Electronic Control System Operation Manual for 6LY3 Series Engines

YANMAR®

ELECTRONIC
CONTROL
SYSTEM
MANOPLYM01
REVISION 3.0

Notice to Boat Manufacturer, Installer, and Consumer

Throughout this manual, warnings are used to alert the installer/operator to special instructions concerning a particular service or operation that may be hazardous if performed incorrectly or carelessly. Observe these alerts carefully!

These "safety alerts" alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing installation, operation, and maintenance plus "common sense" operation are the most effective accident prevention measures.

⚠ WARNING

This device should not be used as a navigational aid to prevent collision, grounding, boat damage, or personal injury. When the boat is moving, water depth may change too quickly to allow time for you to react. Always operate the boat at very slow speeds if you suspect shallow water or submerged objects.

CE RECREATIONAL CRAFT DIRECTIVE 94/25/EC

This product has been designed to be compliant with the above Directive.

Maximum performance, and compliance with the EMC Directive, can only be ensured by correct installation. It is strongly recommended that the installation conforms with the following standards:

APPLICABLE STANDARDS

a) ISO 8846 Small Craft-Electrical Devices
   Protection against ignition of surrounding flammable gases.
b) ISO = International Standards Organization

This device meets or exceeds the applicable ABYC, ISO, and USCG safe boating rules, regulations, standards, and guidelines.

SAFE BOATING ON THE WEB

U.S. Coast Guard www.uscg.mil
U.S. Power Squadron www.usps.org

NMEA 2000® is a registered trademark of the National Marine Electronics Association.

Disassembly and repair of this electronic unit should only be performed by authorized service personnel. Any modification of the serial number or attempt to repair the original equipment or accessories by unauthorized individuals will void the warranty. Handling and/or opening this unit may result in exposure to lead, in the form of solder.

California
Proposition 65 Warning

Diesel engine exhaust and some of its constituents are known to the state of California to cause cancer, birth defects, and other reproductive harm.

California
Proposition 65 Warning

Battery posts, terminals, and related accessories contain lead and lead compounds, chemicals known to the state of California to cause cancer and reproductive harm.
Wash hands after handling.

Contents

System Overview

Although the scope of this document relates to both single and dual engines, the instructions within depict the more widely used dual engine configuration.

Helm Components

This dual engine electronic control system consists of the following helm equipment:

- Two Yanmar i5601E Digital Displays (one, if single engine)
- Dual Shift & Throttle Control Head (single shift & throttle control head, if single engine)

Yanmar i5601E Digital Display

Note: Displays "Single" if single engine configuration.

The i5601E displays real-time data as well as warnings or alarms for any engine abnormality. Diagnostic codes will be stored for future reference by a Yanmar technician.

Shift & Throttle Control Head

CH67601: Trolling Switch (optional)

The Shift & Throttle Control Head selects the gear positions and the throttle settings. The Control Head has several lights that confirm modes of operation and display warnings, if present. Buttons enable engine RPM synchronization and shift disconnect as well as setting the brightness of the lights.

Other control configurations with similar functions may be used.

Start Up

Your electronic engine control system was configured at the factory with the default settings needed to initially start the system. See Appendix C.

1. Connect the battery terminals and turn the master battery switches to the "ON" position. Turn the engine control breaker switches on at the main breaker panel.

   Before starting the engines for the first time, take a moment to familiarize yourself with the shift and throttle controls and ignition switch. With the engines not running, move the control levers over the full range until you are familiar with the feel. Note that the detent pressure and drag can be adjusted using the adjusting screw on the front surface of the control head. The top screw sets the detent pressure; the lower screw sets the drag.

   Next, look at the ignition switch panels. The ignition switch may be a "rocker" type or conventional key type switch. On either type there are three positions: OFF – ON – START. Normal engine shut down is achieved by moving this switch to the OFF position.

   Next to the ignition switch is an EMERGENCY STOP switch. Moving the rocker switch to the off position (or turning the key to off) WILL result in the engine shutting down.

WARNING

In normal operating mode, the engine is started and stopped with either the key switch, or the OFF-ON-START rocker switch. When you switch to the OFF position, the engine can take up to about 5 seconds to stop running, allowing the engine to store certain information and make adjustments for easier restart.
In an emergency situation, you can use the Emergency Stop switch to kill all power to the engine. This will allow you to stop at once, but will not store data and make adjustments for an easy restart. A DTC (Diagnostic Trouble Code) will be generated and stored in the system indicating that the Emergency Stop was activated. You will notice the next time you start, that the engine will crank over for an unusually long time. This is normal for the engine to regain its memory and functions.

The Emergency Stop should only be used in an emergency.

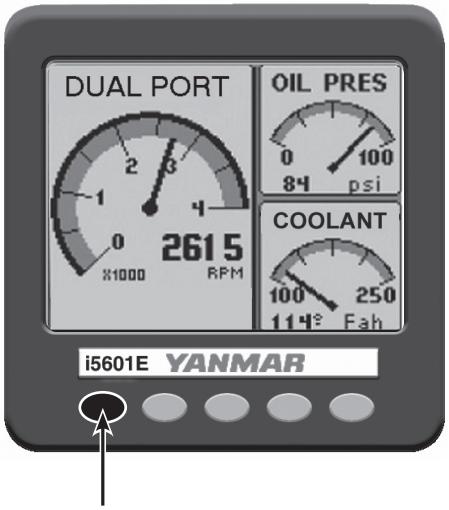
2. Place the control levers in neutral and turn the PORT ignition switch to the On position -- *but do not start the engine.* The green control head light will illuminate.
   a. Check to see if the green light on the control head is solid or flashing. If solid, proceed to the next step. If flashing, push the Select button to select the head. Position the control lever to neutral and the yellow light will now come on.
   b. Start the port engine.
   c. Turn on the starboard ignition systems.
   d. After a two-second wait, start the starboard engine.

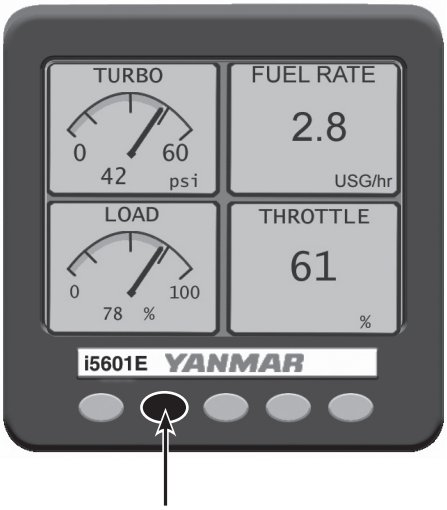
Redundant (Back-up) Throttle

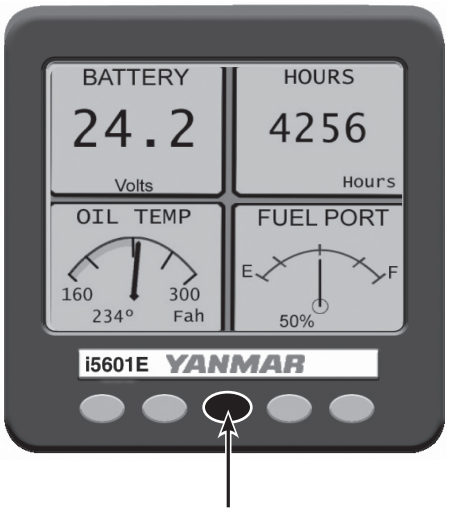
In the unlikely event that the throttle signal is lost between the helm mounted shift/throttle control head and the engine, the system is designed to revert to the redundant or back-up throttle. First, the engine would reduce rpms to idle speed, the digital display would show "Throttle Error," and a small red indicator light would flash at the key panel (or switch panel). Near the red light is a small potentiometer (looks like a volume control knob). Turn the knob ALL the way to counter-clockwise in order to take control of the throttle. Then turn the knob SLOWLY clockwise - the light will glow solid. You will have control of the throttle, however, you will NOT have shift control. At this point you must shut the engine off and restart, to return throttle control back to the shift/throttle control head. See transmission instructions for manual shifting.

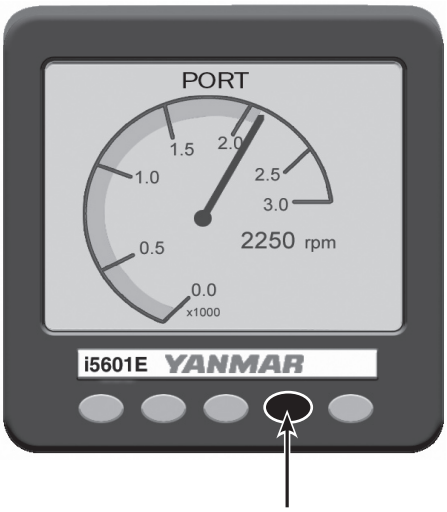
Start Up

When powered-up, the i5601E Digital Displays will initially display an introductory screen showing the software revision level. They will then display one of the following four screens:

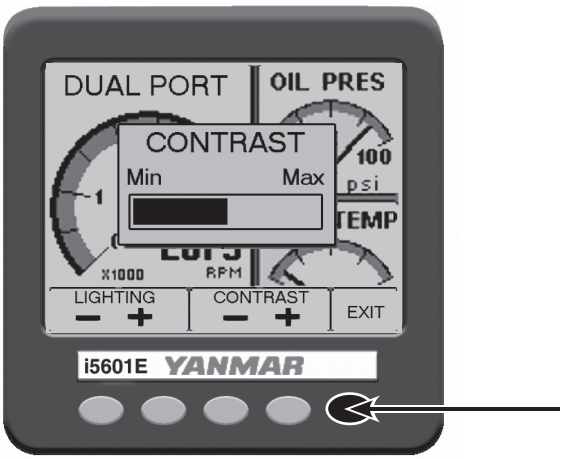






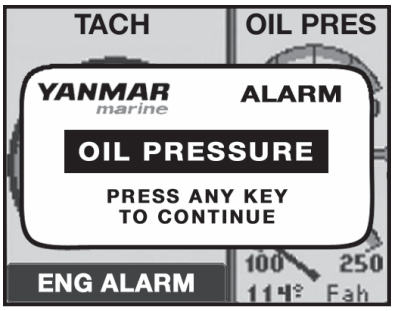


These screens show all of the key engine data and can be accessed by pushing a single button. The right-most button allows the contrast and brightness to be set.



Start Up

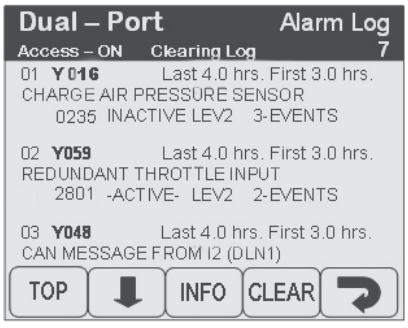
In the unlikely event that an engine fault occurs, a warning box appears in the display showing the cause of the fault, and the action to take, "Press Any Key To Continue."



Pressing any key acknowledges the alarm and immediately switches the display to the Alarms screen. The i5601E continues to beep until all alarm conditions (engine faults) have cleared. Unacknowledged alarms are shown as flashing boxes. Press any key to acknowledge alarm boxes that may still be flashing, and they will then change to a steady highlighted state.

YANMAR marine	PORT Alarm
HOT ENGINE	CHECK ENGINE
OVER REV	EMERGENCY STOP
OIL PRESSURE	LOW VOLTAGE
TURBO BOOST	ALTERNATOR
GEAR OIL	SEA WATER FLOW
ENG COM ERROR	LOW COOLANT
MAINTENANCE	WATER IN FUEL
NETWORK	MAIN THROTTLE
PWR REDUCTION	SEC THROTTLE
NEUTRAL PROTECT	SHUTTING DOWN

Alarm blocks remain highlighted as long as the alarm condition (engine fault) remains and will automatically reset to an un-highlighted state after the alarm condition has passed.



Engine Diagnostic Code Summary Screen

Note: The i5601E is an extremely versitle display. The four-left keys can be reconfigured to allow the user to display whatever screens he or she desires. For additional operational details, refer to Appenbdix A and the technical manual.

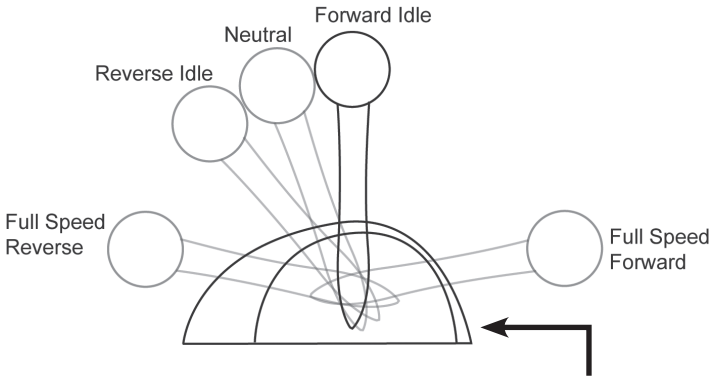
Shift & Throttle Control Head Functions

The Shift and Throttle Control Head comes with a dual function, single lever control. A single lever control initiates both shifting and throttle for a single engine.

Control Head Operation

WARNING
The boat will start to move during the next steps.
Be very cautious when first engaging the gears to establish that forward is truly forward and reverse is truly reverse. A quick in-and-out of gear test is recommended.
Ensure that the boat is clear of all obstacles forward and aft before conducting this test.

1. With the engine running and the control head(s) in neutral, the green and yellow control head lights should be illuminated.
2. Press the Neutral button(s) on the control head. The Neutral control head light(s) should flash.
3. Advancing the control lever(s) to the forward detent (that is, the position identified by a "click" feel) puts the boat in forward idle. Pushing the lever further forward increases the throttle setting. The same is true in the reverse direction.



Note that the detent pressure and drag can be adjusted using the adjusting screw on the front surface of the control head.

4. Return the control handle(s) to the neutral position.
5. Press the Neutral control head button(s). The neutral light(s) will stop flashing and remain continuously lit.

Control Head Operation

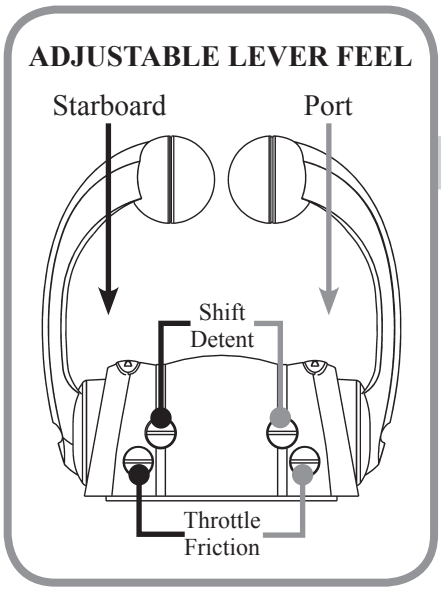
⚠ WARNING

The boat will start to move during the next steps. Be very cautious when first engaging the gears to establish that forward is truly forward and reverse is truly reverse. A quick in-and-out of gear test is recommended. Ensure that the boat is clear of all obstacles forward and aft before conducting this test.

Identification

Engine Trim Control:
in the handle (optional)

Lever Position Indicators:



Select/change Station:

NOTE: Station Protection may be turned on, see Appendix G.
A lit **green** SELECT lamp indicates a station is active.

- On single station boats, station selection is automatic.
- For mutli-station boats, choose a station and then press SELECT button with levers in neutral.

to Change Stations:

- Move to new station and press select button. (**Green** lamp flashes.)
- Match control handle positions with those of active station. (**Green** lamp goes steady when levers match and this station is now in control.)

Indicator Dimming Feature:

Push **SELECT** button and the lamps will dim. There are four degrees of brightness from which to choose.

NOTE: Indicator Dimming is only accessible from the active control station. (Green lamp on steady.)

Operations

NOTE: The flashing yellow N (Neutral) lamp ☼ can indicate status of either Shift Disconnect (SD) or Split Range Throttle (SRT). Please exercise caution when engaging/disengaging either of these modes! A steady-on Neutral lamp ALWAYS indicates engine is in NEUTRAL. ●

Shift Disconnect (SD):

Flashing **yellow** N (Neutral) lamp indicates SD engaged for this engine. ☼ Allows throttle control without gear engagement.

TO ENGAGE Shift Disconnect:

- Move engine's lever to the "Neutral" position.
- Press the N (Neutral) button next to this lever. (**Yellow** lamp flashes.) ☼

TO DISENGAGE Shift Disconnect:

- Return engine's lever to the "Neutral" position.
- Press N (Neutral) button next to this lever. The **yellow** N (Neutral) lamp will go out - SD is disengaged and the engine and transmission will now respond to lever commands. ○

Split Range Throttle (SRT):

Flashing **yellow** N (Neutral) lamp - SRT engaged for this engine. ☼ Provides greater throttle sensitivity: moving an engine's control lever to "Full Forward" will only produce the maximum percentage of WOT (Wide Open Throttle selected at set-up - default Throttle Limit is 25%)

TO ENGAGE Split Range Throttle:

- Move engine's lever to Forward Idle position.
- Press N (Neutral) button next to this lever. (**Yellow** lamp flashes.) ☼

TO DISENGAGE Split Range Throttle:

- Move engine's lever to Forward Idle or Reverse Idle
- Press N (Neutral) button next to engine lever. The **yellow** N (Neutral) lamp will go steady - SRT is disengaged. ●

Sync Operations:

NOTE: Your system ships with Cruise Sync set as the default. Power Train Sync may be selected using the i5601E display.

Cruise Sync (CS): Default

Automatically synchronizes engine RPMs when levers are close together and above 20% forward throttle.
A lit red SYNC lamp indicates sync is enabled. ●

TO ENABLE CS:

- Press SYNC button. (**Red** lamp flashes.) ☼
- Match control handle positions within 10% of each other. (Red lamp goes steady when levers match — CS is now enabled.) ●

CS AUTOMATIC ENGAGEMENT:

- When levers are moved within 10% of each other and over 20% forward throttle.

CS AUTOMATIC DISENGAGEMENT:

- When levers are moved more than 10% apart or under 20% forward throttle.

TO DISABLE CS:

- Press SYNC button. (**Red** lamp flashes.) ☼
- Match control handle positions within 10% of each other. (**Red** lamp goes off when levers match — cruise sync is now off.) ○

Power Train Sync (PTS):

Automatically synchronizes engines and transmissions; the port lever controls throttle and shift of both engines across the entire control range.

A lit **red** SYNC lamp indicates sync is engaged. ●

TO ENGAGE PTS:

- Press SYNC button. (**Red** lamp flashes.) ☼
- Match control handle positions within 10% of each other. (**Red** lamp goes steady when levers match — power trains are now in sync.) ●

TO DISENGAGE PTS:

- Press SYNC button. (**Red** lamp flashes.) ☼
- Match control handle positions within 10% of each other. (**Red** lamp goes off when levers match — power train sync is now disengaged.) ○

Note: Starboard lever may be chosen as master control using the i5601E

System Alarms

Critical Alarms

Continuous flashing both lights on either side of the control indicates a **Critical Alarm**. System will do a "Safe Shut Down," and ***must be serviced before further use***.

When a critical alarm occurs, the system will automatically go to the selected "Fail Safe Response" mode. The system **MUST** be shut down and restarted for most critical alarms. Some functions may operate for a time after restart. See display on Control Unit to determine cause of alarm.

If the alarm is caused by the Throttle Actuator hitting "Stop" - Wide Open Throttle (WOT) - the alarm will go away when the throttle is pulled back. ***However, as with ALL Critical Alarms, the system must be serviced before further use.***

Non-Critical Alarms

Intermittent flashing of both lights on either side the control (five seconds flash, normal for fifteen seconds, then repeating), indicates a **Non-Critical Alarm**. Acknowledge by a power up cycle or pressing the ENTER button on the Control Unit. Continue to operate and ***have the system checked as soon as possible.***

Optional Trolling Mode

Note: The Trolling Mode must be calibrated before trolling will operate properly. See Installation Manual.

The Trolling mode option allows the boat operator to slow the forward and aft speed of the boat for fishing. Trolling mode is achieved by the ECU electronically adjusting pressure bypass valves in the gearbox, allowing the clutches to slip.

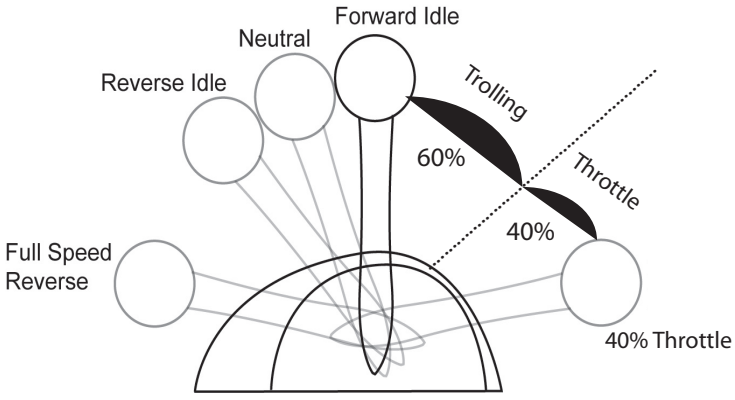
When trolling is selected on the Control Head or by pressing the separate trolling switch and the control lever(s) is moved forward, the boat will start to move at the slowest speed. As the lever approaches 60% throttle, the boat will be close to its non-trolling idle speed. Moving the lever(s) further forward will cause the transmission to lock out trolling and advance the throttle. The factory set defaults will limit throttle to 40%.

The trolling defaults -- *as shown in Appendix C* -- can be set to a variety of operating modes. Contact your dealer for details, or see technical manual.

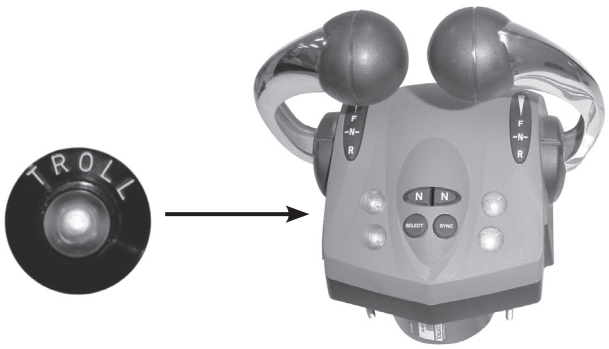
How to Enter Trolling Mode:

1. Move the Control Head lever(s) to the "Neutral" position.
2. Start the engine(s) if necessary. The system must see RPM in order to permit trolling mode to be entered.
3. Press the separate trolling switch. This places the system in trolling mode.
4. When you move the Control Head lever(s) in either the forward or reverse direction, the engine RPM will remain steady, but the boat should move in the selected direction.
5. To take the boat out of the trolling mode, return the Control Head lever(s) to the "Neutral" position and press the Trolling switch.

Control Lever Range of Operation

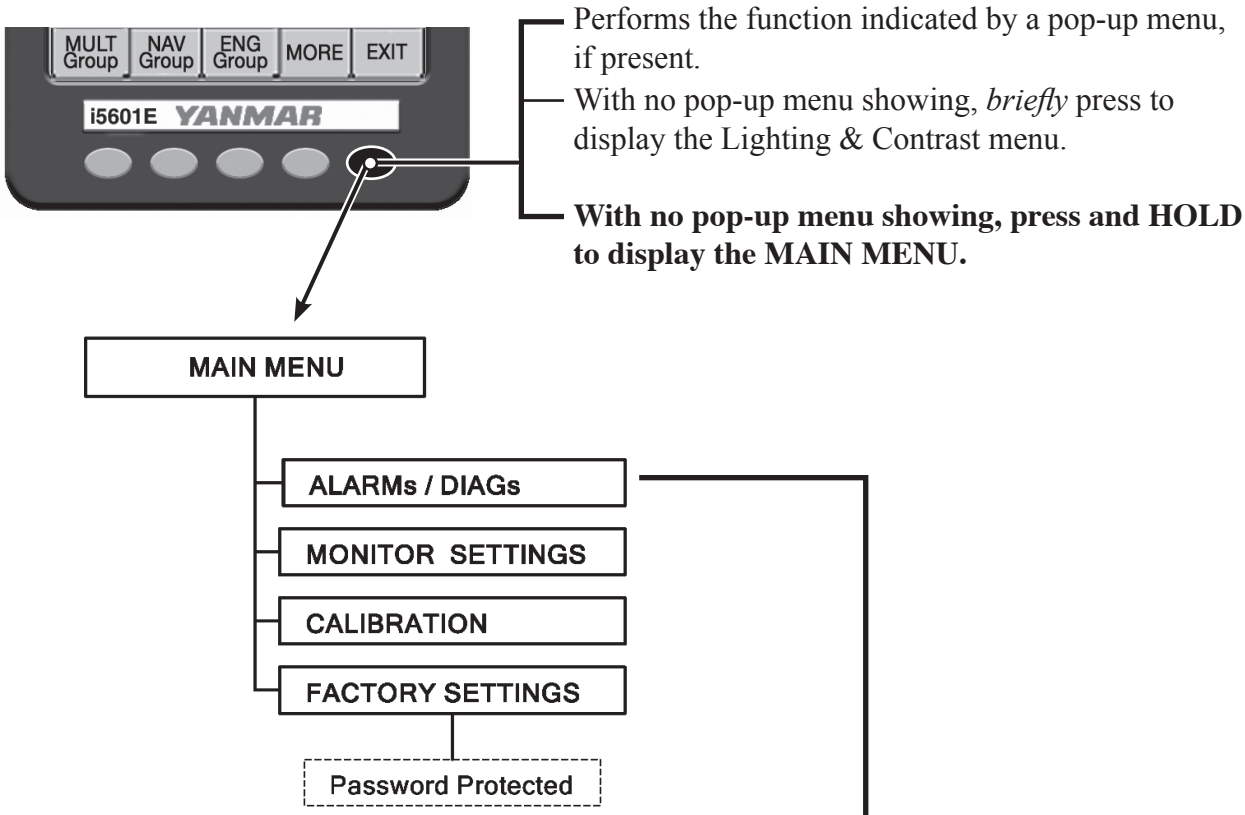


CH67601 Trolling Switch (optional)



Note: While engaged in Trolling mode, Split Range Throttle (SRT) is not operational.

i5601E Digital Display Alarms/Engine Diagnostic Codes



Buttons

- Down Arrow moves menu selection down
- Up Arrow moves menu selection up
- Right Arrow acts on current menu item
- BACK Back Moves back to previous menu

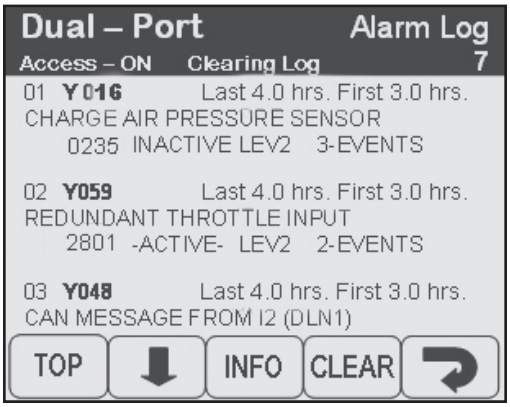
Engine Alarms/Diagnostic Codes

The ALARMs / DIAGs Screen Menu allows user to go to the Alarm or Diag Code Screen. This is very useful in the HOT KEY Mode, as a dedicated hot key is not required to view these screens. User can hold Right most key down go into the menu mode and then via this menu access the desired screen.

YANMAR marine	PORT Alarm
HOT ENGINE	CHECK ENGINE
OVER REV	EMERGENCY STOP
OIL PRESSURE	LOW VOLTAGE
TURBO BOOST	ALTERNATOR
GEAR OIL	SEA WATER FLOW
ENG COM ERROR	LOW COOLANT
MAINTENANCE	WATER IN FUEL
NETWORK	MAIN THROTTLE
PWR REDUCTION	SEC THROTTLE
NEUTRAL PROTECT	SHUTTING DOWN

Engine Alarms

The Alarm Screen will display the status of 20 defined alarms. A flashing black background indicates unacknowledged alarm; a solid black background indicates an acknowledged still in alarm state status.



Engine Diagnostic Codes

This screen displays the diagnostic code information. The title bar indicates the number of diagnostic items.

Maintenance Warning

Based on startup issues, the maintenance timer will activate between 50 and 60 hours of operation. A maintenance warning will be displayed on the digital display screen. To acknowledge this warning, press and hold the #5 (right most) button on the i5601E digital display for a few seconds until the main menu is displayed. Use the down arrow button to move the cursor to “Calibration.” Press the right arrow button, then go to “User Setting” menu. The arrow should be at the “Reset Maint. Time” selection. Press the right arrow key to reset. The warning will go away. After an additional 250 hours of operation the maintenance warning will be displayed again, and every 250 hours thereafter. This a reminder that periodic maintenance must be performed at these intervals.

Diagnostics

The digital display indicates if certain malfunctions occur. The system also stores certain DTC (Diagnostic Trouble Codes) for reference. These codes will help you or a technician to determine which subsystem has malfunctioned. Display and record all Trouble Codes so you can relay them to the technician. A listing of possible Diagnostic Trouble Codes are in Appendix E.

There are also diagnostic lights built into the Electronic Control System to assist in troubleshooting. The shift/throttle control head will flash to indicate improper operation (see the section on the control head function).

There is an i8320 or i8325 electronic control module (ECU mounted in the engine room). On the ECU module are three LED indicator lights which normally flash to acknowledge proper operation. When the ignition switch is "ON" and/or the engine is running, the three small LED indicators will flash at various rates to indicate ENGINE COMMUNICATION, ECU STATUS, and NMEA COMMUNICATION. THE NMEA communication is the data stream to the digital display, shift/throttle control head, and other modules. If any of the three LEDs fail to flash while the key is in the "ON" position (engine does not have to be running), there is a communication problem. For safety reasons, it is best to perform this test while the key is "ON" but the engine is not running. The LED not flashing will indicate the part of the system malfunctioning, and diagnosis should proceed in that subsystem.

Power Reduction Mode

An automatic protection mode called Power Reduction is included in the electronic control system to help protect the engine from major failure. The Power Reduction mode will be activated if:

A. The coolant temperature reaches or exceeds 110° C (230° F).

B. The boost pressure reaches or exceeds 250 kPa (36 psi).

C. An Engine speed sensors error occurs.

D. The Rack Position sensor is out of range.

E. The fuel injection timer shows an abnormal value.

F. A Throttle Position error occurs.

When the Power Reduction mode is active, the engine speed is limited to 1,800 rpm or less for items A through E. Item F (Throttle Position error) will result in rpm returning to idle speed. [See "Redundant (Back-up) Throttle" description on page 5]. If the condition falls back below the threshold or the fault no longer exists, normal power will resume after engine shut-down and re-start.

On multi-engine boats the following actions occur on Power Reduction.

Condition	Engine with Power Reduction	Action
Sync OFF	Either	Engines operate independently
Sync ON	Master	Slave slowly matches master
Sync ON	Slave	Master normal, slave slows

Appendix A

i5601E Digital Display Setup

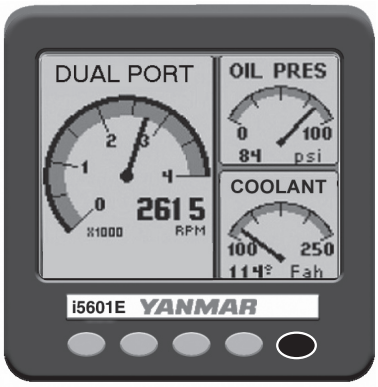
The i5601E was set up at the factory with the keys assigned and locked as shown on page 6 of this manual. This mode is the default mode and allows start up and operation of the engine. It serves many applications quite well. The i5601E Digital Display unit has many additional features and capabilities. This section of the book shows the use of some of these features.

Changing the basic set up is typically accomplished in one of two ways.

1. Go to the systems menu and alter basic selections
2. Enable the right arrow key on the basic screens to allow changing of the data shown in the default displays.

To enter the Main Menu press and hold key 5 until the menu appears.

To move around the menus use the softkeys at the bottom of the screen. The function of a particular softkey changes from screen to screen to whatever is most appropriate for the given screen.



Keys 1 2 3 4 5

NOTE: Any changes to the setup menus may require reconfiguring the i5601E HOT KEY SETUP.

BACK **Returns you to the previous menu or screen.**

Decreases the setting of a selected menu item.

Moves the cursor arrow down to select the next menu item in a list.

EXIT **Exits the current menu and returns you to the prior screen.**

Increases the setting of a selected menu item.

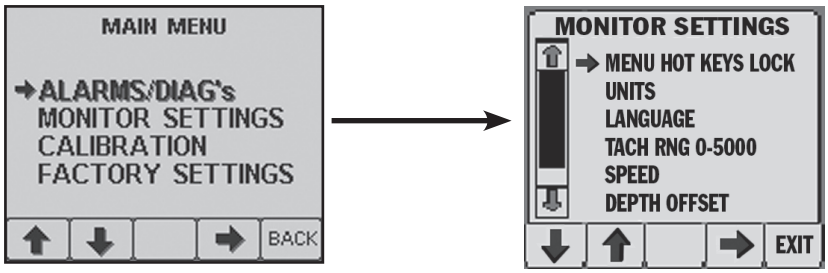
MORE **Reveals additional keys and swaps them with those currently shown.**

ON OFF **Toggles the operational status of a currently selected menu item.**

Moves the cursor arrow up to select the previous menu item in a list.

Appendix A

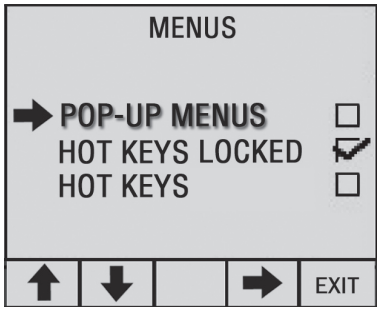
Display Settings



The Monitor Settings Menu allows setting of parameters that are specific to the display unit. Some settings such as Language and Lighting will be communicated to the other displays.

Display Description	*Function*
MENU HOT KEYS LOCK	Controls the actions of the keys
UNITS	Sets a variety of units to suit the operator
LANGUAGE	Sets the language the unit will display
TACH RNG 0-5000	Sets the tach range
SPEED	Allows adjustments to speed readings if available
DEPTH OFFSET	Allows adjustments to depth readings if available
DEFAULT MONITOR	Returns the unit to the default settings
BEEPER ON	Turns the key beeper on and off
ABOUT	Supplies information about the display

Menus



This menu controls the key functions. There are three choices.

1. When the Pop-Up Menus feature is selected (drawing at right), the unit functions like a typical computer. A key push brings up a menu and you then use the keys to make a series of selections. This is the mode that allows new screen set ups to be selected and any screen to be accessed.
2. The Hot Key Locked selection allows keys 1, 2, 3, and 4 to be assigned as favorite screens. Pushing the key immediately brings up the selected screen. This mode will not display the right arrow over key 5. Thus the screens are locked when this is selected. This is the factory default setting.

3. The Hot Key selection allows keys 1, 2, 3, and 4 to be assigned as favorite screens. Pushing the key immediately brings up the selected screen. This mode will display the right arrow above key 5. That arrow allows the user to select various data inputs in the various sections of the screen.

Appendix A

User Settings and Factory Settings

- The user setting allows for reset of the maintenance timer.
- The factory settings require a password to change.

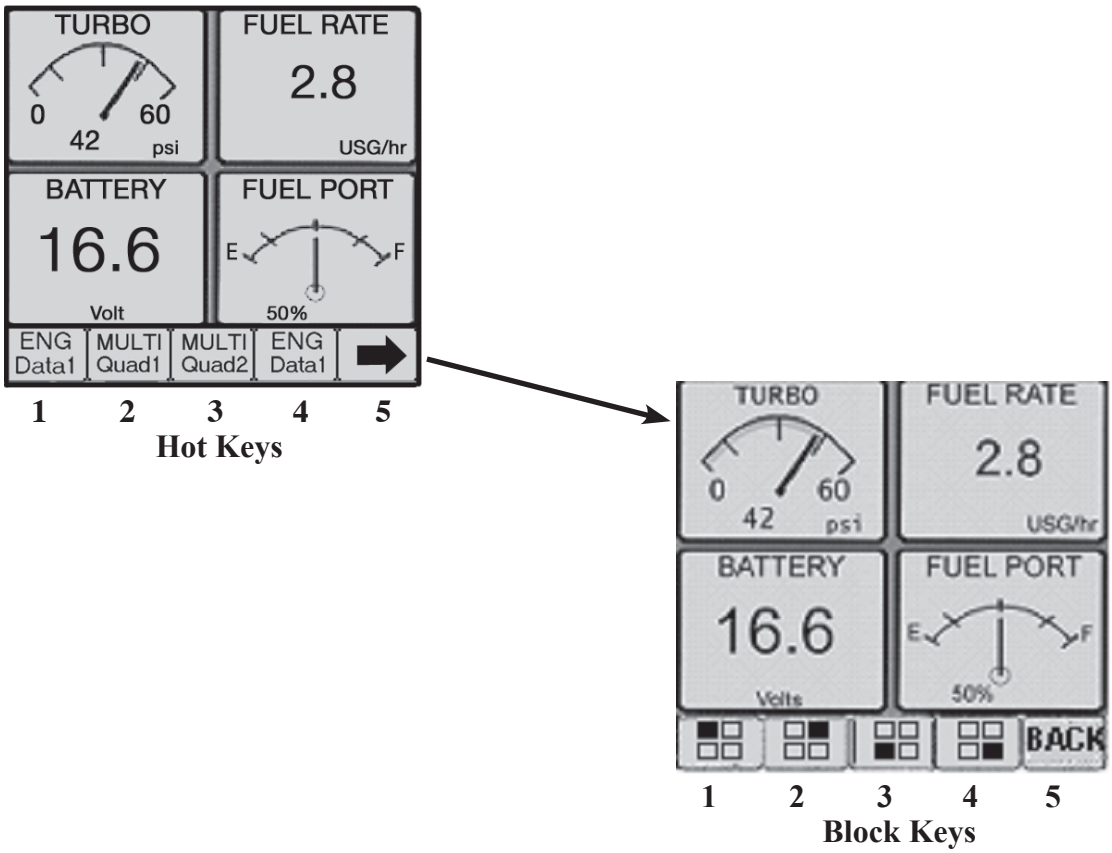
"Unlocking" the Hot Keys

This is a popular way to expand the use of the i5601E. The default hot keys will remain active but you can select other data parameters in the various display areas. A right arrow becomes visible over key 5. Pushing that key then allows for selection of a number of data types in the various boxes.

To unlock the hot keys and allow for additional data selections go to the Main menu as described on pages 17 and 18. Then select HOT KEYS. Exit the menu back to the normal operating screens. You will see a right hand arrow above key 5 when any key is pressed.

The Right Arrow button allows the choice of an individual gauge. The choices available are shown on page 20. The choices are presented in alphabetical order.

Example using a quad screen:



Each button cycles the related block through the list on the next page.

Note: Data in NMEA 2000® format may be added to the CANBus system from a compatible device which feeds the optional parameters listed above. The i5601E display has the capability of displaying additional

Appendix A

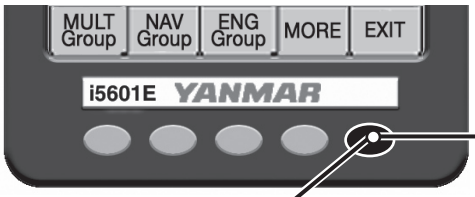
Quad Screen Parameters

These data choices can be placed in any box of a quad screen or in the two small boxes of an engine data screen: The screen headings that are included in a standard (default) set-up are noted in **bold**.

Screen Heading	*Function*	*Typical Data Source*
Battery	Battery Voltage	Engine
Bearing	Bearing to Waypoint	GPS
COG	Course Over Ground	GPS
Coolant	Engine Coolant Temperature	Engine
Depth	Depth of the water	Sonar
Fuel Rate	Fuel level if single engine	Sender
Fuel Tank 1	Fuel level in Tank 1	Sender
Fuel Tank 2	Fuel level in Tank 2	Sender
Fuel Tank 3	Fuel level in Tank 3	Sender
Fuel Tank 4	Fuel level in Tank 4	Sender
Gear	Indicates the selected gear	Engine
Heading	Current vessel heading	Compass
Hours	Actual Engine Hours	Engine
Load	Percent load on engine	Engine
Network	Network voltage	Engine
Oil Pressure	Engine Oil Pressure	Engine
Oil Temperature	Engine Oil Temperature	Engine
RPM	Engine Revolutions Per Minute	Engine
Rudder	Rudder Angle	Sender
Sea Temp	Sea Water Temperature	Sender
SOG	Speed Over Ground	GPS
Speed (SOW)	Speed through the water	Sender
Tab Port	Position of the Port Trim Tab	Sender
Tab Stbd	Position of the Starboard Trim Tab	Sender
Trim Port	Port Engine Trim	Sender
Trim Stbd	Starboard Engine Trim	Sender
Throttle	The percent of throttle currently selected	Engine
Torque	The percent torque the engine is developing	Engine
Turbo	The amount of turbo boost pressure	Engine
Waste	The amount of waste in the holding tank	Sender
Water	The amount of water in the water tank	Sender
WP Dist	The distance to the selected waypoint	GPS
XTE graph	The cross track error from a best source	GPS
XTE value	The cross track error from a best source	GPS

Appendix B

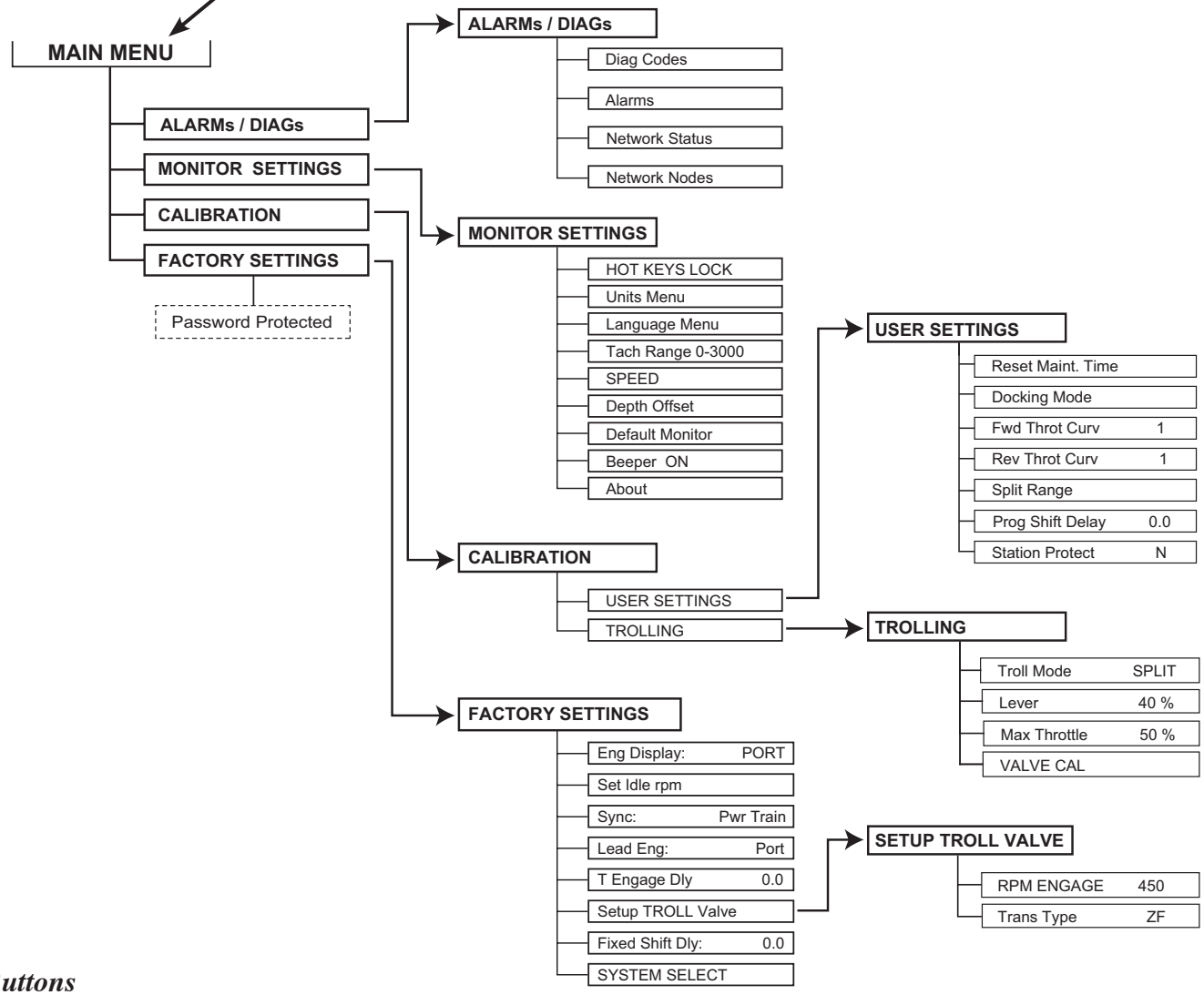
i5601E Menu Navigation



Performs the function indicated by a pop-up menu, if present.

With no pop-up menu showing, briefly press to display the Lighting & Contrast menu.

With no pop-up menu showing, press and HOLD to display the MAIN MENU.



Buttons

- "Down" Arrow moves menu selection down
- "Up" Arrow moves menu selection up
- "Right" Arrow acts on current menu item
- BACK "Back" Moves back to previous menu

Appendix C

Default Settings

For single engine configuration, the engine interface part number is i8320 (no trolling) or i8325 (with trolling). The settings are the same as the dual engine configuration below.

Without Trolling

Engine Interface part number	i8320P	i8320S
Idle RPM	700	700
Sync	Cruise	Cruise
Lead Engine	Port	Port
Split Range Throttle	25%	25%
Forward Throttle Curve	F5	F5
Reverse Throttle Curve	R1	R1
Programmable Shift Delay	7.2	7.2
Fixed Shift Delay	0.2	0.2
Station Select Protection	Off	Off

With Trolling

Engine Interface part number	i8325P	i8325S
Idle RPM	700	700
Sync	Cruise	Cruise
Lead Engine	Port	Port*
Troll Trans Type	ZF	ZF
Troll Engage RPM	850	850
Split Range Throttle	25%	25%
Forward Throttle Curve	F5	F5
Reverse Throttle Curve	R1	R1
Programmable Shift Delay	7.2	7.2
Fixed Shift Delay	0.2	0.2
Station Select Protection	Off	Off
Troll Mode**	Split	Split
Troll Lever Travel	60%	60%
Maximum Throttle in Troll Mode	40%	40%
Troll Throttle Engage Delay	0.2	0.2

Note: A system reset may be needed for some changes to take effect.

**Only shows when Sync is set to Power Train*

***Troll Mode functions are not displayed until Troll Mode is selected.*

Appendix D

Fuses

There is a fuse on the back of both the lower station and upper Station Ignition Switch Panels. It is a 5 amp fuse, designation AGC SA.

Appendix E

Diagnostic Trouble Code Descriptions

NOTE: On the digital display the DTC "Y" code will be shown along with additional information for that code. This information will further define the fault. Please make note of all the information details with the Y code before notifying your Yanmar service technician.

DTC "Y" CODE	System Description
Y0010	Camshaft Position Sensor
Y0011	Engine Overspeed
Y0012	Crankshaft Position Sensor
Y0014	Coolant Temperature Sensor
Y0015	Intake Air Temperature Sensor
Y0016	Turbo Boost Pressure
Y0018	Oil Pressure Sensor
Y0019	Oil Temperature Sensor
Y0020	Fuel Temperature Sensor
Y0025	Throttle Position Sensor
Y0033	System Voltage
Y0048	Communication Link
Y0059	Redundant Throttle
Y0070-Y0073	Rack Position Control
Y0074	Injection Timing Control
Y0088	Control Module Error
Y0098	Voltage Supply
Y0099	ECU Temperature

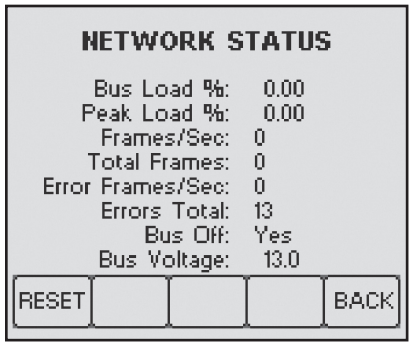
Appendix F

Network Status

The i5601E has several screens to help technicians diagnose errors on the NMEA 2000® Data Bus. See i5601E Operation on page 17 and Menu Navigation on page 21 to locate this screen.

Network Status Display

Accesses the Network Status Display Screen. The purpose of the display is to show details of the Network and allow determination of Network Problems. (The values are constantly monitored and do not rely on the screen being displayed.)



Bus Load:	Current bus load over 1 sec
Peak Load:	Peak Load since last Reset
Frames/Sec:	Current frames transferred over 1 sec
Total Frames:	Total number of frames received since last Reset
Error Frames/Sec:	Error frames over 1 sec
Errors Total:	Total Number of errors received since last Reset
Bus Off	If YES, indicates unit is not Transmitting on Bus
Bus Voltage:	Measured Value of Bus Supply

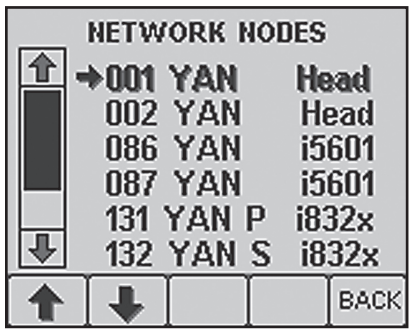
Buttons:

RESET "Reset" – Resets the various parameters that have accumulated values

BACK "Back" – Moves back to previous menu

Network Nodes Display

The Network Units Display shows Yanmar and Teleflex units that have claimed an address on the bus. From the information in the claimed message name (Device Class, Function, and Instance Fields) the type of Model number of the unit will be determined. (The specific model may not be indicated, but it will give a general model of the type of the unit.) i.e. i813x.



The information displayed consists of:

- Node Address
- Manufacturer's Code - (All mfg's **codes** will be shown, but only Yanmar and Teleflex units will show the mfg's **name**)
- Manufacturers Model Info - On some units the ending letter signifies the following: P - Port
  S - Starboard
  C - Center Engine

Buttons:

"Down" Arrow – Scrolls screen down.

"Up" Arrow – Selects Node Detail Screen

BACK "Back" – Moves back to previous menu

Appendix G

Station Select Protection

Station Select Protection prevents accidental switching between control stations on multi-stationed boats. If turned on, a change of control stations requires that control head buttons be pressed in a specific sequence - SELECT, SELECT, NEUTRAL, SELECT to change stations.

The menu options are:

- Station Select Protection Off (N) (Default Setting).
- Station Select Protection On (Y).

NOTE: If the status of Station Protection is in question, it may be checked through the i5601E Digital Display. Sequence: "Main Menu - Calibration," "Calibration," "User Settings." "Station Protect" is the last option under "User Settings." OR try to set the second station - if Station Protection is on (Y) Station Select will not engage.

Operation

To change stations this is the button sequence:

- Go to the station you wish to make active.
- Press the Select button.
- Press the Select button again.
- Press the Neutral or 'N' button.
- Press the Select button.
- The station will go active (green light on solid) if the handles are matched with the originally active station. ●
- If the green light flashes ☼, match the handles with the originally active station and the green light will go solid. ●

WARNING
Until the green light is on solid, the original active station retains control of the boat.

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