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

**SAFE BOATING STATEMENT**

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](http://www.uscg.mil)
- U.S. Power Squadron: [www.usps.org](http://www.usps.org)
- American Boat & Yacht Council (http://www.abycinc.org)

The information contained in this manual is believed to be accurate at the time of going to print but no responsibility, direct or consequential, can be accepted for damage resulting from the use of this information. The manufacturers reserve the right to make changes, without notice, to any of its products.

**NOTICE TO INSTALLER**

The WARNINGS and CAUTIONS within this manual are used to alert the installer to hazards that exist concerning a particular service, operation or component. They also may convey special instructions to reduce the risk of injury during the operation or servicing of the engine.

However, these safety alerts alone cannot eliminate the hazards that they signal. Strict compliance to these special instructions when performing installation, operation, and maintenance is the most effective accident prevention measure along with exercising care and using common sense when performing such actions.

**Special Installation Tools Needed**

1. #15 Torx screw driver
2. 2.5 inch (64mm) hole saw
3. 3.0 inch (75mm) hole saw
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Components

Engine Room

Control Unit

i1002 DC Power Distribution

i8310 i2 Engine Interface Module

DC-DC Converter (SOLA SCD30 S12-DN)
Components

**Helm**

Control Head

Key Switch Panel (for 1st Station)

i5501e Engine Display
**Cables**

Note: xx indicates cable length in feet

**CE107xx**: Control Head to Control Unit

**CE10825**: electronic shift harness to Control Unit

**CE201xx**: i1002 to selected DC power source and main ground

**CE40100**: 1st Station Key Switch

**CE404xx**: extension for 1st Station

**CE406xx**: Engine Harness for i8310 i2 Module
Cables

**CE407xx:** i1002 to CU and DC-DC Converter

**CE408xx:** i1002 to i8310 i2 Module

**CE40900:** i1002 to i8310 i2 Module

**CE41200:** “jumper-trans switch” (jumper for transmission circuit termination)

**CE41300:** CANBus to DC-DC converter (for CANBus power)
**NMEA 2000® CANBus Cables**

**CM100xx**: multi-purpose cable, goes from “T” to “T”

**CM10051**: male terminator / **CM10052**: female term.

**CMS-1**: for 12V CANBus power, if needed

**CM10050**: “T” Connector

---

**Note regarding connectivity of “T” Connectors:**

When connecting a “T” connector to a component (for example, i8310 i2 module) always install via the middle connection (“NODE”).

When connecting a “T” connector to a CANBus cable (for example, CM100xx) to connect components that are far from each other, always install via the male/female end of the connector (whichever applies).

Hand-tighten after the connection is made.
Do not tightly tie down the “T” connectors, as this will create stress.
Mounting

1. Always mount to a solid surface but not directly on the engine.
2. Mounting templates and dimensions are on pages 29-40.
3. Allow 4” cable clearance at all connections.
4. Mount with connectors facing down.

**Engine Room - Block Diagram Layout**

1. Mount the i1002 and i8310 i2 module so that a 2-foot (61 cm) cable can connect them to each other. The length of the CE406xx (where xx = length in feet) harness determines the maximum distance - without the need to splice or add extensions to the cable -between the engine/transmission and the i1002/i8310 i2 module.

2. Mount the Control Unit within x feet of the i1002, based on the length of the CE407xx harness.

3. Mount the DC-DC Converter within x feet of the i1002, based on the length of the CE407xx harness.

Control Unit

Length of CE407xx cable

i1002 Module

Within 18 inches (46cm)

i8310 i2 Module

Length of CE406xx cable

2 Feet (61cm)

DC-DC Converter

Length of CE407xx cable

Engine Room - Block Diagram Layout
Mounting

Helm

1. Mount the i5501e display

2. Mount the Control Head

3. Mount the 1st Station Key Switch panel

Note: Refer to the mounting templates on pages 29-40.
Connectivity

Engine Room

Cable Harness CE408xx

1. Connect the CE408xx harness. Refer to the photo reference below:
   a. grey connector to grey-colored port of i1002 module
   b. triangle-shaped plug to i8310 i2 module at J1 (Power)
   c. “i1002/EMS” connector to “i1002/EMS” connector on CE406xx engine harness

Cable Harness CE407xx

1. Connect the CE407xx harness. Refer to the photo reference below:
   a. Green connector to green-colored port on i1002 module
   b. Control Unit connector to Control Unit Power (triangle-shaped; last connector on right)
   c. Attach ground wire to screw on side of Control Unit
2. Connect the “CAN Pwr” connector to the DC-DC converter (SOLA SCD30 S12-DN) as follows:
   d. Attach RED wire to +IN on DC-DC converter and BLACK wire to -IN on DC-DC converter
1. Connect the CE40900 harness as follows:
   a. black connector to black-colored port of i1002 module
   b. green connector to i8310 i2 module at location J5 (1st Helm Station Panel Harness)
   c. “i8310 i2 module J4” connector to i8310 i2 module at location J4 (Engine Interface Harness)
   d. “eng rdnt throttle” (engine redundant throttle) connector to engine redundant throttle connector on CE406xx cable harness
1. Locate the engine EMS panel on the left side of engine facing the flywheel. The EMS panel has two terminal strips, each covered by a sheet metal cover plate. Loosen, but do not remove the four #15 torx-head screws that are holding down the left cover plate. Remove the cover plate.

2. From the 6-connector end of the CE406xx cable harness:
   
   a. Connect the Engine EMS B-1 plug (10-pin, black) to the engine EMS terminal. Remove the protective cap and plug into the top left location (B1). Route the harnesses to exit the terminal strip, replace the cover plate and tighten the four corner screws.
   
   b. Connect the ENG RDNT THROTTLE C108 plug (3-pin, gray) to the 3-pin gray EMS plug on the engine EMS panel.
   
   c. Connect the TRANS OIL PRESS plug (3-pin, gray) to the transmission oil pressure sender, if used. This harness will not be used if the Trolling option is installed.
   
   d. Locate the TRANS SWITCH plug (2-pin, gray). This is an optional neutral safety switch. Connect to transmission neutral switch, if present. Otherwise, terminate with CE41200 “Jumper-Trans Switch.”
   
   e. Connect the COOLANT SENSOR plug (3-pin, gray) to the coolant level sensor on the engine.
1. Connect CE10825 as follows:
   a. The connector end goes to the Control Unit at “Shift Actuator” (black)
   b. The wire end goes to the transmission shift connectors (see below, “Transmission Connection”)

Transmission Connection

Note:
The exact connections to the transmission may vary by manufacturer!
Connections depend on the transmission rotation.
Refer to Appendix D for detailed connection diagrams of a typical installation.

All CE10825 cables are 25 feet long. Properly route and cut to length.

1. Using cable harness CE10825, connect as follows:
   a. White wire: goes to the forward solenoid on the transmission; the voltage on this wire goes to Positive + (24V) when the handle is in forward gear
   b. Black wire: goes to the reverse solenoid on the transmission; the voltage on this wire goes to Positive + (24V) when the handle is in reverse gear
   c. Bare metal shielded wire: cut this off at the transmission end and tape so it cannot make accidental contact.

2. The transmission control requires a good electrical ground in order to function. Some manufactures have a separate ground wire on the control, while others use the transmission case. If the transmission case is used as ground, the connection of the AWG 12 wire from the engine block to battery negative (as performed on page 22) is sufficient. If a separate ground wire is supplied by the transmission manufacturer, you may run it back to battery negative or connect it to the engine block.
Connectivity

CANBus Cable Harness CM10301 and “T” Connector CM10050

1. Connect the CM10301 as follows:
   a. Connect the green end to the Control Unit at “Comm Port” (green)
   b. Connect a “T” connector to the CANBus end (via the NODE)

i8310 i2 Module/CE409xx and CANBus “T” Connector CM10050

1. Connect a “T” connector (via the NODE) to the CANBus end of the J5 connector at the i8310 i2 module (CE409xx)
Connectivity

**CANBus “T” Connectors** (from previous steps)

*and Cable Harness CM100xx, if needed*

1. Connect the two “T” connectors **from the previous steps**. Connect via the male/female end.
   a. Use a CM100xx harness if the distance does not permit a direct connection (as shown)

![Direct Connect](image1.png)

**OR**

![CM100xx Connect](image2.png)
1. Connect the CANBus end of CE41300 to the “T” connector that was added in the previous step. Connect via the NODE.

2. Connect the wire end of CE41300 as follows:
   a. Red to +12V on the DC-DC converter
   b. Black to GND on the DC-DC converter

3. Terminate the end of the “T” connector with the appropriate gender (male/female) terminator.
1. Run a CM100xx from the engine room to the helm and connect one end to the end of the two T-connectors from the previous step. This comprises the BACKBONE of the CANBus.
**Connectivity**

**Cable Harness CE107xx**

1. Connect the correct end of CE107xx to the Control Unit at “Control Head #1.”
2. Run cable harness CE107xx from the engine room to the helm.

**Cable Harnesses CE404xx**

1. Connect the correct end to the “1st Station Extension” connector on cable harness CE409xx.
2. Run cable harness CE404xx from the engine room to the helm.
### Helm

**CANBus “T” Connector CM10050 and CANBus Terminator(s)**

1. Connect a CM10050 T-connector on the i5501e cable. Connect via the NODE.
2. Connect the CM100xx CANBus backbone cable to one end (male/female) of the “T” connector.
3. Connect a CANBus terminator to one end of the “T” Connector (use the appropriate gender).

---

**Cable Harness CE404xx**

1. Connect the Key Switch to the connector on the CE404xx cable harness.
Connectivity

Cable Harness CE107xx

1. Connect the Control Head to the connector on the CE107xx cable harness.

Cable Harness CE201xx

WARNING

Disconnect power before installing.

Make all connections per ABYC standards.
Note: For a detailed diagram, refer to Appendix E.

1. Connect the CE201xx cable harness as follows:
   a. Connect the unterminated wire ends to the selected power source (protect with a 30 AMP fuse near the battery). Cross connect to both battery banks if two 24V battery banks are available.
      i. red (positive) to voltage source
      ii. yellow (negative) to the boat’s main ground point and as close to the negative battery terminal as possible
   b. Connect the black connector to the i1002 at the dual connector that is labeled black
   c. Connect the grey connector to the i1002 at the dual connector that is labeled grey
Connectivity

Power Connections (for SY)

Make all connections per ABYC standards.

**WARNING**
Make the following battery connections ONLY if you have successfully completed all prior steps.

1. Battery positive to starter. This connection is normally made through the battery switch. The gague of the wire depends on the length of the cable.
2. Battery negative to starter.
3. Battery negative to the block, using AWG 12 or heavier wire.

SY Battery and Ground connections
(schematic representation only)

---

Note: For a more detailed diagram, refer to Appendix E.
Pre-Start Up Checklist

Connection Checks

1. Ensure all connectors are plugged in and properly seated.
2. Verify that the digital displays, engine interface, and the control unit are connected to the NMEA 2000® network.
3. Make sure the CANbus “T” Connectors are not tied down too tightly, thus causing stress.
4. Check each end of the NMEA 2000® CANbus to ensure that a terminator has been properly installed.
5. Verify that the engine ignition panel is properly connected at the helm station.
6. Ensure the engine block is connected to the negative side (-) of the battery by the wire shown on page 22.

24 Volts DC Check

1. Remove the grey and black plugs from each i1002 module.
2. Turn the battery switches and the engine breaker on.
3. Test for 24 Volts DC on each of these connectors.
4. When confirmed, turn off the engine battery switches and the engine breakers and reconnect the grey and black plugs.
5. Turn the engine battery switches and the engine breakers back on.

Key Switch Check

1. Turn the key switch to the “on” position, but do not start the engine. You should hear the injectors “click.”

Module Light/Data Checks

1. The i5501e display(s) comes on.
2. The i8310 i2 Engine Interface status indicators should show two blinking LEDs.
3. The Control lever should be in the neutral position;

i5501e Display Check

1. Press the left-most key on the digital display. The data should be available.
2. Turn off the engine breaker.

Shift & Throttle Range of Motion

Familiarize yourself with the shift and throttle controls and the key switch. With the engine not running, move the control lever over the full range until you are familiar with the feel.
Calibration

Calibrating the Control System

**SY Single Engine, Single and Dual Helm Stations**

This step calibrates the Control Head to the specific Control Unit. This process is required on first installations and any time a different Control Head is connected to a specific Control Unit. Perform the process that is appropriate for the boat’s configuration, either single or dual helm station.

**Single Helm Station Boats**

1. Do NOT start the engine during this process.
2. Perform the following steps using the + - and Enter buttons on the Control Unit in the Engine Room and the Select button and Control Lever on the Control Head at the helm station.
3. If you miss a step in the process, simply power down and start over.

<table>
<thead>
<tr>
<th>Action</th>
<th>Display</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ensure the Control Lever is in the Neutral position (N)</td>
<td>Operating; Control Head lights on.</td>
<td></td>
</tr>
<tr>
<td>Control Unit power on</td>
<td>oP (flashing)</td>
<td>Unit is waiting for a command</td>
</tr>
<tr>
<td>Press Enter</td>
<td>CA (flashing)</td>
<td>Calibration mode</td>
</tr>
<tr>
<td>Press +</td>
<td>dS</td>
<td>Diesel engine</td>
</tr>
<tr>
<td>Press +</td>
<td>00</td>
<td>Tach signal on data bus</td>
</tr>
<tr>
<td>Press +</td>
<td>L1</td>
<td>Calibrate Control Lever 1</td>
</tr>
<tr>
<td>Press Enter</td>
<td>FF</td>
<td>Calibrate Full Forward</td>
</tr>
</tbody>
</table>

**From the control unit ...**

<table>
<thead>
<tr>
<th>Action</th>
<th>Display</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Press Enter</td>
<td></td>
<td>Single engine, single helm station</td>
</tr>
<tr>
<td>Press +</td>
<td>IF (flashing)</td>
<td>Information mode</td>
</tr>
<tr>
<td>Press +</td>
<td>Er (flashing)</td>
<td>Error mode</td>
</tr>
<tr>
<td>Press +</td>
<td>FE (flashing)</td>
<td>Features mode</td>
</tr>
<tr>
<td>Press Select</td>
<td>Y1</td>
<td>Yanmar (control head lights out)</td>
</tr>
<tr>
<td>Press Select</td>
<td>Fr</td>
<td>Calibrate Full Reverse (solid green)</td>
</tr>
<tr>
<td>Move Control Handle Full Forward</td>
<td>Yellow light flashes</td>
<td></td>
</tr>
<tr>
<td>Move Control Handle to “F” (Forward Detent)</td>
<td>Yellow light flashes</td>
<td></td>
</tr>
<tr>
<td>Move Control Handle to “N” (Neutral)</td>
<td>Yellow light flashes</td>
<td></td>
</tr>
<tr>
<td>Move Control Handle to “R” (Reverse Detent)</td>
<td>Yellow light flashes</td>
<td></td>
</tr>
<tr>
<td>Return Control Handle to “N” (Neutral)</td>
<td>Green and yellow lights on steady</td>
<td></td>
</tr>
</tbody>
</table>

The single helm station calibration procedure is complete.
Calibration

Dual Helm Station Boats

1. Do NOT start the engine during this process.
2. Perform the following steps using the + - and Enter buttons on the Control Unit in the Engine Room and the Select (Sel) button and Control Lever on each helm station’s Control Head.
3. If you miss a step in the process simply power down and start over.

### Action

<table>
<thead>
<tr>
<th>Action</th>
<th>Display</th>
<th>Notes</th>
</tr>
</thead>
</table>
| Ensure all Control Levers are in the Neutral position (N). | oP (flashing) | Operating; control head lights on
| Power On | oP | Unit is waiting for a command |
| Press + | IF (flashing) | Information mode |
| Press + | Er (flashing) | Error mode |
| Press + | FE (flashing) | Features mode |
| Press + | CA (flashing) | Calibration mode |
| Press Enter | C1 | Single engine, single helm station |
| Press Enter | C2 (flashing) | Dual helm station |
| Press + | dS | Diesel engine |
| Press + | L1 | Calibrate Control Lever 1 |
| Press Enter | FF | Calibrate Full Forward |

### From the control unit ...

<table>
<thead>
<tr>
<th>Action</th>
<th>Display</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Move Control Handle Full Forward</td>
<td>FF</td>
<td>Yellow light flashes</td>
</tr>
<tr>
<td>Press Sel</td>
<td>IF</td>
<td>Calibrate Idle Forward (solid green)</td>
</tr>
<tr>
<td>Move Control Handle to “F” (Forward Detent)</td>
<td>nU</td>
<td>Calibrate Neutral (solid green)</td>
</tr>
<tr>
<td>Press Sel</td>
<td>Ir</td>
<td>Calibrate Idle Reverse (solid green)</td>
</tr>
<tr>
<td>Move Control Handle to “R” (Reverse Detent)</td>
<td>Fr</td>
<td>Calibrate Full Reverse (solid green)</td>
</tr>
<tr>
<td>Press Sel</td>
<td>L2</td>
<td>Calibrate Second Control Head</td>
</tr>
<tr>
<td>Press Enter</td>
<td>FF</td>
<td>Calibrate Full Forward</td>
</tr>
<tr>
<td>Move Control Handle Full Forward</td>
<td>IF</td>
<td>Yellow light flashes</td>
</tr>
<tr>
<td>Press Sel</td>
<td>nU</td>
<td>Calibrate Neutral (solid green)</td>
</tr>
<tr>
<td>Move Control Handle to “N” (Neutral)</td>
<td>Fr</td>
<td>Calibrate Full Reverse (solid green)</td>
</tr>
<tr>
<td>Press Sel</td>
<td>L2</td>
<td>Calibrate Second Control Head</td>
</tr>
<tr>
<td>Move Control Handle Full Reverse</td>
<td>FF</td>
<td>Yellow light flashes</td>
</tr>
<tr>
<td>Press Sel</td>
<td>Y1</td>
<td>Yanmar; control head lights out</td>
</tr>
<tr>
<td>Press +</td>
<td>--</td>
<td>Successful calibration</td>
</tr>
<tr>
<td>Press +</td>
<td>CA (flashing)</td>
<td>Calibration mode</td>
</tr>
<tr>
<td>Press –</td>
<td>FE (flashing)</td>
<td>Features mode</td>
</tr>
<tr>
<td>Press –</td>
<td>Er (flashing)</td>
<td>Error mode</td>
</tr>
<tr>
<td>Press –</td>
<td>IF (flashing)</td>
<td>Information mode</td>
</tr>
<tr>
<td>Press –</td>
<td>oP (flashing)</td>
<td>Operating mode</td>
</tr>
<tr>
<td>Press Enter</td>
<td>oP</td>
<td>Yellow light on; green light flashes</td>
</tr>
</tbody>
</table>

### From the control head ...

<table>
<thead>
<tr>
<th>Action</th>
<th>Display</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Return Control Handle to “N” (Neutral)</td>
<td>oP</td>
<td>Green and yellow lights on steady</td>
</tr>
</tbody>
</table>

*The dual helm station calibration procedure is complete.*
Familiarize yourself with the ignition switch panel. The panel switches may be a conventional key type switch, or it may be "rocker" type switches. On either type there are three positions: OFF – ON – START. Next to it will be an EMERGENCY STOP switch. On this system, turning the key to off, or moving the Rocker switch to the off position WILL result in the engine shutting down. Note that on electronic engines, shut-down occurs after a delay of a few seconds.

**WARNING**

The EMERGENCY STOP switch is not to be used for normal engine shutdown. The emergency stop switch disconnects the power from the entire system and may make the engine hard to re-start. Use the normal key or rocker switch to turn the engine "OFF."

**Shift & Throttle Indicator Lights**

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 specific engine.

a. Place the control head levers in neutral and turn on the port ignition switch -- but do not start the engine. The green control head light will illuminate.

b. 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.

**Start Up**

**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.

Start the engine.

With the engine running (in neutral), the green and yellow lights of the control head are illuminated. Advancing the control lever to the forward detent (F) puts the boat in forward gear. Pushing it further forward will increase the throttle setting. The same is true in the reverse direction.

**SHIFT DISCONNECT**

![Diagram showing the shift disconnect process.]

**Warning:** Exercise caution when advancing the throttle to assure gear is not engaged.
Digital Display

When powered-up, the i5501e Digital Display will initially display an introductory screen showing the software revision level. It 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. (See illustration below.)

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 i5501e 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.

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. A more detailed description of the engine fault is displayed in the DIAG CODES screen when the #4 key is pressed. This information can be very valuable when contacting a Yanmar-trained technician about the engine fault.

The Clear (CLR) is password-protected.

The i5501e is an extremely versatile display. The four-left keys can be reconfigured to allow the user to display whatever screens he or she desires. For complete operational details, refer to both the Operations and Technical Guides.
Templates

Single Lever Control Head Template

If this template has been downloaded electronically or copied from another document, please verify all template dimensions prior to cutting as different printers/copiers may scale differently.

U.S. to Metric
3.00 inches = 7.62 cm
.25 inches = 0.635 cm
2.00 inches = 5.08 cm
1.65 inches = 4.19 cm
4.05 inches = 10.29 cm
Templates

This page has been left blank.
i5501e Digital Display

Mounting Template

Overall size: 4.4 x 4.4 (112mm)

For best installation results ensure there is adequate ventilation behind the unit.

If this template has been photocopied, check the dimensions before using it because photocopiers can distort images slightly.
This page has been left blank.
Templates

i5601e Digital Display (if equipped)

If this template has been downloaded electronically or copied from another document, please verify all template dimensions prior to cutting as different printers/copiers may scale differently.

Front Panel Mount

i5601e

![Diagram showing dimensions and mounting points for the i5601e Digital Display]
This page has been left blank.
If this template has been downloaded electronically or copied from another document, please verify all template dimensions prior to cutting as different printers/copiers may scale differently.

### Rear Panel Mount

**i5601e**

- Width: 103.0 [4.06”]
- Height: 105.0 [4.13”]
- Distance: 3.8 [0.15”]
- Diameter: 599.0 [23.58”]

*Note: 4 x Ø5.0 [Ø0.20”]*
Templates

1st Station Key Switch Panel (CE40100)

If this template has been downloaded electronically or copied from another document, please verify all template dimensions prior to cutting as different printers/copiers may scale differently.

PANEL CUTOUT
1st STATION KEYSWITCH

U.S. to Metric
1/2 inches = 1.27 cm
3/16 inches = .476 cm
1 9/16 inches = 3.97 cm
3 1/8 inches = 7.94 cm
1 3/8 inches = 3.49 cm
3 1/4 inches = 8.255 cm
7/8 inches = 2.22 cm
Templates

1st Station Ignition Panel - CP19100 (if equipped)

If this template has been downloaded electronically or copied from another document, please verify all template dimensions prior to cutting as different printers/copiers may scale differently.
Templates

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Appendix A

Control Head Operation

**Control Head buttons/lights**

**N:** Neutral button. If the control head lever is in the ‘Neutral’ position, pushing this button engages/disengages *Shift Disconnect* mode. If the associated control head lever is in a ‘Gear Idle’ position, pushing this button engages/disengages *Split Range Throttle*.

**SELECT:** If your boat is outfitted with multiple control stations, the Station Select feature allows you to select which station will be used to control the boat. If your boat only has one control station, then the station will automatically be selected upon startup when the control head levers are in Neutral Idle. A continuously lit SELECT lamp indicates a station is active. This button also controls the brightness of the control head lights.

**Station Selection: Control Head in Neutral / Idle**

When first turning the key or start switch to the "ON" position, the green SELECT lamp will flash and the NEUTRAL lamp will light up if the control head levers are in the Neutral Idle position. This is an indication that no specific helm station has been selected for boat operation. By simply pushing the SELECT button at the station desired for operation the flashing green lamp will turn continuous. This indicates control of the boat is now at this station location. If you choose to change helm locations, simply push the SELECT button at the desired helm location provided the control head is in Neutral Idle.

**Indicator Dimming Feature**

The lamps on the Control Head(s) can be varied in intensity to a more comfortable level if desired. If the indicator lamps are too bright push the SELECT button and the lamps will dim. If the lamps are still too bright, you can continue pressing the SELECT button to cycle through the lamp intensity choices until you find the desired intensity.

**Shift Disconnect**

Shift Disconnect is a Control Head mode that allows you to apply throttle without engaging a gear. This operation is mostly used when a technician is performing diagnostics on the engine.

To engage Shift Disconnect mode, move the engine’s lever to the ‘Neutral Idle’ position. Then press the N (Neutral) button next to this lever on the control head. A flashing N (Neutral) lamp indicates that Shift Disconnect mode is engaged for this engine. While in Shift Disconnect mode you can apply throttle in Forward or Reverse without actually engaging the gear.

To disengage Shift Disconnect mode, return the engine’s lever to the ‘Neutral Idle’ position and once again press the N (Neutral) button next to the lever on the control head. The N (Neutral) lamp will stop flashing and remains continuously lit to indicate that Shift Disconnect mode is disengaged and the transmission(s) will now respond to lever commands.
Split Range Throttle

This Control Head mode gives you greater throttle sensitivity. In Split Range Throttle (SRT), moving an engine’s control lever all the way to the ‘Full Forward’ position will only produce the maximum percentage of wide open throttle selected in the “Features Selection” of the Control Unit program options. Typical Throttle Limit percentages for SRT are 5% to 50%, with 25% being the default value. When SRT is engaged, your engines temporarily use a linear throttle response for application of the chosen SRT Throttle Limit. The throttle curves previously selected are automatically restored upon disengaging SRT.

To engage Split Range Throttle, move the engine’s lever to an in-gear Idle position (Forward Idle or Reverse Idle) and press the N (Neutral) button next to this lever on the control head. The N (Neutral) lamp will flash to indicate that Split Range Throttle is engaged.

While in Split Range Throttle, the system will shift normally but the throttle will be limited in both gears (Forward and Reverse) to the Throttle Limit percentage programmed for WOT (Wide Open Throttle) in the "Features Selection" of the Control Unit program options.

If the system is shifted into Neutral while in Split Range Throttle engine mode, the N (Neutral) lamp will come on (steady) to indicate that the system is in Neutral. Note that this action will NOT exit Split Range Throttle mode. When the lever is moved back into gear, the N (Neutral) lamp will resume flashing to indicate that the system is still in Split Range Throttle.

To disengage Split Range Throttle, return the engine’s lever to a Gear Idle position (Forward Idle or Reverse Idle) and again press the N (Neutral) button next to the lever on the control head. The N (Neutral) lamp will stop flashing, indicating that Split Range Throttle has been disengaged.
As of January 1, 2005 Yanmar SY i6000 Control Units are shipped with the following defaults:

**Single Engine - CUKSE**

<table>
<thead>
<tr>
<th>Features</th>
<th>Calibration</th>
</tr>
</thead>
<tbody>
<tr>
<td>25 Split Range Throttle 25%</td>
<td>C1 Single Engine Single Station</td>
</tr>
<tr>
<td>F8 F8 Forward Throttle Curve</td>
<td>dS Diesel</td>
</tr>
<tr>
<td>R1 R1 Reverse Throttle Curve 00 RPM from data bus</td>
<td>00 RPM from data bus</td>
</tr>
<tr>
<td>96 9.6 Programmable Shift Delay</td>
<td>L1 Lever Calibration</td>
</tr>
<tr>
<td>02 0.2 second Fixed Shift Delay</td>
<td>YI Yanmar</td>
</tr>
<tr>
<td>oF Station Select Protection Off</td>
<td>oF Station Select Protection Off</td>
</tr>
<tr>
<td>nI Neutral, Idle Fail Safe Response</td>
<td>nI Neutral, Idle Fail Safe Response</td>
</tr>
</tbody>
</table>
Appendix D

Twin Disc Transmission Connections

TWIN DISC MG to YANMAR SY

Cut hop and terminate to neutral switch

CE40617 ... "Trans Switch" (CE4120)

No AINC connections made in this unit

Module block lead

To battery/terminals to neutral switch

CE10023 WHI to Module YLW
CE10023 BLK to Module WHT

Diagram shows electrical connections and layout for the twin disc transmission connections.
Appendix D

Twin Disc Transmission Connections w/Trolling

Note: All NC connections must be insulated and secured with heat shrink tubing.

PEL 02835 WHIT to Module 01L
PEL 02835 BLK to Module WHIT

Note: "A", to black lead on CE41725.

TWIN DISC MGX to YANMAR SY

Electronic Control System: Single Engine Installation Manual for 6SY/8SY Engines
Appendix D

ZF Transmission Connections

1. Attach CF-100XX Harness to mating connector, supplied with gear. Wire: White wire to 1st Place Valve; Black wire to Rev.
2. NO CONNECTION Center Tab
3. User-supplied Valve ground connection can be common with both valves.
4. NO CONNECTION Center Tab
5. Attach return wire to Battery Negative

Note: Valve connection depends on the transmission rotation.
Appendix D

ZF Transmission Connections w/Trolling

1. Attach CE112XX Harness to mating connector supplied with gear. White wire to Fwd Valve; Black wire to Rev valve. Do NOT connect the shielded wire.

Note: Wire connection depends on the transmission rotation.

2. Use supplied valve ground connection on both valves.

3. Attach return wire to battery/Negative.

4. Mount Connector on Trolling Valve supplied as part of CE112XX Harness.
Appendix E
Power Diagram

6SY and 8SY

Shore Power

Generator Switch

12 Volt Battery
Generator Battery

12 VDC Alternator

EDC

24 VDC Starter

Ground Stud

12 Volt Parallel

Engine Breaker

25 Amp

Engine Bat Switch

160Ah rated
12 Volt Battery

160Ah rated
12 Volt Battery

Negative Distribution Bus
Appendix E

Power Wiring Diagram

- 12 Volt Battery
- House Battery
- 12 Volt Battery

Gen Battery Charge

To House

House Switch

To 12 volt Charger

To House Keep Hot Terminal Board

Negative Distribution Bus

Revised: 25Feb2005
Appendix F

Trolling

Note: The operator must understand the limitations to the gear and is responsible for the settings.

Trolling Overview
To engage and signify Trolling mode, the Yanmar SY control system utilizes the control head’s neutral switches and LEDs that are either built-in to the control head or contained in a separate, remotely mounted display. The factory configuration for trolling operation is the Split trolling mode. This operation allows the operator to perform from full transmission slip to full lock up with a throttle ramp up with one lever motion. The defaults are: 60% of the lever movement from gear-idle to full lock-up the remaining 40% lever movement is used for throttle control to maximum of 40% throttle.

Trolling Components
Shift & Throttle Control Unit (CU) with Trolling Functionality
Part Number: EU64424PT for port unit or EU64424ST for starboard unit.

Terms the Operator Must Know
Full Slip: minimum troll engagement for slowest boat speed
Full Lock-up: maximum troll speed (No slip) used for normal operation
Troll Engage RPM: Maximum engine speed that the control system will allow trolling mode to be engaged.

Pre-Start Up Checklist
Verify all connections per the appropriate diagram in Appendix D.

Trolling Set-up
All Trolling systems require set-up prior to initial use.

Note: The transmission MUST be warmed up prior to start-up.
Proper set-up calibration can only be achieved when the boat maneuvers are caused by gear. Set-up calibration during windy, strong current, or rough water conditions may not result in the most favorable calibration. CAUTION: Trolling engagement should be performed only during safe conditions.

Calibrating Trolling
Prior to performing this procedure you must determine the speed the boat runs at idle. Use the user interface buttons on the control head (or on the separately installed panel) to perform the calibration routine.

1. Enter Troll Mode by placing the control lever at Neutral
2. Hold the Neutral button until it starts to flash, then release the button. You will need to hold it for 3 seconds.
3. Hold the Neutral button until it starts to flash more rapidly, this indicates calibration mode. On a port control the select lamp will turn off. On a starboard control you will simply notice the frequency of the neutral lamp will increase.
4. Move the control lever forward. The transmission will enter forward gear. Continue pushing the lever very slowly until the drive shaft just starts to rotate. The shift and throttle Control Unit is now sending the minimum troll signal.
5. Record this troll signal as the minimum signal by pressing the SELECT button on a port control or the SYNC button on a starboard control. The SELECT or SYNC lamp will turn on and the Neutral lamp will turn off.
6. Move the control lever back to the Neutral position. The Neutral lamp will start to blink again indicating that you can calibrate the maximum troll signal.

7. Move the control lever forward. The transmission will enter forward gear. Continue pushing the lever very slowly forward. After every little push forward wait several seconds and determine

8. Record this troll signal as the maximum signal by pressing the N button. The SELECT or SYNC lamp will turn on and the Neutral lamp will turn off.

9. Move the control lever back to the Neutral position. The Neutral lamp will start to blink again.

10. Completed the calibration procedure by holding the Neutral button until it turns on solid indicating that the calibration is complete.

**Calibration Notes**

If, during the procedure, you do not wish to keep the calibration values prior to step 10, simply power the Shift and Throttle Control Unit off and back on.

If, after using troll, you determine that when you first enter idle in gear the shaft is spinning too fast, you must manually go into the trolling menu and lower the minimum signal. If the shaft is spinning too slowly you can rerun the procedure for the minimum signal calibration.

If, after using troll, you determine that the maximum trolling signal is too small, you must manually go into the trolling menu and raise the maximum signal. If the trolling signal is too large you can rerun the calibration procedure and lower this value.

**Feature Selection Table**

<table>
<thead>
<tr>
<th>Control Unit Display</th>
<th>Trolling Selection</th>
</tr>
</thead>
<tbody>
<tr>
<td>B2</td>
<td>Trolling Mode</td>
</tr>
<tr>
<td></td>
<td>B1: 100% Trolling Mode; B2: Trolling/Throttle</td>
</tr>
<tr>
<td>60</td>
<td>Trolling/Throttle transition (% Lever Movement)</td>
</tr>
<tr>
<td></td>
<td>XX: Trolling/Throttle --70,60,50,40,30</td>
</tr>
<tr>
<td>40</td>
<td>Maximum Throttle range when trolling/throttle active</td>
</tr>
<tr>
<td></td>
<td>20,40,60,80,100</td>
</tr>
<tr>
<td>02</td>
<td>Throttle engage delay (0=&gt;2 seconds)</td>
</tr>
<tr>
<td></td>
<td>00, 02, 04, 06, 08, 10, 12, 14, 16, 18, 20</td>
</tr>
<tr>
<td>70</td>
<td>Trolling engage RPM (50 RPM Steps)</td>
</tr>
<tr>
<td></td>
<td>400 up to 800 RPM</td>
</tr>
<tr>
<td>CU</td>
<td>Type Output</td>
</tr>
<tr>
<td></td>
<td>CU: Current (ZF)</td>
</tr>
<tr>
<td></td>
<td>LT: Voltage (Twin Disc)</td>
</tr>
<tr>
<td>T1</td>
<td>Calibration</td>
</tr>
<tr>
<td></td>
<td>100 – Full Trolling Current (Full Bypass) CU</td>
</tr>
<tr>
<td></td>
<td>300 – Min Trolling Current (No Bypass) CU</td>
</tr>
<tr>
<td></td>
<td>05 – Full Trolling Voltage (Full Bypass) 05 =&gt; 45 (0.5 to 4.50 Volts) LT</td>
</tr>
<tr>
<td></td>
<td>45 – Min Trolling Voltage (No Bypass) 05 =&gt; 45 (0.5 to 4.50 Volts) LT</td>
</tr>
</tbody>
</table>
Appendix F

Trolling

Control Lever Range of Operation

Entering/Exiting Trolling
1. Enter Troll Mode by placing the control lever at Neutral
2. Hold the Neutral button until it starts to flash, then release the button. You will need to hold it for 3 seconds.
3. To exit Troll Mode, place the control lever to the Neutral position and press the Neutral (N) button.

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

Deutsch Connector: Insertion/Removal

Contact Insertion

1. Grasp crimped contact approximately (25.4 mm) one inch behind the contact barrel.

2. Hold connector with rear grommet facing you.

3. Push contact straight into connector grommet until a click is felt. A slight tug will confirm that it is properly locked in place.

4. Once all contacts are in place, insert orange wedge with arrow pointing toward exterior locking mechanism. The orange wedge will snap into place. Rectangular wedges are not oriented. They may go in either way.

NOTE: The receptacle is shown - use the same procedure for plug.

Contact Removal

1. Remove orange wedge using needlenose pliers or a hook shaped wire to pull wedge straight out.

2. To remove the contacts, gently pull wire backwards, while at the same time releasing the locking finger by moving it away from the contact with a screwdriver.

3. Hold the rear seal in place, as removing the contact will displace the seal.

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Appendix H

Miscellaneous

**Fuel Sender Connections**

The i8310 electronics box can handle a single pole fuel sender with a range of 33 to 240 ohms. The connection is made from the sender output to pin 7 of the J3 connector on the i8310 Engine Interface Modules. The connector is a Deutsch DT style connector that is widely used in the marine industry. The tank must have a good ground back to the main ground terminal post to operate accurately.

The contact used to make the connection is Deutsch 1062-16-0122. It fits 16 to 18 AWG wire.

![Image of fuel sender connections](image)

**Auxiliary Alarm Annunciator**

This is a connection to the system that can be used to operate an audible alarm. The i8310 Engine Interface Module generates a return to ground connection that is active low and rated for one amp. The signal comes out of the i8310 on J5 pin 11. The best place to make a connection is on the CE40900 cable. Use the connector that is a six pin Deutsch marked Helm Idle. The alarm is on pin 3.

The mating Deutsch housing is DT04-6P. The mating contact pin is 1060-16-0122.

**Automatic Fire Systems**

Cable CE41800 plugs into either end of the CE404XX Extension Harness. It supplies a three-pin Deutsch connector that has ignition power and two lines that open the emergency stop line. These two wires are connected to the automatic fire system to a contact that opens in the event of a fire. This will immediately shut down the engine. The ignition signal supplies 24 volts to the fire system when the ignition is turned on.

The mating Deutsch housing is DT04-3P. The mating contact pin is 1060-16-0122.