Solutions for Life Science

Compact Monitoring Technology

CMT V4

Operating Instructions
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1. About this document

1.1 Scope and Objectives

The CMT solution is an environmental monitoring system that lives up to the challenges of consistently complying with cGMP regulations that govern the use of computerized systems.

- EU GMP Annex 11
- US FDA 21 CFR Part 11
- Other regional equivalents, e.g. CFDA

This document describes the principals for operating and maintaining the CMT solution using the various components of the Desigo™ Building Automation and Control System (BACS). Topics covered within this document include:

- Safety precautions for working with electrical equipment
- Mechanical installation requirements for cable shielded connections as well as mounting instructions.
- An overview of the delivered components and explanations for the meanings of the various lamp and LED indicators.
- Principals for operating the system using Desigo Insight navigation screens and explanations of the alarm management and critical parameter handling functions with regulatory commenting on modifications.
- Principals for using InfoCenter Suite to create compliance reports containing historical data captured by the CMT as well as the principals for long term archiving and storage of that data.
- Principals of data backup performed automatically by the system as well as recommendations for integration of these into a super-ordinate site backup strategy.
- Descriptions of the various optional system functionalities. For example, settings for thresholds and warnings for sensor calibration cycles, as well as examples of visualization and alarming for particle counters.
- Description of various hardware options.

1.2 Before you start

1.2.1 Trademarks

The table below lists the trademarks used in this document listed together with their legal owners. The use of these trademarks is subject to international and national statutory provisions.

<table>
<thead>
<tr>
<th>Trademarks</th>
<th>Legal owner</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acronis® Backup &amp; Recovery™</td>
<td>Acronis Inc, see <a href="http://www.acronis.eu/backup-recovery/">www.acronis.eu/backup-recovery/</a></td>
</tr>
<tr>
<td>Climet®</td>
<td>Climet Instruments Company, see <a href="http://www.climet.com">www.climet.com</a></td>
</tr>
<tr>
<td>Desigo™</td>
<td>Siemens Switzerland Ltd.</td>
</tr>
</tbody>
</table>
Trademarks | Legal owner
---|---
GAMP® | International Society for Pharmaceutical Engineering Inc.
InfoCenter Suite® | Siemens Switzerland Ltd.
Microsoft …
Windows Server®
SQL® Server | Microsoft Corporation, see www.microsoft.com/trademarks
PMS
AirNet®
RNet® | Particle Measuring Systems Inc., see www.pmeasuring.com/

Table 1–1: Trademarks

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These documents have been prepared with great care. The contents of all documents are checked at regular intervals. Any corrections necessary are included in subsequent versions. Documents are automatically amended as a consequence of modifications and corrections to the products described. Please ensure that you have the latest revision date of the documentation. If you find any lack of clarity while using this document, or if you have any criticisms or suggestions, please contact your nearest branch office, or write directly to the support team at Headquarters in Zug (see below).

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Please note that without prejudice to your statutory rights, Siemens accepts no liability for any losses resulting from non-observance or improper observance of the points referred to above.

1.2.5 Other important documents

Other manuals used in this guide: For Siemens Building Automation experts or for authorized personnel only.

1.3 Document validity

This document is valid for the Compact Monitoring Technology, Version 4 solution that is based on the Desigo System V5.1 and InfoCenter Suite V1.6.5.

Local differences in operation or processes may be due to:
- Windows user rights.
- Network configurations.
- Operator security restrictions.
- Scope of purchased software.
- Engineering defaults for the plant.

1.3.1 Document revision history

The table below contains the revision history of this document. It does not give detailed change descriptions between versions, and serves only to ensure a correct correlation between the documentation and the product history that is documented in the respective datasheet.

<table>
<thead>
<tr>
<th>Document Nr.</th>
<th>Product Series</th>
<th>Edition Date</th>
<th>Author</th>
<th>Remarks</th>
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<td>CM110840en</td>
<td>A</td>
<td>27.03.2009</td>
<td>CoC Pharma</td>
<td>CMT V1.0</td>
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<td>B</td>
<td>30.07.2009</td>
<td>CoC Pharma</td>
<td>CMT V2.0</td>
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<tr>
<td>CM110840en_03</td>
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<td>11.11.2010</td>
<td>CoC Pharma</td>
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<tr>
<td>CM110840en_031</td>
<td>D</td>
<td>28.11.2011</td>
<td>CoC Pharma</td>
<td>CMT V3.1</td>
</tr>
<tr>
<td>CM110840en_04</td>
<td>E</td>
<td>26.06.2015</td>
<td>CoC Pharma</td>
<td>CMT V4.0</td>
</tr>
</tbody>
</table>

Table 1–2: Document revision history
1.4 Target readers

This document contains all information relevant to the user when operating the system.

1.5 Document conventions

Caution
This symbol denotes information on safety instructions.

Warning
This symbol denotes information on warnings.

Tip
The symbol to the left denotes information that helps you properly operate and use the programs. This information is based on experience; we strongly suggest that you observe all hints.

Important note
Important information is printed on a gray background.

1.6 Safety-relevant working instructions

1.6.1 Country-specific standards

Caution
The products are developed and produced in compliance with the relevant international and European safety standards. Should additional country-specific, local safety standards or regulations concerning project planning, assembly, installation, operation and disposal of the product apply in the place of operation, then these standards or regulations must also be taken into account in addition to the safety regulations mentioned in the product documentation.

1.6.2 Electrical installations

Important note
DANGER Work on electrical installations
Work on electrical installations may only be carried out by qualified electricians or instructed persons working under the guidance and supervision of a qualified electrician, in accordance with the electro-technical regulations.

- Disconnect the CMT cabinet from power during commissioning or maintenance work.
- The CMT panel may still be hot (see connection diagram =16.1 1 (1)) even after power is disconnected.
- Label terminals with external voltage supply with a sign 'DANGER – External voltage'.
- Install mains leads to the control unit separately and provide with a clearly marked fuse.
- Carry out grounding in compliance with local safety regulations.
- When work is carried out in explosion-prone areas, take all appropriate safety precautions.
1.6.3 Assembly, installation, commissioning and inspection

If any tools such as ladders are required, safe and suitable devices must be used.

1.6.4 Modules and spare parts

Locally procured modules and spare parts must comply with the technical specifications laid down by the manufacturer. This compliance is always ensured for original spare parts supplied by Siemens.

Only use fuses with the specific fuse characteristics. Wrong battery types and improper battery exchange may introduce the danger of explosion. Only use the specified battery type or an equivalent battery type recommended by the manufacturer.

Batteries require environmentally safe disposal. They must be recycled at the local collecting points.
2. Shipping information

2.1 Unpacking and checking the delivery

- Please check the packaging material for transport damage upon delivery.
- If any transport damage is present at the time of delivery, lodge a complaint at the shipping company in charge. Have the shipper confirm the transport damage immediately.
- Unpack the CMT cabinet.
- Keep the packaging material in case you have to transport the unit again. Notice: The packaging protects the device during transport and storage. Therefore, never dispose of the original packaging material!
- Please keep the enclosed documentation in a safe place. You will need the documentation when you start the device for the first time.
- Check the package contents for completeness and any visible transport damage. Check for completeness using the enclosed "Scope of delivery" list.
- Notify the shipping company in charge immediately if the packages contents are incomplete or damaged.

Warning  Make sure that a damaged CMT cabinet is not installed nor put into operation.

Consider the following when the devices are transported:
- The CMT cabinet is heavy.
- Suitable hoisting gear operated by trained personnel is essential due to the weight of the CMT cabinet.
- The devices must only be transported in the upright position indicated.
- Serious injury or even death and substantial material damages can occur if the devices are not lifted or transported properly.

2.2 Scope of delivery

<table>
<thead>
<tr>
<th>Designation</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabinet</td>
<td>1</td>
</tr>
<tr>
<td>Touch Panel (assembled in door)</td>
<td>1 (option)</td>
</tr>
<tr>
<td>UPS</td>
<td>1 (option)</td>
</tr>
<tr>
<td>Manageable switch (assembled)</td>
<td>1 (option)</td>
</tr>
<tr>
<td>KVM extender remote unit</td>
<td>1 (option)</td>
</tr>
<tr>
<td>External power supply KVM extender</td>
<td>1 (option)</td>
</tr>
<tr>
<td>Technical documentation binder</td>
<td>1</td>
</tr>
<tr>
<td>Extra carton box</td>
<td>1</td>
</tr>
<tr>
<td>Ferrite core, Würth Elektronik, Art.-Nr. 74271222</td>
<td>4</td>
</tr>
<tr>
<td>Connector gland - must be installed on site</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2–1: Scope of delivery
Extra carton box
This carton box contains the following:
- Windows Server 2008R2
  - License Agreement
- Acronis Backup & Recovery 11
  - Bootable USB Stick
- SIMATIC Microbox 427D
  - Documentation and drivers CD
  - Operating instructions compact
- SIMATIC Touch panel (optional)
  - Installation guideline Panel PC / Flatpanel
  - SIMATIC Flat panel documentation and drivers (document & CD)

Technical binder
The technical documentation binder contains the following information:
- CMT manual
- Checklist options with FAT report
- Data sheet
- Wiring diagram
- CE declaration of conformity
- CMT technical documentation CD
- CMT Backup Image 2*DVD's
3. Mounting instructions

3.1 Mechanical installation

**Warning**
To ensure that the CMT cabinet operates safely and reliably, it must be properly installed and commissioned by qualified personnel, taking into account the warnings provided in these operating instructions. In particular, observe the general and national installation and safety guidelines for high-voltage installations (e.g. VDE – the Union of German Technical Engineers) as well as the guidelines relating to the proper use of tools and personal protective equipment.

**Important note**
Death, serious injury, or substantial material damage can result if these factors are not taken into account.

Note the following for mounting:
- The environment must be dry and dust-free, temperature range 0 °C to 40 °C, humidity max. 90% r.h., non-condensing. To ensure sufficient cooling, make sure that neither fan nor filter are covered.
- The control panel is subject to protection class IP55. No flammable dust or gases may be present.
- The mounting location must be able to accommodate the control panel weight.
- Attach the CMT panel as per the diagram using the four screws. Screws, dowels, etc. must be suitable to both weight and mounting location.
- The CMT panel is very heavy. Make sure you use suitable hoisting gear.
3.2 Mounting brackets

Figure 3–1: Mounting brackets
3.3 Electrical installation

**Scope**

Connect the CMT panel to 230 V, 50 Hz, 16 A. To reduce the radiated emission, 2 ferrites (included in the delivery) need to be clamped on the AC power port. Comply with all national regulations for installation and grounding.

When the CMT solution is delivered, the fuses are in the off position. Switch the fuses back to the on position after attaching the external power supply and all needed connections!

Introduce supply and sensor lines in the direction of the connection through the flanged plate KDP. Make sure you adhere to the intended connection length, then insulate and terminate the cable. Pulling back the cable will arrest the line and provide strain relief (see instructions “8902873009_KDPmetal”).

All cables must be fastened to the cable interception rail for strain relief. Wiring loom changing and clips are not contained in the scope of delivery. The cable shielding of all sensor cables must be mounted like this:

![Cable shielding diagram](image)

**Figure 3–2: Cable shielding**

Refer to diagram “CMT-04-MD-O-006_EN” for line connections.

Install prefabricated lines for monitor, keyboard and mouse etc. via the cable entry. Also here to reduce the radiate emission put 1 ferrite (included in the delivery) for each keyboard and mouse cable.

**Warning**

Cable/plug entry is not installed and supplied, but must be installed accordingly. Unused entries must be closed with plastic pins.

After completion of connections or maintenance work, the covers over the clamps and power supply units must be mounted again!
For mounting the wirings in the cabinet see following pictures:
3.4 Wiring diagram

The wiring diagram is included in the technical documentation binder and also on the technical CD. For detailed information see document CMT-04-MD-O-006_EN.

The data point list for the Desigo default project is appended (plant) to the switching diagram, which references the data point list. In the event of changes to inputs/outputs used in the Desigo default project, append the updated data point list to the connection diagram.

For wiring diagram changes, please contact your local Siemens sales representative.
# 4. Compact Monitoring Technology (CMT)

This chapter provides an overview of the installed components and operation of the lamp indicators. Further details for each component and a comprehensive summary of specifications can be found in the CMT DataSheet reference number: CM1N6520.

## 4.1 CMT solution overview

![CMT Hardware Schematic](image)

*Not standard delivered*

<table>
<thead>
<tr>
<th>Device</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>DDC controller PXC100-E.D</td>
</tr>
<tr>
<td>2</td>
<td>Power supply module 1.2 A, Fused 10A TXS1.12F10</td>
</tr>
<tr>
<td>3</td>
<td>Super universal modules TXM1.8X</td>
</tr>
<tr>
<td>4</td>
<td>Temperature sensor QAC3171</td>
</tr>
<tr>
<td>5*</td>
<td>KVM Extender (optional) Voyager KVM Extender singlehead USB</td>
</tr>
<tr>
<td>6</td>
<td>Relay module TXM1.6R</td>
</tr>
<tr>
<td>7</td>
<td>Fan and filter Rittal, SK3324.107+3325.207</td>
</tr>
<tr>
<td>8</td>
<td>Power supply 24 VAC SITAS transformer, 160 VA</td>
</tr>
<tr>
<td>9*</td>
<td>Power supply, 5 VDC (Option KVM Extender) Logo, 3 A</td>
</tr>
<tr>
<td>10</td>
<td>Power supply 24 VDC SITOP modular, 5A</td>
</tr>
<tr>
<td>11</td>
<td>Fuses Aux. Switch - 5ST3010 Circuit Breaker - 5SY4110-7 Circuit Breaker - 5SY4113-7</td>
</tr>
<tr>
<td>12</td>
<td>Voltage control Plug-in relay, LZS:RT4B4xxx</td>
</tr>
<tr>
<td>Device</td>
<td>Type</td>
</tr>
<tr>
<td>--------</td>
<td>------</td>
</tr>
<tr>
<td>13</td>
<td>Enclosure thermostat</td>
</tr>
<tr>
<td>14</td>
<td>Stainless steel cabinet</td>
</tr>
<tr>
<td>15</td>
<td>Lamp indicators</td>
</tr>
<tr>
<td>16</td>
<td>SIMATIC Microbox 427D</td>
</tr>
<tr>
<td>17*</td>
<td>19&quot; Touch panel (optional)</td>
</tr>
<tr>
<td>18</td>
<td>External hard disk, &gt;100 GB</td>
</tr>
<tr>
<td>19a</td>
<td>Ethernet switch, unmanaged</td>
</tr>
<tr>
<td>19b</td>
<td>Ethernet switch, managed (optional)</td>
</tr>
<tr>
<td>20</td>
<td>UPS (optional)</td>
</tr>
</tbody>
</table>

Table 4–1: CMT hardware details

### 4.2 Lamp indicators

<table>
<thead>
<tr>
<th>Function</th>
<th>green light</th>
<th>yellow light</th>
<th>red light</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal operating</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Warning low and high limit of the sensors, door open - occurs</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Warning low and high limit of the sensors, door open - acknowledge</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Warning disappears, door contact closed --&gt; normal operating</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>Alarm low and high limit of the sensors - occurs</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Alarm low and high limit of the sensors - acknowledge</td>
<td>○</td>
<td>○</td>
<td>●</td>
</tr>
<tr>
<td>Alarm disappears and reset carried out --&gt; normal operating</td>
<td>●</td>
<td>○</td>
<td>○</td>
</tr>
<tr>
<td>PX automation station and or TX-I/O module damaged</td>
<td>●</td>
<td>●</td>
<td>●</td>
</tr>
<tr>
<td>Warning x days before calibration</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Warning when calibration is due</td>
<td>○</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Behavior after voltage failure, Microbox switched off/Additionally, door is opened</td>
<td>●</td>
<td>●</td>
<td>○</td>
</tr>
<tr>
<td>Alarm, warning and door open may be present at the same time</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4–2: Lamp indicators

Legend:
- ● continuous light
- ✔ flashing light
- ○ light off
4.3 I/O module indicators

Module status LED

- The module status LED (green) is located on the I/O module under the transparent address key. It shows the module status as a whole (as opposed to the I/O points).
- This LED is also used for diagnostics.

I/O status LEDs

- The I/O status LED’s (green) indicate the status of the inputs and outputs (field devices).
- The LED’s are labeled with the I/O point number.
- These LED’s are also used for diagnostics.

<table>
<thead>
<tr>
<th>LED states</th>
<th>Cause</th>
<th>Module status LED</th>
<th>I/O status LED</th>
</tr>
</thead>
<tbody>
<tr>
<td>OFF</td>
<td>• No voltage</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Variable intensity</td>
<td>• Indicates analog value</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>ON</td>
<td>• Supply voltage present</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Flashing</td>
<td>• Open loop, no sensor connected</td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Table 4–3: I/O status LEDs
5. Navigation

This section provides information required to operate Desigo Insight.

5.1 Start Desigo Insight

Start Desigo Insight via

- Windows Menu “Start”, “Programs”, “Desigo Insight V4.1” and “Desigo Insight” or click on the desktop icon

![Desigo Insight desktop icon](image)

Figure 5–1: Desigo Insight desktop icon

5.1.1 Login

After starting Desigo Insight, the following window (Figure 5–2) opens. Type your user name and password in the Log On dialog box.

![Desigo Insight Login](image)

Figure 5–2: Desigo Insight Login

**Important note**

If the Desigo Insight is configured to use “Windows Authentication”, then select the “Use Windows user” radio button in this dialogue window. Alternatively, enter a valid user name and password to start Desigo Insight.

5.1.2 Check system information or shell via alarm symbols

After you are logged in and depending on your user access rights, a number of symbols are displayed in the Desigo Insight Shell along with the system information field, the connection field and the symbols providing information on all alarms displayed.

![Desigo Insight Shell](image)

Figure 5–3: Desigo Insight Shell
The Plant Viewer starts automatically. The Plant Viewer navigation bar opens at the bottom of the Desigo Insight Shell.

5.2 Starting Desigo Insight Plant Viewer

In case the Plant Viewer is closed, restart the application as follows:

- Select the Desigo Insight menu. A dialog box with all Desigo Insight applications opens.

![Figure 5–4: Starting Desigo Insight Plant Viewer](image)

- Or, go to the symbols in the Desigo Insight Shell and click to start the application. The symbols (see Figure 5–4) are explained via tooltips.

5.3 Plant Viewer

After the Plant Viewer is started, the navigation page opens below the Desigo Insight Shell.

The navigation bar allows you to go to the “Top” or main entry page, the “System” page, containing the system topology. Or a “select page” dialog box opens with all available pages.

![Figure 5–5: Plant Viewer navigation](image)

**Favorites**: after a page is opened, you can define that page as a Favorite page. A maximum of ten Favorite pages are possible.

**System**: The system topology displays the current state of the automation stations.

**Top**: The Top page is opened as an entry page.

**Select page** dialog box: All available pages are listed and displayed via “open”.
5.3.1 “TOP” page

The “TOP” page is the main entry page. From here, you can go to:

- Room Overview (optional)
- Temperature measurement
- Humidity measurement
- Pressure measurement
- Particle Counting (optional)
- Universal
- System Overview

All the following pages are based on this concept.

The left pane contains the buttons for navigation between the pages; the right pane contains detailed information about the sensors, setpoints and states.

Figure 5–6: “TOP” page
5.3.2 Go to the measurement pages

Figure 5–7: Standard measurement pages (1 of 3)
Pressure measurement

Particle counting (optional)

Universal

System overview

Figure 5–8: Standard measurement pages (2 of 3)
5.3.3 Operate parameters for alarming

---

**Temperature control, Sensor 01**

<table>
<thead>
<tr>
<th>Room</th>
<th>Setpoint, high limit for alarm</th>
<th>35.0 °C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Setpoint, high limit for warning</td>
<td>30.0 °C</td>
</tr>
<tr>
<td></td>
<td>Setpoint, low limit for warning</td>
<td>5.0 °C</td>
</tr>
<tr>
<td></td>
<td>Setpoint, low limit for alarm</td>
<td>0.0 °C</td>
</tr>
</tbody>
</table>

---

Figure 5–9: Standard measurement pages (3 of 3)

Figure 5–10: Operate parameters for alarming
Adjustment of alarm or warning setpoints, by:

- left clicking into the setpoint field and entering the value
- left clicking the spin buttons for increasing or decreasing the values (low increments, stepwise)
- left clicking continuously the spin buttons for increasing or decreasing the values (high increment)

5.3.4 Comment actions when modifying setpoints

When a setpoint is changed, the user must enter a comment that justifies the change. If no comment is entered, the change will not be executed. This text is written into the permanent audit trail (Log Viewer).

5.3.5 Operate parameters for sensors

You can modify the sensors parameters in case of defect as per your user access rights.

If you click on the present value of the sensor, a white frame is displayed. A new dialog box with the main parameters for the sensor opens.
**Forcing present value**  
To set the Analog Input object (which represents the sensor in the application software) to out of service, select "Forcing present value". Enter a substitution value if desired. To release the Analog Input object, click the Automatic button. The Analog Input object receives the signal from the I/O module in the field.

**Alarming**  
The Analog Input objects have predefined alarm and warning limits that are disabled by default. Enable this function if alarms or warnings are needed to control the present value. An alarm (red bell) is created when the high high (HH) or low low (LL) limit is reached. This alarm can be disabled for special operations e.g. cleaning.

**Warning**  
A warning (yellow bell) is created when the warning high (WH) or warning low (WL) limit is reached. The warning can be also disabled for special operations.

**Important note**  
Do not disable alarming in the CMT software application program!

If you point to the red clock symbol below the present value of the sensor, (highlighted within the white frame in Figure 5–13), a new dialog box with the settings for alarm delays for the sensor opens.

**Figure 5–12: Sensor main parameters**

**Figure 5–13: Sensor alarm delay parameters**
**Alarm delay**

A delay can be entered for each alarm. This prevents spurious activation of a warning or alarm.

### 5.3.6 Operating sensor warnings and alarms

**Warnings**

If a sensor warning occurs, an animated swinging yellow warning bell appears next to the sensor.

Click the yellow warning bell and the Warning Status window opens. Now click on the Acknowledge button with the blue tick to acknowledge the sensor warning.

The active warning bell (grey bell with a blue tick) will remain next to the sensor value until value returns into a normal value range between the high and low warning limits.

*Figure 5–14: Sensor warning acknowledgment workflow*

**Important note**

The warning status text is mentioning “Alarm”! This part is hardcoded and can not be altered. This is not a bug!

**Alarms**

If a sensor alarm occurs, an animated swinging red alarm bell appears next to the sensor.
Click the red alarm bell and the Alarm Status window opens. Now click on the Acknowledge button with the blue tick to acknowledge the sensor alarm.

The active alarm bell (red bell with a blue tick) will remain next to the sensor value until the value returns into with the normal range between the high and low alarm limits.

When the alarm condition is no longer active (grey bell with a blue tick), the alarm can be “Reset”. Click the grey alarm bell and the Alarm Status window opens. Now click on the Reset button with the red arrow to reset and clear the sensor alarm. The acknowledged warning condition will disappear automatically once the value returns to normal.

**Figure 5–15: Sensor alarm acknowledgment workflow**
5.4 Lock, log off, shut down and restart

After finishing work, you can click the button in the Desigo Insight Shell to lock, log off, shut down, or restart Desigo Insight.

![Figure 5–16: Desigo Insight Lock, Log Off and Shutdown dialogue](image)

Select “Lock” or “Log Off”, or in some cases “Shut Down” or “Restart” depending on your access rights.

5.5 Explanation of the standard Desigo Insight applications

For further information on the standard Desigo Insight applications, e.g. Plant Viewer, Object Viewer, Alarm Viewer and Online Trend, see the manual CM110588EN*_06, Operating the management station, V5.1, User’s guide, Volumes 1 and 2.

This manual is supplied with the technical binder as hardcopy or you can find it on the technical CD.

5.6 Add new users to the system

For further information on this topic see the manual CM110588EN*_06, Operating the management station, V5.1, User’s guide, Volume 1.

This manual is supplied with the technical binder as hardcopy or you can find it on the technical CD.

**Important note**

Additional information is available in the standard operating procedure (SOP) to create and maintain DI V5 user accounts (optional).
6. Report and archive with CMT

This section provides references to existing manuals on:
- Archiving
- Add new users
- Using Report Manager
- Configure electronic signatures

6.1 Archiving

Maintaining critical data over long periods is very important, making archiving an essential task. For further information on this topic, see the InfoCenter Administrator 1.6.5, Online Help.

6.2 Add new users to InfoCenter

For further information on creating new users in InfoCenter, see the InfoCenter Administrator 1.6.5, Online Help.

6.3 Using Report Manager

For further information on creating new templates, assigning user rights to the reports, and scheduling reports see InfoCenter Report Manager 1.6.5, Online Help.

6.4 Electronic Records / Electronic Signatures

For further information on electronic records and electronic signatures see the document “Desigo V5.1 with InfoCenter Suite V1.6.5 - White Paper”, CM110801, 2014-10-20.
7. **Backup**

The CMT system backs up critical data daily to provide safety in case of crashes or disaster. This backup data is stored on an external hard disk.

**Important note**

We recommend transferring your backup data to your backup server every day.

### 7.1 Data in the backup files

**General**

The CMT backup contains three backups from the different software programs installed on the CMT. These backups are generated automatically from:

- Windows Event Logs
- Desigo Insight project files and databases
- InfoCenter Suite

**Windows Server 2008**

On Windows Server 2008, CMT backs up the EventLog file. This is done automatically each Sunday at 09:00 by means of a scheduled task in Windows. You do not need to do anything. CMT is preconfigured for this backup upon installation.

The Windows EventLog contains crucial information for FDA compliance. Examples:

- User logon and logoff
- Hacker attack
- System errors
- Time changes

**Desigo Insight**

Desigo Insight has a predefined backup strategy of the different databases. Desigo Insight backs up the following data:

- Trend data
- Log data
- Project data
- Audit data (optional)
- Project files (e.g. graphic pages, etc.)

**InfoCenter**

InfoCenter has a predefined backup strategy based on hourly, daily and weekly backups of the different databases. InfoCenter backs up the following databases:

- Active volume
- Intermediate volumes (defined during commissioning)

The primary objective of InfoCenter is to generate reports. These reports are also backed up automatically by means of a scheduled task in Windows.

**InfoCenter Backup schedule**

Schedule for the various InfoCenter backup tasks.

<table>
<thead>
<tr>
<th>Database</th>
<th>ActiveHLog</th>
<th>ActiveNLog</th>
<th>ActiveNdb</th>
<th>ActiveWLog</th>
<th>ActiveWDb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

**Important note**

**General**

- Windows Event Logs
- Desigo Insight project files and databases
- InfoCenter Suite

**Windows Server 2008**

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<th>ActiveNdb</th>
<th>ActiveWLog</th>
<th>ActiveWDb</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tuesday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wednesday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thursday</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saturday</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sunday</td>
<td>X</td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Database</td>
<td>ActiveHLog</td>
<td>ActiveNLog</td>
<td>ActiveNDb</td>
<td>ActiveWLog</td>
<td>ActiveWDb</td>
</tr>
<tr>
<td>-------------</td>
<td>------------</td>
<td>------------</td>
<td>-----------</td>
<td>------------</td>
<td>-----------</td>
</tr>
<tr>
<td>Hourly transaction</td>
<td>Every 37 min past the hour</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nightly transaction</td>
<td>23:15</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FullDB</td>
<td>22:45</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weekly</td>
<td>23:15</td>
<td>23:45</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 7–1: InfoCenter Backup schedule**

**ActiveHLog**

Hourly backup of the transaction log for the active volume. Appends the ActiveLogBackup file, causing it to grow in size.

**ActiveNLog**

Nightly backup of the transaction log for the active volume. Deletes everything in the ActiveLogBackup file prior to performing the backup.

**ActiveNDb**

Nightly backup of the data file for the active volume. Appends the ActiveBackup file, causing it to grow in size.

**ActiveWLog**

Weekly backup of the transaction log for the active volume. Deletes everything in the ActiveLogBackup file prior to performing the backup.

**ActiveWDb**

Weekly backup of the data file for the active volume. Deletes everything in the ActiveBackup file prior to performing the backup.

**Caution**

For every new intermediate database generated in the InfoCenter Administrator, InfoCenter automatically establishes the same backup strategy as for the active database.

### 7.2 Transfer backups to the backup servers

**General**

In principle, the necessary backups are made and stored on the external hard disk in the CMT control panel.

However, if the hard disk crashes, all data is lost. As a result, you should either copy these backups to an external storage medium for each CMT or copy the files to your central backup server.

Two possibilities exist to transfer the backup data to the backup server:

- Manual
- Automatic (Optional)
We recommend the following structure on your backup server:

```
  - Backup
    - PX Backups
      - AS001
      - AS002
      - AS003
    - Servers
      - Backups
        - 1_Monday
        - 2_Tuesday
        - 3_Wednesday
        - 4_Thursday
        - 5_Friday
        - 6_Saturday
        - 7_Sunday
    - Images
  - Tools
    - Image
```

**Figure 7–1: Backup server folder structure**

Finally, store the backups from the CMT in separate folders for each day. Every week, the information in the “Backups” folder is overwritten. Thus, in case of a crash or disaster, the daily information for one week is available online.

**Important note**

When a new hard disk is inserted be aware of the settings it must have. Please check the Configuration Management Plan. It is not necessary to make a new folder structure; this is done automatically by CMT!

### 7.2.1 Manual copy of CMT backup data

Your backup operator must copy the CMT backup data each day to the defined backup structure. See also Figure 7–1.

A detailed description how to transfer the backup is available in the SOP "backup transfer for the standard CMT" (optional).

### 7.2.2 Copy data automatically from CMT to the backup server (optional)

With CMT integrated in your network (this is optional and not standard), we recommend using suitable commercially available software to automatically copy the backups to your backup server.

**Important note**

Ask your IT department about the software you are using.

After the backup drive is prepared, set up the backup software to create the backup jobs automatically.
Backup job definition for CMT

Each CMT backup is copied as one common job to the backup server.

<table>
<thead>
<tr>
<th>Job</th>
<th>Day</th>
<th>Start time</th>
<th>CMT</th>
<th>Target backup server</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Monday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Monday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Tuesday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Tuesday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Wednesday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Wednesday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Thursday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Thursday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Friday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Friday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Saturday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Saturday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sunday</td>
<td>3:35</td>
<td>\drive\backup*.*</td>
<td>\backup\Servers\backups\Sunday***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>System state</td>
<td></td>
</tr>
</tbody>
</table>

Table 7–2: Definition of backup jobs for CMT

*** Overwrite files = yes

Caution

We do not recommend using the Windows Server Backup feature in Windows 2008 Server to make scheduled backups on the pre-installed USB external drive as target location. The standard USB drive is the target location for the automated regular software backups created hourly and daily – if this drive is re-allocated as a Windows Backup device, then the database backups will stop working!!!

7.3 Copy server backups to external media

After all backups are on the central backup server, the next step is to store the information of the backup server to an adequate external storage medium. There are many types of medium available, some examples are; flash memory, hard disk drives, magnetic tape or optical disks. Choice of medium is outside of the scope of this document. Here, we only describe the principal and necessary actions to be taken depending on the actual project situation.

The Sunday backups contain the full database backups from Desigo Insight and InfoCenter. These backups cover all software allowing you to restore CMT. If you want to copy the backups daily to the external media, set up more backup jobs and work out a media rotation strategy.

Important note

We recommend using a backup server and special backup drive rather than six external disks or tapes. The strategy is to copy all Sunday backup files to an external storage medium on Monday. This way, you only need to exchange the external medium on Monday (more details later in the section on media rotation).
### 7.3.1 Backup job to external media

Use the same backup software to copy the backups to external media, and create additional jobs.

<table>
<thead>
<tr>
<th>Job</th>
<th>Day</th>
<th>Start time</th>
<th>Source backup server</th>
<th>Target backup server external media, e.g. LTO</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>Monday</td>
<td>08:00</td>
<td><code>\backup\servers\backups\Sunday:*:*</code>&lt;br&gt;<code>\backup\servers\backup\images:*:*</code>&lt;br&gt;<code>\backup\PX Backups:*:*</code>&lt;br&gt;<code>\backup\Tools:*:*</code></td>
<td></td>
</tr>
</tbody>
</table>

Table 7–3: Backup job definition for backup server

The entire Sunday folder on the server as well as the image folder is copied to the storage medium.
The image folders contain offline images from each CMT. This guarantees that both images and backups are stored together on the external medium.

The next section presents our recommended media rotation.

### 7.4 Media rotation

Media rotation ensures that backups are stored on different external data media. There are a lot of possibilities allowing for very elaborate forms of media rotation.

In reality, however, we find that a simple and understandable media rotation procedure works best. The solution shown below is also called "grandfather, father and son" method. We extended this method to seven days.

⚠️ **Caution**

Our recommendation is based on reducing exchange of tapes. For this reason, we recommend that you use a dedicated backup server. If you prefer to store the backups daily to tape, you need 6 tapes per week (Monday through Saturday), 4 per month (Sunday 1 to Sunday 4) and 12 per year (January to December) = 22 tapes. And, most importantly, you must change the tape every day or you must install a tape exchanger that does the job for you.

**Backup rotation: 16 tapes**

Our recommended backup solution requires 16 tapes used as follows:

<table>
<thead>
<tr>
<th>Week</th>
<th>Mo (on tape)</th>
<th>Tu</th>
<th>We</th>
<th>Th</th>
<th>Fr</th>
<th>Sa</th>
<th>Su</th>
</tr>
</thead>
<tbody>
<tr>
<td>Week1</td>
<td>Week _1</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week2</td>
<td>Week _2</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week3</td>
<td>Week _3</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week4</td>
<td>Week _4</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week5</td>
<td>Month _1</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week6</td>
<td>Week _1</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week7</td>
<td>Week _2</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
<tr>
<td>Week8</td>
<td>Week _3</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
<td>HD</td>
</tr>
</tbody>
</table>
### 7.5 Create images

#### General

We will create an image when we install CMT on your site. The CMT image includes all software, configurations and files.

The image is a one-on-one copy of the entire hard disk.

A new image must be created if static files are changed on the system.

#### Tools

We use the Acronis® Backup & Recovery™ to create the image.

The tool is able to boot via CD or via a USB stick.

The bootable CD or USB stick can be prepared to open a network connection to the backup server. This allows for creating the image directly over the network and storing it to the backup server.

#### Tip

Store the image tool on the USB stick or the backup server (optional), e.g. `\Server name\Backup\Tools\Image\`).

The CD or USB stick needs a network driver if combined with your network.

#### Important note

We do not support online images. Our image solution is based on an offline image! Offline images guarantee that all files are closed, avoiding potential issues with databases and other open files.

#### Caution

The image must be updated after any of the following:

- Install new programs on the server
- Install a patch on the server
- Install a hotfix on the server
- Install a service pack on the server
7.6 Restore CMT (disaster recovery)

General

CMT is restored if your hardware crashes or software installation fails and blocks the machine, or in case of a virus, corrupted files or incompatible updates, service packs, hot fixes etc..

The backups and images created previously and during operation allow you to restore CMT keeping potential data loss to a minimum.

Restoration is a process in which you restore CMT to a point at which you know that everything worked fine and when you still had all data.

Typically, this is the last backup and image you created.

If CMT crashes on a Tuesday you have to restore:
- The last image
- The last backup from Sunday (either from tape or from backup hard disk)
- The backup from Desigo Insight and InfoCenter from Monday

Caution

Please note that as long as the Desigo Insight is not available no data (e.g. trend information and alarms) are stored*. You will also lose all data between the last backup and the current date and time.

Example:

<table>
<thead>
<tr>
<th>Last full backup:</th>
<th>01. March 2015 04:00am</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start working:</td>
<td>01. March 2015 07:00am</td>
</tr>
<tr>
<td>Last transaction backup:</td>
<td>01. March 2015 03:45pm (DI)</td>
</tr>
<tr>
<td>Last transaction backup:</td>
<td>01. March 2015 03:37pm (InfoCenter)</td>
</tr>
<tr>
<td>Server crash:</td>
<td>01. March 2015 04:30pm</td>
</tr>
<tr>
<td>Server restarted after recovery:</td>
<td>08. March 2015 04:30pm</td>
</tr>
</tbody>
</table>

| Loss of data: 45 minutes (assuming 7 day buffer capacity at controller) |

Tip

** Trend and alarm data in the PX automation station continue to be acquired even if the Desigo Insight is not available. After the Desigo Insight is back online, all information stored is uploaded. The local setting determines for how long data is acquired offline in the PX automation station. This together with memory capacity in the PX defines the maximum possible interruption before data loss will occur.

Tools

The tools to restore data are the same as those for backups and images.
- Bootable CD or USB stick
- Image tool
- Backup software
- Restore tools from Desigo Insight and InfoCenter

The entire process to restore CMT is described in the SOP “Disaster recovery”. Ask your local Siemens representative for this procedure. Restoring data from Desigo
Insight and InfoCenter is described in the standard documentation for each software package, supplied with the technical documentation CD:

- Desigo Insight: CM110591
- InfoCenter: Procedure for restoring an InfoCenter server
7.7 Workflow to restore CMT

Figure 7–2: Workflow restoring CMT

* Optional: Only when integrated in the customer network
Optional: With CMT integrated in a network
In the Microsoft Windows Server 2008 family of operating systems, a Security Identifier (an alphanumeric character string commonly known as SID) is a unique name assigned by a Windows domain controller during logon. It is used to identify an object such as a user or a computer or a group of users in a network of systems. SIDs are not portable.
Windows grants or denies access and privileges to resources based on access control lists (ACLs), which use SIDs to uniquely identify users and their group memberships. When a user logs into a computer, an access token is generated that contains user and group SIDs and user privilege level. When a user requests access to a resource, the access token is checked by the ACL to permit or deny particular action on a particular object.
The SID changes regularly every 21 days. If the SID is older then 21 days, the authority check fails because the SID is not longer valid. In such a case, you have to remove the server from the Domain Active Directory and reassign it to the domain, and the server gets a new SID.

Caution
Reassigning the SID works on member servers and on Windows Server 2008 computers only.
If you have a primary domain controller (PDC) or a secondary domain controller (SDC), reassignment does not work! Ask your IT department how to reassign the SID.
8. Archive data

### Principle

Archive GxP records and data throughout the required retention period.

Both Desigo Insight and InfoCenter have their own functionality to archive data.

### 8.1 Storage area for archives

**Storage area**

The archives from Desigo Insight and InfoCenter are stored on the local hard drive in the “Backup” folder, which is already prepared on the local backup hard drive.

![Figure 8–1: Standard archive folder structure based on CMT backup scenario](image)

These archives are backed up daily along with all other folders. The same procedure as for the backup applies.

This ensures that all archives are stored securely on the backup server and on the offline data medium.

### 8.2 Archive Windows EventLog

**EventLog**

The Windows EventLog is part of the archive and must also be archived because of its importance.

The pre-defined windows scheduled task places the Event Log backups in the same location, thus ensuring that they are also backed up securely on the backup server.

### 8.3 Archive Desigo Insight

**Desigo Insight**

Desigo Insight has a separate archive plan for Trend and the Log databases.

You can decide how much data should remain in the online database based on a defined retention period.

**Where is the data?**

All GxP data is stored in InfoCenter. This means:

- All trends
- All alarms
- All system activity

You may wonder why it is necessary to archive Desigo Insight databases?
Not all data must be stored in InfoCenter. Typically, the Desigo Insight databases contain more data than InfoCenter, which is why archiving the Desigo Insight databases makes sense.

**Archive retention period**

We recommend retaining **at least 2 months** worth of data in the Desigo Insight Trend and Log databases before archiving them.

**Caution**

By default, archives in Desigo Insight are in a proprietary format. Thus, they can only be read with Desigo Insight.

Since Desigo Insight V4, it is possible to choose between proprietary archive format or a neutral (XML) archive format. Archiving Desigo Insight Trend or Log data in XML format requires an additional license which is not included in CMT.

### 8.4 Archive InfoCenter data

**InfoCenter**

All data records stored by the InfoCenter Server software are initially written into a database called the active volume, which is created during the InfoCenter installation process. Additional volumes called intermediary volumes can be created to further organize data and ensure optimum performance of the Active volume. These intermediary volumes can be taken offline for archiving to the local backup hard disk by manually converting them to archive volumes.

Generally, the data moves from the active database to one or more intermediary databases. This can be scheduled and automated. Both active and intermediary databases are online and backed up according to the backup strategy.

**Archive retention period**

We recommend retaining **at least 14 months** worth of data in the InfoCenter databases (active and intermediary) before archiving them (taking them offline). This ensures that you can create a report over one year without mounting an offline archive volume.

The setup of the scheduled movement of data from active to intermediary databases is described in the standard documentation; InfoCenter V1.6.5 Administrator Online Help.
The archives made by InfoCenter are in SQL format, allowing for reading the archives in any SQL reader. The archives initially are stored together with all backups and images on the local backup HD and subsequently on the external media.

Decisions are taken based on the reports generated by the InfoCenter software. These reports are stored on the CMT and are also backed up automatically by means of a scheduled task in Windows.

Before you copy the archives from one medium to the next, create an MD5 checksum file for each archive to check that nothing went wrong during copying of the file. This MD5 checksum file can be created in normal Windows mode because the archive file is a static file.
9. Sensor Calibration (optional)

9.1 Operating calibration parameters, optional

If the sensor calibration functionality has been implemented, it is displayed directly underneath each sensor current value and is accessible provided you have the sufficient user access privileges.

![Temperature control, Sensor 01](image1)

Figure 9–1: Operating sensor calibration parameters

When you point to the tool symbol, a white frame is displayed. Click to open the sensor calibration parameters (see Figure 9–2) for that type of measurement.

![Temperature 01, monitoring](image2)

Figure 9–2: Sensor calibration parameters

**Calibration parameters**

For each sensor the following functionality is supported:

- Present value of the sensor
- Slope
- Intercept
- Days before next calibration
- Warning message “Calibration required”
- Alarm message “Calibration expired!”

**Calibration notification settings**

Click the “Settings” button to open a dialog box to show detailed calibration notification settings for the selected sensor.
Figure 9–3: Sensor calibration notification settings

The values for calibration notification can be changed by clicking the setpoint field or by using the spin buttons up and down. After modification, click “Apply” to write the parameters to the application program.

The calibration notification can be enabled or disabled for each sensor by clicking on the respective “enable” or “disable” button. By default, calibration notification is enabled.

9.1.1 Operating sensor calibration warnings and alarms

If a sensor calibration warning occurs, three yellow exclamation marks appear next to the sensor calibration settings button and an additional yellow warning bell and “warning” message appears in the sensor calibration parameters dialogue box.

Calibration warnings remain active as long as the number of days before the next calibration is lower than the warning threshold defined in the notification settings.

Important note

The warning status text is mentioning “Alarm”? This part is hardcoded and can not be altered. This is not a bug!

Calibration Alarms

If a sensor calibration alarm occurs, three flashing red exclamation marks appear next to the sensor calibration settings button and an additional animated swinging red alarm bell and “calibration required” message appears in the sensor calibration parameters dialogue box.
Calibration alarms can be acknowledged using the Alarm Viewer. Calibration alarms remain active as long as the number of days before the next calibration countdown counter reaches zero.

**Figure 9–5: Sensor calibration alarm messages**

**During calibration**

During the calibration, if you wish to suppress warnings and alarms from the sensor, then use the “Forcing present value” function as described in section 5.3.5 above. Not forgetting to return the sensor to “Automatic” mode when calibration is completed.

**Restarting calibration timer**

Once sensor recalibration has been completed, follow the simple workflow below to restart the calibration countdown timer once again.

Click on the tool symbol below the sensor to open the sensor calibration parameters, then click on the “Settings” button to open the sensor calibration notification settings.

Make any required changes to the sensor calibration notification settings if required or simply press the “Apply” button to restart the calibration countdown timer.
Note: If the “Mandatory Comments” function of Desigo Insight is enabled, then you will need to manually enter a comment text after each change including the “Apply” function. These comments are securely written into the Log database to ensure a compliant record of user actions.

The calibration countdown timer is reset to the value given as the maximum days before calibration. Use the exit button to close these dialogues.

Any remaining warning or alarm states are returned to normal.

Figure 9–6: Restarting the calibration countdown timer workflow
10. Particle counters (Optional)

EU GMP Annex 1 requires the continuous monitoring of particles in clean room class ISO 5. Monitoring of clean room class ISO 6 is not mandatory but recommended. For this reason, the new version of CMT can now monitor particles as well to comply with regulations. We recommend devices that communicate via ModBus/IP and have tested various models from the major manufacturers PMS and Climet.

We use the same standard graphics for the particle counter as for temperature, relative humidity and pressure. The standard CMT integrates the particle counter via either 4-20mA, OPC or ModBus/IP interface. In some cases, extra I/O modules or protocol converters must be installed to allow full usage of the additional status information available from the particle counters.

EU GMP Annex 1 stipulates that clean rooms with class A (ISO 5 & 6) must use continuous particle monitoring, whereas in class B rooms (ISO 7) particle monitoring is recommended.

Annex 1 requires that, for room classification, a measured air volume of one cubic meter (1 m³) must be analyzed. It also mentions that the air volume sample for monitoring does not need to be the same as used for classification.

Most particle counters deliver a value of counted airborne particles based on the sample of one cubic foot air volume. The speed at which each counted value is available is a function of the air volume flow rate across the particle counter. Various flow rates are common, e.g. 0.1 cfm, 1.0 cfm, 50 lpm, 100 lpm. As the table below shows, the reaction speed varies depending on the flow rates.

<table>
<thead>
<tr>
<th>Flow Rate</th>
<th>Flow Rate CFM</th>
<th>Time until 1 CFM value</th>
<th>Time until 1 m³ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.1 CFM</td>
<td>0.1 CFM</td>
<td>10 Minutes</td>
<td>353 Minutes</td>
</tr>
<tr>
<td>1.0 CFM</td>
<td>1.0 CFM</td>
<td>1 Minute</td>
<td>35.3 Minutes</td>
</tr>
<tr>
<td>50 LPM</td>
<td>1.78 CFM</td>
<td>34 Seconds</td>
<td>20 Minutes</td>
</tr>
<tr>
<td>100 LPM</td>
<td>3.53 CFM</td>
<td>17 Seconds</td>
<td>10 Minutes</td>
</tr>
</tbody>
</table>

Table 10–1: Typical air volume flow rates and sample durations

When monitoring particle counters using the CMT, both cubic foot and cubic meter values are displayed and stored. You can therefore decide yourself, depending on your current activity, (at rest, in operation, classification, etc.), which value is the most relevant for any decisions that are necessary.

The location of the monitoring points should be based upon a formal risk assessment using data from certification and qualification testing. Other factors, such as equipment interference, mounting points, and operator impedance, contribute to selecting the final location for the sample probe.

The information available for each counter varies slightly depending on how the counter is connected to the CMT:
- Channel 0.5um and 5um, particle count values
Each particle counter requires an appropriate vacuum pump. Please contact the local supplier to get more information on the type of vacuum pumps required!

10.1 Operating calibration parameters, optional

If the particle counter calibration functionality has been implemented, it is displayed directly underneath the counter’s flow status and is accessible provided you have the sufficient user access privileges.

When you point to the text or to the tool symbol, a white frame is displayed. Click to open the calibration page (see Figure 10–3) for that type of measurement.

For each counter the following functionality is supported:
- Days before next calibration
- Warning message “Calibration required”
- Alarm message “Calibration expired!”

**Calibration settings**

Click the “Settings” button to open a dialog box to show detailed calibration notification settings for the selected sensor.

![Particle counter calibration notification settings](image)

**Figure 10–4: Particle counter calibration notification settings**

The values for calibration notification can be changed by clicking the setpoint field or by using the spin buttons up and down.

After modification, click “Apply” to write the parameters to the application program.

The calibration notification can be enabled or disabled for each sensor by clicking on the respective “enable” or “disable” button. By default, calibration notification is enabled.

**10.1.1 Operating sensor calibration warnings and alarms**

**Calibration Warnings and Alarms**

Handling of calibration warnings and alarms from particle counters is the same as for any other sensor type, see section 9.1.1 above for details.
11. Touch panel (optional)

11.1 Touch screen operation

Thanks to the touch sensor, the display is sensitive to touch and application-specific screen elements, e.g. buttons, appear on the screen. Tapping the button with your finger activates the function assigned to the button.

**Caution**

Only touch one area on the touch screen and not several at any given time. You may otherwise trigger unintended reactions.

Do not touch the screen in the following situations:

- When the device is booting until the boot process is completed.
- When plugging or unplugging optional USB components.

The following types of pressure are permissible:

- Using a plastic pen with a 1 mm radius at the point: 25 grams.
- Using a silicone finger with a diameter of 1.6 cm: 50 grams.

11.2 Manual

For further information and how to calibrate the Touch Panel see manual: “17_FlatPanel”, which is delivered on the technical documentation CD.
12. **UPS (optional)**

12.1 **Safety instructions**

---

**Caution**

**Electrical safety**

Do not work alone under hazardous conditions.

- High current through conductive materials can cause severe burns.
- Check that the power cord(s), plug(s), and sockets are in good condition.
- Use qualified service personnel to change the plug on the UPS and to install permanently wired equipment.
- When grounding cannot be verified, disconnect the equipment from the power outlet before installing or connecting to other equipment.
- Reconnect the power cord only after all connections are made.
- Do not handle any metallic connector before the power has been disconnected.
- Connect the equipment to a three wire utility outlet (two poles plus ground). The receptacle must be connected to appropriate branch circuit/mains protection (fuse or circuit breaker). Connection to any other type of receptacle may result in risk of electrical shock.
- 230V models only: In order to maintain compliance with the EMC directive for products sold in Europe, output cords attached to the UPS may not exceed 10 meters in length.
- 230V models only: Total leakage current from connected equipment and the UPS must not exceed 3.5 mA for a pluggable A Type UPS.

**Caution**

**Deenergizing safety**

- If the UPS has an internal energy source (battery), the output may be energized when the unit is not connected to a utility power outlet.
- To deenergize the UPS, press the OFF button or switch to shut the equipment off. Unplug the UPS from the power outlet. Disconnect the internal battery (see Manual APC_SC_420_manual). Push the ON button to deenergize the capacitors.

**Warning**

**Battery safety**

- **This equipment contains potentially hazardous voltages.** Do not attempt to disassemble the unit. The only exception is for a UPS containing batteries. Refer to the battery replacement procedures detailed in the User’s Manual. Except for the battery, the unit contains no user serviceable parts.

  **Repairs are to be performed only by qualified service personnel.**

- Do not dispose of batteries in a fire. The batteries may explode.
- Do not open or mutilate batteries. They contain an electrolyte that is toxic and harmful to skin and eyes.
- To avoid personal injury due to energy hazard, remove wrist watches and jewelry such as rings when replacing the batteries. Use tools with insulated handles.
- Replace batteries with the same number and type of batteries as originally installed in the equipment.

**Replacement and recycling of batteries**

- See your dealer or the APC website, www.apc.com for information on replacement battery kits and battery recycling.

**Be sure to deliver the spent battery to a recycling facility or ship it to APC in the replacement battery packing material.**
Warning

Life support

American Power Conversion Corporation, its affiliates and subsidiaries world-wide, ("APC") do not recommend the use of any of their products in life support applications where failure or malfunction of the APC product can be reasonably expected to cause failure of the life support device or to significantly affect its safety or effectiveness. APC does not permit the use of any of its products in direct patient care. APC will not knowingly sell its products for use in such applications.

Examples of devices considered to be life support devices include, but are not limited to, neonatal oxygen analyzers, nerve stimulators (whether used for anesthesia, pain relief, or other purposes), auto-transfusion devices, blood pumps, defibrillators, arrhythmia detectors and alarms, pacemakers, blood dialysis systems, peritoneal dialysis systems, neonatal ventilator incubators, ventilators for both adults and infants, anesthesia ventilators, infusion pumps, and any other device designated as “critical” by the U.S.F.D.A. Hospital grade wiring devices and reduced leakage currents that meet medical safety standards may be ordered as options on many APC UPS systems. APC does not claim that units with these modifications are certified or listed as such by APC or any other organization, therefore these units do not meet the requirements for use in direct patient care.

12.2 Usage of the UPS

The UPS is preinstalled and tested. The CMT cabinet and the UPS are delivered separately for safety reasons. The battery is disconnected during transport. For detailed information on reconnecting the battery, see data sheet "20_UPS".

Place the UPS vertically on the right side of the panel floor. Connect the female connector to the INPUT connection, and the male connector to one of the three “BATTERY BACK UP” connections on the UPS. Press the button on the front panel of the UPS. Make sure the following events occur after pressing and releasing the button:
- The green On-Line indicator flashes.
- The yellow On Battery indicator lights while the Self-Test is being performed.
- When Self-Test has successfully completed, only the green On Line indicator is lit.
- If the internal battery is not connected, the green On Line indicator lights and the red Replace Battery indicator flashes.

12.3 Manual

For further information see manual “APC_SC_420_manual” on the technical documentation CD.

12.4 Installation

The APC SC 420 and supplied software must be installed during the commissioning. For configuration settings see the Configuration Management Plan.

Place the RS232 cable for the UPS directly on the SIMATIC Microbox as indicated in the CMT wiring diagram.
13. Manageable Switch (optional)

The SCALANCE X-208 can be used universally – in machine level applications as well as in networked plant sections, in electrical linear, ring or star structures and with single mode up to 26 km.

Configuration and remote diagnostics functions are integrated in the STEP 7 engineering tool. This increases plant availability and has advantages during the engineering, commissioning and operational phases. The SCALANCE X-208 also has standard remote diagnostics functions (SNMP, Web server).

13.1 Manual

For detailed information see manual “19b_Scalance_X200.pdf” on the technical documentation CD.
14. **KVM Extender (optional)**

The KVM Extender will allow you to place your monitor with a Digital Video Interface, your keyboard and mouse up to 150 meters (dependant on cable type) away from the CMT cabinet.

### 14.1 Preparing installation

For first-time use, we recommend that you carry out a test placement, confined to a single room, before commencing full installation. This will allow you to identify and solve any cabling problems, and experiment with the DVI extender.

### 14.2 Connecting up

- Shut down the Microbox
- Switch off the power supply for the CMT cabinet
- Connect the USB cable from the Local unit to the Microbox (already installed)
- Connect the power supply to the Voyager Local unit (already installed)
- Connect your UTP cable to the Voyager Local unit
- Connect the other end of your UTP cable to the Voyager Remote unit
- Connect the power supply unit to the Voyager Remote unit
- Plug in your keyboard, monitor and mouse into the corresponding keyboard, monitor and mouse ports on the Voyager Remote unit
- Power on the CMT cabinet and Microbox
- Check that the keyboard and mouse operate correctly

The Remote unit (when installed in its final location) may be left permanently powered up.

### 14.3 Cable requirements

The UTP / STP interconnect cable to connect the Voyager DVI Local Unit to the Voyager DVI Remote Unit is not supplied with the CMT cabinet.

The Local and Remote Unit are connected by industry standard cabling (Category 5, 5E or 6 UTO/STP, 4-pair) terminated with RJ45 connectors. The connector wiring must meet the EIA/TIA 568 standard.

The cable used should be solid trunk cable. Stranded patch cable will give you poor results over longer distance.

### 14.4 Manual

For further information see manual “05_1036-121U_en.pdf” on the technical documentation CD.
Answers for infrastructure and cities.
Our world is undergoing changes that force us to think in new ways: demographic change, urbanization, global warming and resource shortages. Maximum efficiency has top priority – and not only where energy is concerned. In addition, we need to increase comfort for the well-being of users. Also, our need for safety and security is constantly growing. For our customers, success is defined by how well they manage these challenges. Siemens has the answers.

“We are the trusted technology partner for energy-efficient, safe and secure buildings and infrastructure.”

siemens.com/lifescience