

Teleflex Marine Products i6300 Controls Installation Manual

Installation instructions for your Teleflex Marine product.
Please read these instructions through carefully and entirely before beginning installation.
All specifications and features are subject to change without warning.



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
U.S. Power Squadron www.usps.org

Notice to Boat Manufacturer, Installer, and Consumer

Notices

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

Teleflex® is a registered trademark of Teleflex Incorporated.

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.

This product is covered under one or more of the following patents: 6587765, 6751533, 6965817, 7142955

The software in this product is Copyright © 2007 Teleflex® Marine. All Rights Reserved.

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. No part of this manual may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying and recording, for any purpose, without the express written permission of Teleflex Marine.

WARNING

The installation of this product must be performed following all applicable installation and safety codes. To assure safety and long term reliability use only marine grade components with ratings appropriate for the job. Marine grade wire and ignition proof breakers, switches, and fuses in particular are required to assure an installation that meets all codes. Proper wiring practice for securing wires is also required to meet codes.

Definitions

<i>SRT (Split Range Throttle)</i>	A control feature which limits the full throttle lever position on the control to a percentage of the true engine maximum RPM's; it improves control of the boat at slow speeds. Default is 25% and may be set from 0% to 90%.
<i>Trolling Mode</i>	A transmission and control feature that allows the propeller shaft to turn at a speed below the normal idle speed.
<i>Docking Mode</i>	Describes what action the center engine or engines will take when a triple or quad engine boat is maneuvering.
<i>Sync</i>	This feature automatically sets both engines to the same RPM level. When Power Train Sync is selected, the gears and the throttles are operated by one control lever.
<i>Neutral Throttle Warmup</i>	This features allows the engine RPMs to be adjusted without the engine going into gear.

Contents

About the Book	4
Installation Overview	4
Step 1 - Identify the CAN Bus Cable Components	5
NMEA 2000® CAN Bus Cables	5
Step 2 - Mount the Components	6
Install the Helm Components	6
Mount the Actuators	7
Step 3 - Mount the Mechanical Cables	8
Measuring the Cables from the Actuators to the Shift and Throttle Connections on the Engine	8
Connect the Shift and Pull-to-Throttle Cables at the Actuators	9
Step 4 - CAN Bus Cable and Other Connections.	10
Summary	10
Run the CAN Bus	10
Connections	11
Connect the Single Engine Control	11
Connect the Dual Engine Control	12
Connect the Actuators to the CAN Bus	13
Shift Actuator - Connections	14
Throttle Actuator - Connections	15
i6300 Single Station, Single Engine CAN Bus Connection Diagram	16
i6300 Single Station, Dual Engine CAN Bus Connection Diagram	18
Trim Harness Connections • Dual Engine	20
Trim Harness Connections • Triple Engine	21
Step 5 - Power	22
12 Volt Systems	22
Connections with the i1003 Power Module	22
Connections without the i1003 Power Module	24
24 Volt Systems	26
Connections with 24 to 12 volt Converter	26
Connections with separate 12 volt CAN Bus Supply	28
Step 6 - Setup	30
General Information	30
Calibrating the Actuators	30
Throttle Direction and Idle	31
Throttle Stroke	31
Connect the Push-to-Throttle Cable at the Actuator	32
Shift Direction and Neutral	33
Forward and Reverse Shift Stroke	34
i6300 Actuator Calibration Diagram	35
i6300 Control Head Light Indicator Chart	36

Contents

Step 7 - Check the Installation	37
Connection Checks	37
Key Switch Check	37
Shift & Throttle Range of Motion	37
After Checking Installation - Boat in Operation	37
Second Station	37
Appendix A - i6300 Default Settings	38
Appendix B - Control Head Calibration	39
Single Lever - Single Engine Controls	39
Single Lever - Dual or Triple Engine Controls	39
Port Lever	39
Starboard Lever	40
Appendix C - Features	41
Settable Features	41
Control Features	42
Sync - Power Train or Cruise	42
Lead Handle Port or Starboard	42
Split Range Throttle	42
Forward Throttle Curves	42
Reverse Throttle Curves	42
Programmable Shift Delay	43
RPM Setting	43
Throttle Push/Pull	43
Throttle Stroke	43
Shift Push/Pull	43
Forward Shift Stroke	43
Reverse Shift Stroke	43
Overshift/On-Off	43
Station Select Protection	44
Windows Filters	44
Throttle Offset	44
Docking Modes	44
Clear Sync Table	44
Failure Modes	44
Appendix D - Features Setup Using the Control Head	45
Appendix E - General Engine Information	48
Appendix F - Adjusting Throttle Stroke	50
Appendix G - System Alarms and Failure Modes	52
Appendix H - Spare Parts Kits	54

About the Book

This manual covers the installation of the i6300 electronic control system. The detailed set up of the features and calibration can be found in Step 6, starting on page 30.

The operation of the product is covered in the operator's manual and the Quick Reference guides for the various systems.

Number of Engines	Operator's Manual	Quick Reference Card
Single Engine	MANOP6300SEM01	QR6300SE or QR6300SEM01
Dual Engines	MANOP6300DEM01	QR6300DE or QR6300DEM01
Triple Engines	MANOP6300TEM01	QR6300TE
Quad Engines	MANOP6300TEM01	QR6300QE

Additional information for the i6300 is available in the complete System Installation Manual - MANIN6300M02.

Installation Overview

This manual typically shows the dual engine outboard installation. Marine gear and stern drives are similar as are different numbers of engines. Any significant differences are shown.

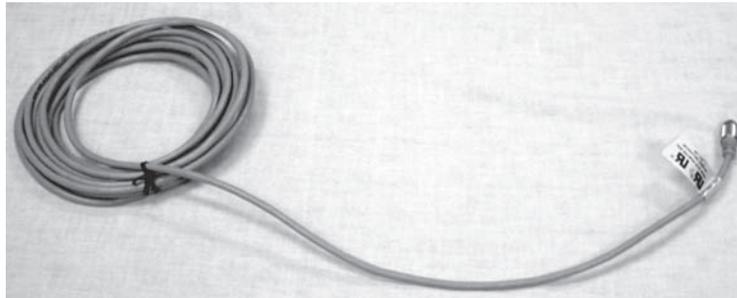
All installations follow the same method which is the order items are covered in this manual.

1. Identify the CAN Bus cable components.
2. Mount the various components.
3. Route and mount the mechanical cables.
4. Route and connect the CAN Bus cables and other connections.
5. Connect the actuators to 12 or 24 volt DC power.
6. Setup the shift and throttle adjustments for direction and stroke.
7. Check out the installation.

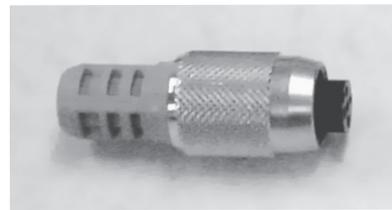
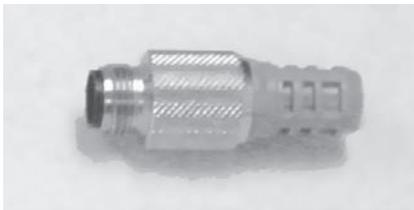
Step 1 - Identify the CAN Bus Cable Components

NMEA 2000[®] CAN Bus Cables

CM100XX: Cable



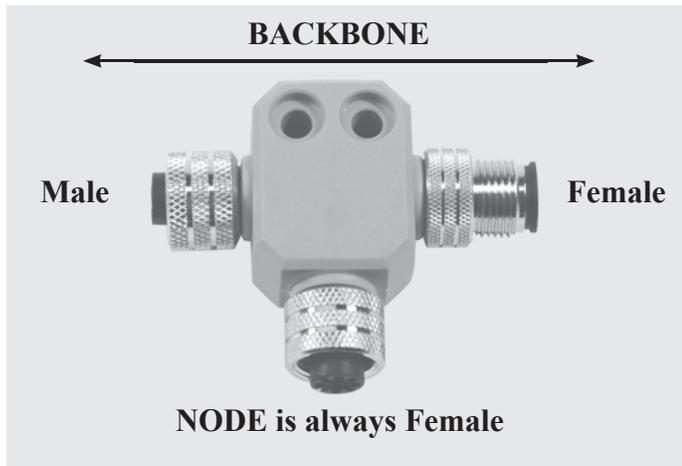
CM10051: male terminator / **CM10052:** female terminator



“T” Connector:

Supplied by several vendors under part numbers CM10050 and CM10060 (shown).
Appearance may vary - parts are interchangeable.

CM10060 “T” Connector



CM10064 - 4 Block “T” Connector



Note regarding connectivity of “T” Connectors:

- When connecting a “T” connector to a component (for example, CH67550 Control Head) always install via the middle connection (“NODE”).
- When connecting a “T” connector to a CAN Bus 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 and can cause damage.

Step 2 - Mount the Components

Install the Helm Components.

1. Mount the Control Head using the templates included with the Control Head.
2. Mount the CH67XXX Control Module, if supplied, using the template supplied in the Control Head Kit.

CH67550 Dual Engine Control Head



CHKCB67650 Single Engine Control Head Kit
(shown with Control Module)



Step 2 - Mount the Components

Mount the Actuators.

Location

Choose a suitable location for the Shift and Throttle Actuators, considering the following requirements:

- The actuators are NOT waterproof. Choose a DRY location.
- The actuators need 12 or 24 volt power and connect to the CAN Bus.
- The mechanical cables to the Engine Shift and Throttle require adequate clearance and no sharp bends.
- The actuators should be mounted where they can be accessed for manual operation.

Actuator Labels

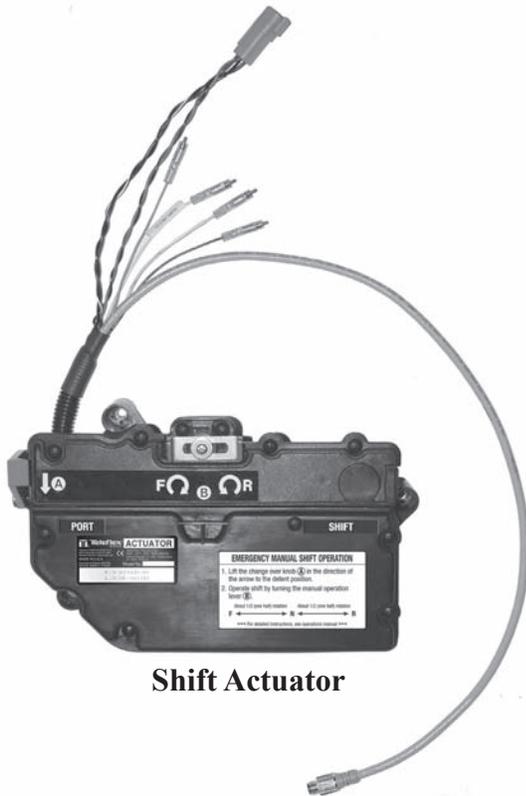
A self adhesive label sheet (shown) is provided with the actuators to assist in product identification and installation. It is suggested that the labels be attached once the actuators are in their proper location but before they are mounted.

PORT		CENTER		STARBOARD	
F		R		IDLE	WOT

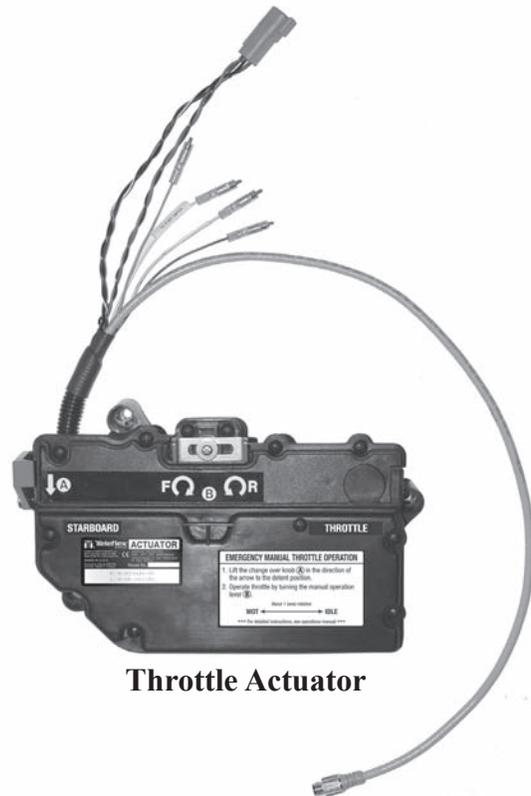
Mounting

There are two ways to mount the actuators:

1. Three bolts (M8 x 1.25 x 440 mm) can be used for rear mount applications (bolt heads behind the mounting panel).
2. Three screws and washers can be used for front mount applications.



Shift Actuator



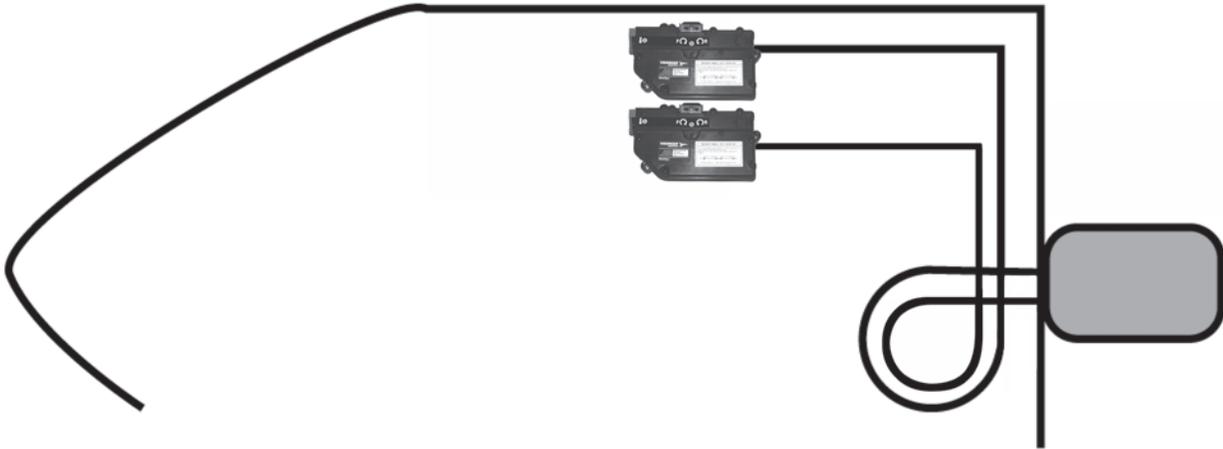
Throttle Actuator

Step 3 - Mount the Mechanical Cables

In this section you must route the mechanical control cables from the shift actuator to the shift lever on the engine and the throttle actuator to the throttle lever on the engine.

Measuring the Cables from the Actuators to the Shift and Throttle Connections on the Engine:

Measure the cable routing path from the Actuators to the engine connections.



- Measure along an unobstructed cable routing -- to the engine connection.
- Round this dimension UP to the next whole foot and order the required Teleflex cable part number.

We recommend Teleflex TFXTREME® cables (CC633XX) for optimum results in all installations. For cable routings that have any tight bends or total bends exceeding 180°, Teleflex TFXTREME® cables (CC633XX) MUST be used for proper operation.

(Last two digits of the Teleflex cable number equal the length of the cable in feet - example: CC63310 would refer to a 10' long cable).

NOTE:

*It is necessary to check if your throttle pushes or pulls to increase engine RPM
and if your gear lever pushes or pulls for forward gear.
(Go to Step 6 and record this information in the areas provided.)*

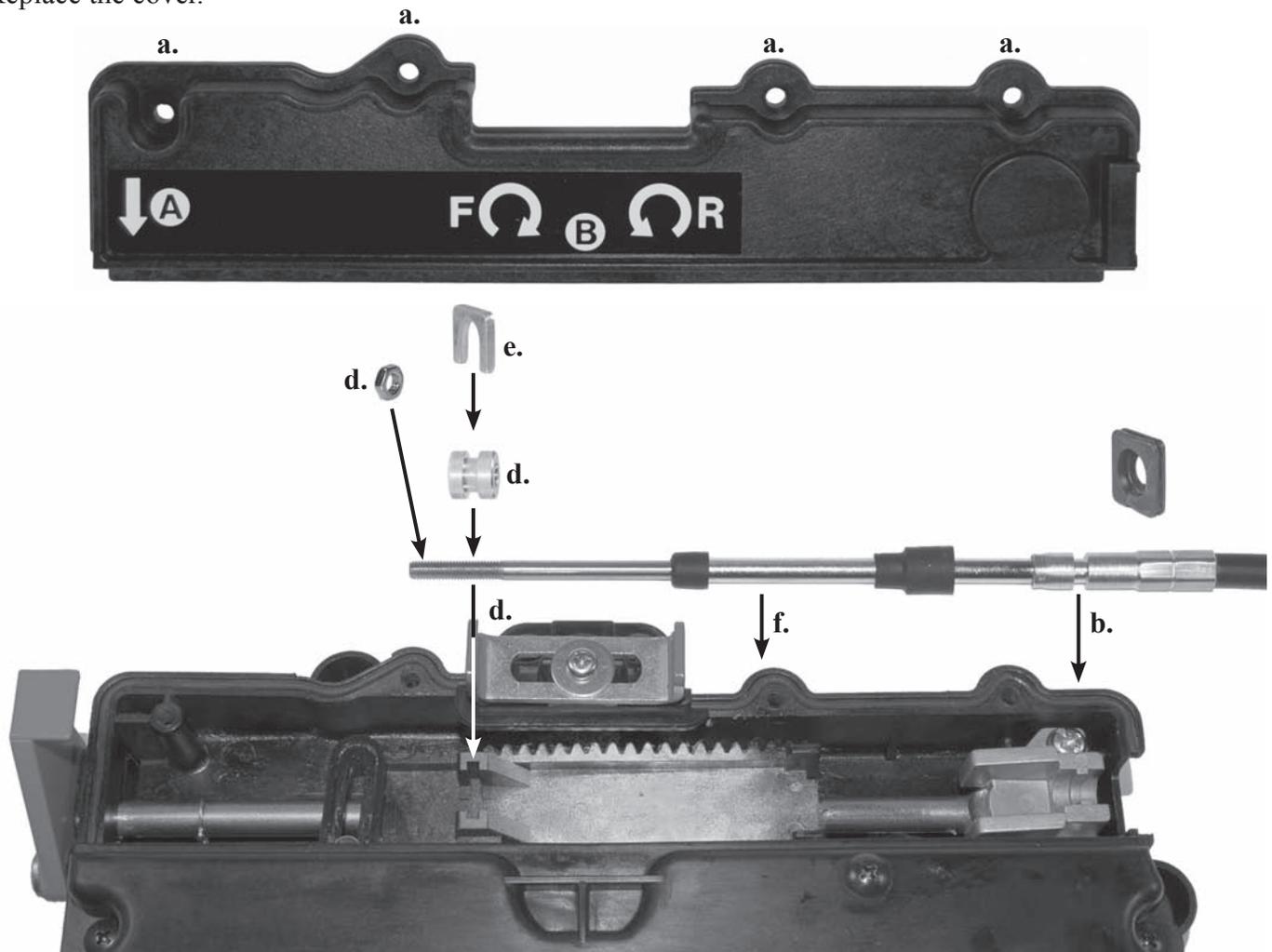
Note: Route the cables through the boat avoiding sharp bends.

Step 3 - Mount the Mechanical Cables

Connect the Shift and Pull-to-Throttle* Cables at the Actuators:

**Connect the Shift Cables at the Actuators using the procedure below now. If you are installing a Pull-to-Throttle connection, use the procedure below now. However, if you have Push-to-Throttle connection, skip this page and go to page 10. A Push-to-Throttle connection will be shown later in the manual.*

- For the Pull-to-Throttle and Shift Actuator connections, remove the cover plate (4 screws) as shown below.
- Position the end of the cable above the cable mount so the notch on the cable will fit into the detent in the mount.
- Place the rubber Grommet around the shaft of the cable, just in front of the two hex crimps. This will slide into the side edges of the housing.
- Screw the Adjustment Barrel, Brass (10-32 thread) or Stainless Steel (M5 thread), approximately halfway onto the end of the cable. Adjust the barrel and cable so it will fit into the slot toward the top of the cable mount. Once the proper position is found, screw on the Jam Nut (supplied with the cable) and tighten against the Adjustment Barrel.
- Secure the Adjustment Barrel to the cable mount with the Steel Retainer.
- Fit the cable into the cable mount so that all previous components are seated into their respective spots.
- Replace the cover.



Note: Now make sure the engine ends of the pull-to-throttle and shift cables are close to their mounting position but **DO NOT** connect. These will be connected during the calibration process in Step 6.

Step 4 - CAN Bus Cable and Other Connections

Summary

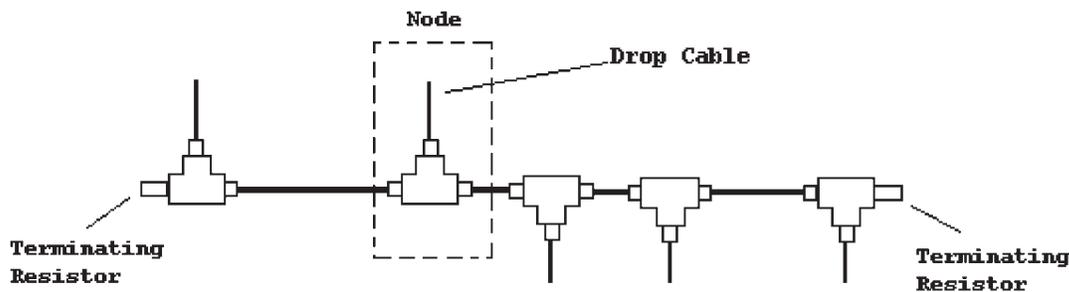
For all installations the following connections must be made. For detailed connection diagrams see pages 16 through 19.

- Run the CAN Bus from the actuators to the control head.
- Connect the actuators to the CAN Bus.
- Connect the control head to the CAN Bus.
- Install the terminators.
- Connect the shift actuator to Start and Ignition Switches.
- Connect the throttle actuator to the tachometer.
- Connect power to the CAN Bus.

Run the CAN Bus

Use CM100XX cables to run the CAN Bus from the actuators to the control head.

The CAN Bus Network must consist of a single cable run to which devices are connected to it by means of a “T” Connector. All products must connect to the node part of the “T” connector. Each end of the cable must have a terminator. It is essential there be a total of two and only two terminators.



Warning

The cables must not be cut or spliced.

Warning

When securing the cables and especially when tying down a number of direct connected “Ts” never pull them down so tight as to cause strain or put a curve in the “Ts” as this may cause a failure.

When installing a NMEA 2000® CAN Bus system there are several things to keep in mind.

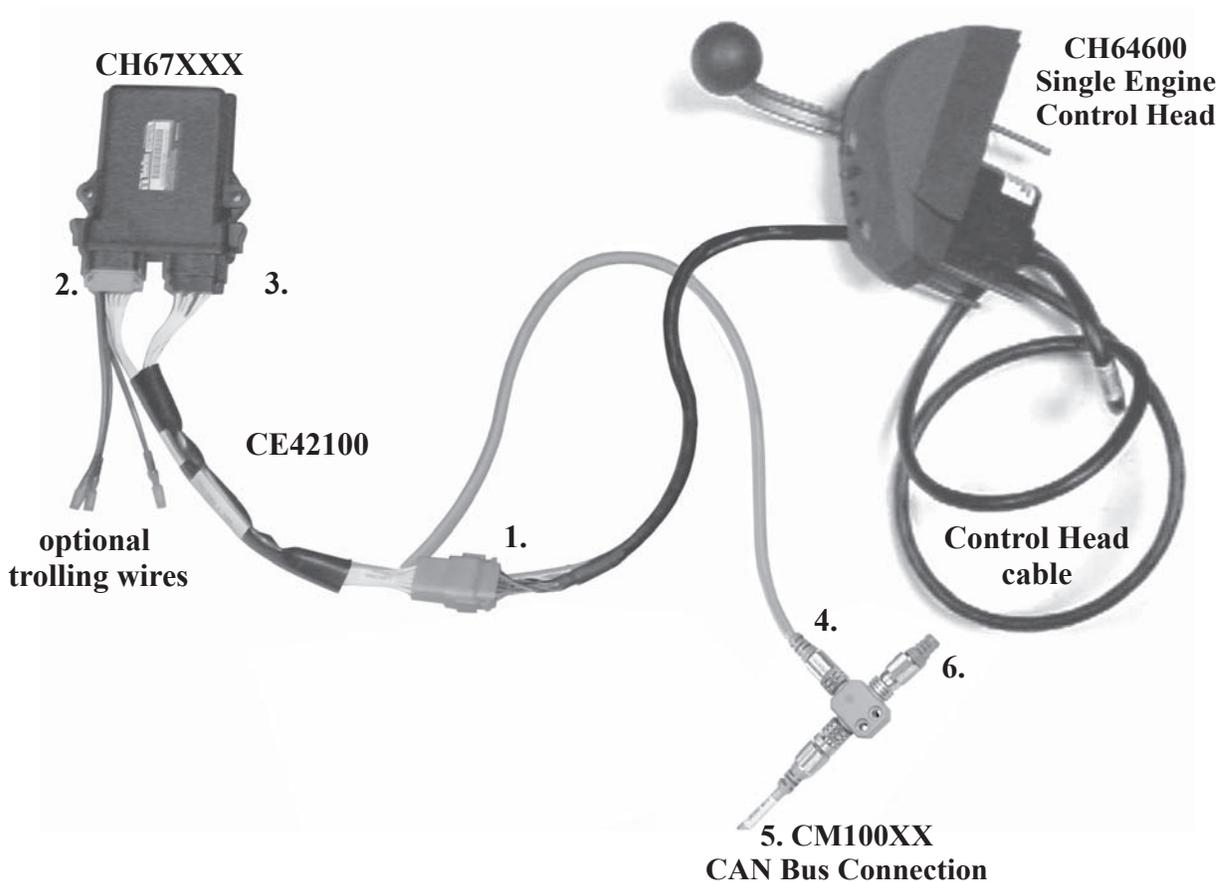
- The cable ends are male and female. To avoid a mismatch it is best to work from one end toward the other. If you must work from both ends toward the middle assure that the mating point will be a male / female connection.
- It is wise to plan for expansion. With so many new NMEA 2000® products entering the market and the ability to connect on to the CAN Bus for testing it is sometimes wise to use two cables where one would suffice. The connection of the two cables can later be separated so additional “Ts can be inserted to add another product or test equipment.

Step 4 - CAN Bus Cable and Other Connections

Connect the Single Engine Control (for Dual Control see page 12).

Parts shown below are included in CHKCB67650.

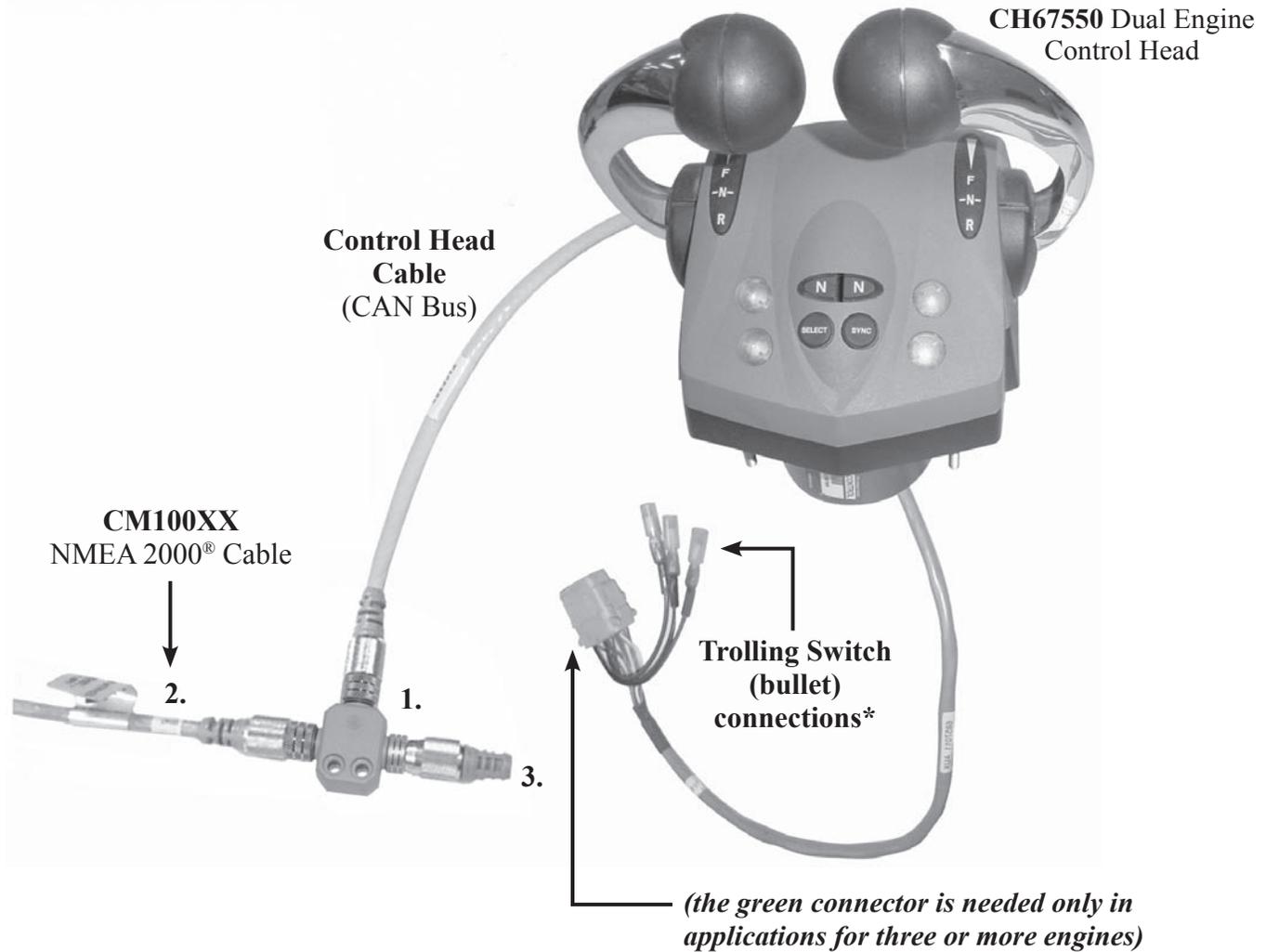
1. Connect the Control Head cable to the appropriate end of cable harness CE42100 (big grey connector).
2. Connect the GREY connector on cable harness CE42100 to the GREY port on the CH67XXX module.
3. Connect the BLACK connector on cable harness CE42100 to the BLACK port on the CH67XXX module.
4. Install a CAN Bus “T” connector to the CAN Bus end of the CE42100 cable. Connect at the NODE.
5. Connect the “T” to the previously run CM100XX CAN Bus cable.
6. Terminate the “T” end with the appropriate gender CAN Bus Terminator.



Step 4 - CAN Bus Cable and Other Connections

Connect the Dual Engine Control *(for Single Control see page 11).*

1. Connect the Control Head (CH67550 in this case) to a “T” connector via the Node.
2. Connect the CM100XX to Control Head “T” connector.
3. Terminate the open “T” connector end using the appropriate gender terminator.



For optional Trim Connections see pages 20 and 21.

**Only used on Inboard applications with trolling valves.*

Step 4 - CAN Bus Cable and Other Connections

Connect the Actuators to the CAN Bus:

1. Connect the Actuator cable NMEA 2000® connectors into the Nodes of the “Ts.”
2. Connect the Actuators to the network using CM100XX cables.



Note: Actuators may be added to the CAN Bus in any order or in any location.

“Ts” may be connected directly to each other or you may use CM10064 as a 4 connection Junction Block in place of separate “Ts.”

CM10064 - 4 Block

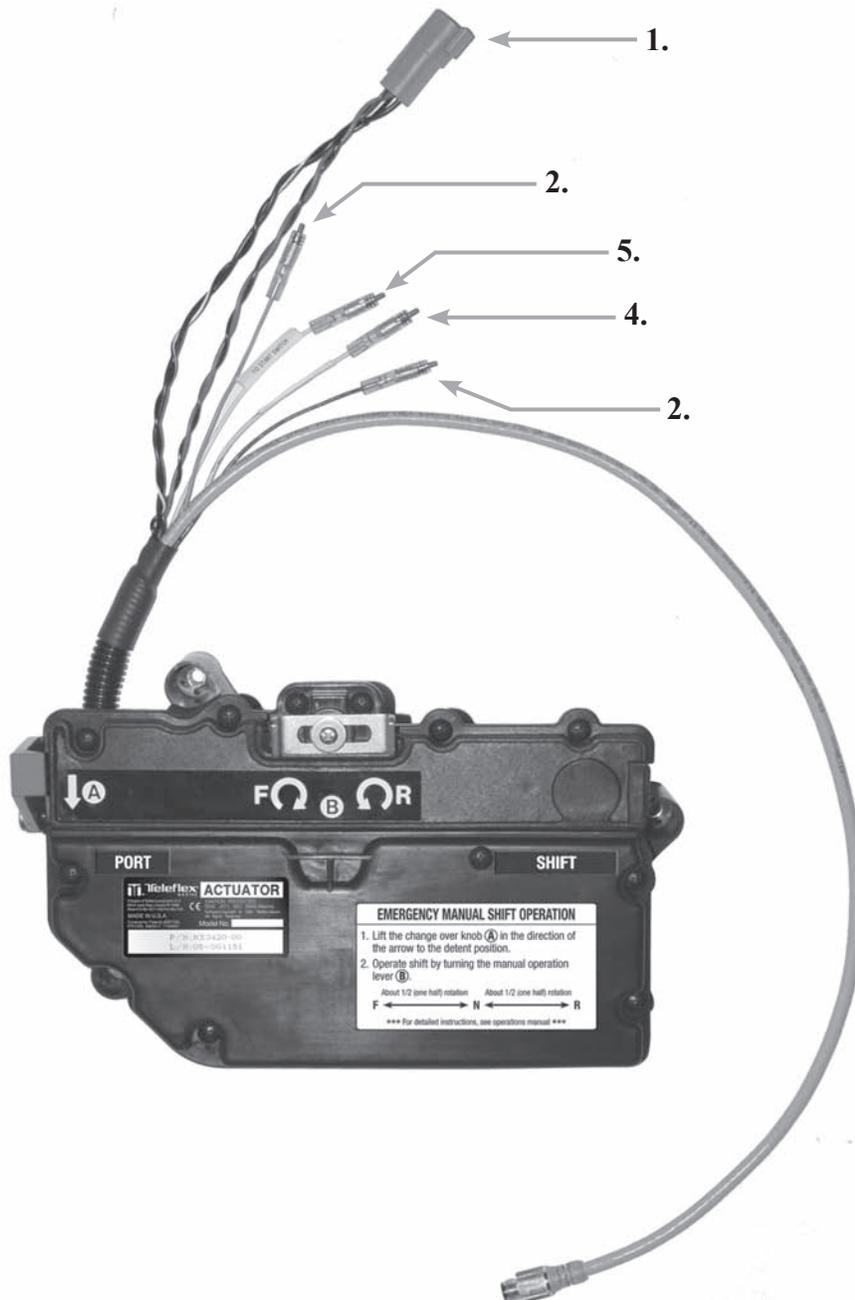


Step 4 - CAN Bus Cable and Other Connections

Shift Actuator - Connections

The shift actuator connections mainly concern starting the engine. A mating bullet connection is supplied for the complimentary wires.

1. Connect the 4-pin Power Connection to the CE20425 Power Cable (see Step 5 - Power, for connections).
2. Tie back the GRAY and BLACK wired bullet connections.
3. Remove the wire from the start terminal of the ignition switch that goes to the start soleniod (not shown).
4. Connect the wire you have removed to the wire that is labeled "Start Solenoid." This will be the YELLOW/ RED STRIPED wire.
5. Connect the YELLOW wired bullet to the Start Terminal of the Ignition Switch.

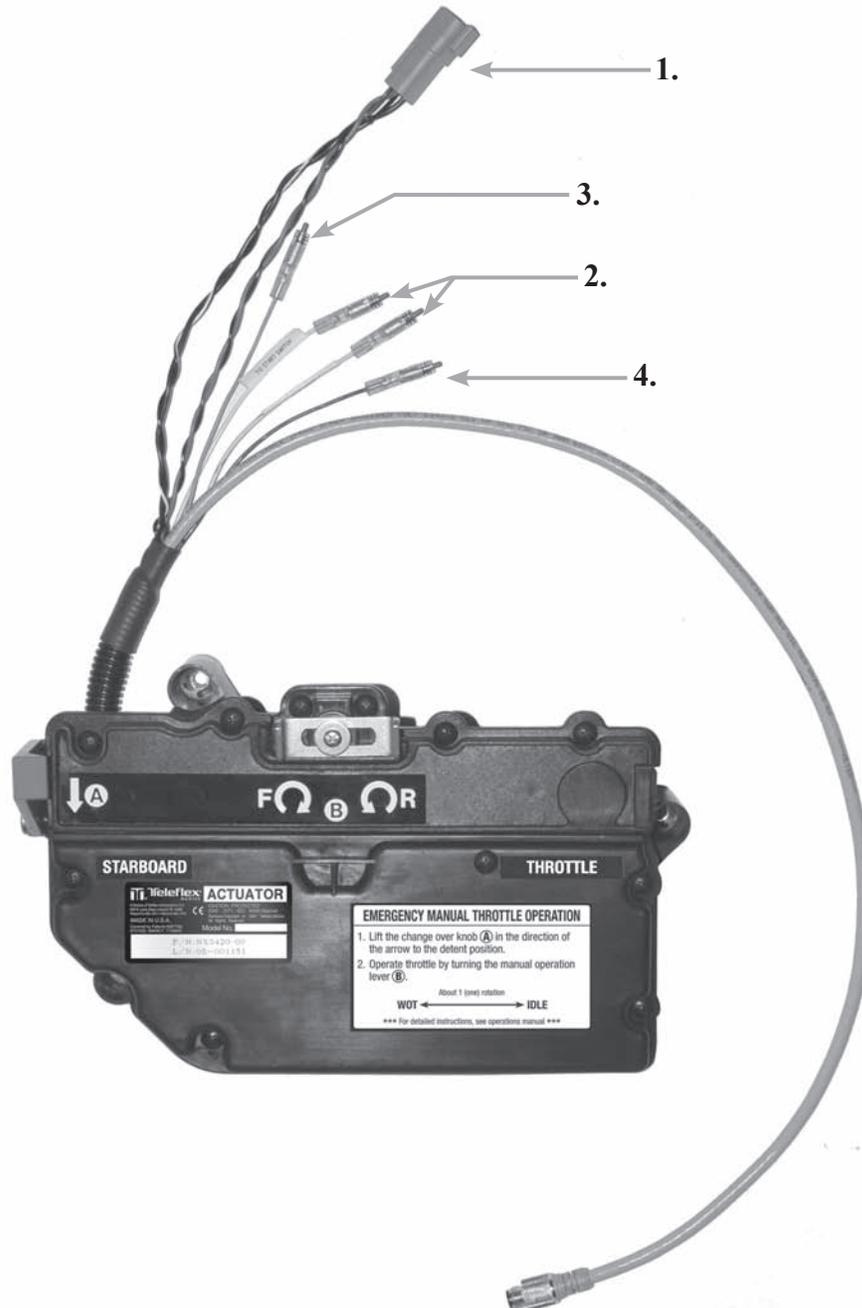


Step 4 - CAN Bus Cable and Other Connections

Throttle Actuator - Connections

The throttle actuator connections refer mainly to the tachometer. A mating bullet connection is supplied for the complimentary wires.

1. Connect the 4-pin Power Connection to the CE20425 Power Cable (see Step 5 - Power, for connections).
2. Tie back the YELLOW and YELLOW/RED STRIPED wired bullet connections.
3. Connect the GRAY wired bullet connector to the Tachometer. **Note: Throttle Actuator comes with a Tach filter on these leads. Remove the filter for diesel engine applications. Tach filter part number is 6850323.**
4. Connect the BLACK wired bullet to ground.



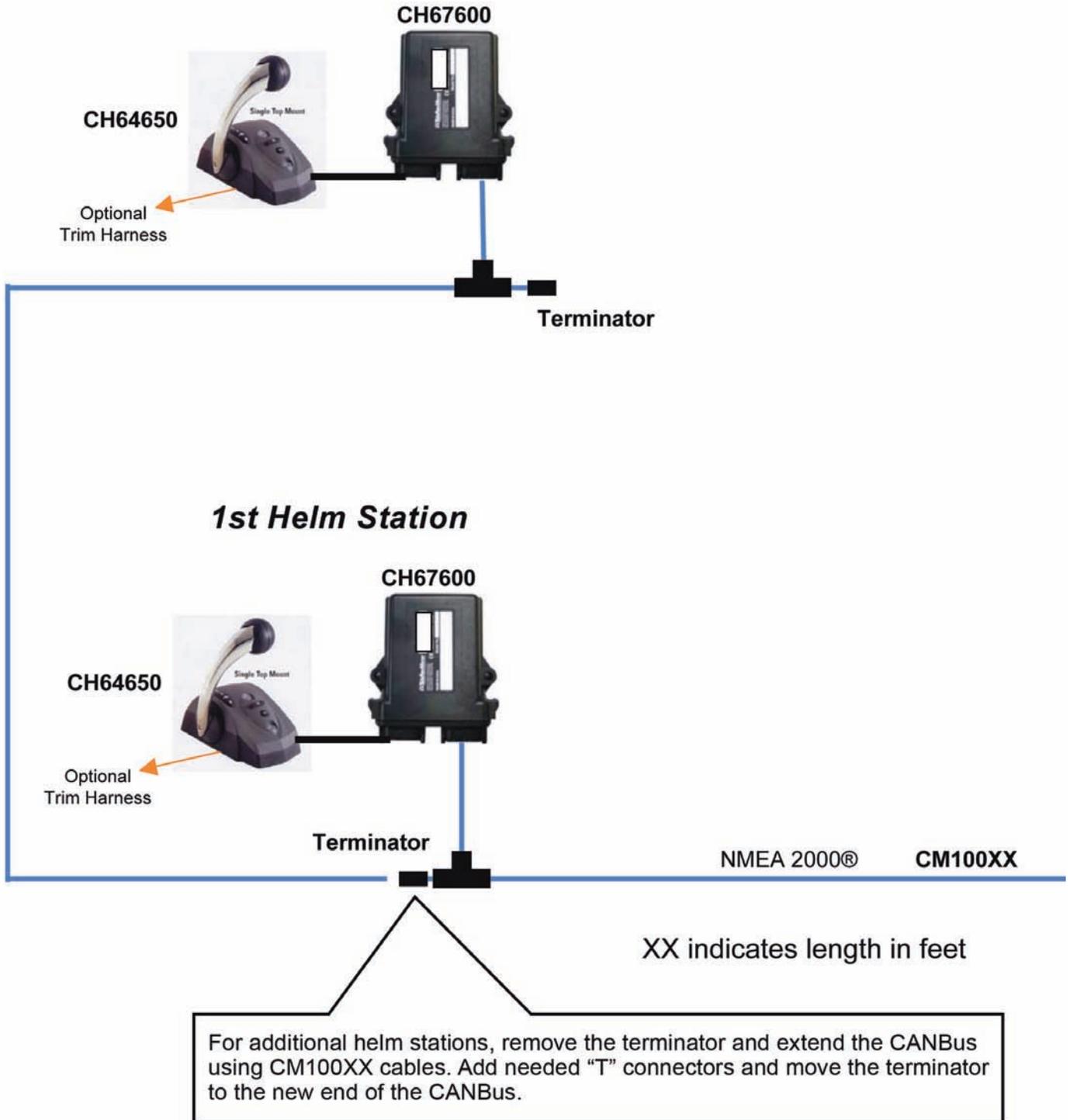
Note:

Tachometer connection is required on multiple engine boats. It is NOT required on single engine boats.

Step 4 - CAN Bus Cable and Other Connections

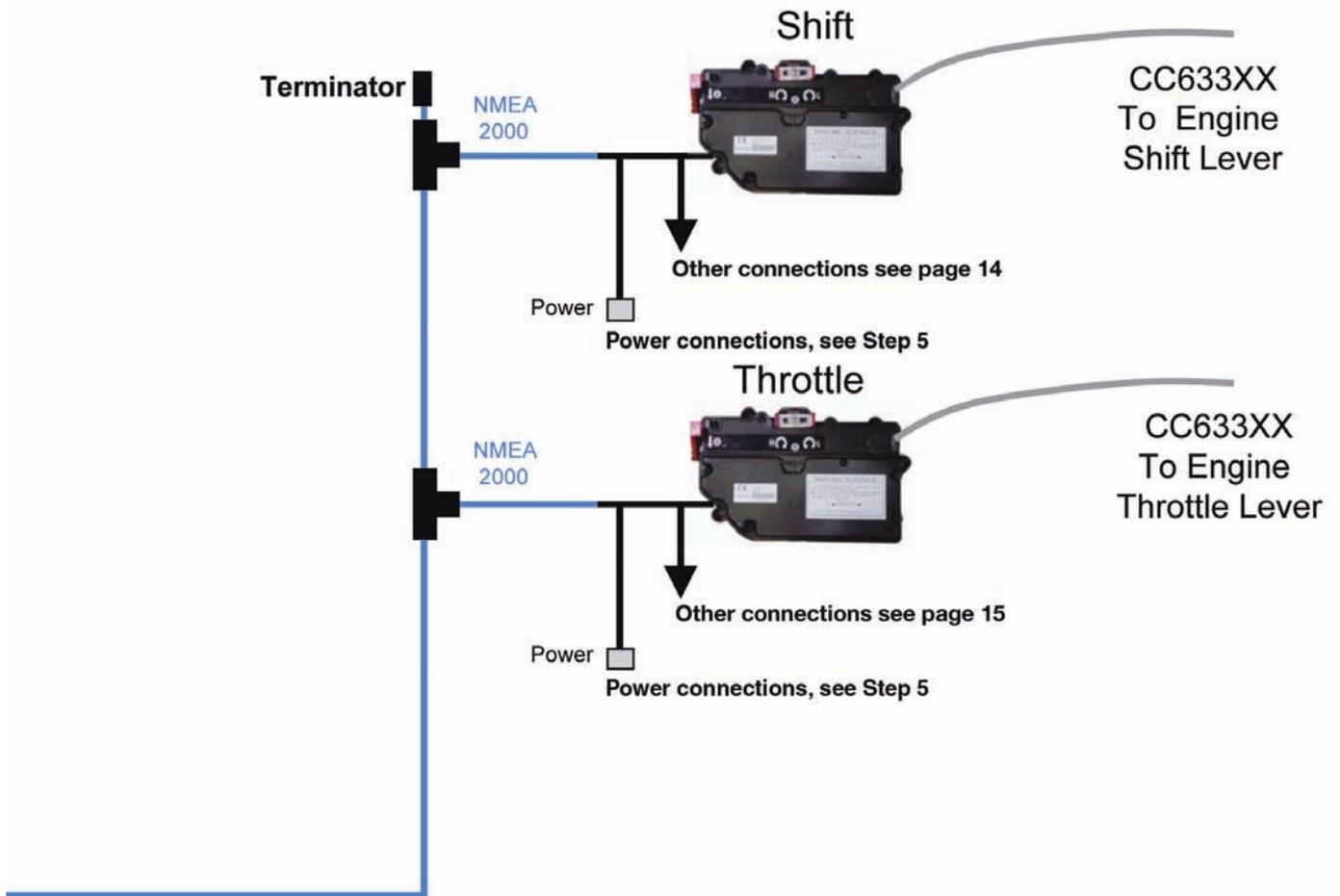
i6300 Single Station, Single Engine CAN Bus Connection Diagram

Optional 2nd thru 6th Helm Station



Step 4 - CAN Bus Cable and Other Connections

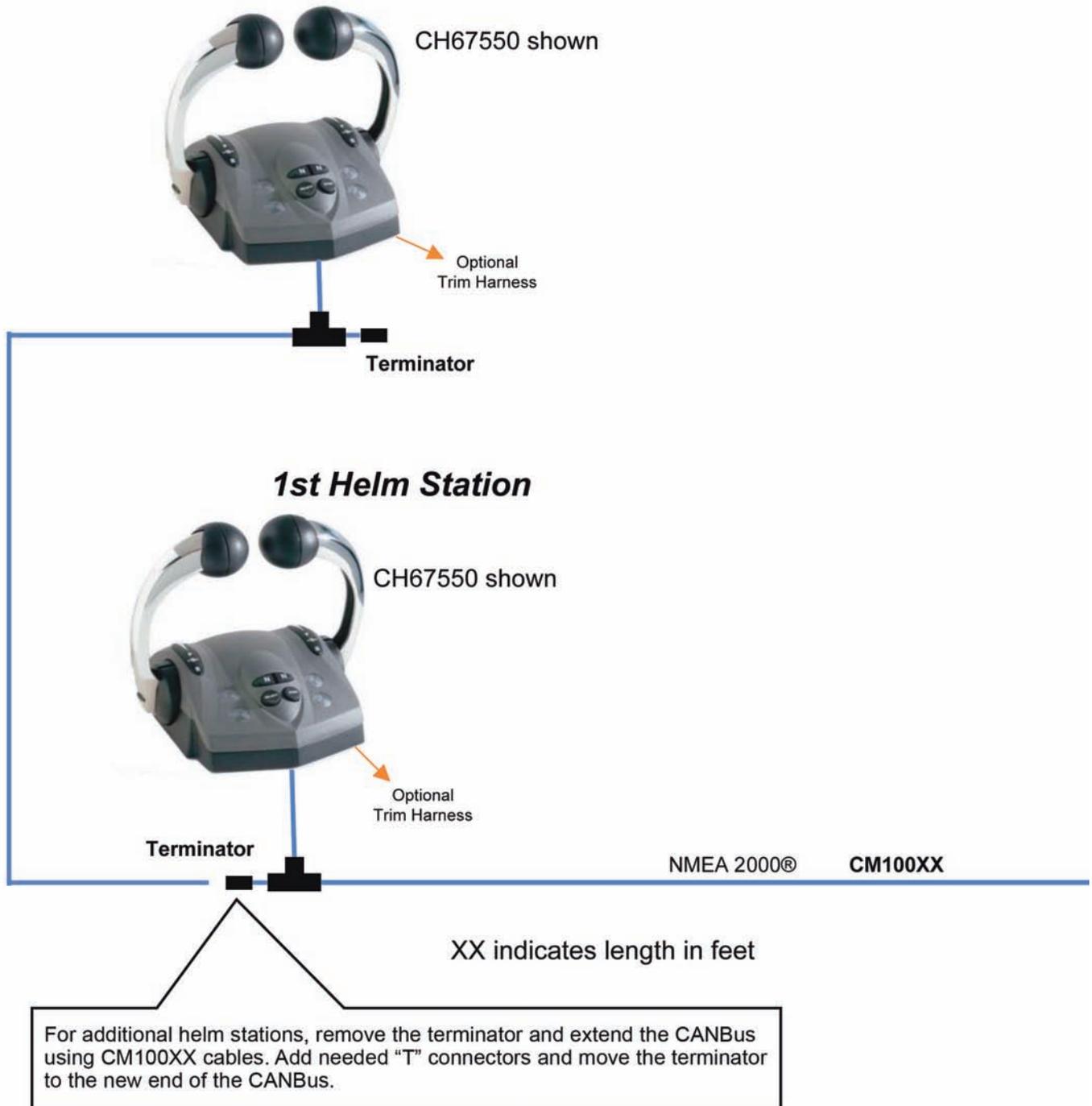
Install per all applicable codes.



Step 4 - CAN Bus Cable and Other Connections

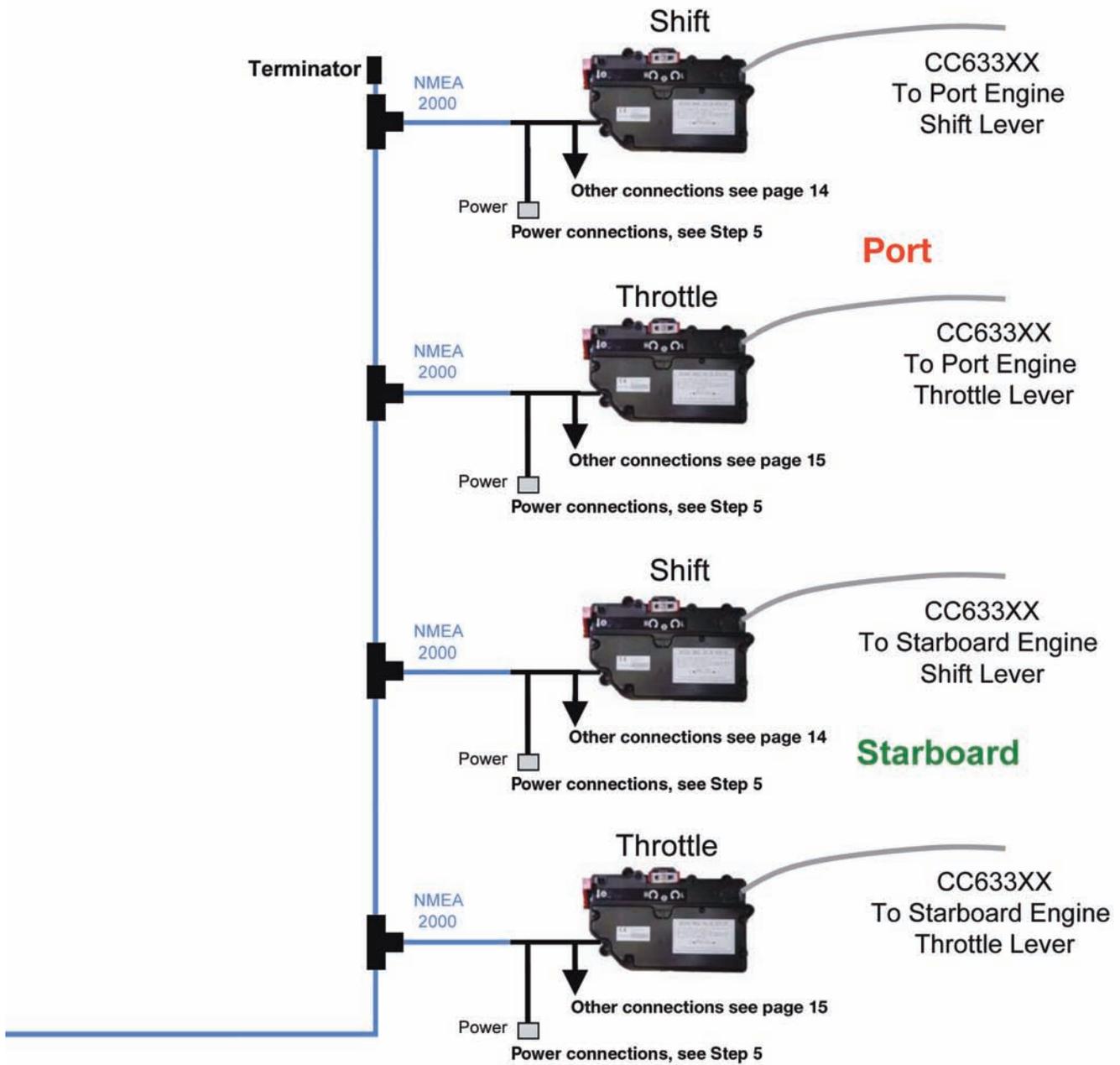
i6300 Single Station, Dual Engine CAN Bus Connection Diagram

Optional 2nd thru 6th Helm Station



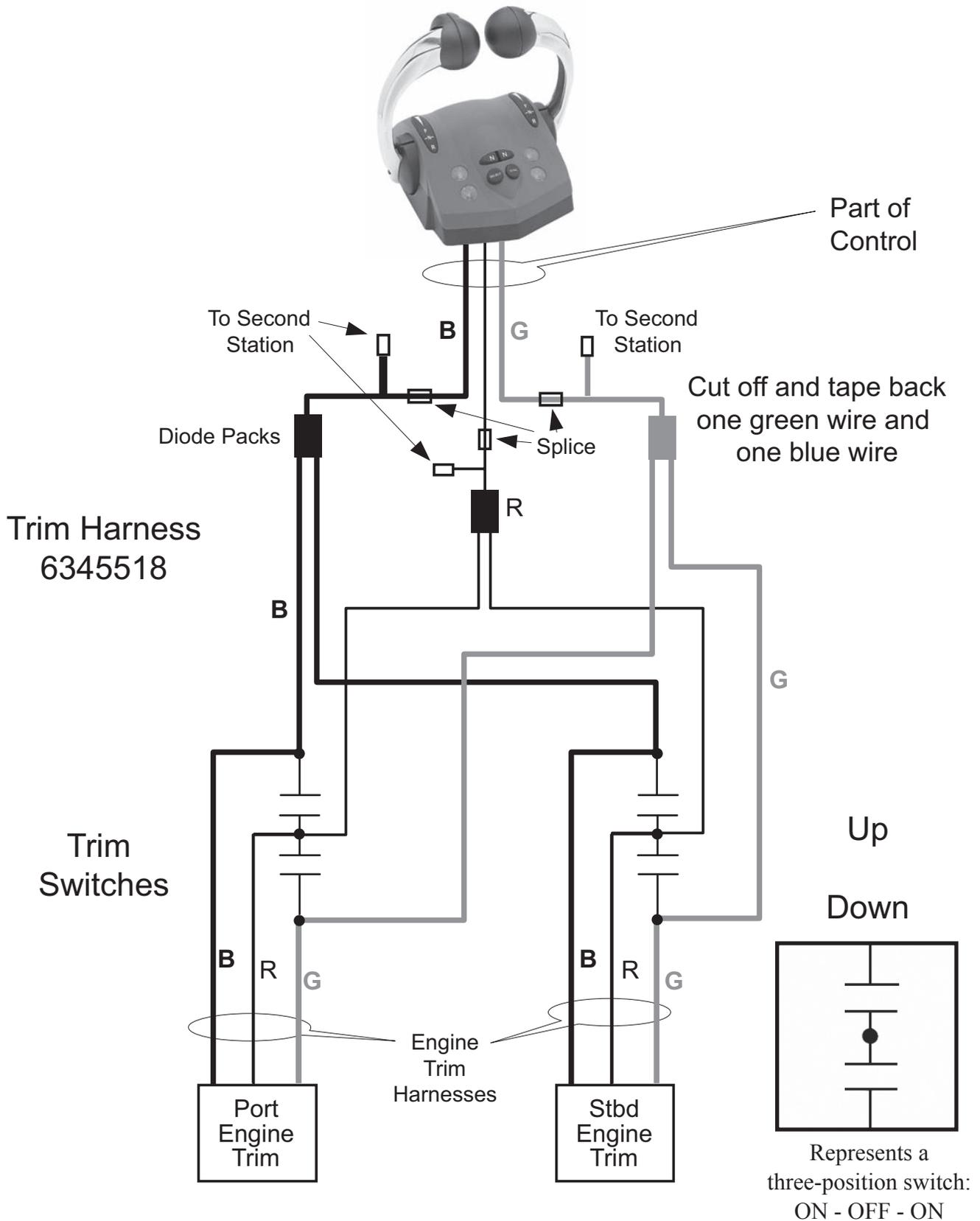
Step 4 - CAN Bus Cable and Other Connections

Install per all applicable codes



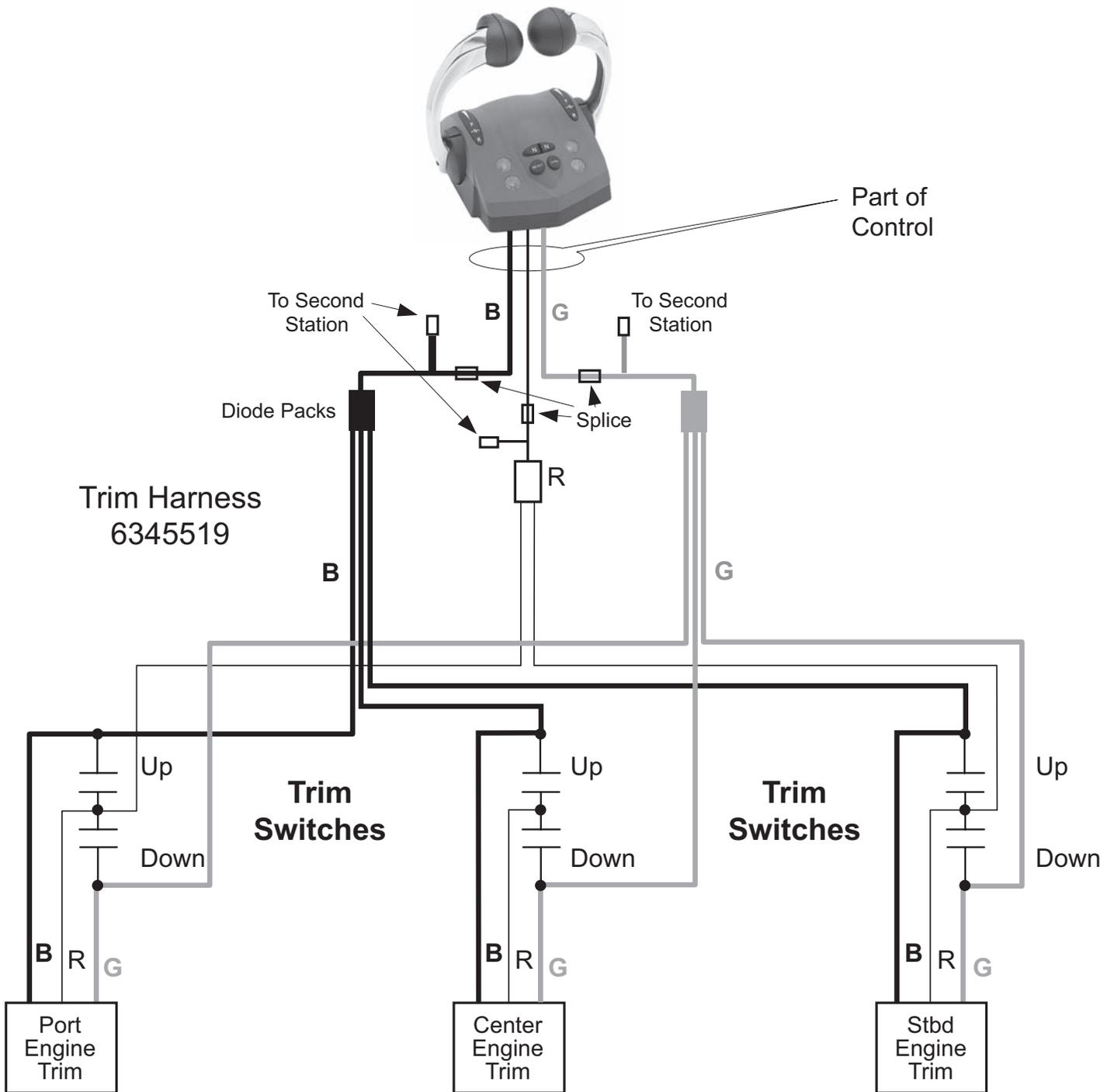
Step 4 - CAN Bus Cable and Other Connections

Trim Harness Connections • Dual Engine



Step 4 - CAN Bus Cable and Other Connections

Trim Harness Connections • Triple Engine



Step 5 - Power

Warning

Make all connections according to the applicable codes.

The diagrams and instructions are for dual engine systems. For single engine systems only connect the port engine. For triple and quad engine installations repeat the starboard connection for each additional engine.

12 Volt Systems

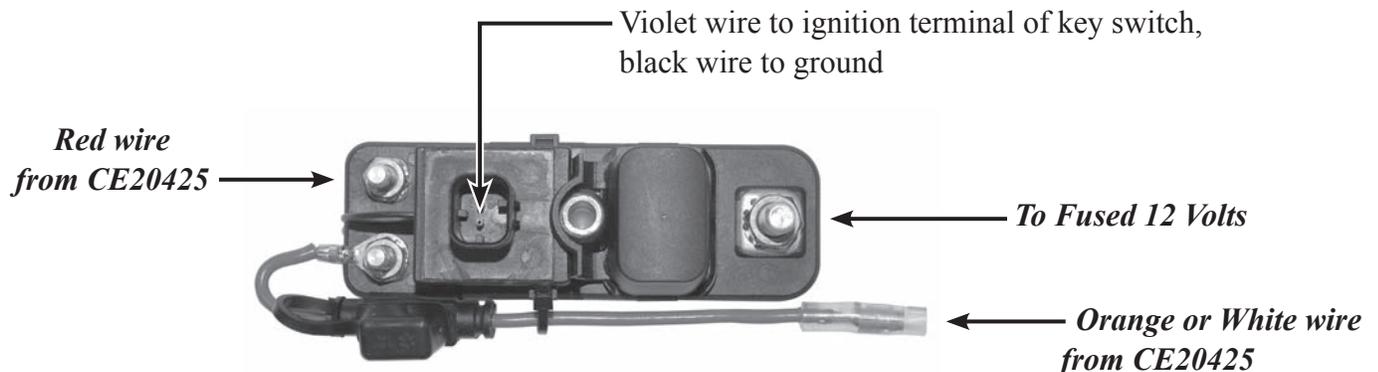
Twelve volt systems may be connected in two different ways.

1. The i6300 Control System will turn on and off with the engine ignition switch. This requires an i1003 Power Module for each engine and no other source of CAN Bus power.
2. The i6300 Control System will turn on or off with the CAN Bus. This requires a separate switch and breaker to operate the CAN Bus.

Connections with i1003 Power Module.

The i6300 Control System will turn on and off with the key switch if there is no other source of CAN Bus power. The connections are shown on the power diagram on page 23. Note the following items.

1. The CE20425 cable is supplied with the connectors ready to plug into the power connector of the actuators.
2. Connect the gray plug with the 4 wires of CE20425 into the shift actuator. Connect the gray plug with two wires into the throttle actuator.
3. Route the CE20425 to the DC power panel.
4. Connect the green* and the black wires of each CE20425 to the main ground point. It is important that both the black and the green* wires are connected directly to ground.
5. Connect the red and white* wires of each CE20425 to a Power Module (as shown) then connect the 12 volt supply. The diagram shows the 12 volts from a fuse. This fuse may not be required if the wire is protected by another disconnect device. Consult codes for details. Connect the wires from the two pin connector to the engine ignition circuit as follows. The violet wire to the ignition terminal of the key switch and the black wire to ground.

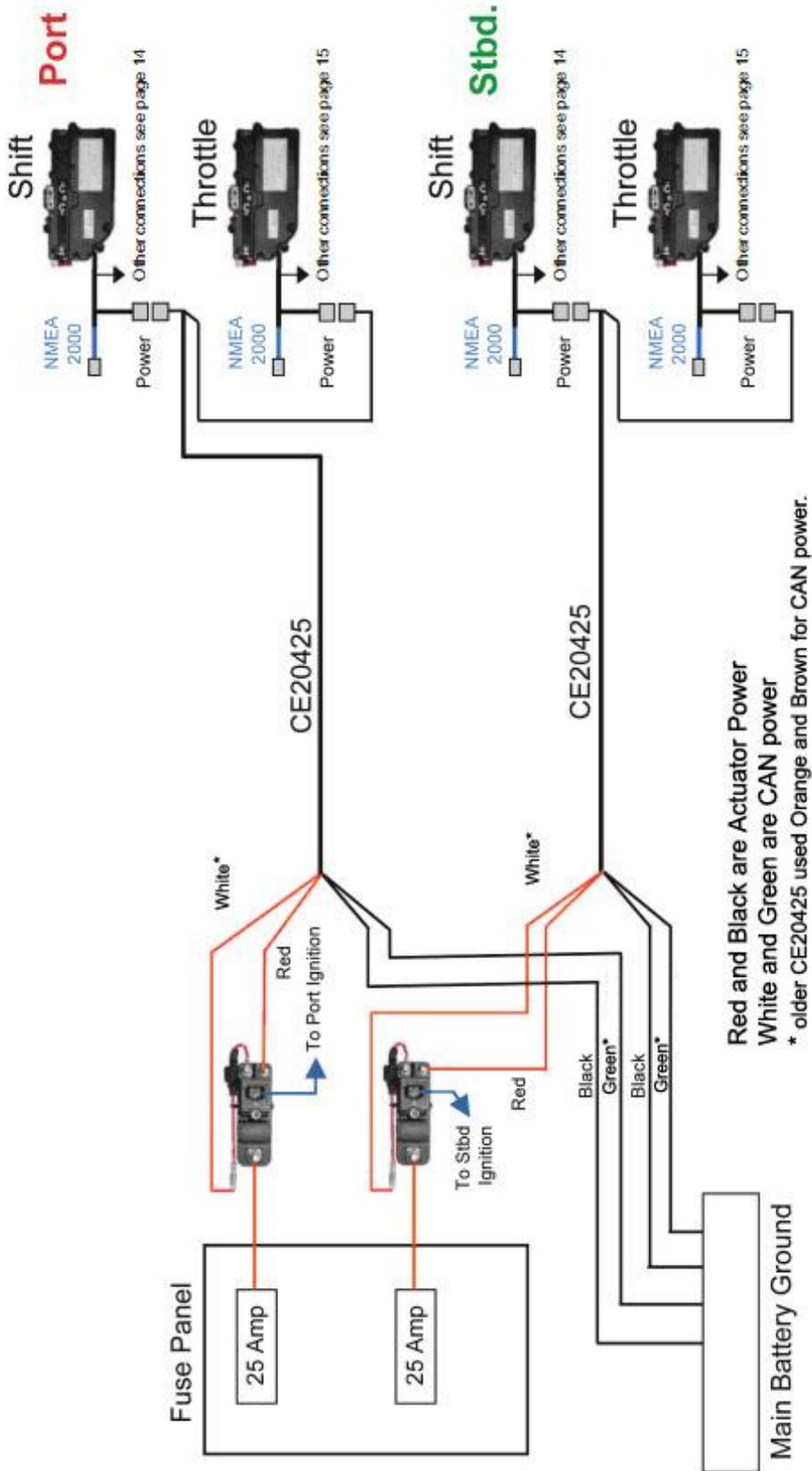


* White and Green wires may be Orange and Brown in some CE20425.

Note: After installation, see page 28 “Proceed to Step 6.”

Step 5 - Power

12 Volt i6300 Power Connections with i1003 Power Module



Note: For single engine applications make only the Port connections.
For triple engine applications duplicate the Starboard connections for the center engine and add another breaker.

Step 5 - Power

12 Volt Systems

Connections without Power Module.

The i6300 Control System will turn on and off with the CAN Bus. The connections are shown on the power diagram on page 25. Note the following items.

1. The CE20425 cable is supplied with the connectors ready to plug into the power connector of the actuators.
2. Connect the gray plug with the 4 wires of CE20425 into the shift actuator. Connect the gray plug with two wires into the throttle actuator.
3. Route the CE20425 to the DC power panel.
4. Connect the green* and the black wires of each CE20425 to the main ground point. It is important that both the black and the green* wires are connected directly to ground.
5. Connect the red wire of each CE20425 cable to a fuse or circuit breaker for the electronic control system.
6. Connect the white* wire of each CE20425 cable to a switch and fuse or circuit breaker for the CAN Bus.

Proceeding to Step 6

Note: At this stage the installation of the components is complete. Make the following checks prior to moving to Step 6.

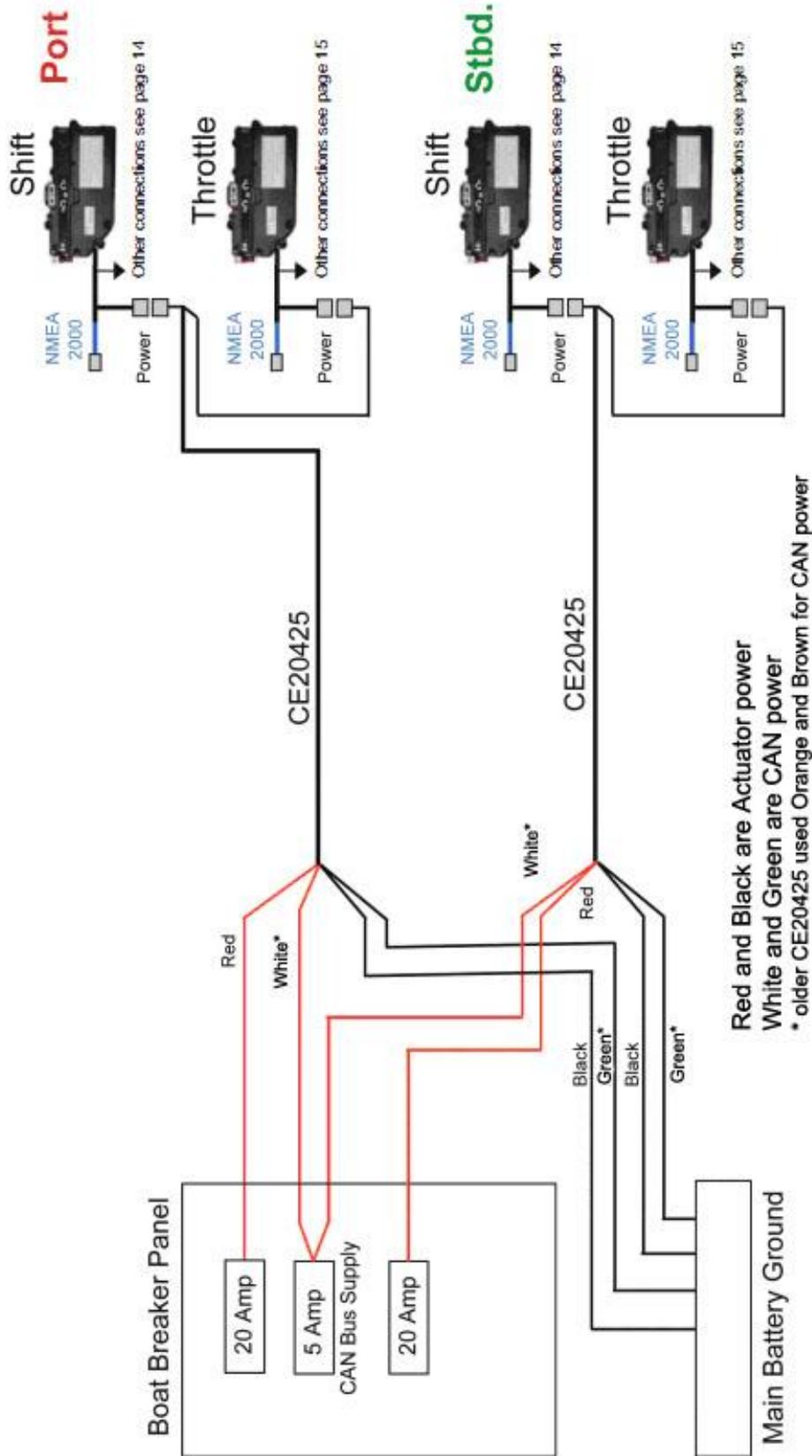
1. Power on the system; the lights on the Control Head will come on.
2. Place the Controls Levers in Neutral.
3. Test the connections to the Shift and Throttle Actuator Cables by moving the Control Levers. The cables should move. If they do not, review the installation.

If the cables move, proceed with calibration.

* White and Green wires may be Orange and Brown in some CE20425

Step 5 - Power

12 Volt i6300 Power Connections without i1003 Power Module



Note: For single engine applications make only the Port connections.
 For triple engine applications duplicate the Starboard connections for the center engine and add another breaker.

Step 5 - Power

24 Volt Systems

Connections with 24 to 12 volt Converter.

The i6300 Control System will turn on and off with the CAN Bus breaker. The connections are shown on the power diagram on page 27. Note the following items.

1. The CE20425 cable is supplied with the connectors ready to plug into the power connector of the actuators.
2. Connect the gray plug with the 4 wires of CE20425 into the shift actuator. Connect the gray plug with two wires into the throttle actuator.
3. Route the CE20425 to the DC power panel.
4. Connect the green* and the black wires of each CE20425 to the main ground point. It is important that both the black and the green* wires are connected directly to ground.
5. Connect the red wire of each CE20425 cable to a fuse or circuit breaker for the electronic control system.
6. Connect the white* wire of each CE20425 cable to the output of the 24 volt to 12 volt converter.
7. Connect the input of the 24 volt to 12 volt converter to a switch and fuse or circuit breaker for the CAN Bus.
8. For up to four engines the CE24025 white* CAN Bus wires may all be connected to the same 24 volt to 12 volt converter.

Proceeding to Step 6

Note: At this stage the installation of the components is complete. Make the following checks prior to moving to Step 6.

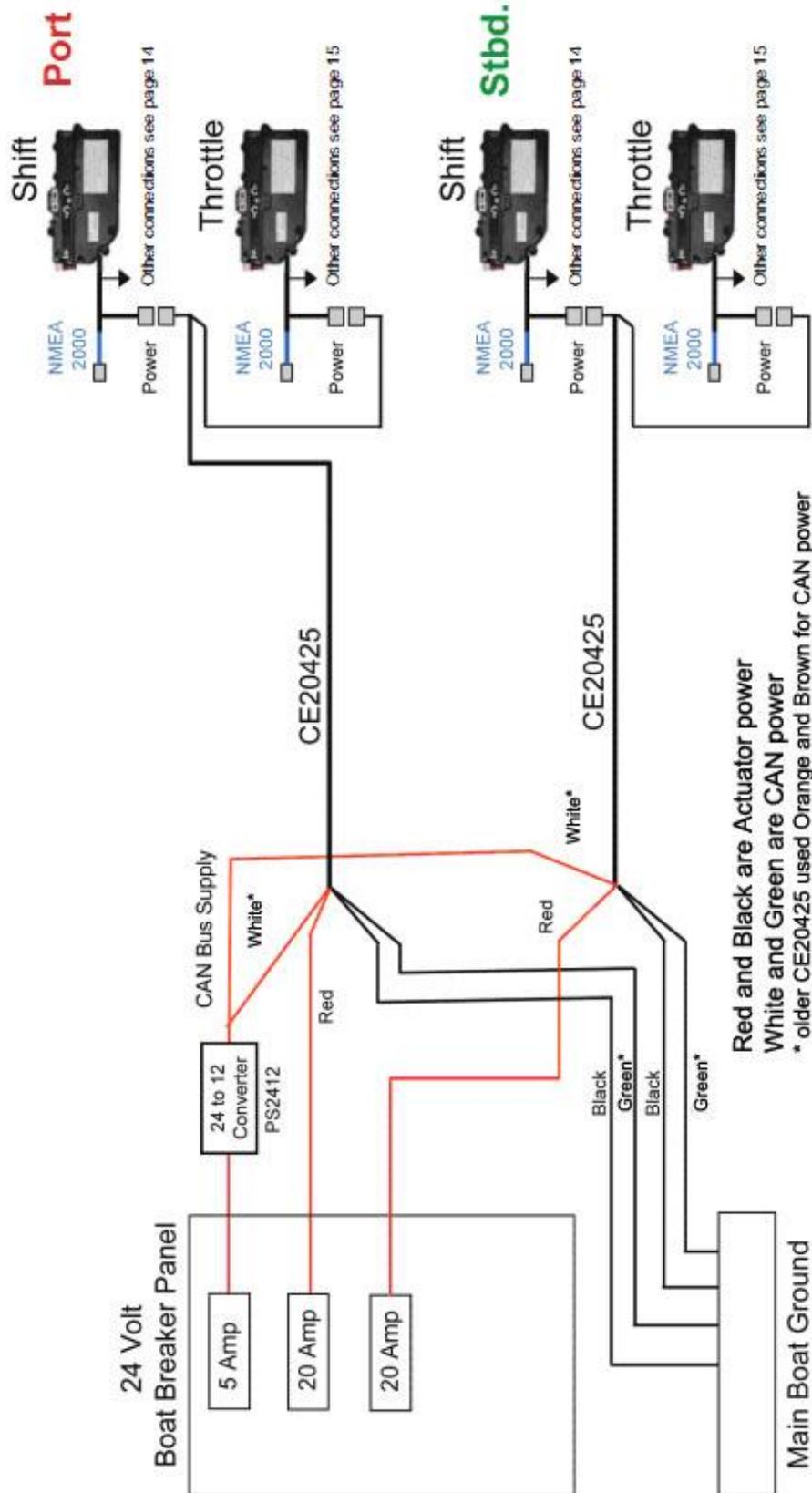
1. Power on the system; the lights on the Control Head will come on.
2. Place the Controls Levers in Neutral.
3. Test the connections to the Shift and Throttle Actuator Cables by moving the Control Levers. The cables should move. If they do not, review the installation.

If the cables move, proceed with calibration.

* White and Green wires may be Orange and Brown in some CE20425

Step 5 - Power

24 Volt i6300 Power Connections with 24 to 12 Volt Converter



Note: For single engine applications make only the Port connections.
For triple engine applications duplicate the Starboard connections for the center engine and add another breaker.

Step 5 - Power

24 Volt Systems

Connections with separate 12 volt CAN Bus Supply.

The i6300 Control System will turn on and off with the CAN Bus breaker. The connections are shown on the power diagram on page 29. Note the following items.

1. The CE20425 cable is supplied with the connectors ready to plug into the power connector of the actuators.
2. Connect the gray plug with the 4 wires of CE20425 into the shift actuator. Connect the gray plug with two wires into the throttle actuator.
3. Route the CE20425 to the DC power panel.
4. Connect the green* and the black wires of each CE20425 to the main ground point. It is important that both the black and the green* wires are connected directly to ground.
5. Connect the red wire of each CE20425 cable to a fuse or circuit breaker for the electronic control system.
6. Connect the white* wire of each CE20425 cable to a switch and fuse or circuit breaker. The input to the circuit breaker must be connected to a 12 volt DC supply. The 12 volt supply ground and the 24 volt system ground should be connected together as a main boat ground.

Proceeding to Step 6

Note: At this stage the installation of the components is complete. Make the following checks prior to moving to Step 6.

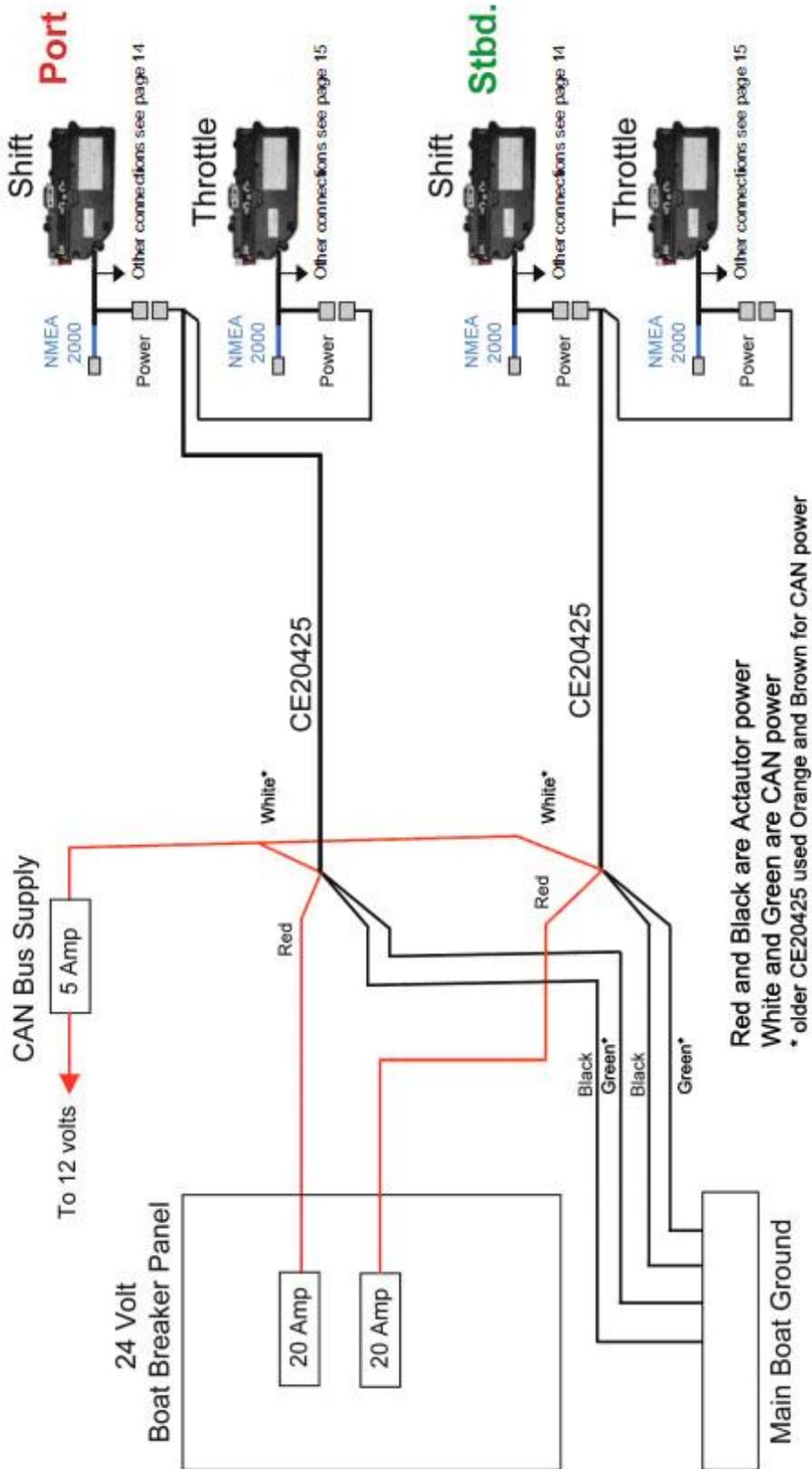
1. Power on the system; the lights on the Control Head will come on.
2. Place the Controls Levers in Neutral.
3. Test the connections to the Shift and Throttle Actuator Cables by moving the Control Levers. The cables should move. If they do not, review the installation.

If the cables move, proceed with calibration.

* White and Green wires may be Orange and Brown in some CE20425

Step 5 - Power

24 Volt i6300 Power Connections with Separate 12 Volt CAN Bus Supply



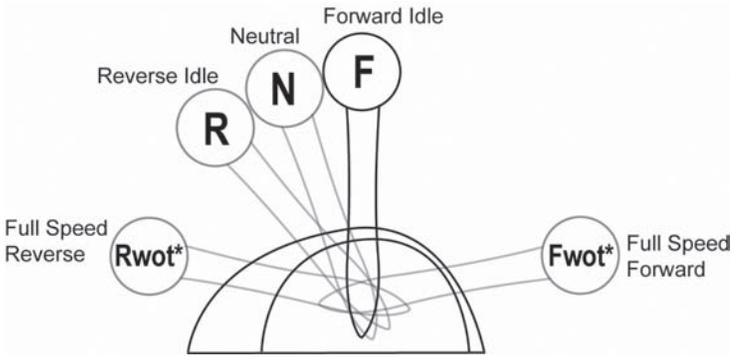
Note: For single engine applications make only the Port connections.
For triple engine applications duplicate the Starboard connections for the center engine and add another breaker.

Step 6 - Setup

It will be necessary to operate the engines and gears to check the adjustments. A completely optimum setup requires a sea trial.

General Information

Calibration with the control head is accomplished by using the control lever as a five position selector and the N (Neutral) Light and N Button and the S (Select or Sync) Light and S button to make the various adjustments. For General Engine information, see Appendix E. If you encounter problems see Appendix G.



NEUTRAL & SELECT LIGHT LEGEND		
		BLINKING - Sequence of blinks will be listed in each chart.
		SOLID
		OFF
		When setting the starboard engine the GREEN light will be RED

**WOT - wide open throttle*

The **N** Light indicates various calibration modes. The **S** Light (SEL or SYNC) indicates settings. The procedure to follow is for a complete system calibration. You may go to any specific setting, change it, and exit without effecting the other settings.

Notes:

- **To EXIT the Calibration mode after any step, return the shift lever to neutral, press the N and S buttons together for 4 (four) seconds and release. This will exit the calibration mode and return you to the run mode.**
- **“Run Mode” refers to normal operating mode. “Calibration Mode” is used to change actuator settings.**

Calibrating the Actuators

With the engine OFF (NOT RUNNING), the Ignition Switch ON, the CAN Bus power ON, the control system breakers ON, the Control Lever in Neutral, and the shift and throttle cables disconnected at the engine end and free to move follow this procedure for the engine you are calibrating. On dual engine controls use the port handle and lights for the port engine and the starboard handle and lights for the starboard engine.

1. For single helm station systems the yellow light and the green light will both come on. For multi-station systems the green light will flash. Press the **S** button and the yellow light and the green light will come on.

N LIGHT ON	S LIGHT ON

2. Press and hold both the **N** and the **S** button for the engine you wish to calibrate for four seconds and release. The **N** light comes on and the **S** light goes out indicating the actuator calibration mode.

N LIGHT ON	S LIGHT OFF

Step 6 - Setup

Throttle Direction and Idle

- Step 1. At the Engine throttle lever determine if your throttle is push or pull to increase engine RPMs.
- Step 2. Place the control lever in the **Rwot** position. The select light will blink a one for Push (default) to throttle or a two for pull to throttle. If you need to change the direction press the **N** button once for Push or the **S** button once for Pull. The **S** light will then show the direction you have selected with a one or two blink indication.

N LIGHT ON	S LIGHT (green) Push to Throttle (default)	S LIGHT (green) Pull to Throttle	Check Correct Engine Throttle Setting <input type="checkbox"/> PUSH <input type="checkbox"/> PULL
		 	

- Step 3. When the direction is set place the throttle cable anchor in its normal lock position. Adjust the barrel on the cable threads until it drops onto the throttle lever at idle. Note: on some engines the throttle lever moves quite a bit before any RPM increase is noticed. On these engines adjust the barrel so the engine is at idle but very little motion of the cable will cause an increase in the RPM's. When adjusted, use the jam nut to lock the barrel in place and connect the throttle cable to the throttle lever but do not install the locking clip or cotter pin.

Place the Control Lever in Neutral. Press and hold both the **N** and the **S** button for the engine you are calibrating for four seconds and release. This will exit the calibration mode and return you to the run mode. Dual helm station systems press the **S** button.

N LIGHT ON	S LIGHT ON
	

IMPORTANT:

For Push-to-Throttle (default) applications connect the throttle cable to the actuator NOW - see page 32.

Throttle Stroke

Note: The procedure described below is applicable to most Diesel, Inboard Engines, and those Outboard Engines with mechanical controls. If you have an electronically controlled Outboard see Appendix F.

- Step 1. With the system in the run mode move the throttle lever to the Fwot (Forward Wide Open Throttle) position. Hold the engine throttle lever at the WOT (Wide Open Throttle) position and see if the cable drops on. If it does not, measure how many millimeters (mm) you need to add or subtract to have the throttle cable drop onto the throttle lever and just bump the WOT stop.

To add or subtract travel to the throttle cable stroke do the following:

- Step 2. Return to the calibration mode by placing the control lever in Neutral and press and hold both the **N** and the **S** button for the engine you are calibrating for four seconds and release.

N LIGHT ON	S LIGHT OFF
	

Number of Millimeters to Add or Subtract:

ADD _____ **SUBTRACT** _____

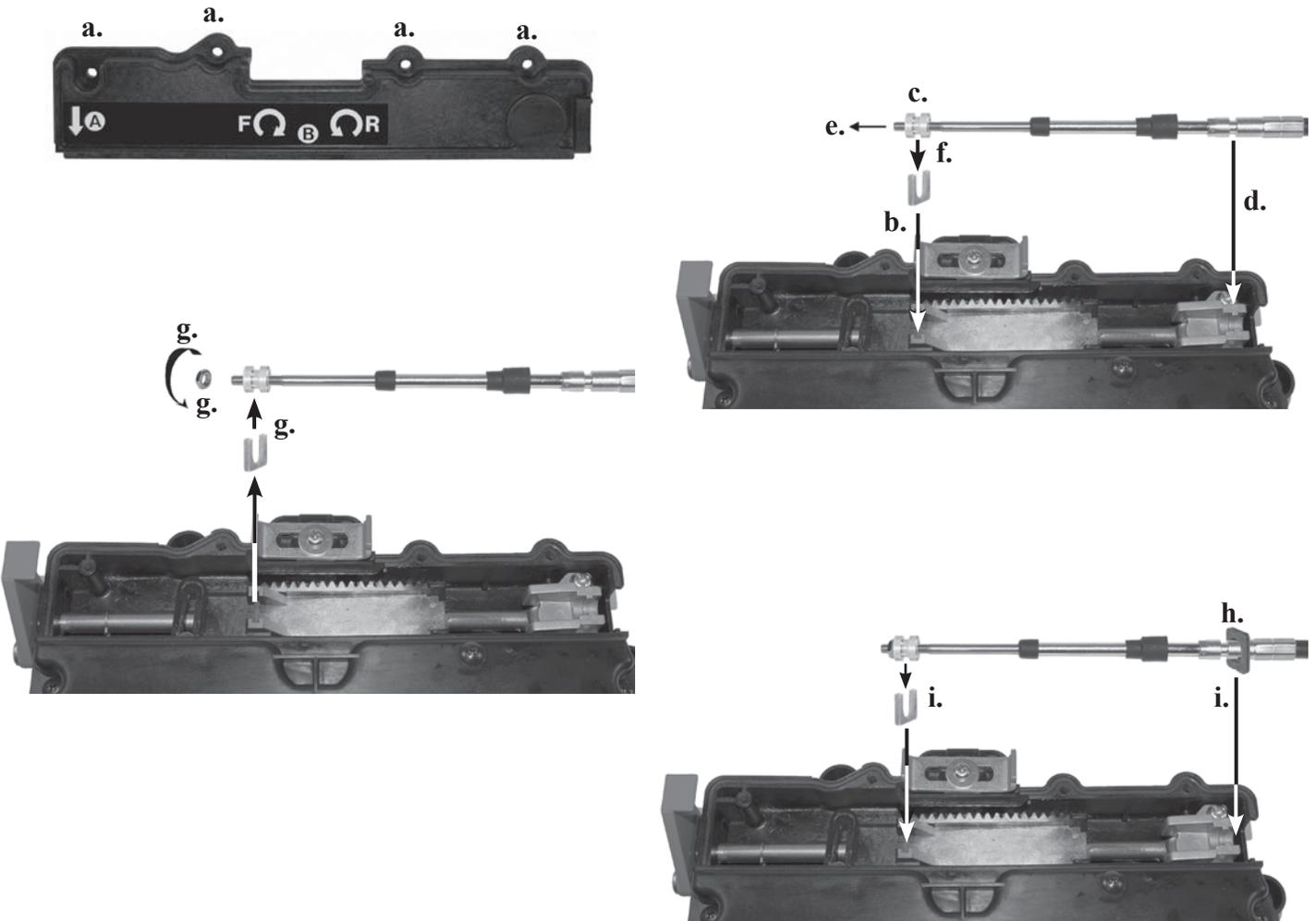
- Step 3. With the Control lever in Neutral press the **N** button to increase the stroke or **S** button to shorten the stroke. Each press changes the setting by 1 mm. Note the cable will not move until you return to run mode.

Step 6 - Setup

Connect the Push-to-Throttle Cable at the Actuator *(default setting)*

Power up the system and the throttle actuator will go to the idle position. **Turn off the power.**

- Remove the cover plate (4 screws) as shown below. Make sure the red lever is in the “up” (towards screws) position.
- Position the Steel Retainer clip into the slot on the rack as shown.
- Screw the Adjustment Barrel, Brass (10-32 thread) or Stainless Steel (M5 thread), approximately halfway onto the end of the cable.
- Install the cable mount so the notch on the cable will fit into the detent in the mount.
- Pull out the slider portion of the cable (open, threaded end).
- While holding the cable completely extended, adjust the Barrel so that it just drops into the steel retainer.
- Remove the cable, with Adjustment Barrel, from the retainer and unscrew the barrel **TWO FULL TURNS**. Secure the barrel on the cable with the Jam Nut.
- Install the rubber grommet at the crimped end of the cable. Position it to fit into the detent in the mount.
- Fit the cable into the cable mount and install the Adjustment Barrel into the retaining clip.
- Replace the cover.



Note: The information on page 9 is applicable and should be used for connecting the “Pull-to-Throttle and Shift cables at the Actuator” applications.

Step 6 - Setup

Step 4. Press and hold both the *N* and the *S* button for the engine you are calibrating for four seconds and release. This will exit the calibration mode and return you to the run mode. Dual helm station systems press the *S* button.

N LIGHT ON	S LIGHT ON
	

Number of Millimeters to Add or Subtract:
 ADD _____ SUBTRACT _____

Step 5. Check to see if the engine throttle lever is now at the WOT (wide open throttle) position. If it is not, measure how many millimeters (mm) you need to add or subtract and return to step 1.

Step 6. When complete install the locking clip or cotter pin to secure the cable to the throttle lever.

Shift Direction and Neutral

Step 1. Press and hold both the *N* and the *S* button for the engine you wish to calibrate for four seconds and release. The *N* light comes on and the *S* light goes out indicating the actuator calibration mode.

N LIGHT ON	S LIGHT OFF
	

Check Correct Transmission Shift Lever Setting
 PUSH PULL

Step 2. Determine if the transmission shift lever is push or pull for forward gear on the engine.

Step 3. Place the i6300 control lever in the *Fwot* position. The select light will blink a one for Push for forward or a two (default) to pull for forward. If you need to change the direction press the *N* button once for Push or the *S* button once for Pull. The *S* light will then show the direction you have selected with a one or two blink indication.

N LIGHT ON	S LIGHT (green) Push for Forward	S LIGHT (green) Pull for Forward (default)
		

Step 4. Place the shift cable anchor in its normal lock position. Adjust the barrel on the cable threads until it drops onto the shift lever in neutral. Wiggle the lever back and forth to determine if the shift lever is in the neutral detent. When satisfied with the adjustment use the jam nut to lock the barrel in place. Connect the shift cable to the shift lever but do not install the locking clip or cotter pin.

Place the Control Lever in Neutral. Press and hold both the *N* and the *S* button for the engine you are calibrating for four seconds and release. This will exit the calibration mode and return you to the run mode. Dual helm station systems press the *S* button.

N LIGHT ON	S LIGHT ON
	

Step 6 - Setup

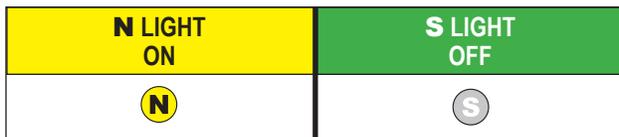
Forward and Reverse Shift Stroke

With the system in the run mode, move the lever to the **F** (forward) position. Move the engine shift lever to the forward position and check if the cable will drop onto the lever. If it does not, measure how many millimeters (mm) you need to add or subtract to have the shift cable drop onto the shift lever. Record this number.

Move the shift lever to the **R** (reverse) position. Place the engine shift lever in the reverse position. Check if the shift cable will drop onto the shift lever. If it does not, measure how many millimeters (mm) you need to add or subtract to have the shift lever in the reverse detent. Record this number.

To add or subtract travel to the shift cable strokes do the following.

Step 1. Return to the calibration mode by placing the control lever in Neutral and press and hold both the **N** and the **S** button for the engine you are calibrating for four seconds and release.



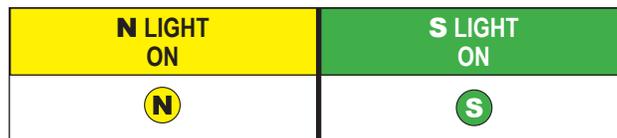
Number of Millimeters to Add or Subtract:

ADD _____ SUBTRACT _____

Step 2. To change the Forward shift stroke place the Control lever in Forward. Press the **N** button to increase the stroke or the **S** button to shorten the stroke. Each press changes the setting by 1 mm. Note the cable will not move until you return to the run mode.

Step 3. To change the Reverse shift stroke place the Control lever in Reverse. Press the **N** button to increase the stroke or the **S** button to shorten the stroke. Each press changes the setting by 1 mm. Note the cable will not move until you return to the run mode.

Step 4. Press and hold both the **N** and the **S** button for the engine you are calibrating for four seconds and release. This will exit the calibration mode and return you to the run mode. Dual helm station systems press the **S** button.



Step 5. Connect the shift cable and check to see if the engine shift strokes are now moving the shift lever to the correct positions. If not, measure how many millimeters (mm) you need to add or subtract to each and return to step 1.

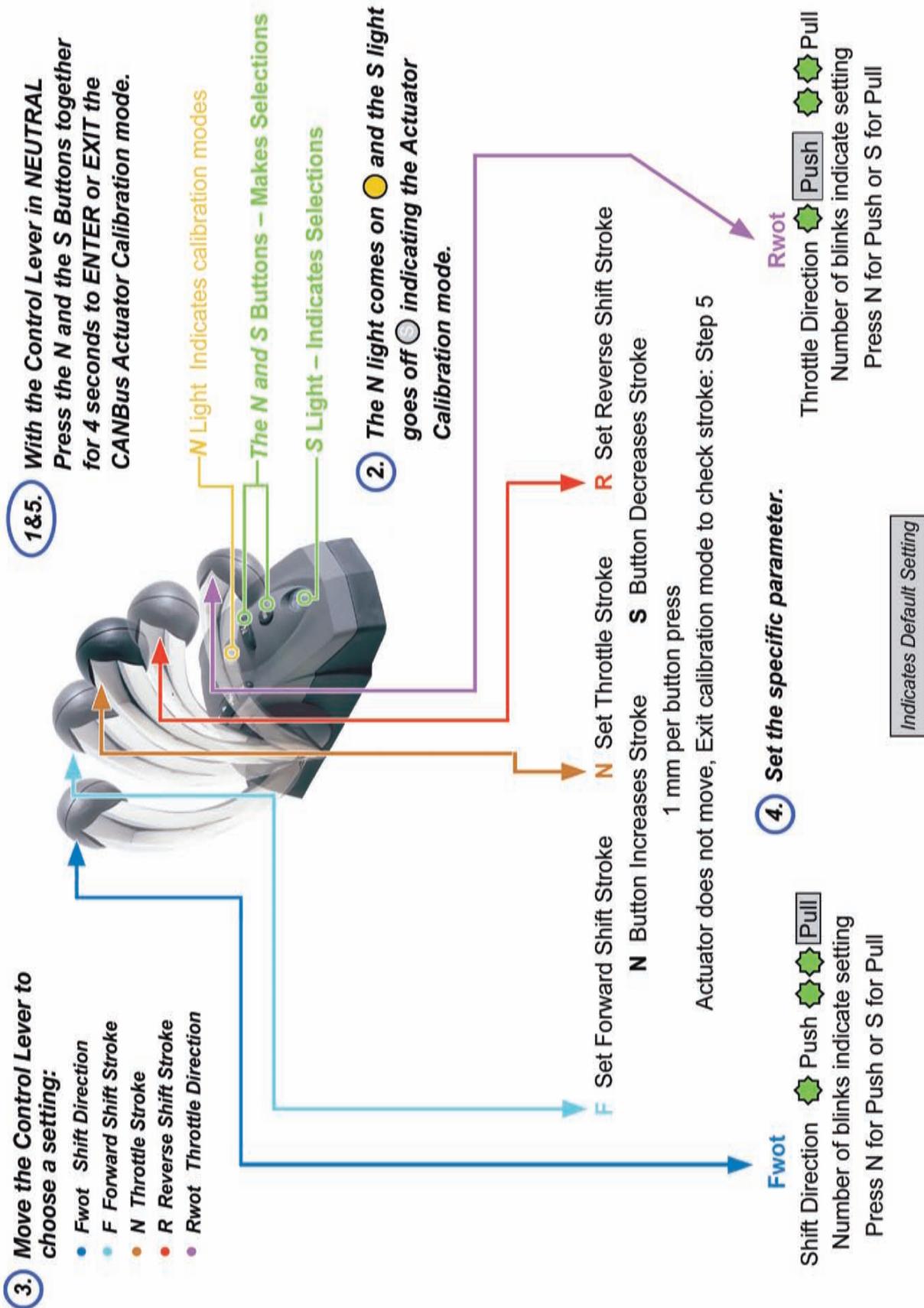
Step 6. When complete install the locking clip or cotter pin to secure the cable to the shift lever.

Note: To EXIT the Calibration mode after any step, return the shift lever to neutral, press the **N** and **S** buttons together for 4 (four) seconds and release. This will exit the calibration mode and return you to the run mode.

Note: Teleflex recommends a sea trial at the end of the setup process. Any setting requiring additional adjustment can be directly accessed using the handle and the **N** and **S** button.

i6300 Actuator Calibration Diagram

Step 6 - Setup



Step 6 - Setup

i6300 Control Head Light Indicator Chart

		Handle Position						
		F	N	R	Rwot			
N Light	S Light	Fwot	F	N	R	Rwot	Activity	
		✓	✓		✓	✓	Run Mode in Gear	
				✓			Run Mode in Neutral	
				✓			Ready to Calibrate Actuators	
		✓					Push for Shift; Press N button	
		✓					Pull for Shift; Press S button	
			✓				Forward Shift Stroke, N to increase, S to reduce	
				✓			Throttle Stroke, N to increase, S to reduce	
					✓		Reverse Shift Stroke, N to increase, S to reduce	
						✓	Push for Throttle; Press N button	
						✓	Pull for Throttle; Press S button	
				✓			Control Head Calibration Mode* See Appendix B	
				✓			Other Features Set-up Mode*	

Note: On a Dual Engine System - when setting the starboard engine - the **RED** light will be used in place of the **GREEN** light.

* On most installations, it is not necessary to use this Calibration Mode.

Step 7 - Check the Installation

Connection Checks

1. Ensure all connectors are plugged in and properly seated.
2. Verify that the control head(s) and actuator(s) are connected to the NMEA 2000® CAN Bus network.
3. Make sure the CAN Bus “T” Connectors are not tied down too tightly, thus causing stress.
4. Check each end of the NMEA 2000® CAN Bus to ensure that a terminator has been properly installed. ***There must be two, and ONLY two, terminators on the CAN Bus.***

Key Switch Check

1. Turn the battery switch and the engine breaker on.
2. Turn the key switch to the “on” position, but do not start the engine.
3. The Control levers should be in the neutral position; the green SEL light and yellow lights should be on.

Note: The green light will be blinking on a dual station system. Press the SEL Button and the green light and yellow lights will come on.

Shift & Throttle Range of Motion

Familiarize yourself with the shift and throttle controls. See Operator’s Manual.

After Checking the Installation - Boat in Operation

After Installation and Check out is complete and with the boat operating in open water:

1. Check Neutral Start Protect to assure that the boat cannot be started in gear.

Second Station

The second station and any additional stations are added to the i6300 by extending the CAN Bus and connecting the control head to the CAN Bus. This is shown on the diagrams on pages 16 and 18. Up to 60 feet of CAN Bus cable CM100XX may be used before an additional CAN Bus power source needs to be considered for the second station.

If additional products are being added to the CAN Bus, refer to the technical manual for a full explanation of CAN Bus power requirements.

Appendix A - i6300 Default Settings

These are the factory default settings for the i6300 control systems:

Sync – Power Train or Cruise	Power Train
Lead Handle – Port or Starboard	Port
*Split Range Throttle 0-90%	25%
Forward Throttle Curves	F1
Reverse Throttle Curves	R1
Programmable Shift Delay	6.0
RPM Pulses per Revolution	6
Throttle / Push – Pull	Push
Throttle Stroke	50mm
Shift / Push – Pull	Pull
Fwd Shift Stroke	32mm
Rev Shift Stroke	32mm
Overshift / Off – On	Off
Station Protect	Off
Window Filters: Off, W1, W2, W3	Off
Throttle Offset	0mm
Failure Modes	N
Clear SYNC Table	No

**Note: Setting Split Range Throttle to “0” turns off this feature.*

Appendix B - Control Head Calibration

The CAN Bus control head is calibrated at the factory and under normal installation and use does not require recalibration. In some installations the full sweep of the control handle may encounter an obstruction or lose calibration. These procedures allow recalibration of the various style controls.

CAN Bus Control Head Calibration

This calibration procedure is for single lever (both shift and throttle on a lever) controls.

Single Lever - Single Engine Controls

- With the system OFF (no power on the CAN Bus) press and hold the NEUTRAL (*N*) button on the control head and turn the power ON. The Yellow lamp will blink a “one code” (blink - wait - blink - wait - blink) indicating control head calibration.
- Move the lever to the FULL FORWARD position and press the *S* (SEL) button. The select lamp will turn on.
- Move the lever to the FORWARD IDLE position. The *S* lamp will go out. Press the SELECT button. The select lamp will turn on.
- Move the lever to the NEUTRAL position. The *S* lamp will go out. Press the SELECT button. The select lamp will turn on.
- Move the lever to the REVERSE IDLE position. The *S* lamp will go out. Press the SELECT button. The select lamp will turn on.
- Move the lever to the FULL REVERSE position. The *S* lamp will go out. Press the SELECT button. The select lamp will blink indicating the process is complete. To EXIT the control head calibration mode, turn off the CAN Bus power.

Single Lever - Dual or Triple Engine Controls

Port Lever

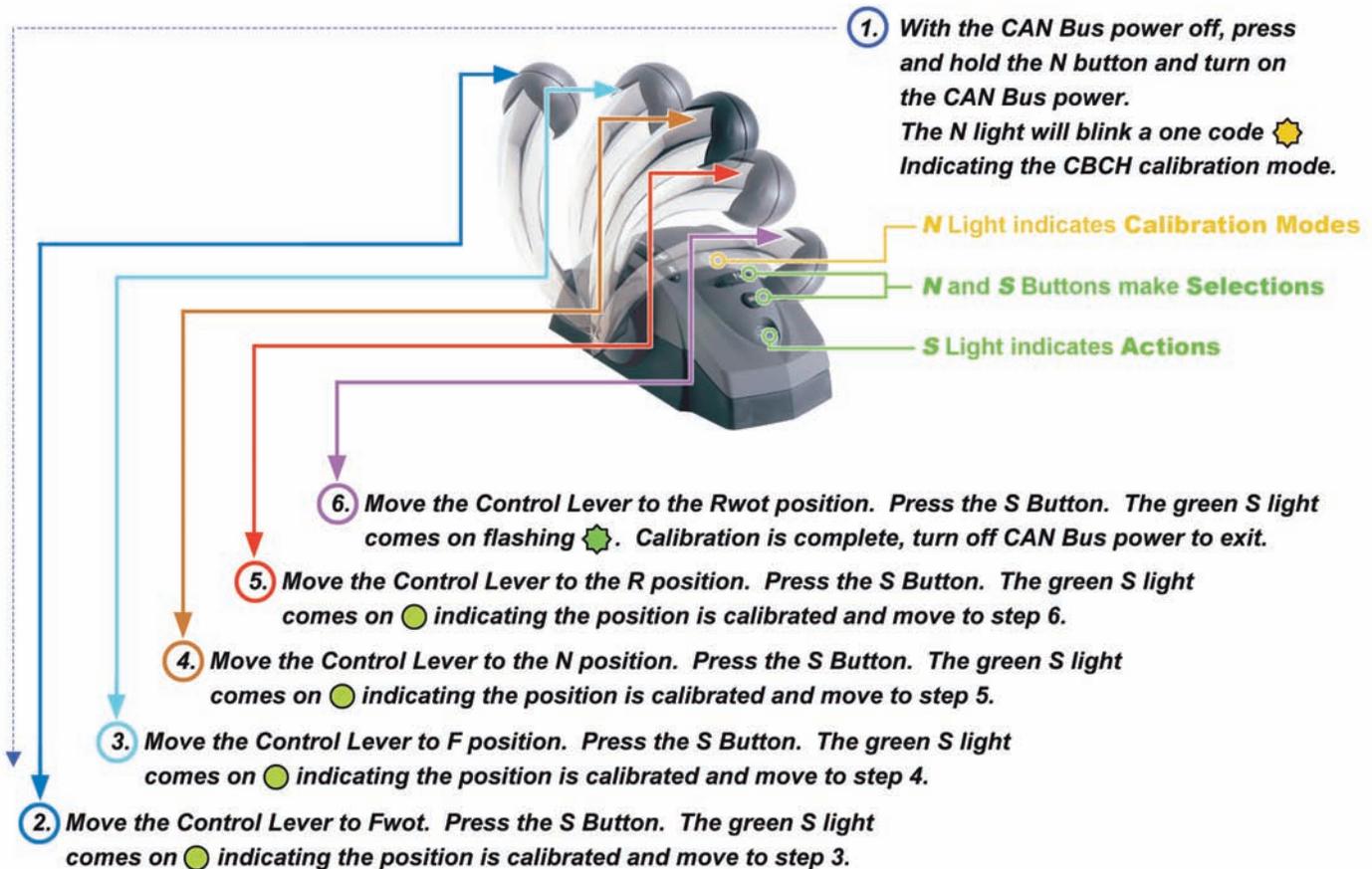
- With the system OFF (no power on the CAN Bus) press and hold the PORT *N* button on the control head and turn the power ON. The port neutral lamp will blink a “one code” (blink - wait - blink - wait - blink) indicating control head calibration.
- Move the Port lever to the FULL FORWARD position and press the SELECT button. The select lamp will turn on.
- Move the Port lever to the FORWARD IDLE position. The port *S* lamp will go out. Press the SELECT button. The select lamp will turn on.
- Move the Port lever to the NEUTRAL position. The port *S* lamp will go out. Press the SELECT button. The select lamp will turn on.
- Move the Port lever to the REVERSE IDLE position. The port *S* lamp will go out. Press the SELECT button. The select lamp will turn on.
- Move the Port lever to the FULL REVERSE position. The port *S* lamp will go out. Press the SELECT button. The select lamp will flash, indicating the process is complete. To EXIT the control head calibration mode, turn off the CAN Bus Power.

Appendix B - Control Head Calibration

Starboard Lever

- With the system OFF (no power on the CAN Bus) press and hold the STARBOARD *N* button on the control head and turn the power ON. The starboard neutral lamp will blink a “one code” (blink - wait - blink - wait - blink) indicating control head calibration.
- Move the Starboard lever to the FULL FORWARD position and press the SYNC button. The sync lamp will turn on.
- Move the Starboard lever to the FORWARD IDLE position. The starboard *S* lamp will go out. Press the SYNC button. The sync lamp will turn on.
- Move the Starboard lever to the NEUTRAL position. The starboard *S* lamp will go out. Press the SYNC button. The sync lamp will turn on.
- Move the Starboard lever to the REVERSE IDLE position. The starboard *S* lamp will go out. Press the SYNC button. The sync lamp will turn on.
- Move the Starboard lever to the FULL REVERSE position. The starboard *S* lamp will go out. Press the SYNC button. The sync lamp will flash indicating the process is complete. To EXIT the control head calibration mode, turn off the CAN Bus power.

i6300 CAN Bus Control Head Calibration



Appendix C - Features

Settable Features

The following table lists the settable features available on the i6300 control system. Some features are selected by ordering the correct part number while others are set in the field. All key items are defaulted to the most common selection or normal starting point.

The first column shows what features are set with the control head, the last column shows the default setting for that feature. A section with a short explanation of the various features follows the table.

To set all features contact your dealer.

Control	Feature	Default
No	Sync – Power Train or Cruise	Power Train
No	Lead Engine – Port or Starboard	Port
No	Split Range Throttle 0-90%	25%
No	Forward Throttle Curves	F1
No	Reverse Throttle Curves	R1
No	Programmable Shift Delay	6.0
Yes	RPM Pulses per Revolution	6 Pole
Yes	Throttle / Push – Pull	Push
Yes	Throttle Stroke	50mm
Yes	Shift / Push – Pull	Pull
Yes	Fwd Shift Stroke	32mm
Yes	Rev Shift Stroke	32mm
Yes	Overshift / Off – On	Off
Yes	Station Protect	Off
No	Window Filters: Off, W1, W2, W3	Off
No	Throttle Offset	0mm
Yes	Clear Sync Table	No
Yes	Failure Mode	N

Appendix C - Features

Control Features

This is a description of the i6300 control features listed in the table on page 41.

Sync - Power Train or Cruise

The i6300 offers two types of engine synchronization.

- Power train sync allows one control handle to operate all engine throttles and gears over the entire operating range. The RPM's of all engines are held at the value of the lead engine and all engine gear shifts follow the lead handle. Power Train Sync is the default selection and may only be changed with an i5600 display. The feature is turned on or off using the sync button on the control head of multi-engine systems.
- ***Cruise Sync*** automatically engages when the feature is made active using the sync button on the control head and the following two conditions are achieved.
 - To enable Cruise Sync - the handles must be within 5% of each other and the SYNC button must be pushed.
 - To engage Cruise Sync - the throttles must be above 20% in forward gear and the handles are within 10% of each other.

If either condition is no longer present each engine follows its OWN control handle.

Lead Handle - Port or Starboard

This sets which engine (handle) is the lead and used to operate the system when power train sync is operating. The default is Port and may only be changed with an i5600 display.

Split Range Throttle

This feature increases the amount of throttle lever movement for a give change in throttle. It also limits the maximum amount of throttle that can be selected. The feature makes it easier to select an exact speed and limits the amount of power that can be applied. This is handy in trolling and docking situations. The maximum amount of throttle that can be achieved is settable with an i5600 display from 0 to 90% of Wide Open Throttle (WOT). At 25% the throttle handle moves four times the usual amount for a given amount of throttle change. The default setting is 25%. A setting of 0% will turn off this feature.

Forward Throttle Curves

This allows the engine to throttle in a manner different from the motion of the throttle handle movement. This is sometimes a useful tool as not all boats and engines respond in a similar manner. The following charts show the various responses that are available. The F1 curve is the default. With an i5600 any of the available curves may be selected.

Reverse Throttle Curves

This allows the engine to throttle in a manner different from the motion of the throttle handle movement. This is sometimes a useful tool as not all boats and engines respond in a similar manner. The following charts show the various responses that are available. The R1 curve is the default. With an i5600 any of the available curves may be selected.

Note: For additional information regarding Throttle Curves, please see the MANIN6300M02 Installation Manual.

Appendix C - Features

Programmable Shift Delay

This is a safety feature to help control the boat in an emergency stop condition. ***This is a smart delay and causes no shift delay in normal operation.*** Example, if the throttle is immediately moved from full forward to full reverse the throttle will immediately go to idle and the transmission to neutral. Assuming the boat has been at full throttle for a good while the delay will then occur before going to full reverse. This smooth's out the deceleration to reduce the chance of injury to those aboard and allows the transmission to shift and still work after the event so the boat is not left without power. The default delay times is 6.0 seconds and may be set from 0 to 12 seconds with an i5600 display. Once again, since this is a smart delay and removes itself in normal operation no delay is noticed in the operation of the system. For a complete explanation of the Programmable Shift Delay see the i6300 technical manual.

RPM Pulses per Revolution

Normally, this setting is made automatically by the system. A manual setting method is also available with an i5600 display. This adjusts the tachometer input to the type of engine that is being used. The default is a 6 pole tachometer signal. See Appendix E for additional details.

Signal

2 Pulses - Some outboards

4 Pulses - Typical V8 gasoline inboards

6 Pulses - Typically most outboards (default)

30 Pulses - Some Volvo Penta diesels

120 Pulses - Typically diesel inboards (other settings available)

Throttle Push / Pull

Sets which direction the throttle will move to increase the engine speed. Some engines are push for throttle while others are pull for throttle. The default is push for throttle which covers the majority of outboards.

Throttle Stroke

Adjusts the length of the throttle stroke. The default is 50 mm.

Shift Push / Pull

Sets which direction the shift will move for forward gear. The default is pull for forward which is common for many outboards.

Forward Shift Stroke

Sets the shift stroke distance in the forward direction. The default is 32 mm.

Reverse Shift Stroke

Sets the shift stroke distance in the reverse direction. The default is 32 mm. Requiring a different shift stroke setting in the forward and reverse direction is common.

Overshift / On - Off

When the shift lever is returned to neutral on some outboard the gears may hesitate to drop out and return to neutral. With mechanical controls the operator would “jiggle” the shift handle to get into neutral. When turned On this feature automatically jiggles the shifter to get to neutral. This is accomplished by the shift actuator going a little past the neutral point and then pulling back to the neutral setting. This artificial jiggle places the gear into neutral. The default is off as most engines do not require this feature.

Appendix C - Features

Station Select Protection

Restricts station transfer unless a code is inserted into the station requesting to take over command of the boat. The primary use of this feature is to protect against small children on the boat from accidentally taking control at an unmanned station. See Operators Manual for details. The default is Off.

Window Filters

On some engines the tachometer signal is quite erratic. The Window Filter is used to smooth the tachometer output from the control system. The four settings are as follows. The default is no filter.

Off No filter (default)

W1 50 RPM Works if tach is jumping outside a + or - 25 RPM range.

W2 100 RPM Works if tach is jumping outside a + or - 50 RPM range.

W3 150 RPM Works if tach is jumping outside a + or - 75 RPM range.

Throttle Offset

Allows electronic adjustment of the throttle idle position so the throttle handles can be aligned without repetitive mechanical adjustments. On multi-engine boats it is desirable to have both throttle handles start to advance the throttles at the same time. This can be difficult to set on some outboards. This feature lets you electronically set the point where the throttle starts. The default is Off and an i5600 is required to use this feature.

Docking Modes

This feature only applies to triple and quad engine installations. This determines the action the center engine will take when docking or maneuvering. There are two choices and they can only be set with an i5600.

0 When mode zero is selected the center engine will follow any engine that is put into reverse.

1 The default mode: in this mode the center engine will not be used when the handles are not in the same gear. As soon as the control handles are placed in different gears the center engine is disengaged. When the handles are returned to the same gear, forward or reverse, the center engine follows the outer engines.

Clear Sync Table

A service feature that allows the sync table to be cleared on the ***active*** control head (each control head has it's own Sync Table and needs to be cleared individually). Select the item and press the SEL button to clear the table.

Failure Modes

This determines what action the system will try to take should a critical failure occur:

- ***N*** (Neutral) - places the shift in neutral and throttle to idle over a 3 second period. This is the default mode.
- ***G*** (Gear) - leaves the shift in it's pre-failure position and moves the throttle to idle over a 3 second period.

Appendix D - Features Setup Using the Control Head

Features Settings

Note: Refer to Appendix C for Features details.

The following features may be checked or changed: Failure Mode, Station Select Protection, Overshift, Clear SYNC Table and RPM Setting - Read Now. Proceed as follows:

1. With the CAN Bus power turned OFF and the lever in NEUTRAL, press and hold the S button and then turn ON the CAN Bus Power.
2. The N will blink a “two code” indicating the Features Setup Mode.  

N LIGHT (yellow) Features	S LIGHT (green)
 	 OR  

Failure Mode

Place the control lever in the N position. The Select light will blink a **one for Neutral (N)** or **two for Gear (G)**. If you need to change the selection press the S button once for Neutral or twice for Gear. The S light will then show the status of the Failure Mode Setting by blinking once (N) or twice (G).

N LIGHT (yellow) Features	Control Lever Position	S LIGHT (green) Neutral Idle (NI)	S LIGHT (green) Gear Idle (GI)
 	N		 

Station Select Protect

Place the control lever in the F position. The Select light will blink a **one for Station Select Protect OFF** or **two for Station Select Protect ON**. If you need to change the selection press the S button once for OFF or twice for ON. The S light will then show the status of the Station Select Protection feature, one for off and two for on. For additional information about this feature see Appendix B of the i6300 operator’s manual.

N LIGHT (yellow) Features	Control Lever Position	S LIGHT (green) Station Select Protect OFF	S LIGHT (green) Station Select Protect ON
 	F		 

Overshift

Place the control lever in the R position. The Select light will blink a **one for Overshift OFF** or **two for Overshift ON**. If you need to change the selection press the S button once for OFF or twice for ON. The S light will then show the status of the Overshift option, one for OFF and two for ON. This applies to all Shift Actuators on the system.

N LIGHT (yellow) Features	Control Lever Position	S LIGHT (green) Overshift OFF	S LIGHT (green) Overshift ON
 	R		 

Appendix D - Features Setup Using the Control Head

Clear Sync Table

Place the control lever in the **Rwot** position. Press the SYNC button. The Sync light will flash once. Then the select light will go out, indicating the sync table is clear. For additional information about the sync table see the i6300 technical manual. This clears the Sync Table in the **active control head only**. The Sync table is only on slave engine. Each control head has it's own Sync Table and needs to be cleared in a similar fashion.

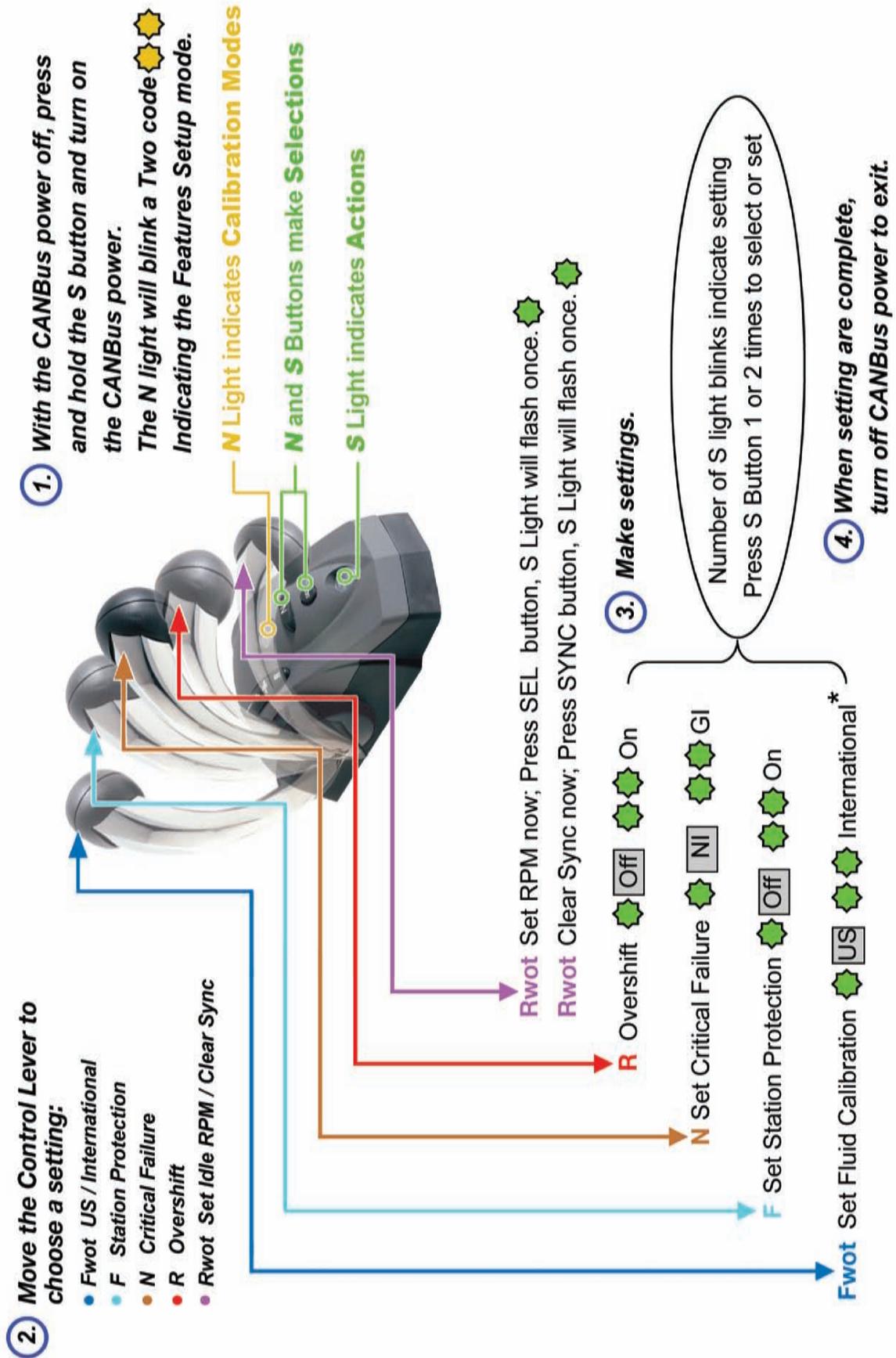
N LIGHT (yellow) Features	Control Lever Position	SYNC LIGHT (red) OFF
	Rwot	

RPM Setting - Read Now

Place the control lever in the **Rwot** position. Press the SELECT (SEL) button. The select light will flash once. Then the select light will go out, indicating that the RPMs have been set. When pressed, allow one (1) minute before making any other changes to the system. This needs to be done for both sides (engines). Using this feature causes the RPM sense to switch to the manual mode.

N LIGHT (yellow) Features	Control Lever Position	S LIGHT (green) OFF
	Rwot	

i6300 Control Head Features Setup Diagram



Appendix E - General Engine Information

Warning

The following information is supplied as a guide. It is based on information supplied by a variety of sources. The information has not been confirmed and should be carefully checked before it is used.

Yamaha

Tach – Dark Green
Ignition Positive - Yellow
Start Circuit – Brown
Tach Pulse 6
Shift is Pull for forward
Shift Stroke is approximately 32mm forward and reverse
Throttle is push to throttle
Throttle stroke is approximately 52mm

Honda

Tach – Gray
Ground - Black
Ignition Positive –Black /Yellow • Neutral start protection is on the engine.
Tach Pulse 2 - 70HP and up
Shift is Pull for forward
Shift Stroke is approximately 32mm forward and reverse
Set Overshift to On
Throttle is push to throttle
Throttle stroke is approximately 62mm

BRP (Evinrude)

Tach – Gray
Ground - Black
Ignition – Violet or Purple
Start – Yellow /Red
Tach Pulse 6
Shift is Pull for forward
Shift Stroke is approximately 32mm forward and reverse
Set Overshift to On
Throttle is push to throttle
Throttle stroke is approximately 62mm

Appendix E - General Engine Information

Suzuki

Tach – Yellow
Ignition Positive – Gray
Neutral start protection is on the engine.
Tach Pulse 6
Shift is Pull for forward
Shift Stroke is approximately 34mm forward and reverse
Set Overshift to On
Throttle is push to throttle
Throttle stroke is approximately 70mm

Mercury

Tach – Gray
Ignition Positive –Violet or Purple
Start Circuit – Yellow / Red
Tach Pulse 6
Shift is Pull for forward
Shift Stroke is approximately 34mm forward and reverse
Throttle is pull to throttle
Throttle stroke is approximately 58mm

Yanmar, Mechanical Engines Only

Tach – Orange wire in eight foot harness.
Ground – Black / Orange
Start Circuit – Large White wire in main harness
Tach Pulse is the number of teeth on the flywheel.
Shift Depends on gear direction
Shift Stroke is approximately 32mm forward and reverse
Throttle is pull to throttle
Throttle stroke is approximately 54mm

Volvo Gasoline Inboard / IO

Tach Pulse 4
Throttle is pull to Throttle
Throttle Stroke is approximately 48mm
For IO Shift Stroke is approximately 38 mm

Appendix F - Adjusting Throttle Stroke

On most engines the mechanical throttle travel and the actual change in engine RPMs are the same (see Figure 1). If this is the case the setting of throttle idle and throttle stroke are as described on page 31 (normal setting).

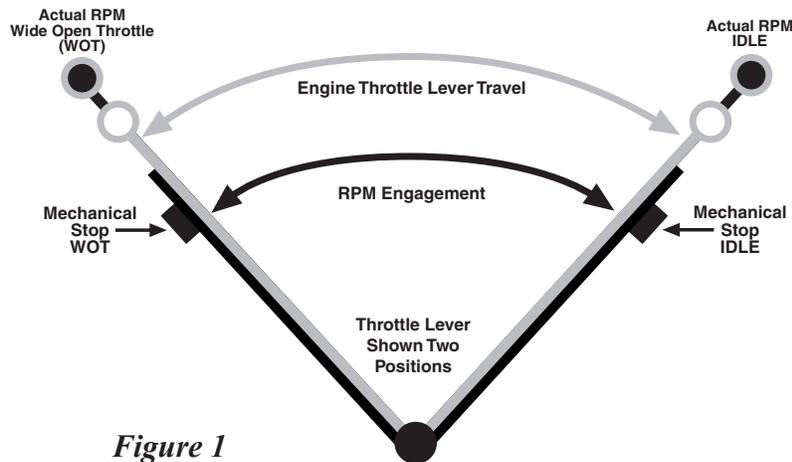


Figure 1

On some engines the actual idle point and the actual WOT position are not the same as the mechanical stops (see Figure 2). This type of throttle setting occurs on electronic engines when the range of the Throttle Position Sensor is smaller than the mechanical travel. The most common occurrence of this is on electronic outboards like the Yamaha 250 HP 4 stroke engines.

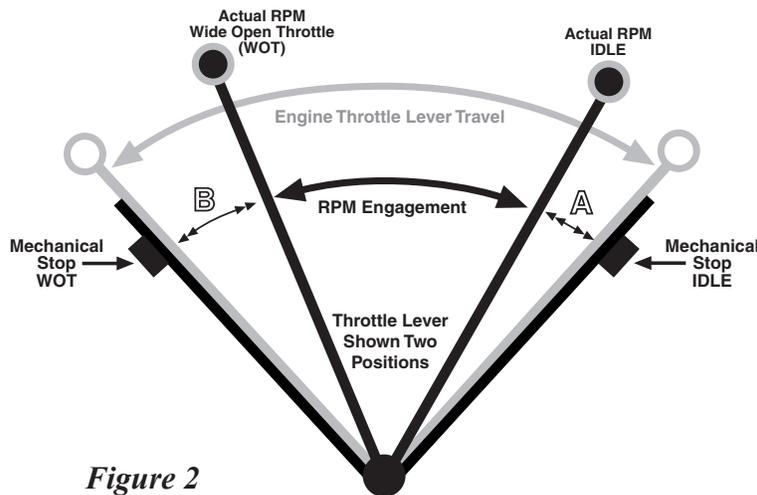


Figure 2

If you do a “normal” throttle setup on an engine with this type of throttle travel using the mechanical stops the result will be a loss of throttle sensitivity. The control lever will advance from the forward idle position for quite a ways and no change in the Engine RPMs will occur. The same is true in reverse. The lever is moving in the area marked with the A in Figure 2.

A similar problem can exist near the Wide Open Throttle end of the travel. Here the control lever will keep moving and the Engine RPMs will not continue to increase. The throttle lever is in the area marked with B in Figure 2.

The result of these two situations is that much of the control lever motion is wasted. End users will sometimes call this a delay problem as the handle moves above idle and nothing happens or they will say the system is too touchy as much of the Handle travel is wasted.

Appendix F - Adjusting Throttle Stroke

This is how to check for this condition at idle. Remove the push / pull throttle cable from the engine throttle lever and with the engine running at its normal idle speed (warmed up) move the engine throttle lever slowly off of its mechanical stop. If the RPM's do not immediately start to increase the condition exists and should be adjusted out with the control system.

The only way to check for the situation at the WOT end (area B) is to sea trial the boat. If the RPMs reach maximum before the control lever reaches the WOT stop then the situation exists at the high end and needs to be adjusted out. In our experience, engines that exhibit the condition at idle also exhibit the issue at the WOT end. Here is how to make the adjustments when these conditions exist.

Setting Idle

With the push pull throttle cable disconnected from the engine throttle lever and with the engine running at its normal idle speed (warmed up) move the engine throttle lever slowly off of its mechanical stop. Advance the lever until the engine RPMs just start to increase. Adjust the threaded end of the push pull cable so this throttle lever position is the new idle end stop. In effect use the throttle actuator and push pull cable as the mechanical idle stop not the engine stop (see Figure 3).

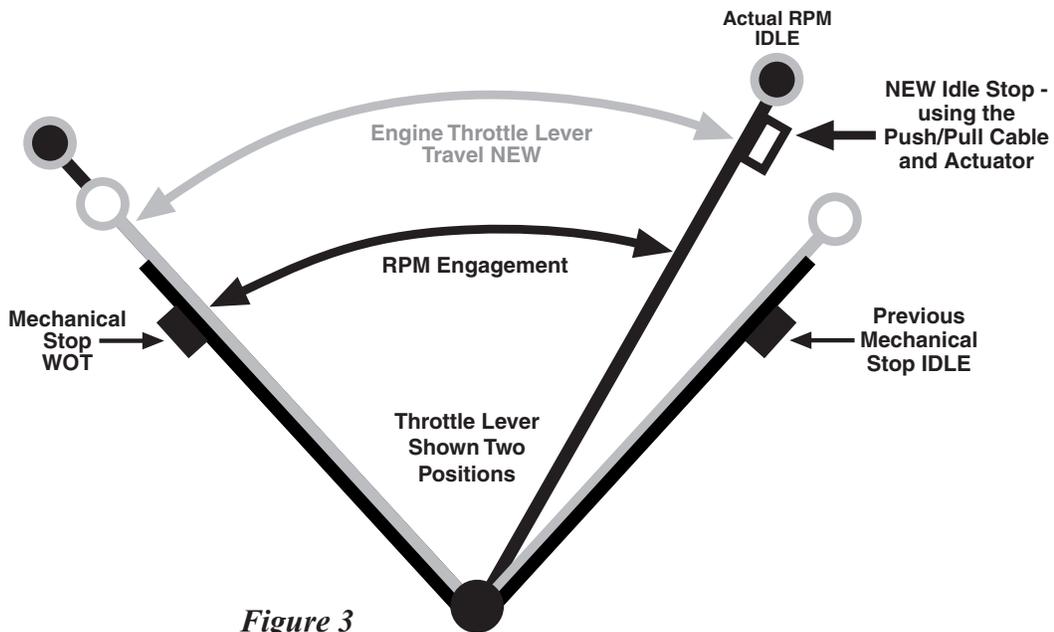


Figure 3

To check for proper setting connect up the system. The engine should idle at its normal RPM's and the RPM's should increase as soon as the control lever comes out of the forward idle detent. Make sure the engine returns to normal idle when the control lever is returned to idle. This may require a longer cable end adapter than the standard black adapter. A longer, blue adapter, Teleflex part number 3838217, is available.

Setting Wide Open Throttle.

This can only be set during a sea trial. Advance the control lever until the RPM's stop increasing. If you can continue to advance the control lever without an increase in RPMs shorten the throttle stroke as described on pages 31 and 32. Repeat as necessary until maximum RPMs occur just before the control lever reaches the WOT stop.

Appendix G - System Alarms and Failure Modes

System Alarms

Critical Alarms

Continuous flashing lights on the control indicates a **Critical Alarm**. System will do a “Safe Shut Down.”

When a critical alarm occurs, the system will automatically go to the selected “Failure Mode” (see next page). The system **MUST** be shut down and restarted for most critical alarms. Some functions may operate for a time after restart.

If the alarm is caused by an Actuator hitting a “Stop,” the alarm will go away when the throttle is pulled back.

However, as with ALL Critical Alarms, the system must be serviced as soon as possible.

Non-critical Alarms

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



Appendix G - System Alarms and Failure Modes

Critical Alarm Codes

The i6300 continuously monitors many parameters and determines if it has control of the boat. In the event a problem is encountered appropriate action is automatically taken by the i6300 control system to assure safe operation.

Based on the problem encountered the i6300 control system uses the lights on the control head as follows.

- Both lights on a side off – The CAN Bus power has been lost or the control head is no longer communicating with the actuators. Assuming the actuators still have power they will put the system in the selected safe shut down mode.
- The lights on a side are flashing for five seconds and then normal for fifteen seconds and the pattern continuously repeats. This is a *non-critical failure*. You may continue to use the system but must have it serviced on return to port as a problem is developing.
- The lights on a side flashing continuously indicates this is a critical failure. The system will go to the selected failure mode. Return the control levers to neutral and then any components still operating can be controlled. Have the system serviced as soon as possible.

Any time the lights are flashing an alarm, if the two buttons associated with that control lever are pressed at the same time a code will flash on the lights.

Two flashes		indicates the shift actuator has caused the failure.
Three flashes		indicates the throttle actuator has caused the failure.
Four flashes		indicates the control head has caused the failure.
Five flashes		indicates miscellaneous devices on the network.

Failure Modes

The i6300 system offers two shut down modes. The safe shut down mode is selected in the set up process. See installation manual MANIN6300M02 to change safe shut down mode.

- Mode **G** (Gear) – The throttle is returned to idle and the gear remains in its current position.
- Mode **N** (Neutral) – The throttle is returned to idle and the gear goes to neutral. This is the default mode.

Appendix H - Spare Parts Kits

Notice: Actuator spare parts only supplied with the kit and are not sold separately.

Actuator Spare Parts Kit - Part No. 9859711

includes the following:

QTY	Part No.	Description
1	ND0701-24	Rod Clamp
1	ND0701-25	Cable end (10-32 thread)
1	NM0102-20	Cable end (M5 thread)
1	21059M3030162	Screw, M5 x 30 mm CR Pan Hd
1	21059M1212162	Screw, M5 x 12 mm CR Pan Hd
1	NM0101-26	Cable grommet

Actuator Spare Parts Kit - Part No. NM0801-00

replaces RED “Auto Manual” handle of the actuator (enough parts for 2 actuators)
and includes the following:

QTY	Description
2	Levers
2	Pins
2	C-Spring Clips
4	Wavy washers

Control Head Trim Switch Repair Kit - Part No. RP6851021

Replaces trim switch and handle ends (2 -piece) on port side handle.

Control Head Handle Grip Repair Kit - Part No. RP6851005

Replaces all round handle ends (2 -piece) on port or stbd side handle.

Copyright © 2007 Teleflex® Marine
All Rights Reserved

Teleflex®
MARINE

Teleflex Marine.

3831 No.6 Road.

Richmond, B.C.

Phone: 604.270.6899

FAX: 604-270-7172

www.teleflexmarine.com

Teleflex Marine is a division of Teleflex Incorporated.
