



## 160 Series C Custom Firmware P04 Option - FRN 7.06 A005

### Introduction

The P04 option differs from the standard version 7.06 firmware with the following function changes:

- 2-Step MOP Reference - page 1
- 4-Step Preset Reference - page 2
- Direction Change Ramp - page 2

A summary of parameter differences is listed on page 3.

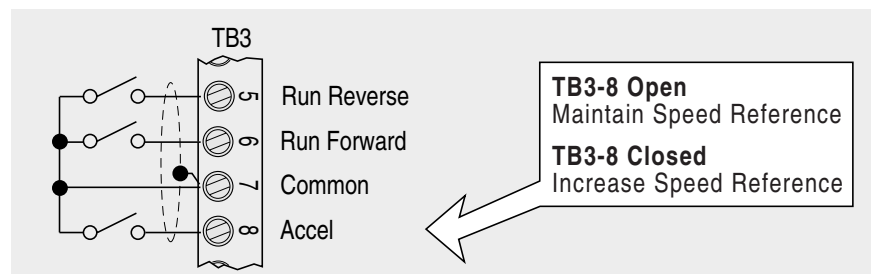


**ATTENTION:** This Custom Firmware has been designed for a specific application and differs from the standard bulletin 160 product offering. It must be installed and run only under this custom application. Attempting to run this Custom Firmware under any other type of application or condition could result in unpredictable and/or hazardous conditions.

### Firmware Changes

#### 2-Step MOP Reference

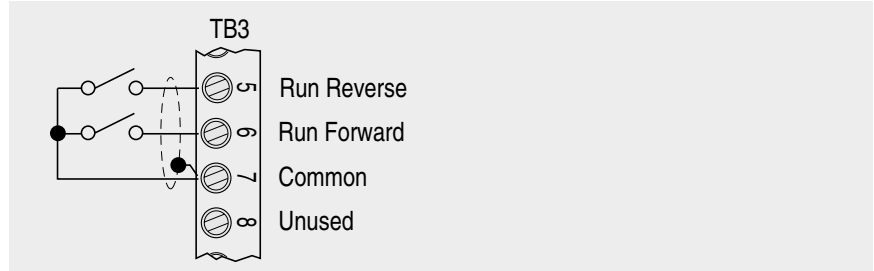
The standard drive “Two-Wire Accel/Decel Control” input mode (parameter 46 - setting 4) has been modified. Terminal functions have been re-defined as shown.



A maintained Run Forward or Run Reverse input will provide both a direction and a start command to the drive and maintain the active speed reference. An Accel input while the drive is running will increase the speed reference. Opening the Run Forward or Run Reverse will decrease the speed reference to the minimum frequency parameter setting (P32) and command the drive to stop. Momentarily opening Run Forward or Run Reverse will cause the drive to operate at a lower speed reference.

### 4-Step Preset Reference

The standard drive “Two-Wire Enable Control” input mode (parameter 46 - setting 5) has been modified. Terminal functions have been re-defined as shown.



A maintained Run Forward or Run Reverse input will provide both a direction and a start command to the drive. Input terminal 8 is now “unused” (defined in the standard drive as “enable”).

The active speed reference is determined by the “cumulative” state of inputs SW1-3 (see [Table A](#)).



**Table A**  
4-Step Preset Input Speed States

SW3 Input	SW2 Input	SW1 Input	Speed Reference
Open(0)	Open(0)	Open(0)	Preset 0 (Parameter 61, factory default = 6 Hz)
Open(0)	Closed(1)	Open(0)	
Closed(1)	Open(0)	Open(0)	
Closed(1)	Open(0)	Closed(1)	
Closed(1)	Closed(1)	Open(0)	
Open(0)	Open(0)	Closed(1)	Preset 1 (Parameter 62, factory default = 30 Hz)
Open(0)	Closed(1)	Closed(1)	Preset 2 (Parameter 63, factory default = 60 Hz)
Closed(1)	Closed(1)	Closed(1)	Preset 3 (Parameter 64, factory default = 6 Hz)

### Direction Change Ramp

If the drive is operating and the opposite direction is commanded (for example, Run Reverse input when the drive is operating in the forward direction), the speed reference is decreased based upon the Decel Time 2 parameter setting. This allows a shorter decel ramp to be specified during a direction change. This feature is only active with input mode parameter settings 4 or 5 and can be disabled by setting Decel Time 1 and Decel Time 2 parameters to the same value.

## Summary of Parameter Changes

The following parameter changes have been made to the standard 160 Preset Speed firmware version 7.06 drive.

Parameter Number	Standard Preset Speed Drive Parameter Name	Custom Firmware Change
30	Accel Time 1	Default changed to 5.0 sec
31	Decel Time 1	Default changed to 5.0 sec
32	Minimum Frequency	Default changed to 6 hz
46	Input Mode	Input modes "4" and "5" modified (see pages 1 & 2). Default changed to "4".
47	Output Relay Configure	Default changed to "2" (motor running).
52	DB Enable	Default changed to 100%
61	Preset 0	Default changed to 6 hz
62	Preset 1	Default changed to 30 hz
63	Preset 2	Default changed to 60 hz
64-68	Preset 3-7	Default changed to 6 hz
70	Decel Time 2	Default changed to 3.0 sec

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**Power, Control and Information Solutions Headquarters**

Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444

Europe/Middle East/Africa: Rockwell Automation, Vorstlaan/Boulevard du Souverain 36, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640

Asia Pacific: Rockwell Automation, Level 14, Core F, Cyberport 3, 100 Cyberport Road, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846