



# Permanent Infrared Hotspot Detection



- ✓ Proven Technology
- ✓ Specified in projects world wide
- ✓ Adopted globally by OEMs
- ✓ 24x7 Real time status/alarm
- ✓ Increased uptime and reliability
- ✓ Increased Safety
- ✓ Low Load fault detection

## The importance of load

LoadMap is a patented software which dynamically adjusts the alarm threshold to suit the load on the circuit; thus enabling earlier and faster detection of compromised joints, even when operating at low load. By combining continuous thermal monitoring temperature data with circuit load data, LoadMap provides a unique and enhanced level of fault detection and verification prior to load switching on mission critical electrical circuits.

This is extremely important to 24x7 operation facilities with high downtime costs, as dual feed circuits are common and are typically only loaded to a level of approx 30% to enable load switching, with a high safety margin. However, as the load level decreases, so does the alarm threshold (see Fig 1 opposite), making these faults more difficult to identify.

FIG 1. DYNAMIC ALARM CALCULATION



Delta T ( $\Delta T$ ) 3.6°C  
@ 30% Load  
=  
Delta T ( $\Delta T$ ) 40°C  
@ 100% Load

## LoadMap® features and benefits

- Early detection of compromised joints operating at low loads by utilising temperature & load data provides an enhanced level of protection for 24x7 operation facilities, which periodic thermal inspection cannot provide.
- Enables user to “predict” in advance the temperature a joint will reach at any given load level, thus increasing load and capacity planning capability.
- Provides advance verification that compromised joints are not present on critical circuits being monitored, prior to load switching.
- LoadMap can provide the data to indicate how by lowering local operating ambient, it is possible to avoid de-rating critical circuits on ageing equipment.
- Identifies the dynamic condition of joints when under high or overload situations, thus providing enhanced levels of safety, asset integrity, and operational uptime.
- Condition based monitoring enables period between scheduled intervention maintenance to be increased. In addition, only joints requiring remedial action need be touched. The result is significant savings in maintenance downtime & improved operator/facility safety.
- Improved asset integrity management combined with increased equipment life due to improved knowledge.

## Feature matrix

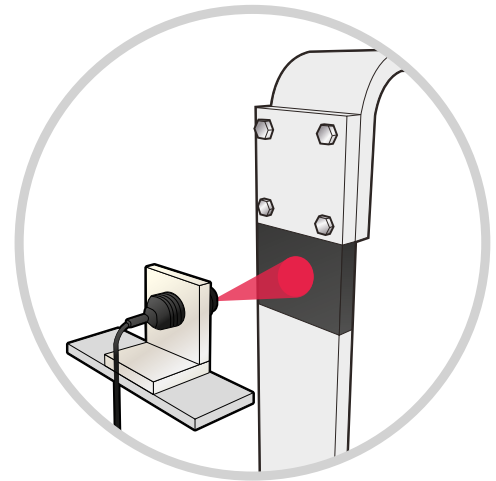
	Exertherm®		LoadMap® Software		
	Raw Data	Alarm Module	Generic	Manual	Dynamic
Raw data transfer (temperature values only)	✓				
Local/Remote alarm relay outputs		✓	✓	✓	✓
Warning Alarm - user adjustable based on temperature		✓	✓		
Warning Alarm - calculation based on manually entered load data				✓	
Warning Alarm - dynamic calculation based on real time load data					✓
Critical Alarm - user adjustable based on temperature		✓	✓	✓	✓
Graphical User Interface via web browser			✓	✓	✓
Modbus TCP export of data to BMS/SCADA etc			✓	✓	✓

## The Problem: Detecting electrical failure

The most common cause of electrical failures and arc flash incidents is poor busbar:busbar joints and cable terminations.

A compromised joint can only be identified by the excess heat it generates. Not to confuse 'excess heat' with 'heat rise', Exertherm sensors measure the Delta T ( $\Delta T$ ). Sensors are permanently installed inside energised electrical equipment to directly view and continuously monitor the condition of critical joints.

Exertherm 24x7 monitoring detects hotspots at an early stage of development preventing downtime caused by electrical failure and arc flash incidents.



## What are the benefits of permanent Exertherm® IR sensor system over periodic?

	Periodic Thermal Imaging/Windows	Permanent Exertherm® IR Sensor System
Inspection Frequency	Typically 1 day out of 365 = <1% of time	24x7/365 = 100% of time
% Chance of Problem Detection	0.27%	100%
Positioning	External	Internal
View	Limited	Unlimited - direct line of sight
Reliability	Dependent on luck/correlation	Continuous reliable data
Availability	Data is not integrated or real-time	Real-time data - integrated to BMS/EMS/SCADA
Safety	Places operator at risk	Increases facility/operator safety
Self-diagnostics	Operator dependent	Automatic

## What does Exertherm® Thermal Monitoring provide?

- ✓ Increased operator & facility safety
- ✓ Increased operational uptime
- ✓ Reduced risk of fire/explosion resulting from Arc Flash
- ✓ Real-time data = improved critical asset integrity
- ✓ Reduced unplanned maintenance
- ✓ OEM vendor neutral
- ✓ Suitable for retrofit or new-build
- ✓ Enhanced protection for critical circuits operating at low load

RISK



NO RISK



# The Exertherm® System: Inside The Panel

## 1 Infrared Sensors

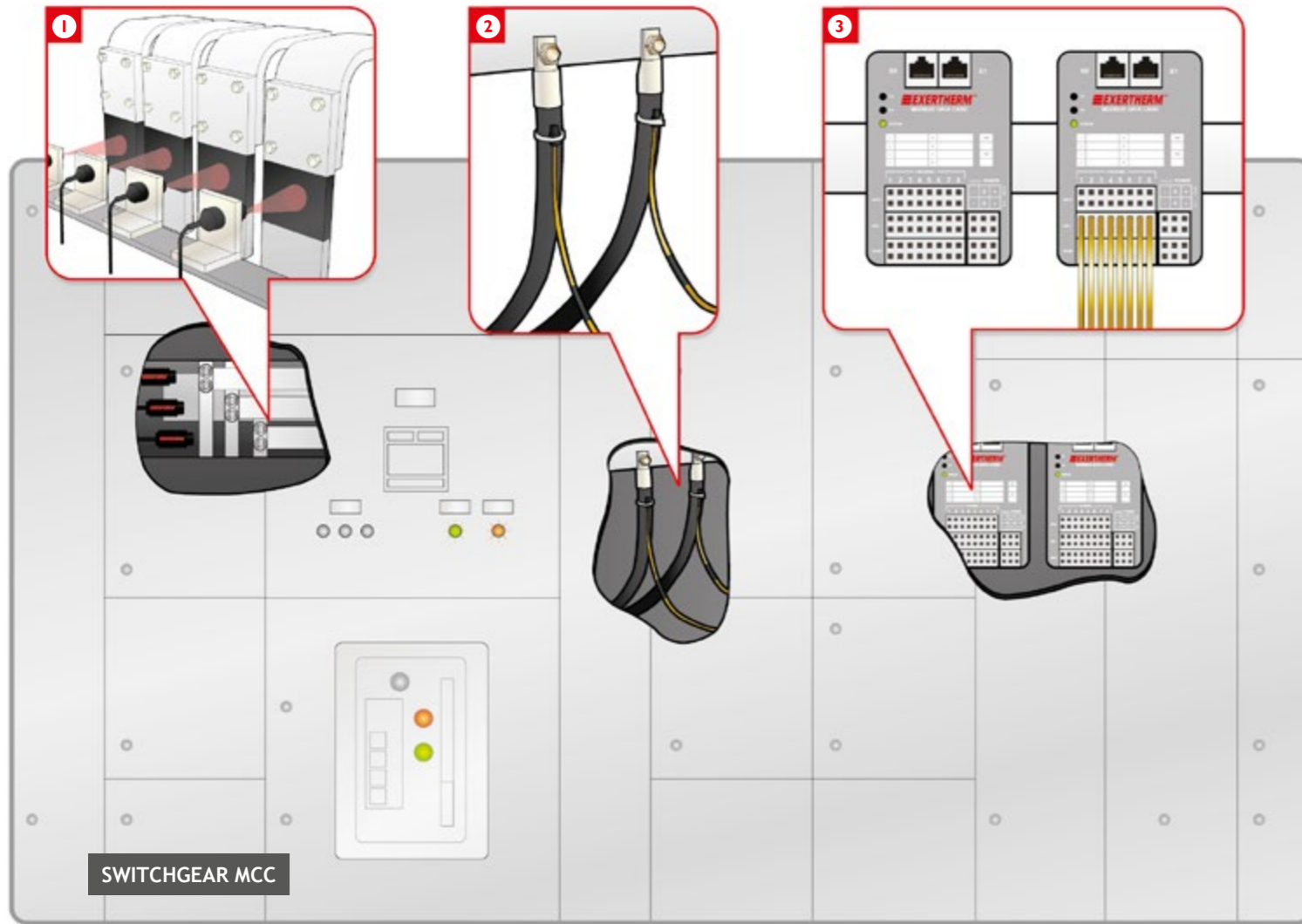
Our small, non-contact, plastic IR Sensors have lifetime calibration and require no external power. These are placed within the enclosure to directly monitor key connections through  $\Delta T$  measurement.

## 2 Cable Sensors

Our patented cable sensors strap to the cable monitors to monitor cable joints through  $\Delta T$  measurement.

## 3 Datacards

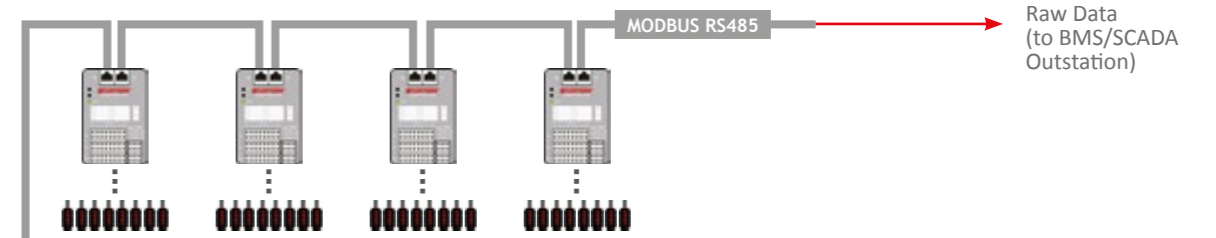
Our Datacards facilitate the collection of data from the IR or Cable sensors (8 per data card) and transmit it to the host system via the ModBus protocol. They feature RJ45 sockets for easy integration and connection to your RS485 Modbus network.



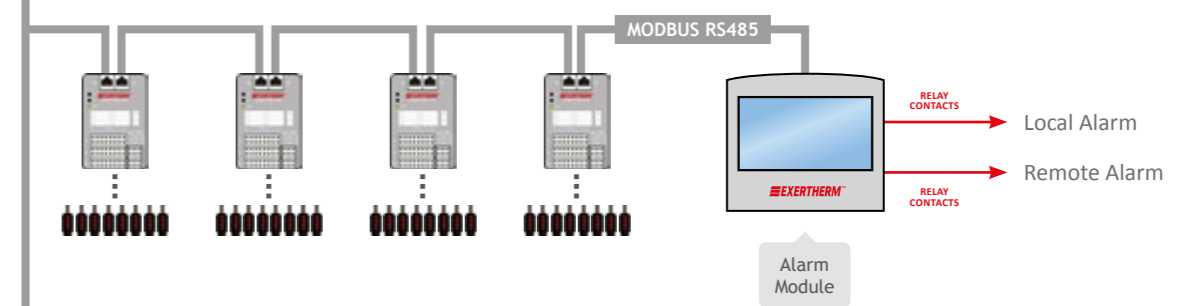
# Outside The Panel

## 4 Integration Options

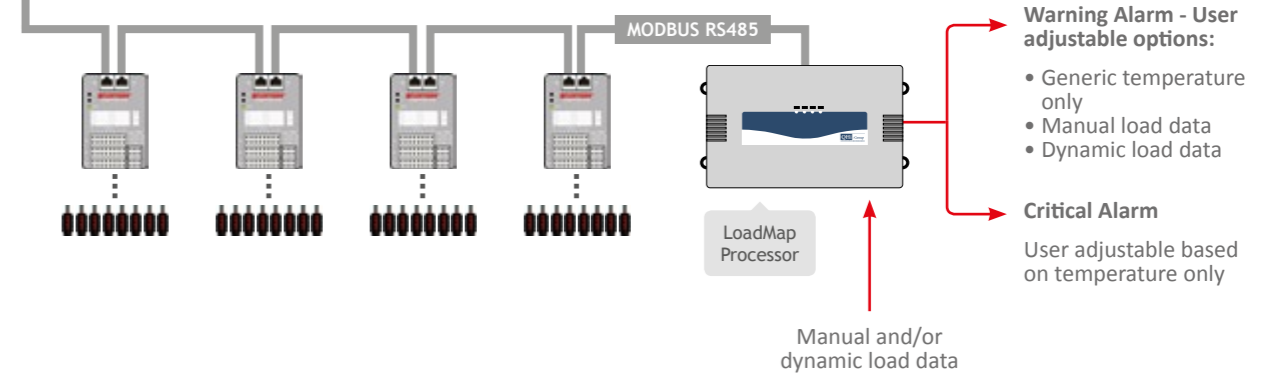
### A - Exertherm® Raw Data Transfer



### B - Exertherm® Alarm Module



### C - LoadMap® Software



## Where to permanently monitor?

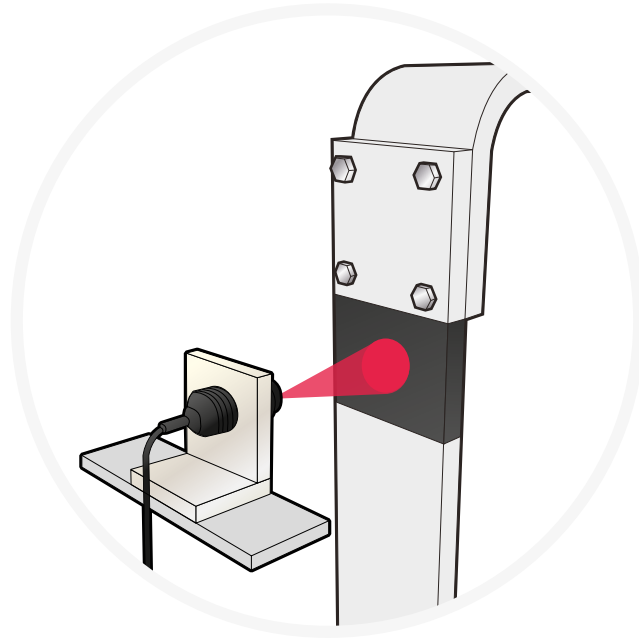
The Exertherm solution is suitable for either LV or MV applications, enabling the following critical and key connections (including insulated bus) to be monitored simultaneously and in real-time:

- ✓ All AIS circuit breakers – line/load side
- ✓ Bus couplers – line/load side
- ✓ Critical vertical to horizontal bus connections
- ✓ MCC clamp connections
- ✓ Critical cable connections - typically above 400A (via specialist Exertherm Cable sensors)
- ✓ All shipping/transport joints Exertherm cable sensors

## LoadMap® Software – Warning Alarm Generation

The LoadMap software can use one or any combination of the 3 options below in a system:

- ✓ **Generic**  
System default temperature level, which is user adjustable as required
- ✓ **Manual Load**  
Manual entry of maximum anticipated load on circuit provides “static” load based alarm level
- ✓ **Dynamic Load**  
Real-time load data provided from metering or BMS/SCADA provides dynamic load based alarm level



**Permanent · Infrared · Hotspot · Detection**

For more information on how our Exertherm® product range can benefit you please contact QHi sales on [sales@QHigroup.com](mailto:sales@QHigroup.com) or call **+44 (0)1582 461123**