



INDUSTRIAL ACCELEROMETER ATS-3D

by PassatInnovations LLC



MAIN FEATURES AND DESIGN REQUIREMENTS

№	Parameters and characteristics	Value
1	Supply voltage range, V	=8...32
2	Consumption current, mA, no more	40
3	Power consumption, W, no more	3
4	Measured values	linear accelerations ± 16g in three axes
5	Limit of permissible relative error of linear acceleration measurement, %	±5
6	Temperature measurement range, °C	from minus 40 to plus 85
7	Limit of permissible error of temperature measurement, °C	±2
8	Data transmission interface	RS-485
9	Data transfer protocol	Modbus RTU
10	Data exchange rate ¹ , bit/s	57600
11	Data sampling rate ² , Hz	100
12	Measurement limit, g (configurable):	±2 ±4 ±8 ±16
13	Sensitivity error (multiplicative error) ³ , % of the slope of the nominal static characteristic	±1
14	Temperature drift of sensitivity ⁴ , %/°C	±0,01
15	Temperature drift of zero offset ⁴ , mg/°C	±1
16	Primary sampling rate of data from the sensing element ⁵ , Hz	833
17	Secondary data sampling rate after decimation ⁵ , Hz (configurable):	10 20 30 40 50 100



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№	Parameters and characteristics	Value
18	Bandwidth at the level -3dB ⁶ , Hz (according to sampling rate):	0 – 2.6 (fd = 10 Hz) 0 – 4.8 (fd = 20 Hz) 0 – 8.7 (fd = 30 Hz) 0 – 13.4 (fd = 40 Hz) 0 – 19.4 (fd = 50 Hz) 0 – 45.2 (fd = 100 Hz)
19	Spectral noise density ⁴ , $\mu\text{g}/\sqrt{\text{Hz}}$ (according to the selected measuring range):	75 (for the limit $\pm 2 \text{ g}$) 80 (for the limit $\pm 4 \text{ g}$) 90 (for the limit $\pm 8 \text{ g}$) 130 (for the limit $\pm 16 \text{ g}$)
20	RMS noise level ⁴ , mg (according to the selected measuring range):	1.8 (для предела $\pm 2 \text{ g}$) 2.0 (для предела $\pm 4 \text{ g}$) 2.4 (для предела $\pm 8 \text{ g}$) 3.0 (для предела $\pm 16 \text{ g}$)

Notes:

¹ The data transmission rate of 57600 bps is set by default during the factory calibration. It can be selected from the range of 2400, 4800, 9600, 19200, 38400, 57600, 115200 bps and changed in the accelerometer settings by the user.

² A data sampling rate of 100 Hz is the default during factory calibration. It can be selected from a range of 10, 20, 30, 40, 50, 100 Hz and changed in the accelerometer settings by the user.

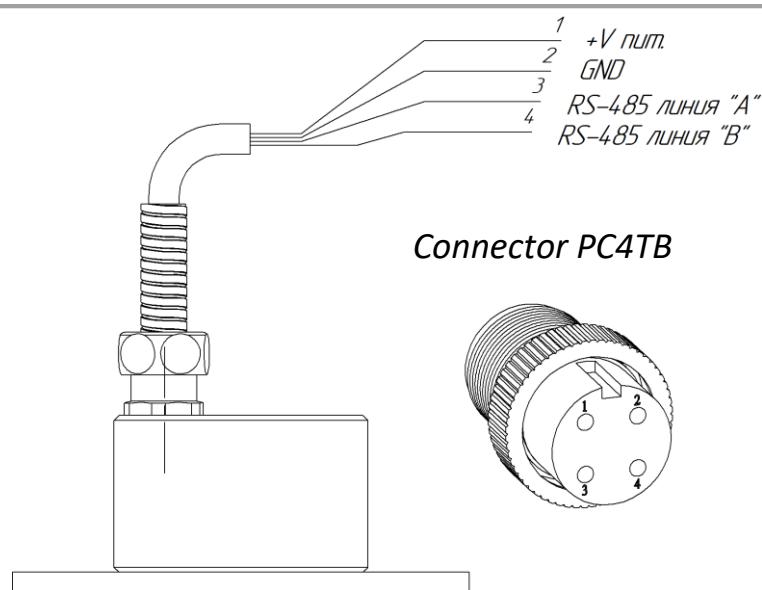
³ Eliminated by individual calibration during sensor manufacturing.

⁴ The values are taken from the official data sheet on the SE.

⁵ The nominal sampling frequency is indicated, but there is a certain technological spread of sampling rates for each specific sample, the characteristics of the spread in the official data sheet on the SE are not declared by the manufacturer.

⁶ The frequency response parameters of the applied digital filters can be adjusted in new software versions as part of work to improve product quality without deteriorating the basic operational and metrological characteristics of the product..

SENSOR CONNECTIONS



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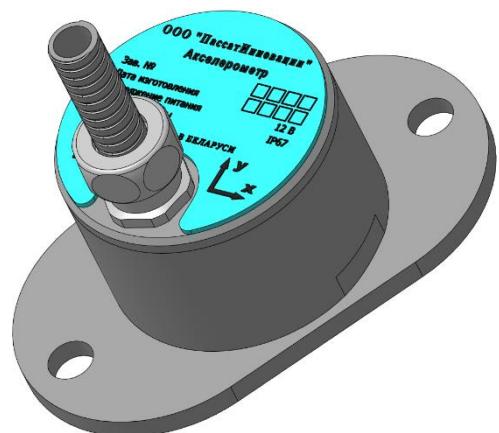
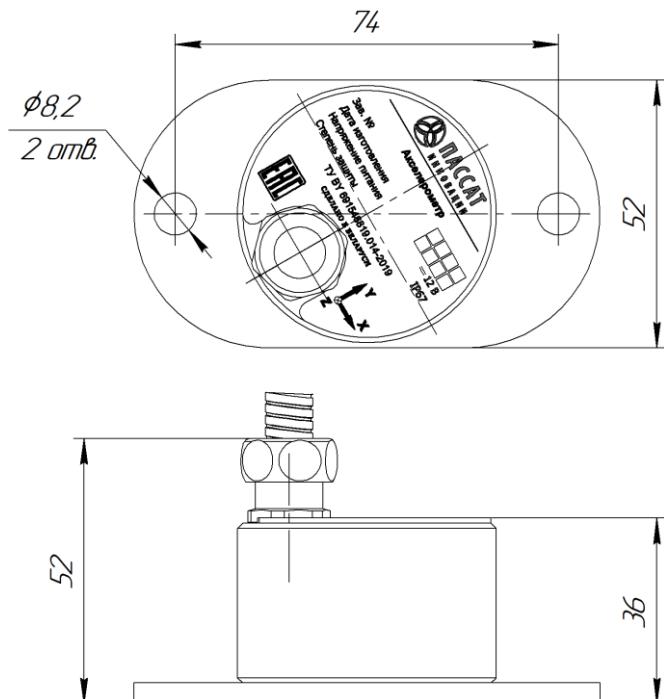
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SENSOR DIMENSIONS AND GENERAL VIEW



Dimensions are in millimeters.

REGISTERS MAP

Address	Mnemonic notation	Number format	Value	Access ¹
40001	MB_REG_STATUS	UINT16	Current hardware state (bitmap):	RO
			bit 0 - start flag - restart of the sensor	RO
			bit 1 - settings error flag	RO
			bit 2 - sensor malfunction flag	RO
			bit 3 - flag of allowing access to registers	RO
			bit 4 - temperature alarm flag	RO
			bit 5 - 15 - reserve	RO
			Fixed hardware state. The flags are set as in the MR_SSTT register, but are cleared only after the register is read.	RO
40003	MB_REG_DEVICE_CODE	UINT16	Device ID	RO
40004	MB_REG_DEVICE_ID	UINT16	Unique identifier of the sensor	RO
40005	MB_REG_SW_VER	UINT16	Sensor software version ²	RO
40006	MB_REG_SW_BUILD	UINT16	Software build number	RO
40007	MB_REG_SAMPLE_FREQ	UINT16	Current measured sampling rate ³	RO
40008	MB_REG_SENS_TEMP	UINT16	Current value of temperature of the accelerometer sensor ⁴	RO
40009	MB_REG_XL_BUFF_SIZE	UINT16	The current amount of last data in the buffer for one axis	RO
40010	MB_REG_XL_TIMESTAMP	UINT16	Timestamp of the last data update ⁵	RO
40011	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[0] ⁶	RO



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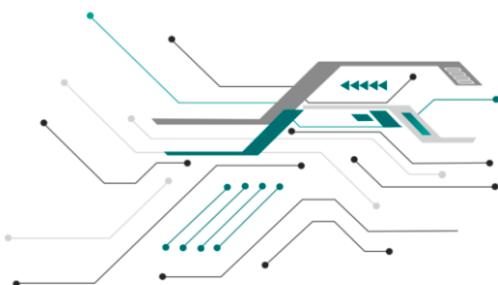
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40012	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[1] ⁶	RO
40013	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[2] ⁶	RO
40014	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[3] ⁶	RO
40015	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[4] ⁶	RO
40016	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[5] ⁶	RO
40017	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[6] ⁶	RO
40018	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[7] ⁶	RO
40019	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[8] ⁶	RO
40020	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[9] ⁶	RO
40021	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[10] ⁶	RO
40022	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[11] ⁶	RO
40023	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[12] ⁶	RO
40024	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[13] ⁶	RO
40025	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[14] ⁶	RO
40026	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[15] ⁶	RO
40027	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[16] ⁶	RO
40028	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[17] ⁶	RO
40029	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[18] ⁶	RO
40030	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[19] ⁶	RO
40031	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[20] ⁶	RO
40032	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[21] ⁶	RO
40033	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[22] ⁶	RO
40034	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[23] ⁶	RO
40035	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[24] ⁶	RO
40036	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[25] ⁶	RO
40037	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[26] ⁶	RO
40038	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[27] ⁶	RO
40039	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[28] ⁶	RO
40040	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[29] ⁶	RO
40041	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[30] ⁶	RO
40042	MB_REG_XL_DATA_BUFF	INT16	ACC_DATA[31] ⁶	RO
40043	MB_REG_LAST_XL_DATA_X	INT16	The last value of the acceleration along the axis X ⁷	RO
40044	MB_REG_LAST_XL_DATA_Y	INT16	The last value of the acceleration along the axis Y ⁷	RO
40045	MB_REG_LAST_XL_DATA_Z	INT16	The last value of the acceleration along the axis Z ⁷	RO
40046	MB_REG_RMS_X_HI	FLOAT	X-axis RMS acceleration in the format IEEE754 float (senior word) ⁸	RO
40047	MB_REG_RMS_X_LO		X-axis RMS acceleration in the format IEEE754 float (junior word) ⁸	RO
40048	MB_REG_RMS_Y_HI	FLOAT	Y-axis RMS acceleration in the format IEEE754 float (senior word) ⁸	RO
40049	MB_REG_RMS_Y_LO		Y-axis RMS acceleration in the format IEEE754 float (junior word) ⁸	RO
40050	MB_REG_RMS_Z_HI	FLOAT	Z-axis RMS acceleration in the format IEEE754 float (senior word) ⁸	RO
40051	MB_REG_RMS_Z_LO		Z-axis RMS acceleration in the format IEEE754 float (junior word) ⁸	RO
40052	MB_REG_XL_AVERAGE_X	INT16	X-axis average acceleration ⁷	RO
40053	MB_REG_XL_AVERAGE_Y	INT16	Y-axis average acceleration ⁷	RO
40054	MB_REG_XL_AVERAGE_Z	INT16	Z-axis average acceleration ⁷	RO
40055	MB_REG_TEMP_BOTTOM	INT16	Temperature of the bottom part of the casing ⁴	RO
40056	MB_REG_TEMP_TOP	INT16	Temperature of the top part of the casing ⁴	RO



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Notes:

¹ RO – read only.

² The format is x.xx.xx for example the number 10506 indicates version 1.5.6.

³ Fundamental frequency before decimation.

⁴ The register displays the temperature value * 10.

⁵ Increments after accumulating the data buffer (every 100 ms).

⁶ Buffer of the latest ramp values (in g units) in fixed point format. Refreshed every 100ms, data is arranged in X, Y, Z order. The data presentation format depends on the measurement range: for ± 2g - 1.15; for ± 4g - 2.14; for ± 8g - 3.13; for ± 16g - 4.12.

⁷ It is returned in the same format as in the last values buffer.

⁸ Not updated. Used for internal production testing only.

REVISION HISTORY

Date	Version	Changes
23-Jun-2021	1.0	First public version

More information about the company and products on the website – www.p-i.by/en



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