



# Service Bulletin SB0066

Date: June 2004  
From: Capstone Technical Support  
Subject: Model C30 Software Version 5.02 Release Notes

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## Affected

All Capstone Model C30 Stationary MicroTurbine systems described as follows:

- Model C30 MicroTurbines with version 5.01 experiencing a 5011 Frame EEPROM Write warning may be upgraded to version 5.02 during a scheduled visit.
- Model C30 MicroTurbines with version 4.93 software (see SB0052) may be upgraded to version 5.02 during a scheduled visit – upgrading is recommended.
- Model C30 MicroTurbines with versions 4.95, 4.96, 4.98, and 4.99 software deviations **MUST** be upgraded to version 5.02 software.

## Summary

Version 5.02 software replaces versions 5.01, 4.93, 4.95, 4.96, 4.98, and 4.99, and incorporates all related changes from these versions. Version 5.02 is released to support all Model C30 Stationary MicroTurbine systems. Major improvements for the version 5.02 and for the various software versions incorporated in version 5.02 are as follows:

### Version 5.02 Updates

1. Updates to SPI Communication to ensure memory (RAM and EEPROM) are locked so that multiple tasks can read/write to memory without overwriting each other.

### Version 5.01 Updates

1. Modified engine and frame PM read/write algorithm to overcome PM checksum faults (5004, 5012) observed in the field.
2. Fixed inaccurate Battery SOC charge. This was reported by customers not being able to accurately gauge battery health after extended storage.
3. Fixed Auto Restart disable for MultiPac systems. Required a matching change in PowerServer code. For applications using a PowerServer, this feature requires CPS software version 2.20 or later.
4. Auto-Restart Delay is now ignored when a manual start is initiated with Auto-Restart set to NO.

5. In the SPV position calculation, the difference between the pressure upstream and the pressure downstream (delta P) is now limited to positive or null values (previously, it also produced negative values). The improvement results in the correct behavior of the valve and ability to light off.
6. Updated code to allow for Protective Relay Under Voltage Time and Over Voltage Time to be adjusted to as low as 0.09 second (previously, the limit was 0.3 second), as requested by certain utility establishments.
7. Changed LOW DCBUS VOLT (6027) to declare at 475VDC to satisfy low grid voltage applications. The DC bus low voltage limit was introduced in version 4.93 software release, but was set too high. As a result, nuisance faults associated with the limit were latched under specific applications.
8. Fixed a bug that caused GC MultiPac Subordinate systems to fail to lock the fuel device, when a 2-point calibrated SPV25 valve with a max position of greater than 80% was installed. A software bug in the "Max SPV Position" algorithm did not provide the acknowledgment signal to the calling function. The calling function would continue to retry indefinitely, thus congesting the SPI communication bus. This would not allow the Subordinate MicroTurbine to properly transition into the MultiPac Subordinate state and prohibit the Subordinate system from receiving a Start command from the Master MicroTurbine. Requires the use of PowerServer software version 2.20 or later.
9. Updated code so that on a MultiPac system, the user-set power demand as well as the actual derated power demand assigned to any MicroTurbine can be viewed on the display panel.
10. Fixed a bug that caused Protective Relay Frequency settings to be set inaccurately. For example, 59.1 Hz reverted to 59.0 Hz, 59.3 Hz to 59.2 Hz, etc. This was a scaling issue and was corrected to enable frequencies to be set accurately.
11. Added °C units to the TET value in the Event Log display menu.

#### Features Included from Version 4.99

1. Updated code so after the injector switch is complete, the igniter is turned off.
2. Fixed power oscillations at 19, 21, and 23 kW.
3. Added a new SPV25 valve position scheme for 2-point calibrated valves.

## Features Included from Version 4.98

1. Added ability to change polarity on Fault Inputs for use with relays. Prior to this change, to trigger an external fault input, the Fault input terminals had to be closed (shorted). This continues to be the default polarity. With this change, the user is allowed to set the polarity so an open circuit between the terminals would indicate an active fault, i.e., ACTIVE OPEN.

To support this setting, a new display setting, OPEN/CLOSED, is added to Fault Input 1 and Fault Input 2 submenus. The value can also be set through the RS232 command INPFLT.

The command has been updated such that there is an additional parameter at its end that is used to specify the value for the polarity setting (Ø for Active Open, 1 for Active Closed). For example, the user can program Fault Input 1 using the following command:

INPFLT = 1,1,3,12Ø,Ø

This command translates into: Fault Input 1, Enabled, SSL3, 12 seconds, and ACTIVE OPEN (Normally Closed).

## Features Included from Version 4.96

1. Added a new, smoother, SPV injector switching sequence.

## Features Included from Version 4.95

1. Updated code to prevent occurrences of pilot tube melt due to 3-Pilot to Premix injector switching, operating on Japanese Natural Gas:
  - Added a new BTU Mode called "Normal: Pilot Lock".
  - Restored TET scheme for "Efficiency" Engine Mode 1100 °F at speeds above 85 krpm.
2. Resolved the version 4.56 to version 4.76 C30 maximum speed fluctuation that resulted in power loss:
  - MultiPac interaction with unit's power demand / speed command.
  - Code optimization (code space limitation).
3. Revised the method for detecting 6019 (PWR LOSS LOW) and 6020 (PWR LOSS HIGH) faults to account for FB RFC systems.

## Restoration of Settings

Version 5.02 updates certain default operational settings (PM data values), upon completion of a software upgrade. In the process, it restores other user-customizable settings to their default values. The Fault Input polarity settings must be restored to their customized values upon completion of a software upgrade from Version 4.98. This process provides for system stability following a software upgrade to Version 5.02 software.

The Fault Input polarity settings must explicitly be restored to their customized values on a site-by-site basis.

<b>NOTE</b>	Record these settings from the display panel or CRMS, PRIOR to upgrading the software.
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An indication that both of the Fault Input polarity settings require an explicit restoration to their customized values will be in the form of posted warning(s) as follows:

7004 IN FLT 1 LVL 2, or  
7007 IN FLT 2 LVL 2

## Responsibility

It is the responsibility of Capstone to provide description of software changes contained within this document to Authorized Service Providers.

It is the responsibility of Capstone to make available the version 5.02 software to Authorized Service Providers for the resolution of issues related to fielded MicroTurbine systems.

It is the responsibility of the Authorized Service Provider to obtain the version 5.02 software zip files from the Members Only section of the Capstone website.

It is the responsibility of the Authorized Service Provider to diagnose related field issues, and upload this software to resolve the problem. After completion of software uploading, it is the responsibility of the Authorized Service Provider to provide Capstone with a Field Service Report.

Capstone shall reimburse the Authorized Service Provider for up to half-an-hour for performing the software upload on systems under warranty and on the following systems:

- Model C30 MicroTurbines with versions 4.95, 4.96, 4.98 and 4.99 software deviations - Must be upgraded.

## Capstone Technical Support

If you have additional questions, please contact:

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