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Machine Monitoring Systems

MMS 3125/xxx-xxx

Dual Channel Bearing Vibration Transmitter for Piezoelectric Sensors



- Highly flexible due to numerous hardware options
- Precisely adaptable to the requirements by versatile combination possibilities
- Applicable for the operation of sensors in explosive areas
- For measurement and processing absolute vibration signals
- Frequency range up to 12 kHz
- Inputs for capacitive and piezoelectric absolute vibration sensors
- Integrated microcontroller
- Corresponds to the standards VDI 2059/.. and API 670
- Two redundant 24 V DC supply inputs
- Supervision functions for electronic and sensors
- To be mounted directly at the machine
- 2 Current outputs 0/4...20 mA
- Up to 5 configurable function outputs

Application:

The **MMS 3125/..** dual channel bearing vibration transmitter is part of the revised **MMS 3000** transmitter system for monitoring and protecting any kind of turbo machines.

The transmitters of the new generation are characterised by their highly flexible hardware options and their versatile combination possibilities and can thus optimally be adapted on the demands of the respective plant.

They permit economic measurement and supervision of absolute bearing vibrations with capacitive or piezoelectric absolute vibration transducers.

Application fields of the transmitters are all kind of turbo machines, fans, compressors, gear boxes, pumps and similar, rotational machines with plain bearings, as well as machines with rolling bearings.

Due to the bus capability, **MMS 3000** transmitters are applicable for big

systems with programmable logic controls and host computers as used in power stations, refineries and chemical plants, as well as for small plants with only few measuring points and decentralized data processing.

The inputs of the transmitter can be operated with both, **epro** standard absolute vibration transducers of type **PR 9264/..** and with piezoelectric IPC sensors.

Function and Design:

The **MMS 3125/..** Dual Channel Bearing Vibration Transmitter converts the input signal of vibration transducers in an electric signal proportional to the vibration depending on the chosen signal evaluation. At this, the kind of evaluating the characteristic also depends on the chosen sensor type.

The integrated module and sensor supervision detects fault functions of both – sensor and module electronic. In error situations the status of the "OK" output changes and the 4...20 mA current output indicates 0 mA.

All required configurations are made by means of the **MMS 3910W** configuration software, component of the software packet which is part of the **MMS ParaKit**. The transmitters are delivered with a standard configuration suitable for most applications, if desired, any other configuration can be prepared in the factory.

Technical Data:

Sensor inputs:

Two independent inputs for capacitive or piezo-electric sensors of type PR 9264/.. resp. IPC piezo-electric sensors.

Dynamic signal deviation:

$4 V_{pp}$ or $8 V_{pp}$ (depends on the hardware configuration)

Sensor connection:

“Harting“ connector

Measuring ranges:

Freely selectable by means of configuration software according to the measuring ranges of the applied sensors.

Frequency ranges (-3dB):

High-pass filter: 5 - 6000 Hz

Low-pass filter: 50 - 12000 Hz

Splittable on up to 4 filter ranges which can be run automatically (automatic mode).

Wed programmably with graphic representation of the bandpass characteristic.

Output characteristic value:

Standard:

- Two current outputs, proportional to the chosen characteristic and related to the the system ground. The outputs may be freely assigned to the measuring channels.

Optional:

- Two galvanically separated current outputs, proportional to the chosen characteristic. The outputs may be freely assigned to the measuring channels.
- Without current output
 - Current output ranges: 0/4-20 mA or 20-4/0 mA
 - Maximum burden: 500 Ohm
 - Open circuit and short-circuit proof.

Buffered sensor signal:

Two signal outputs for analysis and diagnosis purposes one for each channel, proportional to the dynamic sensor signal. Accessible via terminals. Unfiltered voltage output: $\pm 4,0 V$; Error: $\pm 2,5 \%$

Limit value- and channel supervision:

The transmitter provides altogether 5 function outputs. Limit values can only be chosen for the single channel values. Beyond this, the function outputs can be used to indicate the Channel Clear state. The function outputs can be freely assigned by means of the configuration software. The following options are possible:

- Without function outputs-
- 5 x opto-coupler output
 - U_{MAX} : 48 V DC
 - I_{MAX} : 100 mA
 - P_{MAX} : 5 W
- 5 x relay contact (make contact)
 - U_{MAX} : 48 V DC
 - I_{MAX} : 1 A
 - P_{MAX} : 50 W
- 5 x photomos relays
 - U_{MAX} : 48 V DC
 - I_{MAX} : 500 mA
 - P_{MAX} : 25 W

Data interfaces:

Standard:

- RS 232 interface for configuration of the transmitter and for displaying the measured data.

Optional:

- RS485 bus with epro protocol V2.0
- PROFIBUS DP

Linearity error (without sensor):

0,2% at 25°C

Linearity error (with sensor):

<2,2 % at 25°C

Output stability over temperature:

<0,08%/10 K

Long-term drift:

max. 1% of f.s.d

Power supply:

Option for redundant power supply, decoupled via diodes.

Nominal:

+24 V DC

Permissible voltage range:

+18...+31,2 V DC

Power consumption:

Depending on the built-in options.
max. 6 W

Housing:

Aluminium, non-corroding

Protection class:

IP 65 according to DIN 40050, IEC 144, CE certified.

EMC tested:

according to EN 55011 and EN 61326

Environmental conditions:

(according to IEC 359, DIN 43745)
Maximum permissible temperature of the mounting surface
65°C..

Operating temperature range:
-20...+65°C

Mounted on 10 mm spacing bolts:

Maximum permissible temperature of the mounting surface
90°C..

Operating temperature range:
-20...+45°C

By all means, heat concentrations must be avoided by constructive measures.

Permissible relative humidity:

0-95 % non-condensing

Vibration and shock :

shock: max. 20 g over 2 ms

vibration: max. 5 g at 60 Hz

Mounting direction:

Preferably with the cable glands downwards.

Dimensions:

(See drawing)

Weight:

Depending on the chosen hardware options.

Net weight: max. 1,3 kg

Gross weight: max. 1,5 kg

Ex-protection:

The bearing vibration transmitter **MMS 3125/021-010-Ex** can be used in ex-areas “Zone 2”.

The ex-protecton is only valid for the transmitter **MMS 3125/021-010-Ex** with the connection cable **PR 9670/110-100-Ex** and the piezoelectric acceleration sensor **PR 9270-Ex**.

Zündschutzart:

non-sparking electrical equipment (with low power consumption $\leq 20W$, in accordance with EN 60079-15-23)

Designation:

Transmitter:

Ⓜ II 3 G - Ex nA IIC T4,

-20°C $\leq T_a \leq$ +65°C

Manufacturer-declaration:

epro 07 ATEX 0001 X

Permissible voltage range:

22...28 V DC

(not conform to IEC 654-2 class DC4)

Module and sensor supervision:

The internal module supervision continuously checks the following functions:

- whether the input signal is within the predefined range.

- whether the cable between transmitter and sensor is ok (no short-circuit / no broken cable).
- The system voltages.

The state of module and sensor supervision can be signalled by means of switching contacts of the function outputs. Specifications of the different options can be found in the technical data.

The most important configuration parameters:

All configurations are made by means of the **MMS 3910W** configuration software, component of the software packet which is part of the **MMS ParaKits**. The configuration software is not contained in the transmitter's extent of supply and must be ordered separately. The adjustable parameters, shown in the list below may differ, depending on the chosen operation mode and measuring function.

- KKS identification per channel
- Operating mode
- Sensor sensitivity
- Series resistance of safety barriers.
- Measuring range
- Measuring mode
- Frequency range of measurement
- Filter configurations
- Characteristical variables
- Current suppression
- Current calibration
- Current smoothing
- Shift of output current
- Zoom function for current output
- Warning and alarm limits
- Operating principle of function outputs
- Limit value hysteresis
- Response delay of alarm outputs
- Limit downscaling
- Test values

Limit supervision and Function outputs:

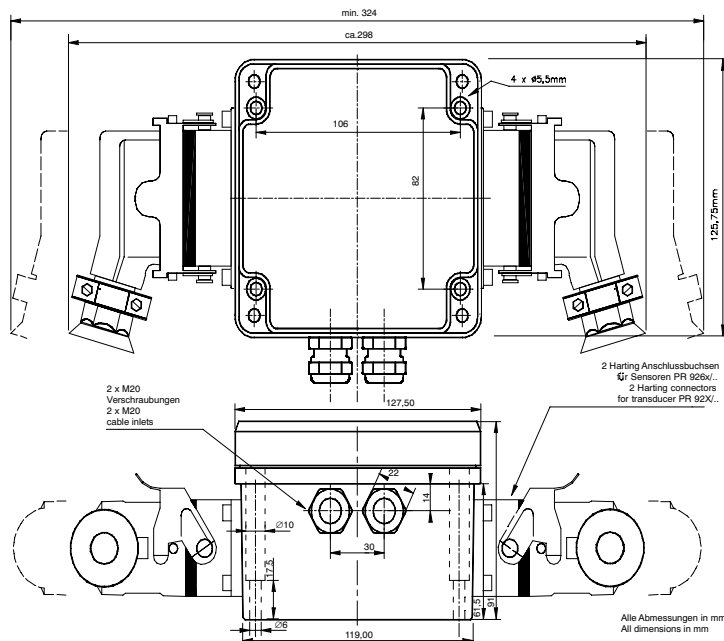
The transmitter provides altogether five so-called function outputs. Each of these function outputs can be assigned to a limit value as well as to the channel clear function. Beside this, the assignment between input channel and function output can be freely selected.

The output of channel clear can be made either individually for each channel or with a logical OR resp. AND combination.

The limit values can only be assigned to a single channel, either with or without latching function. They switch on increasing levels.

Exceeding of limit values can be signalled by means of switching contacts of the function outputs. Specifications of the function output options can be found in the technical data.

Dimensions:

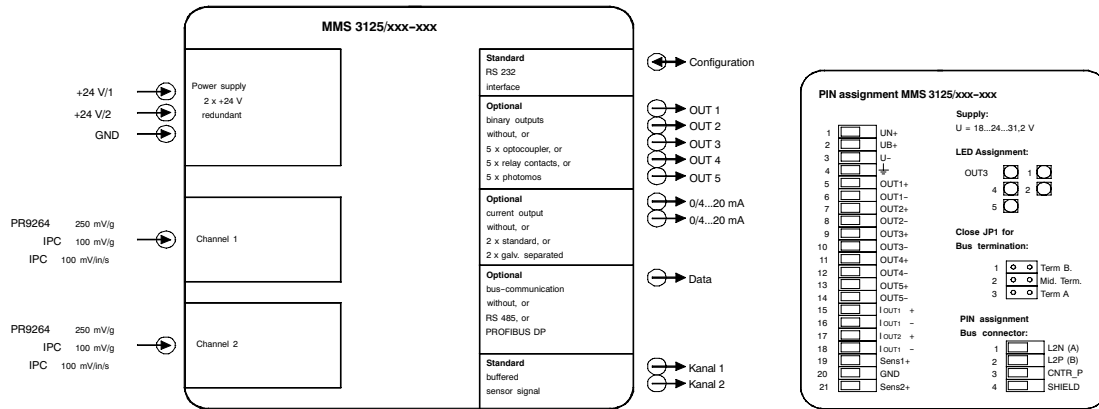


Operating modes:

The **MMS 3125/..** Bearing Vibration Transmitter provides different measuring modes depending on the characteristic value calculated from the sensor signal, each of them to be configured by means of the **MMS 3910W** configuration software, component of the software packet which is part of the **MMS ParaKit**.

- Single Channel (Ch1 or Ch2)
- Dual Channel
- Dual channel single source (signal doubling, 1 sensor \rightarrow 2 channels)
At the single channel as well as at the dual channel mode the following measuring modes are at disposal:
 - Vibration acceleration **a**:
RMS; 0-P; P-P;
(P-P)/2
derived 0-P
derived P-P
 - Vibration velocity **v**:
RMS; 0-P; P-P, P-P
(P-P)/2
derived 0-P
derived P-P
 - Vibration amplitude **s**:
RMS, 0-P, P-P
(P-P)/2
derived 0-P
derived P-P

In- / Outputs:



Order options:

For **MMS 3125/..** bearing vibration transmitters the following order options are possible:
Sensor inputs K1 and K2:
 Two identical input channels, no mixed application !

- PR 9264/.. [Standard]
- IPC 100 mV/g (4V_{pp})
- IPC 100 mV/in/s (4V_{pp}) [Standard]
- IPC 100 mV/g (8V_{pp})

Communication:

- RS 232 [Standard]
- RS 485
- PROFIBUS DP

Output characteristic:

- Without
- 2 x with system ref. [Standard]
- 2 x galvanically separated

Function outputs:

- Without
- 5 x Opto-coupler [Standard]
- 5 x relay (make contact)
- 5 x photomos

Display:

- Without [Standard]
- With 8-digit display

Standard types, deliverable ex stock:

MMS 3125/010-000	Sensor PR 9264/.., RS 232, without Bus-communication, current output with common ground, no function outputs, no display.	9100-03032
MMS 3125/010-020	Sensor IPC 100 mV/in/s, RS 232, without Bus-communication, current output with common ground, no function outputs, no display.	9100-03027
MMS 3125/011-000	Sensor IPC 100 mV/in/s, RS 232, without Bus-communication, current output with common ground, with function outputs, no display.	9100-03028
MMS Para Kit	Configuration kit for MMS 3000 Transmitter	9510-00027

