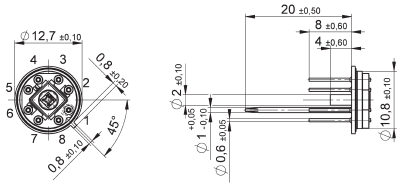
K-Series STARe A/G

Pressure Sensor Module – Absolute and Gauge Measurements

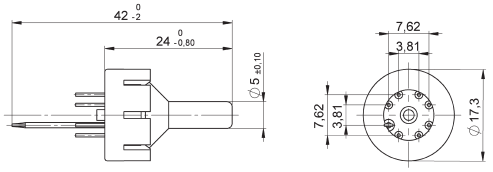
First Sensor

Basic component

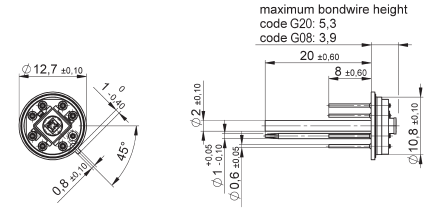


Absolute model
T08

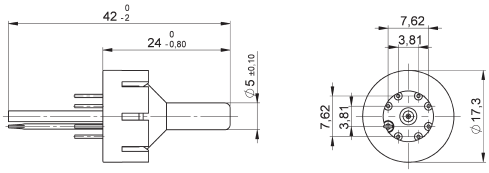
Component delivery form



Weight approx. 4.5 g
Protection cap is suitable for applying pressure up to 10 bar



Relative model



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Overview

Pressure sensor modules K-series STARe has specification similar to sense dies of our High Stability Line STARe. The dies are mounted on T08-headers and used for absolute or relative (gauge) pressure measurement. (V-, L- and M-Layout)

Note: The sensor consist of silicon, glass, glue and gold. Therefore substances which might react with these materials should be tested before application

Applications

- Industrial transmitter
- Measurement and control

Features

- Very high long term stability
- Very low pressure and temperature hysteresis
- High static pressure applicable
- Fast response
- High bridge resistance
- Fatigue free monocrystalline silicon diaphragm giving high load cycle stability
- Temperature sensor (Spreading resistance)
- Filling volume consists of ceramic components (no swelling in oil)

Order No.

K10 - HS20X - XXXX - X YY
1 2 3 4 5

1. **Product Code**
   K-Series STARe A/G
2. **Outside Dimension**
   V: 4,75 X 4,75 mm (6kPa...10kPa)
   L: 2,75 X 2,75 mm (35kPa...100kPa)
   M: 2,15 X 2,15 mm (250kPa...1MPa)
3. **Pressure Range [Pa]**
   06k0: 6 kPa = 60 mbar
   40M0: 40 MPa = 400 bar
4. **Type**
   X:A = Absolute (Glass)
   G = Gauge (Glass)
5. **Thickness Dies Back Plate**
   YY = Back Plate Thickness in 100 µm

Certificate

ISO/TS 16949

Common Characteristics

Type	Pressure range	Parameter	min.	typ.	max.	Unit
K10-HS20V-06k0-A/GXX	6 kPa	Span voltage	60	100	140	mV@5V
K10-HS20V-10k0-A/GXX	10 kPa	Span voltage	60	100	140	mV@5V
K10-HS20L-35k0-A/GXX	35 kPa	Span voltage	60	100	140	mV@5V
K10-HS20L-100k-A/GXX	100 kPa	Span voltage	60	100	140	mV@5V
K10-HS20M-250k-A/GXX	250 kPa	Span voltage	60	100	140	mV@5V
K10-HS20M-500k-A/GXX	500 kPa	Span voltage	60	100	140	mV@5V
K10-HS20M-01M0-A/GXX	1,0 MPa	Span voltage	60	100	140	mV@5V
K10-HS20M-03M0-A/GXX	3,0 MPa	Span voltage	60	100	140	mV@5V
K10-HS20M-10M0-A/GXX	10,0MPa	Span voltage	200	250	300	mV@5V
K10-HS20M-20M0-A08	20,0MPa	Span voltage	60	100	140	mV@5V
K10-HS20M-40M0-A08	40,0MPa	Span voltage	60	100	140	mV@5V

Contact

First Sensor AG
www.first-sensor.com

Electrical Characteristics (measured at 5 V supply and 25 °C, unless otherwise specified)

Parameter	min.	typ.	max.	Unit
Bridge resistance	5.000	6.000	7.000	Ω
Offset voltage	-25	0	+25	mV
Temperature coefficient of bridge resistance[1]	+0,07	+0,09	+0,11	%/K
Temperature coefficient of offset[1] (>100kPa) (<250kPa)	 -0,05 0,00	 ±0,01 +0,05	 +0,05 +0,10	 %F.S.S./K
Temperature coefficient of span[1] (>10kPa)	-0,23	-0,20	-0,17	%F.S.S./K
Temperature hysteresis[1]		<0,05		±%F.S.S.
Pressure hysteresis		<0,10		±%F.S.S.
Linearity error[2,3] (higher than 10 kPa) p-range: higher than 10MPa		 <0,30 <1,00	 0,50	 ±%F.S.S.

1) Measured from 25°C to 85°C. 2) End point straight line setting.
3) Pressure applied onto the front side of the die

Maximum Rating

Type	Over Pressure (100kPa)		Burst Pressure (100kPa)	
	FS min.	RS min.	FS min.	RS min.
K10-HS20V-06k0-A/GXX	4	2*	>4	>2*
K10-HS20V-10k0-A/GXX	6	3*	>6	>3*
K10-HS20L-35k0-A/GXX	10	5	>10	>5
K10-HS20L-100k-A/GXX	20	10	>20	>10
K10-HS20M-250k-A/GXX	40	20	>40	>20
K10-HS20M-500k-A/GXX	50	25	>50	>25
K10-HS20M-01M0-A/GXX	60	30	>60	>30
K10-HS20M-03M0-A/GXX	150	75	>150	>75
K10-HS20M-10M0-A/GXX	200	75	>200	>75
K10-HS20M-20M0-A08	600	-	>600	-
K10-HS20M-40M0-A08	800	-	>800	-

FS: Frontside; RS: Rearside; * 1bar for G-Type

Parameter	Limit Values			Unit
	min.	typ.	max.	RS min.
Operating temperature range	-40		+125	°C
Storage temperature range	-50		+130	°C
Supply voltage		5	12	V

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Silicon Temperature Sensor (at T_A = 25°C and I_B = 1 mA, unless otherwise specified)

Parameter	Symbol	Limit Values			Unit
		min.	typ.	max.	
Sensor resistance at TA=25°C	R_{th}	1,85	2,00	2,15	kΩ
Spread of temperature factor	k_T				
TA=-25°C		0,655	0,66	0,675	
TA=0°C		0,812	0,82	0,826	
TA=25°C			1		
TA=50°C		1,195	1,20	1,215	
TA=75°C		1,42	1,43	1,45	
TA=100°C		1,66	1,68	1,70	
TA=125°C		1,92	1,95	1,98	

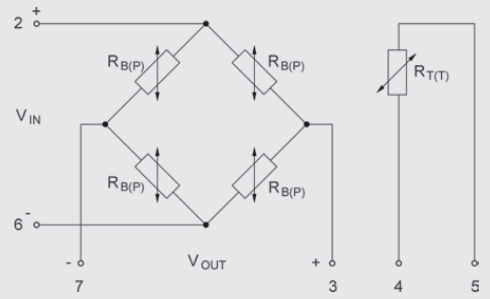
$$R_{th} = R_{25} \cdot (1 + \alpha \cdot \Delta T_A + \beta \cdot \Delta^2 T_A)[\Omega] = f(T_A)$$

$$\alpha = 7.68 \cdot 10^{-3}[k^{-1}],\ \beta = 1.88 \cdot 10^{-5}[K^{-2}]$$

$$k_T = \frac{R^{th}}{R_{25}} = 1 + \alpha \cdot \Delta T_A + \beta \cdot \Delta^2 T_A = f(T_A)$$

$$T = 25 + \frac{\sqrt{\alpha^2 - 4\beta + 4\beta \cdot k_T} - \alpha}{2\beta}\ [°C]$$

Pin configuration



1 Capillary tube
2 $+V_{IN}$
3 $+V_{OUT}$
4 Temperature sensor
5 Temperature sensor
6 $-V_{IN}$
7 $-V_{OUT}$
8 Not connected

Polarity according to pressure onto frontside.

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