Software for GSV Measurement Amplifier

Instruction Manual

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Contents

General instructions

The ME GSV Control program currently provides 5 screens (dialogs) for input

Configuration	This input screen provides a selection of the most important GSV-2 measurement amplifier functions. Use this dialog if you wish to make elementary settings or simply read measurement values off the screen.
Stress analysis	Use this input screen if you wish to stick strain gauges yourself or perform a stress analysis with strain gauges and display the strain in µm/m.
Expert	This input screen gives you access to all GSV-2 measurement amplifier functions. Please always read the context-sensitive help before you alter anything in this input screen. You can read the context-sensitive help by clicking first on the question mark at top right and then clicking the input button.
Sensor	With this input screen you can adapt the screen display and your GSV measurement amplifier's display on the connected sensor. Enter either the data from the calibration log (procedure 1) or apply a known load to the sensor and perform a calibration yourself (procedure 2).
Recorder	In this input screen you can perform and log measurements. You can save the measurement results in Ascii data and Excel format.
Management	The measurement amplifier locking mechanism can be activated in this input screen.

At the following url you will find a comprehensive introduction to the software functions:

http://www.me-systeme.de/support.html

The software is on the CD-ROM and the latest version can be downloaded from the website:
http://www.me-systeme.de/setup/gsv/

http://www.me-systeme.de/software.html

The ME GSV Control software language is oriented towards the Windows regional and language options: the language is German for the German (Germany) region and English for all other regions.

Setting up the display

The display is set up via the "Sensor" tab Figure 1: "Sensor" input screen, Page 4). The measurement amplifier measurement range value is calculated in this tab. The measurement range value (scaling factor) is described as the scale factor in the GSVControl software.

To determine the scale factor, input fields 1) to 4) must be filled with sensor and measurement amplifier data .

	Input field
Input sensitivity of the measurement amplifier: 2 mV/V	1
Sensor measurement range: 1000 N	2 and 3
Sensor specific value : 1,9998 mV/V at 1000 N	4

A scale factor of 1000.10 results from the example.
Further information: http://www.me-systeme.de/de/basics/kb-display.pdf
Scale factor = input sensitivity / specific value * nominal load.

Only the result of the calculation is stored in the measurement amplifier.
The contents of the input fields must always be re-entered anew.

The final value calibration can also be performed by applying a calibration load (procedure 2). for this, enter the calibration load in the appropriate field and press the "Perform procedure now" button. Follow the instructions. The dialogue asks you to perform an offset correction in a load-free state and to apply the load.

To set up the display in accordance with procedure 1 please perform steps 1... 6 .
The input sensitivity of the measurement amplifier arises from the type designation, e.g. GSV-2AS ±5/250/**2** .

The sensor measurement range and specific value arise from the data sheet or from the sensor calibration sheet.

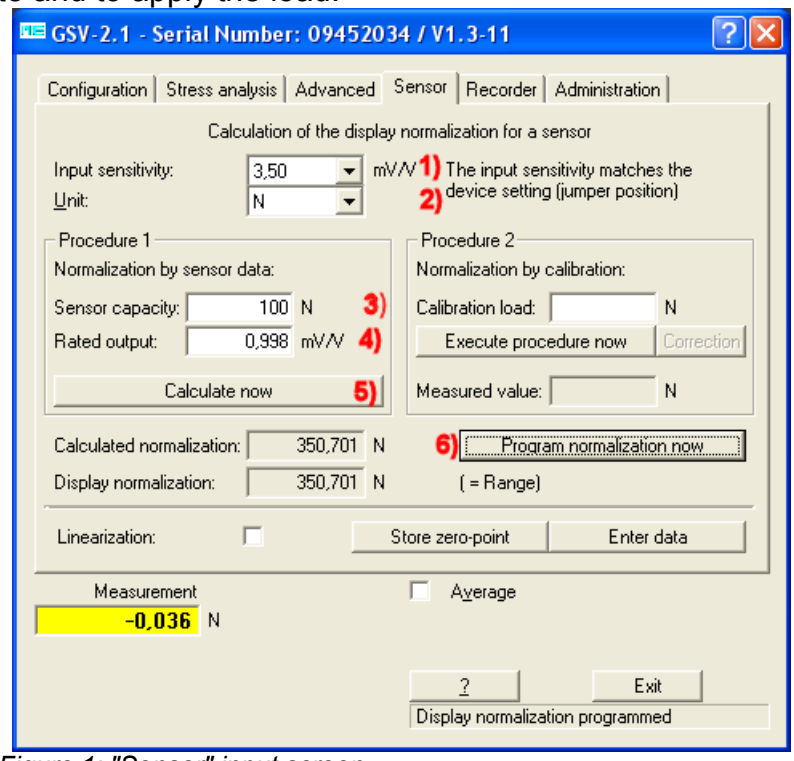

Figure 1: "Sensor" input screen

Should the calibration load entered not be reached, the calibration load can be edited again at the end of the procedure and the Correction button pressed.

Setting up the operation mode

Various operation modes such as Maximum Value Mode (trailing pointer function), can be set up in the Expert input screen.

To convert to ASCII protocol please activate Text Output.

To activate single value mode please activate Logger

The Bi-polar Mode and Amplification=1 settings should not be changed.

Analogue input 0...10V is activated with Channel=1. The input for strain gauges and sensors is only active with the setting Channel=0.

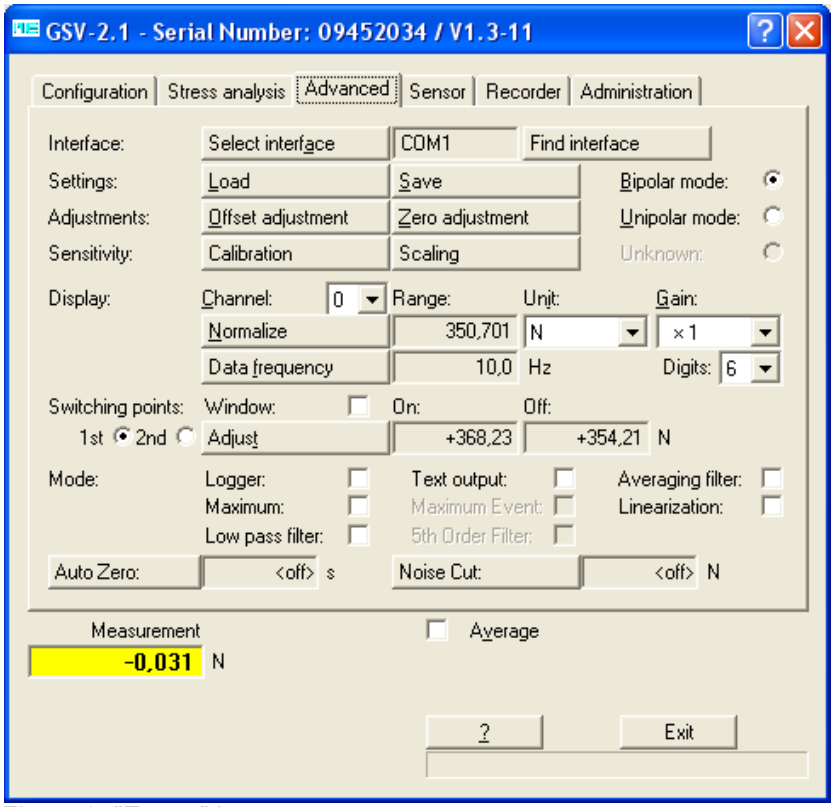

Figure 2: "Expert" input screen

Loading / saving	The complete configuration of the measurement amplifier can be stored in an EEProm in the measurement amplifier or on the computer's hard disk for recovery purposes. The factory settings can be restored at any time by loading the manufacturer's configuration.
Data frequency	The number of measurement values transferred per second is set here. Please note that the resolution of the measurement signal is generally lower with high data frequencies.
Switching points	The points at which the threshold value transmitter switches on and off can be set separately. By selecting the Window operating mode the switching output is treated as a window comparator with an upper and a lower switching point .
Logger	Selecting Logger operating mode switches off continuous data transfer. The transmission of precisely one measurement value is triggered by a pulse at the measurement amplifier's tare input or a software command.
Maximum	The peak memory is activated. It can be reset via the tare input or the Setzero software command.

Recording measurement data

A double-click on the graphic opens an enlarged view.

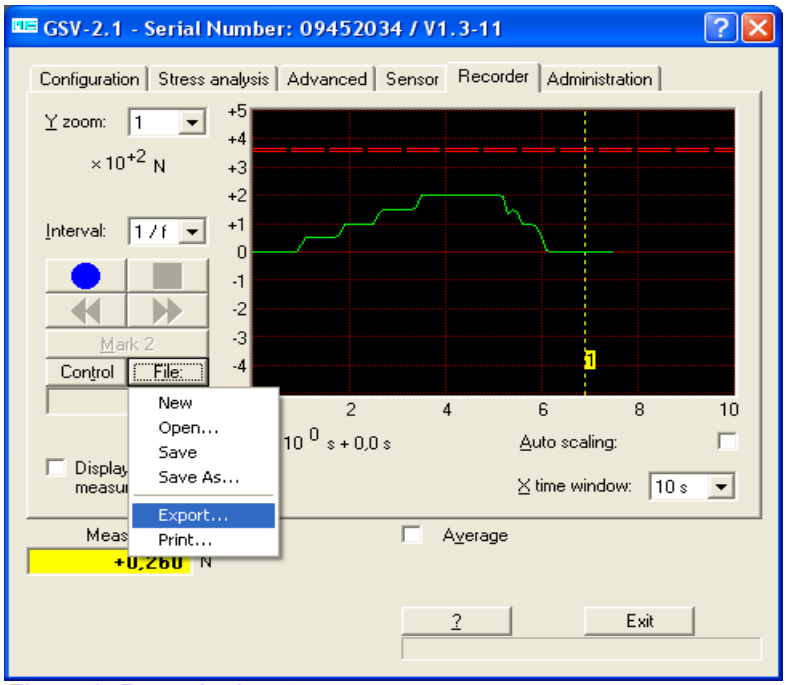

Figure 3: Recorder input screen

Clicking the Control button opens up an extensive range of options for triggering recording.

The measurement data is stored as a table in text format.
It can also be exported in the “sylk” Excel format.

It is necessary to switch to Display Current Measurement Data after stopping a recording or after loading measurement data from a file.

Special settings

200000 part resolution

With the GSV-2 measurement amplifier it is possible to resolve ±200000 parts ±1 digit of the measurement range of ±2 mV/V.

Sensor	Sensor specific value	Resolution at 5V sensor feed voltage	Measurement range at 5V sensor feed voltage [1)]	Measured displacement at 100g
LCB110-0.3kg	1 mV/V	0.003 g	150 g	approx. 0.1 mm
KD24s-2N	0.5 mV/V	0.004 g	200g	approx. 0.03 mm
KD40s-2N	0.5 mV/V	0.004 g	200g	approx. 0.03 mm
LCB150-1kg	2 mV/V	0.005 g	500g	approx. 0.1 mm
KD78-0.5N	0.5 mV/V	0.001 g	100 g	approx. 0.6 mm

For high resolution, jumper JP1 must be placed in position 1.
This increases the sensor feed voltage from 2.5V to 5V.
The input sensitivity is reduced to 1 mV/V.
On delivery, jumper JP1 is in position 2 by default.

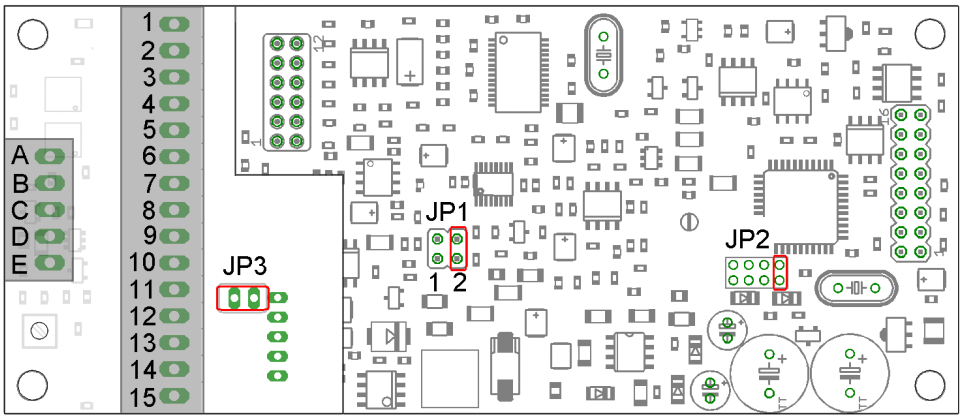

Figure 4: GSV-2 PCB with jumper JP1 for configuring the sensor feed voltage

In the Expert input screen the median filter is activated for high resolution.
The number of figures in the display is set to 7.
Doubling the feed voltage reduces the measurement range to 1 mV/V. A maximum of 500g can then be displayed with a weighing cell which supplies an output signal of 2mV/V for a load of 1000g.

1) For a resolution of 200,000 parts with a sensor feed voltage of 5V an amplification of 0.5 must be set in the Expert input screen.

The measurement range of 500g can be resolved with 100000 parts.
If an amplification of 0.5 is selected, a resolution of 200000 parts for the measurement range of 2 mV/V and of 1000g can be achieved.
An ideal result with high-resolution measurements is normally achieved with a data frequency of 10Hz or 5Hz.

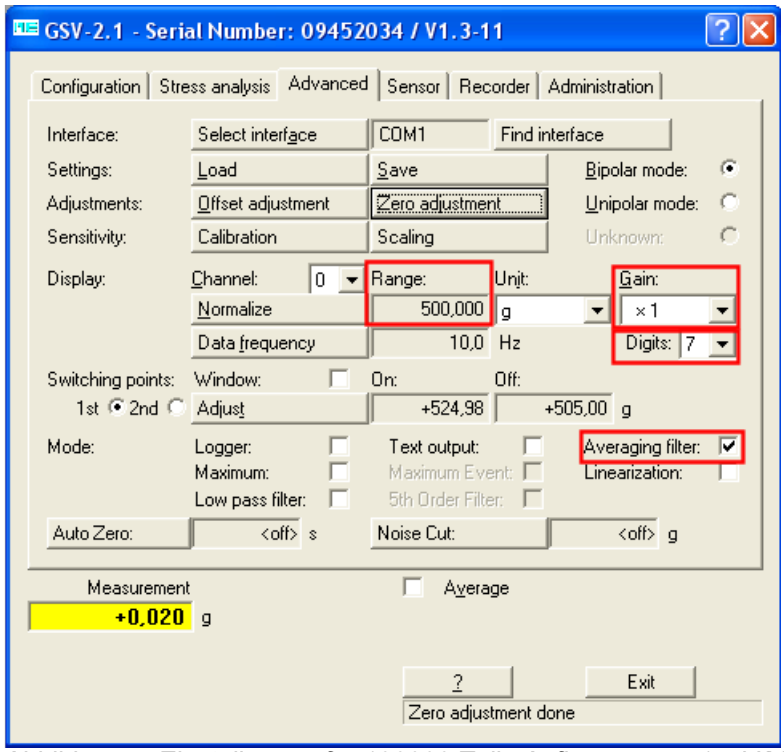

Abbildung 5: Einstellungen für 100000 Teile Auflösung von 1 mV/V

Low-pass filtering

For measurements with strongly fluctuating signals (livestock scales), the low-pass filter or/and filter 5 Order often produces an ideal result.
These filters cannot be combined with the median value filter.

Under certain circumstances it may be sufficient to reduce the data frequency to get a smooth signal.

The data rate should not be increased to realise software-side filtering under any circumstances .

Due to the integrating measurement principle(Sigma-Delta AD converter) the best smoothing is achieved by reducing the data rate.

Zero point tracking

As long as the measurement signal is below the Set Off threshold for *Switching point 1* the scale is zeroed at the set interval (e.g. every 10 seconds). This prevents the zero point from changing due to temperature drifting when the scale is in an unloaded state.

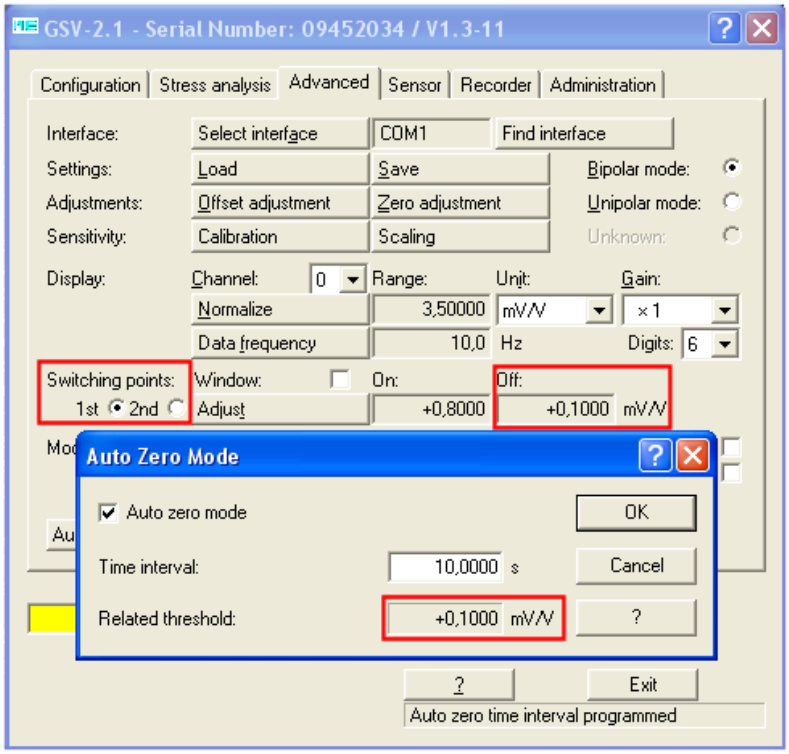

Figure 6: Setting the automatic zero tracking

Noise suppression

Measurement values below the set noise suppression threshold are always displayed with the value 0.0.

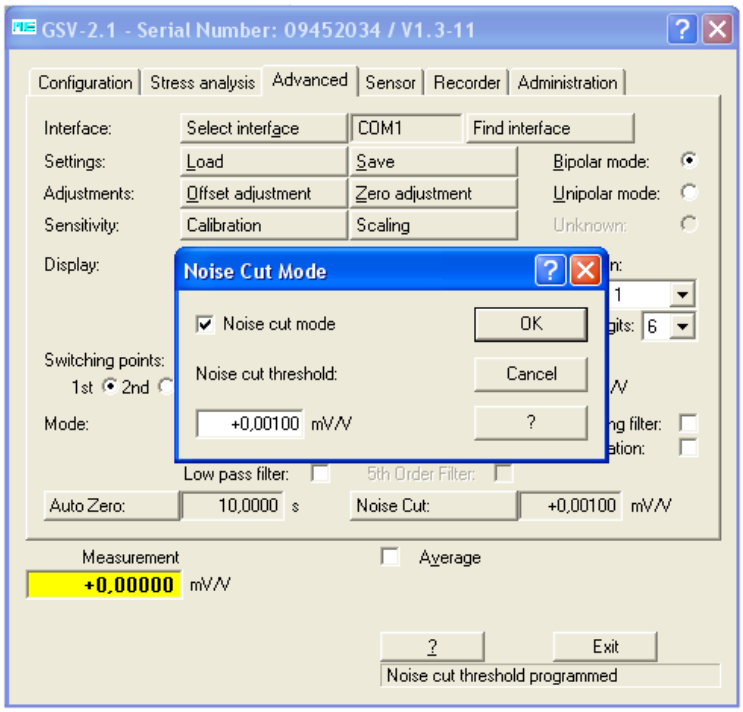

Figure 7: The noise suppression causes 0.0 to be displayed if the measurement value is below the set threshold.

Locking

Activating locking prevents the measurement amplifier configuration from being altered accidentally. Only zero balancing is still possible when the lock is activated. The factory default password for setting and removing the lock is “berlin”.

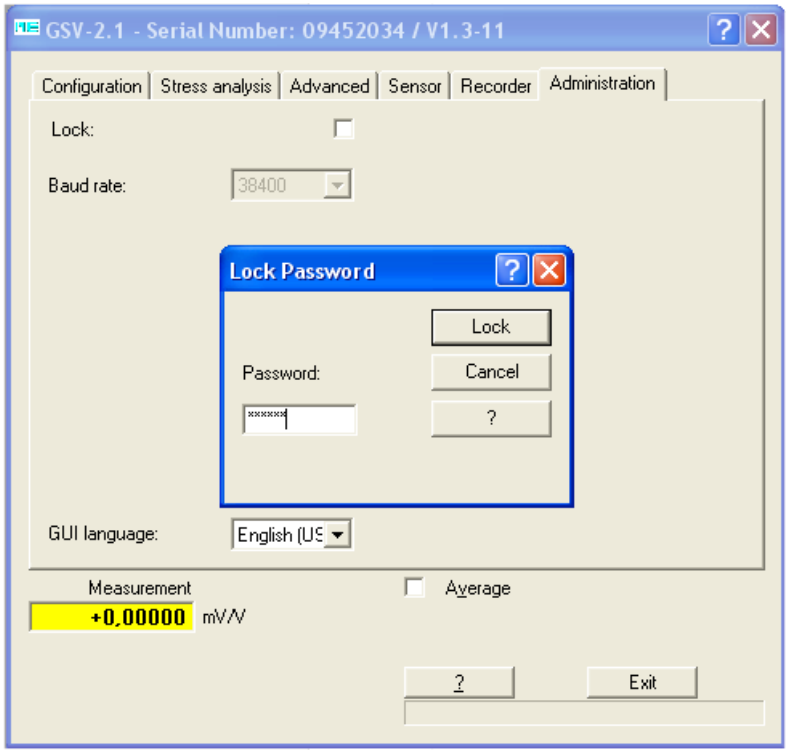

Figure 8: activating the lock prevents accidental changes to the configuration. Default password: berlin

Analogue output

Only the Offset Adjustment and Analogue Filter functions (in the Data Frequency settings screen) have an effect on the measurement amplifier's analogue output. All other input relates exclusively to the serial output.

Linearisation

The GSV-2 and GSV-3 measurement amplifiers have an option for linearising sensor characteristics (device firmware version V1.3-11, 2009 upwards).

The characteristic curve for linearisation is defined by entering supporting points.
The supporting points are pairs of values consisting of a reference and an actual value.
If linearisation is active, the actual values of a non-linear sensor are converted to ideal reference values (expected values).

Step 1

The display must be set up before the supporting points are entered (Setting up the display Page4).
First, perform an adjustment of the final value, for example by entering the sensor data (Procedure 1 with the sensor measurement range and specific value),
or by applying the maximum load (Procedure 2).
Tequirements:

- Set the input sensitivity of the measurement amplifier and the measurement unit. The measurement amplifier's input sensitivity depends on the type designation: GSV-2AS ±5/250/3,5
- Linearisation must be switched off.

Step 2

Entering the reference and actual value pairs
Requirements:

- Linearisation must be switched off.
- The reference and the sensor zero points in an unloaded state are compared before the pairs of values are entered.

Step 3

3. Entering data
With the GSV-3 you are asked for the input sensitivity of the measurement amplifier.
3.1 New With this button you can enter new linearisation data. Confirm with OK.
3.2 Add: Now add the reference and actual value pairs. It is strongly recommended that supporting point 0.0 is entered along with the supporting point at the end of the measurement range.
3.3 OK End input with OK and confirm with OK.

Step 4

4 Save the zero point. Press Save Offset and Zero Point for Linearisation. Figure 11: Step 4: Saving the zero point, Page 13

Step 5

Switching on linearisation:

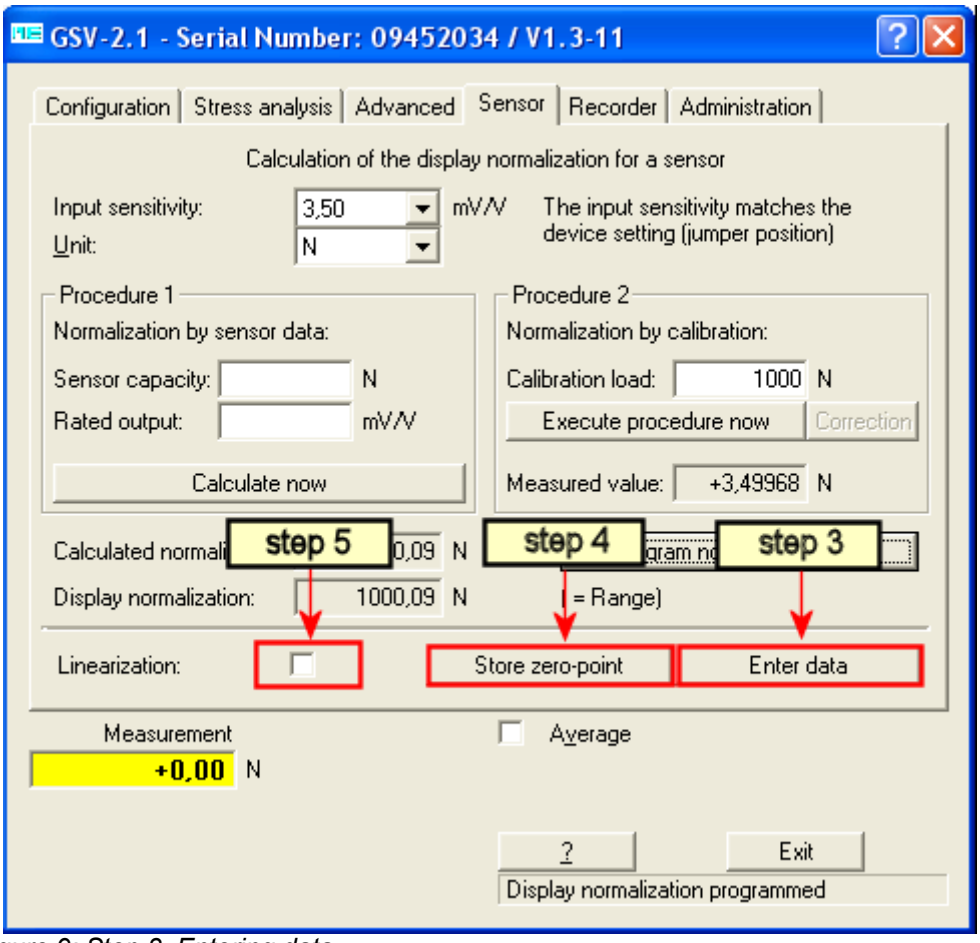

Figure 9: Step 3, Entering data

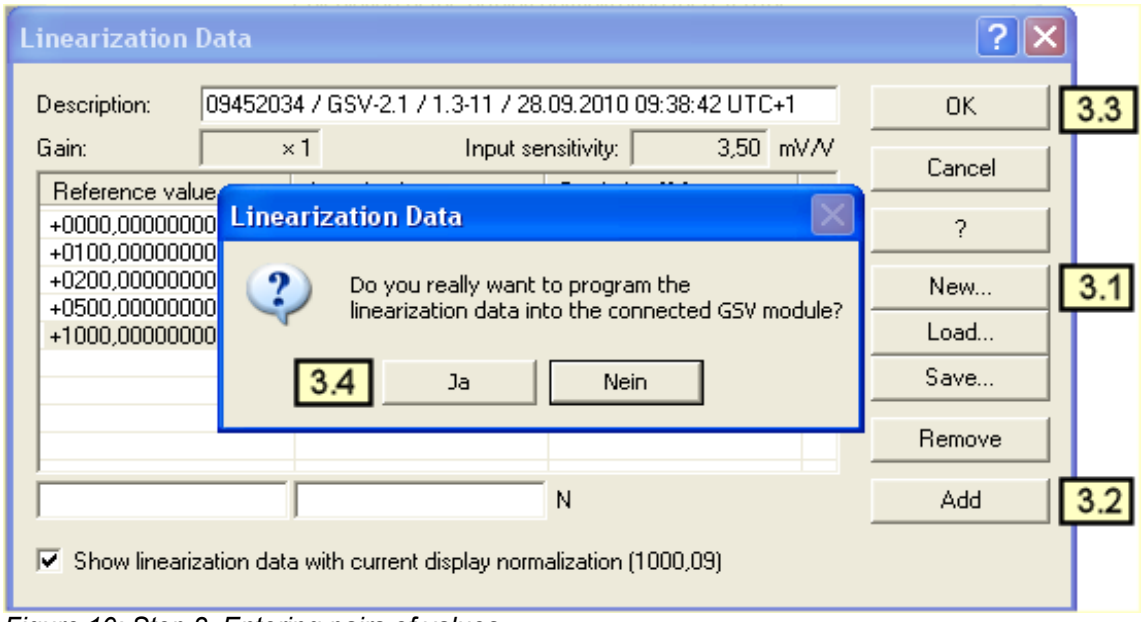

Figure 10: Step 3, Entering pairs of values

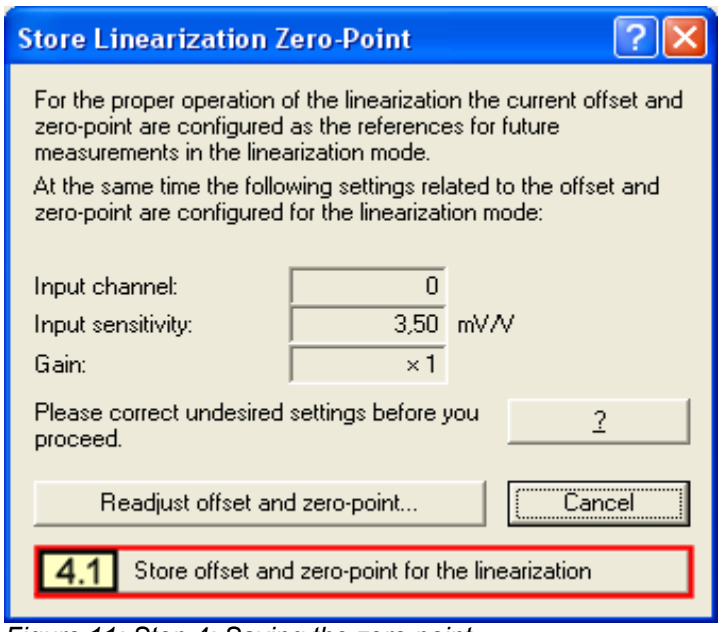

Figure 11: Step 4: Saving the zero point

Programming and integration into Labview

There are a large number of control commands for directly controlling the GSV-2 under DOS or for applications with a PLC.

The GSV-2 measurement amplifier is available in two logging variants. The logging variant can converted by replacing the socketed processor or, with models from July 2006 or later, by configuring the software.

a) Binary protocol for GSV-2 measurement amplifiers:

, (ASCII: 44)	Status	HByte	MByte	LByte

b) Binary protocol for GSV-3 measurement amplifiers:

0xA5	HByte	LByte

c) Text protocol for GSV-2 and GSV-3 measurement amplifiers:
Prefix, 6 digits with decimal point, space, unit, CR, LF e.g.
+01.2345 kgCRLF

Conversion of a digital output value to an analogue input signal with the GSV-3
Output value (decimal) = Highbyte x 256 + Lowbyte
Input signal (decimal) = (output value - 32768) / 32768 * 2.10

Conversion of a digital output value to an analogue input signal with the GSV-2
Output value (decimal) = HighByte x 65536 + Midbyte x 256 + Lowbyte
Input signal (decimal) = (output value - 8388608) / 8388608 * 2.10

The equations apply to devices with an input sensitivity of 2.00 mV/V.
At 3.5 mV/V a factor of 3.675 should be used instead of a factor of 2.10.

With text protocol, the data transfer rate is limited to 100 measurement values per second.

Details on the log are available in the instruction manual and can be downloaded from the website.

Extensive software libraries can be used with Windows 95, 98, ME, NT, 2000 and XP. A DLL, a C++ example program, a Delphi example program and a head file for Visual Basic are available.

Integration into LabView is best achieved via the Windows DLL or as an RS232 device via the text protocol.
The data is transmitted in text format if the Text Output checkbox in the Expert input screen is active.

Further information on the software:
http://www.me-systeme.de/software.html

Installing the USB drivers

To install the USB drivers please insert the USB adaptor or the measurement amplifier with a USB interface into a free socket on your computer.

Please place the driver CD in your CD-ROM drive, select the **Install software automatically** option and follow the operating system instructions.

Caution: The Windows assistant installs two drivers for each measuring channel.
For a measurement amplifier with two channels the installation procedure therefore runs four times.
The installation is not finished until the message:
“The new hardware has been installed and can now be used” appears.

Please press the **Continue Installation button** if the message “... failed the Windows logo test” appears.

With the installation of the USB driver a virtual serial interface is installed for each measuring channel. This interface is allocated a COM number such as COM5 or COM9. The interface is displayed in the Device Manager:
(Workstation --> Control Panel --> Hardware --> Device Manager)

Please note: you do not need to set the baud rate, data bits etc. on the computer for the serial interface. This is done by the GSV.EXE application.

Setting the baud rate

The ME GSV Control program is used for configuration and data input with type GSV-2 and GSV-3 measurement amplifiers.

The standard baud rate for the serial interface is 38400 baud without flow control for all GSV-2 and GSV-3 measurement amplifiers.

The ME GSV Control program therefore always opens the serial interface with a baud rate of 38400 baud (8N1).

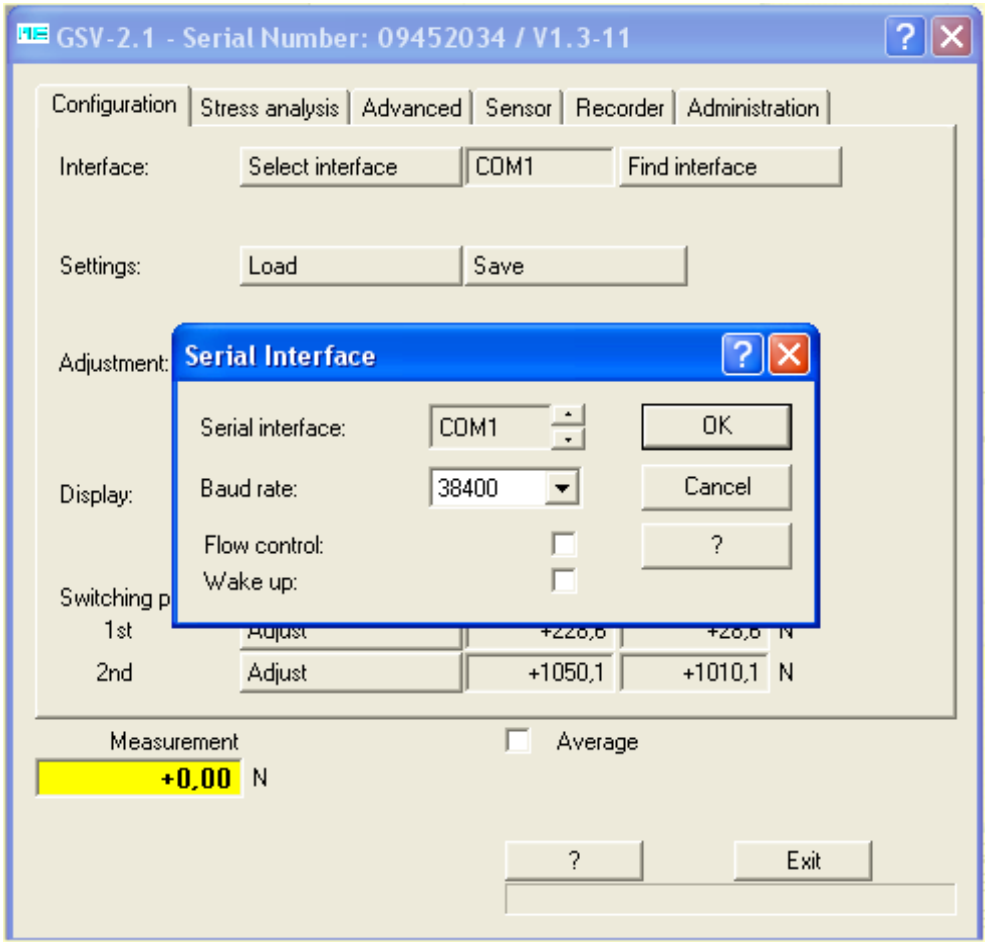

Figure 12: Opening the serial interface

If necessary, the baud rate can be set between 4800 baud and 115200 baud with command no. 130 (documents ba-gsvterm35.pdf, gsv3com.pdf, ba-gsv2.pdf).

If the measurement amplifier's and the GSV.EXE program's baud rates do not coincide no connection can be made.

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