

Introduction



Temperature sensors AKS and ESM are temperature dependent resistance sensors. The sensor unit consists of a platinum element the resistance value of which changes proportionally with the temperature. Except for one type of PT 500 ohm sensor all sensors are Pt 1000 ohm units.

The sensors are offered in two series:

1. AKS
2. ESM

Sensors in the AKS series are mainly for commercial and industrial refrigeration plant use where the requirements on grade of enclosure and temperature range are high. Sensors in the ESM series are mainly for use in air conditioning and comfort applications where the design of the sensor housing is important.

The sensors are adjusted and meet the tolerance requirements of DIN IEC 751 class B.

Technical data

Type	Sensor / sensor body	Connection / cable	Enclosure	Time constant $\tau$ in seconds
AKS 11	Top part: PPO (Noryl)	PVC-kabel, 2 × 0.2 mm <sup>2</sup>	IP 67	3 <sup>1)</sup>
AKS 15	Bottom: Stainless steel			10 <sup>2)</sup>
AKS 21A	18/8 stainless steel tube	Fire-resistive silicone rubber cable 2 × 0.2 mm <sup>2</sup>	IP 67	35 <sup>3)</sup>
AKS 21M				6 <sup>1)</sup>
AKS 21W	Sensor pocket: 18/8 stainless steel tube	Fire-resistive silicone rubber cable 2 × 0.2 mm <sup>2</sup>	IP 56	18 <sup>1)</sup>
	Weld nipple: Free cutting steel			
	Thread nipple: Free cutting steel			
	Top part: 18/8 - 18/12 stainless steel			
AKS 21D	Terminal box: Aluminium - brass	Terminal box	IP 56	50 <sup>3)</sup>
ESMT	Cover: ABS-plastic	Terminal box	IP 43	400 <sup>3)</sup>
	Bottom: PC (polycarbonate)			
ESMA	Cover: PBTB (polyester)	Terminal box	IP 44	3 <sup>2)</sup>
	Bottom: PA (polyamide)			
ESMU	Pocket: Copper	DIN 43650	IP 65	2 <sup>1)</sup>
ESMR	Cover: ABS-plastic	Terminal box	IP 32	50 <sup>3)</sup>
	Bottom: PA (polyamide)			

<sup>1)</sup> Agitated liquid.  
<sup>2)</sup> Clamped to pipe.  
<sup>3)</sup> Air 4 m/s.

Technical data

Resistance values, Pt 1000 ohm

°C	ohm	°C	ohm
0	1000.0		1000.0
1	1003.9	-1	996.1
2	1007.8	-2	992.2
3	1011.7	-3	988.3
4	1015.6	-4	984.4
5	1019.5	-5	980.4
6	1023.4	-6	976.5
7	1027.3	-7	972.6
8	1031.2	-8	968.7
9	1035.1	-9	964.8
10	1039.0	-10	960.9
11	1042.9	-11	956.9
12	1046.8	-12	953.0
13	1050.7	-13	949.1
14	1054.6	-14	945.2
15	1058.5	-15	941.2
16	1062.4	-16	937.3
17	1066.3	-17	933.4
18	1070.2	-18	929.5
19	1074.0	-19	925.5
20	1077.9	-20	921.6
21	1081.8	-21	917.7
22	1085.7	-22	913.7
23	1089.6	-23	909.8
24	1093.5	-24	905.9
25	1097.3	-25	901.9
26	1101.2	-26	898.0
27	1105.1	-27	894.0
28	1109.0	-28	890.1
29	1112.8	-29	886.2
30	1116.7	-30	882.2
31	1120.6	-31	878.3
32	1124.5	-32	874.3
33	1128.3	-33	870.4
34	1132.2	-34	866.4
35	1136.1	-35	862.5
36	1139.9	-36	858.5
37	1143.8	-37	854.6
38	1147.7	-38	850.6
39	1151.5	-39	846.7
40	1155.4	-40	842.7
41	1159.3	-41	838.8
42	1163.1	-42	835.0
43	1167.0	-43	830.8
44	1170.8	-44	826.9
45	1174.7	-45	822.9
46	1178.5	-46	818.9
47	1182.4	-47	815.0
48	1186.3	-48	811.0
49	1190.1	-49	807.0
50	1194.0	-50	803.1

Resistance values, Pt 500 ohm

°C	ohm	°C	ohm
0	500.0	0	500.0
1	502.9	-1	498.1
2	503.9	-2	496.1
3	505.9	-3	494.2
4	507.8	-4	492.2
5	509.8	-5	490.2
6	511.7	-6	488.3
7	513.7	-7	486.3
8	515.6	-8	484.4
9	517.6	-9	482.4
10	519.5	-10	480.5
11	521.5	-11	478.5
12	523.4	-12	476.5
13	525.4	-13	474.6
14	527.3	-14	472.6
15	529.3	-15	470.6
16	531.2	-16	468.7
17	533.2	-17	466.7
18	535.1	-18	464.8
19	537.0	-19	462.8
20	539.0	-20	460.8
21	540.9	-21	458.9
22	542.9	-22	456.9
23	544.8	-23	454.9
24	546.8	-24	453.0
25	548.7	-25	451.0
26	550.6	-26	449.0
27	552.6	-27	447.0
28	554.5	-28	445.1
29	556.4	-29	443.1
30	558.4	-30	441.1
31	560.3	-31	439.2
32	562.3	-32	437.2
33	564.2	-33	435.2
34	566.1	-34	433.2
35	568.1	-35	431.3
36	570.0	-36	429.3
37	571.9	-37	427.3
38	573.9	-38	425.3
39	575.8	-39	423.4
40	577.6	-40	421.4
41	579.7	-41	419.4
42	581.6	-42	417.5
43	583.5	-43	415.4
44	585.4	-44	413.5
45	587.4	-45	411.5
46	589.3	-46	409.5
47	591.2	-47	407.5
48	593.2	-48	405.5
49	595.1	-49	403.5
50	597.0	-50	401.6

*Extension of sensor cables*

When extending a sensor cable, the new resistance value of the longer cable may give rise to indication error.

It is recommended that the total cable resistance should not exceed 2 ohm corresponding to an indication error of 0.5°C (Pt 1000 ohm).

*Typical resistance values for cables*

- 2,4 ohm/100 m for core cross-sectional area of 0.75 mm<sup>2</sup>.
- 1,2 ohm/100 m for core cross-sectional area of 1.50 mm<sup>2</sup>.
- 0,7 ohm/100 m for core cross-sectional area of 2.50 mm<sup>2</sup>.

Ordering

Symbol	Type	Description	Temperature range °C	Cable length m	Code no.
	AKS 11	Surface and duct sensor	-50 to +100	3,5	<b>084N0003</b>
				5.5	<b>084N0005</b>
				8.5	<b>084N0008</b>
	AKS 15 <sup>1)</sup>	Surface and duct sensor	-50 to +100	3.5	<b>084N0023</b>
	AKS 21A	Surface sensor with clip	-70 to +180	2.5	<b>084N2007</b>
		Surface sensor with screened cable and clip	-70 to +180	2.0	<b>084N2024</b>
	AKS 21M	Multipurpose sensor	-70 to +180	2.5	<b>084N2003</b>
	AKS 21W	Immersion sensor with cable and sensor pocket, weld version	-70 to +180	2.5	<b>084N2017</b>
		Immersion sensor with terminal box and sensor pocket for weld version	-70 to +180		<b>084N2016</b>

<sup>1)</sup> Pt 500 ohm

Symbol	Type	Description	Temperature range °C	Thread in.	Code no.		
					Pocket length		
					100 mm	160 mm	250 mm
	AKS 21W	Immersion sensor with terminal box and sensor pocket with thread	-70 to +160	R 1/2 <sup>1)</sup>	<b>084N2026</b>	<b>084N2027</b>	<b>084N2028</b>
				NPT 1/2	<b>084N2031</b>	<b>084N2032</b>	<b>084N2033</b>
	AKS 21D	Duct sensor	-40 to +80			<b>084N2035</b>	<b>084N2037</b>
	ESMU	Immersion sensor, cobber	0 to +120	G 1/2 A <sup>1)</sup>	<b>084N1052</b>		<b>084N1053</b>
	ESMU	Immersion sensor, AISI 316 steel	0 to +120	G 1/2 A <sup>1)</sup>	<b>084N1050</b>		<b>084N1051</b>
	ESMT	Outdoor temperature sensor	-30 to +50			<b>084N1012</b>	
	ESMA	Surface sensor	0 to +120			<b>084N1004</b>	
	ESMR	Room sensor	0 to +40			<b>084N1016</b>	

<sup>1)</sup> To ISO 7/1

Ordering

Spare parts and accessories

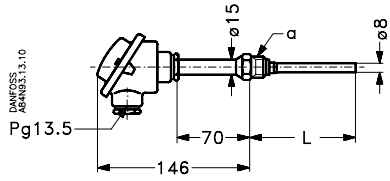
Symbol	Description	Code no.	
	Sensor with 2.5 m cable for AKS 21W weld / thread pocket	<b>084N2043</b>	
	Sensor pocket for AKS 21W weld version	<b>084N2040</b>	
	Sensor pocket for AKS 21W with NPT 1/2 thread	<b>084N2045</b>	
	Accessory bag, AKS 21W weld version containing: - rubber gasket - seal plug - heat-conducting compound - gasket	<b>084N2117</b>	
	Pocket for ESMS, tin-plated copper, R 1/2 1)	100 mm long	<b>084N0251</b>
	Pocket for ESMS, stainless steel, G 1/2 A 1)	100 mm long	<b>084N1080</b>
		250 mm long	<b>084N1081</b>
	Pocket for AKS 21A/M, brass, G 1/2 A 2)	100 mm long	<b>084N1082</b>
	Pocket for AKS 21A/M, stainless steel, G 1/2 A 2)	250 mm long	<b>084N1083</b>

1) To ISO 7/1  
2) To ISO 228/1

Dimensions and weights

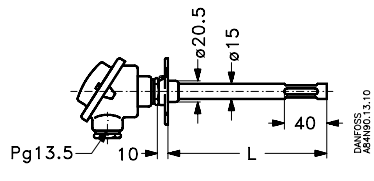
<p>AKS 11, 15</p> <p>Weight: 70 g</p>	<p>Sensor for AKS 21W</p> <p>Weight: 125 g</p>
<p>AKS 21A, AKS 21M</p> <p>Weight: 70 g</p>	<p>Pocket for AKS 21W</p> <p>Weight: 125 g</p>
<p>AKS 21W in welded version</p> <p>Weight: 250 g</p>	<p>AKS 21W for welding with terminal box</p> <p>Weight: 400 g</p>

Dimensions and weights  
(continued)



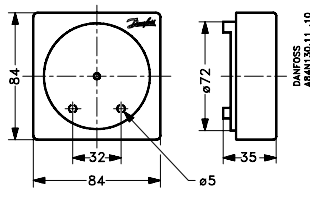
**AKS 21W with thread**

L mm	a in.	Weight g
100	R 1/2 or NPT 1/2	225
160	R 1/2 or NPT 1/2	250
250	R 1/2 or NPT 1/2	300

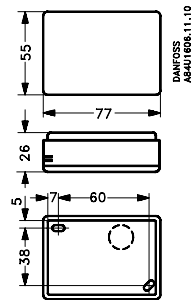


**AKS 21D**

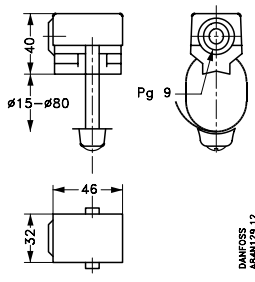
L mm	Weight g
100	225
160	250
250	300



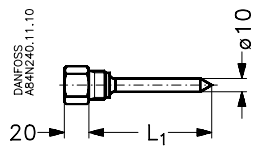
**ESMT** Weight: 80 g



**ESMR** Weight: 60 g

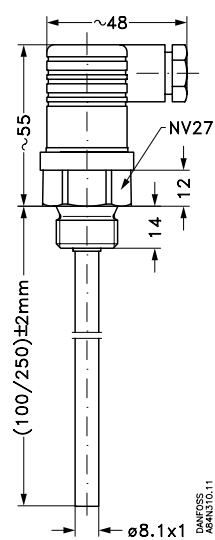


**ESMA** Weight: 60 g

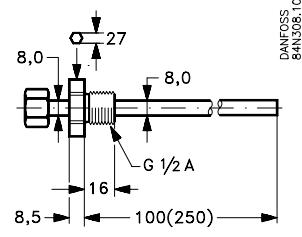


**Pocket for ESMU**

L mm	Weight g
100	225
250	300



**ESMU**



**Pocket for AKS 21 A/M**

L mm	Weight g
100	225
250	300





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