



Operation Manual

DC Voltage Measuring Amplifier with Data Logger

GM 80

From Firmware Rev. 3





1 Imprint

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<i>Valid for...</i>	<i>DC Voltage Measuring Amplifier GM 80 (from firmware rev. 3)</i>
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2 Notes

2.1 General Notes

This operation manual is intended for technically qualified personnel with appropriate skills in the field of measurement and automatic control techniques. The information regarding all safety precautions and warnings in this manual as well as their flawless technical implementation is prerequisite for the safe installation, the commissioning, the safe operation and maintenance of **Lorenz Messtechnik GmbH** devices. Therefore it is imperative that all measures are carried out by qualified personnel, only. All persons involved with project planning, installation and operation of **Lorenz Messtechnik GmbH** devices must be familiar with the safety concepts in automation and control technology and qualified in the above mentioned sense.

For the sake of clarity, this operation manual may not constitute a detailed use of **Lorenz Messtechnik GmbH** devices in all possible applications. Also, not all possible types of installation, operation and maintenance are considered. If further information is required or should particular problems arise, which are not or not sufficiently detailed represented in this manual, please request this information from **Lorenz Messtechnik GmbH**.

The safety precautions must be observed in order to prevent property damage, injuries and/or even death results.

Lorenz Messtechnik GmbH devices may only be operated in accordance with the applications prescribed in this manual. Built-in appliances may be used in professional installations, only.

With the connection and commissioning of the device, the buyer accepts the General Terms of Sale and Delivery of **Lorenz Messtechnik GmbH**. Furthermore, the buyer accepts possible incompleteness of the manual and that information described therein is subject to change. Errors and changes are reserved.

Provisions for Use

A **Lorenz Messtechnik GmbH** device is used for displaying, processing and controlling of processes. It may not be used as a sole instrument for the prevention of dangerous conditions of machines and plants. Machinery and equipment must be designed in a way that erroneous states do not lead to a dangerous situation for operators (e.g. by independent limit switches, mechanical interlocks). In particular, it must be ensured that an incorrect entry on the device, its malfunction or failure does not lead to property damage or cause hazard to persons. It is also important to prevent the evasion of the security provisions of a plant. Emergency stop equipment must always be active.

Installation Notes

Lorenz Messtechnik GmbH devices must be installed and connected in compliance with the relevant DIN and VDE Standards. They must be installed in a way that inadvertent operation is sufficiently excluded. In order to avoid an undefined or hazardous state caused by interruption of the supply and signal lines, the appropriate hardware and software-related safety precautions must be observed. Supply and signal lines must be installed in such way that impairment of function of **Lorenz Messtechnik GmbH** devices cannot be caused by interfering signals (such as inductive or capacitive interference).



Malfunction, Maintenance and Repair Notes

The devices do not contain parts which need or can be serviced by the user. Repairs may be carried out by **Lorenz Messtechnik GmbH**, exclusively. If assuming that safe operation of the device is no longer possible, it must be taken out of service and secured against inadvertent operation, immediately. This applies in particular, if:

- the device shows visible damage
- the device is no longer functional
- parts of the device are loose
- the connection lines show visible damage

It is also pointed out that all obligations of **Lorenz Messtechnik GmbH** are exclusively arising from the respective sales contract in which the warranty is conclusively settled.

2.2 Intended Use

Lorenz Messtechnik GmbH devices may only be used for measurement tasks and the directly related control tasks. Any other use is considered improper.

2.3 General Dangers by not following the Safety Precautions

The device complies with the state of current safety requirements. Residual risks can occur, if the device is improperly used and operated by untrained personnel. Any person commissioned with the installation, operation and maintenance of the device must have read and understood the operation manual and the safety precautions, in particular.

2.4 Residual Dangers

The device only covers part of the scope of measurement technology. Safeguarding interests of the measurement technology must be planned and realized by the plant designer/supplier in a way to minimize residual dangers. The valid rules regulations and laws must be observed. Residual risks in connection with measurement technology must be pointed out.



2.5 Safety and Caution Symbols

If residual risks occur while working with the device, the following symbols in this operation manual must be noted:

**Warning:**

Warns of a potential risk of serious life-threatening injuries. The accident prevention regulations of the employer's liability insurance association must be considered.

**Caution:**

Warns of a potential danger of damage for the device, process, persons, or environment.

**Note:**

Supplemental information.

**Important / Tip:**

Reference to more detailed technical information.

2.6 Health Protection and Safety

To ensure that our products are safe and do not pose health hazard, following points must be considered:

1. All relevant sections of this manual must be read attentively in prior to the operation.
2. All warning labels on containers and packages must be noted.
3. Installation, operation and maintenance work may only be carried out by accordingly trained personnel under observance of the given instructions. If one of these instructions is not considered, the user of the product bears the complete responsibility for all consequences, occurring from the failure to comply.
4. Before opening the device, it must be disconnected from any power supply.

2.7 Qualified Personnel

Qualified personnel are persons who are familiar with the installation, operation and the maintenance of the device and have appropriate qualifications. The device shall only be used by qualified personnel according to the technical data in connection with the following safety regulations and rules. During the operation, legal and safety rules for the respective application case must be noted. The same applies for the use of accessories.

2.8 Changes

The device may not be changed constructively or safety-related without the explicit permission of **Lorenz Messtechnik GmbH**. Any modification shall exclude liability on our part for damages resulting from this. Repairs and changes to the circuit boards are prohibited.

3 Continuative Documents

Following documents contain reference information about //TODO...

- 080599.pdf, data sheet of the DC Voltage Measuring Amplifier GM 80
- 170197.doc, printer connection to the GM 80 Measuring Amplifier
- 090235.doc, description driver installation for USB interface



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5 Introduction

This manual describes the features and installation procedures of the portable DC Voltage Measuring Amplifier GM 80 from firmware version 3.

5.1 Product Description

The GM 80 is a DC Voltage Measuring Amplifier for passive or active sensors. A flexible data logger can store up to 15288 measured values with time and date. Portable use is possible by battery or accumulator operation; however, it can also be operated with a power unit. Measuring or logging values are transmitted via USB or RS-232 interface to a PC or a printer. Up to 10 parameter sets can be stored. The adjustment data, the sensor designation and the physical unit are stored. Functions such as tare, retrieve of min./max. and min./max.-delete are available during the measurement procedure. Via a trigger input, the data logger or the interface can be controlled from the outside. If the GM 80 Measuring Amplifier is being delivered with one or more sensors, these sensors will be adjusted to the GM 80 Measuring Amplifier and are immediately ready for operation. The assignment of the sensors to the corresponding parameter set can be documented on the back side of the device.

5.2 Power Supply

Mains operation:

Power supply:	6 V DC, min. 1,8A, safe from reverse polarity
Ripple:	< 10%
Fuse:	self-resettable fuse 1,5A
Undershoot/overshoot:	can lead to erroneous measurements or defects.
Voltage peaks:	are being discharged by fast protection components.
Voltage dropouts:	voltage dropouts up to 10ms have no effect.

Warning:



Batteries must be removed during Mains Operation !

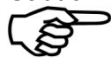
Use only supply voltages with ground reference, switching power supplies without ground reference can cause measurement errors.

Battery- / accumulator operation:

Battery operation:	4 x type: Mignon AA 1,5V
Accumulator operation:	4 x type: NiMH Mignon AA with min. 1500mAh and 1,2V
Power supply:	if the permissible battery voltage falls below, the display will start to blink. Please change the batteries/accumulators immediately, otherwise no proper measurements can be ensured!

5.3 Safe and Proper Use

Caution:



- Protect the device against moisture, condensation, rain, snow....
- Protect the device against direct solar radiation
- Protect the device against dust and pollution
- Protect the device against excessive ambient temperature
- Protect the device against excessive vibration

5.4 Dimensions – Weight

Device dimensions in mm: L x W x H: 200x100x40 Weight: 0,5kg



6 Instruction / Description of the Operating Mode

6.1 Connection Description



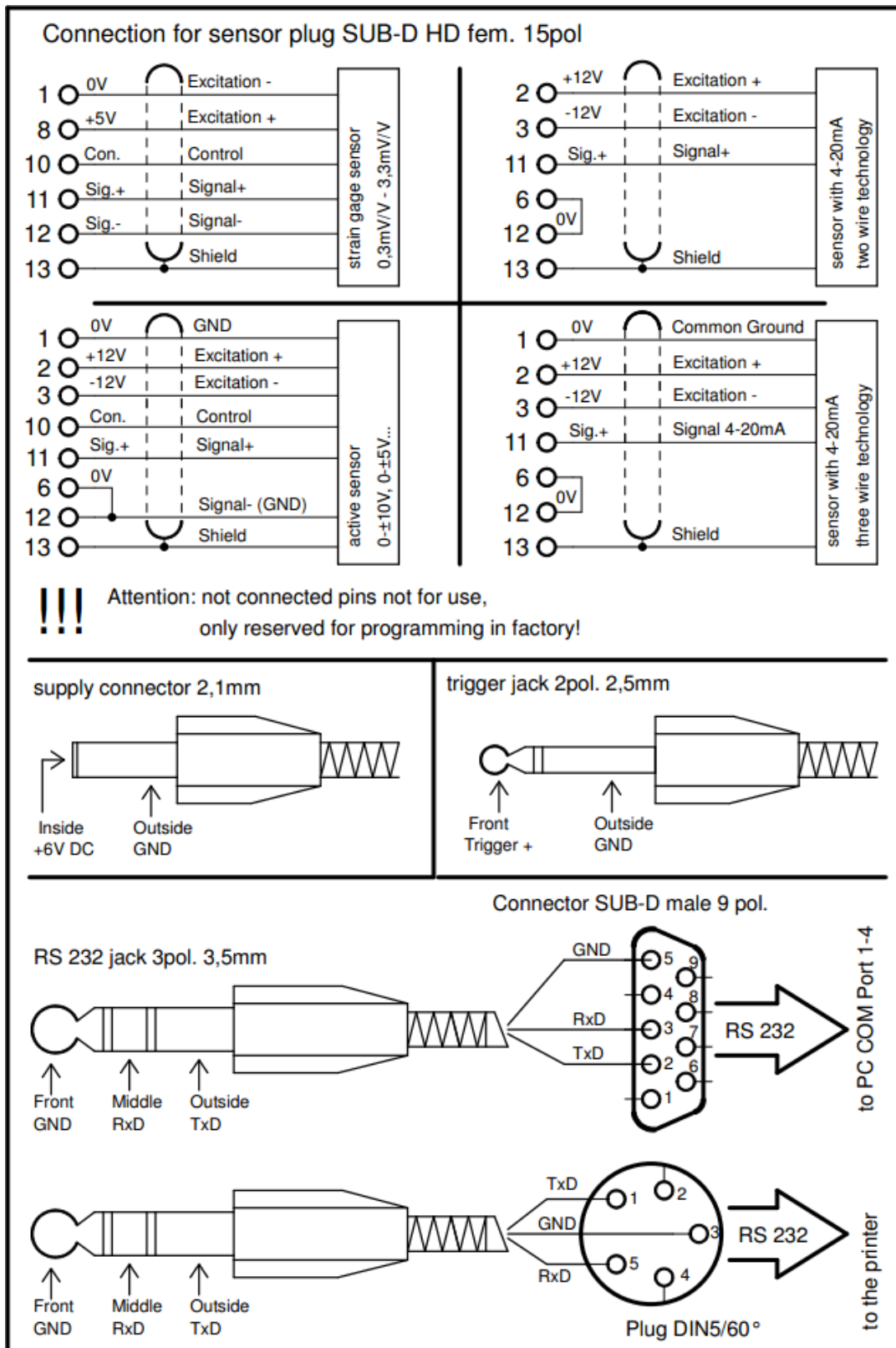
Key Description:

- ENTER:** Switch-on
Confirm, one step forward in the menu
- ESC:** Switch-off
Discard, one step back in the menu
- ▲ :** Scroll up, (press key constantly → automatic display of the next digit etc.)
- ▼ :** Scroll down, (press key constantly → automatic display of the next digit etc.)



- USB:** USB-socket for:
- RS232:** RS232- socket for:
- 6V DC:** Power supply socket for:
- Trig:** Trigger socket for:
- SENSOR:** Sensor socket for:

- USB-connector type B
- 3,5mm pin 3pol.;front: GND; middle: RxD; outside: TxD
- 2,1mm barrel connector; inside: +6V DC; outside: GND
- 2,5mm pin 2pol.; front: Trigger+; outside: GND
- SUB-D HD 15pol.



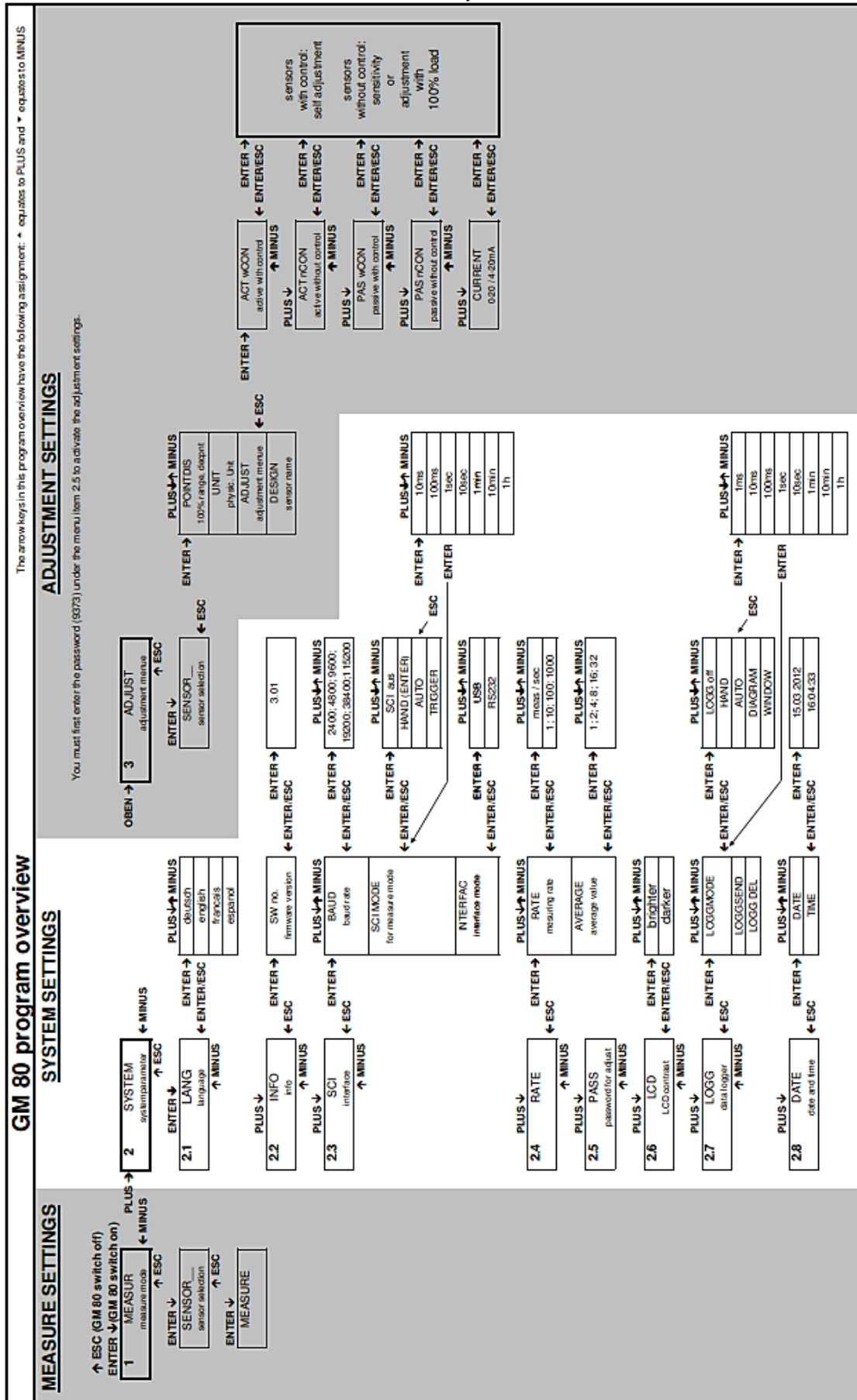
6.2 Switching the Device on

The device is activated and ready to operate as soon as ENTER was pressed.



6.3 Menu Description

6.3.1 Brief Overview of the Menu Structure for the Operation



**6.3.2 Menu description**

1 MEASURE	Measuring mode
SENSOR__	Sensor selection for measuring mode, Sensor 0 – 9 Selection of the sensor parameter set for the measurement. The sensor parameter set must comply with the connected sensor.
2 SYSTEM	All system parameters are stored in this menu column.
2.1 LANG	Language adjustment The menu language is available in English, German, French and Spanish.
2.2 INFO	Information query was factory-configured and is not modifiable.
SW no.	Firmware version, important for technical questions.
2.3 SCI	Interface configuration
BAUD	Baud rate adjustment; it must comply with the receiver (Pc or printer).
SCI MODE	The interface configuration only refers to the measuring mode, not the log mode!
SCI off	Interface switched off
HAND	When pressing ENTER in the measuring mode, a measured value is displayed.
AUTO ¹	Interval time, adjustable from 10ms to 1h (at high measuring rate only possible with the highest baud rate).
TRIGGER	At rising edge on the trigger input, in measuring mode a measured value is displayed.
INTERFAC	Interface selection.
USB	USB interface is activated.
RS232	RS232 interface is activated.
2.4 RATE	Measuring rate¹ and average value
RATE	Measuring rate adjustment, selectable from 1/s to 1000/s. For fast procedures (screw joint, insert press...) always select a fast measuring rate, e.g. 1000/s, for very slow procedures select a small rate, e.g. 1/s.
AVERAGE	Average determination, the numbers indicate the average determination by the amount of measurements. Applicable for e.g. vibrations, control oscillations...
2.5 PASS	Password query
	Entering password 9373 allows to change to menu 3 ADJUST . Here, the sensor parameters can be changed.
2.6 LCD	LCD contrast setting
	If the LCD becomes unreadable by external influences, e.g. solar radiation, heat or cold, the LCD contrast can be changed by pressing key ▲ or ▼.
2.7 LOGG	Data logger settings
LOGGMODE	Data logger configuration
LOGG off	Off-switch for logger operation, measuring mode possible, only.
HAND	With each keystroke on ENTER a log value is accepted.
AUTO	Adjustment of the measurement intervals for the automatic measured value storing.
DIAGRAM	With each rising edge of the trigger signal, a log value is accepted.
WINDOW	The window operation is started by a rising trigger edge and can be finished only by a falling edge. During this time, measured values are stored in 1ms raster in the data logger.
LOGGSEND	Log values are issued through the interface, press ENTER twice.
LOGG DEL	Log values are deleted after a safety query. Before deleting, please assure that the data was received as requested.
2.8 DATE	Date and time setting
DATE	Date
TIME	Time
3 ADJUST	Adjustment Menu
	This menu is active only, if the password has been entered in menu mode 2.5PASS. For the adjustment, the sensor must be connected to the sensor socket.
Sensor__	Sensor number or the name of the sensor to be adjusted.
POINTDIS	Final measurement value of the sensor with decimal indication e.g. 1000; 100,0; 10,00; 1,000. The numerical values are variable, 4 digits are available. Change to menu mode POINTDIS. After pressing ENTER , the final measure-

¹ If the SCI → AUTO interval time is shorter than the adjusted measuring rate, the same measured value will be issued on the interface until a new value is entered.



ment value of the sensor can be entered. With keys \blacktriangle and/or \blacktriangledown the first digit can be edited, go to the next figure by pressing **ENTER**. When all 4 digits are edited, the decimal point gets shifted by keys \blacktriangle and/or \blacktriangledown . Press **ENTER** to complete the entry, the final value will then be stored in the GM 0 measuring amplifier.

UNIT	Entry of the physical unit, e.g. kg, Ncm, t, gr, kN, Nm, bar...
ADJUST	Sensor type selection (active with 100 % control signal, with 100 % control signal, active without 100 % control signal, passive with 100 % control signal, passive without 100 % control signal, 4 – 20mA
DESIG	Name of the sensor, e.g. sensor 1, 2, 3, DR-2112, silo, tank, mixer, scale1, motor, test1..

6.4 Operation Examples

- The GM 80 measuring amplifier is activated by pressing **ENTER**.
- Check time and date in menu mode SYSTEM and adjust if necessary.
 - Adjust language
Enter menu mode 2 SYSTEM – 2.1 LANG. When the **ENTER** key is pressed, the GM 80 Measuring Amplifier is in the selection mode. With key \blacktriangle or \blacktriangledown the language can be selected. With **ENTER**, the selected language will be stored. Now, the menu is displayed in the selected language. With **ESC**, the selected language is discarded.
 - Adjust time
Enter menu mode 2 SYSTEM – 2.8 TIME. Select TIME. When the **ENTER** key is pressed, the actual adjusted time will be displayed. Press **ENTER** again and the time can be adjusted. Adjust the hours with key \blacktriangle or \blacktriangledown . Press the **ENTER** key again and the minutes can be adjusted with key \blacktriangle or \blacktriangledown . Press **ENTER** and time will be stored. By **ESC**, the currently adjusted time will be discarded
- Change to measuring mode
In menu mode 1 MEASUR, a list of all sensors is called by pressing **ENTER** the list of all sensors is called. With key \blacktriangle or \blacktriangledown a sensor parameter set can be selected. By **ENTER** the GM 80 Measuring Amplifier is being adjusted to this sensor parameter set. The **ESC** key allows to return to the menu mode 1 MEASUR from any menu mode.
- Change measuring rate from the measuring mode
The measuring mode can be left by pressing **ESC**. After pressing **ESC** again, the GM 80 Measuring Amplifier is in menu mode 1 MEASUR. From there, the menu mode 2 SYSTEM – 2.4 Rate can be called. Select RATE by key \blacktriangle or \blacktriangledown . By pressing **ENTER** the first adjusted measuring rate is displayed. By key \blacktriangle or \blacktriangledown a new measuring rate can be adjusted. By **ENTER** the new measuring rate will be taken over, by **ESC** the new measuring rate will be discarded
- Switch-off the GM 80 Measuring Amplifier
In menu mode 1 MEASUR, the GM 80 Measuring Amplifier can be switched-off by pressing **ESC** for >1 sec.



6.5 Measuring with the GM 80 Measuring Amplifier

Description with an example:

6.5.1 Selected Sensor

Force sensor, meas. range:	200kN
Sensitivity.:	2mV/V
Designation e.g.:	PRESS
Parameter set: sensor no.:	3
Option:	100 % control signal

6.5.2 Sensor Parameters

After entering the password (9373) in menu mode 2SYSTEM-2.5PASS, the sensor can be applied in the adjustment menu.

Following parameters are available:

Sensor__	Sensor no. 3	Sensor 0 – 9 possible
POINTDIS	200,0	Adjust meas. range and decimal point (max. 9999)
UNIT	_kN	1 – 3-digit unit possible
DESIGN	Press	Up to 8 digit name (or numbers) freely selectable
ADJUST	PAS_wCON	Select "Passive with 100 % control signal". See sensor data sheet.
0% LOAD	Unload sensor	0% sensor value is assigned to display 0.
100% CON	Autom. adjustment	100% sensor value is assigned to display 200,0kN.
SAVE	ENTER or ESC	Confirm or discard

6.5.3 Measuring with the GM 80 Measuring Amplifier

In order to measure with this sensor, the sensor "Press" is selected in the measuring mode. During the measurement, a minimum and maximum value buffer can be accessed with key ▼. The displayed minimum or maximum value in each case can be deleted by pressing **ENTER**.

If the measured value will be sent to a pc or printer via an interface, the appropriate interface must be selected, the baud rate must be matched to the recipient and in SCI-MODE, the operating mode must be chosen. For example: HAND, a measured value with time is displayed each time you press **ENTER** during the measurement.

For data logging, adjust the operating mode in the logger mode, e.g. choose AUTO and interval time e.g. 10 sec and go to the measuring mode. A measured value with time is now stored every 10 sec. In mode LOGGSEND, these data can then be sent via the interface

Note:



During operation with a USB-interface, the baud rate must also be set correctly. It must match the baud rate of the virtual COM port of the receiving PC.

6.6 Serial Interface



For the serial data transmission the GM 80 Measuring Amplifier uses either an RS232 or a USB interface. The PC manages the USB interface as a virtual COM port. For the use of the USB interface, must have a Windows operating system (2k, XP, Vista, 7) and the **Lorenz Messtechnik GmbH** USB driver must be installed (see Chapter 3 – Continuative Documents for the Installation). After installing the drivers, the virtual COM port can be used as described below.

**6.6.1 Transfer rate / specification RS232 (V.24) / USB**

Parity:	none	} 8N1
Number data bits:	8 (1Byte)	
Stop bit:	1	
Baud rate:	settable (2400; 4800; 9600; 19200; 38400; 115200 Baud)	



In the USB mode, the baud rate in the GM 80 Measuring Amplifier must match with the connected device

6.6.2 Protocol overview

Via the serial interface, the GM 80 Measuring Amplifier can issue the measured values individually or automatically. The commands can be send to the GM 80 Measuring Amplifier via a terminal program or a PLC. Following commands are available:

6.6.2.1 Command overview

<u>ASCII</u>	<u>HEX</u>	<u>Description</u>	<u>In Measuring Mode</u>	<u>Not in Measuring Mode</u>
k	0x6B	ENTER	✓	✓
l	0x6C	▲	✓	✓
m	0x6D	▼	✓	✓
n	0x6E	ESC	✓	✓
A	0x41	Read-out data logger	✓	✓
C	0x43	Read-out current sensor parameters	✓	✓
D	0x44	Read-out status	✓	✓
E	0x45	Read-out complete status	✓	✓
g	0x67	Change protocol setup	✓	✓
0	0x30	Continuous measured value query (signed integer)	✓	
1	0x31	Query of max. value (signed integer)	✓	
2	0x32	Query of min. value (signed integer)	✓	
3	0x33	Tare of display	✓	
4	0x34	Reset max. value	✓	
5	0x35	Reset min. value	✓	
6	0x36	Actuate 100 % 100 % control signal – for sensors with 100 % control resistance	✓	
7	0x37	Switch-off 100 % 100 % control signal – for sensors with 100 % control resistance	✓	
B	0x42	Delete data logger	✓	
a	0x61	Write time		✓
b	0x62	Read-out time		✓
c	0x63	Write company head		✓
e	0x65	Write all sensor parameters (<i>not supported yet</i>)		✓
f	0x66	Read- all sensor parameters (<i>not supported yet</i>)		✓



In menu 3: ADJUST→UNIT and ADJUST-DESIG, the adjustments cannot be changed by the commands “l” and “m”.



6.6.2.2 Read-out of actual sensor parameters:

Sensor designation	8Byte	ASCII
Final display value	2Byte	packed BCD-number
Unit	3Byte	ASCII
Sensor type and digit	1Byte	0xAB: A ... 0xAB: A ... Sensor type, B ... digit (binary coded)

Sensor type:
0xXXXX XXXX

```

||||
0000 ...active with 100 % control signal adjust 0%Load and 100%Load
0001 ...active without 100 % 100 % control signal adjust 0%Load and 100%Load
0010 ...active without 100 % 100 % control signal adjust 0%Load and 100%Load V
0011 ...active without 100 % 100 % control signal adjust 0%Load V and 100%Load V
0100 ...passive with 100 % 100 % control signal adjust 0%Load and 100%Load
0101 ...passive without 100 % 100 % control signal adjust 0%Load and 100%Load
0110 ...passive without 100 % 100 % control signal adjust 0%Load V and enter
      100%Load in mV/V
0111 . passive without 100 % 100 % control signal enter 0%Load mV/V and enter
      100%Load in mV/V
1000 ... Current adjust 0%Load and 100%Load
1001 ... Current adjust 0%Load and enter 100%Load in mA
1010 ... Current enter 0%Load in mA and enter 100%Load in mA

```

Digit:
0xXXXX XXXX

```

||||
|000 ... 5000
|001 ... 5,000
|010 ... 50,00
|011 ... 500,0
|100 ... 5,000

```

0%Load	2Byte	HEX-value (MSB/LSB)
100% Load	2Byte	HEX-value (MSB/LSB)

6.6.2.3 Read-out status:

Status	2Byte	General error condition of the GM 80 measuring amplifier
--------	-------	--

6.6.2.4 Read-out complete status:

Status	2Byte	General error condition of the GM 80 measuring amplifier
Meas. rate	1Byte	0x01 ... 1000/s 0x02 ... 100/s 0x03 ... 10/s 0x04 ... 1/s
Average value	1Byte	0x01 ... x/1 0x02 ... x/2 0x04 ... x/4 0x08 ... x/8 0x10 ... x/16 0x20 ... x/32
SCI_MODE	1Byte	0x00 ... interface is off mode 0x04 ... hand mode 0x08 ... automatic mode 0x0C ... trigger mode
SCI_MODE_DELAY	1Byte	0x02 ... 10ms 0x03 ... 100ms 0x04 ... 1s 0x05 ... 10s 0x06 ... 1min 0x07 ... 10min 0x08 ... 1h
LOGGMODE	1Byte	0x00 ... logger is off mode 0x04 ... hand mode 0x08 ... automatic mode 0x0C ... DIAGRAM mode 0x10 ... windows mode
LOGGMODE_DELAY	1Byte	0x01 ... 1ms 0x02 ... 10ms 0x03 ... 100ms 0x04 ... 1s 0x05 ... 10s 0x06 ... 1min 0x07 ... 10min 0x08 ... 1h
Language	1Byte	0x00 ... GERMAN 0x02 ... ENGLISH 0x04 ... FRENCH 0x06 ... SPANISH
Protocol status	1Byte	0xXXXX XXXX (binary coded)

```

|||| |||| ... do not send final character
|||| |11 ... send CR/LF
|||| |1 ... send CR
|||| 1 ... send LF

```

6.6.2.5 Write time:

Writing time is the same as the data block for the receipt of time. However, the data block for writing is secured with a check sum and the associated weighted check sum.



6.6.2.6 Read Time:

With following read-out:
DAY.MONTH.YEAR
2xSpace
HOURS:MINUTES:SECONDS

6.6.2.7 Write Company Head:

The entry ends either if 256 characters are received or if the character ETX (0x03) Strg-C is contained in the character string.

6.6.2.8 Read Company Head:

By this command, the company head, which is stored in the GM 80 Measuring Amplifier, is read-out.

6.6.2.9 Write all Parameters:

The writing data block of all sensor parameters is identical with the receiving data block for reading all parameters. However, for the writing of the sensor parameters a check sum and the referring weighted checksum is required.

6.6.2.10 Read all Parameters:

The read-out of all parameters from sensor 1 to sensor 10 occurs in following sequence:
Sensor designation
Final displayed value
Unit
Sensor type (adjustment type) / decimal point
Adjustment values 0% Load, 100% Load with 2Bytes each
See command „read current sensor parameters“

6.6.2.11 Change Protocol Setup:

Protocol status	1Byte	0xXXXX XXXX (binary coded)
		111
		111 ... do not send final character
		11 ... send CR/LF
		1 ... send CR
		1 ... send LF

6.6.2.12 Calculation of the Check Sum (CS) and the Weighted Check Sum (gewCS):

The calculation occurs via all parameter bytes (without the command byte). At the CS all bytes are added (overflows are not considered here). For the calculation of the gewCS, the CS is added to the gewCS. At an overflow, the gewCS is incremented by 1.

6.6.3 Printer: Type: E-GM 80 – DR: (optionally available)

With this small thermal printer and the supplied connection cable enables read-out and printing of the measured values and the corresponding time from the GM 80 Measuring Amplifier. By the integrated accumulators, mobile application is possible. The accumulators can be charged by using a power supply unit; mains operation is also possible. A baud rate of 9600 baud must be adjusted at the GM 80 Measuring Amplifier.





6.6.4 Operation via the serial Interface / USB

Formatting the serial interface output:

Output format in SCI Mode:

HAND:		Sign, measured value, unit, time and CRLF
AUTO:	10ms	Signed integer and CRLF
	100ms	Signed integer and CRLF
	1s	Sign, measured value, unit, time and CRLF
	10s	Sign, measured value, unit, time and CRLF
	1min	Sign, measured value, unit, time and CRLF
	10min	Sign, measured value, unit, time and CRLF
	1h	Sign, measured value, unit, time and CRLF
TRIGGER:		Signed integer and CRLF

Output format in LOGG mode:

HAND:	Sign, measured value, unit, time and CRLF
AUTO:	Sign, measured value, unit and CRLF
DIAGRAM:	Sign, measured value, unit and CRLF
WINDOW:	Sign, measured value, unit and CRLF

Adjustments in SCI-Mode

SCI Off	In this setting, a transfer of measured values from the GM 80 is disabled. However, the GM 80 can be addressed with the GM 80 commands
HAND	In this mode, a measured value is issued via the serial interface when ENTER is pressed at the GM 80 Measuring Amplifier.
AUTO	In this mode a measured value is issued via the serial interface in the adjusted delay.
TRIGGER	At a trigger event in this mode, a measured value is issued via the serial interface. The trigger pulses can occur in 10ms raster. The edge of the trigger pulse must be on HIGH for at least 4ms. After that, it must be on LOW for at least 6ms.

6.6.5 Operation and Function of the Data Logger

If the GM 80 Measuring Amplifier is not the measuring mode, the data logger can be read either via menu point 2.7 LOGG – SENDING, or by the command "A" via the interface. Outside of the measuring mode, the data logger can only be deleted via menu point 2.7 LOGG – DELETION.

If the GM 80 Measuring Amplifier is in the measuring mode, the data logger can be read by command "A" and deleted by command "B"

If the measuring mode is being selected from the menu point 1MEASURING-sensor selection, the starting time of the measurement, the current sensor designation, the final value of the measuring range, the adjusted measuring rate and the logger mode (e.g.: AUTO 1ms) are saved in the logger.

NOTE: All previous measured values are deleted by this!

During the read-out of the data logger via the serial interface, different adjustments are sent by the GM 80 Measuring Amplifier

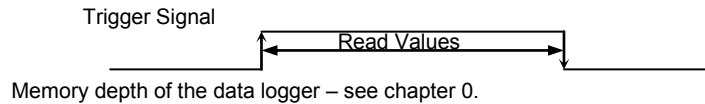
- Company head
- Starting time of the measurement
- Sensor designation
- Final displayed value
- Adjusted measuring rate
- Adjusted logger mode
- Thereafter, the measured values

In the HAND MODE the measured values and the time are logged.

Only the measured values are logged in the LOGGMODE AUTO. The time can be assigned to each measured value by the indicated starting time. Since in GRAPHS and in the WINDOW MODE, trigger events < 1sec can occur, an additional time log is not realizable at the moment.

**Adjustments in the LOGG-Mode**

LOGG OUT	Here the data logger is switched off. The log mode in the measuring mode is switched to "LOGG OUT" as soon as the entire data logger has been edited.
HAND	In this mode a measured value is written into the data logger when the ENTER key was pressed at the GM 80 Measuring Amplifier. By an additional log of time, there is a time assignment for each measured value.
AUTO	In this mode, depending on the adjusted delay, a measured value is written into the data logger. By the stored starting time there is a time assignment for each measured value.
GRAPH	In this mode, at a trigger event, a measured value is written into the logger. Since the trigger pulses occur in 10ms raster, an additional log of the time is not possible. The edge of the trigger pulse must stand on HIGH for 4ms at least. Then it must be on LOW for at least 6ms.
WINDOW	This mode reacts to rising and/or falling edges. At a falling edge, the logging of the measured values is started. From now on the measured values are written in the data logger with 1ms raster. A falling edge ends the recording.

**6.7 Adjustment Description****6.7.1 Adjustment to an active sensor with control signal (ACT wCON)**

Adjustment possibilities:

- After pressing **ENTER**, the automatic adjustment procedure is started. The device first reads the 0% load value and displays WARM UP. Then the 100% load value is read-in and displayed during the WARM UP again. After this procedure, the device displays SAVE?. This indicator should be confirmed either by pressing **ENTER** to store the adjustment values in the GM 80 Measuring Amplifier, or **ESC** to cancel.

6.7.2 Adjustment to an active sensor without control signal (ACT nCON)

Adjustment possibilities:

- adjust 0% load and 100% load
- adjust 0% load and enter hub [100% load in V – 0% load in V]
- enter 0% load in V and the hub [100% load in V – 0% load in V]

By pressing **▲** or **▼** 0% LOAD or the nominal value can be selected.

0%LOAD unload sensor

or NOMVALUE input of the nominal value in V.By pressing **▲** or **▼** 100% LOAD or the nominal value can be selected

100%Load adjustment by 100 % load (apply the nominal load)

or NOMVALUE input of the nominal value in V:

SAVE Query for takeover of the adjusted data.

6.7.3 Adjustment to a passive sensor with control signal (PAS wCON)

Adjustment possibilities:

- After pressing **ENTER**, the automatic adjustment procedure is started. The device first reads the 0% load value and displays WARM UP. Then the 100% load value is read-in and displayed during the WARM UP again. After this procedure, the device displays SAVE?. This indicator should be confirmed either by pressing **ENTER** to store the adjustment values in the GM 80 Measuring Amplifier, or **ESC** to cancel.

**6.7.4 Adjustment to a passive sensor without control signal (PAS nCON)**

Adjustment possibilities:

- adjust 0% load and 100% load
- adjust 0% load and enter 100% load in mV/V
- enter 0% load in mV/V and 100% load in mV/V

Select between 0 % load or nominal value by pressing ▲ or ▼

0%LOAD unload sensor

or NOMVALUE input of the nominal value in mV/V

Select between 100 %load or nominal value by pressing ▲ or ▼

100%Load Adjustment by 100 % load (apply nominal load)

or NOMVALUE input of the nominal value in mV/V

SAVE Query for takeover of the adjusted data.

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6.7.5 Adjustment to current 4-20mA

Adjustment possibilities:

- adjust 0% load and 100% load
- adjust 0% load and enter 100% load in mA
- enter 0% load in mA and 100% load in mA

Select between 0 % load or nominal value by pressing ▲ or ▼

0%LOAD unload sensor

or NOMVALUE input of the nominal value in mA (fixed value 4 – 20mA)

Select between 100 %load or nominal value by pressing ▲ or ▼

100%Load Adjustment by 100 % load (apply nominal load / nominal torque)

or NOMVALUE input of the nominal value in mA

SAVE Query for takeover of the adjusted data

.

Note:

If no sensor can be selected and/or the sensor does not enter into the measuring mode, the sensor/parameter set was not adjusted correctly.
→ Re-adjustment



6.8 Interfaces and Connections

6.8.1 Connection for SG Sensors:

Supply via GM 80: 5,00V max. 20mA, short-circuit protected
 Bridge resistance: min. 350 Ohm, only full bridge, 4- or 6-wire
 Sensitivity: up to 3,3mV/V, other values upon request.
 100% control signal: is switched from the GM 80 Measuring Amplifier via the control input.

6.8.2 Connection for active sensors:

Voltage input: ±10V, max. 5mA, output resistance < 10hm
 Current input: 0...20mA, 4...20mA, an 750hm impedance

6.8.3 Visual Evaluation:

Display: 8-digit LCD-Display with backlight.

6.8.4 Trigger input:

The device has an electrically isolated control input: **Trigger**. This input can be controlled by e.g. a PLC, a remote switch, a foot switch etc. As a control signal, following voltage levels for each logic state must be applied to the phone jack:

Logic State	Low Level	High Level
Voltage Level	0 V – 2 V	3,5 V – 27 V
State	inactive	active

Depending on adjustment, data can be logged or interface data can be issued. This input has a high sampling rate, thus very short pulses will be detected.

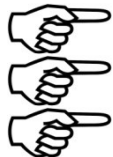
2 pol phone jack: Trigger

6.8.5 RS232 / USB:

For the serial data transfer, the GM 80 Measuring Amplifier uses either an RS232 or a USB interface.

7 Product Phases

7.1 Transportation

Note:

Please pack the equipment suitable for transportation

The equipment may not be able to move back and forth in the package

Please protect the equipment against moisture

7.2 Commissioning and Installation

Safety measures before the installation:**Caution:**

The device may not be connected to the power supply system, directly. The specifications of the supply voltage in chapter 5.2 must be considered.



Cable connections:

Caution:



Never connect voltage levels to unoccupied pins!

7.3 Standard Operation

EMC:

Caution:



The device may not be exposed to higher EMS transients than determined by the standard.

Cable:

Caution:



Never disconnect the connectors by pulling the cables. Always separate the connector at the plug, directly.

Storage

Note:



Store the device in dry and dust-free spaces, only.



Please remove the batteries during storage.



7.4 Maintenance and Cleaning

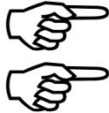
Cleaning:

Warning:



Please disconnect the device from the power supply before cleaning.

Caution:



Clean the housing with a soft and slightly moisturized cloth. Never use solvents, as they may damage the front panel labeling and the display panel. While cleaning, ensure that no liquids enter the device or the connections

Changing the batteries:

Caution:



Note the correct polarity of the batteries.

Preventive maintenance and inspection:

Note:



Check the plug connections.

Repair:

Note:



The device does not contain any parts which must or can be serviced by the user. Repairs may be carried out by **Lorenz Messtechnik GmbH**, exclusively. If assuming that safe operation of the device is no longer possible, it must be taken out of service and secured against inadvertent operation, immediately.

This applies in particular, if:

- the device shows visible damage
- the device is no longer functional
- parts of the device are loose
- the connection lines show visible damage



7.5 Safe Disposal

Battery disposal:

End users are required to return used batteries by law (battery ordinance); the disposal with normal waste is prohibited. The used batteries/rechargeable batteries can be returned to our company free of charge, to collecting communities or any place where batteries are sold.
!

Equipment disposal:

Please dispose obsolete equipment in accordance with the applicable statutory provisions. By this, you meet the legal obligations and also contribute to the environmental protection!

