

BRIDEX  Fuji SMBE

FIPRES

Fire Prevention and Overheating Control system

product presentation

Overview

25%

of building fires are due to electrical malfunctions*

32%

of fires in Germany are related with electricity**

\$3,2B

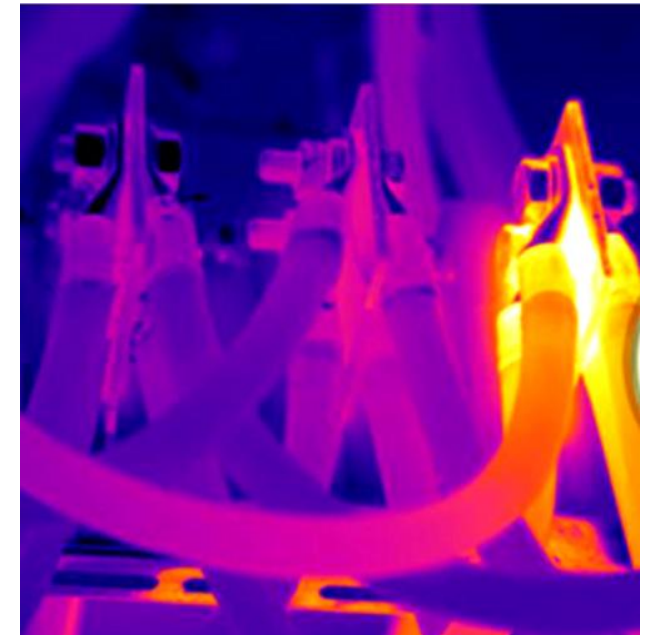
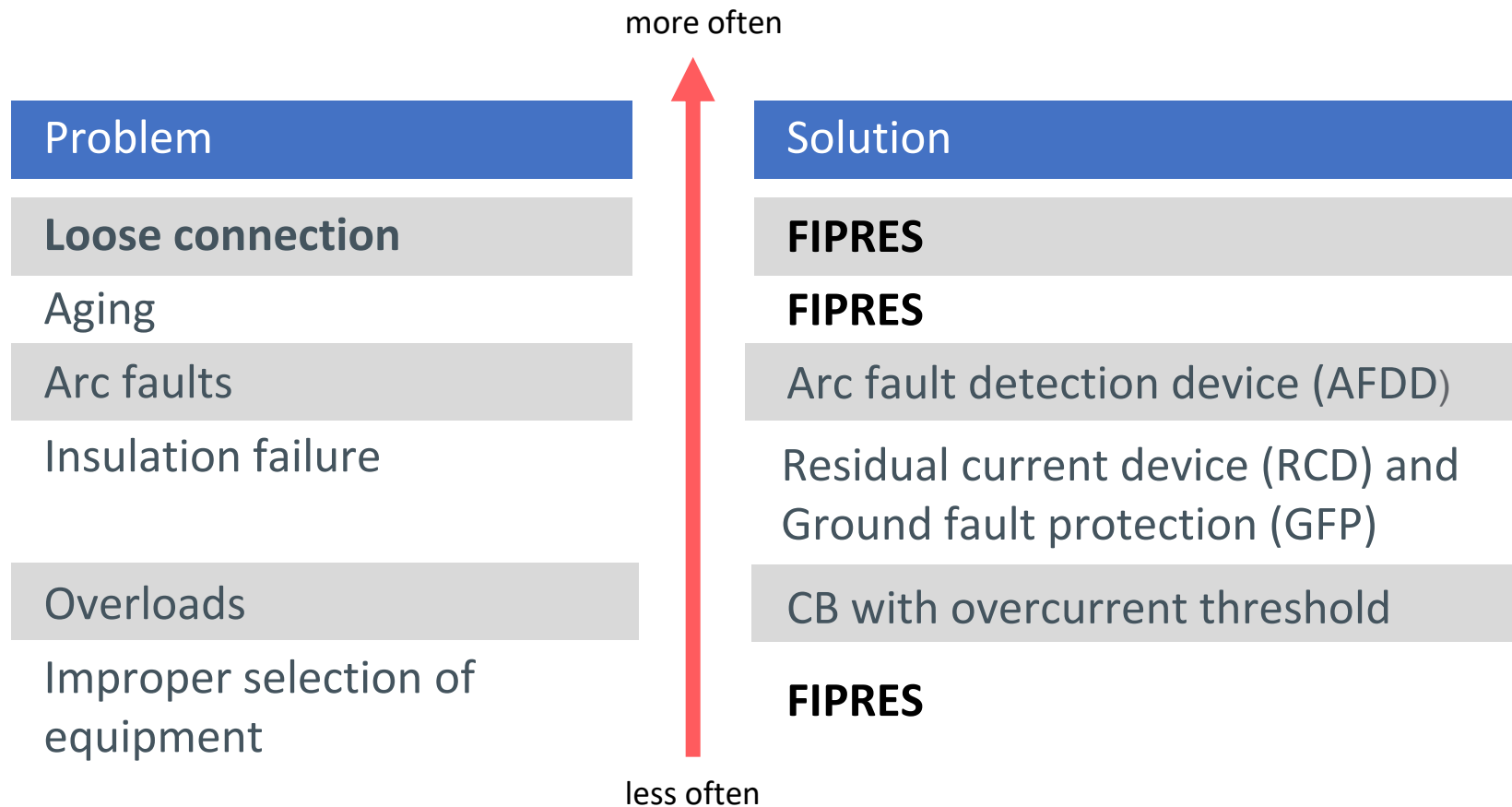
of damage annual damage in the U.S. and Europe due to electrical fires ***

* according to European Fire Academy (EFA)

** according to German Insurance Association

*** according to the National Fire Protection Association (NFPA) and the European Fire Safety Alliance (EFSA)

REASONS OF OVERHEATING/FIRE



LOOSE CONNECTION ?

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

MECHANICALLY LOOSE CONNECTION

OVERHEATING

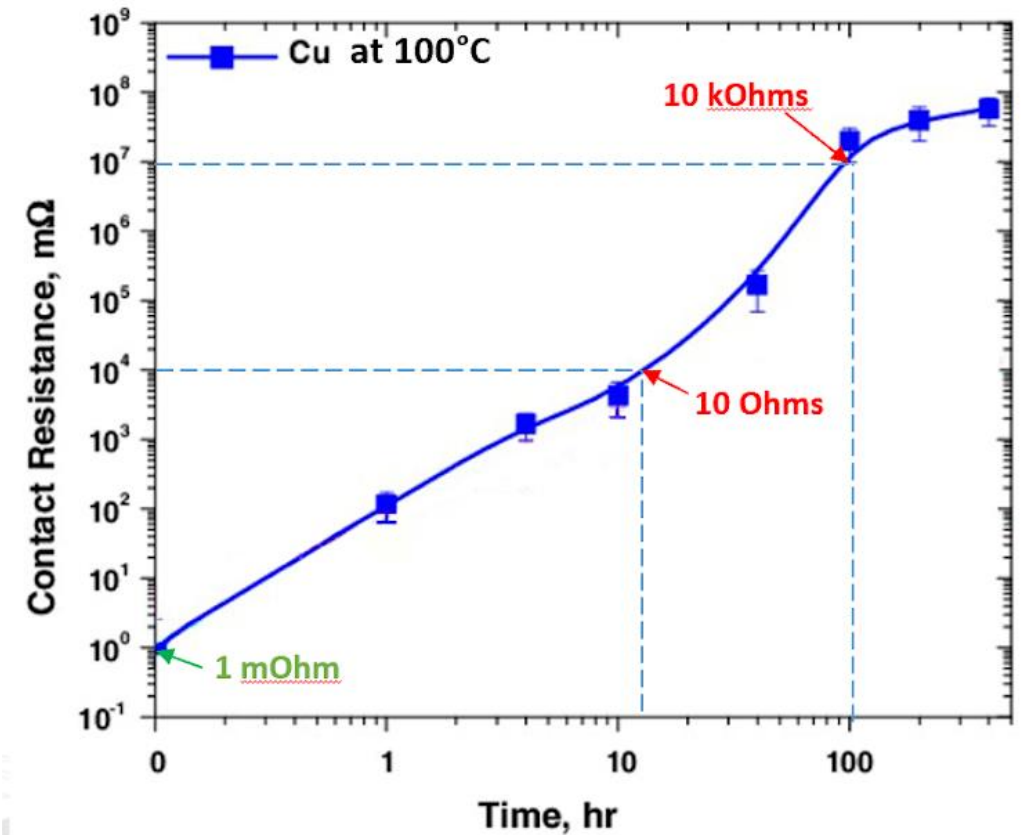
OXIDATION

INCREASE OF RESISTANCE

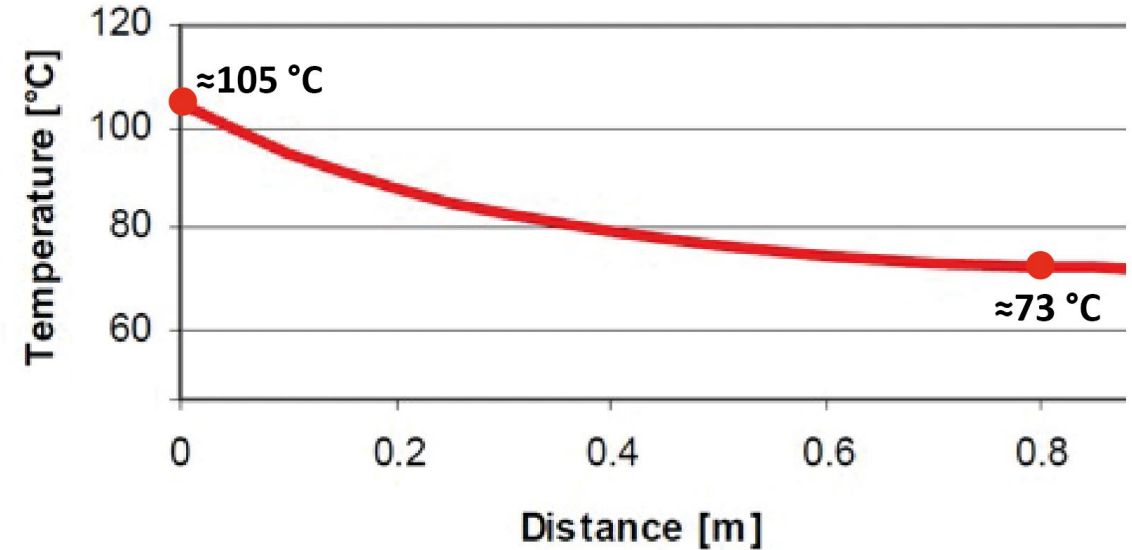
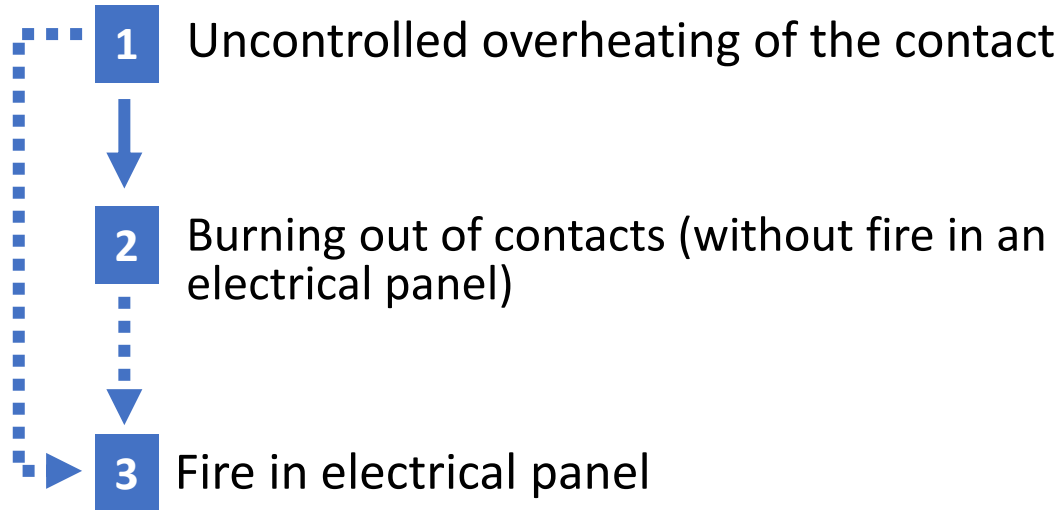
UNCONTROLLED
THERMAL
RUNAWAY

FIRE

Oxidation at connections



OVERHEATING/FIRE CONSEQUENCES



Material damage

- Of electrical equipment
- Of facility

Power supply interruption

- Stop of production process
- Profit loss

Threat to life

- Evacuation

HOW TO SOLVE THIS ISSUE

Fire system



IRT



Temperature sensors



FIPRES



Preventive



Continuous



Affordable



Easy to implement / retrofit



IRT LIMITATIONS



Periodic basis

Infrared thermography is carried out regularly every 6, 12 or 24 months, so it gives an indication of the condition of the equipment only for the time of inspection.

Depends on load level

The load at the time of inspection should be at least 60% to see weak points. If the load level is less than required, an additional fictitious load must be connected. Otherwise, you won't be able to see overheated parts of the connections even if they already occurred.

Limited access

Complex layout and partitions in an electrical panel might not allow to inspect 100% of the contact connection. In case of MV panels (which are locked during operations) the inspection can be done only through small IR windows

Depends on the human factor

The quality of survey largely depends on the diligence and professionalism of the employee

Unsafe for personnel

Maintenance personnel have to stay close to live parts during inspection



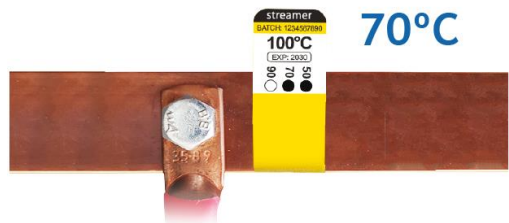
FIPRES. HOW IT WORKS

remote FIRE PREVENTION THERMOLABEL (rFPT)

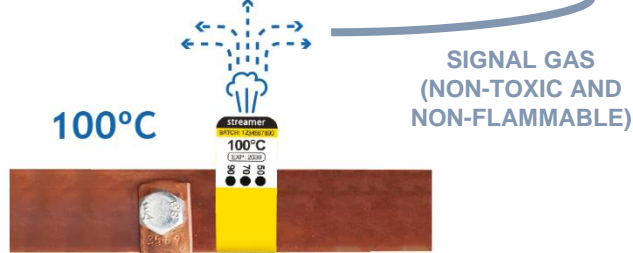
FIRE PREVENTION ALARM (FPA)

FIRE PREVENTION CONCENTRATOR (FPC)

1 rFPT must be wrapped around all the contacts and the gas sensor installed into the switchgear

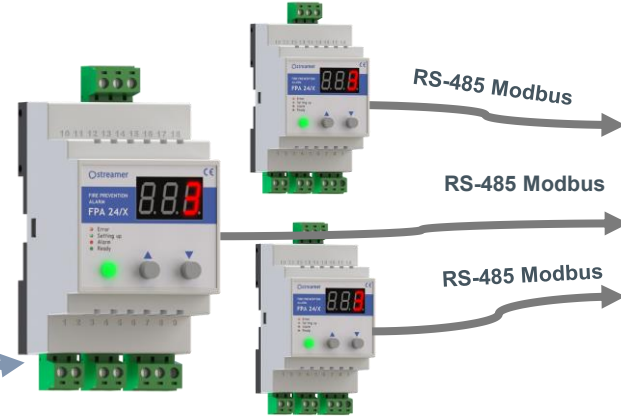


2 When heated above 50 - 90 °C indicator marks will irreversibly change their colors



3 At 100 °C rFPT releases signal gas, which is detected by FPA

4 FPA transmits alarm signals to SCADA or BMS system through Modbus RTU, or to local alarm systems using dry contact output



FPA has "dry contact" type output

Local ALARM system

5 FPC monitors the status of up to 32 FPA, displays and records Alarm signals. When FPA is triggered, the FPC transmits information to the central fire alarm system, SCADA or BMS. FPA has a speaker for audible notification



you can use similar device which supports RS 485 Modbus instead of FPC

SMS

Dry contact relay

RS-485 Modbus



Duty personnel



Fire alarm system



Local computer Network



SCADA or BMS system

FIPRES. HOW IT WORKS

remote FIRE PREVENTION
THERMOLABEL (rFPT)

+

FIRE PREVENTION
ALARM (FPA)

1 rFPT must be wrapped around all the contacts and the gas sensor installed into the switchgear



2 When heated above 50 - 90 °C indicator marks will irreversibly change their colors



3 At 100 °C rFPT releases signal gas, which is detected by FPA

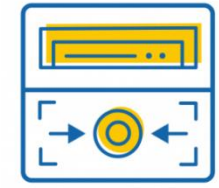
4 FPA transmits alarm signals to SCADA or BMS system through Modbus RTU, or to local alarm systems using dry contact output



FPA has "dry contact" type output

Dry contact relay

RS-485 Modbus



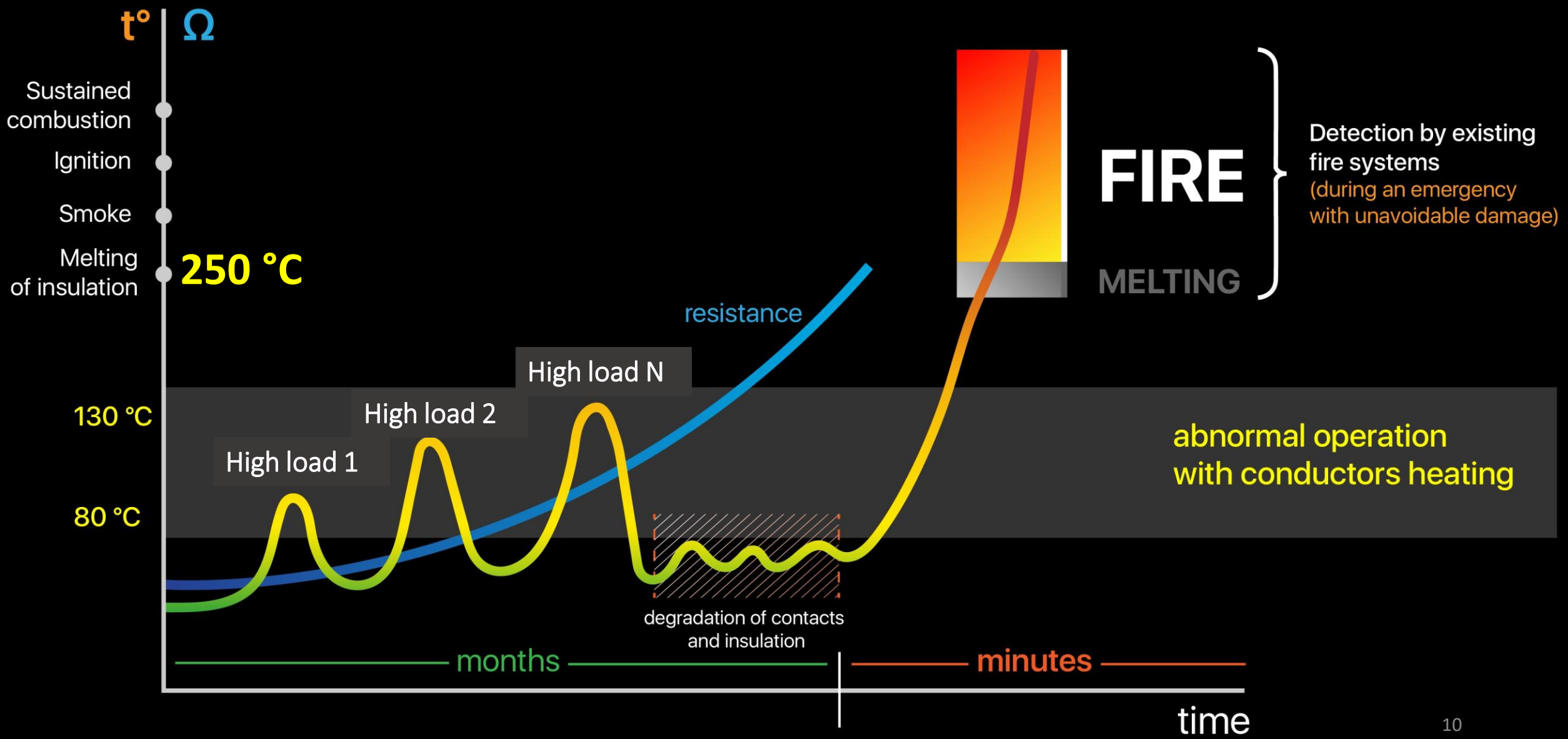
Fire alarm system



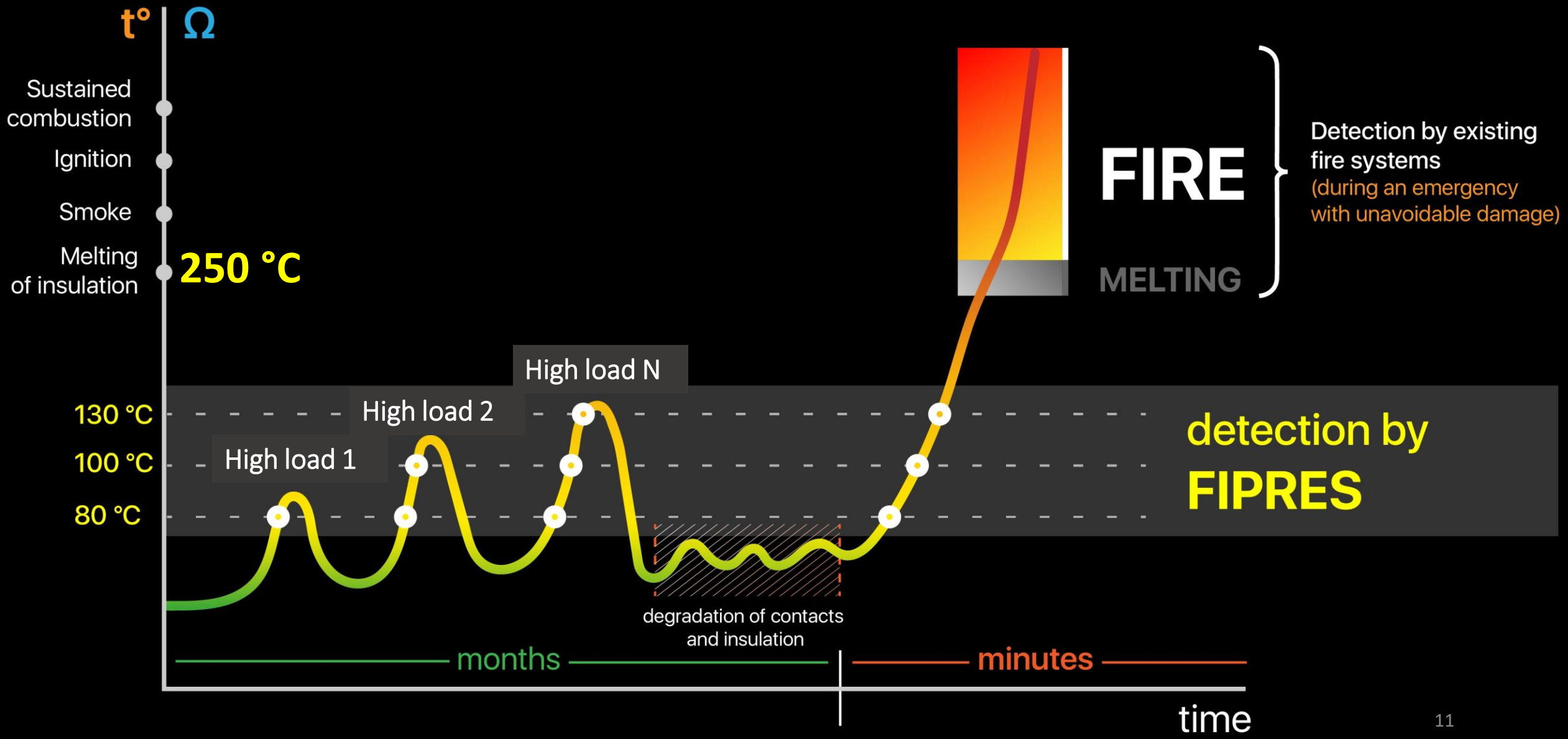
SCADA or BMS system

LIGHT
VERSION

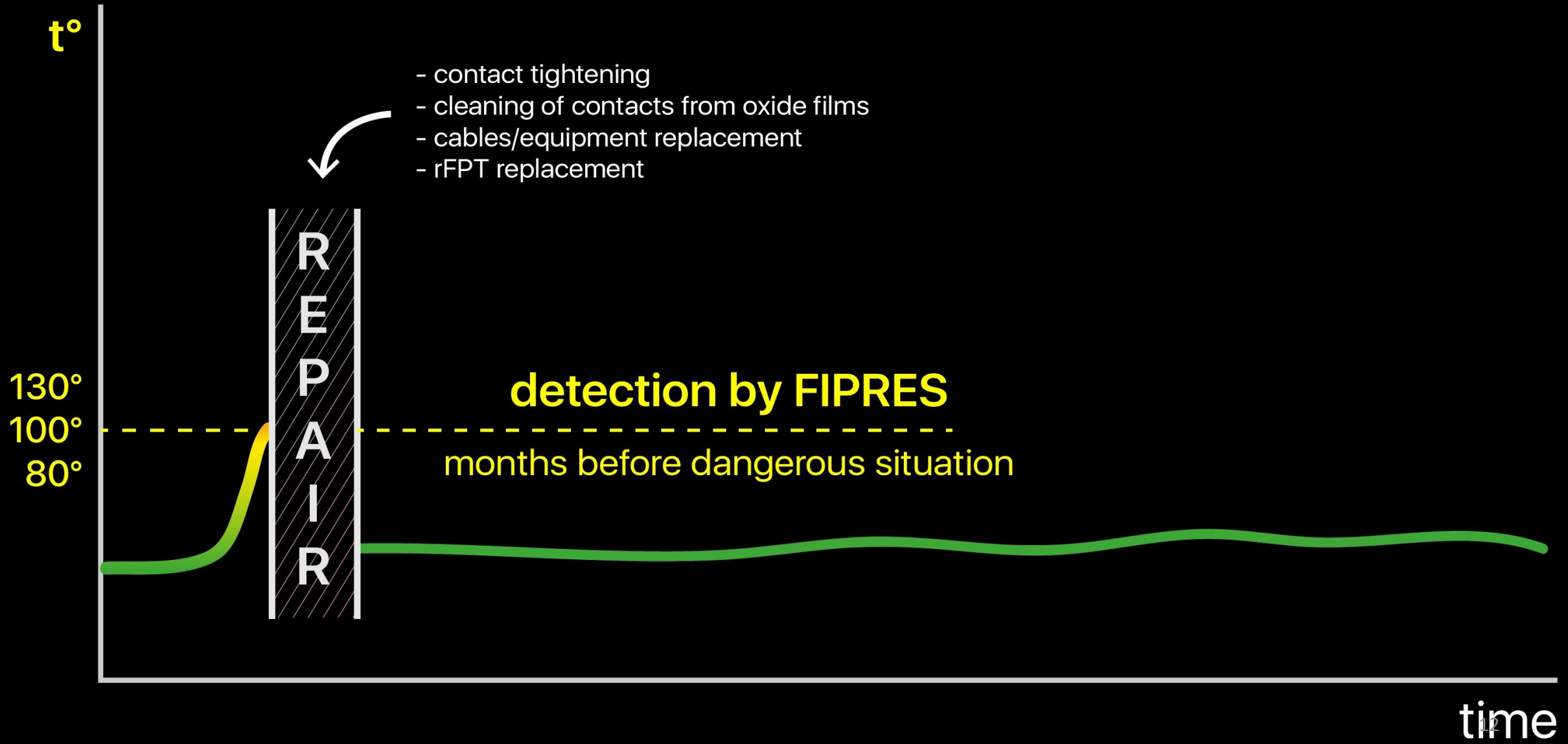
STANDARD SCENARIO OF FIRE



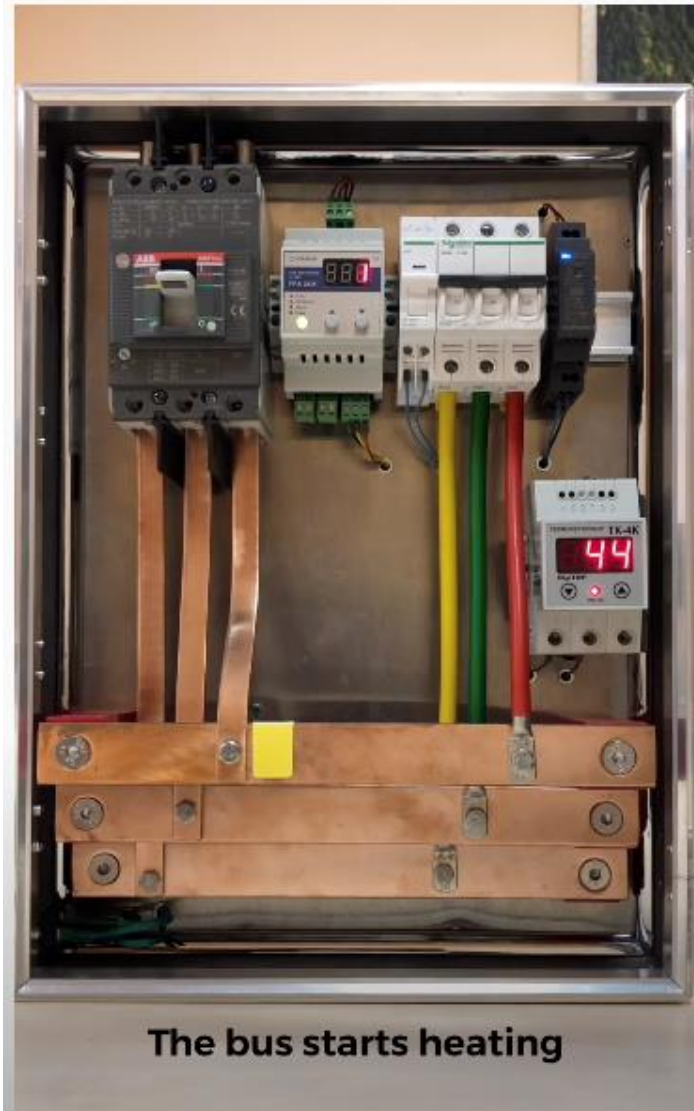
PREVENTIVE DETECTION BY FIPRES



STANDARD SCENARIO OF FIPRES USING



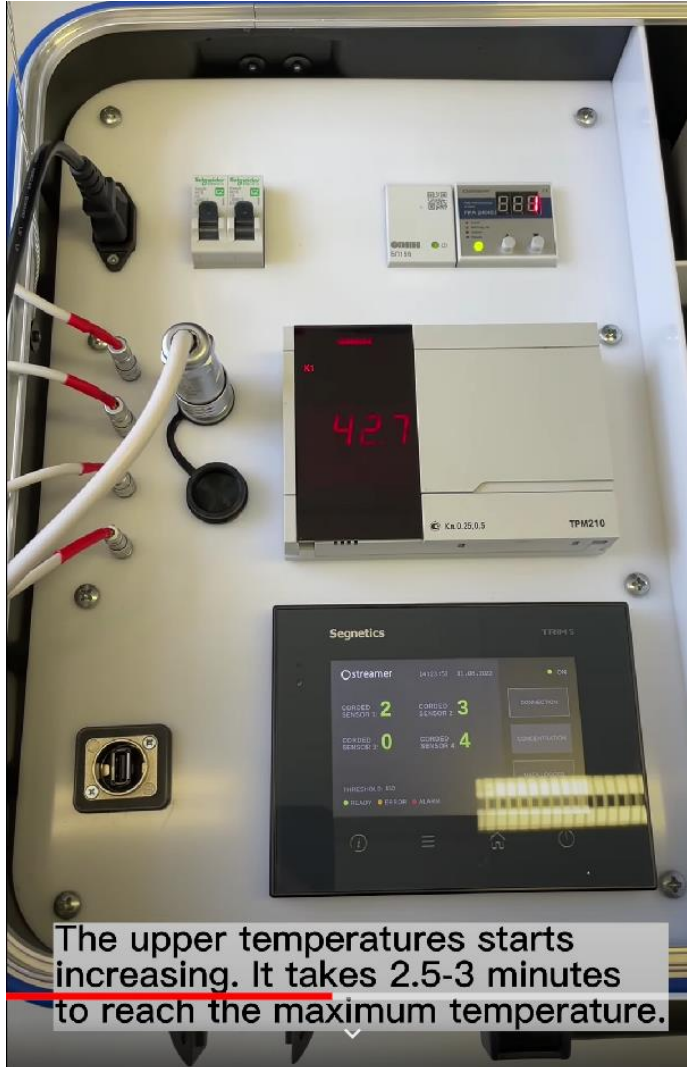
FIPRES DEMOCASE



<https://www.youtube.com/watch?v=eFU3nWpY3ak>

OneDrive\3.a PRODUCT DATA\PD_FIPRES\01. MARKETING TOOLS\Video\democase video

FIPRES TESTING KIT

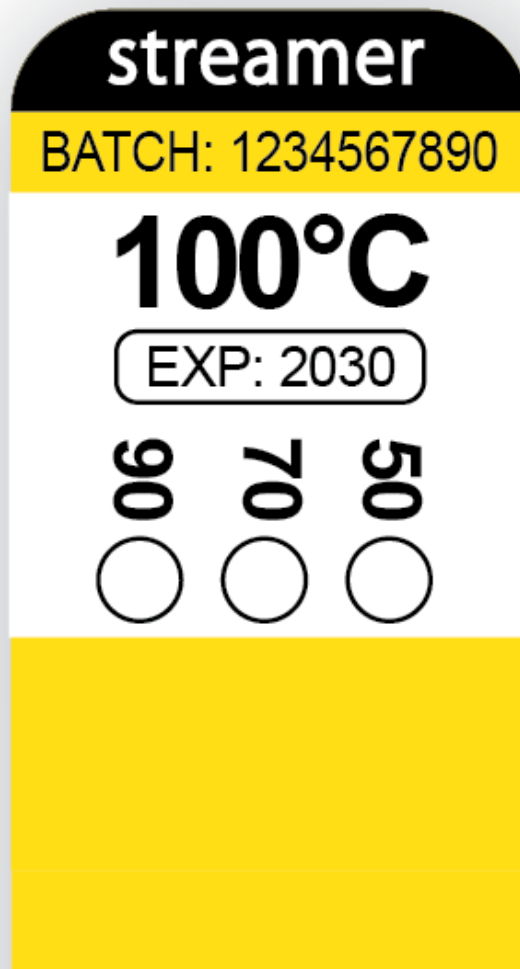


<https://www.youtube.com/watch?v=LaHMXUSJwFs>

OneDrive\3.a PRODUCT DATA\PD_FIPRES\01. MARKETING TOOLS\Video\Testing kit video

rFPT – remote Fire Prevention Thermolabel

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 the rFPT and is detected by Fire Prevention Alarm



Batch number

Used to encode production information and counterfeit protection.

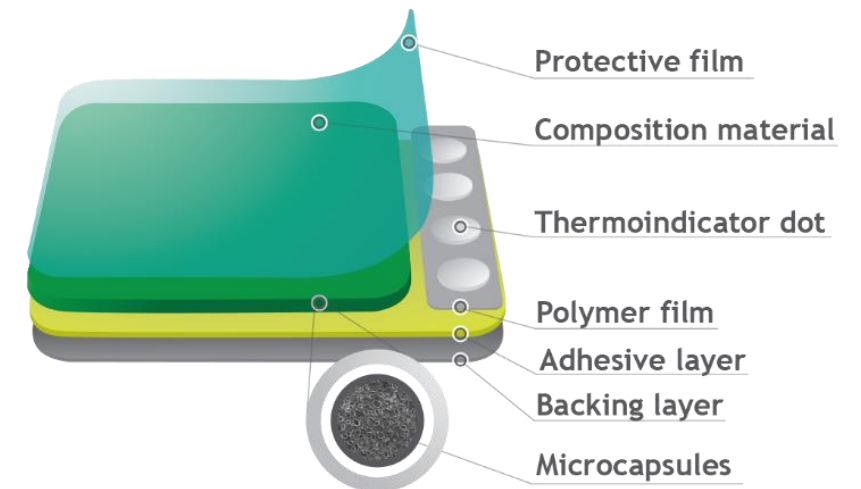
Activation temperature When the contact/cable is heated above the activation temperature, rFPT emits signal gas

Expiration date

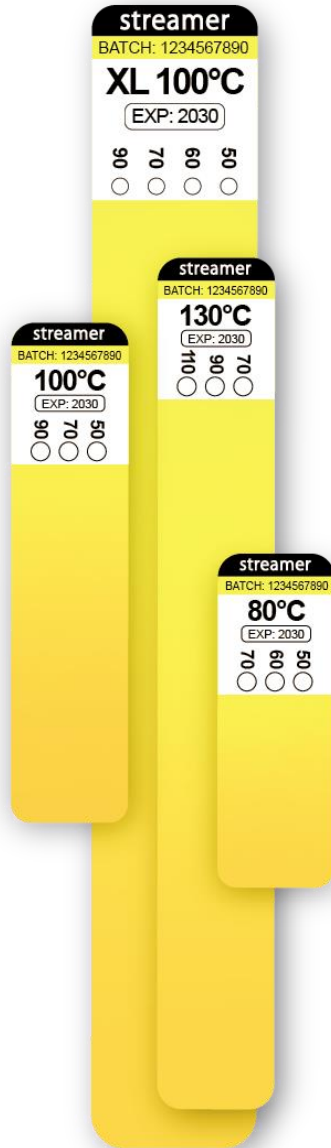
Thermoindication dots

When the contact/cable is heated above the thermoindication temperature, the dot irreversibly changes its color to black

Composite material with signal gas



rFPT – remote Fire Prevention Thermolabel



- Innovative system of gas encapsulation
- 4 sizes to cover 0.1 m³ ... 4 m³ electrical panel
- 3 levels of activation temperature: 80°, 100° or 130° C
- Validity period is 10 years
- Safe, non-toxic and non-flammable gas inside
- Easy installation without additional accessories

	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



SIGNAL GAS SAFETY



Solkane 365/227 93/7
by SOLVAY company (max 70%)

+

Polyvinyl acetate (PVA) (max 30%)
Polyurea (max 10%)
Wax (max 1%)
Colorant (max 2%)



**ENCAPSULATION
CALIBRATION**

(>20 consecutive technological steps)



**RAW material for
rFPT manufacturing**

Solvay Fluor

Solkane® 365/227 Blends

Product Description

- Colourless liquid
- Chemically stable
- Faintly ethereal odour
- Non flammable blends

Solkane® 365/227 are liquid hydrofluorocarbon blends of the third generation without ozone depletion potential. Solkane® 365mfc is currently under notification procedure within the European Authorities. The ELINCS No. is 430-250-1. A SNAP approval has been received.

Flammability

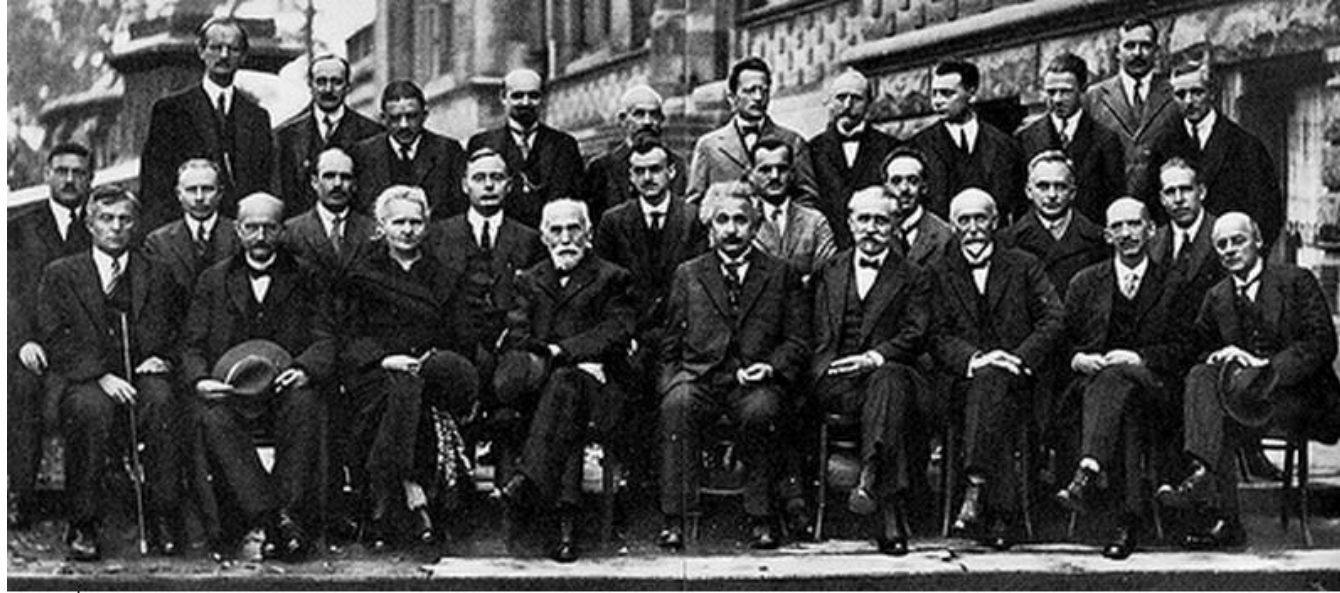
Solkane® 365/227 blends have no flash point (ISO 1516/1523) and are not subject to flammable liquid regulation.

Toxicity

Toxicity testing (28 days, 90 days) shows no acute toxicity and the "no effect levels" are even higher than for Solkane® 141b.

**Screenshot from official TDS*

Full version is available on <https://www.solvay.com/>



Front Row:

I. Langmuir, M. Planck, Mme. Curie, H.A. Lorentz, A. Einstein, P. Langevin, Ch. E. Guye, C.T.R. Wilson, O.W. Richardson

Middle Row:

P. Debye, M. Knudsen, W.L. Bragg, H.A. Kramers, P.A.M. Dirac, A.H. Compton, L. de Broglie, M. Born, N. Bohr

Back Row:

A. Piccard, E. Henriot, P. Ehrenfest, Ed. Herzen, Th. De Donder, E. Schrödinger, E. Verschaffelt, W. Pauli, W. Heisenberg, R.H. Fowler, L. Brillouin

Solvay Conference (1927)

The initiator and investor of these conferences is the Belgian scientist and industrialist Ernest Solve, the founder of the Solvay company.

FPA – Fire Prevention Alarm

- Highly sensitive gas sensor inside (metal-oxide semiconductor sensor)
- Automatically adjusts to 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 24/X



for single volume cabinets up to 1 m³

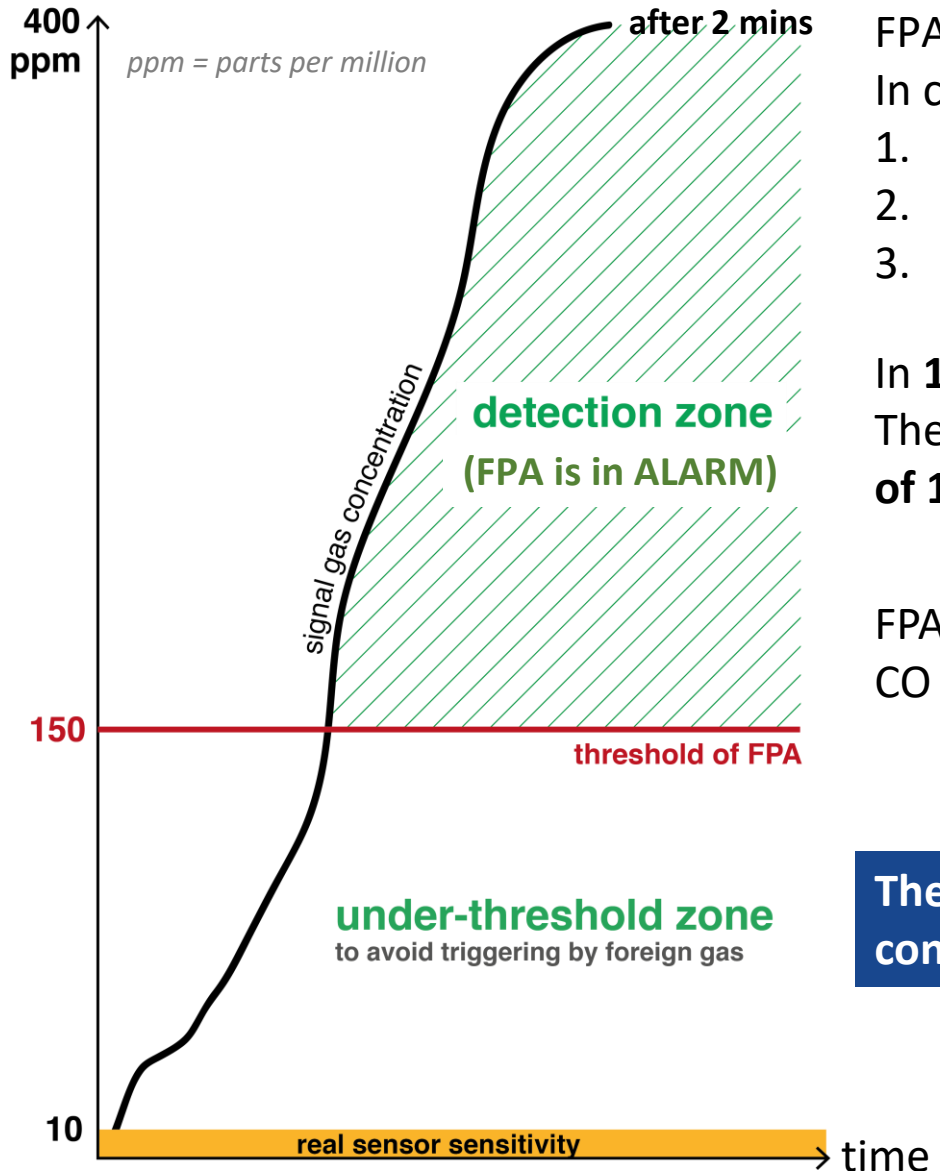
FPA 24(4S)

FPA with 4 corded sensor



To cover large compartments (up to 4 m³)
or to use for several compartments up to 1 m³

FPA: DETECTION AND CALIBRATION



FPA constantly checks the ambient air for the presence of rFPT signal gas.

In case of signal gas detection FPA goes into ALARM mode:

1. It sends ALARM signal via Modbus RS-485 to SCADA or BMS
2. Dry contact output closes
3. FPA stays in ALARM mode until concentration goes down below the threshold

In 1 m^3 compartment a rFPT 100/1 generates up to **400 ppm of gas concentration**. The safety margin in detection is represented by the gap between a concentration of **150 ppm and 400 ppm**.

FPA can detect other (not signal gas) gases, such as CO at high concentrations. CO gas can be produced by melting of cable insulation in neighbour panel.

The FPA automatically calibrates itself every few hours to adjust to the ambient conditions (zero-drift technology)

FPA 24/X



- Built-in display shows the Modbus address
- Volume can be set in a range from 0.1 to 1m³
- Dry contact output has normally open and normally closed contact

2 modes of operation:

1. Default mode:

FPA goes into ALARM mode when the gas concentration gets higher than the threshold and stays there **until concentration drops down below the threshold**

2. ALARM sticking mode:

FPA goes into ALARM mode when the gas concentration gets higher than the threshold and stays there **until one of the buttons is pressed**

FPA 24(4S)



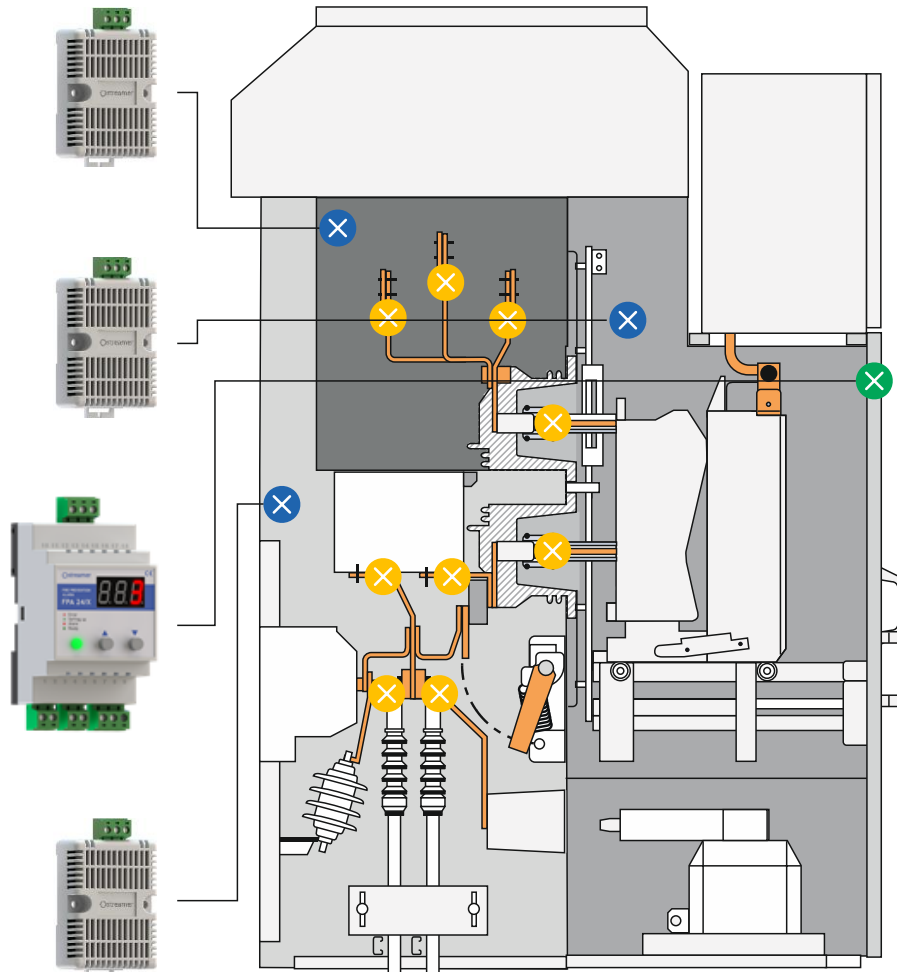
- Built-in display shows the Modbus address
- Has 4 corded sensors, max length between corded sensor and main body is 10 meters
- Can be used for large volumes (up to 4m³)
- Can be used for 4 different compartments with volume up to 1m³ each
- One of the corded sensors can be used as external one (for facilities with presence of intermittent parasite gases)

4 modes of operation:

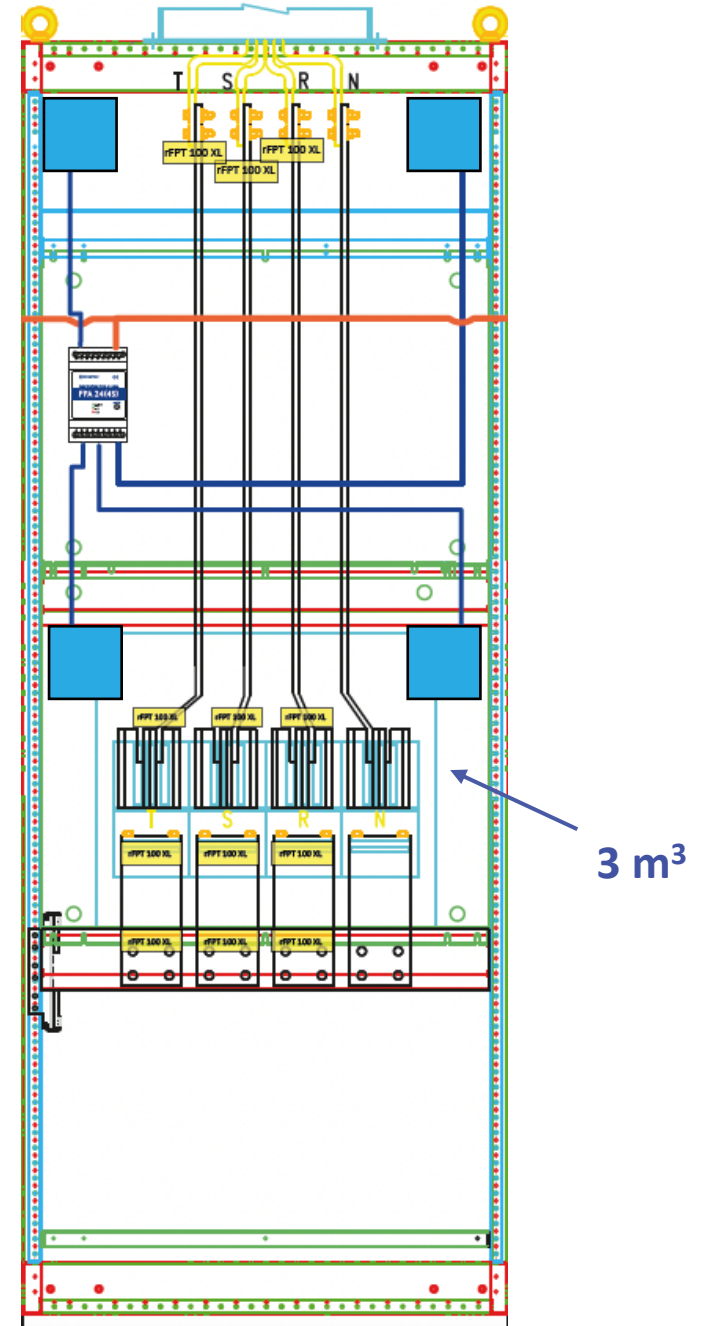
1. Default mode
2. ALARM sticking mode
3. One corded sensor acts as external one
4. Combination of modes 2 and 3

FPA 24(4S)

Switchgear with separated compartments



Panel with large volume



FPC – 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

 **ALARM speaker**

 **LED indication of FPA status**

 **SMS notification about ALARM** *(For GSM version)*

Supply voltage: 100-240 V AC (50/60Hz)

Event log capacity: 1024 events

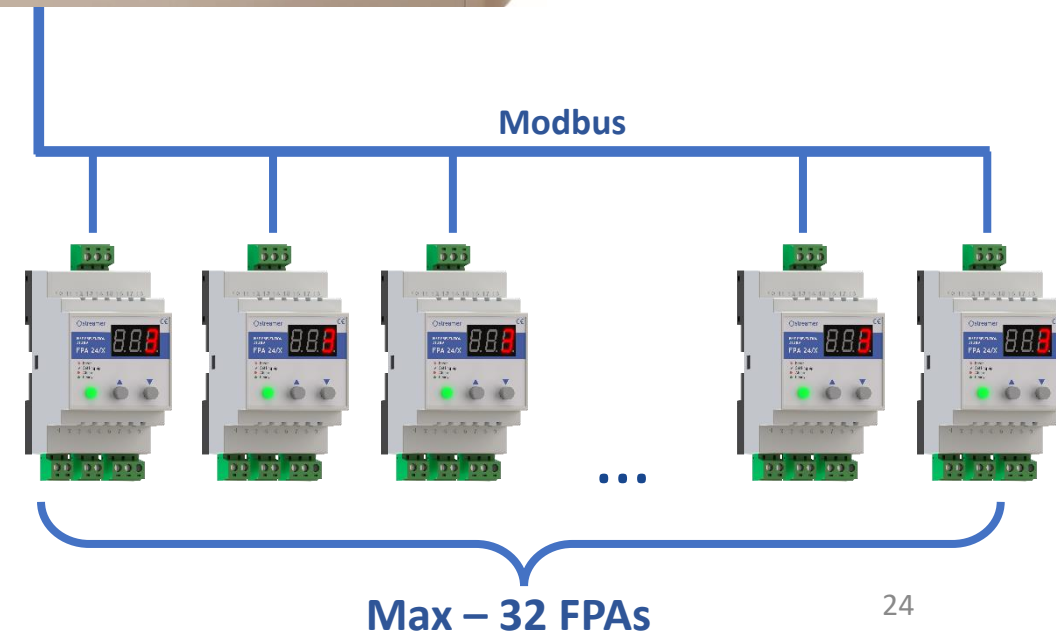
Dimensions: 270x220 mm



2 versions

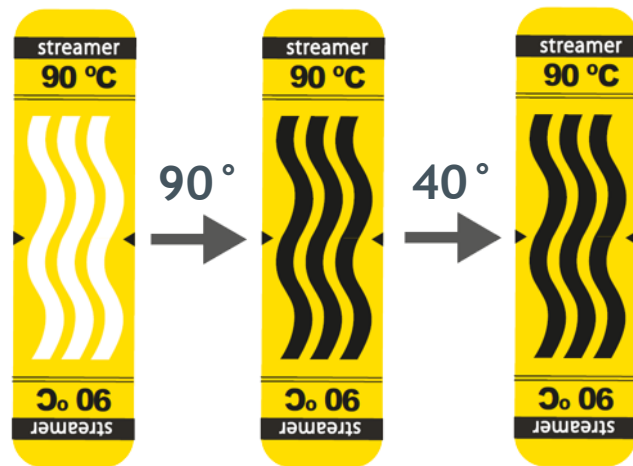
FPC 220S

FPC 220S (GSM)



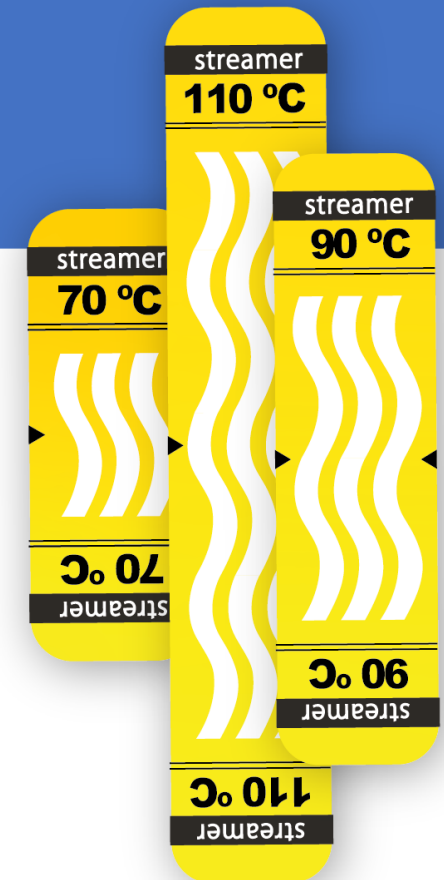
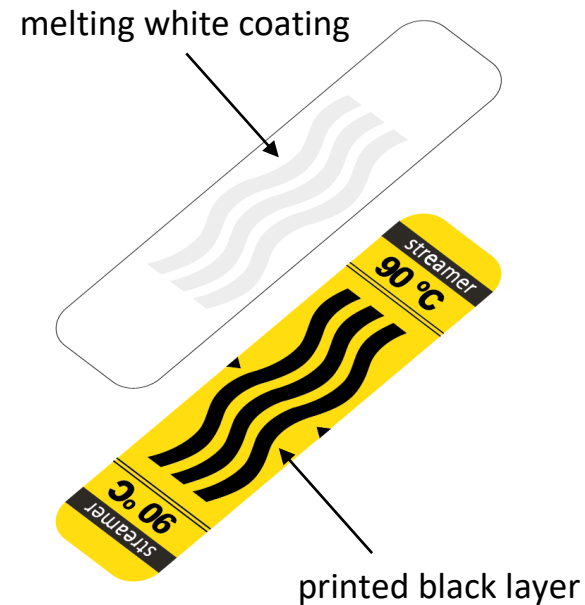
vFPT – visual Fire Prevention Thermolabel

- 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
- 70 °C, 90 °C and 110 °C of activation temperature

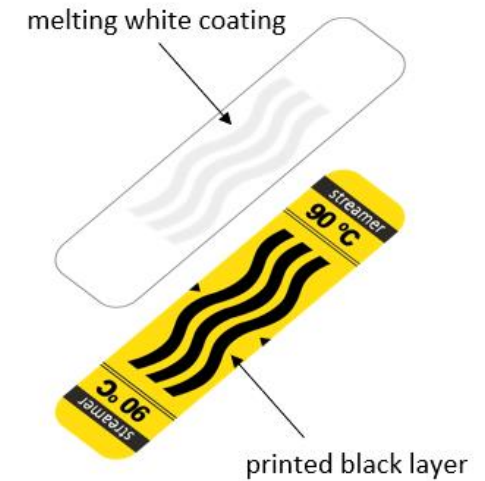
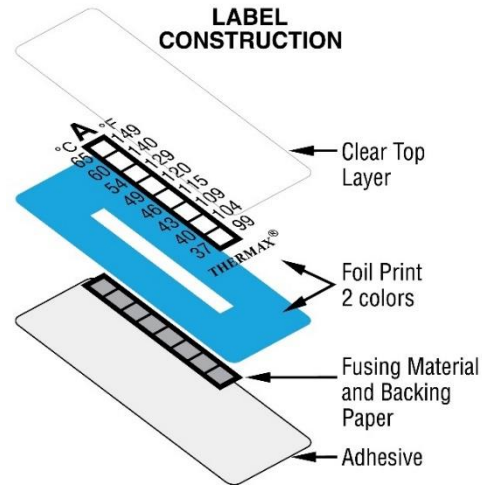


One-time indication

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



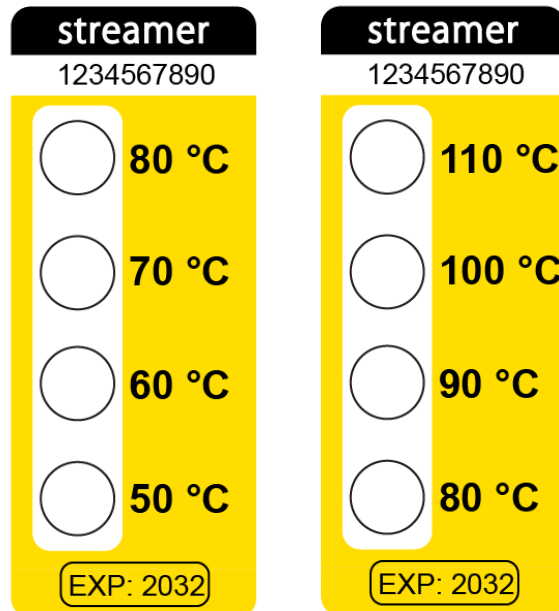
COMPATECH vFPT. Main points



Can be placed on live parts of electrical equipment – cables, busbars	X	
Not flammable material	X	
Insulator	X	
Irreversible operation	X	
Lifespan	⚠ 24 months	✓ 10 years
Designed to be placed on electrical equipment	X	✓

4-temperatures vFPT

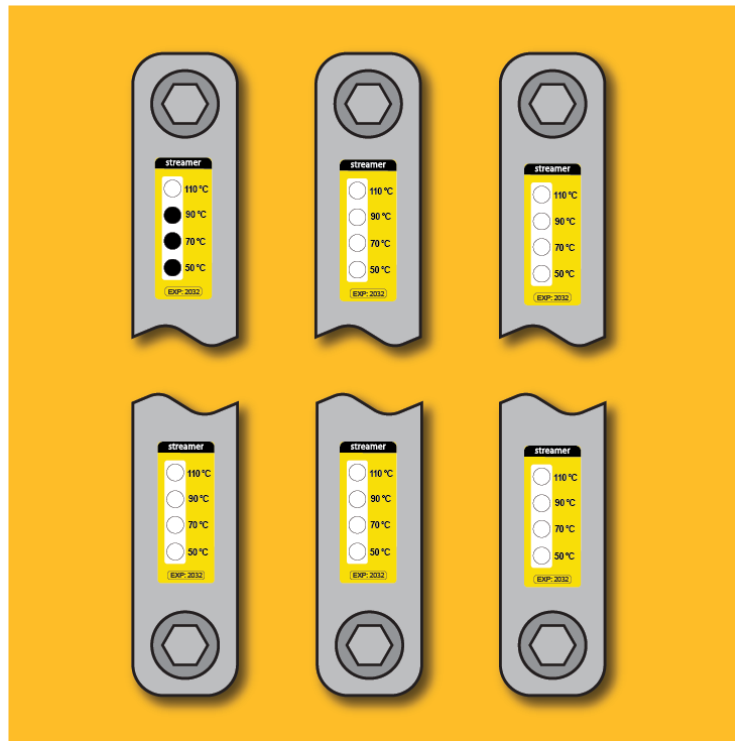
- Shows if the contacts is ok, concerning or emergency.
- Detect defects at early stages.
- 4-temperatures vFPT allows you to understand not only if the contact has reached highest permissible temperature but also to see how defect evolves and understand the reasons of overheating.
- Reduce the risk of fires in electrical installations.
- 10 years of validity period.



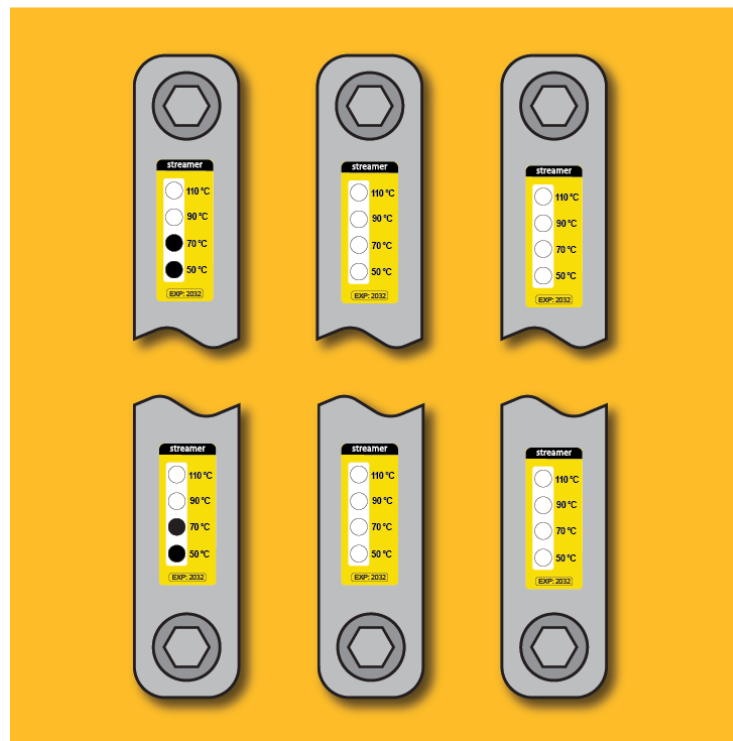
Length, mm	50
Width, mm	20
Conductor cross-section, mm ²	10-120
Standard range vFPT	FP.VT.058C.Y1.WW — 50-60-70-80 °C FP.VT.811C.Y1.WW — 80-90-100-110 °C Other set of temperatures can be created on request with a minimum order quantity
Possible temperature ranges, °C	50, 60, 70 ,80, 90, 100, 110, 120

WHAT CAN BE DETECTED

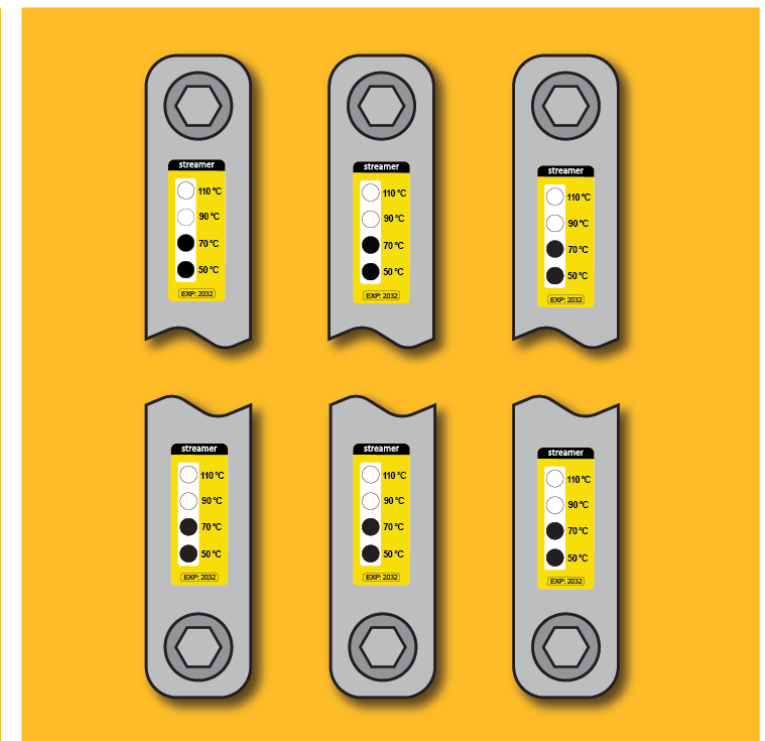
Loose connection of one contact



Overload on one phase



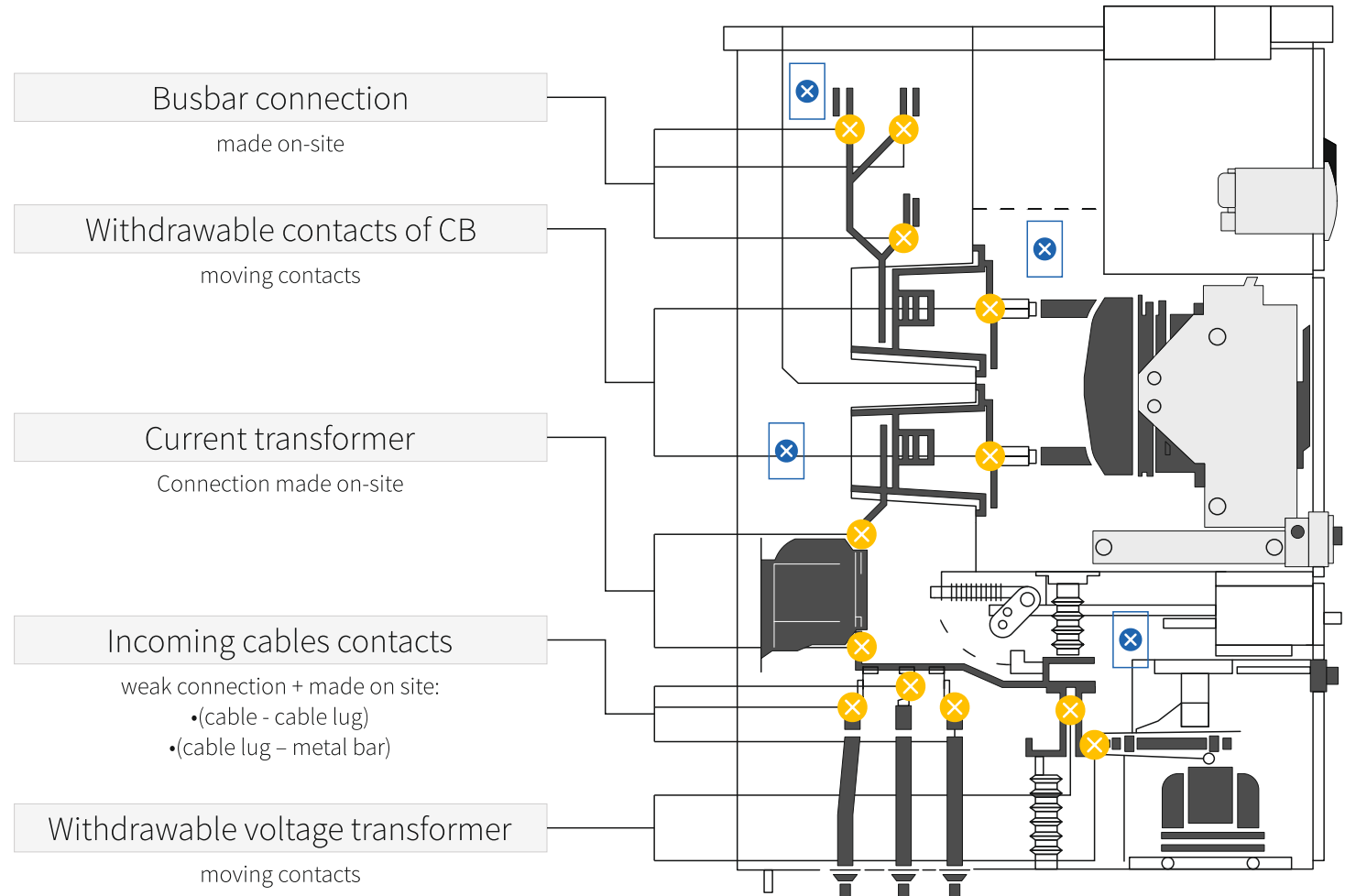
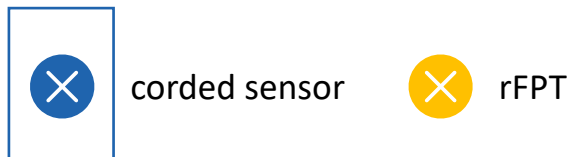
Overload on all phases / high ambient temperature



INSTALLATIONS. SWITCHGEAR

rFPTs should be installed:

- on incoming cables near connection points;
- on the terminal and bolted connections of the control wiring;
- on terminal boxes;
- on electric busbars near contact points;
- on all main circuit connection points (switchers, CBs, fuses, current and voltage transformers);
- on the housing of electrical apparatus;
- other points if it's required.



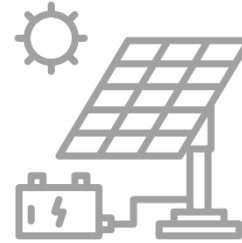
FIPRES INDUSTRIES SEGMENTS FOR END-USERS



POWER TRANSMISSION
UTILITIES



POWER PLANTS



RENEWABLE ENERGY
POWER PLANTS



INDUSTRIAL
FACTORIES



MINING,
OIL & GAS COMPANIES



PANEL BUILDERS



COMMERCIAL AND
RESIDENTIAL BUILDINGS



HOSPITALS



MALLS



METRO STATIONS

SWITCHGEAR



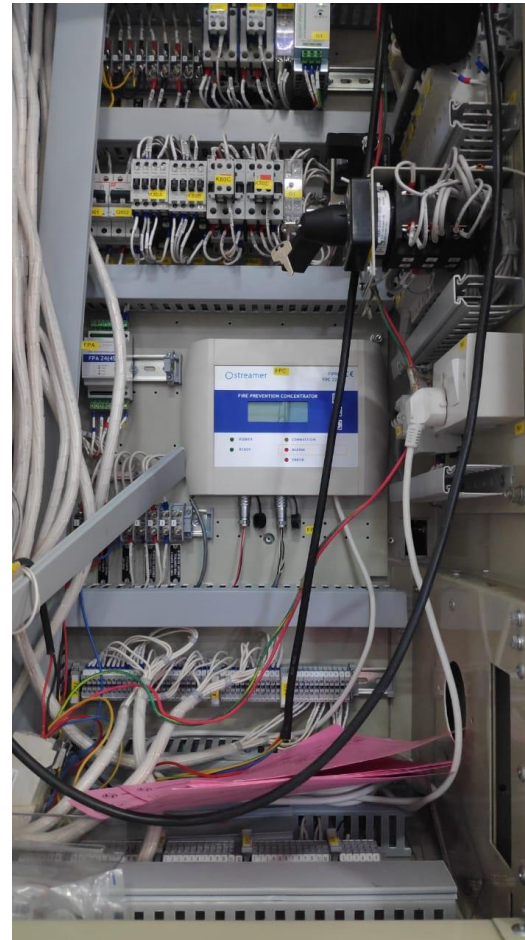
Withdrawable contacts loosen with number of operations



Current transformers contacts

Company	Industry	Country	Protected object
PLN Indonesia Power	Power distribution	Indonesia	MV Switchgear

6.6 kV FEEDER PANELS FOR VFD



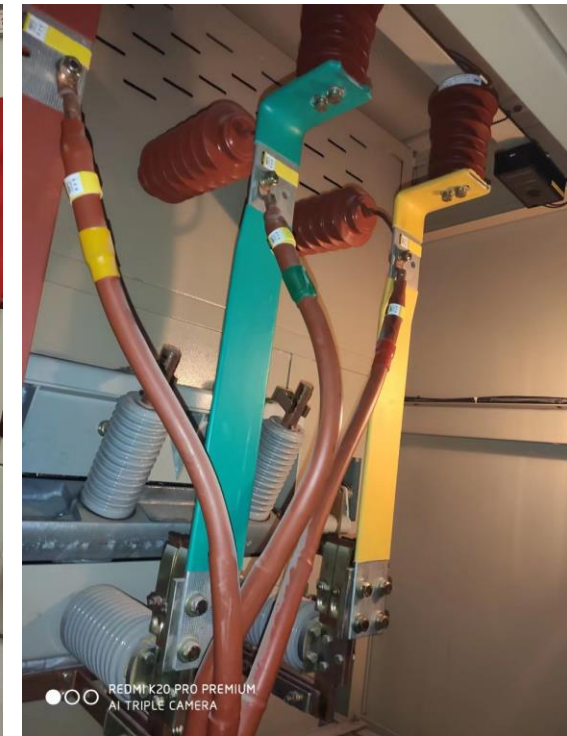
Company	Industry	Country	Protected object
BPCL	Oil & Gas	India	6.6 kV Feeder panels for VFD

MV SWITCHGEAR FOR GENERATOR



Company	Industry	Country	Protected object
Central Hidroeléctrica Guangopolo	Hydro Power plant	Ecuador	MV Switchgear for generator

HIGH ALTITUDE INSTALLATION IN 10 KV SWITCHGEAR



Company	Industry	Country	Protected object
State Grid Qinghai Haibei Power Supply	Power distribution	Qinghai, China	High altitude installation in 10 kV Switchgear

440 V AC DISTRIBUTION PANELS



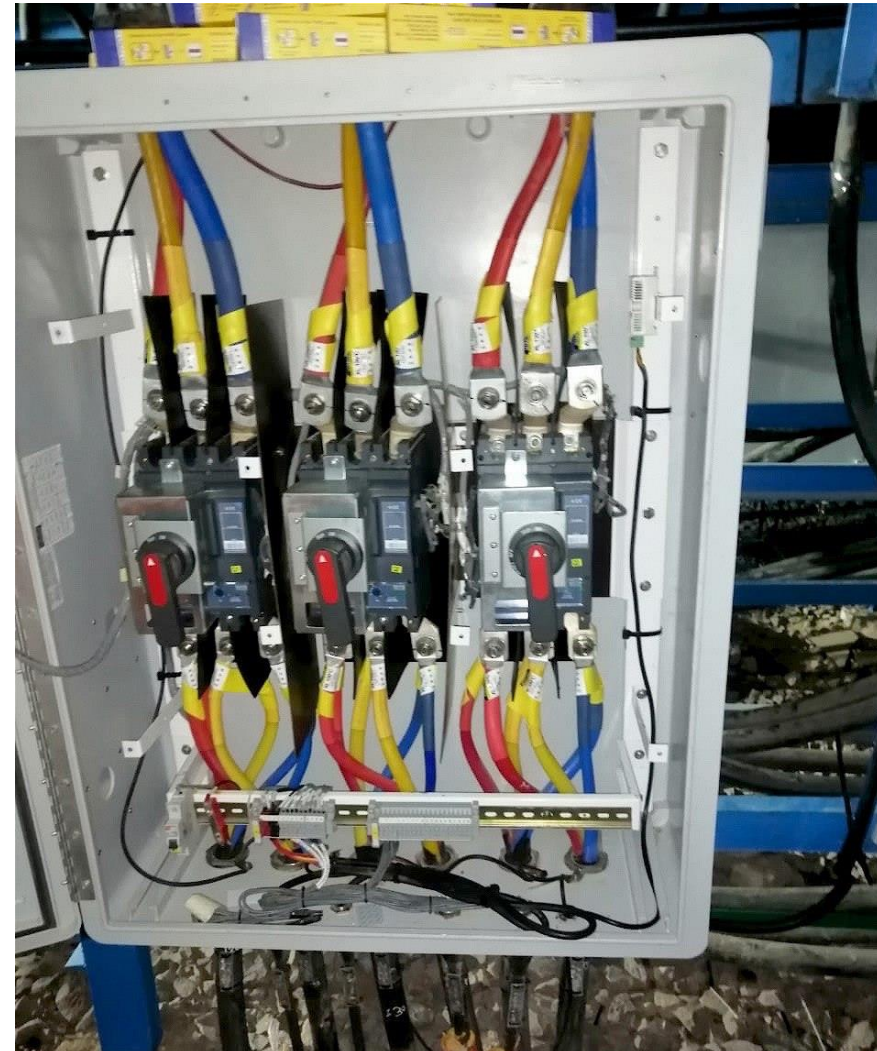
Company	Industry	Country	Protected object
Adani Transmission	Power distribution	Kota, India	440 V AC Distribution panels

COMBINER BOXES OF PHOTOVOLTAIC PLANTS



Company	Industry	Country	Protected object
Adani solar	Solar power plant	Rajasthan, India	Combiner boxes of photovoltaic plants of power 350 MW, 250 MW, 390 MW, 300 MW

COMBINER BOXES OF PHOTOVOLTAIC PLANTS



FIPRES is installed in combiner boxes of 5 PV plants using FPA 24(4S) and rFPT 130XL. A total of 54 panels are equipped with FIPRES.

The dry contact output is connected to CB so that after detection of overheating the panel got tripped.

The client has already faced problem with blowing combiner boxes that led to stop of production of the whole PV plant.

COMBINER BOXES OF PHOTOVOLTAIC PLANTS



The information received by client:

- The panels **were not designed** to be installed in such extreme conditions as Rajasthan, the hottest state in India, where 50 degrees is an average temperature.
- Due to **bimetallic connection** between cable and insulated pin lugs, all connections were prone to overheating.
- Some of the connections were **loosened** due to improper torque.
- On some of the panels there were **no shade** to cover the panel.
- There was **no clearance** between two adjacent panels.

Actions to be taken:

- The panel design will be reconsidered to meet the environmental conditions.
- All contact connections with bimetallic connections will be changed to one metal connection.
- Tighten all contact connection.
- The clearance between two panels will be increased.
- The shade will cover all combiner boxes.

FIPRES FOR CAPACITORS

Overheating and explosion of capacitor banks are common problems in reactive power control systems due to inadequate ventilation, loose connections, bad design, or the overvoltage during lower demand period.

Overheating of the capacitor banks



Solution:

The top part of the capacitor overheats the most, that's why Streamer suggests installing vFPTs on top.

Installation of the vFPTs on capacitors



CASE STUDY: FM200 IN COMPENSATE PANEL

Overheating of one of capacitors led to smoke and further FM200 operation. The cost of refilling FM200 is much higher than actual damage and FM200 operation forces the equipment to be switched off. Preventive ALARM regarding overheating might have helped to plan outage and repair more accurately with less cost.



5k \$

panel cost

1k \$

repair cost

13.5k \$

refill FM200

Thank You.

Corporate Website

bridex.fujielectric.com

Contact Number

+65 6756 0833

Email Address

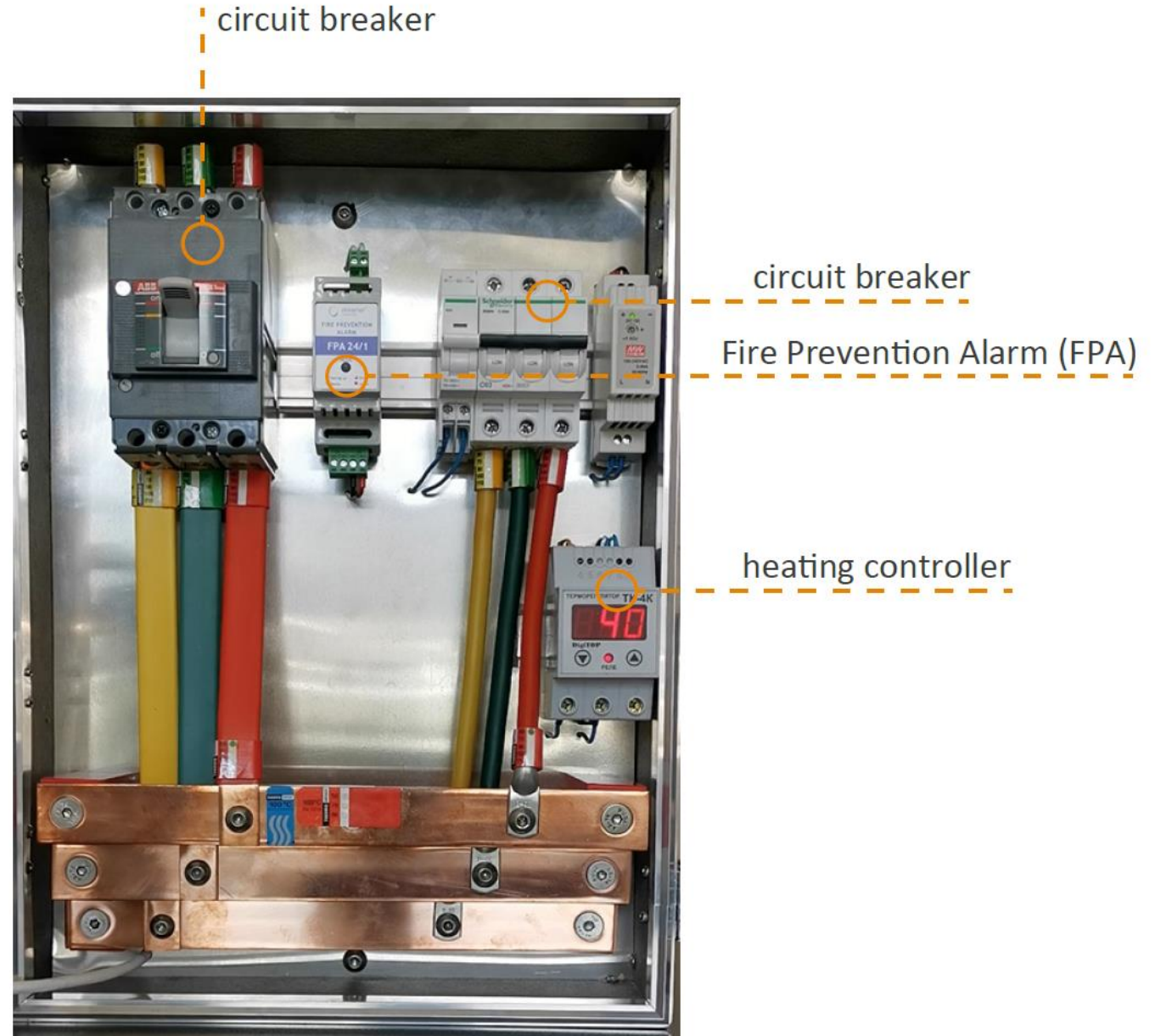
sales@bridex.fujielectric.com

Democase



Contents

No	Designation
1	circuit breaker ABB
2	circuit breaker Schneider
3	shunt trip device Schneider
4	heating controller Digitop
5	24 DC power supply unit
6	2x tubular cartridge heater



Testing kit

