ENGINEERING TOMORROW

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
- CO_2 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 CO_2
- 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	CE Ex II 3G Ex nA IIA T3 Gc -10 °C < Ta < + 85 °C	EN60079-0; EN60079-15

The products for ATEX Zone 2 are applicable in refrigeration applications employing any flammable refrigerants classified as IIA – please, refer to AKS installation guide.
In ATEX Zone 2 applications at low temperatures the cable and plug must be protected against impact.

AKS other products can be used in end user applications employing the following flammable refrigerants: A3: R290, R600, R600a, R1270, A2L: R32, R444B, R452A/B, R454A/B/C, R455A, R1234zyef	IEC/EN 60335-2-89 (commercial refrigerating appliances) IEC/EN 60335-2-40 (electrical heat pumps, air-onditioners)

For other products not ATEX Zone 2 assessed, an ignition risk assessment has been conducted with reference to IEC/EN 60335-2-89 (commercial refrigerating appliances) and IEC/EN 60335-2-40 (electrical heat pumps, air-conditioners).

For countries where safety standards are not an indispensable part of the safety system, Danfoss recommends the installer to seek a third-party approval of the system containing flammable refrigerant.
Note: Please, follow specific selection criteria stated in the data sheet for these particular refrigerants.

Mechanical characteristics

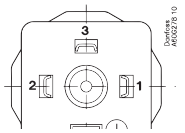
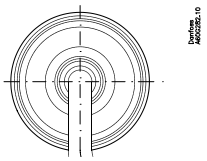
Electrical connection	EN 175301-803 plug / 2 m cable
Wetted parts, material	EN10088-1-1.4404 (AISI 316L)
Housing material	EN10088-1-1.4404 (AISI 316L)
Refrigerants	DR3, DR55, DR7, HDR110, L40, R1234yf, R1234ze, R1270, R1290, R134a, R22, R227, R23, R290, R32, R404A, R407A, R407B, R407C, R407F, R410A, R413A, R417A, R422A, R422D, R427A, R438A, R444B, R447A, R448A, R449A, R449B, R450A, R452A/B, R454A/B/C R455A, R502, R507, R513A, R600, R600a, 717 (NH_3), R744 (CO_2), R1270

Ordering

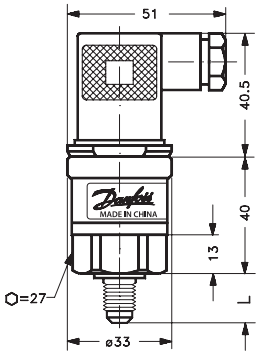
	Type	Operating range [bar]	Permissible working pressure PB [bar]	Compensated temp. range [°C]	Code no.				
					¼ NPT [1]	G ⅜ A [2]	7/16-20 UNF Female	⅜ solder	17/16-20 UNF Female with deflator
	AKS 32R	-1 – 12	33	-30 – 40	**060G1037**	**060G1038**	**060G1036**	**060G3551**	**060G6323**
		-1 – 12	33	-30 – 40	–	–	**060G6339** [4]	–	**060G5961** [3]
		-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 ⅜ A (BSP)
[3]) Incl. Pg 9 plug

Electrical connections

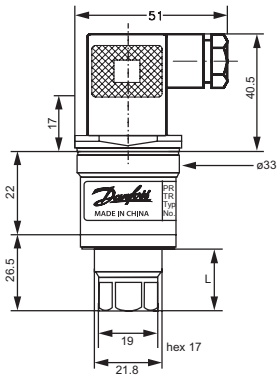
Type code	A1	A3
	 EN 175301-803-A Pg 9	 2 m screened cable
Ambient temperature Ratiometric output, 10 - 90% of supply voltage	-40 – 125 °C	-30 – 85 °C
Electrical connection Ratiometric output, 10 - 90% of supply voltage	Pin 1: + supply Pin 2: ÷ supply / common Pin 3: Signal	Black: + supply Blue: ÷ supply / common Brown: Signal

Dimensions and weight



Pressure connection	¼-18 NPT	G ⅜ A ISO 228/1	¼ in. flare 7/16-20 UNF	⅜ solder
L [mm]	16	21	16.5	30

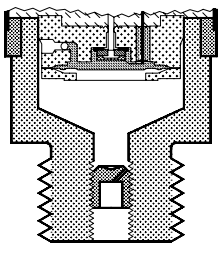
Weight approx. 0.15 kg



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

Weight approx. 0.15 kg

Pulse-snubber, AKS 2050



Pulse-snubber in 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.