

**MicroCommander 9110X  
Installation, Operation  
and Troubleshooting Manual**

MM9110-I Rev D.1 4/08



# 5 SET UP PROCEDURE

The Processor utilizes push buttons in conjunction with Display LED's to program, adjust, calibrate and set up the various features. The push buttons also allow you to access and display information regarding the health of the System.

The following paragraphs explain how to locate and use the push buttons and Display LEDs:

## 5-1 Processor Components Used In Set Up

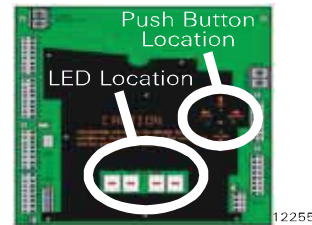
- Each Processor has a Display LED and Push Buttons.
- The Display LED can be viewed through a window on the Processor's cover.

Figure 31: Typical Processor Cover



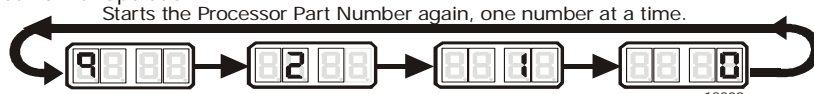
- The Processor enclosure cover **must** be removed to access the Push Buttons.
- The Display LED is used to view the Function Codes and the Values for those Functions.
- The Push Buttons are used to scroll through Function Codes, select Function Codes and set the Values of the Function Codes.

Figure 32: Processor Shield Push Button and Display LED Locations



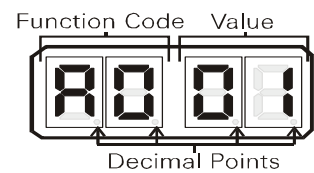
### 5-1.1 Processor Display LED

Figure 33: Display LED at Normal Operation



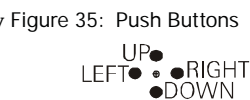
EXAMPLE: Running Processor Part Number during Normal Operation (9210)

- The Processor's Display LED has four 7-segment LED's, which light up to show either letters or numbers.
- The Display LED will have the Processor Part Number showing in a running pattern during Normal operation (Figure 33:)
- The first two digit Display LED's to the left, indicate the Function Code, which is alphanumeric.
- The second two digit Display LED's indicate the numeric Value that is programmed into the Processor for the Function Code displayed to the left.
- A decimal point indicator is located on the bottom right corner of each Display LED.



### 5-1.2 Push Buttons

The Processor has four Push Buttons located on the Circuit Board. They are identified by the words LEFT, RIGHT, UP and DOWN silk-screened on the Shield covering the Circuit Board.



#### 5-1.2.1 Up and Down Push Buttons

Pressing the Up or Down Push Buttons once has the following functions:

- Stops Normal Operation Display (running Processor Part Number) and activates the Function Menu.
- While in the Function Menu, scrolls through the Function Codes one at a time.
- When an Error Code is displayed, scrolls through the error messages one at a time. (Refer to Section B8 - ERROR CODES)
- When in Set Up Mode, increases (Up) or decreases (Down) the Value one digit at a time.



### 5-1.2.2 Left and Right Push Buttons

Pressing and holding the Left and Right Push Buttons simultaneously has the following functions:

- Activates Set Up Mode as indicated by the blinking Display LED. (must hold the buttons until the blinking begins)
- While in Set Up Mode, deactivates Set Up Mode, saves the displayed Value to memory and returns to the Function Menu. (must hold the button until the blinking stops)

### 5-1.2.3 Left Push Button Only

Pressing the Left Push Button once has the following functions:

- Deactivates Set Up Mode without any changes to the Value being stored to memory. The Left Push Button must be held down until function code stops blinking. The default value will then be displayed.

Figure 36: Display LED Error Menu Example

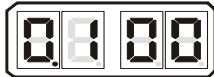


### 5-1.2.4 Right Push Button Only

Pressing the Right Push Button once has the following functions:

- While in Function Menu, changes the Display LED to the Error Menu, if any errors are present. (has no effect if there are no errors stored)
- While in the Error Menu, changes the Display LED back to the Function Menu.
- While in the Error Menu, clears inactive errors. (Active errors blink, inactive do not)
- While in Set Up Mode or Function Menu, allows the Value of the current Function Code to be displayed with all four Display LEDs.

Figure 37: Display LED Four Digit Value



## 5-2 Activating Set Up Mode



NOTE: To Escape from the Set Up procedure at any time without saving the changed value to memory, depress the Left Push Button. The Function Code will stop flashing and the Function will be saved with the original Value.

- The Display LED is in Normal operating condition with the red running Processor Part Number.
- Depressing either the Up or Down Push Button will activate the Function Menu.
- Depressing the Up or Down Push Button will scroll through the Function Codes one at a time.
- Once the desired Function Code is visible on the Display LED, press and hold down the Left and Right Push Buttons simultaneously, until the Function Code begins to blink.
- Depressing the Up Push Button will increase the Value of the Function, while pressing the Down Push Button will decrease the Value of the Function. (Pressing and holding the Up or Down Push Button will increase or decrease the Value rapidly)

## 5-3 Storing Values To Memory

Once the desired Value has been reached in Set Up Mode, the Value is stored to memory as follows:

- Depress and hold the right push button first. Then while still depressing the right button, depress and hold the Left push button until the Function Code stops blinking.
  - The new Value is now programmed into memory.
  - Set Up Mode is exited.
- Depress the Up or Down Push Button until the next required Function Code is reached.
- Reactivate Set Up Mode.



NOTE:

If no Push Buttons are pressed for five (5) minutes, the selected Mode of operation is automatically exited and the System returns to Normal Operating Mode.

If no Push Buttons are pressed for five (5) minutes while in Set Up Mode, it will be exited without the changes stored to memory

## 5-4 Function Codes And Values

The following tables list the Function Codes' Name, Default Value and Range or available Options. Each of the Function Codes are explained in further detail in the following sections.

**NOTE:**

**SINGLE SCREW APPLICATIONS:** The Function Values may be entered and stored in any order.

**MULTI SCREW APPLICATIONS:** The A1 Function must be set FIRST, and the A0 Function must be set SECOND. The rest of the Function Values may be entered and stored in any order.

Once these parameters are set, either cycle power to the Processors or wait five (5) minutes, before continuing set up.

**Table 7: Processor Function Codes**

Function Code	Function Name	Default Value	Value Range or Options
A0	Processor Identification	01	01, 02, 03, 04, 05
A1	Number of Engines	01	01, 02, 03, 04, 05
A2	One Lever Operation	00	00 - Disabled; 01 - Enabled
A3	Station Expander (SE)	00	00 - Disabled; 01 - Enabled
<b>DO NOT ADJUST THE ABOVE FUNCTION!</b>			
Leave at default Value set by the Factory. Contact a ZF Marine Electronics Authorized Technician if this Function requires adjustment.			
A4	Neutral Indication Tone	00	00 - No Tone 01 - Tone upon Control Head engaging Neutral 02 - Tone upon Transmission shifting to Neutral

**Table 8: Throttle Servo Function Codes**

Function Code	Function Name	Default Value	Value Range or Options
E0	Throttle Servo Direction	20	20 - Push (Extends) for Throttle Increase 21 - Pull (Retracts) for Throttle Increase
E1	Throttle in Neutral	00.0	00.0 to 25.0% of Throttle Range
E2	Throttle Minimum	00.0	00.0 to 20.0% Must be 10% or more below Throttle Maximum (E3).
E3	Throttle Maximum	33.0	10.0 to 100.0% of Maximum Throttle Allowable. Must be 10% or more above Throttle Minimum (E2)
E4	Throttle Maximum Astern	100.0	00.0 to 100.0% of Throttle Maximum (E3)
E5	Throttle Pause Following Shift	00.5	00.0 to 05.0 Seconds
E6	High Idle	00.0	00.0 to 20.0% of Throttle Range.
E7	Synchronization	00	00 - Equal Throttle (Open Loop) Synchronization 01 - Active (Closed Loop) Synchronization (reverts to Equal if Tach Signal lost) 02 - No Synchronization 03 - Active (Closed Loop) Synchronization (no synchronization if Tach Signal is lost)

**Table 9: Solenoid Clutch Function Codes**

Function Code	Function Name	Default Value	Value Range or Options
C0	Clutch Pressure Interlock	00	00 – Not Installed; 01 – Installed 02 – Throttle Clutch Pressure Interlock Mode
C1	Clutch Interlock Delay	00.5	00.5 to 10.0 Seconds
C2	Proportional (Reversal) Pause	00	00 – In-Gear; 01 – Neutral; 02 – Fixed Neutral Delay Enabled (NOTE: If C2 is set to 02, the setting of C3 will set Fixed Neutral Delay C8.)
C3	Proportional (Reversal) Pause Time	04	00 to 99 Seconds
C4	Proportional (Reversal) Pause Ratio	00	00 – 2:1 Ahead to Astern vs. Astern to Ahead 01 – 1:1 Ahead to Astern vs. Astern to Ahead
C5	Clutch Servo Direction	20	20 - Pull [Retracts for Ahead 21 - Push [Extends] for Ahead
C6	Clutch Ahead	80	00-100% of Maximum Ahead Travel from Neutral.
C7	Clutch Astern	80	00-100% of Maximum Astern Travel from Neutral.



Table 10: Trolling Valve Function Codes

Function Code	Function Name	Default Value	Value Range or Options
L0	Troll Enable and Control Head Troll Lever Range	00	00 – No Troll 01 – 20 Degrees- Type 1 02 – 35 Degrees- Type 2 03 – 45 Degrees- Type 3 (Throttle limited to 75% of Throttle Range) 04 – 55 Degrees- Type 4 (Throttle limited to 10% of Throttle Range)
Troll Functions are only available and displayed when a P/N 9001 Troll Actuator is connected to the Processor. Refer to MM9001 Manual for Functions.			

Table 11: Servo Troubleshooting Function Codes

Function Code	Function Name	Default Value	Value Range or Options
H0	Diagnostic	00	Input Voltage (+/- 0.5VDC) Tachometer Sensor Frequency Lever A/D, Stations 1, 2, 3, 4, & 5 Servo 1 & 2 A/D Feedback Transfer Button, Stations 1, 2, 3, 4, & 5 Software Revision Level
H1	Erase EPROM	00	Store to Return to Factory Defaults; (For Authorized Personnel Only)

## 5-5 System Programming and Adjustments



NOTE:

**SINGLE SCREW APPLICATIONS:** The Function Values may be entered and stored in any order.

**TWIN SCREW APPLICATIONS:** The A1 Function must be set FIRST, and the A0 Function must be set SECOND. The rest of the Function Values may be entered and stored in any order.



NOTE: Power must be turned ON to the Processors when programming or making any adjustments to the System.



NOTE: In order to prevent nuisance alarms when first setting up a System, some Function Codes take up to 5 minutes to become ACTIVE. The Functions affected by this are the functions that rely on Serial Communication, such as A0, A1, A2, A3, E7, and L0. Cycling power OFF, then ON, expedites these features making the Functions available immediately.

### 5-5.1 Processor Functions

#### 5-5.1.1 Function Code A0 – Processor Identification



NOTE: In twin screw or more applications, the Value of Function Code A0 must be changed AFTER the Value in Function Code A1 has been changed to 02 or higher on ALL Processors.

In applications where there is more than one screw, the system must know which Processor is where. Every Processor must have its OWN UNIQUE identifying number. At NO time can two or more Processors be identified by the same Processor Identification Number.

The available Values for this Function are:

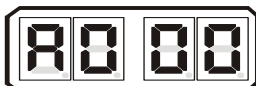
00 (Default Value), 01, 02, 03, 04 and 05.



NOTE: If Processors are not connected by a serial communication cable, leave the A0 Function Code at Default Value 00.

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 38: Display LED Function A0



- A) Scroll to Function Code A0.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.
- E) Repeat on all Processors BEFORE proceeding to the next Function.



NOTE: Before continuing set up, wait 5 minutes or cycle power.

#### 5-5.1.1 Function Code A1 – Number of Engines



NOTE: If Processors are not connected by a serial communication cable, leave the A1 Function Code at Default Value 01.

The total number of engines must be entered into the memory of each of the Processors. All Processors in an installation must have the SAME VALUE entered.

The available Values for this Function are:

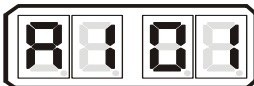
- 01 Single Screw (Default Value)
- 02 Twin Screw
- 03 Triple Screw (if required, contact a ZF Marine Technician.)
- 04 Quad Screw (if required, contact a ZF Marine Technician.)
- 05 Quint Screw (if required, contact a ZF Marine Technician.)



NOTE: Twin screw or more applications require Function Code A1 Value to be changed on ALL Processors prior to changing the Value of Function Code A0.

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 39: Display LED Function A1



- A) Scroll to Function Code A1.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

#### 5-5.1.2 Function Code A2 – One Lever Operation

In Twin Screw or more applications, the System has the ability to command all engines and transmissions to the same speed and direction with a single Control Head lever. This Function allows this Feature to be enabled or disabled. (Refer to Section 2 - OPERATION, for operating instructions)

The available Values for this Function are:

- 00 Disabled (Default Value)
- 01 Enabled

To change the Value (Refer to Sections 5-2 and 5-3):

- A) Scroll to Function Code A2.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

Figure 40: Display LED Function A2



#### 5-5.1.3 Function Code A3 – SE (Station Expander)



NOTE: This Manual does not go into detail on the Station Expander installation and adjustments. For further information on the Station Expander, refer to Section 8 - CONTROL OPTIONS or contact your local ZF Marine Electronics Representative.

The SE is a separate unit, which gives the System the ability to increase the number of Remote Stations.

The available Values for this Function are:

- 00 Disabled (Default Value)
- 01 Enabled

Contact ZF Marine Electronics if this Function Code is going to be changed from the default setting.



5-5.1.4 Function Code A4 – Neutral Indication Tone

This Function allows the installer to turn ON a 1/2 second, low frequency tone to indicate Neutral.

The available Values for this Function are:

- 00 Disabled (Default Value)
- 01 Tone sounds when the Control Head’s lever reaches Neutral.
- 02 Tone sounds when the Processor commands the Transmission to Neutral.

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 41: Display LED Function A4



- A) Scroll to Function Code A4.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

5-5.2 Throttle Functions

The following Throttle Functions are set up in Section 6 - DOCK TRIALS:

Table 12: Throttle Functions Performed during Dock Trials

Code	Function Name	Code	Function Name
E1	Throttle in Neutral	E4	Throttle Maximum Astern
E2	Throttle Minimum	E5	Throttle Pause Following Shift
E3	Throttle Maximum	E6	High Idle

5-5.2.1 Function Code E0 – Throttle Servo Direction

This Function determines if the Throttle Push-Pull cable is fully extended or retracted when at Idle.

The available Values for this Function are:

- 20 Fully Retracted at Idle, extends [Push] for Throttle increase (Default Value)
- 21 Fully Extended at Idle, retracts [Pull] for Throttle increase

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 42: Throttle Push-Pull Cable Orientation

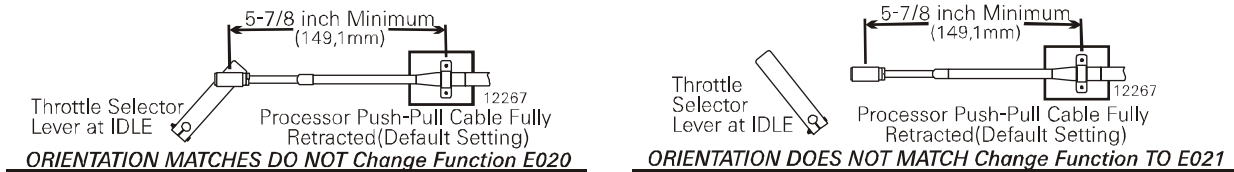
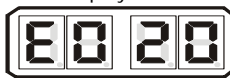


Figure 43: Display LED Function E0



- A) Ensure that the engine’s Governor or Carburetor lever is at the Idle position.
  - If the Throttle Push-Pull cable’s ball joint is close to the Throttle lever’s position, no change is required to this Function Code.
  - If the Throttle Push-Pull cable’s ball joint is at the opposite side of the lever’s position, continue with the next step.
- B) Scroll to Function Code E0.
- C) Activate Set Up Mode.
- D) Scroll Up or Down until Value 21 is displayed.
- E) Store the Value to memory.
  - The Throttle Push-Pull cable’s ball joint should drive to the Throttle lever’s Idle position.
- F) Do not connect the ball joint to the throttle lever at this time.

5-5.2.2 Function Code E7 – Synchronization

This Function Code selects the type of Synchronization, if Synchronization is required. The types are described in Section 2 - OPERATION .

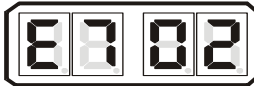


The available Values for this Function are:

- 00 Equal Throttle (Open Loop) Synchronization
- 01 Active (Closed Loop) Synchronization (reverts to Equal Throttle Synch if there is no Tachometer Sensor signal)
- 02 No Synchronization (DEFAULT VALUE)
- 03 Active (Closed Loop) Synchronization (reverts to no Synchronization if there is no Tachometer Sensor signal)

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 44: Display LED Function E7



- A) Scroll to Function Code E7
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

5-5.3 Clutch Functions

The following Clutch Functions are set up in Section 7 - SEA TRIALS:

Table 13: Basic Clutch Functions Performed during Sea Trials

Code	Function Name	Code	Function Name
C2	Proportional (Reversal) Pause	C3	Proportional (Reversal) Pause Time

5-5.3.1 Function Code C0 – Clutch Pressure Interlock

**This adjustment is to be set to Enabled only if the optional Clutch Pressure Switch is being used with this application.**

This Function enables or disables the feature and allows for two different modes of behavior when a Clutch Pressure Switch is used. Refer to Section 8 - CONTROL OPTIONS, for detailed information.

The available Values for this Function are:

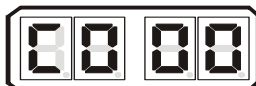
- 00 Not Installed (Default Value)
- 01 Installed
- 02 Throttle Clutch Pressure Interlock Mode



NOTE: The C002 value is recommended in Gear Boxes that take longer than 10 seconds to reach operating pressure. Refer to Section 8 - CONTROL OPTIONS for more information on the settings.

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 45: Display LED Function C0



- A) Scroll to Function Code C0.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

5-5.3.2 Function Code C1 – Clutch Interlock Delay

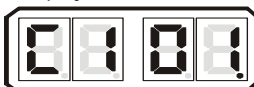
**This adjustment is to be set to Enabled only if the optional Clutch Pressure Switch is being used with this application.**

This Function works together with Function Code C0 – Clutch Pressure Interlock. Refer to Section 8 - CONTROL OPTIONS, for further information.

The available Values are 00.5 to 10.0 seconds. The Default Value is 01.0 seconds.

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 46: Display LED Function C1



- A) Scroll to Function Code C1.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

5-5.3.3 Function Code C4 – Proportional (Reversal) Pause Ratio

This Function Code selects whether the Proportional (Reversal) Pause Time is the same in Ahead and Astern or whether the time in Ahead is twice that in Astern.





Standard vessels with a bow and a stern typically select a pause which is twice as much in Ahead compared to Astern. This is because much more speed is obtainable in Ahead, than Astern. Consequently, more time is required to slow down from Ahead as compared to Astern.



**NOTE:** When the Controls are installed on a vessel such as a double ended Ferry or the Controls are being used to control a thruster, the proportional pause should be the same in Ahead as Astern or Port and Starboard in the case of a Thruster.

The available Values for this Function are:

**00 - 2:1 Ratio (DEFAULT)**

- This is the default setting and determines how the value set in the Proportional (Reversal) Pause Time C3 Function is applied.
- The number of seconds selected is for an Ahead to Astern maneuver only. An Astern to Ahead maneuver will be one-half of the C3 - Proportional (Reversal) Pause Time selected. This is the typical selection since most vessels do not reach the same throttle in Astern as they would in Ahead.

Therefore, the time required to get to a sufficient water speed for a safe reversal is significantly less.

**01- 1:1 Ratio**

- When this setting is selected, the value set in the Proportional (Reversal) Pause Time C3 is the SAME for both Ahead to Astern, as with Astern to Ahead maneuvers.
- This may be selected when the vessel reaches the same water speed in both directions, as would be the case with a Double Ended Ferry. Another application where this option may be selected would be the control of a Bow or Stern Thruster.

To change the Value (Refer to Sections 5-2 and 5-3):

Figure 47: Display LED Function C4



- A) Scroll to Function Code C4.
- B) Activate Set Up Mode.
- C) Scroll Up or Down to the desired Value.
- D) Store the Value to memory.

5-5.3.4 Function Code C5 – Clutch Servo Direction

This Function allows the Processor to be programmed to retract the Push-Pull cable for Ahead or extend for Ahead.

The available Values are:

- 20 Pull [Retracts] for Ahead (Default)
- 21 Push [Extends] for Ahead

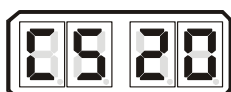
Figure 48: Clutch Push-Pull Cable Orientation



To change the Value (Refer to Sections 5-2 and 5-3):

- A) Position the Clutch Selector Lever to the Ahead position.
- B) Move a Control Head lever into the Ahead detent.
- C) Check the Shift Push-Pull cable to see if it drove in the correct direction for Ahead.
  - If the cable drove in the correct direction, no change to this Function Code is required.
  - If the cable drove in the opposite direction, continue with the next step.

Figure 49: Display LED Function C5



- D) Scroll to Function Code C5.
- E) Activate Set Up Mode.
- F) Scroll Up to change the Value to 21.
- G) Store the Value to memory.

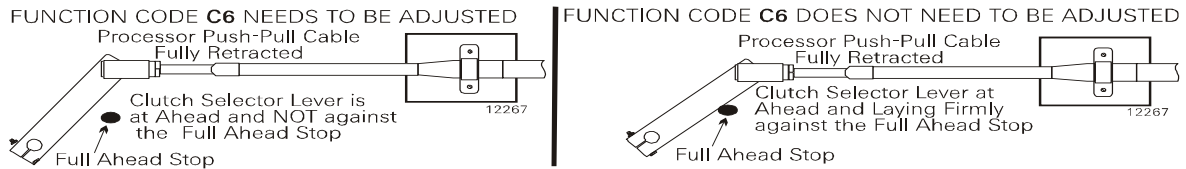


5-5.3.5 Function Code C6 – Servo Clutch Ahead Travel

This function adjusts the amount of Clutch push-pull cable travel in both the Ahead and the Astern directions.

The available Values are 00.0 to 100.0% of the maximum available travel from Neutral to Ahead. The Default Value is 80%.

Figure 50: Clutch Push-Pull Cable Ahead Position



To change the Value (Refer to Sections 5-2 and 5-3):

- A) Move the Control Head lever to the Ahead detent.
- B) Move the Clutch Selector Lever to the Ahead stop.
- C) Does the cable's ball joint and lever align?
  - If yes, no further adjustment of this Function is required.
  - If no, continue with the next step.
- D) Scroll to Function Code C6.
- E) Activate Set Up Mode.
- F) Scroll Up or Down until the ball joint and lever align perfectly.
- G) Store the Value to memory.
- H) Return the Control Head lever to the Neutral/Idle position.

Figure 51: Display LED Function C6



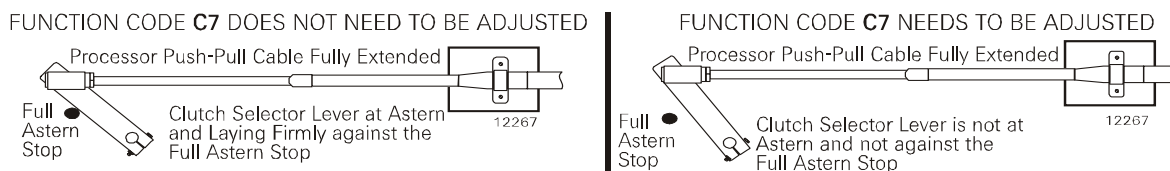
5-5.3.6 Function Code C7 – Clutch Astern Travel

This function is only required when the distance from Neutral to Astern differs from Neutral to Ahead.

This Function Code allows the independent adjustment of Astern travel. Otherwise, the Value selected in Function Code C6 is automatically entered for Function Code C7.

The available Values are 00.0 to 100.0% of the available travel from Neutral to Astern. The Default Value is 80%.

Figure 52: Clutch Push-Pull Cable Astern Position



To change the Value (Refer to Sections 5-2 and 5-3):

- A) Move the Control Head lever to the Astern detent.
- B) Move the Clutch Selector Lever to the Astern stop.
- C) Does the cable's ball joint and lever align?
  - If yes, no further adjustment of this Function is required.
  - If no, continue with the next step.
- D) Scroll to Function Code C7.
- E) Activate Set Up Mode.
- F) Scroll Up or Down until the ball joint and Clutch Selector lever aligns perfectly.
- G) Connect the ball joint to the Clutch Selector lever.
- H) Store the Value to memory.
- I) Return the Control Head lever to the Neutral/Idle position.

Figure 53: Display LED Function C7



5-5.4 Troll Functions

A 9001 Troll Actuator is required to offer Trolling Valve Control. Refer to the 9001 Troll Manual (p/n MM9001) for Installation and Set Up of the Troll Functions.