

Flush-mounted pressure and level transmitter - Type KERAMESS / KERASTAB... - Series 100 -



VERSION EXAMPLE: KERAMESS 101 WITH VARIVENT PROCESS CONNECTION



ADVANTAGES

- MICROPROCESSOR-CONTROLLED ELECTRONICS IN THE FORM OF A 2-WIRE SYSTEM, 4 - 20 MA
- EASY TO CALIBRATE WITHOUT PRESSURE SPECIFICATIONS VIA 3 PUSH-BUTTONS AT THE MEASURING SITE
- TURN-DOWN 1 : 10
- FAST SETTING OF "ZERO" AND "RANGE"
- ACCURATE AND STABLE IN THE LONG TERM
- OPTIMISED HOUSING DESIGN WITH MINIMISED AIR VOLUME
- EXTERNAL DISPLAY / OPERATING MODULE FOR EASY OPERATION

CHARACTERISTICS

- DRY CERAMIC-CAPACITIVE SENSOR, HIGHLY OVERLOAD-RESISTANT
- STAINLESS STEEL FIELD HOUSING: SMOOTH SURFACE, EASY TO CLEAN, HIGH PROTECTION CLASS
- UTILISATION OF MATERIALS SUITABLE FOR FOOD AND PHARMACEUTICALS
- MEASURING RANGES FROM 10 MBAR
- ANY PRESSURE CONNECTIONS FOR ALL APPLICATIONS
- WITH TEMPERATURE DISPLAY

DESCRIPTION

The intelligent digital process pressure and level transmitter **KERAMESS - Series 100** - in a robust stainless steel field housing with ceramic sensors, is also available in a rod version, **KERASTAB**, including an extension pipe. It can be programmed at the measuring site, using three push-buttons and a display / operating module without pressure specifications. The zero point and measuring range can be easily set via two push-buttons, which is a special advantage in the case of applications used for level measurements.

The option of displaying various pressure units during operation has been provided, as has the display of the process (sensor) temperature as a secondary process value. The display and operating module is either integrated into the field device and becomes accessible by removing the front ring (can be rotated by 360° and removed) or available as an external housing with a plug connection. The transmitters are then supplied without a graphics display (cost savings for each measuring site).

The measuring element takes the form of a robust and corrosion-resistant ceramic membrane made from 96% or 99,9% aluminium oxide (check application conditions). The imminent process pressure of the medium to be measured results in a slight mechanical displacement of the ceramic sensor membrane via the pressure connection. The capacitive measuring technology and the application of the measuring membrane after only 25 µm result in an extreme overload resistance of up to 40 times.

The sensor-specific data are stored in a reference data memory and are made available to the microprocessor for extension purposes. All Hengesbach pressure transmitters are temperature-compensated. An additional temperature sensor as a secondary measuring element makes the temperature measured on the sensor available on the display as additional information.

PN/KS100/D-e-08-1/1

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TECHNICAL DATA

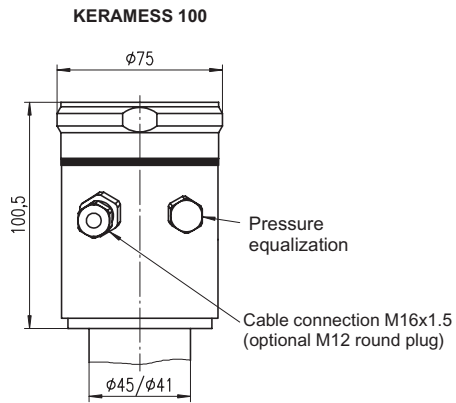
General information							
Manufacturer / device	Hengesbach / Pressure transmitter						
Device type	KERAMESS / KERASTAB ... for process pressure and level measurements						
Applications	Absolute and relative pressure measurement in gases, vapours and liquids						
Measuring principle	ceramic-capacitive						
Type	VA housing and process connections, flush-mounted						
Input							
Capacitive ceramic cell (KERAMESS)	relative	OSD	relative	OSD		absolute	OSD
Nominal measuring ranges (pressures rel./abs. in bar)	0.05 bar	-0.3/ 4 bar	20 bar	40 bar		1 bar	10 bar
	0.1 bar	-0.3/ 4 bar	40 bar	60 bar		2 bar	18 bar
	0.4 bar	6 bar	-1...70 bar	105 bar		4 bar	25 bar
	+/-0.1 bar	6 bar	-1...1 bar	10 bar		5 bar	25 bar
Overload safety device (OSD in bar) acc. to DIN 16086	1 bar	10 bar	-1...4 bar	25 bar		10 bar	40 bar
	2 bar	18 bar	-1...10 bar	40 bar		20 bar	40 bar
	4 bar	25 bar	-1...20 bar	40 bar		40 bar	60 bar
	10 bar	40 bar				70 bar	105 bar
Vacuum resistance	up to 0.1 bar: vacuum-resistant up to 0.7 bar abs. / from 0.1 bar: vacuum-resistant up to 0 bar abs.						
Setting the measuring range	using the keyboard of the display / operating field (OPUS)						
Adjustable ranges	Measuring start zero: 0... 90% of the nominal measuring range, infinitely adjustable Measuring range: 10...100% of the nominal measuring range, infinitely adjustable - (TD1:10)						
Bursting pressure DIN 16086	10 times the measuring range limit value						
Output							
Output signal	Digital 4...20 mA signal, 2-wire						
Breakdown signal	optional: 3.6 mA, 22 mA, hold (last current is kept)						
Current limit	3.85 mA; 21.5 mA (normal operation)						
Integration time	(0,1,2,4,8,16,32,64,128 sec) 0 - 128 sec stepwise adjustable (response time after pressure jump)						
Measuring accuracy							
Reference conditions	Ta = 20 °C, acc. to EN 60751, Class A (standard)						
Linearity, incl. hysteresis and repeatability according to limit point method DIN IEC 770	< 0.2% of the max. value for the nominal measuring range, optional < 0.1%± ± * in the case of small absolute pressure ranges, special linearity indications are required						
Warm-up time	1 s						
Adjustment time (without attenuation)	320 ms (supply frequency 50 Hz selected) or 266 ms (supply frequency 60 Hz selected)						
Long-term drift	0.1% FS per year						
Thermal hysteresis of the transmitter	Zero point and measuring range ≤ ± 0.2% of the nominal value / 10 K (-20... + 80°C) for nominal measuring ranges from 4 bar onwards ≤ ± 5% of the nominal value / 10 K (-20... + 80°C) for measuring ranges of up to 0.6 bar						
Installation position	any						
Conditions for use							
Medium temperature	-40°C... + 125°C, 140°C max. for 1 h						
Environmental temperature	-40°C... + 80°C						
Storage temperature	-40°C... + 80°C						
Protection type EN 60529	- IP 67 (with pressure compensation via FPG) - IP 67 (with permanently connected reference cable with air compensation) - IP 69K (on request)						
Electromagnetic compatibility	EMV guidelines are met, CE symbol						
Design configuration							
Electrical connection	- Standard: Cable connection M 16 x 1.5 terminal strip - optional: with permanently connected reference cable (can be connected on the user side) - optional: Round plug M12 x 1 with FPG						
Process connections	all standardised and common flush-mounted connections						
Materials	Field housing CrNiSt 1.4301, transparent display cover with safety glass 1.4301(Type 100) or plexiglass, process connection 1.4571, membrane made from AL2O3, measuring cell seal: flat seal or O-ring: EPDM/FDA, optionally Viton/FDA, Kalrez, a.a.A., cover seal Viton (flat seal)						
Display and operating module							
Display	LCD display, four-digit number display, five-digit alphanumerical display with additional information						
Displayed units	mbar, bar, psi, kpa, mH20 and %						
Additional displays	Display of output current Display of sensor temperature Display of range exceeded						
Operation	Setting of all parameters in parameter menu with the aid of the digital display and the 3 buttons underneath the display Setting of "zero" and "range" using two buttons						
Auxiliary energy							
Power supply / working resistance	9-36 V VDC, max. permitted residual ripple 1 V _{ss} , RB = (VB - 9V) : 22 mA						
Effect of supply voltage	< ± 3 µV change in supply voltage						
Accessories for types 100 and 101 (process adaptor / welding accessories)							
ZEM/N	Welding socket N for KERAMESS F/N (optionally with WAZ 3,1, EN 10204)						
ZEM/G 11/2	Welding socket G 11/2 for KERAMESS F/G 11/2						
ZEF block flange	Welding block flange for KERAMESS F/DRD						
Accessories for type 101							
OPUS display module	External operating module, CrNiSt IP 67, 41 x 70 mm, with 0.5 m cable and M 16 x 0.75 round plug / locking screw M 16 x 0.75, CrNiSt, IP 67 included in delivery						

PN/KS100/D-e-08-1/2

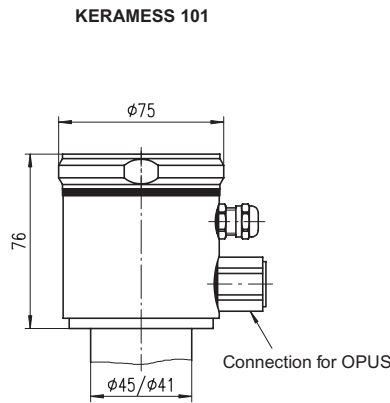
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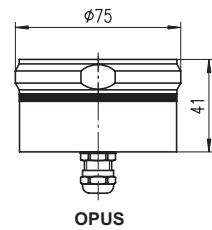
DIMENSIONAL DRAWINGS



KERAMESS 100
Field-housing with integrated display
(stainless steel, IP67 EN 60529)

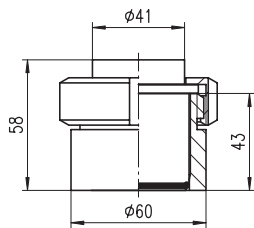


KERAMESS 101
Field housing for OPUS
(stainless steel, IP67 EN 60529)

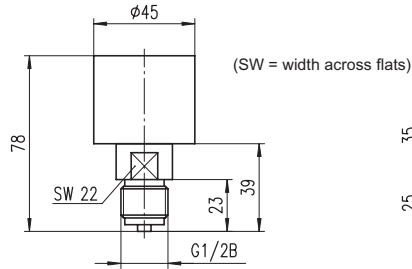


OPUS
Display with three push buttons

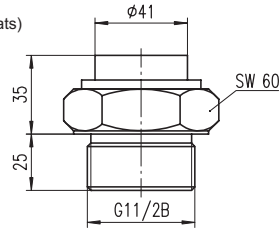
Process connection adapter : (other constructions on request)



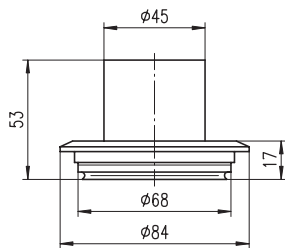
Type N
with welding socket



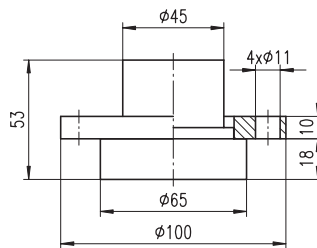
External thread G1/2B EN 837



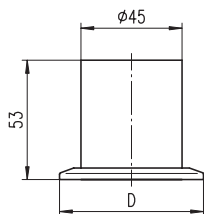
External thread G11/2B



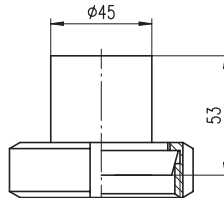
VARIVENT flange d=68mm



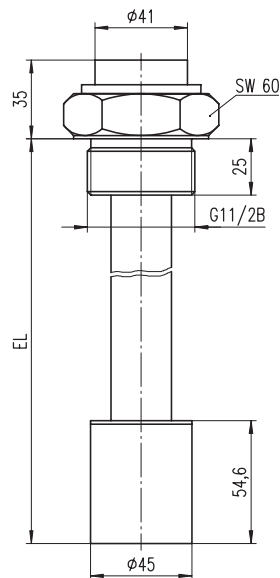
DRD flange d=65mm



Triclamp flange
ISO 2852 2"...4"
DIN 32676 DN50...DN100



Conical socket and grooved nut DIN 11851
DN40...DN100



KERASTAB G11/2B

PN/KS100/D-e-08-1/3

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CALIBRATION / SETTINGS

Variants

Type 100 comes with a standard local display/control module and three push-buttons, so that the measuring values and settings can be directly on site. The entire configuration takes place with the aid of the three push-buttons. The front ring is transparent, optionally closed.

Type 101 has no graphics display and comes in a closed box; it is configured via a display/control module in an external housing.

Operating modes of display and control module

- | | |
|-----------------------|--|
| 1) Display | measuring value |
| 2) Configuration menu | Parameter display |
| 3) Display | Error code (in the event of a malfunction) |

Factory settings

Both versions of the device (Type 100, Type 101) have been factory-programmed as follows:

Calibrated measuring range	Nominal range for 4...20 mA or acc. to order data
Attenuation programmed	1 s
Signal output in the event of a malfunction	hold (most recent values is retained)
Physical unit	bar

Other basic settings can be specified when placing the order and will be charged separately.



Display and operating module
(Version example: KS 100)

Configuration menu / Parameter list

Parameter	No.	Function
Measuring start	0	Determining the measuring start, with or without pressure specification
Measuring range	1	Determining the measuring range, with or without pressure specification
Power supply	2	4...20 mA or inverted 20...4 mA
Attenuation	3	Signal attenuation selection
Power frequency	4	Selection of power frequency suppression 50/60 Hz
Measuring unit	5	Physical unit selection
Display mode	6	Pressure, mA power supply, percent, temperature
Display correction	7	Compensation of a bias pressure
Min/max value	8	Minimum and maximum pressure value (drag indicator function)
Parameter safeguard	9	Protection against unintentional parameter changes
for the power supply in the event of an error	10	Determining the power supply in the event of an error
Display version	11	Display HW and SW version, measuring cell type and measuring range

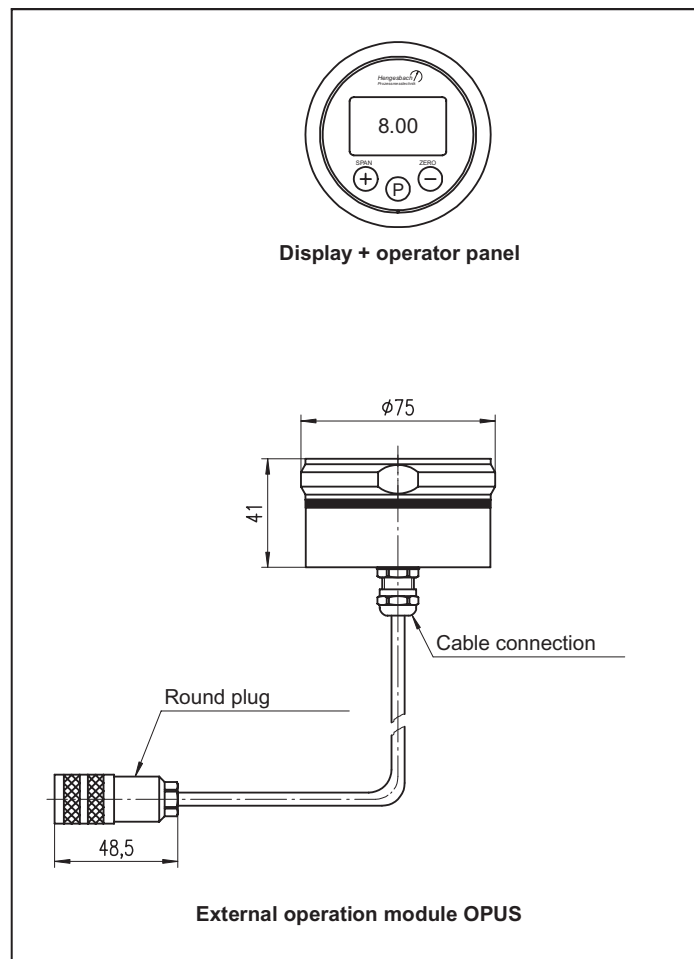
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ELECTRICAL CONNECTION

The electrical connection is made via screw clamps after the screw-type lid has been removed. The cable insertion usually takes place via an M 16x1.5 threaded connection, or optionally by means of an M 12x1 round plug. The test circuit connection ensures an uninterrupted output current measurement. We recommend the use of a cable with an air-equalisation tube in areas, especially in areas with high humidity levels.

	Cable connection M16 x 1.5 4-20 mA (2-wire)	M16 x 1.5 4-20 mA (2-wire)	M 12 plug 4-20 mA (2-wire)
GND	white	GND	
+ supply	red	1	1
- supply	black	2	3



PN/KS100/D-e-08-1/5

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ORDER INFORMATION FOR KERAMESS

Electronics	
100	4-20 mA, LCD display, TD 01:10
101	4-20 mA, operated with Opus, TD 01:10

Process connection (material 1.4404, 316 L)	
N3	aseptic connection with grooved union nut, ceramics, flush-mounted
A4	Flange according to DIN 11864-1, A, DN 40, pipe DIN 11850
A5	Flange according to DIN 11864-1, A, DN 50, pipe DIN 11850
D6	DRD flange DN 65, ceramics, flush-mounted
M4	DIN 11851, DN 40 / PN 40, ceramics, flush-mounted
M5	DIN 11851, DN 50 / PN 25, ceramics, flush-mounted
V6	VARIVENT flange d = 68, DN 40-125 / PN 40, ceramics, flush-mounted
C5	Triclamp ISO 2852, DN 50 / 2", ceramics, flush-mounted
S5	SMS DN 2" (DN 51) PN 40, ceramics, flush-mounted
F5	Flange DN 50 / PN 10 - 40, B1, EN 1092-1 (DIN 2527 D), ceramics, flush-mounted
F6	Flange DN 80 / PN 10 - 40, B1, EN 1092-1 (DIN 2527 D), ceramics, flush-mounted
G5	Threaded connection ISO 228 G1½ B, ceramics, flush-mounted
G4	Threaded connection M 44 x 1.25, PN 25, ceramics, flush-mounted
S9	Other process connection
99	Special material for process connection

Type of pressure / measuring range (R = relative pressure or A = absolute pressure) - all vacuum ranges also possible -		
0.05	bar R	max. overload -0.3 / 4 bar
0.1	bar R	max. overload -0.3 / 4 bar
0.4	bar R	max. overload 6 bar
+/- 0,1	bar R	max. overload 6 bar
1	bar R	max. overload 10 bar
2	bar R	max. overload 18 bar
4	bar R	max. overload 25 bar
10	bar R	max. overload 40 bar
20	bar R	max. overload 40 bar
40	bar R	max. overload 60 bar
-1...70	bar R	max. overload 105 bar
-1...1	bar R	max. overload 10 bar
-1...4	bar R	max. overload 25 bar
-1...10	bar R	max. overload 40 bar
-1...20	bar R	max. overload 40 bar
1	bar A	max. overload 10 bar
2	bar A	max. overload 18 bar
4	bar A	max. overload 25 bar
5	bar A	max. overload 25 bar
10	bar A	max. overload 40 bar
20	bar A	max. overload 40 bar
40	bar A	max. overload 60 bar
70	bar A	max. overload 105 bar
CC	Set measuring range (in the event of a deviation from the nominal measuring range, please state in plain text and in bar)	

Electrical connection	
K	Cable connection M 16 x 1.5
M	Round plug M 12 x 1, 4-pin
W	Right-angle plug connection EN 175301-803 (not for 100)
R	Reference cable, 1 m, permanent connection other lengths to be specified in plain text (max. 80 m)

Measuring cell seal	
4	Viton (with FDA authorisation)
3	Viton (O-ring)
2	EPDM (with FDA authorisation)
5	Kalrez (O-ring)
9	Other

KERAMESS					
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Flush-mounted pressure and level transmitter - Type KERAMESS / KERASTAB... - Series 100 -



ORDER INFORMATION FOR KERASTAB

Electronics	
100	4-20 mA, LCD display, TD 01:10
101	4-20 mA, operated with Opus, TD 01:10

Sensor length / material	
0	xx mm sensor pipe, material 1.4404, 316 L, (40 ... 2,500 mm) per 100 mm or part thereof
E9	xx mm sensor pipe, special material, (40... 2500mm) per 100 mm or part thereof

Process connection (material 1.4404, 316 L)	
M5	DIN 11851, DN 50 / PN 25, ceramics, flush-mounted
S5	SMS DN 2" (DN 51) PN 40, ceramics, flush-mounted
F5	Flange DN 50/PN10-40,B1,EN 1092-1(DIN 2527 D), ceramics, flush-mounted
F6	Flange DN 80/PN10-40,B1,EN 1092-1(DIN 2527 D), ceramics, flush-mounted
G5	Threaded connection ISO 228 G1½ B, ceramics, flush-mounted
N5	without attachment (smooth rod), ceramics, flush-mounted
S9	Other process connection
99	Special material for process connection

Type of pressure / measuring range (R=relative pressure or A=absolute pressure) - all vacuum ranges also possible -		
0.05	bar R	max. overload -0.3 / 4 bar
0.1	bar R	max. overload -0.3 / 4 bar
0.4	bar R	max. overload 6 bar
+/-0,1	bar R	max. overload 6 bar
1	bar R	max. overload 10 bar
2	bar R	max. overload 18 bar
4	bar R	max. overload 25 bar
1	bar A	max. overload 10 bar
2	bar A	max. overload 18 bar
4	bar A	max. overload 25 bar
5	bar A	max. overload 25 bar
CC	Set measuring range (in the event of a deviation from the nominal measuring range, please state in plain text and in bar)	

Electrical connection	
K	Cable connection M 16 x 1.5
M	Round plug M 12 x 1
W	Right-angle plug connection EN 175301-803 (not for 100)
R	Reference cable, 1 m, permanent connection other lengths to be specified in plain text (max. 80 m)

Measuring cell seal	
4	Viton (with FDA authorisation)
3	Viton (O-ring)
2	EPDM (with FDA authorisation)
5	Kalrez (O-ring)
9	Other

KERASTAB						
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ORDER INFORMATION FOR ACCESSORIES / ADD-ON PARTS

Accessories / add-on parts for KERAMESS – Series 100	(order reference)
External operating module OPUS, for electronics 101	OPUS
Welding sleeve for process connection N3, 1.4404 (316 L)	ZEN
DRD welded block flange for D6 process connection, DRD, 1.4435 (316 L)	ZEB
Flat seal made from EPDM for DRD welding flange DN 50	ZDE
Flat seal made from Viton for DRD welding flange DN 50	ZDV
Flat seal made from Gore-Tex for DRD welding flange DN 50	ZDG
4 attachment screws for DRD welding flange DN 50	ZDS
Reference cable with pressure equalisation capillaries per metre or part thereof, made from PUR	ZKP
Pressure equalisation casing with ventilation filter - Wall mounting, can be used for all pressure transducers -	ZDA
Acceptance certificate according to EN 10204 for welding accessories - per order -	WZ 31 (3.1)

Accessories / add-on parts for KERASTAB – Series 100	(order reference)
External operating module OPUS, for electronics 101	OPUS
Reference cable with pressure equalisation capillaries per metre or part thereof, made from PUR	ZKP
Pressure equalisation casing with ventilation filter - Wall mounting, can be used for all pressure transducers -	ZDA
Attachment bracket for smooth rod depending on application	XXX

Our products are constantly in further development, therefore subjects to modifications.

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