BD|SENSORS
pressure measurement

DL 01

Battery Powered Precision Digital Gauge for Leak Testing

Stainless Steel Sensor

class 0.05

Nominal pressure

from 0 … 100 mbar up to 0 ... 400 bar

Special characteristics

► modular sensor concept
► data logger
► graphic display
► stainless steel housing Ø100 mm
► communication interface USB 2.0

Optional

► accredited calibration certificate according to DKD / DAkkS
► IS-version zone 0/1
► software incl. USB converter
► service case with various accessories

Functions

► data logger interval
  1 s … 99 days or fixed time
► default values for time / test duration
► zero point calibration
► backlight and much more

The digital pressure gauge DL 01 is a precision device fulfilling highest demands. It was conceived especially for leak testing or pipeline monitoring.

In the leakage mode the device shows the pressure decrease during an adjustable time. After finishing of measurement, the result is shown in the display.

Outstanding measuring qualities, an intuitive operation, as well as an integrated data logger characterize the DL 01. In addition, the graphic display provides the handling and the clear presentation of the measuring procedure.

The gathered data and the relevant information (TAG or serial number, etc.) are recorded and can be read out and processed over the integrated interface via USB and PC software.
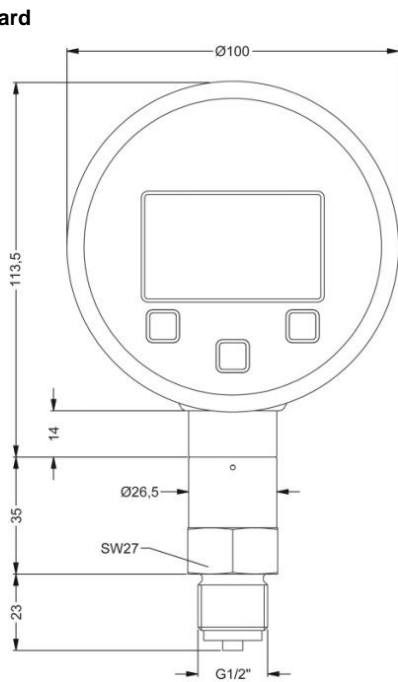
Preferred areas of use are

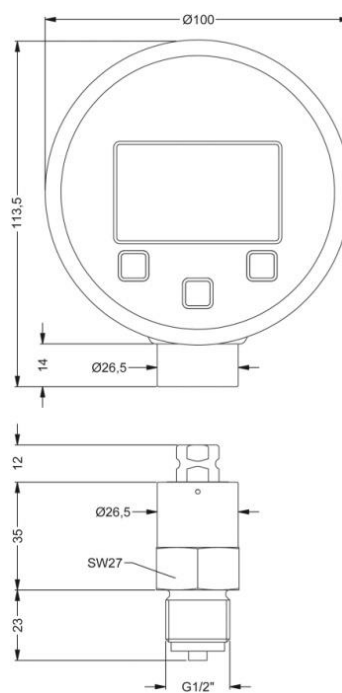Plant and machine engineering
- Pipeline monitoring
- Leak testing

CE Ex RoHS REACH

Input pressure

Nominal pressure gauge	[bar]	-1…0	0.10	0.16	0.25	0.40	0.60	1	1.6	2.5	4	6
Nominal pressure abs.	[bar]	-	-	-	-	0.40	0.60	1	1.6	2.5	4	6
Overpressure	[bar]	5	1	1	1	2	5	5	10	10	17.5	35
Burst pressure ≥	[bar]	7.5	1.5	1.5	1.5	3	7.5	7.5	15	15	25	50

Nominal pressure gauge / abs.	[bar]	10	16	25	40	60	100	160	250	400
Overpressure	[bar]	35	80	80	105	210	600	600	1000	1000
Burst pressure ≥	[bar]	50	120	120	210	420	1000	1000	1250	1250
Vacuum resistance		p_N ≥ 1 bar: unlimited vacuum resistance; p_N < 1 bar: on request								

Performance

Accuracy [1]	nominal pressure p_N ≥ 0.4 bar: ≤ ± 0.05 % FSO BFSL nominal pressure p_N < 0.4 bar: ≤ ± 0.125 % FSO BFSL
Long term stability	≤ ± 0.1 % FSO / year at reference conditions
Measuring rate / Display	1 or 2 measurements per second

[1] accuracy according to IEC 60770 – minimum value setting (non-linearity, hysteresis, repeatability) – at room temperature 20℃

Thermal effects (offset and span)

Temperature error	for nominal pressure ranges p_N ≤ 160 bar: tolerance band ≤ ± 0.2 % FSO for nominal pressure ranges p_N > 160 bar: tolerance band ≤ ± 0.75 % FSO
compensated range	0 ... 50 °C

Permissible temperatures

Permissible temperatures	medium: -10 ... 55 °C storage: -20 ... 70 °C environment: display module: -10 ... 55 °C / transmitter: -20 … 70 °C (for 1G up to +60 °C)

Materials

Pressure port / housing	stainless steel 1.4404 (316L)
Display housing	stainless steel 1.4301 (304)
Seals (media wetted)	FKM, without (welded version)
Diaphragm	stainless steel 1.4435 (316L)
Media wetted parts	pressure port, seal, diaphragm

Explosion protection

AX16-DL01	IBExU12ATEX1108 X variant with standard front foil for zone 1: II 2G Ex ia IIB T4 Gb variant with conductive front foil for zone 0: II 1G Ex ia IIC T4 Ga

Miscellaneous

Display	graphic LC display: visible area 55 x 46 mm; (resolution 128x64) figure height 5.5 mm (displaying of pressure value) measured value display: max. 7 digits, depending on pressure range temperature display, time, 100-segment-bargraph, potential input value background illumination: illumination period and intensity adjustable
Temperature display range	accuracy: ± 2 K resolution: 0,1 K display: -10 … 55 °C
Adjustable units pressure and temperature	[mbar], [bar], [psi], [mmHg], [cmHg], [inHg], [kPa], [MPa], [hPa], [mmH$_2$O], [mH$_2$O], [inH$_2$O], [kg/cm²], [°C], [°F], [K]
Data logger	modes: single, cyclic, linear, off recording pressure values and sensor temperature measuring value interval adjustable (hrs, min, sec, 20 ms, daily at a defined time) measurement rate adjustable (1/s, 2/s or 50/s only with 20 ms measured value interval) max. 600798 values
Current consumption	without background illumination: approx. 1.3 mA with background illumination: approx. 16 mA (depending on adjusted intensity) standby mode: approx. 1.2 µA
Supply	3x 1.5 V: Duracell Plus battery, DUR087033, AA (LR6)
Ingress protection	IP 67
Mounting position [2]	any
Weight	approx. 680 g
A / D-converter resolution	16 bit (module)
Battery life	standard use: > 2.000 h standby mode: at least 5 years (with measurement rate 1/s and 2/s)
Operational life	100 million load cycles
CE-conformity	EMC directive: 2014/30/EU pressure equipment directive: 2014/68/EU (Module A) [3] electromagnetic compatibility: according to EN 61326

[2] Pressure transmitters are calibrated in a vertical position with the pressure connection down. If this position is changed on installation there can be slight deviations in the zero point for pressure ranges p_N ≤ 1 bar.
[3] This directive is only valid for devices with maximum permissible overpressure > 200 bar.

DL 01

Precision Digital Gauge for Leak Testing

Technical Data

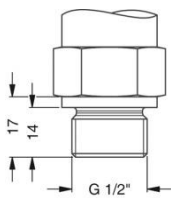**Dimensions (in mm)**

standard
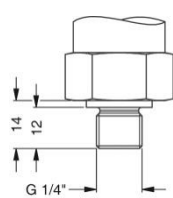

G1/2" EN 837

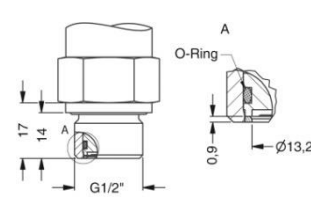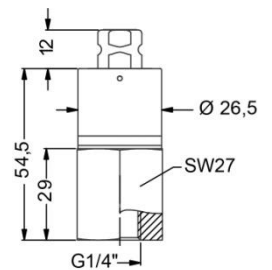G1/2" EN 837
(pressure transmitter and display separated)
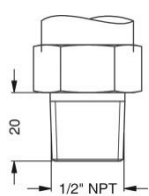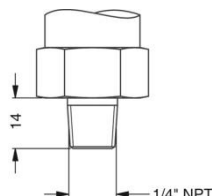
optional

G1/2" DIN 3852

G1/4" DIN 3852

G1/2" DIN 3852
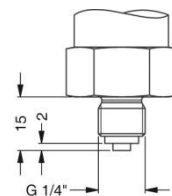with flush sensor [4]

G1/4" EN 837
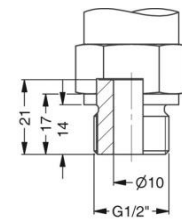internal thread, welded [4, 5]

1/2" NPT

1/4" NPT

G 1/4" EN 837

G1/2" DIN 3852
open pressure port [4]

⇨ **metrical threads and other variations on request**

[4] only possible for nominal pressure ranges $p_N \leq 40$ bar
[5] different connection versions with optional adapters possible (see accessories)

Accessories are not in scope of supply and have to be ordered separately.
Software BD|LOG lite version (Communication, Configuration)

Optionally the software BD|LOG and an interface cable can be ordered. The software is also available for download on our homepage.
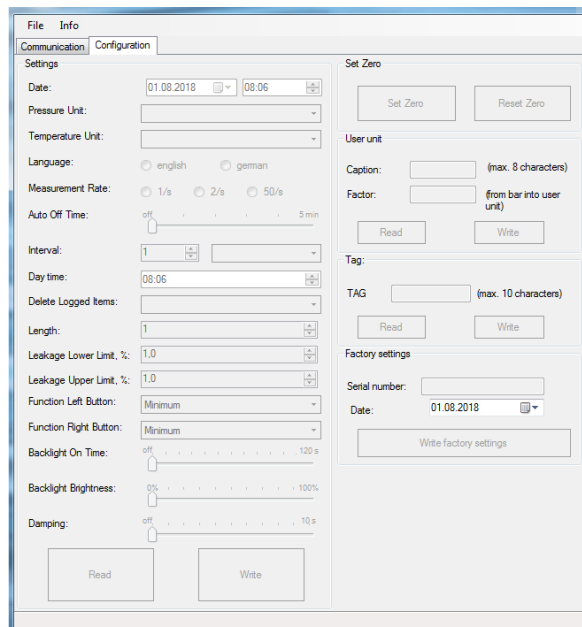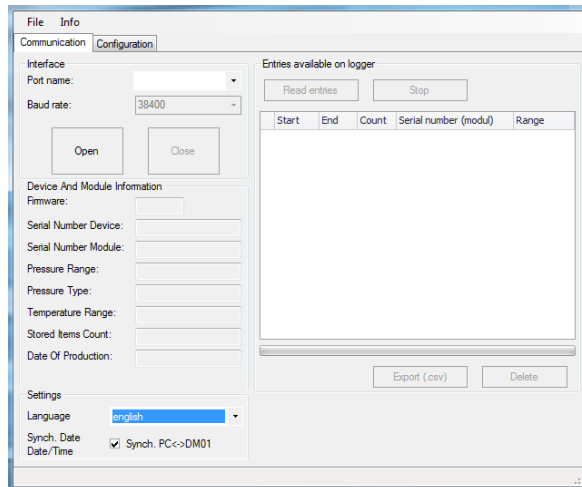
Software (Communication, Configuration):

- display of device information
  (serial number, pressure and temperature range, …)
- configuration area for all parameters
- download area for recorded data:
  - date
  - pressure value
  - temperature value
- actual value
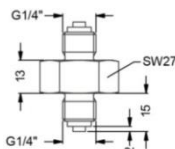
Interface cable with
integrated USB converter
l: 1.7 m

Ordering number: ZUSBCD02

⇨ **Software BD|LOG full version** (communication, configuration, table, diagram) **on request**

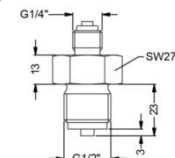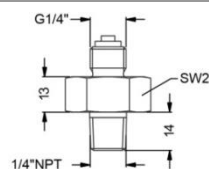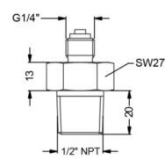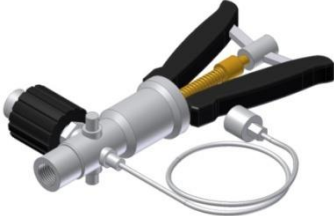| **Adapter for pressure sensor module DL 01,** pressure port G 1/4" EN 837 internal thread, welded			
G ¼" EN 837	Adapter for pressure sensor module with pressure port G ¼" EN 837 internal thread, welded external thread: G ¼" EN 837 external thread: G ¼" EN 837	¼" NPT	Adapter for pressure sensor module with pressure port G ¼" EN 837 internal thread, welded external thread: G ¼" EN 837 external thread: ¼" NPT
Ordering number: Z5010203		Ordering number: Z5010204	
G ½" EN 837	Adapter for pressure sensor module with pressure port G ¼" EN 837 internal thread, welded external thread: G ¼" EN 837 external thread: G ½" EN 837	½" NPT	Adapter for pressure sensor module with pressure port G ¼" EN 837 internal thread, welded external thread: G ¼" EN 837 external thread: ½" NPT
Ordering number: Z5010202		Ordering number: Z5010205	
others on request			

Hard-shell service case without accessories Service_Case_DM01		Hard shell case. Dimension in mm (L x W x H): 432 X 363 X 138
Protective cap Ordering number: Z1002648		Rubber protection
Additional batteries (only in combination with service case)		for IS-version use only • 3 x 1.5 V / AA Duracell Power Plus
Seal set (only in combination with service case)		Flat seal copper for mechanical connections according to EN 837
PTFE seal tape Nr. 498.505 (only in combination with service case)		Seal tape for mechanical connections material: PTFE (Teflon) Temperature range: -200 ... 280 °C
Wrench (only in combination with service case)		Wrench SW 27
Calibration test pump KHP 35 Ordering number: 1002637		The KHP 35 calibration test pump is used to generate pressure and vacuum for checking, adjusting and calibrating mechanical and electronic pressure measuring instruments by comparative measurements. These pressure tests may be carried out in laboratories, workshop or on site at the measuring point. pressure: 0 ... 35 bar vacuum: 0 ... -0,95 bar weight: ca. 510 g dimension: ca. 220 x 105 x 63 mm

Adapter for calibration test pump

Test unit connection: Adapter to connect the test unit to the calibration test pump.		Adapter to connect the test unit to the calibration test pump. external thread: G ¼" EN 837 to: internal thread: G ¼" DIN 3852 (No. 5008909) or G ½" EN o. DIN (No. 5007896) or ¼" NPT (No. 5007897) or ½" NPT (No. 5007898) others on request
Reference unit connection: Adapter to connect the digital gauge to the calibration test pump		Adapter to connect the pressure sensor module to the calibration test pump. external thread: G ½" EN 837 to: internal thread: G ¼" DIN 3852 (No. 5012498) or G ½" DIN 3852 (No. 5012519) or ¼" NPT (No. 5012499) or ½" NPT (No. 5012500) others on request

DL01_E_131120

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BD|SENSORS
pressure measurement

1. Position: Digital Display for Precision Digital Pressure Gauge DL 01

DL 01-

Digital pressure gauge DL 01				
with communication interface	A	2	1	
IS (zone 1) with communication interface	A	2	E	
IS (zone 0) with communication interface	A	2	G	consult

2. Position: Transmitter for Precision Digital Pressure Gauge DL 01

DL 01

Pressure													
gauge	M	0	P										
absolute [1]	M	0	Q										
Input	**[bar]**												
0.10 [1]				1	0	0	0						
0.16 [1]				1	6	0	0						
0.25 [1]				2	5	0	0						
0.40				4	0	0	0						
0.60				6	0	0	0						
1.0				1	0	0	1						
1.6				1	6	0	1						
2.5				2	5	0	1						
4.0				4	0	0	1						
6.0				6	0	0	1						
10				1	0	0	2						
16				1	6	0	2						
25				2	5	0	2						
40				4	0	0	2						
60				6	0	0	2						
100				1	0	0	3						
160				1	6	0	3						
250				2	5	0	3						
400				4	0	0	3						
-1 … 0				X	1	0	2						
customer				9	9	9							consult
Version													
standard version (without explosion protection)								0					
IS-version								E					
Accuracy	**[BFSL]**												
standard for p_N ≥ 0.4 bar	0.05 % FSO								B	1			
standard for p_N < 0.4 bar	0.125 % FSO								B	2			
customer									9	9			consult
Mechanical connection													
G1/2" DIN 3852											1	0	0
G1/2" EN 837											2	0	0
G1/4" DIN 3852											3	0	0
G1/4" EN 837											4	0	0
G1/2" DIN 3852 with flush sensor [2]											F	0	0	consult
G1/2" DIN 3852 open pressure port [2]											H	0	0
1/2" NPT											N	0	0
1/4" NPT											N	4	0
G 1/4" EN837 internal thread, welded [2, 3]											J	0	3
customer											9	9	9	consult
Seals													
FKM												1	
customer												9	consult
Special version													
standard											0	0	0
customer											9	9	9	consult

[1] absolute pressure possible from 0.4 bar
[2] only possible for p_N ≤ 40 bar
[3] different connection versions with optional adapters possible (see accessories)

ordering example:
device DL 01:
position 1: DL01-A21
position 2: M0P-1001-B1-200-1-000
only display: position 1: DL01-A21
only transmitter: position 2: M0P-1001-B1-200-1-000

Accessories	
USB converter (incl. software BD|LOG)	ZUSBCD02
service case (without accessories)	Service_Case_DM01
Protective cap	Z1002648
Additional batteries (3 x 1,5 V / AA Duracell Power Plus) [4]	1002798
Seal set [4]	5008886
PTFE seal tape [4]	1002724
wrench [4]	1002722
Calibration test pump (KHP)	1002637
Adapter for DL 01	
G1/4" EN 837 male - G1/4" EN 837 male	Z5010203
G1/4" EN 837 male - G1/2" EN 837 male	Z5010202
G1/4" EN 837 male - 1/4" NPT male	Z5010204
G1/4" EN 837 male - 1/2" NPT male	Z5010205
Adapter for KHP - test unit connection	
G1/4" EN 837 m - G1/4" DIN3852 fm	5008909
G1/4" EN 837 m - G1/2" EN 837/DIN3852 fm	5007896
G1/4" EN 837 m - 1/4" NPT fm	5007897
G1/4" EN 837 m - 1/2" NPT fm	5007898
Adapter for KHP - reference unit connection	
G1/2" EN 837 m - G1/4" DIN3852 fm	5012498
G1/2" EN 837 m - G1/2" DIN3852 fm	5012519
G1/2" EN 837 m - 1/4" NPT fm	5012499
G1/2" EN 837 m - 1/2" NPT fm	5012500

[4] only in combination with service case