



Series E

Compact Monitoring Technology (Desigo)

HPB10...

Environmental Monitoring Solution for regulated industry

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- Including 36 monitoring channels with preconfigured applications for temperature, humidity, differential pressure sensors and particle counters.
 - Extendable up to maximum 100 channels
 - Reliable trending of all channels
 - Separated high and low warning and alarm levels for each channel
 - Configurable calibration interval for each monitored channel possible
 - On board management station based on Microsoft Windows® Server 2008R2 and Microsoft SQL® Server 2008
 - Intuitive operation, supervision and reporting
 - Integrated backup and archiving of GxP data on separate hard disk
 - Comprehensive data security functions to comply with 21 CFR Part 11
 - Complete validation documentation and test procedures
 - Secure and easy operation locally or remotely using WEB or Remote Desktop functionality
 - Multiple simultaneous users with up to 3 Remote Desktop clients or 10
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The life science industries have changed the structure on how they validate BAC systems. Today, the well established risk-based approach leads customers to install a stand-alone system to monitor all critical parameters, in addition to the BACS system. The CMT solution is an environmental monitoring system designed to monitor just such critical parameters.

The CMT is built using the Siemens Desigo building automation and control with the Desigo PX automation station as the DDC system at the automation level.

The CMT control panel accommodates the DDC system which comprises the programmed automation station and a range of I/O modules. The I/O modules connect the installed components (sensors) to the automation station.

The application program in the automation station is used for the following:

- Monitoring of the connected field devices for sensor open circuit or short circuit, broken connections, I/O modules and signals
- Process alarm monitoring and alarm signals
- Distribution and forwarding of errors and alarms to the management level, alarm lamp, warning lamp, and alarm to external via potential free switches
- Control of the 2 binary outputs by using a manual software switch (Auto, Off, On). In the operating state “Auto” the value of an associated time schedule (connected to the calendar) is used.
- Logging of trend data for the monitored channels and transfer of this data to the management level for permanent archiving

The I/O modules are modular in design and therefore able to accommodate a wide variety of signal types. Signal and fault states for analog or digital input/output signals are displayed by means of LED indicators directly on the module.

Furthermore, the system comprises Desigo Insight and the InfoCenter Suite® at the management level. These are used for alarm handling, alarm routing, data logging, reporting, and as a user interface for the visualization of the measured values, which are displayed on different graphics pages.

The CMT provides free Ethernet ports on the pre-installed Ethernet switch to connect the system to the customer network. Communications between the automation and management levels is based on standard Ethernet communications. The system itself consists of:

- Desigo PXC automation station with TX-I/O modules
- Desigo Insight
- InfoCenter Suite®

The installed and preconfigured operating system and Siemens software allow connection via Remote Desktop or using Internet Explorer for monitoring and operation.

Type summary

Reference numbers Compact monitoring technology (CMT) **HPB10.1** can have one or all of the following options:

- └ uninterruptible power supply **HPB10-UPS**
- └ manageable switch **HPB10-MES**
- └ video remote extension **HPB10-KVM**

Compact monitoring technology (CMT) **HPB10-TP** with door mounted 19" Touch Panel can have one or all of the following options:

- └ uninterruptible power supply **HPB10-UPS**
- └ manageable switch **HPB10-MES**
- └ video remote extension **HPB10-KVM**

Production Series

Document Nr.	Product Series	Edition Date	Remarks
CM1N6520en_01.2	A	14.01.2009	CMT V1.0
CM1N6520en_02	B	30.07.2009	CMT V2.0
CM1N6520en_03	C	11.11.2010	CMT V3.0
CM1N6520en_031	D	28.11.2011	CMT V3.1
CM1N6520en_04	E	27.02.2015	CMT V4.0

System Access

- All Windows user groups and Windows user accounts can be administered from the CMT computer operating system.
- All Windows users are assigned to user groups, for which the access to the programs is defined.
- User rights are valid for a specific user level and apply to all users in the group.
- All CMT users are assigned to user groups. Access to the various software programs and their functionality, as well as read and write access to different objects and setpoints, are valid for a specific user level and apply to all users in the group.
- The user group comprises 7 different security levels that can be set up in the CMT system. The access level are adapted to the parametrization of the objects in the automation station and define read and write access to the objects and their properties such as the presets for analog inputs, setpoints and parameters.
- Unauthorized attempts are automatically detected and stored in the audit trail.
- Users are automatically logged out from the operating system if there is no mouse or keyboard activity.
- All the data in the trend or log database is write-protected, so that it cannot be modified by any users.

Connection fault

- The connection status between the management station and the automation station is checked automatically. If the connection fails, the alarm lamp will flash to indicate the status.
- In the event of a manual disconnection, or if the connection is lost due to a voltage failure on the subsystem side, the management station restores the connection automatically if possible.
- Any disconnection is recorded in the management system log in the Log Viewer, and is indicated in a popup message.

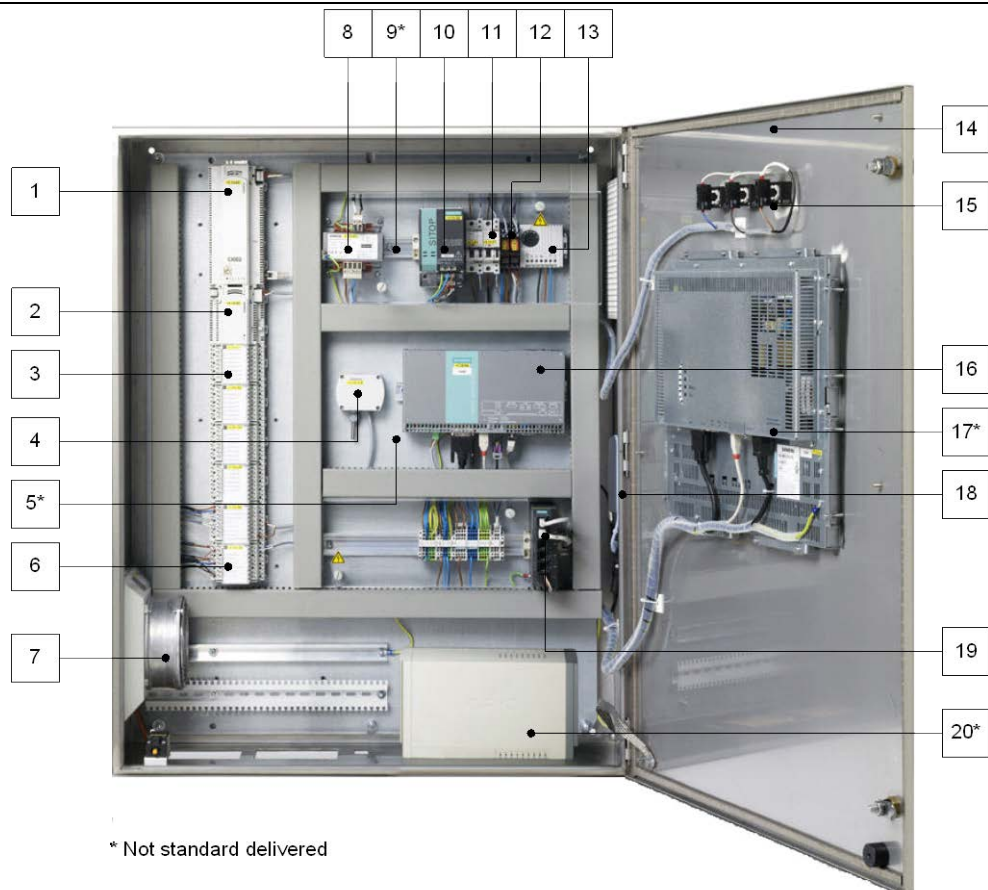
Power fault

- To maintain reliable normal operation (e.g. trend logging, alarm handling, reporting) the CMT restarts automatically after a power failure.
- By selecting the optional uninterruptable power supply (HPB10-UPS), it is possible to maintain normal monitoring and operation during a short mains power outage.

Backup and archiving

- An external removable hard disk is installed for backup data storage and for restoring data, to accommodate all configured data point databases, all application databases, all graphics databases, all user-defined reports and all historical data.
- The data is regularly backed up according to our backup strategy, for more details we refer to the CMT manual.
- The backup of the trend and log data in the databases is carried out automatically hourly, daily and weekly.
- For the offline archiving, the data must be archived manually for safety reasons (supported by the user interface)

Components



* Not standard delivered

	Device	Type	Data sheet
1	DDC controller	PXC100-E.D	01_CM1N9222en_10
2	Power supply module 1.2 A, Fused 10A	TXS1.12F10	02_CM2N8183en_05
3	Super universal modules	TXM1.8X	03_CM2N8174en_09
4	Temperature sensor	QAC3171	04_CE1N1814en_02
5*	KVM Extender (optional)	Voyager KVM Extender singlehead USB	05_1036-121U_en
6	Relay module	TXM1.6R	06_CM2N8175en_07
7	Fan and filter	Rittal, SK3324.107 + Metal housing	07_Rittal SK3324107en
8	Power supply 24 VAC	SITAS transformer, 160 VA	08_4AM_Trafo_en
9*	Power supply, 5 VDC (Option KVM Extender)	Logo, 3 A	09_6EP1311-1SH02_en
10	Power supply 24 VDC	SITOP modular, 5A	10_6EP1333-3BA00_en
11	Fuses	Aux. Switch - 5ST3010 Circuit Breaker - 5SY4110-7 Circuit Breaker - 5SY4113-7	11_Fuses
12	Voltage control	Plug-in relay, LZS:RT4B4xxx	12_PlugInRelay
13	Enclosure thermostat	Rittal, SK3110.000	13_Rittal SK3110000_en
14	Stainless steel cabinet	Rittal, AE1016.600	14_Rittal AE1016600_en
15	Lamp indicators	3SB3244-6AAx0	15_LampIndicator
16	SIMATIC Microbox 427D	6AG4140-6BD00-0PA0	16_Microbox_427D_en
17*	19 inch Touch panel (optional)	SIMATIC Touch Panel 19 inch 6AV7861-3TB00-1AA0	17_FlatPanel_en
18	External hard disk, >100 GB	External SSD Flash Drive, USB 3.0	18_SSDFlash_en
19a	Ethernet switch, unmanaged	Scalance X005 entry level	19a_Scalance_X005
19b	Ethernet switch, managed (optional)	Scalance X208	19b_Scalance_X200
20	UPS (optional)	APC, Smart-UPS SC 420	20_UPS

Lamp indicators

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

- ● continuous light
- ◐ flashing light
- ○ light off

Commissioning



Caution!

Only authorized personnel are permitted to commission and open the CMT cabinet.

In order to prevent equipment damage and/or personal injury, always follow local safety regulations and the required safety standards.

For further information, see the CMT manual and the wiring diagram.

Maintenance

Only authorized personnel are permitted to perform a maintenance tasks.

Always separate the CMT cabinet from the mains before performing any maintenance tasks.

Warning!

Also after power disconnection it is possible to have separate source voltage at the terminals =1.16-X4.1 and 2





Warning!

Unauthorized opening and improper repairs on the devices may result in substantial damage to equipment or endanger the user.

Desigo PXC100-E.D

Alkaline batteries usually have a life span of at least four years. After the "Battery low" event from the Desigo PXC the battery still has a residual life of a few more days.

Lithium batteries usually have a life span of at least 10 years.

The automation station automatically sends a system event in order to indicate a low charge of one of the batteries to the management level.

For further information and the replacement, please see the document: CM1N9222en.

Microbox 427D

To maintain high system availability, we recommend that you replace components that are subject to wear, at the intervals for replacement indicated in the operating instructions, please see the document: 16_Manual_IPC427d_en.

UPS - APC SMART-UPS SC 420 (option)

The typical life cycle of the battery is 3-6 years, depending on the number of discharge cycles and the environmental conditions.

For further information and the replacement, please see the document: APC_SC_420_manual_en.

Housing ventilation

The frequency of filter replacements should be determined individually, depending on dust accumulation and operating period. For further information and replacement, please see data sheet: Rittal SK3324107.

Field sensors calibration

In order to facilitate calibration, a calibration page is available for the management of slope, intercept, calibration interval and calibration due warning (optional).

Disposal



The unit contains electric and electronic components and must not be disposed of with domestic waste. Lithium batteries, printed circuit boards and the different housings must be disposed of separately.

Current local regulations must be observed.

Technical data

Cabinet information	Material Stainless steel 1.4301 (AISI 1304), PU sealing; for further information see datasheet Rittal AE1016600
Protection class	IP55 EN 60529
EC conformity	Electromagnetic compatibility (EMC) 2004/108/EC Low voltage (LVD) 2006/95/EC
Electromagnetic compatibility	Emission class EN 61326 [2006] - HPB10.1 Class B, residential environment - HPB10-TP Class A, industrial environment Immunity EN 6100-6-2 [2005] - HBP10.1 industrial environment - HPB10-TP industrial environment
Power	HBP10.1, HBP10-TP 230 V, 50 Hz
Power consumption	Standard CMT HPB10.1 max. 580 VA option touch panel HPB10-TP, additional max. 95 VA option UPS HPB10-UPS, additional max. 500 VA option manageable switch HPB10-MES, additional max. 3 VA option KVM extender HPB10-KVM, additional inside cabinet max. 5 VA Local unit max. 5 VA
Ambient conditions	external ambient air temperature 0°C to 40°C enclosure ambient air temperature 0°C to 45°C enclosure ambient air humidity 10% r.h. to 90% r.h., non condensing
Key lock system	The control panel is equipped with a special key-locking system
Weight	Standard CMT HPB10.1 69.0 kg (including all components) option touch panel HPB10-TP, additional 10.2 kg option UPS HPB10-UPS, additional 9.1 kg option extender HPB10-KVM, additional 0.4 kg
Fan and filter	Fan Model: 3325.107 Filter Fine filter mat, model 3182.100
Software	Installed software on the CMT: Microsoft Windows® Server 2008R2 64bit Microsoft SQL® Server 2008 and Microsoft SQL® Express 2012 Desigo Insight V5.1 SP2 InfoCenter Suite® 1.6.5 SP1 Adobe Acrobat reader 11.0.03

Inputs/outputs

For all analog field devices and the associated wiring, an alarm signal is initiated in the event of an interruption, short circuit, failure of the I/O module or violation of range limits.

All digital devices used to signal alarms transmit an active signal (DC 24 V, NO) when no alarm condition is present. The status "inactive" indicates the presence of an alarm condition.

All digital inputs/outputs are also electrically isolated to protect the equipment from damage.

All digital outputs are 24 V outputs, and receive their supply from the control panel. 36 channels:

Pre-defined and configured analog Inputs	Analog devices	Range	Sample interval
	10 temperature sensors	4.. 20 mA	1min
	10 humidity sensors	4.. 20 mA	1min
	10 pressure sensors	4.. 20 mA	1min
	2 additional analog inputs	4.. 20 mA	Undefined
	1 input	Door contact	
	1 input	230V fault	
	1 input	24V fault	
	1 input	Internal temperature sensor QAC3171	
	4 inputs	Free configurable analog or digital inputs	
Pre-defined analog outputs	3 binary outputs	Outputs for signal lamp (green, yellow, red)	
	1 binary output	Common alarms to external device	
	2 binary outputs	Free configurable digital output	
Intern. Temp. measurement QAC3171	Signal type	Range	Resolution (25°C)
	PT1000 (4.. 20 mA)	-50 ... +50°C	0.9 K

Visualization

Video card resolution min. 1280 x 1024 pixels

Optional:

19 inch TFT/LCD monitor or 19 inch touch panel ¹⁾

Optical USB 2.0 / PS2 mouse

"UK" keyboard

1) this is for best visualization and is not delivered standard

Display color

Trend color: 16 colors can be chosen for your trends

Background color: green

Trend visualization

Up to 10 online process values can be displayed in 2D and 3D graphs in a single trend view.

Both online and offline data can be displayed simultaneously in separate windows

Update frequency: displays whenever a change of value (COV) occurs or as the result of time-based scan

Summary overview

Measurement value and alarm condition are given for each data point.

Plant Viewer

Measured values, setpoints, operating modes and alarms are displayed on the screen in real-time and updated continuously
Changes are indicated by the object symbol or by the movement, color, shape or text of the values affected

Alarm Viewer

Display the associated alarm property sheet with detailed data point information
View, acknowledge, and reset single or multiple alarms
Object-oriented navigation to other application such as Plant Viewer and Log Viewer

Log Viewer (= Audit trail)

Log Viewer provides users with access to all events that have occurred within the system. Following event logs are reported:

- Alarms from the process level
- System events from the management level (Desigo Insight) and PX automation station
- User events such as authorized and unauthorized user log-in procedures, modification of values, parameters and setpoints

Object Viewer

This Viewer helps users to navigate efficiently through the entire structure. Each point and parameter can be easily accessed and viewed.

Report

Reporting is done with the InfoCenter software.
Reports can contain system activity as well as trend and alarm data
The InfoCenter has the following table and chart report objects for data analysis:

<u>Table objects</u>	<u>Chart objects</u>
Point Value	Scatter
Statistics	Comparison
System Activity	Bar
System Activity Summary	Column
Annotation Summary	Histogram
Alarm Summary	Pie
MKT	

Electronic signature functionality

Electronic signatures are only used with the PDF reports generated by InfoCenter Suite®. In order to sign the PDF reports Adobe Acrobat 6.0 or later is used. For more information refer to the guideline for use of Digital Signatures in InfoCenter (149-202EN_EU).

Alarm functionality

Number of alarm sets
max. 4 pro data point

Types of alarm

High alarms
High warnings
Low warnings
Low alarms

Alarm time delay

1 – 3600 s

Alarm visualization

Alarms are visualized on the screen and on the lamps (red and yellow)

	Special alarms General alarms like sensor fault, short circuits and open door
Communication	BACnet / IP Communication is via Ethernet with the international standard BACnet protocol.
Capacity	Internal hard disk 160 GB SSD External hard disk >100 GB The hardware is designed to allow for a minimum of 3 months of data logging in the databases. Data logging from: 36 sensors at 1-minute intervals
Memory check	Monitoring and alarming Monitoring interval: 2 minute Critical if below: 20 MB Warning if below: 100 MB Threshold limit: 2 MB

Optional extension modules

Option related to security:

- Alarm routing via pager, SMS, Fax, File and/ or email
- Uninterrupted power supply (UPS) – HPB10-UPS
- 5 port manageable Ethernet switch – HPB10-MES

Options related to the accessibility:

- Remote Desktop access
- WEB Operation via Internet Explorer
- Integration into the existing network
- Touch panel local operation – HPB10-TP
- Remote screen, keyboard and mouse for operation – HPB10-KVM
- Additional printer on the network
- Additional printer locally via USB
- Additional users

Options related to the usability

- Remote reporting with InfoCenter clients
- Additional customized reports
- Additional customized graphics
- Additional parameters
- Calibration management

Options related to compliance issues

- Integration of the particle counters to comply with Annex 1 of the EU GMP, e.g. PMS Airnet®, or Climet® using ModBus/IP or 4-20mA
- Standard design documents (URS, FS, SDS, CMP, FAT)
- Standard Verification check or customized to your project
- Execution of Verification check
- Standard Operating Procedures (SOP)

Options related to system expansion

- Additional I/O modules in the main CMT panel (HPB10.1)
- Remote panel with additional I/Os connected to main panel (CMTE.001)
- Remote autonomous panel with PXC controller and I/O modules (CMTE.002)

Dimensions

Dimensions in mm

