

Data sheet

# Pressure transmitter

## AKS 32 and AKS 33



AKS 32 and AKS 33 are pressure transmitters that measure a pressure and convert the measured value to a standard signal:

- 1 – 5 V DC or 0 – 10 V DC for AKS 32
- 4 – 20 mA for AKS 33

A robust design makes the AKS very suitable for application within a number of fields e.g.

- Air conditioning systems
- Refrigeration plant
- Process control
- Laboratories

### Features

Highly developed sensor technology means high pressure regulation accuracy, a very important factor in the precise and energy-economic capacity regulation of refrigeration plant.

- Temperature compensation for LP and HP pressure transmitters, developed specially for refrigeration plant.  
LP: -30 – 40 °C ( $\leq 16$  bar)  
HP: 0 – 80 °C ( $> 16$  bar)
- Compatibility with all refrigerants incl. ammonia means less stock and greater application flexibility.
- Built-in voltage stabiliser, i.e. the AKS pressure transmitters can be powered from an unregulated voltage supply of any output within given limits.
- Effective protection against moisture means that the sensor can be mounted in very harsh environments, e.g. in the suction line encapsulated in an ice block.
- Robust construction gives protection against mechanical influences such as shock, vibration and pressure surge. AKS sensors can be mounted direct on to the plant.
- No adjustment necessary. With the highly developed sensor technology and sealed gauge principle, the accuracy of the factory setting is maintained independent of variations in ambient temperature and atmospheric pressure. This is very important when ensuring evaporating pressure control in air conditioning and refrigeration applications.
- EMC protection according to EU EMC-directive (CE-marked)
- UL approved
- Polarity protected inputs.
- For use in zone 2 explosive atmospheres

**Technical data**
**Performance**

Accuracy (incl. non-linearity, hysteresis and repeatability)	± 0.3% FS (typ.) / ± 0.8% FS (max.)
Non-linearity BFSL (conformity)	< ± 0.2% FS
Hysteresis and repeatability	≤ ± 0.1% FS
Thermal zero point shift	≤ ± 0.1% FS / 10K (typ.)
	≤ ± 0.2% FS / 10K (max.)
Thermal sensitivity (span) shift	≤ ± 0.1% FS / 10K (typ.)
	≤ ± 0.2% FS / 10K (max.)
Response time	< 4 ms
Max. working pressure	See ordering table
Burst pressure	min. 300 bar

**Electrical specifications AKS 33, 4 – 20 mA output signal**

Rated output signal	4 – 20 mA
Supply voltage [U <sub>B</sub> ], polarity protected	10 – 30 V DC
Supply voltage dependency	< 0.05% FS / 10 V
Current limitation (linear output signal up to 1.5 × rated range)	28 mA
Max.Load, [R <sub>L</sub> ]	$R_L \leq \frac{U_B - 10V}{0.02A} [\Omega]$

**Electrical specifications for AKS 32, 0 – 10 V DC output signal**

Rated output signal (short-circuit protected)	0 – 10 V DC
Supply voltage [U <sub>B</sub> ], polarity protected	15 – 30 V DC
Supply current consumption	< 8 mA
Supply voltage dependency	< 0.05% FS / 10 V
Output impedance	< 25 Ω
Load resistance, R <sub>L</sub>	R <sub>L</sub> ≥ 15 kΩ

**Electrical specifications for AKS 32, 1 – 5 V DC output signal**

Rated output signal (short-circuit protected)	1 – 5 V DC
Supply voltage [U <sub>B</sub> ], polarity protected	9 – 30 V DC
Supply current consumption	< 5 mA
Supply voltage dependency	< 0.05% FS / 10 V
Output impedance	< 25 Ω
Load resistance, R <sub>L</sub>	R <sub>L</sub> ≥ 10 kΩ

**Technical data**  
*(continued)*
**Environmental conditions**

Operating temperature range (ambient temp.)		Normal		-40 – 85 °C	
		ATEX Zone 2		-10 – 85 °C	
Max. media temperature [°C]				115 - (0.35 × amb. temp.)	
Compensated temperature range				LP: -30 – 40 °C / HP: 0 – 80 °C	
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 60068-2-34, IEC 60068-2-36	
Shock resistance	Shock	500 g / 1 ms		IEC 60068-2-27	
	Free fall			IEC 60068-2-32	
Enclosure (depending on electrical connection)		Plug version		IP65 - IEC 60529	
		Cable version		IP67 - IEC 60529	

**Approvals**

UL recognized for sale in the USA and Canada	Electrical safety	File no. E310 24
	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)

**Explosive atmospheres**

Zone 2 applications	<b>II 3G</b> <b>Ex nA IIA T3 Gc</b> <b>-20C&lt;Ta&lt;+85C</b>	EN60079-0; EN60079-15
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In ATEX Zone 2 applications with temperatures <-10 °C 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 32 / AKS 33** 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 of the system containing flammable refrigerant. Note please follow specific selection criteria stated in the data sheet 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 316L)
Weight	0.3 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

**Ordering**
*AKS 32, version 1 – 5 V*

Operating range [bar]		Max. working pressure PB [bar]	Compensated temperature range [°C]	Code no.		
				EN 175301-803, plug Pg 9		
				¼ NPT <sup>1)</sup>	G ¾ A <sup>2)</sup>	¼ flare <sup>3)</sup>
LP	-1 – 6	33	-30 – 40	<b>060G2000</b>	<b>060G2004</b>	<b>060G2068</b>
	-1 – 12	33	-30 – 40	<b>060G2001</b>	<b>060G2005</b>	<b>060G2069</b>
HP	-1 – 20	40	0 – 80	<b>060G2002</b>	<b>060G2006</b>	<b>060G2070</b>
	-1 – 34	55	0 – 80	<b>060G2003</b>	<b>060G2007</b>	<b>060G2071</b>
	-1 – 50	100	0 – 80	-	-	<b>060G2155</b>

*AKS 32, version 0 – 10 V*

Operating range [bar]		Max. working pressure PB [bar]	Compensated temperature range [°C]	Code no.		
				EN 175301-803, plug Pg 9		
				¼ NPT <sup>1)</sup>	G ¾ A <sup>2)</sup>	¼ flare <sup>3)</sup>
LP	-1 – 5	33	-30 – 40	-	<b>060G2038</b>	-
	-1 – 9	33	-30 – 40	<b>060G2013</b>	<b>060G2036</b>	<b>060G2082</b>
HP	-1 – 24	40	0 – 80	<b>060G2014</b>	<b>060G2037</b>	<b>060G2083</b>
	-1 – 39	60	0 – 80	<b>060G2080</b>	<b>060G2079</b>	<b>060G2084</b>

*AKS 33, version 4 – 20 mA*

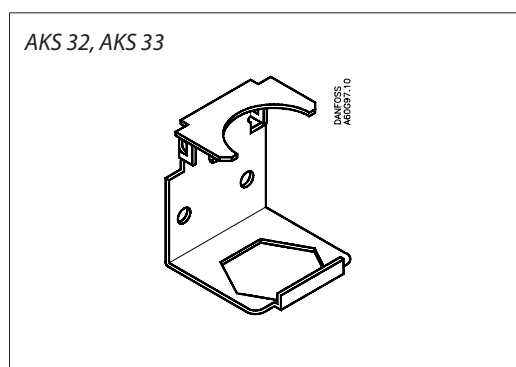
Operating range [bar]		Max. working pressure PB [bar]	Compensated temperature range [°C]	Code no.					
				EN 175301-803, plug Pg 9			Cable		
				¼ NPT <sup>1)</sup>	G ¾ A <sup>2)</sup>	¼ flare <sup>3)</sup>	¼ NPT <sup>1)</sup>	G ¾ A <sup>2)</sup>	¼ flare <sup>3)</sup>
LP	-1 – 5	33	-30 – 40	<b>060G2112</b>	<b>060G2108</b>	<b>060G2047</b>	-	-	-
	-1 – 6	33	-30 – 40	<b>060G2100</b>	<b>060G2104</b>	<b>060G2048</b>	-	<b>060G2120</b>	
	-1 – 9	33	-30 – 40	<b>060G2113</b>	<b>060G2111</b>	<b>060G2044</b>	-	-	<b>060G2062</b>
	-1 – 12	33	-30 – 40	<b>060G2101</b>	<b>060G2105</b>	<b>060G2049</b>	<b>060G2117</b>		
	0 – 16	40	-30 – 40	<b>060G2114</b>	<b>060G2109</b>	-	-	-	-
HP	-1 – 34	55	0 – 80	<b>060G2103</b>	<b>060G2107</b>	<b>060G2051</b>	<b>060G2119</b>		<b>060G2065</b>
	-1 – 20	40	0 – 80	<b>060G2102</b>	<b>060G2106</b>	<b>060G2050</b>	<b>060G2118</b>	-	-
	0 – 25	40	0 – 80	<b>060G2115</b>	<b>060G2110</b>	<b>060G2045</b>	-	<b>060G2127</b>	<b>060G2067</b>

<sup>1)</sup> ¼ - 18 NPT

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

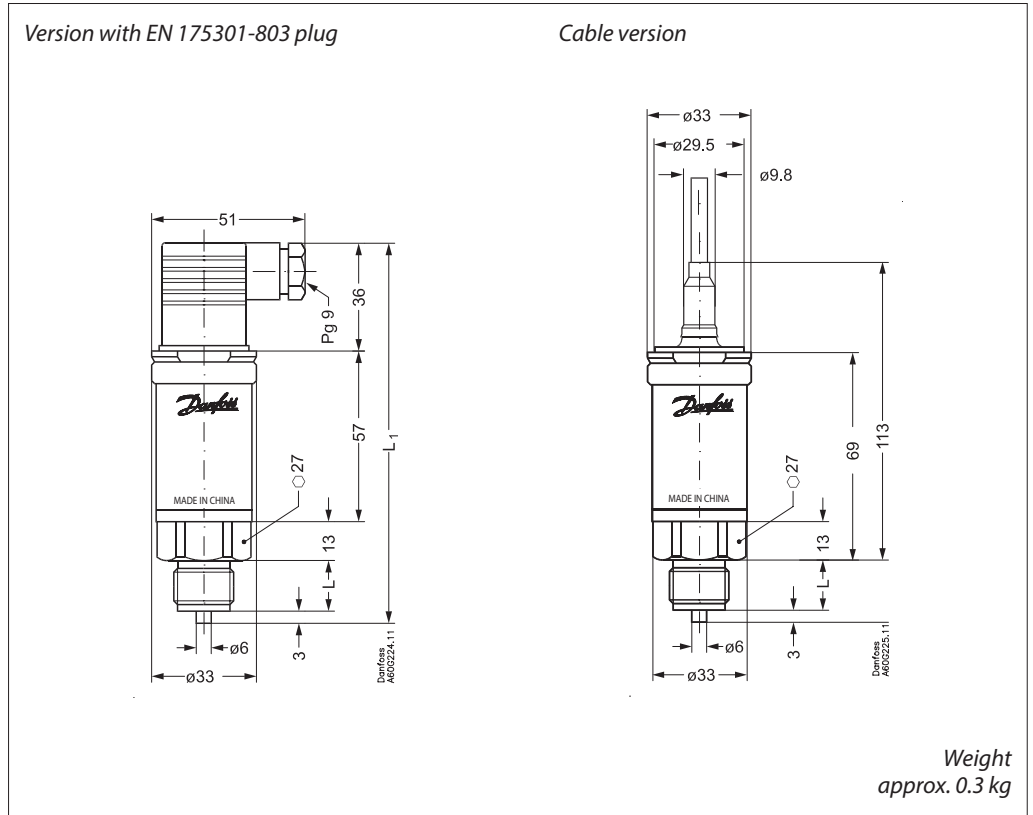
<sup>3)</sup> 7/16 - 20 UNF

Is also available in US-version (1 – 6 V) and with ¼-27 NPT connection. Please contact Danfoss

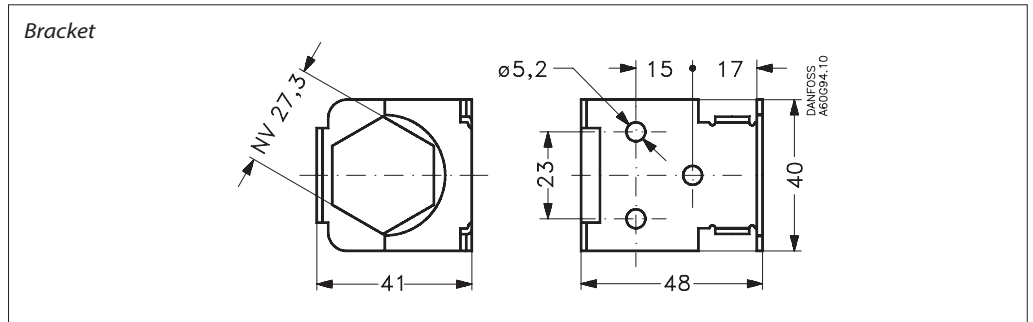
**Accessories**


Description	Code no.
Mounting bracket	<b>060G0213</b>

**Dimensions and weights**



Pressure Connection	¼ - 18 NPT	G ¾ A ISO 228/1	¼ in·flare 7/16 - 20 UNF
L [mm]	16	18	16.5
L <sub>1</sub> [mm]	22	127	122.5



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