

# **Safety Analog Temperature Module TM5STI4ATCFS FW V322 Release Notes**



**Release Version: V322**

**Release Date: 06. June 2018**

**This document contains important information  
about the Safety Module TM5STI4ATCFS FW release. Please read the complete  
document before you update and run the product.**

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# Content

|  |   |
|--|---|
| 1. Product Overview .....  | 4 |
| 2. TÜV Certification .....   | 4 |
| 3. PacDrive3 System – TM5/TM7 safety module firmware .....   | 4 |
| • Test conditions .....  | 4 |
| 4. Known problems.....   | 4 |
| 5. Fixed Issue .....   | 5 |
| • 1 <sup>st</sup> issue: Faulty parameter set selection for PT100/PT1000 signal inputs on TM5 safety<br>temperature input module TM5STI4ATCFS..... | 5 |
| • 2 <sup>nd</sup> issue: Behavior of safe analog measured values during the channel test .....   | 5 |
| 6. New or changed features .....   | 8 |
| 7. Helpful hints.....  | 8 |

# 1. Product Overview

This firmware package is an update for the PacDrive3 System - Safety Analog Module firmware.

The ZIP delivery contains following firmware file:

|  |                  |         |        |
|--|------------------|---------|--------|
|  TM5STI4ATCFS_V322.fw | 19.07.2017 07:53 | FW File | 282 KB |
|--|------------------|---------|--------|

## 2. TÜV Certification

The safety module TM5STI4ATCFS firmware V322 is certified by TÜV Nord.

## 3. PacDrive3 System – TM5/TM7 safety module firmware

The firmware package fits to the following module

| COMPONENT                            | Version |
|--------------------------------------|---------|
| TM5STI4ATCFS safety related firmware | 322     |

- **Test conditions**

The validation of this new firmware V322 using the modules listed above is done with the following software versions:

- SoMachine Motion V4.4 SP1
- SoSafe programmable V2.21

## 4. Known problems

NONE

## 5.Fixed Issue

The new safety temperature module TM5STI4ATCFS FW322 has fixed 2 major issues:

- **1<sup>st</sup> issue: Incorrect parameter set selection for PT100/PT1000 signal inputs on TM5 safety temperature input module TM5STI4ATCFS**

A parameter set (Limit\_Threshold values) includes the permissible minimum temperature, permissible maximum temperature, maximum temperature difference between the two measured values and amount of time that the temperature difference is permitted to be above the limit value.

Instead of the 4 selectable parameter sets, the firmware error causes parameter set 1 to always be used regardless of what was selected.

Parameter set selection for thermocouple signal inputs is not affected by this error and works as described in the product documentation.

The error has been corrected with firmware version 322 of the module.

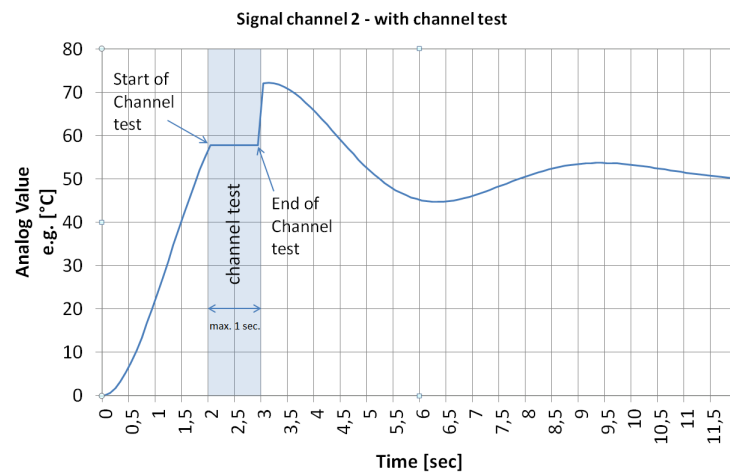
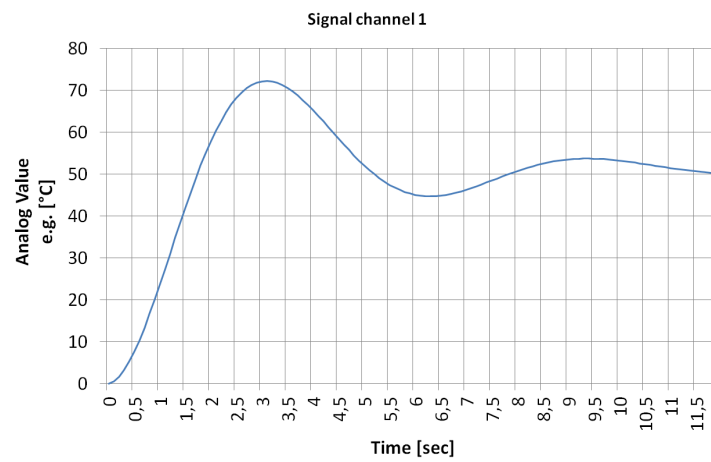
- **2<sup>nd</sup> issue: Behavior of safe analog measured values during the channel test**

The channel electronics are automatically tested internally by the module. Here, a test signal generated in the module is applied to each channel once every 75 minutes for a maximum time of one second. To avoid signal distortion, the last measured value of the input channel being tested is frozen during this time. Only one of the two input channels is tested at a time. The safe analog measured value is formed by taking the arithmetic mean value of the two individual measured values.

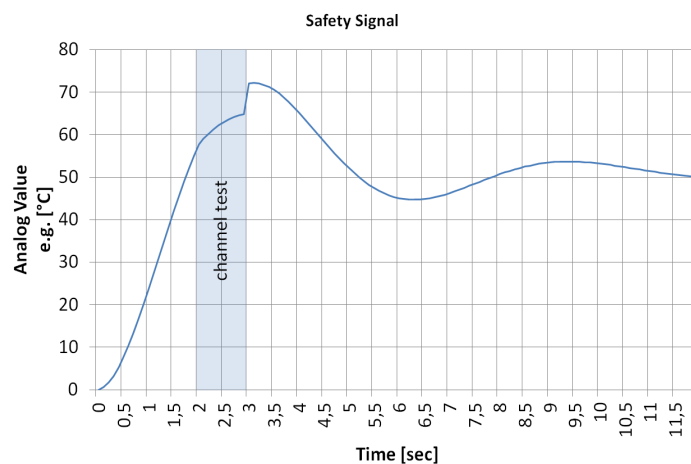
If the measurement signal changes during the channel test, then 50% of the change takes effect due to the arithmetic mean value calculation with the frozen analog measured value. In the worst case, detection of overshooting a dangerous measured value limit can therefore be delayed by up to 1 second.

The following example illustrates the situation.

Values measured on the two input channels



Forming the arithmetic mean value of measured value 1 and measured value 2



In firmware version 322 and later, the following behavior is exhibited:

For the duration of the channel test, it is not the arithmetic mean value of the two individual mean values that is used, but the measured value of the channel that is not currently being tested.

If the behavior of firmware version 302 is desired for compatibility reasons, this can be configured using a parameter.

The following example illustrates the situation:

Values measured on channel 1 as shown in figure 1; Values measured on channel 2 as shown in figure 2.

At the time the channel test is carried out, the safe analog measured value is formed based on the measured value on channel 1.

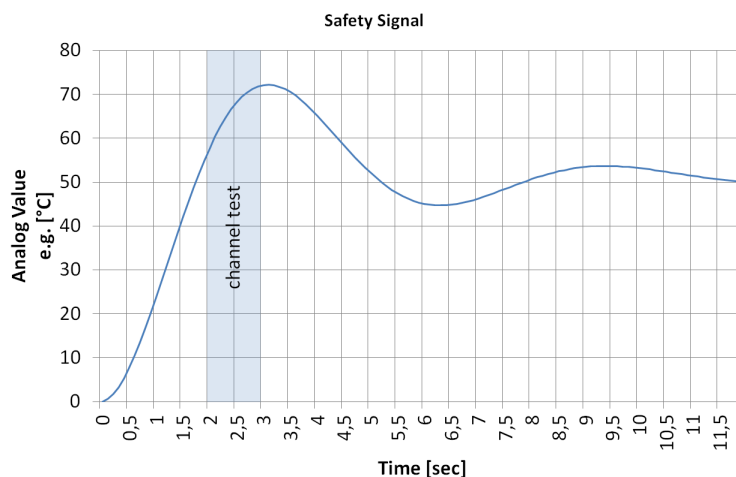


Figure 4: Values measures for the safe analog measured value with firmware 322

The sequence for channel diagnostics is independent of the firmware version and structured as follows:

| Diagnostic Windows  | Time Sequence                    | Channel Sequence |
|---------------------|----------------------------------|------------------|
| Diagnostic Window 1 | every 75 minutes                 | TC1, Sense 1     |
| Diagnostic Window 2 | 15 min after Diagnostic Window 1 | TC4, Sense 2     |
| Diagnostic Window 3 | 30 min after Diagnostic Window 1 | TC3              |
| Diagnostic Window 4 | 45 min after Diagnostic Window 1 | TC2              |

**Remark:** In the ZIP-File you will find a document showing how to update the safety TM5/TM7 I/Os (***How to update TM5\_7 Input card\_drives assistant.pdf***)

## 6. New or changed features

The firmware included here (V322) enables an additional parameter which can be used as of SoSafe Programmable V2.2 SP1.

- **Measurement Result while Testing** (Averaged, Single Channel): This parameter enables the signal behavior specified prior to firmware version 322 for the duration of signal diagnostics
  - **Single Channel:** the resulting measurement value during the test period is the single channel value of the "untested" channel. The (retained) value of the tested channel is ignored during the test period.
  - **Averaged:** the resulting measurement value during the test period of one channel is the average value of both channels (like during normal operation, outside the test periods). During the test of one channel, this corresponds to the average value of the retained (frozen) value of the tested channel and the actual measure value of the "untested" channel.

With this setting, the module behavior corresponds to firmware version V302 (for compatibility reasons).

For a better diagnostic of this behavior, a new channel variable is now available with firmware V322.

- **TestActive:** Diagnostic signal which indicates that the internal channel test is currently performed on the module. Each measurement channel is tested electronically by applying an internal test signal to the channel periodically once every 75 minutes. The test signal is applied for a maximum of one second.

## 7. Helpful hints

- The temperature module has 4 thermocouple inputs which must be wired, otherwise the module switches to the defined "FailSafe" state.

Not used thermocouple inputs must be bridged, but the length of the cable for the bridge must be no longer than necessary to bridge the inputs.

- The temperature module will switch to the defined "FailSafe" state if the "Temp.LimitThreshold.low." value is above the room temperature.