Data protocol for the GSV-3 Strain Gauge Amplifier

Updated: 07/08/2014

Data format

Output of the data format

The serial interface works with a setable boudrate of 4800 up to 1,25Mboud. The format is: 1 Startbit, 8 Data bits, non priority, 1 Stopbit (8N1).

Output of the data values

The GSV operates in the delivery state with a transmission rate of 38400 baud, 1 start bit, 8 data bits, no parity and 1 stop bit (8N1).

Two data formats are available for the output of the measured values:

- Binary format (default setting, up to 1000 measured values per second)
- Text format (Recommended setting for user programs that do not work without a Windows DLL "MEGSV-DLL". Up to 100 readings per second are possible.)

The data format is set using the software GSV Control: Bit 1 is set in the "mode register" in order to activate text format.

The transmission of the measured values takes place either continuously with an adjustable frequency, or "on request" (polling) via command "getvalue" or by request via a digital input.

The continuous transmission of the measured values can be switched off with the software GSVcontrol: The "Logger mode" is activated by setting bit 3 in the mode register.

Binary format

In binary format, 3 bytes are transmitted for each measured value.

0xA5	Highbyte	Lowbyte

The first data is to synchronize.

2 data bytes are following starting with the the High-byte. The intern resolution of the analog digital converter is 16 Bit. In the unipolar mode the measured value correspondents to zero the data value 0. In the bipolar mode the measured value correspondents 0 to the data value hexadecimal 8000.

With an input sensitivity of 1 mV/V, the following assignment results:

Measured value (hexadecimal)	Unipolar	Bipolar
00 00	0,000 mV/V	-1,050 mV/V
80 00	0,525 mV/V	0,000 mV/V
FF FF	1,050 mV/V	1,050 mV/V

At other input sensitivities you have to multiply with the corresponding factor of proportionality.

The end deflection of 105% was selected to generate values, which are insignificantly higher than the measurement range.

For the conversion from digital output value to analog input signal with an input sensitivity of 2 mV/V:

Output value (decimal) = High byte x 256 + Low byte

Input signal (decimal) = (output value - 32768) / 32768 * 2.10

Text format

The output character string corresponds to the indicator on display and may be shown e.g. with a terminal program.

The data format is in the delivery state:

Sign, 6 digits with decimal point, space, unit, CR, LF

e.g.

+1.2345 kg CRLF

Note: When the unit is turned off (with command number 15, setunit), the number is completed with a space and CRLF.

Output of the register values

Register values are divided by a semicolon and they will be transmitted this way after they were requested by a command. Depending on the range of the register 2 to 8 data bytes will be transmitted:

3 Bytes:	; (ASCII: 59)	HByte	MByte	LByte
2 Bytes:	; (ASCII: 59)	HByte	LByte	

Commands to the GSV-3

Commands to the GSV have the following format:

The operating number followed by the parameter P1...P4 will be sended to the GSV.

Operating number	P1	P2	P3	P4

The number of the requested parameter varys depending on the operating number and is located between 0 and 4.
All commands to the GSV-3 cause a permanent configuration. This configuration stays even after a voltage breakdown. This is true for most of the commands besides "StopTransmission" (Nr. 35). A voltage breakdown has the same affect like the commad „StartTransmission (Nr. 36).
To stop the transmisson permanently the "Log-Modus" has to be turned on (Bit 3 in the Mode-Register, command Nr. 38).

Display settings

At the binary coded data protocoll the values will be standarized of ±1 transmitted.
The display indicate the standardizations factor x measured value. The standardization factor can be set with the command "setNorm" or rather with the configuration program.
The formula to calculate the standardization factor can be found below:
Standardization factor = input sensitivity / nominal output * normal load.

For example:
normal load of the load cell: 100kg
nominal output of the load cell: 2 mV/V
Input sensitivity of the amplifier: 2 mV/V
==> standardization factor = 100

communication with the CAN-Modul

The signal strenght is setable from 50kBit/s up to 1 MBit/s.
The adresses and the notices from- and for the CAN-Modul are setable as well.
The measured values and all notices of the CAN-Modul will be sended to the pre seted adress 0x110.
The configuration and all commands of the CAN-Modul takes place via the pre seted adress 0x100.

Commands of the Can-Modul: for example ID=0x100

ID: 0x100	lenght	Operation number	P1	P2	P3	P4

The lenght results of the number of parameter plus one.

Measured datas of the Can-Modul: for example ID=0x110

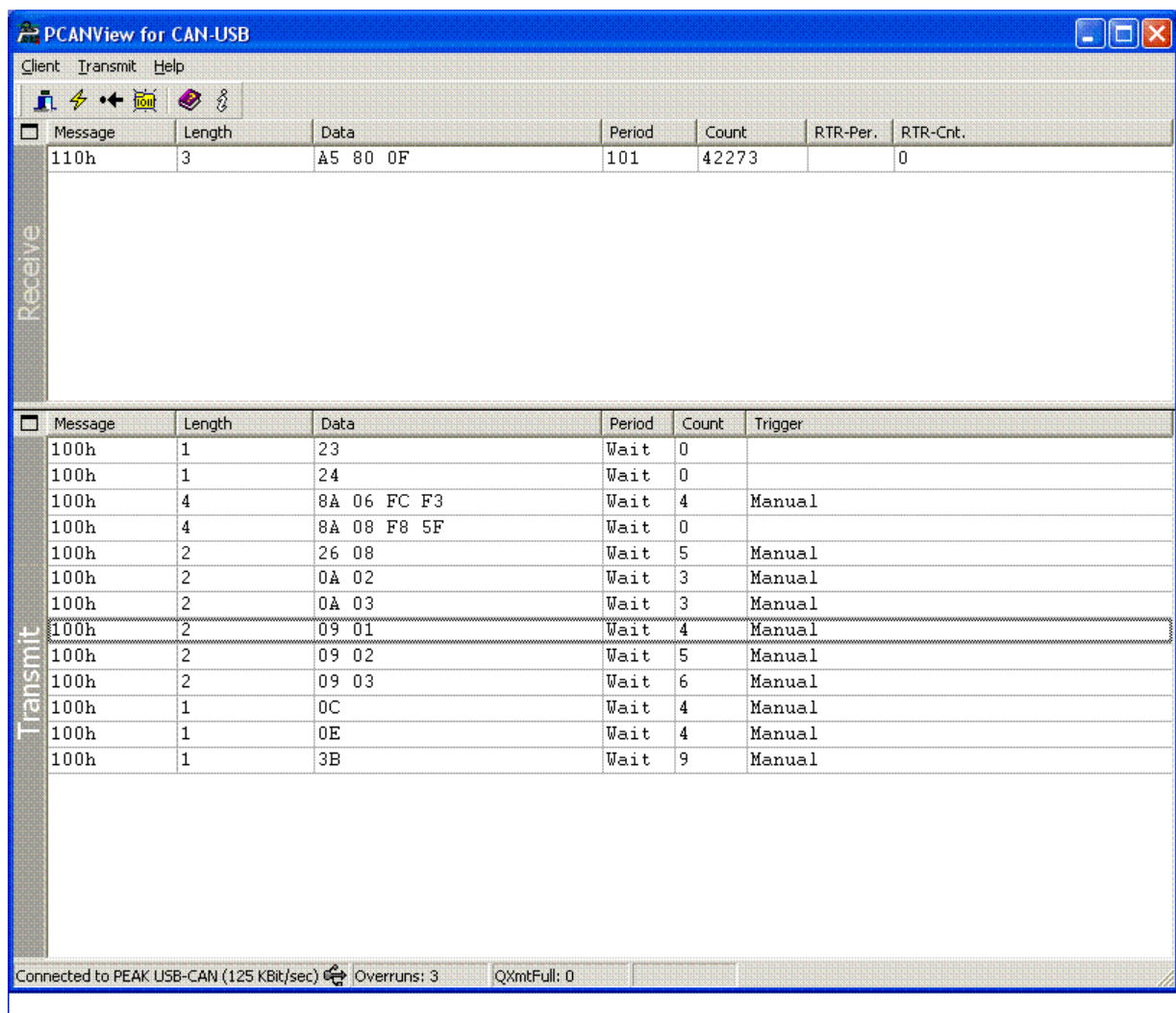| ID: 0x110	0xA5	Highbyte	Lowbyte

notices (command answeres) of Can-Modul: for example ID=0x110

ID: 0x110	0x3B	P1	P2	P3	P4

Beispiele

ID	Lenght	Operation number	P1	P2	P3	P4	/	/	/	/	Explanation
100	02	09	01								Load manufacturer settings
100	02	09	02								Load configuration "2"
100	02	09	03								Load configuration "3"
100	02	0A	02								save the current configuration in memory "2"
100	02	0A	03								Save the current configuration in memory "3"
100	01	0C									Zero point balancing of the AD-transmitter
100	01	0E									Zero point balancing of the input stage
100	01	1F									get serial number
100	01	3B									get value
100	01	21									get threshold
100	01	23									stop transmission
100	01	24									start transmission
100	01	89									read Special-Mode-Register
100	03	88	0	0							FIR-Filter off, (all special modes off)
100	03	88	0	06							FIR-Filter on
100	01	27									Read Mode-Register
100	02	26	0								Log-Modus off (all modes off)
100	02	26	08								Log-Modus on

ID	Lenght	Operation number	P1	P2	P3	P4	/	/	/	/	Explanation
100	02	26	04								Maximum mode on
100	01	8B									Read out data rate
100	04	8A	08	B3	B4						Set data rate to 1 Hz
100	04	8A	08	F8	5F						Set data rate to 10 Hz
100	04	8A	07	FC	F3						Set data rate to 50Hz
100	04	8A	06	FC	F3						Set data rate to 100Hz
100	04	8A	04	FD	8F						Set data rate to 500Hz
100	04	8A	03	FD	8F						Set data rate to 1000Hz

ME-Meßsysteme GmbH
Neuendorfstr. 18a   Tel.: +49 3302 89824 60   Mail: info@me-systeme.de
16761 Hennigsdorf   Fax: +49 3302 89824 69   Web: www.me-systeme.de   5

Setting of the boudrats and adresses

To adjust baudrate and identifier later on, a reprogramming via a reserved identifier is possible. The determination of the reserved identifier happends trough the manufacturer. The reserved identifier is named on the module. Trough the following commands, the reprogramming will be performed:

Identifier is equivalent to the label:	Length of the commands	Code for boudrate	High-Type command-ID	Low-Type command-ID	High-Type report-ID	Low-Type report-ID
0x1D	5	7	01	02	01	12

For example:
a boudrate of 500 kBit/s
a command-ID of 0x102
a report-ID of 0x112
After transmitting the command you need to set beack the module by disconnecting the electric power supply.
As the Identifier you can set an area between 0 and 65535.

The Coding of the boudrate is:

Code	1	2	3	4	5	6	7	8
Bit/s	50000	62500	83333	100000	125000	250000	500000	100000

Table of commands

Nr. Dez	Nr. Hex	command-name remark	rem.	Amount of parameter	Amount of returned bytes	Range of value
0	0	reset status	2	0	0	
1	1	read scale (z.Zt. konstant FFFFFF)	2	0	3	0xFFFFFF
2	2	read zero (das Highbyte at GSV3 is 0)	N	0	3	0..0x00FFFF
3	3	read control	2	0	3	2..0xE07FFF M,B *
4	4	read offset		0	2	0..0x0FFF
5	5	write scale	R	3	0	
6	6	write zero (Highbyte ignored)		3	0	0..0x00FFFF
7	7	write control	2	3	0	2..0xE07FFF
8	8	write offset		2	0	0..0x0FFF
9	9	get all		1	0	0..3
10	A	save all		1	0	2..3(with ID: 0..3)
11	B	set cal	R	0	0	
12	C	set zero		0	0	
13	D	set scale	R	0	0	
14	E	set offset		0	0	
15	F	set unit		1	0	0..d18
16	10	set norm		3	0	
17	11	set dpoint	N	1	0	1..6
18	12	set frequency (only at GSV-2 compatibility, look command 138)	2	2	0	2..0xFFFF
19	13	set gain	N	1	0	
20	14	set bipolar		0	0	
21	15	set unipolar		0	0	
22	16	read frequency (only at GSV-2 compatibility, siehe Befehl 139)	3	0	3	2..0x00FFFF
23	17	*manufacturercalibration- (setMEcal)*	R	3	0	0..0xFFFFFF
24	18	*manufacturercalibration- (getMEcal)*	R	0	3	0..0xFFFFFF
25	*19*	*manufacturercalibration- (setMEid)*	R	3	0	0..0xFFFFFF
26	1A	get norm		0	3	
27	1B	get unit		0	1	0..d18
28	1C	get dpoint		0	1	1..8
29	1D	Switch		1	0	0..1
30	*1E*	*Manufactuer settings (setserialNr)*	R	8	0	Only with ID: Char-array: per 0x20..0x7F
31	1F	get serial number		0	8	je 0x20..0x7F
32	20	set threshold		4	0	0..0xFFFFFFFF
33	21	get threshold		0	4	0..0xFFFFFFFF
34	22	set channel	R	1	0	
35	23	stop transmission		0	0	
36	24	start transmission		0	0	

Nr. Dez	Nr. Hex	command-name remark	rem.	Amount of parameter	Amount of returned bytes	Range of value
37	25	clear buffer		0	0	
38	26	set mode		1	0	0..0xFF
39	27	get mode		0	1	0..0xFF
40	28	*Manufacurer setting*	R	1	0	
41	29	get equipment		0	1	
42	2A	*Manufacurer setting (prep.ext.rd.ctrl)*	R	0	0	
43	2B	firmware version		0	2	d10..d99,1..d255
44	2C	set gauge factor	R	2	0	
45	2D	get gauge factor	R	0	0	
46	2E	set poisson	R	1	0	
47	2F	get poisson	R	0	0	
48	30	set bridge type	R	1	0	
49	31	get bridge type)	R	0	0	
50	32	*Reserviert*	R	0	0	
51	33	get range	R	0	0	
52	34	*Reserviert*	R	0	0	
53	35	get offset wait		0	1	
54	36	get options		0	3	
55	37	*Reserved*	R	0	0	
56	38	*Reserved R(read memory)*	R	1	0	
57	39	*Reserved R(write memory)*	R	3	0	
58	3A	*Reserved*	R	0	0	
59	3B	get value		0	3	
60	3C	clear maximum value		0	0	
61	3D	set digits	R	1	0	
62	3E	get digits	R	0	0	
63	3F	*Reserved*	R	0	0	
128	80	SetTXmode	3, 5	1	0	0..0xFF
129	81	getTXmode	3	0	1	0..0xFF
130	82	SetBaud	3,5	1	0	0..8
131	83	getBaud	3	0	1	0..8
132	84	setDevAdress	N, 3, 5	1	0	0..0x1F
133	85	getDevAdress	N, 3	0	0	0..0x1F
134	86	setSlowRate	3	2	0	1..0xFFFF
135	87	getSlowRate	3	0	2	1..0xFFFF
136	88	setSpecialMode	3	2	0	0..0xFFFF
137	89	getSpecialMode	3	0	2	z.Zt. 0..0x00FF
138	8A	WriteSamplingRate	3	3	0	0..0x08FE10 M,B
139	8B	ReadSamplingRate	3	0	3	0..0x08FE10 M,B

Bem.	discription
	Grey shadowed commands are used in a lot of userprograms.

Bem.	discription
2	This is a GSV-2 command. It is present in the GSV-3. The use is not recomennded for new applications.
3	Its a GSV-3 comand. It is not used at GSV-2.
5	The Baudrate can become only in „the Config mode ". The Config mode can only be activated via a link plug, if RB0 is connected with GND. In this case the Baud rate is always 38400Baud. The bit 0 in „the TX-mode" registers becomes in this case 1. Changes „of the TX-mode of "register become always only active after turn on.
N	This command is not implemented up to now.
R	This command-number is reserved.

Registerwerte

Control-Register

The biggest control register is 3 Bytes.
The content of the control register is saved in the EEProm of the GSV-3.
The structure of the control register of the GSV-3 is similar to the control-register of the GSV-2 (AD7712 von Analoque Devices)
The Control-Register GSV-3 and GSV-2 are compartible.
To programm the boudrate and sampling rate use command 138.
The setting bipolar- unipolar is controlled at the GSV-3 via command 20 and 21.

The control-register is 3 bytes.
bit 23 = bit 15 of the register frequency-value= 19531,25/Boudrate
      (look command 18/ command 22)
bit 22 = bit 14 of the register frequency-value
bit 21 = bit 13 of the register frequency-value
bit 20 =0   (Gain=2)
bit 19 =0   (Gain=1)
bit 18 =0   (Gain=0)
bit 17 =0   (Channel)
bit 16 =0
bit 15 =0   (WL)
bit 14 = bit 12 of the register frequency-value
bit 13 = bit 11 of the register frequency-value
bit 12 = Bipolar / Unipolar-flag: 0 = bipolar, 1 = unipolar
bit 11 = bit 10   of the register frequency-value

ME-Meßsysteme GmbH
Neuendorfstr. 18a   Tel.: +49 3302 89824 60   Mail: info@me-systeme.de
16761 Hennigsdorf   Fax: +49 3302 89824 69   Web: www.me-systeme.de   9

bit 10 = Non-zero-flag for bits10..15 of the register frequency-value: 0: bits10..15 =0, 1:bits10..15 uneven 0
bit 9 = bit 9   of the register frequency-value
bit 8 = bit8 of the register frequency-value
bits7..0 = bits 7..0   v. of the register frequency-value

Mode-Register

The size of the Mode-Registers is 1 byte.
The content of the mode Registers is saved in the EEProm of the GSV-3.
The Mode Register programmed via command 38 and can be read out with command 39.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
x	x	x	window-Mode	Log-Mode	Max-Mode	Text-Mode	x

Text-Mode: Read-Only Flag. If Bit 1 is setted the measured value is transfered as Ascii-symbol.
Max-Mode: only the active max-value is transfered with the setted boundrate.
Log-Mode: the datatransmissiong is turnt off. The measured value can be ordered via command 59.
The zero time input turns to the trigger input: at the falling shoulder at the zero time the current measured value will be transmitted.
Window mode: the threshold output turns to the window comparator.
x: Reserved.

Special-Mode-Register

The size of the Special-Mode-Register is 2 Bytes.
The content of the Special-Mode Register is saved in EEProm of the GSV-3.
Via the Special-Mode-Register special characteristics can be set of the GSV-3.
The command to program is 136. The command 137 can be used to read the Special-Mode-Register

The content of the high byte is 0.
The content of the low byte shows the table below:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
unipolar-Mode	x	x	x	Event-Modus	FIR-Filter	MW-Filter	Slow-Modus

Slow-Modus: At low data rates this command turns of the power supply of the DMS and other devices between the measurments.
MW-Filter: Read-Only Flag: is on, if MWexp > 0 (commands 138, 139)
FIR-Filter: turns on the fir filter.

Event-Mode: stops the data transfer. If a new maximum value appears it will be transmitted one time. The second bit in the Mode-Register (Max-Mode) has to be set to activate the Event-Mode.

Unipolar-Modus: Read-Only Flag determineds whether the unipolar mode or the bipolar mode is turned on .

x: Reservated.

Baudrate-Register

The size of the register is 1 Byte.
The content of the boud rate register is saved in EEProm of the GSV-3 .
To program the boudrate register the command 130 can be used to do so.
The content of the baudrate-register decides the baudrate of the GSV-3. The boud rate can be set if the "Config-Mode" jumper (RB0 to ground) was changed. Follow the steps to change the boudrate: turn off the GSV, set the jumper, turn it on, program the boud rate, turn of the gsv, remove the jumper, turn it on after.
Use the command 131 to read out the Special-Mode-Registers.
True for the boud rate is:

Parameter	Baudrate
0	4800
1	9600
2	19200
3	38400
4	57600
5	115200
6	250000
7	625000
8	1,25 M

Command description

writeSamplingRate / readSamplingRate

Operation number: 138, 139
This command sets the data rate and the sampling rate at the same time.
The number of datas, which are transfered per second via the interface is decided by the data rate.
The Sampling-Rate decides, how many Analog-Digital transformations per second are accompilshed.

ME-Meßsysteme GmbH
Neuendorfstr. 18a
16761 Hennigsdorf

Tel.: +49 3302 89824 60
Fax: +49 3302 89824 69

Mail: info@me-systeme.de
Web: www.me-systeme.de

11

The relation between the data rate and the sampling rate is seted by the number of notices:
sampling rate = Data rate * number of summands of the average value

The number of summands of the average value will be seted by the exponents "MwExp" to the base of "2". The range of values goes from 0 to 8, that means it is possible to make announcments from 1, 2, 4, 8, 16, 32 ...256 values durchgeführt werden, entsprechend 2 hoch „MwExp".

Parameter 1: average value exponent "Mwexp"
Parameter 2: Highbyte of the Sampling-Rate-Register
Parameter 2: Lowbyte of the Sampling-Rate-Register

Parameter 1
2 high Mwexp = number of average values
The value range is from 0 to 8.
0 referes to the average value - off
8 reffers to the average value about 256 summands

Parameter 2 and 3:
the computation formula for the Sampling-Rate-Register (second and third Parameter) of command 138/139 is:
register value = 65536 − (5000000 / Abtastrate);

To get a high signal- noise-ratio, the sampling rate and the MW-Exponent (MwExp) should be very high seted. The data rate can be reduced via the MW-exponent. A few examples for the parameter 1 to 3 at different data rates showes the following table:
Table "of the connections between data rate, sample rate, Sampling-Rate-Register and Baudrate"

Content of the Sampling-Rate-Register	Sample rate	MW-Summands	MW-Exponent	Data rate	minimum Baudrate
0x0000	76,29 Hz	256	8	0,298 Hz	4800
0xB3B4	256,0 Hz	256	8	1,000 Hz	4800
0xF85F	2560 Hz	256	8	10,00 Hz	4800
0xFC2F	5118 Hz	256	8	19,99 Hz	4800
0xF85F	2560 Hz	128	7	20,00 Hz	4800
0xFCF3	6402 Hz	128	7	50,02 Hz	4800
0xFCF3	6402 Hz	64	6	100,0 Hz	4800
0xFCF3	6402 Hz	32	5	200,1 Hz	9600

ME-Meßsysteme GmbH
Neuendorfstr. 18a   Tel.: +49 3302 89824 60   Mail: info@me-systeme.de
12   16761 Hennigsdorf   Fax: +49 3302 89824 69   Web: www.me-systeme.de

Content of the Sampling-Rate-Register	Sample rate	MW-Summands	MW-Exponent	Data rate	minimum Baudrate
0xFD8F	8000 Hz	16	4	500,0 Hz	19200
0xFD8F	8000 Hz	8	3	1000 Hz	38400
0xFE00	9765 Hz	8	3	1220 Hz	38400

The register value 0 reffers to the lowest setable sample rate of approximately 76,3Hz.

The firmware of the GSV-3 proves, if the seted boudrate is enough, to transfer the wanted datas.
Data rates greater than 1220 Hz are not getting transmitted.
The following chart showes the biggest possible data rate depending on the baudrate:

Baudrate	content of the Sampling-Rate-Register	Sample rate	MW-Summands	MW-Exponent	maximum Data rate
4800	0xFE10	10080 Hz	64	6	157,5 Hz
9600	0xFE10	10080 Hz	32	5	315,0 Hz
19200	0xFE00	9765 Hz	16	4	610,4 Hz
38400	0xFE00	9765 Hz	8	3	1220 Hz

To calculate the sample rate with the register value and the Sampling-Rate-Register the formula below:
sample rate = 5000000/(65536-register value).

setFrequency

Operation number: 18
The command SetFrequency sets the sample rate depending on the data rate,which is transfered in parameter. The MW-Exponent will be set to if this command is used (averagin of 16 measured values).
Parameter: Highbyte, Lowbyte
Parameter = (5000000/256) / Data rate = 19531,25 / Data rate

This command has been implemented for upwards compatibility between GSV-2 and GSV-3.

readFrequency

command number: 22

ME-Meßsysteme GmbH
Neuendorfstr. 18a   Tel.: +49 3302 89824 60   Mail: info@me-systeme.de
16761 Hennigsdorf   Fax: +49 3302 89824 69   Web: www.me-systeme.de   13

The 3 return parameters of the readFrequency command are related to the set data rate. This command has been implemented for compatibility with GSV-2 amplifiers. The application of the command 139 is recommended for reading the data rate.

For command 22, the following applies: data rate = 5×10^6 / (2^{24} parameter)

read Zero

command number: 2

Number of parameters: 0

Data sent by the GSV: 3

Read zero determines the contents of the zero register of the GSV. The read value can be stored in the computer and then restored at a later time using **write zero**.

read offset

command number: 4

Number of parameters: 0

From the GSV sent bytes: 2

Read offset Determines the off-setting of the pre-amplifier. The received value can be written back to the GSV using **write offset**.

write zero

command number: 6

Number of parameters: 3

From the GSV sent byte: 0

Write zero sets the zero calibration of the AD converter. The transferred 3 bytes must contain a value determined with **read zero** at an earlier point in time.

Influenced registers: Zero.

write offset

Command number: 8

Number of parameters: 2

From the GSV sent byte: 0

Write offset sets the off-setting of the pre-amplifier. The transferred parameters correspond to the values previously determined with **read offset**.

Note: Only the **write offset** and **set offset** commands affect the analog output.

Influenced registers: Offset.

get all

Command number: 9

Number of parameters: 1

From the GSV sent bytes: 0

Get all Restores the configuration that must be selected by the parameter.

Parameter:

0: Settings before the last shutdown

1: Manufacturer pre-setting

2 User-defined configuration

3 User-defined configuration

Influenced registers: frequency, offset, zero, threshold, mode, special mode

save all

Command number: 10

Number of parameters: 1

From the GSV sent bytes: 0

Save all saves all relevant registers of the GSV in an internal memory. This data is retained even after the device has been switched off. Different configurations can be stored. The parameter specifies the target of the memory process.

Parameters 2 and 3: User-defined configurations.

The positions 0 and 1 are not programmed by the user. At position 0 the current configuration of the GSV is automatically saved.

The secure data is loaded with the **get all** procedure.

set zero

Command number: 12

Number of parameters: 0

from the GSV sent bytes: 0

Set zero leads to a zero-point adjustment in the AD converter with the sensor connected. The analog output is not affected.

Comment: After this command, wait until GSV sends measured data again. If the log mode (see **set mode**) is set, a measured value is transmitted. If the maximum value mode is also set, the maximum value is reset to 0.

ME-Meßsysteme GmbH
Neuendorfstr. 18a   Tel.: +49 3302 89824 60   Mail: info@me-systeme.de
16761 Hennigsdorf   Fax: +49 3302 89824 69   Web: www.me-systeme.de   15

Influenced registers: Zero.

set offset

Command number: 14

Number of parameters: 0

From the GSV sent bytes: 0

Set offset performs an offset adjustment of the GSV input stage. This adjustment, in contrast to **set zero**, also affects the analog output of the GSV. This adjustment is essential for the functioning of the GSV in the event of a major disturbance of the bridge.

Comment:

During the offset adjustment, the GSV does not transmit any measured values.

After execution, all data buffers should be deleted to become obsolete and discarded measured values.

The time duration of the offset adjustment can be determined by **get offset wait** or can be taken from the technical data.

Set offset, write offset, set bipolar and set unipolar are the only commands that affect the analog output.

Influenced registers: Offset.

set unit

command number: 15

Number of parameters: 1

From the GSV sent byte: 0

Set unit displays the desired unit on the LC display.

Parameter	Meaning
0	mV/V
1	kg
2	g
3	N
4	cN
5	V
6	µm/m
7	(no)
8	t

Parameter	Meaning
9	kN
10	lb
11	oz
12	kp
13	lbf
14	pdl
15	mm
16	m
17	cNm
18	Nm

set norm

command number: 16

Number of parameters: 3

From the GSV sent byte: 0

Set norm normalizes the measured value displayed on the LC display

passed value. However, the standardization is not taken into account

Of the decimal point. This must also be set with set dpoint

become.

To calculate the parameter value for **set norm**, the intermediate dp for the decimal point calculated by the logarithm to the base 10 of the desired normalization value and to the whole number is rounded down.

The desired normalization value is then divided by 10 dp.

If the result is greater than the quotient 1.6666 / 1.05, it must be divided by 10 again. In addition, dp in this case must increase by one.

The number thus calculated is multiplied by 5250020, to the integer number

Rounded and expressed as a hexadecimal number (in the order of high byte, midbyte,

Lowbyte) to the GSV.

set dpoint

command number: 17

Number of parameters: 1

From the GSV sent byte: 0

Set dpoint transfers the decimal point indicated on the LC display to the passed digit.

To calculate the parameter value outgoing from a desired normalization value, the last obtained value of dp from the calculation rule for **set norm** is used, increased by one and sent as a parameter for the **set dpoint** command. The setting is only valid if the parameter value is in the range 1..6.

set bipolar

command number: 20

Number of parameters: 0

From the GSV sent byte: 0

Set bipolar sets the GSV into the bipolar mode (the measured value zero corresponds to the data value hexadecimal 8000).

After calling **set bipolar**, **set offset** and **set zero** must be called. The analog output provides an output voltage of 2.50 volts after the **set offset** has been called.

set unipolar

command number: 21

Number of parameters: 0

From the GSV sent byte: 0

Set unipolar Sets the GSV into the unipolar mode (the measured value zero corresponds to the data value 0). After calling **set unipolar**, **set offset** and **set zero** must be called. The analog output provides an output voltage of 0.00 V after calling **set offset**.

get norm

command number: 26

Number of parameters: 0

Data sent by the GSV: 3

Get norm determines a standardization set with **set norm** (without setting of the decimal point).

get unit

command number: 27

Number of parameters: 0

From the GSV sent byte: 1

Get unit determines a unit set with **set unit** (see also the list of meanings).

get dpoint

command number: 28

Number of parameters: 0

From the GSV sent byte: 1

Get dpoint determines the decimal point set with **set dpoint**.

switch

command number: 29

Number of parameters: 1

From the GSV sent byte: 0

Switch switches the switching output according to the parameter byte (1) or off (0). The state of the switching output remains only if the measured value lies between the switching thresholds. With **set threshold** the thresholds can be set. Thresholds at the measuring range edge deactivate the threshold switch. The switch output can then be used with **switch** independent of the measured value.

get serial number

command number: 31

Number of parameters: 0

From the GSV sent byte: 8

Get serial number determines the serial number of the amplifier (ASCII character string).

set threshold

command number: 32

Number of parameters: 4

From the GSV sent byte: 0

Set threshold sets the threshold value of the amplifier. The two first parameters correspond to the upper bytes of the switch-on threshold, the next two to those of the switch-off threshold. First, the higher-order byte is expected. The switch-on value must always be greater than the switch-off value. With the command **set mode**, the function can be selected as a window discriminator. In this case, the values are to be interpreted as upper and lower switching thresholds.

get threshold

command number: 33

Number of parameters: 0

From the GSV sent byte: 4

Get threshold determines the thresholds set with **set threshold**.

stop transmission

Command number: 35

Number of parameters: 0

From the GSV sent byte: 0

Stop transmission prevents the serial transmission of measured values. The serial buffer in the GSV is deleted. The state is not stored in the EEProm. An interruption of the voltage supply acts like start transmission. The "Logger mode", which is set with command 38, is used to permanently switch off the measured value transmission. Querying registers is also possible after calling **stop transmision** and in "Logger mode".

start transmission

command number: 36

Number of parameters: 0

From the GSV sent byte: 0

Start transmission starts the serial transmission of measured values.

clear buffer

command number: 37

Number of parameters: 0

From the GSV sent byte: 0

Clear buffer deletes output and input buffers of the GSV. This command should be executed before start transmission in order to delete existing old measured values.

firmware version

command number: 43

Number of parameters: 0

From the GSV sent bytes: 2

Firmware version reads the version number of the firmware of the GSV. The first byte contains "ten-fold" of the version number. The second byte contains the revision number.

ME-Meßsysteme GmbH
Neuendorfstr. 18a
20   16761 Hennigsdorf
Tel.: +49 3302 89824 60
Fax: +49 3302 89824 69
Mail: info@me-systeme.de
Web: www.me-systeme.de

get offset wait

command number: 53

Number of parameters: 0

From the GSV sent byte: 1

Get offset wait reads the waiting time, which must at least be adhered to after **set offset**. The read value must be multiplied by 0.0062 to get seconds.

get value

command number: 59

Number of parameters: 0

From the GSV sent bytes: 5 (in binary version)

Get value deletes the transmission of a measured value.

Since measurement values are normally transmitted continuously from the module, this function is only relevant if the measured value transmission by **stop transmission** is switched off, or the logger mode is active; See **set mode**.

clear maximum value

command number: 60

Number of parameters: 0

From the GSV sent byte: 0

Clear maximum value resets the maximum value measured in the maximum mode (see **set mode**) so that a new maximum value can be formed.