Addendum
CruiseCommand
785CE-1 Throttle Rate Control/ Speed Boost

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REVISIONS LIST

Revision	**Date**	**Revision Description**

785CE-1 1 Throttle Rate Control

This version of CruiseCommand includes two extra features, Throttle Rate Control and Speed Boost, as described below. For all other CruiseCommand information, refer to MM14330, CruiseCommand Installation and Troubleshooting Manual.

785CE-1 1-1 Introduction

Throttle Rate Control (sometimes referred to as throttle "slew rate") is a feature of this version of CruiseCommand, that allows for a limit to be set on how fast the throttle output responds to a rapid Control Head lever movement from idle to full throttle. The software provides for two additional function codes to control throttle rate. For example, if you “slam” the Control Head lever from idle to full throttle and the throttle rate increase code is set to its maximum, the actual time for the throttle increase will be a full three seconds. If you “slam” the Control Head lever back, the throttle rate decrease function code will ensure that actual throttle decrease time is a full three seconds.

785CE-1 1-2 Operation

E9 is the function code for controlling throttle increase, and **EA** is the function code for controlling throttle decrease. Using these codes, you can control the rate of throttle increase or decrease from 0 to 3 seconds, in increments of 100 milliseconds (1/10th of a second), as defined in the table below.

Table 785CE-1 1: Throttle Rate Control Functions (E9, EA)

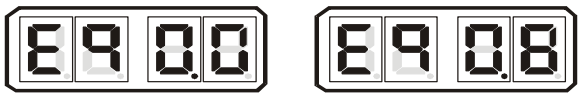
FUNCTION CODE	FUNCTION NAME	DEFAULT VALUE	RANGE (SECONDS)	INCREMENT/ DECREMENT RESOLUTION (SECONDS)
E9	**Throttle Rate Increase**	0.0	0.0 – 3.0	0.1
EA	**Throttle Rate Decrease**	0.0	0.0 – 3.0	0.1

To set the rate of throttle increase:

- Press the up or down arrow on the Processor display until **E9** appears.
- Press right and left arrows simultaneously to select **E9** (it begins to blink slowly).
- Press the up or down arrow to set the code according to your needs.

The examples below show two settings on the **E9** LED display – the default and **0.8** seconds.

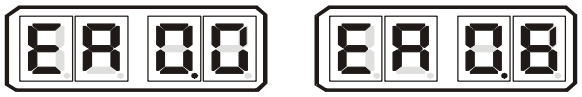
Figure 785CE-1 1: E9 settings on Processor display 0.0 and 0.8



Once the **E9** code is set, **EA** is automatically set to the same value, unless you opt to set it differently. The **EA** function code is one step down from **E9** and is set the same way.

The examples below show the default setting and a setting of **0.8** seconds on the **EA** LED display.

Figure 785CE-1 2: EA settings on Processor display 0.0 and 0.8



785CE-1 1 Speed Boost

Speed Boost is a temporary increase in the speed command output signal from the Processor. Its purpose is to decrease the possibility of the engine stalling during clutch engagement or reversal of direction (for example, from Ahead to Astern). The necessity for using Speed Boost should be assessed during sea trials, using a "trial and error" exercise; under normal operating conditions it is generally not required.

785CE-1 1-1 Features

The primary function of Speed Boost is to prevent an engine from stalling when a heavy load is applied. The Speed Boost signal must be properly set and timed and when used, must be applied responsibly and carefully. Pay particular attention to the Cautions and Notes below.

CAUTION: Misapplication of Speed Boost can damage the transmission or other equipment. Before applying Speed Boost, consult the transmission representative about its use, to discuss any limitations of clutch engagement as a function of engine speed. The person responsible for implementing Speed Boost is the person responsible for making certain it is implemented properly. That person is also responsible for any damage that may occur as a result of the use of Speed Boost.

With a properly set and timed Speed Boost signal, the engine speed should not increase significantly (if at all) during clutch engagement. Engine speed should remain at idle, or slightly above, as the clutch begins to engage, and not rise above idle until after the clutch is fully engaged. Damage to the transmission or other equipment may occur if the Speed Boost signal is not properly set and timed. Adjust the Function Codes as needed to meet this requirement.

NOTE: Speed Boost is NOT required for most applications. Its primary use is with engines that have mechanical governors and where the engine stalls upon clutch engagement or clutch reversal (going from Ahead to Astern or vice versa) typically due to a high gear reduction ratio (4:1 or higher).

NOTE: Speed Boost has been used with some electronic engines where there is a stalling problem due to the engine being unable to respond quickly enough to a sudden load (clutch engagement) especially with boats that have a high gear reduction (typically 4:1 or higher) or to reduce the droop in engine speed (rpm) as clutches engage.

NOTE: Use of Speed Boost does not guarantee that an engine will not stall. Ultimately, the engine must be capable of producing the power required in the time frame necessary to handle the sudden load of clutch engagement.

785CE-1 1-2 Functions

There are four function codes associated with Speed Boost (**F0**, **F1**, **F2**, and **F3**), defined in the table below, and described in the paragraphs following.

Table 785CE-1 2: Speed Boost Functions (F0, F1, F2, F3)

FUNCTION CODE	FUNCTION NAME	DEFAULT VALUE	UNIT	VALUE RANGE OR OPTIONS
F0	**Boost Percent**	0.0	% of throttle	0.0 - 20.0
F1	**Boost Duration**	0.0	seconds	0.0 - 20.0
F2	**Boost Start Delay**	0.0	seconds	0.0 - 10.0
F3	**Boost Bypass Clutch Delay**	0.0	seconds	0.0 - 99.0

- **F0 -- Boost Percent**

  This Function is the percent of throttle to be applied during Speed Boost. (See Figure 785CE-1 3: Speed Boost Usage Graph.)

NOTE: 0% Boost Percent means idle speed.

CAUTION: The range for this function is 0.0 to 20.0%. The range is provided only to allow enough leeway for those rare cases that might need the higher value. In most cases, however, using a value of 20 would very likely cause damage to the transmission.

A **F0** value of **0** means no speed boost is used and the speed command remains at idle speed (0%) as the clutch is engaged. A value of **3.5** means a 3.5% increase in speed command output during clutch engagement.

- **F1 - Boost Duration**

  This Function controls how long the boost is applied. This time starts when the **Boost Start Delay** has expired. See Figure 785CE-1 3: Speed Boost Usage Graph.

  A **F1** value of **0.0** is 0.0 seconds, a value of **2.5** is 2.5 seconds, a value of **5.0** is 5.0 seconds, etc.

- **F2 - Boost Start Delay**

  This Function controls how much time elapses after Ahead or Astern clutch engagement has been commanded until Speed Boost is applied. This is an open loop method of applying sPeed Boost just before the load hits the engine. (See Figure 785CE-1 3: Speed Boost Usage Graph.)

  The open loop method is the only one offered with CruiseCommand. Because it has no ability to determine temperature, it is best set to a warm gear so that the fill times are normal.

  An **F2** value of **0.0** is 0.0 seconds, a value of **0.1** is 100 milliseconds (one tenth of a second), a value of **0.3** is 300 milliseconds (0.3 seconds), etc.

F3 - Boost Bypass Clutch Delay

This function controls whether Speed Boost is applied as a function of the **Proportional (Reversal) Pause Time (C3)**, instead of every time the clutch is engaged.

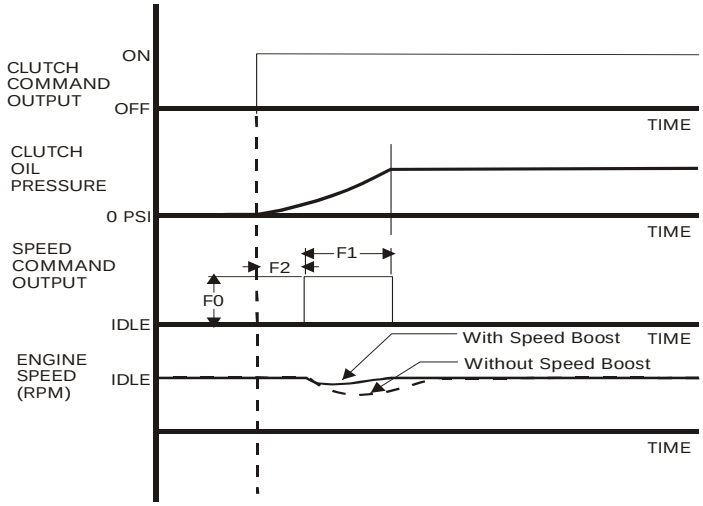
For example, if **F3** is set to **1** (1 second), Speed Boost would be applied only if the **Proportional (Reversal) Pause Time (C3)** is greater than 1 second. A useful application of this function might be when a boat needs a speed boost during a full speed reversal, but not when maneuvering around a dock.

A **F3** value of **00** means 0 seconds, a value of **01** means 1 second, a value of **99** means 99 seconds, etc.

Function Code **C3** is **Proportional (Reversal) Pause Time** and **C4** is **Proportional (Reversal) Pause Ratio**. If **F3** is set at 5 seconds, **C3** at 8 seconds, and **C4** at the default of 2:1, then Speed Boost will be applied when going from Ahead to Astern any time the **Proportional (Reversal) Pause Time (C3)** is greater than 5 seconds. However, because **C4** is set to a 2:1 ratio, the **Proportional (Reversal) Pause Time (C3)** going from Astern to Ahead can be a maximum of 4 seconds (8 seconds divided by 2) and therefore Speed Boost will never be applied when going from Astern to Ahead.

Figure 785CE-1 3: below shows a graph of Speed Boost functions. To determine which function codes to set (not all need to be) and the most appropriate value for those functions, a "trial and error" exercise must be performed during sea trials. Typically, the timing of Speed Boost is the most critical function to set, not the amount of Speed Boost.

Figure 785CE-1 3: Speed Boost Usage Graph



The four function codes associated with Speed Boost (**F0, F1, F2** and **F3**) work in conjunction with each other to apply the right amount of Speed Boost at the correct time and duration.

No adjustments should be made to Speed Boost until function codes **C2 (Proportional [Reversal] Pause)**, **C3 (Proportional [Reversal] Pause Time),** and **C4 (Proportional [Reversal] Pause Ratio)** have been properly adjusted.

The primary function of Speed Boost is to prevent an engine from stalling when a heavy load is applied

Do not change the values of any of the Speed Boost function codes until you have read the descriptions of their usage and have verified their need.

Attempt slow speed reversals initially without Speed Boost and then record the amount of engine droop (how far the engine speed drops below idle). If you determine that Speed Boost is necessary, adjust the function codes based on observations of engine response during slow speed reversals. Attempt a high speed reversal only after adequate testing at slow speeds.

Start by applying **Boost Percent** and **Boost Duration** in small increments, record the result and work upward from there. For example, for an 1800 rpm engine with idle set at 600 rpm, try a starting point of 3% or 4% for **Boost Percent** and a **Boost Duration** of 1 second. If this is unsatisfactory, increase **Boost Duration** to 2 seconds and evaluate those results.

Typically, the timing of Speed Boost is the most critical function to set, not the amount of Speed Boost . You may need to adjust **Boost Start Delay** to obtain Speed Boost just before the clutches start to transmit significant load to the engine. Again, begin with a small initial value (for example, 200 milliseconds, which is **F2** set to **0.2** seconds).

Observe the engine response when engaging the clutch at slow speed. If the engine speed increases too much during slow speed maneuvering/clutch engagements, use the **F3** function code to link the use of Speed Boost to the **Proportional [Reversal] Pause Time** (**C3**) function.