motralec Danfoss Pressure transmitter Type AKS 3000 and AKS 3050 For A· DEMANDE DE PRIX >
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ENGINEERING TOMORROW

Data Sheet

Pressure transmitter Type **AKS 3000** and **AKS 3050**

For A/C and refrigeration



AKS 3000 and AKS 3050 is a series of absolute transmitters with high-level signal conditioned current output, developed to meet demands in A/C and refrigeration applications.

AKS 3000 and AKS 3050 utilizes the proved piezoresistive measuring principle, which has been used for decades in Danfoss pressure transmitters.The pressure reference is a sealed gauge. This means that atmospheric pressure variations have no influence on regulating accuracy. A must in accurate low pressure regulation.

AKS 3050 with integrated pulse-snubber is designed for use in hydraulic applications with severe medium influenes like cavitation, liquid hammer or pressure peaks and offer a reliable pressure measurement, even under harsh environmental conditions.

All materials in contact with the refrigerant and materials for the housing are AISI 316L stainless steel. No soft gaskets, all environmental sealings are made through laser weldings only.

AKS 3000 and AKS 3050 has a 4 – 20 mA output, and is available with spade terminals for EN 175301-803 plug.

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Features

Designed to meet A/C and refrigeration application demands without compromising control accuracy concerning:

Tough environment
- Vibration
- Shock during operation and transport
- Humidity and ice formation
- Temperature variations
- Corrosive media like ammonia gases and salt mist

Convenient performance
- 4 – 20 mA signal
- 1% typical accuracy
- 0.5% typical linearity
- Prepared for high pressure refrigerants Bar code for tracing of calibration data

Convenient performance
- Compact design
- Max. working pressure 33 bar <P< 100 bar
- Digitally temperature compensation Optimized accuracy at -10 °C and 20 °C for suction line installation
- ¼ -18 NPT, G ⅜ A, G½ A or ¼ flare ensures tight pressure connection
- All laser welded AISI 316L stainless steel enclosure
- No soft seals
- Enclosure: IP65
- For use in ATEX zone 2 explosive atmospheres
- UL approved

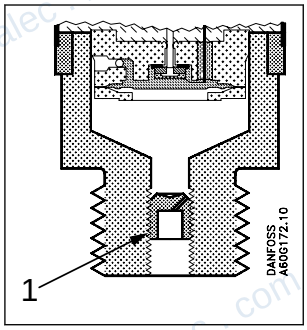
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Applications

- Fan speed control
- High pressure control
- Compressor capacity control
- Evaporator pressure detection
- Oil pressure control

Application and media conditions for AKS 3050



1	Pulse-snubber

Application for AKS 3050

Cavitation, liquid hammer and pressure peaks may occur in hydraulic systems with changes in flow velocity, e.g. fast closing of a valve or when a pump starts and stops.

The problem may occur on the inlet and outlet side of the application, even at rather low operating pressures.

Media condition for AKS 3050

Clogging of the nozzle may occur in liquids containing particles. Mounting the transmitter in an upright position minimizes the risk of clogging, because the flow in the nozzle is limited to the start-up period until the dead volume behind the nozzle orifice is filled. The media viscosity has only little effect on the response time. Even at a viscosities up to 100 cSt the response time will not exceed 4 ms.

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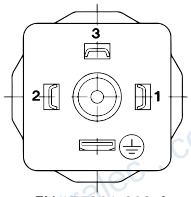
Product specification

Thermal sensitivity

- AKS 3000 is calibrated to limit ambient temperature influence on the regulating accuracy.
- Pressure transmitters to be used at low temperature conditions, e.g. in suction lines, are calibrated at -10 °C and 20 °C.
- In this way control accuracy is optimized in a temperature range of -30 °C – 40 °C.
- Pressure transmitters for general use, e.g. at normal room temperature, are calibrated at 20 °C and 60 °C.
- In this way control accuracy is optimized in a temperature range of 0 °C – 80 °C.

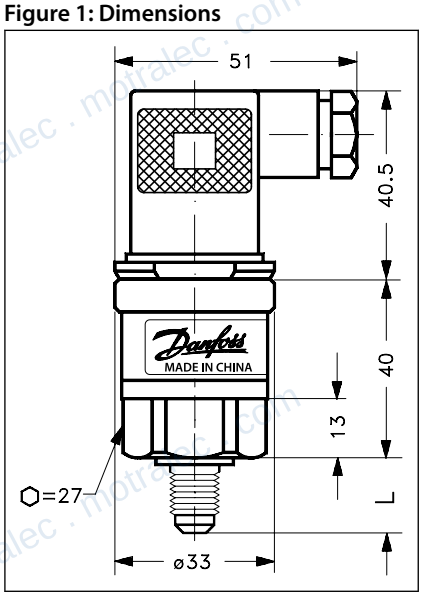
Electrical connection

Table 1: Electrical connection, Two-wire, 4 – 20 mA

Type code	A1
	 EN 175301-803-A pg 9
Ambient temperature 4 - 20 mA output	-40 – 85 °C
Electrical connection 4 - 20 mA output	Pin 1: + supply Pin 2: ÷ supply Pin 3: Not used Connected to transmitter housing

Dimensions and weight

Figure 1: Dimensions



NOTE:
All dimensions in millimeters

Table 2: Dimensions and weight

Pressure Connection	¼ - 18 NPT	G ⅜ A ISO 228/1	G ½ A	¼ Flare 7/16 - 20 UNF	Weight [kg]	
					plug	cable
L [mm]	16	21	20	16.5	0.15	0.20

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Ordering

Table 3: Ordering

Operating range [bar]	Max. working pressure PB [bar]	Calibration at [°C]	Code no.			
			EN 175301-803 plug			
			G 3/8 A	G 1/2 A	1/4 - 18 NPT	1/4 Flare
-1 – 6 (e)	33	-10 / 20	060G1040	–	–	060G1321
-1 – 9 (e)	33		–	060G1895	060G1051	–
0- 10 (a)	33		–	–	–	060G1007
-1 – 12 (e)	33		060G1058	060G1896	060G1052	060G1323
-1 – 20 (e)	50		060G1049	–	060G1053	060G1010
0 – 18 (e)	50	20 / 60	–	–	060G1068	060G1325
0 – 25 (e)	50		060G1041	060G1080	060G1019	
0 - 25 (a)	50		–	060G1608	–	–
0 – 30 (e)	60		–	–	060G1081	060G1327
0 – 40 (e)	100		060G1066	–	–	060G1328
0 – 60 (e)	100		–	060G3631	060G1083	–

Ordering standard

Table 4: Performance

Features	Descriptions
Accuracy	±1% FS (typ.) / ±2% FS (max.)
Non-linearity	< ±0.5% FS
Hysteresis and repeatability	≤ ±0.1% FS
Thermal zero point shift	≤ ±0.2% FS/10K (typ.) ≤ ±0.4% FS/10K (max.)
Thermal sensitivity (span) shift	≤ ±0.2% FS/10K (typ.) ≤ ±0.4% FS/10K (max.)
Response time	< 4 ms
Max. operating pressure	See Table 3: Ordering

Table 5: Electrical specifications

Features	Descriptions
Rated output signal	4 – 20 mA
Supply voltage, [U_B] (polarity protected)	9 – 32 V DC
Supply voltage dependency	< 0.2% FS/10 V
Output limitation	22.4 mA (typ.)
Power-up time	< 50 ms
Max. load, [R_L]	$R_L \leq \frac{U_B - 9V}{0.02\ A}[\Omega]$

Table 6: Environmental conditions

Sensor operating temperature range			Normal	-40 – 85 °C
			ATEX Zone 2	-20 – 85 °C
Media temperature range				- 40 – 85 °C
Compensated temperature range		≤ 16 bar		LP: -30 – 40 °C HP: 0 – 80 °C
		> 16 bar		
Transport temperature range				-50 – 85 °C
EMC - Emmission				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 Vrms, 150 kHz – 30 MHz	EN 61000-6-2
	Transient	Burst	4 kV (CM), Clamp	EN 61000-6-2
		Surge	1 kV (CM,DM) at Rg = 42 Ω	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 grms, 5 Hz – 1 kHz	IEC 60068-2-34, IEC 60068-2-36	

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Shock resistance	Shock	500 g / 1 ms	IEC 60068-2-27	
	Free fall	1 m	IEC 60068-2-32	
Enclosure				IP65 (IEC 60529)

Explosive atmospheres

Table 7: Explosive atmospheres

Zone 2 applications	CE Ex II 3G Ex ec IIA T3 Gc -20 °C<Ta<+85°C	EN60079-0; EN60079-7

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 cable and plug must be protected against impact.

Table 8: Flammable refrigerants

Features	Description
AKS 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

Table 9: Mechanical characteristics

Features	Descriptions
Electrical connection	EN 175301-803 plug
Wetted parts, material	EN10088-1-1.4404 (AISI 316L)
Housing material	EN10088-1-1.4404 (AISI 316L)
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 (NH3), R744 (CO2), R1270

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Certificates, declarations and approvals

The list contains all certificates, declarations, and approvals for this product type. Individual code number may have some or all of these approvals, and certain local approvals may not appear on the list.

Some approvals may change over time. You can check the most current status at danfoss.com or contact your local Danfoss representative if you have any questions.

Table 10: Certificates, declarations and approvals

File name	Document type	Document topic	Approval authority
UL E227388	Explosive - Safety Certificate	Hazardous Locations	UL
UL E31024	Electrical - Safety Certificate		UL
UL E311982	Electrical - Safety Certificate		UL
064G9615.06	EU Declaration	ATEX/EMCD/RoHS	Danfoss
0F18477.5123467890YTN	Pressure - Safety Certificate	CRN	TSSA
060R3160.00	Manufacturers Declaration	China RoHS	Danfoss
E494625	Electrical - Safety Certificate		UL
1786330	Explosive - Safety Certificate		UL

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