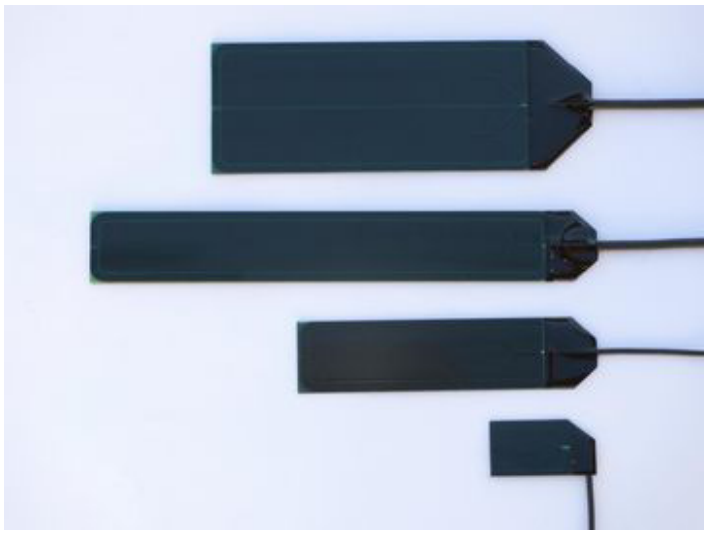
Air gap sensor
AGS

Low profile capacitive air gap measuring sensor for rotating machines



Low profile Air Gap Sensor for wind / hydro-generators and electrical motors
High accuracy, non contact capacitive type distance measuring sensor
High stability FR4 carbon particles sensor probe made for deep-in-the-gap or edge instalation
Stator or rotor installation possible
Temperature compensated, immune to strong magnetic fields, vibrations and deposits
Insulated DC/DC power supply and optocoupler output 0...20mA or 4...20mA
Stable operation over a wide temperature range of -20...125 / 140°C (sensor probe)
Splash-proof electronics case (IP66) well suited for field applications
24 hour burn-in with Manufacturers test and calibration report

Made in Europe

Application examples

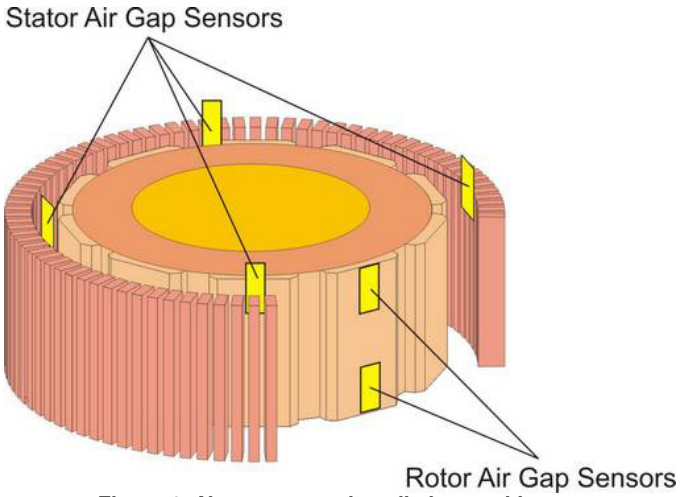


Figure 1. Air gap sensor installation positions

Figure 2. Air Gap Sensors installed at Stator (left) and rotor pole (right)

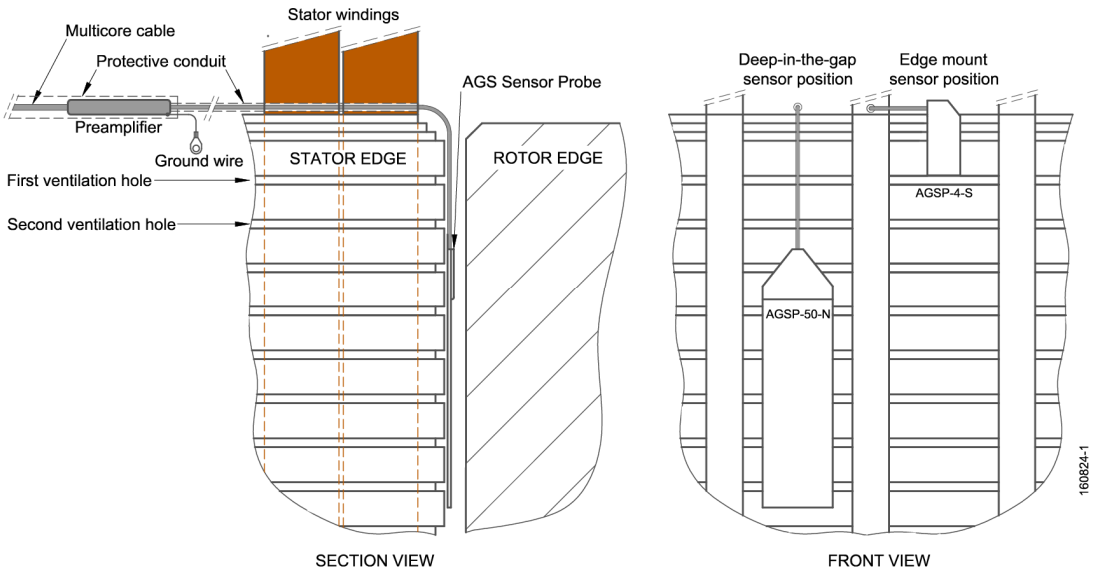


Figure 3. AGS Sensor probe mounting position diagram

Technical specification

	AGS-4-S (Note 3)	AGS-15-N	AGS-25-N	AGS-50-N	AGS-51-N	AGS-65-N
Measuring range (mm) (from sensor surface)	0...4	0...15	0...25	0...50		0...65
Linear measuring range (mm) (from sensor surface)	0,8...4	3...15	5...25	10...50	5...50	6,5...65
True air gap range (mm)	1,7...4,9	5,2...17,2	8,3...28,3	13,3...53,3	8,3...53,3	9,8...68
Linearity FS (25°C)	+/-1,5%			+/-3%		
Linearity FS (80/80/125°C) (Note 1)	+/-3%			+/-5%		
Linearity FS (80/80/140°C) (Note 2)	+/-3%			+/-5%		
Output noise (% of reading)	0,3% (30mV RMS)					
Repeatability	0,3%					
Output pole profile	0…20mA, (0mA=0mm), or 4...20mA (4mA=0mm) with 500 Ohm termination resistor: 0...10V (0V=0mm) or 2...10V, (2V=0mm) opto-insulated					
Sensitivity 0...20mA output (mA/mm)	5	1,33	0,8	0,4	n.a.	
Sensitivity 0...10V output (V/mm)	2,5	0,667	0,4	0,2	n.a.	
Sensitivity 4...20mA output (mA/mm)	4	1,067	0,64	0,32		0,2462
Sensitivity 2...10V output (V/mm)	2	0,533	0,32	0,16		0,1231
Typical frequency response	0...1000Hz, (-3dB), other bandwidth optional					
Magnetic flux density withstand	+/-2 Tesla, 50/60Hz					
Operating temp. (probe only)	-20...125°C or -20...140°C					
Operating/store temperature (AGSC + preamplifier)	-20...80°C					
Power input	+24Vdc, ±10%, 0,15A max.					
Warm-up time	approx. 20 min.					
Relative humidity (AGSC)	95% non condensing					
Vibration	IEC 68 2.27, 5 g peak, 10 Hz to 150 Hz					
Shock	IEC 68 2.27, 15 g peak, 11ms					
EMC	Sensor probe not affected by magnetic fields +/- 2 Tesla, 50/60 Hz					
Probe immunity	magnetic fields, dust and oil vapours, without degradation of material					
AGSP probe dimension (mm)	51x25x0,8	135x32x2,2 (Note 4)	232x32x3,3	175x60x3,3		265x60x3,3
AGSP cable length (m)	0,8m + 10m, optional: 0,8m + 20m		1,8m + 10m, optional: 0,8m + 20m			
AGSC dimension (mm)	220 × 120 × 80 w/o cable inlets type CAB, 220 x 125 x 55mm type CON					
AGSC protection class	IP66 type CAB, IP60 type CON					
Weight AGSP (probe + cable) (g)	6g + 230g	20g + 230g	50g + 250g	100g + 250g		150g + 250g
Weight AGSC unit	1500g type CAB, 720g type CON					

Table 1. Technical specification

NOTES:

(1) AGSC signal conditioner at 80°C, Preamplifier at 80°C, AGSP probe at 125°C.
(2) AGSC signal conditioner at 80°C, Preamplifier at 80°C, AGSP probe at 140°C.
(3) AGS-4S is recommended for generators or motors with permanent magnet rotors only.
Not to be used with switch / inverter drives when mounted at the edge mounting position. Switch mode drives are possible source of electrical noise.
If necessary perform trial installation to verify signal noise specification.
(4) AGS-15 sensor probe tickness from Ser.Nr: 153601 onward has been changed from 1.2mm to current 2.2mm.

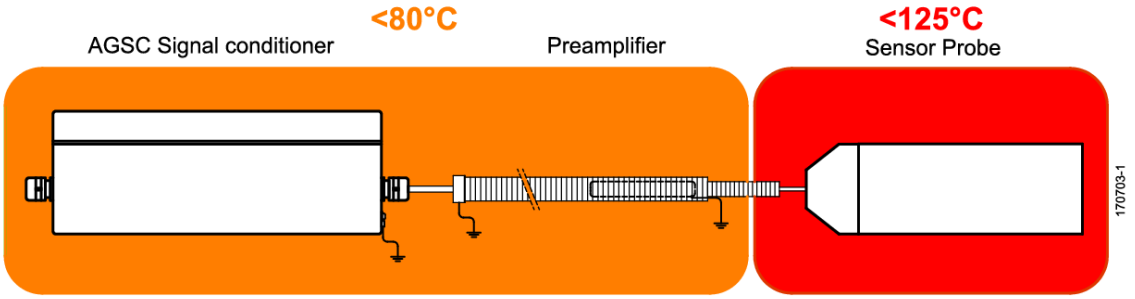


Figure 4. Thermal zones

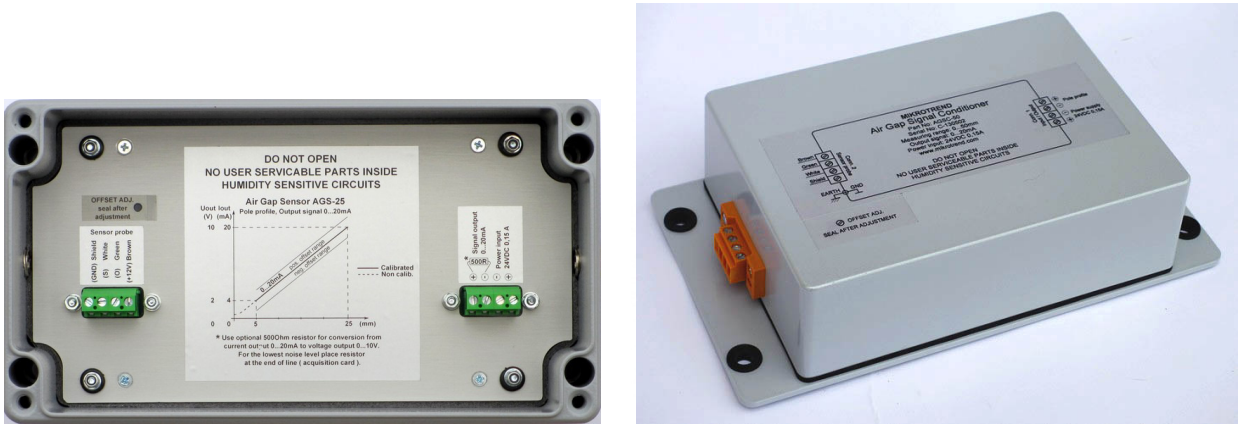


Figure 5. Air Gap Sensor Conditioner, enclosure with cable entry (AGSC-CAB) left and enclosure with connectors (AGSC-CON) right

Outline drawings

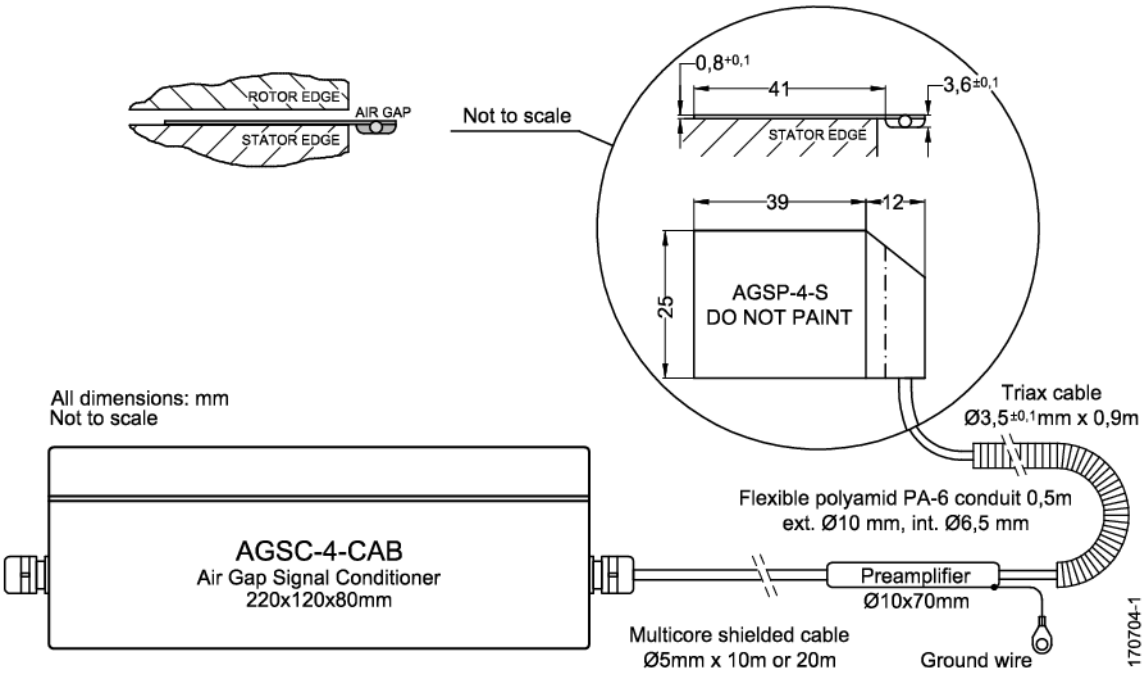


Figure 6. AGS-4S (inverted) outline drawing

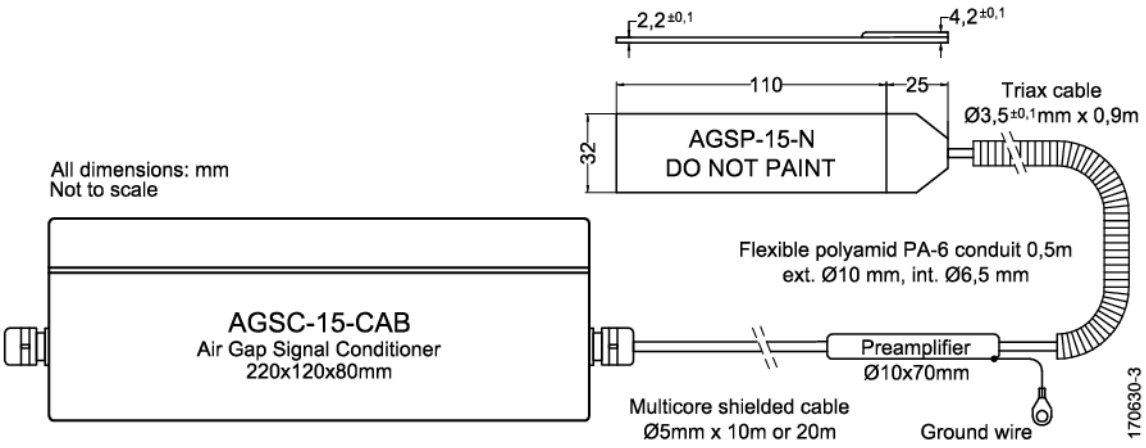


Figure 7. AGS-15-N outline drawing from ser. Nr.153601, (change of sensor probe thickness)

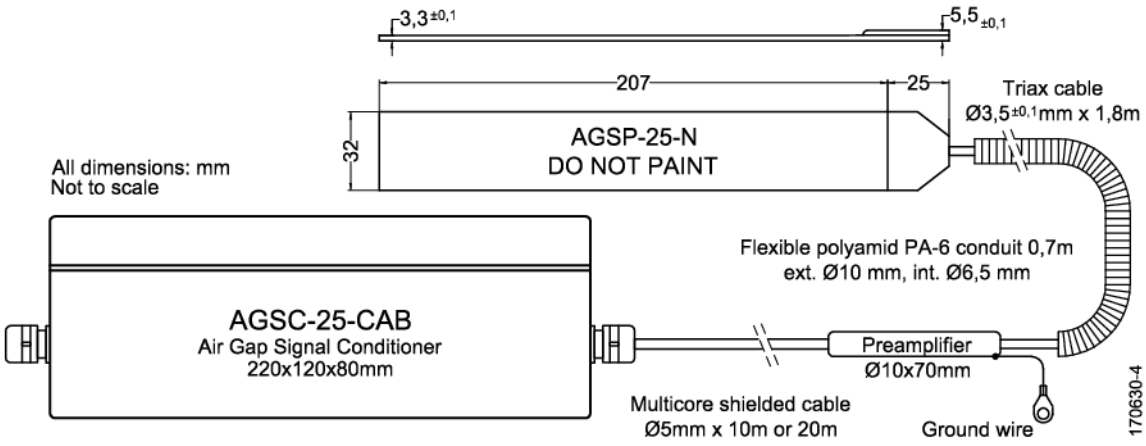


Figure 8. AGS-25-N outline drawing

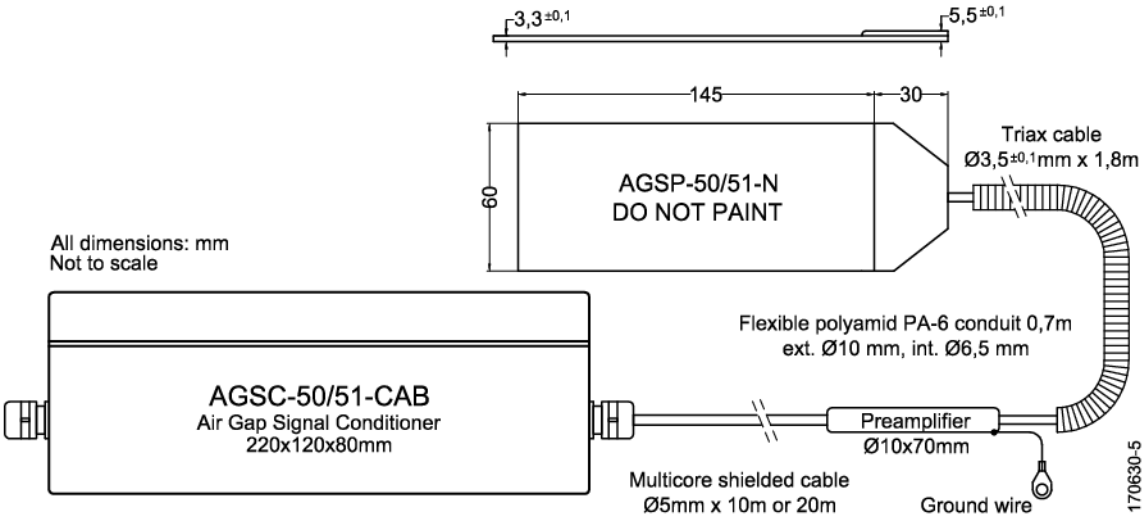


Figure 9. AGS-50/51-N outline drawing

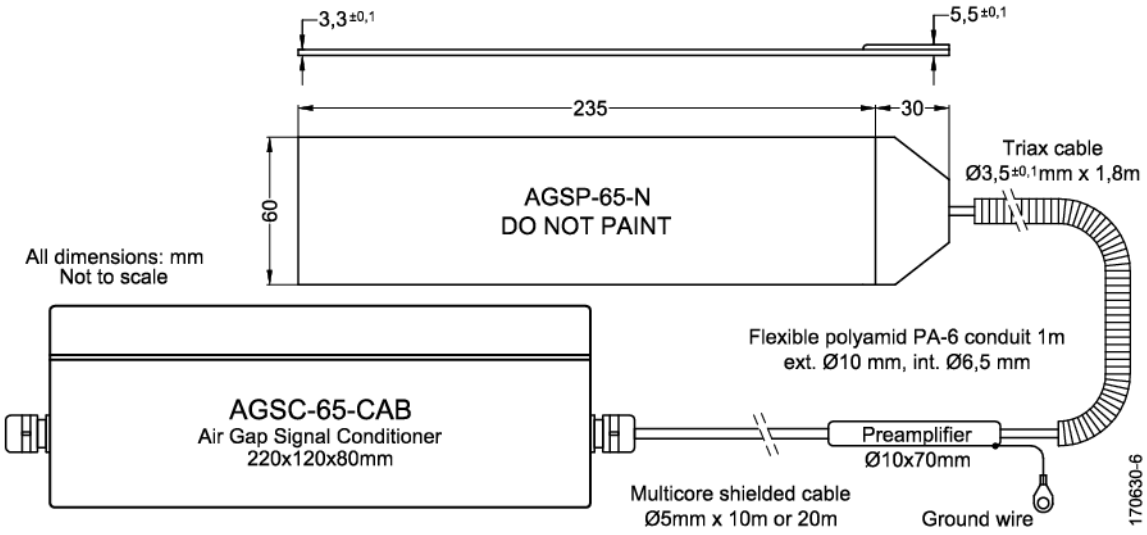


Figure 10. AGS-65-N outline drawing

Installation and wiring diagrams

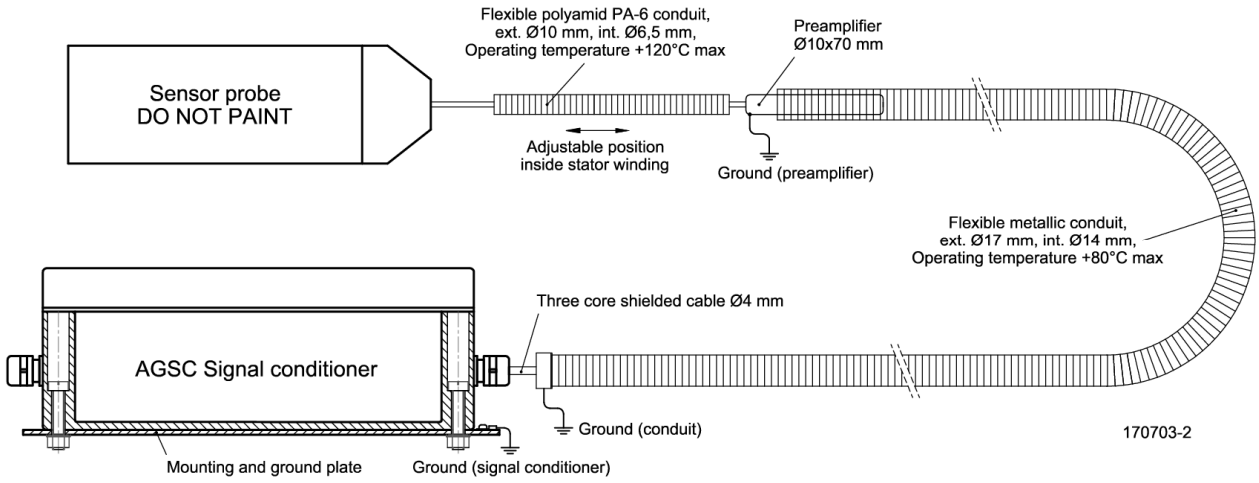


Figure 11. AGS Shielding and grounding diagram
NOTE: Metalic conduit is not part of delivery, to be ordered separately

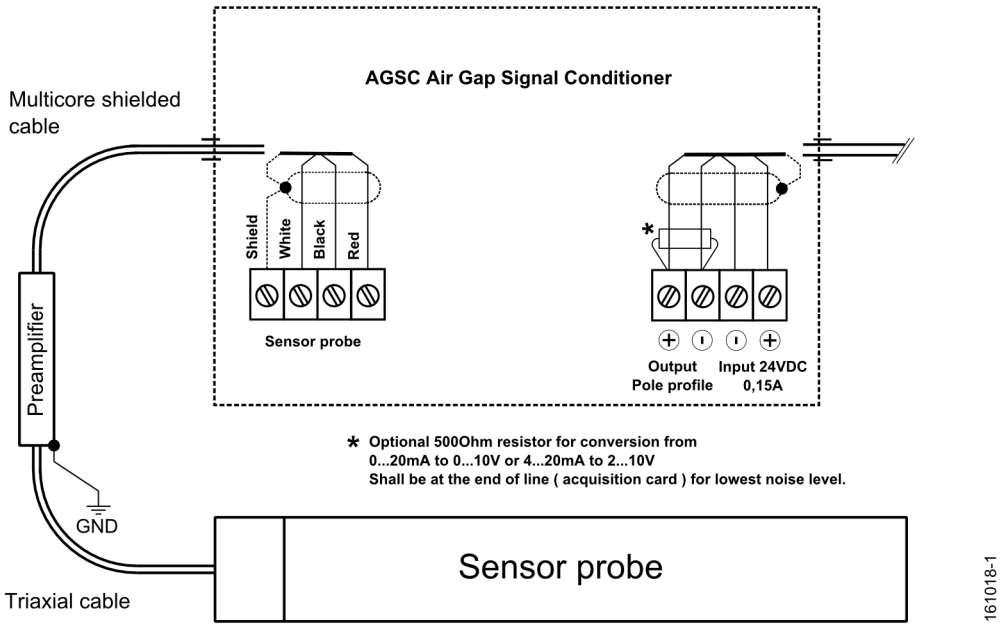


Figure 12. AGS - Wiring diagram

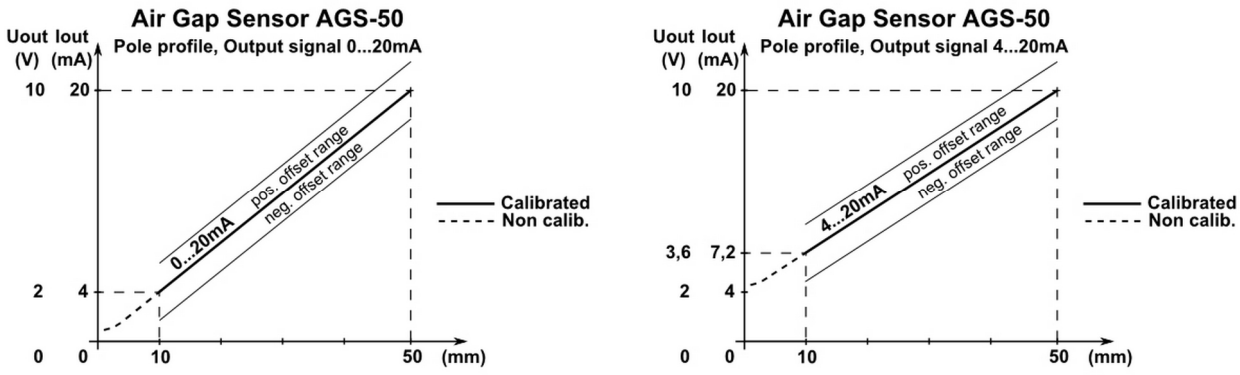


Figure 13. Air Gap Sensor output signal (AGS-50)

Ordering information

Scope of delivery:
NOTE: Metalic conduit is not part of delivery, to be ordered separately

AGS Air Gap Sensors are delivered as a factory calibrated set containing:
- **P/N: AGSP** sensor probe with integrated preamplifier and connection cable,
- **P/N: AGSC** signal conditioner.

When ordering AGSP sensor probe please use the following format:

AGSP - XX - X - XXX - XX

Lin. measuring range (mm):
0,8…4 = **4**
3…15 = **15**
5…25 = **25**
10…50 = **50**
5 ...50 = **51**
6,5…65 = **65**

Installation type:
Deep-in-the-gap mount = **N**
Edge mount = **S**

Operating temperature:
0...125°C = **125**
-20...140°C = **140**

Cable length:
10m = **10**
20m = **20**

When ordering AGSC Signal Conditioner please use the following format:

AGSC - X - XX - XXX

Lin. measuring range (mm):
0,8…4 = **4**
3…15 = **15**
5…25 = **25**
10…50 = **50**
5. ..50 = **51**
6,5…65 = **65**

Output signal:
0...20mA = **0**
4...20mA = **4**

Enclosure type:
With cable inlet = **CAB**
With connectors = **CON**

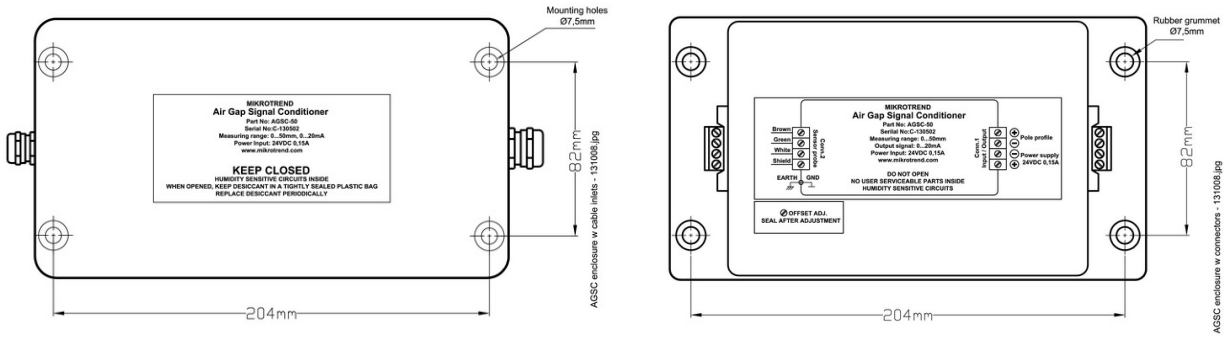


Figure 14. AGSC-CAB (left), AGSC-CON (right)

Manufacturers test and calibration report

Air Gap Sensor sets are individualy calibrated with Manufacturers Test and Calibration report (MTR) included with each set as per sample below:

Manufacturer: **MIKROTREND d.o.o.** 4.Bizek 14, 10090 Zagreb, CROATIA
e-mail: info(at)mikrotrend.com , www.mikrotrend.com
Date: 02. June 2017
Ambient: 22°C
Test performed by: **K. Pavlovic**

Manufacturers Test and Calibration report No. (sample)

Scope of testing: sensor output at specified distance

Passed

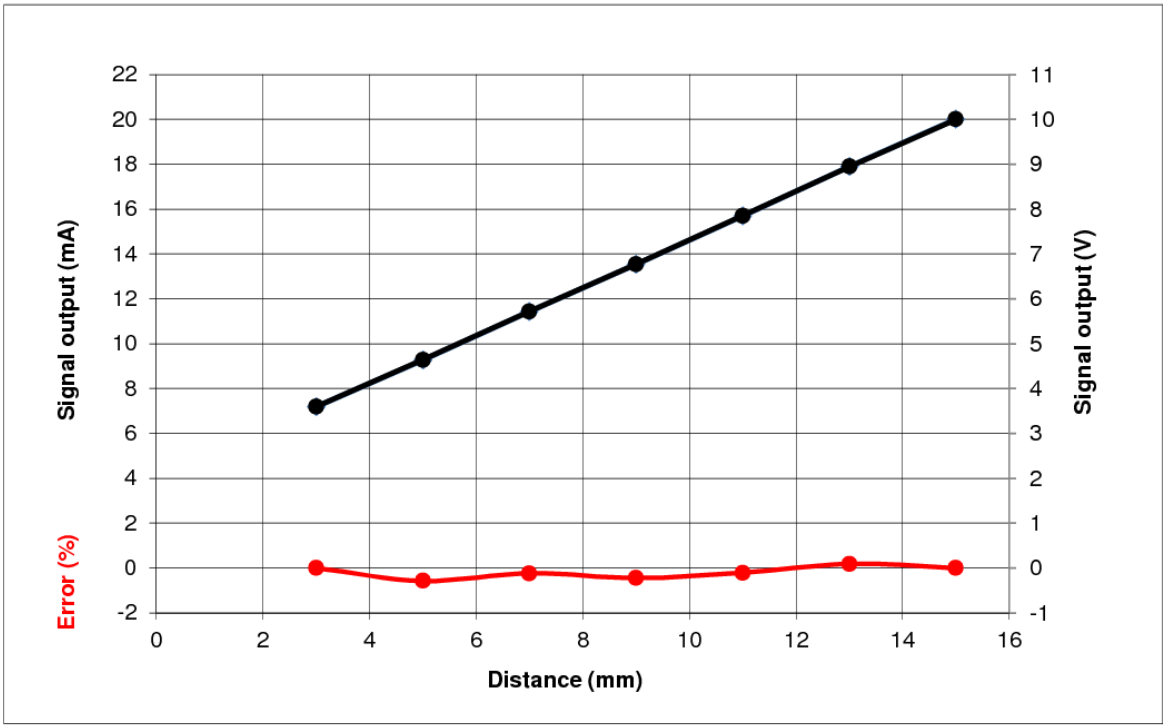
The product and the factory surveillance system meet all applicable requirements as laid down in the relevant datasheets and/or Installation and user manual

Product name:	**Air Gap Sensor Probe**		Part No: **AGSP-15-N-125**	Ser. No:	**(sample)**
	Air Gap Signal Conditioner		Part No: **AGSC-15-4-CAB**	Ser. No:	**(sample)**
Measuring range:	**0...15mm**	Linear measuring range:	**3...15mm**		
Output:	**4...20mA or 2...10V**				
Sensitivity:	**1,06667mA or 0,53334V/mm**				

Calibration Instrument used:

Z-axis:	**Custom design with vacuum table**
Laser Micrometer:	**Keyence LC-2100, Ser. No. 004936**
Micrometer:	**Mitutoyo ID-H0560, Ser. No. 002450**
Multimeter:	**Agilent 34401A, Ser. No. US36115736**

Distance	Signal output		Error	Signal output	
d(mm)	Ioutput(mA)	Imeasured(mA)	(%)	Voutput(V)	Vimeasured(V)
3,00	**7,20**	**7,20**	**0,00**	**3,60**	**3,60**
5,00	**9,33**	**9,28**	**-0,57**	**4,67**	**4,64**
7,00	**11,47**	**11,44**	**-0,23**	**5,73**	**5,72**
9,00	**13,60**	**13,54**	**-0,44**	**6,80**	**6,77**
11,00	**15,73**	**15,70**	**-0,21**	**7,87**	**7,85**
13,00	**17,87**	**17,90**	**0,19**	**8,93**	**8,95**
15,00	**20,00**	**20,00**	**0,00**	**10,00**	**10,00**



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