

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
- CO<sub>2</sub> 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 CO<sub>2</sub>
- 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 <sub>B</sub> ]    |
| Supply voltage [U <sub>B</sub> ] (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/10V                   |
| Output impedance                                      | < 25 Ω                           |
| Load [R <sub>L</sub> ] (load connected to ground)     | R <sub>L</sub> ≥ 10 kΩ 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 <sub>rms</sub> , 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 100 V DC               |                                     |                                       |                |
| Vibration stability                                                | Sinusoidal                         | 20 g, 25 Hz – 2 kHz                 |                                       | IEC 60068-2-6  |
|                                                                    | Random                             | 7.5 g <sub>rms</sub> , 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**

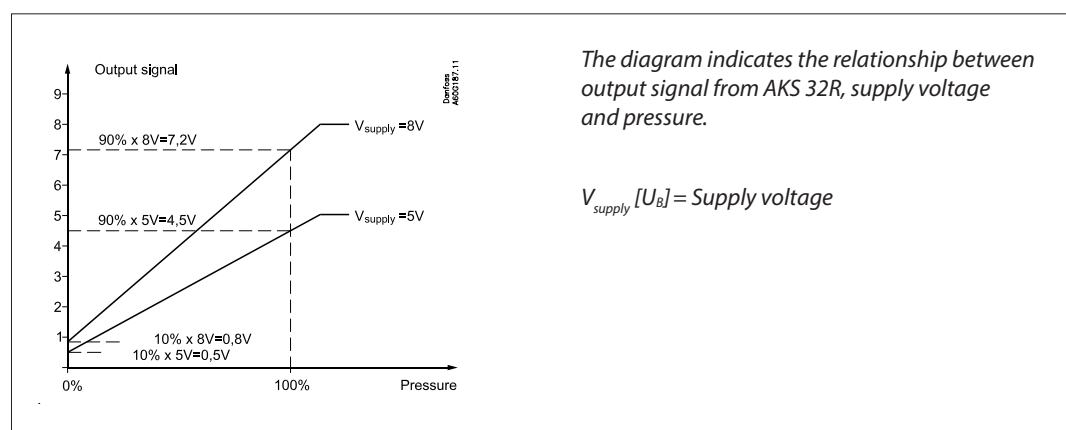
|                     |                                                                     |                       |
|---------------------|---------------------------------------------------------------------|-----------------------|
| Zone 2 applications | <b>II 3G</b><br><b>Ex nA IIA T3 Gc</b><br><b>-20C&lt;Ta&lt;+85C</b> | 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 <sub>3</sub> ), R744 (CO <sub>2</sub> ), R1270 |

**Output signal**

**Ordering**

|          | Type                                                                          | Operating range [bar] | Permissible working pressure PB [bar] | Compensated temp. range [°C] | Code no.            |                     |                               |                 |                                                |
|----------|-------------------------------------------------------------------------------|-----------------------|---------------------------------------|------------------------------|---------------------|---------------------|-------------------------------|-----------------|------------------------------------------------|
|          |                                                                               |                       |                                       |                              | ¼ NPT <sup>1)</sup> | G ¾ A <sup>2)</sup> | ¼ in· flare <sup>3)</sup>     | ¾ solder        | ¼ in· female flare <sup>3)</sup> with deflator |
|          | AKS 32R                                                                       | -1 – 12               | 33                                    | -30 – 40                     | <b>060G1037</b>     | <b>060G1038</b>     | <b>060G1036</b>               | <b>060G3551</b> | <b>060G6323</b>                                |
|          |                                                                               | -1 – 12               | 33                                    | -30 – 40                     |                     |                     | <b>060G6339 <sup>4)</sup></b> |                 | <b>060G5961 <sup>4)</sup></b>                  |
|          |                                                                               | -1 – 34               | 55                                    | 0 – 80                       |                     |                     | <b>060G009</b>                | <b>060G3552</b> | <b>060G6341</b>                                |
|          |                                                                               | -1 – 34               | 55                                    | 0 – 80                       |                     |                     | <b>060G6340 <sup>4)</sup></b> |                 |                                                |
|          | AKS 2050                                                                      | -1 – 59               | 100                                   | -30 – 40                     | <b>060G6342</b>     | <b>060G5750</b>     |                               |                 |                                                |
|          |                                                                               | -1 – 99               | 150                                   | -30 – 40                     | <b>060G6343</b>     | <b>060G5751</b>     |                               |                 |                                                |
| -1 – 159 |                                                                               | 250                   | 0 – 80                                | <b>060G6344</b>              | <b>060G5752</b>     |                     |                               |                 |                                                |
|          | Connecting plug with 5 m cable (mounted on pressure transmitter obtains IP67) |                       |                                       |                              | <b>060G1034</b>     |                     |                               |                 |                                                |
|          | Plug Pg 9                                                                     |                       |                                       |                              | <b>060G0008</b>     |                     |                               |                 |                                                |

<sup>1)</sup> ¼-18 NPT

<sup>2)</sup> Thread ISO 228/1 - G ¾ A (BSP)

<sup>3)</sup> 7/16-20 UNF

<sup>4)</sup> 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**

Cable

Black: +  
Blue: - / common  
Brown: Signal

Pg 9

1: +  
2: - / common  
3: Signal

Danfoss can accept no responsibility for possible errors in catalogues, brochures and other printed material. Danfoss reserves the right to alter its products without notice. This also applies to products already on order provided that such alterations can be made without consequential changes being necessary in specifications already agreed. All trademarks in this material are property of the respective companies. Danfoss and the Danfoss logotype are trademarks of Danfoss A/S. All rights reserved.