# L-Series Process Control 5418-2834 Firmware Release Explanation of Software Changes

## *General*

Woodward has released application firmware 5418-2834 as an upgrade to 5418-1681 for all L-Series Process controls. This application note describes the changes made. Refer also to product manual 26251 for product details inclusive of all firmware releases.

## *Description of Firmware Changes*

The new firmware is based on the existing firmware (5418-1681), with changes listed herein. All of the listed changes are included with a firmware upgrade. Individual change selection is not possible, but feature-disabling instructions are provided where applicable.

**1) Dual Dynamics Added to Process PID**
A dual dynamics option, with a discrete input selection, was added to the Process PID to support dual-fuel applications. This option permits the use of two proportional gain settings (single point or curves) and an Aux input selection used to activate the second set of dynamics. This is an optional feature that is completely disabled when not selected.

**2) Dual Bias Curve Added**
A dual bias curve option, switched through a discrete input, was added to support dual-fuel applications. This option permits the use of two different Bias curves and an Aux input selection used to activate the second bias curve. This is an optional feature that is completely disabled when not selected.

**3) Bias Logic Change—Air/Fuel Ratio Applications Only**
The Bias functionality was changed for applications configured as an Air/Fuel Ratio Control. In the new firmware, the bias is summed with the Process Setpoint, whereas with 5418-1681 firmware it is summed with the Process PID output. This change represents a major difference in functionality between the two firmware versions and cannot be disabled; however, this only affects Air/Fuel Ratio Control applications where the bias feature is used.

**4) Process PID Sensitivity Improvement**
The Process Control PID's sensitivity to very small input changes was improved. In the previous software version, the PID could stop integrating while a very small input error (input/setpoint) still existed. In the new software, the number of bits of resolution within the PID is increased to improve this sensitivity, while overall PID performance is not impacted. The PID gain values are not affected by this change.

**5) Process Control Error Feature Added**
A new feature, Process Control Error, was added as a general indication of a malfunction of the process control. It can be used to shut down the unit and/or drive the discrete output. This is a latching fault that, when set, indicates the process error (input-setpt) has not changed sign (+/–) for longer than the configurable error delay. It is enabled when in closed loop control, disabled when in open loop. This is an optional feature that is completely disabled when not selected.

**6) Discrete Output Change—Delay Added to Open-loop Indication**
A configurable delay was added to the Open Loop Active discrete output indication. When the discrete out is used to indicate an engine problem, this delay will hold off the open loop part of the indication, which can occur on every power-up. Setting the delay to zero will disable this feature.

**7) Power-up Transition Improvement**
The new firmware provides an improved power-up transition into position/process control. Previously, the shaft output would initialize to 0%, hitting the end stop on every power-up. With the new firmware, the shaft does not hit the end stop with a high amount of impact energy, as it did with the old firmware. This feature cannot be disabled.

**8) Process Target Setpoint Improvement**
The resolution of the configured values for the Process Setpoint Target 1 and Target 2 values was improved from 0.4%/bit to 0.003%/bit (8-bit to 16-bit). This change provides the ability to accurately configure the desired target setpoint of the process controller. This is not an optional feature.

## Compatibility with Existing Controls

The new firmware, 5418-2834 NEW, will operate with all existing L-Series Process controls. Version 2.3 of the L-Series Service Tool (9927-1222) is required for the new firmware and is compatible with all L-Series controls. Due to parameter changes in the firmware, configuration files created for previous firmware revisions are not compatible with the latest (5418-2834) and will require re-entering of values. Likewise, configurations for the 5418-2834 are not compatible with the older firmware (5418-1681). Future releases of the Service Tool may provide this conversion functionality, but it is not available at this time.

## Firmware Identification

The L-Series control firmware version can be viewed from the Identification tab on the Service Tool.

## How to Upgrade

The L-Series firmware can be field upgraded, but this requires specialized software tools and must be performed by authorized Woodward personnel. If you have any questions about this issue or wish to upgrade, please contact one of our Woodward facilities and refer to this Application Note number.

WOODWARD

PO Box 1519, Fort Collins CO 80522-1519, USA
1000 East Drake Road, Fort Collins CO 80525, USA
Phone +1 (970) 482-5811 • Fax +1 (970) 498-3058

**Email and Website—www.woodward.com**