

# VC-MANO-DIGI User Handbook

DIGITAL PRESSURE MEASURING

Operating Handbook



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Digital Pressure Gauge VC-MANO-DIGI

## OPERATING HANDBOOK



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#### 1. Safety Instructions



#### **Warning!**

**This symbol warns you against actions that can cause damage to persons or to the instrument.**



**This symbol informs you what tool do you need in order to complete operations correctly and without possible damages to the instruments.**



*This symbol gives you suggested or non-mandatory informations and tips.*



**Read these operating instructions carefully before mounting or starting the digital pressure gauge . Keep this Operating Manual in a place that is accessible to all users at any time.**

**These installation and operating instructions should meet the needs of most pressure measurement applications. For any questions regarding a specific application you can obtain further informations:**

- via our Internet address [www.valcon-hydraulics.com](http://www.valcon-hydraulics.com)
- product data sheet designated as UK SP-ND30 DN80
- contact us at: [info@indunorm.de](mailto:info@indunorm.de)



**Install and start the digital pressure gauge only if you have the qualification required and the knowledge corresponding to operating conditions.**



**Be sure that the scale range and specifications of the digital gauge fits the working conditions prior to installing and starting the instrument.**



**Open pressure connections only if the system is without pressure.**



**Make sure that the digital gauge is only used within the overload threshold limit at all times.**



**Read carefully the working and ambient conditions outlined in "Technical Data" or in the data sheet and avoid any use not according to the features which the gauge is designed to.**



**Do not interfere with or change the digital pressure gauge in any other way than described in this Operating Manual.**



**Do not use the digital gauge if it is damaged or unsafe for operations.**



**Take precautions with regard to remaining media in removed instruments. Remaining media could be hazardous or toxic.**



**Have repairs performed by the manufacturer only.**



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## 2. Product Description

The digital pressure gauge belongs to the innovative series of Valcon's instruments created to evaluate fluids pressure upon machineries and industrial processes, and for calibration purposes.

The pressure is shown to the user through an high contrast LCD display (1) on four digits properly sized for a comfortable reading, with floating point representation to allow the widest resolution of the measure.

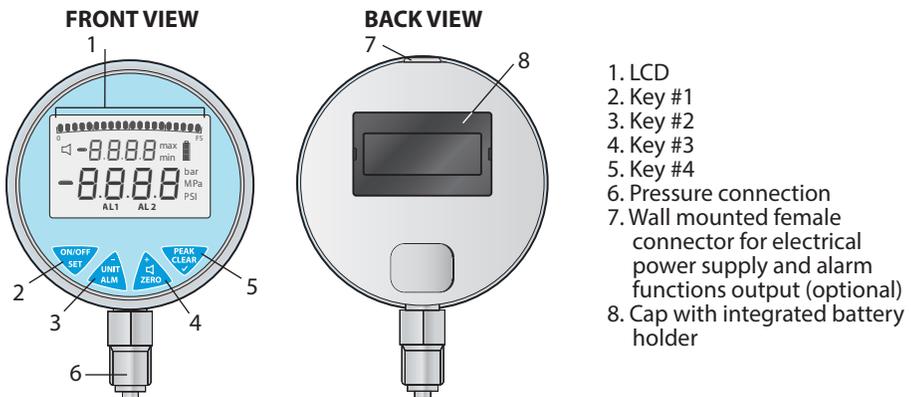
In addition to the main reading (13), the instrument is provided with 4 additional digits located above the main ones (14). They accomplish the auxiliary task of representing the records of maximum and minimum pressure measured at its input. The pressure unit of measurement (11) is selectable among bar, MPa and psi, conforming to international applications. Finally, the instrument display shows on the upper part a bar graph of 20 segments (9) which analogically represents the value read with continue indication, to make the reading of the sampled value even easier.

Beside the measurement functions, the gauge is optionally provided with two alarm functions which warn the user of possible working problems affecting their systems. To this purpose, two signals are supplied externally (7) to activate relais protections applied by the user, which could eventually stop a machine which may have reached unwanted operating levels. When exceeding the set thresholds, two "solid state - Open Source type" contact outputs are activated, and the display shows the flashing message "AL1" or "AL2" (12). It is possible to set such alarms independently from each other and their respective thresholds of too high/low pressure can swing between 10% and 90% of the instrument full scale value via user's selections. The factory pre-set thresholds are respectively 20% of the full scale value for the minimum pressure, and the 80% for the maximum.

To make alarm functions even more flexible, it is also possible to introduce according to the user's need an acoustic signal (15), through an integrated device that is activated when either thresholds set on the instrument are exceeded (optional function).

The gauge may run both on external power (optional) - by means of a wall mounted connector supplied with the instrument (7) - or on a 3.6V primary Lithium Battery (not rechargeable) that guarantees a number of 4000 cycles of readings and self turn-offs.

The residual battery capacity is shown to the user through proper symbols on the right side of the display (10).

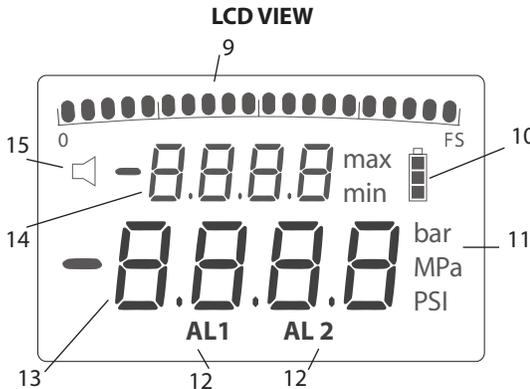


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9. Bar graph with trailing pointer (20 segments)
10. Battery status (1/3, 2/3, 3/3)
11. Units
12. Alarm functions (optional)
13. Main reading (instant value)
14. Secondary reading (min/max recorded value)
15. Buzzer on/off (optional)

### 3. Mounting Instructions



**Required tool: 14mm flat wrench for 1/4" threaded connections  
17mm flat wrench for 3/8" threaded connections  
22mm flat wrench for 1/2" threaded connections**

To complete mounting operations you have to provide for a sealing gasket, exceptions are gauges with self-sealing threads (e.g. NPT thread). The sealing element must be of the right size for the connection.



**When mounting the instrument ensure that the sealing faces of the pressure gauge and the measuring point are clean and undamaged.**

Apply an appropriate torque depending on the dimension and material (see Technical Data) of the connection and on the sealing element used.



**Screw in or unscrew the instrument only via the flat wrench applying torque on the faces of the hexagon of the connection.**



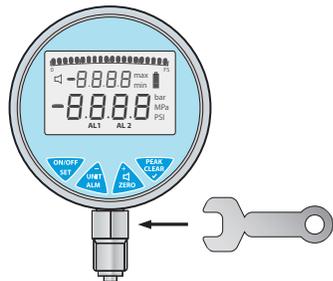
*Use a torque wrench to avoid possible mistakes or unwanted damages to the threaded connection.*



**Do not use the case of the gauge as working surface for screwing in or unscrewing the instrument. Make sure that threads are not jammed when screwing the instrument in.**



*Teflon tape or easily removable thread locker could be applied to threaded connections.*



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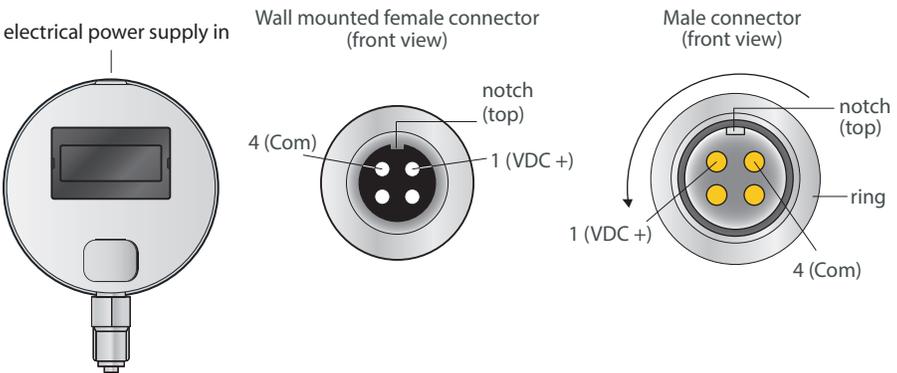
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#### 4. Start-up Operations

Once mounted, the digital pressure gauge is ready to operate. The gauge works with two different power sources: electrical power supply (optional) and battery power supply. You can set electrical power input with the accessories supplied with the gauge, or you can choose battery power supply with the already included battery.

##### HOW TO SET ELECTRICAL POWER SUPPLY

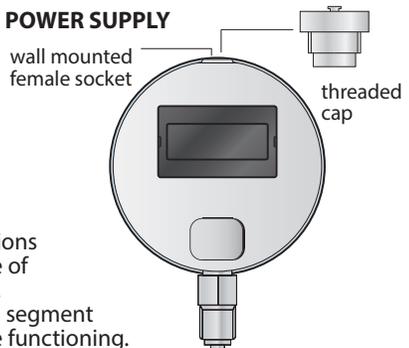
Insert the male connector supplied with the gauge into the female wall mounted connector located at the top of the instrument and tighten the ring. Respect the correct connections among pins. Connectors are provided of a notch that helps the insertion and avoids wrong connections.



Connect the AC-DC adapter to the electrical power supply. The gauge is now ready to operate. In this setting, connectors ensure a high degree of protection (IP65 according to EN 60 529 - IEC 529). Whenever electrical power is switched on, the digital pressure gauge turns on and starts to measure pressure. Every individual segment on the LCD will flash three times to confirm its fine functioning.

##### WORKING WITH BATTERY POWER SUPPLY

If you choose to work with battery power supply, you only have to press the ON/OFF button to start measuring. Every individual segment on the LCD will flash three times to confirm its fine functioning. When working in particularly hard conditions, you could screw the cap supplied in the female wall mounted connector to avoid damages to electrical connections of the instrument. The cap ensures an high degree of protection (IP65 according to EN 60 529 - IEC 529). Whenever a new battery is put in, every individual segment on the LCD will flash three times to confirm its fine functioning.



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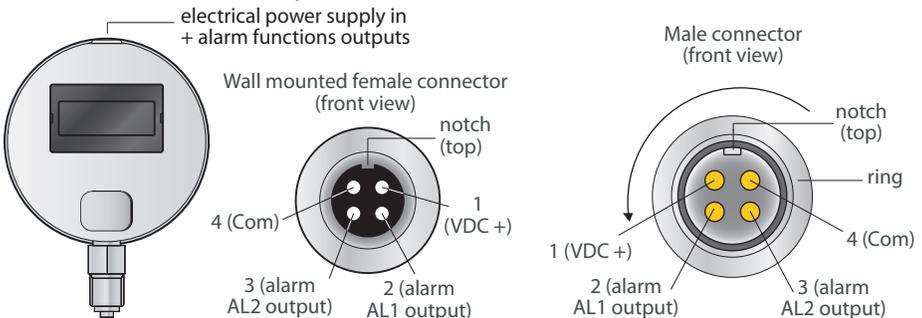
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#### HOW TO SET ALARM FUNCTIONS OUTPUTS

Digital pressure gauge VC-MANO-DIGI is equipped with two optional alarm functions (output MOS-Ch.N  $V_{max}=24V$   $I_{max}=0.4A$ ) and the chance to activate external controls by the supplied electrical outputs. The male socket used for electrical power supply has two other pins for electrical alarm functions outputs.



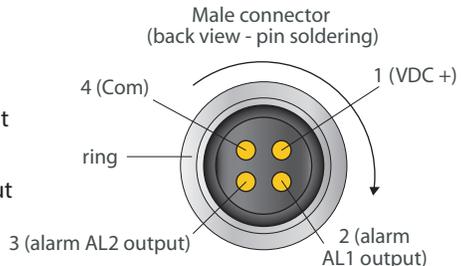
Insert the male connector supplied with the gauge into the female wall mounted connector located at the top of the instrument and tighten the ring. Respect the correct connections among pins. Connectors are provided of a notch that helps the insertion and avoids wrong connections. Note that:

Pin #1: Electrical power supply VDC +

Pin #2: Electrical alarm AL1 (minimum pressure) function output

Pin #3: Electrical alarm AL2 (maximum pressure) function output

Pin #4: Common 0V



Pin #2 and #3 outputs could supply any relays or electrical control system which machineries or plants where the gauge has been mounted are equipped with. In such way, two thresholds are programmable to keep systems under control, thus preventing that pressure drops or rises out of set values.

Connect the AC-DC adapter to the electrical power supply. The gauge is now ready to operate. In this setting, connectors ensure a high degree of protection (IP65 according to EN 60 529 - IEC 529). Whenever electrical power is switched on, the digital pressure gauge turns on and starts to measure pressure. Every individual segment on the LCD will flash three times to confirm its fine functioning.



*We suggest to insert either the male socket (electrical power supply) or the cap provided into the female connector in order to achieve an high degree of protection for the pressure gauge, thus avoiding damages, wears or breaks to mechanical and electrical components in any hard ambience condition.*



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#### 5. Functions

Digital pressure gauge has four keys, each one with a double function according to a "short" pushing (about half a second), or a "long" pushing (about 3 seconds).

##### BUTTON #1: ON/OFF



Button #1 allows to turn on and off the gauge. The functionality is different according to the power supply mode: when using the external AC-DC adapter, the instrument will stay always on after being connect to the power supply and it can be switched off when button 1 is pushed for a long time, about 3 seconds. Thus accidental turn-offs are avoided. To switch it on again, is enough a brief pressure on the same button. When using the internal battery, each time the instrument is turned-on will then go automatically in stand-by after about 2 minutes and a half of sampling and displaying the measured values, in order to preserve the battery capacity. To reactivate it again, a brief pressure on button #1 will be enough as well. The instrument could be turned-off by a long pushing on the button, and then reactivated by a short one.

##### BUTTON #2: UNIT/ALM



Button #2 operates to switch constantly, with every "short" pressure, the required evaluating unit. By default the pressure gauge starts in bar unit, then it is switched in MPa and in psi, from which it gets back to bar. The numerical readings will of course change with every unit conversion, but a symbol located on the right will avoid confusion about the actual unit.



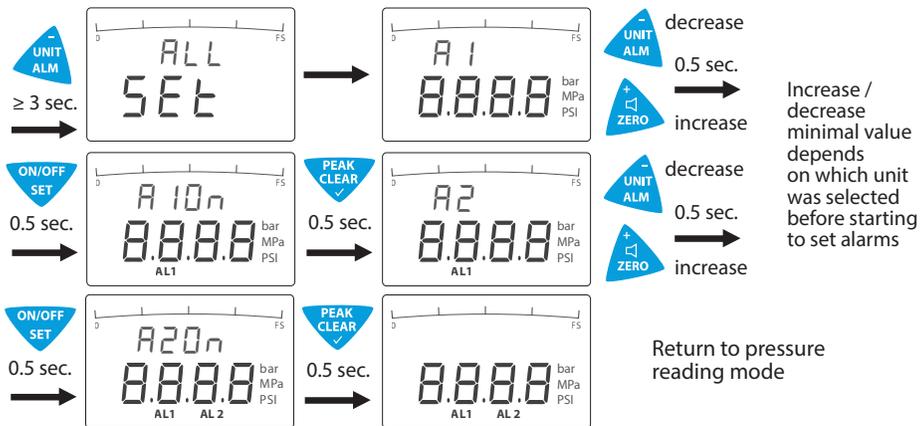
When button #2 is pushed for a long time, the message "ALL SET" is shown on the display for few seconds, then begins the procedure of settings the maximum/minimum pressure alarms (optional). The minimum increase/decrease value settable depends on which measure unit has been selected before. The first setting required is for the minimum pressure alarm, which is shown on the upper numerical display with the flashing message "A1", while the lower numerical display will show a value equal to the 20% of the instrument full scale value, as a standard setting, increasable / decreasable with steps of 1 bar through a short pressure on button #2 (-) and #3 (+). Once the required level (selectable between the 10% and the 90% of the instrument full scale value) is achieved, the alarm can be activated by briefly pushing button #1 (SET). The message "ON" will appear beside "A1" (and disappears after another short pressure to turn off the threshold). Next the user's selection is established with button #4, and the instrument starts to set up the second alarm, showing the flashing message "A2". The maximum pressure alarm is programmed in the same way as above described. Once the proper sequence is fulfilled, after pushing button #4 the instruments gets back to the pressure reading mode. The successful alarm activation will be reported to the user through the presence on the lower side of the display of one or both the symbols "A1", "A2".



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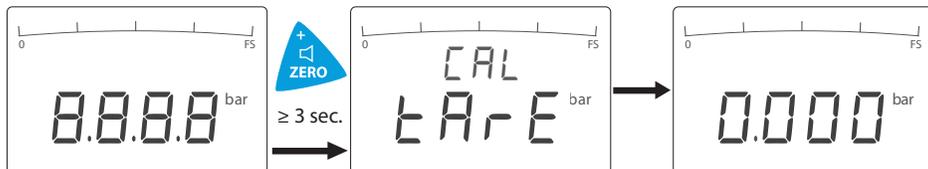
### BUTTON #3: ZERO



Through short pressure on button #3, if at least one of the two alarms of minimum/maximum pressure has been previously set by the user, it is possible to introduce also an acoustic signal of the alarm condition (which will be active either in case of alarm of minimum or maximum pressure). The user will be informed about the activation of the acoustic signal by the appearance, on the left side of the display, of a tiny loudspeaker symbol. This is an optional function available on request.



Pushing button #3 for about 3 seconds will produce the instrument's Tare Calibration. The display will show the message "Tare Cal" for some seconds, after which the instrument will have set the current value on the input transducer as the scale zero value. The widest range of the zero calibration is 10% of the device full scale value. Trying to set the zero at an higher value, tare will be set at the highest value possible (10% of the span).



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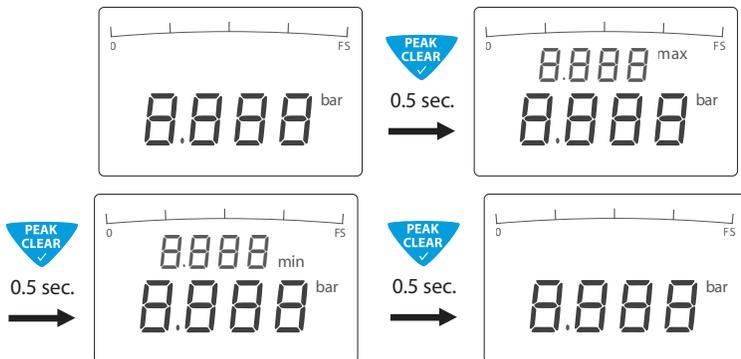
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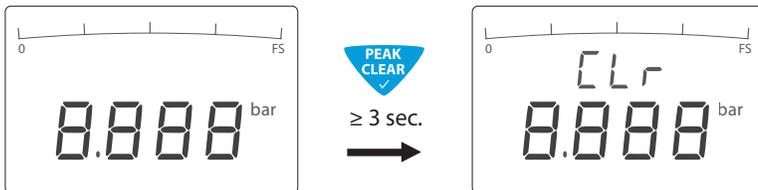
#### BUTTON #4: PEAK



When button #4 is pushed briefly, above the four digits of main reading which indicate the pressure value, another group of 4 digits will work as a secondary indication, that will show the maximum and minimum pressure recorded since the instrument was first turned on or since the last time such records were deleted from the memory. To inform the user of which record he's reading, a symbol "max" or "min" will appear next to the value, on the right. The first time the instrument is turned on, the auxiliary group of digits won't be visible. Each time the proper button is briefly pushed, the secondary group of digits will show up with the sequence Maximum Pressure / Minimum Pressure recorded and finally the indication will disappear again.



When button #4 is pushed for about 3 seconds, the display will show the message "CLR"; to inform the user that the current records of Maximum and Minimum Pressure will be erased, and they will be immediately replaced by the next sampled values. The Maximum and Minimum Pressure values are stored in memory even when the instrument is turned off by the user with button #1 or by the automatic turn-off when using battery power supply. The records are kept until the battery has run down, or indefinitely whether the gauge is constantly fed by the external AC-DC adapter. They are cleared only through an explicit procedure started by the user or when the AC-DC adapter is disconnected from the instrument and the battery has run down.



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#### 6. Maintenance Instructions

Digital pressure gauge VC-MANO-DIGI requires no maintenance, except for battery replacement.

In order to do that, follow these instructions.

Remove carefully the back cap that carries the battery holder. If necessary, use a flat screwdriver with care. Pay attention to not damage the rubber cap and to not break electrical connections. Remove with care the exhausted battery and replace it with a new one of the same type.



**Be careful in removing the rubber cap and don't pull the cap too much. Pull gently to prevent the cables to break.**



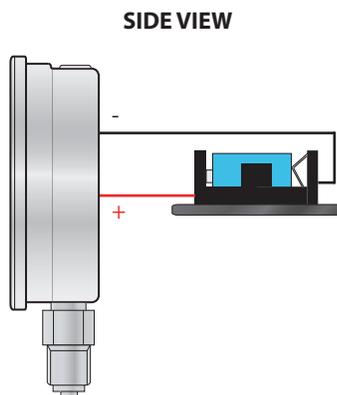
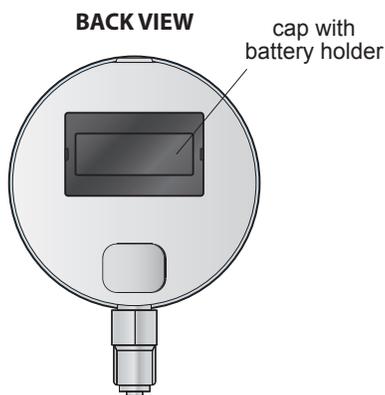
**Do not try to recharge batteries.**



**Do not insert damaged or unsuitable batteries.**



**Respect the polarity of the battery power supply.**



Once the battery has been replaced, insert gently the cap in the case.



**Make sure to put the cables inside the case when mounting the cap to avoid possible damages to the cables and to the gauge. A wrong mounting of the cap could cause damages to the instrument because of lack of IP protection.**



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#### 7. Troubleshooting



**Open pressure connection only if the system is without pressure.**



**Take precautions with regard to remaining media in removed digital pressure gauge. Remaining media in the pressure port may be hazardous or toxic.**



**Pay attention in touching the instrument, the surfaces of the gauge might get hot during working operations.**



**Remove the digital gauge from service and avoid to use it again accidentally if it becomes damaged or unsafe for operations.**



**Have repairs performed by the manufacturer only.**



**Do not insert any pointed or hard objects into the pressure port for cleaning, it may damage the sensor of the pressure connection.**



**Please verify in advance if pressure is being applied to the connection and if the gauge is correctly power supplied.**

Failure	Possible cause	Procedure
No display indication	Empty batteries, wrong polarity No electrical power supply available, wrong connections	Test battery and replace if necessary, ensure electrical power supply, check connections
Defective display indication	Working temperature too high / too low	Check permissible working temperatures (Technical Data)
Displayed value unchanged after change in pressure	Mechanical overload due to overpressure, overpressure exceeding maximum reading	Lower pressure, if failure reoccurs replace instrument or consult the manufacturer
Displayed value erratic or incorrect	Pressure sensor damaged through impact, aggressive media, mechanical overload	Contact the manufacturer / replace instrument
Signal span erratic	Electromagnetic interference source nearby	Remove interference source
Signal span erratic	Working temperature too high / too low	Check permissible working temperatures (Technical Data)
Signal span incorrect	Working temperature too high / too low	Check permissible working temperatures (Technical Data)
Abnormal zero point signal	Working temperature too high / too low	Check permissible working temperatures (Technical Data)



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This is a list of possible failure. For any other problems, failures, malfunctionings contact us



**Clean dismantled instruments before returning or store them in order to protect our employees and environment from any hazardous remaining media.**



**Store dismantled instruments correctly according to Technical Data and clean them properly from remaining media.**



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#### 8. Technical Data

Specifications									
Pressure Ranges	<i>bar</i>	10	20	50	100	200	400	600	
Overpressure Safety	<i>bar</i>	15	30	75	150	300	600	900	
Pressure Ranges	<i>psi</i>	145	290	725	1450	2900	5800	8700	
Overpressure Safety	<i>psi</i>	217	435	1087	2175	4350	8700	13050	
Materials									
- Wetted Parts									
Pressure Sensor		AISI 316 Fully welded stainless steel							
Pressure Connection		AISI 304 Stainless steel or brass							
- Case / Bezel Ring		AISI 304 Stainless steel							
Power Supply		1x 1/2 AA 3,6V Battery or optional electrical supply 9V DC (min)							
On / Off Cycles	<i>nr.</i>	4000 (Lithium battery 1/2AA 1200mAh)							
Internal Sampling Rate	<i>ms</i>	50							
Insulation Voltage	<i>VDC</i>	500							
Display Accuracy	<i>% of span</i>	± 0.5							
Adjustability Zero	<i>% of span</i>	max. 10 (via Tare Cal function)							
Operating Temperature	<i>°C</i>	+0 ... +50 °C (LCD)							
Storage Temperature	<i>°C</i>	-10 ... +60 °C (LCD)							
Medium Temperature	<i>°C</i>	-10 ... +70 °C							
LCD Features		Main reading			Secondary reading				
Principle		7 segment 4 digit floating point			7 segment 4 digit floating point				
Digit Size	<i>mm</i>	11			7				
Bar Graph		Trailing pointer 20 segments (5% of span)							
Functions									
Memory		Min / Max peaks of read pressure							
Auto Power Off	<i>min</i>	2,5							
Tare Adjustment		Via Tare Cal function							
Units		bar, MPa, psi							
Alarms (optional)		2 programmable thresholds MOS-Ch.N Vmax = 24V Imax = 0.4A							
Weather Protection		IP 65 (according to EN 60 529 / IEC 529)							

