

# Digital Pressure Gauge / Pressure Switch

## Application

- Hygienic pressure measurement
- Overpressure save at highest accuracy
- Largest display in a process gauge

## Application examples

- Local display without external power supply
- Pressure switch with two relays

## Hygienic design / Process connection

- Integrated process connection
- Conforming to 3-A Sanitary Standard 74-06 for sensors with Tri-Clamp process connection
- EHEDG certified hygienic CLEANadapt process connection
- Direct connections for Tri-Clamp 3/4" up to 2"
- Adaptors for DIN 11851, SMS etc.
- CIP-/ SIP-cleaning up to 149 °C / 60 minutes maximum
- All materials and actuating fill are FDA conform
- IP 66, housing for optimized cleanability

## Features

- 2-fold overpressure safety as standard
- Protected calibration possibility
- Standard min. / max. pressure caption feature
- Display height 23 mm
- Charge level indicator for battery
- Display units: BAR, PSI, H<sub>2</sub>O, mmHg, inHg, MPa, kPa

## Options

- Two independent relays with external power supply
- MAN-90P-BAT: phar maversion with  $R_a \leq 0.2 \mu\text{m}$  wetted part
- Hastelloy membrane wetted parts

## Authorizations



## MAN-90x-BAT / S / ...



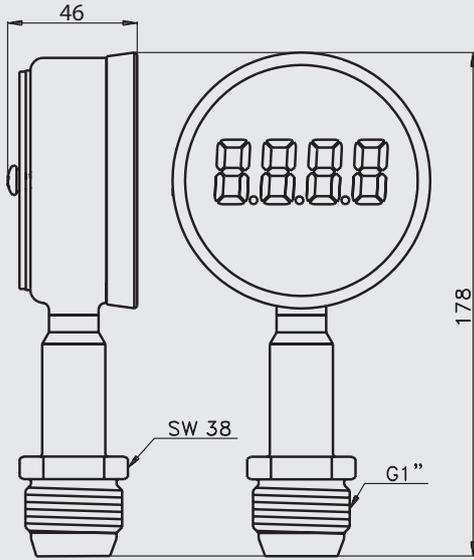
MAN-90-BAT		
Material	diaphragm fitting case inspection window	316L, optional: Hastelloy C 1.4404 1.4301, complete welded polysulfone (for temperatures up to 163 °C)
Surface roughness	diaphragm	$R_a \leq 0.6 \mu\text{m}$ standard
Actuating fill		paraffin oil / medical white oil FDA approval number 21 CFR 172.828 and 178.3620 (a)
Protection Class		IP 66 / NEMAX 4X
Overpressure safety		2-fold
Accuracy		0.2 % of full scale
Repeatability		$\pm 0.06$ % of full scale
Linearity		$\pm 0.07$ % of full scale
Hysteresis		$\pm 0.07$ % of full scale
Temperature	process CIP-/ SIP-cleaning ambient	-4 °C...130 °C 149 °C / 60 minutes maximum 4 °C...50 °C
Temperature effect		< $\pm 0.16$ % / 10 K of full scale (process or ambient)
Display	LED height dampening	23 mm programmable additional display of battery status and alarm 1 and 2 indicators
Power Supply	for LCD for relay	batteries 2 x AA 9...30 V DC, 250 mA battery back up of programmed values
Output	2x switch (relay) (open with no power) function and hysteresis	24 V DC, max. 1 A  programmable
Approvals / Standards	PED EMV-conformity	3-A PED-SEP IEC 61326
Weight	fitting CLEANadapt G1" Tri-Clamp 1,5" Tri-Clamp 2" mounting position back	830 g 690 g 710 g additional 50 g

#### MAN-90P-BAT (Pharma version)

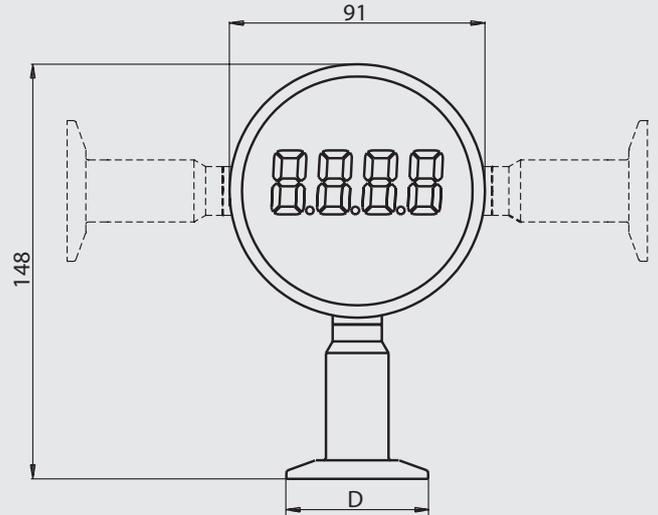
Surface roughness  $R_a \leq 0.2 \mu\text{m}$

Conform to ASME BPE  
Certificates provided with product

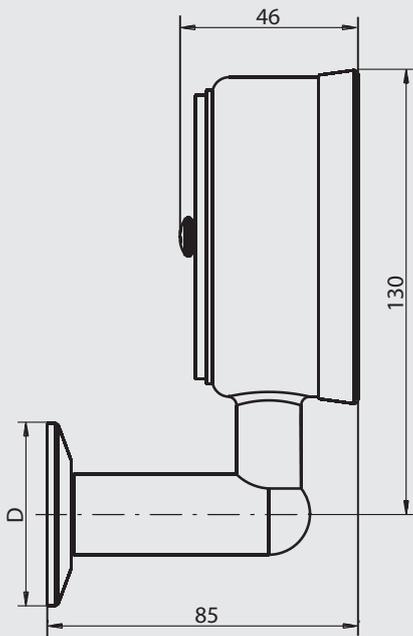
MAN-90x-BAT / S / ...



MAN-90x-BAT / TC / ... with connection U, L, R

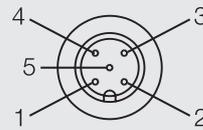


MAN-90x-BAT / TC / ... with connection H



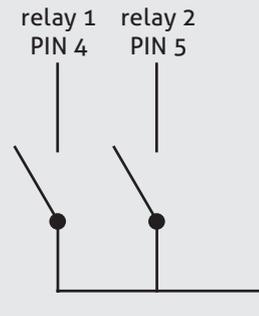
Electrical connection with M12-plug

Configuration M12-plug



- 1: + supply
- 2: - supply
- 3: relay 1 and 2 COM
- 4: relay 1 closing contact
- 5: relay 2 closing contact

Internal switches relay 1 and 2



**Note:**  
Contact voltage per relay  
max 24 V DC

relay 1 and 2  
PIN 3

Dimension table Tri-Clamp

Clamp size D [mm]	Suitable for pipe diameter	Pipe style
50.5	DN 40 1½"	DIN 11866 series A DIN 11866 series B / ISO 1127 DIN 11866 series C / OD-Tube
64.0	DN 50 2"	DIN 11866 series A DIN 11866 series C / OD-Tube
77.5	2½"	DIN 11866 series C / OD-Tube
91.0	DN 65 3"	DIN 11866 series A DIN 11866 series C / OD-Tube

### Conditions for a measuring point according to 3-A Sanitary Standard 74-06



- The sensors MAN-90-BAT / TC... and MAN-90P-BAT / TC... conforming to the 3-A Sanitary Standard.
- The sensors are designed for CIP-/ SIP-cleaning. Maximum 149 °C / 60 minutes.
- Only with 3-A conforming Tri-Clamp process connection..
- Mounting position, self draining and the position of the leakage hole must be in accordance to current 3-A Sanitary Standard.

### Display MAN-90x-BAT

- 1. Primary display**  
Four digit LCD with adjustable decimal point position to indicate pressure value.
- 2. Display setpoint 1 and 2**  
Flashes if setpoint is tripped. Displays continuously during setpoint viewing or programming.
- 3. Secondary display**  
Indicates pressure unit or parameter information.
- 4. Battery status display**  
Three bars indicate an intact and fully charged battery.

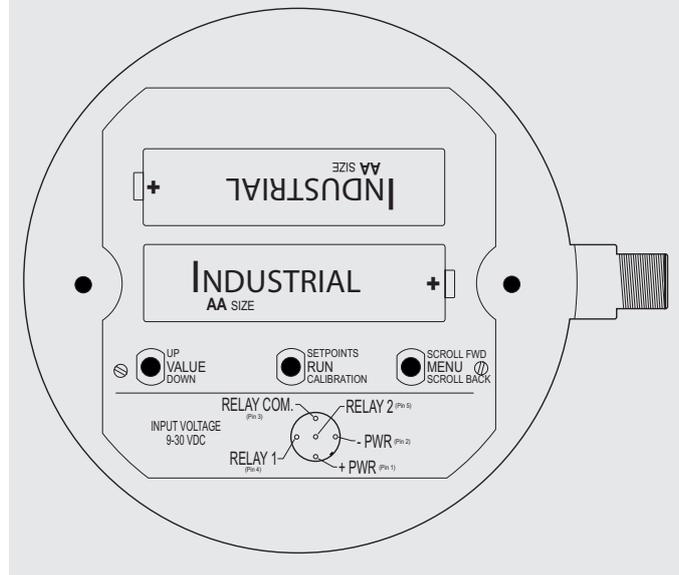
Fig. 1: Display MAN-90x-BAT



### Programming MAN-90x-BAT

- To access the switches remove the two screws and the cover with gasket.
- All parameter values can be read in RUN-Mode by pressing SCROLL FWD and SCROLL BACK.  
After 3 sec. the gauge automatically switches to the display mode.
- MAN-90-BAT is to be programmed with the switches VALUE, RUN and MENU. Therefore you put the RUN-switch to SETPOINTS or CALIBRATION.
- To switch back to measuring mode put RUN-switch back to RUN!

Fig. 2: MAN-90x-BAT with open lid

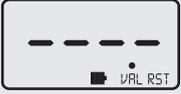


### Attention:



While the cover is removed, do not allow moisture to enter the gauge housing.

Alarm setpoint programming (RUN-switch set to SETPOINTS)					
Value	LC-Display	Switch	Adjustment		
Alarm 1 setpoint		VALUE UP / DOWN	0...100 % of range (in pressure units) pressure at which relay 1 closes		
		MENU SCROLL FWD / SCROLL BACK			
Alarm 1 action		VALUE UP / DOWN			
			Relay 1 closed above setpoint		Relay 1 closed below setpoint
		MENU SCROLL FWD / SCROLL BACK			
Alarm 1 hysteresis		VALUE UP / DOWN	Alarm 1 hysteresis 0...100 % of range (in pressure units)		
		MENU SCROLL FWD / SCROLL BACK			
Alarm 2 setpoint		VALUE UP / DOWN	0...100 % of range (in pressure units) pressure at which relay 2 closes		
		MENU SCROLL FWD / SCROLL BACK			
Alarm 2 action		VALUE UP / DOWN			
			Relay 2 closed above setpoint		Relay 2 closed below setpoint
		MENU SCROLL FWD / SCROLL BACK			
Alarm 2 hysteresis		VALUE UP / DOWN	Alarm 2 hysteresis 0...100 % of range (in pressure units)		

Calibration / Configuration programming (RUN-switch set to CALIBRATION)				
Value	LC-Display	Switch	Adjustment	
Calibration menu				
		MENU SCROLL FWD / SCROLL BACK		
Offset		VALUE UP / DOWN	Offset calibration adjustment Adds to reading Range: ± 10 % of span	
		MENU SCROLL FWD / SCROLL BACK		
Span		VALUE UP / DOWN	Span calibration adjustment Multiplies reading Range: 0.90...1.10	
		MENU SCROLL FWD / SCROLL BACK		
Displayed units		VALUE UP / DOWN	Units PSI Gau, PSI ABS, in H <sub>2</sub> O, kg/cm <sup>2</sup> , mmHg, inHg, MPa, kPa, Bar	
		MENU SCROLL FWD / SCROLL BACK		
Dampening factor		VALUE UP / DOWN	Dampening Factor Digital Filter setable from 0.0...10.0 (no dampening = 0.0)	
		MENU SCROLL FWD / SCROLL BACK		
Decimal position		VALUE UP / DOWN	Decimal point position (Setting is not stored in nonvolatile memory)	
		MENU SCROLL FWD / SCROLL BACK		
Maximum pressure captured		VALUE UP / DOWN	Hold UP-switch for 3 seconds to reset	
		MENU SCROLL FWD / SCROLL BACK		
Minimum pressure captured		VALUE UP / DOWN	Hold UP-switch for 3 seconds to reset	
		MENU SCROLL FWD / SCROLL BACK		
Restore factory defaults		VALUE UP / DOWN	Hold UP-switch for 3 seconds to reset all factory defaults	

**Mechanical Connection / Installation**

- Use only Negele CLEANadapt system for safe operation of measuring point!

**Transport / Storage**

- No outdoor storage
- Dry and dust free
- Not exposed to corrosive media
- Protected against solar radiation
- Avoiding mechanical shock and vibration
- Storage temperature -55...+90 °C
- Relative humidity maximum 98 %

**Cleaning / Maintenance**

- In case of using pressure washers, don't point nozzle directly to electrical connections!

**Reshipment**

- Sensors shall be clean and free of media or heat-conductive paste and must not be contaminated with dangerous media!
- Use suitable transport packaging only to avoid damage of the equipment!

**Conventional Usage**

- Not suitable for applications in explosive areas.
- Not suitable for applications in security-relevant equipments (SIL).

**Standards and Guidelines**

- You have to comply with applicable regulations and directives.

**Advice to EMC**

- The device agrees to following standards: EMC directive 2004/108/EC.
- You have to guarantee the EMC directives for the entire equipment.

**Disposal**

- This instrument is not subject to the WEEE directive 2002/96/EC and the respective national laws.
- Pass the instrument directly on to a specialised recycling company and do not use the municipal collecting points.

**Accessories****M12-K / 5**

M12-connection 4-pin, IDC technique, with plastic knurled screw

**PVC-cable with M12-connection made of 1.4305, IP 69 K, unshielded****M12-PVC / 5-5 m**

PVC-cable 5-pin, length 5 m

**M12-PVC / 5-10 m**

PVC-cable 5-pin, length 10 m

**M12-PVC / 5-25 m**

PVC-cable 5-pin, length 25 m

**PVC-cable with M12-connection, brass nickel-plated, IP 67, shielded****M12-PVC / 5G-5 m**

PVC-cable 5-pin, length 5 m

**M12-PVC / 5G-10 m**

PVC-cable 5-pin, length 10 m

**M12-PVC / 5G-25 m**

PVC-cable 5-pin, length 25 m

**M12-EVK**

M12 plug-in screw cap, 1.4305 (303), with o-ring, as a protection against humidity and dirt

**CAL/MAN**

factory calibration certificate, incl. inspection certificate 3.1 acc. to EN 10204 (only product contacting surface)

**PVC-cable with M12-connection****M12 plug-in screw cap**

## Order Code

**MAN-90-BAT**  
**MAN-90P-BAT**

(Food version, diameter housing 90 mm)

(Pharma version, diameter housing 90 mm, including material certificate and calibration certificate)

**Process Connection with 3-A TPV approval**

**TC1** (Tri-Clamp 1.5")

**TC2** (Tri-Clamp 2")

**TC2.5** (Tri-Clamp 2.5")

**TC3** (Tri-Clamp 3")

**Following Process Connections only for MAN-90-BAT available (not with 3-A TPV approval)**

**S** (CLEANadapt G1", process connection conforming to EHEDG)

**Measuring Range**

**-1...0** (-1.0...0 bar)

**-1...+1** (-1.0...+1.0 bar)

**-1...+2** (-1.0...+2.0 bar)

**-1...+4** (-1.0...+4.0 bar)

**-1...+7** (-1.0...7.0 bar)

**0...1** (0...1.0 bar)

**0...2** (0...2.0 bar)

**0...4** (0...4.0 bar)

**0...6** (0...6.0 bar)

**0...7** (0...7.0 bar)

**0...10** (0...10.0 bar)

**0...14** (0...14.0 bar)

**0...20** (0...20.0 bar)

**Connection**

**U** (bottom)

**L** (left)

**R** (right)

**H** (back)

**Membrane**

**316L** (Standard)

**HAST** (Hastelloy C)

**Switching**

**X** (without)

**1** (with 2 normally open relay contacts, 1 A max.)

MAN-90-BAT /

TC1 /

-1...+2 /

U /

316L /

X