

EK-ED-EP-ER-ET-EC-EL Pressure Sensors

Measurement of gauge or absolute pressure

From 250 mbar to 600 bar full scale

Corrosion resistant

Excellent long term stability

Low cost - excellent performances / price ratio

The TRANSBAR® technology is a spin off of the «thick film technology» used worldwide to produce so called «hybrid electronic circuits».

Patterns of conductive and resistive pasts, or «inks», are deposited on a substrate, generally ceramics, using screen printing techniques.

The uniqueness of the «TRANSBAR®» technology is to use the piezoresistive characteristics of specific resistive inks, i.e. the fact that their resistance values vary when submitted to dimensional changes.

These resistors, called strain gauges, judiciously positioned on the deformable structure (diaphragm), are connected together in a four arms Wheatstone bridge configuration.

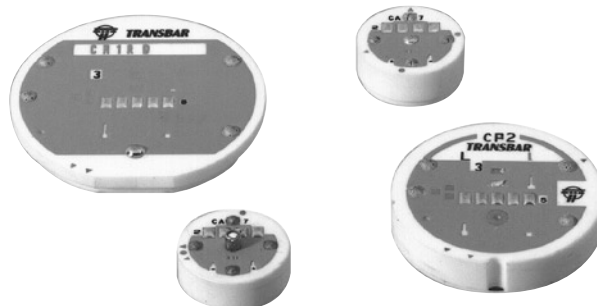
A regulated voltage source is connected to one diagonal of the bridge. A pressure applied to the diaphragm will deform it and therefore unbalance the bridge, resulting in an electrical signal, on the other diagonal of the bridge, proportional to the applied pressure.

This low level signal, some mV., will have to be amplified to a suitable level to be connected to a display, controller, recorder, PLC or whatever required peripheric equipment.

Constructed entirely of ceramics (Al_2O_3 , 96 %), comparable to a cristal, these sensors have a quasi perfect mechanical behaviour : good linearity, low hysteresis. They can withstand tens of millions of cycles. Chemically inert, ceramics accepts most industrial media, even aggressive ones.

Their simple geometry allows their easy integration in OEM's mechanical structures.

The field of their applications is very wide, from basic research to general industry.



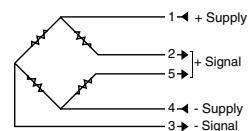
Models

- EK (CS) :** Open bridge, unbalanced.
Bridge impedance : 15 k Ω +30%
- ED (CA) :** Closed bridge, balanced.
The integrated bridge balancing circuitry eliminates possible induced parasites due to connections to an external circuit.
- EP (CP) :** Closed bridge, balanced .
Interchangeability :
Output signal to $\pm 1\%$
- ER (CTi) :** Closed bridge, balanced .
Thermal drifts compensation :
zero and output signal .
- ET (CT) :** Closed bridge, balanced .
Thermal drifts compensation :
zero and output signal .
Output signal to $\pm 1\%$
Interchangeability .

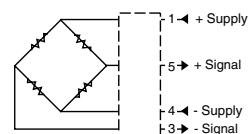
Other models, EC-EL with high level output signal, 0-10 V, or 0-5 V, or 4-20 mA: consult us.

Electrical connections

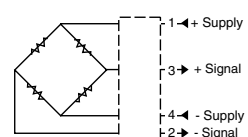
EK11 / 21
(CS1 / 2)



ED-EP 11 / 21
(CA - CP 1 / 2)



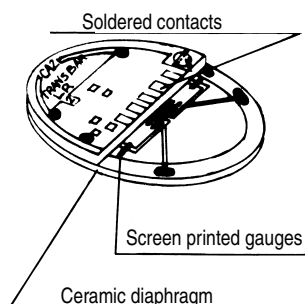
ER-ET 11 / 21
(CTi - CT 1 / 2)



ED71 (CA7)



Sectioned view



Baumer

Options

Particular technical specifications

Zitex humidity protector (gauge pressure models only). **Code 0811**

Polyester flat cable, 5 wires, 50 mm soldered on sensors serie 1 or 2. **Code 2251**

Kapton flat cable, 4 wires, 25 mm. Standard for ED71 (soldered). **Code 2252**

Flexible single wires, soldered on sensor, length to be specified. **Code 2253**

All other options : please consult us.

Pressure sensors, high level output signal models EC - EL

Above described pressure sensors address OEM users, taking in charge the electronic conditioning of the sensor (excitation, signal amplification) depending upon their actual needs.

For those who would not have such capacities, or for whom, the annual requirement would not allow a satisfying playback on the cost of development of such electronic circuitry, BAUMER can supply sensors associated with p.c. boards usually fitted in transmitters, delivering a normalised high level output signal for the rated range : 4-20 mA, 1-5 V, 0-10V, directly usable by peripheric equipments as : displays, recorders, controllers, P.L.C.s, etc.

Ordering Details - EK-ED-EP-ER-ET

		Exxxxxx	
Model	1' digit		
Pressure sensors		E	
Type	2'...4' digit		
Serie 1 - Ø 42 mm		K11	
		D11	
		P11	
		R11	
		T11	
Serie 2 - Ø 34 mm		K21	
		D21	
		P21	
		R21	
		T21	
Serie 7 - Ø 18 mm		D71	
Pressure range	5'...6' digit		
See codes in tables		xx	
Pressure type	7' digit		
Absolute		A	
Gauge		R	

Serie 1 - Ø 42 mm			
code	Range bar		
RB	0.2	-	R
RC	0.5	-	R
RD	0.75	A	R
RE	1.5	A	R
RG	2	A	R

Serie 2 - Ø 34 mm			
code	Range bar		
MB	0.6	A	R
MC	1	A	R
LC	2	A	R
LE	5	A	R
LI	10	A	R
LL	20	A	R
LR	50	A	R
HR	100	A	R
ER	200	A	-
EZ	350	A	-
EP	400	A	-

Serie 7 - Ø 18 mm			
code	Range bar		
FA	2	A	R
FB	4	A	R
DB	6	A	R
FE	10	A	R
DE	16	A	R
DG	25	A	R
CG	40	A	R
DL	60	A	R
CL	100	A	R
CQ	160	A	R
CR	250	A	R
CU	400	A	R
CZ	600	A	R

Be careful :
Max. operating temperature range is limited to 70°C for absolute pressure versions.

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Technical Data (20°C)

SERIE 1 - Ø 42 mm - Low pressure ranges

MODELS SPECIFICATIONS EK11 - ED11 - EP11 - ER11 - ET11						
RANGE IDENTIFICATION :		RB (1)	RC (1)	RD	RE	RG
RATED RANGE (R.R.) :	(bar)	0.2	0.5	0.75	1.5	2
	(≅ psi)	2.9	7.25	10.9	21.75	29
Max. admissible pressure, without derating of specs :	(bar)	0.22	0.55	0.83	1.65	2.2
Burst pressure :	(bar)	≥ 0.4	≥ 1	≥ 1.5	≥ 3	≥ 4
OUTPUT SIGNAL AT RATED RANGE: (2)	(mV)					
EK11	(±30%)	25	50	45	65	55
ED11	(±30%)	22	45	42	60	50
EP11	(±1%)	18	35	35	45	40
ER11	(±30%)	20	40	38	55	45
ET11	(±1%)	15	30	30	40	30
GLOBAL ERROR (max.) :	(±% R.R.)	1	0.4	0.4	0.4	0.4
(non linearity + hysteresis + repeatability)						
DIMENSIONS		See fig. 1				

(1) Gauge pressure only.

SPECIFICATIONS : ALL MODELS	EK11	ED11	EP11	ER11	ET11	
EXCITATION VOLTAGE :						
Nominal :	(Volt)	10	10	10	10 (3)	10 (3)
Maximum :	(Volt)	30	30	30	10 (3)	10 (3)
BRIDGE IMPEDANCE						
Input :	(kOhm)	15 ±30%	≥ 6	≥ 6	≥ 6	≥ 6
Output :	±30% (kOhm)	15	15	10	15	10
TEMPERATURE LIMITS :						
Operating :	(°C)	-55 to +125	-55 to +125	-55 to +125	-55 to +125	-55 to +125
Compensated :	(°C)	n.a.	n.a.	n.a.	-10 to +55	-10 to +55
THERMAL DRIFTS : (2)						
Zero :	(µV / °C)	≤ ±30	≤ ±30	≤ ±30	≤ ±6	≤ ±6
Output signal :	(% / °C)	-0.04	-0.04	-0.04	≤ ± 0.01	≤ ± 0.01
LONG TERM ZERO DRIFT :	(% R.R. / year)	≤ ± 0.2 (non cumulative)				
INITIAL ZERO UNBALANCE (2)	(mV)	≤ ± 500	≤ ± 2	≤ ± 2	≤ ± 1	≤ ± 1

(2) Under nominal excitation voltage : 10 V

(3) 5 V. optional.

SERIE 2 - Ø 34 mm - Low, medium and high pressure ranges

MODELS SPECIFICATIONS EK21 - ED21 - EP21 - ER21 - ET21												
RANGE IDENTIFICATION :		MB	MC	LC	LE	LI	LL	LR	HR	ER*	EZ*	EP*
RATED RANGE : (R.R.) :	(bar)	0.6	1	2	5	10	20	50	100	200	350	400
	(≅ psi)	9	15	30	75	150	300	750	1500	3000	5250	6000
Max. admissible pressure, without derating of specs :	(bar)	0.66	1.1	2.2	5.5	11	22	55	110	220	385	440
Burst pressure :	(bar)	≥1.8	≥3	≥6	≥12	≥25	≥50	≥125	≥250	≥450	≥550	≥600
OUTPUT SIGNAL AT RATED RANGE : (2)	(mV)											
EK21	(±30%)	27	35	55	65	70	70	70	70	65	45	35
ED21	(±30%)	25	33	50	60	65	65	65	65	60	40	30
EP21	(±1%)	20	26	40	50	50	50	50	50	50	35	20
ER21	(±30%)	24	27	37	48	52	52	52	52	48	36	24
ET21	(±1%)	15	20	30	40	40	40	40	40	40	20	15
GLOBAL ERROR (max.)	(±% R.R.)	0.8	0.4	0.4	0.4	0.3	0.3	0.2	0.2	0.2	0.4	0.4
(non linearity + hysteresis + repeatability)												
DIMENSIONS		See fig. 2										

Models with* : absolute pressure only.

SPECIFICATIONS : ALL MODELS	EK21	ED21	EP21	ER21	ET21	
EXCITATION VOLTAGE :						
Nominal :	(Volt)	10	10	10	10 (3)	10 (3)
Maximum :	(Volt)	30	30	30	10 (3)	10 (3)
BRIDGE IMPEDANCE :						
Input :	(kOhm)	15 ± 30%	≥ 6	≥ 6	≥ 6	≥ 6
Output :	± 30% (kOhm)	15	15	10	15	10
TEMPERATURE LIMITS :						
Operating :	(°C)	-55 to +125	-55 to +125	-55 to +125	-55 to +125	-55 to +125
Compensated :	(°C)	n.a.	n.a.	n.a.	-10 to +55	-10 to +55
THERMAL DRIFTS : (2)						
Zero :	(µV / °C)	≤ ±30	≤ ±30	≤ ±30	≤ ±6	≤ ±6
Output signal :	(% / °C)	-0.04	-0.04	-0.04	≤ ± 0.01	≤ ± 0.01
LONG TERM ZERO DRIFT :	(% R.R. / year)	≤ ± 0.2 (non cumulative)				
INITIAL BRIDGE UNBALANCE : (2)	(mV)	≤ ± 500	≤ ± 2	≤ ± 2	≤ ± 1	≤ ± 1

(2) Under nominal excitation voltage 10 V

(3) 5 V optional.

Technical Data (20°C)

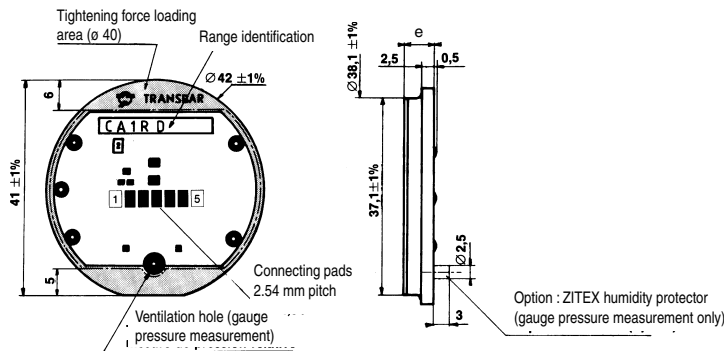
SERIE 7 - Ø 18 mm - Low, medium and high pressure ranges

SPECIFICATIONS		ED71												
RANGE IDENTIFICATION : RATED RANGE : (R.R.)	(bar) (≅ psi)	FA	FB	DB	FE	DE	DG	CG	DL	CL	CQ	CR	CU	CZ
Max. admissible pressure, without derating of specs :	(bar)	2	4	6	10	16	25	40	60	100	160	250	400	600
Burst pressure : ≥	(bar)	30	60	90	150	250	350	600	900	1500	2500	4000	6000	-
OUTPUT SIGNAL AT R.R. : (1)	±30% (mV)	7	12	18	30	48	75	120	180	300	480	600	-	1000
GLOBAL ERROR : (non linearity + hysteresis + repeatability)	(% R.R.)	≤ 0.4												
EXCITATION Nominal :	(Volt)	10												
Maximum :	(Volt)	20												
BRIDGE IMPEDANCE Input :	(kOhm)	Closed bridge : ≥ 6												
Output :	(kOhm)	15 ±30%												
TEMPERATURE LIMITS Operating :	(°C)	-55 to +125												
Compensated :	(°C)	n.a.												
THERMAL DRIFTS Zero :	(µV / °C)	≤ ±30												
Output signal :	(% / °C)	± 0.01												
LONG TERM ZERO DRIFT :	(% R.R. / year)	≤ ± 0.2 (non cumulative)												
INITIAL ZERO UNBALANCE (1)	(mV)	≤ ±2												
DIMENSIONS		See fig. 3												

(1) Under nominal excitation voltage : 10 V

Dimensions

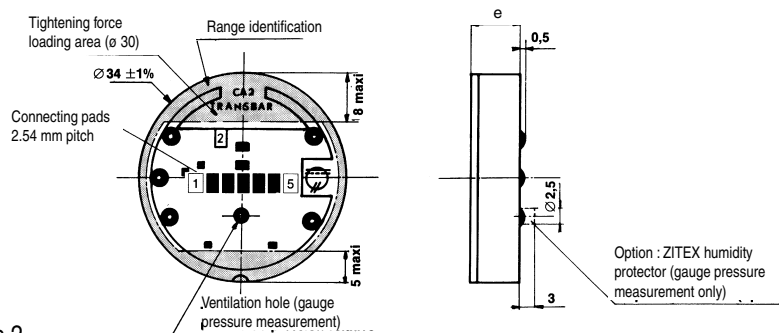
Figure 1



Model identification	e : mm ± 1 %
RB	5.30
RC	5.35
RD	5.40
RE	5.45
RG	5.55

Series 1

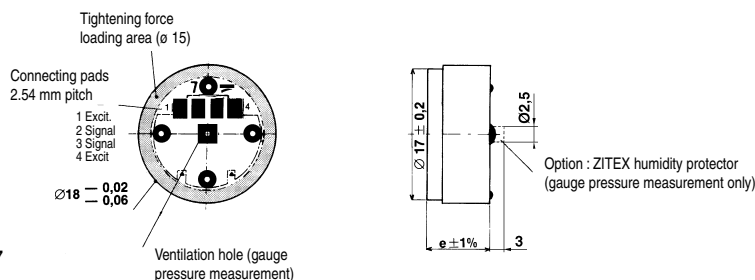
Figure 2



Model Identification	e : mm ± 1 %
MB	6.30
MC LC	6.35
LE	6.45
LI	6.625
LL	6.85
LR HR ER	7.30
EZ	8.05
EP	8.55

Series 2

Figure 3



Series 7

Model Identification	e : mm ± 1 %
FA	6.25
FB DB	6.30
FE DE	6.45
DG CG	6.55
DL CL	6.85
CQ	7.05
CR	7.30
CU	7.65
CZ	7.82