What is meant by ‘Preventive Monitoring’?

“Devices and systems that are able to detect and report changes in an installation which, if no counter measures are taken, could ultimately lead to the tripping of the installation’s primary protection devices and interruption of the supply.“

Preventive Monitoring is a sensible addition to the existing primary protection system.
What applications are involved in ‘Preventive Monitoring’?

- Measurement of current, residual current, voltage, isolation impedance, circuit impedance, etc for monitoring purposes.

- Reporting and circuit isolation on exceeding or going below pre-defined thresholds, possibly after specified time periods.

- Trend calculation, correlation of measurement values with one another and also with events within the EIB system, event logging.
What advantages does ‘Preventive Monitoring’ have?

- The quality of the mains supply is improved. (Quantitative)
- The user feels safer. (Qualitative)
- Improved installation transparency and supervision: faults that appear only sporadically, below the tripping levels of the primary protection devices, are able to be detected.
- Remote diagnose (e.g. as part of the building facility management).
- Certain test and measurement functions (e.g. for the Electrical Installation Check) can be carried out automatically.
Where can ‘Preventive Monitoring’ be implemented?

In the residential area:
- Kitchen, Hobby and Housekeeping rooms,
- Monitoring of the supply to garages and outside buildings,
- Selected socket outlet circuits, e.g. fridge freezer, etc.

In the commercial area:
- Public buildings: Schools, Banks, Swimming Pools, ..... 
- Functional areas: Sanitary, Technical or Laboratory rooms, ..... 
- Selected socket outlet circuits, e.g. Computer server, etc
Current Module SM/S 3.16.30

Product characteristics:

- Measurement of load and/or residual current in 3 independent, measurement circuits.
- Transmission of the actual load and residual current value (8-Bit)
- Set-up of current switching thresholds: Telegram (1-Bit) on exceeding or going below levels
- Adaptation of the measurement time / accuracy according to the type of electrical load.
Current Module SM/S 3.16.30

Technical Data:

For measurement of load and residual current in up to 3 independent circuits.

- Power supply: via ABB i-bus® EIB
- Inputs: 3 potential free, independent measurement circuits
- Accuracy: ± 2% from full scale value (Sinus)
- Rated load current: $I_n$ 16 A AC (Full scale value 25.5 A, Resolution 0.1 A)
- Rated residual current: $I_{\Delta n}$ 30 mA AC Type A - sinusoidal AC and pulsed DC (Full scale value 51.0 mA, Resolution 0.2 mA)
- Rated voltage: max. 230/400 V AC 50/60 Hz

Function

- Transmission of the actual load and residual current value
- Upper and lower thresholds definable for each current measurement. Telegram is send on exceeding or going below both threshold levels.
Current Module SM/S 3.16.30

Connection Diagram:

Load current measurement

Load and/or residual current measurement

Circuit Breaker 16 A S260 B16

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## Communication Objects:

<table>
<thead>
<tr>
<th>No.</th>
<th>Function</th>
<th>Object name</th>
<th>Medium Type</th>
<th>Program</th>
<th>Manufacturer</th>
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<tbody>
<tr>
<td>0</td>
<td>Telegr. Value</td>
<td>Load current value Circuit A</td>
<td>1 Byte</td>
<td></td>
<td>ABB</td>
</tr>
<tr>
<td>1</td>
<td>Telegr. Value</td>
<td>Load current value Circuit B</td>
<td>1 Byte</td>
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<td>ABB</td>
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<tr>
<td>2</td>
<td>Telegr. Value</td>
<td>Load current value Circuit C</td>
<td>1 Byte</td>
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<td>ABB</td>
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<tr>
<td>3</td>
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<td></td>
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<tr>
<td>4</td>
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<tr>
<td>6</td>
<td>Telegr. Switch</td>
<td>Threshold load current Circuit A</td>
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<td>ABB</td>
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<tr>
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<td>1 Bitt</td>
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<tr>
<td>9</td>
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<td>10</td>
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</tr>
<tr>
<td>11</td>
<td>Telegr. Switch</td>
<td>Threshold residual current Circuit C</td>
<td>1 Bitt</td>
<td></td>
<td>ABB</td>
</tr>
</tbody>
</table>
Parameter: General

- **Accuracy of RMS measurement value**: Normal
- **Suitable for**: Ohmic loads, e.g., incandescent lamps
- **Duration of a measurement cycle**:
  - Normal: \(3.3s \times \text{number of activated measurement circuits}\)
  - Increased: \(6.6s \times \text{number of activated measurement circuits}\)
  - High: \(10s \times \text{number of activated measurement circuits}\)
Current Module SM/S 3.16.30

Parameter: Load/Residual current Circuits A,B,C

<table>
<thead>
<tr>
<th>Residual current Circuit</th>
<th>Residual current Circuit</th>
<th>Residual current Circuit</th>
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<tr>
<td>General</td>
<td>Load current Circuit A</td>
<td>Load current Circuit B</td>
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</table>

<table>
<thead>
<tr>
<th>Function</th>
<th>Send measurent value on change of more than</th>
<th>Hysteresis for the transmission of switching telegrams</th>
</tr>
</thead>
<tbody>
<tr>
<td>activated</td>
<td>+/- 0.0A</td>
<td>Upper threshold value</td>
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<tr>
<td>none</td>
<td>+/- 0.0A</td>
<td>25.5A</td>
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<tr>
<td>activated</td>
<td>+/- 0.1A</td>
<td>Lower threshold value</td>
</tr>
<tr>
<td></td>
<td>+/- 25.4A</td>
<td>0.0A</td>
</tr>
<tr>
<td></td>
<td>+/- 25.5A</td>
<td>0.0A</td>
</tr>
<tr>
<td></td>
<td>+/- 5.0A</td>
<td>0.0A</td>
</tr>
<tr>
<td></td>
<td>+/- 1.0A</td>
<td>0.0A</td>
</tr>
<tr>
<td></td>
<td>+/- 25.5A</td>
<td>0.0A</td>
</tr>
</tbody>
</table>

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Current Module SM/S 3.16.30

Threshold Values:

- **Telegram '1'**
- **Telegram '0'**

Upper Threshold:
- 10

Lower Threshold:
- 4

Current Values:
- 0
- 2
- 4
- 6
- 8
- 10
- 12
- 14
- 16

Time: 0 - 16

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Example 1: Monitoring of a 2.5 kW Drying Oven

- **Electrical Consumer**
- **Current Module SM/S 3.16.30**
- **Application Unit AB/S 1.1**
- **Interface RS 232**
- **Protocol via Printer**

**Graph:**
- **Load Current (A)**
- **Operating time**
  - Time 'On'
  - Time 'Off'
- **Heater element failure (Ageing)**
  - Initiate repair
- **Thresholds**

**Diagram Notes:**
- Operating time and load current graph showing thresholds.
- Ageing and repair initiation points indicated.

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Example 2: Residual Current Monitoring

Electrical Consumer e.g. Computer System

Current Module SM/S 3.16.30

Interface RS 232

Visualisation

Residual Current (mA)

Tripping area of primary protection device.

Alarm!
Initiate repair

Thresholds