

**YAMAHA**

**Installation Manual**

**BY Series Engines**

---



**Electronic Control System  
Installation Manual  
for BY Series Engines  
with Classic Controls**

*MANINBYCM01*

*Revision 1.0*

---

---

# 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.

---

## WARNING

This product contains lead, a chemical known to the State of California to cause cancer, birth defects, and other reproductive harm.



---

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](http://www.uscg.mil)

U.S. Power Squadron      [www.usps.org](http://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.

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.

# Table of Contents

---

Components .....	4
Installation. ....	6
Route the Engine Harness. ....	6
Route the Shift Cable .....	7
Install Battery Switch and Engine Breaker. ....	8
Install the Engine .....	9
Connect the Items in the Engine Area. ....	9
Install the Shifter. ....	10
Install the Helm Components .....	10
Install the Tachometer. ....	11
Check Out and Operation .....	12
Start the Engine. ....	12
Move the Boat. ....	12
Shut Down .....	12
Tachometer Display .....	12
Operation. ....	13
Tachometer Menu Structure .....	14
Warning Light .....	16
Engine Status Information .....	16
Templates .....	17
3” Gauge (Tachometer) with Key Cut .....	17
3” Gauge (Tachometer) without Key Cut .....	19
2” Gauge with Key Cut. ....	21
2” Gauge without Key Cut .....	21
CH18000 Top Mount .....	23
CH18000 Side Mount .....	25
Key Switch Panel - CP19400 .....	27
Appendix A: Analog Gauges .....	29
Appendix B: Gauge Measurements .....	30

# Components

---

Please familiarize yourself with the following components:

**CH18000 Series  
Side Mount Control**



**CH18000 Series  
Top Mount Control**



**Tachometer  
with Digital Display**



**Ignition Switch**



# Components

---

**CE500xx Engine Harness**



**CE503xx Engine Extension Harness**



**Warning Light / Audible Alarm/Cut-off Switch**



**Cut-off Switch with Lanyard attached**



# Installation

This book represents a stern drive installation, because there are more items involved to install. Marine gear (inboard) installations are similar but have less parts.

The tasks that must be completed to hook up the BY Classic Control Systems are as follows (This section takes you through each task area).

- Route the CE500XX engine harness from the engine area to the helm and install and connect the items that are attached to the transom.
- Route the shift cable from the engine area to the helm.
- Install battery switch and engine breaker.
- Install the engine.
- Connect the items in the engine area.
- Install the shifter and the tachometer.
- Install the remaining helm components.
- Connect the items at the helm.
- Check out the installation.

**Warning:** Make all connections in accordance with applicable codes and standards.

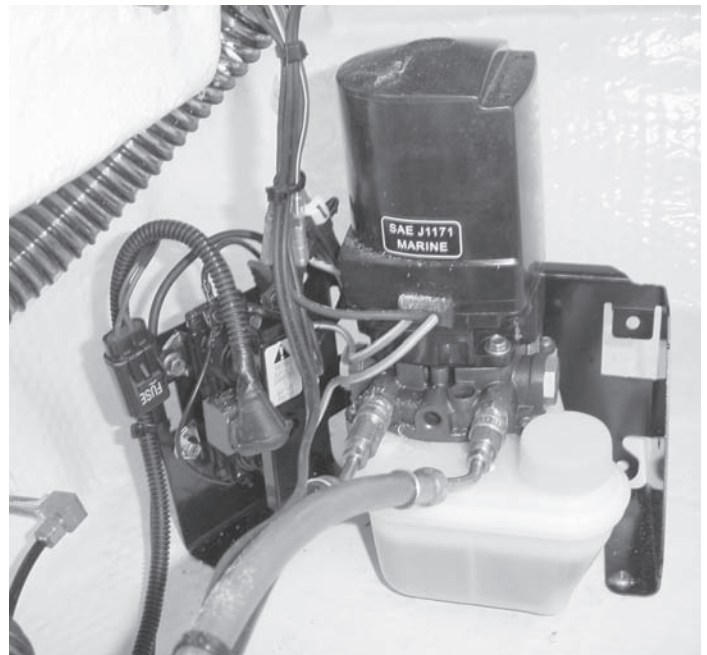
## *Route the CE500XX Engine Harness*

Mount the stern drive transom plate, gear lube reservoir, and trim pump per the stern drive instructions.

**Gear Oil**



**Trim Pump**



# Installation

Run the engine harness from the helm to the transom area. The engine harness has three main connection points, the helm, the transom and the engine.

**CE500xx Helm End**



**CE500xx Transom Breakout**



**CE500xx to Engine**



Attach the transom breakout point to the transom near the centerline of the engine and high enough that you can access this point after the installation is complete. Make the following connections and dress the wires.

- Gear Oil Return (Black) and Gear Oil (Brown) connect to the Gear Oil Reservoir. Tie back when using Marine Gear.
- Trim Position Return (Black) and Drive Trim Position (Dark Blue) connect to wires from the transom plate. Tie back when using Marine Gear.
- Fuel Return (Black) and Fuel (Pink) go to the fuel sender.
- Tie the J7 NMEA connector back at this time. This connector is supplied for future NMEA 2000 connections.

Leave the helm end and the engine end disconnected at this time.

## ***Route the Shift Cable***

Mount the shift plate that came with the stern drive near the stern drive transom plate and route the shift cable from this area to the helm where the control will be mounted. Connect the stern drive lower leg cable and the cable that goes to the shift control. The upper cable goes to the helm and the lower cable goes to the stern drive.

**Shift Plate**





# Installation

## *Install Battery Switch and Engine Breaker*

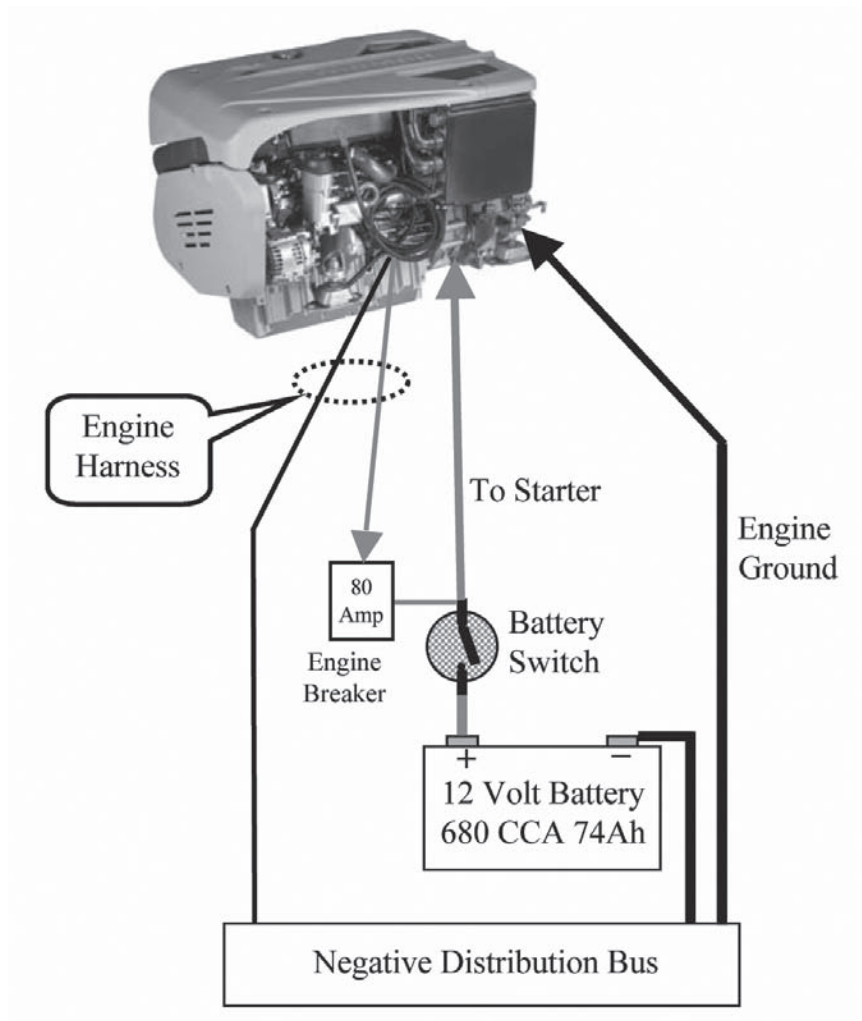
Install the battery switch and close to the battery switch install an 80 amp circuit breaker. The circuit breaker will need to be located so the 2.5 meter (8 foot) cable supplied on the engine can reach the breaker. Do not extend this cable.

The wire from the battery switch to the circuit breaker should not be longer than one meter (3 feet). The wire size should be 10mm<sup>2</sup> (AWG 6).

The wire size of the main ground cable and the cable to the starter motor should be sized based on their length. When determining the wire size add the length of the negative cable from the engine block to the battery and the length of the positive cable from the starter to the battery together.

Distance	Wire size	
Less than 5 meters (16 feet)	20mm <sup>2</sup>	AWG 4
Less than 9 meters (30 feet)	40mm <sup>2</sup>	AWG 1

**Breaker Wiring Diagram**

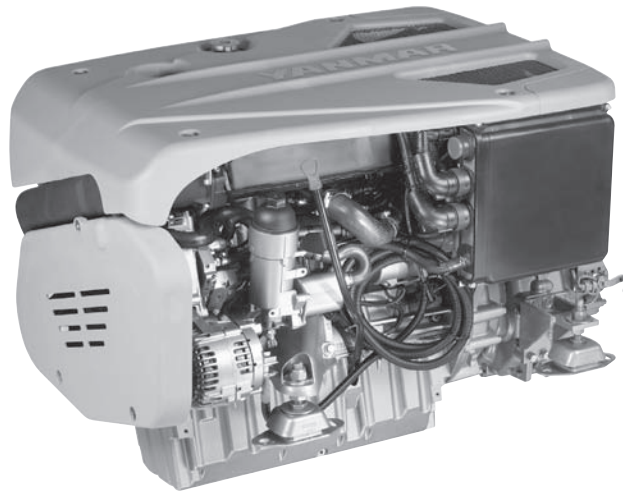


# Installation

---

## *Install the Engine*

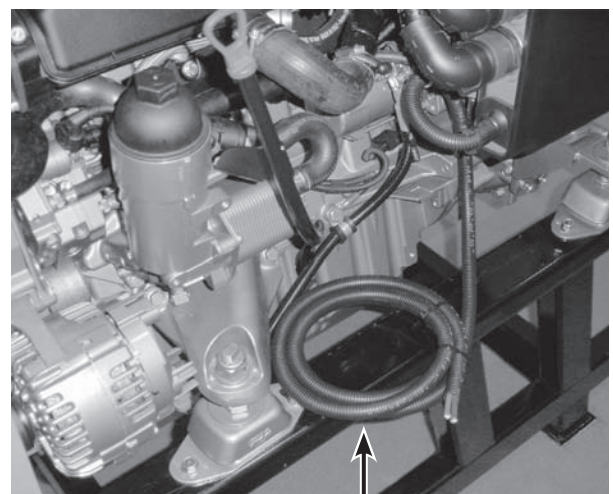
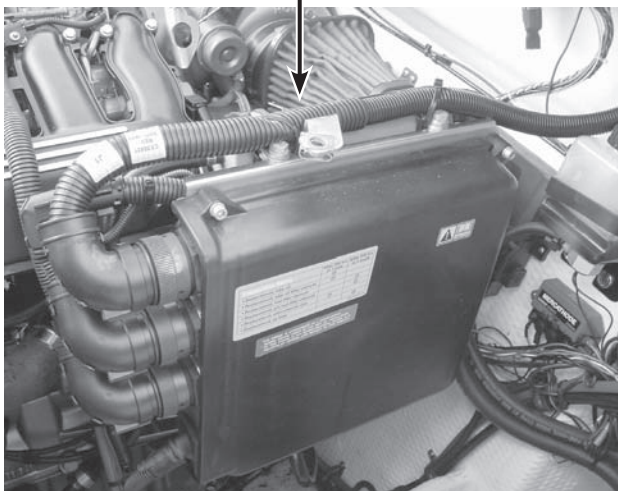
Install and align the engine per the instructions that come with the engine and the stern drive.



## *Connect the Items in the Engine Area*

Route the CE500XX engine harness from the center of the transom to the top connector of the engine computer box located on the starboard side of the engine. Route the power cable from the engine to the 80 amp engine breaker installed earlier. Connect the ground to the common block and complete the connections per the diagram on page 8.

### **Engine Harness Connection**



### **Engine Electronics Connection**

# Installation

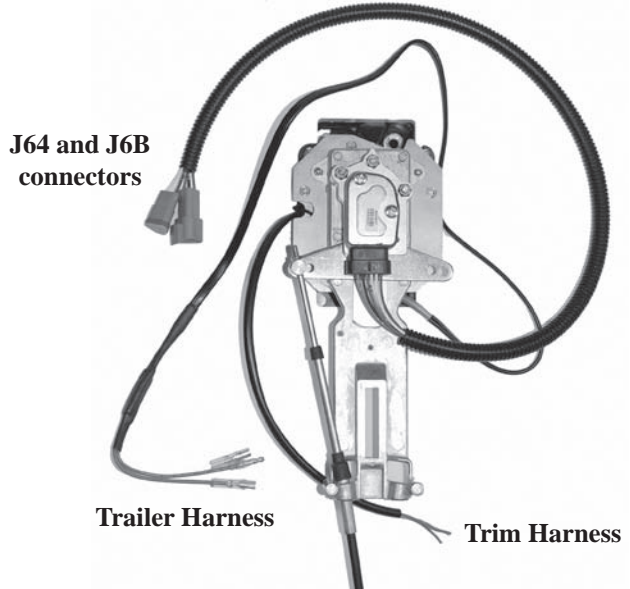
## *Install the Shifter*

Use the template supplied with the shifter or pages 23 and 24 of this manual to cut out the opening for the control head. Mount the shifter and connect the shift cable to the control head per the Control Instruction Manual.

**CH18000 Series Side Mount**  
front view



**CH18000 Series Side Mount**  
rear view  
shown with shift control cable



**CH18000 Series Top Mount**  
front view



**CH18000 Series Top Mount**  
rear view  
shown with shift control cable



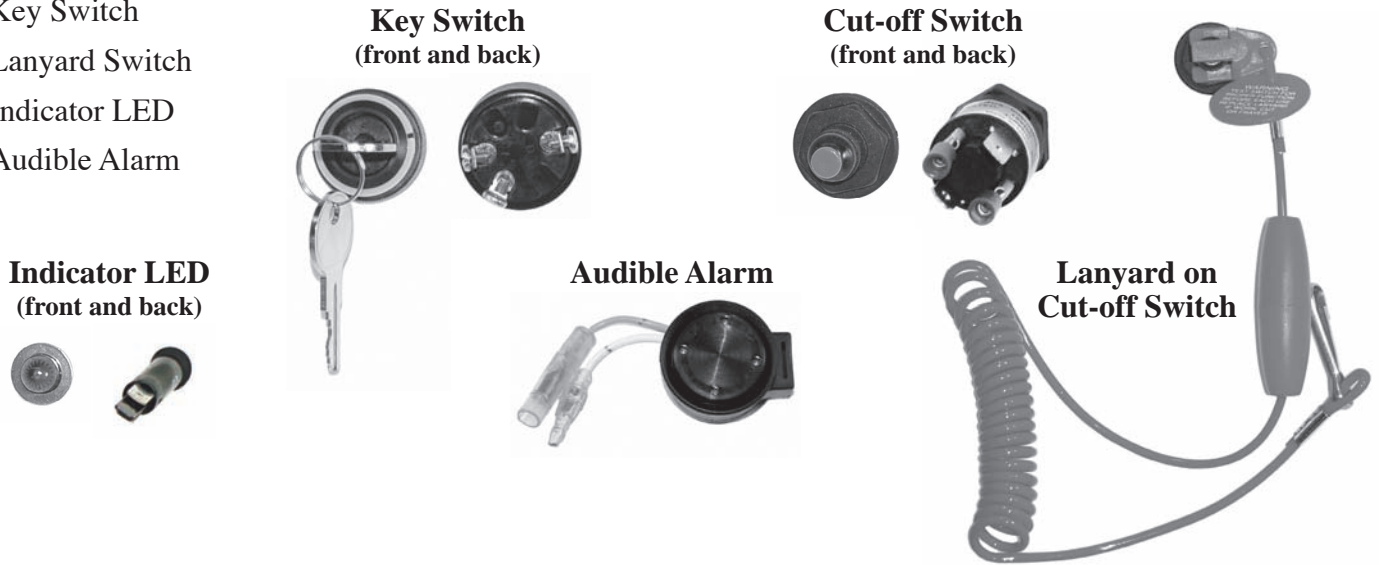
Connect the CE500XX cable that was route to the helm earlier. The J6A and the J6B connectors mate with the connectors on the control. Connect the trim harness supplied with the stern drive to the three bullet connectors.

# Installation

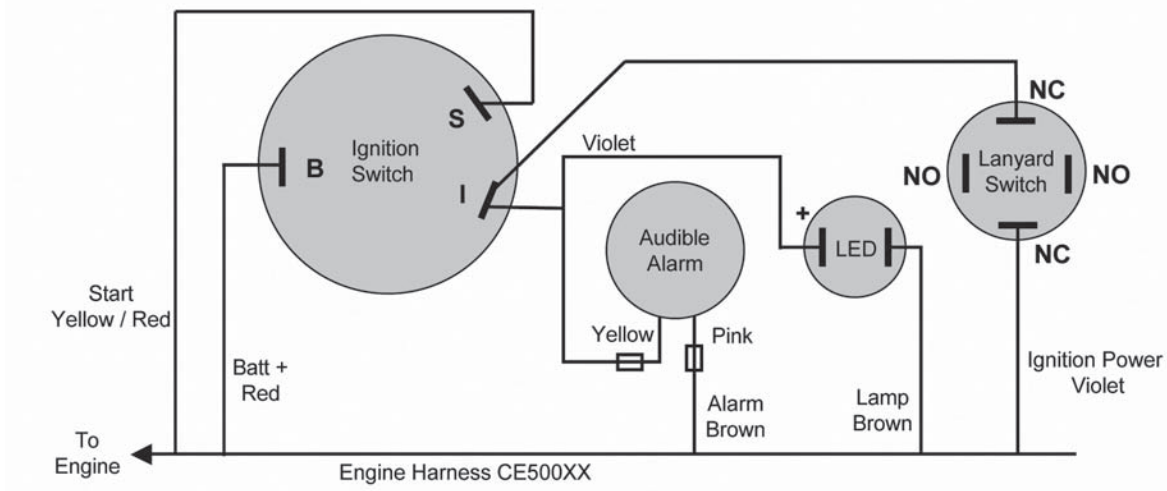
## Install the Helm Components

The following items are supplied as part of kit CP19400K. Locate an appropriate place and mount each item near the helm. The audible alarm should be mounted behind the helm so it is out of the weather.

- Key Switch
- Lanyard Switch
- Indicator LED
- Audible Alarm



When the parts are mounted connect the items to the CE500XX cable as shown in the diagram.

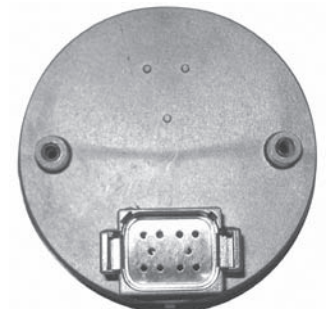


## Install the Tachometer

Mount the Tachometer using the cut out template on page 17 or 19 to insert the connector marked J3 tachometer on the CE500XX engine cable. If no other gauges are being used, individually tape back the other wires in the CE500XX harness for future use.

If optional gauges are being installed see Appendix B of this manual.

Back of Tachometer



# Checkout and Operation

---

For complete operating instructions see the Operators Manual, part number MANOPBYCM01.

## **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***

- Connect the safety lanyard to your person.
- Move the control handle to the NEUTRAL position.
- Turn the key switch to the ON position.
- Turn and hold the key switch at the START position until engine starts.
- When the engine is running allow the key switch to return to the ON position.

The tachometer will indicate the idle RPM's and the boat is ready to operate.

## ***Moving the Boat***

Move the control lever from NEUTRAL to a GEAR position. On Side Mount controls it will be necessary to press the Neutral Interlock button. The boat will move. Pushing the handle past the gear detent will advance the throttle.

Always operate the boat in a safe manner.

## ***Shut Down***

When ready to shut down the engine return the control to NEUTRAL and turn the Key Switch to the OFF position. This will stop the engine.

## ***Tachometer Display***

The digital display on the tachometer shows a variety of engine data. The operation of the display is shown on the next pages. All of the items listed here may be seen on the tachometer's digital display.

### **Data**

RPM

Battery Voltage

Coolant Temperature

Boost Pressure

Engine Load

Fuel Rate

Engine Hours

\* Fuel Level

\* Oil Pressure

### **Alarms**

Check Engine Alarm

Over Temp Alarm

Low System Voltage Alarm

High Boost Pressure Alarm

Throttle Position Sensor Alarm

Neutral Start Protect Alarm

*\* No digital value will be displayed for these parameters on Classic Systems.*

# Operation

## *Tachometer Menu Structure*

The tachometer menu structure (please refer to detailed diagram on the next two pages) is set up with a Main Menu display, accompanied by their respective submenus. Successfully navigating the main and submenus depends on the familiarization and understanding of how the ENTER, UP, and DOWN buttons are pressed, and in what combination.

### **To Navigate the Menus:**

- After the “Yanmar Marine Power-on” flashes on, the screen will return to the last display viewed on shutdown. Use the UP and DOWN buttons to scroll through the Main Menu items from ENGINE DATA to SYSTEM SETUP.
- To view the submenu features under one of these Main Menu displays, press the ENTER button. Then use the UP button to move forward and the DOWN button to move backward through the submenus.
  - Pressing the UP button at the end of the submenu scrolls directly to the first submenu item.
  - At any time you may return to the Main Menu by pressing the ENTER button.
  - With a bit of practice, navigating the menu should become second nature.



### **To Customize the Main Menu:**

It is possible to customize the Main Menu to better suit your boating needs.

- Scroll through the submenu until the substitute item is found. Press and hold the ENTER button for 3 seconds. The item will be “recognized” as the new choice for the Main Menu display. You will be returned to the Main Menu with the new item displayed and the previous Main Menu item will become part of the submenu.

#### CONTROL BUTTON OPERATION



#### **TO ENTER OR EXIT A SUBMENU**

- Press ENTER button at any Main Menu display to go into submenus.
- Press ENTER button at any time to exit back to the Main Menu.

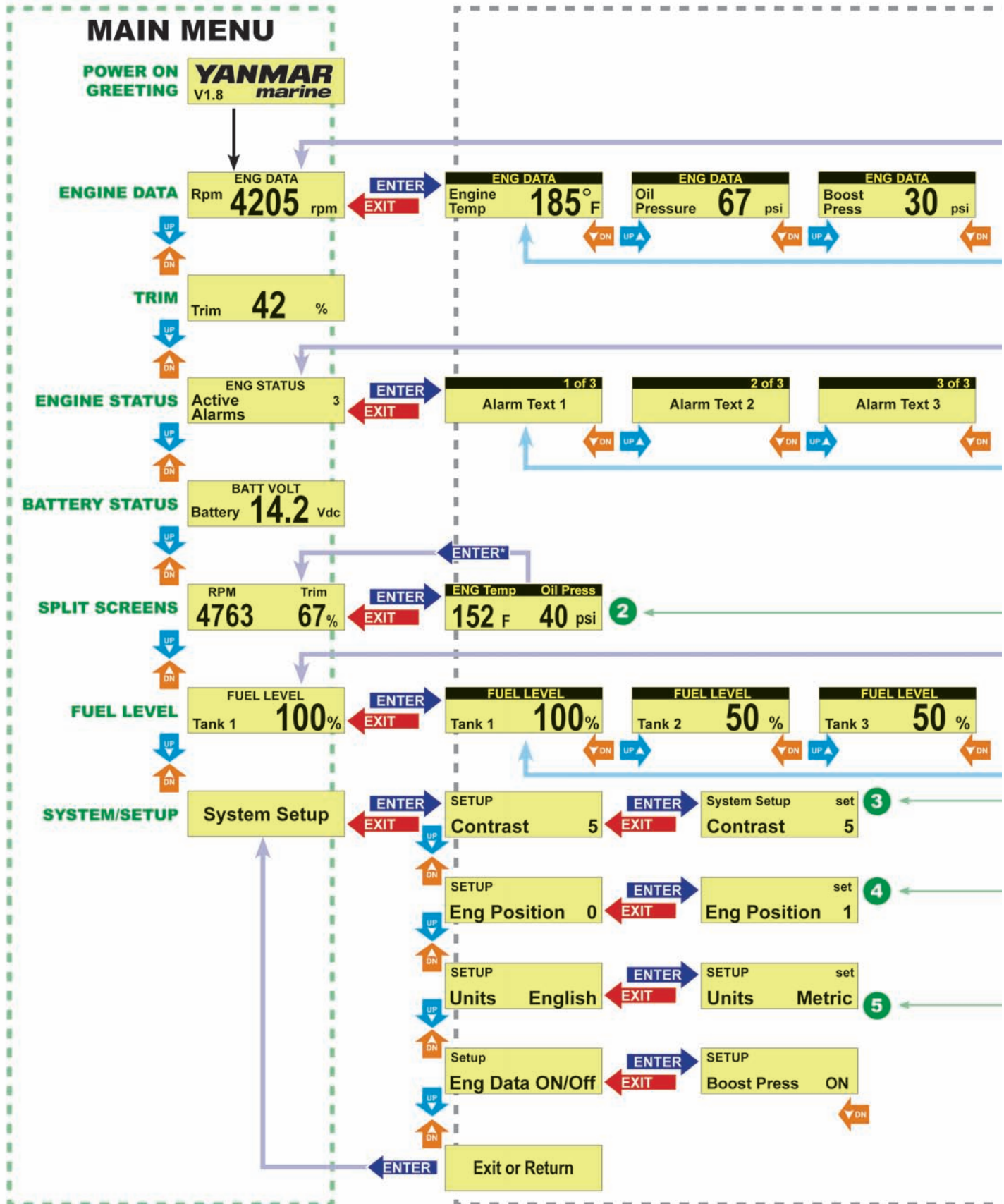
#### **TO CUSTOMIZE THE MAIN MENU**

- Choose submenu item to replace Main Menu item, then Press and Hold ENTER button for 3 seconds. This will return you to the Main Menu, replacing the previous item with the one you just chose.

#### **BACKLIGHT**

- Press the **UP/DOWN buttons at same time** (ONLY possible when in Main Menu).

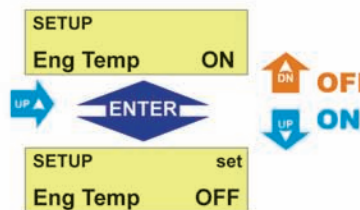
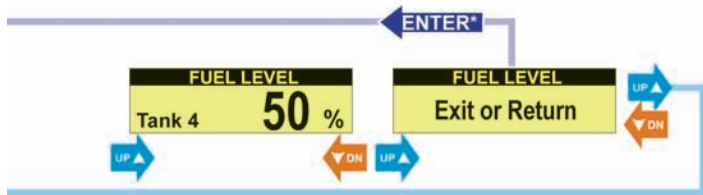
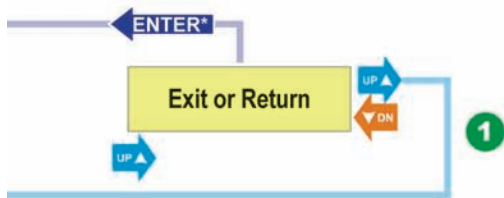
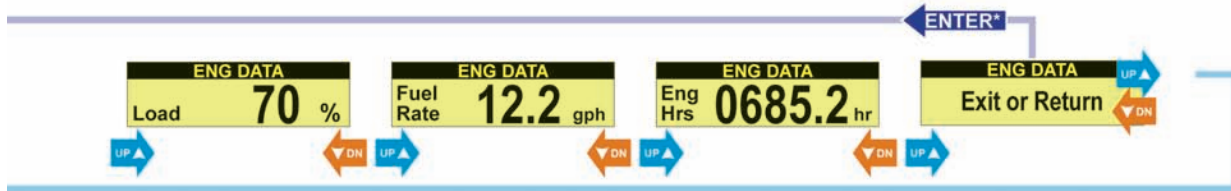
# Operation



# Operation

## SUB MENUS

### Tachometer Menu Structure



### SCREEN OPERATIONS

- 1 View list of Active Alarms.
- 2 Use UP key to scroll items on left of Split Screen and DOWN arrow to scroll items on right. ENTER button returns to MAIN menu.
- 3 Adjust contrast level from 0 - 10 in increments of 1. Only values between 3 - 7 (inclusive) will be saved and restored at power-up. Settings above and below will be saved as 3 or 7.
- 4 0 - Port  
1 - Starboard (Dual), Center (Triple)  
2 - Starboard (Triple)  
Use arrow keys to scroll through numbers, then press ENTER to set. Gauge will reset after position is changed.
- 5 English - psi, gallons, degrees F.  
Metric - bar, liters, degrees C.
- 6 UP or Down arrow toggles ON/OFF. Any parameter can be turned off.

*\*Press and release at any time, to return to Main Menu.*



# Alarms

---

## *Warning Light*

The warning light will come on and the buzzer will sound if any of the following conditions occur. The lights and buzzer will turn off automatically when the alarm condition returns to normal.

- Check Engine Alarm
- Low Oil Pressure Alarm
- Low Gear Lube Alarm
- Water in Fuel Alarm

The digital display on the tachometer will allow you to determine some additional information about the alarm. See pages 14 and 15 to find the Engine Status section of the display.

## *Engine Status Information*

The following alarms will be displayed in the Engine Status Display if they occur. They will go away when the alarm condition returns to the normal operating range.

- Check Engine Alarm
- Over Temp Alarm
- Low System Voltage Alarm
- High Boost Pressure Alarm
- Neutral Start Protect Alarm



*Note: If the check engine alarm is displayed in the tachometer window, a DTC (Diagnostic Trouble Code) may be stored in the Engine Control Module memory. A trained technician with a diagnostic service tool can read and clear any stored DTCs.*

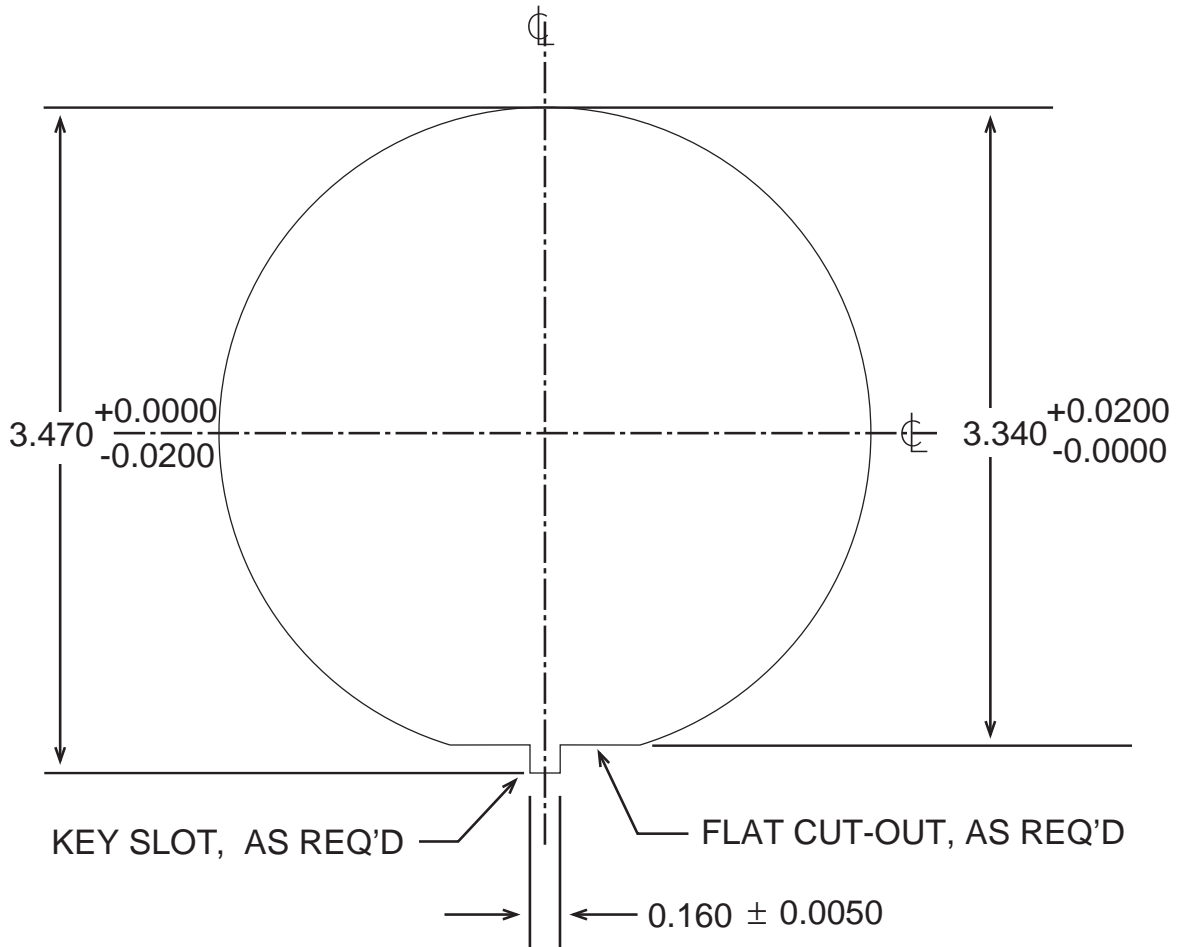
# Templates

## 3" Gauge (Tachometer) with Key Cut

**Note: The 2" and 3" gauges are supplied with a locking tab and flat.**

When installation is being done with a CNC machine, use the "with Key Cut" template. When installation is being done with a hole saw, use the "without Key Cut" templates.

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

0.005 inches	=	0.1mm
0.02 inches	=	0.5mm
0.16 inches	=	4.1mm
3.34 inches	=	84.8mm
3.47 inches	=	88.1mm

# Templates

---

This page left intentionally blank.

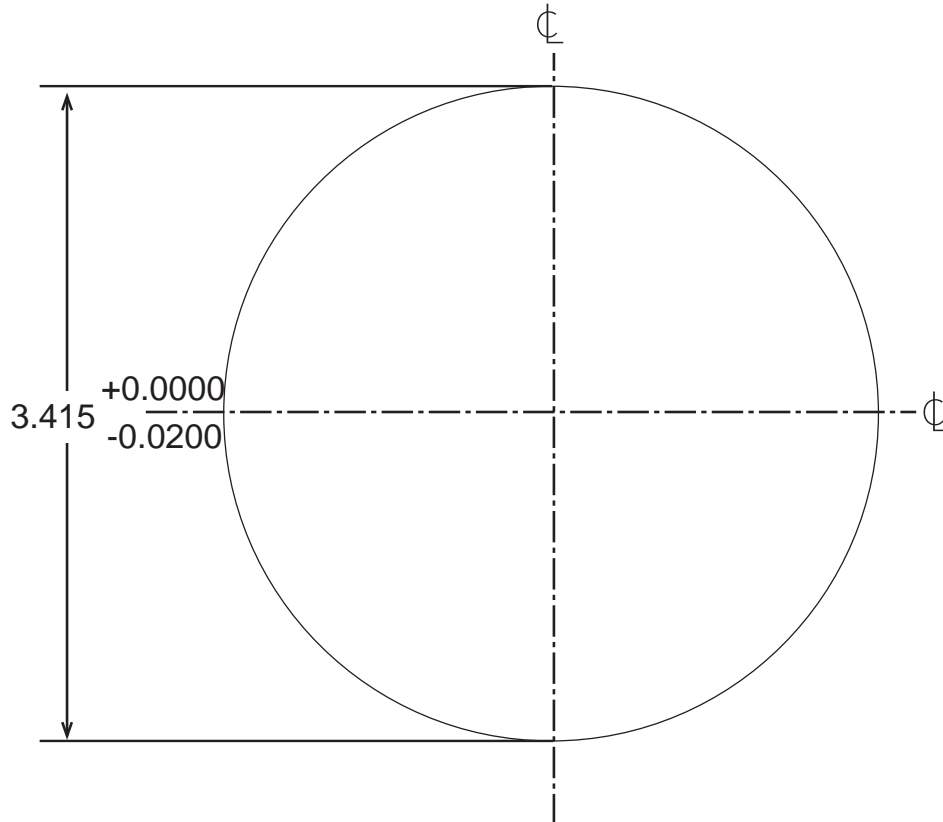
# Templates

## 3" Gauge (Tachometer) without Key Cut

**Note: The 2" and 3" gauges are supplied with a locking tab and flat.**

When installation is being done with a CNC machine, use the "with Key Cut" template. When installation is being done with a hole saw, use the "without Key Cut" templates.

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	
0.02 inches	= 0.5mm
3.415 inches	= 86.7mm

# Templates

---

This page left intentionally blank.

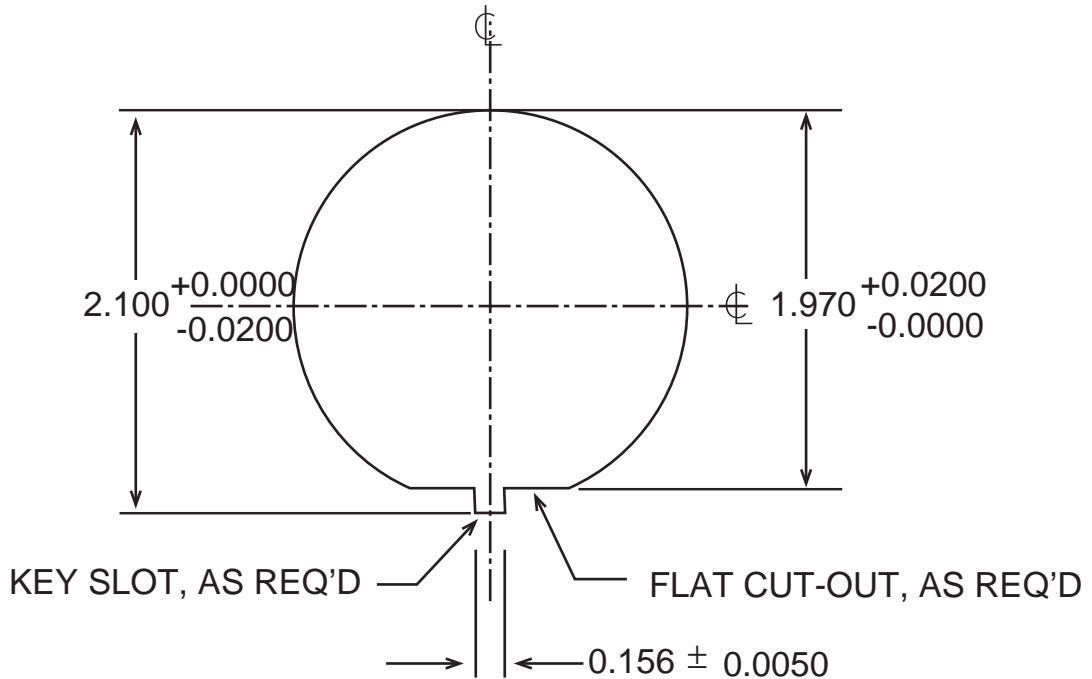
# Templates

## 2" Gauge with Key Cut

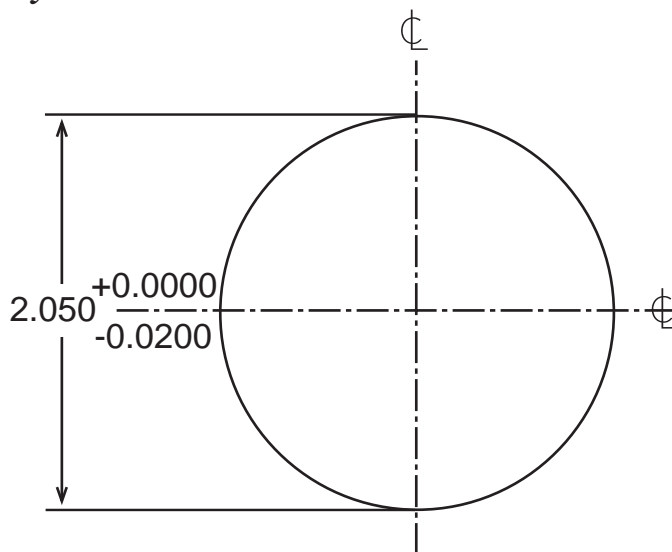
**Note: The 2" and 3" gauges are supplied with a locking tab and flat.**

When installation is being done with a CNC machine, use the "with Key Cut" template. When installation is being done with a hole saw, use the "without Key Cut" templates.

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.



## 2" Gauge without Key Cut



U.S. to Metric	
0.005 inches	= 0.1mm
0.02 inches	= 0.5mm
0.156 inches	= 4.0mm
1.97 inches	= 50.0mm
2.05 inches	= 52.1mm
2.1 inches	= 53.3mm

# Templates

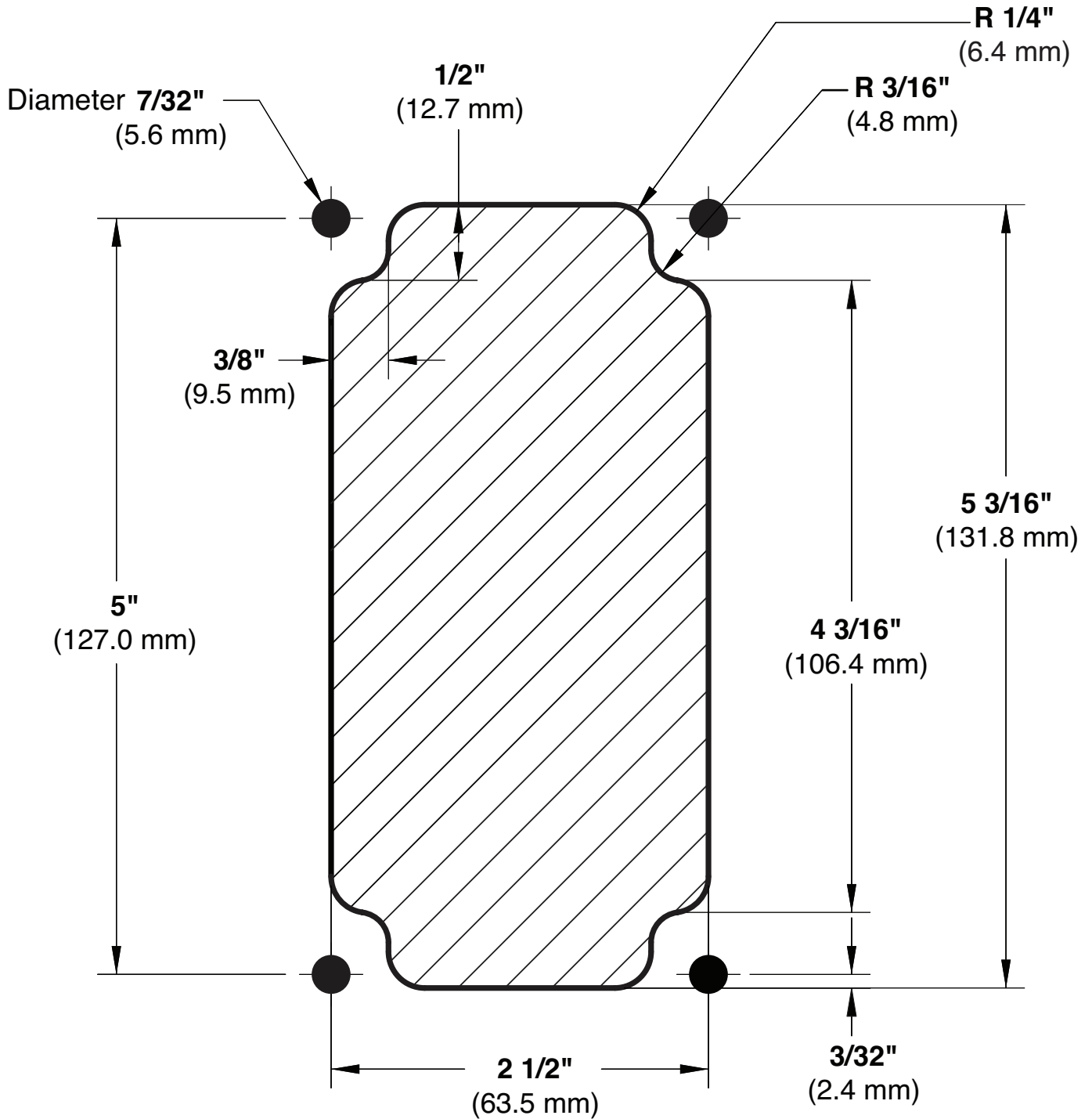
---

This page left intentionally blank.

# Templates

## CH18000 Top Mount 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.*





# Templates

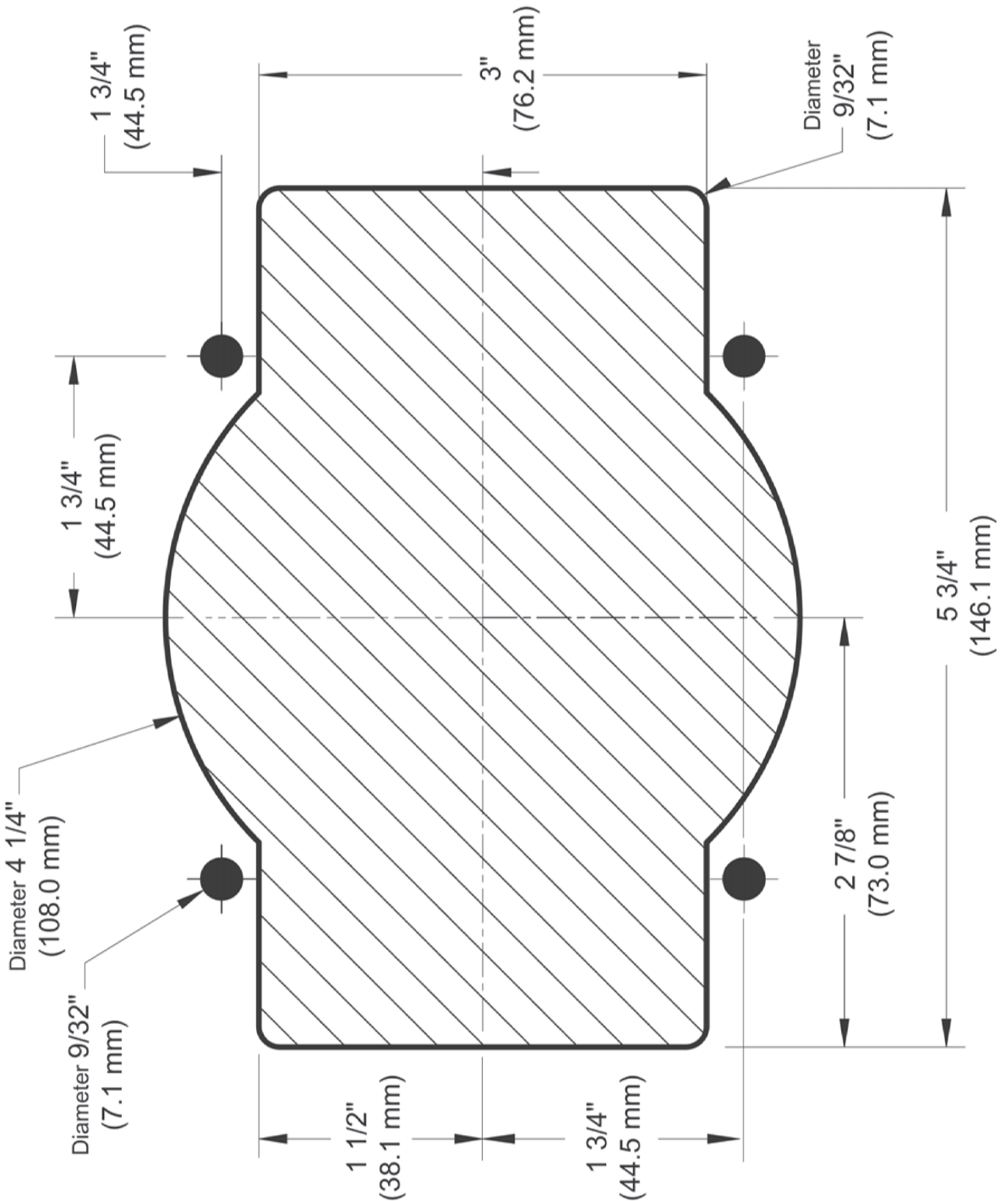
---

This page left intentionally blank.

# Templates

## CH1700 Side Mount 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.



# Templates

---

This page left intentionally blank.



# Templates

---

This page left intentionally blank.

# Appendix A: Analog Gauges

---

Several options are available for the Classic Control System.

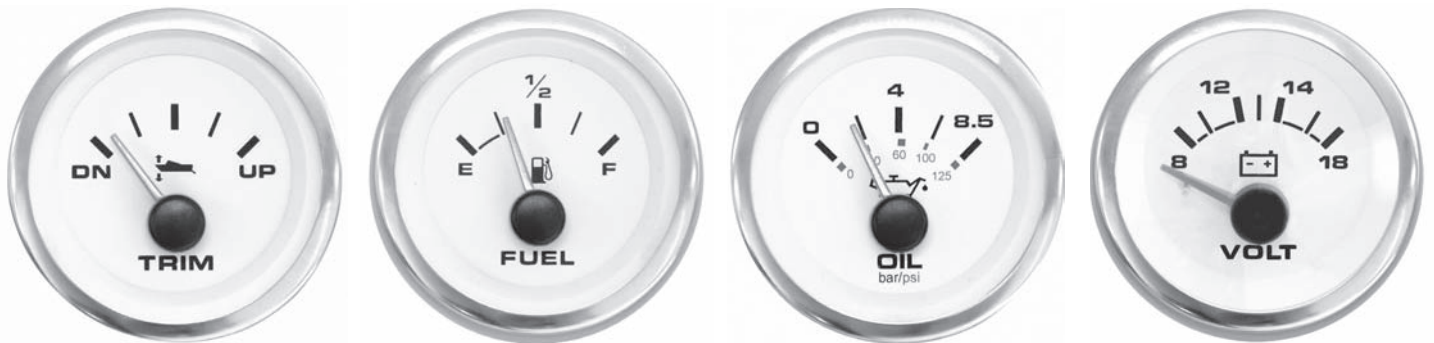
## Analog Gauges

The following gauges are available for easy connection to the system. The wires are in the main harness and are located behind the helm.

Speedometer - This 3 inch gauge requires a pitot tube connection.

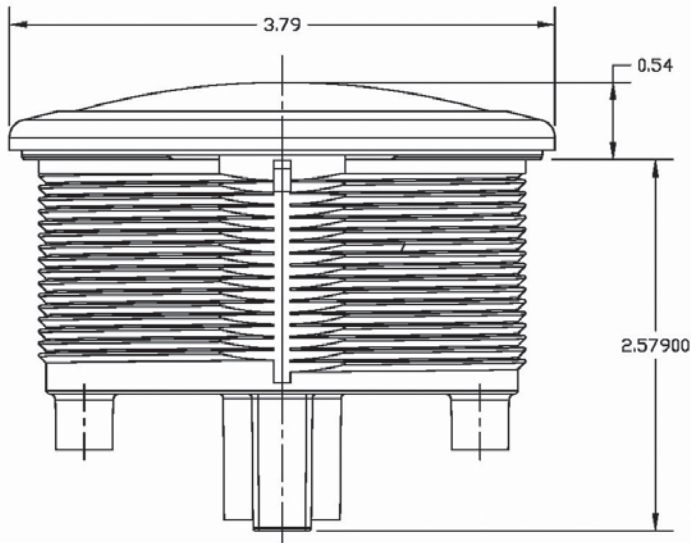


Trim, Fuel Level, Oil Pressure and Volt gauges are also available.



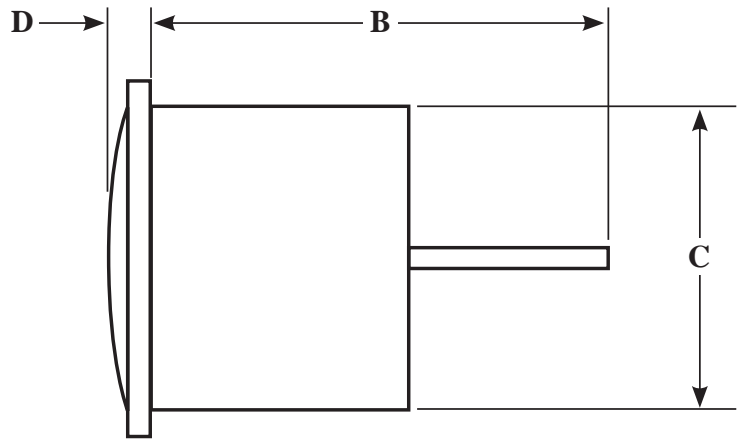
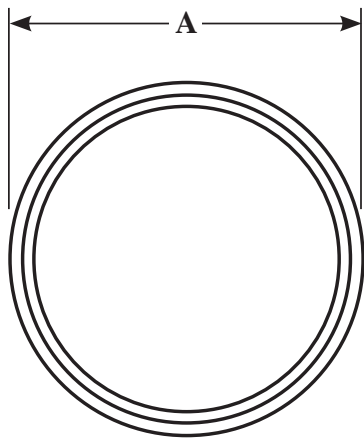
# Appendix B: Gauge Measurements

## 3" Master Tachometer/Slave Speedometer (Dimensions in inches)



U.S. to Metric	
0.54 inches	= 13.7mm
2.579 inches	= 65.5mm
3.79 inches	= 96.3mm

## Analog Gauges



Analog Gauge Style	A	B	C	D
2" All Electrical Gauges	2.38	2.13/2.22	2.50	.38
2" Mechanical Pressure Gauges	2.38	2.13/2.22	2.50	.38
3" Electric Tachometers	3.78	3.41/3.44	2.76	.58
3" 4-N-1	3.78	3.41/3.44	2.76	.58
3" Electric Tach/Hourmeters	3.78	3.41/3.44	3.88	.58
3" Marine Pitot-type Speedos	3.78	3.41/3.44	2.70	.58





