

FAQ Maintenance Guideline from Recorder Serial Console

1. Introduction

- This procedure describes a typical monthly check of a GeoSIG system. It will give some basic information about the state of recorder and sensor.

2. Required Tools

- Recorder and Sensor you want to check
- Computer, connected to Recorder Serial Console with ucon
- SD-Card reader and software to read test pulse files recorded in miniseed format (GeoDAS is recommended)

3. Check for existing Procedures

- Please check if there is a project-specific procedure for your system to follow instead. Especially if your system is tied to an alarm system as the execution of the test pulse described in this procedure may cause an alarm.

4. Check Errors and Warnings

- In the main menu, check that no errors or warnings are present (both brackets show **(0)**)

```
GHSplus s/n 102833 version 21.12.29
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trin values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit
```

- If there are errors or warnings, you can show more information pressing **[X]**

5. Check Battery Voltages

- In the Main Menu, select **[S]** to enter Shell Command Prompt
- Enter **grep "Voltage=" /media/mmcblk0p1/websoh.xml** (case sensitive) and confirm with **[Enter]**

```
GHSplus s/n 102833 version 21.12.29
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (1) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trin values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit
S
Linux Command: grep "Voltage=" /media/mmcblk0p1/websoh.xml
```

- If the recorder is powered from AC (ACPower="ON"), **Voltage=** should at least show **13.5V**
- If your recorder (only GMS-xx, GMSplus and CR-6plus) has a backup battery, the **BackupVoltage=** should be at least **3.0V**

```
GHSplus s/n 102833 version 21.12.29
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (1) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trin values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit
S
Linux Command: grep "Voltage=" /media/mmcblk0p1/websoh.xml
Power="ON" Voltage="14.01" MinVoltage="14.01" BackupVoltage="3.25" >
```

- Main battery should be replaced every 3 years (See Warnings and Safety in User Manual)
- Backup battery should be replaced every 5 years (See Warnings and Safety in User Manual)
- To set battery installation date :
In **Test and Configuration Menu -> T - Battery installation dates** (enter the menu pressing **[Ctrl]+[Z]** when prompted during startup)

Press Ctrl+2 to enter the test mode..
Instrument serial number: 102833
Instrument MAC address: 8C:8E:76:00:55:38

Level	Shortcut	Password	Description
User	Ctrl+U	None	Basic operations only
Powerful User	Ctrl+W	None	Also hardware options and pre-selected tests
Administrator	Ctrl+A	None	Also manual tests and altering the FLASH memory content

Your level [U/W/A] or press 0 to boot now: **W**
WiSync module does not exist in the current hardware configuration
RTC Watchdog timeout is 600 seconds
RTC Watchdog timeout is 0 seconds

Bootloader Menu of the GHSplus s/n 102833
Access level: Powerful User

--- Flash Images and Boot Options ---

L - List flash images
Q - Reset instrument configuration to the user default
U - Reset instrument configuration to the factory default
S - Boot now
X - Reboot the instrument
Y - Power off

--- Hardware Setup and Monitor ---

K - Instrument hardware parameters

M - Memory statistics

T - Battery installation dates

--- Security ---

0 - Set password
J - Reset all passwords

6. Check Time Synchronisation

- In the Main Menu, select [**G**] to view RTC status

GHSplus s/n 102833 version 21.12.29

Main menu:

C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trim values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit

- Source should show **NTP** or **GPS** (whenever possible, an external time source such as NTP or GPS should be used)
- Status should show **Locked**

GHSplus s/n 102833 version 21.12.29

Main menu:

C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trim values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit

Current RTC Local Time: 2023.04.26 15:41:24.769

RTC Status:

Source: "NTP"
Status: "Locked"
PulseDetected: "True"
SourceValid: "True"
AutoLockEnabled: "True"
LastLock: "Now"
LastLockTime: "2023-04-26T15:41:24.778Z" ClockDriftRate: "0.3"
StatusRegisters: "0E 40 00 00 61"

7. Remove offset

- In the Main Menu, select [**U**] to enter a User request

GHSplus s/n 102833 version 21.12.29

Main menu:

C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trim values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit

- Enter command **REMOVEDC** and confirm pressing enter

GHSplus s/n 102833 version 21.12.29

Main menu:

C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trim values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit

Command or HELP for more information --> **REMOVEDC**

- Wait until the operation is completed

8. Request Test Pulse

- In the Main Menu, select [**U**] to enter a User request

```

GMSplus s/n 102833 version 21.12.29
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trin values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit

```

- Enter command **TSTSENSOR 1** and confirm pressing enter

```

GMSplus s/n 102833 version 21.12.29
Main menu:
C - Configuration
M - Messages ->
S - Shell command
L - List firmware images
N - List network tunnels
X - Display errors (0) and warnings (0)
W - Clear errors and warnings
F - View/reset RTC trin values
T - File statistics
G - View RTC status
A - View Alarm status
P - View GPS information
H - Set RTC time
U - User request
R - Restart
Q - Quit
Command or HELP for more information --> TSTSENSOR 1

```

9 Copy Data from SD Card

9.1 Turn off the Recorder

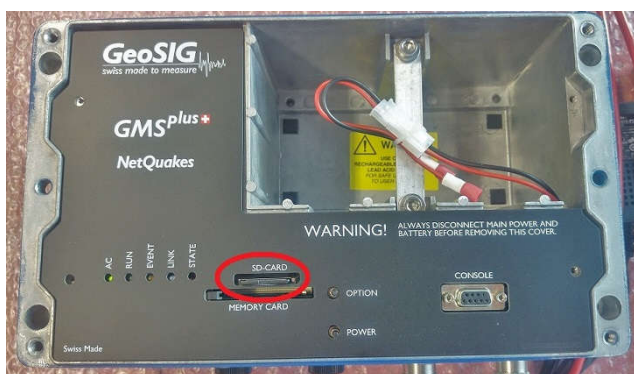
- Turn off the recorder by pressing the power button for 3 seconds



- Wait until the **RUN** LED stops flashing

9.2 Remove SD Card

- Remove the SD card from its slot (push to release)



9.3 Connect SD Card to Computer

- Insert the SD card in your PC's card slot
- Windows cannot detect all partitions on the SD card, so it may ask you to format the card: **PLEASE DO NOT FORMAT THE CARD, OTHERWISE ALL RECORDED DATA WILL BE LOST!**



- Press **[Cancel]** if the above message appears
- The SD card should appear as drive named with the serial number of the recorder



9.4 Copy Test Pulse File

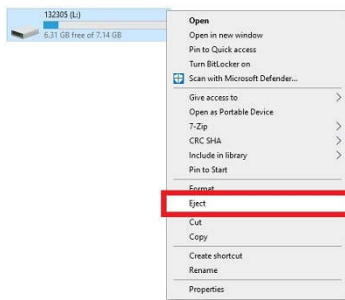
- Check the **Data** folder on the SD card and look for the latest miniseed file with the recorded pulse (file prefix CAL_)

E:\Data			
Name	Date modified	Type	Size
CAL_102833_20230426_160705_Trigger1...	26.04.2023 16:07	GeoDAS Document	72 KB

- Copy the file and paste it to a directory of your computer (remember the location for the check under **10.**)

9.5 Remove SD Card

- Safely remove the drive (Right-click -> **Eject**)



9.6 Mount SD Card in Recorder

- Insert the SD card back in the recorder's card slot and turn it on by pressing the power button

10. Check Test Pulse

- The shape of the test pulse is depending on the sensor type. A reference pulse recorded at the factory is shipped for each sensor on the usb key, the file can be found in the folder Calibration\Test_files_Sensors (file prefix TP_ with the SN of the sensor). It is also recommended to record a test pulse after installation and keep it with later records for comparison.

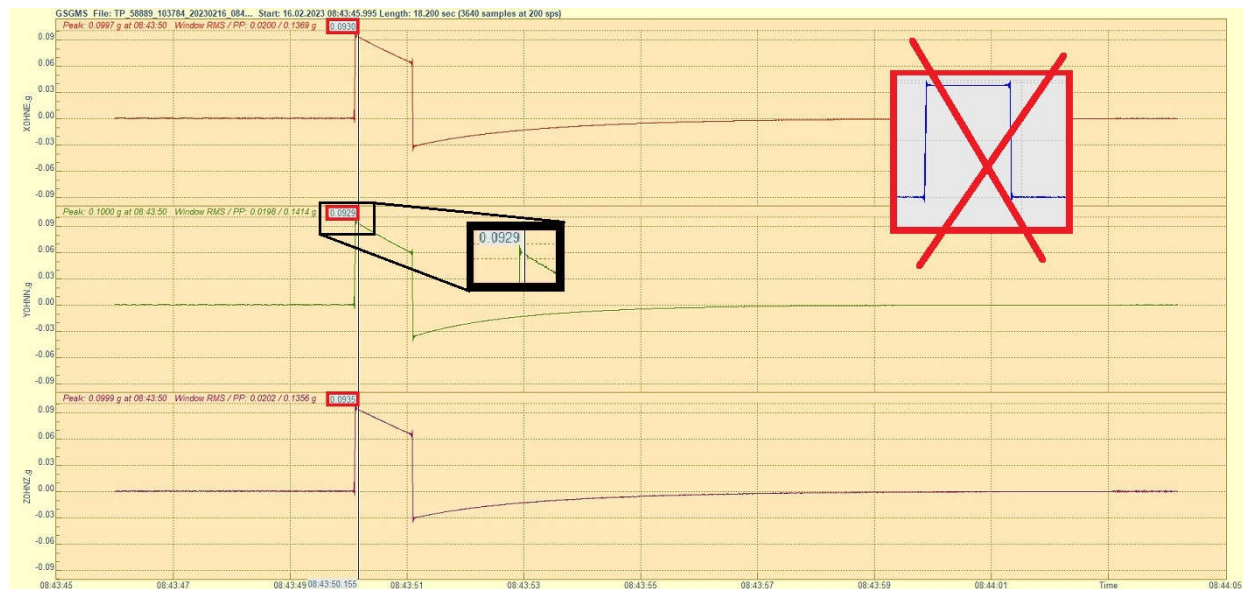
10.1 Test pulse of AC-7x

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Move the cursor to the flat part of the pulse
- Check that the value of the flat part for each axis is within the range of 0.1125g-0.1375g



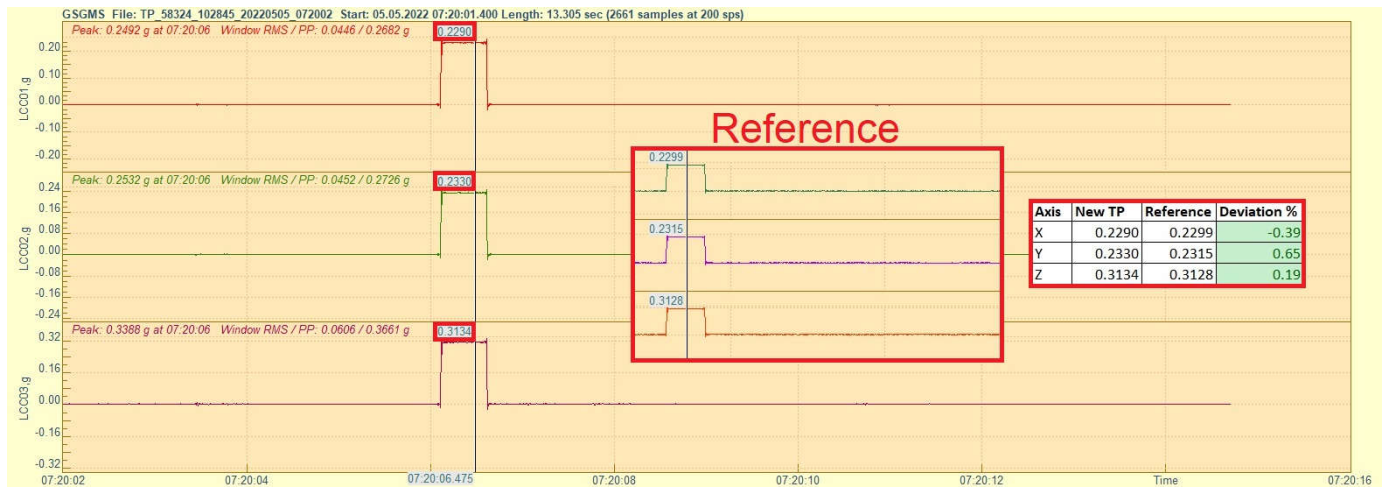
10.2 Test pulse of AC-2x

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Move the cursor right after the peak, the point that forms the beginning of a straight line with some slope
- Check that the value right after the peak for each axis is within the range of 0.09g-0.11g
- Visually check that the angle of the slope is similar on all axis (compare with a reference pulse file if unsure)



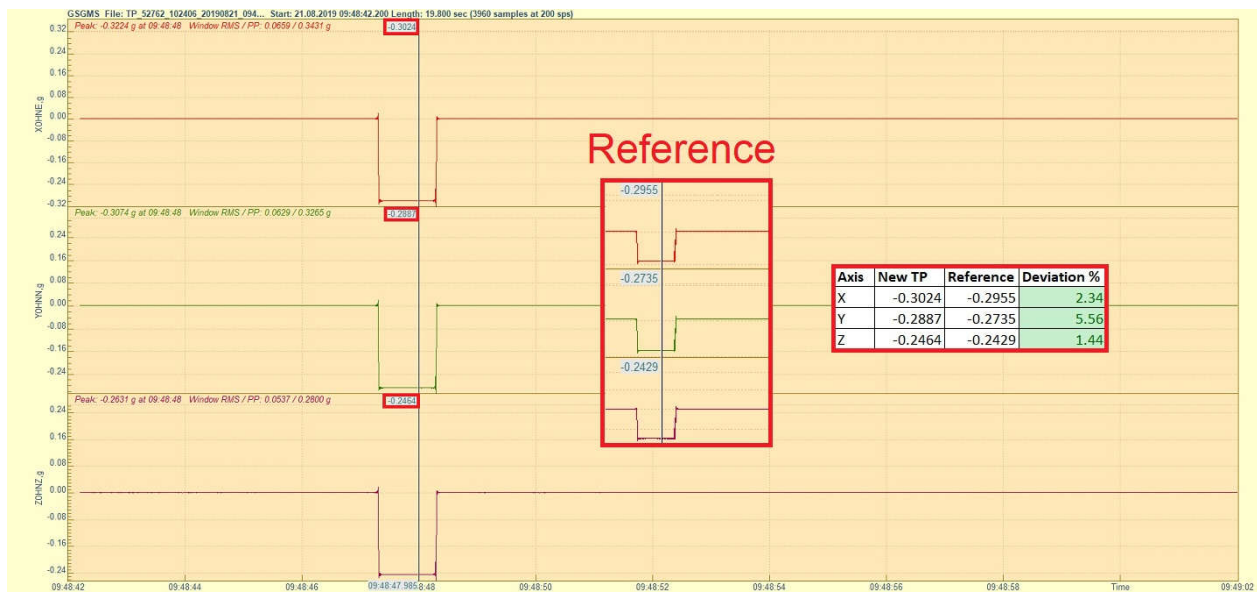
10.3 Test pulse of AC-4x

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Move the cursor to the flat part of the pulse, x- and y-axis should show a similar value, the z-axis should show a higher value
- Open a reference file of the same sensor and check that the flat part for each axis on the newly recorded pulse does not deviate more than +/-10%



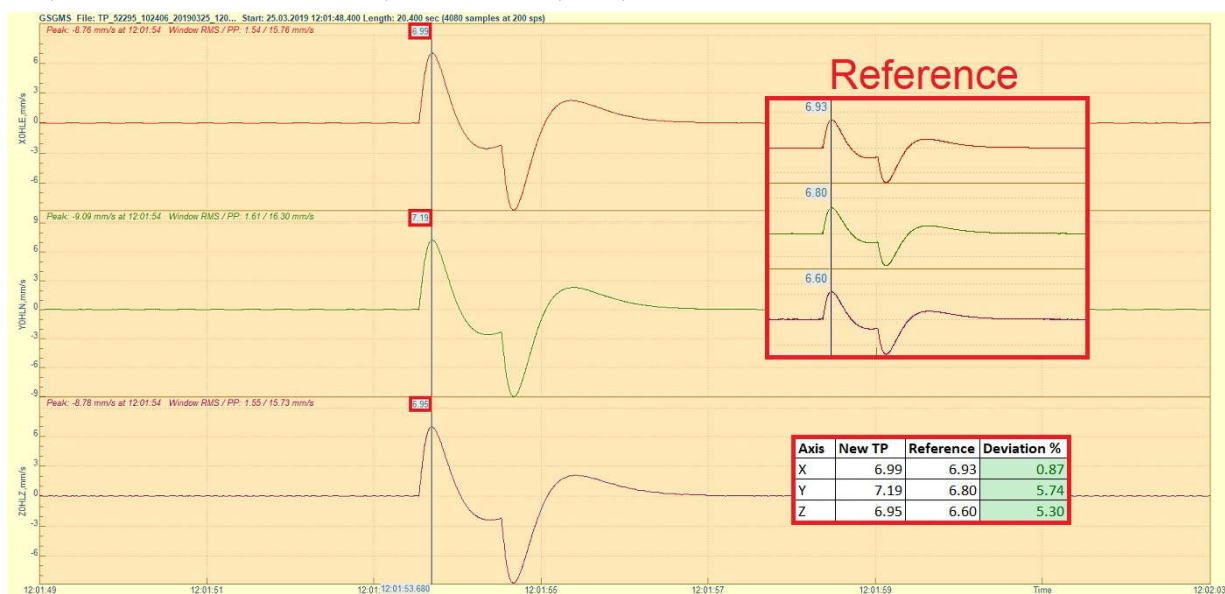
10.4 Test pulse of AC-6x

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Move the cursor to the flat part of the pulse, depending on the sensor generation, the pulse may be negative or positive
- Open a reference file of the same sensor and check that the flat part for each axis on the newly recorded pulse does not deviate more than +/-10%



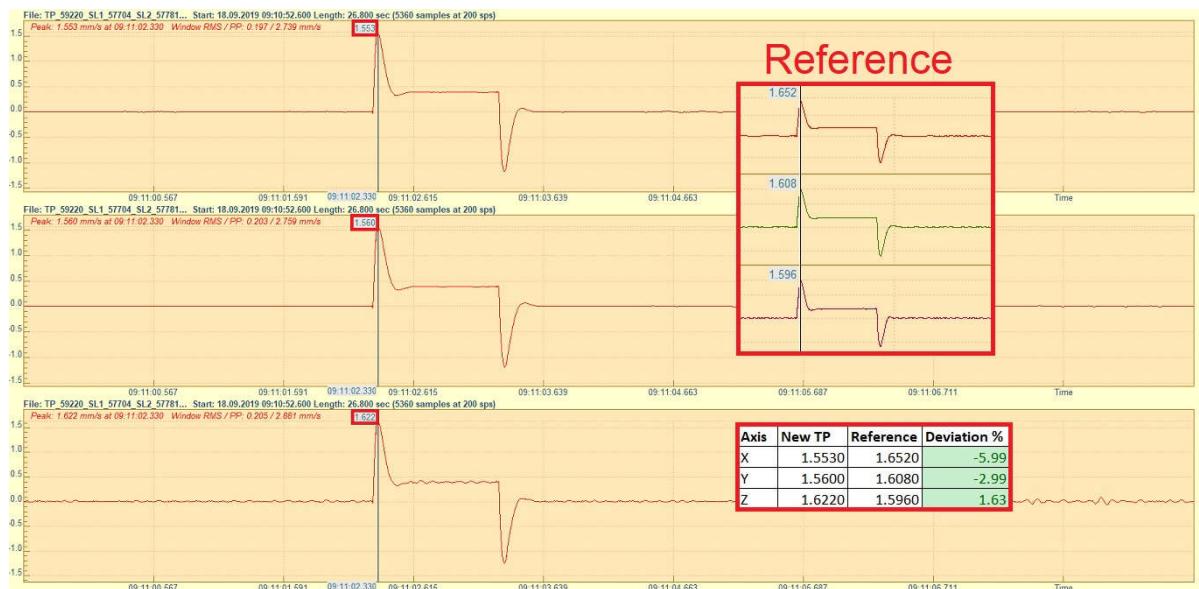
10.5 Test pulse of VE-1x

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Check that the pulse is with similar shape as shown in the picture below
- Move the cursor to the peak of the positive pulse to read the value for each axis
- Open a reference file of the same sensor and check that the peak for each axis on the newly recorded pulse does not deviate more than +/-10%



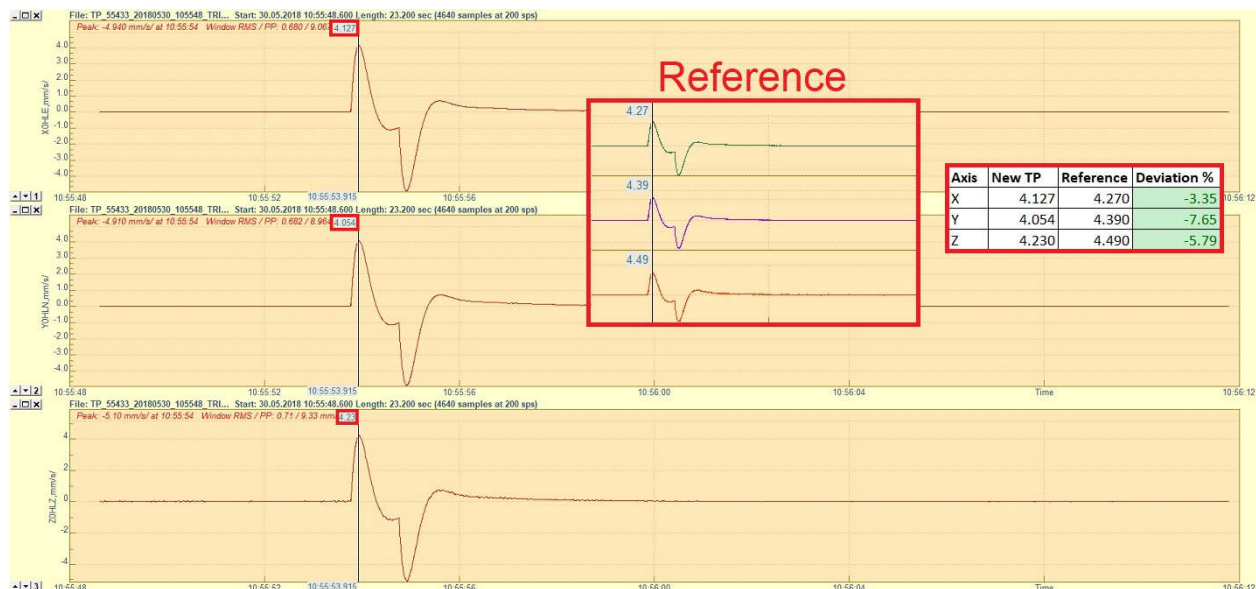
10.6 Test pulse of VE-2x

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Check that the pulse is with similar shape as shown in the picture below
- Move the cursor to the peak of the positive pulse to read the value for each axis
- Open a reference file of the same sensor and check that the peak for each axis on the newly recorded pulse does not deviate more than +/-10%



10.7 Test pulse of VE-5x-SP

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Check that the pulse is with similar shape as shown in the picture below
- Move the cursor to the peak of the positive pulse to read the value for each axis
- Open a reference file of the same sensor and check that the peak for each axis on the newly recorded pulse does not deviate more than +/-10%



10.8 Test pulse of VE-5x-BB

- Double-click the file to open it in GeoDAS
- Click into the yellow part of the window to make the cursor appear
- Check that the pulse is with similar shape as shown in the picture below
- Move the cursor to the peak of the positive pulse to read the value for each axis
- Open a reference file of the same sensor and check that the peak for each axis on the newly recorded pulse does not deviate more than +/-10%

