Electro-dynamic Absolute Vibration Transducers PR 9266/.. and PR 9268/..

- **For measuring absolute vibrations of machines**
- **Operating temperature range up to 200 °C**
- **Seismic function principle**
- **Easy mounting**
- **High sensitivity**
- **Rugged construction for industrial applications**
- **Splash proof, protection class IP 55 resp. IP 65**
- **Two frequency ranges: 10 Hz to 1000 Hz 4 Hz to 1000 Hz**
- **In connection with safety barriers (zone 1) safety class EEx ib II B / II C**
- **Part of the MMS 6000 and MMS 3000 system for rotational machinery**

Application:

The **absolute vibration transducers** of the **PR 9266/..** and **PR 9268/..** families have been designed to measure absolute vibrations in the frequency ranges 10..1000Hz and 4...1000Hz. with vibration amplitudes of up to 2mm resp. 3mm (peak-peak). They provide electric signals proportional to the vibration velocity.
Both transducer families offer several basic types to cover a wide range of industrial measuring applications.

The robust construction and the splash-proof housing permit the transducers to be mounted even in hostile environments.
Application areas of the transducers are all kind of turbo machinery, fans, compressors, gear boxes, pumps, coal mills and other machines.
The transducers **PR 9268/60** and **PR 9268/70** are suitable particularly at high temperatures - i.e. for applications at gas turbines. Moreover, these transducers include electric adaptations to supersede the MMG 033 and MMG 1033 absolute vibration transducers of the former AEG Kanis group. For this, three different transducer sensitivities are at disposal, depending on the type of measuring amplifier.
The high output level and the low impedance of the measuring coil effect a high interference immunity. Subsequent measuring amplifiers of the **epro MMS 3000** and **MMS 6000** Machine Monitoring systems pick up and process the vibration signal without the need of additional intermediate amplifiers.

Function principle and design:

The measuring element of the absolute bearing vibration sensors PR 9266 and PR 9268 consist of a seismic mass with a coil, suspended on membrane springs and moving in the circular gap of a permanent magnet. The membrane springs lead the measuring element in the longitudinal direction (=measuring direction).
The sensors are operated above the resonance frequency, which is between 4 and 13 Hz, depending on the type. The seismic mass remains at rest and due to the vibration of the sensor housing, an electric signal proportional to the vibration velocity is generated.

epro – transducers are dynamic sensors with the measuring coil as part of the seismic element, moving in the field of the permanent magnet. Damping of the measuring elements is realised by damping cylinders resp. by external wiring and set to a value of approx. 0,6, resulting in a very linear characteristic over the entire frequency range.
Measurements below the resonance frequency can be made with corresponding corrections of the amplitude responses. In case of too high vibration amplitudes, mechanical limit stops reduce the maximum amplitude of the seismic systems.
Each transducer is designed for one measuring direction (vertical or horizontal). Deviations of these directions will result in rest positions of the seismic mass different to the normal positions which effects a reduction of the maximum vibration amplitude and the generation of additional spurious resonance's.
To avoid this, sensors of the PR 9266/.. family have additional lifting coils to adjust the centre position of the seismic element by feeding a lifting current of up to 7mA into that coil. When using sensors of the PR 9268/.. family, lifting currents may be fed directly into the measuring coil. However, this current must be decoupled from the measuring signal.
Measuring amplifiers of the MMS 6000 family are designed to support this operation and to supply lifting currents for absolute bearing vibration sensors.

Dimensions:

Fig. 1 Dimensions and connections
PR 9266/10 /11 /12

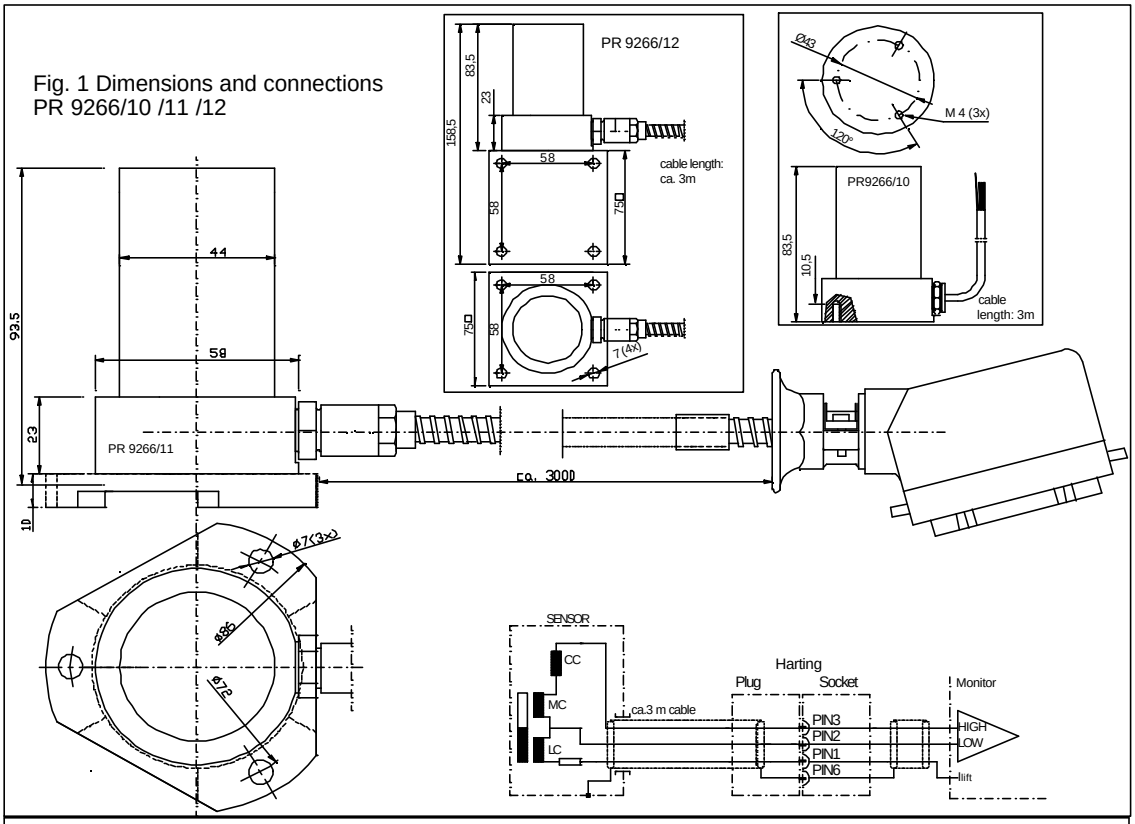
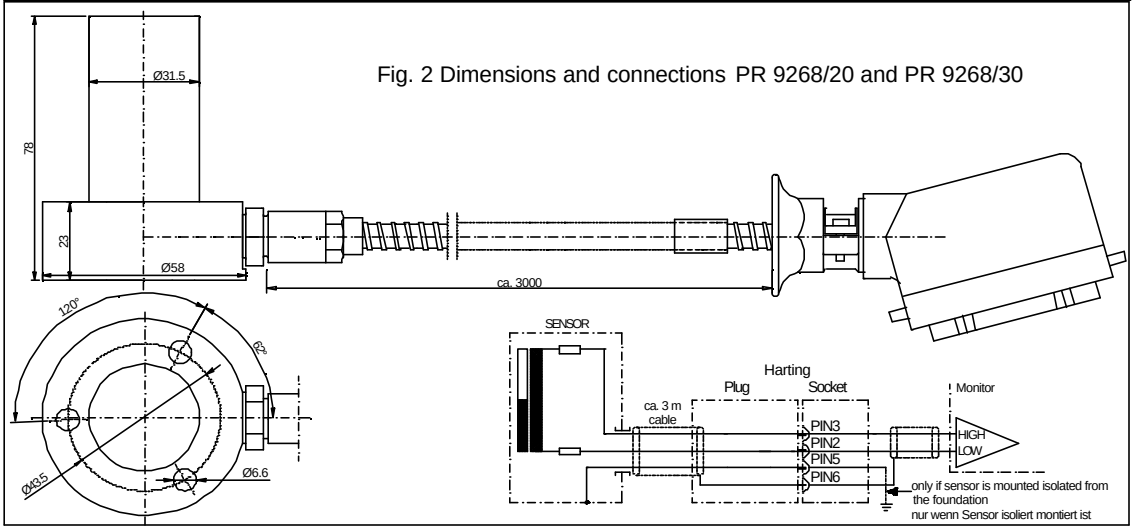


Fig. 2 Dimensions and connections PR 9268/20 and PR 9268/30



Dimensions:

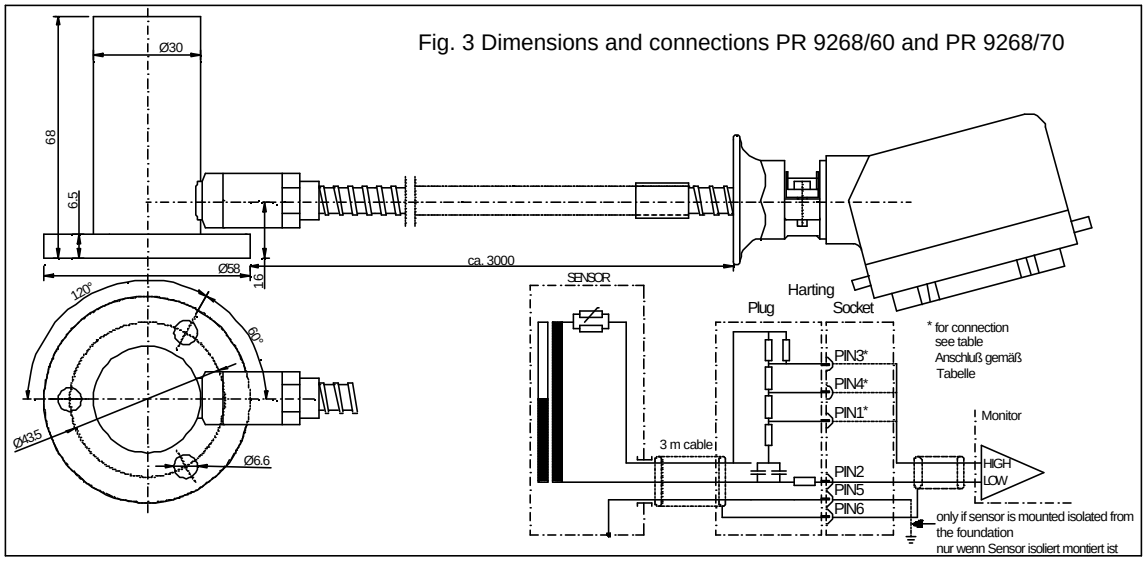


Fig. 3 Dimensions and connections PR 9268/60 and PR 9268/70

Technical Data:

Types	PR 9266/.. series	PR 9268/20 and /30	PR 9268/60 and /70
Measuring principle	low tuned system for absolute vibration measurements		
Mechanical / electrical conversion	electro-dynamic		
Operation direction vertical horizontal	with lifting current without lifting current	PR 9268/20: ±10° PR 9268/30: ±10°	PR 9268/60: ± 60° ≤15 % deviation of specified data PR 9268/70: ± 30° ≤15 % deviation of specified data
Frequency range	10…1000 Hz	4…1000 Hz	10…1000 Hz
Vibration amplitude (peak – peak) Limit stops at	2000 µm ± 1500 µm	3000 µm ± 2000 µm	3000 µm ± 2000 µm
Natural frequency (20 °C) horizontal direction vertical direction with lifting coil active with inactive lifting coil	 12,0 Hz ±2 Hz 12,3 Hz ±2 Hz 14,5 Hz ±1,5 Hz	 4,5 Hz ±0,5 Hz 4,5 Hz ±0,5 Hz	10 Hz ±1 Hz (without damping) 8 Hz ±1 Hz 8 Hz ±1 Hz
Sensitivity Tolerance Linearity error	at 50 Hz, 20° C and 100 kOhm load 30 mV/mm^{-1} ±3 % <2 %	at 50 Hz, 20° C and 100 kOhm load 28,5 mV/mm^{-1} ±5,25 % <2 %	at 80 Hz, 20° C PIN 3, 100 kOhm load 22 mV/mm s^{-1} PIN 1, 50 kOhm load 16,7 mV/mm s^{-1} PIN 4, 20 kOhm load 16,7 mV/mm s^{-1} ±5 % <2 %
Transversal sensitivity	<0,03 (at 50 Hz)	PR 9268/20: <0,27 PR 9268/30: <0,13 (at 110 Hz)	<0,1 (at 80 Hz)
Damping factor D at 20 °C at 100 °C	 ca. 0,6 ca. 0,43	 ca. 0,56 ca. 0,42	measured at PIN 3 ca. 0,7 ca. 0,5 (200 °C)
Effective capacities incl. cable	 <2,5 nF	 <1,2 nF	 < 2,0 nF
Electrical data of meas. coil DC resistance Inductance	 1800 Ohm ± 12 % (incl. correction coil) Meas. coil: ≤ 62 mH Lifting coil: ≤ 75 mH	 1875 Ohm ± 2 % (incl. internal resistance) ≤ 68 mH	 PIN 3: 2760 Ohm ± 10 % PIN 1: 3260 Ohm ± 10 % PIN 4: 3180 Ohm ± 10 % ≤ 200 mH

Technical data:

Types	PR 9266/.. series	PR 9268/20 and /30	PR 9268/60 and /70
Permissible acceleration Measuring direction Transversal direction	 10 g continuous 20 g short-time 5 g	 10 g continuous 20 g short-time 2 g	 10 g continuous 20 g short-time 2 g
Temperature range Sensor without connector continuous short-time (< 4h) Storage / transport	 -20...+150 °C -40... +70 °C	 -20...+100 °C -20...+120 °C -40... +70 °C	 -20...+200 °C -20...+220 °C -40... +70 °C
Protection class Relative humidity (non-condensing)	 IP 65 0...100 %	 IP 55 0...100 %	 IP 65 0...100 %
Material Housing material Metal protection hose Harting connector	 Al Mg Si Pb F 28 stainless steel die cast aluminium	 Al Mg Si Pb F 28 stainless steel die cast aluminium	 stainless steel 1.4104 stainless steel
Weight with cable and connector, without packing	 PR 9266/10: 600g PR 9268/11: 1300 g PR 9266/12: 1900 g	 930 g	 1050 g
Weight with cable and connector, including packing	 PR 9266/10: 1100 g PR 9268/11: 1900 g PR 9266/12: 2500 g	 1200 g	 1600 g
Dimensions	see Fig. 1	see Fig. 2	see Fig. 3
Connection cable	3 x 0,62 mm^2, PTFE	3 x 0,62 mm^2, PTFE	3 x 0,5 mm^2, PTFE

Ordering designations:

Ordering designation PR 926	X	/	X	X	X	-	X X	0
PR 9266	6	/	1			-		
base plate								
without	...	...	...	0				
triangular	...	...	...	1				
cubic	...	...	...	2				
PR 9268	8	/				-		
measuring direction	...	...	2	0				
vertikal	...	...	3	0				
horizontal	...	...	6	0				
vertikal (high temperature 200 °C)	...	...	7	0				
horizontal (high temperature 200 °C)	...	...						
Cable length		/				-		
3 m	...	...	...	...	0			
5 m	...	...	...	...	1			
8 m	...	...	...	...	2			
10 m	...	...	...	...	3			
Cable end (Typ PR 9268/60 und /70 only with Harting connector)		/				-		
Harting connector	...	...	...	...	...	.	0	
open cable end	...	...	...	...	...	.	1	
Flexible metal protection tube		/				-		
with	...	...	...	...	...	.	... 0	
without	...	...	...	...	...	.	... 1	

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