

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 min. value of the output signal is less than 10% of the actual supply voltage. The max. value is more than 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
- Selective temperature compensation
- 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 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 |

Electrical specifications

| | |
|--|---|
| Nominal output signal (short-circuit protection) | 10 – 90% of $[U_B]$ |
| Supply voltage $[U_B]$ (polarity protected) | 4.75 – 8 V DC at 5 V DC (nom.) |
| Power consumption | < 5 mA at 5 V DC |
| Voltage dependence, supply | < 0.05% FS / 10 V |
| Output impedance | < 25 Ω |
| Load $[R_L]$ (load connected to ground) | $R_L \geq 10 \text{ k}\Omega$ at 5 V DC |

Environmental conditions

| | | | | |
|--|------------------------------------|-------------------------------------|---------------------------------------|----------------|
| Operating temperature range (ambient temperature) | Normal | -40 – 85 °C / -40 – 125 °C | | |
| | ATEX Zone 2 | -10 – 85 °C | | |
| Max. media temperature [°C] | 115 - (0.35 x ambient temperature) | | | |
| 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 M Ω at 100 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, E311982 |
| | Explosive safety | File no. E227388 |
| CE marked according to the EMC directive | 89/ 336/ EC | |
| Ex approval 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

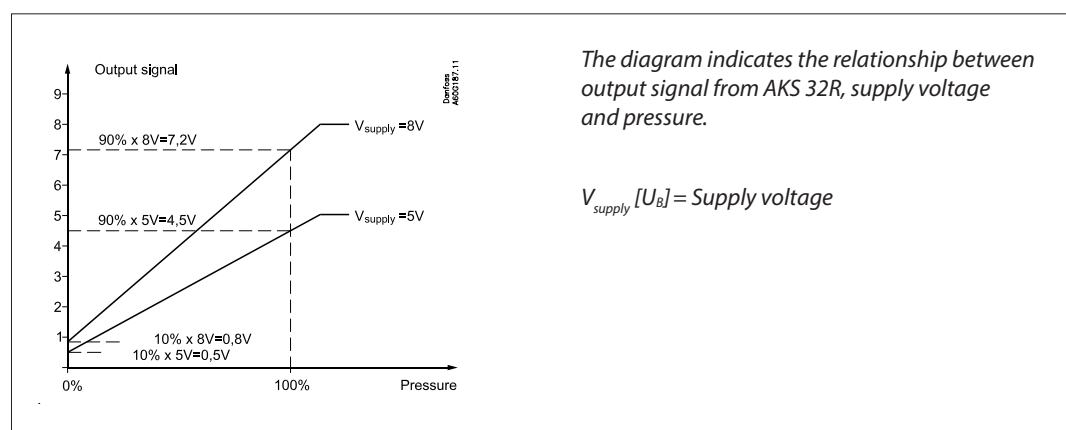
| | | |
|---------------------|--|-----------------------|
| Zone 2 applications | II 3G Ex nA IIA T3 Gc -20C<Ta<85C | EN60079-0; EN60079-15 |
|---------------------|--|-----------------------|

In ATEX Zone 2 applications with temperatures <-10 °C 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 |

Output signal

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⁾ 7/16-20 UNF

⁴⁾ Incl. Pg 9 plug

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 |

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

Plug connections

Black: +
Blue: - / common
Brown: Signal

Cable

1: +
2: - / common
3: Signal

Pg 9