

## PRESSURE SENSING QUARTZ CRYSTAL RESONATOR **RKMA-P**

### APPLICATIONS

RKMA-P is a quartz crystal resonator which is packaged in a rectangular enclosure. The resonance frequency varies with the pressure-induced stress. The crystal unit is designed as a precision electronic pressure sensor for transducer, manometers, and controllers with a frequency output for the conversion of the absolute pressure to frequency.

### FEATURES

- High resolution and accuracy
- Long term quartz crystal stability
- Wide temperature range (-55...+80 °C)
- Low power consumption
- Suitable for precision pressure equipment



### ELECTRICAL CHARACTERISTICS (at normal climatic conditions) / OPERATING CONDITIONS

PARAMETERS		SPECIFICATIONS AND REMARKS				UNITS
Electrical characteristics						
<b>Model</b>		<b>RKMA-P-1</b>	<b>RKMA-P-3</b>	<b>RKMA-P-4</b>	<b>RKMA-P-2</b>	
<b>Frequency range, <math>f_0</math></b>		32.000...48.000				kHz
<b>Resonance resistance typ./max., <math>R_r</math></b>		120; 150 / 200			150; 200 / 250	k $\Omega$
<b>Drive Level max., <math>D_L</math></b>		4.0				$\mu$ W
<b>Insulation Resistance min.</b>		400				M $\Omega$
Motional characteristics						
$f(P) = f_0 + A_1 \cdot P + A_2 \cdot P^2 + A_3 \cdot P^3$ ,						
There: $f(P)$ – crystal frequency at pressure $P$ (Hz),						
$f_0$ – crystal's frequency at zero pressure (Hz),						
$P$ – pressure (MPa),						
$A_1$ – Linear coefficient = Sensitivity						
$A_2, A_3$ – second and third order coefficients. Nonlinearity less than 0.4% FS.*						
Operation conditions						
<b>Model</b>	<b>Pressure range, <math>P</math> MPa</b>	<b>UNIT</b>	<b>Sensitivity (Linear coefficient <math>A_1</math>)</b>	<b>UNIT</b>	<b>Overall dimensions</b>	<b>UNIT</b>
RKMA-0.1-1 (3;4)	0 – 0.10	MPa	21350.00 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 3.0 (5.0)	mm
<b>RKMA-0.1-2</b>	<b>0 – 0.10</b>	<b>MPa</b>	<b>5515.45 <math>\pm</math> 5...20%FS</b>	<b>HZ/MPa</b>	<b>11 x 12 x 0.74</b>	<b>mm</b>
RKMA-0.25-1 (3;4)	0 – 0.25	MPa	7853.14 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 3.2 (5.1)	mm
RKMA-0.4-1 (3;4)	0 – 0.40	MPa	5415.45 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 3.3 (5.2)	mm
RKMA-0.6-1 (3;4)	0 – 0.60	MPa	3144.25 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 3.5 (5.45)	mm
RKMA-1.0-1 (3;4)	0 – 1.00	MPa	1518.88 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 4.45 (6.4)	mm
RKMA-1.6-1 (3)	0 – 1.60	MPa	1092.84 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 3.65 (5.6)	mm
RKMA-2.5-1 (3)	0 – 2.50	MPa	678.055 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 4.55 (6.5)	mm
RKMA-4.0-1 (3)	0 – 4.00	MPa	434.55 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 4.8 (6.75)	mm
RKMA-6.0-1 (3)	0 – 6.00	MPa	294.77 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 5.5 (7.45)	mm
RKMA-10.0-1 (3)	0 – 10.0	MPa	160.06 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 5,15 (7,1)	mm
RKMA-16.0-1 (3)	0 – 16.0	MPa	127.51 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 5,6 (7,5)	mm
RKMA-25.0-1 (3)	0 – 25.0	MPa	58.76 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 6,1 (8,1)	mm
RKMA-60.0-1 (3)	0 – 25.0	MPa	33.30 $\pm$ 5...20%FS	Hz/MPa	25 x 23 x 6,1 (8,8)	mm
<b>Operating temperature, <math>T_{OPR}</math> (typ/max)</b>	-55...+80 / -40...+100; -269...+250**					$^{\circ}$ C
<b>Storage temperature, <math>T_{STR}</math></b>	-55...+85					$^{\circ}$ C
<b>Maximum deviation over temperature</b>	0.75					%
<b>Relative deviation of the linear coefficient <math>A_1</math> from its average value</b>	$\pm$ 5... $\pm$ 20					%
<b>Aging first year/next years max.</b>	$\pm$ 5 / $\pm$ 25					ppm
<b>FS Pressure Hysteresis</b>	< 0.02					%
<b>Reproducibility of temperature dependence of the crystal frequency</b> $f_T = f_0 + B_1 \cdot T + B_2 \cdot T^2$	0.05					%
<b>Vibration resistance, <math>\Delta f/f_0</math></b>	5g / 50-2000 Hz, 8 hours / $\pm$ 7 ppm max.					ppm

\* $A_1, A_2$  and  $A_3$  coefficients are specified on request.

\*\*Temperature range can be increased from -269 to +250  $^{\circ}$ C on request.

Temperature sensing quartz crystal RKT206 is used for compensation of a temperature deviation of RKMA-P.

**PACKAGE DIMENSIONS**

**Four basic package variants of RKMA-P are available:**

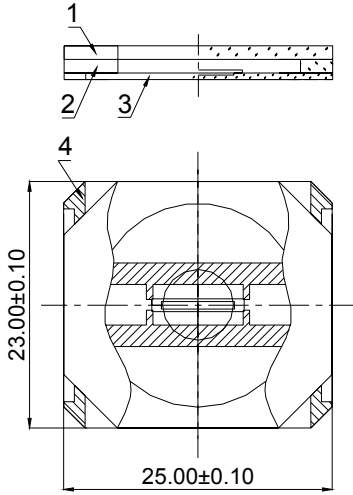
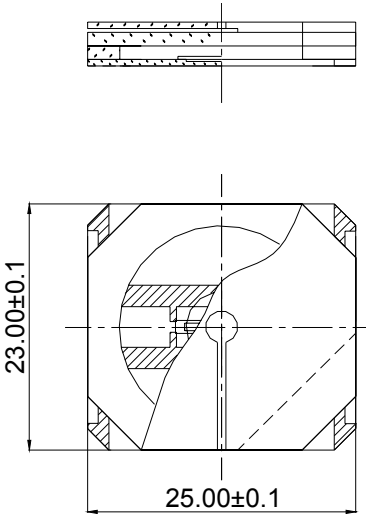
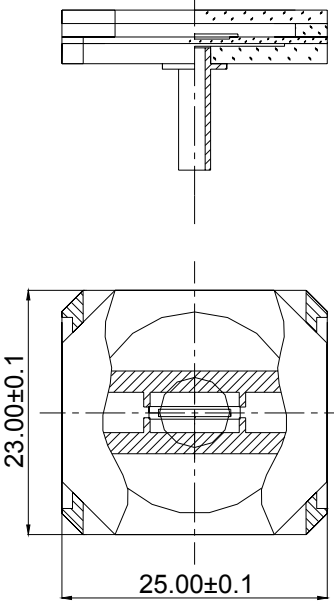
**RKMA-P-1: basic model for direct fastening on the transducer case.**

**RKMA-P-2: Small size variant of RKMA-P-1 (see "Operation Conditions" table).**

**RKMA-P-3: With additional cover, glued to surface, for temperature isolation.**

**RKMA-P-4: With metal connecting pipe, through which the pressure is guided.**

UNITS: millimeters

<b>RKMA-P-1 (LxWxH=25x23xH)</b> <b>RKMA-P-2 (LxWxH=11x13x0,74)</b>	<b>RKMA-P-3</b>	<b>RKMA-P-4</b>
		
<p>1- Cover; 2- Gasket; 3- Diaphragm; 4- Contact surfaces.</p>		