

Data sheet

Pressure transmitter with ratiometric output signal

AKS 32R and AKS 2050



AKS 32R is a ratiometric pressure transmitter that converts the measured pressure to a linear output signal. The output signal is relative to the supply voltage meaning that the min. pressure output will be 10% of the actual supply voltage and the max. pressure output will be 90% of the actual supply voltage.

At a supply voltage of 5 V, the output signal is:

- 0.5 V at min. pressure range
- 4.5 V at max. pressure range

The robust design and the ratiometric output signal makes the transmitter suitable for systems together with ratiometric A/D converters within a number of fields:

- A/C systems
- Refrigeration plant
- CO₂ plant
- Process control
- Laboratories

AKS 2050 is identical to AKS 32R but for high pressure and with pulse-snubber in the pressure connection.

Features

- Highly developed sensor technology means great regulation accuracy
- Fully digitally compensated
- Compatible with all refrigerants incl. ammonia and CO₂
- Built-in voltage stabilizer
- Effective protection against moisture
- Robust construction gives protection against mechanical influences such as shock, vibration, and pressure surge
- EMC protected in accordance with the EU EMC-directive (CE-marked)
- Polarity protected inlets
- Output signal specially adjusted to ratiometric A/D-converters
- Sealed gauge measuring principle (pressure reference = 1013 mbar)
- UL approved
- For use in ATEX zone 2 explosive atmospheres

Technical data
Performance (EN 60770)

Accuracy (incl. Linearity, Hysteresis and repeatability)	± 0.3% FS (typ.)
	± 0.8% FS (max.)
Non-linearity (best fit straight line)	< ± 0.2% FS
Hysteresis and repeatability	≤ ± 0.1% FS
Thermal zero point operation	≤ ± 0.1% FS/10K (typ.)
	≤ ± 0.2% FS/10K (max.)
Thermal sensitivity operation	≤ ± 0.1% FS/10K (typ.)
	≤ ± 0.2% FS/10K (max.)
Response time	< 4 ms
Max. working pressure	See table page 4
Burst pressure	> 6 × FS
Power-up time	< 50 ms

Electrical specifications

Nominal output signal (short-circuit protection)	10 – 90% of [U _B]
Supply voltage [U _B] (polarity protected)	4.5 – 5.5 V DC at 5 V DC (nom.)
Power consumption	< 5 mA at 5 V DC
Ratiometricity	< 0.05% FS / 4.5 - 5.5 V
Sink / source	< 1 mA
Load [R _L] (load connected to ground)	R _L ≥ 10 kΩ at 5 V DC

Environmental conditions

Sensor operating temperature range	Normal	-40 – 125 °C		
	ATEX Zone 2	-10 – 85 °C		
Media temperature range		-40 – 125 °C		
Compensated temperature range		See ordering		
Transport / storage temperature range		-50 – 85 °C		
EMC – Emission		EN 61000-6-3		
EMC – Immunity	Electrostatic discharge	Air	8 kV	EN 61000-6-2
		Contact	4 kV	EN 61000-6-2
	RF	field	10 V/m, 26 MHz – 1 GHz	EN 61000-6-2
		conducted	3 V _{rms} , 150 kHz – 30 MHz	EN 61000-6-2
	Transient	Burst	4 kV (CM)	EN 61000-6-2
		Surge	1 kV (CM, DM)	EN 61000-6-2
Insulation resistance		> 100 MΩ at 500 V DC		
Vibration stability	Sinusoidal	20 g, 25 Hz – 2 kHz	IEC 60068-2-6	
	Random	7.5 g _{rms} , 5 Hz – 1 kHz	IEC 60068-2-64	
Shock resistance	Shock	500 g / 1 ms	IEC 60068-2-27	
	Free fall	1 m	IEC 60068-2-32	
Enclosure (IP protection fulfilled together with mating connector)		IP65-IEC 60529		

Approvals

UL recognized for sale in the USA and Canada	Electrical safety	File no. E31024, E494625
	Hazardous location	File no. E227388
CE marked according to the EMC directive		2015/30/EU
Ex evaluated for Zone 2 for sale in Europe		ATEX II 3G Ex na IIA T3 Gc
For sale in Russia, Belarus and Kazakhstan		EAC (EurAsian conformity)

Technical data
(continued)

Explosive atmospheres

Zone 2 applications	II 3G Ex nA IIA T3 Gc -10 °C < Ta < + 85 °C	EN60079-0; EN60079-15, EN60079-7
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In ATEX Zone 2 applications at low temperatures the cable and plug must be protected against impact.

The product was approved in compliance with ATEX. Ignition risk is evaluated in accordance to ATEX. **AKS 32R / AKS 2050** can be applied on systems with **R290, R600, R600a** and **R1270** as the working fluid. For countries where safety standards are not an indispensable part of the safety system, Danfoss recommends the installer to seek a third party approval for the system containing flammable refrigerant. Note, please follow specific selection criteria stated in the datasheet for these particular refrigerants. This product is approved for **R290, R600, R600a** and **R1270** by ignition source assessment in accordance with standard EN13463-3.

Mechanical characteristics

Housing material and material in contact with medium	EN 10088-1; 1.4404 (AISI 316 L)
Weight	0.15 kg
Refrigerants	DR3, DR55, DR7, HDR110, L40, R1234yf, R1234ze, R1270, R1290, R134a, R22, R227, R23, R290, R32, R404A, R407A, R407B, R407C, R407F, R410A, R413A, R417A, R422A, R422D, R427A, R438A, R444B, R447A, R448A, R449A, R449B, R450A, R452A, R454B, R502, R507, R513A, R600, R600a, R717 (NH ₃), R744 (CO ₂), R1270

Ordering

	Type	Operating range [bar]	Permissible working pressure PB [bar]	Compensated temp. range [°C]	Code no.				
					¼ NPT ¹⁾	G ¾ A ²⁾	¼ in- flare ³⁾	¾ solder	¼ in- female flare ³⁾ with deflator
	AKS 32R	-1 – 12	33	-30 – 40	060G1037	060G1038	060G1036	060G3551	060G6323
		-1 – 12	33	-30 – 40	-	-	060G6339 ⁴⁾	-	060G5961 ⁴⁾
		-1 – 34	55	0 – 80	-	-	060G0090	060G3552	060G6341
		-1 – 34	55	0 – 80	-	-	060G6340 ⁴⁾	-	-
	AKS 2050	-1 – 59	100	-30 – 40	060G6342	060G5750	-	060G6408	-
		-1 – 99	150	-30 – 40	060G6343	060G5751	-	-	-
		-1 – 159	250	0 – 80	060G6344	060G5752	-	-	-
	Connecting plug with 5 m cable (mounted on pressure transmitter obtains IP67)				060G1034				-
	Plug Pg 9				060G0008				-

¹⁾ ¼-18 NPT

²⁾ Thread ISO 228/1 - G ¾ A (BSP)

³⁾ ¾-20 UNF

⁴⁾ Incl. Pg 9 plug

Electrical connections

Type code	A1	A3
	<p>EN 175301-803-A Pg 9</p>	<p>2 m screened cable</p>
Ambient temperature	-40 – 125 °C	-30 – 80 °C
Ratiometric output, 10 - 90% of supply voltage		
Electrical connection Ratiometric output, 10 - 90% of supply voltage	Pin 1: + supply Pin 2: ÷ supply / common Pin 3: Signal	Black: + supply Blue: ÷ supply / common Brown: Signal

Dimensions and weight

Pressure connection	1/4-18 NPT	G 3/8 A ISO 228/1	1/4 in. flare 7/16-20 UNF	3/8 solder
L [mm]	16	21	16.5	30

Weight approx. 0.15 kg

Pressure connection	7/16 UNF flare female with valve deflator
L [mm]	21.5

Weight approx. 0.15 kg

Pulse-snobber, AKS 2050

Cavitation, liquid hammer and pressure peaks may occur in liquid filled systems with changes in flow velocity, e.g. fast closing of a valve or pump starts and stops. The problem may occur on the inlet and outlet side, even at rather low operating pressures.

Pulse-snobber in AKS 2050

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