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Operating Instruction

SPG-DIGI-W



Please read carefully before use!

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1 Introduction

The SPG-DIGI-W (SPG-DIGI wireless) is a digital manometer featuring a MIN/MAX display function. Full scale (FS) accuracy is $\pm 0,5\%$ based on the upper limit of the measurement range. Dynamic pressure peaks are measured at a scanning rate of 10 ms (100 measurement values / second). The MIN/MAX memory is continuously updated and rewritten.

1.1 Notes on Safety / Product Selection

The correct functioning of the SPG-DIGI-W can only be guaranteed when the specifications detailed in these operation instructions are adhered to. In particular, specifications relating to the permitted upper limit of the measurement range as well as the permissible temperature range must be observed.



Serious malfunctions leading to personal injury or damage to property can result from using the chosen product in applications that do not comply with the specifications or from disregarding the operation instructions. In particular, incorrect mounting of the manometer and the corresponding adapter can cause the manometer to be torn out of the assembly.

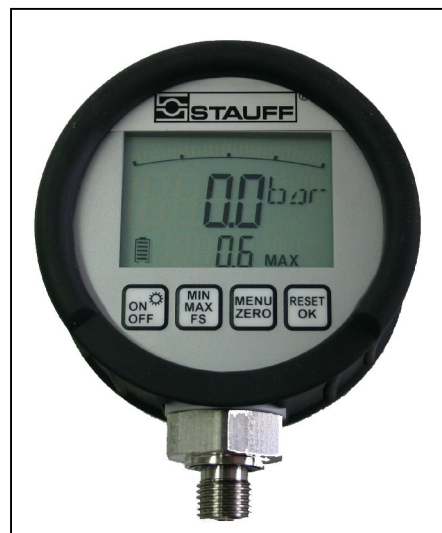
For Service, Repair and Calibration of the measurement instruments please contact your STAUFF sales branch.

1.2 Device Versions and Range of Delivery

Device Versions and scope of delivery			
Pressure connection G 1/4 male thread Without Connection adapter Basic setting to unit "bar"		Pressure connection 7/16-20 UNF male Without Connection adapter Basic setting to unit "PSI"	
Measurement Range	Part No.	Measurement Range	Part No.
-1 ... 16 bar	SPG-DIGI-W-B0016-B	-14,5 ... 230 psi	SPG-DIGI-W-B0016-U
0 ... 100 bar	SPG-DIGI-W-B0100-B	0 ... 1.450 psi	SPG-DIGI-W-B0100-U
0 ... 400 bar	SPG-DIGI-W-B0400-B	0 ... 5.800 psi	SPG-DIGI-W-B0400-U
0 ... 600 bar	SPG-DIGI-W-B0600-B	0 ... 8.700 psi	SPG-DIGI-W-B0600-U
0 ... 1000 bar	SPG-DIGI-W-B1000-B		



SPG-DIGI-W with adapter
(G 1/4 to M16x2,
STAUFF TEST 20)



SPG-DIGI-W with adapter

1.3 Send and receive with wireless radio interface

The SPG-DIGI-W operates with a bidirectional wireless interface. The operating range is specified to 50 m. In some applications you will have disturbance based on existing interferences. Transmitting data's from the SPG-DIGI-W to the PC lost will be avoid by sending cryptic data codes.

In the case of no or less transmission signal received, please put the PC adapter and / or the SPG-DIGI-W into another position. There is no risk to loose data memory content at any time, while the data memory needs to be deleted by the user.

The SPG-DIGI-W operates battery powered.

Send and transmit data to the PC/Notebook or receive parameters will consume energy.

If the battery capacity will be consumed totally, no data memory content will be lost.

The data memory content operates independent from given battery capacity.

1.4 Scanning rate and memory principle

The SPG-DIGI-W is running with a fast scanning rate (10 ms) in order to capture all peaks.

Based on all scanned values, the highest reading will be sorted and saved into the data memory.

The user is able to set up two different memory functions:

- **REC time** (time based data recording)

The memory interval will be set up automatically by selected recording time (3,10,30,60 min) and given quantity of data points (5,000).

According to a recording time of 10 min there is an interval of 120 ms (0.12 s)

Recording time [min]	Interval [ms]	Interval [s]	Qty. of readings	Data memory
3	36	0,036	3	MAX
10	120	0,12	12	MAX
30	360	0,36	36	MAX
60	720	0,72	72	MAX

- **REC Auto** (Long term pressure peak monitoring with trigger point)

Exceeding the trigger point (tp) data recording will be processed.

Below the given trigger point (tp) no readings will be saved.

The memory interval (INT) can be set from 100 ms/1/10/100 s.

The scan rate is still 10 ms and cannot be changed.

Example:

Memory interval "INT = 10 s"

Running with a scan rate of 10 ms and a memory interval of 10 s out of 1,000 readings the highest (MAX) reading will be sorted and saved into data memory.

Interval [s]	Qty. of readings	Data memory
0,1	10	MAX
1	100	MAX
10	1.000	MAX
100	10.000	MAX

This procedure enables the user to monitor pressure peaks over a long-term period.

2 Commissioning

The SPG-DIGI-W is supplied with batteries fitted.
The device is operational as soon as it is turned on.

2.1 Replacing the Batteries



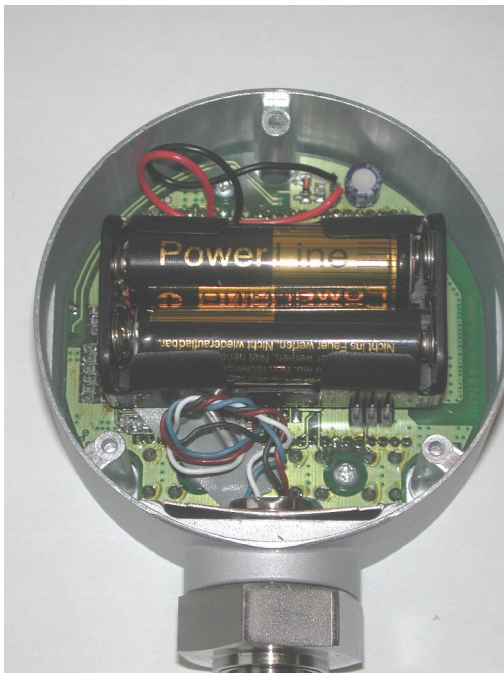
Caution!

Turn off the device before replacing the batteries. Open the battery compartment. Insert the new batteries as depicted. Ensure correct polarity of the batteries.

Batteries: 2 x 1,5 V (LR6 - AA)



When in continuous operation (without light), the service life of the batteries is 800 hours.
A battery symbol permanently displays the actual battery status.



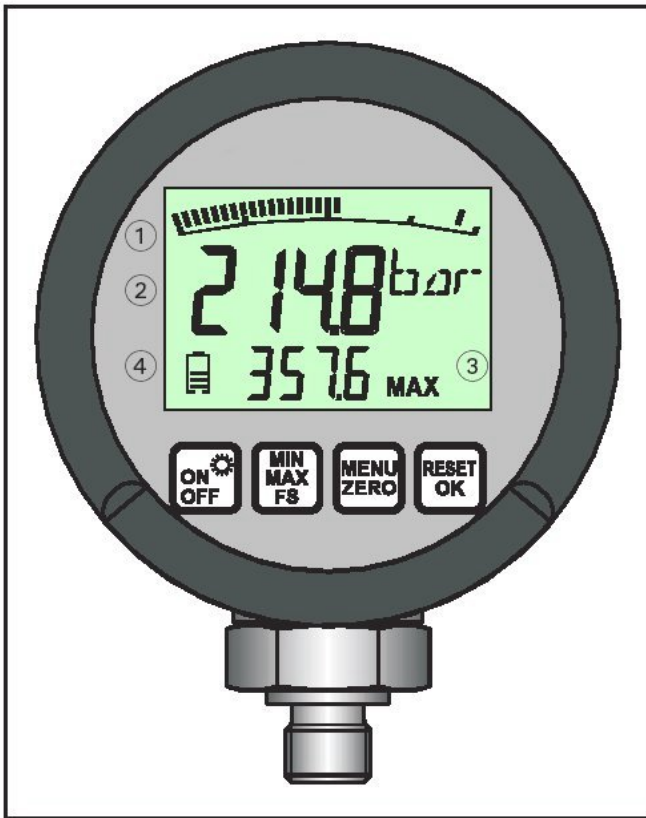
The serial number of the SPG-DIGI-W pressure gauge is no longer displayed on a label under the protective rubber cap but now in the SPG-DIGI-W software menu.



Please press the button **MENU ZERO** and hold the button for min. 2 s. The SPG-DIGI-W will switch through the following menu points on every keystroke:

- Automatic Switch off (PO, 5.10)
- Changing the units (unit, 5.11)
- Filter settings (Filt, 5.12)
- Display serial number (5.13)

3 Functions and keys



Display

- 4 ½ digit LCD with backlight
- Displays measurement values and menu functions

- ① - „Bar-graph“ with peak & hold function
- ② - Actual Value display (size 15mm)
- ③ - MIN/MAX or Full Scale (FS) (8 mm)
- ④ - Battery status


Keys



Key	Function	
	ON /OFF 	Turns the device on / off. Press for 2 s. Turns on the Back Light (stays on for 20 s.).
	MIN MAX FS	Select display unit: MIN, MAX or FS. Minimum value, Maximum value (=pressure peak) Displays the upper limit (FS) of the scale (e.g.400 bar)
	MENU:	Press 2 s Select with 1. Menu functions: Automatic switch off Units (bar / PSI/kPa/Mpa) Filter settings 0/1/2/3/ Device address Software version
	ZERO:	Select with 2. REC Time function: Time based data logging Setup data recording 3. REC Auto function: Long term data logging with Individual memory interval
	RESET:	Erases MIN and MAX values from the memory.
	OK:	Confirms the MENU functions.

3.1 Display Mode

The actual pressure (ACT) is indicated in the display mode. The ACT measured value is displayed in the corresponding unit. The MIN, MAX or FS value is indicated in the lower part of the display.

Display	Description
bar-graph	Graphic indication of the actual pressure. A pressure peak is indicated by means of a pixel (graduation mark). The indicated value is refreshed at intervals of 50 ms (20 measurements /s).
ACT	Indicates the actual pressure. The indicated value is refreshed at intervals of 300 ms (3 times /s).
MIN/MAX	Indicates the MIN- , MAX- or FS value according to setting. The indicated value is refreshed at intervals of 300 ms (3 times /s).
FS	Upper limit of the scale (e.g. 400 bar).
Units	Indicates the chosen unit.
Battery 	Indicates the battery status (5 segments).
	Send- and receive Mode
REC	REC flashes when recording measurement values (optional data logging function)
x10	Indicated value (actual indication and MIN / MAX indication) x10

3.2 Menu Functions

The following settings can be made in the MENU function:

- Auto Power Off – **on** or **off**
- Unit selection (bar, PSI, kPa, Mpa)
- Filter settings
- REC time or REC Auto function
- Delete data memory

Press the MENU key for 2 seconds to activate the functions menu.

Press the MENU key again to select the next function.

Press the OK key to save the function setting.

The device then switches to the display mode.

4 Connection to the Hydraulics

The SPG-DIGI-W is available with male thread G ¼ (BSPP) or 7/16-UNF for the corresponding versions (bar / psi). Several adapters for other pressure connections can be supplied also.

Please make sure that the device is properly mounted to avoid malfunctions.



Please do not assemble while the SPG-DIGI-W is pressurized

Connection	Designation Adapter
G1/4 to M16x2	SDA20-G1/4
G1/4 to M16x1,5	SDA15-G1/4
G1/4 to S12,65x1,5	SDA12-G1/4
Adapter SAD only in conjunction with Adapter SDA20-G1/4	
M16x2 to M16x1.5	SAD20/15-P
M16x2 to S12,65x1.5	SAD20/12-P
M16x2 to Plug	SAD20/10-P

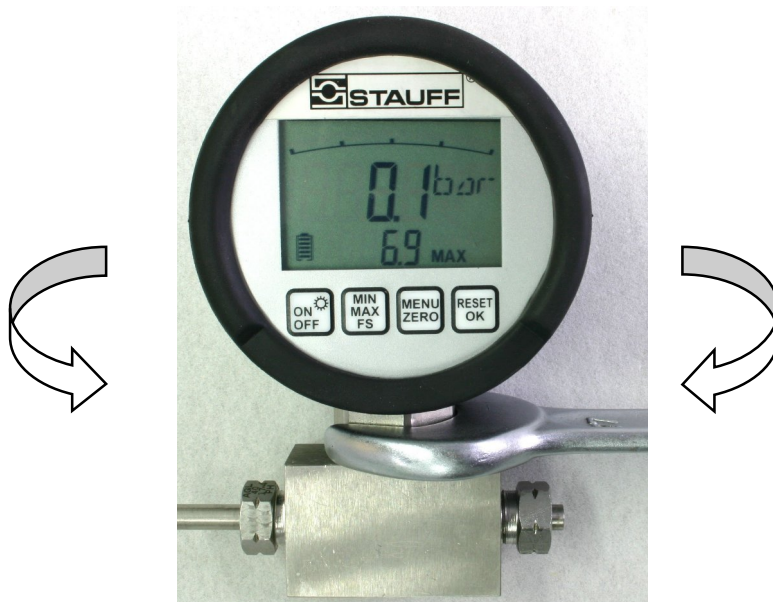
(Other adapters on request available.)



Observe specified torques when fitting the SPG-DIGI-W:

The spanner size of the pressure connection is 27 mm	
Pressure connection	Torque
¼ BSPP	35 Nm
7/16-20 UNF	35 Nm

When fitting directly, please ensure the SPG-DIGI-W can be rotated freely.



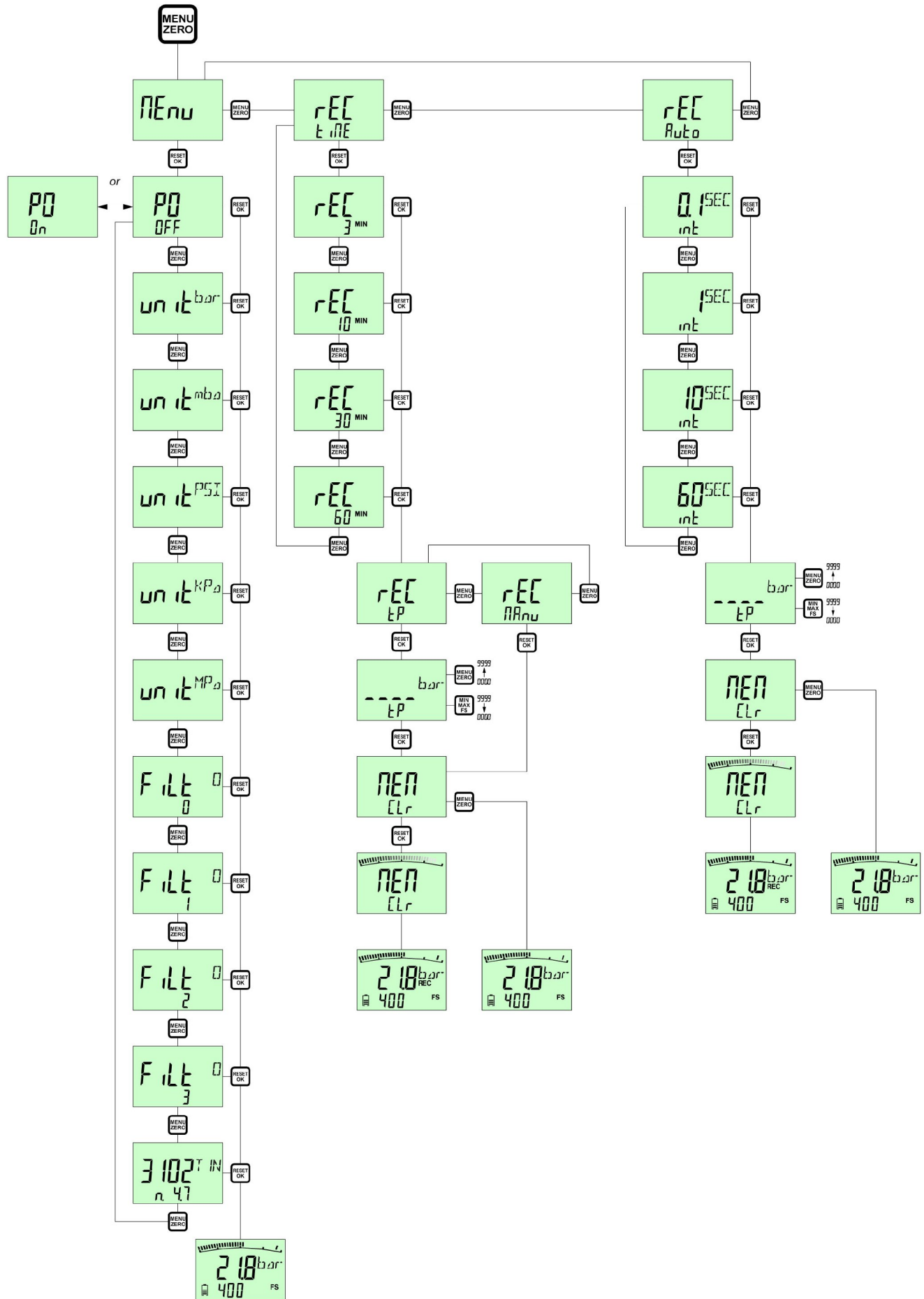
Safety instructions for using the 1.000 bar operating range:

Please note that special connection adapters are available which are approved for a nominal working pressure of 1.000 bar.

Please pay attention to built in test points acc. to rated nominal pressure and specified safety factors.

5 Operating the SPG-DIGI W

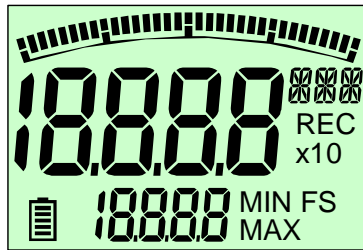
5.1 Functional diagram



5.2 Turning on (ON)



Press



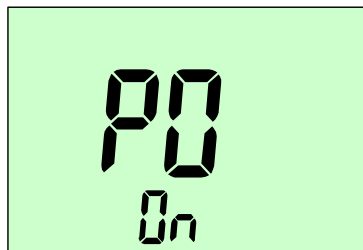
A self-test procedure is carried out



The measuring range is indicated (FS)

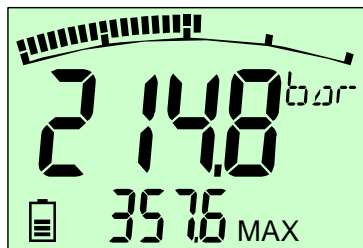
Unit (**bar**) SPG-DIGI-W-...-B

Unit (**PSI**) SPG-DIGI-W-...-U



Auto Power Off function is active. Power off activates automatically after 5 min.

This function can be altered in **MENU**.



Display mode.

ACT value displayed

MAX pressure peak

5.3 Turn off (OFF)



Press once (briefly)

5.4 Turn on backlight



Press for 2 s

The backlight turns off automatically after 20 seconds.

5.5 MIN/MAX Display

Use this key to toggle the required value.

The key function is sequential; the values are indicated in the display in sequence.

The MIN/MAX function is used to measure pressure peaks. The respective lowest (MIN) and highest (MAX) measured values are stored in the MIN/MAX memory. Values in the MIN/MAX memory are erased when the device is turned off. If different pressure tests are to be carried out in succession, the MIN/MAX memory must be erased after each measurement.



MIN / MAX and FS value is indicated in the display

5.6 FS Full Scale Display

Displaying the upper limit of the scale (FS) is designed to increase readability of the bar graph function. The upper limit of the measurement range is indicated numerically. FS is indicated in sequence after MIN and MAX.



FS is displayed.

5.7 Erasing MIN/MAX Values



Erases MIN/MAX values.

5.8 OFL-Display

This indicates that the applied pressure is outside given full-scale range (at app. 20% overload from FS).

If the message will remain displayed, while the SPG-DIGI-W is pressure less, please consult your local STAUFF office.

5.9 Zero Point Correction (ZERO)

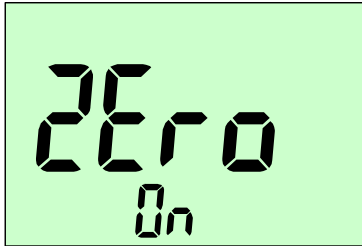
The zero point can be corrected manually should undesired deviations occur when no system pressure is being applied (atmospheric pressure).



Caution! The zero point correction sets the current ACT value to zero. In order to exclude erroneous measurements; ensure **no system pressure** is being applied when carrying out this function.



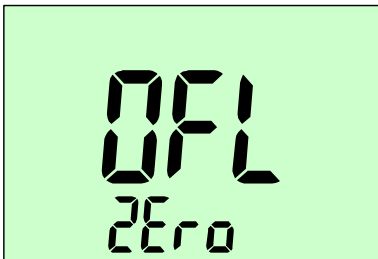
Press ZERO (quick)



This initiates the zero point correction.. The **ACT** (actual) value is indicated in the display as 0.0 bar. This correction remains active until the device is turned off.



OFL / ZERo is displayed for 3 s if the measured pressure is, greater than 5% of the measurement range.



Zero point correction cannot be carried out. Please ensure that **no system pressure** is being applied.

5.10 Resetting Zero Point Correction



Turn off the device. Zero point correction is **no** longer active when the device is turned off and on again.

5.11 Automatic Power Off



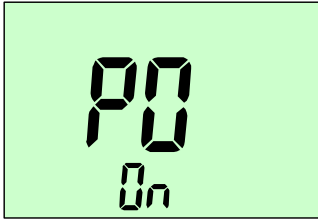
Press for 2 s

Depending on the device configuration, two different displays are possible:

Auto Power off

or

Continuous operations



PO On

Press 
Auto Power off is activated after 5 minutes.

PO OFF

Press 
The device must be turned off manually.



The settings Auto Power Off or Continuous operations remain stored and are active when the device is turned off and on again.

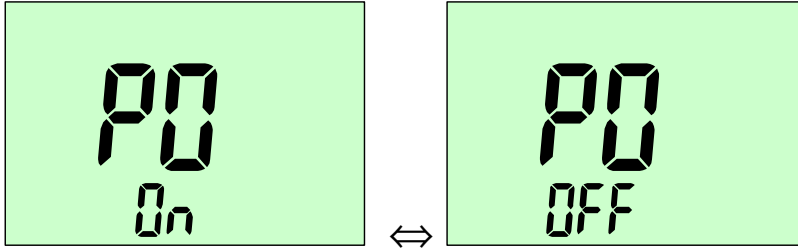
5.12 Changing the Unit



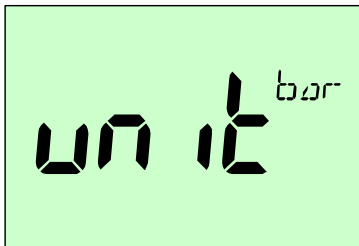
Press for 2 s



Press



Press

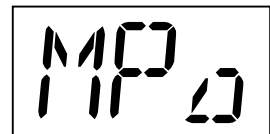
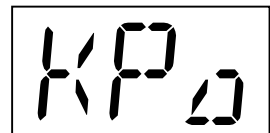
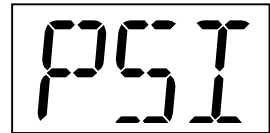
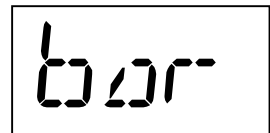


Press once (briefly)

The next unit is indicated.



Confirm unit selection



5.13 Filter settings

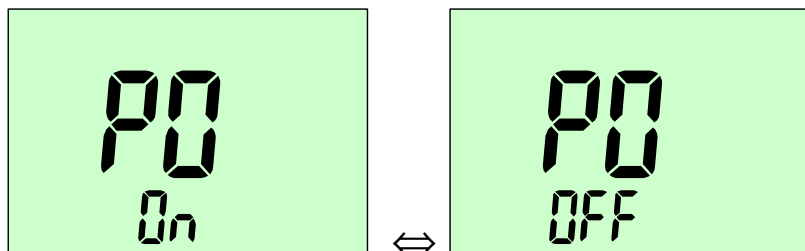
The filter prevents little fluctuations of the displayed values (has the same function as a glycerin filling in an analog pressure gauge that prevents a shivering indicator because of small system fluctuations).



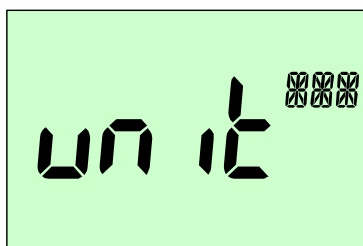
Press for 2 s



Press



Press

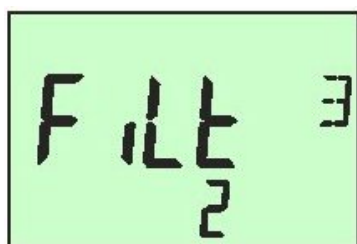


Press once (briefly)

Filter selection is indicated (bar, psi, Kpa, Mpa)



Press



Press once (briefly)

Filter selection is indicated



Confirm filter configuration

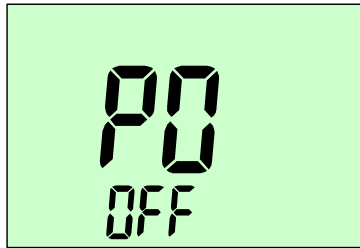
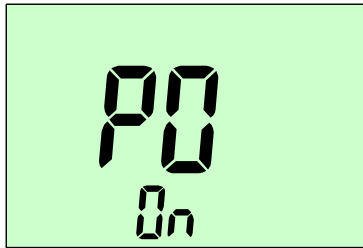
5.14 Display serial number



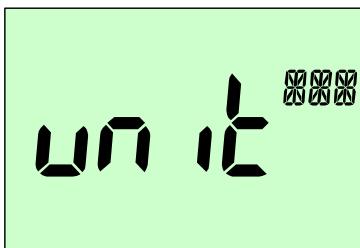
Press for 2 s



Press



Press

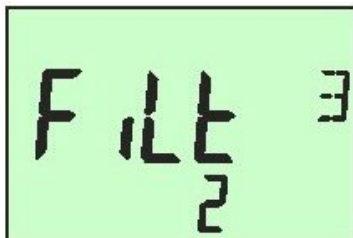


Press once (briefly)

Filter selection is indicated
(bar, psi, Kpa, Mpa)



Press



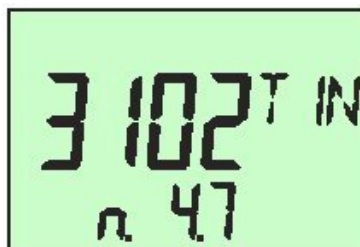
Press several times to switch between the
various filter settings.

The filter settings are displayed

Confirm filter configuration



Press



Display of serial number (1.line)

Display of software version (2.line)



5.15 Data Memory Function

Two different data memory functions can be used.

rEC tiME or **rEC Auto**.

rEC tiME time based data recording

- Can be started manually by **rEC Manu** or
- Operated by a given trigger point **rEC tp**

Depending on the recording time the memory interval will be processed automatically (5,000 intervals). Into each memory interval one maximum reading will be saved.

rEC Auto pressure peak monitoring

- Records readings above given trigger point.

Setup of individual memory interval will be done by user.

Only readings will be saved into data memory, which are above given trigger point.

The data memory can be read out with the wireless PC Adapter and the PC software.

The memory function will be processed



Press 2s



Press



rEc tiME
Function will be set



rEC Auto
Function will be set

5.16 Set up REC TIME Function



Confirm



Select 3 / 10 / 30 / 60 min



Confirm

Select start with Trigger point **rEC tp** or manually **rEC Manu**.



Setup
0 ... FS (Full Scale range)



Start data recording



Select upwards



Select downwards



Confirm trigger point

5.17 Delete Data Memory

When the data memory is full it must be deleted before data recording can be started.



Delete data memory



Deleting data memory content



Start data recording
with selected trigger point (e.g. 103 bar)



REC appears in the display and flashes



Cancel data recording

REC disappears in the display

5.18 Setup Function REC AUTO



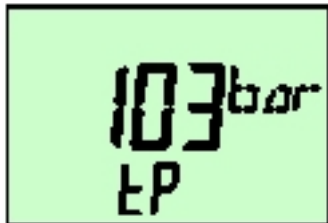
Confirm



Select 0,1 / 1 / 10 / 60 s



Confirm



Select upwards

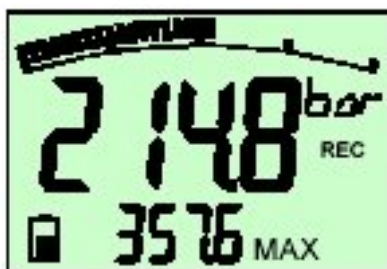


Select downwards

Deleting data memory see chapter 5.17



Start data recording
With selected trigger point (e.g. 157,7 bar)



REC appears in the display and flashes



Cancel data recording

REC disappears in the display

6 Technical Data

Version:	<ul style="list-style-type: none"> - Digital pressure gauge with ACT - MIN and MAX Display - Bar graph display (33 segments) with peak and hold function - 4 ½ digit LC display (15 mm) with back light illumination - Battery powered with low power electronic system - Life time cycle 800 h (No back light function) - Pressure port stainless steel 1.4404 - ¼" BSPP (ISO 1179-2) or - 7/16 – 20 UNF (ISO 11926-2/3) 																
Input:	<ul style="list-style-type: none"> - Ceramic sensor cell (relative) –1. . 16 bar - Strain gauge cell (absolute) 0. . 100/400/600/1000 bar - Scan rate 10 ms - Resolution 12 bit = 4.096 steps. - Accuracy ± 0,25%FS (Full Scale) typ., ± 0,5 %FS max. 																
Housing	<ul style="list-style-type: none"> - Ø79 mm - T=33mm - Zinc die cast with rubber protection TPE 																
Weight	<ul style="list-style-type: none"> - 540 g 																
Sealing	<ul style="list-style-type: none"> - NBR sealed (standard) - FKM (Viton®) or EPDM on request 																
Parts in contact with media	<ul style="list-style-type: none"> - Stainless steel 1.4404 - NBR - Ceramics 																
Power supply	<ul style="list-style-type: none"> - Battery 2 x1,5 VDC AA (LR6 –AA) Alkaline (Mignon) 																
Ambient conditions	<table border="0" style="width: 100%;"> <tr> <td style="width: 60%;">- Operating temperature:</td> <td>-10...50 °C</td> </tr> <tr> <td>- Fluid temperature:</td> <td>-20...+60 °C</td> </tr> <tr> <td>- Storage temperature:</td> <td>-20...+80 °C</td> </tr> <tr> <td>- Rel. humidity:</td> <td>< 85 %</td> </tr> <tr> <td>- Protection:</td> <td>EN 60529 (IP 54)</td> </tr> <tr> <td>- Vibration:</td> <td>IEC 60068-2-6 (5 g)</td> </tr> <tr> <td>- Shock:</td> <td>IEC 60068-2-27 (25 g)</td> </tr> <tr> <td>- Reliability cycles (10⁶):</td> <td>100</td> </tr> </table>	- Operating temperature:	-10...50 °C	- Fluid temperature:	-20...+60 °C	- Storage temperature:	-20...+80 °C	- Rel. humidity:	< 85 %	- Protection:	EN 60529 (IP 54)	- Vibration:	IEC 60068-2-6 (5 g)	- Shock:	IEC 60068-2-27 (25 g)	- Reliability cycles (10 ⁶):	100
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- Storage temperature:	-20...+80 °C																
- Rel. humidity:	< 85 %																
- Protection:	EN 60529 (IP 54)																
- Vibration:	IEC 60068-2-6 (5 g)																
- Shock:	IEC 60068-2-27 (25 g)																
- Reliability cycles (10 ⁶):	100																
Functions	<ul style="list-style-type: none"> - units: bar, psi, MPa, kPa - Display: MIN / MAX – Full Scale - Battery status control - Auto Power Off / On: - Zero function - Reset (deletes MIN / MAX) 																
PC-Functions	<ul style="list-style-type: none"> - PC-Software - Download recorded data's via wireless PC interface (2,4 GHz) - Device setup 																
Memory Functions	<ul style="list-style-type: none"> - 5.000 readings (MAX Readings) - Setup of memory interval - REC TIME (Time based recording) - REC AUTO (Long term recording by limit monitoring) 																

Digital Pressure Gauge SPG-DIGI-W

Range bar	Display bar	Display PSI	Display mbar	Display kPa	Display MPa
-1... 16	-1,0...16,0	-14,5...200,0	-999...16000	-100...1600	-
0... 100	0...100,0	0...1500	-	0...10000	0...10,00
0... 400	0...400,0	0...5800	-	0...4000 (x10)	0...40,00
0... 600	0...600,0	0...8700	-	0...6000 (x10)	0...60,00
0...1000	0...1000	0...15000	-	-	0...100,00

Range (bar)	-1...16	0...100	0...400	0...600	0...1000
Overload P_{max} (bar)	40	200	800	1200	1500
Burst Pressure (bar)	50	800	1700	2200	2500
Range (PSI)	-14,5 . . 230	0 . . 1450	0 . . 5800	0 . . 8700	14500
Overload P_{max} (PSI)	580	2900	11600	17400	21750
Burst Pressure (PSI)	725	11600	24650	31900	36250



Exceeding the maximum overload values (P_{max}) can lead to malfunctions and result in the SPG-DIGI-W being destroyed.

Burst pressures are based on data without assembled adapters.

The SPG-DIGI-W meets the guidelines of the European Community (EU).

It is confirmed that this product is approved acc. to following standards:



DIN / EN 61000-6-2
DIN / EN 61000-6-3

Technical subject to change

April 2009