AP SENSING
advanced photonic

Linear Heat Series Sensor Cables

In close cooperation with leading cable manufacturers, AP Sensing offers a wide range of sensor cables. Besides the “Safety” and “Steel” models described here there are many specialty cables available for specific applications.

Sensor Cable Safety S2000A

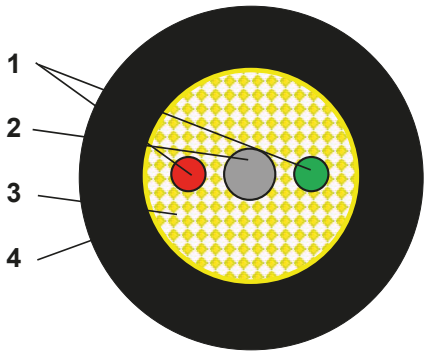
A fast-responding sensor cable with a tight buffered fiber. Compact dimensions, high flexibility and good bending behavior. High tensile strengths due to the Aramid yarns. These cables have a halogen-free and flame-retardant cable sheath.

Sensor Cable Steel S2002A

Fast-responding armored sensor cable with stainless steel loose tubes and outer sheath. High tensile strength, high crush resistance. Longitudinally and laterally water tight. Excellent rodent protection. These cables have a halogen-free and flame-retardant cable sheath.

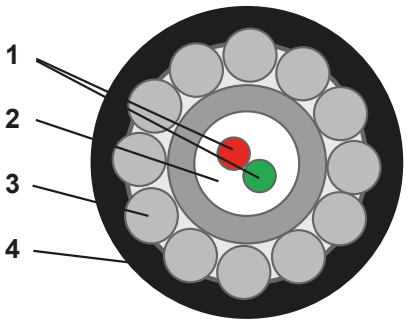
Sensor Cable Safety

1) Acrylate coated fibers
2) GRP strength member
3) Aramid yarn
4) FRNC outer sheath



Sensor Cable Steel

1) Acrylate coated fibers
2) Gel free stainless steel tube, 316L
3) Stainless steel wires, 316L
4) FRNC outer sheath



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	Sensor Cable Safety (S2000A)	Sensor Cable Steel (S2002A)
Construction:	FRNC outer sheath Aramid fibers Tight-buffered fibers	FRNC outer sheath Stainless steel wires Gel-free stainless steel loose tube fibers with primary coating
Color of outer sheath:	Black (standard) Red (S2000A-RED)	Black (standard) Red (S2000A-RED)
Fiber:	MM 50/125 µm (MM 62.5/125 µm)	MM 50/125 µm (MM 62.5/125 µm)
Cable Ø:	4.0 mm	3.8 mm
Weight:	17 kg/km	29 kg/km
Min. bending radius:	20xD mm (with tensile) 15xD mm (without tensile)	20xD mm (with tensile) 15xD mm (without tensile)
Max. crush resistance:	100 N/cm	960 N/cm
Max. tensile strength:	1000 N (short term) 800 N (long term)	1500 N (short term) 1100 N (long term)
Operating temperature:	-40°C to +85°C	-40°C to +85°C
Installation temperature:	-5°C to +50°C	-5°C to +50°C
Short-term temperature:	-50°C to +150°C	-50°C to +150°C

Cables are delivered in the requested length.

Both cables comply with standards:
IEC 60331-25[1]; IEC 60332-1/-2/-3-24; IEC 60754-1/-2; IEC 60793;
IEC 60794-1-2; IEC 61034-2; EN 187000; VdS approved.
UL 521 and CAN/ULC S530 listed.
FM 3210 approved.

[1] Functional integrity of the sensor cable tested for 2 hours at 750°C, furthermore in tunnel fire testing it has been demonstrated that the functional integrity of the cable was maintained for several minutes with temperatures exceeding 1000°C.

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Pre-assembled connectors
(S2000A-001: safety / S2002A-001: steel)

To reduce deployment cost and time, pre-assembled pigtails are optionally available. These enable a quicker and easier installation, with no need to organize a fusion splicer and splice box to connect the sensor cable to the DTS. Pigtails are supplied with E2000 8°angled connectors. For safe transportation they are covered with a flexible protective tube when shipped. The pulling sock increases the diameter of the assembly. Therefore the inner diameter of the duct or conduit should be at least 5 cm.

Pigtail with optical connector
(S2008A: 5 m / S2006A: 30 m)

E2000 8°angled connectors are available in 2 lengths for splicing to the sensor fiber (either to connect to the DTS, or for termination).

E2000 APC Adapter (S2011A)

Used to connect two E2000 APC connectors.

Sensor tube cutting tool (S2010A)

Recommended to cut the stainless steel tube, to properly remove the cable sheath and splicing the pigtail to the sensor fiber.

Specialty cables

In addition to these standard cables, special cables are available for extremely high and low temperature ranges and corrosive atmospheres. Special color requirements can also be met.

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DATASHEET

S200XA Linear Heat Series Sensor Cables

Multimode, Flame Retardant Non-Corrosive (FRNC)

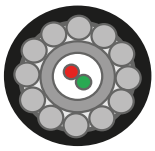
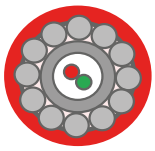
These special linear heat sensor cables are suited for indoor and outdoor use. Each cable includes two MM fibers for temperature sensing. These sensor cables have a halogen-free and flame-retardant FRNC cable sheath.

Sensor Cable Safety S2000A

The S2000A is a fast-responding sensor cable with a tight buffered fiber, compact dimensions, high flexibility and good bending behavior. Due to the aramid yarns, the cable has a high tensile strengths. Upon request, this cable is available in other colors.

Sensor Cable Steel S2002A and S2002A-RED

The S2002A is a fast-responding armored sensor cable with stainless steel loose tubes and outer sheath. Due to this design the sensor cable has a high tensile strength, high crush resistance provides and excellent rodent protection and is longitudinally and laterally watertight. Upon request, this cable is available in other colors.

Design Components				
Cable Types	**S2000A**	**S2000A-RED**	**S2002A**	**S2002A-RED**
Cable Version	Safety		Steel armored	
				
Outer sheath material	Flame Retardant Non-Corrosive (FRNC)			
Armoring	swellable aramid yarns (metal-free)		Stainless steel AISI 316L tube Stainless steel AISI 316L wires	
Cable design	GRP strength member, fiber tight buffered in aramid yarn		gel free, fiber loose in FIMT (fiber in metal tube)	
Standard fiber count / cable	2 MM			
UV-resistant	yes	no	yes	no
Longitudinal water-resistant	no		yes	

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Mechanical / Physical Details				
Cable Types	**S2000A**	**S2000A-RED**	**S2002A**	**S2002A-RED**
Approximate weight [1]	17 kg/km		29 kg/km	
Outer diameter [1]	4.0 mm		3.8 mm	
Crush resistance [2]	1,000 N/10 cm		9,600 N/10 cm [5]	
Tensile strength (installation) [2]	1,000 N		1,500 N	
Tensile strength (operation) [2]	800 N		1,100 N	
Operating temperature	-40 °C to +85 °C			
Short term temperature	-40 °C to +150 °C			
Functional integrity [4]	up to +750 °C			
Optical Details				
MM fiber type	OM2 (50/125 µm)			
MM-Attenuation 850 nm wavelength 1300 nm wavelength	Maximum: 2,7 dB/km / Typical: 2.5 dB/km Maximum: 0,8 dB/km / Typical: 0.7 dB/km			
Installation Details				
Outer diameter [1]	4.0 mm		3.8 mm	
Static bending radius [2]	15 x D (outer Ø)			
Repeated bending (2)	20 x D (outer Ø)			
Installation temperature	-5 °C to +50 °C			
Cable Length				
Max. length / drum	8,000 m		8,500 m	
Typical length / drum	4,000 m		4,500 m	
Optional Features				
For S2000A cable: Sensor cable connector [3] – Option **S2000A-001**	- 2 x Pigtail with E2000 8° APC connector - Splice Protection and Strain Relief - Pre-assembled on one cable end			
For S2002A cable: Sensor cable connectors [3] – Option **S2002A-001**	- 2 x Pigtail with E2000 8° APC connector - Splice Protection and Strain Relief - Pre-assembled on one cable end			
S2008A Pigtail with optical connector Length: 5 m	- Pigtail with E2000 8° APC connector, length: 5 m - For splicing to the sensor fiber (either to connect DTS, or for termination)			
S2006A Pigtail with optical connector Length: 30m	- Pigtail with E2000 8° APC connector, length: 30m - For splicing to the sensor fiber (either to connect DTS, or for termination)			
S2010A Sensor Tube Cutting Tool	- Recommended to cut the stainless steel tube of a reinforced sensor cable type S2002			
S2011A E2000 APC Adapter	- Used to connect two E2000 APC 8° connectors or for termination. - Suitable for singlemode and multimode sensor cables			

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All S200XA linear heat series sensor cables comply with these standards:

Standards and Certification	
Standard / Certification	**Remark**
IEC 60331-25[2]	Tests for electric cables under fire conditions - Circuit integrity – Part 25 Procedures and requirements - Optical fibre cables
IEC 60332-1	Tests on electric and optical fibre cables under fire conditions - Part 1-1: Test for vertical flame propagation for a single insulated wire or cable
IEC 60332-2	Tests on electric and optical fibre cables under fire conditions - Part 2-2: Test for vertical flame propagation for a single small insulated wire or cable - Procedure for diffusion flame
IEC 60332-3-24	Tests on electric and optical fibre cables under fire conditions - Part 3-24: Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C
IEC 60754-1	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content
IEC 60754-2	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity
IEC 60793	Optical fibres - Part 1-1: Measurement methods and test procedures - General and guidance
IEC 60794-1-2	Optical fibre cables - Part 1-2: Generic specification - Basic optical cable test procedures - General guidance
IEC 61034-2	Measurement of smoke density of cables burning under defined conditions - Part 2: Test procedure and requirements
EN 187000	Generic specification: Optical fibre cables
VdS EN-54	Resettable line-type heat detectors, tested and approved by VdS
UL 521 approved	Heat Detectors for Fire Protective Signaling Systems
CAN/ULC S530 listed	Standard for Heat Actuated Fire Detectors for Fire Alarm Systems
FM 3210 approved	Heat detectors for automatic fire alarm signaling

(1) Tolerance of -5% / +10%
(2) Crush resistance IEC 60794-1-2 method E3A
Tensile strength short term (installation) IEC 60794-1-2 method E1 A/B
Tensile strength long term (operation) IEC 60794-1-2 method E1 A/B
Static bend radius IEC 60794-1-2 method E11
Repeated bending IEC 60794-1-2 method E6
(3) Pre-assembled sensor cable connectors are optionally available in order to reduce deployment cost and time. These enable a quicker and easier installation, with no need to organize a fusion splicer and splice box to connect the sensor cable to the DTS or DAS. Pigtails are supplied with E2000 8° connectors. For safe transportation they are covered with a flexible protective tube when shipped.
(4) Functional integrity of the sensor cable tested for 2 hours with min. flame temperature of 750 °C as per IEC 60331-25. In tunnel fire testing it has been demonstrated that the functional integrity of the cable was maintained for several minutes with temperatures exceeding 1000 °C.
[5] 600N/cm in operation / max. 960N/cm during installation.

For more information:
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