



# FIPRES

## FIRE PREVENTION AND OVERHEATING MONITORING SYSTEM



### Salient Features:

24/7 control of concerning points in LV and MV electrical panel of any configuration

Detects hot spots long before a dangerous situation arises, hence avoiding material damage, stop of production process and threats to life

Increases equipment safety and reliability of operation

Can be integrated to SCADA/BMS and local alarm systems

Quick and easy installation even for existing systems

# Problem: Electrical Fire

Every year fire causes an enormous amount of damage to all kinds of facilities, social and private possessions. It can lead to life threatening incidents and huge losses because of material damage of assets, power supply interruption, production loss and business opportunity cost. Global statistics show that around 30% of the fires are caused by electrical faults:

**25%** of building fires are due to electrical malfunctions according to European Fire Academy (EFA)

**32%** of fires in Germany are related with electricity according to German Insurance Association

**3,2B** USD annual cost of damage in the U.S. and Europe due to electrical fires according to the National Fire Protection Association (NFPA) and the European Fire Safety Alliance (EFSA)

Improper torque, corrosion, vibration, current/temperature fluctuations, withdrawals of moving contacts

MECHANICALLY LOOSE CONNECTION

OVERHEATING

OXIDATION

INCREASE OF RESISTANCE

Uncontrolled Thermal Runaway

**FIRE**

When considering the causes of electrical fires, it must be highlighted that there are many causes that cannot be prevented by standard solutions such as overcurrent protection, Arc Fault Detection Device or Ground Fault Protection devices.

In practice, the most common cause of fire and damage to equipment in electrical panels are loose connections, especially those made on site. The connection may become loosened due to improper tightening torque during assembly, constant vibration, corrosion or mechanical wear of moving contacts, such as withdrawable contacts of a circuit breaker. Loose connection have a higher resistance, which leads to overheating of such contact.

This process can be exaggerated by oxidation process of contact surfaces, which happens faster at high temperatures. Oxidation film has much higher resistance than base metal, increasing the overall resistance of the contact. As a result, overheating becomes stronger each time, causing thermal runaway and fire.



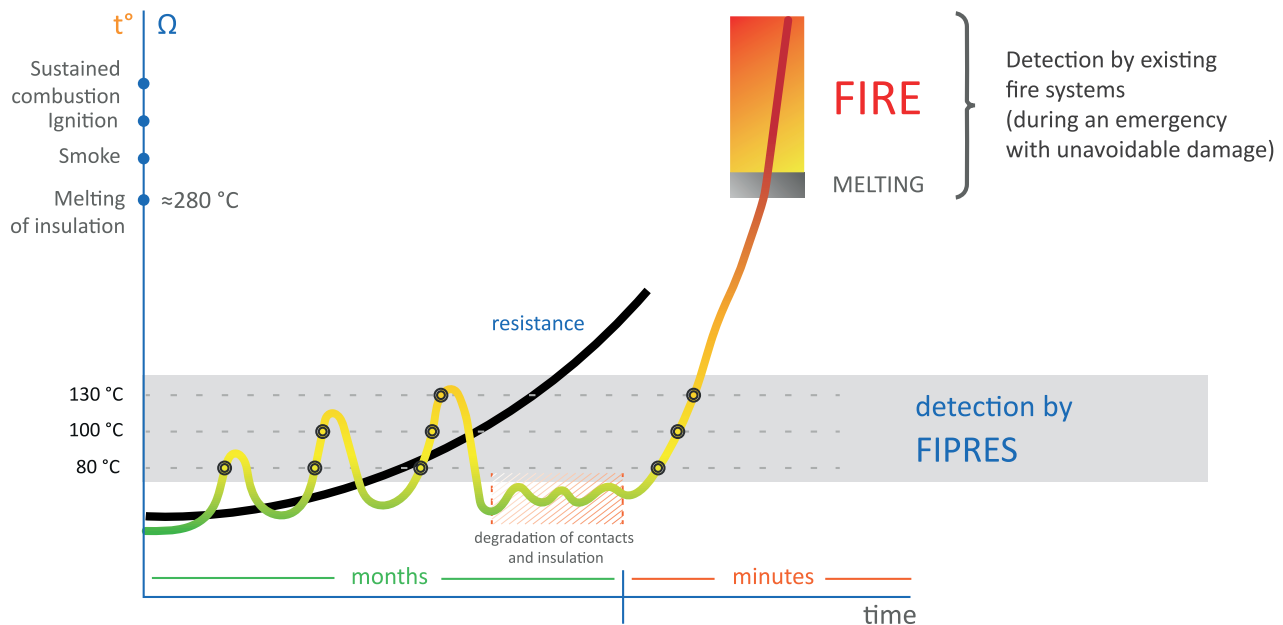
The traditional solution to detect dangerous overheating is Infrared thermography inspection (IRT), but it has technology limitations:

1. Periodic execution
2. The need to have sufficient load during inspection
3. Limited visibility and accessibility
4. Unsafe for personnel

To prevent all possible negative outcomes consequences of overheating and resulting fire, electrical panels require a solution that continuously monitors all critical points and, if overheating is detected, immediately provides information about this to the maintenance personnel. And Streamer Electric AG is glad to provide such solution - FIPRES.

# Introduction: FIPRES

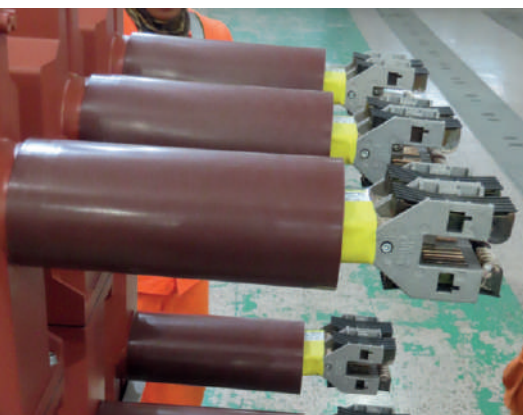
FIPRES works on principle of early detection. Indeed, usually fire starts with melting of cable insulation, which is the weakest point in terms of withstanding temperature. Depending on the material and thickness, generally there are 2 critical temperatures for cable insulation: 200 °C, when insulation starts to deteriorate and 280°C, when insulation material starts to melt and smoke. FIPRES works way below these temperatures, providing detection of overheating in a range 80...130 °C, which are abnormal temperatures for electrical equipment, but still months before any dangerous situation.



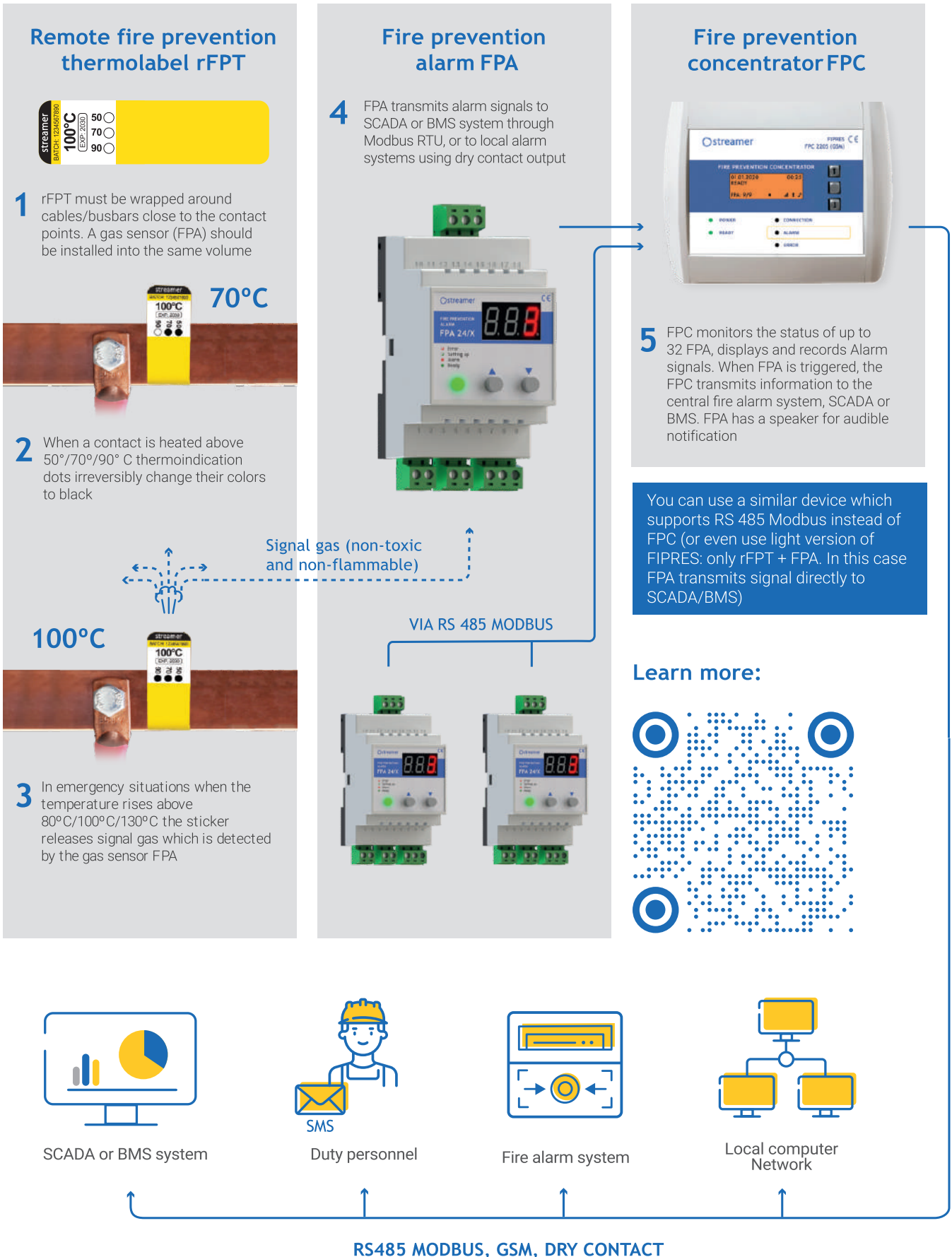
The technology involves the placing of self-adhesive temperature sensitive labels (rFPT) on connection points (bus-bar contacts, cable lugs, contacts of circuit breaker, fuses, current transformer etc.) inside LV or MV electrical panel of any configuration.

Each rFPT has thermo-indication dots with 3 levels of indication, that will irreversibly turn black after reaching its activation temperature. It gives clear indication to the inspection team regarding what temperature has been reached since installation of the label.

When the contact reaches the activation temperature of the rFPT, the label emits non-toxic and non-flammable signal gas which is detected by special gas sensor (FPA) located in the same compartment as the rFPTs. Immediately after that FPA transmits an ALARM signal to SCADA or BMS system by Modbus or to any other external system via dry contact output.



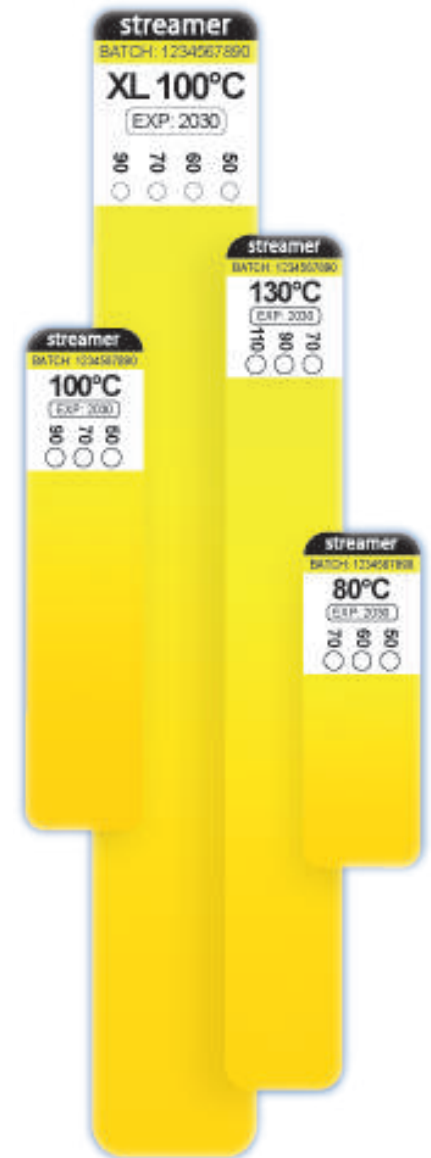
# FIPRES: How it works



# Remote fire prevention thermolabels

- Innovative system of gas encapsulation
- Validity period is 10 years
- Safe, non-toxic and non-flammable gas inside
- Easy installation without additional accessories

Remote Fire Prevention Thermolabels (rFPTs) are installed at the contact connection points, on electrical wires or some parts of electrical equipment which are potentially prone to overheating. When heated to activation temperature, a signal gas is emitted from rFPT and is detected by Fire Prevention Alarm (FPA).

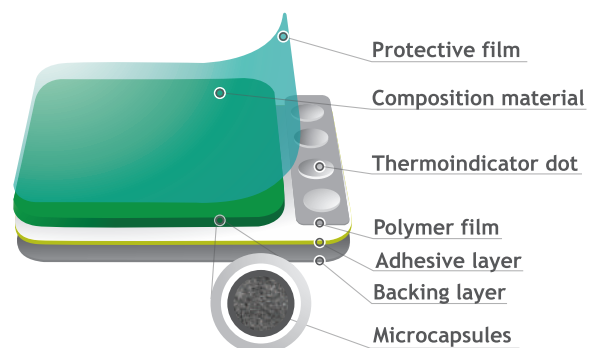


Activation temperature	Item name	Conductor cross-section, mm <sup>2</sup>	Volume of compartment, m <sup>3</sup>	Reference (box with 10x rFPT inside)
80°C	rFPT 80/0,1	< 10	0,1	FP.RT.080A.Y1.WW
	rFPT 80/0,3	10-35	0,3	FP.RT.080B.Y1.WW
	rFPT 80/1	35-120	1	FP.RT.080C.Y1.WW
	rFPT 80/XL	> 120	1-4	FP.RT.080D.Y1.WW
100°C	rFPT 100/0,1	< 10	0,1	FP.RT.100A.Y1.WW
	rFPT 100/0,3	10-35	0,3	FP.RT.100B.Y1.WW
	rFPT 100/1	35-120	1	FP.RT.100C.Y1.WW
	rFPT 100/XL	> 120	1-4	FP.RT.100D.Y1.WW
130°C	rFPT 130/0,1	< 10	0,1	FP.RT.130A.Y1.WW
	rFPT 130/0,3	10-35	0,3	FP.RT.130B.Y1.WW
	rFPT 130/1	35-120	1	FP.RT.130C.Y1.WW
	rFPT 130/XL	> 120	1-4	FP.RT.130D.Y1.WW

\* Operating temperature of all rFPTs is from -60°C to +50 °C

\* Validity period of rFPT is 10 years

	0.1	0.3	1	XL
Length, mm	50	80	138	210
Width, mm	20	20	20	35
Thickness, mm	1,75	1,75	1,75	1,75
Weight, g	1,1	2,2	4,3	11,0



# Fire prevention alarm

- Highly sensitive gas sensor inside (metal-oxide semiconductor sensor)
- Continuous auto-calibration for the best adjustment for environment
- Modbus interface and dry contact output to connect to SCADA, BMS or local alarm system
- Can be used in environment up to 36 kV

FPA constantly checks the ambient air for the presence of rFPT signal gas. In case of signal gas detection FPA goes into ALARM mode and transmits ALARM signal via Modbus RS-485 to SCADA or BMS. Dry contact output closes. FPA has 2 versions: single body FPA (FPA 24/X) and FPA with 4 corded sensors FPA 24(4S). FPA has a display showing the current Modbus address.

## FPA 24/X

FP.AL.00SB.01.WW



## FPA 24(4S)

FP.AL.004S.02.WW



- For single compartment with up to 1m<sup>3</sup> of volume

- For several separate compartments up to 1m<sup>3</sup> each;
- For a large compartment with a volume of up to 4 m<sup>3</sup>

Technical data	FPA 24/X	FPA 24(4S)
Protected volume:	up to 1 m <sup>3</sup>	up to 4 m <sup>3</sup>
Supply voltage:	12-28V DC (24 V DC is nominal)	
Type of connection:	RS-485 Modbus RTU	
Modbus connection type:	9600 bps, 8 data bits, 1 stop bit, none-parity	
Discrete outputs:	Dry contact output (max. power 60W)	
Mounting type:	on DIN-rail	
Dimensions, mm:	52x86x56	main body: 52x86x56 corded sensor: 46x66x28
Lifetime:	10 years	
EMC protection according to:	EN 61000-6-5:2015 EN 61000-6-4:2007/A1:2011	
Other features:	reverse polarity protection; auto-calibration based on environment conditions	

# Fire prevention concentrator

- Gather information from up to 32 FPAs
- LCD display for easy access by maintenance personnel
- Events log, speaker and powerful dry contact output
- Optional GSM module to send an SMS to duty staff
- Can transmit information to SCADA/BMS

Fire Prevention Concentrator (FPC) is a hub which gather information from up to 32 FPAs. It monitors the status of all connected FPAs and displays current operation mode. FPC has a log, stored in non-volatile memory with all events.

FPC has an LCD display with backlight, status indicators, a speaker for audible warning and a three-button keyboard.

Modbus interface, GSM module and dry contact output are available for communication.



**Supply voltage:** 100-240 V AC (220 V AC is nominal)

**Type of connection:** RS-485 Modbus RTU

**Outputs:** RS-485 Modbus RTU

**Modbus connection type:** 9600 bps, 8 data bits, 1 stop bit, none-parity

**Number of connected FPA:** up to 32

**Discrete outputs:** dry contact output (220 V AC, 7 A)

**Dimensions:** 200x270x48 mm

**Lifetime:** 10 years

ITEM NAME	REFERENCE	DESCRIPTION
FPC 220S	FPCU.S000.01.WW	basic version
FPC 220S (GSM)	FPCU.SGSM.01.WW	FPC with GSM module

# Visual fire prevention thermolabels

- vFPT provides information on overheating occurred between 2 checks
- Efficient and affordable addition to traditional visual inspection and IRT
- Long strips allow to get 360° view
- 10 years of validity period

vFPT helps maintenance personnel understand the condition of the equipment, not only at the time of inspection, but can also see if the equipment has reached a certain temperature in the past. Unlike using a thermal imager, vFPT provides a clear picture of what has happened since the last check. These labels are extremely easy to install for any configuration of electrical equipment.

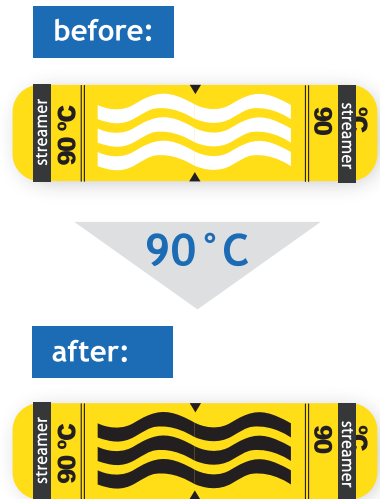
The principle of operation is simple: at the activation temperature (70, 90 or 110°C) the white strips irreversibly change color to black.

	S	M	L
Length, mm	42	57	82
Width, mm	16	16	16

Activation temperature	Item name	Conductor cross-section, mm <sup>2</sup>	Reference
70°C	vFPT 70S	up to 10	FP.VT.070A.Y1.WW
	vFPT 70M	10-35	FP.VT.070B.Y1.WW
	vFPT 70L	35-120	FP.VT.070C.Y1.WW
90°C	vFPT 90S	up to 10	FP.VT.090A.Y1.WW
	vFPT 90M	10-35	FP.VT.090B.Y1.WW
	vFPT 90L	35-120	FP.VT.090C.Y1.WW
110°C	vFPT 110S	up to 10	FP.VT.110A.Y1.WW
	vFPT 110M	10-35	FP.VT.110B.Y1.WW
	vFPT 110L	35-120	FP.VT.110C.Y1.WW



## Principle of operation:



\* Operating temperature of all vFPT is from -60°C to +50 °C

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