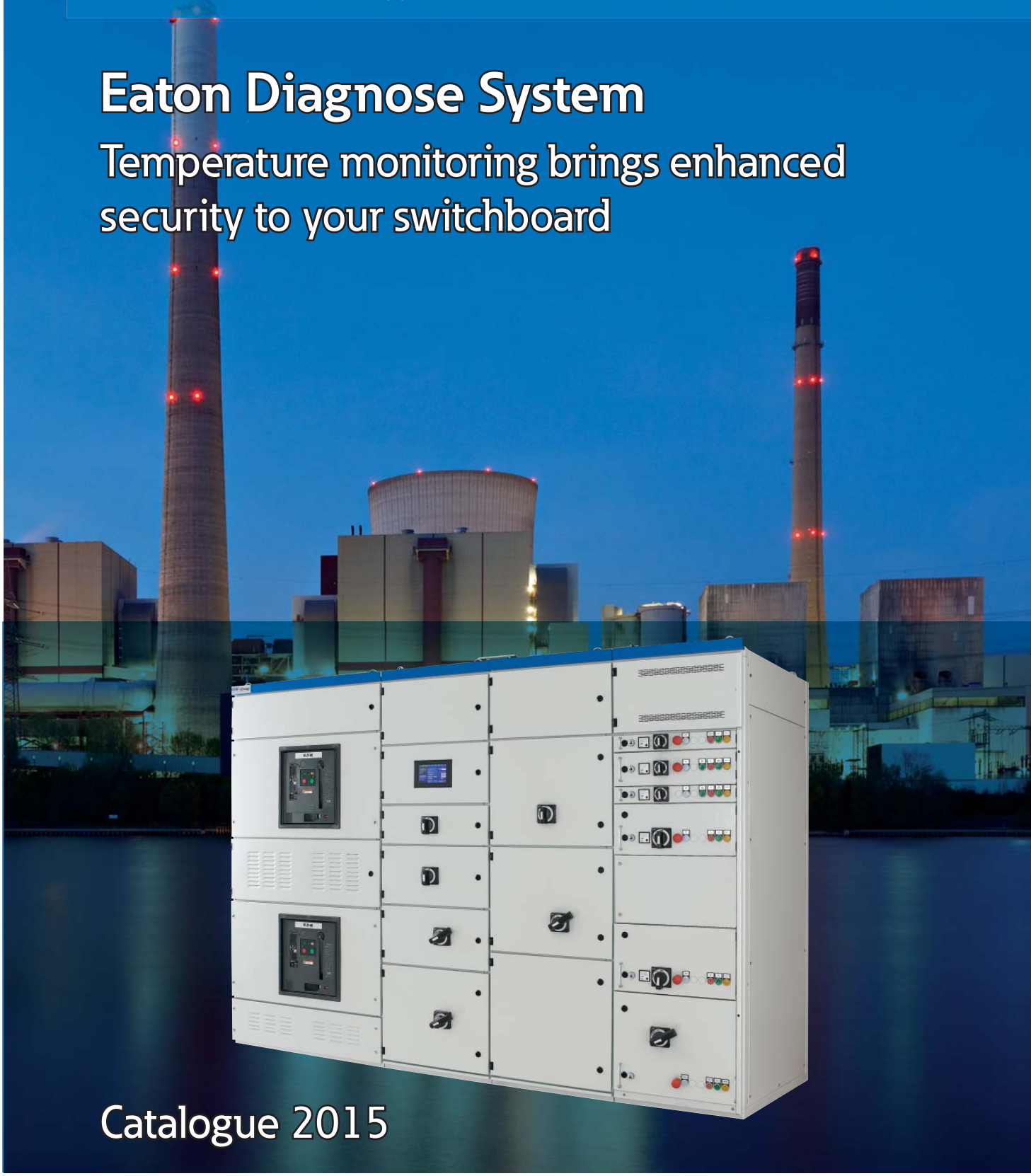
Eaton Diagnose System

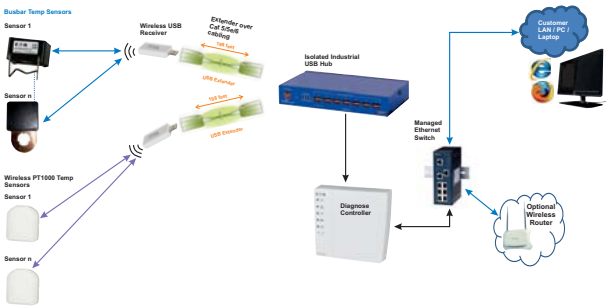
Temperature monitoring brings enhanced security to your switchboard



Catalogue 2015

Powering Business Worldwide

EATON Diagnose System



- Permanent monitoring
- Detection at an early stage
- Warnings
- Diagnostics
- Documentation
- Availability of the system
- Wireless – no wiring of the sensors
- Quick and easy installation
- No batteries in the sensors
- Permanent status transmission
- Log-file recording
- Integration into existing SCADA systems

EATON Diagnose System

Temperature Sensor

• Incl. holding brackets for 10mm flat copper

vt35115

Type designation	Article No.	Pack (pcs.)
XNT-DIAG1	178303	1
XNT-DIAG3	178304	3
XNT-DIAG12	178305	12

Adapter Plate

• Incl. screws and Allen key

vt34715

Type designation	Article No.	Pack (pcs.)
XNT-DIAG-A-3	178306	6
XNT-DIAG-A-4	178659	8

Holding Brackets

• For 15mm Cu material thickness

vt34915

Type designation	Article No.	Pack (pcs.)
XNT-CLAP15	180071	100

Holding Brackets

• For 20mm Cu material thickness

vt34815

Type designation	Article No.	Pack (pcs.)
XNT-CLAP20	180072	100

Diagnostics Controller

vt34215

Type designation	Article No.	Pack (pcs.)
CHCA-00/03	178650	1

EATON Diagnose System

Diagnostics Temperature Input

- RF module for capturing the ambient temperature
- Incl. fixing bracket
- For 2 sensors maximal

	Type designation	Article No.	Pack (pcs.)
vt34415 	CTEU-02/02	179344	1

Temperature Sensor for Ambient Temperature

- PT1000, attachment hole 4mm, cable length = 1m

	Type designation	Article No.	Pack (pcs.)
vt40315 	XNT-PT1000-4MM	179392	1

Receiver

	Type designation	Article No.	Pack (pcs.)
vt34515 	XNT-REC	178660	1

USB Extender

- Incl. fixing bracket

	Type designation	Article No.	Pack (pcs.)
vt34315 	XNT-USB-EXTENDER	178661	1

USB HUB

- 7 Port USB hub

	Type designation	Article No.	Pack (pcs.)
vt34015 	XNT-USB-HUB-7PORT	178662	1

Sensor Tester

		Type designation	Article No.	Pack (pcs.)
vt34115 		XNT-SENSOR-TEST	181584	1

Power supply for HUB

- Rated voltage Input: 100-240V AC, 50/60Hz
- Rated voltage Output: 24V DC, (±3%)
- Rated current: 1.25A

	Designation	Type designation	Article No.	Pack (pcs.)
	Power supply	EASY400-POW	212319	1

Technical Data

Introduction

Eaton DIAGNOSE was developed to provide permanent monitoring of our low-voltage main distribution boards. This results in a wide variety of advantages such as early detection, warning messages, diagnostics, documentation, increased system availability, optimized service intervals, reduction of infra-red scans, reduction of mechanical strain, ...

Thanks to permanent monitoring of the distributions boards any potential errors can be detected at a very early stage and be prevented (early detection). Such errors can by identified by a rise in temperature over a longer period of time, which usually would not be detected during a thermo-scan because there is no reference value available for a longer period of time. Another advantage is that sensors can be placed in areas of the system that are difficult or impossible to access for thermo-scans. As it is no longer necessary to remove covers or planks for thermo-scans, it also results in increased safety for people and increased system availability, because enabling is only necessary when DIAGNOSE reports a pre-vailing abnormity. Thanks to wireless signal transmission between sensors and analysis unit there is no need for any additional cables in the main and distribution busbar areas. And the time usually required for service jobs will be significantly shorter. You can immediately start with the usual revision jobs as thermo-scans and disassembly jobs are no longer necessary.

Warning messages:

If DIAGNOSE detects any abnormity, it will be visually displayed in the software. So there are different colours for messages to indicate the degree of dysfunction.
Green = everything is okay
Yellow = no signal from the sensor, or the battery of the ambient temperature sensor is low
Orange = rail temperatures are getting close to critical values
Red = critical temperature values have been reached or exceeded

DIAGNOSE can be used as a stand-alone solution or it can be interlinked through the Internet, but it can also be incorporated into existing Scada systems in order to be able to react as efficiently and as automatically as possible to any potential errors.

Diagnostics:

Thanks to permanent monitoring of the system and thanks to documentation of the data it is possible to optimize trends and poorly aligned production processes. For example, if there are repeated and extreme load peaks which would normally not be noticed, this may be due to the fact that the entire system is exposed to high strain levels.

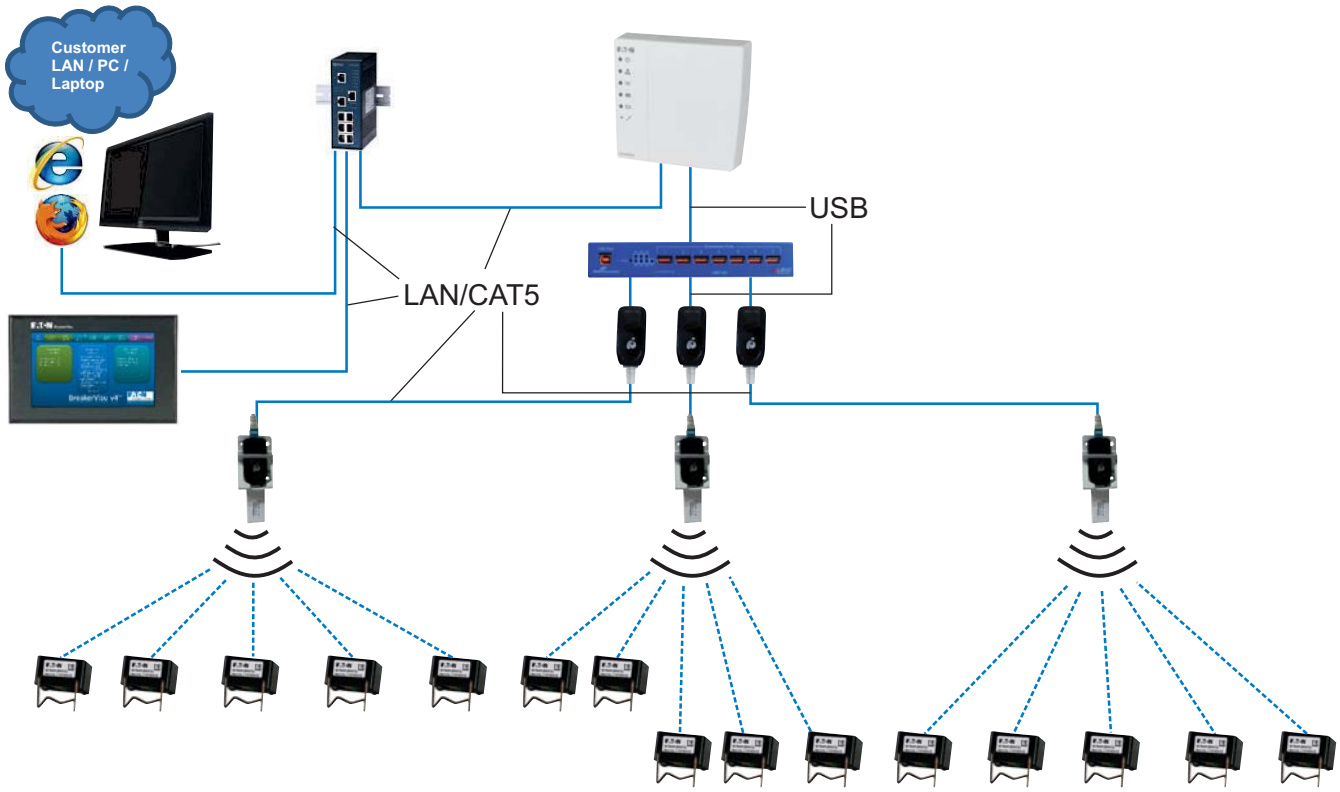
Such load peaks can easily be detected and prevented thanks to DIAGNOSE. In most cases all you need to do is optimize timebased processes in the production routine to get this type of problems under control.

Documentation:

Every 10 minutes the sensors will be checked, their status will be recorded and their data will be saved. The log-file will be saved for one month. After one month, older data will be time-compressed. To prevent any overwriting of data, the DIAGNOSE Controller can be equipped with an additional memory card. Depending on the capacity of the memory card, you can save log-files over very long periods of time. The log-file will be displayed both as a graph and in an Excel table. These data are the basis for displaying the analysis data in a chart.

Technical Data

Functional overview



systemuebersicht1

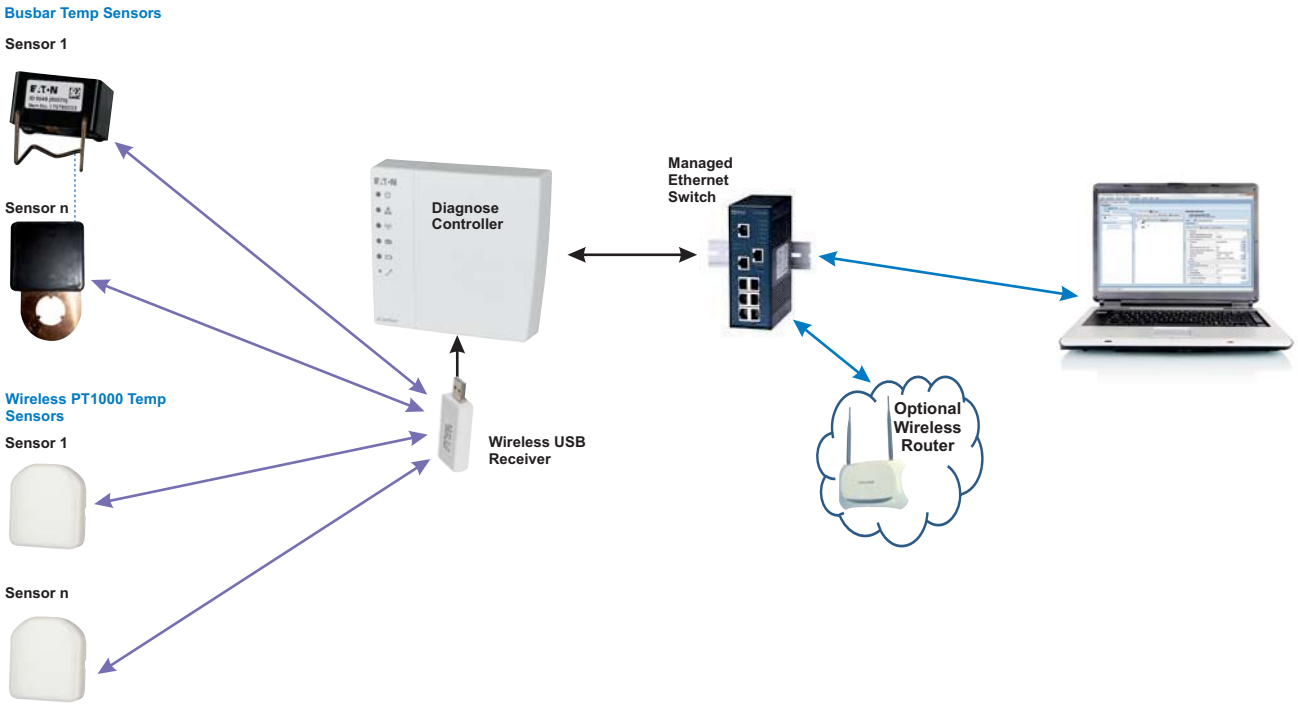
Technical Data

System overview

Version 1:
No network connection, max. number of sections to be monitored = 5

As there is only 1 receiver installed in this configuration, the maximum size of the system is limited to 5 secions (regarding the transmission power it is a max. of 2 sections to the left and 2 sections to the right).

The data received and saved can be loaded from the Eaton Diagnostics Controller to a PC at any time and then be analyzed.

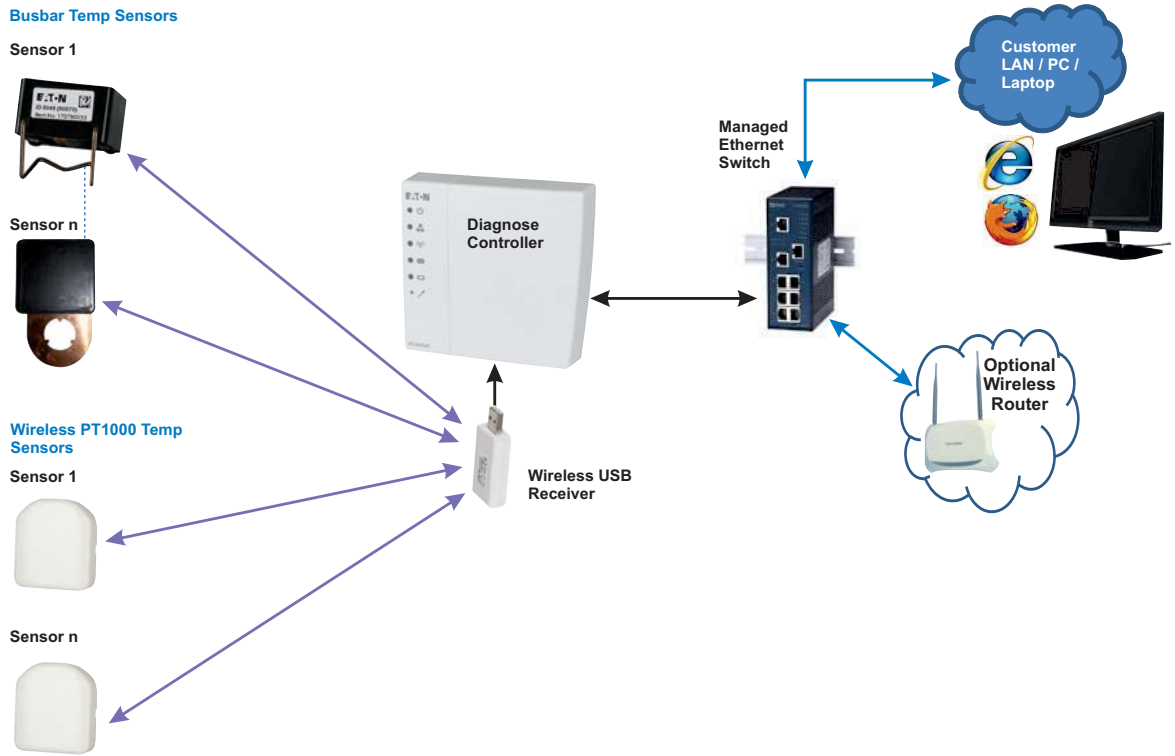


diagnose2

Version 2:
With network connection, max. number of sections to be monitored = 5

As there is only 1 receiver installed in this configuration, the maximum size of the system is limited to 5 secions (regarding the transmission power it is a max. of 2 sections to the left and 2 sections to the right).

The data received will be saved directly at the Diagnostics Controller and at the same time all data will also be transmitted to the connected network.



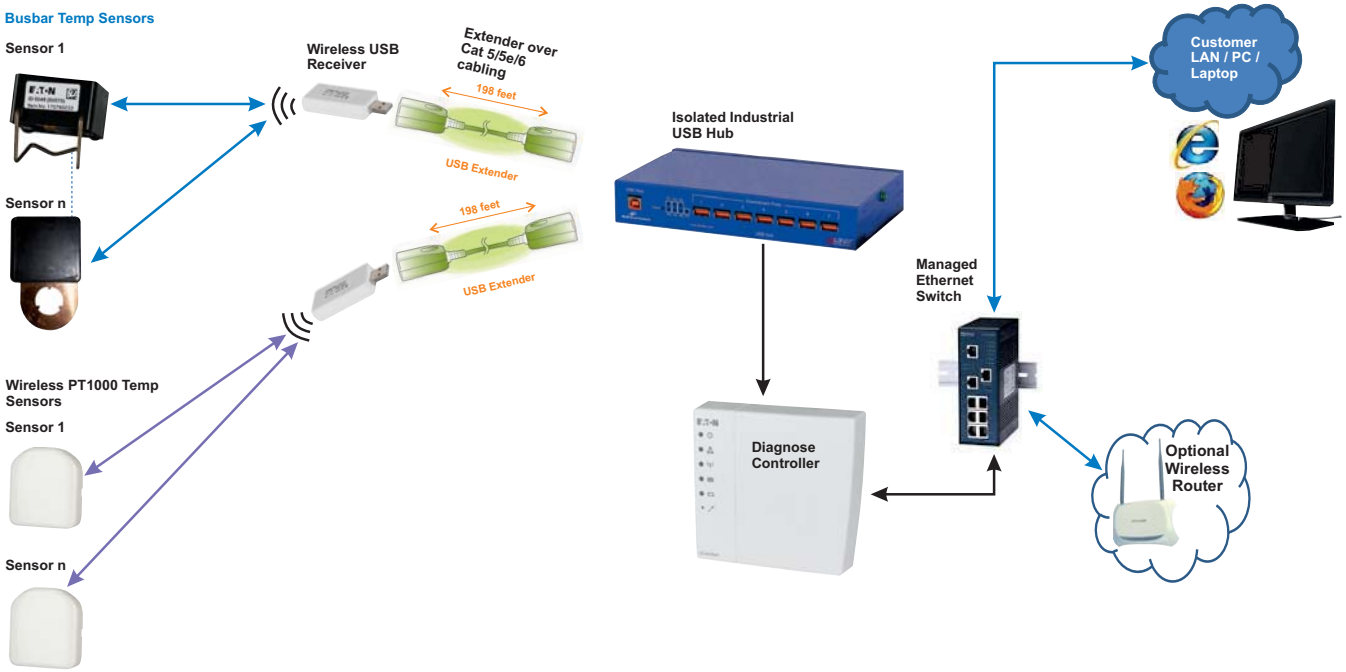
diagnose3

Technical Data

System overview

Version 3:
With network connection, max. number of sections to be monitored = 35

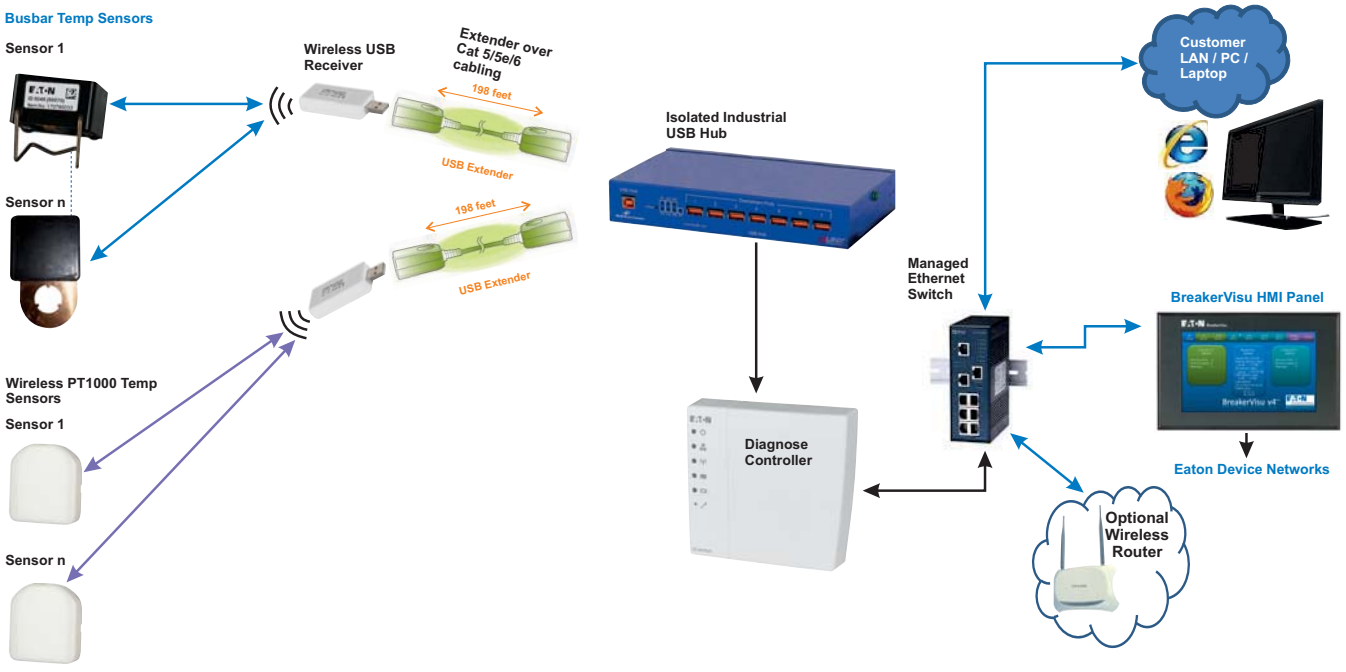
In this configuration the Diagnostics Controller is connected to the USB hub. The hub has 7 outputs and can therefore connect up to 7 receivers. Each receiver can monitor up to 5 sections. All of the data received by the receivers installed are transmitted to the Diagnostics Controller and saved. At the same time all the data are also transmitted via the connected network.



diagnose4

Version 4:
With network connection and Breaker Visu Integration, max. number of sections to be monitored = 35

Same configuration as in version 3.
In addition, there is a connection to the Breaker Visu Touch Panel which makes it possible to immediately read the current values measured and the status requests. Via the Multi-Breaker-Display, the system displays all operating data of your low-voltage switchgear system in a centralized an clearly structured way.



diagnose5

Technical Data

System description

DIAGNOSE is a wireless and maintenance-free temperature monitoring system for busbar systems and ambient temperatures. It can be adapted to any system size and can be expanded to meet any requirements. The sensors can directly be fixed at the critical points in a system. These points are precisely defined in the installation instructions of each system; they are arranged according to field (section) types. Every 10 minutes every sensor transmits its current status, receivers will receive the status and forward it to the DIAGNOSE Controller through a cable-based connection. In addition, the ambient temperature of the individual fields (sections) can be measured and captured. For this purpose, we provide PT1000 sensors with a cable length of one meter. This type of sensor can be connected to a temperature input. Every temperature input can be connected to 2 sensors. Via RF the data will be transmitted from the temperature input to the receiver.

One receiver covers an RF range of a maximum of 5 fields (sections). If the system configuration includes more than 5 fields (sections), a second receiver needs to be installed. In large system configurations one receiver is installed for 5 fields (sections) to ensure a safe reception of the data from the sensors. Therefore it is necessary to install a hub (distributor). Our hubs are equipped with 7 ports. So a maximum system size of 35 fields (sections) can be realized with one DIAGNOSE Controller. If the system size is bigger than that, a second DIAGNOSE Controller needs to be installed. It will again be connected to a hub (up to 35 additional fields/sections).

The receiver sends the data it receives from the sensor to the Controller where they are processed/compared. The Diagnostics Controller processes the data it receives, compares them with the threshold limit values saved in the system and then shows the respective status. In the DIAGNOSE Controller all data will be collected and compared with the respective threshold limit values. If a temperature gets close to a maximum permitted threshold limit, a pre-warning level will be triggered. This will be displayed in orange in the Diagnostics software. In the overview, the respective sensor will change its colour. If a temperature value exceeds the respective threshold limit, the sensor will turn red. If a sensor does not send any information (no current on the busbar), it will be indicated in yellow.

All the data collected will be displayed graphically and can be exported as an Excel table. Further processing of the data, e.g. in charts, can be done at any time. This ensures continuous long-time transparency which can make an analysis so much easier. A slight increase in temperature of individual connection points for example can be detected at a very early stage. This is usually a sign of contact loss which can usually be fixed with just a few touches (by tightening the screws for example).

Internet or SCADA connection:

The Internet or SCADA connection can be realized through a network connection. Depending on the respective situation you can use a UMTS compatible router, a standard network router or a fibre-optic converter system. The system as such is based on an HTML interface which can be opened any time through a standard Internet browser and can therefore be integrated into any network. If the Controller is connected with the Internet, it also offers the opportunity to automatically install any updates available from a server.

Technical Data

Schematic overview of the arrangement of components in the distribution board system

A) Diagnose Controler

B) HUB

C) USB-Adapter

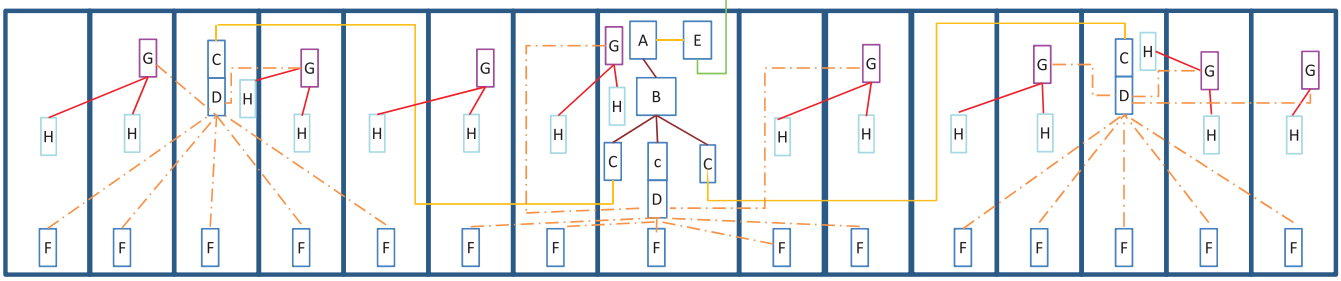
D) Receiver

E) Ethernet Switch

F) Rail-mounted sensor

G) Temperature input (Ambient temperature)

H) PT 1000 sensor (Ambient temperature)



systemuebersicht2

Detailed explanation of the individual components

DIAGNOSE Controller:

The heart of Eaton DIAGNOSE is the DIAGNOSE Controller. This is where the system configuration is uploaded to and saved. The threshold limit values for the different field/section configurations are already pre-configured at the factory before delivery. After DIAGNOSE has been started up, all the data/temperatures collected will be saved for one month. Following that period, the first data saved will be gathered at a time. The DIAGNOSE Controller is equipped with a slot for a card that can be used as a memory extension. This allows saving data over a longer period of time. If sufficient memory capacity is added, the maximum period for saving log-files is 5 years. For first installation and configuration, please refer to the installation instructions.

Sensors (rail-mounted) - fastening technology:

Our sensors are designed for universal application. This means that one and the same sensor can be used for any configuration. However, there are differences in the fastening technology. In most cases the sensor can be mounted using the fixing bracket integrated on the device. This bracket is designed for a material (copper) thickness of 10 mm. In order to cover all the other cases of application there are brackets available for 15 and 20 mm thickness, too. These brackets need to be ordered separately and have to be changed on the sensor using an Allen key included in the delivery. In addition, there is an adapter plate available which makes it possible to screw-fasten the sensor at Cu connections. The holes in the adapter are placed in a way that an M10 screw can be used on one side or an M12 screw on the opposite side.

Maintenance of rail-mounted sensors:

The sensors are equipped with a modern Energy-Harvesting-System, they don't need batteries and are therefore maintenance-free. Three minutes after a minimum current of 100A is available, the sensors start transmitting. After the sensors have been fully charged, they will transmit their status every 10 minutes.

Sensors (ambient temperature):

To be able to measure the ambient temperature in a targeted way in the individual fields/sections, we provide a universal sensor that can be placed anywhere and is equipped with a cable connection. The cable needs to be connected to a temperature input which forwards the collected data. The cable length of 1 m allows both a placement directly at critical points in the cabinets and a freely selected placement of the temperature input that is easy to access at any time. In addition, it is possible to place ambient temperature sensors in modules or in drawers. This is how we provide an uninterrupted monitoring chain.

Technical Data

Detailed explanation of the individual components

Maintenance of ambient temperature sensors:

The sensor as such is maintenance-free. Only the temperature input is equipped with a coin cell which needs to be replaced every 5 years approximately.

Receiver:

The receiver serves a receiver of data from the sensors and temperature inputs of ambient temperature sensors. The maximum number of sensors each receiver can receive data from is limited to 200. The receiver can directly be plugged into the USB port at the DIAGNOSE receiver. However, if you need several receivers for a system, you need to use a USB hub in between. Usually you will need to install one receiver for four fields/sections. If a system includes more than 4 fields/sections, you will need to install several receivers.

Receiver holder:

To install the receiver in a safe and stable way in the cabinet, Eaton provides a mounting device which can easily be fixed at any point easy to access in the system. All you need to fix that holder is 2 screws.

USB extenders:

They are necessary to establish a connection between the USB hub and the receiver (1 extender for each receiver). For the connecting lines you can use standard LAN cables CAT5 or higher. The length of the LAN cables can vary depending on the distance between the receiver and the hub.

USB hub:

To monitor large systems in a safe and reliable way you will need to install several receivers. You will need one receiver for 5 fields/sections. But because each Eaton DIAGNOSE comes with one USB port only, you will need to install an additional distributor (USB hub). We provide a 7-port USB hub equipped with rotary fixing brackets on the side. Therefore it is possible to fix it in different positions.

Gateway/Switch:

A gateway or switch establish a connection to LAN/WLAN networks.

Breaker Visu:

A Breaker Visu touch panel makes it possible to immediately read the current measurement values/status queries directly and on the spot. Each sensor can be scanned section by section. Alarm messages will be visually shown at the display. Via a Multi Breaker Display the system will show all operating data of your low-voltage switchgear system in a centralized and clearly structured way.

- Log-files including operating data, energy and incidents
- Service-life indicator for NZM circuit breakers
- Password protection for important settings
- User-defined labelling of switches

Wireless router:

The wireless router cannot be specified by Eaton because it can be designed differently according to each network. Please consult your local IT specialist to get the support you need (Security Policy).

Eaton is a power management company with 2014 sales of $22.6 billion. Eaton provides energy-efficient solutions that help our customers effectively manage electrical, hydraulic and mechanical power more efficiently, safely and sustainably. Eaton has approximately 102,000 employees and sells products to customers in more than 175 countries.

For more information, visit **www.eaton.com.**

Article number

To contact an Eaton salesperson
or local distributor/agent, please visit
www.eaton.eu/electrical/customersupport

Eaton Industries (Austria) GmbH
Scheydgasse 42
1215 Wien
Austria

Eaton Industries Manufacturing GmbH
EMEA Headquarters
Route de la Longeraie
1110 Morges
Switzerland

Printed in Austria (06/15)
Publication number

Grafics: SRA
DigiPics, Lithos:
Print:

Powering Business Worldwide