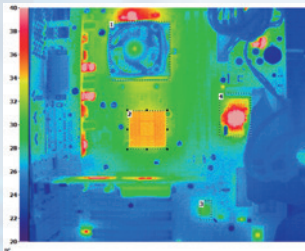# M|C|P|S 8

MULTI CHANNEL PROCESS SYSTEM

- ✓ ENERGY MONITORING E.G. FOR ISO 50001
- ✓ PHARMACEUTICALS / 21 CFR PART 11 COMPLIANT
- ✓ CLIENT / SERVER APPLICATIONS
- ✓ ALARM MONITORING
- ✓ BATCH CONTROL
- ✓ REPORTS

cad computer

ONE SOFTWARE - MANY SOLUTIONS

MCPS is a powerful Windows software for data acquisition and evaluation. The handling is very user-friendly, as all processes are simply configured and neither programming nor flowcharts are required. MCPS is therefore mainly managed by the end user and is found in all areas of industry. Thanks to its modular design, MCPS optimally adapts to your requirements and can be extended later as required, if measuring tasks change.

INNOVATIONS

- More modern user interface with new character set
- Remote access via clients to create, configure, start or stop projects, as well as batches via batch control window
- Print layout with typed output frames to print different types of data on a page (numerics, graphs, alarms, events and more)
- Lines, circles and rectangles with shadows and fill colors in the Print Layout Manager
- Standard comments for alarm confirmation
- Setup Editor for WAGO-PFC and Yokogawa-SmartDac also with /AS option
- Analysis of energy consumption
- Color change in historical trend display based on stored alarms

- Automatic device connection recovery for automatically suspended devices
- Direct zoom and unzoom function in offline graphics
- Solo window with matrix functionality (display of many channels in a window)
- Windows are aligned to a grid
- Driver for Graphtec-GL, Lufft-UMB, Greisinger-Easybus, OPC UA
- Weekly AutoFiles
- Additional display of the alarm limits in the graphic
- Undo functions for PMON and Print Layout Manager
- Keyboard control for numeric window
- Batch database with permanent filters and multiple signing (21 CFR Part 11)
- And many more

ONE PROJECT - MANY POSSIBILITIES

Measuring tasks are easily and quickly created in MCPS via a channel table (project). All desired channels are entered and configured accordingly. The project is the basis for all further operations such as data acquisition, storage, display and evaluation. This simplifies many operations and allows the management of more than 1000 measurement channels. A powerful group manager with any subgroup can manage the channels separately, so that a precise display is guaranteed even with a lot of channels.

MCPS is able to perform several independent measurements simultaneously. A corresponding number of projects is created to be started even at different times. As a result the data is managed separately depending on the application, system or building. The access rights of the users are controlled via the integrated user administration.

Settings for each measuring channel:
- Comment and tag name
- Curve color and markers
- Mathematical calculations with symbolic formulas
- 8 alarm levels with outputs, SMS or email
- Data Reduction
- Analog outputs
- 15 additional comment fields

Data visualization:
- Text, trend, bar and profile windows, analog instruments, matrix display
- 2 measuring cursors for displaying the current and differential values
- Absolute, relative, operating hours and X / Y display
- Freely definable window layouts
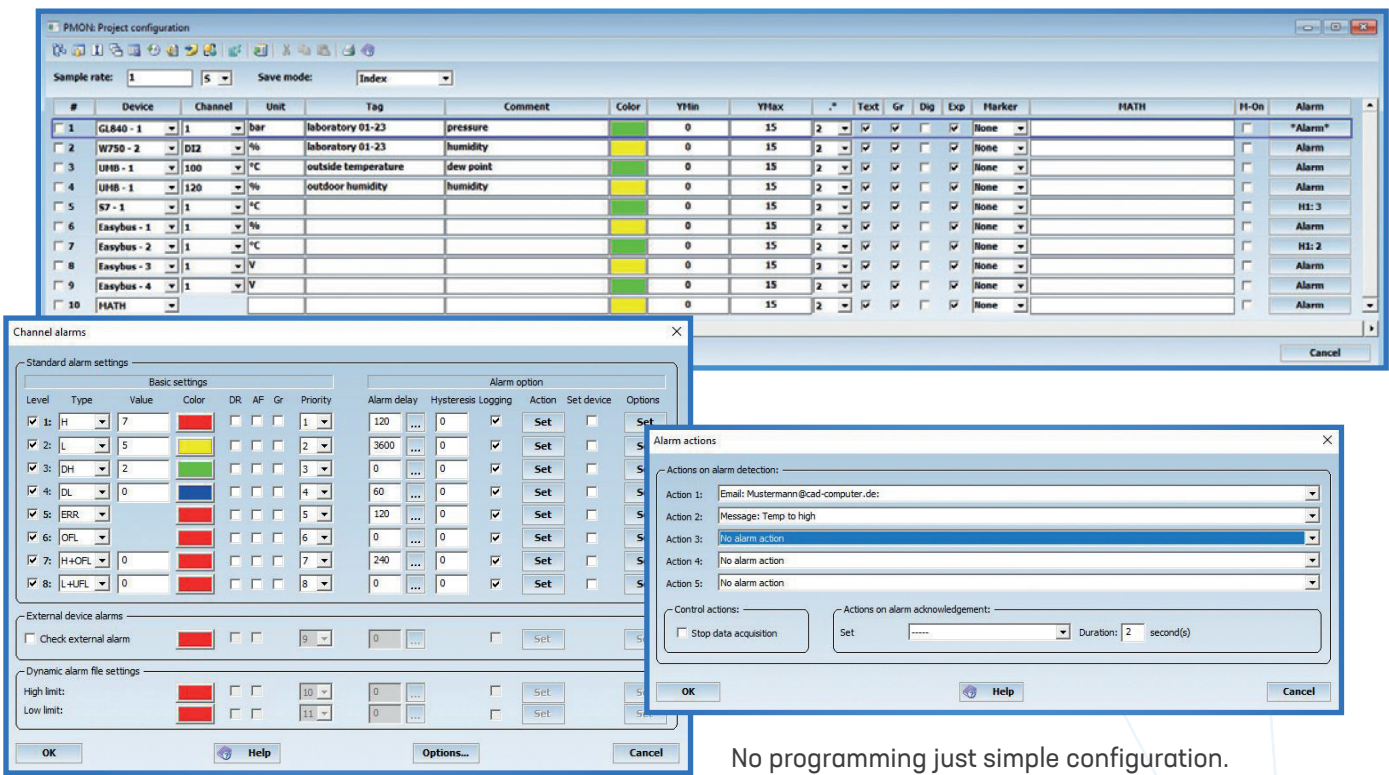
No programming just simple configuration.

ALARM MONITORING

Alarms and related actions are managed in MCPS using a comprehensive alarm management system. For each channel 8 independent alarm levels are available. Up to 5 alarm actions per level are available. This includes alarm messages which are displayed in the current alarm window, digital outputs as well as SMS and email transmission. Alarms must be confirmed, depending on the setting, a comment is to be entered by the user. If an info file is defined for an alarm event, a document icon appears in the alarm window in the Info column. With a mouse click, the corresponding PDF or Word file is opened with instructions for the user. All alarms can be stored and are available as a historical alarm list.
MCPS can synchronize alarms with the measuring devices. When changing the alarm values in the MCPS project, the new values are transferred to the measuring instruments so that a unique alarm monitoring is ensured by software and hardware.
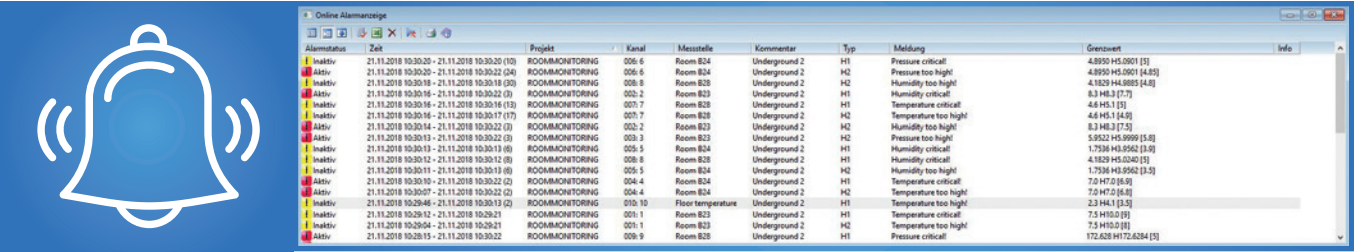
MATHEMATICAL FUNCTIONS

Mathematics is used in various functions to perform scaling, generate new mathematical channels, and compute statistics. In a simple symbolic form, formulas such as sin (x) + (x + 2) / 3 are entered in the project configuration. They are used to convert input values into engineering units (e.g. rescaling from 4-20mA to 0-50Pa). In all displays and outputs only the rescaled values appear. MCPS provides additional math channels to display calculated values such as multi-channel averaging. All channel settings (colors, comments, alarms …) are also available for these math channels.

Polynomial functions allow the linearization of more complex characteristics with up to 20 interpolation points. Non-linear components and sensors can be integrated in this way.

Statistical calculations are performed over any period of time. The historical data is analyzed and the result is exported or printed.

Zero measurements are made before or after a data acquisition to correct the input values over the detected offsets. It is possible to make multiple zero measurements for a project from which one is set active.

Math functions:
• Symbolic formulas
• + - * / ^, ln, log, exp, sqrt, abs, sin, cos, tan, asin….
• Totalizer and time integrator
• F-value calculations for sterilization processes
• Comparison functions
• Logical functions
• Moving average, min, max values per channel
• Min, max, averages across multiple channels
• Stability function (time window)
• Register
• Substitute values
• Zero values
• Standard deviation, mean kinetic temperature (MKT)
• Steam tables
• Thermodynamic calculations of refrigerants
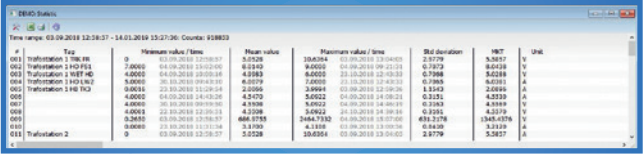
PROCESS VISUALIZATION AND CONTROL

The data from plants, rooms, test benches etc. can often be better visualized with graphical elements than with only numeric values. The MCPS process monitor is used to place various display elements such as digital values, analog displays, bars, LEDs and bitmaps at a fixed position on a page. Complex plant pictures or floor plans of a building are often used as background. MCPS manages multiple pages, easily selectable by buttons. Furthermore action buttons can be placed to set values, to switch outputs, to start and stop measurements or to generate reports. The process window is visible as full or partial screen.

PLC PROGRAM EDITOR

The PLC editor allows a user without special programming knowledge to create control tasks and to simply load them into a WAGO controller. Various basic logic functions, comparisons, PID controls, timers and flip-flops are available, which are easily linked via graphical elements. These control tasks are executed by the hardware completely independent from MCPS.
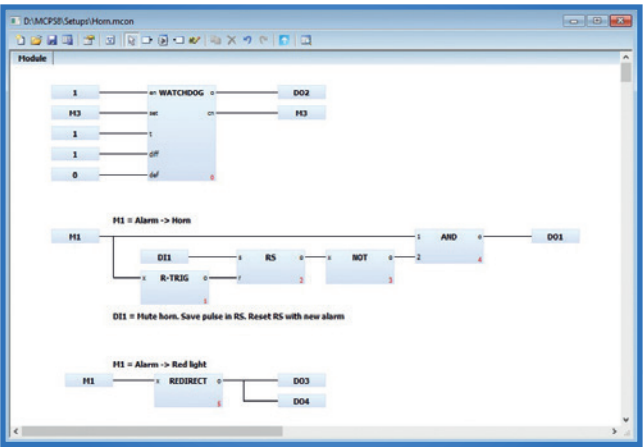
APPLICATIONS IN THE PHARMACEUTICAL AND FOOD INDUSTRY

21 CFR Part 11 Compliance has been achieved by MCPS for many years and is one reason why numerous well-known pharmaceutical companies worldwide use MCPS in a wide variety of applications. Values and alarms of temperature, humidity, pressure, particles, door contact and others are monitored for the following objects:

- Store rooms, climate chambers
- Clean rooms
- Sterilizers with F-value computation
- Ultrapure water
- Incubators
- Refrigerators
- Cryogenic systems
- Blood Banks
- Lyophilization, freeze-drying

21 CFR PART 11 COMPLIANCE

Pharmaceutical applications require a qualified data acquisition system that meets FDA 21 CFR Part 11 and ANNEX 11 requirements. MCPS meets these requirements and is validated worldwide in many pharmaceutical companies:

- Extensive user management with password history
- Audit Trail for logging user actions
- Tamper-resistant files (Electronic Records)
- Electronic Signature
- Automatic filling of missing data (GAPFilling)

REPORTING

MCPS creates manual and automatic reports. For this purpose, so-called individual print layouts are defined, which are reused with every printout. Trends, statistics and alarms can be printed with different layouts. Each print layout contains individual texts and bitmaps like company logos. In the multi frame mode, different sources are combined on one page, so that graph, alarm and statistics can be directly compared. Various control codes in the text serve as placeholders for existing information, such as project name, date, start and stop time or batch information. Reports are output automatically according to a scheduler. In addition, there is an interface to Excel that transfers measured values and special evaluations directly into an existing Excel sheet. The script language integrated in MCPS allows any analysis of the measurement data.
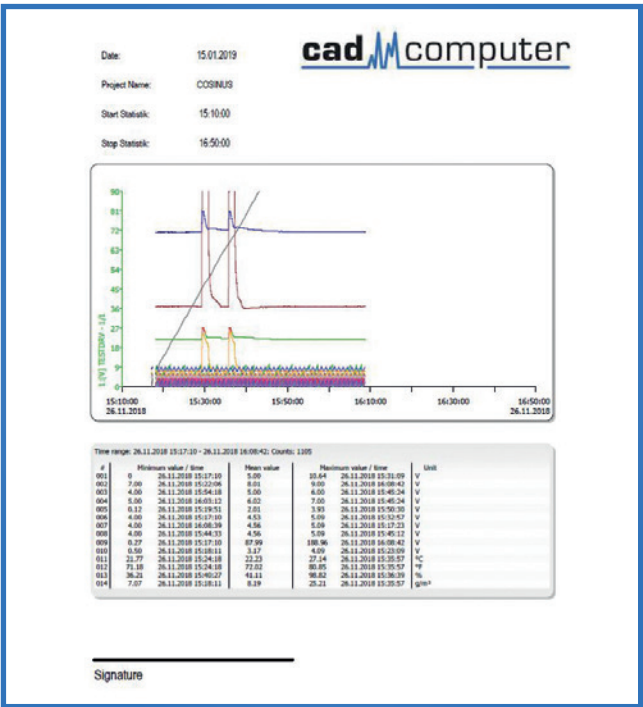

BATCH AND BATCH MANAGEMENT

Lot numbers, batches and batch names are used in time-limited and automated processes and are stored in MCPS with the corresponding measurement data. The MCPS Batch Manager provides a user-friendly interface for different types of monitoring units such as autoclaves, climatic chambers, ovens and sterilizers. An application dependent input mask is used to parameterize and control the process. When starting a new batch, the input of various batch information, such as serial number, client and lot number is possible. These fields are freely configurable. The information entered is displayed in the corresponding batch window and saved in the batch database after the batch has been finished. This database displays all measurements and the entered information. It also allows searching for any data records. So you can search for a serial or order number or filter out all measurements of a time range.

The takeover of the batch information as well as start and stop need not be done manually, but is also triggered from external via digital inputs, OPC, script, PLC or touch panel. The batch manager is able to work without user interaction.

Batch manager with 4 autoclaves (see image below). If another batch is to be started, the <Batch> key is pressed in the corresponding control window. The input field (New batch) appears and the user enters the information for the next measurement. Then the start button is pressed and the batch is running. After completing the measurement, the batch is displayed on the right in the database tree. The information field underneath shows the batch information of the selected batch. Even during the measurement, batch information can still be entered or changed.
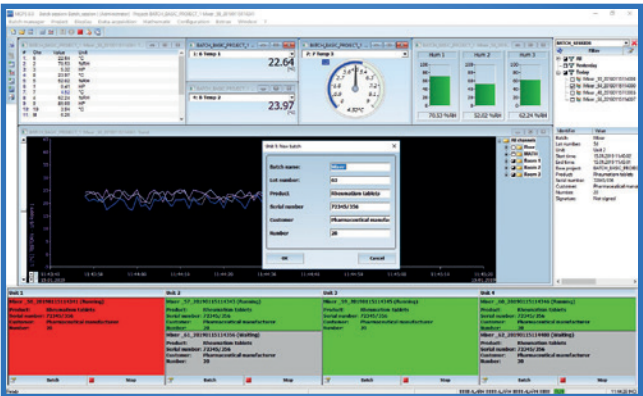
CLIENT SERVER OPERATION

Network capability and deployment in virtual environments are supported by the MCPS client-server concept. Clients have the same interface as the measuring computers and thus offer the same evaluation options. In addition, current measured values, alarms and system messages are forwarded to the clients and visualized online. Alarms with comments can be confirmed at the client. A common user administration and audit trail complete the system. Even the client is able to create projects and start or stop the measurements or batches.

SCRIPT LANGUAGE

VB script is integrated in the MCPS and allows a very flexible adaptation to the requirements of special applications. Both in the control area and in the reporting, individual solutions are possible:

• Any analysis of historical data for reports
• Access to Excel spreadsheets for reading and writing
• Test sequences with several steps
• Setting digital and analog outputs
• Dynamic page creation in the web browser (ASP)

INFRARED MEASUREMENT

Thermography is becoming increasingly popular and cheaper to analyze surfaces or moving parts more accurately. MCPS supports various infrared cameras and pyrometers for non-contact temperature measurement. In addition to the infrared images, it is possible to define zones that provide min, max, or averages of all contained temperature points. These are available in MCPS as normal measurement channels, such as those of a data logger to be recorded in parallel to other channels. Thus, not only the warming of an engine can be seen, but also corresponding relationships such as speed or power consumption coming from other devices.

WEB SERVER

MCPS includes its own web server for data visualization and control. Texts, measured values, LEDs, trends, analog displays, switches and bitmaps are visualized with other web content. Dynamic page layout is also possible as well as the control of MCPS by external switches or other input elements. Ideal suited for additional display monitors, smartphones or touch panels.
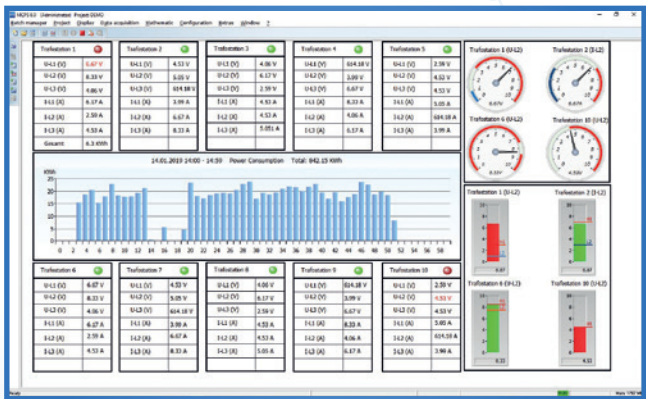
RESOURCES MONITORING

ISO 50001 and other standards will decisively influence our future. Sustainability, energy saving and significantly lower consumption of environmental resources are important goals that need to be monitored accordingly. In order to identify optimization possibilities and to be able to evaluate corresponding results, the valid standards require a long-term monitoring of the different energies and resources. MCPS is ideally suited to carry out this task and to create appropriate evaluations and reviews.
Due to the wide range of device support it is possible to combine completely different measurement data such as energy and process data.

For example if ambient temperatures or machine running times should also be taken into account in the overall assessment. The following sources are typically recorded:

• Electrical energy
• Electrical power
• Gas
• Water
• Compressed air
• Steam
• Temperature
• Running time

AUTOMATED TEST STANDS

Automating test benches and test systems require a high degree of flexibility and openness. With MCPS test sequences are partially or fully automated including various test steps, user inputs, individual and final reports. MCPS not only serves as a measurement data acquisition system, but can also independently control digital outputs, relays or analog outputs of different measurement hardware. With the concept of MCPS it is possible to perform important tasks on the hardware (control, emergency shutdown or others) while the step

control, parameterization and visualization is done by MCPS:

• Several different test steps
• Reports for each test step or overall report
• Pattern functions on analog outputs
• Multiple independent test units simultaneously
• Integration of existing controllers
• Review Management in batch database
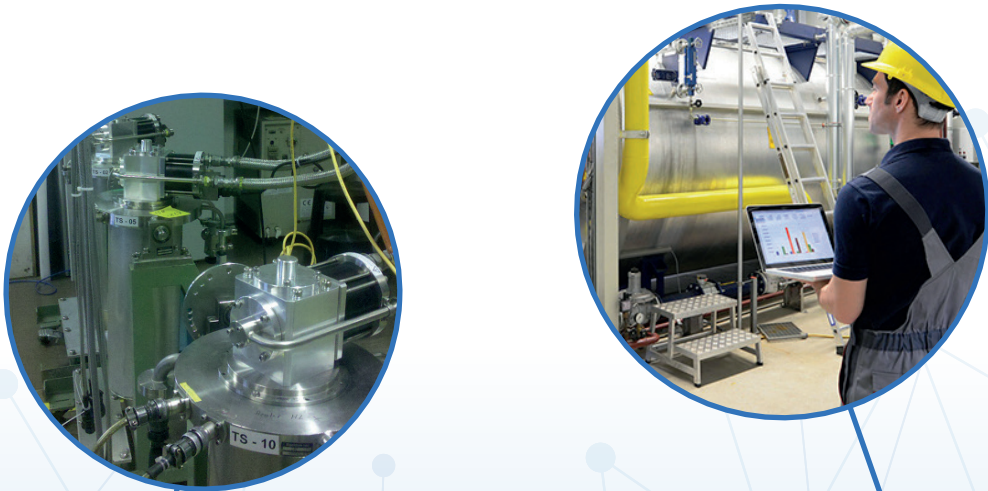
OVERVIEW OF INDUSTRIAL APPLICATIONS

- Pharmaceutical industry (clean rooms, incubators, sterilizers, refrigerators, ultrapure water ...)
- Energy efficiency (ISO 50001, electricity, water, gas, compressed air consumption)
- Test benches and quality assurance (cold heads, generators ...)
- Water and wastewater (pH, oxygen content, cargo value ...)
- Testing and certification centers (TÜV, VDE, LGA, Eurofins ...)
- Power plants (start-up, efficiency and mass flow calculations)
- Automotive industry
- Railway technology (weather test, track laying)

- Environmental technology (emission control, pollution levels)
- Turbine and generator construction
- Computer Technology
- Refrigeration (freezing technology, cryogenic system, vehicle refrigerating machines)
- Nuclear Technology
- Food industry (ice cream, yoghurt ...)
- Deep wells (oil, geothermal, WITS communication)
- Colleges and universities
- Production (glass wool, steel, silicon wafers, bulbs, tablets, tires, plastics, elevators ...)
- Research and development (biotechnology, aerospace, cooling systems, materials ...)

WWW.CAD-COMPUTER.DE

MCPS is available in GERMAN and in ENGLISH. System requirements, technical specifications and downloads are available at **www.mcps.de**.

WEB demo: We would be pleased to present you MCPS live over the Internet. All you need is a web browser. There are no components to install. Thus, a targeted personal demonstration is possible at any time.

DRIVERS

- Advantech
- ASCII
- Fluke
- Greisinger
- Keithley
- Modbus (TCP/RTU)
- Optris
- Rotronic
- WAGO
etc.

- Agilent
- Eurotherm Chessell
- Gantner
- Graphtec
- LUFFT
- OPC DA & UA
- Rigol
- Siemens
- Yokogawa

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