolts or lag screws. If using lag screws, screw length should be no less than 1" (25mm). If using machine bolts, lockwashers or locknuts MUST be used *(figure 1)*.

3.2 Mounting the Control Head

3.2.1 Top Mount - Model EEC-2001

One of the most important factors in selecting control head locations is the ability to control the vessel by allowing FULL movement of the control head handles. The area around the control head should have proper drainage to eliminate standing water. Although the control heads are sealed to withstand damage from exposure to moisture, they are not designed to be submerged.

STEP 1: Mark the location for the Control Head using the template provided (pg. 53). Cut the 3-1/4" x 4-3/4" hole.

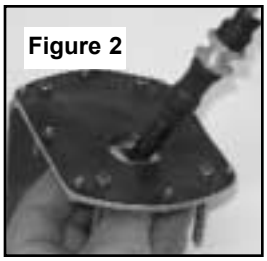


Figure 2

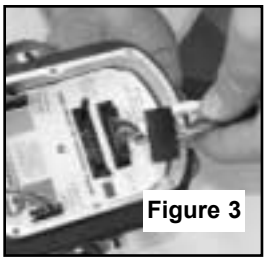


Figure 3

STEP 2: Remove cover on bottom of the Control Head and route the cable through the hole in the cover *(figure 2)*. Install the Station Cable by connecting the two connectors to the appropriate recepticle underneath the Control Head *(figure 3)*. The 2 connectors (large 16 pin-blue connector and small 14 pin-white connector) are different in size and have a polarizing boss on one side of the connector. Install connectors into Control Head being careful NOT to force connector onto pins.

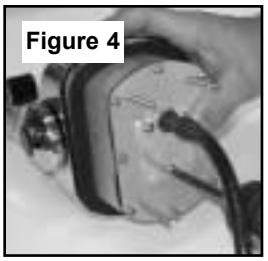


Figure 4

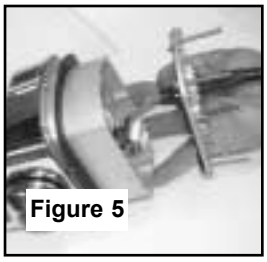


Figure 5

STEP 3: Slide bottom cover up to cable bushing and swing cable clamp to lock cable in place. Tighten the cable clamp plate screw *(figure 4)* and replace bottom cover *(figure 5)*.

STEP 4: Reinstall bottom cover. Be sure to tighten all bottom cover screws to form a watertight seal.

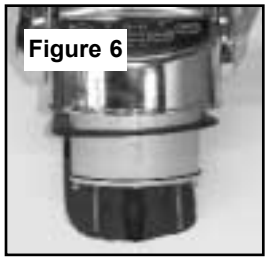


Figure 6

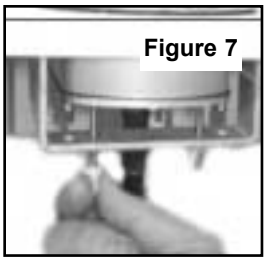


Figure 7

STEP 5: Place the Control Head assembly into the cutout *(figure 6)*. The Control Head clamps, which hold the control head against the console, have a break off point indicated by a perforation. For consoles 1/4" to 1" thickness, use bracket as supplied. For 3/4" to 1-5/8" thickness, break off clamp at 3/4" break off point.

STEP 6: Install Control Head clamps and tighten wing nuts provided *(figure 7)*. Make sure Control Head is firmly mounted to console.

3.2.2 Sidemount Handle Control Assembly

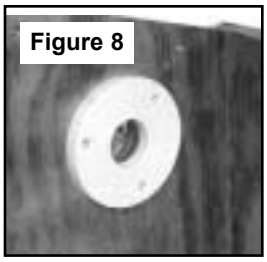
Before installing the Sidemount Control Head Assembly consider:

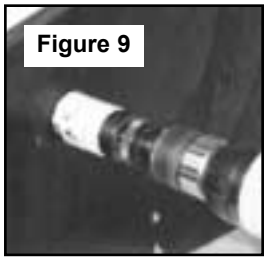
Mounting Options — Bezel outside, bezel inside, or no bezel mounting.
The major differences between these types of mounting options are the outside appearance of the console, and the difficulty of installation.
"No bezel mounting" option means the only visible things are the control head shaft and the sidemount handle. For this option use the existing holes in the control head to mount the control head or mounting brackets (supplied by installer) to the inside of the console.

"Outside Console Bezel mounting" is the simplest method of the three mounting options, but allows a bezel to be seen on the outside of the console. "Inside Console Bezel mounting" is perhaps the more difficult installation of the two, and requires careful planning.

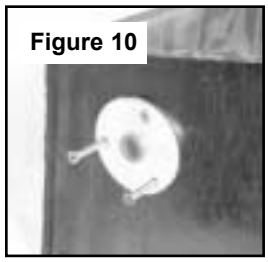
Outside Console Bezel Mounting:

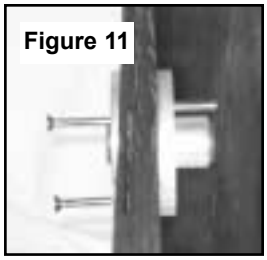
STEP 1: Determine location of bezel hole in console by placing bezel on outside of console where desired and mark the 1-1/4" hole and the 1/4" clearance holes, (see figure 8) *(NOTE: Clearance for control head needs to be determined on inside of console before cutting holes; Notice location of friction control adjustment screws in respect to console placement!)*.





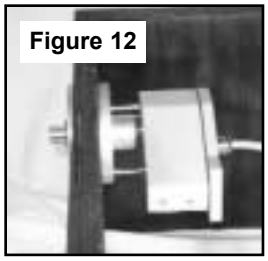
STEP 2: Use 1-1/4" hole saw to cut center hole and drill 17/64" holes for outside flange mounting (see figure 9).

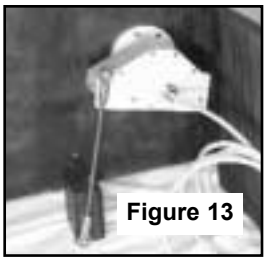




STEP 3: Place outside flange in 1-1/4" hole and place inside flange over small diameter of outside flange on inside of console. Tighten flanges together with 1/4" x 20 flat head screws (see figure 10) *(NOTE: Depending on console thickness, a small diameter of outside flange and 1/4" x 20 flat head screws may need to be shortened)*.

STEP 4: Once Outside Flange and Inside Flange are mounted, install (3) #10 flat head wood screws through Inside Flange. This will hold the Inside Flange in place in case of removal in the future (see figure 11) *(NOTE: Wood screws should not be longer than the thickness of the console)*.

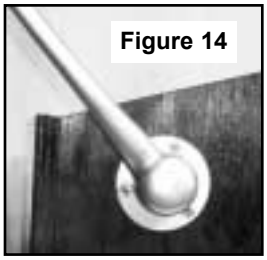


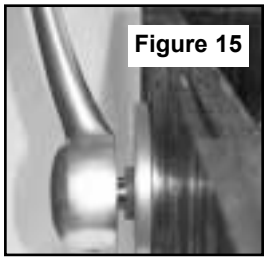


STEP 5: Install the Control Head mechanism in flange (see figure 12) *(NOTE: The control heads are marked Port and Stb.; Adjustment screws should face forward)*.

STEP 6: Establish the desired control head angle according to the clearance in the console (see figure 13).

STEP 7: Threaded rod with ball joints are to be attached to head and console at this point (see figure 13) *(NOTE: Angle of 90 degrees is best for most support)*.





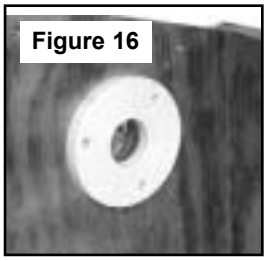
STEP 8: Install control handle and key (where applicable) and tighten set screw down to mark shaft. Fine alignment of handles may be adjusted by shortening or lengthening threaded rod (see figure 14) *(NOTE: Shaft end play between handle and console should be less than 1/8" [see figure 15])*.

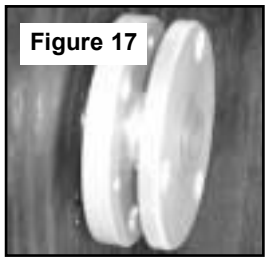
STEP 9: Remove set screw and handle and divot shaft using same size drill as the set screw.

STEP 10: Reinstall control handle and use two set screws, on top of each other.

Inside Console Bezel Mounting:

STEP 1: To determine location of inside bezel mount, caution should be exercised to ensure proper placement of bezel prior to cutting hole in the console *(NOTE: This is determined by the clearance of the control head on the inside of the console)*.





STEP 2: Using the "inner bezel" as a template, trace the 1-1/4" center hole onto the inside wall of the console (see figure 16).

STEP 3: Cut out the 1-1/4" center hole and drill (3) #10 starter holes being careful NOT to drill through the wall of the console.

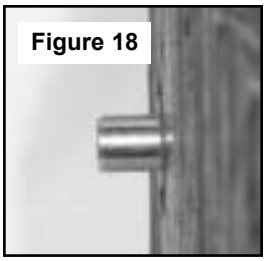


Figure 18

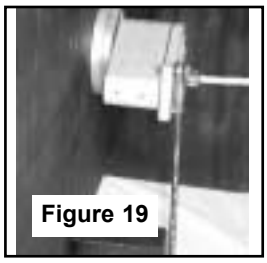


Figure 19

STEP 4: Place inner bezel onto the outer bezel shaft and insert assembly into the 1-1/4" cutout hole. Tighten (3) #10 wood screws into flange where indicated (see figure 17) *(NOTE: make sure to use screw lengths that DO NOT exceed the thickness of the console)*.

STEP 5: Bezel outside of console can now be marked flush so the excess can be removed. This allows no bezel to be seen on outside of console. Remove bezel from console. Remove red bushing from inside of bezel and trim bezel.

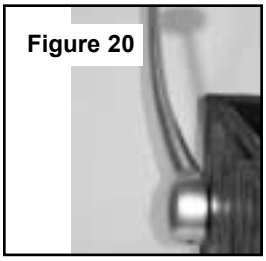


Figure 20

STEP 6: Reinstall red bushing in bezel and insert bezel into hole in console. Tighten (3) #10 wood screws into flange where indicated (see figure 18) *(NOTE: make sure to use screw lengths that DO NOT exceed the thickness of the console)*.

STEP 7: Install the control head shaft into the flange assembly.

STEP 8: Establish the desired control head angle according to the clearance in the console.

STEP 9: Threaded rod with ball joints are to be attached to head and console at this point *(NOTE: Angle of 90 degrees is best for most support)* (see figure 19).

STEP 10: Install control handle and key (where applicable) and tighten set screw down to mark shaft. Fine alignment of handles may be adjusted by shortening or lengthening threaded rod *(NOTE: Shaft end play between handle and console should be less than 1/8")* (see figure 20).

STEP 11: Remove set screw and handle and divot shaft using same size drill as the set screw.

STEP 12: Reinstall control handle and use two set screws, on top of each other.

To mount control handles without Bezel mounting kit:

STEP 1: The control head has one face opposite handle shaft with 1/4 threaded holes to mount to inside face of console.

STEP 2: The 1/4 threaded holes can also be used to mount the control head to a bracket of your design, to attach head to some other locations in console.

STEP 3: When method of mounting is determined, keep a these things in mind—The length of shaft outside of console and the free movement of the shaft.

3.2.3 Sidemount Keypad Assembly

Before mounting the Sidemount Keypad Assembly, inspect the surface that the Keypad is to be mounted to. It should be flat and reasonably strong enough to support the Keypad securely.

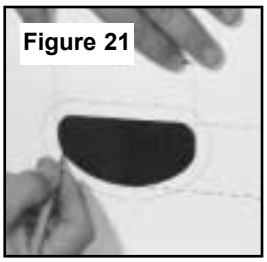


Figure 21

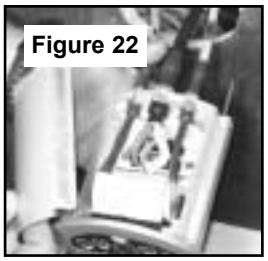


Figure 22

STEP 1: Mark the location for the Keypad Assembly using the full size template (pg. 55) provided in the last section of this manual (see figure 21) . Cut the 2-1/4" x 4-1/4" keypad assembly cutout.

STEP 2: Remove the cover of the keypad assembly and insert the connection cable from the Sidemount Control Handle pod and the Station Cable (that leads to the Control Processor) through the console cutout and attach these connectors to the keypad assembly (see figure 22).

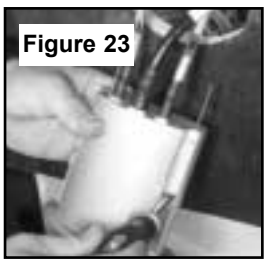


Figure 23

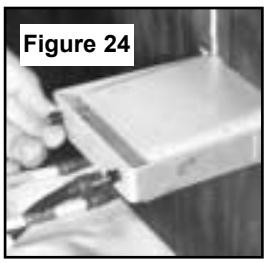


Figure 24

STEP 3: Reassemble the cover making sure that the cable bushings are seated properly and install the Keypad assembly into the cutout using the gaskets supplied (see figure 23). DO NOT chaulk Keypad in order that the unit may be serviced if the need should ever arise.

STEP 4: Install Control Head clamps and tighten wing nuts provided. Make sure Keypad Assembly is firmly mounted to console (see figure 24).

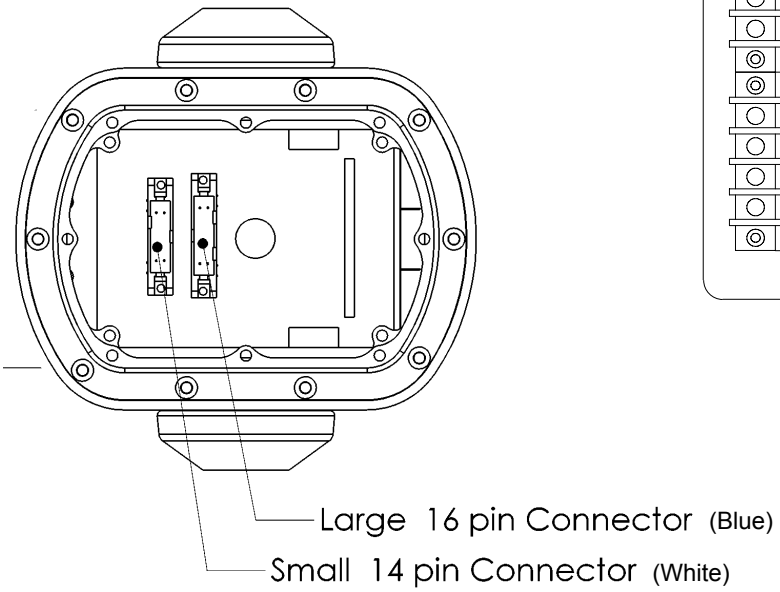
3.3 CONNECTING THE STATION CABLES

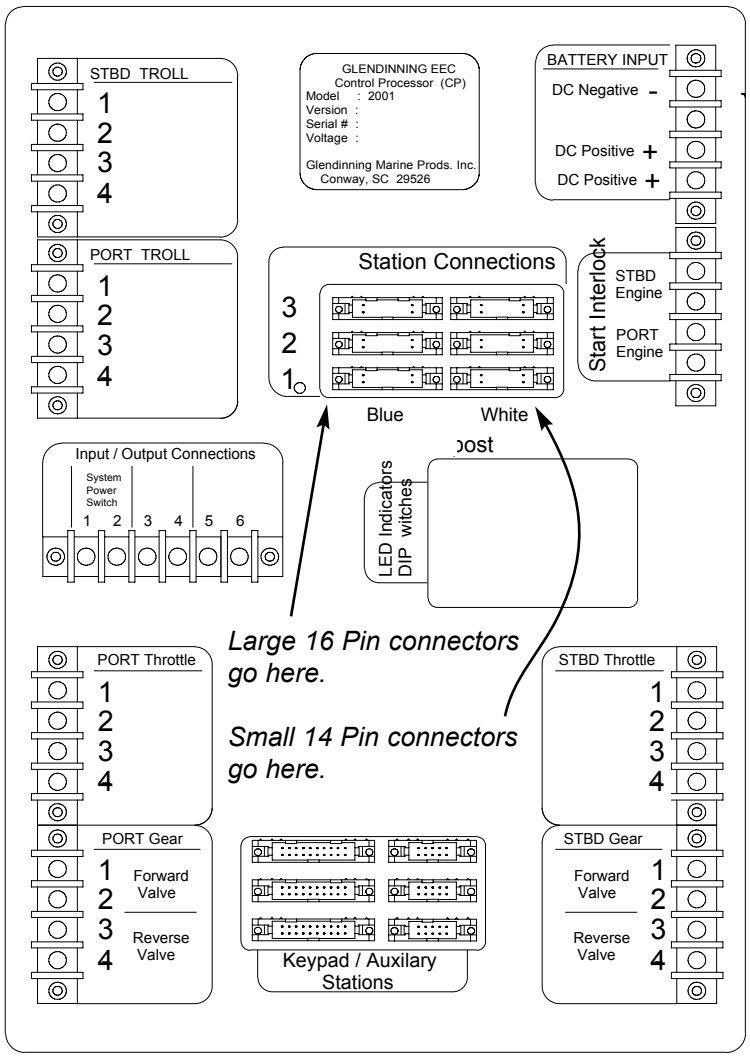
Cables are manufactured in 10' increments and are available from 10 - 100 feet.

Follow these steps to connect the Control Station to the Control Processor:

A. It is important to understand that the connectors on the Station Cables are interchangeable. That is, it does not matter which end connects into the Station Head or Control Processor. However, where the connector connects to these is important.

B. Two types of connectors are bundled into each Station cable: a Large 16 Pin Connector (blue) and a Small 14 Pin Connector (white).





C. Make sure that you connect the appropriate connector to the right recepticle in both the Control Head and the Control Processor (see diagrams at right and on following page).

D. When installing multiple Control Heads, Use the #1 slot on the Control Processor for the Main Control Station. The second station is installed in the #2 slot, etc.

E. When installing 4 or more (up to 6) Control Heads use the Keypad/Auxiliary Station slots on the Control Processor.

REMEMBER:

Connectors are pre-terminated at the factory and should NEVER be forced into their proper recepticle.

Make sure that the connector is properly aligned prior to insertion into the recepticle.

If the connector is properly aligned, only a small amount of force will be necessary to insert the connector into the Control Processor or Control Head.

Failure to properly align connector may damage the pins and cause the system to fail.

3.4 Connecting the Throttle and Transmission Harnesses

Port and Starboard throttle and transmission cables are attached to the EEC-2001 Control Processor at the appropriately labelled section of the Control Processor (see inset below).

To attach the throttle and transmission cables to the Control Processor:

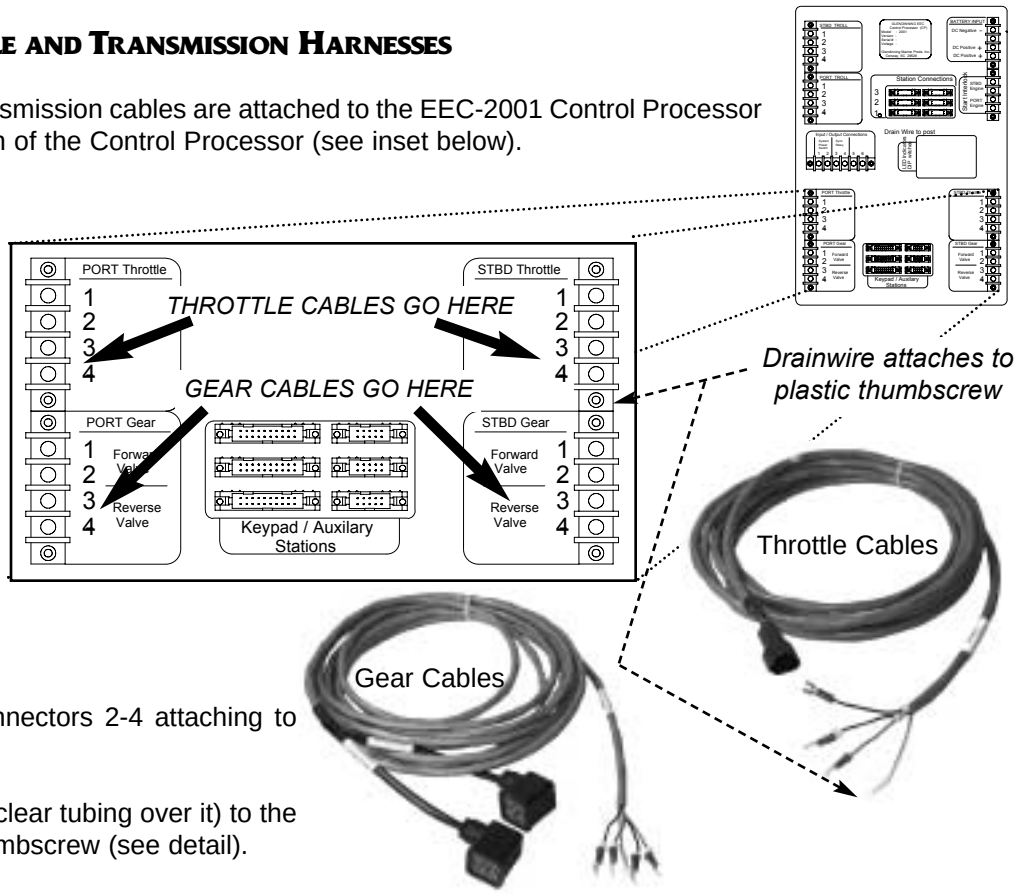
1. Determine that you have the right cable and open the Control Processor cover.

2. Find the barrier strip labelled for the cable you wish to connect.

3. Loosen terminal post and attach the connector labelled 1 to the barrier strip where the number 1 is marked. Tighten screw.

4. Continue steps 3 and 4 for connectors 2-4 attaching to properly numbered terminal post.

5. Attach drainwire (bare wire with clear tubing over it) to the threaded stud using the plastic thumbscrew (see detail).



When all connectors are properly connected to the Control Processor you may proceed to connect the other end of the cable to the engine's appropriate recepticle (whether for Port or Stbd, or Throttle or Transmission).

3.5 Connecting the Troll Harness

Port and Starboard TROLL cables are attached to the EEC-2001 Control Processor at the appropriately labelled section of the Control Processor (see inset below).

To attach the TROLL cables to the Control Processor:

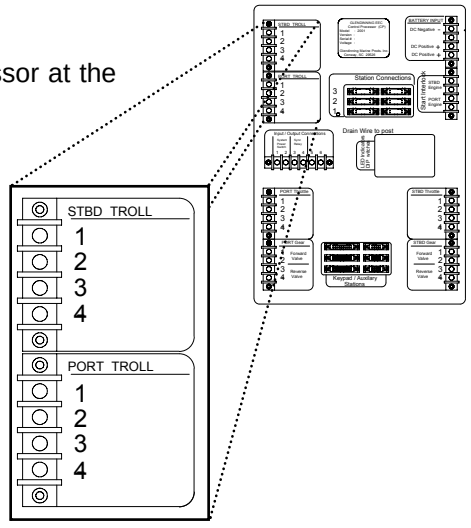
1. Determine that you have the right cable and open the Control Processor cover.

2. Find the barrier strip labelled for the cable you wish to connect.

3. Loosen terminal post and attach the connector labelled 1 to the barrier strip where the number 1 is marked.

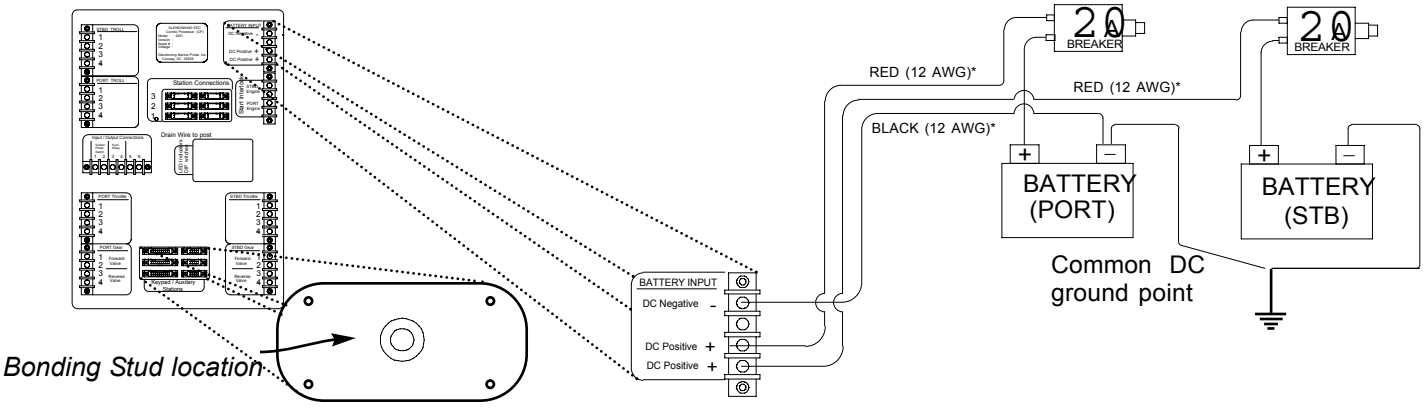
4. Tighten screw. Continue steps 3 and 4 for connectors 2-4.

5. Attach drainwire to the threaded stud using the plastic thumbscrew.



3.6 DC Power Input and Bonding Wire

In the installation of any electronic device, the source of power is one of the most important factors to consider during the installation. The Glendinning Electronic Engine Control has a unique and very reliable power supply system which, if the system is properly installed, greatly improves the overall reliability of the engine control system. *NOTE:The EEC can use 12 or 24V DC power, however, see the specific wiring diagram (see sec 7.1, or supplied by GMP technician) for the correct power to use. In some installations it is required to use 24V DC instead of 12V DC.*



The Glendinning EEC-2001 system is equipped with a sophisticated power management system that allows it to receive power from two (2) independent batteries (normally the port and starboard engine start batteries). In normal operation, the EEC-2001 will receive power from both battery sources, taking power from each battery proportionate to the voltage from level available. In the event of loss or reduction of voltage from one battery source, such as during engine start, the EEC-2001 system will continue to function normally by receiving power from the other battery with normal voltage.

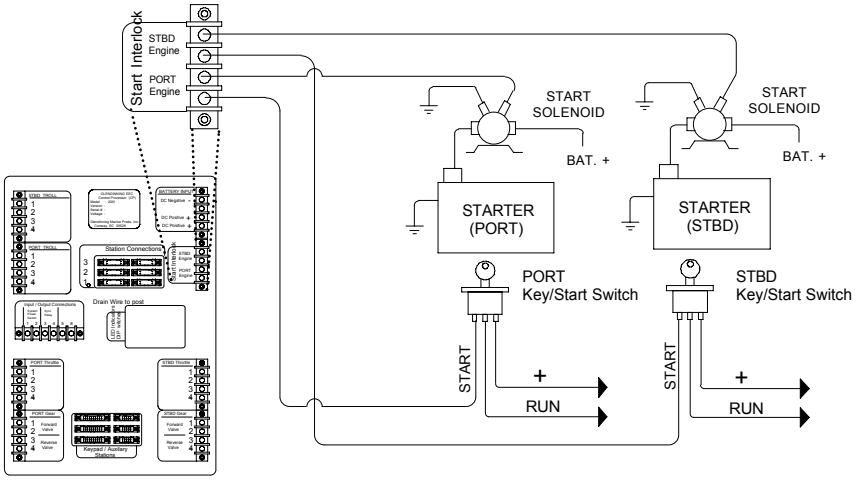
1) Run #12 gage wire from two (2) independent battery sources, (normally the port and starboard engine start batteries) to the Control Processor. On the positive side of these two runs, install a 20amp circuit breaker near each battery or power source (follow ABYC standards which require a circuit protection device within 7" of the wire connection to the power source — NOTE: If the total wire run is longer than 15 feet from the battery to the Control Processor, use #10 AWG wire rather than #12 AWG.

2) Make sure that the breakers are in the OFF position and then connect the two power wires and one negative wire to the Control Processor at the terminal strip where indicated on the Control Processor (see detail inset above).

3) Run a bonding wire (#12 AWG, green jacket) from the Control Processor bonding stud (1/4") located on the lower portion of the front panel.

3.7 START INTERLOCK

The EEC-2001 system includes a "start interlock" safety feature — this feature verifies that the transmission control lever is in Neutral prior to starting the engines. In order to utilize this product feature, the signal wire from the helm station start switch to the engine starter solenoid must be intercepted and run through the control switches within the Control Processor.



To install the Start Interlock system:

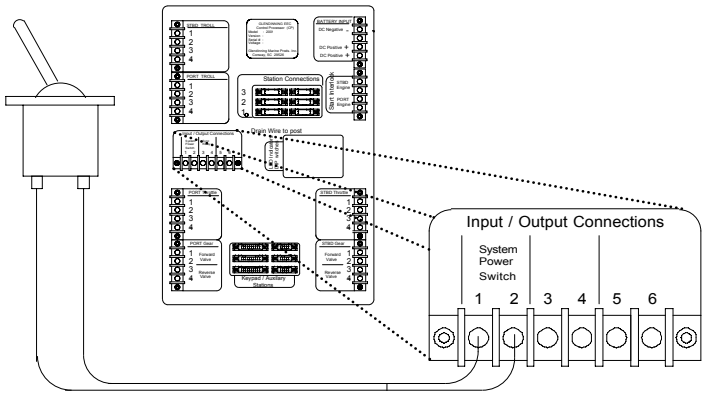
1) Identify the signal wire from the key switch to the starter solenoid of each engine. This is normally a wire that is yellow or yellow w/red stripe.

2) On each engine, cut this wire near the starter relay and connect both ends of a #12 AWG, 2 conductor wire to these two wires. Run this wire to the Control Processor where the Start Interlock is indicated. Make sure you are connecting the appropriate engine to the appropriate connector on the Control Processor (port / starboard).

3.8 REMOTE POWER SWITCH

While the boat is tied up at the dock and not in use, it is recommended that the EEC system be turned off. Since power

is normally supplied directly to the Engine Processor from power sources in the engine room, turning power ON and OFF in the engine room may be difficult to do each time the system is started up. For this reason, a remote "power switch" is available for use with the EEC control system. This power switch allows power to the system to be turned ON or OFF at the Main station.



The EEC System Power Switch is installed as follows:

1. Make sure the circuit breakers that control the power to the Control Processor are turned off before starting this installation.

2. Install a Single Pole, Single Throw (SPST) switch in the instrument panel. A water resistant rocker switch or toggle switch is available from GMP. *NOTE: Locate the switch in an area where it will not be inadvertantly turned OFF during operation.*

3. Run #18 /2 wire from the remote power switch to the Control Processor.

4. Connect the output terminals of the Power switch to the System Power Switch terminals of the Control Processor (see drawing above).

NOTE: Do not connect an indicator light to the remote power switch connections.
NOTE: A "jumper" can be installed in the place of a remote power switch. Power may then be turned OFF and ON by using the 20amp breakers installed at battery input.

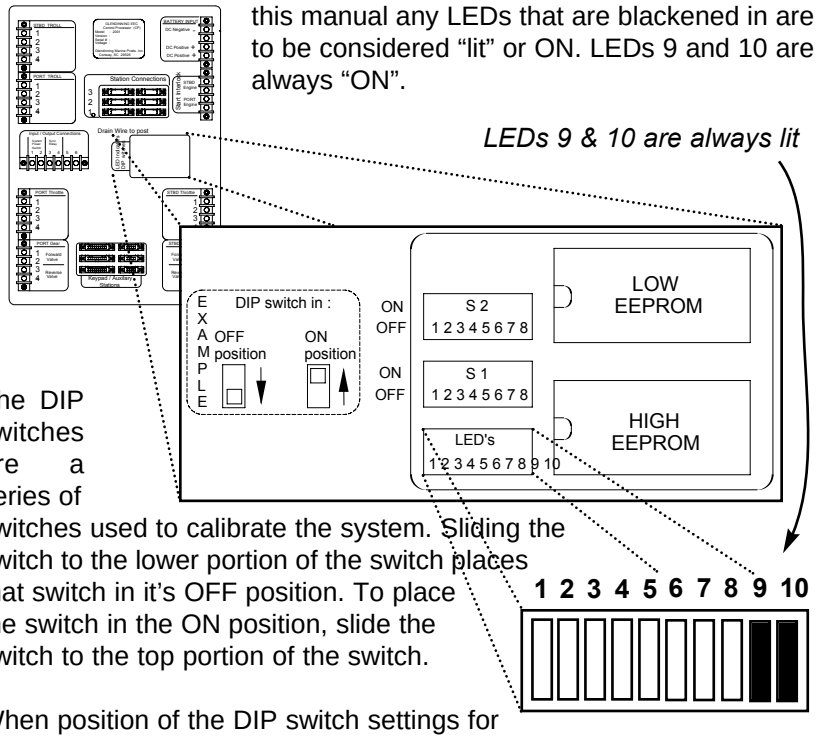
4.0 SYSTEM CALIBRATION

Most installations do not require any calibration. Please contact GMP if settings, such as delays, need to be changed.

INTRODUCTION
System calibration customizes the EEC-2001 system to suit operator preference.

PROCEDURE OVERVIEW
Configuration of the EEC-2001 system is determined by the position of the DIP switches which are located on the Control Processor, below the Station Connection area (see below).

Confirmation of DIP switch setting is indicated by the 10 LEDs below the switch banks (see detail). For the purpose of this manual any LEDs that are blackened in are to be considered "lit" or ON. LEDs 9 and 10 are always "ON".



The DIP switches are a series of switches used to calibrate the system. Sliding the switch to the lower portion of the switch places that switch in it's OFF position. To place the switch in the ON position, slide the switch to the top portion of the switch.

When position of the DIP switch settings for a desired configuration are complete, you will need to turn "ON" DIP switch 8 on Switch Bank 2 until all LEDs are lit. This procedure registers changes made to the configuration of the system. *Failure to do so will result in NO CHANGES being made for that particular feature.*

TO ENTER CALIBRATION MODE
Set DIP switch 1 on Switch Bank 1 ON. Make sure all other switches (2-8) are in the OFF position.

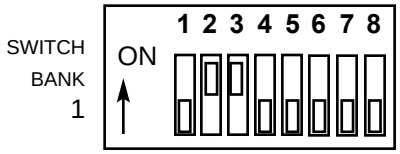
Turn EEC-2001 system ON. You are now in Calibration Mode.

CALIBRATION OPTIONS

4.1 GEAR OPTIONS

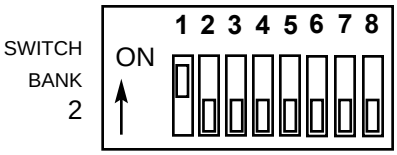
GEAR DELAY: *This feature delays gear shift as the system goes from ahead / astern with throttle to neutral to allow throttle to reach idle before shifting gear.*

To make changes in gear delay, DIP switch bank 1 should always be set as follows:

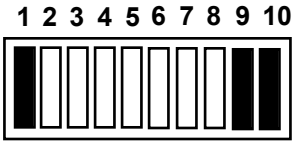


Set DIP switch bank 2 to the specific gear delay setting desired (see below):

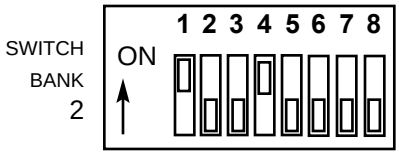
FOR NO GEAR DELAY:



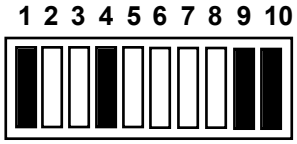
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



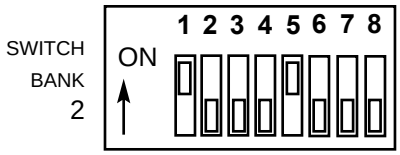
FOR 1.0 SECOND GEAR DELAY:



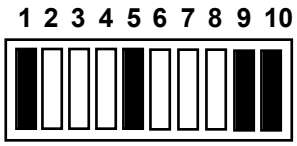
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



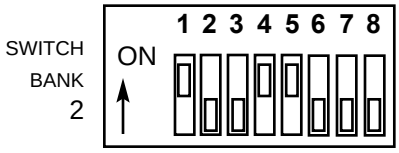
FOR 2.0 SECOND GEAR DELAY:



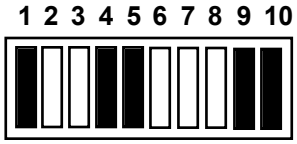
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



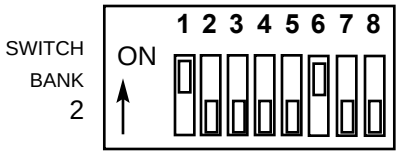
FOR 3.0 SECOND GEAR DELAY:



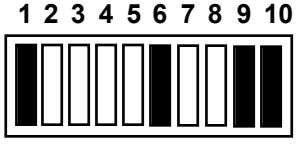
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



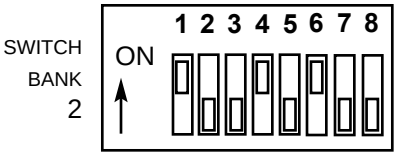
FOR 4.0 SECOND GEAR DELAY:



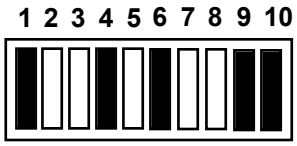
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



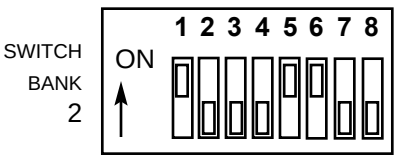
FOR 6.0 SECOND GEAR DELAY:



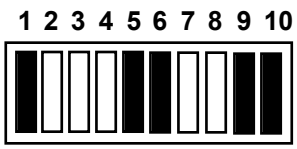
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



FOR 8.0 SECOND GEAR DELAY:



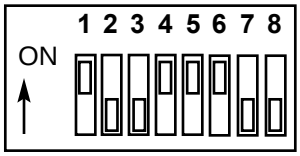
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



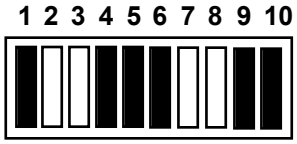
4.1 GEAR OPTIONS (CON'T)

FOR 10.0 SECOND GEAR DELAY:

SWITCH BANK 2



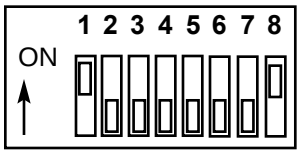
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

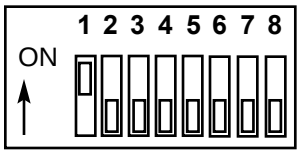


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





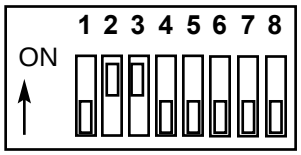
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

NEUTRAL DELAY: *This feature delays gear shift at neutral as the system goes from ahead to astern or from astern to ahead to avoid having the ahead / astern solenoids engaged simultaneously.*

To make changes in neutral delay, DIP switch bank 1 should always be set as follows:

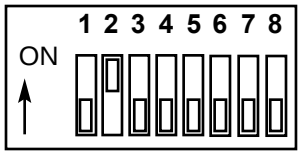
SWITCH BANK 1



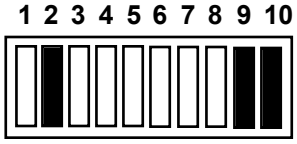
Set DIP switch bank 2 to the specific neutral delay setting desired (see below):

FOR NO NEUTRAL DELAY:

SWITCH BANK 2

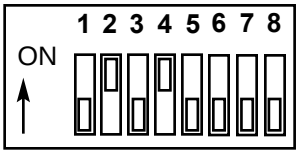


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

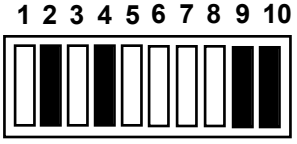


FOR 0.5 SECOND NEUTRAL DELAY:

SWITCH BANK 2

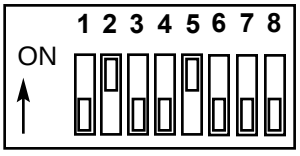


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

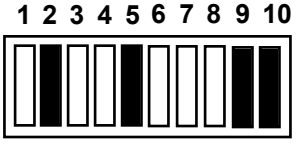


FOR 1.0 SECOND NEUTRAL DELAY:

SWITCH BANK 2

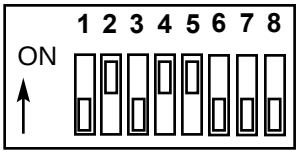


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

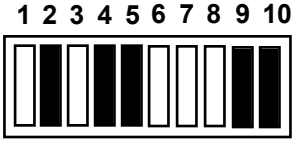


FOR 1.5 SECOND NEUTRAL DELAY:

SWITCH BANK 2



LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



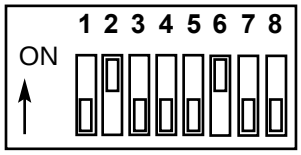
4.1 Gear Options (con't)

NEUTRAL DELAY (CON'T): *This feature delays gear shift at neutral as the system goes from ahead to astern or from astern to ahead to avoid having the ahead / astern solenoids engaged simultaneously.*

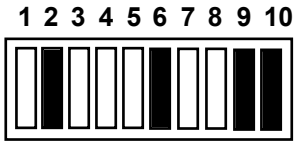
Set DIP switch bank 2 to the specific neutral delay setting desired (see below):

FOR 2.0 SECOND NEUTRAL DELAY:

SWITCH BANK 2

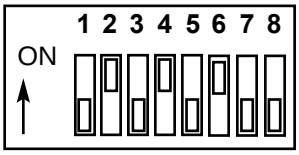


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

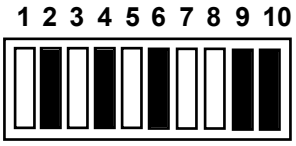


FOR 2.5 SECOND NEUTRAL DELAY:

SWITCH BANK 2

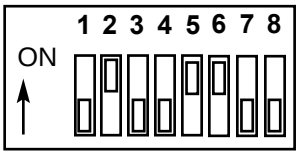


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

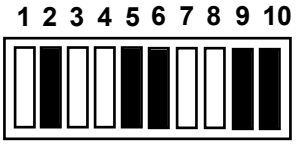


FOR 3.0 SECOND NEUTRAL DELAY:

SWITCH BANK 2



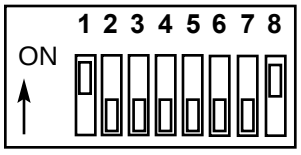
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

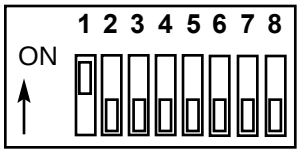


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

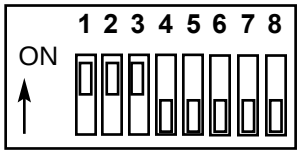
SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

4.2 Throttle Options

THROTTLE DELAY: *Delays throttle output as the system goes from neutral to ahead / astern with throttle to allow gears to shift before adding throttle.*

To make changes in throttle delay, DIP switch bank 1 should always be set as follows:

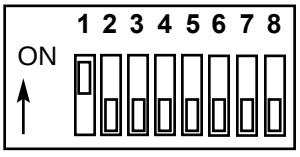
SWITCH BANK 1



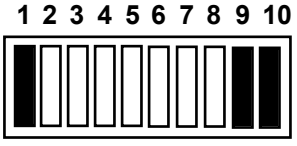
Set DIP switch bank 2 to the specific throttle delay setting desired (see below):

FOR NO THROTTLE DELAY:

SWITCH BANK 2



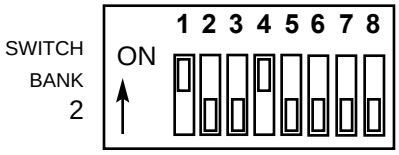
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



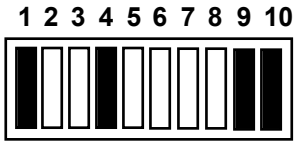
THROTTLE DELAY (CON'T): *Delays throttle output as the system goes from neutral to ahead / astern with throttle to allow gears to shift before adding throttle.*

Set DIP switch bank 2 to the specific throttle delay setting desired (see below):

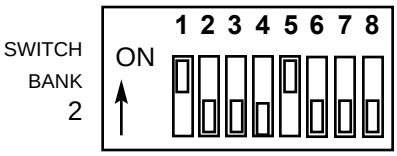
FOR 0.5 SECOND THROTTLE DELAY:



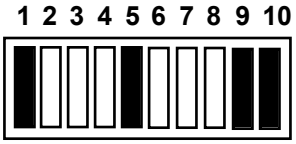
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



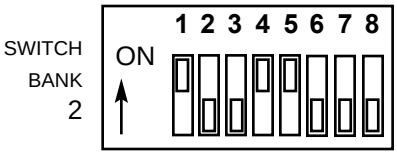
FOR 1.0 SECOND THROTTLE DELAY:



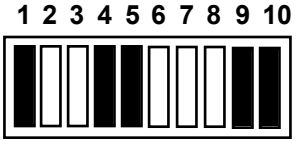
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



FOR 1.5 SECOND THROTTLE DELAY:

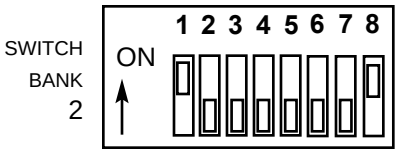


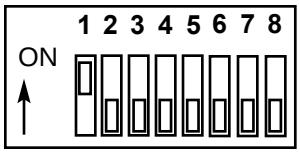
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)





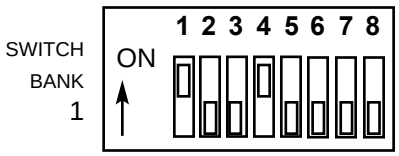
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

4.3 TROLL OPTIONS

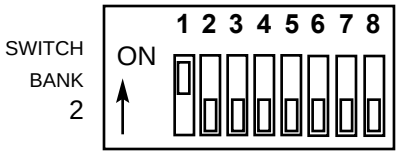
THROTTLE ON TOP OF TROLL: *Gives approximately 1200 RPM of throttle after reaching troll full lock-up.*

To make changes in throttle on top of troll, DIP switch bank 1 should always be set as follows:

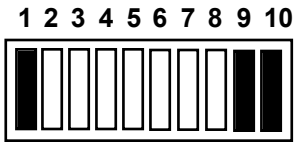


Set DIP switch bank 2 to the specific throttle on top of troll setting desired (see below):

FOR NO THROTTLE ON TOP OF TROLL:



LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

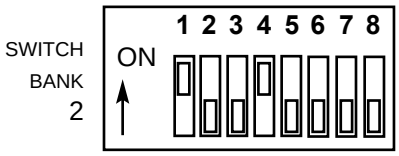


4.3 TROLL OPTIONS (CON'T)

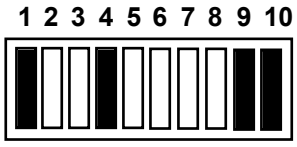
THROTTLE ON TOP OF TROLL(CON'T): *Gives approximately 1200 RPM of throttle after reaching troll full lock-up.*

Set DIP switch bank 2 to the specific throttle on top of troll setting desired (see below):

FOR THROTTLE ON TOP OF TROLL:

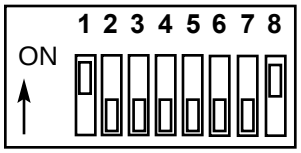


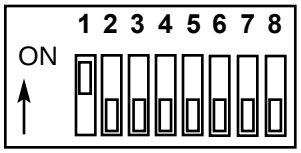
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)



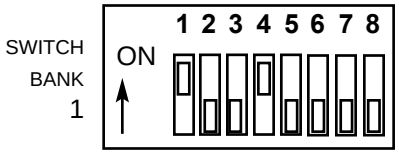


TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

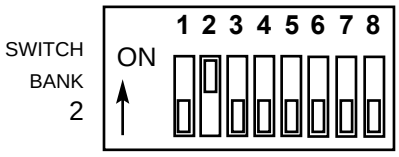
GEAR TO TROLL DELAY: *This feature delays troll modulation as the system goes from gear shift to troll modulation.*

To make changes in gear to troll delay, DIP switch bank 1 should always be set as follows:

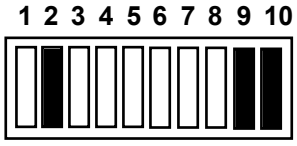


Set DIP switch bank 2 to the specific gear to troll delay setting desired (see below):

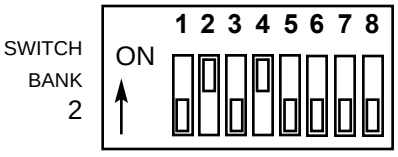
FOR NO GEAR TO TROLL DELAY:



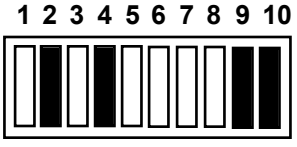
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



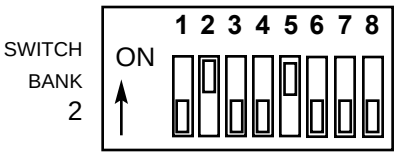
FOR 0.5 SECOND GEAR TO TROLL DELAY:



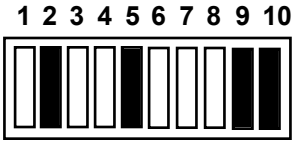
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



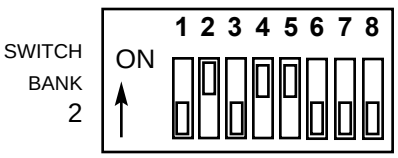
FOR 1.0 SECOND GEAR TO TROLL DELAY:



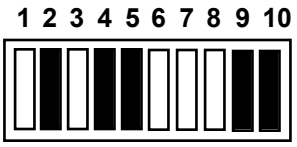
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



FOR 1.5 SECOND GEAR TO TROLL DELAY:



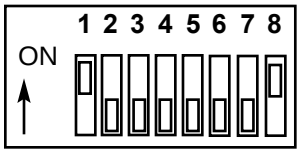
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

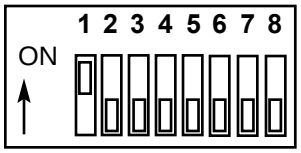


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





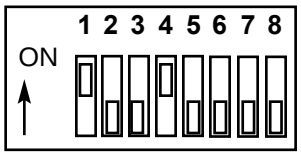
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

TROLL TO GEAR DELAY: *This feature delays gear shift as the system goes from troll modulation to gear shift.*

To make changes in troll to gear delay, DIP switch bank 1 should always be set as follows:

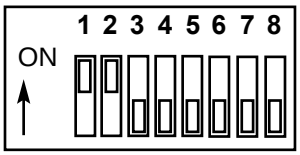
SWITCH BANK 1



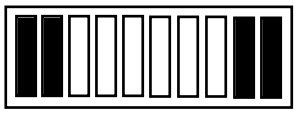
Set DIP switch bank 2 to the specific gear to troll delay setting desired (see below):

FOR NO TROLL TO GEAR DELAY:

SWITCH BANK 2

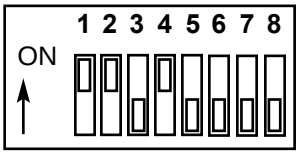


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

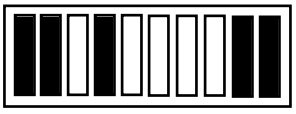


FOR 0.5 SECOND TROLL TO GEAR DELAY:

SWITCH BANK 2

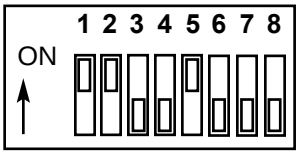


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

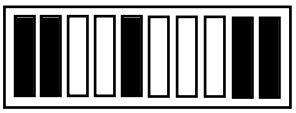


FOR 1.0 SECOND TROLL TO GEAR DELAY:

SWITCH BANK 2

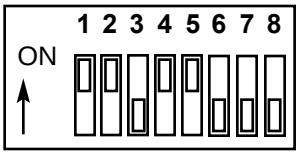


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

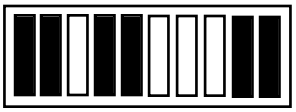


FOR 1.5 SECOND TROLL TO GEAR DELAY:

SWITCH BANK 2



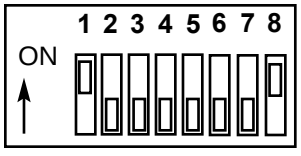
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

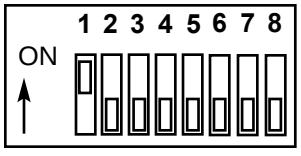


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

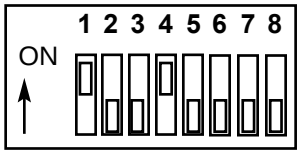
SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

4.3 TROLL OPTIONS (CON'T)

TROLL TO THROTTLE DELAY: *Delays throttle output as the system goes from neutral to ahead / astern with throttle to allow gears to shift before adding throttle.*

To make changes in troll to throttle delay, DIP switch bank 1 should always be set as follows:

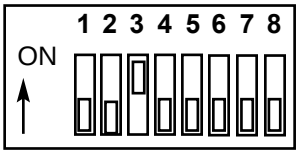
SWITCH BANK 1



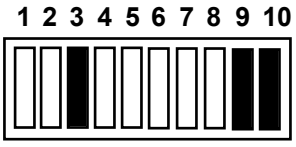
Set DIP switch bank 2 to the specific troll to throttle delay setting desired (see below):

FOR NO TROLL TO THROTTLE DELAY:

SWITCH BANK 2

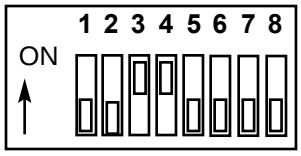


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

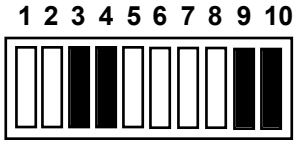


FOR 0.5 SECOND TROLL TO THROTTLE DELAY:

SWITCH BANK 2

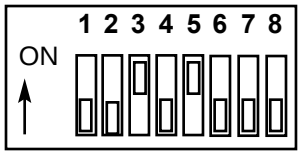


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

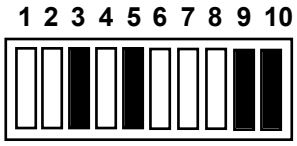


FOR 1.0 SECOND TROLL TO THROTTLE DELAY:

SWITCH BANK 2

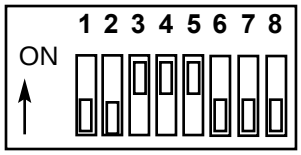


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

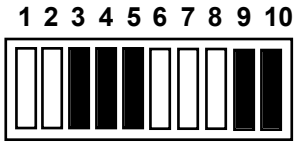


FOR 1.5 SECOND TROLL TO THROTTLE DELAY:

SWITCH BANK 2



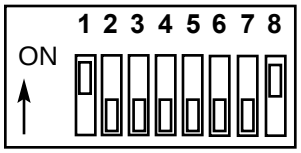
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

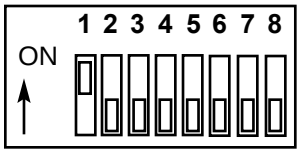


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





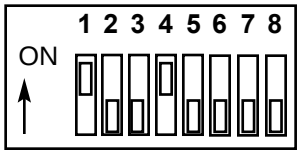
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

THROTTLE TO TROLL DELAY: *Delays troll modulation as the system goes from throttle to troll modulation. Used for throttle on top end of troll.*

To make changes in throttle to troll delay, DIP switch bank 1 should always be set as follows:

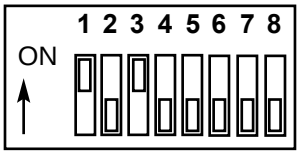
SWITCH BANK 1



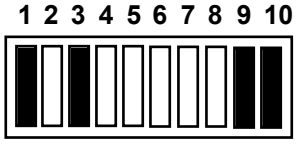
Set DIP switch bank 2 to the specific throttle to troll delay setting desired (see below):

FOR NO THROTTLE TO TROLL DELAY:

SWITCH BANK 2

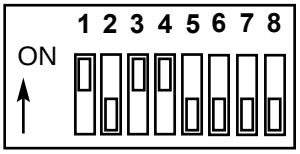


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

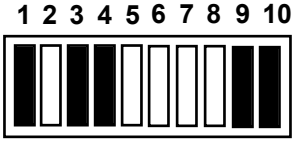


FOR 0.5 SECOND THROTTLE TO TROLL DELAY:

SWITCH BANK 2

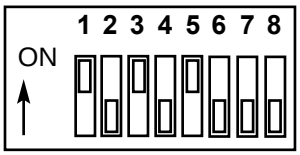


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

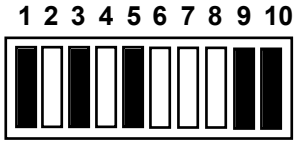


FOR 1.0 SECOND THROTTLE TO TROLL DELAY:

SWITCH BANK 2

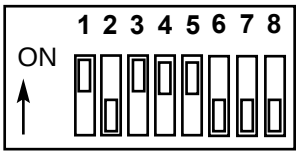


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

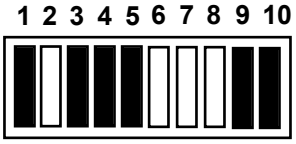


FOR 1.5 SECOND THROTTLE TO TROLL DELAY:

SWITCH BANK 2



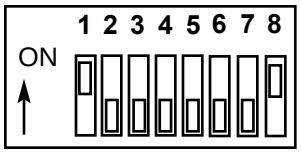
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

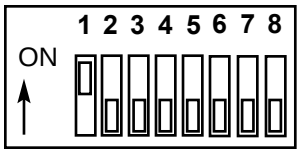


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

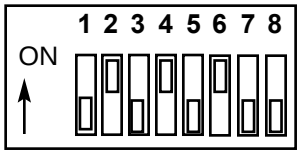
SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

4.4 BUMP / HI-IDLE OPTIONS

TO SET THE NUMBER OF BUMPS AVAILABLE: *This feature allows you to change the number of small changes or "bumps" in engine speed which are available to the system.*

To make changes in number of bumps, DIP switch bank 1 should always be set as follows:

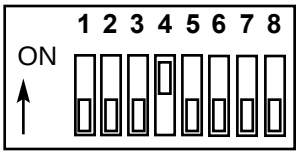
SWITCH BANK 1



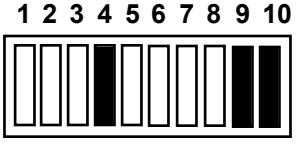
Set DIP switch bank 2 to the specific number of bumps desired (see below):

FOR 10 BUMPS (UP / DWN):

SWITCH BANK 2



LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



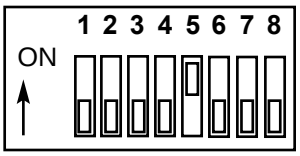
4.4 Bump / Hi-Idle Options (con't)

TO SET THE NUMBER OF BUMPS AVAILABLE (CON'T): *This feature allows you to change the number of small changes or "bumps" in engine speed which are available to the system.*

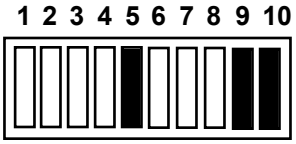
Set DIP switch bank 2 to the specific number of bumps desired (see below):

FOR 20 BUMPS (UP / DWN):

SWITCH BANK 2

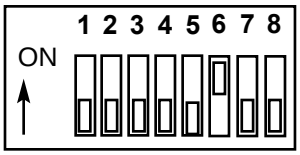


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

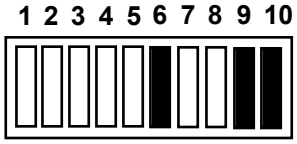


FOR 30 BUMPS (UP / DWN):

SWITCH BANK 2

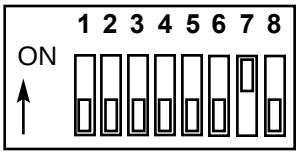


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

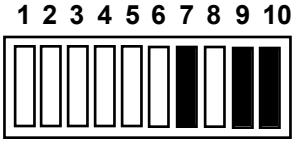


FOR 40 BUMPS (UP / DWN):

SWITCH BANK 2



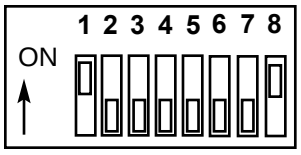
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

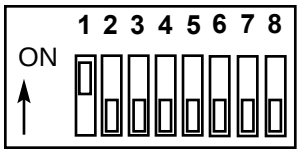


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





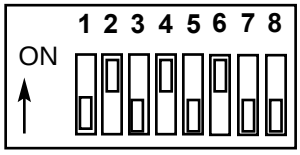
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

TO INCREASE THE SIZE OF EACH BUMP: *This feature allows you to change the amount of increases or decreases in engine speed for each "bump".*

To make changes in the size of each bump, DIP switch bank 1 should always be set as follows:

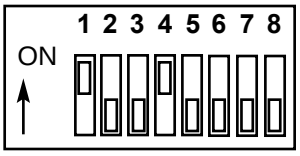
SWITCH BANK 1



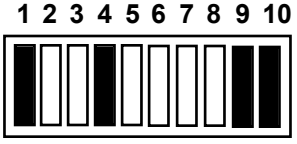
Set DIP switch bank 2 to the specific size of each bump setting desired (see below):

TO INCREASE EACH BUMP BY .5% OF TOTAL THROTTLE:

SWITCH BANK 2

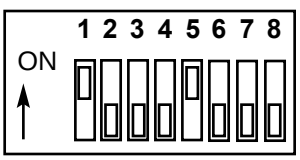


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

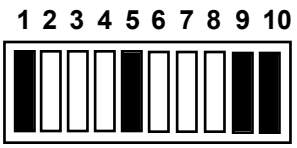


TO INCREASE EACH BUMP BY 1% OF TOTAL THROTTLE:

SWITCH BANK 2

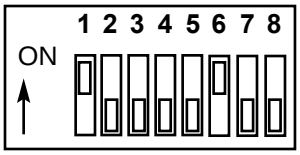


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

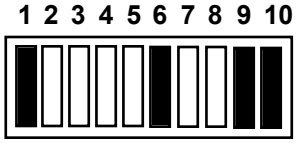


TO INCREASE EACH BUMP BY 1.5% OF TOTAL THROTTLE:

SWITCH BANK 2

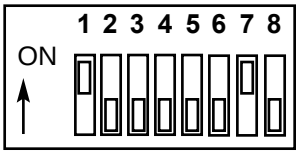


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

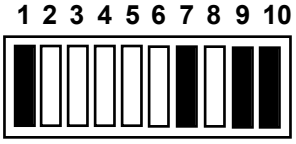


TO INCREASE EACH BUMP BY 2% OF TOTAL THROTTLE:

SWITCH BANK 2



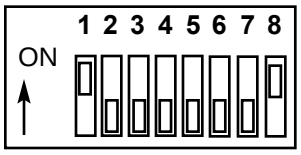
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

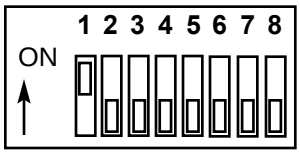


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





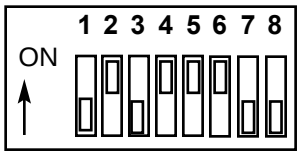
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

TO SET THE NUMBER OF HIGH IDLE SETTINGS: *This feature allows you to change the number of high idle settings that are available to the system.*

To set the number of high idle settings, DIP switch bank 1 should always be set as follows:

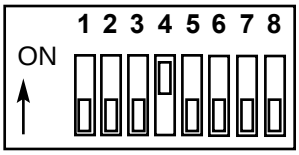
SWITCH BANK 1



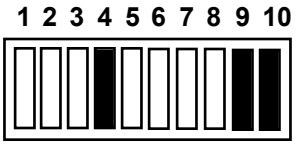
Set DIP switch bank 2 to the specific size of each bump setting desired (see below):

TO SET THE NUMBER OF HIGH IDLE SETTINGS TO 5:

SWITCH BANK 2

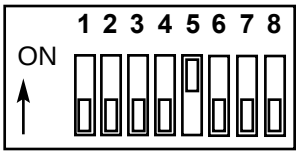


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

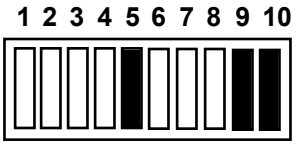


TO SET THE NUMBER OF HIGH IDLE SETTINGS TO 10:

SWITCH BANK 2

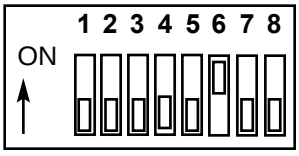


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

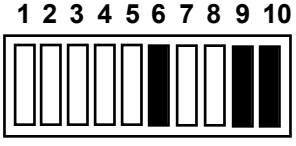


TO SET THE NUMBER OF HIGH IDLE SETTINGS TO 15:

SWITCH BANK 2

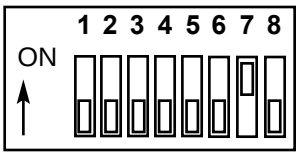


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

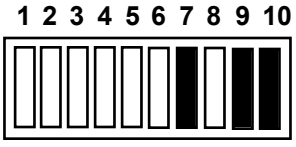


TO SET THE NUMBER OF HIGH IDLE SETTINGS TO 20:

SWITCH BANK 2



LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS



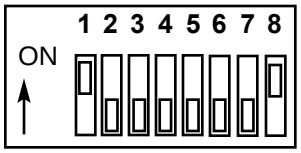
4.4 Bump / Hi-Idle Options (con't)

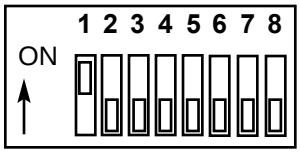
TO SET THE NUMBER OF HIGH IDLE SETTINGS AVAILABLE (CON'T): *This feature allows you to change the number of high idle settings that are available to the system.*

Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





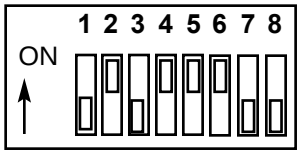
TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

TO SET THE SIZE OF EACH HIGH IDLE SETTINGS: *This feature allows you to change the amount of each high idle step.*

To set the size of each high idle setting, DIP switch bank 1 should always be set as follows:

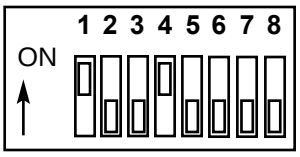
SWITCH BANK 1



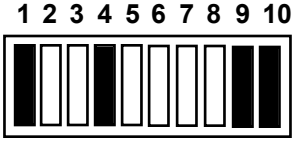
Set DIP switch bank 2 to the specific size of each high idle setting desired (see below):

TO INCREASE EACH STEP TO 1% OF TOTAL THROTTLE:

SWITCH BANK 2

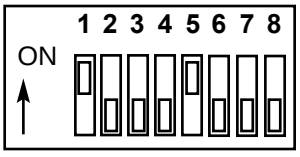


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

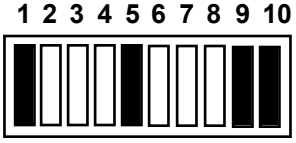


TO INCREASE EACH STEP TO 2% OF TOTAL THROTTLE:

SWITCH BANK 2

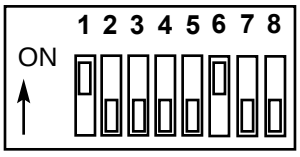


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

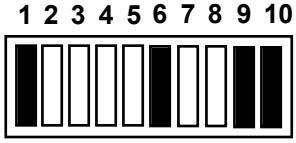


TO INCREASE EACH STEP TO 3% OF TOTAL THROTTLE:

SWITCH BANK 2

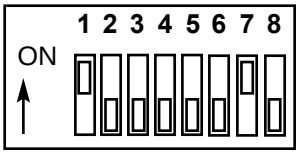


LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

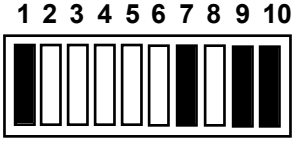


TO INCREASE EACH STEP TO 4% OF TOTAL THROTTLE:

SWITCH BANK 2



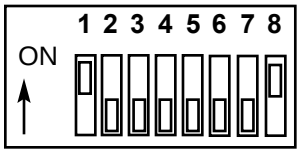
LEDS SHOULD MATCH SWITCH BANK 2 SETTINGS

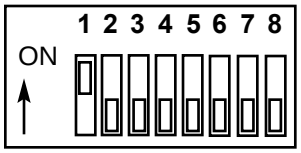


Once LEDs match switch bank 2 settings, complete activation procedure (see below):

TURN "ON" SWITCH 8 ON SWITCH BANK 2 TO ACTIVATE SETTINGS (INDICATED BY ALL LEDS ON)

SWITCH BANK 2





TURN "OFF" SWITCH 8 ON SWITCH BANK 2 AFTER ALL LEDS ARE LIT TO CONTINUE CALIBRATION OF SYSTEM

SWITCH BANK 2 SWITCHES WOULD CORRESPOND TO THE LAST ADJUSTMENT SETTING MADE BEFORE SWITCH 8 IS TURNED "ON".

5.0 SYSTEM TEST AND CHECKOUT

System test and checkout consists of 2 steps:

1) Component installation checks — verify that the components appear to be correctly mounted and installed.
2) Operational tests — make sure the system is operating correctly.

5.1 COMPONENT INSTALLATION CHECKS

A. Control Processor

1.1	Verify Control Processor is securely fastened to boat structure.
1.2	Verify electrical power connections: *Battery Negatives*—Negatives from both batteries should be connected (not at Control Processor. It is vital that there be zero voltage potential between battery negative terminals. Battery negative terminals should be connected to Bonding system also. *Negative Lead*—Negative wire from EEC system is connected to single battery negative. *Positive Leads*—Power should be connected from Battery positive terminal or disconnect switch (battery side of switch) to EP via 25 amp fuse / circuit breaker. Check that all battery connections are tight. Verify that Bonding Wire is properly connected to Bonding stud (see sec. 3.7).
1.3	Verify that all connectors are properly inserted into their recepticles (Station Cables, Transmission Cables, Throttle Cables, and Troll Cables). DO NOT FORCE connectors into recepticles!. All wires should be secured with tie-wraps along route.
1.4	Close Control Processor Cover.

B. Control Head(s)

2.1	Verify Control Head(s) are securely fastened to boat structure.
2.2	Verify that all small (14 pin) and large (16 pin) connectors are properly inserted into their recepticles. DO NOT FORCE connectors into recepticles!. All wires should be secured with tie-wraps along route.
2.3	Verify that Control Handles have an unobstructed freedom of movement (full ahead and full reverse).
2.4	Return all handles to NEUTRAL.

5.2 OPERATIONAL CHECKS — System checks can be performed without the engines running.

A. General Functions

NOTE: While performing system checks, verify that the “Check System” LED stays OFF. If it comes ON, the system is in Alarm Mode (see pg.) and alarm condition must be checked and corrected before proceeding.

3.1	Turn System ON (see sec. 2.1).
3.2	Verify at the main station various functions: Warm up, Slow, Troll, Sync.
3.3	Transfer control to other stations (see pg.) and verify proper operation of functions at each station.

B. Start Interlock

4.1	Move Starboard Control Handle out of NEUTRAL position. Attempt to start engine. *(NOTE: Be prepared to immediately shutdown engine if start interlock has been wired incorrectly!)*
4.2	Engine should NOT start; if it does, start interlock has not been wired correctly. Fix wiring and re-check.
4.3	Move Starbord Control Handle back to NEUTRAL position.
4.4	Perform same check for Port engine.

C. Power Inputs

5.1	To verify separate power inputs, turn ON individual breakers one at a time and verify that DC power (12 or 24 VDC) is supplied to the Control Processor.

D. Engine Room Checks

6.1	Gear Operation — Verify that transmission solenoid valves are turning ON and OFF as you move Control Handles into and out of gear.

6.0 TROUBLESHOOTING MODE

Whenever the EEC-2001 system goes into Alarm Mode, a code is stored in the system memory which indicates the diagnostic alarm that was encountered. This error code may be retrieved from the system at any time from the Control Head or from the Control Processor's LED indicators and DIP switches. To save time from running down to the engine room, we will discuss how to recover alarm codes from the Handle Troubleshoot Mode at the Main Station Control Head.

6.1 ENTERING HANDLE TROUBLESHOOT MODE

1. Turn system power OFF.
2. Move one control handle out of NEUTRAL position at the main station.
3. Turn system power ON (the two outer LEDs — TAKE and TROLL — will be ON).
4. Press the two outer buttons (TAKE and TROLL) on the main station handle.
5. You are now in Handle Troubleshoot Mode.

6.2 TO RETRIEVE ALARM COUNT AND / OR ALARM CODES

While in Handle Troubleshoot Mode the system will show the alarm code by illuminating the LEDs on the keypad in two (2) sets of 4 lights indicated by the Control Head beeping and not beeping every 4 seconds. It is important to write down the flashing light sequence in order to retrieve the alarm codes (see pg. 12).

1. Press the left most button (TAKE) to retrieve the most recent alarm/warning code.
2. Record the alarm code(s) on a piece of paper and press the TAKE button again to retrieve the next previous alarm code.
3. Repeat step 2 until all alarm codes have been read and recorded (NOTE: Only 16 most recent alarm codes will be stored in the system memory. If all 16 alarm codes have been filled the system will repeat the process a display the most recent alarm code again).
4. With all the alarm codes recorded, consult the Alarm Code Troubleshoot Table to determine the cause of the problem.

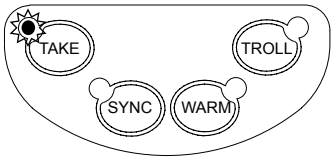
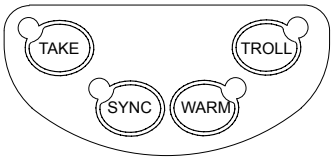
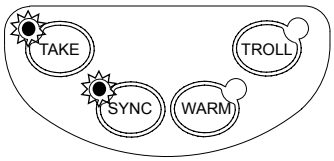
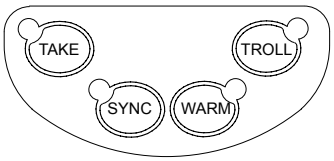
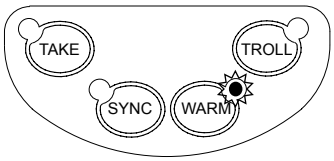
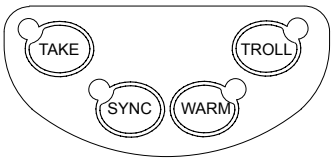
6.3 TO DELETE ALARM CODES AND EXIT HANDLE TROUBLESHOOT MODE

1. To delete all 16 most recent alarm codes and reset the alarm count to zero, press the two (2) right most buttons (WARM and TROLL) at any time after entering Handle Troubleshoot Mode.
2. All the keypad LEDs will flash to indicate that the alarms have been deleted.
3. To exit Handle Troubleshoot Mode, move the Main Station Control Handles to NEUTRAL and the system will immediately enter normal RUN Mode.

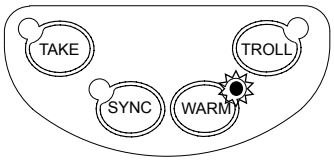
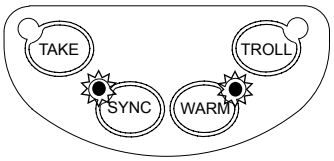
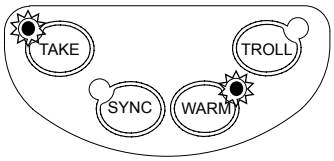
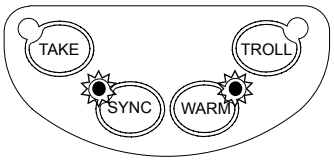
6.4 Alarm Code Troubleshoot Table

LEGEND
✹ = *indicates light is illuminated.*

When these alarms occur, the system WILL NOT operate:

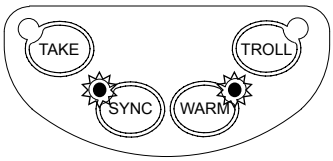
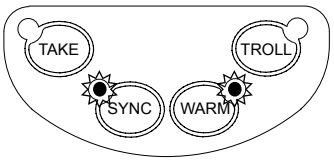
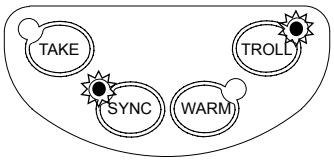
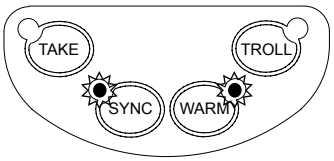
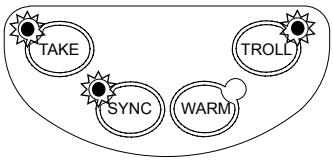
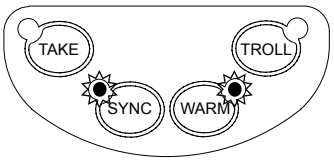
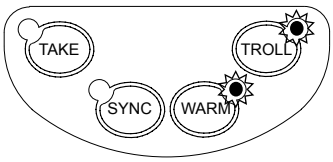
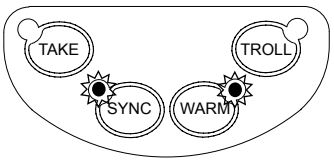
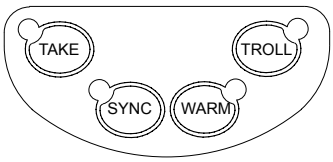
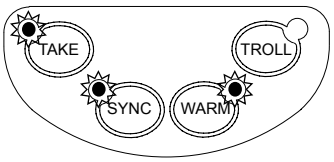
ALARM INDICATOR	ALARM DESCRIPTION	COMMENTS
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	No handle connected to CP at startup *(No handle present at startup)*	Make sure station cables are properly connected to both the Control Handles and CP. Restart system.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Combined battery voltage is too low for system operation (<9.5 V) *(batt bus lo alarm)*	System will SHUT DOWN. When battery voltage goes back to within proper range—Restart system.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Combined battery voltage is too high for system operation (>33.5 V) *(batt bus hi alarm)*	System will SHUT DOWN. When battery voltage goes back to within proper range—Restart system.

When these alarms occur, the system WILL CONTINUE to operate only the particular feature will not operate:

ALARM INDICATOR	ALARM DESCRIPTION	COMMENTS
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 1 handle disconnected during operation. *(CS1 handle disconnect alarm)*	CS1 will go to IDLE / NEUTRAL Take control at different Control Station; Plug CS Connector in Handle or Processor and return handles to NEUTRAL.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 2 handle disconnected during operation. *(CS2 handle disconnect alarm)*	CS2 will go to IDLE / NEUTRAL Take control at different Control Station; Plug CS Connector in Handle or Processor and return handles to NEUTRAL.

When these alarms occur, the system WILL CONTINUE to operate only the particular feature will not operate:

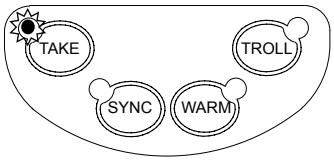
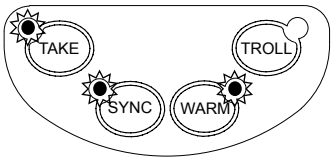
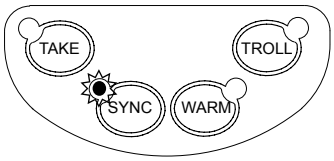
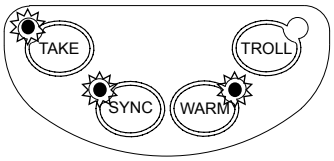
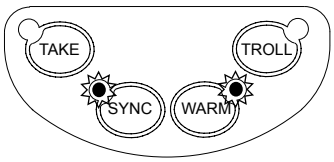
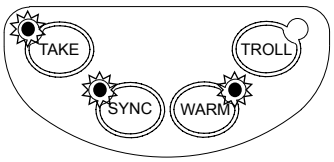
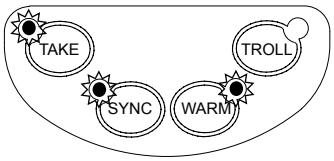
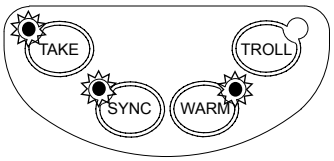
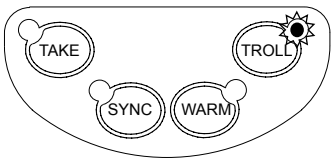
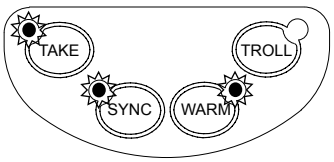
LEGEND
☼ = *indicates light is illuminated.*

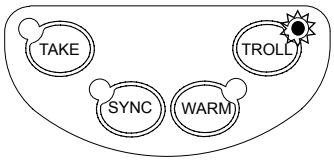
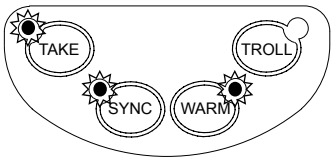
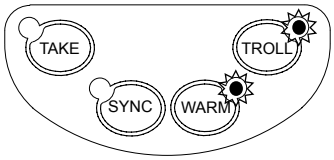
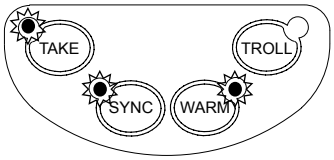
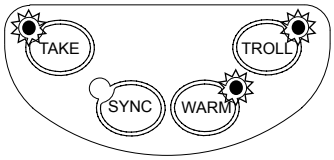
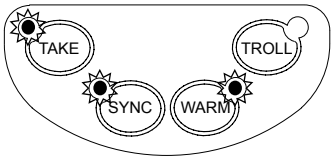
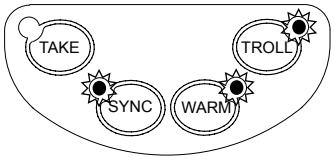
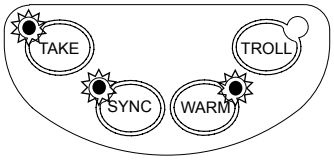
ALARM INDICATOR	ALARM DESCRIPTION	COMMENTS
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 3 handle disconnected during operation. *(CS3 handle disconnect alarm)*	CS3 will go to IDLE / NEUTRAL Take control at different Control Station; Plug CS Connector in Handle or Processor and return handles to NEUTRAL.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 1 Port Pot exceeded maximum limit (>4.96 V) *(CS1 port max pot alarm)*	CS1 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 2 Port Pot exceeded maximum limit (>4.96 V) *(CS2 port max pot alarm)*	CS2 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 3 Port Pot exceeded maximum limit (>4.96 V) *(CS3 port max pot alarm)*	CS3 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 1 Starboard Pot exceeded maximum limit (>4.96 V) *(CS1 stbd max pot alarm)*	CS1 Stbd side will go to IDLE / NEUTRAL; take control at different control station. Port side of control will continue to operate normally.

6.4 Alarm Code Troubleshoot Table (con't)

LEGEND
☼ = *indicates light is illuminated.*

When these alarms occur, the system WILL CONTINUE to operate only the particular feature will not operate:

ALARM INDICATOR	ALARM DESCRIPTION	COMMENTS
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 2 Starboard Pot exceeded maximum limit (>4.96 V) *(CS2 stbd max pot alarm)*	CS2 Stbd side will go to IDLE / NEUTRAL; take control at different control station. Port side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 3 Starboard Pot exceeded maximum limit (>4.96 V) *(CS3 stbd max pot alarm)*	CS3 Stbd side will go to IDLE / NEUTRAL; take control at different control station. Port side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 1 Port Pot and NID switch do not match *(CS1 port handle pot vs switch alarm)*	CS1 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 1 Port Pot and NID switch do not match *(CS1 port handle pot vs switch alarm)*	CS1 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 2 Port Pot and NID switch do not match *(CS2 port handle pot vs switch alarm)*	CS2 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.

ALARM INDICATOR	ALARM DESCRIPTION	COMMENTS
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 3 Port Pot and NID switch do not match *(CS3 port handle pot vs switch alarm)*	CS3 Port side will go to IDLE / NEUTRAL; take control at different control station. Starboard side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 1 Stbd Pot and NID switch do not match *(CS1 stbd handle pot vs switch alarm)*	CS1 Stbd side will go to IDLE / NEUTRAL; take control at different control station. Port side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 2 Stbd Pot and NID switch do not match *(CS2 stbd handle pot vs switch alarm)*	CS2 Stbd side will go to IDLE / NEUTRAL; take control at different control station. Port side of control will continue to operate normally.
Keypad Lights ***Slow Beep***  ***Fast Beep*** 	Control Station 3 Stbd Pot and NID switch do not match *(CS3 stbd handle pot vs switch alarm)*	CS3 Stbd side will go to IDLE / NEUTRAL; take control at different control station. Port side of control will continue to operate normally.

NOTES: If any alarm occurs, the cause of the alarm must be determined as soon as possible after returning to the dock. The alarm codes may be recovered to assist in troubleshooting. Contact Glendinning Marine Products for assistance.

Days (843) 399-6146 **Evenings (843) 477-6630**

The above number is a digital pager available during evening hours and/or weekends. Enter your phone # after you hear 3 beeps. Service personnel will return your call.

7.0 APPENDIX / REFERENCE

The Appendix / Reference section is divided as follows:

7.1 WIRING DIAGRAMS

CAT ECM / ZF BW WIRING DIAGRAM

Control Head (CH)

(up to 3 stations - standard)
(6 station capability - optional)

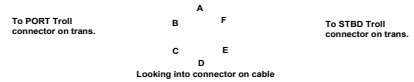
Control Station Cable
(10' - 150' long
- specify length)

Remote Power
Switch (SPST)
(Installer Supplied)

Transmission Harness - ZF BW 190 Shielded #18/4 Wire
- 6 pin Cannon connector on engine end
- wire terminals with numerical markers on CP end.
- 10, 15, 20, 25 or 30 foot long (please specify).

NOTE: Transmission gear selector coils must be the same voltage as the input voltage to the Control Processor (CP).

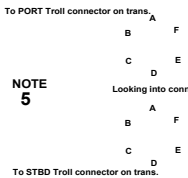
Normal voltage for ZF BW 190 is 24v DC



NOTE 5

Gear Wire Harness Connections: ZF BW190 ver. 1

Cannon	Terminal Connection on CP		
A	#2 on PORT Side	#4 on STBD Side	R1
B	#4 on PORT Side	#2 on STBD Side	B1
F	#1 and #3		R2

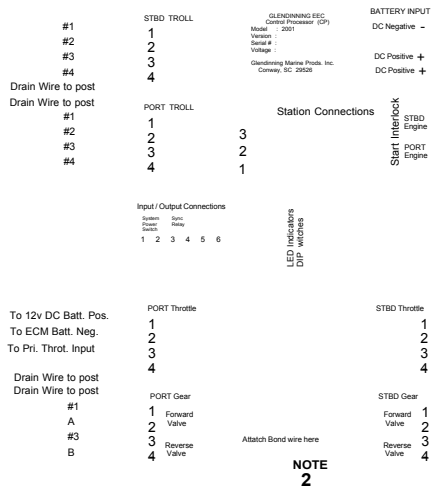


NOTE 5

Troll Harness - ZF BW190 Shielded #18/4 Wire
- 6 pin Cannon connector attatched on engine end
- wire terminals with numerical markers on CP end
- 10, 15, 20, 25 or 30 foot long (please specify)

Troll Wire Harness Connections: ZF BW190 ver. 1

Cannon Connector	Terminal Connection on CP	
A	#1	R1
F	#2	B1
B	#3	R2
C	#4	B2



NOTE 4

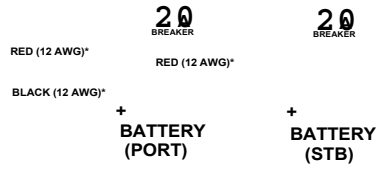
NOTE 2

Control Processor (CP)

(one CP controls up to two engines)
(CP mounted in the engine room)

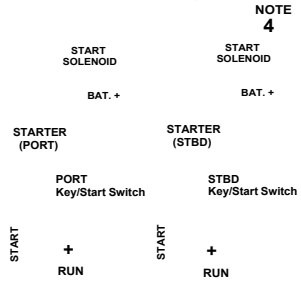
Battery Power Wiring

- 12 or 24v DC (system operational range 10 - 30 v DC)
- it is recommended to use each engine's battery system or two independent, seperately charged, battery systems

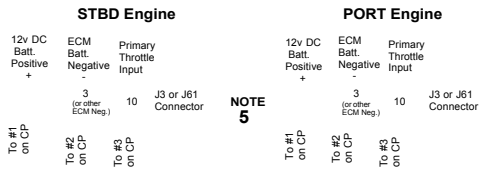


NOTE 3

Start Interlock Wiring



Throttle Harness - CAT ECM #18 gage Twisted Pair
- wire terminals with numerical markers on CP end
- stripped back with no terminals on engine end
- 10, 15, 20, 25 or 30 foot long (please specify)



NOTE 5

NOTE 5

NOTES:

1. All Wire Harnesses supplied by GMP are pre-terminated with proper engine/trans. connectors. Installer will supply and terminate: Battery Power Wire, Start-Interlock Wire, Remote Power Switch Wire and Bonding wire to CP Housing.
2. Bonding is done only at the Control Processor. All other components are already bonded to the Control processor. (In compliance with:ABYC #E-146&CFR Code 111.05)
3. Use 12 awg. wire. minimum
4. PORT and STBD uses seperated normally open relays. Current capacity is 15 amps. Relays close when system is turned on and the active control station is in neutral.
5. Power for the EEC system throttle must be 12v DC. This can be run from any source. NOTE: The CAT ECM negative must be common with this 12v DC negative.

GLENDINNING MARIN
740 Century Circle Conway, SC 2

WIRING DIAGRAM EEC 2001 - CA
with ZF BW 190/195 w/trolling

DATE: 7/01/01 Rev A

CAT ECM / ZF IRM WIRING DIAGRAMS

Control Head (CH)

(up to 3 stations - standard)
(6 station capability - optional)

Control Station Cable
(10' - 150' long
- specify length)

Remote Power
Switch (SPST)
(Installer Supplied)

Transmission Harness - ZF IRM 280/325 Shielded #18/2 Wire
- **DIN Solenoid Valve Connectors marked Forward and Reverse attatched to wire.**
- **wire terminals with numerical markers on CP end of wire.**
- **10, 15, 20, 25 or 30 foot long (please specify).**
- **see ZF manual/boat builder for information on which is the forward and reverse direction selector valve.**

NOTE: Transmission gear selector coils must be the same voltage as the input voltage to the Control Processor (CP).

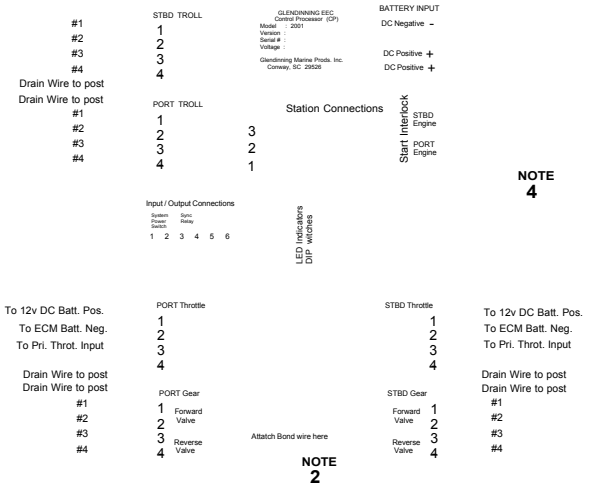
Troll Harness - ZF IRM 280 / 325 #18/4 Wire w/shield
- **Hydraforce Proportional Amplifier attatched to wire. Amplifier has been pre-set by Glendinning Marine.**
- **wire terminals with numerical markers on other end of wire**
- **10, 15, 20, 25 or 30' foot long (specify length)**

NOTE: Transmission troll valve coil must be the same voltage as the input voltage to the Control Processor (CP).

To PORT Troll Soleniod Coil on Trans.

NOTE 5

To STBD Troll Soleniod Coil on Trans.

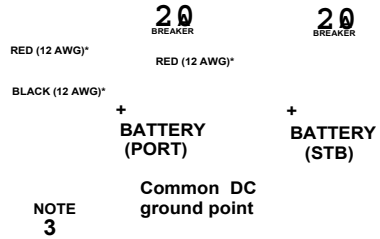


NOTE 4

NOTE 2

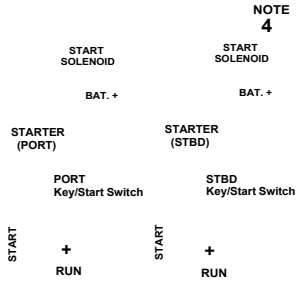
Battery Power Wiring

- 12 or 24v DC (system operational range 10 - 30 v DC)
- it is recommended to use each engine's battery system or two independent, seperately charged, battery systems

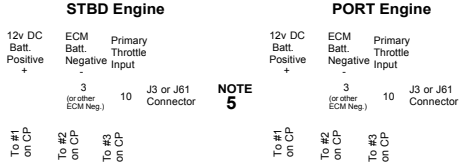


NOTE 3

Start Interlock Wiring



Throttle Harness - CAT ECM #18 gage Twisted Pair
- **wire terminals with numerical markers on CP end**
- **stripped back with no terminals on engine end**
- **10, 15, 20, 25 or 30 foot long (please specify)**

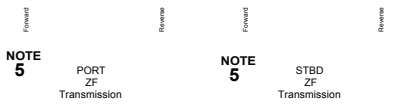


NOTE 5

NOTE 5

Control Processor (CP)

(one CP controls up to two engines)
(CP mounted in the engine room)



NOTE 5

NOTE 5

NOTES:

1. All Wire Harnesses supplied by GMP are pre-terminated with proper engine/trans. connectors. Installer will supply and terminate: Battery Power Wire, Start-Interlock Wire, Remote Power Switch Wire and Bonding wire to CP Housing.
2. Bonding is done only at the Control Processor. All other components are already bonded to the Control processor. (In compliance with:ABYC #E-146&CFR Code 111.05)
3. Use 12 awg. wire. minimum
4. PORT and STBD uses seperated normally open relays. Current capacity is 15 amps. Relays close when system is turned on and the active control station is in neutral.
5. Power for the EEC system throttle must be 12v DC. This can be run from any clean source. NOTE The CAT ECM negative must be comon with this 12v DC negative.

GLENDINNING MARINE
740 Century Circle Conway, SC 295

WIRING DIAGRAM EEC 2001 - CAT with ZF IRM 220/280/325 w/trolling

DATE: 7/01/01 Rev A

MAN 700 MMDS / ZF IRM WIRING DIAGRAM

Control Head (CH)

(up to 3 stations - standard)
(6 station capability - optional)

Troll Harness - ZF IRM 280 / 325 #18/4 Wire w/shield
- Hydraforce Proportional Amplifier attatched to wire. Amplifier has been pre-set by Glendinning Marine.
- wire terminals with numerical markers on other end of wire
- 10, 15, 20, 25 or 30' foot long (specify length)

NOTE: Transmission troll valve coil must be the same voltage as the input voltage to the Control Processor (CP).

To PORT Troll Soleniod Coil on Trans.

NOTE 5

To STBD Troll Soleniod Coil on Trans.

Battery Power Wiring

- for MAN EDC systems
24v DC must be used for EEC system power

20A BREAKER

20A BREAKER

RED (12 AWG)*

RED (12 AWG)*

BLACK (12 AWG)*

\+ BATTERY (PORT)

\+ BATTERY (STB)

Common DC ground point

NOTE 3

Control Station Cable
(10' - 150' long
- specify length)

Pin #3 (24v DC -)

#1
#2
#3
#4
Drain Wire to post
Drain Wire to post
#1
#2
#3
#4

STBD TROLL
PORT TROLL

GLENDINNING EEC
Control Processor (CP)
Model : 2001
Version :
Serial # :
Voltage :
Glendinning Marine Prods. Inc.
Conway, SC 29526

BATTERY INPUT
DC Negative –
DC Negative –
DC Positive +
DC Positive +

Station Connections

Start Interlock
STBD Engine
PORT Engine

To Start Interlock Circuit

Normally open Relays
15 amp MAX

NOTE 4

Input / Output Connections
System Power Switch
1 2 3 4 5 6

LED Indicators
DIP switches

Pin #3 (24v DC -)

Remote Power Switch (SPST) (Installer Supplied)

NOTE: If switch is not used a jumper must be installed in place of switch.

To PORT MAN X9 Connector

To PORT MAN X8 Connector

PORT Throttle
STBD Throttle

Pin # 9 (4-20 ma +)
Pin # 10 (4-20 ma -)
Drain Wire to post
Drain Wire to post

PORT Gear
STBD Gear

Forward Valve
Reverse Valve

Pin #1 (24v DC +)
Pin #2 (24v DC +)

Attatch Bond wire here

NOTE 2

To STBD MAN X9 Connector

To STBD MAN X8 Connector

Control Processor (CP)

(one CP controls up to two engines)
(CP mounted in the engine room)

MAN Throttle Wiring

All throttle connections are installed in the MAN Terminal box

Control Processor	MAN X9 Connector	
#2	#9	4-20ma (+)
#3	#10	4-20ma (-)

Jumpers in Connector required: #11 to #13 and #12 to #14

MAN Transmission Wiring

All transmission connections are installed in the MAN Terminal box

Control Processor	MAN X8 Connector	
#2	#1	Ahead Gear 24v DC (+)
#4	#2	Astern Gear 24v DC (+)
DC Neg (-)	#3	Gearbox Neg. (-)

NOTES:

1. All Wire Harnesses supplied by GMP are pre-terminated with proper engine/trans. connectors. Installer will supply and terminate: Battery Power Wire, Start-Interlock Wire, Remote Power Switch Wire and Bonding wire to CP Housing.
2. Bonding is done only at the Control Processor. All other components are already bonded to the Control processor. (In compliance with:ABYC #E-146&CFR Code 111.05)
3. Use 12 awg. wire. minimum
4. PORT and STBD uses seperated normally open relays. Current capacity is 15 amps. Relays close when system is turned on and the active control station is in neutral.
5. (If applicable) Do not terminated the drain wire at this end. Cut off and leave unconnected.

GLENDINNING MARINE
740 Century Circle Conway, SC 29526

WIRING DIAGRAM EEC 2001 - MAN 700 I with ZF IRM 220/280/325 trolling

DATE: 8/3/01 Rev A

VOLVO 74 EDC / ZF IRM WIRING DIAGRAM

Control Head (CH)

(up to 3 stations - standard)
(6 station capability - optional)

Troll Harness - ZF IRM 280 / 325 #18/4 Wire w/shield
- Hydraforce Proportional Amplifier attatched to wire.
Amplifier has been pre-set by Glendinning Marine.
- wire terminals with numerical markers on other end of wire
- 10, 20 or 30' foot long (specify length)

To PORT Troll Solenoid Coil on Trans.

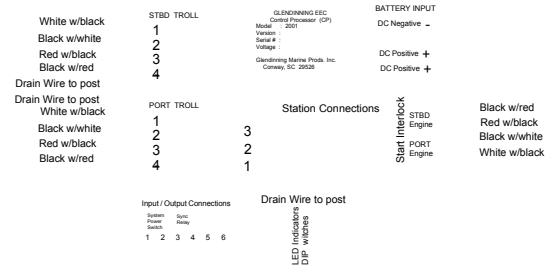
NOTE 5

NOTE: Transmission troll valve coil must be the same voltage as the input voltage to the Control Processor (CP).

To STBD Troll Solenoid Coil on Trans.

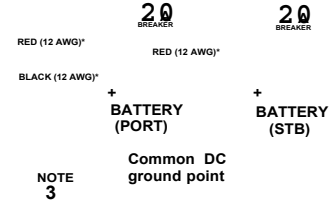
Control Station Cable
(10' - 150' long
- specify length)

Remote Power
Switch (SPST)
(Installer Supplied)



Battery Power Wiring

- it is recommended to use each engine's battery system
- If a separate battery system (house, generator) is used then remove the Red jumper (CP's Batt. + terminal to #1 terminal at the Throttle terminal) Then run engine battery power to the #1 position at each engines throttle terminal.



NOTE 3

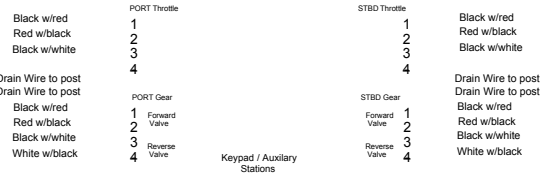
Start Interlock Wiring

NOTE 5

Engine Throttle Wiring

NOTE 5

Green / Black - +5 vDC
Green / Yellow - Ground
Green / Orange - Thottle Signal



NOTE 2

Control Processor (CP)

(one CP controls up to two engines)
(CP mounted in the engine room)

Transmission Harness - ZF IRM 280/325 Shielded #18/2
- DIN Solenoid Valve Connectors marked Forward and R attatched to wire.
- wire terminals with numerical markers on CP end of
- 10, 20 or 30 foot long (please specify).
- see ZF manual/boat builder for information on which forward and reverse direction selector valve.

NOTE: Transmission gear selector coils must be the same voltage as the input voltage to the Control Processor (CP).

NOTES:

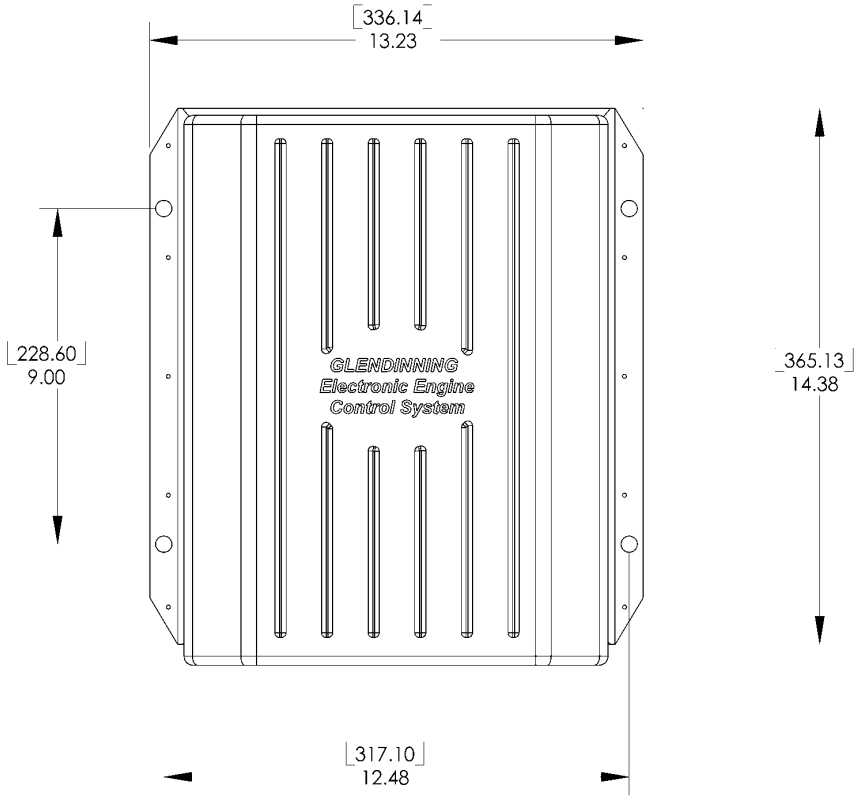
1. All Wire Harnesses supplied by GMP are pre-terminated with proper engine/trans. connectors. Installer will supply and terminate: Battery Power Wire, Start-Interlock Wire, Remote Power Switch Wire and Bonding wire to CP Housing.
2. Bonding is done only at the Control Processor. All other components are already bonded to the Control processor. (In compliance with:ABYC #E-146&CFR Code 111.05)
3. Use 12 awg. wire.
4. PORT and STBD uses seperated normally open relays. Current capacity is 15 amps. Relays close when system is turned on and the active control station is in neutral.
5. (If applicable) Do not terminated the drain wire at this end. Cut off and leave unconnected.

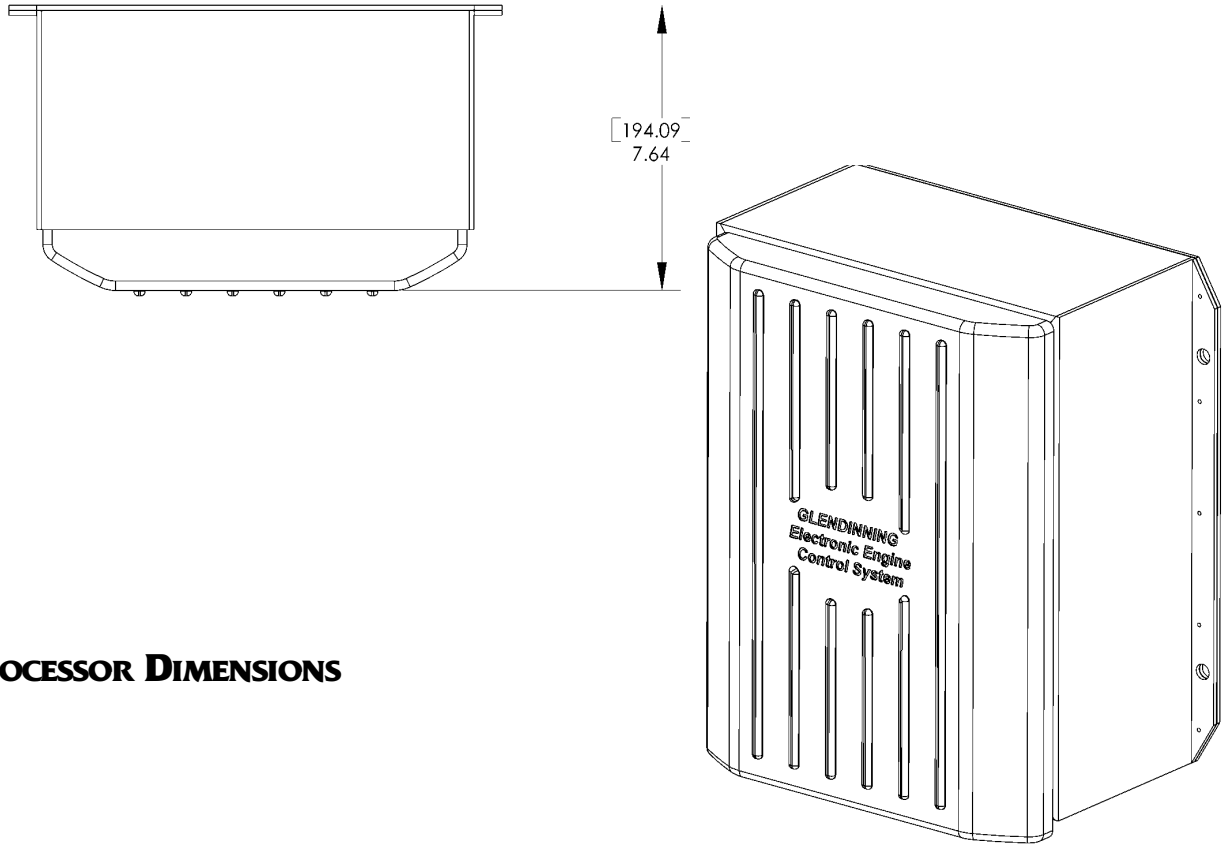
GLENDINNING MAI
740 Century Circle Conway, S

WIRING DIAGRAM EEC 2001 -
with ZF IRM 280/325 w/trolling

DATE: 3/20/01 Rev A

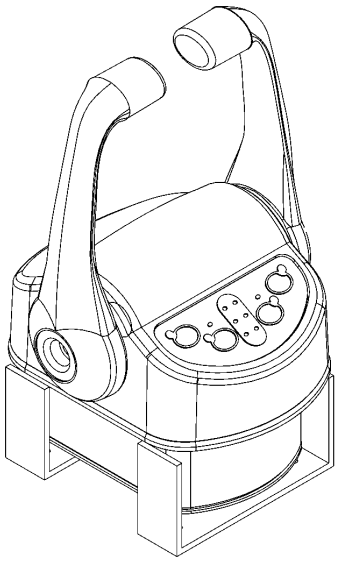
7.2 DIMENSIONAL DRAWINGS / CUTOUT TEMPLATES

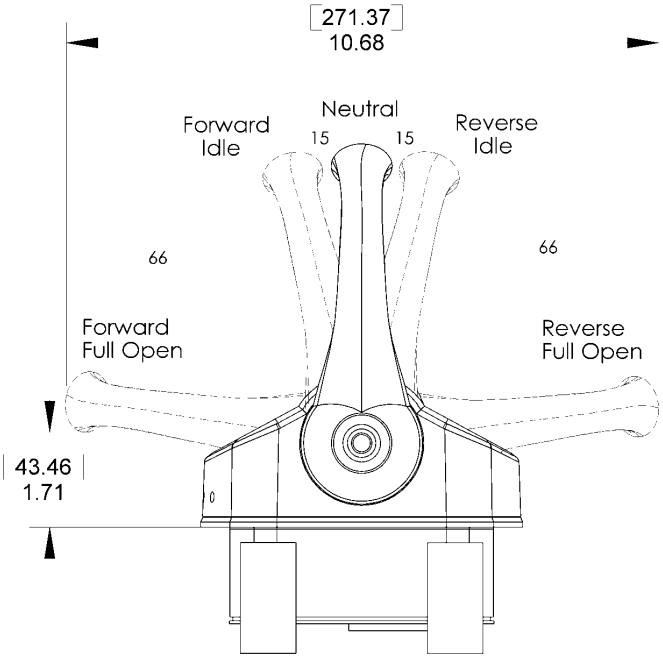


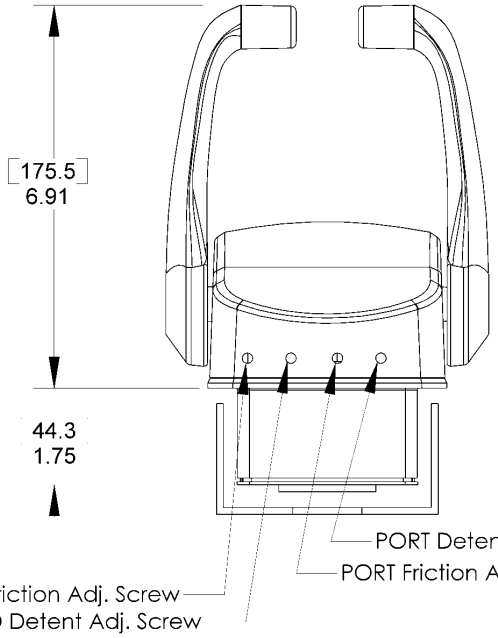


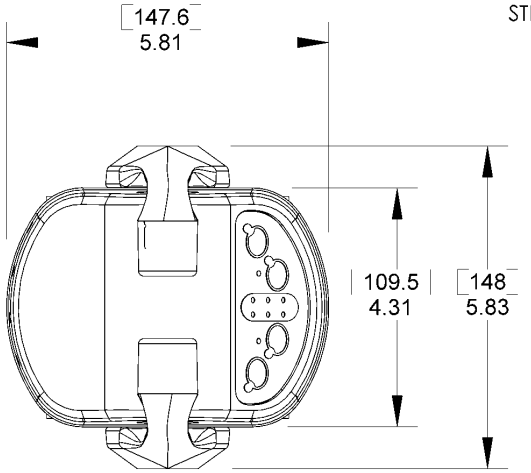
CONTROL PROCESSOR DIMENSIONS

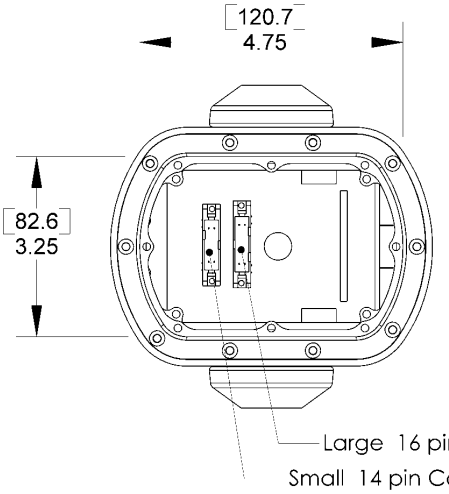
CONTROL HEAD DIMENSIONS



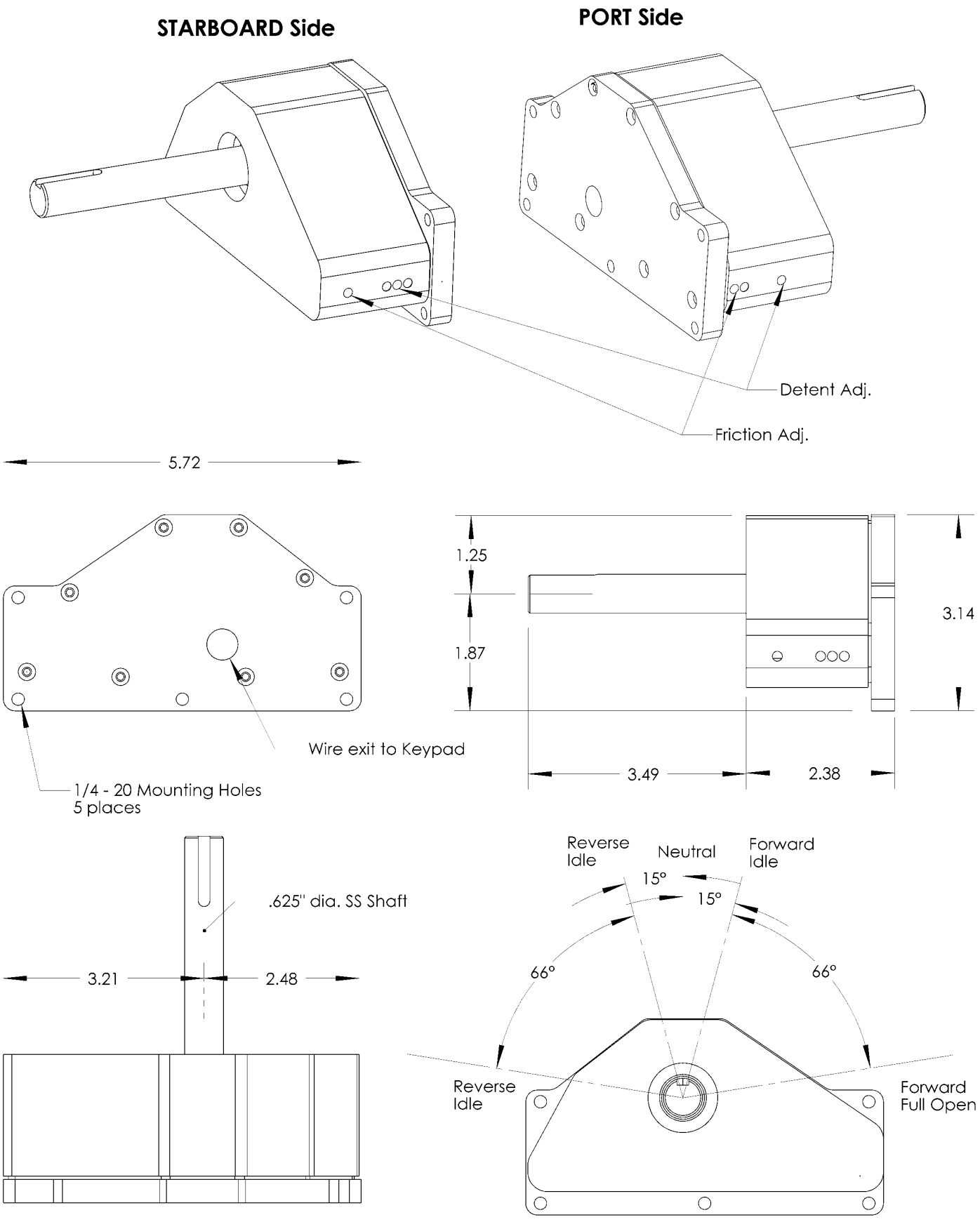






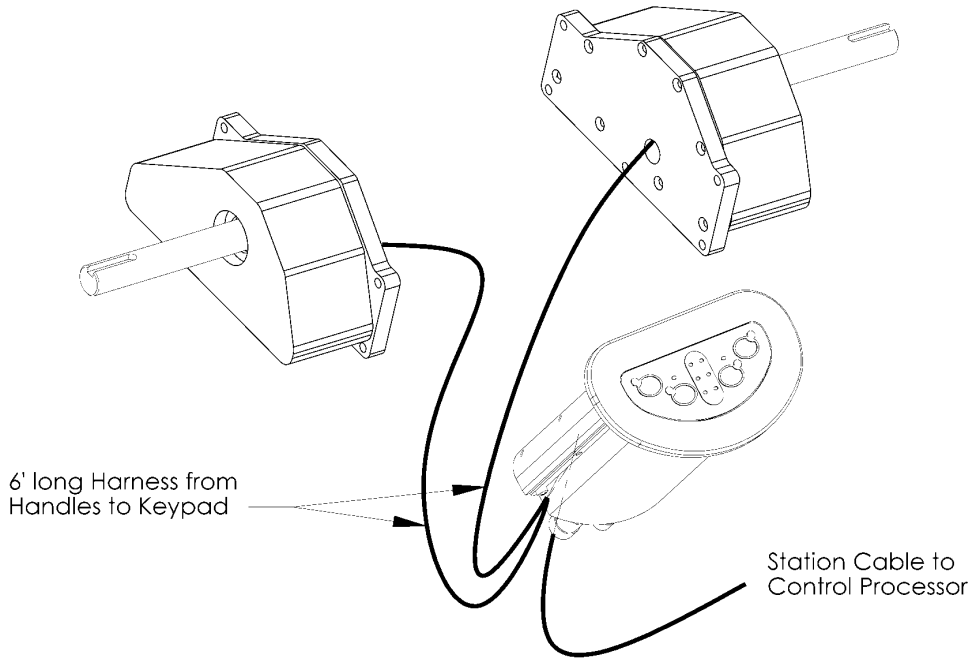


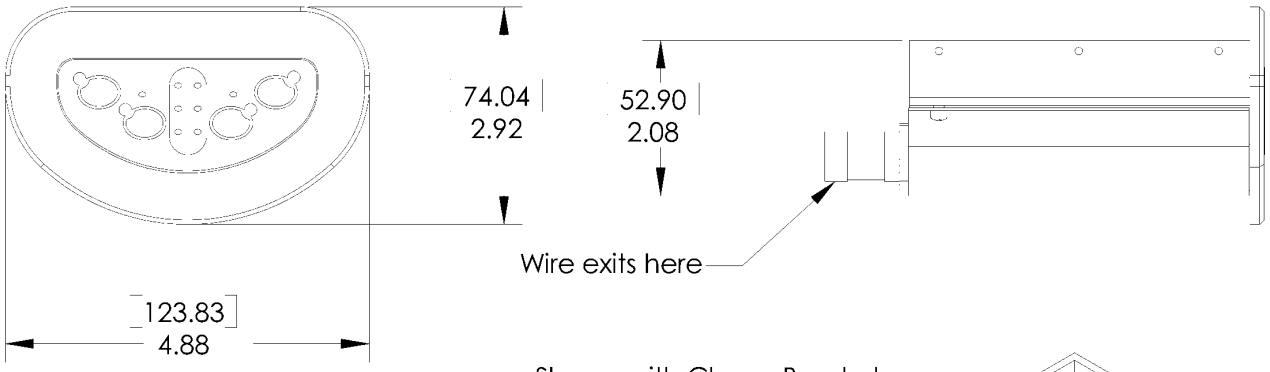
SIDEMOUNT CONTROL HEAD DIMENSIONS

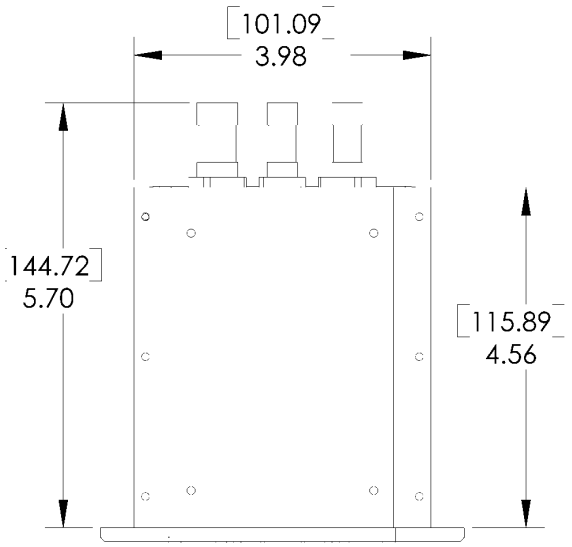


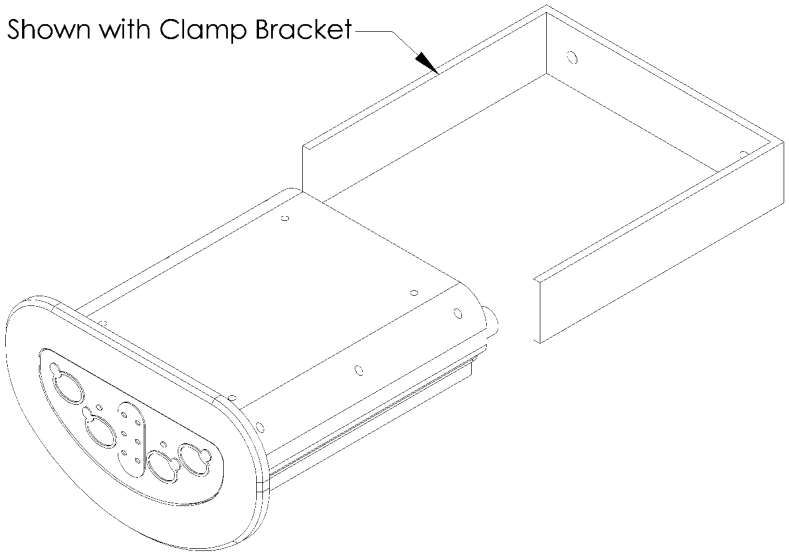
(STARBOARD Side Handle Shown)

SIDEMOUNT KEYPAD DIMENSIONS

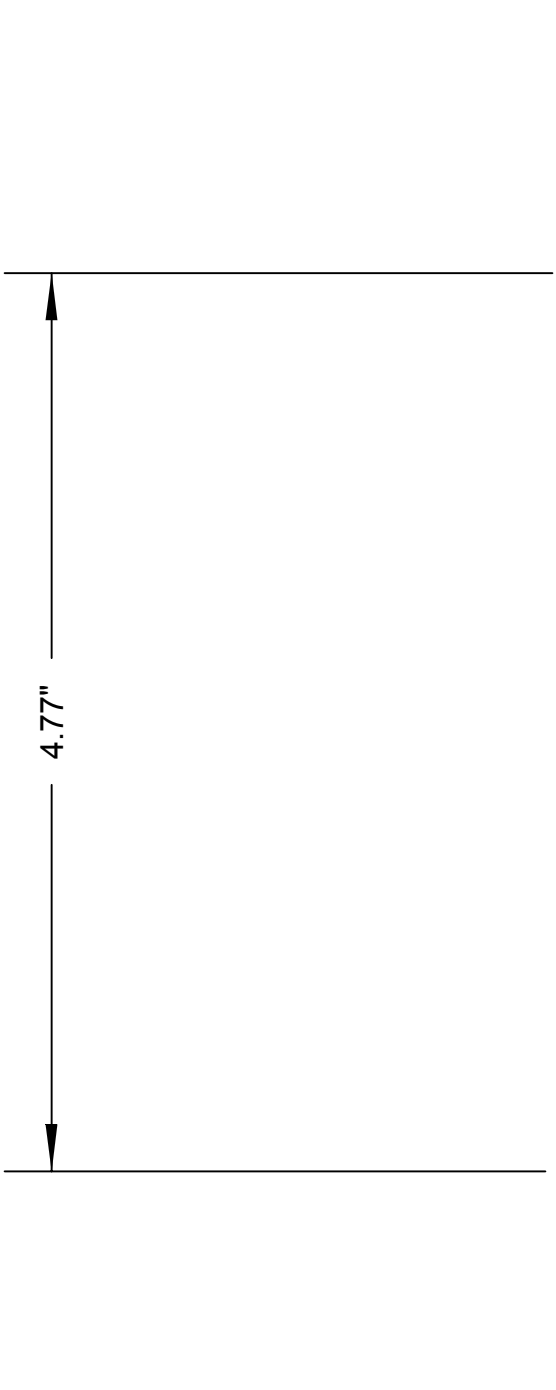








CONTROL HEAD TEMPLATE



SIDEMOUNT KEYPAD ASSEMBLY TEMPLATE