

ProReact EN Analogue Linear Heat Detection System

Data Sheet



General Overview

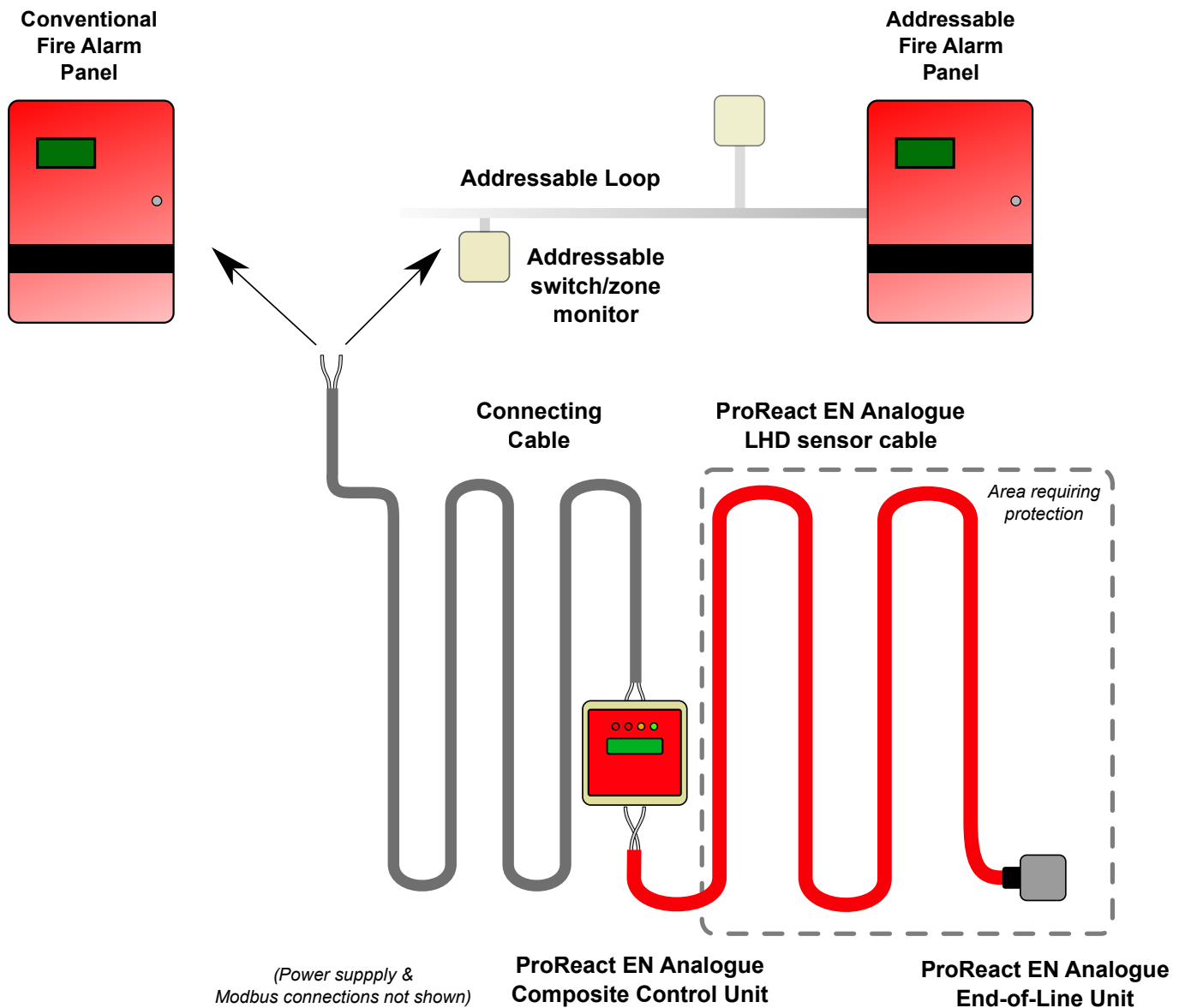
Introduction

Thermocable's ProReact EN Analogue Linear Heat Detection (LHD) system comprises of ProReact EN Analogue Linear Heat Detection (LHD) sensor cable, a ProReact EN Analogue Composite Control Unit and a ProReact EN Analogue end of line unit. The system offers alternative overheat protection in a vast range of applications and industries, from power generation to oil and gas industries.

The ProReact EN Analogue technology offers separate Pre-Alarm and Alarm outputs in order to maximise functionality, coupled with open and short circuit detection and discrimination.

Ambient temperature compensation maintains alarm temperature accuracy. The system is also resettable following an overheat or fire condition if the components are not exposed to temperatures above the maximum recoverable temperature.

Using a zone or switch monitor, or input/output module, the ProReact EN Analogue LHD system can easily be interfaced to an addressable loop. Alternatively it can be directly connected to the initiating zone of any conventional fire alarm control panel (as shown below).



Typical Installation of the ProReact EN Analogue LHD System

Theory of Operation

The ProReact EN Analogue LHD system uses a heat sensitive cable to monitor an area, critical equipment or the like, for an overheat or fire condition.

The ProReact EN Analogue Composite Control Unit continuously monitors the resistance of temperature sensitive polymers within the ProReact EN Analogue LHD cable. The resistance of the ProReact EN Analogue LHD cable decreases as the temperature around the cable increases. An abnormal change in resistance, due to an overheat condition, along the cable triggers either a Pre-Alarm or Alarm on the ProReact EN Analogue Composite Control Unit. The ProReact EN Analogue Composite Control Unit can be interfaced to a conventional or addressable fire alarm system.

Alarm Temperatures

The ProReact EN Analogue LHD system is designed so that an alarm will be triggered when the temperature around a section of ProReact EN Analogue LHD cable (equal to 3% of its total length) reaches a nominal alarm temperature predetermined by the chosen setting on the ProReact Composite Control Unit (as shown in the table below).

The actual exposure temperature required to trigger an alarm will be lower than the nominal alarm temperature (as shown below) if a larger section of ProReact EN Analogue LHD cable is exposed to an abnormal rise in temperature. Likewise, the actual exposure temperature will be higher than the nominal alarm temperature if a shorter section of ProReact EN Analogue LHD cable is exposed to an abnormal rise in temperature.

When the sensor cable is installed and operated in hotter environments, the sensor cable may need to be exposed to a higher temperature than that required in a cooler environment in order to trigger an alarm for a given setting on the ProReact EN Analogue Composite Control Unit. In

For the alarm temperature to be stable across a range of ambient temperatures, the ProReact EN Analogue Composite Control Unit measures the average ambient temperature across the entire cable and dynamically adjusts the alarm threshold accordingly.

It is important therefore to ensure that the ProReact EN Analogue Composite Control Unit is set up correctly and the cable resistance and the average ambient temperature as shown on the ProReact EN Analogue Composite Control Unit are as expected. See the Installation Instructions for more information about setting up a ProReact EN Analogue LHD system.

such circumstances, the ProReact EN Analogue Composite Control Unit dynamically adjusts the alarm threshold to reduce the likelihood of false alarms.

Refer to the Installation Instructions for more information on the typical and maximum application temperature for each controller setting.

Please refer to the Installation Instructions for illustrative examples of the expected temperature a given portion of Analogue LHD cable must be exposed to in order to trigger an alarm by ProReact Composite Control Unit setting.

Rate-of-rise activation

Note: for the Class A11/A21, 54°C and 64°C Alarm settings the control unit will also trigger an alarm if approximately 2% of the sensor cable is heated at more than 15°C per minute for longer than 3 minutes.

VdS EN54-22:2015 +A1:2020 Approved	UL listed (UQGS)	Available Controller Setting	Nominal Alarm Temperature	
			°C	°F
✓	✗	Class A11/A21	66	151
✓	✗	Class BI	80	176
✗	✓	54	54	129
✗	✓	64	64	147
✗	✓	72	72	162
✗	✓	79	79	174
✗	✓	86	86	187
✗	✓	100	100	212

ProReact EN Analogue Composite Control Unit settings & nominal alarm temperatures in typical application temperatures (based on 3% of total cable length)

VdS EN54-22:2015+A1:2020 Approval

Approval Specifics

Certificate No:	G 220006
Holder of the Approval:	Thermocable Flexible Elements Ltd, Pasture Lane, Clayton, Bradford, BD14 6LU UK
Subject of Approval:	Resettable line-type heat detector (ProReact EN Analogue)
Use:	in automatic fire detection and fire alarm systems
Basis of Approval:	VdS 2344:2014-07 VdS 2543:2018-05 EN54-22:2015+A1:2020
Environmental Group:	II (All components)

Approval Components

Part No	Description	EN54-22 Definition
A1389	ProReact EN Analogue Composite Control (PACC) Unit	Sensor Control Unit
A1470	ProReact EN Analogue End-of-line Unit	Functional Unit
A1471	ProReact EN Analogue Junction Box	Functional Unit
F3050	ProReact EN Analogue PVC Coated Sensor Cable	Sensing Element
F3051	ProReact EN Analogue Nylon Coated Sensor Cable	Sensing Element
F3052	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable	Sensing Element

Response Classes

Sensor Control Unit	Sensing Element	Controller Parameter	Response Classification	Max Sensor Cable Zone Length	Min Sensor Cable Zone Length	Typical Application Temperature	Max Application Temperature
ProReact EN Analogue Composite Control Unit	ProReact EN Analogue PVC Coated Sensor Cable	Class A11/A2I	A1I	500m	50m	25°C	50°C
	ProReact EN Analogue Nylon Coated Sensor Cable						
	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable						
ProReact EN Analogue Composite Control Unit	ProReact EN Analogue PVC Coated Sensor Cable	Class A11/A2I	A2I	500m	50m	25°C	50°C
	ProReact EN Analogue Nylon Coated Sensor Cable						
	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable						
ProReact EN Analogue Composite Control Unit	ProReact EN Analogue PVC Coated Sensor Cable	Class BI	BI	500m	30m	40°C	65°C
	ProReact EN Analogue Nylon Coated Sensor Cable						
	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable						

UL 521 (Category Code UQGS) Listing

Approval Specifics

UL File No: S8976
 UL Category (CCN): UQGS
 Holder of Approval: Thermocable Flexible Elements Ltd Pasture Lane Clayton Bradford BD14 6LU UK
 Subject of Approval: Heat-automatic Fire Detectors
 Requirements: UL521 "Heat Detectors for Fire Protective Signaling Systems"

Approval Components

UL Model No	Thermocable Part No	Thermocable Description
A1389 ProReact EN Analogue Composite Control Unit accessory for use with Heat Detection Cable	A1389	ProReact EN Analogue Composite Control unit
ProReact End-Of-Line Module Heat Detector Accessory	A1470	ProReact EN Analogue End-of-line Unit
ProReact EN Analogue Heat Detection Cable (1) (p/n F3050)	F3050	ProReact EN Analogue PVC coated Sensor Cable
ProReact EN Analogue Heat Detection Cable with nylon outer jacket (1) (p/n F3051)	F3051	ProReact EN Analogue Nylon Coated Sensor Cable

Response Classes

Model No.	Type	Compatibility Restrictions	Contact Arrangement	Temp Range (°F)	Spacing Ft (Smooth Ceiling)	Spacing Ft (to Wall or Partition)
A1389 ProReact EN Analogue Composite Control Unit accessory for use with Heat Detection Cable	HSC	None	–	–	–	–
ProReact EN Analogue Heat Detection Cable (1) (p/n F3050)	HSC	D1	NO	129 - 212	35	17.5
ProReact EN Analogue Heat Detection Cable with nylon outer jacket (1) (p/n F3051)						

D1 - Listing limited to specific system control unit. Information on compatible control unit indicated on installation drawing of control unit and/or detector.

(1) - The Models ProReact EN Analogue Heat Detection Cable and ProReact EN Analogue Heat Detection Cable with nylon outer jacket must be used with an A1389 ProReact EN Analogue Composite Control Unit accessory and a ProReact End-Of-Line Module Heat Detector Accessory.

Technical Specifications - ProReact EN Analogue Composite Control Unit

Operating Voltage:	20Vdc - 30Vdc (VdS EN54) 23Vdc - 30Vdc (UL)
Max Power Consumption:	2W
Max Current Consumption	
...(without LCD backlight):	31mA @ 20Vdc to 20mA @ 30Vdc
...(without LCD backlight and alarm):	61mA @ 20Vdc to 39mA @ 30Vdc
...(with LCD backlight and alarm):	85mA @ 20Vdc to 59mA @ 30Vdc
Continuous Operating Temperature Range:	-20°C to +50°C
Continuous Operating Humidity Range:	0% to 95% RH (ambient temperatures -20°C to +30°C) 0% to 75% RH (ambient temperatures greater than +30°C)
Relay outputs:	Alarm & Pre-alarm FORM C 2A @ 30Vdc - resistive (60W) 0.25A @ 250Vac (62.5VA) - resistive
Fault output	Normally closed Opto-isolated phototransistor output Max V: 35Vdc Max I: 80mA Max P: 150mW
Dimensions:	W182mm x H180mm x D90mm (W 7 1/8" x H7 1/8" x D3 1/2")
Weight:	860g
Enclosure Rating:	IP65 (IK08)
Enclosure Material:	Polycarbonate
Remote Reset:	5-28Vdc for minimum 3 seconds
Modbus Output:	2-wire RS-485 Modbus RTU or ASCII
Integral Temperature Sensor:	Alarm if sensor control unit reaches 100°C

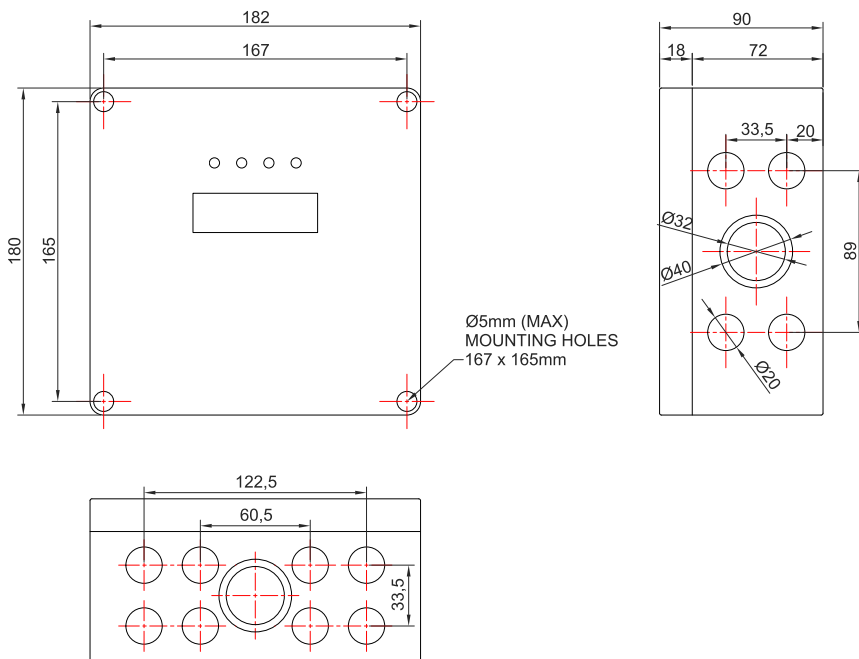


Figure 2. ProReact EN Analogue Composite Control Unit Dimensional Drawing

Thermocable Flexible Elements Ltd A1389 ProReact EN Analogue Composite Control Unit <small>Heat Detector Accessory UL File #S8976</small> VOLTAGE: 20V(VdS)/23V(UL) to 30 V (DC ONLY) CURRENT: 85mA max. TEMP: -20°C (-4°F) to +50°C (122°F)	Terminal Ratings: ALARM & PREALARM (Volt-free Form C) FAULT (opto-isolated phototransistor output) 2A @ 30Vdc 0.25A @ 250Vac (resistive) 35V @ 80mA (resistive)
<small>Refer to ProReact EN Analogue Installation Instructions (PACC-MAN) before carrying out installation.</small>	EN54-22:2015+A1:2020 Environmental Group II Class A1/A2I, Class BI UL listed alarm temperature rating 54°C (129°F) to 100°C (212°F)
CONTROLLER SERIAL NO: _____ CABLE SERIAL NUMBERS: _____ SENSOR CABLE 3-LETTER CODE: _____	COMMISSION DATE: _____ CALIBRATION RESISTANCE: _____
kΩ	

Internal label affixed to the reverse side of the control unit lid

Technical Specifications - ProReact EN Analogue End-of-line Unit

Dimensions:	W100mm x D60mm x H35mm
(with gland and mounting bracket)	(W4" x D2 3/8" x H1 3/8")
Weight:	115g
Continuous Operating Temperature Range:	-40°C to +125°C
Continuous Operating Humidity Range:	0% to 99% RH (ambient temperatures between -40°C to +40°C) 0% to 75% RH (ambient temperatures greater than +40°C)
Enclosure Rating:	IP65
Enclosure Material:	Aluminium

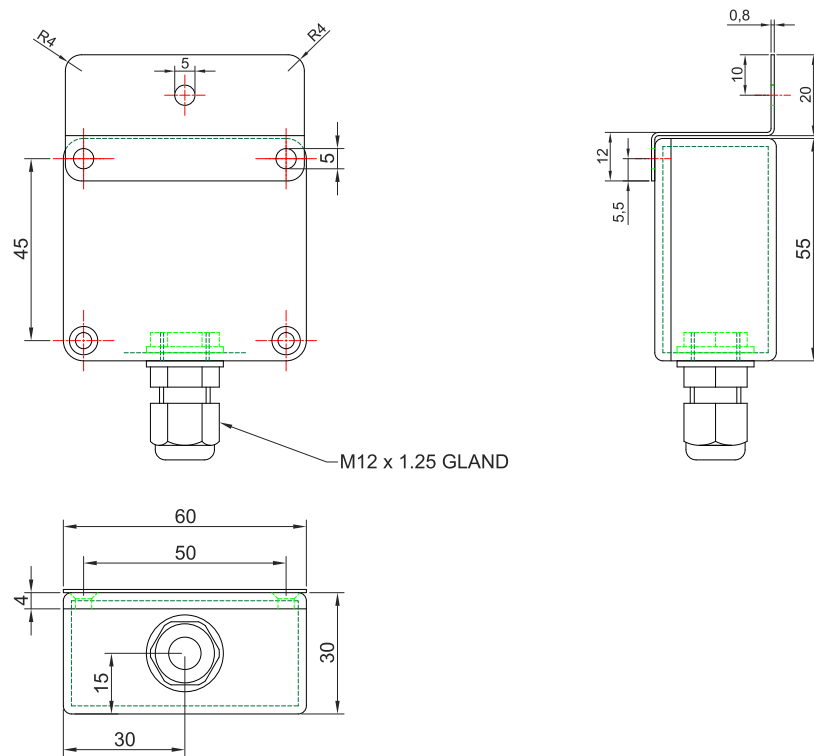


Figure 3. ProReact EN Analogue End-of-line Unit Dimensional Drawing

Technical Specifications - ProReact EN Analogue Sensor Cable

Sensor Cable Product	ProReact EN Analogue PVC Coated Sensor Cable	ProReact EN Analogue Nylon Coated Sensor Cable	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable
VdS EN54-22 Approved (Certificate No. G220006)	✓	✓	✓
UL 521 Listed (File No. S8976)	✓	✓	X
VdS Model No.	ProReact EN Analogue PVC Coated Sensor Cable	ProReact EN Analogue Nylon Coated Sensor Cable	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable
UL Model No.	ProReact EN Analogue Heat Detection Cable (1) (p/n F3050)	ProReact EN Analogue Heat Detection Cable with nylon outer jacket (1) (p/n F3051)	-
Thermocable Part No.	F3050	F3051	F3052
Description	ProReact EN Analogue Sensor cable with PVC outer coat	ProReact EN Analogue Sensor cable with additional Nylon coating	ProReact EN Analogue Sensor Cable with additional Stainless Steel braid over PVC outer jacket
Construction	Overall insulated, 4-core twisted with 100% coverage foil-shield and shield dump wire		
Final Insulation	PVC	Nylon	Stainless Steel braid (min. 70% coverage)
Wire Overall Diameter	4.83mm (0.190 in)	6.00mm (0.235 in)	5.33mm (0.210 in)
Weight (kg per km)	25.6	36.3	39.3
Colour	Red	Black	Silver
Minimum Bend Radius	60mm (2.36 in)	100mm (4 in)	75mm (3 in)
Maximum Ambient Temperature	Dependent upon Alarm Temperature (see Table 3)		
Minimum Ambient Temperature	-40 °C		
Maximum Recoverable Temperature	+125 °C		
Continuous Operating Humidity Range	0% to 99% RH (ambient temperatures between -40°C to +40°C) 0% to 75% RH (ambient temperatures greater than +40°C)		
Minimum Zone Length	50m / 164ft (Class A11/A2I and 54 °C alarm settings) 30m / 100ft (all other alarm settings)		
Maximum Zone Length	500m / 1640ft (all alarm settings)		
EN54-22 Environmental Group	II		
White core resistance per mtr	Approx 17 Ω/m		
Red core resistance per mtr	Approx 3.3 Ω/m		
Clear core resistance per mtr (each)	Approx 0.1 Ω/m		
Features	Hard PVC outer coating suitable for indoor and outdoor use. Not suitable for use in direct sunlight and/or exposed to harsh chemicals	Hard Nylon outer jacket. UV stable for indoor and outdoor use in direct sunlight. Excellent resistance to hydrocarbons	Stainless Steel braid for increased mechanical toughness and abrasion resistance. Suitable for indoor/outdoor use with limited exposure to direct sunlight and not exposed to harsh chemicals
Chemical Resistance	These ratings are given as a guide and for constant, complete exposure to the chemicals listed Shown at normal (10 to 30 deg C)temperatures. (* - not recommended, ***** - little or no impact)		
Ammonia, Liquid / Gas	★★★★★	★★★	★★★★★
Ammonia Nitrate	★★★★★	★	★★★★★
Butane	★★★	★★★★★	★★★★★
Copper Nitrate	★★★★★	★	★★★★★
Fuel Oils	★★★★★	★★★★★	★★★★★
Gasoline	★★★	★★★★★	★★★★★
Hydrofluoric Acid	★★★	★	★
Methyl Ethyl Ketone	★	★★★★★	★★★★★
Diesel Fuel	★★★★★	★★★★★	★★★★★
Ethyl Alcohol	★★★	★★★★★	★★★★★
Ethanol	★★★	★★★★★	★★★★★

Technical Specifications - ProReact EN Analogue Sensor Cable (cont.)

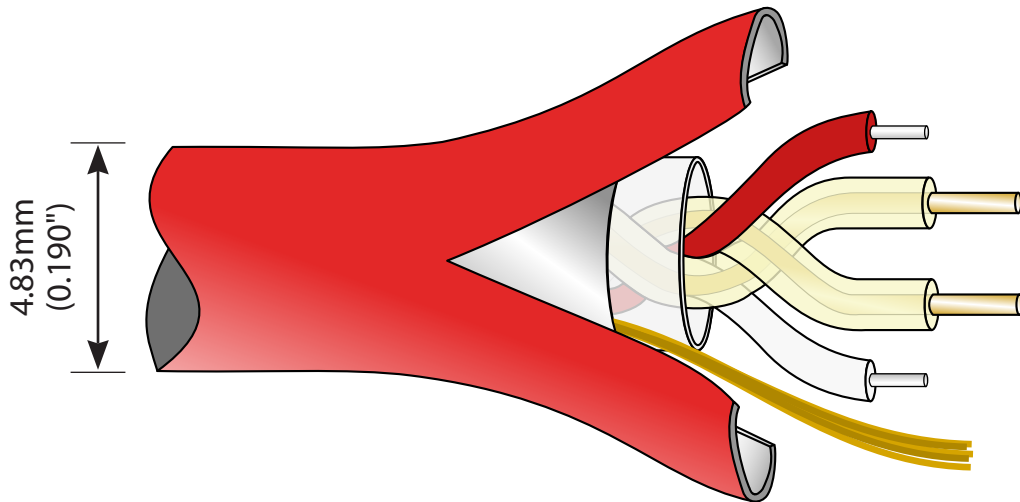


Figure 4a. ProReact EN Analogue PVC Coated Sensor Cable

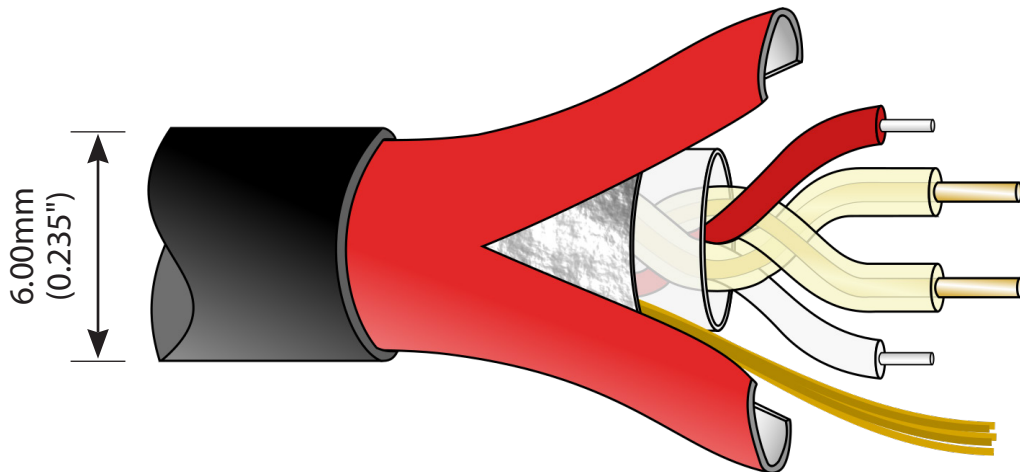


Figure 4b. ProReact EN Analogue Nylon Coated Sensor Cable

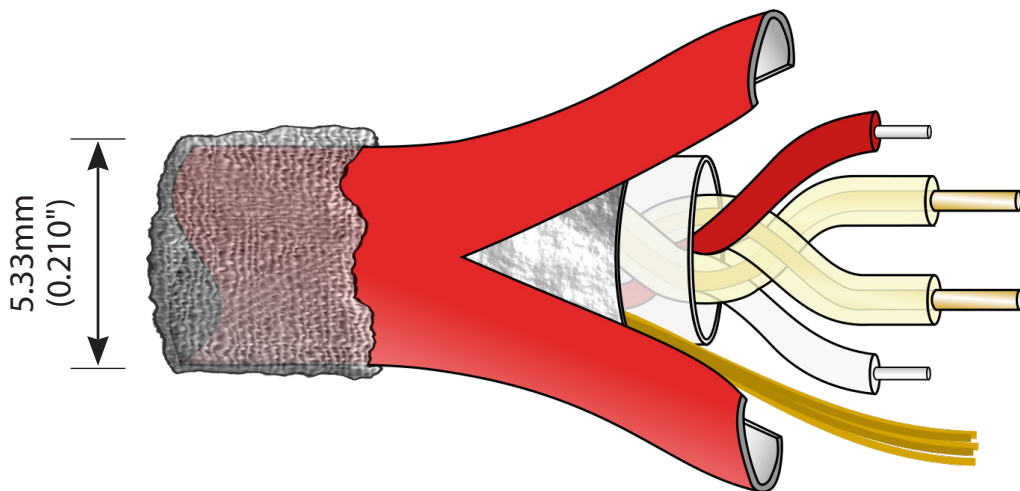


Figure 4c. ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable

ProReact EN Analogue Linear Heat Detection Range

VdS EN54-22:2015 +A1:2020 Approved	UL listed (UQGS)	Available Controller Setting	Recommended Typical Application Temperature		Maximum Application Temperature	
			°C	°F	°C	°F
✓	✗	Class A1 I/A2I	25	77	50	122
✓	✗	Class BI	40	104	65	149
✗	✓	54	15	59	30	86
✗	✓	64	25	77	47	117
✗	✓	72	30	86		
✗	✓	79	35	95		
✗	✓	86	40	104	65	149
✗	✓	100	50	122		

Recommended typical and maximum application temperatures dependent upon chosen control unit setting



Part No	Description	100m Reel			250m Reel			500m Reel		
		Net Kgs	Gross Kgs	Dimms mm	Net Kgs	Gross Kgs	Dimms mm	Net Kgs	Gross Kgs	Dimms mm
F3050	ProReact EN Analogue PVC Coated Sensor Cable	2.47	3.12	Ø300 x 100	6.18	8.84	Ø430 x 135	12.35	15.60	Ø430 x 250
F3051	ProReact EN Analogue Nylon Coated Sensor Cable	3.51	4.16	Ø435 x 135	8.78	11.44	Ø435 x 135	17.55	20.80	Ø435 x 250
F3052	ProReact EN Analogue PVC and Stainless Steel braided Sensor Cable	3.77	4.42	Ø435 x 135	9.43	12.09	Ø435 x 135	18.85	22.10	Ø435 x 250
A1388	Pro React EN Analogue Composite Control Unit and ProReact EN Analogue End-of-line Unit	1062g		255 x 210 x 110						
A1389	ProReact EN Analogue Composite Control Unit	948g								
A1471	ProReact EN Analogue Junction Box	240g		155 x 145 x 60						
A1470	ProReact EN Analogue End-of-line Unit	156g								



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