

CH103 *Control System* series



Installation & User Manual

CH103xx Jet Drive Control for Yanmar Engines

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Product Overview

The CH103xx Series Product is designed as a Plug 'N' Play Throttle and "Thrust" Control for Jet Drive applications using Yanmar Electronic Engines. The system provides single lever electronic throttle operation and independent mechanical shift/bucket operation.

Components

1000066	CH; Livorsi, Jet, SE, Black, ETP, ESSA, no detent	1 per engine
1000016	Switch; N.O. , momentary, Grn LED, w/connector	1 per engine
CM10002	Harness; Devicenet, 2'	As needed
CM10003	Harness; Devicenet, 3'	As needed
CM10006	Harness; Devicenet, 6'	As needed
CM10009	Harness; Devicenet, 9'	As needed
CM10012	Harness; Devicenet, 12'	As needed
CM10016	Harness; Devicenet, 16'	As needed
CM10020	Harness; Devicenet, 20'	As needed
CM10030	Harness; Devicenet, 30'	As needed
CM10060	T; Devicenet	As needed
EM103SE	EM; CH, Jet Drive Sport Style, Yanmar Electronic, SE	1 per engine
EM103DE	EM; CH, Jet Drive Sport Style, Yanmar Electronic, DE	1 per system
MN10010-XX	Manual, User/Installation, CH103 series	1 per engine
MN10013-XX	Mounting Template, CH103 series	1 per engine



1000016 – Select Switch

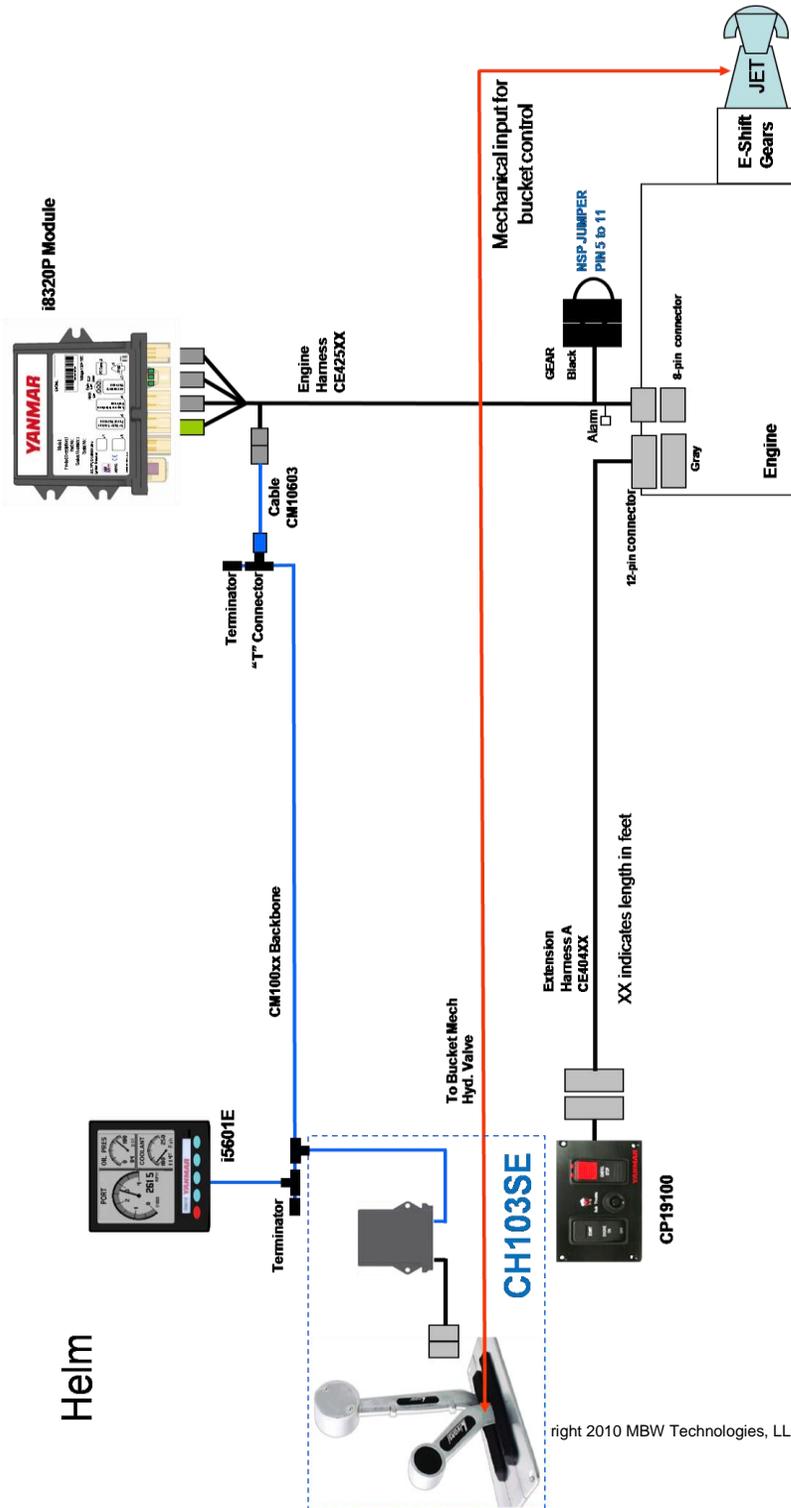


EM103xx – Electronic Module



1000066 Throttle Head

System Diagram



Installing the System

CAUTION

The safety messages that follow have **CAUTION** level hazards.

ALWAYS ensure the power supply is OFF and battery cables are disconnected before you make any electrical connections.

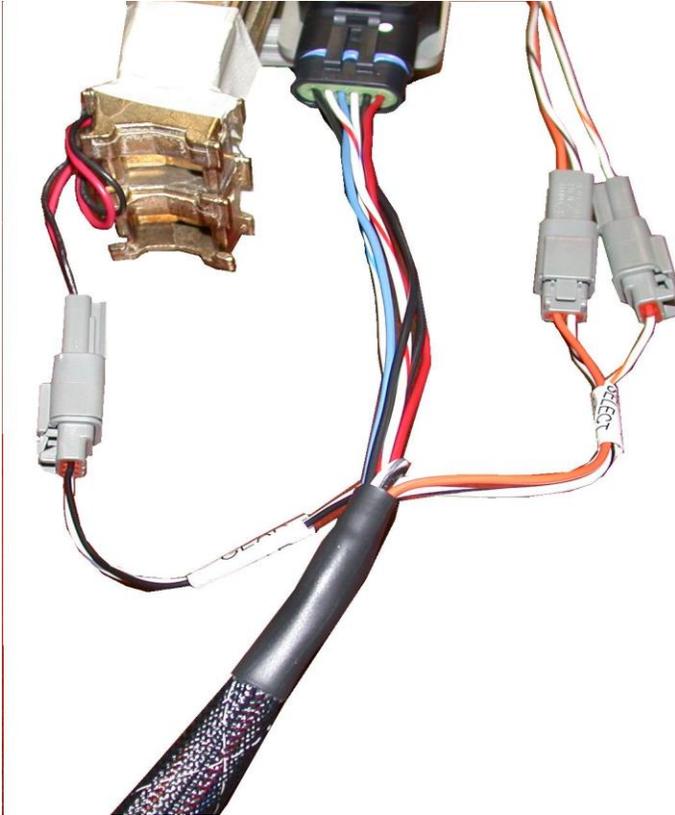
WARNING: This control WILL NOT provide start-in-gear protection meeting USG requirements of “33 CFR Part 183, Subpart L.” Ensure gear/thrust control is in neutral before starting engine.

Making the Connections

Each connector end has a label identifying the connection location. Match the labels with connecting device. In most cases the connector fits in one and only one mating connector. The supply power **MUST** be OFF when interconnecting the system. The EM103 module must be calibrated to the mating throttle head. The CH103 system is supplied from the factory calibrated to the supplied throttle head. Should the EM103 module be mated with a new throttle head, recalibration is required. See System Calibration section for details.

- Recommended order:
 1. Verify the battery / battery switch connections to each engine per the engine installation diagram. (Refer to engine manufacturer installation manual.) Verify engines are bonded to battery return (-) and that battery banks are tied to battery return. Verify engine blocks are connected battery bank ground.
 2. Locate placement area for throttle head. Use supplied template (MN10013) for proper mounting.
 3. Locate placement area for EM103 module. Use supplied template (MN10013) for proper mounting.
 4. Locate placement area for throttle select switch. Mount using 5/8" dia. Hole.
 5. Locate Yanmar NMEA 2000® network. Find appropriate location to install a network 'T'. Connect EM103 module to network using certified network harnessing and 'T'.
 6. Connect throttle select switch to EM103 module. (2- 2pin DTM connectors)
 7. Connect EM103 module to throttle head via: 1 - Packard 6 pin , 1 - Deutsch 3 pin connector.
 8. Locate gear connector on the Yanmar Control System Interface Module. Jumper the Neutral Start Protect input, pin 5 to pin 11. If the mechanical thrust system has a NSP connection, connect pins 5 & 11 to this connection. These connections are necessary for the Yanmar engine to start.

After all controls and system components have been mounted and connected, the system must be setup to agree with the engines, transmissions and operator preferences. Reference Yanmar Electronic Control Operational Manual for details.



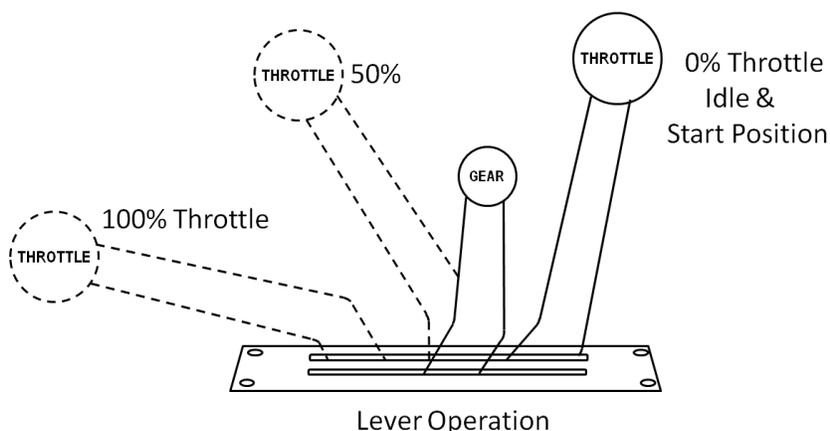
CH103xx Series Interconnect

System Operation

For single station applications, the control will auto select when the system is powered and the throttle lever is less than 2% throttle. For dual station applications station select will occur when throttle lever is less than 2% and select switch for desired station is pressed. (Green lamp active when station selected.) If the control is not selected the select lamp will flash. The Yanmar System will allow the engine to start if the throttle head is not selected but will not allow the engine to throttle up until the control is selected. If the select lamp is flashing simply move the control to the idle position. The select lamp will stop flashing and indicate a steady green indication. The control is now selected and operational.

Since the gear lever is connected via a mechanical cable to the thrust or “bucket” system, its operation is independent of the throttle control. When first operating the system be careful to establish forward and aft (reverse) operation.

The EM103 communicates to the Yanmar Control Interface Module and will lock-out engine start when the throttle lever is requesting a throttle > 5% and the station is selected. Because this system is connected to a mechanical “thrust” system the gear information is available on the Yanmar control network. As a result, the EM103 will communicate an “in-gear” message to the Yanmar Control Module when the engine is started. This is necessary to allow the Yanmar Electronic Engine to properly calculate and display engine fuel flow data.



Start-in-Gear Protection

The Yanmar Control System provides a connection for start-in-Gear protection. This connection is made in the control system engine harness. (See system diagram for details.) Since the gear control of this system is a “bucket” the notion of a neutral position is difficult to ascertain. Therefore, the Yanmar Control System NSP must be jumpered to allow the Yanmar engine to start. Jumper the Neutral Start Protect input of the Yanmar Control Module (pin 5 to pin 11). If the mechanical thrust system has a NSP connection, connect pins 5 & 11 to this connection.

If the Jet Drive application has a mechanical switch connection for the neutral position it should be connected. The CH103 control will not allow the engine to start if the throttle is > 5% throttle and the control is selected.

Note: The CH103 does not evaluate the “bucket” position and prevent the engine from starting.

System Calibration

To calibrate the EM103xx module with the mating throttle head, perform the following steps.

1. With the control powered off, move the gear lever to the full forward position; the throttle lever to idle.
2. Power the system, while pressing and holding the select switch. The control is now in the calibrate mode. Select lamp "Off"
3. Move the throttle lever to the wide open throttle position. Press the select switch to enter the position data of the throttle lever. The green lamp on the select switch will flash momentarily when data is entered.
4. Move the throttle lever to the idle position. Press the select switch to enter the position data of the throttle lever. The green lamp on the select switch will flash momentarily when data is entered.
5. Power the system off and back on.
6. The control is now calibrated.
7. Verify calibration by viewing the %Throttle display on the i5601E display. The display should read 100% when the throttle lever is a WOT and 0% at idle.

Technical Specifications

EM103 Module

Operating Voltage	6 to 16 VDC
Operating Temperature	-18C to +77C
Storage Temperature	-40C to +85C
Power Consumption - operating	250mA @ 12VDC (w/display)
Power Consumption – power down	<100uA
Vibration	ABYC P-24
Communication	NMEA 2000®
Humidity Test 100 Hours	+77C @ 90-95% Rel. Humidity
Transient Voltage Test	SAE J1113-12
Protection	IP67
Corrosion / Salt Spray	300 hrs per ASTM B117
EMI Emissions	ABYC P-24
EMI Immunity	ABYC P-24
Dimensions (base unit without harness)	117mm x 115mm x 35mm (4.63" x 4.50" x 1.38")

CH103 Data Transmitted

Engine Throttle	Yanmar proprietary
Gear	Yanmar proprietary

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